CITY OF GRAND ISLAND

Working Together for a Better Tomorrow. Today.

SPECIFICATION PACKAGE

for

WELL-FIELD CONTROL SYSTEM UPGRADE

Bid Opening Date/Time
Wednesday, April 11, 2012 @ 2:00 p.m.
City of Grand Island, City Hall
100 East 1st Street, P.O. Box 1968
Grand Island, NE 68802-1968

Contact
City of Grand Island – Utilities Department
Platte Generating Station
308/385-5496

Date issued: March 30, 2012

ADVERTISEMENT TO BIDDERS
FOR
WELL-FIELD CONTROL SYSTEM UPGRADE
FOR
CITY OF GRAND ISLAND, NEBRASKA

Sealed bids will be received at the office of the City Clerk, 100 E. First Street, P.O. Box 1968, Grand Island, Nebraska 68802, until Wednesday, April 11, 2012 at 2:00 p.m. local time for Well-Field Control System Upgrade, FOB the City of Grand Island, freight prepaid. Bids will be publicly opened at this time in the Grand Island City Hall Council Conference Room #1 located on 1st floor of City Hall. Submit an original and three copies. Bid proposal package is also available on-line at www.grand-island.com under Business-Bid Calendars. Bids received after the specified time will be returned unopened to sender.

The successful bidder will be required to comply with fair labor standards as required by Nebraska R.R.S.73-102 and comply with Nebraska R.R.S. 48-657 pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska. Successful bidder shall maintain a drug free workplace policy. Every public contractor and his, her or its subcontractors who are awarded a contract by the City for the physical performance of services within the State of Nebraska shall register with and use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska.

Each bidder shall submit with the bid a certified check, a cashiers check, or bid bond payable to the City Treasurer in an amount no less than five percent (5%) of the bid price which shall guarantee good faith on the part of the bidder and the entering into a contract within fourteen (14) days at the bid price if accepted by the City. **Your certified check, cashier's check or bid bond must be submitted in a separate envelope attached to the outside of the envelope containing the bid. Each envelope must be clearly marked indicating its contents. Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened or considered.** Surety companies authorized to do business in the State of Nebraska must issue bid bonds.

Bids will be evaluated by the Purchaser based on price, schedule, quality, adherence to schedule, plan and specifications, economy and efficiency of operation, experience and reputation of the bidder, ability, capacity, and skill of the bidder to perform contract required and adaptability of the particular items to the specific use intended.

The Purchaser reserves the right to reject any or all bids, to waive irregularities therein, and to accept whichever bid that may be in the best interest of the City, at its sole discretion.

No bidder may withdraw his bid for a period of thirty (30) days after date of bid opening.

RaNae Edwards, City Clerk

Advertised
Grand Island Independent

WELL-FIELD CONTROL SYSTEM UPGRADE
BID DATA FORM

CITY OF GRAND ISLAND
GRAND ISLAND, NE

The undersigned bidder, having examined all specifications and other bidding documents, and all addenda thereto, and being acquainted with and fully understanding all conditions relative to the specified materials and equipment, hereby proposes to provide such equipment FOB the City of Grand Island, freight prepaid, at the following price:

ITEM DESCRIPTION	EXTENDED COST
Base Bid:	
Material	$ _____
Labor	$ _____
Applicable Sales tax*	$ _____
Total Base Bid	$ _____

*** If bidder fails to include sales tax in their bid price or takes exception to including sales tax in their bid price, the City will add a 7.0% figure to the bid price for evaluation purposes; however, the City will only pay actual sales tax due.**

☐ By checking this box, Bidder acknowledges that Addenda Number(s) _____ were received and considered in Bid preparation.

☐ By checking this box, Bidder acknowledges the specified completion date of the project is **June 30, 2012**.

According to Nebraska Sales and Use Tax Requirements, Section 1-017, Contractors, check which option you have selected to file with the Nebraska Department of Revenue:

Nebraska law provides a sales and use tax exemption on contractor labor charges for the construction, repair, or annexation of any structure used for the generation, transmission, or distribution of electricity. Separately stated contractor labor would be exempt, all materials are taxable according to the contractor's option.

Option 1 (Section 1-017.05)_____ Option 2 (Section 1-017.06)_____ Option 3 (Section 1-017.07)_____

If the Nebraska sales and use tax election is not filed or noted above, the contractor will be treated as a retailer under Option 1 for sales and use tax purposes.

_____
Bidder Company Name Date

_____
Company Address City State Zip

_____
Print Name of Person Completing Bid Signature

Telephone No._____ Fax No._____

☐ By checking this box, Bidder acknowledges there are Exceptions noted to the bid.
NOTE: Any exceptions to specifications must be fully explained on a separate sheet attached to bid.

CHECKLIST FOR BID SUBMISSION

FOR

WELL-FIELD CONTROL SYSTEM UPGRADE

Bids must be received by the City Clerk before *2:00 p.m. on Wednesday, April 11, 2012*.

The following items must be completed for your bid to be considered.

- ❑ A signed original and three copies of the bidding documents.
- ❑ A reference list of at least three projects of similar scope and complexity.
- ❑ A summary of the experience of the service supervisor proposed for this project.
- ❑ Firm lump sum pricing; firm unit pricing in case adjustments are necessary, and breakout of sales tax pricing.
- ❑ A proposed construction/test schedule.
- ❑ A description of the system proposed, including equipment, controls, alarms and operation.
- ❑ Selection of Nebraska Sales Tax Option.
- ❑ Acknowledgment of Addenda Number(s) _____.
- ❑ Bidders must complete and sign the Bid Data Form provided in these Documents. All blank spaces must be filled in. Bidders shall acknowledge receipt of any Addenda information on the Bid Data Form.
- ❑ A certified check, cashiers check or bid bond in a separate envelope attached to the **outside of the envelope containing the bid**. Each envelope must be clearly marked indicating its contents. Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened.

  Please check off each item as completed.

_____ _____

Company Signature

Telephone No. _____ Fax No. _____

INSTRUCTIONS TO BIDDERS

1. GENERAL INFORMATION.

   The following instructions outline the procedure for preparing and submitting Bids. Bidders must fulfill all requirements as specified in these Documents.

2. TYPE OF BID.

   Bidders shall be required to submit prices for all items listed in the Bid Data Form.

3. PREPARATION OF BIDS.

   Bidders shall use only the Bid Data Form provided in these Documents. All blank spaces in the Bid Data Form, must be filled in, preferably in BLACK ink, in both words and figures where required. No changes to the wording or content of the forms is permitted. Written amounts shall govern in case of discrepancy between the amounts stated in writing and the amounts stated in figures.

   Prices stated shall be f.o.b. with freight and full insurance paid by Bidder, to the job site located in Grand Island.

   The Bidder shall acknowledge receipt of all addenda in the Bid Data Form. Bids received without acknowledgement or without the Addendum enclosed will be considered informal.

4. SUBMISSION OF BIDS.

   All Bids must be submitted intact not later than the time prescribed, at the place, and in the manner set forth in the ADVERTISEMENT FOR BIDS. Bids must be made on the Bid Data Form provided here in. Each Bid must be submitted intact in a sealed envelope, so marked as to indicate its contents without being opened, and delivered in person or addressed and mailed in conformance with the instructions in the ADVERTISEMENT FOR BIDS.

5. BID SECURITY.

   Bids must be accompanied by cash, a certified check, or cashier's check drawn on a bank which is insured by the Federal Deposit Insurance Corporation, or a bid bond issued by a Surety authorized to issue such bonds in the state where the Work is located, in the amount of 5 percent of the bid amount payable to OWNER. This bid security shall be given as a guarantee that the Bidder will not withdraw his Bid for a period of 30 days after bid opening, and that if awarded the Contract, the successful Bidder will execute the attached Contract and furnish a properly executed Performance Bond and Payment Bond each in the full amount of the Contract price within the time specified.

   The Attorney-in-Fact that executes this bond in behalf of the Surety must attach a notarized copy of his power of attorney as evidence of his authority to bind the Surety on the date of execution of the bond. Where State Statue requires, certification by a resident agent shall also be provided.

6. RETURN OF BID SECURITY.

   Within 15 days after the award of the Contract, the OWNER will return the bid securities to all Bidders whose Bids are not to be further considered in awarding the contract. All other retained bid securities will be held until the Contract has been finally executed, after which all bid securities, other than Bidders' bonds and guarantees which have been fortified, will be returned to the respective Bidders whose Bids they accompanied.

7. BASIS OF AWARD.

   The award will be made by the OWNER on the basis of the Bid from the lowest responsive, responsible Bidder which, in the OWNER's sole and absolute judgment will best serve the interest of the OWNER. All Bids will be considered on the following basis:

Conformance with the terms of the Bid Documents.	Bid price. Cost of installation.

Suitability to project requirements. Responsibility and qualification of Bidder.
Delivery time.

The OWNER reserves the right to reject all Bids, or any Bid not in conformance with the intent of the Bid Documents, and to waive any informalities and irregularities in said Bids.

8. EXECUTION OF CONTRACT.

The successful Bidder shall, within 15 days after receiving notice of award, sign and deliver to the OWNER the Contract hereto attached together with the acceptable bonds as required in these Bid Documents. Within 15 days after receiving the signed Contract with acceptable bond(s) from the successful Bidder, the OWNER's authorized agent will sign the Contract. Signature by both parties constitutes execution of the Contract.

9. PERFORMANCE AND PAYMENT BONDS.

The successful Bidder shall file with the OWNER Performance and Payment Bonds in the full amount (100 percent) of the Contract price, as security for the faithful performance of the Contract and the payment of all persons supplying labor and materials for the Work under this Contract, and to cover all guarantees against defective workmanship or materials, or both, for a period of 1 year after the date of final acceptance of the Work by the OWNER. The Surety furnishing these bonds shall have a record of service satisfactory to the OWNER, be authorized to do business in the State where the OWNER's project is located and shall be named on the current list of approved Surety Companies, acceptable on Federal bonds as published by the Audit Staff, Bureau of Accounts, U.S. Treasury Department.

The Attorney-in-Fact (Resident Agent) who executes these bonds on behalf of the Surety must attach a notarized copy of his power-of-attorney as evidence of his authority to bind the Surety on the date of execution of the bond.

10. TIME OF COMPLETION.

The time of completion of the Work to be performed under this Contract is the essence of the Contract. The time allowed for the completion of the Work is stated in the Bid Data Form.

11. GRATUITIES AND KICKBACKS.

City Code states that it is unethical for any person to offer, give, or agree to give any City employee or former City employee, or for any City employee or former City employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefor. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

12. FISCAL YEAR.

The City of Grand Island, Nebraska operates on a fiscal year beginning October 1st and ending on the following September 30th. It is understood and agreed that any portion of this agreement which will be performed in a future fiscal year is contingent upon the City Council adopting budget statements and appropriations sufficient to fund such performance.

CONTRACT AGREEMENT

THIS AGREEMENT made and entered into by and between **[SUCCESSFUL BIDDER]**, hereinafter called the Contractor, and the **CITY OF GRAND ISLAND, NEBRASKA**, hereinafter called the City.

WITNESSETH:

THAT, WHEREAS, in accordance with law, the City has caused contract documents to be prepared and an advertisement calling for bids to be published for *WELL-FIELD CONTROL SYSTEM UPGRADE;* and

WHEREAS, the City, in the manner prescribed by law, has publicly opened, examined, and canvassed the bids submitted, and has determined the aforesaid Contractor to be the lowest responsive and responsible bidder, and has duly awarded to the said Contractor a contract therefore, for the sum or sums named in the Contractor's bid, a copy thereof being attached to and made a part of this contract;

NOW, THEREFORE, in consideration of the compensation to be paid to the Contractor and of the mutual agreements herein contained, the parties have agreed and hereby agree, the City for itself and its successors, and the Contractor for itself, himself, or themselves, and its, his, or their successors, as follows:

ARTICLE I. That the following documents shall comprise the Contract, and shall together be referred to as the "Agreement" or the "Contract Documents";

1. This Contract Agreement.
2. City of Grand Island's Specification for this project.
3. [NAME OF SUCCESSFUL BIDDER] bid signed and dated [DATE OF BID].

In the event of any conflict between the terms of the Contract Documents, the provisions of the document first listed shall prevail.

ARTICLE II. That the contractor shall (a) furnish all tools, equipment, superintendence, transportation, and other construction materials, services and facilities; (b) furnish, as agent for the City, all materials, supplies and equipment specified and required to be incorporated in and form a permanent part of the completed work; (c) provide and perform all necessary labor; and (d) in a good substantial and workmanlike manner and in accordance with the requirements, stipulations, provisions, and conditions of the contract documents as listed in the attached General Specifications, said documents forming the contract and being as fully a part thereof as if repeated verbatim herein, perform, execute, construct and complete all work included in and covered by the City's official award of this contract to the said Contractor, such award being based on the acceptance by the City of the Contractor's bid;

ARTICLE III. That the City shall pay to the Contractor for the performance of the work embraced in this contract and the Contractor will accept as full compensation therefore the sum (subject to adjustment as provided by the contract) of **[DOLLAR AMOUNT] ($00.00)** for all services, materials, and work covered by and included in the contract award and designated in the foregoing Article II; payments thereof to be made in cash or its equivalent in the manner provided in the General Specifications.

The total cost of the Contract includes:

Base Bid:	$	.00
Sales Tax on Materials/Equipment:	$	.00
Sales Tax on Labor:	$	.00
Total	$	.00

The City of Grand Island, Nebraska operates on a fiscal year beginning October 1st and ending on the following September 30th. It is understood and agreed that any portion of this agreement which will be performed in a future fiscal year is contingent upon the City Council adopting budget statements and appropriations sufficient to fund such performance.

ARTICLE IV. The Contractor hereby agrees to act as agent for the City in purchasing materials and supplies for the City for this project. The City shall be obligated to the vendor of the materials and supplies for the purchase price, but the Contractor shall handle all payments hereunder on behalf of the City. The vendor shall make demand or claim for payment of the purchase price from the City by submitting an invoice to the Contractor. Title to all materials and supplies purchased hereunder shall vest in the City directly from the vendor. Regardless of the method of payment, title shall vest immediately in the City. The Contractor shall not acquire title to any materials and supplies incorporated into the project. All invoices shall bear the Contractor's name as agent for the City. This paragraph will apply only to these materials and supplies actually incorporated into and becoming a part of the finished product of the WELL-FIELD CONTROL SYSTEM UPGRADE.

ARTICLE V. That the Contractor shall start work as soon as possible after the contract is signed and the required bonds and insurance are approved, and that the Contractor shall deliver the equipment, tools, supplies, and materials F.O.B. Platte Generating Station, and complete the work on or before ***June 30, 2012.***

ARTICLE VI. The Contractor agrees to comply with all applicable State fair labor standards in the execution of this contract as required by Section 73-102, R.R.S. 1943. The Contractor further agrees to comply with the provisions of Section 48-657, R.R.S. 1943, pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska. During the performance of this contract, the Contractor and all subcontractors agree not to discriminate in hiring or any other employment practice on the basis, of race, color, religion, sex, national origin, age or disability. The Contractor agrees to comply with all applicable Local, State and Federal rules and regulations. The Contractor agrees to maintain a drug-free workplace policy and will provide a copy of the policy to the City upon request. Every public contractor and his, her or its subcontractors who are awarded a contract by the City for the physical performance of services within the State of Nebraska shall register with and use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska.

GRATUITIES AND KICKBACKS

City Code states that it is unethical for any person to offer, give, or agree to give any City employee or former City employee, or for any City employee or former City employee to solicit, demand, accept, or agree to accept from another person, a gratuity or an offer of employment in connection with any decision, approval, disapproval, recommendation, or preparation of any part of a program requirement or a purchase request, influencing the content of any specification or procurement standard, rendering of advice, investigation, auditing, or in any other advisory capacity in any proceeding or application, request for ruling, determination, claim

or controversy, or other particular matter, pertaining to any program requirement or a contract or subcontract, or to any solicitation or proposal therefor. It shall be unethical for any payment, gratuity, or offer of employment to be made by or on behalf of a subcontractor under a contract to the prime contractor or higher tier subcontractor or any person associated therewith, as an inducement for the award of a subcontract or order.

[SUCCESSFUL BIDDER]

By_____ Date _____

Title_____

CITY OF GRAND ISLAND, NEBRASKA

By_____ Date _____
Mayor

Attest:_____
City Clerk

The contract is in due form according to law and hereby approved.

_____ Date _____
Attorney for the City

CITY OF GRAND ISLAND

Working Together for a Better Tomorrow, Today.

REQUEST FOR BIDS - GENERAL SPECIFICATIONS

The Bid shall be in accordance with the following and with all attached BID DATA and DETAILED SPECIFICATIONS.

All prices are to be furnished and installed FOB, Grand Island, Nebraska. **All prices shall be firm, and shall include all sales and use taxes as lawfully assessed under laws and regulations of the State of Nebraska.** * If bidder fails to include sales tax in their bid price or takes exception to including sales tax in their bid price, the City will add a 7.0% figure to the bid price for evaluation purposes; however, the City will only pay actual sales tax due.

Bids shall include the following on the **outside** of the mailing envelope: **"Well-Field Control System Upgrade".** All sealed bids are due no later than **Wednesday, April 11, 2012 at 2:00 p.m. local time**. Submit **an original and three copies** of the bid to:

Mailing Address: City Clerk
City Hall
P. O. Box 1968
Grand Island, NE 68802

Street Address: City Clerk
City Hall
100 E. First Street
Grand Island, NE 68801

Bids will be opened at this time in the City Hall Council Conference Room #1 located on 1st floor of City Hall. Any bid received after the specified date will not be considered. No verbal bid will be considered.

Bids will be evaluated by the Purchaser based on price, schedule, quality, adherence to schedule, plan and specifications, economy and efficiency of operation, experience and reputation of the bidder, ability, capacity, and skill of the bidder to perform contract required and adaptability of the particular items to the specific use intended.

The successful bidder will be required to comply with fair labor standards as required by Nebraska R.R.S.73-102 and comply with Nebraska R.R.S. 48-657 pertaining to contributions to the Unemployment Compensation Fund of the State of Nebraska. Contractor shall maintain a drug free workplace policy. Every public contractor and his, her or its subcontractors who are awarded a contract by the City for the physical performance of services within the State of Nebraska shall register with and use a federal immigration verification system to determine the work eligibility status of new employees physically performing services within the State of Nebraska.

The equipment and materials must be new, the latest make or model, unless otherwise specified. Prior to approving the invoice for payment, the City reserves the right to thoroughly inspect and test the equipment to confirm compliance with specifications. Any equipment or material which does not meet the City's requirements will be returned at vendor's expense for correction. The invoice will be paid after approval at the next regularly scheduled Council meeting and occurring after departmental approval of invoice; the City Council typically meets the second and fourth Tuesday of each month. Invoices must be received well in advance of Council date to allow evaluation and processing time.

Each bidder shall submit with the bid a certified check, a cashiers check, or bid bond payable to the City Treasurer in an amount no less than five percent (5%) of the bid price which shall guarantee good faith on the part of the bidder and the entering into a contract within fourteen (14) days at the bid price if accepted by the City. **Your certified check, cashier's check or bid bond must be submitted in a separate envelope attached to the outside of the envelope containing the bid. Each envelope must be clearly marked indicating its contents. Failure to submit the necessary qualifying information in clearly marked and separate envelopes will result in your bid not being opened or considered.** Surety companies authorized to do business in the State of Nebraska must issue bid bonds.

Successful bidder shall comply with the City's insurance requirements; performance and payment bonds are required for this project as outlined in the Detailed Specifications and Instructions to Bidders.

All bids shall be valid for at least thirty (30) working days after the bid deadline for evaluation purposes.

All bids must be on the bid form and must be signed and dated to be accepted. Please contact Lynn Mayhew at 308-385-5494, for questions concerning this specification.

City of Grand Island
Grand Island, Nebraska

Well-Field Control System Upgrade

Control System Vendor Specification March 26, 2012

Document history:

Revision	Date	Contributors	Comments
1.0	20Mar2012	Lynn Mayhew – City of Grand Island Roger Hammond – City of Grand Island	Initial Draft
2.0	26Mar2012	Lynn Mayhew – City of Grand Island Roger Hammond – City of Grand Island Chris Rerucha – City of Grand Island	Revisions for clarifying multiple sections

PART 1: GENERAL

1.1 INTRODUCTION

The City of Grand Island plans to upgrade the existing control system that controls the Platte River Well Field and Platte River Pump Station in Grand Island, Nebraska.

The purpose of this document is to establish a set of guidelines and requirements for the Vendor which implements the Well-field Control System Upgrade Project for the City of Grand Island. This Specification shall be read in conjunction with the attached drawings and other documentation.

The purpose of this Specification is to provide a guideline of requirements of the Project. It is not intended to completely specify all details of design and construction of the control systems. All suggestions and recommendations from the Vendor that improves the quality, performance, cost, or schedule of the control system are welcomed by the owner and shall be made in writing by the prospective Vendor. However, the Vendor must adhere to the minimum specifications listed herein. Any deviations from these specifications must be pre-approved by the Owner before submitting a proposal for this work.

1.2 DEFINITIONS

A. The term ‘Project’ shall refer to the project set forth in this Specification.

B. The term ‘Owner’ shall refer to City of Grand Island Utilities.

C. The term ‘Vendor’ shall refer to the firm appointed to complete the Project.

D. The term ‘BOM’ shall refer to Bill of Materials.

E. The term ‘PAC’ shall refer to Programmable Automation Controller.

F. The term ‘PLC’ shall refer to Programmable Logic Controller.

G. The term ‘HMI’ shall refer to Human Machine Interface.

H. The term ‘VFD’ shall refer to Variable Frequency Drive.

I. The term ‘GMP(s)’ shall refer to Good Manufacturing Practice(s).

J. The term ‘NEC’ shall refer to the National Electric Code.

K. The term ‘NEMA’ shall refer to the National Electrical Manufacturers Association.

L. The term ‘ANSI’ shall refer to the American National Standards Institute.

M. The term 'ISA' shall refer to the International Society of Automation.

N. The term 'NFPA' shall refer to the National Fire Protection Agency.

O. The term 'UL' shall refer to the Underwriters Laboratories.

P. The term 'I/O' shall refer to PAC Inputs and Outputs.

Q. The term 'O&M manuals' shall refer to Operation and Maintenance Manuals.

R. The term 'Well House' shall refer to one of the buildings that enclose a well pump and control equipment, that pump water to a Pump Station building.

S. The term 'Well Field' (for this project) shall refer to the collective group of 21 wells near the Platte River Pump Station building. This group of 21 wells is also referred to as the 'Platte River Well Field'.

T. The term 'Pump Station' (for this project) shall refer to the 'Platte River Pump Station' building that encloses the three large pumps to move water from the local reservoirs (near the Pump Station) to the three reservoirs (Roger's Reservoir, Kimball Reservoir, and Burdick Reservoir) and to the Platte Generating Station.

U. The term 'PGS' shall refer to the Platte Generating Station, which is the City of Grand Island electrical power generation facility.

V. The term 'WRT' shall refer to the new Uranium Removal Water Treatment Facility which is being added to the Owner's water system.

