AGR22-68

INCORPORATED COUNTY OF LOS ALAMOS
SERVICES AGREEMENT

This **SERVICES AGREEMENT** (this "Agreement") is entered into by and between the **Incorporated County of Los Alamos**, an incorporated county of the State of New Mexico ("County"), and **Molzen Corbin**, a New Mexico corporation ("Contractor"), collectively the "Parties," to be effective for all purposes June 30, 2022.

WHEREAS, the County, through the Department of Public Utilities ("DPU"), provides various public utility services within the county which include potable water, wastewater treatment, natural gas, and electrical production and distribution services; and

WHEREAS, to ensure the continued viability, safety, and functionality of the drinking water wells, DPU requires professional engineering services to design and prepare construction drawings and specifications for various electric and mechanical upgrades to existing wells and booster stations in the DPU water production system.

WHEREAS, the County Purchasing Officer determined in writing that the use of competitive sealed bidding was either not practical or not advantageous to County for procurement of the Services and County issued Request for Proposals No. 22-68 (the "RFP") on May 5, 2022, requesting proposals for Engineering Services Water Production Facilities Electric and Mechanical Upgrades as described in the RFP; and

WHEREAS, Contractor timely responded to the RFP by submitting a response dated May 26, 2022 ("Contractor's Response"); and

WHEREAS, based on the evaluation factors set out in the RFP, Contractor was the successful Offeror for the services listed in the RFP; and

WHEREAS, the Board of Public Utilities approved this Agreement at a public meeting held on June 15, 2022; and

WHEREAS, the County Council approved this Agreement at a public meeting held on June 28, 2022; and

WHEREAS, Contractor shall provide the Services, as described below, to County.

NOW, THEREFORE, for and in consideration of the premises and the covenants contained herein, County and Contractor agree as follows:

SECTION A. SERVICES:

1. Generally. Contractor shall provide engineering services for a Project to design, bid, and construct the necessary upgrades, improvements, and replacement of a variety of electric and mechanical components at the County water production well sites shown in Exhibit "C" (hereafter "Services"), as described in detail and prioritized in Exhibit "D," "Water Production

Facilities Electrical and Mechanical Condition Assessment" dated March 2022 by Molzen Corbin, attached hereto and made a part hereof for all purposes. Contractor shall provide all experienced and properly licensed and registered staff to carry out the Services as required by the State of New Mexico or local governing body.

2. Project Kick-Off. Contractor shall, within ten (10) business days from the Effective Date of this Agreement, schedule a kick-off meeting with the County's designated County staff ("Project Team") at a date, time, and in a format to be agreed upon by both Parties. During the kick-off meeting, the Project Team shall:
    a. Establish a mutually agreed upon Project Schedule to accomplish key tasks with durations for each task conforming substantially to the Contractor's proposed Project Schedule shown in Exhibit "B," attached hereto and made a part hereof for all purposes, and with all Services and Deliverables described in Sections A.3 – A.6 and Section B. of this Agreement scheduled for completion no later than one hundred eighty-nine (189) days from the Effective Date of this Agreement, unless otherwise extended by County in writing. The completion of the Construction Phase Engineering Services described in section B.8 shall be determined by the construction schedule provided during the Construction Bid Phase described in Section B.7 and shall be incorporated into the Project Schedule upon Project Manager review and approval. The Project Schedule shall include, at a minimum, due dates and Project milestones. Contractor shall, within five (5) business days of the kick-off meeting, provide a written Project Schedule to the designated Project Manager for review and approval.
    b. The parties, in the kick-off meeting, shall discuss and set out in writing the following:
        i. Scope of work by Contractor;
        ii. Roles and responsibilities of Contractor and County;
        iii. Identification of document formats and data transfers between Contractor and Project Team related to the performance of this Agreement;
        iv. Contractor design approach and comments by County;
        v. New Mexico Finance Authority ("NMFA") and New Mexico Environment Department ("NMED") review requirements;
        vi. Outlining of water system control panel(s) considerations and compatibility with DPU's concurrent project to conduct a Water System Supervisory Control and Data Acquisition ("SCADA") study;
        vii. Well level measurement/monitoring options;
        viii. Motor inspection and testing options and approach and how best to procure the third-party service provider to perform the inspection and testing; and
        ix. Well measurement instrument installation options and approach.

3. Well Motor Inspection and Testing. The County is responsible for procuring well motor inspection and testing for all wells identified in Exhibit "B" by a third-party service provider who possesses the proper equipment and ability to perform well motor inspections and testing in accordance with Contractor's specifications. County shall provide the well motor inspection and testing data to Contractor in the agreed-upon format, pursuant to the Project Schedule, unless otherwise extended by County.

4. Well Depth, Temperature, Pressure Data, Transducer, and SCADA Design. Contractor, pursuant to the Project Schedule, shall:

a. Provide to County instructions for conducting a test to assess the effectiveness of the sounder casings on eight (8) wells identified by the Project Team as having sounder casings, and if the tests are not successful, as determined by the Project Team, provide to County recommendations, implementation details, estimated costs, steps, equipment, and timeframe necessary for implementing possible alternatives, which may include, but are not limited to, the installation of a submersible transducer between the well casing and the pump and installation of airlines using stainless steel tubing;
b. Based on the alternative recommendations presented by Contractor and option selected by the Project Team, prepare drawings and technical specifications for furnishing and installing well depth/temperature/pressure data transducers at the eight (8) wells identified by County as having sounder casings;
c. Design power supply conductor/conduit and data conductor/conduit between depth sounder casing and SCADA cabinet;
d. Based on specified equipment, prepare input/output ("I/O") list, Points and Instrumentation ID labeled diagram ("P&ID"); and conduit & wiring configuration drawings; and
e. Coordinate with County and current SCADA vendor, HSQ Technologies, to prepare the P&ID diagram and I/O list and ensure the equipment specified and engineering is compatible with County's existing SCADA system.

5. <u>NMED Water Quality Bureau ("NMED-DWQB"), NMED Construction Programs Bureau (NMED-CPB), and NMFA Approval.</u> Contractor shall, pursuant to the Project Schedule, coordinate and secure any necessary written approvals and permits from NMED-CPB, NMED-DWQB, and NMFA, and prepare and submit all items required for approval by these agencies prior to bidding the Project, which may include, but is not limited to a design analysis report, specifications, construction drawings, and engineering drawings.

6. <u>Bidding Phase Engineering Services.</u> Contractor, pursuant to the Project Schedule, shall:
   a. Prepare bid sheet and scope of work for invitation for bids;
   b. Prepare responses to technical questions received during bidding associated with the plans and specifications; and
   c. Assist County in evaluating bids received in accordance with all applicable County procurement laws, regulations, and procedures; assign Contractor's Project Team staff to serve on the County's Evaluation Committee; and provide written recommendation of award to the successful contractor as required by the funding agency.

7. <u>Construction Phase Engineering Services</u>. Contractor shall, pursuant to the Project Schedule, or as may be determined by mutual written agreement:
   a. Provide engineering services during the construction of the future contracted work including, but not limited to, administering and addressing Requests for Information, submittal review, and approval, preparation of as-built drawings, participation in at least ten (10) construction coordination meetings with the later selected contractor and County throughout the Project construction and start-up.
   b. Perform at least three site inspections at critical junctures, identified by County staff during Project meetings, and agreed upon by both Parties, and site inspections at start-up and commissioning of new equipment as installed by the later construction contractor.

SECTION B. DELIVERABLES. Contractor shall, pursuant to the Project Schedule provide to the County's Project Manager the following:

1. Project Design-50% Completion. Contractor, pursuant to the Project Schedule, shall submit, for County's review and approval, project drawings, a design analysis report, technical specifications, and preliminary opinion of cost, for the electrical and mechanical work at the 50% complete stage.

2. Project Design-90% Completion. Contractor, pursuant to the Project Schedule, shall submit for County's review and approval, the complete construction drawings, supplemental technical specifications, and opinion of cost for the Contractor's 90% submittal.

3. Project Design-100% Completion. Contractor, pursuant to the Project Schedule, shall submit for County's review and approval, the complete construction drawings, supplemental technical specifications, and final opinion of cost for the Contractor's 100% submittal.

SECTION C. TERM: The term of this Agreement shall commence July 1, 2022, and shall continue through June 30, 2024, unless sooner terminated, as provided herein. At County's sole option the Agreement may be renewed for up to one (1) consecutive one-year period(s), unless sooner terminated, as provided therein.

SECTION D. COMPENSATION:

1. **Amount of Compensation**. County shall pay compensation for performance of the Services in an amount not to exceed **TWO HUNDRED NINE THOUSAND SIX HUNDRED FOUR DOLLARS ($209,604.00)** which amount includes all travel and direct Contractor expenses and does not include applicable New Mexico gross receipts taxes ("NMGRT"). Compensation shall be paid in accordance with the rate schedule set out in Exhibit "A," attached hereto, and made a part hereof for all purposes.
2. **Monthly Invoices**. Contractor shall submit itemized invoices, in accordance with Exhibit "A," attached hereto and made a part hereof for all purposes, to County's Project Manager showing amount of compensation due, amount of any NMGRT, and total amount payable. Payment of undisputed amounts shall be due and payable thirty (30) days after County's receipt of the invoice.

SECTION E. TAXES: Contractor shall be solely responsible for timely and correctly billing, collecting, and remitting all NMGRT levied on the amounts payable under this Agreement.

SECTION F. STATUS OF CONTRACTOR, STAFF, AND PERSONNEL: This Agreement calls for the performance of services by Contractor as an independent contractor. Contractor is not an agent or employee of County and shall not be considered an employee of County for any purpose. Contractor, its agents, or employees shall make no representation that they are County employees, nor shall they create the appearance of being employees by using a job or position title on a nameplate, business cards, or in any other manner, bearing County's name or logo. Neither Contractor nor any employee of Contractor shall be entitled to any benefits or compensation other than the compensation specified herein. Contractor shall have no authority to bind County to any agreement, contract, duty, or obligation. Contractor shall make no representations that are intended to, or create the appearance of, binding County to any agreement, contract, duty, or obligation. Contractor shall have full power to continue any outside employment or business, to employ and discharge its employees or associates as it deems appropriate without interference from County; provided, however, that Contractor shall at all times during the term of this Agreement maintain the ability to perform the obligations in a professional, timely and reliable manner.

SECTION G. STANDARD OF PERFORMANCE: Contractor agrees and represents that it has and shall maintain the personnel, experience, and knowledge necessary to qualify it for the particular duties to be performed under this Agreement. Contractor shall perform the Services described herein in accordance with a standard that meets the industry standard of care for performance of the Services.

SECTION H. DELIVERABLES AND USE OF DOCUMENTS: All deliverables required under this Agreement, including material, products, reports, policies, procedures, software improvements, databases, and any other products and processes, whether in written or electronic form, shall remain the exclusive property of and shall inure to the benefit of County as works for hire; Contractor shall not use, sell, disclose, or obtain any other compensation for such works for hire. In addition, Contractor may not, with regard to all work, work product, deliverables, or works for hire required by this Agreement, apply for, in its name or otherwise, any copyright, patent, or other property right and acknowledges that any such property right created or developed remains the exclusive right of County. Contractor shall not use deliverables in any manner for any other purpose without the express written consent of County.

SECTION I. EMPLOYEES AND SUB-CONTRACTORS: Contractor shall be solely responsible for payment of wages, salary, or benefits to any and all employees or contractors retained by Contractor in the performance of the Services. Contractor agrees to indemnify, defend and hold harmless County for any and all claims that may arise from Contractor's relationship to its employees and subcontractors.

SECTION J. INSURANCE: Contractor shall obtain and maintain insurance of the types and in the amounts set out below throughout the term of this Agreement with an insurer acceptable to County. Contractor shall assure that all subcontractors maintain like insurance. Compliance with the terms and conditions of this Section is a condition precedent to County's obligation to pay compensation for the Services and Contractor shall not provide any Services under this Agreement unless and until Contractor has met the requirements of this Section. County requires Certificates of Insurance or other evidence acceptable to County that Contractor has met its obligation to obtain and maintain insurance and to assure that subcontractors maintain like insurance. Should any of the policies described below be canceled before the expiration date thereof, notice shall be delivered in accordance with the policy provisions. General Liability Insurance and Automobile Liability Insurance shall name County as an additional insured.

1. **General Liability Insurance:** ONE MILLION DOLLARS ($1,000,000.00) per occurrence; ONE MILLION DOLLARS ($1,000,000.00) aggregate.
2. **Workers' Compensation:** In an amount as may be required by law. County may immediately terminate this Agreement if Contractor fails to comply with the Worker's Compensation Act and applicable rules when required to do so.
3. **Automobile Liability Insurance for Contractor and its Employees:** ONE MILLION DOLLARS ($1,000,000.00) combined single limit per occurrence; ONE MILLION DOLLARS ($1,000,000.00) aggregate on any owned, and/or non-owned motor vehicles used in performing Services under this Agreement.

4. **Professional Liability Insurance:** With a limit of not less than ONE MILLION DOLLARS ($1,000,000.00) each claim, with a ONE MILLION DOLLAR ($1,000,000.00) annual aggregate, and sufficient to provide coverage for a three (3) year period from completion of this contract, against any and all claims which may arise from the contractor's negligent performance of work described herein.

SECTION K. RECORDS: Contractor shall maintain, throughout the term of this Agreement and for a period of six (6) years thereafter, records that indicate the date, time, and nature of the services rendered. Contractor shall make available, for inspection by County, all records, books of account, memoranda, and other documents pertaining to County at any reasonable time upon request.

SECTION L. APPLICABLE LAW: Contractor shall abide by all applicable federal, state, and local laws, regulations, and policies and shall perform the Services in accordance with all applicable laws, regulations, and policies during the term of this Agreement. In any lawsuit or legal dispute arising from the operation of this Agreement, Contractor agrees that the laws of the State of New Mexico shall govern. Venue shall be in the First Judicial District Court of New Mexico in Los Alamos County, New Mexico.

SECTION M. NON-DISCRIMINATION: During the term of this Agreement, Contractor shall not discriminate against any employee or applicant for an employment position to be used in the performance of the obligations of Contractor under this Agreement, with regard to race, color, religion, sex, age, ethnicity, national origin, sexual orientation or gender identity, disability or veteran status.

SECTION N. INDEMNITY: Contractor shall indemnify, hold harmless and defend County, its Council members, employees, agents, and representatives, from and against all liabilities, damages, claims, demands, actions (legal or equitable), and costs and expenses, including without limitation attorneys' fees, of any kind or nature, arising from Contractor's performance hereunder or breach hereof and the performance of Contractor's employees, agents, representatives, and subcontractors.

SECTION O. FORCE MAJEURE: Neither County nor Contractor shall be liable for any delay in the performance of this Agreement, nor any other breach, nor for any loss or damage arising from uncontrollable forces such as fire, theft, storm, war, or any other force majeure that could not have been reasonably avoided by exercise of due diligence.

SECTION P. NON-ASSIGNMENT: Contractor may not assign this Agreement or any privileges or obligations herein without the prior written consent of County.

SECTION Q. LICENSES: Contractor shall maintain all required licenses including, without limitation, all necessary professional and business licenses, throughout the term of this Agreement. Contractor shall require and shall assure that all of Contractor's employees and subcontractors maintain all required licenses including, without limitation, all necessary professional and business licenses.

SECTION R. PROHIBITED INTERESTS: Contractor agrees that it presently has no interest and shall not acquire any interest, direct or indirect, which would conflict in any manner or degree with the performance of its services hereunder. Contractor further agrees that it shall not employ any person having such an interest to perform services under this Agreement. No County Council member or other elected official of County, or manager or employee of County shall solicit, demand, accept or agree to accept a gratuity or offer of employment contrary to Section 31-282 of the Los Alamos County Code.

SECTION S. TERMINATION:

1. **Generally**. County may terminate this Agreement with or without cause upon ten (10) days prior written notice to Contractor. Upon such termination, Contractor shall be paid for Services actually completed to the satisfaction of County at the rate set out in Section C. Contractor shall render a final report of the Services performed to the date of termination and shall turn over to County originals of all materials prepared pursuant to this Agreement.
2. **Funding**. This Agreement shall terminate without further action by County on the first day of any County fiscal year for which funds to pay compensation hereunder are not appropriated by County Council. County shall make reasonable efforts to give Contractor at least ninety (90) days advance notice that funds have not been and are not expected to be appropriated for that purpose.

SECTION T. NOTICE: Any notices required under this Agreement shall be made in writing, postage prepaid to the following addresses, and shall be deemed given upon hand delivery, verified delivery by telecopy (followed by copy sent by United States Mail), or three (3) days after deposit in the United States Mail:

County:
Senior Engineer
Department of Public Utilities
Incorporated County of Los Alamos
1000 Central Avenue, Suite 130
Los Alamos, New Mexico 87544

Contractor:
President and Chief Executive Officer
Molzin Corbin
2701 Miles Road, SE
Albuquerque, NM 87106

SECTION U. INVALIDITY OF PRIOR AGREEMENTS: This Agreement supersedes all prior contracts or agreements, either oral or written, that may exist between the parties with reference to the services described herein and expresses the entire agreement and understanding between the parties with reference to said services. It cannot be modified or changed by any oral promise made by any person, officer, or employee, nor shall any written modification of it be binding on County until approved in writing by both County and Contractor.

SECTION V. NO IMPLIED WAIVERS: The failure of the County to enforce any provision of this Agreement is not a waiver by the County of the provisions or of the right thereafter to enforce any provision(s).

SECTION W. SEVERABILITY: If any provision of this Agreement is held to be unenforceable for any reason: (i) such provision shall be reformed only to the extent necessary to make the intent of the language enforceable; and (ii) all other provisions of this Agreement shall remain in effect.

SECTION X. CAMPAIGN CONTRIBUTION DISCLOSURE FORM: A Campaign Contribution Disclosure Form was submitted as part of the Contractor's Response and is incorporated herein by reference for all purposes.

SECTION Y. **LEGAL RECOGNITION OF ELECTRONIC SIGNATURES**: Pursuant to NMSA 1978 § 14-16-7, this Agreement may be signed by electronic signature.

SECTION Z. DUPLICATE ORIGINAL DOCUMENTS: This document may be executed in two (2) counterparts, each of which shall be deemed an original.

IN WITNESS WHEREOF, the parties have executed this Agreement on the date(s) set forth opposite the signatures of their authorized representatives to be effective for all purposes on the date first written above.

ATTEST

INCORPORATED COUNTY OF LOS ALAMOS

BY: ______________________________

PHILO S. SHELTON III P.E. **DATE**
UTILITIES MANAGER

____
NAOMI D. MAESTAS
COUNTY CLERK

Approved as to form:

____
J. ALVIN LEAPHART
COUNTY ATTORNEY

MOLZEN CORBIN, A NEW MEXICO CORPORATION

BY: ______________________________

KEVIN W. EADES, P.E. **DATE**
PRESIDENT AND CHIEF EXECUTIVE OFFICER

Exhibit "A"
Compensation Rate Schedule
AGR22-68

Contractor shall invoice County, no more frequently than monthly, at the rates shown in the table below based on actual work completed and upon County's acceptance of deliverables. The total cost is a firm fixed price, inclusive of all labor, materials, travel expenses, and all other costs, direct and indirect, necessary for each task identified in Section B. Services of this Agreement.

Cost	Total Fees
Pre-Design and Project Kick-off Meeting	$11,045.00
Priority 1: Motor Inspection	$12,080.00
Preliminary Design (50%)	$90,325.00
Final Design (100%)	$55,870.00
Bidding/Award	$9,260.00
Construction Admin. Services	$29,890.00
TOTAL	**$208,470.00**
TOTAL OTHER TRAVEL* AND DIRECT EXPENSES	**$1,134.00**
TOTAL FEE NOT-TO-EXCEED	**$209,604.00**

***Travel Guidelines:**

Contractor's travel expenses shall only include mileage and per diem and contractor shall adhere to the following:

1. Mileage reimbursement shall not exceed the standard mileage rate for business miles driven as established from time to time by the Internal Revenue Service;
2. Meals, not to exceed Los Alamos County Travel Policy, currently $60.00 per diem daily and shall not include Alcoholic beverages or tobacco products.

Exhibit "B"
Project Schedule
AGR22-68

The following table shows Contractor's *proposed* Project Schedule, which shall be modified and finalized at the Project kick-off meeting as defined herein.

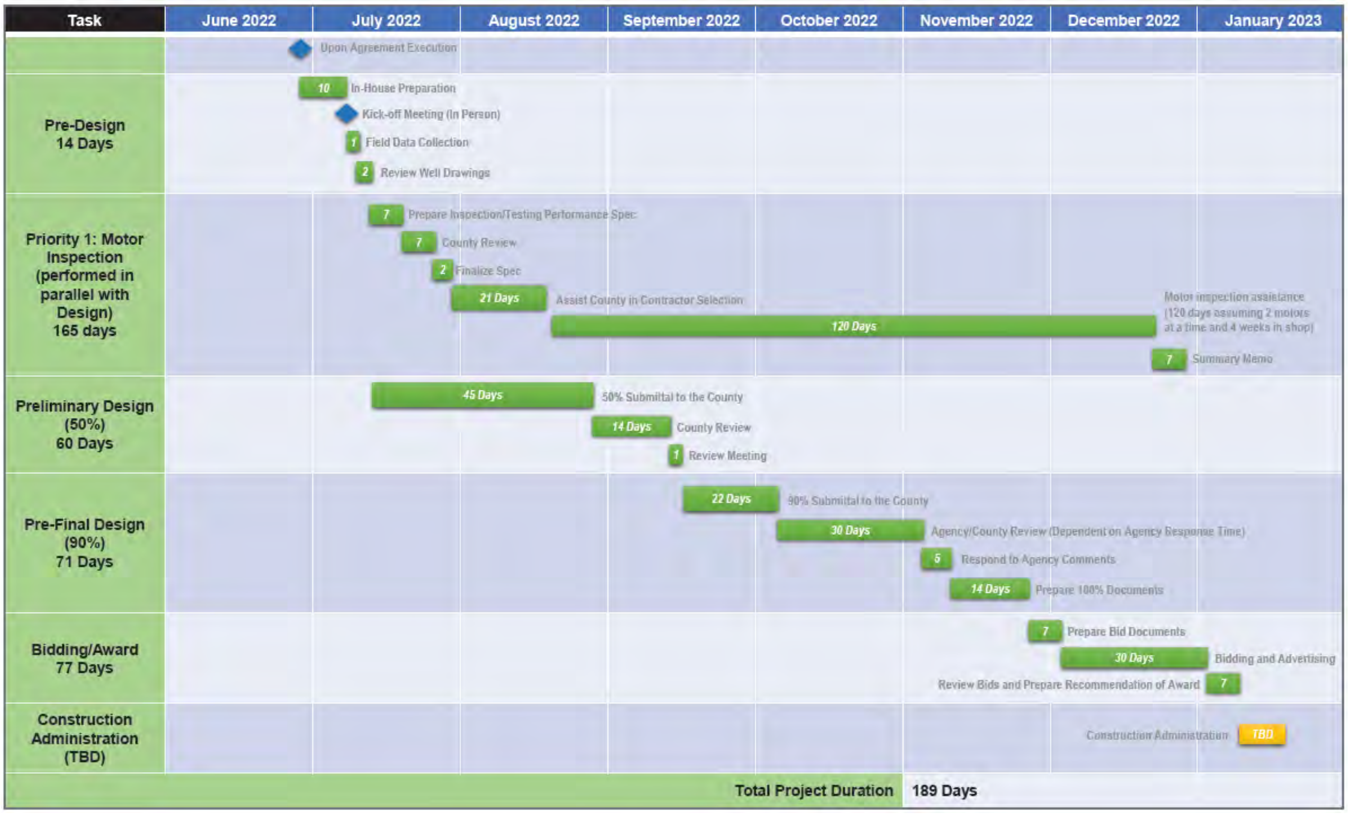

Exhibit “C”
Water Production Facilities Electric and Mechanical Upgrades By Priority and Well as Detailed and Prioritized in the Molzen Corbin Assessment Provided in Exhibit “D”
AGR22-68

Contractor’s Services shall include the following County water production well sites:

PRIORITY	SITE	DESCRIPTION
1	PW1, 2, 3 & 5, GW2A, 3A, 4A & 5A	Motor inspection (8 motors)
		Contingency for corrections (40%) (including temp & vibration sensors & Supervisory Control and Data Acquisition “SCADA” connection)
2	PW1, PW2, PW3, PW4, PW5, OW1, OW2, OW4, GW2A, GW3A, GW4A, GW5A	Equipment acquisition and installation well depth/temperature/pressure data transducer with new cable.
		Electric and cable conduit and wire between depth sounder casing and SCADA Remote Terminal Block “RTB” cabinet.
		SCADA connection and programming; including adding historic excel data into HSQ SCADA historian data base.
3	PW3	Electrical system upgrade Reduced Voltage Soft Starter “RVSS” motor starter, service disconnect, and associated power conductors.
		New facility control panel including connections to Shooting Range Booster Station instrumentation and controls.
		Prep, recoat and paint station valves and piping
		Rebuilding all hydraulic control valves
4	PW1	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.
		New facility control panel
		Prep, recoat and paint station valves and piping
5	PW2	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.
		New facility control panel
		Prep, recoat and paint station valves and piping
6	PW4	Install check valve inside station building

		Prep, recoat and paint station valves and piping
		locate, excavate and remove check valve outside of station
7	PW5	Install check valve inside station building
		Prep, recoat and paint station valves and piping
8	GW2A	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.
		Service transformer testing and maintenance
		Install check valve inside station building
		Prep, recoat and paint station valves and piping
9	GW3A	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.
		Service transformer testing and maintenance
		Install check valve inside station building
		Prep, recoat and paint station valves and piping
10	GW4A	Electrical system upgrade including service conductors, and associated power conductors.
		Service transformer testing and maintenance
		Install check valve inside station building
		Prep, recoat and paint station valves and piping
11	GW5A	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.
		Service transformer testing and maintenance
		Install check valve inside station building
		Prep, recoat and paint station valves and piping
12	OW1	Electrical system upgrade including service conductors, Power Factor Correction Capacitor, RVSS motor starter, and associated power conductors.
		New facility control panel
		Service Transformer Testing and Maintenance
		Install new flow meter

13	OW4	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.
		New facility control panel.
		Rebuilding all hydraulic control valve.
		Service transformer testing and maintenance.
		Install new flow meter.
		Install check valve inside station building.
		Relocate PRV inside station building and eliminate vault.
		Install 8" flap valve on end of drain line and eliminate check and butterfly valves and vault.
		Prep, recoat and paint station valves and piping.

Exhibit “D”
Water Production Facilities Electrical and Mechanical Condition Assessment Conducted by Molzen Corbin, March 2022
AGR22-68

LOS ALAMOS COUNTY
DEPARTMENT OF
PUBLIC UTILITIES

WATER PRODUCTION FACILITIES

ELECTRICAL AND MECHANICAL CONDITION ASSESSMENT

Prepared for:
LOS ALAMOS COUNTY
1000 Central Avenue
Los Alamos, New Mexico 87544

Prepared by:
MOLZEN CORBIN
2701 Miles Road SE
Albuquerque, New Mexico 87106

March 2022

LAC201-11

MOLZENCORBIN
ENGINEERS | ARCHITECTS | PLANNERS

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APPENDICES

ABBREVIATIONS AND ACRONYMS

µ	micro – 0.0000001
A	amps
AC	alternating current
avg	average
BB2	Barranca Booster Station 2
BFP	Back flow preventer
CB	Community Booster Station
DC	direct current
DEAC	diesel engine antifreeze / coolant
dV/dT	Delta (change) Voltage / Delta (change) Time
F	Fahrenheit
FT	feet
Gal	gallons
GB1	Guaje Booster Station 1
GB2	Guaje Booster Station 2
GB3	Guaje Booster Station 3
GFB	Guaje Filter Booster Station

ABBREVIATIONS AND ACRONYMS

GW2A	Guaje Well 2A
GW3A	Guaje Well 3A
GW4A	Guaje Well 4A
GW5A	Guaje Well 5A
HCVs	hydraulic control valves
HP	horsepower
hrs	hours
I	current
IEEE	Institute of Electrical and Electronics Engineers
k	kilo – 1,000
kVA	kilovolt-amps
kW	kilowatts
LANL	Los Alamos National Laboratory
LAPS	Los Alamos Public Schools
LV	low voltage
m	meter
M	million
MCC	motor control center
MDP	main distribution panel
MTBF	mean-time-between failure
MV	medium voltage
NEC	National Electrical Code
NEMA	National Electrical Manufacturer's Association
NFB	North Fill Booster Station
NFPA	National Fire Protection Association
OB2	Otowi Booster Station 2
OSHA	Occupational Safety and Health Administration

ABBREVIATIONS AND ACRONYMS

OW 1	Otowi Well 1
OW 4	Otowi Well 4
PB1	Pajarito Booster Station 1
PB2	Pajarito Booster Station 2
PB3	Pajarito Booster Station 3
PCC	point-of-common-coupling
PF	power factor
PLC	programmable logic controller
PRV	pressure relief valve
PW1	Pajarito Well 1
PW2	Pajarito Well 2
PW3	Pajarito Well 3
PW4	Pajarito Well 4
PW5	Pajarito Well 5
PWM	pulse width modulation
QB	Quemazon Booster Station
RPM	revolutions per minute
RTU	remote terminal unit
RVAT	reduced voltage auto-transformer
RVDY	reduced voltage delta-wye
RVSS	reduced voltage soft starter
s	seconds
SB1	S-Site Booster Station 1
SB2	S-Site Booster Station 2
SCA	supplemental coolant additive
SCADA	supervisory control and data acquisition
SCR	silicon controlled rectifier

ABBREVIATIONS AND ACRONYMS

SRB	Shooting Range Booster Station
TDD	total demand distortion
THD	total harmonic distortion
V	voltage
VFD	variable frequency drive
W	watts
WB	Western Booster Station

EXECUTIVE SUMMARY

The purpose of this document is to provide the Los Alamos County Department of Public Utilities with an Electrical and Mechanical Assessment and Evaluation of the water production facilities. This document looks at the following:

- Facility Assessment:
  - Transformers.
  - Service entrance equipment.
  - Motor control centers (MCCs).
  - Motor starters.
  - Motors.
  - Hydraulic control valves (HCVs).
  - General electrical equipment.
- Evaluation:
  - Starter technology comparison.
  - Arc-flash considerations.
  - Preventative Maintenance Plans.
  - Supervisory Control and Data Acquisition (SCADA) compatibility.

The water production system serves Los Alamos, White Rock, Bandelier National Monument, and the Los Alamos National Laboratory (LANL) and consists of thirteen (13) wells and eighteen (18) booster pump station facilities. Molzen Corbin visited eleven wells and sixteen booster stations with the operational staff providing insight on the known facility deficiencies and needs.

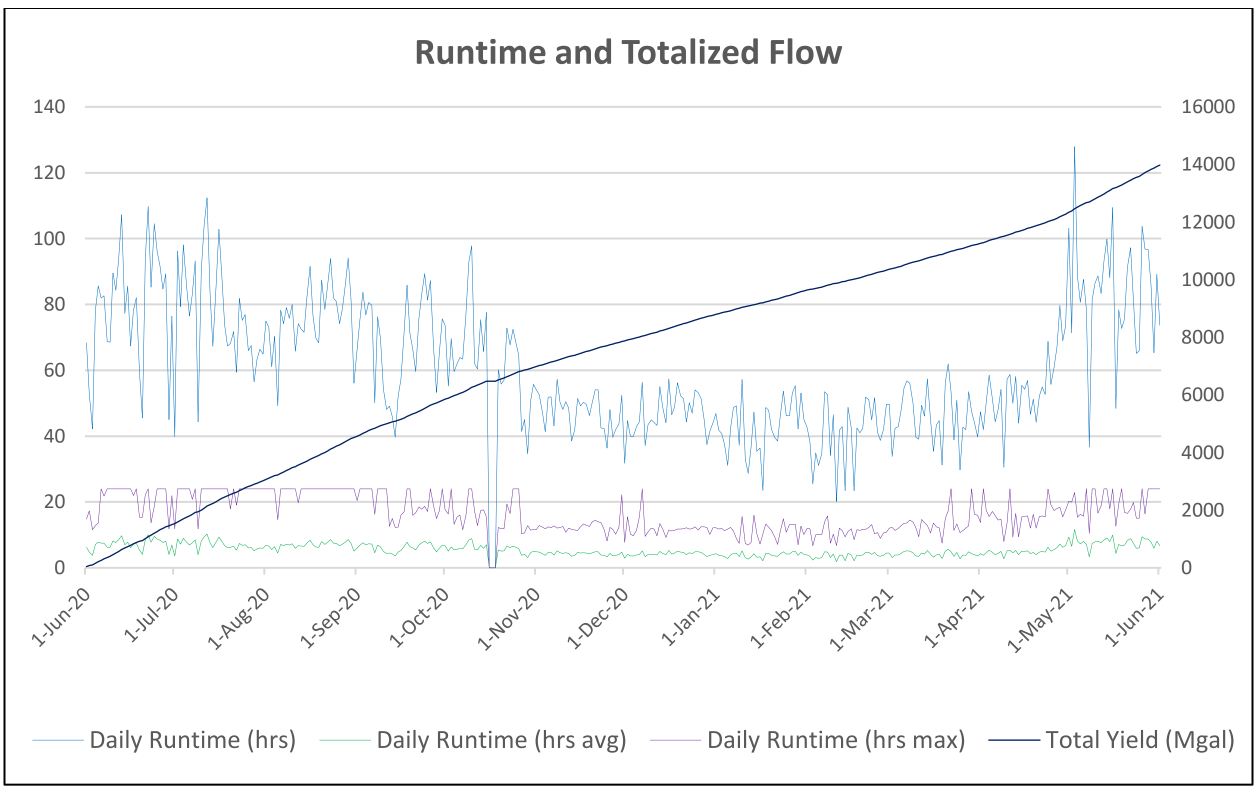
The County has completed an extensive arc-flash analysis effort and provided complete and comprehensive one-line diagrams. Molzen Corbin prepared Site Plans for each of the facilities based on reference documents and field collected information.

Each facility in this Assessment has been summarized into individual sections. The Probable Construction Costs identified herein are Molzen Corbin's best estimates based on current pricing. It should be noted that the current market is highly volatile and it is challenging to predict how the cost will be affected moving forward.

1.0 INTRODUCTION

Los Alamos County (County) owns, operates, and maintains the water production system for the area which serves Los Alamos, White Rock, Bandelier National Monument, and the Los Alamos National Laboratory (LANL). The system consists of thirteen (13) wells and eighteen (18) booster pump station facilities. Many of these facilities have electrical and process mechanical equipment, which have exceeded their expected useful life. The life of the equipment, specifically the electrical equipment, has presented challenges when attempting to access replacement components.

Using recorded Supervisory Control and Data Acquisition (SCADA) runtime data, the County's yearly well runtime and 24-hour totalized flow data are as shown in the following graph. As expected, the runtime is greatest between May and October. Future construction schedules should consider system and individual site demand requirements to minimize the County's operational impacts.



1.1 Starter Technology Review and Evaluation

For the purposes of this evaluation, we will focus the discussion on full voltage across-the-line starters, reduced voltage auto-transformers (RVAT), reduced voltage soft starters (RVSS), and variable frequency drives (VFD) for both low voltage (LV) systems of 1,000V and less and medium voltage (MV) systems greater than 1,000V.

1.1.1 Starter Selection Considerations

When considering starter technology for a pumping application, the following conditions should be considered:

- Starting and Stopping Frequency,
- Hydraulic Control, Flow Control, and Water Hammer,
- Harmonics and Motor Protection,
- Equipment Life Expectancy,
- Cost, Size, and Environmental Considerations, and
- Electrical and Mechanical Stress.

1.1.1.1 Starting and Stopping Frequency

Motor and pump manufacturers typically publish a maximum number of starts allowed per hour and minimum time between starts. These are calculated based on known or assumed factors, including National Electrical Manufacturer's Association (NEMA) motor design, number of poles in the motor, and the motor horsepower rating. In simplified terms, the number of starts per hour has to do with the thermal stress on a motor imposed during startup. The greater the horsepower rating, the greater the current (thermal stress), fewer starts allowed per hour.

During startup, the motor inrush current can reach six times that of the nameplate's full load current (varies per NEMA motor design). Current going through the motor windings (resistance) results in heat dissipation. For example, a 1,800 revolutions per minute (RPM) (4-pole) NEMA Design B motor cannot exceed a maximum number of starts of 5.2 per hour with a minimum off-time between starts of 110 seconds.

The above is calculated assuming an across-the-line mode of operation. When operating in a reduced voltage mode, the inrush current is reduced and may allow for more starts per hour. The inrush current, also called the locked rotor amps, can be reduced by half when operating on an RVSS and as low as 100% on a VFD (inrush amps = nameplate amps).

In general, because the County system utilizes gravity for zone pressurization, increasing the number of starts per hour does not appear to be a significant consideration. Also, for the wells, backspin timers should be incorporated into the control strategy to restrict the well from running again after a stop to allow the water to resettle in the well.

1.1.1.2 Flow Control, Hydraulic Control, and Water Hammer

Flow Control (including pressure or level control) may be considered when the system is designed to maintain a constant set-point. In the instance of flow, there may be a desire to maintain a flow rate to match the system demand. Similarly, pressure may be used to maintain a fixed system pressure. An example of level control might be in a well where limiting a specific well drawdown is desired. In instances such as these, utilizing a VFD may be the preferred approach.

In addition to the above control scenarios, a VFD might also be advantageous when a more advanced control algorithm is desired to improve system efficiency. Examples include adjusting the pump speed to maximize efficiency using the pump and system curves or peak load shaving to reduce the kilowatts (kW) during peak hours to reduce peak demand charges.

Based on the County's water system, it does not appear that either of the above would be considered in this evaluation.

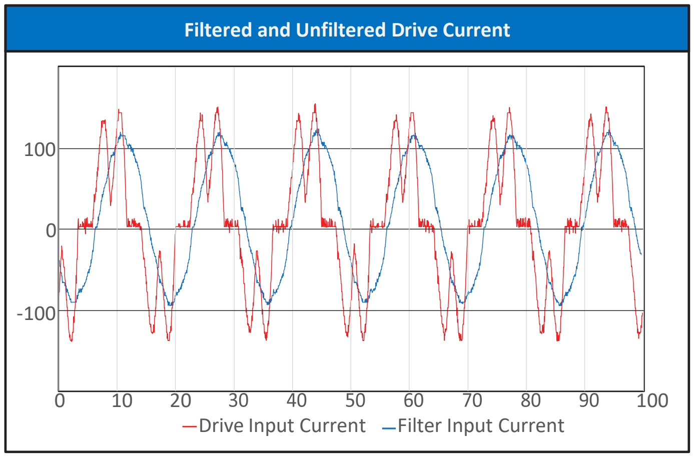
Hydraulic Control should be taken into consideration when water hammer can be a problem. For this reason, Los Alamos County has hydraulic control valves (HCVs) located at many of their well and booster pump station facilities.

For the County's well and booster station sites, the HCVs are designed to provide flow and pressure stability for the water system when water is introduced from the pumps. The rate at which the valve opens / closes is accomplished through valve piloting or time controlled electric actuated valves. In the case of the County's wells, the main line HCV is slowly opened when the pump is started to prevent destabilization of the water distribution system pressure. The reverse operation takes place when the pump shuts down. Under this operational mode, the HCV provides additional control of the flow from the pump instead of initiating the pump directly into the main line without modulating the flow.

With regard to the booster stations, the HCV is in line with the pump discharge (one per pump), and the pumps start against a closed valve. Similar to the well control scenario, the HCV will gradually open / close to prevent hydraulic stress on the system.

Based on the County's system, the HCVs control the operating considerations for the system, so the type of pump starters, whether across-the-line, soft starters, or VFDs, is not an issue. Across-the-line starters are an acceptable choice.

1.1.1.3 Harmonics and Motor Protection



Harmonics distort both the current and the voltage waveforms and are a naturally occurring event associated with non-linear loads. The harmonic severity is a function of the ratio of non-linear loads (such as VFDs) to linear loads (such as across-the-line motors). Harmonics can cause damage and premature failure to electrical components.

With regard to VFDs, harmonics are a concern upstream of the VFD. *Institute of Electrical and Electronics Engineers (IEEE) 519, Recommended Practice and Requirements for Harmonic Control in Electric Power Systems*, is the standard that establishes the recommended allowable harmonic distortion levels at the point of common coupling (PCC). See table IEEE-519 Harmonic Distortion Limits on the following page. Each application is different and should be evaluated independently to ensure compliance. In some instances, the VFD provides adequate harmonic mitigation to meet IEEE 519. The conversion from alternating current (AC) to direct current (DC) is accomplished through input bridge rectifiers while an inverter converts the power from DC to AC (for six-pulse to 54-pulse applications). The more pulses, the lower the harmonics generated but increases both the cost and the footprint. VFDs can also incorporate an active front end that uses a six-pulse VFD and an active front end that injects current to correct irregularities induced into the waveform.

If the County pursues the selection of VFDs, the following should be considered:

- What are the requirements from the connected utility?
- Technology that minimizes cost and meets requirements.
- Standardization across facilities.

IEEE-519 Harmonic Distortion Limits

Current Distortion (120 V through 69 kV)						
I_{SC}/I_L	Individual Harmonic Order					
	<11	>11 <17	>17 <23	>23 <35	>35	TDD
< 20	4.0	2.0	1.5	0.6	0.3	5.0
20 < 50	7.0	3.5	2.5	1.0	0.5	8.0
50 < 100	10.0	4.5	4.0	1.5	0.7	12.0
100 < 1000	12.0	5.5	5.0	2.0	1.0	15.0
> 1000	15.0	7.0	6.0	2.5	1.4	20.0

Voltage Distortion Limits		
Bus Voltage V at PCC	Individual Harmonics (%)	Total Harmonic Distortion THD (%)
V ≤ 1 kV	5.0	8.0
1K < V ≥69 kV	3.0	5.0

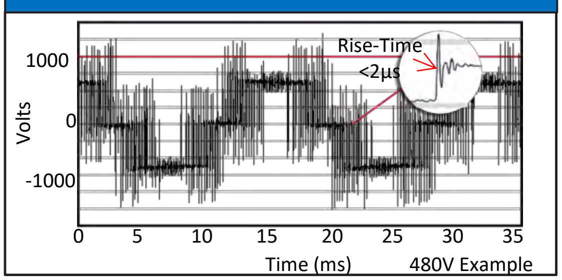
TDD = Total Demand Distortion

I_{SC} = maximum short-circuit current at PCC

I_L = maximum demand load current at PCC.

Motor Protection can be placed into two primary categories. The first being general and would include thermal protection, which is discussed in more detail under Section 4.0 Motor Inspections. This level of motor protection is recommended regardless of the starter technology used. The second is protection required when operating on a VFD as it pertains to voltage spikes, rise-times, common-mode voltage, and reflective wave phenomena.

VFD Voltage Output Without Filter



VFDs operate by taking the incoming power and converting it to a DC. The DC is used to recreate an AC waveform and varying the frequency and the voltage. This is accomplished with pulse-width-modulation (PWM). Imagine, for illustrative purposes turning on and off a switch very rapidly to recreate an alternating current waveform. This rapid switching can create *voltage spikes* that may exceed the motor insulation rating. In addition to the voltage spikes, the *rise-time* (how quickly the voltage rises over a defined time) can also cause insulation failure.

In a true three-phase sine wave application, all three phases cross the zero voltage plane simultaneously (theoretically). This is not so with a VFD. Because the output is not a true sine wave, the phases do not all cross the zero axis at the same time, which causes the current in the motor to seek an alternative path to the source. This path is typically through the bearings to the motor shaft as it is the path of least resistance. This is referred to as *common-mode voltage* and can cause premature bearing failure.

Also, to be considered is the *reflective wave phenomena*. As the length of the motor leads increases between the VFD output and the motor, the voltage spikes amplify. As a general rule of thumb, reflective wave mitigation should be considered when motor leads exceed 50 to 100 feet (carrier frequency-dependent). This does not appear to apply to the County's system, but it is worth understanding the hazard. It is also worth noting that an output filter, which is discussed in further detail below, will also mitigate the reflective wave phenomena.

Understanding the installation requirements when using a VFD is essential. Additional precautions need to be considered to ensure the electrical system and motors are properly protected. The approach taken will vary slightly depending on the operating voltage of the system. For motors 500 HP and below, the following NEMA standards as shown in the NEMA Motor Comparison table should be adhered to (see table below). For motors greater than 500 HP the VFD outputs are designed to produce a filtered output (ex: tune sinewave filter) where the output works with the standard motor windings.

In both LV and MV applications, bearings should be either insulated or ceramic, and the motor should include shaft grounding provisions. When possible, it is good practice to coordinate the VFD design with the motor manufacturer.

NEMA MOTOR COMPARISON TABLE

	NEMA MG1 Part 30 General Purpose Motors (500 Hp and less)		NEMA MG1 Part 31 Inverter Duty Motors (500 Hp and less)	
	≤ 600V	> 600V < 7200V	≤ 600V	> 600V < 7200V
Voltage Spikes	$V_{peak} \leq 1000V$	$V_{peak} \leq 2.04V_{rated}$	$V_{peak} \leq 3.1 \times V_{rated}$	$V_{peak} \leq 2.04 \times V_{rated}$
Rise-Time	≥2µs		≥0.1µs	

In MV applications (motors greater than 600V), both harmonic and motor protection are handled within the VFD. The front-end requirements (number of pulses or active front end) will depend on the requirements from the County and the electrical utility provider.

In LV applications, there are more options to than those for MV. On the output, a common delta (change) voltage / delta (change) time (dV/dT) filter should be sufficient for the County's facilities, provided the distance between the motor and the VFD are not excessive. A dV/dT filter uses an inductive / resistive circuit to reduce voltage spikes and rise-time. With a dV/dT filter, the voltage characteristics should stay within the requirements of a general-purpose motor.

It is also recommended to equip the motor with a grounding brush kit made of Helwig® Carbon when in a VFD application for both MV and LV. These kits can be installed on new motors from the factory or be retrofit to existing motors. The grounding kit provides a path for the current to flow directly to the shaft instead of going through the bearings. This greatly reduces bearing deterioration.

1.1.1.4 Electrical Equipment Life Expectancy

Life expectancy for electrical equipment is only an estimate based on industrial standards such as *IEEE 3007.2 - 2010, Recommended Practice for the Maintenance of Industrial and Commercial Power Systems,* manufacturer recommendations, and experience. A proper routine maintenance schedule can ensure that the life of the equipment meets or exceeds the expected useful life. The following table defines some general electrical equipment's life expectancy per *IEEE 3007.2. - 2010, Recommended Practice for the Maintenance of Industrial and Commercial Power Systems*.

TYPICAL EQUIPMENT LIFE EXPECTANCIES

EQUIPMENT	EXPECTED USEFUL LIFE (YEARS)
Capacitors	17
Low Voltage Circuit Breakers	20
Medium Voltage Circuit Breakers	20
Dry-Type Transformers	20
Liquid Filled Transformers	30
Cables (Low Voltage and Medium Voltage)	20
Motors	30
Across the Line Starters	15-20
Variable Frequecy Drives	10-15
Reduced Voltage Soft Starter	15
Reduced Voltage Auto Transformer	30

Across-the-Line Starters are a tried and true technology. They have minimal moving parts, and they are typically designed with off-the-shelf type components or components that are inexpensive to keep as spares. These designs make it easy to troubleshoot and repair by County staff.

RVATs are also a tried and true technology. However, this technology is not commonly used due to the advancements in soft starter technology, such as VFDs and RVSS, and the high capital cost. RVATs are still available, but as engineered products since they are made to order.

RVSSs do include components that are more susceptible to failure, including the controller (microprocessor-based) and silicon controlled rectifiers (SCR). These starters are used for applications where motor inrush, using an across-the-line starter, can cause undesired surges and voltage spikes within the system. RVSSs incorporate contactors used when the RVSS is at 100% to run the motor and isolate the SCR. These contactors can also be used to start the equipment across-the-line in an emergency situation while either the controller or SCR are replaced. This added benefit can increase the reliability and dependability of the system. Furthermore, RVSS technology is on a flatter part of the development curve compared to that of a VFD. This means that the components are more likely to be supported longer. Consideration should still be given to how long the RVSS has been on the market.

VFDs life expectancy is the most unpredictable of the technologies discussed herein. Life expectancy is affected by the following:

- The electronics are continuously in operation as opposed to an RVSS where the SCR is in use momentarily and then disconnected through isolation contactors.
- VFD model life span. A specific model may only be marketed for 10 years and supported for 15 years. So if a VFD has been on the market for 8 years, it would still have the same calculated life expectancy but may only have access to replacement components for another 7 years.
- VFDs 300 HP and below are not modular in their design which means replacement of individual components is limited. Depending on the failure, a complete replacement may be required.
- Although available, standard VFDs are not equipped with bypass contactors. So in failure mode, there is no backup to start the equipment.

VFD functionality continues to improve along with the life expectancy of the equipment. The County does experience frequent lightning events, and despite the additional means taken to protect their system, damage from lightning events is always a concern.

1.1.1.5 Cost, Size, and Environmental Considerations

Cost can vary significantly depending on the hp rating, features, and voltage category. The following example identifies the probable cost for MV and LV equipment.

COST COMPARISION TABLE

480V 200 HP				4160V 500 HP	
RVSS	VFD	VFD w/ Active Front End	VFD w/ Bypass	RVSS	VFD
$ 6,800	$ 13,500	$ 36,000	$ 29,000	$ 29,500	$ 200,000

The replacement equipment's **size** (or footprint) will be comparable to what would be replaced at the County's sites, except for the VFDs. The size of VFDs will depend on what type of harmonic mitigation will be required and if additional features are needed (e.g., bypass contactors). Refer to specific site sections for additional details as there are several sites where configuration modifications will need to be made to ensure NEC clearances are maintained.

Environmental considerations include site elevation and ambient air temperature. For Los Alamos, the elevation is approximately 7,300 feet with summer ambient highs of up to 100°F. With regard to the ambient ratings, it is important to remember that equipment manufacturers are referring to the ambient temperature in the area the equipment is to be installed. In the County's facilities, most equipment is located in the same room as the motors and is therefore subject to the heat rejection in that space. Every facility has different heat rejection loads, so it would be good to look at some general assumptions. Assuming the ventilation system is working and a peak summer temperature of 100°F, it can be assumed the temperature differential may be 5 to 10 degrees greater (105°F to 110°F). This is the assumption used for this evaluation.

Most equipment is designed to operate at 3,300 feet (1000 m) above mean sea level without derating. Above this elevation, VFD and RVSS manufacturers typically require derating 1% for every 300 feet above 3,300 ft (13.3% total). Since RVAT includes transformers, they too require a derating. RVAT derating would be 0.3% for every 300 feet above 3,300 feet (4% total).

For ambient, the temperatures assumed above do not impact across-the-line, RVAT, or RVSS, but they can impact a VFD. For an RVSS, the SCR is only engaged for a short duration and then goes to across-the-line contactors. This means that the heat-generating and heat-sensitive components are not continuously engaged, allowing for greater operating temperatures. The typical RVSS is rated for 122°F without derating. Additionally, an RVSS can be installed in a NEMA 4 enclosure without ventilation, reducing exposure to dust and bugs. RVATs will have a similar operating temperature range.

VFDs are available with ratings up to 122°F, but it is also common to have ratings of 104°F. In instances such as this, the derating could be as great as 20% for use above 104°F (increments of 10°C). Additionally, VFD enclosures will incorporate fan cooling devices, so there is more exposure to dust and bugs, and they will require more maintenance to ensure proper operations.

1.1.1.6 Electrical and Mechanical Stress

The stress imposed on an electrical system has to do with the electrical distribution system's ability to withstand the motor startup inrush and how it may impact the system and potential customers outside the facility. As mentioned above, the current inrush is nominally 600% of nameplate current rating for across-the-line starters, 300% for an RVSS, and as low as 100% for a VFD. The electric utility provider should define the inrush limitation. The County and/or utility may also define a HP threshold as to when a soft starter is required.

Mechanical stress includes the torque imposed on the motor and pump shaft during startup. Soft starters reduce the mechanical stress on a motor and the shaft because the mechanical equipment accelerates smoothly, which consequently will expand the lifespan of the motor and shaft over time.

1.1.2 Starter Technology Comparison

Across-the-Line Starters are a good option for lower horsepower applications. The HP limit may be determined by a combination of the electrical utility's requirements, hydraulic and mechanical considerations, and the County's preference. Community Booster operates the two 60 HP booster pumps with across-the-line starters. There are no operational or electrical reports for this site demonstrating the successful operation of across-the-line starters. Using Community Booster as a basis, there should be a consideration to allow across-the-line starters for booster station pumps operating at less than 100 HP.

RVSS offers ramping capabilities up to 60 seconds. The RVSS primary components include the controller / interface, SCRs (used during ramping), contactors, and thermal overload protection. The system is modular in design, allowing for any of these components to be replaced. The controller will be the component with the shortest mean-time-between-failure (MTBF), but this is common for the LV and MV RVSS. A shelf spare is an option to minimize downtime in the event of a failure.

Since the SCRs are only used during the start and stop, if not artificially stressed, the life expectancy is high. Again, they are modular in design so that they can be replaced. The RVSS is also equipped with bypass contactors that are primarily used to operate the motor when at full speed but can also be used to start the motor across-the-line if required.

Overall, the RVSS offers high reliability, ramping capabilities to meet the County's needs, and backup when using the bypass contactors, making it a good option for the County's system.

VFDs require a more in-depth review, discussion, and evaluation. There are more options and configurations to consider, impacting cost, complexity, lead-time, and reliability.

Harmonic mitigation: Does the electrical utility presently have or plan to have harmonic standards? If the answer is no, then a standard 6-pulse unit may suffice, the most cost-efficient with the smallest footprint. If required, an active front-end VFD would be preferred due to its superior harmonic mitigation capabilities. This will increase both the cost and the footprint of the VFD.

Reliability: VFDs vary between LV and MV. LV VFDs 300 HP and below are not modular, and failure typically requires complete replacement. The technology has continued to improve, including life expectancy, but a non-module design presents concerns in the event of a failure. LV VFDs over 300 HP and MV VFDs are more modular but consist of a lot more components. The interface panel on the face of the VFD provides information in the event of a failure, but troubleshooting can be challenging and typically requires service from the manufacture. Additionally, VFDs typically have various makes and models. A specific model is typically only marketed for 10 years and supported for 15 years. Depending on how long the VFD has been on the market will affect the availability of parts. At 10 years of use, it is recommended to start budgeting for a replacement (size / cost dependent).

VFD Cable (LV applications): As described above, the VFD output should be designed to protect the motor with insulation ratings between 1,000V and 1,400V. With the standard conductor rated for 600V, a standard cable is subject to damage. Special VFD cable includes special shielding and insulation rated for higher voltage. In MV applications, the VFD output is designed to ensure the voltage does not exceed the standard motor and conductor insulation rating.

Bypass Contactors: Bypass contactors do not come standard in a VFD system. If included, the footprint would increase and possibly double in size. Site improvements and retrofits would require additional oversight to ensure the system fits.

VFDs continue to be used more and more in water systems and are generally used for flow, level, or pressure control. They can also be used to operate the motor at the optimal set-point of the system and pump curve. There does not appear to be added benefit for the County to consider flow, level, or pressure control. There is a potential benefit in pump motor optimization. A further assessment would be required to evaluate the pump and system cover, the site runtime characteristics, and the return on investment over the life of the system. This evaluation would need to take place at each site considering pumping optimization.

RVAT: A predominant technology present at several of the County's facilities is the RVAT and the reduced voltage delta-wye (RVDY) starters. Both technologies have proven to have long lives with low maintenance but are old technologies for soft starters and less common in today's municipal water systems. RVDYs are as costly as an RVAT but less commonly used and are not discussed in this evaluation. RVATs are rarely used as they have minimal ramping capabilities, are very costly, and have a long lead-time.

The following matrix provides a general side-by-side summary comparison across the technologies.

TECHNOLOGY COMPARISON MATRIX

	ACROSS-THE-LINE	RVSS	VFD	RVAT
Strengths	-low cost -High reliability -Easy to work on -Short lead-time	-Reduced inrush -High Reliability -Bypass contactors -Soft start/stop	-No motor caps req. -Low inrush -Varible speed	- High reliability & Life Expectancy -Reduced inrush
Weakness	-High inrush -Suitable for < 100HP	-Susceptibility to lightning	-Temp range -Life Expenctancy -Harmonics -Motor Protection -Trouble shooting	-Cost -Lead-time
Life Expectancy (years)	30	15-20	10-15	30
Capital Cost	$	$$	$$$	$$$$
Inrush (% of namplate)	600%	300%	100%	400%
Maximum Ramp Time (seconds)	NA	60	∞	20
Mantanance (in addition to IEEE and NFPA 70B)	None	None	fan operations and air filters	None
PF Correction Capacitors	Y	Y	NA (.95 PF @ VFD)	Y
Harmonics	NA	NA	Y	NA
VFD Cable (LV only)	N	N	Y	N
External cooling	N	N	Y (fans)	N
Across-the-Line starting	Y	Y	N (can be added)	Y
Susceptibility to Lighting	Low	Moderate	High	Low

1.2 Arc-Flash Evaluation

The County has completed a fair portion of the arc-flash analysis for the sites. The analysis shows that the arc flash ratings are minimum. Based on these values, standard electrical equipment is adequate, and there does not appear to be a need to implement arc-flash mitigating solutions at any of the facilities.

Arc-flash analysis for each site as defined by National Fire Protection Association (NFPA) 70E and Occupational Safety and Health Administration (OSHA) should be updated after any significant modifications are made to the system or every 5 years. The analysis that has been performed was completed in 2017 and is due to be updated. For those sites that undergo system improvements, an updated analysis should be completed at the time of the improvements.

1.3 Preventive Maintenance

The County does not have a robust documented preventive maintenance plan in place. To increase equipment life, reduce downtime, and reduce the potential for failures, it is recommended to continue the use of a preventive maintenance program and to incorporate additional maintenance measurements as recommended by industry standards and manufacturer's recommendation. A preventive maintenance program combined internal to the County and as part of a contract by a third-party support group has been initiated. Maintenance standards for electrical equipment include the following (Manufactures recommendations may include additional recommendations.):

- *IEEE 3007.2 – 2010: Recommended Practice for the Maintenance of Industrial and Commercial Power Systems*.
- *NFPA 70B: Recommended Practice for Electrical Equipment Maintenance*.

1.3.1 Mechanical Components Maintenance

Preventive maintenance of mechanical components such as hydraulic control valves, check valves, isolation valves, etc. should include visual inspection of components, cleaning and replacement of components, ensuring pressures are being maintained and there is adequate replacement of rubber components.

Visual inspections should be performed routinely by operators every time they make a site visit to the water production facility. Visual inspections should include looking at the valve body to make sure there are no visible leaks, checking for broken or leaking pilot systems, and checking the pressure gauges to ensure correct pressures are being maintained.

Cleaning and replacement of components should include cleaning dirty strainer screens and replacing any plugged fittings. Plugged strainers can cause control valve failure by limiting water supply to the main valve, which could cause the valve to have problems closing. Checking and cleaning of the strainer should occur whenever there is an indication of pressure dropping in the system. Replacement of restriction fittings on the piloting system should occur when they become blocked. When this occurs, typically, replacement of the fitting is the most cost-effective solution. This should be checked whenever there is an indication of pressure dropping in the system.

Testing of the main valve diaphragm should also occur to ensure that the diaphragm is still intact because they can wear out over time or due to mineral buildup. Performing a pilot check will also give the ability to check if the pilot system is maintaining correct pressures and still has control of the valve. Making slight adjustments in the pressure settings while the valve is in operation should show an indication on the faces of the pressure gauges that it is responsive to the adjustment and that the pilot and valve are working together. Once the operator has an indication that the system is performing as it should, then the pressure should be brought back to normal. This can be done quarterly to ensure correct operation.

Internal inspections of the valve should also occur every 4 to 5 years. This would consist of taking the valve apart and inspecting all internal mechanical and rubber components to make sure the valve is still in good working condition. When this inspection occurs, the replacement of the internal rubber components should also take place as they can wear down quicker than any of the internal hard parts.

Annual preventive maintenance costs are estimated to be $28,000 for the control valves at the thirty-one (31) water production facilities in the system. This annual maintenance cost is assuming a direct maintenance contract between the County and a third-party maintenance group.

1.4 Supervisory Control and Data Acquisition (SCADA) Compatibility

Improvements recommended herein are required to be SCADA compatible. SCADA compatibility is a general term, and as such, we have defined it as components capable of remote monitoring and/or control using a locally installed Remote Terminal Unit (RTU). The following are examples of typical monitoring and control signals used in SCADA systems. The availability of these signals may vary slightly by the equipment size (Example: Bearing monitor is not common on lower HP motors such as those 60 HP and less).

1.4.1 Motors / Starters

- Hand Off Auto Switches– Discrete signal to the RTU to indicate if the motor is available for automatic operations.
- Run Command – Discrete signal from RTU to start / stop motor.
- Run Status – Discrete signal to verify motor status of running / not-running.

- Fault Indication – Signal available with RVSS and VFDs - Discrete signal indicating a fault.

- Motor Running Current – Analog signal used to monitor the running current. Used in modern SCADA systems for preventive maintenance.

- Winding Temp – Analog signal representing the motor winding temperature. Signal from a motor protection relay. Used in a modern SCADA system as preventive maintenance.

- Bearing Temp – Analog signal representing the motor bearing temperature. Signal from a motor protection relay. Used in a modern SCADA system as preventive maintenance.

- Motor Vibration – Discrete signal to indicate if there is excessive vibration.

1.4.2 Site Power Monitor

- Voltage, current, power factor, balance, kW, kVA, and more – This information is valuable for engineering and can be used to troubleshoot.

1.4.3 Instrumentation

- Flow Meter – Analog signal to measure instantaneous flow in gallons per minute. Cumulative flow (gallons) can be calculated in the local RTU or by means of a pulse signal from the flow meter (more accurate means of measurement).

- Pressure – Analog signal to measure the discharge pressure in pounds per square inch (PSI) and, where appropriate, the inlet pressure.

- Level – analog signal to measure tank level or water surface elevation, where appropriate.

- Equipment temperature, vibration, etc., where appropriate.

All sites are equipped with an RTU. The RTUs are used to control their respective well or booster pumps and are connected to the SCADA system over a licensed radio system allowing the County to remotely monitor and operate the facilities.

The existing SCADA system is operational and has served the County for several decades but is antiquated and is limited in its ability to transfer large amounts of data. For the purposes of this report in making these sites SCADA compatible, it is recommended that as sites are upgraded, a new controller be installed that includes a programable logic controller (PLC) with a graphical interface panel that provides and allows operations staff to interface with the system and view operational and alarm events. This system will allow information to be stored and visible locally and available for connection to a future SCADA system improvements project.

EXHIBIT 1.0:

LOS ALAMOS COUNTY WATER SYSTEM PLAN AND

LOS ALAMOS COUNTY WATER SYSTEM SCHEMATIC

LAST MODIFIED: Feb 16, 2022 - 11:32am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\00-GENERAL\
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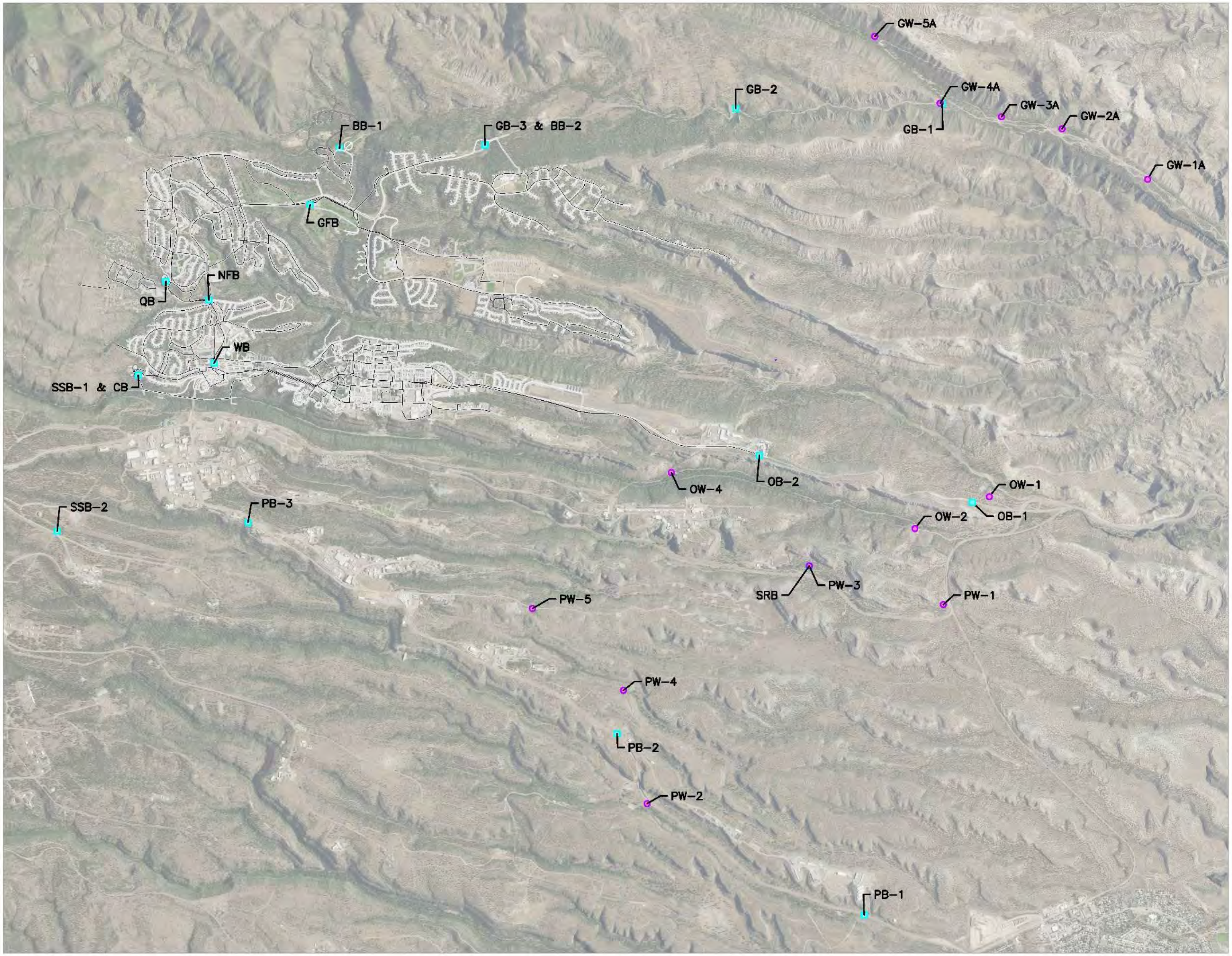

GENERAL NOTES

ONLY ACTIVE FACILITIES (2021) SHOWN.

ABBREVIATION

BB-1	–	BARRANCA BOOSTER 1
BB-2	–	BARRANCA BOOSTER 2
CB	–	COMMUNITY BOOSTER
GB-1	–	GUAJE BOOSTER 1
GB-2	–	GUAJE BOOSTER 2
GB-3	–	GUAJE BOOSTER 3
GFB	–	GUAJE FILTER BOOSTER
GW-1A	–	GUAJE WELL 1A
GW-2A	–	GUAJE WELL 2A
GW-3A	–	GUAJE WELL 3A
GW-4A	–	GUAJE WELL 4A
GW-5A	–	GUAJE WELL 5A
NFB	–	NORTH FILL BOOSTER
OB-1	–	OTOWI BOOSTER 1
OB-2	–	OTOWI BOOSTER 2
OW-1	–	OTOWI WELL 1
OW-2	–	OTOWI WELL 2
OW-4	–	OTOWI WELL 4
PB-1	–	PAJARITO BOOSTER 1
PB-2	–	PAJARITO BOOSTER 2
PB-3	–	PAJARITO BOOSTER 3
PW-1	–	PAJARITO WELL 1
PW-2	–	PAJARITO WELL 2
PW-3	–	PAJARITO WELL 3
PW-4	–	PAJARITO WELL 4
PW-5	–	PAJARITO WELL 5
QB	–	QUEMAZON BOOSTER
SRB	–	SHOOTING RANGE BOOSTER
SSB-1	–	S-SITE BOOSTER 1
SSB-2	–	S-SITE BOOSTER 2
WB	–	WESTERN BOOSTER

LEGEND

- – ACTIVE SUPPLY WELL
- – BOOSTER STATION

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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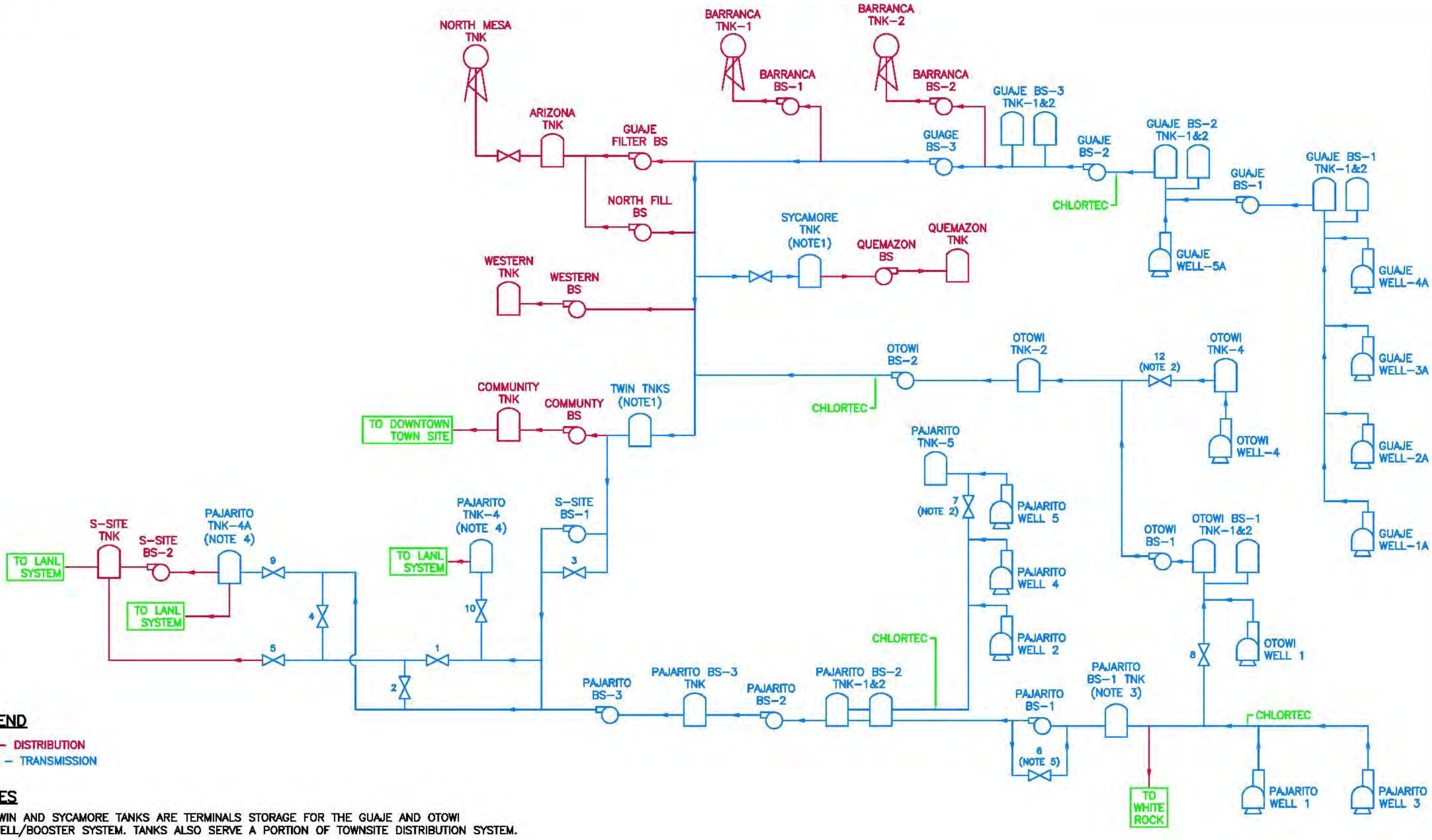
LOS ALAMOS COUNTY WATER SYSTEM PLAN



LEGEND

RED – DISTRIBUTION
BLUE – TRANSMISSION

NOTES

1. TWIN AND SYCAMORE TANKS ARE TERMINALS STORAGE FOR THE GUAJE AND OTOWI WELL/BOOSTER SYSTEM. TANKS ALSO SERVE A PORTION OF TOWNSITE DISTRIBUTION SYSTEM.
2. TANK ASSOCIATED WITH WELL IS HIGHER THAN BOOSTER SUCTION TANK.
3. PAJARITO BS-1 TANK SERVES WHITE ROCK DISTRIBUTION, PAJARITO WELLS 1 & 3 TERMINAL STORAGE, AND SUCTION FOR PAJARITO BS-1.
4. PAJARITO TANK 4 & 4A SERVE AS TERMINAL STORAGE FOR PAJARITO WELL/BOOSTER SYSTEM AND LANL DISTRIBUTION AND FIRE PROTECTION.
5. CONTROL VALVE TO BY-PASS PAJARITO BS-1. USED TO MOVE WATER FROM PAJARITO TANK-2 TO PAJARITO TANK-1 TO SERVE WHITE ROCK.

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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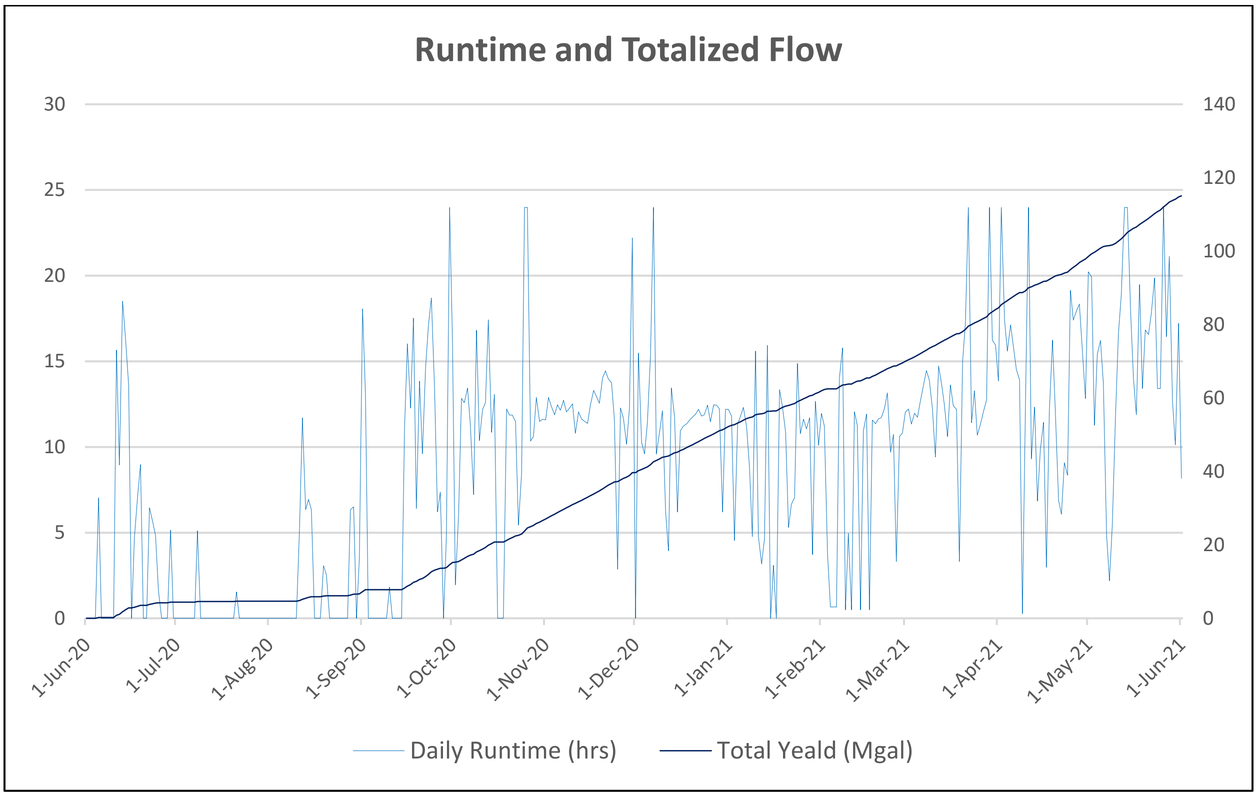
LOS ALAMOS COUNTY
WATER SYSTEM SCHEMATIC

2.0 WATER PRODUCTION FACILITIES – WELL STATIONS

2.1 Pajarito Well 1

Pajarito Well 1 (PW1) has been in service since 1965. This well, along with Pajarito Well 3 (PW3), are the primary sources of water used to fill Pajarito Tank 1, which serves White Rock while also serving LANL and Town Site through Pajarito Booster Station 1. PW1 produces about 58% less than PW3, but is currently more reliable and is therefore required to operate for much longer durations to meet the system demand. PW1 produced approximately 650 gpm and per last year's supervisory control and data acquisition (SCADA) runtime data, ran 3,272 hours and produced 115M gallons (with the assumed flow rate).



2.1.1 Observations

PW1 has been reportedly running dependably and reliably. However, the equipment at this site is beyond the recommended useful life and improvements are recommended to ensure continuing reliability.

- Service Transformer: 100 kVA, x three pole-mounted transformer bank with 277/480V secondary.
  - The transformer is in visibly good appearance.

- Service Equipment: 600A, 480V power panel and associated conductors.
  - Equipment is in fair operation condition but is beyond the recommend useful life.
  - Replacement parts would be difficult to find.

- Motor: 250 HP, 450V:
  - Life Expectancy: 20-30 years (beyond life expectancy).

- Starter: Reduce Voltage Auto-Transformer (RVAT):
  - The exterior and interior appear to be in good shape per visual inspection. However, the age of the equipment is beyond the life expectancy.

- Lighting Panel and Step-Down Transformer:
  - The step-down transformer and lighting panel are in fair operational condition but are beyond their life expectancy.

- Instrumentation:
    - 8" flow meter - Krohne / EnviroMag 2100 C / Serial Number = 21500366 / 2021 / Condition = EXCELLENT.

- Mechanical:
    - 8” check valve - Swing / Kennedy 125 / 1965 / Condition = FAIR.

- SCADA:
    - The local control panel is antiquated and beyond its life expectancy. The SCADA controls are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.1.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspections.

- Electrical System Upgrade:
    - Replace service conductors and service equipment. Replace feeder conductors from service panel.
    - Replace step-down transformer and lighting panelboard. Reuse feeder conductors.
    - Replace starter with a Reduced Voltage Soft Starter (RVSS).
    - Install new site power meter for future SCADA use.
    - Reuse existing conduits where possible.

- Mechanical:
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
    - Prep, recoat and paint station valves and piping.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA: An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and

Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing SCADA remote terminal unit (RTU) for remote monitoring and control of the existing parameters.

