CITY OF
Grand Junction
COLORADO

LETTER OF INTENT

Date: July 26, 2018

Company: Mountain Peak Controls, Inc.

Project: Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition System (SCADA) RFP-4525-18-DH

Based upon review of the bid responses received, and your interview/software demo for Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition System (SCADA) RFP-4525-18-DH, your firm has been selected as the preferred proposer. It is the intent of the City of Grand Junction to award the aforementioned project to your firm as is listed in the RFP documents and your proposal response.

The award for the overall project must be approved by City Manager prior to an official award and contract issued.

Feel free to contact me with any questions at 970-244-1545.

Thank you and Best Regards

Duane Hoff Jr., Senior Buyer

250 N. 5TH STREET, ROOM #245, GRAND JUNCTION, CO 81501 P[970] 244 1533 F[970] 256 4022 www.gjcity.org

CITY OF GRAND JUNCTION, COLORADO

****

CONTRACT

This CONTRACT made and entered into this 17th day of August, 2018 by and between the **City of Grand Junction, Colorado,** a government entity in the County of Mesa, State of Colorado, hereinafter in the Contract Documents referred to as the "Owner" and **Mountain Peak Controls, Inc.** hereinafter in the Contract Documents referred to as the "Contractor."

WITNESSETH:

WHEREAS, the Owner advertised that sealed Responses would be received for furnishing all labor, tools, supplies, equipment, materials, and everything necessary and required for the Project described by the Contract Documents and known as **Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) RFP-4525-18-DH**.

WHEREAS, the Contract has been awarded to the above named Contractor by the Owner, and said Contractor is now ready, willing and able to perform the Work specified in accordance with the Contract Documents;

NOW, THEREFORE, in consideration of the compensation to be paid the Contractor, the mutual covenants hereinafter set forth and subject to the terms hereinafter stated, it is mutually covenanted and agreed as follows:

ARTICLE 1

Contract Documents: It is agreed by the parties hereto that the following list of instruments, drawings, and documents which are attached hereto, bound herewith, or incorporated herein by reference constitute and shall be referred to either as the "Contract Documents" or the "Contract", and all of said instruments, drawings, and documents taken together as a whole constitute the Contract between the parties hereto, and they are fully a part of this agreement as if they were set out verbatim and in full herein:

The order of contract document governance shall be as follows:

a. The body of this contract agreement
b. Solicitation Documents for the Project; **Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA);**

c. Contractors Response to the Solicitation
d. Work Change Requests (directing that changed work be performed);
e. Field Orders
f. Change Orders.

ARTICLE 2

Definitions: The clauses provided in the Solicitation apply to the terms used in the Contract and all the Contract Documents.

ARTICLE 3

Contract Work: The Contractor agrees to furnish all labor, tools, supplies, equipment, materials, and all that is necessary and required to complete the tasks associated with the Work described, set forth, shown, and included in the Contract Documents as indicated in the Solicitation Document.

ARTICLE 4

Contract Time and Liquidated Damages: Time is of the essence with respect to this Contract. The Contractor hereby agrees to commence Work under the Contract on or before the date specified in the Solicitation from the Owner, and to achieve Substantial Completion and Final Completion of the Work within the time or times specified in the Solicitation.

ARTICLE 5

Contract Price and Payment Procedures: The Contractor shall accept as full and complete compensation for the performance and completion of all of the Work specified in the Contract Documents, the sum of **Ninety Six Thousand Two Hundred Twenty and 00/100 Dollars ($96,200.00).** If this Contract contains unit price pay items, the Contract Price shall be adjusted in accordance with the actual quantities of items completed and accepted by the Owner at the unit prices quoted in the Solicitation Response. The amount of the Contract Price is and has heretofore been appropriated by the Grand Junction City Council for the use and benefit of this Project. The Contract Price shall not be modified except by Change Order or other written directive of the Owner. The Owner shall not issue a Change Order or other written directive which requires additional work to be performed, which work causes the aggregate amount payable under this Contract to exceed the amount appropriated for this Project, unless and until the Owner provides Contractor written assurance that lawful appropriations to cover the costs of the additional work have been made.

Unless otherwise provided in the Solicitation, monthly partial payments shall be made as the Work progresses. Applications for partial and Final Payment shall be prepared by the Contractor and approved by the Owner in accordance with the Solicitation.

ARTICLE 6

Contract Binding: The Owner and the Contractor each binds itself, its partners, successors, assigns and legal representatives to the other party hereto in respect to all covenants, agreements and obligations contained in the Contract Documents. The Contract Documents constitute the entire agreement between the Owner and Contractor and may only be altered, amended or repealed by a duly executed written instrument. Neither the Owner nor the Contractor shall, without the prior written consent of the other, assign or sublet in whole or in part its interest under any of the Contract Documents and specifically, the Contractor shall not assign any moneys due or to become due without the prior written consent of the Owner.

ARTICLE 7

Severability: If any part, portion or provision of the Contract shall be found or declared null, void or unenforceable for any reason whatsoever by any court of competent jurisdiction or any governmental agency having the authority thereover, only such part, portion or provision shall be effected thereby and all other parts, portions and provisions of the Contract shall remain in full force and effect.

IN WITNESS WHEREOF, City of Grand Junction, Colorado, has caused this Contract to be subscribed and sealed and attested in its behalf; and the Contractor has signed this Contract the day and the year first mentioned herein.

The Contract is executed in two counterparts.

CITY OF GRAND JUNCTION, COLORADO

DocuSigned by:
By: Duane Hoff Jr., Senior Buyer – City of Grand Junction [illegible]/2018 | 08:40 MDT
9F789E7D50F14BC...
Duane Hoff Jr., Senior Buyer Date

Mountain Peak Controls, Inc.

DocuSigned by:
By: Brian Mitchem, Mountain Peak Controls, Inc. 8/21/2018 | 20:17 MDT
B9C93694-7CBD443...
Brian Mitchem, Mountain Peak Controls VP, Inc. Date

Mountain Peak Controls, Inc.

City of Grand Junction RFP-4525-18-DH

Water Treatment Plant, Collection and Distribution SCADA Project

Duane Hoff Jr., Senior Buyer

City of Grand Junction Purchasing Division
250 North 5th Street
Grand Junction, CO 81501
P 970 244 1545 **E** duaneh@gjcity.org

Issued:
07.10.2018

Valid to:
10.10.2018

Statement of Acceptance

Mountain Peak Controls has read, understands, and agrees with all terms and conditions listed in the RFP and certifies that this proposal will remain valid for 90 days. We acknowledge receipt of Addendum 1 issued 6/22/2018, Addendum 2 issued 6/26/2018, and Addendum 3 issued 6/27/2018.

A. Cover Letter

Water Treatment Plant,
Collection and Distribution
Supervisory Control & Data
Acquisition Automation System
(SCADA) Project

City of Grand Junction July 10, 2018
Attn: Duane Hoff Jr., Senior Buyer
Electronic Copy to Duane Hoff Jr. (via Rocky Mountain E-Purchasing System) No Hard Copy to Follow

RE: Professional SCADA Services Proposal - City of Grand Junction RFP-4525-18-DH

Dear Mr. Hoff & Selection Committee Members:

Mountain Peak Controls (MPC) is pleased to submit our proposal to provide professional Supervisory Control and Data Acquisition (SCADA) system solutions to the City of Grand Junction for your water treatment plant, collection, and distribution controls systems Our team's diversity, depth, and experience can directly benefit Grand Junction as we assist you in upgrading and implementing your SCADA systems. This will ultimately contribute to optimizing the delivery of your water services.

Advantages of selecting the MPC Team include:

- Certified System Integrator. An Ignition certified water system integrator in Colorado.
- "A Team". MPC has assembled a team of skilled individuals capable of addressing all of your project's most challenging needs. Innovative SCADA will provide added expertise and QA/QC. Senior members dedicated to this project include Russ Cook, Brian Mitchem, and Nick Toussaint who together have over 95 years of combined controls expertise.
- Staff Availability. We have adequate staff for this project and the available resources and drive to fill the requirements for a successful completion.
- Cost-Competitive. Our billing rates and individual corresponding years of experience is very competitive.

In conclusion, we appreciate your strongest consideration of the MPC Team to provide this SCADA project for the City. We are confident that we have all the experience, talent, and proper attitude to provide a successful project to Grand Junction and we look forward to sharing ideas on meeting your present and future needs.

If you have any questions or comments, please do not hesitate to contact Brian Mitchem at (303) 885-5967 or bmitchem@mountainpeakcontrols.com.

Mountain Peak Controls

Brian Mitchem
MPC Principal-in-Charge

Innovative SCADA

Nick Toussaint

Nick Toussaint, P.E., PMP
Innovative SCADA Principal

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B. Qualifications/Experience/Credentials

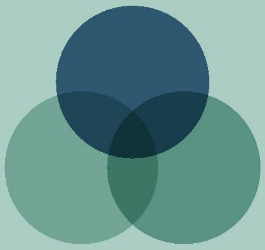
What we do

- SCADA Design, Configuration & Installation
- SCADA Master Plans & Budgeting / Costing
- Operator Instruction & Training
- System Maintenance & Support Services

Mountain Peak Controls, Inc. (MPC)

Mountain Peak Controls, Inc. (MPC) has been in the process controls business in Colorado since 1999 and is based in Golden with a western slope office in Paonia as well as a satellite office in Silverthorne. Our extensive customer base has been built primarily by word-of-mouth with many of our customers having been with us since the beginning. Versatility, flexibility, and honesty in dealing with our customers are the keys to our company's success.

The Right Mix



Success means we've struck the right balance between SCADA system design, ease of operations staff use, and client satisfaction. Through our collaborative approach we will work with you to devise a system of value.

Mountain Peak has a vast amount of expertise and experience in various industries including; Water, Waste Water, irrigation, emergency warning systems, machine control, and robotics. For these industries, our accomplished personnel can do everything from instrument calibrations to troubleshooting to PLC/HMI programming and custom reporting to wireless communications to complete control system design and integration. Other areas of expertise include radio path testing, high speed private wireless networks, remote solar installations, VFD installation and troubleshooting. No matter your project size or what your needs may be, our highly dedicated team members can bring the vast experience and world class resources of Mountain Peak Controls to bear on your specific needs and requirements.

B. Qualifications/Experience/Credentials

Our key employees and project management will have 100% involvement in this project. Our existing knowledge of the City and its needs are an invaluable resource for our ability to complete this project on time and on budget. Our Paonia office will be responsible for this project with assistance from our Golden office.

Similar SCADA Projects

- Arapahoe County Wastewater Authority SCADA Improvements
- Ute Water WTP Automation & SCADA System
- City of Laramie SCADA Upgrade
- Snowmass Water & Sanitation WTP Upgrade & SCADA System
- Village of Taos Ski Valley Wastewater Treatment Plant SCADA Upgrade
- Town of Silverthorne SCADA System Design & Implementation
- City of Cripple Creek Water Treatment Plant SCADA System
- City of Montrose PRV & Tank control SCADA System
- Glacier Club Water Treatment Plant SCADA System
- Clifton Water WTP & Remote Site SCADA Upgrades
- City of Aurora SCADA WAN II Project
- Widefield Water & Sanitation District Multiple SCADA Improvement Projects
- Frisco SCADA Design/Implementation
- Eagle River Water & Sanitation District Controls System Upgrades

Innovative SCADA

Innovative SCADA (InSCADA) will serve as a subconsultant to MPC providing overall QA/QC. InSCADA and MPC have successfully worked together on many past and current projects including similar SCADA projects for the City of Cripple Creek Water Treatment Plant, the Glacier Club Water Treatment Plant, and the City of Laramie Wastewater Treatment Plant.

InSCADA is an Ignition certified water and wastewater system integrator based out of Denver, Colorado. Their team's diversity, depth, and experience will directly benefit the City in not just designing a superior SCADA system but in configuring and installing it with operations staff in mind. InSCADA is experienced providing operations staff with the training needed to optimize system performance. From SCADA and PLC design to operator training, InSCADA's skilled professionals will tailor their level of service to the City's specific needs. InSCADA saves their clients energy, time, and money by putting the right solutions in place.

Why the MPC Team

Our systems specialists have addressed thousands of control systems worldwide and across multiple industries. We will work with City staff to address your project needs quickly and efficiently; and with an office in nearby Paonia, we can be on-site when needed to work through any issues in person.

There will be high involvement on this project by senior staff members **Russ Cook, Brian Mitchem, and Nick Toussaint who together have over 95 years of controls experience**. They will apply their expertise on recent SCADA Master Plans, integrations, and upgrades to identify accurate costs; incorporate existing controls equipment where applicable; and design and implement SCADA improvements for the water treatment plant, distribution, and supply systems.

We understand that having an efficient system in place is useless without proper training and support. Our professionals provide experienced operator training, system implementation, and support.

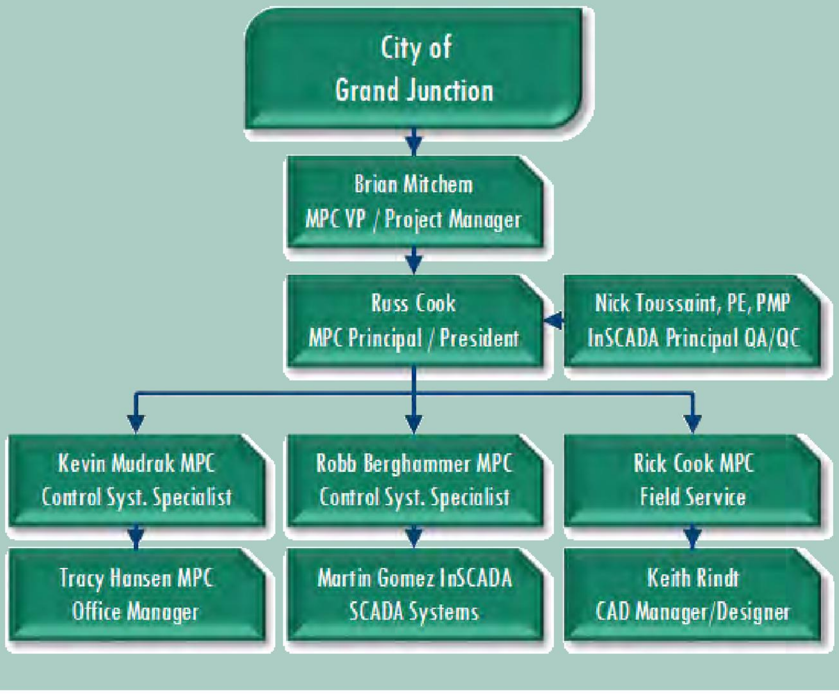
B. Qualifications/Experience/Credentials

Proposed Team

Organizational Chart

> *They are an exciting group to work with, innovative, and (did I mention), accessible.*
>
> ***- Ray Keen, Village of Taos Ski Valley SCADA Project***

> *I find the staff both knowledgeable and helpful. They built our SCADA program from start to finish. We will continue to use InSCADA as our go-to programmers.*
>
> ***- Chris Claymore, City of Laramie SCADA Project***


City of Grand Junction
Brian Mitchem MPC VP / Project Manager
Russ Cook MPC Principal / President
Nick Toussaint, PE, PMP InSCADA Principal QA/QC
Kevin Mudrak MPC Control Syst. Specialist
Robb Berghammer MPC Control Syst. Specialist
Rick Cook MPC Field Service
Tracy Hansen MPC Office Manager
Martin Gomez InSCADA SCADA Systems
Keith Rindt CAD Manager/Designer

Brief Biographies

Russ Cook, MPC President (Golden Office)

Russ Cook possesses 30+ years of experience in process controls management. Having earned AAS degrees in Industrial Process Instrumentation and Computer Electronics from the University of Anchorage Alaska, Russ provides expertise in several industry fields such as complete systems retro fitting, instrumentation calibrations, control systems design/build/integration, start-up and project management. He has employed his skill set in various control environments which include Industrial Automation Control, Water/Wastewater Management, Food/Beverage and the Oil & Gas industry.

Brian Mitchem, MPC Vice President / Project Manager (Paonia Office)

Brian Mitchem earned his degree in AAS Instrumentation Technology from Colorado Northwestern CC and now heads MPC's western slope operations. Brian has the experience of 30+ years in the automation controls industry providing solutions for all phases of controls design, integration and project management in various environments such as water/wastewater treatment, irrigation and manufacturing. Brian's clients include: Clifton Water District, Clifton Sanitation District, Town of Palisade, City of Fruita, City of Montrose, Snowmass Water & Sanitation District, Ute Water and numerous small districts around western Colorado as well as being responsible for the design and implementation of several major irrigation control systems including dam and lateral gate controls.

B. Qualifications/Experience/Credentials

Nick Toussaint, PE, PMP, InSCADA Principal QA/QC (Denver Office)

Nick Toussaint has 34 years of experience in instrumentation, controls, and electrical engineering for WTFs and WWTFs; including expertise with SCADA and HMI systems addressing thousands of systems worldwide. He provides QA/QC for most of our projects. He has similar experience with clients such as Arapahoe County WW, Laramie, Village of Taos Ski Valley, Aurora, Broomfield, Eagle River, Cripple Creek, St. Vrain Sanitation District, Boulder, and Raton.

Robb Berghammer, MPC Control Systems Specialist (Silverthorne)

Robb Berghammer works out of our satellite location in Silverthorne. He came to MPC after working several years at Ball Metal in Golden as an Electronics technician / Industrial electrician. While at Ball he was responsible for troubleshooting and maintaining plant equipment, PLC programming, and starting up new production lines. He has an extensive background in Allen Bradley PLCs / HMI's and VFD's. Robb's clients include the Town of Silverthorne, Widefield Water & Sanitation District (Ignition HMI), Town of Frisco, Copper Mountain & Snake River WWTP.

Kevin Mudrak, MPC Control Systems Specialist (Golden Office)

Kevin Mudrak has an extensive background in PLC / HMI programming and radio communications with multiple manufacturers. Kevin comes to MPC from Progressive Machine and Design in Victor, NY where he served as a Control Systems Engineer. While there Kevin was personally responsible for commissioning of two production lines that were placed in China. Kevin has worked with our clients at Consolidated Mutual Water (17 SCADA sites), Carter Lake WTP, Aspen Park Metro District, Falcon Highlands, and several other systems.

Rick Cook, MPC Field Service (Golden Office)

Rick Cook has a combined 25 years of experience in operations engineering, supervision and process controls implementation. Rick earned an associate degree in Applied Science Welding Technology from Mesa College in Grand Junction and earned certification from Infraspecton Institute in Thermographic Applications. Rick's diverse applications background continues to be a valuable asset to Mountain Peak Controls and its customers.

Martin Gomez, InSCADA Controls Systems / HMI Configurator (Denver Office)

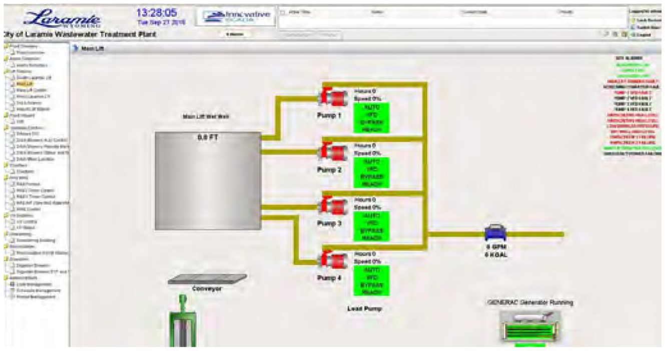
Martin Gomez has over 15 years of experience as a network administrator having provided systems expertise, SCADA systems development, network configuration and setup, data backups and restorations, and cyber security. He has experience with Inductive Automation Ignition server 7.7x and has his A+, Network+, and MCSA certifications. Projects have included Arapahoe County Wastewater Authority, Lyons, Laramie, Village of Taos Ski Valley, and Keenesburg.

B. Qualifications/Experience/Credentials

Glacier Club WTP Expansion

Controls Upgrade

MPC and InSCADA worked together on this CMAR project that involves increasing plant capacity and upgrading the finished water conveyance system. The telemetry system is being upgraded to integrate communication between the finished water storage tank, booster pump station, finished water pump station, WTP, and raw water pump stations. The new controls system will provide remote monitoring and control. Bill Greco, The Glacier Club, 600 Glacier Club Drive, Durango, Colorado 81301 (970) 382-6756 or bgreco@theglacierclub.com.



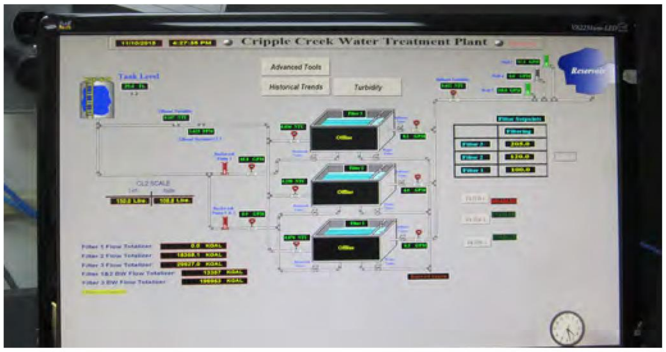
City of Laramie SCADA Upgrade

WWTF SCADA Upgrade

Led by Nick Toussaint, MPC and InSCADA assisted the City with the WWTF SCADA upgrades project which included modernizing and unifying their SCADA systems. The City desired to replace all of its end-of-life SCADA components with a more reliable system. New HMI, SQL and Historian were wanted at the plant along with replacement of the existing TSR-Advantage SCADA software with a more intuitive, open platform software like Inductive Automation's Ignition System.

MPC and InSCADA reviewed the existing hardware, software, and architecture, collected data, provided system configuration and checkout, completed system testing, and provided operations staff training.

Chris Claymore, City of Laramie WWTF Supervisor, Laramie Wyoming 82073 (307) 721-5204 or cclaymore@cityoflaramie.org.



City of Cripple Creek

SCADA & Controls Systems Upgrade

MPC and InSCADA provided SCADA and controls solutions to Aqua Works DBO for the City's WTP upgrade. Services provided included system planning which included WTP Control System and Telemetry System Architecture, HMI screens, Control System Data Logging and Reporting, a Radio Site Study, Evaluation of Alarming, and Review of Remote Access Technologies; and design which included integration of existing systems, replacement of old systems, and improvements to some existing controls. Adam Sommers, President Aqua Works DBO, 3252 Williams Street, Denver, Colorado 80205 or adam@aquaworksdbo.com.

B. Qualifications/Experience/Credentials

Ute Before

Ute Water Conservancy District

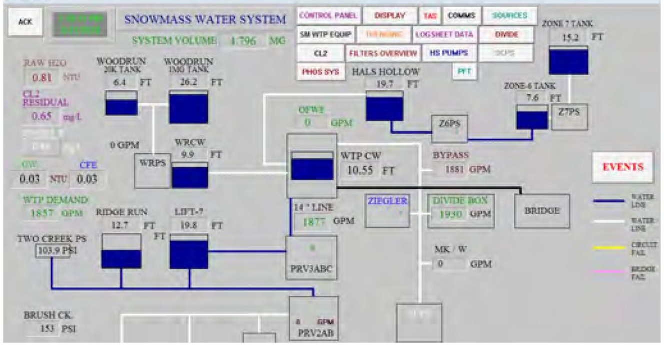
WTP SCADA Design & Implementation

While this project was completed several years ago, it is a great example of taking a plant very similar to where the GJ WTP was a short time ago to where it can be in a few short months. MPC provided control system design and implementation for the WTP upgrade project and its subsequent expansion.

The original plant had relay logic control panels and hardwired filter consoles for each filter and a main operator room panel board showing WTP status and alarms. The project involved replacing each filter control panel and console. Allen Bradley Controllogix PLC's were used along with Rockwell (AB) Panelview touchscreens. Functionality of the system included automatic backwash and filter flow control for each filter along with Filter to waste capability. A central PLC was also installed to handle all functions common to each filter (i.e. backwash / surface wash pumps) as well as all additional WTP operations.

Ute After

2 AB VFD's were installed for backwash pump flow control. The HMI for the project was Rockwell FTView SE running as a redundant system on 2 Dell servers. In addition to the expansion filter work, MPC also designed and installed a plant wide security access system with cameras and keycards. Phase I: $250K. Phase II: $350K. Ben Hoffman, Treatment Superintendent, Ute Water Conservancy District, Palisade CO 81526 (970) 464-5563 or Bhoffman@utewater.org.

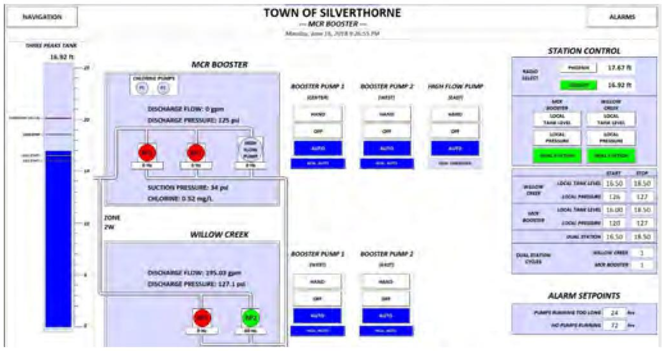

ACK
SNOWMASS WATER SYSTEM
SYSTEM VOLUME 1.796 MG
CONTROL PANEL
DISPLAY
TAS
COMMS
SOURCES
SM WTP EQUIP
LOGSHEET DATA
DIVIDE
CL2
FILTERS OVERVIEW
HS PUMPS
PHOS SYS
PFT
ZONE 7 TANK 15.2 FT
RAW H2O 0.81 NTU
CL2 RESIDUAL 0.65 mg/L
WOODRUN 20K TANK 6.4 FT
WOODRUN 1MG TANK 26.2 FT
HALS HOLLOW 19.7 FT
ZONE-6 TANK 7.6 FT
Z7PS
Z6PS
OFWE 0 GPM
0 GPM
WRPS
WRCW 9.9 FT
WTP CW 10.55 FT
BYPASS 1881 GPM
EVENTS
CW 0.03 NTU
CFE 0.03
WTP DEMAND 1857 GPM
RIDGE RUN 12.7 FT
LIFT-7 19.8 FT
14 " LINE 1877 GPM
ZIEGLER
DIVIDE BOX 1930 GPM
BRIDGE
WATER LINE
WATER LINE
CIRCUIT FAIL
BRIDGE FAIL
TWO CREEK PS 103.9 PSI
PRV3ABC
MK / W 0 GPM
BRUSH CK. 153 PSI
GPM PRV2AB

Snowmass Water & San. District

WTP SCADA Upgrades

As Snowmass' integrator of choice for the past 18 years, MPC has done and continues to do extensive SCADA system expansion and upgrades for the Water treatment plant as well as its 5 pump stations, 4 controlled PRV vaults, 12 tanks, 1 reservoir and 1 flow control station (13 valves, 5 flow meters) and 7 pressure zones. The original system consisted of obsolete Bristol Babcock RTU's communicating over dedicated phone lines. MPC designed and implemented the current system involving Allen Bradley Micrologix PLC's and a combination of Ethernet, 450Mhz & 900 Mhz radios. In 2015, MPC designed and implemented an upgrade of the control system at the Water treatment plant. The Bristol Babcock RTU was replaced with an Allen Bradley Compactlogix PLC system utilizing remote I/O in each of the 6 filter consoles. This was done without plant disruption. Dean Wieser, WTP Supervisor, Snowmass WSD Snowmass Village, CO 81615 (970) 923-2056 or dwieser@swsd.org.

B. Qualifications/Experience/Credentials

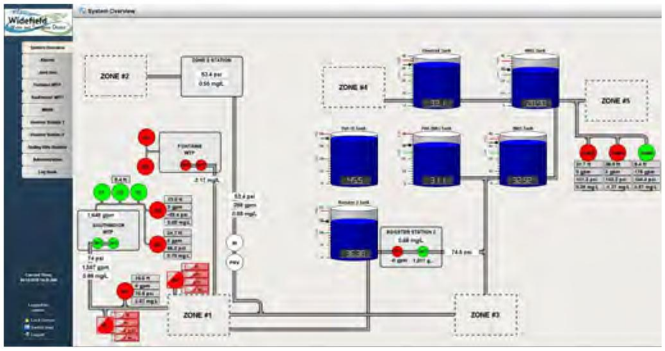

NAVIGATION
TOWN OF SILVERTHORNE
— MCR BOOSTER —
ALARMS
MCR BOOSTER
BOOSTER PUMP 1
BOOSTER PUMP 2
HIGH FLOW PUMP
STATION CONTROL
DISCHARGE FLOW: 0 gpm
DISCHARGE PRESSURE: 125 psi
SUCTION PRESSURE: 34 psi
CHLORINE: 0.52 mg/L
WILLOW CREEK
ALARM SETPOINTS

Town of Silverthorne Water

Water System Improvements & SCADA

MPS has worked with the Town of Silverthorne for 17+ years providing support for over 20 remote radio sites communicating with a Rockwell FactoryTalk View SCADA system. The radio system was recently upgraded to Ubiquiti 5Ghz radios to allow high speed communication from SCADA to tanks, well houses, booster stations, and lift stations. Over the past few years, MPC has been upgrading PLC hardware from Allen Bradley MicroLogix & SLC to modern CompactLogix platform PLCs. Robb Berghammer has been supporting the Town of Silverthorne from our Summit County office since 2010 and continues to work with the town's water department to improve the efficiency and reliability of the system.

Zach Margolis, Utility Manager, Town of Silverthorne, PO Box 1309, Silverthorne, Colorado 80498 (970) 262-7344 or zachm@silverthorne.org.


Widefield
System Overview
ZONE #2
ZONE #4
ZONE #5
ZONE #1
ZONE #3

Widefield Water & Sanitation District

Controls & SCADA Upgrades

MPC provided SCADA and controls solutions for multiple projects to upgrade controls, SCADA, and radio systems for the Widefield Water & Sanitation District. Motorola radios were replaced with GE iNET-II 900MHz radios to provide communication from SCADA to 20+ remote sites. Multiple pump stations have been upgraded with Allen Bradley CompactLogix, Red Lion G3 HMIs, and AB PowerFlex VFDs.

Both Water and Wastewater systems have recently been upgraded to Ignition SCADA software to provide better visualization, historical trends, and Voice/SMS alarm notifications. MPC is currently working with Widefield Water & Sanitation's IT department to upgrade networking equipment and improve overall network security. Fortinet managed switches and firewalls will be used to create VLANs and prevent intrusion into the SCADA system.

Brandon Bernard, Water Department Manager, Widefield Water & Sanitation

B. Qualifications/Experience/Credentials

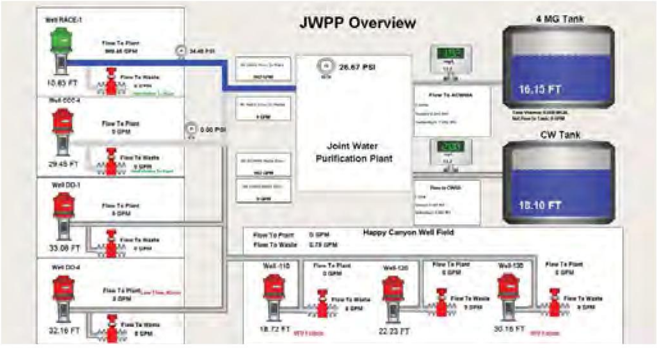
Arapahoe County WW Authority

SCADA Improvements

InSCADA providee a SCADA and Control System Upgrade project along with integration services. The project included SCADA, HMI, and PLC systems, system standardization.

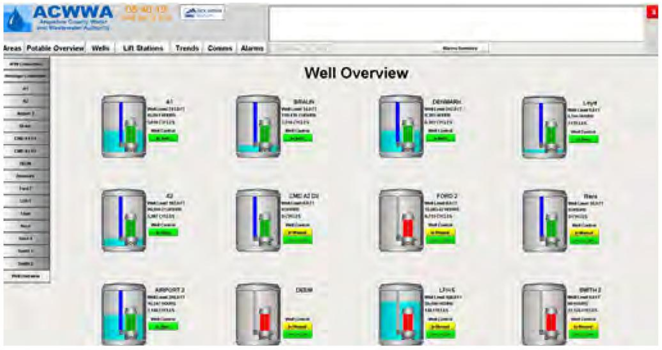
The collection and distribution system consisted of approximately 30 sites including lift stations, wells, storage tanks, and pump stations. The system uses over 30 Rockwell programmable controllers at each site communicating to 3 MTUs. The project was completed in 2017.

For the collection and distribution system PLC replacement and SCADA software and configuration the project cost was $70,000.


JWPP Overview
4 MG Tank
16.15 FT
CW Tank
18.10 FT
Joint Water Purification Plant
26.67 PSI
Happy Canyon Well Field
Well DD-1
Well DD-4
Well-110
Well-120
Well-130
10.83 FT
29.45 FT
33.08 FT
32.16 FT
18.72 FT
22.23 FT
30.16 FT
Flow To Plant
Flow To Waste

The Lone Tree SCADA software and configuration was $50,000 and the Elkhorn Water Treatment Plant PLC replacement and SCADA software and configuration was $40,000.

Toby Arrowsmith, Arapahoe County Wastewater Authority Project Manager, Arapahoe County, Centennial, Colorado (720) 898-7823 or tarrowsmith@arapahoewater.org.

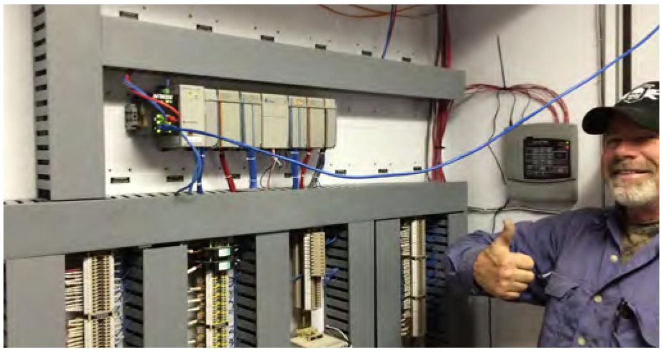

ACWWA
Arapahoe County Water and Wastewater Authority
Areas
Potable Overview
Wells
Lift Stations
Trends
Comms
Alarms
Well Overview
A1
BRAUN
DENMARK
A2
FORD 2
AIRPORT 2
SMITH 2

Village of Taos Ski Valley

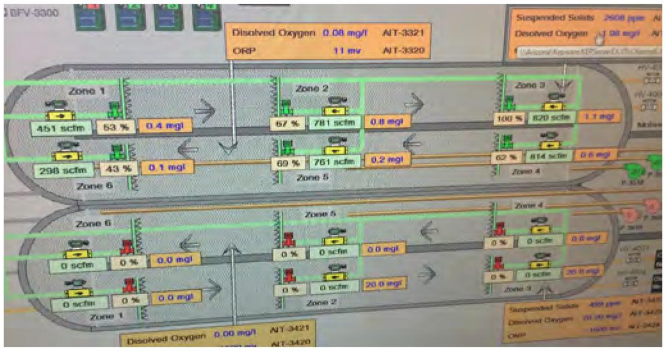
WWTF SCADA Upgrade

InSCADA provided timely and full support to upgrade the SCADA system. The project included replacing the existing Sensaphone SCADA system with a new Rockwell Programmable Logic Controller (PLC) based system and computer package. The new Allen Bradley Compact Logix Processor and Ignition HMI provides operators with updated process graphics, historical process data, alarm notifications, integrated control loops, and remote control.

Innovative SCADA provided SCADA software, hardware, and PLC programming. The VTSV was extremely impressed with the level of service Nick Toussaint provided them with and their level of comfort knowing that if any problems arose, they would get full support to quickly address any issues. The project was efficiently completed for $36,000. Ray Keen, Public Works Director, Village of Taos Ski Valley, New Mexico 57525 (575) 776-8220 or rkeen@vtsv.org.



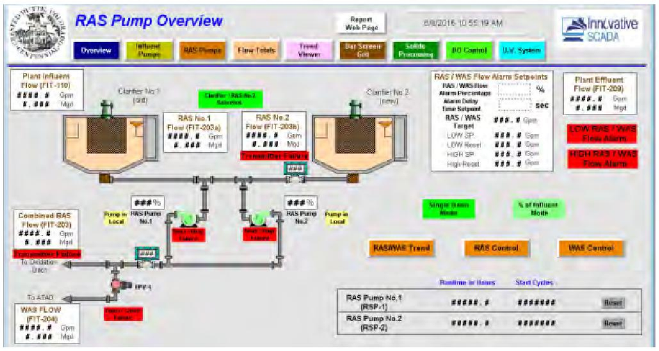
B. Qualifications/Experience/Credentials


Disolved Oxygen 0.08 mg/l AIT-3321
ORP 11 mv AIT-3320
Suspended Solids
Zone 1
Zone 2
Zone 3
Zone 4
Zone 5
Zone 6
Disolved Oxygen 0.00 mg/l AIT-3421

St. Vrain Sanitation District WWTF

SCADA System Design

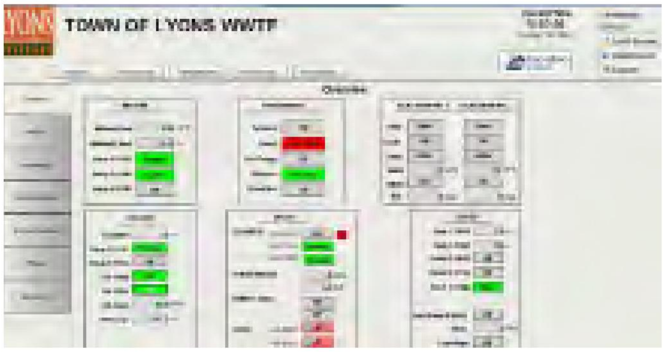
InSCADA team member Nick Toussaint supported new 6 MGD WWTF with biological nutrient removal. Advanced instrumentation and process control with SCADA was incorporated. Electrical power system design included a 2400A electrical switchboard and 1250 kW diesel generator, and several motor control centers, lighting, and power panels. Total construction cost was approximately $32 Million. Rob Fleck, District Engineer, St. Vrain Sanitation District, Colorado 80504 (303) 776-9570. Rob Fleck, District Engineer, SVSD, Firestone, Colorado 80504 (303) 776-9570 or rob@stsan.com.


RAS Pump Overview
Report Web Page
Innovative SCADA
Overview
Influent Pumps
RAS Pumps
Flow Totals
Trend Viewer
Bar Screen Grit
Solids Processing
BO Control
UV System
Plant Influent Flow (FIT-110)
Clarifier No.1
Clarifier No.2
RAS No.1 Flow (FIT-203a)
RAS No.2 Flow (FIT-203b)
RAS / WAS Flow Alarm Setpoints
Plant Effluent Flow (FIT-209)
LOW RAS / WAS Flow Alarm
HIGH RAS / WAS Flow Alarm
Combined RAS Flow (FIT-203)
RAS Pump No.1
RAS Pump No.2
RAS/WAS Trend
RAS Control
WAS Control
WAS FLOW (FIT-204)
Runtime in Hours
Start Cycles
Reset

Town of Crested Butte WWTF

Electrical Engineering & SCADA Upgrade

0.75 MGD WWTF with replacement of the electrical, instrumentation, and controls systems. The existing 200 kW generator is being reconfigured to provide power supply to the existing Headworks MCC and ATAD MCC to provide emergency power. Rodney Due, Town Public Works Director, 507 Maroon Avenue, Crested Butte, Colorado 81224 (970) 349-5338 or rdue@crestedbutte-co.gov or Shea Earley, Town Wastewater Supervisor,. Crested Butte, Colorado 81224 (970) 596-7912 or searley@crestedbutte-co.gov.


TOWN OF LYONS WWTF
Overview

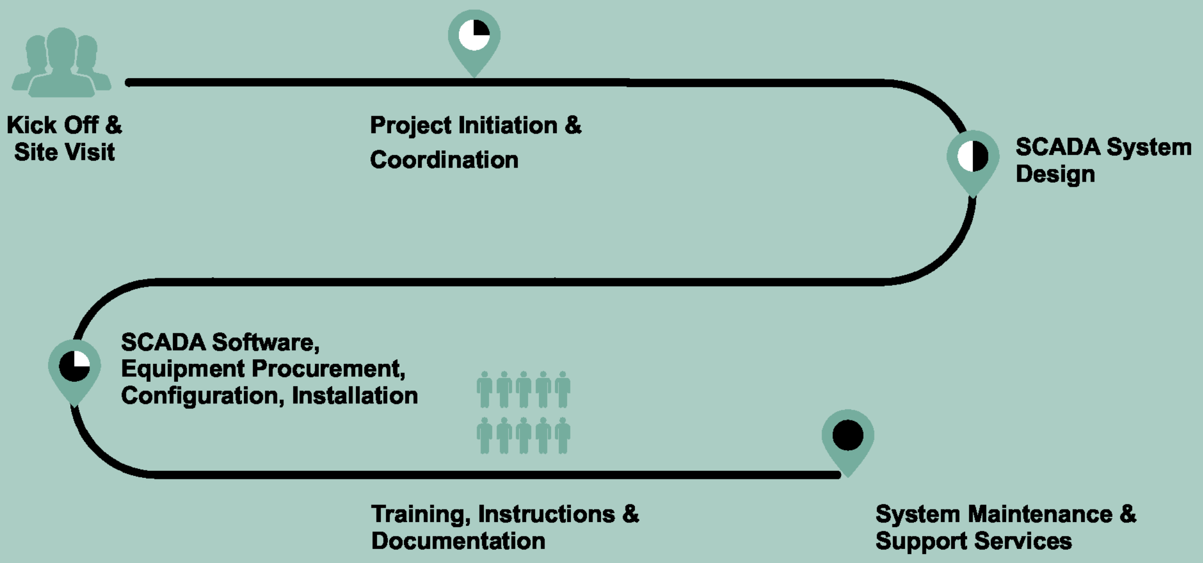
Town of Lyons WWTF

SCADA Project

InSCADA provided a complete SCADA computer system for the upgraded WWTF, including two control panels with touchscreen HMIs and Allen Bradley PLCs and Ignition SCADA software. Services included screen and database development, integration of 5 different PLC-based vendor control packages, and the creation of SCADA, instrumentation, and PLC training documents. The SCADA HMI scope was $35,000. Wayne Ramey, Operator, Ramey Environmental Compliance 5959 Iris Parkway, Frederick, Colorado 80504 (303) 833-5505 or wayner@recinc.net.

C. Strategy & Implementation Plan

Project Progression


Kick Off &
Site Visit
Project Initiation &
Coordination
SCADA System
Design
SCADA Software,
Equipment Procurement,
Configuration, Installation
Training, Instructions &
Documentation
System Maintenance &
Support Services

Project Understanding

The City has undertaken a process to upgrade its SCADA system by requesting proposals to implement improvements to the existing control system at the Water Treatment Plant (WTP). Rather than simply dive into a system upgrade and replacement program, the City has thoughtfully elected to perform comprehensive master planning of the entire control system with the intent of creating a well-defined roadmap for a reliable and robust control system that can address current issues at the main WTP today, while providing a scalable system architecture that will support the City's future needs. It is in the City's best interest to perform system planning, architecture, and equipment evaluation, as well as cost estimation to ensure a successful outcome.

The current project engagement includes two major deliverables:

- ➢ Development of a Design Technical Memorandum
- ➢ Procurement, installation, training and maintenance services for Phase I SCADA Improvements at the WTP

Design Technical Memorandum

The City is requesting a Design Technical Memo that provides direction and documentation on what the overall direction should be to accomplish the technical objectives of implementing a modern City-Wide Supervisory Control and Data Acquisition (SCADA) System while also providing a phased approach to meet a multi-year plan for budgetary planning cycles. The Technical Memo is intended to capture information

C. Strategy & Implementation Plan

from the project team's collaboration, analysis and design activities and transform them into a standards and design guide that will allow implementation of Phase I upgrades at the WTP in 2018. This roadmap will also need to address not only technical issues but operational needs, including:

- Operations Security
- Operator Training
- Operations Reporting
- Remote Access
- Network Security
- Backup & Recovery
- Software Maintenance
- System Support

Procurement and Installation - Phase I WTP SCADA

The City's initial focus is centered on SCADA improvements at the WTP. While the Design Technical Memo will be a collaborative process with City staff input and involvement, the implementation will be largely executed by the MPC Team. During the implementation phase of the project, the MPC Team will:

- Develop the Bill of Material for SCADA system hardware and software
- Provide vendor data on equipment to be furnished
- Provide Shop drawings for new PLC and interconnections between field equipment and computer networks
- Develop a written Controls Narrative and review PLC controls with the City
- Develop preliminary HMI navigation and SCADA screens and conduct a HMI screen development workshop with the City
- Program PLCs and build HMI process database (PDB) and test
- Install new PLCs and HMI stations
- Commission new controls and provide Operator Training
- Provide on-going maintenance and support

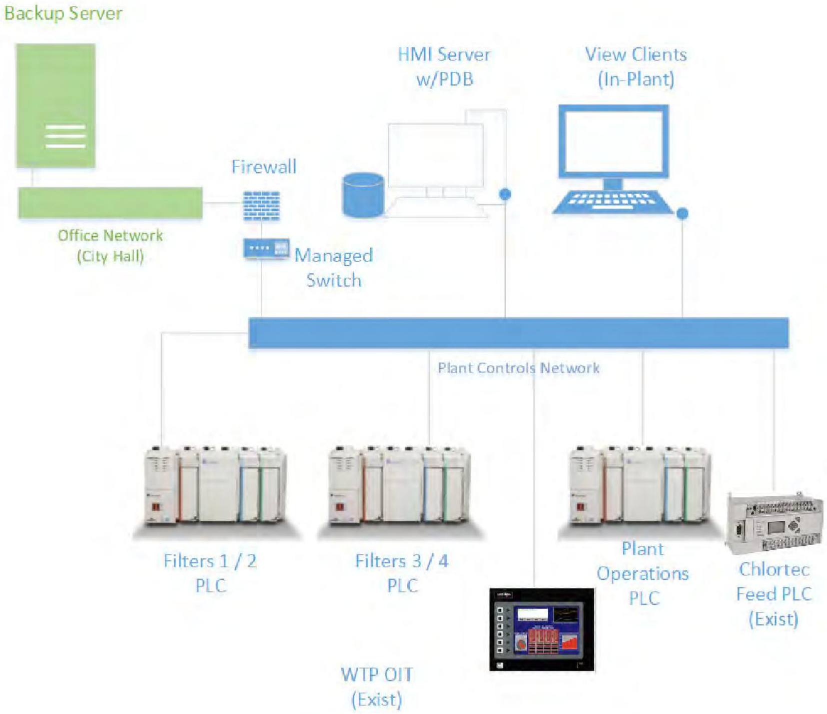
The initial work will consist of developing the submittals to support the approval process as well as the equipment procurement process. We will begin preliminary development and have virtualized development servers in our offices to allow multiple team members to work on different aspects of the system at the same time (Tag database, screens, alarming, trending & reporting). Regular development meetings will include screen reviews and on-line review meetings where all team members can participate in the development and review processes.

Project Approach

The project team will utilize project management principles and processes to drive the execution of the project. Upgrading and delivering a SCADA system is not simply a technical endeavor – it also involves human factors and operational challenges that are as equally important to the project's success.

During the development of the Design Technical Memo, it will be important to start with discussions relating to overall system architecture. Architecture is of paramount importance to the long term operability, reliability, maintainability and stability of the control system. The MPC Team will review, discuss and document the control system architecture on a system wide basis as well as review each facility and process area to allow operations staff to provide input on operations challenges, regulatory concerns as well as redundancy and reliability desires for the system. The figure that follows shows a potential system architecture for the WTP SCADA system:

C. Strategy & Implementation Plan



SCADA System Design

There are several important design factors to be discussed and reviewed during the Design process. One important item to be discussed is network architecture and security. The above figure depicts the HMI server on a controls network with the PLCs and then a separate City Hall network with the backup servers.

It is recommended that at a minimum, there be separation between the WTP process control network and the IT/Backup functions. This is one factor which we refer to as “OT vs. IT” - Operations Technology vs Information Technology. It is important that there is network separation between City Hall and the WTP from a security standpoint. The network separation can be implemented via a managed network switch which can provide multiple sub-networks that will isolate systems. In some instances, we have provided a multilayer plant network that separates the instrument networks from the PLC network and the PLC network from the HMI/OIT network.

Another factor in the security of the system concerns the data flow between equipment. In the case of system backup, the central backup server at City Hall can monitor and control the backup process, but the data flow and backup files between the backup server and the plant HMI server can be encrypted to maintain security. SCADA server redundancy is also an important topic that can have significant cost ramifications. We implemented full HMI redundancy on the Laramie SCADA project, including alarm redundancy, and there are several other factors that need to be considered during design, including alarm management and remote access. An area of technical design to be discussed is the location of the HMI servers. The MPC team has provided a number of different solution approaches in the past, including localized HMI servers, distributed servers, virtualized servers and other hybrid solution architectures. For the Phase I WTP project, we recommend a single HMI server, located at the WTP, with a warm redundant Gateway server and two local HMI client machines.

C. Strategy & Implementation Plan

Even more important are the actual control functions implemented to control the individual process areas. The above system architecture shows WTP filter and backwash control in one PLC, but in our experience, for a plant of this size, the filter processes should have a certain level of redundancy. On past projects we provided individual filter PLC controls for plant effluent control, valve sequencing and backwash control. If a filter PLC had to be taken out of Run, or if there was a CPU or Power Supply failure, this would not shut down the entire filtration process.

Implementing individual filter redundancy and has cost ramifications. The existing filter control system has individual filter effluent rate of flow controllers that are the single loop controller type. There is also an I/O bus between the controllers and an I/O rack in the back of the panel with several inputs/outputs, in order to allow information to be routed to the Filter controller.

The current state architecture for filter control is shown below:

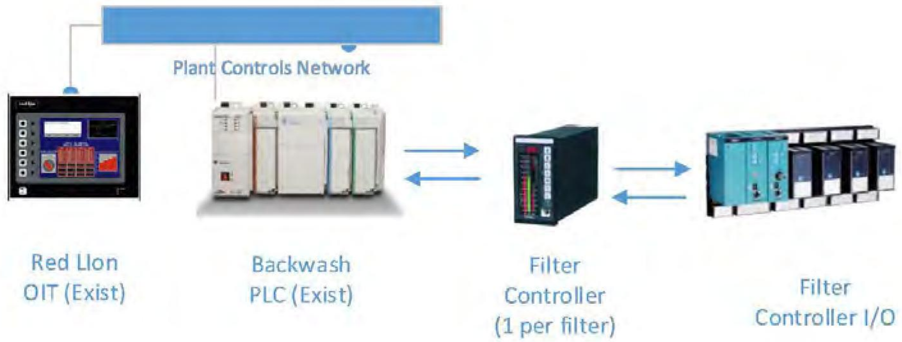


Figure 2 - Filter Controls Current State

In the current state, the Backwash PLC controls the various filter control valves and the Filter controller and I/O control the effluent valve. In the event of PLC failure, the filter controller can still control filter effluent flow rate, however automatic backwash control would be unavailable.

An alternative control architecture has been implemented in many facilities and would allow for the retirement of the individual filter controllers:

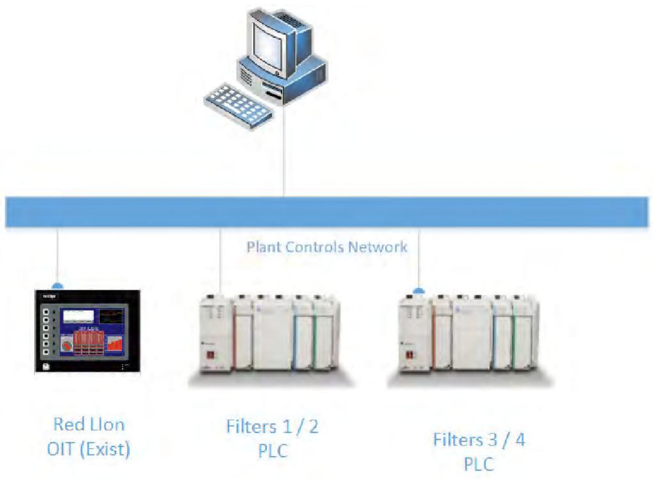


Figure 3 - Filter Controls Future State

In this alternate architecture, filter controls would be implemented for 2 filters in each PLC along with fully redundant backwash controls. This approach would mitigate any impact to a single equipment item failure or being taken offline. The Computer interface would provide operator interface and the Red Lion OIT would provide for additional redundancy in filter control interface.

The above design considerations will be discussed and evaluated, and documented in the Technical report. The report will look at each facility and process area and an overall architecture and process area design will be taken to the 30% design level. This will allow the project team to provide cost estimates that will be used by the City in performing the annual budgetary planning processes a multiyear phased approach.

C. Strategy & Implementation Plan

Telemetry

The MPC Team has a lot of experience providing telemetry solutions across many different platforms. The team has experts in satellite, microwave, radio and cellular technologies that can evaluate and propose a wide range of technical solutions, tailored to the City's needs.

SCADA System Software and Equipment

We have provided a detailed list of SCADA system hardware and software in the attached Fee proposal. We believe the proposed solution will address the City's desire for 2018 improvements at the WTP as well as providing a base system that can be expanded over time.

The MPC Team will provide all required PLC equipment, hardware and software as described below. We intend to furnish a complete and operable set of upgrades that meet the objectives of the RFP, but we are also open to discussing alternatives or enhancements that the City may desire.

We have included costs for replacing the obsolete Siemens and Toshiba PLC's with a new Rockwell/Allen Bradley Compact Logix PLC. We have also estimated the Input/Output requirements for Chemical feed and Filter systems and will provide these as part of the Phase I improvements.

We have included an off the shelf packaged SCADA software package, "Ignition" by Inductive Automation. We are a certified Ignition Integrator and the Ignition package is a competitively priced, modular SCADA software that can support the types of architecture and redundancy options that the City desires to implement. The Ignition package will be priced with five (5) client licenses, more than adequate for 10 users. This will allow for two or three dedicated clients at the WTP, one for remote access for off hour operations as well as a license for City Hall monitoring and reporting access. We will be providing the Ignition system with the View, Alarm Notification, and Tag Historian modules for Phase I WTP improvements as well as the Sytech XLReporter software.

Computer Hardware and network equipment will require the following City-furnished items:

- VPN Firewall (City standard)
- 12 port managed switch with CAT 5e network cables
- QTY (3) Dell Precision Tower 3000 with I5-7500 Quad Core, 3.4 GHz,8Gig RAM, 1TB HD, Windows 10 OS, MS Office 2016, Dell 24" E2417H and 750VA UPS
- QTY (1) Color Laser Printer

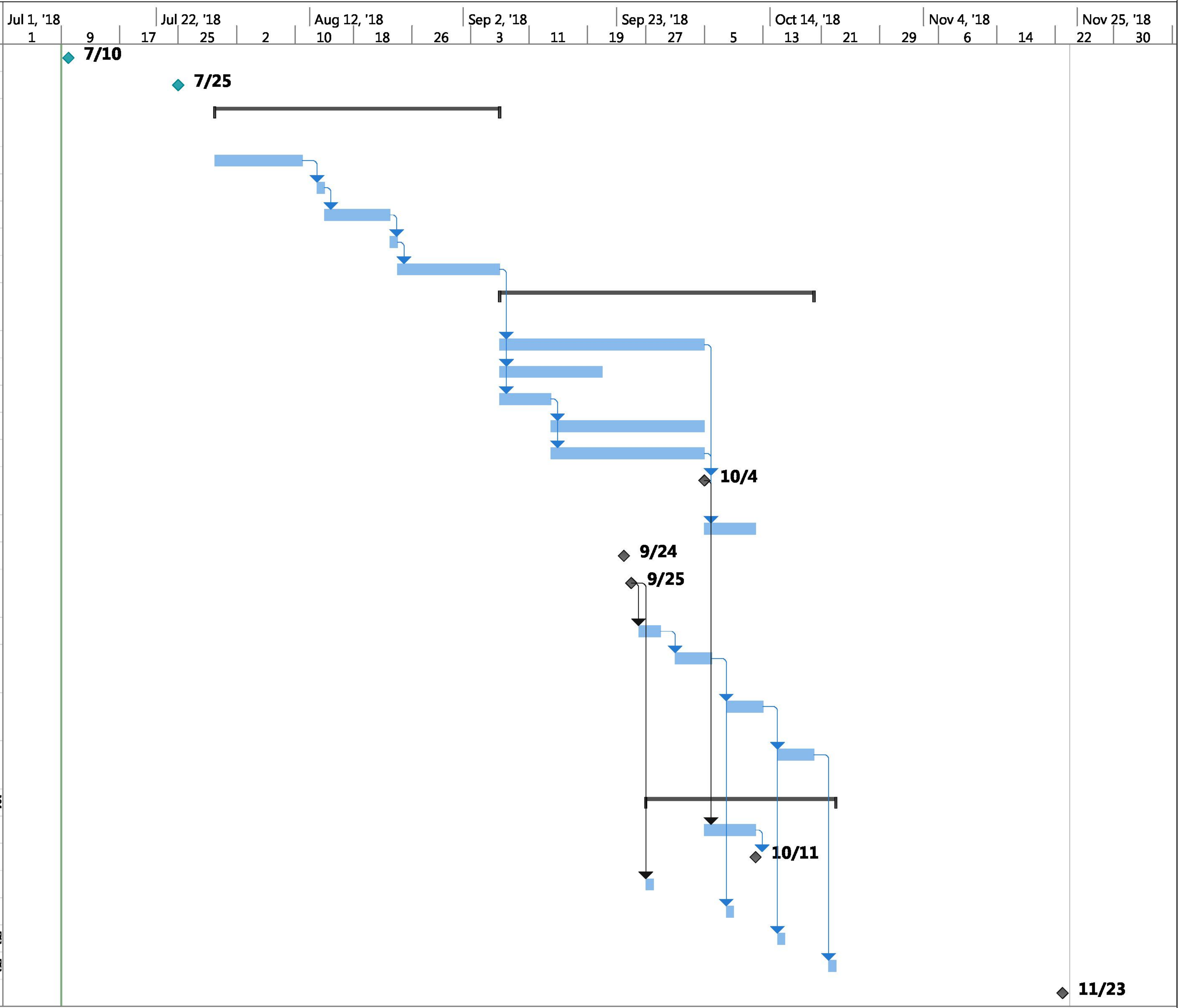
PLC Hardware: MPC-furnished

- Lot (2) Compact Logic L33-ER PLC
- Input/Output Modules

While the Backwash PLC is of the AB 1769 platform, AB is moving their CompactLogix controls to the newer 5069 series. During the Technical workshops the exact PLC models will be finalized.

City of Grand Junction
SCADA System Upgrade

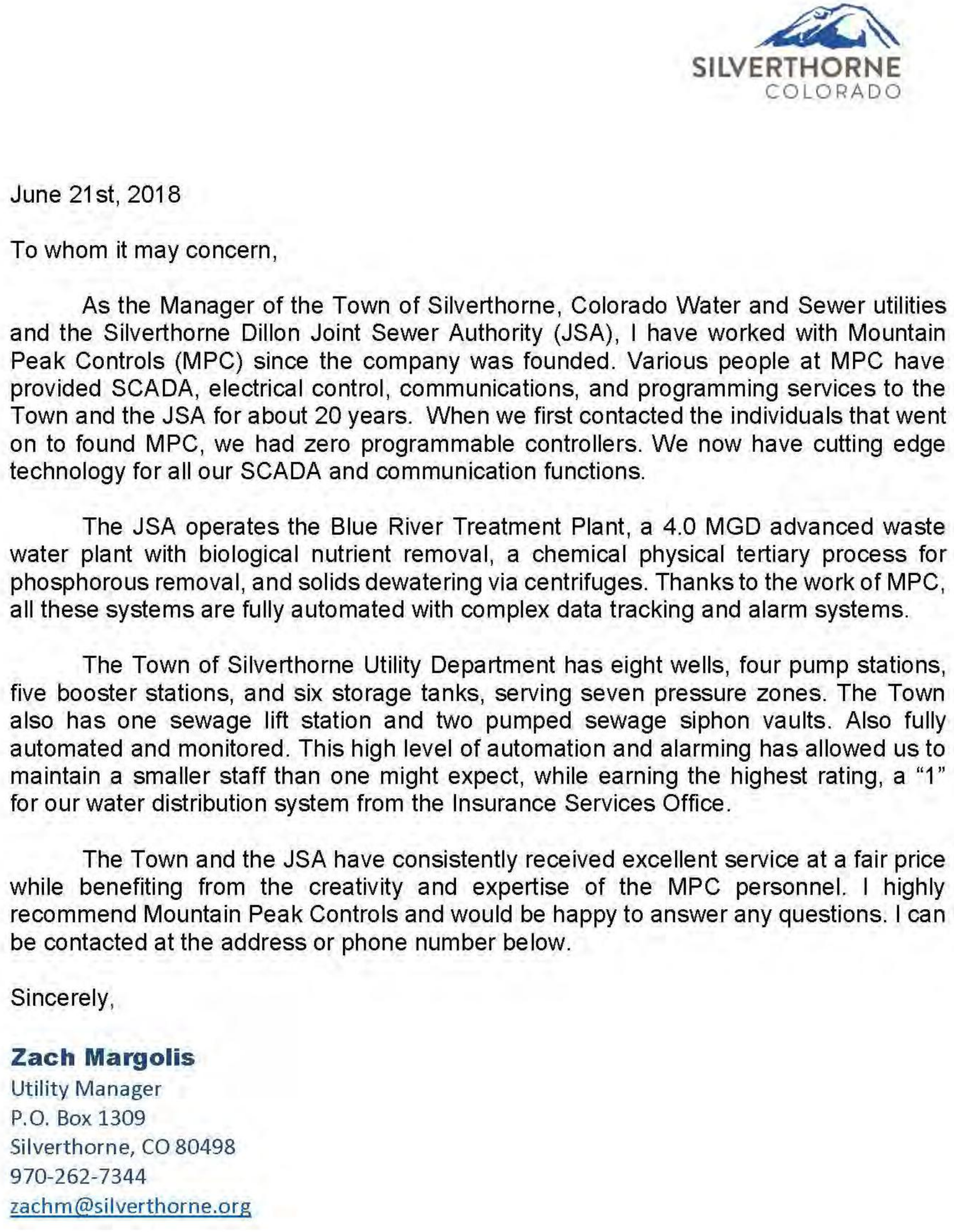
ID	ℹ	Task Mode	Task Name	Duration	Start	Finish
1		📌	**Proposals from Contractors**	0 days	Tue 7/10/18	Tue 7/10/18
2		📌	**Project Contract Execution**	0 days	Wed 7/25/18	Wed 7/25/18
3		➡	**1.0 Design Technical Memo & 30% Design**	**29 days**	**Mon 7/30/18**	**Thu 9/6/18**
4	▦	➡	1.1 Preliminary Design	10 days	Mon 7/30/18	Fri 8/10/18
5		➡	1.2 Preliminary Design Workshop 1	1 day	Mon 8/13/18	Mon 8/13/18
6		➡	1.3 Detail Design	7 days	Tue 8/14/18	Wed 8/22/18
7		➡	1.4 Detail Design Workshop 2	1 day	Thu 8/23/18	Thu 8/23/18
8		➡	1.5 Submit Final Design TM to City	10 days	Fri 8/24/18	Thu 9/6/18
9		➡	**2.0 WTP SCADA System Implementation**	**31 days**	**Fri 9/7/18**	**Fri 10/19/18**
10		➡	2.1 Shop Drawings	20 days	Fri 9/7/18	Thu 10/4/18
11		➡	2.2 Procure SCADA Software	10 days	Fri 9/7/18	Thu 9/20/18
12		➡	2.3 Initial Tag Database Developme	5 days	Fri 9/7/18	Thu 9/13/18
13		➡	2.4 PLC Programming	15 days	Fri 9/14/18	Thu 10/4/18
14		➡	2.5 SCADA System Programming	15 days	Fri 9/14/18	Thu 10/4/18
15		➡	2.6 Review HMI Screen Design with City - Workshop 3	0 days	Thu 10/4/18	Thu 10/4/18
16	▦	➡	2.7 Procure PLC Hardware	5 days	Fri 10/5/18	Thu 10/11/18
17	▦	➡	2.8 Review Installation Schedule	0 days	Mon 9/24/18	Mon 9/24/18
18	▦	➡	2.9 Final HMI Screen Review - Workshop 4	0 days	Tue 9/25/18	Tue 9/25/18
19	▦	➡	2.10 Installation of SCADA Compute	3 days	Wed 9/26/18	Fri 9/28/18
20		➡	2.11 Checkout of Filter PLC 1/2 with new HMI	5 days	Mon 10/1/18	Fri 10/5/18
21		➡	2.12 Checkout of new Filter PLC 3/4 with new HMI	5 days	Mon 10/8/18	Fri 10/12/18
22		➡	2.13 Checkout of new plant PLC with new HMI	5 days	Mon 10/15/18	Fri 10/19/18
23		➡	**3.0 Operator and IT Staff Training**	**18 days**	**Thu 9/27/18**	**Mon 10/22/18**
24		➡	3.1 Prepare Training Syllabus	5 days	Fri 10/5/18	Thu 10/11/18
25		➡	3.2 Review Training Plan with City	0 days	Thu 10/11/18	Thu 10/11/18
26		➡	3.3 IT Training on HMI computer	1 day	Thu 9/27/18	Thu 9/27/18
27		➡	3.4 Operator Training - I	1 day	Mon 10/8/18	Mon 10/8/18
28		➡	3.5 Operator Training - II	1 day	Mon 10/15/18	Mon 10/15/18
29		➡	3.6 Operator Training - III	1 day	Mon 10/22/18	Mon 10/22/18
30	▦	➡	**Estimated Phase I Project Completion**	0 days	Fri 11/23/18	Fri 11/23/18



Project: Project1.mpp
Date: Mon 7/9/18

Task	▬	Project Summary	┌─┐	Manual Task	▬	Start-only	[	Deadline	⇩
Split	┈┈	Inactive Task	▭	Duration-only	▬	Finish-only	]	Progress	─
Milestone	◆	Inactive Milestone	◇	Manual Summary Rollup	▬	External Tasks	▬	Manual Progress	─
Summary	┌─┐	Inactive Summary	┌─┐	Manual Summary	┌─┐	External Milestone	◆		

D. References



SILVERTHORNE
COLORADO

June 21st, 2018

To whom it may concern,

As the Manager of the Town of Silverthorne, Colorado Water and Sewer utilities and the Silverthorne Dillon Joint Sewer Authority (JSA), I have worked with Mountain Peak Controls (MPC) since the company was founded. Various people at MPC have provided SCADA, electrical control, communications, and programming services to the Town and the JSA for about 20 years. When we first contacted the individuals that went on to found MPC, we had zero programmable controllers. We now have cutting edge technology for all our SCADA and communication functions.

The JSA operates the Blue River Treatment Plant, a 4.0 MGD advanced waste water plant with biological nutrient removal, a chemical physical tertiary process for phosphorous removal, and solids dewatering via centrifuges. Thanks to the work of MPC, all these systems are fully automated with complex data tracking and alarm systems.

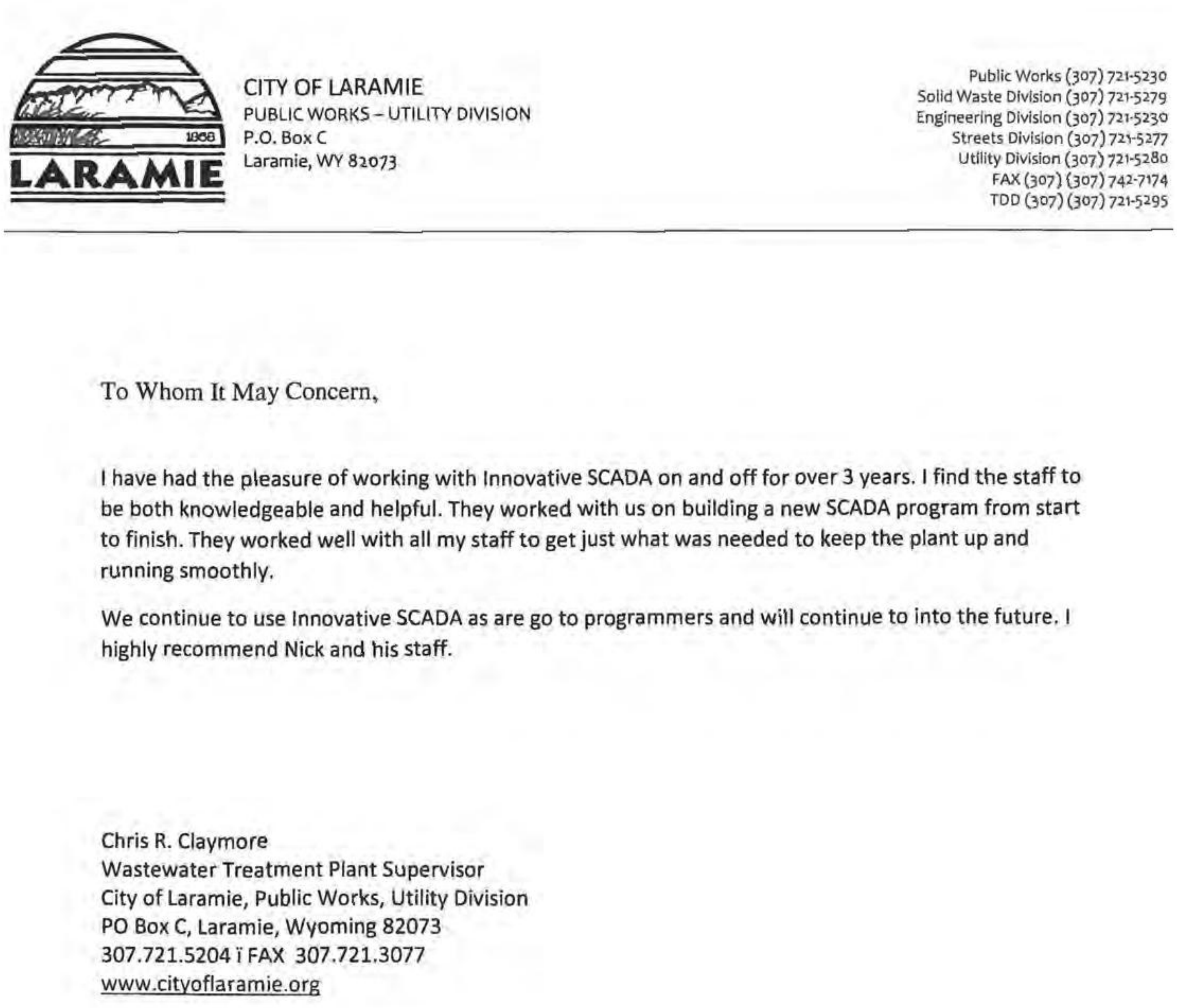
The Town of Silverthorne Utility Department has eight wells, four pump stations, five booster stations, and six storage tanks, serving seven pressure zones. The Town also has one sewage lift station and two pumped sewage siphon vaults. Also fully automated and monitored. This high level of automation and alarming has allowed us to maintain a smaller staff than one might expect, while earning the highest rating, a "1" for our water distribution system from the Insurance Services Office.

The Town and the JSA have consistently received excellent service at a fair price while benefiting from the creativity and expertise of the MPC personnel. I highly recommend Mountain Peak Controls and would be happy to answer any questions. I can be contacted at the address or phone number below.

Sincerely,

Zach Margolis
Utility Manager
P.O. Box 1309
Silverthorne, CO 80498
970-262-7344
zachm@silverthorne.org

D. References



CITY OF LARAMIE
PUBLIC WORKS – UTILITY DIVISION
P.O. Box C
Laramie, WY 82073

Public Works (307) 721-5230
Solid Waste Division (307) 721-5279
Engineering Division (307) 721-5230
Streets Division (307) 721-5277
Utility Division (307) 721-5280
FAX (307) (307) 742-7174
TDD (307) (307) 721-5295

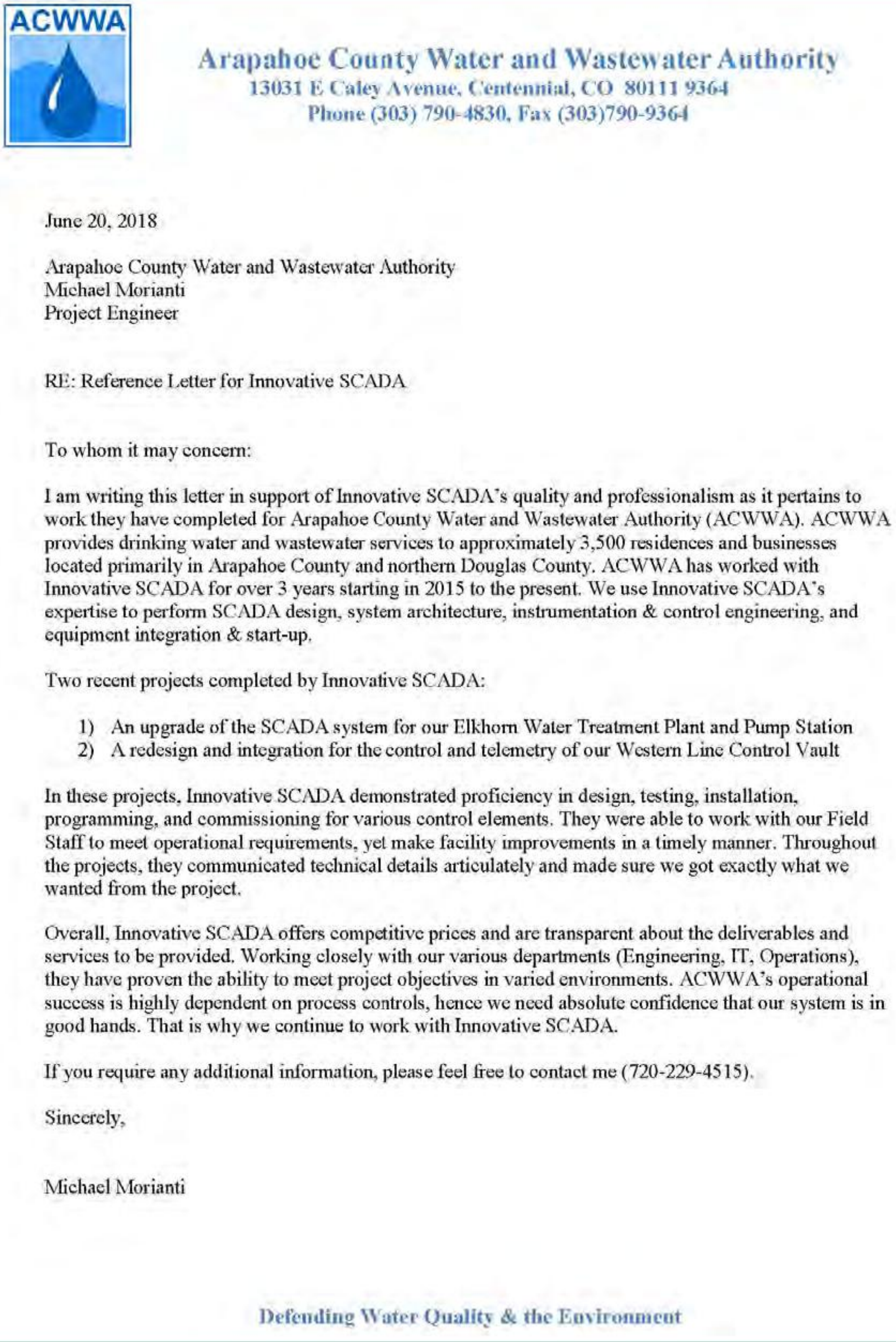
To Whom It May Concern,

I have had the pleasure of working with Innovative SCADA on and off for over 3 years. I find the staff to be both knowledgeable and helpful. They worked with us on building a new SCADA program from start to finish. They worked well with all my staff to get just what was needed to keep the plant up and running smoothly.

We continue to use Innovative SCADA as are go to programmers and will continue to into the future. I highly recommend Nick and his staff.

Chris R. Claymore
Wastewater Treatment Plant Supervisor
City of Laramie, Public Works, Utility Division
PO Box C, Laramie, Wyoming 82073
307.721.5204 ï FAX 307.721.3077
www.cityoflaramie.org

D. References



ACWWA

Arapahoe County Water and Wastewater Authority
13031 E Caley Avenue, Centennial, CO 80111 9364
Phone (303) 790-4830, Fax (303)790-9364

June 20, 2018

Arapahoe County Water and Wastewater Authority
Michael Morianti
Project Engineer

RE: Reference Letter for Innovative SCADA

To whom it may concern:

I am writing this letter in support of Innovative SCADA's quality and professionalism as it pertains to work they have completed for Arapahoe County Water and Wastewater Authority (ACWWA). ACWWA provides drinking water and wastewater services to approximately 3,500 residences and businesses located primarily in Arapahoe County and northern Douglas County. ACWWA has worked with Innovative SCADA for over 3 years starting in 2015 to the present. We use Innovative SCADA's expertise to perform SCADA design, system architecture, instrumentation & control engineering, and equipment integration & start-up.

Two recent projects completed by Innovative SCADA:

1) An upgrade of the SCADA system for our Elkhorn Water Treatment Plant and Pump Station
2) A redesign and integration for the control and telemetry of our Western Line Control Vault

In these projects, Innovative SCADA demonstrated proficiency in design, testing, installation, programming, and commissioning for various control elements. They were able to work with our Field Staff to meet operational requirements, yet make facility improvements in a timely manner. Throughout the projects, they communicated technical details articulately and made sure we got exactly what we wanted from the project.

Overall, Innovative SCADA offers competitive prices and are transparent about the deliverables and services to be provided. Working closely with our various departments (Engineering, IT, Operations), they have proven the ability to meet project objectives in varied environments. ACWWA's operational success is highly dependent on process controls, hence we need absolute confidence that our system is in good hands. That is why we continue to work with Innovative SCADA.

If you require any additional information, please feel free to contact me (720-229-4515).

Sincerely,

Michael Morianti

Defending Water Quality & the Environment

E. Detailed Fee Sheet

City of Grand Junction 2018 SCADA System	*MATERIALS*	
ITEM	**COST**	**SALE**
System Hardware	**$29,983**	**$35,274**
System Software	**$7,000**	**$8,750**
License Maintenance	**$3,027**	**$3,363**
Labor	**$46,000**	**$46,000**
Travel Costs	**$2,550**	**$2,833**
TOTAL	**$88,560**	**$96,220**

Our Rate Sheet is included on the following page. The City's Bid Sheet has been completed, signed, and submitted as requested in the RFP.

SECTION 7.0: SOLICITATION RESPONSE FORM
RFP-4525-8-DH WATER TREATMENT PLANT, COLLECTION AND DISTRIBUTION SUPERVISORY CONTROL AND DATA ACQUISITION AUTOMATION SYSTEM (SCADA)

Offeror must submit entire Form completed, dated and signed.

1) **Total all inclusive pricing to provide all labor, parts, supplies, equipment, installation, etc. necessary for the Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) per specifications:**

TOTAL COST $ 96,220

WRITTEN: Ninety-Six Thousand, Two-Hundred and Twenty **dollars.**

The Owner reserves the right to accept any portion of the work to be performed at its discretion

The undersigned has thoroughly examined the entire Request for Proposals and therefore submits the proposal and schedule of fees and services attached hereto.

This offer is firm and irrevocable for sixty (60) days after the time and date set for receipt of proposals.

The undersigned Offeror agrees to provide services and products in accordance with the terms and conditions contained in this Request for Proposal and as described in the Offeror's proposal attached hereto; as accepted by the Owner.

Prices in the proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a proposal for the purpose of restricting competition.
- The individual signing this proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of 2 percent of the net dollar will be offered to the Owner if the invoice is paid within 15 days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents. State number of Addenda received: 3 .

It is the responsibility of the Proposer to ensure all Addenda have been received and acknowledged.

Mountain Peak Controls, Inc.	Brian Mitchem
Company Name – (Typed or Printed)	Authorized Agent – (Typed or Printed)
	(o) 303-271-0376 (c) 303-885-5967
Authorized Agent Signature	Phone Number
13551 W. 43rd Dr. Unit A	bmitchem@mountainpeakcontrols.com
Address of Offeror	E-mail Address of Agent
Golden, CO 80403	7/10/2018
City, State, and Zip Code	Date

2018 Rates

2018 Billing rates effective 1/1/2018	*Billing rates adjusted annually*	*Direct expenses will be invoiced along with monthly labor costs*

Management & Engineering Personnel	**Rate per Hour, $**
Principal Engineer	140
Project Manager	125
Senior Configuration Specialist	110
Panel Designer	110
PLC Programmer	110
Senior Engineer	110
Startup / Testing	125
Trainer	110
Engineer III	105
Engineer II	100
Engineer I	100
Specialty	
Senior Resident Project Representative	120
Resident Project Representative	115
Senior Designer	100
CAD Designer	95
CAD Technician	75
Support Personnel	
Administrative	85

Direct expenses will be charged at actual cost plus 10% for handling and insurance. Incidental expenses such as miscellaneous copying, telephone service and computer equipment are included in the fee. Reimbursable (direct) expenses may include but are not limited to: Additional outside professional services provided beyond those stipulated in the scope of work; Additional copies of reports, drawings, etc. beyond those stipulated in the scope of work; Postage, courier fees, and shipping; Project vehicle mileage (which will be charged at the current IRS rate); Owner-approved, project-related purchases; Project business meals and lodging; Resident project engineer equipment and rental; and Printed photos.

Purchasing Division

ADDENDUM NO. 1

DATE: **June 22, 2018**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) RFP-4525-18-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. Is there already a pre-approved system integrator list?

   A. No

2. Q. Has the SCADA software been pre-selected?

   A. No

3. Q. Page 20 – 4.2.9 Pricing – It looks like the City wants a base (lump sum) price for:
   a. Hardware (PLCs, I/O, computer(s), network equipment
   b. Software (OS, Application Software, backup SW, etc.)
   c. License (& software support agreement)
   d. Labor for config of proposed system, startup, training, travel
   e. Travel costs for system install and start-up

   Is this also how the city wants the “complete breakdown list of pricing” as described In Section 5.0 Section E? Or does the pricing need to breakdown further into individual parts?

   A. These 5 categories for breakdown is sufficient.

4. Q. What quality of network connectivity exists between City Hall and the WTP?

   A. The current connection is a 200Mbps Microwave Link.

5. Q. Will the city provide required network equipment (i.e. Routers, switches) or are those contractor-supplied? It was suggested at the walkthrough that the city would provide those in order to keep hardware the same as currently used.

A. The city will provide the required networking equipment.

6. Q. Password management system? Sounds like this applies at the Operating System level. Or does it apply also at the application layer?

   A. The city already has an Operating System Password policy that enforces passwords at the application level. The application must also enforce the same password policies

7. Q. Attachment A lists both WTP process equipment and remote equipment – Does the Phase I scope of work include all items in the Attachment or only those that are required for "in-plant" process control?

   A. Phase 1 involves all items listed in Attachment A except those under the heading of "Include for Future Addition of". There are two new projects planned for late 2018-early 2019 that will require 1. Intake Structure Telemetry & 2. PRV Station Monitoring on Flowline to also be integrated into Phase 1 even though they do not exist at the present time. These two items are the only remote telemetry items to add for Phase 1 as the Purdy Mesa Remote Valve and the Kannah Creek Remote Control Valve are already functioning as part of the Kannah Creek WTP's SCADA system.

8. Q. On page 28 of the RFP (Include for Future Addition of), is the city wanting the contractor to include in this proposal all costs for implementing the data points described including hardware / software / installation, etc. or is the city's intent to ensure that any provided SCADA equipment has the ability to expand in the future to be able to handle this equipment?

   A. The intent is to ensure that any provided SCADA equipment has the ability to expand to be able to handle this equipment. Other items to add to the "Future Additions List" include 1. Control and Monitoring of the Gunnison River Pump Station (2 pumps, 2 VFDs, flowmeter, pressure) 2. Reservoir #4 Level Sensor.

9. Q. For maintenance and support can we provide daily or hourly support costs for on-site and remote site support, since we cannot estimate total support needs?

   A. Yes, please provide daily/hourly support costs and/or proposed Maintenance Contract costs.

10. Q. Is upgrade of the Motor Control Center part of this project?

    A. It is not a part of Phase 1, but proposed cost of upgrading for budgetary purposes would be appreciated

11. Q. Will the City provide copies of the Input/Output database for all existing plant PLC's and the Red Lion OIT prior to the bid as they are necessary to provide an accurate estimate of Phase I work?

    A. Yes

12. Q. Will the City make accessible or provide copies of all WTP control wiring drawings prior to the bid?

A. Yes

13. Q. What data points are currently recorded by the electronic chart recorders?

A. 4 individual filters for flow, turbidity, and particle counts. Effluent flow, turbidity, chlorine, pH, Fluoride. Water tank level, free chlorine, city water main flows (x 2). Influent flow, turbidity, pH, chlorine, flowline pressure. Raw water flowlines flow, turbidity, pH (two of them all). Raw water pump flow. Clearwell level.

14. Q. Is the City looking for SCADA communications to remote sites to be on an ethernet / internet platform or is fixed band radio acceptable? Or a combination of technologies as required to make the system work as desired?

A. This can be a combination of communications technologies if it is secured with the appropriate security controls.

15. Q. What are the new and total Input/Output counts for the budgeted Phase I portion of the project?

A. Total I/O counts for Phase 1 will be determined through the design process with the selected integrator.

16. Q. Will the City provide a list of all remote sites to be included in Phase I?

A. PRV Stations on Purdy Mesa Flowline 38.962 / -108.362
B. Intake Structure Telemetry (phone/wifi-umbrella nearly) 38.963 / -108.227
C. Purdy Mesa Control Valve & flowmeter (already wired to Kannah Creek SCADA system) 38.9688 / -108.2944
D. Kannah Creek Control Valve & flowmeter (has radio system to Kannah Creek SCADA) 38.9616 / -108.2723

17. Q. Are there existing communications between the WTP and any Phase I remote sites? If so, what form of communication is being used and to which sites (i.e Hardwire, radio, Fiber, ethernet)?

A. Purdy Mesa Control Valve and flowmeter are hard-wired to the Kannah Creek SCADA system
B. Kannah Creek Control Valve and flowmeter signals are transmitted to the Kannah Creek SCADA system via a repeater and Phoenix Radio (900 MHz) located at the Kannah Creek Water Tanks on a highpoint above an to the southwest of Juniata Reservoir.

The Kannah Creek SCADA system can currently be accessed by WTP staff via LogMeIn, where monitoring and control of the valves can be done.

18. Q. What if any PLC & operator interface equipment is being utilized at any Phase I remote sites?

A See # 17

19. Q. I'd like information about the number and types of PLCs the SCADA is to connect to in phase 1. There are two ways to do this.

1. Send copies of the PLC files, this will contain the most information for me.
2. Send a list of the PLCs make and model, this will contain less information but is an option if it is not possible to give out the PLC code.

A. Some PLC files are attached to this Addendum. Due to software access issues, the attached does not represent the total PLCs in its entirety. The selected firm will be given access to the PLCs at the Water Plant after contract award.

20. Q. Can you send me IO lists per PLC if they are available? If they are not available this information can be found in the PLC files if they are sent as option 1a above.

A. Some PLC files are attached to this Addendum. Due to software access issues, the attached does not represent the total PLCs in its entirety. The selected firm will be given access to the PLCs at the Water Plant after contract award.

21. Q. There are different ways to handle remote access to the servers. Which method would be preferred?

1. VPN access to the control network, this will allow remote computers to connect into the network. This gives good freedom to work because people can use their own computers with their own programs to work on and monitor the system. However, this is less secure because it is more difficult for the City of Grand Junction to monitor 3rd party computers for malicious software intentional or not.
2. Dedicated engineering computer on the control network with Remote Desktop access, so users can login remotely and use the programs installed on that computer to work on the system. More secure because the engineering machine can be administered by the City of Grand Junction and users can only use the programs installed on it, hence reducing the risk of malicious software entering the system.
3. No remote access, all work and monitoring must be done from site. Most secure, least flexible.

A. All remote access to the City's internal resources must be done via a VPN connection requiring multi-factor authentication using the city's existing RSA SecurID services. The actual access level will stop at a dedicated computer and not access the secure controls network.

22. Q. If option 3.b is chosen would you like Rockwell Logix500 and Logix5000 software included in the bid? This will be used to view and edit PLCs, not a requirement for this SCADA job but would be useful in the future to help with remote troubleshooting. So it could be setup from the start if you like.

A. Remote troubleshooting is desirable, please include

23. Q. No contact information is provided in section 1.1 of the RFP, please provide information.

A. The contact for this RFP is the City Purchasing Representative Duane Hoff.
Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org
(970) 244-1545

24. Q. Provide a complete I/O list as mentioned in the pre-bid meeting.

A. Please refer to Attachment A & the PLC files provided

25. Q. What SCADA software is used at the KCWTP currently?

    A. Opto 22

26. Q. In the RFP it mentions budget cycles and 2018 plant improvement budget. Are these budgets provided or will they be discussed with the selected integrator to build the phases as discussed in the RFP?

    A. Budget will be discussed with the selected integrator.

27. Q. The RFP requires a long list of security features of the software provided (items in 4.2.7), yet requires a “Packaged software product” (4.2.4). We will be constrained by the selected “packaged software product” and the offerings as part of the vendor supplied package. Most current SCADA software packages offer most but not all of the required features. Is this a point of discussion during the design of the system with the city?

    A. List any exceptions to the security functions requirements in the RFP. The security features will be scrutinized by the City’s IT Department for acceptability their its entirety.

28. Q. Often times we go thru a software and hardware selection process prior to costing out the hardware and software with the owner. Is this a desired step in the design process as it is currently not indicated in the RFP documents.

    A. Yes. Selection of desired hardware and software will be a step in the design process with the selected integrator. The cost of these components will be considered during their selection.

29. Q. Does the owner have a software preference for the SCADA software?

    A. No

30. Q. Does the owner have a PLC hardware preference for the SCADA Hardware?

    A. Different PLC brands exist throughout the water system. The City desires to make our infrastructure more consistent if possible. The PLC installed as part of the filter upgrade in 2016 was Allens/Bradley.

31. Q. A question was raised during the walk through regarding the programs for the current PLCs. Has that been verified that the programs with tag/register information would be available?

    A. Yes. Some PLC files are attached to this Addendum. Due to software access issues, the attached does not represent the total PLCs in its entirety. The selected firm will be given access to the PLCs at the Water Plant after contract award.

32. Q. I was wondering if I could arrange a site visit either next Monday or Tuesday to the remote locations that are called out in the SCADA system RFP.
    Those sites are critical to the bid process and very limited or no information was given in the RFP or the walkthrough about them.
    If a site visit cannot be arranged, are there pictures, hardware listing and GPS coordinates available for these locations?
    Sites of particular interest:

Gunnison River Pump Station
*Purdy Mesa Influent Control Valve
Purdy Mesa Remote Valve
*Kannah Creek Influent Control Valve
*Kannah Creek Bypass Valve
Kannah Creek Remote Control Valve
*Reservoir Pump 40 hp On/Off
*Reservoir Pump Valve%
*Reservoir 75 hp Pump On/Off
*Reservoir #3 & 4 Bypass Valve Control
Raw Water Intake Structure telemetry
Watershed Reservoir Telemetry & Valve control – not Phase 1
Monitoring of PRV stations on Flowline
Ridges Irrigation Pump Station – not Phase 1
Mantey Heights flow meter – not Phase 1

A. Information for Phase 1 sites in question has been listed above; sites with an asterisk (*) are located within the City WTP compound. If information has not been listed (ie. Mantey Heights), it is anticipated to be in a later phase.

33. Q. We would like to request an additional site visit to the Grand Junction Water Treatment Plant as well as the Kannah Creek Plant. We believe that it is our duty as an integrations company to do a thorough investigation of all control processes currently implemented to give the most comprehensive and sustainable course of action for current and future controls needs. It is our goal to be able to put forth the most competitive, accurate and accommodating bid as possible. However, to do such we would like some additional information that would be best gathered through another on site visit. The additional information that we believe is pertinent to the design and future allocation of controls is below.
    - Current make and model of RTU's/FIU Phoenix Radio 900 MHz
    - Information regarding telemetry system, network map, repeaters, frequency range, etc.
      Listed above
    - Future sites to be added and their function Listed Above in Attachment A
    - Current make and model of PLC's at Kannah Creek Opto10
    - Current communications protocols being used by SCADA at Kannah Creek ethernet
    - Available communications out of Kannah Creek, IP/TCP, Serial, Radio, etc.
      Currently using IP/TCP, no Serial, Radio would definitely need a repeater
    - Current means of instrumentation measurements and control at Grand Junction WTP, 4-20mA, HART, Modbus etc. 4-20
    - Existing wiring to all control valves at the Grand Junction WTP that are to be replaced
      Not as part of this project. It is the City's desire as part of a later phase to move the telemetry/control of 1) Finished water tank level, 2) City 24" Flowmeter, 3) OM 24" Flowmeter, 4) Reservoir 40 HP Pump On/Off, 5) Reservoir 75 HP Pump On/Off, 6) Reservoir Pump Valve Control, & 7) Reservoir Pump Valve % to a wireless system (radio, microwave, etc.) these components are all located within the compound and are currently hard-wired. Please take this into consideration as needed capabilities with future expansion.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

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Author:	
Created:	04/30/2004 12:08:10 pm
Last Modified:	05/19/2009 08:43:59 am

Symbol	Var Type	Data Type	Comment
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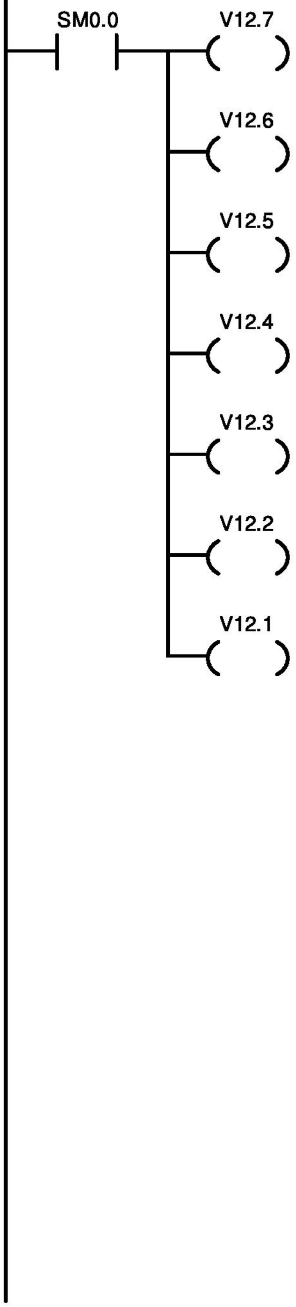
	TEMP		
	TEMP		
	TEMP		

PROGRAM COMMENTS

Network 1 Display Message Activation

Network Comment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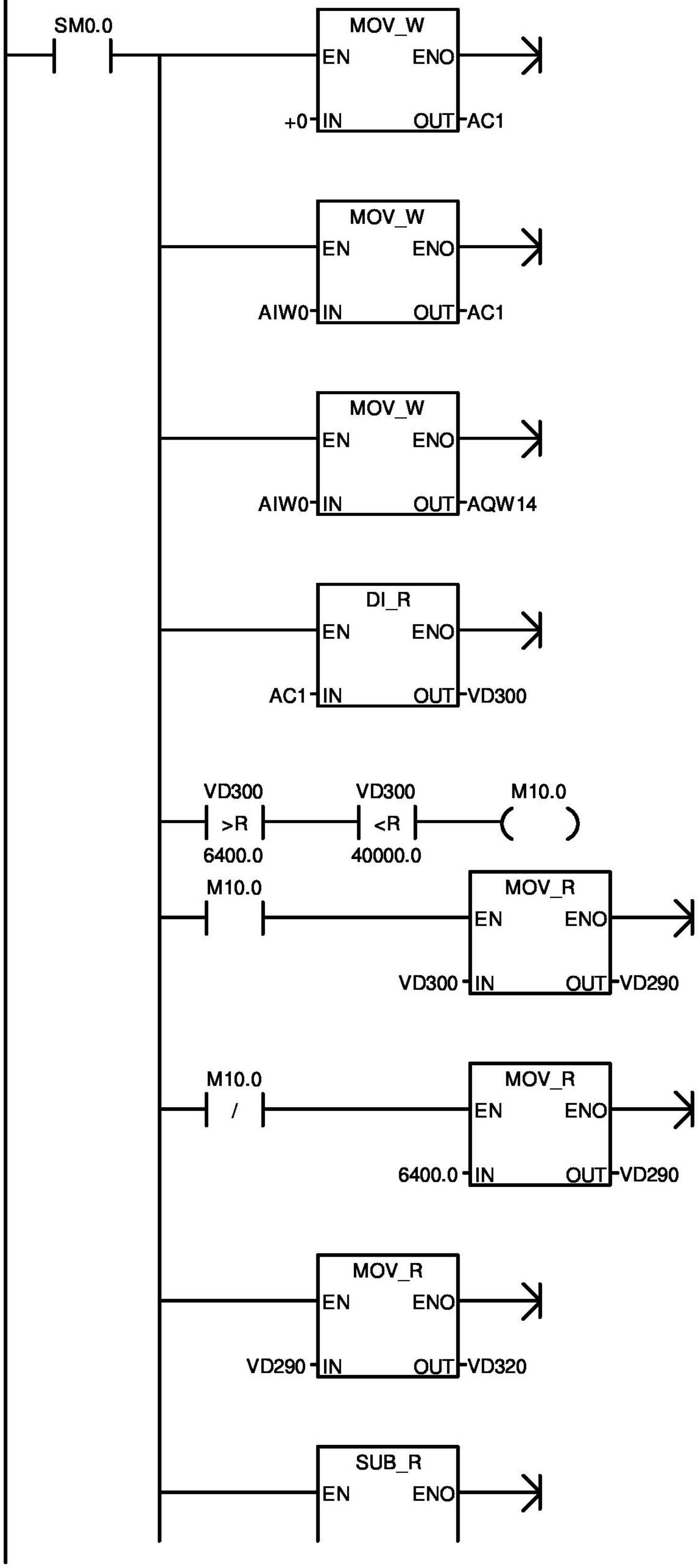
V12.5
V12.4
V12.3
V12.2
V12.1

Network 2 Influent Flow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EN
ENO
AIW0
IN
OUT
AQW14
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AC1
IN
OUT
VD300
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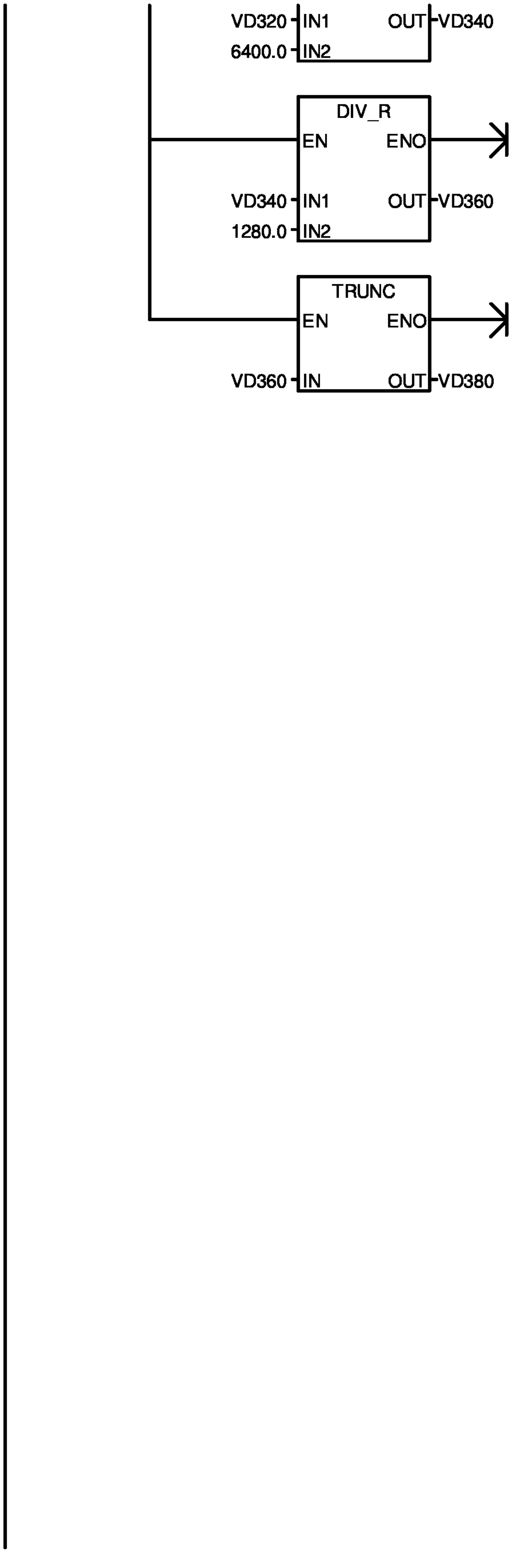
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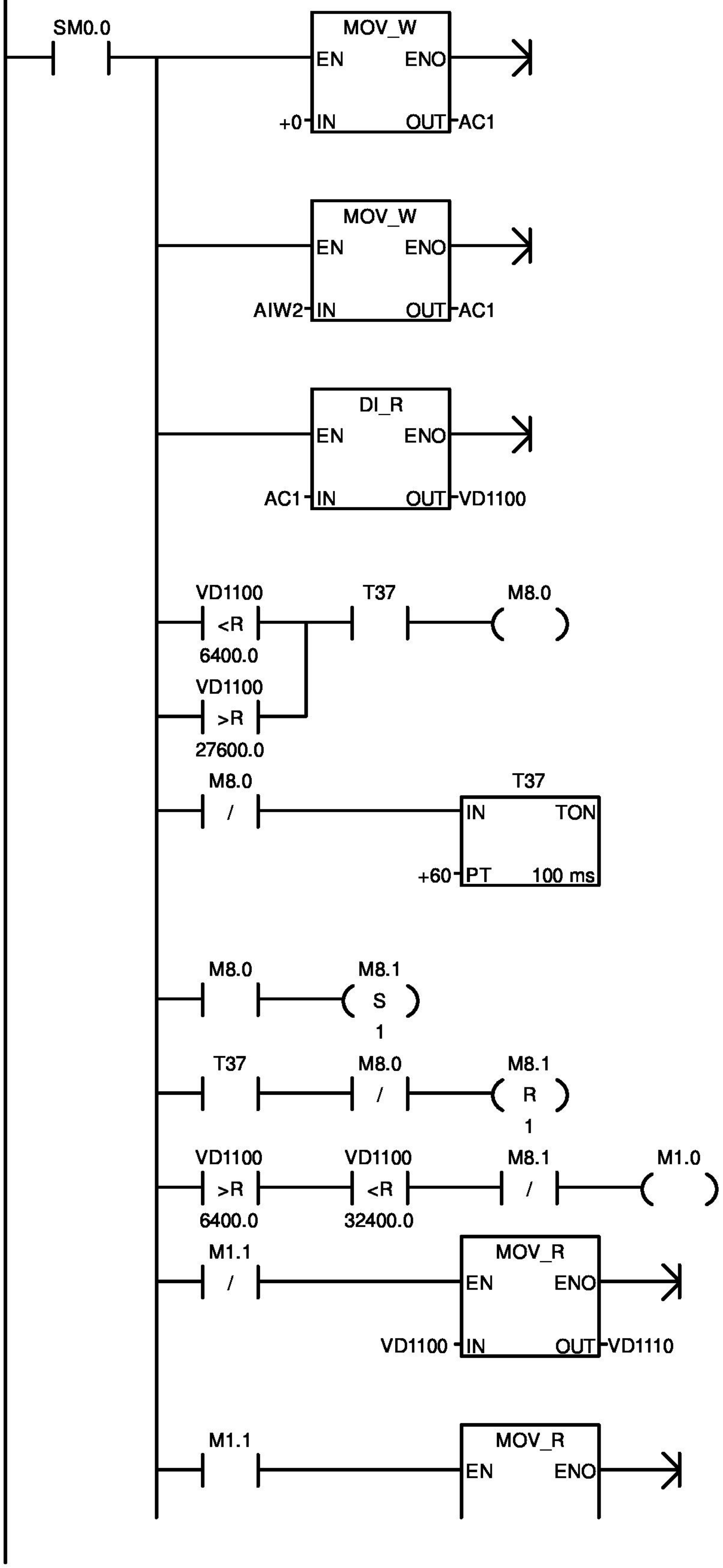
OUT
VD380

Network 3 Effluent Flow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ENO
AC1
IN
OUT
VD1100
VD1100
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T37
M8.0
VD1100
>R
27600.0
M8.0
/
T37
IN
TON
+60
PT
100 ms
M8.0
M8.1
S
1
T37
M8.0
/
M8.1
R
1
VD1100
>R
6400.0
VD1100
<R
32400.0
M8.1
/
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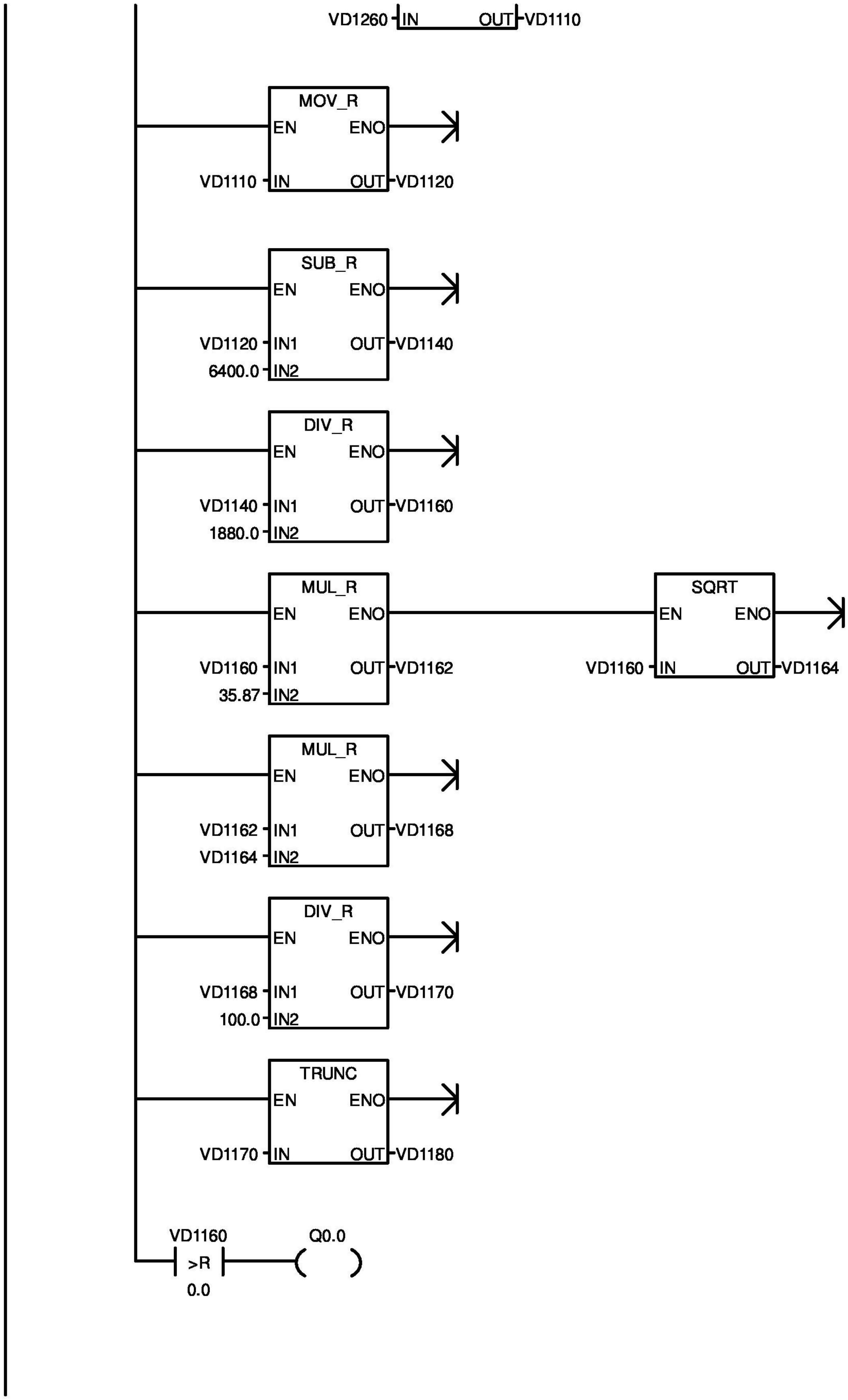
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IN2
MUL_R
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OUT
VD1162
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IN2
SQRT
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IN
OUT
VD1164
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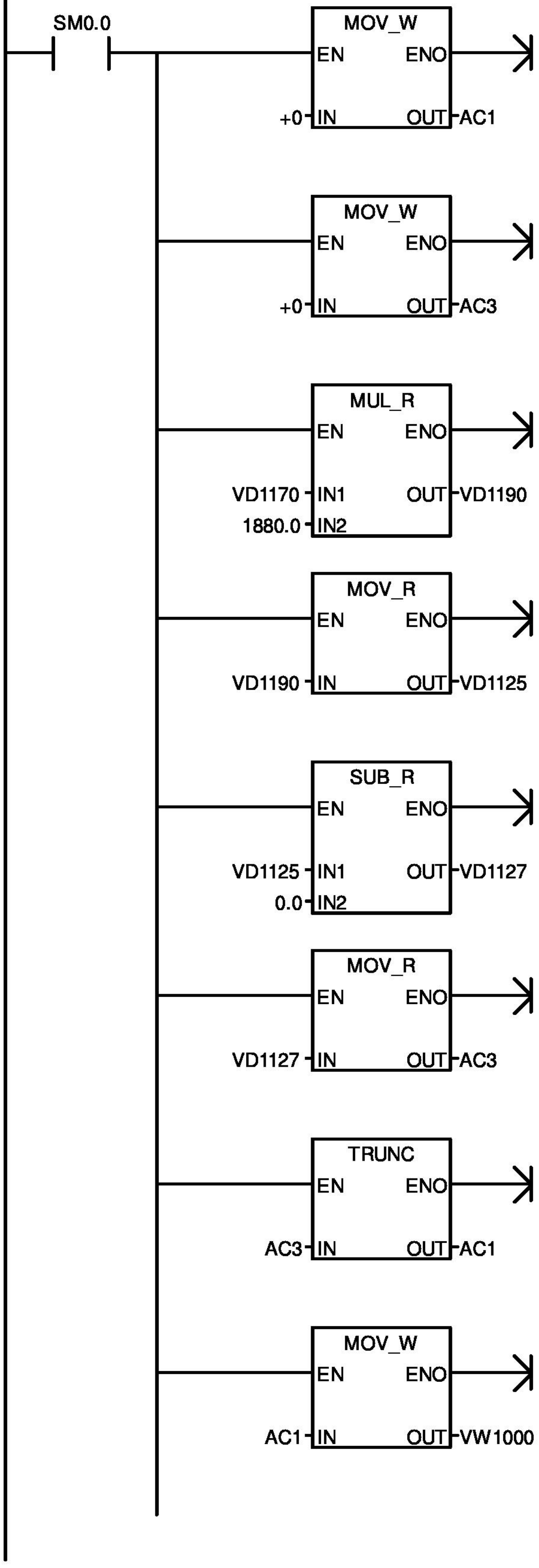
Network 4 Recorder Signal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VD1190
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IN2
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VD1190
IN
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IN1
OUT
VD1127
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IN2
MOV_R
EN
ENO
VD1127
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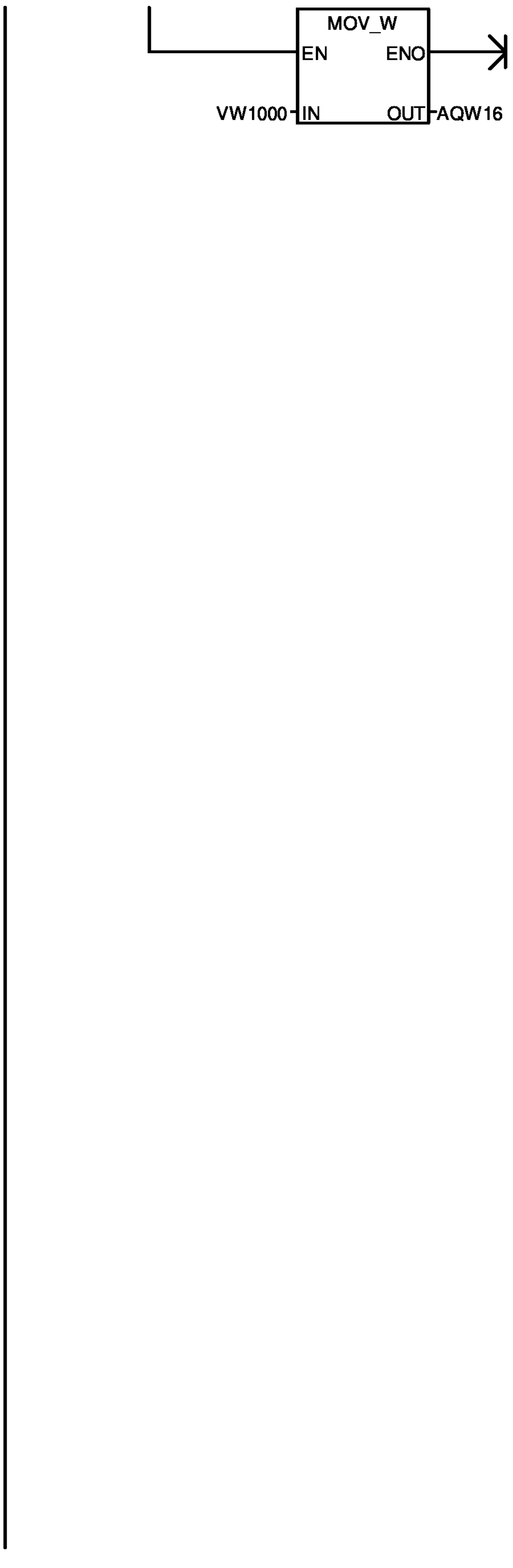
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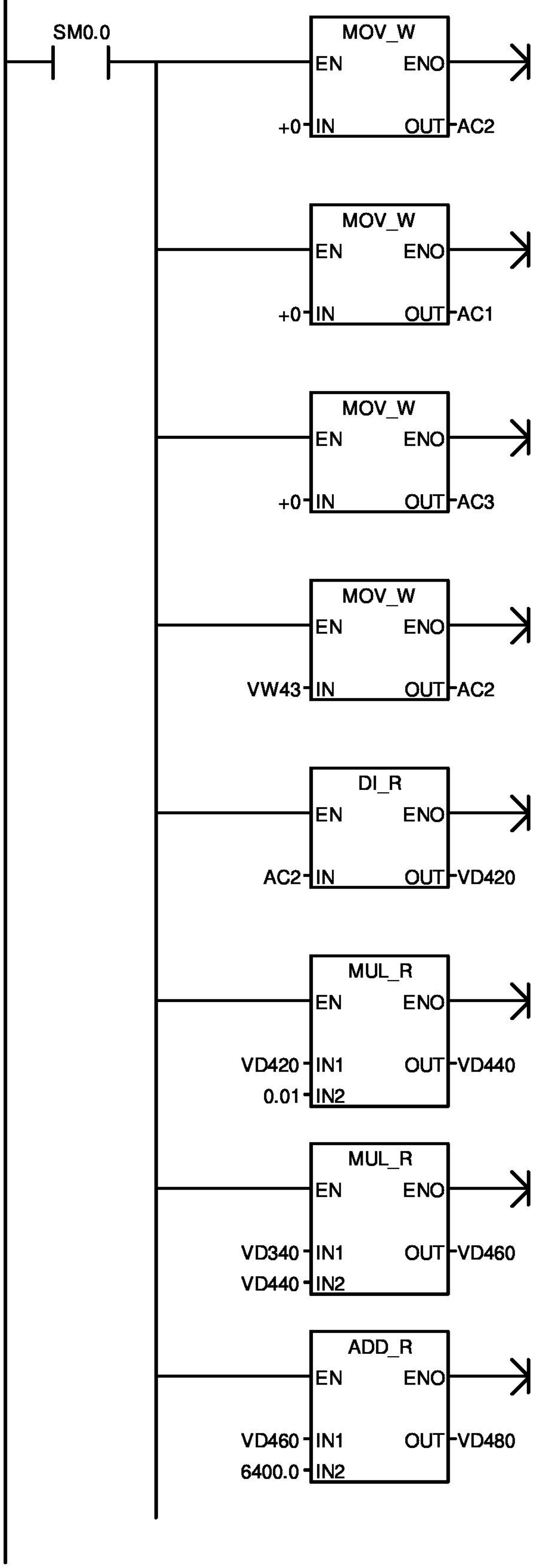
Network 5 ACH Feed Control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VW43
IN
OUT
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DI_R
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ENO
AC2
IN
OUT
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MUL_R
EN
ENO
VD420
IN1
OUT
VD440
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IN2
MUL_R
EN
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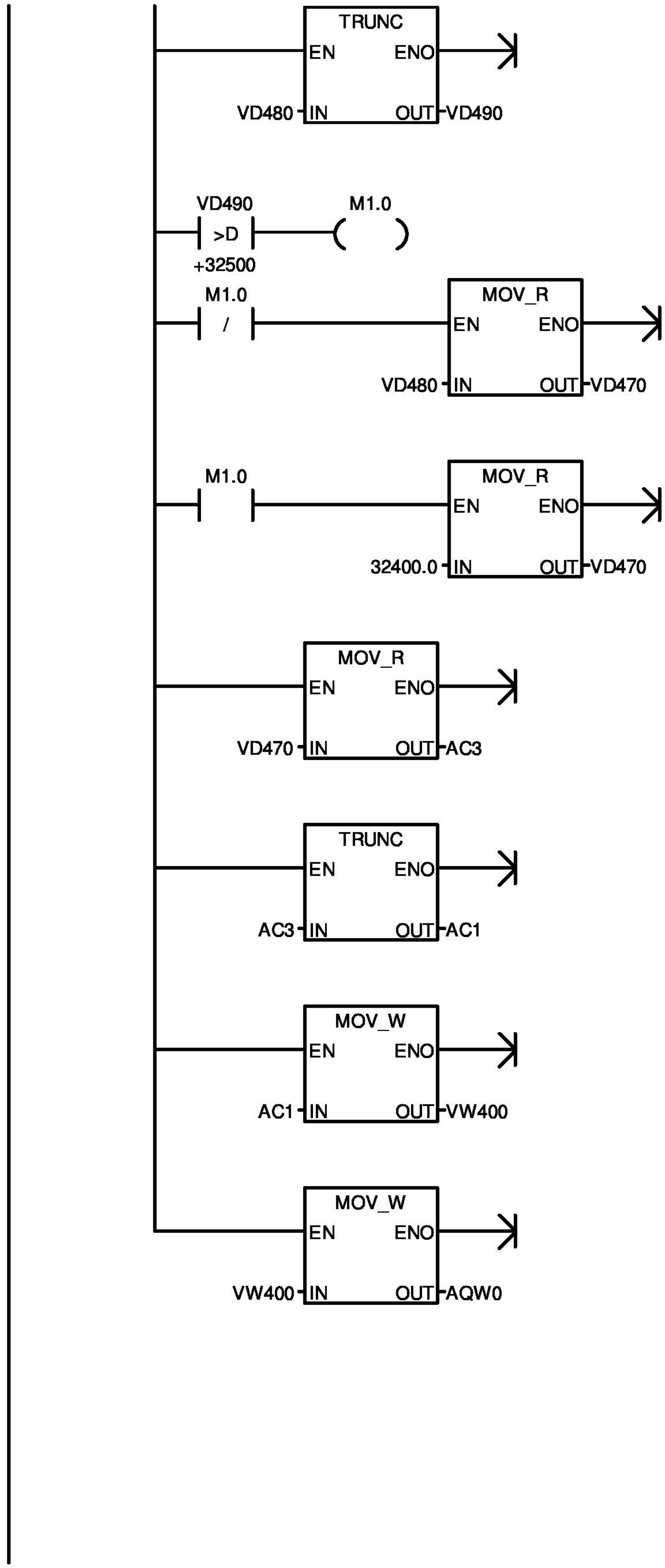
IN2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VD470
M1.0
MOV_R
EN
ENO
32400.0
IN
OUT
VD470
MOV_R
EN
ENO
VD470
IN
OUT
AC3
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EN
ENO
AC3
IN
OUT
AC1
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VW400
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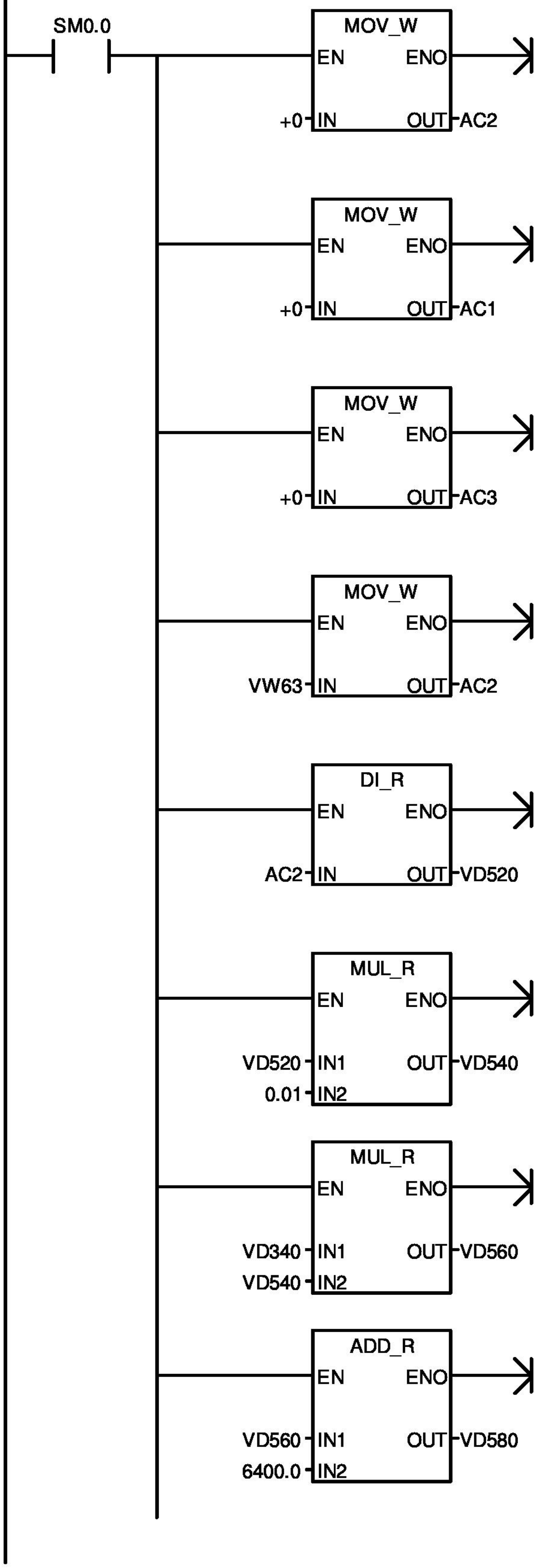
OUT
AQW0

Network 6 Cpoly Feed Control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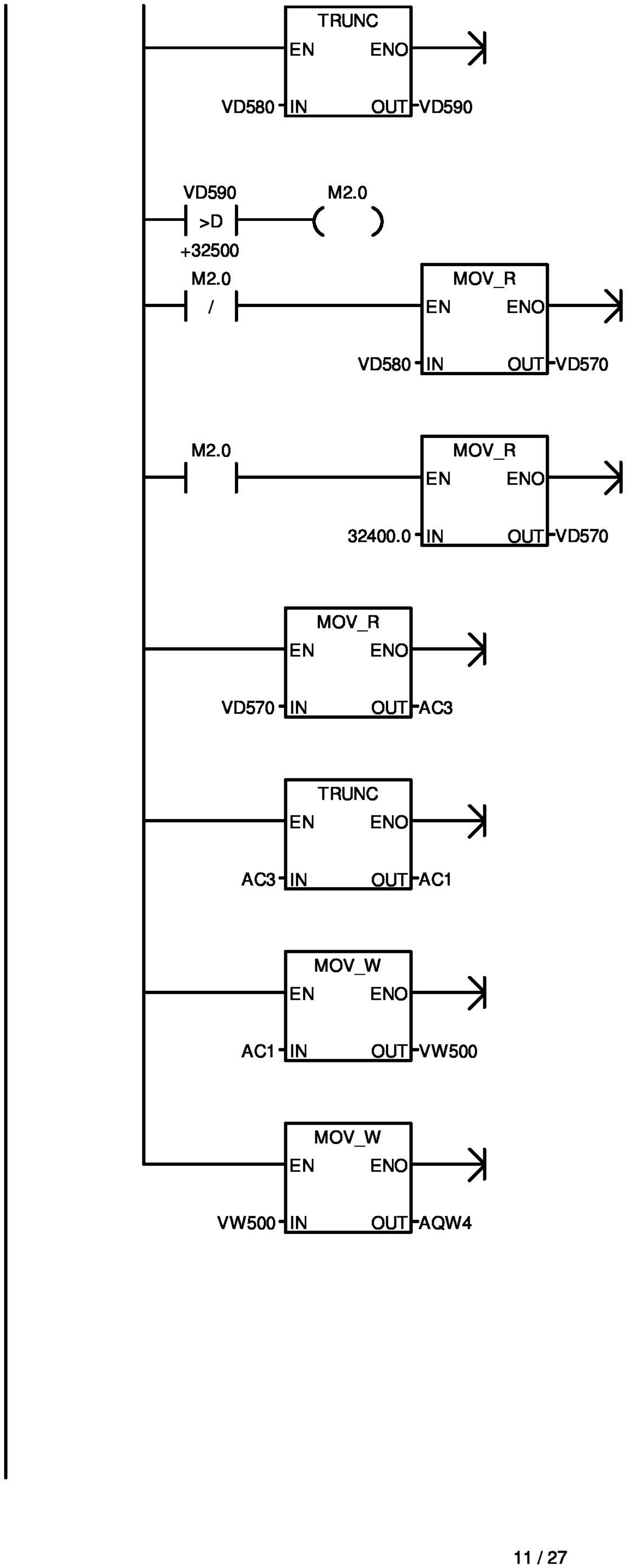
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VD570
MOV_R
EN
ENO
VD570
IN
OUT
AC3
TRUNC
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ENO
AC3
IN
OUT
AC1
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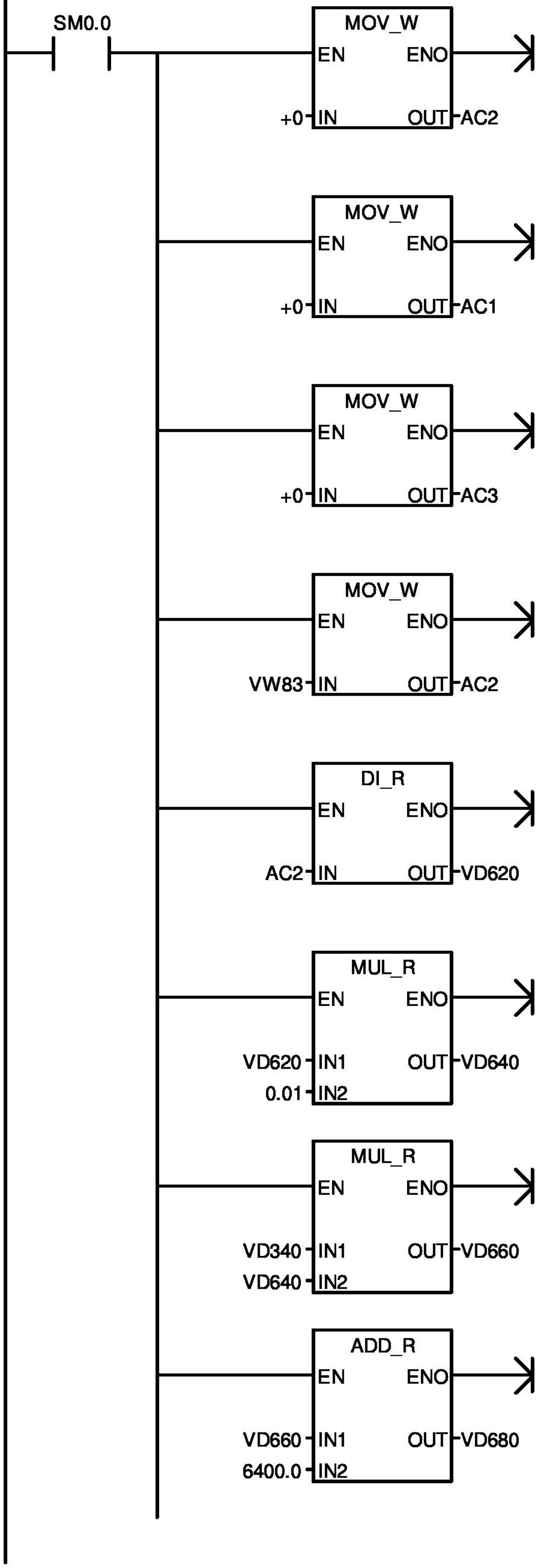
VW500
IN
OUT
AQW4

