

MARTISWOODS HYDROPNEUMATIC PUMP STATION ADDENDUM NO. 3

This document consists of 38 sheets (All 8.5" x 11"). It is the responsibility of the Bidder to assure and guarantee by acknowledging the receipt of this Addendum in the Bid Forms, that the Bidder has received the addendum in its entirety, and that the Bidder accepts all conditions contained herein.

1. SECTION 01450 – PERMITS

Delete the Placer County Encroachment Permit with an expiration date of October 15, 2022. Replace it with the attached Placer County Encroachment Permit with an expiration date of October 15, 2031.

2. SECTION 11211 – PRE-PACKAGED PUMP SKID AND EQUIPMENT

Delete Section 11211 dated June 2021 in its entirety. Replace it with the attached Section 11211 dated June 2026.

3. SECTION 16110 - CONDUITS

On Page 16110-6, delete the first sentence of Article 3.02.B. Replace it with the following:

“Conduit encased in concrete shall be PVC-coated RMC.”

4. DRAWING E1

Delete the third sentence of Note 20. replace it with the following:

“UNDERGROUND HORIZONTAL ELBOWS 18” BELOW GRADE OR DEEPER SHALL BE PVC-TYPE SCHEDULE 40. UNDERGROUND HORIZONTAL ELBOWS WITHIN 18” OF GRADE SHALL BE GALVANIZED RIGID STEEL. ALL UNDERGROUND VERTICAL ELBOWS SHALL BE GALVANIZED RIGID STEEL.”

5. DRAWING E5

In the ELECTRICAL BUILDING EQUIPMENT SCHEDULE, delete the description for Item ES7 and replace it with the following:

“REMOTE TELEMETRY UNIT (RTU). CONTRACTOR TO INSTALL DISTRICT-FURNISHED RTU”

6. ADDENDUM 1

Delete Item 4 in its entirety. Replace it with the following:

On Page 02225-4, insert the following as Article 3.07.K:

“K. Fabrication drawings for the existing elevated tank are given at the end of this Section. These drawings were produced by the steel tank fabricator. The DISTRICT does not have any other fabrication drawings related to the elevated tank and its foundations. These drawings are provided for information purposes only and the DISTRICT cannot verify whether the information contained in the drawings is accurate.”

7. ADDENDUM 1

Delete Item 6 in its entirety. Replace it with the following:

After Page 02225-5, insert the attached fabrication drawings (19 sheets) for the existing elevated tank.

END OF ADDENDUM



PLACER COUNTY

DEPARTMENT OF PUBLIC WORKS

Encroachment Permit

Auburn Office: 3091 County Center Drive, Suite 220
Auburn Road Department:
Tahoe City Office: 775 North Lake Blvd

(530) 745-3000
(530) 745-7565
(530) 581-6227

APN:
Site Address:
Subdivision:
Location: 11726 Rocky Ridge Ct
Job Desc.: New water main. Timeline extended.

Permit: **ENCR21-00535**
Application Date: 8/10/2021
Encroachment Desc: Other
Associated Permits:

Owner Information:

Truckee Donner Public Utility District
11570 Donner Pass Rd Truckee, CA 96161

Application Information:

Truckee Donner Public Utility District
11570 Donner Pass Rd
Truckee, CA 96161
(530) 587-3896

Permit Fees

Fee	Receipt #	Fee Note	Payment
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Declarations

The County of Placer, State of California, having received an application therefore, hereby authorizes and grants revocable license to the owner/applicant of this permit to do the work, construction and/or otherwise encroach upon the right of way of County Roadway(s), as described above, in accordance with the Placer County Code Chapter 12 and the General Provision of Encroachment (attached to this permit). In the event the future improvements of the highway necessitates the relocation of such encroachment the permittee will relocate the same at his/her sole expense.

This permit shall be void unless the work herein contemplated shall have been completed before the expiration date. Permit approved subject to payment of fees and CONDITION OF WORK and is revocable at any time.

PERMIT SHALL BE PRESENT AT JOB SITE.

Approved: Tim Boyer

Issued: 8/10/2021

Expires: 10/15/2031

**Permit expiration date extended per TDPUD request.
Extension issued by Andrew Kay on 07/27/2026.**

Conditions of Encroachment

- Work to conform to General Provisions of Encroachment (included).
- All County Codes and Ordinances, Street and Highways Codes and Vehicle Codes to be adhered to.
- Call for Final Inspection before October 15th.
- Repair all cracked and broken curbs, gutters and sidewalks.
- No stockpiling or storage of equipment or materials on County roads.
- Work to conform to approved Plans and Specifications.
- Work to conform to Placer County General Specifications.
- Street crossings to be repaired within one week of encroachment.
- Traffic control per Caltrans Specifications and California MUTCD.
- BMPs (erosion/sediment control measures) to be in place at all times. Standard Plates 203,204,205
- Trench work to conform to Placer County General Specs. Section 19 and Plates 431,432,434

GENERAL PROVISIONS

ENCROACHMENT PERMIT

1. **DEFINITIONS:** Encroachment Permits are issued under Chapter 12 of the County Code. Permits may be referred to as "permit," "encroachment permit," or "utility encroachment permit." The Department of Public Works is herein called "Department." Except as otherwise provided for public agencies and franchise holders, Encroachment Permits shall be revocable as hereinafter provided.

2. **REVOCATION:** Terms and conditions for any Encroachment Permit issued are revocable, subject to modification, or abrogation at any time. However, to prior rights, including those evidenced by joint use agreement, franchise rights, or reserved right for operating purposes in a grant of highway easement are not so subjected to revocation.

3. **NO PRECEDENT ESTABLISHED:** Permits are issued with the understanding that any particular action is not to be considered as establishing precedent (1) in the question of expediency of permitting any certain kind of encroachment to be erected within right-of-ways, or (2) as to any utility, of the acceptability of such permits as to any other or future situation.

4. **NOTICE PRIOR TO STARTING WORK:** The Permittee shall notify the Department twenty-four (24) hours in advance of the day the work is to begin.

5. **PERMIT AT THE WORK:** A copy of the Permit shall be kept at the site of the work and shown to any representative of the Department or any law enforcement officer on demand.

6. **PERMITS FROM OTHER AGENCIES:** The party to whom a permit is issued shall, whenever required by law, secure the written order or consent to work from the Public Utilities Commission of the State of California or any other public agency having jurisdiction.

7. **LOCATION PLAN:** For installation of any facility, the Permittee shall furnish a plan showing location and details with his application. Upon completion of the work, the Permittee shall furnish a set of "As Built Plans" where substantial variation has been made.

8. **FUTURE MOVING OF INSTALLATION:** It is agreed that whenever construction, reconstruction, or maintenance work on the highway may require, the installation shall, upon request of the Department, be immediately moved or modified by and at the sole expense of the Permittee, except as otherwise provided by law, or by any applicable permit provisions.

9. **BONDING:** A Faithful Performance Bond or acceptable sureties shall be furnished to the Department in the amount established by the Department to insure the work being done in conformance with the Permit.

10. **COUNTY INSPECTION AND INSPECTION FEE:** The County will inspect all work within right-of-ways. Inspection on underground facilities will begin one (1) foot above the facilities. An Inspection Fee is to be paid in accordance with the provisions of Sec. 12.04 of the County Code.

11. **STANDARDS OF CONSTRUCTION:** All work performed within the County Highway shall conform to the County Land Development Manual and subject to inspection and approval by the Department.

12. **PROTECTION OF TRAFFIC:** Adequate provisions shall be made for the protection of the traveling public. The warning signs, lights and other safety, shall conform to and follow the requirements of Section 21401 of the Vehicle Code and of any sign manual issued by the Department. Convenient access to driveways, houses and buildings shall be maintained. Nothing in the permit is intended as to third parties.

13. **MINIMUM INTERFERENCE WITH TRAFFIC.** All work shall be planned and carried out so that there will be the least possible inconvenience to the traveling public. Permittee is authorized to place flagmen to stop and warn traffic for necessary protection to public safety, but traffic shall not be unreasonably delayed.

The Highway shall not be closed or traffic lanes blocked unless specifically authorized by the permit or without first obtaining permission from the Department. When permission is obtained, the applicant shall notify Highway Patrol, Sheriff's Department, and Fire Department prior to closing the road.

14. **STORAGE OF MATERIAL:** Construction material shall not be stored, nor equipment parked, within four (4) feet from the edge of pavement or traveled way. Permittee may, however, stop, stand or park subject to the provisions of Section 25301 of the Vehicle Code, essential construction or maintenance vehicles or equipment

at the edge of pavement or in the traveled way, while permittee's employees are in attendance when necessary to install or maintain its facilities.

15. **CROSSING ROADWAY:** Pavement or roadway shall not be cut unless specifically authorized by the permit. Service and other small diameter pipes shall be jacked or otherwise forced underneath pavement without disturbing same.

Service pipes will not be permitted inside of culverts used as drainage structures.

16. **LIMIT OF EXCAVATION:** Excavation shall not be made closer than four (4) feet from the edge of the pavement except as may be specifically authorized by the permit.

17. **TUNNELING:** Tunneling is not permitted, except in major installations as may be specifically authorized by the permit.

18. **TREES:** Trees located within the right-of-way shall not be removed, trimmed or roots disturbed unless specifically authorized on this permit (Ref. Sec. 12.04 County Code)

19. **LOCATION ON POLE LINES, ETC.:** Pole lines shall be located as shown on the plan.

20. **PUBLIC UTILITIES COMMISSION ORDERS:** All clearances and type of construction shall be in accordance with the applicable orders of the Public Utilities Commission of the State of California.

21. **REMOVE OLD POLES, GUYS AND STUBS:** When removing poles, guys and stubs, the entire length shall be removed from the ground and the holes backfilled and thoroughly tamped.

22. **CLEAN UP RIGHT-OF-WAY:** Upon completion of the work, the right-of-way shall be left in as presentable a condition as existed before the work started.

23. **LIABILITY FOR DAMAGES:** The permittee is responsible for all liability imposed by law for personal injury or property damage which may arise out of work performed by permittee or which may arise out of failure on the permittee's part to perform obligations under any permit in the respect to maintenance. In the event any claim of such liability is made against the County of Placer, or any Department, Officer, or Employee thereof, permittee shall defend, indemnify and hold them, and each of them harmless from such claim. Nothing herein is intended to impose on permittee any different or higher standard of care than that required by law.

24. **MAKING REPAIRS:** In every case, the permittee shall be responsible for restoring to its former condition any portion of the highway which has been excavated or otherwise disturbed, except where the Department elects to make repairs to paving and except where provision to the contrary is made in the permit. If the highway is not restored as herein provided, or if the Department elects to make repairs, permittee agrees by acceptance of the permit to bear the cost thereof.

25. **GUARANTEE OF WORK:** The permittee shall maintain the surface over facilities for a period of five years after completion of work under the permit.

26. **MAINTENANCE:** The permittee agrees, to exercise reasonable care to maintain properly any installation placed in the right-of-way and to exercise reasonable care in inspecting and preventing injury in any portion of the highway resulting from the work.

27. **ROUTINE OR EMERGENCY MAINTENANCE OF PERMITTEE'S FACILITIES:** The Permittee is hereby given permission to enter upon the right-of-way to perform routine or emergency maintenance on permittee's facilities, subject to the following terms, conditions, and limitations: Tree trimming for overhead utilities shall be considered routine maintenance.

Permittee, before proceeding with Maintenance involving excavation within the traveled way or other work interfering with the Public Traffic, shall notify the Highway Superintendent prior to starting the work. In emergencies, the Superintendent shall be notified as soon as possible.

Permittee is authorized to make routine inspection and repairs from the manhole without notification.

28. **SERVICE CONNECTIONS:** These terms and conditions do not authorize installation of gas or water service connections within County highway right-of-way, regardless of location of main. All new pipe services, main extensions or excavations to abandon services must be covered by individual applications.

SECTION 11211 - PRE-PACKAGED PUMP SKID AND EQUIPMENT

PART 1 – GENERAL

1.1 REQUIREMENTS

- A. The Contractor shall perform all work required for installation of the skid mounted pumping system, variable frequency drive, system controller and hydropneumatic tank including but not limited to mounting pump and equipment to concrete pads, completing all pipe connections, completing all electrical and control wiring, and testing all equipment.

1.2 WORK INCLUDED

- ~~A.~~ Variable Speed Packaged Pumping System HYDRO MPC EC 100kA SCCR 5CR64-2-1 1x230V 60Hz Grundfos Skid package with 211 Gallon, ASME 250# Bladder Tank.

1.3 REFERENCE STANDARDS

- A. The work in this section is subject to the requirements of applicable portions of the following standards:
 - 1. Hydraulic Institute
 - 2. ANSI – American National Standards Institute
 - 3. ASME – American Society of Mechanical Engineers
 - 4. ASTM – American Society for Testing and Materials
 - 5. IEEE – Institute of Electrical and Electronics Engineers
 - 6. NEMA – National Electrical Manufacturers Association
 - 7. NEC – National Electrical Code
 - 8. ISO – International Standards Organization
 - 9. UL – Underwriters Laboratories, Inc.