RECOMMENDED IMPROVEMENTS

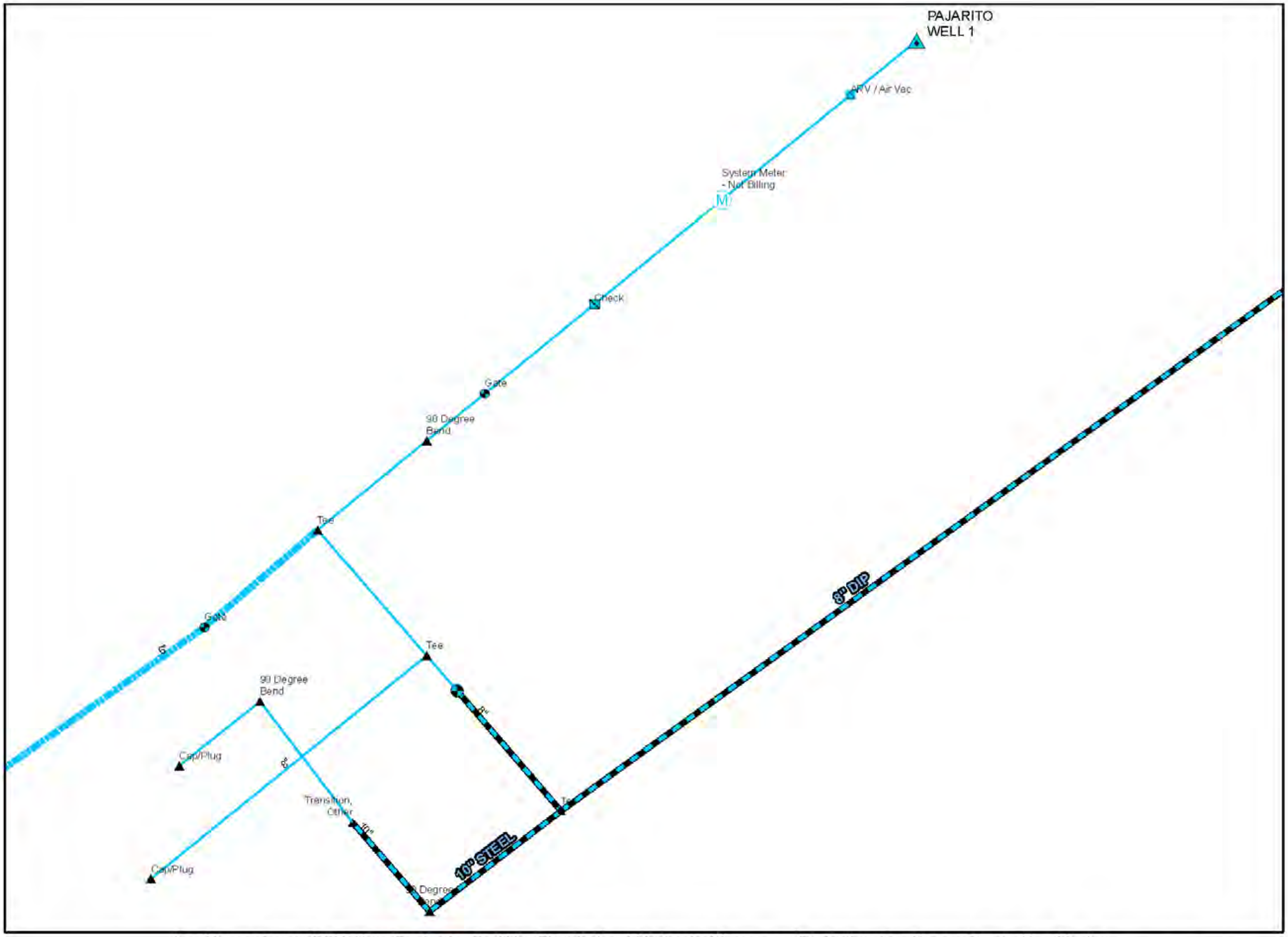
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 67,980
New facility control panel	$ 39,435
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 114,915**

EXHIBIT 2.1 – PAJARITO WELL 1:

PAJARITO WELL 1 MECHANICAL PLAN,

PAJARITO WELL 1 ELECTRICAL PLAN AND

PAJARITO WELL 1 ELECTRICAL ONE LINE DIAGRAM

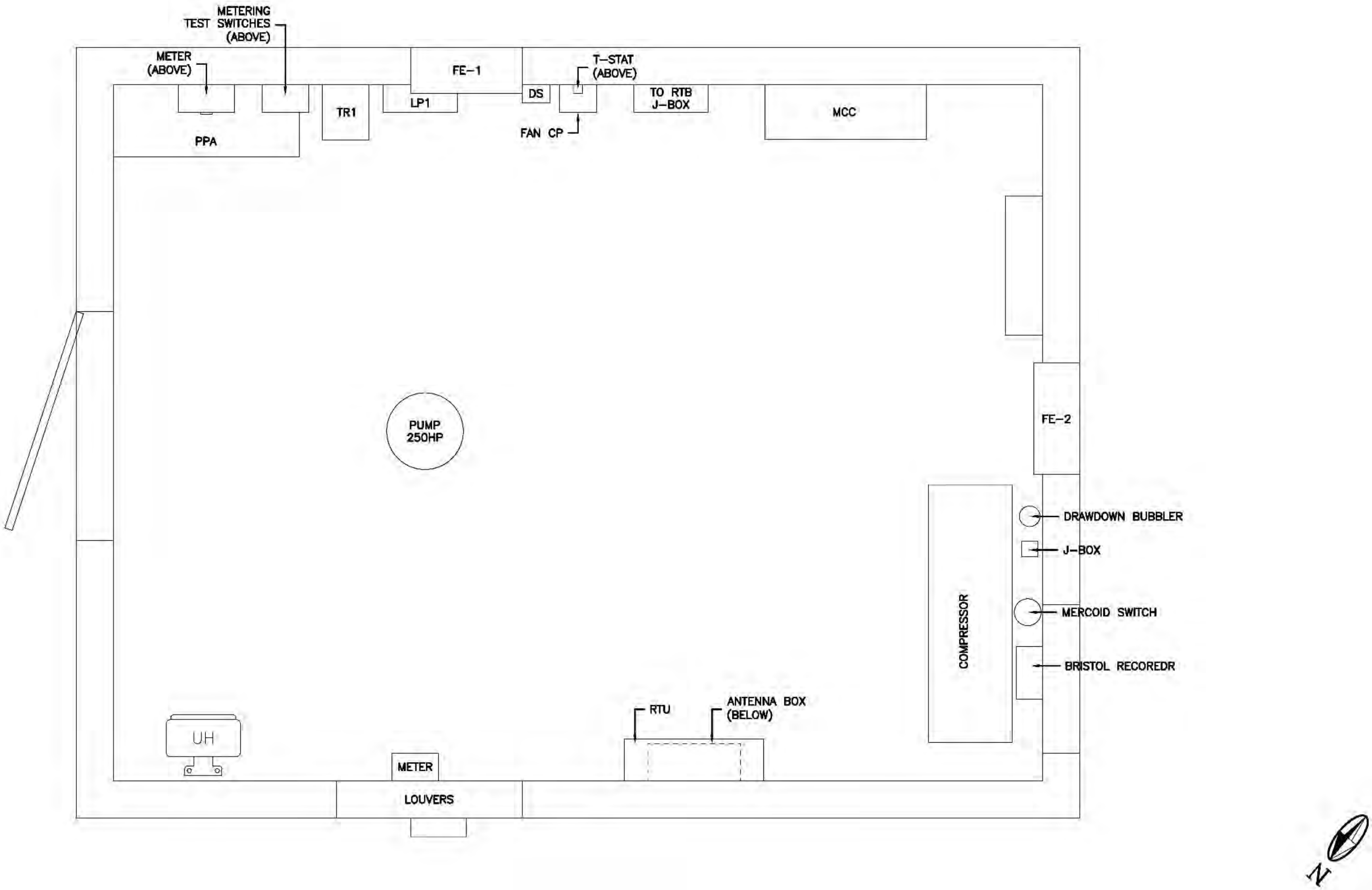


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO WELL 1
Mechanical Plan

LAST MODIFIED: Jun 25, 2021 - 11:10am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\18-PAJARITO WELL 1\
DWG. NAME: ELAC-18-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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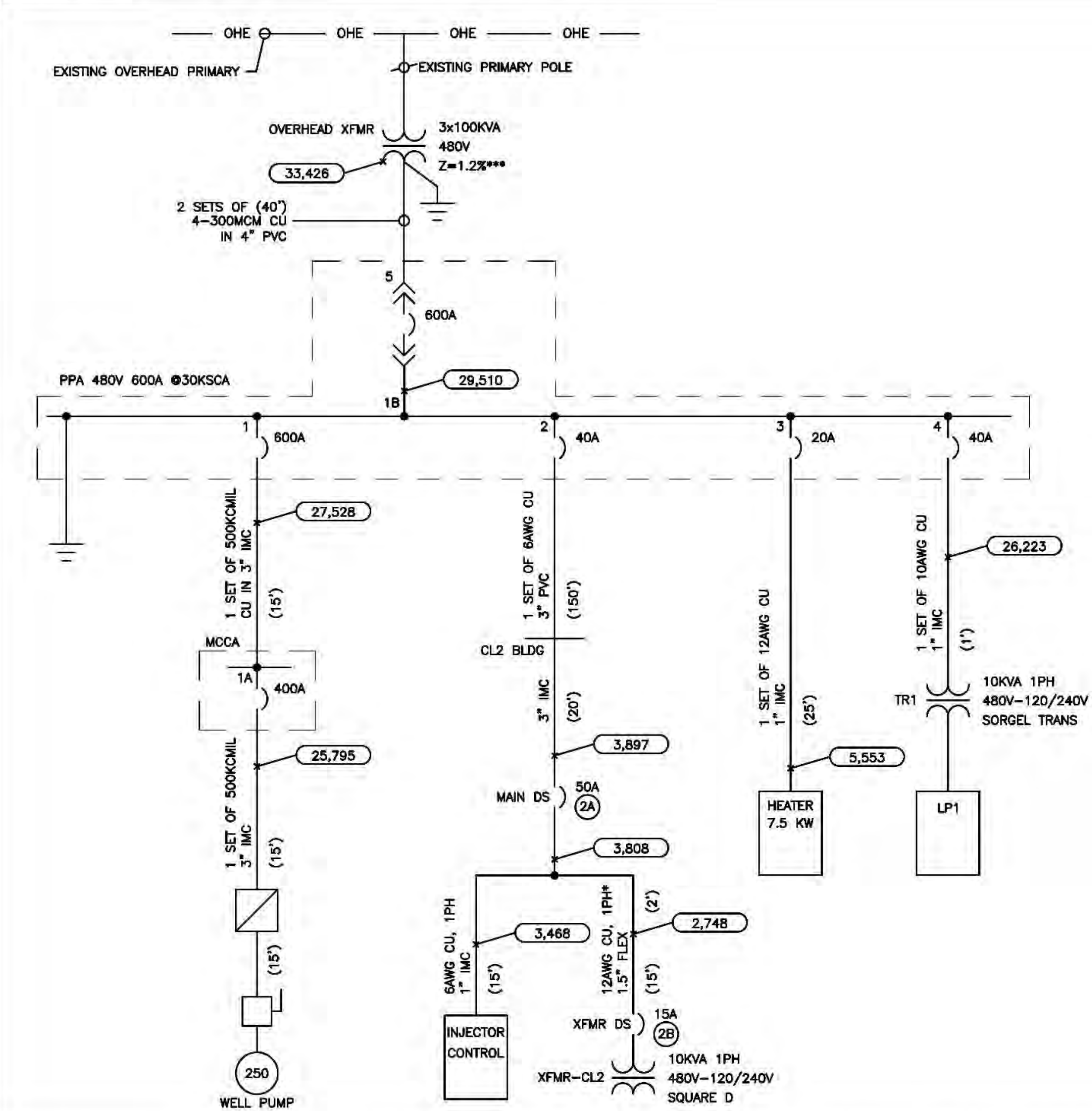
PAJARITO WELL 1
ELECTRICAL PLAN

LAST MODIFIED: Jun 14, 2021 - 9:13am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\PAJARITO WELL 1\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (33,426) = AVAILABLE 3Ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (300') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. UNABLE TO GET FULL ACCESS TO SOME OF THE BREAKERS TO DETERMINE MODEL NUMBER.

* USING APPROPRIATE CONDUCTOR SIZE (12AWG) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (6AWG).

** USING APPROPRIATE CONDUCTOR SIZE (2 SETS 300MCM) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (500MCM).

*** UNABLE TO DETERMINE IMPEDANCE OF OVERHEAD TRANSFORMERS, USING LOWEST IMPEDANCE FOR AVAILABLE FOR THIS SIZE.

1) SQUARE D MAL36600
AIC RATING: 30KA
1A) SQUARE D MAL36400
AIC RATING: 30KA
2) SQUARE D
40A
2A) SQUARE D
50A
2B) SQUARE D
15A
3) SQUARE D
40A
4) SQUARE D
40A
5) SQUARE D MAL36600
AIC RATING: 30KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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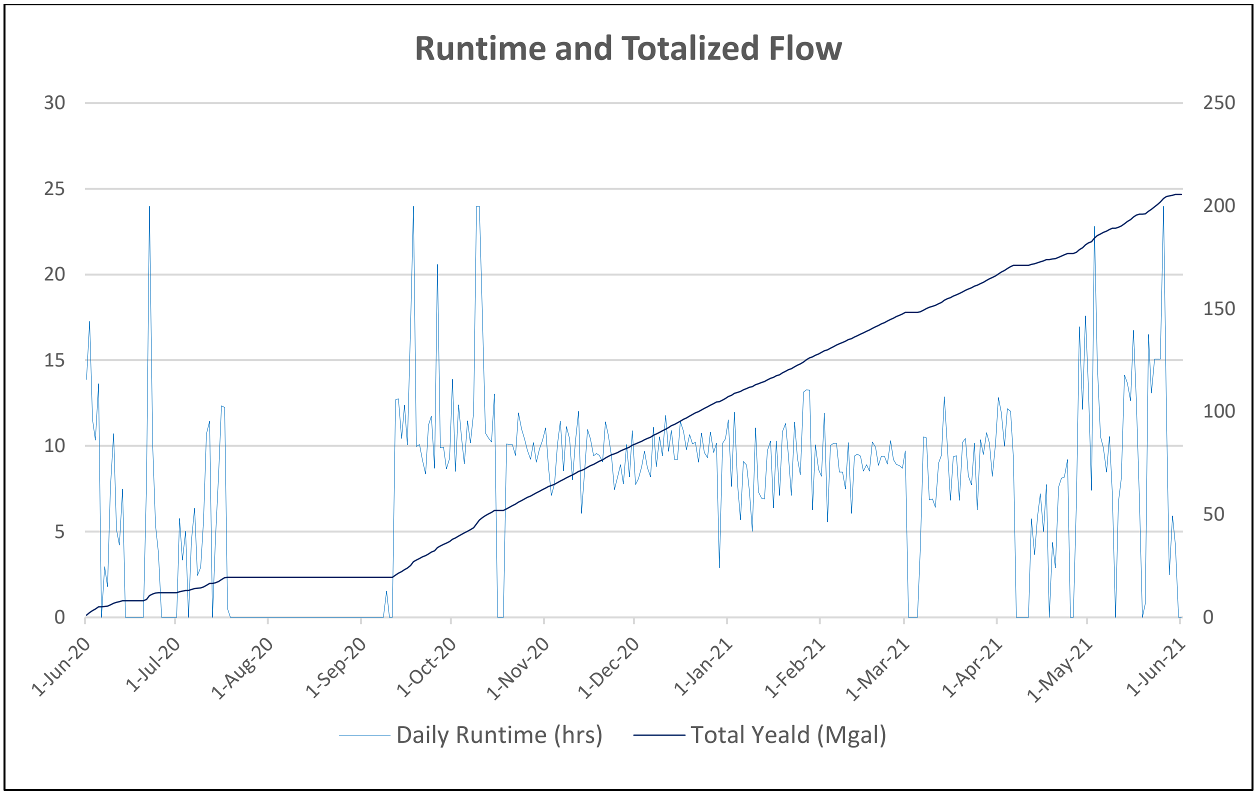
PAJARITO WELL 1
ELECTRICAL ONE-LINE DIAGRAM

2.2 PAJARITO WELL 2

Pajarito Well 2 (PW2) has been in service since 1966. This well pumps into the same transmitting line as Pajarito Wells 4 and 5. PW2 produces approximately 1,275 gpm and per last year's Supervisory Control and Data Acquisition (SCADA) runtime data, ran 2,687 hours and produced 206M gallons (with the assumed flow rate).



2.2.1 Observations

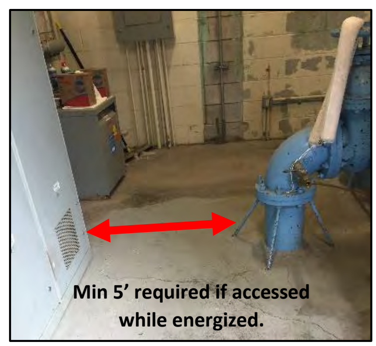
The facility had recently experienced an electrical fault which caused damage to some equipment and wiring. The damaged wire and equipment have been replaced and the fault residue has been cleaned and placed back into working condition. Providing the age of the equipment, the fault may have caused electrical stress that may present itself in the future. Lastly, there are clearance issues within the building in front of the medium voltage starter.

- Service Transformer: 750 kVA, 4,160V secondary:
    - The transformer is owned and operated by Los Alamos National Laboratory (LANL). No action required.

- Service Equipment: 4,160V exterior switchgear:
    - Equipment is in operation condition. Fault damage has been cleaned, but the fault could have caused additional unseen equipment fatigue.
    - The age of the equipment is beyond the life expectancy.

- Motor: 600 HP, 4,160V:
    - Life Expectancy: 20-30 years (beyond life expectancy).

- Starter: Reduced Voltage Auto Transformer (RVAT):
    - The starter appears to be in fair condition per visual inspection. The fault damage has been cleaned, but the fault could have caused additional unseen equipment fatigue.
    - There are electrical code clearance issues in the front of the equipment to the adjacent process piping. *National Electrical Code (NEC) Article 110.34 Working Space and Guardians*, requires 5 feet minimum.
    - The age of the equipment is beyond the life expectancy.



- Lighting Panel and Step-Down Transformer:
    - The step-down transformer and lighting panel are in operational condition but are beyond their life expectancy.

- Instrumentation:
    - 8” flow meter - Krohne / Mag / Model Number = IFM 4020-D-Hart-6 LAS 2-S / Serial Number = 1217 / 03 / 2002 / Condition = GOOD.

- Mechanical:
    - 12” gate valve - Manual / MH V&F Co. / 1965 / Condition = FAIR.
    - 8” gate valve - Manual / MH V&F Co. / 1965 / Condition = FAIR / Drain Line.

- SCADA:
    - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.2.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- Electrical System Upgrade:
    - Replace service conductors and 4,160V switchgear. Replace feeder conductors from switchgear.
    - Replace step-down transformer and lighting panelboard. Reuse feeder conductors.
    - Replace starter with a Reduced Voltage Soft Starter (RVSS). The new RVSS should be positioned such that the clearance complies with the NEC.
    - Install new site meter for future SCADA use.
    - Reuse existing conduits where possible.

- Mechanical:
    - Verify the need for check valve (associated closure) and add as necessary.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
    - Prep, recoat, and paint station valves and piping.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA: An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing SCADA RTU for remote monitoring and control of the existing parameters.

2.2 PW 2

RECOMMENDED IMPROVEMENTS

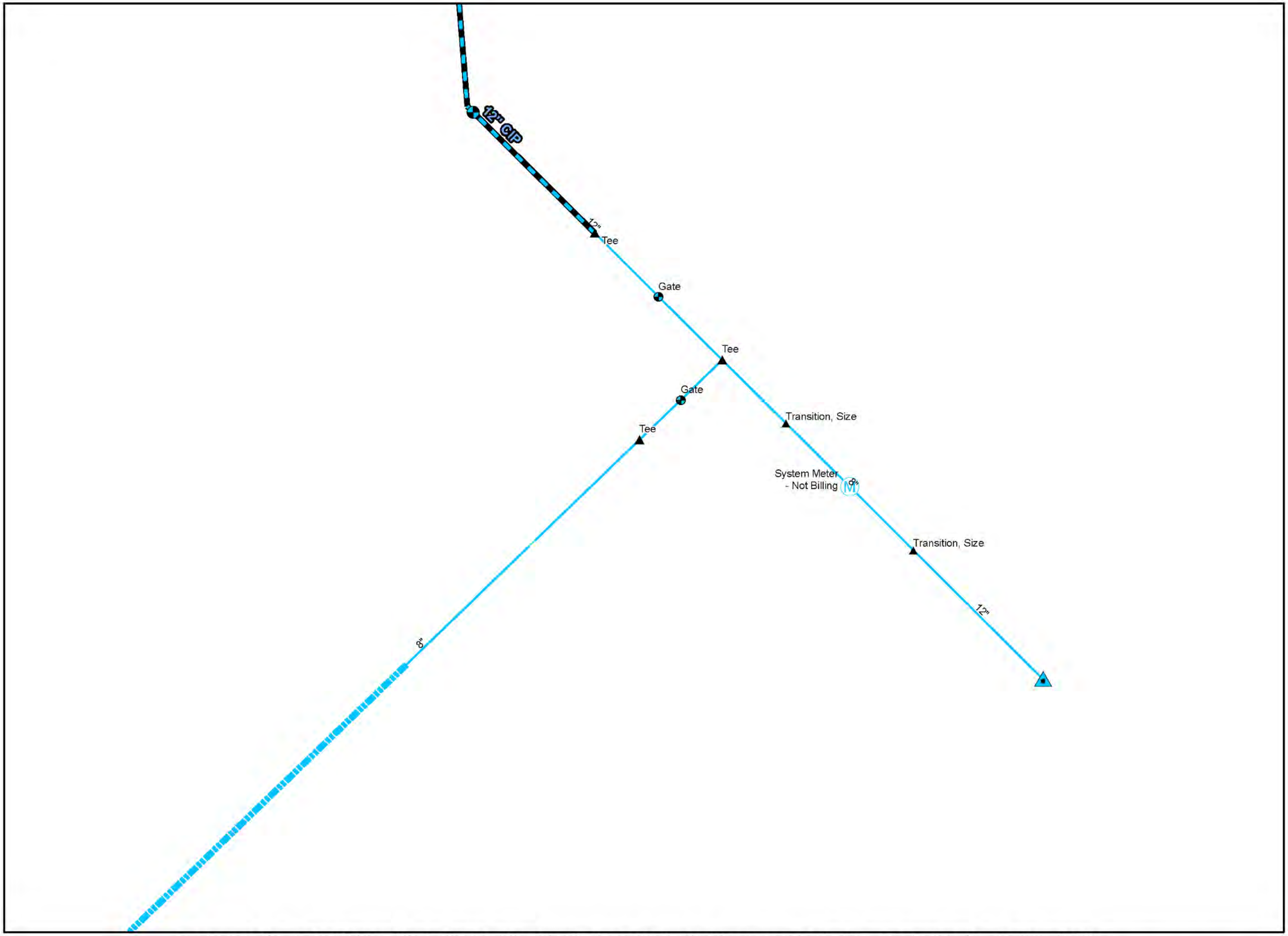
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 224,400
New facility control panel	$ 39,435
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 271,335**

EXHIBIT 2.2 – PAJARITO WELL 2:

PAJARITO WELL 2 MECHANICAL PLAN,

PAJARITO WELL 2 ELECTRICAL PLAN, AND

PAJARITO WELL ELECTRICAL ONE LINE DIAGRAM

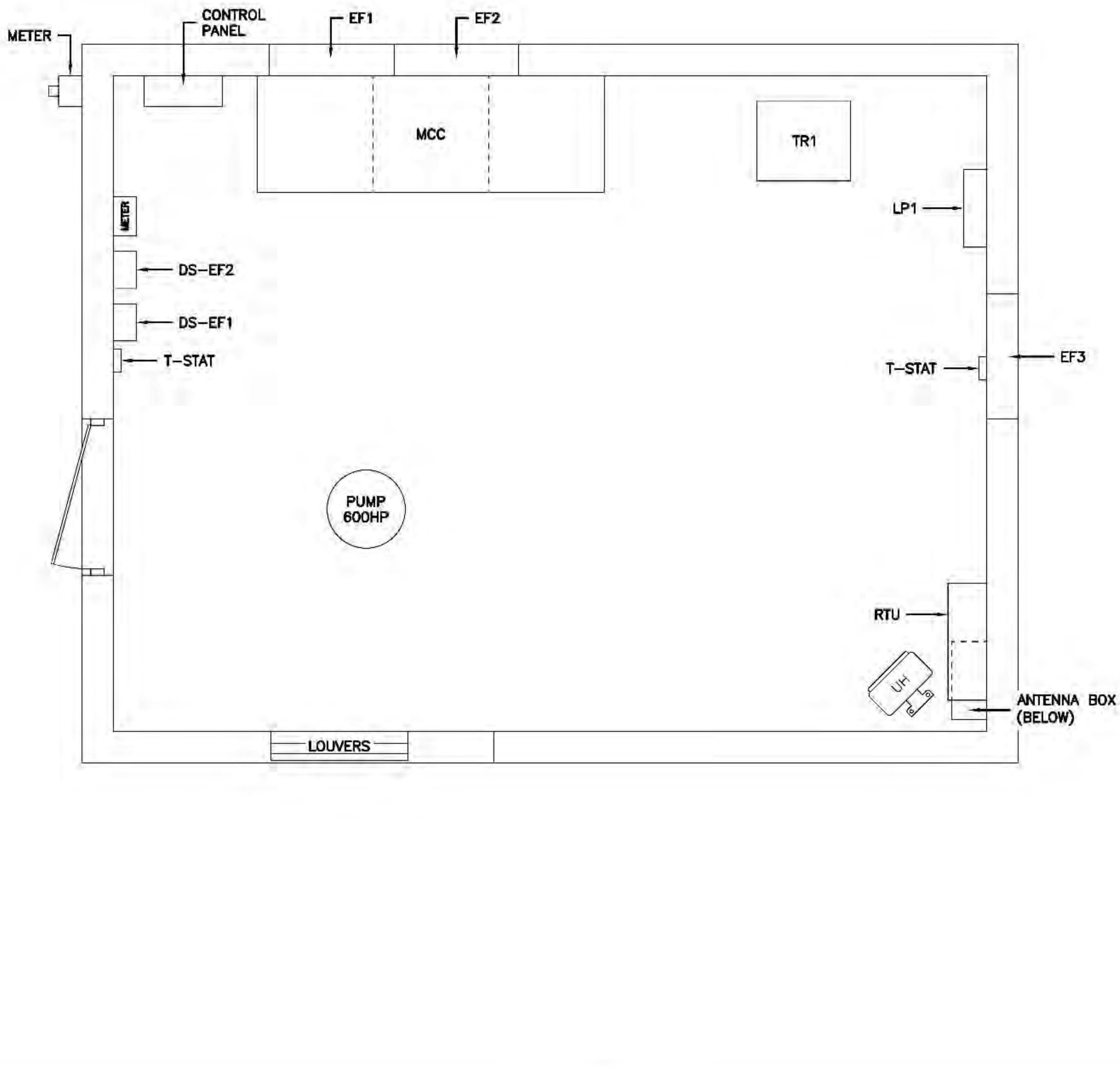


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO WELL 2
Mechanical Plan

LAST MODIFIED: Jun 25, 2021 - 11:15am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\19-PAJARITO WELL 2\
DWG. NAME: ELAC-19-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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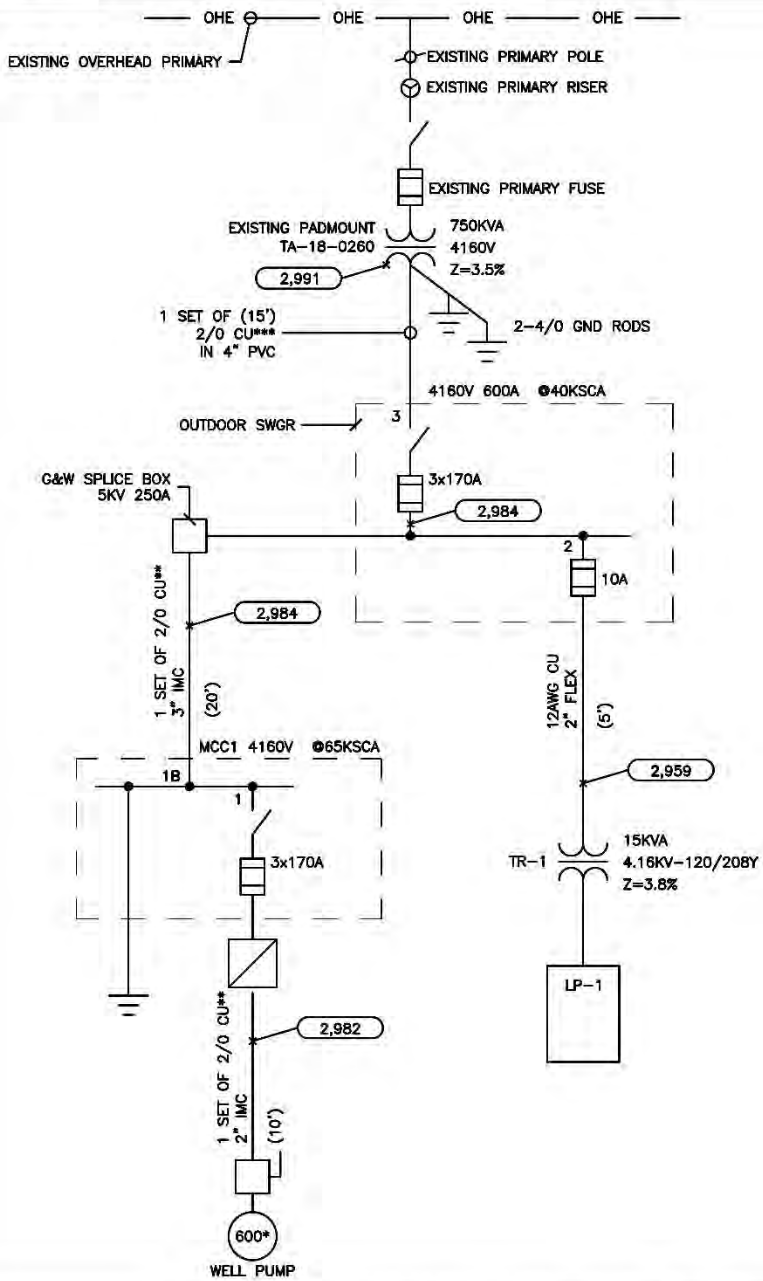
PAJARITO WELL 2
ELECTRICAL PLAN



GENERAL NOTES

1. (13,550) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (120') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* FULL LOAD CURRENT FOR PUMP IS 75A.

** USING APPROPRIATE CONDUCTOR SIZE (2/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (2AWG).

*** USING APPROPRIATE CONDUCTOR SIZE (2/0) FOR 1-LINE & CALCULATIONS, UNABLE TO DETERMINE ACTUAL VALUE (POSSIBLY 2AWG).

1) FERRAZ SHAWMUT A480R6R-1
AIC RATING: 65KA
CONTINUOUS RATING: 6R
2) GE 9F60 DMH010
AIC RATING: 82KA
CONTINUOUS RATING: 10E
3) GE 177L109G19
AIC RATING: 30KA
CONTINUOUS RATING: 6R

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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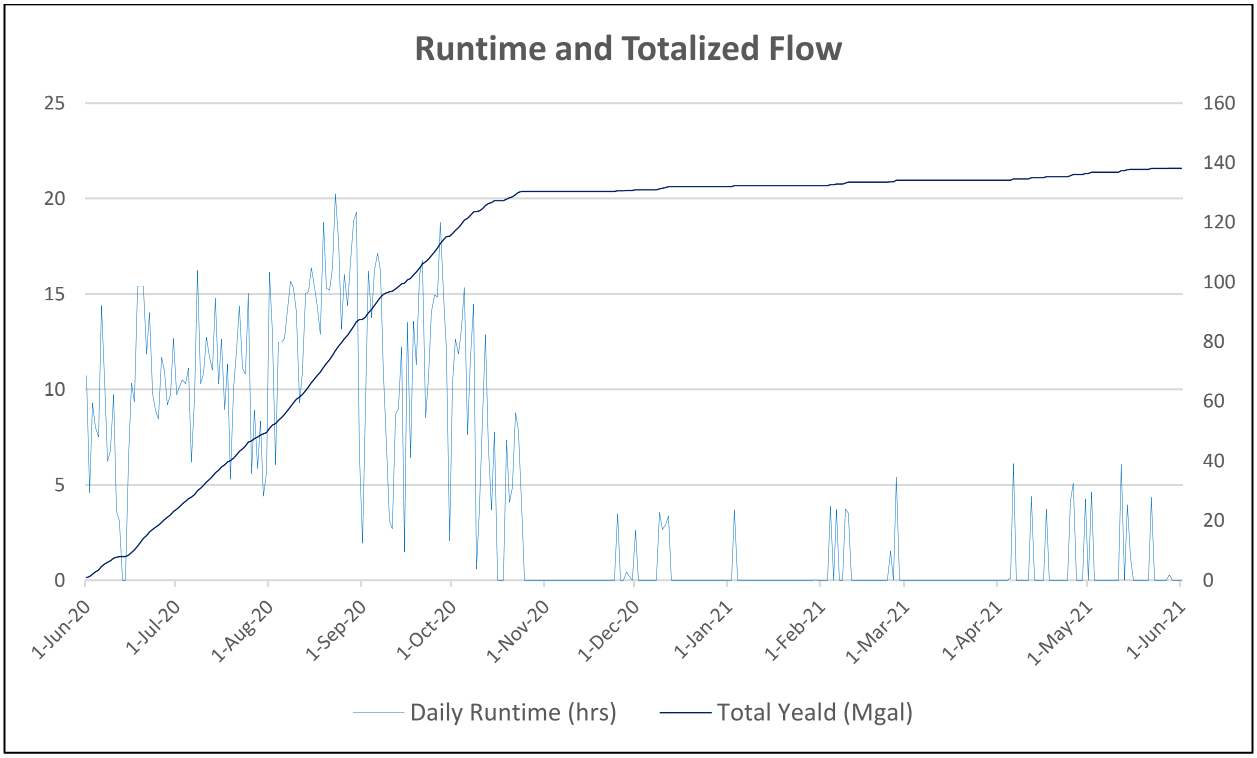
PAJARITO WELL 2
ELECTRICAL ONE-LINE DIAGRAM

2.3 Pajarito Well 3

Pajarito Well 3 (PW3) has been in service since 1968. This well has the greatest pumping rate of the Pajarito's well field at 1,400 gpm. As part of a 2011 upgrades project, the motor starter was replaced with an Eaton soft starter. Per last year's Supervisory Control and Data Acquisition (SCADA) runtime data, PW3 ran 1,645 hours and produced 138M gallons (assuming 1,400 gpm). This well, along with Pajarito Well 1 (PW1), are the primary water producers for Pajarito Tank 1, which is used to serve White Rock.



2.3.1 Observations

Since the installation of the soft starter, PW3 has experienced ongoing issues. The well shuts down when not called to stop and may not indicate that it has stopped through SCADA. These issues have made this site unreliable and require operators to run this site primarily manually. As a result, additional labor hours are required to run this well, and one of this well's counterparts, Pajarito Well 1, produces 58% less flow, resulting in more runtime to meet system demands. Making corrections to PW3 would reduce the amount of runtime required for PW1, therefore, increasing the life expectancy of the PW1 equipment.

- Service Transformer: 500 kVA, 4160V secondary:
    - The transformer is owned and operated by Los Alamos National Laboratory (LANL). No action required.

- Motor: 500 HP, 4160V:
    - Life Expectancy: 20-30 years (beyond expected life).

- Starter: Eaton Soft Starter
    - Since installed in 2011, the starter has not been reliable. The starter will stop the well without a known cause. The starter will also not send the correct signal to SCADA that the well has stopped. There have been ongoing efforts to correct, but Eaton has not been able to correct the issue.

- Service Disconnect Switch: Right most section of Eaton line-up.
    - *National Electrical Code (NEC) Article 110.34 Working Space and Guardians*, requires 5 feet minimum clearance in front of the equipment. Between the service disconnect switch and the wall, there is a only 4 feet-one inch of space available which violates this code requirement prohibiting working or maintaining the equipment while energized.

- Lighting Panel:
    - Lighting panel LP1 is served by a separate, overhead, un-metered pole-mounted transformer bank (LANL owned) and is feed from the Rifle Range Booster

Station. No recommended modifications under this section. Refer to the Rifle Range Booster Station for additional details.

- Instrumentation:

  8” Flow meter – Krohne / Mag / Model Number = Aqua 420K-D-HART-6 LAS2-S / Serial Number = A-01-47705 / 2002 / Condition = GOOD.

- Mechanical:
  - 10” check valve – Swing / Stockham / 1965 / Condition = FAIR.
  - 8” gate valve – Manual / MH V&F Co. / 1965 / Condition = FAIR.
  - 6” pump control valve – Cla-Val / Model Number = 60593 / 1965 / Condition = GOOD / Drain Line / Normally open on start-up then closes slowly / Slowly opens during shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.3.2 Recommendations

- Motor: Refer to Section 4.0 Motor Inspection.

- Starter: Due to the operational issues associated with this starter, replacement is recommended. Retrofitting the existing enclosure was considered, but the cost differential was negligible in comparison to wholesale replacement. New starter to incorporate power parameters for future SCADA monitoring.

- Service Disconnect Switch: Replacement of the starter should include a new service disconnect switch. The new starter and switch would be a smaller footprint and eliminate the clearance concern in front of the switch.

- Mechanical:
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
  - Verify need for main line pump control valve and add as necessary.
  - Existing Drain Line Pump Control Valve – Full rebuild recommended.
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Prep, recoat and paint station valves and piping.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA: An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing

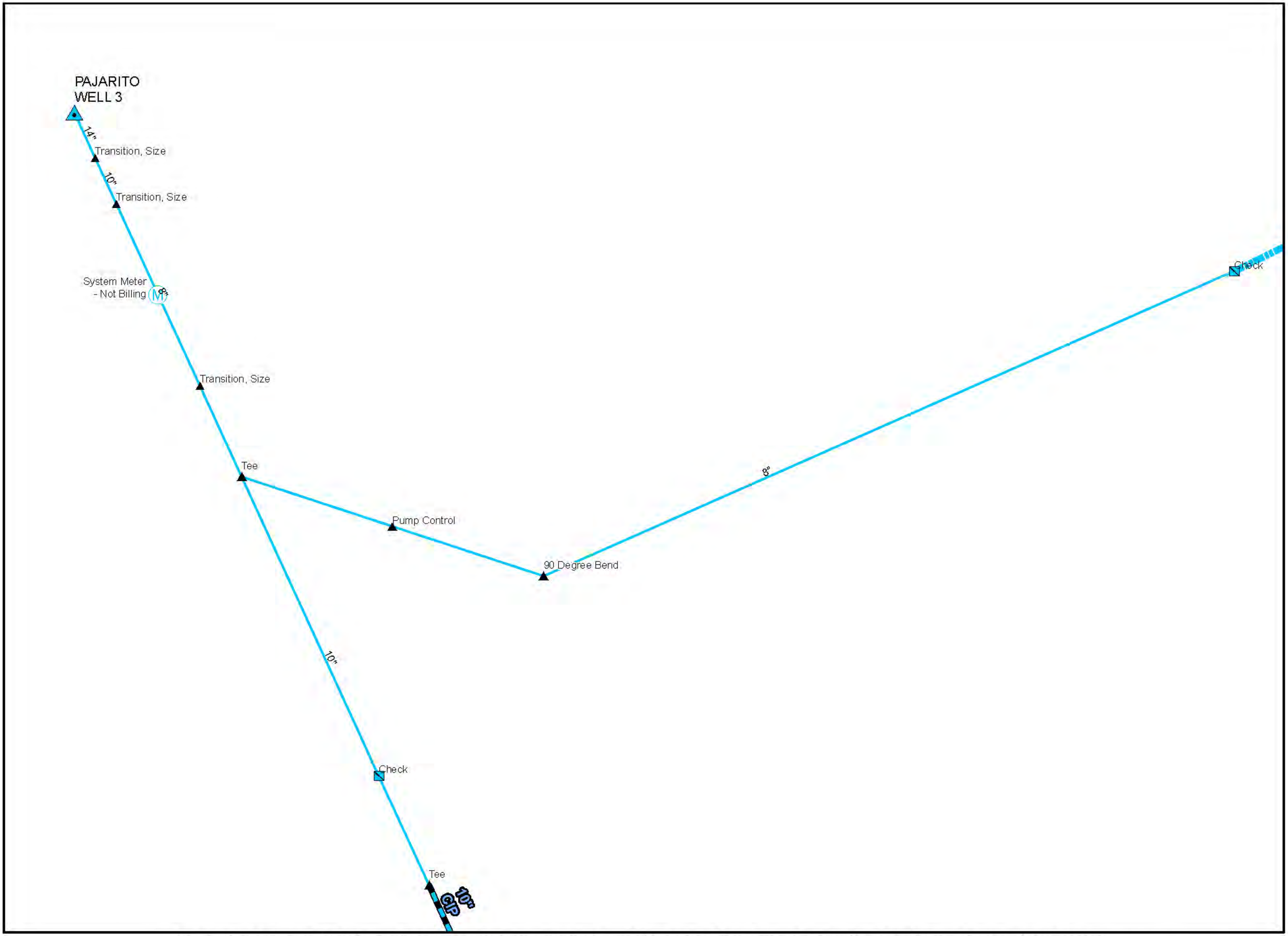
SCADA Remote Terminal Unit (RTU) for remote monitoring and control of the existing parameters.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical system upgrade RVSS motor starter, service disconnect, and associated power conductors.	$ 144,128
New facility control panel including connections to Shooting Range Booster Station instrumentation and controls.	$ 49,995
Prep, recoat and paint station valves and piping	$ 7,500
Rebuilding all hydraulic control valves	$ 8,000
Subtotal (Exclusive of NMGRT)	**$ 209,623**

EXHIBIT 2.3 – PAJARITO WELL 3:

PAJARITO WELL 3 MECHANICAL PLAN, PAJARITO WELL 3 AND LIVE RANGE PUMP STATION ELECTRICAL PLAN, AND PAJARITO WELL 3 PUMP STATION ELECTRICAL ONE-LINE DIAGRAM

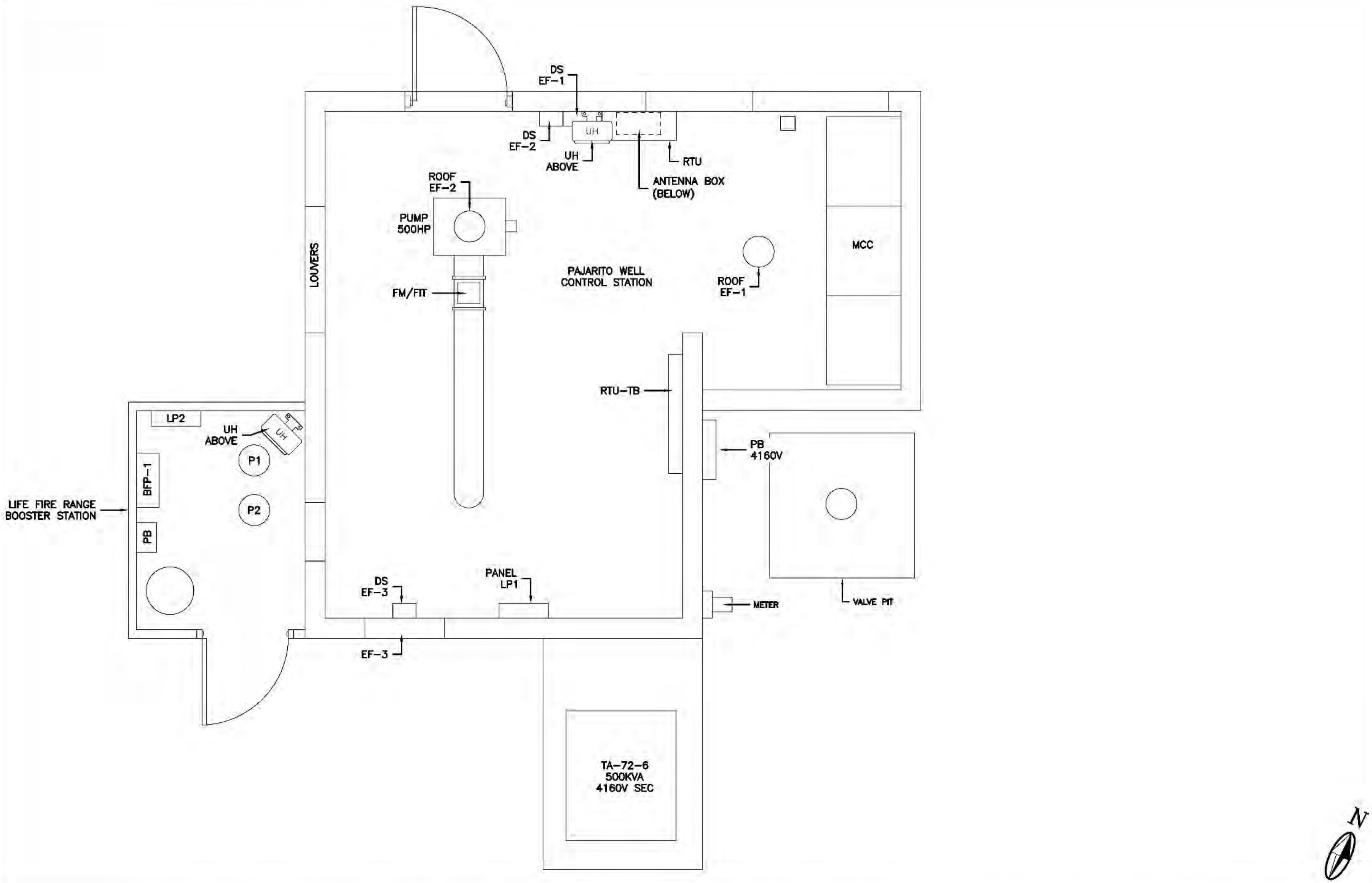


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO WELL 3
Mechanical Plan

LAST MODIFIED: Jun 25, 2021 - 11:22am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\20-PAJARITO WELL 3\
DWG. NAME: ELAC-20-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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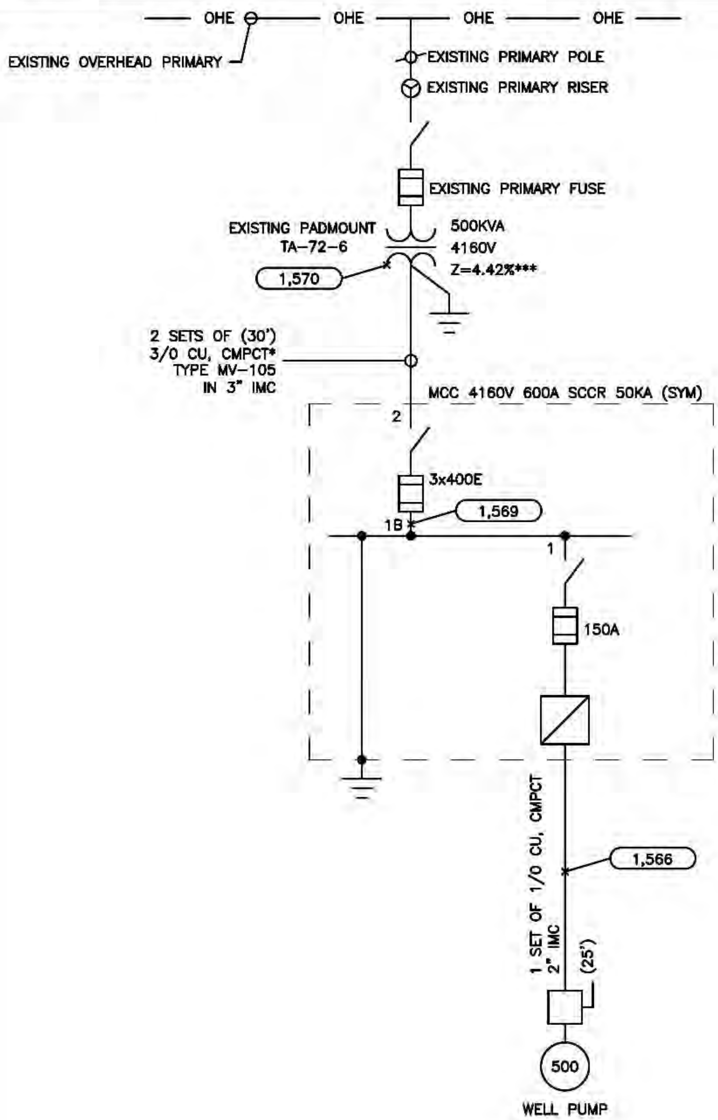
PAJARITO WELL 3 AND LIVE FIRE RANGE PUMP STATION
ELECTRICAL PLAN



1) CUTLER-HAMMER 5BCLS-5R (150A)
INTERRUPTING CURRENT: 50KA RMS SYM
2) CUTLER-HAMMER LBS FUSED SW
CONTINUOUS/ INTERRUPTING RATING: 600A
FUSE CONTINUOUS CURRENT RATING: 400E
3) 3xFERRAZ SHAWMUT A055F2D0R0-400E
INTERRUPTING CURRENT: 65KA RMS SYM

GENERAL NOTES

1. (1,570) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (135') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. 120/208V SERVICE HAS ITS OWN XFMR/CIRCUIT.

* USING APPROPRIATE CONDUCTOR SIZE (2 SETS OF 3/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (4AWG).

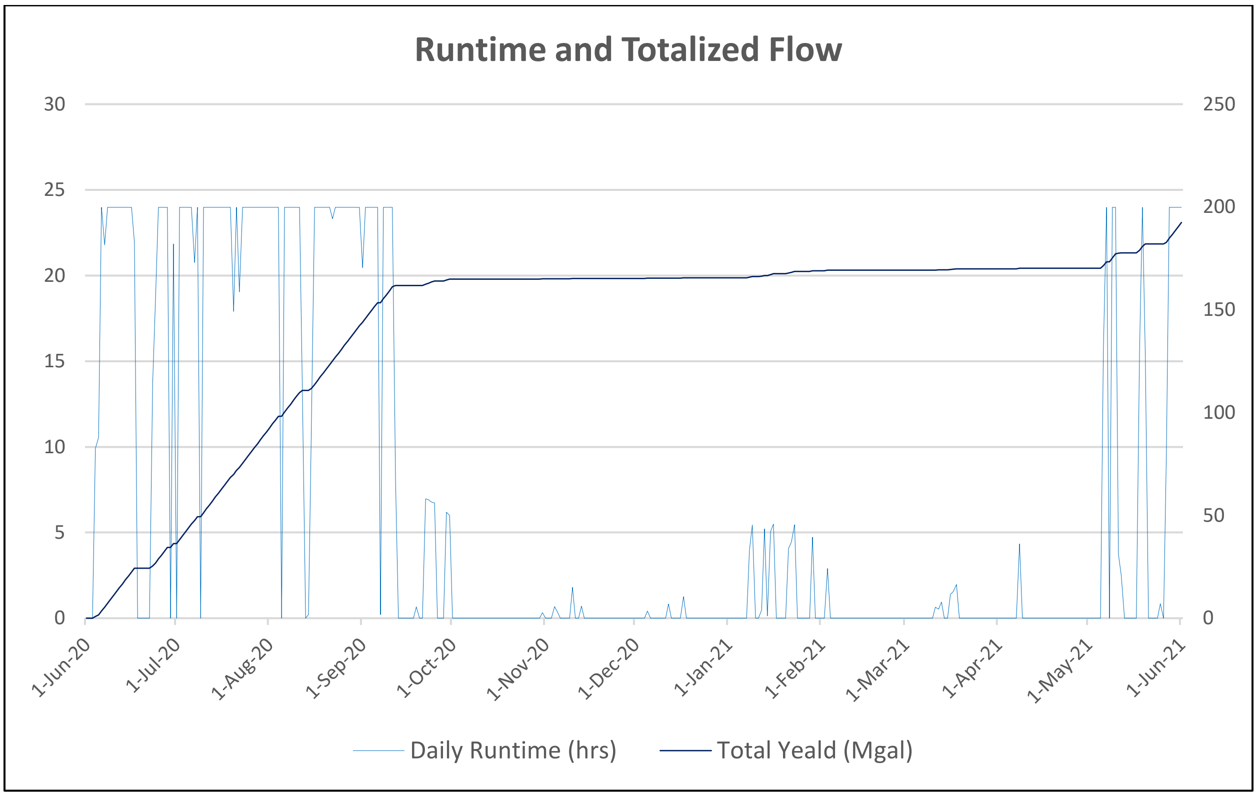
** USING APPROPRIATE CONDUCTOR SIZE (1/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (4AWG).

*** USING LOWEST IMPEDANCE FOUND FOR THIS TRANSFORMER TYPE UNTIL ACTUAL IMPEDANCE IS RECEIVED.

PAJARITO WELL 3 PUMP STATION
ELECTRICAL ONE-LINE DIAGRAM

2.4 Pajarito Well 4

Pajarito Well 4 (PW4) is a natural gas engine driven pump originally installed in 1982. An upgrade was completed in 2020 which included a new Wagner natural gas engine and associated system controls. This well pumps into the same transmitting line as Pajarito Wells 2 and 5. PW4 produces approximately 1,330 gpm and per last year's supervisory control and data acquisition (SCADA) runtime data, ran 2,411 hours and produced 192M gallons (with the assumed flow rate).



2.4.1 Observations

PW4 is served by an overhead 120/208V 3-phase service. Operational staff have confirmed that the facility is in good operational condition and is both dependable and reliable.

- Service Transformer: Pole-mounted 3-Phase transformer bank.
    - The transformer is owned and operated by Los Alamos National Laboratory (LANL). No action required.

- Natural Gas, Engine-Driven Pump:
    - Equipment is in good working condition.

- Lighting Panel:
    - Equipment is in good working condition.

- Instrumentation:
    - 10” flow meter – Foxboro-GE / Ultra Sonic / Aqua Trans AT 600 / Serial Number = M 09190054 / 2021 / Condition = EXCELLENT.

- Mechanical:
    - 10” butterfly valve – Manual / Crane Monarch / 1966 / Condition = FAIR
    - 8” butterfly valve – Pratt / Serial Number = 51226-6 / Electrically Actuated / Tork-Master / Serial Number = TM 2-00 7525 / 1965 / Condition = FAIR / Drain Line / Normally open on start-up then closes slowly / Slowly opens during shut-down.

- SCADA:
    - The Wagner control panel is in good operational condition and is suitable for integration into a new SCADA system.

2.4.2 Recommendations

- Natural Gas, Engine-Driven Pump:
    - Manufacturer’s recommended maintenance and the recommended intervals (included below).

- Lighting Panel:
    - No recommendation at this time.

- Mechanical:
    - Verify need for air / vacuum valve and check valve and add as necessary.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
    - Prep, recoat and paint station valves and piping.
    - Install check valve (assisted closure) inside station building.
    - Locate, excavate and remove rumored check valve outside station.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
    - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost	
Install check valve inside station building	$	50,000
Prep, recoat and paint station valves and piping	$	7,500
locate, excavate and remove check valve outside of station	$	10,000
Subtotal (Exclusive of NMGRT)	**$**	**67,500**

2.4.3 Manufacturer's Recommended Maintenance Intervals

Daily:

- Air Starting Motor Lubricator Oil Level – Check Air Tank Moisture and Sediment – Drain Control Panel – Inspect / Test.
- Coolant Level – Check.

- Engine Air Cleaner Service Indicator – Inspect Engine Oil Level – Check.
- Fuel Filter Differential Pressure – Check.
- Fumes Disposal Filter Differential Pressure - Check Walk-Around Inspection.

Every 250 Service Hours:

- Engine Oil Sample – Obtain.

Initial 1,000 Service Hours:

- Engine Valve Lash and Bridge – Check Valve Stem Projection – Measure / Record.

Every 1,000 Service Hours:

- Coolant Sample (Level 1) – Obtain.

Every 2,000 Service Hours:

- Engine Oil – Change Engine Oil Filter – Change.
- Engine Valve Lash and Bridge – Check.

Every 4,000 Service Hours:

- Air Starting Motor Lubricator Bowl – Clean Alternator – Inspect.
- Belts – Inspect / Adjust / Replace Compressor Bypass – Check Coolant Sample (Level 2) – Obtain.
- Cooling System Supplemental Coolant Additive (SCA) – Test / Add Crankcase Blowby – Test / Record.
- Exhaust Piping – Check.
- Fuel Metering Valve – Check.
- Gas Pressure Regulator Condensation – Drain Hoses and Clamps – Inspect / Replace.
- Ignition System Timing – Check / Adjust Inlet Air System – Check.
- Nitrogen Oxide Sensor – Calibrate Spark Plugs – Inspect / Adjust / Replace.
- Valve Stem Projection – Measure / Record Water Pump – Inspect.

Every 8,000 Service Hours:

- Coolant Temperature Regulator – Replace Crankcase Pressure – Measure.
- Crankshaft Vibration Damper – Inspect.
- Cylinder Pressure – Test / Record Driven Equipment – Check.
- Engine Crankcase Breather – Clean Engine Protective Devices – Check Exhaust Bypass – Inspect.
- Fumes Disposal Filter Element – Replace Starting Motor – Inspect.
- Turbocharger – Inspect.

Between 10,000 and 20,000 Service Hours:

- Overhaul (Top End).

Every 24,000 Service Hours or 3 Years:

- Coolant (diesel engine antifreeze / coolant [DEAC]) – Change.

Between 30,000 and 60,000 Service Hours:

- Overhaul (In-Frame).

Between 50,000 and 100,000 Service Hours:

- Overhaul (Major).

EXHIBIT 2.4-A – PAJARITO WELL 4:

WAGNER POWER SYSTEMS QUOTE

STANDBY PREVENTIVE MAINTENANCE
Customer Value Agreement (CVA)
Quote # 62421.1

Quote Issued Date: 09/10/21

Wagner Power Systems, **Customer Value Agreement (CVA)**, herein referred to as "Agreement" for new and used equipment is an important part of Caterpillar's continuing effort to provide OEM equipment owners with superior value and product support. This Agreement provides the owner reasonable assurance that the reliability and productivity of your equipment is maintained and unexpected repair cost is minimized. This Agreement allows you to do what you do best and focus on your core business while Wagner provides expert product support services on your equipment.

Additional customer benefits:

* **PREDETERMINED COST**	No surprises - maintenance cost are guaranteed up front.
* **FACTORY-TRAINED TECHNICIANS**	Experienced technicians keep pace with advances in equipment technology.
* **MAINTENANCE HISTORY & SCHEDULING**	Maintenance support staff utilize computerized scheduling & monitoring system.
* **GUARANTEED QUALITY**	Cat diagnostic tools, fluids & filters assure consistent product quality and results.
* **EPA COMPLIANCE**	Properly dispose of used fluids and filters in compliance with local & federal laws.
* **SAVINGS**	Avoid overhead on maintenance vehicles, insurance or unemployment compensation; minimize costly downtime; repair before failure; increase your productivity; extend your equipment life and get maximum performance and resale benefits.

COMPANY NAME:	COUNTY OF LOS ALAMOS NM - 55851	**ACCOUNT NO:**	55851
COMPANY ADDRESS:	OFFICE OF MGMT & BUDGET 1000 CENTRAL AVE STE 300	**SITE ADDRESS:**	Pajarito Well #4
CITY:	LOS ALAMOS	**CITY:**	Whiterock
STATE:	NM ZIP: 87544	**STATE:**	NM ZIP: 87544
CONTACT NAME:	Dennis Segura	**PHONE NO:**	505 662 8123
E-MAIL:	dennis.segura@lacnm.us		
PSSR NAME:	Albert T. Hutcherson	**PHONE NO:**	5053797402

MAKE / MODEL	ENGINE SERIAL NO.	START HOURS	START DATE	TERM	Type
Caterpillar / G3508	N8W00177	4000	9/20/2021	12 Month	New

	Unit $	Qty	Total $	Frequency	Planned Dates of Maintenance
PM 1	$1,650.00	17	$28,050.00	Alternating Months	every 1000 Hours
PM 2	$3,522.00	9	$31,698.00	Quarterly	every 2000 hours
PM 3	$5,450.00	5	$27,250.00	Every 6 months	every 4000 hours
		Grand Total:	**$86,998.00**		

Volts	Kilowatts	Cable Length (ft)
N/A	515	N/A

SPECIAL INSTRUCTIONS:

Perform 1000 Hour inspection in accordance with OMM SEBU9429-15 $1650.00
Perform 2000 Hour inspection in accordance with OMM SEBU9429-15 $3522.00
Perform 4000 Hour inspection in accordance with OMM SEBU9429-15 $5450.00
document in effect from 2021-2027 with annual acceptance.

Any non Customer Value Agreement maintenance repairs will be billed at Time & Material at the current Wagner Power Systems rate, and are subject to customer approval.

Tax and/or environmental charges should they apply are not included in above rate. Price Is Per Unit, Per Visit Including Parts, Labor and Travel

SERVICE PROVIDED:

1. Perform the indicated maintenance per the scope of work for that maintenance.
2. Provide written Preventive Maintenance and fluids analysis reports and estimate(s) for any corrective action.
3. Provide computerized maintenance scheduling system and a contact person to coordinate the efficient scheduling of work.
4. Maintain service records of all Preventive Maintenance including fluid analysis.

Customer Signature:____________________ **Date:** __________

PSSR Signature:____________________ **Date:** __________

Service Manager Signature:____________________ **Date:** __________

STANDBY PREVENTIVE MAINTENANCE

Customer Value Agreement (CVA)

Quote # 28745.1

Quote Issued Date: 09/10/21

Wagner Power Systems, **Customer Value Agreement (CVA)**, herein referred to as "Agreement" for new and used equipment is an important part of Caterpillar's continuing effort to provide OEM equipment owners with superior value and product support. This Agreement provides the owner reasonable assurance that the reliability and productivity of your equipment is maintained and unexpected repair cost is minimized. This Agreement allows you to do what you do best and focus on your core business while Wagner provides expert product support services on your equipment.

Additional customer benefits:

* **PREDETERMINED COST** .... No surprises - maintenance cost are guaranteed up front.
* **FACTORY-TRAINED TECHNICIANS** .... Experienced technicians keep pace with advances in equipment technology.
* **MAINTENANCE HISTORY & SCHEDULING** .... Maintenance support staff utilize computerized scheduling & monitoring system.
* **GUARANTEED QUALITY** .... Cat diagnostic tools, fluids & filters assure consistent product quality and results.
* **EPA COMPLIANCE** .... Properly dispose of used fluids and filters in compliance with local & federal laws.
* **SAVINGS** .... Avoid overhead on maintenance vehicles, insurance or unemployment compensation; minimize costly downtime; repair before failure; increase your productivity; extend your equipment life and get maximum performance and resale benefits.

COMPANY NAME:	**COUNTY OF LOS ALAMOS NM - 55851**	**ACCOUNT NO:**	**55851**
COMPANY ADDRESS:	**OFFICE OF MGMT & BUDGET** **1000 CENTRAL AVE STE 300**	**SITE ADDRESS:**	**Pajarito Well #4**
CITY:	**LOS ALAMOS**	**CITY:**	**Whiterock**
STATE:	**NM** **ZIP: 87544**	**STATE:**	**NM** **ZIP: 87544**
CONTACT NAME:	**Dennis Segura**	**PHONE NO:**	**505 662 8123**
E-MAIL:	**dennis.segura@lacnm.us**		
PSSR NAME:	**Albert T. Hutcherson**	**PHONE NO:**	**5053797402**

MAKE / MODEL	ENGINE SERIAL NO.	START HOURS	START DATE	TERM	Type
Caterpillar / G3508	N8W00177	4000	9/20/2021	12 Month	New

	Unit $	Qty	Total $	Frequency	Planned Dates of Maintenance
PM 1	$6,950.00	2	$13,900.00	Yearly	**PM-4 every 8000 Hours
PM 2	$54,522.00	1	$54,522.00	Every 3 Years	Top End Overhaul 16000 hours
PM 3	$89,500.00	1	$89,500.00	Every 6 Years	In Frame Overhaul 32000 Hours
		Grand Total:	**$157,922.00**		

Volts	Kilowatts	Cable Length (ft)
N/A	515	N/A

SPECIAL INSTRUCTIONS:

Perform 8000 Hour Services in accordance with OMM SEBU9429-15. $6950.00 per service.
Top End Overhaul in accordance with OMM SEBU9429-15. $54,522.00 one time
In-Frame Overhaul in accordance with OMM SEBU9429-15 $89500.00 one time

Any non Customer Value Agreement maintenance repairs will be billed at Time & Material at the current Wagner Power Systems rate, and are subject to customer approval.

Tax and/or environmental charges should they apply are not included in above rate. Price Is Per Unit, Per Visit Including Parts, Labor and Travel

SERVICE PROVIDED:

1. Perform the indicated maintenance per the scope of work for that maintenance.
2. Provide written Preventive Maintenance and fluids analysis reports and estimate(s) for any corrective action.
3. Provide computerized maintenance scheduling system and a contact person to coordinate the efficient scheduling of work.
4. Maintain service records of all Preventive Maintenance including fluid analysis.

Customer Signature:_______________________ **Date:** ______________

PSSR Signature:_______________________ **Date:** ______________

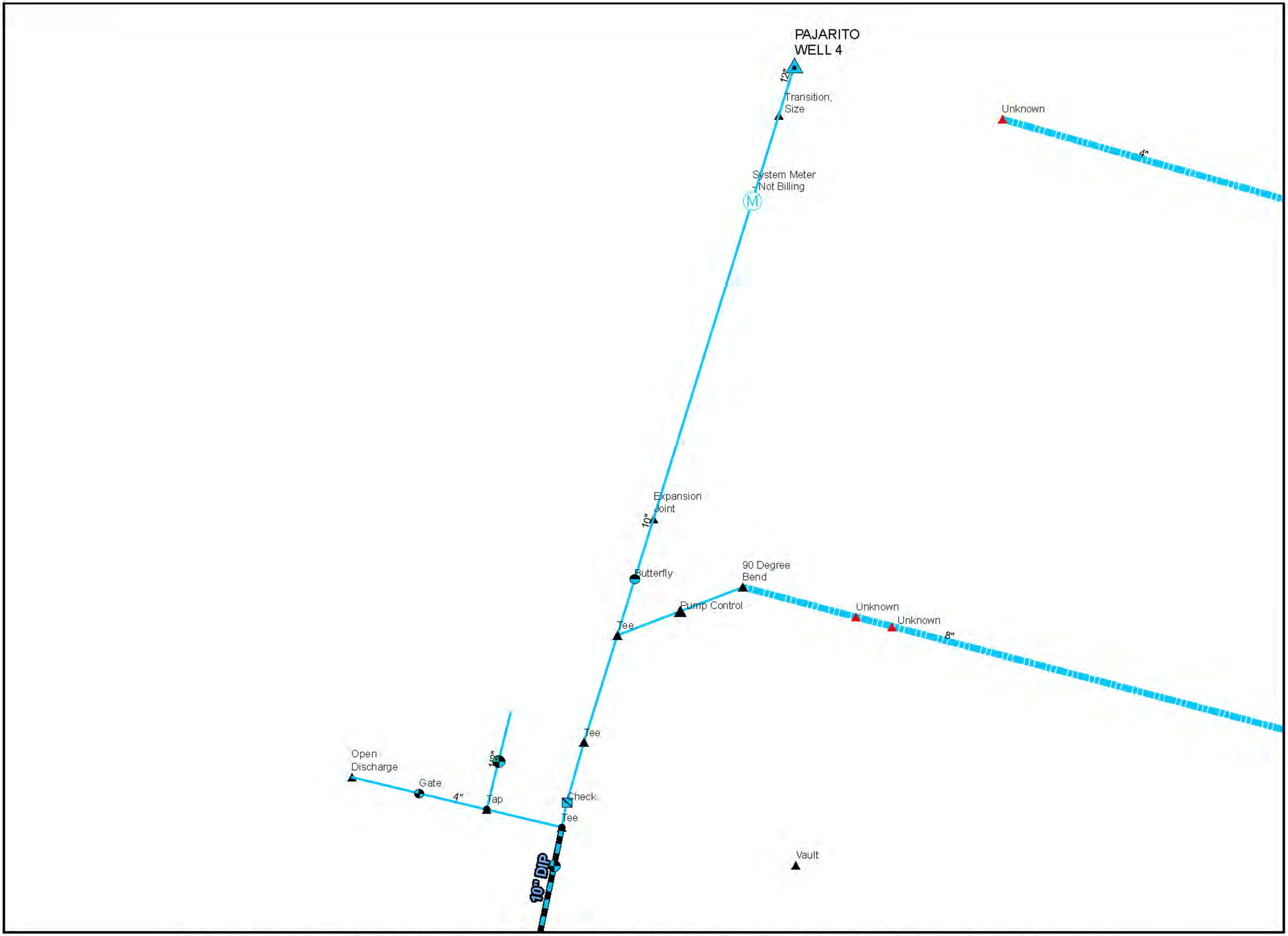
Service Manager Signature:_______________________ **Date:** ______________

EXHIBIT 2.4-B – PAJARITO WELL 4:

PAJARITO WELL 4 MECHANICAL PLAN,

PAJARITO WELL 4 ELECTRICAL PLAN, AND

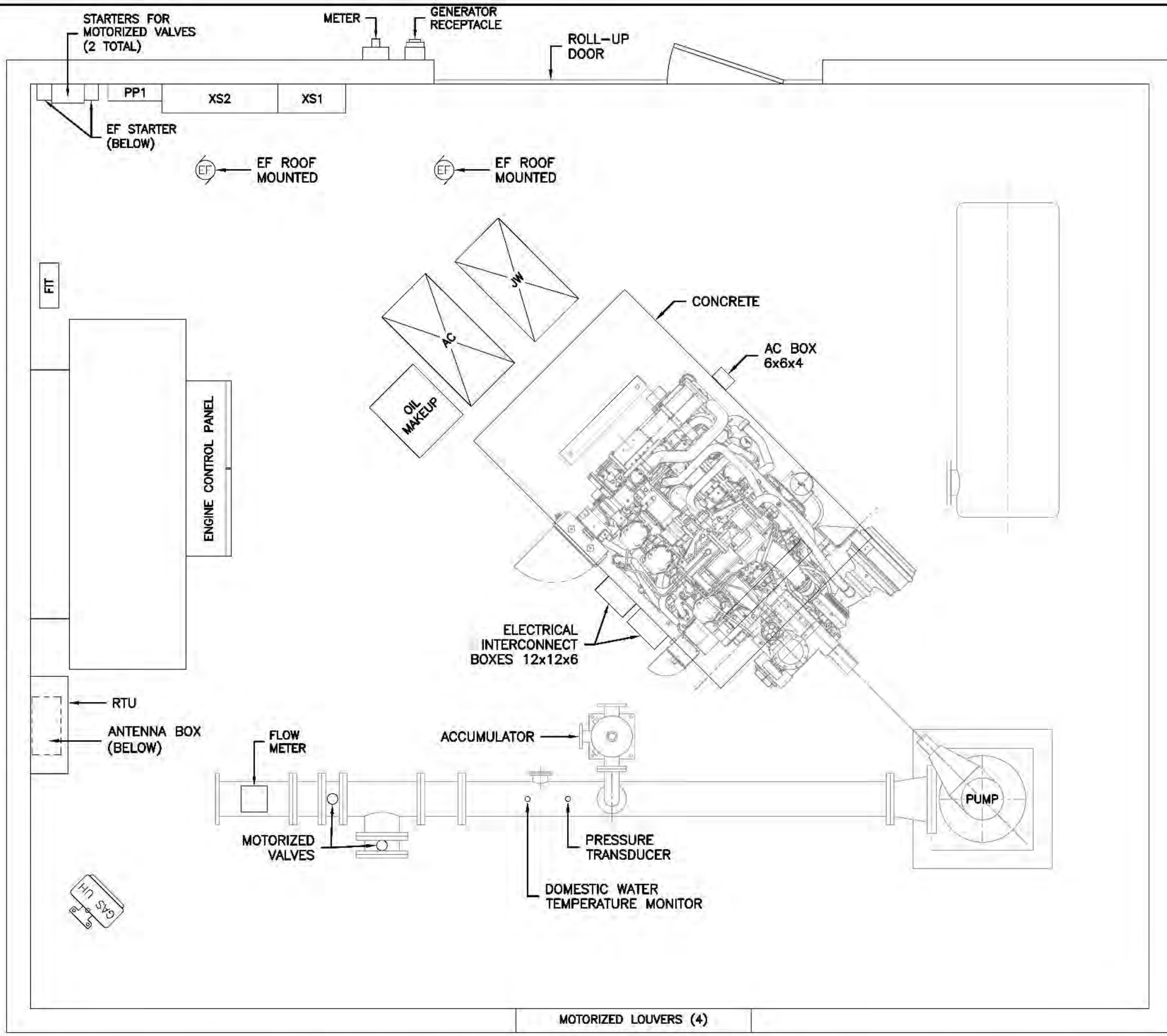
PAJARITO WELL 4 ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

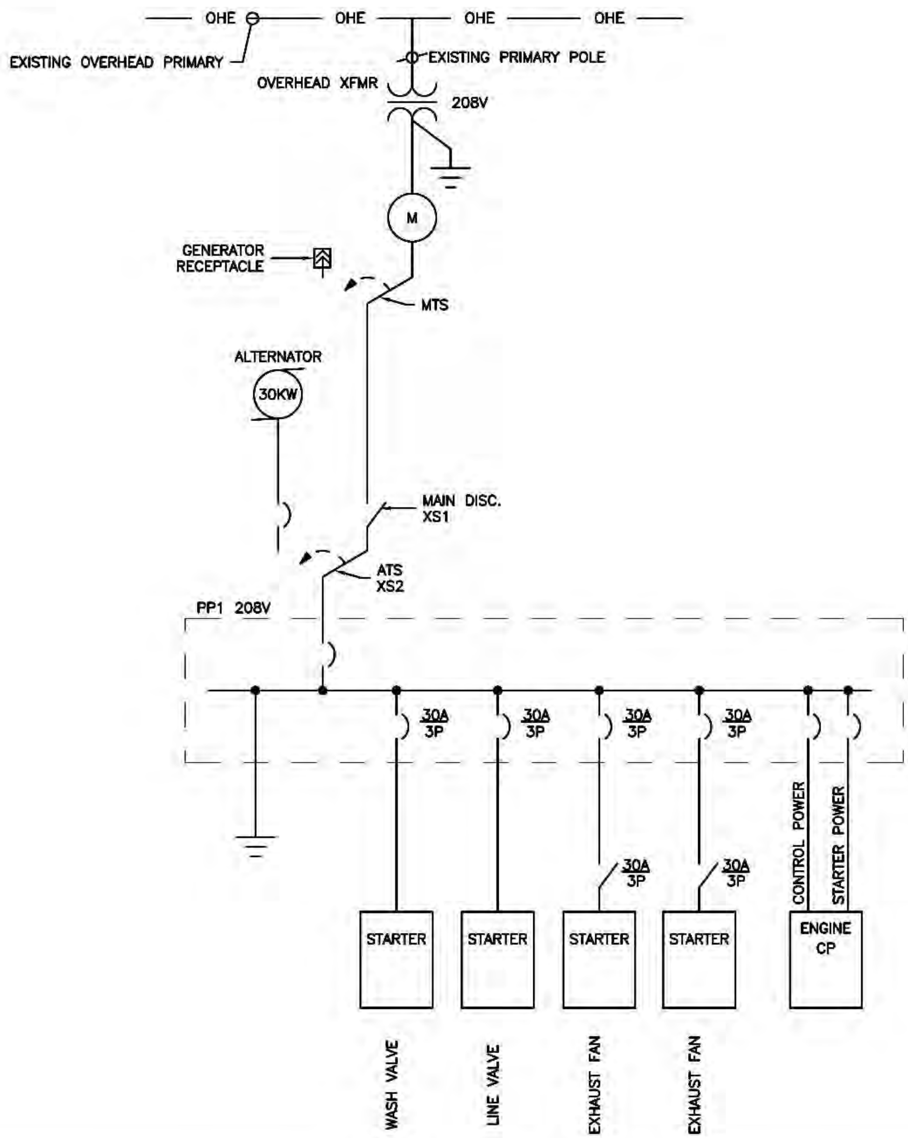
PAJARITO WELL 4
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

PAJARITO WELL 4
ELECTRICAL PLAN



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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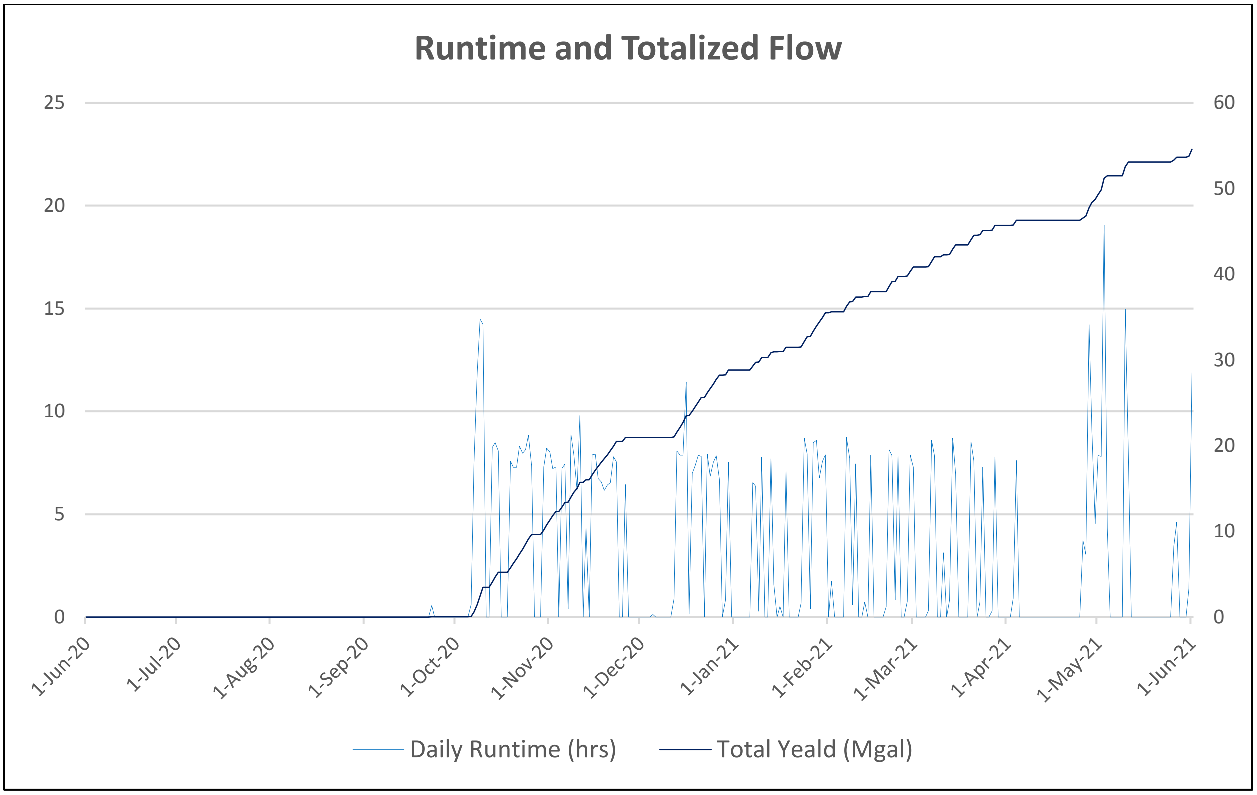
PAJARITO WELL 4
ELECTRICAL ONE-LINE DIAGRAM

2.5 Pajarito Well 5

Pajarito Well 5 (PW5) was placed into service in 1986. An improvement project was completed in 2016. This well pumps into the same transmitting line as Pajarito Wells 2 and 4. PW 5 produces approximately 1,175 gpm and per last year's supervisory control and data acquisition (SCADA) runtime data, ran 774 hours and produced 55M gallons (with the assumed flow rate).



2.5.1 Observations

The recent upgrades included replacement of the motor control center, motor controls, step-down transformer, and associated components. The new motor starter is a Benshaw, Reduced Voltage Soft Starter (RVSS). Operational staff have confirmed that the facility is in good operational condition.

- Service Transformer: 750 kVA, 4,160V secondary:
  - The transformer is owned and operated by the Los Alamos National Laboratory (LANL). No action required.

- Motor: 700 HP, 4,160V:
    - Motor is beyond its life expectancy.

- Starter: Benshaw soft Starter:
    - In good operational condition. Includes step-down transformer for the facilities lighting panel.

- Lighting Panel: 120/208V:
    - The lighting panel is in good operational condition.

- Instrumentation:
    - 8" flow meter – Krohne / Mag / Aqua 420K–D–Hart-6-LAS2-S / Serial Number = A 02-61307 / 2002 / Condition = GOOD.

- Mechanical:
    - 10" butterfly valve – Dresser 450 / Valve Serial Number = 307067 / Electrically Actuated / Limitorque / TI-966 / Serial Number = 307083 / 1966 / Condition = FAIR / Normally open with Manual over-ride Auto.
    - 10" check valve – Swing / 1966 / Condition = FAIR.
    - 10" butterfly valve – Dresser 450 / Electrically Actuated / Limitorque / TI-966 / Serial Number = 307086 / 1966 / Condition = FAIR / Drain Line / Normally closed with Manual over-ride Auto.

- SCADA:
    - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.5.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- Electrical System Upgrade:
    - No improvements recommended at this time.