Network 7 Filter Aid Feed Control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EN ENO
VW83 IN OUT AC2
DI_R
EN ENO
AC2 IN OUT VD620
MUL_R
EN ENO
VD620 IN1 OUT VD640
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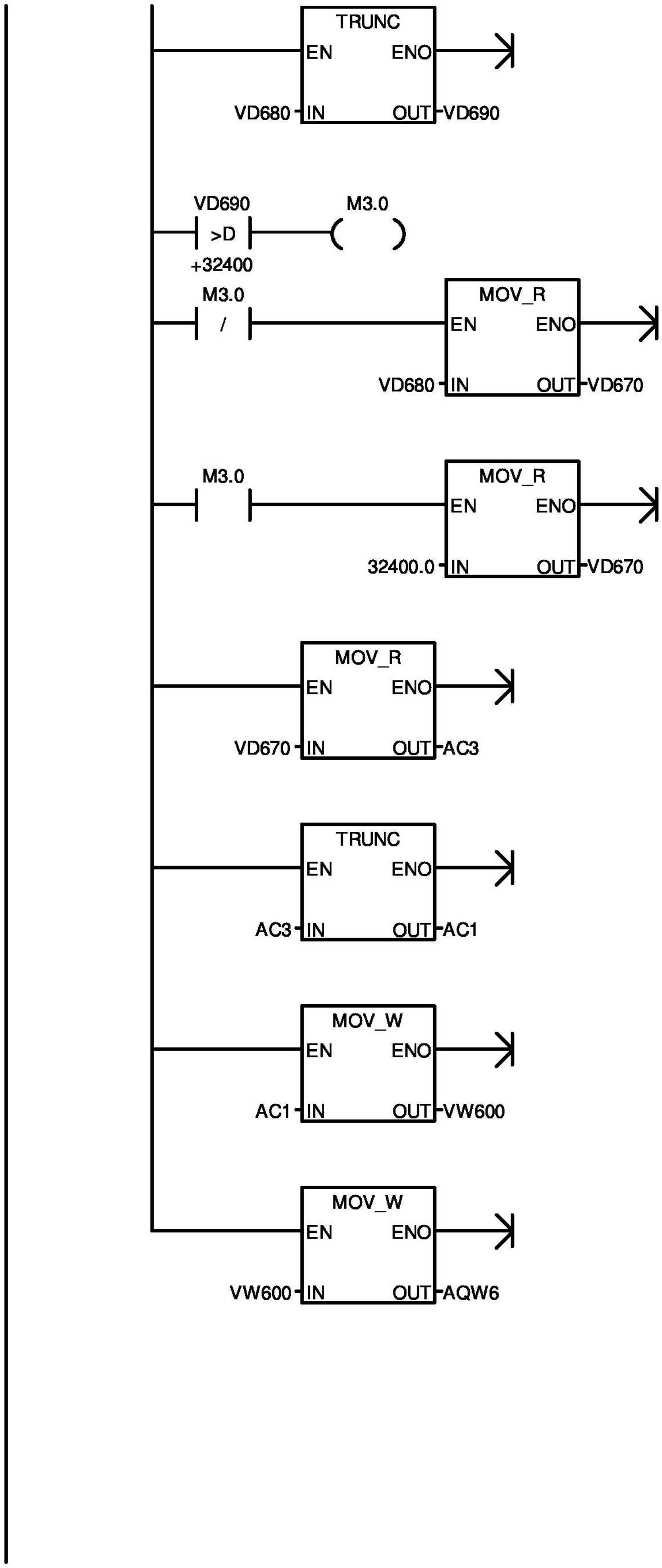
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VD670
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OUT
AC3
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OUT
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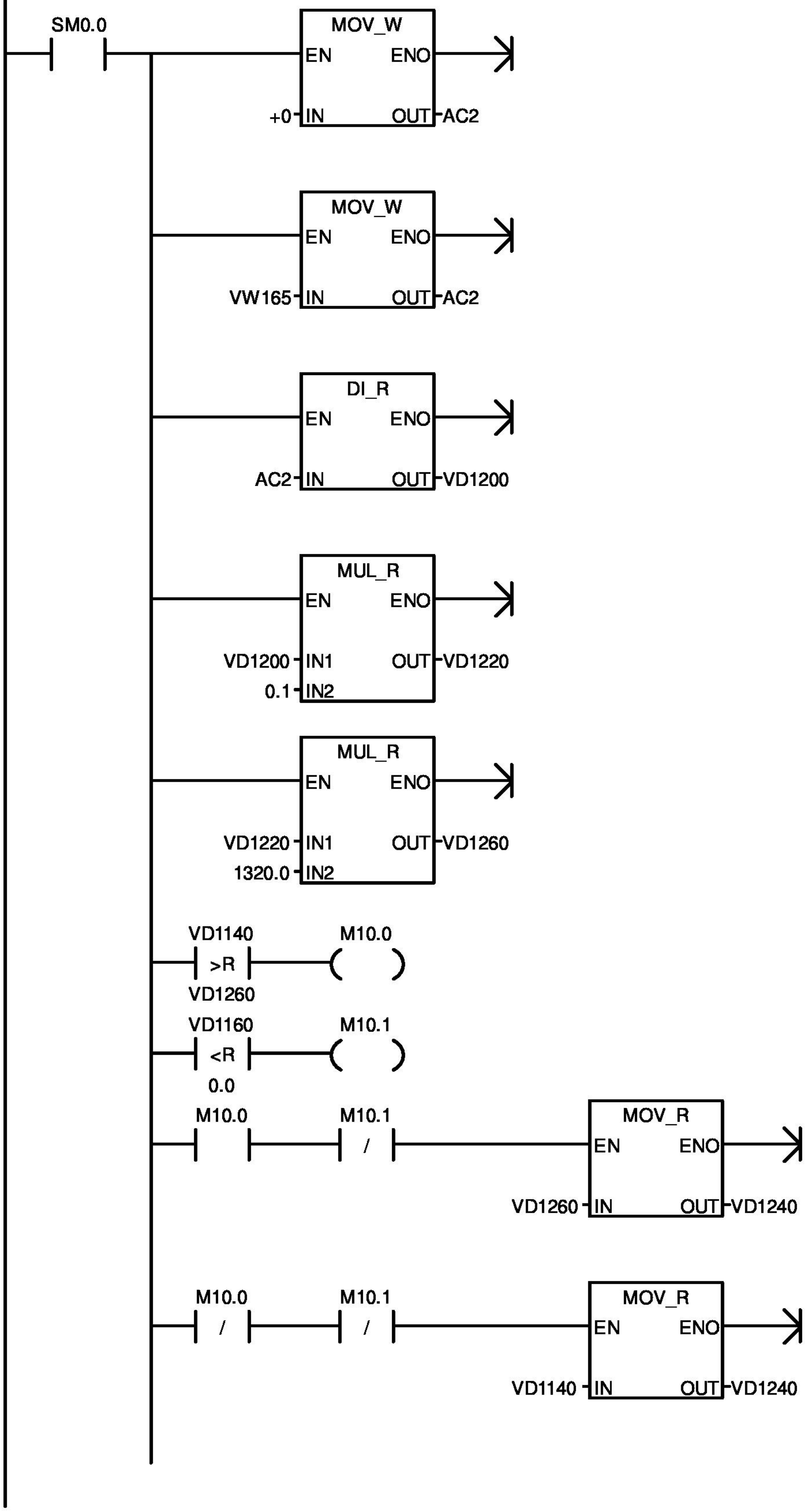
OUT
AQW6

Network 8 Fluoride Flow Limit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AC2
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OUT
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MUL_R
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VD1200
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IN2
MUL_R
EN
ENO
VD1220
IN1
OUT
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VD1260
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VD1160
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M10.0
M10.1
/
MOV_R
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ENO
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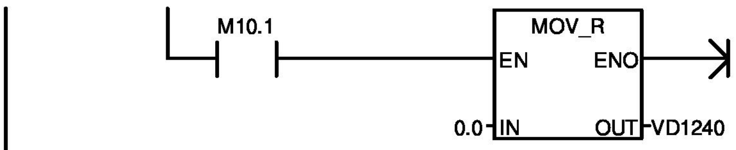
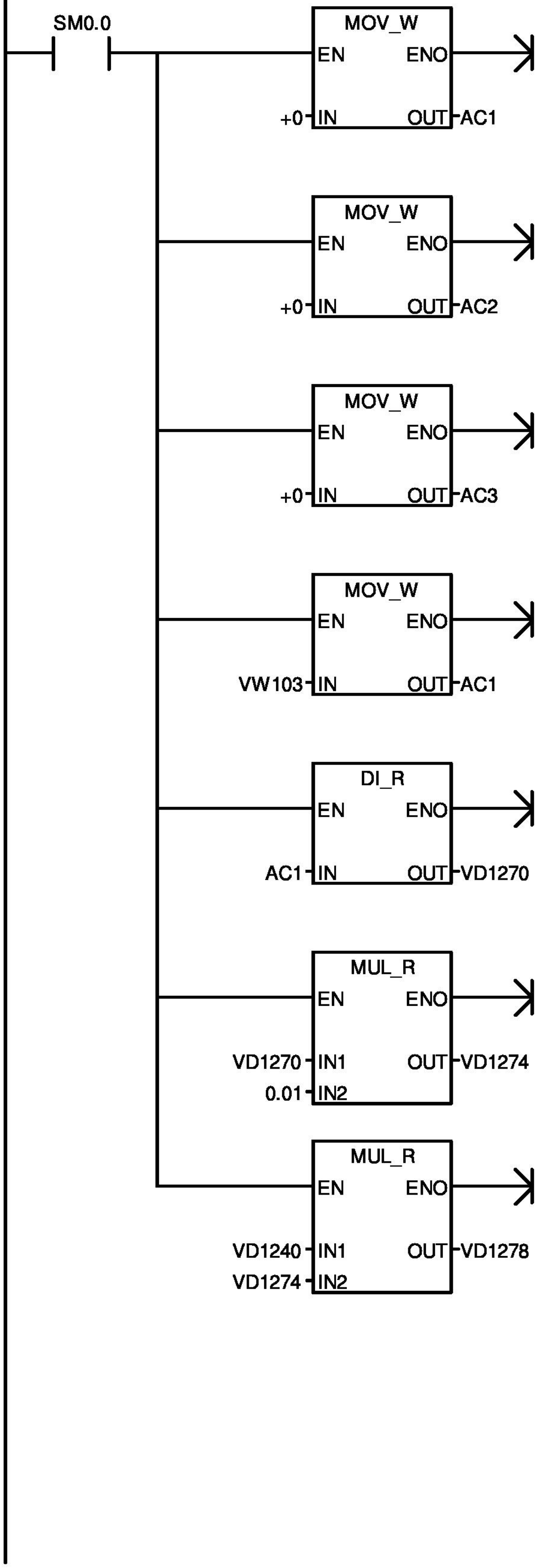
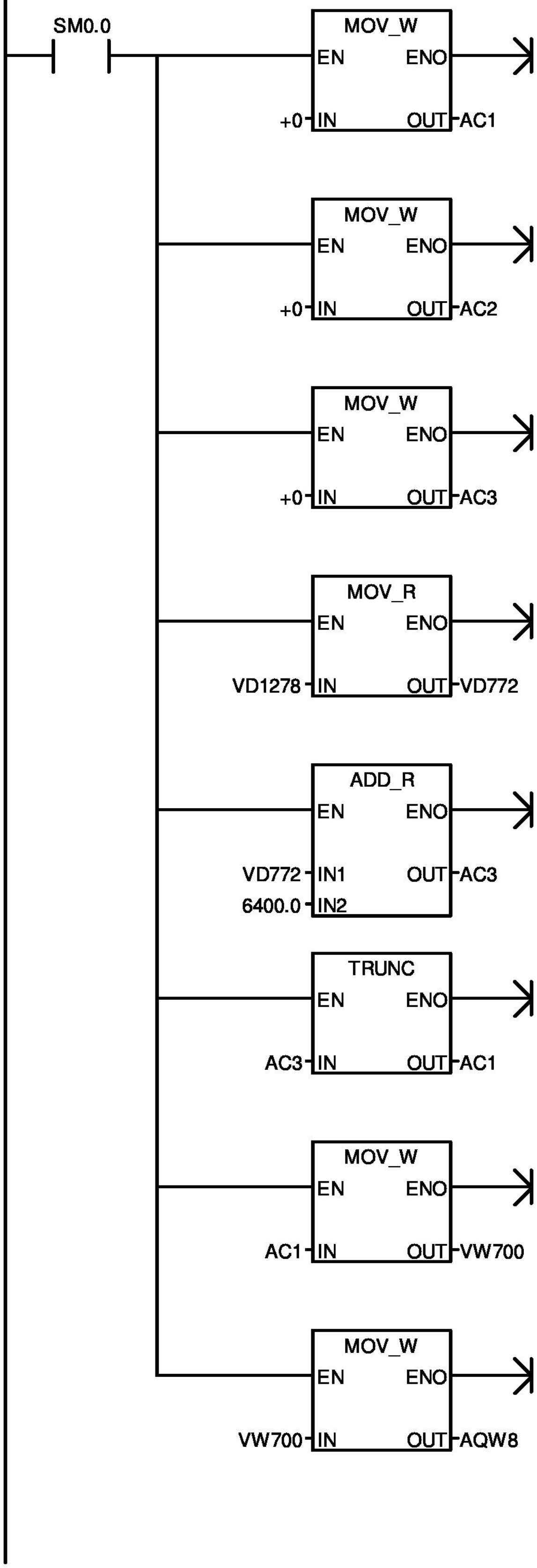
IN
OUT
VD1240
M10.0
/
M10.1
/
MOV_R
EN
ENO
VD1140
IN
OUT
VD1240


M10.1
MOV_R
EN
ENO
0.0
IN
OUT
VD1240

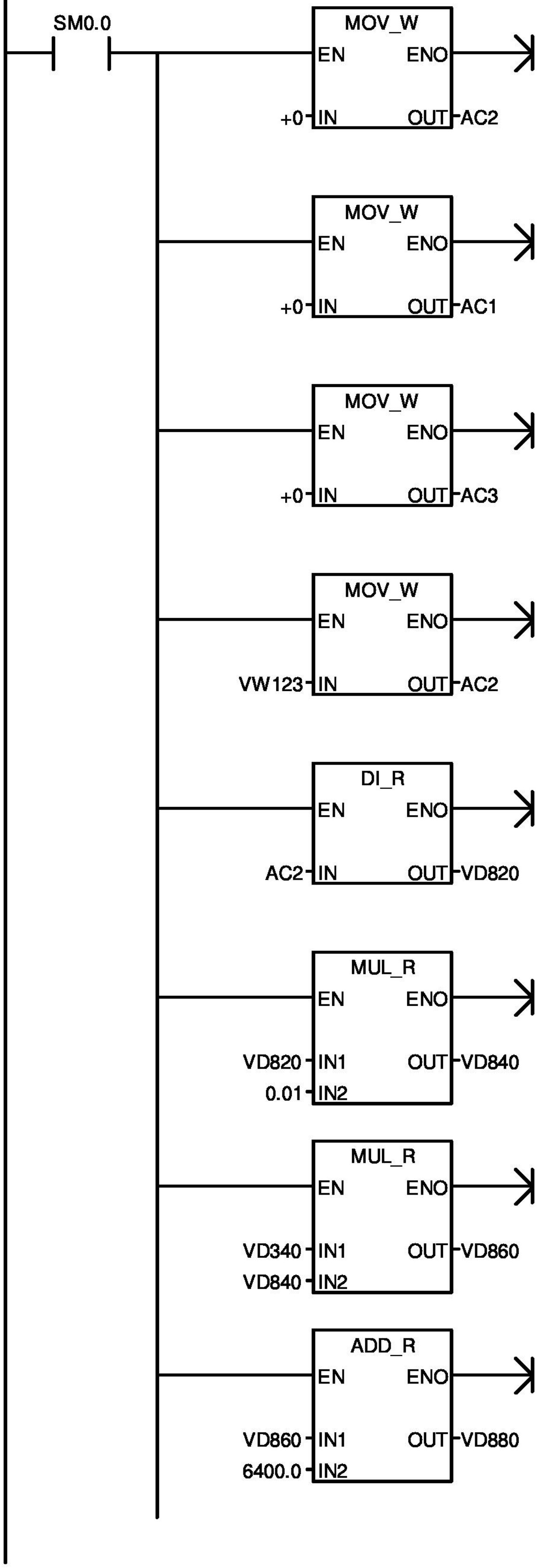
Network 9 Flouride Feed Control

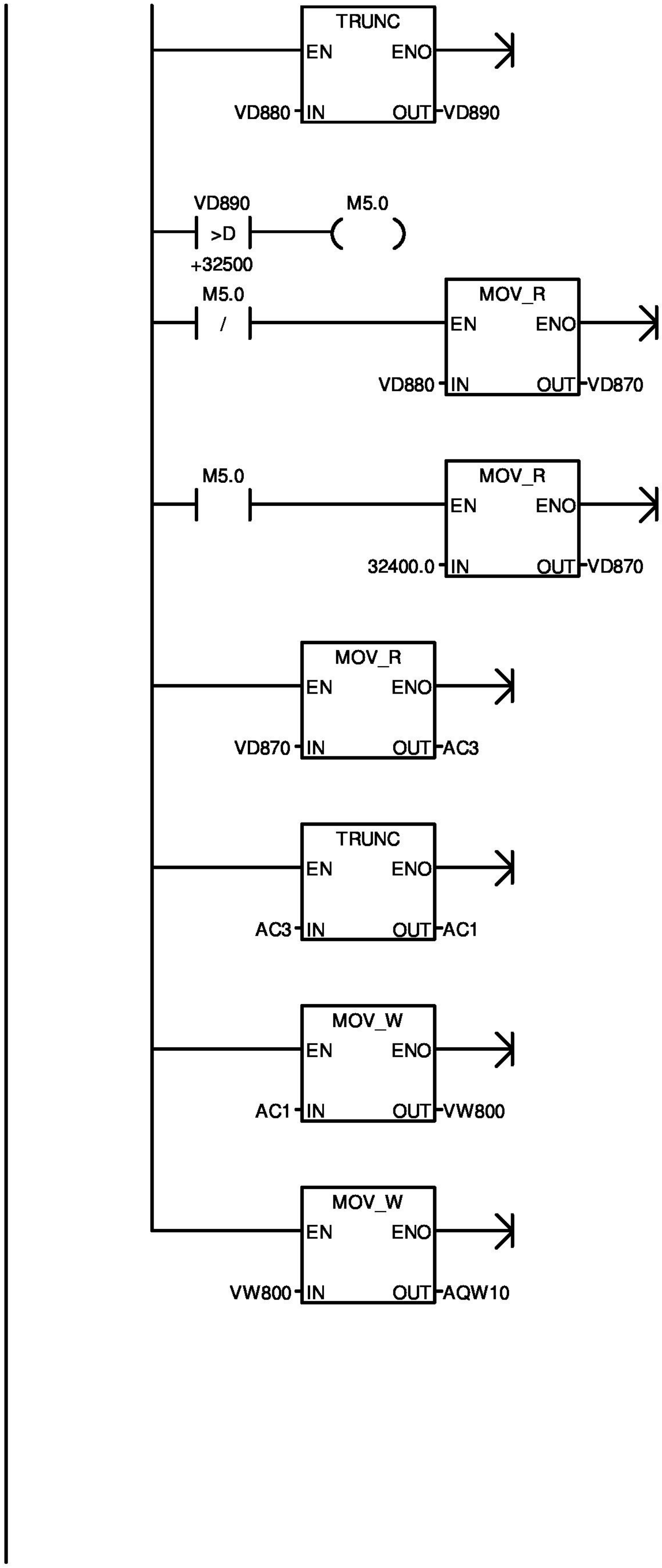

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
VW103
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD1270
MUL_R
EN
ENO
VD1270
IN1
OUT
VD1274
0.01
IN2
MUL_R
EN
ENO
VD1240
IN1
OUT
VD1278
VD1274
IN2

Network 10

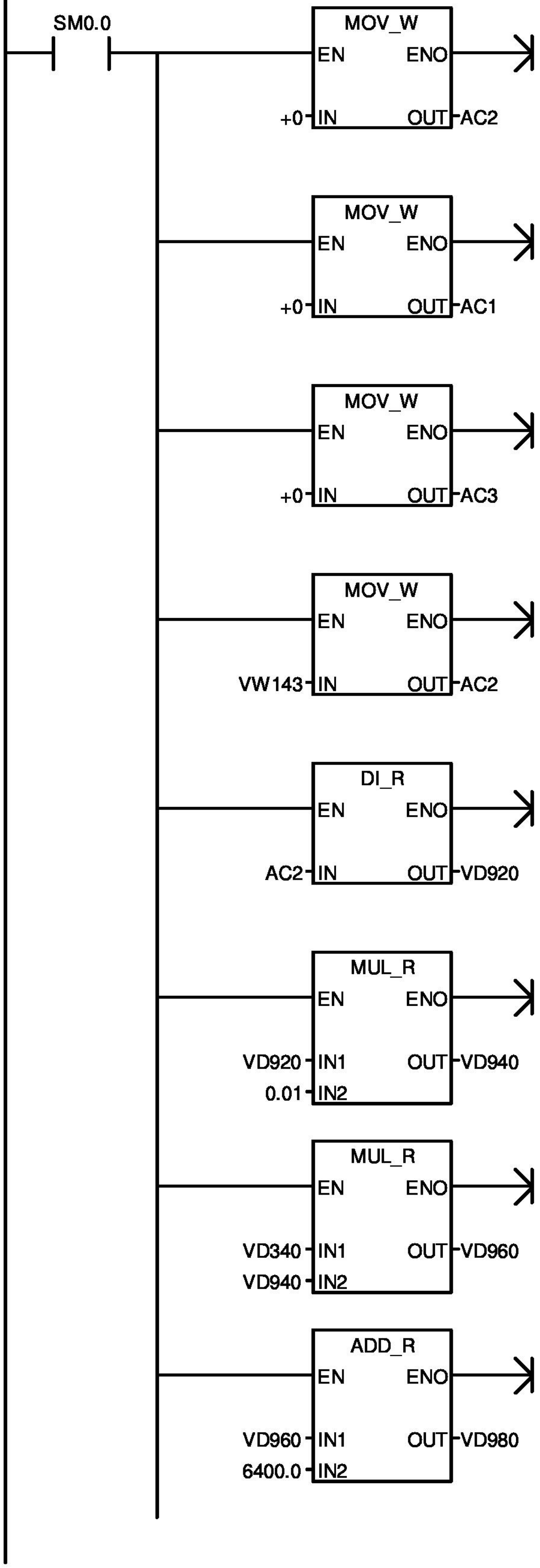

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_R
EN
ENO
VD1278
IN
OUT
VD772
ADD_R
EN
ENO
VD772
IN1
OUT
AC3
6400.0
IN2
TRUNC
EN
ENO
AC3
IN
OUT
AC1
MOV_W
EN
ENO
AC1
IN
OUT
VW700
MOV_W
EN
ENO
VW700
IN
OUT
AQW8

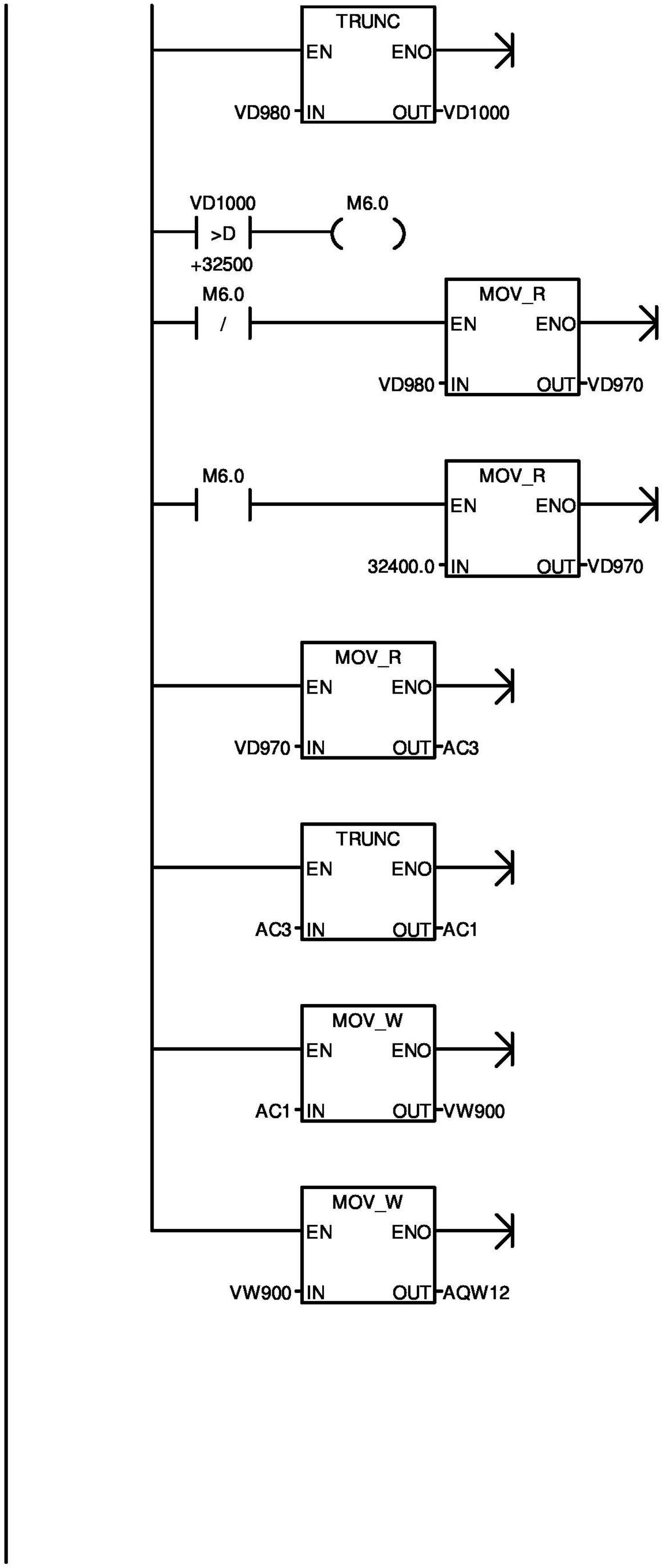
Network 11 Pre Chlorine Feed Control


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
VW123
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD820
MUL_R
EN
ENO
VD820
IN1
OUT
VD840
0.01
IN2
MUL_R
EN
ENO
VD340
IN1
OUT
VD860
VD840
IN2
ADD_R
EN
ENO
VD860
IN1
OUT
VD880
6400.0
IN2


TRUNC
EN
ENO
VD880
IN
OUT
VD890
VD890
>D
+32500
M5.0
M5.0
/
MOV_R
EN
ENO
VD880
IN
OUT
VD870
M5.0
MOV_R
EN
ENO
32400.0
IN
OUT
VD870
MOV_R
EN
ENO
VD870
IN
OUT
AC3
TRUNC
EN
ENO
AC3
IN
OUT
AC1
MOV_W
EN
ENO
AC1
IN
OUT
VW800
MOV_W
EN
ENO
VW800
IN
OUT
AQW10

Network 12 Post Chlorine Feed Control


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
VW143
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD920
MUL_R
EN
ENO
VD920
IN1
OUT
VD940
0.01
IN2
MUL_R
EN
ENO
VD340
IN1
OUT
VD960
VD940
IN2
ADD_R
EN
ENO
VD960
IN1
OUT
VD980
6400.0
IN2


TRUNC
EN
ENO
VD980
IN
OUT
VD1000
VD1000
>D
+32500
M6.0
M6.0
/
MOV_R
EN
ENO
VD980
IN
OUT
VD970
M6.0
MOV_R
EN
ENO
32400.0
IN
OUT
VD970
MOV_R
EN
ENO
VD970
IN
OUT
AC3
TRUNC
EN
ENO
AC3
IN
OUT
AC1
MOV_W
EN
ENO
AC1
IN
OUT
VW900
MOV_W
EN
ENO
VW900
IN
OUT
AQW12

Network 13 Network Title

Network Comment

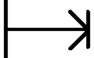
Block: SBR_0
Author:
Created: 04/13/2009 03:01:14 pm
Last Modified: 05/19/2009 08:39:15 am

Symbol	Var Type	Data Type	Comment
EN	IN	BOOL	
	IN		
	IN_OUT		
	OUT		
	TEMP		

SUBROUTINE COMMENTS

Network 1 Network Title

Network Comment



Block: INT_0
Author:
Created: 04/13/2009 03:01:14 pm
Last Modified: 05/19/2009 08:39:15 am

Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

INTERRUPT ROUTINE COMMENTS

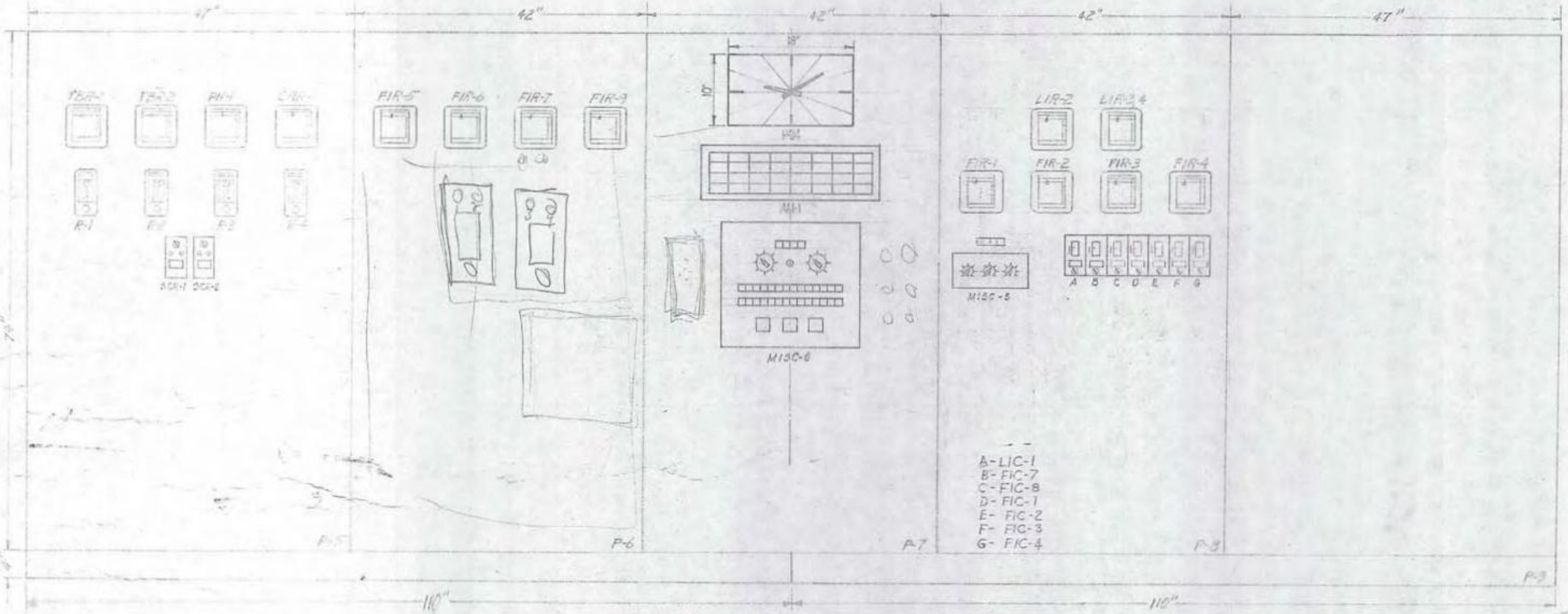
Network 1 Network Title

Network Comment

```
VB0    16#54
VB1    16#44
VB2    16#10
VB3    16#30
VB4    16#07
VB5    16#00
VB6    16#00
VB7    16#20
VB8    16#00
VB9    16#0C
VB10   16#00
VB11   16#00
VB12   16#00
VB13   16#00
VB14   16#00
VB15   16#00
VB16   16#00
VB17   16#00
VB18   16#00
VB19   16#00
VB20   16#00
VB21   16#00
VB22   16#00
VB23   16#00
VB24   16#00
VB25   16#00
VB26   16#00
VB27   16#00
VB28   16#00
VB29   16#00
VB30   16#00
VB31   16#00
VB32   16#41
VB33   16#43
VB34   16#48
VB35   16#20
VB36   16#20
VB37   16#20
VB38   16#20
VB39   16#20
VB40   16#20
VB41   16#10
VB42   16#10
VB43   16#00
VB44   16#00
VB45   16#25
VB46   16#20
VB47   16#20
VB48   16#20
VB49   16#20
VB50   16#20
VB51   16#20
VB52   16#43
VB53   16#50
VB54   16#4F
VB55   16#4C
VB56   16#59
VB57   16#20
VB58   16#20
VB59   16#20
VB60   16#20
VB61   16#10
VB62   16#10
VB63   16#00
VB64   16#00
VB65   16#25
VB66   16#20
VB67   16#20
```

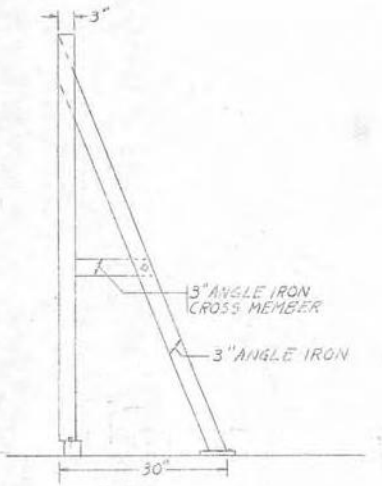
```
VB68   16#20
VB69   16#20
VB70   16#20
VB71   16#20
VB72   16#46
VB73   16#41
VB74   16#20
VB75   16#20
VB76   16#20
VB77   16#20
VB78   16#20
VB79   16#20
VB80   16#20
VB81   16#10
VB82   16#10
VB83   16#00
VB84   16#00
VB85   16#25
VB86   16#20
VB87   16#20
VB88   16#20
VB89   16#20
VB90   16#20
VB91   16#20
VB92   16#46
VB93   16#4C
VB94   16#52
VB95   16#44
VB96   16#45
VB97   16#20
VB98   16#20
VB99   16#20
VB100  16#20
VB101  16#10
VB102  16#10
VB103  16#00
VB104  16#00
VB105  16#25
VB106  16#20
VB107  16#20
VB108  16#20
VB109  16#20
VB110  16#20
VB111  16#20
VB112  16#50
VB113  16#43
VB114  16#4C
VB115  16#32
VB116  16#20
VB117  16#20
VB118  16#20
VB119  16#20
VB120  16#20
VB121  16#10
VB122  16#10
VB123  16#00
VB124  16#00
VB125  16#25
VB126  16#20
VB127  16#20
VB128  16#20
VB129  16#20
VB130  16#20
VB131  16#20
VB132  16#50
VB133  16#53
VB134  16#54
VB135  16#43
```

```
VB136  16#4C
VB137  16#20
VB138  16#20
VB139  16#20
VB140  16#20
VB141  16#10
VB142  16#10
VB143  16#00
VB144  16#00
VB145  16#25
VB146  16#20
VB147  16#20
VB148  16#20
VB149  16#20
VB150  16#20
VB151  16#20
VB152  16#46
VB153  16#4C
VB154  16#32
VB155  16#20
VB156  16#4C
VB157  16#49
VB158  16#4D
VB159  16#49
VB160  16#54
VB161  16#20
VB162  16#20
VB163  16#10
VB164  16#11
VB165  16#00
VB166  16#00
VB167  16#20
VB168  16#4D
VB169  16#47
VB170  16#44
VB171  16#20
```

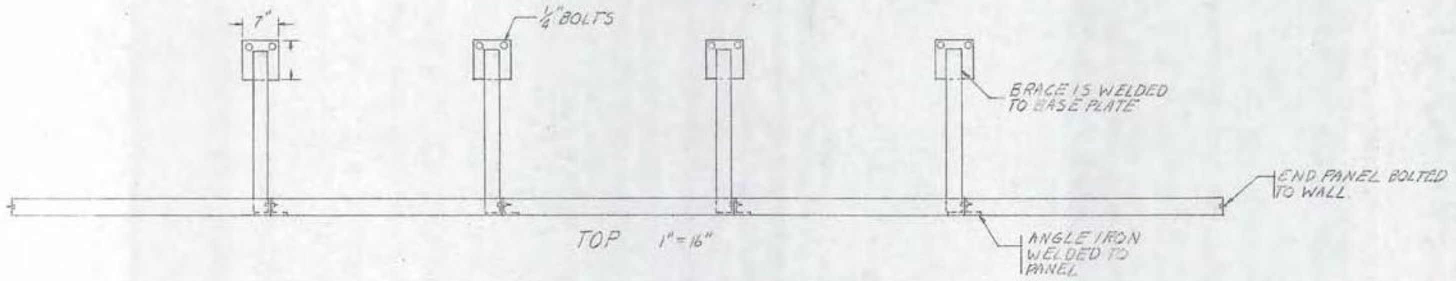

47"
42"
42"
42"
47"
18"
10"
TBR-1
TBR-2
FIR-1
FIR-5
FIR-6
FIR-7
FIR-9
R-1
R-2
R-3
SCR-1
SCR-2
FR1
AN-1
MISC-6
LIR-2
LIR-3,4
FIR-1
FIR-2
FIR-3
FIR-4
MISC-5
A
B
C
D
E
F
G
A-LIC-1
B-FIC-7
C-FIC-8
D-FIC-1
E-FIC-2
F-FIC-3
G-FIC-4
P-5
P-6
P-7
P-8
P-9
110"
110"

10051
sh 1 of 2

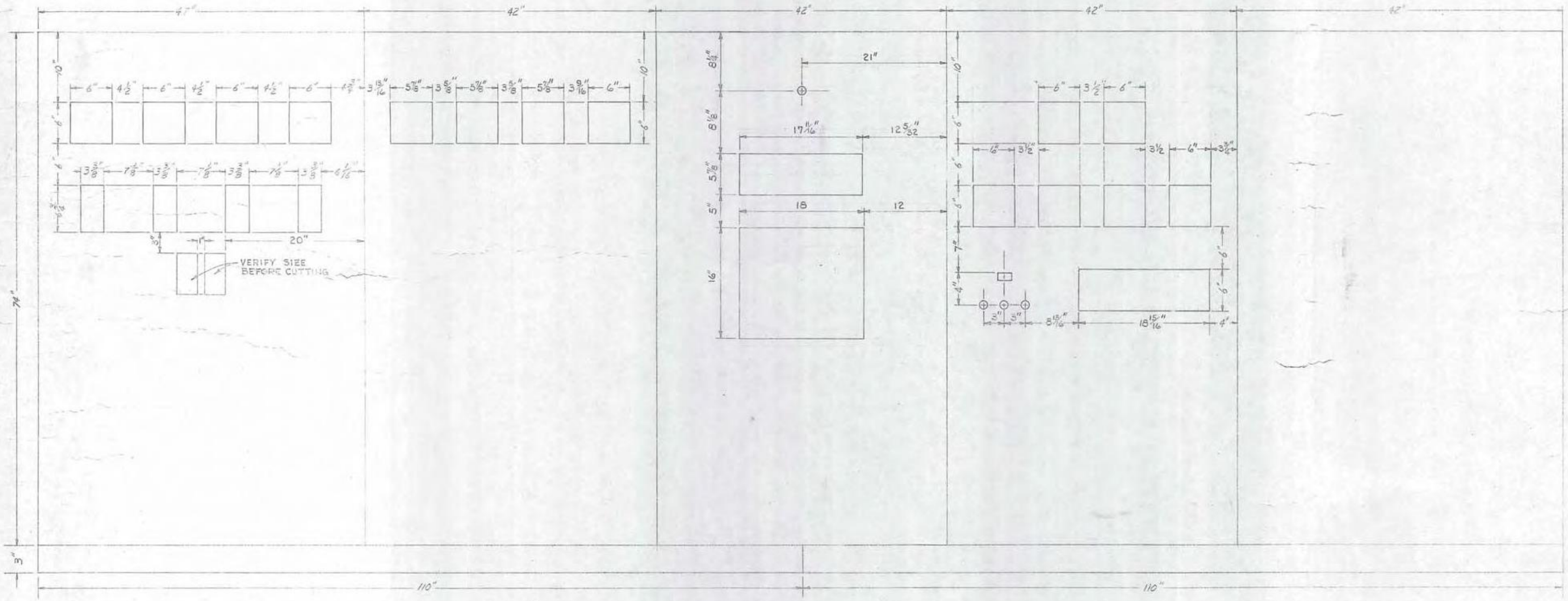
DO NOT SCALE THIS DRAWING


3"
3"ANGLE IRON CROSS MEMBER
3"ANGLE IRON
30"

SIDE


7"
1/2" BOLTS
BRACE IS WELDED TO BASE PLATE
END PANEL BOLTED TO WALL
ANGLE IRON WELDED TO PANEL

TOP 1"=16"


47"
42"
42"
42"
42"
10"
6"
4 1/2"
1 3/4"
3 13/16"
5 7/8"
3 5/8"
3 9/16"
3 3/8"
7 1/8"
6 1/16"
1"
20"
3"
VERIFY SIZE BEFORE CUTTING
74"
8 1/2"
21"
17 11/16"
12 5/32"
5 7/8"
5"
18
12
16"
3 1/2"
3 3/4"
7"
4"
3"
8 15/16"
18 15/16"
4"
3"
110"
110"

FRONT
SCALE 1"=8"

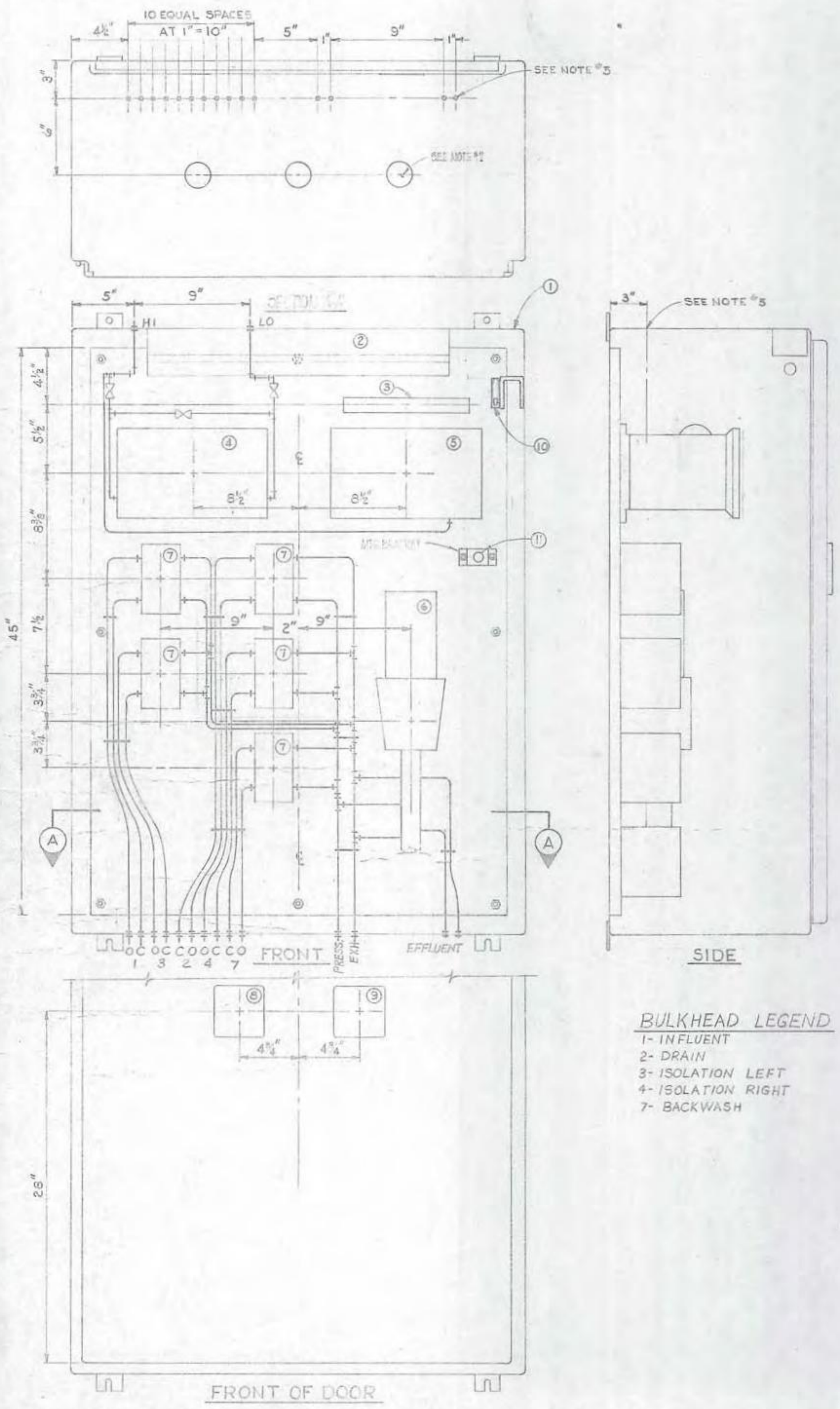
DO NOT SCALE THIS DRAWING

10051 Sh 2 of 2

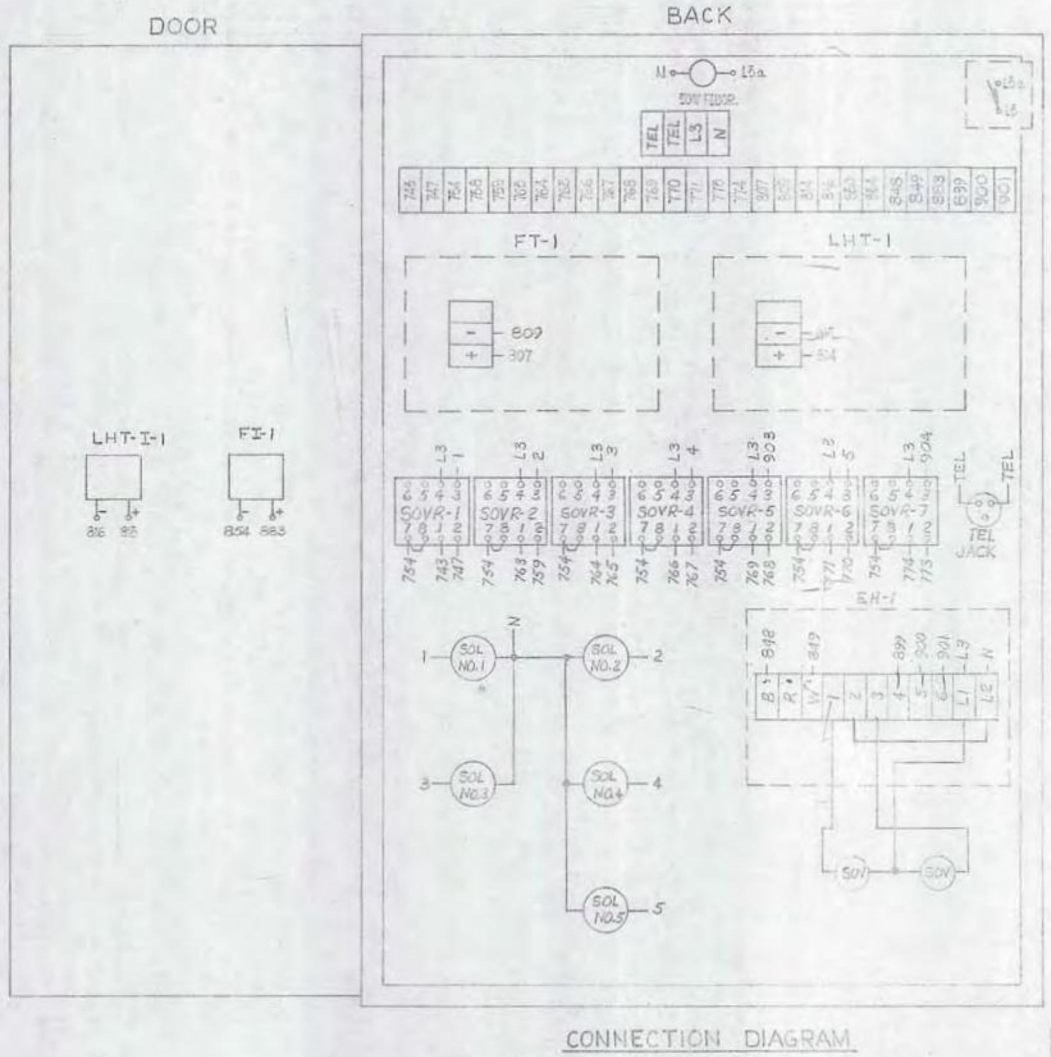
REVISIONS		
NO.	DATE	BY
1		
2		
3		
4		
5		

GOBLE SAMPSON ASS
DENVER, COLO.
GRAND JUNCTION W.T.P.
MAIN CONTROL PANEL

DRAWN BY [illegible] SCALE AS SHOWN
CHK'D DATE [illegible]


10 EQUAL SPACES AT 1" = 10"
4½"
5"
1"
9"
SEE NOTE #5
SEE NOTE #2
SECTION A-A
HI
LO
FRONT
1 3 2 4 7
PRESS. EXH.
EFFLUENT
SIDE
45"
28"
4¾"
FRONT OF DOOR

BULKHEAD LEGEND
1- INFLUENT
2- DRAIN
3- ISOLATION LEFT
4- ISOLATION RIGHT
7- BACKWASH


DOOR
BACK
LHT-I-1
FI-1
FT-1
LHT-1
SOVR-1
SOVR-2
SOVR-3
SOVR-4
SOVR-5
SOVR-6
SOVR-7
TEL JACK
EH-1
SOL NO.1
SOL NO.2
SOL NO.3
SOL NO.4
SOL NO.5
SOV

CONNECTION DIAGRAM

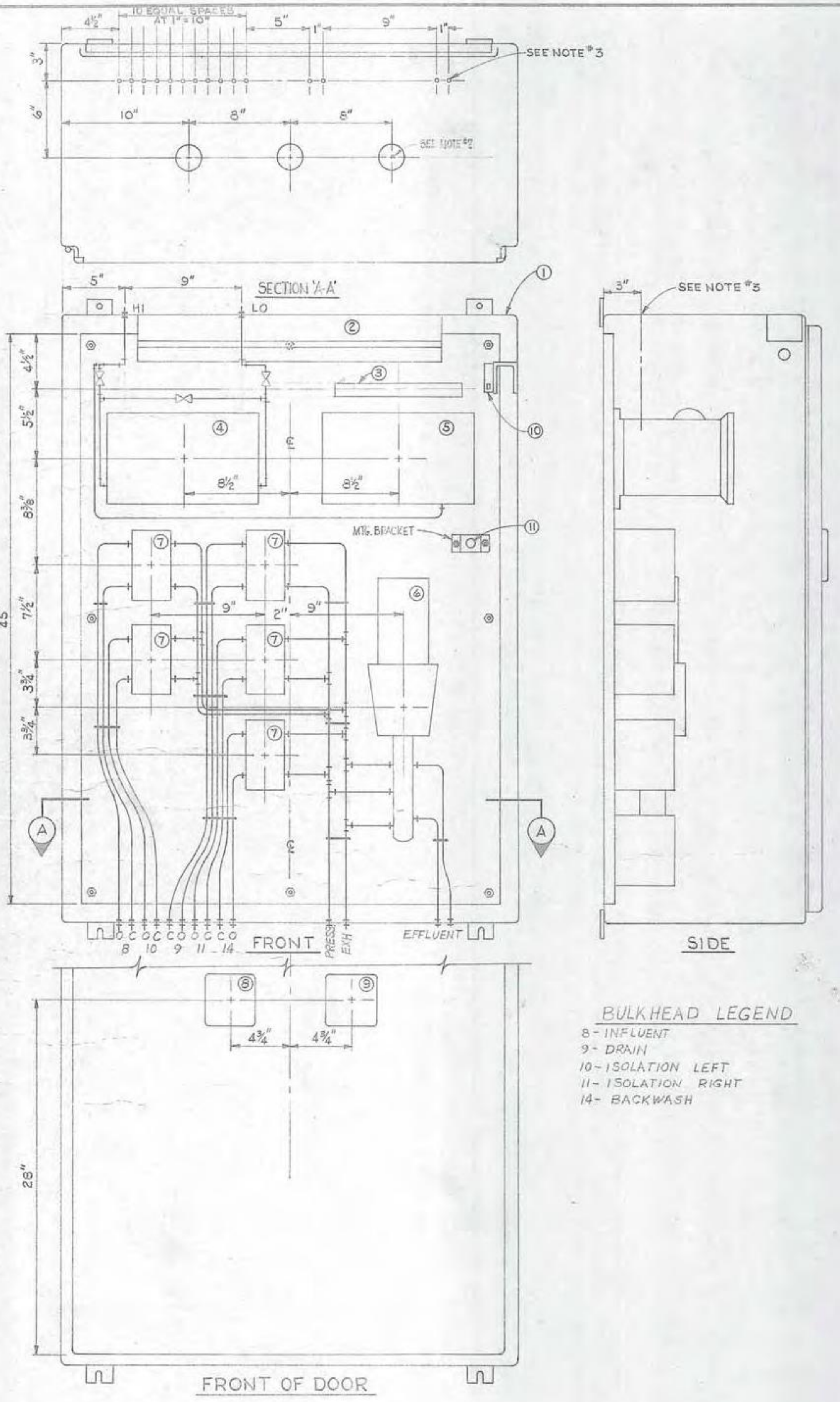
EQUIPMENT LEGEND
① HOFFMAN #A-483616-NEMA-12 ENCLOSURE.
② STRIP LIGHT-SUPER STRIP ELECTROLIER #K201-24 20W W/LAMP.
③ TERMINAL STRIP, 300V. ALLEN-BRADLEY #1492-F3.
④ FT-1 FILTER EFFLUENT FLOW XTMR
⑤ LHT-1 FILTER LOSS OF HEAD XTMR
⑥ EH-1 FILTER ELECTRIC-HYDRAULIC POSITIONER
⑦ SOV-1,2,3,4 & 7 BUTTERFLY VALVE OPEN-CLOSE SOLENOID.
⑧ FT-I-1 FILTER EFFLUENT FLOW INDICATOR
⑨ LHT-I-1 FILTER LOSS OF HEAD INDICATOR
⑩ SNAP SWITCH ROBERTSHAW #BRD2-1P-15.
⑪ TELEPHONE JACK, [illegible]
⑫ SOVR-1,2,3,4,5,6,7 LINE ELECTRIC RLP RELAY.

DRAWING NOTES:
1. TIE ALL LIKE WIRE NUMBERS COMMON.
2. DRILL THREE ½" HOLES IN BOTTOM OF BOX FOR DRAIN PURPOSES.
5. DRILL & TAP FOR ⅜" BULK HEAD FITTING.

10052 Sh 1 of 4

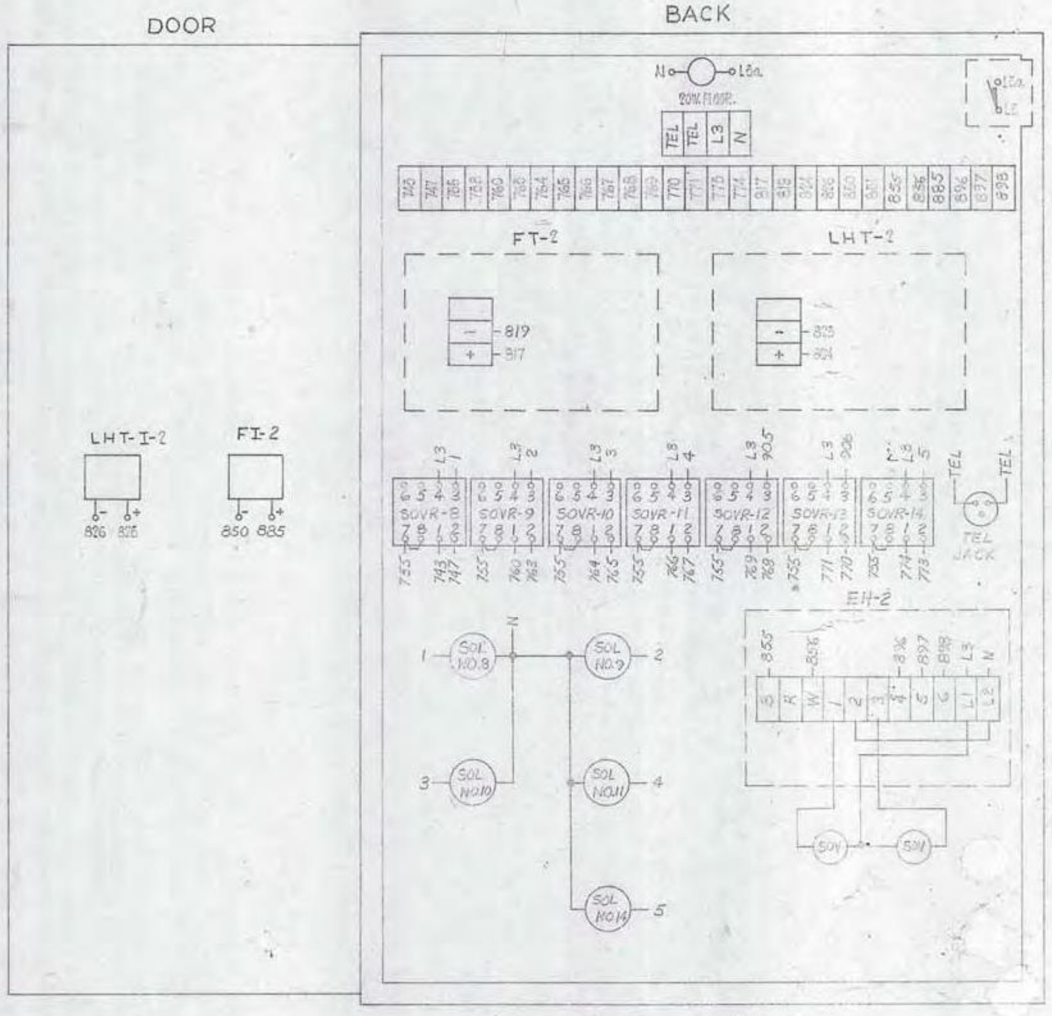
REVISIONS		
NO.	DATE	BY
1	7-30-68	RCD
2	2-26-69	DLZ
3	3-6-69	DLZ
4	3-26-69	DLZ
5		

COBLE SAMPSON [illegible]
FILTER [illegible]
DRAWN BY
SCALE
CHK'D
DATE


10 EQUAL SPACES AT 1"= 10"
SEE NOTE #3
SEE NOTE #2
SECTION 'A-A'
H1
LO
FRONT
SIDE
FRONT OF DOOR
M'TG. BRACKET
PRESS.
EXH
EFFLUENT
45"
28"
A

BULKHEAD LEGEND

8 - INFLUENT
9 - DRAIN
10 - ISOLATION LEFT
11 - ISOLATION RIGHT
14 - BACKWASH


DOOR
BACK
LHT-I-2
FI-2
FT-2
LHT-2
SOVR-8
SOVR-9
SOVR-10
SOVR-11
SOVR-12
SOVR-13
SOVR-14
EH-2
TEL JACK
SOL NO.8
SOL NO.9
SOL NO.10
SOL NO.11
SOL NO.14
20W FLUOR.

CONNECTION DIAGRAM

EQUIPMENT LEGEND

① HOFFMAN #A-483616-NEMA-12 ENCLOSURE.
② STRIP LIGHT-SUPER STRIP ELECTROLIER # K201-24 20W W/LAMP.
③ TERMINAL STRIP, 300V. ALLEN-BRADLEY # 1492-F8.
④ FT-2 FILTER EFFLUENT FLOW XTMR
⑤ LHT-2 FILTER LOSS OF HEAD XTMR
⑥ EH-2 FILTER ELECTRIC-HYDRAULIC POSITIONER
⑦ SOV-8, 9, 10, 11 & 14 BUTTERFLY VALVE OPEN-CLOSE SOLENOID.
⑧ FT-I-2 FILTER EFFLUENT FLOW INDICATOR - 0-4 MGD
⑨ LHT-I-2 FILTER LOSS OF HEAD INDICATOR - 0-12 FT
⑩ SNAP SWITCH ROBERTSHAW # BRD2-1P-15.
⑪ TELEPHONE JACK, CANNON # XLR-3-14H (MATES W/ PLUG # XLR-3-11C.
⑫ SOVR-8, 9, 10, 11, 12, 13, 14 LINE ELECTRIC RLP RELAY.

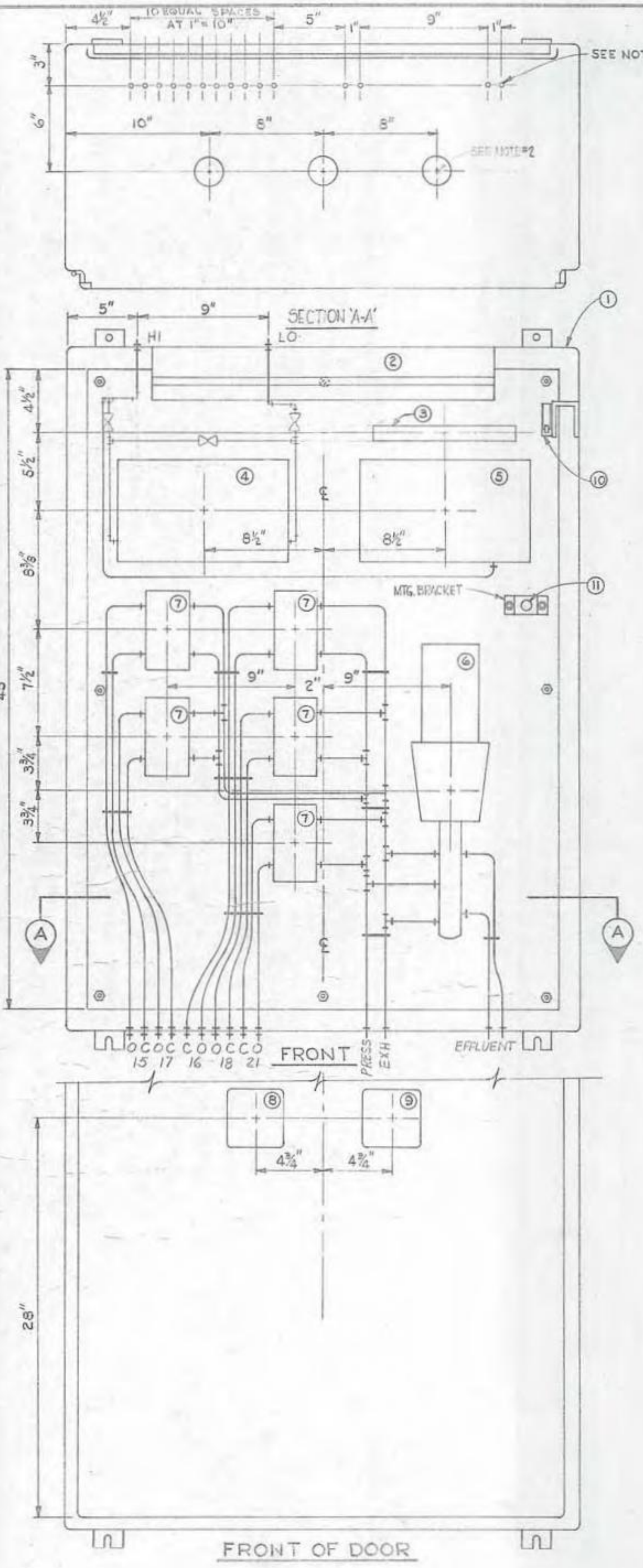
DRAWING NOTES:

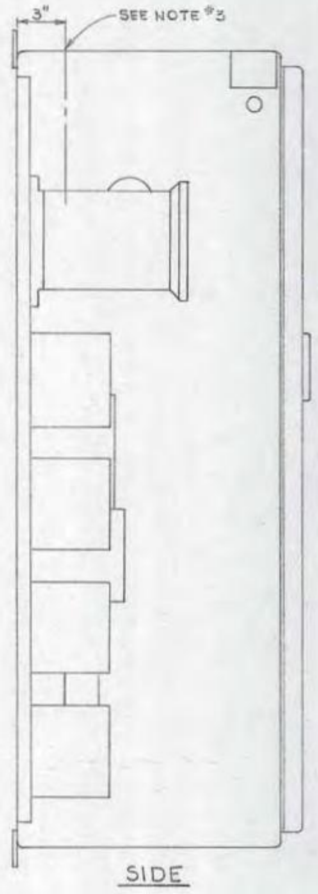
1. TIE ALL LIKE WIRE NUMBERS COMMON.
2. DRILL THREE ½" HOLES IN BOTTOM OF BOX FOR DRAIN PURPOSES.
3. DRILL & TAP FOR ⅜" BULK HEAD FITTING.

10052 Sh 2 of 4

REVISIONS		
NO.	DATE	BY
1	7-30-68	RCD
2	2-26-69	DLZ
3	3-4-69	DLZ
4	3-26-69	DLZ
5		

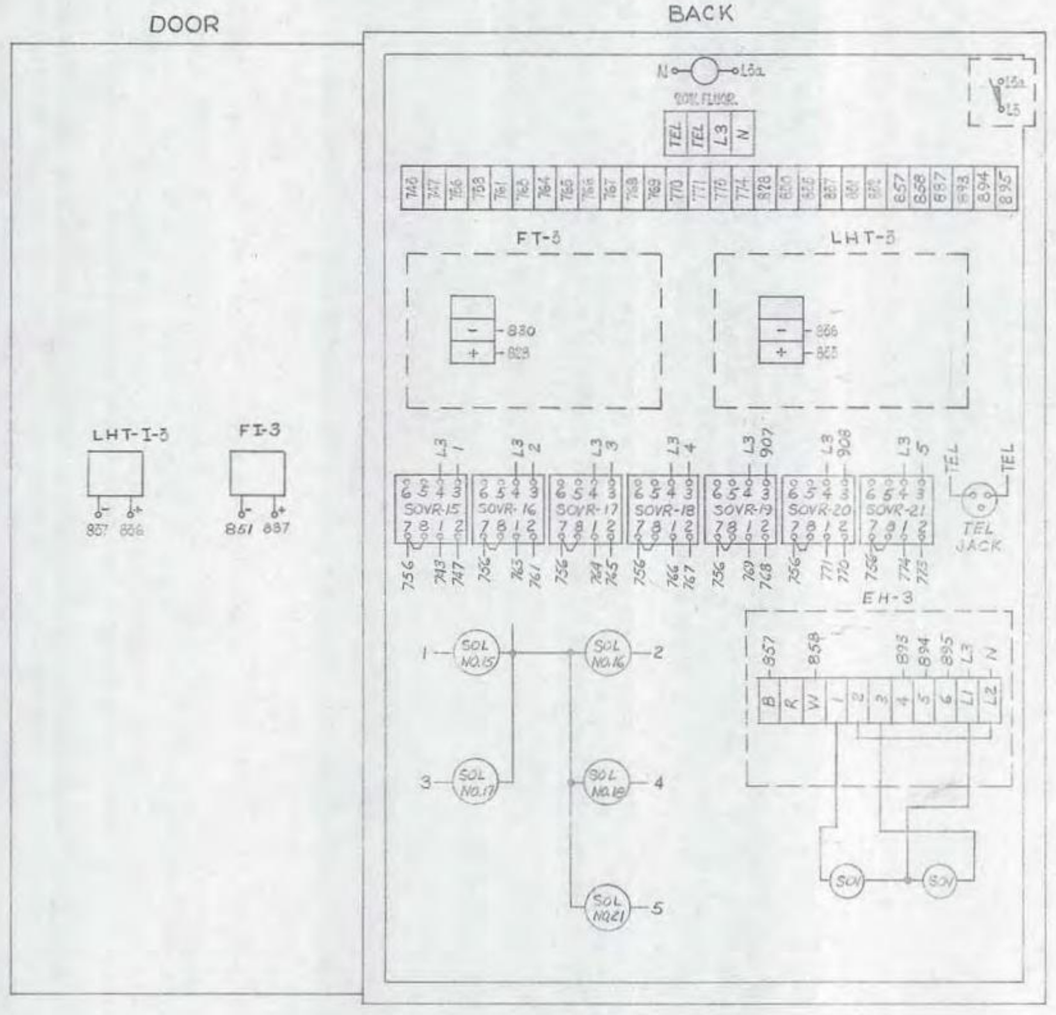
GOBLE SAMPSON ASSOC.
[illegible]
DRAWN BY
SCALE
MATERIAL
CHK'D
DATE
DRAWING NO.
TRACED
APP'D


4½"
10 EQUAL SPACES AT 1" = 10"
5"
1"
9"
1"
SEE NOTE #3
3"
6"
10"
8"
8"
SEE NOTE #2
5"
9"
SECTION 'A-A'
HI
LO
①
②
③
④
⑤
⑥
⑦
⑩
⑪
MTG. BRACKET
4½"
5½"
8⅝"
7½"
3¾"
3¾"
45"
8½"
8½"
9"
2"
9"
A
A
15 17 16 18 21
FRONT
PRESS
EXH
EFFLUENT
⑧
⑨
4¾"
4¾"
28"
FRONT OF DOOR


3"
SEE NOTE #3
SIDE

BULKHEAD LEGEND

15 - INFLUENT
16 - DRAIN
17 - ISOLATION LEFT
18 - ISOLATION RIGHT
21 - BACKWASH


DOOR
BACK
N
L3a
SOV. FLUOR.
TEL
TEL
L3
N
L3a
L3
746 747 750 758 761 762 764 765 766 767 768 769 770 771 772 774 828 830 856 857 861 866 887 868 893 894 895
FT-3
LHT-3
830
828
866
865
LHT-I-3
FI-3
857 856
861 887
SOVR-15
SOVR-16
SOVR-17
SOVR-18
SOVR-19
SOVR-20
SOVR-21
TEL JACK
EH-3
SOL NO.15
SOL NO.16
SOL NO.17
SOL NO.18
SOL NO.21
1
2
3
4
5
B R W 1 2 3 4 5 6 L1 L2
857 858 893 894 895 L3 N
30V
30V

CONNECTION DIAGRAM

EQUIPMENT LEGEND

① HOFFMAN #A-483616-NEMA-12 ENCLOSURE.
② STRIP LIGHT-SUPER STRIP ELECTROLIER #K201-24 20W W/LAMP.
③ TERMINAL STRIP, 300V. ALLEN-BRADLEY #1492-F3.
④ FT-3 FILTER EFFLUENT FLOW XTMR
⑤ LHT-3 FILTER LOSS OF HEAD XTMR
⑥ EH-3 FILTER ELECTRIC-HYDRAULIC POSITIONER
⑦ SOV-15,16,17,18 & 21 BUTTERFLY VALVE OPEN-CLOSE SOLENOID.
⑧ FT-I-3 FILTER EFFLUENT FLOW INDICATOR
⑨ LHT-I-3 FILTER LOSS OF HEAD INDICATOR
⑩ SNAP SWITCH ROBERTSHAW #BRD2-1P-15.
⑪ TELEPHONE JACK, CANNON #XLR-3-14N (MATES W/PLUG #XLR-3-11C.
⑫ SOVR-15, 16, 17, 18, 19, 20, 21 LINE ELECTRIC RLP RELAY.

DRAWING NOTES:

1. TIE ALL LIKE WIRE NUMBERS COMMON.
2. DRILL THREE 2" HOLES IN BOTTOM OF BOX FOR DRAIN PURPOSES.
3. DRILL & TAP FOR ⅜" BULK HEAD FITTING.

10052 sh. 3 of 4

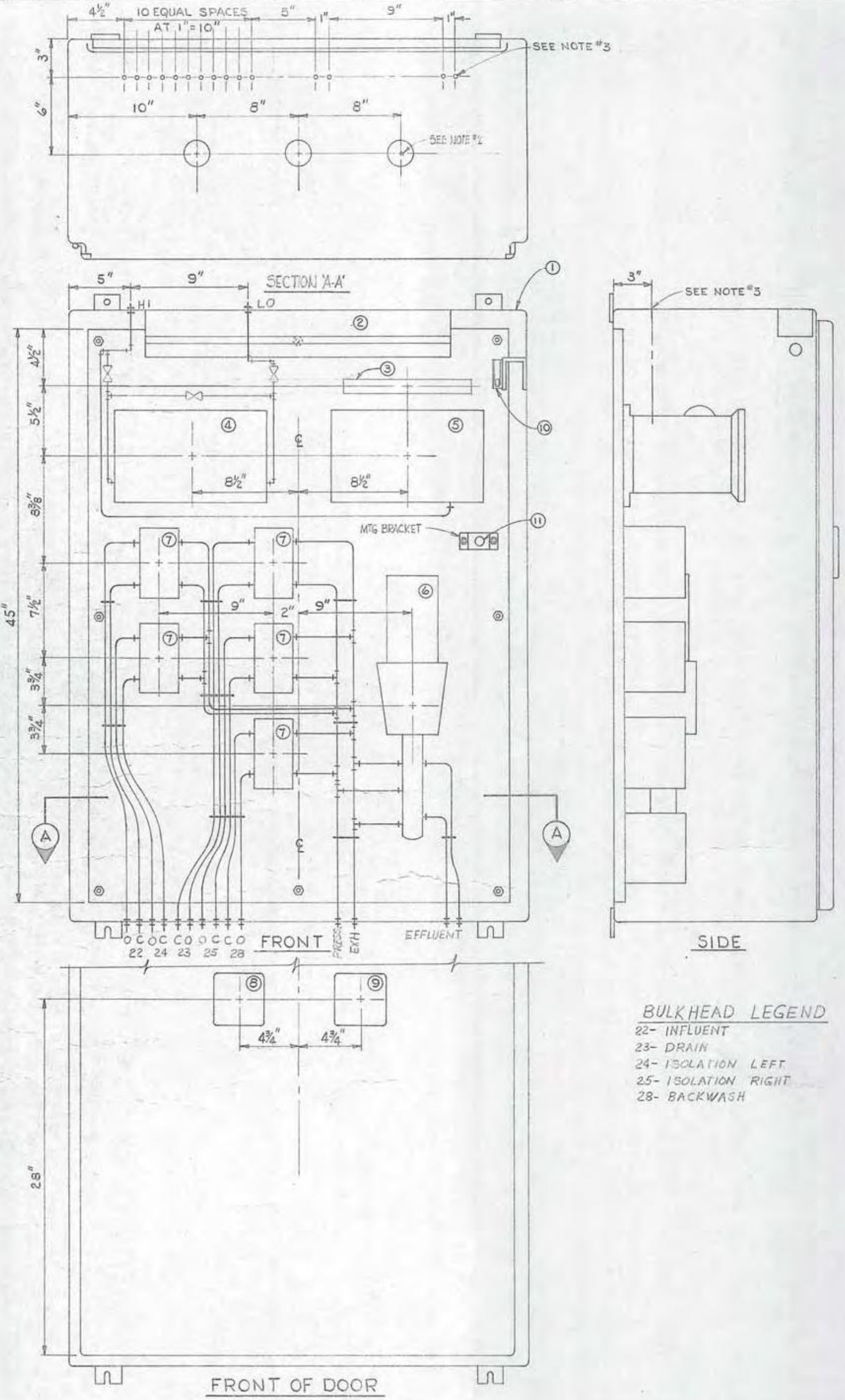
REVISIONS		
NO.	DATE	BY
1	7-30-68	RCD
2	2-26-69	DLZ
3	3-4-69	DLZ
4	3-26-69	DLZ
5		

GOBLE-SAMPSON ASSOC.

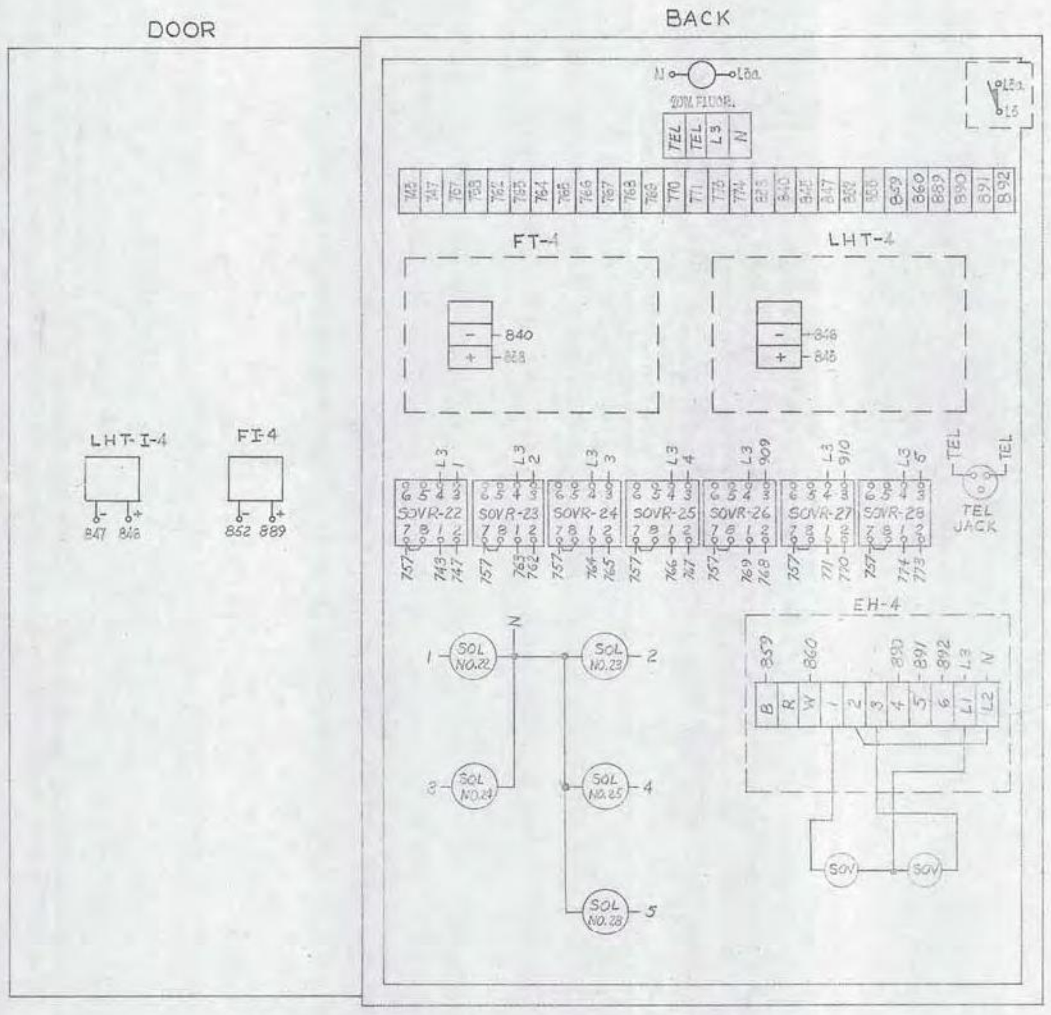
FILTER SUBPANEL #3 LAYOUT & CONNECTIONS

GRAND JUNCTION [illegible]

DRAWN BY [illegible]
SCALE [illegible]
MATERIAL
CHK'D
DATE
DRAWING NO.
TRACED
DATE


4½"
10 EQUAL SPACES AT 1"=10"
5"
1"
9"
1"
SEE NOTE #3
3"
6"
10"
8"
8"
SEE NOTE #2
5"
9"
SECTION 'A-A'
HI
LO
①
②
③
④
⑤
⑥
⑦
⑩
⑪
MTG BRACKET
8½"
8½"
9"
2"
9"
45"
4½"
5½"
8⅜"
7½"
3¾"
3¾"
A
A
℄
22 24 23 25 28
FRONT
PRESS
EXH
EFFLUENT
3"
SEE NOTE #3
SIDE
⑧
⑨
4¾"
4¾"
28"
FRONT OF DOOR

BULKHEAD LEGEND
22- INFLUENT
23- DRAIN
24- ISOLATION LEFT
25- ISOLATION RIGHT
28- BACKWASH


DOOR
BACK
N
L3a
20W FLUOR.
TEL
TEL
L3
N
L3a
L3
743 747 757 759 762 763 764 765 766 767 768 769 770 771 773 774 828 840 842 847 852 858 859 860 889 890 891 892
FT-4
840
828
LHT-4
848
845
LHT-I-4
847 848
FI-4
852 889
SOVR-22
SOVR-23
SOVR-24
SOVR-25
SOVR-26
SOVR-27
SOVR-28
6 5 4 3
7 8 1 2
L3
1
2
3
4
909
910
5
757
743 747
763 762
764 765
766 767
769 768
771 770
774 773
TEL
TEL
TEL JACK
EH-4
859
860
890
891
892
L3
N
B R W 1 2 3 4 5 6 L1 L2
SOV
SOV
N
SOL NO.22
SOL NO.23
SOL NO.24
SOL NO.25
SOL NO.28
1
2
3
4
5

CONNECTION DIAGRAM

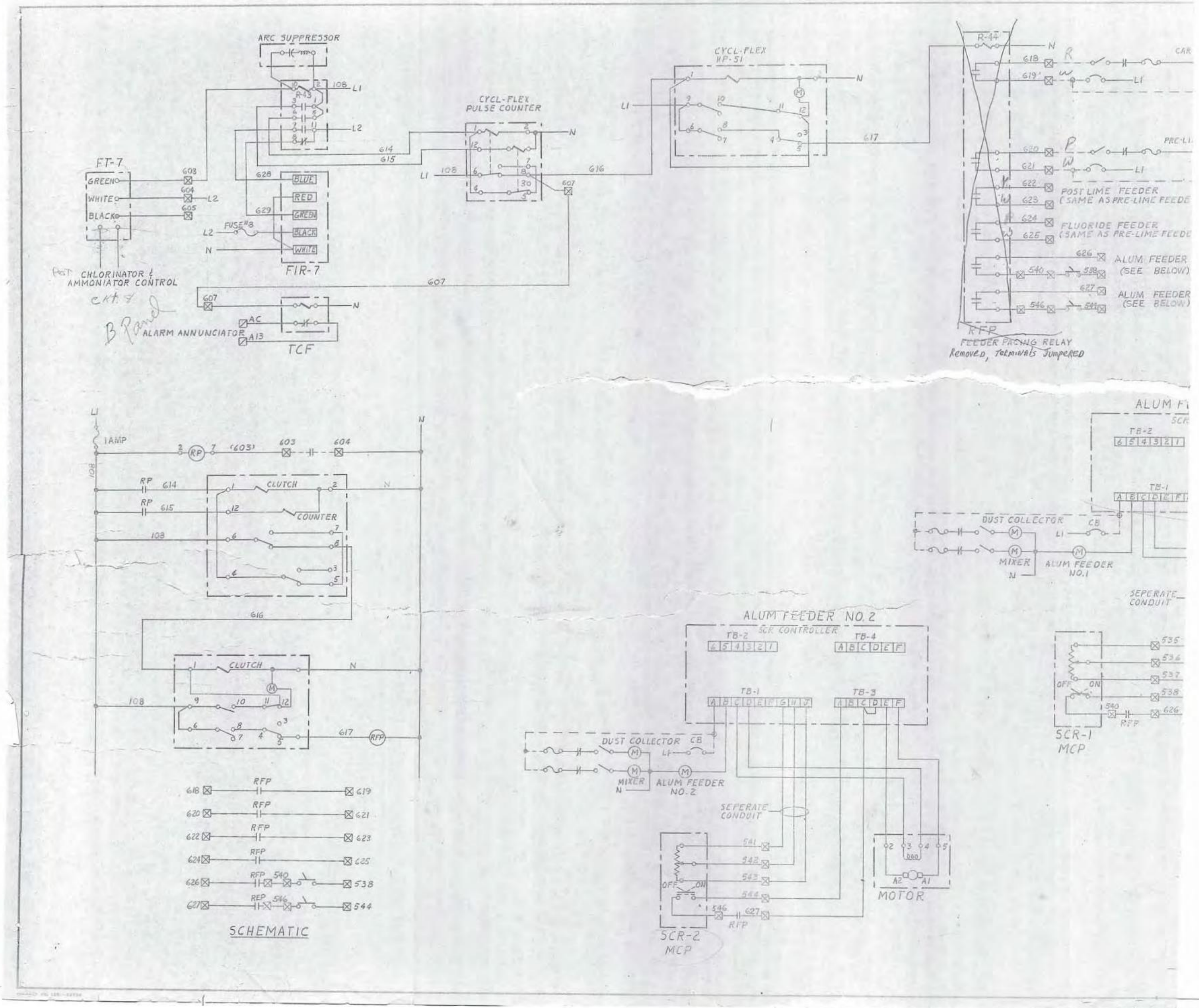
EQUIPMENT LEGEND
① HOFFMAN #A-483616-NEMA-12 ENCLOSURE.
② STRIP LIGHT-SUPER STRIP ELECTROLIER #K201-24 20W W/LAMP
③ TERMINAL STRIP, 300V. ALLEN-BRADLEY #1492-FB.
④ FT-4 FILTER EFFLUENT FLOW XTMR
⑤ LHT-4 FILTER LOSS OF HEAD XTMR
⑥ EH-4 FILTER ELECTRIC-HYDRAULIC POSITIONER
⑦ SOV-22,23,24,25&28 BUTTERFLY VALVE OPEN-CLOSE SOLENOID.
⑧ FT-I-4 FILTER EFFLUENT FLOW INDICATOR
⑨ LHT-I-4 FILTER LOSS OF HEAD INDICATOR
⑩ SNAP SWITCH ROBERTSHAW #BRD2-1P-1S.
⑪ TELEPHONE JACK, CANNON #XLR-3-14N (MATES W/PLUG #XLR-3-11C.
⑫ SOVR-22,23,24,25,26,27,28 LINE ELECTRIC RLP RELAY.

DRAWING NOTES:
1. TIE ALL LIKE WIRE NUMBERS COMMON.
2. DRILL THREE ¼" HOLES IN BOTTOM OF BOX FOR DRAIN PURPOSES.
3. DRILL & TAP FOR ⅜" BULK HEAD FITTING.

10052 Sh 4 of 4

REVISIONS		
NO.	DATE	BY
1	8-1-68	RCD
2	2-26-69	DLZ
3	3-4-69	DLZ
4	3-26-69	DLZ
5		

GOBLE-SAMPSON-ASSOC. [illegible]
FILTER SUBPANEL [illegible] LAYOUT & CONNECTION DIA[illegible]
GRAND JUNCTION WATER TREATMENT PLANT
DRAWN BY [illegible] SCALE [illegible] MATERIAL
CHK'D DATE DRAWING NO.
TRACED APP'D


ARC SUPPRESSOR
R-43
108
L1
L2
CYCL-FLEX PULSE COUNTER
N
614
615
L1
108
616
607
CYCL-FLEX HP-51
L1
N
617
R-44
618
619'
620
621
622
623
624
625
626
540
538
627
546
544
CAR
PRE-LI
L1
POST LIME FEEDER (SAME AS PRE-LIME FEEDE
FLUORIDE FEEDER (SAME AS PRE-LIME FEEDE
ALUM FEEDER (SEE BELOW)
ALUM FEEDER (SEE BELOW)
RFP
FEEDER PACING RELAY
FT-7
GREEN
WHITE
BLACK
603
604
605
628
629
BLUE
RED
GREEN
BLACK
WHITE
FUSE #8
FIR-7
CHLORINATOR & AMMONIATOR CONTROL
ALARM ANNUNCIATOR
AC
A13
TCF
L1
1AMP
RP
(603)
RP 614
RP 615
CLUTCH
COUNTER
616
CLUTCH
M
617
RFP
618
RFP
619
620
621
622
623
624
625
626
RFP 540
538
627
REP 546
544
SCHEMATIC
ALUM FEEDER NO. 2
SCR CONTROLLER
TB-2
6 5 4 3 2 1
TB-4
A B C D E F
TB-1
A B C D E F G H J
TB-3
A B C D E F
DUST COLLECTOR
CB
MIXER
ALUM FEEDER NO. 2
SEPERATE CONDUIT
541
542
543
544
546
627
RFP
OFF
ON
SCR-2 MCP
MOTOR
A2
A1
ALUM F
SCR
TB-2
6 5 4 3 2 1
TB-1
A B C D E F
DUST COLLECTOR
CB
MIXER
ALUM FEEDER NO. 1
SEPERATE CONDUIT
535
536
537
538
540
626
RFP
SCR-1 MCP

Post

ckt 8

B Panel

R

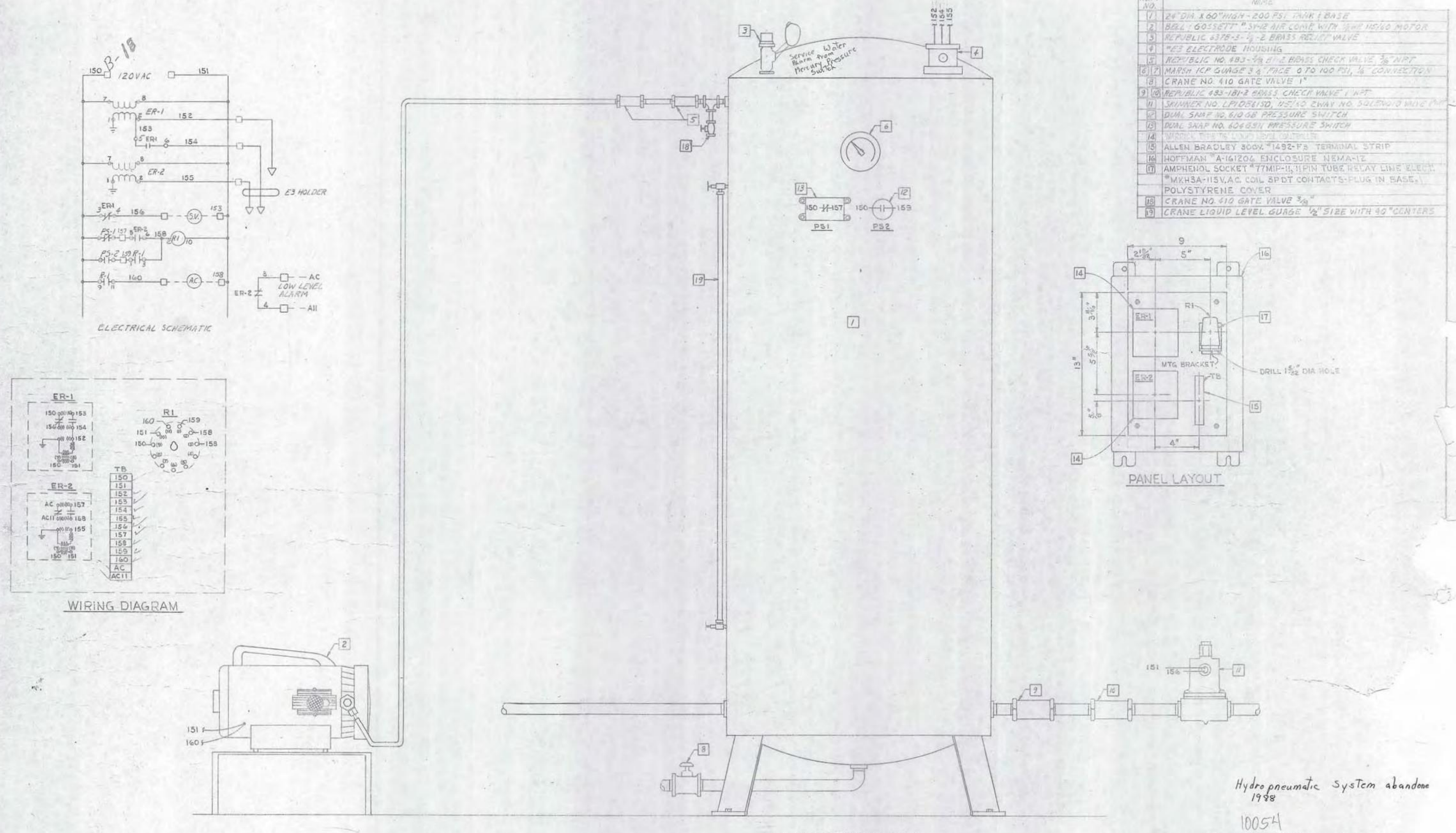
W

P

W

Removed, terminals jumpered

B-18



150
120VAC
151
ER-1
152
153
ER-1
154
ER-2
155
E3 HOLDER
ER-1
156
S.V.
153
PS-1
157
ER-2
158
R1
10
PS-2
159
R-1
R-1
160
AC
158
ER-2
3
AC
LOW LEVEL ALARM
4
A11
ER-1
150
153
156
154
152
150
151
R1
160
159
151
158
150
155
ER-2
AC
157
AC11
168
155
150
151
TB
150
151
152
153
154
155
156
157
158
159
160
AC
AC11
3
Service Water Alarm from Mercury Pressure Switch
152
154
155
4
5
6
18
13
150
157
PS1
12
150
159
PS2
19
1
2
151
160
8
9
10
151
156
11
9
2 15/32"
5"
16
14
ER-1
R1
17
3 11/16"
13"
5 5/8"
MTG BRACKET
DRILL 1 5/32" DIA HOLE
ER-2
TB
15
5"
4"
14

ELECTRICAL SCHEMATIC

WIRING DIAGRAM

HYDRO-PNEUMATIC TANK

PANEL LAYOUT

BILL OF MATERIAL

ITEM NO.	NAME
1	24" DIA. X 60" HIGH - 200 PSI TANK & BASE
2	BELL & GOSSETT "SY-12 AIR COMP. WITH 1/4 HP 115/60 MOTOR
3	REPUBLIC 637B-3-1/2-2 BRASS RELIEF VALVE
4	"E3 ELECTRODE HOUSING
5	REPUBLIC NO. 483-3/8 B-2 BRASS CHECK VALVE, 3/8" NPT
6 7	MARSH ICP GUAGE 3 1/4" FACE 0 TO 100 PSI, 1/4" CONNECTION
8	CRANE NO. 410 GATE VALVE 1"
9 10	REPUBLIC 483-1B1-2 BRASS CHECK VALVE 1" NPT
11	SKINNER NO. LP1DB6ISD, 115/60 2WAY NO. SOLENOID VALVE
12	DUAL SNAP NO. 610 GB PRESSURE SWITCH
13	DUAL SNAP NO. 604 G9N PRESSURE SWITCH
14	WARRICK TYPE "F" LIQUID LEVEL CONTROLLER
15	ALLEN BRADLEY 300V. "1492-F3 TERMINAL STRIP
16	HOFFMAN "A-161206 ENCLOSURE NEMA-12
17	AMPHENOL SOCKET "77MIP-11, 11 PIN TUBE RELAY LINE ELECT.
	"MKH3A-115V.AC. COIL 3PDT CONTACTS-PLUG IN BASE.
	POLYSTYRENE COVER
18	CRANE NO. 410 GATE VALVE 3/8"
19	CRANE LIQUID LEVEL GUAGE 1/2" SIZE WITH 40" CENTERS

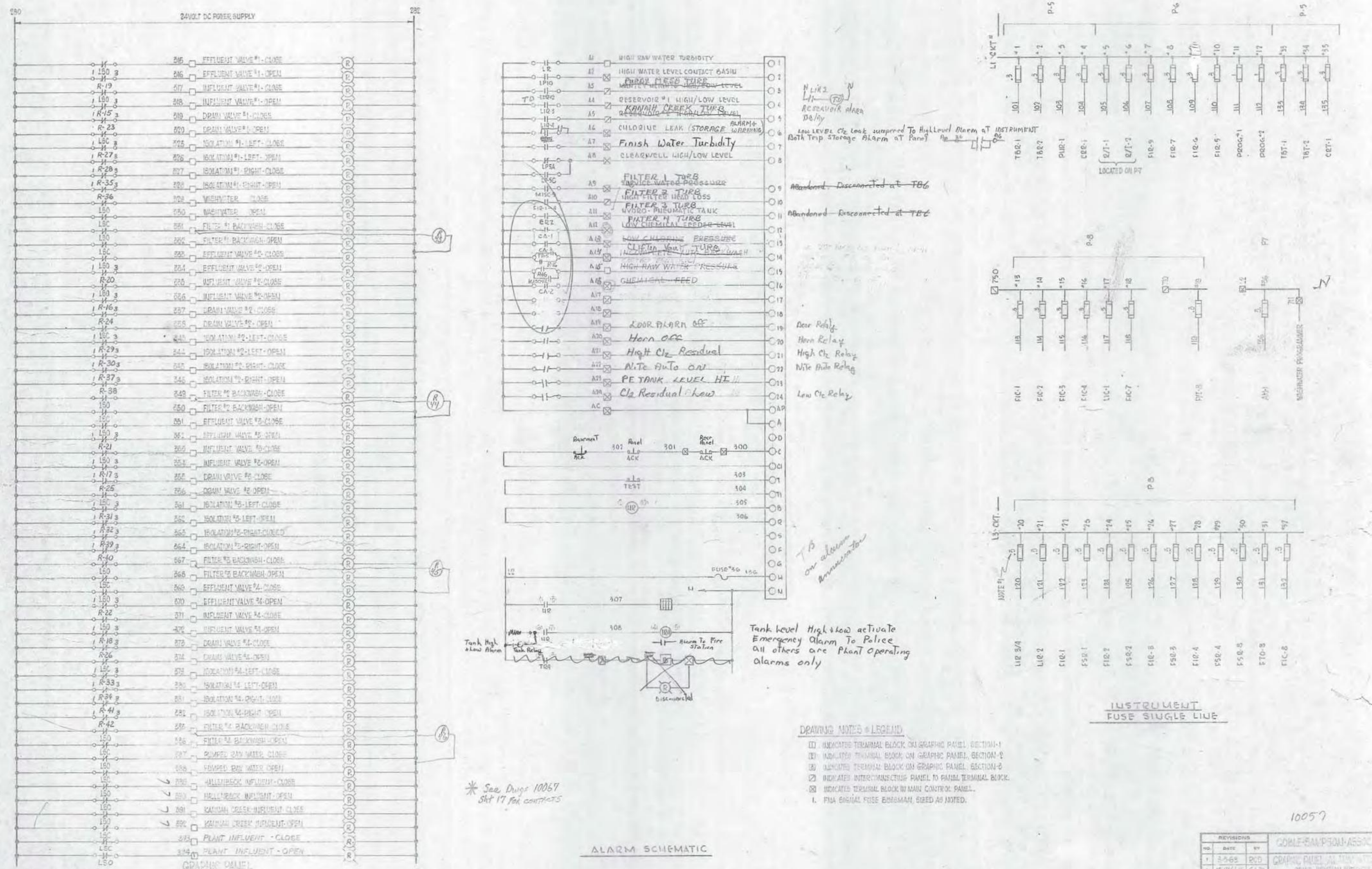
Hydropneumatic System abandone
1988

10054

REVISIONS		
NO.	DATE	BY
1	7-30-68	RCD
2	10/22/68	SGD
3		
4		
5		

GOBLE, SAMPSON, ASSO
DENVER, COLO.
GRAND JUNCTION WTP
HYDRO-PNEUMATIC TANK
DRAWN BY SGD
SCALE
CHK'D
DATE
TRACED

DO NOT SCALE THIS DRAWING


280
24VOLT DC POWER SUPPLY
282
R-19
R-15
R-23
R-27
R-28
R-35
R-36
R-20
R-16
R-24
R-29
R-30
R-37
R-38
R-21
R-17
R-25
R-31
R-32
R-39
R-40
R-22
R-18
R-26
R-33
R-34
R-41
R-42
LSO
LSC
815 EFFLUENT VALVE #1-CLOSE
816 EFFLUENT VALVE #1-OPEN
817 INFLUENT VALVE #1-CLOSE
818 INFLUENT VALVE #1-OPEN
819 DRAIN VALVE #1-CLOSE
820 DRAIN VALVE #1-OPEN
825 ISOLATION #1-LEFT-CLOSE
826 ISOLATION #1-LEFT-OPEN
827 ISOLATION #1-RIGHT-CLOSE
828 ISOLATION #1-RIGHT-OPEN
829 WASHWATER CLOSE
830 WASHWATER OPEN
831 FILTER #1 BACKWASH-CLOSE
832 FILTER #1 BACKWASH-OPEN
833 EFFLUENT VALVE #2-CLOSE
834 EFFLUENT VALVE #2-OPEN
835 INFLUENT VALVE #2-CLOSE
836 INFLUENT VALVE #2-OPEN
837 DRAIN VALVE #2-CLOSE
838 DRAIN VALVE #2-OPEN
843 ISOLATION #2-LEFT-CLOSE
844 ISOLATION #2-LEFT-OPEN
845 ISOLATION #2-RIGHT-CLOSE
846 ISOLATION #2-RIGHT-OPEN
849 FILTER #2 BACKWASH-CLOSE
850 FILTER #2 BACKWASH-OPEN
851 EFFLUENT VALVE #3-CLOSE
852 EFFLUENT VALVE #3-OPEN
853 INFLUENT VALVE #3-CLOSE
854 INFLUENT VALVE #3-OPEN
855 DRAIN VALVE #3-CLOSE
856 DRAIN VALVE #3-OPEN
861 ISOLATION #3-LEFT-CLOSE
862 ISOLATION #3-LEFT-OPEN
863 ISOLATION #3-RIGHT-CLOSED
864 ISOLATION #3-RIGHT-OPEN
867 FILTER #3 BACKWASH-CLOSE
868 FILTER #3 BACKWASH-OPEN
869 EFFLUENT VALVE #4-CLOSE
870 EFFLUENT VALVE #4-OPEN
871 INFLUENT VALVE #4-CLOSE
872 INFLUENT VALVE #4-OPEN
873 DRAIN VALVE #4-CLOSE
874 DRAIN VALVE #4-OPEN
879 ISOLATION #4-LEFT-CLOSE
880 ISOLATION #4-LEFT-OPEN
881 ISOLATION #4-RIGHT-CLOSE
882 ISOLATION #4-RIGHT-OPEN
885 FILTER #4 BACKWASH-CLOSE
886 FILTER #4 BACKWASH-OPEN
887 PUMPED RAW WATER-CLOSE
888 PUMPED RAW WATER-OPEN
889 HALLENBECK INFLUENT-CLOSE
890 HALLENBECK INFLUENT-OPEN
891 KANNAH CREEK-INFLUENT-CLOSE
892 KANNAH CREEK INFLUENT-OPEN
893 PLANT INFLUENT - CLOSE
894 PLANT INFLUENT - OPEN
R
LR
LP10
TD LIR2
LIR3
LIR4
LP5A
LP5C
MISC9
ER2
CA-1
CA-2
R16
A1 HIGH RAW WATER TURBIDITY
A2 HIGH WATER LEVEL CONTACT BASIN
A3 PURDY MESA TURB ~~WHITNEY HEIGHTS HIGH/LOW LEVEL~~
A4 RESERVOIR #1 HIGH/LOW LEVEL
A5 KANNAH CREEK TURB ~~RESERVOIR 2 HIGH/LOW LEVEL~~
A6 CHLORINE LEAK (STORAGE ALARM+ WARNING)
A7 Finish Water Turbidity
A8 CLEARWELL HIGH/LOW LEVEL
A9 FILTER 1 TURB ~~SERVICE WATER PRESSURE~~
A10 FILTER 2 TURB ~~HIGH FILTER HEAD LOSS~~
A11 FILTER 3 TURB ~~HYDRO-PNEUMATIC TANK~~
A12 FILTER 4 TURB ~~LOW CHEMICAL FEEDER LEVEL~~
A13 ~~LOW CHLORINE PRESSURE~~
A14 CLIFTON Vault TURB ~~INCOMPLETE AUTO BACKWASH~~
A15 ~~HIGH RAW WATER PRESSURE~~
A16 ~~CHEMICAL FEED~~
A17
A18
A19 DOOR ALARM Off
A20 Horn Off
A21 High Cl2 Residual
A22 NiTe AuTo ON
A23 PE TANK LEVEL HI
A24 Cl2 Residual Low
AC
1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 AP A D C CI T TI B R S F G H N
N LIR2 TD N
RESERVOIR ALARM Delay
Low LEVEL Cl2 Leak jumpered To HighLevel Alarm aT INSTRUMENT
Both Trip Storage Alarm aT Panel
~~Abandoned Disconnected at TB6~~
~~Abandoned Disconnected at TB6~~
Door Relay
Horn Relay
High Cl2 Relay
NiTe Auto Relay
Low Cl2 Relay
BasemenT ACK
Panel ACK
Rear Panel ACK
302
301
300
TEST
303
304
305
306
HR
FUSE #36
307
308
Tank High + Low Alarm
Tank Relay
TR4
Alarm To Fire Station
Disconnected
TB on alarm annunciator
P-5
P-6
P-5
L1 CKT #
101 102 103 104 105 106 107 108 109 110 111 112 133 134 135
TBR-1 TBR-2 PUR-1 CRR-1 R/T-1 R/T-2 FIR-9 FIR-7 FIR-6 FIR-5 PROG #1 PROG #2 TBT-1 TBT-2 CRT-1
LOCATED ON P7
P-8
P7
750
FIC-1 FIC-2 FIC-3 FIC-4 LIC-1 FIC-7 PIT-8
BACKWASH PROGRAMMER
N
P8
L3-CKT
120 121 122 123 124 125 126 127 128 129 130 131 132
LIR 3/4 LIR-2 FIR-1 FSR-1 FIR-2 FSR-2 FIR-3 FSR-3 FIR-4 FSR-4 FSR-8 FTO-8 FIC-8
NOTE 1

GRAPHIC PANEL

ALARM SCHEMATIC

Tank Level High + Low activate Emergency Alarm To Police All others are Plant Operating alarms only

* See Dwgs 10067 Sht 17 For contacts

INSTRUMENT FUSE SINGLE LINE

DRAWING NOTES & LEGEND

- ⊡ INDICATES TERMINAL BLOCK ON GRAPHIC PANEL, SECTION-1
- ⊡ INDICATES TERMINAL BLOCK ON GRAPHIC PANEL, SECTION-2
- ⊡ INDICATES TERMINAL BLOCK ON GRAPHIC PANEL, SECTION-3
- ▨ INDICATES INTERCONNECTING PANEL TO PANEL TERMINAL BLOCK.
- ☒ INDICATES TERMINAL BLOCK IN MAIN CONTROL PANEL.
- 1. FNA SIGNAL FUSE BUSSMAN, SIZED AS NOTED.

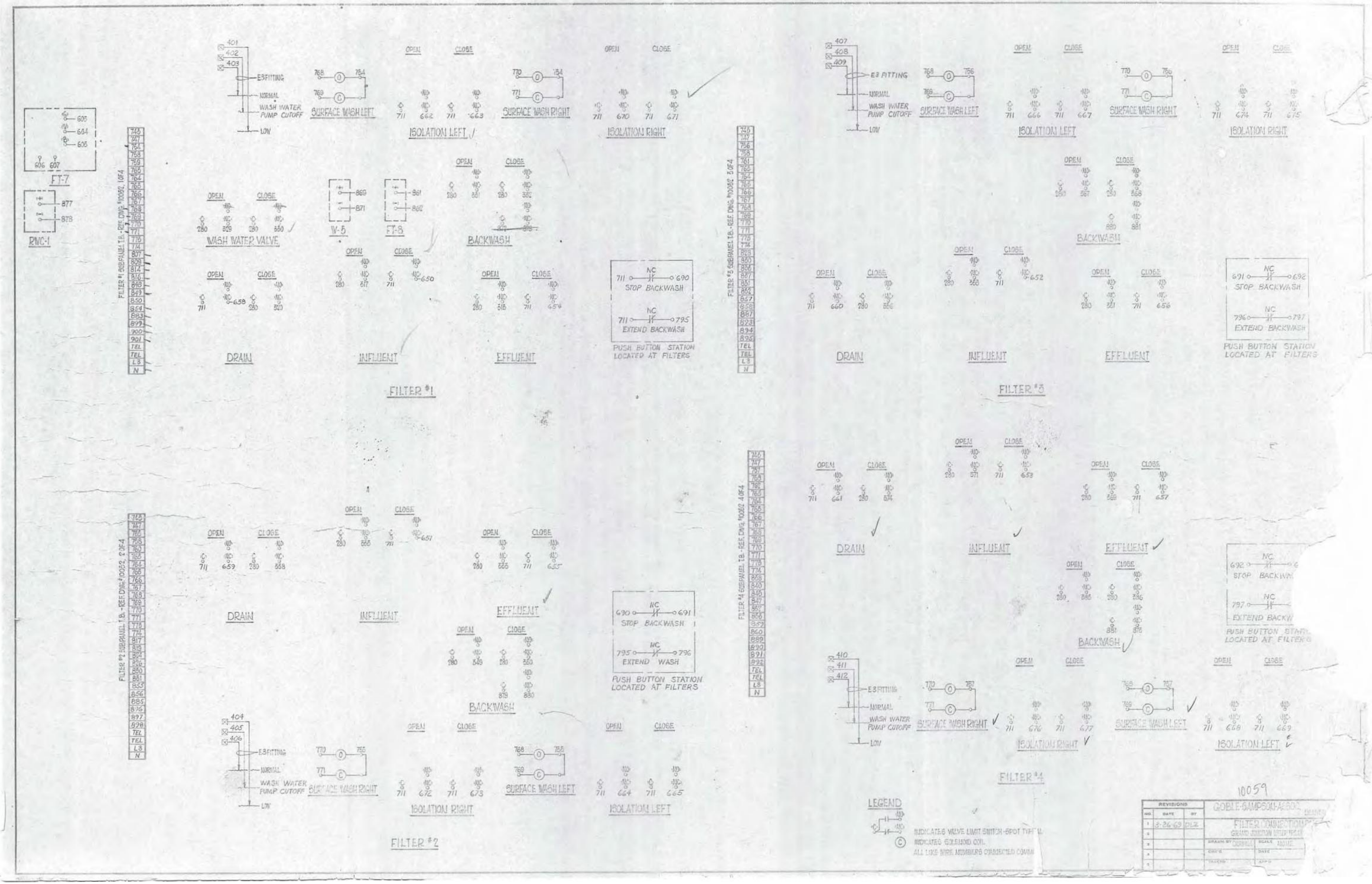
NOTE FABRICATOR:

TERMINAL BLOCKS SHOWN ABOVE AND ON TB-11, DWG #10068 SHT 3 ARE ON THE GRAPHIC PANEL SECTIONS.
LOCATE TERMINAL BLOCKS AND IDENTIFY AS SHOWN.
CODE TERMINAL BLOCKS ON SCHEMATIC AS SUGGESTED UNDER DRAWING NOTES & LEGEND.

10057

REVISIONS		
NO.	DATE	BY
1	3-5-68	RCD
2	10/11/68	SGD
3	3-9-69	DLZ
4	2-26-69	DLZ
5		

GOBLE-SAMPSON-ASSOC.
GRAPHIC PANEL, ALARM
GRAND JUNCTION
DRAWN BY
SCALE NONE
CHK'D
DATE
TRACED
APP'D


FILTER #1
FILTER #2
FILTER #3
FILTER #4
SURFACE WASH LEFT
SURFACE WASH RIGHT
ISOLATION LEFT
ISOLATION RIGHT
WASH WATER VALVE
BACKWASH
DRAIN
INFLUENT
EFFLUENT
OPEN
CLOSE
E3 FITTING
NORMAL
WASH WATER PUMP CUTOFF
LOW
FT-7
FT-8
W-5
RWC-1
NC
STOP BACKWASH
EXTEND BACKWASH
EXTEND WASH
PUSH BUTTON STATION LOCATED AT FILTERS
FILTER #1 SUBPANEL T.B. - REF. DWG. #10052, 1 OF 4
FILTER #2 SUBPANEL T.B. - REF. DWG. #10052, 2 OF 4
FILTER #3 SUBPANEL T.B. - REF. DWG. #10052, 3 OF 4
FILTER #4 SUBPANEL T.B. - REF. DWG. #10052, 4 OF 4
TEL
L3
N

LEGEND

INDICATES VALVE LIMIT SWITCH-SPDT TYPICAL

Ⓒ INDICATES SOLENOID COIL

ALL LIKE WIRE NUMBERS CONNECTED COMM

10059

REVISIONS		
NO.	DATE	BY
1	3-26-69	DLZ
2		
3		
4		
5		

GOBLE-SAMPSON-ASSOC.

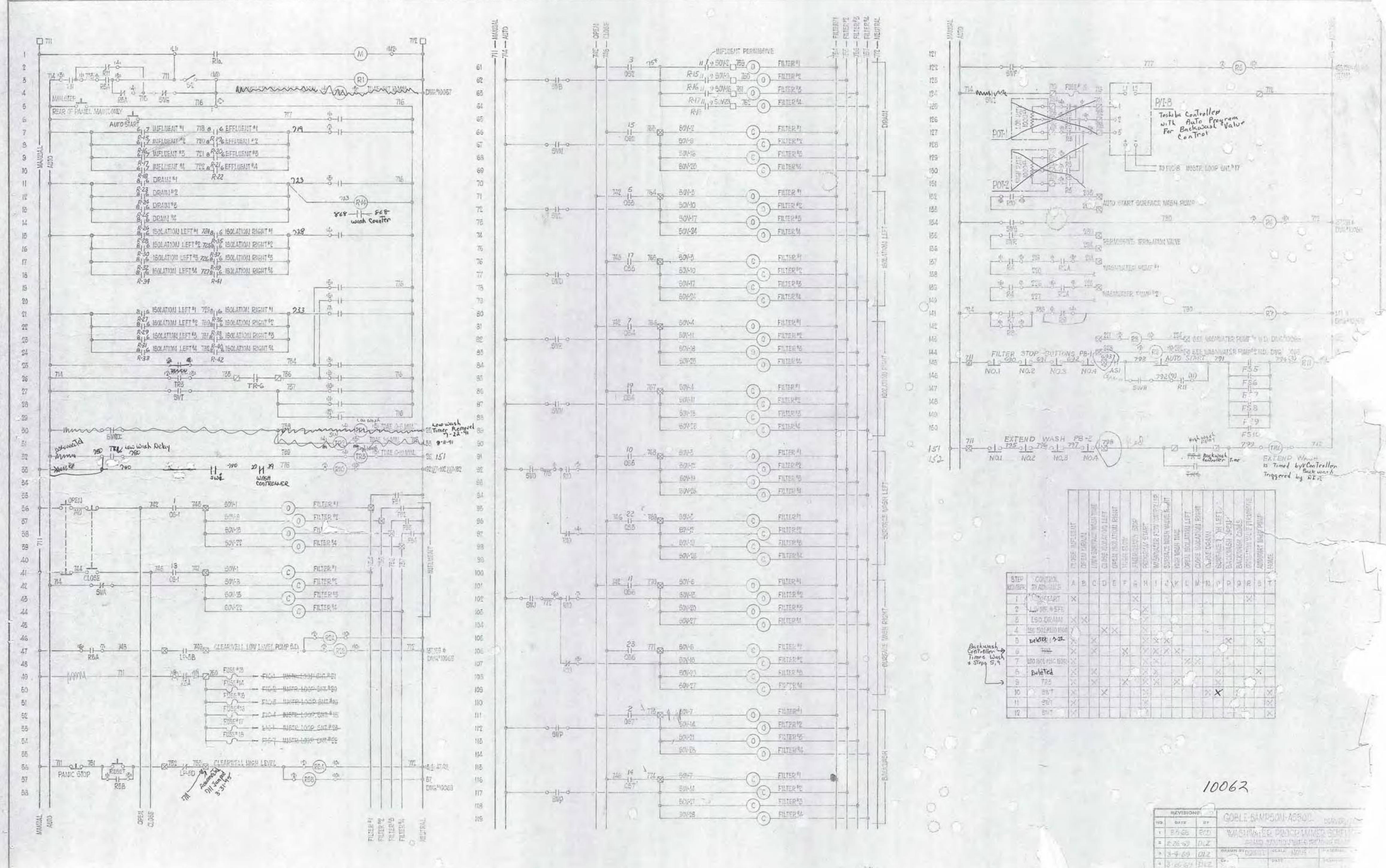
FILTER CONNECTION

GRAND JUNCTION WATER PLANT

DRAWN BY DONNELL SCALE NONE

CHK'D DATE

TRACED APP'D


MANUAL
AUTO
OPEN
CLOSE
FILTER #1
FILTER #2
FILTER #3
FILTER #4
NEUTRAL
INFLUENT PERMISSIVE
DRAIN
ISOLATION LEFT
ISOLATION RIGHT
SURFACE WASH LEFT
SURFACE WASH RIGHT
BACKWASH
INFLUENT
MANUAL
REAR OF PANEL MAINT. ONLY
AUTO START
PANIC STOP
RESET
CLEARWELL HIGH LEVEL
CLEARWELL LOW LEVEL PUMP S.D.
AUTO START SURFACE WASH PUMP
PERMISSIVE IRRIGATION VALVE
WASHWATER PUMP #1
WASHWATER PUMP #2
FILTER STOP BUTTONS PB-1
NO.1
NO.2
NO.3
NO.4
EXTEND WASH PB-2
P/I-B
POT-1
POT-2
TO FIC-8 INSTR. LOOP SHT. #17
Toshiba Controller with Auto Program For Backwash Valve Control
EXTEND Wash is Timed by Controller Backwash Triggered by SE2
Backwash Controller Time
wash Counter
Low wash Timer Removed 7-22-91
Low Wash Delay
Relocated
Wash Controller

STEP NUMBER	CONTROL TO ADVANCE	A CLOSE INFLUENT	B OPEN DRAIN	C LOW SURFACE WASH TIME	D CLOSE ISOLATION LEFT	E OPEN ISOLATION RIGHT	F HIGH FLOW	G EMERGENCY STOP	H PROGRAM START	I WASHWATER PUMP CONTROLLED	J SURFACE WASH VALVE RIGHT	K HIGH WASH TIME	L OPEN ISOLATION LEFT	M CLOSE ISOLATION RIGHT	N CLOSE DRAIN	O SURFACE [illegible] LEFT	P BACKWASH OPEN	Q BACKWASH CLOSE	R EFFLUENT VALVE [illegible]	S AUTOSTART WASH PUMP	T HOME
1	[illegible]START	X						X											X		
2	[illegible] + SFE								X												
3	ISO DRAIN	X	X						X												
4	ISO SOL # ISO SOR	[illegible]			X	X			X												
5	~~[illegible]~~ Deleted 7-22	X		X					X	X	X						X			X	
6	~~TR2~~	X		X			X		X	X	X	X									
7	ISO ISOL # ISC ISOR	X							X	X			X	X							
8	Deleted	X		X					X	X						X				X	
9	TR5	X		X			X		X	X		X				X					
10	SWT	X			X				X						X	X					X
11	SWT	X							X												X
12	SWT	X							[illegible]												X

Backwash Controller Times Wash + Steps 5,9

10062

NO.	DATE	BY
1	8-5-66	RCD
2	2-26-69	DLZ
3	3-4-69	DLZ
4	3-26-69	DLZ

REVISIONS

GOBLE-SAMPSON-ASSOC.

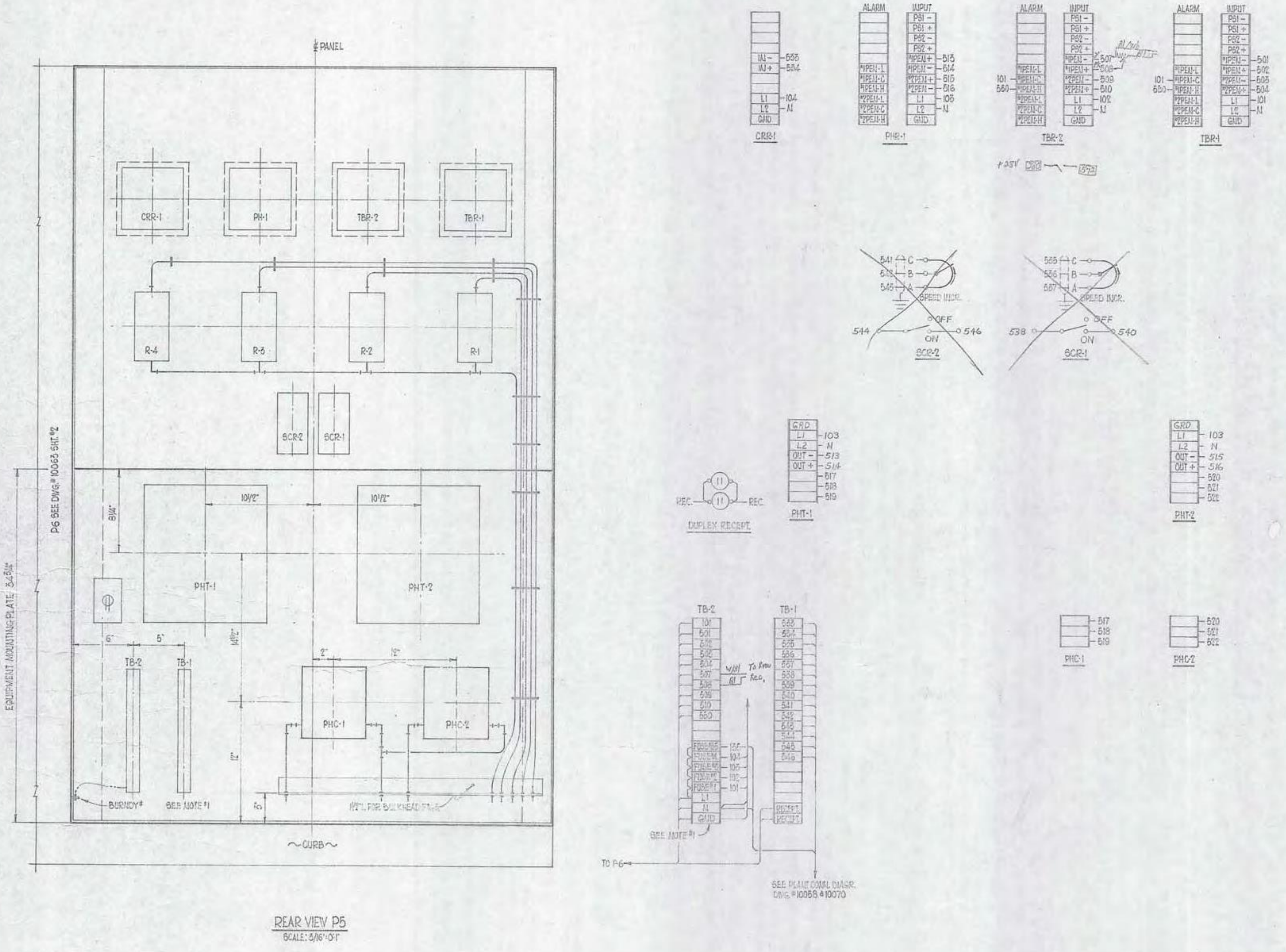
WASHWATER PROGRAMMER SCHEM

GRAND JUNCTION WATER TREATING PLANT

DRAWN BY D.Z. SCALE NONE MATERIAL

CK. DATE

TRACED APP'D



EQUIPMENT MOUNTING PLATE 34 3/4"
P6 SEE DWG.# 10063 SHT.#2
℄ PANEL
CRR-1
PH-1
TBR-2
TBR-1
R-4
R-3
R-2
R-1
SCR-2
SCR-1
PHT-1
PHT-2
PHC-1
PHC-2
TB-2
TB-1
BURNDY#
SEE NOTE #1
~CURB~
ALARM
INPUT
DUPLEX RECEPT.
SPEED ADJ.
ON
OFF
TO P6
SEE NOTE #1
SEE PLANT CONN. DIAGR. DWG. #10065 & 10070

REAR VIEW P5
SCALE: 3/16"=1'-0"

EQUIPMENT LEGEND

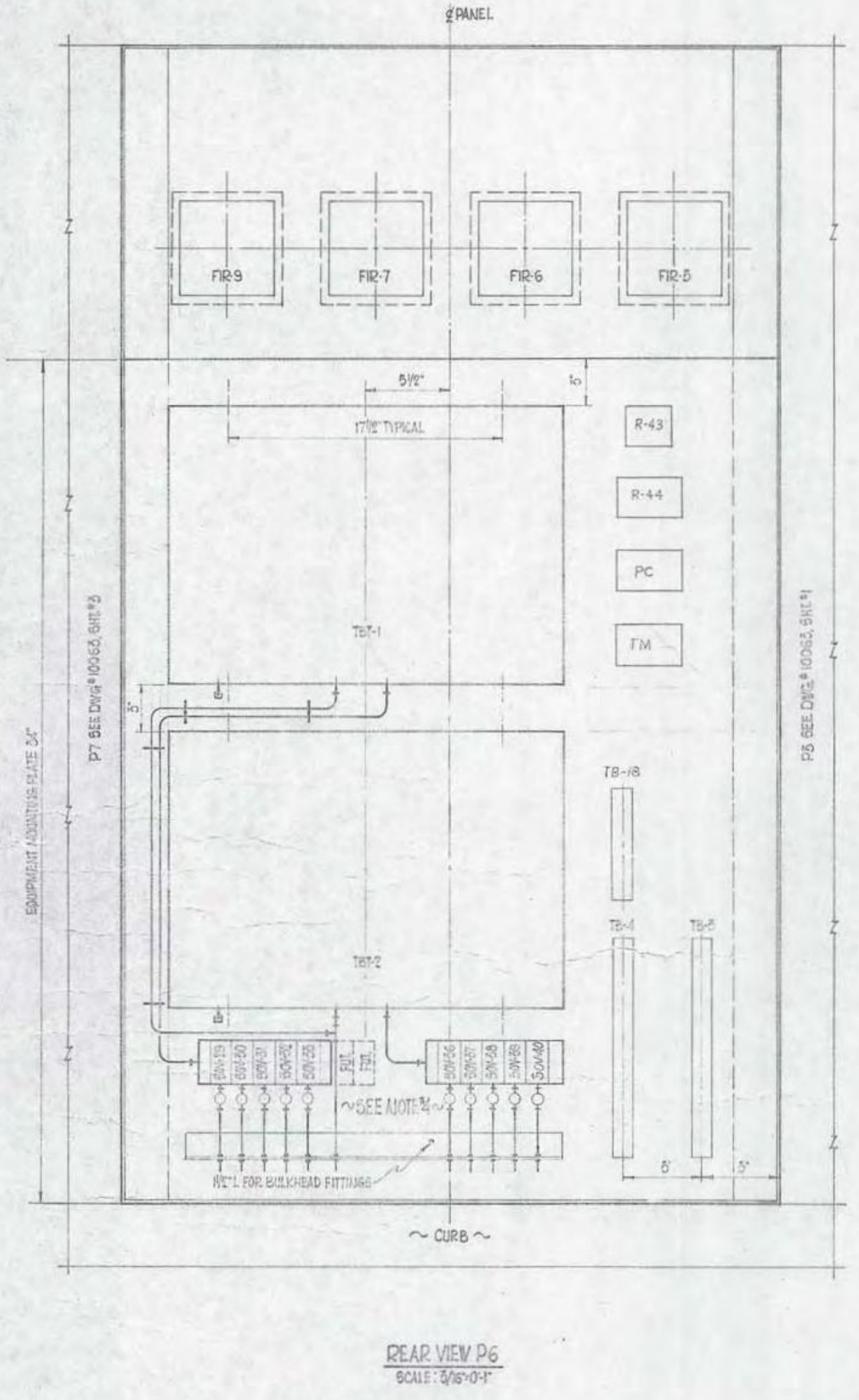
CRR-1	CHLORINE RESIDUAL RECORDER
PH-1	PH AFTER MIXING & CLEAR WELL
TBR-1	FINISHED WATER TURBIDITY RECORDER
TBR-2	RAW WATER TURBIDITY RECORDER
R1	ROTOMETER
R2	ROTOMETER
R3	ROTOMETER
R4	ROTOMETER
PHT-1	AMPLIFIER, PEN #1
PHT-2	AMPLIFIER, PEN #2
PHC-1	SAMPLE CHAMBER, AMPLIFIER #1
PHC-2	SAMPLE CHAMBER, AMPLIFIER #2
SCR-1	STATOTROL CONTROLLER, GE #58RA
SCR-2	STATOTROL CONTROLLER, GE #58RA
TB-1 & 2	TERMINAL BLOCKS, ALLEN-BRADLEY #1492-F5
⏀	DUPLEX RECEPT. HUBBELL #5262 IN HANDY BOX W/COVER.
—	FUSED TERMINAL BLOCK, ALLEN-BRADLEY #1492-CE6

DRAWING NOTES:

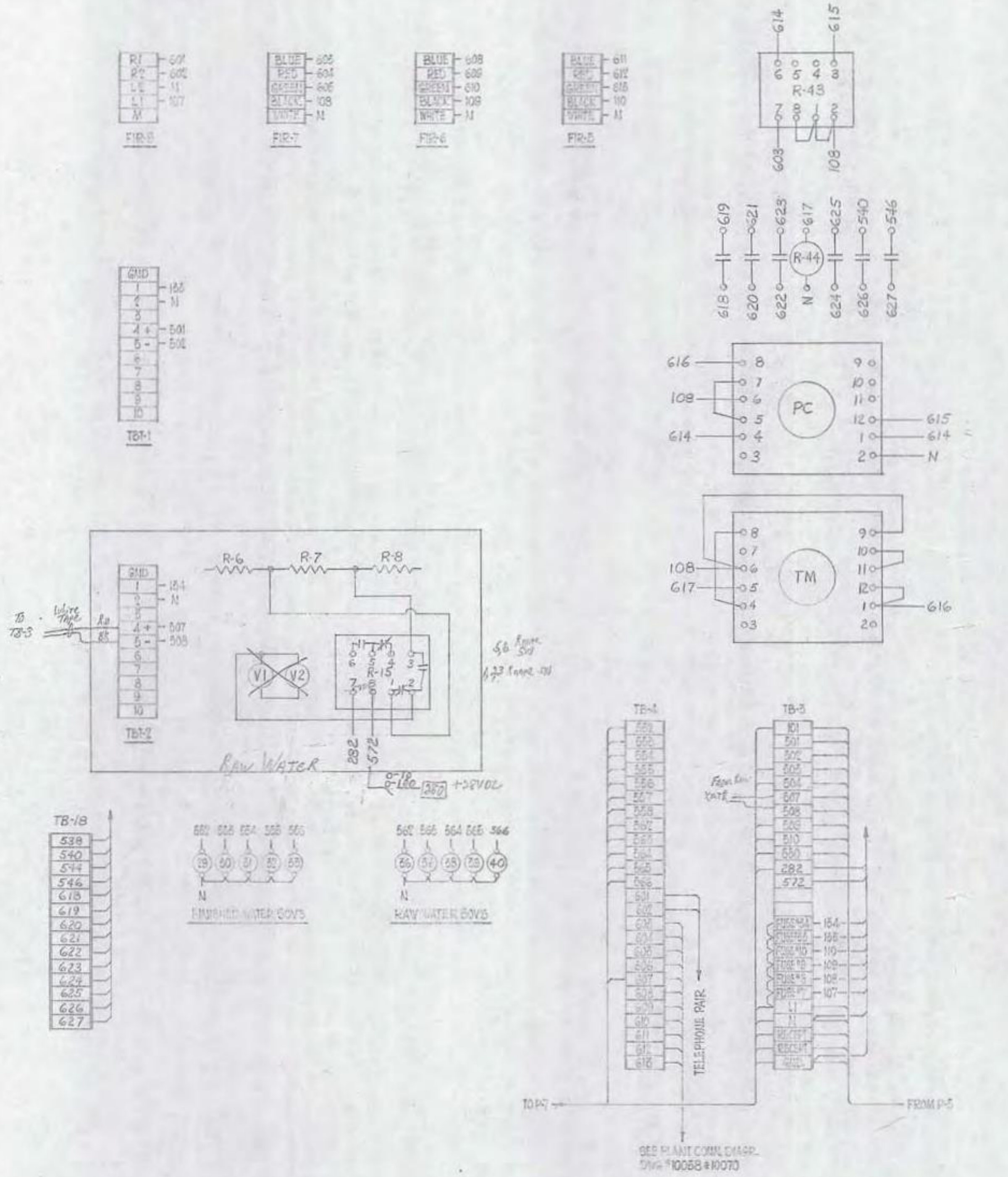
1. LOOP #14 TW GREEN FROM BURNDY GROUND CONNECTOR TO ALL INSTRUMENT GROUND BLOCKS. CONTRACTOR TO TIE MAIN GROUND LOOP TO BURNDY CONNECTOR.
2. TIE ALL LIKE WIRE NUMBERS COMMON.
3. WIRE BUNDLE TO BE UNDONE FROM TB-3, COILED & TAPED IN THIS SECTION FOR SHIPPING.
4. RECEPTACLE CIRCUIT PROVIDED TO PANEL BY CONTRACTOR. WIRE DOWN TO TB-3 INDICATED, AND INCLUDE IN PANEL TO PANEL BUNDLE.