1.4 CONTRACTOR SUBMITTALS

- A. The Contractor shall furnish submittals in accordance with Section 01300 – Contractor Submittals.
- B. Pre-Package Pump and Skid Equipment shall be provided by G3 Engineering (Contact Mike Burns 408 483 1899 mike@g3engineering.com). The design package shall be submitted verifying the following information:
 - 1. The skid shall consist of 5 pumps total, with four operating at the system flow rate and one standby pump.
 - 2. System flowrate of 1000 gpm with the flow of each pump being 250 gpm.

3. Differential head at system flow rate of 173 ft.
4. Normal operating pressure of 96.9 ft with an operating range of ± 16 ft.
5. Variable speed system with a minimum and maximum speed of 900 to 3497 rpm
6. Single phase 230V at 60Hz input power.

PART 2 – PRODUCTS

2.1 VARIABLE SPEED PACKAGED PUMPING SYSTEM

- A. Furnish and install a prefabricated and tested variable speed packaged pumping system to maintain constant water delivery pressure.
- B. The packaged pump system shall be a standard product of a single pump manufacturer. The entire pump system including pumps and pump logic controller, shall be designed, built, and tested by Grundfos no equal.
- C. The complete packaged water booster pump system shall be certified and listed by UL (Category QCZJ – Packaged Pumping Systems) for conformance to U.S. and Canadian Standards.
- D. The complete packaged pumping system shall be NSF/ANSI 61 / NSF/ANSI 372 Listed for drinking water and low lead requirements.
- E. The packaged pump system shall be ASHRAE 90.1-2010 compliant without the need of a remote-mounted sensor. The control logic used to simulate a remote-mounted sensor shall be proportional pressure control with squared or linear adaptation. An actual flow rate or calculated flow rate based on performance curves (5th-order polynomial) loaded into the controller shall be used to adjust setpoint pressure in proportional pressure control.

2.2 PUMPS

- A. All pumps shall be ANSI NSF 61 / NSF372 Listed for drinking water and low lead requirements.
- B. The pumps shall be of the in-line vertical multi-stage design.
- C. The head-capacity curve shall have a steady rise in head from maximum to minimum flow within the preferred operating region. The shut-off head shall be a minimum of 20% higher than the head at the best efficiency point.
- D. Large Vertical In-Line Multi-Stage Pumps (CR64-2-1) shall have the following features:
 1. The pump impellers shall be secured directly to the smooth pump shaft by means of a split cone and nut design.
 2. The suction/discharge base shall have ANSI Class 125 or Class 250 flange connections in a slip-ring (rotating flange) design as indicated in the drawings or pump schedule.

3. Pump Construction.

- a. Suction/discharge base, pump head, motor stool, couplings, flanges: Ductile Iron (ASTM 65-45-12)
- b. Impellers, diffuser chambers, outer sleeve: 304 Stainless Steel
- c. Shaft 431 Stainless Steel
- d. Impeller wear rings: 304 Stainless Steel
- e. Shaft journals and chamber bearings: Silicon Carbide
- f. O-rings: EPDM

4. The shaft seal shall be a balanced o-ring cartridge type with the following features:

- a. Collar, Drivers, Spring: 316 Stainless Steel
- b. Shaft Sleeve, Gland Plate: 316 Stainless Steel
- c. Stationary Ring: Silicon Carbide
- d. Rotating Ring: Silicon Carbide
- e. O-rings: EPDM
- f. The Silicon Carbide shall be imbedded with graphite.

5. Shaft seal replacement shall be possible without removal of any pump components other than the coupling guard, shaft coupling and motor. The entire cartridge shaft seal shall be removable as a one piece component. Pumps shall have adequate space within the motor stool so that shaft seal replacement is possible without motor removal.

2.3 HYDROPNEUMATIC TANK

- A. Tank shall be certified to NSF/ANSI 61 for drinking water use.
- B. Bladder design shall be replaceable.
- C. Tank shall include seismic restraint.
- D. Designed and constructed per ASME Code Section VIII, Division 1.
- E. Tank shall be vertical with a 211 gallon volume and 2" NPTF connection.
- F. Tank construction shall be ASME approved steel shell, heavy duty Butyl bladder, red oxide primer finish, Schrader valve with EPDM seats for air valves.
- G. Tank shall have a maximum operating temperature of 240°F and 250 psig maximum working pressure.

2.4 VARIABLE FREQUENCY DRIVE

- A. The VFD shall convert incoming fixed frequency single-phase AC power into a variable frequency and voltage for controlling the speed of three-phase AC induction motors. The VFD shall be a six-pulse input design, and the input voltage rectifier shall employ a full wave diode bridge; VFD's utilizing controlled SCR rectifiers shall not be acceptable. The output waveform shall closely approximate a sine wave. The VFD shall be of a PWM output design utilizing current IGBT inverter technology and voltage vector control of the output PWM waveform.
- B. The VFD shall include a full-wave diode bridge rectifier and maintain a displacement power factor of near unity regardless of speed and load.
- C. The VFD shall produce an output waveform capable of handling maximum motor cable distances of up to 984 ft. (unshielded) without tripping or derating.
- D. The VFD shall utilize an output voltage-vector switching algorithm, or equivalent, in both variable and constant torque modes. VFD's that utilize Sine-Coded PWM or Look-up tables shall not be acceptable.
- E. VFD shall automatically boost power factor at lower speeds.
- F. The VFD shall be able to provide its full rated output current continuously at 110% of rated current for 60 seconds.
- G. Switching of the input power to the VFD shall be possible without interlocks or damage to the VFD at a minimum interval of 2 minutes.
- H. Switching of power on the output side between the VFD and the motor shall be possible with no limitation or damage to the VFD and shall require no additional interlocks.
- I. The VFD shall have temperature controlled cooling fans for quiet operation, minimized internal losses, and greatly increased fan life.
- J. VFD shall provide full torque to the motor given input voltage fluctuations of up to +10% to -15% of the rated input voltage.
- L. The VFD shall provide internal DC link reactors to minimize power line harmonics and to provide near unity power factor. VFD's without a DC link reactor shall provide a 5% impedance line side reactor.
- M. VFD to be provided with the following protective features:
 - 1. VFD shall have input surge protection utilizing MOV's, spark gaps, and Zener diodes to withstand surges of 2.3 times line voltage for 1.3 msec.
 - 2. VFD shall include circuitry to detect phase imbalance and phase loss on the input side of the VFD.
 - 3. VFD shall include current sensors on all three-output phases to detect and report phase loss to the motor. The VFD will identify which of the output phases is low or lost.
 - 4. VFD shall auto-derate the output voltage and frequency to the motor in the presence of sustained ambient temperatures higher than the normal operating range, so as not to trip on an inverter temperature fault. The use of this feature shall be user-selectable and a warning will be exported during the event. Function shall reduce switching frequency before reducing motor speed.

5. VFD shall auto-derate the output frequency by limiting the output current before allowing the VFD to trip on overload. Speed can be reduced, but not stopped.
 6. The VFD shall have the option of an integral RFI filter. VFD enclosures shall be made of metal to minimize RFI and provide immunity.
- N. VFD to be provided with the following interface features:
1. VFD shall provide an alphanumeric backlit display keypad, which may be remotely mounted using standard 9-pin cable. VFD may be operated with keypad disconnected or removed entirely. Keypad may be disconnected during normal operation without the need to stop the motor or disconnect power to the VFD.
 2. VFD shall display all faults in plain text; VFD's, which can display only fault codes, are not acceptable.
 3. All VFD's shall be of the same series, and shall utilize a common control card and LCP (keypad/display unit) throughout the rating range. The control cards and keypads shall be interchangeable through the entire range of drives used on the project.
 4. VFD keypad shall be capable of storing drive parameter values in non-volatile RAM uploaded to it from the VFD, and shall be capable of downloading stored values to the VFD to facilitate programming of multiple drives in similar applications, or as a means of backing up the programmed parameters.
 5. A start guide menu with factory preset typical parameters shall be provided on the VFD to facilitate commissioning.
 6. VFD shall provide full galvanic isolation with suitable potential separation from the power sources (control, signal, and power circuitry within the drive) to ensure compliance with PELV requirements and to protect PLC's and other connected equipment from power surges and spikes.
 7. All inputs and outputs shall be optically isolated. Isolation boards between the VFD and external control devices shall not be required.
 8. There shall be three programmable digital inputs for interfacing with the systems external control and safety interlock circuitry. An additional digital input is preprogrammed for start/stop.
 9. The VFD shall have two analog signal inputs. One dedicated for sensor input and one for external set point input.
 10. One programmable analog output shall be provided for indication of a drive status.
 11. The VFD shall provide two user programmable relays with selectable functions. Two form 'C' 230VAC/2A rated dry contact relay outputs shall be provided.
 12. The VFD shall store in memory the last 5 faults with time stamp and recorded data.
 13. The VFD shall be equipped with a standard RS-485 serial communications port for communication to the multi-pump controller. The bus communication protocol for the VFD shall be the same as the controller protocol.

O. VFD service conditions:

1. Ambient temperature operating range, -10 to 45°C (14 to 113°F).
2. 0 to 95% relative humidity, non-condensing.
3. Elevation to 3280 ft without derating. (Size VFDs appropriately for 6280')
4. VFD's shall be rated for line voltage of 525 to 690VAC, 380 to 480VAC, or 200 to 240VAC; with +10% to -15% variations. Line frequency variation of $\pm 2\%$ shall be acceptable.
5. No side clearance shall be required for cooling of the units.

2.5 MOTORS

- A. Designed for continuous duty operation, NEMA Design B with a 1.15 service factor.
- B. Totally Enclosed Fan Cooled with Class F insulation.
- C. Nameplate shall have, as a minimum, all information as described in NEMA Standard MG 1-20.40.1.
- D. Motors shall have a NEMA C-Flange for vertical mounting.
- E. Drive-end bearings shall be adequately sized so that the minimum L10 bearing life is 17,500 hours at the minimum allowable continuous flow rate for the pump.
- F. Size motors for 6280' Elevation

2.6 PUMP SYSTEM CONTROLLER

- A. The pump system controller shall be a standard product developed and supported by the pump manufacturer. Grundfos with Danfoss FC202 drives.
- B. The controller shall be microprocessor-based with a Linux-based operating system. Software changes and updates shall be possible via USB, personal computer (notebook), and over-the-air via Wi-Fi. The controller user interface shall feature a color touch-enabled display with a minimum screen size of 10 inches (diagonal) for easy viewing of system status parameters and field programming. The display shall include a backlight with contrast adjustment. Password protection of system settings shall be standard.

C. Home Screen

The controller shall provide an enhanced home screen designed to give the user immediate visibility of system performance and operating status. The home screen shall display key operating information in a clear, intuitive format to allow quick assessment of pump operation and system condition. The home screen shall include, at a minimum:

- System illustration showing the overall pumping configuration
- System overview with measured values displayed in real time
- Operation mode menus providing direct access to primary operating states
- Warning, alarm, and information event indication

- Level 2 cards for pump details including pump speed, operation mode, run time, and pump alarms
- Adjustable display backlight
- Status LED indicating system condition
- Estimated flowrate (or actual flow if a flow sensor is used)
- Other user-defined measured parameters such as specific energy, control mode, and system setpoint

The home screen shall present key metrics and pump status in an easy-to-read layout, enabling the user to understand system performance at a glance. The design shall support intuitive navigation through zoom, move, and logical menu structures, allowing users to access advanced control features easily.

D. Cybersecurity

The pump system controller shall incorporate cybersecurity functions aligned with recognized international standards to ensure secure handling from production through operation, protect system data, and maintain operational integrity.

Applicable Standards:

- ISO/IEC 27001 for information security management of system data, configurations, credentials, and service information.
 - IEC 62443-4-2 for secure industrial automation components, including requirements for identification and authentication control, use control, system integrity, data confidentiality, restricted data flow, timely response to events, and resource availability.
 - RED-equivalent cybersecurity provisions for wireless-enabled equipment, including secure network access, protection against harmful interference, and prevention of unauthorized device communication.
1. **Tamper Detection:** The controller shall include tamper detection mechanisms that monitor unauthorized opening, configuration alteration, or manipulation of hardware or firmware. Tamper events shall generate a warning and be recorded in the controller's security log. Device identity and firmware integrity shall be validated on first startup to ensure secure production-to-installation flow.
 2. **User Access Control:** The controller shall support tiered user access levels including Operator, Service, and Administrator roles. Access to system parameters, network configurations, and firmware management shall require authenticated login per IEC 62443-4-2 identification and authentication control requirements. The controller shall log all user access attempts, including denied attempts, for audit purposes.
 3. **Secure Boot:** The controller shall include secure boot functionality that validates firmware authenticity at startup using cryptographic checks. Modified, unauthorized, or corrupted firmware shall be prevented from loading, and the controller shall revert to a protected recovery mode. Configuration integrity (checksum validation) shall be monitored continuously.
 4. **Firmware Updates:** All updates (USB, PC, or OTA) shall comply with IEC 62443-4-2 software integrity requirements. Updates shall be digitally signed by the manufacturer and verified before installation. The controller shall reject unsigned, altered, or expired update files and log these events.
 5. **Communication Security:** All external communication interfaces (Ethernet, wireless, and service ports) shall meet IEC 62443-4-2 secure communication requirements. The controller shall support encrypted data exchange where applicable and enforce connection restrictions to known, trusted devices. Unauthorized network access, device spoofing, or foreign device association attempts shall be blocked and recorded as security events.
 6. **Device Identity:** The controller shall contain a unique, non-modifiable device identifier used for secure pairing with system components, service tools, and wireless accessories. The controller shall communicate only with validated devices to prevent

interference or cross-association with unknown equipment.

