COUNTY OF CANYON

INVITATION FOR BIDS (IFB)

Installation of Gas Collection System and Flare Station Components Project

Issued By:

BOARD OF COUNTY COMMISSIONERS

Submit Bids to:
Board of County Commissioners
1115 Albany Street
Caldwell, Idaho 83605
Telephone: (208) 454-7507
Facsimile: (208) 454-7336
bocc@canyoncounty.id.gov

Bids must be received by: 9:29 a.m., March 30, 2023

Return in a sealed envelope marked:
"Invitation for Bids for the Installation of Gas Collection System and Flare Station Components Project"

Bids received after said time/date will be returned unopened.

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I. INTRODUCTION

A. Notice

Pursuant to Idaho Code section 67-2805(2)(a), Canyon County hereby invites bids from contractors for the Installation of Gas Collection and Control System Components Project.

The work contemplated by this IFB will take place at Pickles Butte Landfill, 15500 Missouri Avenue, Nampa, Idaho 83686 and consists of construction outlined in the technical specifications and scope of work, affixed hereto as Exhibit 1 and drawings/design set, affixed hereto as Exhibit 2 prepared by Tetra Tech, Inc. and incorporated by reference. This IFB does not include work to be performed by a third-party electrical subcontractor, which will be negotiated under a separate contract.

This IFB also serves as a tool to formalize negotiations to enter into a Construction Contract with the chosen provider, if any.

YOU MUST CAREFULLY READ THIS IFB AND MUST FOLLOW THE INSTRUCTIONS IN IT. YOUR FAILURE TO READ AND CAREFULLY FOLLOW THE INSTRUCTIONS MAY CAUSE THE COUNTY TO REJECT YOUR BID. THE TERMS OF THIS IFB WILL TAKE PRECEDENCE OVER CONTRADICTORY INFORMATION IN ANY EXHIBIT. QUESTIONS RELATED TO ANY INADVERTENT CONTRADICTIONS IN THESE MATERIALS CAN BE SUBMITTED WITH OTHER QUESTIONS OR OBJECTIONS PER THE SCHEDULE OF EVENTS UNDER SECTION II.A.

Contractor selection will be based on the contractor's response to this IFB and the contractor's ability in that response to demonstrate its capabilities to meet the defined objectives of Canyon County. Each bid will be evaluated to determine the qualified bidder submitting the lowest bid price complying with the bidding procedures and meeting the specifications. The County may consider, but is not necessarily limited to, the following factors:

- Responsiveness to the IFB requirements, including proof of appropriate public works licensure;
- Compliance with the administrative requirements of the bidding process;
- The number and scope of conditions attached to the bid;
- Cost.

The following information must be submitted as part of your bid:

- Bid Bond;
- Completed Bid Form.

B. Goals

Time is of the essence in this Project. The County's goals for this Project include:

- Rapid initiation and timely completion of construction per technical specifications and drawings;
- Quality of construction;
- Minimization of disruption and inconvenience to current County operations and the public;
- Best value delivery of the Project; and
- Project completion date before December 31, 2023.

C. Contact

The Project is being directed on behalf of the Canyon County Commissioners by:

David Loper, Director
Canyon County Solid Waste Department
15500 Missouri Avenue
Nampa, Idaho 83686
david.loper@canyoncounty.id.gov

With the exception of official public written communication as described below, Prospective Bidders are prohibited from soliciting or receiving any advice or discussing any aspect relating to the Project or the procurement of the Contract with any person employed by or affiliated with Canyon County.

D. General Project Requirements

This IFB contains the instructions governing the requirements for bids to be submitted by interested contractors, the materials to be included therein, the requirements that must be met, and the contractor's responsibilities before and after delivery.

Canyon County expects the selected contractor, if any, to provide all necessary labor, travel and subsistence, home and field office expenses, equipment, taxes, overhead and profit, and all associated costs to provide the requested construction services.

The contractor will be responsible for identifying and complying with all local, state and federal applicable regulations, codes, statutes, etc., and shall implement the Project work accordingly.

The contractor will develop a Master Schedule to provide a detailed project sequence and timeline. The Master Schedule shall include probable costs, divided into finite task descriptions

in sufficient detail to be used by the County to authorize defined tasks as the project proceeds. Authorization for each task must be provided by the County before any work is conducted on such task.

II. IFB PROCESS

A. Schedule of Events

The following is a schedule of events concerning the bid process:

1. Signing and Distribution of the IFB ..... 9:00 a.m. February 23, 2023
2. Publication Dates ..... February 28 and March 7, 2023
3. Pre-bid conference at Pickles Butte ..... 10:00 a.m., March 13, 2023
4. Questions/Clarifications Due ..... 9:00 a.m. March 16, 2023
5. Objections to Requirements, Standards, Specifications or Process Due ..... 9:00 a.m. March 16, 2023
6. Addendum No. 1 ..... 9:30 a.m. March 28, 2023
7. Bid Due Date ..... 9:29 a.m. March 30, 2023
8. Bid Opening ..... 9:30 a.m. March 30, 2023
9. Notice of Intent to Award Bid ..... 9:30 a.m. April 6, 2023
10. Board Award of Contract(s) (*Tentative*) ..... 9:30 a.m., April 13, 2023

B. Time

All references to the hours of day shall refer to Caldwell, Idaho time.

C. Pre-Bid Conference

A mandatory pre-bid conference will be held at Pickles Butte Landfill, 15500 Missouri Avenue, Nampa, Idaho 83686 at **10:00 a.m. on March 13, 2023**. Bidders can also attend the conference by calling (208) 454-7599, Conference ID 50177#. Bidders will be afforded the opportunity to meet with County personnel and discuss the content of the IFB in further detail.

D. Questions/Clarifications/Objections to IFB

Questions, requests for clarification, and objections relating to the IFB or the IFB process will be considered only if they are submitted in writing and received by the Clerk of the Board of County Commissioners no later than **9:00 a.m. on March 16, 2023.**

Questions, clarifications, and objections should be sent to Clerk of the Board of County Commissioners by U.S. Mail to 1115 Albany Street, Caldwell, Idaho 83605, or by email to BOCC@canyoncounty.id.gov.

Bidders are responsible to ensure all questions are timely received.

No verbal responses will be binding on the County or the Bidder. This IFB may be amended in writing to include the questions, clarifications, and objections submitted to the County and the County's response thereto.

E. Submittal Procedure

Sealed bids submitted pursuant to this IFB must be received by the Office of the Board of County Commissioners, Canyon County Courthouse, 1115 Albany Street, Caldwell, Idaho 83605, no later than **9:29 a.m. on March 30, 2023.** Two (2) hard/paper copies must be supplied at the time of submittal. No facsimile copies will be accepted. Late bids will not be accepted, opened, or considered.

The County will only consider bids submitted on the Contractor's Bid Form, affixed hereto as "Exhibit 3" and incorporated by reference.

F. IFB Preparation Costs

Costs for developing bids pursuant to this IFB are entirely the responsibility of the Bidder and shall not be chargeable to the County.

G. Bid Bond

All bids must be accompanied by bid security in the form of certified check, cash, cashier's check, and/or bid bond made payable to Canyon County, certified check made payable to Canyon County, or bid bond executed by a qualified surety company, made payable to Canyon County, in an amount equal to five percent (5%) of the bid amount.

H. Acceptance and Rejection of Bids

The County reserves the right:

- To reject any or all bids, or any part thereof.
- To waive any minor defects in the bids if this is to the advantage of the County.
- To accept the bid or bids that are in the best interest of the County.

The County's decision shall be final. The County's waiver of a minor defect shall in no way modify the IFB document or excuse the Bidder from full compliance with its specifications if the Bidder is awarded the Contract. The County reserves the right to let separate contracts on any aspect of the work.

Bids which contain false or misleading statements, or which provide references which do not support an attribute or condition claimed by the Bidder, may be rejected. If, in the opinion of the County, such information was intended to mislead the County in its evaluation of the bid, the bid shall be rejected.

III. REVIEW PROCESS

A. Validation Against Requirements

All bids submitted will be checked in detail for compliance with the mandatory requirements set forth in this IFB.

During the validation process, the County may find it necessary to request additional information from the Bidder.

B. Correction of Errors

If errors are found in a bid, the County may reject the bid. However, the County may, at its sole option, correct arithmetic or transposition errors on the basis that the lowest level of detail will prevail in any discrepancy.

In the event of a discrepancy between the quantities cited in the narrative description and proposed Contract quantities and information submitted for evaluation purposes, the quantities cited in the narrative shall govern the quantities and summarization shall be recomputed accordingly.

C. Selection

Subject to the provisions contained in this IFB, the County intends to award a contract to the Bidder meeting the specifications of this IFB and in accordance with the evaluation process contained herein and whose bid complies with all the requirements of this IFB and Idaho law.

The County reserves the right to make an award without further negotiations with the apparent successful Bidder. Therefore, bids should be submitted with the most favorable terms the Bidder can offer.

Bids should reflect the terms under which the Bidder is prepared to meet the requirements of this IFB. After announcement of the successful Bidder, there will be no negotiation of the terms of this IFB, or the Bidder's submitted bid which will with the contract collectively comprise the terms of the agreement between the County and the successful Bidder. Any attempt by the successful Bidder to negotiate any of the terms described in Section IV, below will be considered a repudiation of the award. The County will then select the bid, if any, which next closely meets the requirements of this IFB.

D. Award of Contract

The successful Bidder will be selected based upon the bid which complies with all the requirements of this IFB, any addenda thereto, and any additional IFB documents, except for such immaterial deviations as may be waived by the County, and Idaho law. Written notification of the selection will be made to all Bidders who submitted a bid prior to final award of contract. If the County intends to award the contract to a bidder other than the apparent low bidder, an opportunity to object will be noticed. Time is of the essence in the administration of this IFB and subsequent initiation and performance under the resulting contract, if any.

If the successful Bidder refuses or fails to execute the Contract, the County may award the Contract to the next lowest responsible Bidder, if any, whose bid complies with all the requirements of this IFB and any addenda thereto. The period of time within which such award of Contract may be made shall be subject to written agreement between the County and the Bidder concerned. The County may reject all bids and re-bid.

E. Objection to Contractor Award

The County intends to award the Contract to the licensed public works contractor submitting the lowest bid price, complying with the bidding procedures. If the County chooses to award the contract to a Bidder other than the apparent low bidder, notice and opportunity to object shall be provided all bidders.

IV. GENERAL TERMS AND CONDITIONS

The evaluation of bids submitted in response to this IFB may result in the issuance of a contract. No work is authorized by this IFB to any person or firm until a final contract is approved and executed by both the County and the Contractor.

Should a contract be offered and executed, its General Terms and Conditions will include, but be not limited to, the following:

A. Performance Bond/Payment Bond

The County requires a performance and payment bond, each in full contracted amount, for the protection of persons supplying labor or materials, or renting leasing or otherwise supplying equipment to the Contractor or his Subcontractor in the prosecution of the work provided for in the Contract, and to guarantee satisfactory completion of the Project.

The successful Bidder shall furnish the performance bond and the payment bond to the County at the time the Contract is executed. Performance and payment bonds shall not be a substitute for any other form of insurance that may be required.

B. Insurance

The Bidder shall maintain the following Insurance at all times this Contract is in effect and for the stated periods after final completion of the Project:

1. Workers' Compensation insurance meeting the statutory requirements of the state of Idaho.

2. Employers' Liability insurance providing limits of liability in the following amounts:

Bodily Injury by Accident:	$100,000 each accident
Bodily Injury by Disease:	$500,000 policy limit
Bodily Injury by Disease:	$100,000 each employee

3. Commercial General Liability insurance providing limits of liability in the following amounts, with aggregates applying separately on a "per project" basis:

General Aggregate:	$2,000,000
Product/Completed Operations Aggregate:	$2,000,000
Personal & Advertising Injury Liability:	$1,000,000
Per Occurrence:	$1,000,000
Fire Legal Liability:	$ 50,000

The Commercial General Liability ("CGL") insurance policy shall be written on an "Occurrence" form and shall cover liability arising from premises, operations, independent contractors, products, completed operations, personal injury, advertising injury, and liability assumed under an insured contract (including tort liability of another assumed in a contract). Canyon County and its elected officials, agents, employees, successors and assigns shall be included as Additional Insureds under the CGL with the Additional Insured endorsement providing coverage for Completed Operations.

4. Business Automobile Liability insurance providing bodily injury and property damage liability coverage for not less than $1,000,000 each accident limit. Business Automobile Liability insurance shall be written on a standard ISO policy form, or an equivalent form, providing coverage for liability arising out of owned, hired, or non-owned vehicles in connection with this Contract.

Each of Bidder's subcontractors and suppliers shall procure and maintain equivalent insurance coverage as described in subparagraphs 1 through 4 above and certificates evidencing such coverage must be presented to Canyon County before the subcontractors or suppliers are permitted on the site of the project. If subcontractors do not have the required insurance, Bidder's policies must provide equivalent coverage for the subcontractors and their work.

C. Warranty Against Contingent Fees

The Bidder will agree to warrant that no person or selling agency has been employed or retained to solicit this Contract upon an agreement of understanding for commission, percentage, brokerage, or contingency except bona fide employees or selling agents maintained by the Bidder to secure business.

D. Bidder Personnel

The County may request replacement or deny access of any Bidder personnel believed unable to carry out the responsibilities of the Contract, or unsuitable for working within the environment.

E. Bidder's Cooperation

The Bidder shall, at all times, observe and comply with all federal, state, local and municipal laws, ordinances, rules, and regulations in any way affecting the Contract, or the work performed under the Contract.

F. Warranties/Guarantees Against Defects

Bidder will guarantee that all material and labor (provided by Bidder as part of this IFB Response) shall be free of defects in material and/or workmanship for at least two (2) years after County's acceptance of the work. Canyon County shall be the sole decider on work acceptance.

G. Licenses

Bidder must possess a valid Idaho Public Works Contractor's License at the appropriate level by the time of contract execution and a valid Idaho Bureau of Occupational License.

H. County Claim and Payment Procedure

All claims for services rendered under any contract executed with a selected Bidder shall be sent directly to the Canyon County Board of Commissioners, with a copy to Director David Loper, for processing. Claims shall be paid in accordance with the provisions of the Contract attached as "Exhibit 4", incorporated by reference herein.

I. Non-Appropriation

Subject to the County's determination to annually renew any contract, the County will duly and punctually pay the amounts to satisfy its obligation required under the Contract, recognizing time is of the essence. The County may, solely at its option and in compliance with Article 8 Section 3 of the Idaho Constitution, and when and if it duly budgets and appropriates funds thereof from revenues legally available to it for the ensuing fiscal year, renew the Contract for an additional renewal term, as provided under the conditions of the IFB.

J. Indemnity

Bidder shall indemnify, defend and hold harmless Canyon County, and its officers and employees from and against any liability, claims, damages, lawsuits, expenses or actions, including reasonable attorney fees, covered by or arising out of the performance, act or omission of any term under this IFB or arising out of a failure to comply with federal, state or local laws or regulations.

K. General Information

As specified in the Contract documents, a failure to complete the work shall result in liquidated damages of Five Hundred Dollars ($500.00) per calendar day per phase or area until substantially completed as described in the contract documents.

Contract shall be subject to termination because of County's non-appropriation of funds.

If the Bidder believes that other changes would be beneficial to the County, they may include this information in their bid. However, any Bidder doing so should be sure to include a price based only on the requirements of this IFB with any additional or lesser price also shown.

L. Acceptance of Work

Work shall be considered accepted when contractor and County have finalized inspection of work and all items on final punch list have been completed.

M. System Completion

Bidder will provide the amount of time needed to complete this project.

Work shall be completed within the maximum calendar days specified by Bidder on the Bid form commencing on day of Contract execution.

N. Permits and Inspection

The successful Bidder is otherwise responsible to apply for and obtain all permits and inspections necessary to complete the project.

O. Termination by County for Convenience

The County may, for any reason whatsoever, or without reason, terminate performance under the Agreement by Contractor for convenience. County shall give at least thirty (30) days prior written notice of such termination to Contractor specifying when termination becomes effective. Contractor shall stop work at the time of such Notice. When terminated for the County's convenience, Contractor shall be compensated as follows:

1. That portion of the Fixed Contract Price representing the value of the Work, as reflected on the schedule of values, performed by Contractor prior to the date of termination, which is completed and accepted by the County for which Contractor has not been previously paid;

2. In no event shall Bidder be entitled to recover anticipated profits or consequential damages from the County on account of a termination for convenience or erroneous termination for cause.

V. PROJECT SPECIFICATIONS, DRAWINGS AND PLANS

The responsibility of the successful Bidder shall include performance of construction per the following:

1. Exhibit 1: Tetra Tech, Inc.'s Technical Specifications for Gas Collection System Improvements and Flare Station; and
2. Exhibit 2: Tetra Tech, Inc.'s Drawings/Design Set for Gas Collection System Improvements and Flare Station.

VI. CONCLUSION

Thank you for your interest in this important project.

APPROVED this 23rd day of February, 2023.

CANYON COUNTY BOARD OF COMMISSIONERS

✓ Motion Carried Unanimously
_____ Motion Carried/Split Vote Below
_____ Motion Defeated/Split Vote Below

	Yes	No	Did Not Vote
_____ Commissioner Leslie Van Beek	_____	_____	_____
Brad Holton Commissioner Brad Holton	X	_____	_____
_____ Commissioner Zach Brooks	X	_____	_____

ATTEST: CHRIS YAMAMOTO, CLERK

By: Jenen Ross
Deputy Clerk

EXHIBIT LIST

Exhibit 1: Tetra Tech, Inc.'s Technical Specifications

Exhibit 2: Tetra Tech, Inc.'s Drawings/Design Set

Exhibit 3: Contractor's Bid Form

Exhibit 4: Draft Construction Contract

TECHNICAL SPECIFICATIONS

FOR THE

Gas Collection System Improvements and Flare Station

AT THE PICKLES BUTTE SANITARY LANDFILL

Tetra Tech, Inc.
3380 Americana Terrace, Suite 201
Boise, Idaho 83706

Recommended/Approved by:

Maureen A. McGraw, P.E.

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Pickles Butte Sanitary Landfill Gas Collection Ssytem Improvements and Flare Station
Bid Schedule
Prepared By: Tetra Tech
January 2023

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	Site Work/Grading				
1	Mobilization/Demobilization	1	LS		$ -
2	Clearing and Grubbing	1	LS		$ -
3	Grading and Earthwork	1	LS		$ -
4	Trenching and Backfilling - Piping, Sumps, and Electrical Conduits	1	LS		$ -
5	AC Pavement - Sawcut & Replacement, Match Existing	1	LS		$ -
6	Concrete Sidewalk - Sawcut & Replacement, Match Existing	1	LS		$ -
7	Surveying	1	LS		$ -
	Mechanical/Piping				
8	Landfill Gas Monitoring Probe Drilling Per Foot (per 2/C-501) (OPTIONAL)	1,204	LF		$ -
9	Landfill Gas Monitoring Probe Completion Per Foot (per 2/C-501) (OPTIONAL)	1,204	LF		$ -
10	2-Inch QED ORP215 Vertical Wellhead - Materials and Installation (per 1/C-506)	45	EA		$ -
11	2-Inch QED ORP215HL Horizontal Wellhead - Materials and Installation (per 2/C-506)	1	EA		$ -
12	Condensate Sump #1 (Purchased by County), ancillary items and instrumentation - Materials and Installation (per 1/C502)	1	EA		$ -
13	Condensate Sump #2 - #5 (Purchased by County), ancillary items and instrumentation - Materials and Installation (per 1/C503)	4	EA		$ -
14	1 1/2-Inch HDPE SDR-9 Solid Pipe and Fittings, Compressed Air - Materials and Installation - Below-Grade (per 4/C-504)	8,700	LF		$ -
15	2-Inch HDPE SDR-11 Solid Pipe and Fittings, Condensate/Gas - Materials and Installation - Below-Grade (per 4/C-504)	9,020	LF		$ -
16	4-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 6/C-504)	9,650	LF		$ -
17	8-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 6/C-504)	480	LF		$ -
18	10-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 4/C-504)	11,360	LF		$ -
19	10-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Above-Grade	40	LF		$ -
20	10-Inch HDPE Flange Adapter, D.I. Back-Up Ring, Gasket, and Bolt Kit - Materials and Installation	36	EA		$ -
21	10-Inch Butterfly Valve, Gear Operated - Materials, Installation and Assembly - Below-Grade (per 2/C-504)	6	EA		$ -
22	10-Inch Butterfly Valve, Gear Operated - Materials, Installation and Assembly - Above-Grade (per 3/C-504)	2	EA		$ -
23	10-Inch HDPE Valve Spacer - Materials and Installation	16	EA		$ -
24	2-Inch Butterfly Valve with 6-foot Valve Extension - Materials and Installation	1	EA		$ -
25	18-Inch Corrugate Steel Pipe (CSP) Road Crossing Sleeve - Materials and Installation	400	LF		$ -
26	12-Inch CSP Road Crossing Sleeve - Materials and Installation (per 5/C-504)	100	LF		$ -
27	12-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Above-Grade	40	LF		$ -
28	Bollard Per 1/C-504 - Materials and Installation	32	EA		$ -
29	Manifold #1 Per 1/C-505 - Materials and Installation	1	EA		$ -
30	Manifold #2 Per 1/C-507 - Materials and Installation	1	EA		$ -
31	Manifold #3,#4 and #5 Per 1/C508 - Materials and Installation	3	EA		$ -
32	Miscellaneous Fittings and Materials - Materials and Installation	1	LS		$ -
	Flare Assembly				
33	Gas Handling Skid and Flare Assembly including Skid Mounted Condensate Knock Out/Filter (Purchased by County), Flare Stack (Purchased by County), Pilot System, Gauges, Switches, Transmitters, Valves, Control Panel, Ancillary Items and Instrumentation - Materials and Installation per D-601, M-101, and M-102	1	LS		$ -
34	Compressor World (or Equal) Compressor System (Purchased by County) with Rotary Screw Compressors, Receiver, Desiccant Dryer, Pre & Post Filtration, Isolation Valve, Control Panel, Oil/Water Separator, Steel Housing Container, Ancilliary Items and Instrumentation - Materials and Installation	1	LS		$ -
35	5-Gallon Propane Bottle (Pilot Fuel) - Materials and Installation	2	EA		$ -
36	1/2-Inch SCH 40 Black Iron Pipe and Fittings (Paint Red) - Materials and Installation	1	LS		$ -
37	1/2-Inch SCH 40 Carbon Steel Pipe and Fittings (Galvanized) - Materials and Installation	1	LS		$ -
38	PEI Insulation - Installation Only	1	LS		$ -
	Structural				
39	Equipment/Flare Foundation Per 1/S-101 - Materials and Installation	1	LS		$ -
40	Condensate Pump Foundation Per 2/S-101 - Materials and Installation	1	LS		$ -
41	Pipe Anchor Per 2/M-501 - Materials and Installation	3	EA		$ -
42	Pipe Support Per 1/M-501 - Materials and Installation	1	EA		$ -
43	12-Inch Pipe Support and Footing Per 9/C-504 (Purchased by County) - Materials and Installation	3	EA		$ -
44	12-Inch Circular Concrete Vault, Traffic Rated - Materials and Installation	5	EA		$ -
45	Anchor Bolts for 8" Utility Flare Assembly Per 2/S-501 - Materials and Installation	1	LS		$ -
46	Pipe Rack Per 3/M-103 - Materials and Installation	1	EA		$ -
	Condensate Tank				$ -
47	10,000 Gallon Double Wall Condensate Storage Tank (Purchased by County), Piping, Pumps, GAC, Vaults, Solar Panel, Heat Trace/Insulation, and Ancillary Items - Materials and Installation per 1/M-103 and 2/M-103	1	LS		$ -
				TOTAL	

LS	Lump Sum
LF	Linear Foot
VF	Vertical Foot
EA	Each
SDR	Standard Dimension Ratio
HDPE	High Density Polyethylene

SECTION 00 73 19
HEALTH AND SAFETY CONSIDERATIONS

PART 1 - GENERAL

1.1 Section Includes

A. Preparing project site specific health and safety plan.

B. Implementing project site specific health and safety plan.

1.2 Other

A. The exact nature of materials and wastes disposed of at the landfill is unknown. The possibility exists of encountering gases and/or other substances during the Work that may be potentially hazardous to the safety and health of personnel, especially those working in the vicinity of open excavations and pipes venting gases.

B. The CONTRACTOR is advised that decomposing refuse produces landfill gas which is approximately 50 percent methane (natural gas) by volume. Landfill gas is colorless, can be odorless, may contain hydrogen sulfide, toxic or hazardous material, is combustible, and may contain no oxygen. Landfill gas can also migrate through several thousand feet of soil adjacent to landfills. The CONTRACTOR is therefore advised of the need for precautions against fire, explosion and asphyxiation when working on the landfill and in or near excavations on the project site.

1.3 Submittals

A. CONTRACTOR shall submit with bid documents, a general Health, and Safety Plan to the OWNER, for informational purposes only.

B. CONTRACTOR shall submit, after Notice to Proceed but prior to pre-construction meeting, a Site-Specific Health & Safety Plan to be approved by OWNER (See Section 01 33 00). Acceptance of the plan by the OWNER does not release the CONTRACTOR of liability in the event of an accident or injury, nor does it place any liability on the OWNER.

C. Submittals may be completed electronically.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 Construction

A. CONTRACTOR shall be solely and completely responsible for initiating, maintaining,

and supervising all safety precautions and programs in connection with the Work. Take all necessary precautions for the safety of and provide the necessary protection to prevent injury or loss to all CONTRACTOR'S employees.

B. CONTRACTOR shall comply with all applicable Idaho Occupational Safety and Health Agency (OSHA) regulations. The CONTRACTOR'S Health and Safety Plan does not supersede or in any way relieve the CONTRACTOR of obligations under any applicable OSHA regulations including (but not limited to) 29 CFR 1910: Occupational Safety and Health Standards and 29 CFR 1926: Health and Safety Regulations for Construction.

C. CONTRACTOR shall be responsible for ensuring that all Subcontractors abide with the contents of this section.

D. CONTRACTOR shall become familiar with potential hazardous health and safety conditions and risks associated with working in or near decomposing refuse at a landfill site and take the applicable precautions for work at the project site.

E. CONTRACTOR shall be solely responsible for determining and providing an appropriate health and safety program, including monitoring, equipment, plans in event of problems and/or emergencies, and other related items as needed.

3.2 Site Restrictions

A. Construction will generally be allowed during landfill hours of operation. Landfill hours are 7:00 AM through 6:00 PM, Monday through Saturday. Waste disposal at the open face of the Landfill opens at 8:00 AM and the last call for waste at the Landfill is at 5:00 PM. OWNER reserves the right to adjust the construction schedule accordingly.

B. Smoking will not be permitted at the project site unless a smoking area is designated and approved by OWNER. Smoking is prohibited on the landfill

C. Reflective safety vests, hard hats and steel toed boots shall be worn by all personnel during work. Other personal protective equipment will be worn as necessary.

D. CONTRACTOR shall adhere to the posted speed limit at all times. Contractor shall further limit vehicle speeds as necessary for safe operation based on road conditions and construction traffic.

E. Heavy equipment operating around exposed waste shall be equipped with vertical exhaust piping and spark arrestors to prevent fire. CONTRACTOR shall maintain a minimum of one fire extinguisher with a rating of ABC available with each trailer and construction vehicle.

3.3 Site Specific Health and Safety Program

A. Develop and implement a Health and Safety Program in accordance with all applicable Idaho Health and Safety regulations, Federal OSHA regulations, 29 CFR

1910 and 29 CFR 1926, and any other applicable federal, state, or local agency regulations or requirements. If any of these requirements are in conflict, the more stringent requirement shall apply. The CONTRACTOR'S failure to be thoroughly familiarized with the aforementioned safety and health provisions shall not relieve the CONTRACTOR of responsibility for full compliance with the obligations and requirements set forth herein. The CONTRACTOR'S Health and Safety Plan shall include as appropriate, but shall not necessarily be limited to, the items required by OSHA 29 CFR 1910.120:

1. Organizational structure
2. Comprehensive work plan
3. Hazard analysis for each site task
4. Employee training
5. Personal protective equipment to be used for each task
6. Medical surveillance
7. Frequency and types of air monitoring, personnel monitoring, and environmental sampling techniques and instrumentation to be used.
8. Site control measures
9. Decontamination procedures
10. Emergency response plan
11. Confined space entry procedures (if part of scope of work)
12. Spill containment program

B. Provide to the OWNER, prior to the start of any field activities, certification that requirements of this Section have been met. This certification shall include:

1. Documentation of the training required under OSHA 29 CFR 1910.120 for site personnel and supervisors.
2. Documentation of current first aid and CPR training for at least two employees per work shift.
3. Documentation of participation of all site personnel in a medical surveillance program in accordance with OSHA 29 CFR 1910.120.
4. Documentation that all site personnel expected to wear respiratory protection have been medically examined and approved for wearing such equipment and have been fit tested in accordance with OSHA regulations.

C. The CONTRACTOR shall maintain a copy of the plan at the site for the duration of work.

D. If the OWNER observes any of the CONTRACTOR'S employees or Subcontractors engaging in an unsafe act or procedure that may result in serious injury or death to

the person performing the act/procedure, or to any other person, the OWNER shall have the right, but not the duty, to stop the work until the condition is corrected. The CONTRACTOR shall be held responsible for any increased costs that result from this work stoppage.

E. The CONTRACTOR shall be responsible for holding mandatory weekly safety meetings on the site. The OWNER shall be notified of the time and place for these meetings, so that they may attend if they desire. Meetings shall reiterate all safety measures to be taken and shall discuss any violations committed and preventive measures. The CONTRACTOR shall provide the OWNER with a copy of the minutes and the attendance upon request.

F. The CONTRACTOR shall provide all personnel working on the project with required orientation and training on the potential hazards and the appropriate use of safety equipment.

G. The CONTRACTOR shall meet at all times during drilling and excavations, applicable OSHA health and safety requirements. The CONTRACTOR shall secure all work areas and close any open holes or excavations when not working by marking with ribbons and cones and posting of signs indicating to the public to stay away due to the existence of deep open excavation.

H. The CONTRACTOR shall provide continuous LEL gas detection monitoring and oxygen monitoring in enclosed areas prone to gas build-up or during drilling.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Measurement and Payment

A. Section will be considered part of cost of all other items of work. OWNER will not make separate payment for this section.

* * * END OF SECTION * * *

SECTION 01 11 00
SUMMARY OF WORK

PART 1 - GENERAL

1.1 Project Locations and Access

A. Project Location:

1. The Site (also referred to as Project Site) is the Pickles Butte Sanitary Landfill – Owned and operated by the Canyon County - Solid Waste Division. The physical address is:

Pickles Butte Sanitary Landfill
15500 Missouri Avenue
Nampa, ID 83686

1.2 Scope of Work

A. General: The Work included in the contract consists of construction of improvements to the landfill gas collection and control system (GCCS). The Work is more fully detailed in the Construction Drawings and Specifications included herein.

B. Principal features include:

1. Mobilization and demobilization of equipment, labor, and construction of temporary facilities.
2. Installation of GCCS improvement components, which include but are not limited to the following:
    a. Vertical Landfill Gas Extraction Wellheads
    b. GCCS improvements for LFG piping, compressed and condensate lines
    c. GCCS improvements for Qualifications, pipe supports, anchors, and flange connections
    d. Gas Monitoring Probes (OPTIONAL)
    e. GCCS improvements for Valves
3. Installation and start-up of Gas Handling Skid, Flare Assembly, Air Compressors, and Condensate Tank.
4. Welding of HDPE pipe.
5. Trenching and backfilling both in and out of the waste footprint for gas, air, condensate piping, and electrical conduits.
6. Installation of structural and concrete components including skid anchoring, flare/equipment foundation, and condensate pump foundation.
7. Surveying work including equipment, structural components, and grading.

C. The above description of the Work is for general information only and does not limit the responsibility of the CONTRACTOR to accomplish the Work in strict accordance with the Construction Drawings and Specifications.

D. Environmental Observations: The Work shall be performed in strict accordance with the applicable requirements of the federal, state, and local agencies having jurisdiction, and in accordance with the requirements of the Construction Drawings, General Conditions, Supplementary Conditions, and these Specifications.

E. Time of Completion: CONTRACTOR shall complete construction work December 31, 2023. If the work is not completed within the time stipulated, the COUNTY shall be entitled to claim liquidated damages at a fixed sum of $500 for each and every calendar day the completion of work under the contract is delayed.

1.3 Existing Site Conditions

A. The CONTRACTOR is advised that construction of this project is at a municipal solid waste landfill and will entail working in, on, and adjacent to buried solid wastes and refuse. As buried organic material decomposes anaerobically, it generates landfill gas (LFG). This LFG normally consists of approximately 45 percent carbon dioxide (CO2), 55 percent methane (CH4) and other gases that may include volatile organic compounds (VOCs), depending on the composition of the buried materials. Hydrogen sulfide (H2S) and other toxic gases have been encountered at landfills even though the sites were not classified as hazardous waste disposal sites.

B. The Pickles Butte Sanitary Landfill is permitted for the disposal of "nonhazardous solid waste." Notwithstanding the above, the OWNER cannot guarantee that toxic or hazardous materials or vapors will not be encountered by the CONTRACTOR during the construction of this project.

C. Water is not available for use on site. Any water required must be trucked in offsite from a metered source.

1.4 Construction Drawings

A. Where "as shown," "as detailed," "as noted," or words of like meaning are used in these Specifications, it shall be understood that reference is being made to the Construction Drawings unless otherwise specified.

1.5 Codes and Standards

A. All work to be done and materials and equipment transported, handled, stored or installed shall be done in strict conformance with the applicable orders, rules and regulations of the United States Government, the State of Idaho, and with all other County, City, and District requirements. Nothing contained in these specifications or shown or noted on the plans shall be construed to permit work not conforming to these orders, rules, and regulations.

B. When the Construction Drawings and/or Specifications call for material or construction of a better quality or larger size or capacity than may be required by applicable codes or standards, the provisions of the Construction Drawings and/or Specifications shall take precedence over the requirements of the code or standard. If there is any other conflict between the Construction Drawings and/or Specifications and the requirements of applicable codes and standards, the more stringent provisions shall govern.

C. See also Section 01 42 00 - References.

1.6 Manufacturers' Specifications and Instructions

A. Unless otherwise indicated or specified, all manufactured materials, products, processes, equipment, or the like shall be installed or applied in accordance with the manufacturers' instructions, directions, or specifications. Said installation or application shall be in accordance with printed instructions furnished by the manufacturer of the material or equipment concerned for use under conditions similar to those at the job site. Copies of such instructions shall be furnished to the ENGINEER and their acceptance thereof obtained before work is begun.

B. Any deviation from the manufacturers' printed recommendations shall be explained and acknowledged as correct for the circumstances, in writing by the particular manufacturer. The CONTRACTOR will be held responsible for all installations not conforming to the manufacturers' recommendations. If any item of material or equipment is installed not in accordance with the manufacturer's recommendations, the CONTRACTOR shall make all changes necessary to achieve such compliance.

1.7 Work Quality

A. Shop and field work shall be performed by mechanics and workers skilled and experienced in the fabrication and installation of the work feature involved. All Work under this Contract shall be performed in accordance with the standard practices of the various trades involved and in accordance with the Construction Drawings, reviewed shop drawings, these Specifications and all applicable codes and regulations.

B. All Work shall be erected and installed plumb, level, square and true, or true to indicated angle, and in proper alignment and relationship to the work of other trades. All finished Work shall be free from defects and damage.

C. The ENGINEER reserves the right to reject any materials and work quality which is not considered to be up to the general standards of the various trades involved. Such inferior material or work quality shall be repaired or replaced, as directed, at no additional cost to the OWNER.

1.8 Field Measurement and Templates

A. CONTRACTOR shall secure all field measurements required for proper and accurate fabrication and installation of the Work included in this Contract. Exact measurements are the CONTRACTOR's responsibility. CONTRACTOR shall also furnish or obtain all templates, patterns, and setting instructions required for the installation of all Work. All dimensions shall be verified by the CONTRACTOR in the field.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 29 00

BASIS OF PAYMENT

PART 1 – GENERAL

1.1 INTRODUCTION

This section includes the items of work and the basis of payment for these tasks. The Contractor shall bid Items 1 through 47 below separately and provide a total sum for all work items. The Contractor is responsible for supplying all materials, equipment, and labor necessary for the complete construction and installation of all work as described in these specifications and as shown on the Construction Drawings. Payment for each work item will be made on either a unit price (EA), lump sum (LS), vertical foot (VF), or linear foot (LF) basis, and only after that portion of the project has been completed.

PART 2 – PRODUCTS (NOT USED)

PART 3 – EXECUTION (NOT USED)

PART 4 – PAYMENT

4.1 MOBILIZATION/DEMOBILIZATION

This task includes any and all temporary facilities and utilities, safety plans, and construction equipment required for this project. Payment for this work will be made on a LS basis. Twenty-five (25) percent of the lump sum price bid will be paid with the first payment request following satisfactory evidence of mobilization of sufficient labor, equipment and material to adequately progress the work of this contract. Twenty-five (25) percent of the lump sum price bid will be paid with the payment request subsequent to the payment request in which the initial payment for this item is made. Fifty (50) percent of the lump sum price bid will be paid with the Final Payment request. The price bid in the proposal for this item shall not exceed ten (10) percent of the total project amount.

4.2 CLEARING AND GRUBBING

Supply all materials, equipment, and labor for the clearing and grubbing of the site as required. Payment for this work will be made on a LS basis.

4.3 GRADING AND EARTHWORK

Supply all materials, equipment, and labor for the earthwork and grading of the flare station area. Earthwork includes removal, relocation, or disposal of any rocks/boulders in the

approximate area as shown on the Construction Drawings per Sheet M-101. Payment for this work will be made on a LS basis.

4.4 TRENCHING AND BACKFILLING – PIPING, SUMPS, AND ELECTRICAL CONDUITS

Supply all materials, equipment, and labor for the trenching and backfilling for below grade piping, conduits, and sumps. This work to be completed for LFG piping, air lines, condensate lines and electrical conduits. Payment for this work will be made on a LS basis.

4.5 AC PAVEMENT – SAWCUT AND REPLACEMENT, MATCH EXISTING

Supply all materials, equipment, and labor for the saw cutting and replacing of existing AC Pavement as required. This work to be completed for LFG piping, air lines, condensate lines and electrical conduits. Payment for this work will be made on a LS basis.

4.6 CONCRETE SIDEWALK – SAWCUT AND REPLACEMENT, MATCH EXISTING

Supply all materials, equipment, and labor for the saw cutting and replacing of existing concrete sidewalks as required. This work to be completed for LFG piping, air lines, condensate lines and electrical conduits. Payment for this work will be made on a LS basis.

4.7 SURVEYING

Supply all material, equipment, and labor necessary to perform surveying tasks, including initial layout survey for piping, treatment facility grading and earthwork, and as-built survey of piping and wells. Payment for this work will be on a LS basis.

4.8 LANDFILL GAS MONITORING PROBE DRILLING (OPTIONAL)

Supply all materials, equipment, and labor for the landfill gas monitoring probe drilling. This includes associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an VF basis.

4.9 LANDFILL GAS MONITORING PROBE COMPLETION (OPTIONAL)

Supply all materials, equipment, and labor for the assembly of the landfill gas monitoring probe completion. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an VF basis.

4.10 2-INCH VERTICAL WELLHEADS - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 2-inch vertical wellheads. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.11 2-INCH HORIZONTAL WELLHEADS - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 2-inch horizontal wellheads. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.12 CONDENSATE SUMP #1 (Purchased by County), Instrumentation, and Ancillary Items – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of condensate sump #1 (purchased by County), ancillary items and instrumentation (materials and installation) per the 1/C502 detail as shown on the Construction Drawings and as located as the Construction Drawings. Payment for this work will be made on an EA basis.

4.13 CONDENSATE SUMP #2 THROUGH #5 (Purchased by County), Instrumentation, and Ancillary Items – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of condensate sumps #2 through #5 (purchased by County), ancillary items and instrumentation per the 1/C503 detail as shown on the Construction Drawings and as located as the Construction Drawings. Payment for this work will be made on an EA basis.

4.14 1 1/2-INCH HDPE SDR-9 SOLID PIPE AND FITTINGS, BELOW GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below grade 1 1/2-inch diameter HDPE SDR-9 solid pipe for compressed air as shown on the Construction Drawings per sheet 4 detail C-504. Piping and fittings will be provided by the Contractor. Payment for this item will be made on a LF basis.

4.15 2-INCH HDPE SDR-11 SOLID PIPE AND FITTINGS, BELOW GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below grade 2-inch diameter HDPE SDR-11 solid pipe for condensate/gas as shown on the Construction Drawings per sheet 4 detail C-504. Piping and fittings will be provided by the Contractor. Payment for this item will be made on a LF basis.

4.16 4-INCH HDPE SDR-17 SOLID PIPE AND FITTINGS, BELOW GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below grade 4-inch diameter HDPE SDR-17 solid pipe. This includes all fittings, associated hardware, appurtenances,

trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an LF basis.

4.17 8-INCH HDPE SDR-17 SOLID PIPE AND FITTINGS, BELOW GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below grade 8-inch diameter HDPE SDR-17 solid pipe. This includes all fittings, associated hardware, appurtenances, trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an LF basis.

4.18 10-INCH HDPE SDR-17 SOLID PIPE AND FITTINGS, BELOW GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of below grade 10-inch diameter HDPE SDR-17 solid pipe. This includes all fittings, associated hardware, appurtenances, trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an LF basis.

4.19 10-INCH HDPE SDR-17 SOLID PIPE AND FITTINGS, ABOVE GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of above grade 10-inch diameter HDPE SDR-17 solid pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Payment for this item will be made on a LF basis.

4.20 10-INCH HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET AND BOLT KIT - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 10-inch HDPE flange adapter, D.I. Back-Up Ring, Gasket and Bolt Kit as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.21 10-INCH BUTTERFLY VALVE, GEAR OPERATED, BELOW GRADE - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of below grade 10-inch butterfly valves. This includes all fittings, associated hardware, appurtenances, trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.22 10-INCH BUTTERFLY VALVE, GEAR OPERATED, ABOVE GRADE - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of above grade 10-inch butterfly valves. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an EA basis

4.23 10-INCH HDPE VALVE SPACER - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of the 10-inch HDPE valve spacers. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.24 2-INCH BUTTERFLY VALVE WITH 6-FOOT VALVE EXTENSION - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 2-inch butterfly valves with 6-foot valve extension. This includes all fittings, associated hardware, and appurtenances as shown on the Construction Drawings. Payment for this work will be made on an EA basis.

4.25 18-INCH CORRUGATED STEEL PIPE (CSP) ROAD CROSSING SLEEVE - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 18-inch CSP road crossing. This includes all fittings, associated hardware, appurtenances, trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an LF basis.

4.26 12-INCH CSP ROAD CROSSING SLEEVE - MATERIALS AND INSTALLATION

Supply all materials, equipment and labor for the assembly and installation of 12-inch CSP road crossing. This includes all fittings, flanges, associated hardware, appurtenances, trenching and backfill as shown on the Construction Drawings. Payment for this work will be made on an LF basis.

4.27 12-INCH HDPE SDR-17 SOLID PIPE AND FITTINGS, ABOVE GRADE – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of above grade 12-inch diameter HDPE SDR-17 pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Payment for this item will be made on a LF basis.

4.28 BOLLARD – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of bollards per detail 1 on sheet C504 of the Construction Drawings and place as shown on the Construction Drawings. Payment for this item will be made on an EA basis.

4.29 MANIFOLD #1 – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of manifold #1 per detail 1 on sheet C505 of the Construction Drawings and place as shown on the Construction Drawings. Payment for this item will be made on an EA basis.

4.30 MANIFOLD #2 – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of manifold #2 per detail 1 on sheet C507 of the Construction Drawings and place as shown on the Construction Drawings. Payment for this item will be made on an EA basis.

4.31 MANIFOLD #3 - #4, and #5 – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of manifold #3, #4 and #5 per detail 1 on sheet C508 of the Construction Drawings and place as shown on the Construction Drawings. Payment for this item will be made on an EA basis.

4.32 MISCELLANEOUS FITTINGS AND MATERIALS – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of miscellaneous fittings and materials for the treatment station. This will include all associated hardware. Payment for this work will be made on a LS basis.

4.33 GAS HANDLING SKID AND FLARE ASSEMBLY (Purchased by County) – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of the gas handling skid and flare assembly including skid mounted condensate knock out/filter (purchased by County), flare stack (purchased by County), pilot system, gauges, switches, transmitters, valves, control panel ancillary items and instrumentation per sheets D-601, M-101, and M-102 as shown on the Construction Drawings. Payment for this work will be made on a LS basis.

4.34 COMPRESSOR SYSTEM – MATERIALS AND INSTALLATION

Supply all materials, equipment, and labor for the installation of the compressor system (purchased by County) with rotary screw compressors, receiver, desiccant dryer, pre- and post-filtration, isolation valve, control panel, oil/water separator, steel housing container, ancillary items and instrumentation as shown on the Construction Drawings. Payment for this item will be made on a LS basis.

4.35 5-GALLON PROPANE BOTTLE (PILOT FUEL) – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of the 5-gallon propane bottles for the pilot fuel as shown on the Construction Drawings. Payment for this item will be made on an EA basis.

4.36 1/2-INCH SCHEDULE 40 BLACK IRON PIPE (PAINT RED) – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of ½-inch diameter SCH 40 black iron pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Pipe will be cut and put into flare assembly. Payment for installation this work will be made on a LS basis.

4.37 1/2-INCH SCHEDULE 40 CARBON STEEL PIPE (GALVANIZED) – MATERIALS AND INSTALLATION

Supply materials, equipment, and labor for the installation of ½-inch diameter SCH 40 galvanized carbon steel pipe as shown on the Construction Drawings. Piping and fittings will be provided by the Contractor. Pipe will be cut and put into flare assembly. Payment for installation this work will be made on a LS basis.

4.38 PEI INSULATION - INSTALLATION ONLY

Supply all equipment and labor for the installation of the insulation by PEI as shown on the Construction Drawings. Payment for this item will be made on a LS basis.

4.39 EQUIPMENT AND FLARE FOUNDATIONS PER SHEET S-101 – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the flare and equipment foundations per detail 1 sheet S-101 on the Construction Drawings. Payment for this work will be on a LS basis.

4.40 CONDENSATE PUMP FOUNDATION FOUNDATIONS PER SHEET S-101 – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the condensate pump foundation per detail 2 sheet S-101 on the Construction Drawings. Payment for this work will be on a LS basis.

4.41 PIPE ANCHOR – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe anchoring per sheet M-501, detail 2 as shown on the Construction Drawings. Payment for this work will be on an EA basis.

4.42 PIPE SUPPORT – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe support per sheet M-501, detail 1 as shown on the Construction Drawings. Payment for this work will be on an EA basis.

4.43 12-INCH PIPE SUPPORT AND FOUNDATION (Purchased by County) – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe support and foundation per sheet C-504, detail 9 as shown on the Construction Drawings. Payment for this work will be on an EA basis.

4.44 12-INCH CIRCULAR CONCRETE VAULT, TRAFFIC RATED – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the 12-inch circular concrete vault, that is traffic rated as shown on the Construction Drawings. Payment for this work will be on an EA basis.

4.45 ANCHOR BOLTS – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the anchor bolts for the 8-inch Utility Flare Assembly and Blower Skid per sheet S-501 details 2 and 3 as shown on the Construction Drawings. Payment for this work will be on a LS basis.

4.46 PIPE RACK – MATERIALS AND INSTALLATION

Supply all material, equipment, and labor for the installation of the pipe rack per sheet M-103 detail 3 as shown on the Construction Drawings. Payment for this work will be on an EA basis.

4.47 10,000 CONDENSATE TANK (Purchased by County), PIPING, PUMPS, GAC, VAULTS, SOLAR PANEL, HEAT TRACE/INSULATION, AND ANCILLARY ITEMS – MATERIALS AND INSTALLATION

Supply all equipment and labor for the installation of the 10,000-condensate tank (purchased by County), piping, pumps, GAC, vaults, solar panel, heat trace/insulation and ancillary items per detail 1 on sheet M-103 and detail 2 on sheet M-103 as shown on sheet the Construction Drawings. Payment for this work will be on an LS basis.

END OF SECTION

SECTION 01 33 00

SUBMITTAL PROCEDURES

PART 1 - GENERAL

1.1 Summary

A. This section includes general requirements for preparation and submission of the following submittals required for the completion of the Work of the Contract:

1. Technical Submittals:
    a. Shop Drawings
    b. Product and Performance Data
    c. Manufacturers' Instructions
2. General Submittals:
    a. Project Construction Schedule
    b. Progress Payment Schedule
3. Submittals Not Requiring Approval:
    a. CONTRACTOR's Site-Specific Health and Safety Plan

B. All submittals shall be in English.

C. The CONTRACTOR shall submit all submittals to the ENGINEER.

D. For hard copy submittals, The CONTRACTOR shall submit the number of copies of each submittal that the CONTRACTOR requires to be returned, plus two (2) copies that will be retained by the ENGINEER.

E. For electronic submittals, except as otherwise stated elsewhere in the Contract, the OWNER, ENGINEER, and CONTRACTOR may transmit, and shall accept, Project-related correspondence, text, data, documents, drawings, information, and graphics, including but not limited to Shop Drawings and other submittals, in electronic media or digital format, either directly, or through access to a secure Project website.

1. If the Contract does not establish protocols for electronic or digital transmittals, then OWNER, ENGINEER, and CONTRACTOR shall jointly develop such protocols.
2. When transmitting items in electronic media or digital format, the transmitting party makes no representations as to long term compatibility, usability, or readability of the items resulting from the recipient's use of software application packages, operating systems, or computer hardware differing from those used in the drafting or transmittal of the items, or from those established in applicable transmittal protocols.

F. The ENGINEER will clearly label the submittals as follows and return to the CONTRACTOR:

1. Approved
2. Approved as Noted
3. Revise and Resubmit
4. Rejected
5. Information Only

G. When submittals are returned marked with either “Revise and Resubmit” or “Rejected” the CONTRACTOR shall make such revisions and corrections as required and resubmit the submittal.

1.2 Related Sections

A. Section 01 45 00 - Quality Control

B. Section 01 78 39 - Project Record Documents

1.3 Technical Submittals

A. Schedule of Technical Submittals:

1. The CONTRACTOR shall submit all Technical Submittals required by this Section within 30 days of the Notice of Award.

B. Shop Drawings:

1. Shop Drawings shall establish the actual detail of all manufactured or fabricated items, indicate proper relation of adjoining work, and incorporate minor changes of design or construction to suit actual conditions. Shop drawings shall be drawn to scale and shall be completely dimensioned.
2. Sheet sizes of shop drawings shall be ANSI B (11 inches x 17 inches), or ANSI D (22 inches x 34 inches).
3. A clear space of 3 in x 3 in shall be provided on each drawing for the ENGINEER’s review stamp and comments.
4. Shop drawings shall be submitted to the ENGINEER in the form of a clean drawing suitable for photocopy or in Portable Document Format (PDF) compatible electronic format.
5. After the ENGINEER has completed their review of Shop Drawings, they will return copies to the CONTRACTOR indicating the approval status.
6. The ENGINEER will review and generally return shop drawings within ten (10) calendar days of receipt by the ENGINEER.

C. Product and Performance Data:

1. Each copy shall be marked to identify applicable products, models, options, performance, and other data; manufacturers' standard data shall be supplemented to provide information unique to the work.
2. The CONTRACTOR shall submit the number of copies, which the CONTRACTOR requires to be returned, plus two (2) copies which will be retained by the ENGINEER.

D. Manufacturers' Instructions: The CONTRACTOR shall submit manufacturers' printed instructions for delivery, storage, shelf life, assembly, installation, adjusting, and finishing.

E. Certificates of Compliance:

1. The CONTRACTOR shall submit certificates of compliance for the certain materials and products as specified below in lieu of providing samples. Submit certificates required for demonstrating proof of compliance of materials with specification requirements in duplicate with each lot of materials delivered to the Work. The lot so certified shall be clearly identified by the certificate. Certificates shall be signed by an authorized representative of the producer or manufacturer and shall state that the material complies in all respects with the requirements of the Contract Documents. In the case of multiple shipments, each shipment shall be accompanied by a certificate of compliance.
2. The certificate of compliance shall be accompanied by a certified copy of test results or shall state that such test results are on file with the producer or manufacturer and shall be furnished to the ENGINEER on request. The certificate shall give the information specified for samples in Paragraph C above, the name and address of the organization performing the tests, the date of the tests, and the quantity of material shipped.
3. Materials used on the basis of a certificate of compliance may be sampled and tested at any time. The fact that material is used on the basis of a certificate of compliance shall not relieve the CONTRACTOR of responsibility for incorporating material in the Work that conforms to the requirements of the contract, and any such material not conforming to such requirements will be subject to rejection, whether in place or not.
4. The ENGINEER reserves the right to refuse to permit the use of certain materials on the basis of a certificate of compliance.
5. Materials and products requiring certificates of compliance:
    a. High Density Polyethylene (HDPE) Pipe
    b. Polyvinyl Chloride (PVC) Pipe

1.4 General Submittals

A. Project Construction Schedule:

1. A preliminary issue of the Project Construction Schedule shall be prepared by the CONTRACTOR and submitted with the bid. Within five (5) days after receipt of the Notice to Proceed, the CONTRACTOR shall submit the Project Construction Schedule for approval and issue the approved Project Construction Schedule ten (10) days after receipt of approval and comments from the ENGINEER.
2. Format: The Project Construction Schedule shall consist of the following items, each compatible with the other and developed from the same basis:
    a. Schedule: Gantt/Bar Chart, or Critical Path Method (CPM).
    b. Critical Milestone Dates as listed below.
        1) Start/complete mobilization.
        2) Start/complete installation of the Landfill Gas Extraction Wellheads.
        3) Start/complete installation of the Landfill Gas Monitoring Probes (OPTIONAL).
        4) Start/complete installation of landfill gas header and lateral pipe systems.
        5) Start/complete installation of sump systems including the pumps.
        6) Start/complete installation of the Gas Handling Skid and Flare Assembly.
        7) Start/complete installation of the Condensate Tank.
        8) Start/complete final inspection.
        9) Start/complete demobilization.
3. The CONTRACTOR may generate the Schedule manually or by using a computer. The Schedule shall include all significant items of Work.
4. The CONTRACTOR shall incorporate the ENGINEER's comments into revisions of the Project Construction Schedule, adjust the resources as required, and resubmit the schedule to the ENGINEER for approval along with a summary of the changes.

B. Equipment List and Labor Rates:

1. The CONTRACTOR shall submit Equipment List and Labor Rates Schedules for use in conjunction with any Force Account Work done on a time and material basis, which shall be used to determine compensation to the CONTRACTOR.
2. The schedule shall include all equipment and personnel that the CONTRACTOR expects to use on this project. It shall also include any other equipment and personnel that the CONTRACTOR has available that may be used on the Project.
3. The rates shall include all costs and constitute full payment to the CONTRACTOR for use of operated equipment and personnel. This list shall be submitted with the bid.

1.5 Submittals Not Requiring Approval

A. The CONTRACTOR shall furnish the following submittals for information only. These submittals will not be approved and returned to the CONTRACTOR.

1. The CONTRACTOR, for presentation and discussion at the pre-construction meeting, shall prepare a preliminary Site-Specific Health and Safety Plan. The CONTRACTOR's Safety Monitor shall be named and be present at the pre-construction meeting. Although the Site-Specific Health and Safety Plan will not be formally approved, the ENGINEER will require a copy of the Plan.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 42 00

REFERENCES

PART 1 - GENERAL

1.1 Summary

A. This section includes references and abbreviations of various industry associations, trade associations, societies, organizations, and regulatory agencies, as referenced in the Contract Documents.

1.2 Descriptions

A. The Contract Drawings and Specifications contain references to various standard specifications, codes, practices, and requirements for materials, workmanship, installation inspections, and tests, which references are published and issued by the organizations, societies, and associations listed below by abbreviation and name. Such references are hereby made a part of the Contract Documents to the extent cited.

B. Any material, method, or procedure specified by reference to the number, symbol, or title of a specific specification or standard, such as a Commercial Standard, American National Standard, Federal or State Specification, Industry or Government Code, a trade association code or standard, or other similar standard, shall comply with the requirements in the latest revision thereof and any amendments or supplements thereto in effect on the start date of the Project.

C. The code, specification or standard referred to, except as modified in these Specifications shall have full force and effect as though printed in these Specifications.

1.3 Abbreviations

A. Whenever the abbreviation is specified, it shall be understood to mean the full name of the respective organization as listed below.

AASHTO	American Association of State Highway and Transportation Officials
ACI	American Concrete Institute
AGA	American Gas Association
AI	Asphalt Institute
AIA	American Institute of Architects

AICHE	American Institute of Chemical Engineers
AISC	American Institute of Steel Construction
AISI	American Iron and Steel Institute
ANSI	American National Standards Institute
API	American Petroleum Institute
AREA	American Railway Engineering Association
ARI	Air-Conditioning and Refrigeration Institute
ASCE	American Society of Civil Engineers
ASHRAE	American Society of Heating, Refrigerating and Air-Conditioning Engineers
ASME	American Society of Mechanical Engineers
ASQC	American Society for Quality Control
ASTM	American Society for Testing and Materials
AWS	American Welding Society
AWWA	American Water Works Association
CBM	Certified Ballast Manufacturers
CFR	Code of Federal Regulations
CGA	Compressed Gas Association
CRSI	Concrete Reinforced Steel Institute
EPA	United States Environmental Protection Agency
ETL	Electrical Testing Laboratories
FS	Federal Specification
IEEE	Institute of Electrical and Electronics Engineers
IES	Illuminating Engineering Society
IPCEA	Insulated Power Cable Engineer Association
ISA	Instrument Society of America
ITL	Independent Testing Laboratories
MIL	U.S. Military Specification
NEC	National Electrical Code
NEMA	National Electrical Manufacturers Association
NETA	International Electrical Testing Association

NFPA	National Fire Protection Association
NSF	National Sanitation Foundation
OSHA	Occupational Safety and Health Administration
PPI	Plastics Pipe Institute
SMACNA	Sheet Metal and Air Conditioning Contractor's National Association
SSPC	Steel Structures Painting Council
SWANA	Solid Waste Association of North America
UBC	Uniform Building Code
UL	Underwriters Laboratories
UMC	Uniform Mechanical Code
UPC	Uniform Plumbing Code
USBR	U.S. Bureau of Reclamation
WCRSI	Western Concrete Reinforcing Steel Institute

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 45 00

QUALITY CONTROL

PART 1 - GENERAL

1.1 Summary

A. Section Includes:

1. Acceptance testing by the ENGINEER;
2. Control testing by the CONTRACTOR; and
3. Certificates of compliance.

1.2 Source of Materials

A. The CONTRACTOR shall notify the ENGINEER in writing of the sources from which he proposes to obtain material requiring approval, certification, or testing. Such notification shall be made as soon as possible after award of Contract but no later than 15 days after receipt of the Notice to Proceed.

1.3 Acceptance Testing

A. Acceptance testing shall be defined as the testing of materials prior to or during their use in the Work. Acceptance testing may include, but not necessarily be limited to, in place soil testing and other tests as specified in the various sections of the Specifications to ensure compliance with the Contract Documents. The ENGINEER shall perform acceptance testing of materials and workmanship, unless otherwise specified, in accordance with the Specifications and submit copies of the results to the CONTRACTOR. The CONTRACTOR reserves the right to perform additional testing at any time to determine conformance with the Contract Documents. Additional testing to confirm ENGINEER acceptance testing results will be performed at no cost to the OWNER.

B. Acceptance testing by the ENGINEER is not a replacement for control testing conducted by the CONTRACTOR or a manufacturer producing materials for the CONTRACTOR. Control testing will be performed at the expense of the CONTRACTOR.

1.4 Control Testing

A. Control testing shall be defined as the testing of materials prior to their delivery from a manufacturer, or during construction, including, but not necessarily limited to laboratory soil tests, manufacturer material testing, and other tests as specified in the various sections of the Specifications to ensure compliance. The CONTRACTOR shall assume full responsibility for control testing. Control testing

shall be at the expense of the CONTRACTOR and shall be performed by an independent testing firm.

B. The CONTRACTOR shall submit the name, address, and qualifications, together with the scope of proposed services, of the proposed testing firm(s) to the ENGINEER for approval at least 15 days prior to the scheduled commencement of any Work involving such testing. Should the CONTRACTOR desire to use more than one firm for control testing, the required information shall be submitted for each proposed firm as specified herein.

1.5 Test Reports

A. Within five (5) days after completion of control testing performed by or for the CONTRACTOR, the test results shall be submitted to the ENGINEER, in writing. Test reports shall be identified with the name and address of the organization performing the test, and the date of the tests.

1.6 Certificates of Compliance

A. The CONTRACTOR may use certificates of compliance for certain materials and products in lieu of the specified sampling and testing procedures. Any certificates required for demonstrating proof of compliance of materials with specification requirements shall be submitted in duplicate with each lot of material delivered to the Site. The lot so certified shall be clearly identified by the certificate. Certificates shall be signed by an authorized representative of the producer or manufacturer and shall state that the material complies in all respects with the Contract requirements. In the case of multiple shipments, a certificate of compliance shall accompany each shipment.

B. The certificate of compliance shall be accompanied by a certified copy of test results or shall state that such test results are on file with the producer or manufacturer and shall be furnished to the ENGINEER on request. The certificate shall give the name and address of the organization performing the tests, the date of the tests, and the quantity of material shipped.

C. Materials used on the basis of a certificate of compliance may be sampled and tested at any time. Reliance on a certificate of compliance shall not relieve the CONTRACTOR of responsibility for incorporating material in the Work which conforms to the requirements of the Contract and any such material not conforming to such requirements will be subject to rejection, whether in place or not.

D. The ENGINEER reserves the right to refuse to permit the use of certain materials on the basis of a certificate of compliance.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 45 23.13

TESTING PIPING SYSTEM

PART 1 - GENERAL

1.1 Summary

A. This section covers all labor, equipment, and materials necessary to pressure test the landfill gas, compressed air, and condensate piping.

1.2 Submittals

A. Pipe pressure test results.

1.3 Related sections

A. 33 51 16.13 - High Density Polyethylene (HDPE) Landfill Piping.

PART 2 - PRODUCTS

2.1 Provisions

A. The CONTRACTOR shall provide compressed air flanges, caps, bulkheads and monitoring apparatus as necessary to complete the pressure test.

2.2 Testing Equipment

A. The CONTRACTOR shall provide all equipment required for this testing procedure.

B. Testing Equipment shall include, but may not be limited to:

1. Polyethylene flange adapter with steel blind flange.
2. Temperature gauge (32ºF to 200ºF) tapped and threaded into blind flange.
3. Pressure gauge (0 to 15 psi) ASME Standard B40.1 Grade 2A (accuracy of ±0.5% of full scale) with minor graduation marks no greater than 0.10 psi.
4. Inlet valve to facilitate compressed air hose.
5. Valve to release pipe pressure at test completion.
6. Polyethylene reducers to be used to adapt test flange to size of pipe being tested.
7. Air compressor shall provide adequate air supply for testing.
8. Pressurizing equipment shall include a regulator set to avoid over-pressurizing and damaging otherwise acceptable pipe.

C. Provide verification and results of gauge calibration prior to (less than 60 days) and after Project completion.

PART 3 - EXECUTION

3.1 Preparation

A. Commence test procedures when the following conditions have been met.

1. Pipe section to be tested is clean and free of dirt, sand, or other foreign material.
2. Plug pipe outlets with test plugs. Brace each plug securely to prevent blowouts. Use concrete if necessary.
3. Add compressed air slowly.
4. Pressurizing equipment shall include regulator set to avoid over-pressurizing and damaging an otherwise acceptable section of pipe.

B. Provide necessary pipe connections between the section of line being tested and the compressed air supply, together with test pressure equipment, meters, pressure gauge, and other equipment, materials, and facilities necessary to perform the specified tests.

C. Furnish and install bulkheads, flanges, valves, bracing, blocking or other temporary sectionalizing devices that may be required.

D. Remove temporary sectionalizing devices after tests have been completed.

3.2 Testing

A. ENGINEER shall be given 24-hr notification prior to test.

B. Appropriate safety precautions must be in-place.

C. Pipe Test Segments:

1. Butt-fusion weld pipe segments.
2. Less than 2,000 feet in length.
3. Blind flange with test apparatus on one end and fused cap or blind flange assembly on opposite end.

D. Environment:

1. Bury test segment or lay test segment on ground surface and allow it to reach ambient temperature before test.
2. Perform test during period when pipe segment will be out of direct sunlight to minimize pressure changes as a result of temperature fluctuations.

E. Landfill Gas Pipe Testing:

1. Apply test pressure of 10 psig to test segment.
2. Observe test pressure for 1-hour.
3. Mathematically correct pressure drop for temperature change.
4. Temperature corrected pressure drop over 1-hour period should not exceed 10%.

F. Compressed Air and Condensate Pipe Testing:

1. Apply test pressure of 10 psig to test segment.
2. Observe test pressure for 30-minutes.
3. Apply test pressure of 100 psig to test segment.
4. Observe test pressure for 30-minutes.
5. Mathematically correct pressure drop for temperature change.
6. Temperature corrected pressure drop over 1-hour period should not exceed 10%.

G. Test Failure

1. Perform the following when pipe segment fails test.
    a. Check entire length of pipe and fusion welds for cracks, pinholes, perforations or other possible leakage points.
    b. Check blocked risers and capped ends for leakage and check gaskets at blind flanges.
    c. Verify leaks by applying a soapy water solution and observe for bubble formation.
2. Repair pipe and fused joint leaks by cutting out leak areas and re-fusing suitable segments.
3. After the leaks are repaired, retest the pipe after the 8-hour relaxation period.

3.3 Test Reporting

A. Each test shall be reported in writing, on Attachment 1 included with this section.

B. Include following information if failure occurs:

1. Location of failure segment.
2. Nature of leaks.
3. Details of repairs performed.
4. Retest results.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. Pipe pressure testing shall be considered incidental to the contract price for Landfill Gas Pipe.

END OF SECTION

ATTACHMENT 1 TO SECTION 01 45 23.13
HDPE PIPE PRESSURE TEST REPORT

Project Name/No.: _____ Date: _____

Contractor: _____ Time: _____

Person Performing Tests: _____

Description/Location of Test Segment: (Pipe Diameter, Length, and Standard Dimension Ratios)

_____

_____

Location of Pipe Test Segment

Station From: Station To:

T_i = Initial Temperature = _____ °F
P_i = Initial test pressure = _____ psig
P_c = Initial Pressure in psig corrected for temperature (T_t) at time "t"
t = Time in minutes from initiation of test
T_t = Temperature in °F at time 't'
P_t = Test pressure in psig at time 't'

$$P_c = \frac{(P_i + 14.7)(T_t + 460)}{(T_i + 460)} - 14.7$$

$$\text{Percent Pressure Drop} = \frac{P_c - P_t}{P_c} \times 100$$

Time (min)	T_t Temp Reading (°F)	P_t Gauge Pressure (psig)	P_c Corrected Pressure (psig)	Pressure Drop (%)
0				
20				
30				
40				
50				
60				

Pass/Fail: _____ Retest (yes/no) _____

Description/Nature of leaks and repair of retest segment:

_____

_____

_____

* * * END OF SECTION * * *

SECTION 01 60 00

PRODUCT REQUIREMENTS

PART 1 - GENERAL

1.1 Summary

A. Section Includes: General requirements for materials and equipment including handling, transportation, and storage thereof.

1.2 Related Sections

A. Section 01 45 00 (Quality Control)

1.3 Quality of Materials

A. Materials and equipment provided shall be new, except as may be indicated in the Specifications or the Construction Drawings.

B. The materials and equipment shall be manufactured, handled, transported, stored, and used in accordance with the requirements of the manufacturer and to ensure completed work meets the requirements of the Contract Documents.

1.4 Handling and Transportation

A. Handling:

1. Avoid bending, scraping, or overstressing materials and equipment. Protect projecting parts by blocking with wood, by providing bracing, or by other approved methods.
2. Materials and equipment shall be protected from soiling and moisture by wrapping or by other approved means.
3. Small parts of equipment and accessories shall be packaged in containers such as boxes, crates, or barrels to avoid dispersal and loss. Firmly secure an itemized list and description of contents to each such container.

B. Loading, transporting, unloading, and storage of all materials and equipment shall be conducted such that they are kept clean and free from damage.

1.5 Storage and Protection

A. Provide sheltered, weather-tight or heated weather-tight storage as required for materials and equipment subject to weather damage.

B. Provide blockage, platforms or skids for materials and equipment subject to damage by contact with ground.

C. Store packaged materials in their original unbroken package or container.

D. Protect materials and equipment from damage during warehousing operations.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 71 24

CONSTRUCTION LAYOUT AND SURVEYING

PART 1 - GENERAL

1.1 Summary

A. This section includes general requirements for survey work to be performed by the CONTRACTOR for layout of Work features, for performance of Work, and for field measurements of Work quantities for payment purposes.

1.2 Description

A. Reference Points: The reference points to be provided by the OWNER will include referenced monuments and elevation benchmarks in the vicinity of the project. If displaced by the CONTRACTOR or the CONTRACTOR's agents, replacement of these reference points will be at the expense of the CONTRACTOR. All other necessary reference points shall be established by the CONTRACTOR.

B. The CONTRACTOR shall survey and stake out the work including verification and establishment of all lines, grades, dimensions, and elevations by qualified personnel under the direct supervision of a surveyor licensed in the State of Idaho with experience in construction surveying of the work.

C. The CONTRACTOR's instruments and other survey equipment shall be accurate, suitable for the surveys required in accordance with recognized professional standards, and in proper condition and adjustment at all times.

D. The ENGINEER may at any time use line and grade points and markers established by the CONTRACTOR. The CONTRACTOR's surveys are a part of the Work and may be checked by the ENGINEER or representatives of the ENGINEER at any time. The CONTRACTOR shall be responsible for (1) any lines, grades, or measurements which do not comply with specified or proper tolerances, or which are otherwise defective, and (2) for any resultant defects in the Work. The CONTRACTOR will be required to conduct resurveys or check surveys to correct errors indicated by review of the field notebooks or otherwise detected.

1.3 Surveys for Layout and Performance of Work

A. The CONTRACTOR shall supply all survey equipment and personnel as necessary to meet the line and grade staked in the field and shown on the Plans.

B. The CONTRACTOR will provide all record and documentation survey work.

1.4 Surveys for Measurement for Payment

A. When the Specifications or the ENGINEER require Bid Schedule items of Work to be measured by surveying methods, the CONTRACTOR shall perform the surveys.

1.5 Surveying Accuracy and Tolerances in Setting of Survey Stakes

A. Control traverse field surveys and computations shall be performed to an accuracy of at least 1:25,000.

B. The tolerances generally applicable in setting survey stakes shall be as set forth below. Such tolerances shall not supersede stricter tolerances required by the Drawings or Specifications and shall not otherwise relieve the CONTRACTOR of responsibility for measurements in compliance therewith.

Type of Line or Mark	Horizontal Position	Elevation
Permanent reference points	± 0.01 ft.	± 0.01 ft.
General excavation and earthwork	± 0.10 ft.	± 0.05 ft.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 01 75 16

START-UP PROCEDURES

PART 1 - GENERAL

1.1 Summary

A. This section describes the Start-Up and Demonstration of the landfill gas system components after full completion of system construction. Unless otherwise stipulated, the CONTRACTOR shall notify the ENGINEER of the pending completion of construction and readiness for commencement of the Start-Up and Demonstration Period.

1.2 Definitions

A. Start-Up Demonstration and Period shall be conducted for ten (10) days, or two (2) weeks with five (5) consecutive working days for each week, during which the ENGINEER and CONTRACTOR operate all facility systems and prove functional integrity of those systems by virtue of experiencing no operational failures within the designated demonstration time interval.

B. All parts shall operate satisfactorily in all respects, under continuous maximum achievable load and in accordance with the specified requirements for the full duration of the test period. If any part of a unit shows evidence of unsatisfactory or improper operation during the test period, correction or repairs shall be made by the CONTRACTOR at the CONTRACTOR's expense, and the test, as specified above, shall be performed again until all parts operate satisfactory.

C. Post Demonstration Period shall be the period of time after successful completion of the Start-Up and Demonstration Period, but before final acceptance of the Project during which the CONTRACTOR completes all punch list items and Project close-out procedures.

1.3 Landfill Gas Collection and Control System (GCCS)

A. Except those elements which are specifically excluded elsewhere, the GCCS shall include:

1. Vertical landfill gas extraction wellhead installation.
2. Landfill gas header and lateral piping.
3. Installation and start-up of Gas Handling Skid, Flare Assembly, Air Compressors, and Condensate Tank.
4. Compressed air and condensate piping.

5. Condensate Sumps.
6. Landfill gas monitoring probes (OPTIONAL).
7. Installation of structural and concrete components including skid anchoring, flare/equipment foundation, and condensate pump foundation.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 Start-Up and Demonstration Period

A. The Start-Up and Demonstration Period is intended to demonstrate the reliability and performance of equipment under full operational conditions. The ENGINEER reserves the right to simulate operational variables including, but not necessarily limited to equipment failures and routine maintenance scenarios, etc. to verify the operational integrity of automatic and manual control systems and alternate operating modes.

B. Ensure Work is complete before start-up of any unit or system.

C. The OWNER will provide qualified personnel for operation of the landfill gas system components.

D. The Start-Up and Demonstration Period will be performed with the entire landfill gas system operational and will not be allowed to be tested on a system-by-system basis.

E. The OWNER shall provide all labor, supervision, chemicals, equipment, vehicles or any other items necessary to operate and demonstrate the operation of the landfill gas system components.

F. The CONTRACTOR and his SUBCONTRACTORS shall be onsite during the entire Start-Up and Demonstration period to address any system problems that are found during initial operation. Problems that may be encountered include, but are not limited to leaks in pipes, equipment malfunctions, etc.

G. Length of Start-Up and Demonstration Period shall be 240 hours of continuous operation with no malfunctions.

3.2 Post Demonstration Period

A. If the facility and all systems are substantially complete as defined in the Standard Specifications, the OWNER will assume operation after the successful completion of the Start-Up and Demonstration Period. If the facility and all systems are not

substantially complete, the CONTRACTOR will finalize construction and the system will be retested.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. Startup and Demonstration shall be considered incidental to the contract.

* * * END OF SECTION * * *

SECTION 01 78 39

PROJECT RECORD DOCUMENTS

PART 1 - GENERAL

1.1 Summary

A. This section includes preparation, maintenance, completion, and submission of all project record drawings, specifications, and related documents.

B. The requirements specified herein are in addition to any requirements for record documents specified elsewhere in these Specifications.

1.2 Maintenance of Record Documents

A. The CONTRACTOR shall maintain at the job site one copy of the following Project Documents for record purposes:

1. Construction Drawings
2. Specifications
3. Change Orders
4. ENGINEER's Field Orders
5. Reviewed Shop Drawings
6. Clarifications or Explanatory Drawings and Specifications
7. Inspection Reports
8. Laboratory Test Records
9. Field Test Records

1.3 Record Drawings

A. Project Drawings:

1. The CONTRACTOR shall maintain "as-built" drawings of all work and subcontracts, continuously as the job progresses. A separate set of prints, for this purpose only, shall be kept at the job site at all times.
2. All deviations from the drawings, exact locations of permanent property markers or monuments, all utilities and services, mechanical and electrical lines, details, and other work shall be finally incorporated on this reproducible set.
3. During the course of construction, actual locations to scale shall be identified on the Record Drawings for all runs of mechanical and electrical work, including all site utilities and services, installed underground, in walls, or otherwise

concealed. Deviations from the Construction Drawings shall be shown in detail. All main alignments, whether piping, conduit, ductwork, or drain lines shall be located, in addition, by dimension and elevation.