10063 SH 1 of 7

REVISIONS			GOBLE-SAMPSON ASSOC. DENVER, COLO.		
NO.	DATE	BY	P5-ELEVATIONS & CONNECTION DIAGR. GRAND JUNCTION WATER TREATING PLANT		
1	8-5-68	RCD			
2	3-27-69	DLZ			
3			DRAWN BY CONNELL	SCALE NOTED	MATERIAL
4			CHK'D	DATE	DRAWING NO.
5			TRACED	APP'D	


℄ PANEL
FIR-9
FIR-7
FIR-6
FIR-5
8½"
17½" TYPICAL
R-43
R-44
PC
TM
TBT-1
TBT-2
TB-18
TB-4
TB-5
P7 SEE DWG # 10068, SHT # 3
P5 SEE DWG # 10065, SHT # 1
EQUIPMENT MOUNTING PLATE 54"
~SEE NOTE # 2
¾" E.L. FOR BULKHEAD FITTINGS
~ CURB ~

REAR VIEW P6
SCALE: 3/16"=1'-0"


FIR-9
FIR-7
FIR-6
FIR-5
R-43
R-44
PC
TM
TBT-1
TBT-2
R-6
R-7
R-8
R-15
V1
V2
RAW WATER
TB-18
FINISHED WATER SOV'S
RAW WATER SOV'S
TB-4
TB-5
TELEPHONE PAIR
TO P-7
FROM P-5
SEE PLANT CONN. DIAGR. DWG # 10068 & 10070

EQUIPMENT LEGEND

FIR-5	KANNAH CREEK INFLUENT RECORDER
FIR-6	HALLENBECK RESERVOIR INFLUENT RECORDER
FIR-7	MAIN INFLUENT RECORDER
FIR-9	PLANT EFFLUENT RECORDER
TBT-1	FINISHED WATER TURBIDITY TRANSMITTER
TBT-2	RAW WATER TURBIDITY TRANSMITTER
SOV'S	(AS NOTED) ASCO SOLENOID VALVE 8211 # 8318-81
TB-4	TERMINAL BLOCKS ALLEN-BRADLEY # 1492-F3
—	FUSE TERMINAL BLOCKS ALLEN-BRADLEY # 1492-CE6
R-43	POTTER & BRUMFIELD KRP-11 W/AMPHENOL 140-103 SOCKET.
R-44	GE CR120 - 6 POLE RELAY.
PC	EAGLE CYCL-FLEX PULSE COUNTER.
TM	EAGLE CYCL-FLEX HP-51 TIMER.

DRAWING NOTES:

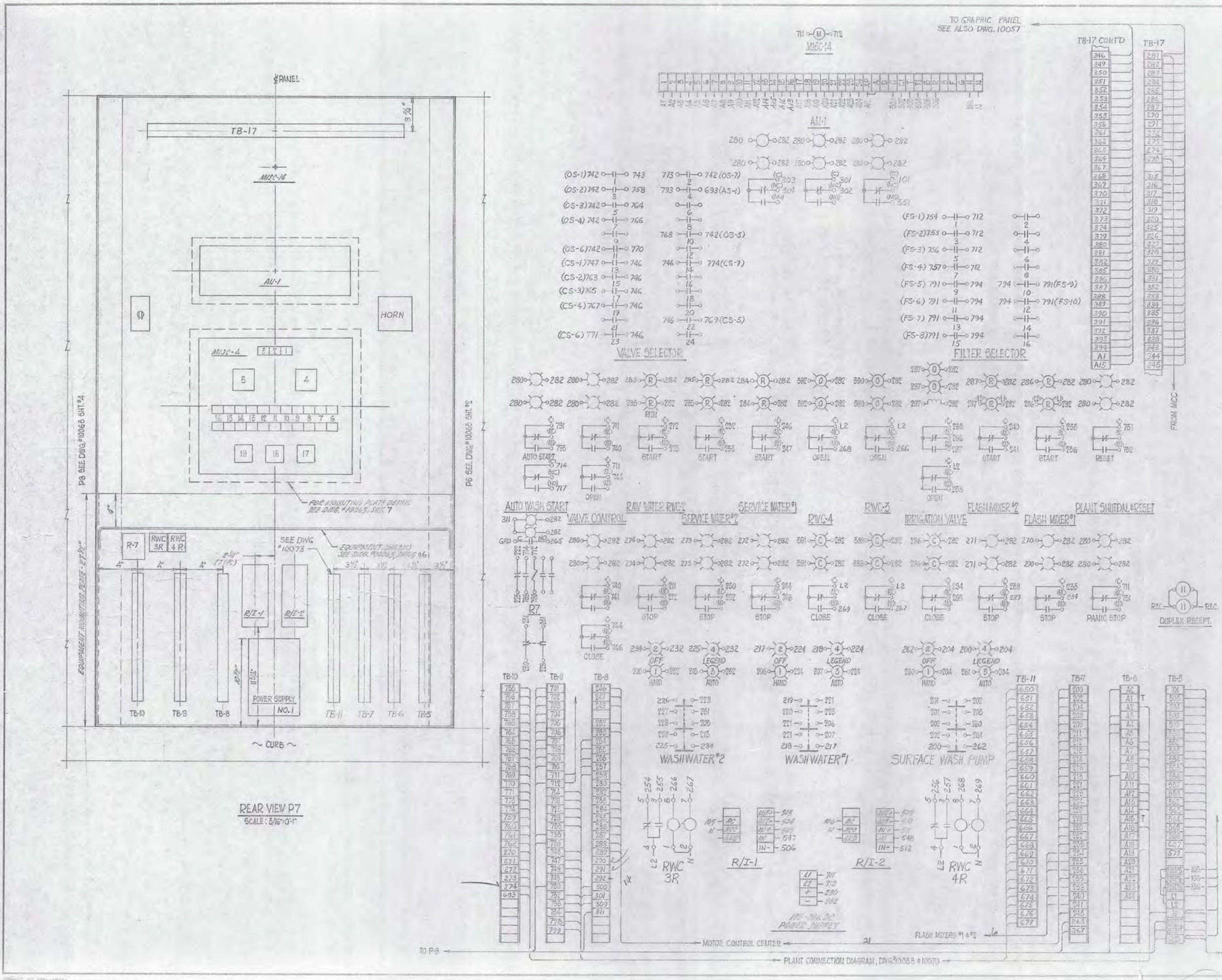
1. LOOP #14 TW (GREEN) FROM TB-5 TO ALL INSTRUMENT GROUND BLOCKS
2. TIE ALL LIKE WIRE NUMBERS COMMON.
3. WIRE BUNDLE TO BE UNDONE FROM TB-5, COILED & TAPED IN THE PANEL FOR SHIPPING.
4. STAND OFF SOLENOID VALVES & 1/2" NIPPLE MOD. A MINIMUM OF 3" FROM MOUNTING PLATE. USE AREA CLEARED AS WIREWAY.

10063 Sh 2 of 7

REVISIONS			
NO.	DATE	BY	
1	8-9-68	RCD	
2	2-26-69	DLZ	
3	3-27-69	DLZ	
4			
5			

GOBLE-SAMPSON-ASSOC. DENVER, COLO.
P6-ELEVATION & CONNECTION DIAGR
GRAND JUNCTION WATER TREATMENT PLANT

DRAWN BY [illegible]	SCALE NOTED	MATERIAL
CHK'D	DATE	DRAWING NO. 10063
TRACED	APP'D	


TO GRAPHIC PANEL
SEE ALSO DWG. 10057
MISC-14
AN-1
℄PANEL
TB-17
HORN
MISC-4
R-7
RWC 3R
RWC 4R
SEE DWG #10073
R/I-1
R/I-2
POWER SUPPLY NO. 1
TB-10
TB-9
TB-8
TB-11
TB-7
TB-6
TB-5
~ CURB ~
P8 SEE DWG. #10066 SHT. #4
P6 SEE DWG. #10066 SHT. #2
EQUIPMENT MOUNTING PLATE - 27 1/2"
REAR VIEW P7
SCALE: 3/16"=1'-0"
VALVE SELECTOR
FILTER SELECTOR
TB-17 CONT'D
FROM MCC
AUTO WASH START
VALVE CONTROL
RAW WATER RWC-2
SERVICE WATER #2
SERVICE WATER #1
RWC-4
RWC-5
IRRIGATION VALVE
FLASH MIXER #2
FLASH MIXER #1
PLANT SHUTDOWN & RESET
START
OPEN
CLOSE
STOP
RESET
PANIC STOP
AUTO START
DUPLEX RECEPT.
REC.
OFF
HAND
AUTO
LEGEND
WASHWATER #2
WASHWATER #1
SURFACE WASH PUMP
RWC 3R
RWC 4R
R7
MOTOR CONTROL CENTER
PLANT CONNECTION DIAGRAM, DWG #10068 & 10070
FLASH MIXERS #1 & #2
TO P-8
FROM P-6

EQUIPMENT LEGEND

MISC-14 CLOCK
AN-1 ANNUNCIATOR, ROCHESTER [illegible]
MISC- WASH WATER PROGRAMMER (CONSISTING OF THE FOLLOWING)
1 - TURBIDITY RESET, MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
2 - [illegible], MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
3 - TEST, MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
4 - FILTER SELECTOR, G.E. TYPE SBM SW. (16 POS.) SEE DEVELOPMENT
5 - VALVE SELECTOR, G.E. TYPE SBM SW. (9 POS.) SEE DEVELOPMENT
6 - PLANT SHUTDOWN & RESET, (2) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
7 - FLASH MIXER #1, (2) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
8 - FLASH MIXER #2, (2) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063
9 - IRRIGATION VALVE, (1) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #2045 W/(2) 1P. DT SW. #2072 & (1) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063

10 - RWC-5
11 - RWC-4 } (2) MICRO SWITCH SHORT BARRIER MOUNTED OPERATOR INDICATOR #201 W/1P. DT SWITCH #2063

12 - SERVICE WATER #1
13 - SERVICE WATER #2
14 - RAW WATER RWC-2 } (2) MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063

15 - VALVE CONTROL, (2) MICRO SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/1P. DT SWITCH #2072 - TYP. OPEN & CLOSE.

16 - AUTO WASH START, MICRO-SWITCH SHORT BARRIER MOUNTED OPERATOR-INDICATOR #201 W/ 1P. DT SW. #2063

17 - SURFACE WASH
18 - WASH WATER #1
19 - WASH WATER #2 } MICRO-SWITCH 3 POS. SELECTOR SW. GROUP [illegible] W/ 5000CA1 [illegible]

R/I-1&2 - RESISTANCE/CURRENT TRANSMITTER, TRANSMATION INC. SERIES 620C

– 100-28V D.C. POWER SUPPLY, GATES MODEL L28-5.

TB-5
TB-6
TB-7
TB-8
TB-9
TB-10
TB-11
TB-17 } ALLEN-BRADLEY TERMINAL STRIP #1492-F3

Φ DUPLEX RECEPTACLE, HUBBELL #5252 W/ HANDY BOX W/COVER.
R-7 CONTROL RELAY, ALLEN-BRADLEY 300V. #700N600-A1 W/#700CH2 OVERLAP CONTACT KIT.
FUSE TERMINAL BLOCKS, ALLEN-BRADLEY #1492-CE6
RWC-3R, 4R, LINE ELECTRIC # RLH1A.

DRAWING NOTES:

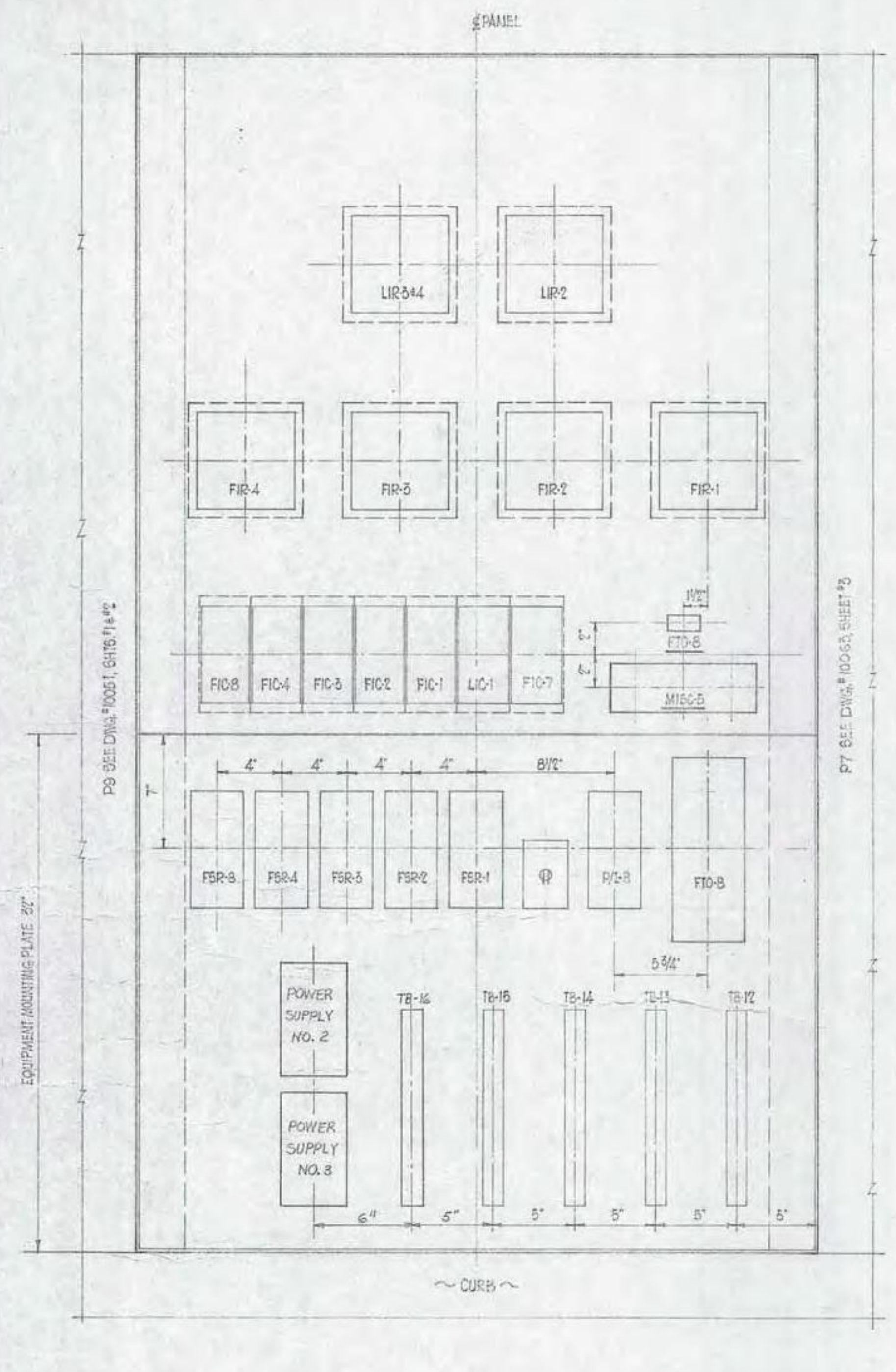
1. LOOP #16 TW GREEN FROM TB-5 TO ALL SWITCHBOARD GROUND POINTS.
2. [illegible]
3. T-BESIDE TB# MEANS - TEST PURPOSES ONLY.

10063 Sh 3 of 9

REVISIONS		
NO.	DATE	BY
1	10-5-68	RCD
2	2-26-69	DLL
3	3-4-69	DLL
4	3-27-69	DLL
5		

GOBLE SAMPSON ASSOC. [illegible]
P7 ELEVATION & CONNECTION DIAGRAM
[illegible]

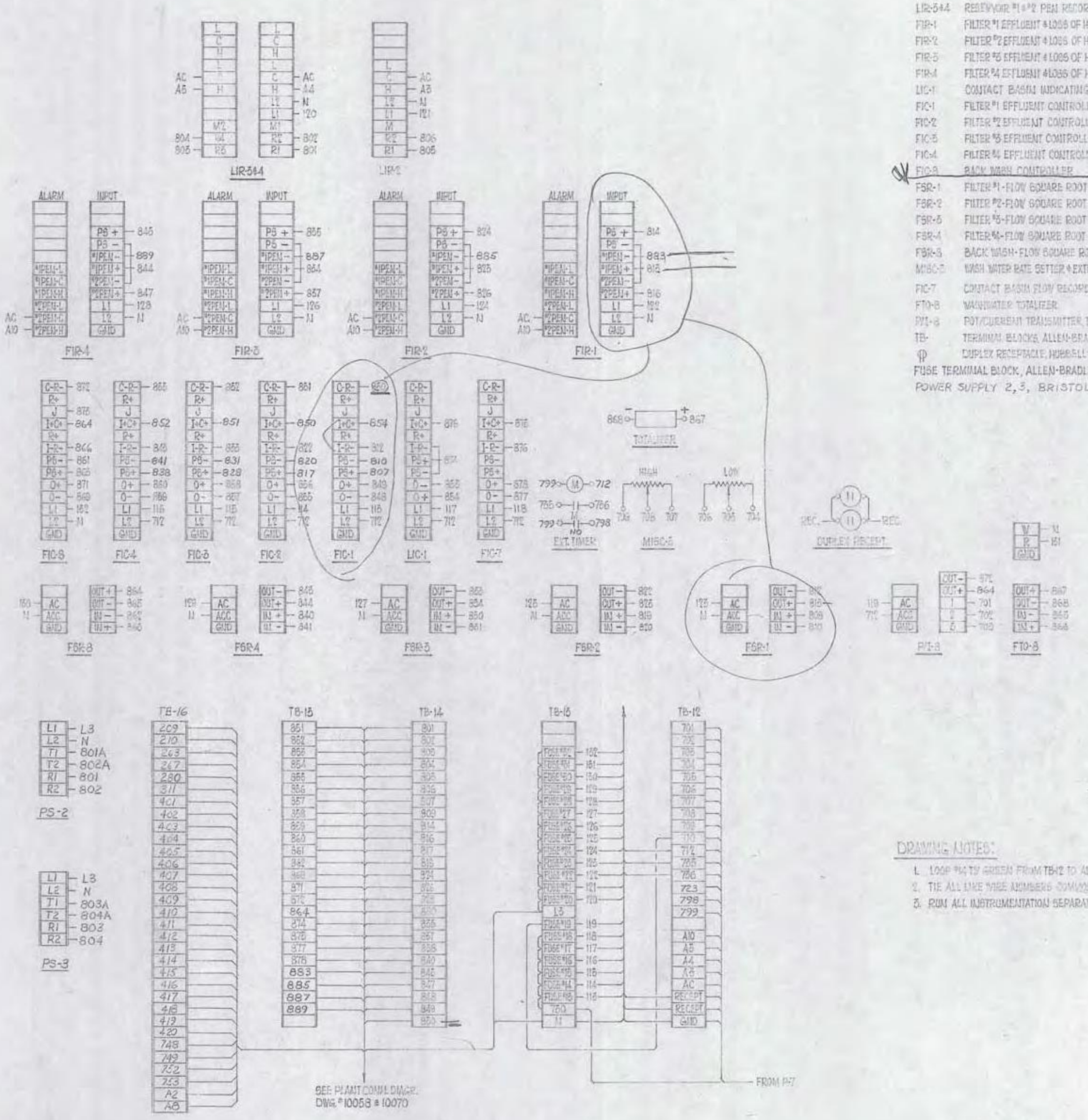
DRAWN BY [illegible] | SCALE [illegible] | MATERIAL
CHK'D | DATE | DRAWING NO.
TRACED | APP'D



℄ PANEL
LIR-3&4
LIR-2
FIR-4
FIR-3
FIR-2
FIR-1
FIC-8
FIC-4
FIC-3
FIC-2
FIC-1
LIC-1
FIC-7
FTQ-8
MISC-5
FSR-5
FSR-4
FSR-3
FSR-2
FSR-1
PI/I-8
FTQ-8
POWER SUPPLY NO. 2
POWER SUPPLY NO. 3
TB-16
TB-15
TB-14
TB-13
TB-12
4"
8½"
5¾"
6"
5"
~CURB~
P9 SEE DWG. #10051, SHT6. #1 & #2
P7 SEE DWG. #10063, SHEET #3
EQUIPMENT MOUNTING PLATE 20"

REAR VIEW P8

SCALE: 3/16"=1'-0"



LIR-3&4
LIR-2
ALARM
INPUT
FIR-4
FIR-3
FIR-2
FIR-1
FIC-8
FIC-4
FIC-3
FIC-2
FIC-1
LIC-1
FIC-7
TOTALIZER
EXT. TIMER
MISC-5
HIGH
LOW
DUPLEX RECEPT.
FSR-5
FSR-4
FSR-3
FSR-2
FSR-1
PI/I-8
FTQ-8
PS-2
PS-3
TB-16
TB-15
TB-14
TB-13
TB-12
SEE PLANT CONN. DIAGR. DWG. #10068 & 10070
FROM P-7

EQUIPMENT LEGEND

LIR-2	MANTEY HEIGHTS LEVEL RECORDER
LIR-3&4	RESERVOIR #1 & #2 PEN RECORDER
FIR-1	FILTER #1 EFFLUENT & LOSS OF HEAD RECORDER
FIR-2	FILTER #2 EFFLUENT & LOSS OF HEAD RECORDER
FIR-3	FILTER #3 EFFLUENT & LOSS OF HEAD RECORDER
FIR-4	FILTER #4 EFFLUENT & LOSS OF HEAD RECORDER
LIC-1	CONTACT BASIN INDICATING CONTROLLER
FIC-1	FILTER #1 EFFLUENT CONTROLLER
FIC-2	FILTER #2 EFFLUENT CONTROLLER
FIC-3	FILTER #3 EFFLUENT CONTROLLER
FIC-4	FILTER #4 EFFLUENT CONTROLLER
FIC-8	BACK WASH CONTROLLER
FSR-1	FILTER #1-FLOW SQUARE ROOT EXTRACTOR
FSR-2	FILTER #2-FLOW SQUARE ROOT EXTRACTOR
FSR-3	FILTER #3-FLOW SQUARE ROOT EXTRACTOR
FSR-4	FILTER #4-FLOW SQUARE ROOT EXTRACTOR
FSR-5	BACK WASH-FLOW SQUARE ROOT EXTRACTOR
MISC-5	WASH WATER RATE SETTER & EXTENSION TIMER
FIC-7	CONTACT BASIN FLOW RECORDER
FTQ-8	WASHWATER TOTALIZER
PI/I-8	POT/CURRENT TRANSMITTER, TRANSMATION INC. SERIES 55-4T
TB-	TERMINAL BLOCKS, ALLEN-BRADLEY #1492-F6
⏀	DUPLEX RECEPTACLE, HUBBELL #5252 IN HANDY BOX W/COVER.

FUSE TERMINAL BLOCK, ALLEN-BRADLEY #1492-CE6

POWER SUPPLY 2,3, BRISTOL 9J1.

DRAWING NOTES:

1. LOOP #14 TW GREEN FROM TB-12 TO ALL INSTRUMENT GROUND BLOCKS.
2. TIE ALL LIKE WIRE NUMBERS COMMON.
3. RUN ALL INSTRUMENTATION SEPARATE FROM POWER.

10063 Sh 4 of 7

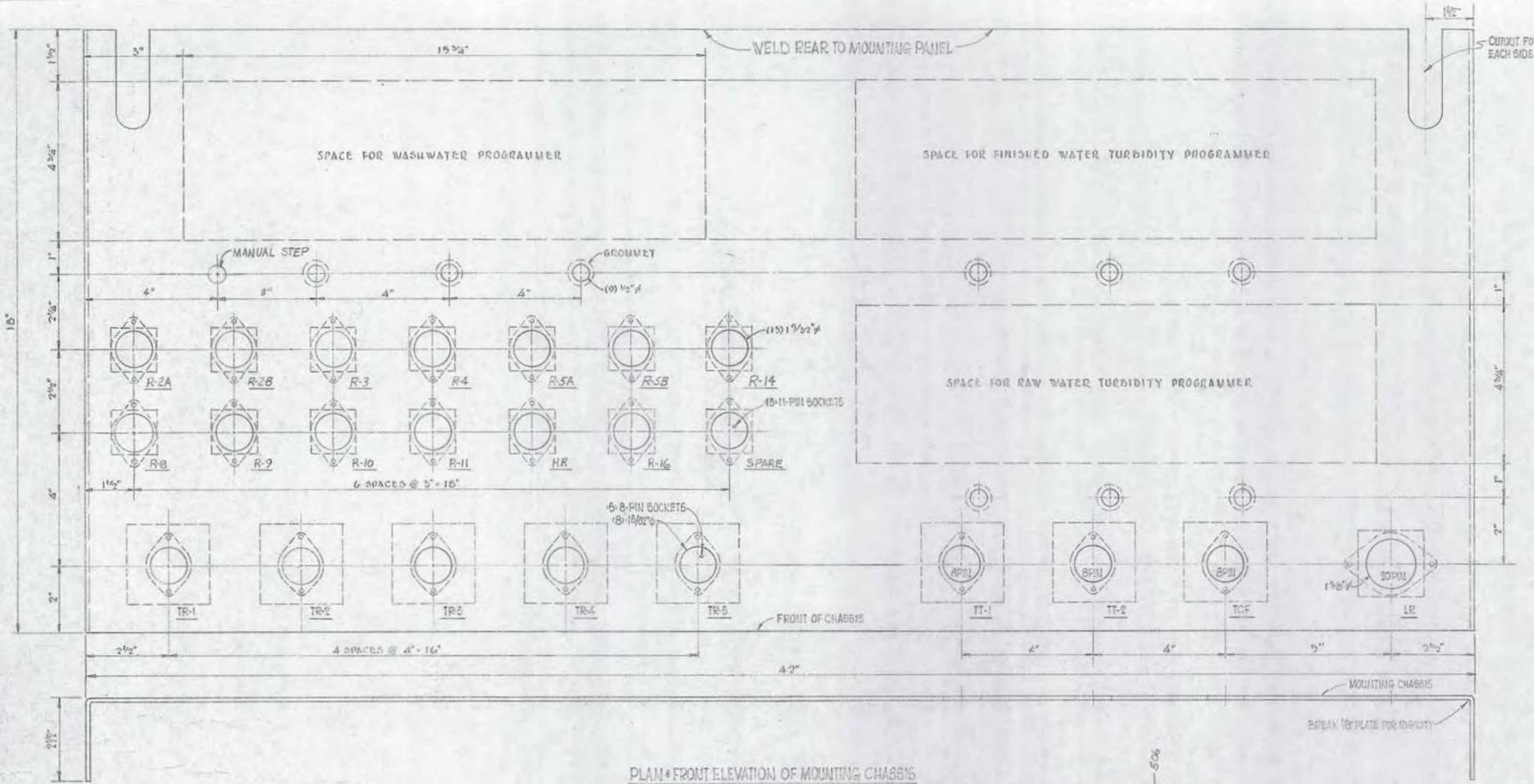
REVISIONS		
NO.	DATE	BY
1	9-18-68	RCD
2	2-26-69	DLE
3	3-26-69	DLE
4		
5		

GOBLE-SAMPSON ASSOC. DENVER, COLO.

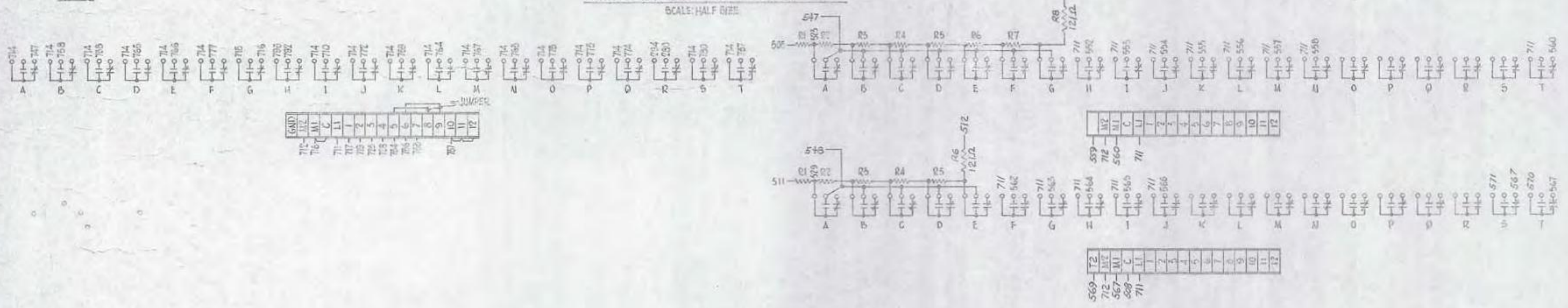
P8-ELEVATION & CONNECTION DIAGR.

GRAND JUNCTION WATER TREATING PLANT

DRAWN BY DUNHILL	SCALE NOTED	MATERIAL
CHK'D	DATE	DRAWING NO.
TRACED	APP'D	


WELD REAR TO MOUNTING PANEL
CUTOUT FOR WIREWAY EACH SIDE AS REQ'D.
SPACE FOR WASHWATER PROGRAMMER
SPACE FOR FINISHED WATER TURBIDITY PROGRAMMER
SPACE FOR RAW WATER TURBIDITY PROGRAMMER
MANUAL STEP
GROMMET
R-2A
R-2B
R-3
R4
R-5A
R-5B
R-14
R-8
R-9
R-10
R-11
HR
R-16
SPARE
(15)-11-PIN SOCKETS
6 SPACES @ 3" = 18"
(5)-8-PIN SOCKETS
TR-1
TR-2
TR-3
TR-4
TR-5
TT-1
TT-2
TCF
LR
8PIN
20PIN
FRONT OF CHASSIS
4 SPACES @ 4" = 16"
42"
18"
MOUNTING CHASSIS

PLAN & FRONT ELEVATION OF MOUNTING CHASSIS
SCALE: HALF SIZE


A
B
C
D
E
F
G
H
I
J
K
L
M
N
O
P
Q
R
S
T
JUMPER

TOP VIEW OF MOUNTING CHASSIS

EQUIPMENT LEGEND

1. TURBIDITY PROGRAMMER, AGASTAT #2962AA50B -(1) REQ'D. & WASHWATER PROGRAMMER, AGASTAT #2962AB20B -(2) REQ'D. & (100) PROGRAMMER PINS EACH.
2. TT-1, TT-2, TIME DELAY RELAY, 120V AC COIL, OCTAL BASE, PLUG IN AGASTAT #2412-AG -(2) REQ'D.
3. TR-1, 2, 3, 4 & 5, TIME DELAY RELAYS, 120V AC COIL, OCTAL BASE, PLUG IN AGASTAT #2412-AF -(5) REQ'D.
4. TCF - TIME DELAY RELAY, 120V AC COIL, OCTAL BASE, PLUG IN AGASTAT #2422-AF -(1) REQ'D.
5. LR - LATCH RELAY, 115 AC COIL, 3PDT CONTACTS, PLUG IN BASE, POLYSTYRENE COVER, LINE ELECTRIC #RLH15A -(1) REQ'D.
6. BALANCE OF CONTROL RELAYS EXCEPT R7 ARE 115V AC COIL-3PDT CONTACTS PLUG IN BASE, POLYSTYRENE COVER, LINE ELECTRIC #MCH3A -(15) REQ'D.
7. AMPHENOL SOCKETS #77-MIP-20, 20 PIN TUBE -(1) REQ'D.
8. AMPHENOL SOCKETS #77-MIP-11, 11 PIN TUBE -(15) REQ'D.
9. AMPHENOL SOCKETS #77-MIP-8, 8 PIN TUBE -(8) REQ'D.
10. MANUAL STEP P.B., ALLEN-BRADLEY #800T-A1A

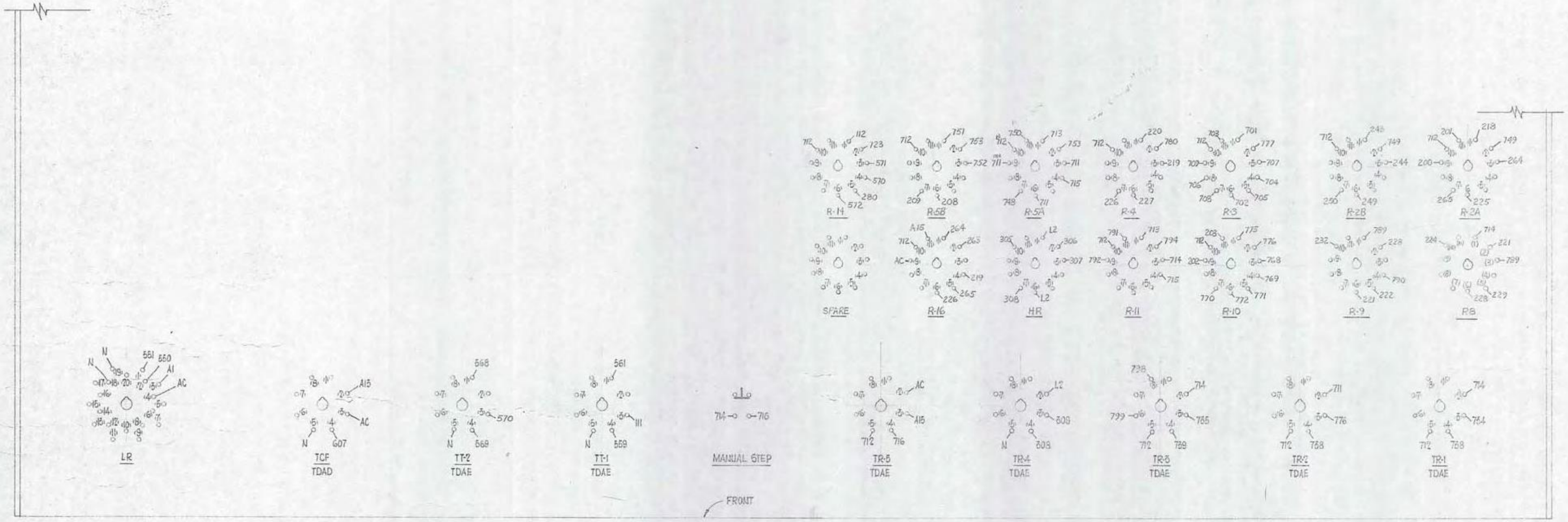
NOTES:

1. WORK THIS DWG W/10065, SHT. #5 & SHT. #6
2. ALL WIRE BUNDLING TO BE DONE ON BOTTOM SIDE OF MTG. CHASSIS. WIRES FOR PROGRAMMERS FEED THRU 1/2" HOLES DRILLED IN CHASSIS.
3. WIRE ALL LIKE NUMBERS COMMON.

10063 Sh 5 of 7

REVISIONS		
NO.	DATE	BY
1	10-2-68	RCD
2	2-26-69	DLZ
3	5-27-69	DLZ
4		
5		

GOBLE-SAMPSON-ASSOC. DENVER, COLO.
MOUNTING CHASSIS LAYOUT & CONN. DIAGRAM
GRAND JUNCTION WATER TREATMENT PLANT
DRAWN BY CONNELL
SCALE NOTED
MATERIAL
CHK'D
DATE
DRAWING NO.
TRACED
APP'D


R-14
R-5B
R-5A
R-4
R-3
R-2B
R-2A
SPARE
R-16
HR
R-11
R-10
R-9
R-8
LR
TCF
TDAD
TT-2
TDAE
TT-1
TDAE
MANUAL STEP
714
716
TR-5
TDAE
TR-4
TDAE
TR-3
TDAE
TR-2
TDAE
TR-1
TDAE
FRONT

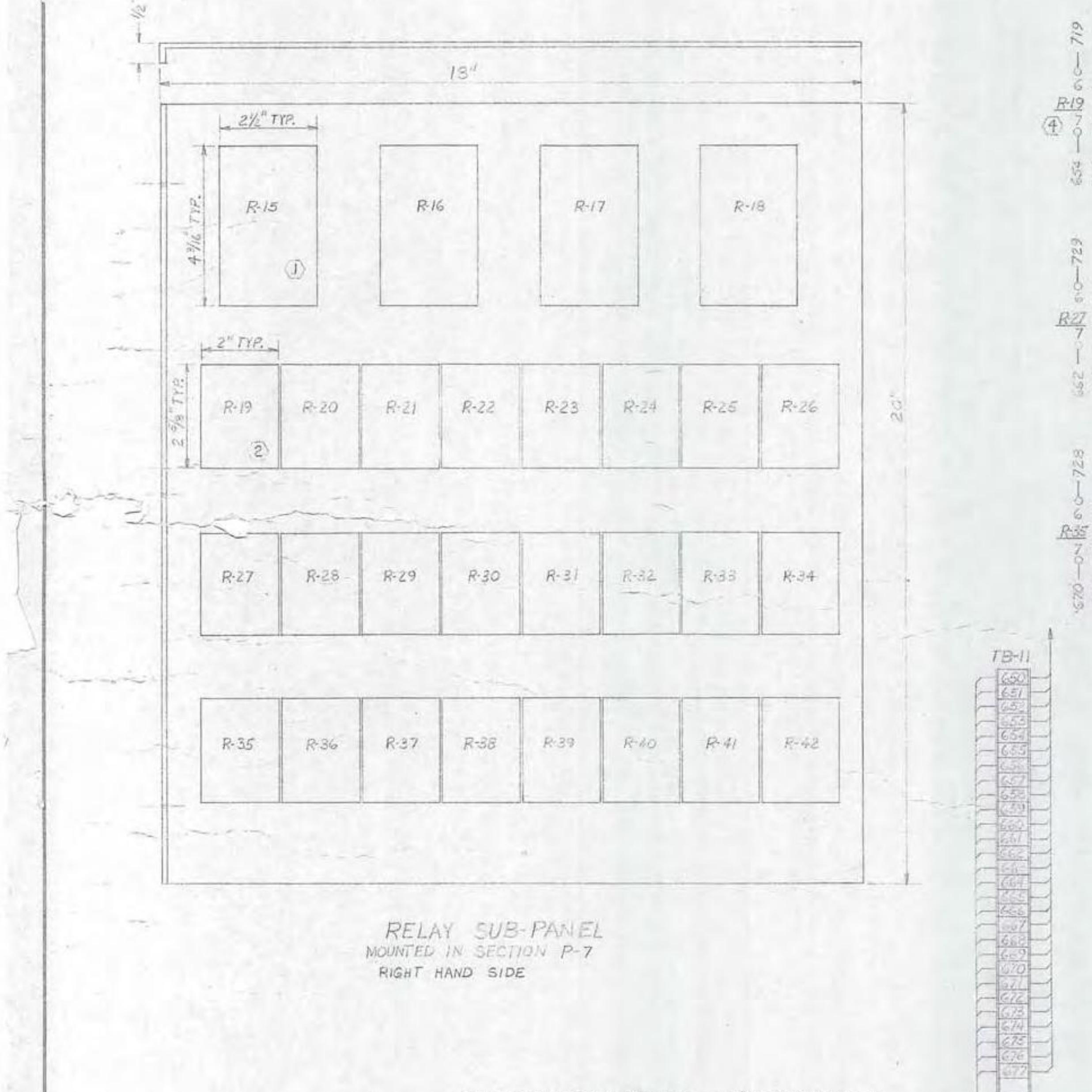
BOTTOM VIEW OF MOUNTING CHASSIS

NOTES:

1. WORK THIS DRAWING W/10066, SHT. #5
2. WIRE ALL LIKE NUMBERS COMMON.

10067 Sh 6 of 7

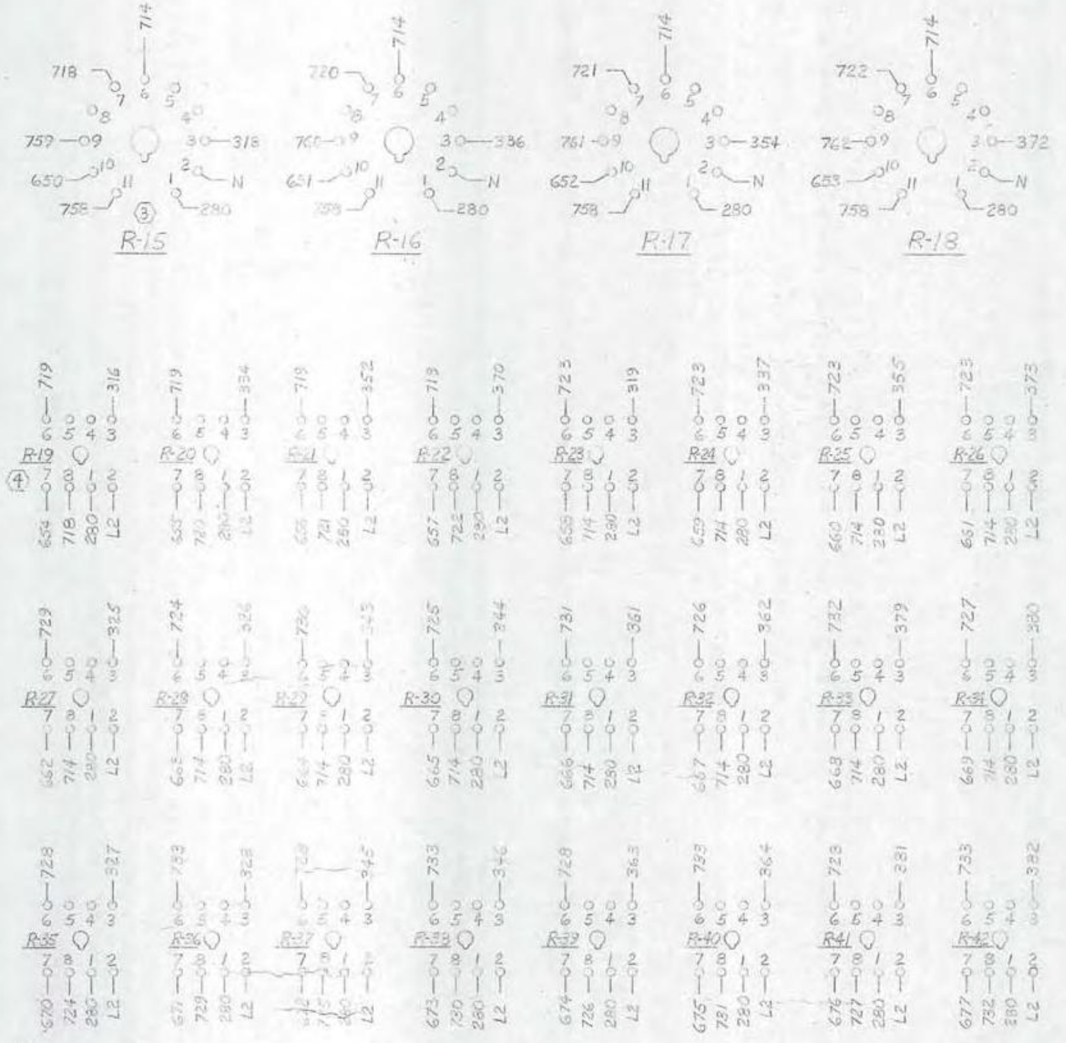
REVISIONS			GOBLE-SAMPSON-ASSOC. DENVER, COLORADO		
NO.	DATE	BY	MOUNTING CHASSIS LAYOUT & CONN. DIAGRAMS GRAND JUNCTION WATER TREATMENT PLANT		
1	2-26-69	DLZ	DRAWN BY CUNHILL	SCALE NONE	MATERIAL
2	3-27-69	DLZ	CHK'D	DATE	DRAWING
3			TRACED	APP'D	
4					
5					


1/2"
18"
2 1/2" TYP.
4 3/16" TYP.
R-15
①
R-16
R-17
R-18
2" TYP.
2 7/8" TYP.
R-19
②
R-20
R-21
R-22
R-23
R-24
R-25
R-26
20"
R-27
R-28
R-29
R-30
R-31
R-32
R-33
R-34
R-35
R-36
R-37
R-38
R-39
R-40
R-41
R-42
TB-11
650
651
652
653
654
655
656
657
658
659
660
661
662
663
664
665
666
667
668
669
670
671
672
673
674
675
676
677

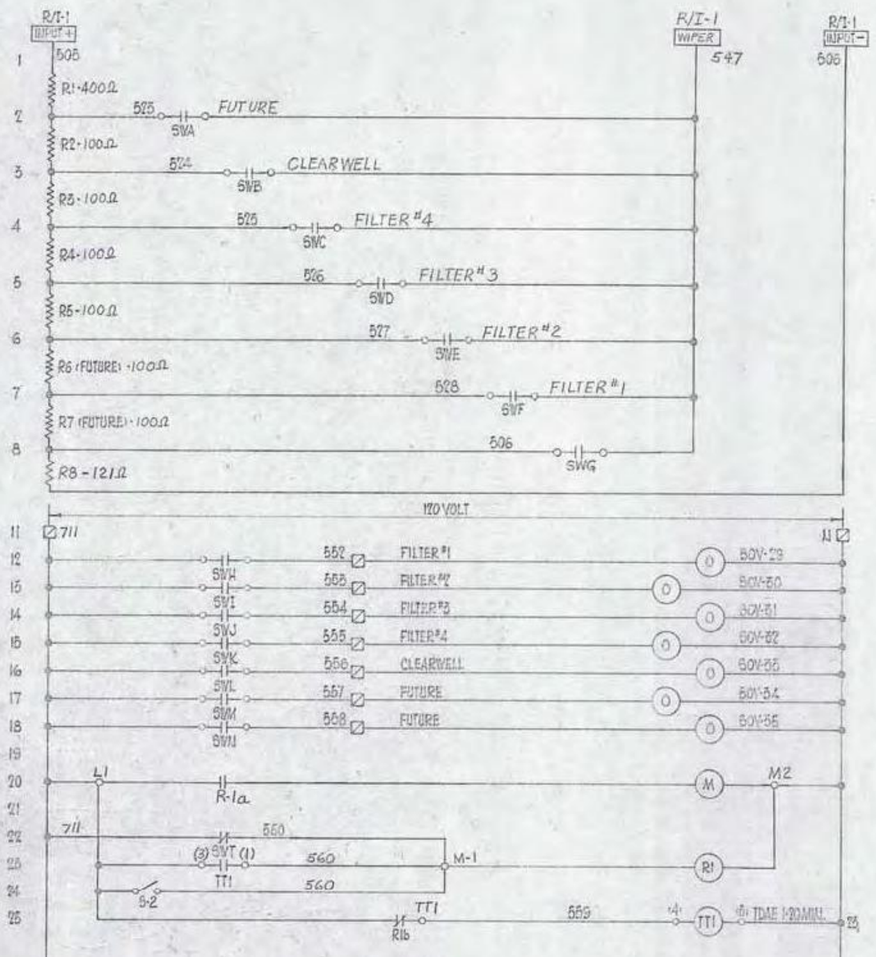
RELAY SUB-PANEL
MOUNTED IN SECTION P-7
RIGHT HAND SIDE

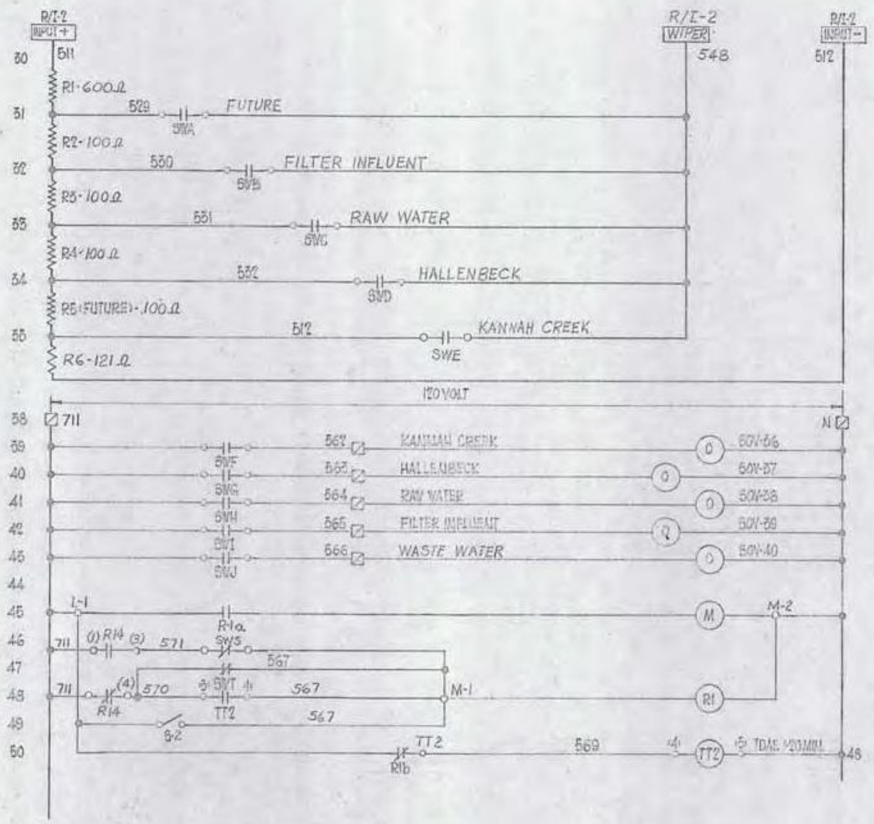
PLANT CONNECTION DIAGRAM, DWG# 10058 & 10070

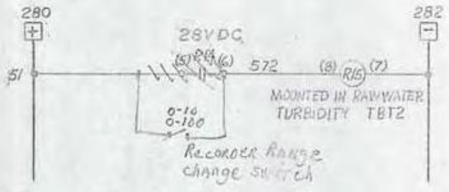
LOCATED CENTER OF PANEL P-7
REFER TO DWG# 10063 3 of 7


718
714
759
318
650
N
758
280
③
R-15
720
714
760
336
651
N
758
280
R-16
721
714
761
354
652
N
758
280
R-17
722
714
762
372
653
N
758
280
R-18
R-19
④
R-20
R-21
R-22
R-23
R-24
R-25
R-26
R-27
R-28
R-29
R-30
R-31
R-32
R-33
R-34
R-35
R-36
R-37
R-38
R-39
R-40
R-41
R-42
L2

WIRING DIAGRAM

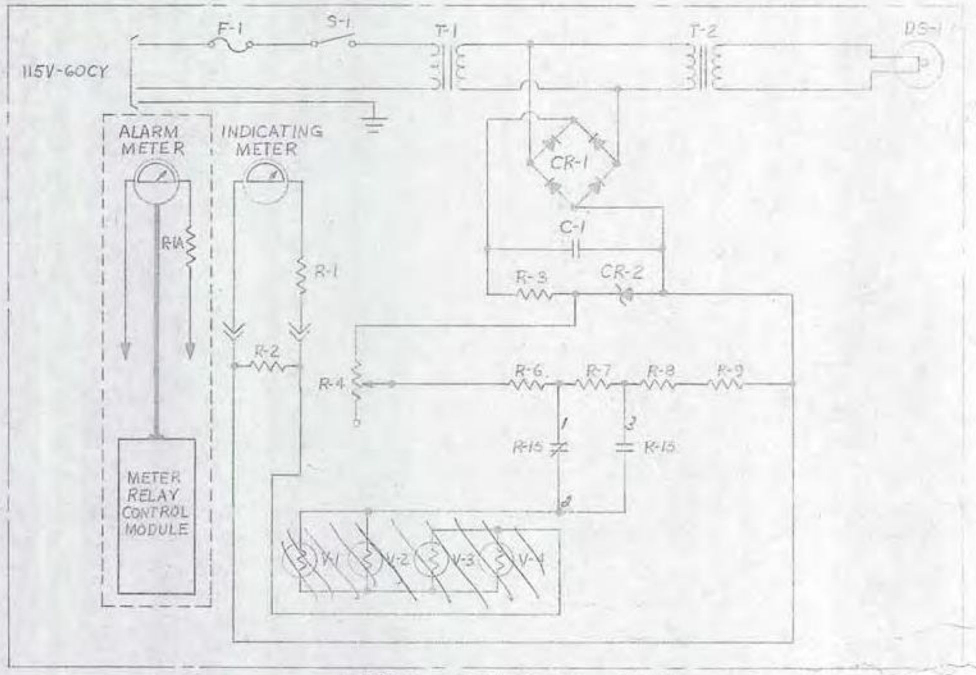

R/I-1 INPUT +
R/I-1 WIPER
R/I-1 INPUT -
505
547
506
R1-400Ω
R2-100Ω
R3-100Ω
R4-100Ω
R5-100Ω
R6 (FUTURE)-100Ω
R7 (FUTURE)-100Ω
R8-121Ω
FUTURE
CLEARWELL
FILTER #4
FILTER #3
FILTER #2
FILTER #1
SWA
SWB
SWC
SWD
SWE
SWF
SWG
120 VOLT
711
N
FILTER #1
FILTER #2
FILTER #3
FILTER #4
CLEARWELL
FUTURE
FUTURE
SOV-29
SOV-30
SOV-31
SOV-32
SOV-33
SOV-34
SOV-35
M
M2
R-1a
R1
M-1
TT1
R1b
TDAE 10 MIN.


R/I-2 INPUT +
R/I-2 WIPER
R/I-2 INPUT -
511
548
512
R1-600Ω
R2-100Ω
R3-100Ω
R4-100Ω
R5 (FUTURE)-100Ω
R6-121Ω
FUTURE
FILTER INFLUENT
RAW WATER
HALLENBECK
KANNAH CREEK
SWA
SWB
SWC
SWD
SWE
120 VOLT
711
N
KANNAH CREEK
HALLENBECK
RAW WATER
FILTER INFLUENT
WASTE WATER
SOV-36
SOV-37
SOV-38
SOV-39
SOV-40
M
M-2
R1a
R14
571
567
570
TT2
M-1
R1
R1b
569
TDAE 10 MIN.


280
282
28VDC
572
R15
MOUNTED IN RAW WATER TURBIDITY TBT2
0-16
0-160
Recorder Range change switch

EQUIPMENT LEGEND

1. RESISTORS R1 THRU R7 ARE +OR- 5%, ½ WATT, 300V. OHMS AS NOTED.


115V-60CY
F-1
S-1
T-1
T-2
DS-1
ALARM METER
INDICATING METER
R1A
R-1
R-2
R-4
CR-1
C-1
R-3
CR-2
R-6
R-7
R-8
R-9
R-15
METER RELAY CONTROL MODULE
V-1
V-2
V-3
V-4

TBT2 MODIFICATION ONLY

PANEL P6

		FILTER #1	FILTER #2	FILTER #3	FILTER #4	CLEARWELL	FUTURE	R/I WIPER INPUT	FILTER #1 SAMPLE	FILTER #2 SAMPLE	FILTER #3 SAMPLE	FILTER #4 SAMPLE	CLEARWELL SAMPLE	FUTURE SAMPLE	FUTURE SAMPLE	SPARE	SPARE	SPARE	SPARE	SPARE	HOME	
STEP NUMBER	CONTROL TO ADVANCE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
1	TR							X	X												X	
2	TR						X			X											X	
3	TR					X					X										X	
4	TR				X							X									X	
5	TR			X									X								X	
6	SWT		X											X								**
7	SWT	X													X							**
8	SWT																					
9	SWT																					
10	SWT																					
11	SWT																					
12	SWT																					

X - INDICATES SWITCH ACTUATION.

** TO ACTIVATE TWO FUTURE POSITION INSERT DRUM PROGRAMMER PINS IN POSITIONS INDICATED AND CONNECT SAMPLE LINES TO BULKHEAD FITTINGS PROVIDED.

FINISHED WATER TURBIDITY PROGRAMMER

PANEL P6

		KANNAH CREEK	HALLENBECK	RAW WATER	FILTER INFLUENT	R/I WIPER INPUT	KANNAH CREEK SAMPLE	HALLENBECK SAMPLE	RAW WATER SAMPLE	FILTER INFL. SAMPLE	WASTE WATER SAMPLE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	SPARE	HOME	
STEP NUMBER	CONTROL TO ADVANCE	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	
1	TR					X	X													X	X	
2	TR				X			X												X	X	
3	TR			X					X											X	X	
4	TR		X							X										X	X	
5	TR	X									X											**
6	SWT																					
7	SWT																					
8	SWT																					
9	SWT																					
10	SWT																					
11	SWT																					
12	SWT																					

X - INDICATES SWITCH ACTUATION.

** - TO ACTIVATE FUTURE POSITION INSERT DRUM PROGRAMMER PINS IN POSITIONS INDICATED AND CONNECT SAMPLE LINES TO BULKHEAD FITTINGS PROVIDED.

RAW WATER TURBIDITY PROGRAMMER

PANEL P6

DRAWING NOTES:

1. WHEN PURCHASING PROGRAMMERS, PROVIDE SUPPLIER WITH A COPY OF THIS DRAWING FOR PROGRAM DATA.
2. FOR PHYSICAL LOCATION & CONNECTIONS SEE DRAWINGS #10065 SHTS #3, #5 & #6.

Removed
Abandoned Prior To 1978
10065

REVISIONS		
NO.	DATE	BY
1	9-19-68	RCD
2	2-26-69	DLZ
3	5-21-69	DLZ
4		
5		

[illegible]

[illegible] PROGRAMMER SCHEMATIC

DRAWN BY [illegible] SCALE NONE

CHK'D DATE

TRACED APP'D

WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS	WIRE	LINE	REMARKS
1			81			161			241	10069	FLASH MIXER#2	321			401	-	10074	481			561	25	10065	641			721	9	10062	801	-	10067-SHEET#11	876	-	[illegible]	951		
2			82			162			242			322			402	-	10074	482			562	39	10065	642			722	10	10062	802	-	10067-SHEET#11	877	-	[illegible]	952		
3			83			163			243	10069	SERVICE WTR.PUMP#1	323			403	-	10074	483			563	40	10065	643			723	11	10062	803	-	10067-SHEET#11	878	-	[illegible]	953		
4			84			164			244	10069	SERVICE WTR.PUMP#1	324			404	-	10074	484			564	41	10065	644			724	15	10062	804	-	10067-SHEET#11	879	-	[illegible]	954		
5			85			165			245			325	-	10057-GRAPHIC	405	-	10074	485			565	42	10065	645			725	16	10062	805	-	10067-SHEET#12	880	-	[illegible]	955		
6			86			166			246	10069	SERVICE WTR.PUMP#1	326	-	10057-GRAPHIC	406	-	10074	486			566	45	10065	646			726	17	10062	806	-	10067-SHEET#12	881	-	[illegible]	956		
7			87			167			247	10069	SERVICE WTR.PUMP#1	327	-	10057-GRAPHIC	407	-	10074	487			567	47	10065	647			727	18	10062	807	-	10067-SHEET#16	882	-	10067, SHEET#16	957		
8			88			168			248			328	-	10057-GRAPHIC	408	-	10074	488			568	48	10065	648			728	19	10062	808	-	10067-SHEET#16	883	-	10067, SHEET#16	958		
9			89			169			249	10069	SERVICE WTR.PUMP#2	329	-	10057-GRAPHIC	409	-	10074	489			569	50	10065	649			729	21	10062	809	-	10067-SHEET#16	884	-	10067, SHEET#15	959		
10			90			170			250	10069	SERVICE WTR.PUMP#2	330	-	10057-GRAPHIC	410	-	10074	490			570	50	10065	650		10072	730	22	10062	810	-	10067-SHEET#16	885	-	10067, SHEET#15	960		
11			91			171			251			331	-	10057-GRAPHIC	411	-	10074	491			571	50	10065	651		10072	731	23	10062	811	-	10067-SHEET#16	886	-	10067, SHEET#14	961		
12			92			172			252	10069	SERVICE WTR.PUMP#2	332	-	10057-GRAPHIC	412	-	10074	492			572	51	10065	652		10072	732	24	10062	812	-	10067-SHEET#16	887	-	10067, SHEET#14	962		
13			93			173			253	10069	SERVICE WTR.PUMP#2	333	-	10057-GRAPHIC	413	-	10074	493			573			653		10072	733	21	10062	813	-	10067-SHEET#16	888	-	10067, SHEET#13	963		
14			94			174			254	10069	HAL.INFL-RVC-5	334	-	10057-GRAPHIC	414	-	10074	494			574			654		10072	734	25	10062	814	-	10067-SHEET#16	889	-	10067, SHEET#13	964		
15			95			175			255	10069	HAL.INFL-RVC-5	335	-	10057-GRAPHIC	415	-	10074	495			575			655		10072	735	26	10062	815	-	10067-SHEET#16	890		10052, SHEET#4	965		
16			96			176			256	10069	KAL.LOK INFL-RVC-4	336	-	10057-GRAPHIC	416	-	10074	496			576			656		10072	736	26	10062	816	-	10067-SHEET#16	891		10052, SHEET#4	966		
17			97			177			257	10069	KAL.LOK INFL-RVC-4	337	-	10057-GRAPHIC	417	-	10074	497			577			657		10072	737	27	10062	817	-	10067-SHEET#16	892		10052, SHEET#4	967		
18			98			178			258	10069	IRRIG.VALVE-SOV	338	-	10057-GRAPHIC	418	-	10074	498			578			658		10072	738	30	10062	818	-	10067-SHEET#16	893		10052, SHEET#3	968		
19			99			179			259			339			419	-	10074	499			579			659		10072	739	32	10062	819	-	10067-SHEET#15	894		10052, SHEET#3	969		
20			100			180			260	10069	SURF.WASH-PUMP	340			420	-	10074	500			580			660		10072	740	36	10062	820	-	10067-SHEET#15	895		10052, SHEET#3	970		
21			101	-	10067-SHEET#4	181			261	10069	SURF.WASH-PUMP	341			421			501	-	10067-SHEET#4	581			661		10072	741	36	10062	821	-	10067-SHEET#16	896		10052, SHEET#2	971		
22			102	-	10067-SHEET#4	182			262	10069	SURF.WASH-PUMP	342			422			502	-	10067-SHEET#4	582			662		10072	742	36	10062	822	-	10067-SHEET#15	897		10052, SHEET#2	972		
23			103	-	10067-SHEET#3	183			263	10069	SURF.WASH PUMP	343	-	10057-GRAPHIC	423			503	-	10067-SHEET#4	583			663		10072	743	36	10062	823	-	10067-SHEET#12	898		10052, SHEET#2	973		
24			104	-	10067-SHEET#3	184			264	10069	SURF.WASH PUMP	344	-	10057-GRAPHIC	424			504	-	10067-SHEET#4	584			664		10072	744	41	10062	824	-	10067-SHEET#13	899		10052, SHEET#1	974		
25			105	-	10067-SHEET#2	185			265	10069	SURF.WASH PUMP	345	-	10057-GRAPHIC	425			505	-	10067-SHEET#4	585			665		10072	745	41	10062	825	-	10067-SHEET#15	900		10052, SHEET#1			
26			106	-	10067-SHEET#1	186			266		10063, SHEET#3	346	-	10057-GRAPHIC	426			506	-	10067-SHEET#4	586			666		10072	746	41	10062	826	-	10067-SHEET#15	901		10052, SHEET#1			
27			107	-	10067-SHEET#7	187			267		10063, SHEET#3	347			427			507	-	10067-SHEET#3	587			667		10072	747	41	10062	827	-	10067-SHEET#15	902					
28			108	-	10067-SHEET#8	188			268		10063, SHEET#3	348			428			508	-	10067-SHEET#3	588			668		10072	748	47	10062	828	-	10067-SHEET#14	903		10052, SHEET#1			
29			109	-	10067-SHEET#9	189			269		10063, SHEET#3	349	-	10057-GRAPHIC	429			509	-	10067-SHEET#3	589			669		10072	749	47	10062	829	-	10067-SHEET#14	904		10052, SHEET#1			
30			110	-	10067-SHEET#10	190			270	10069	FLASH MIXER#1	350	-	10057-GRAPHIC	430			510	-	10067-SHEET#3	590			670		10072	750	49	10062	830	-	10067-SHEET#14	905		10052, SHEET#2			
31			111	11	10065	191			271	10069	FLASH MIXER#2	351	-	10057-GRAPHIC	431			511	-	10067-SHEET#3	591			671		10072	751	56	10062	831	-	10067-SHEET#14	906		10052, SHEET#2			
32			112	38	10065	192			272	10069	SERVICE WTR PUMP#1	352	-	10057-GRAPHIC	432			512	-	10067-SHEET#3	592			672		10072	752	56	10062	832	-	10067-SHEET#14	907					
33			113	-	10067-SHEET#21	193			273	10069	SERVICE WTR PUMP#2	353	-	10057-GRAPHIC	433			513	-	10067-SHEET#2	593			673		10072	753	56	10062	833	-	10067-SHEET#14	908					
34			114	-	10067-SHEET#20	194			274	10069	RAW WATER PUMP	354	-	10057-GRAPHIC	434			514	-	10067-SHEET#2	594			674		10072	754	56	10062	834	-	10067-SHEET#14	909					
35			115	-	10067-SHEET#19	195			275			355	-	10057-GRAPHIC	435			515	-	10067-SHEET#2	595			675		10072	755	57	10062	835	-	10067-SHEET#14						
36			116	-	10067-SHEET#18	196			276			356	-	10057-GRAPHIC	436			516	-	10067-SHEET#2	596			676		10072	756	[illegible]	[illegible]	836		10067-SHEET#14						
37			117	-	10067-SHEET#22	197			277			357			437			517	-	10067-SHEET#2	597			677		10072	757	59	10062	837		[illegible]						
38			118	-	10067-SHEET#22	198			278	10069	WASH WTR PUMP#1	358			438			518	-	10067-SHEET#2	598			678			758	61	10062	838	-	[illegible]						
39			119	-	10067-SHEET#17	199			279	10069	WASH WTR PUMP#1	359			439			519	-	10067-SHEET#2	599			679			759	61	10062	839	-	[illegible]						
40			120	-	10067-SHEET#11	200	10069	SURF.WASH PUMP	280	10069	GRAPHIC PNL-POS.	360			440			520	-	10067-SHEET#2	600			680			760	62	10062	840	-	10067-SHEET#18						
41			121	-	10067-SHEET#12	201	10069	SURF.WASH PUMP	281	10069	WASH WTR.PUMP#1	361	-	10057-GRAPHIC	441			521	-	10067-SHEET#2	601	-	10067-SHEET#7	681			761	63	10062	841	-	10067-SHEET#18						
42			122	-	10067-SHEET#16	202	10069	SURF.WASH PUMP	282	10069	GRAPHIC PNL-NEG.	362	-	10057-GRAPHIC	442			522	-	10067-SHEET#2	602	-	10067-SHEET#7	682			762	64	10062	842	-	10067-SHEET#12	917					
43			123	-	10067-SHEET#16	203	10069	SURF.WASH PUMP	283	10069	RAW WTR.PUMP	363	-	10057-GRAPHIC	443			523	2	10065	603	-	10067-SHEET#8	683			763	66	10062	843	-	10067-SHEET#15	918					
44			124	-	10067-SHEET#15	204	10069	SURF.WASH PUMP	284	10069	SERVICE WTR.PUMP#1	364	-	10057-GRAPHIC	444			524	3	10065	604	-	10067-SHEET#8	684			764	71	10062	844	-	10067-SHEET#18	919					
45			125	-	10067-SHEET#15	205	10069	WASH WTR.PUMP#2	285	10069	SERVICE WTR.PUMP#2	365			445			525	4	10065	605	-	10067-SHEET#8	685			765	76	10062	845	-	10067-SHEET#13	920					
46			126	-	10067-SHEET#14	206	10069	WASH WTR.PUMP#1	286	10069	FLASH MIXER#1	366			446			526	5	10065	606	-	10067-SHEET#8	686			766	81	10062	846	-	10067-SHEET#18	921					
47			127	-	10067-SHEET#14	207	10069	WASH WTR.PUMP#1	287	10069	FLASH MIXER#2	367	-	10057-GRAPHIC	447			527	6	10065	607	-	10067-SHEET#8	687			767	86	10062	847	-	10067-SHEET#21	922					
48			128	-	10067-SHEET#16	208	10069	RAW WTR.PUMP	288	10069	FLASH MIXER#1	368	-	10057-GRAPHIC	448			528	7	10065	608	-	10067-SHEET#9	688			768	91	10062	848	-	10067-SHEET#21	923					
49			129	-	10067-SHEET#18	209	10069	RAW WTR.PUMP	289	10069	FLASH MIXER#2	369	-	10057-GRAPHIC	449			529	51	10065	609	-	10067-SHEET#8	689			769	96	10062	849	-	10067-SHEET#21	924					
50			130	-	10067-SHEET#17	210	10069	RAW WTR.PUMP	290	10069	SERVICE WTR#1	370	-	10057-GRAPHIC	450			530	52	10065	610	-	10067-SHEET#8	690		10062	770	101	10062	850	-	10067-SHEET#21	925					
51			131	-	10067-SHEET#17	211	10069	RAW WTR.PUMP	291	10069	SERVICE WTR#2	371	-	10057-GRAPHIC	451			531	53	10065	611	-	10067-SHEET#10	691		10062	771	106	10062	851	-	10067-SHEET#21	926			1001		
52			132	-	10067-SHEET#17	212	10069	RAW WTR.PUMP	292	10069	RAW WATER PMP.	372	-	10057-GRAPHIC	452			532	54	10065	612	-	10067-SHEET#10	692		10062	772	102	10062	852	-	10067-SHEET#21	927			1002		
53			133	-	10067-SHEET#4	213	10069	RAW WTR.PUMP	293			373	-	10057-GRAPHIC	453			533	-	10067-SHEET#1	613	-	10067-SHEET#10	693		10062	773	111	10062	853	-	10067-SHEET#21	928			1003		
54			134	-	10067-SHEET#3	214	10069	RAW WTR.PUMP	294	10069	IRRIG.VALVE	374	-	10057-GRAPHIC	454			534	-	10067-SHEET#1	614	-	10071	694			774	116	10062	854	-	10067-SHEET#21	929			1004		
55			135			215	10069	WASH WTR.PUMP#2	295	10069	IRRIG.VALVE	375			455			535	-	10067-SHEET#6	615	-	10071	695			775	32	10062	855	-	10067-SHEET#20	930			1005		
56			136	-	10057-ALARM	216	10069	RAW WTR.PUMP	296	10069	IRRIG.VALVE	376			456			536	-	10067-SHEET#6	616	-	10071	696			776	32	10062	856	-	10067-SHEET#20	931			1006		
57			137			217	10069	WASH WTR.PUMP#1	297	10069	IRRIG.VALVE	377			457			537	-	10067-SHEET#6	617	-	10071	697			777	122	10062	857	-	10067-SHEET#18	932			1007		
58			138			218	10069	WASH WTR.PUMP#1	298	10069	WASH WTR.PUMP#2	378			458			538	-	10067-SHEET#6	618	-	10071	698			778			858	-	10067-SHEET#18	933			1008		
59			139			219	10069	WASH WTR.PUMP#1	299	10069	SURF.WASH PUMP	379	-	10057-GRAPHIC	459			539	-	10067-SHEET#6	619	-	10071	699			779			859	-	10067-SHEET#18	934			1009		
60			140			220	10069	WASH WTR.PUMP#1	300	-	10057-ALARM	380	-	10057-GRAPHIC	460			540	-	10067-SHEET#6	620	-	10071	700			780	134	10062	860	-	10067-SHEET#18	935			1010		
61			141			221	10069	WASH WTR.PUMP#1	301	-	10057-ALARM	381	-	10057-GRAPHIC	461			541	-	10067-SHEET#5	621	-	10071	701	-	10067-SHEET#17	781			861	-	10067-SHEET#17	936			1011		
62			142			222	10069	WASH WTR.PUMP#1	302	-	10057-ALARM	382	-	10057-GRAPHIC	462			542	-	10067-SHEET#5	622	-	10071	702	-	10067-SHEET#17	782			862	-	10067-SHEET#17	937			1012		
63			143			223	10069	WASH WTR.PUMP#1	303	-	10057-ALARM	383			463			543	-	10067-SHEET#5	623	-	10071	703	-	10067-SHEET#17	783	137	10062	863	-	10067-SHEET#17	938			1013		
64			144			224	10069	WASH WTR.PUMP#1	304	-	10057-ALARM	384			464			544	-	10067-SHEET#5	624	-	10071	704	-	10067-SHEET#17	784	137	10062	864	-	10067-SHEET#17	939			1014		
65			145			225	10069	WASH WTR.PUMP#2	305	-	10057-ALARM	385	-	10057-GRAPHIC	465			545	-	10067-SHEET#5	625	-	10071	705	-	10067-SHEET#17	785	138	10062	865	-	10067-SHEET#17	940			1015		
66			146			226	10069	WASH WTR.PUMP#2	306	-	10057-ALARM	386	-	10057-GRAPHIC	466			546	-	10067-SHEET#5	626	-	10071	706	-	10067-SHEET#17	786	139	10062	866	-	10067-SHEET#17	941			1016		
67			147			227	10069	WASH WTR.PUMP#2	307	-	10057-ALARM	387	-	10057-GRAPHIC	467			547		10067-SHEET#5	627	-	10071	707	-	10067-SHEET#17	787	139	10062	867	-	10067-SHEET#17	942			1017		
68			148			228	10069	WASH WTR.PUMP#2	308	-	10057-ALARM	388	-	10057-GRAPHIC	468			548		10067-SHEET#5	628			708	-	10067-SHEET#17	788	140	10062	868	-	10067-SHEET#17	943			1018		
69			149			229	10069	WASH WTR.PUMP#2	309	-	10057-ALARM	389	-	10057-GRAPHIC	469			549			629			709	-	10067-SHEET#17	789	141	10062	869	-	10067-SHEET#17	944			1019		
70			150	10054	HYDRO-PNEUMATIC TANK	230	10069	WASH WTR.PUMP#2	310	-	10057-ALARM	390	-	10057-GRAPHIC	470			550	-	10067-SHEET#4	630			710	-	10067-SHEET#17	790	141	10062	870	-	10067-SHEET#17	945			1020		
71			151	10054	HYDRO-PNEUMATIC TANK	231	10069	WASH WTR.PUMP#2	311			391	-	10057-GRAPHIC	471			551		10067-SHEET#4	631			711	1	10062	791	145	10062	871	-	10067-SHEET#17	946			1021		
72			152	10054	HYDRO-PNEUMATIC TANK	232	10069	WASH WTR.PUMP#2	312			392	-	10057-GRAPHIC	472			552	13	10065	632			712	1	10062	792	146	10062	872	-	10067-SHEET#17	947			1022		
73			153	10054	HYDRO-PNEUMATIC TANK	233	10069	FLASH MIXER#1	313			393	-	10057-GRAPHIC	473			553	15	10065	633			713	3	10062	793			873	-	10067-SHEET#17	948			1023		
74			154	10054	HYDRO-PNEUMATIC TANK	234	10069	WASH WTR.PUMP#2	314			394	-	10057-GRAPHIC	474			554	14	10065	634			714	3	10062	794	148	10062	874	-	10067-SHEET#24	949			1024		
75			155	10054	HYDRO-PNEUMATIC TANK	235	10069	FLASH MIXER#1	315	-	10057-GRAPHIC	395			475			555	15	10065	635			715	4	10062	795		10062	875	-	10067-SHEET#23	950			1025		
76			156	10054	HYDRO-PNEUMATIC TANK	236	10069	FLASH MIXER#1	316	-	10057-GRAPHIC	396			476			556	16	10065	636			716	5	10062	796		10062									
77			157	10054	HYDRO-PNEUMATIC TANK	237			317	-	10057-GRAPHIC	397			477			557	17	10065	637			717	6	10062	797		10062									
78			158	10054	HYDRO-PNEUMATIC TANK	238	10069	FLASH MIXER#2	318	-	10057-GRAPHIC	398			478			558	18	10065	638			718	-	10062	798		10062									
79			159	10054	HYDRO-PNEUMATIC TANK	239	10069	FLASH MIXER#2	319	-	10057-GRAPHIC	399			479			559	20	10065	639			719	7	10062	799		10062									
80			160	10054	HYDRO-PNEUMATIC TANK	240	10069	FLASH MIXER#2	320	-	10057-GRAPHIC	400			480			560	21	10065	640			720	8	10062	800											

10068

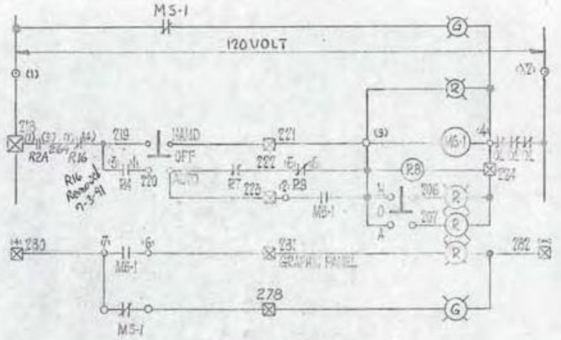
REVISIONS		
NO	DATE	BY
1	8-12-68	RCD
2	2-26-69	DLZ
3	3-4-69	DLZ
4	[illegible]	DLZ

GOBLE-SAMPSO

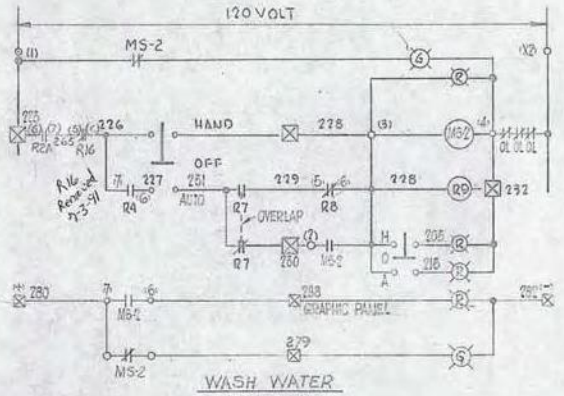
DRAWN BY

CHK'D

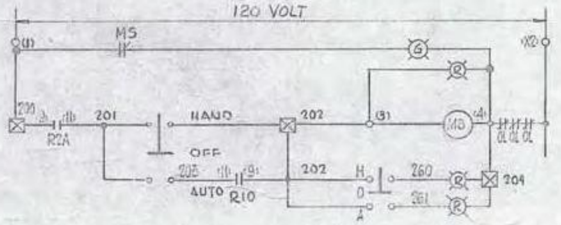
TRACED


MS-1
120 VOLT
HAND
OFF
AUTO
R2A
R16
R16 Removed 7-3-91
R4
R7
R8
MS-1
GRAPHIC PANEL
280
282
278

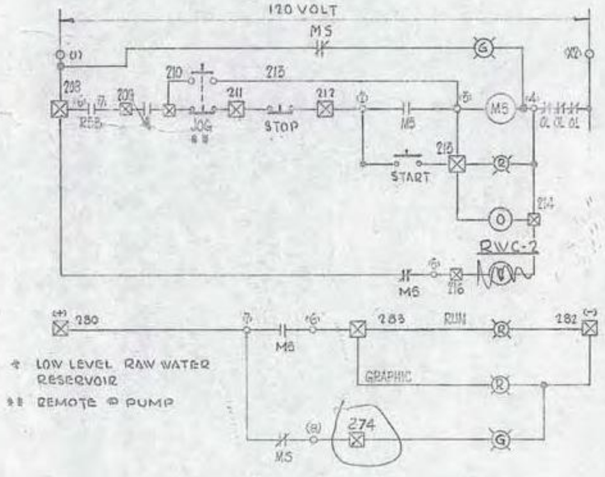
WASH WATER PUMP #1


120 VOLT
MS-2
HAND
OFF
AUTO
R2A
R16
R16 Removed 7-3-91
R4
R7
R8
OVERLAP
MS-2
GRAPHIC PANEL
280
279

WASH WATER PUMP #2

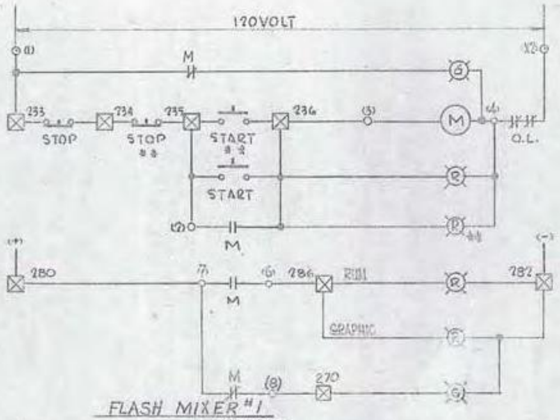

120 VOLT
MS
HAND
OFF
AUTO
R2A
R10
201
202
204

SURFACE WASH PUMP

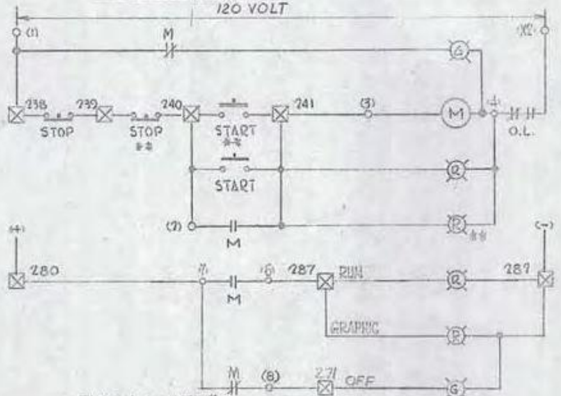

120 VOLT
MS
R2B
JOG
STOP
START
RWC-2
280
282
RUN
GRAPHIC
274

* LOW LEVEL RAW WATER RESERVOIR
** REMOTE @ PUMP

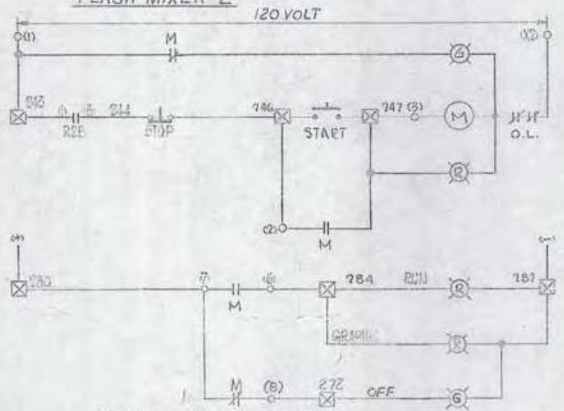
RAW WATER PUMP


120 VOLT
M
STOP
STOP
START
START
O.L.
280
282
RUN
GRAPHIC
270

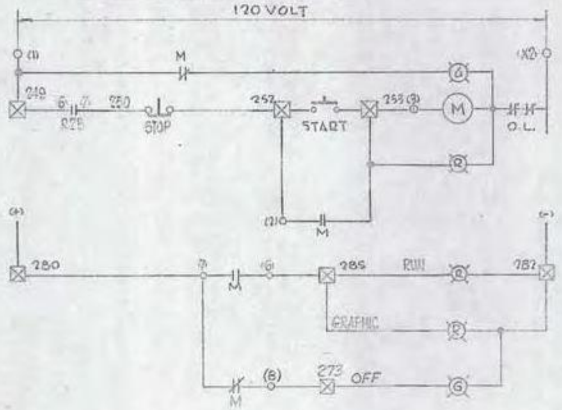
FLASH MIXER #1


120 VOLT
M
STOP
STOP
START
START
O.L.
280
287
RUN
GRAPHIC
271
OFF

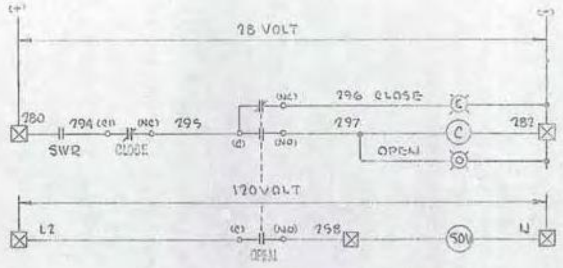
FLASH MIXER #2


120 VOLT
M
R2B
STOP
START
O.L.
280
284
RUN
GRAPHIC
272
OFF

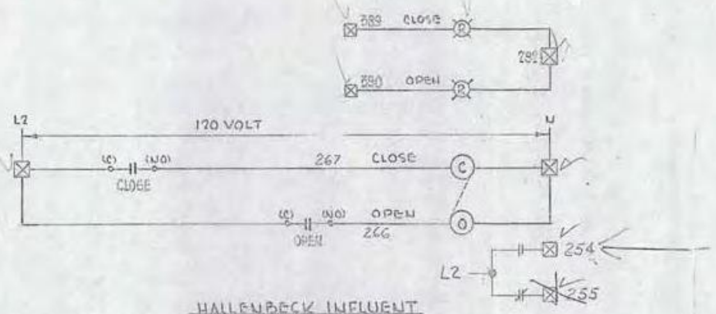
SERVICE WATER PUMP #1


120 VOLT
M
R2B
STOP
START
O.L.
280
285
RUN
GRAPHIC
273
OFF

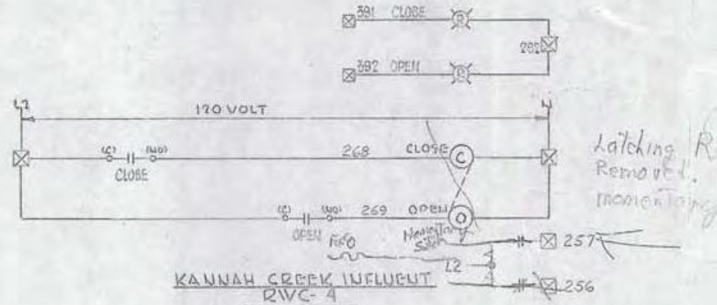
SERVICE WATER PUMP #2


28 VOLT
SWR
CLOSE
OPEN
120 VOLT
L2
N
OPEN
SOL

IRRIGATION VALVE


289 CLOSE
290 OPEN
283
L2
120 VOLT
N
CLOSE
267 CLOSE
OPEN
266
254
L2
255

HALLENBECK INFLUENT RWC-3


291 CLOSE
292 OPEN
L2
120 VOLT
N
CLOSE
268 CLOSE
269 OPEN
Momentary Switch
257
L2
256

KANNAH CREEK INFLUENT RWC-4

Latching Relay System Removed. Valve o/c with momentary Switch

OPERATING NOTES

1. RELAY FUNCTION

L2 CLEARWELL LOW LEVEL SHUTDOWN
R4 AUTO WASH START
R5 MAIN PLANT SHUTDOWN
R7 PUMP ALTERNATION
R8 INTERLOCK
R9 INTERLOCK
R10 SURFACE WASH CONTROL
R16 High Filter level wash water pump shutdown

LEGEND

TERMINAL ON EQUIPMENT MANUFACTURERS NUMBER.
☒ TERMINAL BLOCK IN MAIN CONTROL PANEL.

10069

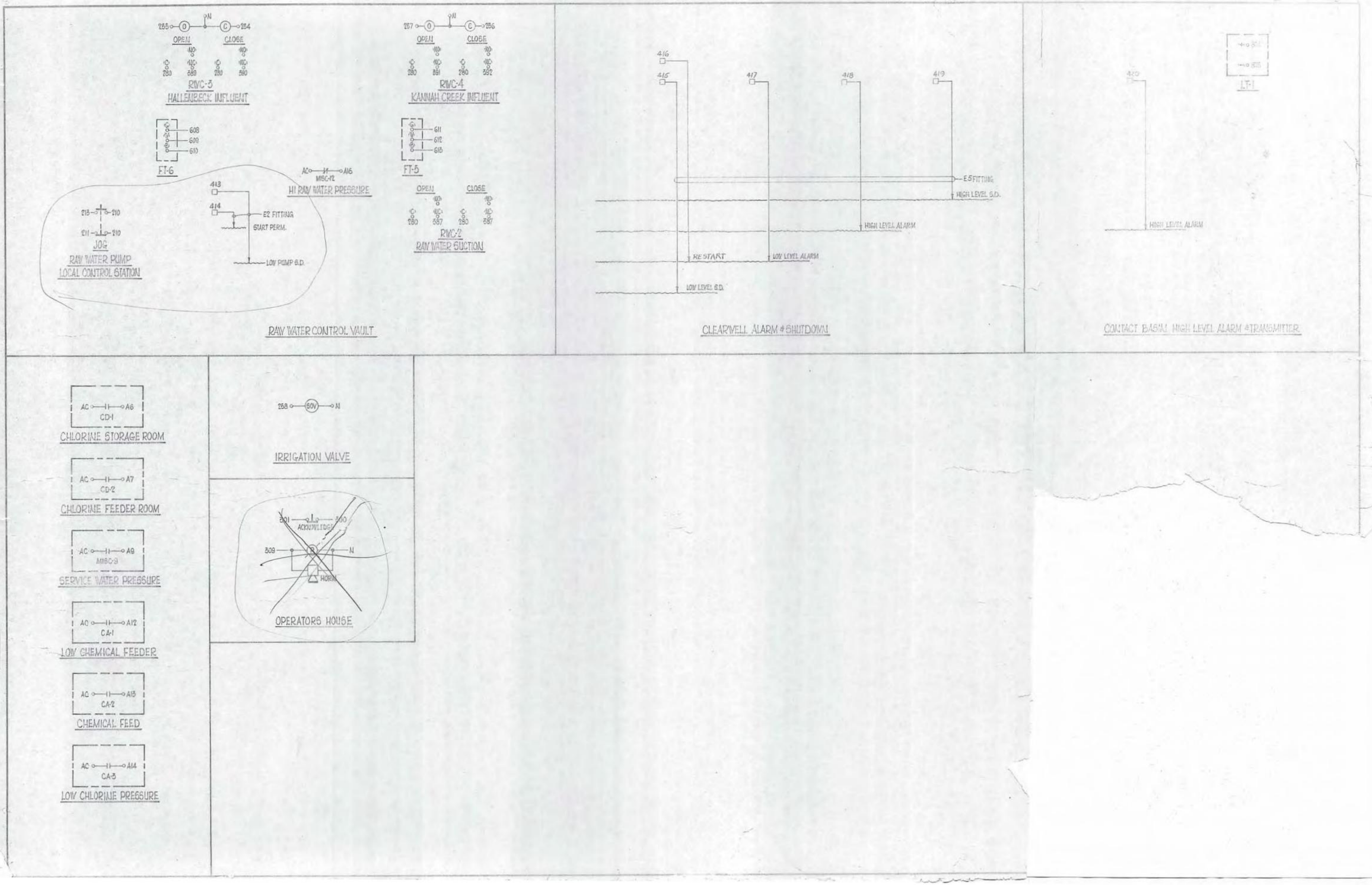
REVISIONS		
NO.	DATE	BY
1	8.12.68	RCD
2	10/11/68	SAD
3	3-4-69	DLZ
4	3-27-69	[illegible]
5		

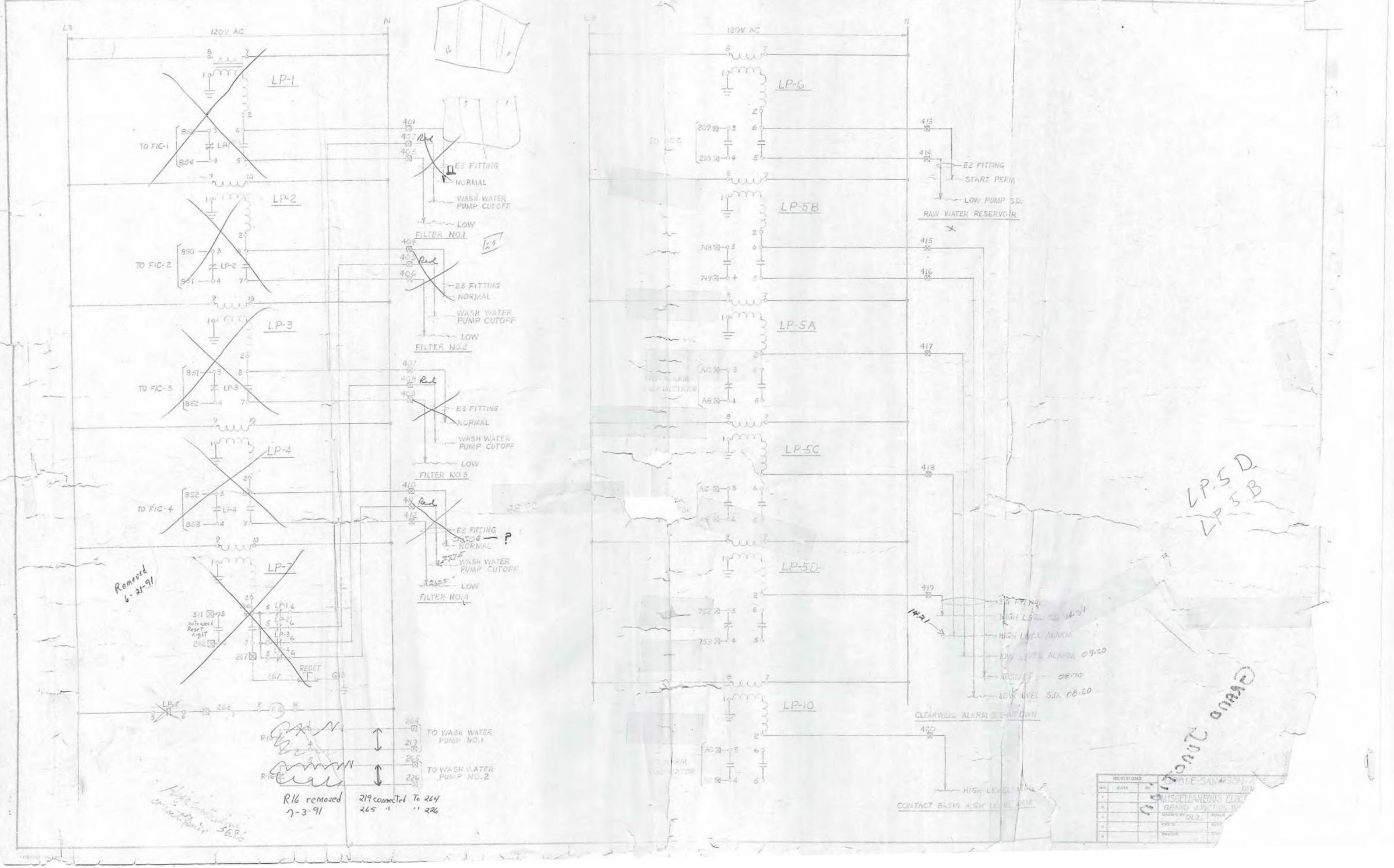
GOBLE-SAMPSON-ASSOC. DENVER

PUMP & VALVE WIRING DIAGRAM

DRAWN K SCALE NONE

CHK'D

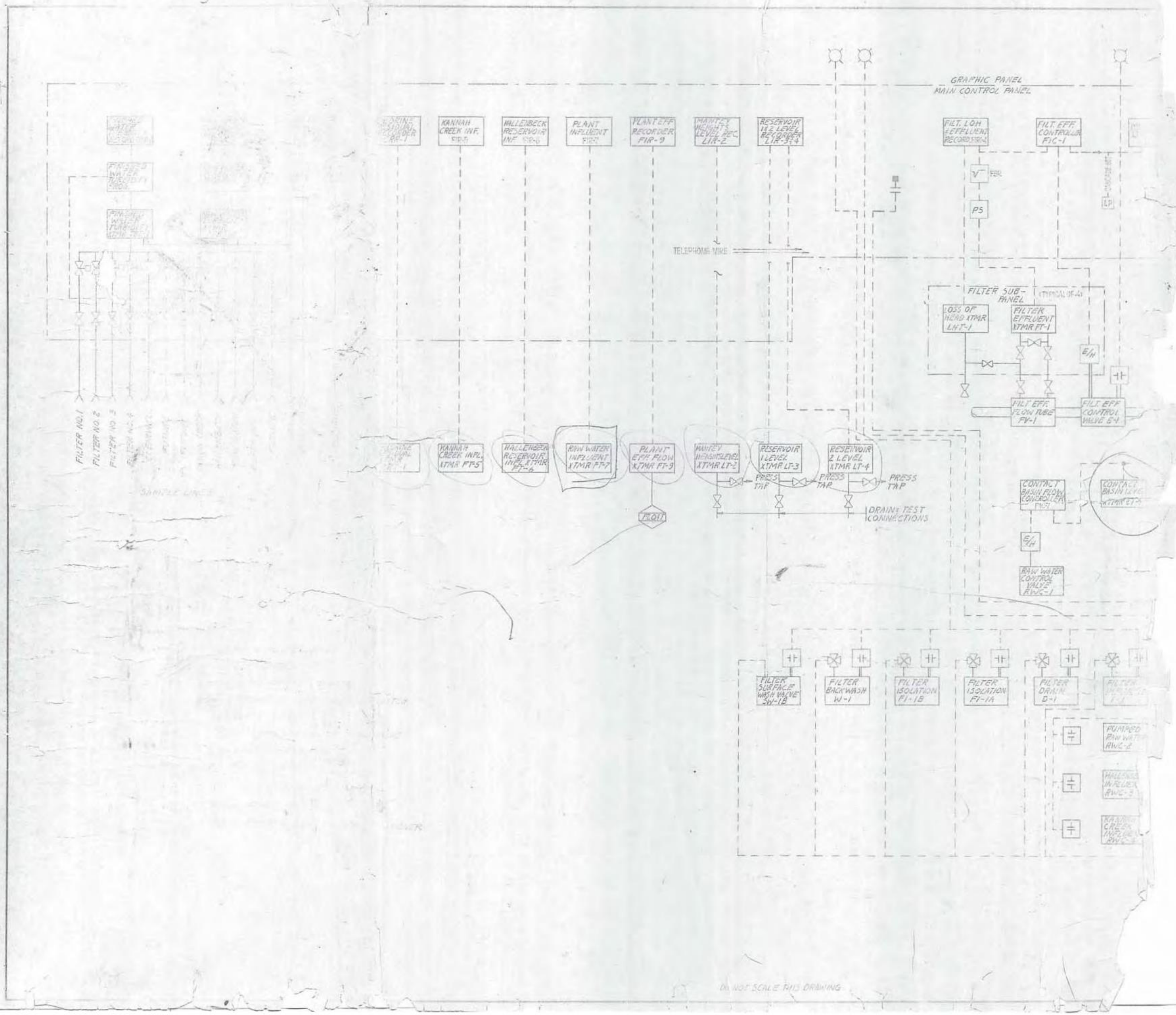

255
O
N
C
254
OPEN
CLOSE
NO
C
NC
280
589
280
590
RWC-3
HALLENBECK INFLUENT
257
O
N
C
256
OPEN
CLOSE
NO
C
NC
280
591
280
592
RWC-4
KANNAH CREEK INFLUENT
G
W
B
608
609
610
FT-6
G
W
B
611
612
613
FT-5
AC
A16
MISC-12
HI RAW WATER PRESSURE
413
414
E2 FITTING
START PERM.
LOW PUMP S.D.
213
210
211
210
JOG
RAW WATER PUMP
LOCAL CONTROL STATION
OPEN
CLOSE
NO
C
NC
280
587
280
587
RWC-2
RAW WATER SUCTION
RAW WATER CONTROL VAULT
416
415
417
418
419
E5 FITTING
HIGH LEVEL S.D.
HIGH LEVEL ALARM
RESTART
LOW LEVEL ALARM
LOW LEVEL S.D.
CLEARWELL ALARM & SHUTDOWN
420
HIGH LEVEL ALARM
LT-1
CONTACT BASIN HIGH LEVEL ALARM & TRANSMITTER
AC
A6
CD-1
CHLORINE STORAGE ROOM
AC
A7
CD-2
CHLORINE FEEDER ROOM
AC
A9
MISC-9
SERVICE WATER PRESSURE
AC
A12
CA-1
LOW CHEMICAL FEEDER
AC
A13
CA-2
CHEMICAL FEED
AC
A14
CA-3
LOW CHLORINE PRESSURE
258
SOV
N
IRRIGATION VALVE
301
300
ACKNOWLEDGE
309
R
N
HORN
OPERATORS HOUSE


L3
120V AC
N
LP-1
TO FIC-1
854
LP-1
401
402
403
Red
E2 FITTING
NORMAL
WASH WATER PUMP CUTOFF
LOW
FILTER NO.1
LP-2
TO FIC-2
850
851
404
405
406
Red
E3 FITTING
NORMAL
WASH WATER PUMP CUTOFF
LOW
FILTER NO.2
LP-3
TO FIC-3
851
852
LP-3
407
408
409
Red
E3 FITTING
NORMAL
WASH WATER PUMP CUTOFF
LOW
FILTER NO.3
LP-4
TO FIC-4
852
853
LP-4
410
411
412
Red
E3 FITTING
NORMAL
WASH WATER PUMP CUTOFF
LOW
FILTER NO.4
?
227.5
212.5
LP-7
311
auto wash Reset light
282
267
LP-1
LP-2
LP-3
LP-4
RESET
267
GD
LP-7
265
R16
264
219
265
226
TO WASH WATER PUMP NO.1
TO WASH WATER PUMP NO.2
L3
120V AC
N
LP-6
TO ACC
209
210
413
414
E2 FITTING
START PERM
LOW PUMP S.D.
RAW WATER RESERVOIR
LP-5B
748
749
415
416
LP-5A
417
AC
AB
LP-5C
418
AC
LP-5D
752
753
419
14-21
S.D FITTING
HIGH LEVEL S.D. 14-31
HIGH LEVEL ALARM
LOW LEVEL ALARM 09.20
RESTART 08.70
LOW LEVEL S.D. 08.20
CLEARWELL ALARM & SHUTDOWN
LP-10
AC
AB
420
HIGH LEVEL
CONTACT BASIN HIGH LEVEL ALM.
LP 5 D
LP 5 B
Grand Junction
REVISIONS
NO.
DATE
BY
GOBLE-SAMPSON
MISCELLANEOUS ELEC
GRAND JUNCTION
DRAWN BY DLZ
SCALE
CHK'D
TRACED

Removed
6-21-91

R16 removed
7-3-91

219 connected To 264
265 " " 226


GRAPHIC PANEL
MAIN CONTROL PANEL
KANNAH CREEK INF. FIR-5
HALLENBECK RESERVOIR INF. FIR-6
PLANT INFLUENT FIR-7
PLANT EFF. RECORDER FIR-9
MANTEY HEIGHTS LEVEL REC. LIR-2
RESERVOIR 1 & 2 LEVEL RECORDER LIR-3 & 4
FILT. LOH & EFFLUENT RECORDER
FILT. EFF. CONTROLLER FIC-1
FBR
PS
LP
TELEPHONE WIRE
FILTER SUB-PANEL
(TYPICAL OF 4)
LOSS OF HEAD XTMR LHT-1
FILTER EFFLUENT XTMR FT-1
E/H
FILT. EFF. FLOW TUBE FV-1
FILT. EFF. CONTROL VALVE E-1
KANNAH CREEK INFL. XTMR FT-5
HALLENBECK RESERVOIR INFL XTMR FT-6
RAW WATER INFLUENT XTMR FT-7
PLANT EFF. FLOW XTMR FT-9
MANTEY HEIGHTS LEVEL XTMR LT-2
RESERVOIR 1 LEVEL XTMR LT-3
RESERVOIR 2 LEVEL XTMR LT-4
PRESS TAP
PRESS TAP
PRESS TAP
DRAIN & TEST CONNECTIONS
FLOAT
CONTACT BASIN FLOW CONTROLLER
CONTACT BASIN LEVEL XTMR
RAW WATER CONTROL VALVE RWC-1
FILTER SURFACE WASH VALVE SW-1B
FILTER BACKWASH W-1
FILTER ISOLATION FI-1B
FILTER ISOLATION FI-1A
FILTER DRAIN D-1
PUMPED RAW WATER RWC-2
RWC-3
KANNAH CREEK INFLUENT
FINISHED WATER TURBIDITY
FILTER NO.1
FILTER NO.2
FILTER NO.3
FILTER NO.4
SAMPLE LINES
DO NOT SCALE THIS DRAWING

Toshiba Connections for Backwash & Filter ProgramToshiba Unit #2

POINT	POINT TYPE	TAG TYPE	TAG NAME	TAG ID	EXPANDED ID	MODULE	POINT	TERM+	TERM_	B_U_M_P	Wire No.+	Wire Non -
1	AI	MA	LI_001	PV	BASIN LEVEL	0	1	2	1	00_01_01_00_01	874	875
2	AI	PID	FI_002	PV	FILTER 2 FLOW	0	2	4	3	00_01_01_00_02	817	819
3	AI	PID	F2_002	PV	BACKWASH FLOW	0	3	6	5	00_01_01_00_03	862	861
4	AO	MA	LI_001	MV	CB REMOTE SP OU	1	1	2	1	00_01_01_01_01	510	509
5	AO	PID	F2_002	MV	FILTER 2 VALVE POSITION	1	2	4	3	00_01_01_01_02	856	855
6	AO	PID	FI_002	MV	BW VFD SPEED OUTPUT	1	3	6	5	00_01_01_01_03	871	869
7	AO	MA	FI_002R	MV	FILTER 2 OUTPUT REC	1	5	10	9	00_01_01_01_05	822	823
8	DI	PB	N_001	FI1	START BACKWASH	2	1	A1	B10	00_01_01_02_01	DI1 776	
9	DI	PB	N_001	FI2	EXTEND BACKWASH	2	2	A2	B10	00_01_01_02_02	DI2 799	
10	DO	PB	X_001	FO1	BACKWASH PUMP	3	1	A1	B10	00_01_01_03_01	DO1 776	R1
11	DO	PB	X_002	FO1	PULSE TO STEPPER	3	2	A2	B10	00_01_01_03_02	DO3 735	R2
12	DO	PB	X_001	FO2	SW PUMP	3	3	A3	B10	00_01_01_03_03	DO2	R3
13	DO	PB	X_002	FO2	BACKWASH TOTALIZER	3	4	A4	B10	00_01_01_03_04	DO4 865	R4
14	DO	PB	X_003	FO1	HIGH BASIN LEVEL ALARM	3	5	A5	B10	00_01_01_03_05	DO5	R5 & R8
15	DO	PB	X_004	FO1	FILTER TOTALIZER PULSE	3	6	A6	B10	00_01_01_03_06		
16	DO	PB	X_004	FO2	FILTER 2 RECDATA ON	3	8	A8	B10	00_01_01_03_08	DO8	R6
19	AI	PID	FI_003	PV	FILTER 3 FLOW	0	6	14	13	00_01_01_00_06	828	830
20	AO	MA	FI_003R	MV	FILTER 3 OUTPUT REC	1	4	8	7	00_01_01_01_04	833	834
22	AO	PID	FI_003	MV	FILTER 3 VALVE POSITION	1	7	14	13	00_01_01_01_07	858	857
23	DO	PB	X_004	FO3	FILTER 3 RECDATA ON	3	7	A7	B10	00_01_01_03_07	DO7	R7

Toshiba Connections for Backwash & Filter ProgramToshiba Unit #1

POINT	POINT TYPE	TAG TYPE	TAG NAME	TAG ID	EXPANDED ID	MODULE	POINT	TERM+	TERM_	B_U_M_P	Wire No.+	Wire Non -
1	AI	MA	LI_001	PV	BASIN LEVEL	0	1	2	1	00_01_01_00_01	874	875
2	AI	PID	FI_001	PV	FILTER 1 FLOW	0	2	4	3	00_01_01_00_02	809	807
3	AI	PID	F2_002	PV	BACKWASH FLOW	0	3	6	5	00_01_01_00_03	862	861
4	AO	MA	LI_001	MV	CB REMOTE SP OU	1	1	2	1	00_01_01_01_01	510	509
5	AO	PID	F1_001	MV	FILTER 1 VALVE POSITION	1	2	4	3	00_01_01_01_02	848	849
6	AO	PID	FI_002	MV	BW VFD SPEED OUTPUT	1	3	6	5	00_01_01_01_03	871	869
7	AO	MA	FI_001R	MV	FILTER 1 OUTPUT REC	1	5	10	9	00_01_01_01_05	812	813
8	DI	PB	N_001	FI1	START BACKWASH	2	1	A1	B10	00_01_01_02_01	DI1 776	
9	DI	PB	N_002	FI2	EXTEND BACKWASH	2	2	A2	B10	00_01_01_02_02	DI2 799	
10	DO	PB	X_001	FO1	BACKWASH PUMP	3	1	A1	B10	00_01_01_03_01	DO1 736	R1
11	DO	PB	X_002	FO1	PULSE TO STEPPER	3	2	A2	B10	00_01_01_03_02	DO3 735	R2
12	DO	PB	X_001	FO2	SW PUMP	3	3	A3	B10	00_01_01_03_03	DO2 776	R3
13	DO	PB	X_002	FO2	BACKWASH TOTALIZER	3	4	A4	B10	00_01_01_03_04	DO4 865	R4
14	DO	PB	X_003	FO1	HIGH BASIN ALARM	3	5	A5	B10	00_01_01_03_05	DO5	R5 & R8
15	DO	PB	X_004	FO1	FILTER TOTALIZER PULSE	3	6	A6	B10	00_01_01_03_06		
16	DO	PB	X_004	FO2	FILTER 2 RECDATA ON	3	8	A8	B10	00_01_01_03_08	DO8	R6
19	AI	PID	FI_004	PV	FILTER 4 FLOW	0	6	14	13	00_01_01_00_06	840	838
20	AO	MA	FI_004R	MV	FILTER 4 OUTPUT REC	1	4	8	7	00_01_01_01_04	844	843
22	AO	PID	FI_004	MV	FILTER 4 VALVE POSITION	1	7	14	13	00_01_01_01_07	860	859
23	DO	PB	X_004	FO3	FILTER 4 RECDATA ON	3	7	A7	B10	00_01_01_03_07	DO7	R7

ProtocolID	DeviceNan	TagName	DataType	DataCount	Retentive	Address	ArrayStart	ArrayEnd
0	<INTERNA	MP-810 H(	Discrete	1	FALSE		0	0
0	<INTERNA	FI_400_SC	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_HO/	Signed_int_	1	FALSE		0	0
0	<INTERNA	ANY_ALAF	Discrete	1	FALSE		0	0
0	<INTERNA	MP_400_C	Floating_P	1	FALSE		0	0
0	<INTERNA	MP-710 H(	Discrete	1	FALSE		0	0
0	<INTERNA	MP-800 H(	Discrete	1	FALSE		0	0
0	<INTERNA	MP-700 H(	Discrete	1	FALSE		0	0
0	<INTERNA	CF_STAR1	Floating_P	1	FALSE		0	0
0	<INTERNA	DOSING_S	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P	1	FALSE		0	0
0	<INTERNA	AI_01_SC/	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P	1	FALSE		0	0
0	<INTERNA	CHEMICAL	Unsigned_	1	FALSE		0	0
0	<INTERNA	PUMP STF	Floating_P	1	FALSE		0	0
0	<INTERNA	PUMP CAF	Floating_P	1	FALSE		0	0
404	DEV001	DO_0_9	Discrete	1	FALSE	O:0/09	0	0
404	DEV001	LOOP 1 A(	Discrete	1	FALSE	B3:16/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/05	0	0
404	DEV001	DO_0_7	Discrete	1	FALSE	O:0/07	0	0
404	DEV001	DO_0_10	Discrete	1	FALSE	O:0/10	0	0
404	DEV001	DO_0_8	Discrete	1	FALSE	O:0/08	0	0
404	DEV001	LOOP 2 A(	Discrete	1	FALSE	B3:16/01	0	0
404	DEV001	DO_0_11	Discrete	1	FALSE	O:0/11	0	0
404	DEV001	PROC1_S	Discrete	1	FALSE	B20:16/03	0	0
404	DEV001	HPTK1_IN	Discrete	1	FALSE	B21:8/00	0	0
404	DEV001	NO HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	ANY_BLW	Discrete	1	FALSE	B23:2/00	0	0
404	DEV001	BLW2_RU	Discrete	1	FALSE	B23:2/02	0	0
404	DEV001	DO_0_1	Discrete	1	FALSE	O:0/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/00	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/04	0	0
404	DEV001	VFD3_HAN	Discrete	1	FALSE	B22:6/01	0	0
404	DEV001	BLW1_RU	Discrete	1	FALSE	B23:2/01	0	0
404	DEV001	DI_0_11	Discrete	1	FALSE	I:0/11	0	0
404	DEV001	DI_0_0	Discrete	1	FALSE	I:0/00	0	0
404	DEV001	DI_0_1	Discrete	1	FALSE	I:0/01	0	0
404	DEV001	DI_0_2	Discrete	1	FALSE	I:0/02	0	0
404	DEV001	DI_0_3	Discrete	1	FALSE	I:0/03	0	0
404	DEV001	DI_0_4	Discrete	1	FALSE	I:0/04	0	0
404	DEV001	DI_0_5	Discrete	1	FALSE	I:0/05	0	0
404	DEV001	DI_0_6	Discrete	1	FALSE	I:0/06	0	0
404	DEV001	DI_0_7	Discrete	1	FALSE	I:0/07	0	0
404	DEV001	DI_0_8	Discrete	1	FALSE	I:0/08	0	0
404	DEV001	DO_0_3	Discrete	1	FALSE	O:0/03	0	0
404	DEV001	DI_0_10	Discrete	1	FALSE	I:0/10	0	0
404	DEV001	DO_0_6	Discrete	1	FALSE	O:0/06	0	0
404	DEV001	DI_0_12	Discrete	1	FALSE	I:0/12	0	0
404	DEV001	DI_0_13	Discrete	1	FALSE	I:0/13	0	0
404	DEV001	DI_0_14	Discrete	1	FALSE	I:0/14	0	0
404	DEV001	DI_0_15	Discrete	1	FALSE	I:0/15	0	0
404	DEV001	DO_0_0	Discrete	1	FALSE	O:0/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/04	0	0
404	DEV001	DO_0_2	Discrete	1	FALSE	O:0/02	0	0

404	DEV001	VFD3_FAL	Discrete	1	FALSE	B20:0/07	0	0
404	DEV001	DO_0_4	Discrete	1	FALSE	O:0/04	0	0
404	DEV001	DO_0_5	Discrete	1	FALSE	O:0/05	0	0
404	DEV001	DI_0_9	Discrete	1	FALSE	I:0/09	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.3	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/02	0	0
404	DEV001	MP_710_H	Signed_int_	1	FALSE	N24:5	0	0
404	DEV001	MP_800_H	Signed_int_	1	FALSE	N24:6	0	0
404	DEV001	MP_810_H	Signed_int_	1	FALSE	N24:7	0	0
404	DEV001	MP_700_S	Signed_int_	1	FALSE	N24:12	0	0
404	DEV001	MP_710_S	Signed_int_	1	FALSE	N24:13	0	0
404	DEV001	PRE_MP_I	Signed_int_	1	FALSE	N24:8	0	0
404	DEV001	POST_MP.	Signed_int_	1	FALSE	N24:9	0	0
404	DEV001	PRE_RES_	Signed_int_	1	FALSE	N7:32	0	0
404	DEV001	BLOWER2	Signed_int_	1	FALSE	N24:2	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.2	0	0
404	DEV001	BLOWER1	Signed_int_	1	FALSE	N24:1	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.0	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.1	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:50	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.2	0	0
404	DEV001	START_UI	Unsigned_	1	FALSE	N9:1	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.3	0	0
404	DEV001	AI1_MAP_(	Unsigned_	1	FALSE	N26:8	0	0
404	DEV001	AI1_MAP_(	Unsigned_	1	FALSE	N26:9	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:10	0	0
404	DEV001	POST_RE:	Signed_int_	1	FALSE	N7:62	0	0
404	DEV001	NO_HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	VFD3_AUT	Discrete	1	FALSE	B22:6/02	0	0
404	DEV001	LOOP 3 A(	Discrete	1	FALSE	B3:16/02	0	0
404	DEV001	CELL12_FI	Discrete	1	FALSE	B23:12/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/01	0	0
404	DEV001	BLW_DPS.	Discrete	1	FALSE	B23:2/04	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/03	0	0
404	DEV001	CELL11_FI	Discrete	1	FALSE	B23:11/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/01	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/02	0	0
404	DEV001	MP_700_H	Signed_int_	1	FALSE	N24:4	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/04	0	0
404	DEV001	VFD3_OFF	Discrete	1	FALSE	B22:6/00	0	0
404	DEV001	ENABLE R	Discrete	1	FALSE	B20:30/03	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/04	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/01	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/00	0	0
404	DEV001	CELL11_F:	Discrete	1	FALSE	B23:8/06	0	0
404	DEV001	CELL11_LI	Discrete	1	FALSE	B23:8/05	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/03	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/04	0	0
404	DEV001	H2_COM_/	Discrete	1	FALSE	B23:2/09	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/03	0	0
404	DEV001	PROC2_CI	Discrete	1	FALSE	B20:26/05	0	0
404	DEV001	CELL22_C	Discrete	1	FALSE	B20:20/08	0	0
404	DEV001	CELL22_FI	Discrete	1	FALSE	B23:22/02	0	0
404	DEV001	RECT2_FA	Discrete	1	FALSE	B23:20/00	0	0
404	DEV001	RECT2_V(	Discrete	1	FALSE	B23:20/02	0	0
404	DEV001	RECT2_V(	Discrete	1	FALSE	B23:20/03	0	0

404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/07	0	0
404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/08	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/01	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/02	0	0
404	DEV001	LAL_201	Discrete	1	FALSE	B23:5/06	0	0
404	DEV001	RACK2_AL	Discrete	1	FALSE	B20:9/02	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/06	0	0
404	DEV001	PROC2_R	Discrete	1	FALSE	B20:26/04	0	0
404	DEV001	PROC2_S	Discrete	1	FALSE	B20:26/03	0	0
404	DEV001	ANY_BRIN	Discrete	1	FALSE	B23:3/02	0	0
404	DEV001	NO_BLW_	Discrete	1	FALSE	B23:2/10	0	0
404	DEV001	BLW_610_	Discrete	1	FALSE	B20:1/08	0	0
404	DEV001	BLW_600_	Discrete	1	FALSE	B20:1/07	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/11	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/12	0	0
404	DEV001	RECT1_A	Discrete	1	FALSE	B23:10/07	0	0
404	DEV001	RACK1_AL	Discrete	1	FALSE	B20:9/01	0	0
404	DEV001	CELL21_C	Discrete	1	FALSE	B20:20/07	0	0
404	DEV001	DI_0_17	Discrete	1	FALSE	I:0/17	0	0
404	DEV001	DI_0_18	Discrete	1	FALSE	I:0/18	0	0
404	DEV001	DI_0_19	Discrete	1	FALSE	I:0/19	0	0
404	DEV001	PROC1_C	Discrete	1	FALSE	B20:3/00	0	0
404	DEV001	PROC2_C	Discrete	1	FALSE	B20:3/01	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:2/07	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:8/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B23:1/05	0	0
404	DEV001	CELL11_C	Discrete	1	FALSE	B20:10/07	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:21/02	0	0
404	DEV001	CELL12_C	Discrete	1	FALSE	B20:10/08	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/07	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/07	0	0
404	DEV001	ESTOP_B	Discrete	1	FALSE	B23:1/15	0	0
404	DEV001	BLW1_OF	Discrete	1	FALSE	B23:2/05	0	0
404	DEV001	BLW2_OF	Discrete	1	FALSE	B23:2/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:18/05	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/04	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/03	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:18/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:21/05	0	0
404	DEV001	LAH_201	Discrete	1	FALSE	B23:5/09	0	0
404	DEV001	H2_DETE	Discrete	1	FALSE	B20:1/01	0	0
404	DEV001	VFD2_FA	Discrete	1	FALSE	B20:0/06	0	0
404	DEV001	RACK1_S	Discrete	1	FALSE	B21:0/02	0	0
404	DEV001	RACK1_R	Discrete	1	FALSE	B21:0/00	0	0
404	DEV001	VFD3_OF	Discrete	1	FALSE	B21:6/00	0	0
404	DEV001	VFD3_HA	Discrete	1	FALSE	B21:6/01	0	0
404	DEV001	VFD3_AU	Discrete	1	FALSE	B21:6/02	0	0
404	DEV001	HPTK2_IN	Discrete	1	FALSE	B21:8/01	0	0
404	DEV001	RACK2_R	Discrete	1	FALSE	B21:10/00	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/01	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/02	0	0
404	DEV001	LU_201	Discrete	1	FALSE	B23:5/05	0	0
404	DEV001	VFD1_FA	Discrete	1	FALSE	B20:0/05	0	0
404	DEV001	PROC1_R	Discrete	1	FALSE	B20:16/04	0	0
404	DEV001	CELL11_L	Discrete	1	FALSE	B23:11/05	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/06	0	0

404	DEV001	PRE_RESI	Unsigned_	1	FALSE	N7:10	0	0
404	DEV001	RECT1_AI	Discrete	1	FALSE	B23:10/08	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:11	0	0
404	DEV001	RECT1_V(	Discrete	1	FALSE	B23:10/03	0	0
404	DEV001	RECT1_V(	Discrete	1	FALSE	B23:10/02	0	0
404	DEV001	RECT1_FA	Discrete	1	FALSE	B23:10/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/09	0	0
404	DEV001	ANY_ALAF	Discrete	1	FALSE	B20:9/00	0	0
404	DEV001	PRE_DOS	Discrete	1	FALSE	B23:3/03	0	0
404	DEV001	CP_100_E	Discrete	1	FALSE	B23:1/13	0	0
404	DEV001	CP_200_E	Discrete	1	FALSE	B23:1/14	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/11	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/12	0	0
404	DEV001	YA_700_AI	Discrete	1	FALSE	B23:4/00	0	0
404	DEV001	YA_710_AI	Discrete	1	FALSE	B23:4/02	0	0
404	DEV001	PRE_NO_I	Discrete	1	FALSE	B23:4/04	0	0
404	DEV001	FU_700_AI	Discrete	1	FALSE	B23:5/10	0	0
404	DEV001	AU_700	Discrete	1	FALSE	B23:5/11	0	0
404	DEV001	RACK1_S1	Discrete	1	FALSE	B21:0/01	0	0
404	DEV001	AAH_700	Discrete	1	FALSE	B23:5/13	0	0
404	DEV001	ANY_HYP(	Discrete	1	FALSE	B23:3/01	0	0
404	DEV001	POST_DO	Discrete	1	FALSE	B23:3/04	0	0
404	DEV001	YA_800_AI	Discrete	1	FALSE	B23:4/10	0	0
404	DEV001	YA_810_AI	Discrete	1	FALSE	B23:4/12	0	0
404	DEV001	POST_NO	Discrete	1	FALSE	B23:4/14	0	0
404	DEV001	FU_800_AI	Discrete	1	FALSE	B23:6/10	0	0
404	DEV001	AU_800	Discrete	1	FALSE	B23:6/11	0	0
404	DEV001	AAL_800	Discrete	1	FALSE	B23:6/12	0	0
404	DEV001	AAH_800	Discrete	1	FALSE	B23:6/13	0	0
404	DEV001	PROC1_CI	Discrete	1	FALSE	B20:16/05	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/06	0	0
404	DEV001	AAL_700	Discrete	1	FALSE	B23:5/12	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:46	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:18	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:19	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:20	0	0
404	DEV001	CELL 2 FL	Floating_P	1	FALSE	F31:30	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:40	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:30	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:45	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:13	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:51	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F52:3	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:56	0	0
404	DEV001	DOSING_S	Floating_P	1	FALSE	F35:2	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:3	0	0
404	DEV001	PUMP STF	Floating_P	1	FALSE	F35:4	0	0
404	DEV001	DOSING_S	Floating_P	1	FALSE	F35:12	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:13	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F51:2	0	0

404	DEV001	MP_810_S	Unsigned_	1	FALSE	N24:15	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:10	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:14	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:13	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:4	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:3	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:25	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:22	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:23	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:15	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:28	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:14	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F35:6	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F52:2	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F35:16	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:29	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:12	0	0
404	DEV001	HIGH LIM	Floating_P	1	FALSE	F35:45	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:24	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:89	0	0
404	DEV001	PUMP ST	Floating_P	1	FALSE	F35:14	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:55	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:60	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:10	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:20	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:16	0	0
404	DEV001	H2_HD100	Floating_P	1	FALSE	F30:70	0	0
404	DEV001	FLOW OF	Floating_P	1	FALSE	F31:52	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:43	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:39	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:88	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:38	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:100	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:110	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:23	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:22	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:24	0	0
404	DEV001	FLOW OF	Floating_P	1	FALSE	F31:57	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:85	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:82	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:80	0	0
404	DEV001	BRTK_SA	Floating_P	1	FALSE	F30:100	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	DOSING_	Floating_P	1	FALSE	F35:22	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:29	0	0
404	DEV001	GAIN 1	Floating_P	1	FALSE	F35:47	0	0
404	DEV001	LOW LIM	Floating_P	1	FALSE	F35:49	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:53	0	0
404	DEV001	HIGH LIM	Floating_P	1	FALSE	F35:55	0	0
404	DEV001	GAIN 2	Floating_P	1	FALSE	F35:57	0	0
404	DEV001	LOW LIM	Floating_P	1	FALSE	F35:59	0	0
404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F35:26	0	0

404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F53:2	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:70	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:43	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:71	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:67	0	0
404	DEV001	PUMP STF	Floating_P	1	FALSE	F35:24	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:23	0	0
404	DEV001	GAIN 3	Floating_P	1	FALSE	F35:67	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:69	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:65	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:63	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:28	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:29	0	0
404	DEV001	DOSING F	Floating_P	1	FALSE	F51:3	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:4	0	0
404	DEV001	MP_710_S	Unsigned_	1	FALSE	N7:28	0	0
404	DEV001	MP_810_S	Unsigned_	1	FALSE	N7:58	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N7:57	0	0
404	DEV001	MP_800_H	Unsigned_	1	FALSE	N7:55	0	0
404	DEV001	MP_810_H	Unsigned_	1	FALSE	N7:56	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:40	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:41	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:1	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:3	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:44	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:5	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:6	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:7	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.0	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.1	0	0
404	DEV001	PLC_TO_F	Unsigned_	1	FALSE	N9:0	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T41:10.PR	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T42:10.PR	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T42:18.PR	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:2	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:14	0	0
404	DEV001	BLW_ROT	Unsigned_	1	FALSE	N24:100	0	0
404	DEV001	BLW_600_	Unsigned_	1	FALSE	N24:10	0	0
404	DEV001	BLW_610_	Unsigned_	1	FALSE	N24:11	0	0
404	DEV001	DI_0_16	Discrete	1	FALSE	I:0/16	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N7:11	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N24:20	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N24:21	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N7:41	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:40	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:61	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:13	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:46	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:16	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:12	0	0
404	DEV001	PRE_RES_	Unsigned_	1	FALSE	N7:31	0	0
404	DEV001	MP_700_S	Unsigned_	1	FALSE	N7:27	0	0
404	DEV001	MP_700_H	Unsigned_	1	FALSE	N7:25	0	0

404	DEV001	MP_710_H	Unsigned_	1	FALSE	N7:26	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:45	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:42	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:43	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:79	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:15	0	0
404	DEV001	QR_710	Floating_P	1	FALSE	F30:3	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N24:14	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:58	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:59	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:60	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:68	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:69	0	0
404	DEV001	BRTK1_S	Floating_P	1	FALSE	F30:102	0	0
404	DEV001	BRTK1_S	Floating_P	1	FALSE	F30:105	0	0
404	DEV001	BLW1_QR	Floating_P	1	FALSE	F30:0	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:49	0	0
404	DEV001	QR_700	Floating_P	1	FALSE	F30:2	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:48	0	0
404	DEV001	QR_800	Floating_P	1	FALSE	F30:4	0	0
404	DEV001	QR_810	Floating_P	1	FALSE	F30:5	0	0
404	DEV001	AAL_700_	Floating_P	1	FALSE	F30:41	0	0
404	DEV001	AAH_700_	Floating_P	1	FALSE	F30:42	0	0
404	DEV001	PRE_MP_	Floating_P	1	FALSE	F51:9	0	0
404	DEV001	PRE_MP_	Floating_P	1	FALSE	F51:10	0	0
404	DEV001	PRE_FP_	Floating_P	1	FALSE	F51:14	0	0
404	DEV001	AAH_800_	Floating_P	1	FALSE	F30:62	0	0
404	DEV001	AAL_800_	Floating_P	1	FALSE	F30:61	0	0
404	DEV001	POST_FP_	Floating_P	1	FALSE	F51:34	0	0
404	DEV001	BLW2_QR	Floating_P	1	FALSE	F30:1	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:139	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:51	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:110	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:118	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:119	0	0
404	DEV001	BRTK_SAL	Floating_P	1	FALSE	F30:108	0	0
404	DEV001	BRTK_SAL	Floating_P	1	FALSE	F30:109	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:120	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:130	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:128	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:50	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:129	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:78	0	0
404	DEV001	ECR_100_	Floating_P	1	FALSE	F30:6	0	0
404	DEV001	RECT2_V	Floating_P	1	FALSE	F32:0	0	0
404	DEV001	RECT2_A	Floating_P	1	FALSE	F32:10	0	0
404	DEV001	ECR_200_	Floating_P	1	FALSE	F30:7	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:30	0	0
404	DEV001	BRTK1_BF	Floating_P	1	FALSE	F30:83	0	0
404	DEV001	BRTK1_BF	Floating_P	1	FALSE	F30:84	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:38	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:39	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:40	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:138	0	0

Block: OB_1
Author:
Created: 04/19/2001 11:21:55 am
Last Modified: 06/06/2007 10:49:23 am