1.3 GENERAL REQUIREMENTS

All bids for the Project shall conform to the requirements set forth by this Specification. No deviations shall be permitted without prior written consent from the Owner.

1.3.1 Codes and Standards

A. The design and implementation of this system shall conform to all state and local laws, codes, and ordinances. In addition to all state and local laws, codes, and ordinances; equipment, materials, and work shall conform to the codes and standards specified in this document.

B. Equipment and workmanship shall comply with industry standard Good Manufacturing Practices (GMPs) as specified in the National Electric Code (NEC) and National Fire Protection Agency (NFPA).

C. Control panel fabrication must be completed by a UL approved Industrial Control Panel Manufacturer, and panel fabrication must be in accordance with UL 508A (UL Standard for Industrial Control Panels). Each new control panel provided must have a UL stamp indicating that the custom electrical panel/enclosure, after completion at the control panel fabricator's facility, (including the electrical control equipment inside) was built and conforms to UL 508A. The UL stamped control panel will then be shipped directly to the Owner's facility for field wiring terminations.

1.3.2 Vendor Requirements

The Vendor shall be an approved manufacturer of UL listed industrial control panels, complying with UL 508A.

Design engineering and also programming shall be done by primary Vendor and Vendor shall not hire a 3rd party to complete programming or any engineering design or function. The vendor shall be accredited as a recognized 'Rockwell Automation Process System Integrator'.

The Vendor shall provide examples of at least three similar scope and size projects that were successfully integrated by the Vendor. This list shall be submitted along with the Vendor's original bid.

The Vendor which implements the system shall be a certified member of the Control System Integrators Association (CSIA).

Vendor shall provide a parts and labor warranty to the City of Grand Island for the control system for one full year after installation and operation on-site in Grand Island, Nebraska. This shall include one full year of technical customer service.

1.3.3 Other Requirements

All source code, programs, drawings, and other documentation/information provided for this Project shall be solely owned by the City of Grand Island. This includes PLC program, HMI program, and any other software configuration or programming that is used for this Project. Under no circumstances shall there be any function in any program (PLC or otherwise) that ceases operation of any components on the system due to a vendor "timer" or similar that is intended to stop or disrupt any system functionality until the Vendor "resets" the system. In short, the City of Grand Island shall receive and maintain the capability to view and modify all programming functions for the entire lifetime of the system without disruption and/or end date. Furthermore, there shall be no "hidden code" in any system. This includes the use of Add-On-Instructions (AOI's) that are not standard Rockwell Automation AOI's (Rockwell AOI's are permissible). Under no circumstances shall vendor use or create proprietary instructions, code, or AOI's (in any software application) that is not fully viewable and modifiable by the City of Grand Island Personnel immediately upon installation and throughout the entire lifetime of the equipment.

Electronic copies of all drawings and programs (both development and runtime, as applicable) shall be given to Owner after each implementation phase of the control system, and also at the end of the project.

1.4 SCOPE OF WORK

There are 21 existing wells (with Well Houses) in the Platte River Well Field. Three of these wells (6, 7, and 8) will be modified as part of this Project. The control system in the Platte River Pump Station building will also be modified as part of this Project. In addition, a new Uranium Removal Water Treatment Plant is being implemented by others. See 'Control System Architecture' drawing for an overview of the system.

The Vendor is required to provide and implement a control system (as described herein) that replaces the Owner's Modicon control system (in the Pump House building and Well Houses 6, 7, and 8) with Allen Bradley PAC's while concurrently allowing existing day-to-day operations of the Owner's water system to continue without interruption. In addition, the Vendor shall provide an operator interface at the Pump House building that will allow the Owner to control the water system wells.

Due to the nature of the Project and the functions/demand of the water system, there will be multiple phases to this integration, spread out over a timeline that is agreeable to City Personnel.

The new Main Control Panel (in Pump Station) and modified Well House controls shall be in place before the Uranium Removal Water Treatment Plant building is operational. However, the existing Modicon PLC panel in the Pump Station will remain operational as well, in order to control the other 18 wells and interface with other systems. Finally, all control functions that are currently part of the Modicon system in the Pump Station will be migrated over to the new (Allen Bradley) Main Control Panel provided by the Vendor. The Vendor is responsible for all aspects of the controls system installation including design, equipment, scheduling/sequencing the work, installation, documentation, etc. The Vendor shall work closely with City personnel to properly schedule reasonable equipment/operational shutdown periods in order to implement the new system.

The Project will not be complete until all I/O points from the existing Modicon controller in the Pump Station building are transferred to the new Allen Bradley 'Main Control Panel', the Uranium building communications is operational, and the three wells 6, 7, and 8 are operational with new Allen Bradley PAC's and VFD's. The labor and hardware required to change out the controllers for the remaining 18 wells is not in the scope of this project, but will be completed at a later date by others. Therefore, consideration for PAC memory, spare I/O points (20% spare), etc. shall be implemented in this Project so the equipment can be modified easily. See 'Sequence of Work' section for more detail.

There is work occurring simultaneously, by others, outside of the scope of this specification, which affects the Project timeline and requirements. These items are the Uranium Removal Facility and the VFD's that are being installed in wells 6, 7, and 8. See below for more details.

The items below describe the main scope of work requirements for this project. However, this list does not in any way describe each detail required of the Vendor to complete the project.

1.4.1 Uranium Removal Water Treatment Plant (WRT)

There is a new building and process being implemented to remove uranium from the well water that is coming from wells 6, 7, and 8. This system will affect the control (start/stop or enable/disable) of well pumps 6, 7, and 8. The interface between the new uranium removal facility and these well pumps will be through the new 'Main Control Panel' in the Pump Building. The Vendor shall work with the contractor that is implementing the uranium removal facility and shall interface the required controls and interlocks for proper pump operation. The interface between the two systems will be Ethernet radio communication.

The communication 'array' shall be large enough to accommodate all of these wells, plus additional space for expansion. The following list shows the minimum parameters that shall be communicated between the Pump Station controller and the WRT for each Well House (6, 7, and 8):

1) *DI: Well pump run status*
2) *DO: Well pump run permissive*
3) *DO: Alarm status*
4) *DO: Shutdown status*
5) *AO: Train 1 Flow*
6) *AO: Train 2 Flow*
7) *Operator Flow Rate Set Point*
8) *Actual Flow Rate (from WRT flow meters)*

The Pump Station will compare the flow of the 'Actual Flow Rate (from WRT flow meters)' and compare that with the 'Operator Flow Rate Set Point', then will adjust the flow automatically to meet the required flow, by modulating the VFD's on each of wells 6, 7, and 8. The difference between the actual flow and the flow set point will determine which well pumps to run and at what speed to meet the required/desired flow to the WRT equipment.

1.4.2 PLATTE RIVER PUMP STATION

A. Provide a new 'Platte River Pump Station Main Control Panel' in the Pump Station building. This new control panel will be located in a small air-conditioned room inside the Pump Station

building. The air-conditioning of the room space is not part of this project, but will be installed concurrently with this project, by others. Therefore, the new enclosure will not require dedicated environmental conditioning by the Vendor. See 'Products' section for more detail.

B. Move field wiring from old (Modicon) control panel in Pump Station to new 'Main Control Panel' and re-terminate the field wiring. Perform an official I/O check-out and verification of operation for each termination. Use 'I/O Checkout Sheet' form for each I/O point. An approved Vendor representative must sign and date the I/O Checkout Sheet for each I/O point, at the time that each point was checked, verifying the point is terminated and operating properly.

C. Program the new ControlLogix controller (in the Main Control Panel) in the Pump Station building. A copy of the existing Modicon PLC program will be available to the Vendor in order to migrate the programming to RSLogix 5000 software. However, this programming shall not be 'copy-and-pasted' from the old program to the new one, and any kind of automated transfer utility for migrating the old program into the new platform is prohibited. Instead, the old program will provide the general "road map" of system functionality. The Vendor shall be responsible for ensuring the new program operates all associated equipment properly.

D. Install a new desktop computer in the Pump Station control room and program the new computer as a dedicated Wonderware HMI terminal.

- Note: All Wonderware HMI terminals of the GI City Water System Facility use the same runtime instance of the Wonderware application. Therefore, the Vendor shall obtain a copy of the existing Wonderware application from the Owner, and then modify it to include all new points that will be added per this Project. After successful implementation, the Vendor shall give the newly modified application back to the Owner so they can install it on the other existing terminals in use at other locations. This sequence may be required multiple times throughout the Project, due to the long timeline.

1.4.3 PLATTE RIVER WELL FIELD (WELL HOUSES)

There are currently 21 wells included in the Platte River Well Field. They are controlled via a Modicon Momentum brand PLC, and each well is nearly identical as far as hardware and programming. Slight differences may occur. This project includes modifying the controllers for wells 6, 7, and 8. The remaining 18 wells are not part of the scope of this project.

A. Remove old (Modicon) PLC in each of Wells 6, 7, and 8 and install a new Allen Bradley CompactLogix PAC in each of the existing enclosures (same location as old PLC's) and re-terminate the field wiring. Perform an official I/O check-out and verification of operation for each termination. Use an official I/O Checkout Sheet form for each I/O point. An approved

Vendor representative must sign and date the I/O Checkout Sheet for each I/O point, at the time that each point was checked, verifying the point is terminated and operating properly.

B. Program the new CompactLogix controller in Well Houses 6, 7, and 8. A copy of the existing Modicon PLC program will be available to the Vendor in order to migrate the programming to RSLogix 5000 software. However, this programming shall not be 'copy-and-pasted' from the old program to the new one, and any kind of automated transfer utility for migrating the old program into the new platform is prohibited. Instead, the old program will provide the general "road map" of system functionality. The Vendor shall be responsible for ensuring the new program operates all associated equipment properly.

C. Well Houses 6, 7, and 8 will be retrofitted with new VFD's (PowerFlex 753's) to control the existing pumps (equipped with new 75hp motors) in these wells. The VFD's are provided and installed by others, and will include an Ethernet interface module. However, the Ethernet interface configuration of the VFD to the PAC in the Well House shall be done by the Vendor who is awarded this Project. The following list shows the minimum parameters that shall be communicated between the Pump Station controller each of VFD's in Well Houses (6, 7, and 8):

   1) *DO: Run command*
   2) *DI: VFD HOR switch 'In Remote' indication*
   3) *DI: VFD Fault*
   4) *DI: Well Pump Motor High Temp Alarm*
   5) *DI: Well Pump Motor High High Temp Shutdown*
   6) *AO: Speed Control*
   7) *AI: Speed Feedback*

1.4.4 MISCELLANEOUS

A. A complete set of control system drawings/schematics for all points directly modified by this project shall be included. This includes drawings that show field wiring verification and termination numbering for equipment in the Pump Station and Well Houses 6, 7, and 8. Some drawings of the existing system are attached to this specification. However, these drawings shall be re-drawn (not modified in their current format) in the format described in the 'Drawings and BOM' section of this specification. New drawings/schematics for the new Main Control Panel and also for each of wells 6, 7, and 8 control systems shall be provided.

B. Configure communications between new PowerFlex 753 VFD's and new CompactLogix controllers in Well Houses 6, 7, and 8. Providing and installing the new Powerflex 753 VFD's is not part of the scope of this specification, and Vendor for this project will not be providing or installing the drives as part of this scope. However, the interface between the drives and the

new PAC's is part of Vendor's responsibility. Each VFD will be provided, by others, with a 20-COMM-E module for the Vendor to use for Ethernet communications to the Well House PAC.

C. Vendor shall configure/modify Ethernet radio communications between Well Houses 6, 7, and 8, Uranium Facility, and Pump Station in order to ensure proper operation of the well system through this communication network.

D. Vendor shall provide a firewall between the Uranium Facility and the rest of the network, in order to prevent the WRT personnel from accessing the business network of the Grand Island Water System.

1.5 DOCUMENTATION

A. All documentation created or modified during the Project shall be considered property of the Owner and turned over at the end of commissioning.

B. All documentation supplied by the Owner to the Vendor shall be considered property of the Owner and turned over at the end of commissioning.

1.5.1 Approvals

The Vendor must receive written approval from the Owner for the following items before the Vendor may proceed.

A. Submittals: The Vendor shall submit all required documentation as listed in the 'Submittal' section of this Specification. The Owner will review the information and reply back to the Vendor within 2 weeks of the date of submission. The Owner will indicate whether or not the Vendor is allowed to proceed with the next phase, based on the responses below:

1) *Approved as submitted*
2) *Approved as noted (Owner will indicate what changes are required)*
3) *Resubmit as noted (Owner will indicated what portion(s) of submittal needs modification)*
4) *Rejected*

All drawings and BOMs developed by the Vendor shall be submitted to the Owner for approval. No procurement or fabrication shall proceed prior to approval.

B. Final Approval, O&M Manuals: The Vendor shall request written approval from the Owner, at the end of the Project, after the Vendor has completed all of the requirements of the Project.

The Owner will provide written approval (email or letter) that indicates the Vendor has completed the system to Owner's satisfaction. After the written approval from the Owner, the Vendor may submit the final Operation and Maintenance Manuals (O&M Manuals) to the Owner. See 'Submittal' section for details on the O&M Manuals.

In addition to the formal approval process, the Vendor shall coordinate with the Owner and receive approval from the Owner before shutting down any part of the Water System for implementation of the Project or modifying the existing system.

1.5.2 Submittals and O&M Manuals

Submittals shall be provided to the customer in a 3-ring binder hard copy (2 copies minimum), and also in electronic form on a CD (2 copies minimum).

The submittal information shall be organized by original manufacturer name in alphabetical order by manufacturer (i.e. All Allen Bradley hardware submittal information shall be grouped together in one tab location). A MAIN table of contents for the whole binder shall be included at the beginning of the binder, which lists each manufacturer that is part of the submittal. Each manufacturer shall have a separate tab in the 3-ring binder for easy reference. There shall also be a table of contents at the beginning of each manufacturer's tab that lists each part number(s) that is(are) being supplied from that manufacturer AND the quantities of that part number that are being provided.

If more than one part number is provided by a single manufacturer, then a blank colored sheet (i.e. blue, yellow, etc.) shall be placed between the data sheets for the two different part numbers to provide separation between the sections.

Submittals which are not in this format will be rejected by the Owner and the Vendor shall be required to re-submit (at no cost to the Owner) in the proper format.

<u>Submittals shall include the following items (see details below):</u>

- Product Information and Manufacturer Drawings
- System Drawings (Preliminary set)

<u>O&M Manuals shall include the following items (see details below):</u>

- Product Information and Manufacturer Drawings
- System Drawings (Final As-Built drawing set)
- Test Reports
- Certificates

A. Product Information and Manufacturer Drawings

1) Catalog Cut Sheets and/or Product Data Sheets

Catalog cut sheets shall be provided for standard manufactured items such as instruments, relays, terminal blocks, PAC hardware, etc. Each sheet shall identify the exact equipment for which it is intended. Include all pertinent information (i.e. physical dimensions, current rating, horsepower, kw rating, phase, voltage, NEMA classification, material type, etc). Each component included in the custom UL panel shall be UL approved.

The part number for each item that will be provided shall be highlighted on the data sheet in a color that is in high contrast with the background color of the paper, so it is noticeable. Also, a RED arrow shall point to the highlighted part number that will be provided.

2) Manufacturer's Standard Drawings

Manufacturer's drawings shall be provided in the submittal for proposed components. The identity of the equipment for which the drawing is intended shall be shown on the drawing, as well as optional features that will be provided. Field connections shall be clearly identified along with terminal and wire numbers. A sequence of operation shall be included from the manufacturer on the drawing unless the control diagram is easily understood without a sequence of operation.

B. System Drawings

Drawings shall be produced by the Vendor and shall be provided for the complete system, including control system architecture, process control drawings, schematics, panel drawings, etc. These drawings shall show the system as a whole, but also provide detail for each piece of hardware provided, including termination information, etc. See 'Drawings and BOM' section for more detail.

C. Test Reports

The system shall be tested according to the standards listed in the 'Testing' section below. A copy of each individual test shall be included in the O&M manual to submit to the Owner at the end of the Project. This documentation includes the signed document of each of the following: I/O checkout sheets, loop checkout sheets, and Instrument Checkout sheets. See 'Testing' section below for more detail.

D. Certificates

It is the responsibility of the Vendor to secure a certificate of inspection and approval from the department having jurisdiction over the work for the Project, if such a certificate is required. The Vendor shall pay all fees associated with obtaining the permits and certificates, at no cost to the Owner. A copy of the certificates and permits shall be included in the O&M manuals.

1.5.3 Drawings and BOM

A. All drawings shall meet the following requirements:

1. Created in AutoCAD (latest release).
2. Provided electronically to the customer in .dwg format as well as .pdf format on a CD or other approved electronic storage media.
3. In addition to the final set of drawings provided in the O&M manuals, provide 2 hard copies of the completed drawing set (As-Built Drawings) to the customer. One copy of the modified Well House buildings shall be provided in each of the modified panels. One copy of the new 'Platte River Pump Station Main Control Panel' shall be placed in that panel. The other copy shall be given directly to the Owner. Both of these As-Built Drawing' sets shall be properly bound together with a continuous binding and shall have a clear plastic cover (on front and back) as part of the bound set.
4. Created for 11"x17" (B-Size) paper size.
5. Contain title block and title block details.
6. Contain revision history, revision details, and design engineer's initials.

B. Control system drawings shall include the following (at a minimum):

1. Index sheet.
2. Control system architecture drawings.
3. Enclosure layouts.
4. Panel layout including orientation and dimensional requirements for component mounting.
5. Terminal block layouts (detailed).
6. A detailed bill of materials for all components in an enclosure drawing.
7. Control power distribution detail.
8. Fuse schedule.
9. Wiring schematics, including power distribution, control system wiring, and point to point details.
10. Discrete and analog wiring information, showing field wiring, field termination information, PLC module connection/termination detail, PLC tag information, field device description of each point, etc.
11. Instrument nameplate schedules.
12. VFD detail drawing (showing the VFD and all related connections) for each VFD. The VFD's are provided by others, but Ethernet configuration is by Vendor, and therefore the Vendor shall have a drawing showing a list of parameters that were changed from factory defaults, including motor nameplate data, IP addresses, motor control type, etc.
13. Instrumentation detail drawing (showing the instrument and all related connections) for each instrument provided. Existing field instruments shall also be shown on drawings, but detailed drawings of the whole device are not required. However, termination information for each field device is required, whether it is existing or not, (terminal numbers on the field device) if the field device is wired to the control panel that is provided or modified by the Vendor in this Project.

1.5.4 Testing

Each of the following items shall be considered official testing and shall be conducted by the Vendor and at the Vendor's expense for this Project. Each document listed herein shall be signed by an approved Vendor representative (preferably the Vendor's Project Manager), and the signed document shall be included in the O&M manuals that are submitted to the Owner at the end of the project.

A. Shop Checkout

A detailed shop checkout shall be performed at the Vendor's facility that tests the custom built control panels/equipment built by the Vendor. This checkout shall test the panel's power distribution, hardware list as it compares to the as-built drawings, I/O checkout of each point (discrete and analog), verification of proper labeling, continuity checks, etc.

B. I/O Checkout

This testing shall be conducted after installation at the Owner's facility. Each non-spare I/O point (discrete and analog) shall be tested by modifying/toggling the field device (for PAC inputs) or changing the PAC output state (for PAC outputs) associated with the I/O point and verifying the proper result. The test shall list each I/O point in a table format that lists the points in the order they are wired to the PAC modules.

C. Instrument Checkout

Each instrument provided or modified shall be tested through its full operating range. The signal from the transmitter shall be monitored via the PAC and the values shall be recording and verified that they correspond to the proper engineering units scaling for the respective instrument.

1.6 SCHEDULE

The Owner has specified to the contractors for the new VFD's, motors, and the WRT system that the pumps shall be available for operation by May 30, 2012. If necessary, these pumps will be run manually. However, controls for automatic operation (as part of this Specification/Project) shall be operational by June 30, 2012.

PART 2: PRODUCTS

This specification describes the "minimum requirements" of the equipment required for this project. Any deviations from this Specification shall be considered not acceptable.

2.1 EQUIPMENT

A. Pilot Indicating Light

Function:	Visual indication of control function
Type:	Heavy duty; oil-tight or weatherproof as required; push-to-test LED
Input:	24VDC
Color:	Red = 'Running'
	Green = 'Stopped'
	Blue = 'Overload'
	White = 'Power ON' or 'Opened'
	Amber = 'Closed'
	Clear = 'Defined Status'
Mounting:	Hole diameter = 30.5mm
Manufacturer:	Allen-Bradley, no exceptions.
Misc.:	All pilot lights shall have a tag indicator above the light that describes its function. Tags shall wrap around the entire light (light shall go inside of hole in tag). Tags shall be white and engraved letters shall be black.

B. Pushbutton

Function:	Manual operator control
Type:	Oil-tight or weatherproof, momentary or maintained contact as required; emergency stop shall be maintained, push to open, twist and pull to close.
Contacts:	1 N.O. and 1 N.C. (minimum), provide contact arrangements as necessary.
Rating:	10amp/120VAC continuous
Mounting:	Hole diameter = 30.5mm
Operator:	Green operator = 'Start', 'Open', 'Run'

Red operator = 'Stop'

Black operator = 'Silence'

Manufacturer: Allen-Bradley, no exceptions.

Misc.: All push buttons shall have a tag indicator above the button that describes its function. Tags shall wrap around the entire button (button shall go inside of hole in tag). Tags shall be white and engraved letters shall be black.

C. Selector Switch

Function: Manual control mode selection

Type: Heavy-duty, Oil-tight or weatherproof as required

Positions: Two, three, or four as required

Operator: Standard knob type (i.e. Allen Bradley 800T-H2A)

Contact Rating: 10amp/120VAC continuous

Mounting: Hole diameter = 30.5mm

Manufacturer: Allen-Bradley, no exceptions.

Misc.: All selector switches shall have a tag indicator above the switch that describes its function. Tags shall wrap around the entire switch (switch shall go inside of hole in tag). Tags shall be white and engraved letters shall be black.

D. Alarm Horn and Warning Light

Function: Alert operators (locally in the Pump Station) of critical alarms.

Mounting: A light and a horn shall be located in the Pump Station main room (not in the control room). A reset and also a silence button shall be located in the 'Main Control Panel' for this local alarm indication system.

Manufacturer: Allen-Bradley, no exceptions.

E. Circuit Breakers

Function: Provide over current protection

Type: Molded-case. Provide voltage and amperage ratings as required

Manufacturer: Square-D, Allen-Bradley, or approved equal

F. Uninterruptible Power Supply and Manual Bypass Switch

Function: Provide back-up 120VAC power

Type: On-line, double conversion with fault tolerant auto-bypass

Input: 120VAC

Output: 120VAC (minimum of six 5-15R receptacles)

VA Output: As required to meet full load plus 20% spare capacity

Runtime: Provide batteries as necessary for 45 minutes of run-time at full load

Communication: DB9 serial port (RS232 and contact closure supported)

Bypass Switch: Manual bypass switch shall be make-before-break type

Manufacturer: Powerware (Eaton) Ferrups, Tripp-Lite (SmartOnline "SU" series), no exceptions.