7. Cybersecurity Event Log:

The controller shall maintain a log recording the following events, including timestamps and user access levels consistent with IEC 62443-4-2 event logging provisions:

- User login attempts (successful and unsuccessful)
- Parameter changes
- Firmware updates
- Communication interface modifications
- Tamper events
- Device association attempts

- 8. Operational Resilience:** The controller shall maintain pump operation during cybersecurity-related interruptions by isolating affected communication channels, maintaining validated operating parameters, and reverting to a safe fallback state. Cybersecurity events shall not override pump protection, system safety functions, or core control logic.

E. Commissioning Wizard

The pump system controller shall include an integrated Commissioning Wizard to simplify and standardize system startup. The wizard shall provide a step-by-step guided workflow that verifies required parameters before advancing to ensure correct and consistent configuration.

1. The wizard shall offer Quick Setup for rapid initialization of standard applications and Full Setup for detailed configuration of advanced system requirements.
2. During commissioning, the controller shall automatically validate sensors, pump communication, and system inputs/outputs. Detected issues shall be displayed with corrective instructions prior to system activation.
3. Upon completion, the wizard shall present a summary of configured parameters and validation results.
4. The wizard shall prevent incomplete commissioning by requiring all essential parameters to be set before exiting. Context-based help shall be available at each step.

- F. Galvanic Isolation:** The controller shall provide internal galvanic isolation to all digital and analog inputs as well as all fieldbus connections.

- G. Backup Battery:** The controller shall have the ability to be connected to a backup battery to supply power to the controller during periods of loss of supply power.

H. Inputs / Outputs

The controller shall have, at a minimum, the following hardware inputs and outputs:

- Four (4) programmable Analog/Digital inputs
- Two (2) Digital inputs
- Two (2) Relay outputs
- Six (6) Analog inputs via BUS
- Support for up to sixteen (16) additional input/output modules for I/O expansion, including additional digital and analog outputs
- Ethernet connection (built-in web server)
- Field service connection via USB-A for firmware updates and default setting storage
- Field service connection to PC via USB-C for advanced programming, firmware upgrades, and data logging
- Field Bluetooth (BLE) connectivity for settings updates, troubleshooting, and system programming

I. Pump System Programming

As a minimum, the following parameters shall be available and/or field-adjustable:

- Water shortage protection (analog or digital)

- Sensor settings (suction, discharge, differential pressure — analog supply/range)
- PI controller (proportional gain and integral time) settings
- High system pressure indication and shutdown
- Low system pressure indication and shutdown
- Low suction pressure/level shutdown (via digital contact)
- Low suction pressure/level warning (via analog signal)
- Low suction pressure/level shutdown (via analog signal)
- Flow meter settings (if used, analog signal)

J. Pump Curve Data

The actual pump performance curves (5th-order polynomial) shall be loaded (software) into the pump system controller. Pump curve data shall be used for the following:

- Display and data logging of calculated flow rate
- Variable pressure control (quadratic or proportional)
- Pump outside-of-duty-range protection
- Sequencing pumps based on efficiency

- K. Variable Pressure Control:** The controller shall include variable pressure control to compensate for pipe friction loss by decreasing the pressure setpoint at lower flowrates and increasing the pressure setpoint at higher flowrates using actual or calculated flow rate. Variable pressure control that uses power consumption and speed only shall not be considered equal to variable pressure control that uses actual differential pressure measurement along with pump power and speed.
- L. Multi-Sensor:** The controller shall be capable of controlling using up to six (6) differential pressure (DP) sensors (zones). Each zone shall have programmable maximum and minimum DP ranges. The controller shall be capable of an energy-optimal mode where pump speed/energy is reduced until any zone reaches the minimum DP setting.
- M. Pulse Flow Meter:** The system controller shall be able to receive pulse readings from a digital pulse meter and log/display accumulated flow.
- N. DP Subtraction:** The system controller shall be capable of controlling via subtraction of two pressure or temperature sensors for differential pressure or differential temperature control.
- O. Programmable Setpoints:** The system controller shall accept up to seven (7) programmable setpoints via digital input (additional input/output module may be required).
- P. Setpoint Influence:** The system pressure setpoint shall be capable of being automatically adjusted by an external setpoint influence. This function enables the user to adjust the control parameter (typically differential pressure) by measuring an additional parameter. Example: lower the system differential pressure setpoint based on a flow or outdoor temperature measurement.
- Q. Remote Control:** The controller shall be capable of receiving a remote analog setpoint (4–20 mA or 0–10 VDC) as well as a remote system on/off digital signal.
- R. Setpoint Ramp:** The controller shall provide adjustable ramp time for setpoint changes (both increase and decrease).

S. Warnings and Alarms

The pump system controller shall store up to 500 warnings and alarms in memory. The time, date, and duration of each alarm shall be recorded. A free relay shall be provided for alarm notification to the building management system as needed. The controller shall display, at a minimum, the following alarm conditions:

Individual Pump Failure	Loss of Sensor Signal (4-20 mA)
VFD Trip/Failure	Limit 1 and Limit 2 Exceeded*
Pump Outside of Duty Range	External Fault
Loss of Remote Setpoint Signal (4-20 mA)	

*The controller shall be capable of monitoring two analog signals (e.g., suction pressure and discharge pressure) for additional pump or system protection.

T. Built-In Data Log

The controller shall have built-in data logging capability. Logged values shall be graphically displayed on the controller and downloadable to a notebook/PC as a delimited text file. A minimum of 7,200 samples per logged value shall be available for the following parameters:

- Estimated flowrate (or actual flow if flow sensor is connected)
- Speed of pumps
- Process value/sensor feedback (usually differential pressure)
- Power consumption
- Controlling parameter (process value)
- Inlet pressure (when remote differential pressure is the primary sensor)

- U. Redundant Primary Sensor:** The controller shall be capable of receiving a redundant sensor input to function as a backup to the primary sensor.
- V. Secondary Sensor:** Upon loss of signal from the remote sensor, the controller shall be capable of reverting control to the pump system-mounted sensors with a programmable setpoint. Pumps shall maintain constant, proportional, or quadratic pressure across the system until the remote setpoint signal is restored.
- W. Pump Test:** The controller shall include a pump "Test Run" feature such that pumps are cycled on during periods of inactivity (system is in the "off" position but with electricity supply still connected). Inoperative pumps shall be switched on for a period of three to four seconds every 24 hours, 48 hours, or once per week at a programmable time of day.
- X. Reduced Operation:** During backup generator operation, the controller shall be capable of reducing power consumed by the pump system by either limiting the number of pumps in operation or limiting power consumption (kW). The controller shall receive a digital input indicating backup generator operation.
- Y. Power and Energy Consumption:** The controller shall be capable of displaying instantaneous power consumption (watts or kilowatts) and cumulative energy consumption (kilowatt-hours).
- Z. Specific Energy:** When a flow sensor is connected, the controller shall be capable of displaying instantaneous specific energy in watt-hours per gallon (Wh/gal) or watt-hours per 1,000 gallons (Wh/kgal).
- AA. Built-In Ethernet:** The controller shall have an Ethernet connection with a built-in web server allowing connection to a building computer network with read/write access to the controller via a web browser.
- BB. Service Contact Information:** The controller shall include a programmable Service Contact field that can be populated with service contact information including contact name, address, phone number(s), and website.

2.7 CONTROL PANEL

- A. Short Circuit Current Rating (SCCR):** The complete control panel assembly shall have a Short Circuit Current Rating of 100 kA.
- B. BMS Integration:** The system shall allow for streamlined BMS integration via a single point. The standard available protocol shall be BACnet MS/TP. Additional available protocols include: BACnet IP, EtherNet/IP, Modbus RTU, Modbus TCP, and LON. Integration to BMS protocols shall be made available via dedicated additional hardware or hardware already integrated into the system.
- C. Enclosure and Listing:** The pump system controller shall be mounted in a UL Type 12 rated

enclosure. A self-certified NEMA enclosure rating shall not be considered equal. The entire UL Type 12 control panel shall be UL 508 listed as an assembly.

- D.** The control panel shall include a main disconnect, circuit breakers for each pump and the control circuit, and control relays for alarm functions. The control panel shall include, at a minimum:
- 80 dB System Fault Audible Alarm with push button to silence
 - Emergency/Normal Operation Switches (control bypass)
 - Individual Service Disconnect Switches (accessible outside of panel)
 - Pump Run Lights
 - System Fault Light
 - Surge Arrestor
- E.** Remote Monitoring and Cloud Connectivity: The controller shall be capable of secure cloud-based connectivity, allowing authorized users to remotely view system dashboards, operating status, trends, events, and alarms. The remote interface shall provide access to pump information, system performance data, device details, files, and configuration settings. The system shall support location-based visualization of the installation and provide full remote oversight of controller operations through an online platform.
- F.** Mobile App Integration: The controller shall support wireless connection to a mobile application for local setup, parameter adjustment, and system monitoring. The controller shall connect to authorized mobile devices via Bluetooth, allowing users to access configuration menus, read operating data, and perform commissioning or service tasks directly from a handheld device. Bluetooth activation shall be required on both the controller and the mobile device to establish a secure pairing.

OSHPD/HCAI Seismic Compliance: The pump system controller and control panel assembly shall be OSHPD/HCAI compliant and supplied with a dedicated OSHPD Special Seismic Certification Preapproval (OSP) number. The certification shall meet the seismic performance requirements of the California Building Code for non-structural components used in healthcare facilities and shall comply with the HCAI Special Seismic Certification Program for pump control panels

2.8 EFFICIENCY AND SEQUENCE OF OPERATION

- A.** The system controller shall operate equal-capacity variable speed pumps to maintain a constant pressure, constant differential pressure, or proportional pressure differential pressure setpoint depending on the application. The system controller shall receive an analog signal (4–20 mA) from the factory-installed pressure transducers on the discharge and suction manifolds, indicating actual system pressure and inlet pressure. The controller shall be capable of controlling the system based on subtracting discharge and suction transducer pressures for differential pressure across the manifolds.

B. Standard Cascade Control (Pumping Efficiency Based)

The pump system controller shall adjust pump speed as necessary to maintain system setpoint pressure as flow demand increases. Utilizing pump curve information (5th-order polynomial), the pump system controller shall stage on additional pumps when hydraulic efficiency will be higher with additional pumps in operation.

When pump curve information is unavailable and/or during regular system maintenance, the controller shall be able to learn or re-learn pump performance characteristics by analyzing differential pressure, pump speed, and individual pump power under controlled operating conditions. Once determined, the controller shall use the learned pump characteristics to select the most energy-efficient number of pumps in operation. The controller shall evaluate whether adding or removing a pump will reduce total power consumption while maintaining required system head and flow, and shall operate the system at the lowest determined power consumption that still meets system demand.

Exception: When flow and head are outside the allowable operating range of the operating

pump(s), the controller shall stage on an additional pump to distribute flow and allow all pumps to operate within the allowable operating range. When system pressure equals the system setpoint, all pumps in operation shall reach equal operating speeds. The pump system controller shall have field-adjustable Proportional Gain and Integral Time (PI) settings for system optimization.

- C.** Proportional Pressure Control: The controller shall include a proportional pressure control mode that automatically reduces the system pressure setpoint at lower flow conditions and increases it at higher flow conditions based on actual system flow demand. The controller shall continuously adjust the setpoint along a programmable proportional curve to maintain stable operation, meet system demand, and reduce energy consumption.
- D.** Pilot Pump: The pump system shall be capable of operating with a dedicated pilot pump for improved efficiency during low-flow conditions. The pilot pump (when optioned) shall be sized at approximately one-quarter of the main pump capacity and shall operate as the primary pump when system demand is low. Use of a pilot pump shall reduce energy consumption in low-flow operation and may allow the use of a smaller diaphragm tank or eliminate the need for a tank entirely. The pilot pump arrangement is recommended for installations with large variations between minimum and maximum system flow.
- E.** The system controller shall be capable of switching pumps on and off to satisfy system demand without the use of flow switches, motor current monitors, or temperature measuring devices.
- F.** All pumps in the system shall alternate automatically based on demand, time, and fault. If flow demand is continuous (no-flow shutdown does not occur), the system controller shall have the capability to alternate pumps every 24 hours, every 48 hours, or once per week. The interval and actual time of pump changeover shall be field-adjustable.
- G.** The system controller shall be capable of controlling a pressure maintenance pump (jockey pump) in pressure boosting applications. The setpoint of the pressure maintenance pump shall be configurable to any value above or below the pump system's setpoint. The pressure maintenance pump shall be capable of being staged on as a backup pump when the capacity of the pump system is exceeded.