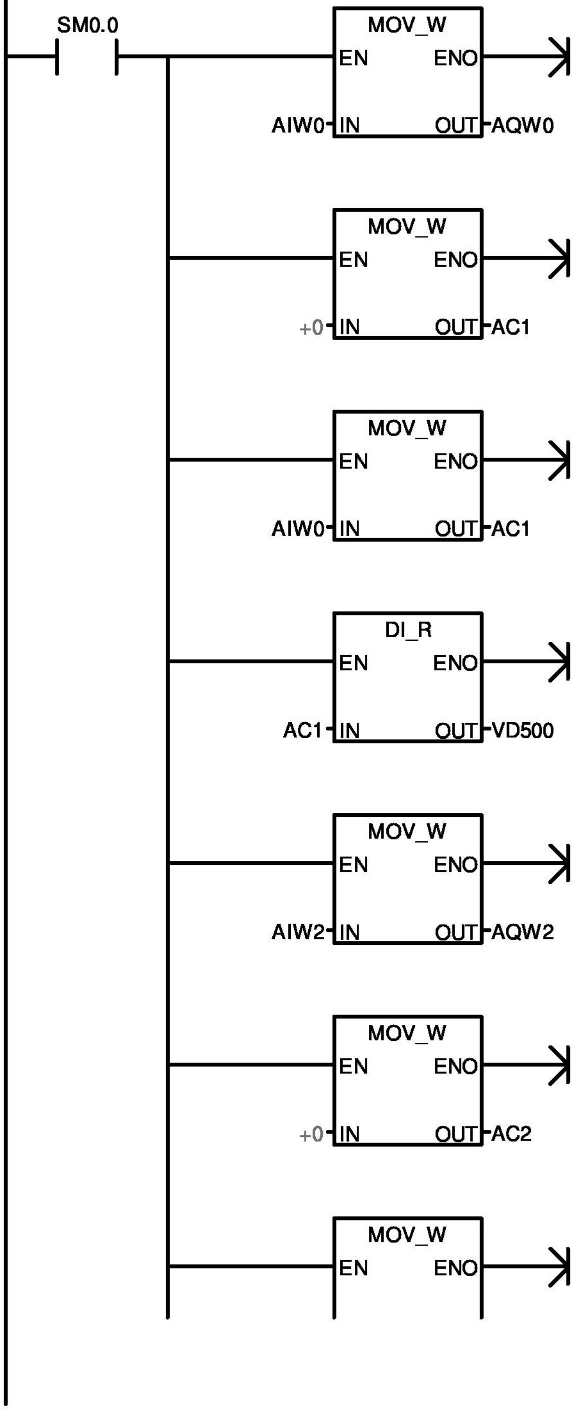
Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

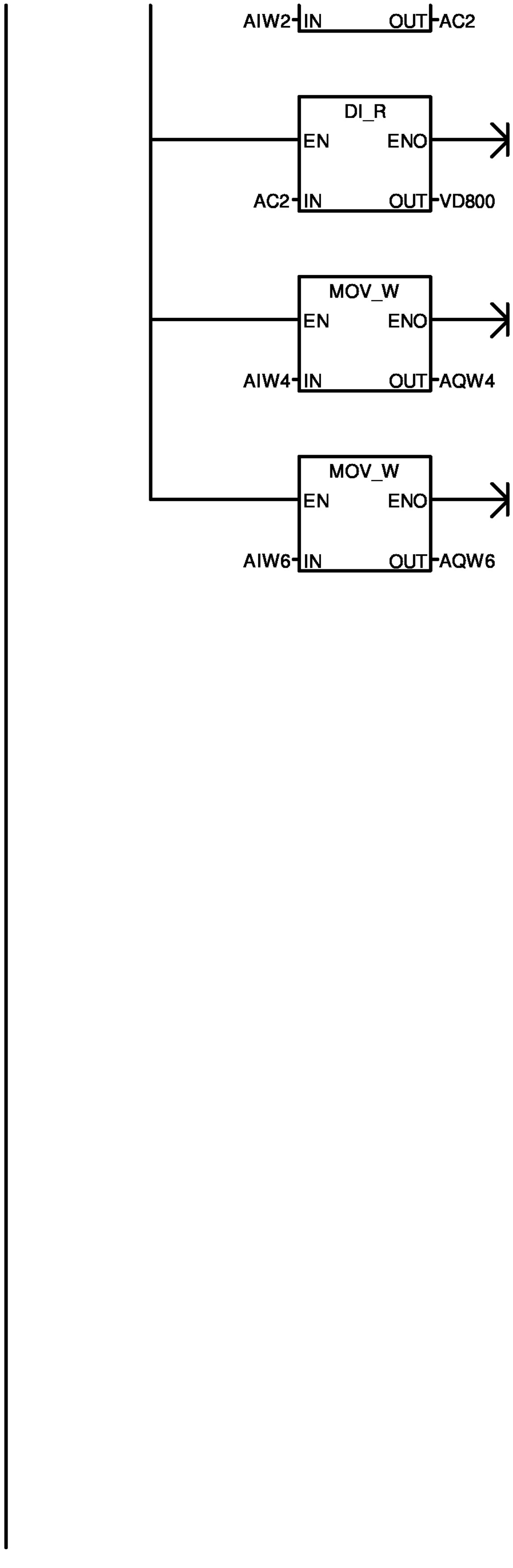
PROGRAM COMMENTS
Press F1 for help and example program

PROGRAM COMMENTS
Press F1 for help and example program

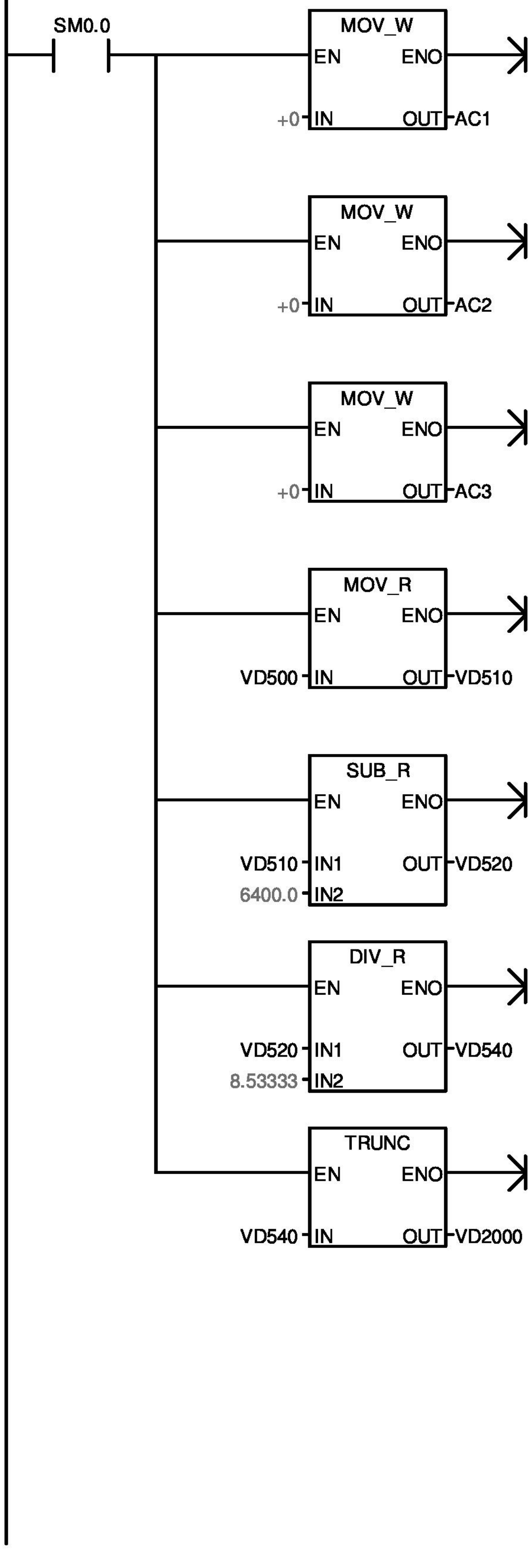
Network 1 NETWORK TITLE (single line)

NETWORK COMMENTS

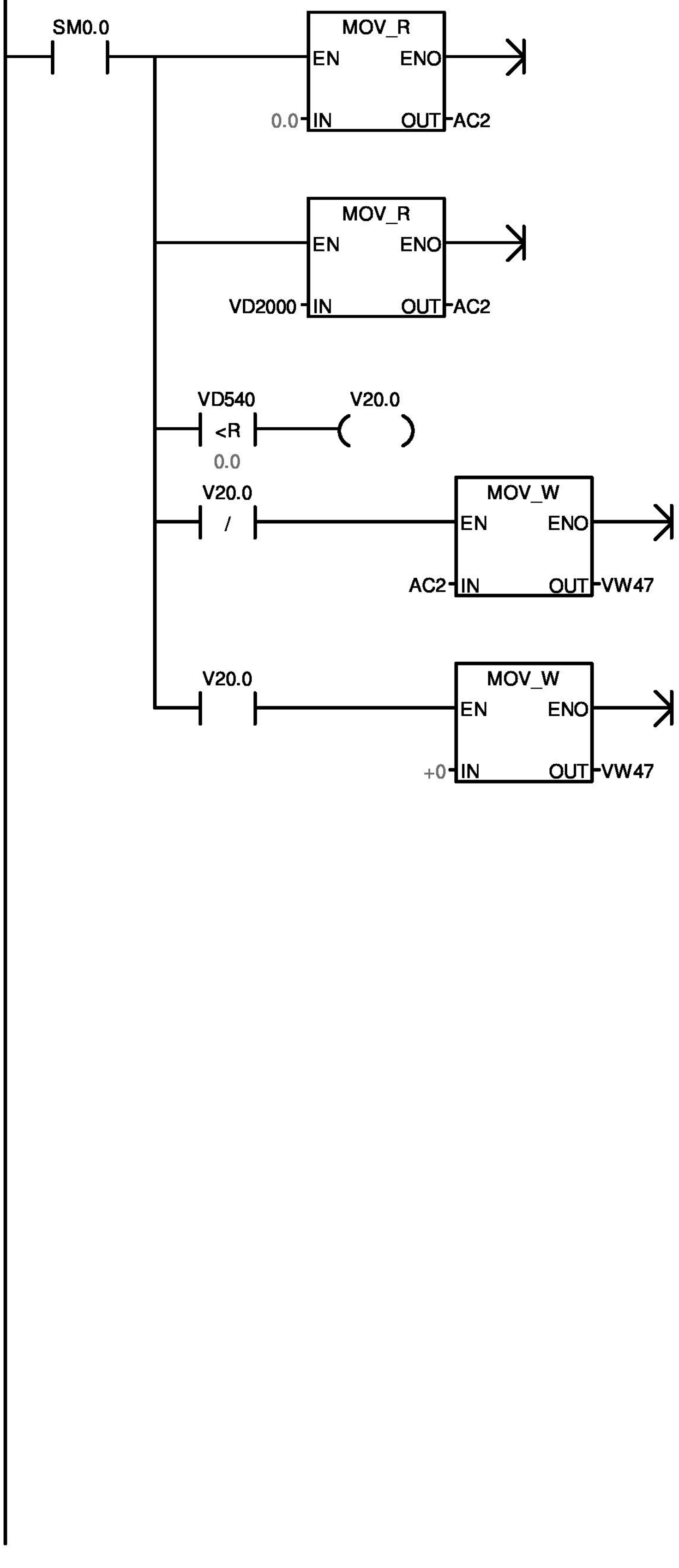

SM0.0
MOV_W
EN
ENO
AIW0
IN
OUT
AQW0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
AIW0
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD500
MOV_W
EN
ENO
AIW2
IN
OUT
AQW2
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO


AIW2
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD800
MOV_W
EN
ENO
AIW4
IN
OUT
AQW4
MOV_W
EN
ENO
AIW6
IN
OUT
AQW6

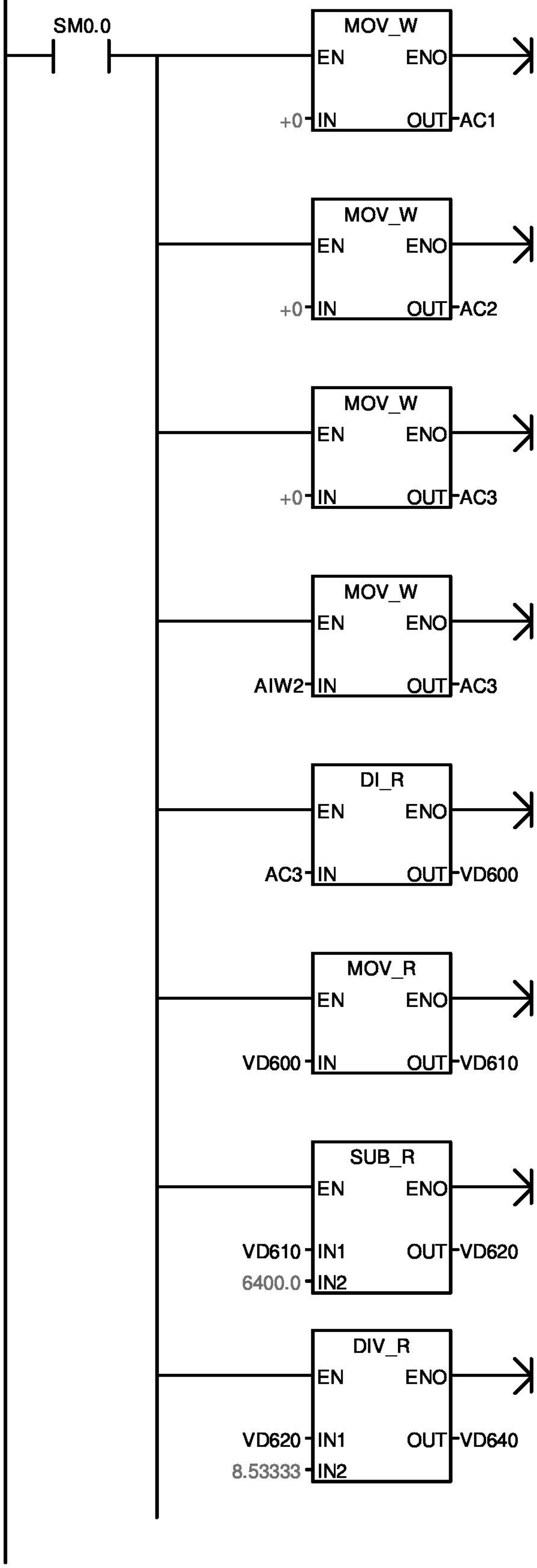
Network 2

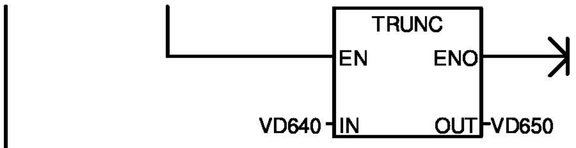

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_R
EN
ENO
VD500
IN
OUT
VD510
SUB_R
EN
ENO
VD510
IN1
OUT
VD520
6400.0
IN2
DIV_R
EN
ENO
VD520
IN1
OUT
VD540
8.53333
IN2
TRUNC
EN
ENO
VD540
IN
OUT
VD2000

Network 3

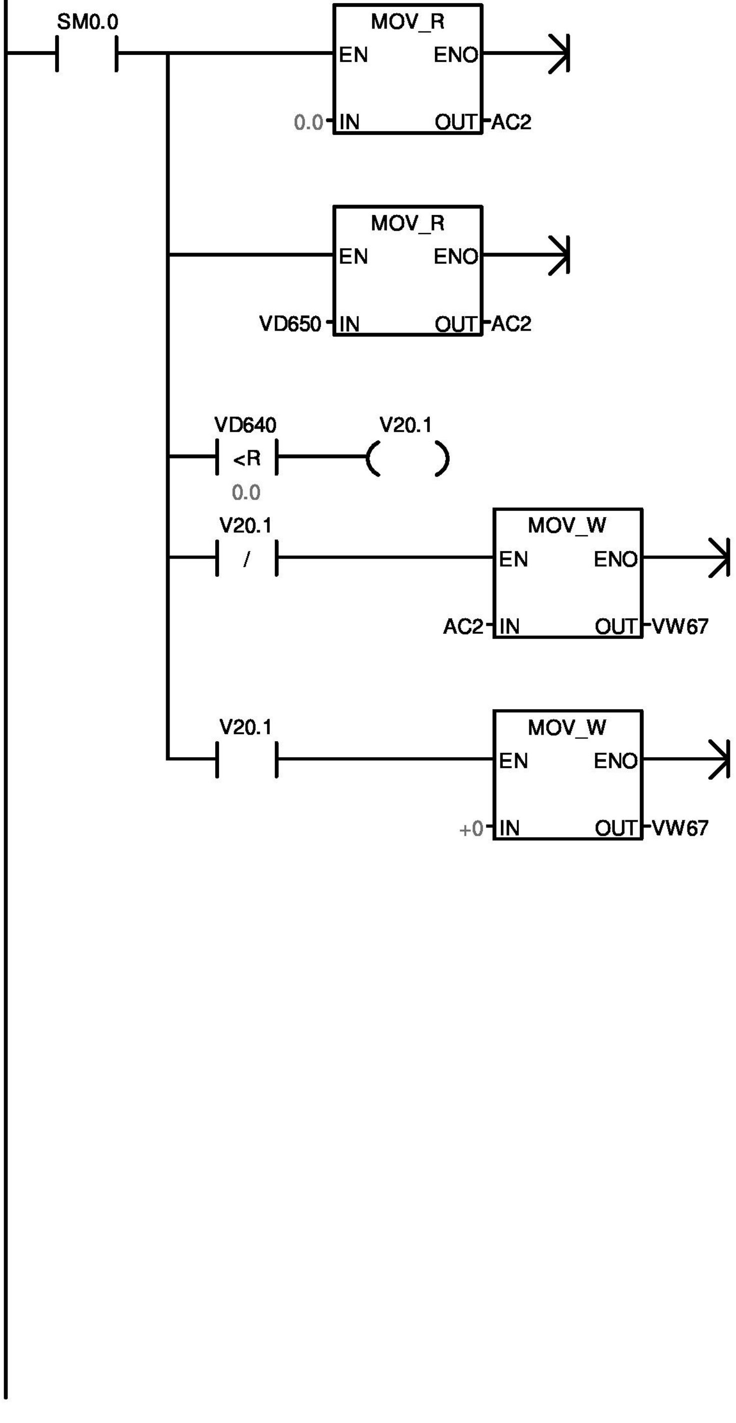

SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_R
EN
ENO
VD2000
IN
OUT
AC2
VD540
<R
0.0
V20.0
V20.0
/
MOV_W
EN
ENO
AC2
IN
OUT
VW47
V20.0
MOV_W
EN
ENO
+0
IN
OUT
VW47

Network 4

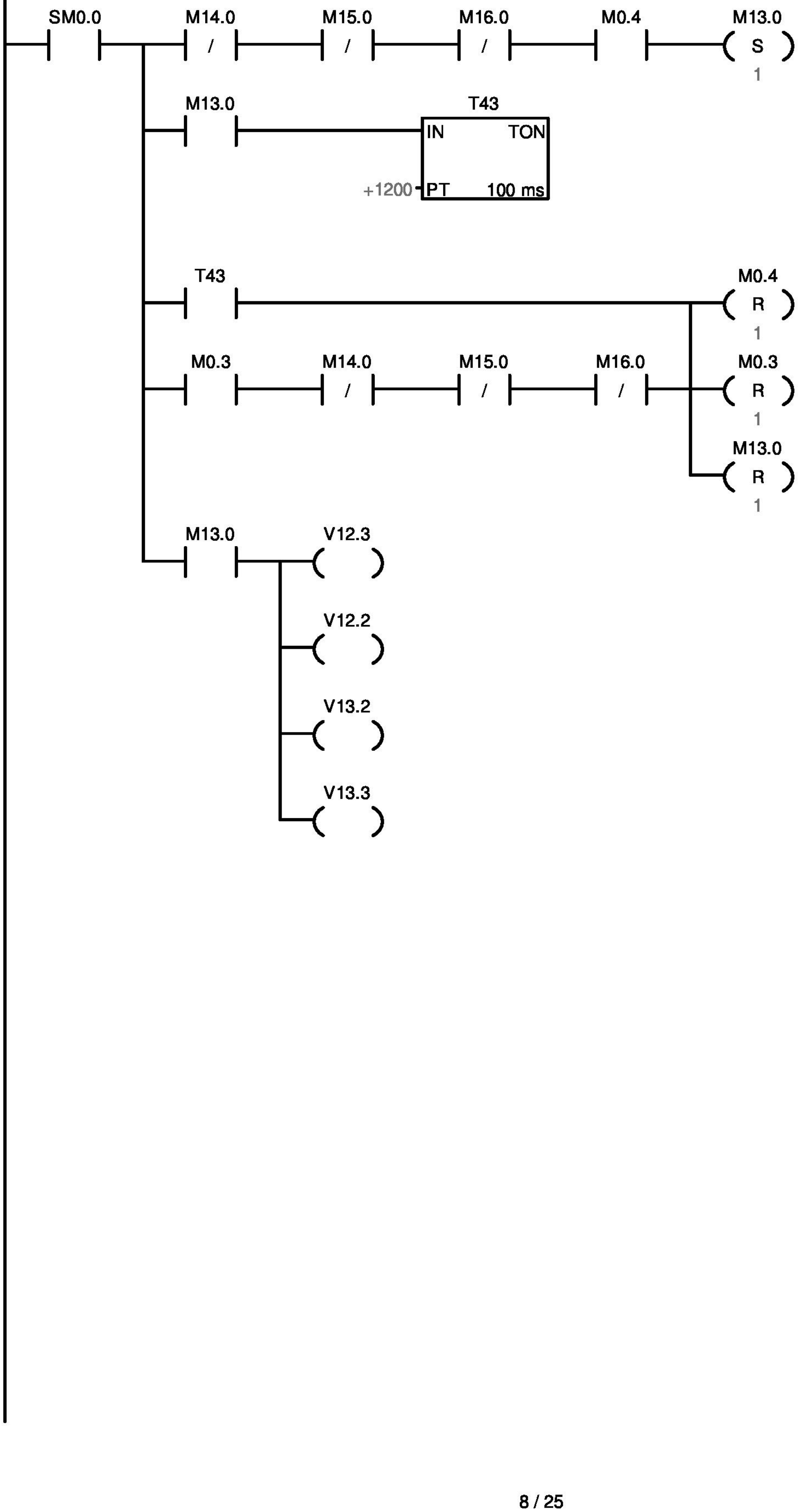

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
AIW2
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD600
MOV_R
EN
ENO
VD600
IN
OUT
VD610
SUB_R
EN
ENO
VD610
IN1
OUT
VD620
6400.0
IN2
DIV_R
EN
ENO
VD620
IN1
OUT
VD640
8.53333
IN2


TRUNC
EN
ENO
VD640
IN
OUT
VD650

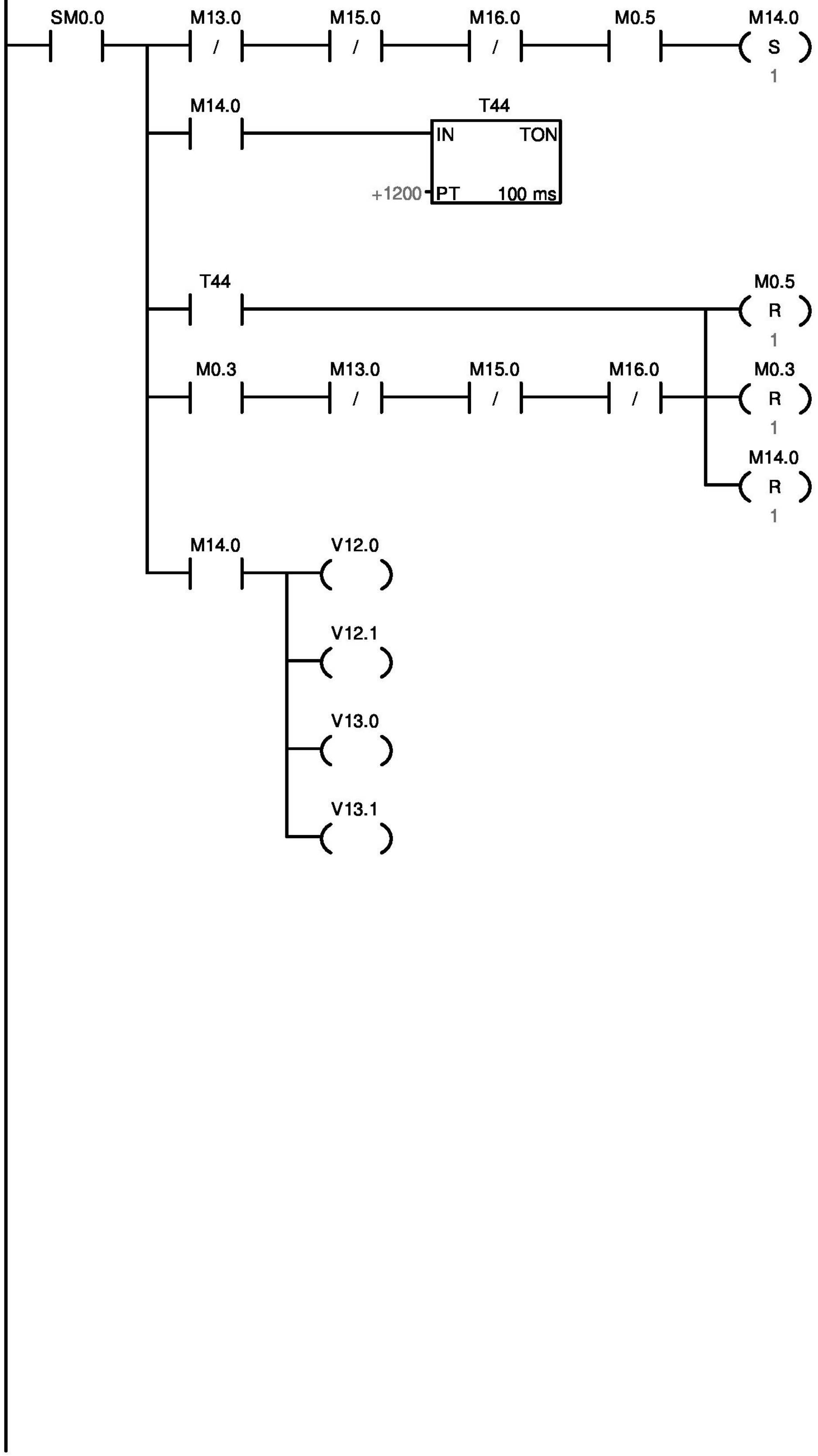
Network 5


SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_R
EN
ENO
VD650
IN
OUT
AC2
VD640
<R
0.0
V20.1
V20.1
/
MOV_W
EN
ENO
AC2
IN
OUT
VW67
V20.1
MOV_W
EN
ENO
+0
IN
OUT
VW67

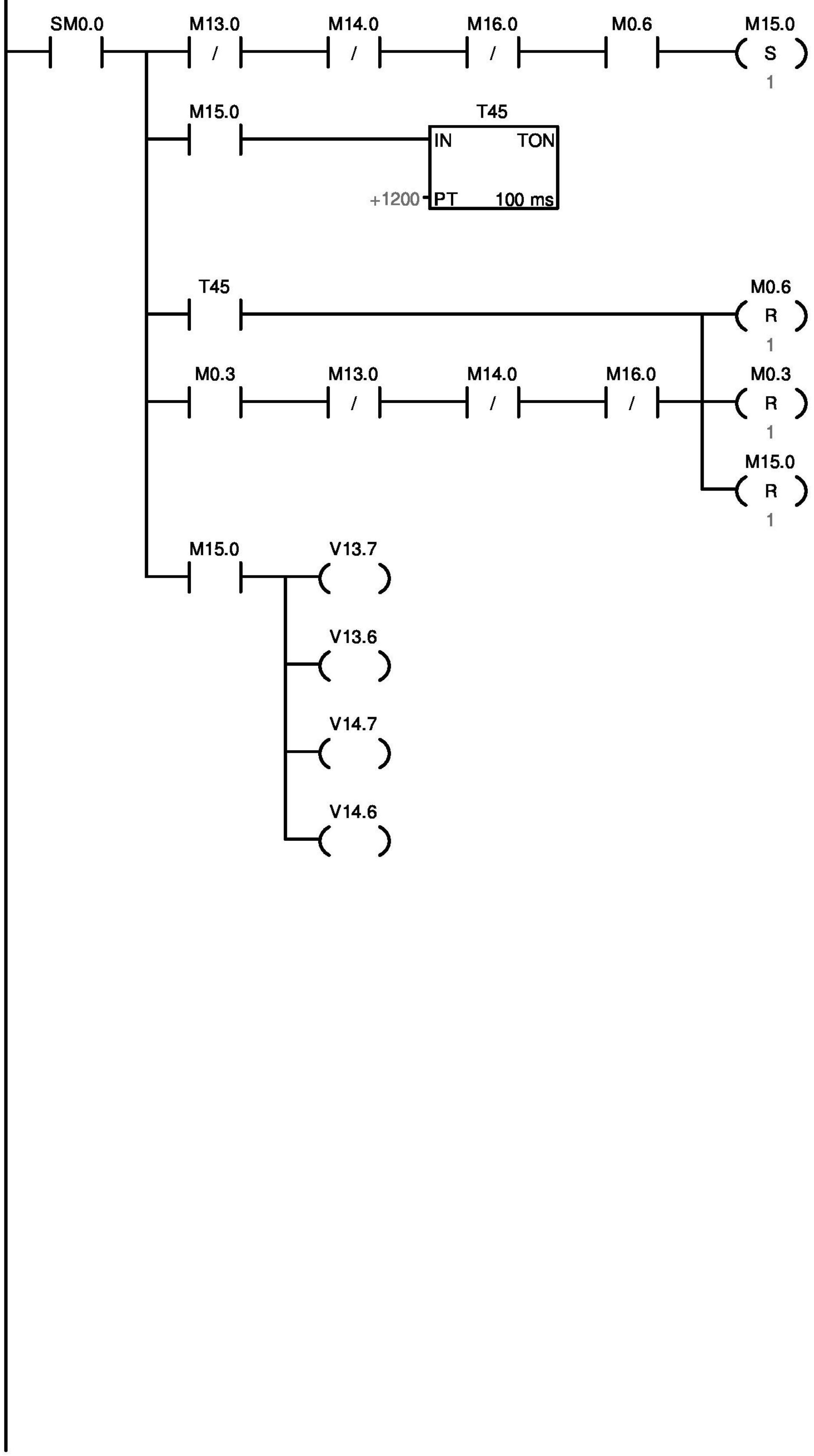
Network 6


SM0.0
M14.0
M15.0
M16.0
M0.4
M13.0
S
1
M13.0
T43
IN
TON
+1200
PT
100 ms
T43
M0.4
R
1
M0.3
M14.0
M15.0
M16.0
M0.3
R
1
M13.0
R
1
M13.0
V12.3
V12.2
V13.2
V13.3

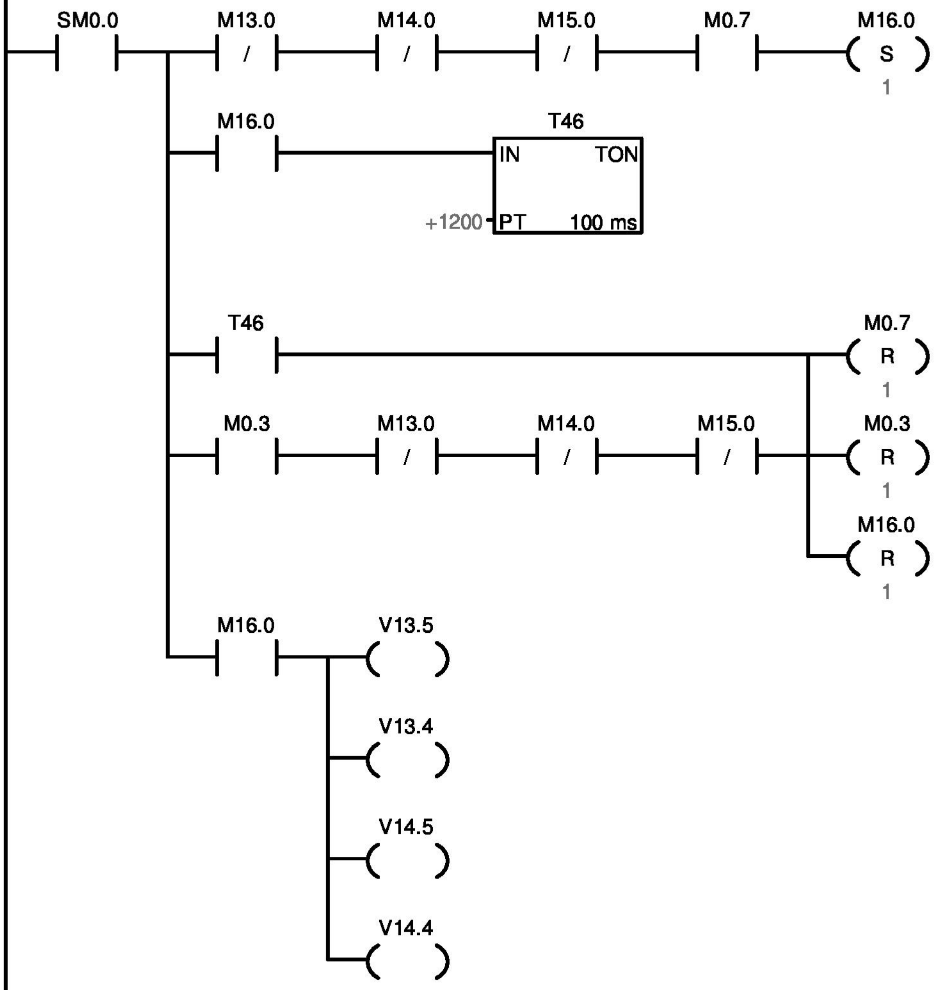
Network 7


SM0.0
M13.0
/
M15.0
/
M16.0
/
M0.5
M14.0
S
1
M14.0
T44
IN
TON
+1200
PT
100 ms
T44
M0.5
R
1
M0.3
M13.0
/
M15.0
/
M16.0
/
M0.3
R
1
M14.0
R
1
M14.0
V12.0
V12.1
V13.0
V13.1

Network 8

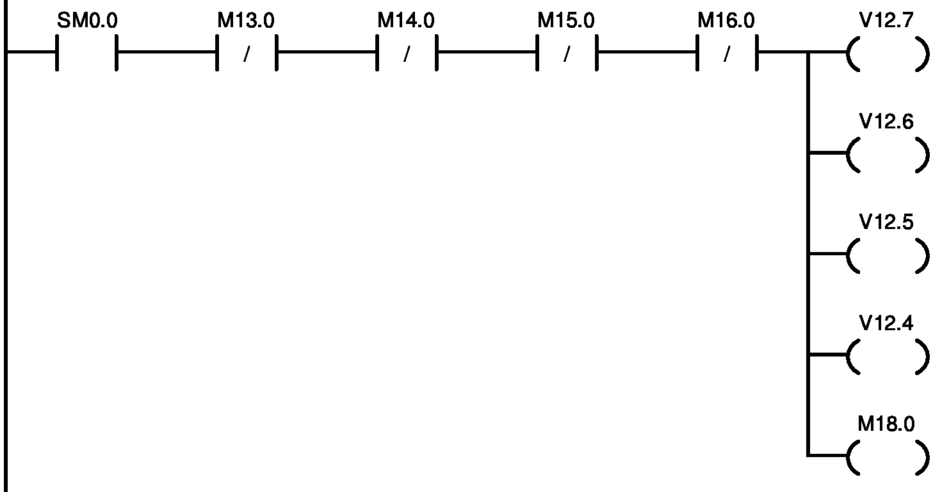

SM0.0
M13.0
/
M14.0
/
M16.0
/
M0.6
M15.0
S
1
M15.0
T45
IN
TON
+1200
PT
100 ms
T45
M0.6
R
1
M0.3
M13.0
/
M14.0
/
M16.0
/
M0.3
R
1
M15.0
R
1
M15.0
V13.7
V13.6
V14.7
V14.6

Network 9

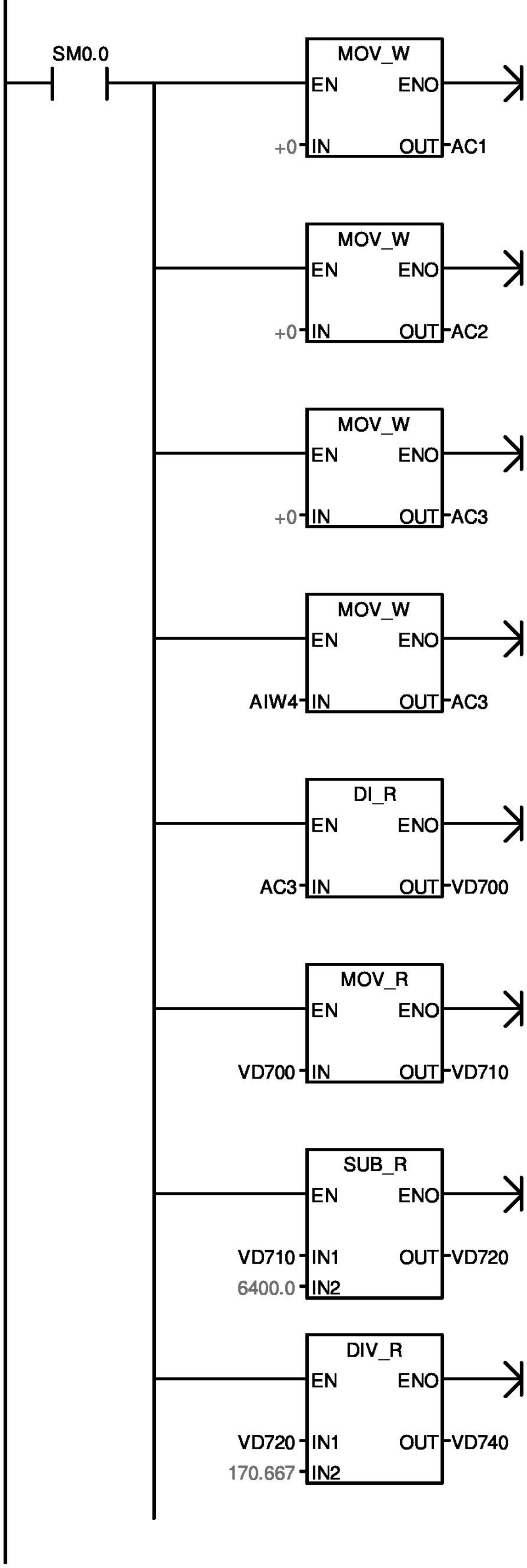

SM0.0
M13.0
M14.0
M15.0
M0.7
M16.0
S
1
M16.0
T46
IN
TON
+1200
PT
100 ms
T46
M0.7
R
1
M0.3
M13.0
M14.0
M15.0
M0.3
R
1
M16.0
R
1
M16.0
V13.5
V13.4
V14.5
V14.4

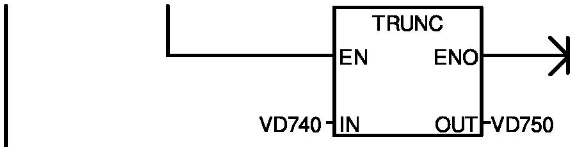
Network 10

Network 11

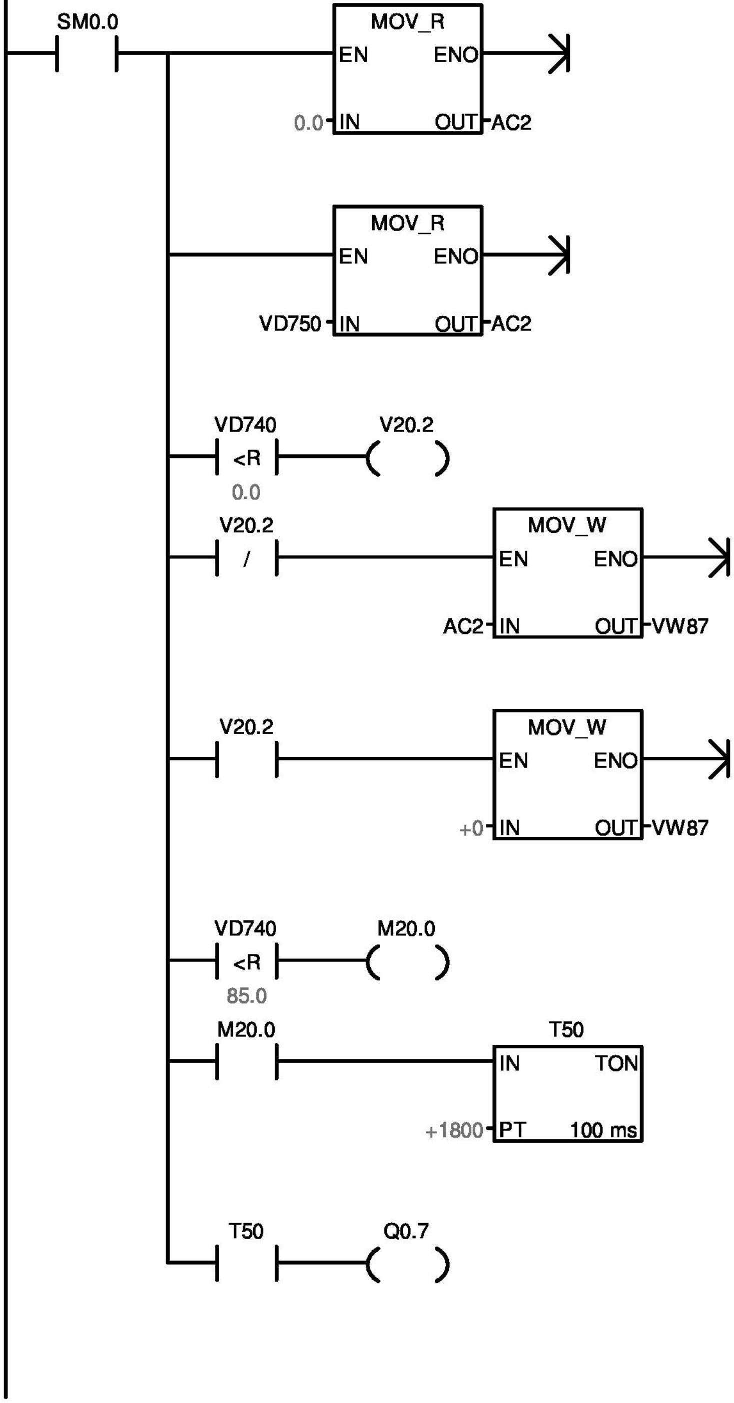

SM0.0
M13.0
M14.0
M15.0
M16.0
V12.7
V12.6
V12.5
V12.4
M18.0

Network 12

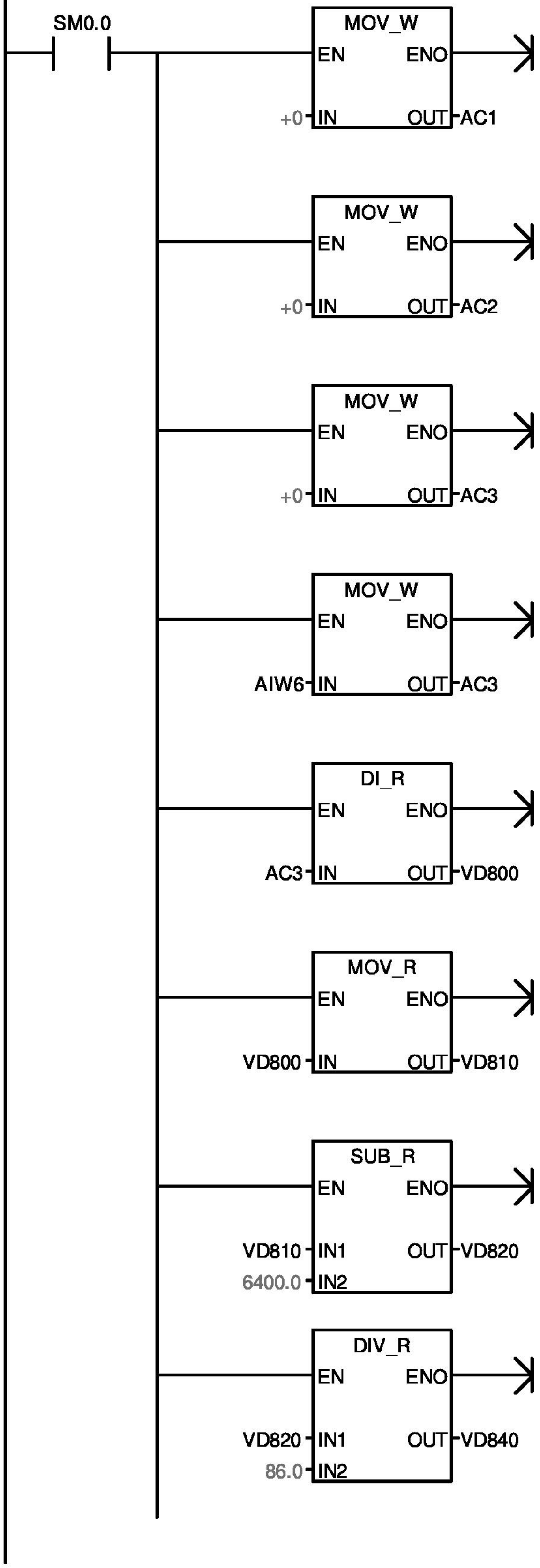

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
AIW4
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD700
MOV_R
EN
ENO
VD700
IN
OUT
VD710
SUB_R
EN
ENO
VD710
IN1
OUT
VD720
6400.0
IN2
DIV_R
EN
ENO
VD720
IN1
OUT
VD740
170.667
IN2

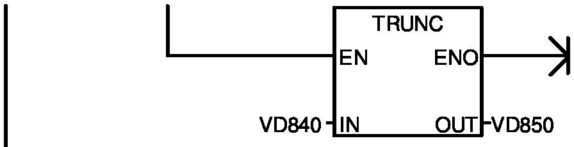

TRUNC
EN
ENO
VD740
IN
OUT
VD750

Network 13

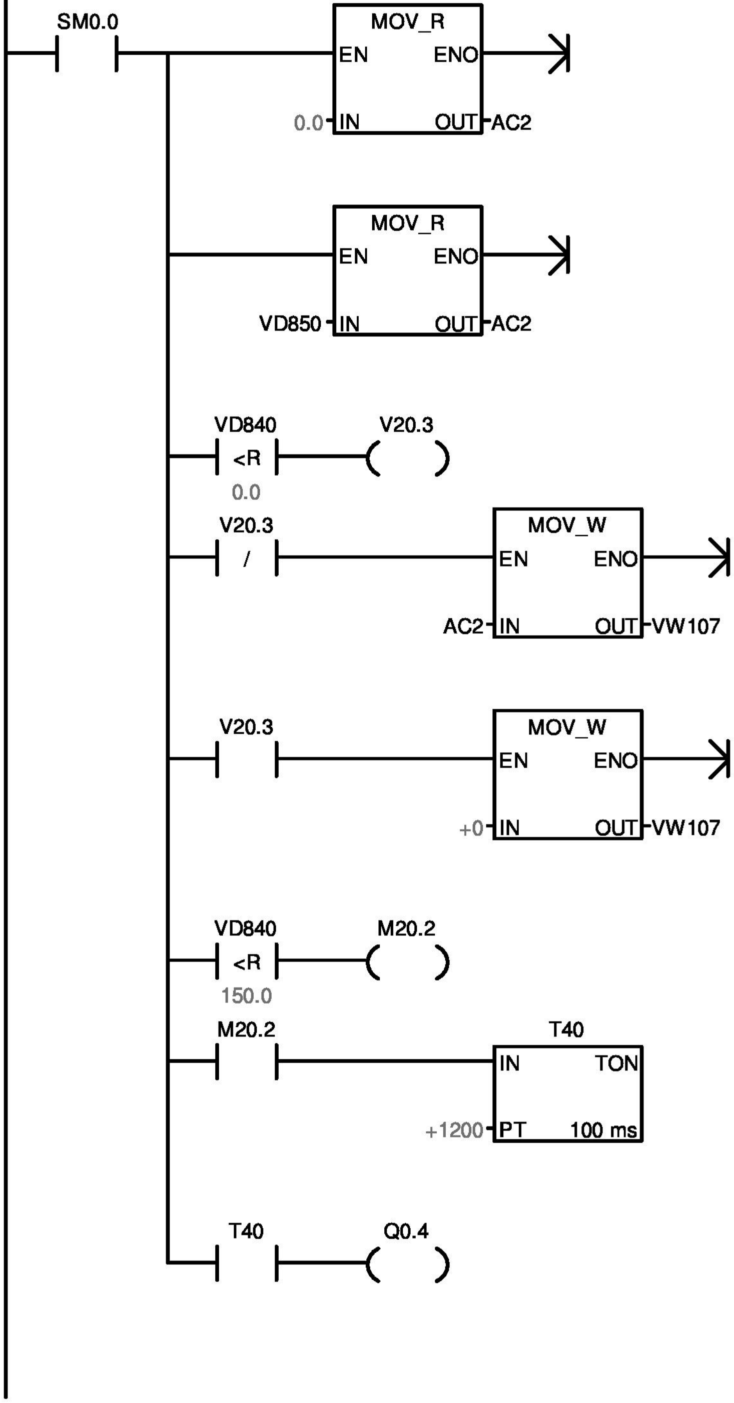

SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_R
EN
ENO
VD750
IN
OUT
AC2
VD740
<R
0.0
V20.2
V20.2
/
MOV_W
EN
ENO
AC2
IN
OUT
VW87
V20.2
MOV_W
EN
ENO
+0
IN
OUT
VW87
VD740
<R
85.0
M20.0
M20.0
T50
IN
TON
+1800
PT
100 ms
T50
Q0.7

Network 14

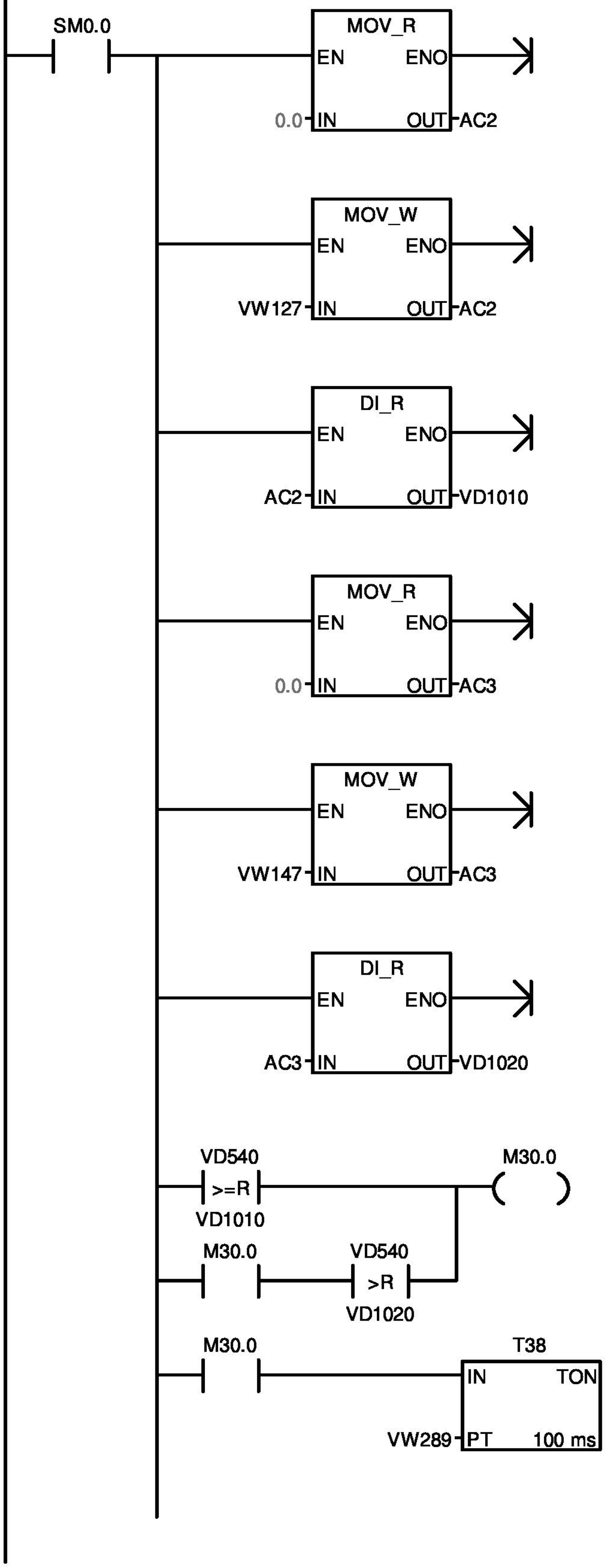

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
AIW6
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD800
MOV_R
EN
ENO
VD800
IN
OUT
VD810
SUB_R
EN
ENO
VD810
IN1
OUT
VD820
6400.0
IN2
DIV_R
EN
ENO
VD820
IN1
OUT
VD840
86.0
IN2

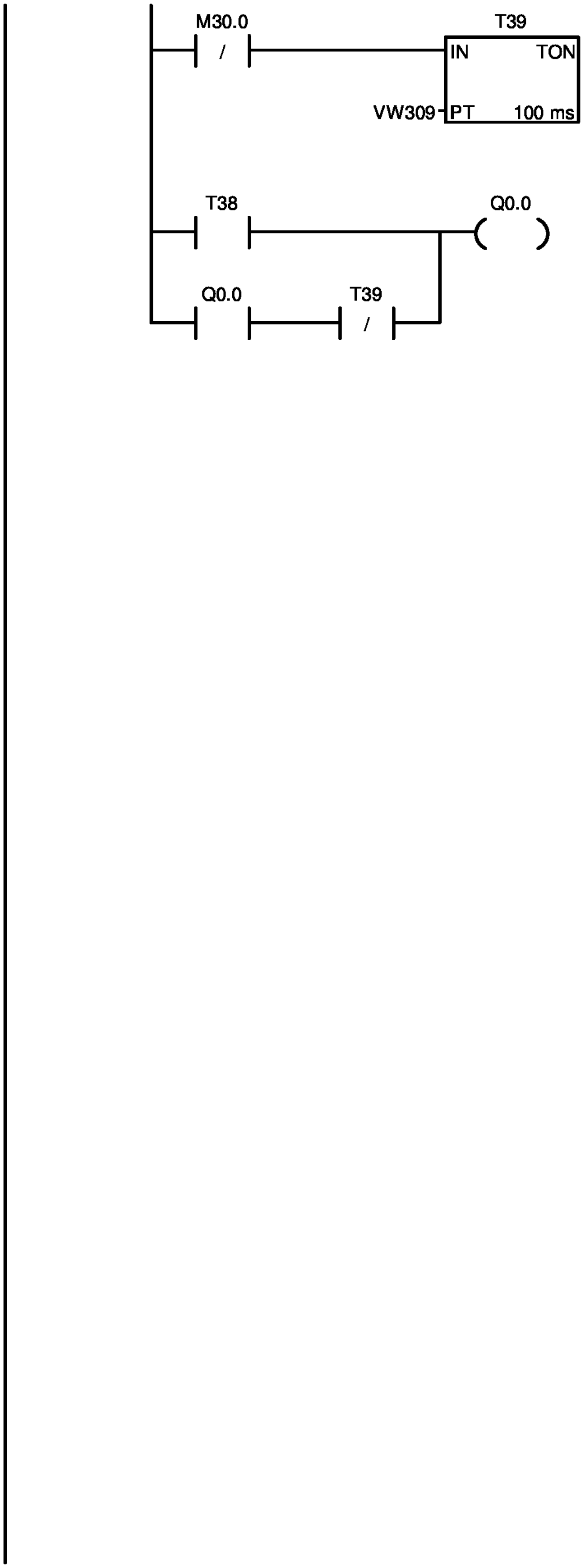

TRUNC
EN
ENO
VD840
IN
OUT
VD850

Network 15

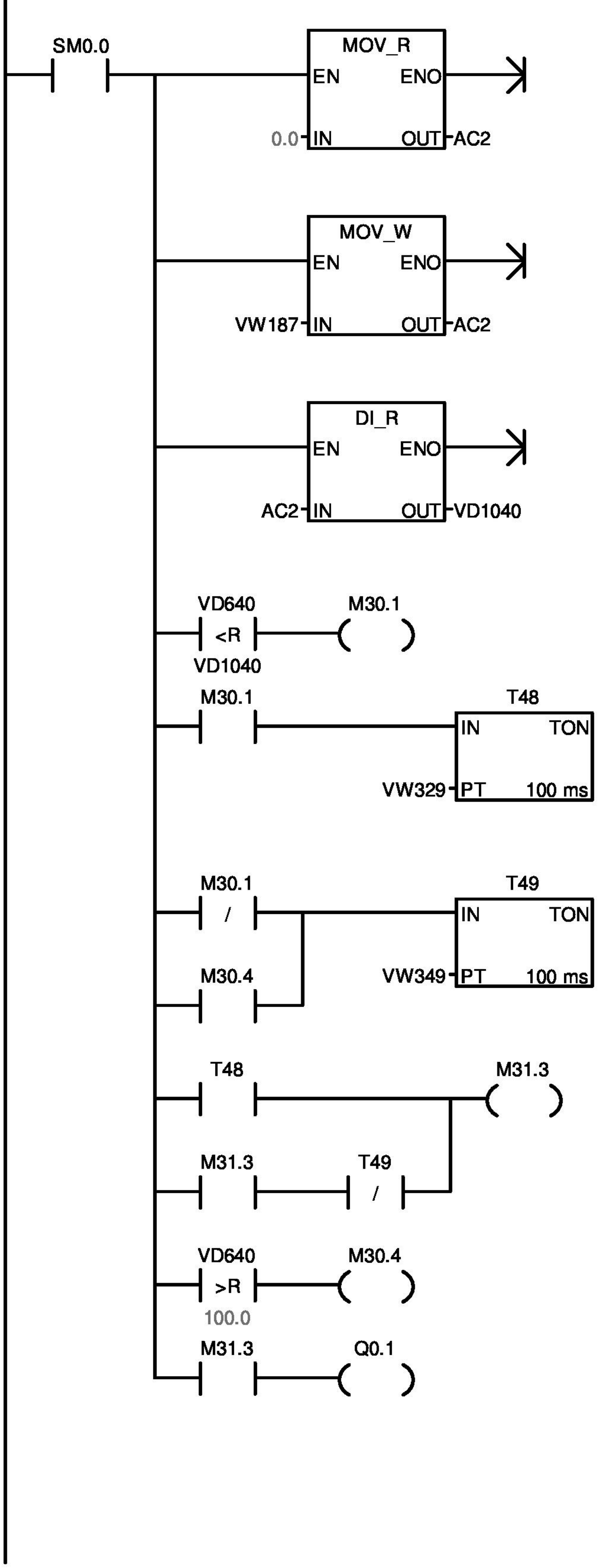

SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_R
EN
ENO
VD850
IN
OUT
AC2
VD840
<R
0.0
V20.3
V20.3
/
MOV_W
EN
ENO
AC2
IN
OUT
VW107
V20.3
MOV_W
EN
ENO
+0
IN
OUT
VW107
VD840
<R
150.0
M20.2
M20.2
T40
IN
TON
+1200
PT
100 ms
T40
Q0.4

Network 16

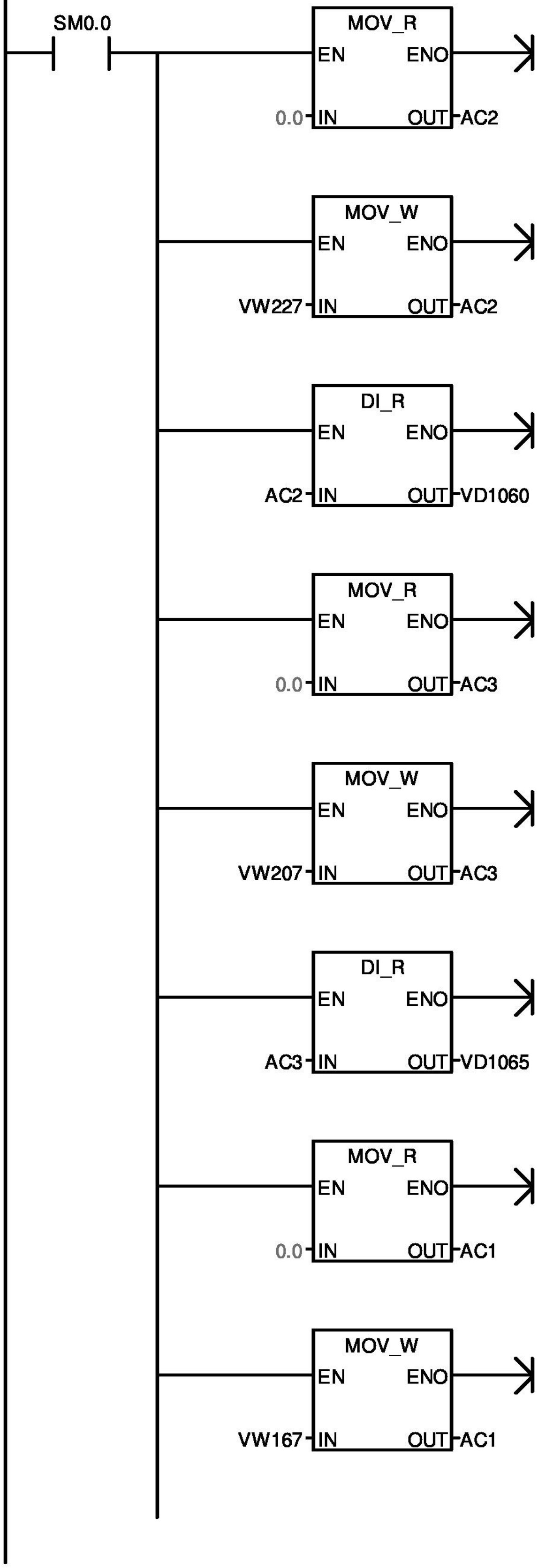

SM0.0
MOV_R
EN ENO
0.0 IN OUT AC2
MOV_W
EN ENO
VW127 IN OUT AC2
DI_R
EN ENO
AC2 IN OUT VD1010
MOV_R
EN ENO
0.0 IN OUT AC3
MOV_W
EN ENO
VW147 IN OUT AC3
DI_R
EN ENO
AC3 IN OUT VD1020
VD540
>=R
VD1010
M30.0
M30.0
VD540
>R
VD1020
M30.0
T38
IN TON
VW289 PT 100 ms

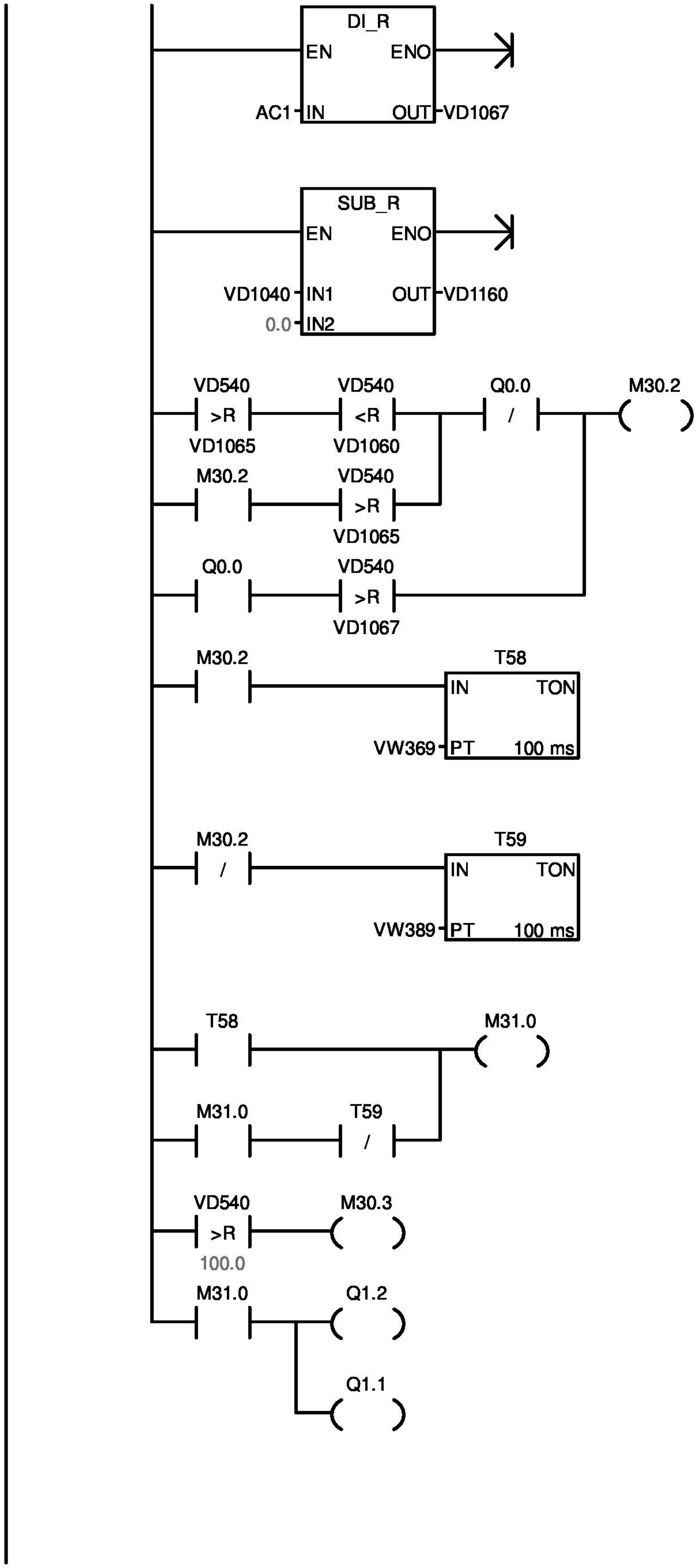

M30.0
/
T39
IN
TON
VW309
PT
100 ms
T38
Q0.0
Q0.0
T39
/

Network 17

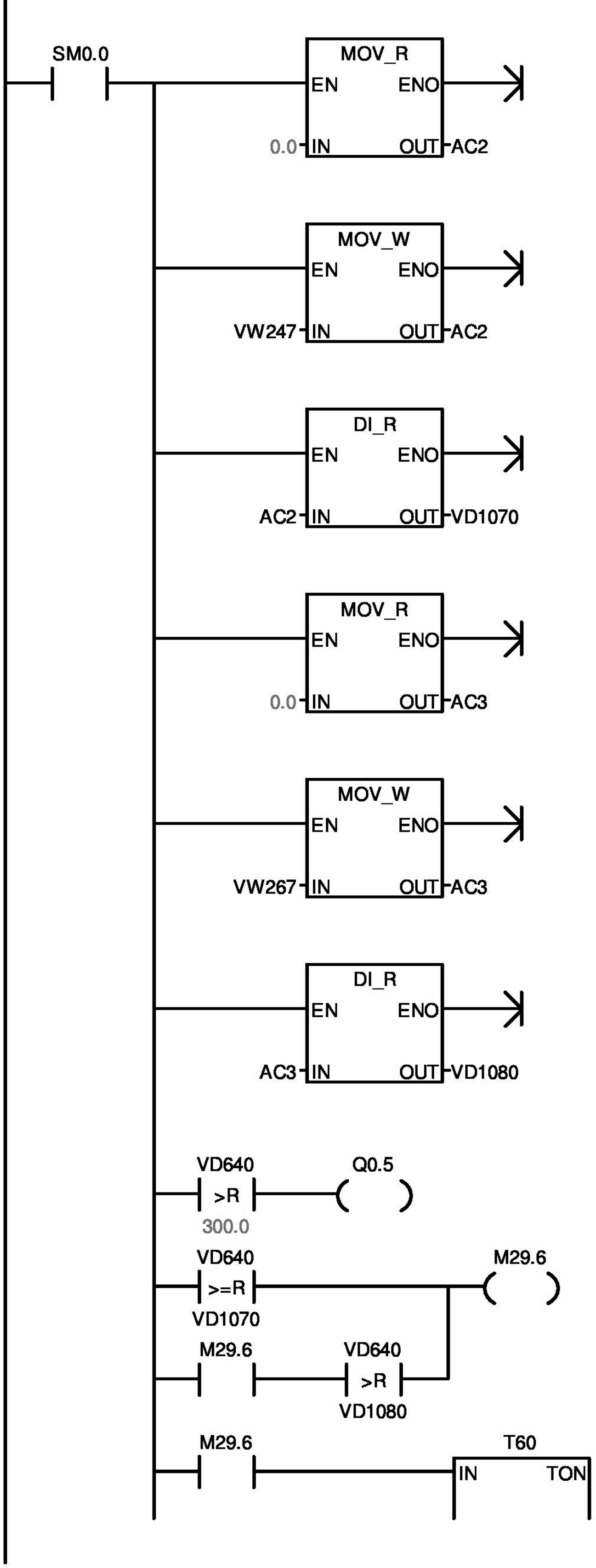

SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_W
EN
ENO
VW187
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD1040
VD640
<R
VD1040
M30.1
M30.1
T48
IN
TON
VW329
PT
100 ms
M30.1
/
T49
IN
TON
M30.4
VW349
PT
100 ms
T48
M31.3
M31.3
T49
/
VD640
>R
100.0
M30.4
M31.3
Q0.1

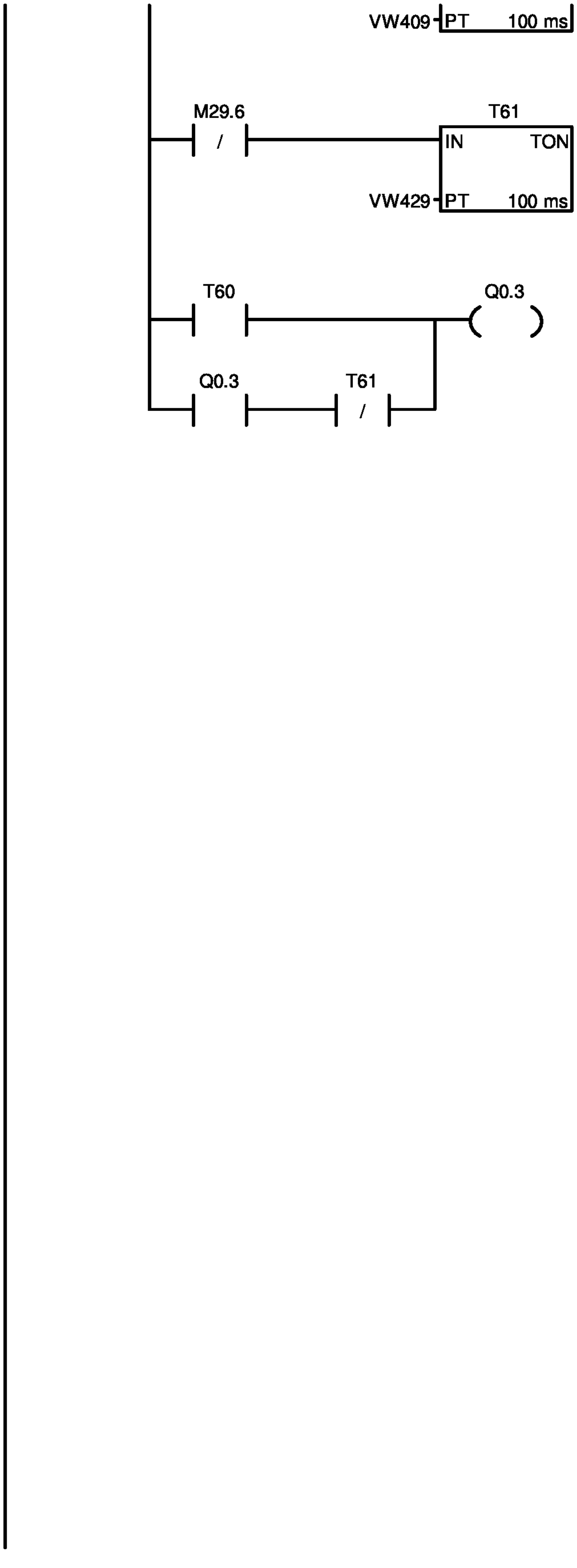
Network 18


SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_W
EN
ENO
VW227
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD1060
MOV_R
EN
ENO
0.0
IN
OUT
AC3
MOV_W
EN
ENO
VW207
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD1065
MOV_R
EN
ENO
0.0
IN
OUT
AC1
MOV_W
EN
ENO
VW167
IN
OUT
AC1


DI_R
EN
ENO
AC1
IN
OUT
VD1067
SUB_R
EN
ENO
VD1040
IN1
OUT
VD1160
0.0
IN2
VD540
>R
VD1065
VD540
<R
VD1060
Q0.0
/
M30.2
M30.2
VD540
>R
VD1065
Q0.0
VD540
>R
VD1067
M30.2
T58
IN
TON
VW369
PT
100 ms
M30.2
/
T59
IN
TON
VW389
PT
100 ms
T58
M31.0
M31.0
T59
/
VD540
>R
100.0
M30.3
M31.0
Q1.2
Q1.1

Network 19


SM0.0
MOV_R
EN
ENO
0.0
IN
OUT
AC2
MOV_W
EN
ENO
VW247
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD1070
MOV_R
EN
ENO
0.0
IN
OUT
AC3
MOV_W
EN
ENO
VW267
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD1080
VD640
>R
300.0
Q0.5
VD640
>=R
VD1070
M29.6
M29.6
VD640
>R
VD1080
M29.6
T60
IN
TON


VW409
PT
100 ms
M29.6
T61
IN
TON
VW429
PT
100 ms
T60
Q0.3
Q0.3
T61

Block: SBR_0
Author:
Created: 06/20/2018 10:04:56 am
Last Modified: 06/20/2018 10:04:56 am

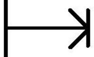
Symbol	Var Type	Data Type	Comment
EN	IN	BOOL	
	IN		
	IN_OUT		
	OUT		
	TEMP		

SUBROUTINE COMMENTS
Press F1 for help and example program

SUBROUTINE COMMENTS
Press F1 for help and example program

Network 1 NETWORK TITLE (single line)

NETWORK COMMENTS



Block: INT_0
Author:
Created: 06/20/2018 10:04:56 am
Last Modified: 06/20/2018 10:04:56 am

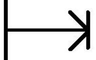
Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

INTERRUPT ROUTINE COMMENTS
Press F1 for help and example program

INTERRUPT ROUTINE COMMENTS
Press F1 for help and example program

Network 1 NETWORK TITLE (single line)

NETWORK COMMENTS



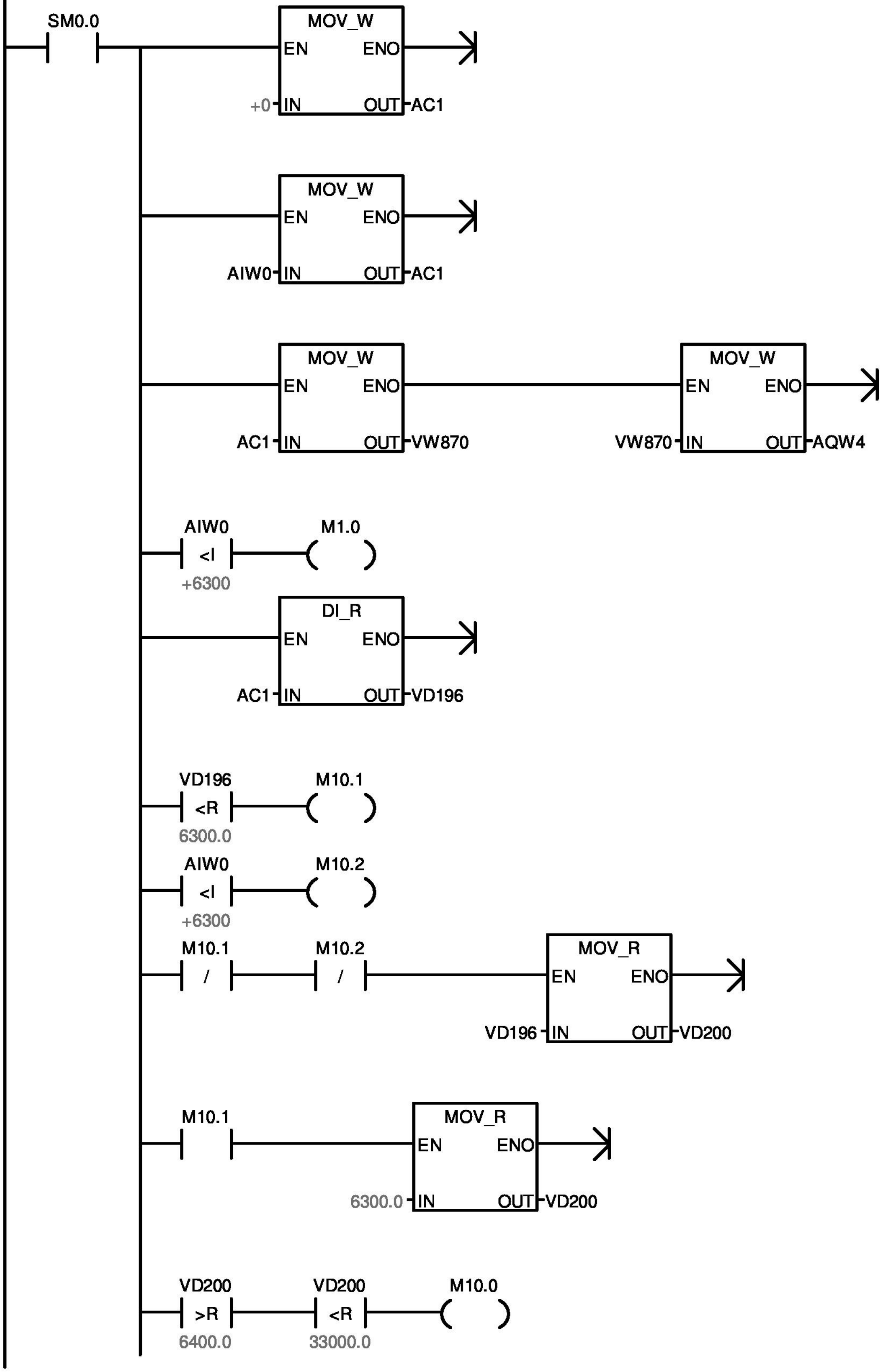
Block: MAIN
Author:
Created: 09/27/2010 10:58:07 am
Last Modified: 08/18/2015 10:29:52 am

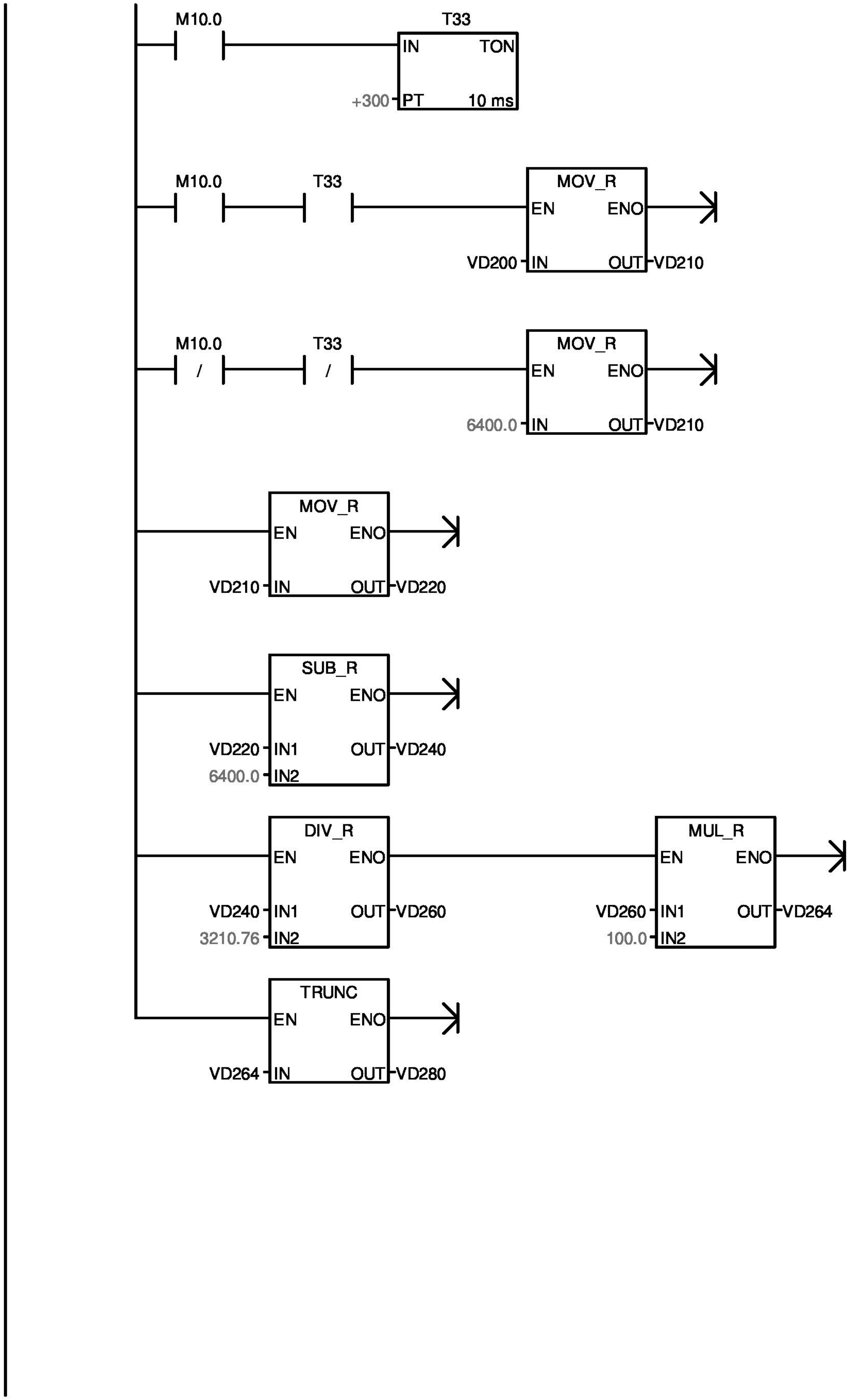
Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

PROGRAM COMMENTS

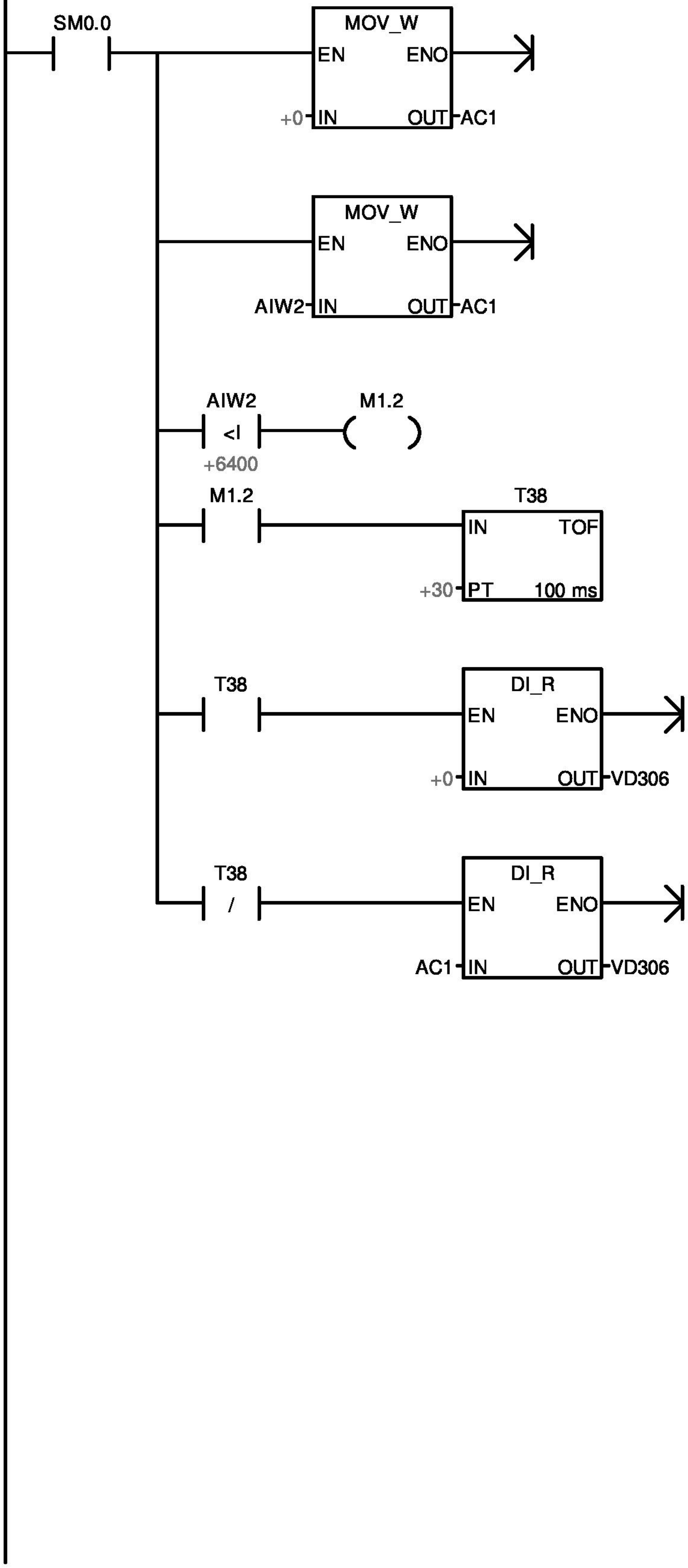
Network 1 mag meter

Network Comment

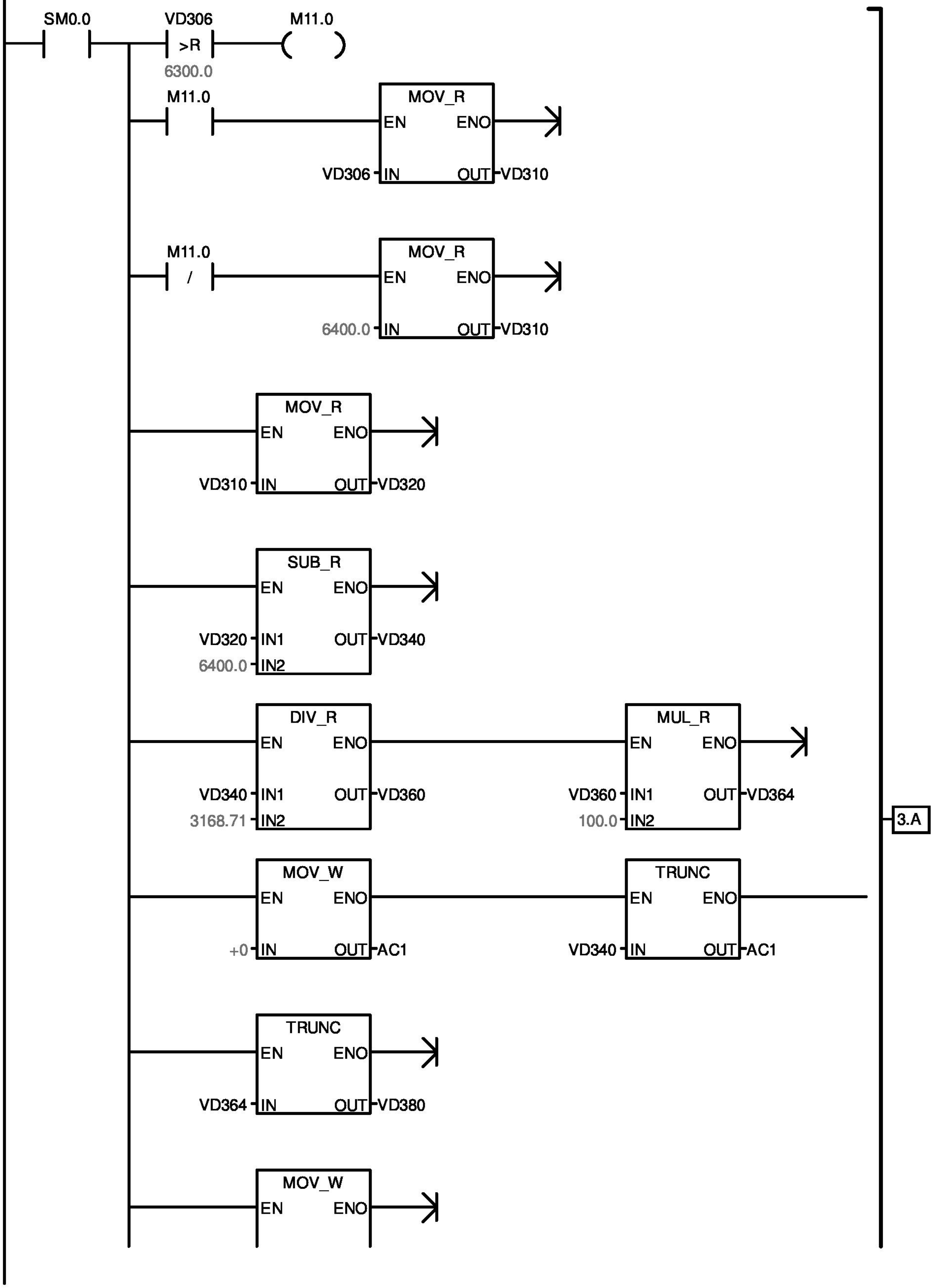

SM0.0
MOV_W
EN ENO
+0 IN OUT AC1
MOV_W
EN ENO
AIW0 IN OUT AC1
MOV_W
EN ENO
AC1 IN OUT VW870
MOV_W
EN ENO
VW870 IN OUT AQW4
AIW0
<I
+6300
M1.0
DI_R
EN ENO
AC1 IN OUT VD196
VD196
<R
6300.0
M10.1
AIW0
<I
+6300
M10.2
M10.1
/
M10.2
/
MOV_R
EN ENO
VD196 IN OUT VD200
M10.1
MOV_R
EN ENO
6300.0 IN OUT VD200
VD200
>R
6400.0
VD200
<R
33000.0
M10.0

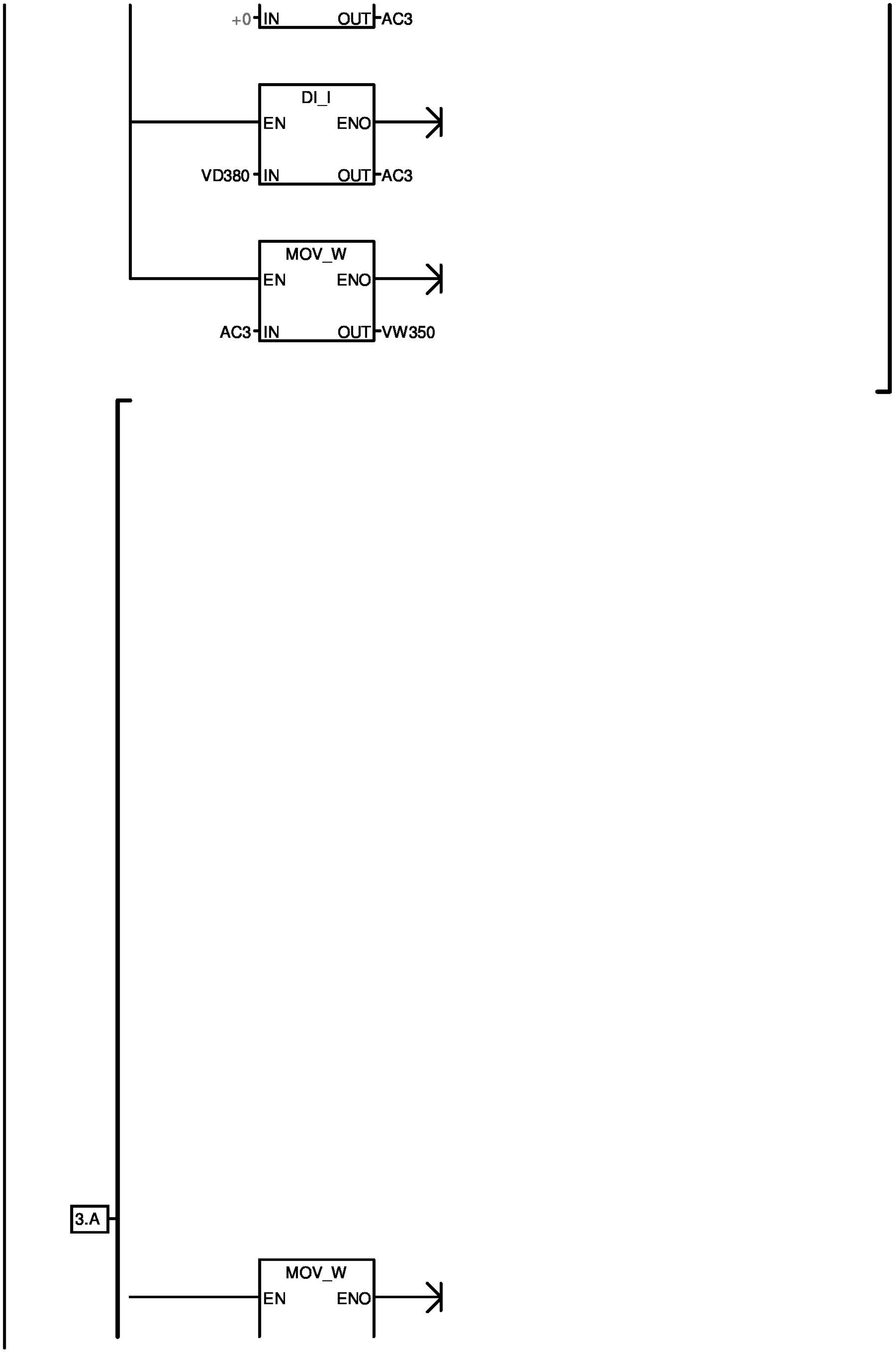

M10.0
T33
IN
TON
+300
PT
10 ms
M10.0
T33
MOV_R
EN
ENO
VD200
IN
OUT
VD210
M10.0
/
T33
/
MOV_R
EN
ENO
6400.0
IN
OUT
VD210
MOV_R
EN
ENO
VD210
IN
OUT
VD220
SUB_R
EN
ENO
VD220
IN1
OUT
VD240
6400.0
IN2
DIV_R
EN
ENO
VD240
IN1
OUT
VD260
3210.76
IN2
MUL_R
EN
ENO
VD260
IN1
OUT
VD264
100.0
IN2
TRUNC
EN
ENO
VD264
IN
OUT
VD280

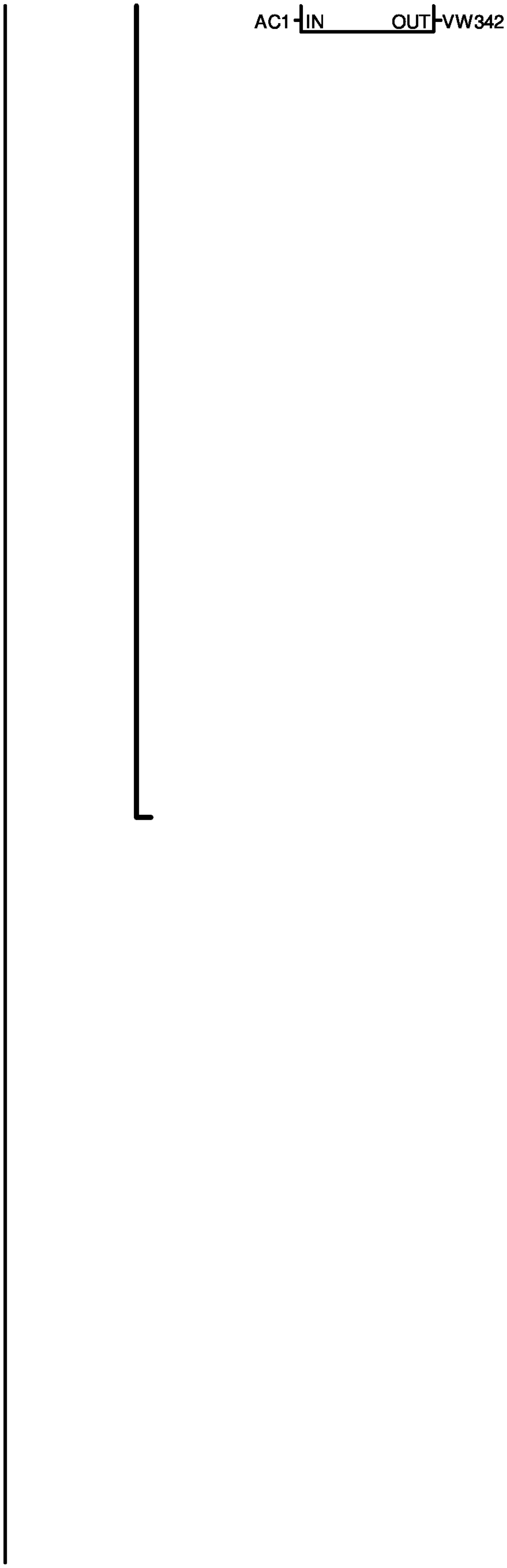
Network 2 Radio Signal 1


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
AIW2
IN
OUT
AC1
AIW2
<I
+6400
M1.2
M1.2
T38
IN
TOF
+30
PT
100 ms
T38
DI_R
EN
ENO
+0
IN
OUT
VD306
T38
/
DI_R
EN
ENO
AC1
IN
OUT
VD306

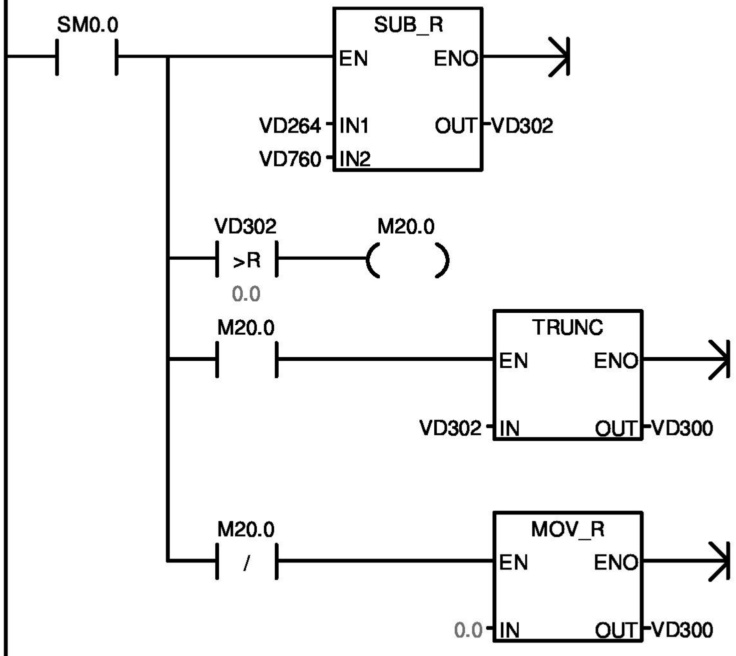
Network 3 Radio Signal 2


SM0.0
VD306
>R
6300.0
M11.0
M11.0
MOV_R
EN
ENO
VD306
IN
OUT
VD310
M11.0
/
MOV_R
EN
ENO
6400.0
IN
OUT
VD310
MOV_R
EN
ENO
VD310
IN
OUT
VD320
SUB_R
EN
ENO
VD320
IN1
OUT
VD340
6400.0
IN2
DIV_R
EN
ENO
VD340
IN1
OUT
VD360
3168.71
IN2
MUL_R
EN
ENO
VD360
IN1
OUT
VD364
100.0
IN2
3.A
MOV_W
EN
ENO
+0
IN
OUT
AC1
TRUNC
EN
ENO
VD340
IN
OUT
AC1
TRUNC
EN
ENO
VD364
IN
OUT
VD380
MOV_W
EN
ENO

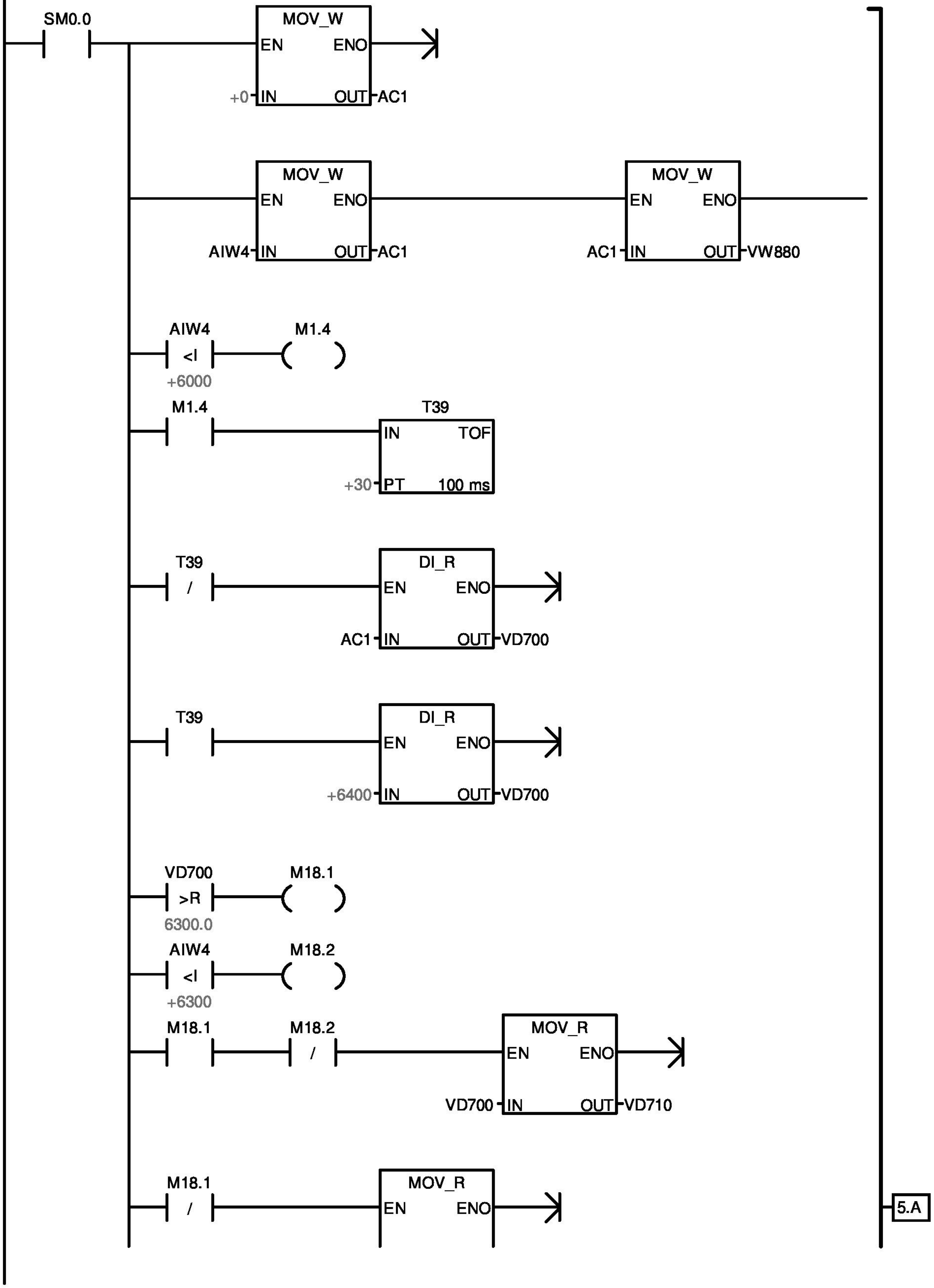

+0
IN
OUT
AC3
DI_I
EN
ENO
VD380
IN
OUT
AC3
MOV_W
EN
ENO
AC3
IN
OUT
VW350
3.A
MOV_W
EN
ENO

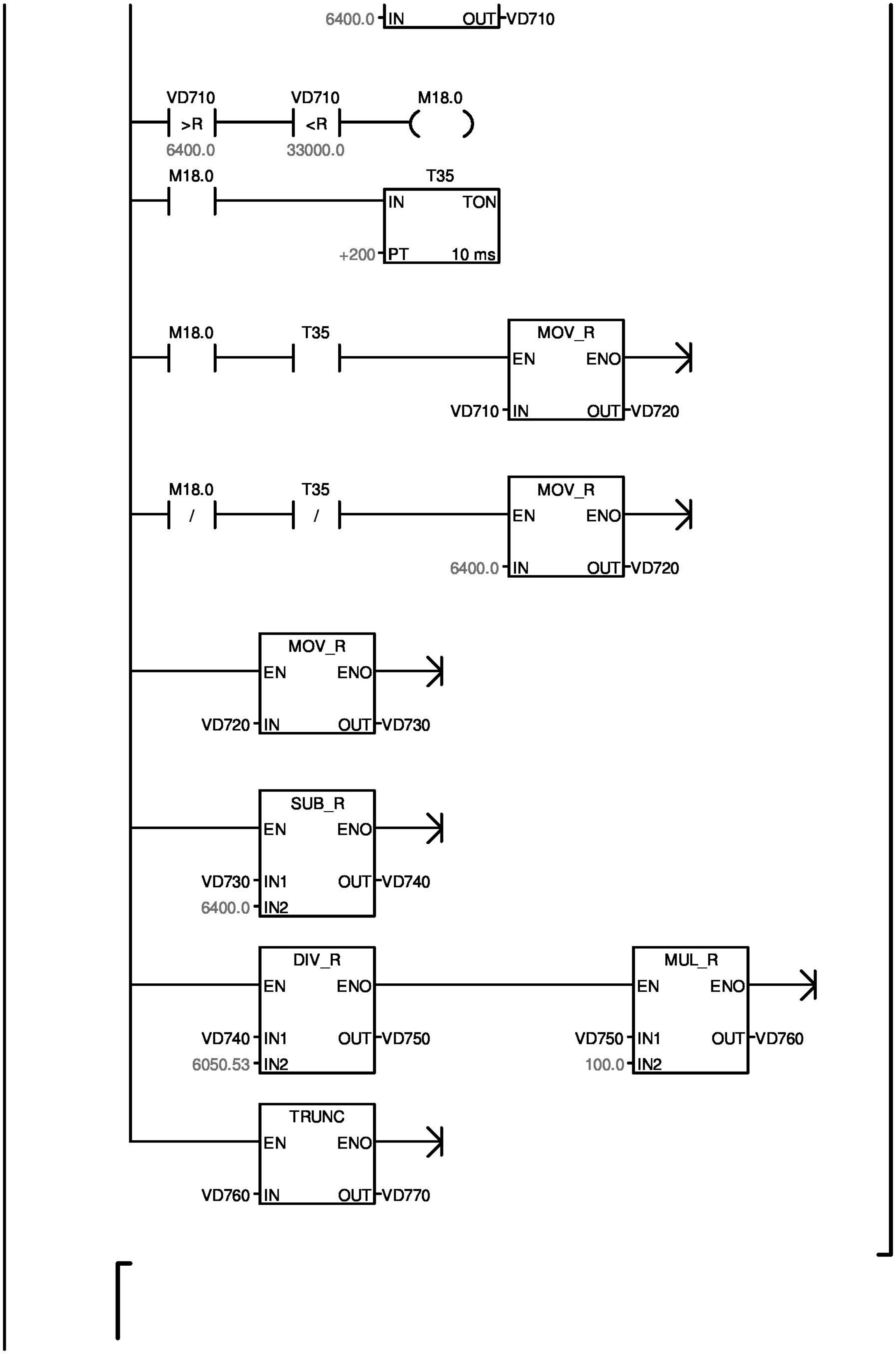

AC1
IN
OUT
VW342

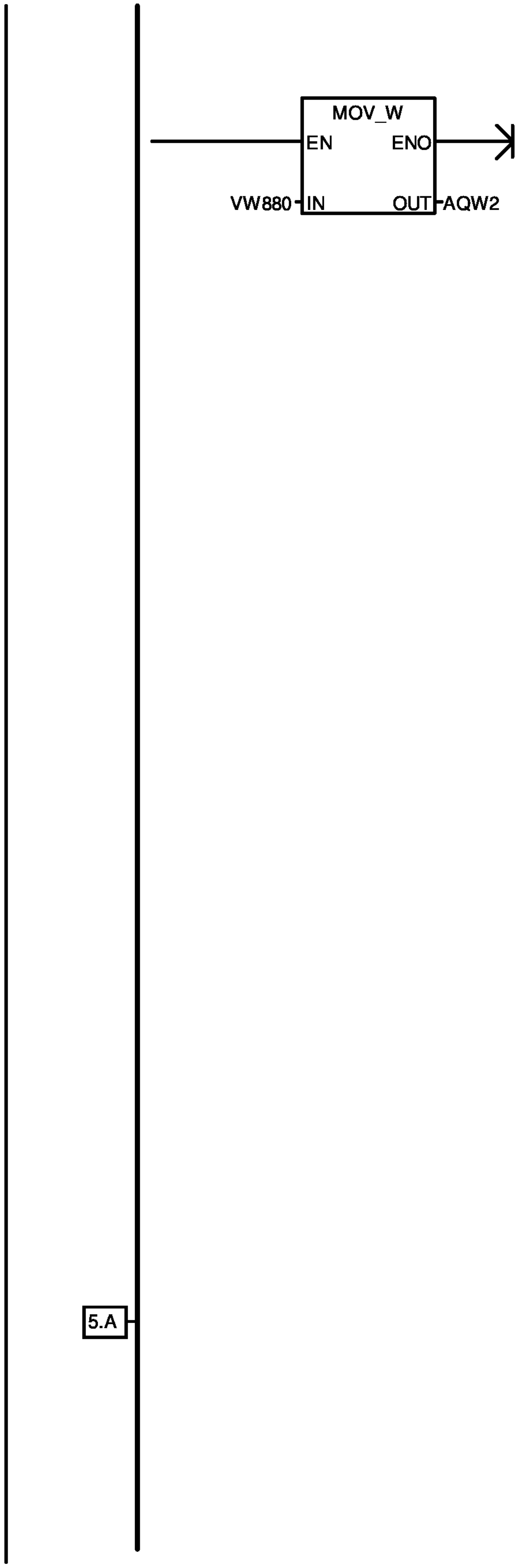
Network 4 CV Flow


SM0.0
SUB_R
EN
ENO
VD264
IN1
OUT
VD302
VD760
IN2
VD302
>R
0.0
M20.0
M20.0
TRUNC
EN
ENO
VD302
IN
OUT
VD300
M20.0
/
MOV_R
EN
ENO
0.0
IN
OUT
VD300

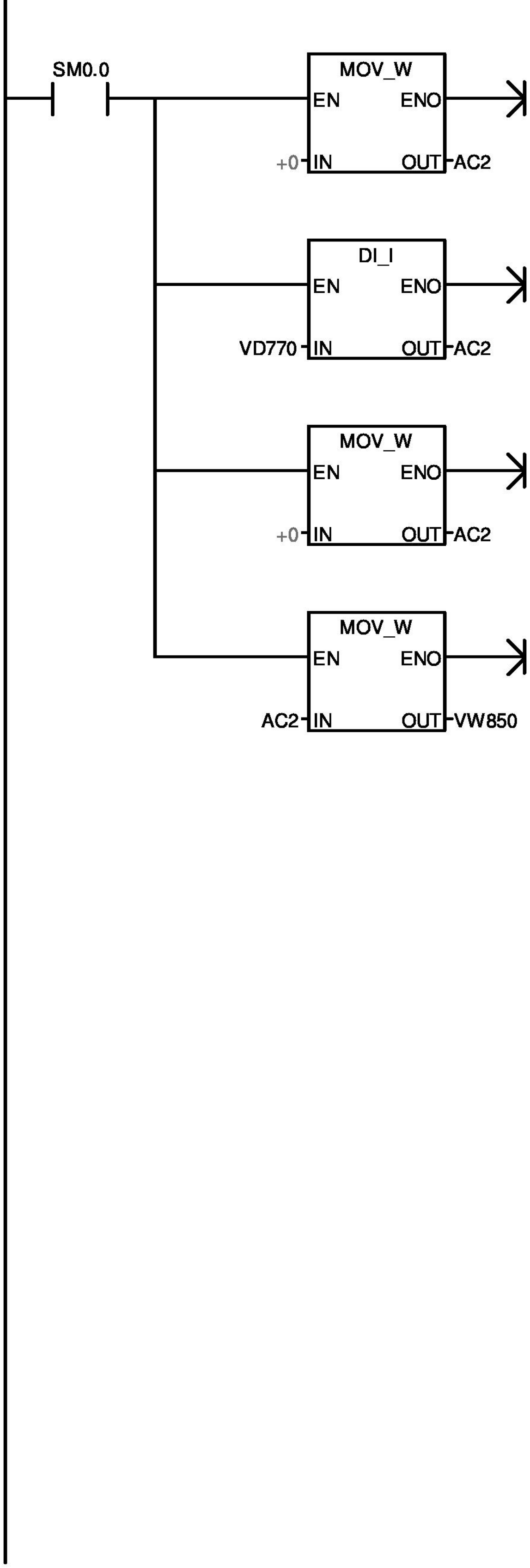
Network 5 Hydro Flow


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
AIW4
IN
OUT
AC1
MOV_W
EN
ENO
AC1
IN
OUT
VW880
AIW4
<I
+6000
M1.4
M1.4
T39
IN
TOF
+30
PT
100 ms
T39
/
DI_R
EN
ENO
AC1
IN
OUT
VD700
T39
DI_R
EN
ENO
+6400
IN
OUT
VD700
VD700
>R
6300.0
M18.1
AIW4
<I
+6300
M18.2
M18.1
M18.2
/
MOV_R
EN
ENO
VD700
IN
OUT
VD710
M18.1
/
MOV_R
EN
ENO
5.A

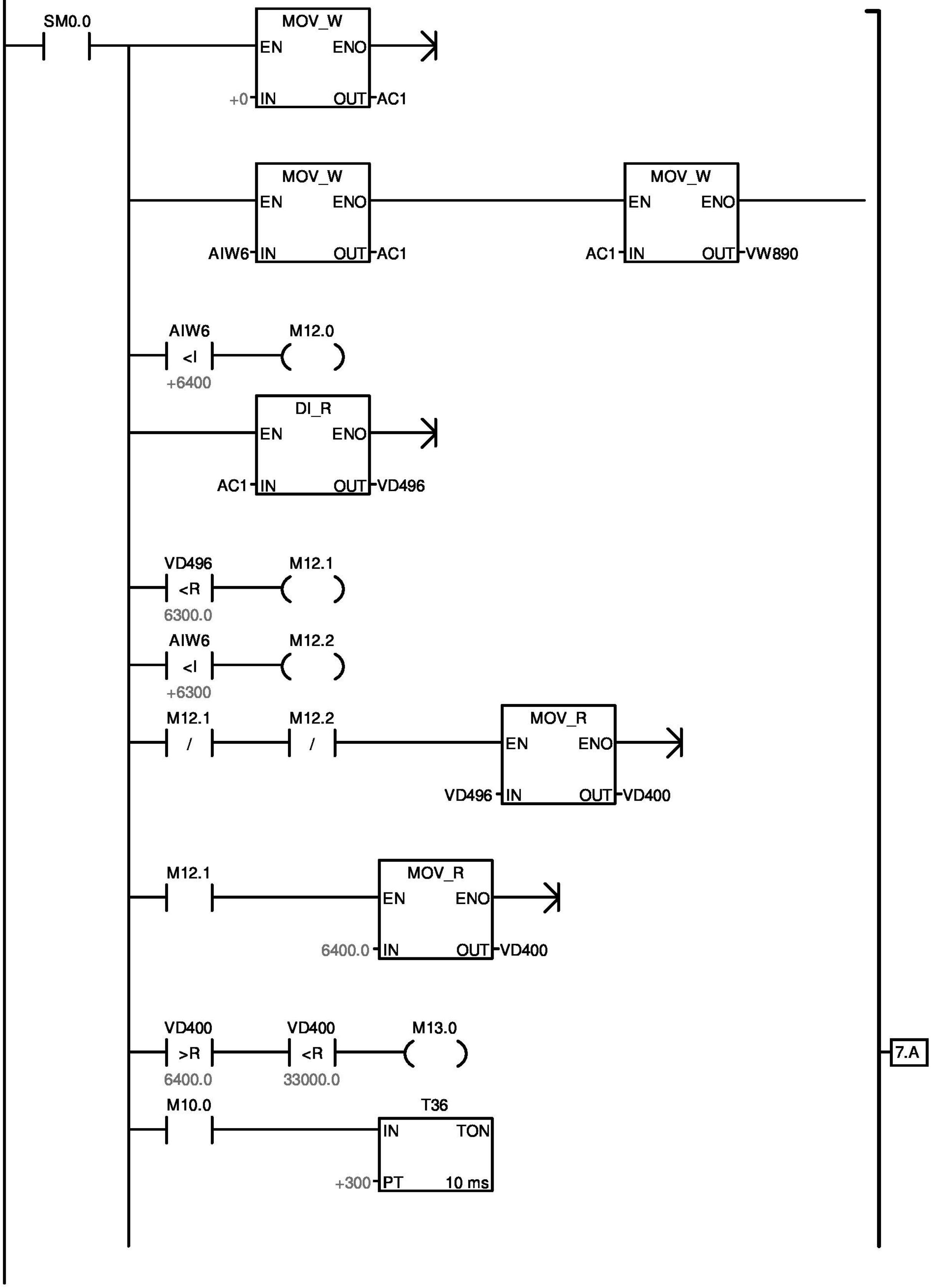

6400.0
IN
OUT
VD710
VD710
>R
6400.0
VD710
<R
33000.0
M18.0
M18.0
T35
IN
TON
+200
PT
10 ms
M18.0
T35
MOV_R
EN
ENO
VD710
IN
OUT
VD720
M18.0
/
T35
/
MOV_R
EN
ENO
6400.0
IN
OUT
VD720
MOV_R
EN
ENO
VD720
IN
OUT
VD730
SUB_R
EN
ENO
VD730
IN1
OUT
VD740
6400.0
IN2
DIV_R
EN
ENO
VD740
IN1
OUT
VD750
6050.53
IN2
MUL_R
EN
ENO
VD750
IN1
OUT
VD760
100.0
IN2
TRUNC
EN
ENO
VD760
IN
OUT
VD770

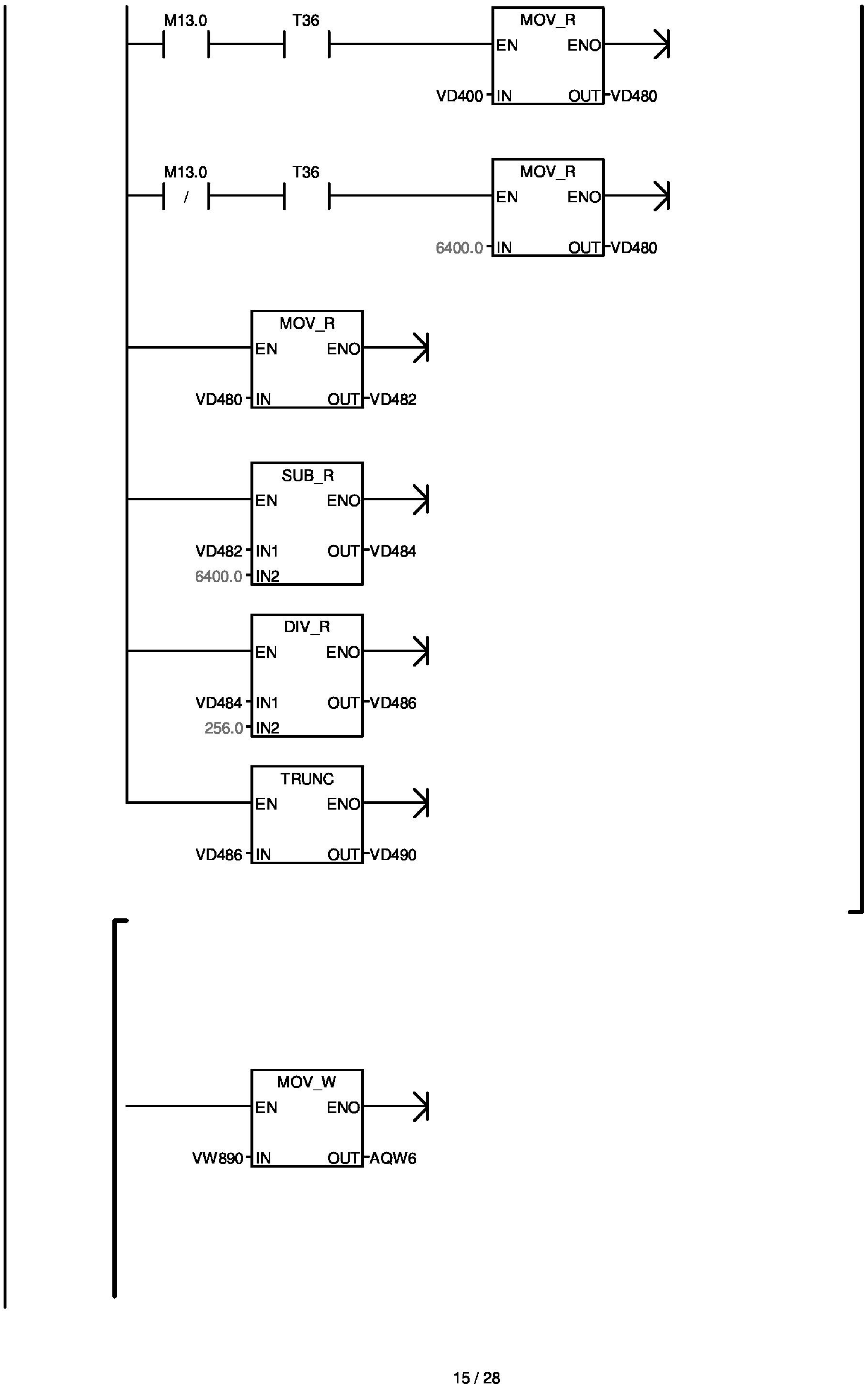

MOV_W
EN
ENO
VW880
IN
OUT
AQW2
5.A

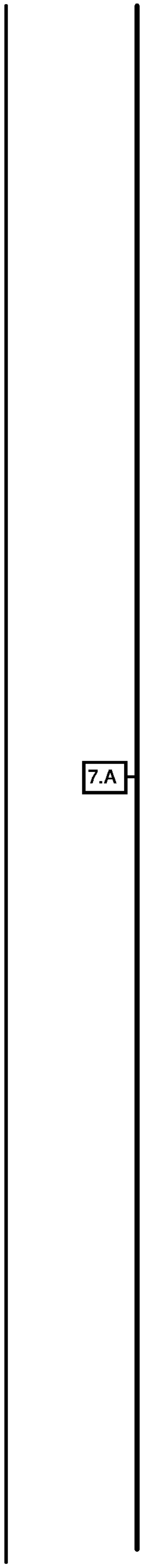
Network 6 hydro Condition

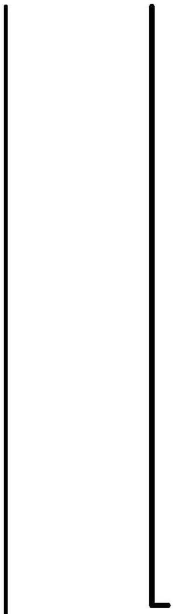

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC2
DI_I
EN
ENO
VD770
IN
OUT
AC2
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
AC2
IN
OUT
VW850

Network 7 Control Vale %

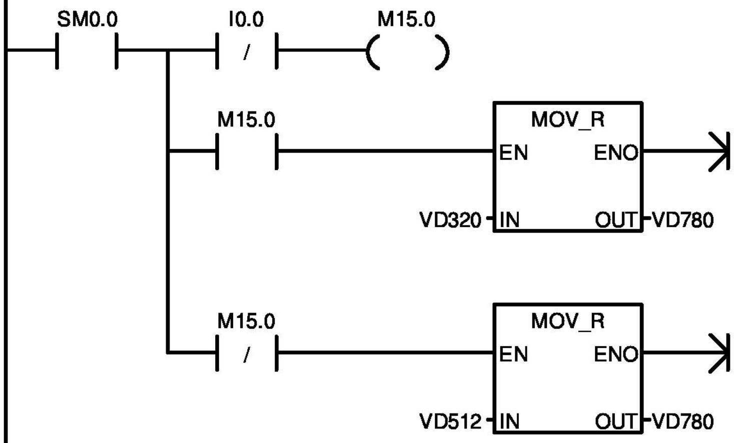

SM0.0
MOV_W
EN ENO
+0 IN OUT AC1
MOV_W
EN ENO
AIW6 IN OUT AC1
MOV_W
EN ENO
AC1 IN OUT VW890
AIW6
<I
+6400
M12.0
DI_R
EN ENO
AC1 IN OUT VD496
VD496
<R
6300.0
M12.1
AIW6
<I
+6300
M12.2
M12.1
/
M12.2
/
MOV_R
EN ENO
VD496 IN OUT VD400
M12.1
MOV_R
EN ENO
6400.0 IN OUT VD400
VD400
>R
6400.0
VD400
<R
33000.0
M13.0
7.A
M10.0
T36
IN TON
+300 PT 10 ms


M13.0
T36
MOV_R
EN
ENO
VD400
IN
OUT
VD480
M13.0
/
T36
MOV_R
EN
ENO
6400.0
IN
OUT
VD480
MOV_R
EN
ENO
VD480
IN
OUT
VD482
SUB_R
EN
ENO
VD482
IN1
OUT
VD484
6400.0
IN2
DIV_R
EN
ENO
VD484
IN1
OUT
VD486
256.0
IN2
TRUNC
EN
ENO
VD486
IN
OUT
VD490
MOV_W
EN
ENO
VW890
IN
OUT
AQW6

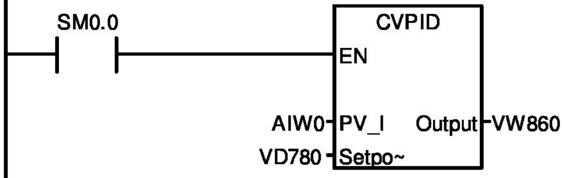

7.A



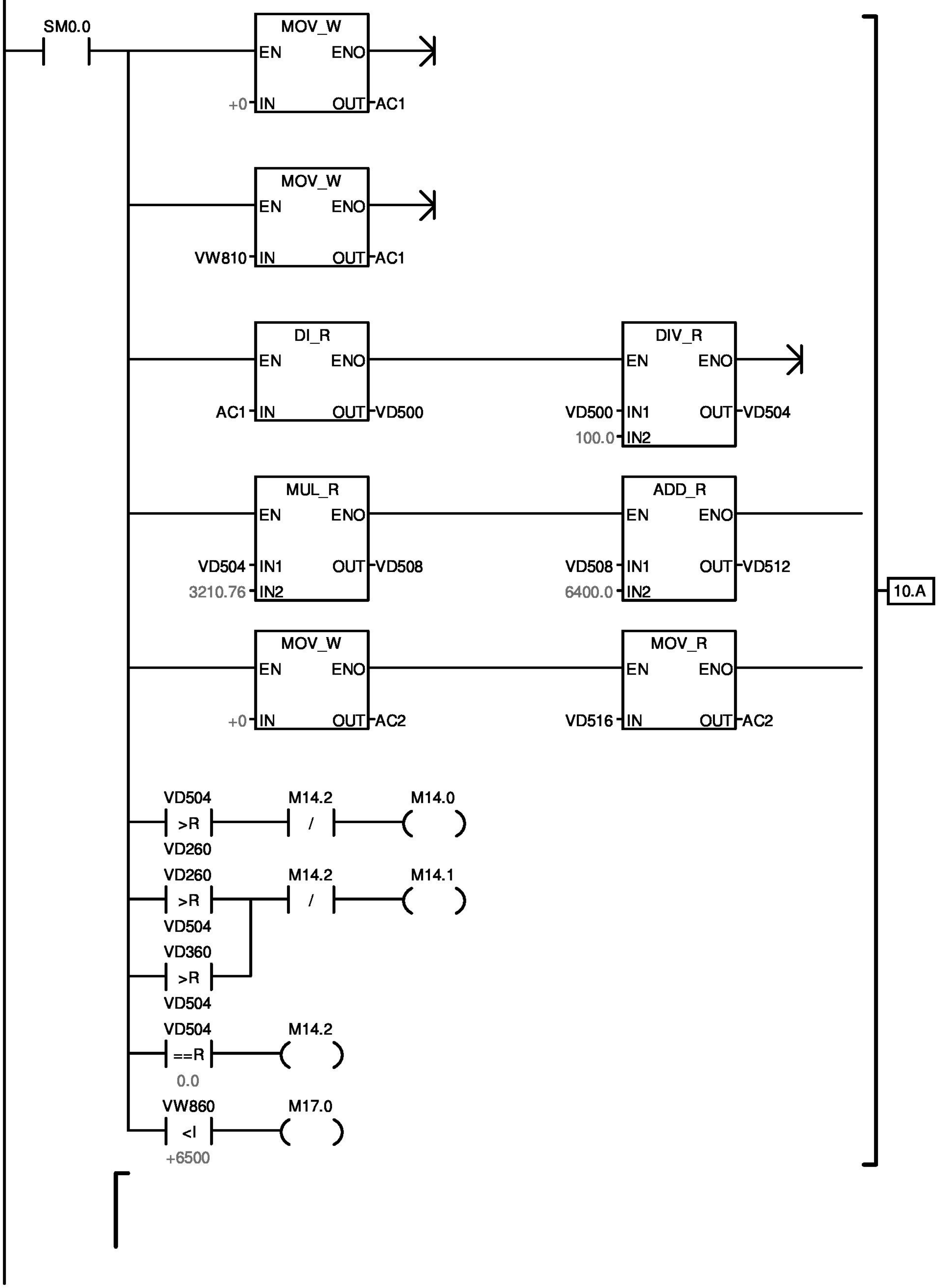
Network 8 Auto/Manual Control

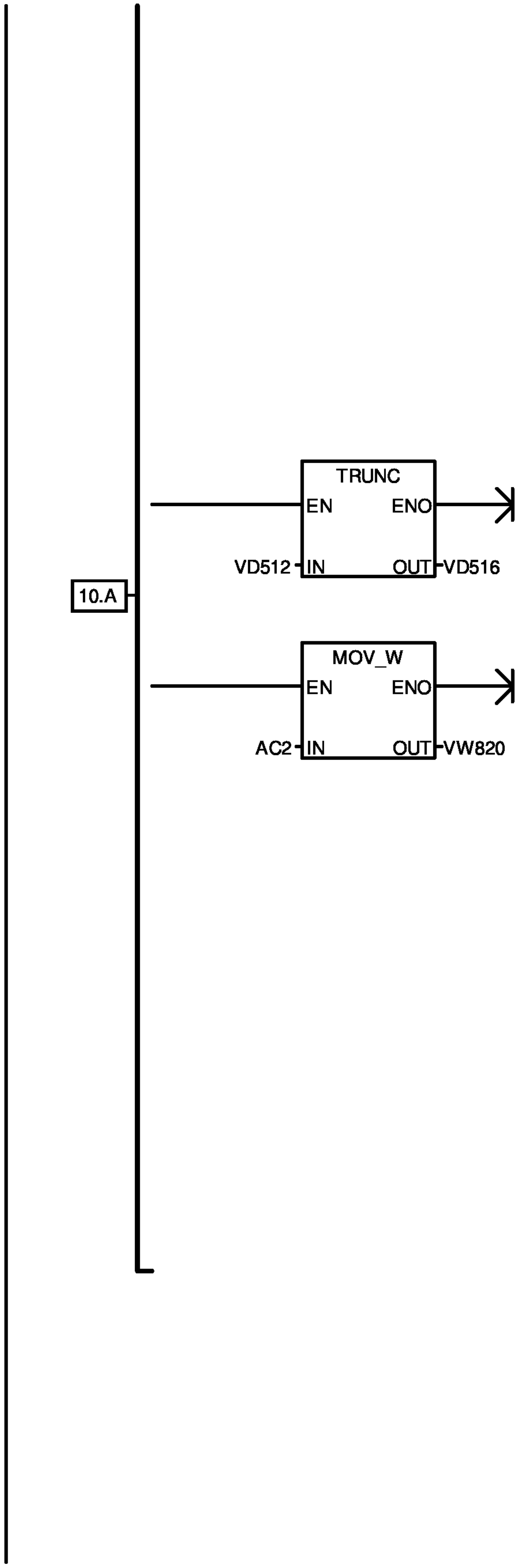

SM0.0
I0.0
/
M15.0
M15.0
MOV_R
EN
ENO
VD320
IN
OUT
VD780
M15.0
/
MOV_R
EN
ENO
VD512
IN
OUT
VD780

Network 9 PID Loop Control

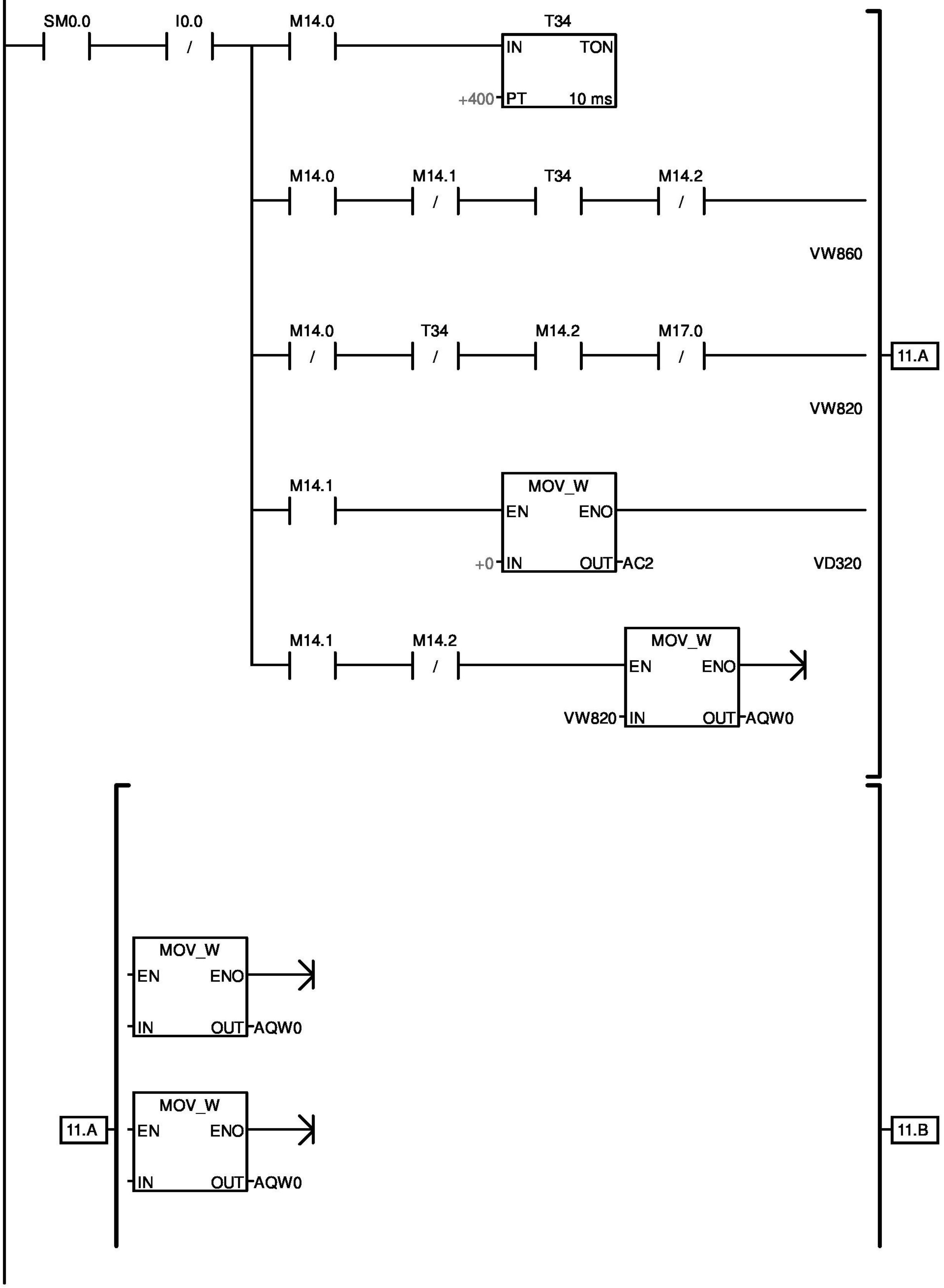

SM0.0
CVPID
EN
AIW0
PV_I
Output
VW860
VD780
Setpo~

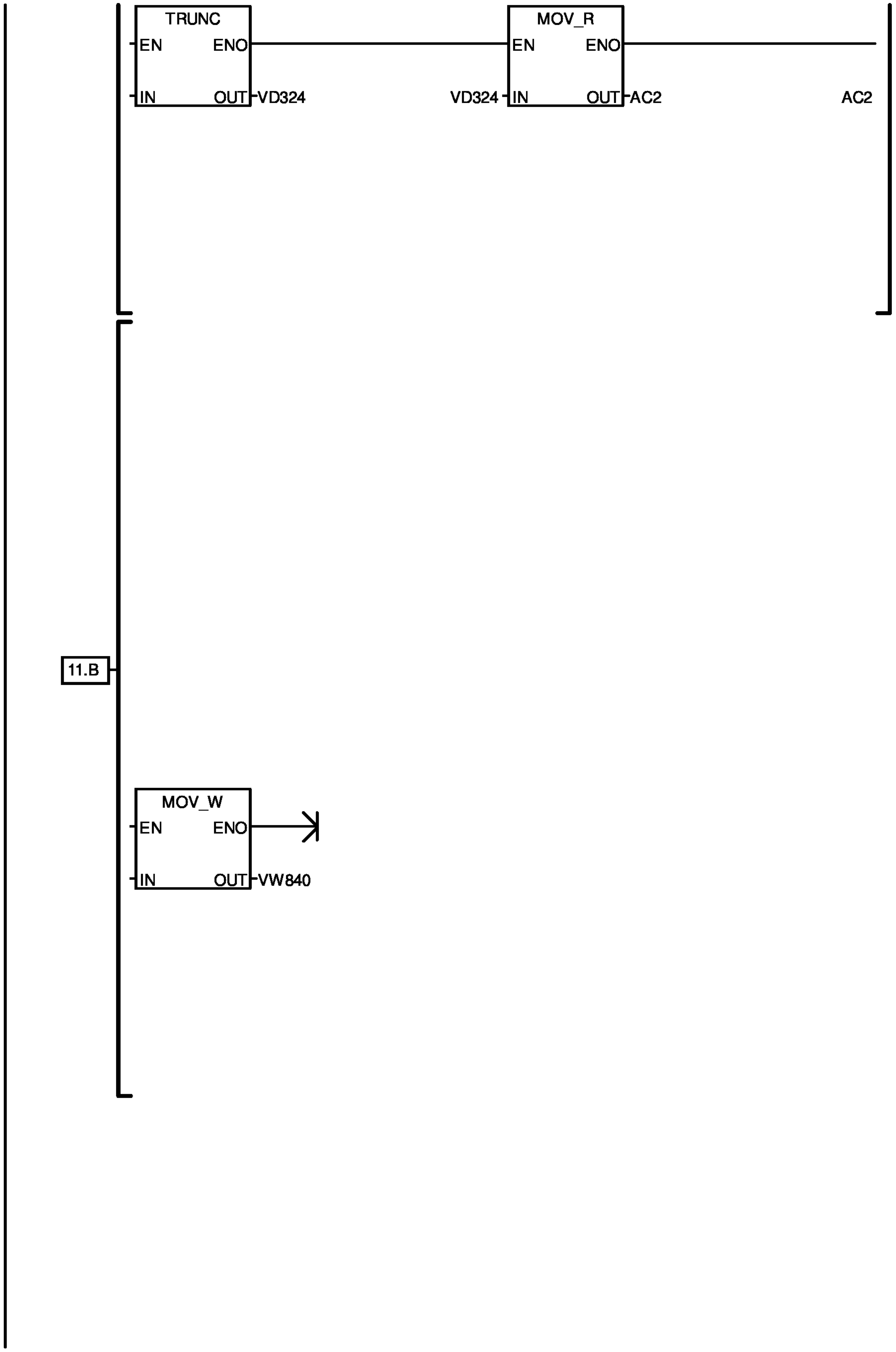
Network 10


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
VW810
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD500
DIV_R
EN
ENO
VD500
IN1
OUT
VD504
100.0
IN2
MUL_R
EN
ENO
VD504
IN1
OUT
VD508
3210.76
IN2
ADD_R
EN
ENO
VD508
IN1
OUT
VD512
6400.0
IN2
10.A
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_R
EN
ENO
VD516
IN
OUT
AC2
VD504
>R
VD260
M14.2
/
M14.0
VD260
>R
VD504
M14.2
/
M14.1
VD360
>R
VD504
VD504
==R
0.0
M14.2
VW860
<I
+6500
M17.0

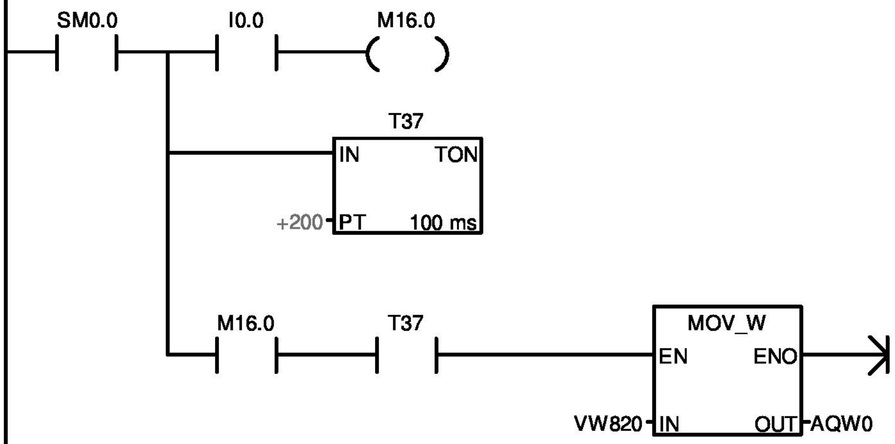

TRUNC
EN
ENO
VD512
IN
OUT
VD516
10.A
MOV_W
EN
ENO
AC2
IN
OUT
VW820

Network 11


SM0.0
I0.0
/
M14.0
T34
IN
TON
+400
PT
10 ms
M14.0
M14.1
/
T34
M14.2
/
VW860
M14.0
/
T34
/
M14.2
M17.0
/
11.A
VW820
M14.1
MOV_W
EN
ENO
+0
IN
OUT
AC2
VD320
M14.1
M14.2
/
MOV_W
EN
ENO
VW820
IN
OUT
AQW0
MOV_W
EN
ENO
IN
OUT
AQW0
11.A
MOV_W
EN
ENO
IN
OUT
AQW0
11.B


TRUNC
EN
ENO
IN
OUT
VD324
MOV_R
EN
ENO
VD324
IN
OUT
AC2
AC2
11.B
MOV_W
EN
ENO
IN
OUT
VW840

Network 12


SM0.0
I0.0
M16.0
T37
IN
TON
+200
PT
100 ms
M16.0
T37
MOV_W
EN
ENO
VW820
IN
OUT
AQW0

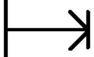
Block:	SBR_0
Author:	
Created:	09/02/2010 09:58:00 am
Last Modified:	09/13/2016 11:36:35 am

Symbol	Var Type	Data Type	Comment
EN	IN	BOOL	
	IN		
	IN_OUT		
	OUT		
	TEMP		

SUBROUTINE COMMENTS

Network 1 Network Title

Network Comment



Block: INT_0
Author:
Created: 09/02/2010 09:58:00 am
Last Modified: 09/13/2016 11:36:35 am

Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

INTERRUPT ROUTINE COMMENTS

Network 1 Network Title

Network Comment

Block: CVPID
Author:
Created: 03/12/2012 10:55:57 am
Last Modified: 09/13/2016 11:36:35 am

	Symbol	Var Type	Data Type	Comment
	EN	IN	BOOL	
LW0	PV_I	IN	INT	
LD2	Setpoint_R	IN	REAL	
		IN		
		IN_OUT		
LW6	Output	OUT	INT	
		OUT		
LD8	Tmp_DI	TEMP	DWORD	
LD12	Tmp_R	TEMP	REAL	
		TEMP		

This POU was created by the PID formula of the S7-200 Instruction Wizard.
To enable this configuration within the program, use SM0.0 to call this Subroutine from the MAIN program block every scan cycle. This code configures PID 0. See DB1 for the PID loop variable table starting at VB0. This subroutine initializes the variables used by the PID control logic and starts the PID Interrupt "CVPID_EXE" routine. The PID interrupt routine is called cyclically based on the PID sample time. For a complete description of the PID instruction see the S7-200 System Manual. Note:When the PID is in manual mode the output should be controlled by writing a normalized value(0.00 to 1.00) to the Manual Output parameter instead of changing the output directly. This will automatically provide a bumpless transfer when the PID is returned to automatic mode.