4. No work shall be permanently concealed by the CONTRACTOR until the required information has been recorded on the record drawing and verified by the ENGINEER.
5. The ENGINEER/OWNER will provide one copy of the final Record Drawings to the CONTRACTOR for record keeping purposes.

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

(Not Used)

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 03 10 00

CONCRETE FORMING AND ACCESSORIES

PART 1 - GENERAL

1.1 Related Documents

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 Summary

A. Section Includes:

1. Form-facing material for cast-in-place concrete.
2. Form liners.
3. Insulating concrete forms.
4. Shoring, bracing, and anchoring.

1.3 Definitions

A. Form-Facing Material: Temporary structure or mold for the support of concrete while the concrete is setting and gaining sufficient strength to be self-supporting.

B. Formwork: The total system of support of freshly placed concrete, including the mold or sheathing that contacts the concrete, as well as supporting members, hardware, and necessary bracing.

1.4 Preinstallation Meetings

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:
    a. Special inspection and testing and inspecting agency procedures for field quality control.
    b. Construction, movement, contraction, and isolation joints
    c. Forms and form-removal limitations.
    d. Shoring and reshoring procedures.
    e. Anchor rod and anchorage device installation tolerances.

1.5 Action Submittals

A. Product Data: For each of the following:

1. Exposed surface form-facing material.
2. Concealed surface form-facing material.

3. Forms for cylindrical columns.
4. Pan-type forms.
5. Void forms.
6. Form liners.
7. Insulating concrete forms.
8. Form ties.
9. Waterstops.
10. Form-release agent.

B. Shop Drawings: Prepared by, and signed and sealed by, a qualified professional engineer responsible for their preparation, detailing fabrication, assembly, and support of forms.
1. For exposed vertical concrete walls, indicate dimensions and form tie locations.
2. Indicate dimension and locations of construction and movement joints required to construct the structure in accordance with ACI 301 (ACI 301M).
3. Location of construction joints is subject to approval of the Engineer.
4. Indicate location of waterstops.
5. Indicate form liner layout and form line termination details.
6. Indicate proposed schedule and sequence of stripping of forms, shoring removal, and reshoring installation and removal.
7. Indicate layout of insulating concrete forms, dimensions, course heights, form types, and details.

C. Samples:
1. For waterstops.
2. For Form Liners: 12-inch by 12-inch (305-mm by 305-mm) sample, indicating texture.

1.6 Informational Submittals

A. Qualification Data: For testing and inspection agency.

B. Research Reports: For insulating concrete forms indicating compliance with International Code Council Acceptance Criteria AC353.

C. Field quality-control reports.

D. Minutes of preinstallation conference.

1.7 Quality Assurance

A. Testing and Inspection Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Mockups: Formed surfaces to demonstrate typical joints, surface finish, texture, tolerances, and standard of workmanship.

1. Build panel approximately 100 sq. ft. (9.3 sq. m) in the location indicated or, if not indicated, as directed by Architect.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work.

1.8 Delivery, Storage, and Handling

A. Form Liners: Store form liners under cover to protect from sunlight.

B. Insulating Concrete Forms: Store forms off ground and under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

C. Waterstops: Store waterstops under cover to protect from moisture, sunlight, dirt, oil, and other contaminants.

PART 2 - PRODUCTS

2.1 Performance Requirements

A. Concrete Formwork: Design, engineer, erect, shore, brace, and maintain formwork, shores, and reshores in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design wood panel forms in accordance with APA's "Concrete Forming Design/Construction Guide."

2. Design formwork to limit deflection of form-facing material to 1/240 of center-to-center spacing of supports.

B. Design, engineer, erect, shore, brace, and maintain insulating concrete forms in accordance with ACI 301 (ACI 301M), to support vertical, lateral, static, and dynamic loads, and construction loads that might be applied, until structure can support such loads, so that resulting concrete conforms to the required shapes, lines, and dimensions.

1. Design cross ties to transfer the effects of the following loads to the cast-in-place concrete core:

a. Wind Loads: As indicated on Drawings.

1) Horizontal Deflection Limit: Not more than 1/240 of the wall height.

2.2 Form-Facing Materials

A. As-Cast Surface Form-Facing Material:

1. Provide continuous, true, and smooth concrete surfaces.
2. Furnish in largest practicable sizes to minimize number of joints.
3. Acceptable Materials: As required to comply with Surface Finish designations specified in Section 03 30 00 "Cast-In-Place Concrete", and as follows:
    a. Plywood, metal, or other approved panel materials.
    b. Exterior-grade plywood panels, suitable for concrete forms, complying with DOC PS 1, and as follows:
        1) APA HDO (high-density overlay).
        2) APA MDO (medium-density overlay); mill-release agent treated and edge sealed.
        3) APA Structural 1 Plyform, B-B or better; mill oiled and edge sealed.
        4) APA Plyform Class I, B-B or better; mill oiled and edge sealed.

B. Concealed Surface Form-Facing Material: Lumber, plywood, metal, plastic, or another approved material.

1. Provide lumber dressed on at least two edges and one side for tight fit.

C. Forms for Cylindrical Columns, Pedestals, and Supports: Metal, glass-fiber-reinforced plastic, paper, or fiber tubes that produce surfaces without spiral or vertical seams not exceeding specified formwork surface class.

1. Provide forms with sufficient wall thickness to resist plastic concrete loads without detrimental deformation.

D. Pan-Type Forms: Glass-fiber-reinforced plastic or formed steel, stiffened to resist plastic concrete loads without detrimental deformation, with straight end forms.

2.3 Waterstops

A. Flexible PVC Waterstops: U.S. Army Corps of Engineers CRD-C 572, with factory-installed metal eyelets, for embedding in concrete to prevent passage of fluids through joints, with factory fabricate corners, intersections, and directional changes.

1. Profile: Flat dumbbell with center bulb
2. Dimensions: 6 inches by 3/8 inch thick (150 mm by 10 mm thick)

2.4 Related Materials

A. Reglets: Fabricate reglets of not less than 0.022-inch- (0.55-mm-) thick, galvanized-steel sheet. Temporarily fill or cover face opening of reglet to prevent intrusion of concrete or debris.

B. Dovetail Anchor Slots: Hot-dip galvanized-steel sheet, not less than 0.034 inch (0.85 mm) thick, with bent tab anchors. Temporarily fill or cover face opening of slots to prevent intrusion of concrete or debris.

C. Chamfer Strips: Wood, metal, PVC, or rubber strips, 3/4 by 3/4 inch (19 by 19 mm), minimum.

D. Rustication Strips: Wood, metal, PVC, or rubber strips, kerfed for ease of form removal.

E. Form-Release Agent: Commercially formulated form-release agent that does not bond with, stain, or adversely affect concrete surfaces and does not impair subsequent treatments of concrete surfaces.

1. Formulate form-release agent with rust inhibitor for steel form-facing materials.

2. Form release agent for form liners shall be acceptable to form liner manufacturer.

F. Form Ties: Factory-fabricated, removable or snap-off, glass-fiber-reinforced plastic or metal form ties designed to resist lateral pressure of fresh concrete on forms and to prevent spalling of concrete on removal.

1. Furnish units that leave no corrodible metal closer than 1 inch (25 mm) to the plane of exposed concrete surface.

2. Furnish ties that, when removed, leave holes no larger than 1 inch (25 mm) in diameter in concrete surface.

3. Furnish ties with integral water-barrier plates to walls indicated to receive dampproofing or waterproofing.

PART 3 - EXECUTION

3.1 Installation of Formwork

A. Comply with ACI 301 (ACI 301M).

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M) and to comply with the Surface Finish designations specified in Section 033000 "Cast-In-Place Concrete" for as-cast finishes.

C. Limit concrete surface irregularities as follows:

1. Surface Finish-3.0: ACI 117 Class A, 1/8 inch (3.0 mm).

D. Construct forms tight enough to prevent loss of concrete mortar.

1. Minimize joints.

2. Exposed Concrete: Symmetrically align joints in forms.

E. Construct removable forms for easy removal without hammering or prying against concrete surfaces.

1. Provide crush or wrecking plates where stripping may damage cast-concrete surfaces.
2. Provide top forms for inclined surfaces steeper than 1.5 horizontal to 1 vertical.
3. Install keyways, reglets, recesses, and other accessories, for easy removal.

F. Do not use rust-stained, steel, form-facing material.

G. Set edge forms, bulkheads, and intermediate screed strips for slabs to achieve required elevations and slopes in finished concrete surfaces.
1. Provide and secure units to support screed strips
2. Use strike-off templates or compacting-type screeds.

H. Provide temporary openings for cleanouts and inspection ports where interior area of formwork is inaccessible.
1. Close openings with panels tightly fitted to forms and securely braced to prevent loss of concrete mortar.
2. Locate temporary openings in forms at inconspicuous locations.

I. Chamfer exterior corners and edges of permanently exposed concrete.

J. At construction joints, overlap forms onto previously placed concrete not less than 12 inches (305 mm).

K. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
1. Determine sizes and locations from trades providing such items.
2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

L. Construction and Movement Joints:
1. Construct joints true to line with faces perpendicular to surface plane of concrete.
2. Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.
3. Place joints perpendicular to main reinforcement.
4. Locate joints for beams, slabs, joists, and girders in the middle third of spans.
    a. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.
5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.
6. Space vertical joints in walls as indicated on Drawings

a. Locate joints beside piers integral with walls, near corners, and in concealed locations where possible.

M. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.

1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.

2. Close temporary ports and openings with tight-fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

N. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

O. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

P. Coat contact surfaces of forms with form-release agent, according to manufacturer's written instructions, before placing reinforcement.

3.2 Installation of Embedded Items

A. Place and secure anchorage devices and other embedded items required for adjoining work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of AISC 303.

3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

4. Install dovetail anchor slots in concrete structures, as indicated on Drawings.

5. Clean embedded items immediately prior to concrete placement.

3.3 Installation of Waterstops

A. Flexible Waterstops: Install in construction joints and at other joints indicated to form a continuous diaphragm.

1. Install in longest lengths practicable.

2. Locate waterstops in center of joint unless otherwise indicated on Drawings.

3. Allow clearance between waterstop and reinforcing steel of not less than 2 times the largest concrete aggregate size specified in Section 033000 "Cast-In-Place Concrete."

4. Secure waterstops in correct position at 12 inches (305 mm) on center.

5. Field fabricate joints in accordance with manufacturer's instructions using heat welding.
    a. Miter corners, intersections, and directional changes in waterstops.
    b. Align center bulbs.
6. Clean waterstops immediately prior to placement of concrete.
7. Support and protect exposed waterstops during progress of the Work.

3.4 Installation of Insulating Concrete Forms

A. Comply with ACI 301 (ACI 301M) and manufacturer's instructions.

B. Construct formwork, so concrete members and structures are of size, shape, alignment, elevation, and position indicated, within tolerance limits of ACI 117 (ACI 117M).

C. Install forms in running bond pattern.
    1. Align joints.
    2. Align furring strips.

D. Construct forms tight to prevent loss of concrete mortar.

E. Form openings, chases, offsets, sinkages, keyways, reglets, blocking, screeds, and bulkheads required in the Work.
    1. Determine sizes and locations from trades providing such items.
    2. Obtain written approval of Architect prior to forming openings not indicated on Drawings.

F. Provide temporary ports or openings in formwork where required to facilitate cleaning and inspection.
    1. Locate ports and openings in bottom of vertical forms, in inconspicuous location, to allow flushing water to drain.
    2. Close temporary ports and openings with tight fitting panels, flush with inside face of form, and neatly fitted, so joints will not be apparent in exposed concrete surfaces.

G. Clean forms and adjacent surfaces to receive concrete. Remove chips, wood, sawdust, dirt, and other debris just before placing concrete.

H. Retighten forms and bracing before placing concrete, as required, to prevent mortar leaks and maintain proper alignment.

I. Shore insulating concrete forms to ensure stability and to resist stressing imposed by construction loads.

3.5 Removing and Reusing Forms

A. Formwork for sides of beams, walls, columns, and similar parts of the Work that does not support weight of concrete may be removed after cumulatively curing at not less than 50 deg F (10 deg C) for 72 hours after placing concrete. Concrete has to be hard enough to not be damaged by form-removal operations, and curing and protection operations need to be maintained.

1. Leave formwork for beam soffits, joists, slabs, and other structural elements that support weight of concrete in place until concrete has achieved its 28-day design compressive strength.

2. Remove forms only if shores have been arranged to permit removal of forms without loosening or disturbing shores.

B. Clean and repair surfaces of forms to be reused in the Work.

1. Split, frayed, delaminated, or otherwise damaged form-facing material are unacceptable for exposed surfaces.

2. Apply new form-release agent.

C. When forms are reused, clean surfaces, remove fins and laitance, and tighten to close joints.

1. Align and secure joints to avoid offsets.

2. Do not use patched forms for exposed concrete surfaces unless approved by Architect.

3.6 Shoring and Reshoring Installation

A. Comply with ACI 318 (ACI 318M) and ACI 301 (ACI 301M) for design, installation, and removal of shoring and reshoring.

1. Do not remove shoring or reshoring until measurement of slab tolerances is complete.

B. In multistory construction, extend shoring or reshoring over a sufficient number of stories to distribute loads in such a manner that no floor or member will be excessively loaded or will induce tensile stress in concrete members without sufficient steel reinforcement.

C. Plan sequence of removal of shores and reshore to avoid damage to concrete. Locate and provide adequate reshoring to support construction without excessive stress or deflection.

3.7 Field Quality Control

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Inspect formwork for shape, location, and dimensions of the concrete member being formed.
2. Inspect insulating concrete forms for shape, location, and dimensions of the concrete member being formed.

END OF SECTION 03 10 00

SECTION 03 20 00

CONCRETE REINFORCING

PART 1 - GENERAL

1.1 Summary

A. Section Includes:

1. Steel reinforcement bars.
2. Welded-wire reinforcement.

1.2 Preinstallation Meetings

A. Preinstallation Conference: Conduct conference at Project site.

1. Review the following:
   a. Special inspection and testing and inspecting agency procedures for field quality control.
   b. Construction contraction and isolation joints.
   c. Steel-reinforcement installation.

1.3 Action Submittals

A. Product Data: For the following:

1. Each type of steel reinforcement.
2. Epoxy repair coating.
3. Zinc repair material.
4. Bar supports.
5. Mechanical splice couplers.
6. Structural thermal break insulated connection system.

B. Shop Drawings: Comply with ACI SP-066:

1. Include placing drawings that detail fabrication, bending, and placement.
2. Include bar sizes, lengths, materials, grades, bar schedules, stirrup spacing, bent bar diagrams, bar arrangement, location of splices, lengths of lap splices, details of mechanical splice couplers, details of welding splices, tie spacing, hoop spacing, and supports for concrete reinforcement.
3. For structural thermal break insulated connection system, indicate general configuration, insulation dimensions, tension bars, compression pads, shear bars, and dimensions.

C. Construction Joint Layout: Indicate proposed construction joints required to build the structure.

1. Location of construction joints is subject to approval of Engineer.

1.4 Informational Submittals

A. Qualification Statements: For delegated design engineer and testing and inspection agency.

B. Delegated Design Engineer Qualifications: Include the following:

1. Experience providing delegated design engineering services of the type indicated.

2. Documentation that delegated design engineer is licensed in the state in which Project is located.

C. Welding certificates.

1. Reinforcement To Be Welded: Welding procedure specification in accordance with AWS D1.4/D1.4M.

D. Material Certificates: For each of the following, signed by manufacturers:

1. Epoxy-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

2. Dual-Coated Reinforcement: CRSI's "Epoxy Coating Plant Certification."

E. Material Test Reports: For the following, from a qualified testing agency:

1. Steel Reinforcement:

a. For reinforcement to be welded, mill test analysis for chemical composition and carbon equivalent of the steel in accordance with ASTM A706/A706M.

F. Field quality-control reports.

G. Minutes of preinstallation conference.

1.5 Quality Assurance

A. Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

B. Welding Qualifications: Qualify procedures and personnel in accordance with AWS D1.4/D 1.4M.

C. Mockups: Reinforcing for cast-concrete formed surfaces, to demonstrate tolerances and standard of workmanship.

1. Build panel approximately 100 sq. ft. (9.3 sq. m) for formed surface in the location indicated on Drawings or, if not indicated, as directed by Engineer.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.6 Delivery, Storage, And Handling

A. Steel Reinforcement: Deliver, store, and handle steel reinforcement to prevent bending and damage.

1. Store reinforcement to avoid contact with earth.
2. Do not allow epoxy-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
3. Do not allow dual-coated reinforcement to be stored outdoors for more than 60 days without being stored under an opaque covering.
4. Do not allow stainless steel reinforcement to come into contact with uncoated reinforcement.

PART 2 - PRODUCTS

2.1 Performance Requirements

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design structural thermal break insulated connection system, including attachment to building construction.

B. Structural Performance of Structural Thermal Break Insulating Connection System: Structural thermal break insulated connection system to withstand the following loads and stresses:

1. Dead Loads: As indicated on Drawings.
   a. Shear Load: As indicated on Drawings.
   b. Bending Moment: As indicated on Drawings.
2. Live Loads: As indicated on Drawings.
   a. Shear Load: As indicated on Drawings.
   b. Bending Moment: As indicated on Drawings.

2.2 Steel Reinforcement

A. Reinforcing Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed.

B. Low-Alloy Steel Reinforcing Bars: ASTM A706/A706M, deformed.

C. Headed-Steel Reinforcing Bars: ASTM A970/A970M.

D. Galvanized Reinforcing Bars:

1. Steel Bars: ASTM A615/A615M, Grade 60 (Grade 420), deformed bars.
2. Zinc Coating: ASTM A767/A767M, Class I zinc coated after fabrication and bending.

E. Deformed-Steel Welded-Wire Reinforcement: ASTM A1064/A1064M, flat sheet.

2.3 Reinforcement Accessories

A. Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, cut true to length with ends square and free of burrs.

B. Epoxy-Coated Joint Dowel Bars: ASTM A615/A615M, Grade 60 (Grade 420), plain-steel bars, ASTM A775/A775M epoxy coated.

C. Bar Supports: Bolsters, chairs, spacers, and other devices for spacing, supporting, and fastening reinforcing bars and welded-wire reinforcement in place.

1. Manufacture bar supports from steel wire, plastic, or precast concrete in accordance with CRSI's "Manual of Standard Practice," of greater compressive strength than concrete and as follows:

a. For concrete surfaces exposed to view, where legs of wire bar supports contact forms, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

b. For epoxy-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.

c. For dual-coated reinforcement, use CRSI Class 1A epoxy-coated or other dielectric-polymer-coated wire bar supports.

d. For zinc-coated reinforcement, use galvanized wire or dielectric-polymer-coated wire bar supports.

e. For stainless steel reinforcement, use CRSI Class 1 plastic-protected steel wire, all-plastic bar supports, or CRSI Class 2 stainless steel bar supports.

D. Steel Tie Wire: ASTM A1064/A1064M, annealed steel, not less than 0.0508 inch (1.2908 mm) in diameter.

1. Finish: Plain

E. Stainless Steel Tie Wire: ASTM A1022/A1022M, not less than 0.0508 inch (1.2908 mm) in diameter.

F. Epoxy Repair Coating: Liquid, two-part, epoxy repair coating; compatible with epoxy coating on reinforcement and complying with ASTM A775/A775M.

G. Zinc Repair Material: ASTM A780/A780M.

2.4 Fabricating Reinforcement

A. Fabricate steel reinforcement according to CRSI's "Manual of Standard Practice."

PART 3 - EXECUTION

3.1 Preparation

A. Protection of In-Place Conditions:

1. Do not cut or puncture vapor retarder.

2. Repair damage and reseal vapor retarder before placing concrete.

B. Clean reinforcement of loose rust and mill scale, earth, ice, and other foreign materials that reduce bond to concrete.

3.2 Installation of Steel Reinforcement

A. Comply with CRSI's "Manual of Standard Practice" for placing and supporting reinforcement.

B. Accurately position, support, and secure reinforcement against displacement.

1. Locate and support reinforcement with bar supports to maintain minimum concrete cover.

2. Do not tack weld crossing reinforcing bars.

C. Preserve clearance between bars of not less than 1 inch (25 mm), not less than one bar diameter, or not less than 1-1/3 times size of large aggregate, whichever is greater.

D. Provide concrete coverage in accordance with ACI 318 (ACI 318M).

E. Set wire ties with ends directed into concrete, not toward exposed concrete surfaces.

F. Splices: Lap splices as indicated on Drawings.

1. Bars indicated to be continuous, and all vertical bars to be lapped not less than 36 bar diameters at splices, or 24 inches (610 mm), whichever is greater.

2. Stagger splices in accordance with ACI 318 (ACI 318M).

3. Weld reinforcing bars in accordance with AWS D1.4/D 1.4M, where indicated on Drawings.

G. Install welded-wire reinforcement in longest practicable lengths.

1. Support welded-wire reinforcement in accordance with CRSI "Manual of Standard Practice."

a. For reinforcement less than W4.0 or D4.0, continuous support spacing to not exceed 12 inches (305 mm).

2. Lap edges and ends of adjoining sheets at least one wire spacing plus 2 inches (50 mm) for plain wire and 8 inches (200 mm) for deformed wire.

3. Offset laps of adjoining sheet widths to prevent continuous laps in either direction.

4. Lace overlaps with wire.

3.3 Joints

A. Construction Joints: Install so strength and appearance of concrete are not impaired, at locations indicated or as approved by Architect.

1. Place joints perpendicular to main reinforcement.

2. Continue reinforcement across construction joints unless otherwise indicated.

3. Do not continue reinforcement through sides of strip placements of floors and slabs.

B. Doweled Joints: Install dowel bars and support assemblies at joints where indicated. Lubricate or asphalt coat one-half of dowel length, to prevent concrete bonding to one side of joint.

3.4 Installation Tolerances

A. Comply with ACI 117 (ACI 117M).

3.5 Field Quality Control

A. Special Inspections: Owner will engage a special inspector and qualified testing and inspecting agency to perform field tests and inspections and prepare test reports.

B. Testing Agency: Engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

C. Inspections:

1. Steel-reinforcement placement.

2. Steel-reinforcement mechanical splice couplers.

3. Steel-reinforcement welding.

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 03 00 00

CAST-IN-PLACE CONCRETE

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:

1. Cast-in-place concrete, including concrete materials, mixture design, placement procedures, and finishes.

B. Related Requirements:

1. Section 03 10 00 "Concrete Forming and Accessories" for form-facing materials, form liners, insulating concrete forms, and waterstops.

2. Section 03 20 00 "Concrete Reinforcing" for steel reinforcing bars and welded-wire reinforcement.

1.2 DEFINITIONS

A. Cementitious Materials: Portland cement alone or in combination with one or more of the following: blended hydraulic cement, fly ash, slag cement, other pozzolans, and silica fume; materials subject to compliance with requirements.

B. Water/Cement Ratio (w/cm): The ratio by weight of water to cementitious materials.

1.3 PREINSTALLATION MEETINGS

A. Preinstallation Conference: Conduct conference at Project site.

1. Require representatives of each entity directly concerned with cast-in-place concrete to attend, including the following:

a. Contractor's superintendent.

b. Independent testing agency responsible for concrete design mixtures.

c. Ready-mix concrete manufacturer.

d. Concrete Subcontractor.

e. Special concrete finish Subcontractor.

2. Review the following:

a. Special inspection and testing and inspecting agency procedures for field quality control.

b. Construction joints, control joints, isolation joints, and joint-filler strips.

c. Semirigid joint fillers.

d. Vapor-retarder installation.

e. Anchor rod and anchorage device installation tolerances.

f. Cold and hot weather concreting procedures.

g. Concrete finishes and finishing.

h. Curing procedures.

i. Forms and form-removal limitations.

j. Shoring and reshoring procedures.

k. Methods for achieving specified floor and slab flatness and levelness.

l. Floor and slab flatness and levelness measurements.

m. Concrete repair procedures.

n. Concrete protection.

o. Initial curing and field curing of field test cylinders (ASTM C31/C31M.)

p. Protection of field cured field test cylinders.

1.4 ACTION SUBMITTALS

A. Product Data: For each of the following.

1. Portland cement.

2. Fly ash.

3. Slag cement.

4. Blended hydraulic cement.

5. Silica fume.

6. Performance-based hydraulic cement

7. Aggregates.

8. Admixtures:

a. Include limitations of use, including restrictions on cementitious materials, supplementary cementitious materials, air entrainment, aggregates, temperature at time of concrete placement, relative humidity at time of concrete placement, curing conditions, and use of other admixtures.

9. Color pigments.

10. Fiber reinforcement.

11. Vapor retarders.

12. Floor and slab treatments.

13. Liquid floor treatments.

14. Curing materials.

a. Include documentation from color pigment manufacturer, indicating that proposed methods of curing are recommended by color pigment manufacturer.

15. Joint fillers.

16. Repair materials.

B. Design Mixtures: For each concrete mixture, include the following:

1. Mixture identification.

2. Minimum 28-day compressive strength.

3. Durability exposure class.

4. Maximum w/cm.

5. Calculated equilibrium unit weight, for lightweight concrete.

6. Slump limit.

7. Air content.

8. Nominal maximum aggregate size.

9. Indicate amounts of mixing water to be withheld for later addition at Project site if permitted.

10. Intended placement method.

11. Submit alternate design mixtures when characteristics of materials, Project conditions, weather, test results, or other circumstances warrant adjustments.

C. Shop Drawings:

1. Construction Joint Layout: Indicate proposed construction joints required to construct the structure.

a. Location of construction joints is subject to approval of the Engineer.

D. Samples: For manufacturer's standard colors for color pigment

E. Concrete Schedule: For each location of each Class of concrete indicated in "Concrete Mixtures" Article, including the following:

1. Concrete Class designation.

2. Location within Project.

3. Exposure Class designation.

4. Formed Surface Finish designation and final finish.

5. Final finish for floors.

6. Curing process.

7. Floor treatment if any.

1.5 INFORMATIONAL SUBMITTALS

A. Qualification Data: For the following:

1. Installer: Include copies of applicable ACI certificates.
2. Testing agency: Include copies of applicable ACI certificates.

B. Material Certificates: For each of the following, signed by manufacturers:

1. Cementitious materials.
2. Admixtures.
3. Fiber reinforcement.
4. Curing compounds.
5. Floor and slab treatments.
6. Bonding agents.
7. Adhesives.
8. Vapor retarders.
9. Semirigid joint filler.
10. Joint-filler strips.
11. Repair materials.

C. Material Test Reports: For the following, from a qualified testing agency:

1. Portland cement.
2. Fly ash.
3. Slag cement.
4. Blended hydraulic cement.
5. Silica fume.
6. Performance-based hydraulic cement.
7. Aggregates.
8. Admixtures:
    a. Permeability-Reducing Admixture: Include independent test reports, indicating compliance with specified requirements, including dosage rate used in test.

D. Floor surface flatness and levelness measurements report, indicating compliance with specified tolerances.

E. Research Reports:

1. For concrete admixtures in accordance with ICC's Acceptance Criteria AC198.

2. For sheet vapor retarder/termite barrier, showing compliance with ICC AC380.

F. Preconstruction Test Reports: For each mix design.

G. Field quality-control reports.

H. Minutes of preinstallation conference.

1.6 QUALITY ASSURANCE

A. Installer Qualifications: A qualified installer who employs Project personnel qualified as an ACI-certified Flatwork Technician and Finisher and a supervisor who is a certified ACI Flatwork Concrete Finisher/Technician or an ACI Concrete Flatwork Technician.

1. Post-Installed Concrete Anchors Installers: ACI-certified Adhesive Anchor Installer.

B. Ready-Mixed Concrete Manufacturer Qualifications: A firm experienced in manufacturing ready-mixed concrete products and that complies with ASTM C94/C94M requirements for production facilities and equipment.

1. Manufacturer certified in accordance with NRMCA's "Certification of Ready Mixed Concrete Production Facilities."

C. Laboratory Testing Agency Qualifications: A testing agency qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated and employing an ACI-certified Concrete Quality Control Technical Manager.

1. Personnel performing laboratory tests to be an ACI-certified Concrete Strength Testing Technician and Concrete Laboratory Testing Technician, Grade I. Testing agency laboratory supervisor to be an ACI-certified Concrete Laboratory Testing Technician, Grade II.

D. Field Quality-Control Testing Agency Qualifications: An independent agency, acceptable to authorities having jurisdiction, qualified in accordance with ASTM C1077 and ASTM E329 for testing indicated.

1. Personnel conducting field tests to be qualified as an ACI Concrete Field Testing Technician, Grade 1, in accordance with ACI CPP 610.1 or an equivalent certification program.

2. Subject to compliance with requirements, approved mockups may become part of the completed Work if undisturbed at time of Substantial Completion.

1.7 PRECONSTRUCTION TESTING

A. Preconstruction Testing Service: Engage a qualified testing agency to perform preconstruction testing on each concrete mixture.

1. Include the following information in each test report:

a. Admixture dosage rates.

b. Slump.

c. Air content.

d. Seven-day compressive strength.

e. 28-day compressive strength.

f. Permeability.

1.8 DELIVERY, STORAGE, AND HANDLING

A. Comply with ASTM C94/C94M and ACI 301 (ACI 301M).

1.9 FIELD CONDITIONS

A. Cold-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 306.1 and as follows.

1. Protect concrete work from physical damage or reduced strength that could be caused by frost, freezing actions, or low temperatures.

2. When average high and low temperature is expected to fall below 40 deg F (4.4 deg C) for three successive days, maintain delivered concrete mixture temperature within the temperature range required by ACI 301 (ACI 301M).

3. Do not use frozen materials or materials containing ice or snow.

4. Do not place concrete in contact with surfaces less than 35 deg F (1.7 deg C), other than reinforcing steel.

5. Do not use calcium chloride, salt, or other materials containing antifreeze agents or chemical accelerators unless otherwise specified and approved in mixture designs.

B. Hot-Weather Placement: Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M), and as follows:

1. Maintain concrete temperature at time of discharge to not exceed 95 deg F (35 deg C).

2. Fog-spray forms, steel reinforcement, and subgrade just before placing concrete. Keep subgrade uniformly moist without standing water, soft spots, or dry areas.

PART 2 - PRODUCTS

2.1 CONCRETE, GENERAL

A. ACI Publications: Comply with ACI 301 (ACI 301M) unless modified by requirements in the Contract Documents.

2.2 CONCRETE MATERIALS

A. Source Limitations:

1. Obtain all concrete mixtures from a single ready-mixed concrete manufacturer for entire Project.

2. Obtain each type or class of cementitious material of the same brand from the same manufacturer's plant.

3. Obtain aggregate from single source.

4. Obtain each type of admixture from single source from single manufacturer.

B. Cementitious Materials:

1. Portland Cement: ASTM C150/C150M, Type II/V.

2. Fly Ash: ASTM C618, Class C or F.

3. Slag Cement: ASTM C989/C989M, Grade 100 or 120.

4. Blended Hydraulic Cement: ASTM C595/C595M, Type IS, portland blast-furnace slag cement.

5. Silica Fume: ASTM C1240 amorphous silica.

C. Normal-Weight Aggregates: ASTM C33/C33M, Class 3M coarse aggregate or better, graded. Provide aggregates from a single source.

1. Alkali-Silica Reaction: Comply with one of the following:

a. Expansion Result of Aggregate: Not more than 0.04 percent at one-year when tested in accordance with ASTM C1293.

b. Expansion Results of Aggregate and Cementitious Materials in Combination: Not more than 0.10 percent at an age of 16 days when tested in accordance with ASTM C1567.

c. Alkali Content in Concrete: Not more than 4 lb./cu. yd. (2.37 kg/cu. m) for moderately reactive aggregate or 3 lb./cu. yd. (1.78 kg/cu. m) for highly reactive aggregate, when tested in accordance with ASTM C1293 and categorized in accordance with ASTM C1778, based on alkali content being calculated in accordance with ACI 301 (ACI 301M).

2. Maximum Coarse-Aggregate Size: 1 inch (25 mm) nominal.

3. Fine Aggregate: Free of materials with deleterious reactivity to alkali in cement.

D. Air-Entraining Admixture: ASTM C260/C260M.

E. Chemical Admixtures: Certified by manufacturer to be compatible with other admixtures that do not contribute water-soluble chloride ions exceeding those permitted in hardened concrete. Do not use calcium chloride or admixtures containing calcium chloride in steel-reinforced concrete.

1. Water-Reducing Admixture: ASTM C494/C494M, Type A.

2. Retarding Admixture: ASTM C494/C494M, Type B.

3. Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type D.

4. High-Range, Water-Reducing Admixture: ASTM C494/C494M, Type F.

5. High-Range, Water-Reducing and -Retarding Admixture: ASTM C494/C494M, Type G.

6. Plasticizing and Retarding Admixture: ASTM C1017/C1017M, Type II.

F. Water and Water Used to Make Ice: ASTM C94/C94M, potable

2.3 CURING MATERIALS

A. Evaporation Retarder: Waterborne, monomolecular film forming, manufactured for application to fresh concrete.

B. Absorptive Cover: AASHTO M 182, Class 2, burlap cloth made from jute or kenaf, weighing approximately 9 oz./sq. yd. (305 g/sq. m) when dry.

C. Moisture-Retaining Cover: ASTM C171, polyethylene film burlap-polyethylene sheet.

1. Color:

a. Ambient Temperature Below 50 deg F (10 deg C): Black.

b. Ambient Temperature between 50 deg F (10 deg C) and 85 deg F (29 deg C): Any color.

c. Ambient Temperature Above 85 deg F (29 deg C): White.

D. Curing Paper: 8-feet- (2438-mm-) wide paper, consisting of two layers of fibered kraft paper laminated with double coating of asphalt.

E. Water: Potable or complying with ASTM C1602/C1602M.

F. Clear, Waterborne, Membrane-Forming, Dissipating Curing Compound: ASTM C309, Type 1, Class B.

2.4 RELATED MATERIALS

A. Expansion- and Isolation-Joint-Filler Strips: ASTM D1751, asphalt-saturated cellulosic fiber.

B. Semirigid Joint Filler: Two-component, semirigid, 100 percent solids, epoxy resin with a Type A shore durometer hardness of 80 in accordance with ASTM D2240.

C. Bonding Agent: ASTM C1059/C1059M, Type II, nonredispersible, acrylic emulsion or styrene butadiene.

D. Epoxy Bonding Adhesive: ASTM C881, two-component epoxy resin, capable of humid curing and bonding to damp surfaces, of class suitable for application temperature and of grade and class to suit requirements, and as follows:

1. Types IV and V, load bearing, for bonding hardened or freshly mixed concrete to hardened concrete.

2.5 REPAIR MATERIALS

A. Repair Underlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/8 inch (3 mm) and that can be feathered at edges to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.

2. Primer: Product of underlayment manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3 to 6 mm) or coarse sand, as recommended by underlayment manufacturer.

4. Compressive Strength: Not less than 4100 psi (29 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

B. Repair Overlayment: Cement-based, polymer-modified, self-leveling product that can be applied in thicknesses from 1/4 inch (6 mm) and that can be filled in over a scarified surface to match adjacent floor elevations.

1. Cement Binder: ASTM C150/C150M portland cement or hydraulic or blended hydraulic cement, as defined in ASTM C219.

2. Primer: Product of topping manufacturer recommended for substrate, conditions, and application.

3. Aggregate: Well-graded, washed gravel, 1/8 to 1/4 inch (3.2 to 6 mm) or coarse sand as recommended by topping manufacturer.

4. Compressive Strength: Not less than 5000 psi (34.5 MPa) at 28 days when tested in accordance with ASTM C109/C109M.

2.6 CONCRETE MIXTURES, GENERAL

A. Prepare design mixtures for each type and strength of concrete, proportioned on the basis of laboratory trial mixture or field test data, or both, in accordance with ACI 301 (ACI 301M).

1. Use a qualified testing agency for preparing and reporting proposed mixture designs, based on laboratory trial mixtures.

B. Cementitious Materials: Limit percentage, by weight, of cementitious materials other than portland cement in concrete as follows:

1. Fly Ash or Other Pozzolans: 25 percent by mass.

2. Slag Cement: 50 percent by mass.

3. Silica Fume: 10 percent by mass.

4. Total of Fly Ash or Other Pozzolans, Slag Cement, and Silica Fume: 50 percent by mass, with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

5. Total of Fly Ash or Other Pozzolans and Silica Fume: 35 percent by mass with fly ash or pozzolans not exceeding 25 percent by mass and silica fume not exceeding 10 percent by mass.

C. Admixtures: Use admixtures in accordance with manufacturer's written instructions.

1. Use high-range water-reducing admixture in concrete, as required, for placement and workability as needed.

2. Use water-reducing and -retarding admixture when required by high temperatures, low humidity, or other adverse placement conditions.

3. Use water-reducing admixture in pumped concrete, and concrete with a w/cm below 0.50 as needed.

4. Use corrosion-inhibiting admixture in concrete mixtures where indicated.

D. Color Pigment: Add color pigment to concrete mixture in accordance with manufacturer's written instructions and to result in hardened concrete color consistent with approved mockup.

2.7 CONCRETE MIXTURES

A. Class A: Normal-weight concrete used for footings, grade beams, and tie beams.

1. Exposure Classes: ACI 318 (ACI 318M) F0, S1, W0, C1.

2. Minimum Compressive Strength: 4000 psi (34.5 MPa) at 28 days.

3. Maximum w/cm: 0.45.

4. Slump Limit: 4 inches (100 mm), plus or minus 1 inch (25 mm) or 8 inches (200 mm), plus or minus 1 inch (25 mm) for concrete with verified slump of 3 inches (75 mm), plus or minus 1 inch (25 mm) before adding high-range water-reducing admixture at Project site.

5. Air Content:

a. Exposure Class F1: 4.5 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch (25-mm) nominal maximum aggregate size

b. Exposure Classes F2 and F3: 6 percent, plus or minus 1.5 percent at point of delivery for concrete containing 1-inch (25-mm) nominal maximum aggregate size.

6. Limit water-soluble, chloride-ion content in hardened concrete to 0.15 percent by weight of cement.

2.8 CONCRETE MIXING

A. Ready-Mixed Concrete: Measure, batch, mix, and deliver concrete in accordance with ASTM C94/C94M, and furnish batch ticket information.

B. Project-Site Mixing: Measure, batch, and mix concrete materials and concrete in accordance with ASTM C94/C94M. Mix concrete materials in appropriate drum-type batch machine mixer.

1. For mixer capacity of 1 cu. yd. (0.76 cu. m) or smaller, continue mixing at least 1-1/2 minutes, but not more than five minutes after ingredients are in mixer, before any part of batch is released.

2. For mixer capacity larger than 1 cu. yd. (0.76 cu. m), increase mixing time by 15 seconds for each additional 1 cu. yd. (0.76 cu. m).

3. Provide batch ticket for each batch discharged and used in the Work, indicating Project identification name and number, date, mixture type, mixture time, quantity, and amount of water added. Record approximate location of final deposit in structure.

PART 3 - EXECUTION

3.1 EXAMINATION

A. Verification of Conditions:

1. Before placing concrete, verify that installation of concrete forms, accessories, and reinforcement, and embedded items is complete and that required inspections have been performed.

2. Do not proceed until unsatisfactory conditions have been corrected.

3.2 PREPARATION

A. Provide reasonable auxiliary services to accommodate field testing and inspections, acceptable to testing agency, including the following:

1. Daily access to the Work.

2. Incidental labor and facilities necessary to facilitate tests and inspections.

3. Secure space for storage, initial curing, and field curing of test samples, including source of water and continuous electrical power at Project site during site curing period for test samples.

4. Security and protection for test samples and for testing and inspection equipment at Project site.

3.3 INSTALLATION OF EMBEDDED ITEMS

A. Place and secure anchorage devices and other embedded items required for adjoining Work that is attached to or supported by cast-in-place concrete.

1. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

2. Install anchor rods, accurately located, to elevations required and complying with tolerances in Section 7.5 of ANSI/AISC 303.

3. Install reglets to receive waterproofing and to receive through-wall flashings in outer face of concrete frame at exterior walls, where flashing is shown at lintels, shelf angles, and other conditions.

3.4 INSTALLATION OF VAPOR RETARDER

A. Sheet Vapor Retarders: Place, protect, and repair sheet vapor retarder in accordance with ASTM E1643 and manufacturer's written instructions.

1. Install vapor retarder with longest dimension parallel with direction of concrete pour.

2. Face laps away from exposed direction of concrete pour.

3. Lap vapor retarder over footings and grade beams not less than 6 inches (150 mm), sealing vapor retarder to concrete.

4. Lap joints 6 inches (150 mm) and seal with manufacturer's recommended tape.

5. Terminate vapor retarder at the top of floor slabs, grade beams, and pile caps, sealing entire perimeter to floor slabs, grade beams, foundation walls, or pile caps.

6. Seal penetrations in accordance with vapor retarder manufacturer's instructions.

7. Protect vapor retarder during placement of reinforcement and concrete.

a. Repair damaged areas by patching with vapor retarder material, overlapping damages area by 6 inches (150 mm) on all sides, and sealing to vapor retarder.

B. Bituminous Vapor Retarders: Place, protect, and repair bituminous vapor retarder in accordance with manufacturer's written instructions.

3.5 JOINTS

A. Construct joints true to line, with faces perpendicular to surface plane of concrete.

B. Construction Joints: Coordinate with floor slab pattern and concrete placement sequence.

1. Install so strength and appearance of concrete are not impaired, at locations indicated on Drawings or as approved by Architect.

2. Place joints perpendicular to main reinforcement.

a. Continue reinforcement across construction joints unless otherwise indicated.

b. Do not continue reinforcement through sides of strip placements of floors and slabs.

3. Form keyed joints as indicated. Embed keys at least 1-1/2 inches (38 mm) into concrete.

4. Locate joints for beams, slabs, joists, and girders at third points of spans. Offset joints in girders a minimum distance of twice the beam width from a beam-girder intersection.

5. Locate horizontal joints in walls and columns at underside of floors, slabs, beams, and girders and at the top of footings or floor slabs.

6. Space vertical joints in walls as indicated on Drawings. Unless otherwise indicated on Drawings, locate vertical joints beside piers integral with walls, near corners, and in concealed locations where possible.

7. Use a bonding agent at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

8. Use epoxy-bonding adhesive at locations where fresh concrete is placed against hardened or partially hardened concrete surfaces.

C. Control Joints in Slabs-on-Ground: Form weakened-plane control joints, sectioning concrete into areas as indicated. Construct control joints for a depth equal to at least one-third of concrete thickness as follows:

1. Grooved Joints: Form control joints after initial floating by grooving and finishing each edge of joint to a radius of 1/8 inch (3.2 mm). Repeat grooving of control joints after applying surface finishes. Eliminate groover tool marks on concrete surfaces.

2. Sawed Joints: Form control joints with power saws equipped with shatterproof abrasive or diamond-rimmed blades. Cut 1/8-inch- (3.2-mm-) wide joints into concrete when cutting action does not tear, abrade, or otherwise damage surface and before concrete develops random cracks.

D. Isolation Joints in Slabs-on-Ground: After removing formwork, install joint-filler strips at slab junctions with vertical surfaces, such as column pedestals, foundation walls, grade beams, and other locations, as indicated.

1. Extend joint-filler strips full width and depth of joint, terminating flush with finished concrete surface unless otherwise indicated on Drawings.

2. Terminate full-width joint-filler strips not less than 1/2 inch (13 mm) or more than 1 inch (25 mm) below finished concrete surface, where joint sealants, specified in Section 079200 "Joint Sealants," are indicated.

3. Install joint-filler strips in lengths as long as practicable. Where more than one length is required, lace or clip sections together.

E. Doweled Joints:

1. Install dowel bars and support assemblies at joints where indicated on Drawings.

2. Lubricate or asphalt coat one-half of dowel bar length to prevent concrete bonding to one side of joint.

F. Dowel Plates: Install dowel plates at joints where indicated on Drawings.

3.6 CONCRETE PLACEMENT

A. Before placing concrete, verify that installation of formwork, reinforcement, embedded items, and vapor retarder is complete and that required inspections are completed.

1. Immediately prior to concrete placement, inspect vapor retarder for damage and deficient installation, and repair defective areas.

2. Provide continuous inspection of vapor retarder during concrete placement and make necessary repairs to damaged areas as Work progresses.

B. Notify Engineer and testing and inspection agencies 24 hours prior to commencement of concrete placement.

C. Do not add water to concrete during delivery, at Project site, or during placement unless approved by Architect in writing, but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

D. Before test sampling and placing concrete, water may be added at Project site, subject to limitations of ACI 301 (ACI 301M), but not to exceed the amount indicated on the concrete delivery ticket.

1. Do not add water to concrete after adding high-range water-reducing admixtures to mixture.

E. Deposit concrete continuously in one layer or in horizontal layers of such thickness that no new concrete is placed on concrete that has hardened enough to cause seams or planes of weakness.

1. If a section cannot be placed continuously, provide construction joints as indicated.

2. Deposit concrete to avoid segregation.

3. Deposit concrete in horizontal layers of depth not to exceed formwork design pressures and in a manner to avoid inclined construction joints.

4. Consolidate placed concrete with mechanical vibrating equipment in accordance with ACI 301 (ACI 301M).

a. Do not use vibrators to transport concrete inside forms.

b. Insert and withdraw vibrators vertically at uniformly spaced locations to rapidly penetrate placed layer and at least 6 inches (150 mm) into preceding layer.

c. Do not insert vibrators into lower layers of concrete that have begun to lose plasticity.

d. At each insertion, limit duration of vibration to time necessary to consolidate concrete, and complete embedment of reinforcement and other embedded items without causing mixture constituents to segregate.

F. Deposit and consolidate concrete for floors and slabs in a continuous operation, within limits of construction joints, until placement of a panel or section is complete.

1. Do not place concrete floors and slabs in a checkerboard sequence.

2. Consolidate concrete during placement operations, so concrete is thoroughly worked around reinforcement and other embedded items and into corners.

3. Maintain reinforcement in position on chairs during concrete placement.

4. Screed slab surfaces with a straightedge and strike off to correct elevations.

5. Level concrete, cut high areas, and fill low areas.

6. Slope surfaces uniformly to drains where required.

7. Begin initial floating using bull floats or darbies to form a uniform and open-textured surface plane, before excess bleedwater appears on the surface.

8. Do not further disturb slab surfaces before starting finishing operations.

3.7 FINISHING FORMED SURFACES

A. As-Cast Surface Finishes:

1. ACI 301 (ACI 301M) Surface Finish SF-3.0:

a. Patch voids larger than 3/4 inch (19 mm) wide or 1/2 inch (13 mm) deep.

b. Remove projections larger than 1/8 inch (3 mm).

c. Patch tie holes.

d. Surface Tolerance: ACI 117 (ACI 117M) Class A.

e. Locations: Apply to concrete surfaces exposed to view or to be covered with a coating or covering material applied directly to concrete

B. Rubbed Finish: Apply the following to as cast surface finishes where indicated on Drawings:

1. Smooth-Rubbed Finish:

a. Perform no later than one day after form removal.

b. Moisten concrete surfaces and rub with carborundum brick or another abrasive until producing a uniform color and texture.

c. If sufficient cement paste cannot be drawn from the concrete by the rubbing process, use a grout made from the same cementitious materials used in the in-place concrete.

d. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

2. Grout-Cleaned Rubbed Finish:

   a. Clean concrete surfaces after contiguous surfaces are completed and accessible.

   b. Do not clean concrete surfaces as Work progresses.

   c. Mix 1 part portland cement to 1-1/2 parts fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.

   d. Wet concrete surfaces.

   e. Scrub grout into voids and remove excess grout. When grout whitens, rub surface with clean burlap, and keep surface damp by fog spray for at least 36 hours.

   f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

3. Cork-Floated Finish:

   a. Mix 1 part portland cement to 1 part fine sand, complying with ASTM C144 or ASTM C404, by volume, with sufficient water to produce a mixture with the consistency of thick paint.

   b. Mix 1 part portland cement and 1 part fine sand with sufficient water to produce a mixture of stiff grout. Add white portland cement in amounts determined by trial patches, so color of dry grout matches adjacent surfaces.

   c. Wet concrete surfaces.

   d. Compress grout into voids by grinding surface.

   e. In a swirling motion, finish surface with a cork float.

   f. Maintain required patterns or variances as shown on Drawings or to match design reference sample.

4. Scrubbed Finish: After concrete has achieved a compressive strength of from 1000 to 1500 psi (6.9 to 10.3 MPa), apply scrubbed finish.

   a. Wet concrete surfaces thoroughly and scrub with stiff fiber or wire brushes, using water freely, until top mortar surface is removed and aggregate is uniformly exposed.

   b. Rinse scrubbed surfaces with clean water.

c. Maintain continuity of finish on each surface or area of Work.

d. Remove only enough concrete mortar from surfaces to match design reference sample.

C. High-Pressure Water-Jet Finish: Apply the following to as-cast surface finishes where indicated on Drawings:

1. Perform high-pressure water jetting on concrete that has achieved a minimum compressive strength of 4500 psi (31 MPa).

2. Coordinate with formwork removal to ensure that surfaces to be high-pressure water-jet finished are treated at same age for uniform results.

3. Surface Continuity: Perform high-pressure water-jet finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.

4. Maintain required patterns or variances in reveal projection to match design reference sample.

D. Bushhammer Finish: Apply the following to as-cast surface finishes where indicated on Drawings:

1. Perform bushhammer finish to concrete that has achieved a minimum compressive strength of 4500 psi (31 MPa).

2. Surface Continuity:

a. Perform bushhammer finishing in as continuous an operation as possible, maintaining continuity of finish on each surface or area of Work.

3. Surface Cut:

a. Maintain required depth of cut and general aggregate exposure.

b. Use power tool with hammer attachments for large, flat surfaces, and use hand hammers for small areas, at corners and edges, and for restricted locations where power tools cannot reach.

4. Remove impressions of formwork and form facings with exception of tie holes.

5. Maintain required patterns or variances of cut as shown on Drawings or to match design reference sample.

6. Maintain control of concrete chips, dust, and debris in each Work area, limiting migration of airborne materials and dust by use of tarpaulins, wind-breaks, or similar devices.

E. Related Unformed Surfaces:

1. At tops of walls, horizontal offsets, and similar unformed surfaces adjacent to formed surfaces, strike off smooth and finish with a color and texture matching adjacent formed surfaces.

2. Continue final surface treatment of formed surfaces uniformly across adjacent unformed surfaces unless otherwise indicated.

3.8 FINISHING FLOORS AND SLABS

A. Comply with ACI 302.1R recommendations for screeding, restraightening, and finishing operations for concrete surfaces. Do not wet concrete surfaces.

B. Trowel Finish:

1. After applying float finish, apply first troweling and consolidate concrete by hand or power-driven trowel.

2. Continue troweling passes and restraighten until surface is free of trowel marks and uniform in texture and appearance.

3. Grind smooth any surface defects that would telegraph through applied coatings or floor coverings.

4. Do not add water to concrete surface.

5. Do not apply hard-troweled finish to concrete, which has a total air content greater than 3 percent.

6. Apply a trowel finish to surfaces exposed to view

7. Finish surfaces to the following tolerances, in accordance with ASTM E1155 (ASTM E1155M), for a randomly trafficked floor surface:

a. Slabs on Ground:

1) Finish and measure surface so gap at any point between concrete surface and an unleveled, freestanding, 10-ft.- (3.05-m-) long straightedge resting on two high spots and placed anywhere on the surface does not exceed 1/8 inch (3 mm) and also no more than 1/16 inch (1.6 mm) in 2 feet (610 mm)].

C. Trowel and Fine-Broom Finish: Apply a first trowel finish to surfaces indicated on Drawings. While concrete is still plastic, slightly scarify surface with a fine broom perpendicular to main traffic route.

1. Coordinate required final finish with Architect before application.

2. Comply with flatness and levelness tolerances for trowel-finished floor surfaces.

D. Broom Finish: Apply a broom finish to exterior concrete platforms, steps, ramps, and locations indicated on Drawings.

1. Immediately after float finishing, slightly roughen trafficked surface by brooming with fiber-bristle broom perpendicular to main traffic route.

2. Coordinate required final finish with Architect before application.

3.9 INSTALLATION OF MISCELLANEOUS CONCRETE ITEMS

A. Filling In:

1. Fill in holes and openings left in concrete structures after Work of other trades is in place unless otherwise indicated.

2. Mix, place, and cure concrete, as specified, to blend with in-place construction.

3. Provide other miscellaneous concrete filling indicated or required to complete the Work.

B. Curbs: Provide monolithic finish to interior curbs by stripping forms while concrete is still green and by steel-troweling surfaces to a hard, dense finish with corners, intersections, and terminations slightly rounded.

C. Equipment Bases and Foundations:

1. Coordinate sizes and locations of concrete bases with actual equipment provided.

2. Construct concrete bases 6 inches (150 mm) high unless otherwise indicated on Drawings, and extend base not less than 6 inches (150 mm) in each direction beyond the maximum dimensions of supported equipment unless otherwise indicated on Drawings, or unless required for seismic anchor support.

3. Minimum Compressive Strength: 4000 psi (34.5 MPa) at 28 days.

4. Install dowel rods to connect concrete base to concrete floor. Unless otherwise indicated, install dowel rods on 18-inch (450-mm) centers around the full perimeter of concrete base.

5. For supported equipment, install epoxy-coated anchor bolts that extend through concrete base and anchor into structural concrete substrate.

6. Prior to pouring concrete, place and secure anchorage devices.

a. Use setting drawings, templates, diagrams, instructions, and directions furnished with items to be embedded.

b. Cast anchor-bolt insert into bases.

c. Install anchor bolts to elevations required for proper attachment to supported equipment.

D. Steel Pan Stairs: Provide concrete fill for steel pan stair treads, landings, and associated items.

1. Cast-in inserts and accessories, as shown on Drawings.

2. Screed, tamp, and trowel finish concrete surfaces.

3.10 CONCRETE CURING

A. Protect freshly placed concrete from premature drying and excessive cold or hot temperatures.

1. Comply with ACI 301 (ACI 301M) and ACI 306.1 for cold weather protection during curing.

2. Comply with ACI 301 (ACI 301M) and ACI 305.1 (ACI 305.1M) for hot-weather protection during curing.

3. Maintain moisture loss no more than 0.2 lb/sq. ft. x h (1 kg/sq. m x h), calculated in accordance with ACI 305.1, before and during finishing operations.

B. Curing Formed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Cure formed concrete surfaces, including underside of beams, supported slabs, and other similar surfaces.

2. Cure concrete containing color pigments in accordance with color pigment manufacturer's instructions.

3. If forms remain during curing period, moist cure after loosening forms.

4. If removing forms before end of curing period, continue curing for remainder of curing period, as follows:

a. Continuous Fogging: Maintain standing water on concrete surface until final setting of concrete.

b. Continuous Sprinkling: Maintain concrete surface continuously wet.

c. Absorptive Cover: Pre-dampen absorptive material before application; apply additional water to absorptive material to maintain concrete surface continuously wet.

d. Water-Retention Sheeting Materials: Cover exposed concrete surfaces with sheeting material, taping, or lapping seams.

e. Membrane-Forming Curing Compound: Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

1) Recoat areas subject to heavy rainfall within three hours after initial application.

2) Maintain continuity of coating and repair damage during curing period.

C. Curing Unformed Surfaces: Comply with ACI 308.1 (ACI 308.1M) as follows:

1. Begin curing immediately after finishing concrete.

2. Interior Concrete Floors:

a. Floors to Receive Floor Coverings Specified in Other Sections: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).

b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.

b) Continuous water-fog spray.

b. Floors to Receive Penetrating Liquid Floor Treatments: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).

b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Moisture-Retaining-Cover Curing: Cover concrete surfaces with moisture-retaining cover for curing concrete, placed in widest practicable width, with sides and ends lapped at least 12 inches (300 mm), and sealed by waterproof tape or adhesive.

a) Immediately repair any holes or tears during curing period, using cover material and waterproof tape.

b) Cure for not less than seven days.

3) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.

b) Continuous water-fog spray.

c. Floors to Receive Polished Finish: Contractor has option of the following:

1) Absorptive Cover: As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

a) Lap edges and ends of absorptive cover not less than 12 inches (300 mm).

b) Maintain absorptive cover water saturated, and in place, for duration of curing period, but not less than seven days.

2) Ponding or Continuous Sprinkling of Water: Maintain concrete surfaces continuously wet for not less than seven days, utilizing one, or a combination of, the following:

a) Water.

b) Continuous water-fog spray.

d. Floors to Receive Chemical Stain:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install curing paper over entire area of floor.

2) Install curing paper square to building lines, without wrinkles, and in a single length without end joints.

3) Butt sides of curing paper tight; do not overlap sides of curing paper.

4) Leave curing paper in place for duration of curing period, but not less than 28 days.

e. Floors to Receive Urethane Flooring:

1) As soon as concrete has sufficient set to permit application without marring concrete surface, install prewetted absorptive cover over entire area of floor.

2) Rewet absorptive cover, and cover immediately with polyethylene moisture-retaining cover with edges lapped 6 inches (150 mm) and sealed in place.

3) Secure polyethylene moisture-retaining cover in place to prohibit air from circulating under polyethylene moisture-retaining cover.

4) Leave absorptive cover and polyethylene moisture-retaining cover in place for duration of curing period, but not less than 28 days.

f. Floors to Receive Curing Compound:

1) Apply uniformly in continuous operation by power spray or roller in accordance with manufacturer's written instructions.

2) Recoat areas subjected to heavy rainfall within three hours after initial application.

3) Maintain continuity of coating, and repair damage during curing period.

4) Removal: After curing period has elapsed, remove curing compound without damaging concrete surfaces by method recommended by curing compound manufacturer unless manufacturer certifies curing compound does not interfere with bonding of floor covering used on Project.

g. Floors to Receive Curing and Sealing Compound:

1) Apply uniformly to floors and slabs indicated in a continuous operation by power spray or roller in accordance with manufacturer's written instructions.

2) Recoat areas subjected to heavy rainfall within three hours after initial application.

3) Repeat process 24 hours later, and apply a second coat. Maintain continuity of coating, and repair damage during curing period.

3.11 TOLERANCES

A. Conform to ACI 117 (ACI 117M).

3.12 APPLICATION OF LIQUID FLOOR TREATMENTS

A. Penetrating Liquid Floor Treatment: Prepare, apply, and finish penetrating liquid floor treatment in accordance with manufacturer's written instructions.

1. Remove curing compounds, sealers, oil, dirt, laitance, and other contaminants and complete surface repairs.

2. Do not apply to concrete that is less than 28 days' old.

3. Apply liquid until surface is saturated, scrubbing into surface until a gel forms; rewet; and repeat brooming or scrubbing.

4. Rinse with water; remove excess material until surface is dry.

5. Apply a second coat in a similar manner if surface is rough or porous.

B. Sealing Coat: Uniformly apply a continuous sealing coat of curing and sealing compound to hardened concrete by power spray or roller in accordance with manufacturer's written instructions.

3.13 JOINT FILLING

A. Prepare, clean, and install joint filler in accordance with manufacturer's written instructions.

1. Defer joint filling until concrete has aged at least one month(s).

B. Do not fill joints until construction traffic has permanently ceased.

C. Remove dirt, debris, saw cuttings, curing compounds, and sealers from joints; leave contact faces of joints clean and dry.

D. Install semirigid joint filler full depth in saw-cut joints and at least 2 inches (50 mm) deep in formed joints.

E. Overfill joint, and trim joint filler flush with top of joint after hardening.

3.14 CONCRETE SURFACE REPAIRS

A. Defective Concrete:

1. Repair and patch defective areas when approved by Engineer.

2. Remove and replace concrete that cannot be repaired and patched to Engineer's approval.

B. Patching Mortar: Mix dry-pack patching mortar, consisting of 1 part portland cement to 2-1/2 parts fine aggregate passing a No. 16 (1.18-mm) sieve, using only enough water for handling and placing.

C. Repairing Formed Surfaces: Surface defects include color and texture irregularities, cracks, spalls, air bubbles, honeycombs, rock pockets, fins and other projections on the surface, and stains and other discolorations that cannot be removed by cleaning.

1. Immediately after form removal, cut out honeycombs, rock pockets, and voids more than 1/2 inch (13 mm) in any dimension to solid concrete.

a. Limit cut depth to 3/4 inch (19 mm).

b. Make edges of cuts perpendicular to concrete surface.

c. Clean, dampen with water, and brush-coat holes and voids with bonding agent.

d. Fill and compact with patching mortar before bonding agent has dried.

e. Fill form-tie voids with patching mortar or cone plugs secured in place with bonding agent.

2. Repair defects on surfaces exposed to view by blending white portland cement and standard portland cement, so that, when dry, patching mortar matches surrounding color.

a. Patch a test area at inconspicuous locations to verify mixture and color match before proceeding with patching.

b. Compact mortar in place and strike off slightly higher than surrounding surface.

3. Repair defects on concealed formed surfaces that will affect concrete's durability and structural performance as determined by Architect.

D. Repairing Unformed Surfaces:

1. Test unformed surfaces, such as floors and slabs, for finish, and verify surface tolerances specified for each surface.
    a. Correct low and high areas.
    b. Test surfaces sloped to drain for trueness of slope and smoothness; use a sloped template.
2. Repair finished surfaces containing surface defects, including spalls, popouts, honeycombs, rock pockets, crazing, and cracks in excess of 0.01 inch (0.25 mm) wide or that penetrate to reinforcement or completely through unreinforced sections regardless of width, and other objectionable conditions.
3. After concrete has cured at least 14 days, correct high areas by grinding.
4. Correct localized low areas during, or immediately after, completing surface-finishing operations by cutting out low areas and replacing with patching mortar.
    a. Finish repaired areas to blend into adjacent concrete.
5. Correct other low areas scheduled to receive floor coverings with a repair underlayment.
    a. Prepare, mix, and apply repair underlayment and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
    b. Feather edges to match adjacent floor elevations.
6. Correct other low areas scheduled to remain exposed with repair topping.
    a. Cut out low areas to ensure a minimum repair topping depth of 1/4 inch (6 mm) to match adjacent floor elevations.
    b. Prepare, mix, and apply repair topping and primer in accordance with manufacturer's written instructions to produce a smooth, uniform, plane, and level surface.
7. Repair defective areas, except random cracks and single holes 1 inch (25 mm) or less in diameter, by cutting out and replacing with fresh concrete.
    a. Remove defective areas with clean, square cuts, and expose steel reinforcement with at least a 3/4-inch (19-mm) clearance all around.
    b. Dampen concrete surfaces in contact with patching concrete and apply bonding agent.
    c. Mix patching concrete of same materials and mixture as original concrete, except without coarse aggregate.
    d. Place, compact, and finish to blend with adjacent finished concrete.
    e. Cure in same manner as adjacent concrete.

8. Repair random cracks and single holes 1 inch (25 mm) or less in diameter with patching mortar.

    a. Groove top of cracks and cut out holes to sound concrete, and clean off dust, dirt, and loose particles.

    b. Dampen cleaned concrete surfaces and apply bonding agent.

    c. Place patching mortar before bonding agent has dried.

    d. Compact patching mortar and finish to match adjacent concrete.

    e. Keep patched area continuously moist for at least 72 hours.

E. Perform structural repairs of concrete, subject to Architect's approval, using epoxy adhesive and patching mortar.

F. Repair materials and installation not specified above may be used, subject to Architect's approval.

3.15 FIELD QUALITY CONTROL

A. Special Inspections: Owner will engage a special inspector to perform field tests and inspections and prepare testing and inspection reports.

B. Testing Agency: Owner will engage a qualified testing and inspecting agency to perform tests and inspections and to submit reports.

1. Testing agency to be responsible for providing curing container for composite samples on Site and verifying that field-cured composite samples are cured in accordance with ASTM C31/C31M.

2. Testing agency to immediately report to Architect, Contractor, and concrete manufacturer any failure of Work to comply with Contract Documents.

3. Testing agency to report results of tests and inspections, in writing, to Owner, Architect, Contractor, and concrete manufacturer within 48 hours of inspections and tests.

    a. Test reports to include reporting requirements of ASTM C31/C31M, ASTM C39/C39M, and ACI 301, including the following as applicable to each test and inspection:

        1) Project name.

        2) Name of testing agency.

        3) Names and certification numbers of field and laboratory technicians performing inspections and testing.

        4) Name of concrete manufacturer.

        5) Date and time of inspection, sampling, and field testing.

        6) Date and time of concrete placement.

7) Location in Work of concrete represented by samples.

8) Date and time sample was obtained.

9) Truck and batch ticket numbers.

10) Design compressive strength at 28 days.

11) Concrete mixture designation, proportions, and materials.

12) Field test results.

13) Information on storage and curing of samples before testing, including curing method and maximum and minimum temperatures during initial curing period.

14) Type of fracture and compressive break strengths at seven days and 28 days.

C. Batch Tickets: For each load delivered, submit three copies of batch delivery ticket to testing agency, indicating quantity, mix identification, admixtures, design strength, aggregate size, design air content, design slump at time of batching, and amount of water that can be added at Project site.

D. Inspections:

1. Headed bolts and studs.

2. Verification of use of required design mixture.

3. Concrete placement, including conveying and depositing.

4. Curing procedures and maintenance of curing temperature.

5. Verification of concrete strength before removal of shores and forms from beams and slabs.

6. Batch Plant Inspections: On a random basis, as determined by Architect.

E. Concrete Tests: Testing of composite samples of fresh concrete obtained in accordance with ASTM C 172/C 172M to be performed in accordance with the following requirements:

1. Testing Frequency: Obtain one composite sample for each day's pour of each concrete mixture exceeding 5 cu. yd. (4 cu. m), but less than 25 cu. yd. (19 cu. m), plus one set for each additional 50 cu. yd. (38 cu. m) or fraction thereof.

a. When frequency of testing provides fewer than five compressive-strength tests for each concrete mixture, testing to be conducted from at least five randomly selected batches or from each batch if fewer than five are used.

2. Slump: ASTM C143/C143M:

a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.

b. Perform additional tests when concrete consistency appears to change.

3. Slump Flow: ASTM C1611/C1611M:

   a. One test at point of placement for each composite sample, but not less than one test for each day's pour of each concrete mixture.

   b. Perform additional tests when concrete consistency appears to change.

4. Air Content: ASTM C231/C231M pressure method, for normal-weight concrete.

   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

5. Concrete Temperature: ASTM C1064/C1064M:

   a. One test hourly when air temperature is 40 deg F (4.4 deg C) and below or 80 deg F (27 deg C) and above, and one test for each composite sample.

6. Unit Weight: ASTM C567/C567M fresh unit weight of structural lightweight concrete.

   a. One test for each composite sample, but not less than one test for each day's pour of each concrete mixture.

7. Compression Test Specimens: ASTM C31/C31M:

   a. Cast and laboratory cure two sets of four 6-inch (150 mm) by 12-inch (300 mm) or 4-inch (100 mm) by 8-inch (200 mm) cylinder specimens for each composite sample.

   b. Cast, initial cure, and field cure two sets of four standard cylinder specimens for each composite sample.

8. Compressive-Strength Tests: ASTM C39/C39M.

   a. Test one set of two laboratory-cured specimens at seven days and one set of two specimens at 28 days.

   b. Test one set of two field-cured specimens at seven days and one set of two specimens at 28 days.

   c. A compressive-strength test to be the average compressive strength from a set of two specimens obtained from same composite sample and tested at age indicated.

9. When strength of field-cured cylinders is less than 85 percent of companion laboratory-cured cylinders, Contractor to evaluate operations and provide corrective procedures for protecting and curing in-place concrete.

10. Strength of each concrete mixture will be satisfactory if every average of any three consecutive compressive-strength tests equals or exceeds specified compressive strength, and no compressive-strength test value falls below specified compressive strength by more than 500 psi (3.4 MPa) if specified

compressive strength is 5000 psi (34.5 MPa), or no compressive strength test value is less than 10 percent of specified compressive strength if specified compressive strength is greater than 5000 psi (34.5 MPa).

11. Nondestructive Testing: Impact hammer, sonoscope, or other nondestructive device may be permitted by Architect but will not be used as sole basis for approval or rejection of concrete.

12. Additional Tests:

    a. Testing and inspecting agency to make additional tests of concrete when test results indicate that slump, air entrainment, compressive strengths, or other requirements have not been met, as directed by Engineer.

    b. Testing and inspecting agency may conduct tests to determine adequacy of concrete by cored cylinders complying with ASTM C42/C42M or by other methods as directed by Architect.

        1) Acceptance criteria for concrete strength to be in accordance with ACI 301 (ACI 301M), Section 1.6.6.3.

13. Additional testing and inspecting, at Contractor's expense, will be performed to determine compliance of replaced or additional work with specified requirements.

14. Correct deficiencies in the Work that test reports and inspections indicate do not comply with the Contract Documents.

F. Measure floor and slab flatness and levelness in accordance with ASTM E1155 (ASTM E1155M) within 48 hours of completion of floor finishing and promptly report test results to Architect.

3.16 PROTECTION

A. Protect concrete surfaces as follows:

1. Protect from petroleum stains.

2. Diaper hydraulic equipment used over concrete surfaces.

3. Prohibit vehicles from interior concrete slabs.

4. Prohibit use of pipe-cutting machinery over concrete surfaces.

5. Prohibit placement of steel items on concrete surfaces.

6. Prohibit use of acids or acidic detergents over concrete surfaces.

7. Protect liquid floor treatment from damage and wear during the remainder of construction period. Use protective methods and materials, including temporary covering, recommended in writing by liquid floor treatments installer.

8. Protect concrete surfaces scheduled to receive surface hardener or polished concrete finish using Floor Slab Protective Covering.

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 05 12 00

STRUCTURAL STEEL

PART 1 - GENERAL

1.1 SCOPE OF WORK

A. The CONTRACTOR shall furnish, fabricate, and place all structural steel and make all connections necessary to provide a complete work and in accordance with the Contract Documents.

1.2 REFERENCES

A. American Institute of Steel Construction (AISC):

1. Specification for Structural Steel Buildings—Allowable Stress Design and Plastic Design, excluding Section A7.1
2. Allowable Stress Design Specification for Structural Joints using ASTM A325 or A490 Bolts.
3. Manual of Steel Construction, Allowable Stress Design
4. Seismic Provisions for Structural Steel Buildings
5. Code of Standard Practice for Steel Buildings and Bridges, excluding Sections 3, 4, 7.11.3.3, 7.11.4, 7.11.5, and 7.13
6. AISC Quality Certification Program
7. AISC Erector Certification Program

B. American Society of Mechanical Engineers (ASME):

1. BPVC SEC IX Qualification Standard for Welding and Brazing Procedures, Welders, Brazers, and Welding and Brazing

C. American Society of Nondestructive Testing (ASNT):

1. ASNT-TC-IA Personnel Qualification and Certification in Nondestructive Testing

D. American Welding Society (AWS):

1. D1.1 Structural Welding Code-Steel
2. QC 1 Standard for AWS Certification of Welding Inspectors

E. ASTM International (ASTM):

1. A6 Standard Specification for General Requirements for Rolled Structural Steel Bars, Plates, Shapes, and Steel Piling.
2. A36 Standard Specification for Structural Steel

3. A53 Standard Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated Welded and Seamless
4. A123 Standard Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
5. A143 Standard Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedures for Detecting Embrittlement
6. A153 Standard Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
7. A307 Standard Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile Strength
8. A325 Standard Specification for High-Strength Bolts for Structural Steel Joints
9. A384 Standard Practice for Safeguarding Against Warpage and Distortion During Hot-Dip Galvanizing of Steel Assemblies
10. A385 Standard Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
11. A490 Standard Specification for Heat-Treated Steel Structural bolts, 150 ksi Minimum Tensile Strength.
12. A500 Standard Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes
13. A501 Standard Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
14. A563 Standard Specification for Carbon and Alloy Steel Nuts
15. A572 Standard Specification for High-Strength Low Alloy Columbium-Vanadium Structural Steel
16. A588 Standard Specification for High-Strength Low Alloy Structural Steel with 50 ksi Minimum Yield Point to 4 in. thick
17. A673 Standard Specification for Sampling Procedure for Impact Testing of Structural Steel
18. A780 Standard Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
19. A992 Standard Specification for Steel for Structural Shapes for Use in Building Frames
20. B695 Standard Specification for Coatings of Zinc Mechanically Deposited on Iron and Steel.
21. F436 Standard Specification for Hardened Steel Washers

22. F959 Standard Specification for Compressible-Washer-Type Direct Tension Indicators for Use with Structural Fasteners

23. F1852 Standard Specification for "Twist Off" Type Tension Control Structural Bolt/Nut/Washer Assemblies, Steel, Heat Treated, 120/150 ksi Minimum Tensile Strength

1.3 SUBMITTALS

A. Action Submittals:

1. Provide shop drawings showing erection plans, member size and their connections.
2. Anchor bolt layouts.
3. Hardened washer details (if applicable).
4. Joint details for complete penetration welds
5. Schedules for fabrication procedures
6. Primer and other coatings for items in this Section
7. Name and address of manufacturer(s)
8. Product specifications
9. Manufacturers' testing procedures and standards
10. Preparation and installation or application instructions, as appropriate

B. Informational Submittals:

1. Mill Certificates of tests made in accordance with ASTM A6.
2. High-Strength Bolts (Plain Noncoated and Hot-Dip Galvanized):
   a. Certificates of Compliance that products meet chemical and mechanical requirements of standards specified.
   b. Manufacturer's inspection test report results for production lot(s) furnished, to include:
      1) Tensile strength
      2) Yield strength
      3) Reduction of area
      4) Elongation and hardness
3. Certified Mill Test Reports for Bolts and Nuts:
   a. Name and address of manufacturer.
   b. Bolts correctly marked.

c. Marked bolts and nuts used in required mill tests and manufacturer's inspection tests.

4. Direct Tension Indicators (DTIs): Furnish manufacturer's test report meeting requirements of ASTM F959.

5. Tension Control (TC) Bolts: Furnish manufacturer's test report meeting requirements of ASTM A325 and ASTM F1852.

6. Methods proposed to resolve misalignment between anchor bolts and bolt holes in steel members.

7. Welding Procedures, Qualifications, and Inspection Report. Provide in accordance with AWS D1.1/D1.1M for each welded joint whether prequalified or qualified by testing, including the following:

   a. Power Source (constant current or constant voltage).

   b. Electrode manufacturer and trade name, for demand-critical welds

8. AISC Quality Certification: AISC certificate showing name and address of certified firm, effective date, and category of certification.

1.4 QUALITY ASSURANCE

A. Mill identification marks in accordance with ASTM A6.

B. AISC Quality Certification for Fabricator: Conventional Steel Structures (Sbd).

C. Welding Qualifications:

1. Welding Procedure Specifications: In accordance with AWS D1.1 (Annex E) or ASME BPVC SEC IX (Forms QW-482 and QW-483).

2. Welder/Welding Operator Performance Qualifications: In accordance with AWS D1.1 (Annex E), or ASME BPVC SEC IX (Form QW-484).

3. Certified Welding Inspector: Certified in accordance with AWS QC1, and having prior experience with the welding codes specified.

4. Testing Agency: Personnel performing tests shall be Nondestructive Testing Level II Certified in accordance with ASNT SNT-TC-1A.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Delivery: Load structural members in such a manner that they will be transported and unloaded without damage to coatings and without being excessively stressed, deformed, or otherwise damaged.

B. Storage:

1. Protect structural steel members and packaged materials from corrosion and deterioration.

2. Store in dry area and not in direct contact with ground.

3. Protect fasteners from dirt and moisture. Do not remove lubricant from bolts and nuts.

4. Handle materials to avoid distortion or damage to members or supporting structures.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Rolled Plates, Shapes except W-Shapes, and Bars: ASTM A36, unless indicated otherwise.

B. W-Shapes: ASTM A992, unless indicated otherwise on Drawings.

C. Plate material for frame connections shall be ASTM A572, Grade 50, where indicated on Drawings.

D. Steel Pipe: ASTM A500 Round.

E. Square and Rectangular Hollow Structural Sections (HSS): ASTM A500, Grade C (Fy equals 50 ksi).

2.2 FASTENERS

A. Anchor Bolts: As specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

B. High-Strength Bolts: ASTM A325 or ASTM A490, bolt type 1, galvanized. Bolt length and thread length shall be as required for the connection type shown, with hardened washers as required.