2.9 LOW FLOW STOP FUNCTION (CONSTANT PRESSURE APPLICATIONS)

- A.** The system controller shall be capable of stopping pumps during periods of low-flow or zero-flow without wasting water or adding unwanted heat to the liquid. Temperature-based no-flow shutdown methods that have the potential to waste water or add unwanted temperature rise to the pumping fluid are not acceptable and shall not be used.

B. Standard Low Flow Stop and Energy Saving Mode

A bladder-type diaphragm tank shall be installed on the discharge manifold or downstream of the pump system with a pre-charge pressure of 70% of system setpoint.

When only one pump is in operation, the system controller shall be capable of detecting low flow (less than 10% of pump nominal flow) without the use of additional flow sensing devices. When low flow is detected, the system controller shall increase pump speed until the discharge pressure reaches the stop pressure (system setpoint plus 50% of programmed on/off band, adjustable). The pump shall remain off until the discharge pressure reaches the start pressure (system setpoint minus 50% of programmed on/off band, adjustable).

Upon low flow shutdown, a pump shall be restarted in one of the following ways:

- Low Flow Restart: If the low flow condition still exists, the pump shall start and speed shall be increased until the stop pressure is reached, whereupon the pump

shall again be switched off.

- Normal Flow Restart: If the pump system controller determines a low flow condition no longer exists, the pump shall start and speed shall be increased until the system pressure reaches the system setpoint.

2.10 SYSTEM CONSTRUCTION

- A. Suction and discharge manifold construction shall be in way that ensures minimal pressure drops, minimize potential for corrosion, and prevents bacteria growth at intersection of piping into the manifold. Manifold construction that includes sharp edge transitions or interconnecting piping protruding into manifold is not acceptable. Manifold construction shall be such that water stagnation cannot exist in manifold during operation to prevent bacteria growth inside manifold.
- B. The suction and discharge manifolds shall be constructed of 316 stainless steel. Manifold connection sizes shall be as follows:
 - 1. 10 inch and larger: ANSI Class 150 flanges
- C. Pump Isolation valves shall be provided on the suction and discharge of each pump. Isolation valve shall be a full lug style butterfly valve. The valve disk shall be of stainless steel. The valve seat material shall be EPDM and the body shall be cast iron, coated internally and externally with fusion-bonded epoxy.
- D. A spring-loaded non-slam type check valve shall be installed on the discharge of each pump. The valve shall be a wafer style type fitted between two flanges. The head loss through the check valve shall not exceed 5 psi at the pump design capacity. Check valves shall have a body material of stainless steel or epoxy coated iron (fusion bonded) with an EPDM or NBR resilient seat. Spring material shall be stainless steel. Disk shall be of stainless steel or leadless bronze.
- E. For systems that require a diaphragm tank, a connection of no smaller than ¾" shall be provided on the discharge manifold.
- F. A pressure transducer shall be factory installed on the discharge manifold (or field installed as specified on plans). Systems with positive inlet gauge pressure shall have a factory installed pressure transducer on the suction manifold for water shortage protection. Pressure transducers shall be made of 316 stainless steel. Transducer accuracy shall be +/- 1.0% full scale with hysteresis and repeatability of no greater than 0.1% full scale. The output signal shall be 4-20 mA with a supply voltage range of 9-32 VDC.
- G. A bourdon tube pressure gauge, 2.5 inch diameter, shall be placed on the suction and discharge manifolds. The gauge shall be liquid filled and have copper alloy internal parts in a stainless steel case. Gauge accuracy shall be 2 1/2 %. The gauge shall be capable of a pressure of 30% above its maximum span without requiring recalibration.
- H. Systems with a flooded suction inlet or suction lift configuration shall have a factory installed water shortage protection device on the suction manifold.
- I. The base frame shall be constructed of corrosion resistant 304 stainless steel. Rubber vibration dampers shall be fitted between each pumps and base frame to minimize vibration.
- J. Depending on the system size and configuration, the control panel shall be mounted in one of the following ways:

1. On a 304 stainless steel fabricated skid, separate from the main system skid
2. On its own base (floor mounted with plinth)

2.11 TESTING

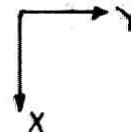
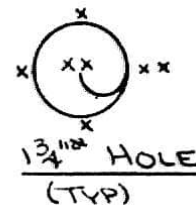
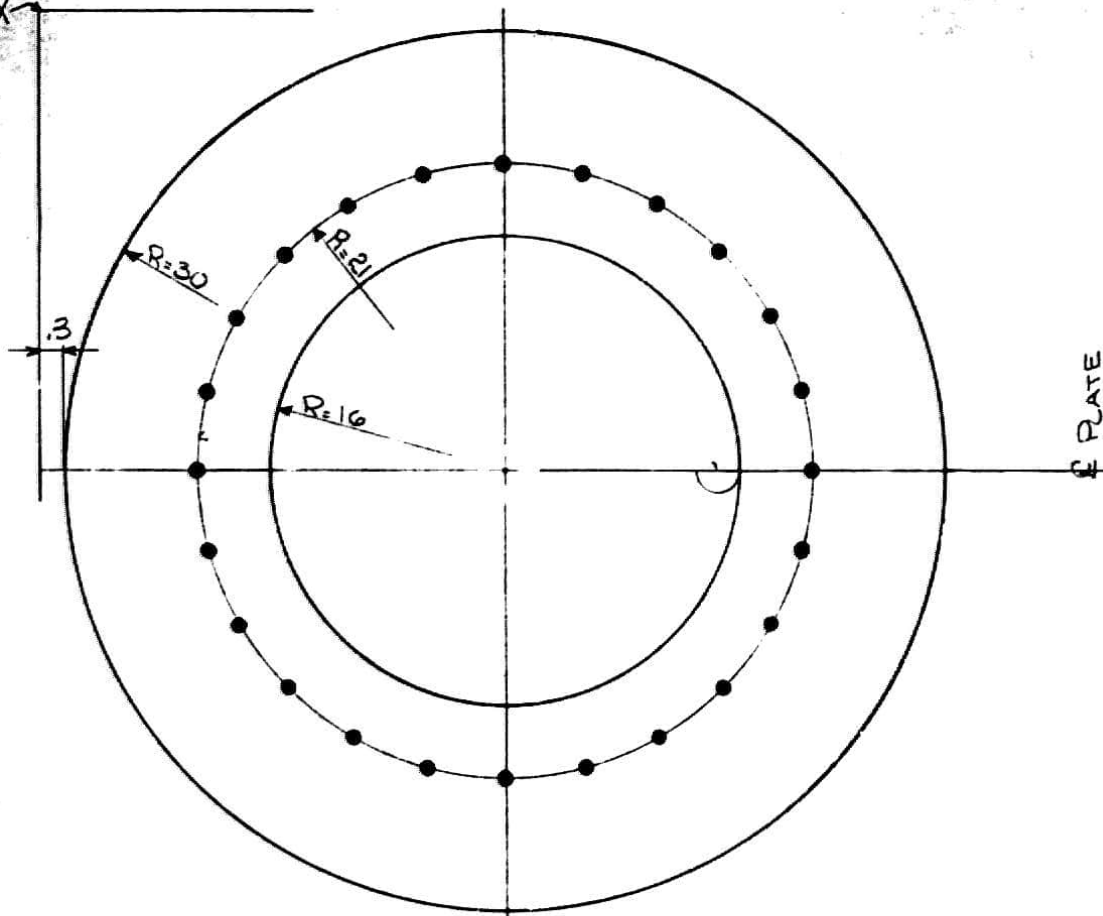
- A. The tester used for testing the pump system shall be constructed and calibrated according to the requirements of hydraulic test standard ISO 9906.
- B. The entire pump station shall as a minimum be factory tested for functionality and documented results of functionality test supplied with pump station.
 1. Functionality testing shall include the following parameters:
 - a. Complete System Hydrostatic Test – 1.5 times the nameplate maximum pressure
 - b. No-Flow Detection Shutoff Test
 - c. Water Shortage Test
 - d. Two-Point Setpoint Performance Test.
- C. Water used for testing shall be treated with three different filtration systems to ensure only clean water is used for testing pump station.
 1. 25 micron mechanical filter – removes solid parts from water
 2. Activated carbon filter – keeps water clear and eliminates odor
 3. Ultraviolet light system – kills all bacteria growth

2.12 WARRANTY

- A. The warranty period shall be a non-prorated period of 24 months from date of installation, not to exceed 30 months from date of manufacture.

END OF SECTION

INDEX



ALL DIM. IN INCHES
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REFER TO DWG #6

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IDENT. NO. _____ SLAB NO. _____

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ACCORDANCE WITH Q. A. PROCEDURE _____

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS - FABRICATORS - CONTRACTORS

PITTSBURGH, PA. HUNTER, PA. BRISTOL, PA. BALTIMORE, MD.
BIRMINGHAM, ALA. MARSEILLES, ILL. DES MOINES, IOWA PROVO, UTAH
FRESNO, CALIF. SACRAMENTO, CALIF. SANTA CLARA, CALIF. STOCKTON, CALIF.

DWG. PREPARED AT DMA

FABRICATED AT 32

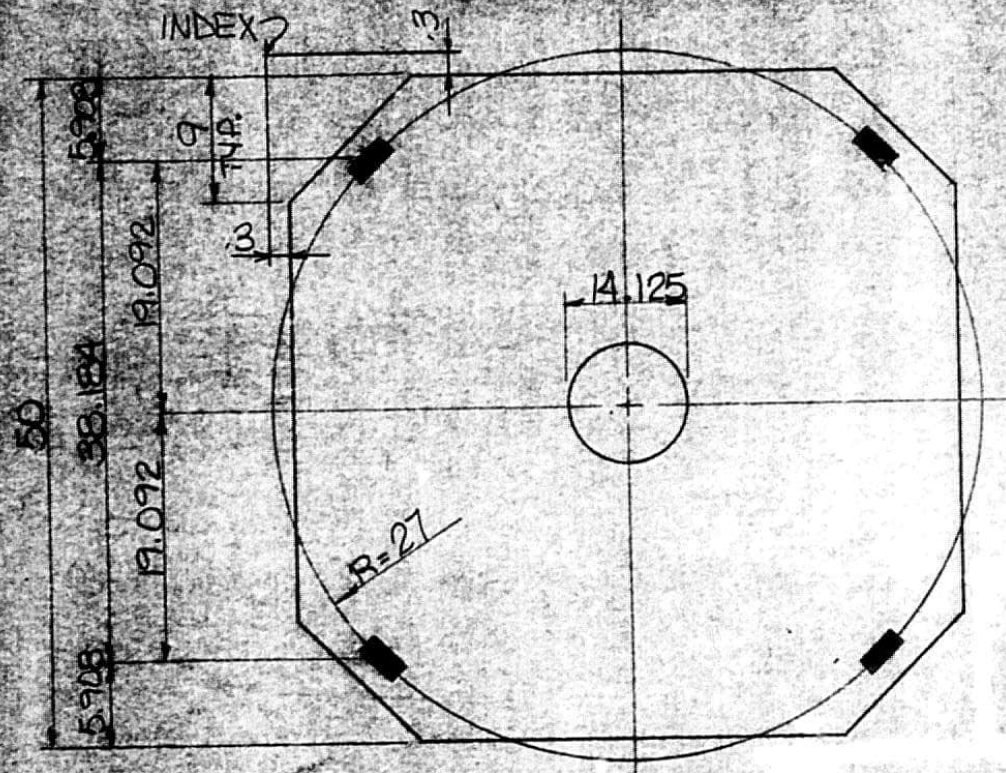
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CONTRACT NO. 31358

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48" Riser DERRICK Ring h

NO DATE DESCRIPTION OF REVISION BY



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STOCK P SIZE 38x50 1/2 x 50 1/2
REFER TO DWG. #6

NOTE: DIM. SHOWN ARE TYPICAL
FOR ALL SIDES

AIRCO-1000 TAPE NO. 81-200

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IDENT. NO. _____ SLAB NO. _____

RECORDING OF INFORMATION AND MARKING OF MATERIAL IN
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PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS - FABRICATORS - CONTRACTORS

PITTSBURGH, PA. WARREN, PA. BRISTOL, PA. BALTIMORE, MD.
BIRMINGHAM, ALA. MARSHFIELD, ILL. DES MOINES, IOWA PROVO, UTAH
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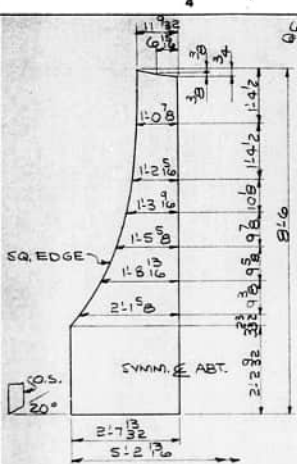
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TRUCKEE, CALIFORNIA
RISER BASE P 9.10

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CHECKED HV 1-11-82

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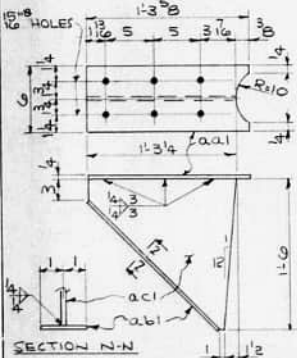
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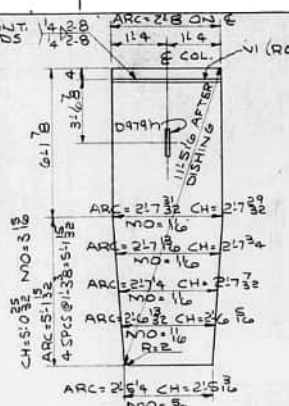
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OS. OF PIPE SHOWN
DIMENSIONS ON OS.