Block: TD_CTRL_1111
Author:
Created: 09/02/2010 09:58:11 am
Last Modified: 09/13/2016 11:36:35 am

Symbol	Var Type	Data Type	Comment
EN	IN	BOOL	
	IN		
	IN_OUT		
	OUT		
	TEMP		

Block: TD_ALM_1111
Author:
Created: 09/17/2010 10:59:10 am
Last Modified: 09/13/2016 11:36:35 am

	Symbol	Var Type	Data Type	Comment
	EN	IN	BOOL	
		IN		
L0.0	ALM_EN	IN_OUT	BOOL	
		IN_OUT		
		OUT		
LD1	Tmp_DI	TEMP	DWORD	
LD5	Tmp_R	TEMP	REAL	
		TEMP		

This POU was created by the PID formula of the S7-200 Instruction Wizard.
To enable this configuration within the program, use SM0.0 to call this Subroutine from the MAIN program block every scan cycle.
This code configures PID 0. See DB1 for the PID loop variable table starting at VB402. This subroutine initializes the variables used by the PID control logic and starts the PID Interrupt "CVPID" routine. The PID interrupt routine is called cyclically based on the PID sample time. For a complete description of the PID instruction see the S7-200 System Manual. Note:When the PID is in manual mode the output should be controlled by writing a normalized value(0.00 to 1.00) to the Manual Output parameter instead of changing the output directly. This will automatically provide a bumpless transfer when the PID is returned to automatic mode.

Block: CVPID_EXE
Author:
Created: 03/12/2012 10:55:57 am
Last Modified: 09/13/2016 11:36:35 am

Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

This POU was created by the PID formula of the S7-200 Instruction Wizard.
This interrupt routine implements Timed Interrupt for PID execution. This interrupt routine was attached in subroutine "CVPID".

PHOENIX RADIO SYSTEM HARDWARE					
LOCATION	Number	HOPKEY	ORD#	ASSY#	Module
PLANT	M 12746	12690	28 85 34 6	2248-10J1612372	RAD-ISM-900-XD-BUS
	RTM	NONE	28 67 32 2	25-01-05 J996194	RAD IN/OUT-2D-1A-I
TANK	REPEATER S-12690	12690	28 85 34 6	2248-10 J1612372	RAD-ISM-900-XD-BUS
	S0 12746	12690	28 85 34 6	2248-10 J1612372	
KC VALVE	S1 RTM	12690	28 85 34 6	2248-10 J1549813	RAD-ISM-900-XD-BUS
SPARE	S0 12690	12746	28 85 34 6	2248-10 J1549813	RAD-ISM-900-XD-BUS
	M 12690	12746	28 85 34 6	2248-10 J1549813	RAD-ISM-900-XD-BUS

TAG

ProtocolID	DeviceNam	TagName	DataType	DataCount	Retentive	Address	ArrayStart	ArrayEnd
0	<INTERNA	MP-810 H	Discrete	1	FALSE		0	0
0	<INTERNA	FI_400_SC	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_HO	Signed_int_	1	FALSE		0	0
0	<INTERNA	ANY_ALA	Discrete	1	FALSE		0	0
0	<INTERNA	MP_400_C	Floating_P	1	FALSE		0	0
0	<INTERNA	MP-710 H	Discrete	1	FALSE		0	0
0	<INTERNA	MP-800 H	Discrete	1	FALSE		0	0
0	<INTERNA	MP-700 H	Discrete	1	FALSE		0	0
0	<INTERNA	CF_START	Floating_P	1	FALSE		0	0
0	<INTERNA	DOSING_S	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P	1	FALSE		0	0
0	<INTERNA	AI_01_SC	Floating_P	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P	1	FALSE		0	0
0	<INTERNA	CHEMICAL	Unsigned_	1	FALSE		0	0
0	<INTERNA	PUMP ST	Floating_P	1	FALSE		0	0
0	<INTERNA	PUMP CA	Floating_P	1	FALSE		0	0
404	DEV001	DO_0_9	Discrete	1	FALSE	O:0/09	0	0
404	DEV001	LOOP 1 A	Discrete	1	FALSE	B3:16/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/05	0	0
404	DEV001	DO_0_7	Discrete	1	FALSE	O:0/07	0	0
404	DEV001	DO_0_10	Discrete	1	FALSE	O:0/10	0	0
404	DEV001	DO_0_8	Discrete	1	FALSE	O:0/08	0	0
404	DEV001	LOOP 2 A	Discrete	1	FALSE	B3:16/01	0	0
404	DEV001	DO_0_11	Discrete	1	FALSE	O:0/11	0	0
404	DEV001	PROC1_S	Discrete	1	FALSE	B20:16/03	0	0
404	DEV001	HPTK1_IN	Discrete	1	FALSE	B21:8/00	0	0
404	DEV001	NO HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	ANY_BLW	Discrete	1	FALSE	B23:2/00	0	0
404	DEV001	BLW2_RU	Discrete	1	FALSE	B23:2/02	0	0
404	DEV001	DO_0_1	Discrete	1	FALSE	O:0/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/00	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/04	0	0
404	DEV001	VFD3_HA	Discrete	1	FALSE	B22:6/01	0	0
404	DEV001	BLW1_RU	Discrete	1	FALSE	B23:2/01	0	0
404	DEV001	DI_0_11	Discrete	1	FALSE	I:0/11	0	0
404	DEV001	DI_0_0	Discrete	1	FALSE	I:0/00	0	0
404	DEV001	DI_0_1	Discrete	1	FALSE	I:0/01	0	0
404	DEV001	DI_0_2	Discrete	1	FALSE	I:0/02	0	0
404	DEV001	DI_0_3	Discrete	1	FALSE	I:0/03	0	0
404	DEV001	DI_0_4	Discrete	1	FALSE	I:0/04	0	0
404	DEV001	DI_0_5	Discrete	1	FALSE	I:0/05	0	0
404	DEV001	DI_0_6	Discrete	1	FALSE	I:0/06	0	0
404	DEV001	DI_0_7	Discrete	1	FALSE	I:0/07	0	0
404	DEV001	DI_0_8	Discrete	1	FALSE	I:0/08	0	0
404	DEV001	DO_0_3	Discrete	1	FALSE	O:0/03	0	0
404	DEV001	DI_0_10	Discrete	1	FALSE	I:0/10	0	0
404	DEV001	DO_0_6	Discrete	1	FALSE	O:0/06	0	0
404	DEV001	DI_0_12	Discrete	1	FALSE	I:0/12	0	0
404	DEV001	DI_0_13	Discrete	1	FALSE	I:0/13	0	0
404	DEV001	DI_0_14	Discrete	1	FALSE	I:0/14	0	0
404	DEV001	DI_0_15	Discrete	1	FALSE	I:0/15	0	0
404	DEV001	DO_0_0	Discrete	1	FALSE	O:0/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/04	0	0
404	DEV001	DO_0_2	Discrete	1	FALSE	O:0/02	0	0

404	DEV001	VFD3_FAL	Discrete	1	FALSE	B20:0/07	0	0
404	DEV001	DO_0_4	Discrete	1	FALSE	O:0/04	0	0
404	DEV001	DO_0_5	Discrete	1	FALSE	O:0/05	0	0
404	DEV001	DI_0_9	Discrete	1	FALSE	I:0/09	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:4.3	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/02	0	0
404	DEV001	MP_710_H	Signed_int_	1	FALSE	N24:5	0	0
404	DEV001	MP_800_H	Signed_int_	1	FALSE	N24:6	0	0
404	DEV001	MP_810_H	Signed_int_	1	FALSE	N24:7	0	0
404	DEV001	MP_700_S	Signed_int_	1	FALSE	N24:12	0	0
404	DEV001	MP_710_S	Signed_int_	1	FALSE	N24:13	0	0
404	DEV001	PRE_MP_	Signed_int_	1	FALSE	N24:8	0	0
404	DEV001	POST_MP	Signed_int_	1	FALSE	N24:9	0	0
404	DEV001	PRE_RES_	Signed_int_	1	FALSE	N7:32	0	0
404	DEV001	BLOWER2	Signed_int_	1	FALSE	N24:2	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:4.2	0	0
404	DEV001	BLOWER1	Signed_int_	1	FALSE	N24:1	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:5.0	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:5.1	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:50	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:5.2	0	0
404	DEV001	START_U	Unsigned_	1	FALSE	N9:1	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:5.3	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:8	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:9	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:10	0	0
404	DEV001	POST_RE	Signed_int_	1	FALSE	N7:62	0	0
404	DEV001	NO_HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	VFD3_AU	Discrete	1	FALSE	B22:6/02	0	0
404	DEV001	LOOP 3 A	Discrete	1	FALSE	B3:16/02	0	0
404	DEV001	CELL12_F	Discrete	1	FALSE	B23:12/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/01	0	0
404	DEV001	BLW_DPS	Discrete	1	FALSE	B23:2/04	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/03	0	0
404	DEV001	CELL11_F	Discrete	1	FALSE	B23:11/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/01	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/02	0	0
404	DEV001	MP_700_H	Signed_int_	1	FALSE	N24:4	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/04	0	0
404	DEV001	VFD3_OF	Discrete	1	FALSE	B22:6/00	0	0
404	DEV001	ENABLE R	Discrete	1	FALSE	B20:30/03	0	0
404	DEV001	BRTK_LE	Discrete	1	FALSE	B23:5/04	0	0
404	DEV001	BRTK_LE	Discrete	1	FALSE	B23:5/01	0	0
404	DEV001	BRTK_LE	Discrete	1	FALSE	B23:5/00	0	0
404	DEV001	CELL11_F	Discrete	1	FALSE	B23:8/06	0	0
404	DEV001	CELL11_L	Discrete	1	FALSE	B23:8/05	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/03	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/04	0	0
404	DEV001	H2_COM_	Discrete	1	FALSE	B23:2/09	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/03	0	0
404	DEV001	PROC2_C	Discrete	1	FALSE	B20:26/05	0	0
404	DEV001	CELL22_C	Discrete	1	FALSE	B20:20/08	0	0
404	DEV001	CELL22_F	Discrete	1	FALSE	B23:22/02	0	0
404	DEV001	RECT2_F	Discrete	1	FALSE	B23:20/00	0	0
404	DEV001	RECT2_V	Discrete	1	FALSE	B23:20/02	0	0
404	DEV001	RECT2_V	Discrete	1	FALSE	B23:20/03	0	0

404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/07	0	0
404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/08	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/01	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/02	0	0
404	DEV001	LAL_201	Discrete	1	FALSE	B23:5/06	0	0
404	DEV001	RACK2_A	Discrete	1	FALSE	B20:9/02	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/06	0	0
404	DEV001	PROC2_R	Discrete	1	FALSE	B20:26/04	0	0
404	DEV001	PROC2_S	Discrete	1	FALSE	B20:26/03	0	0
404	DEV001	ANY_BRIN	Discrete	1	FALSE	B23:3/02	0	0
404	DEV001	NO_BLW_	Discrete	1	FALSE	B23:2/10	0	0
404	DEV001	BLW_610_	Discrete	1	FALSE	B20:1/08	0	0
404	DEV001	BLW_600_	Discrete	1	FALSE	B20:1/07	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/11	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/12	0	0
404	DEV001	RECT1_A	Discrete	1	FALSE	B23:10/07	0	0
404	DEV001	RACK1_A	Discrete	1	FALSE	B20:9/01	0	0
404	DEV001	CELL21_C	Discrete	1	FALSE	B20:20/07	0	0
404	DEV001	DI_0_17	Discrete	1	FALSE	I:0/17	0	0
404	DEV001	DI_0_18	Discrete	1	FALSE	I:0/18	0	0
404	DEV001	DI_0_19	Discrete	1	FALSE	I:0/19	0	0
404	DEV001	PROC1_C	Discrete	1	FALSE	B20:3/00	0	0
404	DEV001	PROC2_C	Discrete	1	FALSE	B20:3/01	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:2/07	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:8/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B23:1/05	0	0
404	DEV001	CELL11_C	Discrete	1	FALSE	B20:10/07	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:21/02	0	0
404	DEV001	CELL12_C	Discrete	1	FALSE	B20:10/08	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/07	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/07	0	0
404	DEV001	ESTOP_B	Discrete	1	FALSE	B23:1/15	0	0
404	DEV001	BLW1_OF	Discrete	1	FALSE	B23:2/05	0	0
404	DEV001	BLW2_OF	Discrete	1	FALSE	B23:2/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:18/05	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/04	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/03	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:18/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:21/05	0	0
404	DEV001	LAH_201	Discrete	1	FALSE	B23:5/09	0	0
404	DEV001	H2_DETE	Discrete	1	FALSE	B20:1/01	0	0
404	DEV001	VFD2_FA	Discrete	1	FALSE	B20:0/06	0	0
404	DEV001	RACK1_S	Discrete	1	FALSE	B21:0/02	0	0
404	DEV001	RACK1_R	Discrete	1	FALSE	B21:0/00	0	0
404	DEV001	VFD3_OF	Discrete	1	FALSE	B21:6/00	0	0
404	DEV001	VFD3_HA	Discrete	1	FALSE	B21:6/01	0	0
404	DEV001	VFD3_AU	Discrete	1	FALSE	B21:6/02	0	0
404	DEV001	HPTK2_IN	Discrete	1	FALSE	B21:8/01	0	0
404	DEV001	RACK2_R	Discrete	1	FALSE	B21:10/00	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/01	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/02	0	0
404	DEV001	LU_201	Discrete	1	FALSE	B23:5/05	0	0
404	DEV001	VFD1_FA	Discrete	1	FALSE	B20:0/05	0	0
404	DEV001	PROC1_R	Discrete	1	FALSE	B20:16/04	0	0
404	DEV001	CELL11_L	Discrete	1	FALSE	B23:11/05	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/06	0	0

404	DEV001	PRE_RESI	Unsigned_	1	FALSE	N7:10	0	0
404	DEV001	RECT1_AI	Discrete	1	FALSE	B23:10/08	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:11	0	0
404	DEV001	RECT1_V(	Discrete	1	FALSE	B23:10/03	0	0
404	DEV001	RECT1_V(	Discrete	1	FALSE	B23:10/02	0	0
404	DEV001	RECT1_F/	Discrete	1	FALSE	B23:10/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/09	0	0
404	DEV001	ANY_ALAF	Discrete	1	FALSE	B20:9/00	0	0
404	DEV001	PRE_DOS	Discrete	1	FALSE	B23:3/03	0	0
404	DEV001	CP_100_E	Discrete	1	FALSE	B23:1/13	0	0
404	DEV001	CP_200_E	Discrete	1	FALSE	B23:1/14	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/11	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/12	0	0
404	DEV001	YA_700_AI	Discrete	1	FALSE	B23:4/00	0	0
404	DEV001	YA_710_AI	Discrete	1	FALSE	B23:4/02	0	0
404	DEV001	PRE_NO_I	Discrete	1	FALSE	B23:4/04	0	0
404	DEV001	FU_700_AI	Discrete	1	FALSE	B23:5/10	0	0
404	DEV001	AU_700	Discrete	1	FALSE	B23:5/11	0	0
404	DEV001	RACK1_S1	Discrete	1	FALSE	B21:0/01	0	0
404	DEV001	AAH_700	Discrete	1	FALSE	B23:5/13	0	0
404	DEV001	ANY_HYP(	Discrete	1	FALSE	B23:3/01	0	0
404	DEV001	POST_DO	Discrete	1	FALSE	B23:3/04	0	0
404	DEV001	YA_800_AI	Discrete	1	FALSE	B23:4/10	0	0
404	DEV001	YA_810_AI	Discrete	1	FALSE	B23:4/12	0	0
404	DEV001	POST_NO	Discrete	1	FALSE	B23:4/14	0	0
404	DEV001	FU_800_AI	Discrete	1	FALSE	B23:6/10	0	0
404	DEV001	AU_800	Discrete	1	FALSE	B23:6/11	0	0
404	DEV001	AAL_800	Discrete	1	FALSE	B23:6/12	0	0
404	DEV001	AAH_800	Discrete	1	FALSE	B23:6/13	0	0
404	DEV001	PROC1_CI	Discrete	1	FALSE	B20:16/05	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/06	0	0
404	DEV001	AAL_700	Discrete	1	FALSE	B23:5/12	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:46	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:18	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:19	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:20	0	0
404	DEV001	CELL 2 FL	Floating_P	1	FALSE	F31:30	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:40	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:30	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:45	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:13	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:51	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F52:3	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:56	0	0
404	DEV001	DOSING_S	Floating_P	1	FALSE	F35:2	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:3	0	0
404	DEV001	PUMP STF	Floating_P	1	FALSE	F35:4	0	0
404	DEV001	DOSING_S	Floating_P	1	FALSE	F35:12	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:13	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F51:2	0	0

404	DEV001	MP_810_S	Unsigned_	1	FALSE	N24:15	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:10	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:14	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:13	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:4	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:3	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:25	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:22	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:23	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:15	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:28	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:14	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F35:6	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F52:2	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F35:16	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:29	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:12	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:45	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:24	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:89	0	0
404	DEV001	PUMP ST	Floating_P	1	FALSE	F35:14	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:55	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:60	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:10	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:20	0	0
404	DEV001	RECT1_A	Floating_P	1	FALSE	F31:16	0	0
404	DEV001	H2_HD100	Floating_P	1	FALSE	F30:70	0	0
404	DEV001	FLOW OF	Floating_P	1	FALSE	F31:52	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:43	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:39	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:88	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:38	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:100	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:110	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:23	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:22	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:24	0	0
404	DEV001	FLOW OF	Floating_P	1	FALSE	F31:57	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:85	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:82	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:80	0	0
404	DEV001	BRTK_SA	Floating_P	1	FALSE	F30:100	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	DOSING_	Floating_P	1	FALSE	F35:22	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:29	0	0
404	DEV001	GAIN 1	Floating_P	1	FALSE	F35:47	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:49	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:53	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:55	0	0
404	DEV001	GAIN 2	Floating_P	1	FALSE	F35:57	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:59	0	0
404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F35:26	0	0

404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F53:2	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:70	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:43	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:71	0	0
404	DEV001	FLOW RA	Floating_P	1	FALSE	F31:67	0	0
404	DEV001	PUMP ST	Floating_P	1	FALSE	F35:24	0	0
404	DEV001	PUMP CA	Floating_P	1	FALSE	F35:23	0	0
404	DEV001	GAIN 3	Floating_P	1	FALSE	F35:67	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:69	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:65	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:63	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:28	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:29	0	0
404	DEV001	DOSING F	Floating_P	1	FALSE	F51:3	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:4	0	0
404	DEV001	MP_710_S	Unsigned_	1	FALSE	N7:28	0	0
404	DEV001	MP_810_S	Unsigned_	1	FALSE	N7:58	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N7:57	0	0
404	DEV001	MP_800_H	Unsigned_	1	FALSE	N7:55	0	0
404	DEV001	MP_810_H	Unsigned_	1	FALSE	N7:56	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:40	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:41	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:1	0	0
404	DEV001	RECT1_V	Floating_P	1	FALSE	F31:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:3	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:44	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:5	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:6	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:7	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:4.0	0	0
404	DEV001	AO_MAP_	Unsigned_	1	FALSE	O:4.1	0	0
404	DEV001	PLC_TO_F	Unsigned_	1	FALSE	N9:0	0	0
404	DEV001	UDATE TI	Unsigned_	1	FALSE	T41:10.PR	0	0
404	DEV001	UDATE TI	Unsigned_	1	FALSE	T42:10.PR	0	0
404	DEV001	UDATE TI	Unsigned_	1	FALSE	T42:18.PR	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:2	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:14	0	0
404	DEV001	BLW_ROT	Unsigned_	1	FALSE	N24:100	0	0
404	DEV001	BLW_600_	Unsigned_	1	FALSE	N24:10	0	0
404	DEV001	BLW_610_	Unsigned_	1	FALSE	N24:11	0	0
404	DEV001	DI_0_16	Discrete	1	FALSE	I:0/16	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N7:11	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N24:20	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N24:21	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N7:41	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:40	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:61	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:13	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:46	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:16	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:12	0	0
404	DEV001	PRE_RES_	Unsigned_	1	FALSE	N7:31	0	0
404	DEV001	MP_700_S	Unsigned_	1	FALSE	N7:27	0	0
404	DEV001	MP_700_H	Unsigned_	1	FALSE	N7:25	0	0

404	DEV001	MP_710_H	Unsigned_	1	FALSE	N7:26	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:45	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:42	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:43	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:79	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:15	0	0
404	DEV001	QR_710	Floating_P	1	FALSE	F30:3	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N24:14	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:58	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:59	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:60	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:68	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:69	0	0
404	DEV001	BRTK1_SA	Floating_P	1	FALSE	F30:102	0	0
404	DEV001	BRTK1_SA	Floating_P	1	FALSE	F30:105	0	0
404	DEV001	BLW1_QR	Floating_P	1	FALSE	F30:0	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:49	0	0
404	DEV001	QR_700	Floating_P	1	FALSE	F30:2	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:48	0	0
404	DEV001	QR_800	Floating_P	1	FALSE	F30:4	0	0
404	DEV001	QR_810	Floating_P	1	FALSE	F30:5	0	0
404	DEV001	AAL_700_S	Floating_P	1	FALSE	F30:41	0	0
404	DEV001	AAH_700_	Floating_P	1	FALSE	F30:42	0	0
404	DEV001	PRE_MP_	Floating_P	1	FALSE	F51:9	0	0
404	DEV001	PRE_MP_S	Floating_P	1	FALSE	F51:10	0	0
404	DEV001	PRE_FP_C	Floating_P	1	FALSE	F51:14	0	0
404	DEV001	AAH_800_	Floating_P	1	FALSE	F30:62	0	0
404	DEV001	AAL_800_S	Floating_P	1	FALSE	F30:61	0	0
404	DEV001	POST_FP_	Floating_P	1	FALSE	F51:34	0	0
404	DEV001	BLW2_QR	Floating_P	1	FALSE	F30:1	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:139	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:51	0	0
404	DEV001	SP_AI_M1_	Floating_P	1	FALSE	F30:110	0	0
404	DEV001	SP_AI_M1_	Floating_P	1	FALSE	F30:118	0	0
404	DEV001	SP_AI_M1_	Floating_P	1	FALSE	F30:119	0	0
404	DEV001	BRTK_SAL	Floating_P	1	FALSE	F30:108	0	0
404	DEV001	BRTK_SAL	Floating_P	1	FALSE	F30:109	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:120	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:130	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:128	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:50	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:129	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:78	0	0
404	DEV001	ECR_100_	Floating_P	1	FALSE	F30:6	0	0
404	DEV001	RECT2_VO	Floating_P	1	FALSE	F32:0	0	0
404	DEV001	RECT2_AM	Floating_P	1	FALSE	F32:10	0	0
404	DEV001	ECR_200_	Floating_P	1	FALSE	F30:7	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:30	0	0
404	DEV001	BRTK1_BF	Floating_P	1	FALSE	F30:83	0	0
404	DEV001	BRTK1_BF	Floating_P	1	FALSE	F30:84	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:38	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:39	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:40	0	0
404	DEV001	SP_AI_M2_	Floating_P	1	FALSE	F30:138	0	0

ProtocolID	DeviceNam	TagName	DataType	DataCount	Retentive	Address	ArrayStart	ArrayEnd
0	<INTERNA	MP-810 H(	Discrete	1	FALSE		0	0
0	<INTERNA	FI_400_SC	Floating_P'	1	FALSE		0	0
0	<INTERNA	VFD1_HO/	Signed_int_	1	FALSE		0	0
0	<INTERNA	ANY_ALAF	Discrete	1	FALSE		0	0
0	<INTERNA	MP_400_C	Floating_P'	1	FALSE		0	0
0	<INTERNA	MP-710 H(	Discrete	1	FALSE		0	0
0	<INTERNA	MP-800 H(	Discrete	1	FALSE		0	0
0	<INTERNA	MP-700 H(	Discrete	1	FALSE		0	0
0	<INTERNA	CF_STAR1	Floating_P'	1	FALSE		0	0
0	<INTERNA	DOSING_S	Floating_P'	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P'	1	FALSE		0	0
0	<INTERNA	AI_01_SC/	Floating_P'	1	FALSE		0	0
0	<INTERNA	VFD1_SPE	Floating_P'	1	FALSE		0	0
0	<INTERNA	CHEMICAL	Unsigned_	1	FALSE		0	0
0	<INTERNA	PUMP STF	Floating_P'	1	FALSE		0	0
0	<INTERNA	PUMP CAF	Floating_P'	1	FALSE		0	0
404	DEV001	DO_0_9	Discrete	1	FALSE	O:0/09	0	0
404	DEV001	LOOP 1 A(	Discrete	1	FALSE	B3:16/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/05	0	0
404	DEV001	DO_0_7	Discrete	1	FALSE	O:0/07	0	0
404	DEV001	DO_0_10	Discrete	1	FALSE	O:0/10	0	0
404	DEV001	DO_0_8	Discrete	1	FALSE	O:0/08	0	0
404	DEV001	LOOP 2 A(	Discrete	1	FALSE	B3:16/01	0	0
404	DEV001	DO_0_11	Discrete	1	FALSE	O:0/11	0	0
404	DEV001	PROC1_S'	Discrete	1	FALSE	B20:16/03	0	0
404	DEV001	HPTK1_IN	Discrete	1	FALSE	B21:8/00	0	0
404	DEV001	NO HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	ANY_BLW	Discrete	1	FALSE	B23:2/00	0	0
404	DEV001	BLW2_RU	Discrete	1	FALSE	B23:2/02	0	0
404	DEV001	DO_0_1	Discrete	1	FALSE	O:0/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/00	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/01	0	0
404	DEV001	HPTK1_LE	Discrete	1	FALSE	B23:6/04	0	0
404	DEV001	VFD3_HAN	Discrete	1	FALSE	B22:6/01	0	0
404	DEV001	BLW1_RU	Discrete	1	FALSE	B23:2/01	0	0
404	DEV001	DI_0_11	Discrete	1	FALSE	I:0/11	0	0
404	DEV001	DI_0_0	Discrete	1	FALSE	I:0/00	0	0
404	DEV001	DI_0_1	Discrete	1	FALSE	I:0/01	0	0
404	DEV001	DI_0_2	Discrete	1	FALSE	I:0/02	0	0
404	DEV001	DI_0_3	Discrete	1	FALSE	I:0/03	0	0
404	DEV001	DI_0_4	Discrete	1	FALSE	I:0/04	0	0
404	DEV001	DI_0_5	Discrete	1	FALSE	I:0/05	0	0
404	DEV001	DI_0_6	Discrete	1	FALSE	I:0/06	0	0
404	DEV001	DI_0_7	Discrete	1	FALSE	I:0/07	0	0
404	DEV001	DI_0_8	Discrete	1	FALSE	I:0/08	0	0
404	DEV001	DO_0_3	Discrete	1	FALSE	O:0/03	0	0
404	DEV001	DI_0_10	Discrete	1	FALSE	I:0/10	0	0
404	DEV001	DO_0_6	Discrete	1	FALSE	O:0/06	0	0
404	DEV001	DI_0_12	Discrete	1	FALSE	I:0/12	0	0
404	DEV001	DI_0_13	Discrete	1	FALSE	I:0/13	0	0
404	DEV001	DI_0_14	Discrete	1	FALSE	I:0/14	0	0
404	DEV001	DI_0_15	Discrete	1	FALSE	I:0/15	0	0
404	DEV001	DO_0_0	Discrete	1	FALSE	O:0/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/04	0	0
404	DEV001	DO_0_2	Discrete	1	FALSE	O:0/02	0	0

404	DEV001	VFD3_FAL	Discrete	1	FALSE	B20:0/07	0	0
404	DEV001	DO_0_4	Discrete	1	FALSE	O:0/04	0	0
404	DEV001	DO_0_5	Discrete	1	FALSE	O:0/05	0	0
404	DEV001	DI_0_9	Discrete	1	FALSE	I:0/09	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.3	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/02	0	0
404	DEV001	MP_710_H	Signed_int	1	FALSE	N24:5	0	0
404	DEV001	MP_800_H	Signed_int	1	FALSE	N24:6	0	0
404	DEV001	MP_810_H	Signed_int	1	FALSE	N24:7	0	0
404	DEV001	MP_700_S	Signed_int	1	FALSE	N24:12	0	0
404	DEV001	MP_710_S	Signed_int	1	FALSE	N24:13	0	0
404	DEV001	PRE_MP_I	Signed_int	1	FALSE	N24:8	0	0
404	DEV001	POST_MP	Signed_int	1	FALSE	N24:9	0	0
404	DEV001	PRE_RES	Signed_int	1	FALSE	N7:32	0	0
404	DEV001	BLOWER2	Signed_int	1	FALSE	N24:2	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.2	0	0
404	DEV001	BLOWER1	Signed_int	1	FALSE	N24:1	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.0	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.1	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:50	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.2	0	0
404	DEV001	START_UI	Unsigned_	1	FALSE	N9:1	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:5.3	0	0
404	DEV001	AI1_MAP_(	Unsigned_	1	FALSE	N26:8	0	0
404	DEV001	AI1_MAP_(	Unsigned_	1	FALSE	N26:9	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:10	0	0
404	DEV001	POST_RE:	Signed_int	1	FALSE	N7:62	0	0
404	DEV001	NO_HYPO	Discrete	1	FALSE	B23:1/00	0	0
404	DEV001	VFD3_AUT	Discrete	1	FALSE	B22:6/02	0	0
404	DEV001	LOOP 3 A(	Discrete	1	FALSE	B3:16/02	0	0
404	DEV001	CELL12_FI	Discrete	1	FALSE	B23:12/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/01	0	0
404	DEV001	BLW_DPS	Discrete	1	FALSE	B23:2/04	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:15/03	0	0
404	DEV001	CELL11_FI	Discrete	1	FALSE	B23:11/02	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/01	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/02	0	0
404	DEV001	MP_700_H	Signed_int	1	FALSE	N24:4	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/04	0	0
404	DEV001	VFD3_OFF	Discrete	1	FALSE	B22:6/00	0	0
404	DEV001	ENABLE R	Discrete	1	FALSE	B20:30/03	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/04	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/01	0	0
404	DEV001	BRTK_LEV	Discrete	1	FALSE	B23:5/00	0	0
404	DEV001	CELL11_F:	Discrete	1	FALSE	B23:8/06	0	0
404	DEV001	CELL11_LI	Discrete	1	FALSE	B23:8/05	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/03	0	0
404	DEV001	CELL11_P	Discrete	1	FALSE	B23:8/04	0	0
404	DEV001	H2_COM_	Discrete	1	FALSE	B23:2/09	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B20:25/03	0	0
404	DEV001	PROC2_CI	Discrete	1	FALSE	B20:26/05	0	0
404	DEV001	CELL22_C	Discrete	1	FALSE	B20:20/08	0	0
404	DEV001	CELL22_FI	Discrete	1	FALSE	B23:22/02	0	0
404	DEV001	RECT2_FA	Discrete	1	FALSE	B23:20/00	0	0
404	DEV001	RECT2_V(	Discrete	1	FALSE	B23:20/02	0	0
404	DEV001	RECT2_V(	Discrete	1	FALSE	B23:20/03	0	0

404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/07	0	0
404	DEV001	RECT2_A	Discrete	1	FALSE	B23:20/08	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/01	0	0
404	DEV001	SHUTDOW	Discrete	1	FALSE	B23:1/02	0	0
404	DEV001	LAL_201	Discrete	1	FALSE	B23:5/06	0	0
404	DEV001	RACK2_AL	Discrete	1	FALSE	B20:9/02	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/06	0	0
404	DEV001	PROC2_R	Discrete	1	FALSE	B20:26/04	0	0
404	DEV001	PROC2_S	Discrete	1	FALSE	B20:26/03	0	0
404	DEV001	ANY_BRIN	Discrete	1	FALSE	B23:3/02	0	0
404	DEV001	NO_BLW_	Discrete	1	FALSE	B23:2/10	0	0
404	DEV001	BLW_610_	Discrete	1	FALSE	B20:1/08	0	0
404	DEV001	BLW_600_	Discrete	1	FALSE	B20:1/07	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/11	0	0
404	DEV001	DPAL_500	Discrete	1	FALSE	B23:2/12	0	0
404	DEV001	RECT1_A	Discrete	1	FALSE	B23:10/07	0	0
404	DEV001	RACK1_AL	Discrete	1	FALSE	B20:9/01	0	0
404	DEV001	CELL21_C	Discrete	1	FALSE	B20:20/07	0	0
404	DEV001	DI_0_17	Discrete	1	FALSE	I:0/17	0	0
404	DEV001	DI_0_18	Discrete	1	FALSE	I:0/18	0	0
404	DEV001	DI_0_19	Discrete	1	FALSE	I:0/19	0	0
404	DEV001	PROC1_C	Discrete	1	FALSE	B20:3/00	0	0
404	DEV001	PROC2_C	Discrete	1	FALSE	B20:3/01	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:2/07	0	0
404	DEV001	H2_DET_1	Discrete	1	FALSE	B23:8/00	0	0
404	DEV001	PROCESS	Discrete	1	FALSE	B23:1/05	0	0
404	DEV001	CELL11_C	Discrete	1	FALSE	B20:10/07	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:21/02	0	0
404	DEV001	CELL12_C	Discrete	1	FALSE	B20:10/08	0	0
404	DEV001	CELL21_T	Discrete	1	FALSE	B23:21/07	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/07	0	0
404	DEV001	ESTOP_B	Discrete	1	FALSE	B23:1/15	0	0
404	DEV001	BLW1_OF	Discrete	1	FALSE	B23:2/05	0	0
404	DEV001	BLW2_OF	Discrete	1	FALSE	B23:2/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:18/05	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/04	0	0
404	DEV001	CELL21_P	Discrete	1	FALSE	B23:18/03	0	0
404	DEV001	CELL21_F	Discrete	1	FALSE	B23:18/06	0	0
404	DEV001	CELL21_L	Discrete	1	FALSE	B23:21/05	0	0
404	DEV001	LAH_201	Discrete	1	FALSE	B23:5/09	0	0
404	DEV001	H2_DETE	Discrete	1	FALSE	B20:1/01	0	0
404	DEV001	VFD2_FA	Discrete	1	FALSE	B20:0/06	0	0
404	DEV001	RACK1_S	Discrete	1	FALSE	B21:0/02	0	0
404	DEV001	RACK1_R	Discrete	1	FALSE	B21:0/00	0	0
404	DEV001	VFD3_OF	Discrete	1	FALSE	B21:6/00	0	0
404	DEV001	VFD3_HA	Discrete	1	FALSE	B21:6/01	0	0
404	DEV001	VFD3_AU	Discrete	1	FALSE	B21:6/02	0	0
404	DEV001	HPTK2_IN	Discrete	1	FALSE	B21:8/01	0	0
404	DEV001	RACK2_R	Discrete	1	FALSE	B21:10/00	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/01	0	0
404	DEV001	RACK2_S	Discrete	1	FALSE	B21:10/02	0	0
404	DEV001	LU_201	Discrete	1	FALSE	B23:5/05	0	0
404	DEV001	VFD1_FA	Discrete	1	FALSE	B20:0/05	0	0
404	DEV001	PROC1_R	Discrete	1	FALSE	B20:16/04	0	0
404	DEV001	CELL11_L	Discrete	1	FALSE	B23:11/05	0	0
404	DEV001	CELL11_T	Discrete	1	FALSE	B23:11/06	0	0

404	DEV001	PRE_RESI	Unsigned_	1	FALSE	N7:10	0	0
404	DEV001	RECT1_A	Discrete	1	FALSE	B23:10/08	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:11	0	0
404	DEV001	RECT1_V	Discrete	1	FALSE	B23:10/03	0	0
404	DEV001	RECT1_V	Discrete	1	FALSE	B23:10/02	0	0
404	DEV001	RECT1_F	Discrete	1	FALSE	B23:10/00	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/09	0	0
404	DEV001	ANY_ALA	Discrete	1	FALSE	B20:9/00	0	0
404	DEV001	PRE_DOS	Discrete	1	FALSE	B23:3/03	0	0
404	DEV001	CP_100_E	Discrete	1	FALSE	B23:1/13	0	0
404	DEV001	CP_200_E	Discrete	1	FALSE	B23:1/14	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/11	0	0
404	DEV001	MSG_ERO	Discrete	1	FALSE	B23:1/12	0	0
404	DEV001	YA_700_A	Discrete	1	FALSE	B23:4/00	0	0
404	DEV001	YA_710_A	Discrete	1	FALSE	B23:4/02	0	0
404	DEV001	PRE_NO_	Discrete	1	FALSE	B23:4/04	0	0
404	DEV001	FU_700_A	Discrete	1	FALSE	B23:5/10	0	0
404	DEV001	AU_700	Discrete	1	FALSE	B23:5/11	0	0
404	DEV001	RACK1_S	Discrete	1	FALSE	B21:0/01	0	0
404	DEV001	AAH_700	Discrete	1	FALSE	B23:5/13	0	0
404	DEV001	ANY_HYP	Discrete	1	FALSE	B23:3/01	0	0
404	DEV001	POST_DO	Discrete	1	FALSE	B23:3/04	0	0
404	DEV001	YA_800_A	Discrete	1	FALSE	B23:4/10	0	0
404	DEV001	YA_810_A	Discrete	1	FALSE	B23:4/12	0	0
404	DEV001	POST_NO	Discrete	1	FALSE	B23:4/14	0	0
404	DEV001	FU_800_A	Discrete	1	FALSE	B23:6/10	0	0
404	DEV001	AU_800	Discrete	1	FALSE	B23:6/11	0	0
404	DEV001	AAL_800	Discrete	1	FALSE	B23:6/12	0	0
404	DEV001	AAH_800	Discrete	1	FALSE	B23:6/13	0	0
404	DEV001	PROC1_C	Discrete	1	FALSE	B20:16/05	0	0
404	DEV001	HPTK2_LE	Discrete	1	FALSE	B23:6/06	0	0
404	DEV001	AAL_700	Discrete	1	FALSE	B23:5/12	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:46	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:18	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:19	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	VOLTAGE	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	CURRENT	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:20	0	0
404	DEV001	CELL 2 FL	Floating_P	1	FALSE	F31:30	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:40	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:30	0	0
404	DEV001	ANALYZE	Floating_P	1	FALSE	F31:45	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:13	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	FLOW RA	Floating_P	1	FALSE	F31:51	0	0
404	DEV001	ACTUAL F	Floating_P	1	FALSE	F52:3	0	0
404	DEV001	FLOW RA	Floating_P	1	FALSE	F31:56	0	0
404	DEV001	DOSING_	Floating_P	1	FALSE	F35:2	0	0
404	DEV001	PUMP CA	Floating_P	1	FALSE	F35:3	0	0
404	DEV001	PUMP ST	Floating_P	1	FALSE	F35:4	0	0
404	DEV001	DOSING_	Floating_P	1	FALSE	F35:12	0	0
404	DEV001	PUMP CA	Floating_P	1	FALSE	F35:13	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F51:2	0	0

404	DEV001	MP_810_S	Unsigned_	1	FALSE	N24:15	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:10	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:14	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:13	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:4	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:3	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:25	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:22	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:23	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:15	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:28	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:14	0	0
404	DEV001	VFD1_SPE	Floating_P	1	FALSE	F35:6	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F52:2	0	0
404	DEV001	VFD2_SPE	Floating_P	1	FALSE	F35:16	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:8	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:9	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:18	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:19	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:29	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:12	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:45	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:24	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:89	0	0
404	DEV001	PUMP STF	Floating_P	1	FALSE	F35:14	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:55	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:60	0	0
404	DEV001	HPTK1_LE	Floating_P	1	FALSE	F30:10	0	0
404	DEV001	HPTK2_LE	Floating_P	1	FALSE	F30:20	0	0
404	DEV001	RECT1_AI	Floating_P	1	FALSE	F31:16	0	0
404	DEV001	H2_HD100	Floating_P	1	FALSE	F30:70	0	0
404	DEV001	FLOW OFI	Floating_P	1	FALSE	F31:52	0	0
404	DEV001	ANALYZEI	Floating_P	1	FALSE	F31:43	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:39	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:88	0	0
404	DEV001	CELL 2 RA	Floating_P	1	FALSE	F31:38	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:100	0	0
404	DEV001	NH3_PMP	Floating_P	1	FALSE	F35:110	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:23	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:22	0	0
404	DEV001	CELL 1 FL	Floating_P	1	FALSE	F31:24	0	0
404	DEV001	FLOW OFI	Floating_P	1	FALSE	F31:57	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:85	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:82	0	0
404	DEV001	BRTK1_LE	Floating_P	1	FALSE	F30:80	0	0
404	DEV001	BRTK_SAI	Floating_P	1	FALSE	F30:100	0	0
404	DEV001	ANALYZEI	Floating_P	1	FALSE	F31:41	0	0
404	DEV001	DOSING_S	Floating_P	1	FALSE	F35:22	0	0
404	DEV001	POST_MP	Floating_P	1	FALSE	F51:29	0	0
404	DEV001	GAIN 1	Floating_P	1	FALSE	F35:47	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:49	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:53	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:55	0	0
404	DEV001	GAIN 2	Floating_P	1	FALSE	F35:57	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:59	0	0
404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F35:26	0	0

404	DEV001	VFD3_SPE	Floating_P	1	FALSE	F53:2	0	0
404	DEV001	CUSTOME	Floating_P	1	FALSE	F31:50	0	0
404	DEV001	ANALYZEF	Floating_P	1	FALSE	F31:70	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:43	0	0
404	DEV001	RESIDUAL	Floating_P	1	FALSE	F31:71	0	0
404	DEV001	FLOW RAI	Floating_P	1	FALSE	F31:67	0	0
404	DEV001	PUMP STF	Floating_P	1	FALSE	F35:24	0	0
404	DEV001	PUMP CAF	Floating_P	1	FALSE	F35:23	0	0
404	DEV001	GAIN 3	Floating_P	1	FALSE	F35:67	0	0
404	DEV001	LOW LIMI	Floating_P	1	FALSE	F35:69	0	0
404	DEV001	HIGH LIMI	Floating_P	1	FALSE	F35:65	0	0
404	DEV001	MAX TIME	Floating_P	1	FALSE	F35:63	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:28	0	0
404	DEV001	CELL 1 RA	Floating_P	1	FALSE	F31:29	0	0
404	DEV001	DOSING F	Floating_P	1	FALSE	F51:3	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:4	0	0
404	DEV001	MP_710_S	Unsigned_	1	FALSE	N7:28	0	0
404	DEV001	MP_810_S	Unsigned_	1	FALSE	N7:58	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N7:57	0	0
404	DEV001	MP_800_H	Unsigned_	1	FALSE	N7:55	0	0
404	DEV001	MP_810_H	Unsigned_	1	FALSE	N7:56	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:40	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:41	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:1	0	0
404	DEV001	RECT1_V(	Floating_P	1	FALSE	F31:0	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:3	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:44	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:5	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:6	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:7	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.0	0	0
404	DEV001	AO_MAP_(	Unsigned_	1	FALSE	O:4.1	0	0
404	DEV001	PLC_TO_F	Unsigned_	1	FALSE	N9:0	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T41:10.PR	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T42:10.PR	0	0
404	DEV001	UDATE TII	Unsigned_	1	FALSE	T42:18.PR	0	0
404	DEV001	AI1_MAP_	Unsigned_	1	FALSE	N26:2	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:14	0	0
404	DEV001	BLW_ROT	Unsigned_	1	FALSE	N24:100	0	0
404	DEV001	BLW_600_	Unsigned_	1	FALSE	N24:10	0	0
404	DEV001	BLW_610_	Unsigned_	1	FALSE	N24:11	0	0
404	DEV001	DI_0_16	Discrete	1	FALSE	I:0/16	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N7:11	0	0
404	DEV001	PRE_DOS	Unsigned_	1	FALSE	N24:20	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N24:21	0	0
404	DEV001	POST_DO	Unsigned_	1	FALSE	N7:41	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:40	0	0
404	DEV001	POST_RE	Unsigned_	1	FALSE	N7:61	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:13	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:46	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:16	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:12	0	0
404	DEV001	PRE_RES_	Unsigned_	1	FALSE	N7:31	0	0
404	DEV001	MP_700_S	Unsigned_	1	FALSE	N7:27	0	0
404	DEV001	MP_700_H	Unsigned_	1	FALSE	N7:25	0	0

404	DEV001	MP_710_H	Unsigned_	1	FALSE	N7:26	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:45	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:42	0	0
404	DEV001	POST_PID	Unsigned_	1	FALSE	N7:43	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:79	0	0
404	DEV001	PRE_PID_	Unsigned_	1	FALSE	N7:15	0	0
404	DEV001	QR_710	Floating_P	1	FALSE	F30:3	0	0
404	DEV001	MP_800_S	Unsigned_	1	FALSE	N24:14	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:58	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:59	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:60	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:68	0	0
404	DEV001	AI_800_SC	Floating_P	1	FALSE	F30:69	0	0
404	DEV001	BRTK1_S	Floating_P	1	FALSE	F30:102	0	0
404	DEV001	BRTK1_S	Floating_P	1	FALSE	F30:105	0	0
404	DEV001	BLW1_QR	Floating_P	1	FALSE	F30:0	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:49	0	0
404	DEV001	QR_700	Floating_P	1	FALSE	F30:2	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:48	0	0
404	DEV001	QR_800	Floating_P	1	FALSE	F30:4	0	0
404	DEV001	QR_810	Floating_P	1	FALSE	F30:5	0	0
404	DEV001	AAL_700_	Floating_P	1	FALSE	F30:41	0	0
404	DEV001	AAH_700_	Floating_P	1	FALSE	F30:42	0	0
404	DEV001	PRE_MP_	Floating_P	1	FALSE	F51:9	0	0
404	DEV001	PRE_MP_	Floating_P	1	FALSE	F51:10	0	0
404	DEV001	PRE_FP_	Floating_P	1	FALSE	F51:14	0	0
404	DEV001	AAH_800_	Floating_P	1	FALSE	F30:62	0	0
404	DEV001	AAL_800_	Floating_P	1	FALSE	F30:61	0	0
404	DEV001	POST_FP_	Floating_P	1	FALSE	F51:34	0	0
404	DEV001	BLW2_QR	Floating_P	1	FALSE	F30:1	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:139	0	0
404	DEV001	PROCESS	Unsigned_	1	FALSE	N24:51	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:110	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:118	0	0
404	DEV001	SP_AI_M1	Floating_P	1	FALSE	F30:119	0	0
404	DEV001	BRTK_SA	Floating_P	1	FALSE	F30:108	0	0
404	DEV001	BRTK_SA	Floating_P	1	FALSE	F30:109	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:120	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:130	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:128	0	0
404	DEV001	FI_800_SC	Floating_P	1	FALSE	F30:50	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:129	0	0
404	DEV001	H2_LEVEL	Floating_P	1	FALSE	F30:78	0	0
404	DEV001	ECR_100_	Floating_P	1	FALSE	F30:6	0	0
404	DEV001	RECT2_V	Floating_P	1	FALSE	F32:0	0	0
404	DEV001	RECT2_A	Floating_P	1	FALSE	F32:10	0	0
404	DEV001	ECR_200_	Floating_P	1	FALSE	F30:7	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:30	0	0
404	DEV001	BRTK1_B	Floating_P	1	FALSE	F30:83	0	0
404	DEV001	BRTK1_B	Floating_P	1	FALSE	F30:84	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:38	0	0
404	DEV001	FI_700_SC	Floating_P	1	FALSE	F30:39	0	0
404	DEV001	AI_700_SC	Floating_P	1	FALSE	F30:40	0	0
404	DEV001	SP_AI_M2	Floating_P	1	FALSE	F30:138	0	0

CITY OF GRAND JUNCTION

WTP FILTER UPGRADES

PLC DRAWING SET

1. TITLE
2. LEGEND
3. POWER DISTRIBUTION
4. POWER DISTRIBUTION CONT'D
5. DI SLOT 1 & 2
6. DI SLOT 3 & 4
7. DI SLOT 5 & 6
8. DI SLOT 7 & 8
9. DI SLOT 9 & DO SLOT 10
10. DO SLOT 11 & 12
11. AI SLOT 13
12. AI SLOT 14 & AO SLOT 15
13. PANEL LAYOUT
14. EXISTING PANEL HOA'S
15. FILTER #1 VALVES FIELD WIRING
16. FILTER #2 VALVES FIELD WIRING
17. FILTER #3 VALVES FIELD WIRING
18. FILTER #4 VALVES FIELD WIRING

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

DRAWING INDEX

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

01
18

WIRE COLOR CODING

D.C. CONTROL CIRCUITS

1) +12V - BLUE
2) -12V - BLUE WITH WHITE STRIPE
3) +24V - BLUE
4) -24V - VIOLET

A.C. CONTROL CIRCUITS

1) 24V PWR - ORANGE
2) 24V NEUTRAL - GRAY
3) 120V PWR UNPROTECTED - BLACK
4) 120 PWR PROTECTED - RED
5) 120 NEUTRAL - WHITE
6) FOREIGN PWR TO PANEL - YELLOW

A.C. POWER
480V/277V

1) PHASE A - BROWN
2) PHASE B - ORANGE
3) PHASE C - YELLOW
4) EQUIPMENT GROUND - GREEN

240/120V, 208/120V

1) PHASE A - BLACK
2) PHASE B - RED
3) PHASE C - BLUE
4) EQUIPMENT GROUND - GREEN

WIRE SIZE CODE

WIRE TYPE	WIRE SIZE
PLC INPUT/OUTPUT	#16 AWG
AC & DC CONTROL WIRING	#14 AWG
120 VAC GENERAL PURPOSE	#14 AWG
DC ANALOG SIGNALS	#18 TSP

GENERAL NOTES

GENERAL NOTES
ALL TERMINALS WITH THE SAME LABEL ARE JUMPERED TOGETHER.
WIRES WITHOUT A LABEL SHALL BE LABELED WITH THE SAME LEGEND AS THE TERMINAL BLOCK.
ALL FIELD WIRE SHALL BE COPPER WIRE, AND TORQUED PER MANUFACTURER RECOMMENDATIONS.
CONDUIT FITTINGS, HUBS OR ANY OTHER PENETRATIONS SHALL BE UL LISTED TO MAINTAIN THE ENVIROMENTAL RATING OF THE ENCLOSURE PROVIDED.
DANGER,MULTIPLE POWER SUPPLIES RISK OF ELECTRIC SHOCK, BURN OR EXPLOSION. MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT BEFORE SERVICING.
* EQUIPMENT MOUNTED ON THE DOOR.

FIELD TERMINATIONS TORQUE TABLE

EQUIPMENT TYPE	TORQUE RATING	EQUIPMENT TYPE	TORQUE RATING
FIELD TERMINAL BLOCKS	5 - 7 LB/IN²	CUTLER HAMMER PILOT DEVICES	12 LB/IN²
GROUND BAR	20 LB/IN²	RED LION DISPLAY	4.5 LB/IN²
QOU CIRCUIT BREAKER	45 LB/IN²	ALLEN BRADLEY DIGITAL DISPLAYS	6-8 LB/IN²
MERLIN GERLIN CIRCUIT BREAKER	22 LB/IN²	ALLEN BRADLEY PILOT DEVICES	5-8 LB/IN²
IDEC RELAYS	9-11 LB/IN²	ALLEN BRADLEY MICROLOGIX	5 LB/IN²
IDEC POWER SUPPLIES	7 LB/IN²	SQUARE D PILOT DEVICES	5-8 LB/IN²
ALLEN BRADLEY COMPACTLOGIX	6 LB/IN²	ALLEN BRADLEY CONTROLOGIX	7-9 LB/IN²
SCHNEIDER ELECTRIC - QUANTUM	10 LB/IN²	SCHNEIDER ELECTRIC - MOMENTUM	4.9 N/M²
SCHNEIDER ELECTRIC - ADVANTYS	2.2 LB/IN²	SCHNEIDER ELECTRIC - M340, MAGELIS, PREMIUM	0.5 N/M²

USE COPPER WIRE ONLY 60° C

FUSE LIST

FUSE	AMP	VOLTAGE	PART #
CB1	15A	120VAC	QOU115
F1	2A	120VAC	GMA-2A
F2-F6	1A	120VAC	GMA-1A
F7	2A	120VAC	GMA-2A
F8-F10	1A	24VDC	GMA-1A
F11	2A	24VDC	GMA-2A
F12-F15	1A	24VDC	GMA-1A

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

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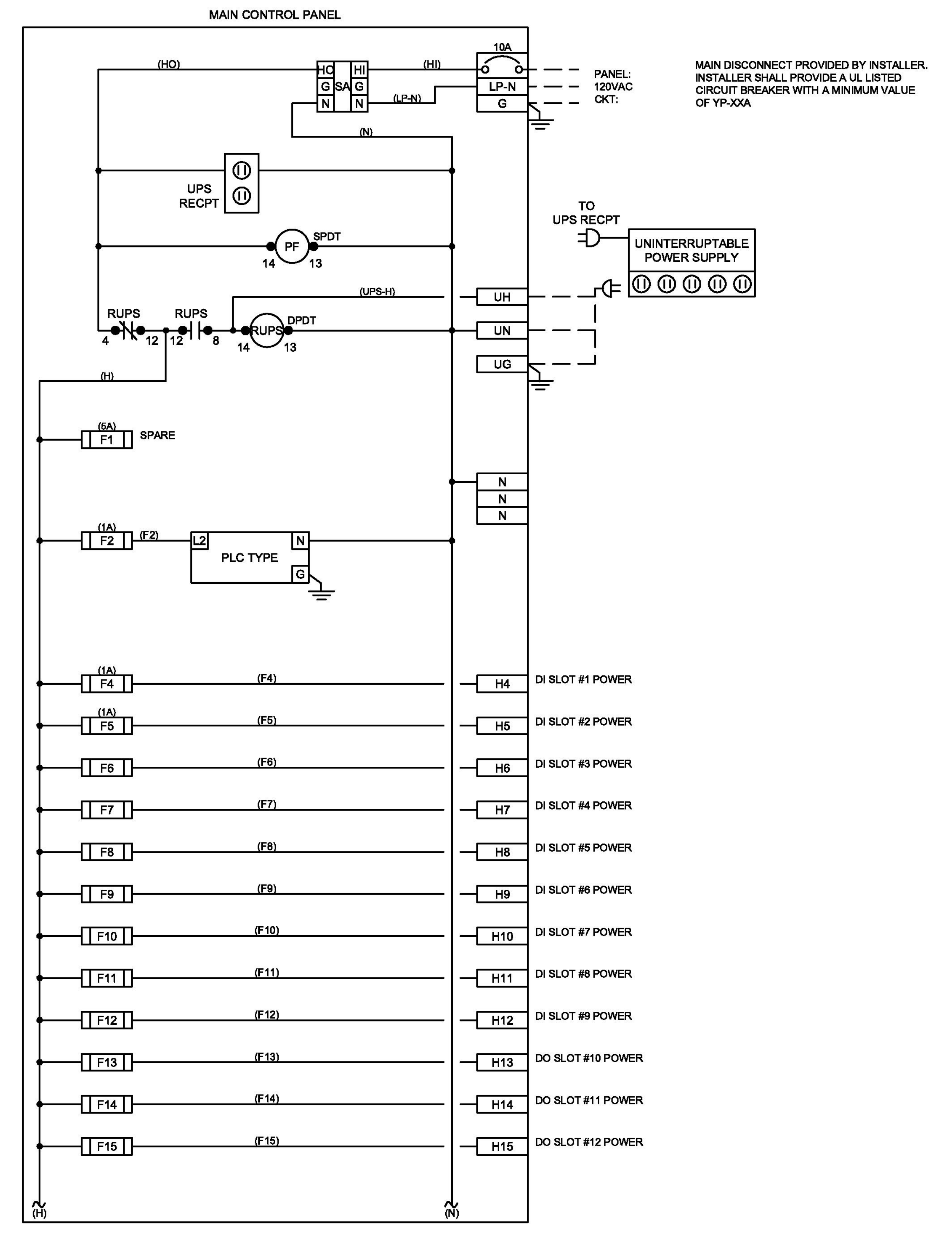
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

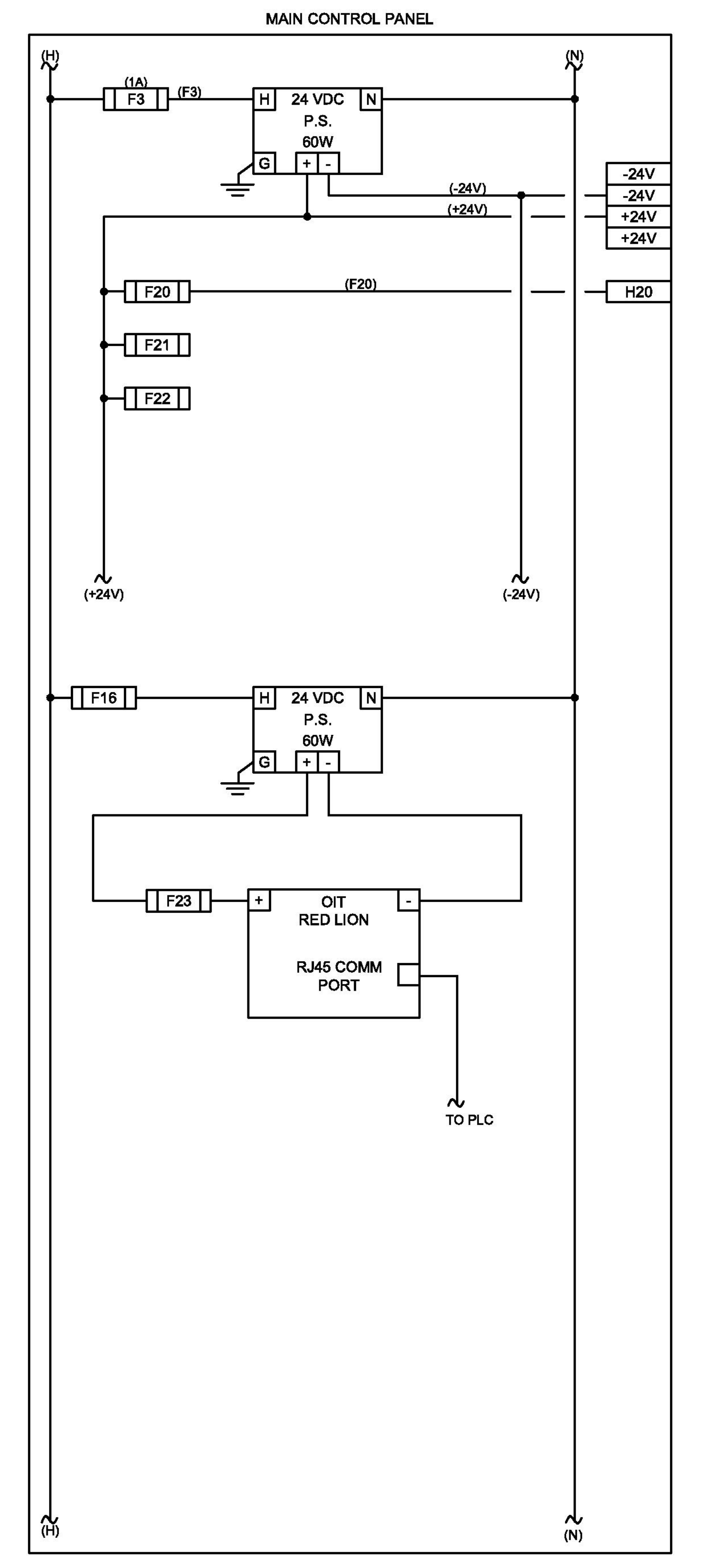
LEGEND

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

02
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D02 LEGEND.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL
(HO)
(HI)
HO
HI
G
SA
G
N
N
(LP-N)
10A
LP-N
G
PANEL:
120VAC
CKT:
MAIN DISCONNECT PROVIDED BY INSTALLER.
INSTALLER SHALL PROVIDE A UL LISTED
CIRCUIT BREAKER WITH A MINIMUM VALUE
OF YP-XXA
(N)
UPS
RECPT
PF
SPDT
14
13
TO
UPS RECPT
UNINTERRUPTABLE
POWER SUPPLY
(UPS-H)
UH
RUPS
RUPS
DPDT
4
12
12
8
RUPS
14
13
UN
UG
(H)
(5A)
F1
SPARE
N
N
N
(1A)
F2
(F2)
L2
PLC TYPE
N
G
(1A)
F4
(F4)
H4
DI SLOT #1 POWER
(1A)
F5
(F5)
H5
DI SLOT #2 POWER
F6
(F6)
H6
DI SLOT #3 POWER
F7
(F7)
H7
DI SLOT #4 POWER
F8
(F8)
H8
DI SLOT #5 POWER
F9
(F9)
H9
DI SLOT #6 POWER
F10
(F10)
H10
DI SLOT #7 POWER
F11
(F11)
H11
DI SLOT #8 POWER
F12
(F12)
H12
DI SLOT #9 POWER
F13
(F13)
H13
DO SLOT #10 POWER
F14
(F14)
H14
DO SLOT #11 POWER
F15
(F15)
H15
DO SLOT #12 POWER
(H)
(N)


MAIN CONTROL PANEL
(H)
(N)
(1A)
F3
(F3)
H
24 VDC
P.S.
60W
N
G
+
-
(-24V)
(+24V)
-24V
-24V
+24V
+24V
F20
(F20)
H20
F21
F22
(+24V)
(-24V)
F16
H
24 VDC
P.S.
60W
N
G
+
-
F23
+
OIT
RED LION
-
RJ45 COMM
PORT
TO PLC
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

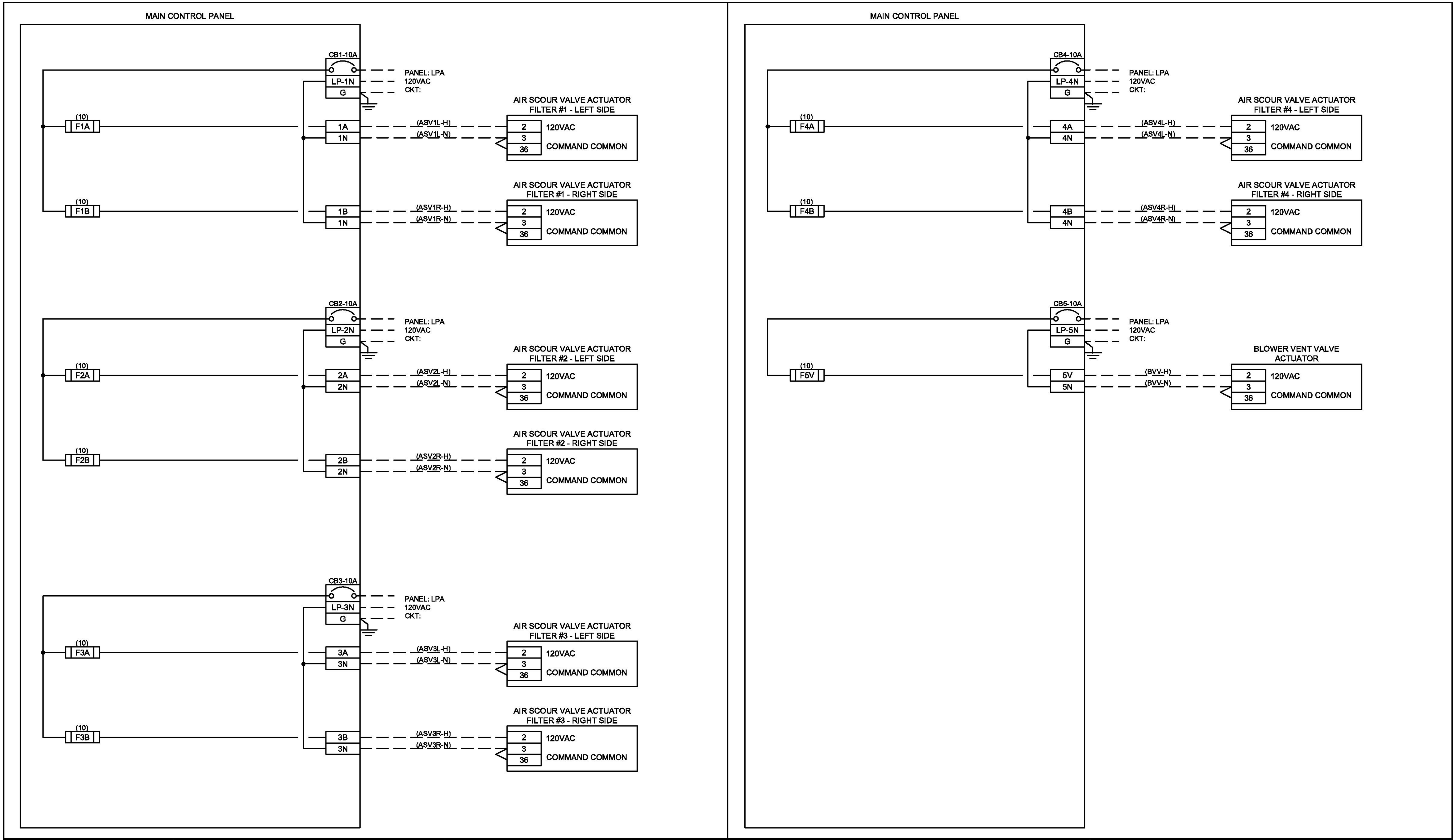
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

POWER DISTRIBUTION

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

03
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D03 Power Distribution.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL
CB1-10A
LP-1N
G
PANEL: LPA
120VAC
CKT:
AIR SCOUR VALVE ACTUATOR
FILTER #1 - LEFT SIDE
(10)
F1A
1A
1N
(ASV1L-H)
(ASV1L-N)
2
3
36
120VAC
COMMAND COMMON
AIR SCOUR VALVE ACTUATOR
FILTER #1 - RIGHT SIDE
(10)
F1B
1B
1N
(ASV1R-H)
(ASV1R-N)
CB2-10A
LP-2N
G
PANEL: LPA
120VAC
CKT:
AIR SCOUR VALVE ACTUATOR
FILTER #2 - LEFT SIDE
(10)
F2A
2A
2N
(ASV2L-H)
(ASV2L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #2 - RIGHT SIDE
(10)
F2B
2B
2N
(ASV2R-H)
(ASV2R-N)
CB3-10A
LP-3N
G
PANEL: LPA
120VAC
CKT:
AIR SCOUR VALVE ACTUATOR
FILTER #3 - LEFT SIDE
(10)
F3A
3A
3N
(ASV3L-H)
(ASV3L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #3 - RIGHT SIDE
(10)
F3B
3B
3N
(ASV3R-H)
(ASV3R-N)
MAIN CONTROL PANEL
CB4-10A
LP-4N
G
PANEL: LPA
120VAC
CKT:
AIR SCOUR VALVE ACTUATOR
FILTER #4 - LEFT SIDE
(10)
F4A
4A
4N
(ASV4L-H)
(ASV4L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #4 - RIGHT SIDE
(10)
F4B
4B
4N
(ASV4R-H)
(ASV4R-N)
CB5-10A
LP-5N
G
PANEL: LPA
120VAC
CKT:
BLOWER VENT VALVE
ACTUATOR
(10)
F5V
5V
5N
(BVV-H)
(BVV-N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
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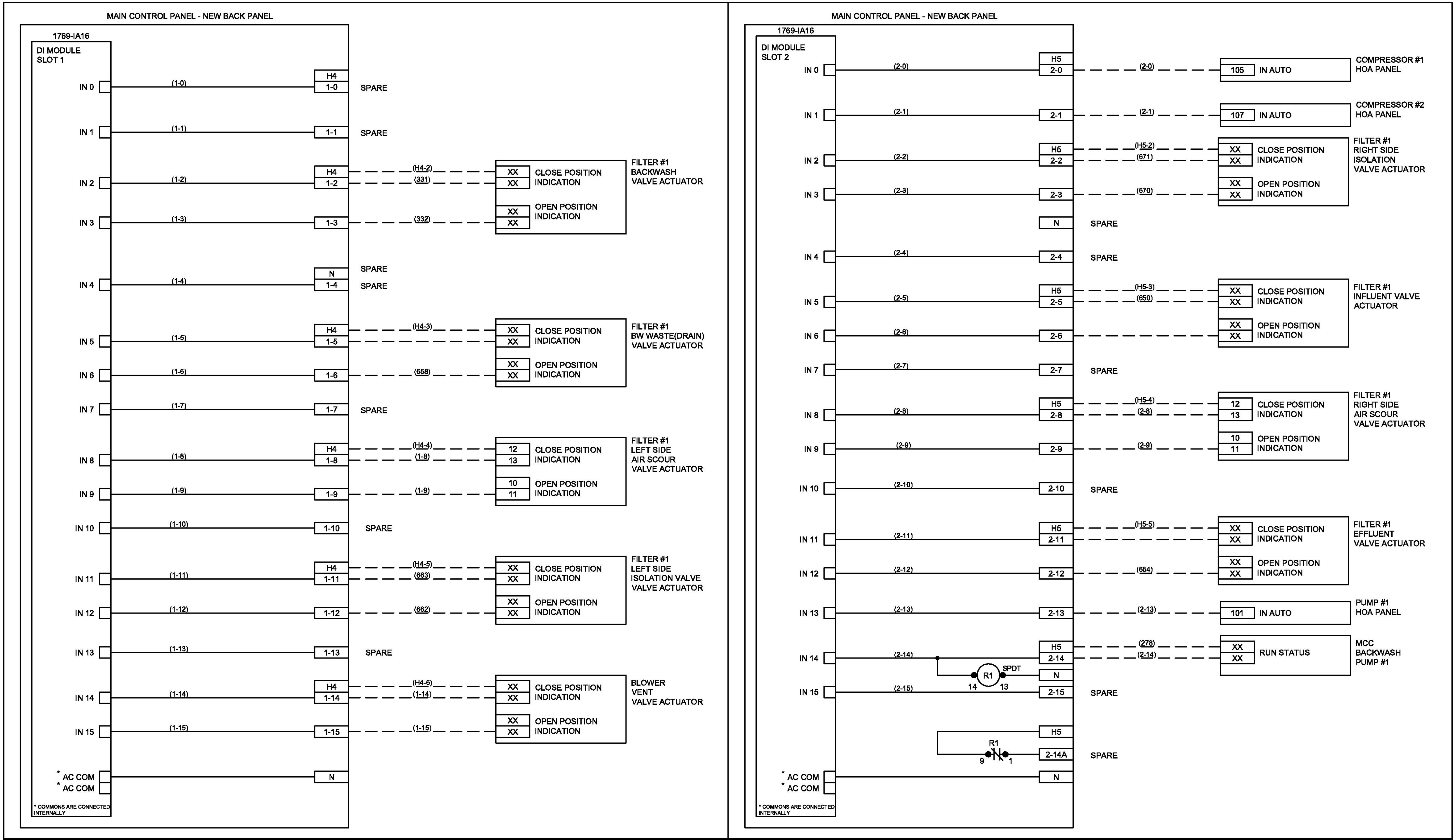
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

AIR SCOUR VALVES
POWER DISTRIBUTION

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

04
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D04 Power Distribution Cont'd.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL - NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 1
IN 0
(1-0)
H4
1-0
SPARE
IN 1
(1-1)
1-1
SPARE
IN 2
(1-2)
H4
1-2
(H4-2)
(331)
XX
CLOSE POSITION
INDICATION
OPEN POSITION
INDICATION
FILTER #1
BACKWASH
VALVE ACTUATOR
IN 3
(1-3)
1-3
(332)
IN 4
(1-4)
N
1-4
SPARE
SPARE
IN 5
(1-5)
H4
1-5
(H4-3)
FILTER #1
BW WASTE(DRAIN)
VALVE ACTUATOR
IN 6
(1-6)
1-6
(658)
IN 7
(1-7)
1-7
SPARE
IN 8
(1-8)
H4
1-8
(H4-4)
(1-8)
12
13
10
11
FILTER #1
LEFT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(1-9)
1-9
(1-9)
IN 10
(1-10)
1-10
SPARE
IN 11
(1-11)
H4
1-11
(H4-5)
(663)
FILTER #1
LEFT SIDE
ISOLATION VALVE
VALVE ACTUATOR
IN 12
(1-12)
1-12
(662)
IN 13
(1-13)
1-13
SPARE
IN 14
(1-14)
H4
1-14
(H4-6)
(1-14)
BLOWER
VENT
VALVE ACTUATOR
IN 15
(1-15)
1-15
(1-15)
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY
MAIN CONTROL PANEL - NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 2
IN 0
(2-0)
H5
2-0
(2-0)
105
IN AUTO
COMPRESSOR #1
HOA PANEL
IN 1
(2-1)
2-1
(2-1)
107
IN AUTO
COMPRESSOR #2
HOA PANEL
IN 2
(2-2)
H5
2-2
(H5-2)
(671)
FILTER #1
RIGHT SIDE
ISOLATION
VALVE ACTUATOR
IN 3
(2-3)
2-3
(670)
N
SPARE
IN 4
(2-4)
2-4
SPARE
IN 5
(2-5)
H5
2-5
(H5-3)
(650)
FILTER #1
INFLUENT VALVE
ACTUATOR
IN 6
(2-6)
2-6
IN 7
(2-7)
2-7
SPARE
IN 8
(2-8)
H5
2-8
(H5-4)
(2-8)
FILTER #1
RIGHT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(2-9)
2-9
(2-9)
IN 10
(2-10)
2-10
SPARE
IN 11
(2-11)
H5
2-11
(H5-5)
FILTER #1
EFFLUENT
VALVE ACTUATOR
IN 12
(2-12)
2-12
(654)
IN 13
(2-13)
2-13
(2-13)
101
IN AUTO
PUMP #1
HOA PANEL
IN 14
(2-14)
H5
2-14
(278)
(2-14)
RUN STATUS
MCC
BACKWASH
PUMP #1
R1
SPDT
14
13
N
IN 15
(2-15)
2-15
SPARE
H5
R1
9
1
2-14A
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

DI SLOT 1 & 2

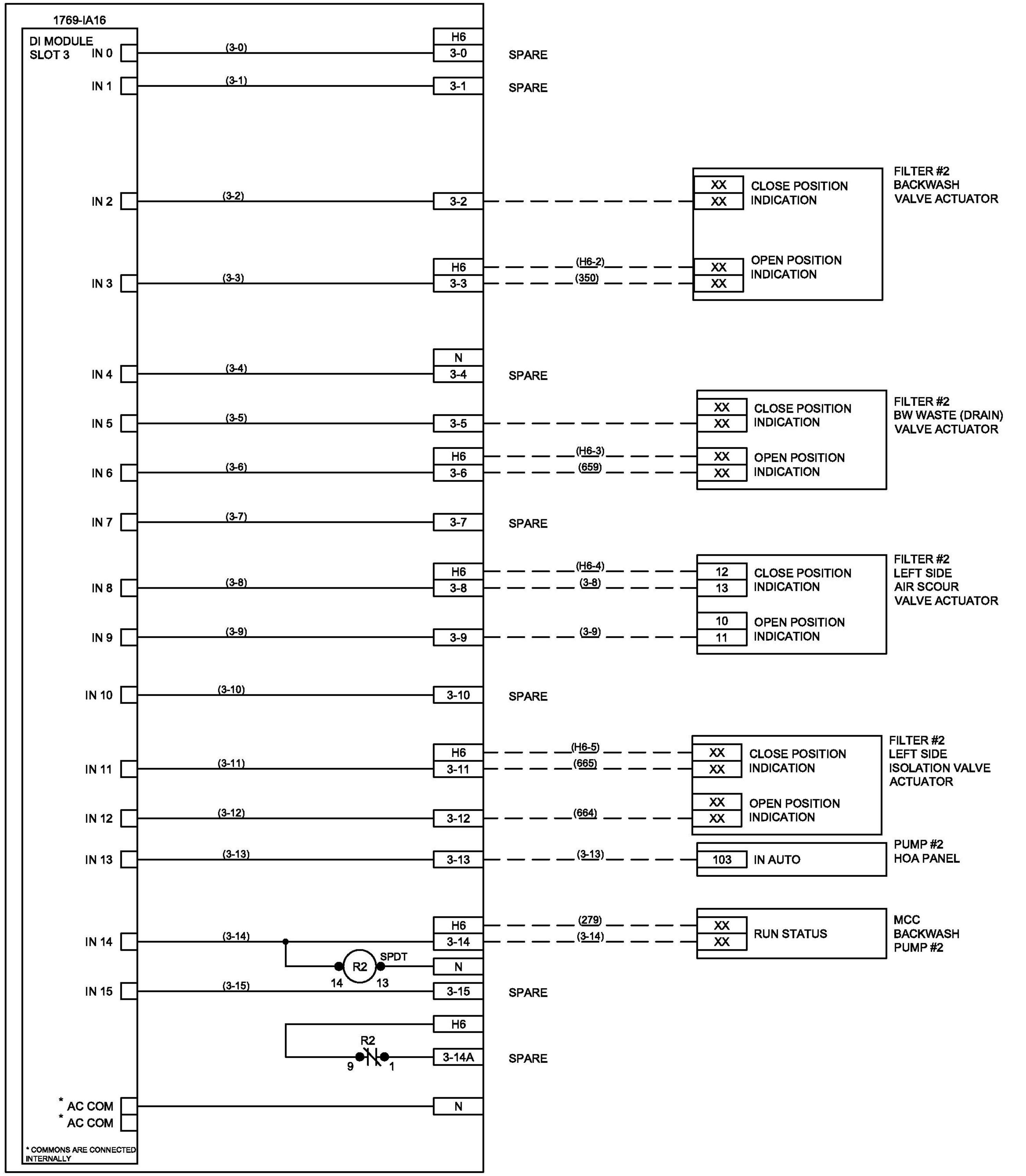
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

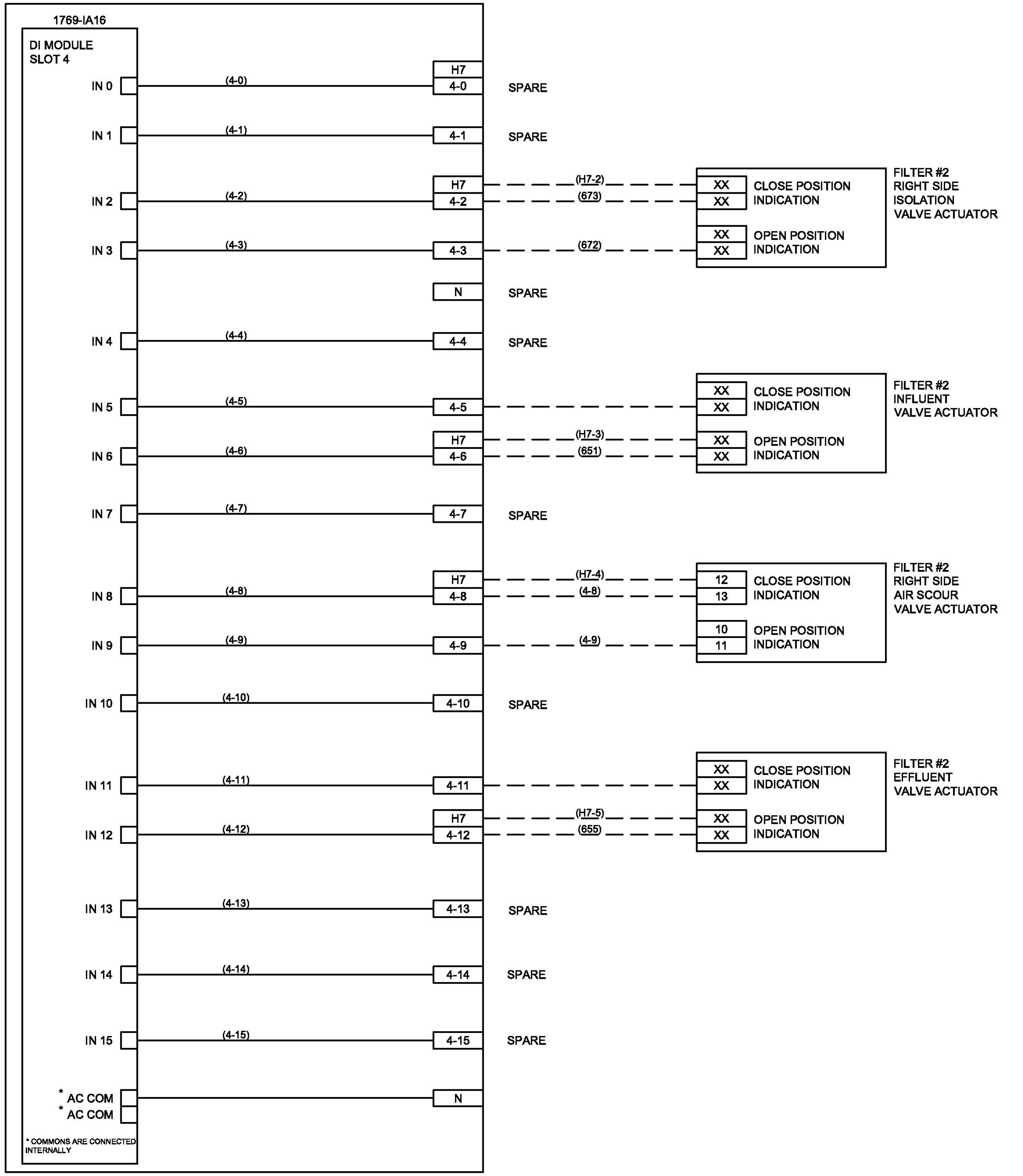
05
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D05 DI Slot 1 & 2.dwg [Thursday, April 06, 2017]

MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL


1769-IA16
DI MODULE SLOT 3
IN 0 (3-0) H6 3-0 SPARE
IN 1 (3-1) 3-1 SPARE
IN 2 (3-2) 3-2 XX XX CLOSE POSITION INDICATION
IN 3 (3-3) H6 3-3 (H6-2) (350) XX XX OPEN POSITION INDICATION
FILTER #2 BACKWASH VALVE ACTUATOR
IN 4 (3-4) N 3-4 SPARE
IN 5 (3-5) 3-5 XX XX CLOSE POSITION INDICATION
IN 6 (3-6) H6 3-6 (H6-3) (659) XX XX OPEN POSITION INDICATION
FILTER #2 BW WASTE (DRAIN) VALVE ACTUATOR
IN 7 (3-7) 3-7 SPARE
IN 8 (3-8) H6 3-8 (H6-4) (3-8) 12 13 CLOSE POSITION INDICATION
IN 9 (3-9) 3-9 (3-9) 10 11 OPEN POSITION INDICATION
FILTER #2 LEFT SIDE AIR SCOUR VALVE ACTUATOR
IN 10 (3-10) 3-10 SPARE
IN 11 (3-11) H6 3-11 (H6-5) (665) XX XX CLOSE POSITION INDICATION
IN 12 (3-12) 3-12 (664) XX XX OPEN POSITION INDICATION
FILTER #2 LEFT SIDE ISOLATION VALVE ACTUATOR
IN 13 (3-13) 3-13 (3-13) 103 IN AUTO
PUMP #2 HOA PANEL
IN 14 (3-14) H6 3-14 (279) (3-14) XX XX RUN STATUS
MCC BACKWASH PUMP #2
R2 SPDT 14 13 N
IN 15 (3-15) 3-15 SPARE
H6
R2 9 1 3-14A SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL


1769-IA16
DI MODULE SLOT 4
IN 0 (4-0) H7 4-0 SPARE
IN 1 (4-1) 4-1 SPARE
IN 2 (4-2) H7 4-2 (H7-2) (673) XX XX CLOSE POSITION INDICATION
IN 3 (4-3) 4-3 (672) XX XX OPEN POSITION INDICATION
FILTER #2 RIGHT SIDE ISOLATION VALVE ACTUATOR
N SPARE
IN 4 (4-4) 4-4 SPARE
IN 5 (4-5) 4-5 XX XX CLOSE POSITION INDICATION
IN 6 (4-6) H7 4-6 (H7-3) (651) XX XX OPEN POSITION INDICATION
FILTER #2 INFLUENT VALVE ACTUATOR
IN 7 (4-7) 4-7 SPARE
IN 8 (4-8) H7 4-8 (H7-4) (4-8) 12 13 CLOSE POSITION INDICATION
IN 9 (4-9) 4-9 (4-9) 10 11 OPEN POSITION INDICATION
FILTER #2 RIGHT SIDE AIR SCOUR VALVE ACTUATOR
IN 10 (4-10) 4-10 SPARE
IN 11 (4-11) 4-11 XX XX CLOSE POSITION INDICATION
IN 12 (4-12) H7 4-12 (H7-5) (655) XX XX OPEN POSITION INDICATION
FILTER #2 EFFLUENT VALVE ACTUATOR
IN 13 (4-13) 4-13 SPARE
IN 14 (4-14) 4-14 SPARE
IN 15 (4-15) 4-15 SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

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GENERAL CONTRACTOR
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ELECTRICAL CONTRACTOR
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970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

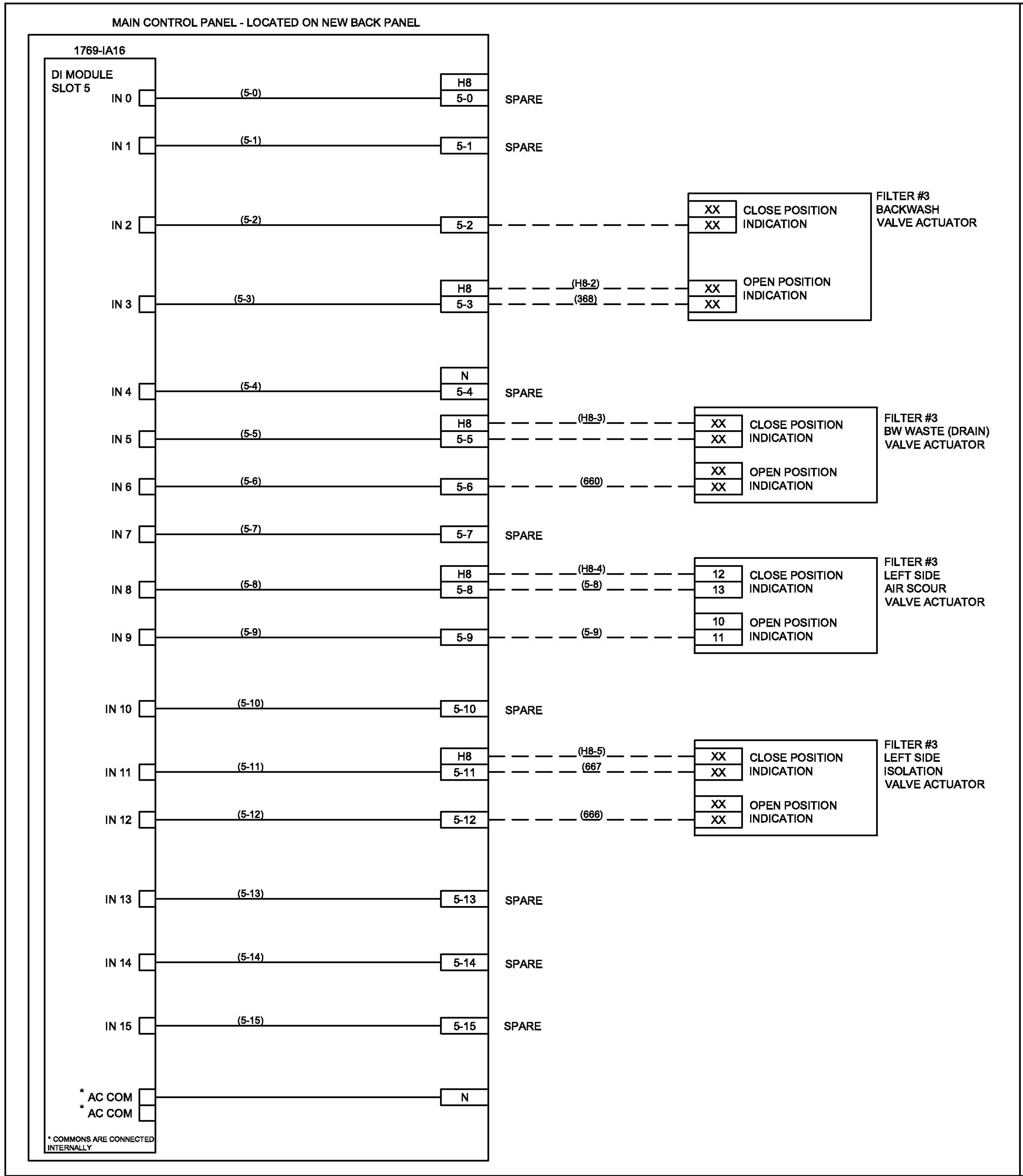
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

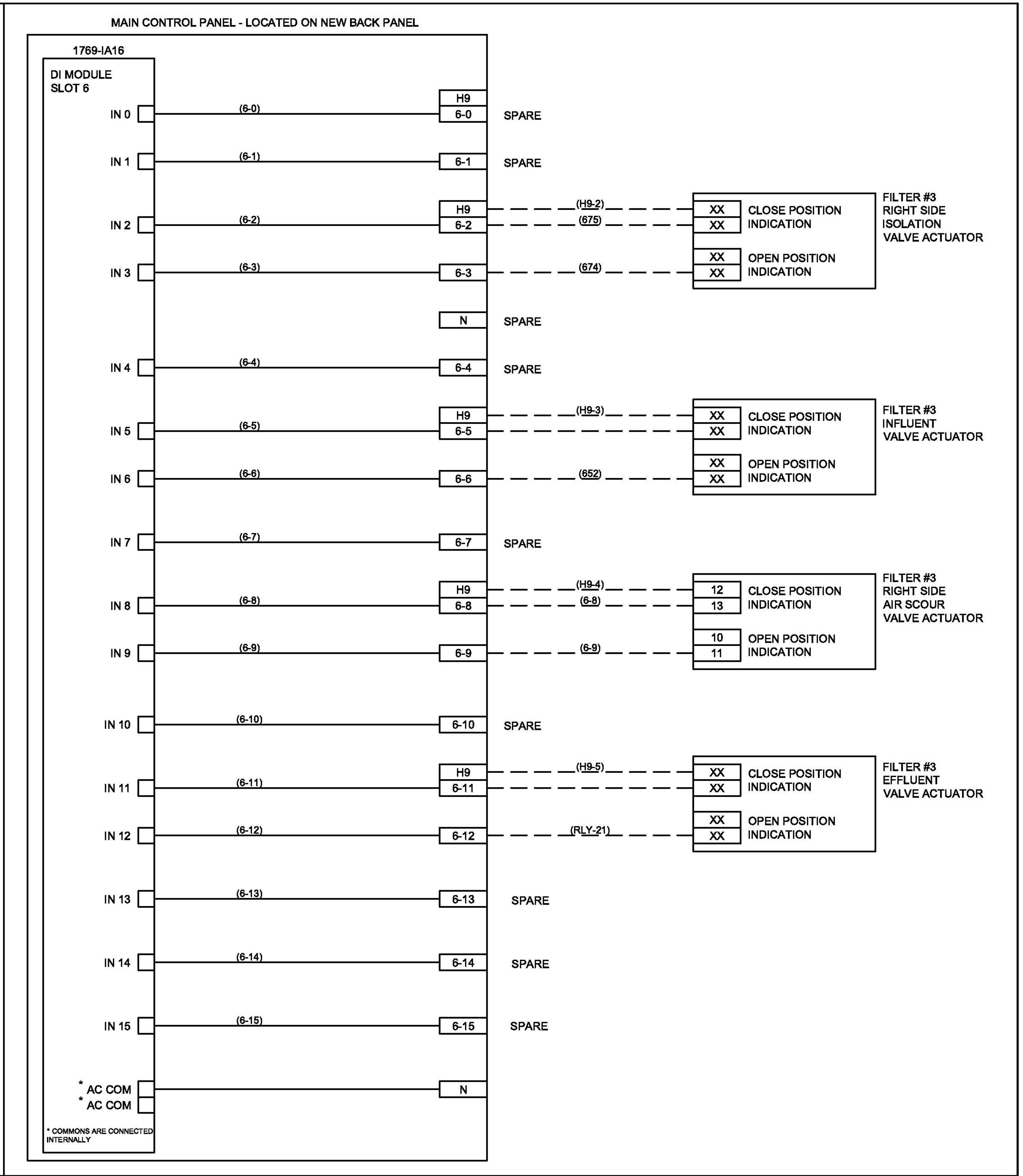
DI SLOT 3 & 4

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

06
18


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 5
IN 0
(5-0)
H8
5-0
SPARE
IN 1
(5-1)
5-1
SPARE
IN 2
(5-2)
5-2
XX
XX
CLOSE POSITION INDICATION
FILTER #3
BACKWASH
VALVE ACTUATOR
IN 3
(5-3)
H8
5-3
(H8-2)
(368)
XX
XX
OPEN POSITION INDICATION
IN 4
(5-4)
N
5-4
SPARE
IN 5
(5-5)
H8
5-5
(H8-3)
XX
XX
CLOSE POSITION INDICATION
FILTER #3
BW WASTE (DRAIN)
VALVE ACTUATOR
IN 6
(5-6)
5-6
(660)
XX
XX
OPEN POSITION INDICATION
IN 7
(5-7)
5-7
SPARE
IN 8
(5-8)
H8
5-8
(H8-4)
(5-8)
12
13
CLOSE POSITION INDICATION
FILTER #3
LEFT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(5-9)
5-9
(5-9)
10
11
OPEN POSITION INDICATION
IN 10
(5-10)
5-10
SPARE
IN 11
(5-11)
H8
5-11
(H8-5)
(667
XX
XX
CLOSE POSITION INDICATION
FILTER #3
LEFT SIDE
ISOLATION
VALVE ACTUATOR
IN 12
(5-12)
5-12
(666)
XX
XX
OPEN POSITION INDICATION
IN 13
(5-13)
5-13
SPARE
IN 14
(5-14)
5-14
SPARE
IN 15
(5-15)
5-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 6
IN 0
(6-0)
H9
6-0
SPARE
IN 1
(6-1)
6-1
SPARE
IN 2
(6-2)
H9
6-2
(H9-2)
(675)
XX
XX
CLOSE POSITION INDICATION
FILTER #3
RIGHT SIDE
ISOLATION
VALVE ACTUATOR
IN 3
(6-3)
6-3
(674)
XX
XX
OPEN POSITION INDICATION
N
SPARE
IN 4
(6-4)
6-4
SPARE
IN 5
(6-5)
H9
6-5
(H9-3)
XX
XX
CLOSE POSITION INDICATION
FILTER #3
INFLUENT
VALVE ACTUATOR
IN 6
(6-6)
6-6
(652)
XX
XX
OPEN POSITION INDICATION
IN 7
(6-7)
6-7
SPARE
IN 8
(6-8)
H9
6-8
(H9-4)
(6-8)
12
13
CLOSE POSITION INDICATION
FILTER #3
RIGHT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(6-9)
6-9
(6-9)
10
11
OPEN POSITION INDICATION
IN 10
(6-10)
6-10
SPARE
IN 11
(6-11)
H9
6-11
(H9-5)
XX
XX
CLOSE POSITION INDICATION
FILTER #3
EFFLUENT
VALVE ACTUATOR
IN 12
(6-12)
6-12
(RLY-21)
XX
XX
OPEN POSITION INDICATION
IN 13
(6-13)
6-13
SPARE
IN 14
(6-14)
6-14
SPARE
IN 15
(6-15)
6-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

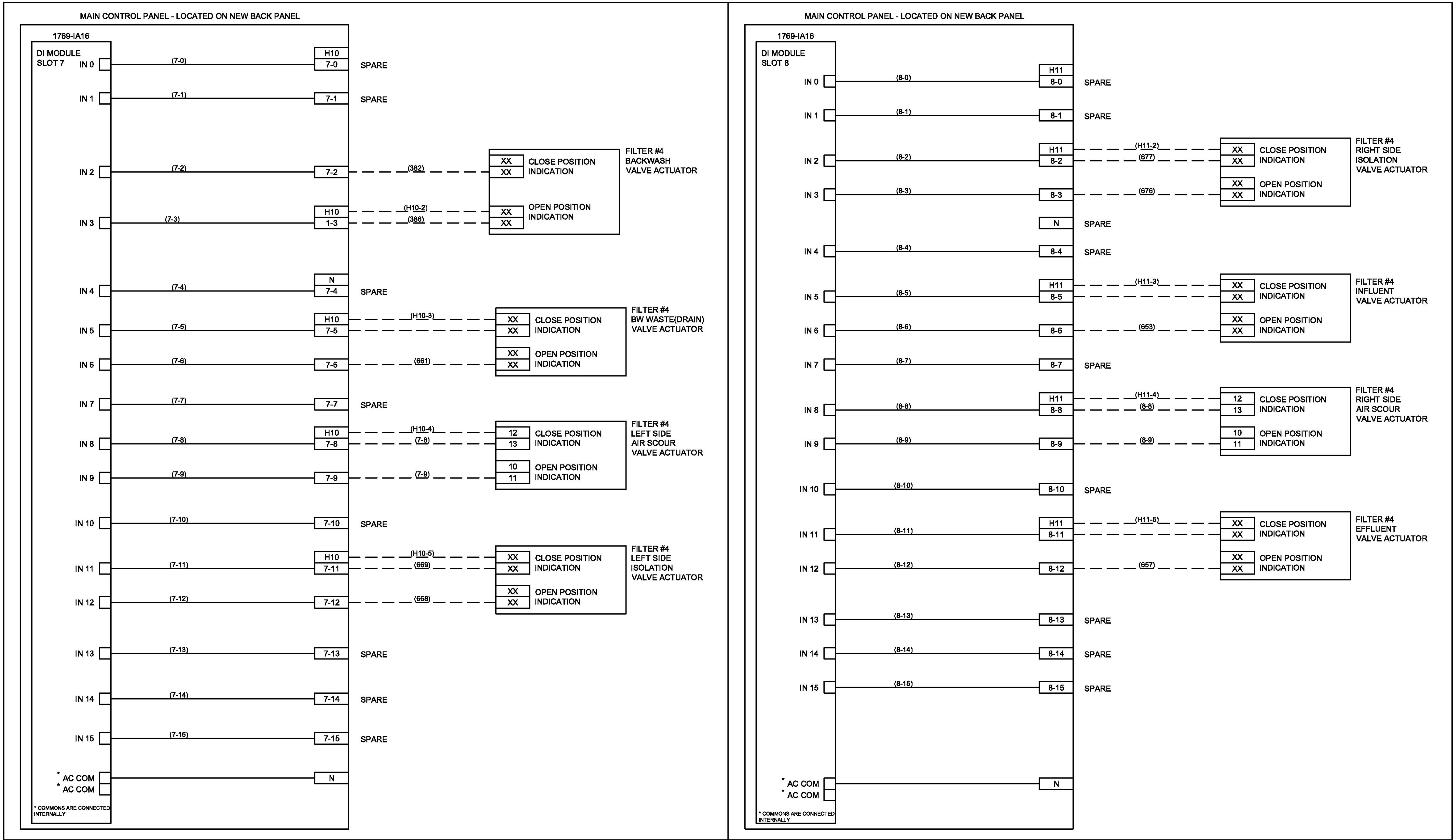
DI SLOT 5 & 6

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

07
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D07 DI Slot 5 & 6.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE SLOT 7
IN 0 (7-0) H10 7-0 SPARE
IN 1 (7-1) 7-1 SPARE
IN 2 (7-2) 7-2 (382)
IN 3 (7-3) H10 1-3 (H10-2) (386)
XX CLOSE POSITION INDICATION
XX OPEN POSITION INDICATION
FILTER #4 BACKWASH VALVE ACTUATOR
IN 4 (7-4) N 7-4 SPARE
IN 5 (7-5) H10 7-5 (H10-3)
IN 6 (7-6) 7-6 (661)
FILTER #4 BW WASTE(DRAIN) VALVE ACTUATOR
IN 7 (7-7) 7-7 SPARE
IN 8 (7-8) H10 7-8 (H10-4) (7-8)
IN 9 (7-9) 7-9 (7-9)
12 13 CLOSE POSITION INDICATION
10 11 OPEN POSITION INDICATION
FILTER #4 LEFT SIDE AIR SCOUR VALVE ACTUATOR
IN 10 (7-10) 7-10 SPARE
IN 11 (7-11) H10 7-11 (H10-5) (669)
IN 12 (7-12) 7-12 (668)
FILTER #4 LEFT SIDE ISOLATION VALVE ACTUATOR
IN 13 (7-13) 7-13 SPARE
IN 14 (7-14) 7-14 SPARE
IN 15 (7-15) 7-15 SPARE
* AC COM
* AC COM N
* COMMONS ARE CONNECTED INTERNALLY
MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE SLOT 8
IN 0 (8-0) H11 8-0 SPARE
IN 1 (8-1) 8-1 SPARE
IN 2 (8-2) H11 8-2 (H11-2) (677)
IN 3 (8-3) 8-3 (676)
FILTER #4 RIGHT SIDE ISOLATION VALVE ACTUATOR
N SPARE
IN 4 (8-4) 8-4 SPARE
IN 5 (8-5) H11 8-5 (H11-3)
IN 6 (8-6) 8-6 (653)
FILTER #4 INFLUENT VALVE ACTUATOR
IN 7 (8-7) 8-7 SPARE
IN 8 (8-8) H11 8-8 (H11-4) (8-8)
IN 9 (8-9) 8-9 (8-9)
FILTER #4 RIGHT SIDE AIR SCOUR VALVE ACTUATOR
IN 10 (8-10) 8-10 SPARE
IN 11 (8-11) H11 8-11 (H11-5)
IN 12 (8-12) 8-12 (657)
FILTER #4 EFFLUENT VALVE ACTUATOR
IN 13 (8-13) 8-13 SPARE
IN 14 (8-14) 8-14 SPARE
IN 15 (8-15) 8-15 SPARE
* AC COM
* AC COM N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
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A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
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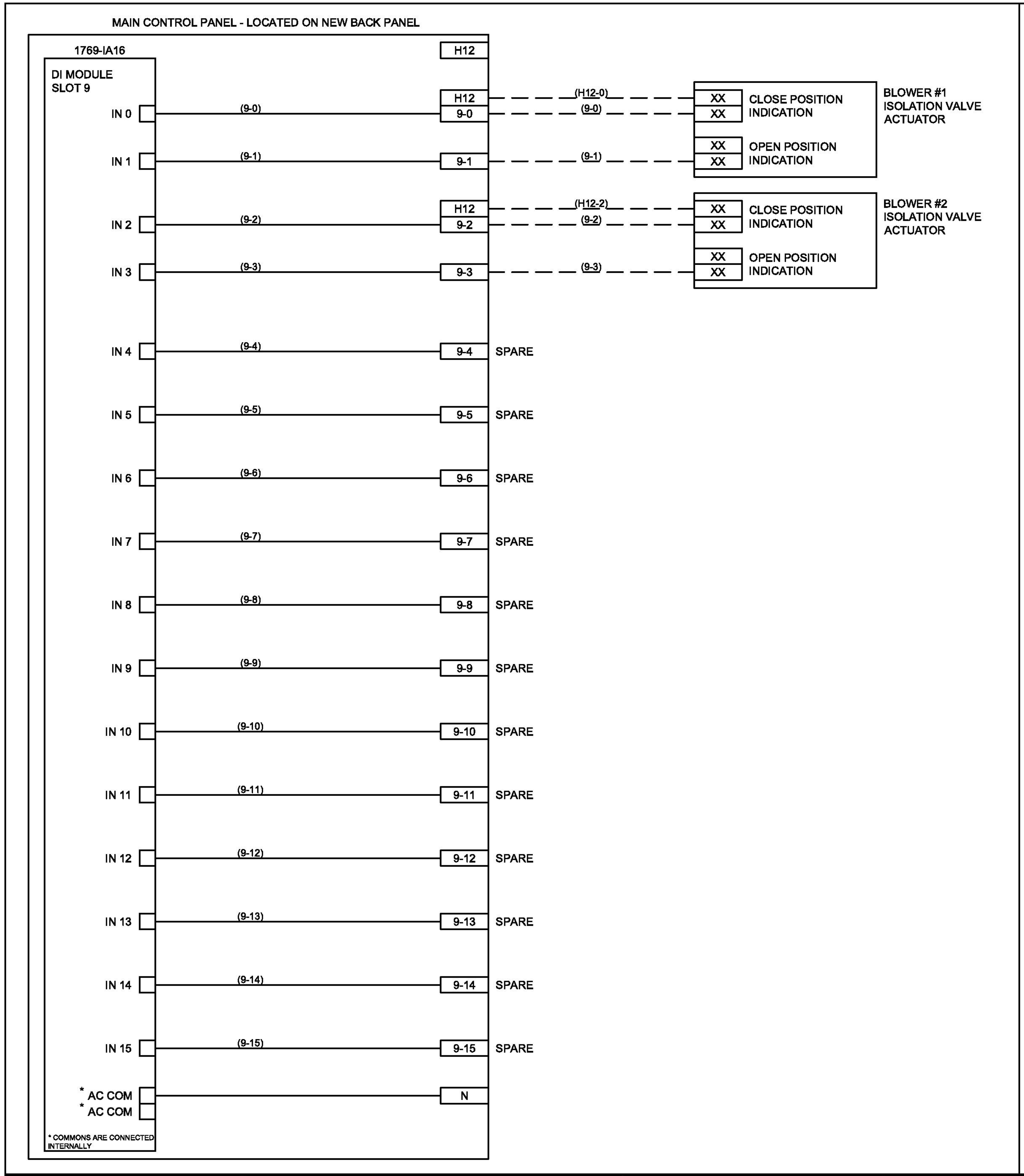
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

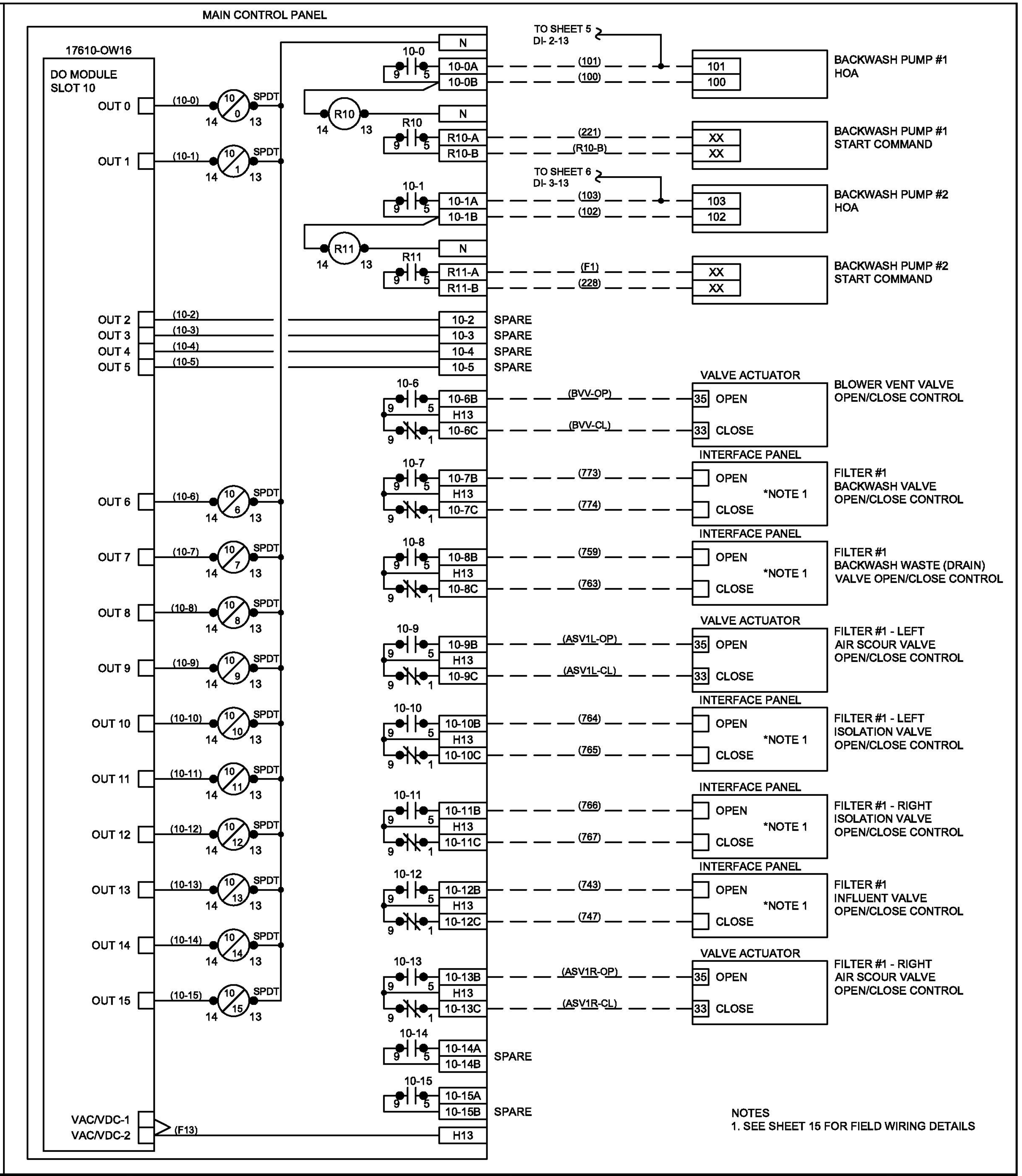
DI SLOT 7 & 8

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

08
18


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 9
IN 0
IN 1
IN 2
IN 3
IN 4
IN 5
IN 6
IN 7
IN 8
IN 9
IN 10
IN 11
IN 12
IN 13
IN 14
IN 15
* AC COM
* AC COM
* COMMONS ARE CONNECTED INTERNALLY
(9-0)
(9-1)
(9-2)
(9-3)
(9-4)
(9-5)
(9-6)
(9-7)
(9-8)
(9-9)
(9-10)
(9-11)
(9-12)
(9-13)
(9-14)
(9-15)
H12
H12
9-0
9-1
H12
9-2
9-3
9-4
9-5
9-6
9-7
9-8
9-9
9-10
9-11
9-12
9-13
9-14
9-15
N
SPARE
(H12-0)
(9-0)
(9-1)
(H12-2)
(9-2)
(9-3)
XX
CLOSE POSITION INDICATION
OPEN POSITION INDICATION
BLOWER #1 ISOLATION VALVE ACTUATOR
BLOWER #2 ISOLATION VALVE ACTUATOR


MAIN CONTROL PANEL
17610-OW16
DO MODULE
SLOT 10
OUT 0
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
OUT 7
OUT 8
OUT 9
OUT 10
OUT 11
OUT 12
OUT 13
OUT 14
OUT 15
VAC/VDC-1
VAC/VDC-2
(F13)
(10-0)
(10-1)
(10-2)
(10-3)
(10-4)
(10-5)
(10-6)
(10-7)
(10-8)
(10-9)
(10-10)
(10-11)
(10-12)
(10-13)
(10-14)
(10-15)
SPDT
14
13
R10
R11
N
10-0A
10-0B
R10-A
R10-B
10-1A
10-1B
R11-A
R11-B
10-2
10-3
10-4
10-5
SPARE
10-6B
H13
10-6C
10-7B
10-7C
10-8B
10-8C
10-9B
10-9C
10-10B
10-10C
10-11B
10-11C
10-12B
10-12C
10-13B
10-13C
10-14A
10-14B
10-15A
10-15B
TO SHEET 5 DI- 2-13
TO SHEET 6 DI- 3-13
(101)
(100)
(221)
(R10-B)
(103)
(102)
(F1)
(228)
(BVV-OP)
(BVV-CL)
(773)
(774)
(759)
(763)
(ASV1L-OP)
(ASV1L-CL)
(764)
(765)
(766)
(767)
(743)
(747)
(ASV1R-OP)
(ASV1R-CL)
101
100
103
102
XX
BACKWASH PUMP #1 HOA
BACKWASH PUMP #1 START COMMAND
BACKWASH PUMP #2 HOA
BACKWASH PUMP #2 START COMMAND
VALVE ACTUATOR
INTERFACE PANEL
35
33
OPEN
CLOSE
*NOTE 1
BLOWER VENT VALVE OPEN/CLOSE CONTROL
FILTER #1 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #1 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #1 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #1 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #1 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #1 INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #1 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL

NOTES
1. SEE SHEET 15 FOR FIELD WIRING DETAILS

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
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BROWNS HILL
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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

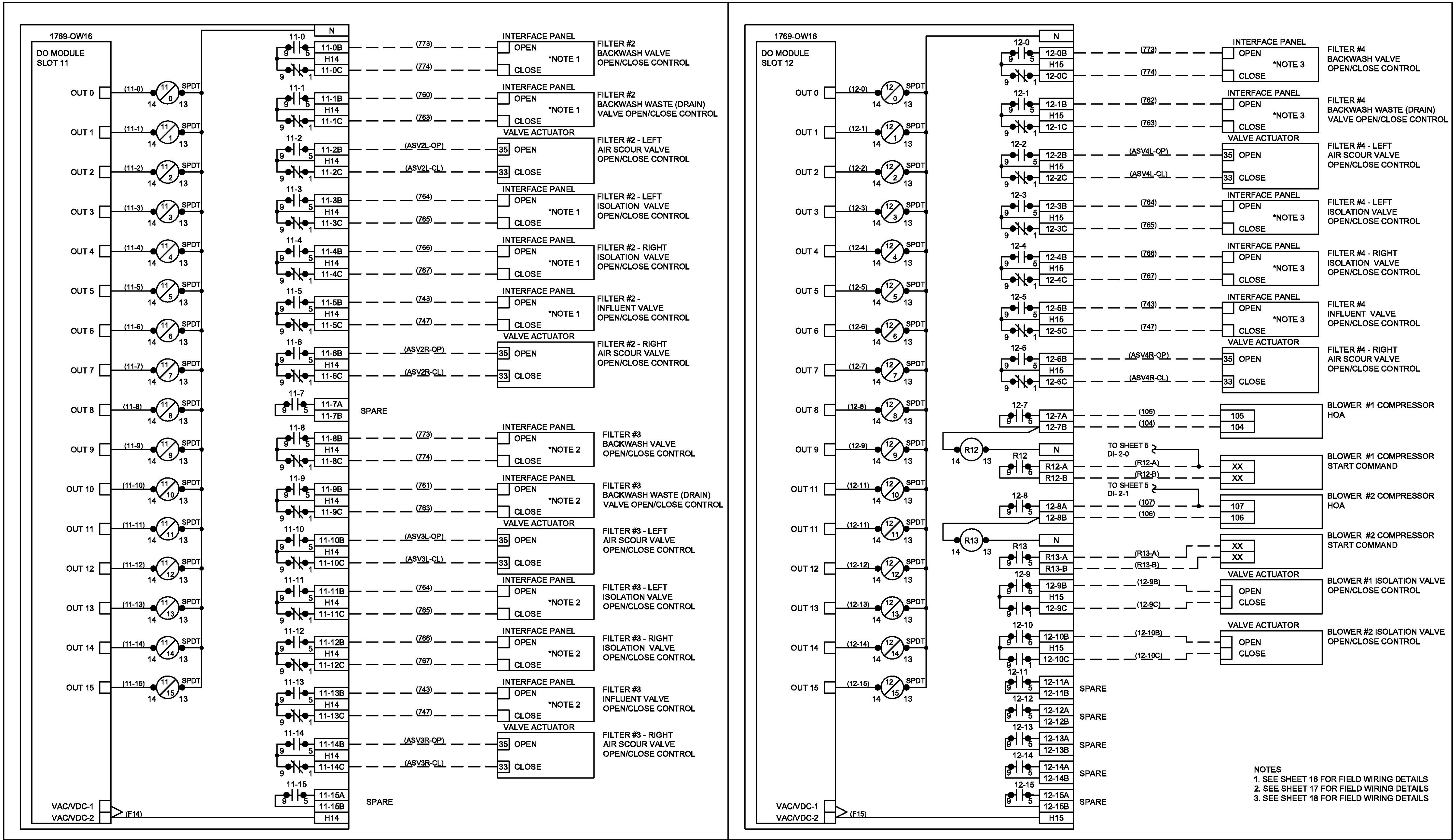
DI SLOT 9 & DO SLOT 10

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 2/2017

09
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D09 DI Slot 9 & DO SLOT 10.dwg [Thursday, April 06, 2017]