- Mechanical:
    - Install new check valve, with associated closure, inside station building.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
    - Prep, recoat and paint station valves and piping.
    - Install new check valve (assisted closure) inside station building.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
    - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

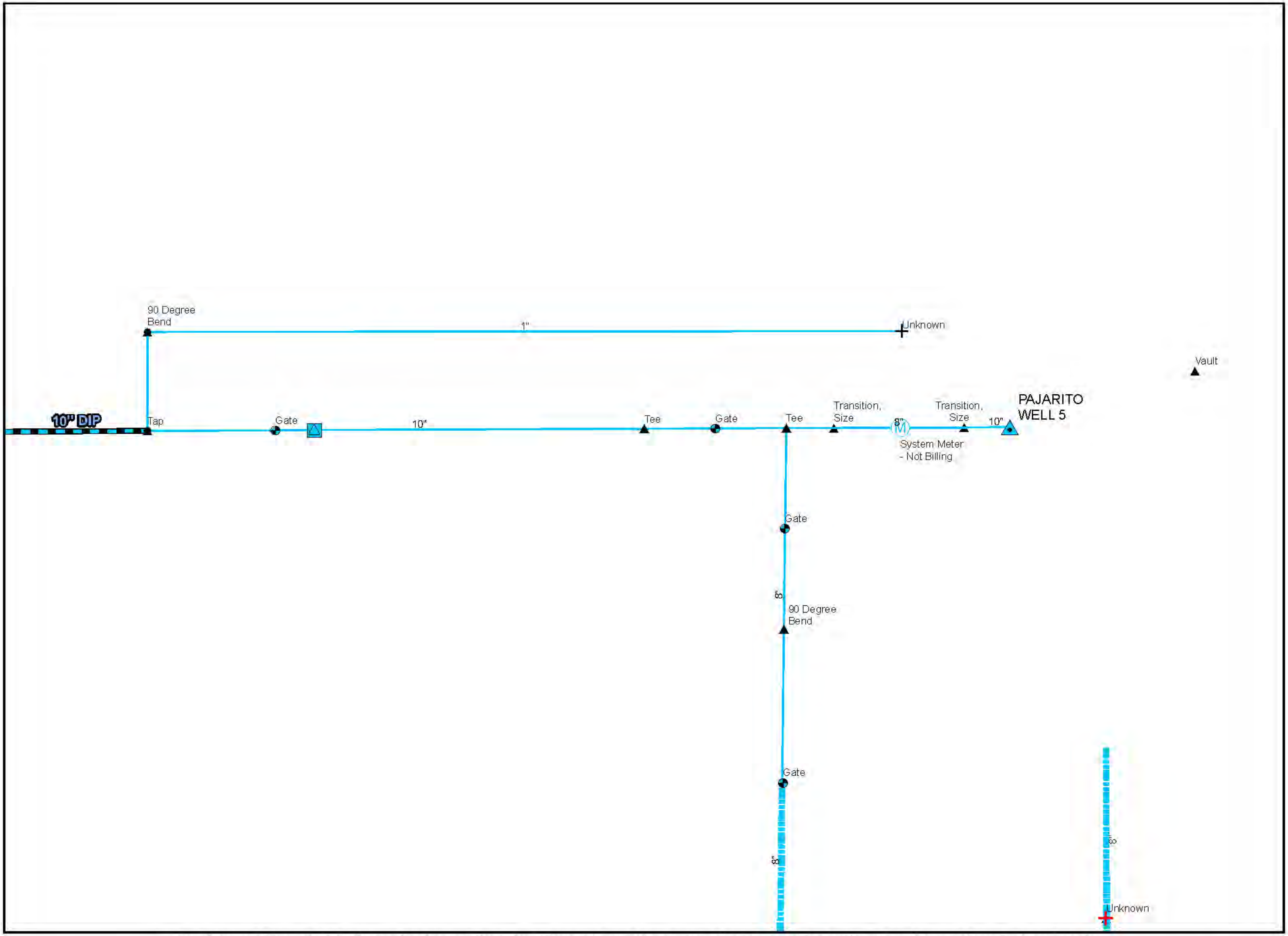
Improvement Description	Budgetary Construction Cost
Install check valve inside station building	$ 50,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 57,500**

EXHIBIT 2.5 – PAJARITO WELL 5:

PAJARITO WELL 5 MECHANICAL PLAN,

PAJARITO WELL 5 ELECTRICAL PLAN, AND

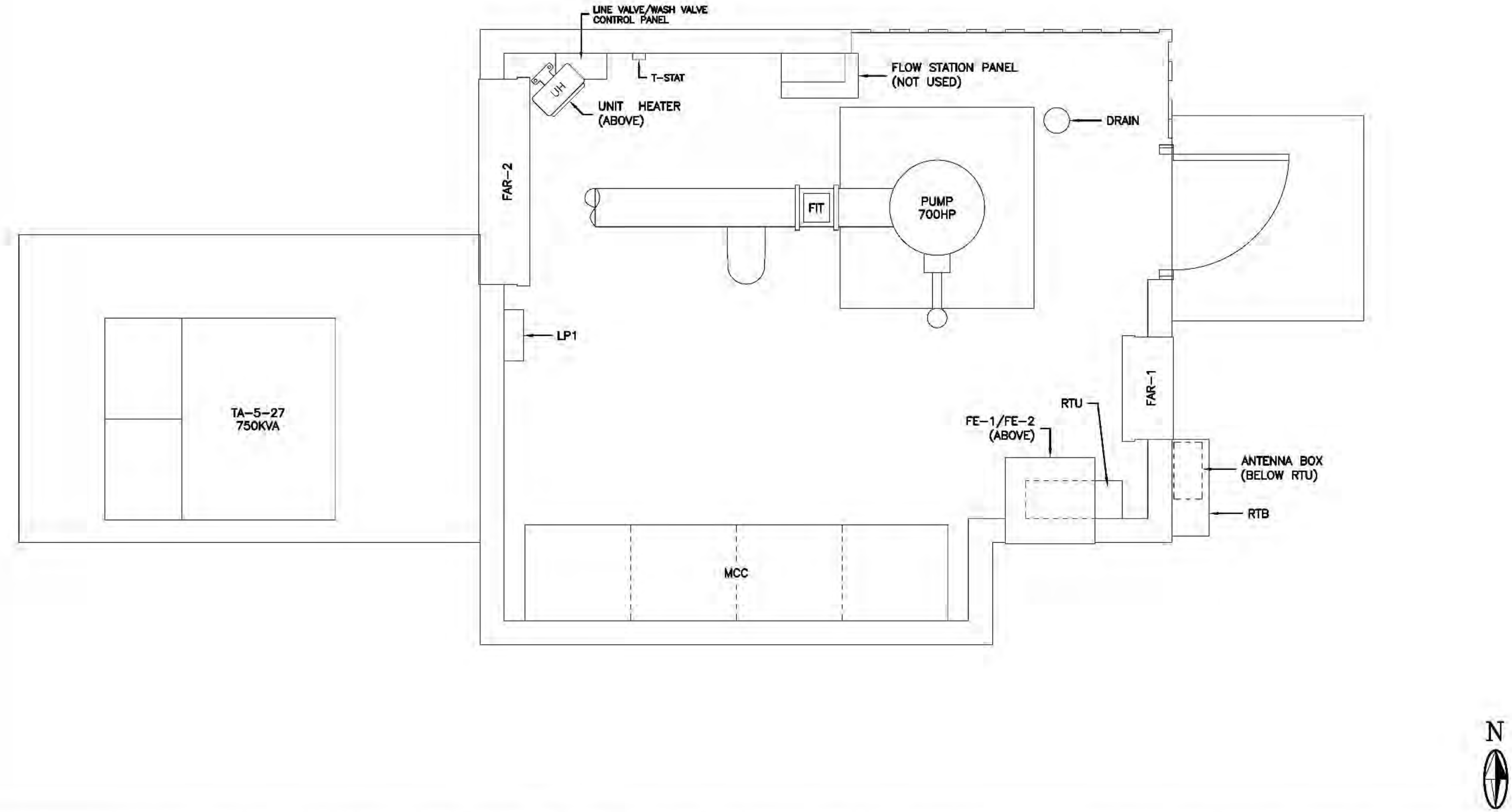
PAJARITO WELL 5 ELECTRICAL ONE LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO WELL 5
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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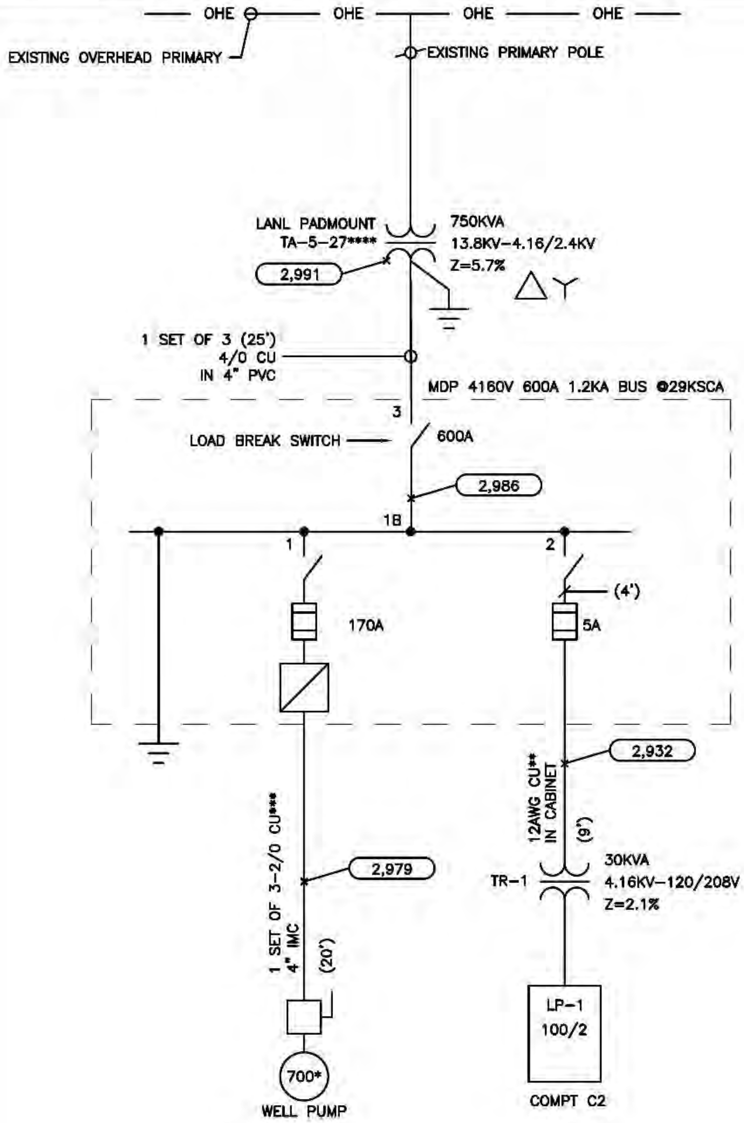
PAJARITO WELL 5
ELECTRICAL PLAN



GENERAL NOTES

1. (2,991) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* THE FULL LOAD CURRENT FOR THE PUMP IS 84A.

** USING APPROPRIATE CONDUCTOR SIZE (12AWG) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (6AWG).

*** USING APPROPRIATE CONDUCTOR SIZE (2/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (2AWG).

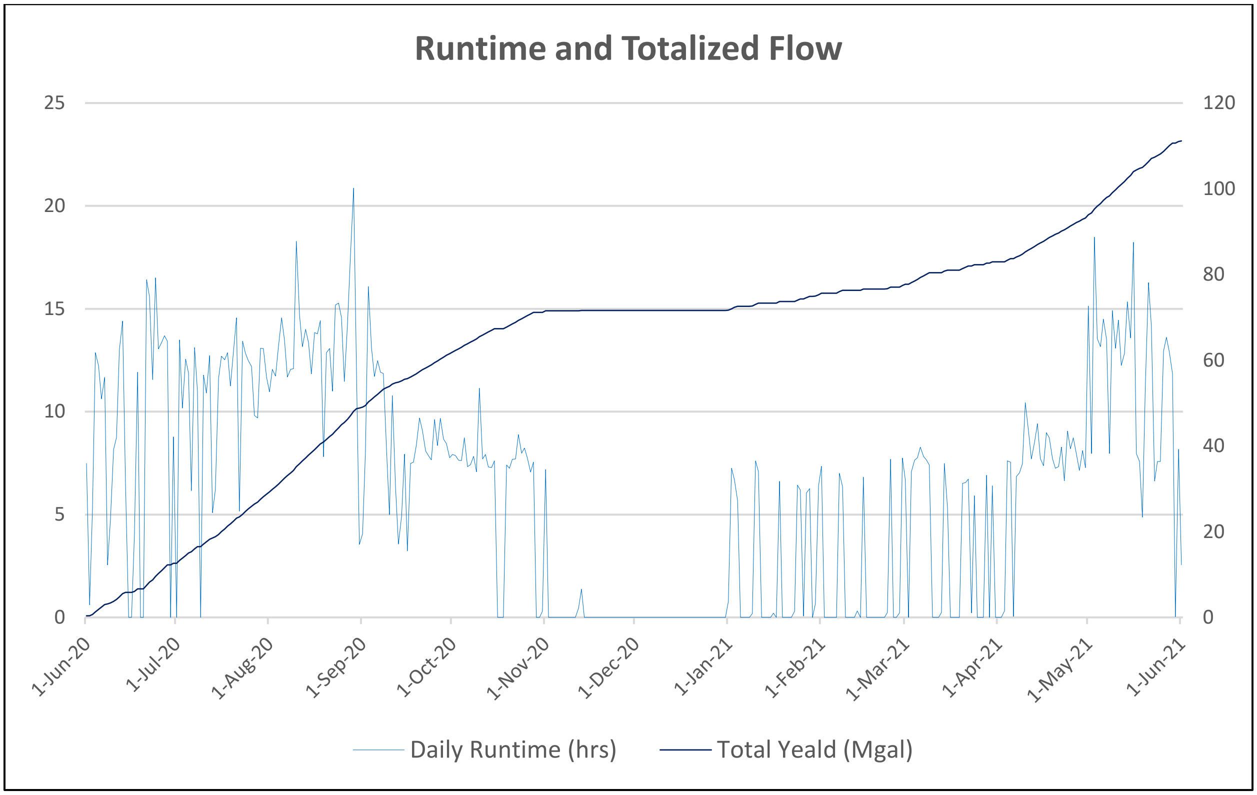
**** FULL LOAD CURRENT FOR SUPPLY TRANSFORMER IS 104A.

1) 3xEATON 170A 5ACLS-6R
AIC RATING: 50KA
2) NON-LOAD BREAK SWITCH
+CH 5CLPT-5E FUSE
AIC RATING: 60KA SYM
3) LOAD BREAK SWITCH 600A

PAJARITO WELL 5
ELECTRICAL ONE-LINE DIAGRAM

2.6 Guaje Well 2A

The Guaje Well 2A (GW2A) has been in service since 1999. It is one of four (4) operational wells in the Guaje Well Field and is the greatest producer at approximately 820 gpm. Per last year's supervisory control and data acquisition (SCADA) runtime data, GW2A ran 2,259 hours and produced 111M gallons (with the assumed flow rate).



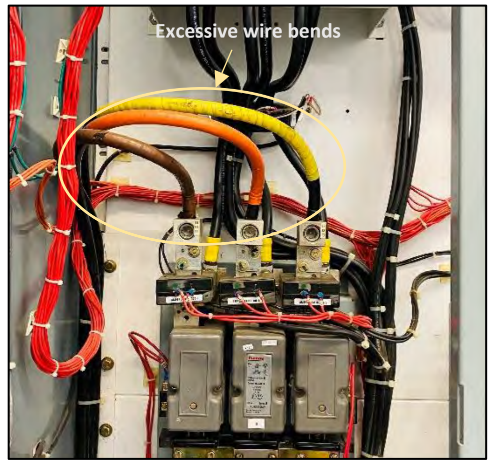
2.6.1 Observations

Operational staff have confirmed that the facility is in good operational condition and is both dependable and reliable. By visual inspection, the equipment is in good condition.

- Service Transformer: 500 kVA, 277/480V:
  - The transformer appears to be in good condition based on visual inspection.

- Motor: 200 HP, 480V:
  - Motor appears to be in good condition based on visual inspection.
  - The motor is approaching its life expectancy.

- Motor Control Center (MCC):
  - The reduced voltage delta-wye (RVDY) starter is approaching its end of life.
  - In the starter section, there are wires that appear to be under extra stress due to the installed bending radius. It is possible for the stress to cause wire damage or damage to the terminals.
  - The remaining MCC consists of circuit breakers and is in good operational condition.



- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Instrumentation:
  - 8" flow meter – Krohne / Mag / IFS 4000 F - 6 / Serial Number = A99 8444 / 1998 / Condition = GOOD.

- Mechanical:
  - 10" butterfly valve – Valve Serial Number = L487330 / Electrically Actuated / Limitorque / Serial Number = L487330 / 1998 / Condition = GOOD / Normally closed on start-up then opens slowly / Slowly closes on shut-down.
  - 8" check valve – Swing / Val Matic / Model Number 508-200 PSI / 1998 / Condition = FAIR.
  - 10" butterfly valve – Valve Serial Number = L487304 / Electrically Actuated / Limitorque / Serial Number = L487304 / 1998 / Condition = FAIR / Drain Line / Normally open on start-up then closes slowly / Slowly opens on shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.6.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.
  - Replace the conductors with the tight radius wires.

- Electrical System Upgrade:
  - Replace service conductors and service equipment. Replace feeder conductors form service panel.

- Mechanical:
  - Verify need or desire to install a new check valve inside station building and eliminate confined space vault and complete as necessary.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
  - Prep, recoat and paint station valves and piping.

- Install new check valve (assisted closure) inside station building and eliminate vault.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

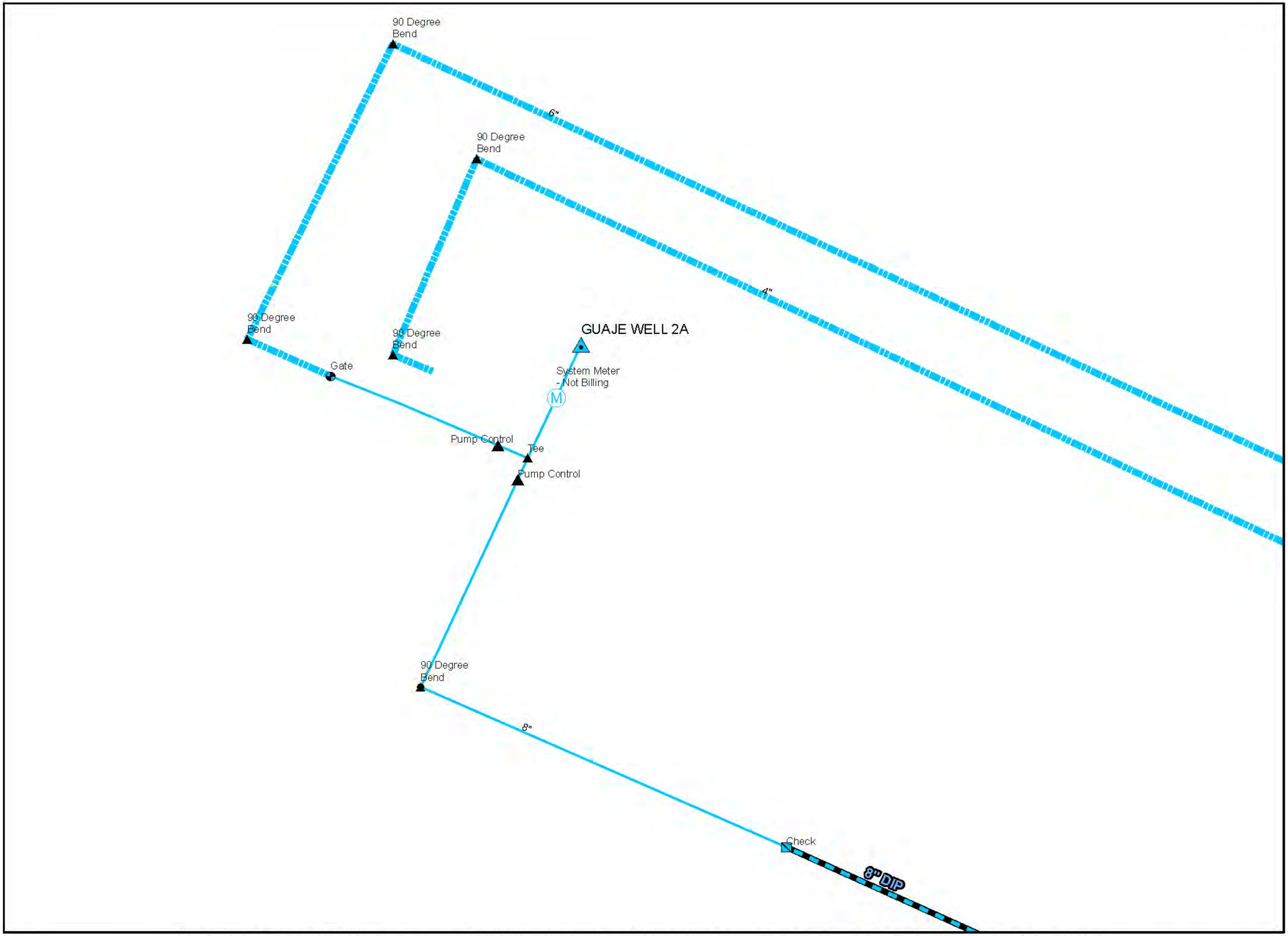
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 55,688
Service transformer testing and maintenance	$ 4,000
Install check valve inside station building	$ 75,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 142,188**

EXHIBIT 2.6 – GUAJE WELL 2A:

GUAJE WELL 2A MECHANICAL PLAN,

GUAJE WELL 2A ELECTRICAL PLAN, AND

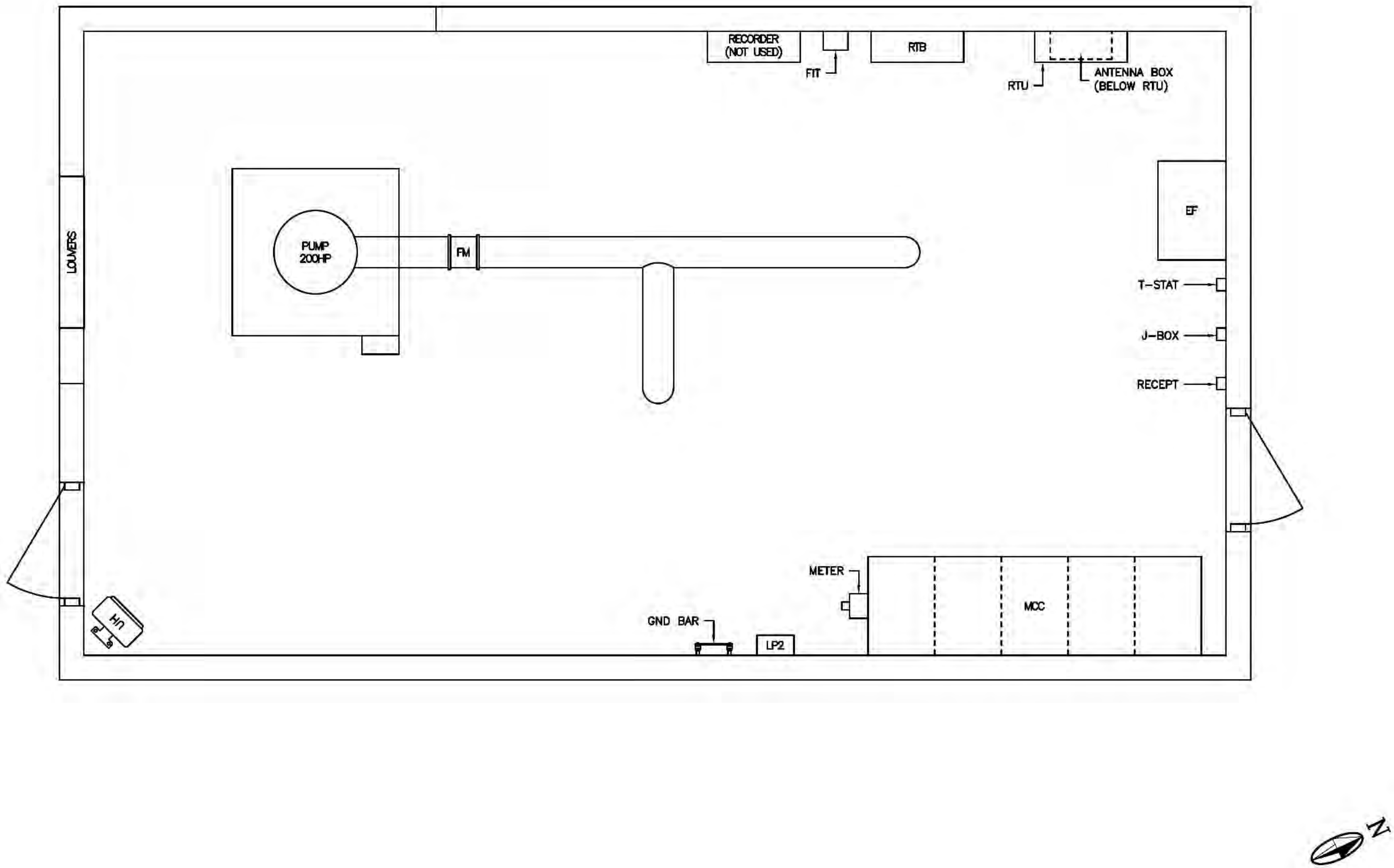
GUAJE WELL 2A ELECTRICAL ONE LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

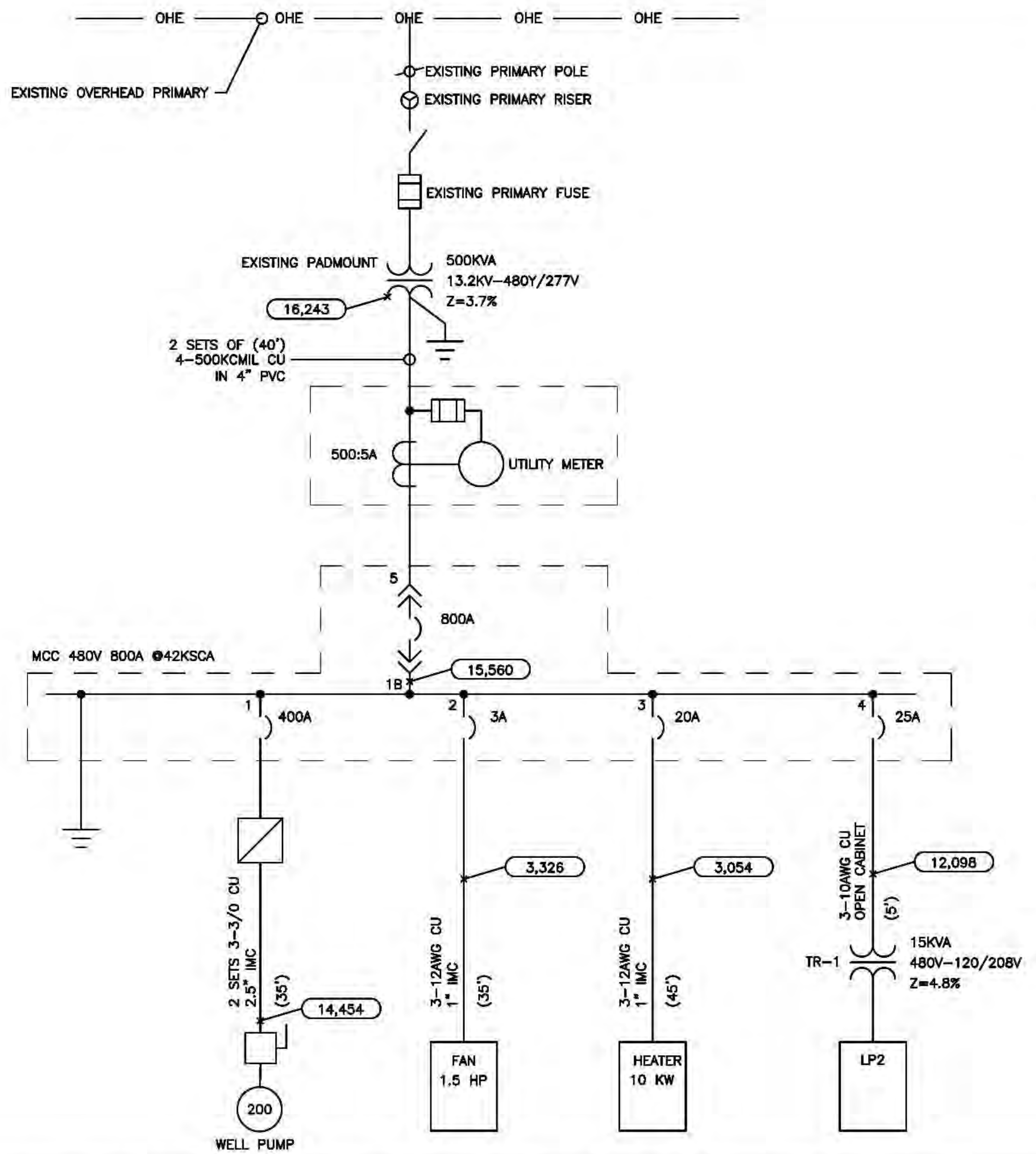
GUAJE WELL 2A
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 2A
ELECTRICAL PLAN



GENERAL NOTES

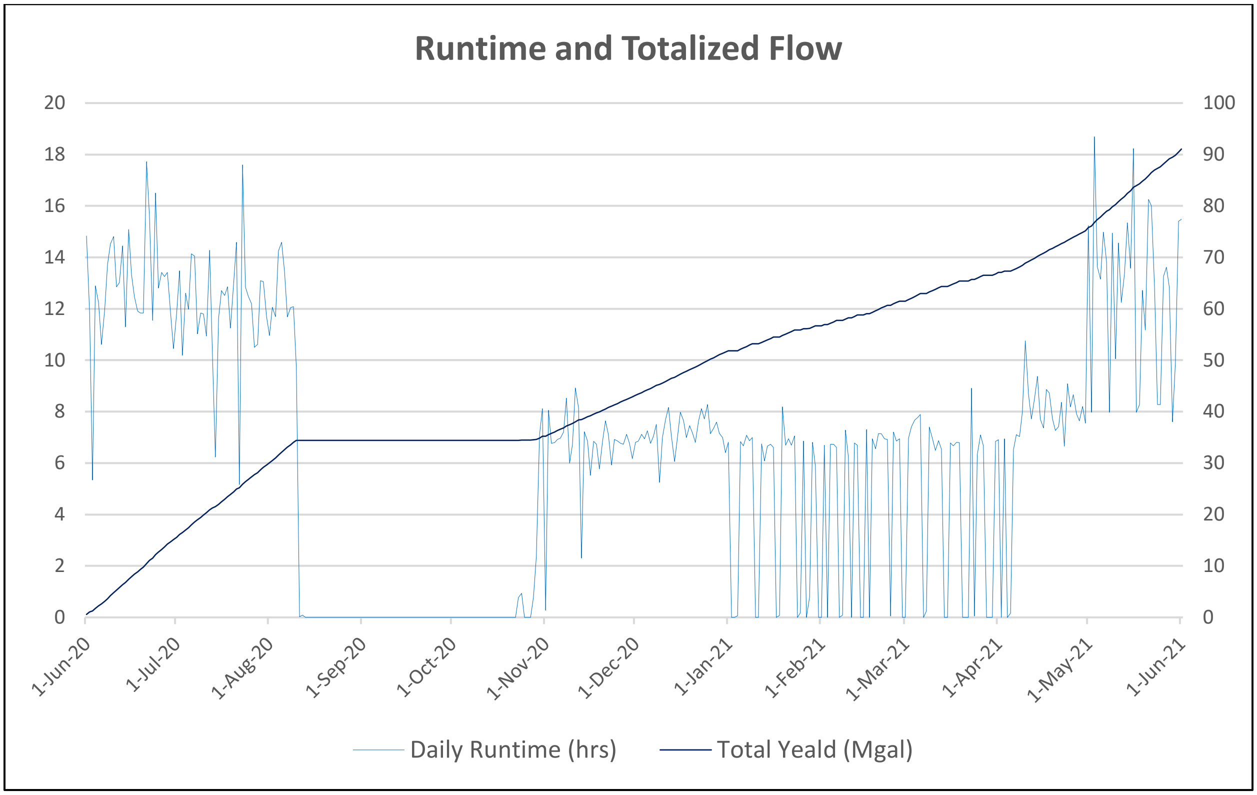
1. (16,243) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (160') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

1) SIEMENS SENTRON JXD63L400
INSTANTANEOUS TRIP SET TO 2.32KA
2) SIEMENS ED63A003
INSTANTANEOUS TRIP SET TO 35A
3) SIEMENS ED63B020
INTERRUPTING RATING: 25KA
4) SIEMENS ED63B025
INTERRUPTING RATING: 25KA
5) SIEMENS SENTRON MXD63S800A
AIC RATING: 50KA

GUAJE WELL 2A
ELECTRICAL ONE-LINE DIAGRAM

2.7 Guaje Well 3A

Guaje Well 3A (GW3A) has been in service since 1999. It is one of four (4) operational wells in the Guaje Well Field and is the greatest producer at approximately 650 gpm. Per last year's supervisory control and data acquisition (SCADA) runtime data, GW3A ran 2,334 hours and produced 95M gallons (with the assumed flow rate).



2.7.1 Observations

Operational staff have confirmed that the facility is in good operational condition and is both dependable and reliable. By visual inspection, the equipment is in good condition.

- Service Transformer: 500 kVA, 277/480V:
    - The transformer appears to be in good condition based on visual inspection.

- Motor: 150 HP, 480V:
  - The motor appears to be in good condition based on visual inspection.
  - The motor is approaching its life expectancy.

- Motor Control Center (MCC):
  - The reduced voltage delta-wye (RVDY) starter is approaching its end of life.
  - The remaining MCC consists of circuit breakers and is in good operational condition.

- Lighting Panel: 120/208V
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Instrumentation:
  - 8" flow meter – Krohne / Mag / IFS 4000 F - 6 / Serial Number = A99 8443 / 1998 / Condition = GOOD.

- Mechanical:
  - 10" butterfly valve – Valve Serial Number = L487320 / / Electrically Actuated / Limitorque Serial Number = M182162 / 1998 / Condition = FAIR / Normally Closed on start-up then opens slowly / Closes slowly on shut-down.
  - 8" check valve – Swing / Val Matic / Model Number 508-200 PSI / 1998 / Condition = FAIR.
  - 10" butterfly valve – Valve Serial Number = L536470 / Electrically Actuated / Limitorque Serial Number = M182129 / 1998 / Condition = FAIR / Drain Line / Normally Open on start-up then closes slowly / Slowly opens on shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.7.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.

- Electrical System Upgrade:
  - Replace service conductors. Replace feeder conductors form service panel.

- Mechanical:
  - Verify the need or desire to install a new check valve inside the building and eliminate confined space vault and complete as necessary.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
  - Prep, recoat and paint station valves and piping.
  - Install new check valve (assisted closure) inside station building and eliminate vault.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

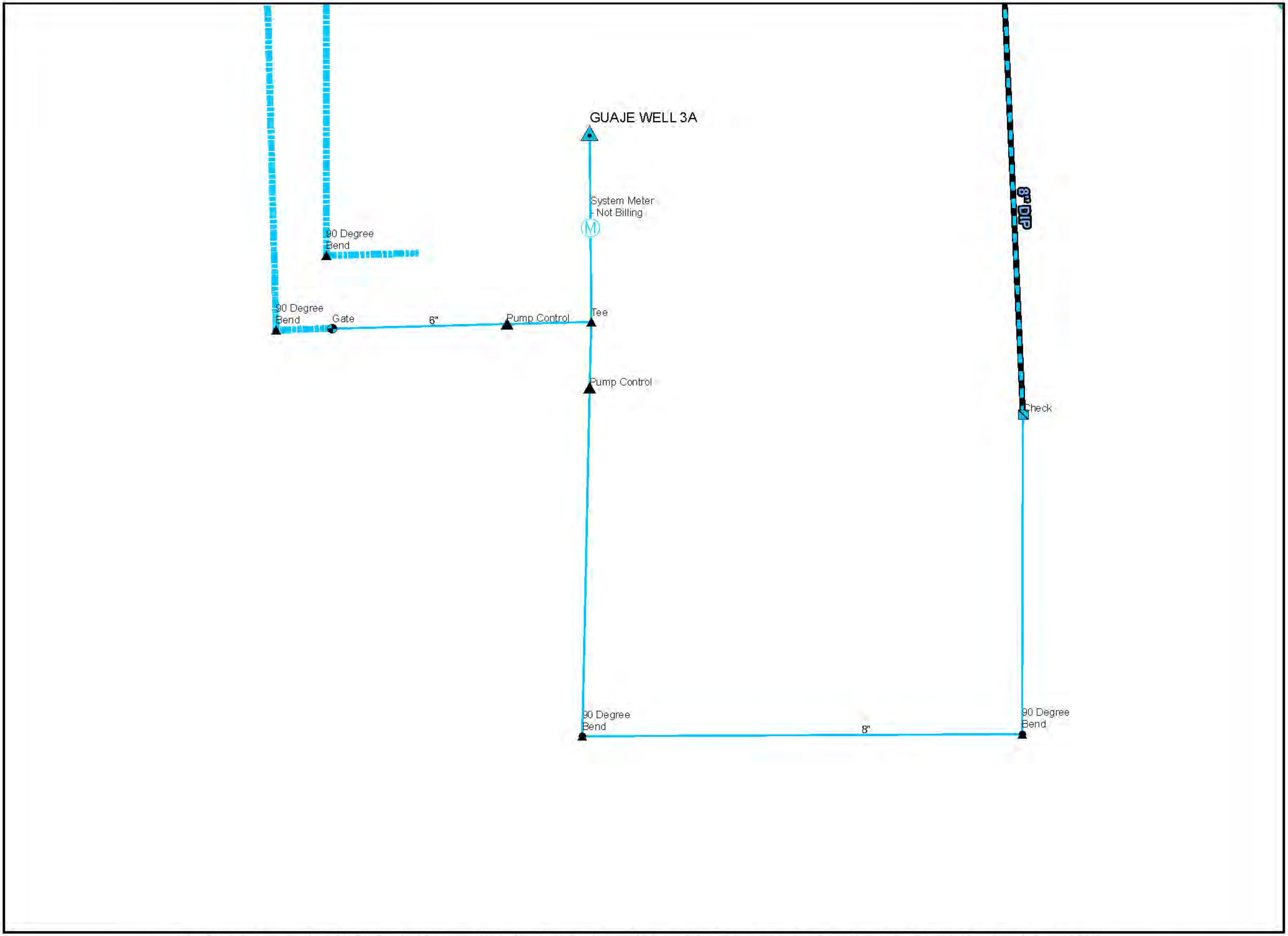
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$ 51,150
Service transformer testing and maintenance	$ 4,000
Install check valve inside station building	$ 60,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 122,650**

EXHIBIT 2.7 – GUAJE WELL 3A:

GUAJE WELL 3A MECHANICAL PLAN,

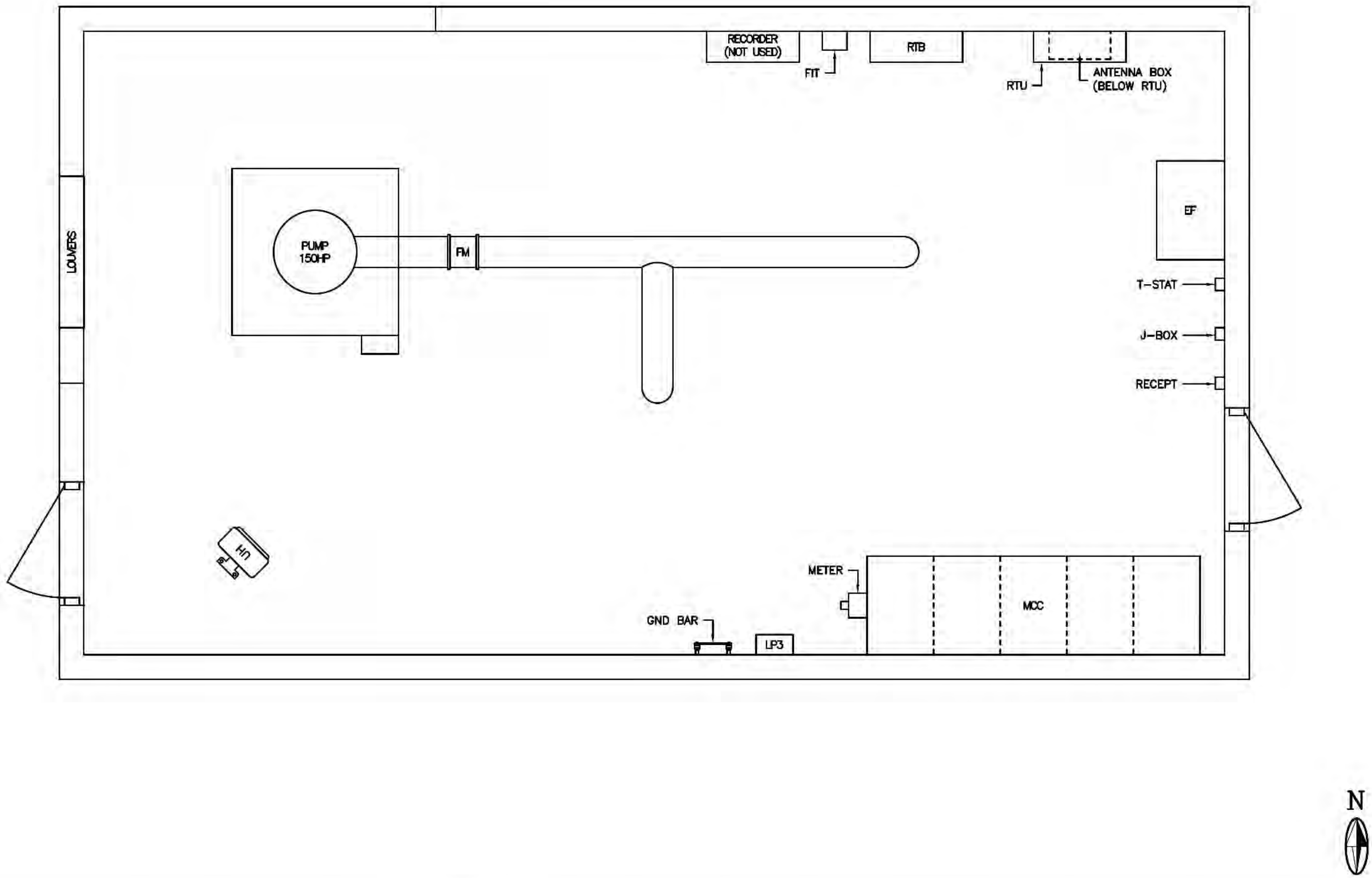
GUAJE WELL 3A ELECTRICAL PLAN, AND

GUAJE WELL 3A ELECTRICAL ONE LINE DIAGRAM



GUAJE WELL 3A
Mechanical Plan

LAC/DPU/GWS/GIS

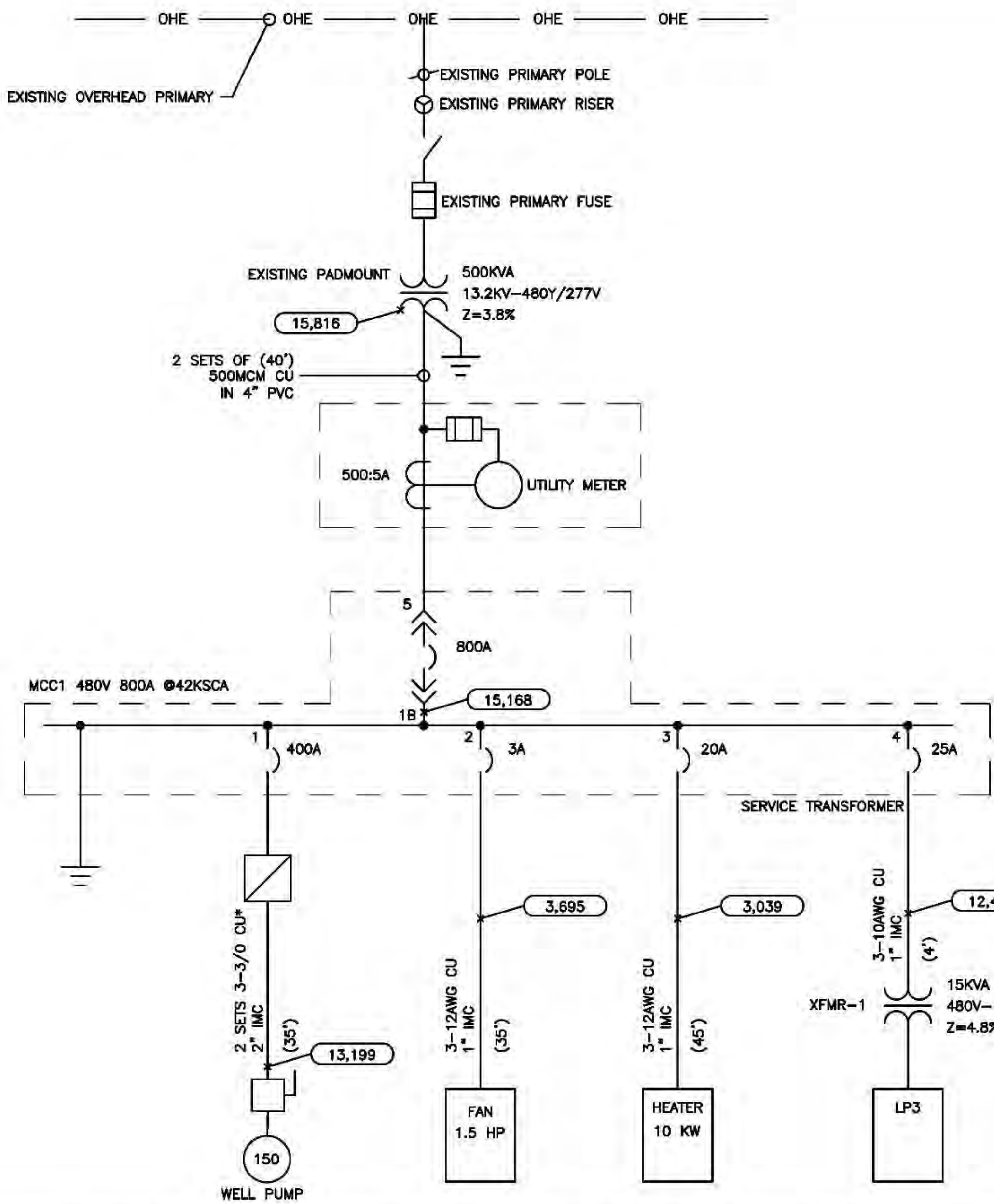


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 3A
ELECTRICAL PLAN

LAST MODIFIED: Jun 09, 2021 - 1:16pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\GUAJE WELL 3A\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (15,816) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (120') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* USING APPROPRIATE CONDUCTOR SIZE (2 SETS 3/0) FOR 1–LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (2 SETS OF 4/0) FROM STARTER TO PUMP.

1) SIEMENS SENTRON JXD63L400
INSTANTANEOUS TRIP: 1.25KA
2) SIEMENS ED63A003
INSTANTANEOUS TRIP SET TO 35A
3) SIEMENS ED63B020
AIC RATING: 25KA
4) SIEMENS ED63B025
AIC RATING: 25KA
5) SIEMENS SENTRON MXD63S800A
AIC RATING: 50KA

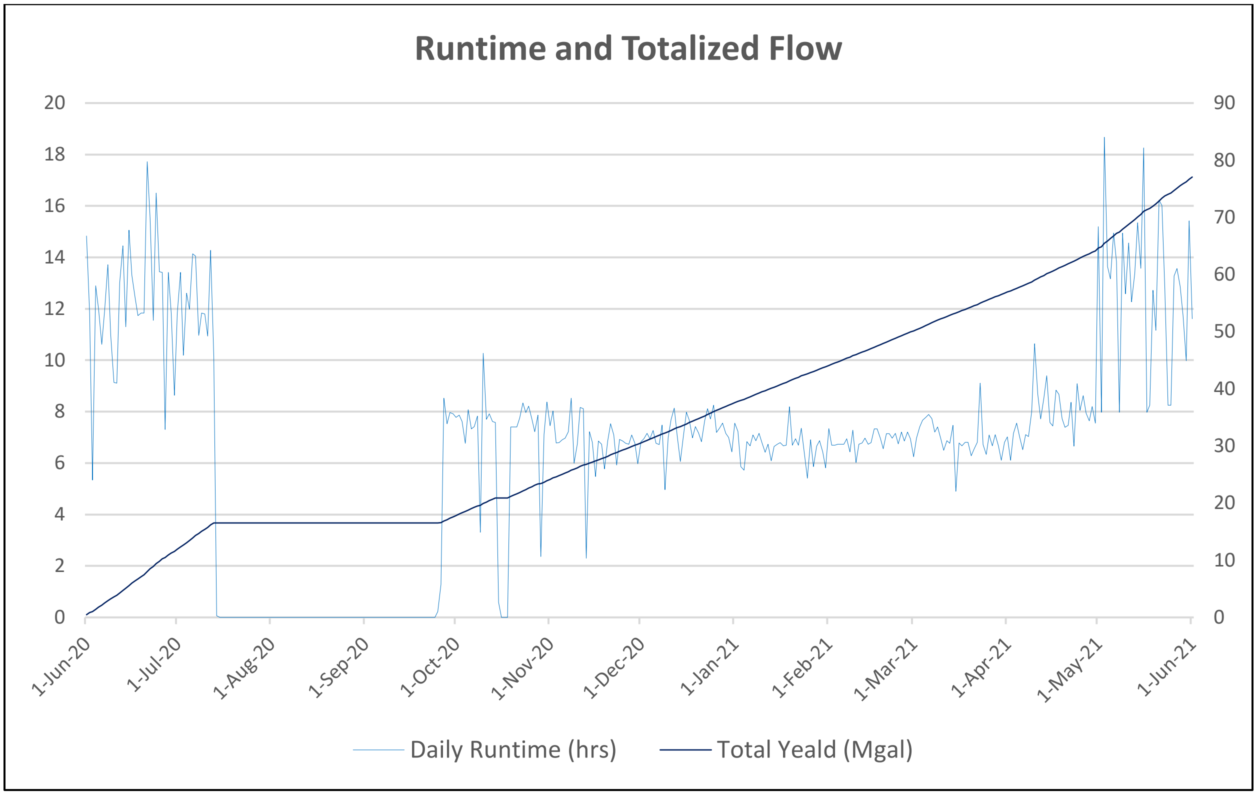
Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 3A
ELECTRICAL ONE-LINE DIAGRAM

2.8 Guaje Well 4A

Guaje Well 4A (GW4A) has been in service since 1999. It is one of four (4) operational wells in the Guaje Well Field and is the greatest producer at approximately 525 gpm. Per last year's supervisory control and data acquisition (SCADA) runtime data, GW3A ran 2,446 hours and produced 77M gallons (with the assumed flow rate).



2.8.1 Observations

Operational staff have confirmed that the facility is in good operational condition and is both dependable and reliable. The existing starter had recently failed and has since be replaced with a Reduced Voltage Soft Starter (RVSS). By visual inspection, the equipment is in good condition.

- Service Transformer: 500 kVA, 277/480V:
  - The transformer appears to be in good condition based on visual inspection.

- Motor: 125 HP, 480V:
  - Motor appears to be in good condition based on visual inspection.
  - The motor is approaching its life expectancy.

- Motor Control Center (MCC):
  - Benshaw RVSS is newer and in good operational condition.
  - The remaining MCC consists of circuit breakers and is in good operational condition.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Instrumentation:
  - 8" flow meter – Krohne / Mag / IFS 4000 F - 6 / Serial Number = A99 8503 / 1998 / Condition = GOOD.

- Mechanical:
  - 10" butterfly valve – Valve Serial Number = L486781 / Electrically Actuated / Limitorque Serial Number = M182135 / 1998 / Condition = FAIR / Normally Closed on start-up then opens slowly / Closes slowly on shut-down.
  - 8" check valve – Swing / Val Matic / Model Number 508-200 PSI / 1998 / Condition = FAIR.
  - 10" butterfly valve – Valve Serial Number = L477309 / Electrically Actuated / Limitorque Serial Number = M182215 / 1998 / Condition = FAIR / Drain Line / Normally Open on start-up then closes slowly / Slowly opens on shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.8.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
  - No recommended improvements currently.

- Electrical System Upgrade:
  - Replace service conductors. Replace feeder conductors form service panel.

- Mechanical:
  - Verify the need or desire to install a new check valve inside station building and eliminate confined space vault and complete as necessary.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
  - Prep, recoat and paint station valves and piping.
  - Install new check valve (assisted closure) inside station building and eliminate vault.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

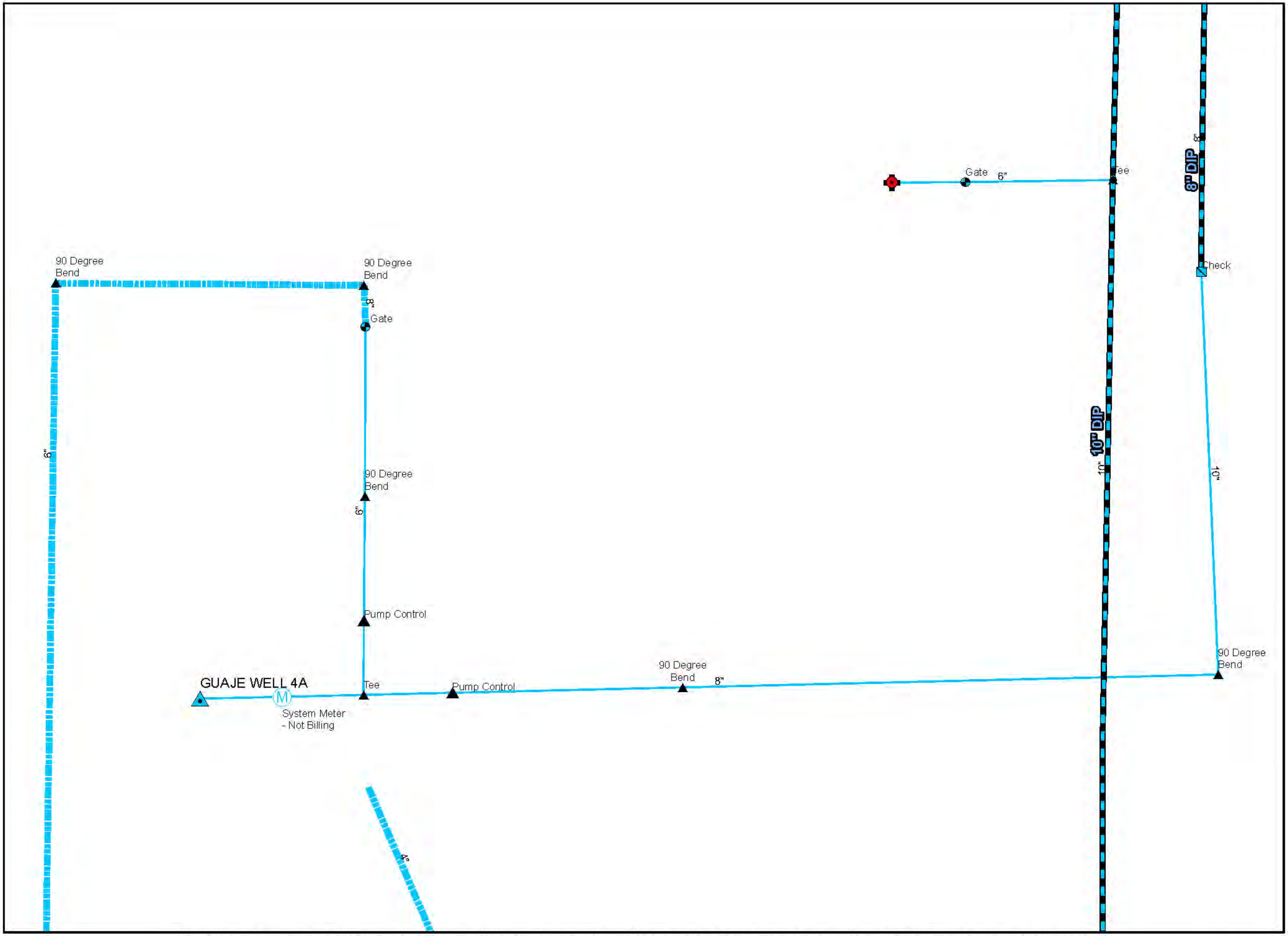
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, and associated power conductors.	$ 26,136
Service transformer testing and maintenance	$ 5,000
Install check valve inside station building	$ 60,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 98,636**

EXHIBIT 2.8 – GUAJE WELL 4A:

GUAJE WELL 4A MECHANICAL PLAN,

GUAJE WELL 4A ELECTRICAL PLAN, AND

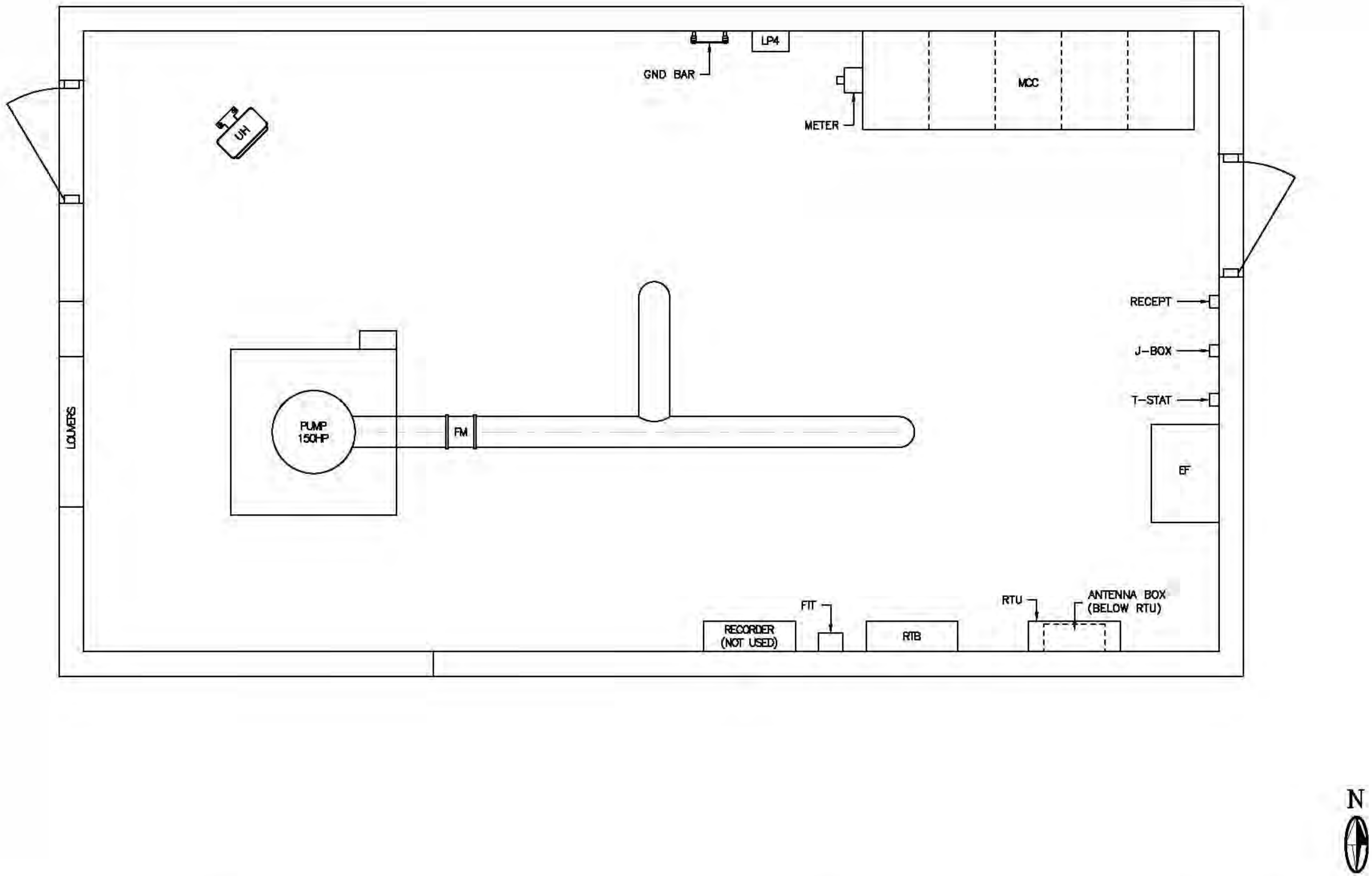
GUAJE WELL 4A ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

GUAJE WELL 4A
Mechanical Plan

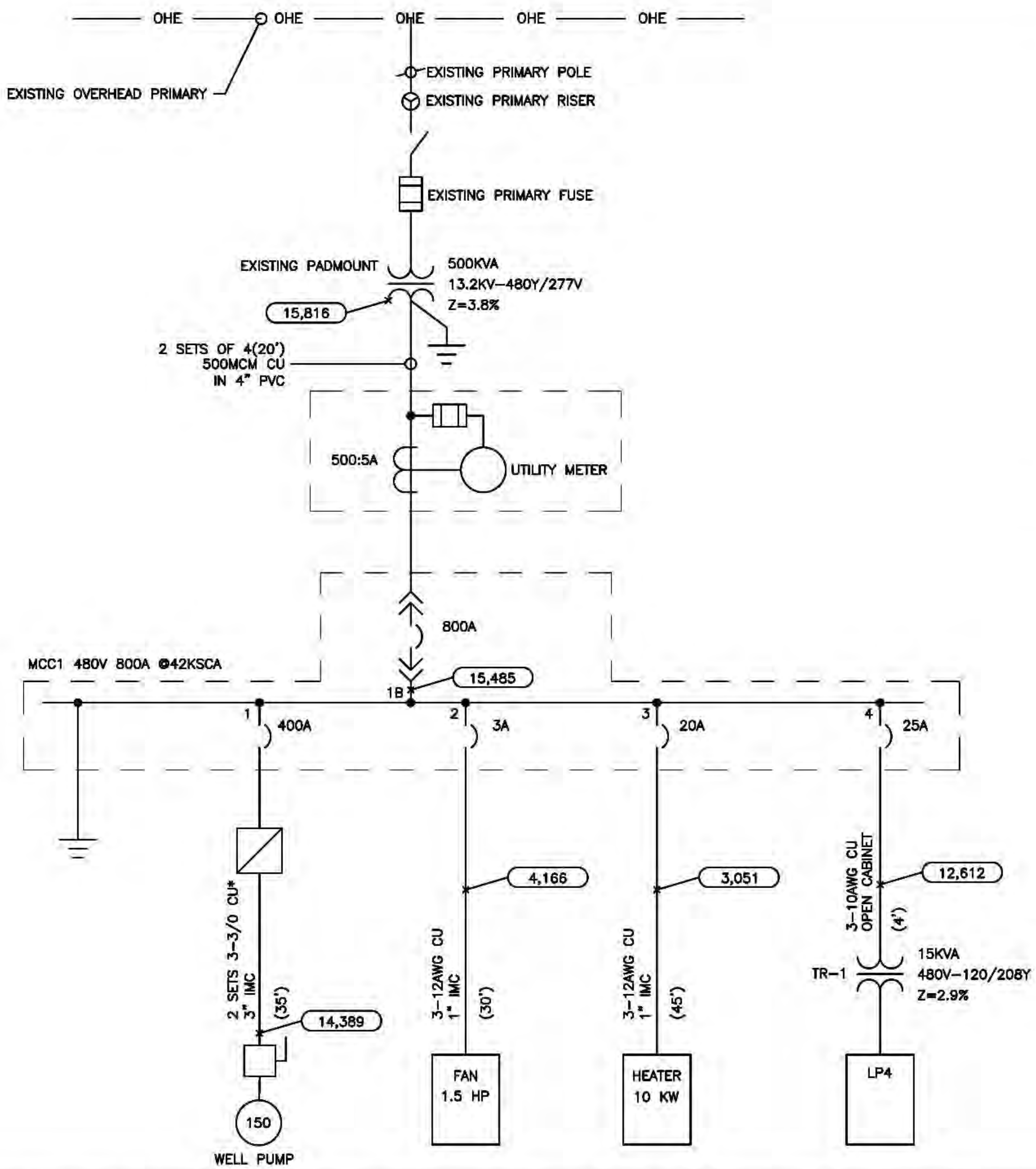


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 4A
ELECTRICAL PLAN

LAST MODIFIED: Jun 09, 2021 - 1:51pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\GUAJE WELL 4A\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (15,816) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (135') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* USING APPROPRIATE CONDUCTOR SIZE (2 SETS 3/0) FOR 1–LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (2 SETS 4/0) FROM STARTER TO PUMP.

1) SIEMENS SENTRON JXD63L400
INSTANTANEOUS TRIP: 1.79KA
2) SIEMENS SENTRON ED63A003
INSTANTANEOUS TRIP SET TO 35A
3) SIEMENS SENTRON ED63B020
AIC RATING: 25KA
4) SIEMENS SENTRON ED63B025
AIC RATING: 25KA
5) SIEMENS SENTRON MXD63S800A
AIC RATING: 50KA

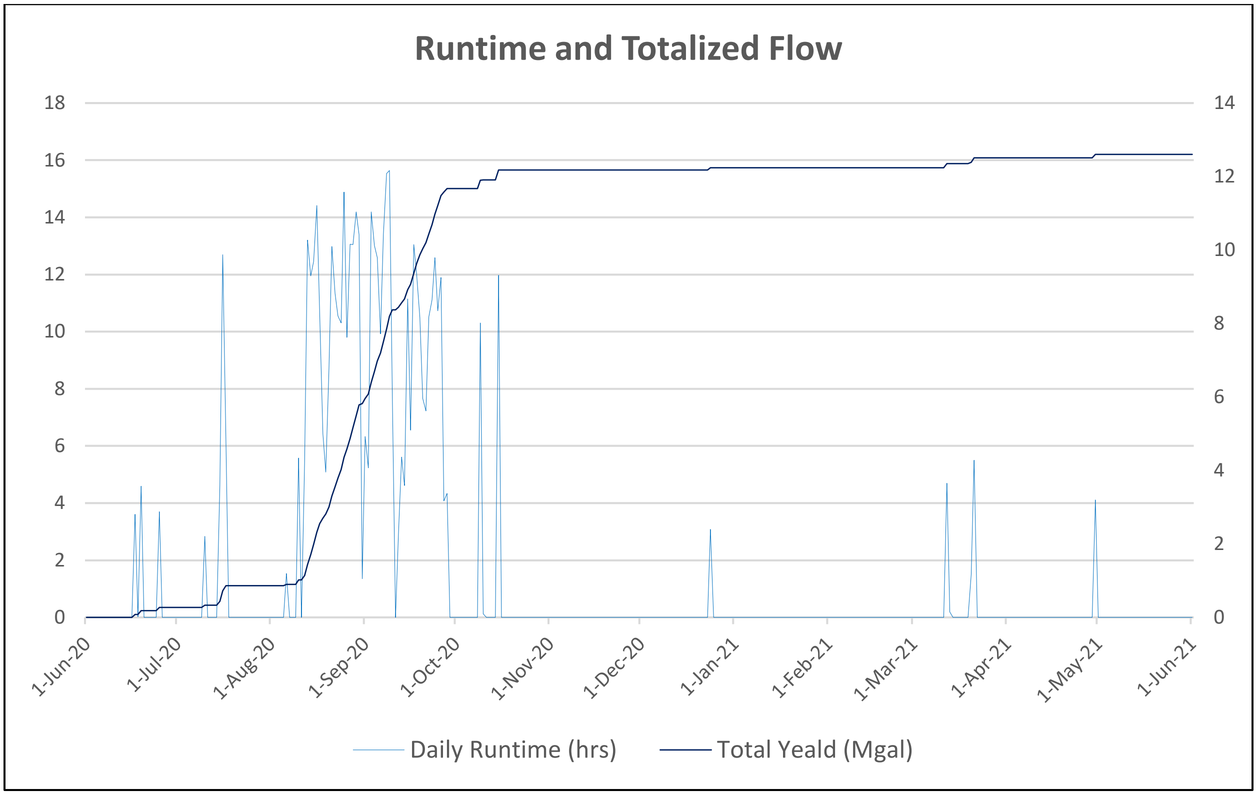
Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 4A
ELECTRICAL ONE-LINE DIAGRAM

2.9 Guaje Well 5A

Guaje Well 5A (GW5A) has been in service since 2000. It is one of four (4) operational wells in the Guaje Well Field and is the greatest producer at approximately 375 gpm. Per last year's supervisory control and data acquisition (SCADA) runtime data, GW3A ran 560 hours and produced 13M gallons (with the assumed flow rate).



2.9.1 Observations

Operational staff have confirmed that the facility is in good operational condition and is both dependable and reliable. By visual inspection, the equipment is in good condition.

- Service Transformer: 750 kVA, 277/480V:
  - The transformer appears to be in good condition based on visual inspection.

- Motor: 150 HP, 480V:
  - Motor appears to be in good condition based on visual inspection.
  - The motor is approaching its life expectancy.

- Motor Control Center (MCC):
  - The reduced voltage delta-wye (RVDY) starter is approaching its end of life.
  - The remaining MCC consists of circuit breakers and is in good operational condition.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.
- Instrumentation:
  - 8” flow meter – Krohne / Mag IFS 4000 F - 6 / Serial Number = A99 8504 ISO / 1998 / Condition = GOOD.

- Mechanical:
  - 10” butterfly valve – Valve Serial Number = 487321 / Electrically Actuated / Limitorque Serial Number = M182131 / 1998 / Condition = FAIR / Normally Closed on start-up then opens slowly / Closes slowly on shut-down.
  - 8” check valve – Swing / Val Matic / Model Number 508-200 PSI / 1998 / Condition = GOOD.
  - 10” butterfly valve – Valve Serial Number = L497373 / Electrically Actuated / Limitorque Serial Number = M182139 / 1998 / Condition = FAIR / Drain Line / Normally Open on start-up then closes slowly / Slowly opens on shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.9.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.

- Electrical System Upgrade:
  - Replace service conductors. Replace feeder conductors form service panel.

- Mechanical:
  - Verify the need or desire to install a new check valve inside station building and eliminate confined space vault and complete as necessary.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
  - Prep, recoat and paint station valves and piping.
  - Install new check valve (assisted closure) inside station building and eliminate vault.

- Instrumentation: Add flow meter to annual calibration check schedule.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

RECOMMENDED IMPROVEMENTS

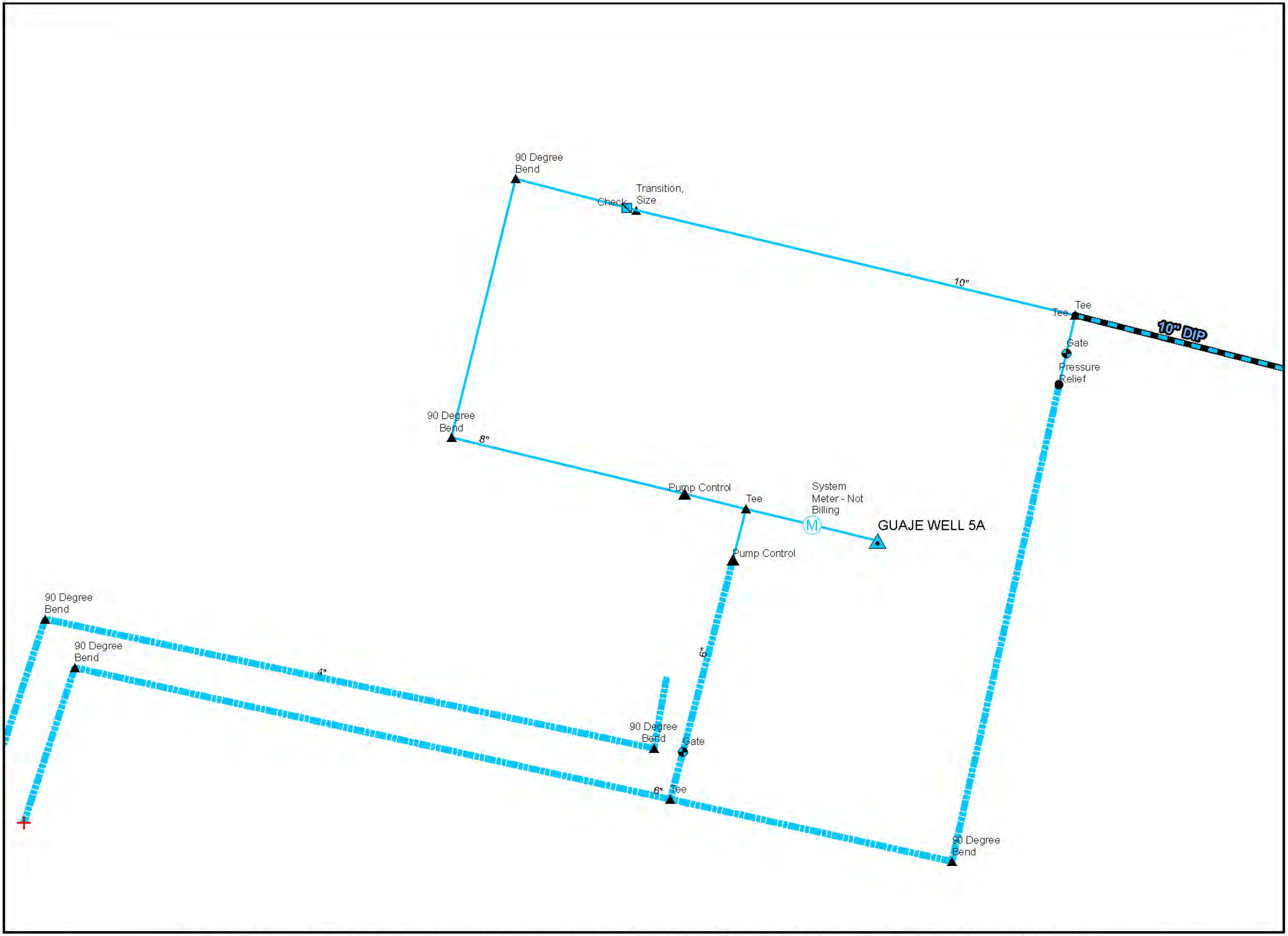
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$ 54,120
Service transformer testing and maintenance	$ 5,000
Install check valve inside station building	$ 60,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 126,620**

EXHIBIT 2.9 – GUAJE WELL 5A:

GUAJE WELL 5A MECHANICAL PLAN,

GUAJE WELL 5A ELECTRICAL PLAN, AND

GUAJE WELL 5A ELECTRICAL ONE-LINE DIAGRAM

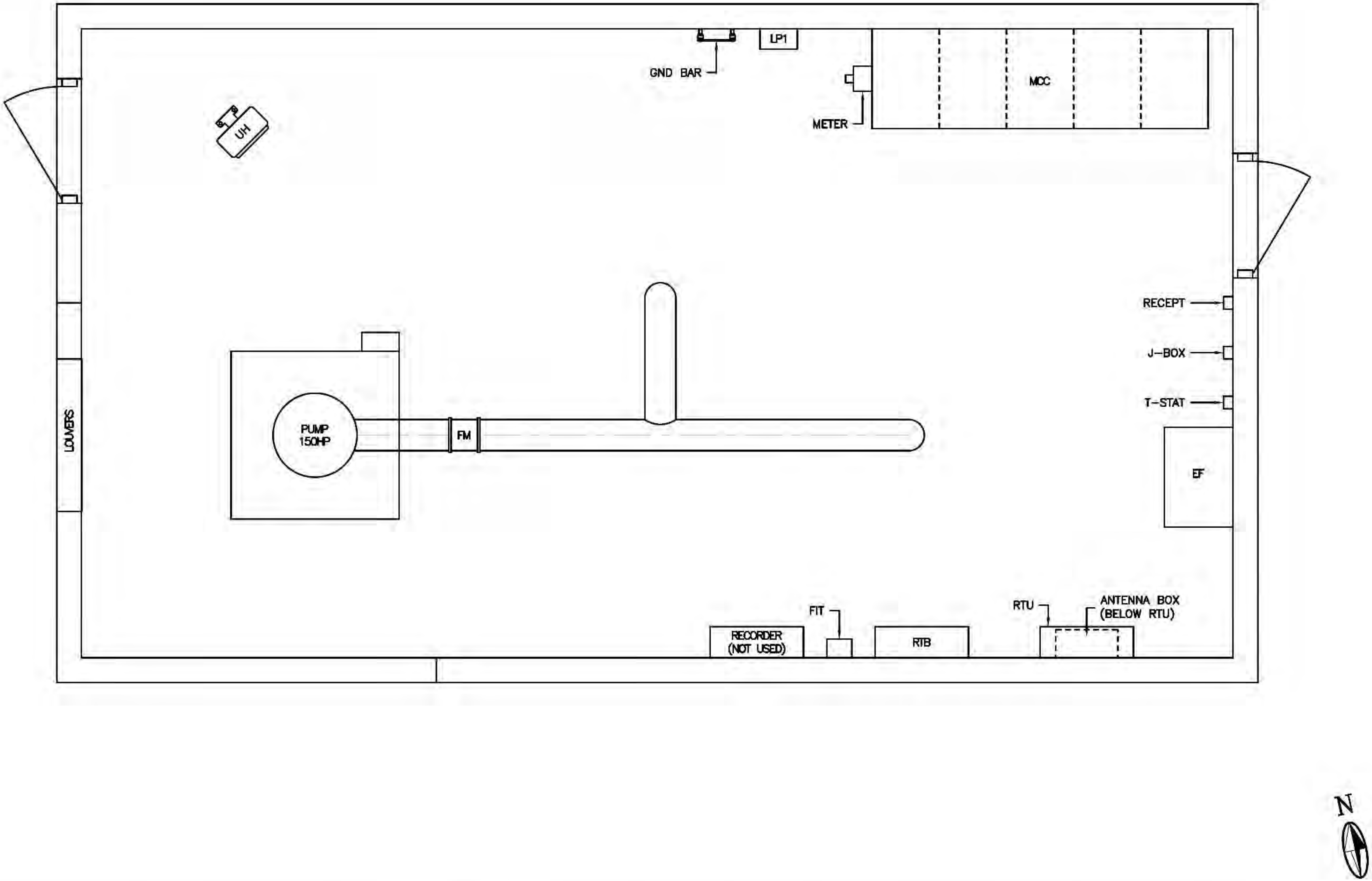


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

GUAJE WELL 5A
Mechanical Plan

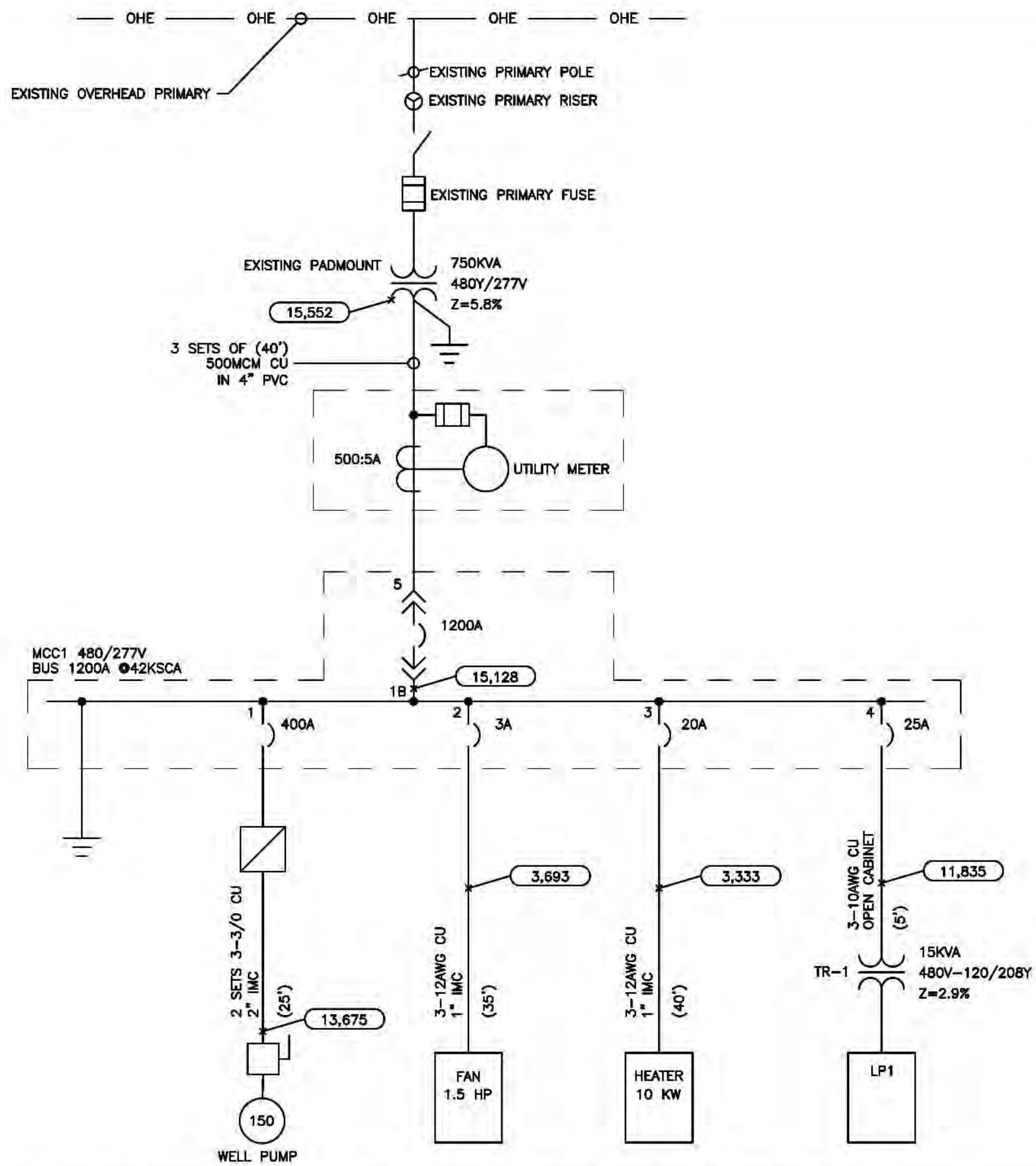
LAST MODIFIED: Jun 25, 2021 - 10:00am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\10-GUAJE WELL 5A\
DWG. NAME: ELAC-10-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 5A
ELECTRICAL PLAN



GENERAL NOTES

1. (15,552) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (120') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* USING APPROPRIATE CONDUCTOR SIZE (2 SETS OF 3/0 CU) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL SIZE (2 SETS OF 4/0) FROM STARTER TO PUMP.