C. Direct Tension Indicators (DTIs) or Load Indicator Washers:

1. ASTM F959, coating type to match bolt finish.

2. Type A325 or A490, to match bolt type.

3. Manufacturers and Products:

a. TurnaSure LLC, Langhorne, PA; DTI's.

b. Applied Bolting Technology Products, Ludlow, VT; DTI's, regular or Squirter type.

D. Tension Control (TC) Bolts:

1. High-strength, ASTM A325 and F1852.

2. Manufacturers:

a. LeJeune Bolt Company, Burnsville, MN.

b. Nucor Fastener, Saint Joe, IN.

c. T.S. Bolts and Tools, Bristol Machine Co., Walnut, CA.

d. Haydon Bolts, Philadelphia, PA.

e. Vermont Fasteners Manufacturing, Swanton, VT.

E. Machine Bolts (M.B.): ASTM A307

F. Nuts: ASTM A563, type to match bolt type and finish.

G. Hardened Steel Flat and Beveled Washers: ASTM F436, type to match bolt finish.

H. Welded Shear Studs: As specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

2.3 ANCILLARY MATERIALS

A. Surface Preparation and Primer:

1. Surface Preparation of Steel: Clean surfaces to be painted. Remove loose rust and mill scale and spatter, slag, or flux deposits. Prepare surfaces in accordance with the following specifications and standards:

a. SSPC-SP 2

b. SSPC-SP 3

c. SSPC-SP 7 (WAB)/NACE WAB-4

d. SSPC-SP 14 (WAB)/NACE WAB-8

e. SSPC-SP 11

f. SSPC-SP 6 (WAB)/NACE WAB-3

g. SSPC-SP 10 (WAB)/NACE WAB-2

h. SSPC-SP 5 (WAB)/NACE WAB-1

i. SSPC-SP 8

2. Surface Preparation of Galvanized Steel: Prepare galvanized-steel surfaces for shop priming by thoroughly cleaning steel of grease, dirt, oil, flux, and other foreign matter, and treating with etching cleaner or in accordance with SSPC-SP 16.

3. Priming: Immediately after surface preparation, apply primer in accordance with manufacturer's written instructions and at rate recommended by SSPC to provide minimum dry film thickness of 1.5 mils (0.038 mm). Use priming methods that result in full coverage of joints, corners, edges, and exposed surfaces.

a. Stripe paint corners, crevices, bolts, welds, and sharp edges.

b. Apply two coats of shop paint to surfaces that are inaccessible after assembly or erection. Change color of second coat to distinguish it from first.

B. Grout:

1. Metallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, metallic aggregate grout, mixed with water to consistency suitable for application and a 30-minute working time.

2. Nonmetallic, Shrinkage-Resistant Grout: ASTM C1107/C1107M, factory-packaged, nonmetallic aggregate grout, noncorrosive and nonstaining, mixed with water to consistency suitable for application and a 30-minute working time.

2.4 FABRICATION

A. General:

1. Fabricate as shown and in accordance with AISC Specification for Structural Steel Buildings and AISC Code of Standard Practice for Steel Buildings and Bridges.

2. Columns shall be full length members without splices, unless shown otherwise or approved by ENGINEER.

3. Mark and match mark materials for field assembly.

4. Complete assembly, including bolting and welding of units, before start of finishing operations.

5. Fabricate to agree with field measurements.

B. Connections:

1. Shop Connections: Weld or bolt, as shown.

2. Meet requirements of AISC Manual of Steel Construction tables for bolted double-angle shear connections, unless indicated otherwise.

3. Meet OSHA requirements for one independent bolt at beams framing in to column web connections.

4. Provide oversized holes for anchor bolts in column base plates in accordance with AISC Manual of Steel Construction, unless indicated otherwise.

C. Welded Construction:

1. Conform to governing welding codes for type of weld and material for each weld.

2. Groove and Butt Joint Welds: Complete penetration, unless otherwise indicated.

3. Interface with Other Work.

D. Holes:

1. As necessary or as indicated for securing other Work to structural steel framing, and for passage of other Work through steel framing members.

2. No flame-cut holes will be permitted without prior approval of ENGINEER.

3. Weld threaded nuts to framing, and other specialty items as shown to receive other Work.

E. Shop Paint Primer:

1. Do not shop prime the following surfaces, unless indicated otherwise:

a. Faying surfaces of slip critical bolted connections.

b. Within 2 inches of field-welded connections.

c. Steel members to be completely encased in reinforced concrete or coated with cementitious fireproofing.

F. Galvanizing:

1. Fabricate steel to be galvanized in accordance with ASTM A143, A384, and A385. Avoid fabrication techniques that could cause distortion or embrittlement of steel.

2. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.

3. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.

4. Hot-dip galvanize steel members, fabrications, and assemblies after fabrication in accordance with ASTM A123.

5. Hot-dip galvanize A325 bolts, nuts, washers, and hardware components in accordance with ASTM A153.

6. Oversize holes to allow for zinc alloy growth.

7. Shop assemble bolts, nuts, and washers with special lubricant and test in accordance with ASTM A325 and A563.

8. Tension-control (TC) bolts, nuts, and washers shall be mechanically zinc coated in accordance with ASTM F1852 and B695, Class 50.

9. Galvanize components of bolted assemblies separately before assembly.

2.5 SOURCE QUALITY CONTROL

A. Welding:

1. Visually inspect fabrication welds in accordance with AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.

2. An independent testing agency will be retained by OWNER to perform the following inspection and testing of fabrication welds.

a. Groove welds:

1) Radiographic (RT) or ultrasonic (UT) testing for 10 percent of randomly selected welds, unless otherwise indicated.

2) Use RT only for butt joint groove welds.

b. Fillet welds larger than 5/16-inch: Liquid penetrant (PT) or magnetic particle (MT) for 10 percent of randomly selected welds, unless otherwise indicated.

c. All Welds: 100 percent visually inspected (VT).

3. The Certified Welding Inspector (CWI) shall perform inspection prior and during assembly, during welding, and after welding. CWI duties include:

a. Verifying conformance of specified job material and proper storage.

b. Monitoring conformance with approved Welding Procedure Specification.

c. Monitoring conformance of Welder/Welding Operator Performance Qualification.

d. Inspecting weld joint fit-up and in-process inspection.

e. Providing 100 percent visual inspection of all welds.

f. Supervising nondestructive testing personnel and evaluating test results.

g. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.

4. Repair and retest rejected weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

B. Special inspection of fabrication process and shop welding will be provided by OWNER as indicated on Drawings.

C. Hot-Dip Galvanizing:

1. An independent testing agency will be retained by OWNER to inspect and test hot-dip galvanized fabricated items in accordance with ASTM A123 and A153.

2. Visually inspect and test for thickness and adhesion of zinc coating for minimum of three test samples from each lot in accordance with ASTM A123 and A153.

3. Reject and retest nonconforming articles in accordance with ASTM A123 and A153.

PART 3 - EXECUTION

3.1 STEEL MEMBER ERECTION

A. Meet requirements of AISC Specification for Structural Steel Buildings and AISC Code of Standard Practice for Steel Buildings and Bridges, with exceptions as specified.

B. CONTRACTOR is responsible for design and installation of temporary bracing to support components as erection proceeds.

C. High-Strength Bolted Connections:

1. Tighten in accordance with AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts.

2. Hardened Washers:

a. Provide at locations required by Washer Requirements section of AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts, to include slip critical connections using slotted or oversized holes or A490 bolts.

b. Use beveled style and extra thickness where required by AISC Specification.

c. Use square or rectangular beveled washers at inner flange surfaces of American Standard beams and channels.

d. Do not substitute DTIs for hardened flat washers required at slotted and oversize holes.

3. For bearing-type connections not fully tensioned (N, X), tighten to snug tight condition. Use hardened washer over slotted or oversize holes in outer plies.

D. Fully Tensioned Bolted Connections:

1. Use DTIs or TC bolts at slip critical (SC) and fully tensioned (FT) bearing-type connections.

2. DTIs:

a. Position within bolted assembly in accordance with ASTM F959.

b. Install bolts, with DTIs plus hardened washers as required, in all holes of an assembly and tighten until plies are in firm contact and fasteners are uniformly snug tight.

3. Final tighten bolts, beginning at most rigid part of bolted connection and progressing toward free edges, until final twist-off of TC bolts or until DTIs have been compressed to an average gap equal to or less than shown in Table 2, ASTM F959.

E. Welded Connections:

1. Welding and Fabrication by Welding: Conform to AWS D1.1 Structural Welding Code based on material and type of weld.

2. Groove and Butt Joint Welds: Complete penetration, unless otherwise indicated.

3.2 ANCHOR BOLTS

A. Coordinate installation of anchor bolts and other connectors required for securing structural steel to in-place work.

B. Provide templates and other devices for presetting bolts and other anchors to accurate locations.

C. Projection of anchor bolts beyond face of concrete and threaded length shall be adequate to allow for full engagement of all threads of hold-down nuts, adjustment of leveling nuts, washer thicknesses, and construction tolerances, unless indicated otherwise.

D. Placement Tolerances:

1. As required by AISC Code of Standard Practice for Steel Buildings and Bridges, unless indicated otherwise.

2. Embedded anchor bolts shall not vary from the dimensions as shown on Drawings by more than the following:

a. Center to center of any two bolts within an anchor group: 1/8 inch.

b. Center to center of adjacent anchor bolt groups: 1/4 inch.

c. Variation from perpendicular to theoretical bearing surface: 1:50.

3.3 SETTING BASES AND BEARING PLATES

A. Clean concrete and masonry bearing surfaces of bond reducing materials and roughen to improve bond to bearing surfaces.

B. Clean bottom surface of base and bearing plates.

C. Set loose and attached base plates and bearing plates for structural members on wedges, shims, leveling nuts, or other adjustable devices. Use leveling plates where indicated on Drawings.

D. Tighten anchor bolts after supported members have been positioned and plumbed. Do not remove wedges or shims, but if protruding, cut off flush with edge of base or bearing plate prior to placing grout. Weld plate washers to base plates where indicated in Drawings.

E. Grout Under Base plates prior to placing loads on structure.

1. Promptly pack shrinkage-resistant grout solidly between bearing surfaces and plates, so no voids remain. Neatly finish exposed surfaces; protect grout and allow to cure. Comply with manufacturer's written installation instructions for grouting.

3.4 FIELD ASSEMBLY

A. Set structural frames accurately to lines and elevations shown.

B. Clean bearing surfaces and other surfaces that will be in permanent contact before assembly.

C. Align and adjust various members forming a part of a complete frame or structure before permanently fastening.

D. Level and plumb individual members of structure within tolerances shown in AISC Code of Standard Practice for Steel Buildings and Bridges.

E. Establish required leveling and plumbing measurements on mean operating temperature of structure. Make allowances for difference between temperature at time of erection and mean temperature at which structure will be completed and in service.

F. Perform necessary adjustments to compensate for minor discrepancies in elevations and alignment.

G. Provide additional field connection material as required by AISC Code of Standard Practice for Steel Buildings and Bridges.

H. Splice members only where indicated and accepted on shop drawings.

3.5 MISFITS AT BOLTED CONNECTIONS

A. Where misfits in erection bolting are encountered, immediately notify ENGINEER for approval of one of the following methods of correction:

1. Ream holes that must be enlarged to admit bolts and use oversized bolts.

2. Plug weld misaligned holes and redrill holes to admit standard size bolts.

3. Drill additional holes in connection, conforming with AISC Standards for bolt spacing and end and edge distances, and add additional bolts.

4. Reject member containing misfit, incorrect sized, or misaligned holes and fabricate new member to ensure proper fit.

B. Do not enlarge incorrectly sized or misaligned holes in members by burning or using a drift pin.

3.6 MISFITS AT ANCHOR BOLTS

A. Resolve misalignments between anchor bolts and bolt holes in steel members in accordance with approved submittal.

B. Do not flame cut to enlarge holes without prior approval of ENGINEER.

3.7 GAS CUTTING

A. Do not use gas cutting torches in field for correcting fabrication errors in structural framing.

B. Secondary members not under stress and concealed in finished structure may be corrected by gas cutting torches, if approved by ENGINEER.

C. Finish flame-cut sections equivalent to sheared and punched appearance.

3.8 REPAIR AND CLEANING

A. Immediately after erection, clean field welds, bolted connections, and abraded areas of shop primer.

B. Remove and grind smooth tack welds, fit-up-lugs, and weld runoff tabs.

C. Remove weld back-up bars and grind smooth where indicated on Drawings.

D. Apply touchup paint primer by brush or spray of same thickness and material as that used in shop application.

3.9 REPAIR OF DAMAGED HOT-DIP GALVANIZED COATING

A. Conform to ASTM A780.

B. For minor repairs at abraded areas, use sprayed zinc conforming to ASTM A780.

C. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780.

D. Use magnetic gauge to determine that thickness is equal to or greater than base galvanized coating.

3.10 FIELD QUALITY CONTROL

A. High-Strength Bolted Connections:

1. An independent testing agency will be retained by OWNER to perform the following inspection and testing in accordance with the AISC Specification for Structural Joints Using ASTM A325 or A490 Bolts:

a. Marking identification and conformance to ASTM standards.

b. Alignment of bolt holes.

c. Placement, type, and thickness of hardened washers.

d. Tightening of bolts.

2. Bearing-Type Connections Not Fully Tensioned (N, X): Snug tight condition with plies of joint in firm contact.

3. Fully Tensioned (FT) Bearing and Slip Critical (SC) Connections:

a. Conduct preinstallation test.

b. Monitor installation and tightening of DTIs or TC bolts.

c. Monitor condition of faying surfaces for slip critical connections.

4. Preinstallation Test:

a. Conduct jobsite test prior to start of work using a bolt tension measuring device.

b. Select representative sample of not less than three bolts of each diameter, length, and grade.

c. Include DTIs and flat hardened washers as required to match actual connection assembly.

d. Conduct test in accordance with Specification for Structural Joints Using ASTM A325 or A490 Bolts.

5. Nondestructive Testing (NDT) Report: Prepare and submit a written NDT report identifying location of inspected bolted connections and summary of corrections as required to meet code acceptance criteria.

6. Defective Connections: Correct and reinspect defective and improperly tightened high-strength bolted connections. Retest fully tensioned bolts as necessary to demonstrate compliance of completed work.

B. Welded Connections:

1. Visually inspect field welds in accordance with AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.

2. An independent testing agency will be retained by OWNER to perform the following inspection and testing of field welds.

3. Unless otherwise specified, perform nondestructive testing (NDT) of welds at a spot testing frequency as shown below in accordance with the referenced welding codes. Perform ultrasonic on complete joint penetration groove welds that cannot be readily radiographed. In case there is a conflict the higher frequency level of NDT shall apply:

a. Complete Joint Penetration (CJP) Butt Joint Welds: 10 percent random Radiographic (RT).

b. Groove Welds:

1) Radiographic (RT) or ultrasonic (UT) testing for 10 percent of randomly selected welds, unless otherwise indicated.

2) Use RT only for butt joint groove welds.

c. Fillet Welds Larger Than 5/16 Inch: Liquid penetrant (PT) or magnetic particle (MT) testing for 10 percent of randomly selected welds, unless otherwise indicated.

d. Partial Joint Penetration (PJP) Groove Welds: 10 percent random PT or MT.

e. All Welds: 100 percent visually inspected (VT).

4. Weld Acceptance:

a. Visual Testing:

1) Structural Pipe and Tubing: AWS D1.1, paragraph 6.9, Visual Inspection, Tubular Connections.

2) All Other Structural Steel: AWS D1.1, paragraph 6.9, Visual Inspection, Statically Loaded Nontubular Connections.

3) Stud Connections: AWS D1.1, paragraph 7.8.1.

b. Ultrasonic Testing: Perform UT of CJP groove welds in accordance with AWS D1.1, paragraph 6.13.3, Class R Indications.

c. Radiographic Testing: Perform RT of CJP butt joint welds in accordance with AWS D1.1, paragraph 6.12.1.

d. PT or MT:

1) Perform on fillet and PJP groove welds in accordance with AWS D1.1, paragraph 6.10.

2) Acceptance shall be in accordance with VT standards specified above.

5. The CWI shall be present whenever field welding is performed. The CWI shall perform inspections prior and during assembly, during and after welding. CWI duties include:

a. Verifying conformance of specified job material and proper storage.

b. Monitoring conformance with approved WPS.

c. Monitoring conformance of WPQ.

d. Inspecting weld joint fit-up and in-process inspection.

e. Providing 100 percent visual inspection of all welds.

f. Supervising nondestructive testing personnel and evaluating test results.

g. Maintaining records and preparing report confirming results of inspection and testing comply with the Work.

6. Repair and retest rejected weld defects until sound weld metal has been deposited in accordance with appropriate welding codes.

C. Special inspection will be provided by OWNER as indicated on Drawings.

D. Welded Shear Studs: Inspect and test welded shear studs as specified in Section 05 50 00, METAL FABRICATIONS AND CASTINGS.

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 05 50 00

METAL FABRICATIONS AND CASTINGS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

1.2 SCOPE OF WORK

A. The CONTRACTOR shall furnish, fabricate, and install miscellaneous metalwork, such as connection plates, ladders, floor plates, ladder extensions, fall protection system, stair nosing and treads and appurtenances, complete, in accordance with the requirements of the Contract Documents.

1.3 REFERENCES

A. The Aluminum Association, Inc. (AA):

1. The Aluminum Design Manual

B. American Association of Highway Transportation Officials (AASHTO):

1. HS-20 Truck Loading

C. American Galvanizers Association (AGA):

1. Inspection of Products Hot-Dip Galvanized After Fabrication.

D. American Institute of Steel Construction (AISC):

1. S329, Allowable Stress Design
2. Specification for Structural Joints using ASTM A325 or A490 Bolts.

E. American Iron and Steel Institute (AISI):

1. Stainless Steel Types

F. American National Standards Institute (ANSI):

1. A10.11 Safety Requirements for Personnel and Debris Nets
2. A14.3 Ladders - Fixed - Safety Requirements
3. B1.1 Unified-inch Screw Threads (UN and UNR Thread Form)

G. American Welding Society (AWS):

1. D1.1 Structural Welding Code - Steel
2. D1.2 Structural Welding Code - Aluminum
3. D1.6 Structural Welding Code - Stainless Steel

H. ASTM International (ASTM):

1. A36/A36M Specification for Carbon Structural Steel
2. A48 Specification for Gray Iron Castings
3. A53/A53M Specification for Pipe, Steel, Black and Hot-Dipped, Zinc-Coated, Welded and Seamless
4. A108 Specification for Steel Bars, Carbon, Cold-Finished, Standard Quality
5. A123/A123M Specification for Zinc (Hot-Dip Galvanized) Coatings on Iron and Steel Products
6. A143 Practice for Safeguarding Against Embrittlement of Hot-Dip Galvanized Structural Steel Products and Procedure for Detecting Embrittlement
7. A153/A153M Specification for Zinc Coating (Hot-Dip) on Iron and Steel Hardware
8. A193/A193M Specification for Alloy-Steel and Stainless Steel Bolting Materials for High-Temperature Service
9. A194/A194M Specification for Carbon and Alloy Steel Nuts for Bolts for High-Pressure or High-Temperature Service, or Both
10. A240/A240M Specification for Heat-Resisting Chromium and Chromium-Nickel Stainless Steel Plate, Sheet, and Strip for Pressure Vessels
11. A276 Specification for Stainless Steel Bars and Shapes
12. A278 Specification for Gray Iron Castings for Pressure-Containing Parts for Temperatures Up to 650 Degree
13. A283/A283M Specification for Low and Intermediate Tensile Strength Carbon Steel Plates
14. A307 Specification for Carbon Steel Bolts and Studs, 60,000 PSI Tensile
15. A325 Specification for Structural Bolts, Steel, Heat Treated 120/105 ksi Minimum Tensile Strength
16. A380 Practice for Cleaning, Descaling, and Passivation of Stainless Steel Parts, Equipment, and Systems
17. A384 Practice for Safeguarding Against Warpage and Distortion during Hot-Dip Galvanizing of Steel Assemblies
18. A385 Practice for Providing High-Quality Zinc Coatings (Hot-Dip)
19. A489 Specification for Carbon Steel Lifting Eyes
20. A500 Specification for Cold-Formed Welded and Seamless Carbon Steel Structural Tubing in Rounds and Shapes

21. A501 Specification for Hot-Formed Welded and Seamless Carbon Steel Structural Tubing
22. A563 Specification for Carbon and Alloy Steel Nuts
23. A653 Specification for Steel Sheet, Zinc-Coated (Galvanized) or Zinc-Iron Alloy-Coated (Galvannealed) by the Hot-Dip Process
24. A780 Practice for Repair of Damaged and Uncoated Areas of Hot-Dip Galvanized Coatings
25. A786/A786M Specification for Hot-Rolled Carbon, Low-Alloy, High-Strength Low-Alloy, and Alloy Steel Floor Plates
26. A793 Specification for Rolled Floor Plate, Stainless Steel
27. A967 Specification for Chemical Passivation Treatments for Stainless Steel Parts
28. A992/A992M Specification for Steel for Structural Shapes for Use in Building Framing
29. B209 Specification for Aluminum and Aluminum-Alloy Sheet and Plate
30. B308/B308M Specification for Aluminum-Alloy 6061-T6 Standard Structural Profiles
31. B429 Specification for Aluminum-Alloy Extruded Structural Pipe and Tube
32. B632/B632M Specification for Aluminum-Alloy Rolled Tread Plate
33. D1056 Specification for Flexible Cellular Materials - Sponge or Expanded Rubber
34. F436 Specification for Hardened Steel Washers
35. F468 Specification for Nonferrous Bolts, Hex Cap Screws, and Studs for General Use
36. F593 Specification for Stainless Steel Bolts, Hex Cap Screws, and Studs
37. F594 Specification for Stainless Steel Nuts
38. F844 Specification for Washers, Steel, Plain (Flat), Unhardened for General Use
39. F1554 Specification for Anchor Bolts, Steel, 36, 55, and 105-ksi Yield Strength

I. International Code Council (ICC):

1. Evaluation Reports for Concrete and Masonry Anchors.

J. NSF International (NSF):

K. Occupational Safety and Health Administration (OSHA):

1. 29 CFR 1910.27 Fixed Ladders
2. 29 CFR 1926.105 Safety Nets
3. 29 CFR 1926.502 Fall Protection Systems Criteria and Practices

L. Specialty Steel Industry of North America (SSINA):

1. Specifications for Stainless Steel
2. Design Guidelines for the Selection and Use of Stainless Steel
3. Stainless Steel Fabrication
4. Stainless Steel Fasteners

1.4 DEFINITIONS

A. Submerged: Location at or below top of wall of open water-holding structure, such as a basin or channel, or surface inside a covered water-holding structure, or exterior face of below grade wall.

B. Interior Wet Area: Location inside building or structure where floor is sloped to floor drains or gutters and is subject to liquid spills or washdown, or where wall, floor, or roof slab is common to a water-holding or earth-retaining structure.

C. Interior Dry Area: Location inside building or structure where floor is not subject to liquid spills or washdown, nor where wall or roof slab is common to a water-holding or earth-retaining structure.

D. Corrosive Area: Containment area or area exposed to delivery, storage, transfer, or use of chemicals.

1.5 SUBMITTALS

A. Action Submittals:

1. Shop Drawings:

a. Metal fabrications such as pipe supports, ladders, fabricated supports or connection plates and floor plates. Show dimensions, indicate profile, size count and reference materials of construction by ASTM designation and grade, including welding and fastener information.

b. Specific instructions for concrete anchor installation, including drilled hole size, preparation, placement procedures, and instructions for safe handling of anchoring systems.

2. Design Calculations: Design calculations shall be prepared by an Idaho licensed professional civil or structural engineer hired by the CONTRACTOR. The calculations shall be submitted for review and approved by the ENGINEER prior to fabrication.

a. Calculations shall include, but not be limited to, ladders, pipe brackets, floor plates or support flanges, and fasteners.

b. Calculations shall be stamped and signed by an Idaho civil or structural professional engineer.

3. Samples: Color samples of abrasive stair nosings.

B. Informational Submittals:

C. Concrete and Masonry Drilled Anchors:

1. Manufacturer's product description and installation procedures.

2. Current ICC evaluation report.

3. Adhesive Anchor Installer Certification.

1.6 QUALITY ASSURANCE

A. Qualifications:

1. All fabrication shall be performed in an OWNER approved fabrication shop subject to special inspection in accordance with the CBC.

2. Adhesive Anchor Installers: Trained and certified by manufacturer.

3. Galvanized Coating Applicator: Company specializing in hot-dip galvanizing after fabrication and following procedures of Quality Assurance Manual of the American Galvanizers Association.

B. Special Inspection: The following portions of the work require continuous special inspection by a deputy inspector.

1. Shop fabrication and field welding

2. Installation of epoxy adhesive anchors in drilled holes

1.7 DELIVERY, STORAGE, AND HANDLING

A. Insofar as practical, factory assemble items specified herein. Assemblies that due to necessity have to be shipped unassembled shall be packaged and tagged in manner that will protect materials from damage and will facilitate identification and field assembly.

B. Package stainless steel items in a manner to provide protection from carbon impregnation.

C. Protect painted coatings and hot-dip galvanized finishes from damage due to metal banding and rough handling. Use padded slings and straps.

PART 2 - PRODUCTS

2.1 GENERAL REQUIREMENTS

A. Unless otherwise indicated, meet the following requirements:

Item	ASTM Reference
Steel Shapes and Plates	A36/A36M

Item	ASTM Reference
Steel Pipe	A500 Round
Structural Steel Tubing	A500, Grade C
Stainless Steel:	
Bars and Angles	A276, AISI Type 316
Shapes	A276, AISI Type 304
Steel Plate, Sheet, and Strip	A240/A240M, AISI Type 316
Bolts, Threaded Rods, Anchor Bolts, and Anchor Studs	F593, AISI Type 316, Condition CW
Nuts	F594, AISI Type 316, Condition CW
Steel Bolts and Nuts:	
Carbon Steel	A307 bolts, with A563 nuts
High-Strength	A325, Type 1 bolts, with A563 nuts
Anchor Bolts and Rods	F1554, Grade 55, with weldability supplement S1.
Eyebolts	A489
Threaded Rods	A36/A36M
Flat Washers (Unhardened)	F844
Flat and Beveled Washers (Hardened)	F436
Thrust Ties for Steel Pipe:	
Threaded Rods	A193/A193M, Grade B7
Nuts	A194/A194M, Grade 2H
Plate	A283/A283M, Grade D
Welded Anchor Studs	A108, Grades C-1010 thru C-1020
Aluminum Plates and Structural Shapes	B209 and B308/B308M, Alloy 6061-T6
Aluminum Bolts and Nuts	F468, Alloy 2024-T4
Cast Iron	A48, Class 50B or better

B. Bolts, Washers, and Nuts: Use stainless steel, hot-dip galvanized steel, zinc-plated steel, and aluminum material types as indicated in FASTENER SCHEDULE at end of this section.

C. Corrosion Protection: Unless otherwise indicated, miscellaneous metalwork of fabricated steel, which will be used in a corrosive environment and/or will be submerged shall be stainless steel unless noted otherwise.

2.2 ANCHOR BOLTS AND ANCHOR BOLT SLEEVES

A. Cast-In-Place Anchor Bolts:

1. Headed type, unless otherwise shown on Drawings.

2. Material type and protective coating as shown in FASTENER SCHEDULE at end of this section.

B. Anchor Bolt Sleeves:

1. Plastic:

2. Single unit construction with corrugated sleeve.

3. Top of sleeve shall be self-threading to provide adjustment of threaded anchor bolt projection.

4. Material: High density polyethylene.

5. Manufacturer: Sinco Products, Inc., Middletown, CT. (800-243-6753).

C. Fabricated Steel: ASTM A36/A36M.

2.3 CONCRETE AND MASONRY DRILLED ANCHORS

A. General:

1. Use AISI Type 316 stainless, hot-dip galvanized, or zinc-plated steel, as shown in FASTENER SCHEDULE at end of this section.

2. Product shall have a current evaluation reports by ICC.

B. Expansion Anchors:

1. Manufacturers and Products:

a. ITW Ramset/Red Head, Wood Dale, IL; Trubolt Wedge Anchor.

b. Hilti, Inc., Tulsa, OK; Kwik-Bolt II Stud Anchor.

c. Powers Rawl, New Rochelle, NY; Power-Stud Anchor.

d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Wedge-All Anchor.

C. Epoxy Adhesive Anchors:

1. Threaded Rod:

a. ASTM F593 stainless steel threaded rod, diameter as shown on Drawings.

b. Length as required, to provide minimum depth of embedment.

c. Clean and free of grease, oil, or other deleterious material.

d. For hollow-unit masonry, provide stainless steel wire cloth screen tube to fit threaded rod.

2. Adhesive:

a. Two-component, designed to be used in adverse freeze/thaw environments, with gray color after mixing.

b. Cure Temperature, Pot Life, and Workability: Compatible for intended use and environmental conditions.

c. Nonsag, with selected viscosity base on installation temperature and overhead application where applicable.

3. Packaging and Storage:

a. Disposable, self-contained cartridge system capable of dispensing both components in the proper mixing ratio and fitting into a manually or pneumatically operated caulking gun.

b. Store adhesive cartridges on pallets or shelving in covered storage area, in accordance with manufacturer's written instructions.

c. Cartridge Markings: Include manufacturer's name, product name, material type, batch or serial number, and adhesive expiration date.

d. Dispose of cartridges if shelf life has expired.

4. Manufacturers and Products:

a. ITW Ramset/Red Head, Wood Dale, IL; Epcon Ceramic 6 Epoxy or A7 Adhesive Anchor System. (Use only Epcon A7 Adhesive System for hollow masonry.)

b. Hilti, Inc., Tulsa, OK; HSE 2421 Epoxy Anchoring System

c. Powers Rawl, New Rochelle, NY; Power Fast Epoxy Injection Gel Cartridge System.

d. Simpson Strong-Tie Co., Inc., Pleasanton, CA; Structural Epoxy-Tie Adhesive SET

e. Covert Operations, Inc., Long Beach, CA; CIA-Gel 7000 Epoxy Anchors.

f. Unitex, Kansas City, MO; Pro-Poxy 300 and Pro-Poxy 300 Fast Epoxy Adhesive Anchors.

2.4 EMBEDDED STEEL SUPPORT FRAMES FOR FLOOR PLATE AND GRATING

A. Steel angle support frames to be embedded in concrete shall be stainless steel, ASTM A276, AISI Type 316, unless indicated otherwise.

B. Welded stainless steel anchors to stainless steel support frames.

2.5 ABRASIVE NOSING FOR CONCRETE STAIRS

A. Unless otherwise shown on Drawings, furnish flush type abrasive nosings on stair treads.

B. Nosing Components:

1. Homogeneous epoxy abrasive, with minimum 50 percent aluminum oxide content, formed and cured upon an extruded aluminum base.

2. Epoxy abrasive shall extend over and form curved front edge of nosing.

3. Base of Nosing: Extruded aluminum alloy, 6063-T5, heat-treated.

C. Anchoring System: Double-set anchors consisting of two rows of integrally extruded anchors.

D. Size: 3 inches wide by 1/4 to 3/8 inch thick by length as shown.

E. Color: Selected by ENGINEER from manufacturer's standard color range.

F. Manufacturers and Products:

1. Wooster Products, Inc., Wooster, OH; Spectra Type WP3J.

2. American Safety Tread Co., Inc., Helena, AL; Type BF-311D.

2.6 STEEL BAR GRATING STAIR TREADS

A. Description: Steel pressure-lock bar grating with bearing bar spacing of 1 3/16" and [checker plate or cast abrasive nosing with mounting angle]. Stair tread finish shall match stair stringer member's finish.

B. Tread to have carrier plate at each end for bolted connection to stair stringer web.

C. Manufacturers:

1. Grating Pacific, Los Alamitos, CA

2. McNichols Co., Tampa FL

3. IKG Borden, Clark, NJ

2.7 FLOOR PLATE

A. Material:

1. Galvanized Steel: Carbon steel, ASTM A786/A786M, commercial grade, hot-dip galvanized after fabrication in accordance with ASTM A123/A123M.

2. Stainless Steel: ASTM A793, AISI Type 304.

3. Aluminum: ASTM B632/B632M, Alloy 6061-T6.

B. Minimum Thickness:

1. Steel: 1/4 inch, unless shown otherwise on Drawings.

2. Aluminum: 3/8 inch, unless shown otherwise on Drawings.

3. Sized to limit deflection of the plate loaded at 100 pounds per square foot to a span-to-deflection ratio of no more than 1/240 or ¼-inch, whichever is less.

C. Surface shall be raised-lug pattern or diamond tread and smooth on the opposite side, unless shown otherwise on Drawings. The lugs shall be a length of one inch minimum and be raised a minimum 0.050 inches above the plate surface. The lugs shall be in a pattern in which the lugs are oriented at 90 degrees to the adjacent lug in two orthogonal directions. The rows of lugs shall be oriented at 45 degrees to the edges of the plates.

D. Slip-Resistant Surface:

1. Provide where indicated on Drawings.

2. Manufacturers and Products:

a. IKG/Borden, Clark, NJ; MEBAC 2.

b. W.S. Molnar Co., Detroit, MI; SLIPNOT Grade 2-Medium.

c. Approved equal

2.8 IRON CASTINGS

A. Iron castings shall be uniform in quality, free from blowholes, porosity, hard spots, shrinkage, distortion, or other defects. They shall be smooth and well cleaned by shotblasting.

B. Covers and grating shall have equal and level bearing on their frames with the covers flush with the frame. The cover and grating shall not rock or rattle when loading is applied. Round covers and frames shall be machined bearing surfaces.

C. Covers and grating with matching frames shall be designed to support the following loading:

1. Where located within a structure, the design loading shall match that required for the adjacent floor area, or if the loading is not noted, a load of 300 pounds per square foot shall be used.

2. Exterior covers and grates shall be designed for AASHTO H20 vehicle loading, unless noted otherwise.

2.9 LADDERS

A. Fabricate ladders with rails, rungs, landings, and cages to meet applicable requirements of OSHA, CFR Part 1910.27, and ANSI A14.3.

1. Concentrated load of 250 pounds plus 30 percent impact on rungs.

2. Maximum rung deflection of l/360.

3. Concentrated load of 250 pounds plus 30 percent impact between consecutive attachments.

B. Flat Bar Ladders:

1. Punch rails and pass rungs through rails, weld on outside around perimeter of rung.

2. Weld brackets to ladder rail to secure ladder to wall with bolted connection.

3. Hot-dip galvanize steel after fabrication in accordance with ASTM A123/A123M and A385.

C. Aluminum Pre-Engineered Pipe Ladders:

1. Rungs:

a. Aluminum extrusions of Alloy 6063-T6.

b. Nonslip grip surface, 1-inch wide flat top, semicircular or rectangular bottom with mill finish.

2. Side Rails: ASTM B429, Alloy 6063-T6, 1-1/2 inches, Schedule 40 pipe or 2 ½-inch wide minimum channel with anodized finish, AA M32-C22-A41.

3. Fasteners for Ladder Attachments and Cage Assembly: Stainless steel.

4. Welded or glued construction is not acceptable.

5. Fabricate to longest length as practical but not to exceed 24 feet.

6. Furnish support attachments to side rails at 6 feet maximum spacing.

7. Manufacturers:

a. O' Keeffe's, Inc., San Francisco, CA

b. Precision Stair Corp., Morristown, TN

c. Thompson Fabricating Co. Inc., Tarrant, AL.

D. Ladder Extension: Where a hatch cover is installed over the ladder or indicated on the drawings, a ladder extension shall be furnished and installed on the ladder. The extension shall be either a Ladder-Up safety post Model LU-3 (Type 304 stainless steel) or Ladder-Up safety post Model LU-2 (hot dip galvanized) as manufactured by the Bilco Co., or approved equal. The device shall be manufactured of high strength steel with telescoping tubular section that locks automatically when fully extended. Upward and downward movement shall be controlled by a stainless steel spring balancing mechanism. Unit shall be completely assembled with fasteners for securing to the ladder rungs in accordance with the manufacturer's instructions.

E. Side Rail Extensions: Where a fall protection device is required, instead of a ladder extension specified in Item D above, the Contractor may provide side rail extensions.

1. All of the materials for the side rail extension shall be the same material as the ladder (hot-dipped galvanized).

2. The side rail extension shall consist of a swing lock style ladder extension attached to each side rail of the ladder as manufactured by Brooks Products, Specialty Dept., Inwesco Company or approved equal.

3. The ladder extension shall be of sufficient size, dimension and capacity to match the ladder and comply with all requirements of OSHA. The extension shall be located three (3) inches below the inside bottom of the hatch cover in the down position and shall swing up and lock in position for entry in the up position.

4. All rails shall be fabricated from a minimum of 3/8" steel flat bar stock. The swing connection shall include a ¾" (minimum) diameter rod pin welded to the ladder side rail, a 7/8" x 4" (minimum) slot, 8 1/2" x 5/8" (minimum) side bar and a 6" x 5/8" (minimum) side bar.

5. Each side rail extension shall include a 4" long lifting handle welded to the rail to use to lift up the extension. Contractor shall submit a shop drawing of the side rail extension for the Engineer's approval.

2.10 FALL PROTECTION DEVICE

A. General:

1. Conforms to ANSI A14.3 and OSHA CFR Part 1910.27.

2. Belt and harness shall withstand minimum drop test of 250 pounds in 6-foot free fall.

3. Fall Prevention System Material: Hot-dip galvanized steel in accordance with ASTM A123/A123M.

B. Components and Accessories:

1. Main Components: Sleeve or Trolley, Safety Harness, and Carrier or Climbing Rail.

2. Ladder rung clamps with hot-dip galvanized steel mounting brackets and hardware.

3. Removable extension kit with tiedown rod or trolley gate, mandrel, and carrier rail for ladders under manholes and hatches.

C. Manufacturers and Products:

1. North Safety Products, Specialty Products Division, Toronto, Ontario, Canada; Saf-T-Climb Fall Prevention System.

2. Miller Equipment, Franklin, PA; Sure Track Rail System.

3. TS Products, St. Charles, IL; TS Safety Rail System.

2.11 FABRICATION

A. General:

1. Finish exposed surfaces smooth, sharp, and to well-defined lines.

2. Furnish necessary rabbets, lugs, and brackets so work can be assembled in neat, substantial manner.

3. Conceal fastenings where practical; where exposed, flush countersink.

4. Drill metalwork and countersink holes as required for attaching hardware or other materials.

5. Grind cut edges smooth and straight. Round sharp edges to small uniform radius. Grind burrs, jagged edges, and surface defects smooth.

6. Fit and assemble in largest practical sections for delivery to site.

B. Materials:

1. Use steel shapes, unless otherwise noted.

2. Steel to be hot-dip galvanized: Limit silicon content to less than 0.04 percent or to between 0.15 and 0.25 percent.

3. Fabricate aluminum in accordance with AA Specifications for Aluminum Structures – Allowable Stress Design.

C. Welding:

1. Weld connections and grind exposed welds smooth. When required to be watertight, make welds continuous.

2. Welded fabrications shall be free from twisting or distortion caused by improper welding techniques.

3. Steel: Meet fabrication requirements of AWS D1.1, Section 5.

4. Aluminum: By Gas Metal Arc (MIG) or Gas Tungsten Arc (TIG) process in accordance with AWS D1.2. Discoloration of exposed aluminum surfaces, whether or not due to welding, shall constitute a basis for rejection of the entire assembly.

5. Stainless Steel: Meet requirements of AWS D1.6.

6. Welded Anchor Studs: Prepare surface to be welded and weld with stud welding gun in accordance with AWS D1.1, Section 7, and manufacturer's instructions.

7. Complete welding before applying finish.

D. Painting:

1. Shop prime with rust-inhibitive primer, unless otherwise indicated.

2. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals, with electrolysis protective coating.

3. Do not apply protective coating to galvanized steel anchor bolts, unless indicated otherwise.

E. Electrolysis Protection:

1. Electrolysis protective material shall be alkali-resistant asphaltum base paint.

2. Manufacturers and product:

a. Koppers “Bitumastic 50”

b. Texaco “Cement 1401”

c. Approved equal

F. Galvanizing:

1. Fabricate steel to be galvanized in accordance with ASTM A143, ASTM A384, and ASTM A385. Avoid fabrication techniques that could cause distortion or embrittlement of the steel.

2. Provide venting and drain holes for tubular members and fabricated assemblies in accordance with ASTM A385.

3. Remove welding slag, splatter, burrs, grease, oil, paint, lacquer, and other deleterious material prior to delivery for galvanizing.

4. Remove by blast cleaning or other methods surface contaminants and coatings not removable by normal chemical cleaning process in the galvanizing operation.

5. Galvanize steel members, fabrications, and assemblies after fabrication by hot-dip method in accordance with ASTM A123/A123M.

6. Hot-dip galvanize bolts, nuts, washers, and hardware components in accordance with ASTM A153/A153M. Oversize holes to allow for zinc alloy growth. Shop-assemble bolts and nuts.

7. Galvanize steel sheets in accordance with ASTM A653.

8. Galvanize components of bolted assemblies separately before assembling. Galvanizing of tapped holes is not required.

G. Accessories: Furnish as required for a complete installation. Fasten by welding or with stainless steel bolts or screws.

2.12 SOURCE QUALITY CONTROL

A. Visually inspect all fabrication welds and correct any deficiencies.

1. Steel: AWS D1.1, Section 6 and Table 6.1, Visual Inspection Acceptance Criteria.
2. Aluminum: AWS D1.2.
3. Stainless Steel: AWS D1.6.

PART 3 - EXECUTION

3.1 INSTALLATION OF METAL FABRICATIONS

A. General:

1. Install metal fabrications plumb or level, accurately fitted, free from distortion or defects.
2. Install rigid, substantial, and neat in appearance.
3. Install manufactured products in accordance with manufacturer's recommendations.
4. Obtain ENGINEER approval prior to field cutting steel members or making adjustments not scheduled.

B. Aluminum:

1. Do not remove mill markings from concealed surfaces.
2. Remove inked or painted identification marks on exposed surfaces not otherwise coated after installed material has been inspected and approved.
3. Fabrication, mechanical connections, and welded construction shall be in accordance with the AA Aluminum Design Manual.

C. Pipe Sleeves:

1. Provide sleeve where pipes pass through concrete or masonry.
2. Holes drilled with a rotary drill may be provided in lieu of sleeves in existing walls.
3. Provide a center seep ring flange for water stoppage on sleeves in exterior or water-bearing walls.
4. Provide a rubber caulking sealant or a modular mechanical unit to form a watertight seal in the annular space between pipes and sleeves.

3.2 CAST-IN-PLACE ANCHOR BOLTS

A. Accurately locate and hold anchor bolts in place with templates at the time concrete is placed.

B. Use anchor bolt sleeves for location adjustment and provide two nuts and one washer per bolt of same material as bolt.

C. Minimum Bolt Size: 1/2-inch diameter by 12 inches long, unless otherwise shown.

3.3 CONCRETE AND MASONRY DRILLED ANCHORS

A. Begin installation only after concrete or masonry to receive anchors has attained design compressive strength.

B. Install in accordance with manufacturer's instructions.

C. Provide minimum embedment, edge distance, and spacing as shown on Drawings.

D. Use only type of drill, type of drill bit and diameter recommended by anchor manufacturer. Clean hole of debris and dust with brush and compressed air as recommended.

E. Using a non-destructive method, to locate reinforcing in substrate prior to drilling. If drilled hole is required to be abandoned, the hole shall be filled with cement grout.

F. Epoxy Adhesive Anchors:

1. Do not install adhesive anchors when temperature of concrete is below 40 degrees F or above 100 degrees F.

2. Remove any standing water from hole with oil-free compressed air. Inside surface of hole shall be dry where required by manufacturer's instructions.

3. Do not disturb anchor during recommended curing time.

4. Do not exceed maximum torque as specified in manufacturer's instructions.

3.4 COMMON MACHINE BOLTS AND NUTS

A. General: Bolts shall be inserted accurately into the bolt holes without damaging the thread. Bolt heads shall be protected from damage during installation. Bolt heads and nuts shall rest squarely against the base metal. Where bolts are to be used on beveled surfaces having slopes greater than 1 in 20 with a plane normal to the bolt axis, beveled washers shall be provided to give full bearing to the head or nut. Where self-locking nuts are not furnished, bolt threads shall be upset to prevent the nuts from backing off.

B. Bolt Insertion: Bolts shall be of the length that will extend entirely through but not more than 1/4-inch beyond the nuts. Bolt heads and nuts shall be drawn tight against the work. Bolt heads shall be tapped with a hammer while the nut is being tightened. After having been finally tightened, the nuts shall be locked.

3.5 ABRASIVE NOSINGS

A. Provide abrasive nosings on concrete steps not being supplied or coated with another type of nosing or nonskid material.

3.6 SAFETY CLIMB DEVICE SYSTEM

A. Provide for each ladder where unbroken height between levels exceeds 20 feet, or at lesser height where indicated on Drawings.

B. Install in accordance with manufacturer's instructions.

C. Furnish additional accessories required to complete the system for each ladder.

D. Furnish one harness for each ladder equipped with a safety climb device.

E. Furnish pivot section at platforms, landings, and roofs.

F. When installed to required height, fall prevention system shall be rigid and an integral part of the structure.

3.7 ELECTROLYTIC PROTECTION

A. Aluminum and Galvanized Steel:

1. Coat surfaces of galvanized steel and aluminum fabricated items to be in direct contact with concrete, grout, masonry, or dissimilar metals with electrolytic protection coating specified in this Section.

2. Do not apply protective coating to galvanized steel anchor bolts or galvanized steel welded anchor studs, unless indicated otherwise.

3. Allow coating to dry before installation of the material.

4. Protect coated surfaces during installation.

5. Should coating become marred, prepare and touch up in accordance with paint manufacturer's written instructions.

B. Titanium: Where titanium equipment is in contact with concrete or dissimilar metal, provide full-face neoprene insulation gasket, 3/32-inch minimum thickness and 70-durometer hardness.

C. Stainless Steel:

1. During handling and installation, take necessary precautions to prevent carbon impregnation of stainless steel members.

2. After installation, visually inspect stainless steel surfaces for evidence of iron rust, oil, paint, and other forms of contamination.

3. Remove contamination in accordance with requirements of ASTM A380 and A967.

4. Brushes used to remove foreign substances shall utilize only stainless steel or nonmetallic bristles.

5. After treatment, visually inspect surfaces for compliance.

3.8 PAINTING AND REPAIR OF GALVANIZED STEEL

A. Painted Galvanized Surfaces: Prepare and paint as specified in Section 09900, PAINTING.

B. Repair of Damaged Hot-Dip Galvanized Coating:

1. To prepare surface, remove all oil, grease, soil, and soluble material by cleaning with water and detergent (SSPC, SP1) followed by brush off blast cleaning (SSPC, SP 7), over an area extending at least 4 inches into the undamaged area.

2. For minor repairs at abraded areas, apply Galvinox, Galvo-Weld, Drygalv or equal zinc conforming to ASTM A780.

3. For flame cut or welded areas, use zinc-based solder, or zinc sticks, conforming to ASTM A780.

4. Use magnetic gauge to determine that thickness is equal to or greater than the base galvanized coating.

3.9 FASTENER SCHEDULE

A. Anchor Bolts Cast Into Concrete for Structural Steel Column Base Plates

1. Interior Dry Areas: Plain uncoated

2. Exterior and Interior Wet or Humid Areas: Stainless steel headed anchor bolts.

B. Anchor Bolts Cast Into Concrete for Equipment Bases

1. All Locations: Stainless steel headed anchor bolts, unless otherwise specified with equipment

C. Anchor Bolts Cast Into Concrete for Metal Fabrications and Structural Components

1. Interior Dry Areas: Hot-dip galvanized steel headed anchor bolts

2. Submerged, Exterior, Interior Wet, and Corrosive Areas: Stainless steel headed anchor bolts with fusion bonded coating – See Section 09900

D. Drilled Anchors for Metal Components to Cast-in-Place Concrete (e.g., Ladders, Handrail Posts, Electrical Panels, and Equipment)

1. Interior Dry Areas: Zinc-plated or stainless steel wedge or expansion anchors.

2. Submerged, Exterior, Interior Wet, and Corrosive Areas: Adhesive stainless steel anchors

E. Anchors in Grout-Filled Concrete Masonry Units

1. Exterior and Interior Wet and Dry Areas: Hot-dip galvanized steel headed anchor bolts.

F. Connections for Structural Steel Framing

1. Exterior and Interior Wet and Dry Areas: Galvanized headed bolts, unless noted otherwise

G. Connections for Steel Fabrications and Wood Components

1. Exterior and Interior Wet and Dry Areas: Hot-dip galvanized carbon steel bolted connections

H. Connections for Aluminum Components

1. All locations: Stainless steel bolted connections, unless otherwise specified with equipment.

I. All Others

1. All locations: Stainless steel fasteners

J. Antiseizing Lubricant: Use on all stainless steel threads.

K. Do not use adhesive anchors to support fire-resistive construction or where ambient temperature will exceed 120 degrees F.

PART 4 - MEASUREMENT AND PAYMENT

(Not Used)

* * * END OF SECTION * * *

SECTION 23 09 13

VALVES

PART 1 - GENERAL

1.1 Summary

A. The Contractor shall furnish valves (including nuts and bolts), other materials, all labor, tools, supervision, transportation, equipment, and incidentals necessary to install valves of the type and size and at the locations shown on the Construction Drawings and as needed for a complete and proper operation.

B. The work shall be carried out in accordance with these Specifications and with the Construction Drawings.

1.2 Related Sections

1. Section 33 51 16.13 - High Density Polyethylene (HDPE) Landfill Piping
2. Section 33 51 16.23 - Polyvinyl Chloride (PVC) Landfill Piping
3. Section 33 53 23 - Horizontal Landfill Gas Extraction Wellheads

1.3 Submittals

A. Product Data: Before shipping, the CONTRACTOR shall submit

1. Materials list of items proposed to be provided under this Section.
2. Manufacturer's Specifications, catalog cuts, and other data needed to prove compliance with the specified requirements.
3. Manufacturer's recommended installation procedures which, when approved by the ENGINEER, will become the basis for accepting or rejecting actual installation procedures used on the Work.

B. If materials proposed to be provided under this Section are shipped prior to ENGINEER’s conditional approval or approval, it will be at the CONTRACTOR’s risk.

PART 2 - PRODUCTS

2.1 General

A. All valves shall be complete with all necessary operators, actuators, handwheels, worm and gear operators, wrenches, and other accessories or appurtenances, which are required for the proper completion of work, included under this Section.

B. Valves shall be suitable for the intended service. Renewable parts, including discs, packing, and seats, shall be of types recommended by valve manufacturer for

intended service, but not of lower quality than specified herein.

C. Valves and operators shall be suitable for the exposure they are subjected to, enclosed in valve chamber, or exposed, as applicable.

D. All valves shall have the name of the manufacturer and sizes cast on the body or bonnet or shown on a permanently attached plate in raised letters.

E. For the purpose of designating the type and grade of valve desired, a manufacturer's name is given in the following specifications. Valves of equal quality by other manufacturers will be acceptable.

2.2 Butterfly Valves

A. Unless otherwise specified, butterfly valves used in the landfill gas collection system shall be lug-style, ductile-iron body with flat-faced flanged ends with Type 316 stainless steel disk and stem, and Viton seal and seat, rated for 200 psi, or approved equal.

B. All bolting for valves installed above grade shall be Type 316 stainless steel.

C. Unless specified otherwise on the Construction Drawings, valves greater than 6 inches shall have a gear operator and hand wheel and valves 6 inches and less shall have a 10-position locking handle.

D. All valves and gear operators shall be right hand close.

2.3 Ball Valves

A. Ball valves shall have Type 316 stainless steel body and ball with glass-filled PTFE seats and PTFE seals. Valves shall be rated for 500 psi at 200° F maximum pressure, 28.95 inches Hg vacuum, and a temperature range of o to 450° F.

B. Valve connections shall be NPT female at the sizes shown on the Construction Drawings.

C. Valves shall have an oval handle.

PART 3 - EXECUTION

3.1 Preparation

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Notify the ENGINEER of such conditions and proposed corrective actions before correcting unsatisfactory conditions. Do not proceed until unsatisfactory conditions are corrected.

B. Adjoining pipe, couplings and fittings shall be cleaned of all foreign material such as dirt, grease, oil, or moisture prior to valve installation.

3.2 Valve Installation

A. Valves of the size and type shown on the Construction Drawings shall be set plumb and installed at the locations indicated on the Construction Drawings. Valves shall be installed in accordance with manufacturer's recommended installation procedures and with the details shown on the Construction Drawings.

B. Valves shall be installed such that they are supported properly in their respective positions, free from distortion and strain. Valves shall be installed such that their weight is not borne by blowers and equipment that are not designed to support the weight of the valve.

C. Valves shall be carefully inspected during installation; they shall be opened wide and then tightly closed and the various nuts and bolts shall be tested for tightness. Special care shall be taken to prevent any foreign matter from becoming lodged in the valve seat. Check and adjust all valves for smooth operation.

D. Clean iron flanges by wire brushing before installing flanged valves. Clean flange bolts and nuts by wire brushing, lubricate threads with oil or graphite, and tighten nuts uniformly and progressively. Clean threaded joints by wire brushing or swabbing. Apply Teflon joint compound or Teflon tape to pipe threads before installing threaded valves. Joints shall be airtight.

E. Install valves with the operating stem in either horizontal or vertical position. When possible, all butterfly valves shall be installed so that the disk rotates on the vertical axis. Below grade butterfly valves without gear operator shall be installed with their axis in the vertical direction.

F. The inside diameter of HDPE pipe flange adapters may be smaller than the diameter of the disk on a butterfly valve. If the inside diameter of the flange adapter interferes with full operation of the disk, the Contractor shall install 2-inch HDPE valve spacers on both sides of the valves.

G. Locate and arrange valves to allow sufficient clearance around the valve operator for proper operation and to provide complete adjustment between fully open to fully closed position.

H. Install where shown on the Construction Drawings.

I. Locate valves for easy accessibility and maintenance.

J. Install valves in closed position.

3.3 Testing

A. Valves shall be tested while the adjacent pipeline is tested. Joints shall show no visible leakage under test. Joints that show signs of leakage shall be repaired prior to final acceptance. If there are any special parts of control systems or operators that might be damaged by the pipeline test, they shall be properly protected. The CONTRACTOR will be held responsible for any damage caused by the testing.

* * * END OF SECTION * * *

SECTION 31 10 00

SITE CLEARING

PART 1 - GENERAL

1.1 Summary

A. This section includes clearing and grubbing the site as shown on the Construction Drawings and specified in this Section.

1.2 Related Sections:

A. Section 31 22 00 - Grading

B. Section 31 23 16 - Excavation

C. Section 31 23 26 - Structural Fill

D. Section 31 23 33 - Trenching and Backfilling

E. Section 31 25 00 - Erosion and Sediment Controls

PART 2 - PRODUCTS

(Not Used)

PART 3 - EXECUTION

3.1 Surface Conditions

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.2 Protection of Property

A. Protect existing improvements, adjacent property, other facilities, and existing utilities indicated on the Construction Drawings or made known.

B. Protect trees and shrubs, outside the areas of improvement as shown on the Construction Drawings. Maintain natural topsoil around the root systems. Do not disturb natural topsoil within the drip line of any trees or shrubs. Obtain ENGINEER's written approval for any tree or brush removal not shown on the Drawings.

C. Protection of persons and property:

1. Barricade open depressions and holes occurring as part of this Project.

2. Protect structures, utilities, sidewalks, pavements, and other facilities from damage by settlement, lateral movement, undermining, washout, and other hazards created by operations under this Section.

D. Use means necessary to prevent dust from becoming a nuisance to the public, neighbors, or other work being performed on or near the site. CONTRACTOR shall minimize dust deposited on adjacent properties.

E. Maintain access to the site at all times.

3.3 Clearing of Trees

A. Remove trees, brush, and roots that are within the limits of construction.

3.4 Stripping Topsoil

A. Remove topsoil in areas within the limits of construction, as necessary.

B. Stockpile in area adjacent to the limits of construction.

C. Use excavated topsoil to re-establish vegetative cover.

D. If topsoil stockpile will not be disturbed for more than three (3) weeks, stabilize the pile using appropriate temporary vegetative cover seed mix.

3.5 Utilities

A. Coordinate with utility companies and local agencies as required.

B. Where utility cutting, capping, or plugging is required, perform such work in accordance with requirements of the utility company or governmental agency having jurisdiction.

3.6 Disposal

A. General:

1. Remove trees, brush, grass, roots, trash, and other material from clearing operations.

2. Dispose from the site in a legal manner, at the landfill free of charge, or at an on-site location designated by the OWNER.

3. Do not store or permit debris to accumulate on the job site.

B. Do not burn debris at the site.

C. Do not place removed debris in trenches to be backfilled.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. Work under this section shall be considered incidental to the contract.

* * * END OF SECTION * * *

SECTION 31 22 00

GRADING

PART 1 - GENERAL

1.1 Summary

A. Provide all rough and finish grading as necessary to complete the Project.

1.2 Related Sections

A. Section 31 10 00 - Site Clearing

B. Section 31 23 16 - Excavation

C. Section 31 23 26 - Structural Fill

D. Section 31 23 33 - Trenching and Backfilling

E. Section 31 25 00 - Erosion and Sediment Controls

1.3 Description

A. Work in this section includes the rough and finish grading of the following areas:

1. Landfill access roads disturbed as part of the Work.
2. Landfill surfaces disturbed as part of the Work.

PART 2 - PRODUCTS

2.1 General

A. Provide all materials as shown on the Construction Drawings, as specified herein, and as needed for a complete and proper installation.

2.2 Topsoil

A. Provide topsoil that is free from waste, rocks greater than 1-inch, rubble, and other deleterious material that shall be used for finish grading of the landfill surface and other non-driving areas as shown on the Construction Drawings.

PART 3 - EXECUTION

3.1 General

A. The CONTRACTOR shall take necessary precautions to protect underground utilities, and especially any utilities whose original cover may be temporarily removed as part of construction.

B. The CONTRACTOR shall grade to the lines and grades shown on the Construction Drawings and as staked in the field. Excess material shall be stockpiled at the locations as identified by the OWNER.

C. The CONTRACTOR is responsible for securing, purchasing, hauling, and placement of fill material to complete the grading as specified on the Construction Drawings and in these Specifications.

3.2 Surface Conditions

A. Examine the areas and conditions under which Work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Project. Do not proceed until unsatisfactory conditions are corrected.

3.3 Finish Elevations and Lines

A. Comply with pertinent provisions of Section 01 71 24 - Construction Layout and Surveying.

3.4 Procedures

A. Protection of Existing Utilities:

1. Unless shown to be abandoned or removed, protect utility lines and other pipes shown on the Construction Drawings or otherwise made known to the CONTRACTOR prior to excavating. CONTRACTOR is required to perform all utility clearances, including interviewing on-site personnel to inquire about existing utilities in areas of proposed excavations. If a utility is damaged by the CONTRACTOR, the utility shall be repaired or replaced at no additional cost to the OWNER.

2. If utility lines are encountered that are not shown on the Construction Drawings or otherwise made known to the CONTRACTOR, promptly take necessary steps to assure that service is not interrupted.

3. If service is interrupted as a result of work under this Section, ENGINEER shall be notified, and CONTRACTOR shall immediately restore service by repairing the damaged utility.

4. If existing utilities are found to interfere with the facilities being constructed under this Section, immediately notify the ENGINEER and request their instructions.

5. Do not proceed with permanent relocation of the work until written instructions are received from the ENGINEER.

6. Exposed utilities shall be properly supported at all times if undermined.

B. Protection of Persons and Property:

1. Barricade open holes and depressions occurring as part of the Project, and post warning lights on property adjacent to or with public access.
2. Operate warning lights during hours from dusk to dawn each day and as otherwise required.
3. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:

1. Remove all water, including rainwater, encountered during work to an approved location by pumps, drains, and other approved methods.
2. Keep site construction area free from water.
3. Handling and disposal of water shall comply with all stormwater and erosion and sedimentation control permits.

D. Use means necessary to prevent dust from becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.

E. Maintain access to adjacent areas at all times.

3.5 Access Road Grading

A. Access roads disturbed as part of construction shall be graded to the original grades shown on the Construction Drawings.

B. Structural fill shall be placed under the road surface as shown on the Construction Drawings and as specified in Section 31 23 26 - Structural Fill.

3.6 Vegetated Surface Grading

A. Vegetated areas including the landfill surface and any other areas disturbed as part of the Work shall be graded as follows:

1. Place a minimum of 6 inches of topsoil conforming to the requirements of this Section to the grades shown on the Construction Drawings and in the field.
2. Topsoil shall be free from clods and large objects.
3. Prepare the topsoil surface for seeding in accordance with Section 31 25 00 - Erosion and Sediment Controls.

3.7 Maintenance

A. Protection of newly graded areas:

1. Protect newly graded areas from traffic and erosion and keep free from trash and weeds.
2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

B. Where completed graded areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, and reshape as necessary to comply with the Specifications.

3.8 Field Quality Control

A. The ENGINEER will test areas receiving compacted crushed aggregate material using a nuclear density moisture gauge in accordance with ASTM D 6938.

3.9 Erosion Control

A. Erosion Control practices shall be completed in accordance with Section 31 25 00 - Erosion and Sediment Controls.

3.10 Seeding and Mulching

A. Seeding, fertilizing, and mulching shall be completed in accordance with Section 31 25 00 - Erosion and Sediment Controls.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Grading

A. Grading shall be considered incidental to the Bid Items for piping.

* * * END OF SECTION * * *

SECTION 31 23 16

EXCAVATION

PART 1 - GENERAL

1.1 Summary

A. The CONTRACTOR shall excavate to the lines and grades shown on the plans and as staked by the ENGINEER in the field.

1.2 Related Sections

A. Section 31 10 00 - Site Clearing

B. Section 31 22 00 - Grading

C. Section 31 23 26 - Structural Fill

D. Section 31 23 33 - Trenching and Backfilling

E. Section 31 25 00 - Erosion and Sediment Controls

1.3 Description

A. Work in this section includes but is not necessarily limited to the following items:

1. Excavation inside the limits of waste.
2. Excavation outside the limits of waste.

PART 2 - PRODUCTS

2.1 General

A. Provide all materials as shown on the Construction Drawings, as specified herein, and as needed for a complete and proper installation.

2.2 Other Materials

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the CONTRACTOR and approved by the OWNER and ENGINEER.

PART 3 - EXECUTION

3.1 General

A. The CONTRACTOR shall excavate the areas shown on the Construction Drawings.

B. The CONTRACTOR shall take necessary precautions to protect underground utilities, and especially any utilities whose original cover may be temporarily removed as part of construction.

C. The CONTRACTOR shall excavate to the lines and grades shown on the Construction Drawings. Excavated material shall be stockpiled at the locations shown on the Construction Drawings. Before commencing any fill or compaction operations, each excavation shall be observed and approved by the ENGINEER. The cost of filling inadvertent over-excavation shall be borne by the CONTRACTOR.

D. Surplus excavated materials unsatisfactory for backfill shall be disposed of at the landfill working face.

E. The CONTRACTOR is responsible for securing, purchasing, hauling and placement of fill material meeting the requirements of the Specifications.

3.2 Surface Conditions

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the work. Do not proceed until unsatisfactory conditions are corrected.

3.3 Finish Elevations and Lines

A. Comply with pertinent provisions of Section 01 71 24 - Construction Layout and Surveying.

3.4 Procedures

A. Protection of existing utilities:

1. Unless shown to be abandoned or removed, protect utility lines and other pipes shown on the Construction Drawings or otherwise made known to the CONTRACTOR prior to excavating. CONTRACTOR is required to perform all utility clearances, including interviewing on-site personnel to inquire about existing utilities in areas of proposed excavations If a utility is damaged by the CONTRACTOR, the utility shall be repaired or replaced at no additional cost to the OWNER.

2. If utility lines are encountered that are not shown on the Construction Drawings or otherwise made known to the CONTRACTOR, promptly take necessary steps to assure that service is not interrupted.

3. If service is interrupted as a result of work under this Section, ENGINEER shall be notified, and CONTRACTOR shall immediately restore service by repairing the damaged utility.

4. If existing utilities are found to interfere with the facilities being constructed under this Contract, immediately notify ENGINEER and request their

instructions. Maintain a minimum 12-inch horizontal and vertical separation from existing utilities and the facilities being constructed under this Contract.

5. Do not proceed with permanent relocation of the Work until written instructions are received from the ENGINEER.
6. Exposed utilities shall be properly supported at all times if undermined.

B. Protection of Persons and Property:

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
2. Excavations shall be clearly marked if left open overnight. The CONTRACTOR shall supply barricades, warning lights, fencing or other OSHA approved devices to clearly mark and delineate open excavations.

C. Dewatering:

1. Remove all water, including rainwater, encountered during work to an approved location by pumps, drains, and other approved methods.
2. Handling and disposal of water shall comply with all stormwater and erosion and sedimentation control permits.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site. Use of wet sprays is recommended to minimize fugitive dust emissions.

E. CONTRACTOR shall be responsible for ensuring that fugitive litter resulting from construction is collected before the end of each construction day. Use of wet sprays is recommended to minimize fugitive litter.

F. Maintain access to adjacent areas at all times.

3.5 Excavation

A. Perform excavations of every type of material encountered within the limits of the Project to the lines, grades, and dimensions indicated on the Construction Drawings and specified herein.

B. Satisfactory excavated materials shall be transported to and placed in stockpiles or fill areas within the limits of the Project identified by the OWNER.

C. If unsatisfactory materials are encountered above or at the design depth of the excavation, excavate the unsatisfactory materials to three (3) feet below the design depth and replace with compacted fill meeting the requirements of the Specifications.

D. Excavate in a manner and sequence that will provide proper drainage at all times. The CONTRACTOR shall provide dewatering equipment if necessary.

E. Dispose of unsatisfactory excavated material at the landfill working face, and surplus satisfactory excavated material, away from the work area as identified by the OWNER.

F. Any waste excavated shall be disposed of at the working face of the landfill at no cost to the CONTRACTOR. Waste deliveries to the landfill active face will not be accepted before 8:00 AM or after 5:00 PM. Exposed waste not delivered to the working face shall be covered either with 6 inches of earthen material or by fire retardant tarpaulins that are secured to prevent being carried off by heavy winds.

G. Unauthorized Excavation:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions as shown on the Construction Drawings.
2. Backfill and compact unauthorized excavations as specified for authorized excavations.

H. Stability of Excavations:

1. Sides of excavations shall be cut back in accordance with 29 CFR 1910 OSHA standards.
2. Shore and brace excavations where slope cutbacks are not practical because of space restrictions or stability of the materials being excavated.
3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

I. Shoring and Bracing:

1. Provide all labor and materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
2. Maintain shoring and bracing in excavations regardless of the time period excavations will be open.
3. Remove shoring and bracing as excavation progresses.

3.6 Field Quality Control

A. Secure the ENGINEER's observation and approval of subgrade before subsequent construction is permitted thereon.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Excavation

A. Excavation shall be considered incidental to the Bid Items for piping.

* * * END OF SECTION * * *

SECTION 31 23 26

STRUCTURAL FILL

PART 1 - GENERAL

1.1 Summary

A. CONTRACTOR shall place and compact structural fill in the locations shown on the Construction Drawings.

1.2 Related Sections

A. Section 31 10 00 - Site Clearing

B. Section 31 22 00 - Grading

C. Section 31 23 16 - Excavation

D. Section 31 23 33 - Trenching and Backfilling

E. Section 31 25 00 - Erosion and Sediment Controls

1.3 Description

A. Work in this section includes but is not necessarily limited to the following items:

1. Placement of structural fill in the access roads and access road crossing.

PART 2 - PRODUCTS

2.1 General

A. Provide all materials as shown on the Construction Drawings, as specified herein, and as needed for a complete and proper installation.

2.2 Structural Fill Materials

A. CONTRACTOR shall provide sand, a mixture of sand and gravel, crushed gravel, crushed stone, crushed concrete, or other fragmented mineral material free from organic matter, waste, boulders and other deleterious material for use as Structural Fill.

2.3 Other Materials

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the CONTRACTOR and approved by the OWNER and ENGINEER.

PART 3 - EXECUTION

3.1 General

A. The areas shown on the Construction Drawings that require compacted structural fill shall be excavated in accordance with Section 31 23 16 – Excavation.

B. The CONTRACTOR shall take necessary precautions to protect underground utilities, and especially any utilities whose original cover may be temporarily removed as part of construction.

C. The CONTRACTOR is responsible for securing, purchasing, hauling and placement of fill material meeting the requirements of the Specifications.

3.2 Surface Conditions

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.3 Finish Elevations and Lines

A. Comply with pertinent provisions of Section 01 71 24 - Construction Layout and Surveying.

3.4 Procedures

A. Protection of Existing Utilities:

1. Unless shown to be abandoned or removed, protect utility lines and other pipes shown on the Construction Drawings or otherwise made known to the CONTRACTOR prior to excavating. CONTRACTOR is required to perform all utility clearances, including interviewing on-site personnel to inquire about existing utilities in areas of proposed excavations. If a utility is damaged by the CONTRACTOR, the utility shall be repaired or replaced at no additional cost to the OWNER.

2. If utility lines are encountered that are not shown on the Construction Drawings or otherwise made known to the CONTRACTOR, promptly take necessary steps to assure that service is not interrupted.

3. If service is interrupted as a result of work under this Section, ENGINEER shall be notified, and CONTRACTOR shall immediately restore service by repairing the damaged utility.

4. If existing utilities are found to interfere with the facilities being constructed under this Contract, immediately notify the OWNER and ENGINEER and request their instructions. Maintain a minimum 12-inch horizontal and vertical

separation from existing utilities and the facilities being constructed under this contract.

5. Do not proceed with permanent relocation of the work until written instructions are received from the OWNER/ENGINEER.
6. Exposed utilities shall be properly supported at all times if undermined.

B. Protection of Persons and Property:

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.

C. Dewatering:

1. Remove all water, including rainwater, encountered during work to an approved location by pumps, drains, and other approved methods.
2. Handling and disposal of water shall comply with all stormwater and erosion and sedimentation control permits.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site.

E. Maintain access to adjacent areas at all times.

3.5 Structural Fill Placement

A. Structural fill shall be placed at all road crossings and as otherwise indicated on the Construction Drawings.

B. Ground Surface Preparation:

1. Remove vegetation, debris, unsatisfactory soil materials, obstructions, and deleterious matter from ground surface prior to placement of structural fill.

C. Structural Fill Placement and Compaction:

1. Place backfill and a minimum gravel fill material of 12 inches beneath slabs in loose thickness.
2. Compact structural fill using suitable mechanical equipment until no noticeable deformation is observed.
3. Do not place backfill or fill material on surfaces that are muddy, frozen, or containing frost or ice.
4. Place backfill and fill materials evenly adjacent to structures to required elevations.
5. Hydraulic compaction utilizing water to consolidate soils shall not be allowed.

3.6 Maintenance

A. Protection of Structural Fill Areas:

1. Protect structural fill areas from traffic and erosion and keep free from trash and weeds.

2. Repair and reestablish grades in settled, eroded, and rutted areas to the specified tolerances.

B. Where completed compacted areas are disturbed by subsequent construction operations or adverse weather, scarify the surface, reshape, and compact to the required density prior to further construction.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Structural Fill

A. Structural fill placement and compaction shall be considered incidental to the associated Bid Items.

* * * END OF SECTION * * *

SECTION 31 23 33

TRENCHING AND BACKFILLING

PART 1 - GENERAL

1.1 Summary

A. The CONTRACTOR shall provide all trenching and backfilling of trenches necessary to complete the Work specified herein.

1.2 Related Sections

A. Section 31 10 00 - Site Clearing

B. Section 31 23 16 - Grading

C. Section 31 23 16 - Excavation

D. Section 31 23 26 - Structural Fill

E. Section 31 25 00 - Erosion and Sediment Controls

1.3 Description

A. Work in this Section includes, but is not necessarily limited to the following:

1. Trenching in active waste disposal area and areas with intermediate cover.
2. Trenching across and within access roads.

PART 2 - PRODUCTS

2.1 General

A. Provide all materials as shown on the Construction Drawings, as specified herein, and as needed for a complete and proper installation.

2.2 Trench Backfill Materials

A. Trenches located in active waste disposal area and areas with intermediate cover:

1. The CONTRACTOR shall backfill trenches in waste with cover soils obtained as a result of initial trench excavation and as detailed on the Construction Drawings.

B. Trenches located in access roads and other areas outside of the limits of waste:

1. The CONTRACTOR shall backfill trenches with pipe bedding material and clean soil fill as detailed on the Construction Drawings. Soil is available on site and can

be stocked piled near construction activities as required by coordinating with the Owner.

2. Pipe bedding shall be sand clear of organic matter and meeting the following gradation:

U.S. Sieve Size	Range of Percent Passing
No. 4	95 to 100
No. 16	60 to 95
No. 50	0 to 50
No. 100	0 to 20
No. 200	0 to 5

   a. The CONTRACTOR shall supply the ENGINEER with laboratory testing results demonstrating that the pipe bedding meets the requirements of this Section.

   b. The CONTRACTOR shall bear all costs associated with securing the material and providing the sampling and testing required to demonstrate compliance with this section.

2.3 Other Materials

A. Provide other materials, not specifically described but required for a complete and proper installation, as selected by the CONTRACTOR and approved by the OWNER and ENGINEER.

PART 3 - EXECUTION

3.1 General

A. The CONTRACTOR shall provide trenching at all locations shown on the Construction Drawings for landfill gas piping, electrical conduits, and associated structures.

B. The CONTRACTOR shall take necessary precautions to protect underground utilities, and especially any utilities whose original cover may be temporarily removed as part of construction.

C. The CONTRACTOR shall excavate trenches to the lines and grades shown on the Construction Drawings. Excavated material shall be stockpiled at the locations identified by the ENGINEER. Before commencing any fill or compaction operations, each excavation shall be observed and approved by the ENGINEER. The cost of filling inadvertent over-excavation shall be borne by the CONTRACTOR.

D. Surplus excavated materials unsatisfactory for backfill shall be disposed of at the landfill working face at no cost to the CONTRACTOR. Waste deliveries to the landfill active face will not be accepted before 8:00 AM or after 5:00 PM. Exposed waste

not delivered to the working face shall be covered either with 6 inches of earthen material or by fire retardant tarpaulins that are secured to prevent being carried off by heavy winds.

E. The CONTRACTOR is responsible for securing, purchasing, hauling and placement of fill material meeting the requirements of the Specifications.

3.2 Surface Conditions

A. Examine the areas and conditions under which work of this Section will be performed. Correct conditions detrimental to timely and proper completion of the Work. Do not proceed until unsatisfactory conditions are corrected.

3.3 Finish Elevations and Lines

A. Comply with pertinent provisions of Section 01 71 24 - Construction Layout and Surveying.

3.4 Procedures

A. Protection of Existing Utilities:

1. Unless shown to be abandoned or removed, protect utility lines and other pipes shown on the Construction Drawings or otherwise made known to the CONTRACTOR prior to excavating. CONTRACTOR is required to perform all utility clearances, including interviewing on-site personnel to inquire about existing utilities in areas of proposed excavations. If a utility is damaged by the CONTRACTOR, the utility shall be repaired or replaced at no additional cost to the OWNER.
2. If utility lines are encountered that are not shown on the Construction Drawings or otherwise made known to the CONTRACTOR, promptly take necessary steps to assure that service is not interrupted.
3. If service is interrupted as a result of work under this Section, ENGINEER shall be notified, and CONTRACTOR shall immediately restore service by repairing the damaged utility.
4. If existing utilities are found to interfere with the facilities being constructed under this Contract, immediately notify ENGINEER and request their instructions. Maintain a minimum 12-inch horizontal and vertical separation from existing utilities and the facilities being constructed under this Contract.
5. Do not proceed with permanent relocation of the work until written instructions are received from the ENGINEER.
6. Exposed utilities shall be properly supported at all times if undermined.