G. Ethernet Switch for Well Houses

Function: Network connectivity for Well Houses 6, 7, and 8

Type: The switches for each of the Well Houses shall be an 'unmanaged' type, 5 RJ45 ports (copper), 10/100 Mbps. Vendor shall provide a quantity of 3 of these switches, one for each of Well Houses 6, 7, and 8.

Manufacturer: Allen-Bradley, no exceptions.

Model Numbers: Well Pump Houses (qty = 3) = 1783-US05T, no exceptions.

H. Ethernet Switch for Pump Station

Function: Network connectivity

Type: Vendor shall provide two (2) Ethernet switches for the new Main Control Panel in the Pump Station. The first shall be a 'managed' type, 8 RJ45 ports (copper), 10/100 Mbps. The second shall be an 'unmanaged' type, 5 RJ45 ports (copper), 10/100 Mbps.

Manufacturer: Allen-Bradley, no exceptions.

Model Numbers: Switch #1 - Pump Station Main Control Panel (qty=1) = 1783-EMS08T, no exceptions.

Switch #2 – Pump Station Main Control Panel (qty=1) = 1783-US05T, no exceptions.

I. Control Power Surge Suppressor

Function: Provide surge protection

Type: 120VAC, 1-phase, 3-wire, 10kA

Manufacturer: MTL, Square-D, or approved equal.

J. Operator Interface (HMI)

Function: Operator control station at the Platte River Pump Station

Type: Desktop Workstation, Windows 7 Professional 64, Xeon E3 required (1240, 3.3 GHz, 8M) or better, 8GB RAM Required, 1333 MHz DDR3 non-ECC Unbuffered RAM or better, (qty,2)-500 GB 7200 rpm SATA or better (configured as RAID 1, mirrored), SATA 16X DVD-ROM or better, NVIDIA Quadro 400 512MG graphics card or better, 90% Efficient Power Supply or better, 3 year basic hardware warranty or better.

Manufacturer: Dell, no exceptions.

K. Programmable Automation Controller (PAC) for Pump Station Main Control Panel.

Function: Control of equipment in Pump Station and interface with Well Field and Platte Generating Station

Type: ControlLogix PAC

Manufacturer: Allen Bradley, no exceptions.

Model: 1756-L71, (this is a minimum specification for PAC capability. Vendor shall determine final PAC to be used)

L. Programmable Automation Controllers (PAC) for Well Pump Houses.

Function: Control of equipment in each Well Pump House and interface with Pump Station

Type: CompactLogix PAC

Manufacturer: Allen Bradley, no exceptions.

Model: 1769-L16ER-BB1B, (this is a minimum specification for PAC capability. Vendor shall determine final PAC to be used)

M. Discrete Input Modules

Function: Provide discrete inputs to PAC

Type: 24VDC, sinking. Modules for Pump Station Control shall be ControlLogix (1756) I/O modules. Modules for Well Houses shall be CompactLogix, compatible I/O with the processor.

Manufacturer: Allen Bradley, no exceptions.

Misc.: All field wiring for discrete inputs shall be wired to the coil of an interposing relay in the Main Control Panel. The separate interposing relay will then turn on the respective input. See 'PAC I/O Module' section for more details.

N. Discrete Output Modules

Function: Provide discrete outputs from PAC

Type: 24VDC, sourcing. Modules for Pump Station Control shall be ControlLogix (1756) I/O modules. Modules for Well Houses shall be CompactLogix, compatible I/O with the processor.

Manufacturer: Allen Bradley, no exceptions.

Misc.: Each discrete output from each discrete output module shall be wired to the coil side of an interposing relay. The field wiring will be wired to the contact side of the interposing relay. See 'PAC I/O Module' section for more details.

O. Analog Input Modules

Function: Provide analog inputs to PAC

Type: Modules for Pump Station Control shall be ControlLogix (1756) I/O modules. Modules for Well Houses shall be CompactLogix, compatible I/O with the processor.

Manufacturer: Allen Bradley, no exceptions.

P. Analog Output Modules

Function: Provide analog outputs from PAC

Type: Modules for Pump Station Control shall be ControlLogix (1756) I/O modules. Modules for Well Houses shall be CompactLogix, compatible I/O with the processor.

Manufacturer: Allen Bradley, no exceptions.

Q. High Speed Counter/Input Modules

Function: High speed input for counting pulses from flow meter in Wells 6, 7, and 8.

Type: Modules for Well Houses shall be CompactLogix, compatible I/O with the processor.

Manufacturer: Allen Bradley, no exceptions.

R. Thermocouple Input Modules

Function:	Provide thermocouple input interface to PAC
Manufacturer:	Allen Bradley, no exceptions.

S. Ethernet Radio

Function:	Communication between Processors
Type:	Wireless Ethernet-serial modem, 900MHz
Manufacturer:	Data-Linc, no exceptions.
Model Number:	SRM-6220, no exceptions.
Misc.:	Vendor shall provide antenna and any other hardware or software necessary for establishing communications.

T. Modbus Interface Module

Function:	Communication between Allen Bradley ControlLogix processor and Modicon processors.
Type:	Modbus Communication Interface for ControlLogix Platform.
Manufacturer:	ProSoft, no exceptions.
Misc.:	This module shall be provided by the Vendor and placed in the ControlLogix rack in the Pump Station Main Control Panel by the Vendor. Vendor is responsible for selecting the proper module for successful communications between all processors.

2.2 CONTROL PANELS/ENCLOSURES

The Main Control Panel enclosure for the Pump Station shall be a Hoffman 'Type 4 Floor-Mount Enclosure' with floor stands. The completed control panel shall be built to NEMA Type 12 standards. Each hinged door section shall have a 3-point latch. Material shall not be less than 12 gauge steel, reinforced with body stiffeners and panel supports. Construction incorporating light gauge skin will not be accepted. Panel shall have front access and be constructed by an approved UL industrial panel manufacturer in strict compliance with NEMA and UL standards.

Panel shall be factory assembled, wired, and tested by an approved UL industrial panel manufacturer. All wiring shall be neatly installed in horizontal and vertical runs. Terminals shall be so arranged to provide complete accessibility to all items.

All enclosure doors shall be hinged with heavy gauge removable continuous hinge pin. All joined edges, corners, and seams shall be of continuous bead weld and ground to a finish so as not to be detectable after painting. Enclosure shall be painted with ANSI 61 gray polyester paint. Back panel shall have a white painted finish.

Heavy duty lifting eye-bolts shall be provided on the top of the enclosure for handling and installation of the enclosure.

Each section of the enclosure shall incorporate an interior lighting system with a manual on/off switch.

The enclosure shall incorporate a duplex receptacle (GFCI type) and Ethernet port connection on the outside of the panel (on the side, not through the door), so programming functions, and network connection capability can be carried out without opening the enclosure. 'Grace Engineered Products' or Hoffman 'INTERSAFE' brands are acceptable, no exceptions or equals. The HMI Ethernet connection shall not utilize this network port on the side of the enclosure. The HMI Ethernet connection shall be routed to the inside of the panel and connected directly to the Ethernet switch inside the panel.

Plastic wire way (Panduit) shall be used to route wires in the enclosure. Wire way fill shall not exceed 60% and shall be run in continuous lengths with snap on covers.

Every single wire in the enclosure (and field wiring as well) shall be labeled at both ends with its respective wire number. The wire color and wire label shall match exactly as the drawings indicate, with no exceptions. Each label shall be printed from a printer (no hand written labels), and each label shall compose the full wire number in ONE single label. Labels shall NOT be 'pieced together' with multiple single-numbered-labels wrapped around the wire to create a full label marking. Labels shall have adhesive backing and shall wrap around the wire at least one full revolution, to ensure the label will not fall off.

Wire color, size, insulation, etc., shall comply with the UL 508A standard.

All terminal blocks and other termination points shall be labeled properly and correspond exactly as the drawings indicate, with no exceptions. Terminal blocks shall have labels on them that are printed from a computer printer (no hand written labels), and the label shall be manufactured for the definite purpose of the particular terminal block it is used for, to ensure proper fit.

The 'mains' power supplied to the Main Control Panel in the Pump Station shall have a Control Power Surge Suppressor. (120VAC, 1-phase, 3-wire, 10kA), manufacturer: MTL, Square-D, or approved equal.

The new Main Control Panel for the Pump Station shall provide power to the same instrumentation and other equipment, as existing control panel does, as required.

2.3 PAC I/O MODULES (FOR PLATTE RIVER PUMP STATION CONTROL PANEL)

All wiring from the I/O modules (discrete or analog) shall be wired to intermediate terminal blocks in the panel provided by the Vendor. Field wiring terminations shall not be terminated directly to the I/O module. Field wiring terminations shall be made to terminal blocks, fuses, relays, or other, as specified below.

Vendor shall provide enough I/O modules in order to allow 20% spare expansion for each I/O type.

All I/O points that have field wiring outside of the building envelope of the Pump Station shall be individually surge protected.

The existing control system in the Pump Station uses both 115VAC and 24VDC discrete inputs to the existing PLC. Therefore, in order to minimize PAC module types (for spares) and also to provide an easier transition of I/O wiring from the old system to the new system, all discrete points (inputs and outputs) shall use interposing relays to/from the I/O modules respectively.

The estimated quantity of I/O points is listed below. See 'Platte River Pump Station' Drawings in the appendix for details. However, these drawings (from Owner) are somewhat incomplete and out of date (i.e. Rack 3, Slot 6 shows only one I/O point, however field verification shows the module to be mostly full). Therefore, it is the sole responsibility of the Vendor to verify the I/O requirements and the Vendor is required to provide all I/O modules in order to serve all I/O points that are currently in use, whether they are on the drawings or not. No change orders will be approved from the Owner for additional I/O modules that the Vendor did not include in the original proposal. This I/O count is an estimate only.

Platte River Pump Station I/O count (approximate)

I/O Module Type	Approximate I/O Quantity
Discrete Inputs	30
Discrete Outputs	15
Analog Inputs	12
Analog Outputs	6
Thermocouple Inputs	18

2.4 PAC I/O MODULES (FOR PLATTE RIVER WELL HOUSE PUMP CONTROL PANEL)

See 'Well Controls Schematic for Well Houses' in Appendix for I/O count and additional information.

2.5 SPARES

Vendor shall supply the following spare equipment at the beginning of the start-up/commissioning phase of the Project. Spare equipment shall be the property of the Owner.

A. One spare processor shall be provided for the Pump Station controller. This spare processor shall be the exact model of processor that is provided as the primary processor that is being used for this project.

B. PAC I/O modules (1 spare module of each model used).

C. Fuses of each type and size used.

2.6 SOFTWARE AND LICENSES

The following software shall be purchased by the Vendor and all licensing shall be transferred to the Owner and licensed to the Owner at the time of the Project start-up.

Development software for PLC programming of the Modicon controllers, and Wonderware HMI programming is not required to be purchased for the Owner. However, the Vendor shall use the Vendor's development license (at no additional cost to the Owner) to program and configure all necessary equipment, including but not limited to Modicon PLC's (Momentum and Quantum), Allen Bradley PAC's or PLC's, Wonderware HMI, Ethernet radios, etc. The Vendor shall supply one development license to the Owner (licensed in the Owner's name), for RSLogix 5000 programming software as indicated below.

A. PAC Programming Software (development software license required)

Function: Program and configure PAC's

Type: RSLogix 5000 development software, version 20 or greater.

Manufacturer: Rockwell Automation, Inc.

B. HMI Runtime Software

Function: Operate Wonderware HMI application

Type: InTouch 2012 Runtime 3000 Tag with I/O (Wonderware Runtime license, latest version release)

Manufacturer: Invensys (Wonderware), no exceptions.

2.7 WARRANTY

Vendor shall provide a warranty for all equipment and installation for a period of one year from date of Project completion.

PART 3: EXECUTION

3.1 SEQUENCE OF WORK

The following description gives a rough, abbreviated list of the sequence and phases that are expected. However, Vendor shall work closely with the Owner to determine the exact sequence during the Project. This list does not include each required step/phase. Vendor is responsible for the complete control system integration, as described above.

The list is roughly in sequential order. However, some phases will be advancing simultaneously, and some phases may be carried out at multiple times throughout the project (i.e. Pump Station Field Wiring).

Phase	Responsible
Submittals	Vendor
Submittal Approval	Owner
Equipment Procurement	Vendor
Pump Station Panel Construction	Vendor
Shop Checkout of Pump Station Panel	Vendor
Install Air Conditioning in Pump Station Control Room	Owner/others
Pump Station Panel and HMI Computer Installation	Vendor
Pump Station Field Wiring	Vendor
I/O and Instrument Checkout	Vendor
Start-up / Commissioning	Vendor
Install VFD's for Well House Pumps 6, 7, and 8	Owner/others
Install and wire new controllers for Well Pump Houses 6, 7, and 8	Vendor
Configure communications between Well Houses and Pump Station	Vendor
Configure communications between Pump Station and PGS	Vendor
Project Completion letter to Vendor	Owner
O&M Manuals	Vendor

3.2 PROGRAMMING

The PAC program (RSLogix 5000) application shall be developed with well documented rung comments, tag names, and tag descriptions. The programmer shall make every effort to clearly describe each section of code in the rung comments of the program.

The Vendor shall assign a programmer from the Vendor's company whom has had experience programming at least 3 other systems of this size and complexity in the past. Programmers who do not meet this requirement shall not be acceptable to program this system. References for the programmer shall be provided to the Owner by the Vendor.

The new Allen Bradley PAC program shall include all existing functionality of the Modicon Quantum process, plus the additional requirements for this project.

The Owner has requested that old code in the existing Quantum processor in the Pump Station building be removed from the program (in the Quantum processor). This shall be done in order to reduce troubleshooting complications throughout the Project cycle.

The following items are some of the standards required for programming.

A. Operational Adjustments

Operational adjustments shall consist of configuration parameters, and system parameters. All parameters affecting or potentially affecting process capability shall be password protected with security levels assigned to appropriate user groups.

Tuning parameters, calibration points, configuration set points, and operational set points shall be accessible via the HMI and shall not require the use of engineering or development software for adjustment and modification. This shall only be accessible with proper security level permission.

B. Security Levels

Security levels shall be enabled on the HMI to prevent unauthorized access and revision of data. All security logins shall be logged with a time/date stamp. High level access groups shall include a timeout function (system parameter by group) with auto log out.

- Operator – monitoring functions only
- Maintenance – system parameter access, set point change access
- Administrator – full access

C. Operator Alerts

The Main Control Panel in the Pump Station building shall be equipped with visual and audible alerts. These shall be added as part of this Project by the Vendor. The audible alert shall have a silence button.

- Yellow = Alarm
- Red = Fault/E-Stop

Audible alert shall sound upon the following events

- Automatic with operator intervention required
- Alarm
- Fault/E-Stop

D. Alarm Management

The alarms and alarm subsystem(s) shall function is accordance with the ANSI/ISA-18.2 Alarm Management Standard.

PART 4: ATTACHMENTS

1) **EXISTING SCADA LAYOUT**
2) **NEW CONTROL SYSTEM ARCHITECTURE**
3) **WATER DISTRIBUTION NETWORK SCHEMATIC**
4) **PLATTE RIVER WELL HOUSES EXISTING CONTROLS SCHEMATIC**
5) **PLATTE RIVER PUMP STATION EXISTING DRAWINGS**
6) **AIR INJECTION PUMPS DRAWING**
7) **URANIUM REMOVAL FACILITY ELECTRICAL DRAWINGS**
8) **URANIUM REMOVAL FACILITY P&ID DRAWINGS**

MINIMUM INSURANCE REQUIREMENTS
CITY OF GRAND ISLAND, NEBRASKA

The successful bidder shall obtain insurance from companies authorized to do business in Nebraska of such types and in such amounts as may be necessary to protect the bidder and the interests of the City against hazards or risks of loss as hereinafter specified. This insurance shall cover all aspects of the Bidder's operations and completed operations. Failure to maintain adequate coverage shall not relieve bidder of any contractual responsibility or obligation. Minimum insurance coverage shall be the amounts stated herein or the amounts required by applicable law, whichever are greater.

1. WORKERS COMPENSATION AND EMPLOYER'S LIABILITY

This insurance shall protect the Bidder against all claims under applicable State workers compensation laws. This insurance shall provide coverage in every state in which work for this project might be conducted. The liability limits shall not be less than the following:

Workers Compensation	Statutory Limits
Employers Liability	$100,000 each accident
	$100,000 each employee
	$500,000 policy limit

2. BUSINESS AUTOMOBILE LIABILITY

This insurance shall be written in comprehensive form and shall protect the Bidder, Bidder's employees, or subcontractors from claims due to the ownership, maintenance, or use of a motor vehicle. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	$ 500,000 Combined Single Limit

3. COMPREHENSIVE GENERAL LIABILITY

The comprehensive general liability coverage shall contain no exclusion relative to explosion, collapse, or underground property. The liability limits shall be not less than the following:

Bodily Injury & Property Damage	$ 500,000 each occurrence
	$1,000,000 aggregate

4. UMBRELLA LIABILITY INSURANCE

This insurance shall protect the Bidder against claims in excess of the limits provided under employer's liability, comprehensive automobile liability, and commercial general liability policies. The umbrella policy shall follow the form of the primary insurance, including the application of the primary limits. The liability limits shall not be less than the following:

Bodily Injury & Property Damage	$1,000,000 each occurrence
	$1,000,000 general aggregate

5. ADDITIONAL REQUIREMENTS

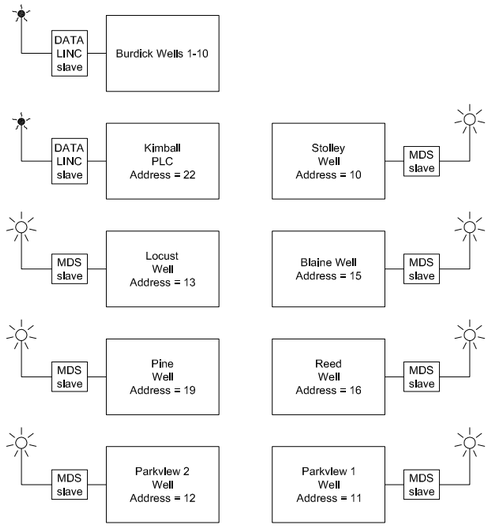
The City may require insurance covering a Bidder or subcontractor more or less than the standard requirements set forth herein depending upon the character and extent of the work to be performed by such Bidder or subcontractor.

Insurance as herein required shall be maintained in force until the City releases the Bidder of all obligations under the Contract.

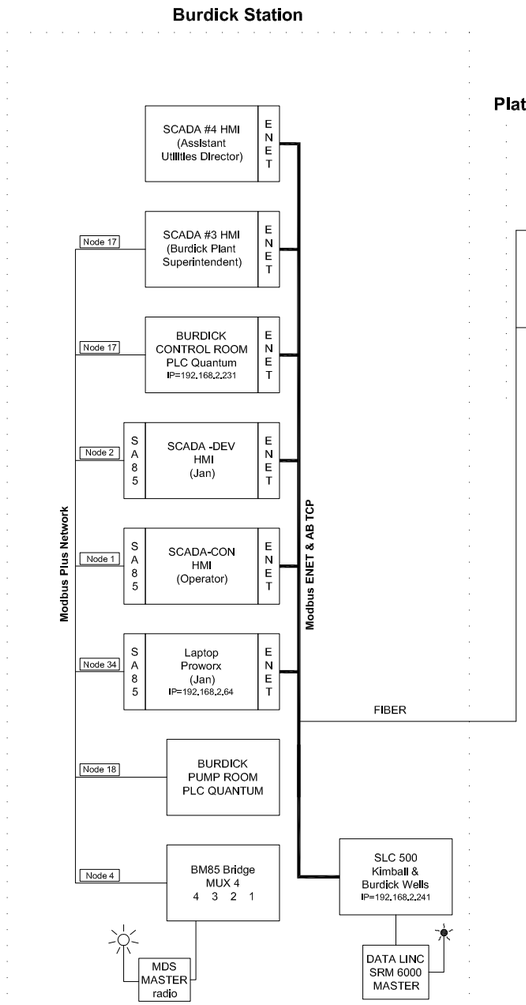
The Bidder shall provide and carry any additional insurance as may be required by special provisions of these specifications.