1) SIEMENS SENTRON JXD63L400
INSTANTANEOUS TRIP: 1.79KA
2) SIEMENS ED63A003
INSTANTANEOUS TRIP SET TO 35A
3) SIEMENS ED63B020
AIC RATING: 25KA
4) SIEMENS ED63B025
AIC RATING: 25KA
5) SIEMENS SENTRON MXD63S1200A
AIC RATING: 50KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

GUAJE WELL 5A
ELECTRICAL ONE-LINE DIAGRAM

2.10 Otowi Well 1

Otowi Well 1 (OW 1) was placed into service in 1996 and is the only submersible style well in the system. This well pumps directly into Otowi Tank 1. This well produces approximately 970 gpm. According to last year's supervisory control and data acquisition (SCADA) runtime data, OW 1 did not run for the entire year.

2.10.1 Observations

Despite not being operated over the past year, this well is reported to be operational. The starter is currently out of service due to failed power factor correction capacitors.

- Service Transformer: 500 kVA, 2,400V secondary.

- Motor: 300 HP, 2,400V:
  - Reaching its life expectancy.

- Motor Control Center (MCC):
  - Reduced Voltage Auto-Transformer (RVAT) is reaching its life expectancy.
  - Remaining sections include fused switches for the incoming service and the step-down lighting panel transformer. Sections are in operational condition.

- Lighting Panel:
  - In operational condition.

- Instrumentation:
  - 8" flow meter – Krohne / Mag / IFS-4000 / Serial Number = A96-8123 / 1990 / Condition = FAILED.

- Mechanical:
  - 12” butterfly valve – Manual / Pratt 2F II / Valve Serial Number = 25721-2 / 1990 / Condition = FAIR / Normally Open.
  - 8” check valve – Swing / 1990 / Condition = GOOD.
  - 10” butterfly valve – Pratt 2F II / Valve Serial Number = L497373 / Electrically Actuated / Limitorque Serial Number = M166564 / 1990 / Condition = FAIR / Drain Line / Normally Open on start-up then closes slowly / Slowly opens on shut-down.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented

<u>2.10.2 Recommendations</u>

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
  - Keep MCC in services.
  - Keep existing RVAT as backup and replace the power factor correction capacitors.
  - Install new Reduced Voltage Soft Starter (RVSS) adjacent to the MCC assembly.

- Electrical System Upgrade:
  - Replace service conductors and feeds to motor.
  - Reuse existing conduits where possible.

- Mechanical: Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.

- Instrumentation:
  - Install new electromagnetic flow meter.
  - Add flow meter to annual calibration check schedule.

- SCADA: An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing SCADA remote terminal unit (RTU) for remote monitoring and control of the existing parameters.

RECOMMENDED IMPROVEMENTS

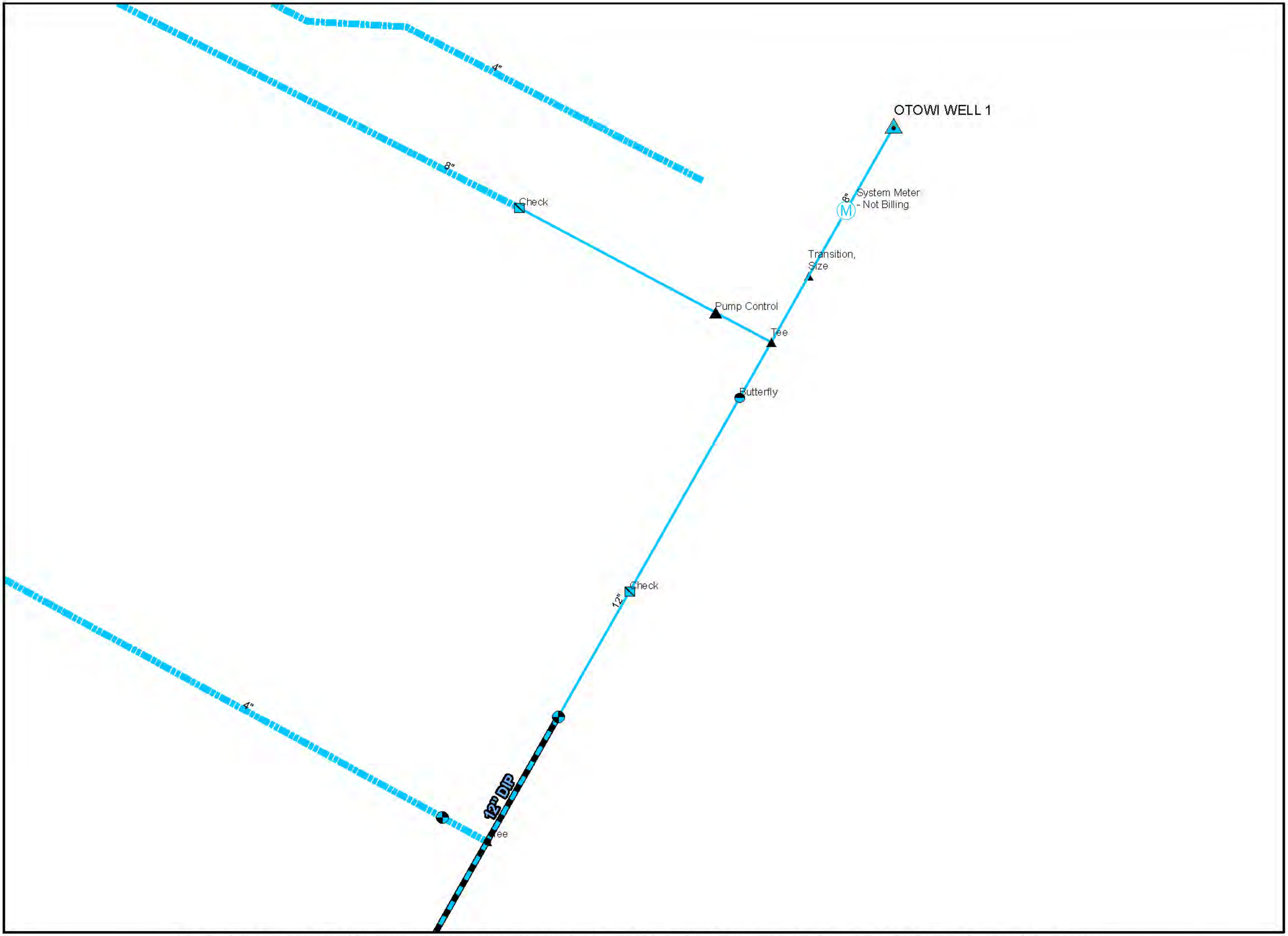
Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, Power Factor Correction Capacitor, RVSS motor starter, and associated power conductors.	$ 143,220
New facility control panel	$ 37,991
Service Transformer Testing and Maintenance	$ 4,000
Install new flow meter	$ 50,000
Subtotal (Exclusive of NMGRT)	**$ 235,211**

EXHIBIT 2.10 – OTOWI WELL 1:

OTOWI WELL 1 MECHANICAL PLAN,

OTOWI WELL 1 ELECTRICAL PLAN, AND

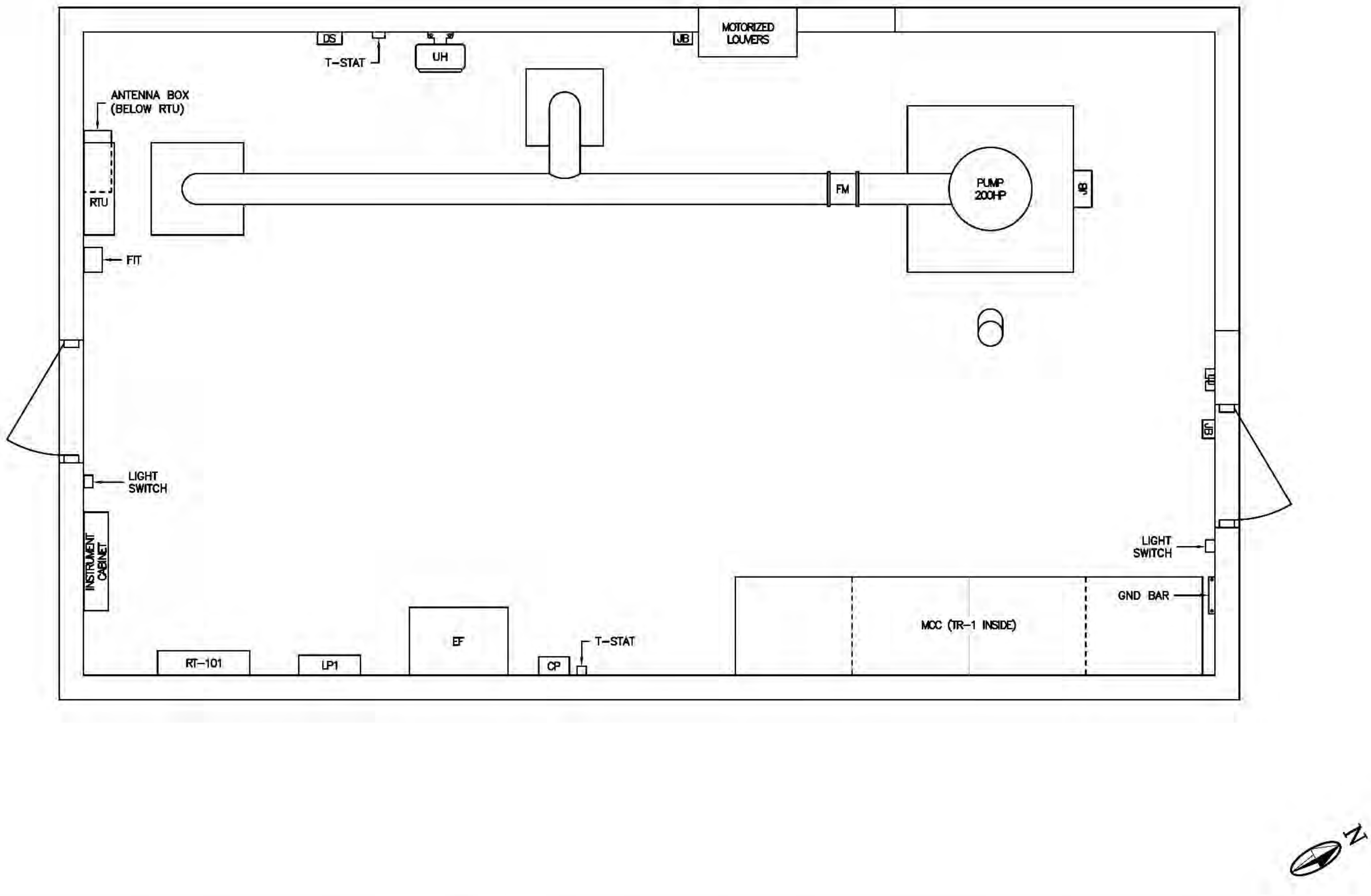
OTOWI WELL 1 ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

OTOWI WELL 1
Mechanical Plan

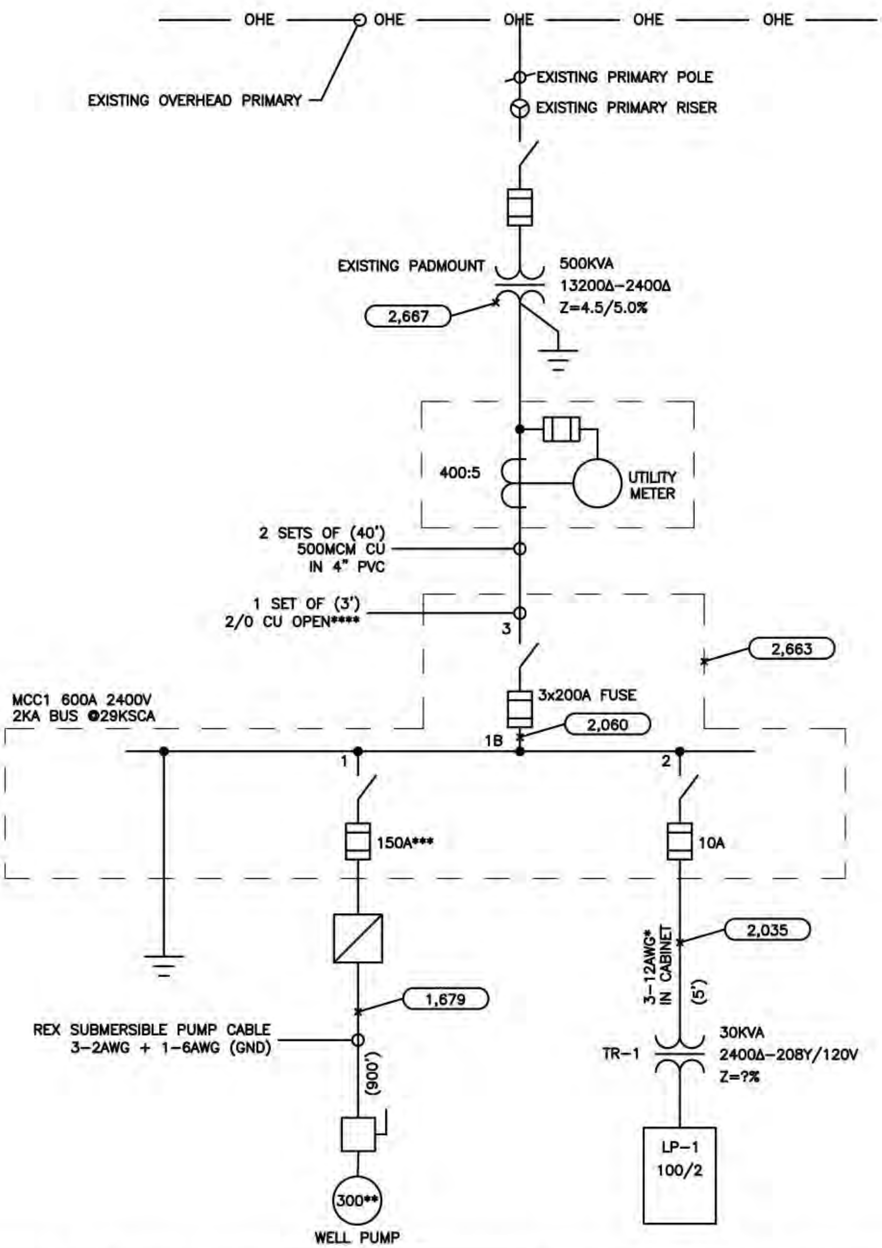


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

OTOWI WELL 1
ELECTRICAL PLAN

LAST MODIFIED: Oct 20, 2021 - 1:44pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\13-OTOWI WELL 1\
DWG. NAME: ELAC-13-601.dwg



GENERAL NOTES

1. (2,667) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (950') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* USING APPROPRIATE CONDUCTOR SIZE (12AWG) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (14AWG).

** FULL LOAD CURRENTFOR 300HP PUMP IS 74A.

*** WITH THE 74FLA OF THE PUMP, 150A FUSE MIGHT NEED TO BE RESIZED.

**** SIZE OF CONDUCTOR IS RATED FOR 195A NOT FOR 200A MAY NEED TO BE RESIZED.

1) CH WESTINGHOUSE
5ACLS-5R
AIC RATING: 50KA
2) CH WESTINGHOUSE
5CLPT-10E
AIC RATING: 80KA
3) CH WESTINGHOUSE
5ACLS-9R 200A
AIC RATING: 50KA

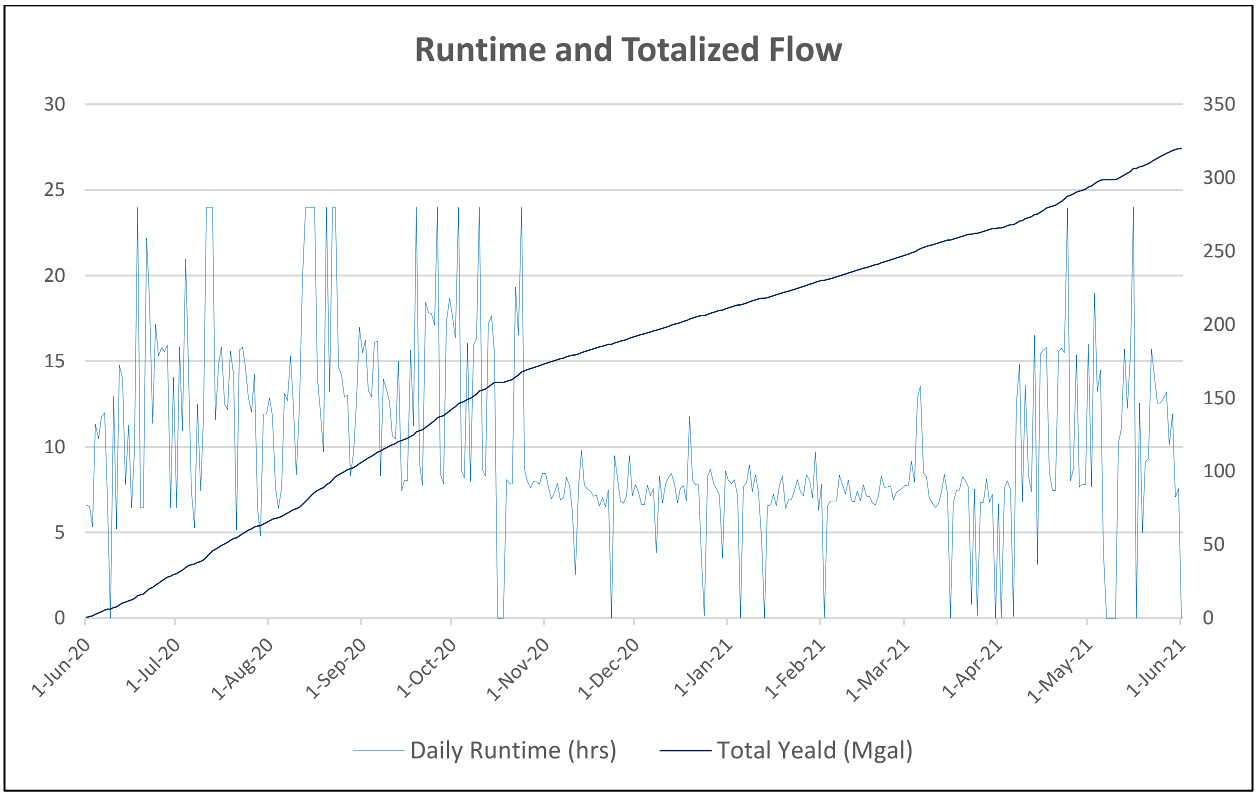
Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

OTOWI WELL 1
ELECTRICAL ONE-LINE DIAGRAM

2.11 Otowi Well 4

Otowi Well 4 (OW 4) was placed into service in 1990. A failure had occurred in 1999, which caused water damage to the original motor starter and was therefore replaced at that time. OW 4 pumps into Otowi Tank 4, is the most heavily used well in the system, and is the systems greatest water producer. Pajarito Well 4 (PW4) produces approximately 1,450 gpm and per last year's supervisory control and data acquisition (SCADA) runtime data, ran 3,675 hours and produced 320M gallons (with the assumed flow rate).



2.11.1 Observations

The well pump motor was recently pulled and inspected due to operational concerns by staff who reported a whining sound when running. The motor inspection showed significant wear and damage. The County is currently in the process of replacing the motor. Outside of the motor replacement, the only other reported operational concern is the well startup / shutdown blow-off duration. The hydraulic control valves (HCVs) used in this process operate as needed to prevent hammering. However, reducing the duration of blow-off would be desirable.

- Service Transformer: 1,000 kVA, 4160V secondary:
  - The transformer appears to be in good condition based on visual inspection.

- Motor: 800 HP, 4160V:
  - The motor is currently being replaced.

- Motor Control Center (MCC):
  - the Reduced Voltage Auto-Transformer (RVAT) starter is in operational condition, but has limited ramping capabilities. The ramping limitations result in a blow-off duration greater than operationally desired. Approaching life expectancy.
  - The remaining MCC consists of circuit breakers and is in good operational condition.

- Lighting Panel:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Instrumentation:
  - 8" flow meter – Krohne / Mag / SC 80 AS-F / Serial Number = 914840 G2 / 2000 / Condition = GOOD.

- Mechanical:
  - 10" pump control valve – Cla-Val / Model Number = 10-81-02-16E-300-PN25 / 1990 / Condition = FAIR / Normally Closed on start-up then opens slowly / Closes slowly on shut-down.
  - 8" pump control valve – Cla-Val / Model Number = 8-61-02-66H-SN / 1990 / Condition = FAIR / Drain Line / Normally Open on start-up then closes slowly / Slowly opens on shut-down.
  - 8" check valve – Swing / Condition = POOR / Drain Line.

- 4” surge anticipation valve – Cla-Val / Model Number = 4-652-03B-46J / Condition = FAIR / Discharge Line downstream and outside of well station.

- SCADA:
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

2.11.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
  - Keep MCC in services.
  - Keep existing RVAT as backup.
  - Install new Reduced Voltage Soft Starter (RVSS) adjacent to the MCC assembly. Equipment on wall will require adjusting to allow the equipment to fit. After installed, the ramp times will need to be adjusted in addition to the piloting on the pump control valve.

- Electrical System Upgrade:
  - Replace service conductors and feeds to motor.
  - Reuse existing conduits where possible.

- Mechanical:
    - Verify the need or desire to add a check valve inside station building.
    - Relocate surge anticipation valve inside station building and eliminate confined space vault.
    - Fully rebuild the existing pump control valves.
    - Add a drain line discharge flap valve and eliminate drain line check and butterfly valves in order to eliminate confined space vault.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and functionality and rebuild, if necessary.
    - Have the pump control valves and surge anticipation valve inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
    - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e. rubber gasket and piloting components).
    - Prep, recoat and paint station valves and piping.
    - Install new check valve (assisted closure) inside station building.
    - Relocate the surge anticipation valve inside the building and eliminate vault.
    - Install new 8: flap valve on end of the drain line and eliminate check and butterfly valve and vault.
    - Add the well control valve and surge anticipation valve to a long-term maintenance program.

- Instrumentation:
    - Install new flow meter
    - Add flow meter to annual calibration check schedule.

- SCADA: An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing SCADA remote terminal unit (RTU) for remote monitoring and control of the existing parameters.

RECOMMENDED IMPROVEMENTS

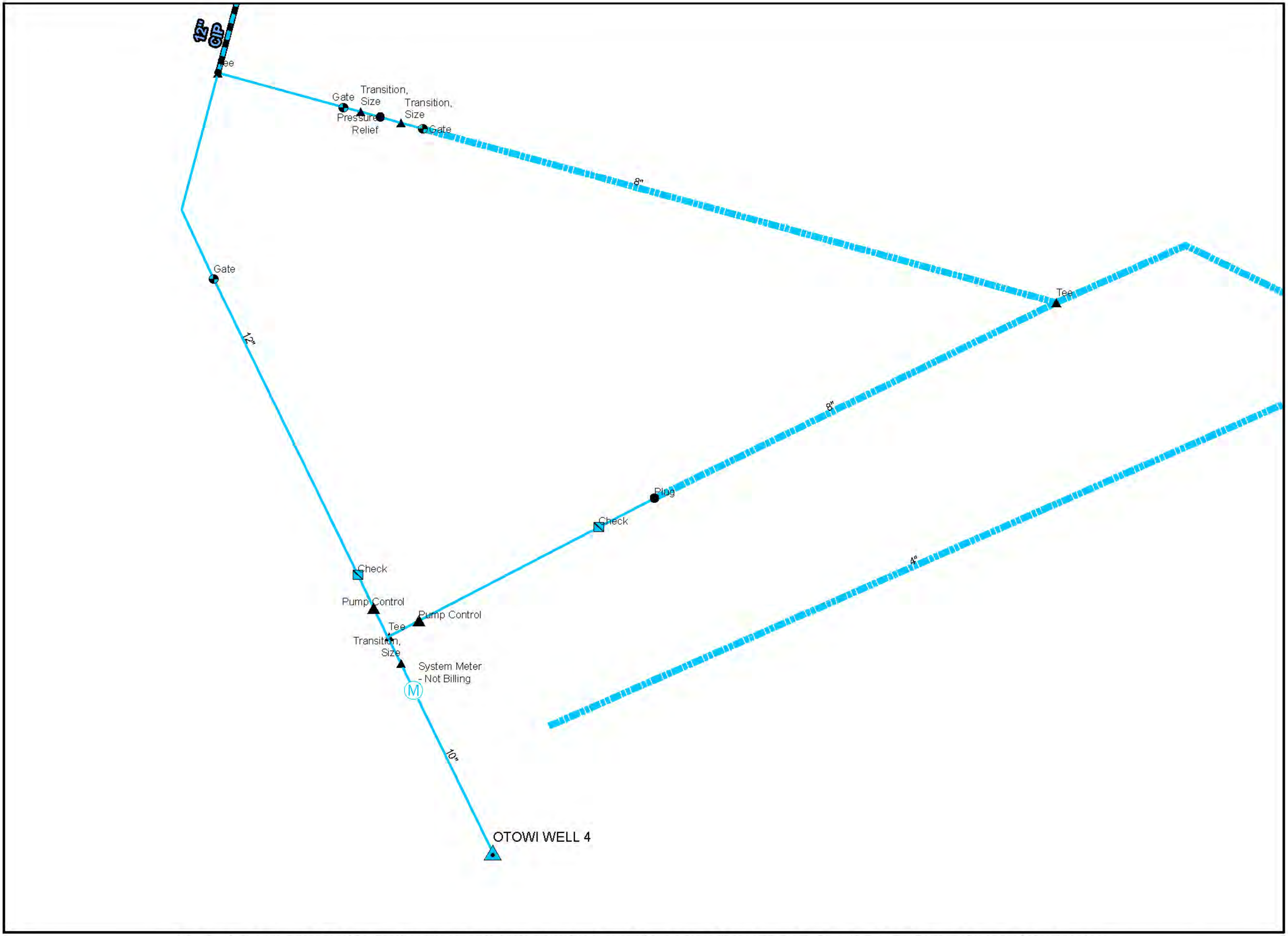
Improvement Description	Budgetary Construction Cost	
Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$	118,635
New facility control panel	$	37,991
Rebuilding all hydraulic control valve	$	24,000
Service transformer testing and maintenance	$	5,000
Install new flow meter	$	50,000
Install check valve inside station building	$	50,000
Relocate PRV inside station building and eliminate vault	$	75,000
Install 8" flap valve on end of drain line and eliminate check and butterfly valves and vault	$	15,000
Prep, recoat and paint station valves and piping	$	7,500
Subtotal (Exclusive of NMGRT)	**$**	**383,126**

EXHIBIT 2.11 – OTOWI WELL 4:

OTOWI WELL 4 MECHANICAL PLAN,

OTOWI WELL 4 ELECTRICAL PLAN, AND

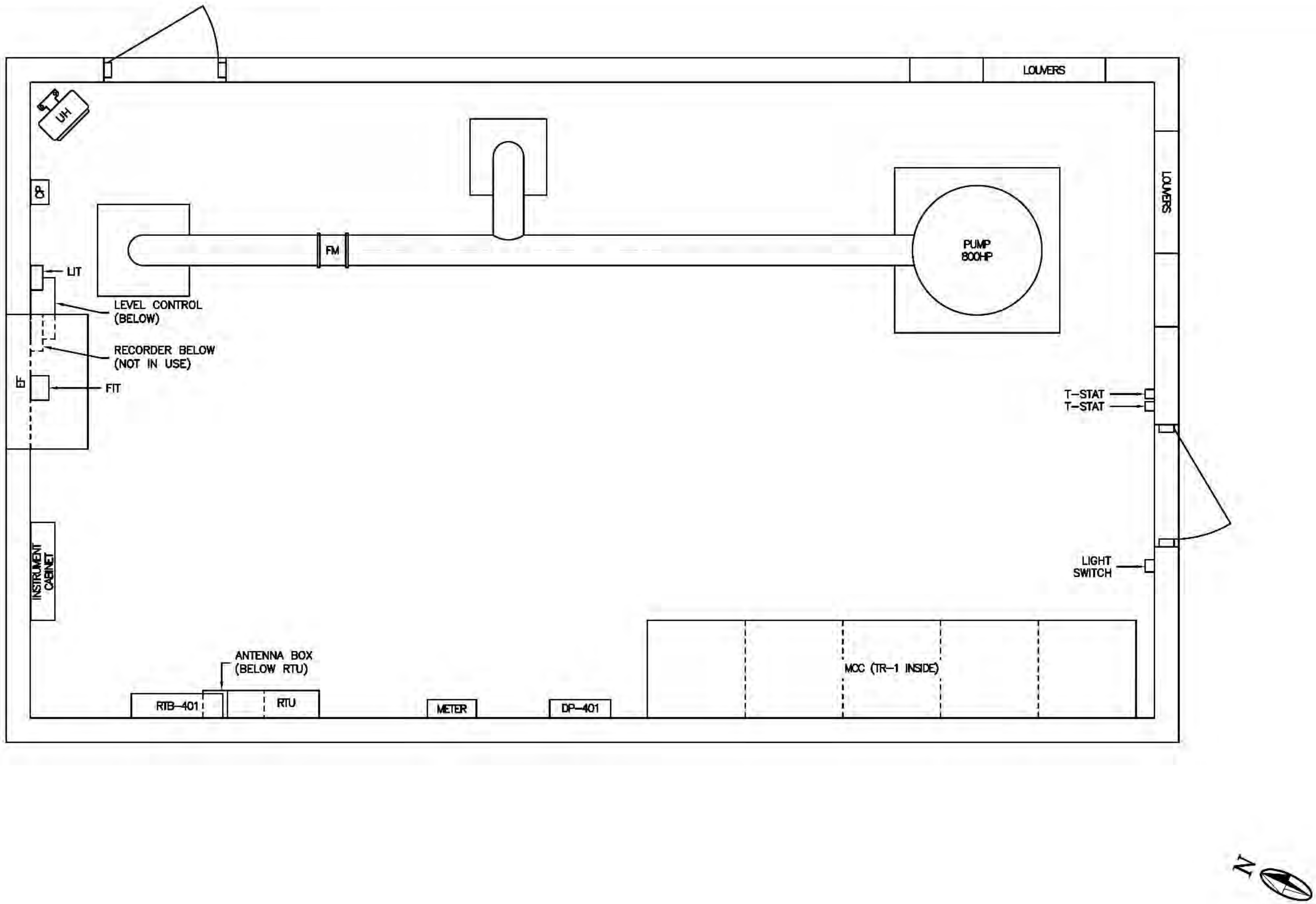
OTOWI WELL 4 ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

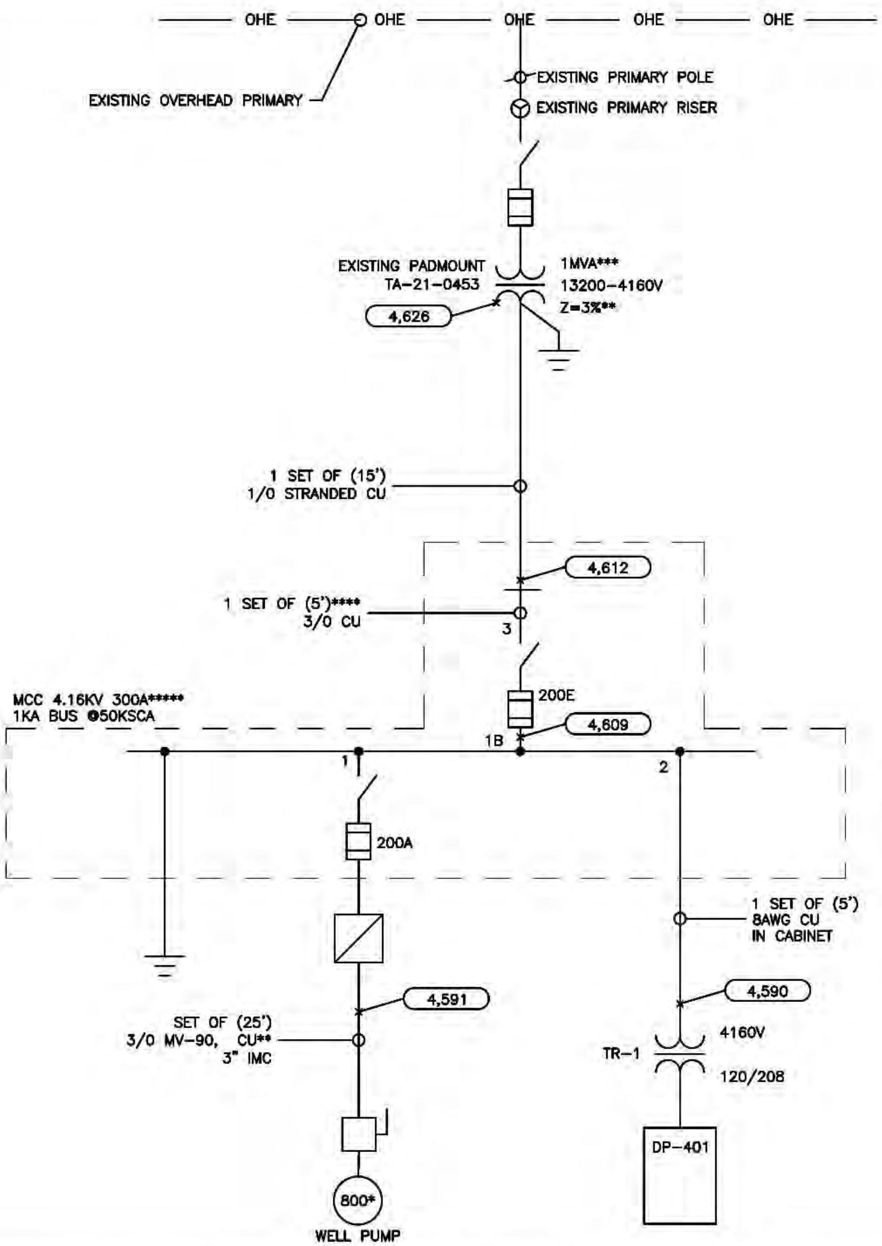
OTOWI WELL 4
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

OTOWI WELL 4
ELECTRICAL PLAN



GENERAL NOTES

1. (4,626) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (50') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. ASSUMING THIS IS SUPPLIED BY A 1MVA XFMR WITH SECONDARY OF 4160V, FULL LOAD CURRENT IS 138.79A SO 200A DISCONNECT MIGHT BE OVERSIZED FOR THIS SERVICE.

* FULL LOAD CURRENT FOR 800HP PUMP IS 96A.

** USING APPROPRIATE CONDUCTOR SIZE (3/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (2AWG MV-90).

*** USING LOWEST IMPEDANCE FOR THIS TYPE OF TRANSFORMER UNTIL TRANSFORMER DATA IS PROVIDED.

**** USING APPROPRIATE CONDUCTOR (3/0) FOR THE 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (2 SETS OF 4/0).

***** UNABLE TO DETERMINE THE CONTINUOUS CURRENT FOR MCC1. SIZE SHOWN IN 1-LINE IS BASED ON THE LOAD (300A).

1) SIEMENS R-RATED
FUSED DISCONNECT
48FMR95-4G
AIC RATING: @80KA RMS
3) LITTLE FUSE
600A LOAD BREAK SW
200E-1C-5.5
AIC RATING: @80KA RMS

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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OTOWI WELL 4
ELECTRICAL ONE-LINE DIAGRAM

3.0 WATER PRODUCTION FACILITIES – BOOSTER STATIONS

3.1 Pajarito Booster Station 1

Pajarito Booster Station 1 (PB1) was placed into service in the early 1960s. An electrical system rehabilitation project was completed in 2013. PB1 consists of two (2) 100 HP pumps, each with a rated capacity of 700 gpm. PB1 transfers water from Pajarito Tank 1 to Pajarito Tank 2.

3.1.1 Observations

The system has been reported to be in good operational condition. The pump control valves are in operational condition, but the bodies do show some rust.

- Service Transformer: 225 kVA, 277/480V secondary.
  - The transformer is owned and operated by the Los Alamos National Laboratory (LANL) and was replaced during the 2013 improvements project. No action required.

- Motor: (100 HP, 480V) x 2.
  - Motors are beyond their life expectancy.

- Starter: Allen Bradley Reduced Voltage Auto-Transformer (RVAT):
  - Starters are in good operational condition and have an estimated 20-year life expectancy remaining.

- Electrical Equipment: 480V panelboard, 120/240V step-down transformer, and 120/240V lighting panel:
  - In good and operational condition.

- Supervisory control and data acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - The existing pump control valve bodies body and piloting system are operational but show signs of water damage. Typical for all.
    - 8” Pump 1 Control Valve – Ross 42WR / Serial Number = 6605 / 1966 / Condition = GOOD / Last Rebuilt 2020.
    - 8” Pump 2 Control Valve – Ross 42WR / Serial Number = 6606 / 1966 / Condition = GOOD / Last Rebuilt 2019.
    - 6” Pressure Relief Valve – Ross / Model Number = 50 RWRF / Serial Number = 6610 / 1966 / Condition = UNKNOWN / Last Rebuilt Never.
    - Pressure Tank – Trend Corp / Serial Number = 106 / 1966 / 250 psi / Condition = UNKNOWN / Connected to discharge manifold via a manual gate valve = Normally Closed – No longer in service. Air compressor removed and Intake valve to remain Normally Closed.

- Instrumentation:
    - 14” flow meter – Sparling / Propeller Insert / Serial Number = F-2711 / 1966 / Condition = GOOD.

3.1.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- Starter (RVAT):
  - No improvements recommended at this time.

- Electrical equipment:
  - No improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - Rebuild or replace pump intake isolation gate valve for each pump.

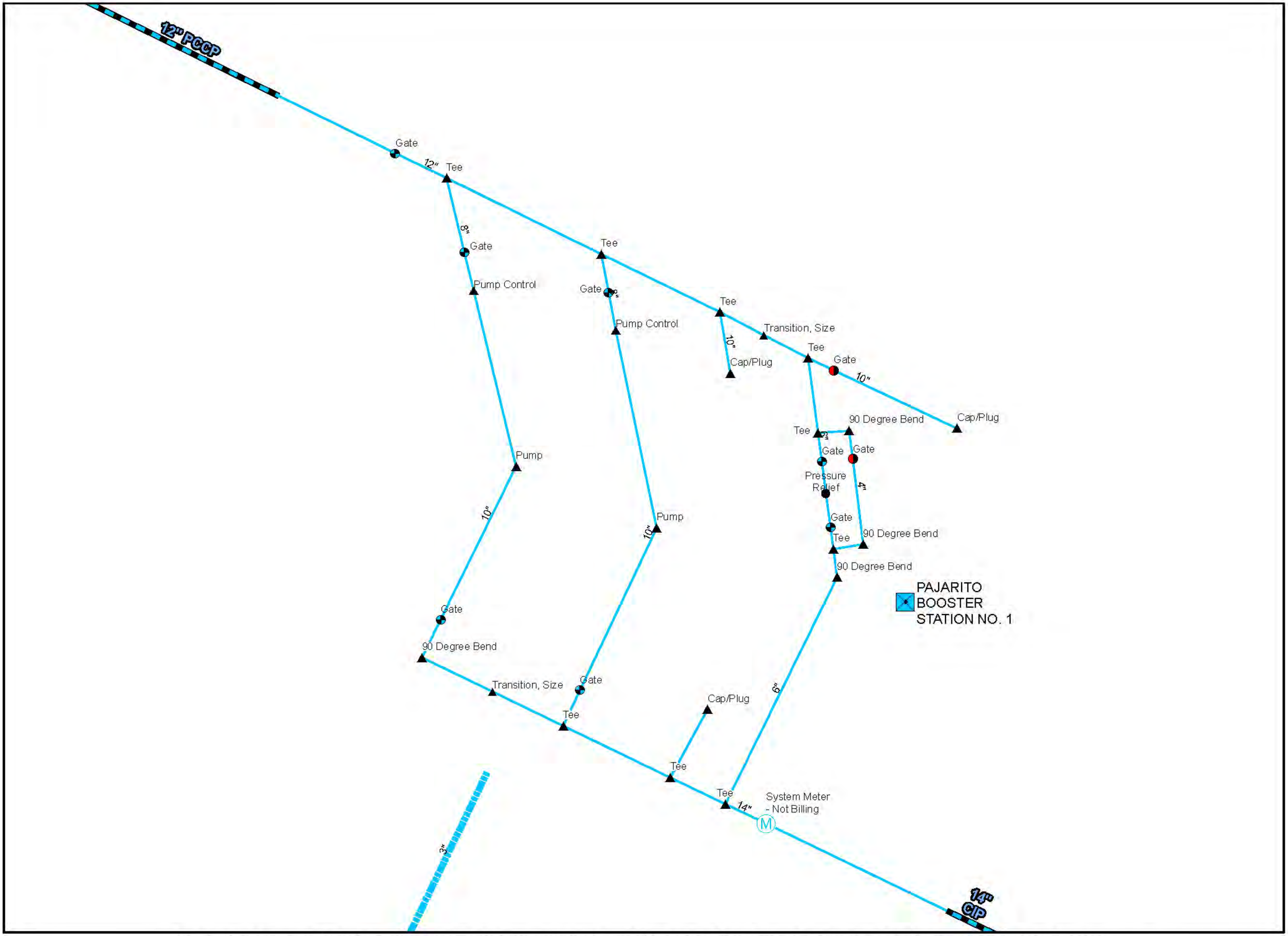
- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Rebuilding all hydraulic control valve	$ 17,136
Prep, recoat and paint station valves and piping	$ 7,500
Rebuild or replace pump intake isolation gate valves for each pump	$ 50,000
Subtotal (Exclusive of NMGRT)	**$ 74,636**

EXHIBIT 3.1 – PAJARITO BOOSTER STATION 1:

PAJARITO BOOSTER NO. 1 MECHANICAL PLAN, PAJARITO BOOSTER STATION 1 ELECTRICAL PLAN, AND PAJARITO BOOSTER STATION 1 ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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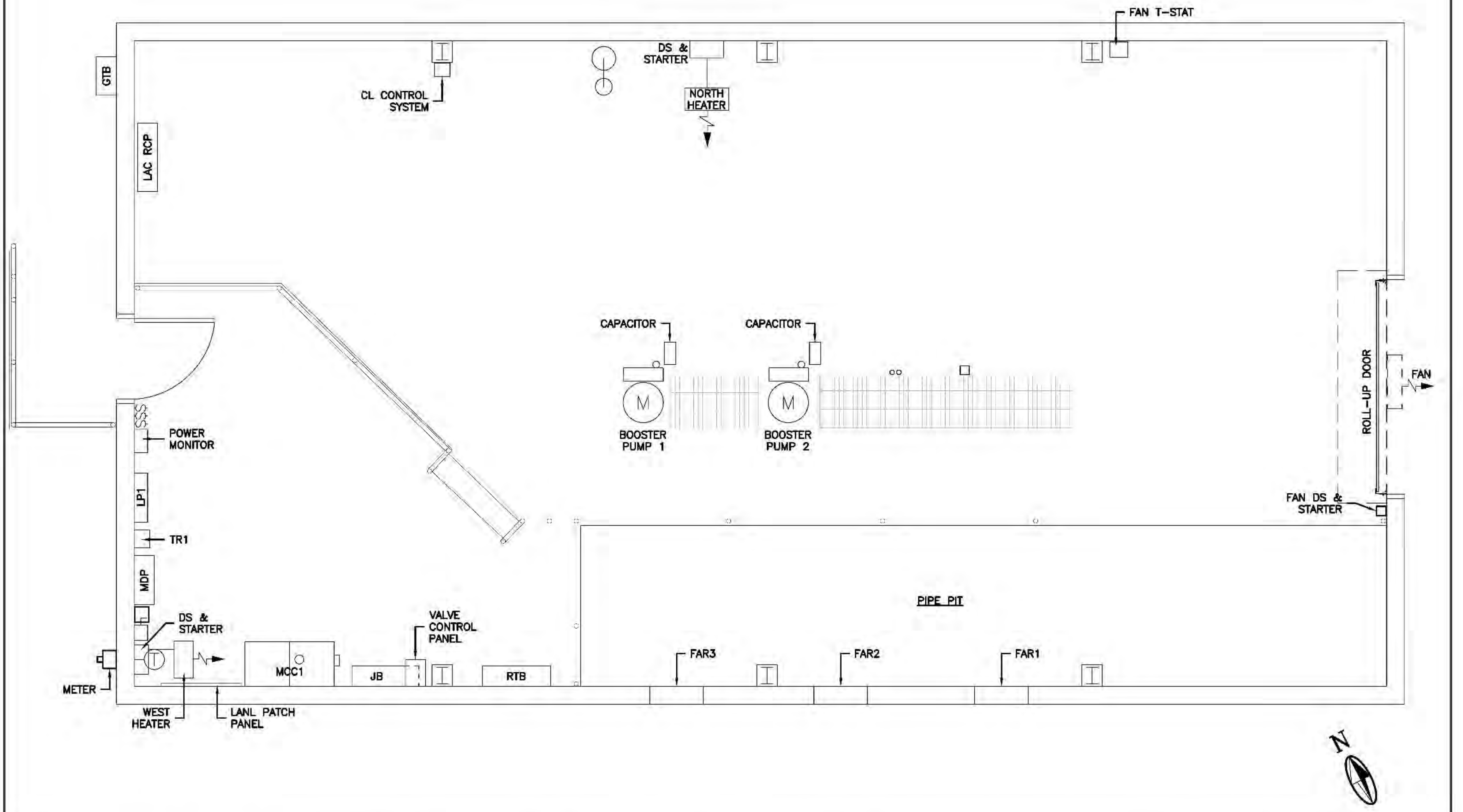
PAJARITO BOOSTER NO.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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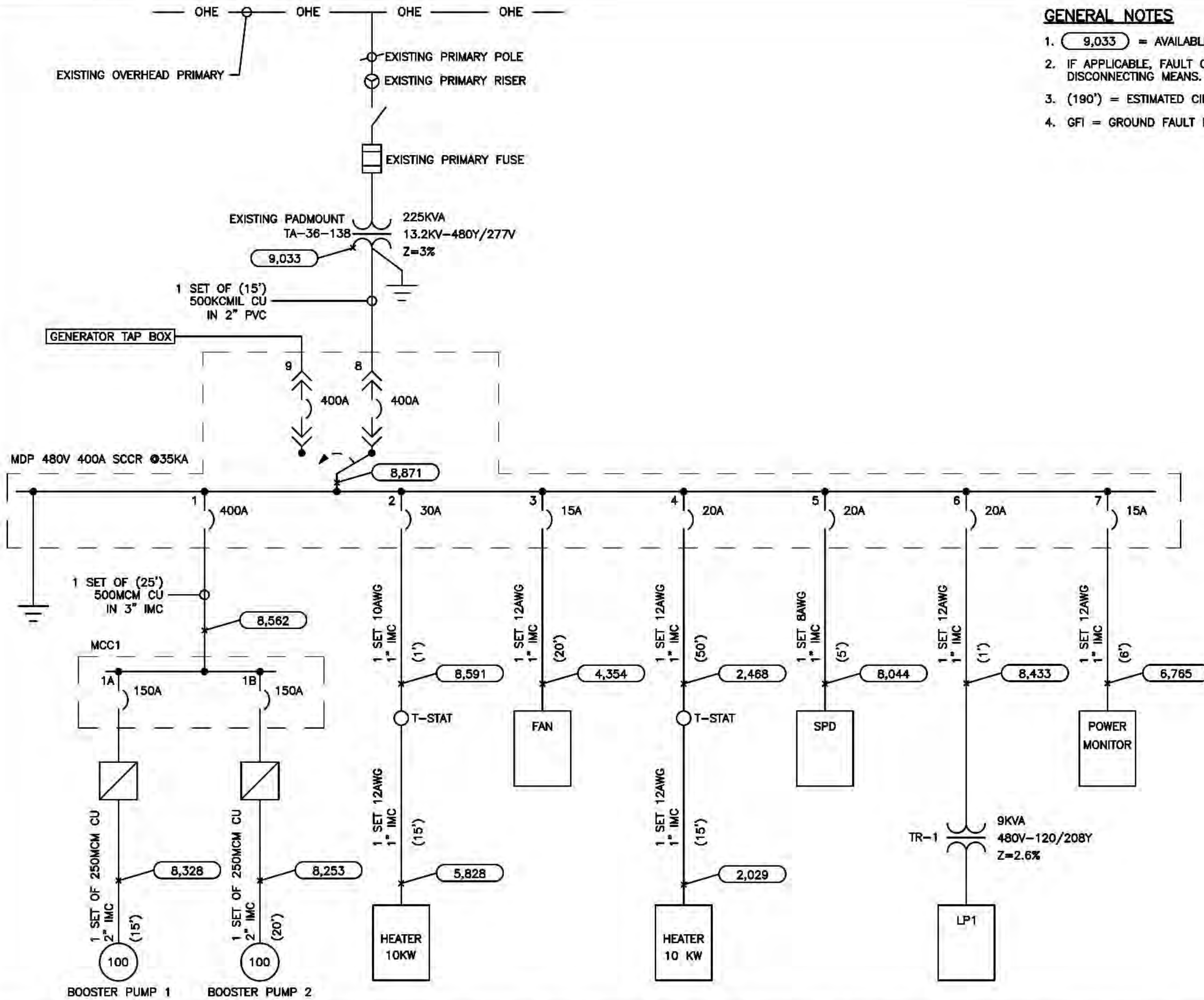
PAJARITO BOOSTER STATION 1
ELECTRICAL PLAN



GENERAL NOTES

1. (9,033) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (190') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

1) SIEMENS SENTRON JXD63B400
INTERRUPTING RATING: 35KA
INSTANTANEOUS TRIP: 1.25KA
1A) ALLEN BRADLEY 140U-JD6
TRIP SETTING: 1.5KA
1B) ALLEN BRADLEY 140U-JD6
TRIP SETTING: 1.5KA
2) SIEMENS NGB3B030
INTERRUPTING RATING: 25A
3) SIEMENS NGB3B015
INTERRUPTING RATING: 25KA
4) SIEMENS NGB3B020
INTERRUPTING RATING: 25KA
5) SIEMENS NGB3B020
INTERRUPTING RATING: 25KA
6) SIEMENS NGB3B020
INTERRUPTING RATING: 25KA
7) SIEMENS NGB3B015
INTERRUPTING RATING: 25KA
8) SIEMENS SENTRON JXD63B400
INTERRUPTING RATING: 35KA
9) SIEMENS SENTRON JXD63B400
INTERRUPTING RATING: 35KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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PAJARITO BOOSTER STATION 1
ELECTRICAL ONE-LINE DIAGRAM

3.2 Pajarito Booster Station 2

Pajarito Booster Station 2 (PB2) was placed into service in the early 1960s. An electrical system rehabilitation project was completed in 2013. PB2 consists of three (3) 200 HP pumps, each with a rated capacity of 1,375 gpm. PB2 transfers water from Pajarito Tank 2 to Pajarito Tank 3.

3.2.1 Observations

The system has been reported to be in good operational condition. The pump control valves are in operational condition, but the bodies do show some rust.

- Service Transformer: 500 kVA, 277/480V secondary:
  - The transformer is owned and operated by Los Alamos National Laboratory (LANL) and was replaced during the 2013 improvements project. No action required.

- Motor: (200 HP, 480V) x 3:
  - Motors are beyond their life expectancy.

- Starter: Allen Bradley Reduced Voltage Auto-Transformer (RVAT):
  - Starters are in good operational condition and have an estimated 20-year life expectancy remaining.

- Electrical Equipment: 480V panelboard, 120/240V step-down transformer, and 120/240V lighting panel:
  - In good and operational condition.

- Supervisory control and data acquisition (SCADA):
    - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
    - The existing pump control valve body and piloting system are operational but show signs of water damage. Typical for all.
    - 10" Pump 1 Control Valve – Ross 42WR / Serial Number = 6602 / 1966 / Condition = GOOD / Last Rebuilt 2017.
    - 10" Pump 2 Control Valve – Ross 42WR / Serial Number = 6604 / 1966 / Condition = GOOD / Last Rebuilt 2021.
    - 10" Pump 3 Control Valve – Ross 42WR / Serial Number = 6603 / 1966 / Condition = GOOD / Last Rebuilt 2021.
    - 6" Pressure Relief Valve – Ross / Model Number = 50RWRE / Serial Number = 6611 / 1966 - Condition = UNKNOWN / Last Rebuilt Never.
    - Pressure Tank – Trend Corp / Serial Number = 104 / 1966 / 250 psi / Condition = UNKNOWN / Connected to discharge manifold via a manual gate valve = Normally Closed – no longer in service. Air compressor removed and Intake valve to remain Normally Closed.

- Instrumentation:
    - 18" flow meter – Sparling / Propeller Insert / Serial Number = F-3137 / 1966 / Condition = GOOD.
    - 14" flow meter – Sparling / Propeller Insert / Serial Number = F-2491 / 1966 / Condition = GOOD / Chlorination Building – Chlorination Pace Meter.

3.2.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.
- Starter (RVAT):
    - No improvements recommended at this time.

- Electrical equipment:
    - No improvements recommended at this time.

- SCADA:
    - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
    - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
    - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
    - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
    - Remove the rust from the valve body of the well control valves and recoat the valve for protection.
    - Add the pump control valve and PRV to a long-term maintenance program.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
    - Rebuild or replace pump intake isolation gate valve for each pump.

- Instrumentation: Add flow meters to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Rebuilding all hydraulic control valve	$ 16,000
Prep, recoat and paint station valves and piping	$ 15,000
Rebuild or replace pump intake isolation gate valves for each pump	$ 75,000
Subtotal (Exclusive of NMGRT)	**$ 106,000**

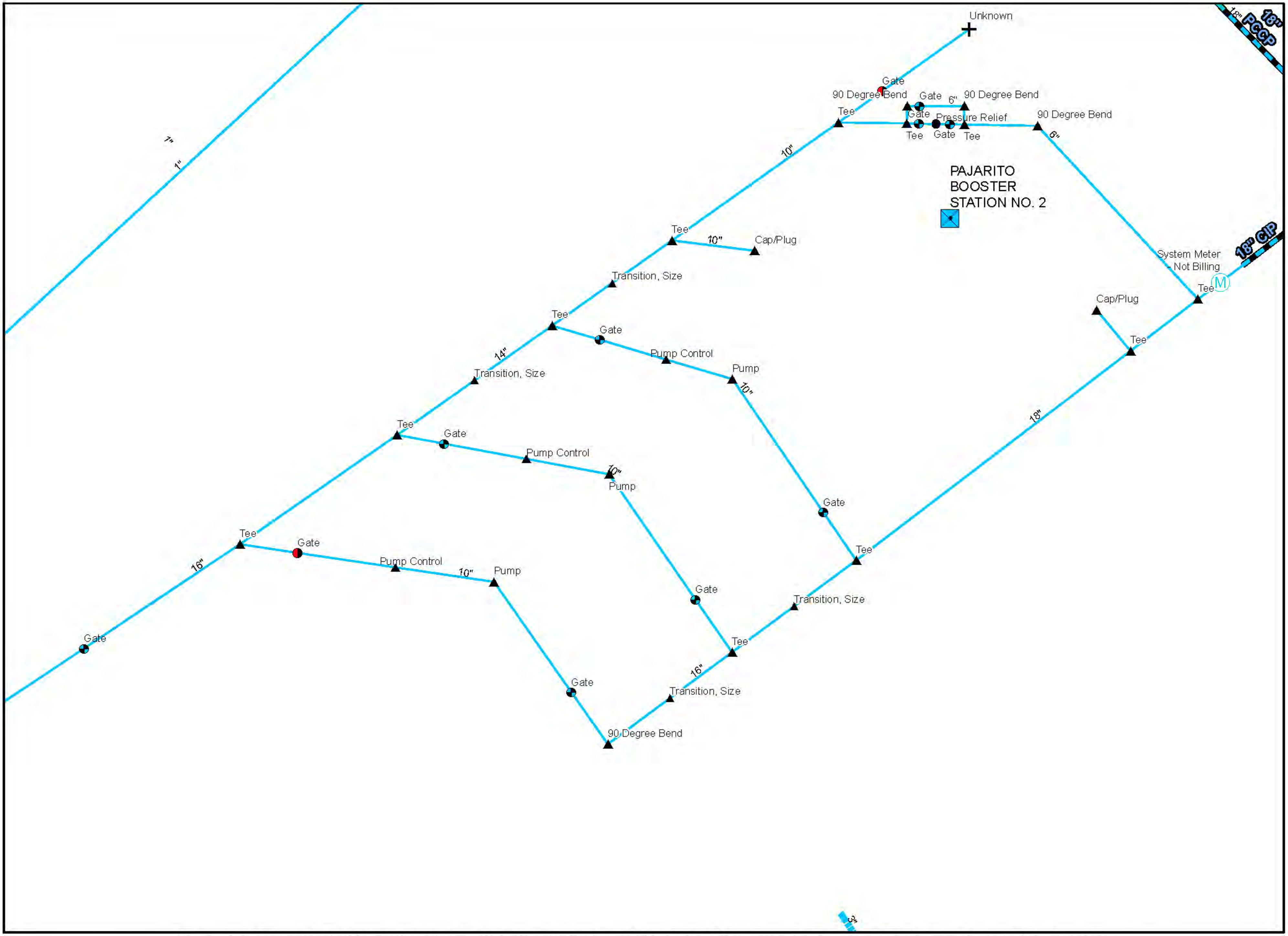
EXHIBIT 3.2 – PAJARITO BOOSTER STATION 2:

PAJARITO BOOSTER NO. 2 MECHANICAL PLAN,

PAJARITO BOOSTER STATION 2 ELECTRICAL PLAN,

AND PAJARITO BOOSTER STATION 2 ELECTRICAL

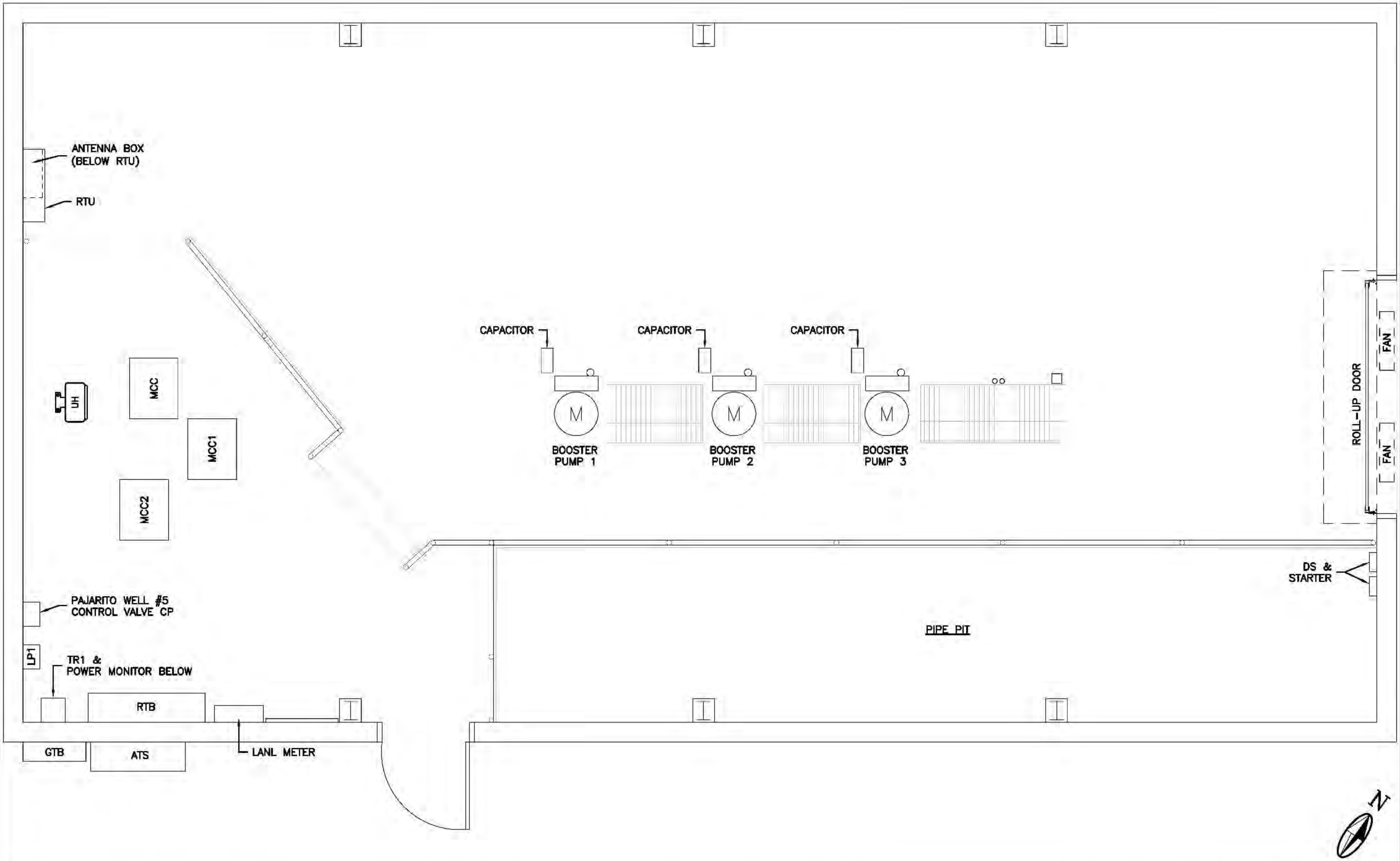
ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO BOOSTER NO.2
Mechanical Plan

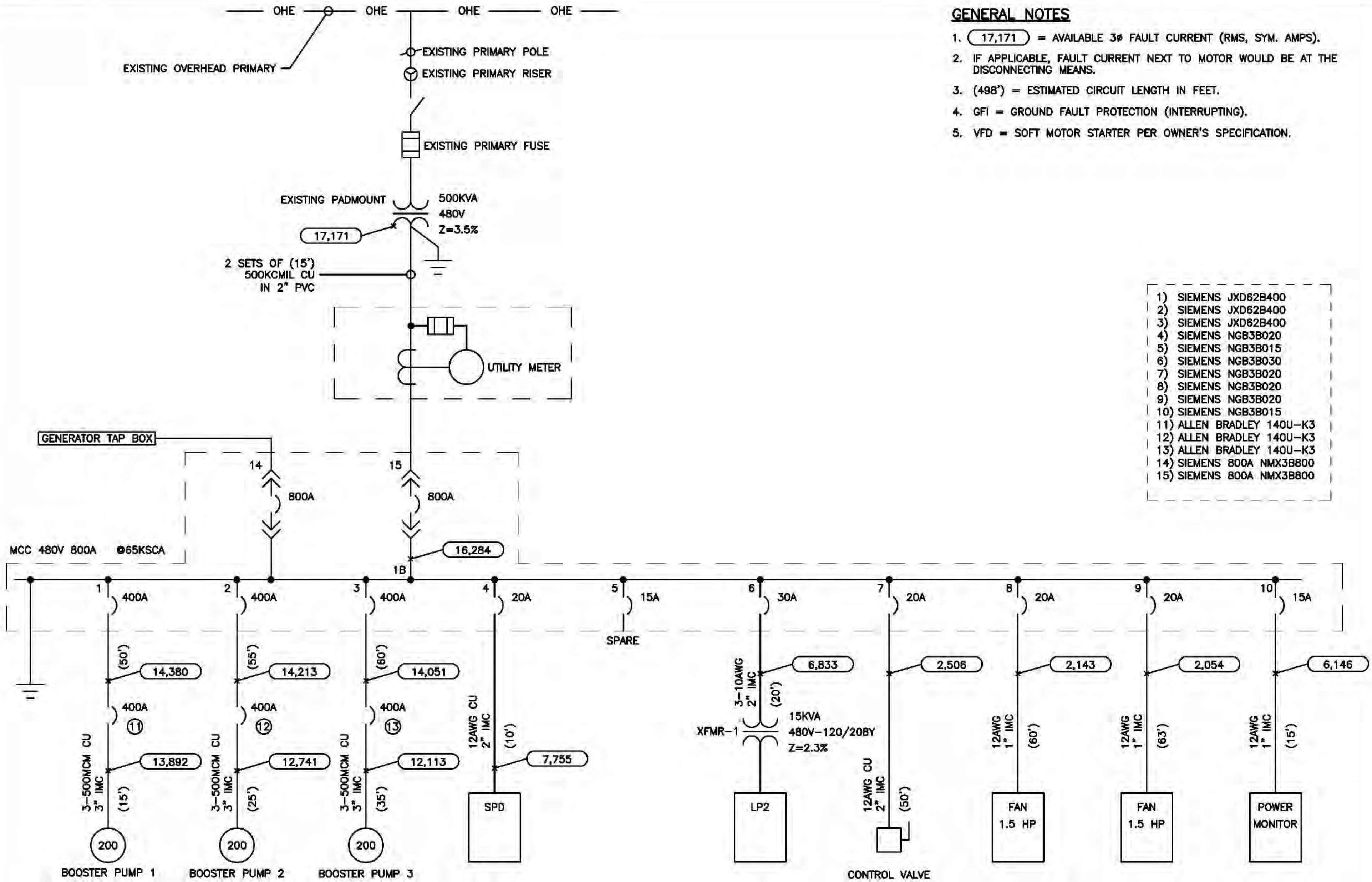


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

PAJARITO BOOSTER STATION 2
ELECTRICAL PLAN

LAST MODIFIED: Jun 10, 2021 - 3:36pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\PAJARITO BS 2\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (17,171) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (498') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATION.

1) SIEMENS JXD62B400
2) SIEMENS JXD62B400
3) SIEMENS JXD62B400
4) SIEMENS NGB3B020
5) SIEMENS NGB3B015
6) SIEMENS NGB3B030
7) SIEMENS NGB3B020
8) SIEMENS NGB3B020
9) SIEMENS NGB3B020
10) SIEMENS NGB3B015
11) ALLEN BRADLEY 140U-K3
12) ALLEN BRADLEY 140U-K3
13) ALLEN BRADLEY 140U-K3
14) SIEMENS 800A NMX3B800
15) SIEMENS 800A NMX3B800

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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PAJARITO BOOSTER STATION 2
ELECTRICAL ONE-LINE DIAGRAM

3.3 Pajarito Booster Station 3

Pajarito Booster Station 3 (PB3) was placed into service in the early 1960s. An electrical system rehabilitation project was completed in 2013. PB3 consists of three (3) 125 HP pumps, each with a rated capacity of 1,170 gpm. PB2 transfers water from Pajarito Tank 3 to Pajarito Tanks 4 and 4A.

3.3.1 Observations

The system has been reported to be in good operational condition. The pump control valves are in operational condition, but the bodies do show some rust.

- Service Transformer: 300 kVA, 277/480V secondary.
  - The transformer is owned and operated by the Los Alamos National Laboratory (LANL) and was replaced during the 2013 improvement project. No action required.

- Motor: (200 HP, 480V) x 3:
  - Motors are beyond their life expectancy.

- Starter: Allen Bradley Reduced Voltage Auto-Transformer (RVAT):
  - Starters are in good operational condition and have an estimated 20-year life expectancy remaining.

- Electrical Equipment: 480V panelboard, 120/240V step-down transformer, and 120/240V lighting panel:
  - In good and operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - The existing pump control valve body and piloting system are operational but show signs of water damage. Typical for all.
  - 10” Pump 1 Control Valve / Ross 42WR / Serial Number = 6608 / 1966 / Condition = GOOD / Last Rebuilt 2021.
  - 10” Pump 2 Control Valve / Ross 42WR / Serial Number = 6609 / 1966 / Condition = GOOD / Last Rebuilt 2021.
  - 10” Pump 3 Control Valve / Ross 42WR / Serial Number = 6607 / 1966 / Condition = GOOD / Last Rebuilt 2020.
  - 6” Surge Anticipation & Pressure Relief Valve / Ross / Model Number = 50RWRE / Serial Number = Unknown / 1966 / Condition = UNKNOWN / Last Rebuilt Never.
  - Pressure Tank / Trend Corp / Serial Number = 105 / 1966 / 200 psi / Condition = UNKNOWN / Connected to discharge manifold via a manual gate valve = Normally Closed – No longer in service. Air compressor removed and intake valve to remain closed at all times.

- Instrumentation:
  - 18” flow meter – Sparling / Propeller Insert / Serial Number = F-2789 / 1966 / Condition = GOOD.

3.3.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- Starter (RVAT):
  - No improvements recommended at this time.

- Electrical Equipment:
  - No improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - Rebuild or replace pump intake isolation gate valve for each pump.

- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Rebuilding all hydraulic control valve	$ 8,000
Prep, recoat and paint station valves and piping	$ 15,000
Rebuild or replace pump intake isolation gate valves for each pump	$ 75,000
Subtotal (Exclusive of NMGRT)	**$ 98,000**

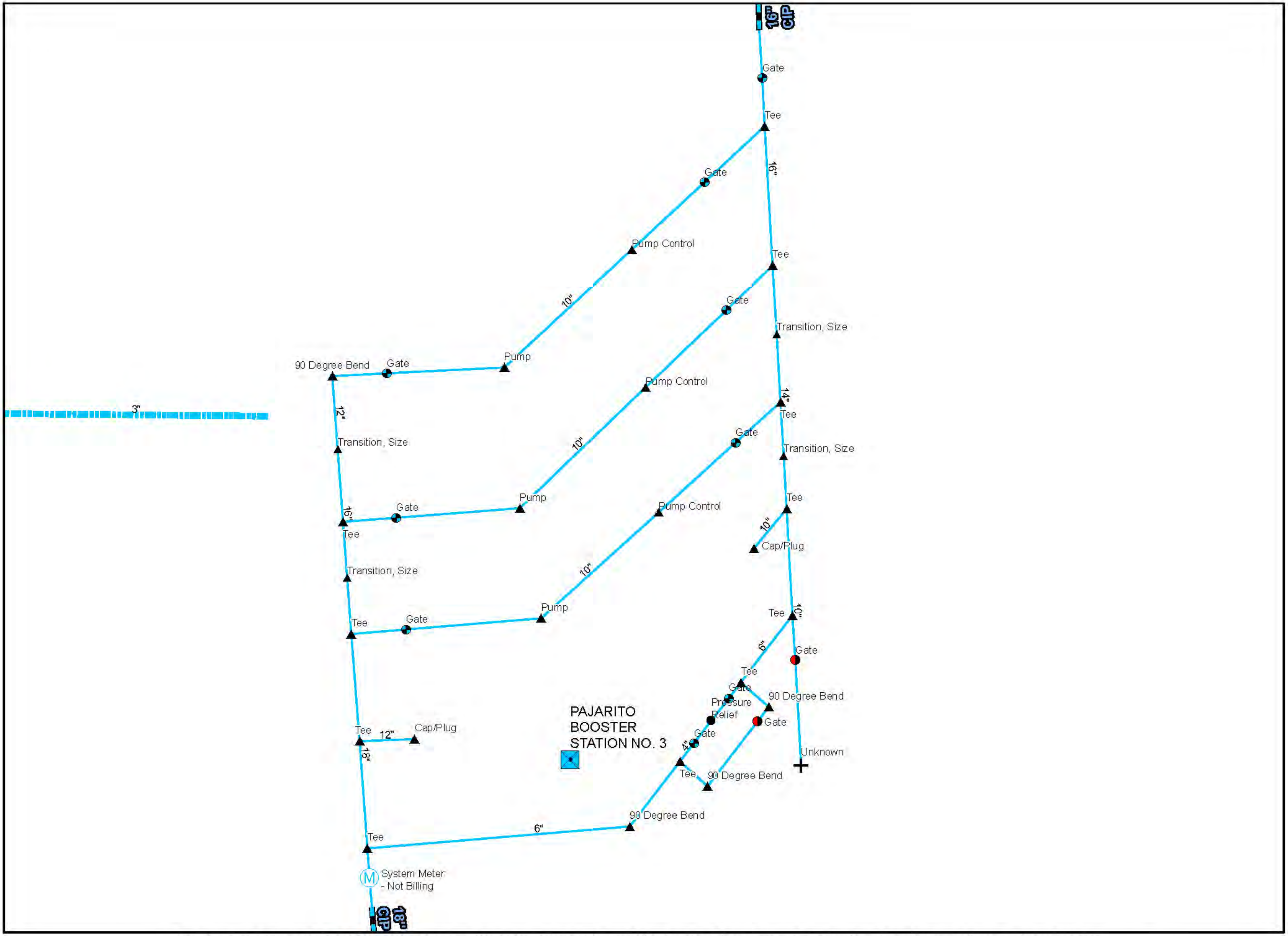
EXHIBIT 3.3 – PAJARITO BOOSTER STATION 3:

PAJARITO BOOSTER NO. 3 MECHANICAL PLAN,

PAJARITO BOOSTER STATION 3 ELECTRICAL PLAN,

AND PAJARITO BOOSTER STATION 3 ELECTRICAL

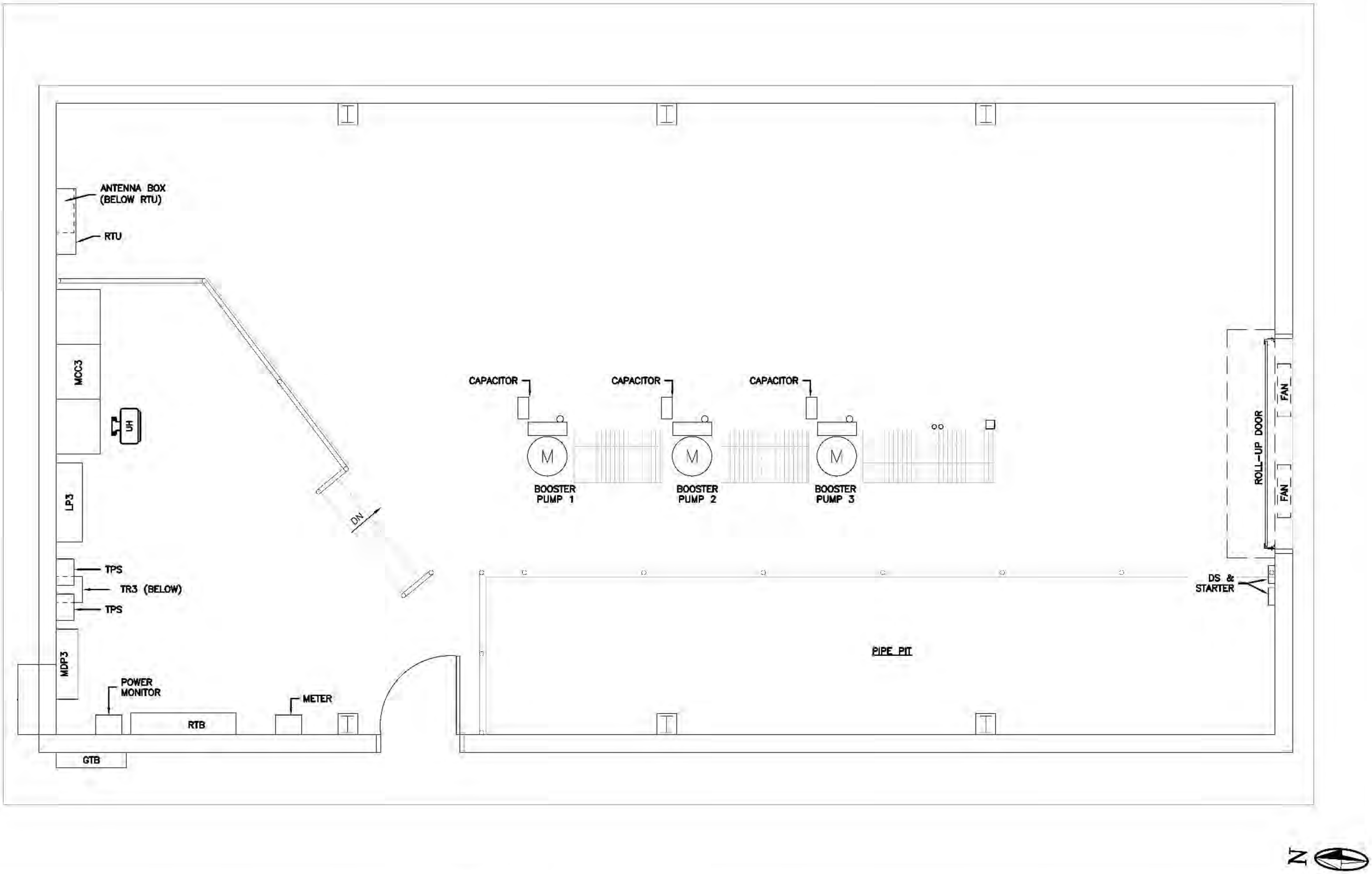
ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

PAJARITO BOOSTER NO.3
Mechanical Plan

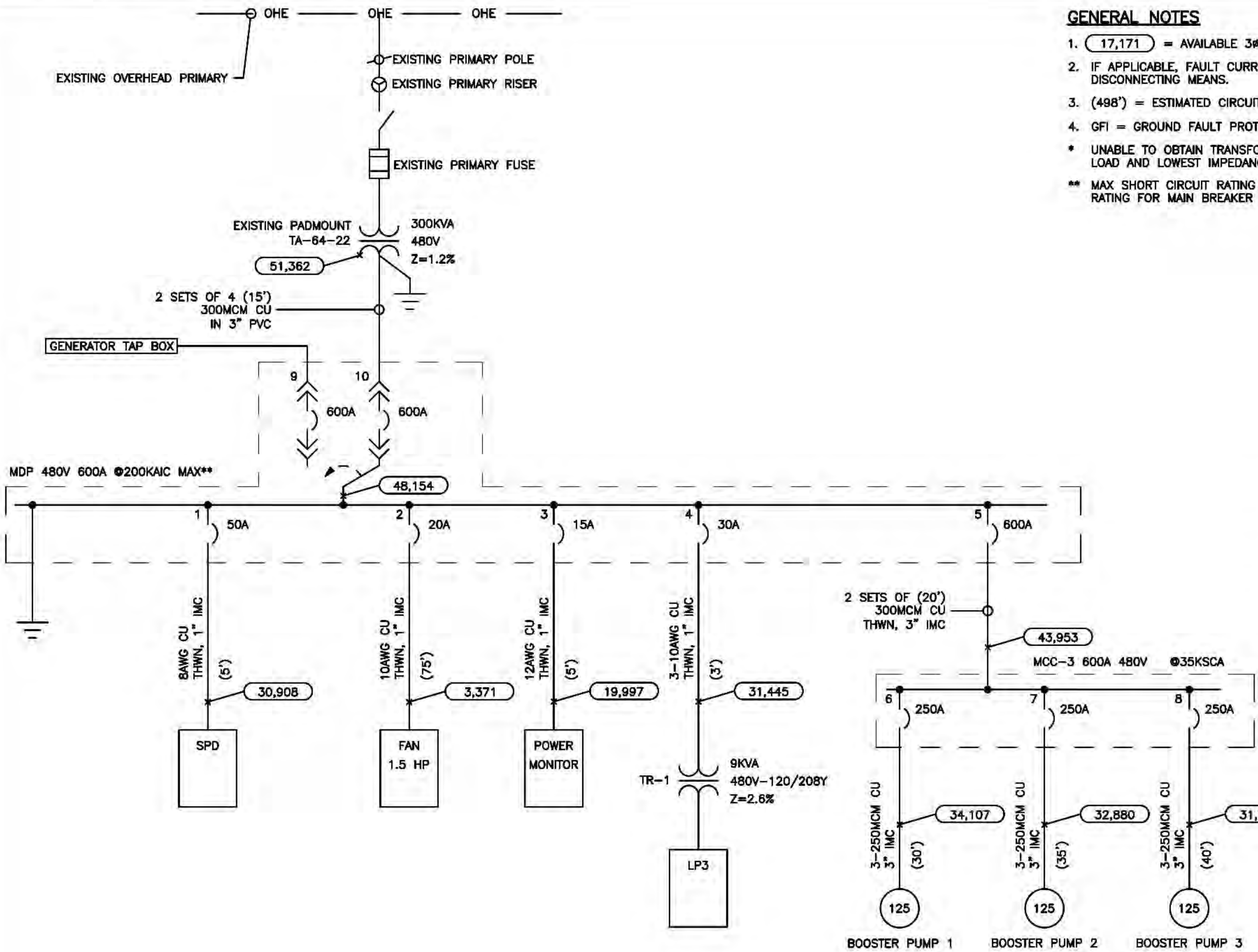


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

PAJARITO BOOSTER STATION 3
ELECTRICAL PLAN

LAST MODIFIED: Jun 10, 2021 - 5:00pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\PAJARITO BS 3\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (17,171) = AVAILABLE 3Ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (498') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* UNABLE TO OBTAIN TRANSFORMER DATA FROM LANL, USING CALCULATED LOAD AND LOWEST IMPEDANCE.