B. Protection of Persons and Property:

1. Protect structures, utilities, sidewalks, pavements, and other facilities from damage caused by settlement, lateral movement, washout, and other hazards created by operations under this Section.
2. Trenches shall be clearly marked if left open overnight. The CONTRACTOR shall supply barricades, warning lights, fencing or other OSHA approved devices to clearly mark and delineate open excavations.

C. Dewatering:

1. Remove all water, including rainwater, encountered during work to an approved location by pumps, drains, and other approved methods.
2. Handling and disposal of water shall comply with all stormwater and erosion and sedimentation control permits.

D. Use means necessary to prevent dust becoming a nuisance to the public, to neighbors and to other work being performed on or near the site. Use of wet sprays is recommended to minimize fugitive dust emissions.

E. CONTRACTOR shall be responsible for ensuring that fugitive litter resulting from construction is collected before the end of each construction day. Use of wet sprays is recommended to minimize fugitive litter.

F. Maintain access to adjacent areas at all times.

3.5 Trenching

A. Perform trenching of every type of material encountered within the limits of the Work to the lines, grades, and dimensions indicated on the Construction Drawings and specified herein.

B. Satisfactory excavated materials shall be transported to and placed in stockpiles or fill areas within the limits of the Work as identified by the OWNER.

C. If unsatisfactory materials are encountered above or at the design depth of the trench, excavate the unsatisfactory materials to six (6) inches below the design depth and replace with compacted structural fill meeting the requirements of the specifications.

D. Trench in a manner and sequence that will provide proper drainage at all times. The CONTRACTOR shall provide dewatering equipment if necessary.

E. Dispose of unsatisfactory excavated material, and surplus satisfactory excavated material, away from the work area as shown on Construction Drawings.

F. Waste shall be disposed of at the working face of the landfill.

G. Unauthorized Excavation:

1. Unauthorized excavation consists of removal of materials beyond indicated subgrade elevations or dimensions as shown on the Construction Drawings.

2. Backfill and compact unauthorized excavations as specified for authorized excavations.

H. Trenching Safety:

1. Trenching shall be completed in accordance with 29 CFR 1910 OSHA regulations.
2. Trench boxes, shoring and bracing shall be placed in trenches in accordance with 29 CFR 1910 if personnel are to enter the trench or if the trench is susceptible to cave in.
3. Maintain sides and slopes of excavations in a safe condition until completion of backfilling.

I. Shoring and Bracing:

1. Provide all labor and materials for shoring and bracing as may be necessary for safety of personnel, protection of work, and compliance with requirements of governmental agencies having jurisdiction.
2. Maintain shoring and bracing in trenches regardless of the time period excavations will be open.
3. Remove shoring and bracing as trenching progresses.

J. Asbestos Handling: Please refer to Addendum 31 23 33.1 Excavation, Screening, and Asbestos Disposal Work Plan for further information regarding this matter.

3.6 Backfilling

A. Backfilling shall be completed in accordance with the location of the trench as shown on the Construction Drawings.

B. Pipe bedding outside of the limits of waste shall be compacted until no noticeable deformation is observed.

C. Backfill areas shall be completed in accordance with these Specifications and placed in the areas shown on the Construction Drawings.

D. Conduct air monitoring to confirm lack of surface emissions after completion of backfill. If emissions are detected, rework cover soils and cover system and recomplete air monitoring until passing per the project documents.

3.7 Field Quality Control

A. The ENGINEER shall observe all trenching as part of the Work.

B. Backfill shall not be placed in trenches until the ENGINEER has observed the placement of the piping and verified that the line and grade have been met.

C. The ENGINEER shall observe and document air monitoring results following completion of backfill.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Trenching and Backfilling

A. Trenching and Backfilling shall be considered incidental to the Bid Items for piping.

B. Items included in Trenching and Backfilling are landfill gas piping, electrical conduits, and associated structures.

* * * END OF SECTION * * *

SECTION 31 23 33.1

EXCAVATION, SCREENING, AND ASBESTOS DISPOSAL WORK PLAN

PICKLES BUTTE SANITARY LANDFILL
LANDFILL GAS COLLECTION AND CONTROL SYSTEM

PART 1 – GENERAL

1.1 SUMMARY OF THE WORK

A. This work plan is for the excavation of trenches in Phase 1 for connection of vertical landfill gas well to the header pipe that may contain asbestos-impacted waste. If any other hazardous or potentially hazardous wastes are discovered work must be immediately shutdown until these wastes can be identified and this work plan modified to include these wastes.

1.1.1 EXTENT OF THE WORK

A. Asbestos Supervisor and Equipment Operator will coordinate all work, scheduling, and start date with Pickle Butte Sanitary Landfill (Owner) and Owner's Representative.

B. Below is a brief description of the estimated quantities of waste that is potentially contaminated with suspect asbestos requiring screening and disposal. This is for informational purposes only and is based on the best information available at the time of the scope of work preparation. The Asbestos Supervisor and Equipment Operator shall assume all excavated waste is contaminated with suspect asbestos material. Nothing in this section may be interpreted as limiting the extent of work otherwise required by this scope of work.

Materials and Description	Estimated Quantity
Remove cover soil and set aside for reuse. Excavate trenches in waste and dispose of waste at the landfill. Assume that all waste is contaminated with suspect asbestos materials. There are no associated disposal fees. Roll off bins will be provided by the landfill and landfill staff will move waste to active face.	4,000 YD^3 (waste)

1.1.2 TASKS

The work tasks are summarized briefly as follows:

A. The preliminary work tasks are described below.

1. The Asbestos Supervisor and Equipment Operator will coordinate with the Owner for scheduling of access to site. The Asbestos Supervisor and Equipment Operator shall assume that the area surrounding the site could be partially occupied during this project.

2. Access to each excavation location will be restricted to the Asbestos Supervisor, Equipment Operator, Awareness Trained Asbestos Staff (4 hours (2 hours site specific)), Asbestos Supervisor's Sub-contractors, Owner, Owner's Representative, and Government Representative's. The work areas shall be demarcated in accordance with OSHA requirements as an asbestos work area. Appropriate signage is discussed elsewhere in this scope of work.
3. The Asbestos Supervisor will prepare the work areas for trench excavation, field screening for asbestos (i.e. air monitoring), wetting, and placement of asbestos containing materials (ACM) into roll off bins. Each work area preparation measures are to be approved by the Owner or Owners Representative prior to the commencement of work.
4. In the absence of a Negative Exposure Assessment as described in OSHA 1926.1101, the Asbestos Supervisor and Equipment Operator shall utilize respiratory protection while in the regulated work areas or until sufficient air monitoring data has been collected for representative exposures resulting from the asbestos waste excavation. In addition, the Asbestos Supervisor and Equipment Operator shall maintain the use of disposable coveralls, hand protection, steel toed boots, safety glasses, hearing protection, and head coverings. The Asbestos Supervisor shall also provide for worker/equipment decontamination areas which are within or contiguous with each regulated area.
5. The Asbestos Supervisor and Equipment Operator shall pickup and containerize trench cuttings assuming that they have suspect asbestos materials. The use of wet methods (see Section 2.3.1) is anticipated to reduce the generation of asbestos fibers and migration of fibers or asbestos debris beyond the localized isolation area.
6. Following the completion of the procedures outlined above, the Asbestos Supervisor will thoroughly clean the localized isolation area, remove visible suspect asbestos materials that may have been missed, and thoroughly decontaminate equipment.
7. Disposal of waste contaminated with suspect asbestos materials and suspect asbestos debris removed from each site work area shall be disposed of at the landfill in an area approved by the Owner, for the specific materials being disposed of, and all removals shall be in accordance with all applicable Federal, State and local regulations.
8. All equipment, tools, and machines used in the performance of the work covered by these specifications shall be subject to the approval of the Owner or Owner Representative and shall comply with all applicable safety requirements. All equipment and machines used on the project shall be adequately maintained and shall be the proper equipment for the work being accomplished so as to produce the result required by the Contract Document.

B. Pre-work activities include: pre-work meeting(s), inspection(s), notifications, permits where required, work-site preparations, emergency procedure arrangements, and standard operating procedures for asbestos related work.

C. Trench excavation, field screening and air monitoring for asbestos, and disposal of ACM work activities include: removal of waste from within trenches after removal of soil cover,

field screening of waste and debris to identify material contaminated with suspect asbestos materials, clean up, record keeping, waste disposal, security, monitoring and inspections.

D. Clearance work activities are to include: final visual inspections and soil sample collection and analysis and certification of no contamination.

E. The Asbestos Supervisor shall be responsible for coordination of proper disposal of the waste and associated materials generated by project activities with the Owner.

1.1.3 ASBESTOS SUPERVISORS USE OF THE PREMISES

A. The Asbestos Supervisor, Asbestos Supervisor's personnel, and Equipment Operator shall cooperate fully with the Owner to facilitate efficient use of site. The Asbestos Supervisor and Equipment Operator shall perform the work in accordance with the scope of work and in compliance with any/all applicable regulations and Pickles Butte Sanitary Landfill requirements.

1.2 STOP REMOVAL AND CLEANING OPERATIONS

A. If the Owner or their field representative presents a written Stop Work Order, the Asbestos Supervisor/Personnel and Equipment Operator shall immediately stop all asbestos related work activities within each regulated area. The Asbestos Supervisor and Equipment Operator shall not resume any asbestos related work activities until authorized to do so by the Owner or their field representative. A stop work order may be issued at any time the Owner or their field representative determines work conditions or activities are not within scope of work requirements. Work stoppage will continue until conditions have been corrected to the satisfaction of the Owner or their field representative. The occurrence of any of the following events shall be reported immediately by the Asbestos Supervisor and/or Owner's field representative to the Owner and shall require the Asbestos Supervisor to immediately stop asbestos related work activities:

1. Visible evidence of airborne fugitive dust;
2. Asbestos concentrations ≥ 0.01 f/cc outside a regulated area;
3. Asbestos Supervisors employees and Equipment Operator performing asbestos work activities without proper Personal Protective Equipment (PPE);
4. Any injury or near miss incident;
5. Any fire or safety emergency;
6. Any respiratory protection system failure;
7. Excessive airborne fibers (>0.5 f/cc) in the regulated area when wet methods are being used.
8. Visual or analytical evidence of tracking of asbestos from beyond the regulated area.

1.3 APPLICABLE CODES AND REGULATIONS

1.3.1 GENERAL APPLICABILITY OF CODES, REGULATIONS, AND STANDARDS

A. All work shall be done in strict accordance with all applicable Pickles Butte Sanitary Landfill Safe Work Practices, along with all applicable Federal, State, and local regulations, standards and codes governing asbestos related work activities, and any other trade work done in conjunction with the asbestos waste, cleanup, and disposal work activities. All applicable codes, regulations and standards are adopted into this scope of work and will have the same force and effect as this scope of work.

B. The most recent edition of any applicable Pickles Butte Sanitary Landfill Work Practice, relevant regulation, standard, document or code shall be in effect. Where conflict among the requirements or with this scope of work exists, the most stringent requirement(s) shall be utilized.

1.3.2 ASBESTOS SUPERVISOR RESPONSIBILITY

A. The Asbestos Supervisor and Equipment Operator shall assume full responsibility and liability for compliance with all applicable Pickles Butte Sanitary Landfill Safe Work Practice, and Federal, State and Local regulations related to any and all aspects of the waste excavation, field screening, and asbestos disposal work activities. The Asbestos Supervisor is responsible for providing and maintaining training, accreditations, medical exams, medical records, personal protective equipment as required by applicable Pickles Butte Sanitary Landfill, and Federal, State and Local regulations. The Asbestos Supervisor and Equipment Operator shall hold the Owner and consultants harmless for any failure to comply with any applicable work, packaging, transporting, disposal, safety, health, licensing, certification, or other environmental requirement on the part of themselves, their employees, or their sub-contractors.

1.3.3 FEDERAL REQUIREMENTS

A. Federal requirements which govern some aspect of asbestos include, but are not limited to, the following regulations.

1. Occupational Safety and Health Administration (OSHA)
    a. 29 CFR 1926.1101 – Construction Standard for Asbestos
    b. 29 CFR 1926 Subpart E - Personal Protective Equipment and Life Saving Equipment
    c. 29 CFR 1910.20 - Access to Employee Exposure and Medical Records
    d. 29 CFR 1910.132 -Personal Protective Equipment
    e. 29 CFR 1910.134 – Respiratory Protection
    f. 29 CFR 1910.145 - Specifications for Accident Prevention Signs and Tags
    g. 29 CFR 1910.151 - Medical and First Aid
    h. 29 CFR 1926 – Construction Industry Standards
    i. 29 CFR 1910.20 – Access to Employee Exposure and Medical Records

j. 29 CFR 1926.59 same as 29 CFR 1910.1200 – Hazard Communication

k. 29 CFR 1926 Subpart C – General Safety and Health Provisions and Subpart D – Occupational Health and Environmental Controls

2. Environmental Protection Agency (EPA)

a. 40 CFR 61, Part A - General Provisions

b. 40 CFR 61, Subpart M - National Emission Standard for Hazardous Air Pollutants – Asbestos

c. 40 CFR 763.120-1 - Asbestos Abatement Projects

d. 40 CFR 763 - Asbestos Hazard Emergency Response Act (AHERA) and Asbestos Hazard Abatement Reauthorization Act (ASHARA)

e. 560/5-85-024 - Guidance for Controlling Friable Asbestos-Containing Materials in Buildings

3. Department of Transportation (DOT)

a. Title 49 CFR 100 - 185 – Transportation

1.3.4 STATE REQUIREMENTS

A. There are no state requirements that govern any aspect to the asbestos work, transportation and disposal, etc. on this project. Owner will provide notification to the Idaho Department of Environmental Quality two weeks before work commences.

1.3.5 STANDARDS

A. Standards governing testing laboratories:

1. Air sampling – AIHA Accredited

2. Bulk sampling – NIST Accredited

B. Standards which govern the fire and safety concerns in the asbestos soil cleaning work area include, but are not limited to, the following:

1. National Fire Protection Association (NFPA) 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations.

2. NFPA 10 - Standard for Fire Extinguishers

3. NFPA 70 - Standard for National Electric Code

4. NFPA 101 - Life Safety Code

5. NFPA 241 - Standard for Safeguarding Construction, Alteration, and Demolition Operations

6. NFPA 701 - Standard Methods for Fire Tests for Flame Resistant Textiles and Film

7. NFPA 101 - Life Safety Code

8. Uniform Building Code (UBC) – 2006 Edition

1.3.6 EPA GUIDANCE DOCUMENTS

A. EPA guidance documents which discuss asbestos abatement work activities are listed below. These documents are made part of this section by reference. EPA publications can be ordered from (800) 424-9065.

B. Guidance for Controlling ACM in Buildings (Purple Book) EPA 560/5-85-024

C. Asbestos Waste Management Guidance EPA 530-SW-85-007

D. A Guide to Respiratory Protection for the Asbestos Abatement Industry EPA-560-OPTS-86-001

E. Guide to Managing Asbestos in Place (Green Book) TS 799 20T July 1990

1.3.7 SITE SECURITY

A. Regulated area access is to be restricted only to authorized, trained/accredited and protected personnel. These may include the Asbestos Supervisor's employees, Equipment Operator, employees of sub-contractors, Owner employees and representatives, Federal, State and local inspectors, and any other designated individuals. A list of authorized personnel shall be established prior to commencing the project and be available at the job site.

B. Entry into the regulated areas by unauthorized individuals shall be reported immediately to the Owner by anyone observing the entry.

C. A log book shall be maintained on the project site. Anyone who enters the regulated areas must record their name, affiliation, time in, and time out for each entry.

D. Access to the regulated areas shall be through a posted and controlled access for asbestos waste excavation and cleanup work activities.

E. The Asbestos Supervisor's Competent Person shall control site security during asbestos waste excavation and cleanup work activities in order to isolate work in progress and protect adjacent personnel.

1.4 PROJECT COORDINATION

A. The following are the minimum supervisory personnel necessary for coordination of the work.

1.4.1 PERSONNEL

A. Supervisory personnel shall consist of a qualified Competent Person as defined by OSHA in the Construction Standards and the Asbestos Construction Standard. These employees are the Asbestos Supervisor's Representatives responsible for compliance with this scope of work and all other applicable requirements.

B. Non-supervisory personnel shall consist of an adequate number of qualified personnel to meet the schedule requirements of the project.

C. Minimum qualifications for assigned personnel are:

1. The Competent Person meets the OSHA definition of a Competent Person; has completed EPA AHERA/OSHA/State/Local training requirements/accreditation(s) and refreshers; and has all required OSHA documentation related to medical and respiratory protection.
2. Any additional personnel utilized for the asbestos cleanup under the supervision of the Competent Person shall have completed the EPA AHERA/OSHA/State abatement worker course; have training on the standard operating procedures of the Asbestos Supervisor; has applicable medical and respiratory protection documentation; has certificate of training and State accreditation/license.
3. The Equipment Operator shall have completed the OSHA Asbestos Awareness course, have training on the standard operating procedures of the Asbestos Supervisor; has applicable medical and respiratory protection documentation and has certificate of training.

1.5 RESPIRATORY PROTECTION

1.5.1 GENERAL – RESPIRATORY PROTECTION PROGRAM

A. The Asbestos Supervisor shall develop and implement a Respiratory Protection Program (RPP) which is in compliance with OSHA requirements found at 29 CFR 1926.1101 and 29 CFR 1910.132;134. ANSI Standard Z88.2-1992 provides excellent guidance for developing a respiratory protection program. All respirators used must be NIOSH approved for asbestos abatement activities. The written respiratory protection shall, at a minimum, contain the basic requirements found at 29 CFR 1910.134 (c) (1) (i - ix) - Respiratory Protection Program.

1.5.2 RESPIRATORY PROTECTION PROGRAM COORDINATOR

A. The Respiratory Protection Program Coordinator (RPPC) must be identified. The RPPC must provide a signed statement attesting to the fact that the program meets the above requirements.

1.5.3 SELECTION AND USE OF RESPIRATORS

A. The procedure for the selection and use of respirators must be submitted to the Owner and Owner Representative as part of the Asbestos Supervisor's qualification. The procedure must be written enabling workers to understand clearly. A copy of the Respiratory Protection Program plan must be available in the clean room of the decontamination unit for reference by employees or authorized visitors.

1.5.4 MINIMUM RESPIRATORY PROTECTION

A. Minimum respiratory protection shall be a half face air purifying respirator when airborne fiber levels are maintained consistently at or below 0.5 f/cc, as determined by PLM analysis. A higher level of respiratory protection may be provided or required, depending on the concentration of airborne fiber levels in the regulated area. Respirator selection shall meet the requirements of 29 CFR 1926.1101 (h); Table 1, except as indicated in this paragraph. Abatement personnel must each have a respirator for their exclusive use. Onsite respirator use must comply with the requirements of 29 CFR 1910.134.

1.5.5 MEDICAL WRITTEN OPINION

A. No employee shall be allowed to wear a respirator unless a physician has determined they are capable of doing so and has issued a written opinion for that person in accordance with 29 CFR 1910.134.

1.5.6 RESPIRATOR FIT TEST

A. All personnel wearing respirators shall have a current qualitative/quantitative fit test which was conducted in accordance with 29 CFR 1910.134 (f) and Appendix A.

1.5.7 RESPIRATOR FIT CHECK

A. The Competent Person shall assure that the positive/negative fit check is done each time the respirator is donned by an employee. Head coverings must cover respirator headstraps. Any situation that prevents an effective face-piece to face seal as evidenced by failure of a fit check shall preclude that person from wearing a respirator until resolution of the problem.

1.5.8. MAINTENANCE AND CARE OF RESPIRATORS

A. The Respiratory Protection Program Coordinator shall submit evidence and documentation showing compliance with 29 CFR 1910.134 (h) Maintenance and care of respirators.

1.6 WORKER PROTECTION

1.6.1 MEDICAL EXAMINATIONS

A. Medical examinations meeting the requirements of 29 CFR 1926.1101 (m) shall be provided for all personnel working in the regulated area, regardless of exposure levels. The physician's written opinion as required by 29 CFR 1926.1101 (m) (4) shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

B. The physician's written opinion as required by 29 CFR 1910.134 (e) – medical evaluation, shall be provided for each person and shall include in the opinion the person has been evaluated for working in a heat stress environment while wearing personal protective equipment and is able to perform the work.

1.6.2 PROTECTIVE CLOTHING

A. Provide boots, booties, hard hats, goggles, clothing, respirators, and any other personal protective equipment as determined by conducting the hazard assessment required by OSHA at 29 CFR 1910.132 (d). Provide all personnel entering the regulated area with disposable full body coveralls, disposable head covering, and 18-inch boot coverings. The Competent Person shall ensure the integrity of personal protective equipment worn for the duration of the project. Duct tape shall be used to secure all suit sleeves to wrists and to secure foot coverings at the ankle.

1.6.3 REGULATED AREA ENTRY PROCEDURE

A. Worker protection shall meet the most stringent requirement. The Competent Person shall ensure that each time workers enter the regulated area: they put on new disposable coveralls, head coverings, a clean respirator, and then proceed into the regulated area through the controlled access point where they put on non-disposable personal protective equipment, as required.

1.6.4 DECONTAMINATION PROCEDURE – AIR PURIFYING, NEGATIVE PRESSURE RESPIRATOR

A. The Competent Person shall require all personnel to adhere to following decontamination procedures, as a minimum, whenever leaving the regulated area:

1. When exiting the regulated areas, HEPA vacuum and/or wet contaminated work clothing while it is still being worn. At no time may asbestos be removed from protective clothing by any means which would result in uncontrolled dispersal of asbestos into the air. Remove shoe coverings and leave them in the decontamination area. Remove protective coveralls by carefully rolling down the garment to reduce exposure to asbestos fibers.

2. While still wearing the respirator, care must be taken to follow reasonable procedures in decontamination and removing the respirator. The following procedure is required, as a minimum:

a. Thoroughly HEPA vacuum body from neck down. Vacuum hair as thoroughly as possible.

b. With the respirator still in place, wash hands, exposed areas of the face and hair with soap and water. Carefully remove respirator while proceeding out of the decontamination area.

c. Dispose of wetted or overloaded filters from respirator.

d. Carefully decontaminate respirator facepiece and respirator inside and out. (NOTE: THIS IS NOT A SUBSTITUTE FOR ROUTINE RESPIRATOR CLEANING!).

1.6.5 REGULATED AREA REQUIREMENTS

A. The Competent Person shall meet all requirements of 29 CFR 1926.1101 (o) and assure that all requirements for regulated areas at 29 CFR 1926.1101 (e) are met. All personnel in the regulated area shall not be allowed to eat, drink, smoke, chew tobacco or gum, apply cosmetics, or in any way interfere with the fit of their respirator.

1.7 DECONTAMINATION FACILITIES

1.7.1 DESCRIPTION

A. Provide the regulated work area with separate Personnel Decontamination Facilities (PDF) and Equipment Decontamination Facilities (EDF). Ensure that the PDF are the only means of ingress and egress to the regulated areas and that all equipment, bagged waste, and other material exit the regulated areas only through the EDF. See OSHA 29 CFR 1926.1101, Appendix F for minimum requirements of each and OSHA 29 CFR 1926.1101, Appendix F.

1.7.2 GENERAL REQUIREMENTS

A. All personnel entering or exiting a regulated area shall follow the requirements at 29 CFR 1926.1101 (j) (1) and this scope of work. All equipment and materials must exit the regulated areas through the EDF and be decontaminated in accordance with this scope of work. PDF and EDF must consist of 6-mil fire retardant polyethylene sheeting placed on the ground adjacent to the regulated area. This area must be properly demarcated with barrier tape or appropriate signage similar to the regulated area. The area must be equipped with HEPA filtered vacuum, soap and water, disposable towels adequate for the decontamination of workers and equipment.

1.8 MONITORING, INSPECTION AND TESTING

1.8.1 GENERAL

A. The Contractor shall employ or subcontract an industrial hygienist (IH) Air Monitoring Firm to perform various services. The IH will perform the necessary monitoring, inspection, testing, and other support services to ensure that the Owners employees and visitors will not be adversely affected by the excavation, screening, or cleanup work, and that the excavation, screening, and cleanup work proceeds in accordance with this work plan.

B. The Contractor shall perform, throughout excavation and installation of piping in Phase 1, monitoring of Asbestos Supervisor personnel exposure, Equipment Operator personnel exposure, inside and outside the work area in accordance with OSHA requirements and this scope of work. The Contractor shall provide daily reports to Owner or Owner Representative of conditions inside the work area to ensure compliance with OSHA, EPA, and this scope of work. In addition, Contractor shall manage air sample collection, analysis and evaluation for personnel samples and work area samples to satisfy OSHA requirements. Additional inspection and testing requirements are specified in other parts of this section.

PART 2 – EXECUTION

2.1 REGULATED AREA PREPARATIONS

A. Post OSHA WARNING signs meeting the specifications of OSHA 29 CFR 1926.1101 at any location and approaches to the regulated area. Signs shall be posted at a distance sufficiently far enough away from the regulated area to permit any personnel to read the sign and take the necessary measures to avoid exposure. Additional signs will be posted following preparation of the regulated area. Warning labels shall be provided and affixed to all asbestos products contaminated with asbestos. Sign and label formats shall conform to 29 CFR 1910.145(d)(4).

B. Warning Signs:

1. Signs shall be provided by the Asbestos Supervisor of sufficient size to be clearly legible, displaying the following legend:

C. Warning Labels:

1. Labels shall be provided by the Asbestos Supervisor of sufficient size to be clearly legible, displaying the following legend:

D. Waste Generator Labels:

1. Labels shall be provided by the Asbestos Supervisor to be clearly legible, displaying the name of the project, Owner, date of in which the waste was generated, and the Generator contact phone number.

2.2 ESTABLISHMENT OF THE REGULATED AREA

2.2.1 CONTROLLING ACCESS TO THE REGULATED AREA

A. Access to the regulated areas shall be permitted only through the controlled access point. All other means of access shall be closed off with WARNING signs posted on the clean side of the regulated area where it is adjacent to or within view of any occupiable areas. Provide an appropriate number of OSHA WARNING signs for each work area.

2.2.2 EXTENSION OF THE REGULATED AREAS

A. If the regulated area is breached in any manner that could allow the passage of asbestos-containing debris, the Competent Person shall immediately stop any work, continue cleaning, and proceed to extend the regulated area to include the affected area. All

personnel shall be isolated from the affected area until decontamination/cleanup is completed as verified by visual inspection and soil sample collection and analysis. At the completion of the cleaning activities soil sample analytical results must be less than 1% asbestos.

2.3 ASBESTOS WASTE CLEANUP

2.3.1 WET CLEANUP OF WASTE CONTAMINATED WITH ASBESTOS

A. Adequately wet the waste contaminated with suspect asbestos, prior to excavation and field screening to reduce/prevent asbestos fiber release to the air. Adequate time must be allowed for the amended water to saturate the waste contaminated with asbestos. Waste excavation and field screening personnel must not disturb dry asbestos. Use a fine spray of water. Saturate the waste sufficiently to wet to the ground without causing excessive water penetration. The material must be fine sprayed repeatedly/continuously during the waste excavation and field screening process in order to maintain adequately wet conditions. (Note: In no event shall dry asbestos cleanup occur except in the case of electrical hazards or a greater safety issue is possible!).

2.4 DISPOSAL OF WASTE CONTAMINATED WITH ASBESTOS WASTE MATERIALS

2.4.1 GENERAL

A. Dispose of waste contaminated with asbestos which is placed in a roll off bin in accordance with this scope of work, and OSHA, MDEQ, EPA and DOT regulations. The landfill requirements for packaging must be met and approval from the landfill must be received prior to disposal. Disposal shall be done at the Owners approved landfill. Disposal of waste contaminated with asbestos and incidental cleaning materials shall be disposed of by asbestos certified landfill staff in accordance with applicable regulations.

B. Asbestos waste shall be placed in a roll off bin and disposed of daily. Wetted waste can be very heavy. Ensure that unauthorized persons do not have access to the waste material once it is outside the regulated area. All transport containers must be covered at all times when not in use. NESHAP's signs must be on containers during loading and unloading. Material shall not be transported in open vehicles.

2.5 FINAL VISUAL INSPECTION AND CLEARANCE TESTING

2.5.1 GENERAL

A. Notify the Owners Representative 24 hours in advance for the performance of the final visual inspection and testing. The final visual inspection and testing will be performed with the Owner or Owner Representative after finishing the asbestos waste excavation and cleanup work activities. Final testing shall be performed immediately following the visual inspection.

2.5.2 FINAL VISUAL INSPECTION

A. Final visual inspection will be conducted by the Owner or Owner Representative and will include the entire regulated area and the decontamination. If any debris, residue, or any

other suspect asbestos is detected, the final cleaning shall be repeated. When the regulated area is visually clean the final testing can be done.

2.5.3 FINAL CLEARANCE TESTING

A. After an acceptable final visual inspection by the Owner or Owner Representative, the Contractor shall perform the final testing. All sample locations will be documented on a field drawing. Soil samples will be taken and analyzed by an accredited laboratory in accordance with CARB Method 435 to refine the samples followed by using Polarized Light Microscopy (PLM) EPA Method 600/R-93/116 with its stipulated 400 Point Count analysis to acquire a limit of detection of 0.25%. The CARB Method 435 will include modifications made by the EPA to include a visual estimation of conducting point count and a field of view report of asbestos structures as specified in the September 2008 EPA Framework for Investigating Asbestos-Contaminated Superfund Sites (page C-6).

B. The regulated area will be determined to be complete, and the area cleared, when the area has been cleaned, as described above, a visual inspection has been performed and passed, and the asbestos concentrations in soil have been reduced to or below the level stated below:

1. Each of the concentrations of a five-point composite sample collected in an established grid within the work area, is no less than 1% asbestos.

C. If release criteria are not met, the Asbestos Supervisor shall repeat final cleaning and continue the decontamination procedure from that point.

D. If release criteria are met, proceed to perform work area closeout.

2.6 WASTE EXCAVATION, SCREENING AND ASBESTOS DISPOSAL CLOSEOUT

2.6.1 COMPLETION OF ASBESTOS WASTE CLEANUP WORK ACTIVITIES

A. After thorough decontamination and passing result of soil samples collected in the areas, complete the asbestos soil cleanup work by fulfilling the following:

1. Remove all equipment, materials, and debris from the project area.

2. Package and dispose of all asbestos contaminated waste as required.

* * * END OF WORK PLAN * * *

SECTION 31 25 00

EROSION AND SEDIMENT CONTROLS

PART 1 - GENERAL

1.1 Summary

A. Work in this Section includes practices for erosion control during and after construction. The following erosion control methods are specified in this Section.

1. Hydroseeding
2. Fertilizing
3. Mulching

1.2 Related Sections

A. Section 31 10 00 - Site Clearing

B. Section 31 23 16 - Grading

C. Section 31 23 16 - Excavation

D. Section 31 23 26 - Structural Fill

E. Section 31 23 33 - Trenching and Backfilling

PART 2 - PRODUCTS

2.1 Materials

A. Hydroseed:

1. Hydroseed shall be delivered to the project in labeled and sealed containers. Hydroseed and labels shall be subject to testing provisions of the Association of Official Seed Analysts. The ENGINEER will not accept for use hydroseed that is more than 12 months old from date of certified germination test. Recommendation of hydroseed producer shall be followed in determining quantity of hydroseed to apply per acre.

B. Mulch:

1. Mulch shall be specially processed fiber containing no growth or germination inhibiting components. Recycled mulch material, such as processed newspaper, is allowable if accepted for use by the ENGINEER. Fibers shall form homogeneous slurry after addition and agitation in hydro-mulch seeder with seed, fertilizer, water and other additives not detrimental to plant growth.

When hydraulically sprayed on soil, fibers shall form blotter-like ground cover that readily absorbs water and allows infiltration to underlying soil.

C. Fertilizer:

1. Proper fertilizer shall be used in hydro-mulch mix, depending on condition of soil. The Contractor shall provide a Spoil Analysis Report, if requested by the ENGINEER, and shall use report to determine quantity and ratio of fertilizer for sustained growth of grass.

PART 3 - EXECUTION

3.1 Hydroseeding

A. Begin planting period immediately after hydroseeding area is accepted by the ENGINEER. If area has mixture of trees, shrubs, and grass, do not start planting period until all trees, shrubs, and grass have been planted. If only grass is planted, during planting period provide 95 percent coverage with 5-inch-tall healthy grass within 90 days. Re-hydroseed areas after 30 days that do not show thorough "catch" until the ENGINEER determines there is satisfactory growth.

B. Prior to hydroseeding the CONTRACTOR shall place a minimum of 6 inches of topsoil.

C. Hydroseed only to be used in Phase I area of Landfill.

D. Hydroseed shall be hand sown in confined areas (i.e. around wells, drip legs, etc.)

3.2 Fertilizer

A. Fertilizer may be applied with the hydroseed in the hydraulic seeder or separately.

B. Fertilizer shall be applied uniformly at a rate of 750 lbs per acre.

C. Fertilizer shall be applied by hand in confined areas.

3.3 Mulching

A. Mulch shall be applied uniformly by mechanical methods at a rate of 1.5 tons per acre.

B. Mulch shall be hand spread in confined areas.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Erosion Control

A. Erosion control shall be considered incidental to the Contract.

* * * END OF SECTION * * *

SECTION 33 51 16.13

HIGH DENSITY POLYETHYLENE (HDPE) LANDFILL PIPING

PART 1 - GENERAL

1.1 Summary

A. This Section includes material and installation specifications for high density polyethylene (HDPE) pipe and fittings.

1.2 References

A. American Society for Testing and Materials (ASTM):

1. ASTM D-638-95 - Test Method for Tensile Properties of Plastics.
2. ASTM D-790-86 - Test Method for Flexural Properties of Unreinforced and Reinforced Plastics and Electrical Insulating Materials.
3. ASTM D-1238-88 - Test Method for Flow Rates of Thermoplastic by Extrusion Plastometer.
4. ASTM D-1248-84 - Specification for Polyethylene Plastics Molding and Extrusion Materials.
5. ASTM D-1505-85 - Test Method for Density of Plastics by Density-Gradient Technique.
6. ASTM D-1693-70 - Test Method for Environmental Stress - Cracking of Ethylene Plastics.
7. ASTM D-2122-88 - Test Method of Determining Dimensions of Thermoplastic Pipe and Fittings.
8. ASTM D-2513-95(c) - Specification for Thermoplastic Gas Pressure Pipe, Tubing, and Fittings.
9. ASTM D-2837-88 Test Method for Obtaining Hydrostatic Design Basis for Thermoplastic Pipe Materials.
10. ASTM D-3261-88 - Specification for Butt Heat Fusion Polyethylene (PE) Plastic Fittings for Polyethylene (PE) Plastic Pipe and Tubing.
11. ASTM D-3350-84 - Polyethylene Plastic Pipe and Fittings Material.
12. ASTM F-1055-95 - Electrofusion Type Polyethylene Fittings.

1.3 Related Sections

A. Section 01 45 23.13 - Testing Piping Systems

B. Section 23 09 13 - Valves

C. Section 33 51 16.23 - Polyvinyl Chloride (PVC) Landfill Piping

D. Section 33 51 23 - Vertical Landfill Gas Extraction Wellheads

E. Section 33 53 23 - Horizontal Landfill Gas Extraction Wellheads

1.4 Submittals

A. Provide manufacturing test specification data listing resin type, cell classification, stock density, melt flow, flexural modulus, tensile strength, and coloration.

B. Include results of tests with shipment of materials, with two (2) additional copies of test results furnished to ENGINEER.

1.5 Quality Assurance

A. Source Quality Control:

1. If Manufacturer's test data is inadequate or unavailable, ENGINEER reserves the right to reject or require additional tests to satisfy material requirements. Costs of these tests shall be borne by CONTRACTOR.

B. Work shall comply with appropriate codes and standards of organizations for handling, fusion, and underground installation of low-pressure polyethylene pipe, including but not limited to:

1. AGA
2. ANSI
3. ASME
4. ASTM
5. PPI

1.6 Deliveries, Storage, and Handling

A. Pipe Storage:

1. Store or stack pipe to prevent damage from marring, crushing, or puncture. Limit maximum stacking height to six (6) feet or manufacturer's maximum recommended height, whichever is less.
2. Store in accordance with manufacturer's recommendations.

B. Pipe handling:

1. Protect pipe from excessive heat or harmful chemicals.

PART 2 - PRODUCTS

2.1 Physical Properties of HDPE Pipe Resin

A. Density: ASTM D-1505, not less than 0.941 - 0.955 gm/cu cm.

B. Melt Flow: ASTM D-1238 - Condition E, not greater than 0.15.

C. Flexural Modulus: ASTM D-790, 110,000 to less than 160,000 psi.

D. Tensile Strength at Yield: ASTM D-638, 3,000 to less than 3,500 psi.

E. Environmental Stress Crack Resistance (ESCR): ASTM D-1693 - Condition C, shall be in excess of 5,000 hrs with zero failure.

F. Hydrostatic Design Basis: ASTM D-2837, 1600 psi at 23ºC.

2.2 HDPE Pipe

A. High performance, high molecular weight, high density polyethylene pipe (type PE 4710 resin).

1. ASTM D-1248 (Type III, Class C, Category 5, P34).
2. ASTM D-3350, minimum cell classification value 345434C.
3. Standard dimension ratio: See Drawings.
4. Marking: Intervals of 5 ft or less
   a. Manufacturer's name or trademark.
   b. Nominal pipe size.
   c. Type of plastic resin (i.e., PE 4710).
   d. Standard dimension ratio (i.e., SDR-17).
   e. ASTM D-2513.
   f. Extrusion date, period of manufacture or lot, or batch number.

B. Dimensions:

1. Conform to standard dimensions and tolerances of ASTM D-2513.

2.3 HDPE Fittings

A. Fittings from polyethylene compound having cell classification equal to or exceeding compound used in pipe to insure compatibility of polyethylene resins.

B. Polyethylene fittings shall be fabricated from polyethylene pipe by means of thermal butt-fusion, and shall be fabricated for sizes 14-inch and larger. Fittings for sizes 12 inch and smaller shall be molded fittings. Extrusion welds on fittings will not be allowed. The ends of the fabricated fittings shall not be trimmed to match the pipe section to which they are going to be joined. Molded and most fabricated polyethylene fittings shall have the same or higher-pressure rating as the pipe when

installed in accordance with the latest technical specifications. 14-inch and larger wye and cross fabricated fittings may be de-rated.

C. Joints

1. Joints shall be thermal butt-fusion, except where connecting to unions, valves, and equipment with connections that may require future disassembly.
2. No mechanical couplings shall be used unless shown on the Drawings.
3. Extrusion welds will not be allowed.

D. Flange Connections:

1. 150-lb carbon steel or convoluted epoxy coated ductile iron backup rings for flanged connections as recommended by manufacturer.
2. Type 316 stainless steel hex head nuts and bolts and accompanying flat washers.
3. Viton full-face flange gaskets.
4. Flanges and bolt patterns consistent with ANSI B16.5/AWWA C207/ASTM A536, as recommended by manufacturer.

E. Dimensions of fittings conform to standard dimensions and tolerances according to ASTM D-3261.

F. Markings:

1. Manufacturer's name or trademark.
2. Nominal size.
3. Type of plastic resin (i.e. PE 4710).
4. Standard dimension ratio (i.e., SDR-17).
5. ASTM D-2513.
6. Extrusion date, lot number, or batch number.

G. Pressure rating of fittings shall be equal to or greater than pressure rating of pipe.

H. Branch saddle connections are strictly prohibited unless approved by the ENGINEER.

PART 3 - EXECUTION

3.1 Field Quality Control

A. Pipe may be rejected for failure to conform to Specifications, or for:

1. Fractures or cracks passing through pipe wall, except single crack not exceeding two (2) inches in length at either end of pipe which could be cut off and discarded. Pipes within one shipment will be rejected if defects exist in more than 5 percent of shipment or delivery.

2. Cracks sufficient to impair strength, durability, or serviceability of pipe.
3. Defects indicating improper proportioning, mixing, and molding.
4. Damaged ends, where such damage would prevent making satisfactory joints.

B. Acceptance of fittings, stubs, or other specifically fabricated pipe sections shall be based on visual observation by the ENGINEER at the Project site and documentation that they conform to these Specifications.

3.2 Installation

A. General:

1. Perform trenching and backfilling in accordance with Section 31 23 33 Trenching and Backfilling.
2. Pipes and fittings shall be carefully lowered into trench to limit stress to pipes, fittings, and joints.
3. Pipe and fittings shall be installed so that there will be no deviation at the joints and so that inverts present a smooth surface. Pipe and fittings that do not fit together to form a tight-fitting joint are not permitted.
4. Pipes shall be installed at the locations and to the required lines and grades shown in the Construction Drawings and provided in these Specifications, using an approved method of control. The ENGINEER has the authority to order the removal or relaying of pipe laid contrary to the specifications, her/his instructions, or during her/his absence.
5. Excavations shall be maintained free of water during the progress of the work. No pipes shall be laid in water, nor shall there be any joints made up in water. All slides or cave-ins of the trenches or cuts shall be remedied to the satisfaction of the ENGINEER.
6. Cleanliness of installed pipe and fitting interiors shall be maintained throughout the Work. Cap pipe sections longer than single joint on both ends during placement, except during fusing operations.
7. All adjustments to the line and grade of pipe laid on earth foundation shall be done by scraping away or placing compacted fill under the barrel of the pipe, and not by blocking or wedging the pipe. In all cases, the trench under the joint shall be excavated to permit an even bearing surface for the barrel of the pipe.
8. Fittings shall be installed as required and in accordance with the Construction Drawings and Specifications. The installation of fittings after the pipeline has been laid will not be permitted without written approval from the ENGINEER. In such cases, complete details pertaining to the proposed type of fittings and the installation procedure shall be submitted by the CONTRACTOR to the ENGINEER for review before approval will be considered.

9. Approval by the ENGINEER is required prior to changing the location of any of the Project due to field conditions. Changes in pipe sizes are prohibited without a written consent from the ENGINEER.
10. All installed pipe shall form completely connected systems, including connections to valves and appurtenances specified in other sections, to result in a satisfactorily operating installation.

B. Heat Fusion of HDPE Piping:

1. HDPE pipe shall be joined by butt fusion methods, having a uniform and monolithic pipe interior according to the fusion joining procedures as instructed by the manufacturer, except within the structures, as shown in the Construction Drawings.
2. Each individual performing fusion joining shall have at least one (1) year of experience in the use of the fusion procedure.
3. Join pipe sections at ground level to a maximum length of 400 feet, or a length recommended by the manufacturer such that maximum allowable stress, when pulling the pipe into position alongside the trench, is not exceeded. Use appropriate materials and equipment, as recommended by the HDPE pipe manufacturer, when pulling butt fused pipe sections alongside the trench to prevent pipe damage.
4. For summertime installations it may be necessary to provide a slightly longer length of HDPE pipe when connections are to be made between two fixed points or structures to compensate for contraction of the pipe in a cooler trench bottom. The additional pipe length requirements shall be in accordance with the HDPE pipe manufacturer's instructions.
5. For cleaning pipe ends, solutions such as detergents and solvents, when required, shall be used in accordance with manufacturer’s recommendations.
6. Do not bend pipe to greater degree than minimum radius recommended by manufacturer for type and grade.
7. Do not subject pipe to strains that will overstress or buckle pipe or impose excessive stress on joints.
8. Before butt fusing pipe, each length shall be observed for presence of dirt, sand, mud, shavings, and other debris or animals. Remove all materials from the inside of the pipe.
9. At end of each working day, cover open ends of fused pipe. Cap to prevent entry by animals or debris.
10. Use compatible fusion techniques when polyethylene pipes of different melt indexes are fused together. Refer to manufacturer’s specifications for compatible fusion.

C. Flange Joining:

1. Use on flanged pipe connection sections.
2. Connect slip-on backup flanges with nuts and bolts.
3. Butt fuse flange adapters to pipe.
4. Observe the following precautions when connecting flanged joints.
    a. Align flanges or flange/valve connections to provide a tight seal. Viton full-face gaskets are required for flange/valve connections. Valve spacers are required for valve connections.
    b. Place U.S. Standard round washers as may be required on some flanges per manufacturer's recommendations. Bolts shall be lubricated in accordance with manufacturer's recommendations.
    c. Tighten flange bolts in sequence and in accordance with manufacturer's recommendations. CAUTION: Do not over-torque the bolts. CONTRACTOR shall be required to use a torque wrench to secure flanged connections.
5. Pull bolt down by degrees to uniform torque in accordance with manufacturer's recommendations.

D. Pipe Placement:

1. Grade control equipment shall accurately maintain design grades and slopes during installation of pipe. Slope may not vary by more than 0.1 percent from the design slope without ENGINEER approval.
2. Maximum lengths of fused pipe to be handled as one section shall be placed according to manufacturer's recommendations as to pipe size, pipe SDR, and topography so as to not cause excessive gouging or surface abrasion, but not to exceed 400 feet.
3. Notify ENGINEER prior to installing pipe into trench and allow time for ENGINEER'S observation.
    a. Correct irregularities found during inspection.
4. Complete connections within trench whenever possible to prevent overstressed connections.
5. Allow pipe sufficient time to adjust to trench temperature prior to any testing, segment connections, or backfilling activity.
6. Install reducers adjacent to laterals or tees.
7. Place in trench by allowing at least 12 inches per 100 feet for thermal contraction and expansion.
8. Coordinate construction of header lines near access roads with OWNER to limit interruptions to normal landfill operations.

3.3 Pipe Testing

A. Test pipe sections in accordance with Section 01 45 23.13 - Testing Piping Systems.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. All HDPE piping shall be paid for on the installed horizontal linear foot basis.

* * * END OF SECTION * * *

SECTION 33 51 16.23

POLYVINYL CHLORIDE (PVC) PIPING

PART 1 - GENERAL

1.1 Summary

A. This section covers the work necessary to furnish and install the polyvinyl chloride (PVC) pipe and fittings specified herein.

1.2 Related sections

A. Section 01 45 23.13 - Testing Piping Systems

B. Section 23 09 13 - Valves

C. Section 33 51 16.13 - High Density Polyvinyl Landfill Piping

D. Section 33 51 23 - Vertical Landfill Gas Extraction Wellheads

E. Section 33 53 23 - Horizontal Landfill Gas Extraction Wellheads

1.3 General

A. Polyvinyl chloride pipe is designated as "PVC" on the Construction Drawings.

B. Solvent welding shall be performed in accordance with manufacturer's recommendations.

PART 2 - PRODUCTS

2.1 Materials

A. PVC pipe shall be Schedule 80, Type I, Grade 1, or Class 12454-B, conforming to ASTM D-1784.

B. Joints shall be socket-solvent welded, except where connecting to unions, valves, and equipment with threaded connections that may require future disassembly.

C. Fittings shall be schedule 80, as specified above. Fittings shall conform to the requirements of ASTM D-2467 for socket type and ASTM D-2464 for threaded type.

D. Flanges shall be one-piece, molded hub type flat faced flanges, 125-pound standard, as specified under Fittings above.

E. Flange Gaskets:

1. Flange gaskets shall be full faced, 1/8-inch thick, fabricated from Viton.

2. When mating flange has raised face, use flat ring gasket and provide filler gasket between OD of raised face and flange OD to protect PVC flange from bolting moment.

F. Fasteners shall be 316 stainless steel hex head nuts and bolts, and flat washers.

G. All socket connections shall be primed with PVC primer conforming to ASTM F656 then welded with PVC solvent cement conforming to ASTM D-2564. Manufacture and viscosity shall be as recommended by the pipe and fittings manufacturer to assure compatibility. A minimum of three (3) evenly spaced lag screws shall be installed after pipe has been welded.

H. Thread Lubricant shall be Teflon tape.

I. Branch Connections shall use socket type tees as specified under Fittings. If a size reduction cannot be accomplished with a commercially available reducing tee, use a socket type tee and install socket type reducing bushing in the branch outlet. Saddle type branch connections are not acceptable unless specifically approved by the ENGINEER.

PART 3 - EXECUTION

3.1 General

A. All rigid PVC pipe shall be cut, made up, and installed in accordance with manufacturer's recommendations.

B. Only strap wrenches shall be used for tightening threaded plastic joints, and care shall be taken not to over tighten these fittings.

C. Provide adequate ventilation when working with PVC solvent cement.

D. After solvent welding, the pipe shall remain undisturbed until cement has reached initial set.

3.2 Pressure Tests

A. All pipe, with the exception of LFG extraction wells, shall be pressure tested at the pressures and following the test procedures specified in Section 01 45 23.13.

PART 4 - MEASUREMENT AND PAYMENT

4.1 PVC Piping

A. PVC piping shall be incidental to the Bid Item for Landfill Gas Extraction Wells.

B. If PVC piping is used, the piping will be measured and paid for on a linear foot basis.

* * * END OF SECTION * * *

SECTION 33 51 23

VERTICAL LANDFILL GAS EXTRACTION WELLHEADS

PART 1 - GENERAL

1.1 Summary

A. This section includes the installation of Vertical Landfill Gas Extraction Wellheads.

1.2 Related Sections include but are not necessarily limited to:

A. Section 01 45 23.13 - Testing Pipe Systems

B. Section 23 09 13 - Valves

C. Section 33 51 16.13 - High Density Polyethylene (HDPE) Piping

D. Section 33 51 16.23 - Polyvinyl Chloride (PVC) Piping

E. Section 33 53 23 - Horizontal Landfill Gas Extraction Wellheads

PART 2 - PRODUCTS

2.1 Materials

A. Materials and Equipment to fabricate and install Vertical Landfill Gas Extraction Wellheads shall be as listed below and as shown on the Construction Drawings:

1. 2-inch Vertical Wellhead Assembly (QED Environmental Systems ORP215 or approved equal).
2. 2-inch hose (QED Solarguard or approved equal).
3. 2-inch SDR 11 HDPE Pipe.
4. 4” x 2” SDR 11 HDPE reducing fittings.
5. 4” x 2” Fernco flexseal coupling with 2” bushing.
6. Stainless Steel Worm Gear Clamps.
7. Well I.D. Tag.

PART 3 - EXECUTION

3.1 Installation

A. Landfill Gas Extraction Wellheads:

1. Install 4-inch by 2-inch Fernco Flexseal coupling with 2-inch bushing or approved equal.

2. Install wellhead according to Manufacturer's Specifications.
3. Install 2-inch hose using stainless steel clamps.
4. Install HDPE reducing fittings to connect well to lateral riser.
5. The wellhead shall be installed at a manageable elevation (approximately four feet above existing grade) to support maintenance and monitoring operations.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. Vertical Landfill Gas Extraction Wellheads will be paid by the total quantity installed and shall include all items described in the specification and shown on the Construction Drawings.

* * * END OF SECTION * * *

SECTION 33 51 39

LANDFILL GAS MONITORING PROBES (OPTIONAL)

PART 1 - GENERAL

1.1 Summary

A. This section includes drilling and installation of Landfill Gas Monitoring Probes.

1.2 Related Sections include but are not necessarily limited to:

A. Section 01 45 23.13 - Testing Pipe Systems

B. Section 23 09 13 - Valves

C. Section 33 51 16.13 - High Density Polyethylene (HDPE) Piping

D. Section 33 51 16.23 - Polyvinyl Chloride (PVC) Piping

1.3 Quality Assurance

A. Landfill Gas Monitoring Probes Contractor Qualifications:

1. CONTRACTOR, or its site foreman, shall have had previous experience with the installation of similar landfill gas monitoring probes.

2. CONTRACTOR shall prepare final landfill gas monitoring probes drilling logs and construction diagrams, and they shall be signed by a person of responsible charge. Field supervision of drilling, logging and installation activities shall be performed by trained, experienced personnel.

1.4 Landfill Gas Monitoring Probes Submittals

A. CONTRACTOR shall submit one copy of the following Landfill Gas (LFG) Collection Monitoring Probes Data on a weekly basis, and upon completion of drilling.

1. CONTRACTOR will provide copies of proposed detailed LFG Probes installation procedures and material submittals for review and approval by the OWNER or ENGINEER prior to initiation of probe construction.

2. Daily drilling report: During the drilling of the probe, maintain daily drilling report that includes at a minimum, but not limited to:

   a. Date;

   b. Location;

   c. Boring identification number;

   d. Weather conditions;

e. Daily activities;

f. Equipment used;

g. Drilling crew;

h. Time (rig time, down time, stand-by, etc.);

i. Footage drilled;

j. Materials used;

k. Probe construction (materials used, type, quantity, etc.);

l. Air monitoring conducted and results; and

m. Relevant notations and verification of activities.

3. LFG Probe Log: During the drilling of the probe the CONTRACTOR will complete a probe log report that includes at a minimum, but not limited to:

   a. Logger's Name;

   b. Date Begun;

   c. Date Completed;

   d. Location;

   e. Boring identification number;

   f. Weather conditions;

   g. Equipment used;

   h. Drilling crew;

   i. Time (time to depth, down time, stand-by, etc.);

   j. Footage (total depth, probe depth);

   k. General descriptions of strata encountered;

   l. Depth and thickness of intermediate covers/soil layers;

   m. General soils descriptions, estimates of moisture content, notation of wet or saturated zones; and

   n. Relevant notations and verification of activities.

4. LFG Probe Installation Log: Upon completion of the probe the CONTRACTOR will complete a probe installation report that includes at a minimum, but not limited to:

   a. Installer's Name;

   b. Date Begun;

   c. Date Completed;

d. Location;

e. Boring identification number;

f. Equipment used;

g. Installation crew;

h. Time (time to depth, down time, stand-by, etc.);

i. Footage (total depth, probe depth);

j. Probe construction materials used (materials used, type, dimensions, quantity, etc.);

k. Size and depth of pipe;

l. Length of perforated and solid casing;

m. Depth and type of gravel pack;

n. Depth and thickness of bentonite seal(s);

o. Depth and thickness of backfill materials(s);

p. Type and thickness of surface seal,

q. Casing elevation;

r. Air monitoring conducted and results; and

s. Relevant notations and verification of activities.

5. CONTRACTOR will provide copies of Driller's Reports, LFG Probe Logs, and LFG Probe Installation Logs for review and approval by the OWNER or ENGINEER upon probe construction.

6. ENGINEER will review and confirm all Contractor submitted reports.

PART 2 - PRODUCTS

2.1 Materials

A. Materials and equipment to fabricate and install LFG recovery probes shall be as listed below:

1. Each landfill gas monitoring probe assembly shall consist of three blank 3/4-inch SCH 80 PVC casings with 1/4-inch Labcock valves enclosed by an 8-inch diameter locking, 5-foot-long Steel or HDPE probe Monument painted bright orange or yellow pipe. Each casing shall have a 3/4-inch SCH 80 PVC probe screen with a 3/4-inch PVC bottom end cap, as shown in the Construction Drawings. Probes shall be installed to the depths as shown on the Construction Drawings.

2. Bentonite seal(s) shall be per the Construction Drawings using Baroid Benseal or equal.

a. CONTRACTOR shall assume an application rate of eight (8) 50-pound bags of bentonite chips per foot.

b. Bentonite seals shall be hydrated at a minimum rate of 25 gallons of water per foot of bentonite.

c. CONTRACTOR shall assume an application rate of eight (8) 50-pound bags of bentonite chips per foot.

3. Sand shall be number three sand and shall be per the Construction Drawings.

4. Gravel shall be a probe sorted non-calcareous 3/8-inch pea gravel.

5. Soil shall be of a fine material that has good compaction characteristics and shall conform to cover materials on-site or as designated in the Construction Drawings, and as approved by the OWNER or ENGINEER.

6. Probe I.D. Tags.

B. Landfill Gas Monitoring Probe Design:

1. The CONTRACTOR shall install the landfill gas monitoring probes at the locations noted on the Construction Drawings and/or where staked in the field, or as approved by the OWNER or ENGINEER.

2. Precise locations, depths, and screen lengths will be finalized by a registered civil engineer or a certified engineering geologist registered in the state of Idaho based on subsurface conditions encountered during drilling.

3. The Landfill Gas Monitoring Probe boring will be as noted in the drawings. The CONTRACTOR shall be responsible for determining the final probe depth with the ENGINEER based upon the available information at the time of drilling. All probes shall be installed above the permanent low seasonal water table, above and below perched ground water, and above bedrock. The Geologist or engineering geologist shall adjust the probe casing lengths, as needed, to adhere to the intent of the probe detail. Probes shall be constructed in accordance with the details shown on the Construction Drawings and as noted in the Specifications.

PART 3 - EXECUTION

3.1 Installation

A. Landfill Gas Monitoring Probe:

1. CONTRACTOR shall fabricate the probe casings and monuments in accordance with the Construction Drawings and Specifications.

2. No pressure tests are required for the Landfill Gas Monitoring Probes.

3. CONTRACTOR shall drill the Landfill Gas Monitoring Probe bores using an appropriate drilling unit capable of boring to the depths and diameters indicated

in the Construction Drawings and Specifications. Drilling methods using liquids are prohibited. CONTRACTOR shall not perform any drilling unless the ENGINEER has verified the location and elevation.

4. The Landfill Gas Monitoring Probe boring will be as noted in the Construction Drawings with depths based on the lowest future landfill bottom elevation . Final casing depths shall be adjusted at the completion of drilling to accommodate any deviation from specified depths.
5. A steel grate or similar barrier shall be placed over the borehole at all times that drilling activities are not taking place. At no time are open probe borings to be left uncovered and/or unattended.
6. Gas monitoring probes shall be set and the annular space backfilled in accordance with Construction Drawings and Specifications. Probe casings A, B, and C for each probe drilled shall be installed immediately after completion of the holes by lifting the casings with the drill rig cable hoist, in sections if required, and lowering the casings into the hole. The probe casings shall be suspended at the surface and evenly spaced, as shown in the Construction Drawings, in the boring at all times during backfilling. Initial gravel backfilling operations shall be completed while the top of the Probe casings are suspended 3 feet above the ground surface. Probes shall be completely backfilled with the designated amounts and levels of gravel, soil, sand, and cement bentonite grout. The bentonite shall be allowed to hydrate thoroughly prior to addition of clean backfill. Placement of backfill material in the boring shall be done in a manner to limit bridging of backfill in the borehole. Upon completion of the probe installation, a three (3) foot square, eight (8) inch thick concrete apron shall be installed with the finished apron top sitting two (2) inches above ground surface in accordance with Construction Drawings.
7. No probe boring shall remain unfinished at the end of the workday. At no time are open probe borings to be left uncovered and/or unattended.
8. All refuse removed from drilling operations must be removed and disposed of at the landfill working face at no cost to the CONTRACTOR. Litter that is blown away from the work area is the responsibility of the CONTRACTOR.
9. CONTRACTOR shall be responsible for any grading, leveling, towing and/or restoration that may be necessary for movement of the drill rig on the landfill property.

B. Any settlement shall be backfilled within 3 weeks after placement of backfill from the level of the subsidence to 6 inches above existing grade with the appropriate cover materials.

C. If there is a drilling obstruction encountered in the landfill that, despite the best reasonable efforts of the CONTRACTOR, cannot be penetrated, the CONTRACTOR shall request relief from the ENGINEER from completion of the probe. If an

obstruction is encountered, the following tasks may be completed depending on the depth encountered.

1. The hole shall be abandoned. The CONTRACTOR shall backfill the probe to the predrilled condition. The CONTRACTOR shall be compensated for the drilling and backfilling of the probe, but not its completion.
2. The probe shall be accepted at the obstructed depth. The probe shall be completed at this new depth. Compensation shall be for the modified footage of the probe.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Landfill Gas Monitoring Probes

A. The Landfill Gas Monitoring Probe Drilling shall be paid for on the as-built drilled vertical linear footage. The payment shall be per foot originating from the level ground surface to the depth below original grade as measured by the Contractor at the conclusion of drilling to the nearest 1-foot and confirmed by the OWNER. Should refusal be encountered, Contractor shall be paid ¼ the LFG Probe Completion Per Foot unit price to abandon and backfill the boring with site soils. There shall be no compensation for relocating to a new drilling location. Per foot drilling unit pricing shall apply to all new probe locations. Drilling is on a landfill and drilling progress rates will vary. There shall be no adjustments to the per foot drilling unit price.

B. The Landfill Gas Monitoring Probe Completion shall be paid for on the as-built drilled vertical linear footage and shall include the following:

1. All casing
2. All monuments
3. All backfill
4. All installation
5. Miscellaneous items necessary to complete each probe as described in the Specifications and on the Construction Drawings.

* * * END OF SECTION * * *

SECTION 33 53 23

HORIZONTAL LANDFILL GAS EXTRACTION WELLHEADS

PART 1 - GENERAL

1.1 Summary

A. This section includes the installation of Horizontal Landfill Gas Extraction Wellheads.

1.2 Related Sections include but are not necessarily limited to:

A. Section 01 45 23.13 - Testing Pipe Systems

B. Section 23 09 13 - Valves

C. Section 33 51 16.13 - High Density Polyethylene (HDPE) Piping

D. Section 33 51 16.23 - Polyvinyl Chloride (PVC) Piping

E. Section 33 51 23 - Vertical Landfill Gas Extraction Wellheads

PART 2 - PRODUCTS

2.1 Materials

A. Materials and Equipment to fabricate and install Horizontal Landfill Gas Extraction Wellheads shall be as listed below and as shown on the Construction Drawings:

1. 2-inch SCH 80 PVC Elbow and Nipple.
2. 6-inch by 4-inch and 4-inch by 2-inch SDR-11 HDPE Reducers (as needed).
3. 2-inch hose (QED Solarguard or approved equal).
4. Stainless Steel Worm Gear Clamps.
5. 2-inch HDPE to Stainless Steel Transition Fitting (Butt x MPT).
6. 2-inch SDR-11 HDPE Elbow.
7. 2-inch SCH 80 PVC Coupling (SOC x FPT).
8. Well I.D. Tag.

PART 3 - EXECUTION

3.1 Installation

A. Horizontal Landfill Gas Extraction Wellheads:

1. Assemble wellhead as shown on the Construction Drawings.
2. Remove temporary cap from previously installed horizontal extraction.
3. Connect the flange end of the wellhead to the flange on the horizontal extraction.

4. Install 2-inch hose using stainless steel clamps on the end of the wellhead to be connected to the manifold.
5. The wellhead shall be installed at the ground surface elevation to support maintenance and monitoring operations.

PART 4 - MEASUREMENT AND PAYMENT

4.1 Contract Price

A. Horizontal Landfill Gas Extraction Wellheads will be paid by the total quantity installed and shall include all items described in the specification and shown on the Construction Drawings.

* * * END OF SECTION * * *

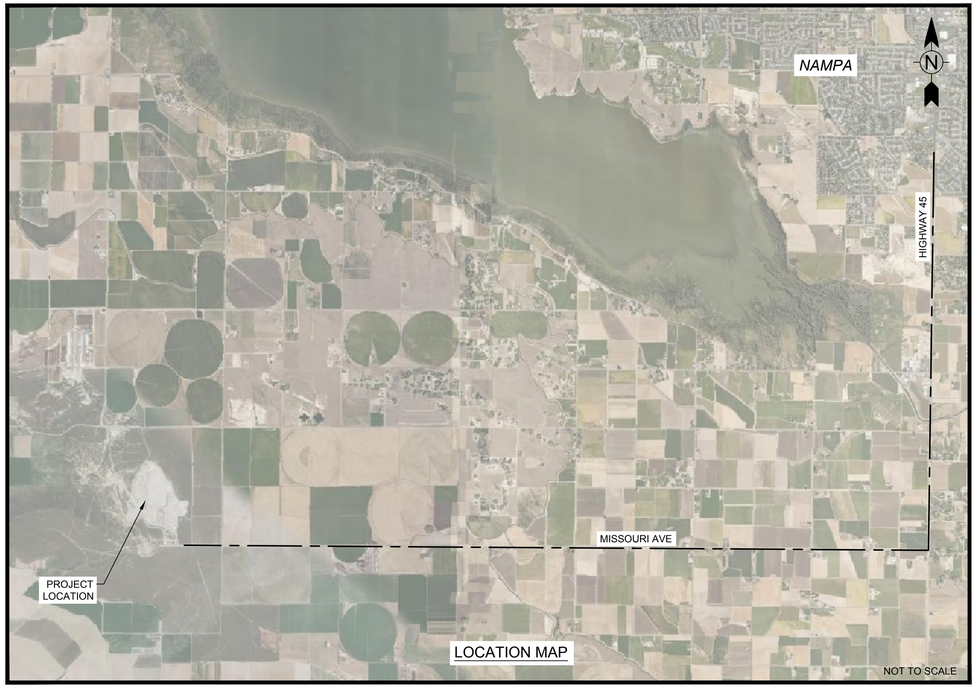
PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

3380 AMERICANA TERRACE, SUITE 201
BOISE, ID 83706
PHONE: 208-389-1030

www.tetratech.com

TETRA TECH

DRAWING INDEX	
SHEET #	TITLE
G-001	COVER & DRAWING INDEX (THIS SHEET)
G-002	ABBREVIATIONS
C-001	SITE PLAN AND INDEX TO PLAN SHEETS
C-002	CONSTRUCTION NOTES
C-101	GCCS PLAN (SOUTHEAST AREA)
C-102	GCCS PLAN (SOUTHWEST AREA)
C-103	GCCS PLAN (NORTHWEST AREA)
C-104	GCCS PLAN (NORTHEAST AREA)
C-105	FLARE STATION SITE/GRADING PLAN
C-501	GAS WELL AND MONITORING PROBE DETAILS
C-502	CONDENSATE PUMP STATION #1 DETAIL
C-503	CONDENSATE PUMP STATION #2-#5 DETAIL
C-504	GCCS DETAILS
C-505	GCCS DETAILS
C-506	GCCS DETAILS
C-507	GCCS DETAILS
C-508	GCCS DETAILS
D-601	PIPING & INSTRUMENTATION DIAGRAM
M-101	FLARE STATION ASSEMBLY PLAN
M-102	FLARE STATION ELEVATION AND ISOMETRIC
M-103	CONDENSATE TANK ASSEMBLY PLAN AND DETAILS
M-501	DETAILS
S-101	FOUNDATION PLANS
S-501	STRUCTURAL DETAILS
E000	ELECTRICAL COVER SHEET
E100	SITE ELECTRICAL PLAN
E200	FLARE STATION ELECTRICAL PLAN
E300	ONE-LINE DIAGRAM
E301	ELECTRICAL SCHEDULES
E400	ELECTRICAL SPECIFICATIONS
E401	ELECTRICAL SPECIFICATIONS
E402	ELECTRICAL SPECIFICATIONS

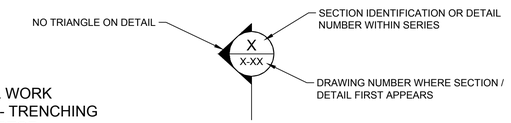


LOCATION MAP

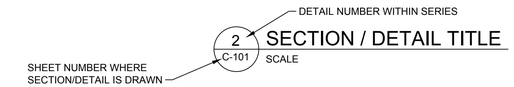
NOT TO SCALE

ELECTRICAL WORK
BY OTHERS - TRENCHING
BY CONTRACTOR

SECTION AND DETAIL DESIGNATION



SECTION CUT / DETAIL CALLOUT SYMBOL



TITLE FOR SECTION CUT / DETAIL

NOTE TO CONTRACTOR

1. ITEMS PURCHASED BY COUNTY (LONG-LEAD ITEMS) PRIOR TO AWARD OF CONTRACT INCLUDE: FLARE, BLOWER SKID, AIR COMPRESSOR SYSTEM/POD, CONDENSATE SUMPS, CONDENSATE TANK.
2. WELL DRILLING AND COMPLETION WILL BE COMPLETED BY OTHERS.
3. ELECTRICAL WORK, EXCLUDING SAWCUTTING, TRENCHING AND BACKFILL, WILL BE PERFORMED BY OTHERS.