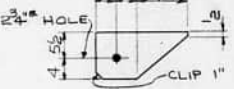
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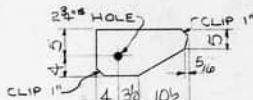
SECTION N-N
4-BALCONY BRKTS-1-D



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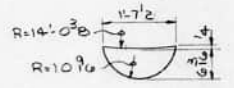
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DETAIL R SI (8 REQ'D)



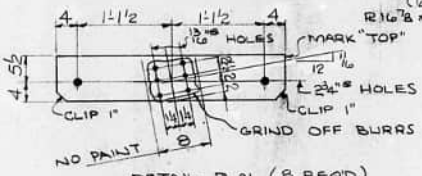
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DETAIL R A473 (4 REQ'D)



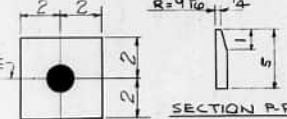
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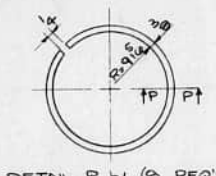
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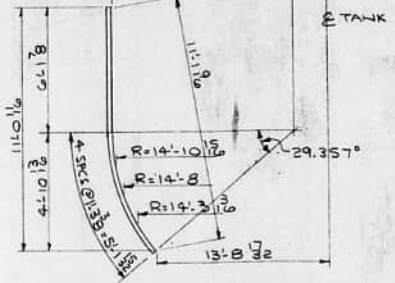
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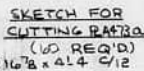
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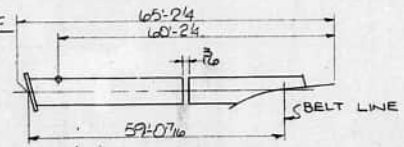
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DISHING SKETCH FOR R PI



SKETCH FOR CUTTING R A473



COLUMN LENGTH SKETCH

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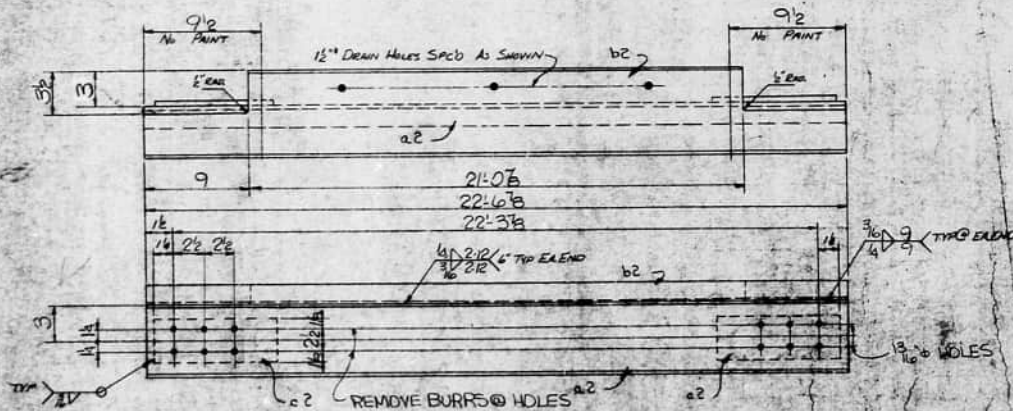
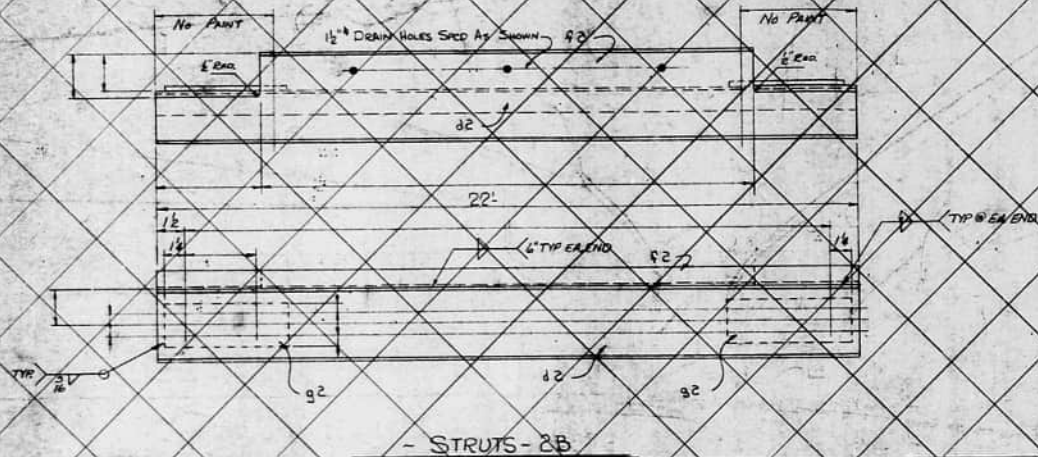
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PART SEE PI
MATERIAL BILL

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MATERIAL BILL

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14	4	1	1000	20	32	1	1	1	1	1
15	4	1	1000	20	32	1	1	1	1	1
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30	4	1	1000	20	32	1	1	1	1	1
31	4	1	1000	20	32	1	1	1	1	1
32	4	1	1000	20	32	1	1	1	1	1

WELD SPEC: AWWA D100-79
PIPE STRUCT. GR. & NOTED
MATERIAL BILL
PITTSBURGH DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
PITTSBURGH, PA. SANTA CLARA, CALIF.
BRIDGEVILLE, ALA. DES MOINES, IOWA
100 M GAL DEW TST 301
TRUCKEE, CALIFORNIA
COLUMNS
DRAWING NO. 18
CONTRACT NO. 21446



ITEM NO.	QTY	DESCRIPTION	UNIT	PRICE	TOTAL	REMARKS	DATE	BY	CHKD	APP'D	PLANT	REVISION
1												
2	4	2A STRUT	22"	4.95								
3	4	16x8 B	22"	1.10								
4	4	17x9 B	22"	1.10								
5	4	18x10 B	22"	1.10								
6												
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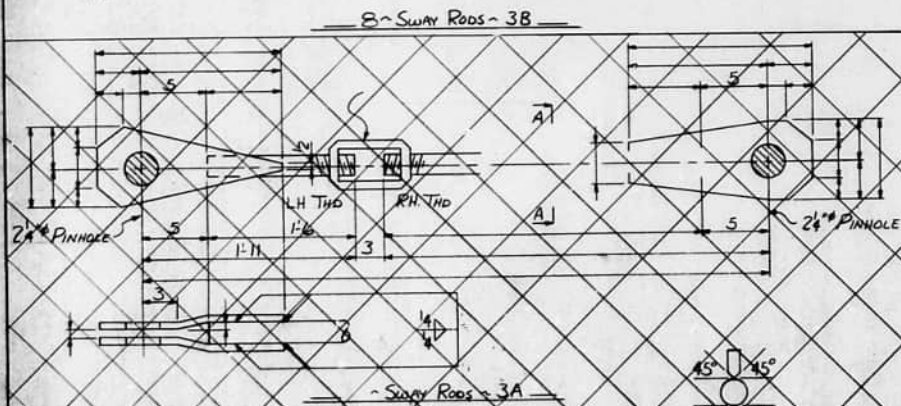
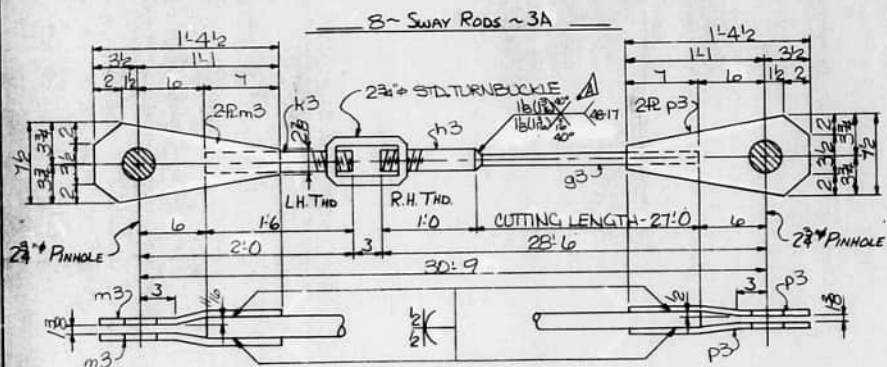
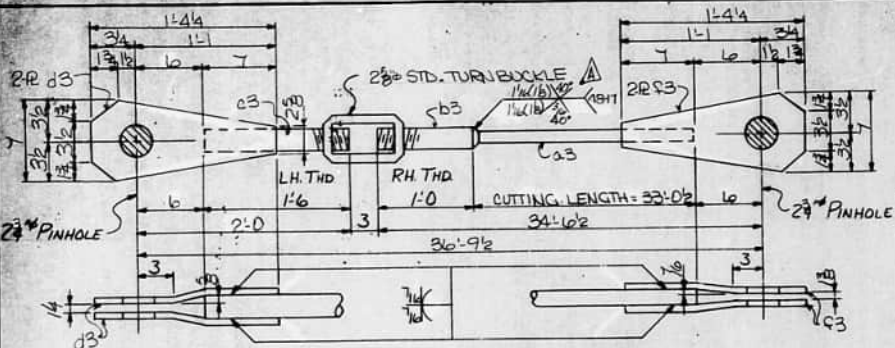
WELD SHIMS ANNA D100-79

OPTIONAL SHOP WELDS
WILL BE PERMITTED TO
UTILIZE STOCK MATERIAL.

1. NO. 100
2. NO. 100
3. NO. 100
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98. NO. 100
99. NO. 100
100. NO. 100

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40	41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60	61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80	81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98	99	100
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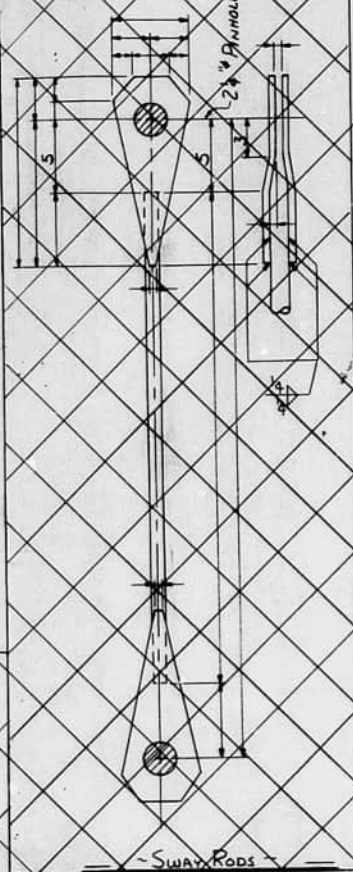
PITTSBURGH STEEL CO.
ENGINEERS - FABRICATORS - CONTRACTORS
PITTSBURGH, PA. 15201
100 N. CALLENT ST. 3014
PITTSBURGH, PA. 15201



ALL CODES 606

NO PAINT ON THREADS

SECTION A-A



MATERIAL BILL									
LINE NO.	QTY	UNIT	DESCRIPTION	SECTION & FINISHED SIZE	LENGTH FEET INCHES	CUT FROM OF CODE NO.	REMARKS	1/2" MATERIAL SOURCE	1/2" PLANT ROUTING
1	25	ROD	SWAY ROD	2 1/2"	25' 0"	10/10		ALCOA	
2	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
3	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
4	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
5	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
6	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
7	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
8	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
9	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
10	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
11	25	ROD	SWAY ROD	2 1/2"	25' 0"	10/10		ALCOA	
12	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
13	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
14	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
15	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
16	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
17	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
18	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
19	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
20	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
21	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
22	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
23	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
24	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
25	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
26	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
27	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
28	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
29	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
30	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
31	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
32	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
33	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
34	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
35	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
36	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
37	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
38	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
39	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
40	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
41	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
42	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
43	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
44	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
45	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
46	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
47	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
48	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
49	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
50	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
51	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
52	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
53	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
54	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
55	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
56	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
57	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
58	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
59	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
60	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
61	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
62	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
63	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
64	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
65	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
66	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
67	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
68	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
69	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
70	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
71	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
72	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
73	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
74	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
75	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
76	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
77	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
78	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
79	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
80	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
81	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
82	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
83	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
84	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
85	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
86	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
87	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
88	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
89	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
90	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
91	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
92	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
93	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
94	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
95	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
96	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
97	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
98	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
99	1	ROD	ROD	2 1/2"	1' 0"			1/2"	
100	1	ROD	ROD	2 1/2"	1' 0"			1/2"	

GRT PLANT YES NO U.S. MILL TEST REPORTS REQ. YES NO
 FRONT SEE DI NATL SPEC Q-1002C

MATERIAL BILL												
LINE NO.	QTY	UNIT	DESCRIPTION	SECTION & FINISHED SIZE	LENGTH	CUT FROM	REMARKS	1/2" BILL	MATERIAL	WEIGHT	PLANT ROUTING	
NO.	FEET	FEET			FEET	INCHES	EDGE NO.	NO. 11	SOURCE			
30												
31												
32												
33												
34												
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58												
CUT BLAST: YES NO U.A.			BILL TEST REPORTS REC'D: YES NO			GROUP #		PAGE		CHG.	BILL #	REV.
PART			MATERIAL SPECS.			FAS BY		CONT. #			DIT. #	

OPEN HOLES
ELEC. REF.
WELD SPEC.