** MAX SHORT CIRCUIT RATING FOR THIS PANEL IS 200KAIC. NOTE THAT AIC RATING FOR MAIN BREAKER IS 35KSCA.

1) SIEMENS NGB3B050
AIC RATING: 25KA
2) SIEMENS NGB3B020
AIC RATING: 25A
3) SIEMENS NGB3B015
AIC RATING: 25KA
4) SIEMENS NGB3B030
AIC RATING: 25KA
5) SIEMENS LXD63B600
AIC RATING: 35KA
6) ALLEN BRADLEY 140U-JD6
AIC RATING: 65KA
TRIP SETTING: 2.5KA
7) ALLEN BRADLEY 140U-JD6
AIC RATING: 65KA
TRIP SETTING: 2.5KA
8) ALLEN BRADLEY 140U-JD6
AIC RATING: 65KA
TRIP SETTING: 2.5KA
9) SIEMENS LXD63B600
AIC RATING: 35KA
10) SIEMENS LXD63B600
AIC RATING: 35KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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PAJARITO BOOSTER STATION 3
ELECTRICAL ONE-LINE DIAGRAM

3.4 Guaje Booster Station 1

Guaje Booster Station 1 (GB1) was placed into service in 1980. An improvement project was completed in 2005. GB1 consists of three (3) 150 HP pumps, each with a rated capacity of 1,100 gpm. GB1 transfers water from Guaje Tank 1 to Guaje Tank 2.

3.4.1 Observations

The system has been reported to be in good operational condition. The pump control valve for Pump 3 has a slight leak that is not presently causing operational issues but requires addressing.

- Service Transformer: 500kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (150HP, 480V) x 3.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - The reduced voltage delta-wye (RVDY) starter is approaching life expectancy (16 years).
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - The existing pump control valve body and piloting system are operational but show signs of leaking on Pump 3.
  - 10" Pump 1 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt 2015.
  - 10" Pump 2 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt Never.
  - 10" Pump 3 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt 2017.
  - 4" Pressure Relief Valve – Cla-Val / Model Number = 4-CO8-9-A-DLE-C / 1950 / Condition = UNKNOWN / Last Rebuilt Never.

3.4.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.
  - Replace conductors from MCC to the service transformer.

- Electrical Equipment:
    - No other improvements recommended at this time.

- SCADA:
    - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
    - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
    - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
    - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve (PRV)) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
    - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
    - Add the pump control valve and PRV to a long-term maintenance program.
    - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
- Instrumentation:
    - Install a new 16” flow meter.
    - Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 103,158
Rebuilding all hydraulic control valve	$ 25,704
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 15,000
New 16" flow meter on intake main line	$ 50,000
Subtotal (Exclusive of NMGRT)	**$ 197,862**

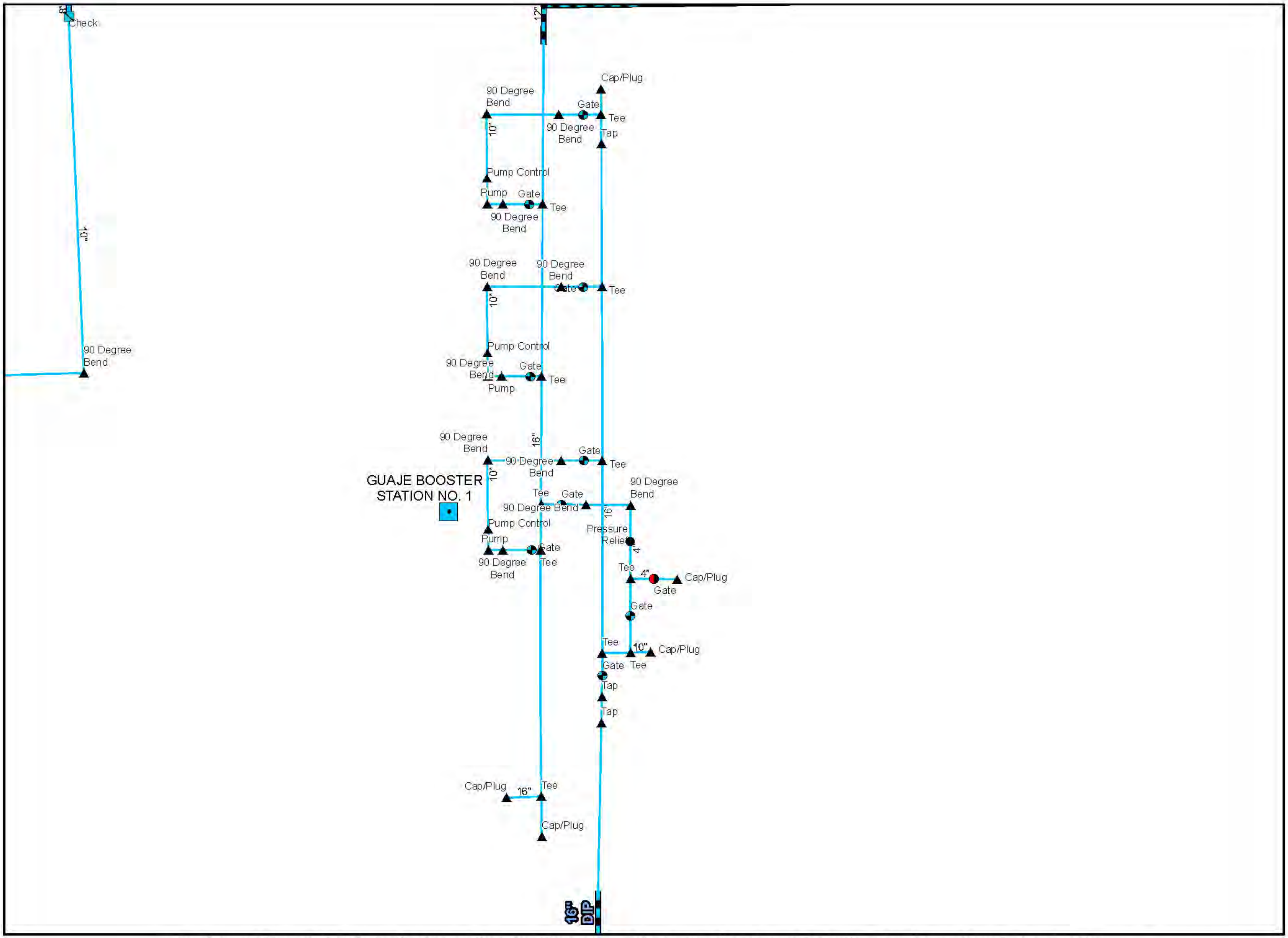
EXHIBIT 3.4 – GUAJE BOOSTER STATION 1:

GUAJE BOOSTER NO. 1 MECHANICAL PLAN,

GUAJE BOOSTER STATION 1 ELECTRICAL PLAN, AND

GUAJE BOOSTER STATION 1 ELECTRICAL ONE-LINE

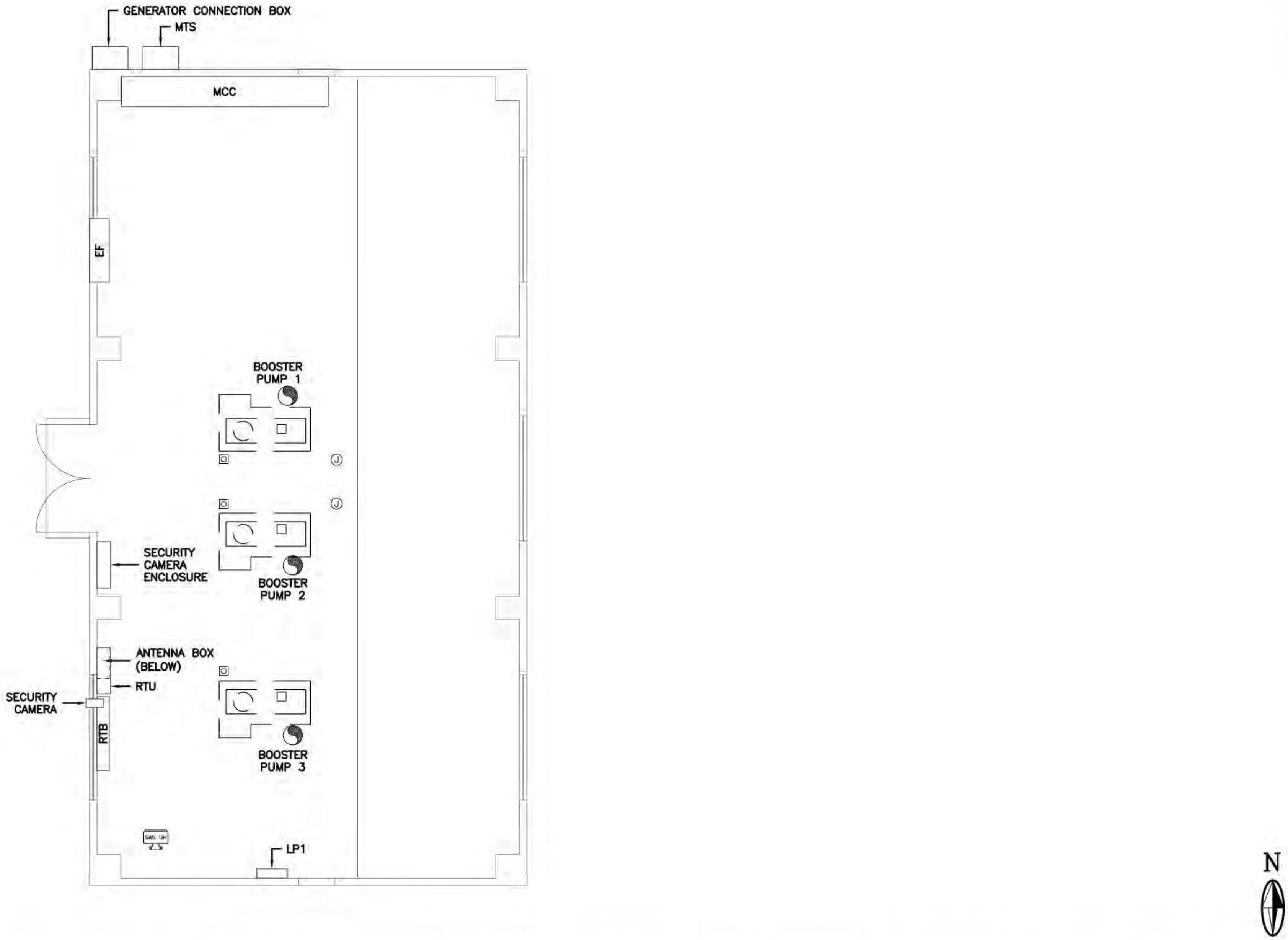
DIAGRAM



GUAJE BOOSTER NO.1
Mechanical Plan

LAC/DPU/GWS/GIS

LAST MODIFIED: Jun 16, 2021 - 2:11pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\GUAJE BS 1\
DWG. NAME: ELAC-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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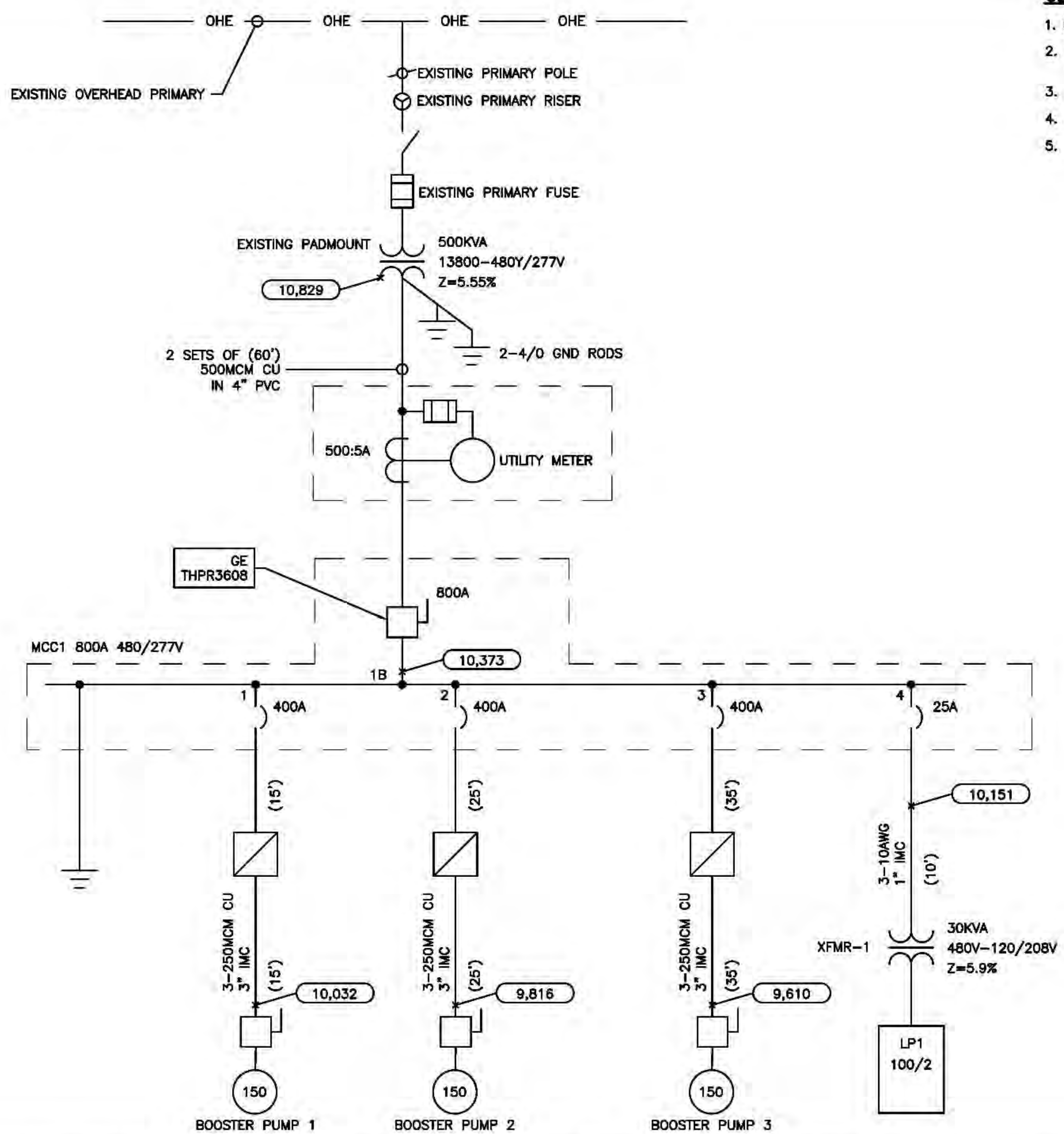
GUAJE BOOSTER STATION 1
ELECTRICAL PLAN



GENERAL NOTES

1. (10,829) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (135') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

1) GE SPECTRA RMS SGLA36A10400
2) GE SPECTRA RMS SGLA36A10400
3) GE SPECTRA RMS SGLA36A10400
4) TRI-ONIC 45A TRS45R

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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GUAJE BOOSTER STATION 1
ELECTRICAL ONE-LINE DIAGRAM

3.5 Guaje Booster Station 2

Guaje Booster Station 2 (GB2) was placed into service in 1980. An improvement project was completed in 2005. GB1 consists of three (3) 150 HP pumps, each with a rated capacity of 1,100 gpm. GB2 transfers water from Guaje Tank 2 to Guaje Tank 3. GB2 also houses the MicroClor® system for the Guaje Well Fields.

3.5.1 Observations

The system has been reported to be in good operational condition. The pump control valve for Pump 1 has a slight leak that is not presently causing operational issues but requires addressing.

- Service Transformer: 500 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (150 HP, 480V) x 3.
  - Motors are beyond their life expectancy.
  - Motor feed conductors are undersized (1/0). This size of cable is rated for 150A and the motor nameplate is rated for 175A.

- Motor Control Center (MCC):
  - Reduced voltage delta-wye (RVDY) starter is approaching life expectancy (16 years).
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V.
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - The existing pump control valve body and piloting system are operational but show signs of leaking on Pump 1.
  - 10" Pump 1 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt 2019.
  - 10" Pump 2 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt 2009.
  - 10" Pump 3 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1950 / Condition = GOOD / Last Rebuilt 2019.
  - 4" Pressure Relief Valve – Cla-Val / Model Number = 4-CO8-9-A-DLE-C / 1950 / Condition = UNKNOWN / Last Rebuilt Never.

- Instrumentation:
  - 16" flow meter – Sparling / Propeller Insert/ Serial Number = 135246 / 1950 / Condition = GOOD.

3.5.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace and upsize conductors to the motor (assumed 4/0).
  - Replace conductors from MCC to the service transformer.

- Electrical Equipment:
  - No other improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.

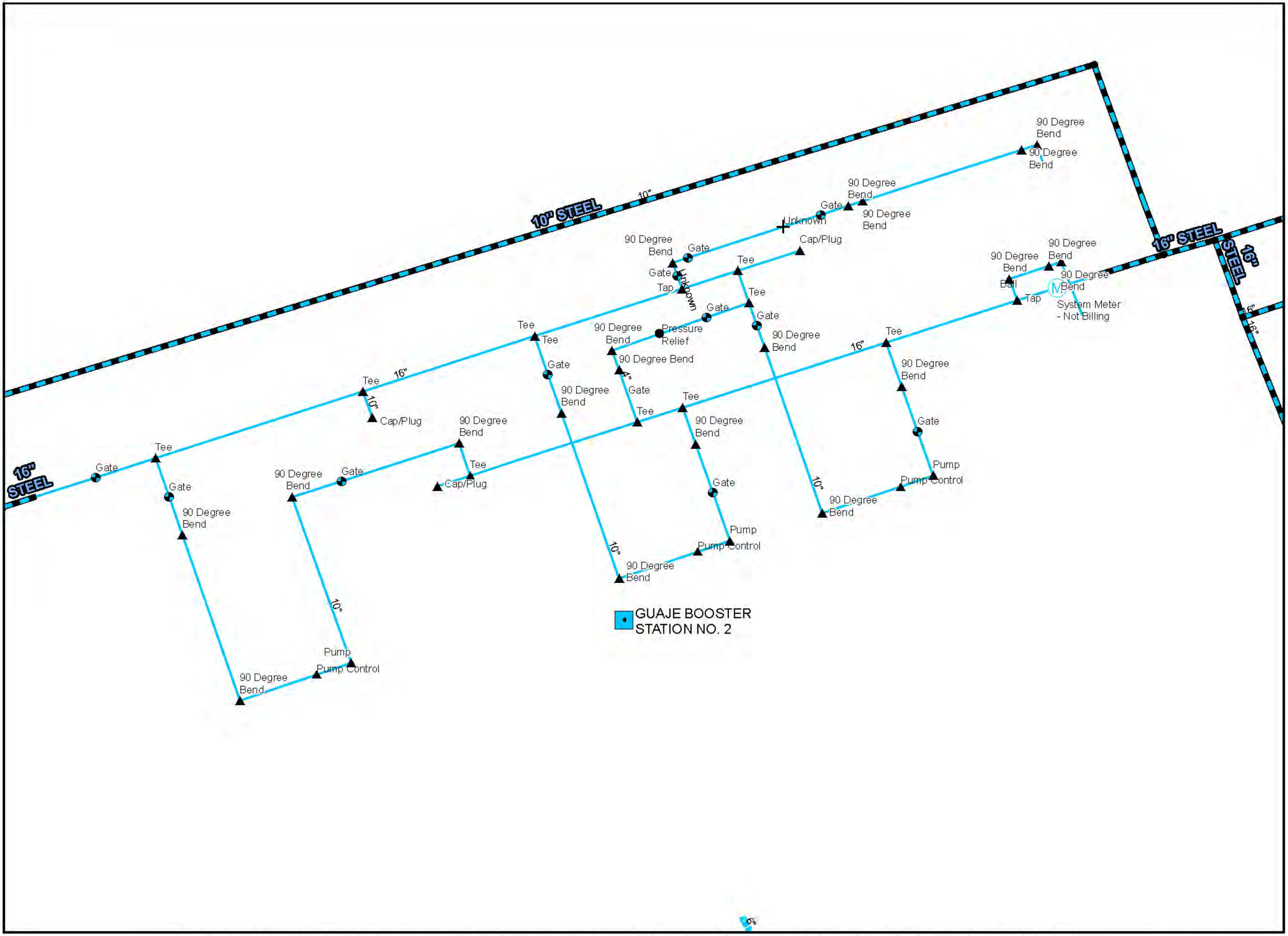
- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 96,030
Rebuilding all hydraulic control valve	$ 25,704
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 15,000
Subtotal (Exclusive of NMGRT)	**$ 140,734**

EXHIBIT 3.5 – GUAJE BOOSTER STATION 2:

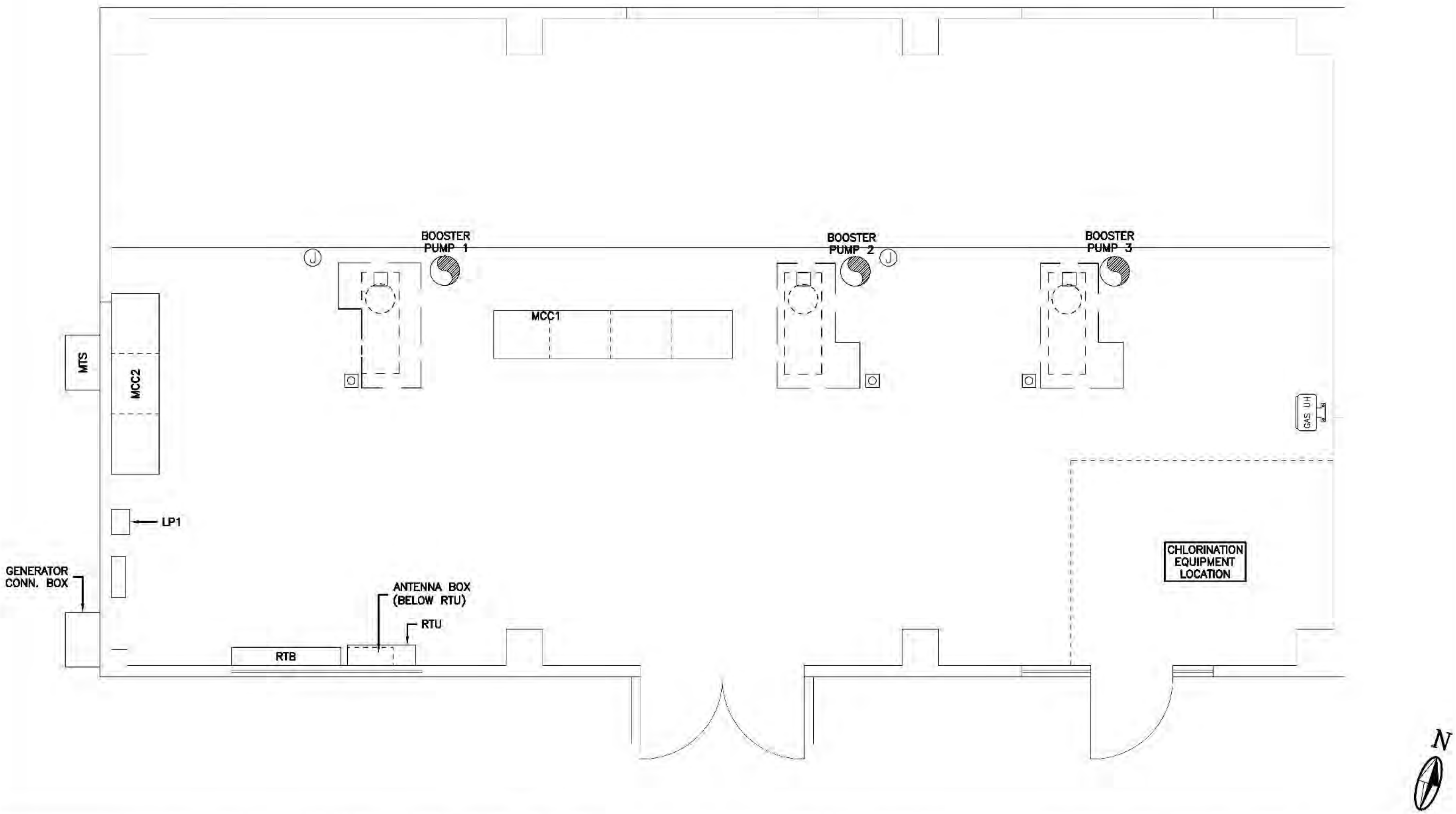
GUAJE BOOSTER NO. 2 MECHANICAL PLAN, GUAJE BOOSTER STATION 2 ELECTRICAL PLAN, AND GUAJE BOOSTER STATION 2 ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

GUAJE BOOSTER NO.2
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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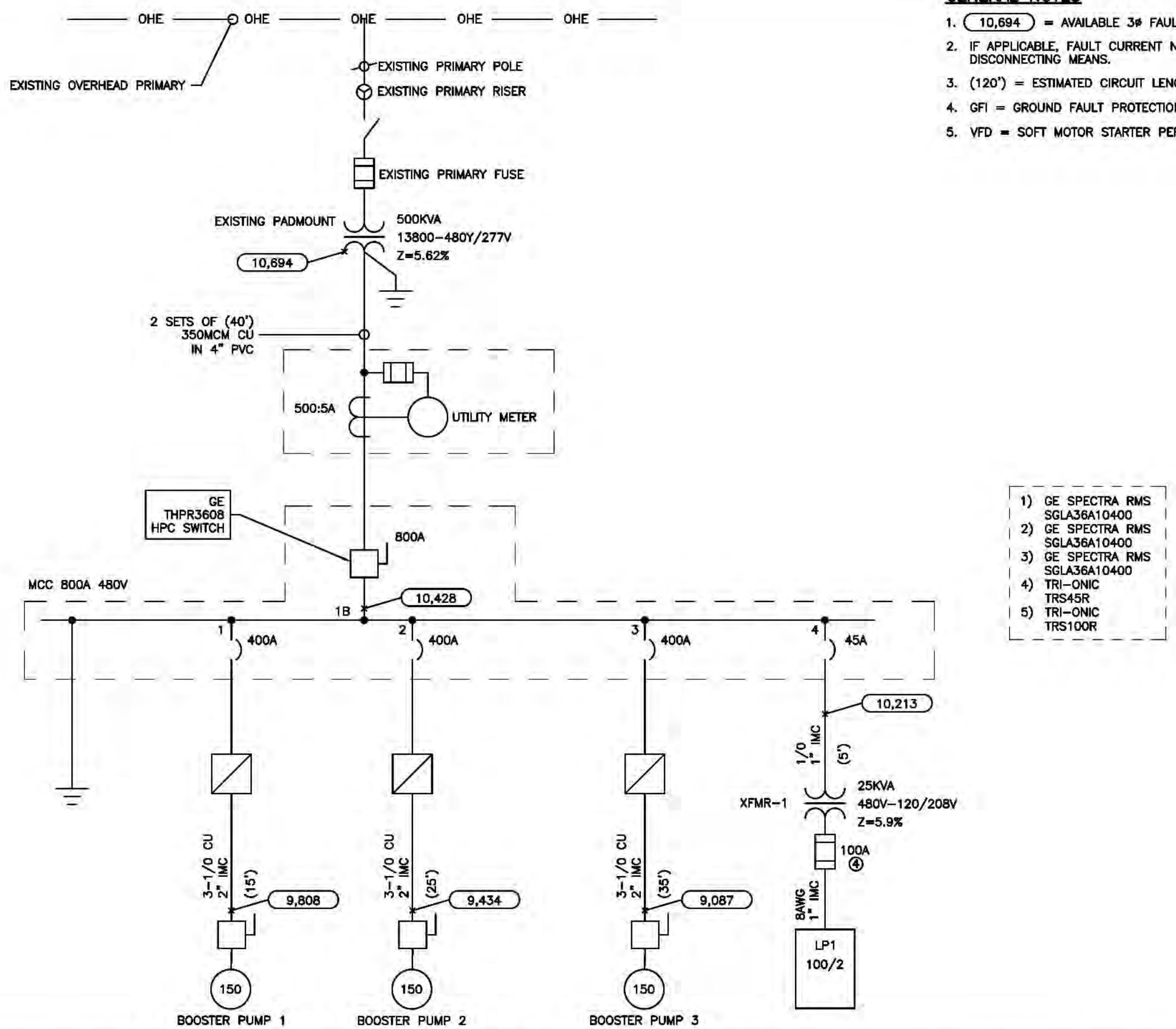
GUAJE BOOSTER STATION 2
ELECTRICAL PLAN



GENERAL NOTES

1. (10,694) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (120') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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GUAJE BOOSTER STATION 2
ELECTRICAL ONE-LINE DIAGRAM

3.6 Guaje Booster Station 3

Guaje Booster Station 3 (GB3) was placed into service in 1980. An improvements project was completed in 2005. GB1 consists of three (3) 150 HP pumps, each with a rated capacity of 1,100 gpm. GB3 transfers water from Guaje Tank 3 to Twin Tanks and Sycamore Tank (both tanks are at same elevation). Within the same building is the Barranca Booster Station (refer to Section 3.10 for additional details).

3.6.1 Observations

The system has been reported to be in good operational condition. The pump control valve for Pump 1 has a slight leak that is not presently causing operational issues but requires addressing.

- Service Transformer: 500 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (150 HP, 480V) x 3.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - Reduced voltage delta-wye (RVDY) starter is approaching life expectancy (16 years).
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - The existing pump control valve body and piloting system are operational but show signs of leaking on Pump 1.
  - 10” Pump 1 Control Valve - Cla-Val / Model Number = 10-60P-60581-KF / 1950 / Condition = GOOD / Last Rebuilt 2015.
  - 10” Pump 2 Control Valve - Cla-Val / Model Number = 10-60P-60581-KF / 1950 / Condition = GOOD / Last Rebuilt Never.
  - 10” Pump 3 Control Valve - Cla-Val / Model Number = 10-60P-60581-KF / 1950 / Condition = GOOD / Last Rebuilt 2018.
  - 4” Pressure Relief Valve - Cla-Val / Model Number = 4-CO8-9-A-DLE-C / 1950 / Condition = UNKNOWN / Last Rebuilt Never.

- Instrumentation:
  - 16” flow meter - Sparling / Propeller Insert / Serial Number = F-2425 / 1950 / Condition = GOOD.

3.6.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.
  - Replace conductors from MCC to the service transformer.

- Electrical Equipment:
  - No other improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e. rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.

- Relocate the existing flow meter pass tee serving Garranca Booster Station 2 to only meter GB 3.

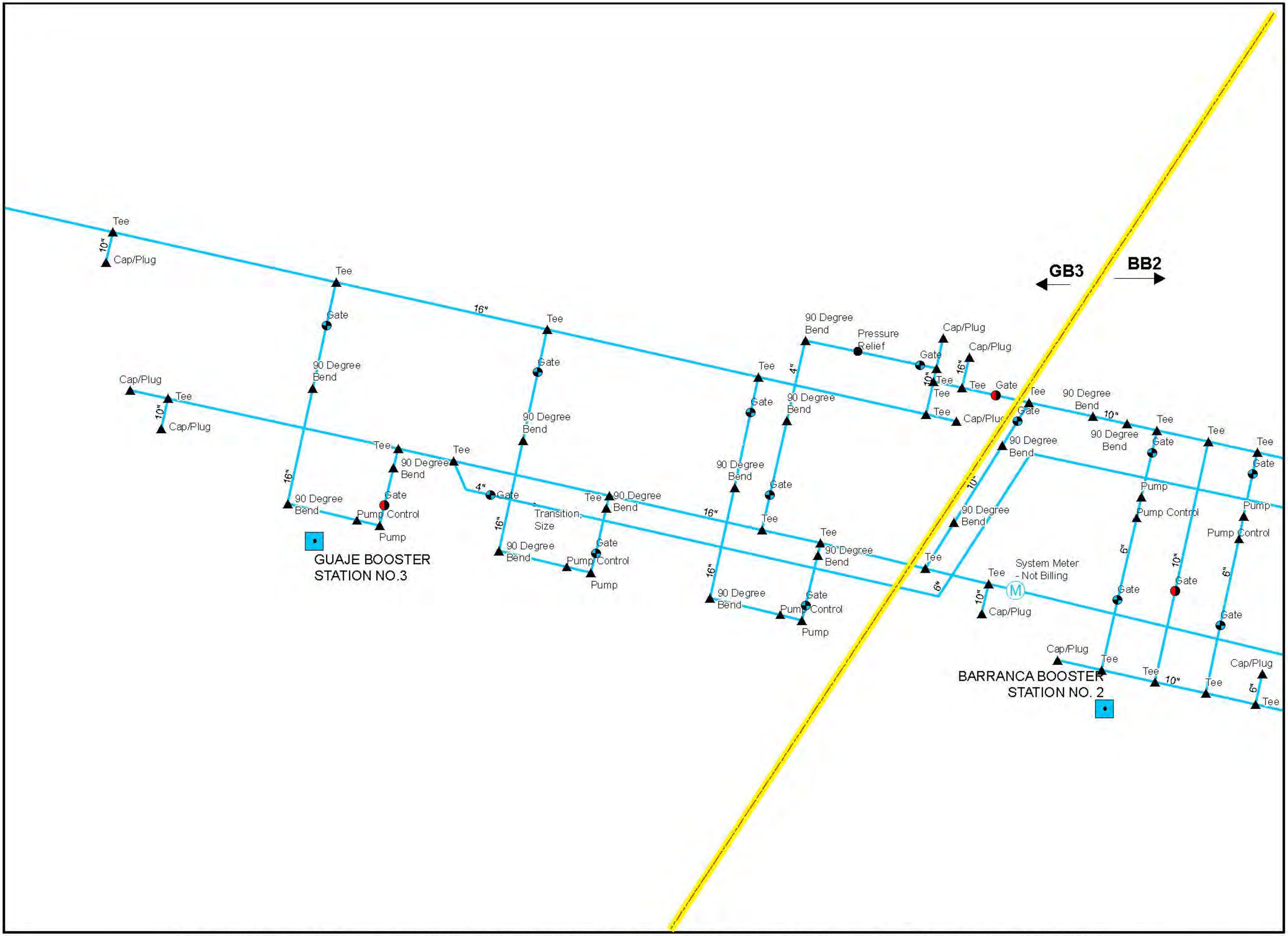
- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 135,630
Rebuilding all hydraulic control valve	$ 25,704
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 7,500
Relocate Existing meter past tee serving Barranca Booster Station 2	$ 25,000
Subtotal (Exclusive of NMGRT)	**$ 197,834**

EXHIBIT 3.6 – GUAJE BOOSTER STATION 3:

GUAJE BOOSTER NO. 3 MECHANICAL PLAN, GUAJE BOOSTER STATION 3 ELECTRICAL PLAN, AND GUAJE BOOSTER STATION 3 ELECTRICAL ONE-LINE DIAGRAM

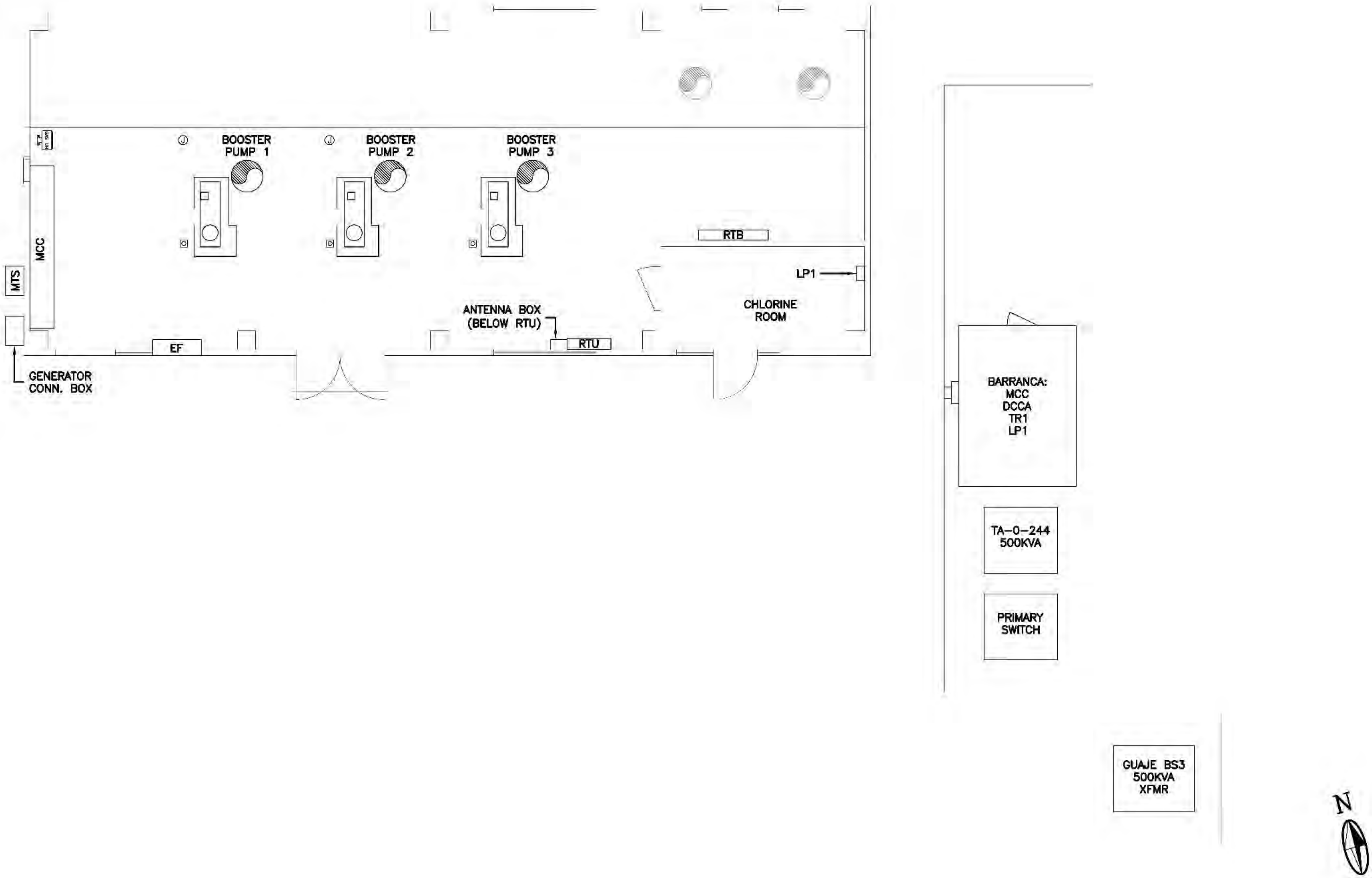


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

Guaje Booster No.3
Mechanical Plan

LAST MODIFIED: Jun 25, 2021 - 9:08am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\05-GUAJE BS 3\
DWG. NAME: ELAC-05-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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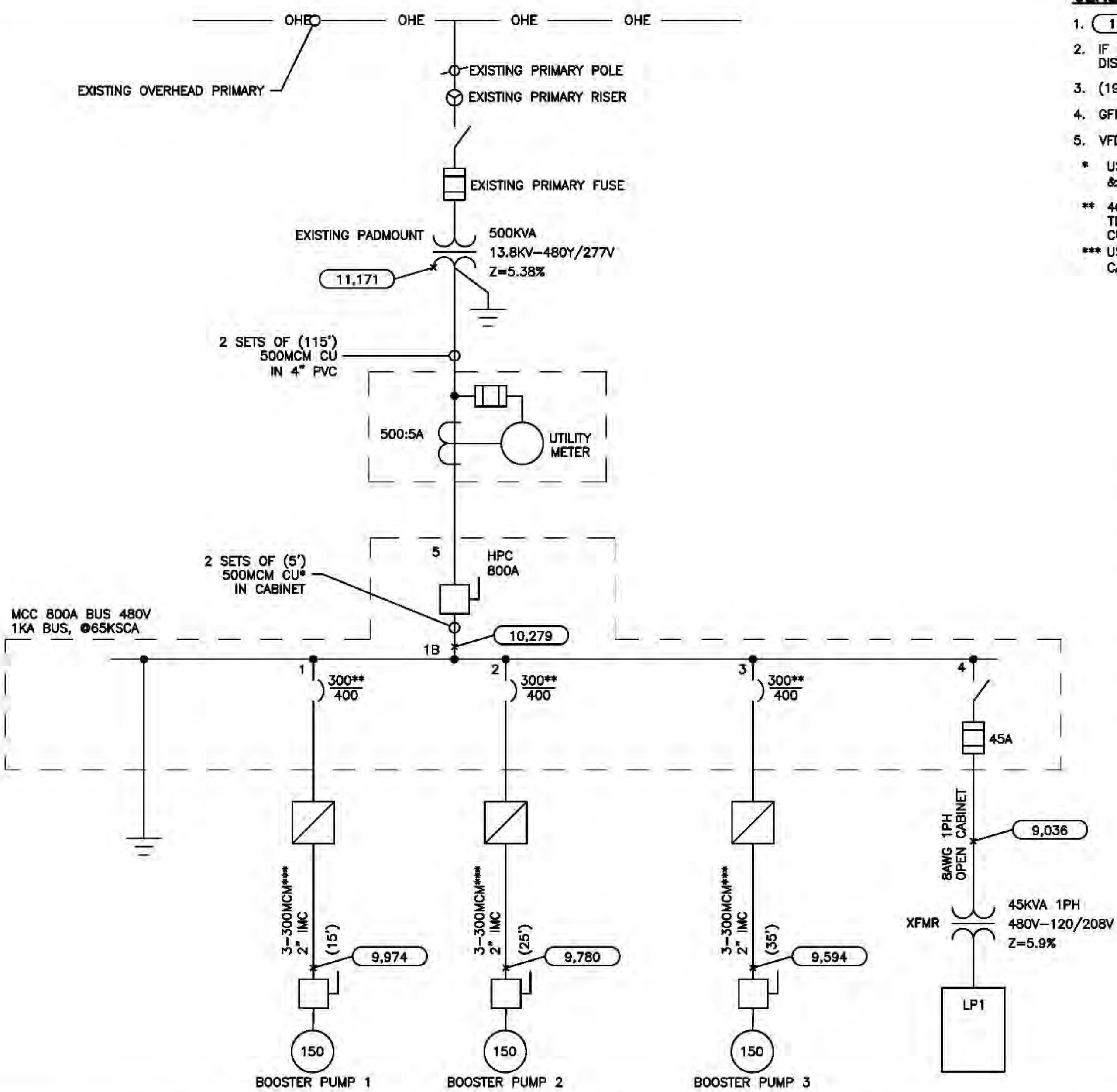
GUAJE BOOSTER STATION 3
ELECTRICAL PLAN



GENERAL NOTES

1. (11,171) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (190') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

* USING APPROPRIATE CONDUCTOR SIZE (2 SETS OF 500MCM) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (2 OF 350MCM).

** 400A IS THE MAX CONTINUOUS CURRENT RATING FOR THIS BREAKER. THERE IS A 300A RATING PLUG USED IN THIS BREAKER TO LIMIT THE CURRENT.

*** USING APPROPRIATE CONDUCTOR SIZE (300MCM) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (4/0).

1) GE SPECTRA RMS
SGLA36A10400
AIC RATING: 65KA
RATING PLUG: SRPG400A300
INSTANTANEOUS TRIP SET TO 3.06KA
2) GE SPECTRA RMS
SGLA36A10400
AIC RATING: 65KA
RATING PLUG: SRPG400A300
INSTANTANEOUS TRIP SET TO 3.06KA
3) GE SPECTRA RMS
SGLA36A10400
AIC RATING: 65KA
RATING PLUG: SRPG400A300
INSTANTANEOUS TRIP SET TO 3.06KA
4) FUSED DISCONNECT
TRI-ONIC TRS45R
AIC RATING: 200KA
5) GE HPC SWITCH
THPR3608
AIC RATING: 200KA

GUAJE BOOSTER STATION 3
ELECTRICAL ONE-LINE DIAGRAM

3.7 Guaje Filter Booster Station

Guaje Filter Booster Station (GFB) was placed into service in 1981. GFB consists of two (2) 125 HP pumps, each with a rated capacity of 1,100 gpm. GFB transfers water from Twin Tanks and Sycamore Tank (both tanks are at same elevation) to Arizona Tank.

3.7.1 Observations

The system has been reported to be in good operational condition. The pump control valve for Pump 1 has a slight leak that is not presently causing operational issues but requires addressing.

- Service Transformer: 300 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (125 HP, 480V) x 2.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - MCC is mounted outside and is clean and well maintained.
  - The reduced voltage delta-wye (RVDY) starter is beyond life expectancy.
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
    - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
    - 8” Pump 1 Control Valve / Cla-Val / Model Number = 10-60P-30762-EA / 1950 / Condition = GOOD / Last Rebuilt Never.
    - 8” Pump 2 Control Valve / Cla-Val / Model Number = 10-60P-30762-EA / 1950 / Condition = GOOD / Rebuilt 2016.

- Instrumentation:
    - 10” flow meter – Sparling / Propeller Insert / Serial Number = F-2788 / 1950 / Condition = GOOD.

3.7.2 Recommendations

- Transformer:
    - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor:
    - For recommendations, refer to Section 4.0 Motor Inspection.
    - Motor 1 rebuilt in 2021.

- MCC:
    - Leave outside as is.
    - RVDYs can stay abandoned in place and would be available as spares.
    - Install new service conductors.

- RVDY:
  - Install new Reduced Voltage Soft Starter (RVSS) in the process room and feed from the MCC.
  - Install new conduit and conductors to the motors.

- Electrical Equipment:
  - No other improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.

- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 89,694
Rebuilding all hydraulic control valve	$ 17,136
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 7,500
Subtotal (Exclusive of NMGRT)	**$ 118,330**

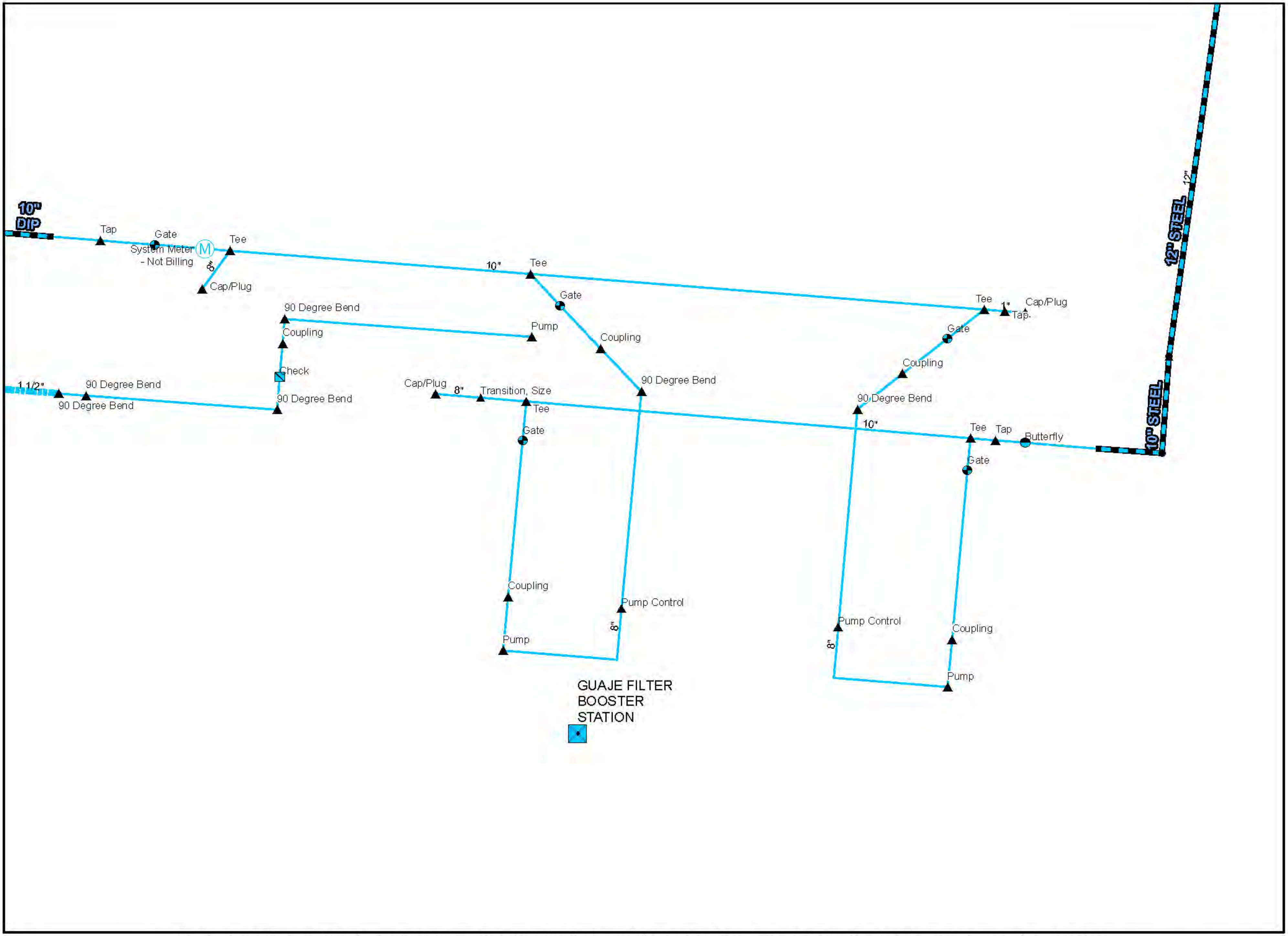
EXHIBIT 3.7 – GUAJE FILTER BOOSTER STATION:

GUAJE FILTER BOOSTER MECHANICAL PLAN,

GUAJE FILTER BOOSTER STATION ELECTRICAL PLAN,

AND GUAJE FILTER BOOSTER STATION ELECTRICAL

ONE-LINE DIAGRAM

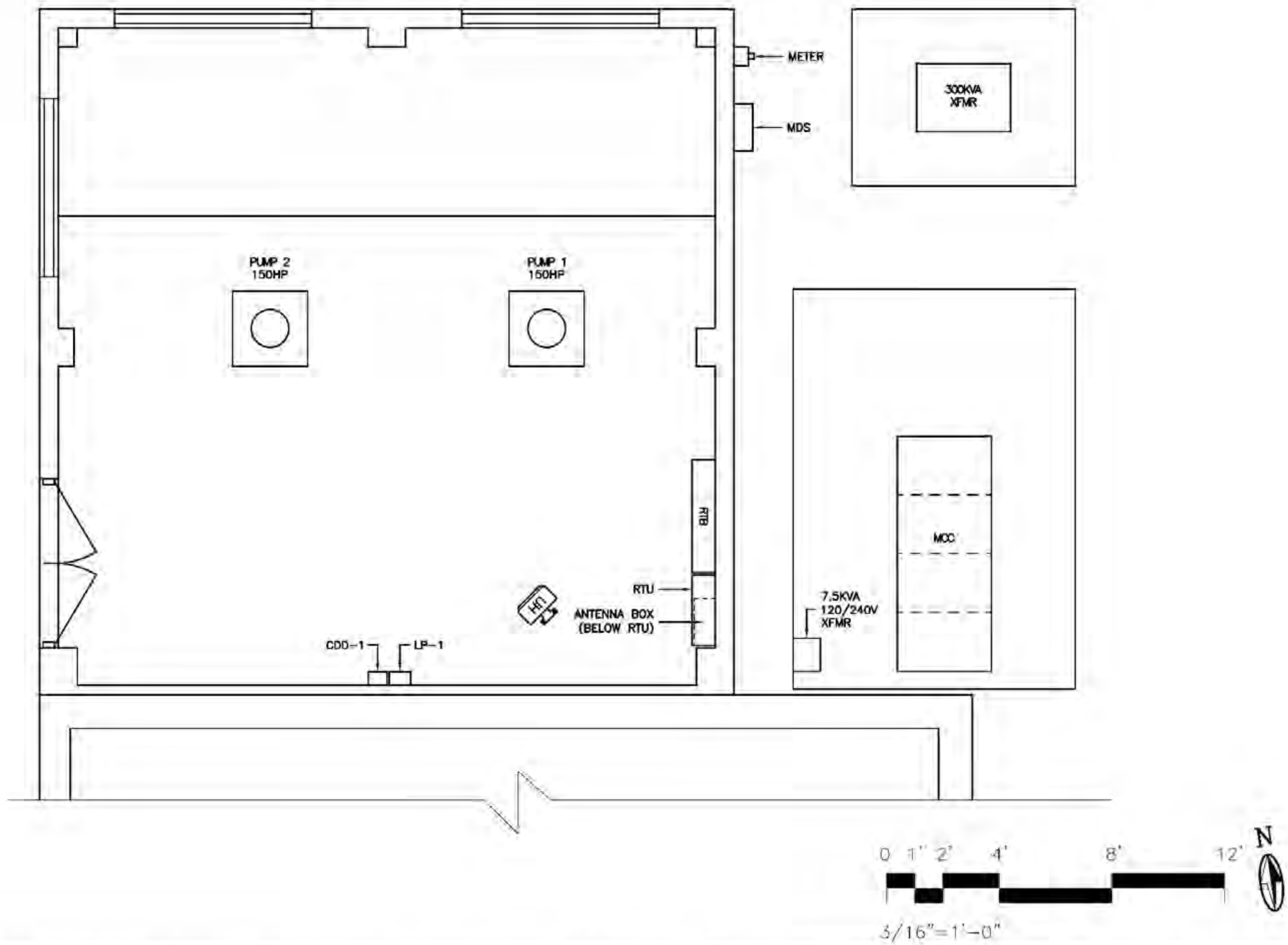


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

GUAJE FILTER BOOSTER
Mechanical Plan

LAST MODIFIED: Feb 22, 2022 - 2:54pm BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\06-GUAJE FILLTER BS\
DWG. NAME: ELAC-06-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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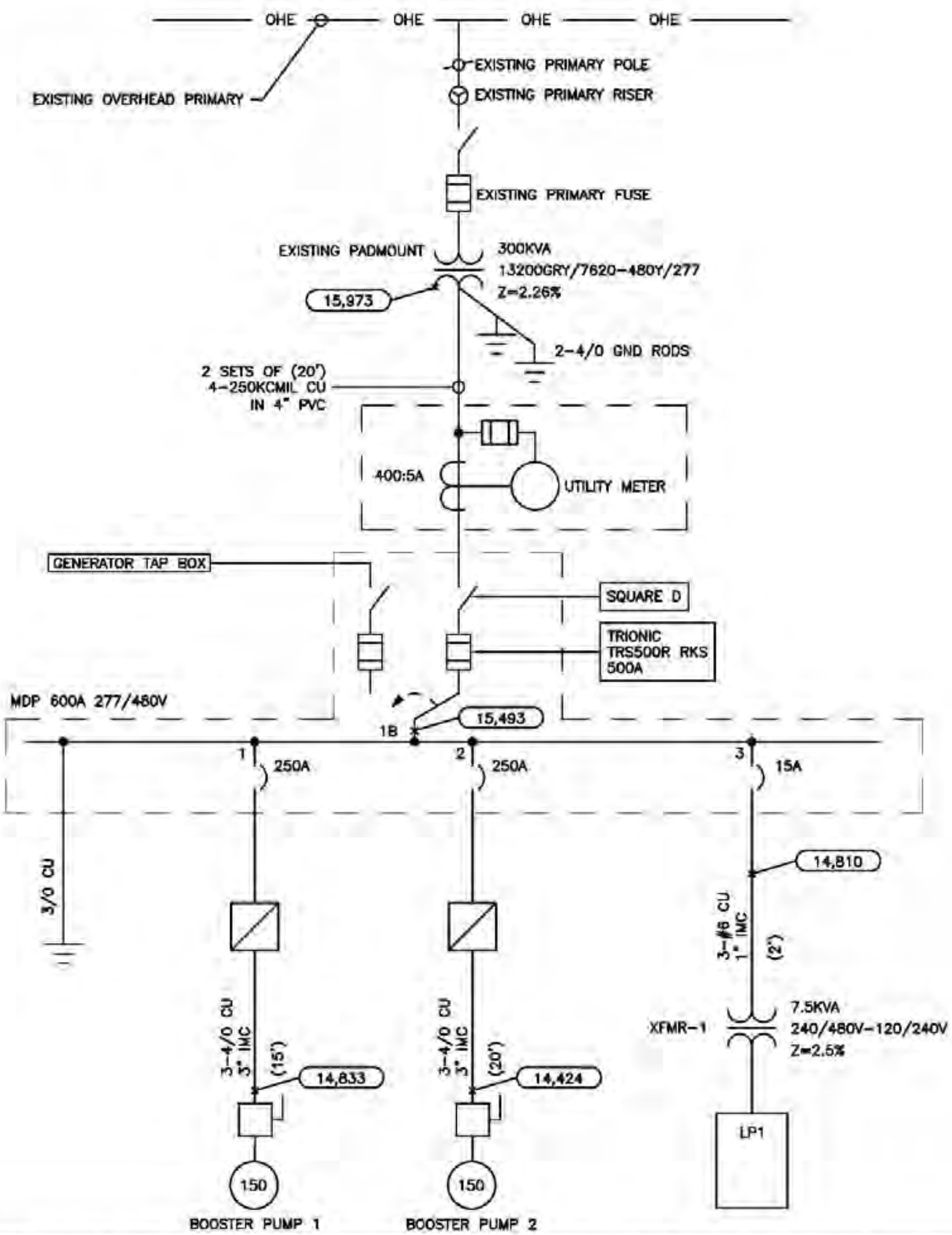
GUAJE FILTER BOOSTER STATION
ELECTRICAL PLAN



GENERAL NOTES

1. (15,973) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (60') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

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GUAJE FILTER BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

3.8 Otowi Booster Station 2

Otowi Booster Station 2 (OB2) was placed into service in 1981. An improvement project was completed in 2006. OB2 consists of three (3) 150 HP pumps, each with a rated capacity of 1,000 gpm. OB2 transfers water from Otowi Tank 2 to Twin Tanks and Sycamore Tank (both tanks are at same elevation).

3.8.1 Observations

The system has been reported to be in good operational condition.

- Service Transformer: 500 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (150 HP, 480V) x 3.
  - Motors 1 and 3 are beyond their life expectancy.
  - Pump motor 2 was rewound in 2018.

- Motor Control Center (MCC):
  - MCC has been in service for 15-years and is in good operational condition.
  - Starters are Reduced Voltage Auto-Transformer (RVAT).

- Lighting Panel: 120/208V.
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - 10” Pump 1 Control Valve / Cla-Val / Model Number = 10-60P-60581-LA / 1947 / Condition = FAIR / Last Rebuilt 2020.
  - 10” Pump 2 Control Valve / Cla-Val / Model Number = 10-60P-60581-LA / 1947 / Condition = FAIR / Last Rebuilt Never.
  - 10” Pump 3 Control Valve / Cla-Val / Model Number = 10-60P-60581-LA / 1947 / Condition = FAIR / Last Rebuilt UNKNOWN.
  - 4” Pressure Relief Valve / Cla-Val / Model Number = 4-50-44045-HB / 1947 / Condition = UNKNOWN / Last Rebuilt Never.

- Instrumentation:
  - 16” flow meter – Sparling / Propeller Insert / Serial Number = F-2547 / 1947 / Condition = GOOD.

3.8.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Electrical Improvements:
  - No recommended improvements at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine

the condition of the existing valve and components and what components need replacement.

- If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
- Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
- Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
- Add the pump control valve and PRV to a long-term maintenance program.
- Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
- Replumb PRV intake to serve all pump discharges and not just Pump 2.

- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Rebuilding all hydraulic control valve	$ 25,704
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 15,000
Replumb PRV intake to serve all pump discharges	$ 25,000
Subtotal (Exclusive of NMGRT)	**$ 69,704**

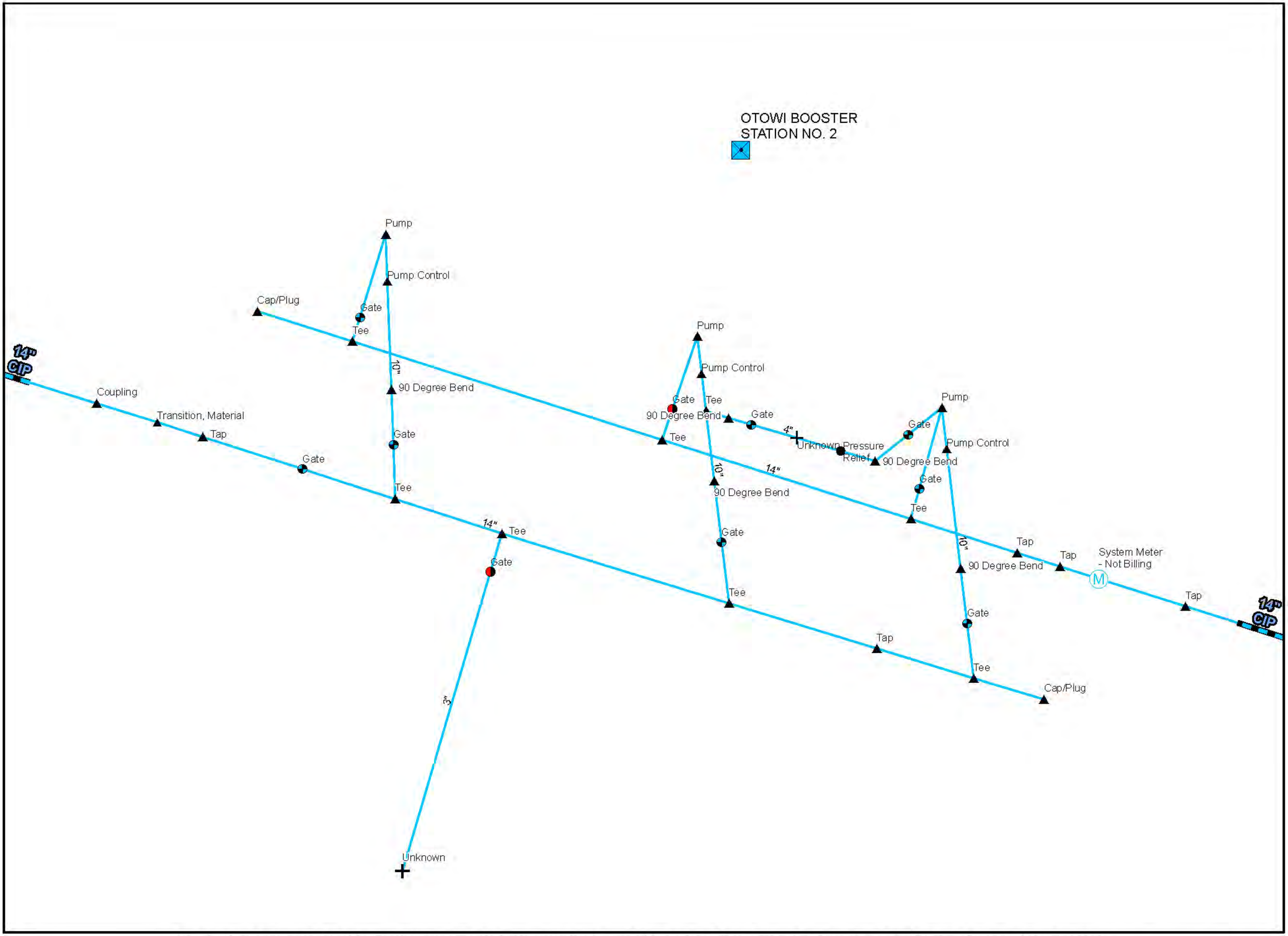
EXHIBIT 3.8 – OTOWI BOOSTER STATION 2:

OTOWI BOOSTER NO. 2 MECHANICAL PLAN,

OTOWI BOOSTER STATION 2 ELECTRICAL PLAN,

AND OTOWI BOOSTER STATION 2 ELECTRICAL

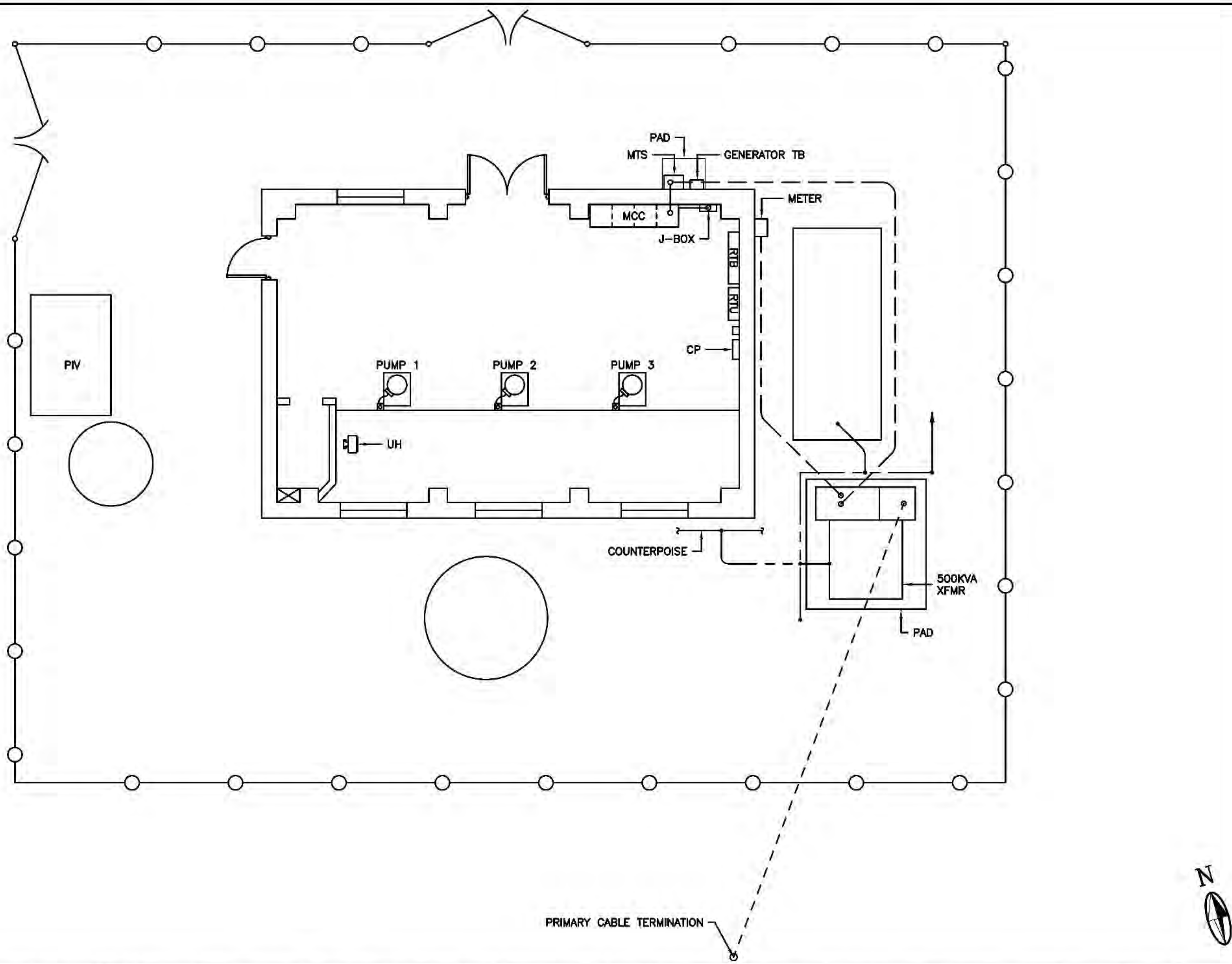
ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

OTOWI BOOSTER NO.2
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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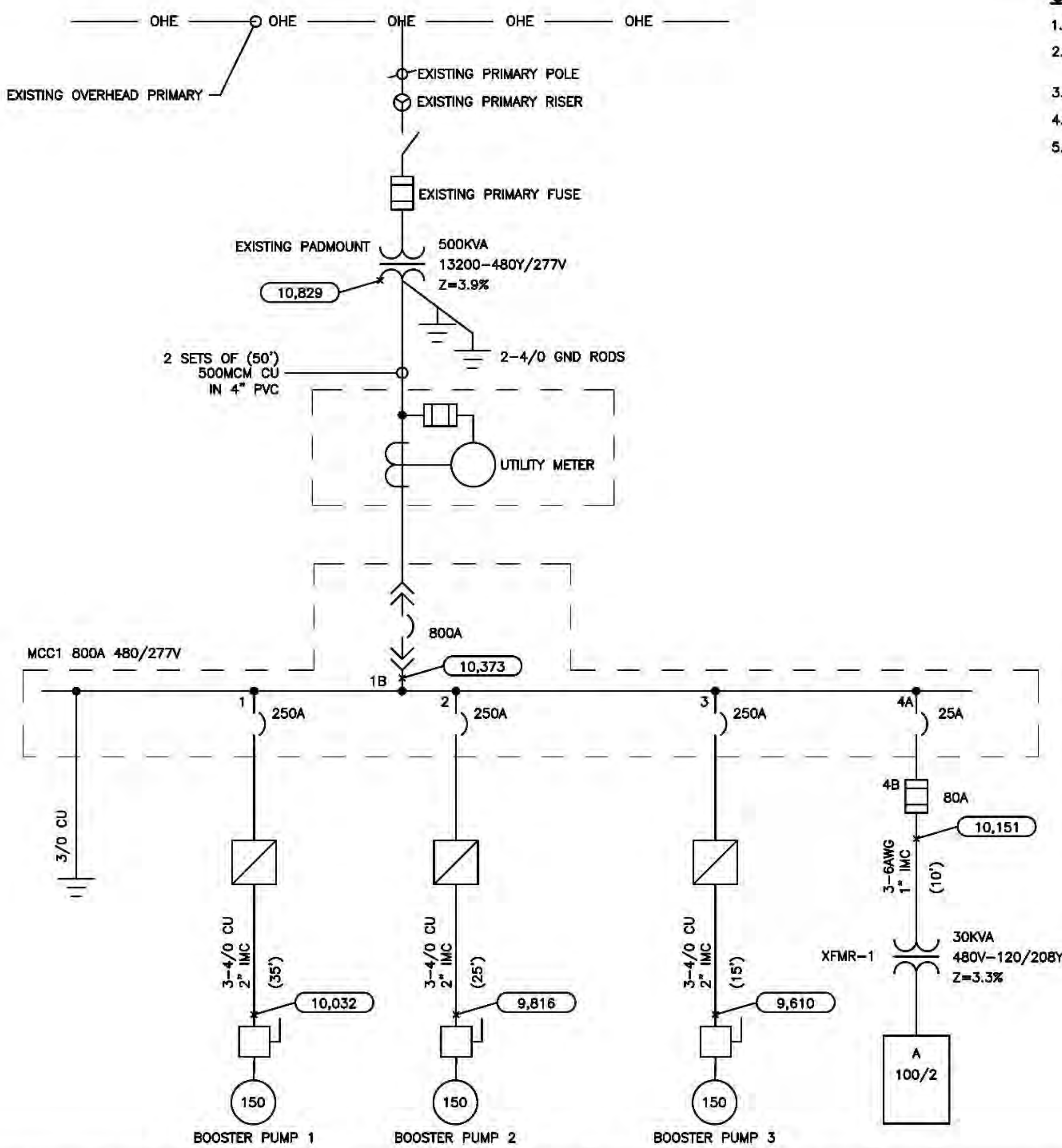
OTOWI BOOSTER STATION 2
ELECTRICAL PLAN



GENERAL NOTES

1. (10,829) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (135') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

1) CUTLER-HAMMER HJD3250F
2) CUTLER-HAMMER HJD3250F
3) CUTLER-HAMMER HJD3250F
4A) CUTLER-HAMMER HFD3025L
4B) TRI-ONIC TR80R

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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OTOWI BOOSTER STATION 2
ELECTRICAL ONE-LINE DIAGRAM

<u>3.9 North Fill Booster Station</u>

North Fill Booster Station (NFB) was placed into service in 1981. NFB consists of two (2) 100 HP pumps, each with a rated capacity of 940 gpm. NFB transfers water from Twin Tanks and Sycamore Tank (both tanks are at same elevation) to Arizona Tank.

<u>3.9.1 Observations</u>

The system has been reported to be in good operational condition.

- Valve Pit Grating:
  - Grating between the pumps is a thin perforated metal that is not securely fastened to the floor. Weight capabilities are questionable.

- Service Transformer: 150 kVA, 277/480V secondary.
  - The transformer body shows a little wear but is in good condition and operational.

- Motor: (100 HP, 480V) x 2:
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - MCC is mounted outside and is clean and well maintained.
  - The reduced voltage delta-wye (RVDY) starter is beyond life expectancy.
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - 8” Pump 1 Control Valve – Cla-Val / Model Number = 8-C-46 / 1950 / Condition = GOOD / Last Rebuilt 2019.
  - 8” Pump 2 Control Valve – Cla-Val / Model Number = 8-C-46 / 1950 / Condition = GOOD / Last Rebuilt 2010.

- Instrumentation:
  - 8” flow meter – Krohne / Mag IFS 4000 KC-6 / Serial Number = 2114-05 / 1950 / Condition = GOOD.

3.9.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Valve Pit Grating:
  - Replace with grating that is fastened to the floor and suitable to hold the weight of the motor (in the event of removal).

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- RVDY:
  - Replace starter with a Reduced Voltage Soft Starter (RVSS). Retrofit to place replacement in the same space as the existing starter.
  - Replace conductors to the motor.
  - Replace conductors from MCC to the service transformer.

- Electrical Equipment:
  - No other improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.

- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost	
Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$	89,760
Replace valve pit grating	$	16,500
Rebuilding all hydraulic control valve	$	17,136
Service transformer testing and maintenance	$	4,000
Prep, recoat and paint station valves and piping	$	7,500
Subtotal (Exclusive of NMGRT)	**$**	**134,896**

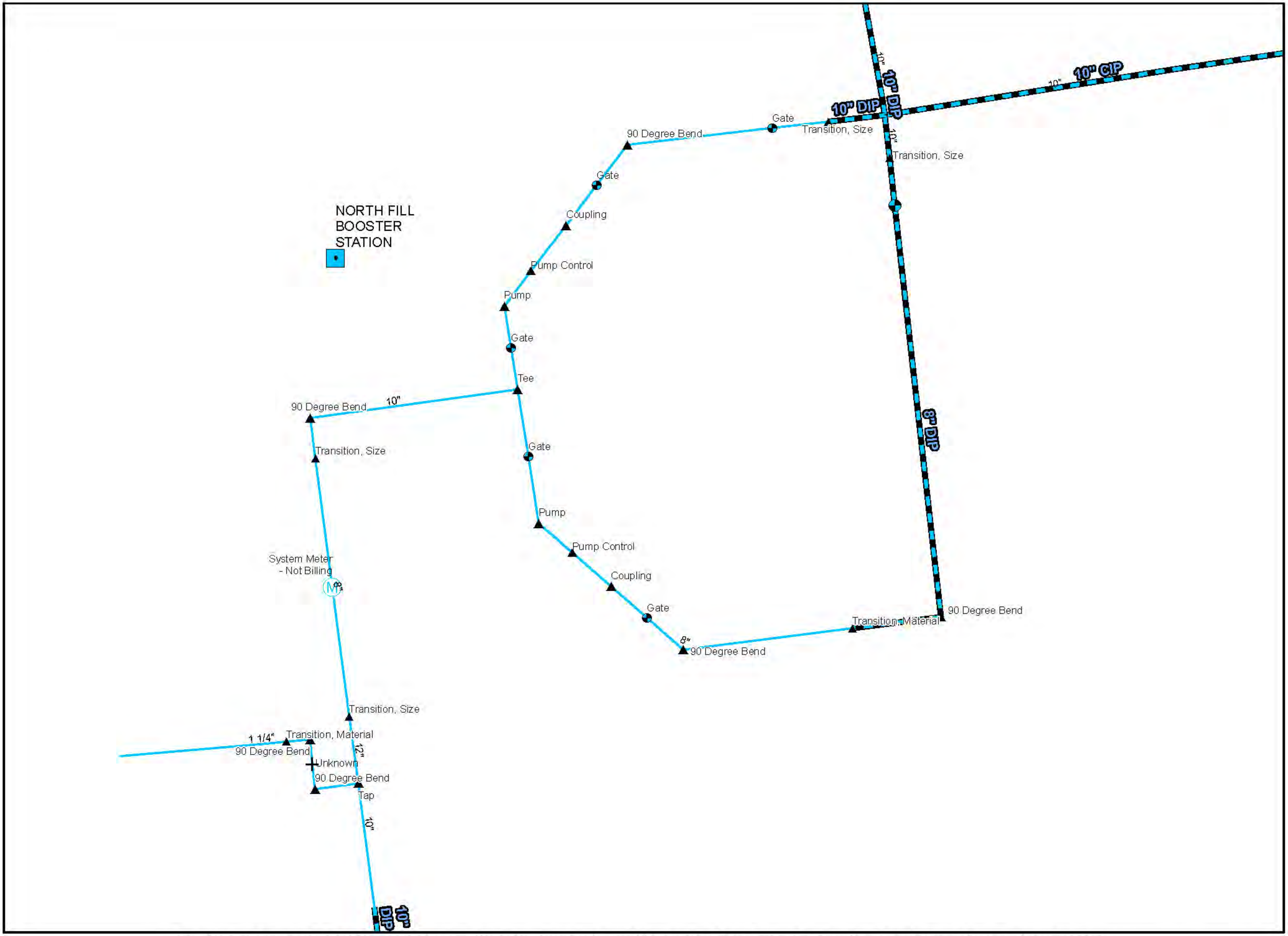
EXHIBIT 3.9 – NORTH FILL BOOSTER STATION:

NORTH FILL BOOSTER MECHANICAL PLAN,

NORTH FILL BOOSTER STATION ELECTRICAL PLAN,

AND NORTH FILL BOOSTER STATION ELECTRICAL

ONE-LINE DIAGRAM



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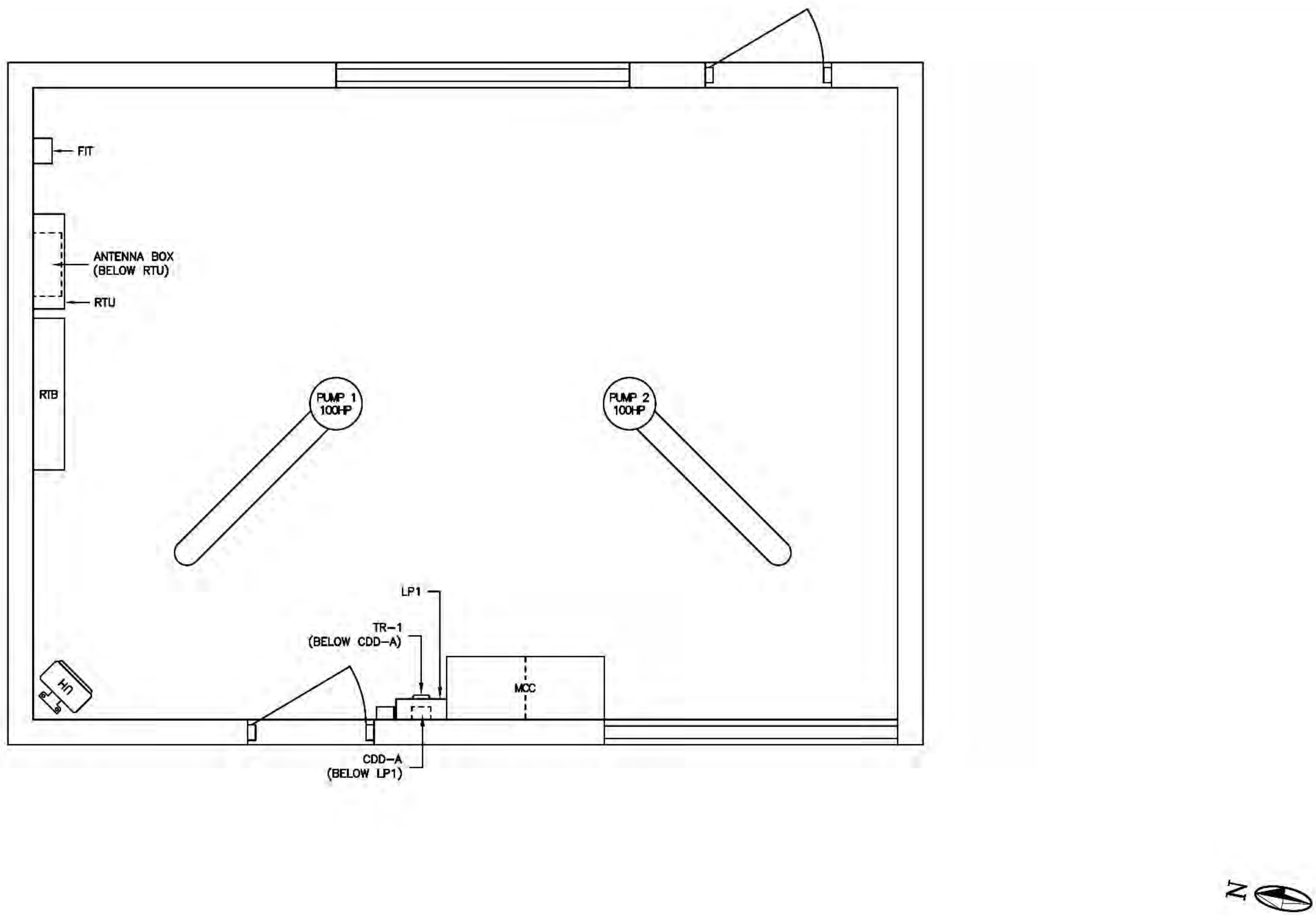
NORTH FILL BOOSTER
Mechanical Plan



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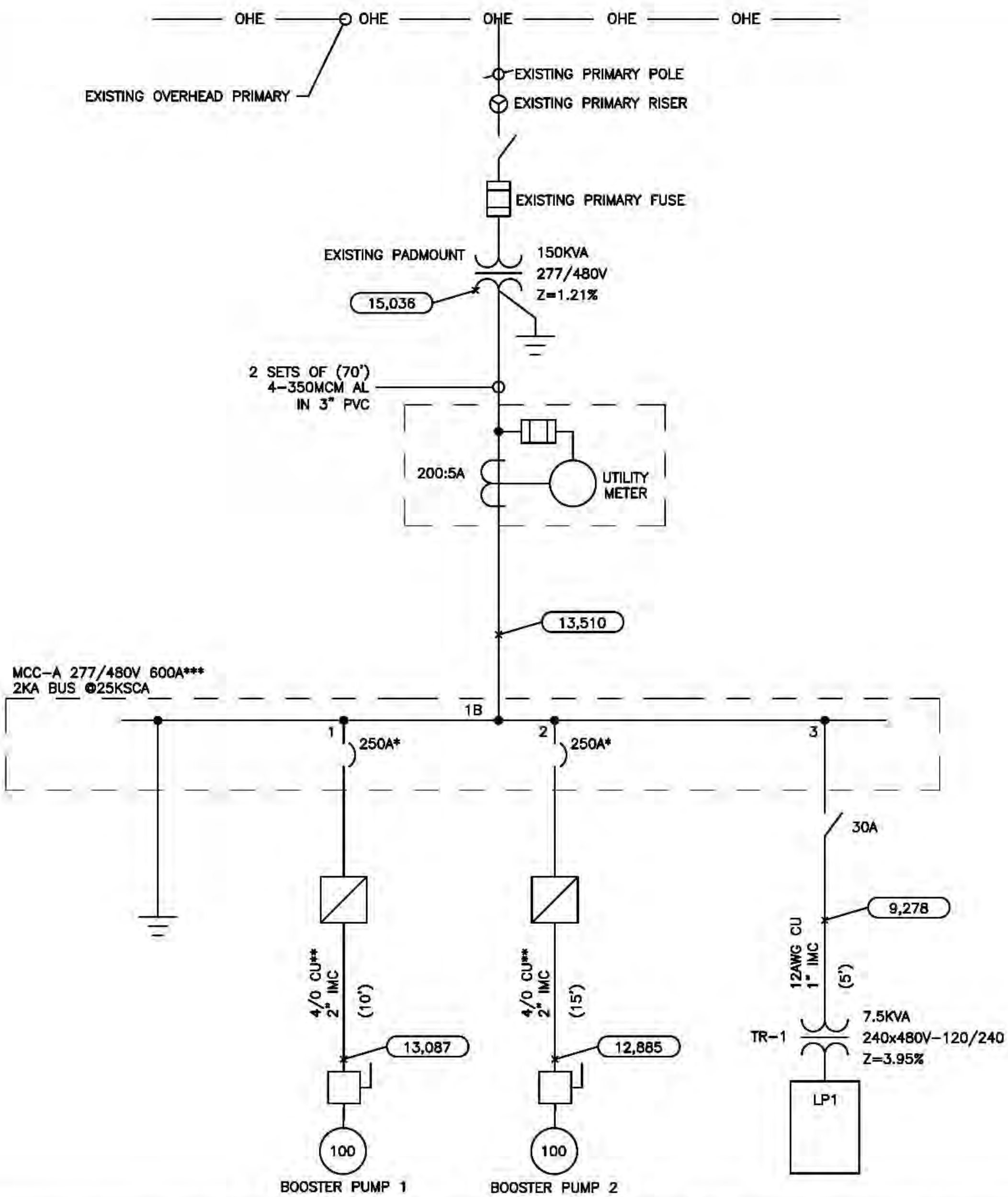
NORTH FILL BOOSTER STATION
ELECTRICAL PLAN



GENERAL NOTES

1. (15,036) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (100') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* SIZE OF BREAKER BUT TRIP SETTING AMPS ARE SET TO 1405A.