SURVEY DATUM INFORMATION:
2021 STATE PLANE
LOCATION: SECTION 21, T2N, R3W
CANYON COUNTY, IDAHO
BASIS OF BEARING:
VERTICAL DATUM:
UNIT OF MEASURE: U.S. SURVEY FOOT

PROJECT LOCATION:

INTERSECTION OF MISSOURI AVENUE
AND PERCH ROAD

CLIENT INFORMATION:

PICKLES BUTTE LANDFILL
15500 MISSOURI AVENUE
NAMPA, ID 83686

Tt PROJECT No.:

114-571040-2022

CLIENT PROJECT No.:

NONE

PROJECT DESCRIPTION / NOTES:

GAS COLLECTION AND CONTROL SYSTEM (GCCS)
AND FLARE STATION (UTILITY FLARE)

ISSUED:

DRAFT 60% DESIGN SUBMITTAL-2/15/2022
DRAFT 90% DESIGN SUBMITTAL-4/1/2022
100% DESIGN SUBMITTAL-4/28/2022
REVISED DESIGN SUBMITTAL-1/23/2023

VICINITY MAP

NOT TO SCALE

PROFESSIONAL ENGINEER
LICENSED
16021
STATE OF IDAHO
MAUREEN A. McGRAW
4/28/2022

PROJECT_DESCRIPTION_1_PROJECT_DESCRIPTION_2

MISCELLANEOUS ABBREVIATIONS

A	=	ACTUATOR
AC or A/C	=	AIR CONDITIONER
ACFM	=	ACTUAL CUBIC FEET PER MINUTE
ADS	=	AUTO DIALER SYSTEM
AF	=	AMPERE FRAME SIZE (CIRCUIT BREAKER)
AFF	=	ABOVE FINISH FLOOR
AI	=	ANALOG INPUT
AIO	=	ANALOG INPUT OUTPUT
AOUT	=	ANALOG OUTPUT
AL	=	ALUMINUM
AMP	=	AMPERES, AMPERAGE
AT	=	AMPERE TRIP
AUTO	=	AUTOMATIC
AWG	=	AMERICAN WIRE GAUGE
B	=	BLOWER
BALL	=	BURNER ALARM LOW LOW
BATT	=	BATTERY
BC	=	BARE COPPER
BG	=	BURNER GLASS
BE	=	BURNER ELEMENT (UV SCANNER)
BKR	=	BREAKER
BOM	=	BILL OF MATERIAL
BPS	=	BUILDING PROTECTION SYSTEM
BS	=	BURNER SWITCH (FLAME SAFEGUARD)
BTM	=	BOTTOM
BTU	=	BRITISH THERMAL UNIT
C	=	CONDUIT
CAH	=	CURRENT ALARM HIGH
CAL	=	CURRENT ALARM LOW
CBL	=	CABLE
CC	=	CENTER TO CENTER
CGH	=	COMBUSTIBLE GAS HIGH
CGHH	=	COMBUSTIBLE GAS HIGH HIGH
CGI	=	COMBUSTIBLE GAS INDICATOR
CGT	=	COMBUSTIBLE GAS TRANSMITTER
CH	=	CHANNEL
CHR	=	CHART RECORDER
CI	=	CURRENT INDICATOR
CIR	=	CIRCUIT
CNT	=	COUNTER
CO	=	CONDUIT ONLY
COMM	=	COMMUNICATION
CMP or COMP	=	COMPRESSOR
CP	=	CONTROL PANEL
CPT	=	CONTROL POWER TRANSFORMER
CPVC	=	CHLORINATED POLYVINYL CHLORIDE
CR	=	CONTROL RELAY
CS	=	CARBON STEEL
CSH	=	CURRENT SWITCH HIGH
CSL	=	CURRENT SWITCH LOW
CT	=	CURRENT TRANSFORMER
CU	=	COPPER
CV	=	CONTROL VALVE (MODULATING)
D	=	DRYER
DI	=	DIGITAL INPUT
DISTR	=	DISTRIBUTION
DL	=	DAYLIGHT
DP	=	DELTA OR DIFFERENTIAL PRESSURE
DPI	=	DIFFERENTIAL PRESSURE INDICATOR
DPS	=	DIFFERENTIAL PRESSURE SWITCH
DS	=	DISCONNECT SWITCH
DWG	=	DRAWING
E	=	ELECTRICAL MOTOR
E/E	=	VOLTAGE TRANSFORMER
EDP	=	ELECTRICAL DISTRIBUTION PANEL
EI	=	VOLTAGE INDICATOR
EL OR ELEV	=	ELEVATION
EMER	=	EMERGENCY
EMT	=	ELECTRICAL METALLIC TUBING
ENCL	=	ENCLOSURE, ENCLOSED
EQPT	=	EQUIPMENT
ETM	=	ELAPSED TIME METER
EXH	=	EXHAUST
EXIST	=	EXISTING
EXP	=	EXPLOSION PROOF
°F	=	DEGREE FAHRENHEIT
FLT or F	=	FILTER
FA	=	FLAME ARRESTER
FAH	=	FLOW ALARM HIGH
FAHH	=	FLOW ALARM HIGH HIGH
FAL	=	FLOW ALARM LOW
FALL	=	FLOW ALARM LOW LOW
FBO	=	FURNISHED BY OTHERS
FC	=	FLOW CONTROLLER
F.C.	=	FAIL CLOSE
FCV	=	FLOW CONTROL VALVE
FD	=	FUSED DISCONNECT
FDR	=	FEEDER
FE	=	FLOW ELEMENT (FLOW METER)
FFA	=	FLAME FAILURE ALARM
FG	=	FINISH GRADE
FI	=	FLOW INDICATOR
FIR	=	FLOW INDICATING RECORDER
FIT	=	FLOW INDICATING TRANSMITTER
FL	=	FLOWLINE
FLA	=	FULL LOAD AMPS
FLR	=	FLARE
FX or FLEX	=	FLEXIBLE HOSE
FLTP	=	PORT FILTER
F.O.	=	FAIL OPEN
FOR	=	FORWARD
FQI	=	FLOW TOTALIZER INDICATOR
FR	=	FLOW RECORDER
FRG	=	FILTER REGULATOR
FRL	=	FILTER/REGULATOR/LUBRICATOR
FRP	=	FIBERGLASS REINFORCED PLASTIC
FS	=	FLOW SWITCH OR FINISH SURFACE
FSH	=	FLOW SWITCH HIGH
FSL	=	FLOW SWITCH LOW
FSV	=	FLOW SAFETY VALVE (CHECK VALVE)
FT	=	FLOW TRANSMITTER
FU	=	FUSE
FUH	=	FUSE HOLDER
FUT	=	FUTURE
FV	=	FLOW VALVE
GAC	=	GRANULAR ACTIVATED CARBON
GB	=	GRADE BREAK
GCCS	=	GAS COLLECTION AND CONTROL SYSTEM
GF	=	GROUND FAULT
GFI	=	GROUND FAULT INTERRUPTER
GM	=	GAS MONITOR
GND or GRND	=	GROUND
HDPE	=	HIGH DENSITY POLYETHYLENE
HOA	=	HAND-OFF-AUTO
HP	=	HORSEPOWER OR HIGH POINT
HS	=	HAND SWITCH
HT	=	HEAT TRACE
HTR	=	HEATER
HV	=	HAND VALVE
HVP	=	HAND VALVE PORT
HZ	=	HERTZ
I	=	CURRENT
II	=	CURRENT INDICATOR
I/I	=	CURRENT TRANSFORMER
IAH	=	CURRENT ALARM HIGH
IAHH	=	CURRENT ALARM HIGH HIGH
IAL	=	CURRENT ALARM LOW
IALL	=	CURRENT ALARM LOW LOW
IAS	=	INSTRUMENT AIR SUPPLY
IG or IGN	=	IGNITOR
IIR	=	CURRENT INDICATING RECORDER
INST	=	INSTANTANEOUS
INSTR	=	INSTRUMENT
INV	=	INVERT
ISC	=	SHORT CIRCUIT CURRENT
IT	=	CURRENT TRANSMITTER
ITC	=	INDUSTRIAL TECHNICAL CORPORATION
KI	=	TIME INDICATOR
KV	=	KILOVOLTS
KVA	=	KILOVOLT AMPERES
KW	=	KILOWATTS
LAH	=	LEVEL ALARM HIGH
LAHH	=	LEVEL ALARM HIGH HIGH
LAL	=	LEVEL ALARM LOW
LALL	=	LEVEL ALARM LOW LOW
LC	=	LEVEL CONTROLLER
LCH	=	LEVEL CONTROLLER HIGH
LCL	=	LEVEL CONTROLLER LOW
LCP	=	LOCAL CONTROL PANEL
LCR	=	LATCHING CONTROL RELAY
LE	=	LEVEL ELEMENT
LEL	=	LOWER EXPLOSIVE LIMIT
LFG	=	LANDFILL GAS
LG	=	LEVEL GAGE
LI	=	LEVEL INDICATOR
LMP	=	LAMP
LO	=	LUBE OIL
LOC	=	LOCAL
LOS	=	LOCK-OUT-STOP
LP	=	LIGHTING PANEL
LS	=	LEVEL SWITCH
LSH	=	LEVEL SWITCH HIGH
LSHH	=	LEVEL SWITCH HIGH HIGH
LSL	=	LEVEL SWITCH LOW
LSLL	=	LEVEL SWITCH LOW LOW
LT	=	LEVEL TRANSMITTER OR LIGHT(S)
LTG	=	LIGHTING
LUB	=	LUBRICATOR
M	=	MOTOR
MA	=	MILLIAMPS
M.A.	=	METHANE ANALYZER
MAL	=	METHANE ALARM LOW
MALL	=	METHANE ALARM LOW LOW
MAG	=	MAGNETIC
MAN	=	MANWAY
MAX	=	MAXIMUM
MCC	=	MOTOR CONTROL CENTER
MCM	=	THOUSAND CIRCULAR MILS
MCP	=	MAIN CONTROL PANEL
MH	=	MANHOLE
MI	=	METHANE INDICATOR
MIR	=	METHANE INDICATING RECORDER
MIN	=	MINIMUM
MIT	=	METHANE INDICATOR TRANSMITTER
MMS	=	MANUAL MOTOR STARTER
MOD	=	MODEM
MOT	=	MOTOR
MOV	=	MOTOR OPERATED VALVE
MS	=	MOTOR STARTER
MSB	=	MAIN SWITCH BOARD
MTD	=	MOUNTED
M.W.	=	MANWAY
NA	=	NON-AUTOMATIC
NBK	=	NEUTRAL BLOCK
N.C.	=	NORMALLY CLOSED
N.C.T.C.	=	NORMALLY CLOSED TIMED TO CLOSE
N.C.T.O.	=	NORMALLY CLOSED TIMED TO OPEN
NEG	=	NEGATIVE
NIC	=	NOT IN CONTRACT
N.O.	=	NORMALLY OPEN
N.O.T.C.	=	NORMALLY OPEN TIMED TO CLOSE
N.O.T.O.	=	NORMALLY OPEN TIMED TO OPEN
NP	=	NAMEPLATE
NTS	=	NOT TO SCALE
NOX	=	OXIDES OF NITROGEN
O	=	OXYGEN
O/C	=	OPEN/CLOSE
O.C.	=	ON CENTER
OA	=	OXYGEN ANALYZER
OAH	=	OXYGEN ALARM HIGH
OAHH	=	OXYGEN ALARM HIGH HIGH
OE	=	OXYGEN ELEMENT
OI	=	OXYGEN INDICATOR
OIR	=	OXYGEN INDICATING RECORDER
OT	=	OXYGEN TRANSMITTER
OIT	=	OXYGEN INDICATOR TRANSMITTER
OSF	=	OXYGEN SENSOR FAILURE
OL	=	OVERLOAD
PDI	=	PRESSURE DIFFERENTIAL INDICATOR
PMP or P	=	PUMP
PB	=	PUSH BUTTON
PA	=	PURGE AUTO
PAH	=	PRESSURE ALARM HIGH
PAHH	=	PRESSURE ALARM HIGH HIGH
PAL	=	PRESSURE ALARM LOW
PALL	=	PRESSURE ALARM LOW LOW
PC	=	PRESSURE CONTROLLER
PCV	=	PRESSURE CONTROL VALVE
PDI	=	PRESSURE DIFFERENTIAL INDICATOR
PE	=	POLYETHYLENE
PG	=	PILOT GAS
PH	=	PHONE
PI	=	PRESSURE INDICATOR
P&ID	=	PIPING AND INSTRUMENTATION DIAGRAM
PIC	=	PRESSURE INDICATING CONTROLLER
PIR	=	PRESSURE INDICATING RECORDER
PIT	=	PRESSURE INDICATING TRANSMITTER
PLC	=	PROGRAMMABLE LOGIC CONTROLLER
PLT	=	PILOT
PNL	=	PANEL
POS	=	POSITION, POSITIVE
POT	=	POTENTIOMETER
POZ	=	POSITIONER
PP	=	POWER PANEL or POWER POLE
PS	=	PRESSURE SWITCH
PSE	=	PRESSURE SAFETY ELEMENT
PSH	=	PRESSURE SWITCH HIGH
PSI	=	POUNDS PER SQUARE INCH
PSL	=	PRESSURE SWITCH LOW
PT	=	PRESSURE TRANSMITTER
PSV	=	PRESSURE RELIEF VALVE
PVC	=	POLYVINYL CHLORIDE
PWR	=	POWER
QL	=	TOTALIZER
R.E.P.	=	REAL ENVIRONMENTAL PRODUCTS
REQD	=	REQUIRED
RD	=	RUPTURE DISK
RDAH	=	RUPTURE DISK ALARM HIGH
RDS	=	RUPTURE DISK SWITCH
RECEPT	=	RECEPTACLE
RES	=	RESISTOR
RGS	=	RIGID GALVANIZED STEEL
RM	=	RELAY MODULE
RPM	=	REVOLUTIONS PER MINUTE
RT	=	RETENTION TIME
RTC	=	RETENTION TIME CALCULATOR
S	=	AIR STRIPPER
SB	=	SPECTACLE BLIND
SCFM	=	STANDARD CUBIC FEET PER MINUTE
SCH	=	SCHEDULE
SD	=	SHUTDOWN
SD/O	=	SHUTDOWN OR ON
SDV	=	SHUTDOWN VALVE
SEC	=	SECONDARY, SECONDS
SECT	=	SECTION
SEL	=	SELECTOR
SEQ	=	SEQUENCE, SEQUENCER
SF	=	SUPPLEMENTAL FUEL
SFR	=	SENSOR FAILURE
SG	=	SIGHT GLASS
SHLD	=	SHIELD, SHIELDED
SHT	=	SHEET
SI	=	SPEED INDICATOR
SOV	=	SOLENOID VALVE
SP	=	SAMPLE PORT
SPECS	=	SPECIFICATION
SS	=	STAINLESS STEEL
SSR	=	SURGE ARRESTOR
ST	=	SHUNT TRIP
STA	=	STATION
STD	=	STANDARD
STR	=	STRAINER
SW	=	SWITCH
SYS	=	SYSTEM
T or TK	=	TANK
TACH	=	TACHOMETER
TAH	=	TEMPERATURE ALARM HIGH
TAHH	=	TEMPERATURE ALARM HIGH HIGH
TAL	=	TEMPERATURE ALARM LOW
TALL	=	TEMPERATURE ALARM LOW LOW
TB	=	TERMINAL BLOCK
TC	=	TEMPERATURE CONTROLLER
TCV	=	TEMPERATURE CONTROL VALVE
TCZ	=	TEMPERATURE CONTROLLER POSITIONER
TD or TDR	=	TIME DELAY RELAY
TE	=	TEMPERATURE ELEMENT (THERMOCOUPLE)
TEMP	=	TEMPERATURE
TES	=	TEMPERATURE ELEMENT SWITCH
TEW	=	TEMPERATURE ELEMENT WELL
THERM	=	THERMOSTAT
TI	=	TEMPERATURE INDICATOR
TIC	=	TEMPERATURE INDICATOR CONTROLLER
TIR	=	TEMPERATURE INDICATOR RECORDER
TIT	=	TEMPERATURE INDICATOR TRANSMITTER
TMR	=	TIMER
TR	=	TEMPERATURE RECORDER
TS	=	TEMPERATURE SWITCH OR TOP OF SLAB
TSE	=	TEMPERATURE SAFETY ELEMENT
TSH	=	TEMPERATURE SWITCH HIGH
TSL	=	TEMPERATURE SWITCH LOW
TSO	=	TIGHT SHUTOFF
TSV	=	TEMPERATURE SAFETY VALVE
TT	=	TEMPERATURE TRANSMITTER
TV	=	TEMPERATURE VALVE
TYP	=	TYPICAL
UG	=	UNDERGROUND
UPS	=	UNINTERRUPTIBLE POWER SUPPLY
UV	=	ULTRAVIOLET SCANNER
V	=	VESSEL
VA	=	VIBRATION ALARM
VAH	=	VIBRATION ALARM HIGH
VAHH	=	VIBRATION ALARM HIGH HIGH
VFD	=	VARIABLE FREQUENCY DRIVE
VI	=	VIBRATION INDICATOR
VIR	=	VIBRATION INDICATING RECORDER
VP	=	VAPOR PROOF
VS	=	VIBRATION SWITCH
VSD	=	VARIABLE SPEED DRIVE
VSH	=	VIBRATION SWITCH HIGH
VT	=	VIBRATION TRANSMITTER
W	=	WATTS
W.C.	=	WATER COLUMN
WP	=	WEATHER PROOF
XFMR	=	TRANSFORMER
XP	=	EXPLOSION PROOF
YA	=	EVENT ALARM
YI	=	EVENT INDICATOR
YIC	=	EVENT INDICATOR CONTROLLER
ZA	=	POSITION ALARM
ZC	=	POSITION CONTROLLER
ZI	=	POSITION INDICATOR
ZS	=	POSITION SWITCH
ZSC	=	POSITION SWITCH CLOSED
ZSO	=	POSITION SWITCH OPENED

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MARREN A. SHAW
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

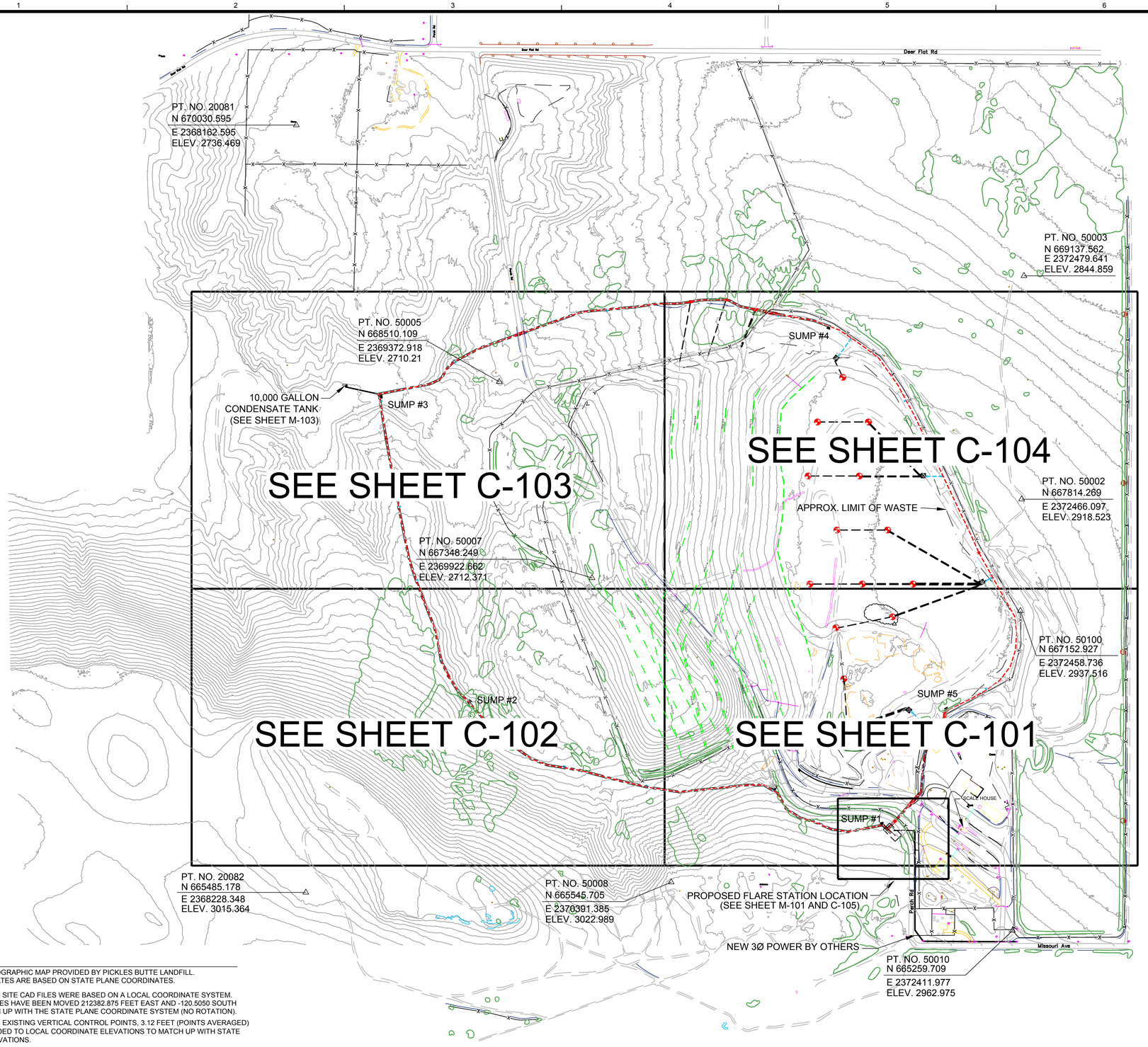
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

ABBREVIATIONS

Project No.: 141-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

G-002

1/19/2023 3:40:28 PM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\G-002.DWG - ANGUS, SCOTT



GRAPHIC SCALE

300 150 0 300 600

(IN FEET)

NOTES:

1. 2021 TOPOGRAPHIC MAP PROVIDED BY PICKLES BUTTE LANDFILL. COORDINATES ARE BASED ON STATE PLANE COORDINATES.
2. PREVIOUS SITE CAD FILES WERE BASED ON A LOCAL COORDINATE SYSTEM. THESE FILES HAVE BEEN MOVED 212382.875 FEET EAST AND -120.5050 SOUTH TO MATCH UP WITH THE STATE PLANE COORDINATE SYSTEM (NO ROTATION).
3. BASED ON EXISTING VERTICAL CONTROL POINTS, 3.12 FEET (POINTS AVERAGED) WERE ADDED TO LOCAL COORDINATE ELEVATIONS TO MATCH UP WITH STATE PLAN ELEVATIONS.

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER
16021
STATE OF IDAHO
MAUREEN A. MARSHALL
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

SITE PLAN AND INDEX TO PLAN SHEETS

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-001

1/19/2023 10:14:55 AM - I:\DWG\PICKLES BUTTE LANDFILL\LLFG\GCCS DESIGN\C-001.DWG - ANGUS, SCOTT

CONSTRUCTION NOTES/BILL OF MATERIAL

1. PROTECT IN PLACE
2. INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER — 6 C-504
5. INSTALL 4" HDPE ELBOW
6. INSTALL 4" HDPE TO PVC TRANSITION FITTING
7. INSTALL 4" SCH 80 PVC PIPE
8. INSTALL 4" PVC FLANGE (SOC X FL)
9. INSTALL 4" PVC BLIND FLANGE, BOLT AND GASKET KIT
10. INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
11. INSTALL 10" SDR 17 HDPE ABOVE GRADE HEADER
12. INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
13. JOIN EXISTING PIPE
14. INSTALL 18" CSP ROAD CROSSING SLEEVE PER — 5 C-504
15. INSTALL 10" BUTTERFLY VALVE, ABOVE GRADE PER — 3 C-504
16. INSTALL 10" BUTTERFLY VALVE ASSEMBLY, BELOW GRADE PER — 2 C-504
17. INSTALL 10" HDPE TEE
18. INSTALL 10" HDPE ELBOW, 90°
19. INSTALL 10" HDPE ELBOW, 45°
20. INSTALL 12" SDR 17 HDPE PIPE, ABOVE GRADE
21. INSTALL 12" HDPE TEE
22. INSTALL 12" X 10" HDPE REDUCER
23. INSTALL 12" HDPE ELBOW
24. INSTALL R.E.P. SERIES 7000-R-8 PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY)
25. INSTALL VERTICAL GAS EXTRACTION WELL (BY OTHERS) PER — 1 C-501
26. INSTALL CONDENSATE SUMP #1 (SUMP PURCHASED BY COUNTY) PER — 1 C-502
27. INSTALL CONDENSATE SUMP #2-#5 (SUMPS PURCHASED BY COUNTY) PER — 1 C-503
28. INSTALL 1" SS THREADED COUPLING
29. INSTALL 8" PVC BLIND FLANGE
30. INSTALL FLARE STATION INLET PIPING PER — 4 C-506
31. INSTALL 4" SCH 80 PVC TEE (SxSxS)
32. INSTALL 1/4" PVC LABCOCK VALVE, FPT X HOSE (DRILL & TAP PIPING AS NEEDED)
33. INSTALL 8" X 6" HDPE REDUCER
34. INSTALL 6" X 4" HDPE REDUCER
35. INSTALL 4" X 2" HDPE REDUCER
36. INSTALL 2" FERNCO ADAPTER
37. INSTALL MANIFOLD #1 PER — 1 C-505
38. INSTALL 10" HDPE CROSS
39. INSTALL QED VERTICAL ORP215 WELLHEAD PER — 1 C-506
40. INSTALL 2" HDPE TEE
41. INSTALL QED HORIZONTAL ORP215HL WELLHEAD PER — 2 C-506
42. INSTALL VERTICAL WELL I.D. TAG PER — 7 C-504
43. INSTALL HORIZONTAL COLLECTOR I.D. TAG PER — 8 C-504
44. INSTALL 2" X 1" HDPE REDUCER, SDR 11
45. INSTALL 1 1/2" X 1" HDPE REDUCER
46. SAWCUT AND REPLACEMENT AC PAVEMENT SECTION (MATCH EXISTING)
47. INSTALL 1" X 1/2" CS THREADED BUSHING AND 1/2" THREADED NIPPLE
48. INSTALL 1" X 3/4" SS THREADED BUSHING AND 3/4" THREADED NIPPLE
49. INSTALL 2" HDPE CLEAN-OUT, WITH THREADED PLUG
50. INSTALL 1" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
51. INSTALL BOLLARD PER — 1 C-504
52. SAWCUT AND REPLACE CONCRETE SIDEWALK (MATCH EXISTING)
53. INSTALL 1/4" STAINLESS STEEL MALE ADAPTER
54. SWAGELOK STAINLESS STEEL FLEXIBLE METAL HOSE, PART # SS-FM4PF4PM4
55. INSTALL 2" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
56. INSTALL 2" SCH 80 PVC COUPLING, SOC X FPT
57. INSTALL LANDFILL GAS MONITORING PROBE PER — 2 C-501
58. INSTALL 12" CIRCULAR CONCRETE VAULT, TRAFFIC RATED
59. INSTALL 10" x 4" HDPE REDUCING TEE, MOLDED
60. INSTALL WELL MANIFOLD #2 PER — 1 C-507
61. INSTALL WELL MANIFOLD #3, #4, #5 PER — 1 C-508
62. INSTALL 2" HDPE CAP
63. INSTALL 2" FLEX HOSE (QED SOLARGUARD OR EQUAL) WITH PIPE CLAMPS
64. INSTALL 2" SDR 11 HDPE ELBOW
65. INSTALL 12" PIPE SUPPORT AND FOOTING PER — 9 C-504
66. INSTALL REMOTE VERTICAL WELLHEAD PER — 10 C-504
67. INSTALL 1 1/2" HDPE BALL VALVE, BUTT X BUTT
68. INSTALL 10" HDPE VALVE SPACER
69. INSTALL 8" SDR 17 HDPE LATERAL, BELOW GRADE PER — 6 C-504
70. INSTALL 10" X 8" HDPE REDUCER
71. INSTALL PIPE RACK PER — 3 M-103
72. INSTALL 4" DIXON AIR & VACUUM TANK VENT VALVE OR EQUAL
73. INSTALL 4" COUPLING
74. INSTALL 1/4" PVC LABCOCK VALVE, FPT X HOSE (DRILL & TAP PIPE)
75. INSTALL 2" HDPE TO SS TRANSITION FITTING
76. INSTALL PIPE SUPPORT PER — 1 M-501
77. INSTALL 2" PVC MALE ADAPTER, SOC X MPT
78. INSTALL 2" GROTH FLAME CHECK, THREADED, GROTH OR EQUAL
79. INSTALL 10,000 GALLON DOUBLE WALL CONDENSATE STORAGE TANK PER (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR) — 1 M-103, 2 M-103
80. CONTRACTOR TO PROVIDE TRENCHING AND BACKFILL FOR UTILITIES (CONDUITS/WIRING BY OTHERS)
81. INSTALL 3/4" STAINLESS STEEL BALL VALVE, THREADED
82. INSTALL 1 5/8" GALVANIZED STRUT CHANNEL, FITTINGS, AND HARDWARE
83. INSTALL CONDENSATE PUMP FOUNDATION PER — 2 S-101
84. INSTALL 1 5/8" X 1 5/8" STRUT CHANNEL POST BASE, GALVANIZED
85. (DELETED)
86. INSTALL 1" STAINLESS STEEL THREADED COUPLING
87. INSTALL PIPE ANCHOR PER — 2 M-501
88. INSTALL 1" X 3/4" SS THREADED BUSHING AND 3/4" THREADED NIPPLE
89. INSTALL 2" SCH 80 PVC PIPE AND FITTINGS
90. INSTALL 2" PVC TRUE UNION BALL VALVE
91. INSTALL 2" PVC UNION
92. INSTALL/ANCHOR 2" WILDEN PNEUMATIC DIAPHRAGM PUMP, MODEL P820 STAINLESS STEEL
93. INSTALL 3/4" COMPRESSED AIR FLEX HOSE, STEEL STEEL, FPT, 250 PSI MIN RATING
94. INSTALL 2" PVC CAMLOCK AND PLUG
95. INSTALL 4" PVC FLANGE AND BOLT KIT (FL X SOC)
96. INSTALL 2" HUSKY NPS DEF OVERFILL GUARD TANK GAUGE (MECHANICAL FLOAT ASSEMBLY)
97. INSTALL 4" X 2" PVC REDUCER BUSHING (SPIG X FPT)
98. (DELETED)
99. INSTALL 1/2"Ø X 4" LONG SIMPSON TITEN HD ANCHOR BOLT
100. INSTALL CHRISTY B12-61G UTILITY BOX WITH GALV STL CHECKER PLATE AND 6" READING LID (REMOVE AS NEEDED)
101. INSTALL 2" BUTTERFLY VALVE WITH 6' VALVE EXTENSION
102. INSTALL 2" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, BOLT KIT, AND GASKETS
103. INSTALL 1" HUDSON AUTOMATIC FLOAT VALVE, ANTI-SIPHON (SET 1' FROM TOP OF TANK)
104. INSTALL 2" X 1" PVC REDUCER BUSHING (MPT X FPT)
105. (DELETED)
106. INSTALL 1" SCH 80 PVC NIPPLE (LENGTH TBD)
107. INSTALL 2" PVC FLANGE (FL X SOC)
108. INSTALL CARBTROL 55 GALLON GRANULAR ACTIVATED CARBON DRUM, 2" FNPT INLET & OUTLET
109. INSTALL 2" PVC STRAINER, SxS
110. INSTALL 2" HDPE WYE FITTING
111. INSTALL ANCHOR BOLTS FOR 8" UTILITY FLARE ASSEMBLY PER — 2 S-501
112. INSTALL EQUIPMENT/FLARE FOUNDATION PER — 1 S-101
113. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS (CONDENSATE DRAIN LINE)
114. INSTALL PERENNIAL ENERGY, INC. OR EQUAL GAS HANDLING SKID AND FLARE ASSEMBLY (PURCHASED BY COUNTY), INCLUDES: SKID MOUNTED CONDENSATE KNOCK-OUT/FILTER, 2 MULTI-STAGE CENTRIFUGAL BLOWERS WITH VFDs, PIPING, INSTRUMENTATION, FLOW METER, FLAME ARRESTOR, UTILITY FLARE STACK, PILOT SYSTEM, GAUGES, SWITCHES, TRANSMITTERS, VALVES, AND CONTROL PANEL PER P&ID (D-601), ASSEMBLY PLAN (M-101/M-102), AND PROJECT SPECIFICATIONS (ELECTRICAL BY OTHERS).
115. INSTALL COMPRESSOR WORLD OR EQUAL COMPRESSOR SYSTEM (PURCHASED BY COUNTY). SYSTEM INCLUDES A PRE-ASSEMBLED DUPLEX 7.5 HP ROTARY SCREW COMPRESSORS (24 CFM MIN @ 125 PSI), 120 GALLON RECIEVER, DESICCANT DRYER, PRE & POST FILTRATION, ISOLATION VALVE, CONTROL PANEL, OIL/WATER SEPARATOR IN 10' X 20' HEATED/INSULATED STEEL STORAGE CONTAINER WITH INTERIOR AND EXTERIOR LIGHTING, EXHAUST FANS, 480V DISCONNECT SWITCH, AND TRANSFORMER. 60 AMP FEEDER (480V/3Ø/60Hz) SHALL BE CONNECTED TO SYSTEM BY CONTRACTOR (ELECTRICAL BY OTHERS).
116. GRADE AREA TO CONTOURS SHOWN
117. INSTALL ELECTRICAL CONDUITS PER FLARE MANUFACTURER AND SHEET E200 (BY OTHERS)
118. INSTALL #2/0 COPPER GROUND RING PER SHEET E200 AND E301 (BY OTHERS)
119. INSTALL #2 COPPER GROUND WIRE PER E200 AND E301 (BY OTHERS)
120. INSTALL 3/4" ROCK WITHIN GRADING LIMITS
121. INSTALL/ANCHOR PIPE SUPPORT TO FOUNDATION PER — 3 M-501
122. INSTALL/ANCHOR BLOWER SKID TO FOUNDATION PER — 3 S-501
123. INSTALL CONDUIT/PIPE ANCHOR PER — 2 M-501
124. INSTALL 2" SCH 80 PVC PHONE/DATA LINE CONDUIT AND WIRE (BY OTHERS)
125. CONNECT PHONE/DATA LINE TO EXISTING J-BOX AT OFFICE BUILDING (BY OTHERS)
126. INSTALL 1/2" SCH 40 BLACK IRON PIPE AND FITTINGS (PAINT RED)
127. INSTALL 1/2" SCH 40 CARBON STEEL PIPE AND FITTINGS, GALVANIZED
128. INSTALL 1 1/2" X 1/2" HDPE REDUCER
129. INSTALL 1/2" HDPE TO SS TRANSITION FITTING (BUTT X MPT)
130. INSTALL 1/2" CS OR SS THREADED COUPLING
131. INSTALL 5 GALLON PROPANE BOTTLE AND ASSOCIATED PIPING/FITTINGS (PILOT FUEL)
132. CONNECT CABLES/WIRING TO ELECTRICAL DEVICES @ FLARE (BY OTHERS)
133. INSTALL 4" x 2" SCH 80 PVC TEE, SxSxS
134. INSTALL HEADER FLANGE CONNECTION (FUTURE CONNECTION POINT) PER — 3 C-506
135. INSTALL 8" SDR 17 HDPE LATERAL ON GRADE
136. INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
137. INSTALL 8" HDPE TEE
138. INSTALL 8" HDPE ELBOW, 90°
139. INSTALL 8" x 2" HDPE REDUCING TEE, MOLDED (NOT FABRICATED)
140. INSTALL 10" x 6" HDPE REDUCER
141. INSTALL FIBERGLASS CAUTION GAS PIPELINE MARKER
142. INSTALL 12" CSP ROAD CROSSING SLEEVE PER — 5 C-504
143. INSTALL PIPE INSULATION AND HEAT TRACE WIRE (BY OTHERS)
144. INSTALL 400W, 12V SOLAR PANEL, CONTROLLER, MOUNTING KIT (BY OTHERS)
145. INSTALL 22" I.D. MANWAY WITH STEEL COVER AND EXTENSION (PROVIDED BY TANK MFR.)

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER — 16021 — STATE OF IDAHO — MARREN A. MARSHALL — 1/18/2023

MARK	DATE	DESCRIPTION	BY
1	1/2023	UPDATED CONDENSATE TANK CONSTRUCTION NOTES	SA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

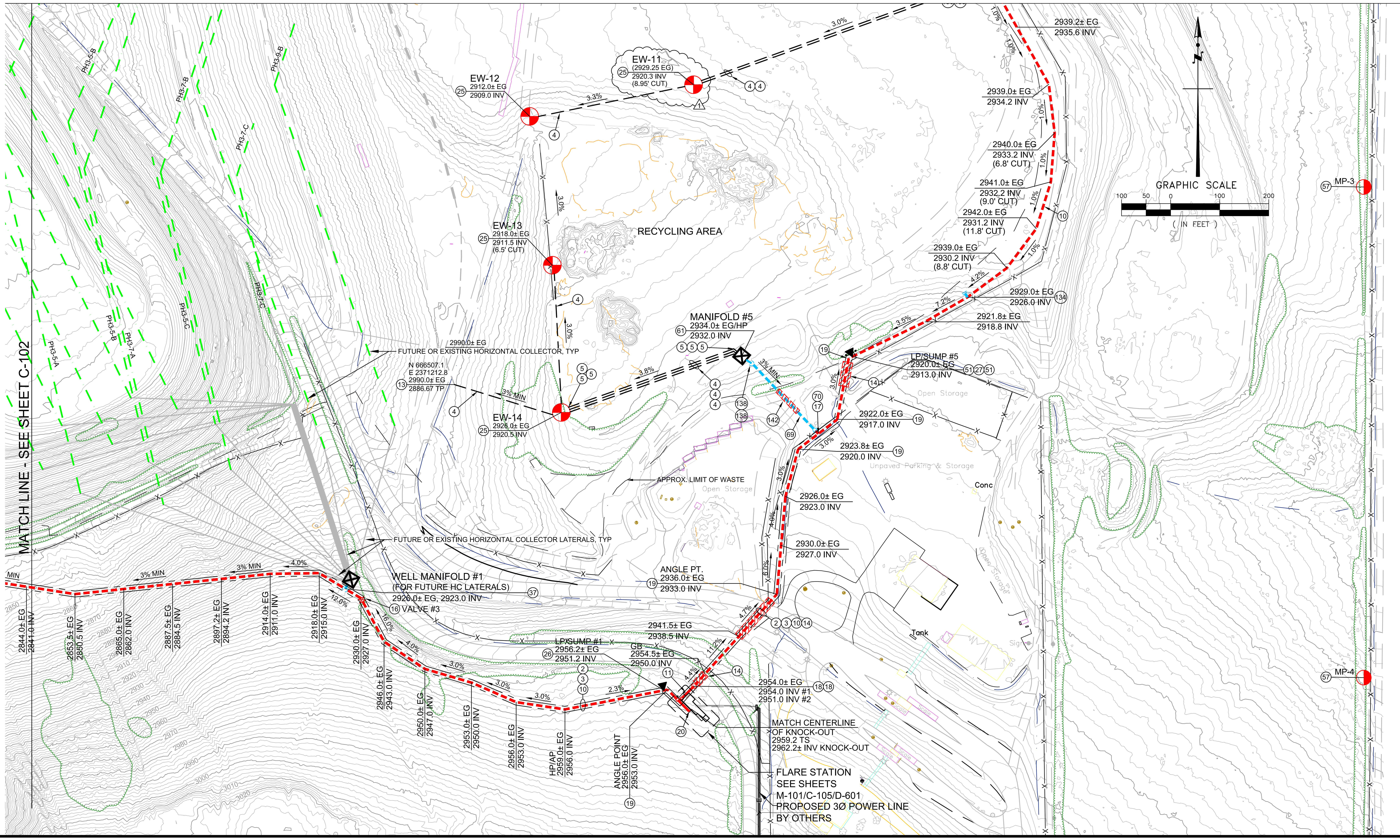
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

CONSTRUCTION NOTES

Project No.: 114-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

C-002

1/18/2023 4:13:47 PM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\C-002 REV1.DWG - ANGUS, SCOTT



LEGEND

- PROPOSED 10" BELOW GRADE GAS HEADER
- PROPOSED 8" BELOW GRADE GAS LATERAL
- PROPOSED 4" BELOW GRADE GAS LATERAL
- PROPOSED 2" CONDENSATE CONVEYANCE LINE
- PROPOSED 1 1/2" COMPRESSED AIR LINE
- FUTURE OR EXISTING HORIZONTAL GAS COLLECTOR
- FUTURE OR EXISTING HORIZONTAL COLLECTOR LATERAL
- APPROXIMATE LIMIT OF WASTE
- PROPOSED ROAD CROSSING (CSP SLEEVE)
- PROPOSED VERTICAL GAS EXTRACTION WELL (INSTALLED BY OTHERS)
- PROPOSED WELL MANIFOLD VAULT
- PROPOSED PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR)
- PROPOSED HEADER ISOLATION VALVE WITH SAMPLE PORTS
- MP-1 PROPOSED LANDFILL GAS MONITORING PROBE
- PROPOSED HEADER TEE & BLIND FLANGE

CONSTRUCTION NOTES/BILL OF MATERIAL

- (2) INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) 4/C-504
- (3) INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) 4/C-504
- (4) INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER 6/C-504
- (5) INSTALL 4" HDPE ELBOW
- (10) INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER 4/C-504
- (11) INSTALL 10" SDR 17 HDPE ABOVE GRADE HEADER
- (13) JOIN EXISTING PIPE
- (14) INSTALL 18" CSP SLEEVE ROAD CROSSING PER 5/C-504
- (16) INSTALL 10" BUTTERFLY VALVE ASSEMBLY, BELOW GRADE PER 2/C-504
- (17) INSTALL 10" HDPE TEE
- (19) INSTALL 10" HDPE ELBOW, 45°
- (20) INSTALL 12" SDR 17 HDPE PIPE, ABOVE GRADE
- (25) INSTALL VERTICAL GAS EXTRACTION WELL PER 1/C-501
- (26) INSTALL R.E.P. CONDENSATE SUMP #1 PER 1/C-502
- (27) INSTALL R.E.P. CONDENSATE SUMP #2-#5 PER 1/C-503
- (37) INSTALL MANIFOLD #1 PER 1/C-505
- (51) INSTALL BOLLARD PER 1/C-504
- (57) INSTALL LANDFILL GAS MONITORING PROBE PER 2/C-501
- (61) INSTALL WELL MANIFOLD #3, #4, #5 PER 1/C-508
- (69) INSTALL 8" SDR 17 HDPE BELOW GRADE HEADER PER 4/C-504
- (70) INSTALL 10" x 8" HDPE REDUCER
- (134) INSTALL HEADER TEE AND BLIND FLANGE PER 3/C-506
- (138) INSTALL 8" HDPE ELBOW
- (142) INSTALL 12" CSP SLEEVE ROAD CROSSING PER 3/C-506

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER LICENSED 16021 STATE OF IDAHO MAUREEN A. McGRAW

MARK	DATE	DESCRIPTION	BY
1	1/2023	REVISED EW-11 LOCATION/ELEV., SLAB DIMENSIONS, INLET PIPING	SA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS PLAN (SOUTHEAST AREA)

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-101

1/19/2023 3:34:23 PM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\C-101 REV1.DWG - ANGUS, SCOTT

MATCH LINE - SEE SHEET C-103

MATCH LINE - SEE SHEET C-101

2760.5± EG
2756.5 INV
IN
3.0%
2766.0± EG
2759.5 INV
(6.5' CUT)
3.0%
2768.0± EG
2762.5 INV
(5.5' CUT)
3.0%
2770.0± EG
2765.5 INV
3.0%
134 2771.8± EG
2768.5 INV
3.0%
HIGH POINT
VALVE #4
16 2774.5± EG
2771.5 INV
4.5%
2770.0± EG
2767.0 INV
5.0%
LOW POINT
SUMP #2
51 27 51 2770.0± EG
2765.0 INV
2776.7± EG
2773.7 INV
3% MIN
134 2787.0± EG
2783.0 INV
3.5%
2790.5± EG
2787.5 INV
3.25%
2 3 10 2794.0± EG
2791.0 INV
4.0%
2800.5± EG
2796.0 INV
(6.5' CUT)
3.0%
2804.5± EG
2798.0 INV
(6.5' CUT)
3.0%
134 2804.3± EG
2801.0 INV
3.0%
2807.0± EG
2804.0 INV
3% MIN
2814.5± EG
2811.5 INV
3% MIN
2820.5± EG
2817.5 INV
3% MIN
2827.0± EG
2824.0 INV
3% MIN
134 2835.5± EG
2832.5 INV
2844.0± EG
2841.0 INV

PHASE 3
BORROW AREA

PH3-1B
PH3-3B
PH3-1A
PH3-3A

2700
2710
2720
2730
2740
2750
2760
2770
2780
2790
2800
2810
2820
2830
2840
2850

N

GRAPHIC SCALE
100 50 0 100 200
(IN FEET)

LEGEND

- PROPOSED 10" BELOW GRADE GAS HEADER
- PROPOSED 8" BELOW GRADE GAS LATERAL
- PROPOSED 4" BELOW GRADE GAS LATERAL
- PROPOSED 2" CONDENSATE CONVEYANCE LINE
- PROPOSED 1 1/2" COMPRESSED AIR LINE
- FUTURE OR EXISTING HORIZONTAL GAS COLLECTOR
- FUTURE OR EXISTING HORIZONTAL COLLECTOR LATERAL
- APPROXIMATE LIMIT OF WASTE
- PROPOSED VERTICAL GAS EXTRACTION WELL (INSTALLED BY OTHERS)
- PROPOSED WELL MANIFOLD VAULT
- PROPOSED PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR)
- PROPOSED HEADER ISOLATION VALVE WITH SAMPLE PORTS
- PROPOSED HEADER TEE AND BLIND FLANGE

CONSTRUCTION NOTES/BILL OF MATERIAL

2 INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
3 INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
10 INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
16 INSTALL 10" BUTTERFLY VALVE ASSEMBLY, BELOW GRADE PER — 2 C-504
27 INSTALL R.E.P. CONDENSATE SUMP #2-#5 PER — 1 C-503
51 INSTALL BOLLARD PER — 1 C-504
134 INSTALL HEADER TEE AND BLIND FLANGE PER — 3 C-506

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TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

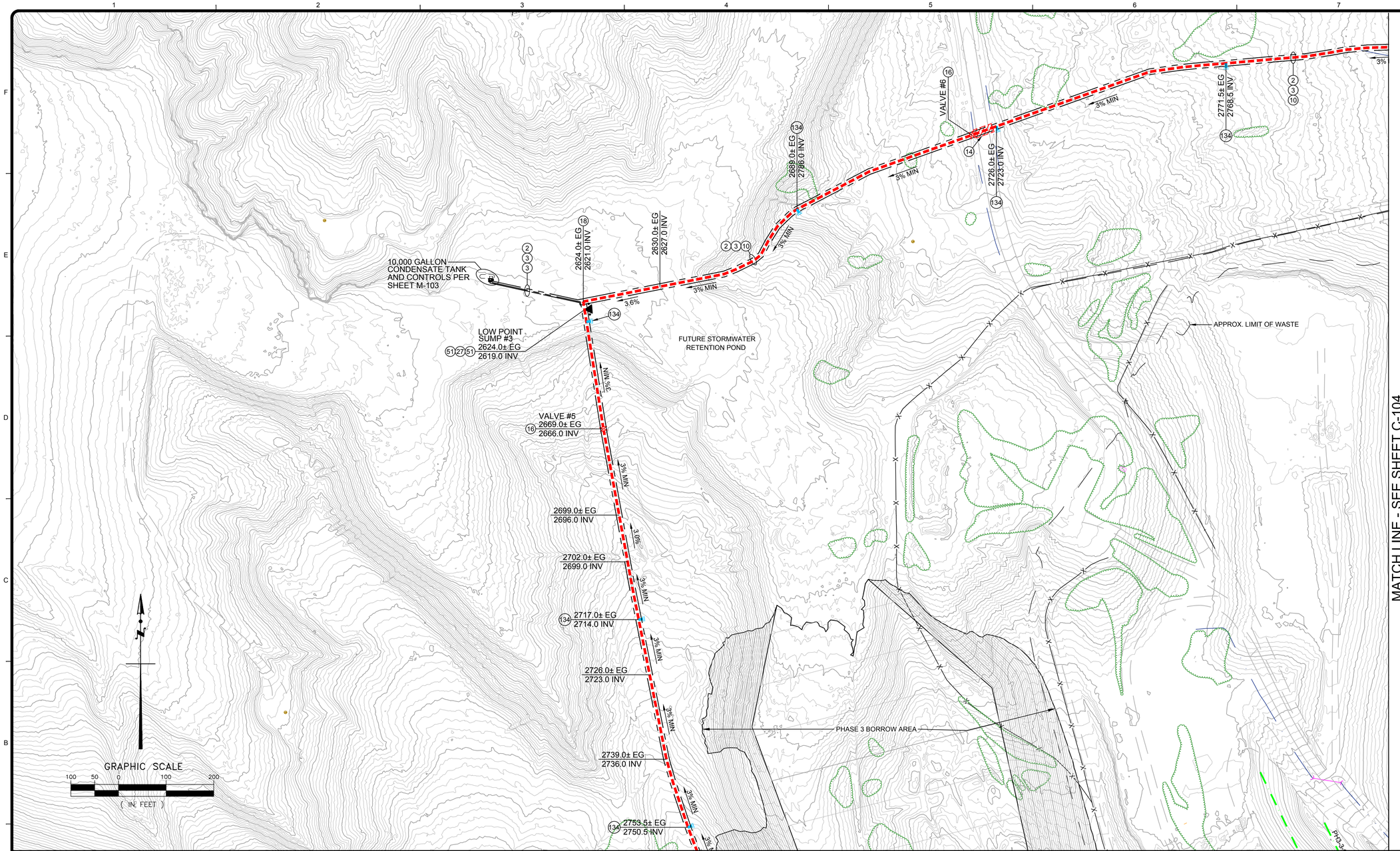
PROFESSIONAL ENGINEER
16021
STATE OF IDAHO
MAUREEN A. SNA
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION
GCCS PLAN
(SOUTHWEST AREA)

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-102



LEGEND

- PROPOSED 10" BELOW GRADE GAS HEADER
- PROPOSED 8" BELOW GRADE GAS LATERAL
- PROPOSED 4" BELOW GRADE GAS LATERAL
- PROPOSED 2" CONDENSATE CONVEYANCE LINE
- PROPOSED 1 1/2" COMPRESSED AIR LINE
- FUTURE OR EXISTING HORIZONTAL GAS COLLECTOR
- FUTURE OR EXISTING HORIZONTAL COLLECTOR LATERAL
- APPROXIMATE LIMIT OF WASTE
- PROPOSED ROAD CROSSING (CSP SLEEVE)
- PROPOSED VERTICAL GAS EXTRACTION WELL (INSTALLED BY OTHERS)
- PROPOSED WELL MANIFOLD VAULT
- PROPOSED PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR)
- PROPOSED HEADER ISOLATION VALVE WITH SAMPLE PORTS
- PROPOSED HEADER TEE AND BLIND FLANGE

MATCH LINE - SEE SHEET C-102

CONSTRUCTION NOTES/BILL OF MATERIAL

(2) INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
(3) INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
(10) INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
(14) INSTALL 18" CSP SLEEVE ROAD CROSSING PER — 5 C-504
(16) INSTALL 10" BUTTERFLY VALVE ASSEMBLY, BELOW GRADE PER — 2 C-504
(17) INSTALL 10" HDPE TEE
(18) INSTALL 10" HDPE ELBOW, 90°
(27) INSTALL R.E.P. CONDENSATE SUMP #2-#5 PER — 1 C-503
(51) INSTALL BOLLARD PER — 1 C-504
(134) INSTALL HEADER TEE AND BLIND FLANGE PER — 3 C-506

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER — 16021 — STATE OF IDAHO — MAUREEN A. SNAHNY
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS PLAN (NORTHWEST AREA)

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-103

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HC-P2-3-A
2851.0± EG
2848.0 INV

HC-P2-5-A
HC-P2-7-A
2880.0± EG
2877.0 INV

HC-P2-1-A
2826.0± EG
2823.0 INV

2861.0± EG
2858.0 INV

HP/AP/GB
VALVE #7
2892.0± EG
2889.0 INV

2892.0± EG
2887.8 INV

2893.3± EG
2886.8 INV
(6.5' CUT)

LP/SUMP #4
2893.8± EG
2885.8 INV

2894.0± EG
2888.7 INV
(5.3' CUT)

2898.9± EG
2891.7 INV

2897.7± EG
2894.7 INV

MP-1

N 668719
E 2370803
2884.59 TP

N 668716
E 2370804
2861.65 TP

N 668627
E 2370441
2812.0± EG
2811.12 TP

N 667664
E 2370608
2833.62 TP

MANIFOLD #2
HC-PH2-9-2/EW-1
2900.0± EG
2892.1 TOP HC
N 668656
E 2371376

2889.1 TP

2900.4± EG
2897.7 INV

2904.0± EG
2901.3 INV

2908.0± EG
2905.3 INV

2912.4± EG
2908.5 INV

2916.8± EG
2911.5 INV
(5.3' CUT)

2921.7± EG
2914.5 INV
(7.2' CUT)

2925.7± EG
2917.5 INV
(8.2' CUT)

2928.5± EG
2920.5 INV
(8.0' CUT)

2931.0± EG
2923.5 INV
(7.5' CUT)

MP-2

2934.2± EG
2926.5 INV
(7.7' CUT)

2937.0± EG
2929.5 INV
(7.5' CUT)

2939.0± EG
2932.5 INV
(6.5' CUT)

2941.5± EG
2935.5 INV
(6.0' CUT)

HP/VALVE #8
2941.5± EG
2938.5 INV

2940.0± EG
2937.3 INV

MANIFOLD #4
2940.0± EG/HP
2938.0 INV
2940.0± EG
2936.6 INV

EXISTING HORIZONTAL
COLLECTOR LATERALS

2802.82 TP
2877.2 TP
2839.8 TP
2877.2 TP

EW-1
2920.5± EG
2917.5 INV

EW-2
2921.0± EG
2907.9 INV
(13.1' CUT)

EW-3
2926.5± EG/HP
2916.9 INV
(9.6' CUT)

EXISTING HORIZONTAL COLLECTOR

EW-4
2920.8± EG
2911.5 INV
(10.2' CUT)

EW-5
2930.0± EG
2920.6 INV
(9.4' CUT)

MANIFOLD #3
2934.0± EG/HP

EW-6
2925.0± EG
2909.9 INV
(15.1' CUT)

EW-7
2932.0± EG
2918.9 INV
(13.1' CUT)

APPROX. LIMIT OF WASTE

EW-8
2922.0± EG
2907.5 INV
(14.5' CUT)

EW-9
2927.9± EG
2916.8 INV
(11.1' CUT)

EW-10
2936.0± EG
2925.8 INV
(10.2' CUT)

PH2-1-A
PH2-3-A
PH2-5-A
PH2-7-A
PH2-9-A
PH3-5-A
PH3-7-A
PH3-9-A

3% MIN
1.0%
3.0%
4.0%
1.2%

MATCH LINE - SEE SHEET C-101

GRAPHIC SCALE
100 50 0 100 200
(IN FEET)

LEGEND

- PROPOSED 10" BELOW GRADE GAS HEADER
- PROPOSED 8" BELOW GRADE GAS LATERAL
- PROPOSED 4" BELOW GRADE GAS LATERAL
- PROPOSED 2" CONDENSATE CONVEYANCE LINE
- PROPOSED 1 1/2" COMPRESSED AIR LINE
- FUTURE OR EXISTING HORIZONTAL GAS COLLECTOR
- FUTURE OR EXISTING HORIZONTAL COLLECTOR LATERAL
- APPROXIMATE LIMIT OF WASTE
- PROPOSED ROAD CROSSING (CSP SLEEVE)
- PROPOSED VERTICAL GAS EXTRACTION WELL (INSTALLED BY OTHERS)
- PROPOSED WELL MANIFOLD
- PROPOSED PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR)
- PROPOSED REMOTE WELLHEAD FOR HORIZONTAL COLLECTOR
- PROPOSED LANDFILL GAS MONITORING PROBE
- PROPOSED HEADER ISOLATION VALVE WITH SAMPLE PORTS
- PROPOSED HEADER TEE AND BLIND FLANGE

CONSTRUCTION NOTES/BILL OF MATERIAL

2. INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER — 6 C-504
5. INSTALL 4" HDPE ELBOW
10. INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
12. INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
13. JOIN EXISTING PIPE
14. INSTALL 18" CSP SLEEVE ROAD CROSSING PER — 5 C-504
16. INSTALL 10" BUTTERFLY VALVE ASSEMBLY, BELOW GRADE PER — 2 C-504
17. INSTALL 10" HDPE TEE
25. INSTALL VERTICAL GAS EXTRACTION WELL PER — 1 C-501
27. INSTALL R.E.P. CONDENSATE SUMP #2-#5 PER — 1 C-503, 1 C-504
51. INSTALL BOLLARD PER — 2 C-501
57. INSTALL LANDFILL GAS MONITORING PROBE PER — 2 C-501, 1 C-507
60. INSTALL WELL MANIFOLD #2 PER
61. INSTALL WELL MANIFOLD #3, #4, #5 PER — 1 C-508
66. INSTALL REMOTE VERTICAL WELLHEAD PER — 10 C-504
69. INSTALL 8" SDR 17 HDPE BELOW GRADE LATERAL PER — 4 C-504
70. INSTALL 10" X 8" HDPE REDUCER
134. INSTALL HEADER TEE AND BLIND FLANGE PER — 3 C-506
138. INSTALL 8" HDPE ELBOW

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER
16021
STATE OF IDAHO
MAUREEN A. SHAW
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS PLAN (NORTHEAST AREA)

Project No.: 114-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

C-104

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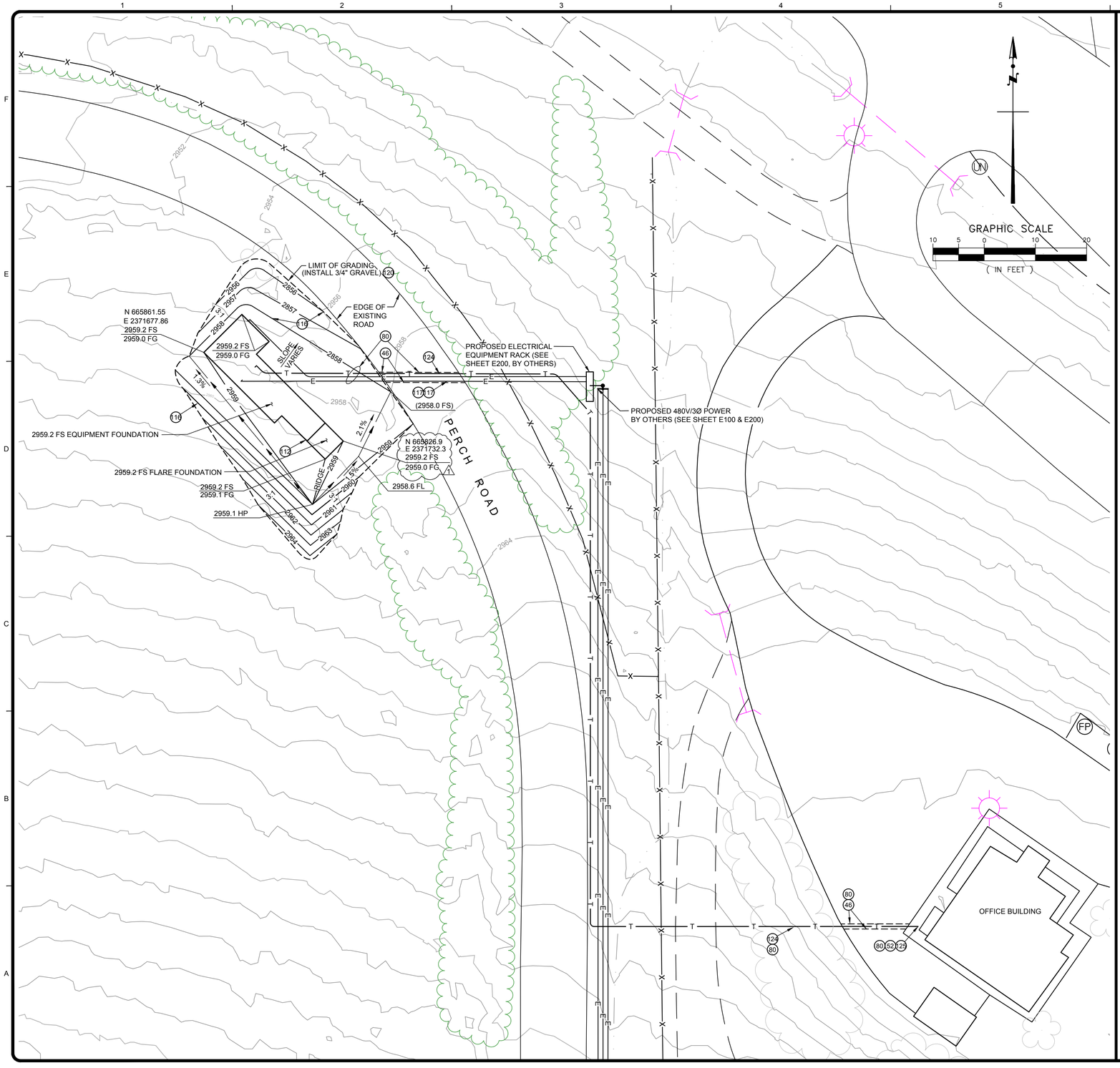

CONSTRUCTION NOTES/BILL OF MATERIAL

- (46) SAWCUT AND REPLACE AC PAVEMENT SECTION (MATCH EXISTING)
- (52) SAWCUT AND REPLACE CONCRETE SIDEWALK (MATCH EXISTING)
- (80) CONTRACTOR TO PROVIDE TRENCHING FOR UTILITIES (CONDUITS/WIRING BY OTHERS)
- (112) INSTALL EQUIPMENT/FLARE FOUNDATION PER 1/S-101
- (116) GRADE AREA TO CONTOURS SHOWN
- (117) INSTALL ELECTRICAL CONDUITS PER FLARE MANUFACTURER AND SHEET E200 (BY OTHERS)
- (120) INSTALL 3/4" ROCK WITHIN GRADING LIMITS
- (124) INSTALL 2" SCH 80 PVC PHONE/DATA LINE CONDUIT AND WIRE (BY OTHERS)
- (125) CONNECT PHONE/DATA LINE TO EXISTING J-BOX AT OFFICE BUILDING (BY OTHERS)

GENERAL NOTES:

1. NEW SITE FENCING THAT ENCOMPASSES THE FLARE STATION NOT SHOWN, BY OTHERS.
2. GAS SYSTEM PIPING NOT SHOWN, SEE SHEET C-101 AND DETAIL 2/C-505.
3. ELECTRICAL IMPROVEMENTS NOT SHOWN, SEE ELECTRICAL DRAWINGS (BY OTHERS).
4. CONTRACTOR SHALL VERIFY LOCATIONS OF EXISTING UTILITIES BEFORE TRENCHING.
5. ELECTRICAL CONTRACTOR SHALL VERIFY PHONE LINE J-BOX LOCATION AT OFFICE BUILDING.

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www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER LICENSED 16021 STATE OF IDAHO MAUREEN A. MARSHALL
4/28/2023

MARK	DATE	DESCRIPTION
1	1/2023	REALIGNED CONDUITS TO EQUIPMENT SHORTENED SLAB BY 5'

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

FLARE STATION SITE/GRADING PLAN

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-105

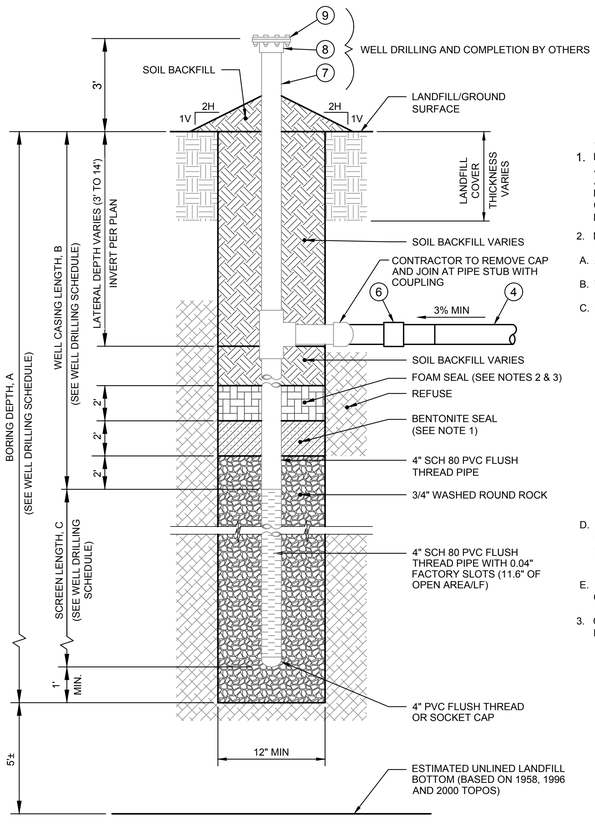
DRILLING SCHEDULE

WELL I.D.	COORDINATES		WELL GROUND ELEVATION	ESTIMATED LANDFILL BOTTOM ELEV.	LAT INV ELEV	BORING DEPTH DIMENSION "A" IN FEET	WELL CASING LENGTH DIMENSION "B" IN FEET	SCREEN LENGTH DIMENSION "C" IN FEET
	NORTHING	EASTING						
EW-1	668537	2371406	2920.5	2875	2917.5	40	20	19
EW-2	668272	2371256	2921.0	2802	2907.9	114	20	93
EW-3	668272	2371558	2926.5	2847	2916.9	74	20	53
EW-4	667952	2371202	2920.8	2806	2911.5	109	20	88
EW-5	667952	2371504	2930.0	2846	2920.6	79	20	58
EW-6	667632	2371372	2925.0	2800	2909.9	120	20	99
EW-7	667632	2371672	2932.0	2849	2918.9	78	20	57
EW-8	667312	2371212	2922.0	2760	2907.5	157	20	136
EW-9	667312	2371522	2927.9	2794	2916.8	128	20	107
EW-10	667312	2371822	2936.0	2868	2925.8	63	20	42
EW-11	667118	2371700	2929.2	2814	2920.3	110	20	89
EW-12	667054	2371366	2912.0	2802	2902.3	105	20	84
EW-13	666750	2371412	2918.0	2805	2911.5	108	20	87
EW-14	666450	2371431	2926.0	2845	2920.5	76	20	55

TOTAL DRILLING: 1,361 VF

WELL DRILLING SCHEDULE NOTES:

1. THE ENGINEER SHALL CONFIRM ALL WELL DEPTHS AFTER WELL LOCATIONS ARE SURVEYED. THIS WELL SCHEDULE IS DRAFT UNTIL APPROVED BY ENGINEER.
2. SURVEYOR SHALL STAKE THE WELL LOCATIONS AND VERIFY SURFACE ELEVATIONS PRIOR TO CONSTRUCTION.. INCLUDE ON EACH STAKE IN THE FIELD THE NORTHING, EASTING, ELEVATION, SURVEY STAKE ID, SURVEY POINT NUMBER. ALL INFORMATION SHALL CORRESPOND TO WELL DRILLING SCHEDULE.
3. 3 FEET OF SOLID PIPE STICK-UP NOT INCLUDED IN THE PIPING TOTAL.



NOTES:

1. HYDRATED BENTONITE SEAL SHALL INCLUDE COARSE GRANULAR BENTONITE CHIPS (3/8" TO 1/4") AND FINE GRANULAR BENTONITE (8 MESH BAROID BENSEAL) PRE-MIXED AT RATIO 2:1 OR APPROVED EQUAL. MINIMUM 60% BENTONITE TO MAXIMUM 40% WATER (BY VOLUME) AND POLYMER (CETCO INSTA-VIS PLUS OR APPROVED EQUAL) SHALL BE MIXED TO THICK SLURRY CONSISTENCY BEFORE PLACEMENT. DO NOT HYDRATE BENTONITE IN PLACE BY ADDING WATER DOWN THE BOREHOLE.
2. MATERIALS REQUIRED FOR A 2-FOOT FOAM SEAL:

A. 2 BAGS OF FOAM CONCEPTS POUR SYSTEM ES 24-005 (TYPICAL - ROOM TEMPERATURE).

B. THE PROCESS IS TO BE COMPLETED IN "BATCHES" FOR EACH LIFT. A LIFT IS CONSIDERED TO BE 1-FOOT.

C. EACH "BATCH" TO BE PREPARED AS FOLLOWS:
STEP 1: REMOVE THE FOAM FROM THE SHIPPING BOX AND OUTER BAG.
STEP 2: PLACE THE BAG ON A FLAT CLEAN WORK AREA AND REMOVE THE CENTER WHITE DIVIDER STRIP.
STEP 3: TWIST THE BAG BACK AND FORTH BY TWO CORNERS SEVERAL TIMES TO MIX THE 2 SIDES OF THE BAG TOGETHER.
STEP 4: KNEAD THE BAG VIGOROUSLY FOR ~40-60 SECONDS UNTIL MIXED TO A CONSISTENT CREAM COLOR.
STEP 5: REMOVE THE 8" PVC CAP FROM THE WELL PIPE TO RELIEVE GAS PRESSURE.
STEP 6: CUT OFF THE CORNER OF THE BAG CREATING A 3-5" HOLE.
STEP 7: ALLOW THE FOAM TO RISE OUT OF THE BAG AND EVENLY DISTRIBUTE THE FOAM AROUND THE BOREHOLE MINIMIZING THE AMOUNT OF FOAM CONTACTING THE PIPE AND WELL SIDEWALLS.
STEP 8: WAIT AS THE FOAM EXPANDS TO FILL THE BOREHOLE DIAMETER, APPROXIMATELY 5 MINUTES (UP TO 10 MINUTES).
STEP 9: ENSURE THAT THE FOAM IS FULLY EXPANDED BY TOSSING A ROCK IN THE BOREHOLE. IF ROCK BOUNCES OFF FOAM, THEN FOAM IS FULLY EXPANDED. IF ROCK SINKS INTO THE FOAM, THEN CONTINUE TO WAIT.
STEP 10: MEASURE THE EXPANSION OF THE BAG AFTER INSTALLATION.
STEP 11: REPEAT STEPS 1-10 UNTIL A 2-FOOT SEAL IS ACHIEVED (1 TO 3 TIMES POSSIBLE). THE SEAL DEPTH IS TO BE CONFIRMED BY MEASUREMENT.

D. THICKNESS OF RESULTING FOAM SEAL IS HIGHLY DEPENDENT ON OUTSIDE TEMPERATURE. THE WARMER IT IS OUTSIDE, THE MORE THE FOAM WILL EXPAND. IT IS POSSIBLE FOR 1 BAG OF FOAM TO EXPAND ANYWHERE FROM 6-INCHES TO 3-FEET. CONTRACTOR TO PAY CLOSE ATTENTION DURING INSTALLATION OF TOP SEAL TO ENSURE THAT SEAL WILL NOT END UP ABOVE GRADE.

E. NEVER EMPTY THE CONTENTS OF THE FOAM BAG INTO THE HOLE BEFORE THE FOAM HAS STOPPED EXPANDING OUT OF THE BAG.

3. CONTRACTOR IS REQUIRED TO WAIT AT LEAST 20 MINUTES AFTER COMPLETION OF THE ENTIRE SEAL PRIOR TO PLACING THE SOIL BACKFILL.

1 | GAS WELL AND DRILLING SCHEDULE (INSTALLED BY OTHERS)
NTS | REFERENCE SHEET: C-101-C104

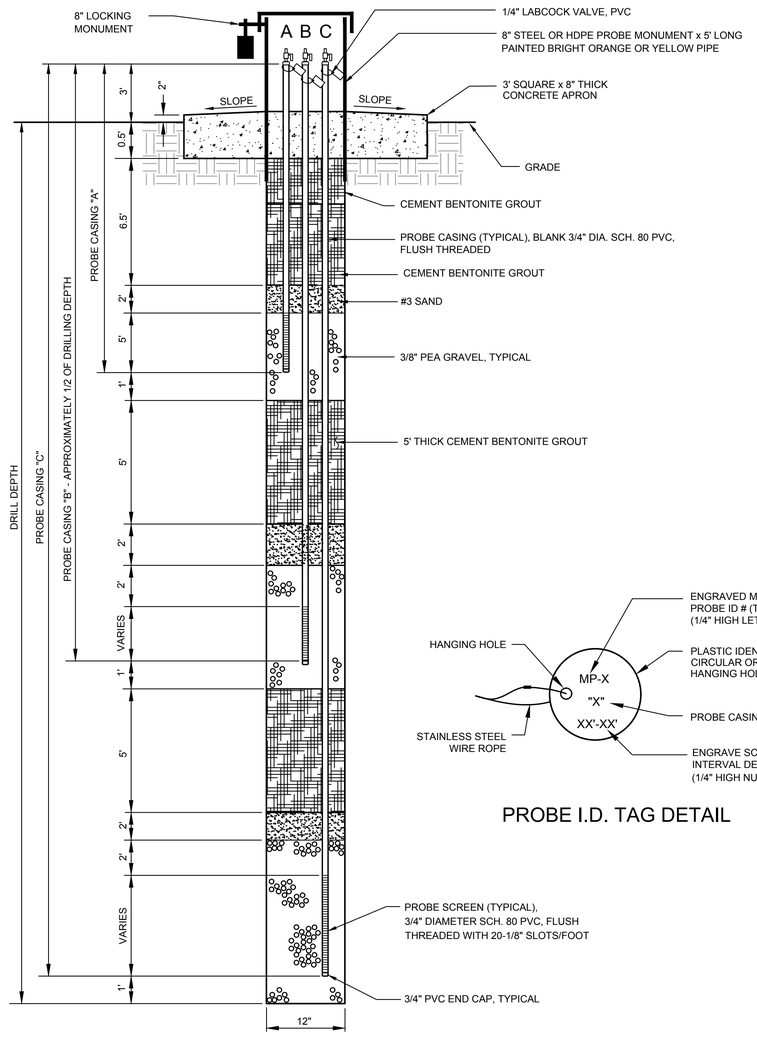
PROBE DRILLING/COMPLETION SCHEDULE

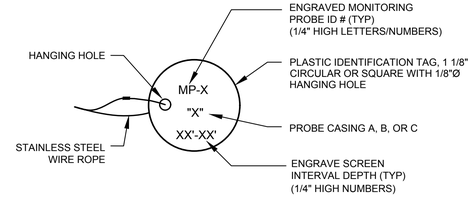
PROBE I.D.	PROBE COORDINATES		PROBE GROUND ELEVATION (SEE NOTE 6)	ESTIMATED TOTAL DRILLING DEPTH (SEE NOTE 1)	PROBE CASING "A"			PROBE CASING "B"			PROBE CASING "C"			NOTES
	NORTHING	EASTING			SOLID (FT.)	PERF. (FT.)	TOTAL (FT.)	SOLID (FT.)	PERF. (FT.)	TOTAL (FT.)	SOLID (FT.)	PERF. (FT.)	TOTAL (FT.)	
MP-1	668909	237074	2840	260	12	5	17	27	105	132	142	120	262	
MP-2	667910	237069	2892	312	12	5	17	27	131	158	168	146	314	
MP-3	666910	237066	2903	323	12	5	17	27	137	164	174	151	325	
MP-4	665910	237066	2889	309	12	5	17	27	130	157	167	144	311	

TOTAL DRILLING: 1,204 VF

NOTES:

1. BASIS FOR PROBE DEPTHS IS LOWEST FUTURE LANDFILL BOTTOM ELEVATION (PH-8-2), ELEVATION 2580 (AMSL).
2. GROUNDWATER LEVEL IS ESTIMATED TO BE BETWEEN ELEVATION 2360-2420 AMSL.
3. PRECISE LOCATIONS, DEPTHS, AND SCREEN LENGTHS WILL BE FINALIZED BY A REGISTERED CIVIL ENGINEER OR A CERTIFIED ENGINEERING GEOLOGIST REGISTERED IN THE STATE OF IDAHO BASED ON SUBSURFACE CONDITIONS ENCOUNTERED DURING DRILLING.
4. COORDINATES ARE BASED ON IDAHO STATE PLANE COORDINATES.
5. ALL PROBES SHALL BE INSTALLED ABOVE THE PERMANENT LOW SEASONAL WATER TABLE, ABOVE AND BELOW PERCHED GROUND WATER, AND ABOVE BEDROCK. THE GEOLOGIST OR ENGINEERING GEOLOGIST SHALL ADJUST THE PROBE CASING LENGTHS, AS NEEDED, TO ADHERE TO THE INTENT OF THE PROBE DETAIL.
6. GROUND ELEVATIONS ROUNDED TO THE NEAREST WHOLE FOOT (ROUNDED UP OR DOWN).





PROBE I.D. TAG DETAIL

2 | LANDFILL GAS MONITORING PROBE AND COMPLETION SCHEDULE
NTS | REFERENCE SHEET: C-101,C-104

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SHEAHAN 4/28/2023

MARK	DATE	DESCRIPTION	BY
1	1/2023	UPDATED WELL #11 LOCATION/ELEV.	SA

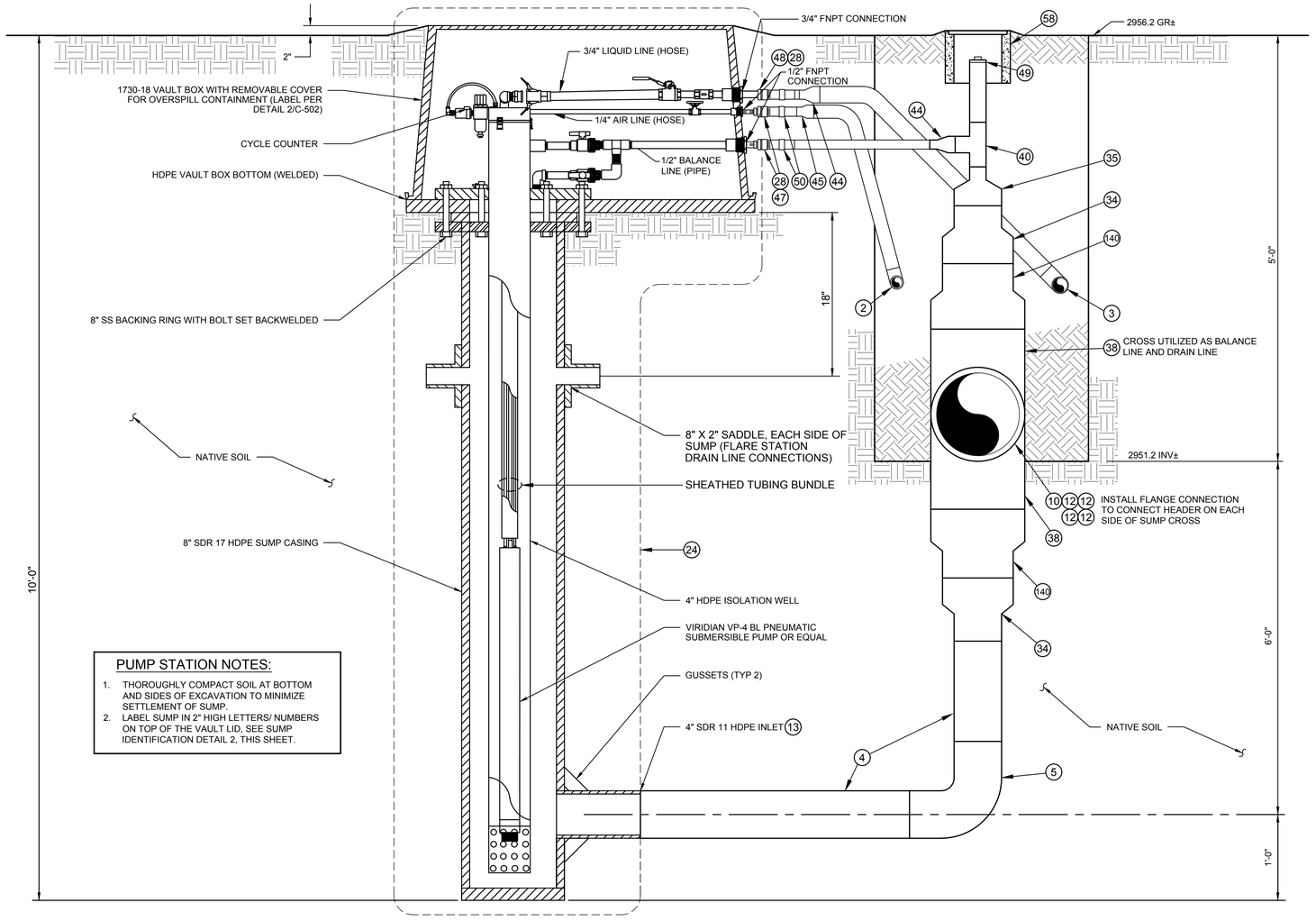
PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GAS WELL AND MONITORING PROBE DETAILS

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-501

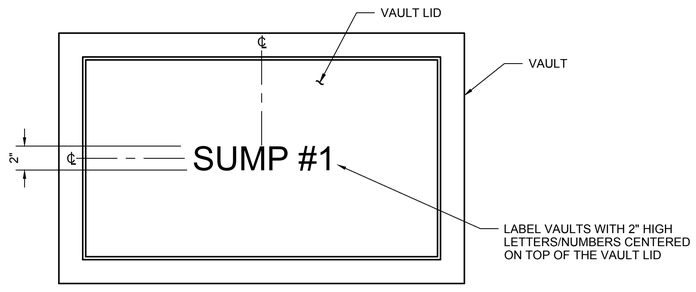
1/19/2023 10:35:02 AM - I:\DWG\PICKLES BUTTE LANDFILL\LLF\GCCS DESIGN\C-501 REV1.DWG - ANGUS, SCOTT



PUMP STATION NOTES:

1. THOROUGHLY COMPACT SOIL AT BOTTOM AND SIDES OF EXCAVATION TO MINIMIZE SETTLEMENT OF SUMP.
2. LABEL SUMP IN 2" HIGH LETTERS/ NUMBERS ON TOP OF THE VAULT LID, SEE SUMP IDENTIFICATION DETAIL 2, THIS SHEET.