1769-OW16
DO MODULE
SLOT 11
OUT 0
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
OUT 7
OUT 8
OUT 9
OUT 10
OUT 11
OUT 12
OUT 13
OUT 14
OUT 15
VAC/VDC-1
VAC/VDC-2
(F14)
SPDT
N
H14
11-0B
11-0C
11-1B
11-1C
11-2B
11-2C
11-3B
11-3C
11-4B
11-4C
11-5B
11-5C
11-6B
11-6C
11-7A
11-7B
SPARE
11-8B
11-8C
11-9B
11-9C
11-10B
11-10C
11-11B
11-11C
11-12B
11-12C
11-13B
11-13C
11-14B
11-14C
11-15A
11-15B
SPARE
(773)
(774)
(760)
(763)
(ASV2L-OP)
(ASV2L-CL)
(764)
(765)
(766)
(767)
(743)
(747)
(ASV2R-OP)
(ASV2R-CL)
(761)
(ASV3L-OP)
(ASV3L-CL)
(ASV3R-OP)
(ASV3R-CL)
INTERFACE PANEL
VALVE ACTUATOR
OPEN
CLOSE
*NOTE 1
*NOTE 2
35
33
FILTER #2 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #2 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #2 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #2 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #2 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #2 - INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #2 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #3 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #3 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #3 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #3 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #3 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #3 INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #3 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
1769-OW16
DO MODULE
SLOT 12
(F15)
H15
12-0B
12-0C
12-1B
12-1C
12-2B
12-2C
12-3B
12-3C
12-4B
12-4C
12-5B
12-5C
12-6B
12-6C
12-7A
12-7B
R12
R12-A
R12-B
12-8A
12-8B
R13
R13-A
R13-B
12-9B
12-9C
12-10B
12-10C
12-11A
12-11B
12-12A
12-12B
12-13A
12-13B
12-14A
12-14B
12-15A
12-15B
SPARE
(762)
(ASV4L-OP)
(ASV4L-CL)
(ASV4R-OP)
(ASV4R-CL)
(105)
(104)
(107)
(106)
(12-9B)
(12-9C)
(12-10B)
(12-10C)
TO SHEET 5 DI- 2-0
TO SHEET 5 DI- 2-1
105
104
107
106
XX
*NOTE 3
FILTER #4 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #4 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #4 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #4 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #4 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #4 INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #4 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
BLOWER #1 COMPRESSOR HOA
BLOWER #1 COMPRESSOR START COMMAND
BLOWER #2 COMPRESSOR HOA
BLOWER #2 COMPRESSOR START COMMAND
BLOWER #1 ISOLATION VALVE OPEN/CLOSE CONTROL
BLOWER #2 ISOLATION VALVE OPEN/CLOSE CONTROL

NOTES
1. SEE SHEET 16 FOR FIELD WIRING DETAILS
2. SEE SHEET 17 FOR FIELD WIRING DETAILS
3. SEE SHEET 18 FOR FIELD WIRING DETAILS

1"
IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

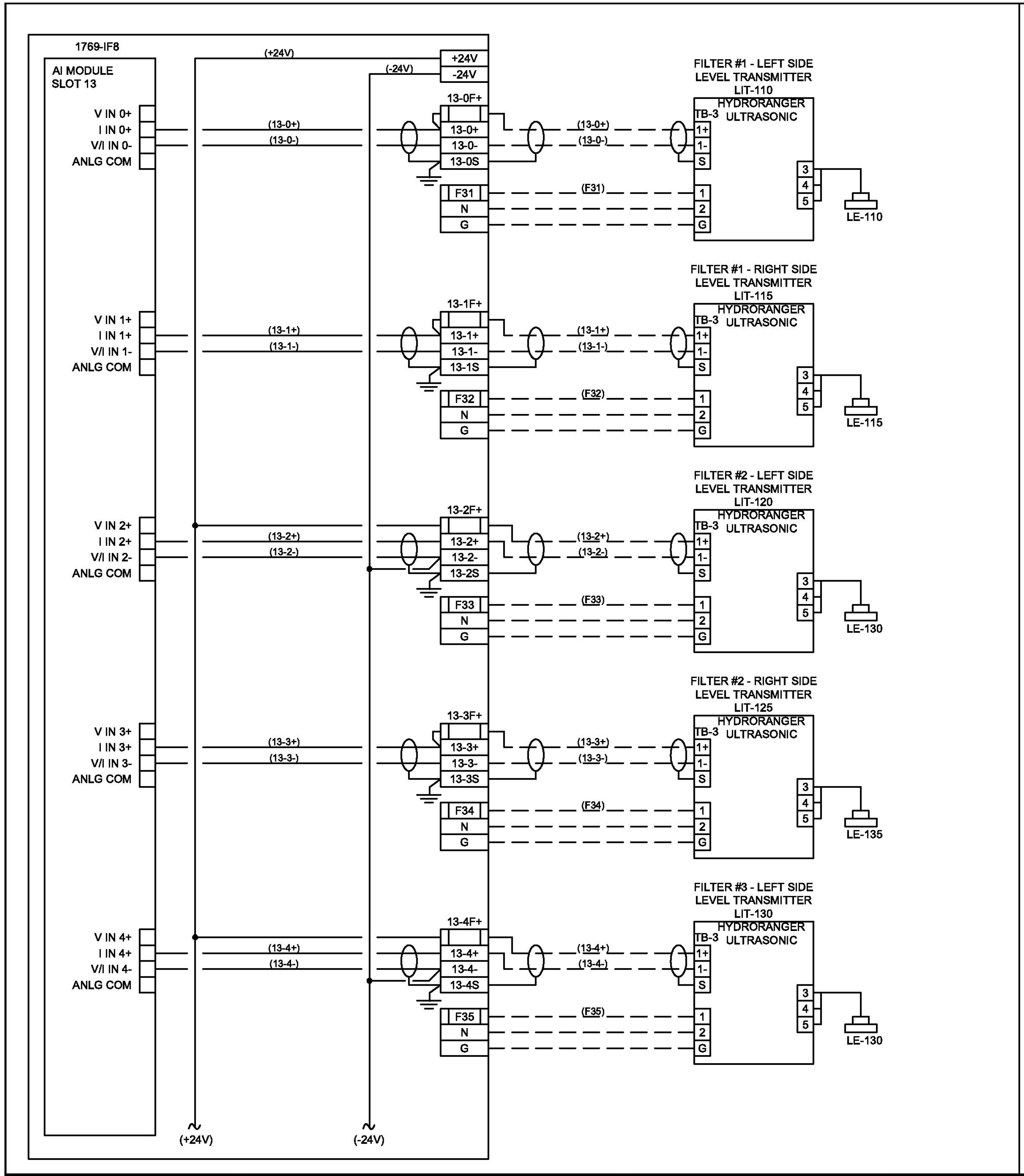
DO SLOTS 11 & 12

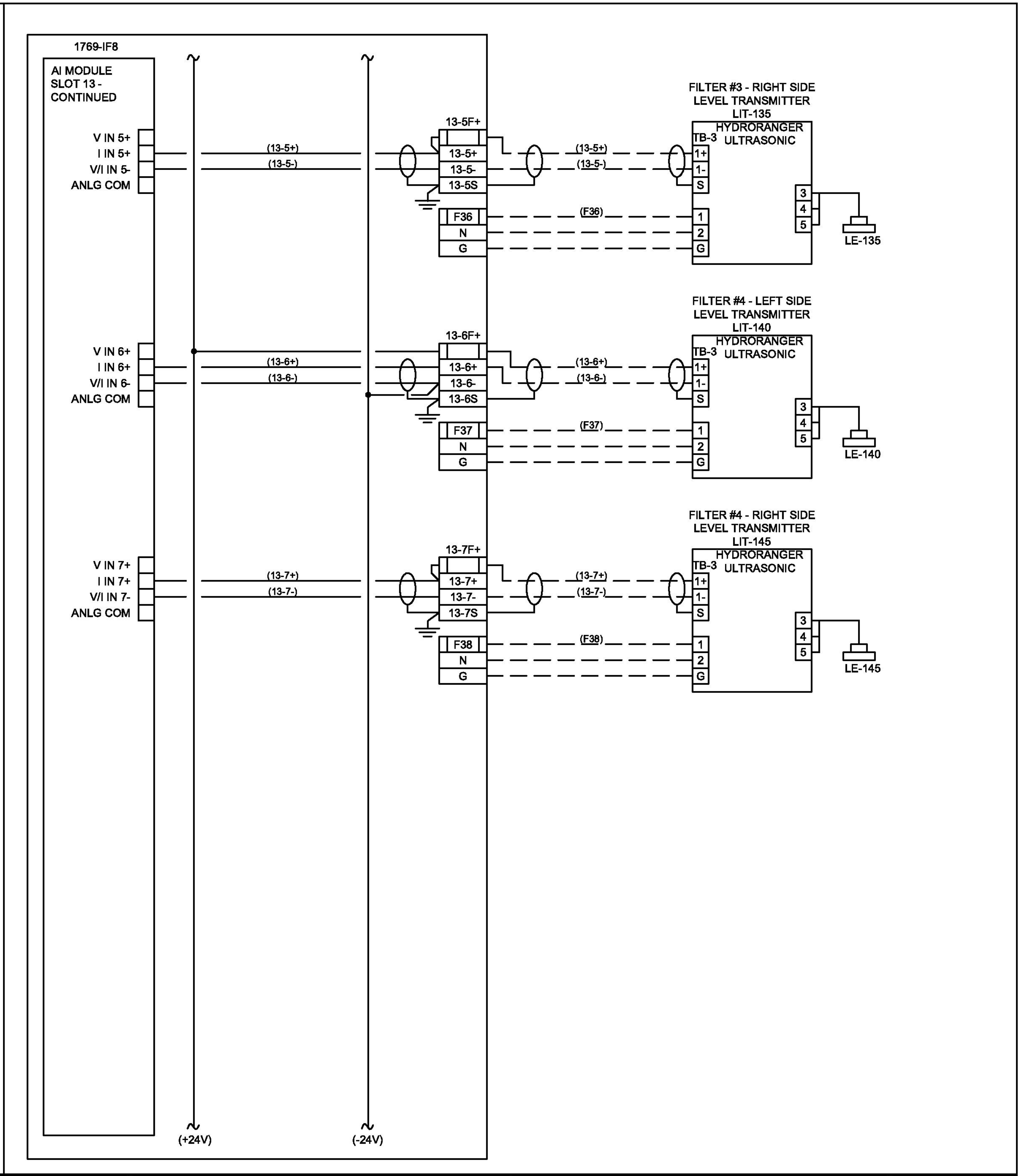
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

10
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D10 DO Slots 11 & 12.dwg [Thursday, April 06, 2017]


1769-IF8
AI MODULE
SLOT 13
(+24V)
+24V
(-24V)
-24V
13-0F+
V IN 0+
I IN 0+
V/I IN 0-
ANLG COM
(13-0+)
(13-0-)
13-0+
13-0-
13-0S
F31
N
G
(F31)
FILTER #1 - LEFT SIDE
LEVEL TRANSMITTER
LIT-110
HYDRORANGER
TB-3
ULTRASONIC
1+
1-
S
1
2
G
3
4
5
LE-110
FILTER #1 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-115
13-1F+
V IN 1+
I IN 1+
V/I IN 1-
ANLG COM
(13-1+)
(13-1-)
13-1+
13-1-
13-1S
F32
(F32)
LE-115
FILTER #2 - LEFT SIDE
LEVEL TRANSMITTER
LIT-120
13-2F+
V IN 2+
I IN 2+
V/I IN 2-
ANLG COM
(13-2+)
(13-2-)
13-2+
13-2-
13-2S
F33
(F33)
LE-130
FILTER #2 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-125
13-3F+
V IN 3+
I IN 3+
V/I IN 3-
ANLG COM
(13-3+)
(13-3-)
13-3+
13-3-
13-3S
F34
(F34)
LE-135
FILTER #3 - LEFT SIDE
LEVEL TRANSMITTER
LIT-130
13-4F+
V IN 4+
I IN 4+
V/I IN 4-
ANLG COM
(13-4+)
(13-4-)
13-4+
13-4-
13-4S
F35
(F35)
LE-130
(+24V)
(-24V)


1769-IF8
AI MODULE
SLOT 13 -
CONTINUED
FILTER #3 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-135
HYDRORANGER
TB-3
ULTRASONIC
13-5F+
V IN 5+
I IN 5+
V/I IN 5-
ANLG COM
(13-5+)
(13-5-)
13-5+
13-5-
13-5S
F36
N
G
(F36)
1+
1-
S
1
2
G
3
4
5
LE-135
FILTER #4 - LEFT SIDE
LEVEL TRANSMITTER
LIT-140
13-6F+
V IN 6+
I IN 6+
V/I IN 6-
ANLG COM
(13-6+)
(13-6-)
13-6+
13-6-
13-6S
F37
(F37)
LE-140
FILTER #4 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-145
13-7F+
V IN 7+
I IN 7+
V/I IN 7-
ANLG COM
(13-7+)
(13-7-)
13-7+
13-7-
13-7S
F38
(F38)
LE-145
(+24V)
(-24V)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

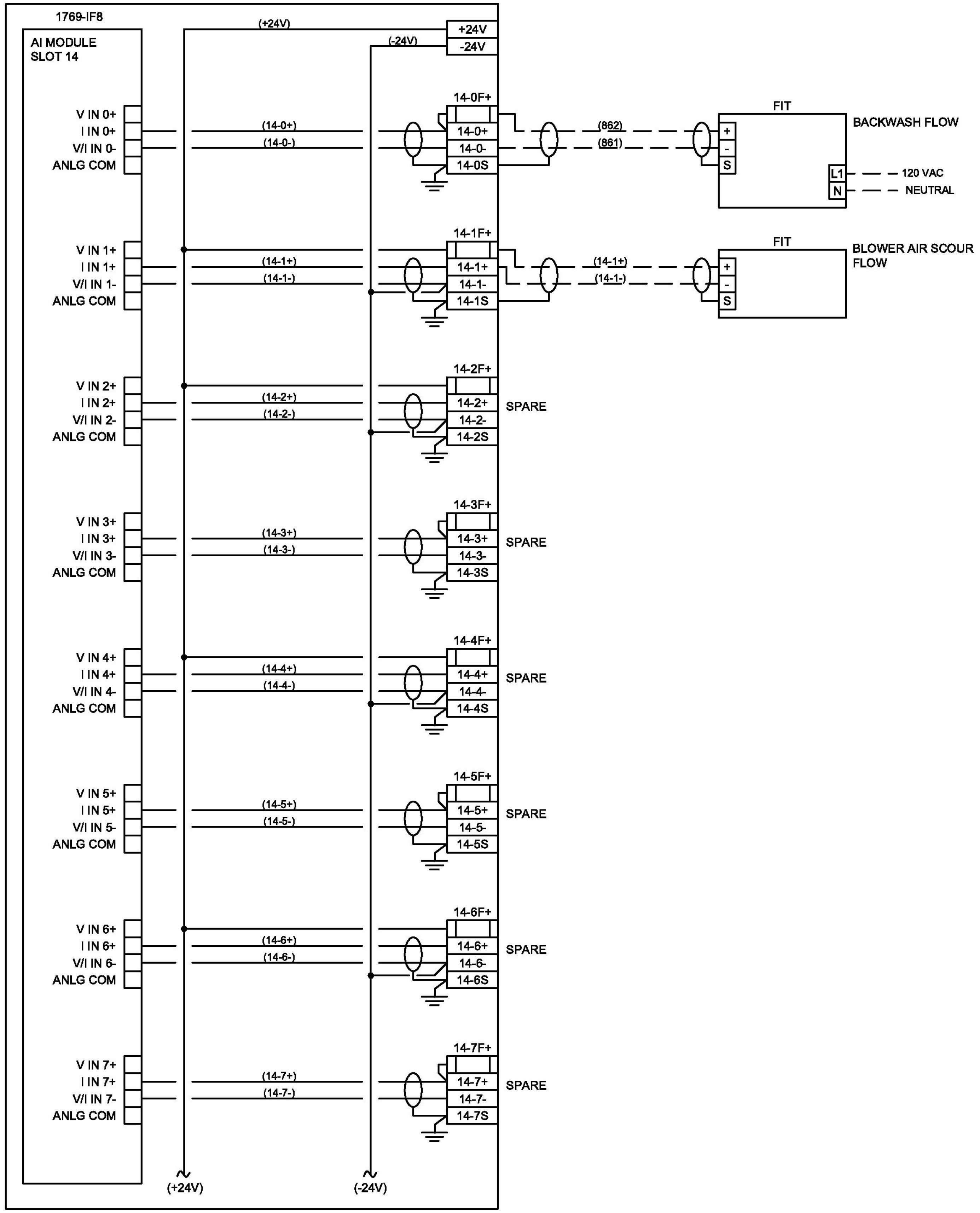
AI SLOT 13

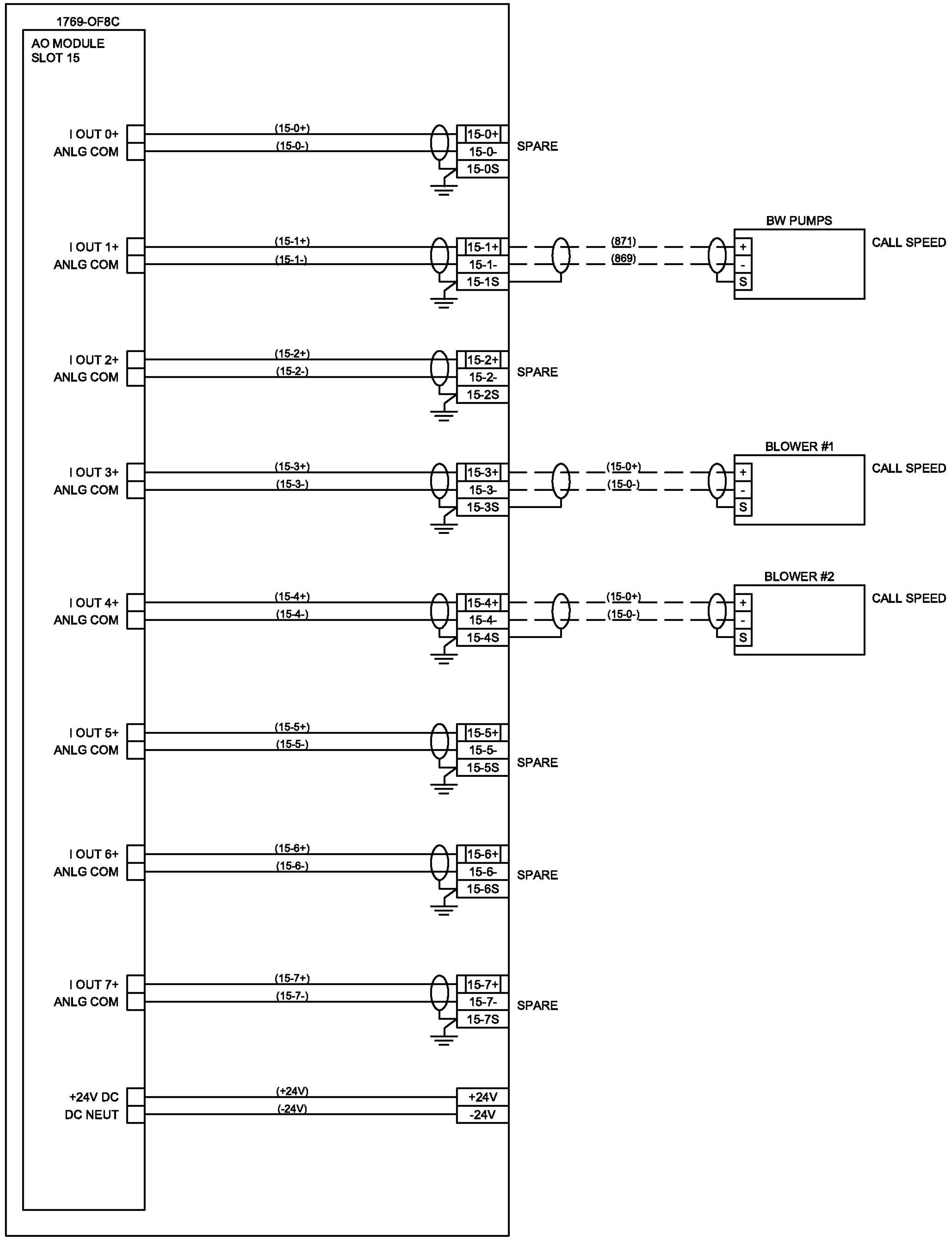
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

11
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D11 AI Slot 13.dwg [Thursday, April 06, 2017]


1769-IF8
AI MODULE
SLOT 14
(+24V)
(-24V)
+24V
-24V
V IN 0+
I IN 0+
V/I IN 0-
ANLG COM
(14-0+)
(14-0-)
14-0F+
14-0+
14-0-
14-0S
(862)
(861)
FIT
BACKWASH FLOW
+
-
S
L1
N
120 VAC
NEUTRAL
V IN 1+
I IN 1+
V/I IN 1-
ANLG COM
(14-1+)
(14-1-)
14-1F+
14-1+
14-1-
14-1S
FIT
BLOWER AIR SCOUR FLOW
V IN 2+
I IN 2+
V/I IN 2-
ANLG COM
(14-2+)
(14-2-)
14-2F+
14-2+
14-2-
14-2S
SPARE
V IN 3+
I IN 3+
V/I IN 3-
ANLG COM
(14-3+)
(14-3-)
14-3F+
14-3+
14-3-
14-3S
SPARE
V IN 4+
I IN 4+
V/I IN 4-
ANLG COM
(14-4+)
(14-4-)
14-4F+
14-4+
14-4-
14-4S
SPARE
V IN 5+
I IN 5+
V/I IN 5-
ANLG COM
(14-5+)
(14-5-)
14-5F+
14-5+
14-5-
14-5S
SPARE
V IN 6+
I IN 6+
V/I IN 6-
ANLG COM
(14-6+)
(14-6-)
14-6F+
14-6+
14-6-
14-6S
SPARE
V IN 7+
I IN 7+
V/I IN 7-
ANLG COM
(14-7+)
(14-7-)
14-7F+
14-7+
14-7-
14-7S
SPARE
(+24V)
(-24V)


1769-OF8C
AO MODULE
SLOT 15
I OUT 0+
ANLG COM
(15-0+)
(15-0-)
15-0+
15-0-
15-0S
SPARE
I OUT 1+
ANLG COM
(15-1+)
(15-1-)
15-1+
15-1-
15-1S
(871)
(869)
BW PUMPS
CALL SPEED
+
-
S
I OUT 2+
ANLG COM
(15-2+)
(15-2-)
15-2+
15-2-
15-2S
SPARE
I OUT 3+
ANLG COM
(15-3+)
(15-3-)
15-3+
15-3-
15-3S
(15-0+)
(15-0-)
BLOWER #1
CALL SPEED
I OUT 4+
ANLG COM
(15-4+)
(15-4-)
15-4+
15-4-
15-4S
(15-0+)
(15-0-)
BLOWER #2
CALL SPEED
I OUT 5+
ANLG COM
(15-5+)
(15-5-)
15-5+
15-5-
15-5S
SPARE
I OUT 6+
ANLG COM
(15-6+)
(15-6-)
15-6+
15-6-
15-6S
SPARE
I OUT 7+
ANLG COM
(15-7+)
(15-7-)
15-7+
15-7-
15-7S
SPARE
+24V DC
DC NEUT
(+24V)
(-24V)
+24V
-24V

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

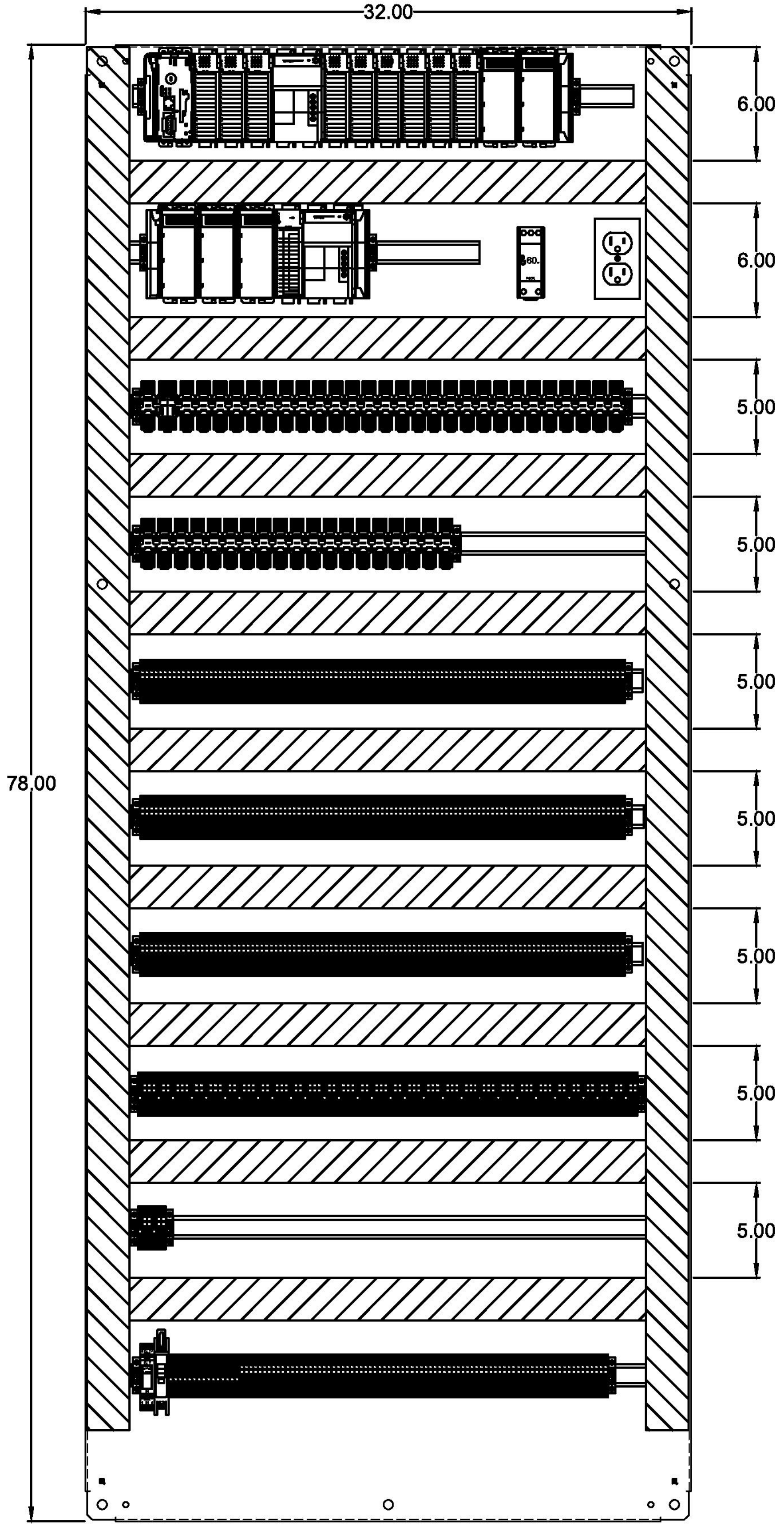
AI SLOT 14 & AO SLOT 15

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

12
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D12 AI Slot 14 & AO Slot 15.dwg [Thursday, April 06, 2017]



A90P36F1

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

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F				
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GENERAL CONTRACTOR

MOLTZ CONSTRUCTORS

2881 S 31ST aVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

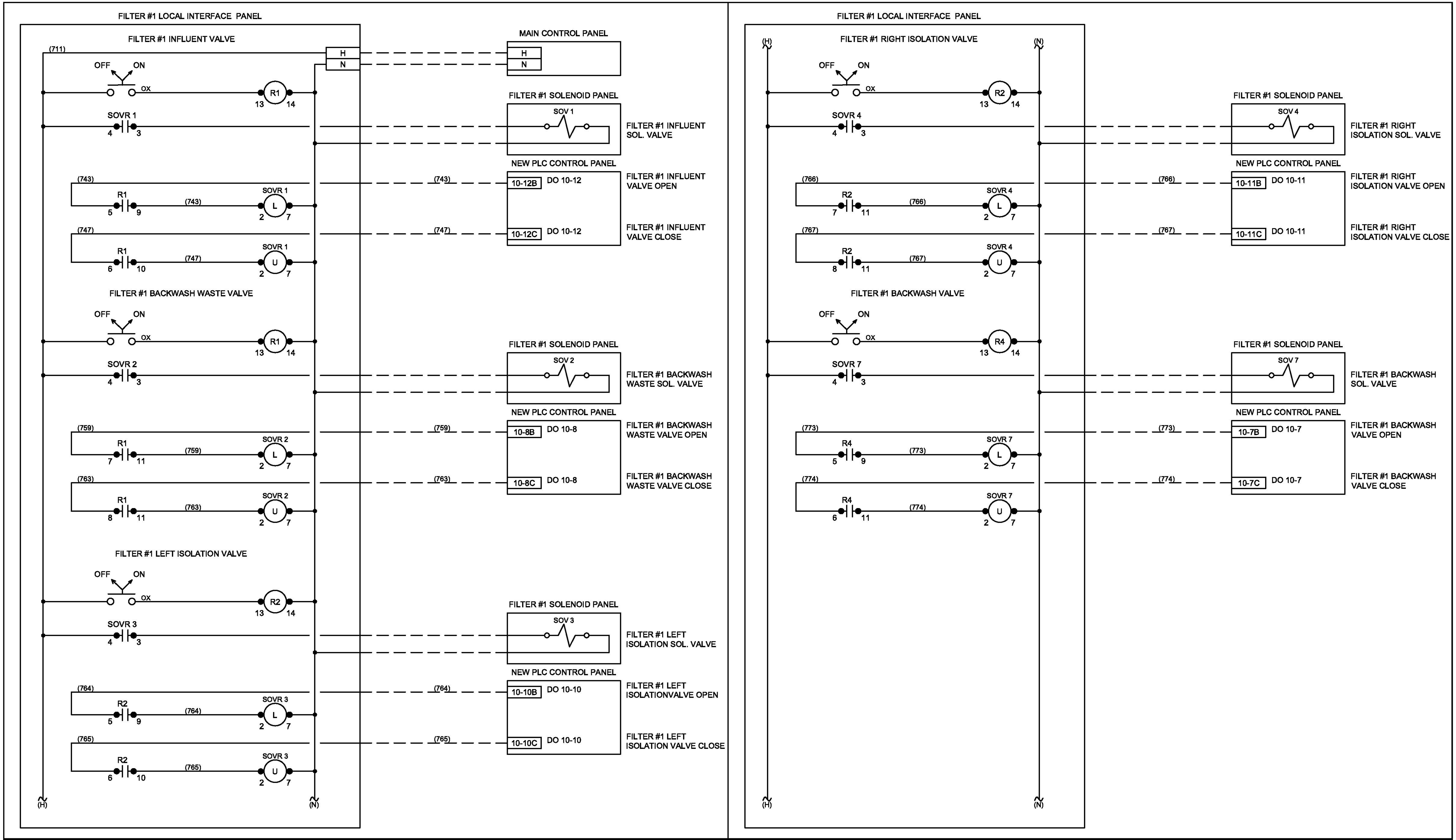
PANEL LAYOUT

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

13
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D13 Panel Layout.dwg


FILTER #1 LOCAL INTERFACE PANEL
FILTER #1 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
H
N
OFF
ON
OX
R1
13
14
SOVR 1
4
3
FILTER #1 SOLENOID PANEL
SOV 1
FILTER #1 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
SOVR 1
L
2
7
10-12B
DO 10-12
FILTER #1 INFLUENT VALVE OPEN
(747)
R1
6
10
SOVR 1
U
10-12C
DO 10-12
FILTER #1 INFLUENT VALVE CLOSE
FILTER #1 BACKWASH WASTE VALVE
OFF
ON
OX
R1
SOVR 2
FILTER #1 SOLENOID PANEL
SOV 2
FILTER #1 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(759)
R1
7
11
SOVR 2
L
10-8B
DO 10-8
FILTER #1 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
SOVR 2
U
10-8C
DO 10-8
FILTER #1 BACKWASH WASTE VALVE CLOSE
FILTER #1 LEFT ISOLATION VALVE
OFF
ON
OX
R2
SOVR 3
FILTER #1 SOLENOID PANEL
SOV 3
FILTER #1 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
SOVR 3
L
10-10B
DO 10-10
FILTER #1 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
SOVR 3
U
10-10C
DO 10-10
FILTER #1 LEFT ISOLATION VALVE CLOSE
(H)
(N)
FILTER #1 LOCAL INTERFACE PANEL
FILTER #1 RIGHT ISOLATION VALVE
(H)
(N)
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #1 SOLENOID PANEL
SOV 4
FILTER #1 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
SOVR 4
L
10-11B
DO 10-11
FILTER #1 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
SOVR 4
U
10-11C
DO 10-11
FILTER #1 RIGHT ISOLATION VALVE CLOSE
FILTER #1 BACKWASH VALVE
OFF
ON
OX
R4
SOVR 7
FILTER #1 SOLENOID PANEL
SOV 7
FILTER #1 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
SOVR 7
L
10-7B
DO 10-7
FILTER #1 BACKWASH VALVE OPEN
(774)
R4
6
11
SOVR 7
U
10-7C
DO 10-7
FILTER #1 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
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A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

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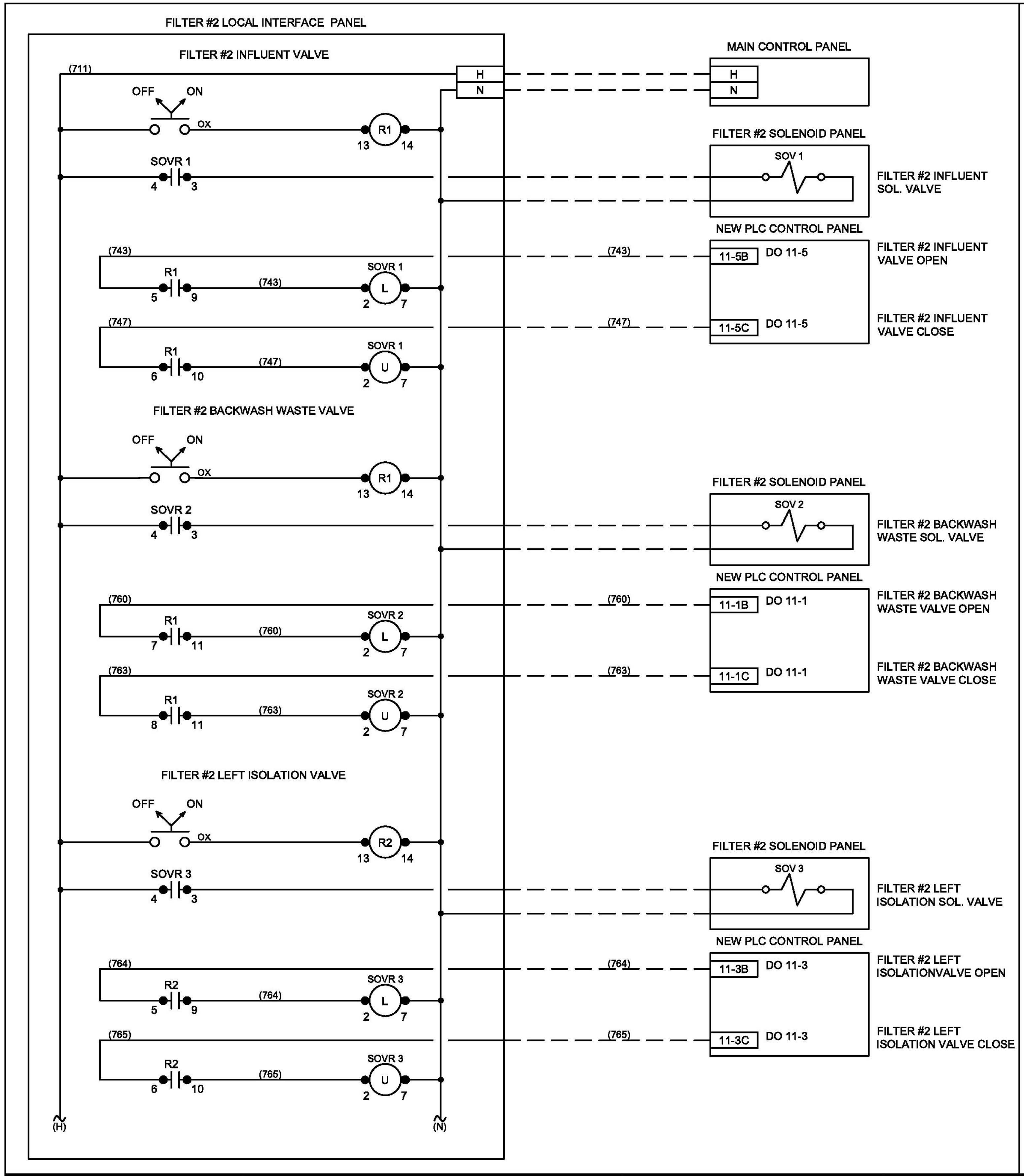
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

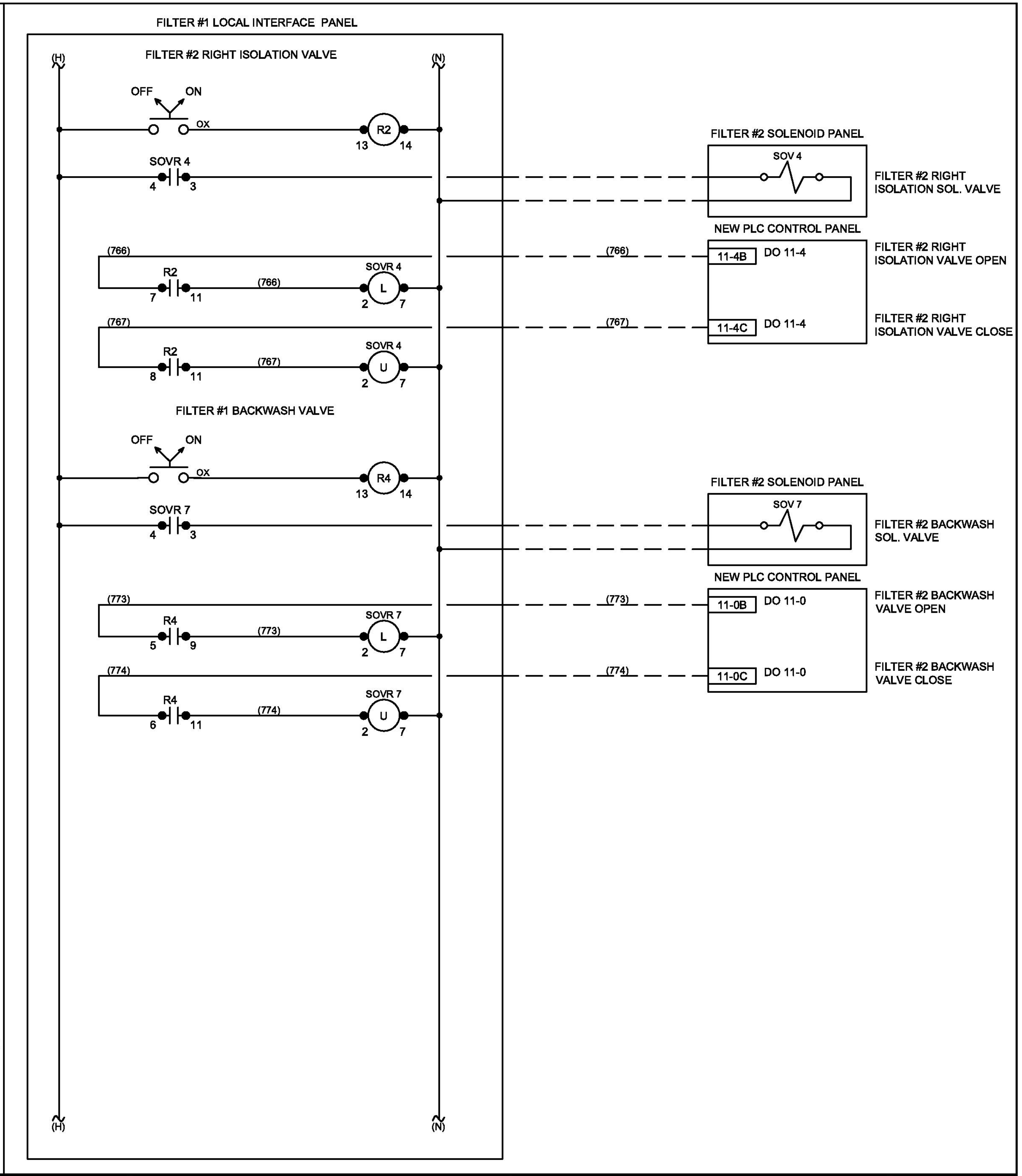
EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

15
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D15 Filter #1 Valve Field Wiring.dwg [Thursday, April 06, 2017]


FILTER #2 LOCAL INTERFACE PANEL
FILTER #2 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
H
N
OFF
ON
OX
R1
13
14
SOVR 1
4
3
FILTER #2 SOLENOID PANEL
SOV 1
FILTER #2 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
(743)
SOVR 1
L
2
7
(743)
11-5B
DO 11-5
FILTER #2 INFLUENT VALVE OPEN
(747)
R1
6
10
(747)
SOVR 1
U
2
7
(747)
11-5C
DO 11-5
FILTER #2 INFLUENT VALVE CLOSE
FILTER #2 BACKWASH WASTE VALVE
OFF
ON
OX
R1
13
14
SOVR 2
4
3
FILTER #2 SOLENOID PANEL
SOV 2
FILTER #2 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(760)
R1
7
11
(760)
SOVR 2
L
2
7
(760)
11-1B
DO 11-1
FILTER #2 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
(763)
SOVR 2
U
2
7
(763)
11-1C
DO 11-1
FILTER #2 BACKWASH WASTE VALVE CLOSE
FILTER #2 LEFT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 3
4
3
FILTER #2 SOLENOID PANEL
SOV 3
FILTER #2 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
(764)
SOVR 3
L
2
7
(764)
11-3B
DO 11-3
FILTER #2 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
(765)
SOVR 3
U
2
7
(765)
11-3C
DO 11-3
FILTER #2 LEFT ISOLATION VALVE CLOSE
(H)
(N)


FILTER #1 LOCAL INTERFACE PANEL
(H)
(N)
FILTER #2 RIGHT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #2 SOLENOID PANEL
SOV 4
FILTER #2 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
(766)
SOVR 4
L
2
7
(766)
11-4B
DO 11-4
FILTER #2 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
(767)
SOVR 4
U
2
7
(767)
11-4C
DO 11-4
FILTER #2 RIGHT ISOLATION VALVE CLOSE
FILTER #1 BACKWASH VALVE
OFF
ON
OX
R4
13
14
SOVR 7
4
3
FILTER #2 SOLENOID PANEL
SOV 7
FILTER #2 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
(773)
SOVR 7
L
2
7
(773)
11-0B
DO 11-0
FILTER #2 BACKWASH VALVE OPEN
(774)
R4
6
11
(774)
SOVR 7
U
2
7
(774)
11-0C
DO 11-0
FILTER #2 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

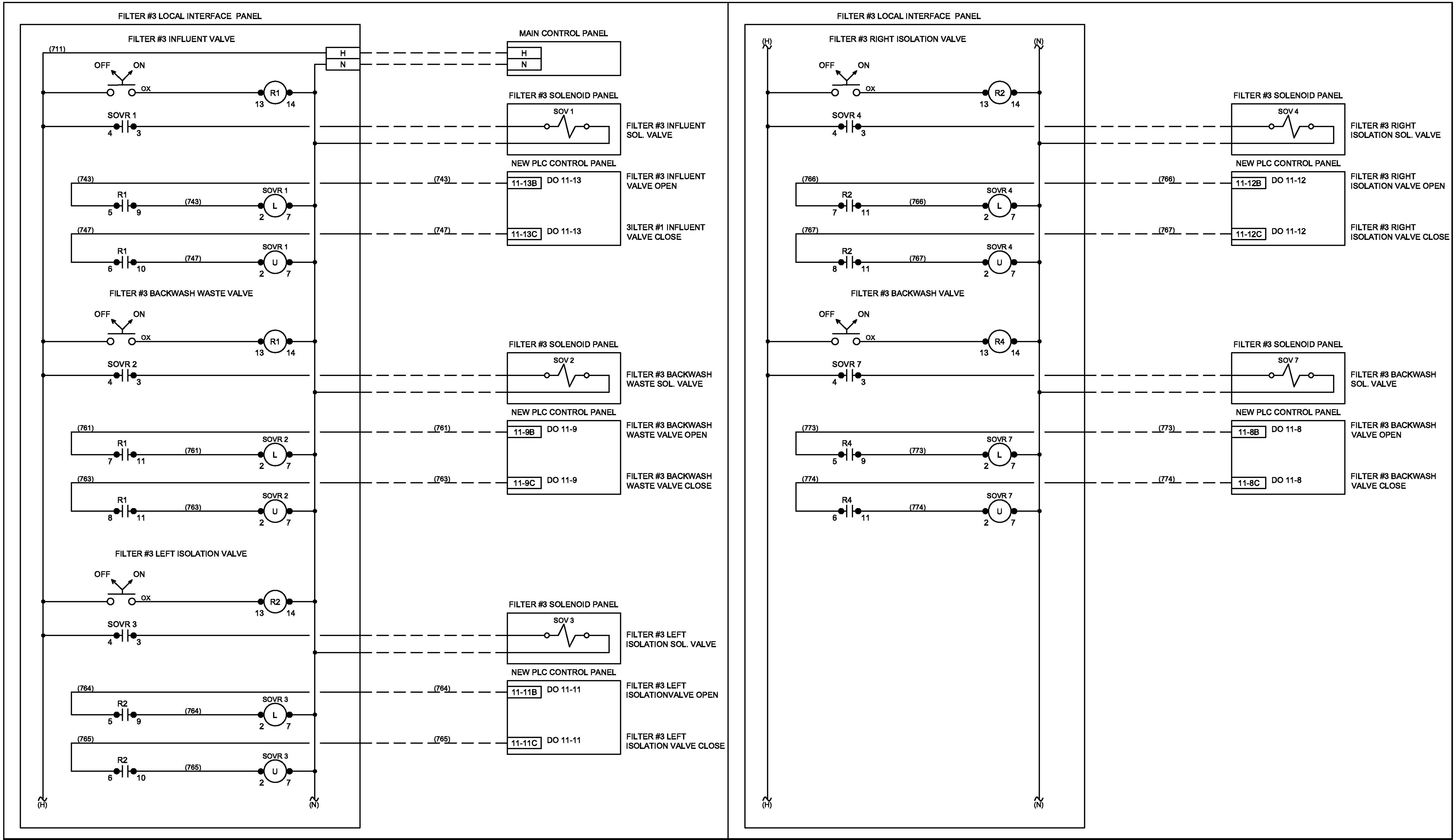
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

FILTER #2 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

16

18


FILTER #3 LOCAL INTERFACE PANEL
FILTER #3 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
H
N
OFF
ON
OX
R1
13
14
SOVR 1
4
3
FILTER #3 SOLENOID PANEL
SOV 1
FILTER #3 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
SOVR 1
L
2
7
11-13B
DO 11-13
FILTER #3 INFLUENT VALVE OPEN
(747)
R1
6
10
SOVR 1
U
11-13C
DO 11-13
3ILTER #1 INFLUENT VALVE CLOSE
FILTER #3 BACKWASH WASTE VALVE
SOVR 2
SOV 2
FILTER #3 BACKWASH WASTE SOL. VALVE
(761)
R1
7
11
11-9B
DO 11-9
FILTER #3 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
11-9C
DO 11-9
FILTER #3 BACKWASH WASTE VALVE CLOSE
FILTER #3 LEFT ISOLATION VALVE
R2
SOVR 3
SOV 3
FILTER #3 LEFT ISOLATION SOL. VALVE
(764)
R2
5
9
11-11B
DO 11-11
FILTER #3 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
11-11C
DO 11-11
FILTER #3 LEFT ISOLATION VALVE CLOSE
(H)
(N)
FILTER #3 LOCAL INTERFACE PANEL
FILTER #3 RIGHT ISOLATION VALVE
R2
SOVR 4
SOV 4
FILTER #3 RIGHT ISOLATION SOL. VALVE
(766)
R2
7
11
11-12B
DO 11-12
FILTER #3 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
11-12C
DO 11-12
FILTER #3 RIGHT ISOLATION VALVE CLOSE
FILTER #3 BACKWASH VALVE
R4
SOVR 7
SOV 7
FILTER #3 BACKWASH SOL. VALVE
(773)
R4
5
9
11-8B
DO 11-8
FILTER #3 BACKWASH VALVE OPEN
(774)
R4
6
11
11-8C
DO 11-8
FILTER #3 BACKWASH VALVE CLOSE

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

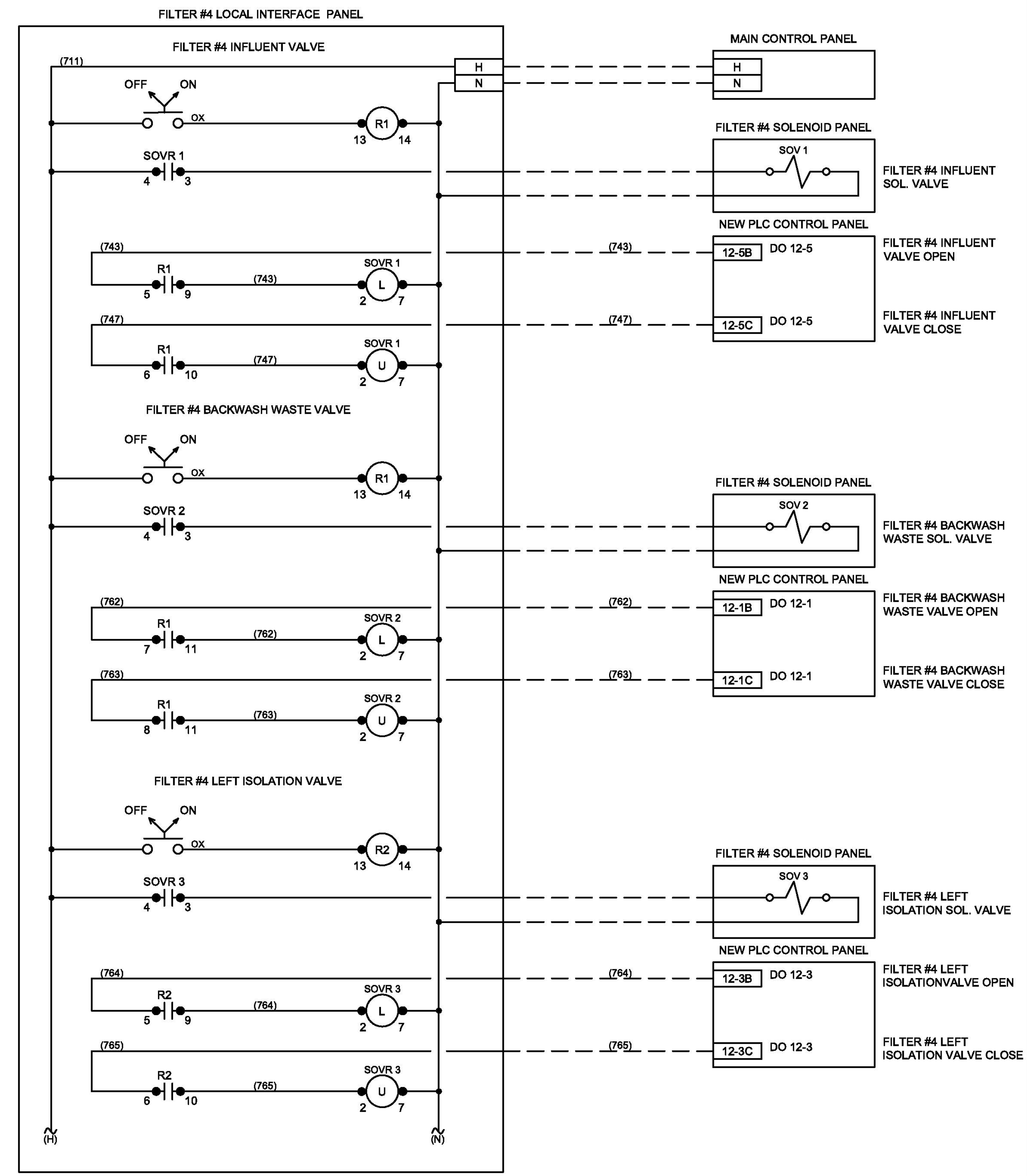
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

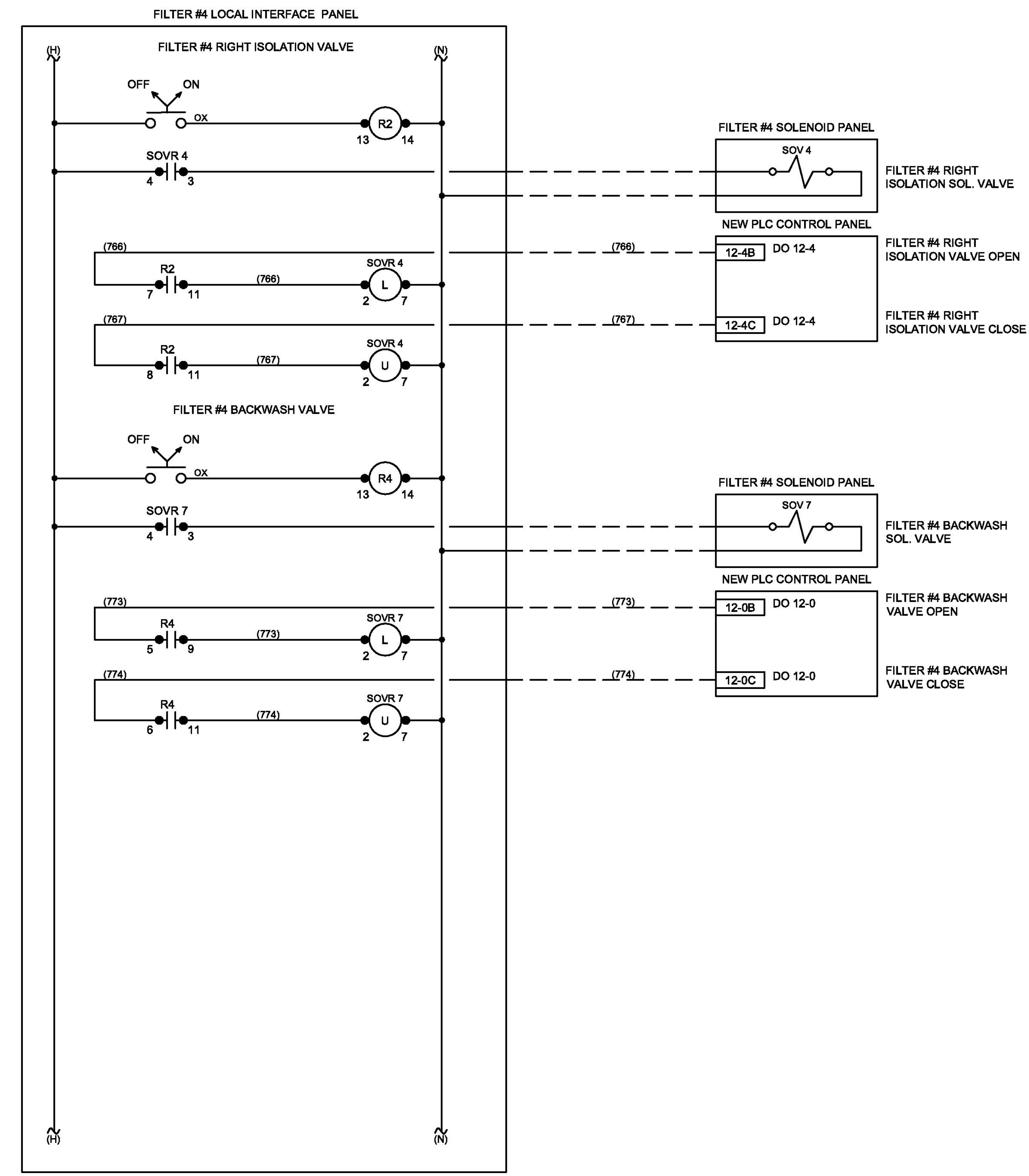
FILTER #3 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

17
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D17 Filter #3 Valve Field Wiring.dwg [Thursday, April 06, 2017]


FILTER #4 LOCAL INTERFACE PANEL
FILTER #4 INFLUENT VALVE
(711)
OFF
ON
OX
R1
13
14
H
N
MAIN CONTROL PANEL
H
N
SOVR 1
4
3
FILTER #4 SOLENOID PANEL
SOV 1
FILTER #4 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
(743)
SOVR 1
L
2
7
(743)
12-5B
DO 12-5
FILTER #4 INFLUENT VALVE OPEN
(747)
R1
6
10
(747)
SOVR 1
U
2
7
(747)
12-5C
DO 12-5
FILTER #4 INFLUENT VALVE CLOSE
FILTER #4 BACKWASH WASTE VALVE
OFF
ON
OX
R1
13
14
SOVR 2
4
3
FILTER #4 SOLENOID PANEL
SOV 2
FILTER #4 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(762)
R1
7
11
(762)
SOVR 2
L
2
7
(762)
12-1B
DO 12-1
FILTER #4 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
(763)
SOVR 2
U
2
7
(763)
12-1C
DO 12-1
FILTER #4 BACKWASH WASTE VALVE CLOSE
FILTER #4 LEFT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 3
4
3
FILTER #4 SOLENOID PANEL
SOV 3
FILTER #4 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
(764)
SOVR 3
L
2
7
(764)
12-3B
DO 12-3
FILTER #4 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
(765)
SOVR 3
U
2
7
(765)
12-3C
DO 12-3
FILTER #4 LEFT ISOLATION VALVE CLOSE
(H)
(N)


FILTER #4 LOCAL INTERFACE PANEL
(H)
FILTER #4 RIGHT ISOLATION VALVE
(N)
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #4 SOLENOID PANEL
SOV 4
FILTER #4 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
(766)
SOVR 4
L
2
7
(766)
12-4B
DO 12-4
FILTER #4 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
(767)
SOVR 4
U
2
7
(767)
12-4C
DO 12-4
FILTER #4 RIGHT ISOLATION VALVE CLOSE
FILTER #4 BACKWASH VALVE
OFF
ON
OX
R4
13
14
SOVR 7
4
3
FILTER #4 SOLENOID PANEL
SOV 7
FILTER #4 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
(773)
SOVR 7
L
2
7
(773)
12-0B
DO 12-0
FILTER #4 BACKWASH VALVE OPEN
(774)
R4
6
11
(774)
SOVR 7
U
2
7
(774)
12-0C
DO 12-0
FILTER #4 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

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GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

FILTER #4 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

18
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D18 Filter #4 Valve Field Wiring.dwg [Thursday, April 06, 2017]

CITY OF GRAND JUNCTION

WTP FILTER UPGRADES

PLC DRAWING SET

1. TITLE
2. LEGEND
3. POWER DISTRIBUTION
4. POWER DISTRIBUTION CONT'D
5. DI SLOT 1 & 2
6. DI SLOT 3 & 4
7. DI SLOT 5 & 6
8. DI SLOT 7 & 8
9. DI SLOT 9 & DO SLOT 10
10. DO SLOT 11 & 12
11. AI SLOT 13
12. AI SLOT 14 & AO SLOT 15
13. PANEL LAYOUT
14. EXISTING PANEL HOA'S
15. FILTER #1 VALVES FIELD WIRING
16. FILTER #2 VALVES FIELD WIRING
17. FILTER #3 VALVES FIELD WIRING
18. FILTER #4 VALVES FIELD WIRING

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

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GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

DRAWING INDEX

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

01
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D01 TITLE.dwg [Thursday, April 06, 2017]

WIRE COLOR CODING

D.C. CONTROL CIRCUITS

1) +12V - BLUE
2) -12V - BLUE WITH WHITE STRIPE
3) +24V - BLUE
4) -24V - VIOLET

A.C. CONTROL CIRCUITS

1) 24V PWR - ORANGE
2) 24V NEUTRAL - GRAY
3) 120V PWR UNPROTECTED - BLACK
4) 120 PWR PROTECTED - RED
5) 120 NEUTRAL - WHITE
6) FOREIGN PWR TO PANEL - YELLOW

A.C. POWER
480V/277V

1) PHASE A - BROWN
2) PHASE B - ORANGE
3) PHASE C - YELLOW
4) EQUIPMENT GROUND - GREEN

240/120V, 208/120V

1) PHASE A - BLACK
2) PHASE B - RED
3) PHASE C - BLUE
4) EQUIPMENT GROUND - GREEN

WIRE SIZE CODE

WIRE TYPE	WIRE SIZE
PLC INPUT/OUTPUT	#16 AWG
AC & DC CONTROL WIRING	#14 AWG
120 VAC GENERAL PURPOSE	#14 AWG
DC ANALOG SIGNALS	#18 TSP

GENERAL NOTES

GENERAL NOTES
ALL TERMINALS WITH THE SAME LABEL ARE JUMPERED TOGETHER.
WIRES WITHOUT A LABEL SHALL BE LABELED WITH THE SAME LEGEND AS THE TERMINAL BLOCK.
ALL FIELD WIRE SHALL BE COPPER WIRE, AND TORQUED PER MANUFACTURER RECOMMENDATIONS.
CONDUIT FITTINGS, HUBS OR ANY OTHER PENETRATIONS SHALL BE UL LISTED TO MAINTAIN THE ENVIROMENTAL RATING OF THE ENCLOSURE PROVIDED.
DANGER,MULTIPLE POWER SUPPLIES RISK OF ELECTRIC SHOCK, BURN OR EXPLOSION. MORE THAN ONE DISCONNECT SWITCH MAY BE REQUIRED TO DE-ENERGIZE THE EQUIPMENT BEFORE SERVICING.
* EQUIPMENT MOUNTED ON THE DOOR.

FIELD TERMINATIONS TORQUE TABLE

EQUIPMENT TYPE	TORQUE RATING	EQUIPMENT TYPE	TORQUE RATING
FIELD TERMINAL BLOCKS	5 - 7 LB/IN^2	CUTLER HAMMER PILOT DEVICES	12 LB/IN^2
GROUND BAR	20 LB/IN^2	RED LION DISPLAY	4.5 LB/IN^2
QOU CIRCUIT BREAKER	45 LB/IN^2	ALLEN BRADLEY DIGITAL DISPLAYS	6-8 LB/IN^2
MERLIN GERLIN CIRCUIT BREAKER	22 LB/IN^2	ALLEN BRADLEY PILOT DEVICES	5-8 LB/IN^2
IDEC RELAYS	9-11 LB/IN^2	ALLEN BRADLEY MICROLOGIX	5 LB/IN^2
IDEC POWER SUPPLIES	7 LB/IN^2	SQUARE D PILOT DEVICES	5-8 LB/IN^2
ALLEN BRADLEY COMPACTLOGIX	6 LB/IN^2	ALLEN BRADLEY CONTROLOGIX	7-9 LB/IN^2
SCHNEIDER ELECTRIC - QUANTUM	10 LB/IN^2	SCHNEIDER ELECTRIC - MOMENTUM	4.9 N/M^2
SCHNEIDER ELECTRIC - ADVANTYS	2.2 LB/IN^2	SCHNEIDER ELECTRIC - M340, MAGELIS, PREMIUM	0.5 N/M^2

USE COPPER WIRE ONLY 60° C

FUSE LIST

FUSE	AMP	VOLTAGE	PART #
CB1	15A	120VAC	QOU115
F1	2A	120VAC	GMA-2A
F2-F6	1A	120VAC	GMA-1A
F7	2A	120VAC	GMA-2A
F8-F10	1A	24VDC	GMA-1A
F11	2A	24VDC	GMA-2A
F12-F15	1A	24VDC	GMA-1A

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

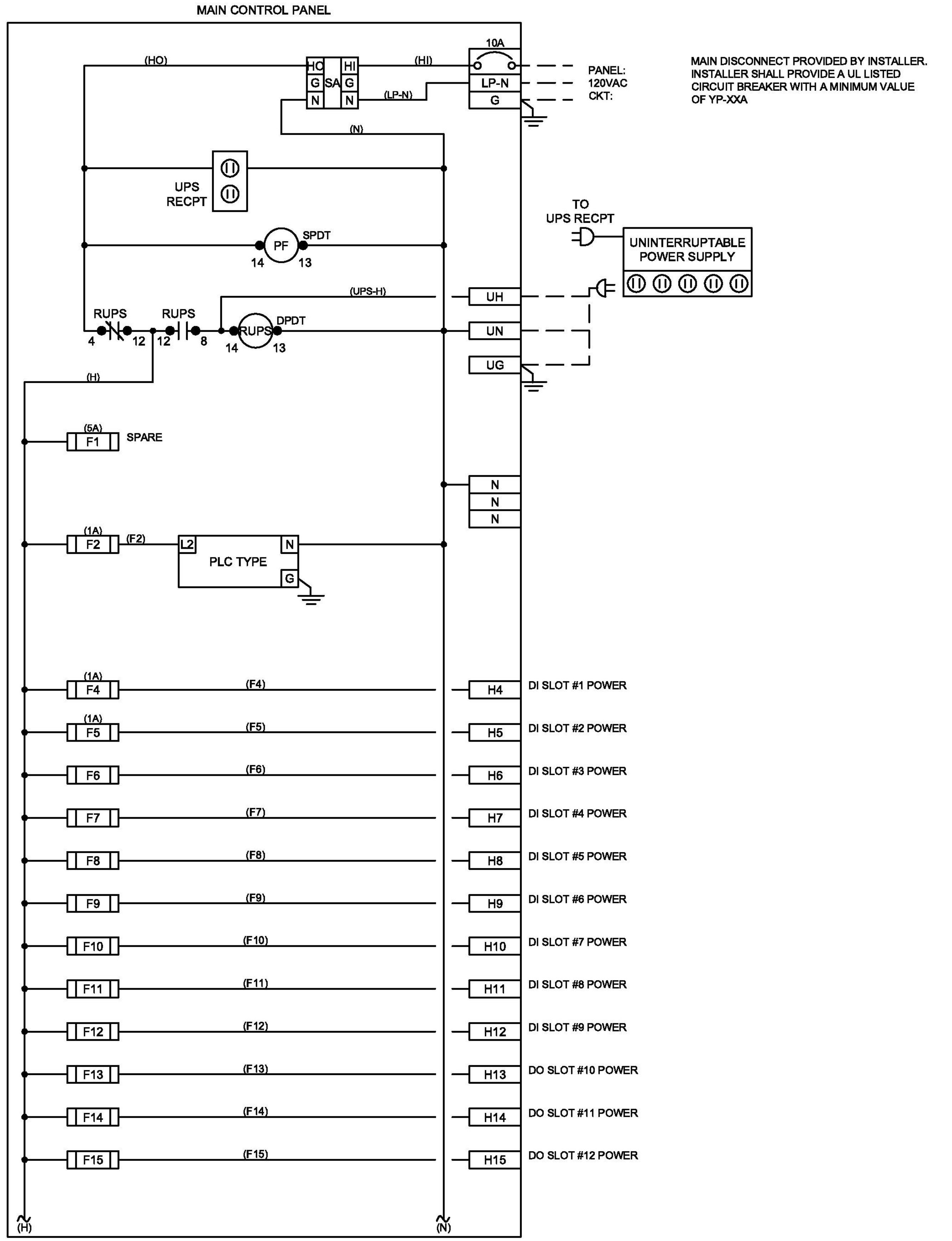
BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

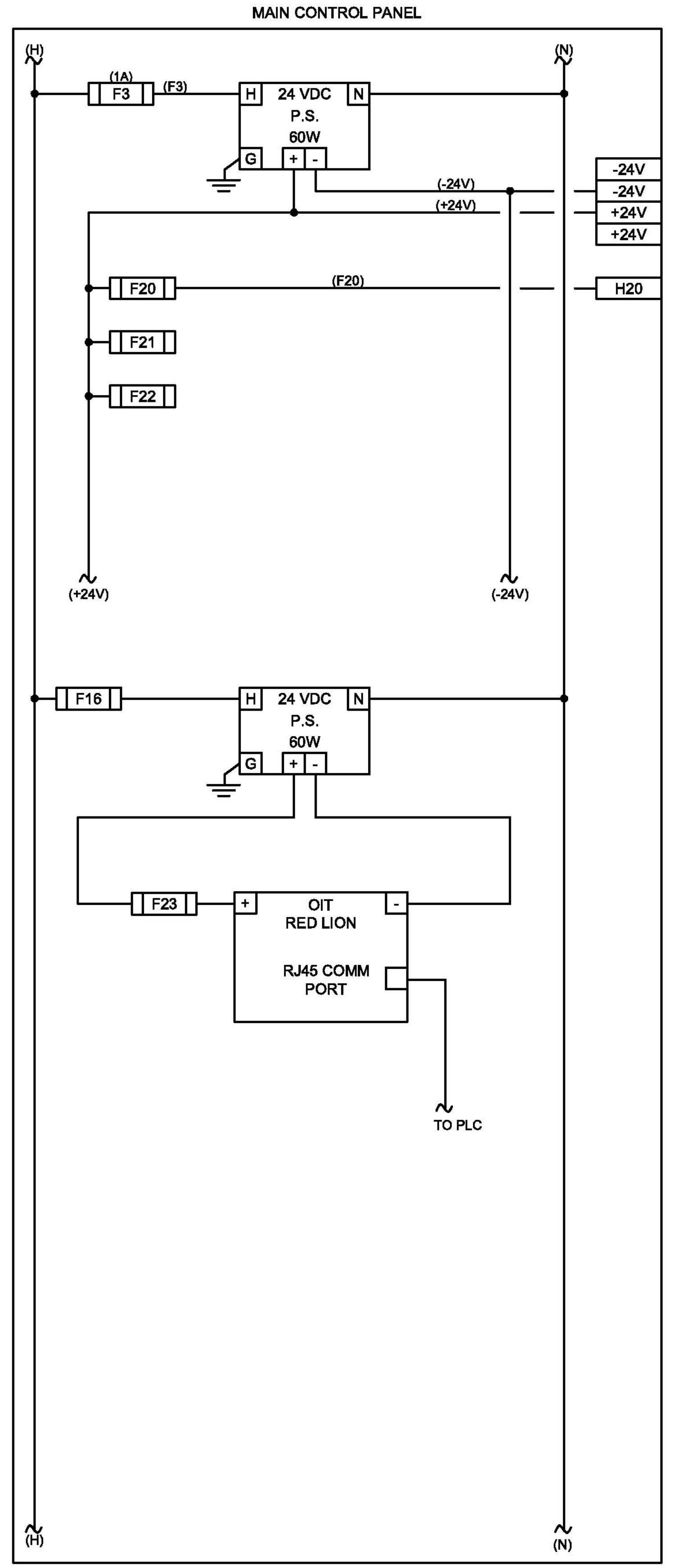
LEGEND

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

02
18


MAIN CONTROL PANEL
(HO)
HO
HI
G
SA
G
N
N
(HI)
10A
LP-N
G
(LP-N)
PANEL:
120VAC
CKT:
(N)
UPS
RECPT
PF
SPDT
14
13
(UPS-H)
UH
UN
UG
RUPS
RUPS
4
12
12
8
RUPS
DPDT
14
13
(H)
TO
UPS RECPT
UNINTERRUPTABLE
POWER SUPPLY
(5A)
F1
SPARE
N
N
N
(1A)
F2
(F2)
L2
PLC TYPE
N
G
(1A)
F4
(F4)
H4
DI SLOT #1 POWER
(1A)
F5
(F5)
H5
DI SLOT #2 POWER
F6
(F6)
H6
DI SLOT #3 POWER
F7
(F7)
H7
DI SLOT #4 POWER
F8
(F8)
H8
DI SLOT #5 POWER
F9
(F9)
H9
DI SLOT #6 POWER
F10
(F10)
H10
DI SLOT #7 POWER
F11
(F11)
H11
DI SLOT #8 POWER
F12
(F12)
H12
DI SLOT #9 POWER
F13
(F13)
H13
DO SLOT #10 POWER
F14
(F14)
H14
DO SLOT #11 POWER
F15
(F15)
H15
DO SLOT #12 POWER
(H)
(N)

MAIN DISCONNECT PROVIDED BY INSTALLER.
INSTALLER SHALL PROVIDE A UL LISTED
CIRCUIT BREAKER WITH A MINIMUM VALUE
OF YP-XXA


MAIN CONTROL PANEL
(H)
(N)
(1A)
F3
(F3)
H
24 VDC
P.S.
60W
N
G
+
-
(-24V)
(+24V)
-24V
-24V
+24V
+24V
F20
(F20)
H20
F21
F22
(+24V)
(-24V)
F16
H
24 VDC
P.S.
60W
N
G
+
-
F23
+
OIT
RED LION
-
RJ45 COMM
PORT
TO PLC
(H)
(N)

1"
IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

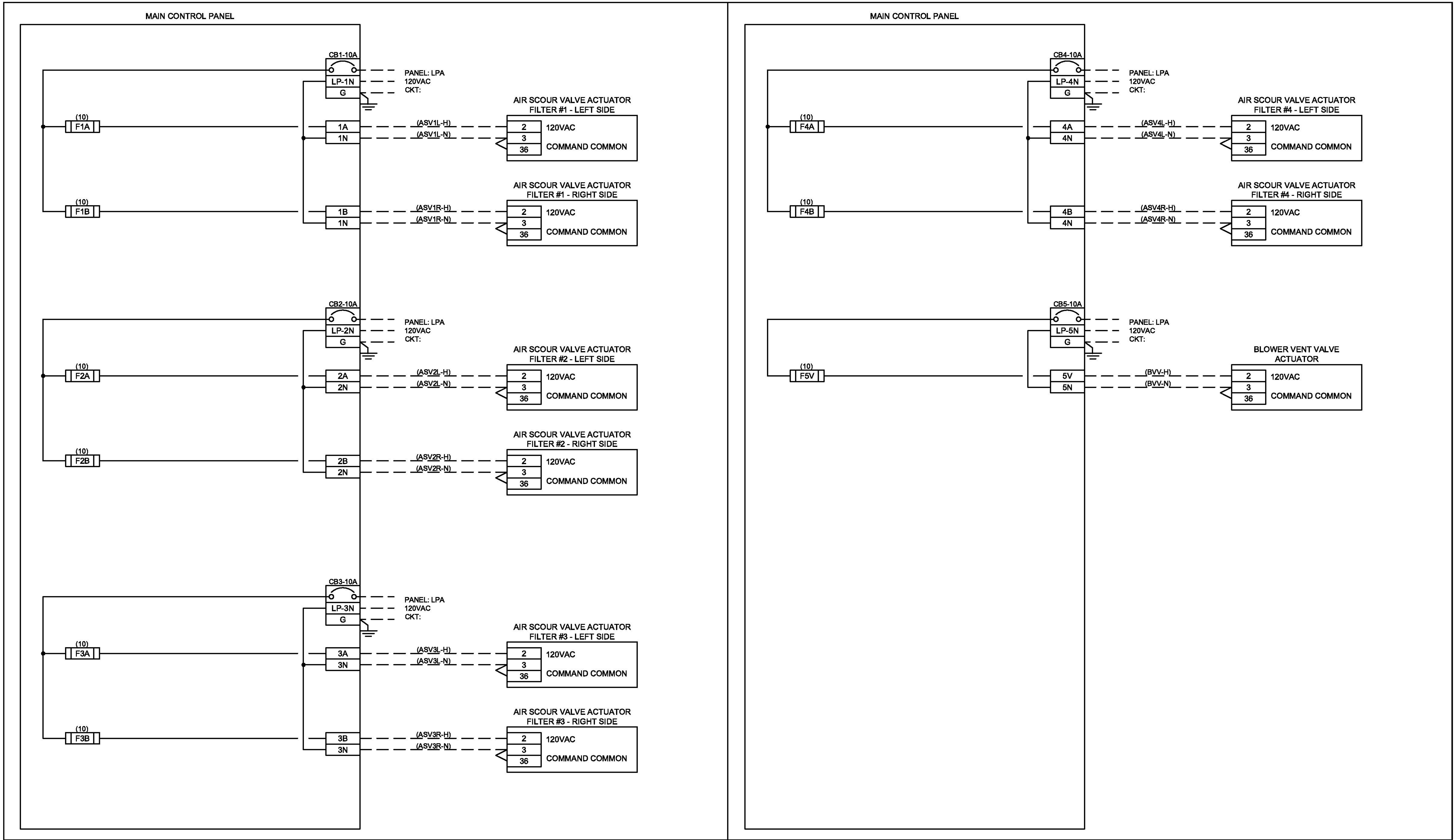
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

POWER DISTRIBUTION

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

03
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D03 Power Distribution.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL
CB1-10A
LP-1N
G
PANEL: LPA
120VAC
CKT:
(10)
F1A
1A
1N
(ASV1L-H)
(ASV1L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #1 - LEFT SIDE
2
3
36
120VAC
COMMAND COMMON
(10)
F1B
1B
1N
(ASV1R-H)
(ASV1R-N)
AIR SCOUR VALVE ACTUATOR
FILTER #1 - RIGHT SIDE
2
3
36
120VAC
COMMAND COMMON
CB2-10A
LP-2N
G
PANEL: LPA
120VAC
CKT:
(10)
F2A
2A
2N
(ASV2L-H)
(ASV2L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #2 - LEFT SIDE
2
3
36
120VAC
COMMAND COMMON
(10)
F2B
2B
2N
(ASV2R-H)
(ASV2R-N)
AIR SCOUR VALVE ACTUATOR
FILTER #2 - RIGHT SIDE
2
3
36
120VAC
COMMAND COMMON
CB3-10A
LP-3N
G
PANEL: LPA
120VAC
CKT:
(10)
F3A
3A
3N
(ASV3L-H)
(ASV3L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #3 - LEFT SIDE
2
3
36
120VAC
COMMAND COMMON
(10)
F3B
3B
3N
(ASV3R-H)
(ASV3R-N)
AIR SCOUR VALVE ACTUATOR
FILTER #3 - RIGHT SIDE
2
3
36
120VAC
COMMAND COMMON
MAIN CONTROL PANEL
CB4-10A
LP-4N
G
PANEL: LPA
120VAC
CKT:
(10)
F4A
4A
4N
(ASV4L-H)
(ASV4L-N)
AIR SCOUR VALVE ACTUATOR
FILTER #4 - LEFT SIDE
2
3
36
120VAC
COMMAND COMMON
(10)
F4B
4B
4N
(ASV4R-H)
(ASV4R-N)
AIR SCOUR VALVE ACTUATOR
FILTER #4 - RIGHT SIDE
2
3
36
120VAC
COMMAND COMMON
CB5-10A
LP-5N
G
PANEL: LPA
120VAC
CKT:
(10)
F5V
5V
5N
(BVV-H)
(BVV-N)
BLOWER VENT VALVE
ACTUATOR
2
3
36
120VAC
COMMAND COMMON

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
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A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

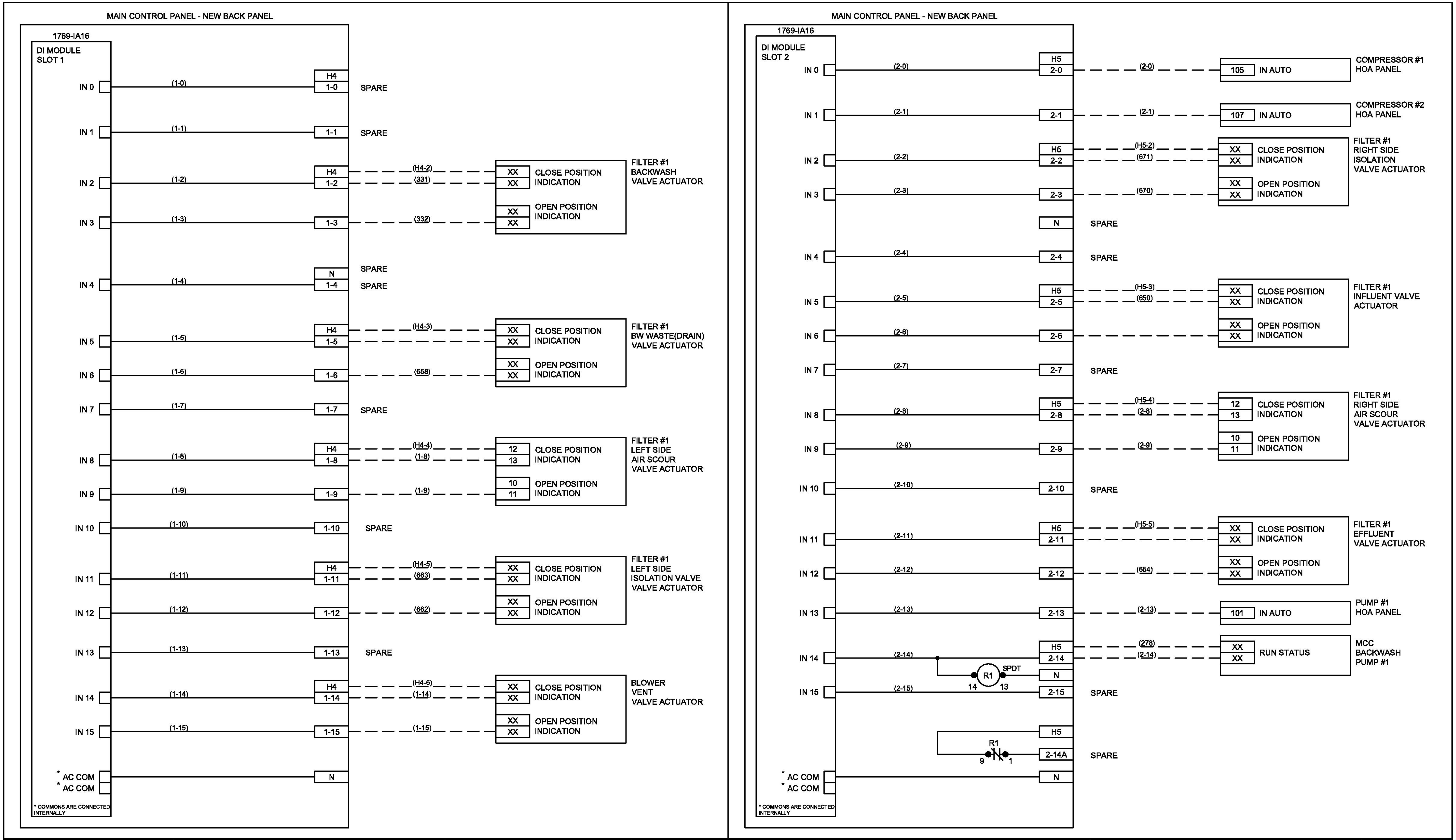
BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

AIR SCOUR VALVES
POWER DISTRIBUTION

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

04
18


MAIN CONTROL PANEL - NEW BACK PANEL
1769-IA16
DI MODULE SLOT 1
IN 0
(1-0)
H4
1-0
SPARE
IN 1
(1-1)
1-1
SPARE
IN 2
(1-2)
H4
1-2
(H4-2)
(331)
XX
CLOSE POSITION INDICATION
FILTER #1 BACKWASH VALVE ACTUATOR
IN 3
(1-3)
1-3
(332)
OPEN POSITION INDICATION
N
SPARE
IN 4
(1-4)
1-4
SPARE
IN 5
(1-5)
H4
1-5
(H4-3)
FILTER #1 BW WASTE(DRAIN) VALVE ACTUATOR
IN 6
(1-6)
1-6
(658)
IN 7
(1-7)
1-7
SPARE
IN 8
(1-8)
H4
1-8
(H4-4)
(1-8)
12
13
FILTER #1 LEFT SIDE AIR SCOUR VALVE ACTUATOR
IN 9
(1-9)
1-9
(1-9)
10
11
IN 10
(1-10)
1-10
SPARE
IN 11
(1-11)
H4
1-11
(H4-5)
(663)
FILTER #1 LEFT SIDE ISOLATION VALVE VALVE ACTUATOR
IN 12
(1-12)
1-12
(662)
IN 13
(1-13)
1-13
SPARE
IN 14
(1-14)
H4
1-14
(H4-6)
(1-14)
BLOWER VENT VALVE ACTUATOR
IN 15
(1-15)
1-15
(1-15)
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY
MAIN CONTROL PANEL - NEW BACK PANEL
1769-IA16
DI MODULE SLOT 2
IN 0
(2-0)
H5
2-0
(2-0)
105
IN AUTO
COMPRESSOR #1 HOA PANEL
IN 1
(2-1)
2-1
(2-1)
107
IN AUTO
COMPRESSOR #2 HOA PANEL
IN 2
(2-2)
H5
2-2
(H5-2)
(671)
CLOSE POSITION INDICATION
FILTER #1 RIGHT SIDE ISOLATION VALVE ACTUATOR
IN 3
(2-3)
2-3
(670)
OPEN POSITION INDICATION
N
SPARE
IN 4
(2-4)
2-4
SPARE
IN 5
(2-5)
H5
2-5
(H5-3)
(650)
FILTER #1 INFLUENT VALVE ACTUATOR
IN 6
(2-6)
2-6
IN 7
(2-7)
2-7
SPARE
IN 8
(2-8)
H5
2-8
(H5-4)
(2-8)
12
13
FILTER #1 RIGHT SIDE AIR SCOUR VALVE ACTUATOR
IN 9
(2-9)
2-9
(2-9)
10
11
IN 10
(2-10)
2-10
SPARE
IN 11
(2-11)
H5
2-11
(H5-5)
FILTER #1 EFFLUENT VALVE ACTUATOR
IN 12
(2-12)
2-12
(654)
IN 13
(2-13)
2-13
(2-13)
101
IN AUTO
PUMP #1 HOA PANEL
IN 14
(2-14)
H5
2-14
(278)
(2-14)
RUN STATUS
MCC BACKWASH PUMP #1
R1
SPDT
14
13
N
IN 15
(2-15)
2-15
SPARE
H5
R1
9
1
2-14A
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

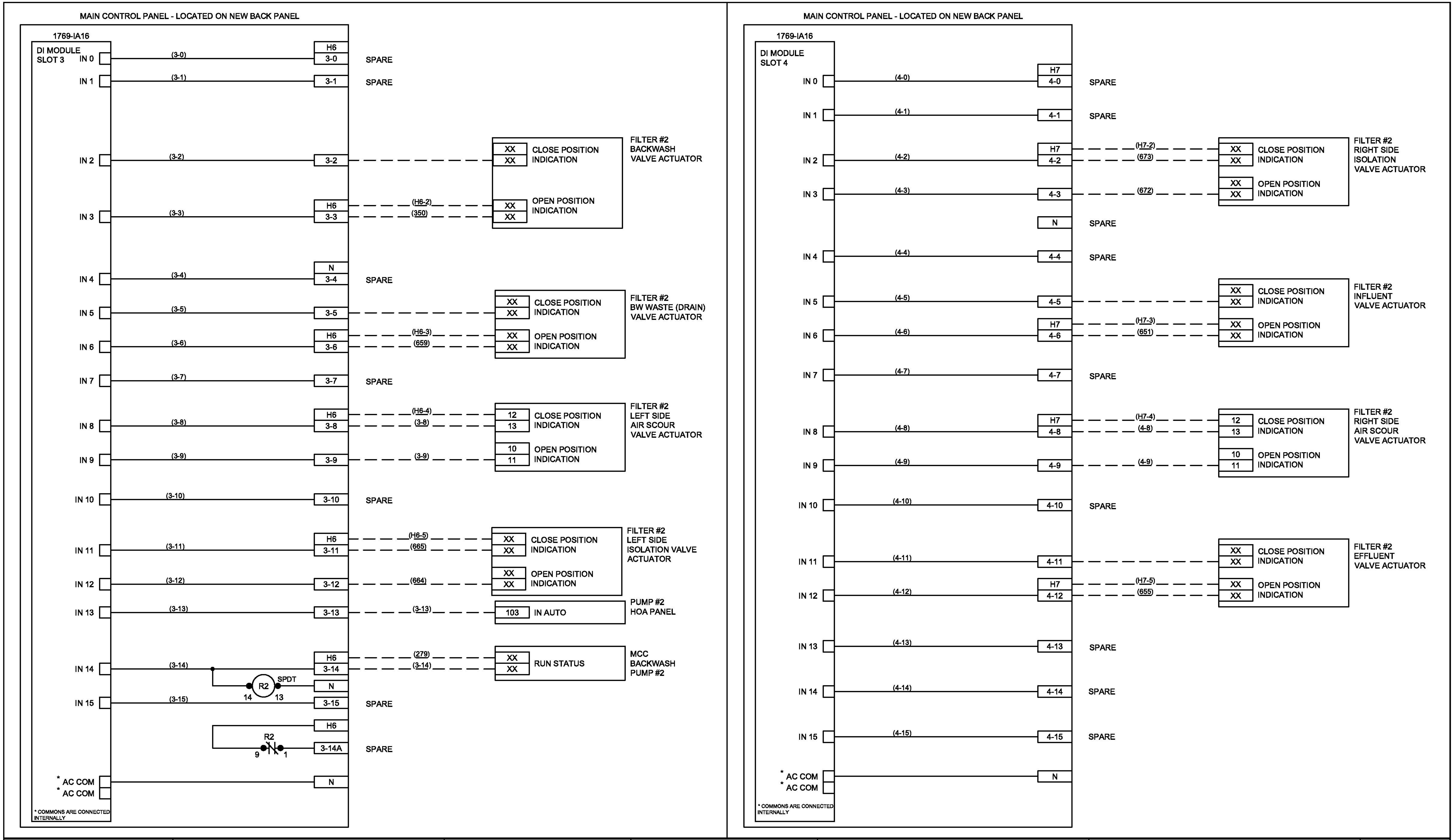
DI SLOT 1 & 2

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

05
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D05 DI Slot 1 & 2.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 3
IN 0
(3-0)
H6
3-0
SPARE
IN 1
(3-1)
3-1
SPARE
IN 2
(3-2)
3-2
XX
XX
CLOSE POSITION INDICATION
FILTER #2
BACKWASH
VALVE ACTUATOR
IN 3
(3-3)
H6
3-3
(H6-2)
(350)
XX
XX
OPEN POSITION INDICATION
N
IN 4
(3-4)
3-4
SPARE
IN 5
(3-5)
3-5
XX
XX
CLOSE POSITION INDICATION
FILTER #2
BW WASTE (DRAIN)
VALVE ACTUATOR
IN 6
(3-6)
H6
3-6
(H6-3)
(659)
XX
XX
OPEN POSITION INDICATION
IN 7
(3-7)
3-7
SPARE
IN 8
(3-8)
H6
3-8
(H6-4)
(3-8)
12
13
CLOSE POSITION INDICATION
FILTER #2
LEFT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(3-9)
3-9
(3-9)
10
11
OPEN POSITION INDICATION
IN 10
(3-10)
3-10
SPARE
IN 11
(3-11)
H6
3-11
(H6-5)
(665)
XX
XX
CLOSE POSITION INDICATION
FILTER #2
LEFT SIDE
ISOLATION VALVE
ACTUATOR
IN 12
(3-12)
3-12
(664)
XX
XX
OPEN POSITION INDICATION
IN 13
(3-13)
3-13
(3-13)
103
IN AUTO
PUMP #2
HOA PANEL
IN 14
(3-14)
H6
3-14
(279)
(3-14)
XX
XX
RUN STATUS
MCC
BACKWASH
PUMP #2
R2
SPDT
14
13
N
IN 15
(3-15)
3-15
SPARE
H6
R2
9
1
3-14A
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY
MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 4
H7
IN 0
(4-0)
4-0
SPARE
IN 1
(4-1)
4-1
SPARE
IN 2
(4-2)
H7
4-2
(H7-2)
(673)
XX
XX
CLOSE POSITION INDICATION
FILTER #2
RIGHT SIDE
ISOLATION
VALVE ACTUATOR
IN 3
(4-3)
4-3
(672)
XX
XX
OPEN POSITION INDICATION
N
SPARE
IN 4
(4-4)
4-4
SPARE
IN 5
(4-5)
4-5
XX
XX
CLOSE POSITION INDICATION
FILTER #2
INFLUENT
VALVE ACTUATOR
IN 6
(4-6)
H7
4-6
(H7-3)
(651)
XX
XX
OPEN POSITION INDICATION
IN 7
(4-7)
4-7
SPARE
IN 8
(4-8)
H7
4-8
(H7-4)
(4-8)
12
13
CLOSE POSITION INDICATION
FILTER #2
RIGHT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(4-9)
4-9
(4-9)
10
11
OPEN POSITION INDICATION
IN 10
(4-10)
4-10
SPARE
IN 11
(4-11)
4-11
XX
XX
CLOSE POSITION INDICATION
FILTER #2
EFFLUENT
VALVE ACTUATOR
IN 12
(4-12)
H7
4-12
(H7-5)
(655)
XX
XX
OPEN POSITION INDICATION
IN 13
(4-13)
4-13
SPARE
IN 14
(4-14)
4-14
SPARE
IN 15
(4-15)
4-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
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GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

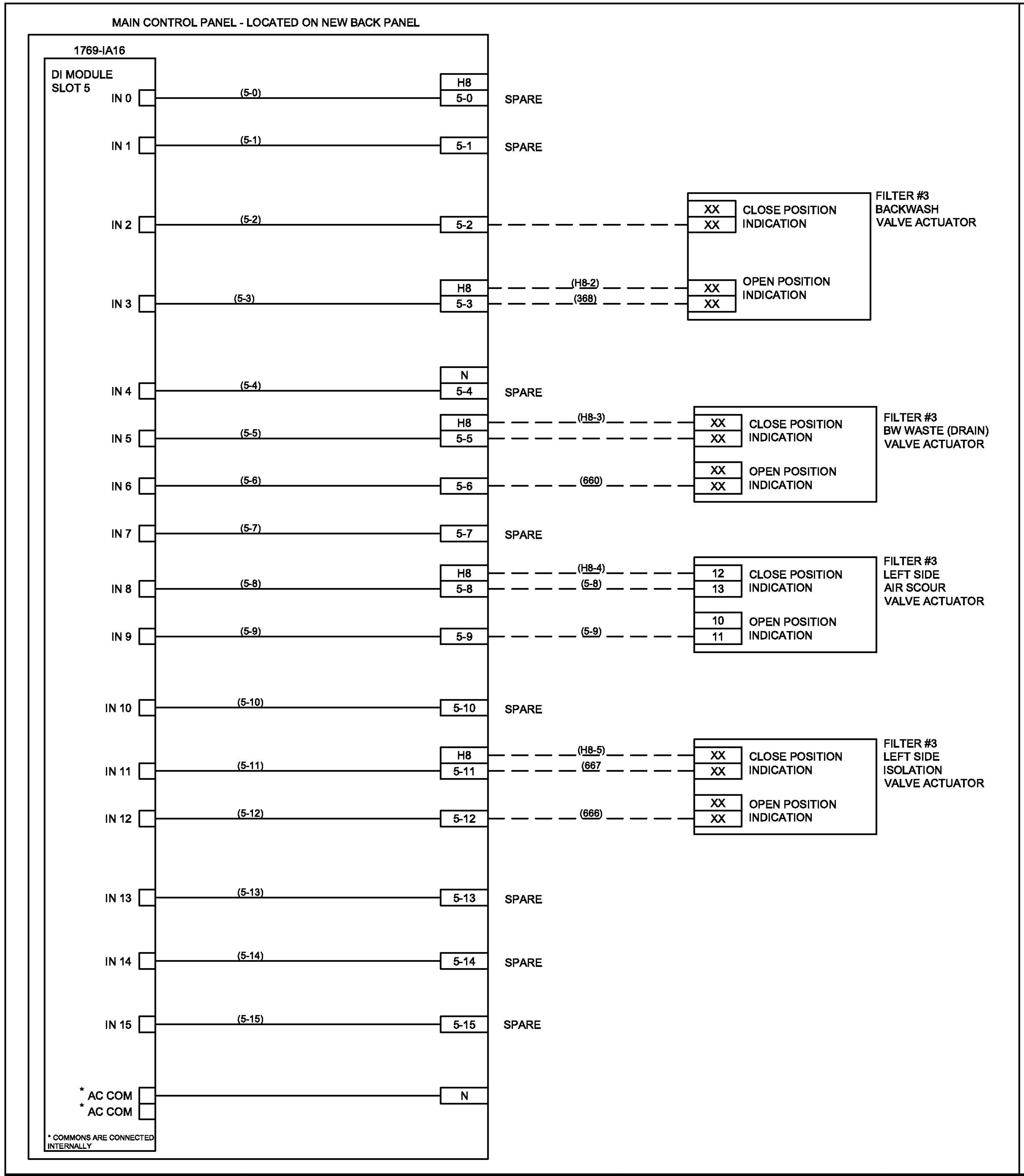
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

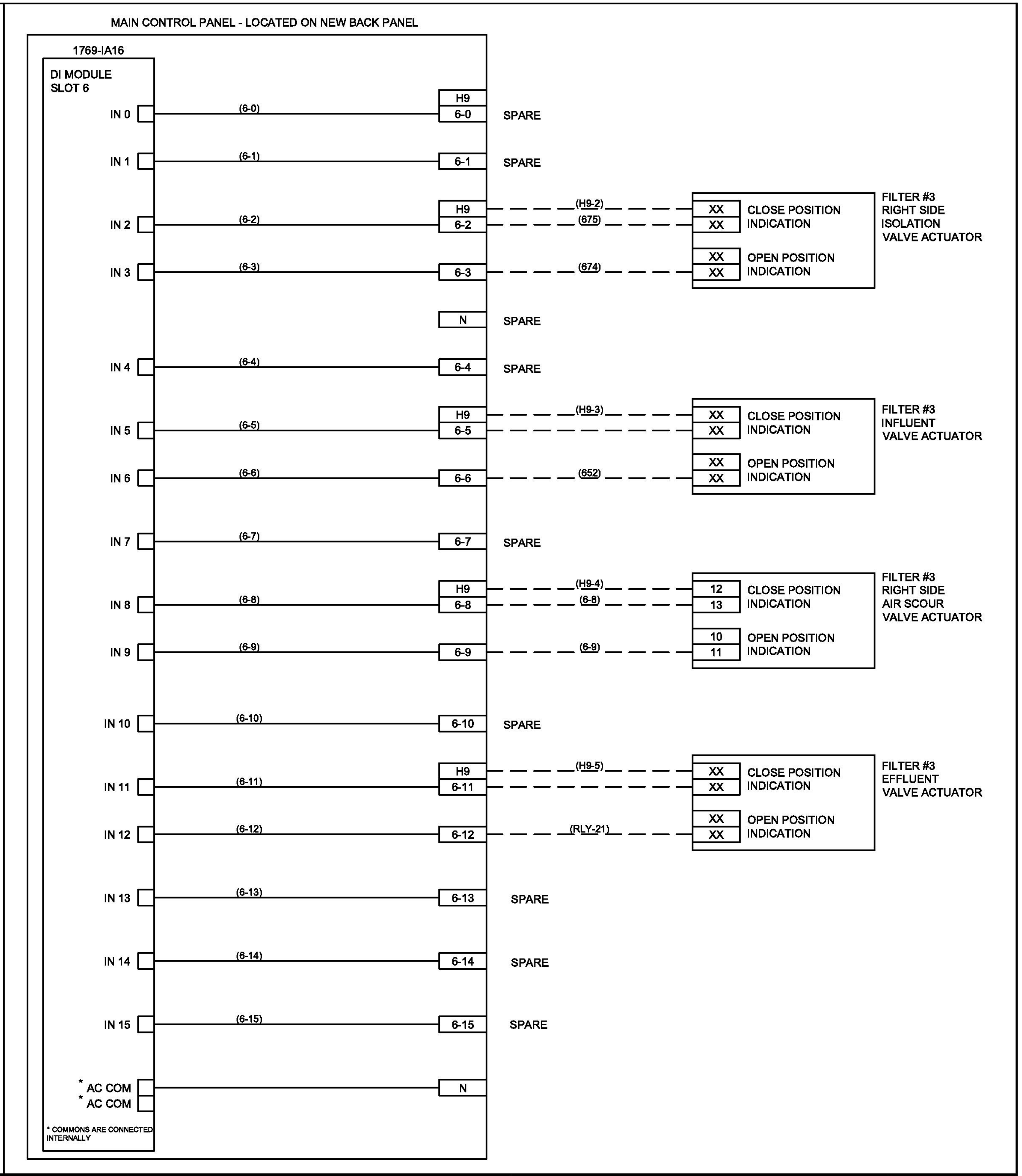
DI SLOT 3 & 4

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

06
18


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 5
IN 0
(5-0)
H8
5-0
SPARE
IN 1
(5-1)
5-1
SPARE
IN 2
(5-2)
5-2
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
BACKWASH
VALVE ACTUATOR
IN 3
(5-3)
H8
5-3
(H8-2)
(368)
XX
XX
OPEN POSITION
INDICATION
IN 4
(5-4)
N
5-4
SPARE
IN 5
(5-5)
H8
5-5
(H8-3)
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
BW WASTE (DRAIN)
VALVE ACTUATOR
IN 6
(5-6)
5-6
(660)
XX
XX
OPEN POSITION
INDICATION
IN 7
(5-7)
5-7
SPARE
IN 8
(5-8)
H8
5-8
(H8-4)
(5-8)
12
13
CLOSE POSITION
INDICATION
FILTER #3
LEFT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(5-9)
5-9
(5-9)
10
11
OPEN POSITION
INDICATION
IN 10
(5-10)
5-10
SPARE
IN 11
(5-11)
H8
5-11
(H8-5)
(667
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
LEFT SIDE
ISOLATION
VALVE ACTUATOR
IN 12
(5-12)
5-12
(666)
XX
XX
OPEN POSITION
INDICATION
IN 13
(5-13)
5-13
SPARE
IN 14
(5-14)
5-14
SPARE
IN 15
(5-15)
5-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 6
IN 0
(6-0)
H9
6-0
SPARE
IN 1
(6-1)
6-1
SPARE
IN 2
(6-2)
H9
6-2
(H9-2)
(675)
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
RIGHT SIDE
ISOLATION
VALVE ACTUATOR
IN 3
(6-3)
6-3
(674)
XX
XX
OPEN POSITION
INDICATION
N
SPARE
IN 4
(6-4)
6-4
SPARE
IN 5
(6-5)
H9
6-5
(H9-3)
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
INFLUENT
VALVE ACTUATOR
IN 6
(6-6)
6-6
(652)
XX
XX
OPEN POSITION
INDICATION
IN 7
(6-7)
6-7
SPARE
IN 8
(6-8)
H9
6-8
(H9-4)
(6-8)
12
13
CLOSE POSITION
INDICATION
FILTER #3
RIGHT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 9
(6-9)
6-9
(6-9)
10
11
OPEN POSITION
INDICATION
IN 10
(6-10)
6-10
SPARE
IN 11
(6-11)
H9
6-11
(H9-5)
XX
XX
CLOSE POSITION
INDICATION
FILTER #3
EFFLUENT
VALVE ACTUATOR
IN 12
(6-12)
6-12
(RLY-21)
XX
XX
OPEN POSITION
INDICATION
IN 13
(6-13)
6-13
SPARE
IN 14
(6-14)
6-14
SPARE
IN 15
(6-15)
6-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

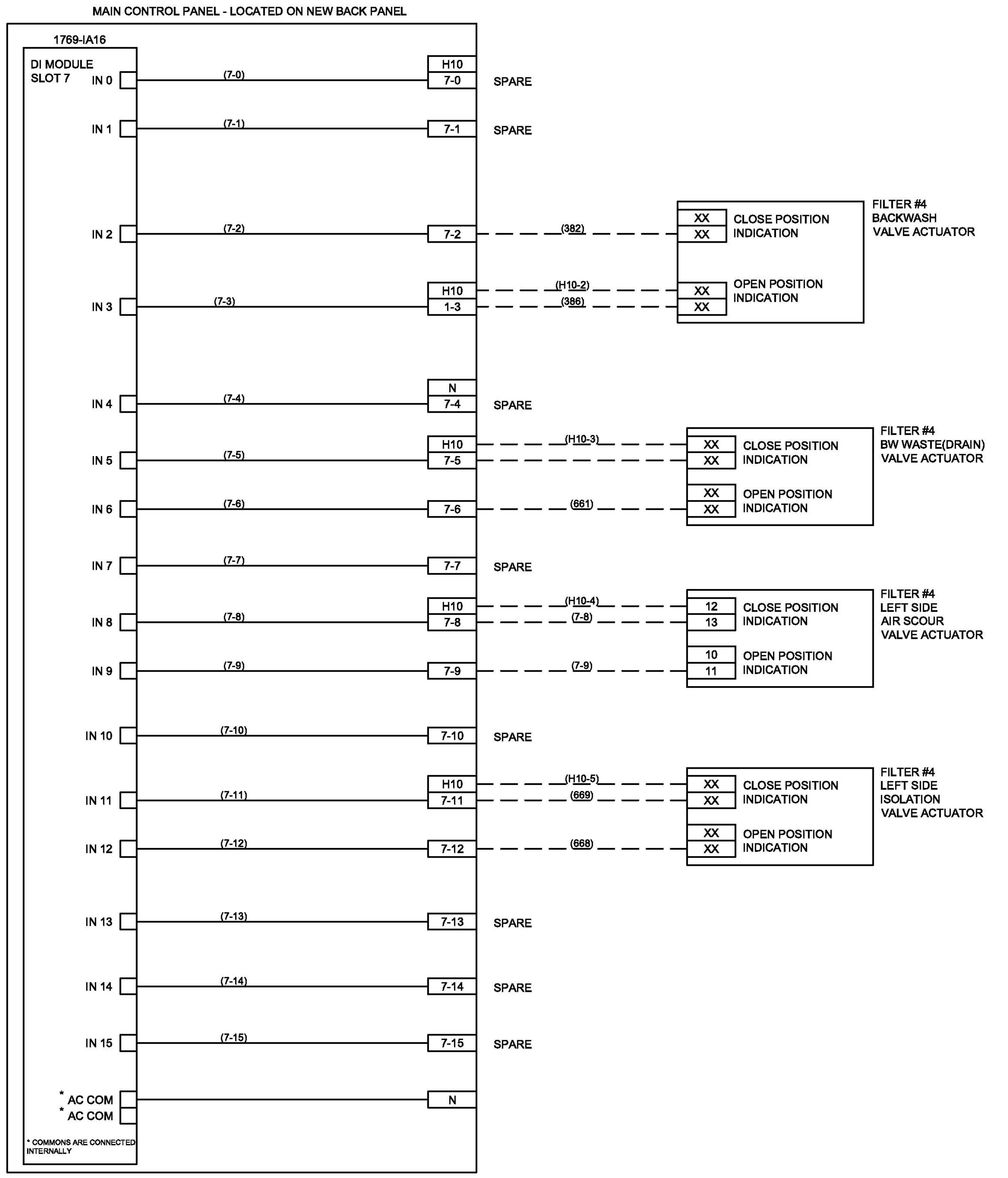
DI SLOT 5 & 6

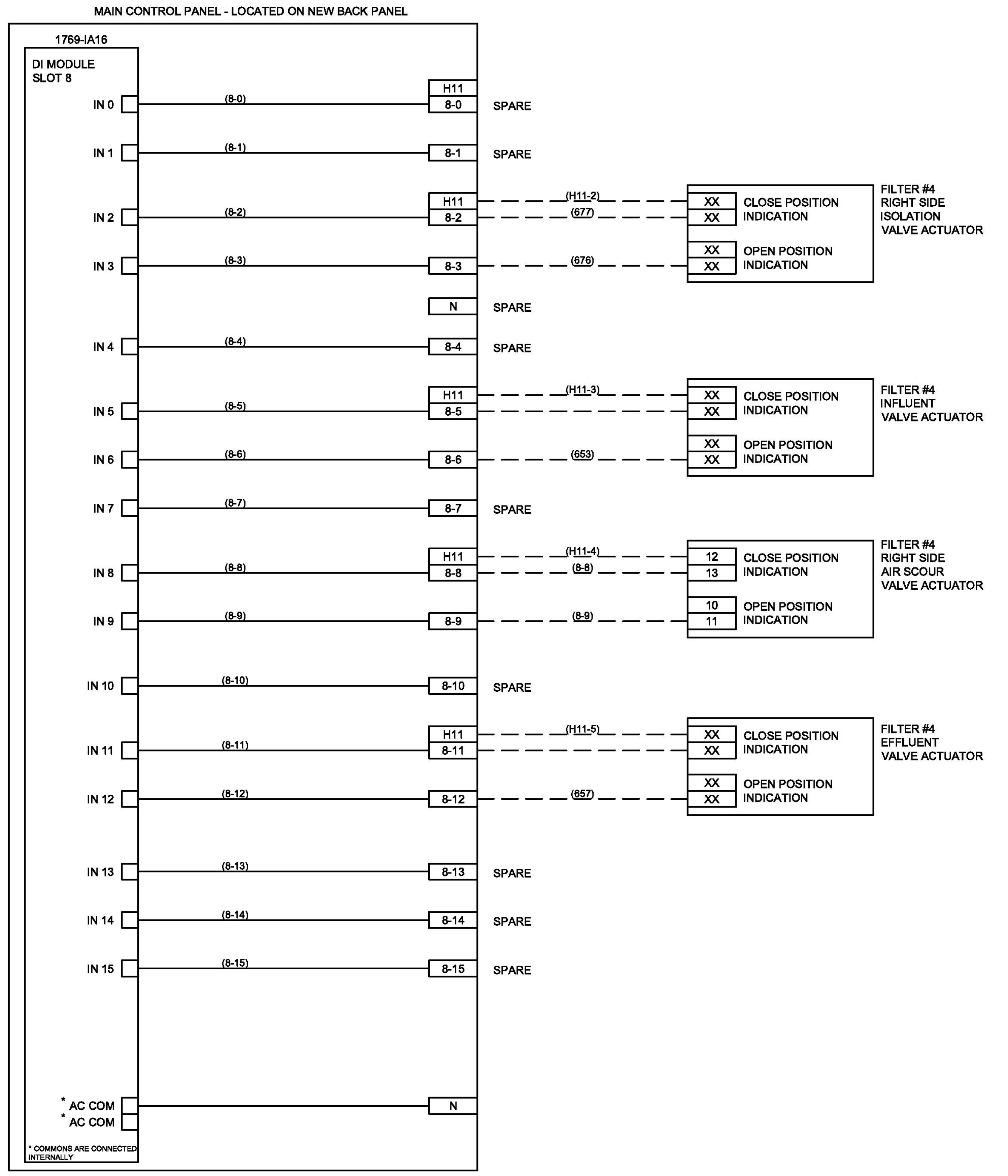
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

07
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D07 DI Slot 5 & 6.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 7
IN 0
(7-0)
H10
7-0
SPARE
IN 1
(7-1)
7-1
SPARE
IN 2
(7-2)
7-2
(382)
IN 3
(7-3)
H10
1-3
(H10-2)
(386)
XX
CLOSE POSITION
INDICATION
OPEN POSITION
INDICATION
FILTER #4
BACKWASH
VALVE ACTUATOR
IN 4
(7-4)
N
7-4
SPARE
IN 5
(7-5)
H10
7-5
(H10-3)
IN 6
(7-6)
7-6
(661)
FILTER #4
BW WASTE(DRAIN)
VALVE ACTUATOR
IN 7
(7-7)
7-7
SPARE
IN 8
(7-8)
H10
7-8
(H10-4)
(7-8)
IN 9
(7-9)
7-9
(7-9)
12
13
10
11
FILTER #4
LEFT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 10
(7-10)
7-10
SPARE
IN 11
(7-11)
H10
7-11
(H10-5)
(669)
IN 12
(7-12)
7-12
(668)
FILTER #4
LEFT SIDE
ISOLATION
VALVE ACTUATOR
IN 13
(7-13)
7-13
SPARE
IN 14
(7-14)
7-14
SPARE
IN 15
(7-15)
7-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE
SLOT 8
IN 0
(8-0)
H11
8-0
SPARE
IN 1
(8-1)
8-1
SPARE
IN 2
(8-2)
H11
8-2
(H11-2)
(677)
IN 3
(8-3)
8-3
(676)
XX
CLOSE POSITION
INDICATION
OPEN POSITION
INDICATION
FILTER #4
RIGHT SIDE
ISOLATION
VALVE ACTUATOR
N
SPARE
IN 4
(8-4)
8-4
SPARE
IN 5
(8-5)
H11
8-5
(H11-3)
IN 6
(8-6)
8-6
(653)
FILTER #4
INFLUENT
VALVE ACTUATOR
IN 7
(8-7)
8-7
SPARE
IN 8
(8-8)
H11
8-8
(H11-4)
(8-8)
IN 9
(8-9)
8-9
(8-9)
12
13
10
11
FILTER #4
RIGHT SIDE
AIR SCOUR
VALVE ACTUATOR
IN 10
(8-10)
8-10
SPARE
IN 11
(8-11)
H11
8-11
(H11-5)
IN 12
(8-12)
8-12
(657)
FILTER #4
EFFLUENT
VALVE ACTUATOR
IN 13
(8-13)
8-13
SPARE
IN 14
(8-14)
8-14
SPARE
IN 15
(8-15)
8-15
SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

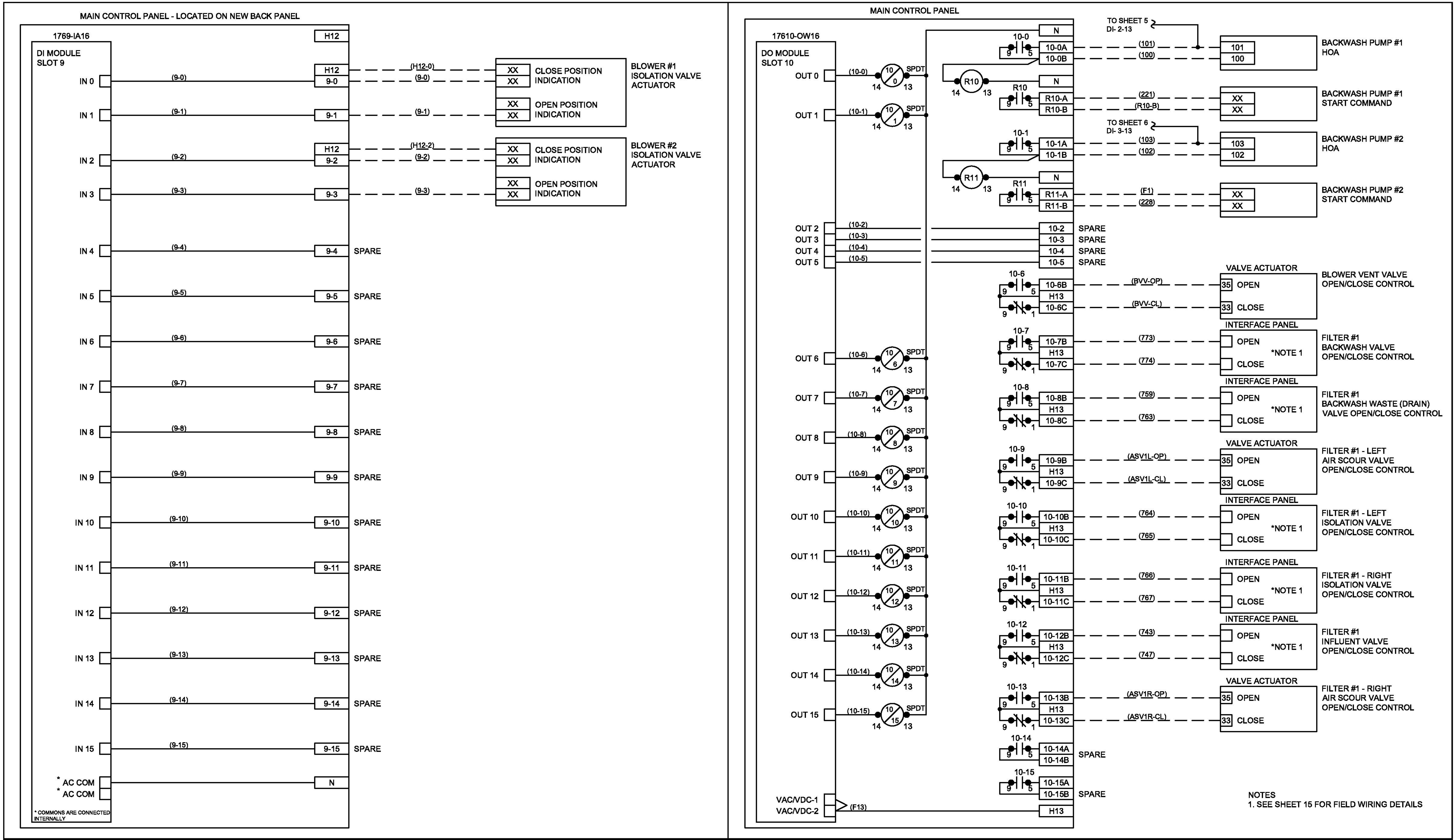
DI SLOT 7 & 8

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

08
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D08 DI Slot 7 & 8.dwg [Thursday, April 06, 2017]


MAIN CONTROL PANEL - LOCATED ON NEW BACK PANEL
1769-IA16
DI MODULE SLOT 9
IN 0 (9-0) 9-0
IN 1 (9-1) 9-1
IN 2 (9-2) 9-2
IN 3 (9-3) 9-3
H12
(H12-0)
(H12-2)
XX CLOSE POSITION INDICATION
XX OPEN POSITION INDICATION
BLOWER #1 ISOLATION VALVE ACTUATOR
BLOWER #2 ISOLATION VALVE ACTUATOR
IN 4 (9-4) 9-4 SPARE
IN 5 (9-5) 9-5 SPARE
IN 6 (9-6) 9-6 SPARE
IN 7 (9-7) 9-7 SPARE
IN 8 (9-8) 9-8 SPARE
IN 9 (9-9) 9-9 SPARE
IN 10 (9-10) 9-10 SPARE
IN 11 (9-11) 9-11 SPARE
IN 12 (9-12) 9-12 SPARE
IN 13 (9-13) 9-13 SPARE
IN 14 (9-14) 9-14 SPARE
IN 15 (9-15) 9-15 SPARE
* AC COM
* AC COM
N
* COMMONS ARE CONNECTED INTERNALLY
MAIN CONTROL PANEL
17610-OW16
DO MODULE SLOT 10
OUT 0 (10-0)
OUT 1 (10-1)
SPDT
14 13
N
10-0 10-0A 10-0B
R10 R10-A R10-B
10-1 10-1A 10-1B
R11 R11-A R11-B
TO SHEET 5 DI- 2-13
TO SHEET 6 DI- 3-13
(101) (100)
(221) (R10-B)
(103) (102)
(F1) (228)
101 100 BACKWASH PUMP #1 HOA
XX XX BACKWASH PUMP #1 START COMMAND
103 102 BACKWASH PUMP #2 HOA
XX XX BACKWASH PUMP #2 START COMMAND
OUT 2 (10-2) 10-2 SPARE
OUT 3 (10-3) 10-3 SPARE
OUT 4 (10-4) 10-4 SPARE
OUT 5 (10-5) 10-5 SPARE
10-6 10-6B H13 10-6C
(BVV-OP) (BVV-CL)
VALVE ACTUATOR 35 OPEN 33 CLOSE
BLOWER VENT VALVE OPEN/CLOSE CONTROL
OUT 6 (10-6)
10-7 10-7B H13 10-7C (773) (774)
INTERFACE PANEL OPEN CLOSE *NOTE 1
FILTER #1 BACKWASH VALVE OPEN/CLOSE CONTROL
OUT 7 (10-7)
10-8 10-8B H13 10-8C (759) (763)
FILTER #1 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
OUT 8 (10-8)
10-9 10-9B H13 10-9C (ASV1L-OP) (ASV1L-CL)
FILTER #1 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
OUT 9 (10-9)
OUT 10 (10-10)
10-10 10-10B H13 10-10C (764) (765)
FILTER #1 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
OUT 11 (10-11)
10-11 10-11B H13 10-11C (766) (767)
FILTER #1 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
OUT 12 (10-12)
10-12 10-12B H13 10-12C (743) (747)
FILTER #1 INFLUENT VALVE OPEN/CLOSE CONTROL
OUT 13 (10-13)
10-13 10-13B H13 10-13C (ASV1R-OP) (ASV1R-CL)
FILTER #1 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
OUT 14 (10-14)
10-14 10-14A 10-14B SPARE
OUT 15 (10-15)
10-15 10-15A 10-15B SPARE
VAC/VDC-1
VAC/VDC-2
(F13) H13

NOTES
1. SEE SHEET 15 FOR FIELD WIRING DETAILS

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

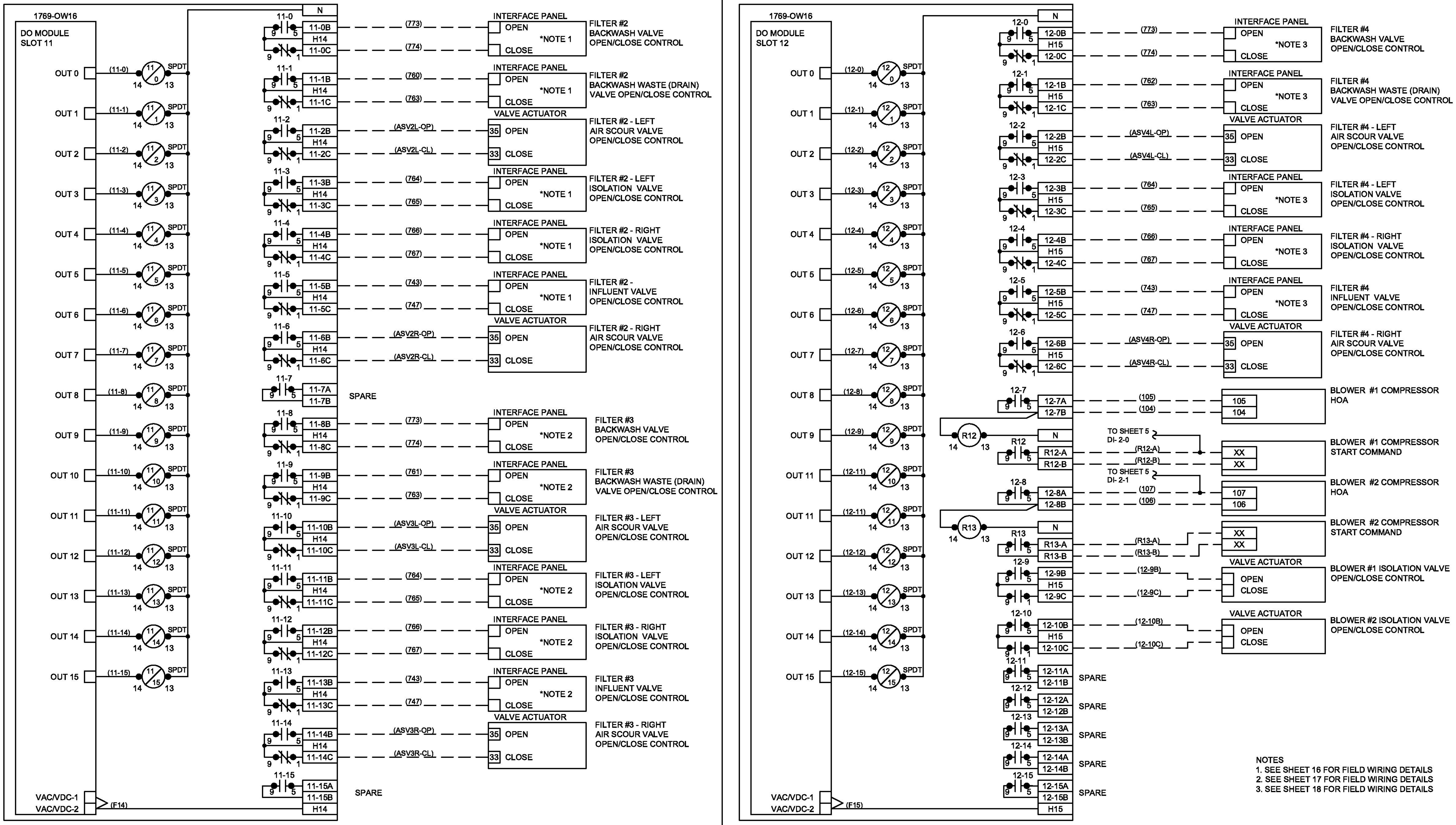
DI SLOT 9 & DO SLOT 10

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 2/2017

09
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D09 DI Slot 9 & DO SLOT 10.dwg [Thursday, April 06, 2017]


1769-OW16
DO MODULE SLOT 11
OUT 0
OUT 1
OUT 2
OUT 3
OUT 4
OUT 5
OUT 6
OUT 7
OUT 8
OUT 9
OUT 10
OUT 11
OUT 12
OUT 13
OUT 14
OUT 15
SPDT
VAC/VDC-1
VAC/VDC-2
(F14)
N
H14
INTERFACE PANEL
VALVE ACTUATOR
OPEN
CLOSE
*NOTE 1
*NOTE 2
SPARE
FILTER #2 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #2 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #2 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #2 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #2 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #2 - INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #2 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #3 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #3 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #3 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #3 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #3 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #3 INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #3 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
1769-OW16
DO MODULE SLOT 12
(F15)
H15
*NOTE 3
FILTER #4 BACKWASH VALVE OPEN/CLOSE CONTROL
FILTER #4 BACKWASH WASTE (DRAIN) VALVE OPEN/CLOSE CONTROL
FILTER #4 - LEFT AIR SCOUR VALVE OPEN/CLOSE CONTROL
FILTER #4 - LEFT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #4 - RIGHT ISOLATION VALVE OPEN/CLOSE CONTROL
FILTER #4 INFLUENT VALVE OPEN/CLOSE CONTROL
FILTER #4 - RIGHT AIR SCOUR VALVE OPEN/CLOSE CONTROL
BLOWER #1 COMPRESSOR HOA
BLOWER #1 COMPRESSOR START COMMAND
BLOWER #2 COMPRESSOR HOA
BLOWER #2 COMPRESSOR START COMMAND
BLOWER #1 ISOLATION VALVE OPEN/CLOSE CONTROL
BLOWER #2 ISOLATION VALVE OPEN/CLOSE CONTROL
TO SHEET 5 DI- 2-0
TO SHEET 5 DI- 2-1
R12
R13
(R12-A)
(R12-B)
(R13-A)
(R13-B)
(105)
(104)
(107)
(106)
XX

NOTES
1. SEE SHEET 16 FOR FIELD WIRING DETAILS
2. SEE SHEET 17 FOR FIELD WIRING DETAILS
3. SEE SHEET 18 FOR FIELD WIRING DETAILS

1"
IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
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A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

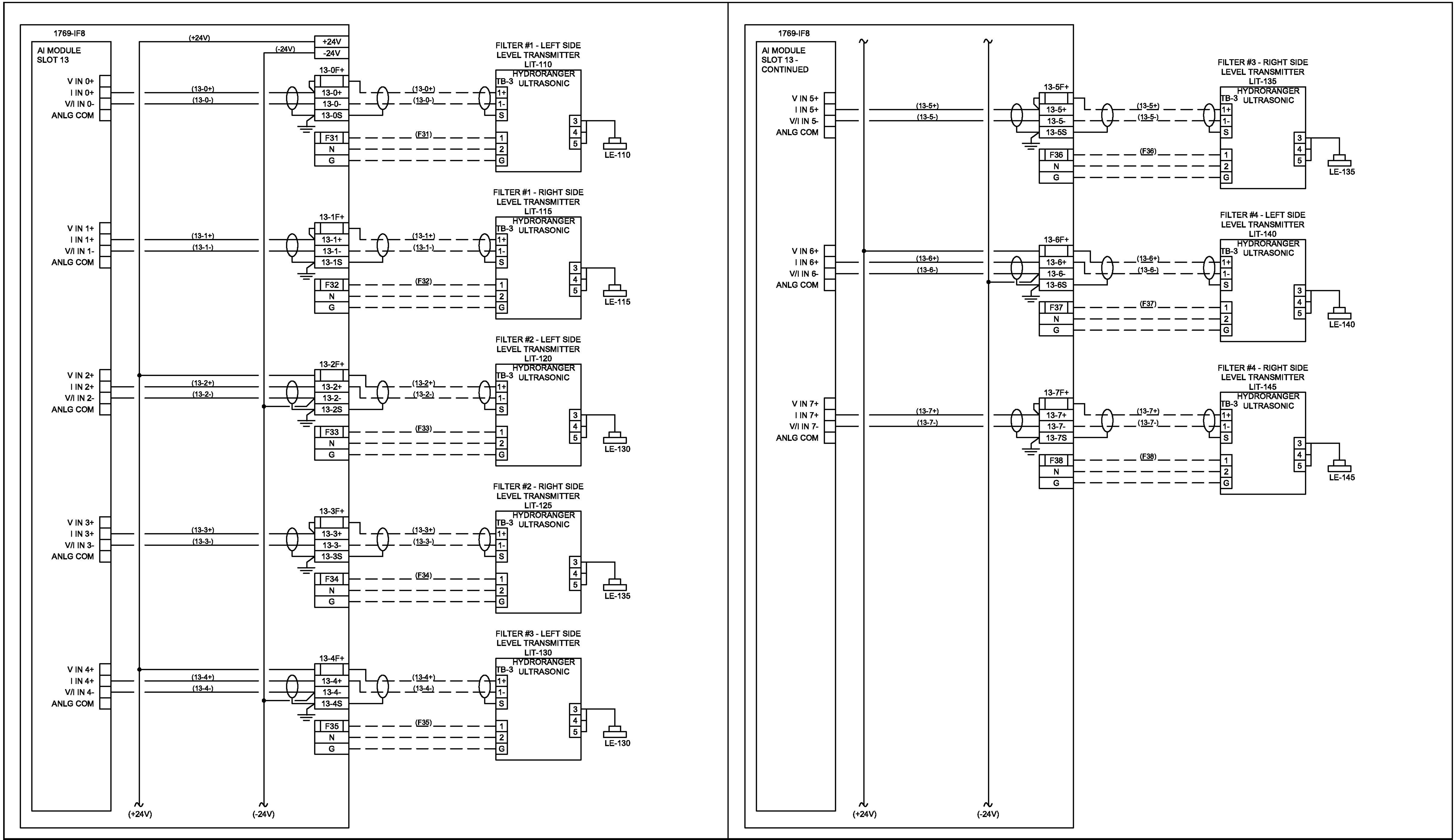
DO SLOTS 11 & 12

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

10
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D10 DO Slots 11 & 12.dwg [Thursday, April 06, 2017]