** USING APPROPRIATE CONDUCTOR SIZE (4/0) FOR 1-LINE & CALCULATIONS INSTEAD OF ACTUAL CONDUCTOR (2/0). IF CONFIRMED CONDUCTOR NEEDS TO BE UPGRADED OR BREAKER NEEDS TO BE DOWNSIZED.

*** USING THE SUM OF THE LOAD TO DETERMINE THE SIZE OF THE MCCA (BUS SIZE FOR THE UNITROL HAS 2KA BUS)..

1) WESTINGHOUSE
MCP 32500
TRIP SETTING: 1405A
2) WESTINGHOUSE
MCP 32500
TRIP SETTING: 1405A
3) CUTLER-HAMMER
DISCONNECT 30A 600V

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NORTH FILL BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

3.10 Barranca Booster Station 2

Barranca Booster Station 2 (BB2) was placed into service in 1993. BB2 consists of two (2) 125 HP pumps, each with a rated capacity of 750 gpm. BB2 transfers water from Guaje Tank 3 to Barranca Tanks 1 and 2. Within the same building is the Guaje Booster Station 3 (refer to Section 3.6 for additional details).

3.10.1 Observations

The system has been reported to be in good operational condition.

- Service Transformer: 500 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (125 HP, 480V) x 2.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - The MCC is located outside in a walking enclosure.
  - MCC is in need of cleaning and a preventive maintenance. Dust and webs are present.
  - Starters are reduced voltage delta-wye (RVDY).

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - 6” Pump 1 Control Valve / Cla-Val / Model Number = 6-30760-GL / 1962 / Condition = GOOD / Last Rebuilt 2015.
  - 6” Pump 2 Control Valve / Cla-Val / Model Number = 6-30760-GL / 1962 / Condition = GOOD / Last Rebuilt 2018.
  - 6” Pressure Relief Valve / Cla-Val / Model Number = UNKNOWN / 1962 / Condition = UNKNOWN / Last Rebuilt Unknown (Maybe assume same Model as Guaje Booster Station No. 3 PRV Valve).

- Instrumentation:
  - No flow meter – Meter for Guaje Booster Station No. 3 also meters flow thru Barranca Booster Station No. 2.

3.10.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.
  - Replace service buss to MCC.

- MCC:
  - Perform maintenance.
  - Reuse MCC feeders to feed new Reduced Voltage Soft Starters (RVSS).

- RVDY:
  - Install new RVSS starters in the booster station building for better environment control.
  - Use existing RVDY section in MCC to feed new RVSS starters.
  - New feeder conduits and conductors to MCC and motor.

- Electrical Improvements:
  - No other recommended improvements at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e. rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - Replumb PRV from underneath floor slab.

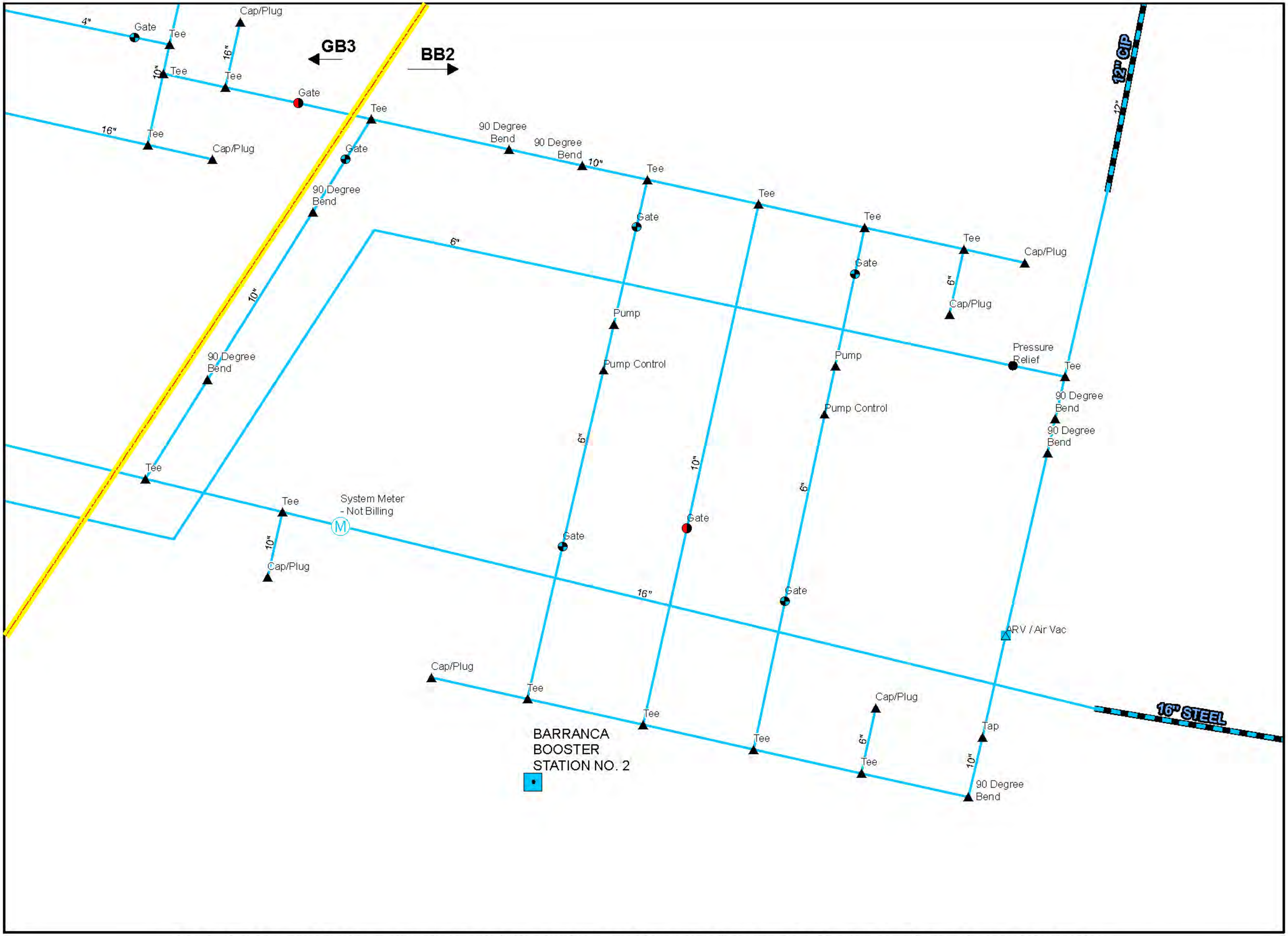
- Instrumentation:
  - Install 10” electromagnetic flow meter where serving Barranca Booster Station 2.
  - Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 121,770
Rebuilding all hydraulic control valve	$ 34,431
Service transformer testing and maintenance and service buss replacement	$ 8,500
Prep, recoat and paint station valves and piping	$ 7,500
New 10" flow meter serving only Baranca Booster Station 2	$ 50,000
Replumb PRV valve from underneath slab floor	$ 15,000
Subtotal (Exclusive of NMGRT)	**$ 237,201**

EXHIBIT 3.10 – BARRANCA BOOSTER STATION 2:

BARRANCA BOOSTER NO. 2 MECHANICAL PLAN, BARRANCA BOOSTER STATION 2 ELECTRICAL PLAN, AND BARRANCA BOOSTER STATION 2 ELECTRICAL ONE-LINE DIAGRAM



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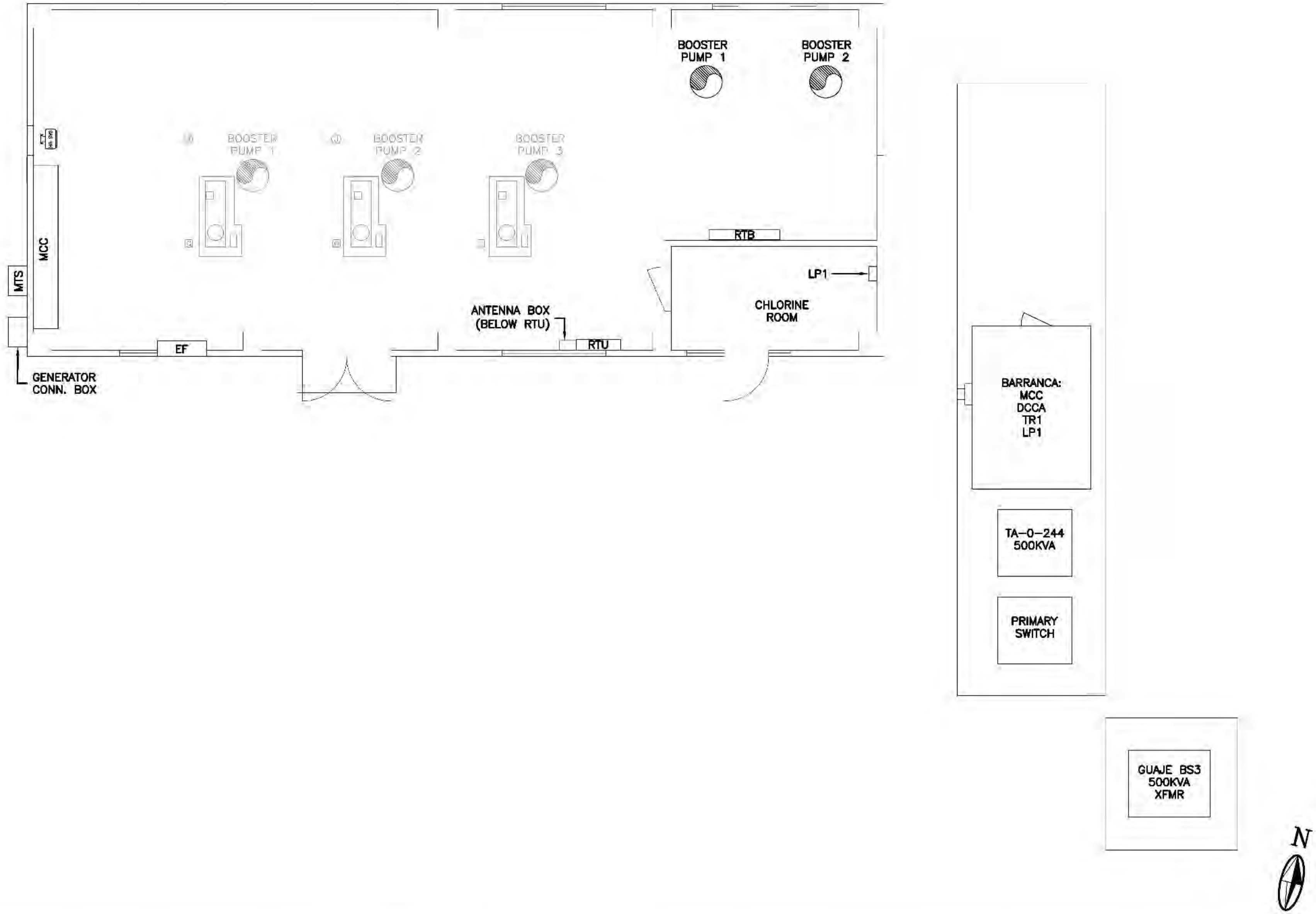
Barranca Booster No.2
Mechanical Plan



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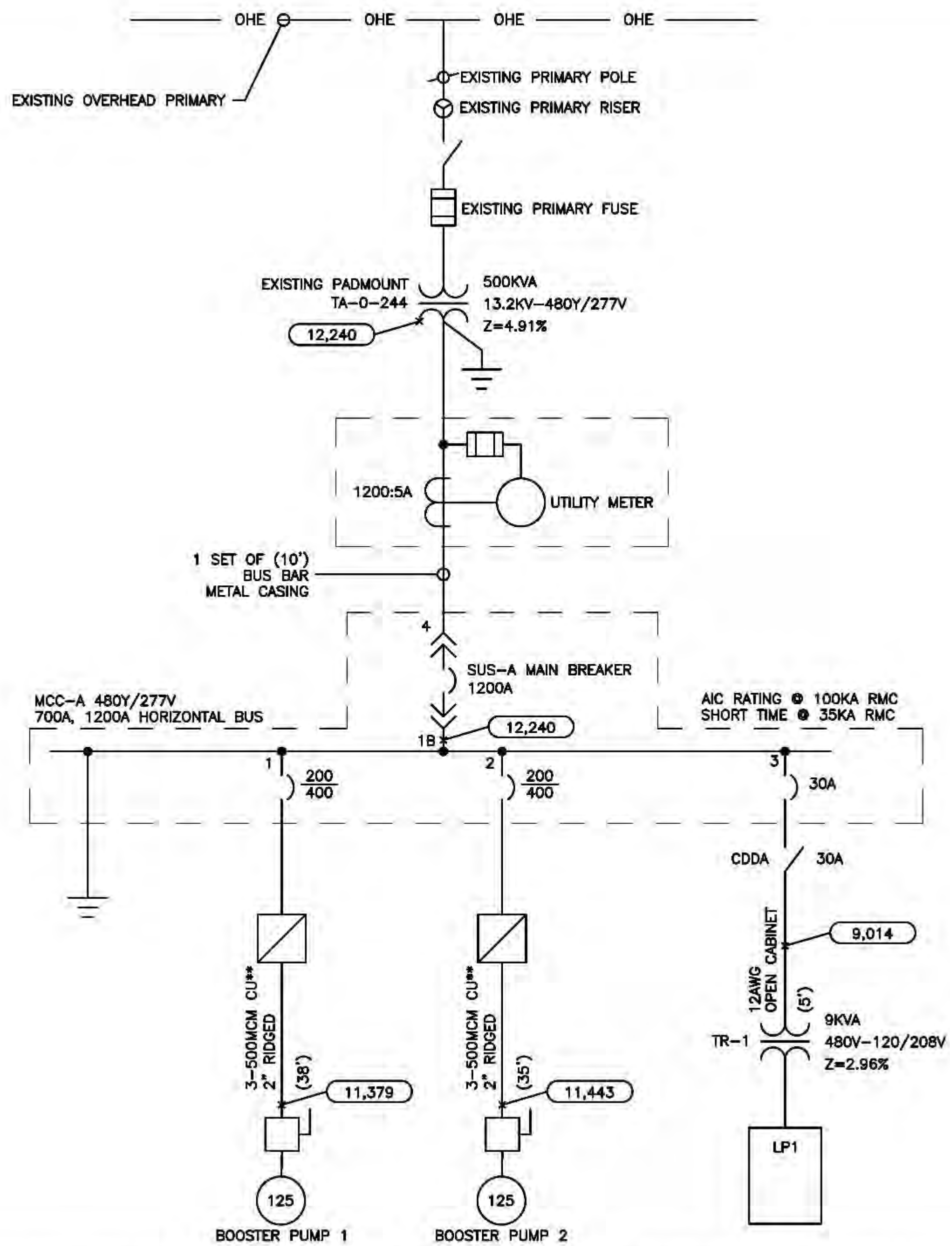
BARRANCA BOOSTER STATION 2
ELECTRICAL PLAN



GENERAL NOTES

1. (12,240) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (90') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).

* THIS BREAKER HAS A CONTINUOUS CURRENT OF 400A BUT HAS THE FLA SET TO 192.4–204A WITH A TRIP SETTING OF 2.5KA.

** USING APPROPRIATE CONDUCTOR FOR 1-LINE & CALCULATIONS (500MCM) INSTEAD OF ACTUAL CONDUCTOR (1 SET OF 4/0 AL).

1) CUTLER HAMMER WESTINGHOUSE
HMCP400W5C
AIC RATING: 35KA
2) CUTLER HAMMER WESTINGHOUSE
HMCP400W5C
AIC RATING: 35KA
3) WESTINGHOUSE
HFD3030L
AIC RATING: 65KA
4) WESTINGHOUSE
SYS POW-R BREAKER TYPE SPB-100
1200A FRAME 3-POLE
AIC RATING: 35KA

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BARRANCA BOOSTER STATION 2
ELECTRICAL ONE-LINE DIAGRAM

3.11 Community Booster Station

Community Booster Station (CB) consists of two (2) 60 HP pumps, each with a rated capacity of 1,200 gpm. CB transfers water from Twin Tank to Community Tank.

3.11.1 Observations

The system has been reported to be in good operational condition.

- Service Transformer: 150 kVA, 277/480V secondary (pole mounted).
  - The transformer is in visually good condition and operational.

- Motor: (60 HP, 480V) x 2.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - The MCC is in good operational condition.
  - Starters are across-the-line NEMA contactors and in good operational condition.
  - There are clearance issues in front of the MCC.

- Lighting Panel: 120/208V
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - o 14” Pump 1 Control Valve – Ross / Model Number = 42WR / Serial Number = 66482 / 1947 / Condition = GOOD / Last Rebuilt 2020.
  - o 14” Pump 2 Control Valve – Ross / Model Number = 42WR / Serial Number = 66483 / 1947 / Condition = GOOD / Last Rebuilt 2011.

- Instrumentation:
  - o 24” flow meter – Sparling / Propeller Insert / Serial Number = Unknown / 1947 / Condition = FAILED.

3.11.2 Recommendations

- Electrical Improvements:
  - o No recommended improvements at this time.
  - o Across the line components are readily available rated for 10-million operations.
  - o Clearance issue should be address if an upgrade is performed, but during the interim can be addressed by the County’s operation and maintenance policy.

- SCADA:
  - o The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - o Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - o If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended.

Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).

- Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
- Add the pump control valve to a long-term maintenance program.
- Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
- Rehab and rebuild of the existing metering vault piping.

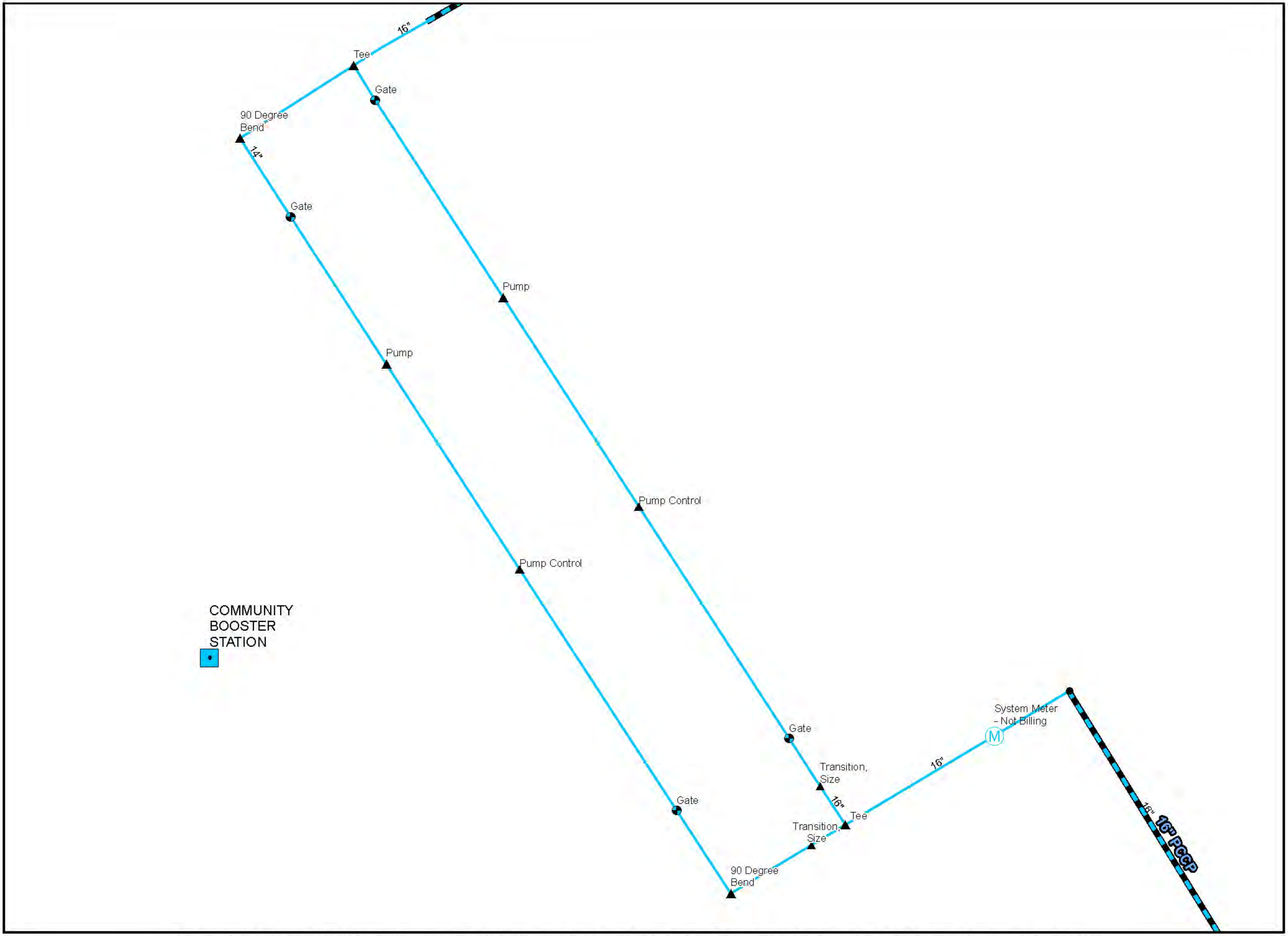
- Instrumentation:
  - Replace non-functional flow meter.
  - Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost	
Rebuilding all hydraulic control valve	$	9,000
New 24" flow meter on discharge main line	$	75,000
Existing meter vault piping and valve rehab	$	50,000
Prep, recoat and paint station valves and piping	$	7,500
Subtotal (Exclusive of NMGRT)	**$**	**141,500**

EXHIBIT 3.11 – COMMUNITY BOOSTER STATION:

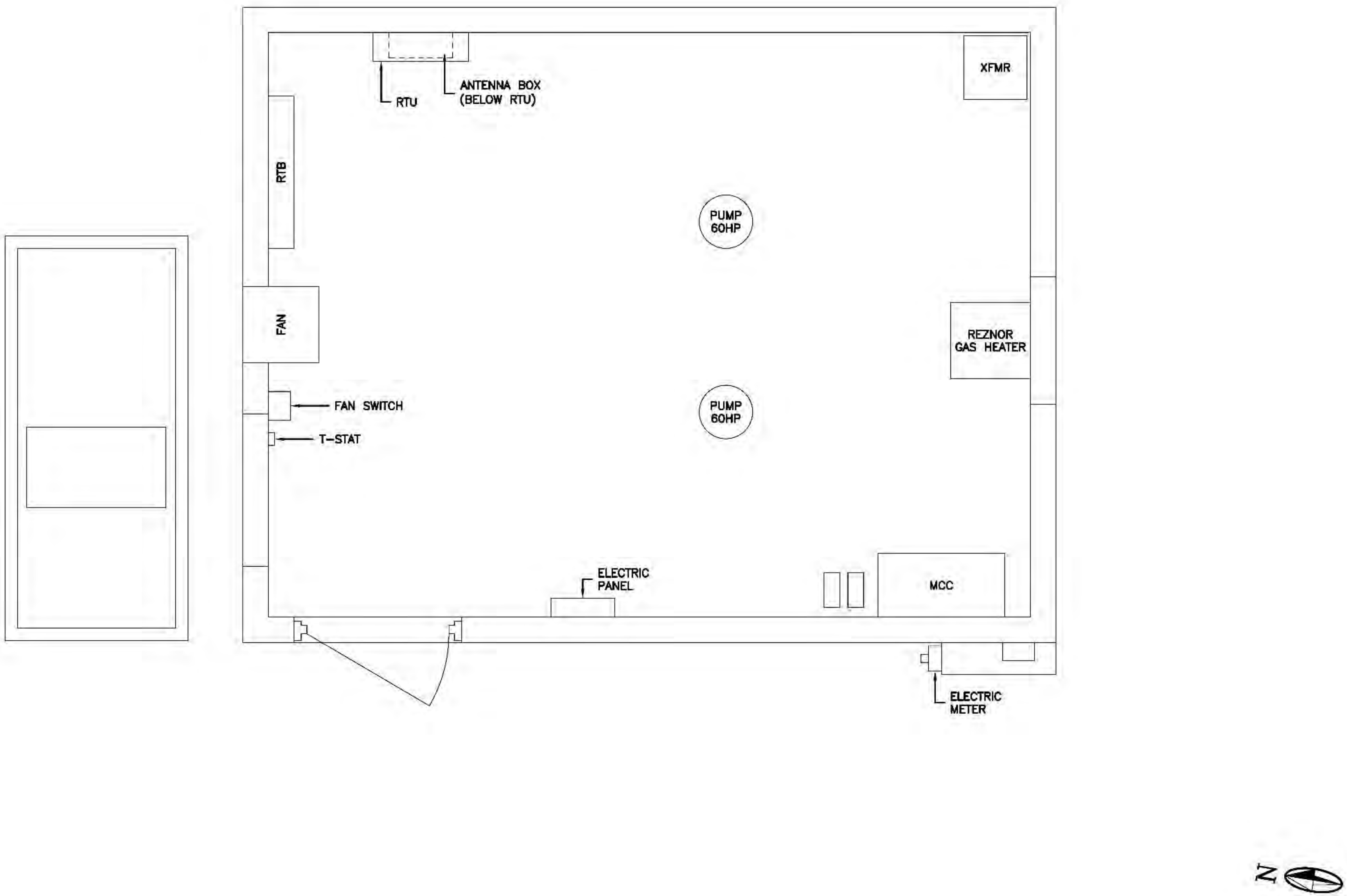
COMMUNITY BOOSTER STATION MECHANICAL PLAN, COMMUNITY BOOSTER STATION ELECTRICAL PLAN, AND COMMUNITY BOOSTER STATION ELECTRICAL ONE LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

COMMUNITY BOOSTER STATION
Mechanical Plan

LAC/DPU/GWS/GIS



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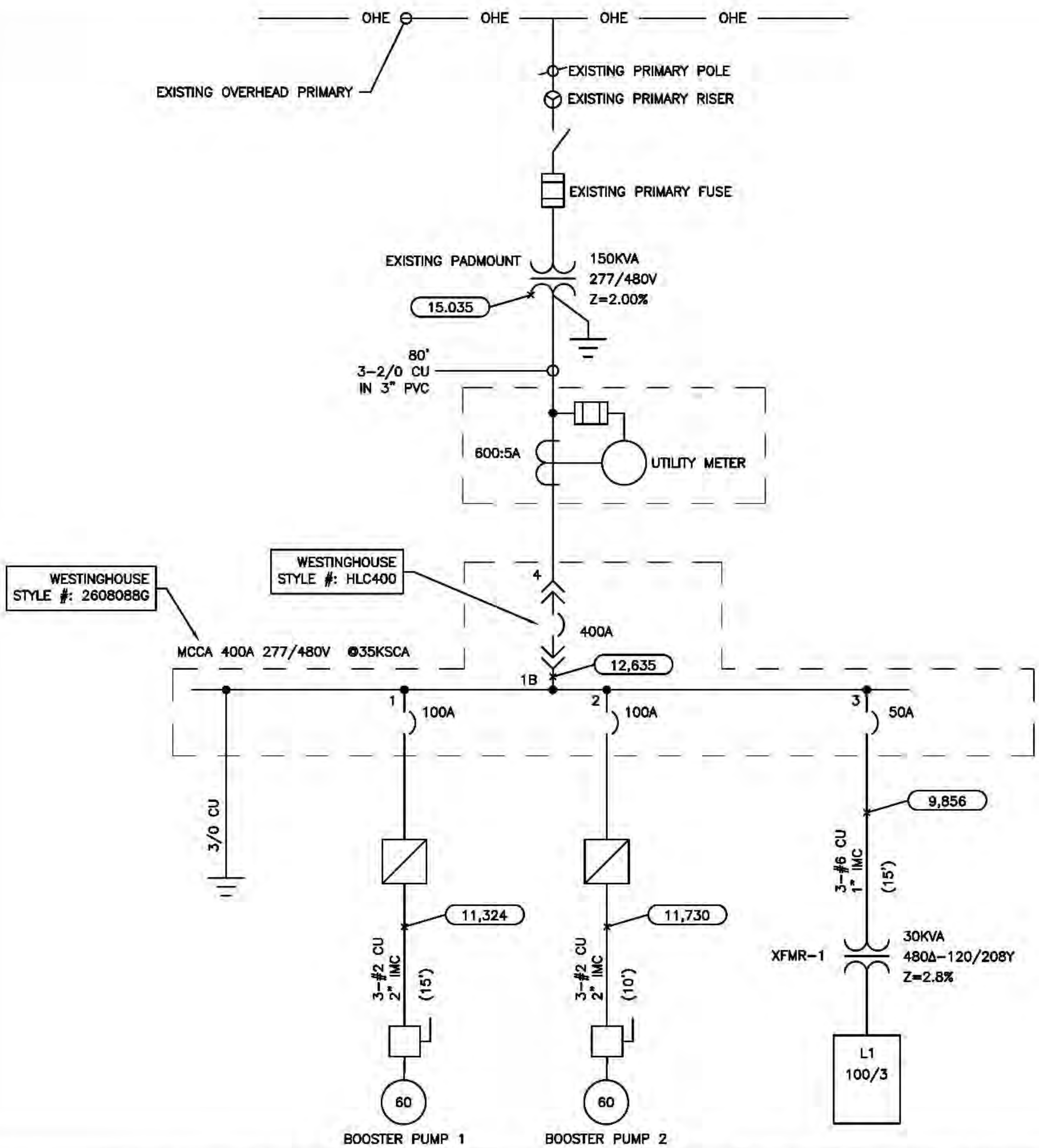
COMMUNITY BOOSTER STATION
ELECTRICAL PLAN



GENERAL NOTES

1. (15,035) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (80') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VFD = SOFT MOTOR STARTER PER OWNER'S SPECIFICATIONS.

1) WESTINGHOUSE
HLC 3400F
AIC RATING: 35KA
2) WESTINGHOUSE
HLC 3400F
AIC RATING: 35KA
3) WESTINGHOUSE
126166G07
4) WESTINGHOUSE
HLC400
AIC RATING: 35KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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COMMUNITY BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

3.12 Quemazon Booster Station

Quemazon Booster Station (QB) was placed into service in 1999. GFB consists of two (2) 100 HP pumps, each with a rated capacity of 600 gpm. GFB transfers water from Sycamore Tank to Quemazon Tank.

3.12.1 Observations

The system has been reported to be in good operational condition.

- Service Transformer: 300 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (100 HP, 480V) x 2.
  - Motors are 22-years-old and approaching life expectancy.

- Motor Control Center (MCC):
  - The reduced voltage delta-wye (RVDY) starter is approaching its life expectancy.
  - The last MCC section consists of a circuit breaker and is in good operational condition and is used to feed the lighting panel transformer.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
    - 4” Pump 1 Control Valve – Cla-Val / Model Number = 4-61-02-14B-RQ / 1999 / Condition = GOOD / Last Rebuilt Never.
    - 3” Pump 1 Surge Anticipation and Pressure Relief Valve – Cla-Val / Model Number = 3-52-08-54F-RQ / 1999 / Condition = GOOD / Last Rebuilt 2020.
    - 4” Pump 2 Control Valve / Cla-Val / Model Number = 4-61-02-758F-MB / 2021 / Condition = GOOD / Last Rebuilt Never.
    - 3” Pump 2 Surge Anticipation – Pressure Relief Valve / Cla-Val / Model Number = 3-52-08-54F-RQ / 1999 / Condition = GOOD / Last Rebuilt Never.

- Instrumentation:
    - 8” flow meter – Kronhe / Mag IFS 4000 F-6 / Serial Number = A99-7611 / 1999 / Condition = GOOD.

3.12.2 Recommendations

- Transformer:
    - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
    - Keep MCC as is.
    - Keep the existing RVDY starters in place and would be available as spares.
    - Install new service conductors (reuse existing conduit).

- RVDY:
  - Install new Reduced Voltage Soft Starter (RVSS) in the process room and feed from the MCC (MCC has sections for new circuit breakers).
  - Install new conduit and conductors to the motors and MCC.

- Electrical Equipment:
  - No other improvements recommended at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and PRV to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - Seal main pipeline inlet into station including new SS fasteners.

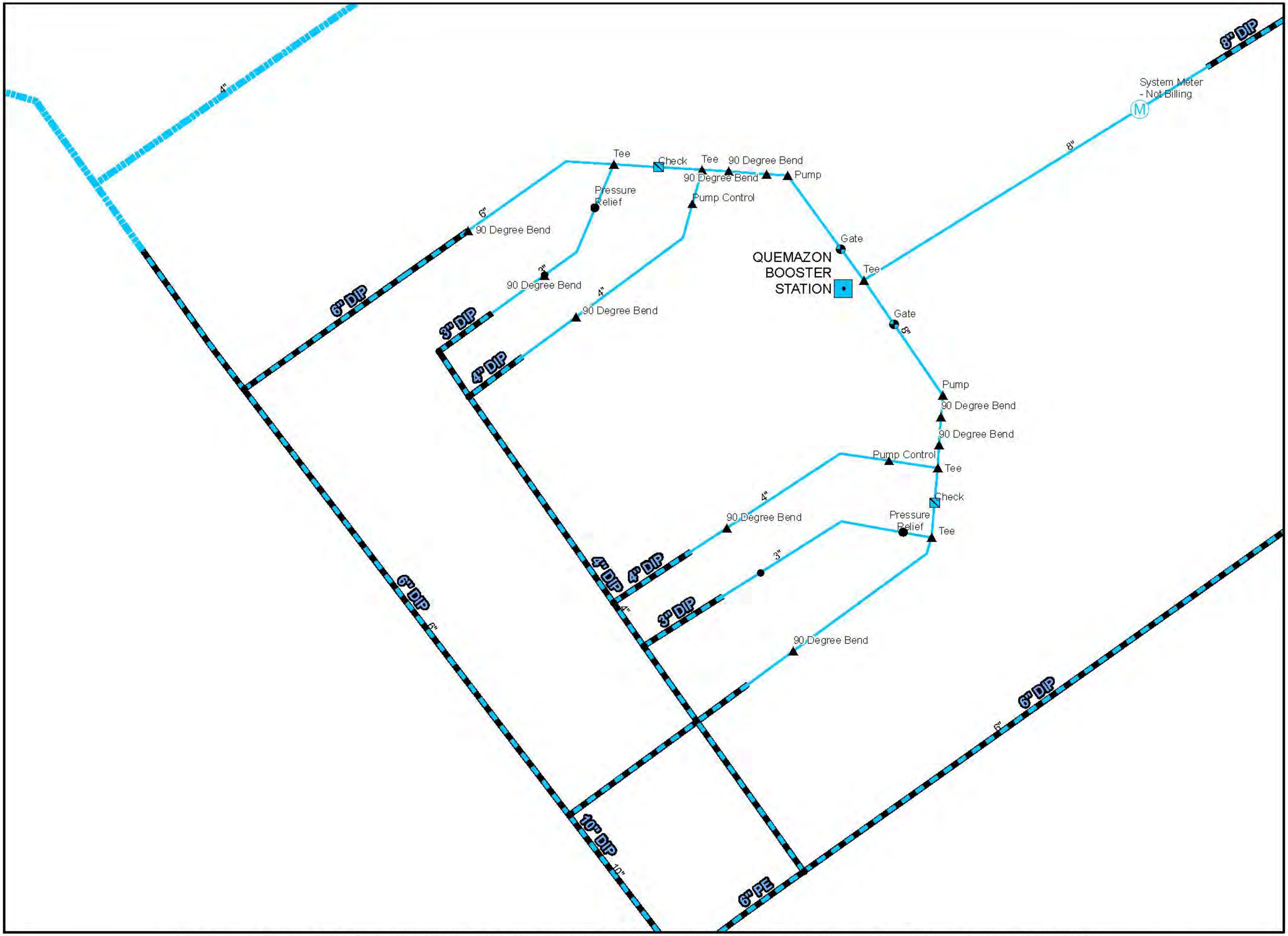
- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost	
Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$	62,535
Rebuilding all hydraulic control valve	$	28,666
Service transformer testing and maintenance	$	4,000
Prep, recoat and paint station valves and piping	$	7,500
Seal main pipeline inlet into station including new ss fasteners	$	25,000
Subtotal (Exclusive of NMGRT)	**$**	**127,701**

EXHIBIT 3.12 – QUEMAZON BOOSTER STATION:

QUEMAZON BOOSTER MECHANICAL PLAN, QUEMAZON BOOSTER STATION ELECTRICAL PLAN, AND QUEMAZON BOOSTER STATION ELECTRICAL ONE LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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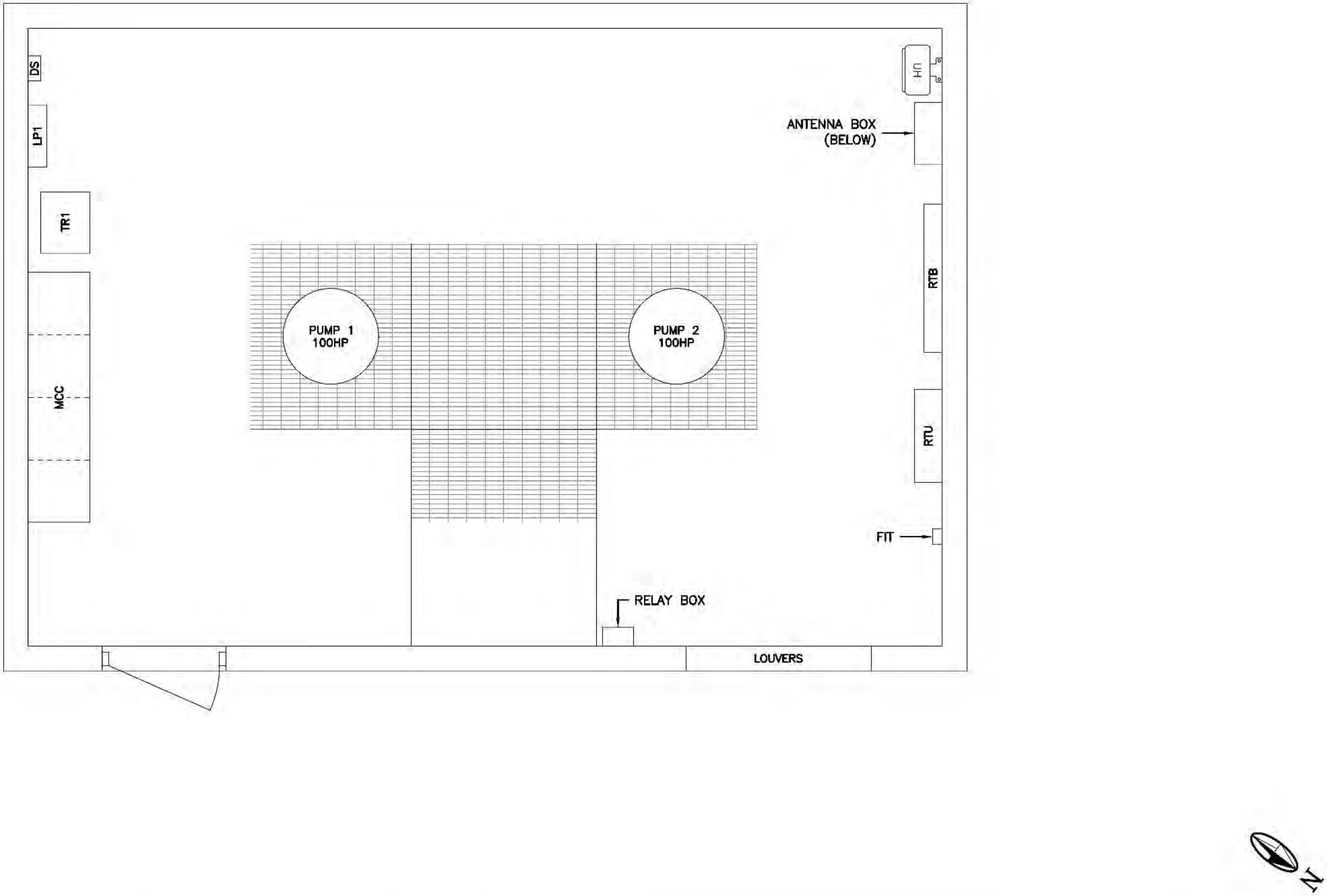
QUEMAZON BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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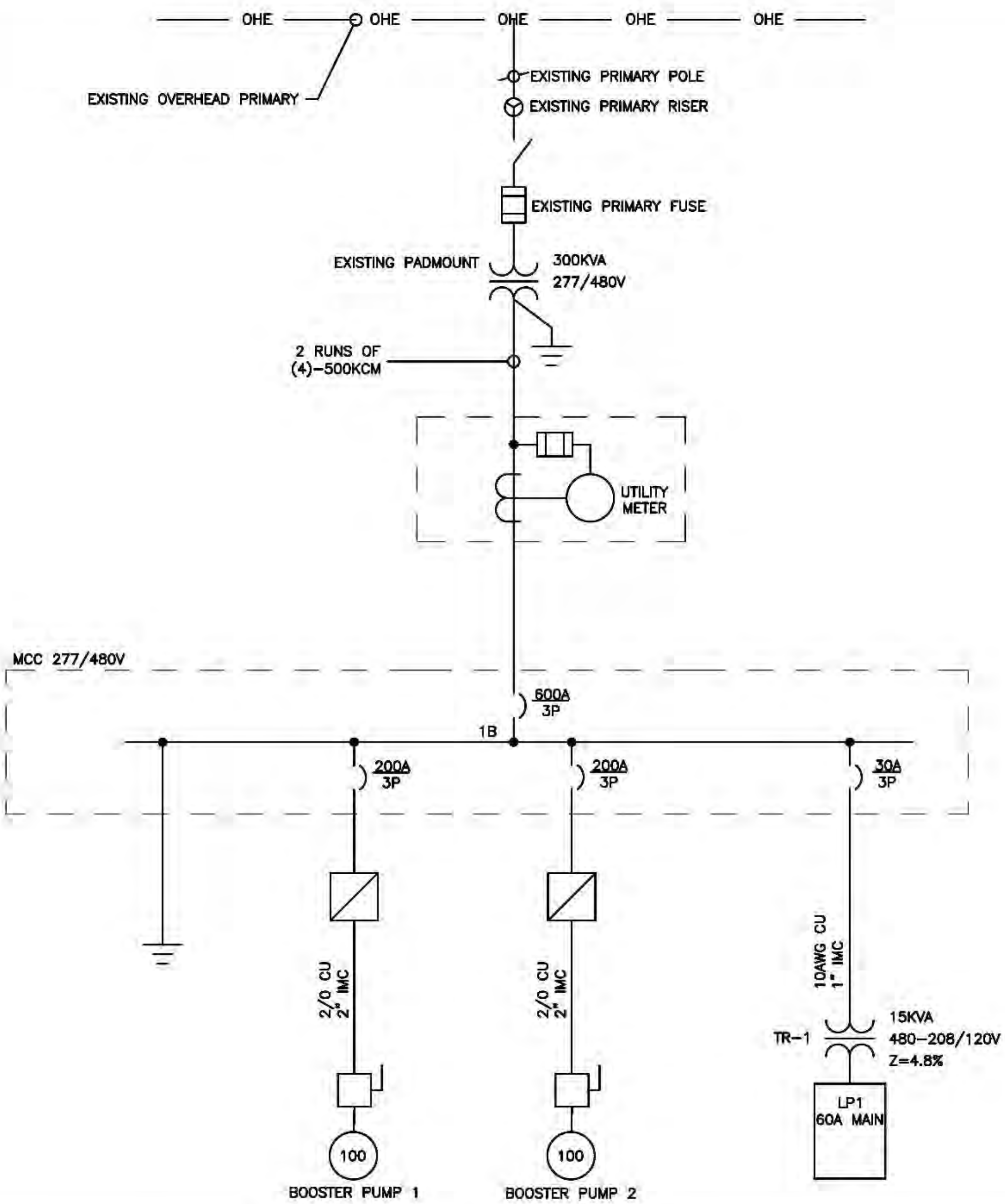
QUEMAZON BOOSTER STATION
ELECTRICAL PLAN



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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QUEMAZON BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

3.13 Shooting Range Booster Station

Shooting Range Booster Station (SRB) consists of two (2) 3 HP pumps. Pump 1 pumps 32 gpm and Pump 2 pumps 30 gpm. SRB is use to provide water and system pressure to for the Los Alamos National Laboratory (LANL) Shooting Range.

3.13.1 Observations

The system has been reported to be in acceptable operational condition. The station building has a lot of deficiencies and in need of upgrades. The piping and valves appear haphazard and in need of upgrade when the pumps are replaced.

- Service Transformer: 3 x 10 kVA, 120/208V secondary (pole mounted).
  - The transformer is in visually good condition and operational and LANL owned.
  - There is no utility meter at this site.

- Motor: (3 HP, 208V) x 2.
  - Motors are in operational condition.

- Booster Pump Control Panel:
  - The booster pump control panel operates the booster pumps in monitoring and maintaining the system pressure. It also houses the pump starters.

- Lighting Panel: 120/208V:
  - The lighting panels are in good operational condition.
  - The lighting panel is also used for Pajarito Well 3.

- Supervisory Control and Data Acquisition (SCADA):
  - Part of Pajarito Well 3. Refer to Section 2.3.

- Mechanical:
  - 2” Pump 1 Intake Valve – Manual Gate Valve / 1995 / Condition = FAIR.
  - 2” Pump 2 Intake Valve – Manual Gate Valve / 1995 / Condition = FAIR.
  - Pressure Tank / Taco, Inc. – Model Number = PS 080-3R / Serial Number = 3156 / 1995 / 125 psi / Condition = POOR / Connected to discharge pipeline inside station with Honeywell Pressuretrol Controller – Typical small system pressure tank/controller/pump system.

- Instrumentation:
  - 1.5” flow meter – Neptune / Trident Propeller / Serial Number = E65N-2&2HPT-08-3429 / 1995 / Condition = FAIR / Upper Meter.
  - 2” flow meter – Badger / Propeller / Serial Number = 91266579 / 1995 / Condition = FAILED / Lower Meter.

3.13.2 Recommendations

- General: Total reconstruction of station interior including electrical, insulation, water-resistant sheathing and new pumps, motors, valving and piping.

- Electrical Equipment:
  - Install a utility power meter. Modify for new conduit and conductors as needed.
  - Rewiring for new system as described above.

- SCADA:
  - Part of Pajarito Well 3. Refer to Section 2.3.
  - Recommend assessing potential monitoring points from the Booster Pump Control Panel as part of the future SCADA assessment project.

- Mechanical:
  - No hydraulic control valves, bypass valves, or pressure relief valves are recommended at this station.
  - Test all main line and equipment valves (isolation, check, ARV-Air Vacuum, etc.) to verify condition and functionality and rebuild as necessary.

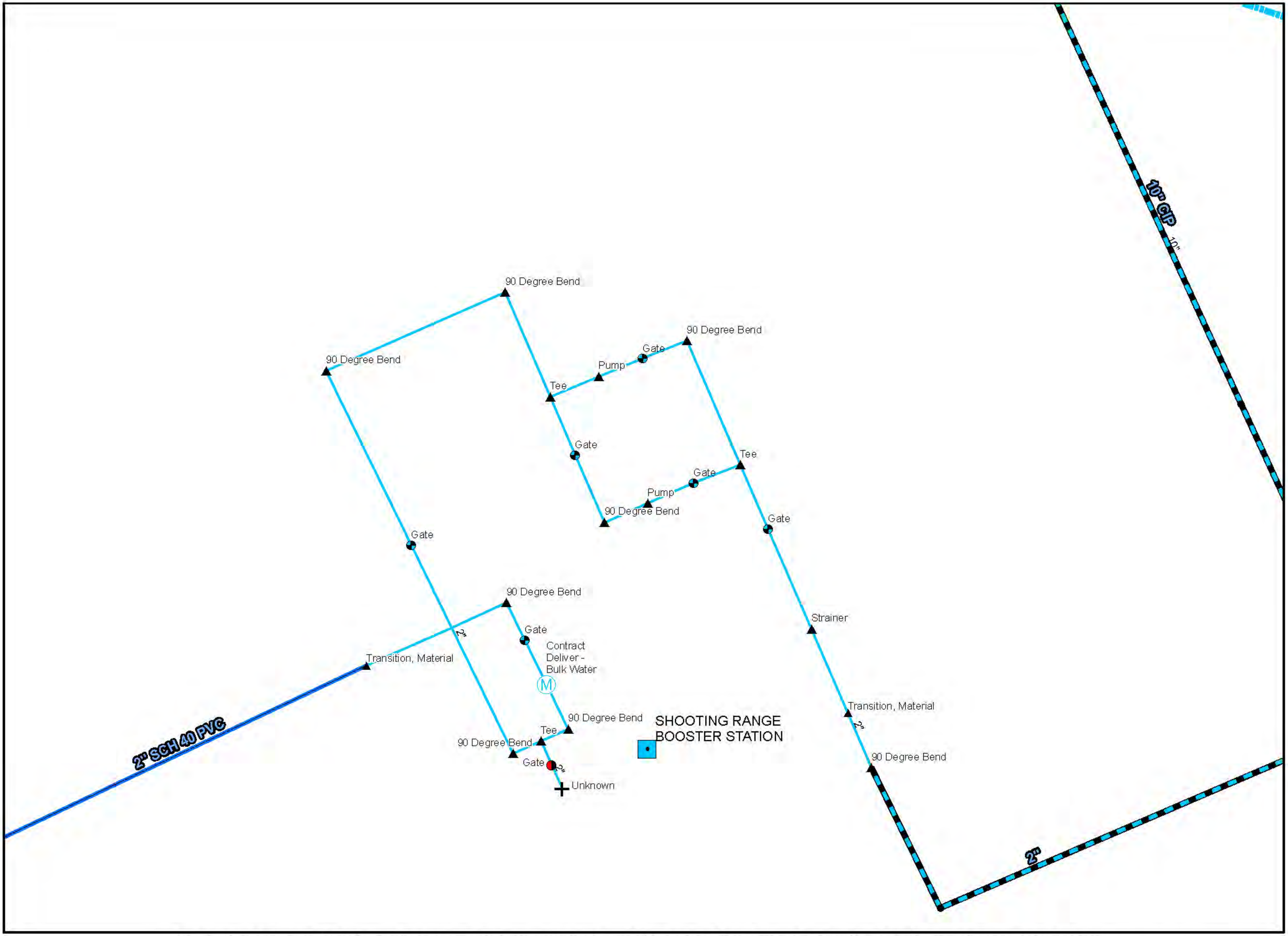
- Instrumentation:
  - Replace the non-operational 2” lower flow meter.
  - Add flow meters to the annual meter calibration test program.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Install new utility power meter.	$ 6,518
Replace flow meter on discharge main line	$ 5,000
Reconstruction of station interior including electrical, insulation, water-resistant sheathing and new pumps / motors, valving and piping	$ 125,000
Subtotal (Exclusive of NMGRT)	**$ 136,518**

EXHIBIT 3.13 – SHOOTING RANGE BOOSTER STATION:

SHOOTING RANGE BOOSTER MECHANICAL PLAN, PAJARITO WELL 3 AND LIVE FIRE RANGE PUMP STATION ELECTRICAL PLAN, AND RIFLE RANGE BOOSTER STATION ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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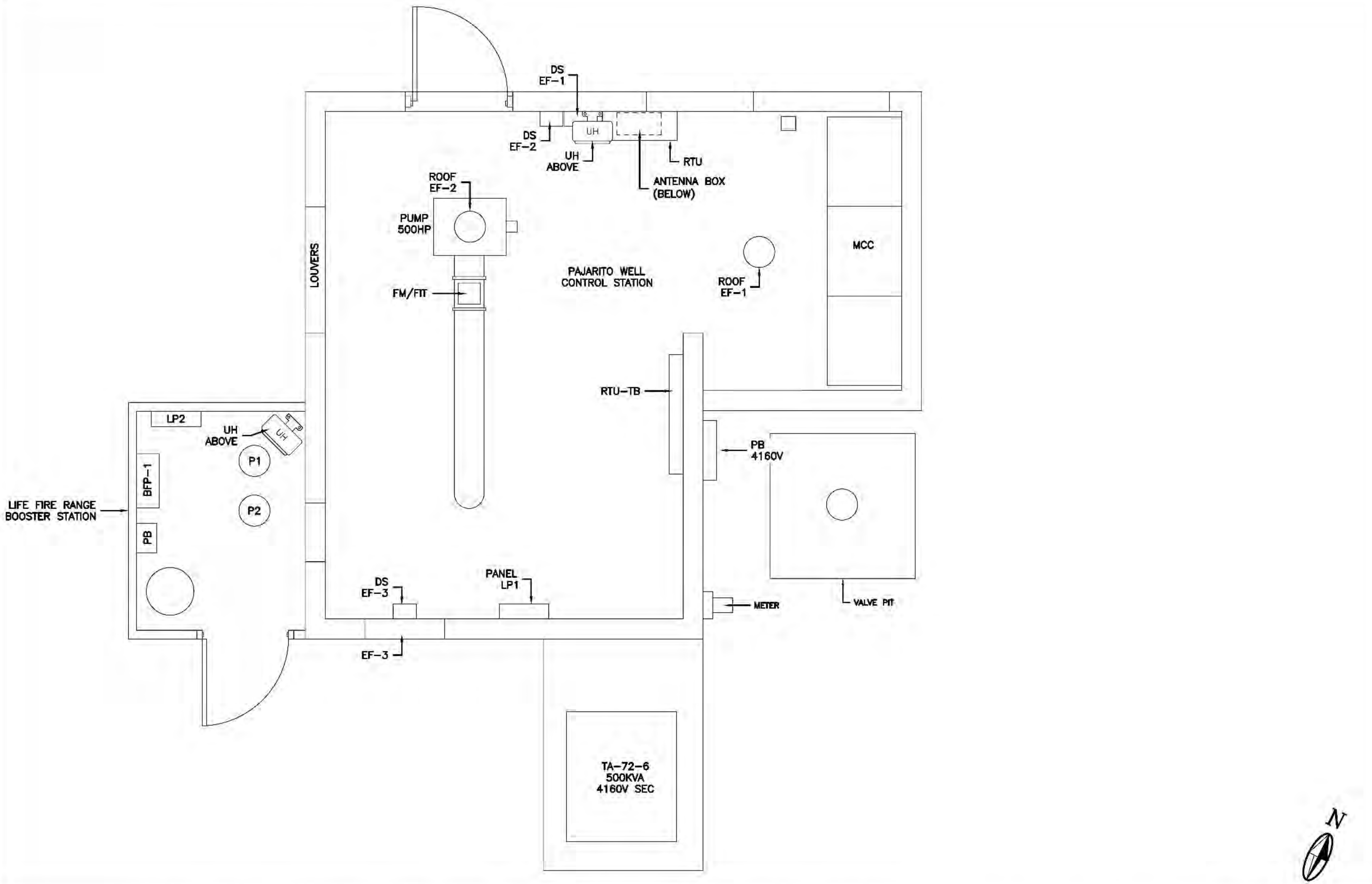
SHOOTING RANGE BOOSTER
Mechanical Plan

LAST MODIFIED: Jun 25, 2021 - 11:24am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\24-RIFLE RANGE BS\
DWG. NAME: ELAC-24-101.dwg



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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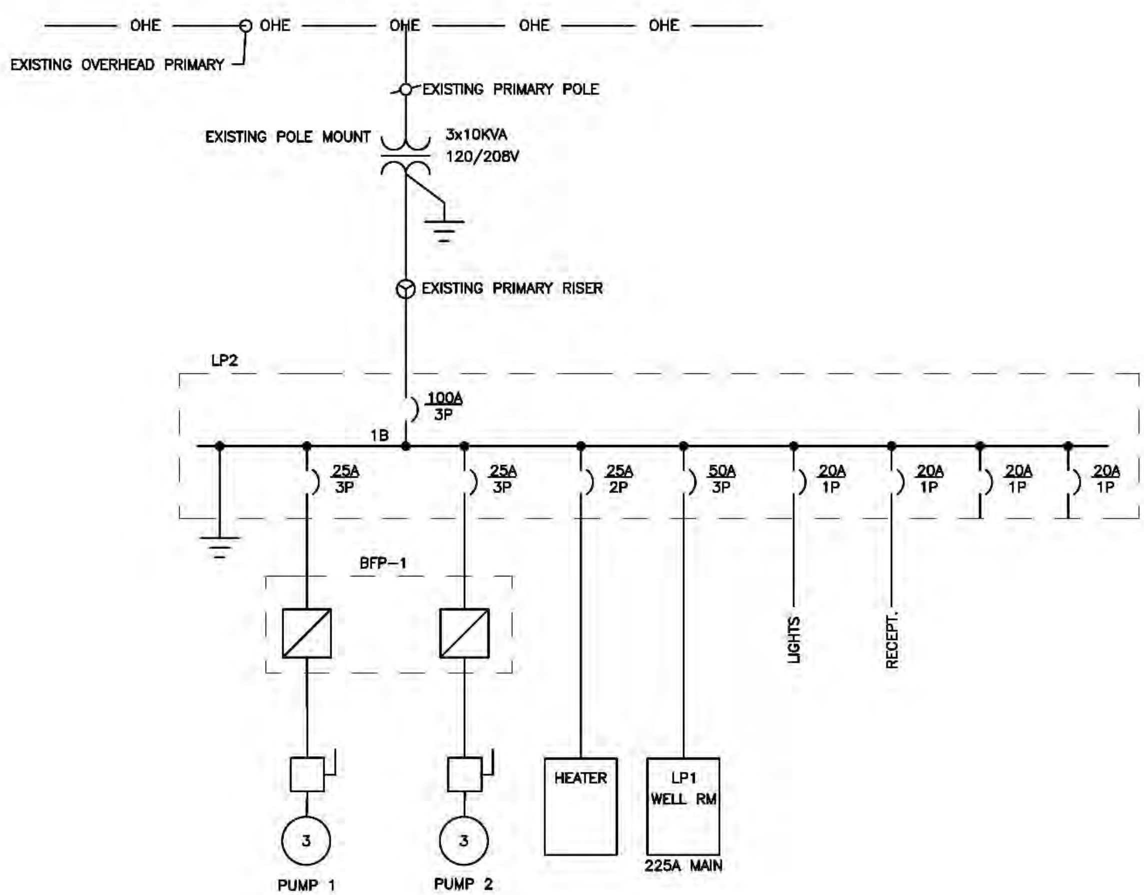
PAJARITO WELL 3 AND LIVE FIRE RANGE PUMP STATION
ELECTRICAL PLAN



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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RIFLE RANGE BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

3.14 S-Site Booster Station 1

S-Site Booster Station 1 (SB1) was placed into service in 1981. It consists of three (3) 150 HP pumps, each with a rated capacity of 975 gpm. SB1 is used to transfer water from Twin Tank to Pajarito Tank 4.

3.14.1 Observations

The system has been reported to be in good operational condition. The Motor Control Center (MCC) is located outside in a non-walking enclosure. There is a lot of dust and cobwebs present within the enclosure.

- Service Transformer: 500 kVA, 277/480V secondary.
  - The transformer is in visually good condition and operational.

- Motor: (150 HP, 480V) x 3.
  - Motors are beyond their life expectancy.

- MCC:
  - MCC is beyond its life expectancy. The location of the MCC presents environmental concerns.
  - Starters are reduced voltage delta wye (RVDY) and beyond life expectancy.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are located within the building and are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - 10” Pump 1 Control Valve – Cla-Val / Model Number = 8-60P-30752-IE / 1947 / Condition = FAIR / Last Rebuilt Never.
  - 10” Pump 2 Control Valve – Cla-Val / Model Number = 8-60P-30752-IE / 1947 / Condition = FAIR / Last Rebuilt Never.
  - 10” Pump 3 Control Valve – Cla-Val / Model Number = 8-60P-30752-IE / 1947 / Condition = FAIR / Last Rebuilt Never.
  - 4” Pressure Relief Valve – Cla-Val / Model Number = 4-60P-60515-SG / 1947 / Condition = UNKNOWN / Last Rebuilt Never / Intake off Pump 2 discharge line.
  - 8” Combination Auto Valve No. 3 and PRV Station No. 502 - Cla-Val / Model Number = 8-132E-31094-KF / Date Unknown / Condition = FAIR / Last Rebuilt Never.

- Instrumentation:
  - 14” flow meter – Sparling / Propeller Insert / Serial Number = F-2556 / 1947 / Condition = GOOD / Forward Flow Reading (SSBS1 discharge to Pajarito Tank 4) / Backward Flow Reading (Pajarito Tank 4 into Twin Tank when Auto Valve 3 Open) / Outside station in south side vault with meter dials inside station.

3.14.2 Recommendations

- Transformer:
  - Perform preventive maintenance including oil sampling and testing, insulation resistance testing, gages and valves (where applicable), clean, and visibly inspect.

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- Electrical Equipment:
    - Install new 800A, 277/480V panelboard (main distribution panel [MDP]) in the building to replace the MCC.
    - Connect new MDP to service transformer with new conduit and conductors.
    - Install new Reduced Voltage Soft Starters (RVSS) in the building. Connect to existing motors with new conduit and conductors.
    - Refeed the stepdown transformer from MDP.

- SCADA:
    - An evaluation of the SCADA system is not included as part of this evaluation. However, to make the new system SCADA compatible and to allow Operations and Engineering access to more site historical data, it is recommended to install a control panel to operate the site equipment and connect this control panel to the existing SCADA remote terminal unit (RTU) for remote monitoring and control of the existing parameters.

- Mechanical:
    - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
    - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
    - Rebuild Bypass Hydraulic Control Valve (or pressure relief valve [PRV]) and rebuild and restore as necessary. Replace with a new valve if no rebuild kit is available.

- Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
- Replumb PRV to serve all pump discharges and not just Pump 2.
- Add the pump control valve and PRV to a long-term maintenance program.
- Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.

- Instrumentation:
  - Replace non-functional flow meter.
  - Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, MPD, RVSS motor starter (x3), and associated power conductors.	$ 157,245
New facility control panel	$ 48,840
Rebuilding all hydraulic control valve	$ 25,704
Service transformer testing and maintenance	$ 4,000
Prep, recoat and paint station valves and piping	$ 15,000
Replumb PRV to serve all pump discharges	$ 50,000
Replace auto valve no. 3 / pressure sustaining valve with County supplied valve	$ 25,000
Subtotal (Exclusive of NMGRT)	**$ 325,789**

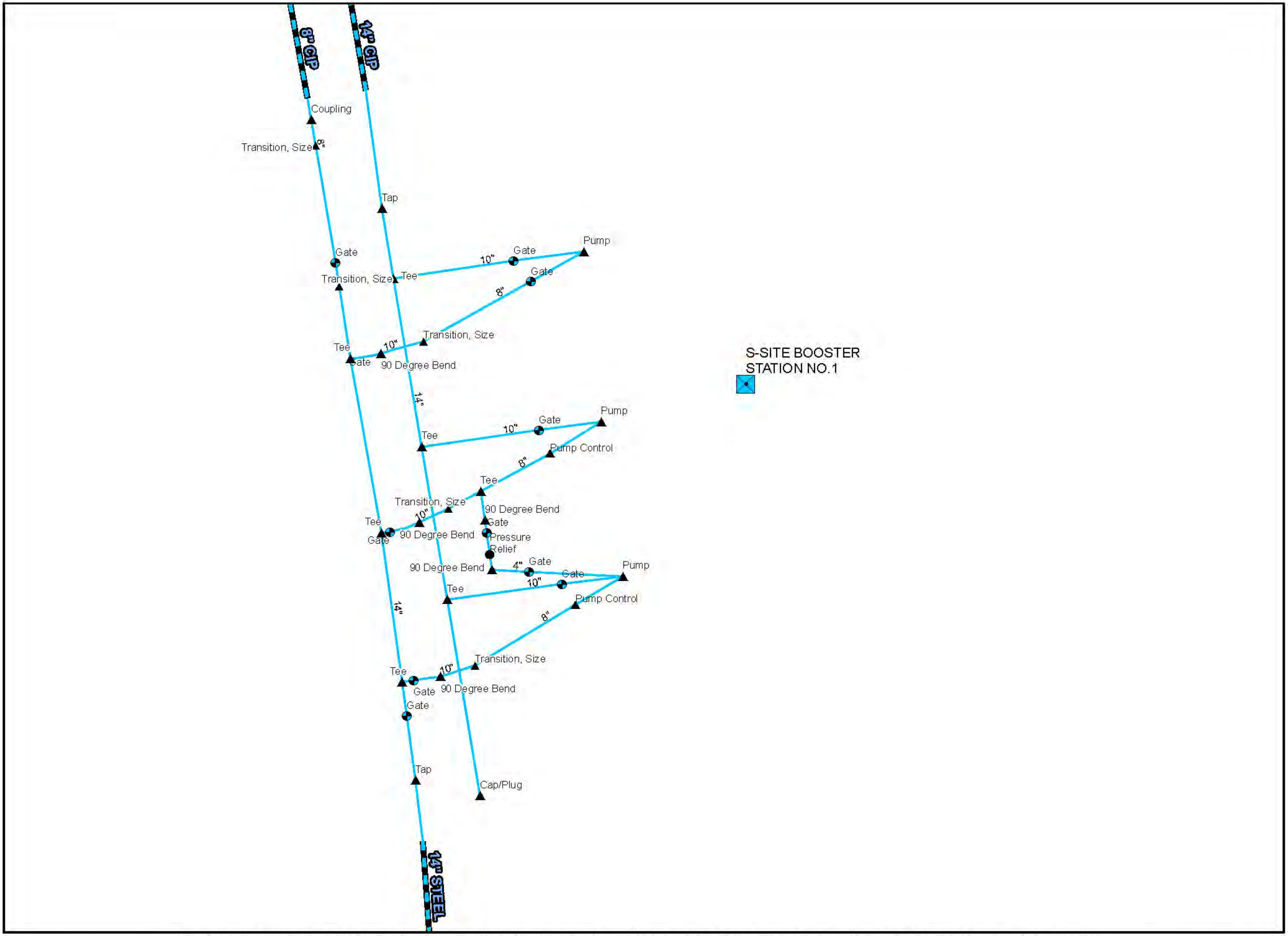
EXHIBIT 3.14 – S-SITE BOOSTER STATION 1:

S-SITE BOOSTER NO. 1 MECHANICAL PLAN,

S-SITE BOOSTER STATION 1 ELECTRICAL PLAN,

AND S-SITE BOOSTER STATION 1 ELECTRICAL

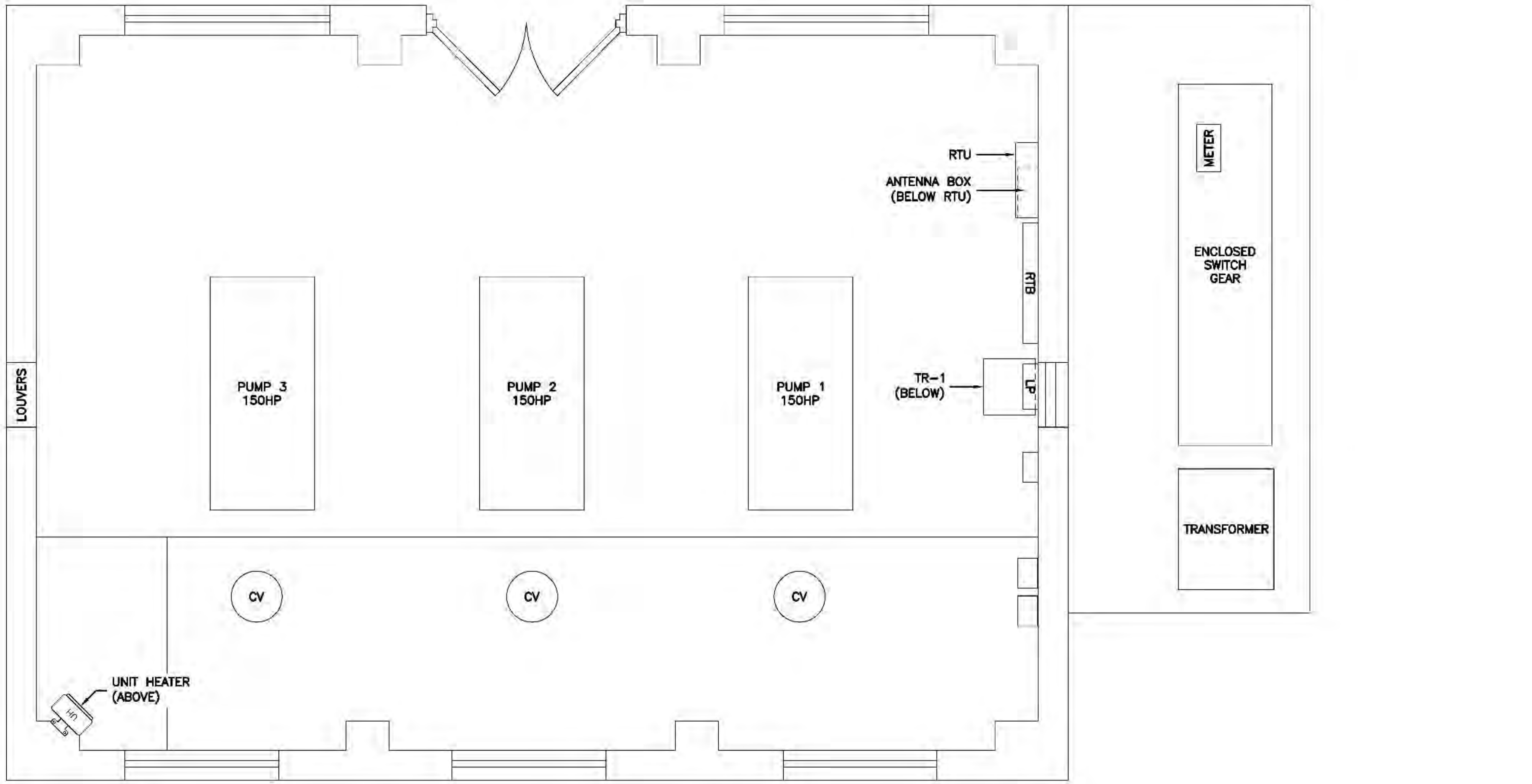
ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

S-SITE BOOSTER NO.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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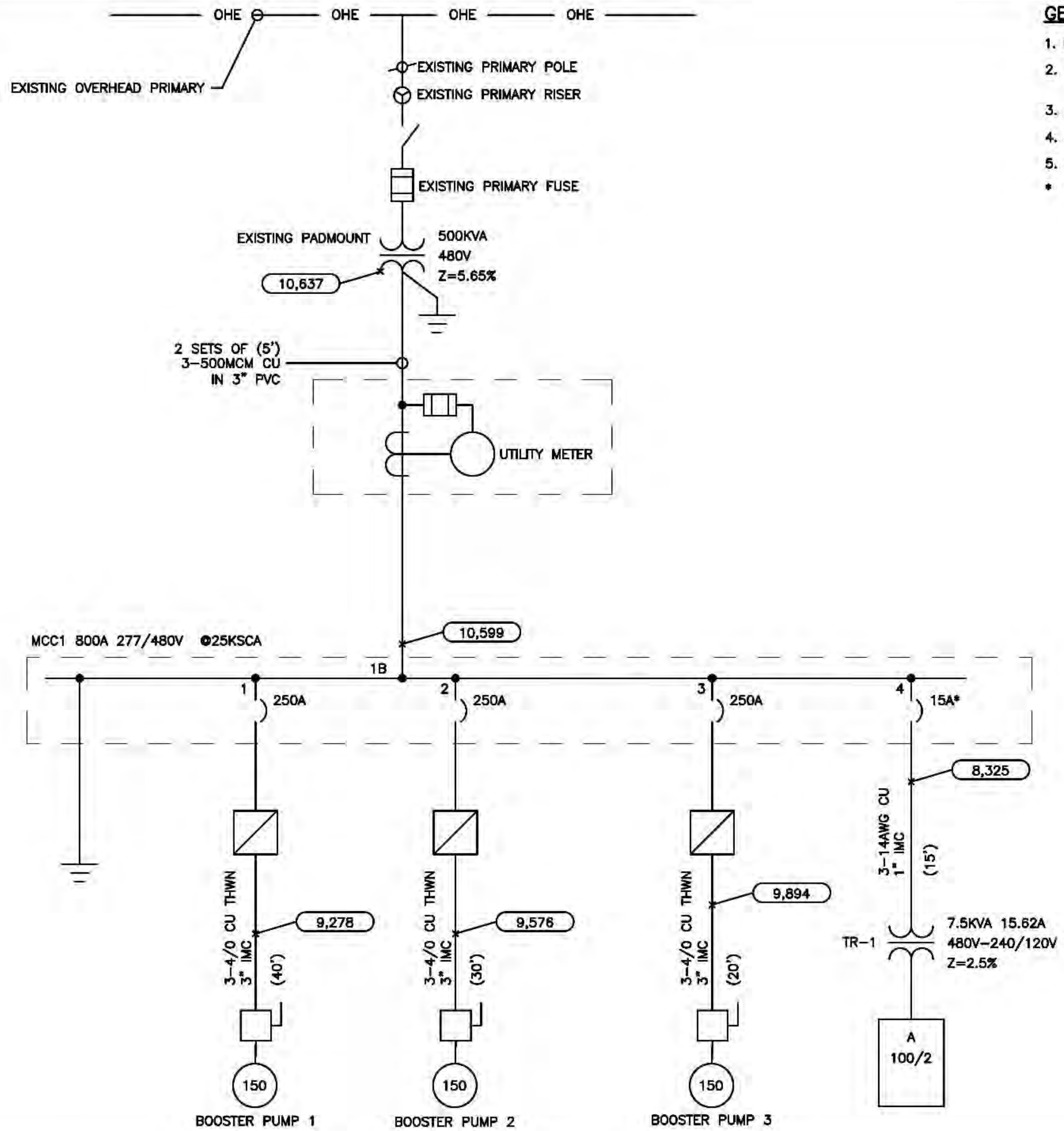
S-SITE BOOSTER STATION 1
ELECTRICAL PLAN

LAST MODIFIED: Jun 16, 2021 - 8:40am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\S-SITE BS 1\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (10,637) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (110') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. UNABLE TO DETERMINE CT RATION FOT METER.

* FLA OF TR–1 IS 15.62A WHILE THE BREAKER SUPPLYING IT IS 15A.

1) WESTINGHOUSE MCP5 32500
TRIP SETTING: 2500A
2) WESTINGHOUSE MCP5 32500
TRIP SETTING: 2500A
3) WESTINGHOUSE MCP5 32500
TRIP SETTING: 2500A
4) CUTLER HAMMER FC 3015
AIC RATING: 14KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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S-SITE BOOSTER STATION 1
ELECTRICAL ONE-LINE DIAGRAM

3.15 S-Site Booster Station 2

S-Site Booster Station 2 (SB2) was placed into service in 1981. It consists of three (3) 40 HP pumps, each with a rated capacity of 700 gpm. SB2 is used to transfer water from Pajarito Tank 4A and the S-Site Tank.

3.15.1 Observations

The system has been reported to be in good operational condition with the exception of one motor starter, which is currently being repaired by the County. The enclosure of the transformer is in poor condition, but it is owned by the Los Alamos National Laboratory (LANL) and they stated it is operational and did not require replacement.