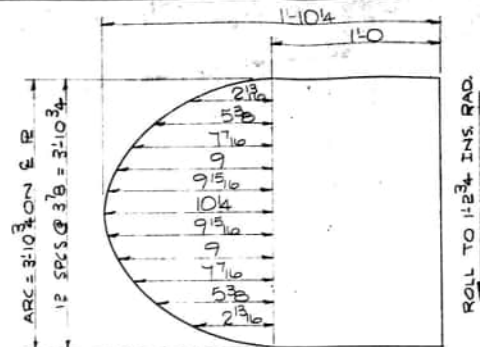
Noted
AWWAD 79

AWWAD 79

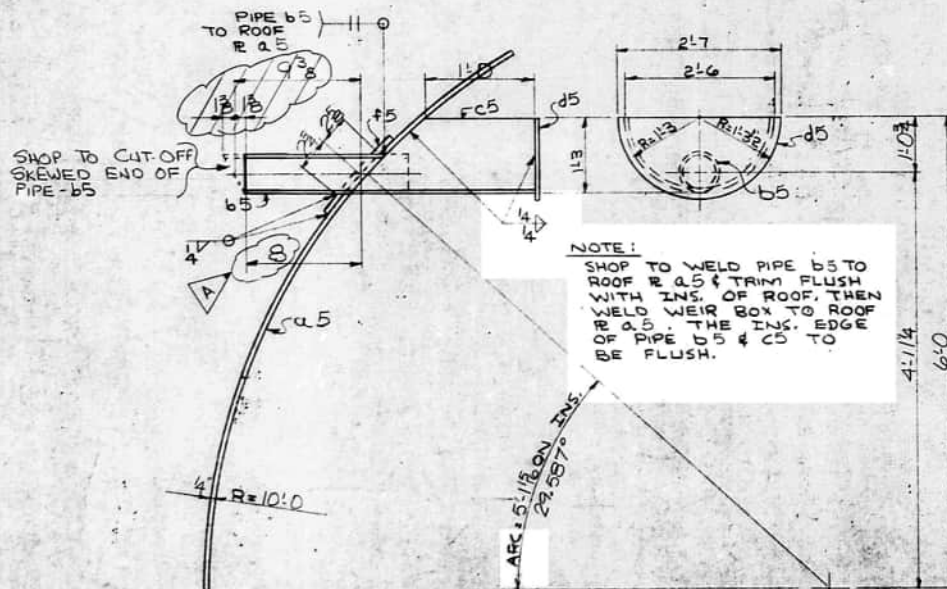
AWWAD 79

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
100 M. OBL. DEWITT 30'd
TRUCKEE, CALIFORNIA
Rods

CIVIL PREPARED AT
FABRICATED AT
DRAWN
CHECKED
CONTRACT NO.



DEVELOPED DETAIL OF R C5
SHOP NOTE: R C5 MAY BE SUBSTITUTED WITH
A HALF SECTION OF 30" O.D. PIPE.
(14" MIN. - 9" MAX. WALL THK.)



118 O'FLOW CONN. FOR ROOF P. 5A

WATERL BELL										
GL. NO.	IN	PL	PL	PL	DESCRIPTION	LENGTH	OUT L. IN	WATERL	WEIGHT	PLANT ROUTE
1	15				FEET	INCHES	CODE NO.	NO. L.		
1	15				1/2" 3" ROPE R		103		1700	(1700)
2					1/2" 3" ROPE R		103		1700	(1700)
3					1/2" 3" ROPE R		103		1700	(1700)
4	15				1/2" 3" ROPE R		103		1700	(1700)
5					1/2" 3" ROPE R		103		1700	(1700)
6					1/2" 3" ROPE R		103		1700	(1700)
7					1/2" 3" ROPE R		103		1700	(1700)
8					1/2" 3" ROPE R		103		1700	(1700)
9					1/2" 3" ROPE R		103		1700	(1700)
10					1/2" 3" ROPE R		103		1700	(1700)
11	4				1/2" 3" ROPE R		103		1700	(1700)
12					1/2" 3" ROPE R		103		1700	(1700)
13					1/2" 3" ROPE R		103		1700	(1700)
14					1/2" 3" ROPE R		103		1700	(1700)
15					1/2" 3" ROPE R		103		1700	(1700)
16	4				1/2" 3" ROPE R		103		1700	(1700)
17					1/2" 3" ROPE R		103		1700	(1700)
18					1/2" 3" ROPE R		103		1700	(1700)
19					1/2" 3" ROPE R		103		1700	(1700)
20	12				1/2" 3" ROPE R		103		1700	(1700)
21					1/2" 3" ROPE R		103		1700	(1700)
22					1/2" 3" ROPE R		103		1700	(1700)
23					1/2" 3" ROPE R		103		1700	(1700)
24					1/2" 3" ROPE R		103		1700	(1700)
25					1/2" 3" ROPE R		103		1700	(1700)
26					1/2" 3" ROPE R		103		1700	(1700)
27					1/2" 3" ROPE R		103		1700	(1700)
28					1/2" 3" ROPE R		103		1700	(1700)
29					1/2" 3" ROPE R		103		1700	(1700)
30					1/2" 3" ROPE R		103		1700	(1700)
31					1/2" 3" ROPE R		103		1700	(1700)
32					1/2" 3" ROPE R		103		1700	(1700)
33					1/2" 3" ROPE R		103		1700	(1700)
34					1/2" 3" ROPE R		103		1700	(1700)
35					1/2" 3" ROPE R		103		1700	(1700)
36					1/2" 3" ROPE R		103		1700	(1700)
37					1/2" 3" ROPE R		103		1700	(1700)
38					1/2" 3" ROPE R		103		1700	(1700)
39					1/2" 3" ROPE R		103		1700	(1700)
40					1/2" 3" ROPE R		103		1700	(1700)
41					1/2" 3" ROPE R		103		1700	(1700)
42					1/2" 3" ROPE R		103		1700	(1700)
43					1/2" 3" ROPE R		103		1700	(1700)
44					1/2" 3" ROPE R		103		1700	(1700)
45					1/2" 3" ROPE R		103		1700	(1700)
46					1/2" 3" ROPE R		103		1700	(1700)
47					1/2" 3" ROPE R		103		1700	(1700)
48					1/2" 3" ROPE R		103		1700	(1700)
49					1/2" 3" ROPE R		103		1700	(1700)
50					1/2" 3" ROPE R		103		1700	(1700)
51					1/2" 3" ROPE R		103		1700	(1700)
52					1/2" 3" ROPE R		103		1700	(1700)
53					1/2" 3" ROPE R		103		1700	(1700)
54					1/2" 3" ROPE R		103		1700	(1700)
55					1/2" 3" ROPE R		103		1700	(1700)
56					1/2" 3" ROPE R		103		1700	(1700)
57					1/2" 3" ROPE R		103		1700	(1700)
58					1/2" 3" ROPE R		103		1700	(1700)
59					1/2" 3" ROPE R		103		1700	(1700)
60					1/2" 3" ROPE R		103		1700	(1700)
61					1/2" 3" ROPE R		103		1700	(1700)
62					1/2" 3" ROPE R		103		1700	(1700)
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152					1/2" 3" ROPE R		103		1700	(1700)
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154					1/2" 3" ROPE R		103		1700	(1700)
155					1/2" 3" ROPE R		103		1700	(1700)
156					1/2" 3" ROPE R		103		1700	(1700)
157					1/2" 3" ROPE R		103		1700	(1700)
158					1/2" 3" ROPE R		103		1700	(1700)
159					1/2" 3" ROPE R		103		1700	(1700)
160					1/2" 3" ROPE R		103		1700	(

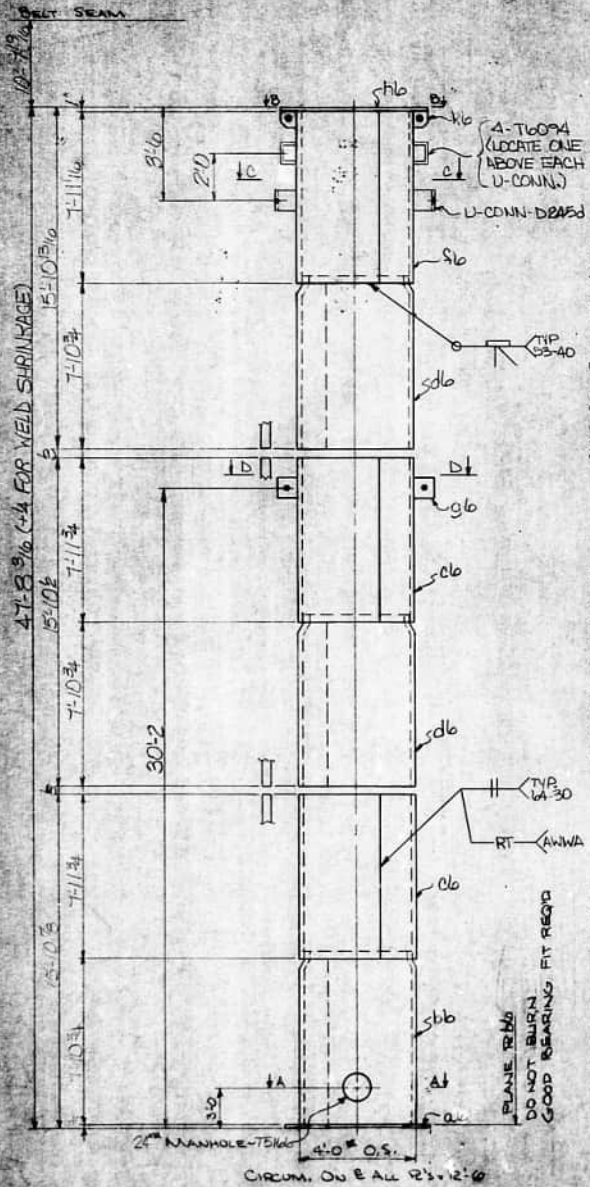
MATERIAL BILL											
NO. OF ASPS	NO. OF PCS.	PIECE MARK	DESCRIPTION SECTION & FINISHED SIZE	LENGTH FEET (INCHES)	CUT FROM SP. CODE NO.	REMARKS	1/2" (INCH) BOLL L.I.	MATERIAL SOURCE	WEIGHT	PLANT IDENTIFICATION	
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DIST. BLAST YES NO U.S.A.			MILL TEST REPORT REQ'D. YES NO			GROUP #	MADE	CHRG.	BILL #	REV.	
Plant			MATH. SPECL			FAB. BY	COAT. #			DIT. #	

OPEN HOLES NONE
 EREC. REF. E2
 WELD SPEC. AWA-100-T

NO.	DATE	DESCRIPTION OF INJURY
		CUT-OFF PIPE 65

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
PITTSBURGH, PA. DUNSMUIR, PA. BRIDGEVILLE, PA. BUTTE, MONT.
BIRMINGHAM, ALA. BIRMINGHAM, ALA. NEW BRUNSWICK, N.J. PHOENIX, ARIZ.
PITTSBURGH, PA. PITTSBURGH, PA. PITTSBURGH, PA. PITTSBURGH, PA.
100 M CAL DEWIT ST-C-4
TRUCKEE, CALIFORNIA
118 O'FLOW, CONN.