1769-IF8
AI MODULE
SLOT 13
(+24V)
+24V
(-24V)
-24V
V IN 0+
I IN 0+
V/I IN 0-
ANLG COM
(13-0+)
(13-0-)
13-0F+
13-0+
13-0-
13-0S
F31
N
G
(F31)
FILTER #1 - LEFT SIDE
LEVEL TRANSMITTER
LIT-110
HYDRORANGER
TB-3
ULTRASONIC
1+
1-
S
1
2
G
3
4
5
LE-110
V IN 1+
I IN 1+
V/I IN 1-
ANLG COM
(13-1+)
(13-1-)
13-1F+
13-1+
13-1-
13-1S
F32
(F32)
FILTER #1 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-115
LE-115
V IN 2+
I IN 2+
V/I IN 2-
ANLG COM
(13-2+)
(13-2-)
13-2F+
13-2+
13-2-
13-2S
F33
(F33)
FILTER #2 - LEFT SIDE
LEVEL TRANSMITTER
LIT-120
LE-130
V IN 3+
I IN 3+
V/I IN 3-
ANLG COM
(13-3+)
(13-3-)
13-3F+
13-3+
13-3-
13-3S
F34
(F34)
FILTER #2 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-125
LE-135
V IN 4+
I IN 4+
V/I IN 4-
ANLG COM
(13-4+)
(13-4-)
13-4F+
13-4+
13-4-
13-4S
F35
(F35)
FILTER #3 - LEFT SIDE
LEVEL TRANSMITTER
LIT-130
LE-130
(+24V)
(-24V)
1769-IF8
AI MODULE
SLOT 13 -
CONTINUED
V IN 5+
I IN 5+
V/I IN 5-
ANLG COM
(13-5+)
(13-5-)
13-5F+
13-5+
13-5-
13-5S
F36
(F36)
FILTER #3 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-135
LE-135
V IN 6+
I IN 6+
V/I IN 6-
ANLG COM
(13-6+)
(13-6-)
13-6F+
13-6+
13-6-
13-6S
F37
(F37)
FILTER #4 - LEFT SIDE
LEVEL TRANSMITTER
LIT-140
LE-140
V IN 7+
I IN 7+
V/I IN 7-
ANLG COM
(13-7+)
(13-7-)
13-7F+
13-7+
13-7-
13-7S
F38
(F38)
FILTER #4 - RIGHT SIDE
LEVEL TRANSMITTER
LIT-145
LE-145
(+24V)
(-24V)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

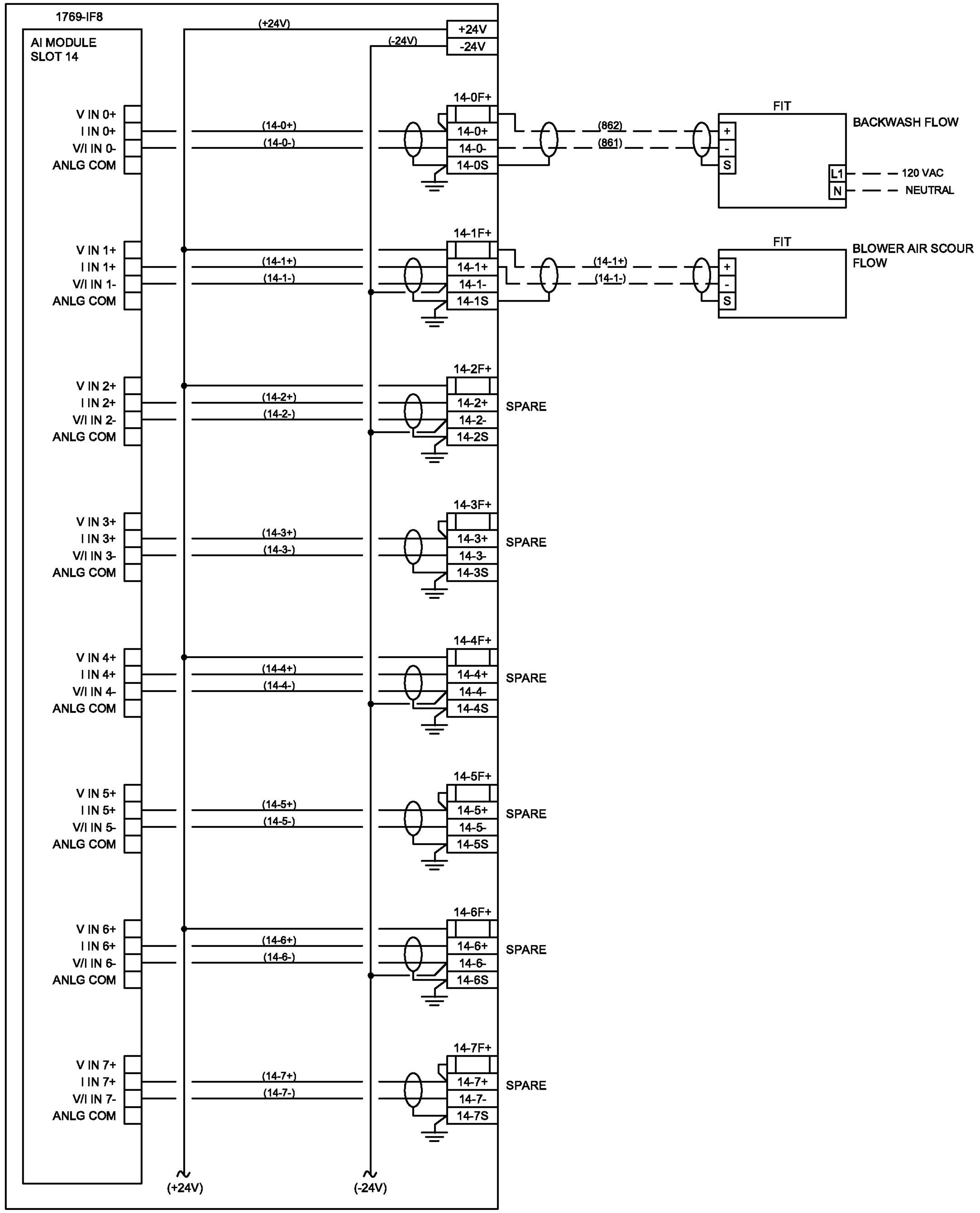
AI SLOT 13

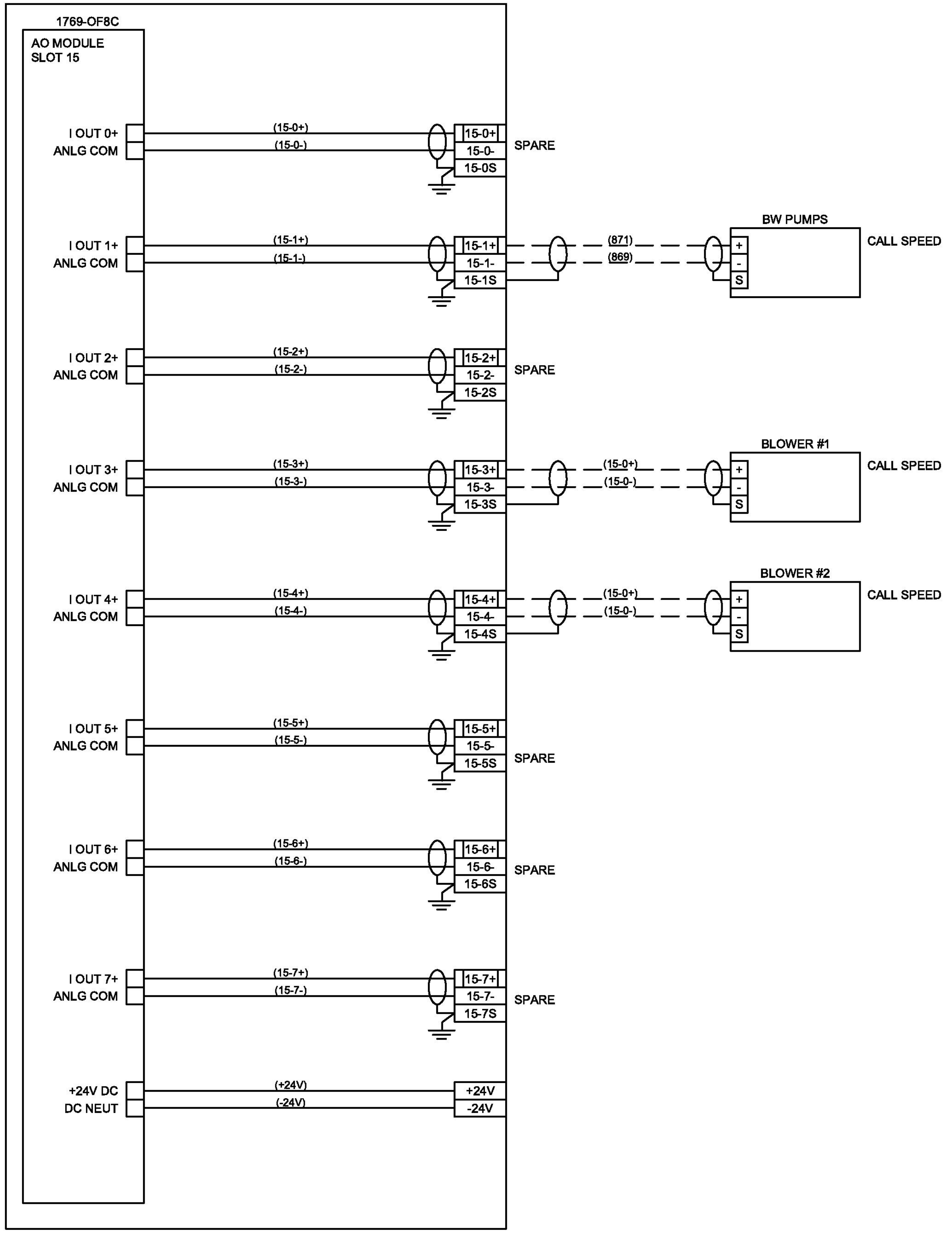
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

11
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D11 AI Slot 13.dwg [Thursday, April 06, 2017]


1769-IF8
AI MODULE
SLOT 14
(+24V)
(-24V)
+24V
-24V
V IN 0+
I IN 0+
V/I IN 0-
ANLG COM
(14-0+)
(14-0-)
14-0F+
14-0+
14-0-
14-0S
(862)
(861)
FIT
BACKWASH FLOW
+
-
S
L1
N
120 VAC
NEUTRAL
V IN 1+
I IN 1+
V/I IN 1-
ANLG COM
(14-1+)
(14-1-)
14-1F+
14-1+
14-1-
14-1S
FIT
BLOWER AIR SCOUR FLOW
V IN 2+
I IN 2+
V/I IN 2-
ANLG COM
(14-2+)
(14-2-)
14-2F+
14-2+
14-2-
14-2S
SPARE
V IN 3+
I IN 3+
V/I IN 3-
ANLG COM
(14-3+)
(14-3-)
14-3F+
14-3+
14-3-
14-3S
SPARE
V IN 4+
I IN 4+
V/I IN 4-
ANLG COM
(14-4+)
(14-4-)
14-4F+
14-4+
14-4-
14-4S
SPARE
V IN 5+
I IN 5+
V/I IN 5-
ANLG COM
(14-5+)
(14-5-)
14-5F+
14-5+
14-5-
14-5S
SPARE
V IN 6+
I IN 6+
V/I IN 6-
ANLG COM
(14-6+)
(14-6-)
14-6F+
14-6+
14-6-
14-6S
SPARE
V IN 7+
I IN 7+
V/I IN 7-
ANLG COM
(14-7+)
(14-7-)
14-7F+
14-7+
14-7-
14-7S
SPARE
(+24V)
(-24V)


1769-OF8C
AO MODULE
SLOT 15
I OUT 0+
ANLG COM
(15-0+)
(15-0-)
15-0+
15-0-
15-0S
SPARE
I OUT 1+
ANLG COM
(15-1+)
(15-1-)
15-1+
15-1-
15-1S
(871)
(869)
BW PUMPS
CALL SPEED
+
-
S
I OUT 2+
ANLG COM
(15-2+)
(15-2-)
15-2+
15-2-
15-2S
SPARE
I OUT 3+
ANLG COM
(15-3+)
(15-3-)
15-3+
15-3-
15-3S
(15-0+)
(15-0-)
BLOWER #1
CALL SPEED
I OUT 4+
ANLG COM
(15-4+)
(15-4-)
15-4+
15-4-
15-4S
(15-0+)
(15-0-)
BLOWER #2
CALL SPEED
I OUT 5+
ANLG COM
(15-5+)
(15-5-)
15-5+
15-5-
15-5S
SPARE
I OUT 6+
ANLG COM
(15-6+)
(15-6-)
15-6+
15-6-
15-6S
SPARE
I OUT 7+
ANLG COM
(15-7+)
(15-7-)
15-7+
15-7-
15-7S
SPARE
+24V DC
DC NEUT
(+24V)
(-24V)
+24V
-24V

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

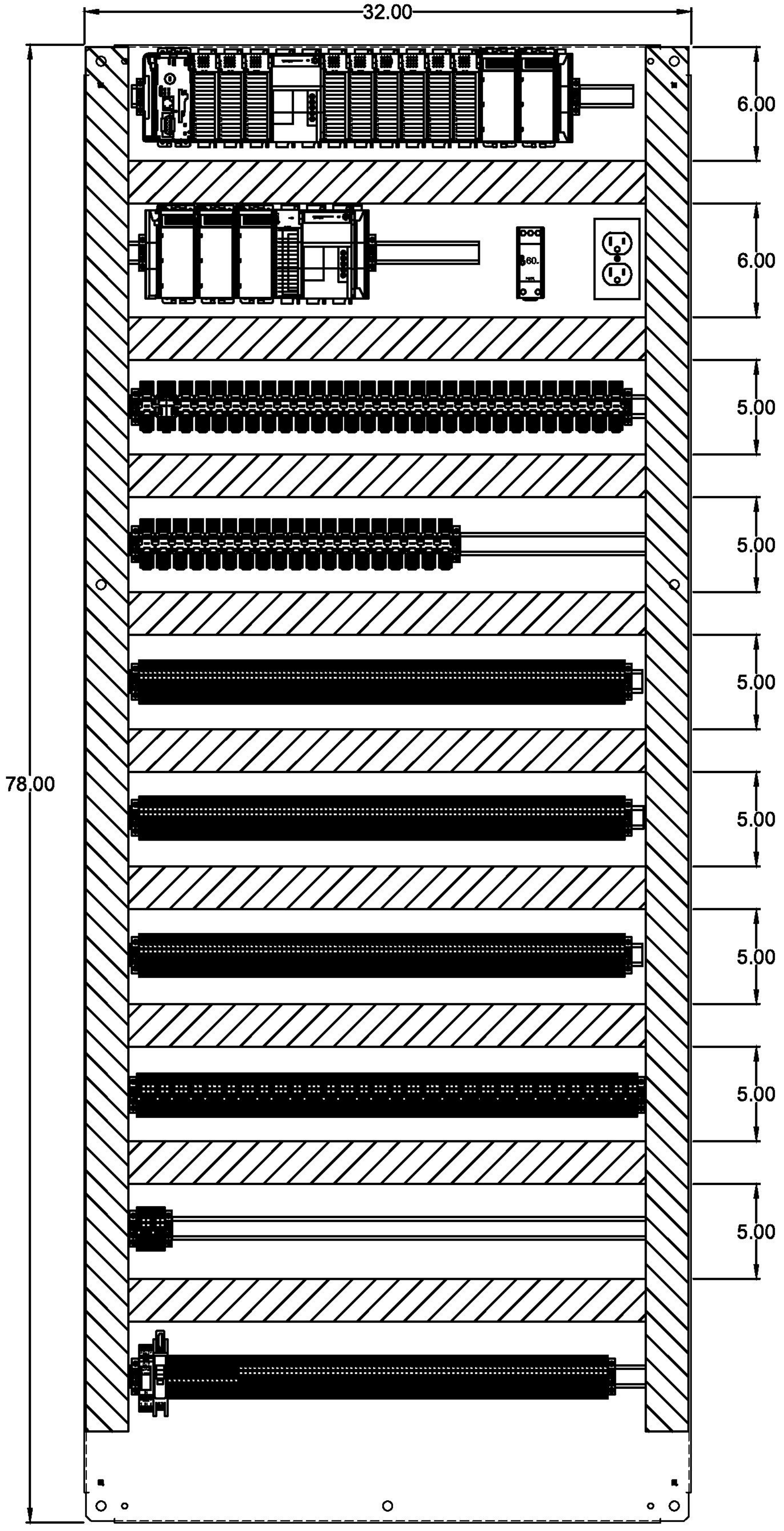
AI SLOT 14 & AO SLOT 15

WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

12
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D12 AI Slot 14 & AO Slot 15.dwg [Thursday, April 06, 2017]



A90P36F1

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH
ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTORS

2881 S 31ST aVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

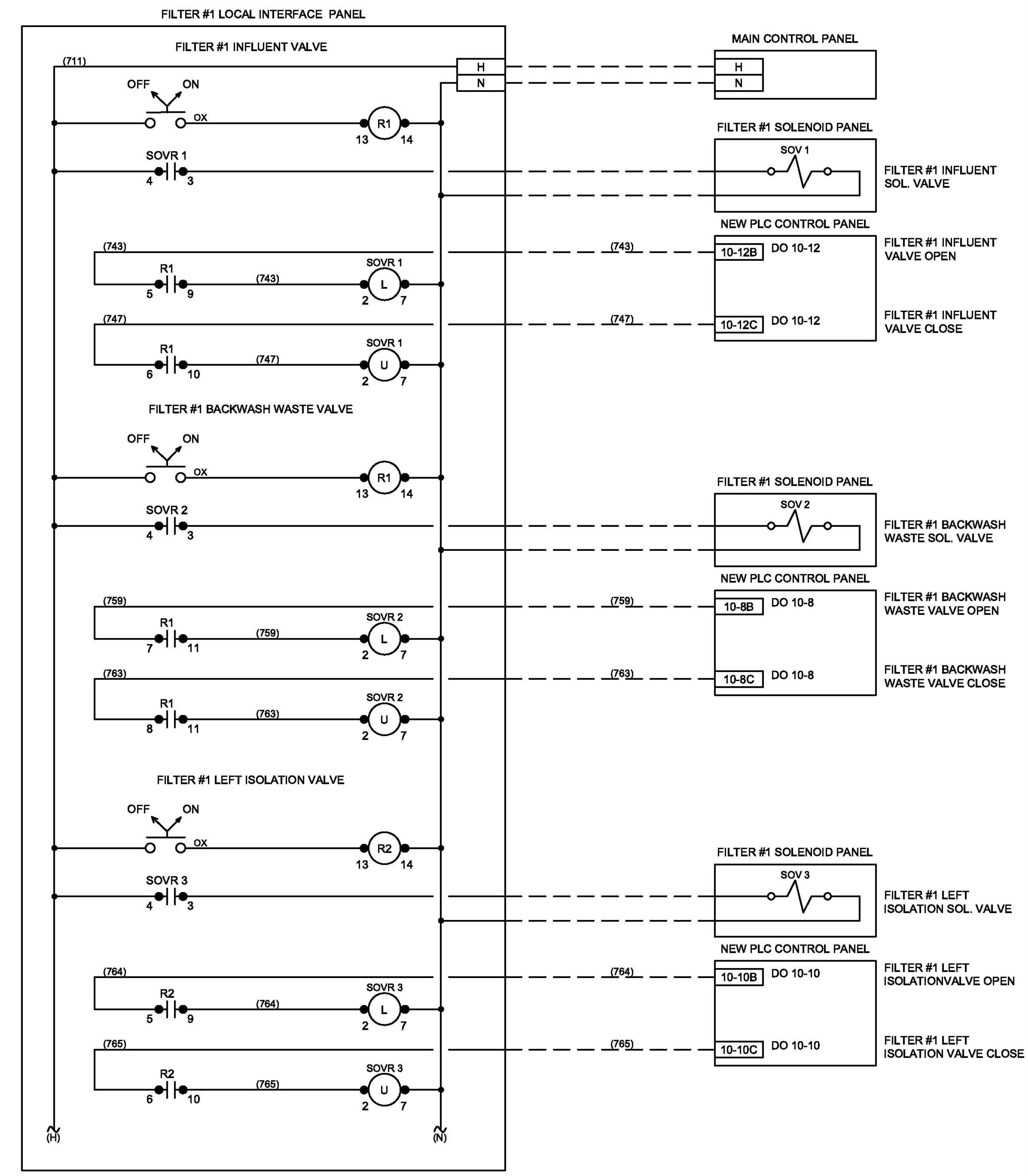
PANEL LAYOUT

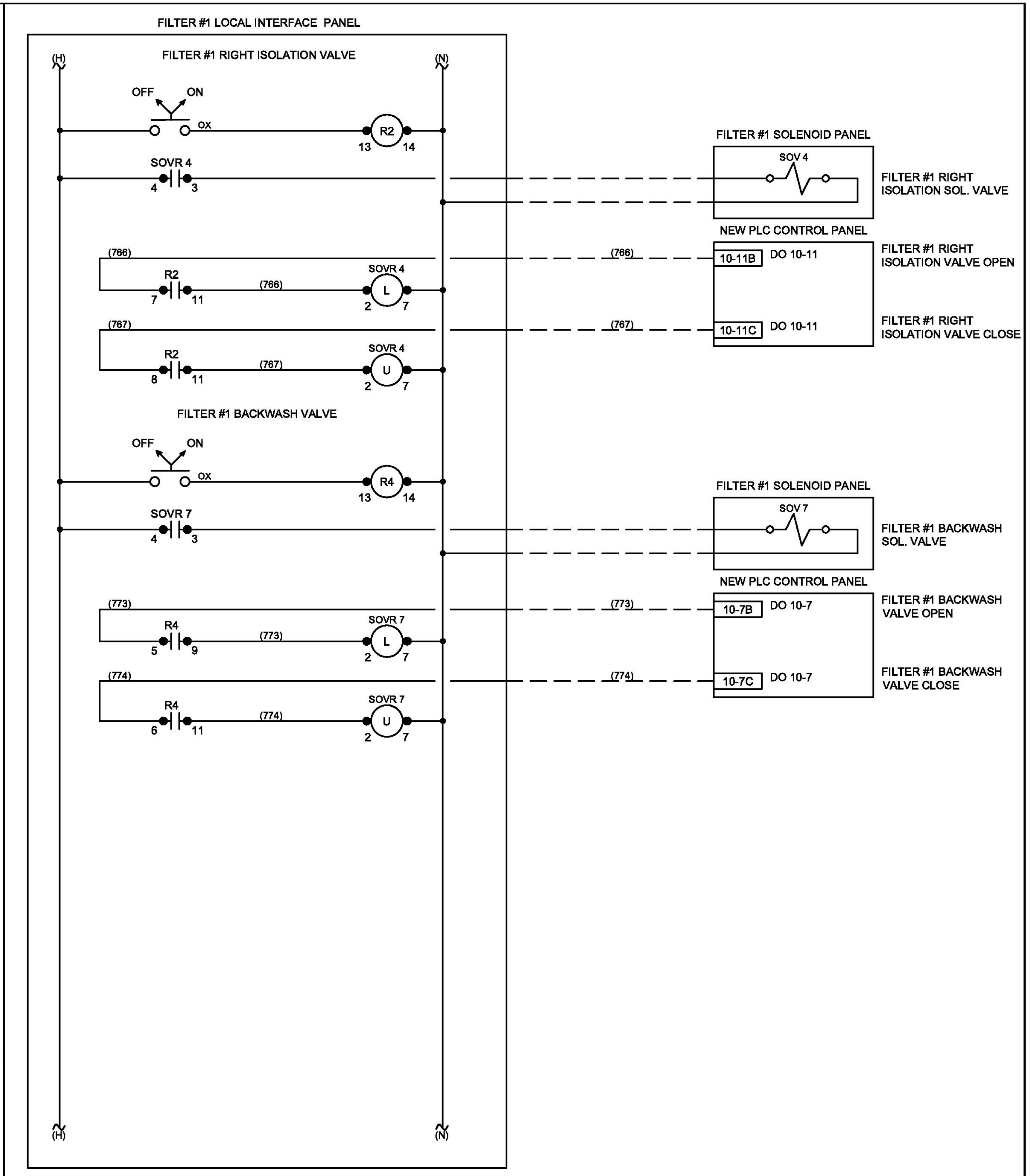
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: TFW
APPROVED BY:
DATE: 4/2017

13
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D13 Panel Layout.dwg


FILTER #1 LOCAL INTERFACE PANEL
FILTER #1 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
H
N
OFF
ON
OX
R1
13
14
SOVR 1
4
3
FILTER #1 SOLENOID PANEL
SOV 1
FILTER #1 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
SOVR 1
L
2
7
10-12B
DO 10-12
FILTER #1 INFLUENT VALVE OPEN
(747)
R1
6
10
SOVR 1
U
10-12C
DO 10-12
FILTER #1 INFLUENT VALVE CLOSE
FILTER #1 BACKWASH WASTE VALVE
OFF
ON
OX
R1
SOVR 2
FILTER #1 SOLENOID PANEL
SOV 2
FILTER #1 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(759)
R1
7
11
SOVR 2
L
10-8B
DO 10-8
FILTER #1 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
SOVR 2
U
10-8C
DO 10-8
FILTER #1 BACKWASH WASTE VALVE CLOSE
FILTER #1 LEFT ISOLATION VALVE
OFF
ON
OX
R2
SOVR 3
FILTER #1 SOLENOID PANEL
SOV 3
FILTER #1 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
SOVR 3
L
10-10B
DO 10-10
FILTER #1 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
SOVR 3
U
10-10C
DO 10-10
FILTER #1 LEFT ISOLATION VALVE CLOSE
(H)
(N)


FILTER #1 LOCAL INTERFACE PANEL
(H)
(N)
FILTER #1 RIGHT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #1 SOLENOID PANEL
SOV 4
FILTER #1 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
SOVR 4
L
2
7
10-11B
DO 10-11
FILTER #1 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
SOVR 4
U
10-11C
DO 10-11
FILTER #1 RIGHT ISOLATION VALVE CLOSE
FILTER #1 BACKWASH VALVE
OFF
ON
OX
R4
SOVR 7
FILTER #1 SOLENOID PANEL
SOV 7
FILTER #1 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
SOVR 7
L
10-7B
DO 10-7
FILTER #1 BACKWASH VALVE OPEN
(774)
R4
6
11
SOVR 7
U
10-7C
DO 10-7
FILTER #1 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS				
REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
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A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

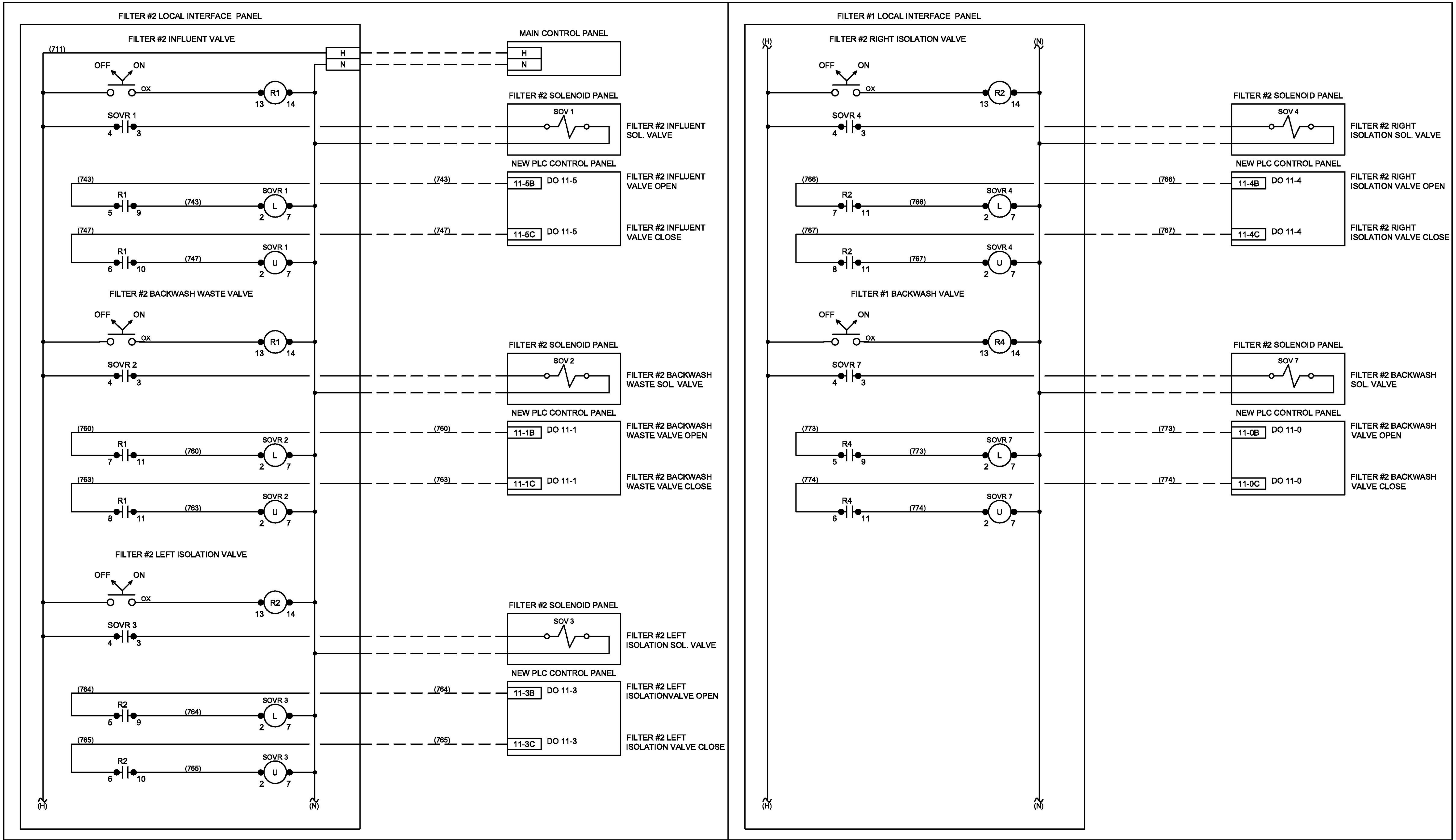
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

15
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D15 Filter #1 Valve Field Wiring.dwg [Thursday, April 06, 2017]


FILTER #2 LOCAL INTERFACE PANEL
FILTER #2 INFLUENT VALVE
(711)
OFF
ON
OX
R1
13
14
SOVR 1
4
3
H
N
MAIN CONTROL PANEL
H
N
FILTER #2 SOLENOID PANEL
SOV 1
FILTER #2 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
(743)
SOVR 1
L
2
7
(743)
11-5B
DO 11-5
FILTER #2 INFLUENT VALVE OPEN
(747)
R1
6
10
(747)
SOVR 1
U
2
7
(747)
11-5C
DO 11-5
FILTER #2 INFLUENT VALVE CLOSE
FILTER #2 BACKWASH WASTE VALVE
OFF
ON
OX
R1
13
14
SOVR 2
4
3
FILTER #2 SOLENOID PANEL
SOV 2
FILTER #2 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(760)
R1
7
11
(760)
SOVR 2
L
2
7
(760)
11-1B
DO 11-1
FILTER #2 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
(763)
SOVR 2
U
2
7
(763)
11-1C
DO 11-1
FILTER #2 BACKWASH WASTE VALVE CLOSE
FILTER #2 LEFT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 3
4
3
FILTER #2 SOLENOID PANEL
SOV 3
FILTER #2 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
(764)
SOVR 3
L
2
7
(764)
11-3B
DO 11-3
FILTER #2 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
(765)
SOVR 3
U
2
7
(765)
11-3C
DO 11-3
FILTER #2 LEFT ISOLATION VALVE CLOSE
(H)
(N)
FILTER #1 LOCAL INTERFACE PANEL
(H)
(N)
FILTER #2 RIGHT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #2 SOLENOID PANEL
SOV 4
FILTER #2 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
(766)
SOVR 4
L
2
7
(766)
11-4B
DO 11-4
FILTER #2 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
(767)
SOVR 4
U
2
7
(767)
11-4C
DO 11-4
FILTER #2 RIGHT ISOLATION VALVE CLOSE
FILTER #1 BACKWASH VALVE
OFF
ON
OX
R4
13
14
SOVR 7
4
3
FILTER #2 SOLENOID PANEL
SOV 7
FILTER #2 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
(773)
SOVR 7
L
2
7
(773)
11-0B
DO 11-0
FILTER #2 BACKWASH VALVE OPEN
(774)
R4
6
11
(774)
SOVR 7
U
2
7
(774)
11-0C
DO 11-0
FILTER #2 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

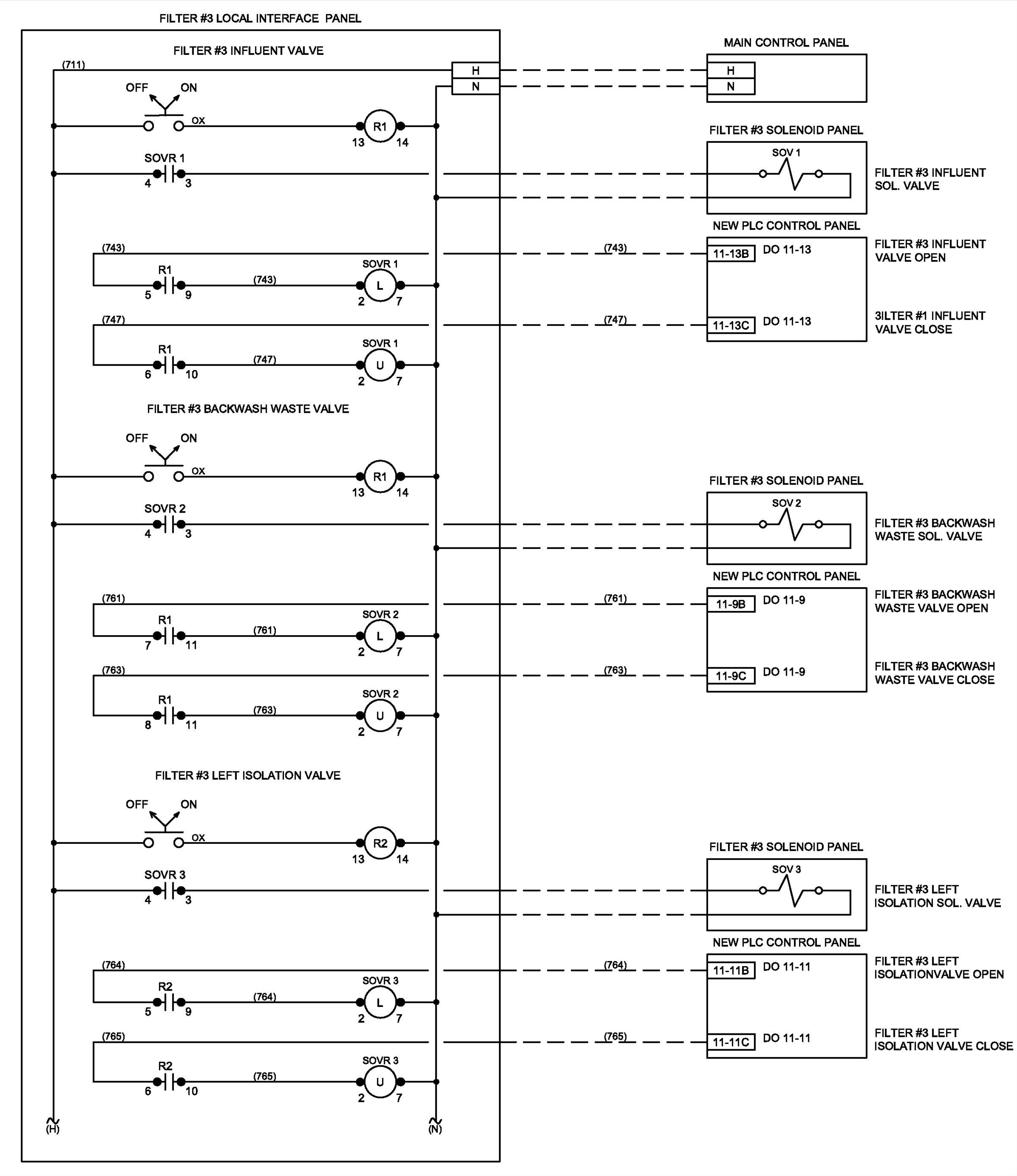
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

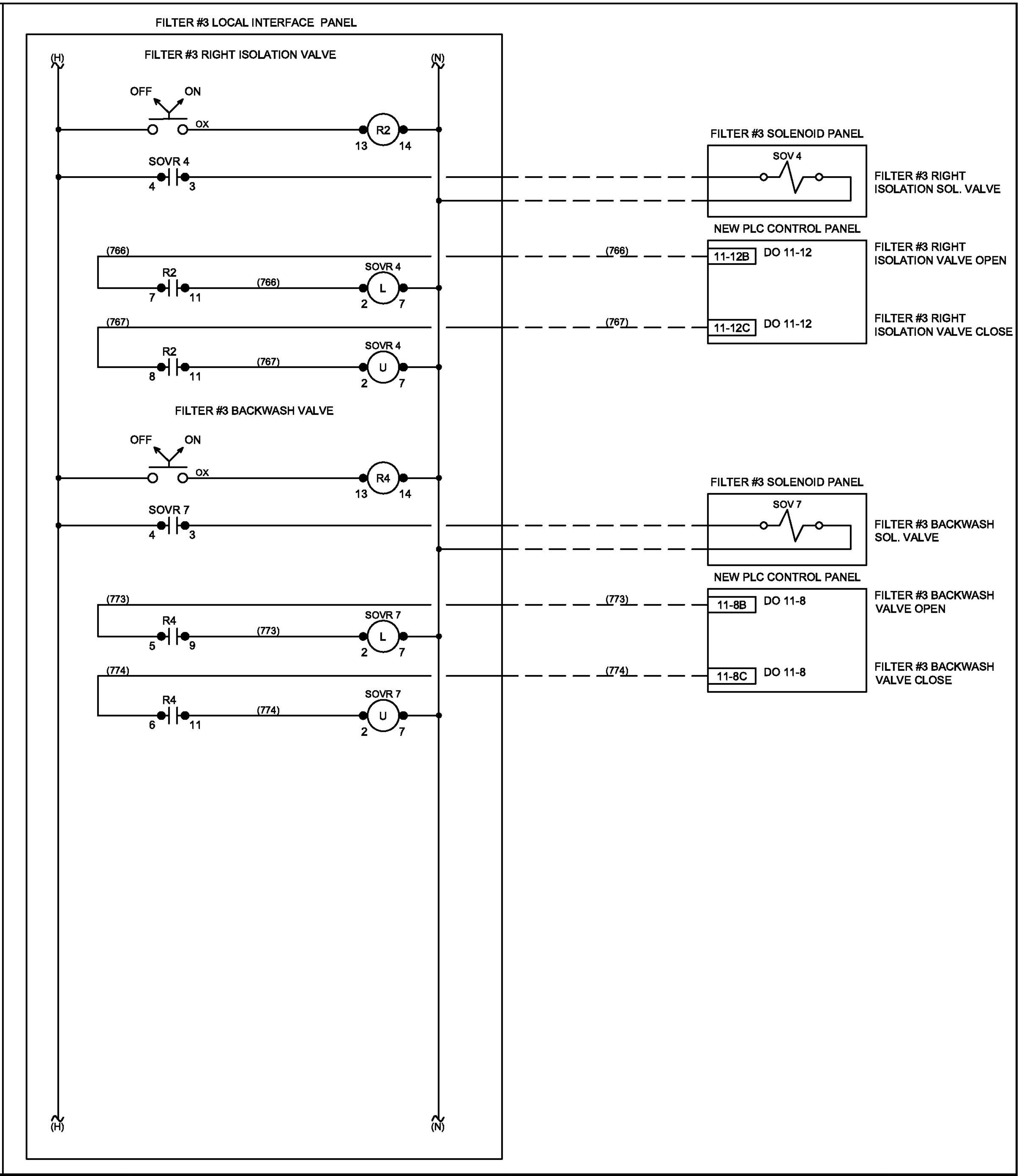
FILTER #2 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

16
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D16 Filter #2 Valve Field Wiring.dwg [Thursday, April 06, 2017]


FILTER #3 LOCAL INTERFACE PANEL
FILTER #3 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
OFF
ON
OX
R1
13
14
SOVR 1
4
3
FILTER #3 SOLENOID PANEL
SOV 1
FILTER #3 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
11-13B
DO 11-13
FILTER #3 INFLUENT VALVE OPEN
5
9
L
2
7
(747)
11-13C
DO 11-13
3ILTER #1 INFLUENT VALVE CLOSE
6
10
U
FILTER #3 BACKWASH WASTE VALVE
SOVR 2
SOV 2
FILTER #3 BACKWASH WASTE SOL. VALVE
(761)
11-9B
DO 11-9
FILTER #3 BACKWASH WASTE VALVE OPEN
11
(763)
11-9C
DO 11-9
FILTER #3 BACKWASH WASTE VALVE CLOSE
8
FILTER #3 LEFT ISOLATION VALVE
R2
SOVR 3
SOV 3
FILTER #3 LEFT ISOLATION SOL. VALVE
(764)
11-11B
DO 11-11
FILTER #3 LEFT ISOLATIONVALVE OPEN
(765)
11-11C
DO 11-11
FILTER #3 LEFT ISOLATION VALVE CLOSE
(H)
(N)


FILTER #3 LOCAL INTERFACE PANEL
(H)
(N)
FILTER #3 RIGHT ISOLATION VALVE
OFF
ON
OX
R2
13
14
SOVR 4
4
3
FILTER #3 SOLENOID PANEL
SOV 4
FILTER #3 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
11-12B
DO 11-12
FILTER #3 RIGHT ISOLATION VALVE OPEN
7
11
L
2
(767)
11-12C
DO 11-12
FILTER #3 RIGHT ISOLATION VALVE CLOSE
8
U
FILTER #3 BACKWASH VALVE
R4
SOVR 7
SOV 7
FILTER #3 BACKWASH SOL. VALVE
(773)
11-8B
DO 11-8
FILTER #3 BACKWASH VALVE OPEN
5
9
(774)
11-8C
DO 11-8
FILTER #3 BACKWASH VALVE CLOSE
6

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
C				
B				
A				

GENERAL CONTRACTOR

MOLTZ CONSTRUCTION

2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR

STURGEON ELECTRIC

2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS

720.344.7771 720.344.7460 FAX

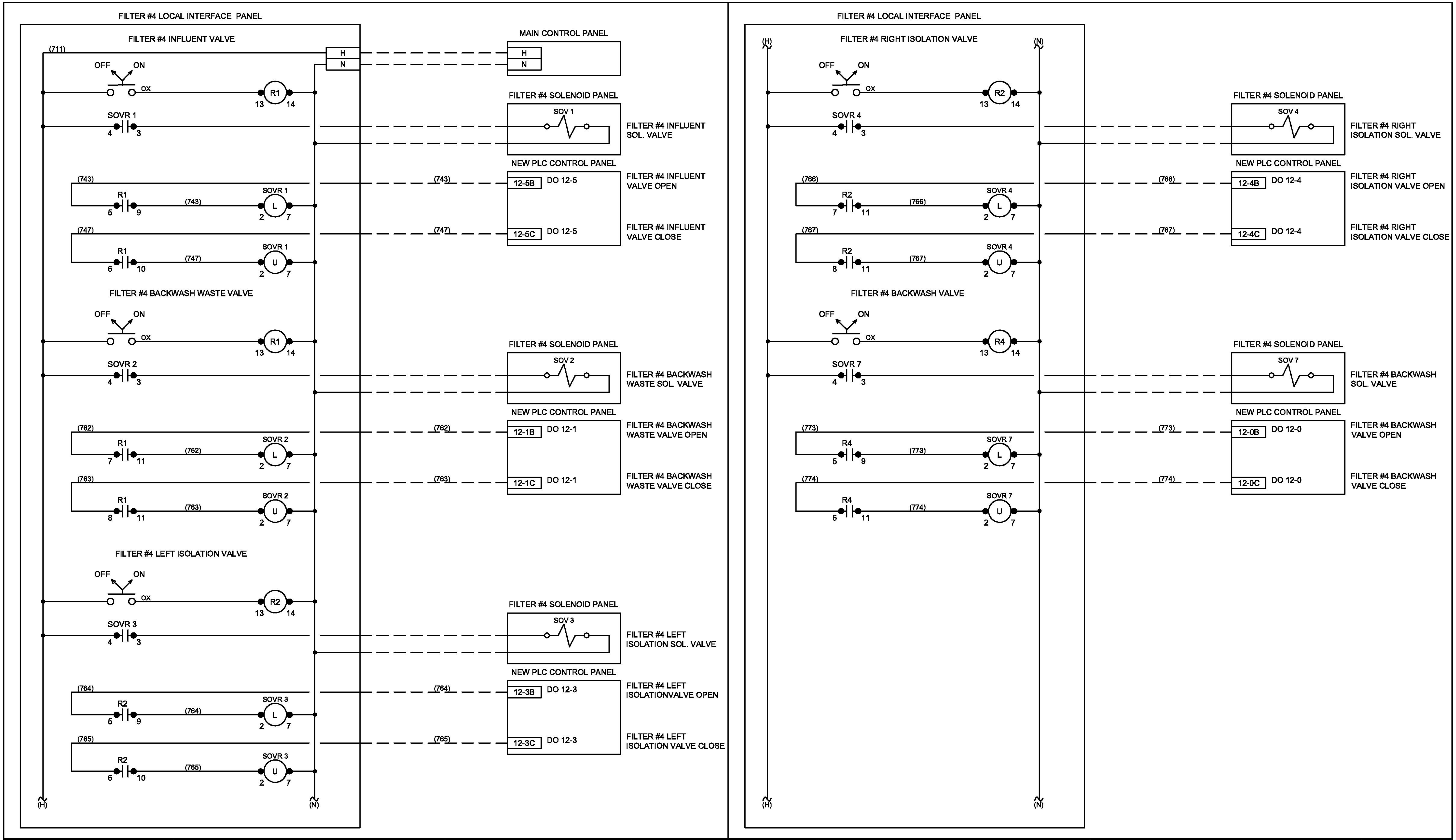
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

FILTER #3 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

17
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D17 Filter #3 Valve Field Wiring.dwg [Thursday, April 06, 2017]


FILTER #4 LOCAL INTERFACE PANEL
FILTER #4 INFLUENT VALVE
(711)
H
N
MAIN CONTROL PANEL
H
N
OFF
ON
OX
R1
13
14
FILTER #4 SOLENOID PANEL
SOVR 1
4
3
SOV 1
FILTER #4 INFLUENT SOL. VALVE
NEW PLC CONTROL PANEL
(743)
R1
5
9
(743)
SOVR 1
L
2
7
(743)
12-5B
DO 12-5
FILTER #4 INFLUENT VALVE OPEN
(747)
R1
6
10
(747)
SOVR 1
U
2
7
(747)
12-5C
DO 12-5
FILTER #4 INFLUENT VALVE CLOSE
FILTER #4 BACKWASH WASTE VALVE
OFF
ON
OX
R1
13
14
FILTER #4 SOLENOID PANEL
SOVR 2
4
3
SOV 2
FILTER #4 BACKWASH WASTE SOL. VALVE
NEW PLC CONTROL PANEL
(762)
R1
7
11
(762)
SOVR 2
L
2
7
(762)
12-1B
DO 12-1
FILTER #4 BACKWASH WASTE VALVE OPEN
(763)
R1
8
11
(763)
SOVR 2
U
2
7
(763)
12-1C
DO 12-1
FILTER #4 BACKWASH WASTE VALVE CLOSE
FILTER #4 LEFT ISOLATION VALVE
OFF
ON
OX
R2
13
14
FILTER #4 SOLENOID PANEL
SOVR 3
4
3
SOV 3
FILTER #4 LEFT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(764)
R2
5
9
(764)
SOVR 3
L
2
7
(764)
12-3B
DO 12-3
FILTER #4 LEFT ISOLATIONVALVE OPEN
(765)
R2
6
10
(765)
SOVR 3
U
2
7
(765)
12-3C
DO 12-3
FILTER #4 LEFT ISOLATION VALVE CLOSE
(H)
(N)
FILTER #4 LOCAL INTERFACE PANEL
(H)
(N)
FILTER #4 RIGHT ISOLATION VALVE
OFF
ON
OX
R2
13
14
FILTER #4 SOLENOID PANEL
SOVR 4
4
3
SOV 4
FILTER #4 RIGHT ISOLATION SOL. VALVE
NEW PLC CONTROL PANEL
(766)
R2
7
11
(766)
SOVR 4
L
2
7
(766)
12-4B
DO 12-4
FILTER #4 RIGHT ISOLATION VALVE OPEN
(767)
R2
8
11
(767)
SOVR 4
U
2
7
(767)
12-4C
DO 12-4
FILTER #4 RIGHT ISOLATION VALVE CLOSE
FILTER #4 BACKWASH VALVE
OFF
ON
OX
R4
13
14
FILTER #4 SOLENOID PANEL
SOVR 7
4
3
SOV 7
FILTER #4 BACKWASH SOL. VALVE
NEW PLC CONTROL PANEL
(773)
R4
5
9
(773)
SOVR 7
L
2
7
(773)
12-0B
DO 12-0
FILTER #4 BACKWASH VALVE OPEN
(774)
R4
6
11
(774)
SOVR 7
U
2
7
(774)
12-0C
DO 12-0
FILTER #4 BACKWASH VALVE CLOSE
(H)
(N)

1"

IF THIS LINE IS NOT EQUAL TO ONE INCH ADJUST SCALES ACCORDINGLY

PROJECT NUMBER:
16-873

REVISIONS

REV.	DESCRIPTION	BY	DATE	APP.
F				
E				
D				
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A				

GENERAL CONTRACTOR
MOLTZ CONSTRUCTION
2881 S 31ST AVE #5A
GREELEY, CO 80631
970-330-3248

ELECTRICAL CONTRACTOR
STURGEON ELECTRIC
2775 RIVERSIDE PARKWAY
GRAND JUNCTION, CO 81501
970-281-9041

BROWNS HILL
ENGINEERING & CONTROLS
720.344.7771 720.344.7460 FAX

CITY OF GRAND JUNCTION
WTP FILTER UPGRADE

FILTER #4 EXISTING VALVES
FIELD WIRING
WIRING DIAGRAMS

DESIGNED BY: TFW
DRAWN BY: KJW
APPROVED BY:
DATE: 4/2017

18
18

X:\BH Office Clients\Grand Junction\16-873 WTP Filter Upgrade- Bidding\16-873 Wiring Diagrams\BHEC AutoCAD Drawings\D18 Filter #4 Valve Field Wiring.dwg [Thursday, April 06, 2017]

Block: OB_1
Author:
Created: 06/26/2007 12:29:09 pm
Last Modified: 04/12/2012 12:43:47 pm

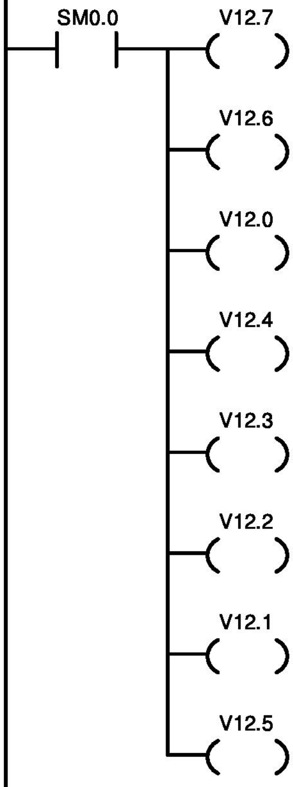
Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

PROGRAM COMMENTS
Press F1 for help and example program

PROGRAM COMMENTS
Press F1 for help and example program

Network 1 TD200 MESSAGE DISPLAY

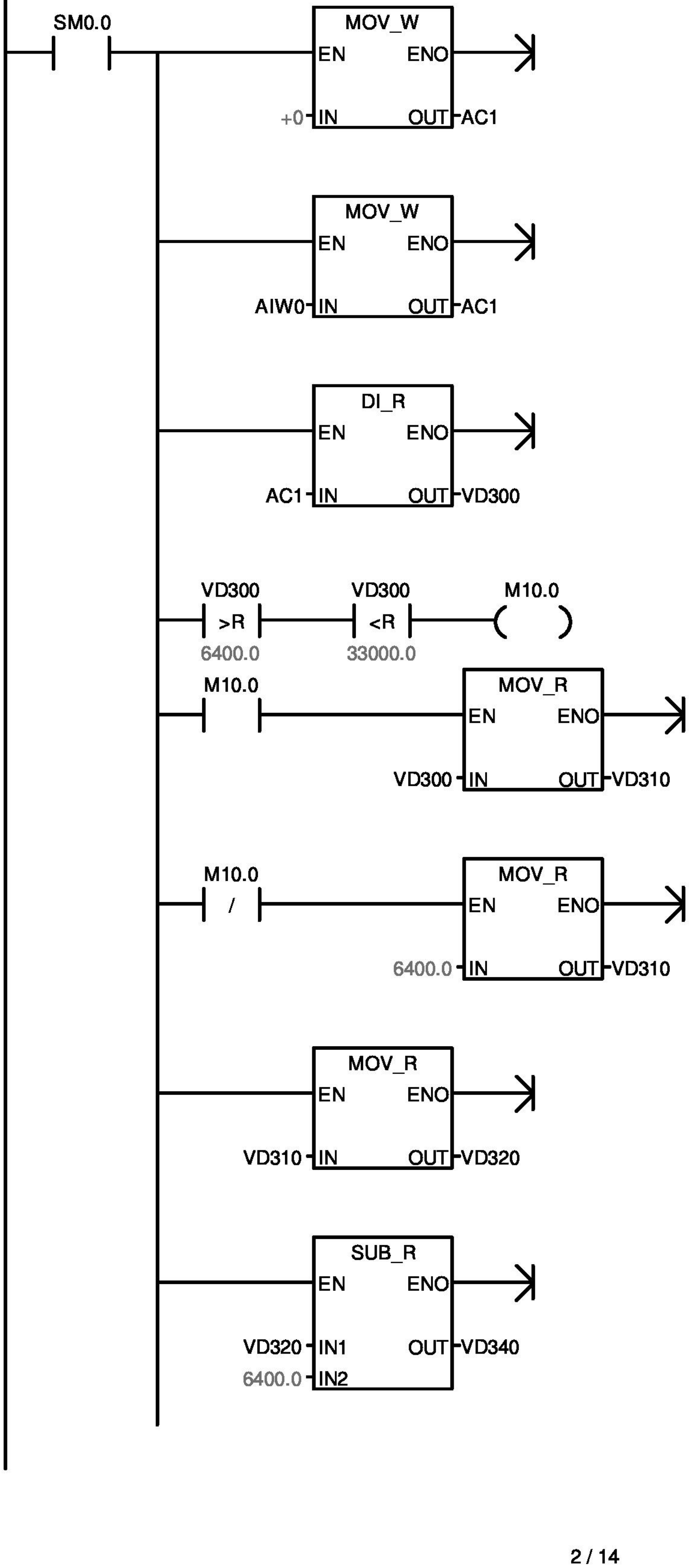
NETWORK COMMENTS

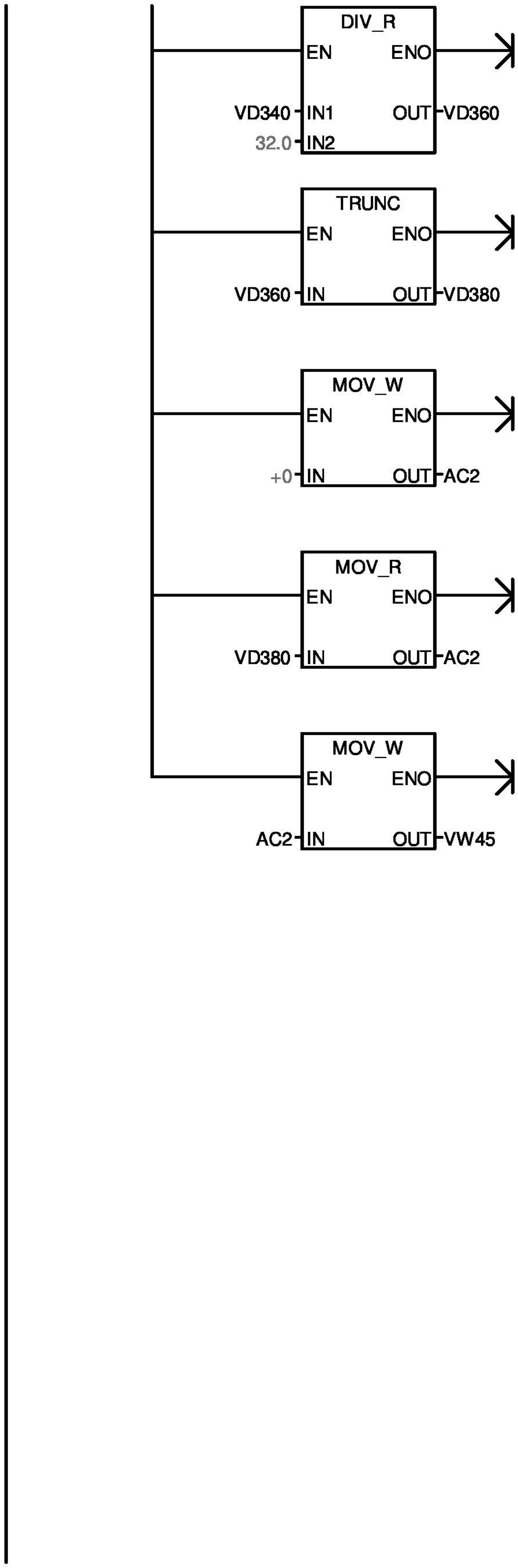

SM0.0
V12.7
V12.6
V12.0
V12.4
V12.3
V12.2
V12.1
V12.5

Network 2 Flow Rate

NETWORK COMMENTS

This rung is the analog control for the PUMP STATION flow

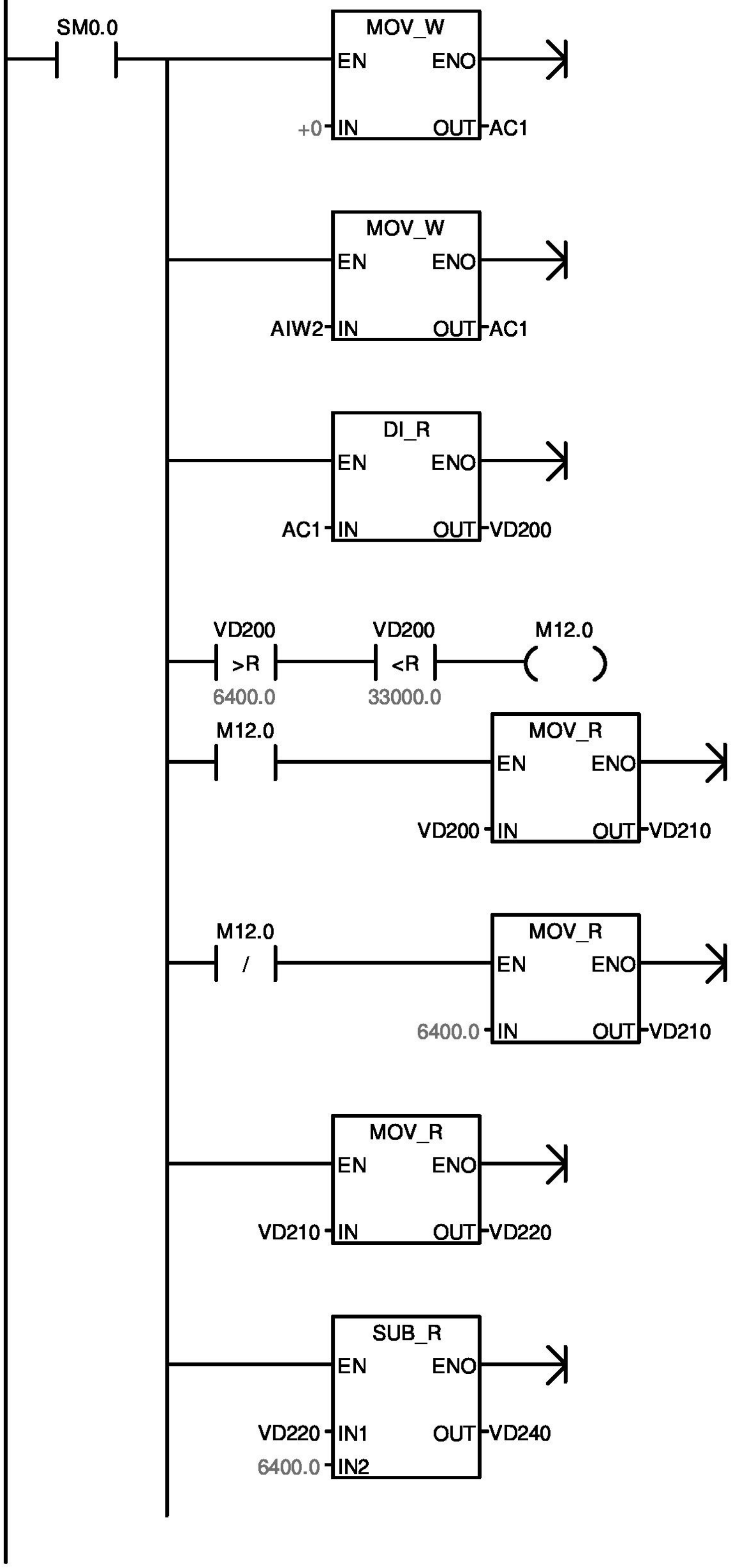

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
AIW0
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD300
VD300
>R
6400.0
VD300
<R
33000.0
M10.0
M10.0
MOV_R
EN
ENO
VD300
IN
OUT
VD310
M10.0
/
MOV_R
EN
ENO
6400.0
IN
OUT
VD310
MOV_R
EN
ENO
VD310
IN
OUT
VD320
SUB_R
EN
ENO
VD320
IN1
6400.0
IN2
OUT
VD340

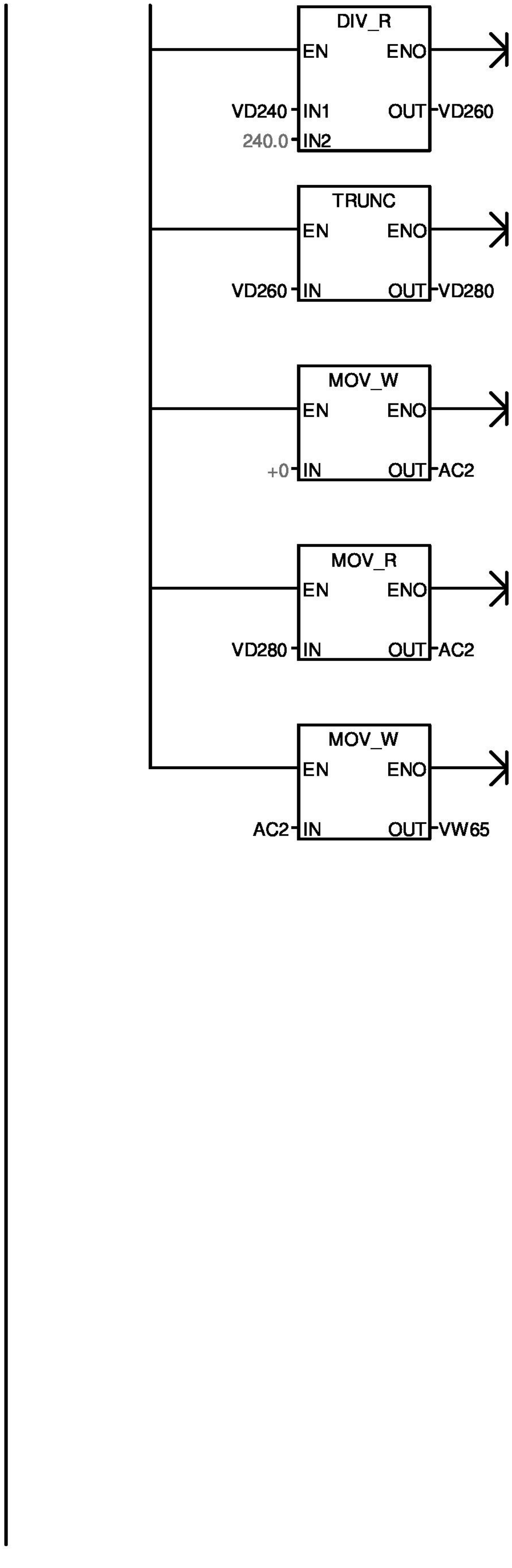

DIV_R
EN
ENO
VD340
IN1
OUT
VD360
32.0
IN2
TRUNC
EN
ENO
VD360
IN
OUT
VD380
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_R
EN
ENO
VD380
IN
OUT
AC2
MOV_W
EN
ENO
AC2
IN
OUT
VW45

Network 3 Pressure Signal

NETWORK COMMENTS

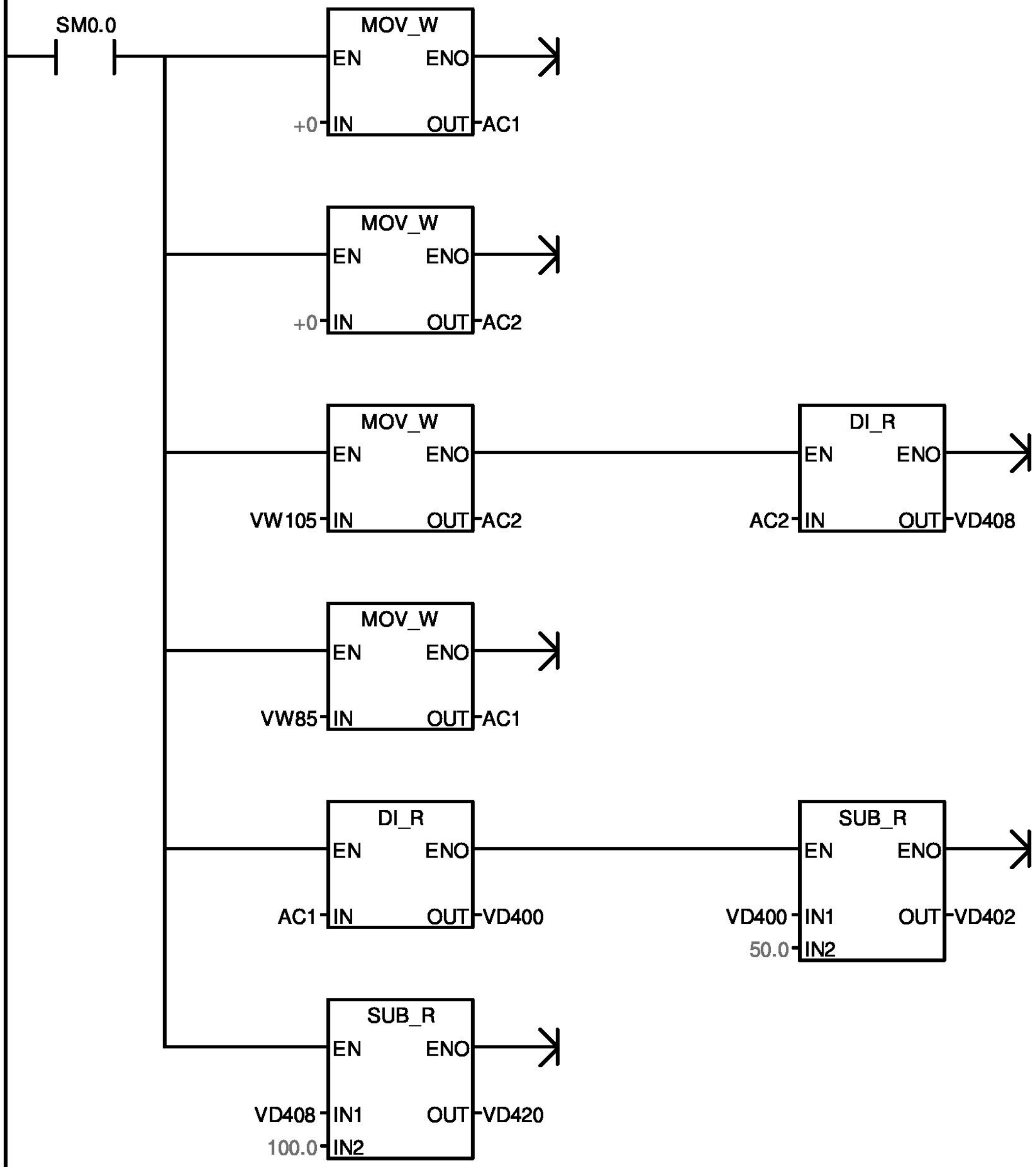
This rung is the analog control for the PUMP STATION flow


SM0.0
MOV_W
EN ENO
+0 IN OUT AC1
MOV_W
EN ENO
AIW2 IN OUT AC1
DI_R
EN ENO
AC1 IN OUT VD200
VD200
>R
6400.0
VD200
<R
33000.0
M12.0
M12.0
MOV_R
EN ENO
VD200 IN OUT VD210
M12.0
/
MOV_R
EN ENO
6400.0 IN OUT VD210
MOV_R
EN ENO
VD210 IN OUT VD220
SUB_R
EN ENO
VD220 IN1 OUT VD240
6400.0 IN2


DIV_R
EN
ENO
VD240
IN1
OUT
VD260
240.0
IN2
TRUNC
EN
ENO
VD260
IN
OUT
VD280
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_R
EN
ENO
VD280
IN
OUT
AC2
MOV_W
EN
ENO
AC2
IN
OUT
VW65

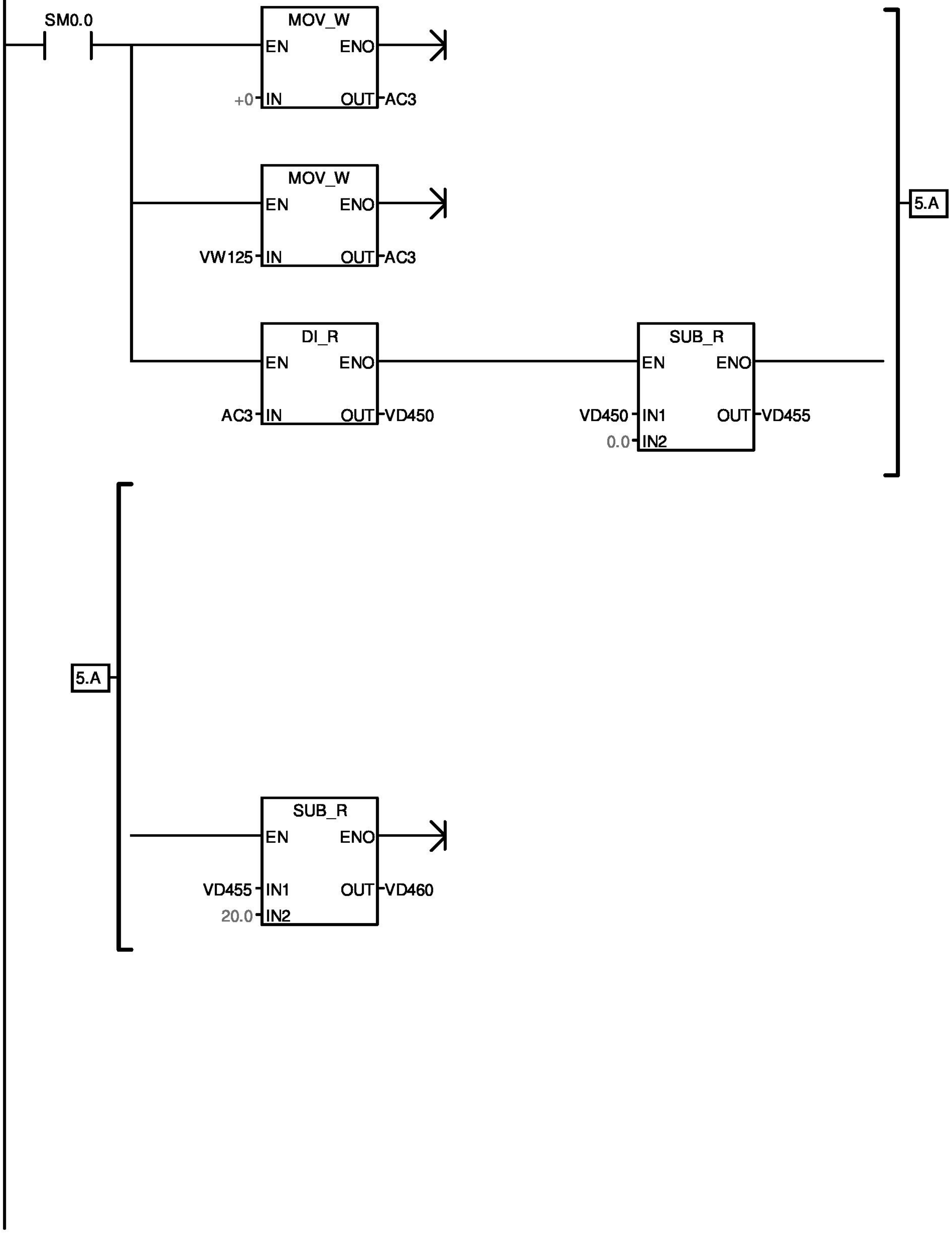
Network 4 Pump 2 & 3 Flow Control

This is the setpoints for Pumps 2 & 3 flowcontrol


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
VW105
IN
OUT
AC2
DI_R
EN
ENO
AC2
IN
OUT
VD408
MOV_W
EN
ENO
VW85
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD400
SUB_R
EN
ENO
VD400
IN1
OUT
VD402
50.0
IN2
SUB_R
EN
ENO
VD408
IN1
OUT
VD420
100.0
IN2

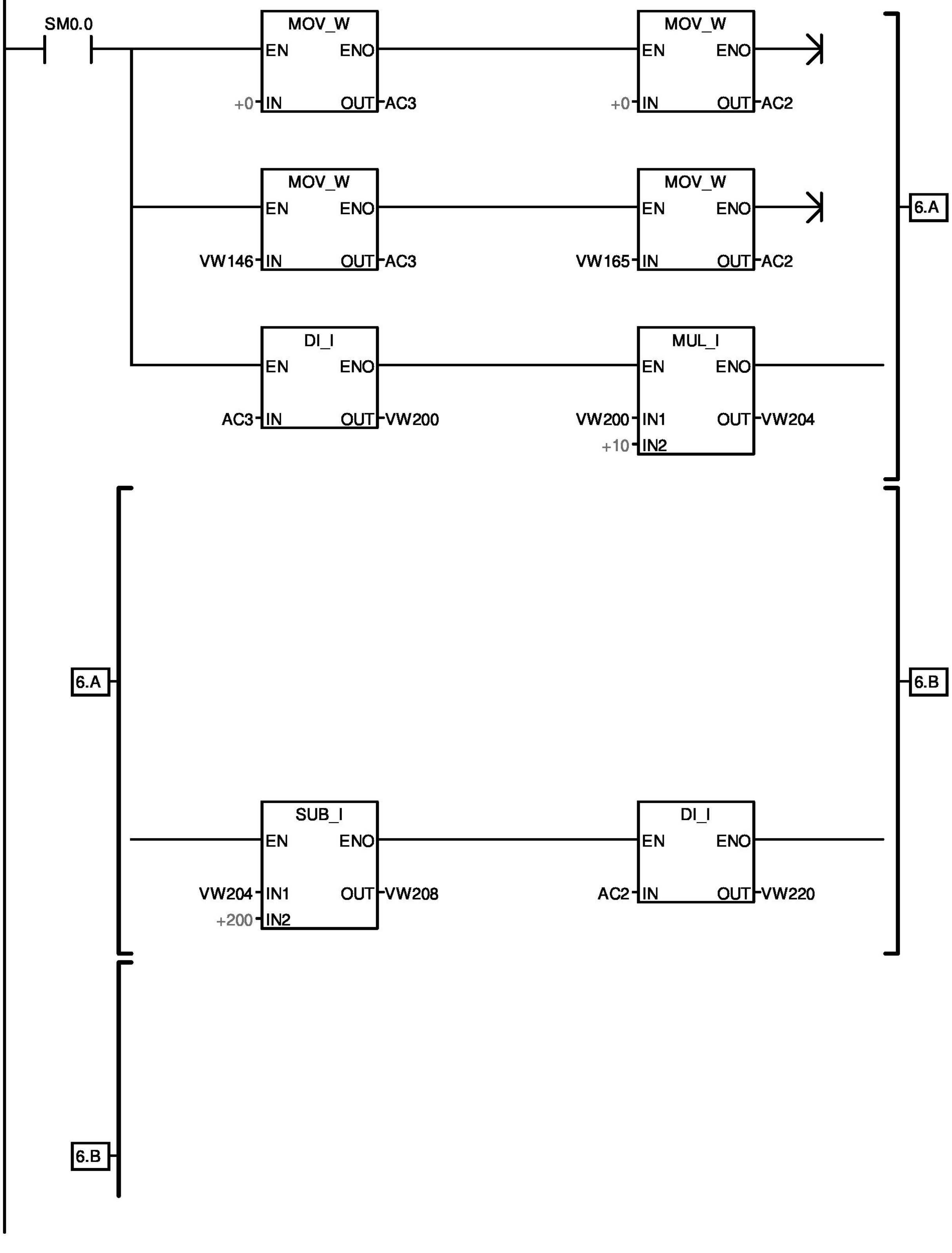
Network 5 Pump 2 & 3 Pressure Control

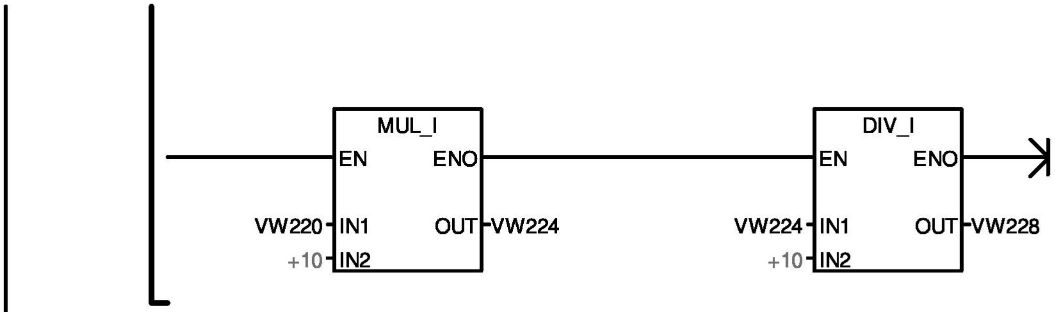
This is the setpoints for Pumps 2 & 3 Pressure control


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
VW125
IN
OUT
AC3
DI_R
EN
ENO
AC3
IN
OUT
VD450
SUB_R
EN
ENO
VD450
IN1
0.0
IN2
OUT
VD455
5.A
5.A
SUB_R
EN
ENO
VD455
IN1
20.0
IN2
OUT
VD460

Network 6 Pump 2 & 3 On/Off delay Control

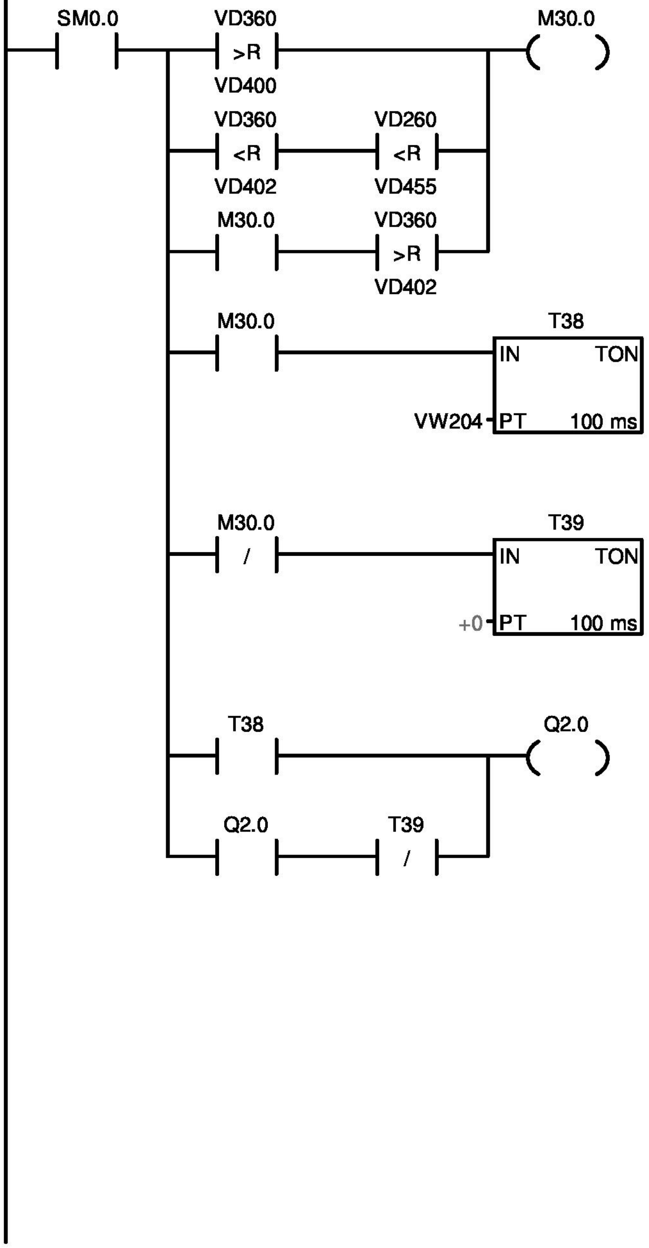
This is the ON\OFF Time Delay for Pumps 2 & 3 control


SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC3
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_W
EN
ENO
VW146
IN
OUT
AC3
MOV_W
EN
ENO
VW165
IN
OUT
AC2
6.A
DI_I
EN
ENO
AC3
IN
OUT
VW200
MUL_I
EN
ENO
VW200
IN1
+10
IN2
OUT
VW204
6.A
6.B
SUB_I
EN
ENO
VW204
IN1
+200
IN2
OUT
VW208
DI_I
EN
ENO
AC2
IN
OUT
VW220
6.B


MUL_I
EN
ENO
VW220
IN1
OUT
VW224
+10
IN2
DIV_I
EN
ENO
VW224
IN1
OUT
VW228
+10
IN2

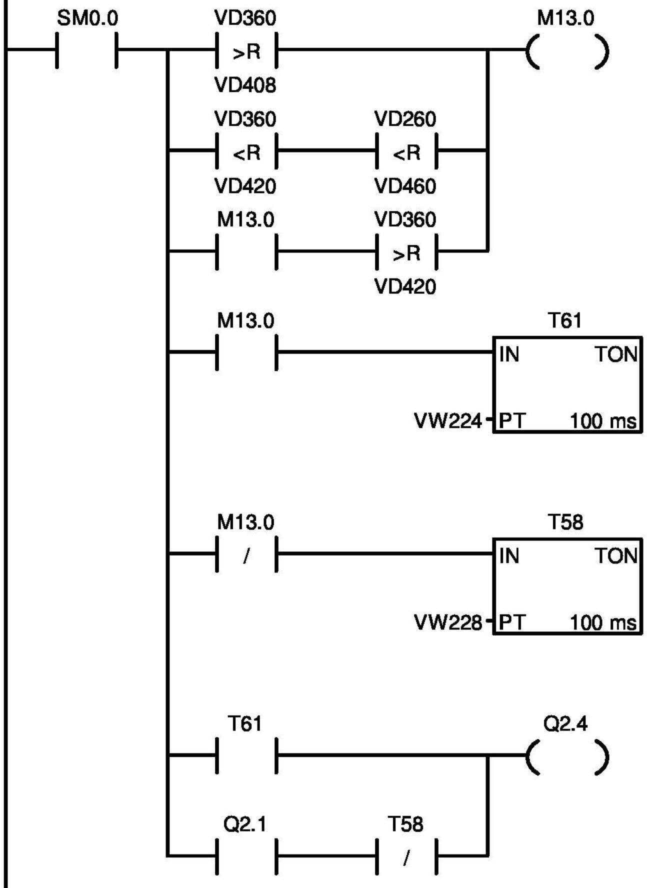
Network 7 Pump 2 (20Hp) Control

This is the setpoint control for the number 2 pump


SM0.0
VD360
>R
VD400
M30.0
VD360
<R
VD402
VD260
<R
VD455
M30.0
VD360
>R
VD402
M30.0
T38
IN
TON
VW204
PT
100 ms
M30.0
/
T39
IN
TON
+0
PT
100 ms
T38
Q2.0
Q2.0
T39
/

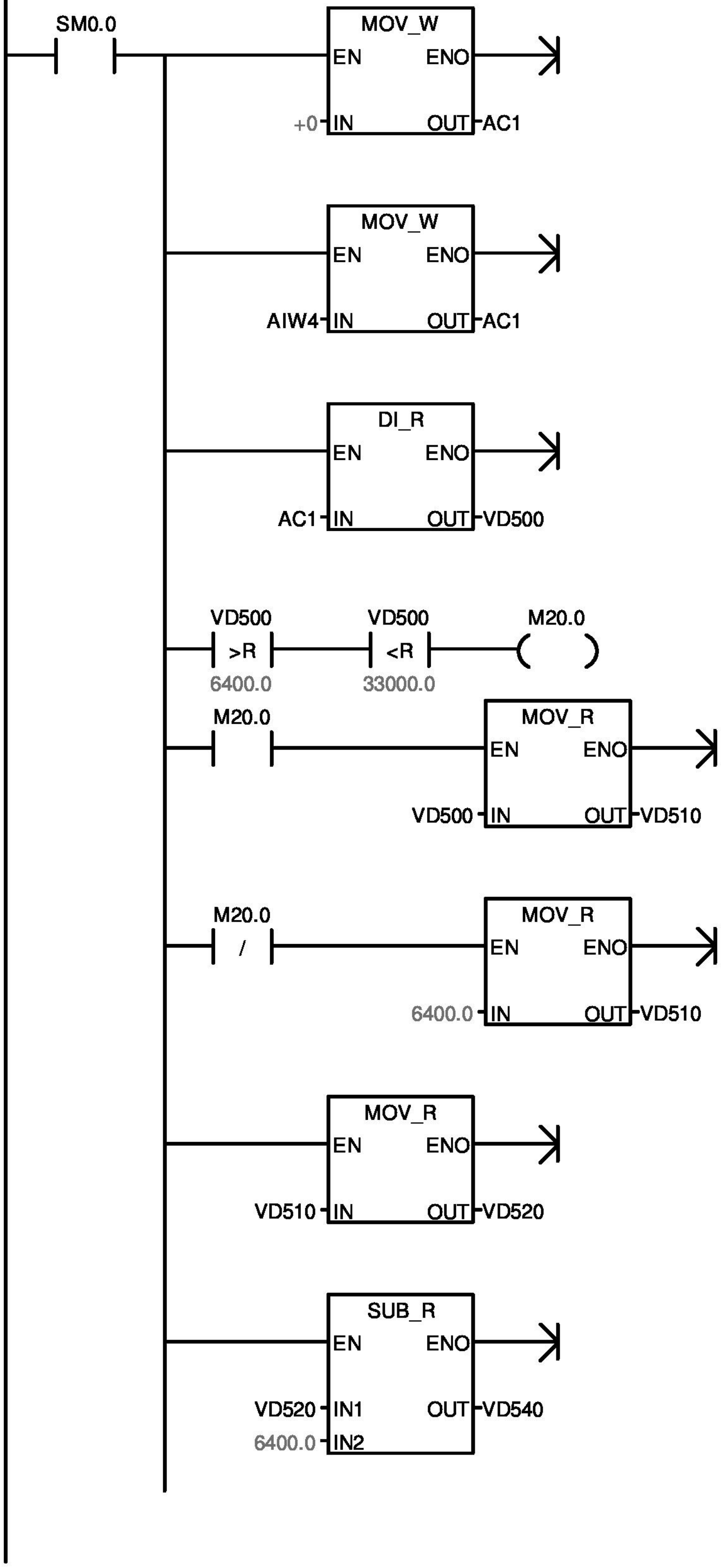
Network 8 Pump 3 (Fire) Control

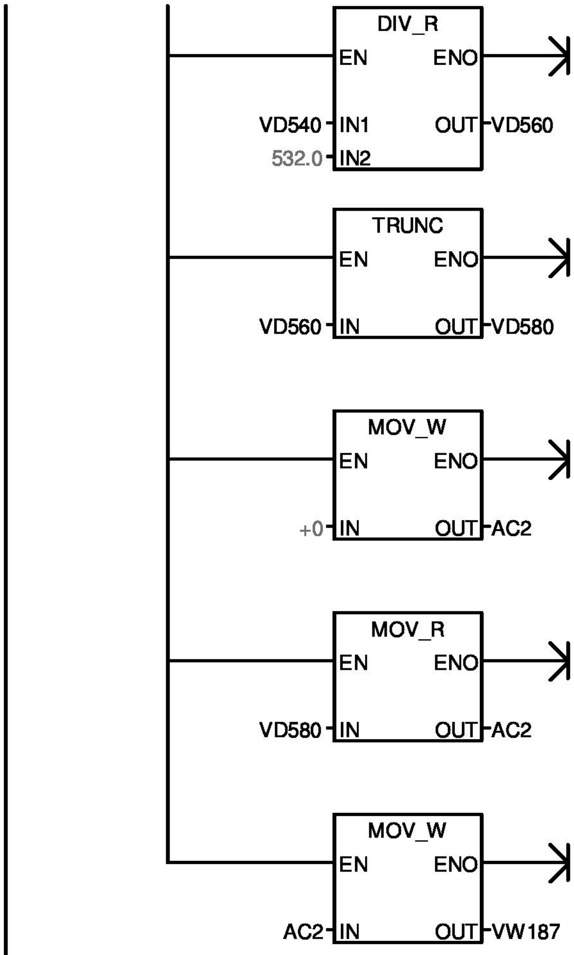
This is the setpoint control for the number 3 (Fire) pump


SM0.0
VD360
>R
VD408
M13.0
VD360
<R
VD420
VD260
<R
VD460
M13.0
VD360
>R
VD420
M13.0
T61
IN
TON
VW224
PT
100 ms
M13.0
/
T58
IN
TON
VW228
PT
100 ms
T61
Q2.4
Q2.1
T58
/

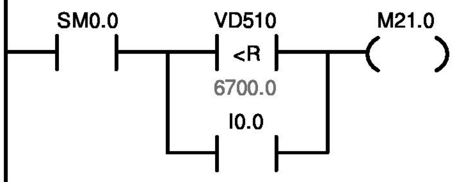
Network 9 NETWORK TITLE (single line)

NETWORK COMMENTS

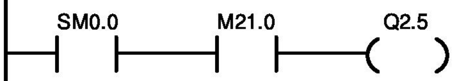

SM0.0
MOV_W
EN
ENO
+0
IN
OUT
AC1
MOV_W
EN
ENO
AIW4
IN
OUT
AC1
DI_R
EN
ENO
AC1
IN
OUT
VD500
VD500
>R
6400.0
VD500
<R
33000.0
M20.0
M20.0
MOV_R
EN
ENO
VD500
IN
OUT
VD510
M20.0
/
MOV_R
EN
ENO
6400.0
IN
OUT
VD510
MOV_R
EN
ENO
VD510
IN
OUT
VD520
SUB_R
EN
ENO
VD520
IN1
OUT
VD540
6400.0
IN2


DIV_R
EN
ENO
VD540
IN1
OUT
VD560
532.0
IN2
TRUNC
EN
ENO
VD560
IN
OUT
VD580
MOV_W
EN
ENO
+0
IN
OUT
AC2
MOV_R
EN
ENO
VD580
IN
OUT
AC2
MOV_W
EN
ENO
AC2
IN
OUT
VW187

Network 10


SM0.0
VD510
<R
6700.0
I0.0
M21.0

Network 11


SM0.0
M21.0
Q2.5

Block: SBR_0
Author:
Created: 05/24/2018 11:13:53 am
Last Modified: 05/24/2018 11:14:38 am

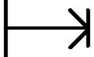
Symbol	Var Type	Data Type	Comment
EN	IN	BOOL	
	IN		
	IN_OUT		
	OUT		
	TEMP		

SUBROUTINE COMMENTS
Press F1 for help and example program

SUBROUTINE COMMENTS
Press F1 for help and example program

Network 1 NETWORK TITLE (single line)

NETWORK COMMENTS



Block: INT_0
Author:
Created: 05/24/2018 11:13:53 am
Last Modified: 05/24/2018 11:14:38 am

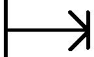
Symbol	Var Type	Data Type	Comment
	TEMP		
	TEMP		
	TEMP		
	TEMP		

INTERRUPT ROUTINE COMMENTS
Press F1 for help and example program

INTERRUPT ROUTINE COMMENTS
Press F1 for help and example program

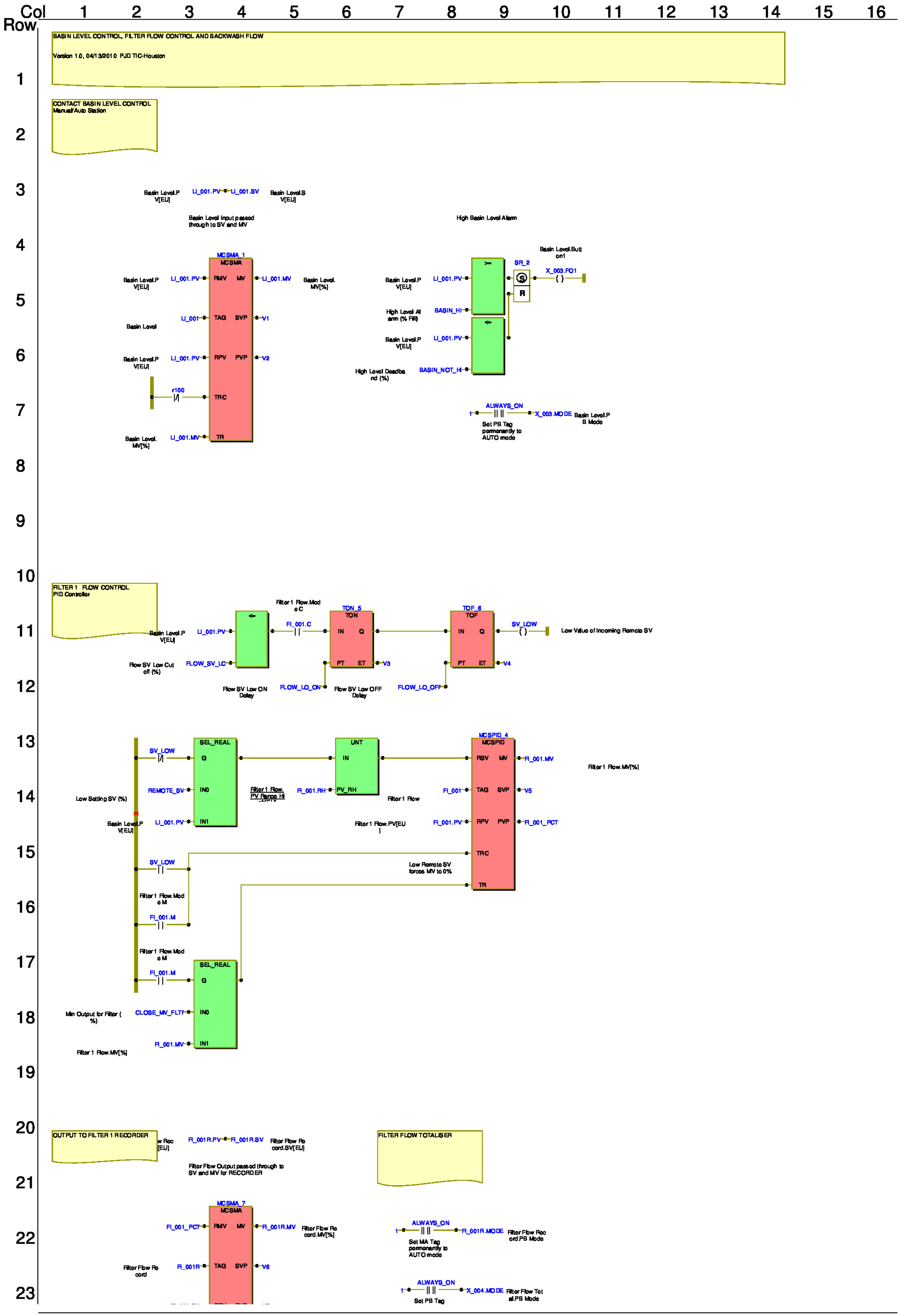
Network 1 NETWORK TITLE (single line)

NETWORK COMMENTS



Water Plant Feed Control
Siemans S700 PLC I/O

Influent Flow	AIW0
Effluent Flow	AIW2
Influent Flow to Recorder	AQW16
Ach Feeder	AQW0
Cpoly Feed	AQW4
Filter Aid Feed	AQW6
Flouride Feed Limit	VD1240
Flouride Feed	AQW8
Pre Chlorine Feed	AQW10
Post Chlorine Feed	AQW12


Col
1
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5
6
7
8
9
10
11
12
13
14
15
16
Row
1
2
3
4
5
6
7
8
9
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11
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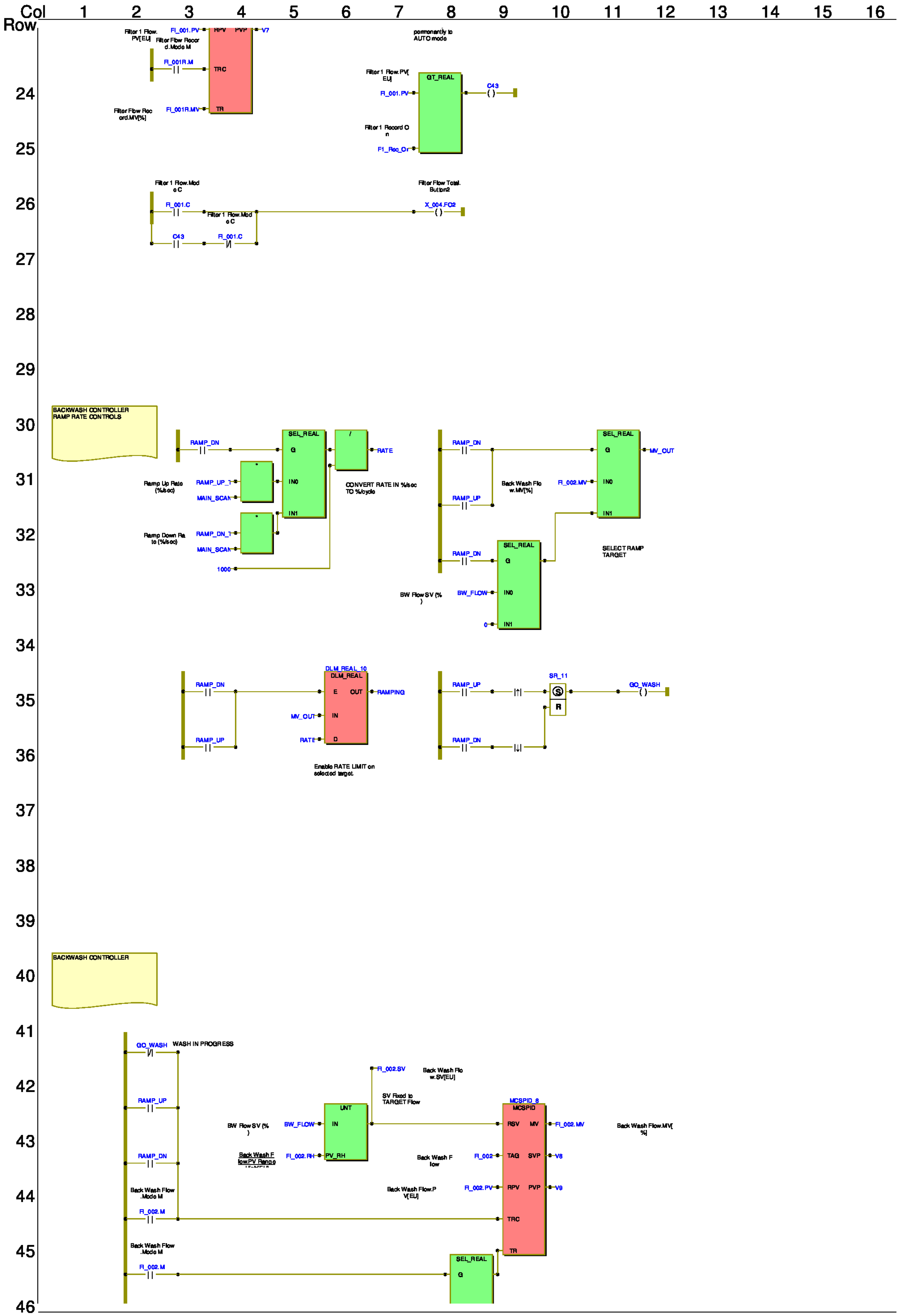
18
19
20
21
22
23
BASIN LEVEL CONTROL, FILTER FLOW CONTROL AND BACKWASH FLOW
Version 1.0, 04/13/2010 PJD TIC-Houston
CONTACT BASIN LEVEL CONTROL
Manual/Auto Station
Basin Level.PV[EU]
LI_001.PV
LI_001.SV
Basin Level.SV[EU]
Basin Level Input passed through to SV and MV
High Basin Level Alarm
MCSMA_1
MCSMA
RMV
MV
TAG
SVP
RPV
PVP
TRC
TR
LI_001.PV
LI_001.MV
Basin Level.MV[%]
LI_001
V1
Basin Level
V2
r100
Basin Level.MV[%]
LI_001.MV
>=
<=
SR_2
S
R
Basin Level.Button1
X_003.FO1
( )
High Level Alarm (% Fill)
BASIN_HI
BASIN_NOT_HI
High Level Deadband (%)
ALWAYS_ON
1
X_003.MODE
Basin Level.PB Mode
Set PB Tag permanently to AUTO mode
FILTER 1 FLOW CONTROL
PID Controller
Filter 1 Flow.Mode C
FI_001.C
TON_5
TON
IN
Q
PT
ET
V3
TOF_6
TOF
V4
SV_LOW
Low Value of Incoming Remote SV
Flow SV Low Cut off (%)
FLOW_SV_LO
Flow SV Low ON Delay
FLOW_LO_ON
Flow SV Low OFF Delay
FLOW_LO_OFF
SEL_REAL
G
IN0
IN1
REMOTE_SV
Low Setting SV (%)
Filter 1 Flow. PV Range Hi
FI_001.RH
UNT
PV_RH
Filter 1 Flow
Filter 1 Flow.PV[EU]
MCSPID_4
MCSPID
RSV
FI_001.MV
Filter 1 Flow.MV[%]
FI_001
V5
FI_001.PV
FI_001_PCT
Low Remote SV forces MV to 0%
Filter 1 Flow.Mode M
FI_001.M
Min Output for Filter (%)
CLOSE_MV_FLTR
OUTPUT TO FILTER 1 RECORDER
w Rec
[EU]
FI_001R.PV
FI_001R.SV
Filter Flow Record.SV[EU]
Filter Flow Output passed through to SV and MV for RECORDER
FILTER FLOW TOTALISER
MCSMA_7
FI_001_PCT
FI_001R.MV
Filter Flow Record.MV[%]
Filter Flow Record
FI_001R
V6
FI_001R.MODE
Filter Flow Record.PB Mode
Set MA Tag permanently to AUTO mode
X_004.MODE
Filter Flow Total.PB Mode
Set PB Tag


Col
Row
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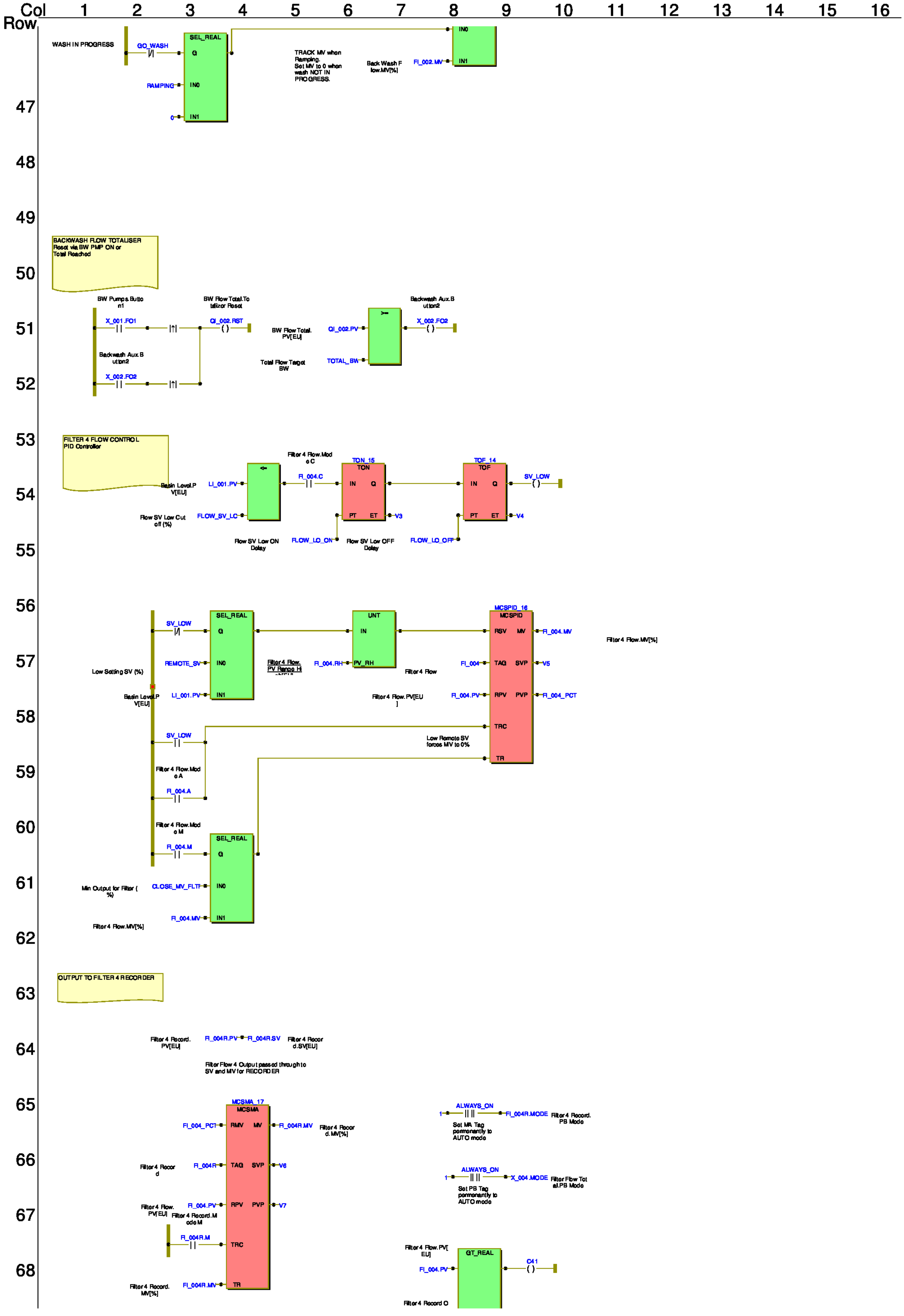
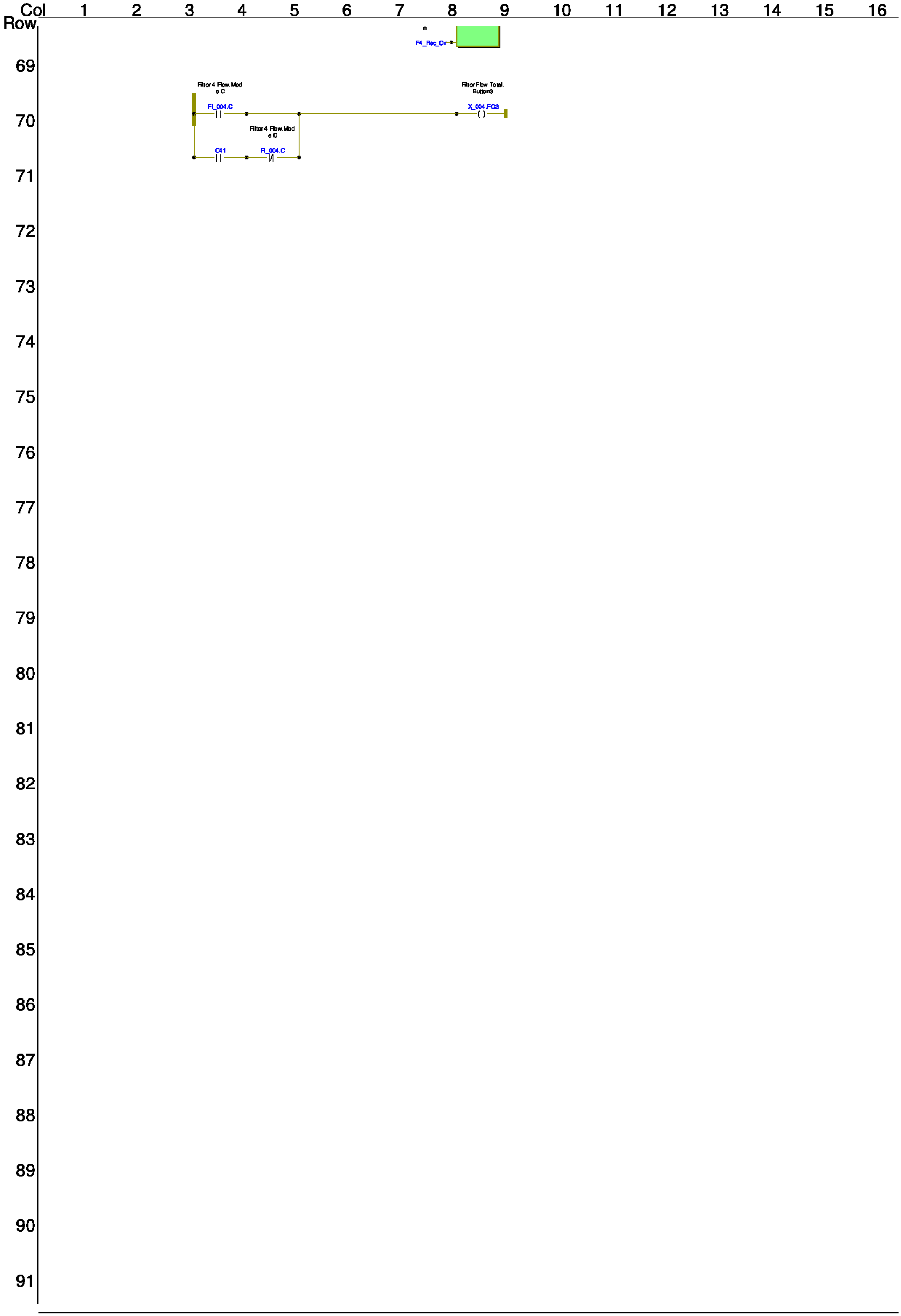
9
10
11
12
13
14
15
16
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39
40
41
42
43
44
45
46
Filter 1 Flow.PV[EU]
FI_001.PV
RPV
PVP
V7
Filter Flow Record.Mode M
FI_001R.M
TRC
Filter Flow Record.MV[%]
FI_001R.MV
TR
permanently to AUTO mode
Filter 1 Flow.PV[EU]
FI_001.PV
GT_REAL
C43
( )
Filter 1 Record On
F1_Rec_On
Filter 1 Flow.Mode C
FI_001.C
Filter 1 Flow.Mode C
C43
FI_001.C
Filter Flow Total.Button2
X_004.FO2
( )
BACKWASH CONTROLLER
RAMP RATE CONTROLS
RAMP_DN
SEL_REAL
G
IN0
IN1
/
RATE
*
Ramp Up Rate (%/sec)
RAMP_UP_T
MAIN_SCAN
*
Ramp Down Rate (%/sec)
RAMP_DN_T
MAIN_SCAN
1000
CONVERT RATE IN %/sec TO %/cycle
RAMP_DN
RAMP_UP
Back Wash Flow.MV[%]
FI_002.MV
SEL_REAL
G
IN0
IN1
MV_OUT
RAMP_DN
SEL_REAL
G
IN0
IN1
SELECT RAMP TARGET
BW Flow SV (%)
BW_FLOW
0
RAMP_DN
RAMP_UP
DLM_REAL_10
DLM_REAL
E
OUT
IN
D
RAMPING
MV_OUT
RATE
Enable RATE LIMIT on selected target.
RAMP_UP
|↑|
SR_11
S
R
GO_WASH
( )
RAMP_DN
|↓|
BACKWASH CONTROLLER
GO_WASH
WASH IN PROGRESS
RAMP_UP
RAMP_DN
Back Wash Flow.Mode M
FI_002.M
Back Wash Flow.Mode M
FI_002.M
BW Flow SV (%)
BW_FLOW
UNT
IN
PV_RH
Back Wash Flow.PV Range
FI_002.RH
FI_002.SV
Back Wash Flow.SV[EU]
SV Fixed to TARGET Flow
MCSPID_8
MCSPID
RSV
MV
TAG
SVP
RPV
PVP
TRC
TR
FI_002.MV
Back Wash Flow.MV[%]
Back Wash Flow
FI_002
V8
Back Wash Flow.PV[EU]
FI_002.PV
V9
SEL_REAL
G


Col
1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
Row
47
48
49
50
51
52
53
54
55
56
57
58
59
60
61
62
63
64
65
66
67
68
WASH IN PROGRESS
GO_WASH
SEL_REAL
G
IN0
IN1
RAMPING
0
TRACK MV when Ramping. Set MV to 0 when wash NOT IN PROGRESS.
Back Wash Flow.MV[%]
FI_002.MV
IN0
IN1
BACKWASH FLOW TOTALISER Reset via BW PMP ON or Total Reached
BW Pumps Button1
X_001.FO1
BW Flow Total.Totalizor Reset
QI_002.RST
Backwash Aux.Button2
X_002.FO2
BW Flow Total.PV[EU]
QI_002.PV
>=
Total Flow Target BW
TOTAL_BW
Backwash Aux.Button2
X_002.FO2
FILTER 4 FLOW CONTROL PID Controller
Basin Level.PV[EU]
LI_001.PV
<=
Flow SV Low Cut off (%)
FLOW_SV_LC
Filter 4 Flow.Mode C
FI_004.C
TON_15
TON
IN
Q
PT
ET
V3
Flow SV Low ON Delay
FLOW_LO_ON
TOF_14
TOF
IN
Q
PT
ET
V4
Flow SV Low OFF Delay
FLOW_LO_OFF
SV_LOW
SV_LOW
SEL_REAL
G
IN0
IN1
REMOTE_SV
Low Setting SV (%)
Basin Level.PV[EU]
LI_001.PV
UNT
IN
PV_RH
Filter 4 Flow.PV Range High[EU]
FI_004.RH
Filter 4 Flow
Filter 4 Flow.PV[EU]
MCSPID_16
MCSPID
RSV
MV
TAG
SVP
RPV
PVP
TRC
TR
FI_004.MV
Filter 4 Flow.MV[%]
FI_004
V5
FI_004.PV
FI_004_PCT
SV_LOW
Low Remote SV forces MV to 0%
Filter 4 Flow.Mode A
FI_004.A
Filter 4 Flow.Mode M
FI_004.M
SEL_REAL
G
IN0
IN1
Min Output for Filter (%)
CLOSE_MV_FLTR
Filter 4 Flow.MV[%]
FI_004.MV
OUTPUT TO FILTER 4 RECORDER
Filter 4 Record.PV[EU]
FI_004R.PV
FI_004R.SV
Filter 4 Record.SV[EU]
Filter Flow 4 Output passed through to SV and MV for RECORDER
MCSMA_17
MCSMA
RMV
MV
TAG
SVP
RPV
PVP
TRC
TR
FI_004_PCT
FI_004R.MV
Filter 4 Record.MV[%]
Filter 4 Record
FI_004R
V6
Filter 4 Flow.PV[EU]
FI_004.PV
V7
Filter 4 Record.Mode M
FI_004R.M
Filter 4 Record.MV[%]
FI_004R.MV
1
ALWAYS_ON
FI_004R.MODE
Filter 4 Record.PB Mode
Set MA Tag permanently to AUTO mode
1
ALWAYS_ON
X_004.MODE
Filter Flow Total.PB Mode
Set PB Tag permanently to AUTO mode
Filter 4 Flow.PV[EU]
FI_004.PV
GT_REAL
C41
Filter 4 Record O


Col
Row
n
F4_Rec_Or
Filter 4 Flow.Mod
e C
FI_004.C
Filter Flow Total.
Button3
X_004.FO3
Filter 4 Flow.Mod
e C
C41
FI_004.C

UNit #2 Toshiba Connections for Backwash & Filter ProgramToshiba Unit #2

POINT	POINT TYPE	TAG TYPE	TAG NAME	TAG ID	EXPANDED ID	MODULE	POINT	TERM+	TERM_	B_U_M_P	Wire No.+	Wire Non -
1	AI	MA	LI_001	PV	BASIN LEVEL	0	1	2	1	00_01_01_00_01	874	875
2	AI	PID	FI_002	PV	FILTER 2 FLOW	0	2	4	3	00_01_01_00_02	817	819
3	AI	PID	F2_002	PV	BACKWASH FLOW	0	3	6	5	00_01_01_00_03	862	861
4	AO	MA	LI_001	MV	CB REMOTE SP OU	1	1	2	1	00_01_01_01_01	510	509
5	AO	PID	F2_002	MV	FILTER 2 VALVE POSITION	1	2	4	3	00_01_01_01_02	856	855
6	AO	PID	FI_002	MV	BW VFD SPEED OUTPUT	1	3	6	5	00_01_01_01_03	871	869
7	AO	MA	FI_002R	MV	FILTER 2 OUTPUT REC	1	5	10	9	00_01_01_01_05	822	823
8	DI	PB	N_001	FI1	START BACKWASH	2	1	A1	B10	00_01_01_02_01	DI1 776	
9	DI	PB	N_001	FI2	EXTEND BACKWASH	2	2	A2	B10	00_01_01_02_02	DI2 799	
10	DO	PB	X_001	FO1	BACKWASH PUMP	3	1	A1	B10	00_01_01_03_01	DO1 776	R1
11	DO	PB	X_002	FO1	PULSE TO STEPPER	3	2	A2	B10	00_01_01_03_02	DO3 735	R2
12	DO	PB	X_001	FO2	SW PUMP	3	3	A3	B10	00_01_01_03_03	DO2	R3
13	DO	PB	X_002	FO2	BACKWASH TOTALIZER	3	4	A4	B10	00_01_01_03_04	DO4 865	R4
14	DO	PB	X_003	FO1	HIGH BASIN LEVEL ALARM	3	5	A5	B10	00_01_01_03_05	DO5	R5 & R8
15	DO	PB	X_004	FO1	FILTER TOTALIZER PULSE	3	6	A6	B10	00_01_01_03_06		
16	DO	PB	X_004	FO2	FILTER 2 RECDATA ON	3	8	A8	B10	00_01_01_03_08	DO8	R6
NEW												
19	AI	PID	FI_003	PV	FILTER 3 FLOW	0	6	14	13	00_01_01_00_06	828	830
20	AO	MA	FI_003R	MV	FILTER 3 OUTPUT REC	1	4	8	7	00_01_01_01_04	833	834
22	AO	PID	FI_003	MV	FILTER 3 VALVE POSITION	1	7	14	13	00_01_01_01_07	858	857
23	DO	PB	X_004	FO3	FILTER 3 RECDATA ON	3	7	A7	B10	00_01_01_03_07	DO7	R7

CITY OF
Grand Junction
COLORADO

Purchasing Division

ADDENDUM NO. 2

DATE: **June 26, 2018**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) RFP-4525-18-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. The Responses Due Date and Time has been changed to ***July 10, 2018 prior to 3:30pm***. During the inquiry period, the City missed answering a set of questions received from a prospective Bidder/Contractor during the inquiry period. Due to the nature and required responses of the questions, the bid opening is being rescheduled to the above-mentioned date and time.

   Replace Section 3.7, IFB Tentative Timeline Schedule, within the bid documents with the updated timeline below:

3.7 IFB TENTATIVE TIME SCHEDULE

Invitation for Bids available:	May 29, 2018
Mandatory Pre-Bid Meeting:	June 6, 2018
Inquiry deadline, no questions after this date:	June 19, 2018
Final Addendum Posted:	June 27, 2018
Submittal deadline for proposals (Bid Opening):	**July 10, 2018**
Owner evaluation of proposals	July 11 - July 18, 2018
Final selection (unless City Council approval is required)	July 20, 2018
Contract execution	July 25, 2018
Work begins no later than	July 30, 2018

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado

CITY OF
Grand Junction
COLORADO

Purchasing Division

ADDENDUM NO. 3

DATE: **June 27, 2018**
FROM: **City of Grand Junction Purchasing Division**
TO: **All Offerors**
RE: **Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) RFP-4525-18-DH**

Offerors responding to the above referenced solicitation are hereby instructed that the requirements have been clarified, modified, superseded and supplemented as to this date as hereinafter described.

Please make note of the following clarifications:

1. Q. If the City can provide physical VM Host servers at City Hall for SCADA VMs, please confirm approximately how many server resources (cores/memory) will be available for use.

   A. The city will provide the required core and memory requirement for based on the software recommend requirements in it's VM environment.

2. Q. Please confirm if disk storage for SCADA servers at City Hall will be SAN, NAS, or DAS type.

   A. Storage will be on one of the SAN devices.

3. Q. Please confirm if the City will also provide the required VM licenses.

   A. The city's VM environment is correctly licensed.

4. Q. Please confirm if the City will be responsible for procurement/installation of all network equipment at City Hall and the WTP.

   A. The City's I.T. Department will purchase and deploy the networking equipment to integrate into the city's infrastructure.

5. Q. If it is decided to install new SCADA servers (primary and/or backup servers) at the WTP, will the City or the SCADA provider be required to procure server/workstation hardware, software and necessary licenses?

   A. The City will procure the severs hardware and all OS licenses to comply with the city's license agreements with Microsoft or other vendors warranty agreements.

6. Q. Please confirm the City Hall to WTP comms link will provide a minimum of 1Gbps dedicated BW for SCADA network needs.

   A. See addendum 1

7. Q. Please provide network speed of the City Hall to WTP wireless remote link.

   A. See addendum 1

8. Q. Please confirm if the City will provide a mail server and/or SMS modem for sending process alarm notifications to WTP support personnel.

   A. The has a mail server that can be used to send emails from systems as needed. The city does not operate an SMS gateway at this time if this is required please provide recommendations for this service for evaluation.

9. Q. Will the City have its own Reporting SW /method for producing the required process/environmental reports, or will the SCADA provider need to provide a reporting solution?

   A. Reporting will need to be part of the SCADA system. The can develop reports from the SCADA system reporting system.

10. Q. What format does the City require history data to be transferred/saved on the City Hall DWH repository?

    A. History data need to be stored in a SQL type Database. The city is most familiar with Microsoft SQL as a database service.

11. Q. Are there any system performance KPI requirements (e.g. max allowed time from field device state change to SCADA GUI displaying the change)?

    A. We're not sure what KPI is, but if it deals with a communication protocol, standard industry specs are fine.

12. Q. Please provide the approximate SCADA monitoring & control i/o count, and if available please send through the WTP SCADA i/o listing.

    A. Please refer to Addendum 1

13. Q. If available, please provide a copy of existing WTP process control descriptions with SCADA functions identified.

    A. Please refer to Addendum 1

14. Q. If available, please provide screen-shots of Redlion HMI GUIs.

    A. See Attached.

15. Q. Please list all PLC comm protocols currently in use for communication between plant PLCs (and stand-alone smart devices) and the Redlion HMI, as well as any other monitoring/control HMIs.

    A. All PLCs are stand-alone; no interface with other systems.

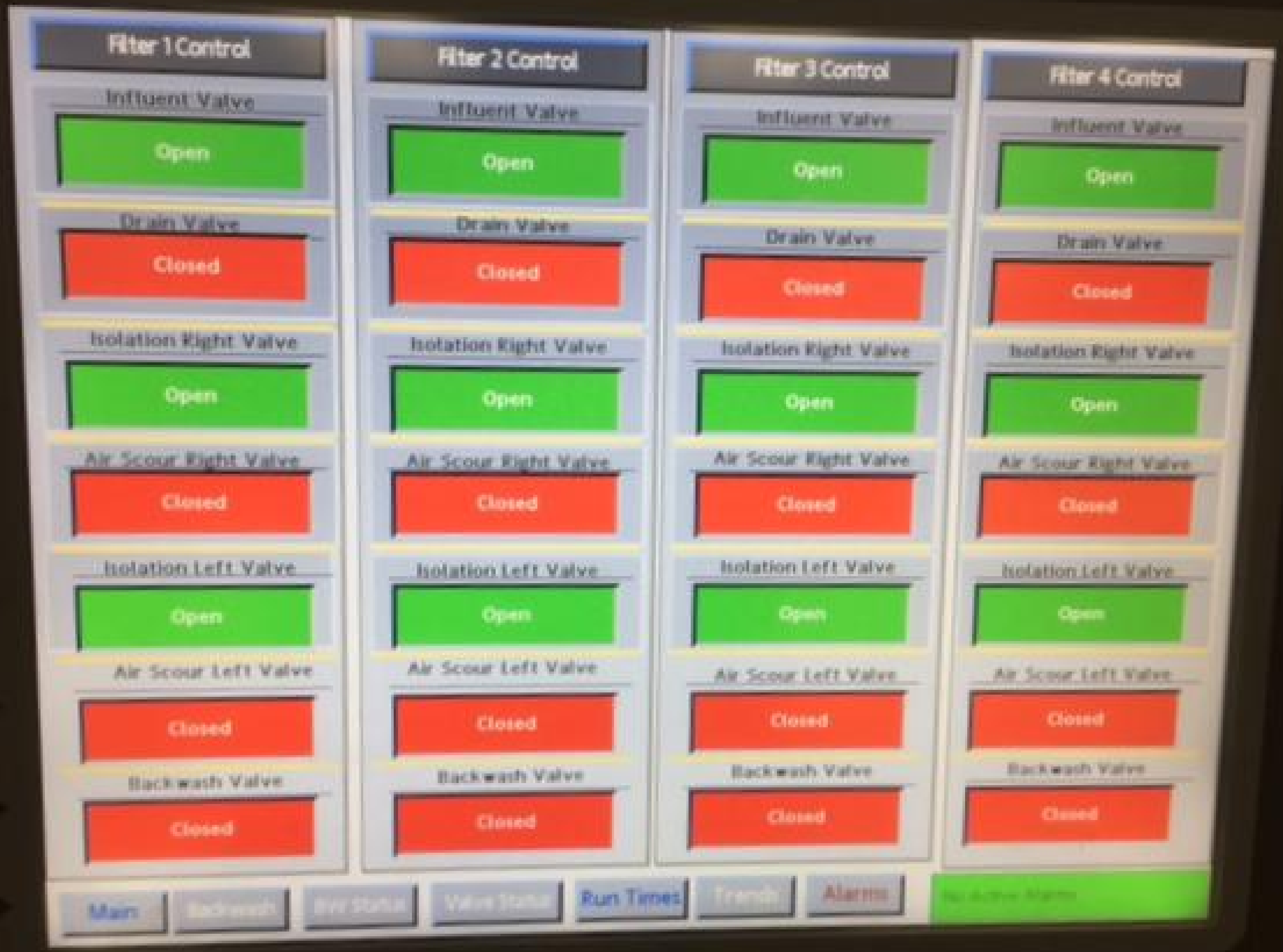
16. Q. What is the earliest date that intrusive site testing can occur? Are there limited (off-peak) hours we must work within?
    A. If intrusive testing means that the plant must be shut down, we would prefer not until August as July is our high-demand month. The plant is staffed from 6AM to 5 PM.

The original solicitation for the project noted above is amended as noted.

All other conditions of subject remain the same.