1	CONDENSATE PUMP STATION #1
NTS	REFERENCE SHEET: C-101



2	SUMP IDENTIFICATION
NTS	REFERENCE SHEET: C-101

CONSTRUCTION NOTES/BILL OF MATERIAL

2. INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER — 6 C-504
5. INSTALL 4" HDPE ELBOW
10. INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
12. INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
13. JOIN EXISTING PIPE
24. INSTALL R.E.P. SERIES 7000-R-8 PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY)
28. INSTALL 1" SS THREADED COUPLING
34. INSTALL 6" X 4" HDPE REDUCER
35. INSTALL 4" X 2" HDPE REDUCER
38. INSTALL 10" HDPE CROSS
40. INSTALL 2" HDPE TEE
44. INSTALL 2" X 1" HDPE REDUCER, SDR 11
45. INSTALL 1 1/2" X 1" HDPE REDUCER
47. INSTALL 1" X 1/2" CS THREADED BUSHING AND 1/2" THREADED NIPPLE
48. INSTALL 1" X 3/4" SS THREADED BUSHING AND 3/4" THREADED NIPPLE
49. INSTALL 2" HDPE CLEAN-OUT, WITH THREADED PLUG
50. INSTALL 1" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
58. INSTALL 12" CIRCULAR CONCRETE VAULT, TRAFFIC RATED
140. INSTALL 10" X 6" HDPE REDUCER

TETRA TECH
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Boise, ID 83796
Phone: 208.389.1030
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PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MARREN A. SHAW 4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

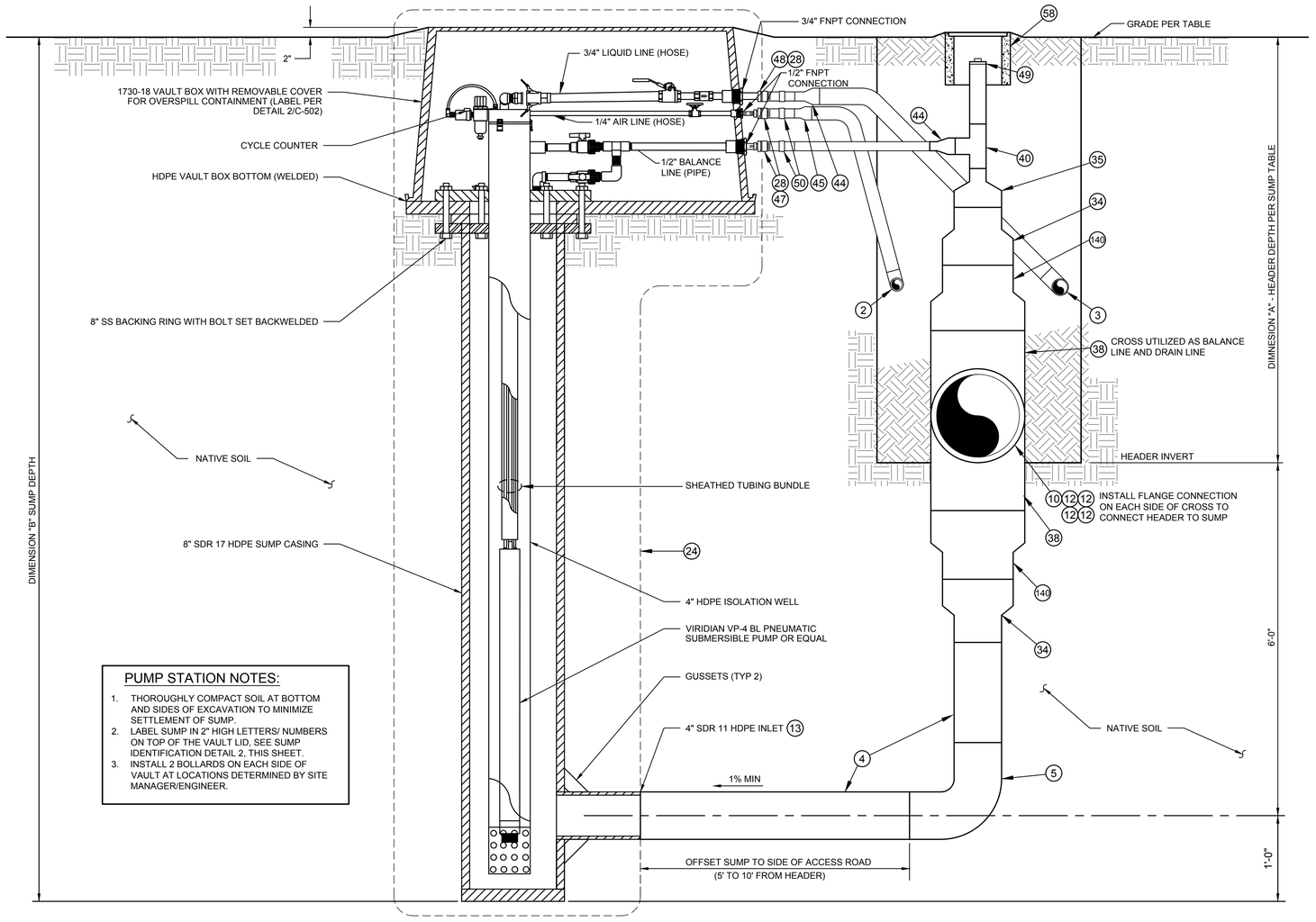
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

CONDENSATE PUMP STATION #1 DETAIL

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-502

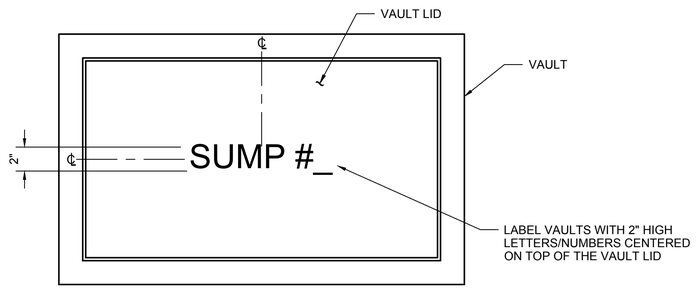
1/19/2023 3:48:43 PM - I:\DWG\PICKLES BUTTE LANDFILL\LF\GCCS DESIGN\C-502.DWG - ANGUS, SCOTT



PUMP STATION NOTES:

1. THOROUGHLY COMPACT SOIL AT BOTTOM AND SIDES OF EXCAVATION TO MINIMIZE SETTLEMENT OF SUMP.
2. LABEL SUMP IN 2" HIGH LETTERS/ NUMBERS ON TOP OF THE VAULT LID, SEE SUMP IDENTIFICATION DETAIL 2, THIS SHEET.
3. INSTALL 2 BOLLARDS ON EACH SIDE OF VAULT AT LOCATIONS DETERMINED BY SITE MANAGER/ENGINEER.

1	CONDENSATE PUMP STATION #2-#5
NTS	REFERENCE SHEET: C-101 - C-104



2	SUMP IDENTIFICATION
NTS	REFERENCE SHEET: C-101 - C-104

SUMP CONSTRUCTION TABLE

SUMP #	APPROXIMATE GRADE AT SUMP	HEADER DEPTH (FT) DIMENSION "A"	SUMP DEPTH (FT) DIMENSION "B"
2	2770.0	5	12
3	2624.0	5	12
4	2893.8	8	15
5	2920.0	7	14

3	SUMP CONSTRUCTION TABLE
NTS	REFERENCE SHEET: C-101 - C-104

CONSTRUCTION NOTES/BILL OF MATERIAL

2. INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4/C-504
3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4/C-504
4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER — 6/C-504
5. INSTALL 4" HDPE ELBOW
10. INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4/C-504
12. INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
13. JOIN EXISTING PIPE
24. INSTALL R.E.P. SERIES 7000-R-8 PNEUMATIC CONDENSATE PUMP STATION (PURCHASED BY COUNTY)
28. INSTALL 1" SS THREADED COUPLING
34. INSTALL 6" X 4" HDPE REDUCER
35. INSTALL 4" X 2" HDPE REDUCER
38. INSTALL 10" HDPE CROSS
40. INSTALL 2" HDPE TEE
44. INSTALL 2" X 1" HDPE REDUCER, SDR 11
45. INSTALL 1 1/2" X 1" HDPE REDUCER
47. INSTALL 1" X 1/2" CS THREADED BUSHING AND 1/2" THREADED NIPPLE
48. INSTALL 1" X 3/4" SS THREADED BUSHING AND 3/4" THREADED NIPPLE
49. INSTALL 2" HDPE CLEAN-OUT, WITH THREADED PLUG
50. INSTALL 1" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
58. INSTALL 12" CIRCULAR CONCRETE VAULT, TRAFFIC RATED
140. INSTALL 10" X 6" HDPE REDUCER

TETRA TECH
3880 Americana Terrace, Suite 201
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Phone: 208.389.1030
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PROFESSIONAL ENGINEER — 16021 — STATE OF IDAHO — MAUREEN A. SNAW — 4/28/2022

MARK	DATE	DESCRIPTION	BY

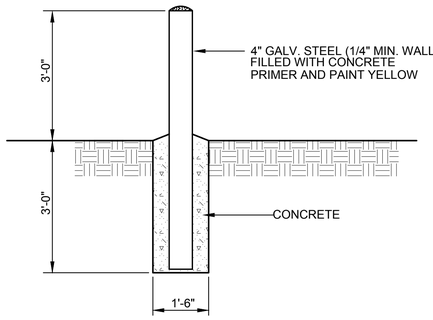
PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

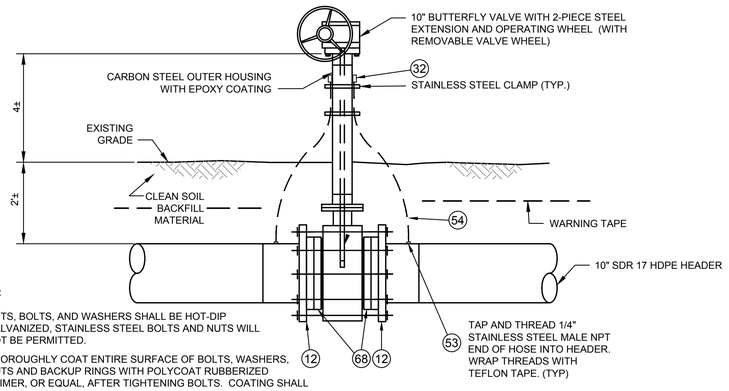
CONDENSATE PUMP STATION #2 - #5 DETAIL

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-503



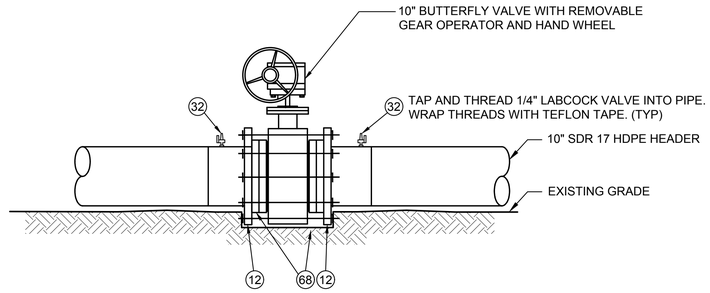
1	BOLLARD
NTS	REFERENCE SHEET: C-101-C104



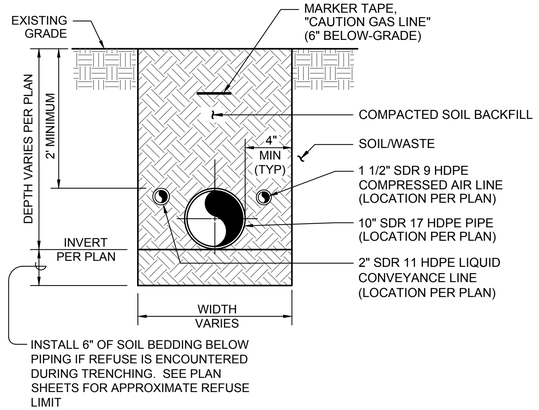
NOTES:

1. NUTS, BOLTS, AND WASHERS SHALL BE HOT-DIP GALVANIZED, STAINLESS STEEL BOLTS AND NUTS WILL NOT BE PERMITTED.
2. THOROUGHLY COAT ENTIRE SURFACE OF BOLTS, WASHERS, NUTS AND BACKUP RINGS WITH POLYCOAT RUBBERIZED PRIMER, OR EQUAL, AFTER TIGHTENING BOLTS. COATING SHALL HAVE NO "HOLIDAYS", OR GAPS IN ITS APPLICATION.
3. WRAP FLANGE IN PLASTIC WRAP PRIOR TO BACKFILLING.

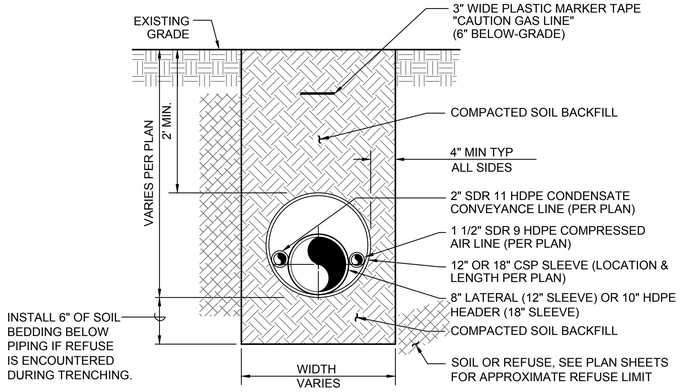
2	BELOW GRADE VALVE
NTS	REFERENCE SHEET: C-101 - C-104 (AIR AND CONDENSATE LINES NOT SHOWN, WHERE APPLICABLE)



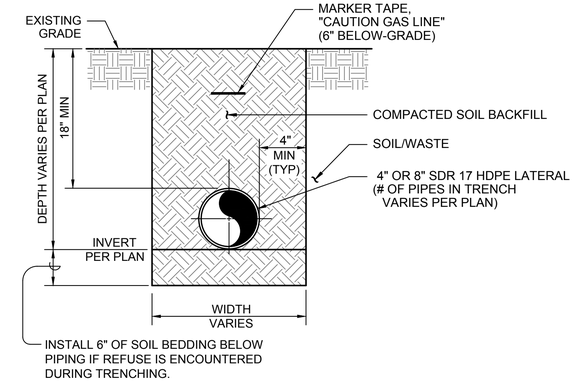
3	ABOVE GRADE VALVE
NTS	REFERENCE SHEET: C-101 (AIR AND CONDENSATE LINES NOT SHOWN)



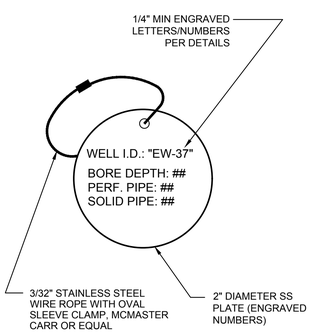
4	TYPICAL HEADER TRENCH SECTION
NTS	REFERENCE SHEET: C-101-C-104



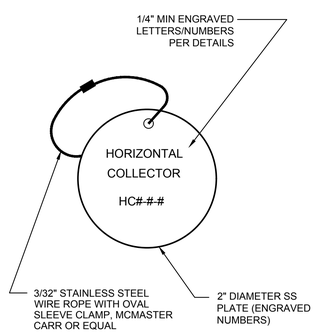
5	TYPICAL ROAD CROSSING SLEEVE
NTS	REFERENCE SHEET: C-101-C-104



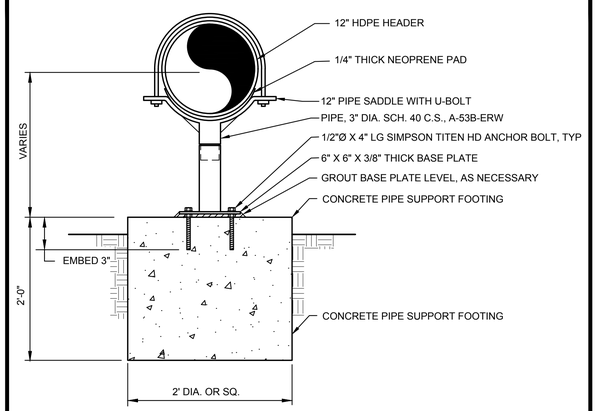
6	TYPICAL LATERAL TRENCH SECTION
NTS	REFERENCE SHEET: C-101-C-104



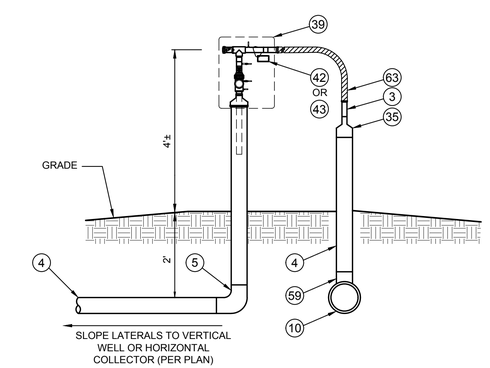
7	VERTICAL WELL I.D. TAG
NTS	REFERENCE SHEET: C-505,C-507, C-508



8	HORIZONTAL WELL I.D. TAG
NTS	REFERENCE SHEET: C-506, C-507



9	12" PIPE SUPPORT AND FOOTING
NTS	REFERENCE SHEET: C-101, M-101



10	REMOTE WELLHEAD CONNECTION
NTS	REFERENCE SHEET: C-104

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Phone: 208.389.1030
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PROFESSIONAL ENGINEER — 16021 — STATE OF IDAHO — MAUREEN A. SNAHAY — 4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS DETAILS

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-504

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CONSTRUCTION NOTES/BILL OF MATERIAL

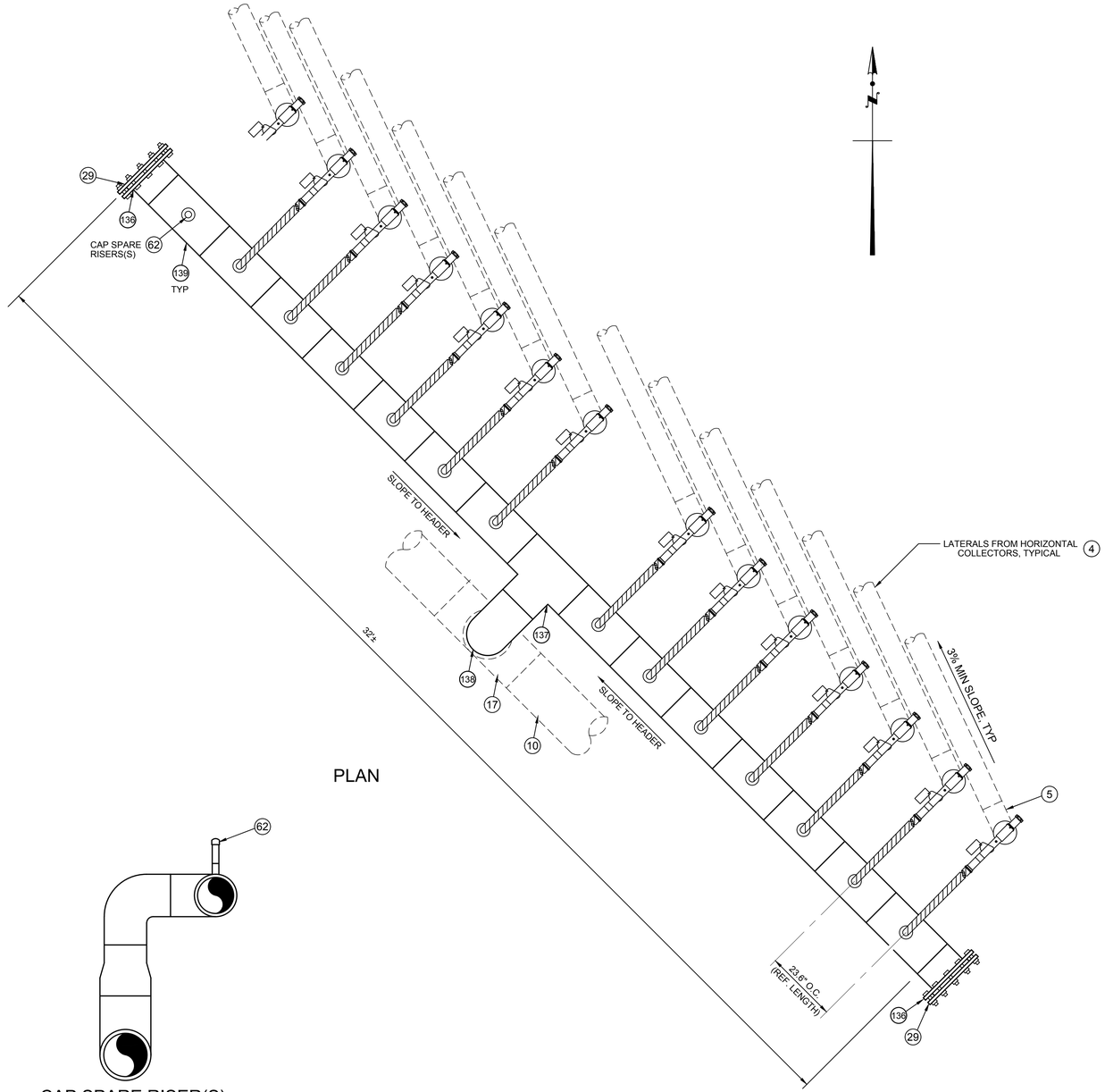
(3) INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE)
(4) INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER (6/C-504)
(5) INSTALL 4" HDPE ELBOW
(10) INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER (4/C-504)
(17) INSTALL 10" HDPE TEE
(29) INSTALL 8" PVC BLIND FLANGE
(39) INSTALL QED VERTICAL ORP215 WELLHEAD PER (1/C-506)
(43) INSTALL HORIZONTAL COLLECTOR I.D. TAG PER (8/C-504)
(62) INSTALL 2" HDPE CAP
(63) INSTALL 2" FLEX HOSE (QED SOLARGUARD OR EQUAL) WITH PIPE CLAMPS
(63) INSTALL 10" x 8" HDPE REDUCER
(70) INSTALL 10" X 8" HDPE REDUCER
(136) INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
(137) INSTALL 8" HDPE TEE
(138) INSTALL 8" HDPE ELBOW, 90°
(139) INSTALL 8" x 2" HDPE REDUCING TEE, MOLDED

WELL MANIFOLD TABLE

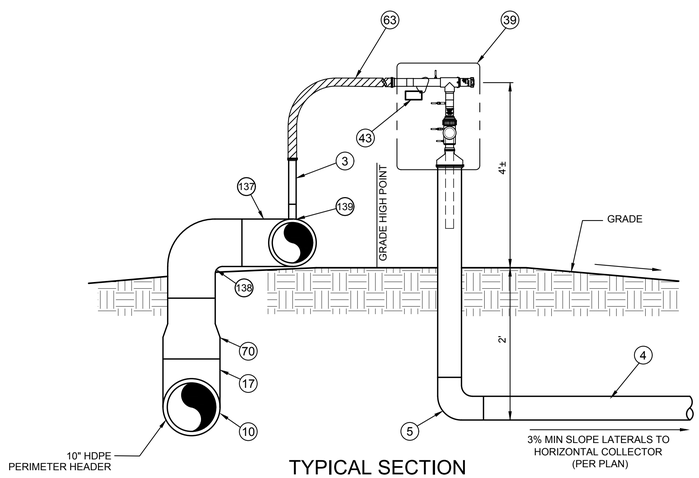
MANIFOLD #	NUMBER OF WELLHEADS	WELL I.D.
1	13 CONNECTIONS, 1 SPARE (14)	FUTURE PH3-5-A, PH3-7-A, PH3-5-B, PH3-7-B, PH3-5-C FUTURE PH3-3-A, PH3-3-B, PH3-A-1, PH3-3-C, PH3-1-B FUTURE PH3-7-C, PH3-9-A, PH3-9-B

NOTE:

1. IN THE EVENT THAT A LATERAL FROM A VERTICAL WELL OR HORIZONTAL COLLECTOR SLOPES TOWARDS THE MANIFOLD, A HORIZONTAL WELLHEAD (PER DETAIL 2/C-506) SHALL BE USED IN PLACE OF A VERTICAL WELLHEAD. THE LATERAL SHALL SLOPE CONTINUOUSLY FROM THE CONNECTION POINT TO THE PERIMETER HEADER TO AVOID A LOW POINT IN THE LATERAL (CONDENSATE BLOCKAGE). THE LATERAL SHALL BE SLOPED TO DAYLIGHT AT THE MANIFOLD IN ORDER TO INSTALL THE WELLHEAD ON GRADE (SIMILAR TO DETAIL 5, C-506)



PLAN



TYPICAL SECTION

CAP SPARE RISER(S)

1	MANIFOLD #1
NTS	REFERENCE SHEET: C-101

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Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SWAN 4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS DETAILS

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-505

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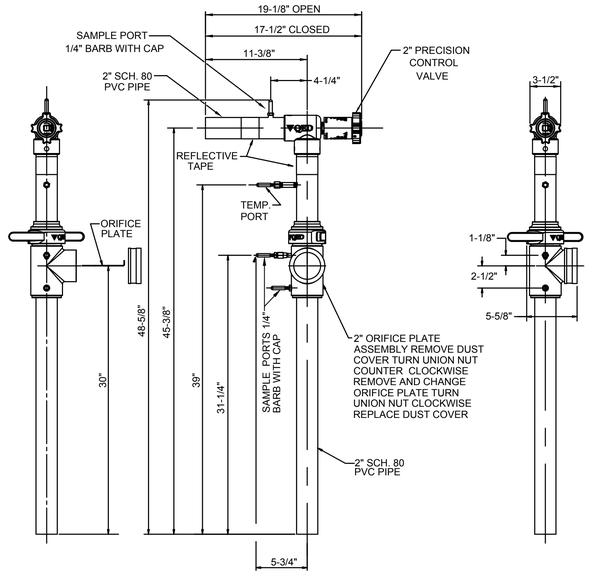
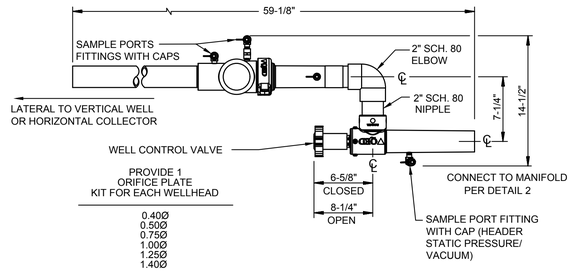
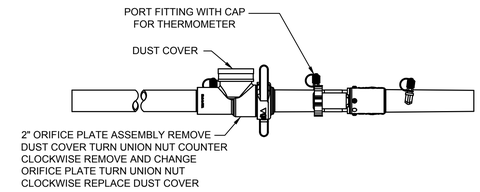


12 QED ORIFICE PLATE KITS
TO BE PURCHASED WITH
WELLHEADS
0.40Ø
0.50Ø
0.75Ø
1.00Ø
1.25Ø
1.40Ø

1	TYPICAL VERTICAL WELLHEAD
NTS	REFERENCE SHEET: C-101, C-104 (QED ORP215, 45 TOTAL)

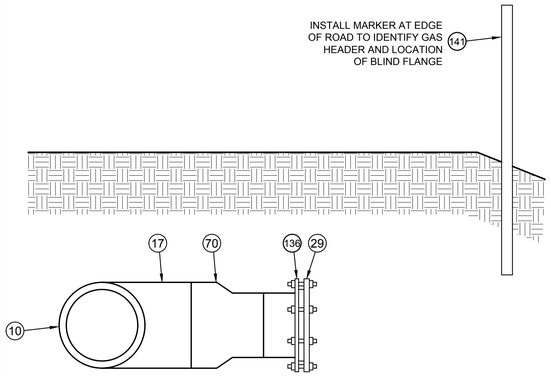


PLAN VIEW

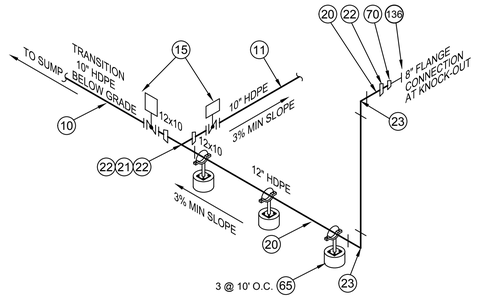


ELEVATION VIEW

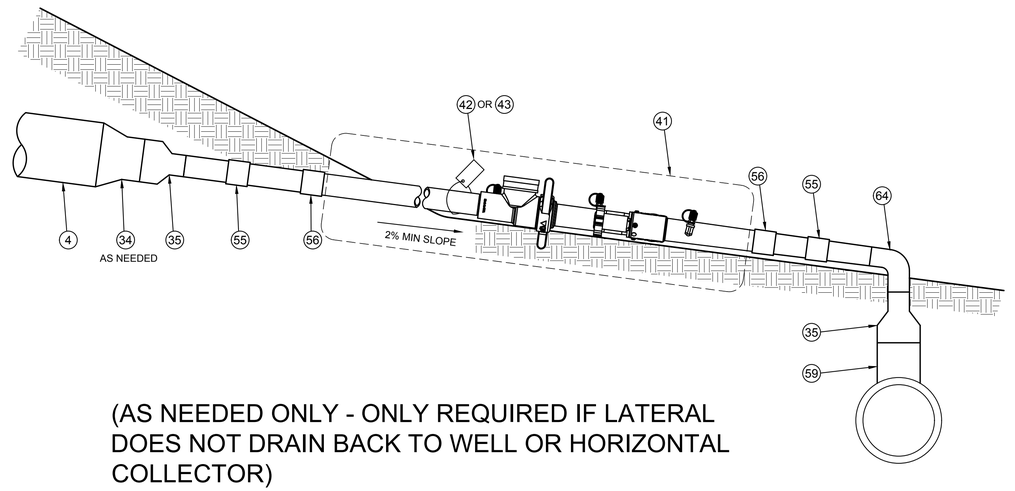
2	TYPICAL HORIZONTAL WELLHEAD
NTS	REFERENCE SHEET: C-104 (QED ORP215HL)



3	HEADER TEE AND BLIND FLANGE
NTS	REFERENCE SHEET: C-101, C-102, C-103, C-104



4	INLET PIPING ISOMETRIC
NTS	REFERENCE SHEET: C-101



(AS NEEDED ONLY - ONLY REQUIRED IF LATERAL DOES NOT DRAIN BACK TO WELL OR HORIZONTAL COLLECTOR)

5	TYPICAL HORIZONTAL WELL TO HEADER CONNECTION
NTS	REFERENCE SHEET: C-104, C-507

CONSTRUCTION NOTES/BILL OF MATERIAL

4 INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER 6/C-504
10 INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER 4/C-504
11 INSTALL 10" SDR 17 HDPE ABOVE GRADE HEADER
12 INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
15 INSTALL 10" BUTTERFLY VALVE, ABOVE GRADE PER 3/C-504
17 INSTALL 10" HDPE TEE
20 INSTALL 12" SDR 17 HDPE PIPE, ABOVE GRADE OR ON PIPE SUPPORTS
21 INSTALL 12" HDPE TEE
22 INSTALL 12" X 10" HDPE REDUCER
23 INSTALL 12" HDPE ELBOW
29 INSTALL 8" PVC BLIND FLANGE
34 INSTALL 6" X 4" HDPE REDUCER
35 INSTALL 4" X 2" HDPE REDUCER
41 INSTALL QED HORIZONTAL ORP215HL WELLHEAD PER 2/C-506
42 INSTALL VERTICAL WELL I.D. TAG PER 7/C-504
43 INSTALL HORIZONTAL COLLECTOR I.D. TAG PER 8/C-504
55 INSTALL 2" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
56 INSTALL 2" SCH 80 PVC COUPLING, SOC X FPT
59 INSTALL 8" x 4" HDPE MOLDED TEE (NOT FABRICATED OR BRANCH SADDLE)
64 INSTALL 2" SDR 11 HDPE ELBOW
65 INSTALL 12" PIPE SUPPORT AND FOOTING PER 9/C-504
70 INSTALL 10" x 8" HDPE REDUCER
136 INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
141 INSTALL FIBERGLASS CAUTION GAS PIPELINE MARKER

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER
LICENSED
16021
STATE OF IDAHO
MAUREEN A. SNAHM
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

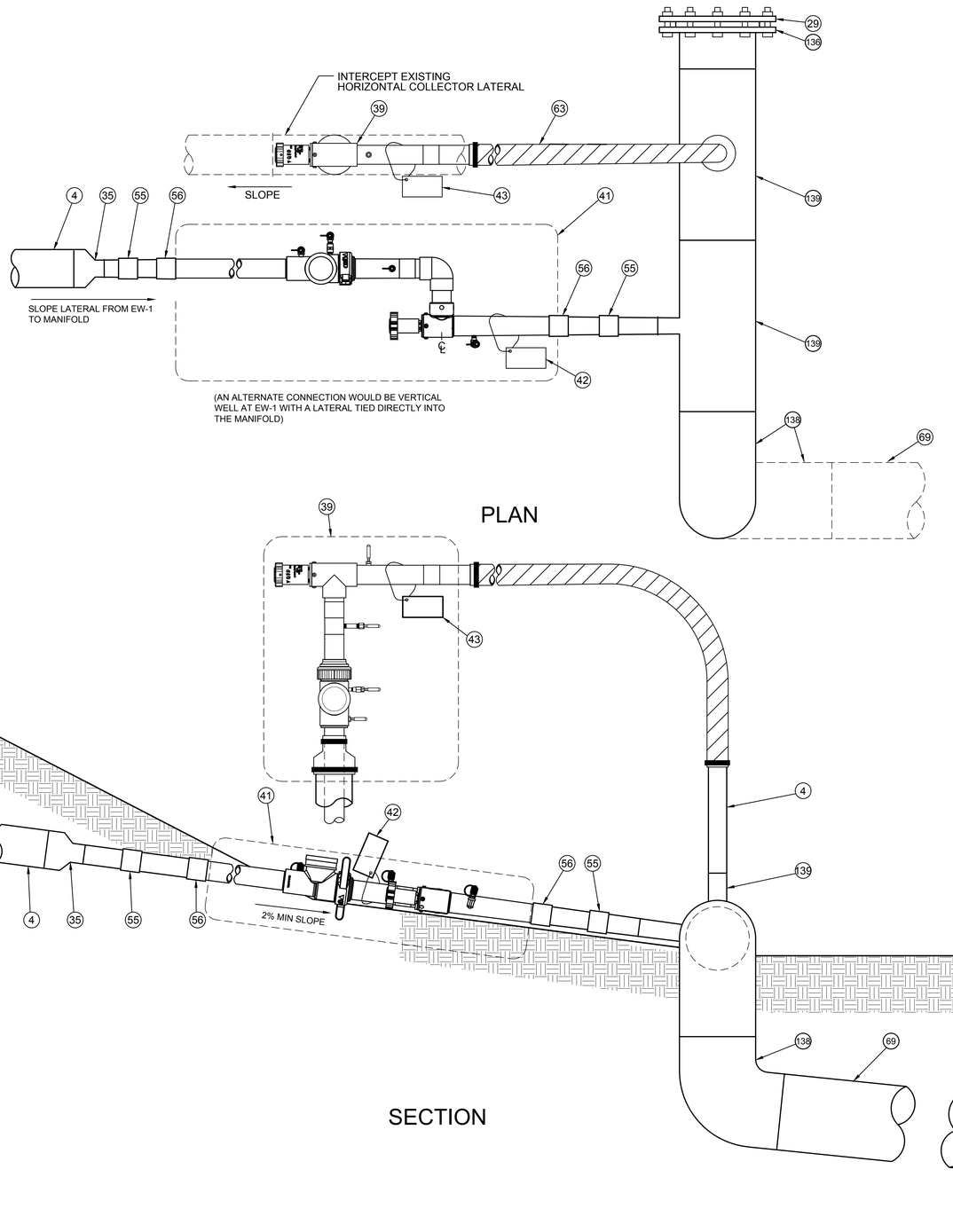
GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

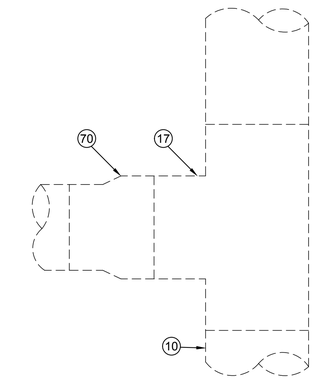
GCCS DETAILS

Project No.: 114-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

C-506

1/19/2023 10:40:26 AM - I:\DWG\PICKLES BUTTE LANDFILL\LF\GCCS DESIGN\C-506.DWG - ANGUS, SCOTT





CONSTRUCTION NOTES/BILL OF MATERIAL

4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER 6 C-504
10. INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER 4 C-504
17. INSTALL 10" HDPE TEE
18. INSTALL 10" HDPE ELBOW, 90°
29. INSTALL 8" PVC BLIND FLANGE
35. INSTALL 4" X 2" HDPE REDUCER
39. INSTALL QED VERTICAL ORP215 WELLHEAD PER 1 C-506
41. INSTALL QED HORIZONTAL ORP215HL WELLHEAD PER 2 C-506
42. INSTALL VERTICAL WELL I.D. TAG PER 7 C-504
43. INSTALL HORIZONTAL COLLECTOR I.D. TAG PER 8 C-504
55. INSTALL 2" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
56. INSTALL 2" SCH 80 PVC COUPLING, SOC X FPT
63. INSTALL 2" FLEX HOSE (QED SOLARGUARD OR EQUAL) WITH PIPE CLAMPS
69. INSTALL 8" SDR 17 HDPE LATERAL, BELOW GRADE
70. INSTALL 10" x 8" HDPE REDUCER
136. INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
138. INSTALL 8" HDPE ELBOW
139. INSTALL 8" x 2" HDPE REDUCING TEE, MOLDED

1	MANIFOLD #2
NTS	REFERENCE SHEET: C-104

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. MARSHALL
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

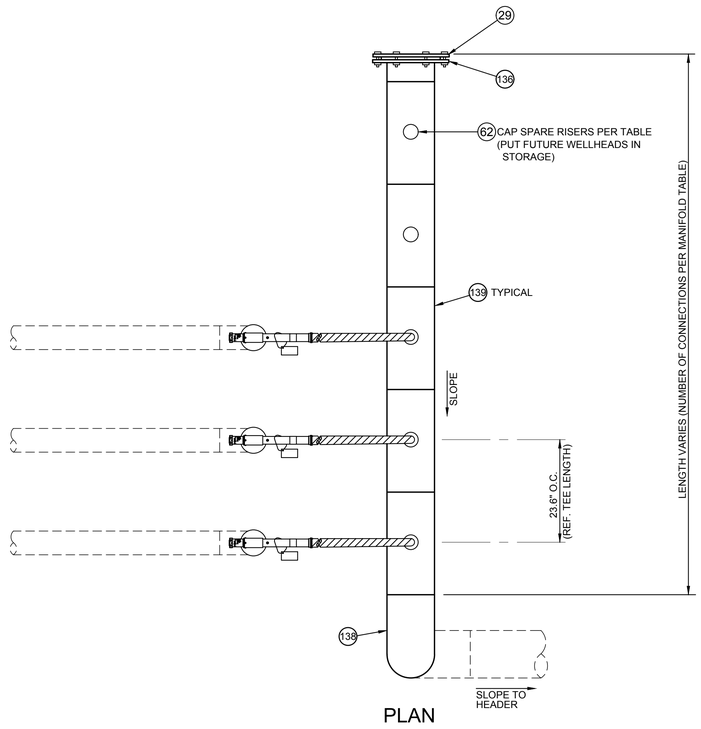
GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

GCCS DETAILS

Project No.:	114-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-507

1/19/2023 10:49:33 AM - I:\DWG\PICKLES BUTTE LANDFILL\LF\GCCS DESIGN\C-507.DWG - ANGUS, SCOTT



PLAN

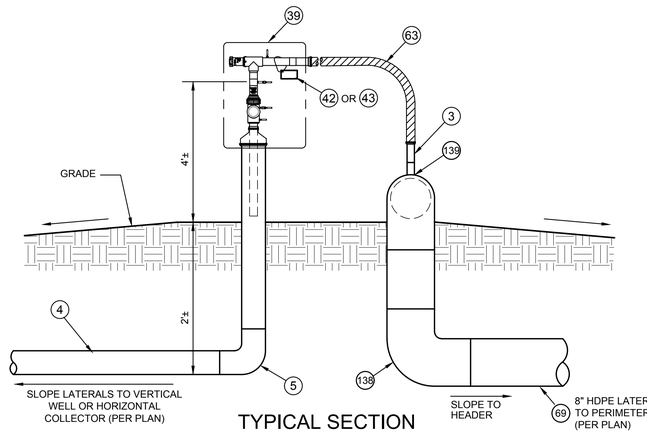
WELL MANIFOLD AND WELLHEAD TABLE

MANIFOLD #	NUMBER OF WELLHEADS CONNECTED TO MANIFOLD	WELL I.D.	
1	13 CONNECTIONS AND 1 SPARE (14)	FUTURE PH3-5-A, PH3-7-A, PH3-5-B, PH3-7-B, PH3-5-C FUTURE PH3-3-A, PH3-3-B, PH3-A-1, PH3-3-C, PH3-1-B FUTURE PH3-7-C, PH3-9-A, PH3-9-B	SEE DETAIL 1, C-505
2	2 CONNECTIONS (SEE SHEET C-508)	PH2-9-A, EW-1 (1 HORIZ. & 1 VERTICAL WELLHEAD)	SEE DETAIL 1, C-508
3	4 CONNECTIONS AND 2 SPARES (6)	EW-2, EW-3, EW-4, EW-5	SEE DETAIL 1, C-507
4	7 CONNECTIONS AND 1 SPARE (8)	EW-6, EW-7, EW-8, EW-9, EW-10, EW-11, EW-12	SEE DETAIL 1, C-507
5	2 CONNECTIONS AND 2 SPARES (4)	EW-13, EW-14	SEE DETAIL 1, C-507
OTHERS	INDIVIDUAL CONNECTIONS TO HEADER	PH2-1-A, PH2-3-A, PH2-5-A, PH2-7-A (4 VERT. WELLHEADS)	SEE DETAIL 10, C-504

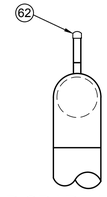
TOTAL CONNECTED AND FUTURE WELLHEADS: 32 (31 VERTICAL WELLHEADS AND 1 HORIZONTAL WELLHEAD). INSTALL WELL I.D. TAGS ONLY FOR WELLS THAT ARE CONNECTED FOR THIS PROJECT PER MANIFOLD TABLE ABOVE.

NOTE:

1. IN THE EVENT THAT A LATERAL FROM A VERTICAL WELL OR HORIZONTAL COLLECTOR SLOPES TOWARDS THE MANIFOLD, A HORIZONTAL WELLHEAD (PER DETAIL 2/C-506) SHALL BE USED IN PLACE OF A VERTICAL WELLHEAD. THE LATERAL SHALL SLOPE CONTINUOUSLY FROM THE CONNECTION POINT TO THE PERIMETER HEADER TO AVOID A LOW POINT IN THE LATERAL (CONDENSATE BLOCKAGE). THE LATERAL SHALL BE SLOPED TO DAYLIGHT AT THE MANIFOLD IN ORDER TO INSTALL THE WELLHEAD ON GRADE (SIMILAR TO DETAIL 5, C-506)



TYPICAL SECTION



CAP SPARE RISERS

(SEE WELL MANIFOLD TABLE FOR SPARE CONNECTIONS. WELLHEADS FOR FUTURE CONNECTIONS TO BE PUT IN STORAGE UNTIL LATERALS ARE CONNECTED)

CONSTRUCTION NOTES/BILL OF MATERIAL

3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE)
4. INSTALL 4" SDR 17 HDPE BELOW GRADE LATERAL PER 6/C-504
5. INSTALL 4" HDPE ELBOW
12. INSTALL 10" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
18. INSTALL 10" HDPE ELBOW, 90°
29. INSTALL 8" PVC BLIND FLANGE
35. INSTALL 4" X 2" HDPE REDUCER
39. INSTALL QED VERTICAL ORP215 WELLHEAD PER 1/C-506
42. INSTALL VERTICAL WELL I.D. TAG PER 7/C-504
43. INSTALL HORIZONTAL COLLECTOR I.D. TAG PER 8/C-504
62. INSTALL 2" HDPE CAP
63. INSTALL 2" FLEX HOSE (QED SOLARGUARD OR EQUAL) WITH PIPE CLAMPS
69. INSTALL 8" SDR 17 HDPE LATERAL, BELOW GRADE
136. INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
138. INSTALL 8" HDPE ELBOW
139. INSTALL 8" x 2" HDPE REDUCING TEE, MOLDED

1	WELL MANIFOLD #3, #4, #5
NTS	REFERENCE SHEET: C-101, C-104

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SNOW 4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

GCCS DETAILS

Project No.:	141-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

C-508

1/19/2023 10:50:28 AM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\C-508.DWG - ANGUS, SCOTT

PT-301
PRESSURE TRANSMITTER
MFR: ROSEMOUNT OR EQUAL
MODEL: 3051CD2A22A1AE5
RANGE: -250 TO 250" W.C.
OUTPUT: 4-20mA
CLASS: CLASS 1, DIVISION 2
CONNECTION: 1/2" NPT
MOUNT: 8" PIPE

FLT-301
FUEL FILTER/KNOCK-OUT VESSEL
MFR: PERENNIAL ENERGY INC. OR EQUAL
FLOW RATE = 350 TO 1,360 SCFM
99% REMOVAL EFFICIENCY OF SOLID
PARTICLES 6 MICRON & LARGER IN SIZE
8" FLANGED INLET & OUTLET
MATERIAL: SS OR HDPE
WITH CLEAN-OUT, DRAIN LINE, SITE TUBE,
DIFFERENTIAL PRESSURE GAUGE (0-10" W.C.)

T-1
CONDENSATE STORAGE TANK
MFR: XERXES (ZCL) OR EQUAL
SIZE: 10,000 GALLON PRIMARY TANK
WITH SECONDARY CONTAINMENT
MATERIAL: FIBERGLASS
ACCESSORIES: 2-4" FLANGES,
2-2" FLANGES, 22" MANWAY

P-1
DIAPHRAGM PUMP
MFR: WILDEN OR EQUAL
MODEL: P820
MAX. FLOW: 161 GPM
MATERIAL: STAINLESS STEEL
AIR INLET: 3/4"
LIQUID INLET: 2" FNPT
LIQUID OUTLET: 2" FNPT

BLR-301/302
CENTRIFUGAL GAS BLOWERS
MFR: LONE STAR BLOWER OR EQUAL
MODEL NO.: MC8-4, 4 STAGE
DESIGN FLOW RATE = 375 TO 1,360 SCFM
DESIGN INLET VACUUM: -60" W.C.
DISCHARGE PRESSURE: 20" W.C.
MOTOR: 50 HP TEFC (VFD DRIVEN)
480 VOLT, 60 HERTZ, 3 PHASE
CONNECTIONS: 8" INLET & OUTLET
MANIFOLD BLOWER DRAIN CONNECTION
INSULATED WRAP FOR BLOWERS

V-1
GRANULAR ACTIVATED CARBON (GAC)
MFR: CARBTROL OR EQUAL
MODEL NO.: G-1S
2'Ø DIAMETER x 34" HIGH
CARBON STEEL DRUM WITH EPOXY
INTERNAL COATING AND ENAMEL EXTERNAL FINISH
MAXIMUM FLOW RATE: 100 SCFM
2" FPT INLET & OUTLET

FT-301
DIFFERENTIAL PRESSURE TRANSMITTER
MFR: VERIS
MODEL: ANNUBAR
PIPE SIZE: 8" SS10
DESIGN FLOW RATE:
0-1,500 SCFM LFG

FLR-1
UTILITY FLARE
MFR: PERENNIAL ENERGY INC.
FLOW RATE: 68-1360 SCFM
PIPE SIZE: 8" SS10

CMP-1
DUPLEX ROTARY SCREW COMPRESSOR SYSTEM
SUPPLIER: COMPRESSOR WORLD OR EQUAL
MODEL: 7.5 HP ROTARY SCREW
FLOW RATE: 24 CFM MIN (EACH) @ 125 PSIG
NEMA 4 STARTER AND CONTROLS
ELECTRICAL: 480V/3Ø

TSE-301
8" HORIZONTAL FLAME ARRESTOR
MFR: ENARDO OR EQUAL
MODEL: E72008/IIA-C4R-13
ALUMINUM HOUSING
STAINLESS STEEL ELEMENT
1/2" PRESSURE PORTS
1/2" DRAIN LINE

GHS
GAS HANDLING SYSTEM MOUNTED EQUIPMENT
(PURCHASED BY COUNTY AND INSTALLED BY CONTRACTOR, ELECTRICAL BY OTHERS)

PIP
P.E.I PIPE INTERCONNECTION SPOOL
(PURCHASED BY COUNTY AND INSTALLED BY CONTRACTOR, ELECTRICAL BY OTHERS)

(PURCHASED BY COUNTY AND INSTALLED BY CONTRACTOR, ELECTRICAL BY OTHERS)

LFG IN –55" WC MIN
100°F MAX,
100% RH
1360 SCFM LFG MAX
400 SCFM LFG MIN
CH4= 30-55%
CO_2=20-45%
H2S<1000 ppmv
NH3=0ppmv
H2<3%
O2<5%
13.6°F TO 94.7°F AMBIENT TEMP

SITE ELEVATION:
3000 FT AMSL

2" HDPE11 TO SUMP #1
TO APPROPRIATE CONDENSATE DISPOSAL SYSTEM

20' HEAT TRACE PIGTAIL PROVIDED

2" HDPE11 CONDENSATE FROM FIELD
2" HDPE11 CONDENSATE FROM FIELD

SOURCE: BLOWER ASSEMBLY AND FLARE SYSTEM P&ID PROVIDED BY PERENNIAL ENERGY, INC. FINAL COMPONENTS SUBJECT TO CHANGE.

(TANK PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR, ELECTRICAL BY OTHERS)

P-1

INSULATED/HEAT TRACED (SOLAR)

SUMP #1
SUMP #2
SUMP #3

DISCHARGE POINT

0–30"WC
13"WC
18 SCFH PROPANE
40,000 Btu/hr

PILOT PROPANE GAS STORAGE TANKS

FLR
P.E.I. FLARE MOUNTED EQUIPMENT

TO APPROPRIATE CONDENSATE DISPOSAL SYSTEM

CMP-1
DUPLEX COMPRESSOR
COMPRESSOR SYSTEM HOUSED IN 10' X 20' STEEL CONTAINER
(PURCHASED BY COUNTY AND INSTALLED BY CONTRACTOR)

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SNA
4/28/2023

MARK	DATE	DESCRIPTION	BY
1	12/2022	REVISED COMPRESSOR SYSTEM UPDATED COND. TANK FITTINGS UPDATED PIPING TO MATCH P&ID	SNA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

PIPING & INSTRUMENTATION DIAGRAM

Project No.:	141-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

D-601

1/19/2023 3:51:23 PM - I:\IDW\G\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\D-601 REV1.DWG - ANGUS, SCOTT

NOTE:

1. FLARE, CONTROL PANEL, BLOWER SKID, COMPRESSOR SYSTEM/BUILDING AND ASSOCIATED EQUIPMENT WILL BE PURCHASED BY COUNTY AND INSTALLED BY CONTRACTOR. ALL OTHER EQUIPMENT SHOWN SHALL BE PURCHASED AND INSTALLED BY CONTRACTOR.
2. ALL ELECTRICAL WORK, EXCLUDING TRENCHING AND BACKFILL, WILL BE PERFORMED BY OTHERS.

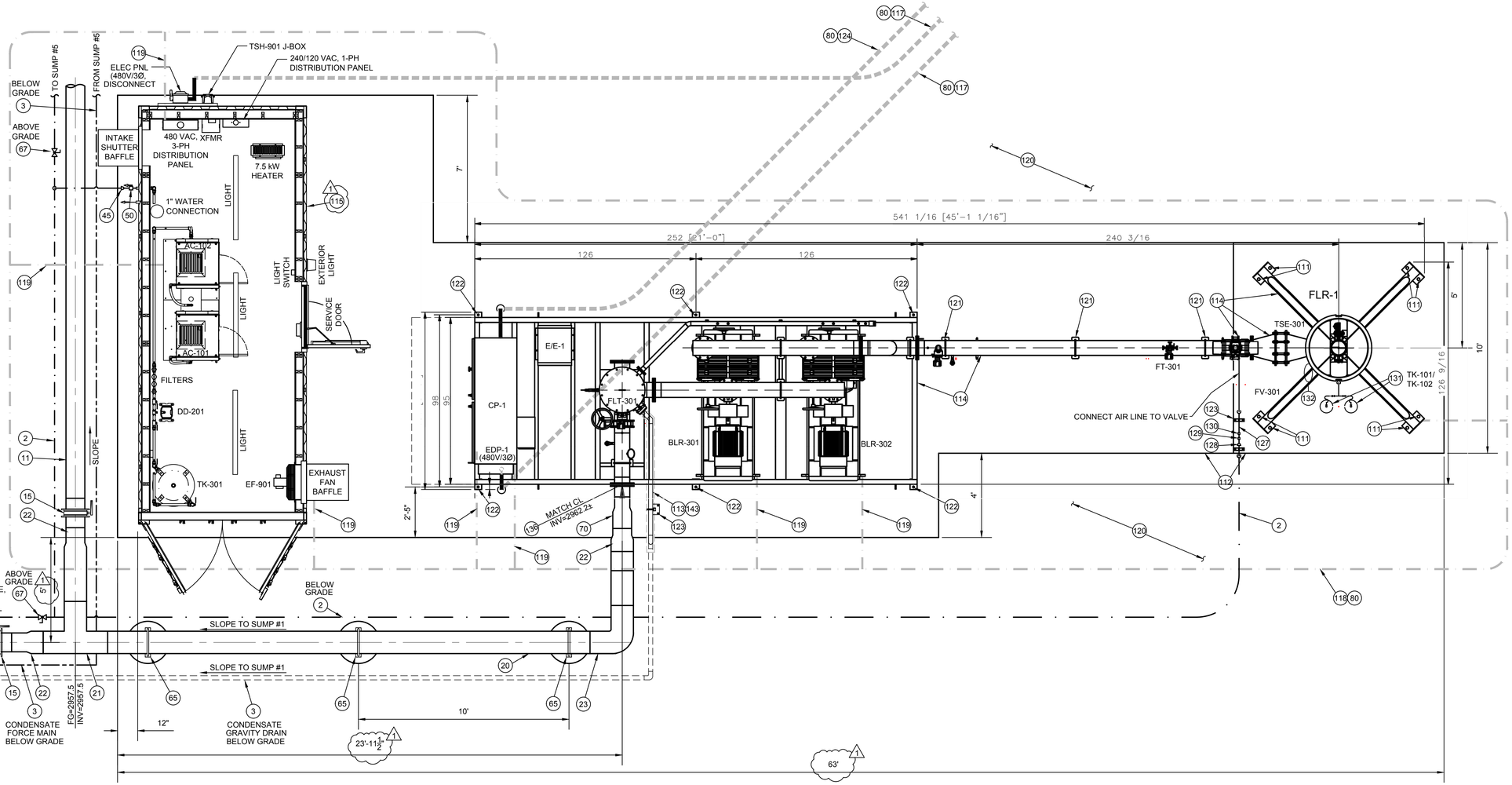
GRAPHIC SCALE

0 1 2 3 4 5

3/8"=1'-0"

CONSTRUCTION NOTES/BILL OF MATERIAL

(2) INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
(3) INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
(10) INSTALL 10" SDR 17 HDPE BELOW GRADE HEADER PER — 4 C-504
(11) INSTALL 10" SDR 17 HDPE ABOVE GRADE HEADER
(15) INSTALL 10" BUTTERFLY VALVE, ABOVE GRADE PER — 3 C-504
(20) INSTALL 12" SDR 17 HDPE PIPE, ABOVE GRADE OR ON PIPE SUPPORTS
(21) INSTALL 12" HDPE TEE
(22) INSTALL 12" X 10" HDPE REDUCER
(23) INSTALL 12" HDPE ELBOW
(45) INSTALL 1 1/2" x 1" HDPE REDUCER
(50) INSTALL 1" HDPE TO STAINLESS STEEL TRANSITION FITTING
(65) INSTALL 12" PIPE SUPPORT AND FOOTING PER — 9 C-504
(67) INSTALL 1 1/2" HDPE BALL VALVE, BUTT X BUTT
(70) INSTALL 10" x 8" HDPE REDUCER
(80) CONTRACTOR TO PROVIDE TRENCHING FOR UTILITIES (CONDUITS/WIRING BY OTHERS)
(111) INSTALL ANCHOR BOLTS FOR 8" UTILITY FLARE ASSEMBLY PER — 2 S-501
(112) INSTALL EQUIPMENT/FLARE FOUNDATION PER — 1 S-101
(113) INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS (CONDENSATE DRAIN LINE)
(114) INSTALL PERENNIAL ENERGY, INC. OR EQUAL GAS HANDLING SKID AND FLARE ASSEMBLY (PURCHASED BY COUNTY), INCLUDES: SKID MOUNTED CONDENSATE KNOCK-OUT/FILTER, 2 MULTI-STAGE CENTRIFUGAL BLOWERS WITH VFDs, PIPING, INSTRUMENTATION, FLOW METER, FLAME ARRESTOR, UTILITY FLARE STACK, PILOT SYSTEM, GAUGES, SWITCHES, TRANSMITTERS, VALVES, AND CONTROL PANEL PER P&ID (D-601), ASSEMBLY PLAN (M-101/M-102), AND PROJECT SPECIFICATIONS (ELECTRICAL BY OTHERS).
(115) INSTALL COMPRESSOR WORLD OR EQUAL COMPRESSOR SYSTEM (PURCHASED BY COUNTY). SYSTEM INCLUDES PRE-ASSEMBLED DUPLEX 7.5 HP ROTARY SCREW COMPRESSORS (24 CFM MIN @ 125 PSI), 120 GALLON RECIEVER, DESICCANT DRYER, PRE & POST FILTRATION, ISOLATION VALVE, CONTROL PANEL, OIL/WATER SEPARATOR IN 10' X 20' HEATED/INSULATED STEEL STORAGE CONTAINER WITH INTERIOR AND EXTERIOR LIGHTING, EXHAUST FANS, 480V DISCONNECT SWITCH, AND TRANSFORMER. 60 AMP FEEDER (480V/3Ø/60Hz) SHALL BE CONNECTED TO SYSTEM BY CONTRACTOR (ELECTRICAL BY OTHERS).
(117) INSTALL ELECTRICAL CONDUITS PER FLARE MANUFACTURER AND SHEET E200 (BY OTHERS)
(118) INSTALL #2/0 COPPER GROUND RING PER SHEET E200 AND E301 (BY OTHERS)
(119) INSTALL #2 COPPER GROUND WIRE PER E200 AND E301 (BY OTHERS)
(120) INSTALL 3/4" ROCK WITH GRADING LIMITS
(121) INSTALL/ANCHOR PEI SUPPLIED PIPE SUPPORT, SIMILAR TO — 3 M-501
(122) INSTALL/ANCHOR BLOWER SKID TO FOUNDATION PER — 3 S-501
(123) INSTALL CONDUIT/PIPE ANCHOR PER — 2 M-501
(124) INSTALL 2" SCH 80 PVC PHONE/DATA LINE CONDUIT AND WIRE (BY OTHERS)
(126) INSTALL 1/2" SCH 40 BLACK IRON PIPE AND FITTINGS (PAINT RED)
(127) INSTALL 1/2" SCH 40 CARBON STEEL PIPE AND FITTINGS, GALVANIZED
(128) INSTALL 1 1/2" X 1/2" HDPE REDUCER
(129) INSTALL 1/2" HDPE TO SS TRANSITION FITTING (BUTT X MPT)
(130) INSTALL 1/2" CS OR SS THREADED COUPLING
(131) INSTALL 5 GALLON PROPANE BOTTLE AND ASSOCIATED PIPING/FITTINGS (PILOT FUEL)
(132) CONNECT CONDUIT/WIRING TO ELECTRICAL DEVICES @ FLARE (BY OTHERS)
(136) INSTALL 8" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, GASKET, AND BOLT KIT
(143) INSTALL PIPE INSULATION AND HEAT TRACE WIRE (BY OTHERS)



TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SNEHAM
4/28/2023

MARK	DATE	DESCRIPTION	BY
1	1/2023	ADDED COMPRESSOR BUILDING MODIFIED INLET PIPING, REVISED PEI BLOWER/FLARE EQUIPMENT LAYOUT	SNA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

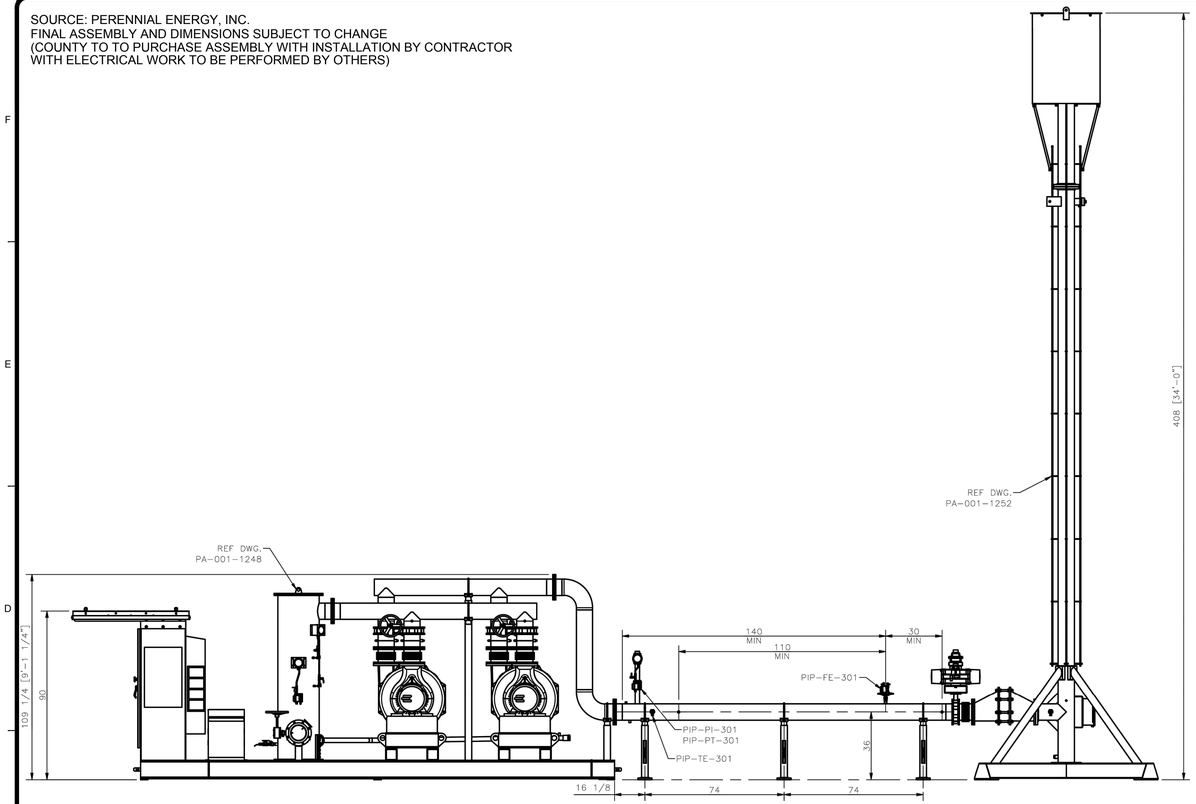
FLARE STATION ASSEMBLY PLAN

Project No.:	141-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

M-101

1/18/2023 4:52:19 PM - I:\DWG\PICKLES BUTTE LANDFILL\FG\GCCS DESIGN\M-101 REV1.DWG - ANGUS, SCOTT

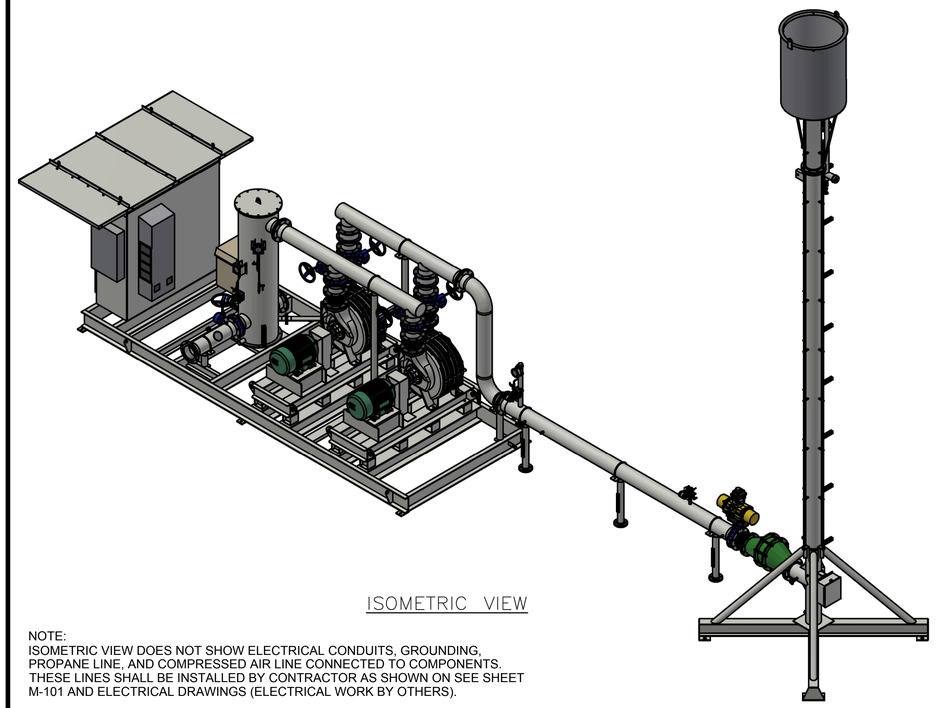
SOURCE: PERENNIAL ENERGY, INC.
FINAL ASSEMBLY AND DIMENSIONS SUBJECT TO CHANGE
(COUNTY TO TO PURCHASE ASSEMBLY WITH INSTALLATION BY CONTRACTOR
WITH ELECTRICAL WORK TO BE PERFORMED BY OTHERS)



FRONT ELEVATION

1	BLOWER SKID/FLARE STACK ELEVATION
SCALE: NONE	REFERENCE SHEET: M-101

SOURCE: PERENNIAL ENERGY, INC.
FINAL ASSEMBLY AND DIMENSIONS SUBJECT TO CHANGE
(COUNTY TO TO PURCHASE ASSEMBLY WITH INSTALLATION BY CONTRACTOR
WITH ELECTRICAL WORK PERFORMED BY OTHERS)



ISOMETRIC VIEW

NOTE:
ISOMETRIC VIEW DOES NOT SHOW ELECTRICAL CONDUITS, GROUNDING, PROPANE LINE, AND COMPRESSED AIR LINE CONNECTED TO COMPONENTS. THESE LINES SHALL BE INSTALLED BY CONTRACTOR AS SHOWN ON SEE SHEET M-101 AND ELECTRICAL DRAWINGS (ELECTRICAL WORK BY OTHERS).

2	BLOWER SKID/FLARE STACK ISOMETRIC
SCALE: NONE	REFERENCE SHEET: M-101

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. MARSHALL
4/28/2023

MARK	DATE	DESCRIPTION
1	1/2023	UPDATED PEI DWGS PER SUBMITTAL

BY: SA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

BLOWER SKID AND FLARE STACK ELEVATION AND ISOMETRIC

Project No.: 141-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

M-102

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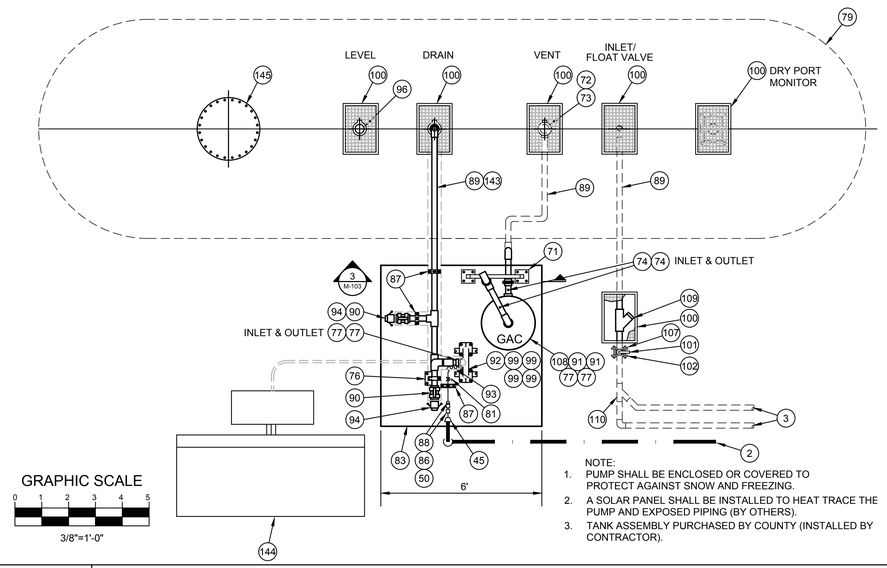


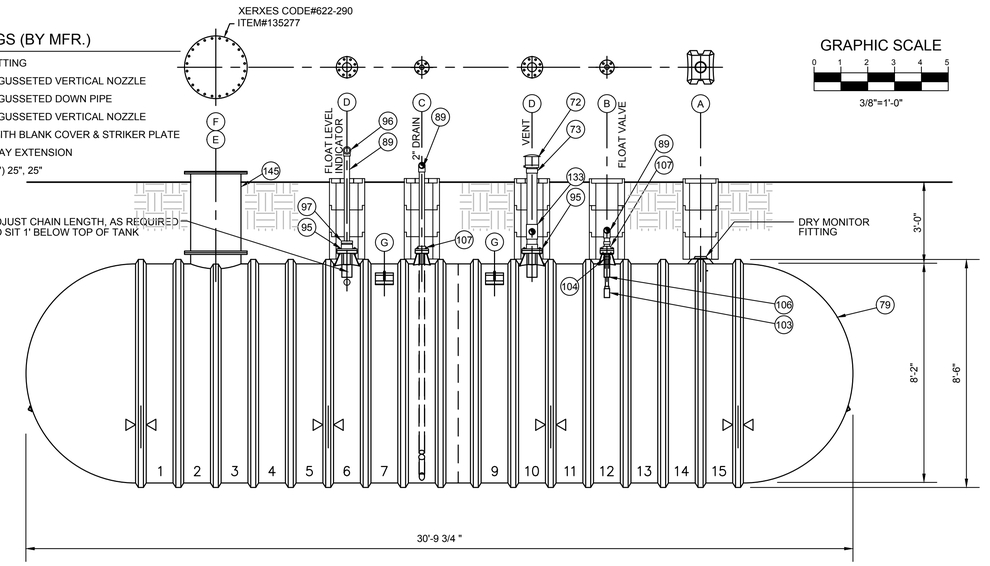
NOTE:
1. PUMP SHALL BE ENCLOSED OR COVERED TO PROTECT AGAINST SNOW AND FREEZING.
2. A SOLAR PANEL SHALL BE INSTALLED TO HEAT TRACE THE PUMP AND EXPOSED PIPING (BY OTHERS).
3. TANK ASSEMBLY PURCHASED BY COUNTY (INSTALLED BY CONTRACTOR).

1 CONDENSATE TANK PLAN

SCALE: 3/8"=1'-0" | REFERENCE SHEET: C-103

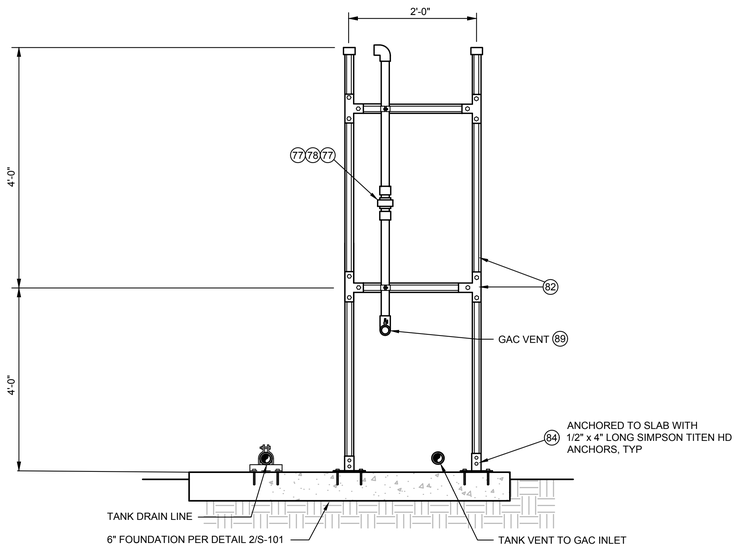
TANK FITTINGS (BY MFR.)

- A 4" NPT MONITOR FITTING
- B 2" FRP FLANGED & GUSSETED VERTICAL NOZZLE
- C 2" FRP FLANGED & GUSSETED DOWN PIPE
- D 4" FRP FLANGED & GUSSETED VERTICAL NOZZLE
- E 22" DIA. MANWAY WITH BLANK COVER & STRIKER PLATE
- F 22" DIA X 36" MANWAY EXTENSION
- G LIFTING LUG (10"X8") 25", 25"



2 CONDENSATE TANK ELEVATION

SCALE: 3/8"=1'-0" | REFERENCE SHEET: C-103



3 CONDENSATE TANK PIPE RACK/VENT LINE

SCALE: NONE | REFERENCE SHEET: C-103

CONSTRUCTION NOTES/BILL OF MATERIAL

2. INSTALL 1 1/2" SDR 9 HDPE PIPE AND FITTINGS, BELOW GRADE (COMPRESSED AIR LINE) — 4 C-504
3. INSTALL 2" SDR 11 HDPE PIPE AND FITTINGS, BELOW GRADE (CONDENSATE OR GAS LINE) — 4 C-504
45. INSTALL 2" x 1" HDPE REDUCER
50. INSTALL 1" HDPE TO STAINLESS STEEL TRANSITION FITTING (BUTT X MPT)
71. INSTALL PIPE RACK PER — 3 M-103
72. INSTALL 4" DIXON STAINLESS AIR & VACUUM RELIEF TANK VALVE OR EQUAL
73. INSTALL 4" COUPLING
74. INSTALL 1/4" PVC LABCOCK VALVE, FPT X HOSE (DRILL & TAP PIPE)
76. INSTALL PIPE SUPPORT PER — 1 M-501
77. INSTALL 2" PVC MALE ADAPTER, SOC X MPT
78. INSTALL 2" GROTH FLAME CHECK, THREADED, GROTH OR EQUAL
79. INSTALL XERXES 10,000 GALLON CONDENSATE STORAGE TANK PER (PURCHASED BY COUNTY - INSTALLED BY CONTRACTOR) — 1 M-103, 2 M-103
81. INSTALL 3/4" STAINLESS STEEL BALL VALVE, THREADED
82. INSTALL 1 5/8" GALVANIZED STRUT CHANNEL, FITTINGS, AND HARDWARE
83. INSTALL CONDENSATE PUMP FOUNDATION PER — 2 S-101
84. INSTALL 1 5/8" X 1 5/8" STRUT CHANNEL POST BASE, GALVANIZED
85. (DELETED)
86. INSTALL 1" STAINLESS STEEL THREADED COUPLING
87. INSTALL PIPE ANCHOR PER — 2 M-501
88. INSTALL 1" X 3/4" SS THREADED BUSHING AND 3/4" THREADED NIPPLE
89. INSTALL 2" SCH 80 PVC PIPE AND FITTINGS
90. INSTALL 2" PVC TRUE UNION BALL VALVE
91. INSTALL 2" PVC UNION
92. INSTALL/ANCHOR 2" WILDEN PNEUMATIC DIAPHRAGM PUMP
93. INSTALL 3/4" COMPRESSED AIR FLEX HOSE, STEEL STEEL, FPT, 250 PSI MIN RATING
94. INSTALL 2" PVC CAMLOCK AND PLUG
95. INSTALL 4" PVC FLANGE AND BOLT KIT (FL X SOC)
96. INSTALL 2" HUSKY NPS DEF OVERFILL GUARD TANK GAUGE (MECHANICAL FLOAT ASSEMBLY)
97. INSTALL 4" X 2" PVC BUSHING (SP X FPT)
99. INSTALL 1/2"Ø X 4" LONG SIMPSON TITEN HD ANCHOR BOLT
100. INSTALL CHRISTY B12-61G UTILITY BOX WITH GALV STL CHECKER PLATE AND 6" READING LID (REMOVE AS NEEDED)
101. INSTALL 2" BUTTERFLY VALVE WITH 6' VALVE EXTENSION
102. INSTALL 2" HDPE FLANGE ADAPTER, D.I. BACK-UP RING, BOLT KIT, AND GASKETS
103. INSTALL 1" HUDSON AUTOMATIC FLOAT VALVE, ANTI-SIPHON (SET 1' FROM TOP OF TANK)
104. INSTALL 2" X 1" PVC REDUCER BUSHING (MPT X FPT)
105. (DELETED)
106. INSTALL 1" SCH 80 PVC NIPPLE (LENGTH TBD)
107. INSTALL 2" PVC FLANGE (FL X SOC)
108. INSTALL CARBTROL 55 GALLON GRANULAR ACTIVATED CARBON DRUM. 2" FNPT INLET & OUTLET
109. INSTALL 2" PVC STRAINER, SxS
110. INSTALL 2" HDPE WYE FITTING
133. INSTALL 4" x 2" SCH 80 PVC TEE, SxSxS
143. INSTALL PIPE INSULATION AND HEAT TRACE WIRE (BY OTHERS)
144. INSTALL 400W, 12V SOLAR PANEL, CONTROLLER, MOUNTING KIT (BY OTHERS)
145. INSTALL 22" I.D. MANWAY WITH STEEL COVER AND EXTENSION (PROVIDED BY TANK MFR.)