6. CERTIFICATE OF INSURANCE

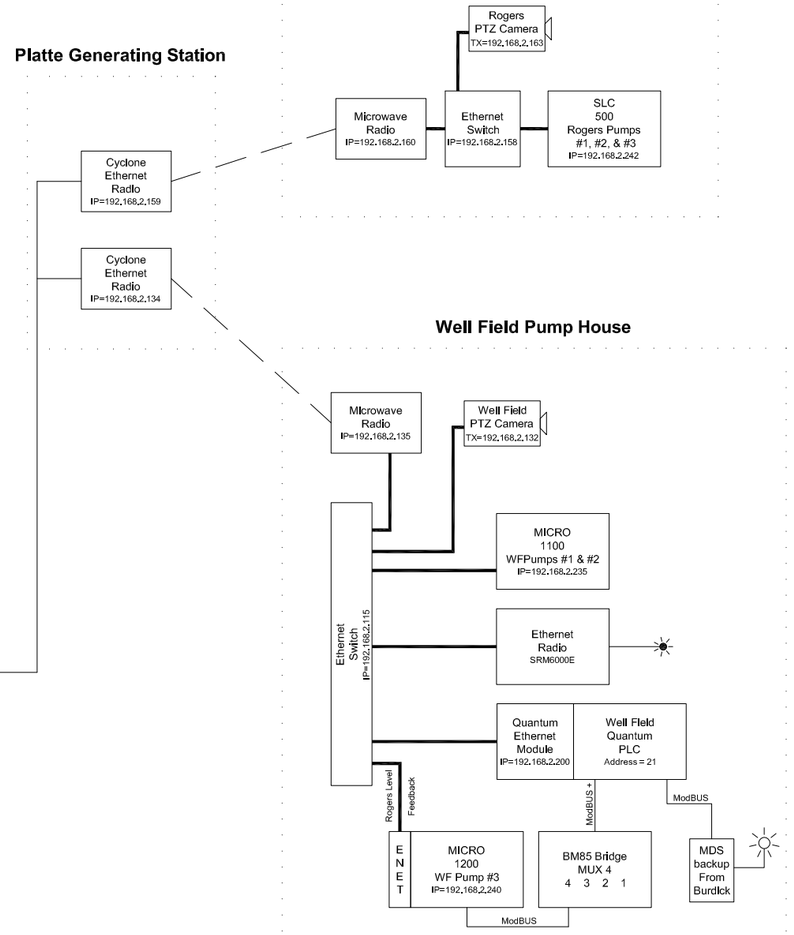
Satisfactory certificates of insurance shall be filed with the City prior to starting any work on this Contract**. The certificates shall show the City as an additional insured on all coverage except Workers Compensation. The certificate shall state that thirty (30) days written notice shall be given to the City before any policy is cancelled (strike the "endeavor to" wording often shown on certificate forms). If the bidder cannot have the "endeavor to" language stricken, the bidder may elect to provide a new certificate of insurance every 30 days during the contract. Bidder shall immediately notify the City if there is any reduction of coverage because of revised limits or claims paid which affect the aggregate of any policy.**



Burdick Station



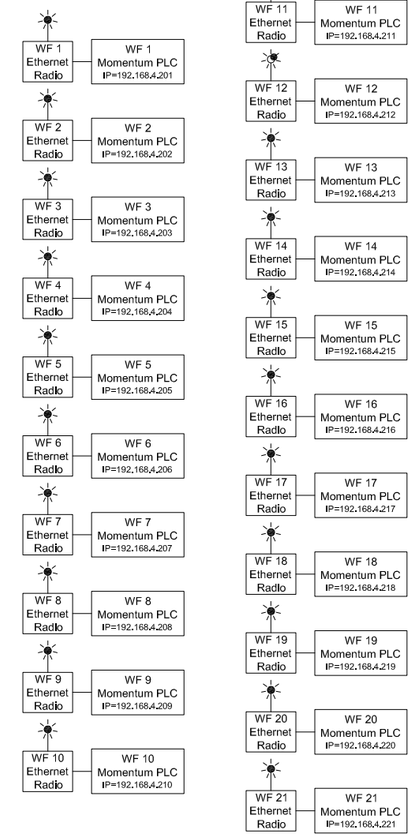
Platte Generating Station



Rogers Pumping Station

Well Field Pump House

Well Field Wells



NO.	DATE	REVISION	BY	APVD

CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island
Water System SCADA

SCADA Layout

Site Address: City of Grand Island		
Drawn by: LM	Date: Oct 5, 2010	Sheet No. 1 of 1
Approved : XX	Scale: NTS	

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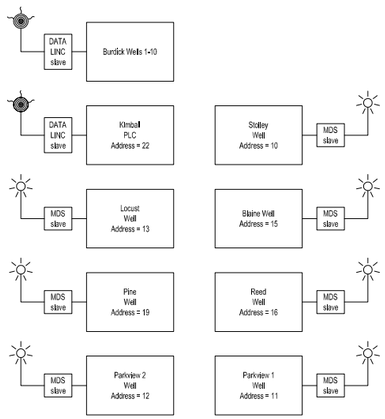
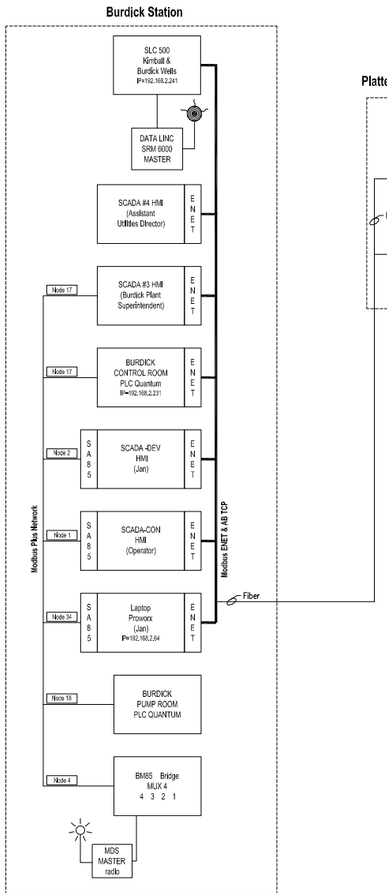
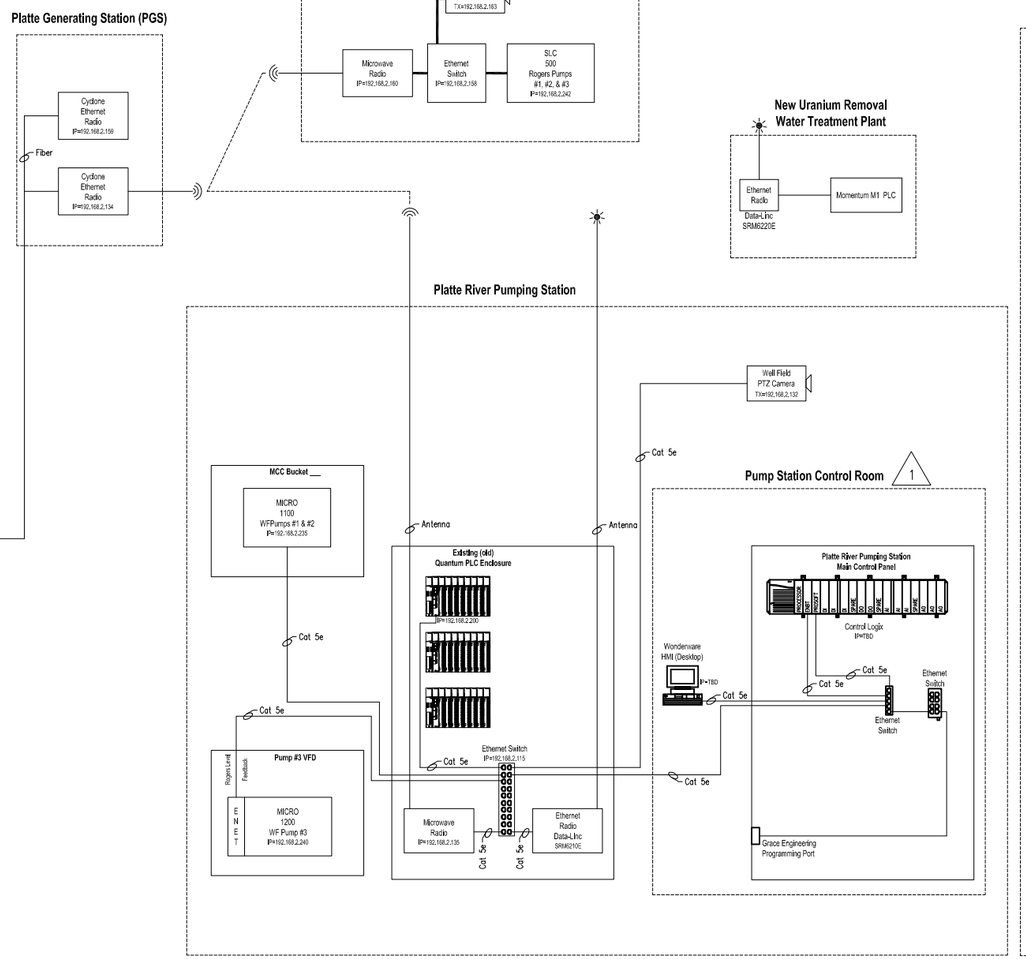
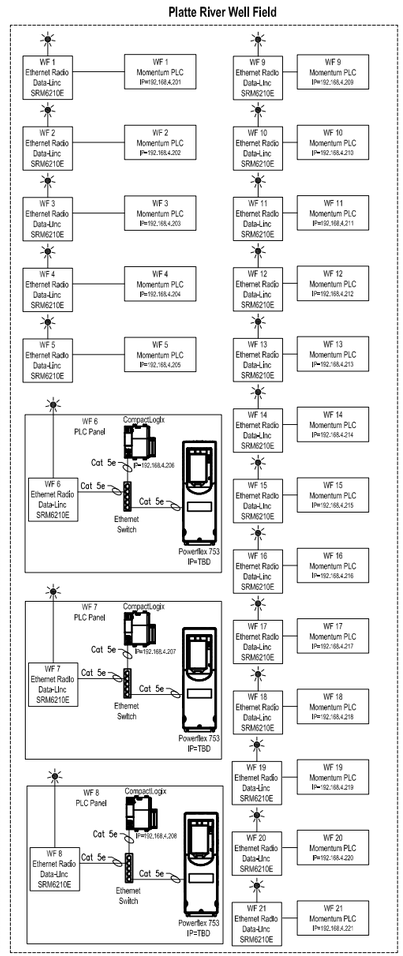
DRAWING # WW072-E00A09

Grand Island Water System
Control System Architecture
(Well System)









1 New "Main Control Panel" and Desktop PC/HMI will be placed in air conditioned room "Pump Station Control Room" inside the pump house. The new enclosure will not be air conditioned internally.

REV	DATE	DRW	ENG	REMARKS
1.0	2/24/12	JK	AO	SUBMITTED FOR CUSTOMER APPROVAL
1.1	2/28/12	JK	AO	ETHERNET CONNECTIONS

CITY OF GRAND ISLAND, GRAND ISLAND, NEBRASKA
GRAND ISLAND WELL FIELD UPGRADE
CONTROL SYSTEM ARCHITECTURE

PROJECT # WW072
SCALE NONE
DWG OF

HUFFMAN ENGINEERING INC.
5301 North 57th Street
LINCOLN, NE. 68507
402-464-6823

DRAWING # WW072-E00A09

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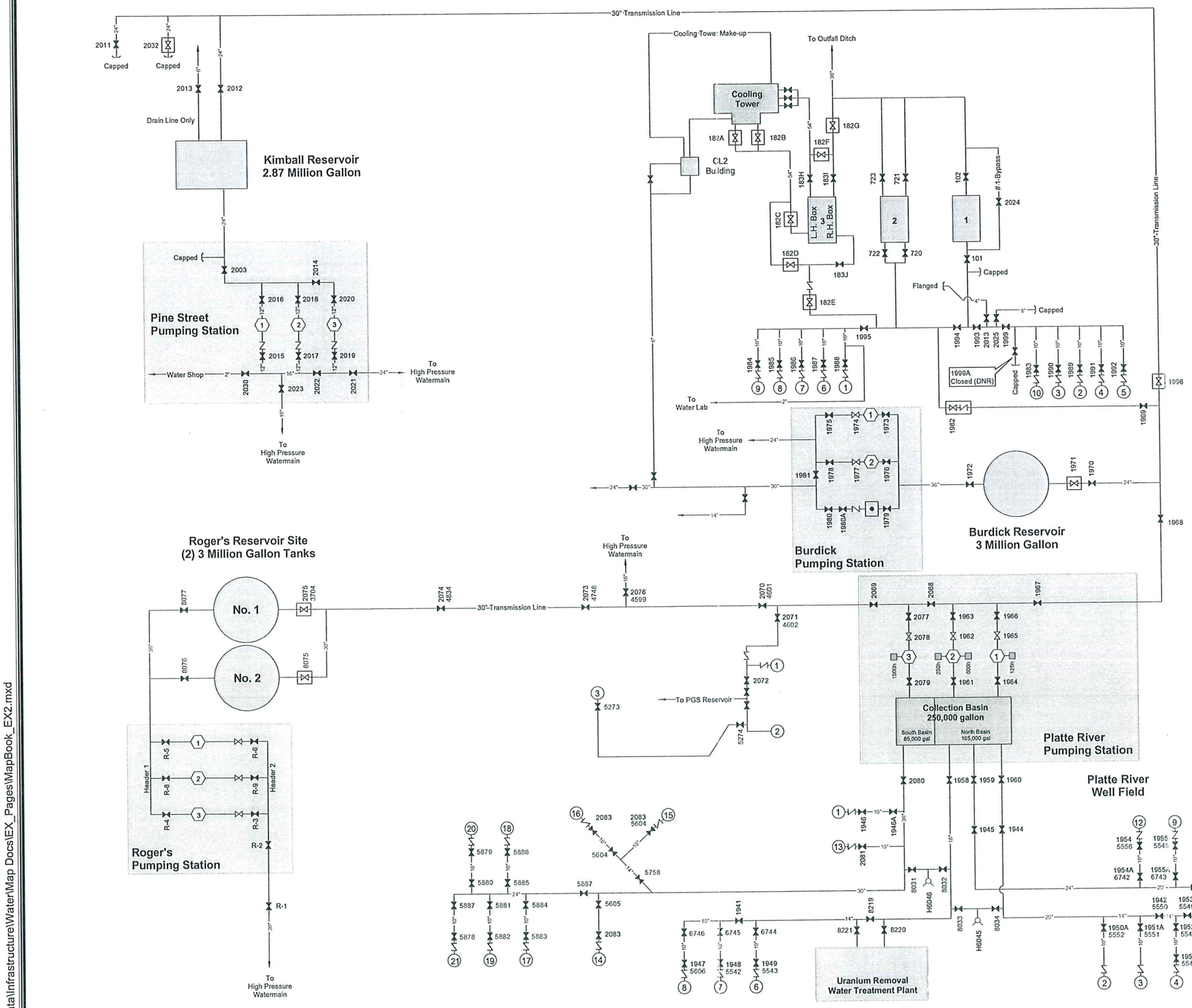

Legend

- Ball Valve
- Check Valve
- Hand Operated Valve
- Hydraulic Operated Cone Valve
- Motor Operated Valve
- Electric Motor
- Electric Pump
- Engine Driven Pump
- Steam Turbine Condenser
- Reservoir
- Well
- Water Line
- 1234 Plant Valve Number
- 1234 City Valve Number

Water Distribution Network

Pump Schematic EX-2

City of Grand Island
Utilities Department

Revised 12/5/2011

W:\Data\InfrastructureWater\Map Docs\EX_Pages\MapBook_EX2.mxd

120 VAC IN
HOT — H1 — TRANSTACTOR ACP-100-MN SRUGE PROTECTOR (LINE / LOAD / NEUTRAL) — H
NEUTRAL — N
GROUND — GND

OTM1 1A, 250V
OTM1 1A, 250V
OTM6 6A, 250V

POWERS DATA-LINC
SRM 6210E
RADIO MODEM

CONNECTION THROUGH DIN RAIL

HOT NEUTRAL GND
PS5R-C24
24 VDC 30W PSU
V+ V-

HOT NEUTRAL GND
PS5R-A12
12 VDC 7.5W PSU
V+ V-

PLC 3-1 — PLC 3-3 — PLC 3-5 — PLC 3-7 — PLC 2-17

3AG, 600mA, 250V
CPU — PLC 2-18

PLC 3-18

PLC DIGITAL INPUTS

TO MOTOR AUX CONTACT — RNNG T — PLC 2-13

RNNG B
DOOR B
REM B

I / O
3AG,600mA, 250V

TO DOOR SWITCH — DOOR T — PLC 2-14

TO REMOTE/RUN SWITCH — * REMOTE FEEDBACK — REM T — PLC 2-15

TO MOTOR CURRENT TRANSFORMER 4-20 mA

PLC ANALOG INPUTS

AMPS T — PLC 3-2
5MT , 100 mA, 250V

AMPS B
TEMP B
LEVEL B

TO TEMP SWITCH

TEMP T — PLC 3-4
1k Ω
* Note: Analog input being used as a digital input.

TO DRUCK LEVEL SENSOR 4-20 mA

4 - 20 mA

LEVEL T — PLC 3-6
5MT , 100 mA, 250V

AMPS GND
TEMP GND
LEVEL GND

TO SENSOS FLOWMETER (PULSE)

FLOW B
FLOW R
FLOW G

3 5 CROVZET 4
1 DR-IDC24 12V TO 24V LEVEL SHIFTER 2
PLC 2-16

PLC 2-1 — PLC 2-2
PLC 2-3 — PLC 2-4
PLC 2-5 — PLC 2-6

PLC DIGITAL OUTPUTS

PLC 3-13 — GRAYHILL 3 70RCK4R 2 LOGIC I/O RACK FIELD 2 1x70-OAC24 3 I/O MODULE

→ TO MOTOR REMOTE/RUN SWITCH (POWERS COIL WHEN IN REMOTE)

NETWORK CONNECTION

MODICON TSX MOMENTUM — ETHERNET — DATA-LINK SRM 6210E RADIO MODEM — COAXIAL CABLE — YAGI DIRECTIONAL ANTENNA

NO.	DATE	REVISION	BY	APVD

CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island Well Field
Wellfield Rd

Well Controls
1,3-12, 14-21

Site Address: 1035 Wildwood Drive

Drawn by: LM	Date: AUG 2, 2010	Sheet No. 1 of 1
Approved : XX	Scale: NTS	

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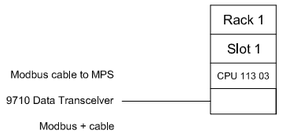
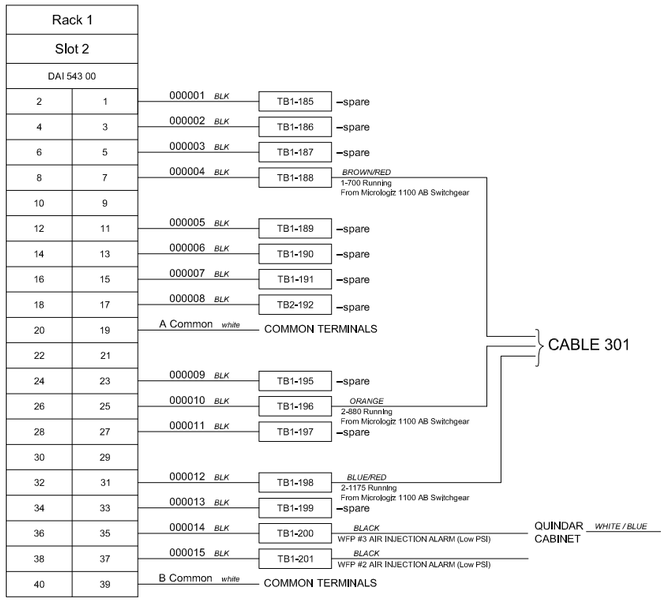
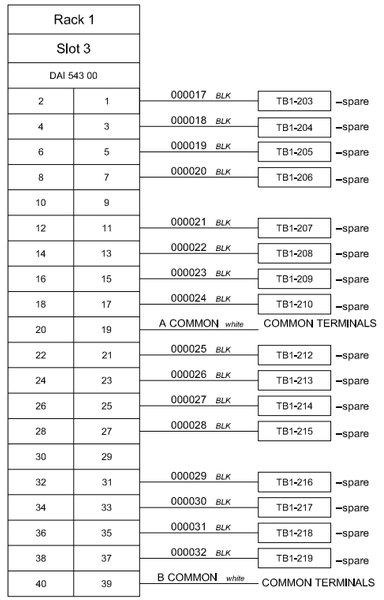
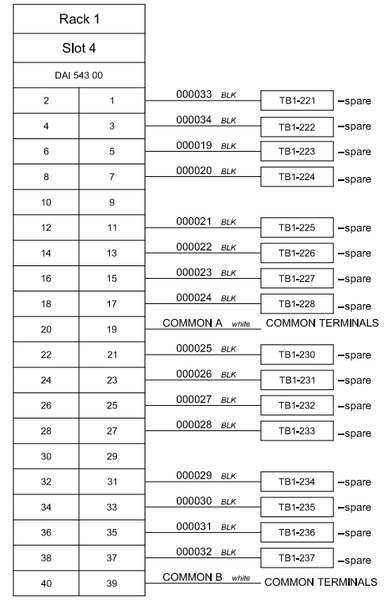
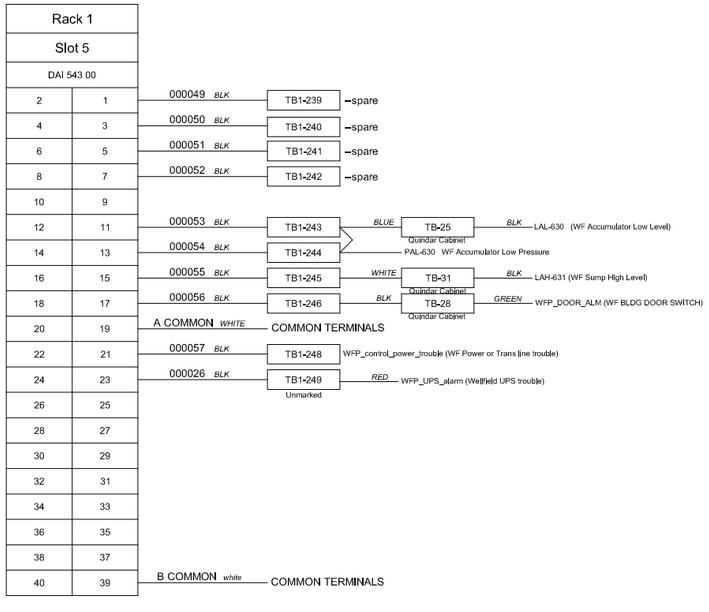
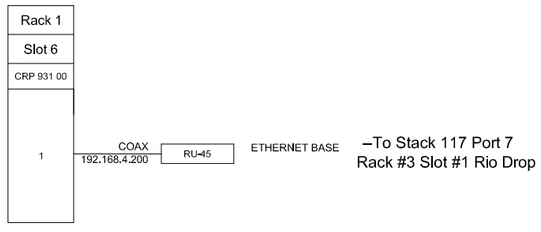


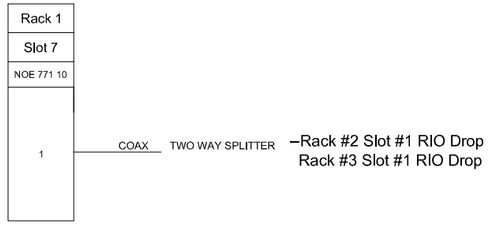


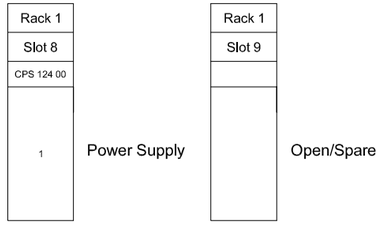


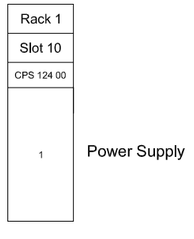












NO.	DATE	REVISION	BY	APVD

CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island Well Field
Wellfield Rd

Platte River Pump Station Rack #1

Site Address: 1035 Wildwood Drive

Drawn by: LM | Date: NOV 18, 2010 | Sheet No. 1 of 5

Approved : XX | Scale: NTS

RIO Drop through
COAX CABLE
From Rack #1 Slot #6

Rack 2
Slot 1
CRA 931 00

Relay Ouput

Rack 2					
Slot 2					
DRA 840 00					
1	000001 *BLK*	TB2-101F			
2	*RED*	TB1-102	*RED*	TB2-1-700	Pump Start Relays (All have been disconnected) Bottom Right Terminal
3	000002 *BLK*	--X			
4	*RED*	TB1-104	--X		
5	000003 *BLK*	TB2-101F			
6	*RED*	TB1-106	*RED*	TB2-1-880	Pump Start Relays (All have been disconnected) Bottom Right Terminal
7	000004 *BLK*	--X			
8	*RED*	TB1-108	--X		
9					
10					
11	000005 *BLK*	TB2-109F			
12	*RED*	TB1-110	*RED*	TB2-2-880	Pump Start Relays (All have been disconnected) Bottom Right Terminal
13	000006 *BLK*	--X			
14	*RED*	TB1-112	--X		
15	000007 *BLK*	TB2-113F			
16	*RED*	TB1-114	*RED*	TB2-1-1175	Pump Start Relays (All have been disconnected) Bottom Right Terminal
17	000008 *BLK*	--X			
18	*RED*	TB1-116	--X		
19					
20					
21	000009 *BLK*	TB2-117F			
22	*RED*	TB1-118	*RED*	TB2-3-1175	Pump Start Relays (All have been disconnected) Bottom Right Terminal
23	000010 *BLK*	--X			
24	*RED*	TB1-120	--X		
25	000011 *BLK*	TB2-121F	--X		
26	*RED*	TB1-122	--X		
27	000012 *BLK*	TB2-123F	--X		
28	*RED*	TB1-124	--X		
29					
30					
31	000013 *BLK*	TB2-125F	--X		
32	*RED*	TB1-126	--X		
33	000014 *BLK*	TB2-127F	--X		
34	*RED*	TB1-128	--X		
35	000015 *BLK*	TB2-127F	--X		
36	*RED*	TB1-130	--X		
37	000016 *BLK*	TB2-131F	--X		
38	*RED*	TB1-132	--X		
39					

125 VAC

Rack 2			
Slot 3			
DRA 840 00			
1	000017 *BLK*	TB2-133F	--X
2	*RED*	TB1-134	--X
3	000018 *BLK*	TB2-135F	--X
4	*RED*	TB1-136	--X
5	000019 *BLK*	TB2-137F	--X
6	*RED*	TB1-138	--X
7	000020 *BLK*	TB2-139F	--X
8	*RED*	TB1-140	--X
9			
10			
11	000021 *BLK*	TB2-141F	--X
12	*RED*	TB1-142	--X
13	000022 *BLK*	TB2-143F	--X
14	*RED*	TB1-144	--X
15	000023 *BLK*	TB2-145F	--X
16	*RED*	TB1-146	--X
17	000024 *BLK*	TB2-147F	--X
18	*RED*	TB1-148	--X
19			
20			
21	000025 *BLK*	TB2-149F	--X
22	*RED*	TB1-150	
23	000026 *BLK*	TB2-151F	--X
24	*RED*	TB1-152	--X
25	000027 *BLK*	TB2-153F	--X
26	*RED*	TB1-154	--X
27	000028 *BLK*	TB2-155F	--X
28	*RED*	TB1-156	--X
29			
30			
31	000029 *BLK*	TB2-157F	--X
32	*RED*	TB1-158	--X
33	000030 *BLK*	--X	
34	*RED*	--X	
35	000031 *BLK*	TB2-161F	--X
36	*RED*	TB1-162	--X
37	000032 *BLK*	TB2-163F	--X
38	*RED*	TB1-164	--X
39			

Rack 2			
Slot 4			
ATI 030 00			
1	300001 #1 - 700 MOTOR IB BEARING TEMP	*gold*	*tan*
2			
3			*pink*
4			
5	300002 #1 - 700 MOTOR OB BEARING TEMP	*brown*	*pink*
6			
7			*red*
8			
9			
10			
11	300003 #1 - 700 MOTOR BEARING NORTH TEMP	*gold*	*tan*
12			
13			*pink*
14			
15	300004 #1 - 700 MOTOR BEARING SOUTH TEMP	*gold*	*tan*
16			
17			*pink*
18			
19			
20			
21	300005 #1 - 880 MOTOR IB BEARING TEMP	*gold*	*tan*
22			
23			*pink*
24			
25	300006 #1 - 880 MOTOR OB BEARING TEMP	*gold*	*tan*
26			
27			*pink*
28			
29			
30			
31	300007 #2 - 880 MOTOR IB TEMP	*gold*	*tan*
32			
33			*pink*
34			
35	300008 #2 - 880 MOTOR OB TEMP	*gold*	*tan*
36			
37			*pink*
38			
39			

NOTE: Gold foil cables are bundled into thick black cabling. (5 cables per bundle.) All cables are routed through Quindar cabinet.