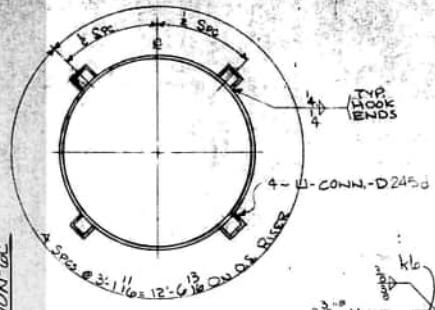
DWG. PREPARED AT		135
FABRICATED AT		22
	BY	DATE
DRAWN	+KMB	1/1/81
CHECKED	HV	1/1/81
DRAWING NO.		
CONTRACT NO.		



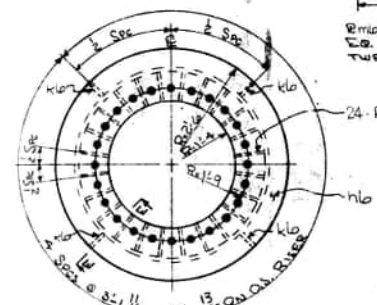
ONE-RISER SECTION-LB

ONE-RISER SECTION-LB

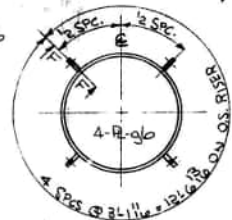
ONE-RISER SECTION-LB



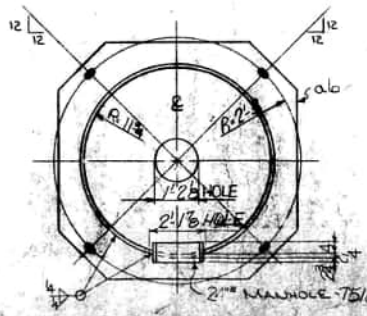
SECTION C-C



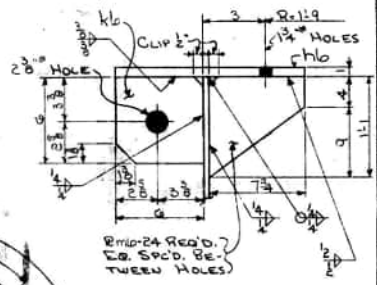
SECTION B-B



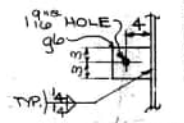
SECTION D-D



SECTION A-A



SECTION E-E



SECTION F-F

LINE NO.	NO. OF RISER	PIECE MARK	DESCRIPTION	FINISHED SIZE	LENGTH FT.	UNIT PRICE	REMARKS	NO. OF BILLS	DATE	WEIGHT	PLANT ROUTING
1	1	LA	RISER SECTION	48" X 50"	4.2	247	48" X 50"	247			
2	1	ALO	R 3x 50	12 6	2	242	SEE CS-1	242			
3	1	BLO	R 4x 95 3/4	12 6	1	240		240			
4	1	CLO	R 4x 95 3/4	12 6	1	10.17		10.17			
5	1	72166	23 1/2" MANHOLE			235	PERGEE S/PTO 22 FOR INSTALLATION	235			
6											
7											
8											
9	1	LB	RISER SECTION	48" X 50"	4.2	247	48" X 50"	247			
10	1	ALO	R 4x 95 3/4	12 6	2	242		242			
11	1	ALO	R 4x 95 3/4	12 6	1	10.17		10.17			
12	1	ALO	R 12 x 10	12 6	1	23		23			
13											
14											
15											
16	1	LB	RISER SECTION	48" X 50"	4.2	247	48" X 50"	247			
17	1	ALO	R 4x 95 3/4	12 6	2	242		242			
18	1	ALO	R 4x 95 3/4	12 6	1	10.17		10.17			
19	1	BLO	R 4x 95 3/4	12 6	1	10.17		10.17			
20	1	BLO	R 16x 60x 32 1/2	1 6	573		SEE CS-2	573			
21	1	KLO	R 3x 10	1 6	20			20			
22	1	MLO	R 2 x 7 1/4	1 1	223			223			
23	1	NOV 23	R 12 x 10	1 5/12	100			100			
24	1	NOV 23	R 5 1/2 x 14	1 9	4			4			
25											
26	1		AS50 STD PDM NAME R								
27											
28											

DATE		SEE	P1	MAIL SPEED	PC	442536	PART BY		32	COUNT	=	512535	DATE	=	40	BY	427
Material Bill																	
LINE NO.	NO. OF RISER	NO. OF PCS	PIECE MARK	DESCRIPTION FINISHED SIZE	LENGTH FT.	UNIT PRICE	UNIT CODE NO.	REMARKS	DATE BILLS PAID	DATE SOURCE	WEIGHT	PLANT ROUTING					
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PART				MAIL SPEED				END BY				COUNT		DATE		BY	

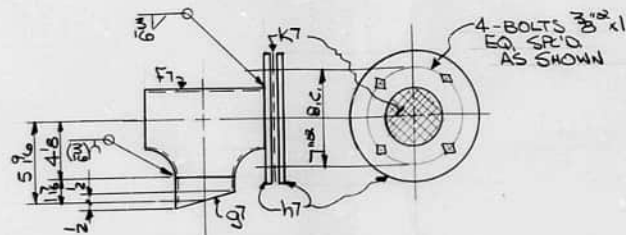
NOTE: MATCH LINES MARKED E IN ALL VIEWS.

WELD SPECS: AWWA D100-79

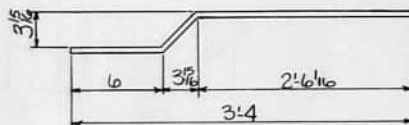
MAT. RA283c
SPEC. NO. E2

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS - FABRICATORS - CONTRACTORS
PITTSBURGH, PA. SANTA CLARA, CALIF.
BIRMINGHAM, ALA. DES MOINES, IOWA
100 M GAL DEW TIT
TRUCKEE, CALIFORNIA
42\"/>

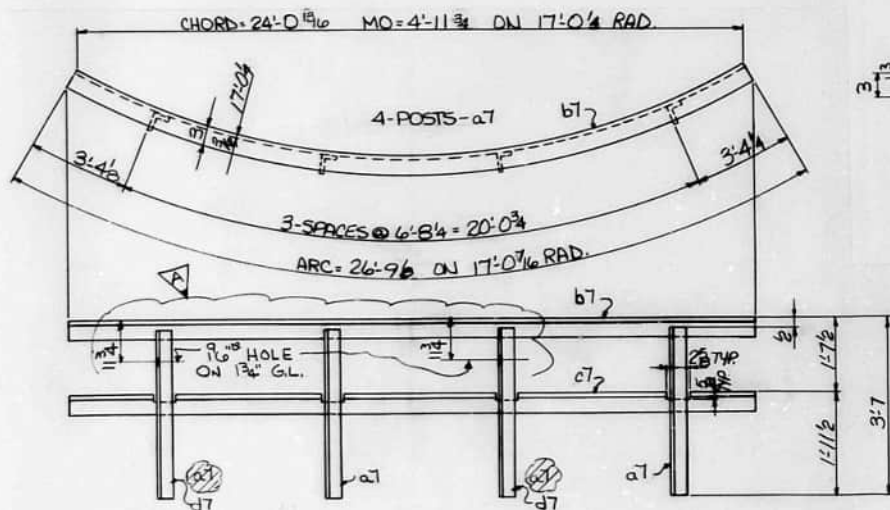
UNLESS SPECIFIED AT
FABRICATED AT
DRAWN
CHECKED
REVIEWED
DATE
CONTRACT NO. 31358



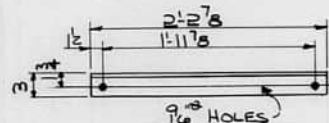
ONE-OFF FLOW TEE-7P
FAB AT 32



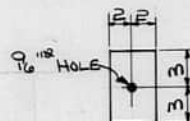
2-BRACKETS-7B



4-HANDRAILS-7A



8-ANGLES-7H
FAB AT 32

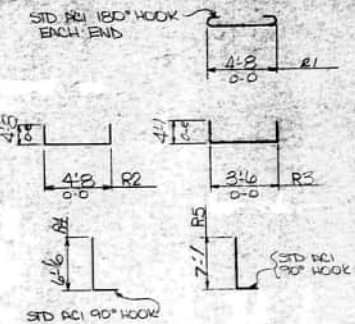
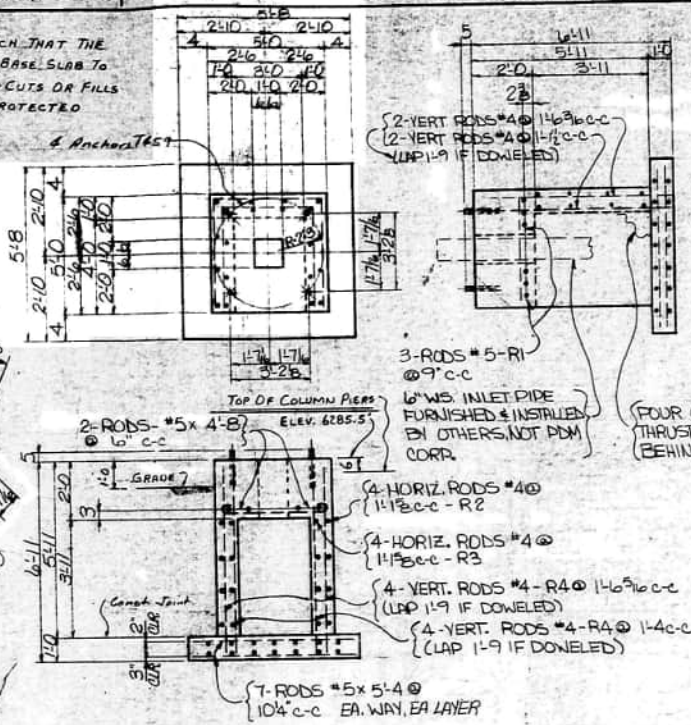
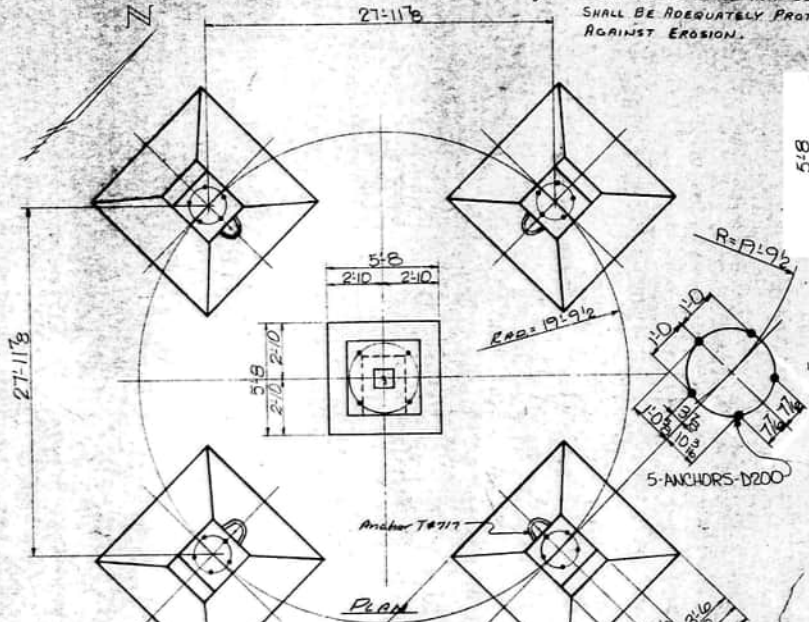


8-PLATES-7K
FAB AT 32

MATERIAL BILL									
ALL NO.	NO. OF	PIECE	DESCRIPTION	LENGTH	CUT FROM	REMARKS	1/2" BILL	MATERIAL	WEIGHT
NO.	ASST.	NO.	SECTION & FINISHED SIZE	FEET	OF CODE NO.		NO. LBL	SOURCE	
1	4	7A	HANDRAILS	2	622		3	16B	(2A2)
2	8	a7	2 1/2 x 3 1/2	2	622		3	16B	
3	4	a7	2 1/2 x 3 1/2	2	622		3	16B	
4	4	a7	2 1/2 x 3 1/2	2	622		3	16B	
5	8	a7	2 1/2 x 3 1/2	2	622		3	16B	
6	2	7B	BRACKETS	3	580		2	16B	(7)
7	2	7B	BRACKETS	3	580		2	16B	
8	2	7C	2 1/2 x 4 x 5/16	7	5		1	153	(16)
9	1	7D	2 1/2 x 4 x 5/16	2	11		1	20	
10	2	7E	2 1/2 x 3 x 4	9			1	5	(3)
11	2	7F	2 1/2 x 3 x 2	10			1	4	(2)
12									
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R-8888 PIPE A DES MOINES SEE RI 100 M CAL DENTIST SD & TRACKER CALIFORNIA MISCELLANEOUS	PITTSBURGH-DES MOINES STEEL CO. ENGINEERS FABRICATORS CONTRACTORS PITTSBURGH, PA. SANTA CLARA, CALIF. BIRMINGHAM, ALA. DES MOINES, IOWA	THIS PURCHASE AT FABRICATED AT DRAWN BY CHECKED BY APPROVED BY
--	---	--

NOTE: FINAL GRADING TO BE SUCH THAT THE COVER OVER BOTTOM OF BASE SLAB TO BE A MIN. OF 4'-10". ANY CUTS OR FILLS SHALL BE ADEQUATELY PROTECTED AGAINST EROSION.