- Service Transformer: 164 kVA, 277/480V secondary.
    - The transformer is owned and operated by LANL. No action required.

- Motor: (40 HP, 480V) x 3.
    - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
    - Is in visibly good condition.
    - Starters are Reduced Voltage Auto-Transformer (RVAT) and beyond life expectancy.

- Lighting Panel: 120/208V:
    - The lighting panel and its associated step-down transformer are located within the building and are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
    - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
    - 6” Pump 1 Control Valve – Cla-Val / Model Number = 6-60-36RT / 60-36-14D-AN / 1982 / Condition = GOOD / Last Rebuilt Never.
    - 6” Pump 2 Control Valve – Cla-Val / Model Number = 10-60-39BY / 60-36-14D-AN / 1982 / Condition = GOOD / Last Rebuilt Never.
    - 6” Pump 3 Control Valve – Cla-Val / Model Number = 10-60P-60581-MC / 1982 / Condition = GOOD / Last Rebuilt Never.
    - Pressure Tank – Shock Trap / Model Number = CST-048 / Serial Number = 18034 / 1982 / 175 psi / Condition = GOOD / Connected to discharge pipeline outside station with intake through a manual butterfly valve = Normally Open.

- Instrumentation:
    - 10” flow meter – Krohne / Mag/ Opti Flow 4100 / Serial Number = A02-62345 / 2020 / Condition = GOOD.

3.15.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
    - Keep MCC in service.
    - Replace service conductors from transformer to the MCC in the existing conduit.

- RVAT:
    - Replace RVAT with Reduced Voltage Soft Starters (RVSS). Retrofit to be installed within MCC.
    - New feeders to motors in existing conduits.

- Electrical Equipment:
    - No other recommendations at this time.

- SCADA:
  - o The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - o Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - o If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - o Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - o Add the pump control valves to a long-term maintenance program.

- Instrumentation: Add flow meter to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter (x3), and associated power conductors.	$ 118,553
Rebuilding all hydraulic control valve	$ 25,704
Subtotal (Exclusive of NMGRT)	**$ 144,257**

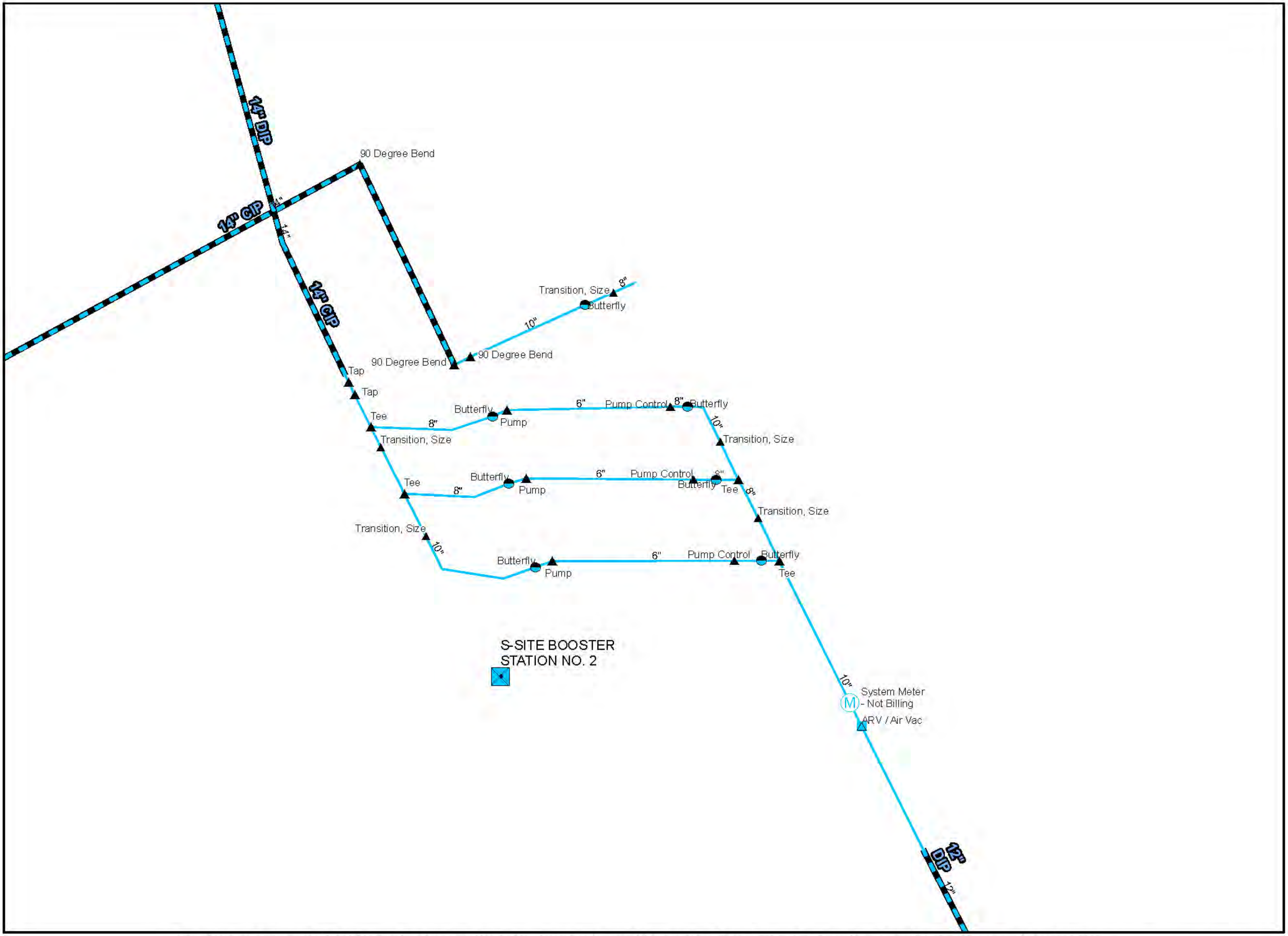
EXHIBIT 3.15 – S-SITE BOOSTER STATION 2:

S-SITE BOOSTER NO. 2 MECHANICAL PLAN,

S-SITE BOOSTER STATION 2 ELECTRICAL PLAN,

AND S-SITE BOOSTER STATION 2 ELECTRICAL

ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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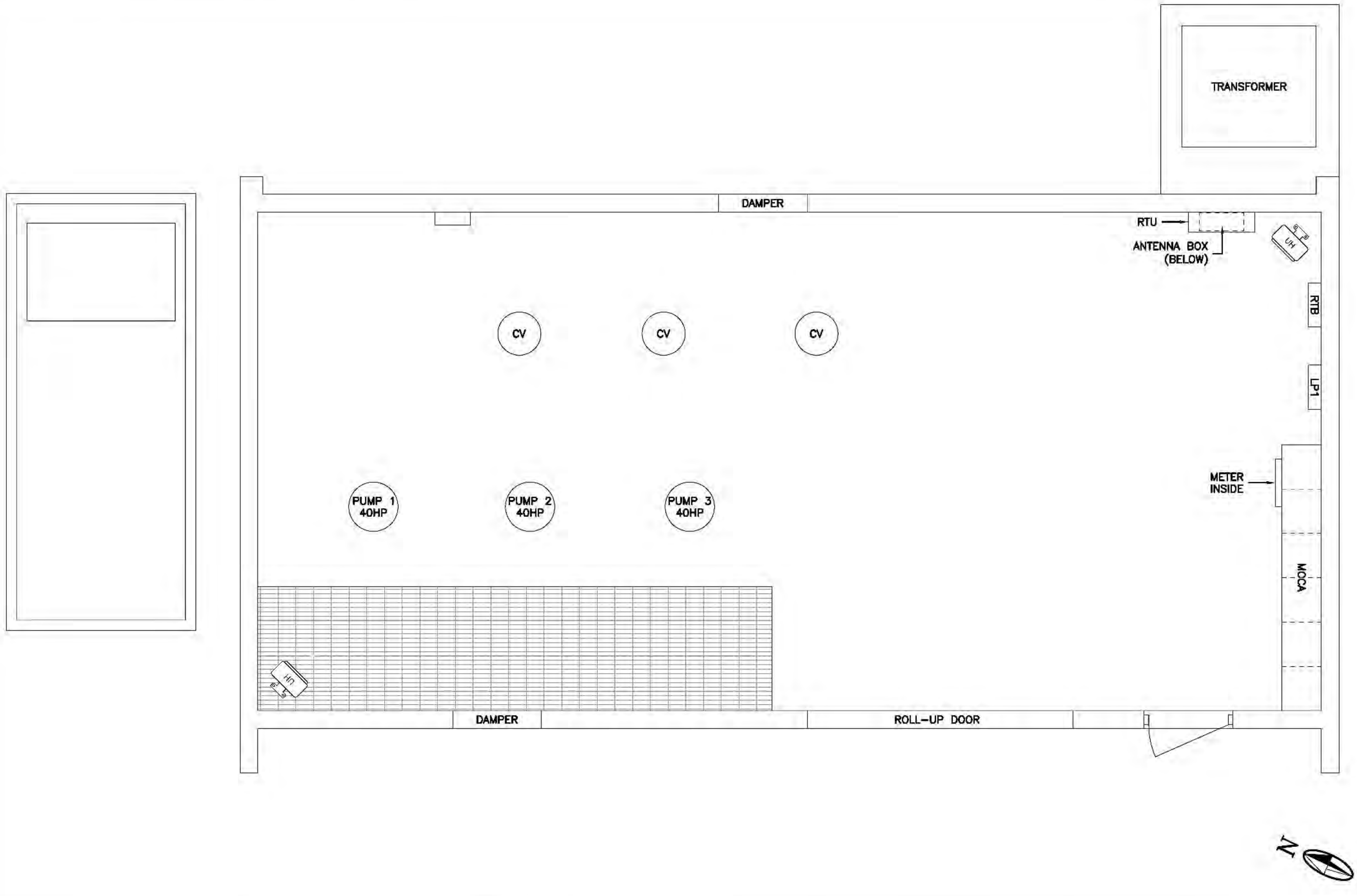
S-SITE BOOSTER NO.2
Mechanical Plan

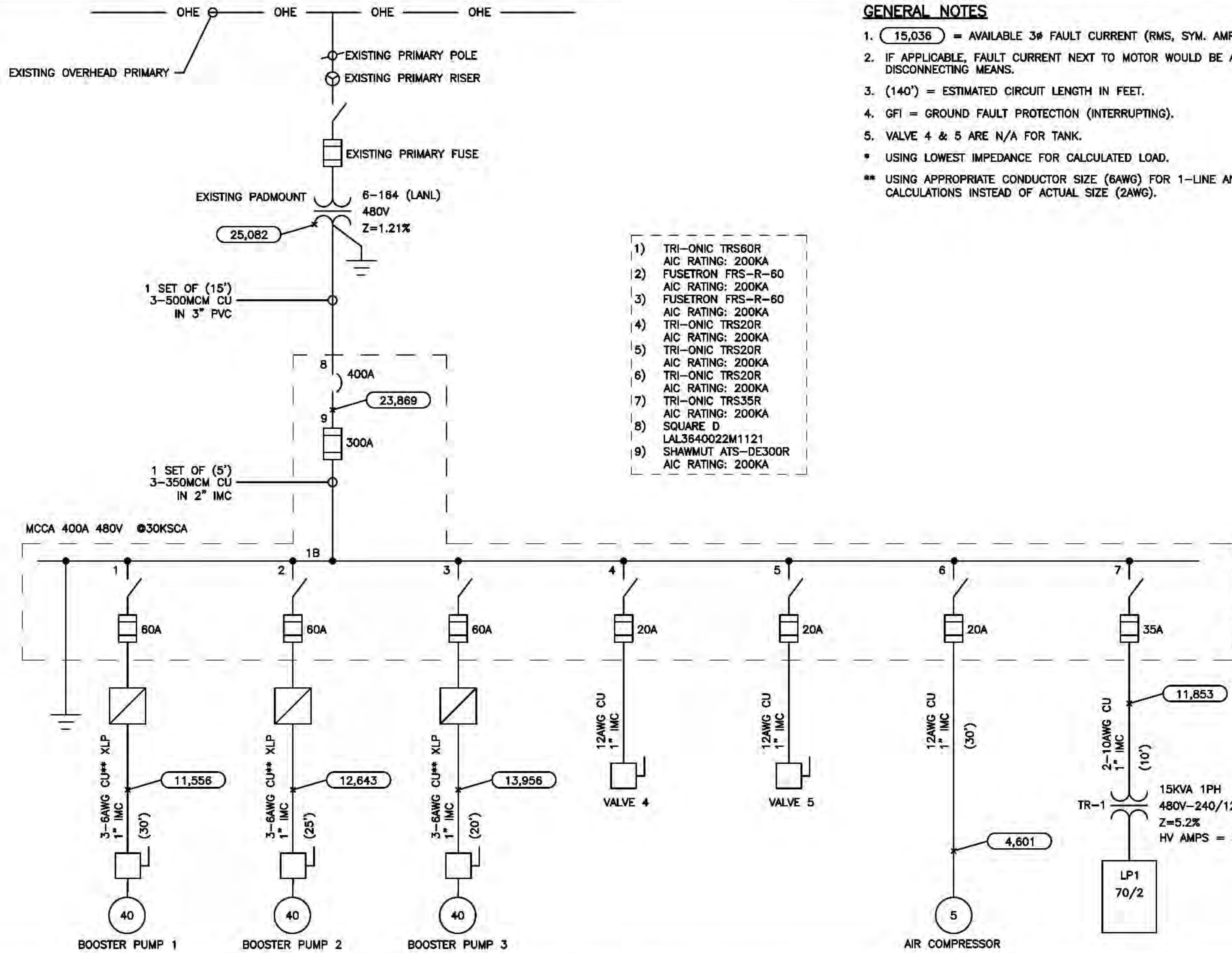


Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

S-SITE BOOSTER STATION 2
ELECTRICAL PLAN

LAST MODIFIED: Jun 16, 2021 - 10:36am BY USER: nwilhelm
DWG. LOCATION: I:\LACOUNTY\LAC201-11 Water Production Facility Eval\DWGS\S-SITE BS 2\
DWG. NAME: ELAC-601.dwg



GENERAL NOTES

1. (15,036) = AVAILABLE 3ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (140') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. GFI = GROUND FAULT PROTECTION (INTERRUPTING).
5. VALVE 4 & 5 ARE N/A FOR TANK.

* USING LOWEST IMPEDANCE FOR CALCULATED LOAD.

** USING APPROPRIATE CONDUCTOR SIZE (6AWG) FOR 1-LINE AND CALCULATIONS INSTEAD OF ACTUAL SIZE (2AWG).

1) TRI-ONIC TRS60R
AIC RATING: 200KA
2) FUSETRON FRS-R-60
AIC RATING: 200KA
3) FUSETRON FRS-R-60
AIC RATING: 200KA
4) TRI-ONIC TRS20R
AIC RATING: 200KA
5) TRI-ONIC TRS20R
AIC RATING: 200KA
6) TRI-ONIC TRS20R
AIC RATING: 200KA
7) TRI-ONIC TRS35R
AIC RATING: 200KA
8) SQUARE D
LAL3640022M1121
9) SHAWMUT ATS-DE300R
AIC RATING: 200KA

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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S-SITE BOOSTER STATION 2
ELECTRICAL ONE-LINE DIAGRAM

3.16 Western Booster Station

Western Booster Station (WB) was placed into service in 1981. It consists of two (2) 50 HP pumps, each with a rated capacity of 920 gpm. WB is used to transfer water from Sycamore and Twin Tanks to Western Tank.

3.16.1 Observations

The system has been reported to be in good operational condition.

- Service Transformer: 3 x 50 kVA (Pole mounted), 277/480V secondary.
  - The transformer is in visibly good appearance.

- Motor: (50 HP, 480V) x 2.
  - Motors are beyond their life expectancy.

- Motor Control Center (MCC):
  - Is in visibly good condition.
  - Starters are Reduced Voltage Auto-Transformer (RVAT) and beyond life expectancy.

- Lighting Panel: 120/208V:
  - The lighting panel and its associated step-down transformer are located within the building and are in good operational condition.

- Supervisory Control and Data Acquisition (SCADA):
  - The local control panel is antiquated and beyond its life expectancy. The SCADA control are necessary to remain in place to automatically control the system until a SCADA improvements study and project is implemented.

- Mechanical:
  - 8” Pump 1 Control Valve – Cla-Val / Model Number = 8-60P-60601-JH / 1947 / Condition = GOOD / Last Rebuilt 2013.
  - 8” Pump 2 Control Valve – Cla-Val / Model Number = 8-60P-60601-JH / 1947 / Condition = GOOD / Last Rebuilt 2011.
  - 6” Back Flow Prevention Valve – Ames / Model Number = 4000-SS / Serial Number = 08556-1202 / 2007 / Condition = FAIR.

- Instrumentation:
  - 8” flow meter – Sparling / Propeller Insert / Serial Number = Unknown / 1947 / Condition = FAILED.
  - 6” flow meter – Neptune / Model Number = 6” HPT / Serial Number = 4-95-3027 / Condition = GOOD.

3.16.2 Recommendations

- Motor: For recommendations, refer to Section 4.0 Motor Inspection.

- MCC:
  - Keep MCC in service.
  - Replace service conductors from transformer to the MCC in the existing conduit.

- RVAT:
  - Replace RVAT with Reduced Voltage Soft Starters (RVSS). Retrofit to be installed within MCC.
  - New feeders to motors in existing conduits.

- Electrical Equipment:
  - No other recommendations at this time.

- SCADA:
  - The system is SCADA ready when future improvements are completed in the SCADA system. No improvements recommended at this time.

- Mechanical:
  - Have the pump control valves inspected with both a visual and function test of the main valve, components, and pilot system. Inspections should be used to determine the condition of the existing valve and components and what components need replacement.
  - If, after inspection, a rebuild is recommended, but no rebuild kit (full set of rebuild parts) is available, then a full replacement with a new valve is recommended. Otherwise, rebuild valve as necessary based on recommendation from the inspection (i.e., rubber gasket and piloting components).
  - After the valve is rebuilt, routine and regular maintenance should include visual inspections of the valve boy, piloting system, and pressure gauges to ensure correct pressures are being maintained.
  - Remove the rust from the pump control valve body of the well control valves and recoat the valve for protection.
  - Add the pump control valve and pressure relief valve (PRV) to a long-term maintenance program.
  - Test all main line and equipment valves (isolation, check, air / vacuum, etc.) to verify condition and rebuild and restore as necessary.
  - Verify with Los Alamos Public Schools (LAPS) if Back Flow Prevention assembly and meter are still required for irrigation water to the high school fields. If not, ensure that intake valve to back flow preventer (BFP) and meter is closed and maintained as normally closed.
  - Rebuild intake piping from abandoned filter piping.
  - Disconnect intake piping from abandoned filter piping.

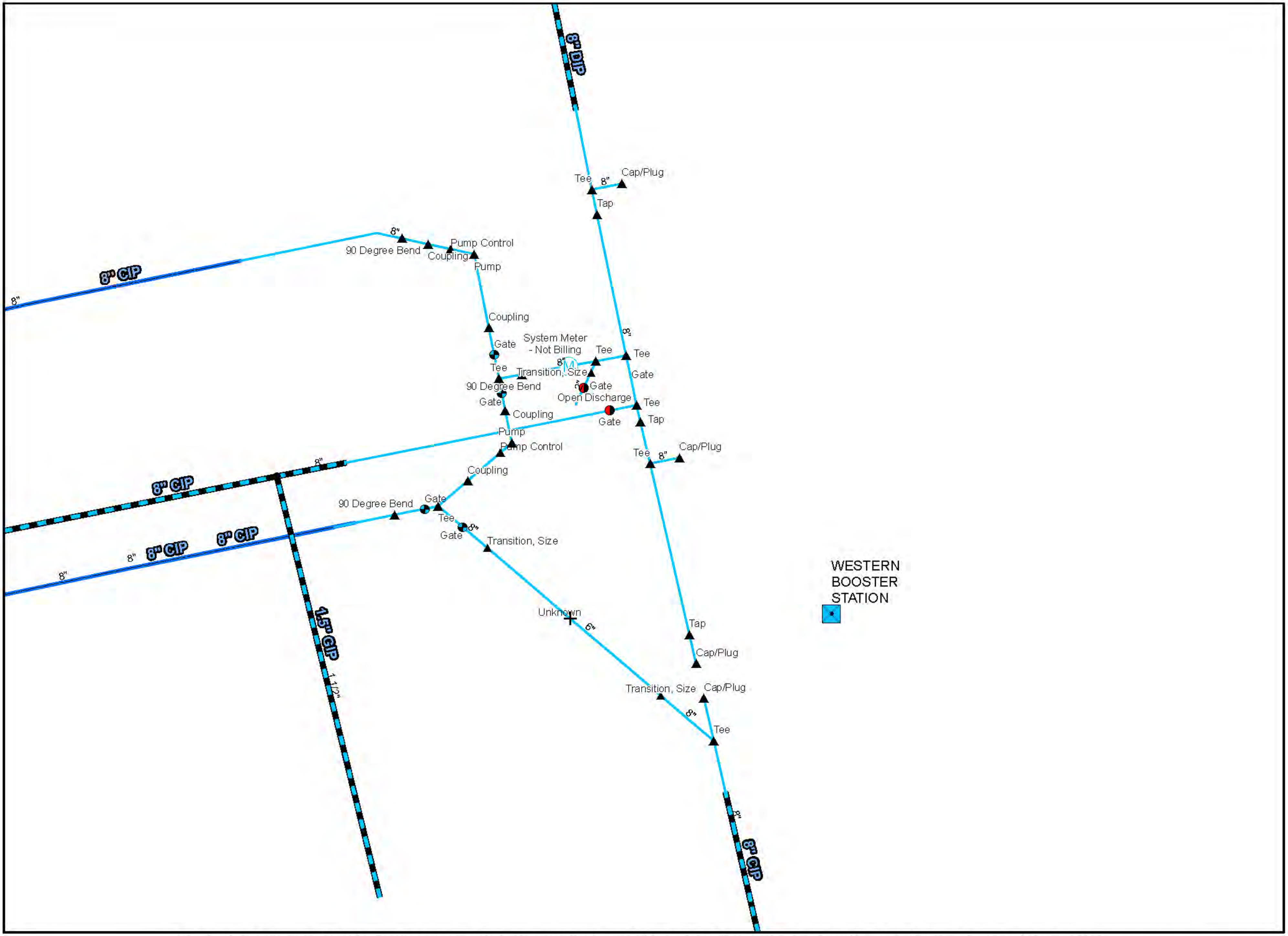
- Instrumentation:
    - Replace non-functional 8” flow meter.
    - Add flow meters to annual calibration check schedule.

RECOMMENDED IMPROVEMENTS

Improvement Description	Budgetary Construction Cost
Electrical system upgrade including service conductors, RVSS motor starter (x2), and associated power conductors.	$ 68,640
Rebuilding all hydraulic control valve	$ 17,136
Install new 8" flow meter	$ 25,000
Rebuild intake piping and valves	$ 85,000
Disconnect intake piping from abandoned filter piping	$ 50,000
Prep, recoat and paint station valves and piping	$ 15,000
Subtotal (Exclusive of NMGRT)	**$ 260,776**

EXHIBIT 3.16 – WESTERN BOOSTER STATION:

WESTERN BOOSTER MECHANICAL PLAN, WESTERN BOOSTER STATION ELECTRICAL PLAN, AND WESTERN BOOSTER STATION ELECTRICAL ONE-LINE DIAGRAM



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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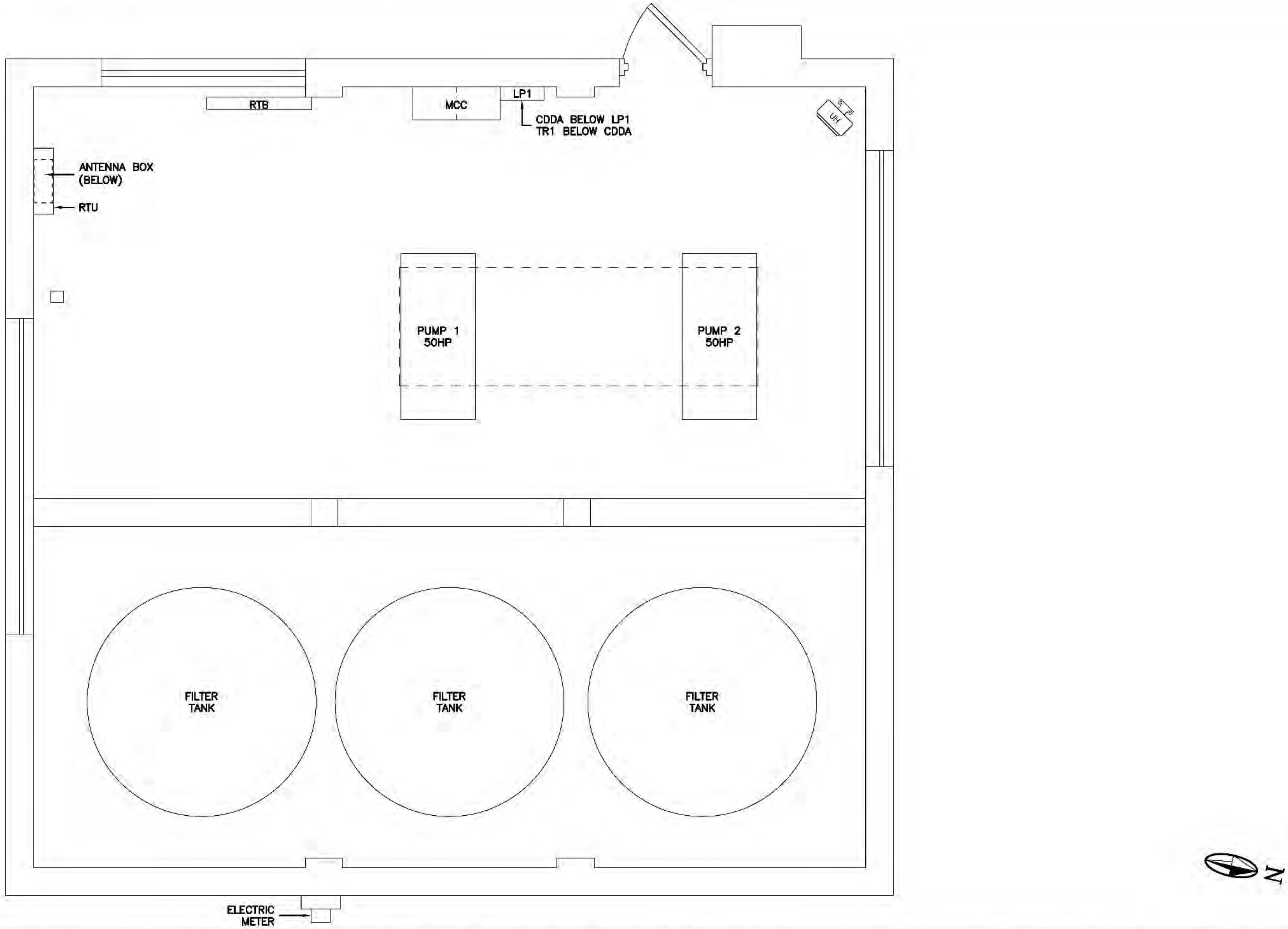
WESTERN BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

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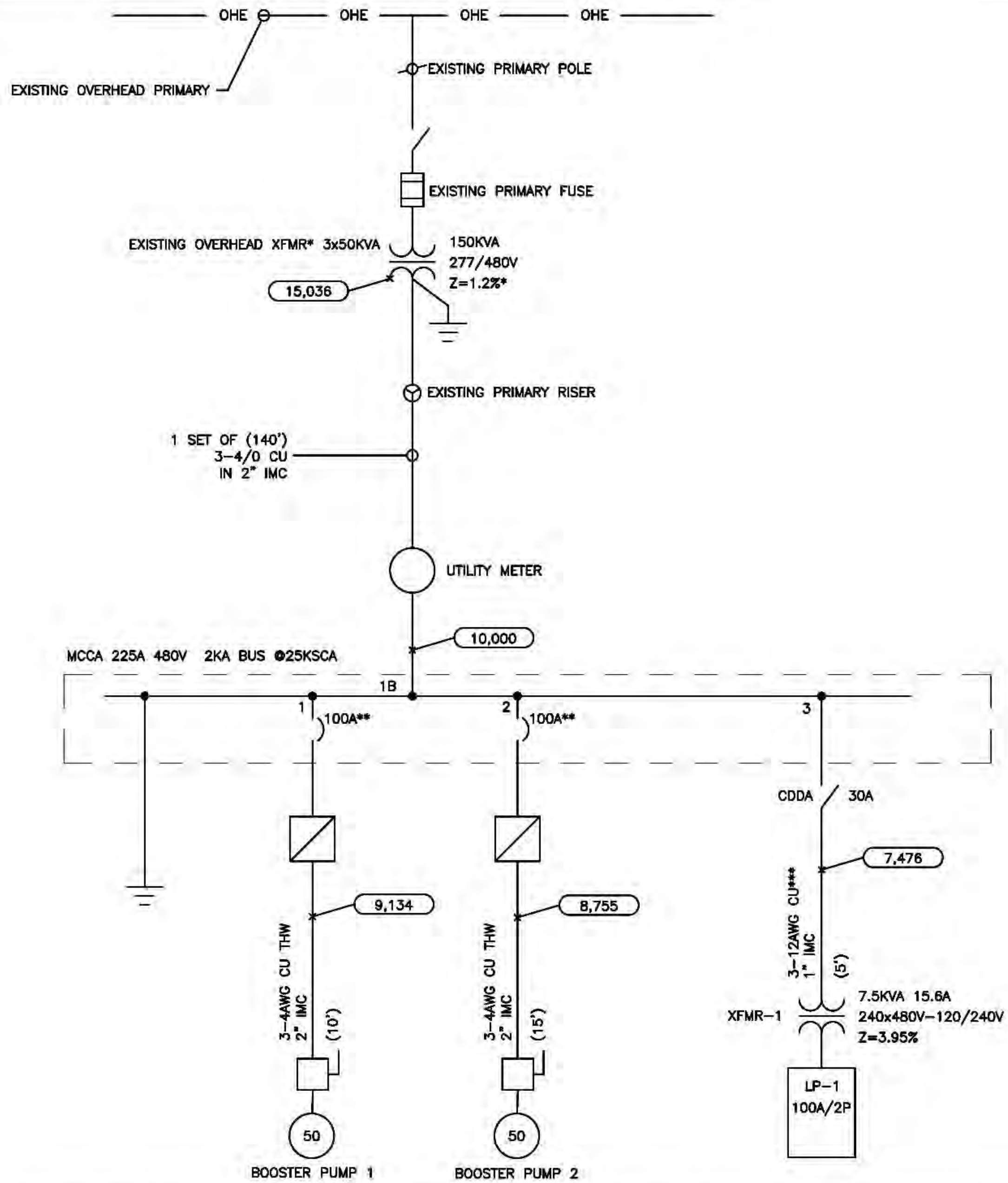
WESTERN BOOSTER STATION
ELECTRICAL PLAN



GENERAL NOTES

1. (15,036) = AVAILABLE 3Ø FAULT CURRENT (RMS, SYM. AMPS).
2. IF APPLICABLE, FAULT CURRENT NEXT TO MOTOR WOULD BE AT THE DISCONNECTING MEANS.
3. (170') = ESTIMATED CIRCUIT LENGTH IN FEET.
4. BREAKER AND CONDUCTOR RATINGS DO NOT MATCH. EITHER UPGRADE CONDUCTOR SIZE OR CHANGE BREAKER TO ACCOMMODATE 95A.
5. UNABLE TO DETERMINE THE OVERHEAD CONDUCTOR SERVICING THE STATION. USING APPROPRIATE SIZE FOR LOAD IN 1-LINE & CALCULATIONS (4/0 CU).

* OVERHEAD TRANSFORMER Z% UNKNOWN, USING LOWEST VALUE.

** TRIP SETTINGS ON 900A, FLA SET TO 69.2-76.8A. FLA OF MOTOR IS 63A.

*** CONDUCTOR UNKNOWN, USING APPROPRIATE SIZE IN 1-LINE & CALCULATIONS (12AWG CU).

1) CUTLER HAMMER HMCP100R3C
INSTANTANEOUS RATING: 900A
AIC RATING: 65KA
2) CUTLER HAMMER HMCP100R3C
INSTANTANEOUS RATING: 900A
AIC RATING: 65KA
3) CUTLER HAMMER
DISCONNECT 600V 30A

Los Alamos County DPU Water Production Facilities Electrical and Mechanical Condition Assessment and Evaluation - Los Alamos County, New Mexico

MOLZENCORBIN

WESTERN BOOSTER STATION
ELECTRICAL ONE-LINE DIAGRAM

4.0 MOTOR INSPECTION

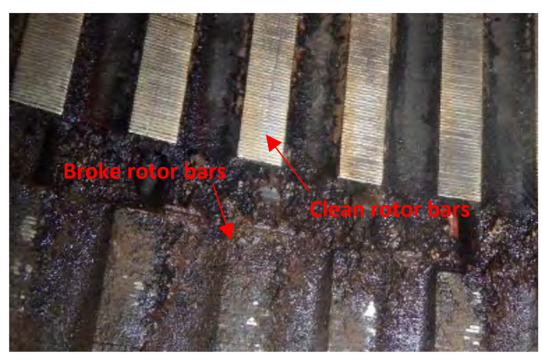
The motors in the water production system are critical components in the system. Motor failures can result in extended downtime and costly repairs. As discussed in Section 1.0, the expected life of a motor is up to 30 years. This life expectancy can be impacted by several factor, the primary for the County being the number of operational hours the motors run per year.

Warning signs of motor deterioration can included things such as higher operating current over time, winning sound when running, motor vibration, and similar. However, investigating a motor by visual inspection alone is not an accurate or reliable means to determine the potential life expectancy. Furthermore, the potential warning signs may only present themselves when it is already too late.

4.1 Observations

Per a recent event at Otowi Well 4, Operations reported atypical whining sounds being produced by the motor. The motor was removed and sent to Lane Electric for inspection and the following was reported:

> *"…we have found the rotor to have broken bars and will need to have a new iron stack and new bars installed. It appears the rotor bar failure is due to a varnish build up in the lower air vents in the stator. This was contacting the rotor iron during operation. This excessive heat was likely the root cause of the bar failures. The stator air vents will need to be cleared to prevent future failures.*



We recommend the upper and lower bearing temp probes be replaced along with the connection heads and the fluid couplings."

Fortunately for the County, the issue was identified before a catastrophic failure occurred. Unfortunate, the issues warranted a replacement of the motor and an extended downtime.

4.2 Recommendations

The life expectancy can be extended by the implementation of a good preventive maintenance plan. Because the condition of the existing motors is unknow, the first step would be to identify a schedule to begin to have the motors sent to a motor maintenance facility where they can be properly inspected. Ideally, this would entail teardown, inspection, steam cleaning, drying, reassembly and testing. The following table identifies the probably cost associated with this leave of inspection. The costs identified include removal, reinstallation, and freight costs per site. Combining sites and motors can reduce the respective freight costs for shipping the motors.

Since the condition of the motors is unknown, the first round of maintenance will likely identify potential repair recommendations. These potential costs will vary depending on the severity of the damage. The County should include a contingency budget in the event an issue is identified during the inspection. The budget should be proportional to the motor size and quantity.

TEARDOWN, INSPECTION AND BASIC RECONDITIONING

Improvement Description	Voltage	HP	Cost
Pajarito Well 1	480	250	$ 10,948
Pajarito Well 2	4160	600	$ 12,048
Pajarito Well 3	4160	500	$ 12,048
Pajarito Well 4	Engine Driven		
Pajarito Well 5	4160	700	$ 12,748
Guaje Well 1A (Inactive)	480	150	$ 10,748
Guaje Well 2A	480	150	$ 10,748
Guaje Well 3A	480	150	$ 10,248
Guaje Well 4A	480	150	$ 10,248
Guaje Well 5A	480	150	$ 10,248
Otowi Well 1 (Submersible)	2400	300	-
Otowi Well 2(1)	480	700	$ 13,748
Otowi Well 4(2)	4160	800	$ 13,748
Pajarito Booster Station 1	480	100 x 2	$ 20,096
Pajarito Booster Station 2	480	200 x 3	$ 32,244
Pajarito Booster Station 3	480	125 x 3	$ 24,344
Guaje Booster Station 1	480	150 x 3	$ 24,944
Guaje Booster Station 2	480	150 x 3	$ 24,944
Guaje Booster Station 3	480	150 x 3	$ 24,944
Guaje Filter Booster Station	480	100 x 2	$ 17,196
Otowi Booster Station 2	480	150 x 3	$ 24,944
North Fill Booster Station	480	100 x 2	$ 17,196
Barranca Booster Station 2	480	125 x 2	$ 17,196
Community Booster Station	480	60 x 2	$ 16,596
Quemazon Booster Station	480	100 x 2	$ 17,596
Shooting Range Booster Station	HP rating not applicable		
S-Site Booster Station 1	480	150 x 3	$ 24,944
S-Site Booster Station 2	480	40 x 3	$ 23,444
Western Booster Station	480	50 x 2	$ 16,596

1) Well installed in 2022.

2) Motor replaced in 2022.

5.0 IMPROVEMENTS SUMMARY

The improvements identified in this Assessment are summarized in the following Section. The probable construction cost identified is Molzen Corbin's best estimate based on the current pricing. Due to the current construction environment, there is a lot of volatility that can significantly impact cost and equipment lead-time.

The pricing associated with the hydraulic control valves (HCVs) assumes each site is completed individually. Suppose the County elects to complete this work as part of a preventive maintenance program and hire the maintenance firm directly. In that case, they will avoid the General Contractor markup, and consolidating sites would reduce travel time and ultimately cost.

Recent failure of a transformer failure in Albuquerque, New Mexico. Loss of power to high profile businesses, melted insulation on secondaries, primary feeders vaporized, and fire.

Similarly, placing the transformers on a preventive maintenance schedule would result in similar savings. The cost difference in the transformer maintenance is due to the transformer size. Transformers 500 kVA and below generally do not include power factor testing but can be included if desired. Oil-filed transformers or known for their reliability and longevity and are often placed into service and forgotten. Although failures are uncommon when a failure occurs, it can be catastrophic equipment, the distribution system, and fires.

As recently experienced with Otowi Well 4, a motor failure is significant. The maintenance program identified herein is highly recommended because there are no effective means to identify the motors health by field inspection only. As noted in Section 4.0, the budgetary costs are for general inspection and cleaning, and therefore the County may expect to see the inspection impact these prices.

The following is the prioritized list of improvements as defined by the Los Alamos County Department of Public Utilities.

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
1	PW1, 2, 3 & 5, GW2A, 3A, 4A & 5A	Motor inspection (11 motors).	$ 89,284	**$ 124,997.00**
		Contingency for corrections (40%) (inc/ temp & vibration sensors & SCADA connection).	$ 35,713	
2	PW1, PW2, PW3, PW4, PW5, OW1, OW2, OW4, GW2A, GW3A, GW4A, GW5A	Equipment acquisition and installation well depth/temperature/pressure data transducer with new cable.	$ 62,000	**$ 177,000.00**
		Eclectic and cable conduit and wire between depth sounder casing and SCADA RTB cabinet.	$ 65,000	
		SCADA connection and programming; including adding historic excel data into HSQ SCADA historian data base.	$ 50,000	
3	PW3	Electrical system upgrade RVSS motor starter, service disconnect, and associated power conductors.	$ 144,128	**$ 209,623.00**
		New facility control panel including connections to Shooting Range Booster Station instrumentation and controls.	$ 49,995	
		Prep, recoat and paint station valves and piping.	$ 7,500	
		Rebuilding all hydraulic control valves.	$ 8,000	
4	PW1	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 67,980	**$ 114,915.00**
		New facility control panel.	$ 39,435	
		Prep, recoat and paint station valves and piping.	$ 7,500	

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
5	PW2	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 224,400	**$ 271,335.00**
		New facility control panel.	$ 39,435	
		Prep, recoat and paint station valves and piping	$ 7,500	
6	PW4	Install check valve inside station building.	$ 50,000	**$ 67,500.00**
		Prep, recoat and paint station valves and piping.	$ 7,500	
		locate, excavate and remove check valve outside of station.	$ 10,000	
7	PW5	Install check valve inside station building.	$ 50,000	**$ 57,500.00**
		Prep, recoat and paint station valves and piping.	$ 7,500	
8	GW2A	Electrical system upgrade including service conductors, RVSS motor starter, site power meter, and associated power conductors.	$ 55,688	**$ 142,188.00**
		Service transformer testing and maintenance.	$ 4,000	
		Install check valve inside station building.	$ 75,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
9	GW3A	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$ 51,150	**$ 122,650.00**
		Service transformer testing and maintenance.	$ 4,000	
		Install check valve inside station building.	$ 60,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
10	GW4A	Electrical system upgrade including service conductors, and associated power conductors.	$ 26,136	**$ 98,636.00**
		Service transformer testing and maintenance.	$ 5,000	
		Install check valve inside station building.	$ 60,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
11	GW5A	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$ 54,120	**$ 126,620.00**
		Service transformer testing and maintenance.	$ 5,000	
		Install check valve inside station building.	$ 60,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
12	OW1	Electrical system upgrade including service conductors, Power Factor Correction Capacitor, RVSS motor starter, and associated power conductors.	$ 143,220	**$ 235,211.00**
		New facility control panel.	$ 37,991	
		Service Transformer Testing and Maintenance.	$ 4,000	
		Install new flow meter.	$ 50,000	
13	OW4	Electrical system upgrade including service conductors, RVSS motor starter, and associated power conductors.	$ 118,635	**$ 383,126.00**
		New facility control panel.	$ 37,991	
		Rebuilding all hydraulic control valve.	$ 24,000	
		Service transformer testing and maintenance.	$ 5,000	
		Install new flow meter.	$ 50,000	
		Install check valve inside station building.	$ 50,000	
		Relocate PRV inside station building and eliminate vault.	$ 75,000	
		Install 8" flap valve on end of drain line and eliminate check and butterfly valves and vault.	$ 15,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
14	ALL BOOSTER STATIONS	Motor inspection (38 motors).	$ 327,224	**$ 432,805.00**
		Contingency for corrections (40%) (inc/ temp & vibration sensors & SCADA connection).	$ 105,581	

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
15	SB1	Electrical system upgrade including service conductors, MPD, RVSS motor starter (x3), and associated power conductors.	$ 157,245	**$ 325,789.00**
		New facility control panel.	$ 48,840	
		Rebuilding all hydraulic control valve.	$ 25,704	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 15,000	
		Replumb PRV to serve all pump discharges.	$ 50,000	
		Replace auto valve no. 3 / pressure sustaining valve with County supplied valve.	$ 25,000	
16	OB2	Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 62,535	**$ 127,701.00**
		Rebuilding all hydraulic control valve.	$ 28,666	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
		Seal main pipeline inlet into station including new ss fasteners.	$ 25,000	
17	GB1	Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 103,158	**$ 197,862.00**
		Rebuilding all hydraulic control valve.	$ 25,704	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 15,000	
		New 16" flow meter on intake main line.	$ 50,000	
18	GB2	Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 96,030	**$ 140,734.00**
		Rebuilding all hydraulic control valve.	$ 25,704	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 15,000	

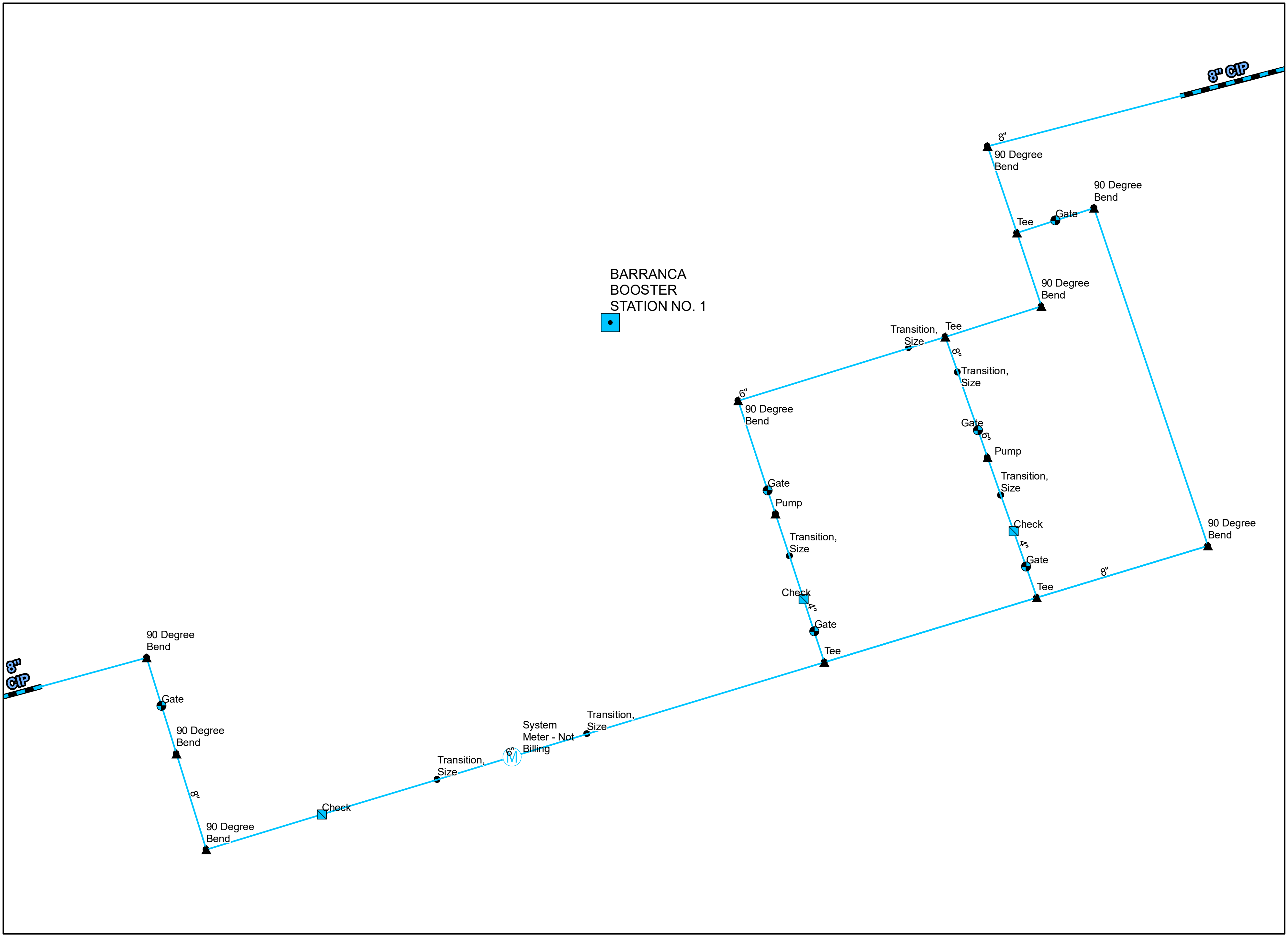
Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
19	GB3	Electrical upgrade including RVSS motor starter (x3) and associated power conductors.	$ 135,630	**$ 197,834.00**
		Rebuilding all hydraulic control valve.	$ 25,704	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
		Relocate Existing meter past tee serving Barranca Booster Station 2.	$ 25,000	
20	GFB	Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 89,694	**$ 118,330.00**
		Rebuilding all hydraulic control valve.	$ 17,136	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
21	BB2	Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 121,770	**$ 237,201.00**
		Rebuilding all hydraulic control valve.	$ 34,431	
		Service transformer testing and maintenance and service buss replacement.	$ 8,500	
		Prep, recoat and paint station valves and piping.	$ 7,500	
		New 10" flow meter serving only Baranca Booster Station 2.	$ 50,000	
		Replumb PRV valve from underneath slab floor.	$ 15,000	
22	CB	Rebuilding all hydraulic control valve.	$ 9,000	**$ 141,500.00**
		New 24" flow meter on discharge main line.	$ 75,000	
		Existing meter vault piping and valve rehab.	$ 50,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
23	WB	Electrical system upgrade including service conductors, RVSS motor starter (x2), and associated power conductors.	$ 68,640	**$ 260,776.00**
		Rebuilding all hydraulic control valve.	$ 17,136	
		Install new 8" flow meter.	$ 25,000	
		Rebuild intake piping and valves.	$ 85,000	
		Disconnect intake piping from abandoned filter piping.	$ 50,000	
		Prep, recoat and paint station valves and piping.	$ 15,000	
24	PB1	Rebuilding all hydraulic control valve.	$ 17,136	**$ 74,636.00**
		Prep, recoat and paint station valves and piping.	$ 7,500	
		Rebuild or replace pump intake isolation gate valves for each pump.	$ 50,000	
25	PB2	Rebuilding all hydraulic control valve.	$ 16,000	**$ 106,000.00**
		Prep, recoat and paint station valves and piping.	$ 15,000	
		Rebuild or replace pump intake isolation gate valves for each pump..	$ 75,000	
26	PB3	Rebuilding all hydraulic control valve	$ 8,000	**$ 98,000.00**
		Prep, recoat and paint station valves and piping.	$ 15,000	
		Rebuild or replace pump intake isolation gate valves for each pump.	$ 75,000	
27	NFB	Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 89,760	**$ 134,896.00**
		Replace valve pit grating.	$ 16,500	
		Rebuilding all hydraulic control valve.	$ 17,136	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	

Water Production Facilities Electrical and Mechanical Condition Assessment Priority List				
PRIORITY	SITE	DESCRIPTION	COST ESTIMATE	TOTAL COST ESTIMATE
28	QB	Electrical upgrade including RVSS motor starter (x2) and associated power conductors.	$ 62,535	**$ 127,701.00**
		Rebuilding all hydraulic control valve.	$ 28,666	
		Service transformer testing and maintenance.	$ 4,000	
		Prep, recoat and paint station valves and piping.	$ 7,500	
		Seal main pipeline inlet into station including new ss fasteners.	$ 25,000	
29	SB2	Electrical system upgrade including service conductors, RVSS motor starter (x3), and associated power conductors.	$ 118,553	**$ 144,257.00**
		Rebuilding all hydraulic control valve.	$ 25,704	
30	SRB	Install new utility power meter.	$ 6,518	**$ 136,518.00**
		Replace flow meter on discharge main line.	$ 5,000	
		Reconstruction of station interior including electrical, insulation, water-resistant sheathing and new pumps / motors, valving and piping.	$ 125,000	

APPENDIX A:

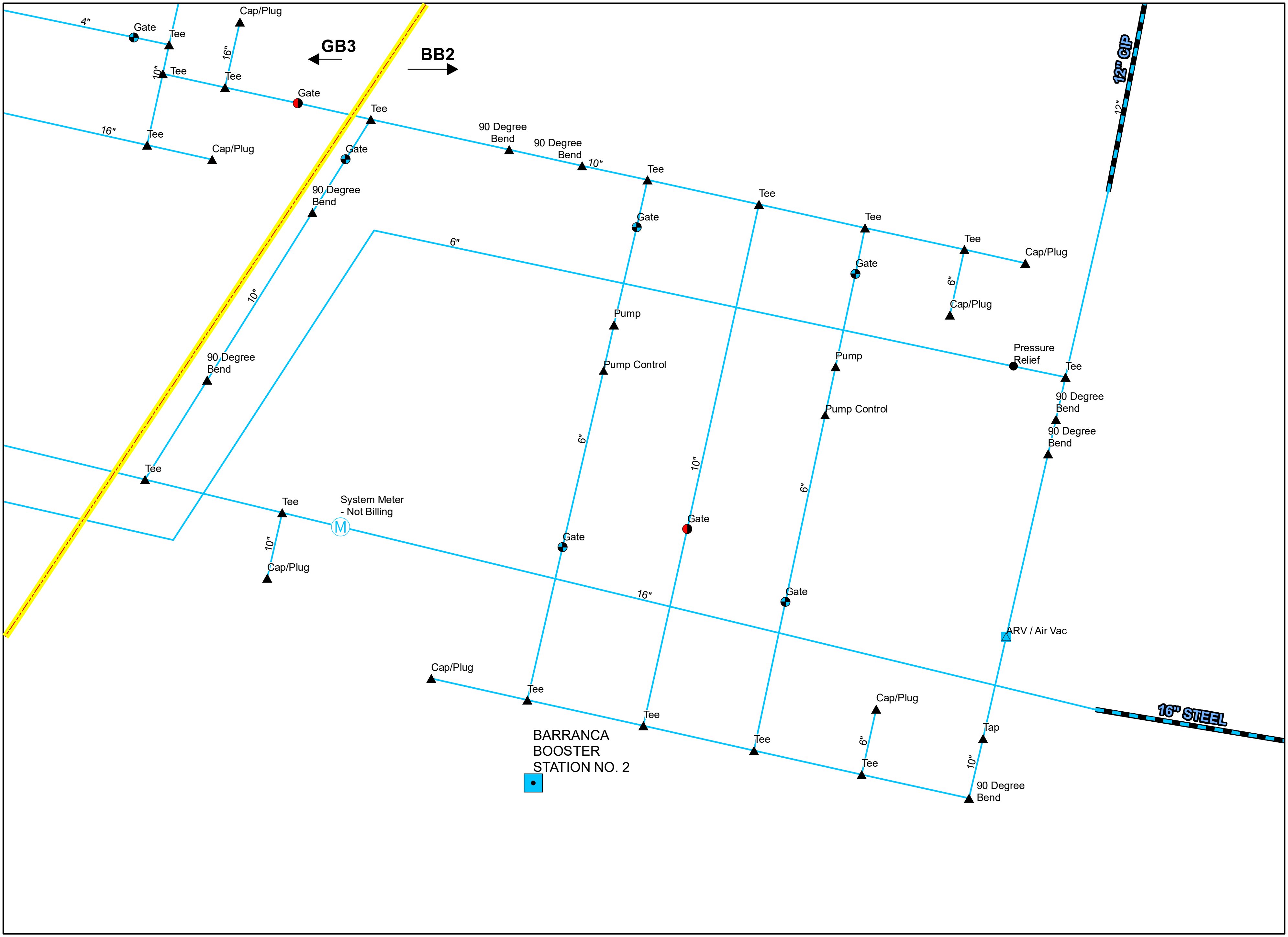
MECHANICAL PLANS FOR SITES



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

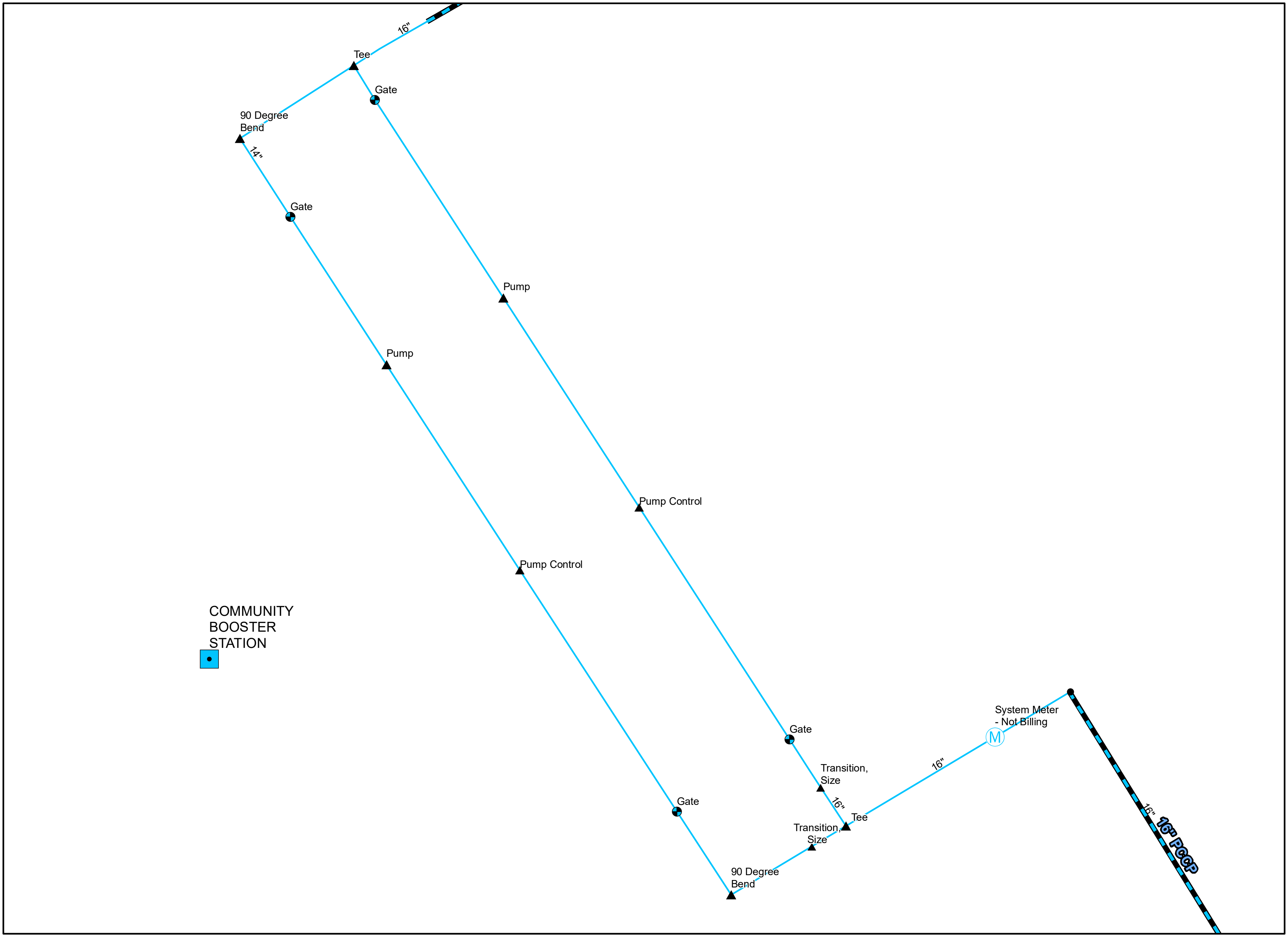
Barranca Booster No.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

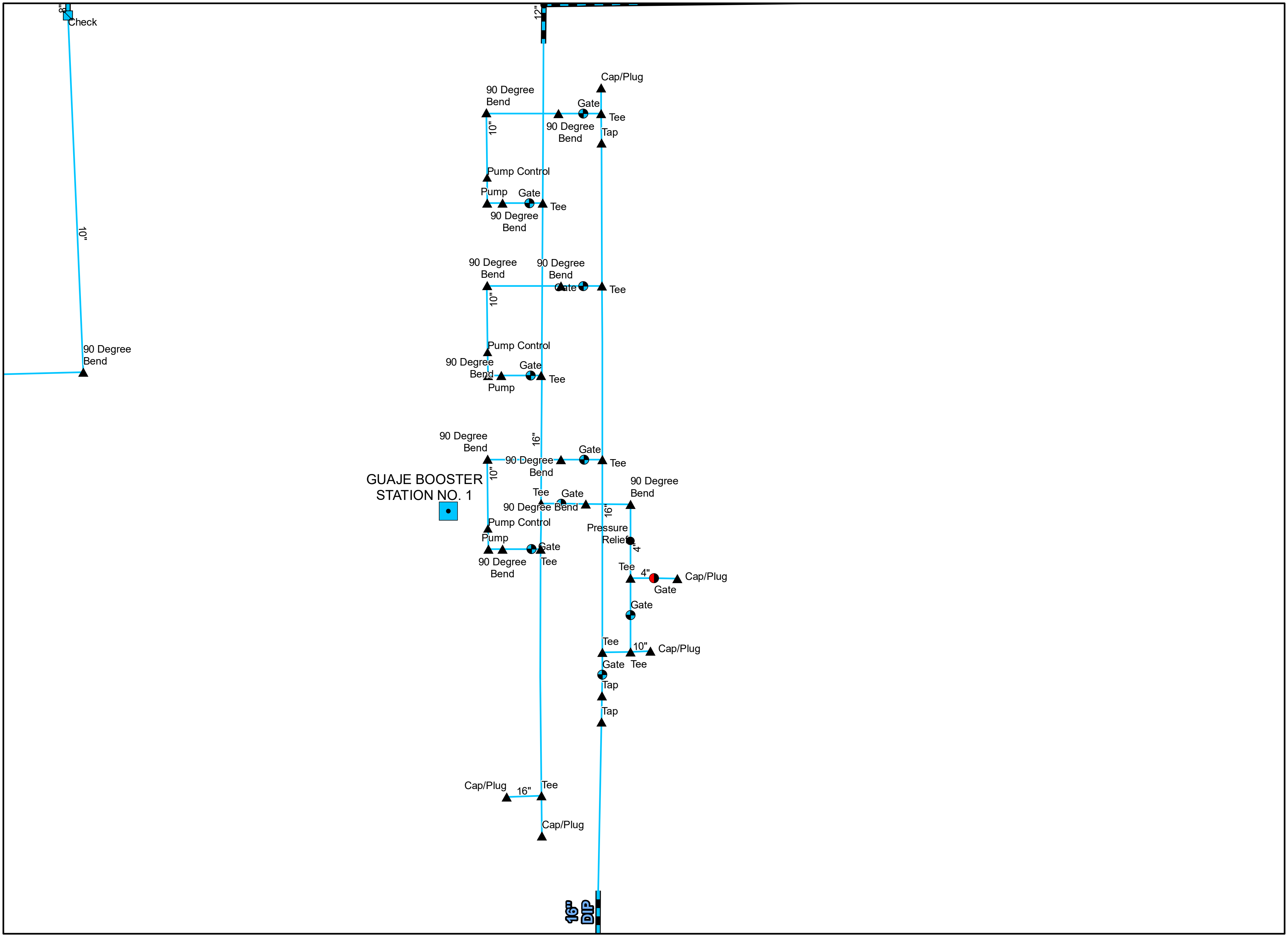
Barranca Booster No.2
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

COMMUNITY BOOSTER STATION
Mechanical Plan

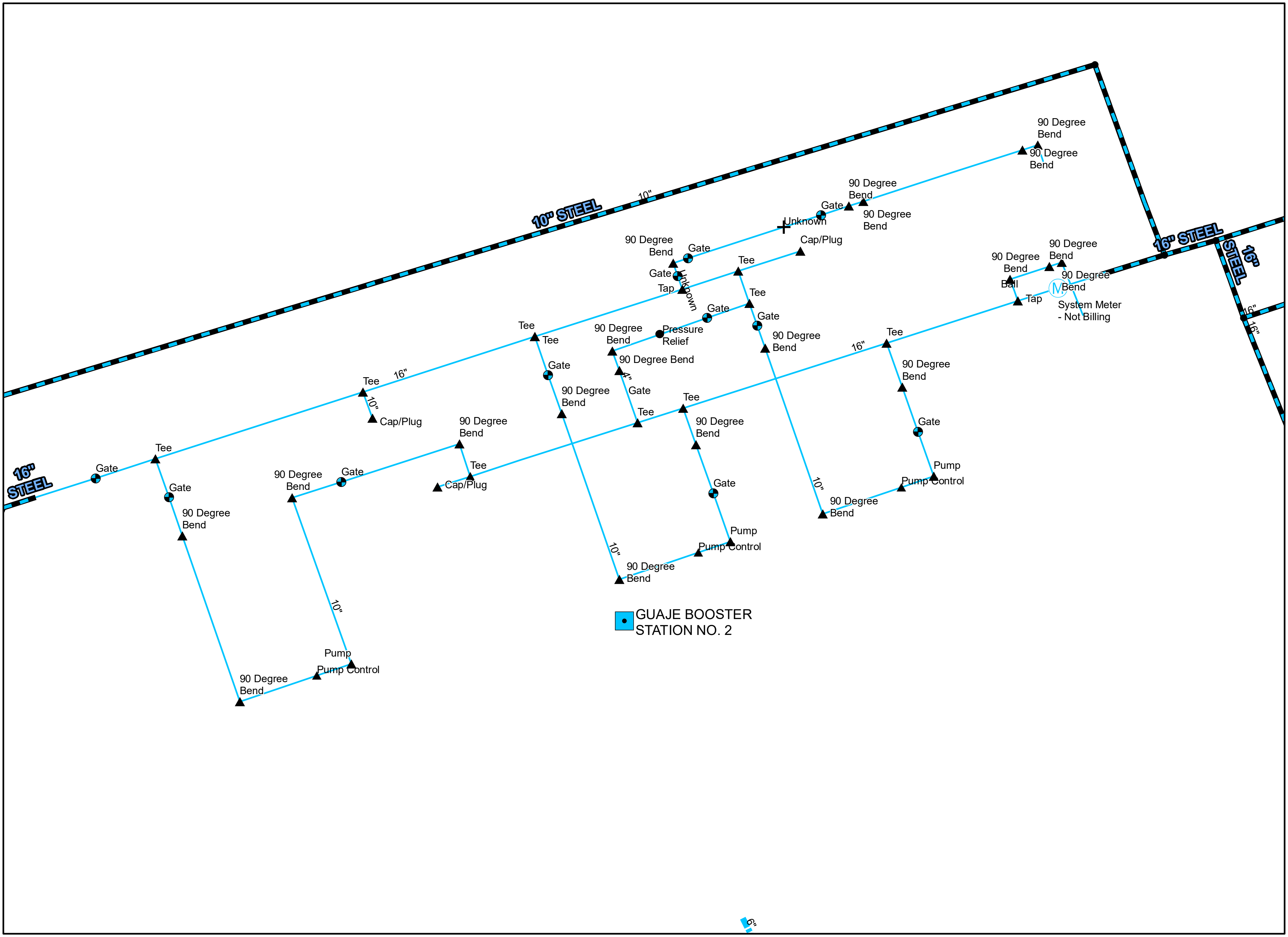
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

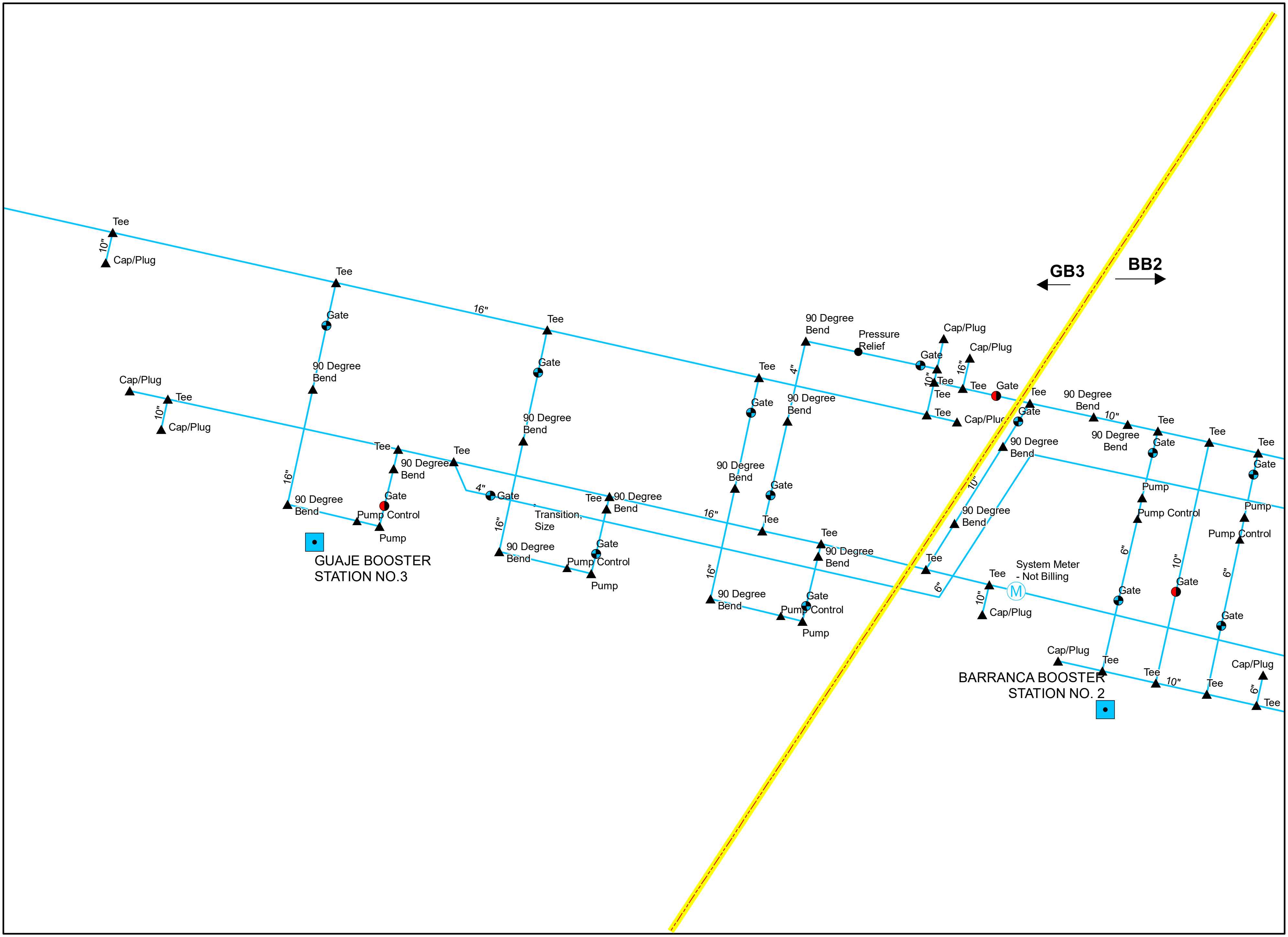
GUAJE BOOSTER NO.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

GUAJE BOOSTER NO.2
Mechanical Plan

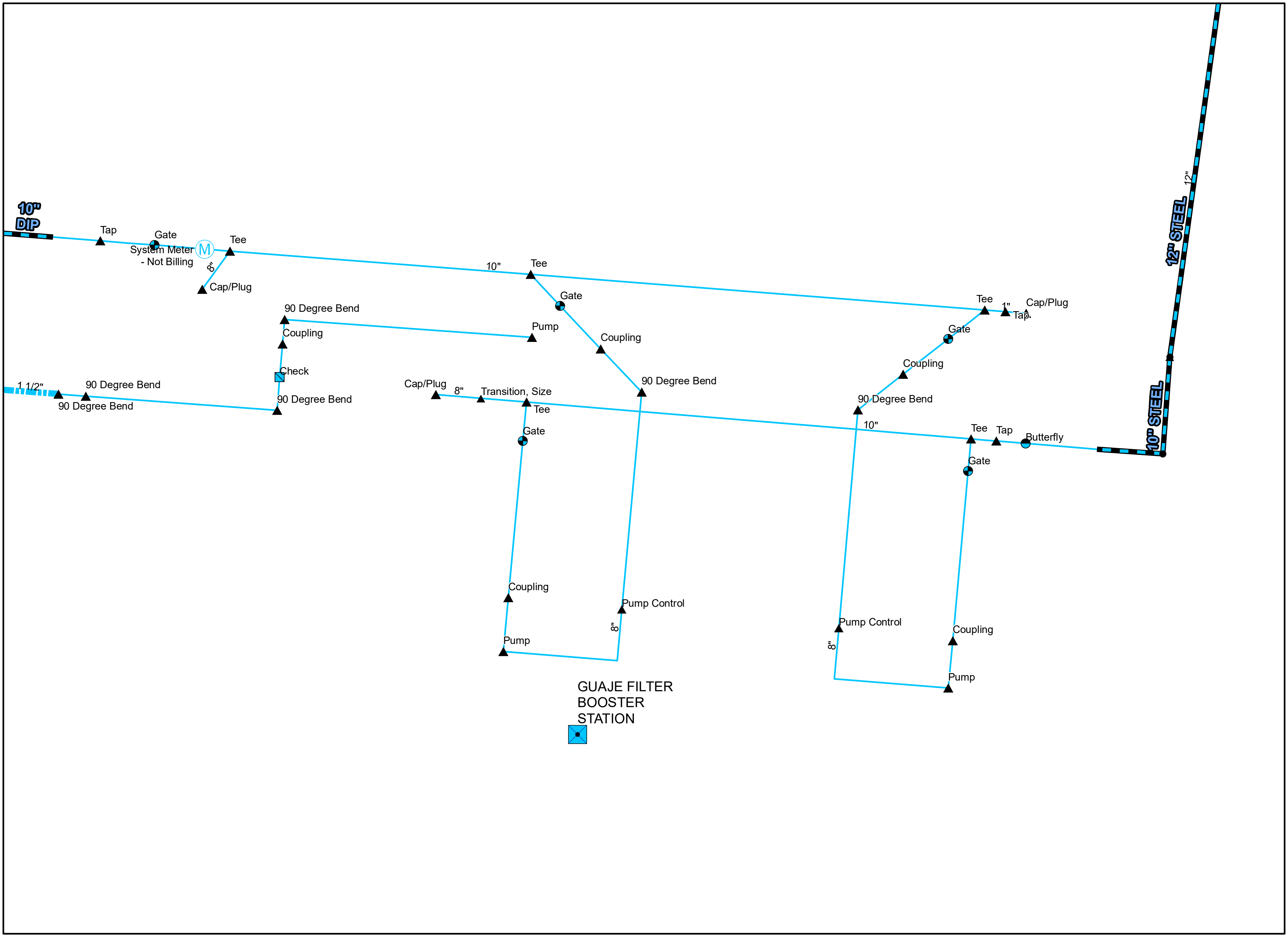
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

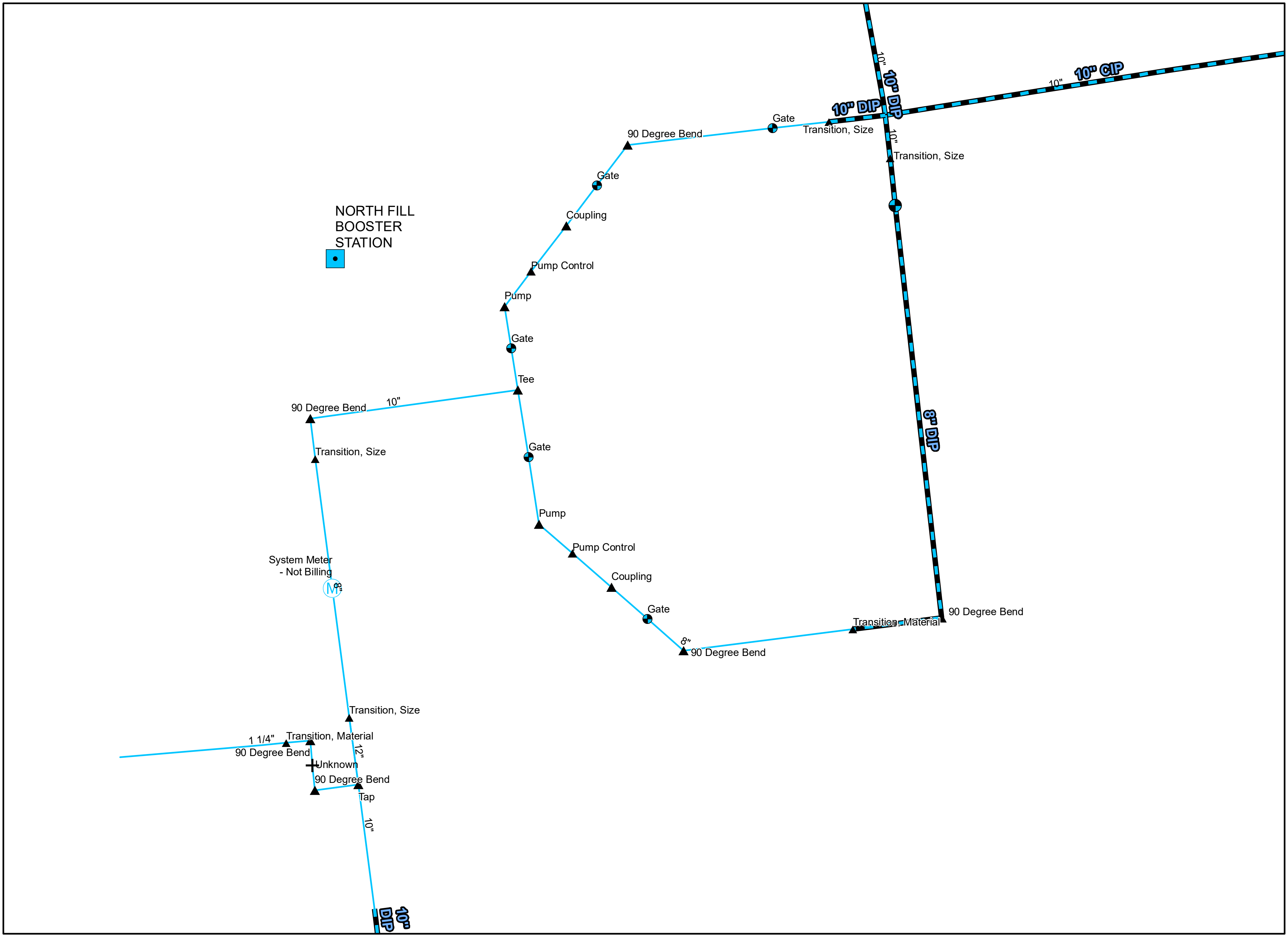
Guaje Booster No.3
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

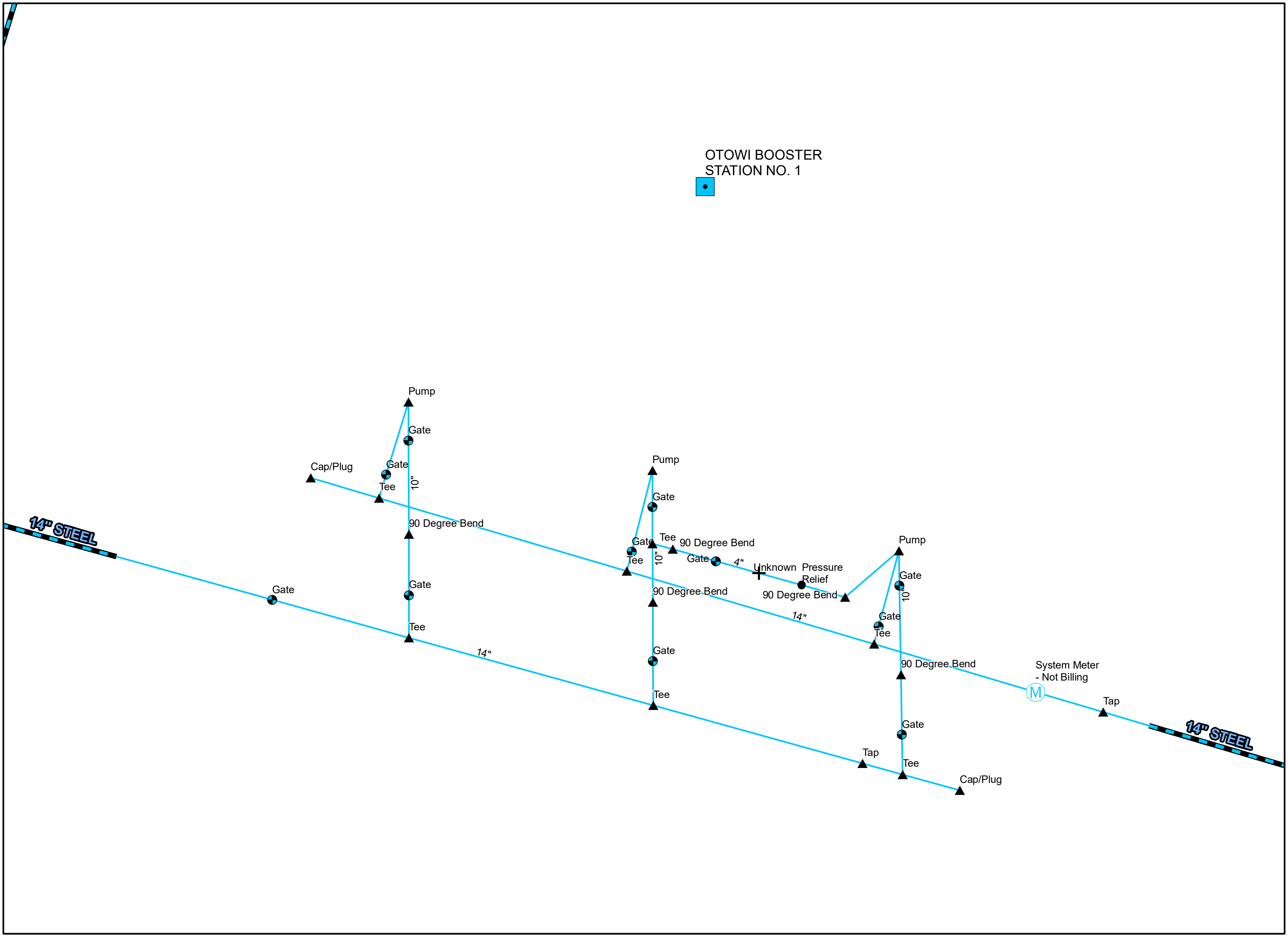
GUAJE FILTER BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