NO.	DATE	REVISION	BY	APVD

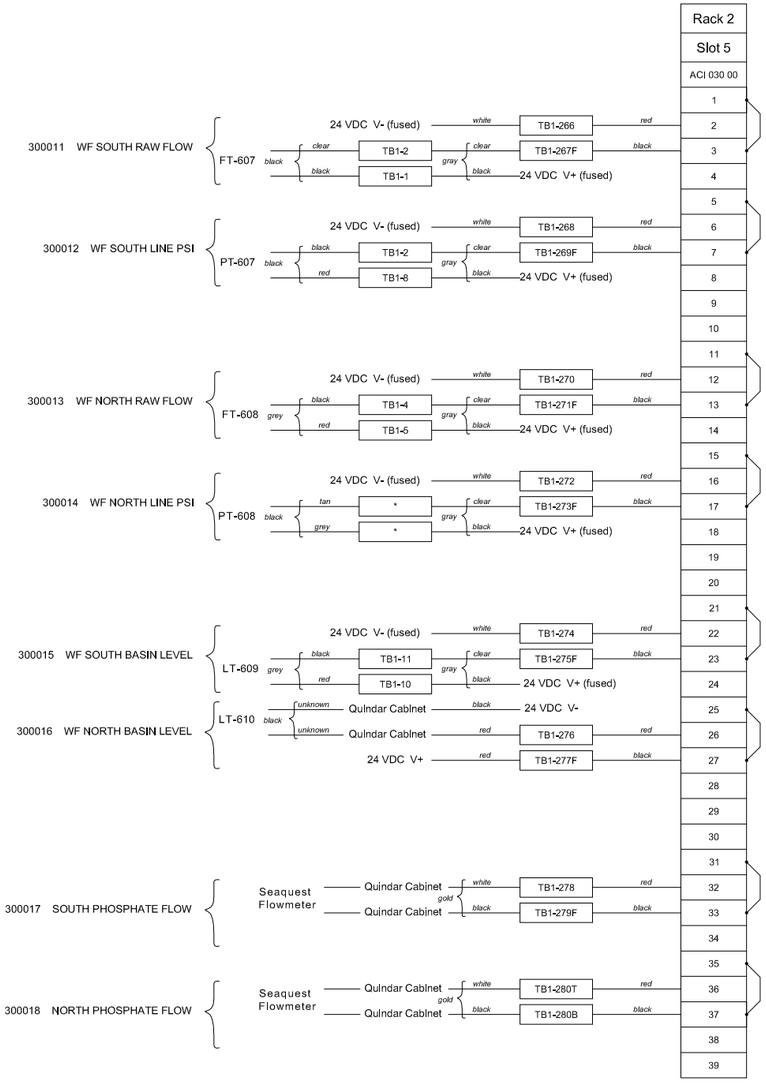
CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island Well Field
Wellfield Rd

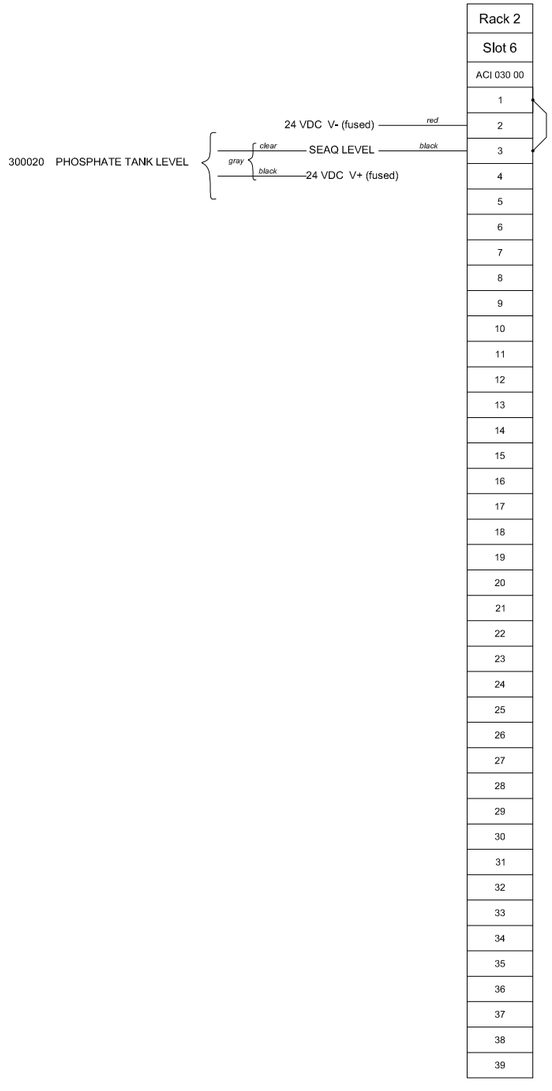
Platte River Pump Station Rack #2 (1-4)

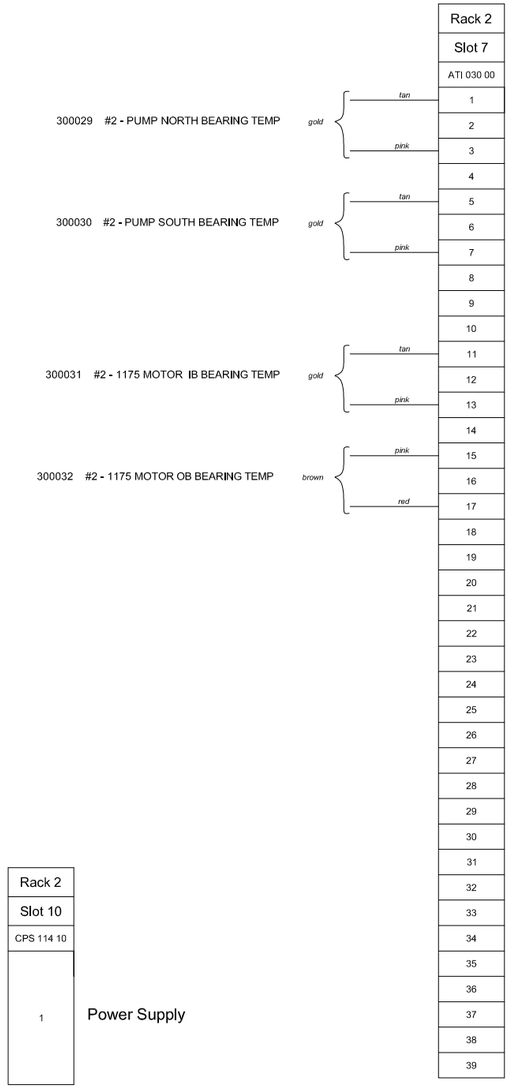
Site Address: 1035 Wildwood Drive

Drawn by: LM	Date: NOV 18, 2010	Sheet No. 2 of 5
Approved : XX	Scale: NTS	



NOTE: Gold foll cables are bundled lnto thlck black cablng. (5 cables per bundle.) All cables are routed through Quindar cablnet.





NOTE: All TC's routed through the Quindar Cablnet.

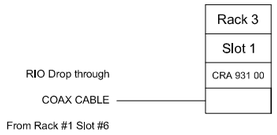
NO.	DATE	REVISION	BY	APVD

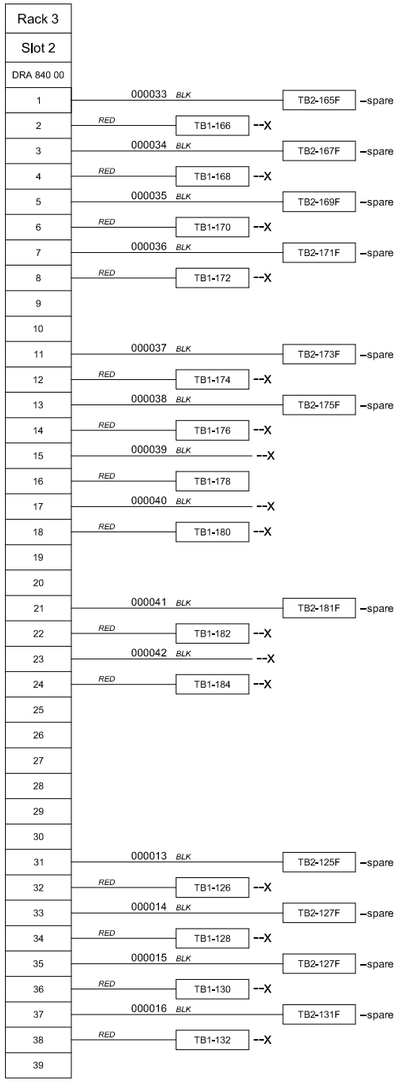
CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

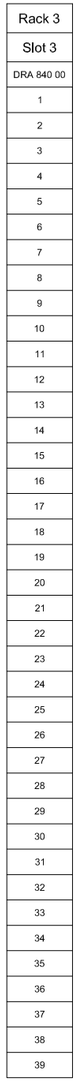
City of Grand Island Well Field
Wellfield Rd

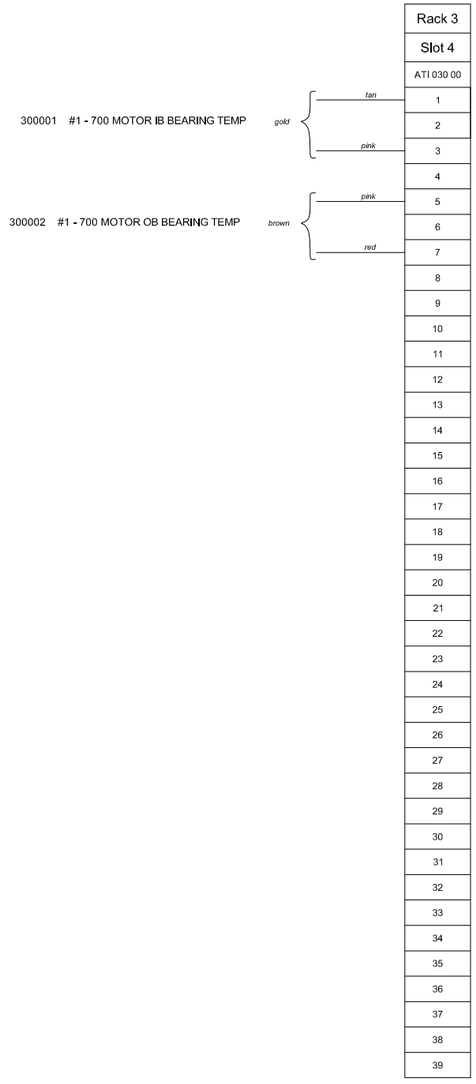
Platte River Pump Station Rack #2 (5-7)

Site Address: 1035 Wildwood Drive		
Drawn by: LM	Date: NOV 18, 2010	Sheet No. 3 of 5
Approved : XX	Scale: NTS	









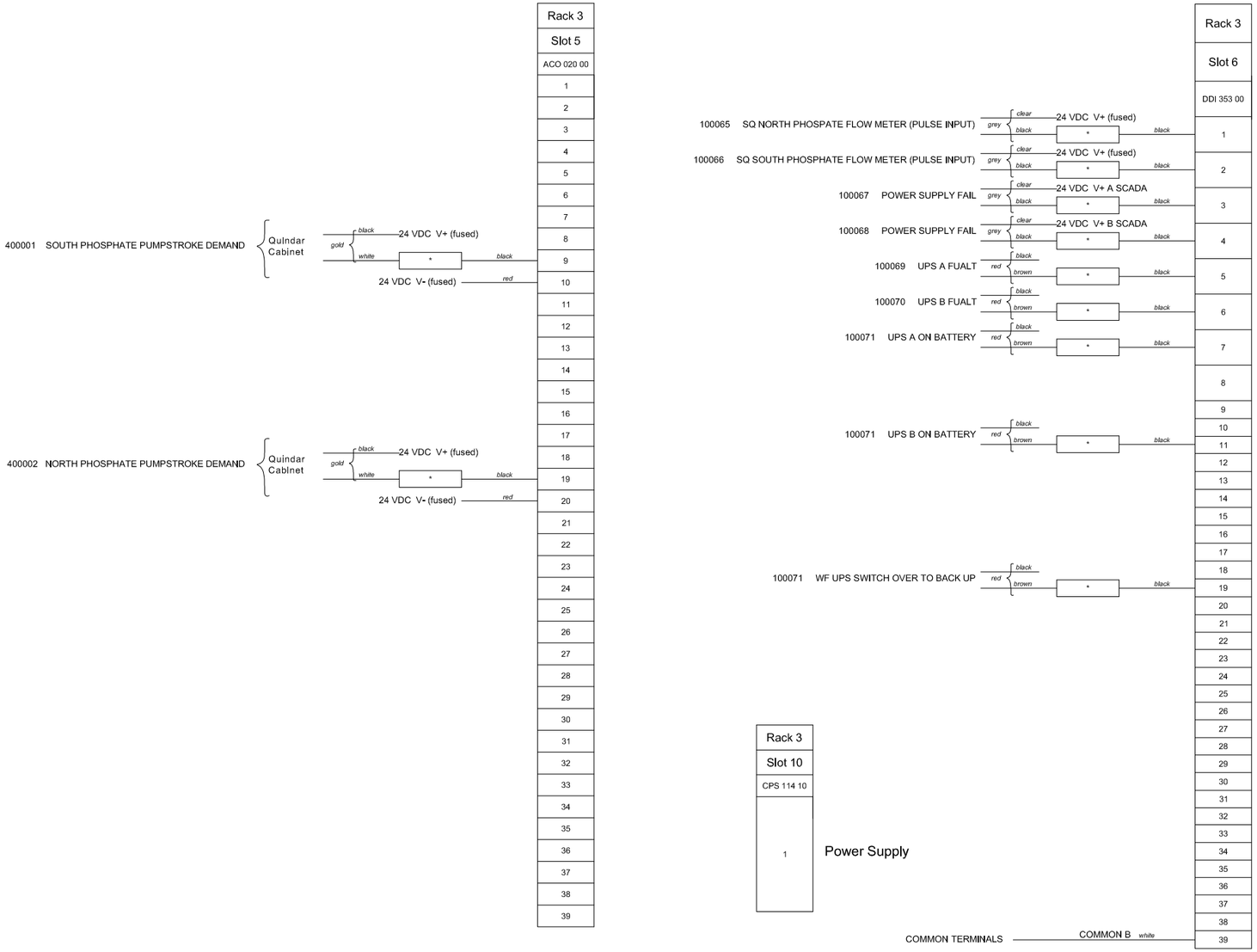
NO.	DATE	REVISION	BY	APVD

CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island Well Field
Wellfield Rd

Platte River Pump Station Rack #3 (1-4)

Site Address: 1035 Wildwood Drive		
Drawn by: LM	Date: NOV 18, 2010	Sheet No. 4 of 5
Approved : XX	Scale: NTS	



NO.	DATE	REVISION	BY	APVD

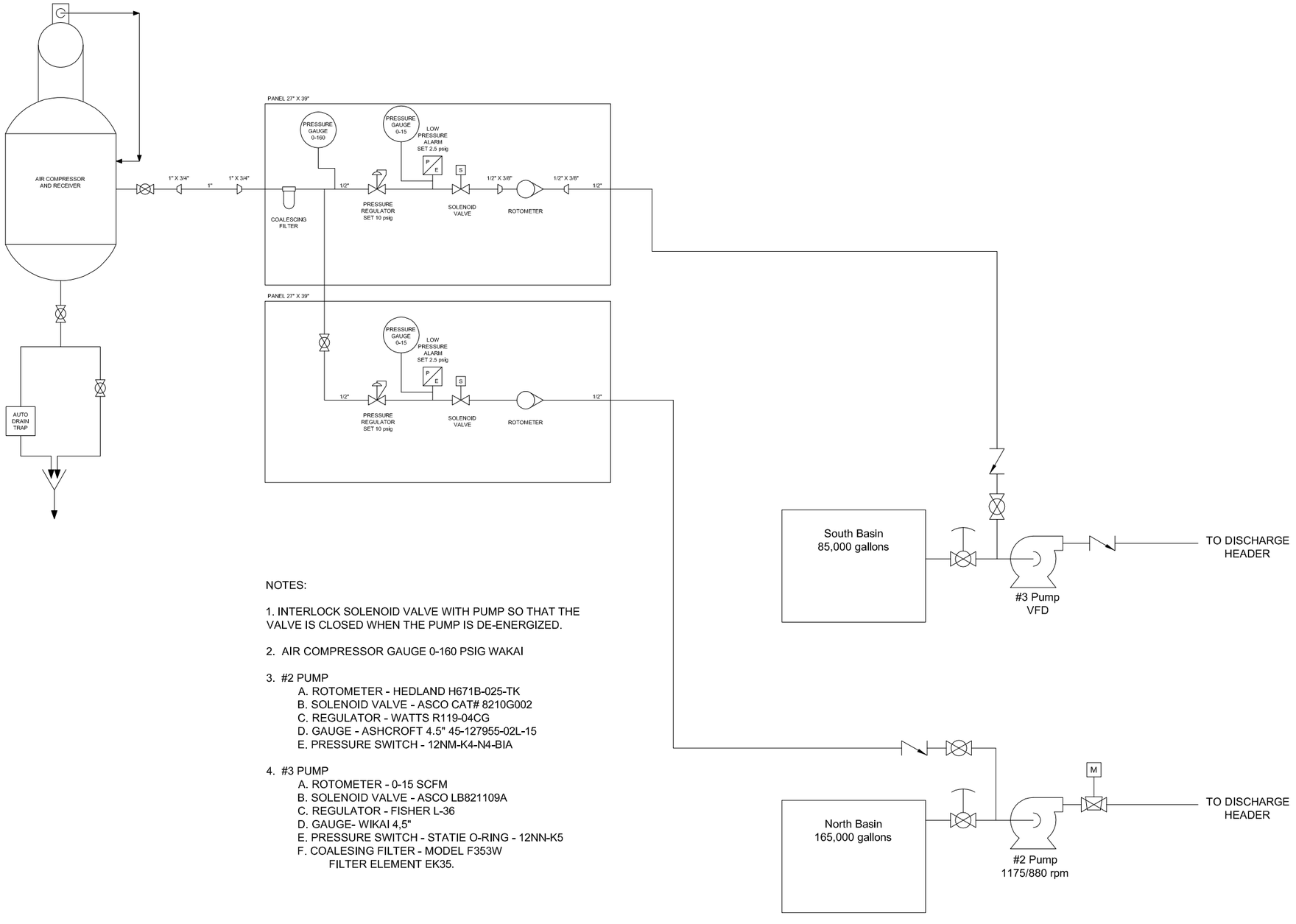
CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

City of Grand Island Well Field
Wellfield Rd

Platte River Pump Station Rack #3 (5-7)

Site Address: 1035 Wildwood Drive

Drawn by: LM	Date: NOV 18, 2010	Sheet No. 5 of 5
Approved : XX	Scale: NTS	



NOTES:

1. INTERLOCK SOLENOID VALVE WITH PUMP SO THAT THE VALVE IS CLOSED WHEN THE PUMP IS DE-ENERGIZED.

2. AIR COMPRESSOR GAUGE 0-160 PSIG WAKAI

3. #2 PUMP
   - A. ROTOMETER - HEDLAND H671B-025-TK
   - B. SOLENOID VALVE - ASCO CAT# 8210G002
   - C. REGULATOR - WATTS R119-04CG
   - D. GAUGE - ASHCROFT 4.5" 45-127955-02L-15
   - E. PRESSURE SWITCH - 12NM-K4-N4-BIA

4. #3 PUMP
   - A. ROTOMETER - 0-15 SCFM
   - B. SOLENOID VALVE - ASCO LB821109A
   - C. REGULATOR - FISHER L-36
   - D. GAUGE- WIKAI 4,5"
   - E. PRESSURE SWITCH - STATIE O-RING - 12NN-K5
   - F. COALESING FILTER - MODEL F353W
     FILTER ELEMENT EK35.