NOTE:
DO NOT SCALE THIS DRAWING. CHECK ALL DIMENSIONS ON THE GROUND. IF ANY DIMENSIONS DO NOT CHECK DO NOT PROCEED UNTIL THEY ARE VERIFIED OR CORRECTED.
BUILD ALL PIERS AT SAME LEVEL, EXCEPT RISER PIER. FINISHED ELEVATION: FINISH TOPS OF PIERS LEVEL & SMOOTH. DO NOT PERMIT WEIGHT OF CONCRETE ON ANCHORS TO PULL THEM OUT OF POSITION WHILE POURING.
CONCRETE: 3000 PSI OR BETTER @ 28 DAYS. SEE CONSULTING ENGINEER'S SPECIFICATIONS. FOUR PIERS MONOLITHICALLY EXCEPT FOR CONSTRUCTION JOINTS SHOWN. REINFORCING RODS NOT FURNISHED BY P.D.M. CORP.
REINFORCING RODS TO BE ASTM A615 GRADE 60 AND A615 30K-70. CHAMFER ALL EXPOSED RODS 1\"/>

NOTE:
THESE FOUNDATIONS ARE DESIGNED FOR BEARING ON GOOD FIRM NATURAL EARTH, CLEAN DRY SAND, FIRM CLAY OR OTHER SOIL HAVING A SAFE BEARING CAPACITY OF 3000 LBS PER SQUARE FOOT NET. IF THE SOIL AT THE BOTTOM OF THE EXCAVATION IS NOT EQUAL TO THE ABOVE REQUIREMENTS, IF IT IS NOT OF UNIFORM BEARING VALUE, OR IF THERE ARE ANY STRAINS OR EXCAVATIONS NEAR WHICH MIGHT AFFECT THE STABILITY OF THE FOUNDATIONS, CONSULT YOUR ENGINEER OR PITTSBURGH-DES MOINES CORPORATION BEFORE PROCEEDING. AS PITTSBURGH-DES MOINES CORPORATION ASSUMES NO RESPONSIBILITY FOR THE SAFE BEARING VALUE OF THE SOIL.

EXCAVATION & BRICKFILL PER ENG'S SPECS.
TOP ELEVATION OF RISER PIER IS 6" GREATER THAN 4 COLUMN PIERS.

THESE FOUNDATIONS ARE DESIGNED FOR BEARING ON MEDIUM DENSE TO VERY DENSE SOILS AND WEATHERED OR FRESH ROCK WHICH UNDERLIES THE SITE HAVING A SAFE BEARING CAPACITY OF 3000 LBS PER SQUARE FOOT NET. IF THE SOIL AT THE BOTTOM OF THE EXCAVATION IS NOT EQUAL TO THE ABOVE REQUIREMENTS, IF IT IS NOT OF UNIFORM BEARING VALUE OR IF THERE ARE ANY STRAINS OR EXCAVATIONS NEAR WHICH MIGHT AFFECT THE STABILITY OF THE FOUNDATIONS, CONSULT YOUR ENG'R BEFORE PROCEEDING. AS P.D.M. CORP. ASSUMES NO RESPONSIBILITY FOR THE SAFE BEARING VALUE OF THE SOIL. SEE SOIL REPORT.

HAIRPIN ANCHOR T417 (MODIFIED)

28-VERT. RODS #7-R5

8-SETS #3 TIES @ 9 3/4" C-C, 5 TIES PER SET

8-RODS #4X9-16 @ 1'-4 1/4" C-C EA WAY BENDS AS SHOWN

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

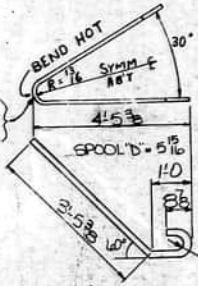
14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

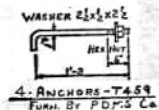
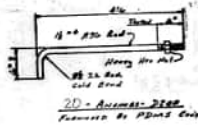
14-BARS #7 @ 9 1/2" C-C

14-BARS #7 @ 9 1/2" C-C

CONCRETE QUANTITIES
& Col. piers - 33.5 CU.YDS.
Center pier - 4.9 CU.YDS.
TOTAL = 38.4 CU.YDS.



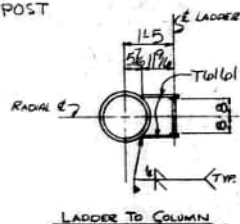
4-HAIRPIN ANCHORS-T417 (MODIFIED)
FURNISHED BY P.D.M. CORP.



NO.	DATE	BY	CHKD.	REVISION	DESCRIPTION
1					
2					
3					
4					
5					
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30					

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
1000 CAL. DELVIEW ST. 3015
TRUCKEE, CALIFORNIA
ERIE FOUNDATION PLAN

PREPARED BY: J. L. BROWN
CHECKED BY: J. L. BROWN
DATE: 12/5/51
DRAWING NO. 87
CONTRACT NO. 31358



LANIER MATERIAL:

SIDE BARS - R 3/4 x 2 @ 1/4 APART
RUNGS - R 1/2 x 2 @ 1/4 OC-C
BRACKETS - R 3/4 x 5

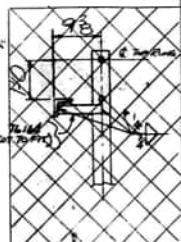
9A

LOCATE ROOF LADDER FOR
EASY ACCESS TO ROOF WATCH

WELD EXTENSION BRKT }
T6165 TO BRKT T6161 }

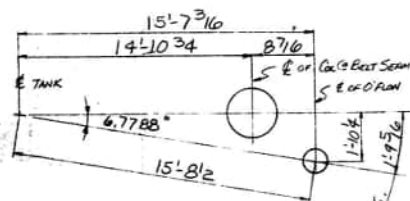
LINE BRKTS - T60601

LADDER ERECTION



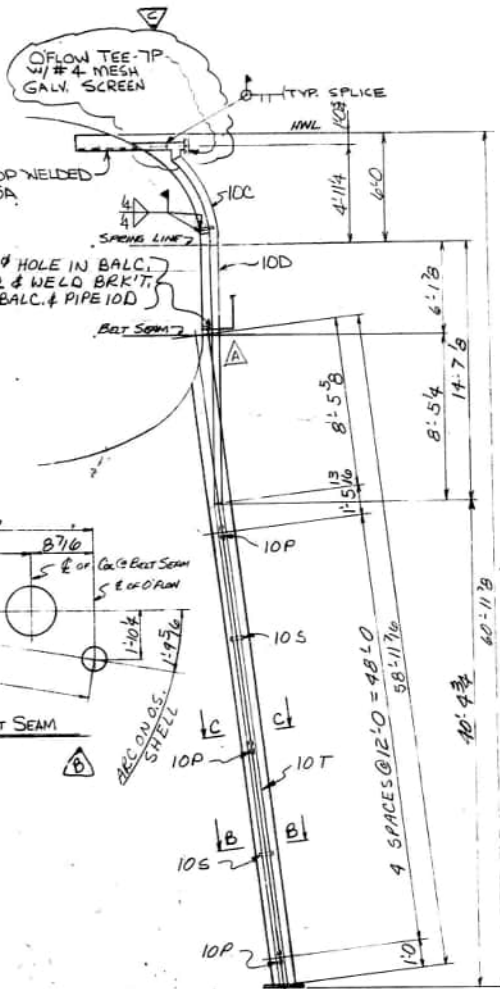
WIER BOX-SHOP WELDED
TO ROOF R. 5A

BURN 5" Ø HOLE IN BALC.
FLOOR & WELD BRK'T.
10 N TO BALC. & PIPE 10D

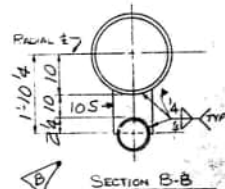


VIEW AT BELT SEAM

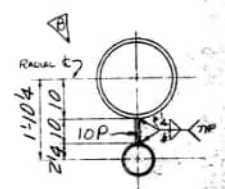
LAD-SAF SAFETY DEVICE FOR
STRAIGHT LADDERS x 55:0 c-c
RUNGS - COMPLETE @ 2 CON-
NECTORS, 2 SLEEVES, 2 BELTS &
2 LANYARDS



OVERFLOW ERECTION



SECTION B-8



SECTION C-C

[illegible]

		O'FLOW	HIGH ADD HALF BRACES AS
		O'FLOW	ADDITION GCS
		SUBTRACT	ANALOG FLOW M

PITTSBURGH-DES MOINES STEEL CO.
ENGINEERS-FABRICATORS-CONTRACTORS
PITTSBURGH, PA. - ST. LOUIS, MO. - CHICAGO, ILL.
MINNEAPOLIS, MINN. - MILWAUKEE, WIS. - INDIANAPOLIS, IND.
DETROIT, MICH. - CLEVELAND, OHIO - PITTSBURGH, PA.
MEMPHIS, TENN. - KANSAS CITY, MO. - ST. LOUIS, MO.

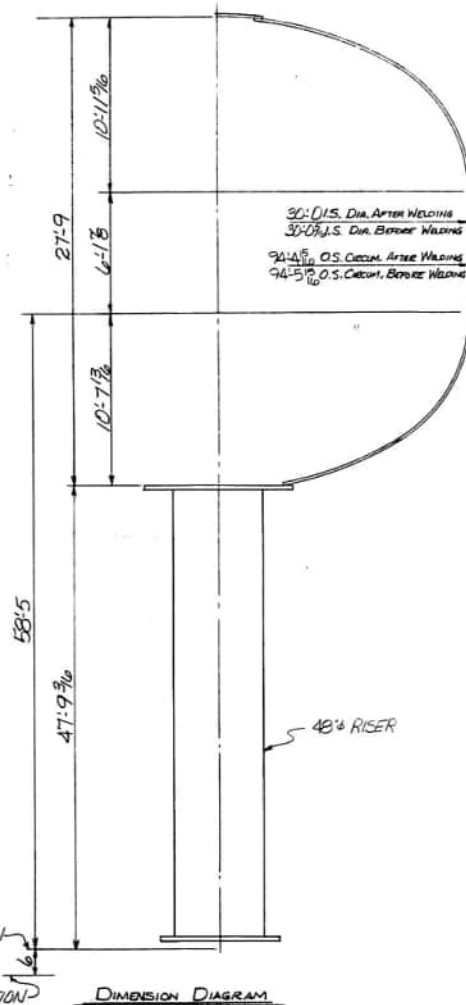
100M-GAL DEWTER 304
TRUCKER CALIFORNIA
LADDER & CEILING ERECTION

DRAWN PREPARED BY		BY		DATE	
FABRICATED AT		BY		DATE	
DRAWN		BY		DATE	
CHECKED		BY		DATE	
DRAWING NO.		BY		DATE	
CONTRACT NO.		BY		DATE	



RADIOGRAPHIC REQUIREMENTS			
SEAM	Ln. Ft.	TOL.	#SEAMS
SANDER TO BOTTOM	25	30	1
BOTTOM TO SUE-AS-1	202	4	2
BOTTOM RADIAL	75	4	1
BOTTOM TO SHELL	58	5/10 ^{3/4}	1
SHELL VENTS	43	5/10 ^{3/4}	1
ROOF TO SHELL	95	3/10 ^{3/4}	1
ROOF SUE-AS-1	52	4	1
ROOF RADIAL	27	4	1
TOTALS	148		9

3 SHOTS REQUIRED AT INTERSECTIONS.



A B C D E F G H I J K L M N O P Q R S T U V W X Y Z														
NO														
DATE														
DEPTH APRIL CORNER SHIP PROG. ION. TIDE. MACH. REL. V. WITH.														
BRIT. BLAST YES ☐ NO ☐														
SHIP NAME														
SHIP ADDRESS AND MAILING MARK ☐ NO ☐ MATERIAL														
FOR MAILING MARK DIAGRAM SEE SHEET														
A T V W X Y Z OSH VOL.														

NO.	DATE	DESCRIPTION OF REVISION	P.
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TRUCKEE, CALIFORNIA
WAS QUINCY CENTER

DWG. PREPARED AT <u>MS</u>	
FABRICATED AT <u>325</u>	
BY <u>WJG</u>	DATE <u>12/28/89</u>
CHECKED <u>HW</u>	<u>1-18-91</u>
DRAWING NO. <u>WQ1</u>	
CONTRACT NO. <u>375</u>	