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SNAHAW 4/28/2023

MARK	DATE	DESCRIPTION	BY
1	9/2022	UPDATED FITTINGS SUPPLIED BY TANK MANUFACTURER	SA
2	1/2023	UPDATED PER TANK MFR	SA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

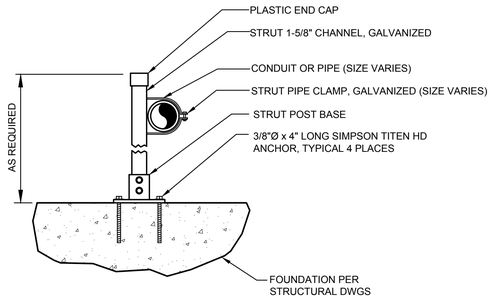
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

CONDENSATE TANK ASSEMBLY PLAN AND DETAILS

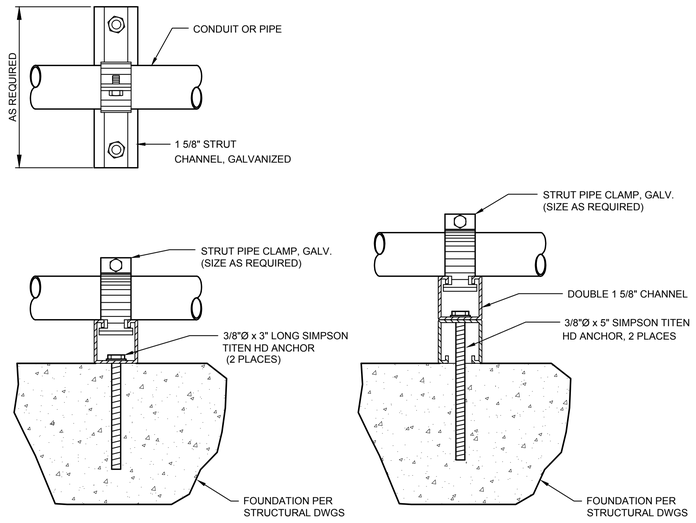
Project No.: 141-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

M-103

1/19/2023 9:08:46 AM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\M-103 REV2.DWG - ANGUS, SCOTT

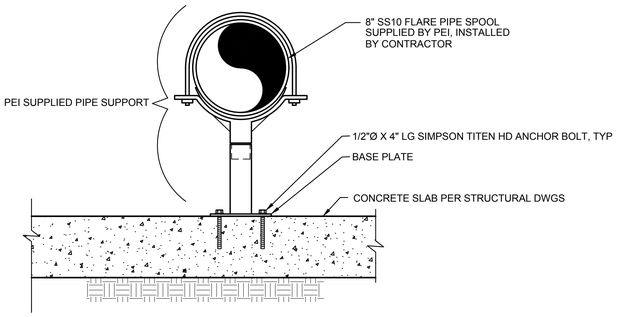


1	PIPE SUPPORT
NTS	REFERENCE SHEET: M-101, M-103



ALTERNATE ASSEMBLY

2	CONDUIT/PIPE ANCHOR
NTS	REFERENCE SHEET: M-101, M-103



NOTE:
1. PEI TO SUPPLY CABLE TRAY, CABLES, AND WIRING BETWEEN SKID AND FLARE (NOT SHOWN). CONTRACTOR SHALL INSTALL PER MANUFACTURER RECOMMENDATIONS

3	FLARE PIPE/CONDUIT SUPPORT
NTS	REFERENCE SHEET: M-101

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER
MAUREEN A. MARSHALL
16021
STATE OF IDAHO
4/28/2023

MARK	DATE	DESCRIPTION	BY
1	1/2023	UPDATED PIPE SUPPORT DETAIL 3	SA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

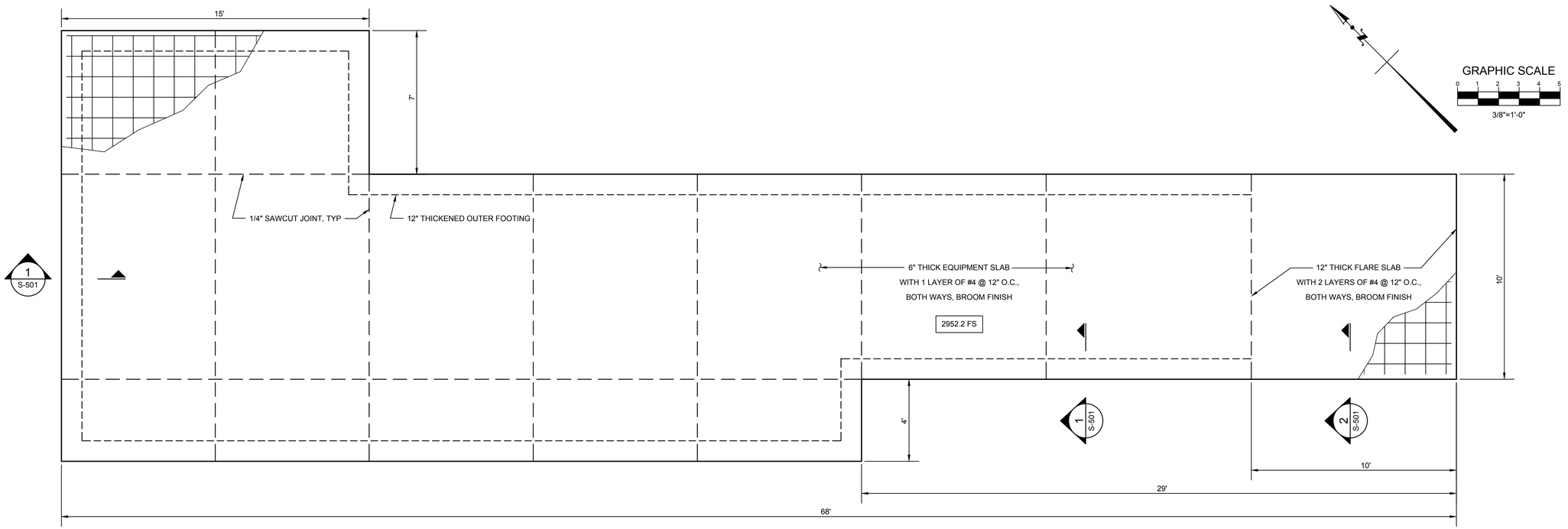
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

DETAILS

Project No.: 141-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

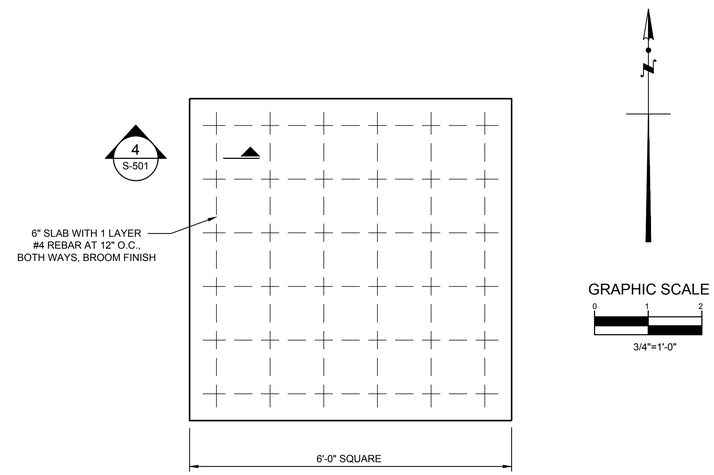
M-501

1/11/2023 4:17:33 PM - I:\DWG\PICKLES BUTTE LANDFILL\FG\GCCS DESIGN\M-501 REV1.DWG - ANGUS, SCOTT



1 EQUIPMENT/FLARE FOUNDATION

SCALE: 3/8"=1'-0" REFERENCE SHEET: M-101



2 CONDENSATE TANK PUMP FOUNDATION

SCALE: 3/4"=1'-0" REFERENCE SHEET: M-103, C-103

TETRA TECH
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030
www.tetratech.com

PROFESSIONAL ENGINEER 16021 STATE OF IDAHO MAUREEN A. SWAN
4/28/2023

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

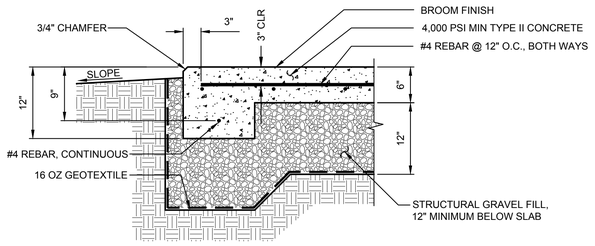
GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

FOUNDATION PLANS

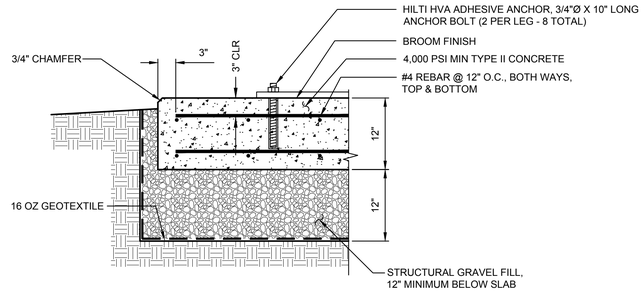
Project No.:	141-571040-2022
Designed By:	KAJ/SNA
Drawn By:	SNA
Checked By:	MM/KAJ

S-101

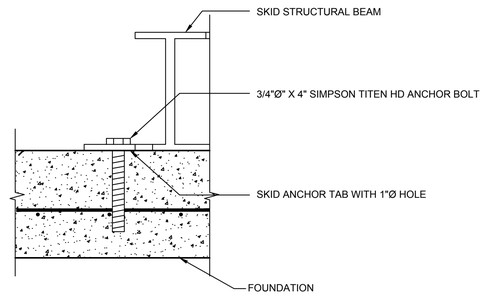
1/12/2023 9:52:12 AM - I:\DWG\PICKLES BUTTE LANDFILL\LFG\GCCS DESIGN\S-101.DWG - ANGUS, SCOTT



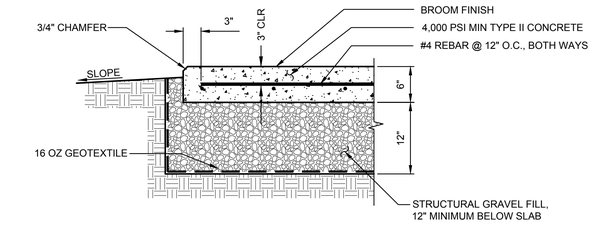
1	TYPICAL EQUIPMENT FOUNDATION SECTION
SCALE: 1"=1'-0"	REFERENCE SHEET: S-101, M-101



2	FLARE FOUNDATION/ANCHORING
SCALE: 1"=1'-0"	REFERENCE SHEET: S-101, M-101



3	SKID ANCHORING
SCALE: 1"=1'-0"	REFERENCE SHEET: M-101



4	CONDENSATE PUMP FOUNDATION SECTION
SCALE: 1"=1'-0"	REFERENCE SHEET: S-101, M-103, C-103

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER
16021
STATE OF IDAHO
MAUREEN A. MAHAN
4/28/2022

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

STRUCTURAL DETAILS

Project No.: 141-571040-2022
Designed By: KAJ/SNA
Drawn By: SNA
Checked By: MM/KAJ

S-501

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FIRE ALARM SYMBOLS

FACP	FIRE ALARM CONTROL PANEL
NAC	NOTIFICATION EXTENDER PANEL
FAA	REMOTE FIRE ALARM ANNUNCIATION PANEL
F	MANUAL PULL STATION
TS	TAMPER SWITCH
FS	FLOW SWITCH
S P	SMOKE DETECTOR - PHOTOELECTRIC
S D	IN-DUCT SMOKE DETECTOR
	HEAT DETECTOR
	DEVICES ARE WALL MOUNTED (UNO), C = CEILING MOUNTED CANDELA RATING (AS INDICATED)
C 15	FIRE ALARM HORN/STROBE
C	FIRE ALARM HORN ONLY
C 15	FIRE ALARM STROBE ONLY
C 15	FIRE ALARM SPEAKER/STORBE
C	FIRE ALARM SPEAKER ONLY
K	KNOX BOX
MM	ADDRESSABLE MONITOR MODULE
RM	ADDRESSABLE RELAY MODULE
PIV	POST INDICATOR VALVE

1. ALL VISUAL NOTIFICATION APPLIANCES THAT ARE WALL MOUNTED ARE TO BE MOUNTED WITH ENTIRE LENS ABOVE +80" AFF AND BELOW +90" AFF.
2. MOUNT FACP, NAC, FAA AT +60" AFF.

TELE/COMM SYMBOLS

	TELE/DATA OUTLET, +18" AFF (UNO)
	FLOOR MOUNTED DATA OUTLET
S	CEILING MOUNTED SPEAKER
S	WALL MOUNTED SPEAKER
V	VOLUME CONTROLLER, +46" AFF (UNO)
TV	CEILING TV OUTLET
TV	TV OUTLET, +18" AFF (UNO)

SECURITY SYMBOLS

CR	CARD READER, +46" AFF (UNO)
	CCTV CAMERA
MS	MOTION SENSOR

LIGHTING SYMBOLS

	2'X4' GRID MOUNT LIGHT
	W/ EMERGENCY BATTERY
	2'X2' GRID MOUNT LIGHT
	W/ EMERGENCY BATTERY
	4' SURFACE WRAP
	W/ EMERGENCY BATTERY
	STRIP LIGHT (LENGTH AS SHOWN)
	W/ EMERGENCY BATTERY
	LINEAR PENDANT MOUNT (LENGTH AS SHOWN)
x	RECESSED CAN LIGHT
x	*W/ EMERGENCY BATTERY*
x	ROUND SURFACE LIGHT
x	PENDANT LIGHT
	WALL LIGHT (LENGTH AS SHOWN)
	W/ EMERGENCY BATTERY
	TRACK LIGHT (LENGTH AS SHOWN)
x	POLE MOUNTED AREA LIGHT
X	WALL MOUNTED LIGHT
X	*W/ EMERGENCY BATTERY*
X	'BUG EYE' EGRESS LIGHT
X	COMBO EXIT SIGN & EGRESS LIGHT
X	SINGLE FACE, WALL MOUNTED EXIT SIGN
X	DUAL FACE, WALL MOUNTED EXIT SIGN
X	SINGLE FACE, CEILING MOUNTED EXIT SIGN
X	DOUBLE FACE, CEILING MOUNTED EXIT SIGN
	ARROW INDICATED CHEVRON MARKERS

1. 'X' INDICATED LIGHT FIXTURE CALL OUT. SEE LIGHT FIXTURE SCHEDULE FOR ADDITIONAL INFORMATION.
2. EXIT SIGNS TO BE CENTERED ABOVE DOORS OR OPENINGS WITH EXIT SIGN CENTER MOUNTED 12" ABOVE TOP OF DOOR.

DEVICES & EQUIPMENT

	SIMPLEX RECEPTACLE, +18" AFF (UNO)
	DUPLEX RECEPTACLE, +18" AFF (UNO)
	DUPLEX REC. (HALF SWITCHED), +18" (UNO)
	GFCI - DUPLEX RECEPTACLE, +18" (UNO)
	DOUBLE DUPLEX RECEPTACLE, +18" AFF (UNO)
	GFCI - DOUBLE DUPLEX REC., +18" (UNO)
	SPECIAL CONNECTION, +18" AFF (UNO)
	DUPLEX FLOOR RECEPTACLE
	DOUBLE DUPLEX FLOOR RECEPTACLE
$	SINGLE SWITCH, +46" AFF (UNO)
$D	DIMMER SWITCH, +46" AFF (UNO)
$3	3-WAY SWITCH, +46" AFF (UNO)
$4	4-WAY SWITCH, +46" AFF (UNO)
$M	LOW VOLTAGE MOMENTARY SWITCH, +46" AFF (UNO)
$LV	LOW VOLTAGE SWITCH, +46" AFF (UNO)
$OS	SWITCH MOUNTED OCCUPANCY SENSOR, +46" AFF
$VS	SWITCH MOUNTED VACANCY SENSOR, +46" AFF
OS	CEILING MOUNTED OCCUPANCY SENSOR
VS	CEILING MOUNTED VACANCY SENSOR
TC	TIME CLOCK
P	PHOTOCELL
	DRY-TYPE TRANSFORMER
	ELECTRICAL ENCLOSURE
	ELECTRICAL PANEL, SURFACE MOUNTED
	ELECTRICAL PANEL, FLUSH MOUNTED
F	FUSED SAFETY SWITCH
	NON-FUSED SAFETY SWITCH
60/3/3R	SWITCH RATING (AMP/POLES/NEMA RATING)
	CONNECTION TO MOTOR

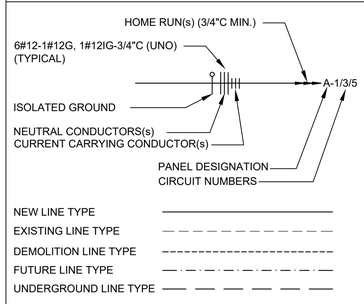
ONE-LINE SYMBOLS

	PAD MOUNTED TRANSFORMER
	ELECTRICAL PANEL
XXA XXP	CIRCUIT BREAKER
	GROUND CONNECTION
X	CONDUCTOR CALL OUT
M	ELECTRICAL METER

DRAFTING SYMBOLS

#	KEYED NOTE CALL OUT
	CONDUIT STUB-UP
	CONDUIT STUB-DOWN
	CONDUIT STUB (CAP, MARK, INSTALL PULL LINE)
XX XX	EQUIPMENT CALL OUT

CIRCUITING LEGEND



****WIRE SIZE SHALL BE MINIMUM #12 AWG COPPER UNLESS NOTED OTHERWISE. PROVIDE APPROPRIATELY SIZED EQUIPMENT GROUNDING CONDUCTOR WITH ALL CIRCUITS. WIRE SIZE SHALL NOT BE LESS THAN CORRESPONDING CIRCUIT BREAKER RATING AS REQUIRED BY NEC.**

COMMON ABBREVIATIONS

A	AMPERE
AC	ABOVE COUNTER
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AF	AMP FRAME
AIC	AMPERE INTERRUPTING CAPACITY
ATS	AUTOMATIC TRANSFER SWITCH
AWG	AMERICAN WIRE GAUAGE
AL	ALUMINUM
AT	AMP TRIP
BKR	BREAKER
BLDG	BUILDING
C	CEILING
CT	CURRENT TRANSFORMER
CU	COPPER
dB	DECIBEL
EC	ELECTRICAL CONTRACTOR
EF	EXHAUST FAN
EM	EMERGENCY
EMT	ELECTRICAL METALLIC CONDUIT
EPO	EMERGENCY POWER OFF
F	FUSE
FA	FIRE ALARM
FLA	FULL LOAD AMPS
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFI	GROUND FAULT INTERRUPTER
GFEP	GROUND FAULT EQUIPMENT PROTECTION
GND	GROUND
GRC	GALVANIZED RIGID CONDUIT
IG	ISOLATED GROUND
IMC	INTERMEDIATE METALLIC CONDUIT
KCMIL	THOUSAND CIRCULAR MILS
KVA	KILOVOLT-AMPERES
KVAR	KILOVOLT-AMPERES REACTIVE
LTG	LIGHTING
LRA	LOCKED ROTOR AMPS
MC	METAL CLAD CONDUIT
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MI	MINERAL INSULATED
MLO	MAIN LUG ONLY
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
P	POLE
PT	POTENTIAL TRANSFORMER
REC	RECEPTACLE
RMC	RIGID METALLIC CONDUIT
RTU	ROOF TOP UNIT
SP	SPARE
ST	SHUNT TRIP
TTB	TELEPHONE TERMINAL BOARD
TYP	TYPICAL
UG	UNDERGROUND
UL	UNDERWRITERS LABORATORY
UNO	UNLESS NOTED OTHERWISE
V	VOLT
WP	WEATHER PROOF
XFMR	TRANSFORMER
%Z	PERCENT IMPEDANCE

PROJECT ELECTRICAL GENERAL NOTES

1. ALL WORK TO BE COMPLETED PER THE LATEST ADDITION OF NATIONAL ELECTRICAL CODE (NEC) ADOPTED BY THE AHJ AND ALL LOCAL CODES AND RESTRICTIONS.
2. CONTRACTOR IS RESPONSIBLE FOR PROVIDING ALL REQUIRED PERMITS, TESTS AND INSPECTIONS THAT MAY BE REQUIRED DURING CONSTRUCTION.
3. THIS DOCUMENT SET IS TO BE CONSIDERED THE CONSTRUCTION DOCUMENTS INCLUDING ALL DRAWINGS, DETAILS, SCHEDULES AND SPECIFICATIONS. ANY DISCREPANCIES OR ISSUES SHROUD BE IMMEDIATELY BROUGHT TO THE ENGINEERS ATTENTION TO CLARIFICATION.
4. ALL MATERIALS PROVIDED AND INSTALLED SHALL BE UL LISTED AND SHALL BE NEW UNLESS OTHERWISE NOTED.
5. ALL DEVICES, EQUIPMENT, CONDUIT, ETC. SHALL BE FLUSH MOUNTED OR CONCEALED IN WALL UNLESS OTHERWISE NOTED.
6. ELECTRICAL CONTRACTOR TO COORDINATE WITH OTHER TRADES TO AVOID INSTALLATION CONFLICTS PRIOR TO ROUGH-IN.
7. HACR RATED BREAKERS SHALL BE PROVIDED FOR ALL HVAC EQUIPMENT.
8. ALL BRANCH CIRCUITS AND FEEDER CIRCUITS ARE TO BE PROVIDED WITH SEPARATE APPROPRIATELY SIZED GROUNDING CONDUCTOR.
9. ALL WIRE IS SIZED BASED ON 75°C COPPER. COMPACT ALUMINUM IS APPROVED FOR ALL BRANCH AND FEEDER CIRCUITS OVER 100A (UNLESS COPPER IS REQUIRED BY EQUIPMENT MANUFACTURE, VERIFICATION IS THE RESPONSIBILITY OF THE CONTACTOR). IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO UPSIZE CONDUIT AND CONDUCTORS AND VERIFY TERMINATION REQUIREMENTS AS REQUIRED IF ALUMINUM IS USED.

ELECTRICAL SHEET INDEX

FOR REFERENCE ONLY-WORK BY OTHERS

AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

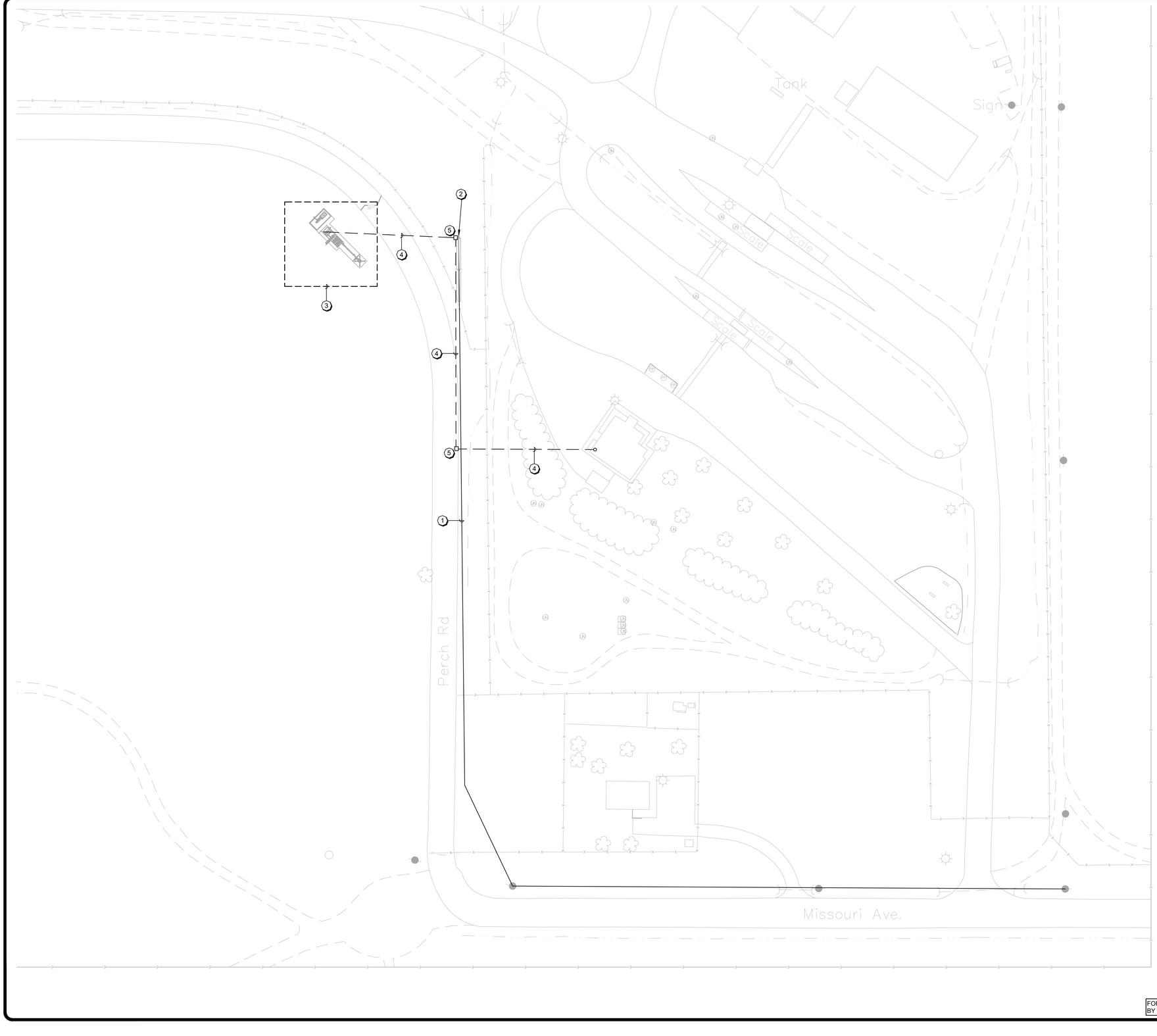
MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

ELECTRICAL COVER SHEET

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E000



GENERAL NOTES:

A. EQUIPMENT LAYOUT ON THIS SHEET IS SUBJECT TO CHANGE. CONTRACTOR TO COORDINATE ALL UTILITY INSTALLATIONS WITH LOCAL UTILITY COMPANIES PRIOR TO ANY WORK BEING STARTED. VERIFY LOCATIONS OF UTILITY TRENCHES AND EQUIPMENT AND COORDINATE WITH OTHER SITE FEATURES AND EQUIPMENT TO VERIFY ANY CONFLICTS.

B. ALL CONDUITS TO BE INSTALLED A MINIMUM OF 24" BELOW FINISHED GRADE. ALL PRIMARY AND SECONDARY CONDUITS TO BE INSTALLED PER LOCAL UTILITY COMPANY REQUIREMENTS.

C. CONTRACTOR TO COORDINATE ALL SITE WORK WITH CIVIL AND ARCHITECTURAL SITE PLANS PRIOR TO STARTING ANY WORK.

D. ALL EMPTY CONDUITS SHALL BE PROVIDED WITH PULL LINE AND BE LABELED ON BOTH ENDS FOR FUTURE USE.

E. UNLESS OTHERWISE NOTED, ALL UNDERGROUND CONDUIT SHALL BE PVC COATED RIGID GALVANIZED STEEL. ALL EXPOSED CONDUIT SHALL BE RIGID GALVANIZED STEEL. FINAL CONNECTION TO FIELD DEVICES SHALL BE MADE WITH SHORT LENGTH (MAX 18") OF METALLIC SEALTITE FLEXIBLE CONDUIT AND APPROVED FITTINGS.

F. WIRE SIZE SHALL BE MINIMUM #12 AWG COPPER UNLESS NOTED OTHERWISE. PROVIDE APPROPRIATELY SIZED EQUIPMENT GROUNDING CONDUCTOR WITH ALL CIRCUITS. WIRE SIZE SHALL NOT BE LESS THAN CORRESPONDING CIRCUIT BREAKER RATING AS REQUIRED BY NEC.

KEYED NOTES:

1. APPROXIMATE ROUTING OF NEW PROPOSED 3-PHASE OVERHEAD PRIMARY POWER BY IDAHO POWER COMPANY. SHOWN FOR REFERENCE ONLY.
2. NEW 480Y/277V POLE MOUNTED TRANSFORMERS BY IDAHO POWER COMPANY.
3. LOCATION OF NEW FLARE. SEE ENLARGED PLANS ON SHEET E200 FOR WORK IN THIS AREA.
4. NEW UNDERGROUND CONDUIT FROM EXISTING OFFICE TO NEW FLARE FOR PHONE/DATA CONNECTION. SEE CIVIL SHEET C-105 FOR DETAILS.
5. FURNISH AND INSTALL NEW PRE-CAST OPEN BOTTOM CONCRETE VAULT. PROVIDE 12" GRAVEL BED FOR DRAINAGE. PROVIDE CORE-DRILLED HOLES AS REQUIRED FOR CONDUIT INSTALLATION AND CONDUCTORS ROUTING. MINIMUM INTERIOR DIMENSIONS TO BE 24"X24"X24".

SCALE: 1" = 50'-0"

FOR REFERENCE ONLY- ELECTRICAL WORK BY OTHERS - TRENCHING BY CONTRACTOR

AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

SITE ELECTRICAL PLAN

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E100

FLARE SKID CONDUIT SCHEDULE

TAG	CONDUIT SIZE	WIRE	TYPE	FROM	TO	NOTES
1	3/4"	(2) BELDEN 8760, (4) TYPE 'KX' T/C 18 GUAGE WITH SHIELD, PVC JACKET, 1 #12 GND	SIGNAL	CONTROL PANEL	J-BOX (LV) @ FLARE (TE/FE/FCV)	FLARE MANUFATURER TO PROVIDE WIRING
2	3/4"	7 #16, 1 #12	120V	CONTROL PANEL	J-BOX (HV) @ FLARE	
3	3/4"	UV SENSOR CABLES	SIGNAL	CONTROL PANEL	BE-501 @ FLARE	FLARE MANUFATURER TO PROVIDE WIRING
4	3/4"	(1) BELDEN 8760	SIGNAL	CONTROL PANEL	FE/FT-301	LFG PIPING TO FLARE

GENERAL NOTES:

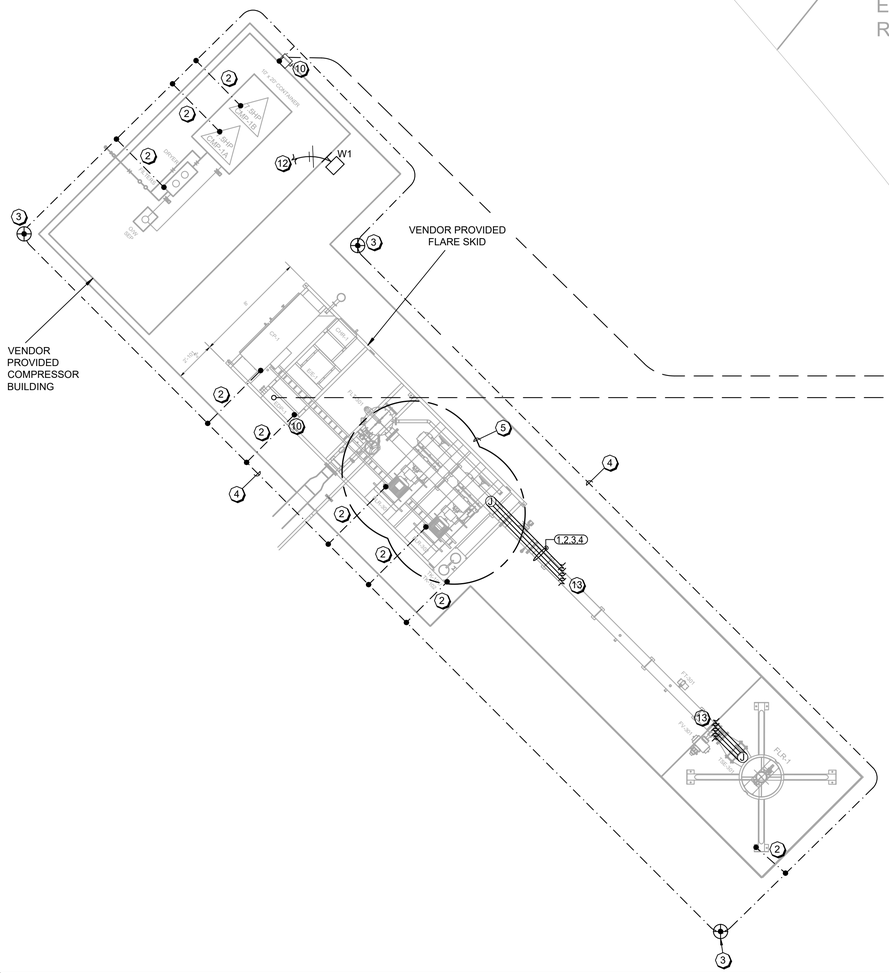
A. COORDINATE ALL LOCATIONS AND POWER REQUIREMENTS WITH OWNER PRIOR TO ROUGH-IN AND FINAL COVER.

B. WIRE SIZE SHALL BE MINIMUM #12 AWG COPPER UNLESS NOTED OTHERWISE. PROVIDE APPROPRIATELY SIZED EQUIPMENT GROUNDING CONDUCTOR WITH ALL CIRCUITS. WIRE SIZE SHALL NOT BE LESS THAN CORRESPONDING CIRCUIT BREAKER RATING AS REQUIRED BY NEC.

C. UNLESS OTHERWISE NOTED, ALL UNDERGROUND CONDUIT SHALL BE PVC COATED RIGID GALVANIZED STEEL. ALL EXPOSED CONDUIT SHALL BE RIGID GALVANIZED STEEL. FINAL CONNECTION TO FIELD DEVICES SHALL BE MADE WITH SHORT LENGTH (MAX 18") OF METALLIC SEALTITE FLEXIBLE CONDUIT AND APPROVED FITTINGS.

KEYED NOTES:

1. MOUNT NEW ELECTRICAL SERVICE ON EQUIPMENT RACK. SEE DETAIL ON SHEET E300 FOR DETAILS.
2. FURNISH AND INSTALL BONDING CONDUCTOR FROM GROUND RING TO EQUIPMENT INDICATED. BOND EQUIPMENT WITH #2 BARE COPPER BY MEANS OF EXOTHERMIC WELD OR LISTED COMPRESSION FITTING. SEE DETAIL ON SHEET E301.
3. PROVIDE 3/4" x 10' COPPER CLAD GROUND ROD AND INSPECTION WELL AT LOCATIONS SHOWN. CONNECT TO GROUND RING BY LISTED MEANS AND PROVIDE IN-GROUND ACCESS. SEE DETAIL ON SHEET E301.
4. FURNISH AND INSTALL #2/0 BARE COPPER GROUND RING AROUND FLARE AS INDICATED. GROUND RING TO BE BURIED AT A DEPTH NOT LESS THAN 30" PER NEC 250.53(F).
5. AREA WITHIN 60" OF BLOWER SEAL IS CLASSIFIED AS CLASS I, DIVISION 2. ALL WIRING WITHIN THIS AREA SHALL COMPLY WITH SECTION 501 OF THE CURRENT VERSION OF THE NATIONAL ELECTRICAL CODE.
6. NOT USED.
7. NEW UNDERGROUND SECONDARY. COORDINATE REQUIREMENTS WITH IDAHO POWER COMPANY PRIOR TO ROUGH-IN. SEE ONE-LINE DIAGRAM ON SHEET E300 FOR DETAILS.
8. NEW UNDERGROUND FEEDER TO FLARE SKID PANEL 'EDM-1' PROVIDED WITH FLARE BY FLARE MANUFACTURER. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. SEE ONE-LINE DIAGRAM ON SHEET E300 FOR DETAILS.
9. NEW UNDERGROUND FEEDER TO COMPRESSOR BUILDING DISCONNECT PROVIDED WITH COMPRESSOR BUILDING. COORDINATE REQUIREMENTS WITH EQUIPMENT SUPPLIER PRIOR TO ROUGH-IN. SEE ONE-LINE DIAGRAM ON SHEET E300 FOR DETAILS.
10. DISCONNECT AT SEPARATE STRUCTURE TO BE BONDED TO GROUND RING. NEUTRAL AND GROUND ARE TO BE ISOLATED. NEUTRAL TO GROUND BOND TO BE PROVIDE AT SERVICE ENTRANCE PANEL ONLY.
11. CONNECT RECEPTACLE AT SERVICE TO RECEPTACLE CIRCUIT IN COMPRESSOR BUILDING.
12. CONNECT LIGHT FIXTURE TO LIGHTING CIRCUIT IN COMPRESSOR BUILDING.
13. CONTRACTOR RESPONSIBLE TO PROVIDE CONDUIT CONNECTION BETWEEN JUNCTION BOXES ON FLARE. SEE FLARE CONDUIT SCHEDULE ON THIS PAGE FOR CONDUIT AND WIRE INFO. CONNECT CONDUITS TO APPROPRIATE JUNCTION BOXES LOCATED ON FLARE PER P.E.I FLARE DRAWINGS.



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AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83796
Phone: 208.389.1030

PROFESSIONAL ENGINEER
LICENSED
16238
4/27/22
STATE OF IDAHO
KEITH W. ADAMS

MARK	DATE	DESCRIPTION	BY
REV 1	12/27/22	REVIEW CHANGES	NAA

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

FLARE STATION ELECTRICAL PLAN

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E200

FAULT CURRENT CALCULATIONS

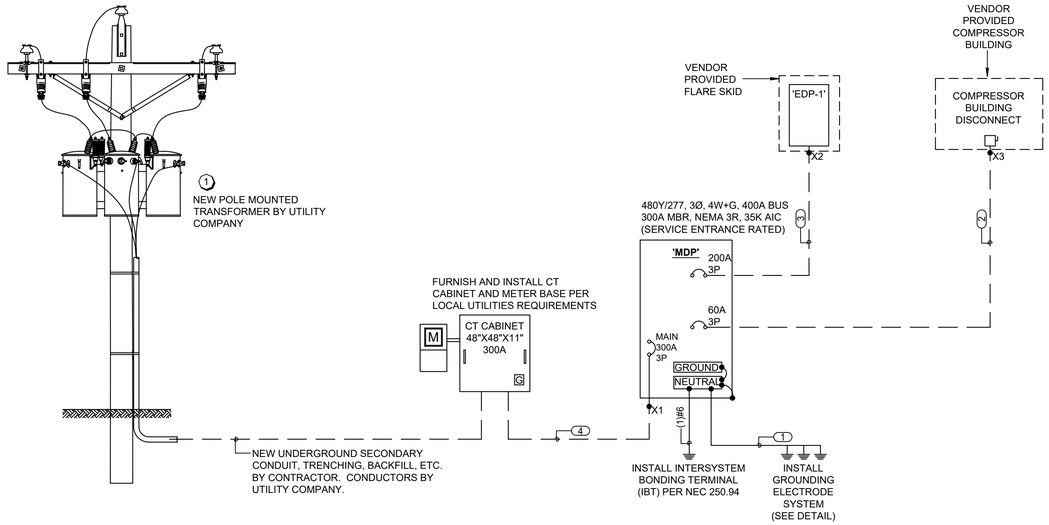
POINT #	LOCATION	EST. DISTANCE (FT.)	AVAILABLE FAULT CURRENT (A)
X1	SERVICE ENTRANCE	~30'	9,137
X2	PANEL 'EDP-1'	~135'	6,924
X3	COMPRESSOR DISSCONECT	~150'	3,011

NOTES: AVAILABLE FAULT CURRENT AT UTILITY XFMR SECONDARY BASED ON AN ESTIMATED 150KVA XFMR WITH 1.8% IMPEDANCE AND (1) RUN OF #4/0 ALUMINUM CONDUCTORS IN PVC CONDUIT. CONTRACTOR TO VERIFY ACTUAL EQUIPMENT TO BE INSTALLED WITH UTILITY COMPANY PRIOR TO ORDERING ELECTRICAL GEAR. IF ANY ITEMS DO NOT MATCH ABOVE ASSUMPTIONS, NOTIFY ENGINEER IMMEDIATELY FOR UPDATED FAULT CURRENT CALCULATIONS.

3-PHASE FEEDER SCHEDULE

TAG	OCPD RATING	NO. OF CONDUITS	CONDUIT SIZE	NO. OF CONDUCTORS	CONDUCTOR SIZE	GROUND SIZE
1	N/A	1 (PVC)	3/4"	1	N/A	#2 AWG CU
2	60A	1	1-1/2"	4+G	#6 AWG	#10 AWG
3	200A	1	2"	4+G	#3/0 AWG	#6 AWG
4	300A	1	3"	4+G	#300 KCMIL	#4 AWG

NOTE #1: WIRE SIZING BASED ON 75°C ALUMINUM CONDUCTORS WITH NOT MORE THAN (3) CURRENT-CARRYING CONDUCTORS IN RACEWAY AND AMBIENT TEMPERATURE OF 30°C.



ONE-LINE DIAGRAM

SCALE: NTS

GENERAL NOTES:

A. SERIES RATED COMBINATIONS SHALL BE UL LISTED AND LABELED PER NEC 110.22.

B. ELECTRICAL EQUIPMENT SHALL BE FIELD OR FACTORY MARKED TO WARN OF POTENTIAL ARC-FLASH HAZARDS PER NEC 110.16.

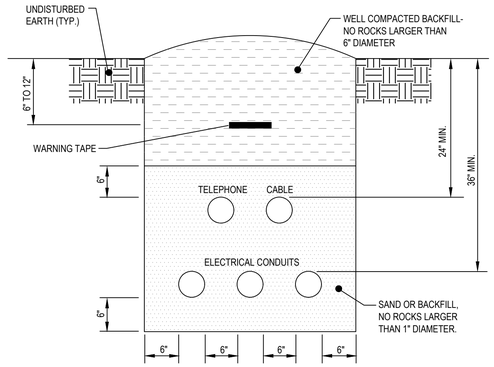
C. SERVICE EQUIPMENT SHALL BE MARKED WITH AVAILABLE FAULT CURRENT PER NEC 110.24.

D. CONTRACTOR TO MAINTAIN ALL WORKING CLEARANCES AROUND ELECTRICAL EQUIPMENT PER NEC 110.26. ANY CONFLICTS THAT ARISE ARE TO BE REPORTED IMMEDIATELY TO THE ENGINEER FOR REVIEW

E. ALL GROUNDING ELECTRODES THAT ARE PRESENT AT EACH BUILDING OR STRUCTURE SERVED SHALL BE BONDED TOGETHER TO FORM THE GROUNDING ELECTRODE SYSTEM PER NEC 250.50.

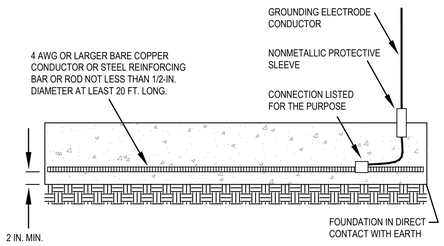
KEYED NOTES:

1. COORDINATE NEW ELECTRICAL SERVICE WITH IDAHO POWER COMPANY PRIOR TO STARTING WORK OR ORDERING EQUIPMENT.



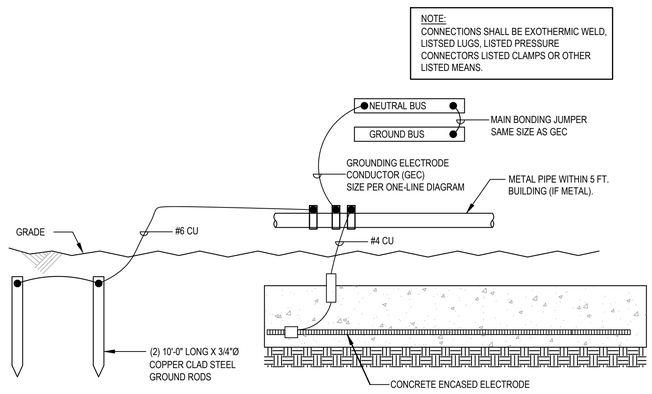
ELECTRICAL TRENCH DETAIL

SCALE: NTS



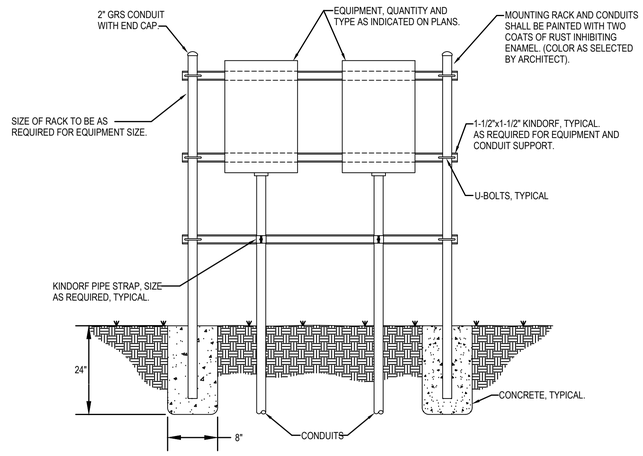
CONCRETE ENCASED ELECTRODE DETAIL

SCALE: NTS



GROUNDING ELECTRODE SYSTEM DETAIL

SCALE: NTS



RACK MOUNTED EQUIPMENT DETAIL

SCALE: NTS

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AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

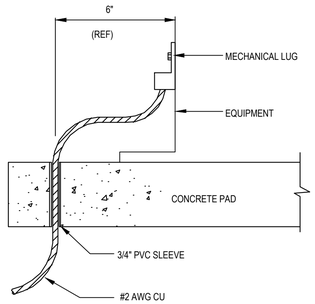
PROFESSIONAL ENGINEER
LICENSED
16238
4/27/22
STATE OF IDAHO
KEITH W. ADAMS

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION
ONE-LINE DIAGRAM

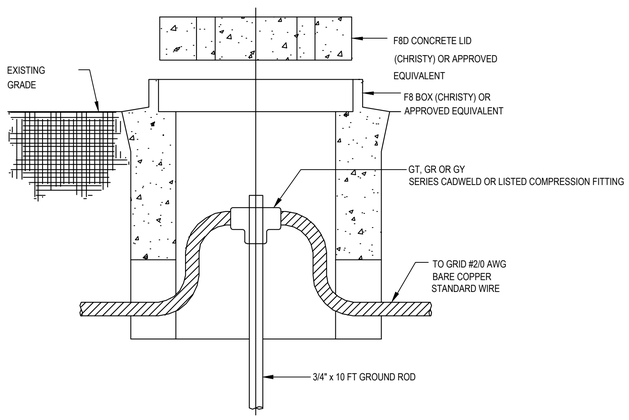
Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E300



GROUND RING CONCRETE PENETRATION DETAIL

SCALE: NTS



GROUND ROD INSPECTION WELL DETAIL

SCALE: NTS

ELECTRICAL SERVICE LOAD SUMMARY

PROJECT: PICKLES BUTTE

EQUIPMENT: MDP

VOLTAGE:	480Y/277		
PHASE, WIRE:	3-PHASE, 4-WIRE + GND	MOUNTING:	SURFACE
OCPD RATING:	300 AMPS STANDARD	FED FROM:	IP XFMR
BUS RATING:	400 AMPS	NEUTRAL:	100%
ENCLOSURE:	NEMA 3R, LOCKABLE	LOCATION:	BY IP POLE
MAIN:	BREAKER		

AVAILABLE FAULT CURRENT:	9,137	AMPS
EQUIPMENT RATING:	35K	AIC

AVAILABLE FAULT CURRENT TO BE MARKED ON SERVICE EQUIPMENT PER NEC 110.24

		LTG (KVA)	REC (KVA)	MOTOR (KVA)	KITCHEN (KVA)	CONT. (KVA)	NON-CONT. (KVA)	HVAC (KVA)	ELEC. HEAT (KVA)
PANEL 'MDP'		-	-	172.9	-	-	-	-	-
TOTAL CONN. LOAD	(KVA):	-	-	172.9	-	-	-	-	-
	(AMPS):	-	-	207.9	-	-	-	-	-
DEMAND FACTOR:		-	-	*106%*	-	-	-	-	-
TOTAL DEMAND LOAD	(KVA):	-	-	**183.6**	-	-	-	-	-
	(AMPS):	-	-	**220.9**	-	-	-	-	-
		LARGEST (KVA)		43.0	0	TOTAL KITCHEN UNITS			

OVERALL LOAD SUMMARY

	TOTAL CONNECTED (KVA)	TOTAL CONNECTED (AMPS)	*DEMAND FACTOR*	TOTAL DEMAND (KVA)	TOTAL DEMAND (AMPS)
TOTAL NEW LOAD:	172.9	207.9	*106%*	**183.6**	**220.9**
EQUIPMENT OCPD OR BUS RATING:					300
					PANEL 'OK'

SCHEDULE - PANEL 'MDP'

PROJECT: PICKLES BUTTE

VOLTAGE:	480Y/277	AIC RATING:	35K
PHASE, WIRE:	3-PHASE, 4 WIRE + GND	MOUNTING:	SURFACE
OCPD RATING:	300 AMPS	FED FROM:	POLE XFMR
BUS RATING:	400 AMPS	NEUTRAL:	100%
ENCLOSURE:	NEMA 3R, LOCKABLE	LOCATION:	RACK BY UTILITY POLE
MAIN:	BREAKER	MAIN RATING:	STANDARD RATED

PANEL NOTES:

A. SERIES COMBINATIONS SHALL BE UL LISTED AND LABELED PER NEC 110.22.

NOTES	LOAD TYPE	CKT #	DESCRIPTION	BRK SIZE	# POLE	LOAD (VA)	LOAD (A)	PHASE LOADS (VA) 'A'	'B'	'C'	LOAD (A)	LOAD (VA)	# POLE	BRK SIZE	DESCRIPTION	CKT #	LOAD TYPE	NOTES
	M	1		200		44,320	160.0	44,320			-			50		2		
	M	3	EDP - 1 (FLARE PANEL)	200	3	44,320	160.0		44,320		-		3	50	SPARE	4		
	M	5		200		44,320	160.0			44,320	-			50		6		
	M	7		60		13,302	48.0	13,302			-		1	20	SPARE	8		
	M	9	COMPRESSOR BUILDING	60	3	13,302	48.0		13,302		-		1	20	SPARE	10		
	M	11		60		13,302	48.0			13,302	-		1	20	SPARE	12		
		13		20			-	0			-				BLANK	14		
		15	SPARE	20	3		-		0		-				BLANK	16		
		17		20			-			0	-				BLANK	18		
		19	BLANK				-	0			-				BLANK	20		
		21	BLANK				-		0		-				BLANK	22		
		23	BLANK				-			0	-				BLANK	24		
		25	BLANK				-	0			-				BLANK	26		
		27	BLANK				-		0		-				BLANK	28		
		29	BLANK				-			0	-				BLANK	30		
		31	BLANK				-	0			-				BLANK	32		
		33	BLANK				-		0		-				BLANK	34		
		35	BLANK				-			0	-				BLANK	36		
		37	BLANK				-	0			-				BLANK	38		
		39	BLANK				-		0		-				BLANK	40		
		41	BLANK				-			0	-				BLANK	42		
						TOTAL (VA)		57,622	57,622	57,622								
						TOTAL (AMPS)		207.9	207.9	207.9								
						% UNBALANCE		0.0%	0.0%	0.0%								

PANEL LOAD SUMMARY		LOAD TYPE	CONN. LOAD	DEMAND FACTOR	DEMAND LOAD
172.9	CONNECTED LOAD (KVA)	LIGHTING (VA):	0	125%	0
207.9	CONNECTED LOAD (AMPS)	RECEPTACLE (VA):	0	-	0
		MOTORS (VA):	172,866	106%	183,616
183.6	DEMAND LOAD (KVA)	KITCHEN (VA):	0	-	0
220.9	DEMAND LOAD (AMPS)	CONTINUOUS (VA):	0	125%	0
PANEL 'OK'		NON-CONTINUOUS (VA):	0	100%	0
		HVAC (VA):	0	100%	0
		ELECTRIC HEAT (VA):	0	100%	0
		TOTAL:	172,866	106%	183,616

43	LARGEST (KVA)
0	EQUIP. COUNT

BRANCH CIRCUIT NOTES:

1. PROVIDE CLASS 'A' GFCI TYPE BREAKER
2. PROVIDE CLASS 'B' GFEP TYPE BREAKER
3. ROUTE CIRCUIT THROUGH RELAY PANEL FOR CONTROL
4. BREAKER TO BE LOCKABLE PER NEC 110.25.
5. ROUTE CIRCUIT THROUGH HOOD CONTACTOR FOR ANSUL SHUT DOWN
7. BREAKER HANDLE TO BE RED PER NFPA 72.
8. BREAKER TO BE LOCKABLE IN THE 'ON' POSITION.
9. SUB FEED LOAD INCLUDED IN PANEL LOAD SUMMARY
10. --

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AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

PROFESSIONAL ENGINEER
LICENSED
16238
4/27/22
STATE OF IDAHO
KEITH W. ADAMS

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

ELECTRICAL SCHEDULES

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E301

SECTION 260500 - COMMON WORK RESULTS FOR ELECTRICAL

PART 1 - GENERAL

1.1 DESCRIPTION

A. This section includes general electrical requirements which apply to the entire electrical division including, but not necessarily restricted to, the following:
   1. Procedural requirements.
   2. Specifications for general items not specifically covered in other technical sections.

1.2 RELATED WORK SPECIFIED ELSEWHERE

A. Section 019100, General Commissioning Requirements
B. Section 024119, Selective Interior Demolition
C. Section 083100, Access Doors and Panels
D. Section 260533, Raceway and Boxes for Electrical Systems
E. Section 271000, Structured Cabling

1.3 REFERENCES

A. All equipment and materials shall be in accordance with the applicable standards of the following organizations:
   1. ANSI: American National Standards Institute
   2. IBC: International Building Code
   3. ICEA: Insulated Cable Engineers Association
   4. IEEE: Institute of Electrical and Electronic Engineers
   5. NEC: National Electrical Code
   6. NEMA: National Electrical Manufacturers Association
   7. NFPA: National Fire Protection Association
   8. UL: Underwriters Laboratories

1.4 CODES, PERMITS, AND CERTIFICATES

A. See Division 1 for specific requirements relating to codes enforced, permits, and inspections.
B. Notify the electrical inspector of jurisdiction having authority sufficiently in advance to completely inspect the work in the various stages necessary. Uncover concealed work and provide qualified staff to assist inspectors.
C. In preparation for final inspection, all electrical equipment shall have wires installed and under terminal posts, and circuit schedule and labeling complete.
D. Deliver certificates from inspection authorities, certifying work is complete and satisfactory, before acceptance of the work.

1.5 DELIVERY, STORAGE, AND HANDLING

A. Store and handle materials to protect against corrosion or mechanical damage. Remove damaged materials from site immediately after detection.
B. Deliver materials in manufacturer's packaging. Deliver conductors and cables in complete coils.

1.6 ELECTRICAL DRAWINGS

A. The drawings are diagrammatic and do not show every detail of installation.

PART 2 - PRODUCTS

2.1 MATERIALS

A. Supply all materials to complete and provide the operating system specified, unless it is specifically indicated that materials are being furnished by others, or that existing equipment shall or may be reused.
B. All materials shall be new and meet the requirements of these specifications.
C. All components and equipment provided and normally tested and labeled by Underwriters Laboratories (UL), or similar recognized third party approval authority, shall be so labeled.

PART 3 - EXECUTION

3.1 LAYOUT AND COORDINATION

A. Contractor shall visit site prior to bid or beginning in work to become familiar with project scope and requirements.
B. Layout of the various equipment is very specific with the dimensioning, relative location and/or dimensions shown on the drawings. Call attention to any error, conflict, or discrepancy in the drawings or specifications. Do not proceed with any questionable items of work until clarification has been received.
C. Work under this division shall be conducted in a cooperative manner with work of other divisions employed on the project, for proper installation of all items of equipment.
D. Verify the physical dimensions of each item of electrical equipment to fit the available space and provide prompt notification prior to roughing_in if conflicts appear. Coordinate equipment to fit into the available spaces and coordinate access routes through the construction site.

3.2 PROTECTION

A. Electrical work, wire and cable, materials, and other equipment specified in this division shall be protected against damage by other construction activities, weather conditions, or any other causes as a part of this work. Equipment found damaged or in other than new condition shall be rejected as defective.
B. Keep light fixtures and electrical equipment covered or closed to exclude moisture, dust, dirt, cement, or paint and shall be free of all contamination before acceptance. Enclosures and trims shall be in new condition, free of rust, scratches or other finish defects. Properly refinish to new condition if damaged.
C. Keep conduit and raceways closed during construction to prevent entrance of dirt, moisture, concrete or foreign objects. Raceways shall be clean and dry before installation of wire and shall be so at the time of final acceptance.

3.3 GENERAL INSTALLATION METHODS

A. Install all material and equipment in accordance with the manufacturer's recommendations, instructions, and/or installation drawings, and in accordance with NEC and specifications.
B. Unless otherwise noted on the drawings, conceal all wiring in finished spaces. Exposed conduit is acceptable only when and where prior specific authorization is obtained from the owner. If exposed conduit is installed, it shall be parallel to structural lines.
C. Unless otherwise noted on the drawings, all wiring devices, recessed light fixtures, etc., in finished spaces shall be flush-mounted.
D. Provide necessary rigid conduit sleeves, openings, and chases where conduits or cables are required to pass through floors, ceilings, or walls. Seal all openings around conduits against leaks and in a manner to maintain the fire rating of the structure penetrated. Prevent unnecessary cutting in connection with the finished work.
E. Cutting or notching shall be kept to a minimum. Structural members shall not be disturbed or cut in any way without specific written approval from the structural engineer. Patch and correct finished surfaces damaged by electrical work.
F. Provide all backing and mounting hardware required to complete the electrical systems in a safe, working condition as part of the contract work.
G. Comply with code requirements and methods.
H. In general, mounting heights shall be as noted on the drawings. Where no heights are indicated, request clarification. All device dimensions are to the center above finish floor unless specified otherwise. Lighting dimensions are to the bottom of suspended fixtures.

3.4 POWER SERVICE OR UTILITY COORDINATION

A. Power Service:
   1. Submit for approval, arrangement layouts and installation details for the service equipment. Install the equipment in accordance with the approved drawings.
B. Utility Coordination:
   1. Coordinate all aspects of incoming electrical service indicated with the appropriate provider. Requirements of the utility company exceeding the provisions made on the drawings or covered in these specifications shall take precedence. Provisions made on the drawings or specifications in excess of the utility company requirements shall take precedence.

3.5 TESTING

A. Upon completion, test systems to show the equipment installed operates as designed and specified, free of faults and unintentional grounds. Submit testing plans per Section 013300, Submittal Procedures, for review prior to testing. The system tests shall be set up for as many at one time as possible to work into construction phasing.
B. A journeyman electrician with required tools shall be available to conduct all tests, with or without the equipment factory representative present.
C. Systems to be tested shall include, but not be limited to the following:
   1. Power Distribution system.
   2. Emergency power system.
   3. Lighting systems.
   4. Lighting control system.
D. A written record of performance tests shall be compiled, dated, witnessed, and submitted along with operating and maintenance data prior to substantial completion.
E. See other sections for possible testing requirements as they apply to those sections.

END OF SECTION 260500

SECTION 26 0519 - LOW VOLTAGE ELECTRICAL POWER CONDUCTORS AND CABLES

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Copper building wire rated 600 V or less.
   2. Aluminum building wire rated 600 V or less.
   3. Metal-clad cable, Type MC, rated 600 V or less.
   4. Fire-alarm wire and cable.
   5. Connectors, splices, and terminations rated 600 V and less.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Product Schedule: Indicate type, use, location, and termination locations.

1.3 INFORMATIONAL SUBMITTALS

A. Field quality-control reports.

PART 2 - PRODUCTS

2.1 COPPER BUILDING WIRE

A. Description: Flexible, insulated and uninsulated, drawn copper current-carrying conductor with an overall insulation layer or jacket, or both, rated 600 V or less.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following
   1. Alpha Wire Company.
   2. Belden Inc.
   3. Cerro Wire LLC.
   4. Encore Wire Corporation.
   5. General Cable Technologies Corporation.
   6. Houston Wire & Cable.
   7. Service Wire Co.
   8. Southwire Company.
C. Standards:
   1. Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
   2. RoHS compliant.
   3. Conductor and Cable Marking: Comply with wire and cable marking according to UL's "Wire and Cable Marking and Application Guide."
D. Conductors: Copper, complying with ASTM B3 for bare annealed copper and with ASTM B8 for stranded conductors.
E. Conductor Insulation:
   1. Type NM: Comply with UL 83 and UL 719.
   2. Type RHH and Type RHW-2: Comply with UL 44.
   3. Type USE-2 and Type SE: Comply with UL 854.
   4. Type THHN and Type THWN-2: Comply with UL 83.
   5. Type THW and Type THW-2: Comply with NEMA WC-70/ ICEA S-95-658 and UL 83.
   6. Type XHHW-2: Comply with UL 44.

2.2 FIRE-ALARM WIRE AND CABLE

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Allied Wire & Cable Inc.
   2. CommScope, Inc.
   3. Comtran Corporation.
   4. Draka Cableteq USA; a Prysmian Group company.
   5. Genesis Cable Products; Honeywell International, Inc.
   6. Radix Wire.
   7. Rockbestos-Suprenant Cable Corp.
   8. Superior Essex Inc.
   9. West Penn Wire.
B. General Wire and Cable Requirements: NRTL listed and labeled as complying with NFPA 70, Article 760.
C. Signaling Line Circuits: Twisted, shielded pair, size as recommended by system manufacturer.
D. Non-Power-Limited Circuits: Solid-copper conductors with 600-V rated, 75 deg C, color-coded insulation, and complying with requirements in UL 2196 for a two-hour rating.
   1. Low-Voltage Circuits: No. 16 AWG, minimum, in pathway.
   2. Line-Voltage Circuits: No. 12 AWG, minimum, in pathway.
   3. Multiconductor Armored Cable: NFPA 70, Type MC, copper conductors, Type TFN/THHN conductor insulation, copper drain wire, copper armor with red identifier stripe, NTRL listed for fire-alarm and cable tray installation, plenum rated.

2.3 CONNECTORS AND SPLICES

A. Description: Factory-fabricated connectors, splices, and lugs of size, ampacity rating, material, type, and class for application and service indicated; listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. 3M Electrical Products.
   2. AFC Cable Systems; a part of Atkore International.
   3. Hubbell Power Systems, Inc.
   4. Thomas & Betts Corporation; A Member of the ABB Group.
C. Jacketed Cable Connectors: For steel and aluminum jacketed cables, zinc die-cast with set screws, designed to connect conductors specified in this Section.
D. Lugs: One piece, seamless, designed to terminate conductors specified in this Section.
   1. Material: Copper.
   2. Type: Two hole with long barrels.
   3. Termination: Compression.

PART 3 - EXECUTION

3.1 CONDUCTOR MATERIAL APPLICATIONS

A. Feeders & Branch Circuits: Copper; stranded for No. 12 AWG and larger.
B. Remote-Limited Fire Alarm and Control: Solid for No. 12 AWG and smaller.

3.2 CONDUCTOR INSULATION AND MULTI-CONDUCTOR CABLE APPLICATIONS AND WIRING METHODS

A. Service Entrance: Type XHHW-2, single conductors in raceway.
B. Feeders: Type THHN/THWN-2, single conductors in raceway.
C. Exposed Branch Circuits, Including in Crawlspaces: Type THHN/THWN-2, single conductors in raceway.
D. Branch Circuits Concealed in Ceilings, Walls, and Partitions: Type THHN/THWN-2, single conductors in raceway or Metal-clad cable, Type MC.
E. Branch Circuits Concealed in Concrete, below Slabs-on-Grade, and Underground: Type THHN/THWN-2, single conductors in raceway.

3.3 INSTALLATION OF CONDUCTORS AND CABLES

A. Conceal cables in finished walls, ceilings, and floors unless otherwise indicated.
B. Complete raceway installation between conductor and cable termination points.
C. Use manufacturer-approved pulling compound or lubricant where necessary; compound used must not deteriorate conductor or insulation. Do not exceed manufacturer's recommended maximum pulling tensions and sidewall pressure values.
D. Use pulling means, including fish tape, cable, rope, and basket-weave wire/cable grips, that will not damage cables or raceway.
E. Install exposed cables parallel and perpendicular to surfaces of exposed structural members, and follow surface contours where possible.
F. Support cables according to Section 260529 "Hangers and Supports for Electrical Systems."

3.4 CONNECTIONS

A. Tighten electrical connectors and terminals according to manufacturer's published torque-tightening values. If manufacturer's torque values are not indicated, use those specified in UL 486A-486B.
B. Make splices, terminations, and taps that are compatible with conductor material and that possess equivalent or better mechanical strength and insulation ratings than unspliced conductors.
   1. Use oxide inhibitor in each splice, termination, and tap for aluminum conductors.

3.5 IDENTIFICATION

A. Identify and color-code conductors and cables according to Section 260553 "Identification for Electrical Systems."
B. Identify each spare conductor at each end with identity number and location of other end of conductor, and identify as spare conductor.

3.6 SLEEVE AND SLEEVE-SEAL INSTALLATION FOR ELECTRICAL PENETRATIONS

A. Install sleeves and sleeve seals at penetrations of exterior floor and wall assemblies.

3.7 FIRESTOPPING

A. Apply firestopping to electrical penetrations of fire-rated floor and wall assemblies to restore original fire-resistance rating of assembly.

END OF SECTION 260519

SECTION 260526 - GROUNDING AND BONDING FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY
A. Section includes grounding and bonding systems and equipment.
1.2 ACTION SUBMITTALS
A. Product Data: For each type of product.
1.3 CLOSEOUT SUBMITTALS
A. Operation and maintenance data.

PART 2 - PRODUCTS

2.1 SYSTEM DESCRIPTION

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Comply with UL 467 for grounding and bonding materials and equipment.

2.2 MANUFACTURERS

A. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
   1. Advanced Lightning Technology, Ltd.
   2. Dossert; AFL Telecommunications LLC.
   3. ERICO; a brand of nVent.
   4. Galvan Industries, Inc.; Electrical Products Division, LLC.
   5. Hubbell Incorporated (Construction and Energy Group).
   6. ILSCO.
   7. Robbins Lightning, Inc.
   8. Siemens Industry, Inc., Energy Management Division.
   9. Thomas & Betts Corporation; A Member of the ABB Group.

2.3 CONDUCTORS

A. Insulated Conductors: Copper wire or cable insulated for 600 V unless otherwise required by applicable Code or authorities having jurisdiction.
B. Bare Copper Conductors:
   1. Stranded Conductors: ASTM B8.
   2. Bonding Cable: 28 kcmil, 14 strands of No. 17 AWG conductor, 1/4 inch (6 mm) in diameter.
   3. Bonding Conductor: No. 4 or No. 6 AWG, stranded conductor.
   4. Bonding Jumper: Copper tape, braided conductors terminated with copper ferrules; 1-5/8 inches wide and 1/16 inch thick.
C. Grounding Bus: Predrilled rectangular bars of annealed copper, 1/4 by 8 inches in cross section, with 9/32-inch holes spaced 1-1/8 inches apart. Stand-off insulators for mounting shall comply with UL 891 for use in switchboards, 600 V and shall be Lexan or PVC, impulse tested at 5000 V.

2.4 CONNECTORS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction for applications in which used and for specific types, sizes, and combinations of conductors and other items connected.
B. Welded Connectors: Exothermic-welding kits of types recommended by kit manufacturer for materials being joined and installation conditions.
C. Beam Clamps: Mechanical type, terminal, ground wire access from four directions, with dual, tin-plated or silicon bronze bolts.
D. Cable-to-Cable Connectors: Compression type, copper or copper alloy.
E. Cable Tray Ground Clamp: Mechanical type, zinc-plated malleable iron.
F. Conduit Hubs: Mechanical type, terminal with threaded hub.
G. Service Post Connectors: Mechanical type, bronze alloy terminal, in short- and long-stud lengths, capable of single and double conductor connections.
H. Signal Reference Grid Clamp: Mechanical type, stamped-steel terminal with hex head screw.
I. Straps: Solid copper, [cast-bronze clamp] [copper lugs]. Rated for 600 A.

2.5 GROUNDING ELECTRODES

A. Ground Rods: Copper-clad steel; 3/4 inch by 10 feet.

PART 3 - EXECUTION

3.1 APPLICATIONS

A. Conductors: Install solid conductor for No. 10 AWG and smaller, and stranded conductors for No. 8 AWG and larger unless otherwise indicated.
B. Grounding Bus: Install in electrical equipment rooms, in rooms housing service equipment, and elsewhere as indicated.
   1. Install bus horizontally, on insulated spacers 2 inches minimum from wall, 6 inches above finished floor unless otherwise indicated.
C. Conductor Terminations and Connections:
   1. Pipe and Equipment Grounding Conductor Terminations: Bolted connectors.
   2. Underground Connections: Welded connectors except at test wells and as otherwise indicated.
   3. Connections to Structural Steel: Welded connectors.

3.2 GROUNDING AT THE SERVICE

A. Equipment grounding conductors and grounding electrode conductors shall be connected to the ground bus. Install a main bonding jumper between the neutral and ground buses.

3.3 EQUIPMENT GROUNDING

A. Install insulated equipment grounding conductors with all feeders and branch circuits.
B. Poles Supporting Outdoor Lighting Fixtures: Install grounding electrode and a separate insulated equipment grounding conductor in addition to grounding conductor installed with branch-circuit conductors.

3.4 INSTALLATION

A. Grounding Conductors: Route along shortest and straightest paths possible unless otherwise indicated or required by Code. Avoid obstructing access or placing conductors where they may be subjected to strain, impact, or damage.
B. Ground Rods: Drive rods until tops are 2 inches (50 mm) below finished floor or final grade unless otherwise indicated.
   1. Interconnect ground rods with grounding electrode conductor below grade and as otherwise indicated. Make connections without exposing steel or damaging coating if any.
C. Bonding Straps and Jumpers: Install in locations accessible for inspection and maintenance except where routed through short lengths of conduit.
   1. Bonding to Structure: Bond straps directly to basic structure, taking care not to penetrate any adjacent parts.
   2. Bonding to Equipment Mounted on Vibration Isolation Hangers and Supports: Install bonding so vibration is not transmitted to rigidly mounted equipment.
   3. Use exothermic-welded connectors for outdoor locations; if a disconnect-type connection is required, use a bolted clamp.
D. Grounding and Bonding for Piping:
   1. Metal Water Service Pipe: Install insulated copper grounding conductors, in conduit, from building's main service equipment, or grounding bus, to main metal water service entrances to building. Connect grounding conductors to main metal water service pipes; use a bolted clamp connector or bolt a lug-type connector to a pipe flange by using one of the lug bolts of the flange. Where a dielectric main water fitting is installed, connect grounding conductor on street side of fitting. Bond metal grounding conductor conduit or sleeve to conductor at each end.
   2. Water Meter Piping: Use braided-type bonding jumpers to electrically bypass water meters. Connect to pipe with a bolted connector.
   3. Bond each aboveground portion of gas piping system downstream from equipment shutoff valve.

3.5 FIELD QUALITY CONTROL

A. Tests and Inspections:
   1. After installing grounding system but before permanent electrical circuits have been energized, test for compliance with requirements.
   2. Inspect physical and mechanical condition. Verify tightness of accessible, bolted, electrical connections with a calibrated torque wrench according to manufacturer's written instructions.
   3. Test completed grounding system at each location where a maximum ground-resistance level is specified, at service disconnect enclosure grounding terminal. Make tests at ground rods before any conductors are connected.
      a. Measure ground resistance no fewer than two full days after last trace of precipitation and without soil being moistened by any means other than natural drainage or seepage and without chemical treatment or other artificial means of reducing natural ground resistance.
      b. Perform tests by fall-of-potential method according to IEEE 81.
   4. Prepare dimensioned Drawings locating each test well, ground rod and ground-rod assembly, and other grounding electrodes. Identify each by letter in alphabetical order, and key to the record of tests and observations. Include the number of rods driven and their depth at each location, and include observations of weather and other phenomena that may affect test results. Describe measures taken to improve test results.
B. Grounding system will be considered defective if it does not pass tests and inspections.
C. Prepare test and inspection reports.
D. Report measured ground resistances that exceed the following values:
   1. Power and Lighting Equipment or System with Capacity of 500 kVA and Less: 20 ohms.
   2. Power and Lighting Equipment or System with Capacity of 500 or more kVA: 10 ohms.
   3. Power Distribution Units or Panelboards Serving Electronic Equipment: 5 ohms.
E. Excessive Ground Resistance: If resistance to ground exceeds specified values, notify Architect promptly and include recommendations to reduce ground resistance.

END OF SECTION 260526

SECTION 260529 - HANGERS AND SUPPORTS FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

A. Product Data: For each type of product.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Delegated Design: Engage a qualified professional engineer, as defined in Section 014000 "Quality Requirements," to design hanger and support system.
B. Seismic Performance: Hangers and supports shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.
   1. The term "withstand" means "the supported equipment and systems will remain in place without separation of any parts when subjected to the seismic forces specified and the supported equipment and systems will be fully operational after the seismic event.
   2. Component Importance Factor: 1.5.

2.2 SUPPORT, ANCHORAGE, AND ATTACHMENT COMPONENTS

A. Steel Slotted Support Systems: Preformed steel channels and angles with minimum 13/32-inch diameter holes at a maximum of 8 inches o.c. in at least one surface.
   1. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
      a. Allied Tube & Conduit; a part of Atkore International.
      b. B-line, an Eaton business.
      c. CADDY; a brand of nVent.
      d. Flex-Strut Inc.
      e. Gripple Inc.
      f. Thomas & Betts Corporation; A Member of the ABB Group.
      g. Unistrut; Part of Atkore International.
   2. Standard: Comply with MFMA-4 factory-fabricated components for field assembly.
   3. Material for Channel, Fittings, and Accessories: Galvanized steel.
   4. Channel Width: Selected for applicable load criteria.
   5. Metallic Coatings: Hot-dip galvanized after fabrication and applied according to MFMA-4.
   6. Protect finishes on exposed surfaces from damage by applying a strippable, temporary protective covering before shipping.
B. Conduit and Cable Support Devices: Steel hangers, clamps, and associated fittings, designed for types and sizes of raceway or cable to be supported.
C. Mounting, Anchoring, and Attachment Components: Items for fastening electrical items or their supports to building surfaces include the following:
   1. Powder-Actuated Fasteners: Threaded-steel stud, for use in hardened Portland cement concrete, steel, or wood, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   2. Mechanical-Expansion Anchors: Insert-wedge-type, zinc-coated steel, for use in hardened Portland cement concrete, with tension, shear, and pullout capacities appropriate for supported loads and building materials where used.
   3. Concrete Inserts: Steel or malleable-iron, slotted support system units are similar to MSS Type 18 units and comply with MFMA-4 or MSS SP-58.
   4. Clamps for Attachment to Steel Structural Elements: MSS SP-58 units are suitable for attached structural element.
   5. Through Bolts: Structural type, hex head, and high strength. Comply with ASTM F3125/F3125M, Grade A325.
   6. Toggle Bolts: steel springhead type.
   7. Hanger Rods: Threaded steel.