NO.	DATE	REVISION	BY	APVD

CITY OF GRAND ISLAND
UTILITIES DEPARTMENT

AIR INJECTION
WELLFIELD PUMPING STATION

Site Address: WELLFIELD ROAD
Drawn by: L.M.
Date: MARCH 12, 2009
Approved :
Sheet No.

3/20/2012 10:03:56 AM, dobst

DRAWINGS

FOR

WATER REMEDIATION TECHNOLOGY

WATER TREATMENT SYSTEM
CONTROL PANEL

FOR

W000214, NE – GRAND ISLAND

RELEASE #2

OCTOBER 12, 2011

DRAWING TITLE	DRAWING NAME	REVISION NUMBERS BY RELEASE									
		1	2	3	4	5	6	7	8	9	10
TITLE PAGE	1200-X3RT-100	0	1								
REVISION HISTORY	1200-X3RR-100	0	1								
PROCESS & INSTRUMENTATION DIAGRAM SYMBOL LEGEND	1200-X3RL-100	0	0								
DEVICE TAG LEGEND	1200-X3RL-101	0	0								
ELECTRICAL SYMBOL LEGEND	1200-X3RL-102	0	0								
CONTROL PANEL - LAYOUT	1200-X3EL-100	0	0								
CONTROL PANEL - MATERIAL LIST	1200-X3EM-100	0	0								
CONTROL PANEL - AC POWER WIRING	1200-X3EP-100	0	1								
CONTROL PANEL - DC POWER WIRING	1200-X3EP-200	0	1								
CONTROL PANEL - AI1INPUT WIRING 1OF 2	1200-X3EC-100	0	1								
CONTROL PANEL - AI1INPUT WIRING 2 OF 2	1200-X3EC-101	0	1								
CONTROL PANEL - DIO1INPUT WIRING 1OF 4	1200-X3EC-500	0	1								
CONTROL PANEL - DIO1INPUT WIRING 2 OF 4	1200-X3EC-501	0	0								
CONTROL PANEL - DIO1OUTPUT WIRING 3 OF 4	1200-X3EC-502	0	1								
CONTROL PANEL - DIO1OUTPUT WIRING 4 OF 4	1200-X3EC-503	0	0								
NETWORK DIAGRAM	1200-X3ND-100	0	0								

REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	UPDATED FOR NEW RELEASE
2			
3			
4			

TITLE: **REVISION HISTORY**

DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3RR-100.VSD | P.O.:

SCALE: NONE | REVISION: 1

DEVICE SYMBOLS

- FIELD-MOUNTED DEVICE
- PANEL-MOUNTED DEVICE
- DEVICE MOUNTED BEHIND PANEL
- PROGRAMMABLE OPERATOR INTERFACE (PANEL-MOUNTED)
- PROGRAMMABLE LOGIC CONTROLLER (MOUNTED BEHIND PANEL)

MISCELLANEOUS

- MINOR PROCESS LINE
- MAJOR PROCESS LINE
- ELECTRICAL SIGNAL
- WATER SURFACE
- MAJOR ARROW
- MINOR ARROW
- PROCESS VALUE POINT (??)
- DRAIN WITH AIR BREAK

INSTRUMENTATION

- VARIABLE AREA FLOWMETER
- PADDLE WHEEL/ TURBINE FLOWMETER
- M — MAGNETIC FLOWMETER
- L — LAMINAR FLOWMETER
- VORTEX SHEDDING FLOWMETER
- T — THERMAL DISPERSION FLOWMETER
- ULTRASONIC LEVEL DEVICE
- FLOAT LEVEL DEVICE
- SIGHT LEVEL DEVICE
- GUIDED WAVE RADAR LEVEL DEVICE
- PRESSURE DEVICE
- CAPACITIVE LEVEL DEVICE

PROCESS EQUIPMENT

- M — ELECTRIC MIXER
- HEAT EXCHANGER
- HEATER
- STATIC MIXER
- PIPE WEIR WITH AIR BREAK
- EDUCTOR
- FILTER / STRAINER
- COALESCING FILTER
- ORIFICE PLATE
- RUPTURE DISK
- PRESSURE GAUGE ISOLATOR
- PIPE REDUCER

PUMPS/ BLOWERS

- BLOWER
- CENTRIFUGAL PUMP
- DIAPHRAGM PUMP
- FLEXIBLE IMPELLER PUMP
- GEAR PUMP
- PERISTALTIC PUMP
- PROGRESSIVE CAVITY PUMP
- COMPRESSOR

CONTROL FUNCTIONS

- f(x) PID — PROPORTIONAL, INTEGRAL & DERIVATIVE
- f(x) PACE — FLOW PACING
- f(x) SUB — SUBTRACTION
- f(x) PWM — PULSE WIDTH MODULATION
- f(x) CALC — CALCULATION

VALVES

- NEEDLE VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CHECK VALVE
- RELIEF VALVE
- GLOBE VALVE
- DIAPHRAGM VALVE
- GATE VALVE
- 3-WAY BALL VALVE
- 3-WAY GENERAL VALVE
- PLUG VALVE
- GENERAL VALVE
- AIR RELIEF VALVE
- VACUUM RELIEF VALVE
- PRESSURE / SAFETY RELIEF VALVE

CONTROL PHILOSOPHY

- SEQUENCER STEP
- DECISION
- OPERATOR INPUT
- PROCESS
- REFERENCE TO A DIFFERENT PAGE
- IF CONDITION IS TRUE CONTINUE

ACTUATORS

- PRESSURE REGULATING ACTUATOR
- AIR-TO-OPEN/ SPRING TO CLOSE ACTUATOR
- AIR-TO-OPEN/ AIR-TO-CLOSE ACTUATOR
- AIR-TO-CLOSE/ SPRING-TO-OPEN ACTUATOR
- M — ELECTRIC ACTUATOR
- S — SOLENOID ACTUATOR
- HAND ACTUATOR
- LEVEL ACTUATOR

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: **PROCESS & INSTRUMENTATION DIAGRAM SYMBOL LEGEND**

DWG. PACK:ALL	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3RL-100.VSD	P.O.:
SCALE: NONE	REVISION: 0

INPUT DEVICE TAG PREFIXES

PARAMETER	ELEMENT / SENSOR	INDICATOR	TRANSMITTER		SWITCH	
			BLIND	INDICATING	HIGH	LOW
AMMONIUM	AME	AMI	AMT	AMIT	AMSH	AMSL
ANALYTICAL (UNSPECIFIED)	AE	AI	AT	AIT	ASH	ASL
CHLORINE	CHE	CHI	CHT	CHIT	CHSH	CHSL
CONDUCTIVITY	CE	CI	CT	CIT	CSH	CSL
CURRENT	CUE	CUI	CUT	CUIT	CUSH	CUSL
FLOW RATE	FE	FI	FT	FIT	FSH	FSL
FLOW TOTALIZER	FQE	FQI	FQT	FQIT	FQSH	FQSL
HARDNESS	HE	HI	HT	HIT	HSH	HSL
HYDROGEN SULFIDE	HSE	HSI	HST	HSIT	HSSH	HSSL
LEVEL	LE	LI	LT	LIT	LSH	LSL
NITROGEN	NE	NI	NT	NIT	NSH	NSL
ORP	ORE	ORI	ORT	ORIT	ORSH	ORSL
OXYGEN	OXE	OXI	OXT	OXIT	OXSH	OXSL
OZONE	OZE	OZI	OZT	OZIT	OZSH	OZSL
PARTICLE	PCE	PCI	PCT	PCIT	PCSH	PCSL
PH	PHE	PHI	PHT	PHIT	PHSH	PHSL
POWER	PWE	PWI	PWT	PWIT	PWSH	PWSL
POWER TOTALIZER	PWQE	PWQI	PWQT	PWQIT	PWQSH	PWQSL
PRESSURE	PE	PI	PT	PIT	PSH	PSL
PRESSURE DIFFERENTIAL	PDE	PDI	PDT	PDIT	PDSH	PDSL
RESISTIVITY	RE	RI	RT	RIT	RSH	RSL
RELATIVE HUMIDITY	RHE	RHI	RHT	RHIT	RHSH	RHSL
SPEED	SE	SI	ST	SIT	SSH	SSL
STREAMING CURRENT	SCE	SCI	SCT	SCIT	SCSH	SCSL
SUSPENDED SOLIDS	SSE	SSI	SST	SSIT	SSSH	SSSL
TEMPERATURE	TE	TI	TT	TIT	TSH	TSL
TIME TOTALIZER	TQE	TQI	TQT	TQIT	TQSH	TQSL
TOTAL ORGANIC CARBON	TCE	TCI	TCT	TCIT	TCSH	TCSL
TURBIDITY	TUE	TUI	TUT	TUIT	TUSH	TUSL
UV ABSORPTION	UVE	UVI	UVT	UVIT	UVSH	UVSL
VOLTAGE	VE	VI	VT	VIT	VSH	VSL
WEIGHT / FORCE	WE	WI	WT	WIT	WSH	WSL

ALARM DEVICE TAG PREFIXES

PARAMETER	HIGH	LOW
AMMONIUM	AMAH	AMAL
ANALYTICAL (UNSPECIFIED)	AAH	AAL
CHLORINE	CHAH	CHAL
CONDUCTIVITY	CAH	CAL
CURRENT	CUAH	CUAL
FLOW RATE	FAH	FAL
FLOW TOTALIZER	FQAH	FQAL
HARDNESS	HAH	HAL
HYDROGEN SULFIDE	HSAH	HSAL
LEVEL	LAH	LAL
NITROGEN	NAH	NAL
OXYGEN	OXAH	OXAL
OZONE	OZAH	OZAL
PARTICLE	PCAH	PCAL
PH	PHAH	PHAL
POWER	PWAH	PWAL
POWER TOTALIZER	PWQAH	PWQAL
PRESSURE	PAH	PAL
PRESSURE DIFFERENTIAL	PDAH	PDAL
RESISTIVITY	RAH	RAL
RELATIVE HUMIDITY	RHAH	RHAL
SPEED	SAH	SAL
STREAMING CURRENT	SCAH	SCAL
SUSPENDED SOLIDS	SSAH	SSAL
TEMPERATURE	TAH	TAL
TIME TOTALIZER	TQAH	TQAL
TOTAL ORGANIC CARBON	TCAH	TCAL
TURBIDITY	TUAH	TUAL
UV ABSORPTION	UVAH	UVAL
VOLTAGE	VAH	VAL
WEIGHT / FORCE	WAH	WAL

OUTPUT DEVICE TAG PREFIXES

DESCRIPTION	TAG
CHECK VALVE	CV
DISCRETE VALVE (OPEN/CLOSED)	DV
INJECTION VALVE	IV
PILOT VALVE	YV
PRESSURE REGULATOR	PR
PROPORTIONAL VALVE (MODULATING)	PV
RELIEF VALVE	RV
SAMPLE VALVE	SV

CONTROL DEVICE TAG PREFIXES

DESCRIPTION	TAG
FLOW CONTROLLER	FC
FLOW INDICATING CONTROLLER	FIC
PRESSURE CONTROLLER	PC
PRESSURE INDICATING CONTROLLER	PIC
SPEED CONTROLLER	SC
SPEED INDICATING CONTROLLER (VFD)	SIC
TEMPERATURE CONTROLLER	TC
TEMPERATURE INDICATING CONTROLLER	TIC

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: **DEVICE TAG LEGEND**

DWG. PACK:ALL | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3RL-101.VSD | P.O.:

SCALE: NONE | REVISION: 0

ELECTRICAL

- WIRING PROVIDED BY OTHERS
- INTERNAL WIRING OR COMPONENTS
- NON-WIRE JUMPERS
- STRANDED COPPER WIRE
- TWISTED PAIR CABLE WITH SHIELD & DRAIN
- MANUFACTURER SUPPLIED CABLE
- CATEGORY 5 UNSHIELDED TWISTED PAIR
- PANEL BOUNDARY
- DEVICE AND COMPONENT BOUNDARIES
- MOTOR (X HP)
- TRANSFORMER
- SHIELD
- PLUG CONNECTOR
- INLINE CONNECTOR (SPLICE, WIRE NUT, ETC)
- GROUND
- TERMINAL (X)
- COIL
- LIGHT WITH COLOR (C)
- CIRCUIT BREAKER
- FUSE
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- OVERLOAD RELAY
- SIGNAL POLE SWITCH
- PRESSURE SWITCH
- RESISTOR
- VARISTOR
- CAPACITOR
- HAND-OFF-AUTO SWITCH
- TWO POSITION SWITCH
- FLOW SWITCH
- LIQUID LEVEL SWITCH
- TEMPERATURE SWITCH
- NORMALLY OPEN PUSH-BUTTON
- NORMALLY CLOSED PUSH-BUTTON
- LINE REACTOR

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

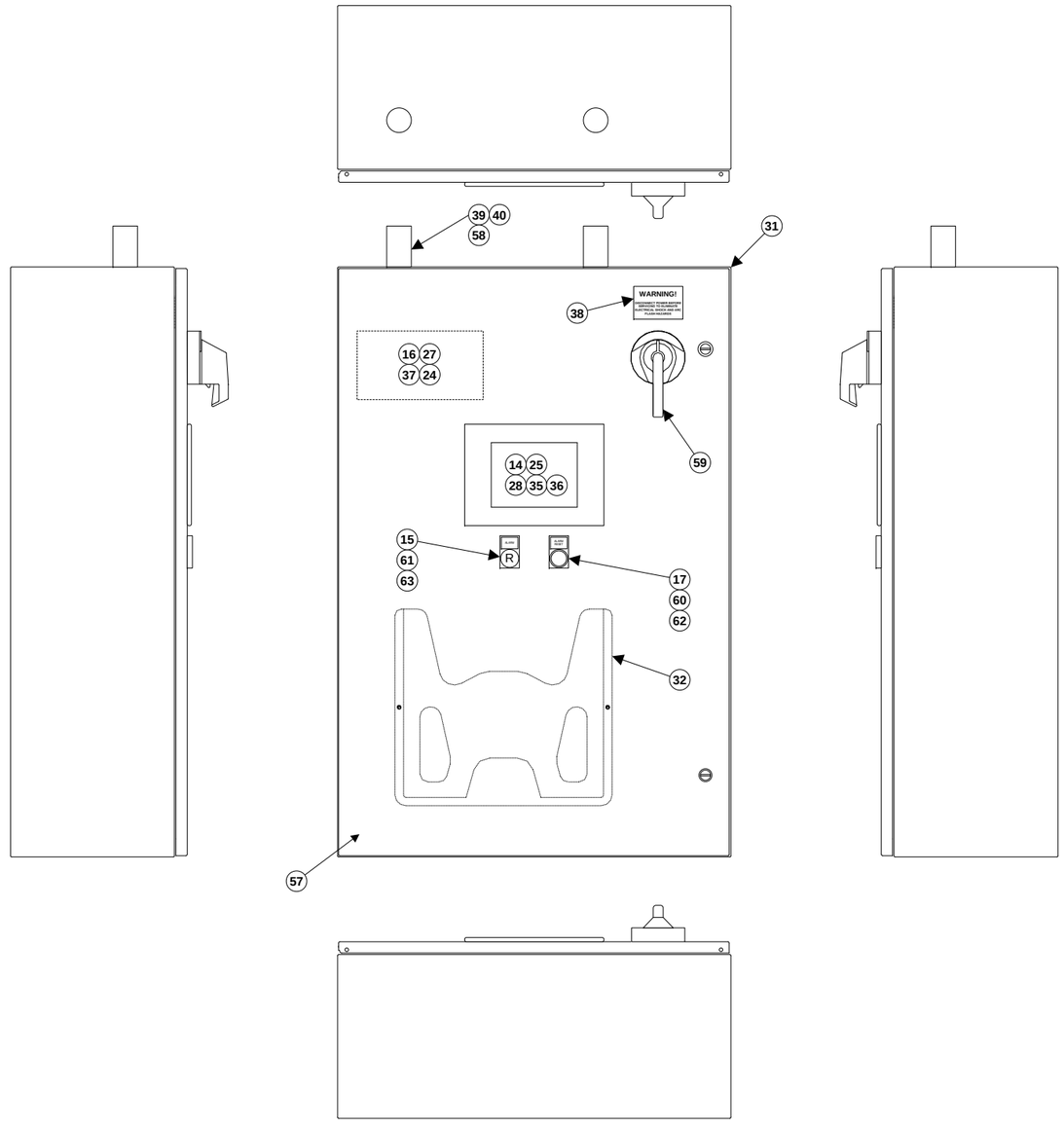
TITLE: **ELECTRICAL SYMBOL LEGEND**

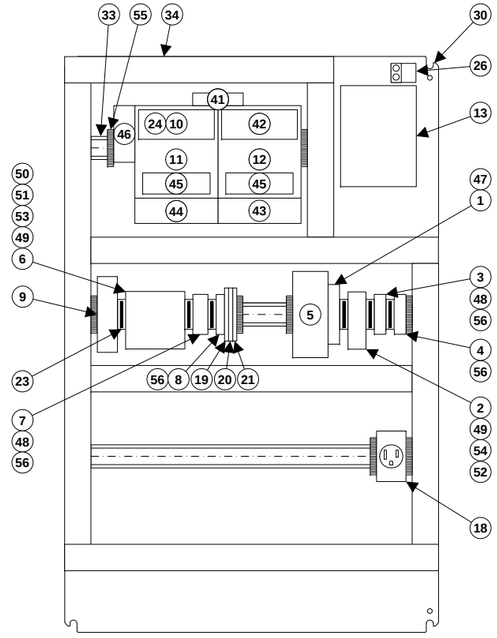
DWG. PACK:ALL | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3RL-102.VSD | P.O.:

SCALE: NONE | REVISION: 0





REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: **CONTROL PANEL LAYOUT**

DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

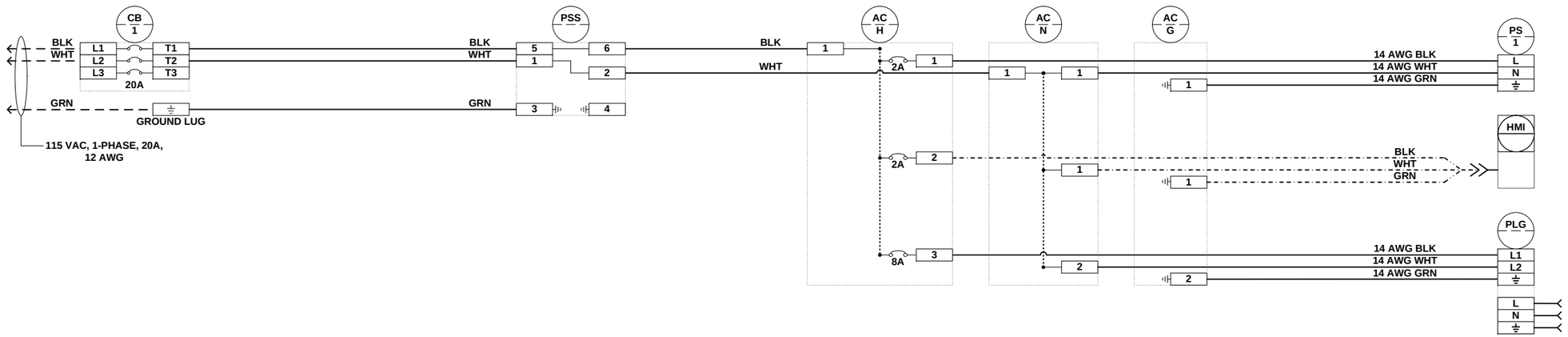
DRAWING NAME: 1200-X3EL-100.VSD | P.O.:

SCALE: 1" = 9" | REVISION: 0

ITEM	TAG NAME	DESCRIPTION	MANUFACTURER	PART NUMBER	QTY
1	PSS	SURGE SUPPRESSOR PLUG, PT2-PE/S-120AC-ST, 20A	PHOENIX	28 39 33 4	1
2	ACH	TERMINAL, CIRCUIT-BREAKER BASE, SPRING-CAGE, 30A MAX, ST 4-FSI/C	PHOENIX	30 36 37 2	3
3	ACN	TERMINAL, SPRING CAGE, 3-POS, 5.2MM, GRAY, ST 2,5-TWIN	PHOENIX	30 3124 1	3
4	ACG	TERMINAL, SPRING CAGE, GROUND, 3-POS, 5.2MM, ST 2,5-TWIN-PE	PHOENIX	30 3126 7	3
5	PS1	POWER SUPPLY, 24VDC, 5A, 100-240VAC INPUT, QUINT-PS/1AC/24DC/5	PHOENIX	28 66 75 0	1
6	DC+	TERMINAL, CIRCUIT-BREAKER BASE, SPRING-CAGE, 30A MAX, ST 4-FSI/C	PHOENIX	30 36 37 2	9
7	DC-	TERMINAL, SPRING CAGE, 3-POS, 5.2MM, GRAY, ST 2,5-TWIN	PHOENIX	30 3124 1	4
8	DCG	TERMINAL, SPRING CAGE, GROUND, 3-POS, 5.2MM, ST 2,5-TWIN-PE	PHOENIX	30 3126 7	2
9	HUB	ETHERNET SWITCH, DIN-MTG, 10/100, 5 PORT, 18.5-30.2VDC	PHOENIX	28 91 15 2	1
10	PLC	PLC PROCESSOR ADAPTER, 200K, ETHERNET, I/OBUS, IEC EXEC	MODICON	171CCC96030	1
11	AI1	PLC I/O BASE, ANALOG INPUT, 16-CH, 4-20MA, SINGLE-ENDED	MODICON	170AAI14000	1
12	DIO1	PLC I/O, DISCRETE, PNP, 16-CH 24VDC INPUT, 24VDC OUTPUT	MODICON	170ADM35010	1
13	CB1	CIRCUIT BREAKER, 3-POLE, 120/240VAC, 20A	SQUARE D	FAL32020	1
14	HMI	OPERATOR INTERFACE, TOUCHSCREEN, 6.4", 640X480, NEMA 4, RS232-1, RS232/485-1, ETH-2, COM	ARISTA	ARP-1606AP	1
15	L1	OPERATOR 22MM, LED, 24 VDC, RED	TELEMECANIQUE	ZB5AVB4	1
16	MDM	MODEM, CELLULAR, VERIZON, VPN	DIGI	CP-WAN-B311	1
17	PB1	OPERATOR, PUSHBUTTON, FLUSH, MOMENTARY, 22MM	TELEMECANIQUE	ZB5AA2	1
18	PLG	RECEPTACLE, DIN-MOUNT, W/ LIGHT INDICATOR	PHOENIX	29 63 86 0	1
19	R1	RELAY, 24VDC, 1PDT, 6AMP CONTACT RATING, WITH BASE, PLC-RSC-24DC/21, SPRING-CAGE	PHOENIX	29 66 47 2	1
20	R2	RELAY, 24VDC, 1PDT, 6AMP CONTACT RATING, WITH BASE, PLC-RSC-24DC/21, SPRING-CAGE	PHOENIX	29 66 47 2	1
21	R3	RELAY, 24VDC, 1PDT, 6AMP CONTACT RATING, WITH BASE, PLC-RSC-24DC/21, SPRING-CAGE	PHOENIX	29 66 47 2	1
22					
23		GENERAL MARKER, 10MM. GRAY	ALLEN-BRADLEY	1492-GM35	6
24		ETHERNET CABLE, 3FT, SNAGLESS, GREEN	BELKIN	A3L791-03-GRN-S	2
25		ETHERNET CABLE, 5FT, SNAGLESS, GREEN	BELKIN	A3L791-05-GRN-S	1
26		GROUND LUG, ALUMINIUM, TWO 14 TO 1/0 AWG	BURNDY	K2A25U	1
27		MODEM POWER CORD, 48"	DIGI	76000732	1
28		USB FLASH DRIVE, 1GB	DISKGO	EDGDMDG001GDISK	1
29					
30		ENCLOSURE PANEL, 36H X 24W	HOFFMAN	C-P3624	1
31		ENCLOSURE, 36H X 24W X 10D, NEMA 4, WALL MOUNT	HOFFMAN	C-SD362410	1
32		ENCLOSURE DATA POCKET, 12" X 12"	HOFFMAN	ADP2	1
33		DINRAIL, 2 METER, PERFORATED	IBOCO	OMEGA3F	1
34		WIRE DUCT, 1.5"W X 4"H, NARROW TOOTH, WHITE, INCLUDES COVER, 2M LENGTH	IBOCO	T1E-1540W	3
35		HMI SOFTWARE, 150 TAG	INDUSOFT	IND-15002CE-RT	1
36		HMI AND PLC SOFTWARE LICENSE	INTUITECH	INT??	1
37		MODEM MOUNTING BRACKET	INTUITECH		1
38		TAG, ENGRAVED PLASTIC, 0.062" THICK, WHITE TEXT, RED BACKGROUND, ADHESIVE-BACKED	INTUITECH		1
39		ANTENNA MOUNT	MAXRAD	MTPM800	2
40		ANTENNA, LOW PROFILE, 806-960 MHZ	MAXRAD	BMLPVDB800/1900	2
41		PLC COMMUNICATION ADAPTER CABLE, INTERBUS, 4.5"	MODICON	170MCI00700	1
42		PLC COMMUNICATION ADAPTER, INTERBUS	MODICON	170INT11000	1
43		PLC I/O BASE BUSBAR, SPRING CAGE, 2-ROW	MODICON	170XTS00801	1
44		PLC I/O BASE BUSBAR, SPRING CAGE, 3-ROW	MODICON	170XTS00301	1
45		PLC I/O BASE TERMINAL, SPRING CAGE, 3-PCS	MODICON	170XTS00200	2
46		PLC SERIAL OPTION ADAPTER, 1-RS485, BATTERY	MODICON	172JNN21032	1
47		SURGE SUPPRESSOR BASE ELEMENT, PT-BE/FM, 20A	PHOENIX	28 39 28 2	1
48		TERMINAL BRIDGE, PLUG-IN, 10-POS, FOR 5.2MM ST SPRING CAGE, 24 AMP, FBS 10-5	PHOENIX	30 30 213	1
49		TERMINAL BRIDGE, PLUG-IN, 10-POS, FOR ST 4-FSI/C, 41AMP, FBS 10-8	PHOENIX	30 30 32 3	2
50					
51		TERMINAL CIRCUIT BREAKER, FOR ST 4-FSC/C BASE, 0.5A	PHOENIX	07 12 15 2	2
52		TERMINAL CIRCUIT BREAKER, FOR ST 4-FSC/C BASE, 2A	PHOENIX	07 12 217	2
53		TERMINAL CIRCUIT BREAKER, FOR ST 4-FSC/C BASE, 4A	PHOENIX	07 12 25 9	6
54		TERMINAL CIRCUIT BREAKER, FOR ST 4-FSC/C BASE, 8A	PHOENIX	07 12 29 1	1
55		TERMINAL END ANCHOR, E/NS 35 N	PHOENIX	08 00 88 6	6
56		TERMINAL END COVER, GRAY, D-ST 2,5-TWIN	PHOENIX	30 30 48 8	4
57		ENCLOSURE GROUND STRAP	RITTAL	SZ 2568	1
58		ANTENNA WIRE LEAD, 48"	SAT-PAK	SP5848NMSM	2
59		OPERATING HANDLE KIT FOR FAL CIRCUIT BREAKERS	SQUARE D	9421-LN3	1
60		CONTACT BLOCK, 1-NO, WITH COLLAR, 22MM	TELEMECANIQUE	ZB5AZ101	1
61		OPERATOR LEGEND AND PLATE, 22MM, WHITE/YELLOW, "ALARM"	TELEMECANIQUE	ZBY6H101	1
62		OPERATOR LEGEND AND PLATE, 22MM, WHITE/YELLOW, LINE 1"ALARM", LINE 2 "RESET"	TELEMECANIQUE	ZBY6H101	1
63		OPERATOR, 22MM, LIGHT LENS, RED	TELEMECANIQUE	ZB5AV043	1

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE:	CONTROL PANEL MATERIAL LIST
DWG. PACK: 05	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EM-100.VSD	P.O.:
SCALE: NONE	REVISION: 0



NOTES:
1. WIRE SHALL BE TYPE MTW 12 AWG, UNLESS OTHERWISE SPECIFIED

2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	MODIFIED LINE STYLE FOR EXTERNAL POWER CONNECTION
2			
3			
4			

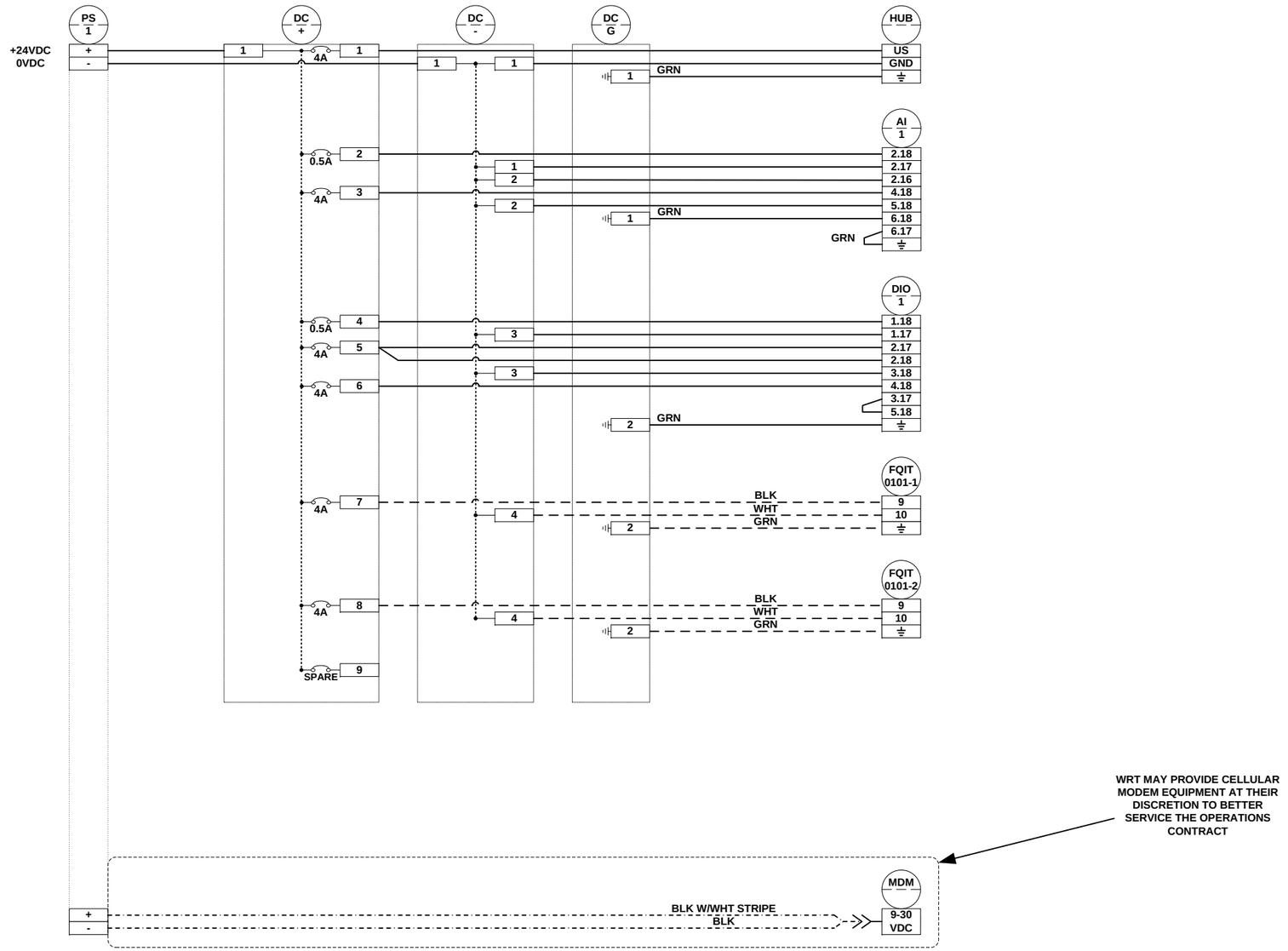
TITLE: **CONTROL PANEL AC POWER WIRING**

DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3EP-100.VSD | P.O.:

SCALE: NONE | REVISION: 1



NOTES:

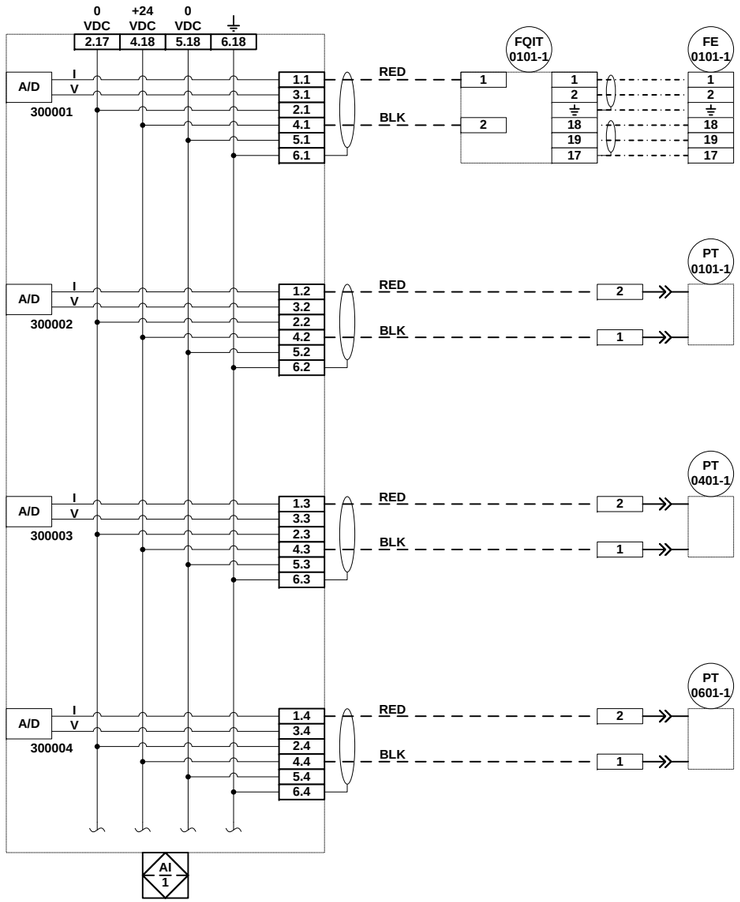
1. WIRE SHALL BE TYPE MTW 18 AWG BLUE UNLESS OTHERWISE SPECIFIED.

2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	MODIFIED LINE STYLE FOR FLOW METERS
2			
3			
4			

TITLE:	CONTROL PANEL DC POWER WIRING
DWG. PACK: 05	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EP-200.VSD	P.O.:
SCALE: NONE	REVISION: 1

DESC: ANALOG INPUT MODULE, SINGLE-ENDED,
16 CHANNEL, 4...20 mADC/ -10...+10 VDC/ -5...+5 VDC
MFR: MODICON
PN: 170AAI14000

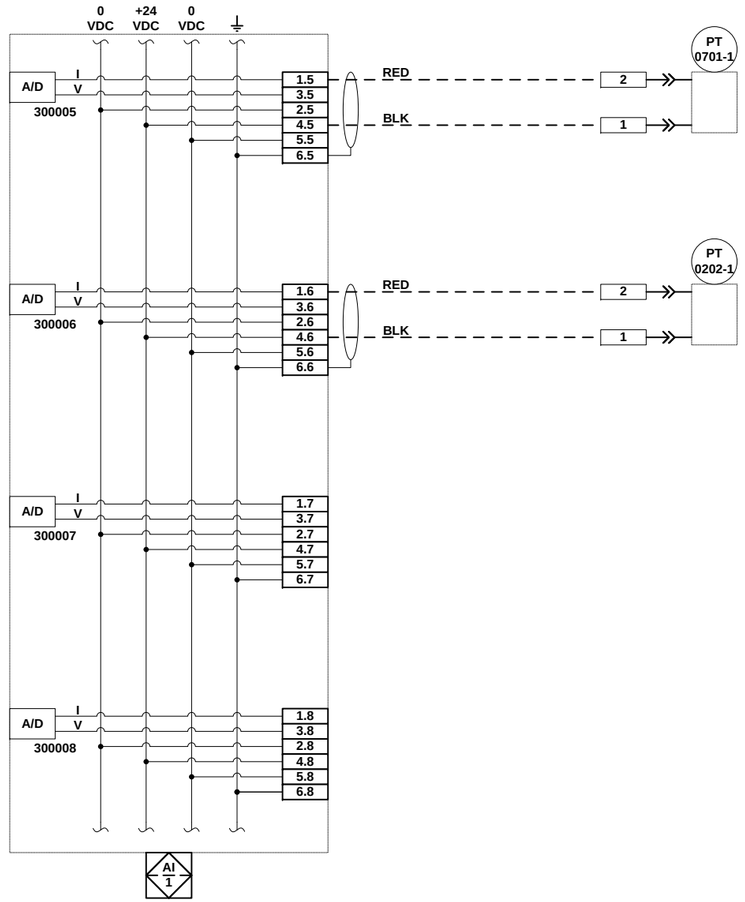


DESC: FLOW METER
MFR: ROSEMOUNT
PN: 8705TSA100C1W0N0DW, 8732EST2A1N0M4
RANGE: 0...1750 GPM

DESC: PRESSURE TRANSMITTER
MFR: IFM EFECTOR
PN: PA3224
RANGE: 0...145 PSIG

DESC: PRESSURE TRANSMITTER
MFR: IFM EFECTOR
PN: PA3224
RANGE: 0...145 PSIG

DESC: PRESSURE TRANSMITTER
MFR: IFM EFECTOR
PN: PA3224
RANGE: 0...145 PSIG



DESC: PRESSURE TRANSMITTER
MFR: IFM EFECTOR
PN: PA3224
RANGE: 0...145 PSIG

DESC: PRESSURE TRANSMITTER
MFR: IFM EFECTOR
PN: PA3224
RANGE: 0...145 PSIG

NOTES:
1. WIRE SHALL BE TYPE TWISTED SHIELDED PAIR, 18 AWG UNLESS OTHERWISE SPECIFIED.

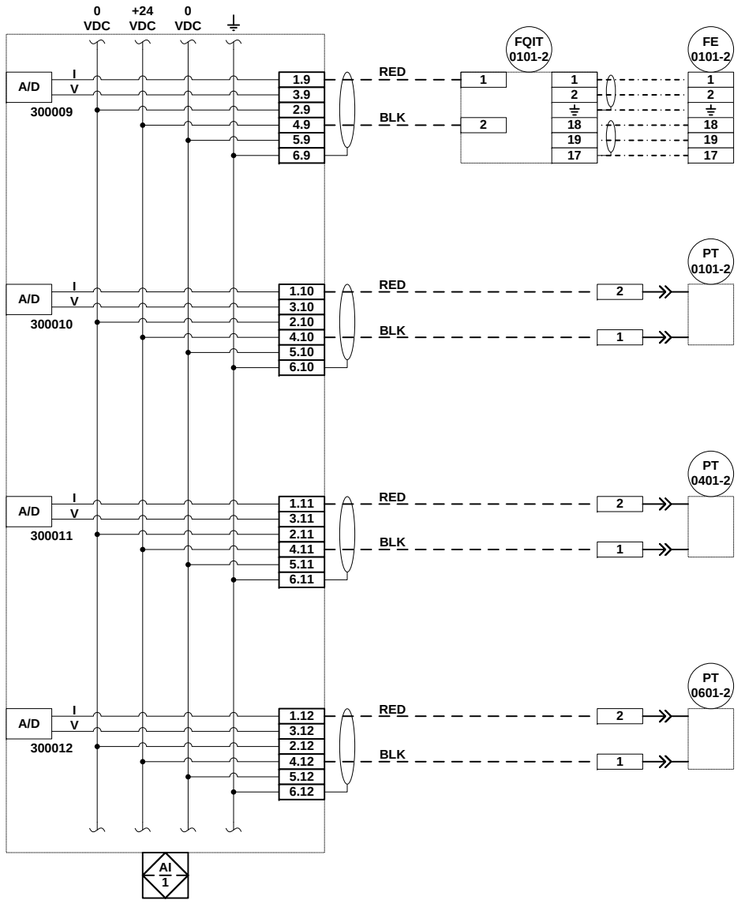
2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

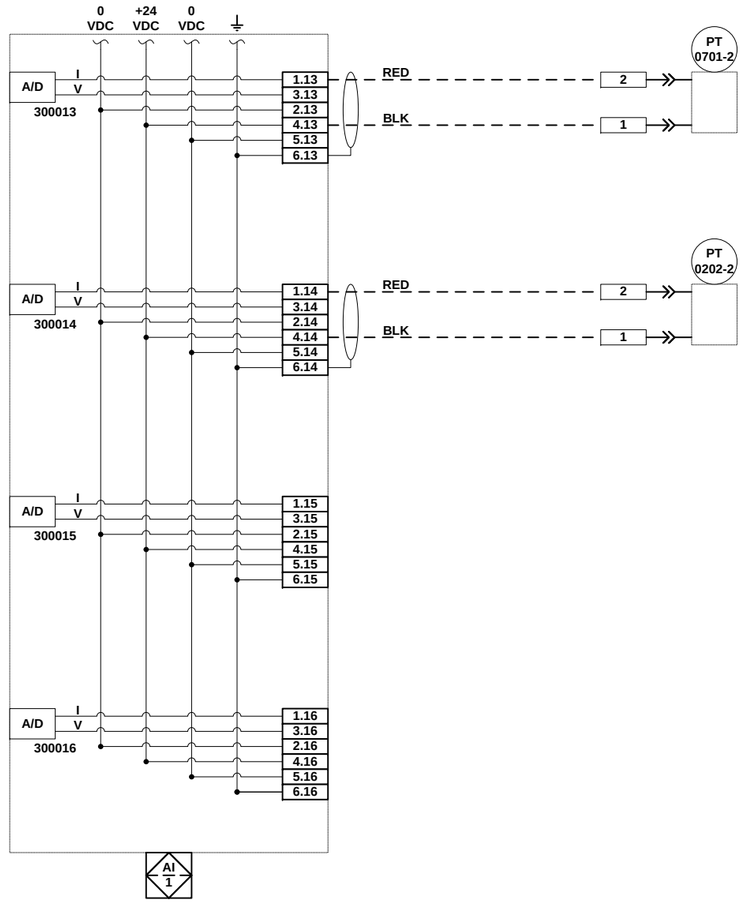
REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	MODIFIED LINE STYLE FOR FIELD INSTRUMENTS, TAG FOR PRESSURES
2			
3			
4			

TITLE: CONTROL PANEL
AI1 INPUT WIRING 1 OF 2

DWG. PACK: 05	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EC-100.VSD	P.O.:
SCALE: NONE	REVISION: 1

DESC: ANALOG INPUT MODULE, SINGLE-ENDED,
16 CHANNEL, 4...20 mADC/ -10...+10 VDC/ -5...+5 VDC
MFR: MODICON
PN: 170AAI14000





NOTES:
1. WIRE SHALL BE TYPE TWISTED SHIELDED PAIR, 18 AWG UNLESS OTHERWISE SPECIFIED.