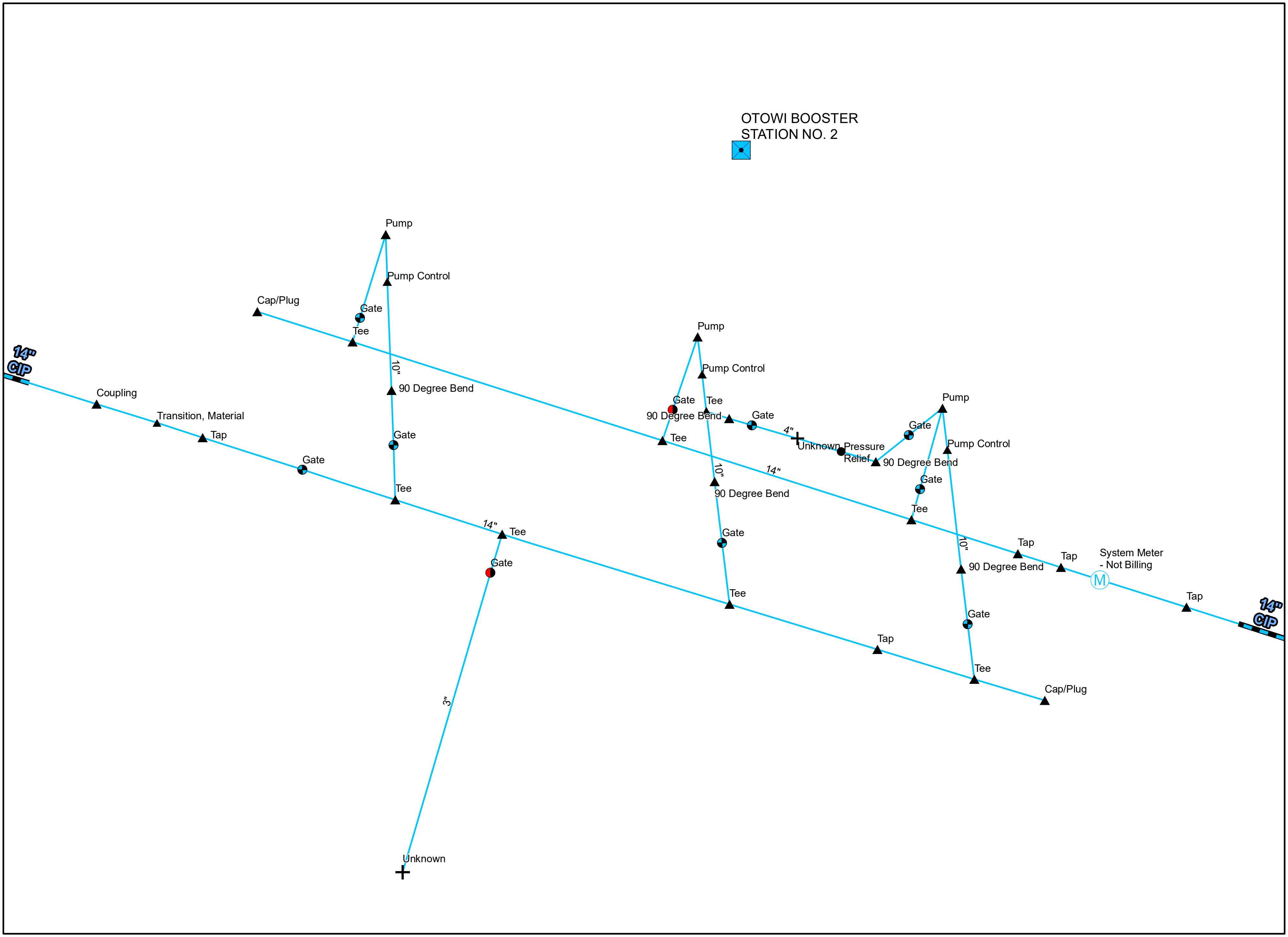
NORTH FILL BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

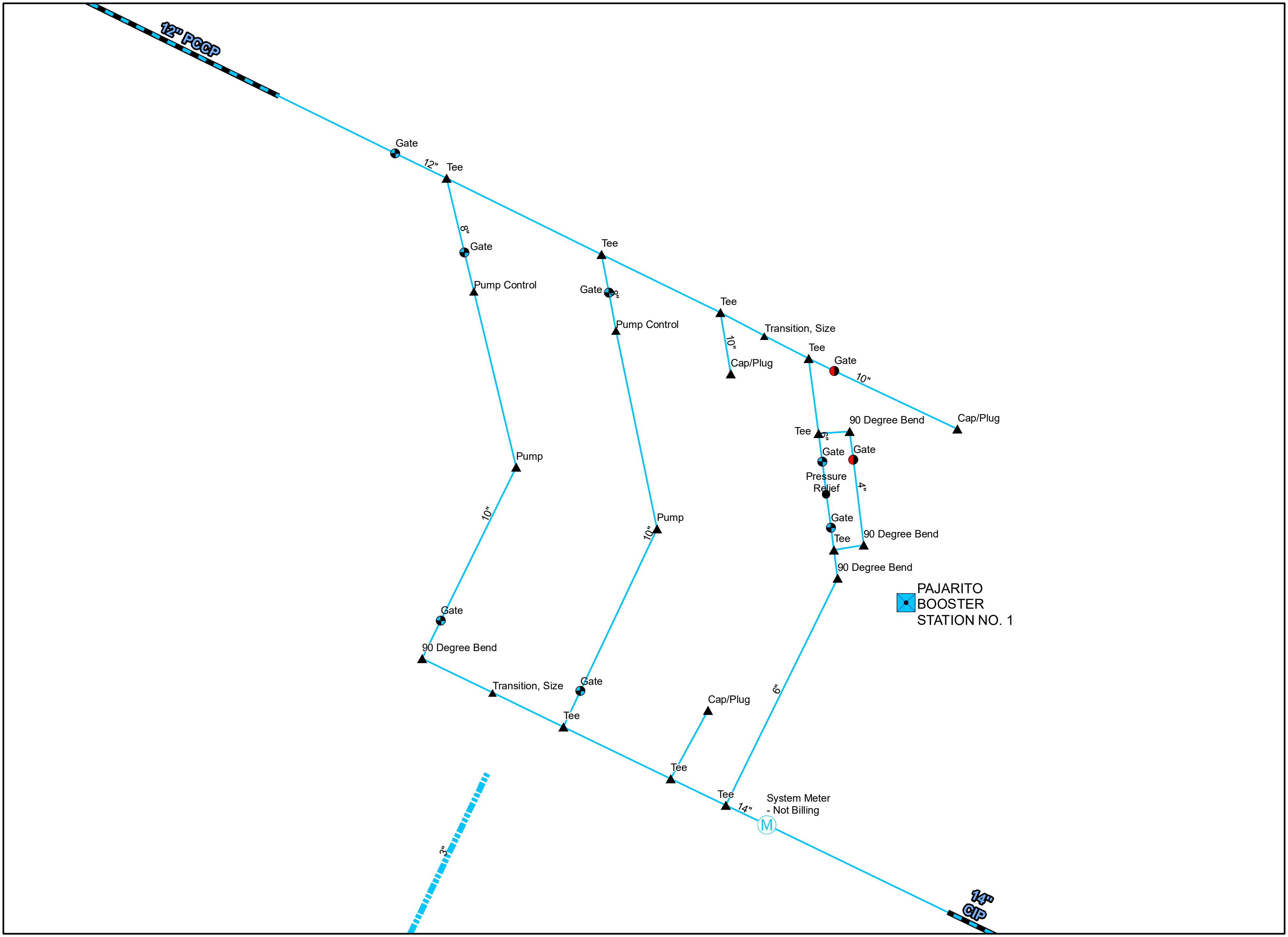
OTOWI BOOSTER NO.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

OTOWI BOOSTER NO.2
Mechanical Plan

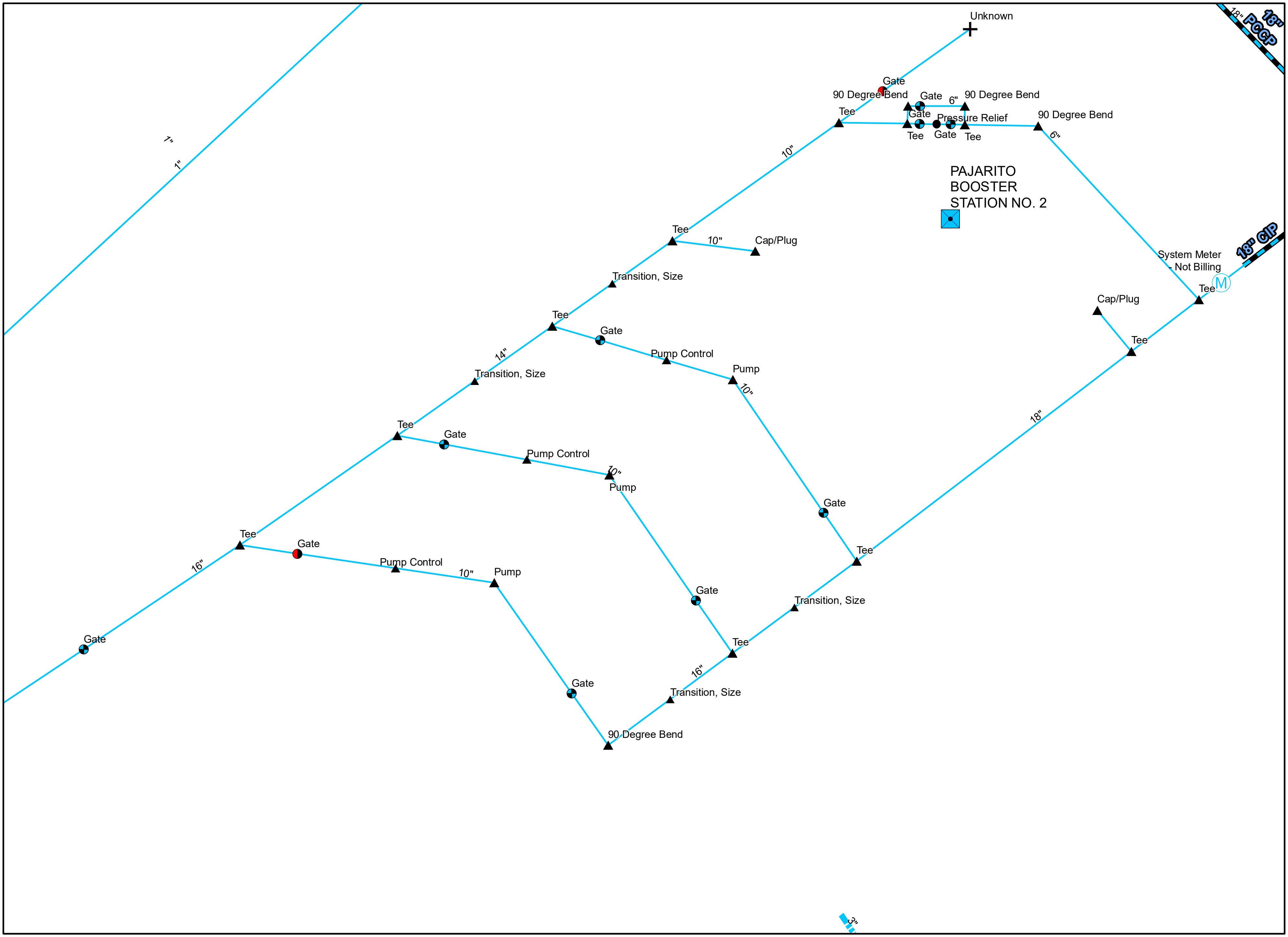
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

PAJARITO BOOSTER NO.1
Mechanical Plan

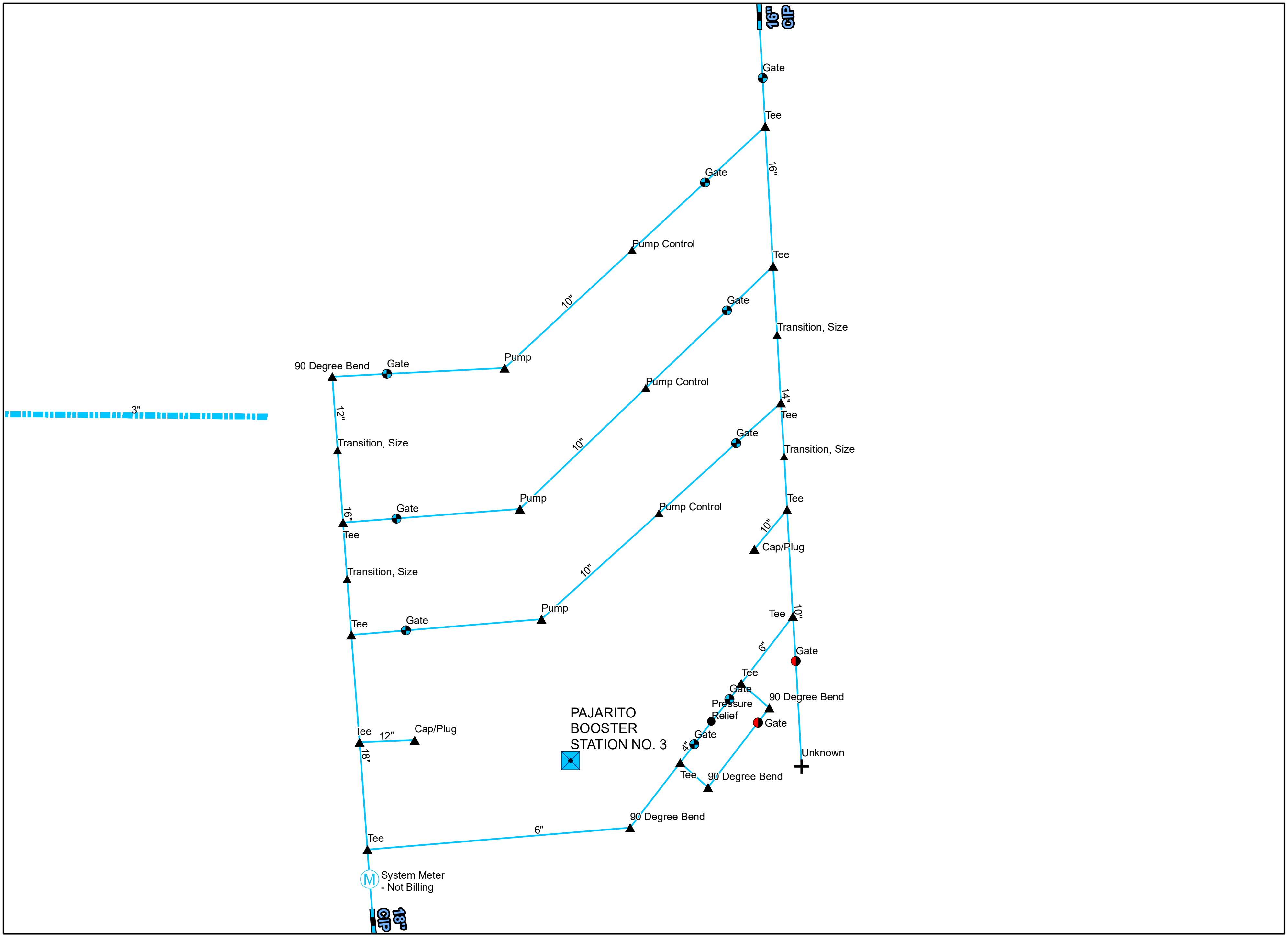
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

PAJARITO BOOSTER NO.2
Mechanical Plan

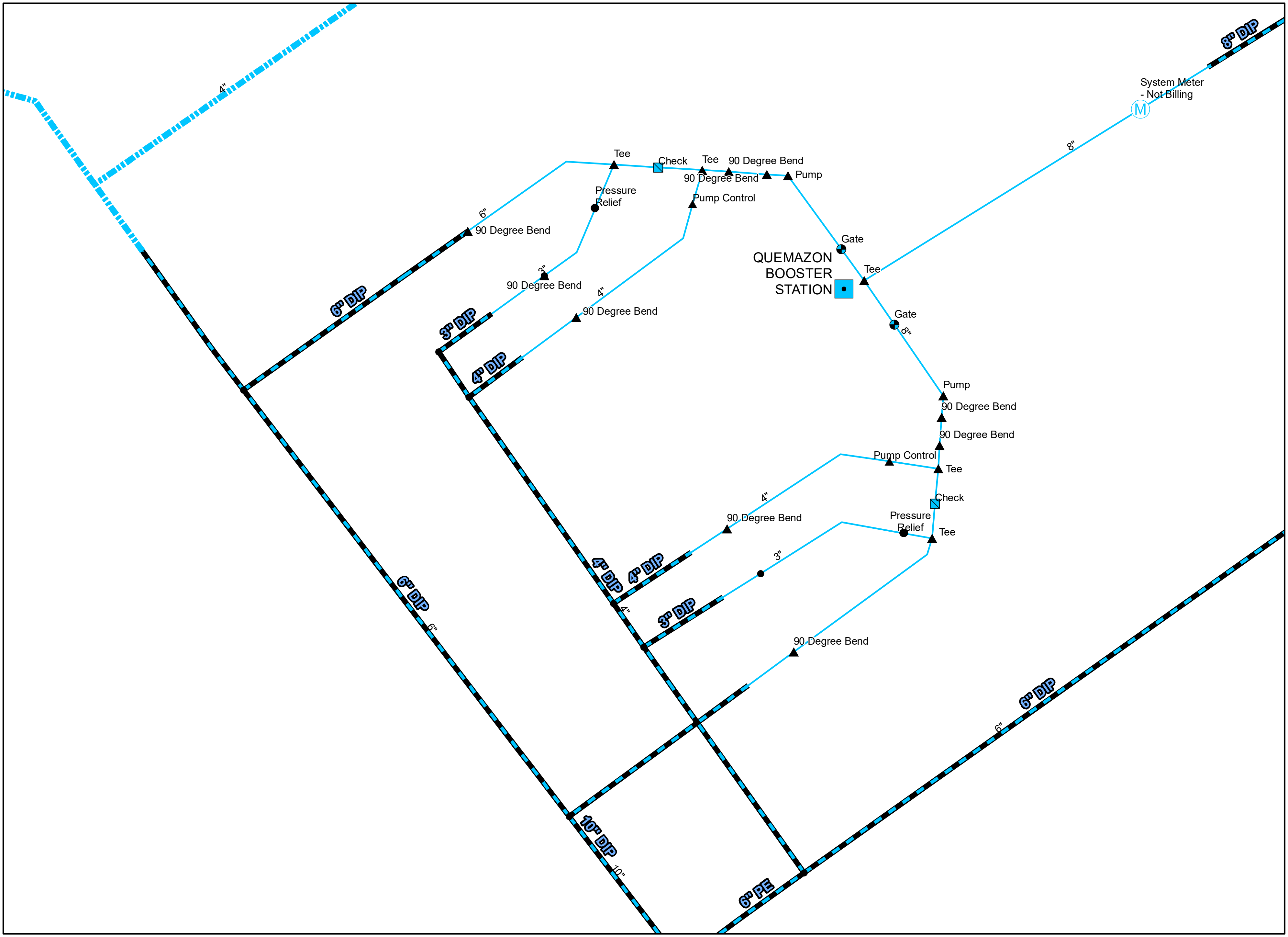
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

PAJARITO BOOSTER NO.3
Mechanical Plan

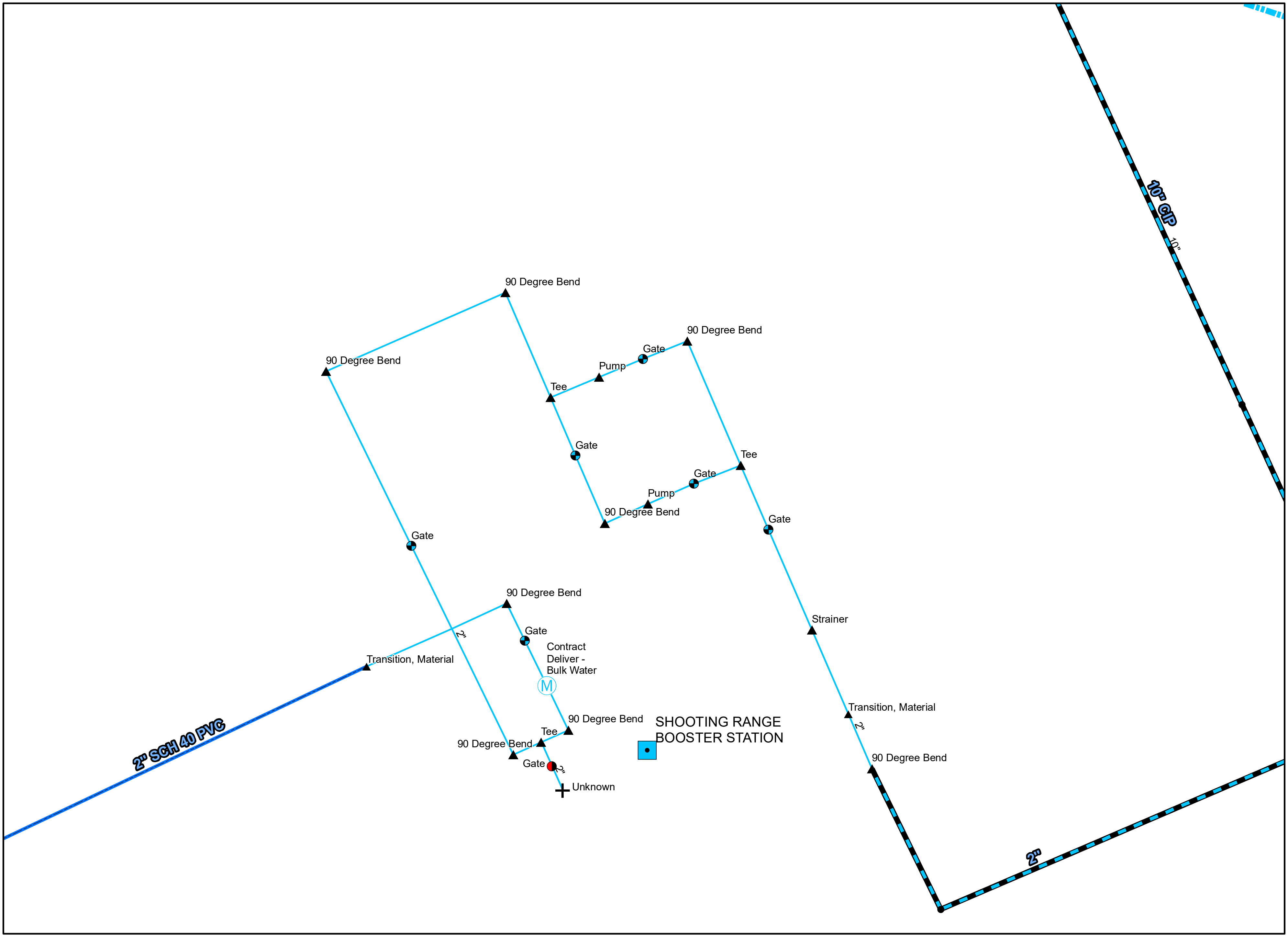
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

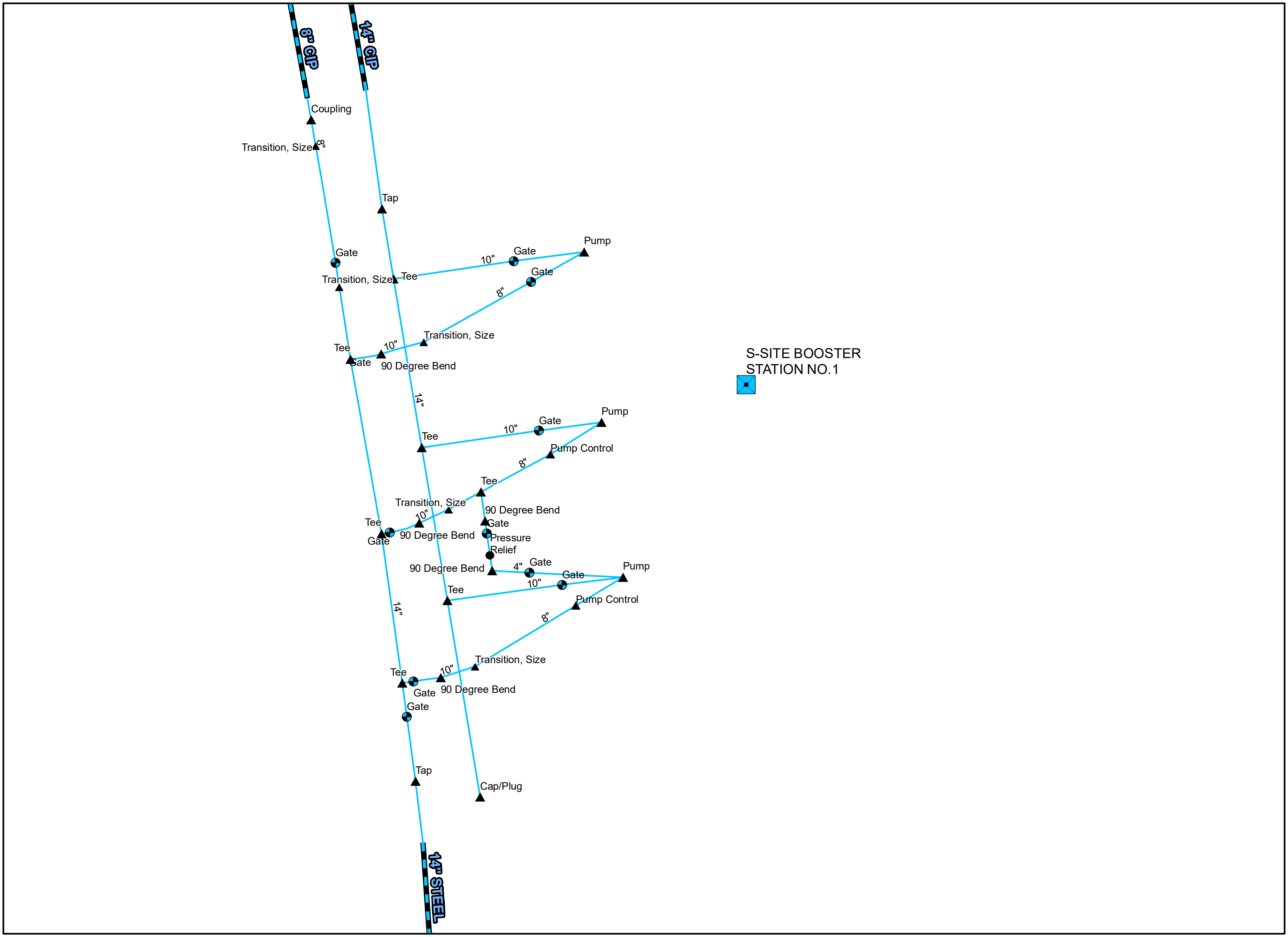
QUEMAZON BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

SHOOTING RANGE BOOSTER
Mechanical Plan

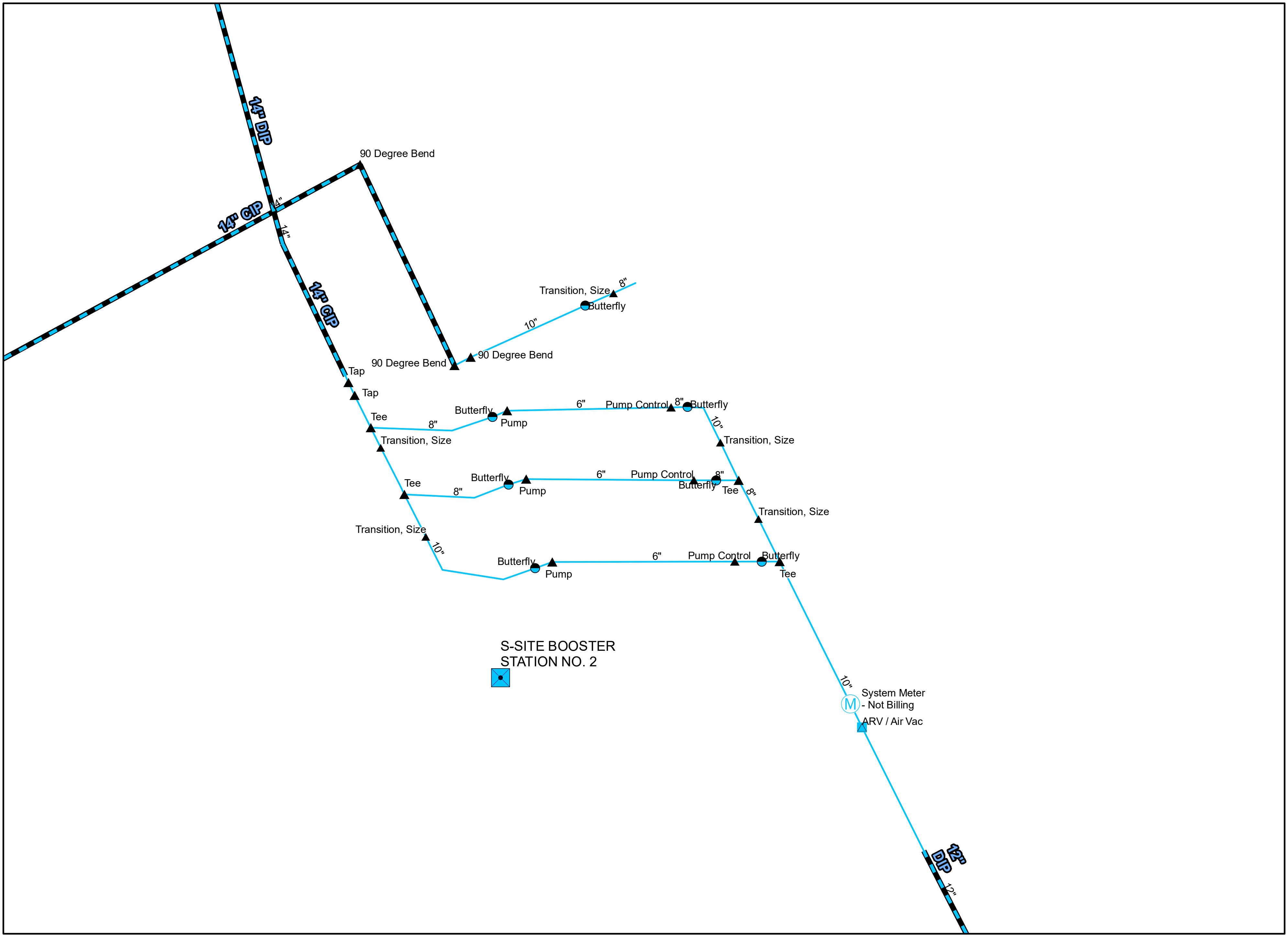
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

S-SITE BOOSTER NO.1
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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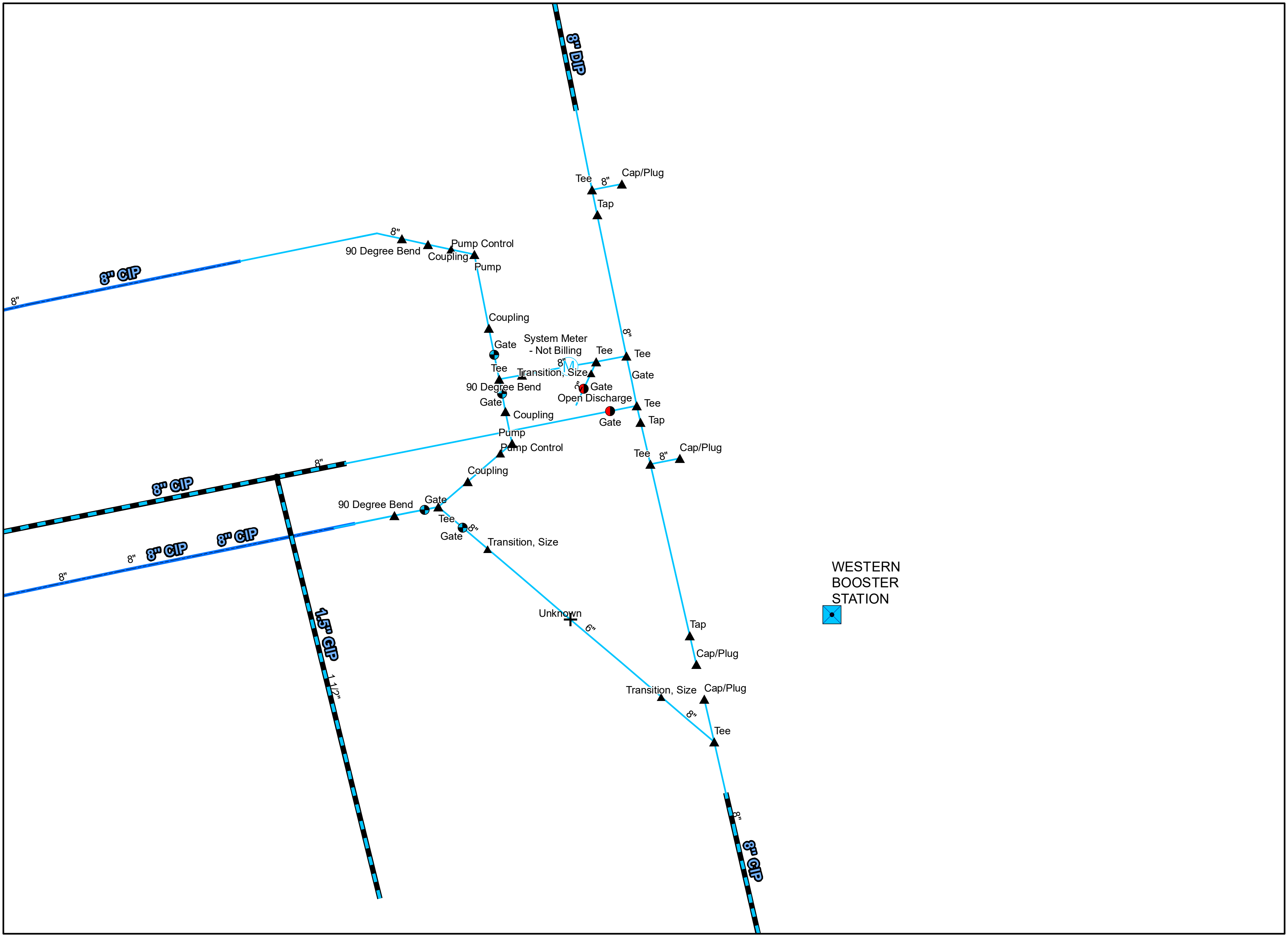
S-SITE BOOSTER NO.2
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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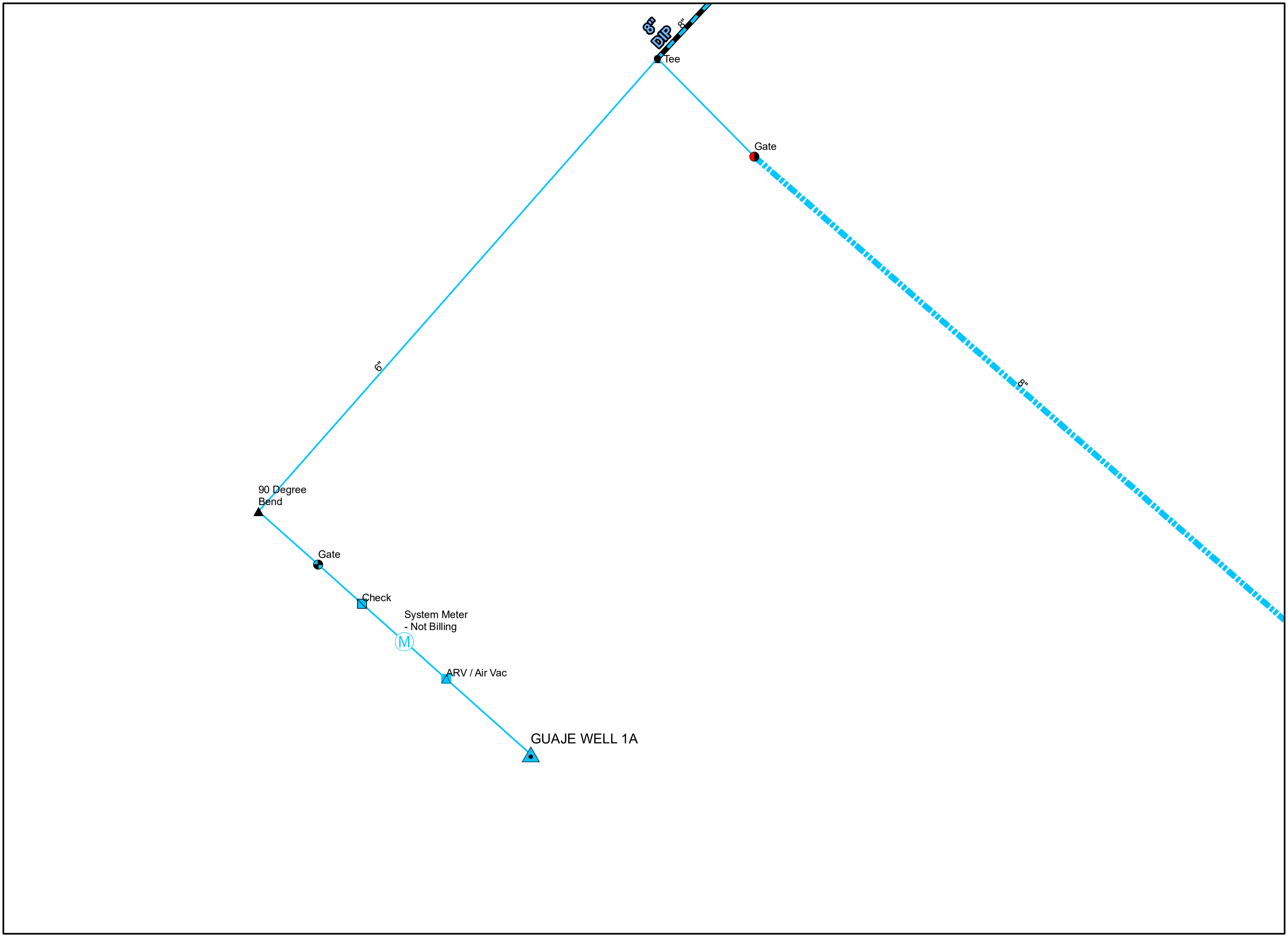
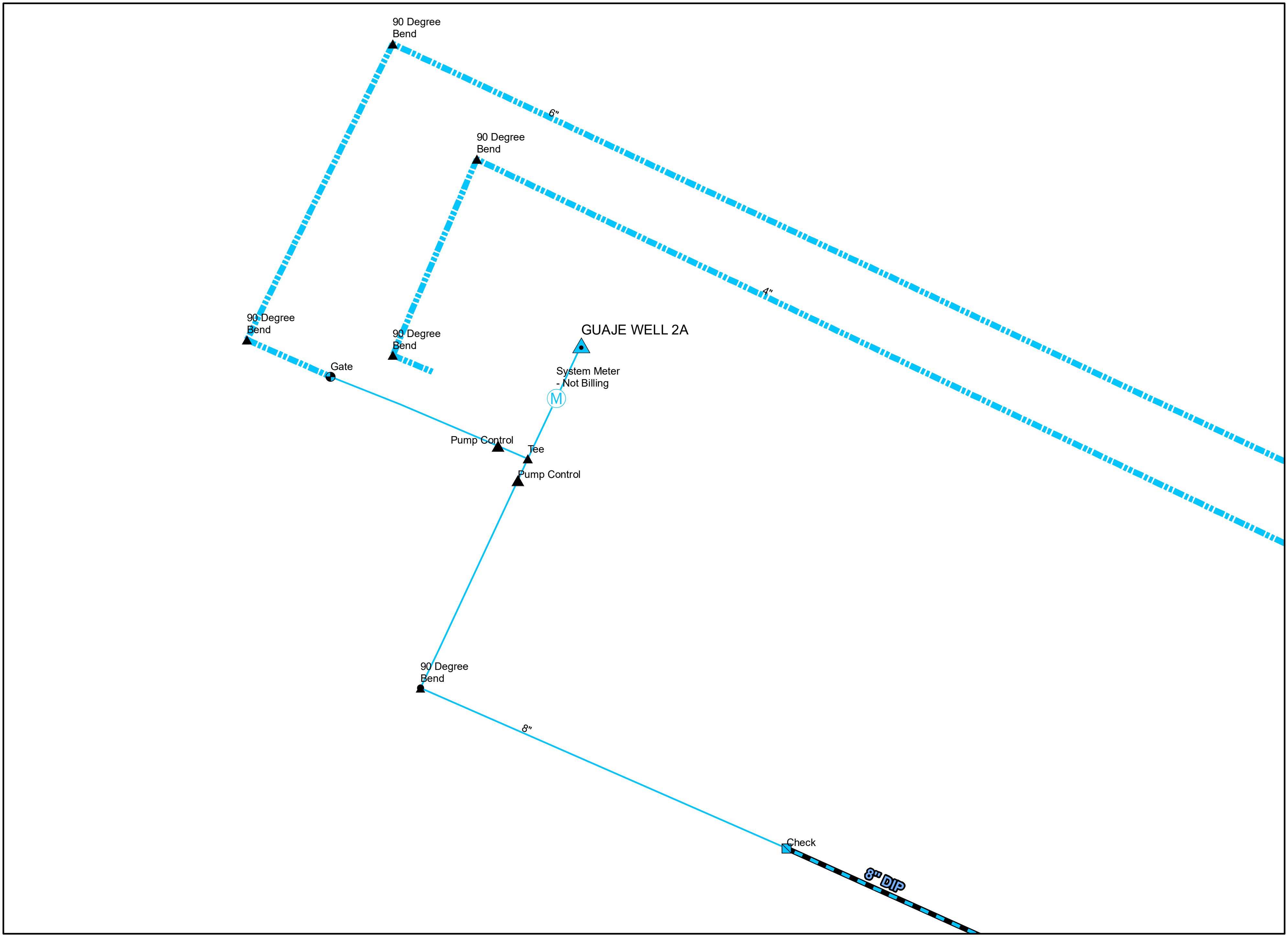
WESTERN BOOSTER
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

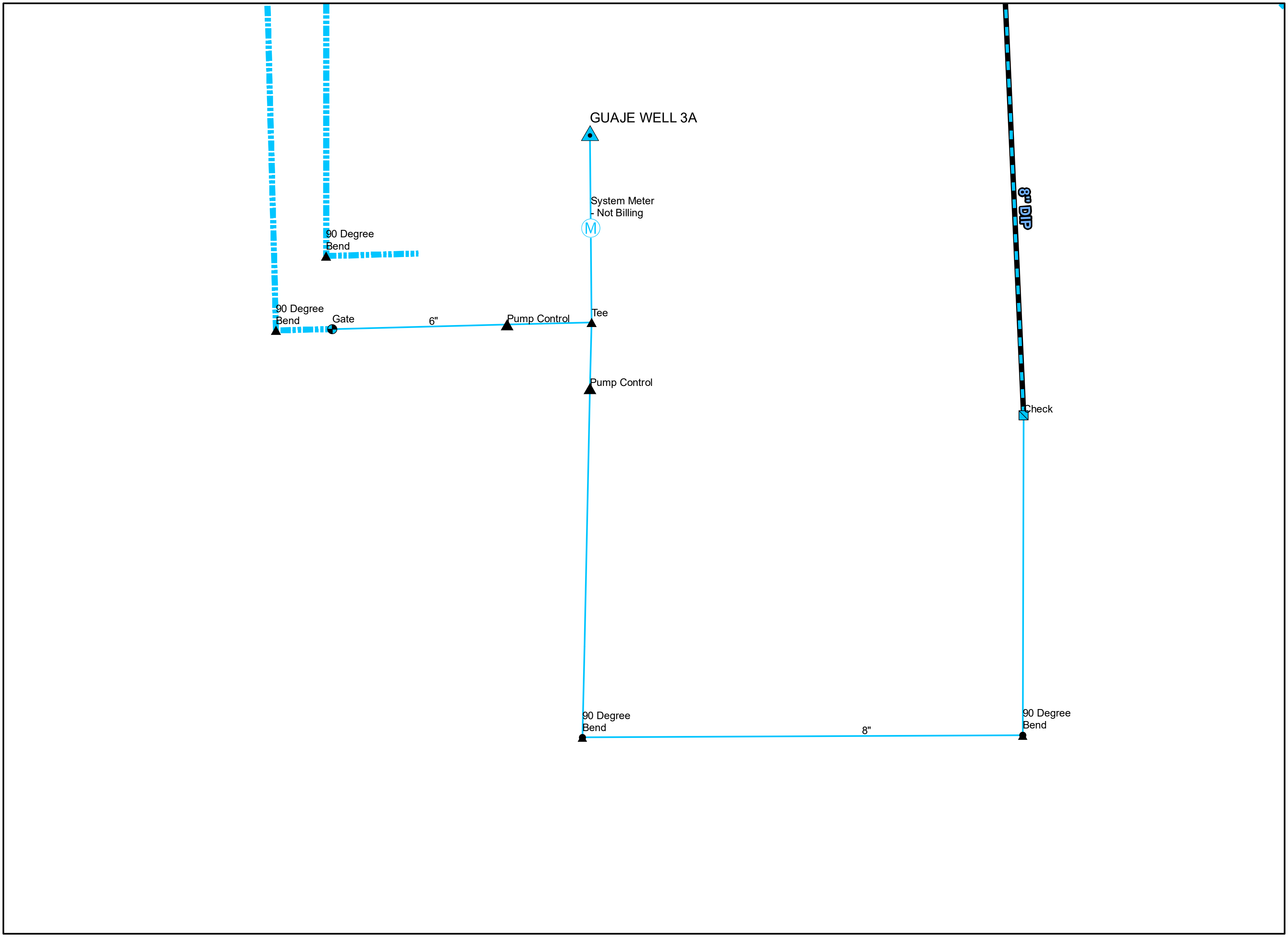
GUAJE WELL 1A
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

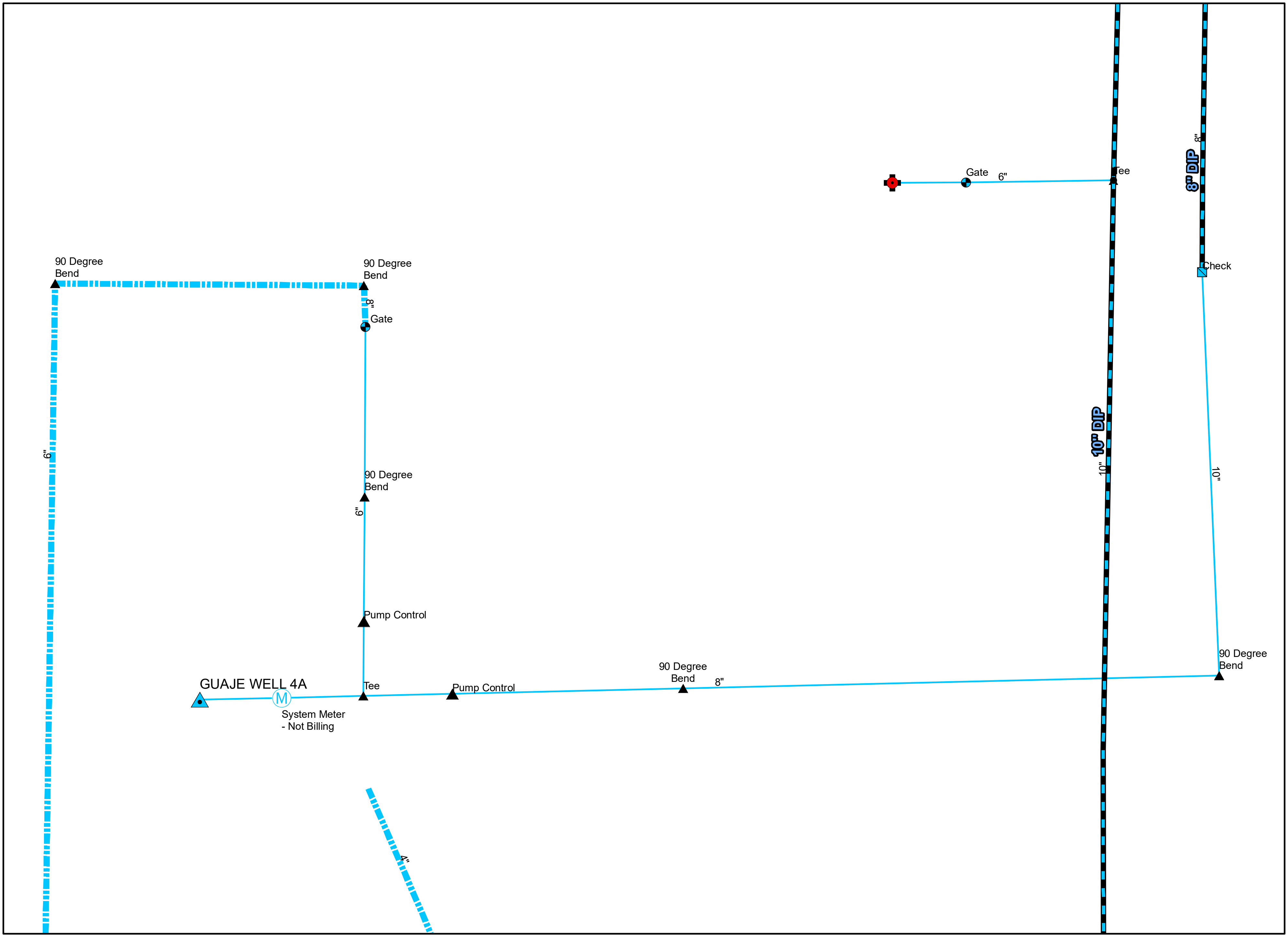
GUAJE WELL 2A
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

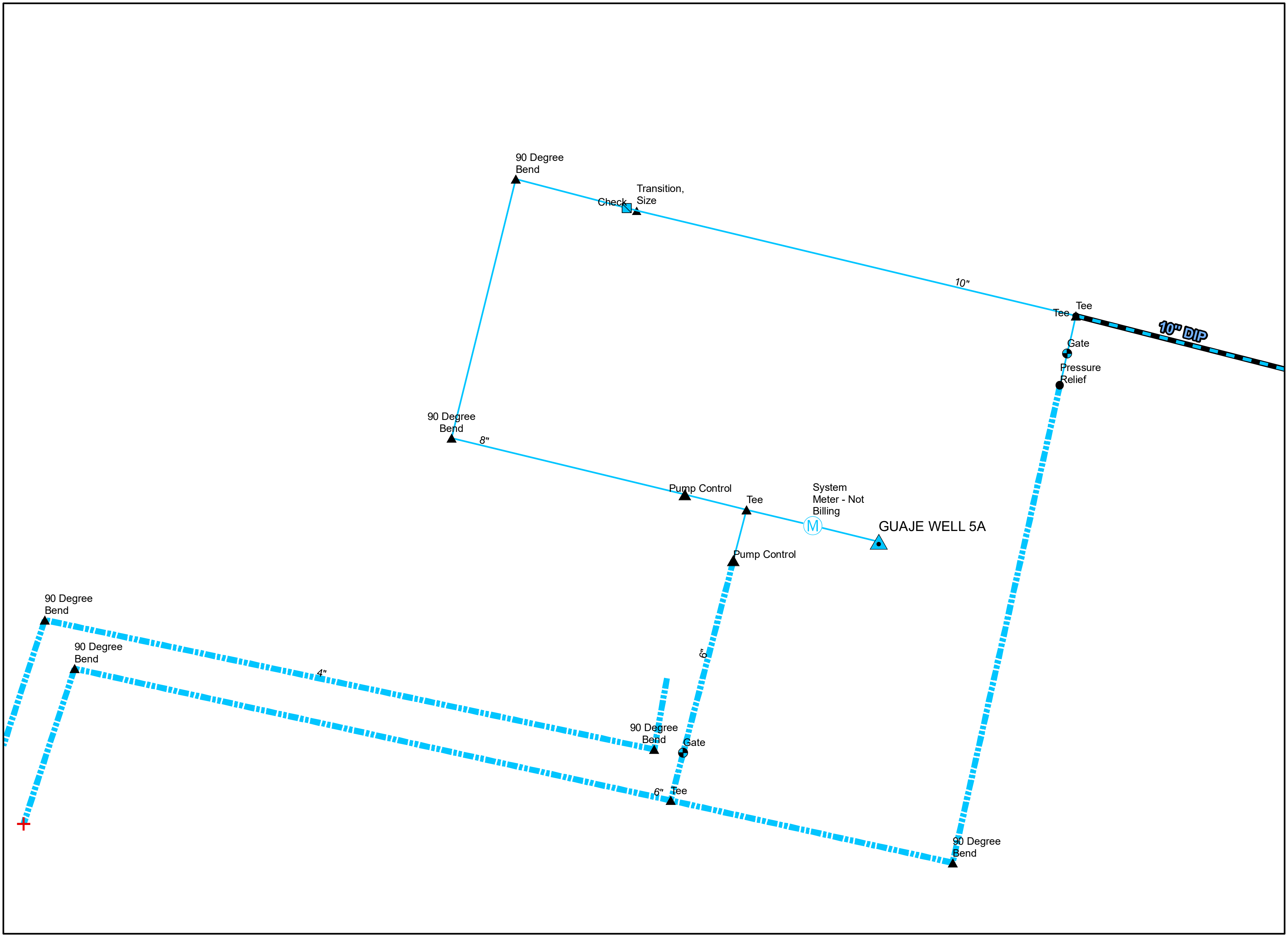
GUAJE WELL 3A
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

GUAJE WELL 4A
Mechanical Plan

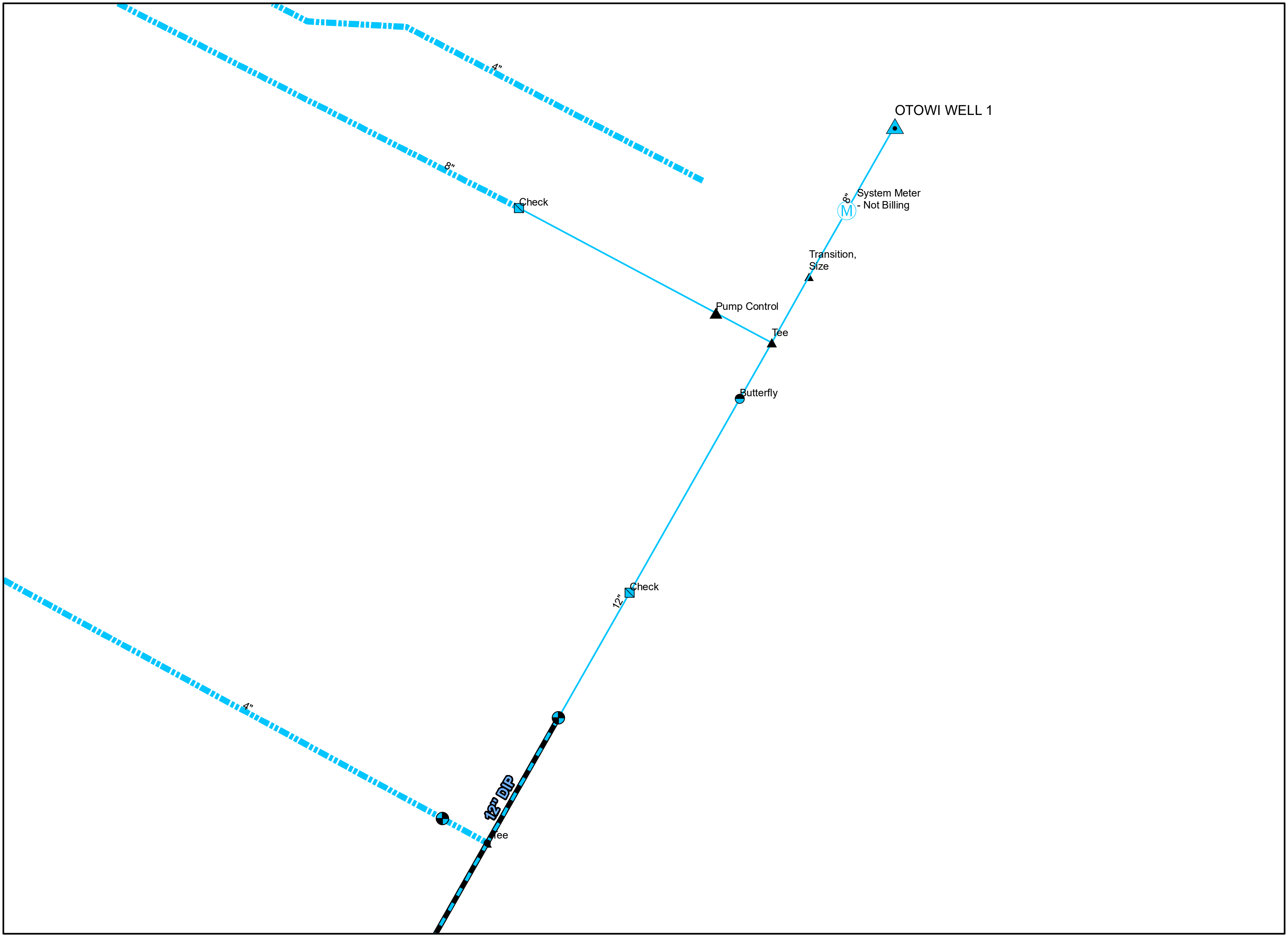
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

GUAJE WELL 5A
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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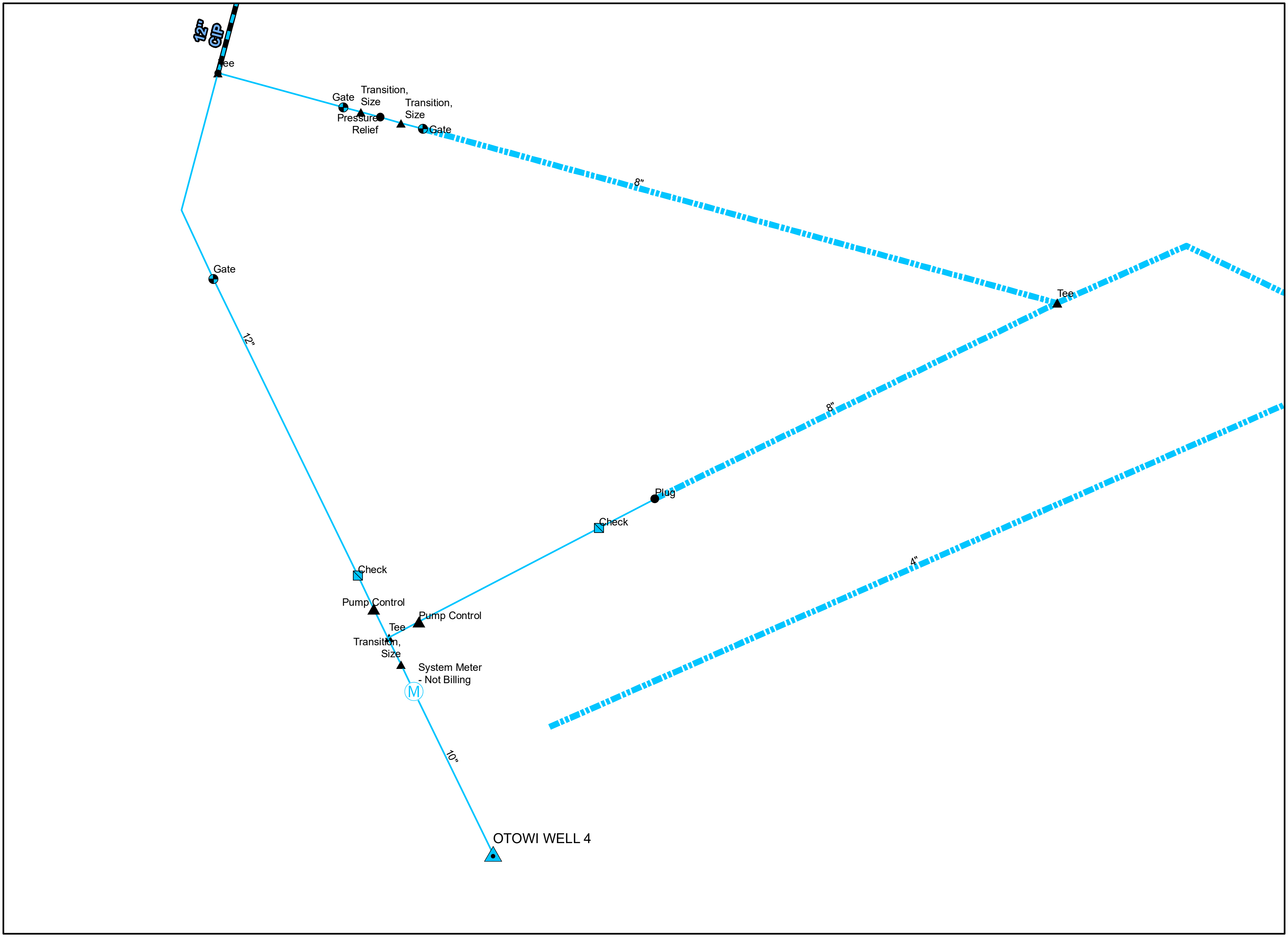
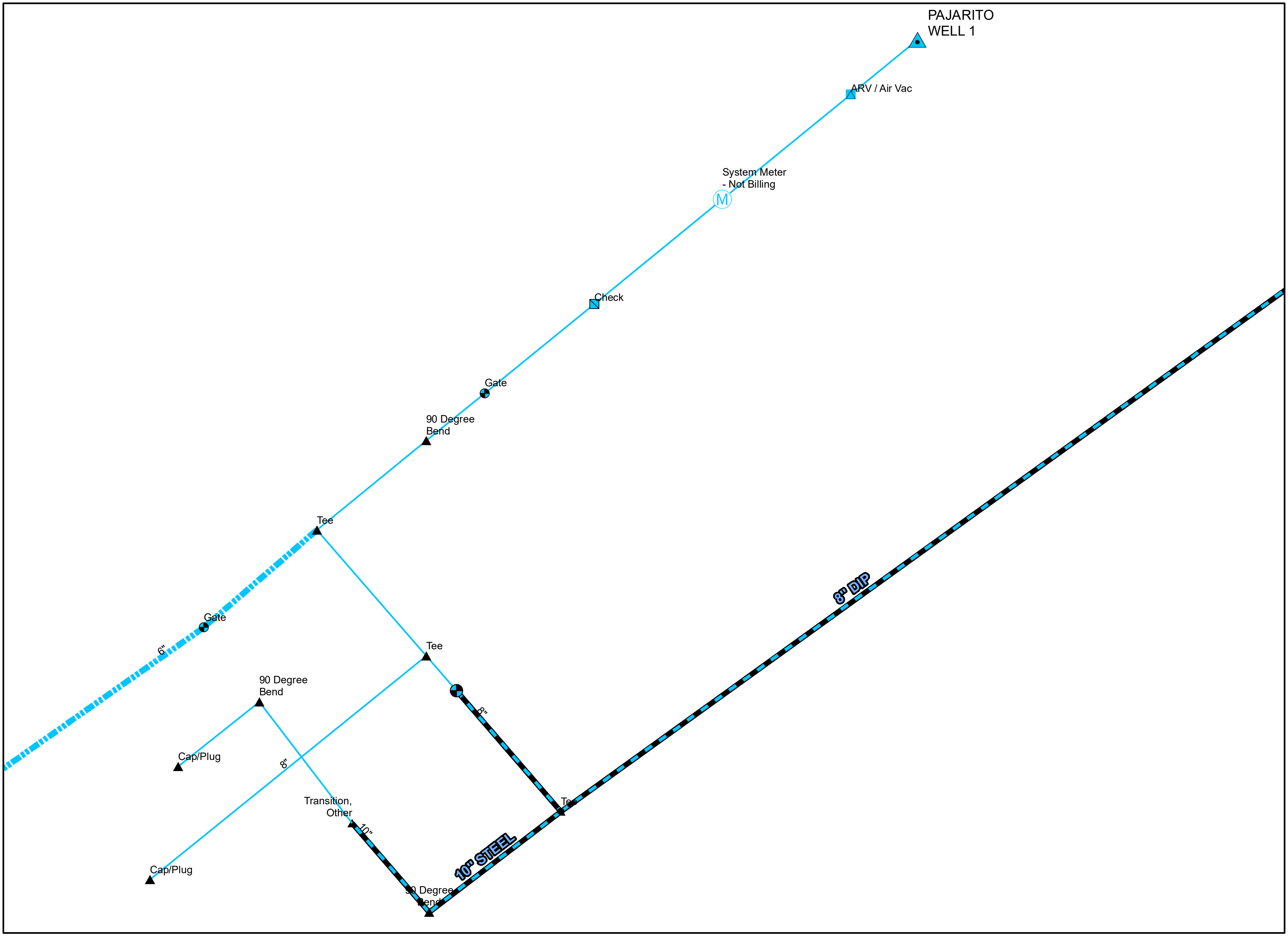
OTOWI WELL 1
Mechanical Plan



LAC/DPU/GWS/GIS

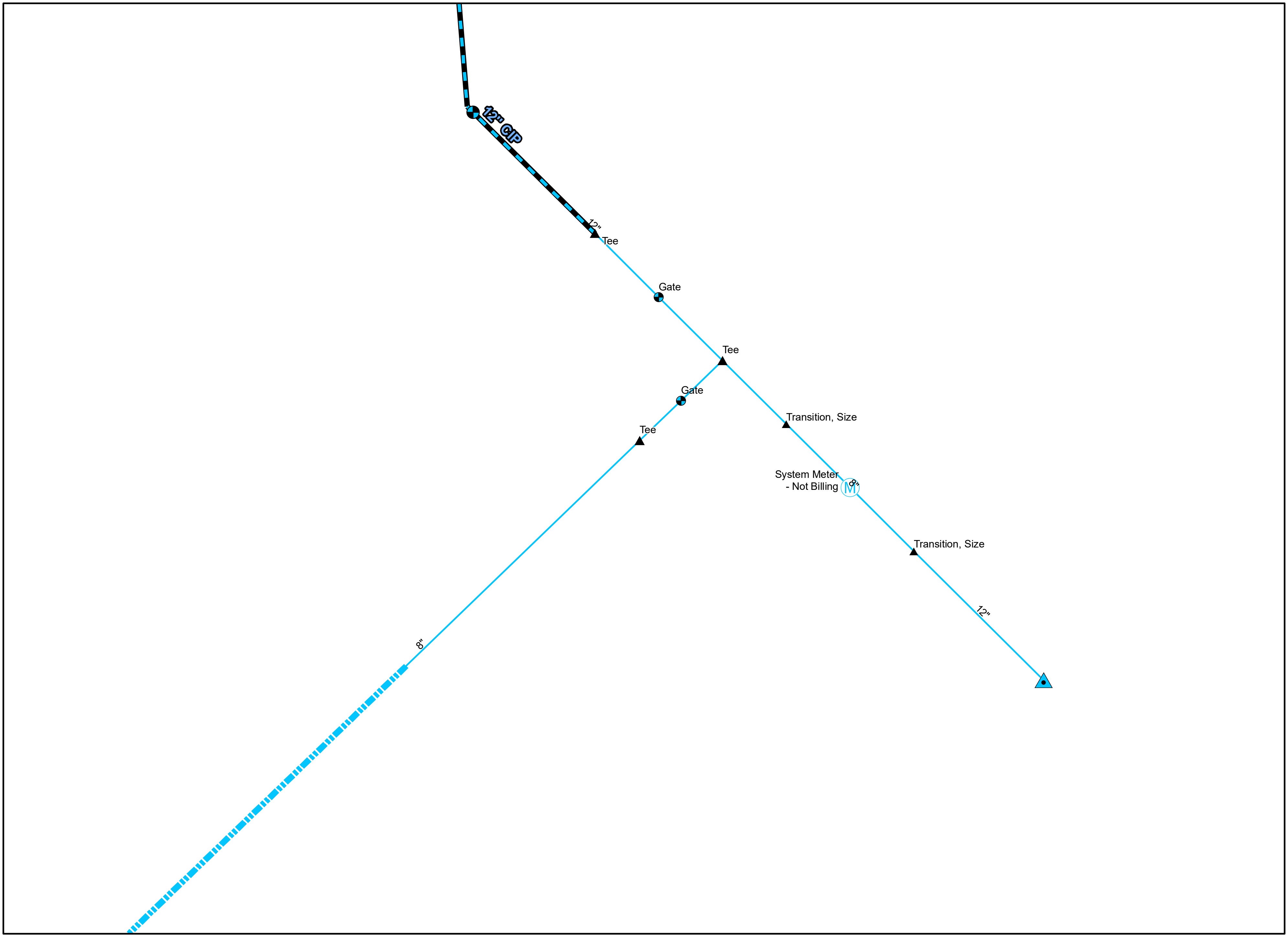
OTOWI WELL 4
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

PAJARITO WELL 1
Mechanical Plan

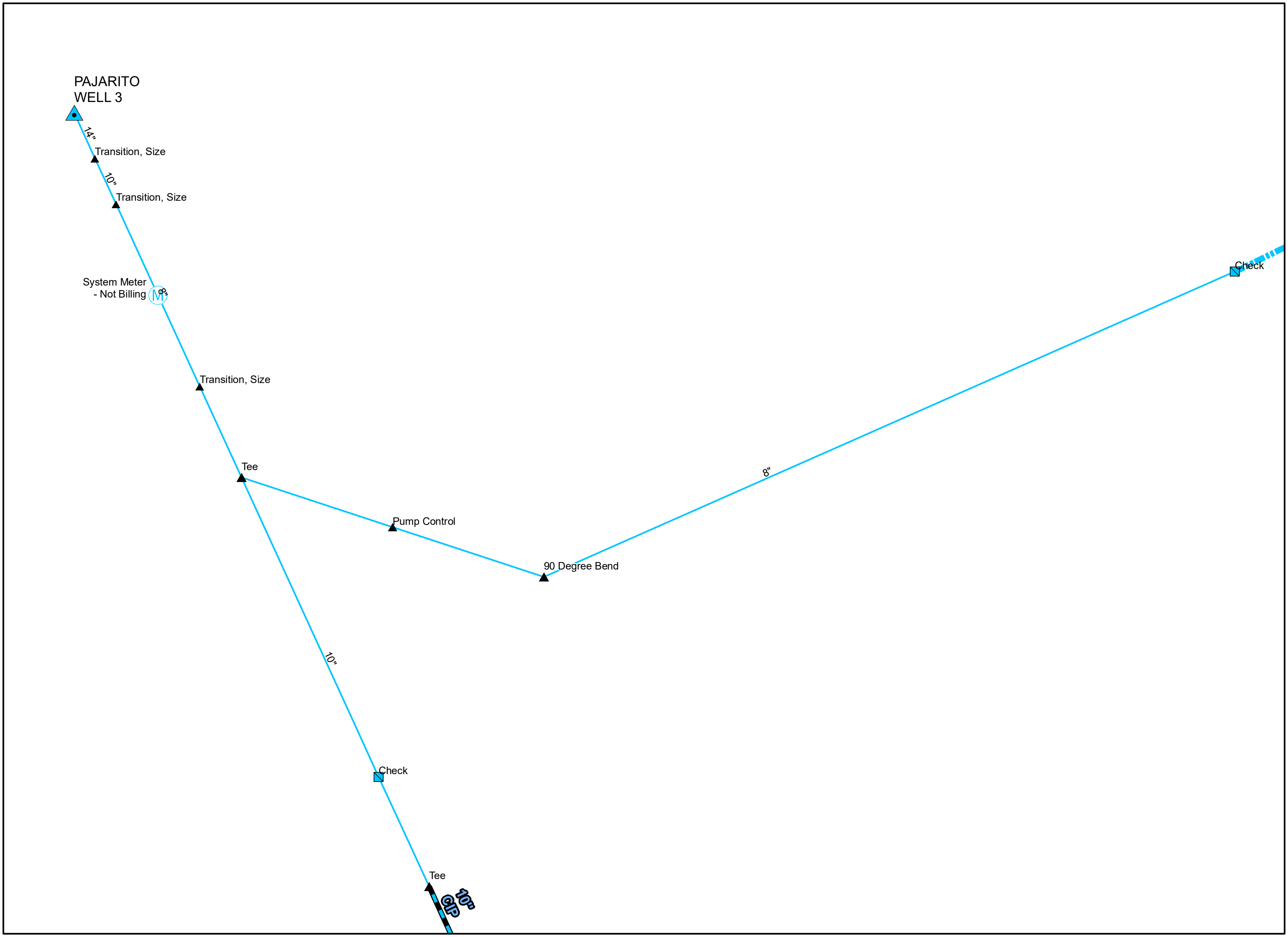
LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

LAC/DPU/GWS/GIS

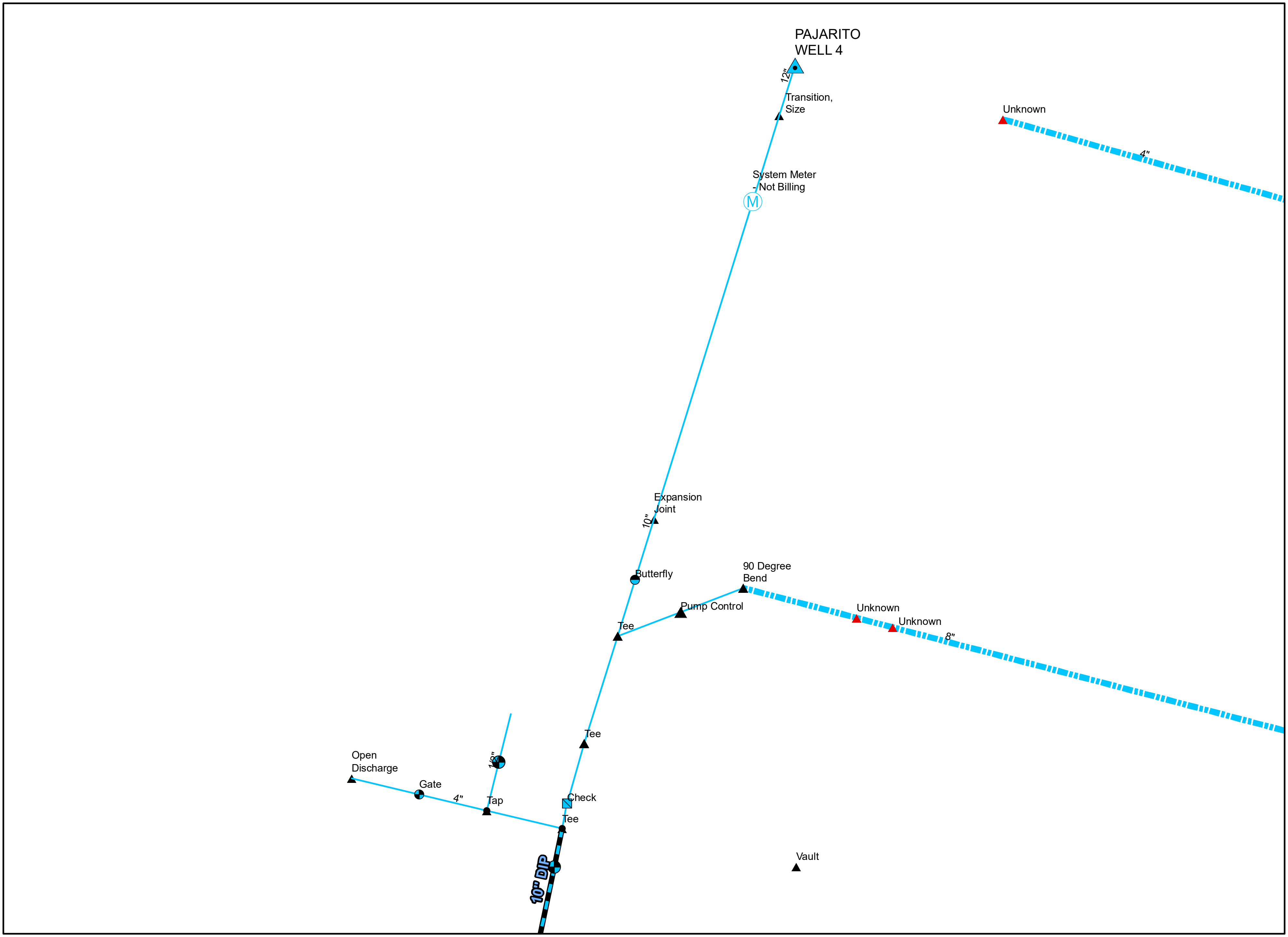
PAJARITO WELL 2
Mechanical Plan



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

PAJARITO WELL 3
Mechanical Plan

LAC/DPU/GWS/GIS



Los Alamos County DPU Water Production Facilities Electrical and Mechanical Assesment Evaluation- Los Alamos County, New Mexico

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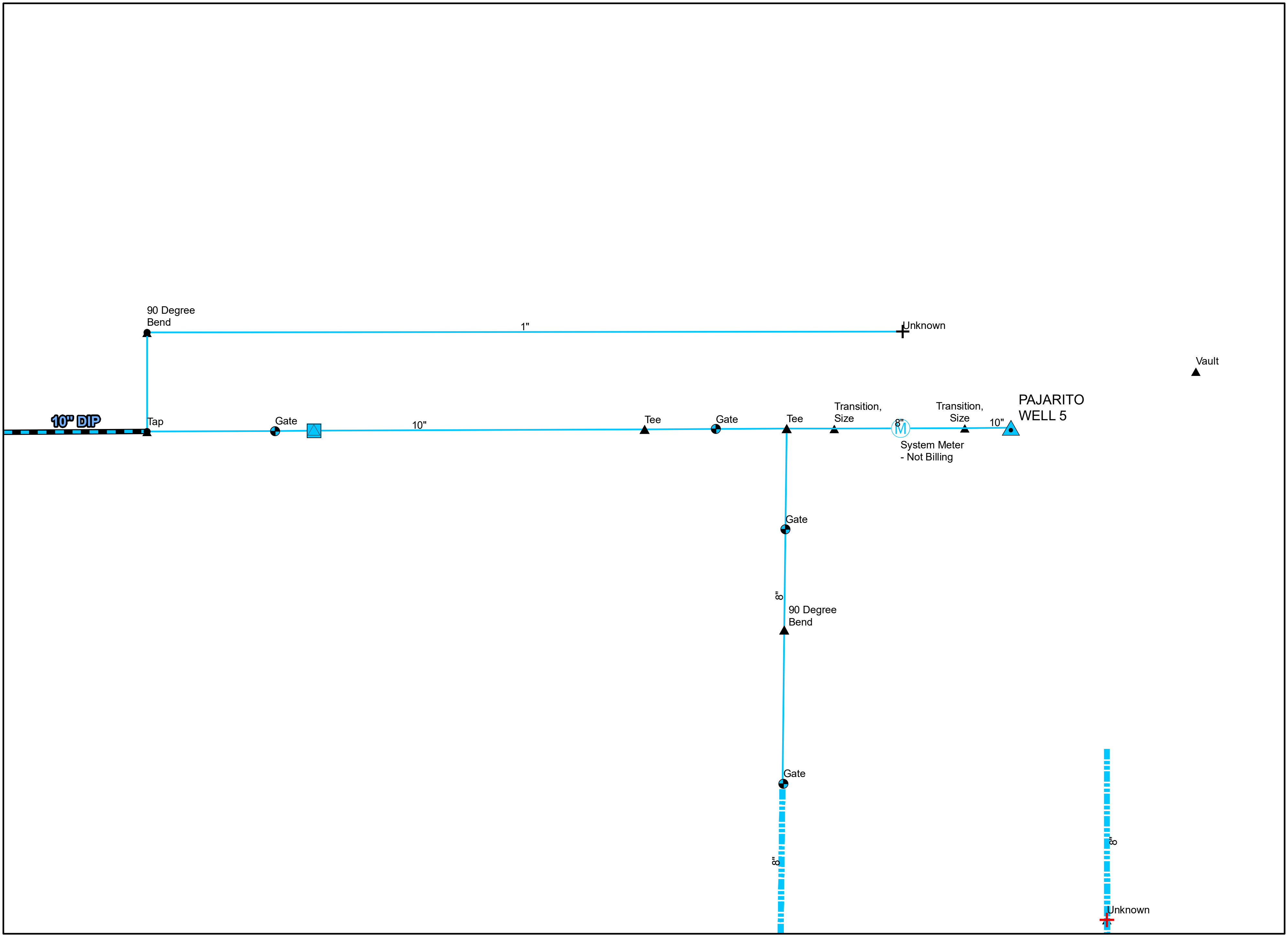
PAJARITO WELL 4
Mechanical Plan



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PAJARITO WELL 5
Mechanical Plan