2.3 FABRICATED METAL EQUIPMENT SUPPORT ASSEMBLIES

A. Description: Welded or bolted structural-steel shapes, shop or field fabricated to fit dimensions of supported equipment.
B. Materials: Comply with requirements in Section 055000 "Metal Fabrications" for steel shapes and plates.

PART 3 - EXECUTION

3.1 APPLICATION

A. Comply with the following standards for application and installation requirements of hangers and supports, except where requirements on Drawings or in this Section are stricter:
   1. NECA 1.
B. Comply with requirements for firestopping materials and installation for penetrations through fire-rated walls, ceilings, and assemblies.
C. Maximum Support Spacing and Minimum Hanger Rod Size for Raceways: Space supports for EMT, IMC, and RMC as required by NFPA 70. Minimum rod size shall be 1/4 inch in diameter.
D. Multiple Raceways or Cables: Install trapeze-type supports fabricated with steel slotted support system, sized so capacity can be increased by at least 25 percent in future without exceeding specified design load limits.
   1. Secure raceways and cables to these supports with conduit clamps
E. Spring-steel clamps designed for supporting single conduits without bolts may be used for 1-1/2-inch and smaller raceways serving branch circuits and communication systems above suspended ceilings, and for fastening raceways to trapeze supports.

3.2 SUPPORT INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except as specified in this article.
B. Raceway Support Methods: In addition to methods described in NECA 1, EMT may be supported by openings through structure members, according to NFPA 70.
C. Strength of Support Assemblies: Where not indicated, select sizes of components so strength will be adequate to carry present and future static loads within specified loading limits. Minimum static design load used for strength determination shall be weight of supported components plus 200 lb.
D. Mounting and Anchorage of Surface-Mounted Equipment and Components: Anchor and fasten electrical items and their supports to building structural elements by the following methods unless otherwise indicated by code:
   1. To Wood: Fasten with lag screws or through bolts.
   2. To New Concrete: Bolt to concrete inserts.
   3. To Masonry: Approved toggle-type bolts on hollow masonry units and expansion anchor fasteners on solid masonry units.
   4. To Existing Concrete: Expansion anchor fasteners.
   5. Instead of expansion anchors, powder-actuated driven threaded studs provided with lock washers and nuts may be used in existing standard-weight concrete 4 inches thick or greater. Do not use for anchorage to lightweight-aggregate concrete or for slabs less than 4 inches thick.
   6. To Steel: Beam clamps (MSS SP-58, Type 19, 21, 23, 25, or 27), complying with MSS SP-69.
   7. To Light Steel: Sheet metal screws.
   8. Items Mounted on Hollow Walls and Nonstructural Building Surfaces: Mount cabinets, panelboards, disconnect switches, control enclosures, pull and junction boxes, transformers, and other devices on slotted-channel racks attached to substrate by means that comply with seismic-restraint strength and anchorage requirements.
E. Drill holes for expansion anchors in concrete at locations and to depths that avoid the need for reinforcing bars.

3.3 INSTALLATION OF FABRICATED METAL SUPPORTS

A. Cut, fit, and place miscellaneous metal supports accurately in location, alignment, and elevation to support and anchor electrical materials and equipment.
B. Field Welding: Comply with AWS D1.1/D1.1M.

END OF SECTION 260529

SECTION 260533 - RACEWAYS AND BOXES FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
   1. Metal conduits and fittings.
   2. Nonmetallic conduits and fittings.
   3. Metal wireways and auxiliary gutters.
   4. Nonmetal wireways and auxiliary gutters.
   5. Surface raceways.
   6. Boxes, enclosures, and cabinets.
   7. Handholes and boxes for exterior underground cabling.
B. Related Requirements:
   1. Section 078413 "Penetration Firestopping" for firestopping at conduit and box entrances.
   2. Section 270528 "Pathways for Communications Systems" for conduits, wireways, surface pathways, innerduct, boxes, faceplate adapters, enclosures, cabinets, and handholes serving communications systems.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.
B. Shop Drawings: For custom enclosures and cabinets. Include plans, elevations, sections, and attachment details.

PART 2 - PRODUCTS

2.1 METAL CONDUITS AND FITTINGS

A. Metal Conduit:
   1. Manufacturers: Subject to compliance with requirements:
   2. Listing and Labeling: Metal conduits, tubing, and fittings shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   3. GRC: Comply with ANSI C80.1 and UL 6.
   4. IMC: Comply with ANSI C80.6 and UL 1242.
   5. PVC-Coated Steel Conduit: PVC-coated rigid steel conduit.
      a. Comply with NEMA RN 1.
      b. Coating Thickness: 0.040 inch minimum.
   6. EMT: Comply with ANSI C80.3 and UL 797.
   7. FMC: Comply with UL 1; zinc-coated steel.
   8. LFMC: Flexible steel conduit with PVC jacket and complying with UL 360.
B. Metal Fittings: Comply with NEMA FB 1 and UL 514B.
   1. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   2. Fittings, General: Listed and labeled for type of conduit, location, and use.
   3. Conduit Fittings for Hazardous (Classified) Locations: Comply with UL 1203 and NFPA 70.
   4. Fittings for EMT:
      a. Material: Steel.
      b. Type: Setscrew or compression as required for installation environment.
   5. Expansion Fittings: PVC or steel to match conduit type, complying with UL 651, rated for environmental conditions where installed, and including flexible external bonding jumper.
   6. Coating for Fittings for PVC-Coated Conduit: Minimum thickness of 0.040 inch (1 mm), with overlapping sleeves protecting threaded joints.
C. Joint Compound for IMC, GRC, or ARC: Approved, as defined in NFPA 70, by authorities having jurisdiction for use in conduit assemblies, and compounded for use to lubricate and protect threaded conduit joints from corrosion and to enhance their conductivity.

2.2 NONMETALLIC CONDUITS AND FITTINGS

A. Listing and Labeling: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
   1. ENT: Comply with NEMA TC 13 and UL 1653.
   2. RNC: Type EPC-40-PVC, complying with NEMA TC 2 and UL 651 unless otherwise indicated.
   3. LFNC: Comply with UL 1660.
B. Nonmetallic Fittings:
   1. Fittings, General: Listed and labeled for type of conduit, location, and use.
   2. Fittings for ENT and RNC: Comply with NEMA TC 3; match to conduit or tubing type and material.
   3. Fittings for LFNC: Comply with UL 514B.
   4. Solvents and Adhesives: As recommended by conduit manufacturer.

2.3 METAL WIREWAYS AND AUXILIARY GUTTERS

A. Description: Sheet metal, complying with UL 870 and NEMA 250, Type 1 otherwise indicated, and sized according to NFPA 70.
   1. Metal wireways installed outdoors shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Fittings and Accessories: Include covers, couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings to match and mate with wireways as required for complete system.

2.4 NONMETALLIC WIREWAYS AND AUXILIARY GUTTERS

A. Listing and Labeling: Nonmetallic wireways and auxiliary gutters shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. Description: PVC, extruded and fabricated to required size and shape, and having snap-on cover, mechanically coupled connections, and plastic fasteners.
C. Fittings and Accessories: Couplings, offsets, elbows, expansion joints, adapters, hold-down straps, end caps, and other fittings shall match and mate with wireways as required for complete system.
D. Solvents and Adhesives: As recommended by conduit manufacturer.

2.5 BOXES, ENCLOSURES, AND CABINETS

A. General Requirements for Boxes, Enclosures, and Cabinets: Boxes, enclosures, and cabinets installed in wet locations shall be listed for use in wet locations.
B. Sheet Metal Outlet and Device Boxes: Comply with NEMA OS 1 and UL 514A.
C. Cast-Metal Outlet and Device Boxes: Comply with NEMA FB 1, ferrous alloy, Type FD, with gasketed cover.
D. Paddle Fan Outlet Boxes: Nonadjustable, designed for attachment of paddle fan weighing 70 lb.
   1. Listing and labeling: Paddle fan outlet boxes shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
E. Small Sheet Metal Pull and Junction Boxes: NEMA OS 1.
F. Hinged-Cover Enclosures: Comply with UL 50 and NEMA 250, type 1 with continuous-hinge cover with flush latch unless otherwise indicated.
   1. Metal Enclosures: Steel, finished inside and out with manufacturer's standard enamel.
   2. Nonmetallic Enclosures: Plastic.
   3. Interior Panels: Steel; all sides finished with manufacturer's standard enamel.
G. Cabinets:
   1. NEMA 250, galvanized-steel box with removable interior panel and removable front, finished inside and out with manufacturer's standard enamel.

FOR REFERENCE ONLY - ELECTRICAL BY OTHERS - TRENCHING BY CONTRACTOR

AMP ENGINEERING
Project #: 22-031
PO Box 226, | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

ELECTRICAL SPECIFICATIONS

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E400

2. Hinged door in front cover with flush latch and concealed hinge.
3. Nonmetallic cabinets shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

2.6 HANDHOLES AND BOXES FOR EXTERIOR UNDERGROUND WIRING

A. General Requirements for Handholes and Boxes:
1. Boxes and handholes for use in underground systems shall be designed and identified as defined in NFPA 70, for intended location and application.
2. Boxes installed in wet areas shall be listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.

B. Fiberglass Handholes and Boxes: Molded of fiberglass-reinforced polyester resin, with frame and covers of fiberglass.
1. Standard: Comply with SCTE 77.
2. Configuration: Designed for flush burial with open bottom unless otherwise indicated.
3. Cover: Weatherproof, secured by tamper-resistant locking devices and having structural load rating consistent with enclosure and handhole location.

PART 3 - EXECUTION

3.1 RACEWAY APPLICATION

A. Outdoors: Apply raceway products as specified below unless otherwise indicated:
1. Exposed Conduit: GRC.
2. Concealed Conduit, Aboveground: EMT (with appropriate fittings), GRC or IMC.
3. Underground Conduit: RNC, Type EPC-40-PVC. Transmission to Schedule 80 Above ground.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): LFMC.
5. Boxes and Enclosures, Aboveground: NEMA 250, Type 3R.

B. Indoors: Apply raceway products as specified below unless otherwise indicated.
1. Exposed, Not Subject to Physical Damage: EMT.
2. Exposed and Subject to Severe Physical Damage: GRC. Raceway locations include the following:
a. Loading dock.
b. Corridors used for traffic of mechanized carts, forklifts, and pallet-handling units.
c. Mechanical rooms.
3. Concealed in Ceilings and Interior Walls and Partitions: EMT.
4. Connection to Vibrating Equipment (Including Transformers and Hydraulic, Pneumatic, Electric Solenoid, or Motor-Driven Equipment): FMC, except use LFMC in damp or wet locations.
5. Damp or Wet Locations: GRC or PVC.
6. Boxes and Enclosures: NEMA 250, Type 1, unless noted otherwise.

C. Minimum Raceway Size: 1/2-inch trade size.

D. Raceway Fittings: Compatible with raceways and suitable for use and location.
1. Rigid and Intermediate Steel Conduit: Use threaded rigid steel conduit fittings unless otherwise indicated. Comply with NEMA FB 2.10.
2. PVC Externally Coated, Rigid Steel Conduits: Use only fittings listed for use with this type of conduit. Patch and seal all joints, nicks, and scrapes in PVC coating after installing conduits and fittings. Use sealant recommended by fitting manufacturer and apply in thickness and number of coats recommended by manufacturer.
3. EMT: Use setscrew or compression fittings as required for locaiton. Comply with NEMA FB 2.10.
4. Flexible Conduit: Use only fittings listed for use with flexible conduit. Comply with NEMA FB 2.20.

E. Install surface raceways only where indicated on Drawings.

3.2 INSTALLATION

A. Comply with NECA 1 and NECA 101 for installation requirements except where requirements on Drawings or in this article are stricter. Comply with NECA 102 for aluminum conduits. Comply with NFPA 70 limitations for types of raceways allowed in specific occupancies and number of floors.

B. Do not install raceways or electrical items on any "explosion-relief" walls or rotating equipment.

C. Do not fasten conduits onto the bottom side of a metal deck roof.

D. Keep raceways at least 6 inches away from parallel runs of flues and steam or hot-water pipes. Install horizontal raceway runs above water and steam piping.

E. Arrange stub-ups so curved portions of bends are not visible above finished slab.

F. Install no more than the equivalent of three 90-degree bends in any conduit run except for control wiring conduits, for which fewer bends are allowed. Support within 12 inches of changes in direction.

G. Make bends in raceway using large-radius preformed ells. Field bending shall be according to NFPA 70 minimum radii requirements. Use only equipment specifically designed for material and size involved.

H. Conceal conduit and EMT within finished walls, ceilings, and floors unless otherwise indicated. Install conduits parallel or perpendicular to building lines.

I. Support conduit within 12 inches of enclosures to which attached.

J. Raceways Embedded in Slabs:
1. Run conduit larger than 1-inch trade size, parallel or at right angles to main reinforcement. Where at right angles to reinforcement, place conduit close to slab support. Secure raceways to reinforcement at maximum 10-foot intervals.
2. Arrange raceways to cross building expansion joints at right angles with expansion fittings.
3. Arrange raceways to keep a minimum of 2 inches of concrete cover in all directions.
4. Do not embed threadless fittings in concrete unless specifically approved by Architect for each specific location.
5. Change from ENT to GRC before rising above floor.

K. Install pull wires in empty raceways. Use polypropylene or monofilament plastic line with not less than 200-lb tensile strength. Leave at least 12 inches of slack at each end of pull wire. Cap underground raceways designated as spare above grade alongside raceways in use.

L. Surface Raceways:
1. Install surface raceway with a minimum 2-inch radius control at bend points.
2. Secure surface raceway with screws or other anchor-type devices at intervals not exceeding 48 inches and with no less than two supports per straight raceway section. Support surface raceway according to manufacturer's written instructions. Tape and glue are not acceptable support methods.

M. Install raceway sealing fittings at accessible locations according to NFPA 70 and fill them with listed sealing compound. For concealed raceways, install each fitting in a flush steel box with a blank cover plate having a finish similar to that of adjacent plates or surfaces.

N. Install devices to seal raceway interiors at accessible locations. Locate seals so no fittings or boxes are between the seal and the following changes of environments. Seal the interior of all raceways at the following points:
1. Where conduits pass from warm to cold locations, such as boundaries of refrigerated spaces.
2. Where an underground service raceway enters a building or structure.
3. Conduit extending from interior to exterior of building.
4. Conduit extending into pressurized duct and equipment.
5. Conduit extending into pressurized zones that are automatically controlled to maintain different pressure set points.
6. Where otherwise required by NFPA 70.

O. Flexible Conduit Connections: Comply with NEMA RV 3. Use a maximum of 72 inches of flexible conduit for recessed and semirecessed luminaires, equipment subject to vibration, noise transmission, or movement; and for transformers and motors.
1. Use LFMC in damp or wet locations subject to severe physical damage.
2. Use LFMC or LFNC in damp or wet locations not subject to severe physical damage.

P. Mount boxes at heights indicated on Drawings. If mounting heights of boxes are not individually indicated, give priority to ADA requirements. Install boxes with height measured to center of box unless otherwise indicated.

Q. Recessed Boxes in Masonry Walls: Saw-cut opening for box in center of cell of masonry block, and install box flush with surface of wall. Prepare block surfaces to provide a flat surface for a raintight connection between the box and cover plate or the supported equipment and box.

R. Horizontally separate boxes mounted on opposite sides of walls so they are not in the same vertical channel.

S. Locate boxes so that cover or plate will not span different building finishes.

T. Support boxes of three gangs or more from more than one side by spanning two framing members or mounting on brackets specifically designed for the purpose.

U. Fasten junction and pull boxes to or support from building structure. Do not support boxes by conduits.

V. Set metal floor boxes level and flush with finished floor surface.

W. Set nonmetallic floor boxes level. Trim after installation to fit flush with finished floor surface.

3.3 INSTALLATION OF UNDERGROUND CONDUIT

A. Direct-Buried Conduit:
1. Excavate trench bottom to provide firm and uniform support for conduit. Prepare trench bottom for pipe less than 6 inches in nominal diameter.
2. Install backfill as specified.
3. After installing conduit, backfill and compact. Start at tie-in point, and work toward end of conduit run, leaving conduit at end of run free to move with expansion and contraction as temperature changes during this process. Firmly hand tamp backfill around conduit to provide maximum supporting strength. After placing controlled backfill to within 12 inches of finished grade, make final conduit connection at end of run and complete backfilling with normal compaction as specified in Section 312000 "Earth Moving."
4. Install manufactured duct elbows for stub-up at poles and equipment and at building entrances through floor unless otherwise indicated. Encase elbows for stub-up ducts throughout length of elbow.
5. Install manufactured rigid steel conduit elbows for stub-ups at poles and equipment and at building entrances through floor.
a. Couple steel conduits to ducts with adapters designed for this purpose, and encase coupling with 3 inches of concrete for a minimum of 12 inches on each side of the coupling.
b. For stub-ups at equipment mounted on outdoor concrete bases and where conduits penetrate building foundations, extend steel conduit horizontally a minimum of 60 inches from edge of foundation or equipment base. Install insulated grounding bushings on terminations at equipment.

3.4 FIRESTOPPING

A. Install firestopping at penetrations of fire-rated floor and wall assemblies. Comply with requirements in Section 078413 "Penetration Firestopping."

3.5 PROTECTION

A. Protect coatings, finishes, and cabinets from damage and deterioration.
1. Repair damage to galvanized finishes with zinc-rich paint recommended by manufacturer.
2. Repair damage to PVC coatings or paint finishes with matching touchup coating recommended by manufacturer.

END OF SECTION 260533

SECTION 260553 - IDENTIFICATION FOR ELECTRICAL SYSTEMS

PART 1 - GENERAL

1.1 RELATED DOCUMENTS

A. Drawings and general provisions of the Contract, including General and Supplementary Conditions and Division 01 Specification Sections, apply to this Section.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Comply with NFPA 70.
B. Comply with NFPA 70E requirements for arc-flash warning labels.
C. Adhesive-attached labeling materials, including label stocks, laminating adhesives, and inks

2.2 COLOR AND LEGEND REQUIREMENTS

A. Color-Coding for Phase and Voltage-Level Identification, 600 V or Less: Use colors listed below for service, feeder and branch-circuit conductors.
1. Color shall be factory applied or field applied for sizes larger than No. 1 AWG if authorities having jurisdiction permit.
2. Colors for 208/120-V Circuits:
a. Phase A: Black.
b. Phase B: Red.
c. Phase C: Blue.
d. Neutral: White
3. Colors for 240-V Circuits:
a. Phase A: Black.
b. Phase B: Red.
c. Neutral: White
4. Colors for 480/277-V Circuits:
a. Phase A: Brown.
b. Phase B: Orange.
c. Phase C: Yellow.
d. Neutral: Gray
5. Color for Equipment Grounds: Green.
6. Colors for Isolated Grounds: Green two or more yellow stripes.

B. Warning Label Colors:
1. Identify system voltage with black letters on an orange background.

C. Warning labels and signs shall include, but are not limited to, the following legends:
1. Multiple Power Source Warning: "DANGER - ELECTRICAL SHOCK HAZARD - EQUIPMENT HAS MULTIPLE POWER SOURCES."
2. Workspace Clearance Warning: "WARNING - OSHA REGULATION - AREA IN FRONT OF ELECTRICAL EQUIPMENT MUST BE KEPT CLEAR FOR 36 INCHES."
3. Electrical Arc Flash Hazard Per NEC 110.16(A).

D. Equipment Identification Labels:
1. Black letters on a white field.

2.3 LABELS

A. Vinyl Wraparound Labels: Preprinted, flexible labels laminated with a clear, weather- and chemical-resistant coating and matching wraparound clear adhesive tape for securing label ends.

B. Snap-around Labels: Slit, pretensioned, flexible, preprinted, color-coded acrylic sleeves, with diameters sized to suit diameter and that stay in place by gripping action.

C. Self-Adhesive Wraparound Labels: Preprinted, 3-mil thick, vinyl flexible label with acrylic pressure-sensitive adhesive.
1. Self-Lamination: Clear; UV-, weather- and chemical-resistant: self-laminating, protective shield over the legend. Labels sized such that the clear shield overlaps the entire printed legend.
2. Marker for Labels: Machine-printed, permanent, waterproof, black ink recommended by printer manufacturer.

D. Self-Adhesive Labels: Vinyl, thermal, transfer-printed, 3-mil thick, multicolor, weather- and UV-resistant, pressure-sensitive adhesive labels, configured for intended use and location.
1. Minimum Nominal Size:
a. 1-1/2 by 6 inches (37 by 150 mm) for raceway and conductors.
b. 3-1/2 by 5 inches (76 by 127 mm) for equipment.
c. As required by authorities having jurisdiction.

2.4 TAPES AND STENCILS

A. Underground-Line Warning Tape:
1. Tape:
a. Recommended by manufacturer for the method of installation and suitable to identify and locate underground electrical and communications utility lines.
b. Printing on tape shall be permanent and shall not be damaged by burial operations.
c. Tape material and ink shall be chemically inert and not subject to degradation when exposed to acids, alkalis, and other destructive substances commonly found in soils.
2. Color and Printing:
a. Inscriptions for Red-Colored Tapes: "ELECTRIC LINE, HIGH VOLTAGE".
b. Inscriptions for Orange-Colored Tapes: "TELEPHONE CABLE, CATV CABLE, COMMUNICATIONS CABLE, OPTICAL FIBER CABLE".

B. Laminated Acrylic or Melamine Plastic Signs:
1. Engraved legend.
2. Thickness:
a. For signs up to 20 sq. in. minimum 1/16 inch thick.
b. For signs larger than 20 sq. in., 1/8 inch thick.
c. Engraved legend with white letters on a black background.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Verify and coordinate identification names, abbreviations, colors, and other features with requirements in other Sections requiring identification applications, Drawings, Shop Drawings, manufacturer's wiring diagrams, and operation and maintenance manual. Use consistent designations throughout Project.
B. Install identifying devices before installing acoustical ceilings and similar concealment.
C. Verify identity of each item before installing identification products.
D. Apply identification devices to surfaces that require finish after completing finish work.
E. Install signs with approved legend to facilitate proper identification, operation, and maintenance of electrical systems and connected items.
F. Self-Adhesive Identification Products: Before applying electrical identification products, clean substrates of substances that could impair bond, using materials and methods recommended by manufacturer of identification product.
G. System Identification for Raceways and Cables under 600 V: Identification shall completely encircle cable or conduit. Place identification of two-color markings in contact, side by side.
1. Secure tight to surface of conductor, cable, or raceway.
H. System Identification for Raceways and Cables over 600 V: Identification shall completely encircle cable or conduit. Place adjacent identification of two-color markings in contact, side by side.
1. Secure tight to surface of conductor, cable, or raceway.
I. Auxiliary Electrical Systems Conductor Identification: Identify field-installed alarm, control, and signal connections.
J. Self-Adhesive Vinyl Tape: Secure tight to surface at a location with high visibility and accessibility.
K. Floor Marking Tape: Apply stripes to finished surfaces following manufacturer's written instructions.
L. Underground Line Warning Tape:
1. During backfilling of trenches, install continuous underground-line warning tape directly above cable or raceway at 6 to 8 inches below finished grade. Use multiple tapes where width of multiple lines installed in a common trench [or concrete envelope exceeds 16 inches overall.
2. Install underground-line warning tape for direct-buried cables and cables in raceways.
M. Laminated Acrylic or Melamine Plastic Signs:
1. Attach signs and plastic labels that are not self-adhesive type with mechanical fasteners appropriate to the location and substrate.
2. Unless otherwise indicated, provide a single line of text with 1/2-inch- high letters on minimum 1-1/2-inch- high sign; where two lines of text are required, use signs minimum 2 inches high.

3.2 IDENTIFICATION SCHEDULE

A. Identify conductors, cables, and terminals in enclosures and at junctions, terminals, pull points, and locations of high visibility. Identify by system and circuit designation.
B. Arc Flash Warning Labeling: Self-adhesive labels.
C. Equipment Identification Labels:
1. Indoor Equipment: Laminated acrylic or melamine sign
2. Outdoor Equipment: Laminated acrylic or melamine sign
3. Equipment to Be Labeled:
a. Panelboards: Typewritten directory of circuits in the location provided by panelboard manufacturer. Panelboard identification shall be in the form of engraved, laminated acrylic or melamine label.
b. Enclosures and electrical cabinets.
c. Access doors and panels for concealed electrical items.
d. Switchgear.
e. Switchboards.
f. Transformers: Label that includes tag designation indicated on Drawings for the transformer, feeder, and panelboards or equipment supplied by the secondary.
g. Emergency system boxes and enclosures.
h. Motor-control centers.
i. Enclosed switches.
j. Enclosed circuit breakers.
k. Enclosed controllers.
l. Push-button stations.
m. Contactors.
n. Remote-controlled switches, dimmer modules, and control devices.
o. Receptacles are to be labeled with panel and circuit designation.

END OF SECTION 260553

SECTION 262726 - WIRING DEVICES

PART 1 - GENERAL

1.1 ACTION SUBMITTALS

C. Product Data: For each type of product.
D. Shop Drawings: List of legends and description of materials and process used for premarking wall plates.

PART 2 - PRODUCTS

2.1 GENERAL WIRING-DEVICE REQUIREMENTS

A. Wiring Devices, Components, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and use.
B. Comply with NFPA 70.
C. RoHS compliant.
D. Comply with NEMA WD 1.
E. Device Color:
1. Wiring Devices Connected to Normal Power System: White unless otherwise indicated or required by NFPA 70 or device listing.
2. Wiring Devices Connected to Essential Electrical System: Red.
3. SPD Devices: Blue.
4. Isolated-Ground Receptacles: Orange with triangle on face.
F. Wall Plate Color: For plastic covers, match device color.
G. Source Limitations: Obtain each type of wiring device and associated wall plate from single source from single manufacturer.

2.2 COMMERCIAL-GRADE RECEPTACLES, 125 V, 20 A

A. Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498 and FS W-C-596.

B. Tamper-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498 and FS W-C-596.
4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

C. Weather-Resistant Duplex Receptacle, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498.
4. Marking: Listed and labeled as complying with NFPA 70, "Receptacles in Damp or Wet Locations" Article.

D. Tamper- and Weather-Resistant Duplex Receptacles, 125 V, 20 A:
1. Description: Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Standards: Comply with UL 498.
4. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.3 GFCI RECEPTACLES, 125 V, 20 A

A. Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Type: Non-feed through.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.

B. Tamper-Resistant Duplex GFCI Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle.
2. Configuration: NEMA WD 6, Configuration 5-20R.
3. Type: Non-feed through.
4. Standards: Comply with UL 498, UL 943 Class A, and FS W-C-596.
5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" Article.

C. Tamper- and Weather-Resistant, GFCI Duplex Receptacles, 125 V, 20 A:
1. Description: Integral GFCI with "Test" and "Reset" buttons and LED indicator light. Two pole, three wire, and self-grounding. Integral shutters that operate only when a plug is inserted in the receptacle. Square face.
2. Configuration: NEMA WD 6, Configuration 5-15R.
3. Type: Non-feed through.
4. Standards: Comply with UL 498 and UL 943 Class A.
5. Marking: Listed and labeled as complying with NFPA 70, "Tamper-Resistant Receptacles" and "Receptacles in Damp or Wet Locations" articles.

2.6 WALL PLATES

A. Single Source: Obtain wall plates from same manufacturer of wiring devices.
B. Single and combination types shall match corresponding wiring devices.
1. Plate-Securing Screws: Metal with head color to match plate finish.
2. Material for Finished Spaces: 0.035-inch- thick, satin-finished, stainless steel.
3. Material for Unfinished Spaces: Smooth, high-impact thermoplastic.
4. Material for Damp Locations: Cast aluminum with spring-loaded lift cover and listed and labeled for use in wet and damp locations.
C. Wet-Location, Weatherproof Cover Plates: NEMA 250, complying with Type 3R, weather-resistant die-cast aluminum with lockable cover.

PART 3 - EXECUTION

3.1 INSTALLATION

A. Comply with NECA 1, including mounting heights listed in that standard, unless otherwise indicated.
B. Coordination with Other Trades:
1. Keep outlet boxes free of plaster, drywall joint compound, mortar, cement, concrete, dust, paint, and other material that may contaminate the raceway system, conductors, and cables.
2. Install device boxes in brick or block walls so that the cover plate does not cross a joint unless the joint is troweled flush with the face of the wall.
3. Install wiring devices after all wall preparation, including painting, is complete.
C. Device Installation:
1. Connect devices to branch circuits using pigtails that are not less than 6 inches in length.
2. When mounting into metal boxes, remove the fiber or plastic washers used to hold device-mounting screws in yokes, allowing metal-to-metal contact.
D. Receptacle Orientation:
1. Install ground pin of vertically mounted receptacles down, and on horizontally mounted receptacles to the right.
2. Install hospital-grade receptacles in patient-care areas with the ground pin or neutral blade at the top.
E. Device Plates: Do not use oversized or extra-deep plates. Repair wall finishes and remount outlet boxes when standard device plates do not fit flush or do not cover rough wall opening.
F. Dimmers:
1. Install dimmers within terms of their listing.
2. Verify that dimmers used for fan-speed control are listed for that application.
3. Install unshared neutral conductors on line and load side of dimmers according to manufacturers' device, listing conditions in the written instructions.
G. Arrangement of Devices: Unless otherwise indicated, mount flush, with long dimension vertical and with grounding terminal of receptacles on top. Group adjacent switches under single, multigang wall plates.
H. Adjust locations of floor service outlets and service poles to suit arrangement of partitions and furnishings.

3.2 FIELD QUALITY CONTROL

A. Tests for Receptacles:
1. Line Voltage: Acceptable range is 105 to 132 V.
2. Percent Voltage Drop under 15-A Load: A value of 6 percent or higher is unacceptable.
3. Ground Impedance: Values of up to 2 ohms are acceptable.
4. GFCI Trip: Test for tripping values specified in UL 1436 and UL 943.
5. Using the test plug, verify that the device and its outlet box are securely mounted.
B. Wiring device will be considered defective if it does not pass tests and inspections.
C. Prepare test and inspection reports.

6. END OF SECTION 262726

FOR REFERENCE ONLY - ELECTRICAL WORK BY OTHERS - TRENCHING BY CONTRACTOR

AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID
GAS COLLECTION SYSTEM IMPROVEMENTS AND FLARE STATION

ELECTRICAL SPECIFICATIONS

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E401

SECTION 265619 - LED EXTERIOR LIGHTING

PART 1 - GENERAL

1.1 SUMMARY

A. Section Includes:
1. Exterior solid-state luminaires that are designed for and exclusively use LED lamp technology.
2. Luminaire supports.
3. Luminaire-mounted photoelectric relays.

1.2 DEFINITIONS

A. CCT: Correlated color temperature.
B. CRI: Color rendering index.
C. Lumen: Measured output of lamp and luminaire, or both.
D. Luminaire: Complete lighting unit, including lamp, reflector, and housing.

1.3 ACTION SUBMITTALS

A. Product Data: For each type of luminaire.
B. Shop Drawings: For nonstandard or custom luminaires.
1. Include plans, elevations, sections, and mounting and attachment details.
2. Include details of luminaire assemblies. Indicate dimensions, weights, loads, required clearances, method of field assembly, components, and location and size of each field connection.
3. Include diagrams for power, signal, and control wiring.
C. Delegated-Design Submittal: For luminaire supports.
1. Include design calculations for luminaire supports and seismic restraints.

1.4 INFORMATIONAL SUBMITTALS

A. Coordination Drawings: Plans, drawn to scale and coordinated.
B. Seismic Qualification Data: For luminaires, accessories, and components, from manufacturer.
C. Product Certificates: For each type of the following:
1. Luminaire.
2. Photoelectric relay.
D. Sample warranty.

1.5 CLOSEOUT SUBMITTALS

A. Operation and maintenance data.
1. Provide a list of all lamp types used on Project. Use ANSI and manufacturers' codes.
2. Provide a list of all photoelectric relay types used on Project; use manufacturers' codes.

1.6 FIELD CONDITIONS

A. Mark locations of exterior luminaires for approval by Architect prior to the start of luminaire installation.

1.7 WARRANTY

A. Warranty: Manufacturer and Installer agree to repair or replace components of luminaires that fail in materials or workmanship within specified warranty period.
1. Warranty Period: 2 year(s) from date of Substantial Completion.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. Seismic Performance: Luminaires shall withstand the effects of earthquake motions determined according to ASCE/SEI 7.

2.2 LUMINAIRE REQUIREMENTS

A. Electrical Components, Devices, and Accessories: Listed and labeled as defined in NFPA 70, by a qualified testing agency, and marked for intended location and application.
B. NRTL Compliance: Luminaires shall be listed and labeled for indicated class and division of hazard by an NRTL.
C. FM Global Compliance: Luminaires for hazardous locations shall be listed and labeled for indicated class and division of hazard by FM Global.
D. UL Compliance: Comply with UL 1598 and listed for wet location.
E. Lamp base complying with ANSI C81.61 or IEC 60061-1.
F. CRI of minimum 70. CCT as listed on the fixture schedule.
G. L70 lamp life minimum of 50,000 hours.
H. Lamps dimmable from 100 percent to 10 percent of maximum light output.

2.3 LUMINAIRE TYPES

A. As noted on the fixture schedule.

2.4 MATERIALS

A. Metal Parts: Free of burrs and sharp corners and edges.
B. Sheet Metal Components: Stainless steel. Form and support to prevent warping and sagging.
C. Doors, Frames, and Other Internal Access: Smooth operating, free of light leakage under operating conditions, and designed to permit relamping without use of tools. Designed to prevent doors, frames, lenses, diffusers, and other components from falling accidentally during relamping and when secured in operating position. Doors shall be removable for cleaning or replacing lenses.
D. Housings:
1. Rigidly formed, weather- and light-tight enclosure that will not warp, sag, or deform in use.
2. Provide filter/breather for enclosed luminaires.

2.5 FINISHES

A. Variations in Finishes: Noticeable variations in same piece are unacceptable. Variations in appearance of adjoining components are acceptable if they are within the range of approved Samples and are assembled or installed to minimize contrast.
B. Luminaire Finish: Manufacturer's standard paint applied to factory-assembled and -tested luminaire before shipping. Where indicated, match finish process and color of pole or support materials.

PART 3 - EXECUTION

3.1 GENERAL INSTALLATION REQUIREMENTS

A. Comply with NECA 1.
B. Use fastening methods and materials selected to resist seismic forces defined for the application and approved by manufacturer.
C. Install lamps in each luminaire if not provided with the luminaire.
D. Fasten luminaire to structural support.
E. Supports:
1. Sized and rated for luminaire weight.
2. Able to maintain luminaire position after cleaning and relamping.
3. Support luminaires without causing deflection of finished surface.
4. Luminaire-mounting devices shall be capable of supporting a horizontal force of 100 percent of luminaire weight and a vertical force of 400 percent of luminaire weight.
F. Wall-Mounted Luminaire Support:
1. Attached per manufactures recommendations.
G. Wiring Method: Install cables in raceways. Conceal raceways and cables.
H. Install luminaires level, plumb, and square with finished grade unless otherwise indicated.
I. Coordinate layout and installation of luminaires with other construction.
J. Adjust luminaires that require field adjustment or aiming. Include adjustment of photoelectric device to prevent false operation of relay by artificial light sources, favoring a north orientation.

3.2 INSTALLATION OF INDIVIDUAL GROUND-MOUNTED LUMINAIRES

A. Aim as indicated on Drawings.
B. Install on concrete base with top 30 inches above finished grade or surface at luminaire location. Cast conduit into base, and finish by troweling and rubbing smooth.

3.3 CORROSION PREVENTION

A. Aluminum: Do not use in contact with earth or concrete. When in direct contact with a dissimilar metal, protect aluminum by insulating fittings or treatment.
B. Steel Conduits: Comply with Section 260533 "Raceways and Boxes for Electrical Systems." In concrete foundations, wrap conduit with 0.010-inch- (0.254-mm-) thick, pipe-wrapping plastic tape applied with a 50 percent overlap.

3.4 IDENTIFICATION

A. Identify system components, wiring, cabling, and terminals. Comply with requirements for identification specified in Section 260553 "Identification for Electrical Systems."

3.5 FIELD QUALITY CONTROL

A. Inspect each installed luminaire for damage. Replace damaged luminaires and components.
B. Perform the following tests and inspections.
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
2. Verify operation of photoelectric controls.
C. Illumination Tests:
1. Operational Test: After installing luminaires, switches, and accessories, and after electrical circuitry has been energized, test units to confirm proper operation.
D. Luminaire will be considered defective if it does not pass tests and inspections.

3.6 DEMONSTRATION

A. Train Owner's maintenance personnel to adjust, operate, and maintain luminaires and photocell relays.

END OF SECTION 265619

SECTION 271513 - COMMUNICATIONS COPPER HORIZONTAL CABLING

PART 1 - GENERAL

1.1 COPPER HORIZONTAL CABLING DESCRIPTION

A. Horizontal cabling system shall provide interconnections between Distributor A, Distributor B, or Distributor C, and the equipment outlet, otherwise known as "Cabling Subsystem 1," in the telecommunications cabling system structure. Cabling system consists of horizontal cables, intermediate and main cross-connects, mechanical terminations, and patch cords or jumpers used for horizontal-to-horizontal cross-connection.
1. TIA-568-C.1 requires that a minimum of two equipment outlets be installed for each work area.
2. Horizontal cabling shall contain no more than one transition point or consolidation point between the horizontal cross-connect and the telecommunications equipment outlet.
3. Bridged taps and splices shall not be installed in the horizontal cabling.
B. A work area is approximately 100 sq. ft. (9.3 sq. m), and includes the components that extend from the equipment outlets to the station equipment.
C. The maximum allowable horizontal cable length is 295 feet. This maximum allowable length does not include an allowance for the length of 16 feet to the workstation equipment or in the horizontal cross-connect.

1.2 ACTION SUBMITTALS

A. Product Data: For each type of product.

1.3 CLOSEOUT SUBMITTALS

A. Maintenance data.
B. Software and Firmware Operational Documentation:
1. Software operating and upgrade manuals.
2. Program Software Backup: On USB media.
3. Device address list.
4. Printout of software application and graphic screens.

1.5 QUALITY ASSURANCE

A. Installer Qualifications: Cabling Installer must have personnel certified by BICSI on staff.

1.6 COORDINATION

A. Coordinate layout and installation of telecommunications pathways and cabling with Owner's telecommunications and LAN equipment and service suppliers.

PART 2 - PRODUCTS

2.1 PERFORMANCE REQUIREMENTS

A. General Performance: Horizontal cabling system shall comply with transmission standards in TIA-568-C.1, when tested according to test procedures of this standard.
B. Telecommunications Pathways and Spaces: Comply with TIA-569-D.
C. Grounding: Comply with TIA-607-B.

2.2 GENERAL CABLE CHARACTERISTICS

A. Listed and labeled by an NRTL acceptable to authorities having jurisdiction as complying with the applicable standard and NFPA 70 for the following types:
1. Communications, Plenum Rated: Type CMP complying with UL 1685.
2. Communications, Non-plenum: Type CMR complying with UL 1666.
B. Surface-Burning Characteristics: Comply with ASTM E84; testing by a qualified testing agency. Identify products with appropriate markings of applicable testing agency.
1. Flame-Spread Index: 25 or less.
2. Smoke-Developed Index: 50 or less.
C. RoHS compliant.

2.3 CATEGORY 6 TWISTED PAIR CABLE

A. Description: Four-pair, balanced-twisted pair cable,[with internal spline,] certified to meet transmission characteristics of Category 6 cable at frequencies up to 250MHz.
B. Manufacturers: Subject to compliance with requirements, provide products by one of the following:
1. 3M.
2. AMP NETCONNECT; a TE Connectivity Ltd. company.
3. Belden CDT Networking Division/NORDX.
4. Berk-Tek Leviton; a Nexans/Leviton alliance.
5. CommScope, Inc.
6. Superior Essex Inc.
7. SYSTIMAX Solutions; a CommScope Inc. brand.
C. Standard: Comply with NEMA WC 66/ICEA S-116-732 and TIA-568-C.2 for Category 6 cables.
D. Conductors: 100-ohm, 23 AWG solid copper.
E. Shielding/Screening: Unshielded twisted pairs (UTP).
F. Jacket: Blue thermoplastic.

2.4 TWISTED PAIR CABLE HARDWARE

A. Description: Hardware designed to connect, splice, and terminate twisted pair copper communications cable.
B. General Requirements for Twisted Pair Cable Hardware:
1. Comply with the performance requirements of Category 6.
2. Comply with TIA-568-C.2, IDC type, with modules designed for punch-down caps or tools.
3. Cables shall be terminated with connecting hardware of same category or higher.
C. Source Limitations: Obtain twisted pair cable hardware from single source from single manufacturer.
D. Connecting Blocks:
1. 110-style IDC for Category 6.
2. Provide blocks for the number of cables terminated on the block, including plugs and jacks where indicated.
E. Cross-Connect: Modular array of connecting blocks arranged to terminate building cables and permit interconnection between cables.
1. Number of Terminals per Field: One for each conductor in assigned cables.
F. Patch Panel: Modular panels housing numbered jack units with IDC-type connectors at each jack location for permanent termination of pair groups of installed cables.
1. Features:
a. Universal T568A and T568B wiring labels.
b. Labeling areas adjacent to conductors.
c. Replaceable connectors.
d. 24 or 48 ports.
2. Construction: 16-gauge steel and mountable on 19-inch (483 mm) equipment racks.
3. Number of Jacks per Field: One for each four-pair cable indicated.
G. Plugs and Plug Assemblies:
1. Male; eight position; color-coded modular telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Standard: Comply with TIA-568-C.2.
H. Jacks and Jack Assemblies:
1. Female; eight position; modular; fixed telecommunications connector designed for termination of a single four-pair, 100-ohm, unshielded or shielded twisted pair cable.
2. Designed to snap-in to a patch panel or faceplate.
3. Standard: Comply with TIA-568-C.2.
I. Faceplate:
1. Six port, vertical single gang faceplates designed to mount to single gang wall boxes.
2. Plastic Faceplate: High-impact plastic. Coordinate color with Section 262726 "Wiring Devices."
3. Metal Faceplate: Stainless steel, complying with requirements in Section 262726 "Wiring Devices."
4. For use with snap-in jacks accommodating any combination of twisted pair, optical fiber, and coaxial work area cords.
a. Flush mounting jacks, positioning the cord at a 45-degree angle.
J. Legend:
1. Machine printed, in the field, using adhesive-tape label.
2. Snap-in, clear-label covers and machine-printed paper inserts.

2.5 GROUNDING

A. Comply with requirements in Section 270526 "Grounding and Bonding for Communications Systems" for grounding conductors and connectors.
B. Comply with TIA-607-B.

PART 3 - EXECUTION

3.1 INSTALLATION OF TWISTED-PAIR HORIZONTAL CABLES

A. Comply with NECA 1 and NECA/BICSI 568.
B. Wiring Method: Install cables in raceways and cable trays, except within consoles, cabinets, desks, and counters. Conceal raceway and cables, except in unfinished spaces.
1. Install plenum cable in environmental air spaces, including plenum ceilings.
C. Wiring within Enclosures: Bundle, lace, and train cables within enclosures. Connect to terminal points with no excess and without exceeding manufacturer's limitations on bending radii. Provide and use lacing bars and distribution spools. Install conductors parallel with or at right angles to sides and back of enclosure.
D. General Requirements for Cabling:
1. Comply with TIA-568-C.1.
2. Comply with BICSI's Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section.
3. Install 110-style IDC termination hardware unless otherwise indicated.
4. Do not untwist twisted pair cables more than 1/2 inch from the point of termination to maintain cable geometry.
5. Terminate all conductors; no cable shall contain unterminated elements. Make terminations only at indicated outlets, terminals, cross-connects, and patch panels.
6. Cables may not be spliced. Secure and support cables at intervals not exceeding 30 inches and not more than 6 inches from cabinets, boxes, fittings, outlets, racks, frames, and terminals.
7. Install lacing bars to restrain cables, prevent straining connections, and prevent bending cables to smaller radii than minimums recommended by manufacturer.
8. Bundle, lace, and train conductors to terminal points without exceeding manufacturer's limitations on bending radii, but not less than radii specified in BICSI information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Cable Termination Practices" Section. Use lacing bars and distribution spools.
9. Do not install bruised, kinked, scored, deformed, or abraded cable. Do not splice cable between termination, tap, or junction points. Remove and discard cable if damaged during installation, and replace it with new cable.
10. Pulling Cable: Comply with BICSI Information Transport Systems Installation Methods Manual, Ch. 5, "Copper Structured Cabling Systems," "Pulling and Installing Cable" Section. Monitor cable pull tensions.
E. Group connecting hardware for cables into separate logical fields.
F. Separation from EMI Sources:
1. Comply with recommendations from BICSI's "Telecommunications Distribution Methods Manual" and TIA-569-D for separating unshielded copper communication cable from potential EMI sources, including electrical power lines and equipment.

3.2 FIRESTOPPING

A. Comply with requirements in Section 078413 "Penetration Firestopping."
B. Comply with TIA-569-D, Annex A, "Firestopping."
C. Comply with "Firestopping Systems" Article in BICSI's "Telecommunications Distribution Methods Manual."

3.3 GROUNDING

A. Install grounding according to the "Grounding, Bonding, and Electrical Protection" chapter in BICSI's "Telecommunications Distribution Methods Manual."
B. Comply with TIA-607-B and NECA/BICSI-607.
C. Locate grounding bus bar to minimize the length of bonding conductors. Fasten to wall, allowing at least a 2-inch (50-mm) clearance behind the grounding bus bar. Connect grounding bus bar to suitable electrical building ground, using a minimum No. 4 AWG grounding electrode conductor.
D. Bond metallic equipment to the grounding bus bar, using not smaller than a No. 6 AWG equipment grounding conductor.

3.4 IDENTIFICATION

A. Identify system components, wiring, and cabling complying with TIA-606-B. Comply with requirements for identification specified in Section 270553 "Identification for Communications Systems."
B. Paint and label colors for equipment identification shall comply with TIA-606-B for Class 2 level of administration, including optional identification requirements of this standard.
C. Equipment grounding conductors.
D. Cable and Wire Identification:
1. Label each cable within 4 inches of each termination and tap, where it is accessible in a cabinet or junction or outlet box, and elsewhere as indicated.
2. Each wire connected to building-mounted devices is not required to be numbered at the device if wire color is consistent with associated wire connected and numbered within panel or cabinet.
E. Labels shall be preprinted or computer-printed type, with a printing area and font color that contrast with cable jacket color but still comply with TIA-606-B requirements for the following:
1. Cables use flexible vinyl or polyester that flexes as cables are bent.

3.5 FIELD QUALITY CONTROL

A. Perform tests and inspections.
B. Tests and Inspections:
1. Visually inspect jacket materials for NRTL certification markings. Inspect cabling terminations in communications equipment rooms for compliance with color-coding for pin assignments, and inspect cabling connections for compliance with TIA-568-C.1.
2. Visually inspect cable placement, cable termination, grounding and bonding, equipment and patch cords, and labeling of all components.
3. Test twisted pair cabling for DC loop resistance, shorts, opens, intermittent faults, and polarity between conductors. Test operation of shorting bars in connection blocks. Test cables after termination but not cross-connection.
C. Data for each measurement shall be documented. Data for submittals shall be printed in a summary report that is formatted similarly to Table 10.1 in BICSI's "Telecommunications Distribution Methods Manual," or shall be transferred from the instrument to the computer, saved as text files, printed, and submitted.
D. Remove and replace cabling where test results indicate that they do not comply with specified requirements.
E. End-to-end cabling will be considered defective if it does not pass tests and inspections.
F. Prepare test and inspection reports.

END OF SECTION 271513

FOR REFERENCE ONLY - ELECTRICAL WORK
BY OTHERS - TRENCHING BY CONTRACTOR

AMP ENGINEERING
Project #: 22-031
PO Box 226 | Kuna, ID 83634
(208) 830-5370 | keith@amp-eng.com

TETRA TECH
www.tetratech.com
3880 Americana Terrace, Suite 201
Boise, ID 83706
Phone: 208.389.1030

MARK	DATE	DESCRIPTION	BY

PICKLES BUTTE LANDFILL
CANYON COUNTY, ID

GAS COLLECTION SYSTEM IMPROVEMENTS
AND FLARE STATION

ELECTRICAL SPECIFICATIONS

Project No.:	197-2021-0175
Designed By:	KWA/NAA
Drawn By:	NAA
Checked By:	KWA

E402

CONTRACTOR'S BID FORM

CANYON COUNTY INSTALLATION OF GAS COLLECTION SYSTEM AND FLARE STATION COMPONENTS PROJECT

INVITATION FOR BIDS (IFB)
CANYON COUNTY, IDAHO

NAME OF BIDDER: _____

Bidder's Public Works Contractor's License # _____

TO: Board of County Commissioners
Canyon County Courthouse
1115 Albany Street
Caldwell, Idaho 83605

1. Bid

Use attached bid form, affixed hereto as the "Bid Proposal".

2. Scope of Work

The undersigned bidder, having familiarized itself with the local conditions affecting the cost of the work, and with the contract documents, including the Invitation for Bids (IFB), Construction Contract Between Owner and Contractor, detailed specifications and blueprints and any Addenda on file in the office of the CANYON COUNTY BOARD OF COMMISSIONERS, First Floor, Canyon County Courthouse, 1115 Albany, Caldwell, Idaho 83605, does hereby propose to perform everything required to be performed, to provide and furnish all the labor, materials, necessary tools, expendable equipment, and all utility and transportation services necessary to perform, and to complete in a workmanlike manner, all of the work required as noted in the IFB, contract and specifications for the Construction Project, Installation of Gas Collection System and Flare Station Components Project for the bid amount noted above.

3. Addenda

Bidder hereby expressly acknowledges receipt of Addendum(s):

_____

4. Time of Completion

The undersigned agrees to commence work on the Project in compliance with the Notice to Proceed and to complete the Project in accordance with the contract requirements and the Project Schedule.

5. Bid Security

Accompanying this Bid is a (Certified Check) (Cashier Check) (Cash) (Bid Bond) in the amount of _____
Dollars ($_____) which is five percent (5%) of the bid amount, payable to Canyon County, which protects and, it is agreed, will be forfeited to Canyon County if the undersigned fails to execute the Fixed Price Construction Contract and other Contract Documents as set forth in the IFB and Specifications, Addenda, and furnish the required performance bond, and labor and material payment bond, as specified within ten (10) days after expiration of the objection period, if any, following notification of the award of the Contract to the undersigned.

6. Surety Letter

The County requires the Bidder to establish proof of financial stability by providing in Bidder's response a letter from an authorized surety company, licensed to do business in the State of Idaho, stating that it is willing to issue a Performance Bond and a Payment Bond, in accordance with the plans, specifications and conditions thereof, guaranteeing the Bidder's financial liability in all respects to the Bidder's faithful performance of the Contract in the County's name in the amount of 100% of the Contract price. The authorized surety company must be licensed to do business in the State of Idaho and state that it is willing to issue bonds guaranteeing Bidder's faithful performance on the Contract in the amount of the Contract. This letter is to be submitted with the bid.

7. Right to Reject Bids

In submitting this bid, and in accordance with the Invitation to Bid, it is understood that the right to reject any and all bids is reserved by the County. It is agreed that this bid may not be withdrawn for a period of sixty (60) days from the opening thereof. The contractor understands that the County retains the right to waive compliance with any bidding informalities and accept the bid that is most beneficial to the County.

8. Bidder's Declaration and Understanding

Bidder certifies and agrees as follows:

This bid is genuine and is not made in the interests of or on behalf of any undisclosed person, firm, or corporation. Bidder has not directly or indirectly induced or solicited any other prospective Bidder to submit a false or sham bid; Bidder has not solicited or induced any person, firm, or corporation to refrain from bidding; and Bidder has not sought by collusion to obtain for itself any advantage over any other prospective Bidder or over County.

Bidder certifies that none of its principals are related within the second degree of kindred to a member of the Canyon County Board of Commissioners or any other Canyon County elected official.

By submitting this bid, Bidder certifies it is qualified to do professional public works construction in Idaho, or, if allowed by statute, covenants to obtain such qualification by the time of contract execution.

By submitting this bid, Bidder agrees that the costs for developing its submittal are entirely the responsibility of the Bidder.

The Bidder has visited the site, become familiar with local conditions under which the Work is to be performed and has correlated the Bidder's personal observations with the requirements of the proposed Contract Documents. Failure to visit the site prior to the bid opening shall in no way relieve the successful bidder from necessity of furnishing all material or performing all work that may be required to complete the work in accordance with Contract documents without additional cost to the County. Each Bidder is solely responsible to inform him/herself fully of all conditions relating to the Bid documents and the work prior to submitting a Bid. A Bidder may withdraw a Bid at any time prior to the time scheduled for the opening of Bids.

The Bid is based upon the materials, equipment and systems required by the Bidding Documents without exception. Materials and equipment for which there is no installation procedure noted in the specifications shall be installed in conformance with the manufacturer's written instructions.

Bidder has carefully examined the IFB, and addenda and exhibits issued and attached to the specifications, visit the site of the work, and fully informed themselves as to the existing conditions and limitations, and they included in the Bid a sum to cover the cost of all items contemplated by the IFB. By making a Bid, the Bidder represents that it has read and understands the Bidding and Contract documents, has visited the site, become familiar with local conditions under which the work is to be performed, and has correlated the Bidder's personal observations with the requirements of the Contract documents.

Bidders shall include in their Bids all taxes which are levied by Federal, State, or Municipal Governments upon labor and for material entering into the Work, and the Contractor shall pay all such taxes and show evidence of payment if required prior to final payment. Bidders must, as a condition precedent to entering into the Construction Contract, have reviewed and complied with Idaho Code § 63-1502.

The Contractor shall assume the work in the condition as found and shall take all necessary measures to conduct all work required to complete the necessary elements of the project, as per detailed specifications and blueprints.

The Bidder is authorized, pursuant to Idaho Code § 67-2310 to report, and does here so report, the anticipated participation on this Project of the following subcontractors:

a. Name and Contractor's License Number of _____ Subcontractor:

_____

b. Name and Contractor's License Number of _____ Subcontractor:

_____

c. Name and Contractor's License Number of _____ Subcontractor:

_____

IN WITNESS HERETO the undersigned has set his/her hand this ____ day of _____, 2023.

NAME OF FIRM: **ADDRESS:**

_____ _____

_____ _____

By: _____
(Signature)

_____
Title

_____
(Printed Name)

CONTRACTOR'S IDAHO PUBLIC WORKS LICENSE NO. _____

STATE OF _____)
) ss.
County of _____)

On this ___ day of _____, 2023, before me, a notary public, personally appeared _____, known or identified to me to be the _____ _____for _____, whose name is subscribed to the within instrument, and acknowledged to me that said corporation executed the same.

(S E A L)

_____
Notary Public for Idaho
Residing at:_____
My Commission Expires: _____

BID PROPOSAL

Please provide a breakdown of costs as outlined in the bid schedule prepared by Tetra Tech and attached to this Bid Proposal as Attachment 1. Further, please identify the total bid amount in the space provided below. The bid amount shall include all equipment, materials, and labor to complete the work described in the IFB and its exhibits. The prices are to be listed in US dollars.

Total bid amount:

$_____

Time estimated to complete the work:

_____
(working days)

_____
Name of Company

_____
Signature of Authorized Representative

_____
Date Signed

_____
Company Street Address

_____
City, State, Zip Code

_____
Contact Information (phone number)

_____
Contact Information (email)

IN WITNESS HERETO the undersigned has set his/her hand this ____ day of _____, 2023.

NAME OF FIRM:

_____

By: _____
(Signature)

_____
Title

_____
(Printed Name)

ADDRESS:

_____

_____

CONTRACTOR'S IDAHO PUBLIC WORKS LICENSE NO. _____

STATE OF _____)
) ss.
County of _____)

On this ___ day of _____, 2023, before me, a notary public, personally appeared _____, known or identified to me to be the _____ _____for _____, whose name is subscribed to the within instrument, and acknowledged to me that said corporation executed the same.

(S E A L)

_____
Notary Public for Idaho
Residing at:_____
My Commission Expires: _____

ATTACHMENT 1

Pickles Butte Sanitary Landfill Gas Collection Ssytem Improvements and Flare Station
Bid Schedule
Prepared By: Tetra Tech
January 2023

ITEM NO.	DESCRIPTION OF WORK	QUANTITY	UNIT	UNIT PRICE	TOTAL COST
	Site Work/Grading				
1	Mobilization/Demobilization	1	LS		$ -
2	Clearing and Grubbing	1	LS		$ -
3	Grading and Earthwork	1	LS		$ -
4	Trenching and Backfilling - Piping, Sumps, and Electrical Conduits	1	LS		$ -
5	AC Pavement - Sawcut & Replacement, Match Existing	1	LS		$ -
6	Concrete Sidewalk - Sawcut & Replacement, Match Existing	1	LS		$ -
7	Surveying	1	LS		$ -
	Mechanical/Piping				
8	Landfill Gas Monitoring Probe Drilling Per Foot (per 2/C-501) (OPTIONAL)	1,204	LF		$ -
9	Landfill Gas Monitoring Probe Completion Per Foot (per 2/C-501) (OPTIONAL)	1,204	LF		$ -
10	2-Inch QED ORP215 Vertical Wellhead - Materials and Installation (per 1/C-506)	45	EA		$ -
11	2-Inch QED ORP215HL Horizontal Wellhead - Materials and Installation (per 2/C-506)	1	EA		$ -
12	Condensate Sump #1 (Purchased by County), ancillary items and instrumentation - Materials and Installation (per 1/C502)	1	EA		$ -
13	Condensate Sump #2 - #5 (Purchased by County), ancillary items and instrumentation - Materials and Installation (per 1/C503)	4	EA		$ -
14	1 1/2-Inch HDPE SDR-9 Solid Pipe and Fittings, Compressed Air - Materials and Installation - Below-Grade (per 4/C-504)	8,700	LF		$ -
15	2-Inch HDPE SDR-11 Solid Pipe and Fittings, Condensate/Gas - Materials and Installation - Below-Grade (per 4/C-504)	9,020	LF		$ -
16	4-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 6/C-504)	9,650	LF		$ -
17	8-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 6/C-504)	480	LF		$ -
18	10-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Below-Grade (per 4/C-504)	11,360	LF		$ -
19	10-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Above-Grade	40	LF		$ -
20	10-Inch HDPE Flange Adapter, D.I. Back-Up Ring, Gasket, and Bolt Kit - Materials and Installation	36	EA		$ -
21	10-Inch Butterfly Valve, Gear Operated - Materials, Installation and Assembly - Below-Grade (per 2/C-504)	6	EA		$ -
22	10-Inch Butterfly Valve, Gear Operated - Materials, Installation and Assembly - Above-Grade (per 3/C-504)	2	EA		$ -
23	10-Inch HDPE Valve Spacer - Materials and Installation	16	EA		$ -
24	2-Inch Butterfly Valve with 6-foot Valve Extension - Materials and Installation	1	EA		$ -
25	18-Inch Corrugate Steel Pipe (CSP) Road Crossing Sleeve - Materials and Installation	400	LF		$ -
26	12-Inch CSP Road Crossing Sleeve - Materials and Installation (per 5/C-504)	100	LF		$ -
27	12-Inch HDPE SDR-17 Solid Pipe and Fittings - Materials and Installation - Above-Grade	40	LF		$ -
28	Bollard Per 1/C-504 - Materials and Installation	32	EA		$ -
29	Manifold #1 Per 1/C-505 - Materials and Installation	1	EA		$ -
30	Manifold #2 Per 1/C-507 - Materials and Installation	1	EA		$ -
31	Manifold #3,#4 and #5 Per 1/C508 - Materials and Installation	3	EA		$ -
32	Miscellaneous Fittings and Materials - Materials and Installation	1	LS		$ -
	Flare Assembly				
33	Gas Handling Skid and Flare Assembly including Skid Mounted Condensate Knock Out/Filter (Purchased by County), Flare Stack (Purchased by County), Pilot System, Gauges, Switches, Transmitters, Valves, Control Panel, Ancillary Items and Instrumentation - Materials and Installation per D-601, M-101, and M-102	1	LS		$ -
34	Compressor World (or Equal) Compressor System (Purchased by County) with Rotary Screw Compressors, Receiver, Desiccant Dryer, Pre & Post Filtration, Isolation Valve, Control Panel, Oil/Water Separator, Steel Housing Container, Ancillary Items and Instrumentation - Materials and Installation	1	LS		$ -
35	5-Gallon Propane Bottle (Pilot Fuel) - Materials and Installation	2	EA		$ -
36	1/2-Inch SCH 40 Black Iron Pipe and Fittings (Paint Red) - Materials and Installation	1	LS		$ -
37	1/2-Inch SCH 40 Carbon Steel Pipe and Fittings (Galvanized) - Materials and Installation	1	LS		$ -
38	PEI Insulation - Installation Only	1	LS		$ -
	Structural				
39	Equipment/Flare Foundation Per 1/S-101 - Materials and Installation	1	LS		$ -
40	Condensate Pump Foundation Per 2/S-101 - Materials and Installation	1	LS		$ -
41	Pipe Anchor Per 2/M-501 - Materials and Installation	3	EA		$ -
42	Pipe Support Per 1/M-501 - Materials and Installation	1	EA		$ -
43	12-Inch Pipe Support and Footing Per 9/C-504 (Purchased by County) - Materials and Installation	3	EA		$ -
44	12-Inch Circular Concrete Vault, Traffic Rated - Materials and Installation	5	EA		$ -
45	Anchor Bolts for 8" Utility Flare Assembly Per 2/S-501 - Materials and Installation	1	LS		$ -
46	Pipe Rack Per 3/M-103 - Materials and Installation	1	EA		$ -
	Condensate Tank				$ -
47	10,000 Gallon Double Wall Condensate Storage Tank (Purchased by County), Piping, Pumps, GAC, Vaults, Solar Panel, Heat Trace/Insulation, and Ancillary Items - Materials and Installation per 1/M-103 and 2/M-103	1	LS		$ -
				TOTAL	

LS Lump Sum
LF Linear Foot
VF Vertical Foot
EA Each
SDR Standard Dimension Ratio
HDPE High Density Polyethylene

CONSTRUCTION CONTRACT

CANYON COUNTY INSTALLATION OF GAS COLLECTION SYSTEM AND FLARE STATION COMPONENTS PROJECT

INVITATION FOR BIDS (IFB)
CANYON COUNTY, IDAHO

THIS AGREEMENT is made this _____day of _____, 2023, between _____ _____, having a local address _____ (hereinafter "CONTRACTOR") and Canyon County, a political subdivision of the State of Idaho, having offices at 1115 Albany Street Caldwell, Idaho 83605 (hereinafter "COUNTY").

WHEREAS, COUNTY issued an Invitation for Bids pursuant to procedures provided by Idaho Code Section 67-2805 for the purpose of identifying the lowest responsive bid for the Installation of Gas Collection System and Flare Station Components Project (hereinafter "Project"); and

WHEREAS, COUNTY has determined that CONTRACTOR's bid to provide said construction services was the lowest responsive bid received for that portion of this project and that funds sufficient to complete such construction have been duly appropriated for expenditure in FY2023.

NOW THEREFORE, in consideration of the mutual promises contained herein, the Parties hereby understand and agree as follows:

1. **PURPOSE:**

1.1 COUNTY hereby employs CONTRACTOR as an independent contractor to complete and perform the following project and work:

Installation of Gas Collection System and Flare Station Components Project as described in the Invitation for Bids and its Exhibits 1 and 2, attached hereto as Attachment 1 and incorporated fully by reference.

1.2 CONTRACTOR agrees to provide all materials and services for the project as requested by the COUNTY and in accordance with Attachment 1 and CONTRACTOR's bid, attached hereto as Attachment 2 and incorporated fully by reference.

2. **CONTRACTOR REPRESENTATIONS:**

2.1 CONTRACTOR has visited the Site and become familiar with and satisfied as to the general, local, and Site conditions that may affect cost, progress, and performance of the project.

2.2 CONTRACTOR is a duly licensed public works contractor, familiar with and satisfied as to all federal, state, and local laws and regulations that may affect cost, progress, and performance of the project. CONTRACTOR agrees to comply with all federal, state, city, and local laws, rules and regulations.

2.3 The project specifications and this contract sufficiently detail the work required and convey understanding of all terms and conditions for performance and furnishing of the work.

2.4 CONTRACTOR warrants that all materials and goods supplied under this Agreement shall be of good merchantable quality and that all services will be performed in a good workmanlike manner. CONTRACTOR acknowledges that it will be liable for any breach of this warranty.

2.5 CONTRACTOR represents that neither it nor any of its principals is related to a County Commissioner or other Canyon County official by blood or marriage within the second degree of kindred. CONTRACTOR agrees to comply with all federal, state, city, and local laws, rules and regulations.

2.6 CONTRACTOR understands that COUNTY is exempt from payment of Federal Excise Tax under Certificate No. 82-6000-290 and none shall be charged to COUNTY.

2.7 Idaho Code § 63-1503 statement: CONTRACTOR, in consideration of securing the business of erecting or constructing public works in this state, recognizing that the business in which he is engaged is of a transitory character, and that in the pursuit thereof, his property used therein may be without the state when taxes, excises, or license fees to which he is liable become payable, agrees:

(1) To pay promptly when due all taxes, (other than on real property), excises and license fees due to the state, its subdivisions, and municipal and quasi-municipal corporations therein, accrued or accruing during the term of this contract, whether or not the same shall be payable at the end of such term;

(2) That if the said taxes, excises, and license fees are not payable at the end of said term, but liability for the payment thereof exists, even though the same constitute liens upon his property, to secure the same to the satisfaction of the respective officers charged with the collection thereof; and

(3) That, in the event of his default in the payment or securing of such taxes, excises, and license fees, to consent that the department, officer, board, or taxing unit entering into this contract may withhold from any payment due him hereunder the estimated amount of such accrued and accruing taxes, excises, and license fees for the benefit of all taxing units to which said contractor is liable.

3. **COMPENSATION:**

3.1 COUNTY agrees to pay CONTRACTOR for the services described by this Agreement an amount not to exceed the sum of _____Dollars ($_____).

Twenty-five percent (25%) of such sum shall be distributed upon execution of this Agreement, with the remaining seventy-five percent (75%) distributed monthly in proportion to services performed.

Prior to the first monthly payment, the CONTRACTOR shall submit to the County an initial schedule of values allocated to various portions of the work that shall be used as a basis for reviewing the monthly invoices. Monthly invoices shall certify that payment is for work, materials, equipment or supplies actually performed or actually installed in furtherance of the Installation of Gas Collection System and Flare Station Components Project, and shall reflect a five percent (5%) retainage.

3.2 CONTRACTOR shall submit their invoices to:

David Loper, Director
Canyon County Solid Waste Department
15500 Missouri Ave.
Nampa, ID 83686
David.loper@canyoncounty.id.gov

3.3 Subject to Article 8, Sections 3 and 4 of the Idaho Constitution and all other non-appropriation law in relation thereto, COUNTY will duly and punctually pay the amounts to satisfy its obligations required under this Agreement, recognizing that time is of the essence. If non-appropriation occurs, this Agreement shall automatically terminate and all future rights and liabilities of the parties hereto shall thereupon cease upon CONTRACTOR's receipt of original notice from COUNTY informing CONTRACTOR of that event.

4. **TIME OF PERFORMANCE:**

4.1 Time is of the essence in the performance of the work as specified in this Agreement.

4.2 Upon execution of contract, CONTRACTOR will start project within _____ _____ to _____business days and thereafter complete the project before December 31, 2023. Any unforeseen stoppages of work beyond CONTRACTOR's control will require the completion date to be modified.

4.3 If CONTRACTOR fails to deliver the subject matter of this Agreement in accordance with this time schedule, liquidated damages shall accrue to COUNTY as follows: CONTRACTOR shall pay COUNTY the sum of Five Hundred Dollars ($500.00) per day for each and every calendar day of unexcused delay. Liquidated

damages shall not be charged when the delay arises out of causes beyond the control of CONTRACTOR.

5. **INSURANCE:**

5.1 CONTRACTOR The Bidder shall maintain the following Insurance at all times this Contract is in effect and for the stated periods after final completion of the Project:

(1) Workers' Compensation insurance meeting the statutory requirements of the State of Idaho.

(2) Employers' Liability insurance providing limits of liability in the following amounts:

Bodily Injury by Accident:	$100,000 each accident
Bodily Injury by Disease:	$500,000 policy limit
Bodily Injury by Disease:	$100,000 each employee

(3) Commercial General Liability insurance providing limits of liability in the following amounts, with aggregates applying separately on a "per project" basis:

General Aggregate:	$2,000,000
Product/Completed Operations Aggregate:	$2,000,000
Personal & Advertising Injury Liability:	$1,000,000
Per Occurrence:	$1,000,000
Fire Legal Liability:	$ 50,000

The Commercial General Liability ("CGL") insurance policy shall be written on an "Occurrence" form and shall cover liability arising from premises, operations, independent contractors, products, completed operations, personal injury, advertising injury, and liability assumed under an insured contract (including tort liability of another assumed in a contract). Canyon County and its elected officials, agents, employees, successors and assigns shall be included as Additional Insureds under the CGL with the Additional Insured endorsement providing coverage for Completed Operations.

(4) Business Automobile Liability insurance providing bodily injury and property damage liability coverage for not less than $1,000,000 each accident limit. Business Automobile Liability insurance shall be written on a standard ISO policy form, or an equivalent form, providing coverage for liability arising out of owned, hired, or non-owned vehicles in connection with this Contract.

Each of Bidder's subcontractors and suppliers shall procure and maintain equivalent insurance coverage as described in subparagraphs 1 through 4

above and certificates evidencing such coverage must be presented to Canyon County before the subcontractors or suppliers are permitted on the site of the project. If subcontractors do not have the required insurance, Bidder's policies must provide equivalent coverage for the subcontractors and their work.

6. **INDEMNIFICATION:**

6.1 CONTRACTOR agrees to indemnify, defend, and hold harmless COUNTY, and its officers, agents and employees, from and against any and all claims, losses, actions, or judgments for damages or injury to persons or property arising out of or in connection with the acts and/or any performances or activities of CONTRACTOR, CONTRACTOR'S agents, employees, or representatives under this Agreement.

7. **INDEPENDENT CONTRACTOR:**

7.1 The parties agree that CONTRACTOR is the independent contractor of COUNTY and in no way an employee or agent of COUNTY and is not entitled to worker's compensation or any benefit of employment with COUNTY.

7.2 COUNTY shall have no control over the performance of this Agreement by CONTRACTOR or its employees, except to specify the time and place of performance, and the results to be achieved. COUNTY shall have no responsibility for security or protection of CONTRACTOR supplies or equipment.

8. **PERSONNEL AND SECURITY REQUIREMENTS:**

8.1 CONTRACTOR reserves the right to designate its resources and personnel for installation in every situation. Notwithstanding the above, CONTRACTOR shall provide a list of the individuals assigned to the project team to COUNTY.

8.2 COUNTY shall have the right to direct removal of a CONTRACTOR employee for cause, if in the opinion of COUNTY, such employee demonstrates non-performance or inappropriate conduct, which jeopardizes security, safety, or other Agreement requirements, or fails to pass the initial background check. COUNTY shall provide CONTRACTOR with written justification as to the reason(s) for the directed removal.

9. **PERFORMANCE BOND/PAYMENT BOND:**

9.1 Pursuant to Idaho Code Section 54-1926, CONTRACTOR shall provide and maintain at all times a valid Contractor's Performance Bond in the full contracted amount and sufficient to cover performance of this Agreement. The Performance Bond shall be issued for a period of not less than one (1) year and must be renewed annually for the term of this Agreement, and CONTRACTOR shall provide a new Bond, or evidence satisfactory to COUNTY of renewability, at least sixty (60) calendar days before the Bond then in effect expires. The Performance Bond shall be for the use and benefit of COUNTY, with a Surety company authorized to do business in the State of Idaho and acceptable to COUNTY. Said Performance Bond shall cover CONTRACTOR's failure to faithfully perform all of the provisions of this Agreement. Said Performance Bond shall obligate the Surety to undertake or cause to be undertaken the work required to be performed pursuant to this Agreement for the term of the Bond. Such Bond shall be submitted to, and subject to approval of, the Board of Canyon County Commissioners prior to its effective date.

9.2 Pursuant to Idaho Code Section 54-1926, CONTRACTOR shall provide and maintain at all times a valid Payment Bond in the full contracted amount and sufficient to cover CONTRACTOR's payment obligations arising under each phase of this Agreement. The Payment Bond shall be issued for a period of not less than one (1) year and must be renewed annually for the term of this Agreement, and CONTRACTOR shall provide a new Payment Bond, or evidence satisfactory, to COUNTY of renewability at least sixty (60) calendar days before the Payment Bond then in effect expires. The Payment Bond shall be for the use and benefit of COUNTY, with a Surety company authorized to do business in the State of Idaho and acceptable to COUNTY. Said Payment Bond shall be submitted to, and subject to approval of, the Board of Canyon County Commissioners prior to its effective date.

9.3 CONTRACTOR is required to furnish the performance and payment bonds to COUNTY on the date of the execution of this Agreement. The performance bonds must guarantee CONTRACTOR's performance from the date of the Agreement execution up to and including the project acceptance and completion of Agreement and the payment bond must guarantee CONTRACTOR's payment obligations arising from this Agreement from the date of the Agreement execution up to and including the system acceptance testing and completion of Agreement.

10. **MISCELLANEOUS:**

10.1 CONTROLLING LAW: The Agreement shall be interpreted, and rights of the Parties determined, under the laws of the State of Idaho. The venue of any claim, litigation, or cause of action between the Parties shall be in the Third Judicial District Court of the State of Idaho in Canyon County.

10.2 LEGISLATIVELY MANDATED CERTIFICATION CONCERNING BOYCOTT OF ISRAEL: CONTRACTOR must select and initial at least one of the following certifications:

[__] Pursuant to Idaho Code § 67-2346, Contractor certifies that it "is not currently engaged in, and will not for the duration of the contract engage in, a boycott of goods or services from Israel or territories under its control." The terms in this section defined in Idaho Code § 67-2346 shall have the meaning defined therein.

[__] Contractor certifies that County's payments under the Contract will not exceed One Hundred Thousand Dollars ($100,000).

[__] Contractor certifies that Contractor does not employ more than nine persons.

10.3 SEVERABILITY: The terms of this Agreement are severable. Should a court of competent jurisdiction decide that any portion of this Agreement is unlawful or invalid, said decision shall only affect those specific sections and the remaining portions of this Agreement shall remain in full force and effect.

10.4 ENTIRE AGREEMENT: This is the entire agreement of the parties and can only be modified or amended in writing by the parties.

CANYON COUNTY BOARD OF COUNTY COMMISSIONERS

DATED this _____ day of _____, 2023.

_____ Motion Carried Unanimously
_____ Motion Carried/Split Vote Below
_____ Motion Defeated/Split Vote Below

	Yes	No	Did Not Vote
_____ Commissioner Leslie Van Beek	_____	_____	_____
_____ Commissioner Brad Holton	_____	_____	_____
_____ Commissioner Zach Brooks	_____	_____	_____

ATTEST: CHRIS YAMAMOTO, CLERK

By: _____
Deputy Clerk

ATTEST: CHRIS YAMAMOTO, CLERK

_____, Deputy Clerk

CONTRACTOR

_____
(Name/Title)

STATE OF IDAHO)
) ss.
County of _____)

On this ___ day of _____, 20__, before me, a notary public, personally appeared _____, known or identified to me to be the _____ _____for _____, whose name is subscribed to the within instrument, and acknowledged to me that said corporation executed the same.

(S E A L)

_____
Notary Public for Idaho
Residing at:_____
My Commission Expires: _____