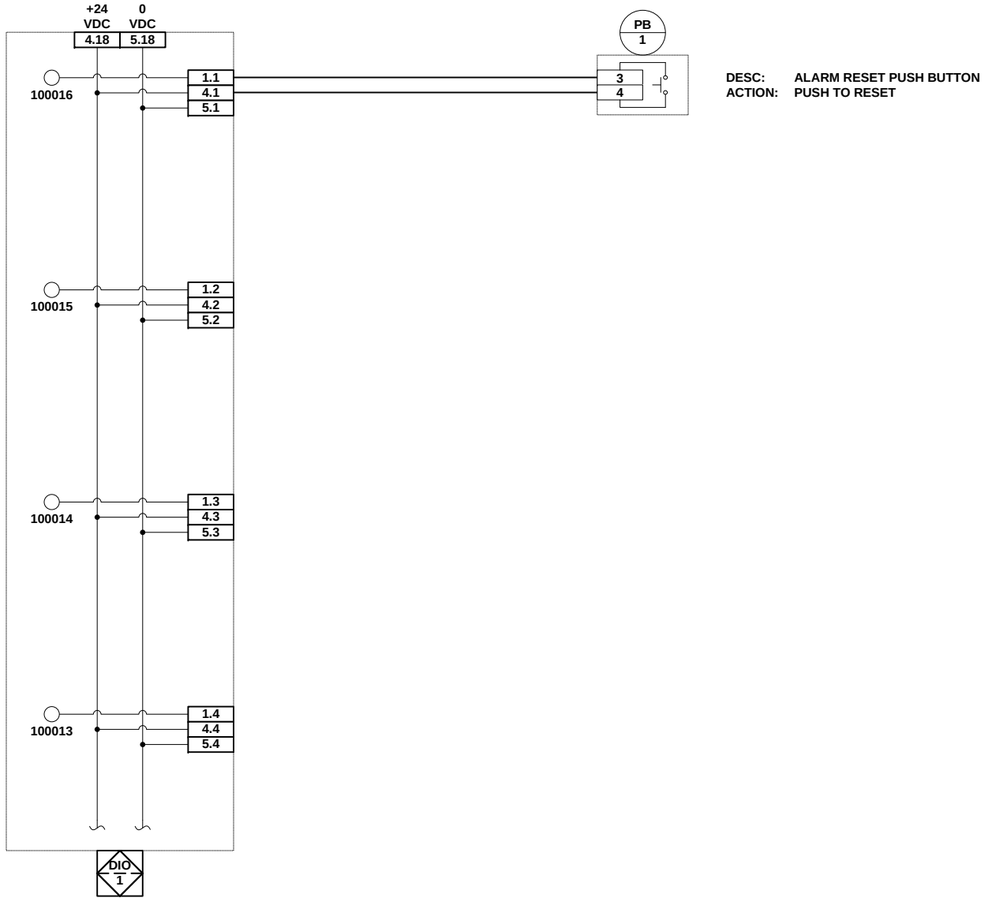
2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

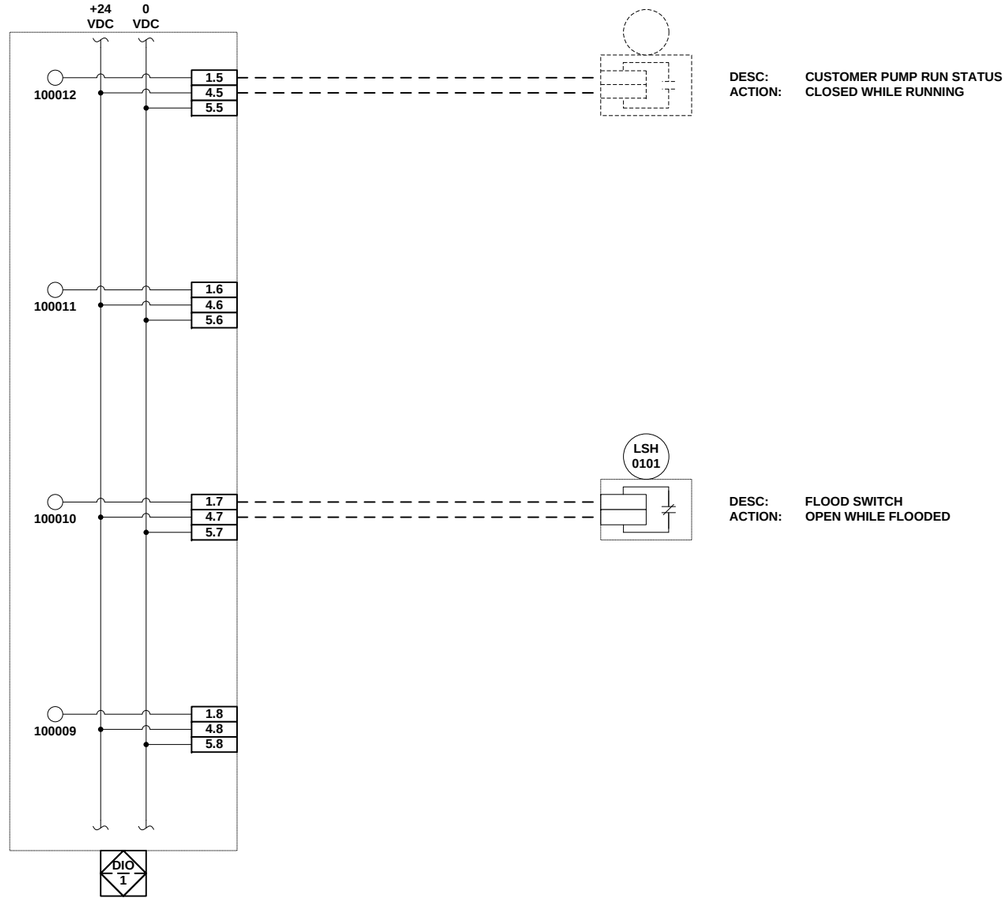
REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	MODIFIED LINE STYLE FOR FIELD INSTRUMENTS, TAG FOR PRESSURES
2			
3			
4			

TITLE: CONTROL PANEL
AI1 INPUT WIRING 2 OF 2

DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR | DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EC-101.VSD | P.O.:
SCALE: NONE | REVISION: 1

DESC: DISCRETE INPUT/OUTPUT MODULE,
16 CHANNEL, 20...30 VDC
MFR: MODICON
PN: 170ADM35010





NOTES:
1. WIRE SHALL BE TYPE MTW 18 AWG BLUE UNLESS OTHERWISE SPECIFIED.

2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

REV	DATE	BY	DESCRIPTION
1	10-13-11	JDR	MODIFIED LINE STYLE FOR FIELD SWITCHES
2			
3			
4			

TITLE: CONTROL PANEL
DIO1 INPUT WIRING 1 OF 4

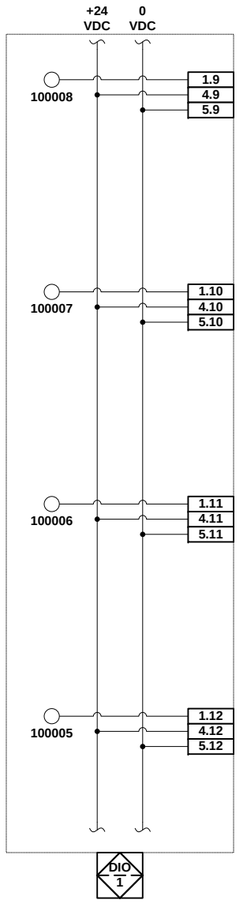
DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

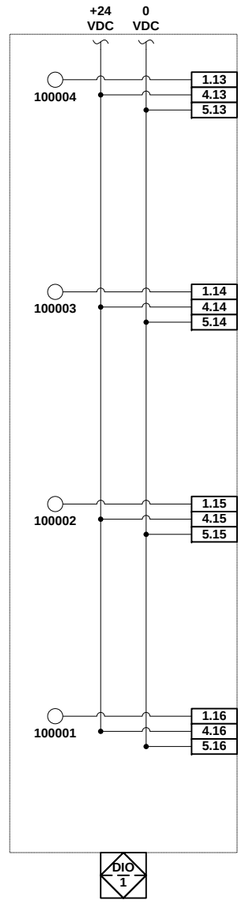
DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3EC-500.VSD | P.O.:

SCALE: NONE | REVISION: 1

DESC: DISCRETE INPUT/OUTPUT MODULE,
16 CHANNEL, 20...30 VDC
MFR: MODICON
PN: 170ADM35010





NOTES:
1. WIRE SHALL BE TYPE MTW 18 AWG BLUE UNLESS OTHERWISE SPECIFIED.

2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: CONTROL PANEL
DIO1 INPUT WIRING 2 OF 4

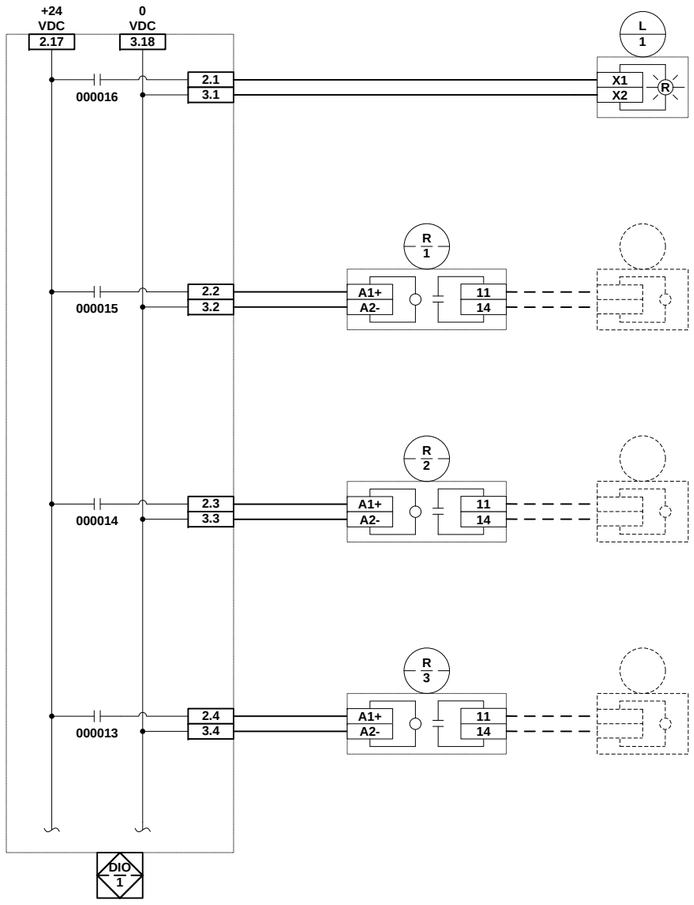
DWG. PACK: 05 | DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL

DRAWN BY: JDR | DRAWN DATE: 09-12-11

DRAWING NAME: 1200-X3EC-501.VSD | P.O.:

SCALE: NONE | REVISION: 0

DESC: DISCRETE INPUT/OUTPUT MODULE,
16 CHANNEL, 20...30 VDC
MFR: MODICON
PN: 170ADM35010

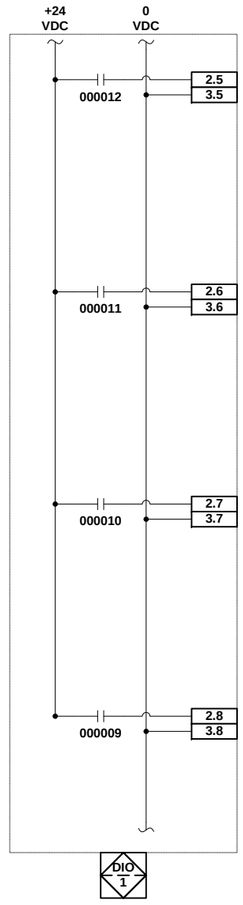


DESC: ALARM LIGHT
ACTION: ENERGIZE WHILE ALARM EXISTS

DESC: WELL PUMP RUN PERMISSIVE
ACTION: DEENERGIZE WHILE SHUTDOWN

DESC: ALARM STATUS
ACTION: DEENERGIZE ON ALARM

DESC: SHUTDOWN STATUS
ACTION: DEENERGIZE ON SHUTDOWN



NOTES:
1. WIRE SHALL BE TYPE MTW 18 AWG BLUE UNLESS OTHERWISE SPECIFIED.

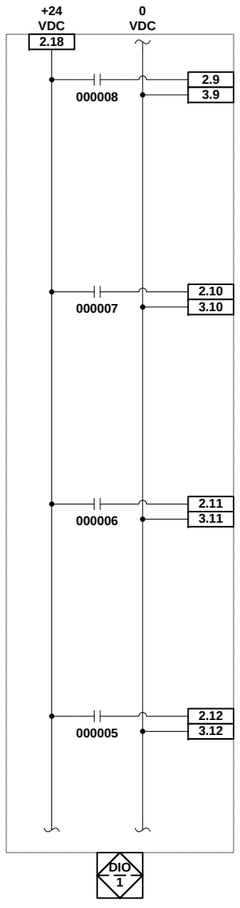
2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

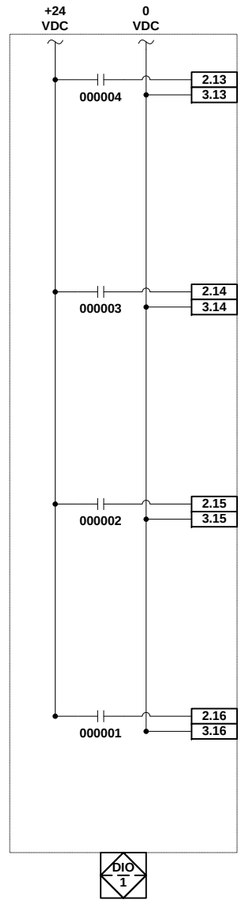
REV	DATE	BY	DESCRIPTION
1	10-12-11	JDR	MODIFIED LINE STYLE FOR FIELD LOADS
2			
3			
4			

TITLE: CONTROL PANEL
DIO1 OUTPUT WIRING 3 OF 4

DWG. PACK: 05
DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR
DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EC-502.VSD
P.O.:
SCALE: NONE
REVISION: 1

DESC: DISCRETE INPUT/OUTPUT MODULE,
16 CHANNEL, 20...30 VDC
MFR: MODICON
PN: 170ADM35010





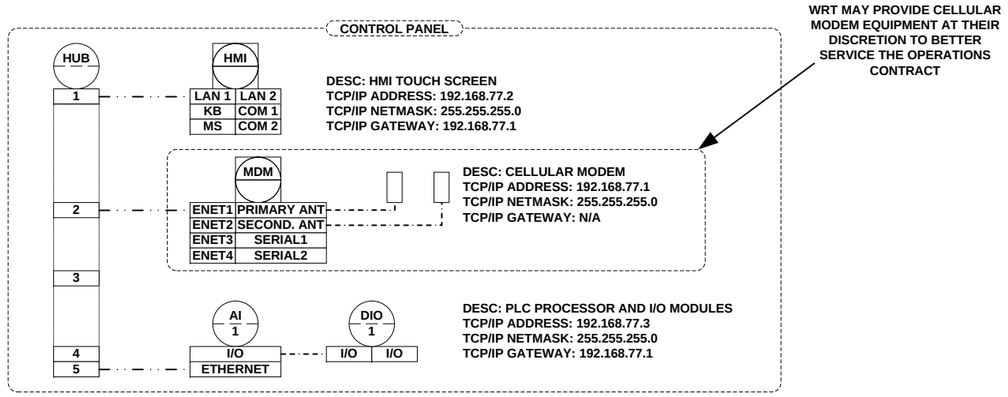
NOTES:
1. WIRE SHALL BE TYPE MTW 18 AWG BLUE UNLESS OTHERWISE SPECIFIED.

2. WRT PERSONNEL SHALL MAKE FINAL TERMINATIONS WITHIN CONTROL PANEL FOR SENSORS AND SWITCHES. ELECTRICAL CONTRACTOR SHALL MAKE ALL OTHER TERMINATIONS WITHIN CONTROL PANEL AND FIELD WIRING TERMINATIONS. ALL CONDUCTORS TO BE CLEARLY TAGGED AS DETAILED IN THIS DRAWING PACK.

REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: CONTROL PANEL
DIO1 OUTPUT WIRING 4 OF 4

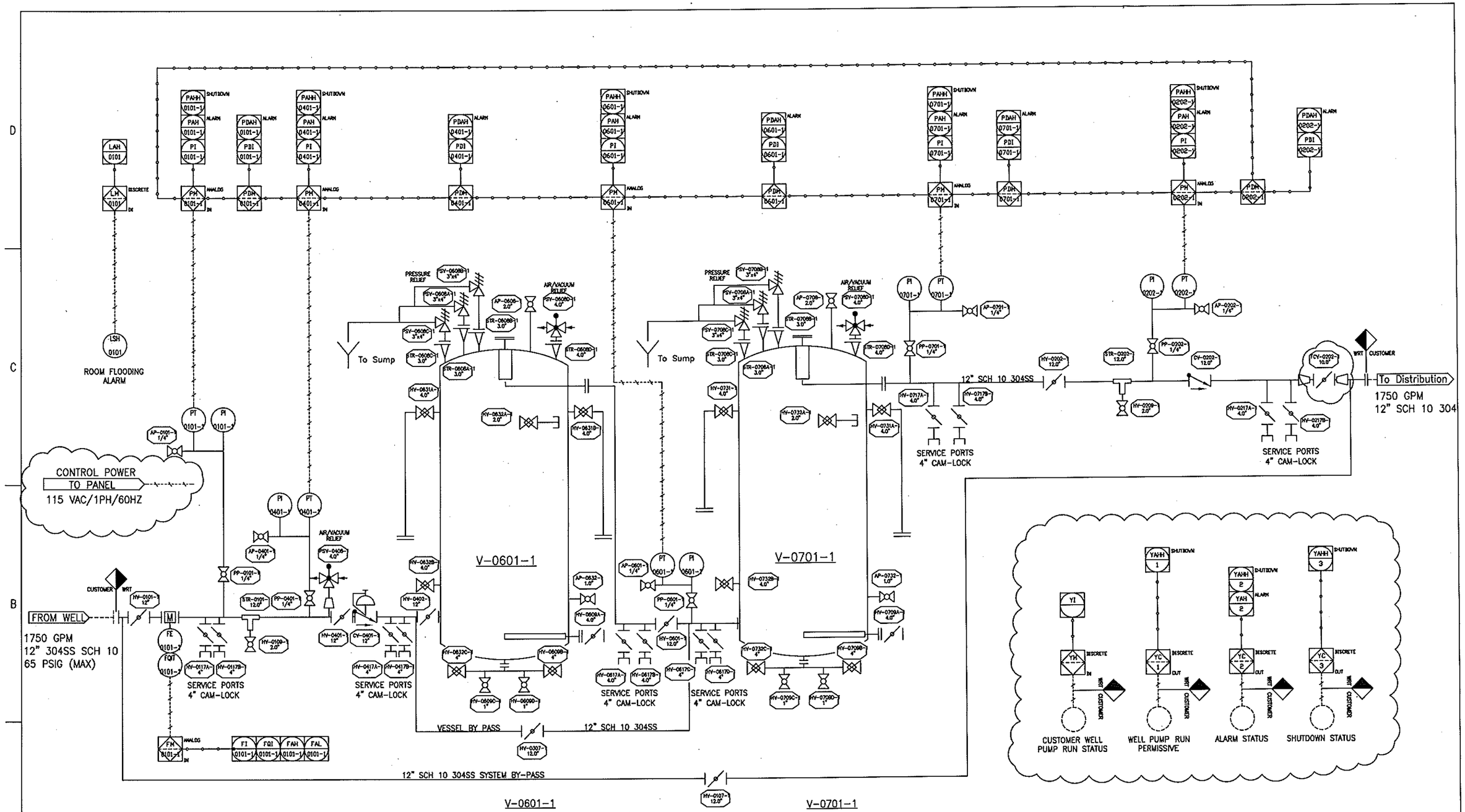
DWG. PACK: 05	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3EC-503.VSD	P.O.:
SCALE: NONE	REVISION: 0



REV	DATE	BY	DESCRIPTION
1			
2			
3			
4			

TITLE: **NETWORK DIAGRAM**

DWG. PACK: 05	DESCRIPTION: WATER TREATMENT SYSTEM CONTROL PANEL
DRAWN BY: JDR	DRAWN DATE: 09-12-11
DRAWING NAME: 1200-X3ND-100.VSD	P.O.:
SCALE: NONE	REVISION: 0



JOB REFERENCE NUMBERS	REFERENCE DRAWINGS	NO.	REVISIONS	BY	DATE	CHK'D	APP'D
		1	ADDED TRAIN TAGS, POWER, PUMP INTERLOCK, FCV 0202-1	TRH	10/11/11	RLH	WRT
		0	ISSUED FOR APPROVAL - TRAIN #1	TRH	09/14/11	WRT	TRH

ENGINEERING		DATE
DRWN	KFH	01/22/09
CHK'D		
APP'D		
APP'D		

WRT

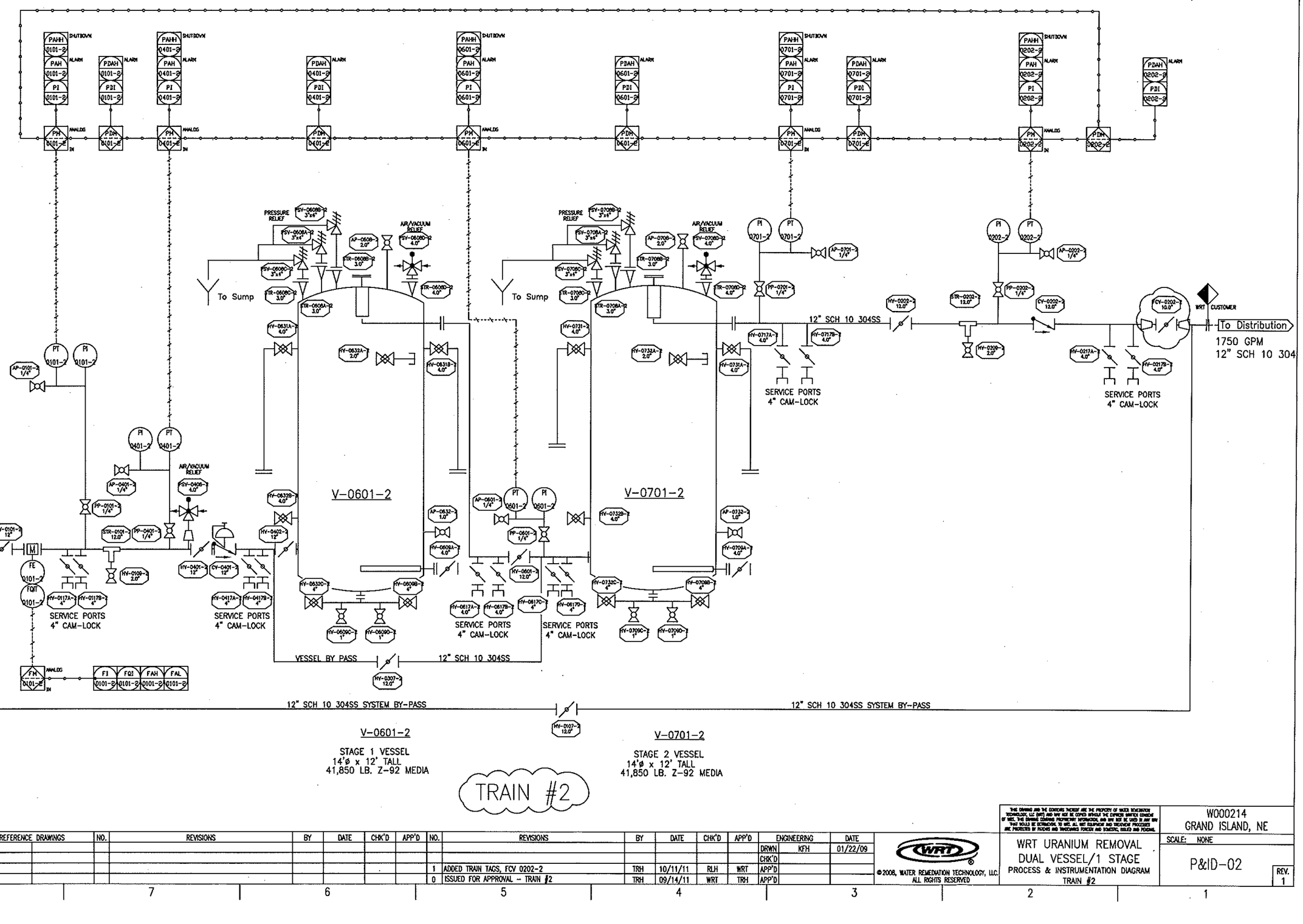
WRT URANIUM REMOVAL
DUAL VESSEL/1 STAGE
PROCESS & INSTRUMENTATION DIAGRAM
TRAIN #1

W000214
GRAND ISLAND, NE

SCALE: NONE

P&ID-01

REV. 1



V-0601-2

STAGE 1 VESSEL
14'ø x 12' TALL
41,850 LB. Z-92 MEDIA

V-0701-2

STAGE 2 VESSEL
14'ø x 12' TALL
41,850 LB. Z-92 MEDIA

TRAIN #2

JOB REFERENCE NUMBERS	REFERENCE DRAWINGS	NO.	REVISIONS	BY	DATE	CHK'D	APP'D
		1	ADDED TRAIN TAGS, FCV 0202-2	TRH	10/11/11	RLH	WRT
		0	ISSUED FOR APPROVAL - TRAIN #2	TRH	09/14/11	WRT	TRH

ENGINEERING		DATE
DRWN	KFH	01/22/09
CHK'D		
APP'D		
APP'D		

WRT URANIUM REMOVAL
DUAL VESSEL/1 STAGE
PROCESS & INSTRUMENTATION DIAGRAM
TRAIN #2

W000214
GRAND ISLAND, NE

SCALE: NONE

P&ID-02

REV. 1