Respectfully,

Duane Hoff Jr., Senior Buyer
City of Grand Junction, Colorado



Filter 1 Control

Influent Valve: Open
Drain Valve: Closed
Isolation Right Valve: Open
Air Scour Right Valve: Closed
Isolation Left Valve: Open
Air Scour Left Valve: Closed
Backwash Valve: Closed

Filter 2 Control

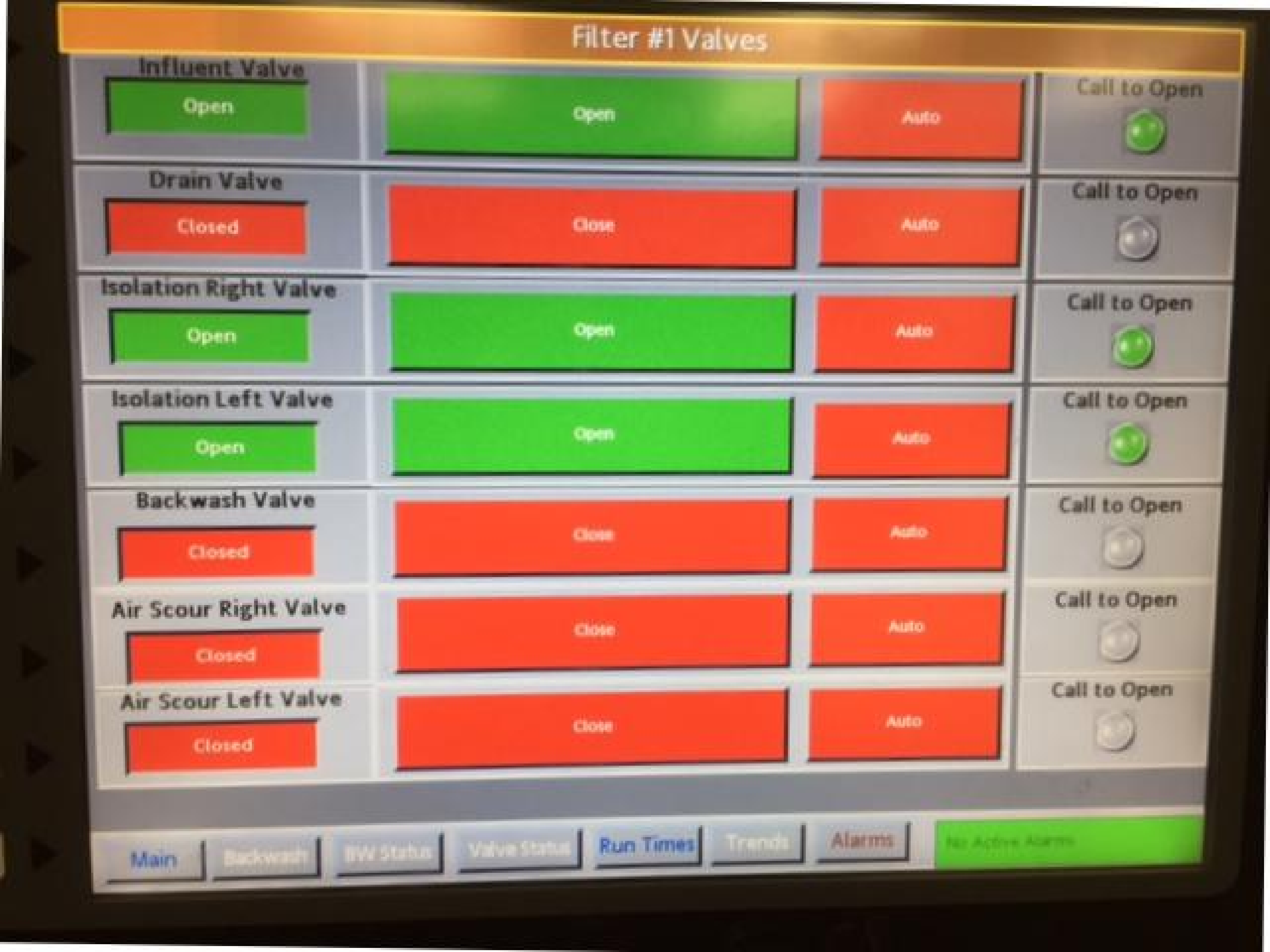
Influent Valve: Open
Drain Valve: Closed
Isolation Right Valve: Open
Air Scour Right Valve: Closed
Isolation Left Valve: Open
Air Scour Left Valve: Closed
Backwash Valve: Closed

Filter 3 Control

Influent Valve: Open
Drain Valve: Closed
Isolation Right Valve: Open
Air Scour Right Valve: Closed
Isolation Left Valve: Open
Air Scour Left Valve: Closed
Backwash Valve: Closed

Filter 4 Control

Influent Valve: Open
Drain Valve: Closed
Isolation Right Valve: Open
Air Scour Right Valve: Closed
Isolation Left Valve: Open
Air Scour Left Valve: Closed
Backwash Valve: Closed

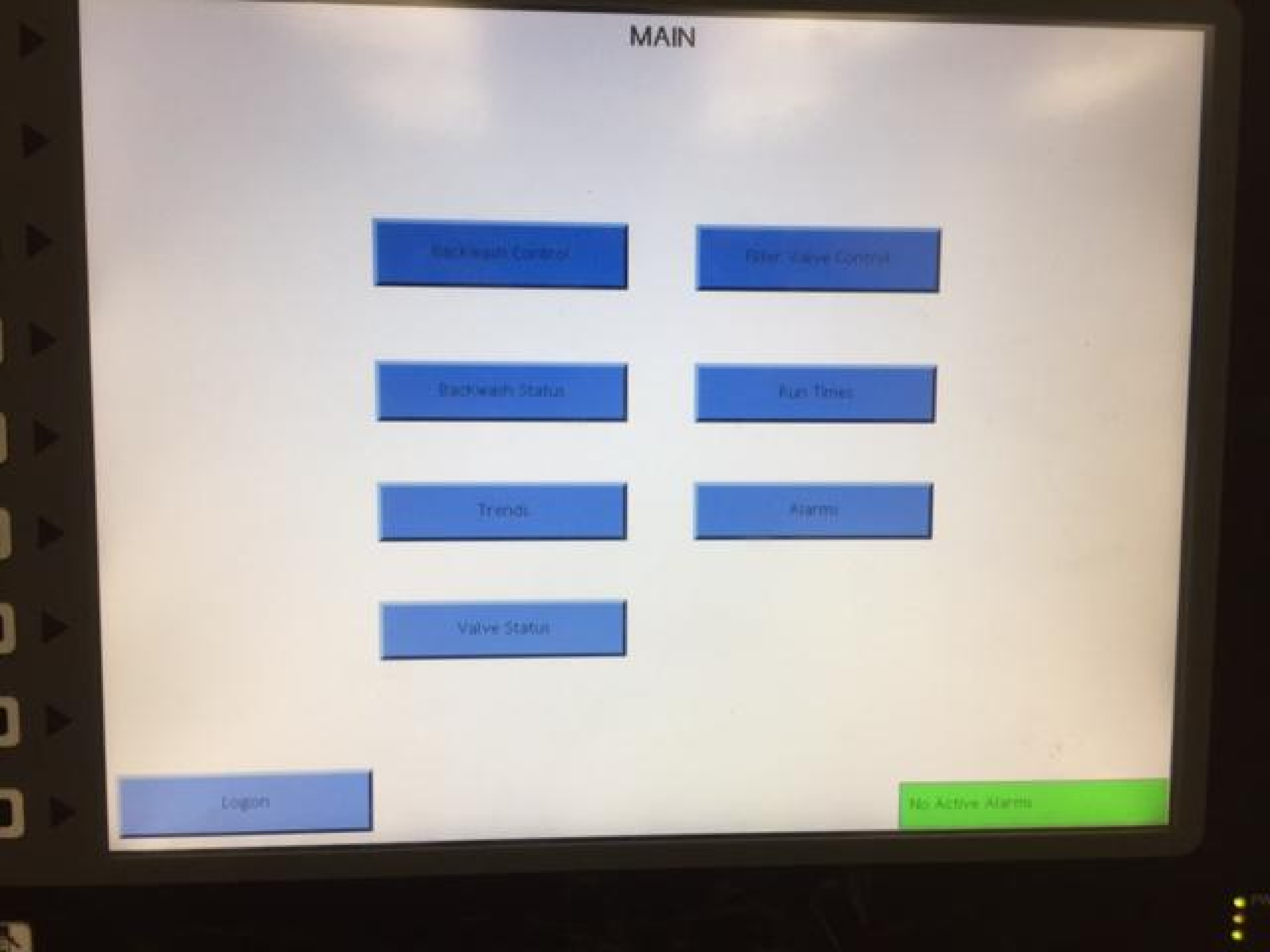


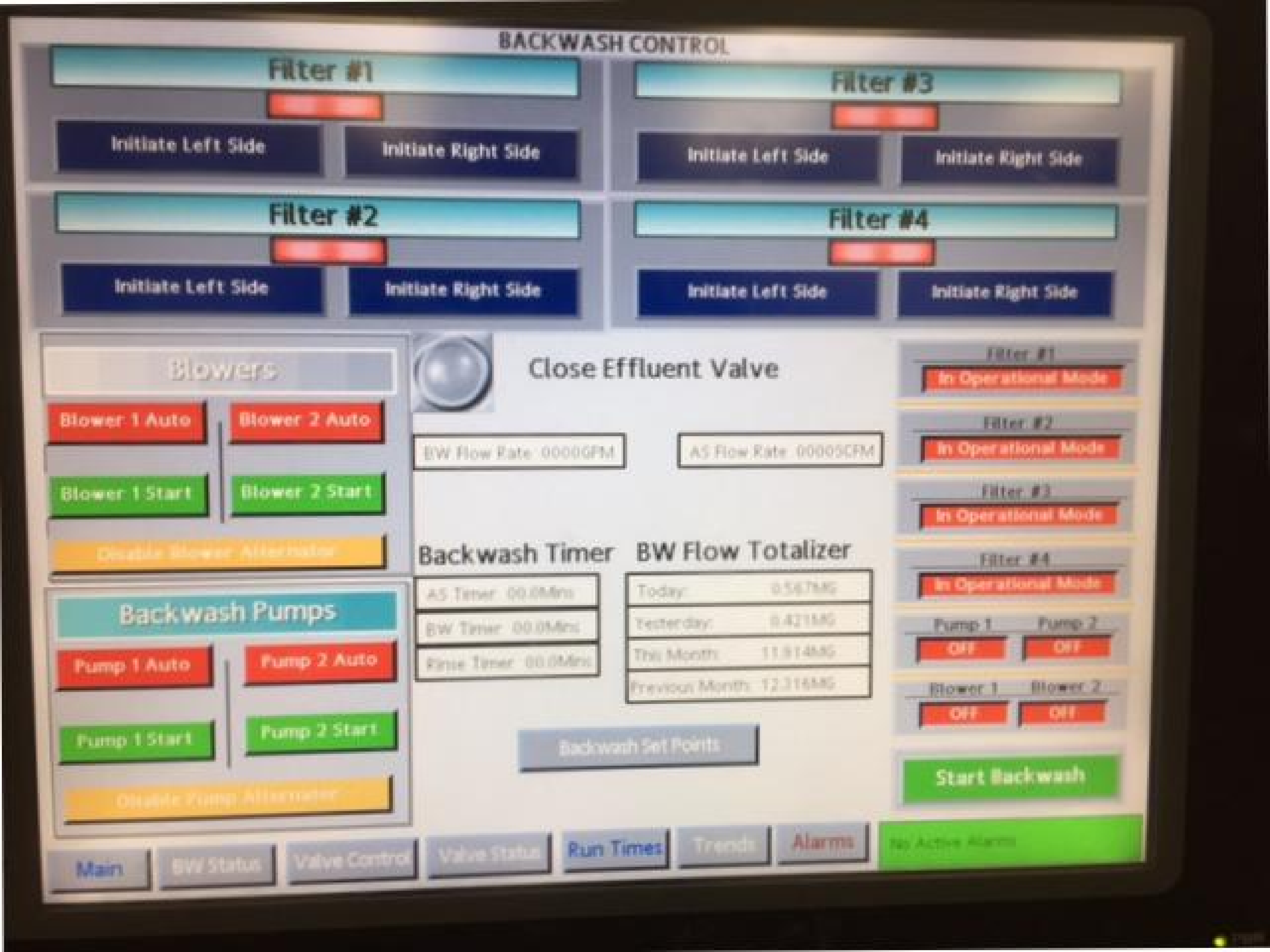
Filter #1 Valves

Influent Valve	Open	Open	Auto	Call to Open ●
Drain Valve	Closed	Close	Auto	Call to Open ○
Isolation Right Valve	Open	Open	Auto	Call to Open ●
Isolation Left Valve	Open	Open	Auto	Call to Open ●
Backwash Valve	Closed	Close	Auto	Call to Open ○
Air Scour Right Valve	Closed	Close	Auto	Call to Open ○
Air Scour Left Valve	Closed	Close	Auto	Call to Open ○

Main
Backwash
BW Status
Valve Status
Run Times
Trends
Alarms

No Active Alarms


MAIN
Backwash Control
Filter Valve Control
Backwash Status
Run Times
Trends
Alarms
Valve Status
Logon
No Active Alarms


BACKWASH CONTROL
Filter #1
Initiate Left Side
Initiate Right Side
Filter #3
Initiate Left Side
Initiate Right Side
Filter #2
Initiate Left Side
Initiate Right Side
Filter #4
Initiate Left Side
Initiate Right Side
Blowers
Blower 1 Auto
Blower 2 Auto
Blower 1 Start
Blower 2 Start
Disable Blower Alternator
Close Effluent Valve
Backwash Pumps
Pump 1 Auto
Pump 2 Auto
Pump 1 Start
Pump 2 Start
Disable Pump Alternator
Backwash Set Points
Start Backwash
Main
BW Status
Valve Control
Valve Status
Run Times
Trends
Alarms

BW Flow Rate 0000GPM

AS Flow Rate 0000SCFM

Backwash Timer

AS Timer 00.0Mins

BW Timer 00.0Mins

Rinse Timer 00.0Mins

BW Flow Totalizer

Today:	0.567MG
Yesterday:	0.421MG
This Month:	11.914MG
Previous Month:	12.316MG

Filter #1: In Operational Mode

Filter #2: In Operational Mode

Filter #3: In Operational Mode

Filter #4: In Operational Mode

Pump 1	Pump 2
Off	Off

Blower 1	Blower 2
Off	Off

No Active Alarms

Request for Proposal
RFP-4525-18-DH

WATER TREATMENT PLANT, COLLECTION AND DISTRIBUTION SUPERVISORY CONTROL AND DATA ACQUISITION AUTOMATION SYSTEM (SCADA)

RESPONSES DUE:
June 28, 2018 prior to 3:30 PM MST
Accepting Electronic Responses Only
Responses Only Submitted Through the Rocky Mountain E-Purchasing System (RMEPS)
https://www.rockymountainbidsystem.com/default.asp
(Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor MUST contact RMEPS to resolve issue prior to the response deadline. 800-835-4603)

PURCHASING REPRESENTATIVE:
Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org
(970) 244-1545

This solicitation has been developed specifically for a Request for Proposal intended to solicit competitive responses for this solicitation, and may not be the same as previous City of Grand Junction/Mesa County solicitations. All offerors are urged to thoroughly review this solicitation prior to submitting. Submittal by **FAX, EMAIL or HARD COPY IS NOT ACCEPTABLE** for this solicitation.

REQUEST FOR PROPOSAL

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Section

1.0 Administrative Information and Conditions for Submittal

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4.0 Specifications/Scope of Services

5.0 Preparation and Submittal of Proposals

6.0 Evaluation Criteria and Factors

7.0 Solicitation Response Form

REQUEST FOR PROPOSAL

SECTION 1.0: ADMINISTRATIVE INFORMATION & CONDITIONS FOR SUBMITTAL

1.1 **Issuing Office:** This Request for Proposal (RFP) is issued by the City of Grand Junction. All contact regarding this RFP is directed to:

RFP QUESTIONS:
Name, Title
Email

1.2 **Purpose:** The purpose of this RFP is to obtain proposals from qualified professional firms to provide a SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (SCADA).

1.3 **The Owner:** The Owner is the City of Grand Junction, Colorado and is referred to throughout this Solicitation. The term Owner means the Owner or his authorized representative.

1.4 **Site Visit/Briefing:** A **mandatory** site visit is required by all contractors intending to submit a response to this RFP. Any contractor that does not attend the **mandatory** site visit shall not be eligible to submit a response to this RFP. **The site visit shall be held at the City of Grand Junction Water Treatment Plant located at 244 26 ¼ Road, Grand Junction, CO on June 6, 2018 at 10:30am.**

1.5 **Compliance:** All participating Offerors, by their signature hereunder, shall agree to comply with all conditions, requirements, and instructions of this RFP as stated or implied herein. Should the Owner omit anything from this packet which is necessary to the clear understanding of the requirements, or should it appear that various instructions are in conflict, the Offeror(s) shall secure instructions from the Purchasing Division prior to the date and time of the submittal deadline shown in this RFP.

1.6 **Submission:** Please refer to section 5.0 for what is to be included. ***Each proposal shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (https://www.rockymountainbidsystem.com/default.asp).*** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals.* *(Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide"** at http://www.gjcity.org/business-and-economic-development/bids/ for details. For proper comparison and evaluation, the City requests that proposals be formatted as directed in Section 5.0 "Preparation and Submittal of Proposals." Submittals received that fail to follow this format may be ruled non-responsive. (Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline. **800-835-4603**).

1.7 **Altering Proposals:** Any alterations made prior to opening date and time must be initialed by the signer of the proposal, guaranteeing authenticity. Proposals cannot be altered or amended after submission deadline.

1.8 **Withdrawal of Proposal:** A proposal must be firm and valid for award and may not be withdrawn or canceled by the Offeror for sixty (60) days following the submittal deadline date, and only prior to award. The Offeror so agrees upon submittal of their proposal. After award this statement is not applicable.

1.9 **Acceptance of Proposal Content:** The contents of the proposal of the successful Offeror shall become contractual obligations if acquisition action ensues. Failure of the successful Offeror to accept these obligations in a contract shall result in cancellation of the award and such vendor shall be removed from future solicitations.

1.10 **Addenda:** All questions shall be submitted in writing to the appropriate person as shown in Section 1.1. Any interpretations, corrections and changes to this RFP or extensions to the opening/receipt date shall be made by a written Addendum to the RFP by the City Purchasing Division. Sole authority to authorize addenda shall be vested in the City of Grand Junction Purchasing Representative. Addenda will be issued electronically through the Rocky Mountain E-Purchasing website at www.rockymountainbidsystem.com. Offerors shall acknowledge receipt of all addenda in their proposal.

1.11 **Exceptions and Substitutions:** All proposals meeting the intent of this RFP shall be considered for award. Offerors taking exception to the specifications shall do so at their own risk. The Owner reserves the right to accept or reject any or all substitutions or alternatives. When offering substitutions and/or alternatives, Offeror must state these exceptions in the section pertaining to that area. Exception/substitution, if accepted, must meet or exceed the stated intent and/or specifications. The absence of such a list shall indicate that the Offeror has not taken exceptions, and if awarded a contract, shall hold the Offeror responsible to perform in strict accordance with the specifications or scope of work contained herein.

1.12 **Confidential Material:** All materials submitted in response to this RFP shall ultimately become public record and shall be subject to inspection after contract award. “**Proprietary or Confidential Information”** is defined as any information that is not generally known to competitors and which provides a competitive advantage. Unrestricted disclosure of proprietary information places it in the public domain. Only submittal information clearly identified with the words “***Confidential Disclosure***” and uploaded as a separate document shall establish a confidential, proprietary relationship. Any material to be treated as confidential or proprietary in nature must include a justification for the request. The request shall be reviewed and either approved or denied by the Owner. If denied, the proposer shall have the opportunity to withdraw its entire proposal, or to remove the confidential or proprietary restrictions. Neither cost nor pricing information nor the total proposal shall be considered confidential or proprietary.

1.13 **Response Material Ownership**: All proposals become the property of the Owner upon receipt and shall only be returned to the proposer at the Owner’s option. Selection or rejection of the proposal shall not affect this right. The Owner shall have the right to use all ideas or adaptations of the ideas contained in any proposal received in response to this RFP, subject to limitations outlined in the entitled “Confidential Material”. Disqualification of a proposal does not eliminate this right.

1.14 Minimal Standards for Responsible Prospective Offerors: A prospective Offeror must affirmably demonstrate their responsibility. A prospective Offeror must meet the following requirements.

- Have adequate financial resources, or the ability to obtain such resources as required.
- Be able to comply with the required or proposed completion schedule.
- Have a satisfactory record of performance.
- Have a satisfactory record of integrity and ethics.
- Be otherwise qualified and eligible to receive an award and enter into a contract with the Owner.

1.15 Open Records: Proposals shall be received and publicly acknowledged at the location, date, and time stated herein. Offerors, their representatives and interested persons may be present. Proposals shall be received and acknowledged only so as to avoid disclosure of process. However, all proposals shall be open for public inspection after the contract is awarded. Trade secrets and confidential information contained in the proposal so identified by offer as such shall be treated as confidential by the Owner to the extent allowable in the Open Records Act.

1.16 Sales Tax: The Owner is, by statute, exempt from the State Sales Tax and Federal Excise Tax; therefore, all fees shall not include taxes.

1.17 Public Opening: Proposals shall be opened in the City Hall Auditorium, 250 North 5th Street, Grand Junction, CO, 81501, immediately following the proposal deadline. Offerors, their representatives and interested persons may be present. Only the names and locations on the proposing firms will be disclosed.

SECTION 2.0: GENERAL CONTRACT TERMS AND CONDITIONS

2.1. Acceptance of RFP Terms: A proposal submitted in response to this RFP shall constitute a binding offer. Acknowledgment of this condition shall be indicated on the Letter of Interest or Cover Letter by the autographic signature of the Offeror or an officer of the Offeror legally authorized to execute contractual obligations. A submission in response to the RFP acknowledges acceptance by the Offeror of all terms and conditions including compensation, as set forth herein. An Offeror shall identify clearly and thoroughly any variations between its proposal and the Owner's RFP requirements. Failure to do so shall be deemed a waiver of any rights to subsequently modify the terms of performance, except as outlined or specified in the RFP.

2.2. Execution, Correlation, Intent, and Interpretations: The Contract Documents shall be signed by the Owner and Contractor. By executing the contract, the Contractor represents that they have familiarized themselves with the local conditions under which the Work is to be performed, and correlated their observations with the requirements of the Contract Documents. The Contract Documents are complementary, and what is required by any one, shall be as binding as if required by all. The intention of the documents is to include all labor, materials, equipment, services and other items necessary for the proper execution and completion of the scope of work as defined in the technical specifications and drawings contained herein. All drawings, specifications and copies furnished by the Owner are, and shall remain, Owner property. They are not to be used on any other project.

2.3. **Permits, Fees, & Notices:** The Contractor shall secure and pay for all permits, governmental fees and licenses necessary for the proper execution and completion of the work. The Contractor shall give all notices and comply with all laws, ordinances, rules, regulations and orders of any public authority bearing on the performance of the work. If the Contractor observes that any of the Contract Documents are at variance in any respect, he shall promptly notify the Owner in writing, and any necessary changes shall be adjusted by approximate modification. If the Contractor performs any work knowing it to be contrary to such laws, ordinances, rules and regulations, and without such notice to the Owner, he shall assume full responsibility and shall bear all costs attributable.

2.4. **Responsibility for those Performing the Work:** The Contractor shall be responsible to the Owner for the acts and omissions of all his employees and all other persons performing any of the work under a contract with the Contractor.

2.5. **Payment & Completion:** The Contract Sum is stated in the Contract and is the total amount payable by the Owner to the Contractor for the performance of the work under the Contract Documents. Upon receipt of written notice that the work is ready for final inspection and acceptance and upon receipt of application for payment, the Owner's Project Manager will promptly make such inspection and, when they find the work acceptable under the Contract Documents and the Contract fully performed, the Owner shall make payment in the manner provided in the Contract Documents. Partial payments will be based upon estimates, prepared by the Contractor, of the value of Work performed and materials placed in accordance with the Contract Documents. The work performed by Contractor shall be in accordance with generally accepted professional practices and the level of competency presently maintained by other practicing professional firms in the same or similar type of work in the applicable community. The work and services to be performed by Contractor hereunder shall be done in compliance with applicable laws, ordinances, rules and regulations.

2.6. **Protection of Persons & Property:** The Contractor shall comply with all applicable laws, ordinances, rules, regulations and orders of any public authority having jurisdiction for the safety of persons or property or to protect them from damage, injury or loss. Contractor shall erect and maintain, as required by existing safeguards for safety and protection, and all reasonable precautions, including posting danger signs or other warnings against hazards promulgating safety regulations and notifying owners and users of adjacent utilities. When or where any direct or indirect damage or injury is done to public or private property by or on account of any act, omission, neglect, or misconduct by the Contractor in the execution of the work, or in consequence of the non-execution thereof by the Contractor, they shall restore, at their own expense, such property to a condition similar or equal to that existing before such damage or injury was done, by repairing, rebuilding, or otherwise restoring as may be directed, or it shall make good such damage or injury in an acceptable manner.

2.7. **Changes in the Work:** The Owner, without invalidating the contract, may order changes in the work within the general scope of the contract consisting of additions, deletions or other revisions. All such changes in the work shall be authorized by Change Order/Amendment and shall be executed under the applicable conditions of the contract documents. A Change Order/Amendment is a written order to the Contractor signed by the Owner issued after the execution of the contract, authorizing a change in the work or an adjustment in the contract sum or the contract time.

2.8. **Minor Changes in the Work:** The Owner shall have authority to order minor changes in the work not involving an adjustment in the contract sum or an extension of the contract time and not inconsistent with the intent of the contract documents.

2.9. **Uncovering & Correction of Work:** The Contractor shall promptly correct all work found by the Owner as defective or as failing to conform to the contract documents. The Contractor shall bear all costs of correcting such rejected work, including the cost of the Owner's additional services thereby made necessary. The Owner shall give such notice promptly after discover of condition. All such defective or non-conforming work under the above paragraphs shall be removed from the site where necessary and the work shall be corrected to comply with the contract documents without cost to the Owner.

2.10. **Acceptance Not Waiver:** The Owner's acceptance or approval of any work furnished hereunder shall not in any way relieve the proposer of their present responsibility to maintain the high quality, integrity and timeliness of his work. The Owner's approval or acceptance of, or payment for, any services shall not be construed as a future waiver of any rights under this Contract, or of any cause of action arising out of performance under this Contract.

2.11. **Change Order/Amendment:** No oral statement of any person shall modify or otherwise change, or affect the terms, conditions or specifications stated in the resulting contract. All amendments to the contract shall be made in writing by the Owner.

2.12. **Assignment:** The Offeror shall not sell, assign, transfer or convey any contract resulting from this RFP, in whole or in part, without the prior written approval from the Owner.

2.13. **Compliance with Laws:** Proposals must comply with all Federal, State, County and local laws governing or covering this type of service and the fulfillment of all ADA (Americans with Disabilities Act) requirements. Contractor hereby warrants that it is qualified to assume the responsibilities and render the services described herein and has all requisite corporate authority and professional licenses in good standing, required by law.

2.14. **Debarment/Suspension:** The Contractor herby certifies that the Contractor is not presently debarred, suspended, proposed for debarment, declared ineligible, or voluntarily excluded from covered transactions by any Governmental department or agency.

2.15. **Confidentiality:** All information disclosed by the Owner to the Offeror for the purpose of the work to be done or information that comes to the attention of the Offeror during the course of performing such work is to be kept strictly confidential.

2.16. **Conflict of Interest:** No public official and/or Owner employee shall have interest in any contract resulting from this RFP.

2.17. **Contract:** This Request for Proposal, submitted documents, and any negotiations, when properly accepted by the Owner, shall constitute a contract equally binding between the Owner and Offeror. The contract represents the entire and integrated agreement between the parties hereto and supersedes all prior negotiations, representations, or agreements, either written or oral, including the Proposal documents. The contract may be amended or modified with Change Orders, Field Orders, or Amendment.

2.18. **Project Manager/Administrator:** The Project Manager, on behalf of the Owner, shall render decisions in a timely manner pertaining to the work proposed or performed by the Offeror. The Project Manager shall be responsible for approval and/or acceptance of any related performance of the Scope of Services.

2.19. **Contract Termination**: This contract shall remain in effect until any of the following occurs: (1) contract expires; (2) completion of services; (3) acceptance of services or, (4) for convenience terminated by either party with a written *Notice of Cancellation* stating therein the reasons for such cancellation and the effective date of cancellation at least thirty days past notification.

2.20. **Employment Discrimination:** During the performance of any services per agreement with the Owner, the Offeror, by submitting a Proposal, agrees to the following conditions:

2.20.1. The Offeror shall not discriminate against any employee or applicant for employment because of race, religion, color, sex, age, disability, citizenship status, marital status, veteran status, sexual orientation, national origin, or any legally protected status except when such condition is a legitimate occupational qualification reasonably necessary for the normal operations of the Offeror. The Offeror agrees to post in conspicuous places, visible to employees and applicants for employment, notices setting forth the provisions of this nondiscrimination clause.

2.20.2. The Offeror, in all solicitations or advertisements for employees placed by or on behalf of the Offeror, shall state that such Offeror is an Equal Opportunity Employer.

2.20.3. Notices, advertisements, and solicitations placed in accordance with federal law, rule, or regulation shall be deemed sufficient for the purpose of meeting the requirements of this section.

2.21. **Immigration Reform and Control Act of 1986 and Immigration Compliance:** The Offeror certifies that it does not and will not during the performance of the contract employ illegal alien workers or otherwise violate the provisions of the Federal Immigration Reform and Control Act of 1986 and/or the immigration compliance requirements of State of Colorado C.R.S. § 8-17.5-101, *et.seq.* (House Bill 06-1343).

2.22. **Ethics:** The Offeror shall not accept or offer gifts or anything of value nor enter into any business arrangement with any employee, official, or agent of the Owner.

2.23. **Failure to Deliver:** In the event of failure of the Offeror to deliver services in accordance with the contract terms and conditions, the Owner, after due oral or written notice, may procure the services from other sources and hold the Offeror responsible for any costs resulting in additional purchase and administrative services. This remedy shall be in addition to any other remedies that the Owner may have.

2.24. **Failure to Enforce:** Failure by the Owner at any time to enforce the provisions of the contract shall not be construed as a waiver of any such provisions. Such failure to enforce shall not affect the validity of the contract or any part thereof or the right of the Owner to enforce any provision at any time in accordance with its terms.

2.25. **Force Majeure:** The Offeror shall not be held responsible for failure to perform the duties and responsibilities imposed by the contract due to legal strikes, fires, riots, rebellions, and acts of God beyond the control of the Offeror, unless otherwise specified in the contract.

2.26. **Indemnification:** Offeror shall defend, indemnify and save harmless the Owner and all its officers, employees, insurers, and self-insurance pool, from and against all liability, suits, actions, or other claims of any character, name and description brought for or on account of any injuries or damages received or sustained by any person, persons, or property on account of any negligent act or fault of the Offeror, or of any Offeror's agent, employee, subcontractor or supplier in the execution of, or performance under, any contract which may result from proposal award. Offeror shall pay any judgment with cost which may be obtained against the Owner growing out of such injury or damages.

2.27. **Independent Firm:** The Offeror shall be legally considered an Independent Firm and neither the Firm nor its employees shall, under any circumstances, be considered servants or agents of the Owner. The Owner shall be at no time legally responsible for any negligence or other wrongdoing by the Firm, its servants, or agents. The Owner shall not withhold from the contract payments to the Firm any federal or state unemployment taxes, federal or state income taxes, Social Security Tax or any other amounts for benefits to the Firm. Further, the Owner shall not provide to the Firm any insurance coverage or other benefits, including Workers' Compensation, normally provided by the Owner for its employees.

2.28. **Nonconforming Terms and Conditions:** A proposal that includes terms and conditions that do not conform to the terms and conditions of this Request for Proposal is subject to rejection as non-responsive. The Owner reserves the right to permit the Offeror to withdraw nonconforming terms and conditions from its proposal prior to a determination by the Owner of non-responsiveness based on the submission of nonconforming terms and conditions.

2.29. **Ownership:** All plans, prints, designs, concepts, etc., shall become the property of the Owner.

2.30. **Oral Statements:** No oral statement of any person shall modify or otherwise affect the terms, conditions, or specifications stated in this document and/or resulting agreement. All modifications to this request and any agreement must be made in writing by the Owner.

2.31. **Patents/Copyrights:** The Offeror agrees to protect the Owner from any claims involving infringements of patents and/or copyrights. In no event shall the Owner be liable to the Offeror for any/all suits arising on the grounds of patent(s)/copyright(s) infringement. Patent/copyright infringement shall null and void any agreement resulting from response to this RFP.

2.32. Venue: Any agreement as a result of responding to this RFP shall be deemed to have been made in, and shall be construed and interpreted in accordance with, the laws of the City of Grand Junction, Mesa County, Colorado.

2.33. Expenses: Expenses incurred in preparation, submission and presentation of this RFP are the responsibility of the company and cannot be charged to the Owner.

2.34. Sovereign Immunity: The Owner specifically reserves its right to sovereign immunity pursuant to Colorado State Law as a defense to any action arising in conjunction to this agreement.

2.35. Public Funds/Non-Appropriation of Funds: Funds for payment have been provided through the Owner's budget approved by the City Council/Board of County Commissioners for the stated fiscal year only. State of Colorado statutes prohibit the obligation and expenditure of public funds beyond the fiscal year for which a budget has been approved. Therefore, anticipated orders or other obligations that may arise past the end of the stated Owner's fiscal year shall be subject to budget approval. Any contract will be subject to and must contain a governmental non-appropriation of funds clause.

2.36. Collusion Clause: Each Offeror by submitting a proposal certifies that it is not party to any collusive action or any action that may be in violation of the Sherman Antitrust Act. Any and all proposals shall be rejected if there is evidence or reason for believing that collusion exists among the proposers. The Owner may or may not, at the discretion of the Owner Purchasing Representative, accept future proposals for the same service or commodities for participants in such collusion.

2.37. Gratuities: The Contractor certifies and agrees that no gratuities or kickbacks were paid in connection with this contract, nor were any fees, commissions, gifts or other considerations made contingent upon the award of this contract. If the Contractor breaches or violates this warranty, the Owner may, at their discretion, terminate this contract without liability to the Owner.

2.38. Performance of the Contract: The Owner reserves the right to enforce the performance of the contract in any manner prescribed by law or deemed to be in the best interest of the Owner in the event of breach or default of resulting contract award.

2.39. Benefit Claims: The Owner shall not provide to the Offeror any insurance coverage or other benefits, including Worker's Compensation, normally provided by the Owner for its employees.

2.40. Default: The Owner reserves the right to terminate the contract in the event the Contractor fails to meet delivery or completion schedules, or otherwise perform in accordance with the accepted proposal. Breach of contract or default authorizes the Owner to purchase like services elsewhere and charge the full increase in cost to the defaulting Offeror.

2.41. Multiple Offers: If said proposer chooses to submit more than one offer, THE ALTERNATE OFFER must be clearly marked "Alternate Proposal". The Owner reserves the right to make award in the best interest of the Owner.

2.42. **Cooperative Purchasing:** Purchases as a result of this solicitation are primarily for the Owner. Other governmental entities may be extended the opportunity to utilize the resultant contract award with the agreement of the successful provider and the participating agencies. All participating entities will be required to abide by the specifications, terms, conditions and pricings established in this Proposal. The quantities furnished in this proposal document are for only the Owner. It does not include quantities for any other jurisdiction. The Owner will be responsible only for the award for our jurisdiction. Other participating entities will place their own awards on their respective Purchase Orders through their purchasing office or use their purchasing card for purchase/payment as authorized or agreed upon between the provider and the individual entity. The Owner accepts no liability for payment of orders placed by other participating jurisdictions that choose to piggy-back on our solicitation. Orders placed by participating jurisdictions under the terms of this solicitation will indicate their specific delivery and invoicing instructions.

2.43. **Definitions:**

2.43.1. “Offeror” and/or “Proposer” refers to the person or persons legally authorized by the Consultant to make an offer and/or submit a response (fee) proposal in response to the Owner’s RFP.

2.43.2. The term “Work” includes all labor, materials, equipment, and/or services necessary to produce the requirements of the Contract Documents.

2.43.3. “Contractor” is the person, organization, firm or consultant identified as such in the Agreement and is referred to throughout the Contract Documents. The term Contractor means the Contractor or his authorized representative. The Contractor shall carefully study and compare the General Contract Conditions of the Contract, Specification and Drawings, Scope of Work, Addenda and Modifications and shall at once report to the Owner any error, inconsistency or omission he may discover. Contractor shall not be liable to the Owner for any damage resulting from such errors, inconsistencies or omissions. The Contractor shall not commence work without clarifying Drawings, Specifications, or Interpretations.

2.43.4. “Sub-Contractor is a person or organization who has a direct contract with the Contractor to perform any of the work at the site. The term sub-contractor is referred to throughout the contract documents and means a sub-contractor or his authorized representative.

2.44. **Public Disclosure Record:** If the Proposer has knowledge of their employee(s) or sub-proposers having an immediate family relationship with an Owner employee or elected official, the proposer must provide the Purchasing Representative with the name(s) of these individuals. These individuals are required to file an acceptable “Public Disclosure Record”, a statement of financial interest, before conducting business with the Owner.

SECTION 3.0: INSURANCE REQUIREMENTS

3.1 Insurance Requirements: The selected Firm agrees to procure and maintain, at its own cost, policy(s) of insurance sufficient to insure against all liability, claims, demands, and other obligations assumed by the Firm pursuant to this Section. Such insurance shall be in addition to any other insurance requirements imposed by this Contract or by law. The Firm shall not be relieved of any liability, claims, demands, or other obligations assumed pursuant

to this Section by reason of its failure to procure or maintain insurance in sufficient amounts, durations, or types.
Firm shall procure and maintain and, if applicable, shall cause any Subcontractor of the Firm to procure and maintain insurance coverage listed below. Such coverage shall be procured and maintained with forms and insurers acceptable to The Owner. All coverage shall be continuously maintained to cover all liability, claims, demands, and other obligations assumed by the Firm pursuant to this Section. In the case of any claims-made policy, the necessary retroactive dates and extended reporting periods shall be procured to maintain such continuous coverage. Minimum coverage limits shall be as indicated below unless specified otherwise in the Special Conditions:

(a) Worker Compensation insurance to cover obligations imposed by applicable laws for any employee engaged in the performance of work under this Contract, and Employers' Liability insurance with minimum limits of:

ONE MILLION DOLLARS ($1,000,000) each accident,
ONE MILLION DOLLARS ($1,000,000) disease - policy limit, and
ONE MILLION DOLLARS ($1,000,000) disease - each employee

(b) General Liability insurance with minimum combined single limits of:

ONE MILLION DOLLARS ($1,000,000) each occurrence and
ONE MILLION DOLLARS ($1,000,000) per job aggregate.

The policy shall be applicable to all premises, products and completed operations. The policy shall include coverage for bodily injury, broad form property damage (including completed operations), personal injury (including coverage for contractual and employee acts), blanket contractual, products, and completed operations. The policy shall include coverage for explosion, collapse, and underground (XCU) hazards. The policy shall contain a severability of interests provision.

(c) Comprehensive Automobile Liability insurance with minimum combined single limits for bodily injury and property damage of not less than:

ONE MILLION DOLLARS ($1,000,000) each occurrence and
ONE MILLION DOLLARS ($1,000,000) aggregate

(d) Professional Liability & Errors and Omissions Insurance policy with a minimum of:

ONE MILLION DOLLARS ($1,000,000) per claim

This policy shall provide coverage to protect the contractor against liability incurred as a result of the professional services performed as a result of responding to this Solicitation.

With respect to each of Consultant's owned, hired, or non-owned vehicles assigned to be used in performance of the Work. The policy shall contain a severability of interests provision.

3.2 Additional Insured Endorsement: The policies required by paragraphs (b), and (c) above shall be endorsed to include the Owner and the Owner's officers and employees as additional insureds. Every policy required above shall be primary insurance, and any insurance carried by the Owner, its officers, or its employees, or carried by or provided through any insurance pool of the Owner, shall be excess and not contributory insurance to that provided by Contractor. The Contractor shall be solely responsible for any deductible losses under any policy required above.

SECTION 4.0: SPECIFICATIONS/SCOPE OF SERVICES

4.1. General/Background:

The City of Grand Junction is in Mesa County, Colorado on the western slope of the Rocky Mountains, midway between Denver, Colorado and Salt Lake City, Utah. Grand Junction is a full-service City operating under a Council-City Manager structure. It is the County Seat and is the largest city on the western slope of Colorado with a population of approximately 60,000 within City Limits and approximately 145,000 county-wide.

The City has 9,700 of taps serving approximately 28,000 customers. The water department is responsible for maintaining 353 miles of distribution pipe, two water treatment plants, 19 reservoirs and associated raw water transmission pipes. Many of these facilities are in remote locations. The main water treatment plant (WTP), located in Orchard Mesa, was commissioned in 1969.

The Water Treatment Plant (WTP) is a direct filtration plant rated to 16 MGD. Currently the WTP unit processes are controlled by a Redlion Touchscreen Graphic Operator Interface (GCI). The GCI and associated PLC were installed during upgrade of the filters in 2017. The upgrade also included the blowers for air scour during backwash cycles. Raw water is brought into the plant where ACH and a cationic polymer are added, the water runs through an in-line flash mixer and then to an outdoor "contact basin" (floc basin). Water is then brought directly back into the plant for filtration. Up to 4 filters are utilized, depending on flow rates. The filters are dual media filters with IMS caps installed during the 2017 upgrade. Filtered water then gets dosed with sodium hypochlorite, which is produced in a separate building on site, then moves through a clearwell and finally into two 4-million gallon storage tanks before entering the distribution system.

The Kannah Creek Water Plant (KCWTP) is rated to 0.2 MGD and serves approximately 150 taps for a small rural community southeast of Grand Junction. The KCWTP has a 10-year-old stand-alone SCADA system used for controlling unit processes. KCWTP is also a direct filtration plant. Coagulants are injected and the raw water is directed through a large diameter pipe which serves as a floc basin by providing adequate detention time. Coagulated water flows through a filter consisting of anthracite, sand, and garnet sand. Filtered water flows into a 40,000 gallon clearwell and is pumped into storage tanks about ¾ of a mile away.

The City of Grand Junction is seeking proposals from qualified vendors to assist with development and implementation of a comprehensive, fully featured System Control and Data Acquisition system for the water treatment plant, collection and distribution systems. It is the intent of the water department to implement SCADA improvements to the system in phases over the next several years.

Full implementation of the SCADA improvements for the water treatment plant, distribution and supply systems will be completed in multiple phases.

This solicitation relates to the first phase of this project and requires the selected vendor to provide the following deliverables:

- Design Technical Memorandum including but not limited to identifying the scope and probable cost for each phase to be implemented with each annual budget cycle, the number of phases needed for full implementation, security, training, remote capabilities
- Identify, procure and implement hardware, software, licencing, etc. such that the Water Treatment Plan is operable from the new SCADA system, including as much of the existing process equipment (i.e. filters, blowers, chorine production, etc) as can be included withing the 2018 Plant Improvement Bugdet.
- Training for Plant operators and other pertinent personnel on SCADA system operation.
- Maintenance and support following Final Acceptance of each project phase.

4.2. Special Conditions/Provisions:

4.2.1. Project Objectives:

4.2.1.1. Identify options for SCADA system types of hardware, software and implementation strategies. Develop an overall plan for implementing SCADA at the WTP that creates a roadmap for expanding the system as the City can make upgrades and tie in additional components as budget allows. It is intended that the Water Supply, Treatment and Distribution Systems will be tied into the SCADA system centralized at the WTP at Orchard Mesa. Server storage and backup will be located at the main IT facility at City of Grand Junction City Hall. Full integration will be a multi-phase endeavor over several years. Phase 1 includes design, procurement and implementation of the backbone of the SCADA system and integrate existing equipment at the WTP that is capable of being directly connected to this system and communication to the servers at City Hall by December 31, 2018. Phase 1 also includes a design report and preliminary (30%) design identifying number and scope of future phases to complete full buildout and implementation of the SCADA system over the next several years.

Design report must identify existing and possible future physical locations for SCADA equipment, servers, workstations, routers, and switches. Discuss equipment placement as it relates to reliability, operational efficiency, operational functionality, physical security, environmental effects, expandability, network connection options, back-up electrical power sources, server failover and recovery options.

4.2.1.2. Study existing process control strategies and adequacy of existing monitoring and control functions. Consider ways to improve or optimize the level of monitoring and control. Consider existing features that should be retained and shortcomings that should be addressed.

4.2.1.3. Develop an understanding of the existing telemetric backbone methodology including physical locations and issues. Discuss remote access options including alarm features, as well “read only” access, and full control levels of access. Describe the pros and cons of each as well as the required equipment and software necessary for implementation.

4.2.1.4. Identify potential operational, maintenance, IT, training, business, and strategic needs.

4.2.1.5. The Water Treatment Plant is considered critical infrastructure for the City of Grand Junction. As such security is of paramount importance. During plant modifications and implementation of the SCADA system, plant shutdown time must be kept to a minimum.

4.2.1.6. Attachment A is an inventory of functions the Water Department manages that it believes could be implemented into a SCADA system. The inventory includes local and remote equipment and processes. It also tries to identify future needs. This list is not exhaustive, but is meant to be a starting point for responders to understand the system and make more complete recommendations.

Attachment B is a selection of one-line diagrams and as-builts to assist in understanding the current system at the WTP.

4.2.2. Site Access

Proposers must pay particular attention to site access requirements. City of Grand Junction Water Treatment Plants, supply facilities and distribution systems are considered part of the City's critical infrastructure. As such, access is limited to authorized personnel Access to each site must be schedule and coordinated with the City. Obtaining appropriate site access permission is the responsibility of the Proposer.

4.2.3. Locations

The Proposer should address where the SCADA Monitoring/Control System, and associated hardware should be located. Options include installing new equipment at the WTP, or utilizing the City's network servers at City Hall. In either case, backup data should be stored, at a minimum, at the servers at City Hall.

4.2.4. Materials and Services

Information provided as a response to this RFP should discuss the design, software licensing, programming, installation, testing, startup and commissioning of a complete SCADA system for up to 10 users.

The Proposer should address the City's desire to have the system implemented in phases. Recommendations for said phasing are encouraged in response.

The proposed SCADA system should be based on a packaged software product. The Responder will provide information on software licensing, security, and programming required to implement such a system.

4.2.5. The Proposer should outline a training program including, but not limited to the following personnel:

- Operators, including the use of HMI, trending, alarms/notifications, data logging, communication, and analysis/reporting features.
- SCADA System Administrators and SCADA technicians, including configuring interface and troubleshooting

- IT System Administrators responsible for ongoing operation of computer hardware and software components.

4.2.6. Maintenance and Support

Responders should outline options for maintenance and support of SCADA system, service agreement options, warranty information if available, etc.

4.2.7. Consider current security practices with respect to National Institute of Standards and Technology (NIST) and Department of Homeland Security (DHS) guidelines. Explain your security practices on the following topics and any additional topics:

4.2.7.1. Password/Authentication Management and Complexity Requirements

Weak passwords introduce vulnerabilities to the control systems network. In addition, sometimes passwords are hard-coded into software to facilitate control system internal communications allowing anyone with access to the code/configuration files knowledge of the password(s).

The Vendor shall provide a configurable account password management system that allows for selection of password length, frequency of change, setting of required password complexity, number of login attempts, inactive session logout, screen lock by application, and denial of repeated or recycled use of the same password.

The Vendor shall not store passwords electronically or in Vendor-supplied hardcopy documentation in clear text unless the media is physically protected.

The Vendor shall control configuration interface access to the account management system

4.2.7.2. Removal of Unnecessary Services and Programs

Unused services in a host operating system that are left enabled are possible entry points for exploits on the network and are generally not monitored because these services are not used. Only the services used for control systems operation and maintenance shall be enabled to limit possible entry points.

The Vendor shall provide a list of services required for any computer system running the control system applications or required to interface with the control system applications. The list shall include all ports and services required for normal operation as well as any other ports and services required for emergency operation. The list shall also include an explanation or cross reference to justify why each service is necessary for operation.

The Vendor shall verify and provide documentation that all services are patched to status.

The Vendor shall provide, within a pre-negotiated period, appropriate software and service updates and/or workarounds to mitigate all vulnerabilities associated with the product and to maintain the established level of system security.

4.2.7.3. Disabling, Removal or Modifying of Default/Backdoor, Well-Known or Guest Accounts

Default accounts and passwords are available on many control systems and are often publicly available in published materials allowing unauthorized system access.

The Vendor shall recommend which accounts need to be active and those that can be disabled, removed, or modified.

The Vendor shall disable, remove, or modify all the accounts pursuant to the approved recommendation. Once changed, accounts will not be published except that new account information and passwords will be provided by the Vendor via protected media.

4.2.7.4. Account Auditing and Logging

Logging and auditing of both active and disabled accounts are useful for anomaly and unauthorized access detection. However, cyber attackers commonly modify audit logs to cover activities.

The Vendor shall provide a system whereby account activity is logged and is auditable both from a management (policy) and operational (account use activity) perspective.

The Vendor shall time stamp, encrypt, and control access to audit trails and log files.

The Vendor shall ensure audit logging does not adversely impact the system performance requirements.

4.2.7.5. File System Auditing and Logging

The Vendor shall configure hosts with least-privilege file and account access and provide documentation of the configuration.

The Vendor shall configure the necessary system services to execute at the least user privilege level possible for that service and provide documentation of the configuration.

The Vendor shall document that changing or disabling access to such files and functions has been completed.

4.2.7.6. Separation of Employment Notifications to Customer

Integrators and companies that support control systems are very dynamic and competitive, resulting in frequent turnover of key support personnel potentially exposing sensitive information.

Prior to contract award, the Vendor shall provide a separation agreement to delineate how Vendor employees who have sensitive knowledge of the City's control systems and who leave their positions or have responsibilities changed will be prohibited from disclosing that knowledge, where disclosure could lead to a reduction in security.

The Vendor shall notify the City within a pre-negotiated period when key personnel leave or change positions, should it possibly impact control system security.

The Vendor shall provide detailed documentation on how the control system security can be maintained and supported in the event the Vendor leaves the business (e.g., security-related procedures and products placed in escrow).

The Vendor shall return to the City any sensitive data in the Vendor's possession when the Vendor is no longer able to maintain control of the City's products.

4.2.7.7. Firmware and Software Vaulting practices

Software flaws are a primary avenue for gaining system access. Many control system security vulnerabilities are the direct result of writing software with inadequate attention to defense against deliberate and persistent malicious attack. These vulnerabilities are particularly threatening because the control system can be compromised by bypassing normal access control checks, such as firewalls. In such attacks, control system traffic will appear normal as far as the network is concerned. A common method of attach to infect many customers it replaces Firmware and software code available for download by customer base.

Vaulting is a method in which software which is known to be uncorrupted is stored in an off-line location or as a read-only version to be used/restored when active code has been compromised.

Vendor shall provide documentation how they protect firmware and software in case of corruption or infection of available version. Documentation shall include methods for testing public available versions and verification against known vaulted versions.

4.2.7.8. End Device Security:

IED – Intelligent Electronic Devices can be used as access points to other systems that perform command and control functions. The devices are used to provide system control at the lowest level of a process and are vulnerable to communication interception and modification. Hardware and software (e.g., portable configuration computers) are needed to program IED's. IED's and configuration computers need to be secured by physical and cyber means.

RTU – Remote Terminal Units can be used as access points to other systems that perform command and control functions. The devices are used to provide system control at the lowest level of a process and are vulnerable to communication interception and modification. Hardware and software (e.g., portable configuration computers) are needed to program RTU's. RTU's and configuration computers need to be secured by physical and cyber means.

PLC – Programmable Logic Controllers can be used as access points to other systems that perform command and control functions. PLCs communicate over open networks that are vulnerable to communication interception and modification. Hardware and software (e.g., portable configuration computers) are needed to program PLCs. PLCs and configuration computers need to be secured by physical and cyber means.

Misc. Sensor, Actuators, Meters and other devices can be used as access points to other systems (e.g., PLCs and IED's) that perform command and control functions. These devices communicate over networks that are vulnerable to communication interception and modification. Hardware and software (e.g., portable configuration computers) are needed to program smart devices. Smart devices and configuration computers need to be secured by physical and cyber means.

The Vendor shall provide physical and cyber security features including, but not limited to, authentication, encryption, access control, event and communication logging, monitoring, and alarming to protect the device and configuration computer from unauthorized modification or use.

The Vendor shall clearly identify the physical and cyber security features and provide the methodologies for maintaining the features, including the methods to change settings from the Vendor-configured or manufacturer default conditions.

The Vendor shall verify that the addition of security features does not adversely affect connectivity, latency, bandwidth, response time, and throughput, when connected to existing equipment.

The Vendor shall remove or disable all software components that are not required for the operation and maintenance of the device. The Vendor shall provide documentation on what is removed and/or disabled.

The Vendor shall provide, within a pre-negotiated period, appropriate software and service updates and/or workarounds to mitigate all vulnerabilities associated with the product and to maintain the established level of system security.

4.2.7.9. Firewall and Intrusion Detection System/Intrusion Prevention System (IDS/IPS) Rules

Firewalls are used to stop unauthorized connections, or to allow limited communications between two networks or from a network to a networked device. Firewalls fall into four broad categories: packet filters, circuit level gateways, application level gateways, and stateful multilayer inspection firewalls. Firewalls can be implemented in software, hardware, or a combination of both. While IDS/IPS is used to identify unauthorized or abnormal network traffic.

The Vendor shall provide firewall/IDS rule sets between network zones.

The Vendor shall provide firewall/IDS rule sets and/or other equivalent documentation. The basis of the rule set shall be “deny all,” with exceptions explicitly identified by the Vendor. This information is deemed business sensitive and shall be protected as such.

Following contract award, the Vendor shall provide detailed information on all communications (including protocols) required through a firewall/IDS, whether inbound or outbound, and identify each network device initiating a communication in accordance with the corresponding rule sets.

4.2.7.10. Patching (Operating System, Application and required Third-Party Software)

Patches and software updates, including those for anti-virus scanners, are required to reduce attack surface. Most successful cyber attacks occur in non-patched systems or applications.

The Vendor shall have a patch management and update process to include support of operating system patch support, vendor application patching, all required third party software, and the support for city’s antivirus/antimalware (Endpoint Protection) product.

Prior to contract award, the Vendor shall provide details on their patch management and update process. Responsibility for installation and update of patches shall be identified.

Following contract award, the Vendor shall provide notification of known vulnerabilities affecting Vendor-supplied or required OS, application, and third-party software within a pre-negotiated period after public disclosure. Vendor will assist mitigating issues with City’s support EndPoint Protection Product.

Following contract award, the Vendor shall provide notification of patches affecting security within a pre-negotiated period as identified in the patch management process. The Vendor shall apply, test, and validate the appropriate updates and/or workarounds on a baseline reference system before distribution. Mitigation of these vulnerabilities shall occur within a pre-negotiated period.

4.2.7.11. Malware Detection and Protection

Malicious code, worms, viruses, and Trojans can propagate through a control system and potentially impact or curtail operations.

The Vendor shall disclose the existence and reasons for any known or identified backdoor codes that Malware could be used to compromise a system.

Vendor will assist mitigating issues with City’s support Endpoint Protection Product.

The Vendor shall disclose any attacks against the vendor's system that involved a malware incident that could potential compromise the City's Systems. Vendor will provide documentation of the remediation of the incident.

4.2.7.12. Wireless Technologies

Wireless technologies refer to any technology, such as radio, microwave, or infrared waves, which allows analog and digital communication without the use of wires. Wireless Technologies may include well known methods such as: Bluetooth, 802.11 (WiFi), ZigBee, Zwave, WirelessHart, Cellular, WiMAX, Radio/Microwave, and Satellite.

Following contract award, the Vendor shall provide specific protocols and other detailed information required for the wireless device to communicate with the control network, including other wireless equipment that can communicate with the Vendor-supplied device.

The Vendor shall provide documentation on the range of the wireless device and power requirements.

The wireless system shall provide encryption of radio signals. The Vendor shall clearly identify these security devices and methods to change them from the Vendor-configured or manufacture default conditions.

4.2.8. Maintenance and Support

The Vendor should outline options for maintenance and support of SCADA system, service agreement options, warranty information if available. At a minimum the selected Vendor will provide maintenance service for a minimum of 3 years and a warranty for 1 year all materials and workmanship from the date of Final Acceptance of the SCADA system.

4.2.9. Pricing

The Proposer pricing shall be all inclusive for all recommended hardware options, software packages, service agreements, training, startup, labor, travel, etc. to fulfill the project requirements successfully.

Proposer are required to provide accurate and complete pricing for use in the evaluation, including any licensing and pricing options.

4.2.10. Other Services

Proposers may include any other services that are considered necessary to complete this project, or which would, in the judgement of the Proposer, improve the capability or increase the value of the proposed system.

4.3. Specifications/Scope of Services: The project is to be completed with the following tasks:

1) Project Management and Coordination
2) SCADA System Design
3) SCADA System Software, Equipment Procurement, Configuration, and Installation
4) Training, Instructions and Documentation
5) System Maintenance and services

Task 1: Project Management and Coordination

Project Initiation: Selected proposer shall develop a project schedule for creating design plans and report specifically to complete Phase 1 to meet integration deadline of December 31, 2018. The schedule should also outline future phases as they correlate with the plans described in Task 2 below. The Schedule shall show individual tasks described in the scope of work for the project and identify key milestone dates. The Proposer Project Manager (PM) shall maintain and update the project schedule as work proceeds. The PM will be assigned to this project for the duration of the work.

Work Task Coordination: The Consultant PM shall assign and coordinate all work tasks being accomplished, including those to be performed by sub-consultants, to ensure project work is completed on schedule.

Project Team Coordination: The City PM and the Consultant PM shall maintain ongoing communication about the project on a frequent and regular basis. Each PM shall provide the other with

- Written synopsis of their respective contracts (both telephone or in person) with others
- Copies of pertinent written communications, including electronic (email) correspondence
- Early identification of potential problems

Progress Meetings: The City and Consultant shall meet, either in person or by telephone conference calls, at regularly scheduled Project Working Group Meetings held at approximate two-week intervals throughout the project. Meetings shall include consultant PM, City PM, and Water Resources Manager. The Project Working Group Meetings shall be used to coordinate the work effort and resolve any outstanding issues or problems. The meetings shall focus on the following topics:

- Activities completed since last meeting
- Problems encountered or anticipated
- Late activities/activities slipping behind schedule
- Solutions for unresolved or newly identified problems
- Schedule of upcoming activities
- Information on items required, or comments from Federal agencies.

The Consultant PM shall prepare a written summary report of the general discussions held including all action items assigned. This scope assumes six (6) Project Working Group Meetings via conference call.

Reporting Requirements: The Consultant PM shall provide the following on a routine basis:

Monthly status reports (percent of design components complete) and monthly billings.

Task 2: SCADA System Design

Proposers should expect to develop a fully documented design for all SCADA components, including the WTP and remote sites (KCWTP, remote monitoring locations, pumps, valves, intakes, etc.) prior to the actual performance of any installation, configuration, or development work in each phase. Plans of improvements shall include physical modifications to WTP, hardware installation, one-line diagrams, component details, etc.

Design documentation shall include a technical memorandum outlining all phases of the SCADA system implementation. The memorandum shall provide basis for design, design plans, schematics and details that will be used for installation, details of hardware components, software. The memorandum shall include recommendations for improving processes, data recording, analysis, reporting, alarms/alerts, security (both physical and cyber security) and troubleshooting and recovery. Memorandum will outline recommended phasing of additional component integration that may be used for future expansion of the SCADA system. The memorandum shall outline initial installation/integration schedule, the proposed training program and system maintenance and service programs.

Cost estimation is a critical part of the design phase of this project. The design must include costs of all hardware, software licensing, installation and operations costs of for the first three (3) years of operation. This is a key factor when considering budget and determining phasing of SCADA system integration.

Three (3) design submittals are required. 30% design and 90% design submittals shall have comments and responses. The third submittal will be final design prior to installation of the SCADA system.

Task 3: SCADA System Software, Equipment Procurement, Configuration, and Installation

Software Implementation: The SCADA system shall be based on a packaged software product. The successful proposer will provide all required software licensing and programming required to implement the SCADA system according to the approved design. A total of 10 users are expected to require access to the SCADA system.

The successful proposer will be required to integrate or migrate existing configurations or create new configurations for all required screens, scripts, functions, reports, trends, logic blocks, communications and other system elements to ensure complete and equivalent capability in the new system as compared to the City's existing operations.

System Startup and Acceptance Testing: Proposals shall include the start-up, integration and testing elements of the SCADA system, including acceptance testing. The existing operation system must be maintained to run in parallel until the new system has been accepted. Acceptance Testing shall be proposed for each phase of work.

Task 4: Training, Instructions and Documentation

The City of Grand Junction believes that thorough, effective training will be critical to attaining its objectives. Training should be proposed for:

- Operators, including use of HMI, Trending, Alarms, alarm notifications, data logging, communications, analysis and reporting features.

- SCADA System Administrators and SCADA Technicians, including configuration interface and troubleshooting the SCADA system.

- IT System Administrators, responsible for ongoing operation of the computer hardware and software components.

The City of Grand Junction also requires both system and user documentation (hardcopy and electronic formats that can be updated by the City). The technical system documentation will describe the system architecture, system logic, and operating requirements in sufficient detail for City staff to understand and take over technical support of the system. The user documentation will include and easy-to-use “cheat sheet” for reference by users.

Task 5: System Maintenance and services

Proposers shall include maintenance services for all components of the SCADA system including hardware, software and communications (except for computer, networking and communication elements provided by the City) for a period of 3 years following Final Acceptance of the system. It is expected that the vendor will provide warranty on materials delivered for a period of 1 year from the date of Final Acceptance.

Other Services:

Proposals may include any other services that are considered necessary to complete this project in a turnkey fashion, or which would, in the judgement of the Proposer, improve the capability or increase the value of the delivered system.

4.4. Site Visit/Briefing: A **mandatory** site visit is required by all contractors intending to submit a response to this RFP. Any contractor that does not attend the **mandatory** site visit shall not be eligible to submit a response to this RFP. **The site visit shall be held at the City of Grand Junction Water Treatment Plant located at 244 26 ¼ Road, Grand Junction, CO on June 6, 2018 at 10:30am.**

4.5. RFP Tentative Time Schedule:

Request for Proposal available	May 29, 2018
Mandatory Site Visit	June 6, 2018
Inquiry deadline, no questions after this date	June 19, 2018
Addendum Posted	June 23, 2018
Submittal deadline for proposals	June 28, 2018
Owner evaluation of proposals	June 29-July 6, 2018
Final selection (unless City Council approval is required)	July 11, 2018
Contract execution	July 13, 2018
Work begins no later than	July 18, 2018

4.6. Questions Regarding Scope of Services:

Duane Hoff Jr., Senior Buyer
duaneh@gjcity.org

SECTION 5.0: PREPARATION AND SUBMITTAL OF PROPOSALS

Submission: ***Each proposal shall be submitted in electronic format only, and only through the Rocky Mountain E-Purchasing website (https://www.rockymountainbidsystem.com/default.asp).*** *This site offers both "free" and "paying" registration options that allow for full access of the Owner's documents and for electronic submission of proposals.* *(Note: "free" registration may take up to 24 hours to process. Please Plan accordingly.)* Please view our "**Electronic Vendor Registration Guide"** at http://www.gjcity.org/BidOpenings.aspx for details. (Purchasing Representative does not have access or control of the vendor side of RMEPS. If website or other problems arise during response submission, vendor **MUST** contact RMEPS to resolve issue prior to the response deadline **800-835-4603**). For proper comparison and evaluation, the City requests that proposals be formatted as directed in Section 5.0 "Preparation and Submittal of Proposals." Offerors are required to indicate their interest in this Project, show their specific experience and address their capability to perform the Scope of Services in the Time Schedule as set forth herein. For proper comparison and evaluation, the Owner requires that proposals be formatted **A** to **F**:

A. **Cover Letter:** Cover letter shall be provided which explains the Firm's interest in the project. The letter shall contain the name/address/phone number/email of the person who will serve as the firm's principal contact person with Owner's Contract Administrator and shall identify individual(s) who will be authorized to make presentations on behalf of the firm. The statement shall bear the signature of the person having proper authority to make formal commitments on behalf of the firm. By submitting a response to this solicitation the Contractor agrees to all requirements herein.

B. **Qualifications/Experience/Credentials:** Proposers shall provide their qualifications for consideration as a contract provider to the City of Grand Junction/Mesa County and include prior experience in similar projects.

C. **Strategy and Implementation Plan:** Describe your (the firm's) interpretation of the Owner's objectives with regard to this RFP. Describe the proposed strategy and/or plan for achieving the objectives of this RFP. The Firm may utilize a written narrative or any other printed technique to demonstrate their ability to satisfy the Scope of Services. The narrative should describe a logical progression of tasks and efforts starting with the initial steps or tasks to be accomplished and continuing until all proposed tasks are fully described and the RFP objectives are accomplished. Include a **time schedule** for completion of your firm's implementation plan and an estimate of time commitments from Owner staff.

D. **References:** A minimum of three (3) **references** with name, address, telephone number, and email address that can attest to your experience in projects of similar scope and size.

E. **Fee Proposal:** In addition to providing all-inclusive pricing for this project using the Solicitation Response form Found in Section 7, also provide a complete breakdown list of pricing.

F. **Additional Data (optional):** Provide any additional information that will aid in evaluation of your qualifications with respect to this project.

SECTION 6.0: EVALUATION CRITERIA AND FACTORS

6.1 **Evaluation:** An evaluation team shall review all responses and select the proposal or proposals that best demonstrate the capability in all aspects to perform the scope of services and possess the integrity and reliability that will ensure good faith performance.

6.2 **Intent:** Only respondents who meet the qualification criteria will be considered. Therefore, it is imperative that the submitted proposal clearly indicate the firm's ability to provide the services described herein.

Submittal evaluations will be done in accordance with the criteria and procedure defined herein. The Owner reserves the right to reject any and all portions of proposals and take into consideration past performance. The following parameters will be used to evaluate the submittals (in no particular order of priority):

- Responsiveness of submittal to the RFP
- Understanding of the project and the objectives
- Experience/Required Skills
- Necessary resources
- Strategy & Implementation Plan
- References
- Fees

Owner also reserves the right to take into consideration past performance of previous awards/contracts with the Owner of any vendor, contractor, supplier, or service provider in determining final award(s).

The Owner will undertake negotiations with the top rated firm and will not negotiate with lower rated firms unless negotiations with higher rated firms have been unsuccessful and terminated.

6.3 **Oral Interviews:** The Owner may invite the most qualified rated proposers to participate in oral interviews.

6.4 **Award:** Firms shall be ranked or disqualified based on the criteria listed in Section 6.2. The Owner reserves the right to consider all of the information submitted and/or oral presentations, if required, in selecting the project Contractor.

SECTION 7.0: SOLICITATION RESPONSE FORM

RFP-4525-8-DH WATER TREATMENT PLANT, COLLECTION AND DISTRIBUTION SUPERVISORY CONTROL AND DATA ACQUISITION AUTOMATION SYSTEM (SCADA)

Offeror must submit entire Form completed, dated and signed.

1) **Total all inclusive pricing to provide all labor, parts, supplies, equipment, installation, etc. necessary for the Water Treatment Plant, Collection and Distribution Supervisory Control and Data Acquisition Automation System (SCADA) per specifications:**

TOTAL COST $____________________

WRITTEN:____dollars.

The Owner reserves the right to accept any portion of the work to be performed at its discretion

----

The undersigned has thoroughly examined the entire Request for Proposals and therefore submits the proposal and schedule of fees and services attached hereto.

This offer is firm and irrevocable for sixty (60) days after the time and date set for receipt of proposals.

The undersigned Offeror agrees to provide services and products in accordance with the terms and conditions contained in this Request for Proposal and as described in the Offeror's proposal attached hereto; as accepted by the Owner.

Prices in the proposal have not knowingly been disclosed with another provider and will not be prior to award.

- Prices in this proposal have been arrived at independently, without consultation, communication or agreement for the purpose of restricting competition.
- No attempt has been made nor will be to induce any other person or firm to submit a proposal for the purpose of restricting competition.
- The individual signing this proposal certifies they are a legal agent of the offeror, authorized to represent the offeror and is legally responsible for the offer with regard to supporting documentation and prices provided.
- Direct purchases by the City of Grand Junction are tax exempt from Colorado Sales or Use Tax. Tax exempt No. 98-903544. The undersigned certifies that no Federal, State, County or Municipal tax will be added to the above quoted prices.
- City of Grand Junction payment terms shall be Net 30 days.
- Prompt payment discount of _________ percent of the net dollar will be offered to the Owner if the invoice is paid within ____________ days after the receipt of the invoice.

RECEIPT OF ADDENDA: the undersigned Contractor acknowledges receipt of Addenda to the Solicitation, Specifications, and other Contract Documents. State number of Addenda received: ____________.

It is the responsibility of the Proposer to ensure all Addenda have been received and acknowledged.

Company Name – (Typed or Printed)	Authorized Agent – (Typed or Printed)
Authorized Agent Signature	Phone Number
Address of Offeror	E-mail Address of Agent
City, State, and Zip Code	Date

Attachment A

Function List

Telemetry of:

Purdy Mesa Flow meter
Purdy Mesa Turbidimeter
Purdy Mesa pH analyzer
Purdy Mesa Flowline Pressure
Purdy Mesa Remote Valve Flowmeter
Kannah Creek Flow Electromagnetic Flow Meter
Kannah Creek Raw Turbidimeter
Kannah Creek pH Analyzer
Kannah Creek Remote Valve Flowmeter
Reservoir Pump Electromagnetic Flow Meter
Influent Flow Electromagnetic Flow Meter
Influent Flow Turbidimeter
Influent pH Analyzer
Effluent Flow
Effluent Turbidimeter
Effluent pH analyzer
Clearwell Chlorine Analyzer
EPTDS Chlorine analyzer
Effluent Fluoride analyzer
Water Tank Level
City 24" Electromagnetic Flow Meter
OM 24" Electromagnetic Flow Meter
Clearwell Level sensor
Service Waterline Pressure
Ultrasonic Level sensor - Contact Basin
Raw Water Vault Flood sensor
4 - individual filter Electromagnetic Flow Meters
4- individual filter turbidimeters
4- individual filter particle counters
Backwash System HMI
Plant Security System
OSG Building HMI
Solar Power System
Pre and Post chlorine flowmeters
Spyglass Raw Water Flow
Cemetery Raw Water Flowmeter
Reservoir #4 Level Sensor
CL17 Permanganate Analyzer
Online DO analyzer

Natural Gas Generator

Control of:

Purdy Mesa Influent Control Valve
Purdy Mesa Remote Valve
Kannah Creek Influent Control Valve
Kannah Creek Bypass Valve
Kannah Creek Remote Control Valve
Reservoir Pump 40 hp On/Off
Reservoir Pump Valve%
Reservoir 75 hp Pump On/Off
Service Water Pump 1 Control
Service Water Pump 2 Control
PLC Maintaining constant water level in Contact Basin
Flow-Paced Chemical feed system
    ACH pump
    Polymer pump
    Filter aid pump
    Sodium Fluorosilicate Feed System
Surface Wash Pump On/Off
Flash Mixer On/Off
Backwash System PLC
    4 valves on 4 filters open/close (16 total)
    4 modulating effluent valves
    8 ultrasonic filter level sensors
    2 Blowers
    8 isolation Valves - on air scour system
    1 air compressor blow off valve open/close
    air flow meter
    2 backwash pumps
    backwash flow Electromagnetic Flow Meter
Plant Alarm Panel
Auto-dialer system
PID loop for chlorine dosing (4 chlorination pumps 2-pre/ 2 post)
8 -Sample Pumps
Gunnison River Pump station

Include for Future Addition of:

Several Distribution System Chlorine Analyzers
Remote Monitoring of Mantey Heights Flowmeter
? Gate Security system
Interface with Kannah Creek SCADA system
Interface with Ridges Irrigation Pump station
Chemical Feed Flowmeters
Coagulant Charge Analyzer / Zeta Potential Meter

Reservoir #3 & 4 Bypass Valve Control
Raw Water Intake Structure telemetry
Watershed Reservoir Telemetry & Valve control
Monitoring of PRV stations on Flowline
Asset Management System

Data Processing / Storage

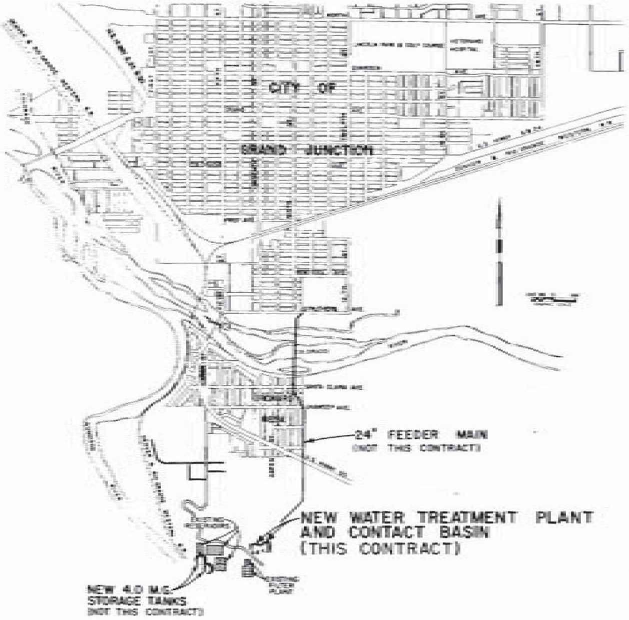
Capture 4-hour turbidity/chlorine readings for compliance
Flow totalizers
high/low events (turb, chlorine, flow, etc.)
Calculate real-time CT
Headloss calculation
Accept Operator inputs for daily labs & chemical usage
Track chemical inventory
Track Filter run times
Track filter loading rate
calculate backwash gpm/sf

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO

1967

CONTRACT - I

WATER TREATMENT PLANT



VICINITY MAP

LIST OF DRAWINGS

SHEET NO.	TITLE
1.	GENERAL - LAYOUT AND SITE PLAN
2.	GENERAL - PLANT GRADING & CONTROL, MISCELLANEOUS SITE DETAILS
3.	GENERAL - PLANT YARD PIPING - PLAN
4.	METERING & CONTROLS - HYDRAULIC PROFILE, PLANT FLOW AND CONTROL SCHEMATICS
5.	ARCHITECTURAL - LANDSCAPING PLAN
6.	ARCHITECTURAL - GROUND FLOOR PLAN AND WALL SECTIONS
7.	ARCHITECTURAL - OPERATING FLOOR PLAN
8.	ARCHITECTURAL - STORAGE FLOOR PLAN AND STAIR SECTIONS
9.	ARCHITECTURAL - BUILDING ELEVATIONS AND DETAILS
10.	ARCHITECTURAL - BUILDING ELEVATIONS AND WINDOW DETAILS
11.	ARCHITECTURAL - BUILDING SECTIONS AND DETAILS
12.	ARCHITECTURAL - ROOM FINISH, DOOR AND OPENING SCHEDULES
13.	STRUCTURAL - MECHANICAL - FOUNDATION PLAN
14.	STRUCTURAL - MECHANICAL - GROUND FLOOR AND PIPE GALLERY, PLANS AND DETAILS
15.	STRUCTURAL - MECHANICAL - OPERATING FLOOR PLAN
16.	STRUCTURAL - MECHANICAL - STORAGE FLOOR PLAN, MISCELLANEOUS DETAILS
17.	STRUCTURAL - MECHANICAL - SECTION 1/17 AND DETAILS
18.	STRUCTURAL - MECHANICAL - SECTION 2/18 AND DETAILS
19.	STRUCTURAL - MECHANICAL - SECTION 3/19 AND DETAILS
20.	STRUCTURAL - MECHANICAL - SECTION 5/20 AND DETAILS
21.	STRUCTURAL - MECHANICAL - SECTION 6/21 AND DETAILS
22.	STRUCTURAL - MECHANICAL - SECTION 7/22 AND DETAILS
23.	STRUCTURAL - MECHANICAL - MISCELLANEOUS DETAILS
24.	STRUCTURAL - BEAM FRAMING DETAILS & SCHEDULES
25.	STRUCTURAL - COLUMN SCHEDULE AND STRUCTURAL DETAILS
26.	STRUCTURAL - ROOF FRAMING PLANS AND DETAILS
27.	MECHANICAL - EQUIPMENT PIPING SCHEMATICS
28.	MECHANICAL - EQUIPMENT PIPING SCHEMATICS
29.	METERING & CONTROLS - MAIN CONTROL PANEL - ELEVATIONS, SECTIONS AND SCHEDULES
30.	ELECTRICAL - LIGHTING AND POWER PLAN - STORAGE FLOOR, MOTOR CONTROL CENTER, ELECTRICAL ONE LINE DIAGRAM
31.	ELECTRICAL - LIGHTING AND POWER - GROUND AND OPERATING FLOOR PLANS
32.	MECHANICAL - PLUMBING - GROUND AND OPERATING FLOOR PLANS
33.	MECHANICAL - HEATING AND VENTILATING - GROUND AND OPERATING FLOOR PLANS
34.	MECHANICAL - PLUMBING, HEATING AND VENTILATING - STORAGE FLOOR PLAN
35.	CONTACT BASINS - PLAN AND DETAILS
36.	CONTACT BASINS - SECTIONS AND DETAILS
37.	FLASH MIXING BASINS - PLANS, SECTIONS & DETAILS
38.	RAW WATER CONTROL VAULT - PLANS, SECTIONS AND DETAILS
39.	RAW WATER PUMPING STATION - RAW WATER FLOW METER VAULT - PLANS, SECTIONS AND DETAILS

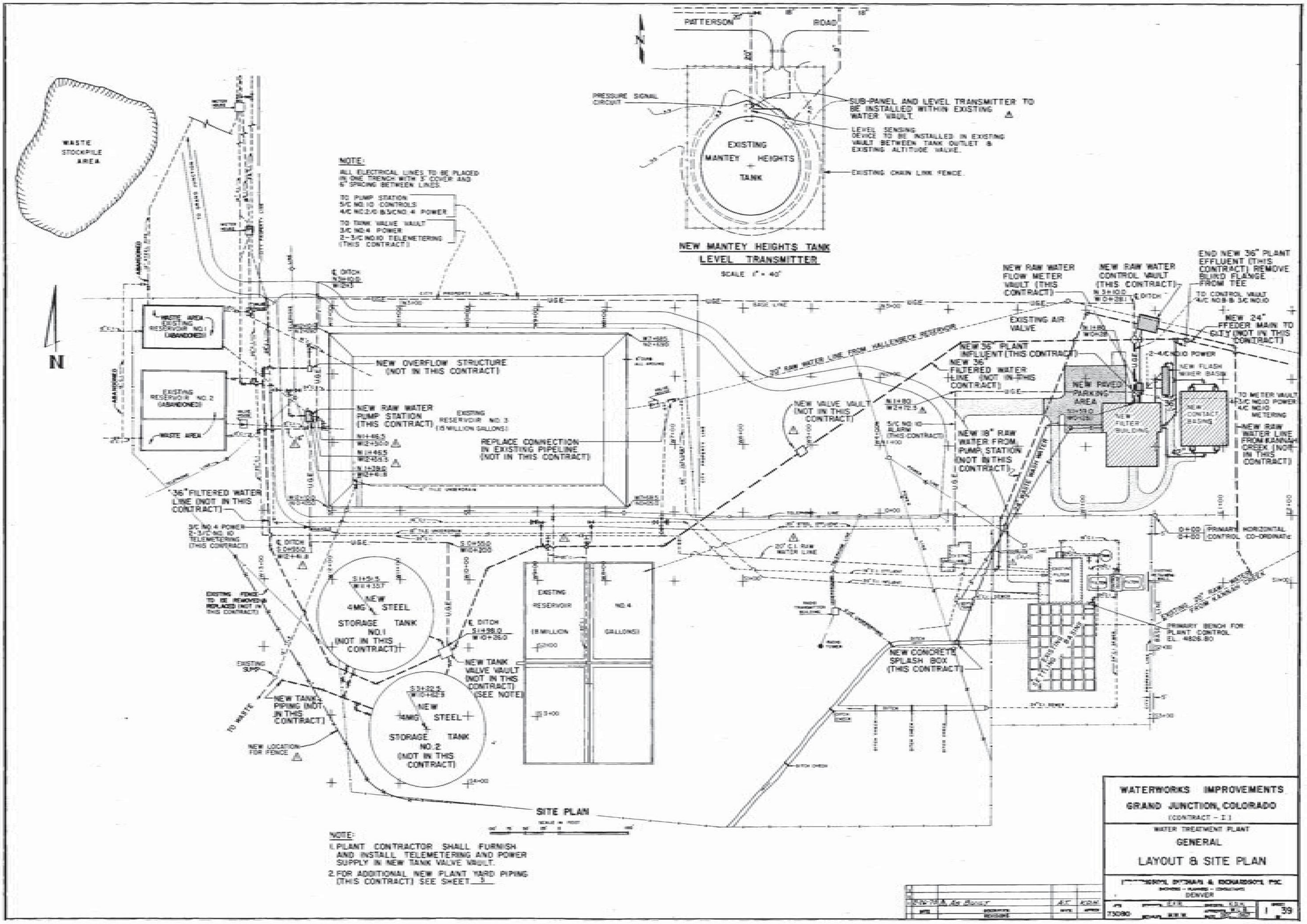
HENNINGSON, DURHAM & RICHARDSON

ENGINEERS · PLANNERS · CONSULTANTS

DENVER

FILED WITH CITY OF GRAND JUNCTION,
COLORADO - DECEMBER 20, 1967

2934


PATTERSON
ROAD
PRESSURE SIGNAL CIRCUIT
SUB-PANEL AND LEVEL TRANSMITTER TO BE INSTALLED WITHIN EXISTING WATER VAULT.
LEVEL SENSING DEVICE TO BE INSTALLED IN EXISTING VAULT BETWEEN TANK OUTLET & EXISTING ALTITUDE VALVE.
EXISTING MANTEY HEIGHTS TANK
EXISTING CHAIN LINK FENCE.
NEW MANTEY HEIGHTS TANK LEVEL TRANSMITTER
SCALE 1" = 40'
WASTE STOCKPILE AREA
N
WASTE AREA EXISTING RESERVOIR NO. 1 (ABANDONED)
EXISTING RESERVOIR NO. 2 (ABANDONED)
WASTE AREA
ABANDONED
TO GRAND JUNCTION
CITY PROPERTY LINE
USE
BASE LINE
℄ DITCH
NEW OVERFLOW STRUCTURE (NOT IN THIS CONTRACT)
NEW RAW WATER PUMP STATION (THIS CONTRACT)
EXISTING RESERVOIR NO. 3 (15 MILLION GALLONS)
REPLACE CONNECTION IN EXISTING PIPELINE (NOT IN THIS CONTRACT)
36" FILTERED WATER LINE (NOT IN THIS CONTRACT)
3/C NO. 4 POWER 2-3/C NO. 10 TELEMETERING (THIS CONTRACT)
EXISTING FENCE TO BE REMOVED & REPLACED (NOT IN THIS CONTRACT)
NEW 4MG STEEL STORAGE TANK NO. 1 (NOT IN THIS CONTRACT)
NEW 4MG STEEL STORAGE TANK NO. 2 (NOT IN THIS CONTRACT)
NEW TANK VALVE VAULT (NOT IN THIS CONTRACT) (SEE NOTE)
EXISTING SUMP
NEW TANK PIPING (NOT IN THIS CONTRACT)
TO WASTE
NEW LOCATION FOR FENCE
EXISTING RESERVOIR NO. 4 (8 MILLION GALLONS)
20" RAW WATER LINE FROM HALLENBECK RESERVOIR
NEW VALVE VAULT (NOT IN THIS CONTRACT)
5/C NO. 10 ALARM (THIS CONTRACT)
20" C.I. RAW WATER LINE
NEW 36" PLANT INFLUENT (THIS CONTRACT)
NEW 36" FILTERED WATER LINE (NOT IN THIS CONTRACT)
NEW 18" RAW WATER FROM PUMP STATION (NOT IN THIS CONTRACT)
EXISTING AIR VALVE
NEW RAW WATER FLOW METER VAULT (THIS CONTRACT)
NEW RAW WATER CONTROL VAULT (THIS CONTRACT)
END NEW 36" PLANT EFFLUENT (THIS CONTRACT) REMOVE BLIND FLANGE FROM TEE
TO CONTROL VAULT 4/C NO. 8 & 3/C NO. 10
NEW 24" FEEDER MAIN TO CITY (NOT IN THIS CONTRACT)
2-4/C NO. 10 POWER
NEW FLASH MIXER BASIN
NEW PAVED PARKING AREA
NEW FILTER BUILDING
NEW CONTACT BASINS
TO METER VAULT 3/C NO. 10 POWER 4/C NO. 10 METERING
NEW RAW WATER LINE FROM KANNAH CREEK (NOT IN THIS CONTRACT)
0+00 0+00 PRIMARY HORIZONTAL CONTROL CO-ORDINATE
PRIMARY BENCH FOR PLANT CONTROL EL. 4826.80
EXISTING 20" RAW WATER FROM KANNAH CREEK
RADIO TRANSMISSION BUILDING
RADIO TOWER
NEW CONCRETE SPLASH BOX (THIS CONTRACT)
DITCH CHECK
SITE PLAN
SCALE IN FEET

NOTE:
ALL ELECTRICAL LINES TO BE PLACED IN ONE TRENCH WITH 3' COVER AND 6" SPACING BETWEEN LINES.

TO PUMP STATION
5/C NO. 10 CONTROLS
4/C NO. 2/0 & 3/C NO. 4 POWER

TO TANK VALVE VAULT
3/C NO. 4 POWER
2-3/C NO. 10 TELEMETERING
(THIS CONTRACT)

NOTE:
1. PLANT CONTRACTOR SHALL FURNISH AND INSTALL TELEMETERING AND POWER SUPPLY IN NEW TANK VALVE VAULT.
2. FOR ADDITIONAL NEW PLANT YARD PIPING (THIS CONTRACT) SEE SHEET 3

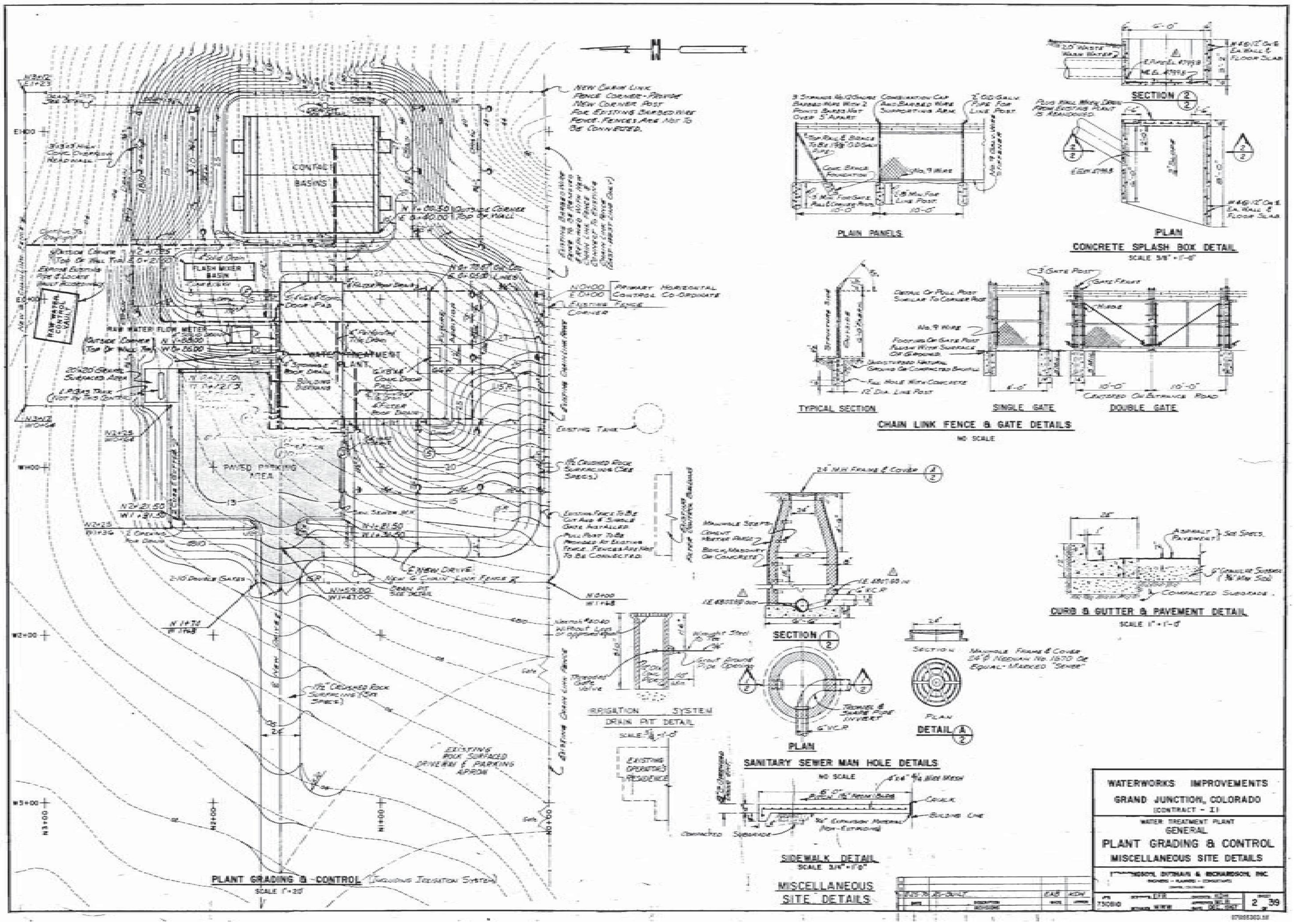
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
GENERAL
LAYOUT & SITE PLAN

DENVER

73080

1 39


PLANT GRADING & CONTROL (INCLUDING IRRIGATION SYSTEM)
SCALE 1" = 20'
CONTACT BASINS
FLASH MIXER BASIN
RAW WATER CONTROL VAULT
RAW WATER FLOW METER
WATER TREATMENT PLANT
PAVED PARKING AREA
N 1+00.50 OUTSIDE CORNER
E 5+40.00 TOP OF WALL
Outside Corner Top Of Wall
N 2+11.25
E 0+21.50
N 1+88.00
W 0+86.00
3'x3'x3' High Conc. Overflow Headwall
Expose Existing Pipe & Locate
20'x20' Gravel Surfaced Area
L.P. Gas Tank (Not In This Contract)
4" Solid Drain
4" Perforated Tile Drain
6'x8'x6" Conc. Door Pad
4" Filter Roof Drain
Building Drains
N 0+00
E 0+00
Primary Horizontal Control Co-Ordinate
Existing Fence Corner
Existing Chain Link Fence
Existing Tank
1½" Crushed Rock Surfacing (See Specs.)
Existing Fence To Be Cut And 4' Single Gate Installed
Pull Post To Be Provided At Existing Fence. Fences Are Not To Be Connected.
New Chain Link Fence Corner - Provide New Corner Post For Existing Barbed Wire Fence. Fences Are Not To Be Connected.
Existing Barbed Wire Fence To Be Removed & Replaced With New Chain Link Fence & Connect To Existing Chain Link Fence (East-West Line Only)
New 6' Chain Link Fence
℄ New Drive
2-10' Double Gates
Drain Pit See Detail
N 1+59.00
W 1+47.00
N 1+74
W 1+68
N 2+21.50
W 1+31.50
N 1+21.50
W 1+31.50
N 2+25
W 1+36
N 2+25
W 0+24
N 3+12
E 1+23
N 3+12
W 0+64
N 0+00
W 1+68
24'
Existing Rock Surfaced Driveway & Parking Apron
E 1+00
E 0+00
W 1+00
W 2+00
W 3+00
N 0+00
N 1+00
N 2+00
N 3+00
Gate
PLAIN PANELS
3 Strands No. 12 Gauge Barbed Wire With 2 Points Barbs Not Over 5" Apart
Combination Cap And Barbed Wire Supporting Arm
2" O.D. Galv. Pipe For Line Post
Top Rail & Brace To Be 1⅝" O.D. Galv. Pipe
Conc. Brace Foundation
No. 9 Wire
No. 9 Galv. Wire Stretcher
3' Min. For Gate, Pull & Corner Posts
2'-6" Min. For Line Post
10'-0"
TYPICAL SECTION
Structure Side
Outside
Disturbed Natural Ground Or Compacted Backfill
Fill Hole With Concrete
12" Dia. Line Post
Detail Of Pull Post Similar To Corner Post
Footings Of Gate Post Flush With Surface Of Ground
SINGLE GATE
DOUBLE GATE
3" Gate Post
Gate Frame
Hinge
4'-0"
Centered On Entrance Road
CHAIN LINK FENCE & GATE DETAILS
NO SCALE
SECTION 2/2
20" Waste Wash Water
Plug Wall When Drain From Existing Plant Is Abandoned
#4 @ 12" Ctrs. Ea. Wall & Floor Slab
6'-0"
8'-0"
PLAN
CONCRETE SPLASH BOX DETAIL
SCALE 3/8" = 1'-0"
24" M.H. Frame & Cover A/2
Manhole Steps
Cement Mortar Parge
Brick Masonry Or Concrete
6" V.C.P.
SECTION 1/2
PLAN
Trowel & Shape Pipe Invert
SECTION
PLAN
Manhole Frame & Cover 24"Ø Neenah No. 1670 Or Equal - Marked "Sewer"
DETAIL A/2
SANITARY SEWER MAN HOLE DETAILS
NO SCALE
IRRIGATION SYSTEM DRAIN PIT DETAIL
Threaded Gate Valve
Grout Around Pipe Opening
Existing Operator's Residence
Existing Filter Control Building
4'x4" ⁴⁄₄ Wire Mesh
Caulk
Building Line
½" Expansion Material (Non-Extruding)
Compacted Subgrade
SIDEWALK DETAIL
SCALE 3/4" = 1'-0"
28"
Asphalt Pavement } See Specs.
6" Granular Subbase (¾" Max Size)
Compacted Subgrade.
CURB & GUTTER & PAVEMENT DETAIL
SCALE 1" = 1'-0"

MISCELLANEOUS SITE DETAILS

8-25-70	AS-BUILT	EAB	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPROVED

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
GENERAL
PLANT GRADING & CONTROL
MISCELLANEOUS SITE DETAILS

[illegible]SSOL, DITTMAN & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

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KDH
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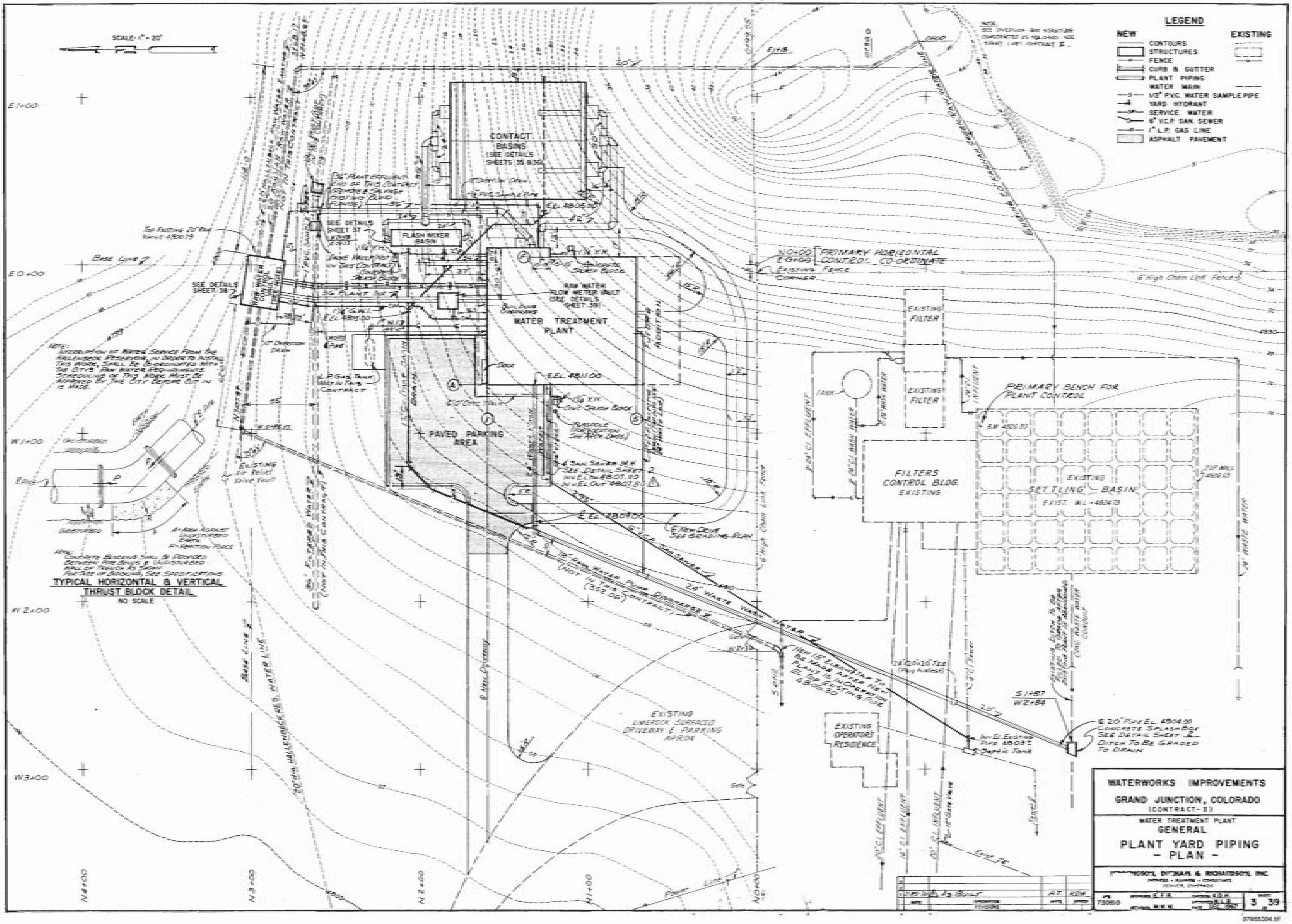
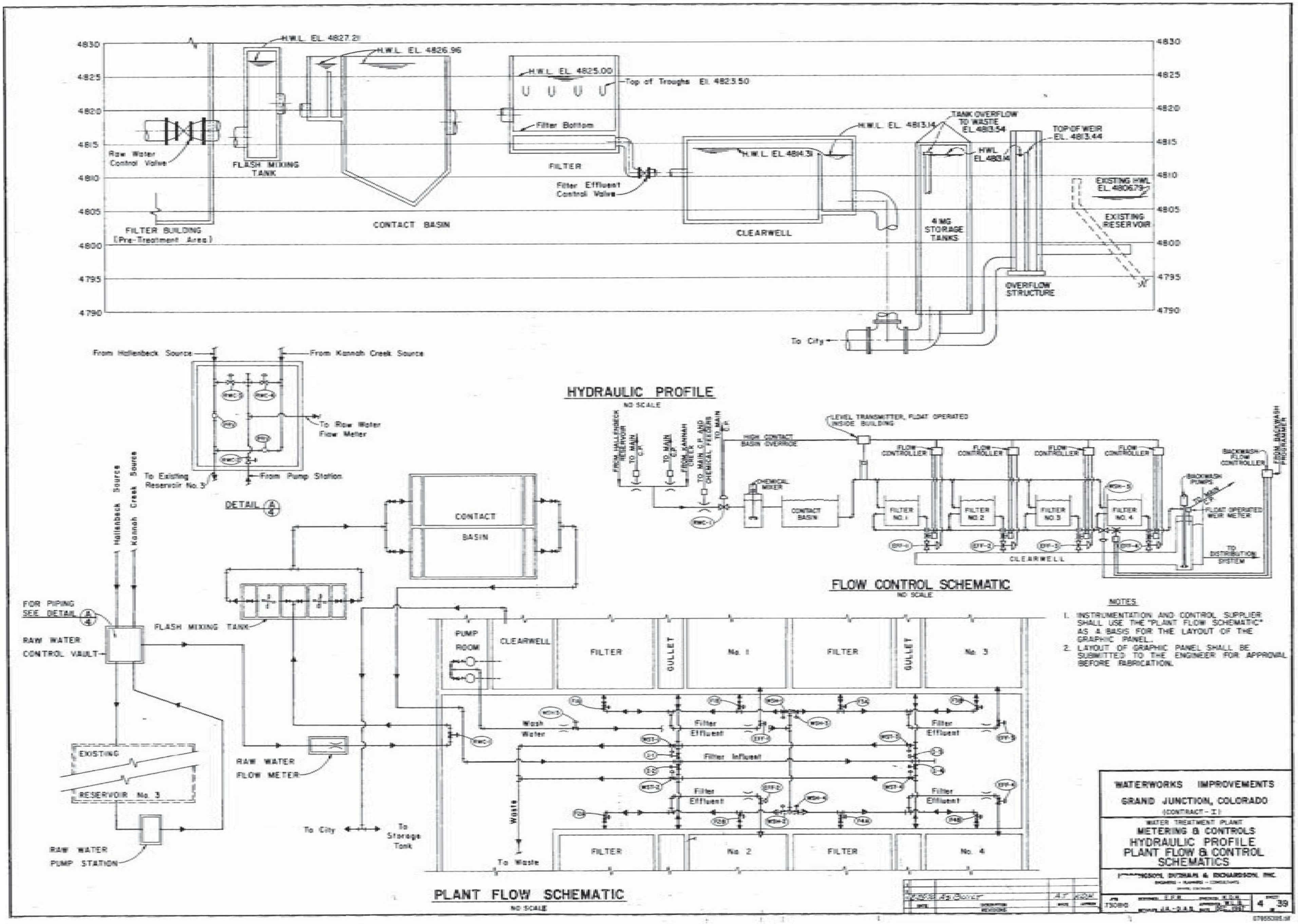
SHEET 2 OF 39

SCALE: 1" = 20'
LEGEND
NEW
EXISTING
CONTOURS
STRUCTURES
FENCE
CURB & GUTTER
PLANT PIPING
WATER MAIN
1/2" PVC WATER SAMPLE PIPE
YARD HYDRANT
SERVICE WATER
6" V.C.P. SAN. SEWER
1" L.P. GAS LINE
ASPHALT PAVEMENT
CONTACT BASINS (SEE DETAILS SHEETS 35 & 36)
FLASH MIXER BASIN
SEE DETAILS SHEET 37
SEE DETAILS SHEET 38
RAW WATER CONTROL VAULT
RAW WATER FLOW METER VAULT (SEE DETAILS SHEET 39)
WATER TREATMENT PLANT
FUTURE ADDITION
EL. 4811.00
PAVED PARKING AREA
Base Line
TYPICAL HORIZONTAL & VERTICAL THRUST BLOCK DETAIL
NO SCALE
N0+00 PRIMARY HORIZONTAL CONTROL CO-ORDINATE
E 0+00
Existing Fence Corner
6' High Chain Link Fence
EXISTING FILTER
EXISTING FILTER
FILTERS CONTROL BLDG. EXISTING
PRIMARY BENCH FOR PLANT CONTROL
EXISTING SETTLING BASIN
EXIST. W.L. 4804.73
24" WASTE WATER
24" WASTE WASH WATER
18" RAW WATER PUMP DISCHARGE (NOT IN THIS CONTRACT)
36" FILTERED WATER (NOT IN THIS CONTRACT)
20" dia. HALLENBECK RES. WATER LINE
EXISTING TO KANNAH CREEK RAW WATER LINE
EXISTING LIMEROCK SURFACED DRIVEWAY & PARKING APRON
EXISTING OPERATOR'S RESIDENCE
Septic Tank
Inv. El. Existing Pipe 4803.5
E 20" Pipe EL. 4804.00 Concrete Splash Box See Detail Sheet 2 Ditch To Be Graded To Drain
S 1+87 W 2+84
20" C.I. EFFLUENT
16" C.I. EFFLUENT
20" C.I. INFLUENT
E1+00
E0+00
W1+00
W2+00
W3+00
N4+00
N3+00
N2+00
N1+00
N0+00
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT- II)
WATER TREATMENT PLANT
GENERAL
PLANT YARD PIPING
- PLAN -
DITTMAN & RICHARDSON, INC.
DENVER, COLORADO
E.F.R.
730810
As Built
3
39


H.W.L. EL. 4827.21
H.W.L. EL. 4826.96
H.W.L. EL. 4825.00
Top of Troughs El. 4823.50
Filter Bottom
H.W.L. EL. 4813.14
H.W.L. EL. 4814.31
TANK OVERFLOW TO WASTE EL. 4813.54
HWL EL. 4813.14
TOP OF WEIR EL. 4813.44
EXISTING HWL EL. 4806.79
Raw Water Control Valve
FLASH MIXING TANK
FILTER
Filter Effluent Control Valve
FILTER BUILDING (Pre-Treatment Area)
CONTACT BASIN
CLEARWELL
4 MG STORAGE TANKS
EXISTING RESERVOIR
OVERFLOW STRUCTURE
To City
4830
4825
4820
4815
4810
4805
4800
4795
4790
From Hallenbeck Source
From Kannah Creek Source
RWC-3
RWC-4
RWC-2
To Raw Water Flow Meter
To Existing Reservoir No. 3
From Pump Station
DETAIL A/4
LEVEL TRANSMITTER, FLOAT OPERATED INSIDE BUILDING
FROM HALLENBECK RESERVOIR
TO MAIN C.P.
FROM KANNAH CREEK
TO MAIN C.P. AND CHEMICAL FEEDERS
HIGH CONTACT BASIN OVERRIDE
FLOW CONTROLLER
CHEMICAL MIXER
CONTACT BASIN
RWC-1
FILTER NO. 1
FILTER NO. 2
FILTER NO. 3
FILTER NO. 4
WSH-5
BACKWASH PUMPS
BACKWASH FLOW CONTROLLER
FROM BACKWASH PROGRAMMER
FLOAT OPERATED WEIR METER
EFF-1
EFF-2
EFF-3
EFF-4
CLEARWELL
TO DISTRIBUTION SYSTEM
Hallenbeck Source
Kannah Creek Source
FOR PIPING SEE DETAIL A/4
RAW WATER CONTROL VAULT
FLASH MIXING TANK
CONTACT BASIN
EXISTING RESERVOIR No. 3
RAW WATER PUMP STATION
RAW WATER FLOW METER
To City
To Storage Tank
PUMP ROOM
CLEARWELL
FILTER
GULLET
No. 1
No. 3
No. 2
No. 4
Wash Water
Filter Effluent
Filter Influent
Waste
To Waste
F1A
F1B
F2A
F2B
F3A
F3B
F4A
F4B
WSH-1
WSH-2
WSH-3
WSH-4
WST-1
WST-2
WST-3
WST-4
I-1
I-2
I-3
I-4

HYDRAULIC PROFILE

NO SCALE

FLOW CONTROL SCHEMATIC

NO SCALE

PLANT FLOW SCHEMATIC

NO SCALE

NOTES

1. INSTRUMENTATION AND CONTROL SUPPLIER SHALL USE THE "PLANT FLOW SCHEMATIC" AS A BASIS FOR THE LAYOUT OF THE GRAPHIC PANEL.
2. LAYOUT OF GRAPHIC PANEL SHALL BE SUBMITTED TO THE ENGINEER FOR APPROVAL BEFORE FABRICATION.

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
METERING & CONTROLS
HYDRAULIC PROFILE
PLANT FLOW & CONTROL
SCHEMATICS

THOMPSON, DURHAM & RICHARDSON, INC.
ENGINEERS – PLANNERS – CONSULTANTS

As Built

T3080

E.F.R.

W.J.L.

JR. - D.A.S.

DEC. 1987

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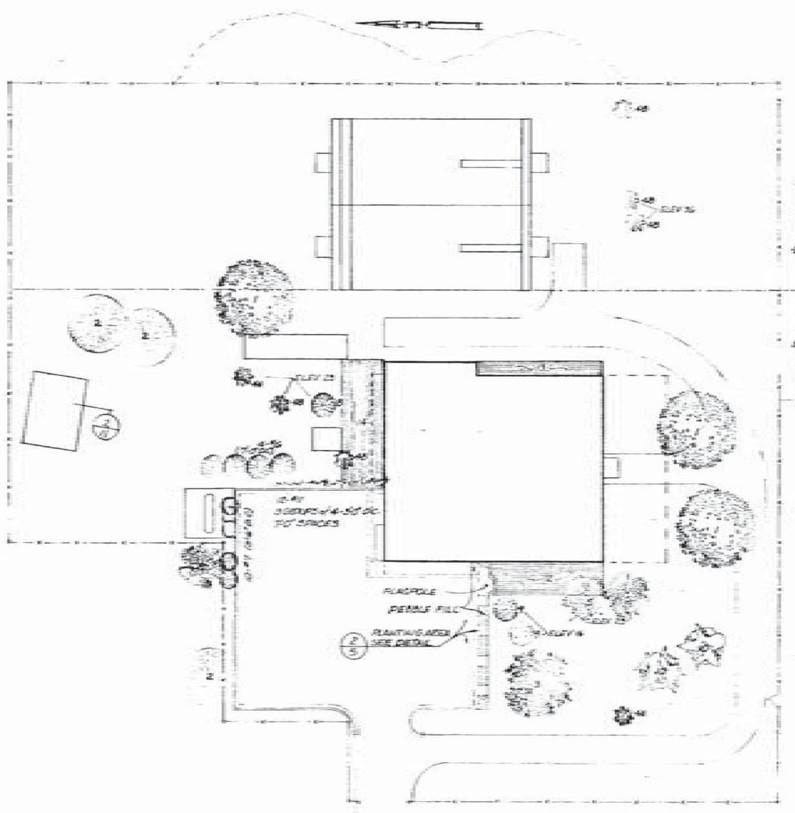
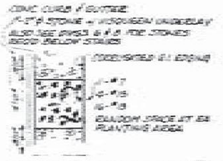

ALL AREAS WITHIN FENCE-LINE AND ANY OTHER AREA WHERE NATURAL GROUND COVER IS DISTURBED LYING EAST OF THIS LINE SHALL BE SEEDED TO BUFFALO GRASS
ALL AREAS WITHIN FENCE-LINE AND ANY OTHER AREA WHERE NATURAL GROUND COVER IS DISTURBED LYING WEST OF THIS LINE SHALL BE SEEDED TO KENTUCKY BLUEGRASS
FLAGPOLE
PEBBLE FILL
PLANTING AREA SEE DETAIL
2
5

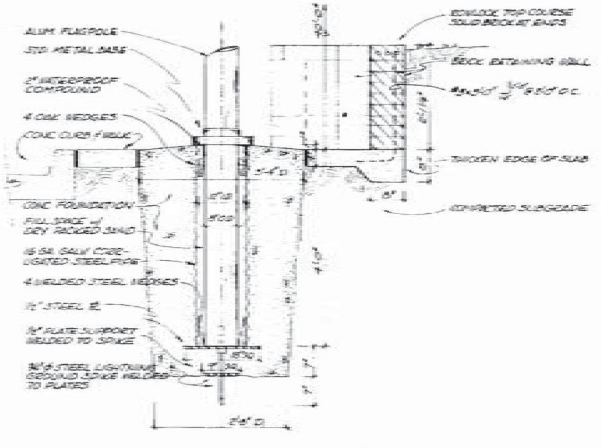
LANDSCAPING PLAN

SCALE: 1" = 20'


CONC CURB & GUTTER
1"-2" Ø STONE w/ VISQUEEN UNDERLAY
ALSO SEE DWGS 6 & 8 FOR STONES REQD BELOW STAIRS
REDWOOD 2x4 EDGING
1-#7
4-#13
16-#13
RANDOM SPACE AT EA PLANTING AREA

PLANTING AREA DETAIL ②/⑤

NO SCALE


ALUM. FLAGPOLE
STD. METAL BASE
2" WATERPROOF COMPOUND
4 OAK WEDGES
CONC CURB & WALK
CONC FOUNDATION
FILL SPACE w/ DRY PACKED SAND
16 GA. GALV CORRUGATED STEEL PIPE
4 WELDED STEEL WEDGES
½" STEEL PL
½" PLATE SUPPORT WELDED TO SPIKE
¾" Ø STEEL LIGHTNING GROUND SPIKE WELDED TO PLATES
ROWLOCK TOP COURSE SOLID BRICK AT ENDS
BRICK RETAINING WALL
THICKEN EDGE OF SLAB
COMPACTED SUBGRADE
2'-8" D
5'-4" D
8"
4'-0"

FLAGPOLE FOUNDATION AND RETAINING WALL SECTION ①/⑤

SCALE: 1" = 1'-0"

NOTES:
1. LOCATION OF PLANTS IS APPROXIMATE - VERIFY BEFORE EXCAVATING.
2. PLANTS SHALL BE SET AT A COMMON ELEVATION WHERE SO SHOWN
3. DELINEATION OF MATERIAL DOES NOT NECESSARILY INDICATE SIZE, SHAPE, OR SPECIES

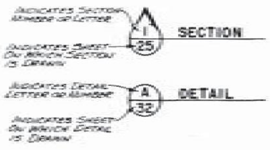
SCHEDULE OF PLANT MATERIAL

KEY	QUANTITY	COMMON NAME	BOTANICAL OR PATENT NAME	SIZE
1	3	LINDEN, REDMOND	Tilia americana, sp	1½"-1¾" CAL, CONT
2	3	HONEYLOCUST	Shademaster Pat. 1515	1½"-1¾" CAL, CONT
3	1	PIN OAK	Quercus palustris	2½"-3" CAL, B & B
4a 4b	2 5	PIÑON PINE	Pinus edulis	3½'-4', B & B 3½'-4'
5	3	RUSSIAN OLIVE	Elaeagnus angustifolia	3'-4', B.R.
6	4	STAGHORN SUMAC	Rhus typhina	3'-5', B.R.
7	15	SKUNKBUSH SUMAC	Rhus trilobata	2-3', B.R.
8	1	DOLGO CRABAPPLE	Malus dolgo	4'-6', CONT
9	2	ELEY CRABAPPLE	Malus purpurea	4'-6', CONT
10	2	PONDEROSA PINE	Pinus ponderosa	4'-4½', B & B
11	12	FIRETHORN	Pyracantha coccinea lalandi	3'-5', CONT
12	80	ST. PAUL VIRGINIA CREEPER	Parthenocissus saintpauli	2 yr., B.R.
13	200	PERIWINKLE (MYRTLE)	Vinca minor	CLUMP
14	300	CREEPING HOLLY-GRAPE	Mahonia repens	5", CONT
15	20	SILVERMOUND SAGE	Artemisia -	5", CLUMP

LEGEND

▨ PEBBLE FILL AREA
▤ GROUND COVER PLANTING AREA

SECTION AND DETAIL SYMBOLS


INDICATES SECTION NUMBER OR LETTER
1
25
SECTION
INDICATES SHEET ON WHICH SECTION IS DRAWN
INDICATES DETAIL LETTER OR NUMBER
A
32
DETAIL
INDICATES SHEET ON WHICH DETAIL IS DRAWN

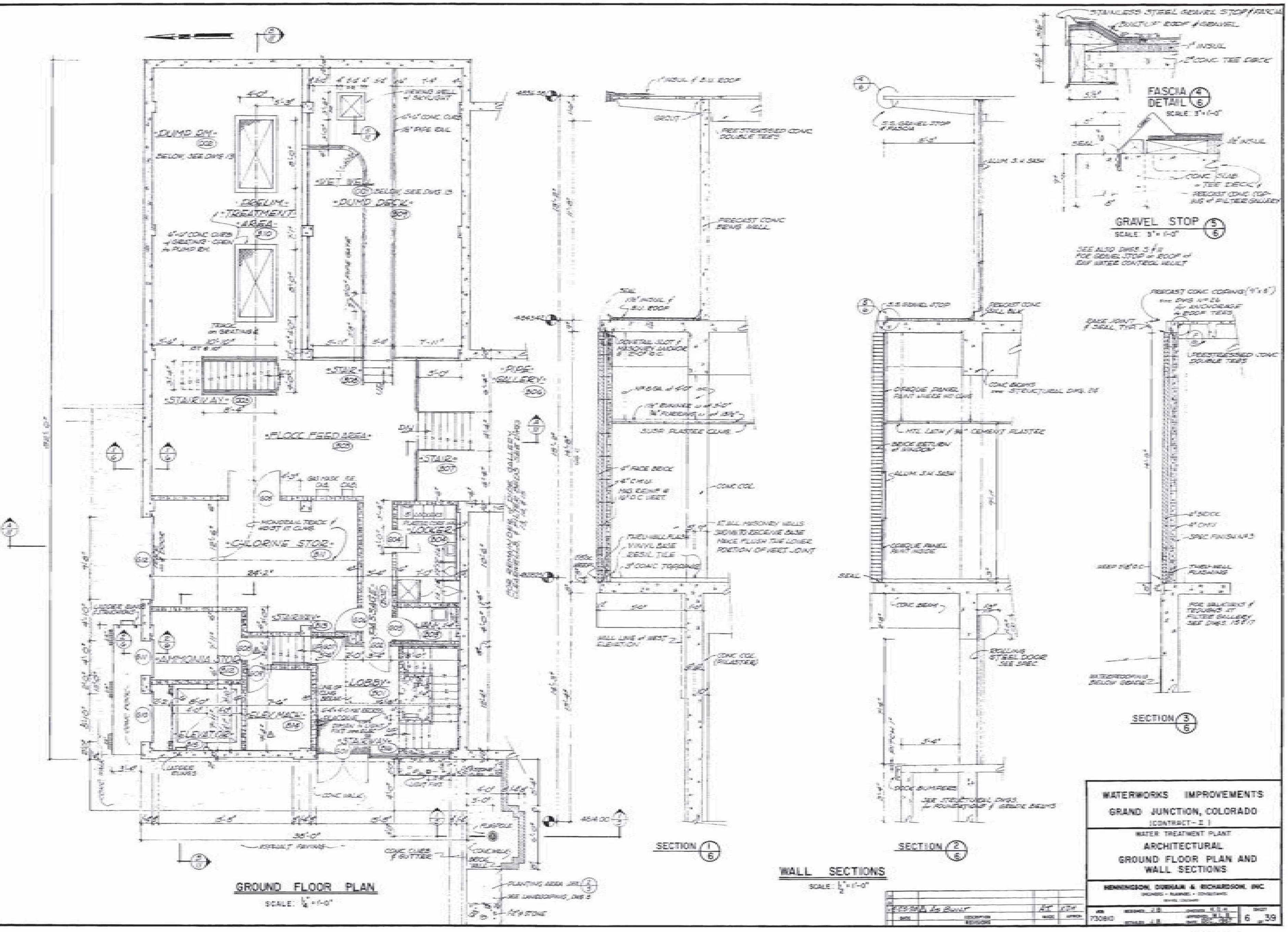
	2-25-76 As Built	A.T.	RDH
DATE	DESCRIPTION REVISIONS	MADE	APPROV

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
ARCHITECTURAL
LANDSCAPING PLAN

[illegible]NSON, DUTHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS
[illegible], COLORADO

JOB 730810 DESIGNED J.B. CHECKED R.D.H. APPROVED W.L.B. DRAWN J.B. DATE DEC. 1973 SHEET 5 OF 39


DUMP RM.
BELOW, SEE DWG 13
VIEWING WELL & SKYLIGHT
6"-6" CONC. CURB
1½" PIPE RAIL
WET WELL
BELOW, SEE DWG 13
DUMP DECK
DRUM TREATMENT AREA
6"-6" CONC. CURB & GRATING - OPEN to PUMP RM.
TRACK on GRATING
STAIR
PIPE GALLERY
STAIRWAY
FLOCC FEED AREA
STAIR
DN
GAS MASK
MONORAIL TRACK & HOIST IT CLAS.
CHLORINE STOR.
LOCKER
PASSAGE
STAIRWAY
AMMONIA STOR.
LOBBY
ELEV. MACH.
ELEVATOR
STAIRWAY
LADDER RUNGS
CONC. WALK
ASPHALT PAVING
CONC. CURB & GUTTER
FLAGPOLE
PLANTING AREA
SEE LANDSCAPING
12" STONE
24'-2"
35'-0"
GROUND FLOOR PLAN
SCALE: ⅛" = 1'-0"
1" INSUL & B.U. ROOF
GROUT
PRESTRESSED CONC. DOUBLE TEES
PRECAST CONC. BEAM WALL
DOVETAIL SLOT & MASONRY ANCHOR
SUSP. PLASTER CLNG.
4" FACE BRICK
4" CMU
CONC. COL.
THRU-WALL FLASH.
VINYL BASE
RESIL. TILE
3" CONC. TOPPING
WALL LINE of WEST ELEVATION
CONC. COL. (PILASTER)
SECTION 1/6
S.S. GRAVEL STOP & FASCIA
ALUM. S.H. SASH
PRECAST CONC. SILL BLK.
OPAQUE PANEL
CONC. BEAMS see STRUCTURAL DWG. 24
MTL. LATH & ¾" CEMENT PLASTER
BRICK RETURN at WINDOW
SEAL
CONC. BEAM
ROLLING STEEL DOOR SEE SPEC.
DOCK BUMPERS
SEE STRUCTURAL DWGS. for FOUNDATIONS & GRADE BEAMS
SECTION 2/6
WALL SECTIONS
SCALE: ½" = 1'-0"
STAINLESS STEEL GRAVEL STOP & FASCIA
BUILT-UP ROOF & GRAVEL
1" INSUL.
2" CONC. TEE DECK
FASCIA DETAIL 4/6
SCALE: 3" = 1'-0"
SEAL
½" INSUL.
CONC. SLAB on TEE DECK
PRECAST CONC. COPING at FILTER GALLERY
GRAVEL STOP 5/6
SCALE: 3" = 1'-0"
SEE ALSO DWGS. 5 & 11 FOR GRAVEL STOP on ROOF of BW WATER CONTROL VAULT
PRECAST CONC. COPING (9"x5")
BAKE JOINT & SEAL TYP.
PRESTRESSED CONC. DOUBLE TEES
4" BRICK
4" CMU
SPEC. FINISH No. 3
THRU-WALL FLASHING
WATERPROOFING BELOW GRADE
SECTION 3/6

DATE	DESCRIPTION REVISIONS	MADE	APPROV.
12-05-98	As Built	KE	KDH

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ARCHITECTURAL
GROUND FLOOR PLAN AND
WALL SECTIONS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS – PLANNERS – CONSULTANTS
DENVER, COLORADO

JOB 730810 DESIGNED J.B. DRAWN J.B. CHECKED K.D.H. APPROVED W.L.S. DATE DEC. 1967 SHEET 6 OF 39

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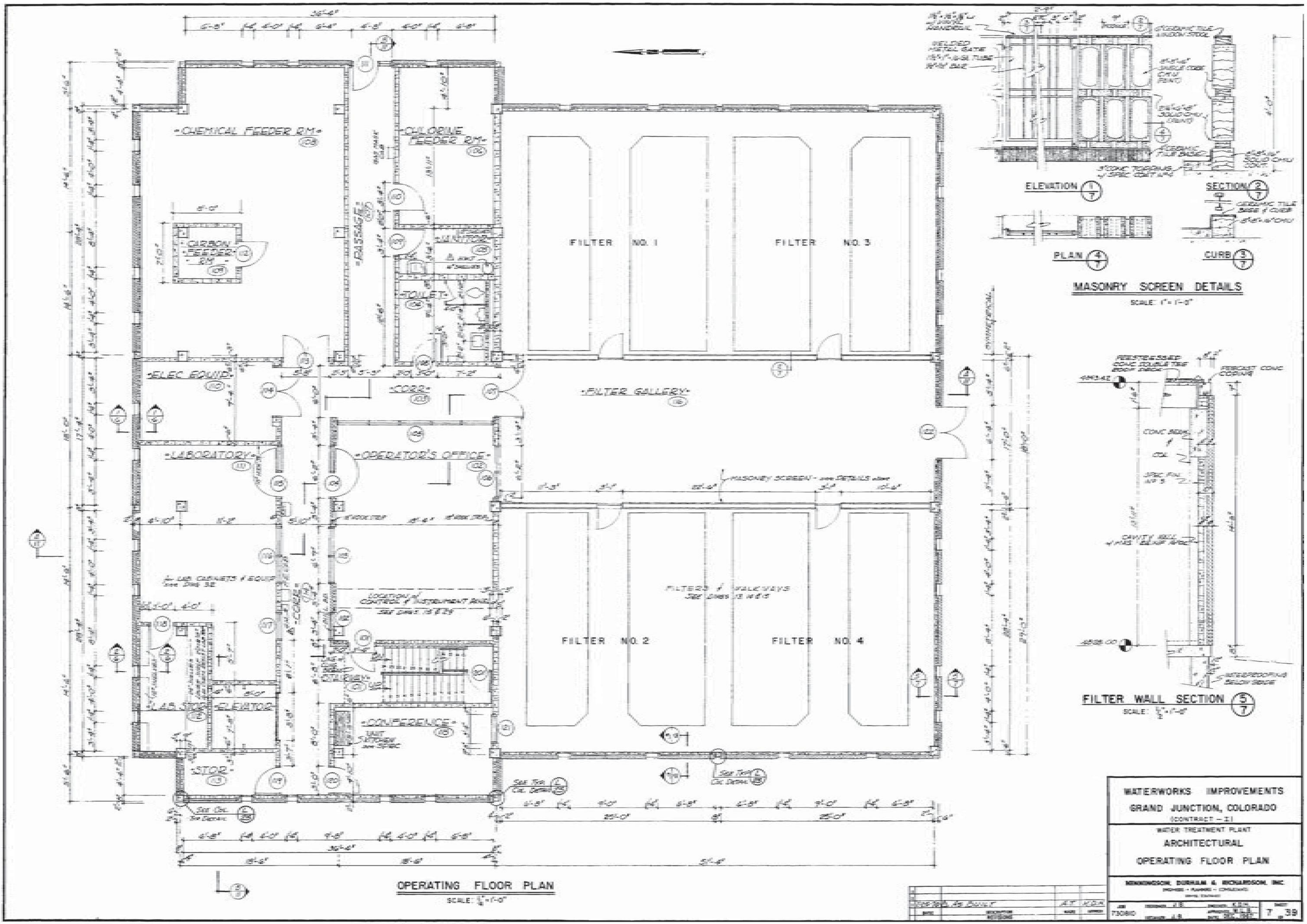
CHEMICAL FEEDER RM 108
CARBON FEEDER RM 109
CHLORINE FEEDER RM 106
PASSAGE 107
JANITOR
TOILET 104
ELEC EQUIP 110
CORR 103
LABORATORY 111
OPERATOR'S OFFICE 102
CORR 114
LAB STOR
ELEVATOR
STAIRWAY
CONFERENCE 115
UNIT KITCHEN see SPEC
STOR 113
FILTER GALLERY 116
FILTER NO. 1
FILTER NO. 3
FILTER NO. 2
FILTER NO. 4
FILTERS & WALKWAYS SEE DWGS 13 14 & 15
MASONRY SCREEN - see DETAILS above
LOCATION of CONTROL & INSTRUMENT PANEL SEE DWGS 16 & 29
LAB CABINETS & EQUIP See DWG 32
See Typ. Col. Detail
SYMMETRICAL
36'-4"
51'-4"
25'-0"
ELEVATION 1/7
SECTION 2/7
PLAN 4/7
CURB 3/7
MASONRY SCREEN DETAILS
SCALE: 1" = 1'-0"
WELDED METAL GATE
CERAMIC TILE WINDOW STOOL
CERAMIC TILE BASE & CURB
FILTER WALL SECTION 5/7
SCALE: 1/2" = 1'-0"
PRECAST CONC COPING
CONC BEAM
CAVITY WALL
WATERPROOFING BELOW GRADE
4943.42
4928.00
OPERATING FLOOR PLAN
SCALE: 1/8" = 1'-0"

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT – II)

WATER TREATMENT PLANT
ARCHITECTURAL
OPERATING FLOOR PLAN

HENNINGSON, DURHAM & RICHARDSON, INC.

JOB 730810

SHEET 7 OF 39

AS BUILT A.T. K.D.H.

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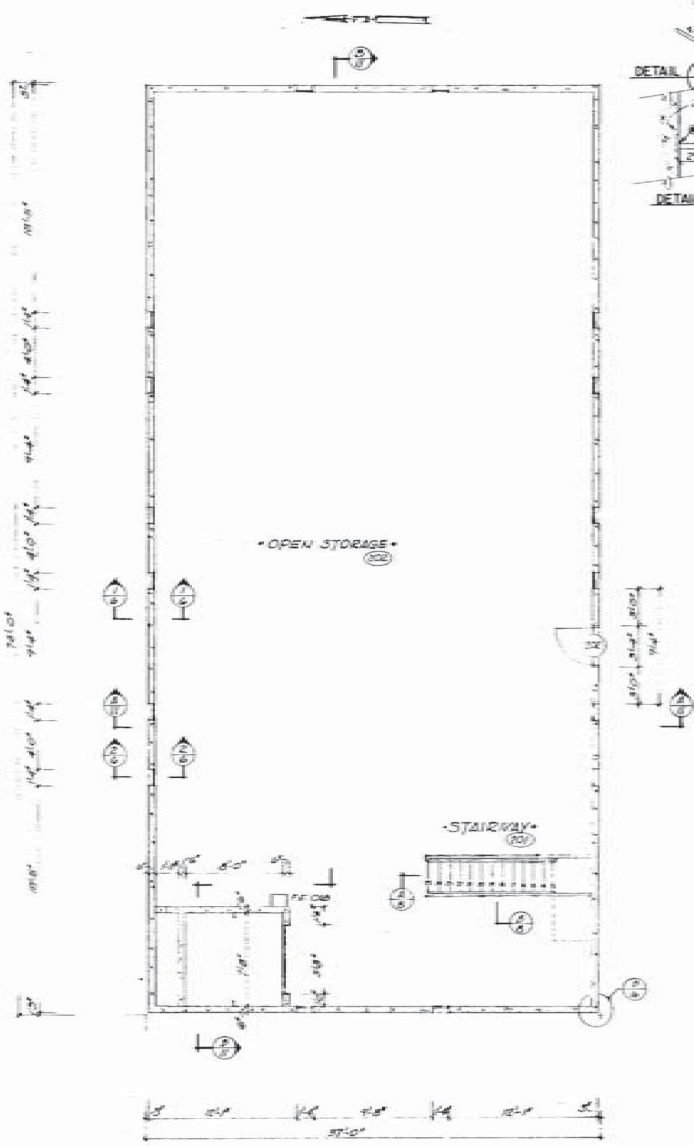
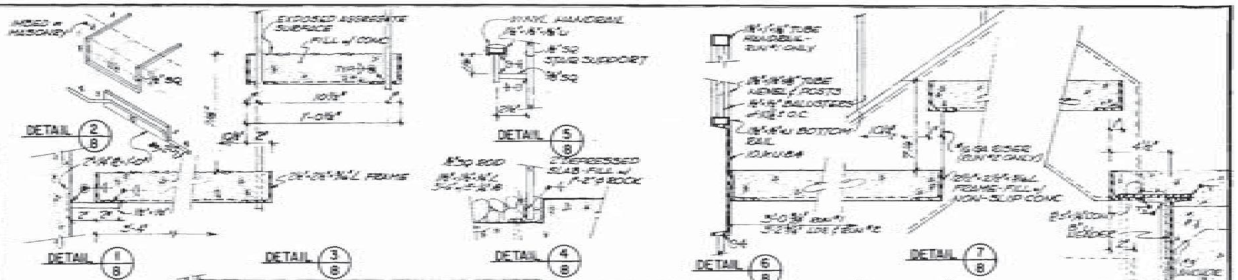
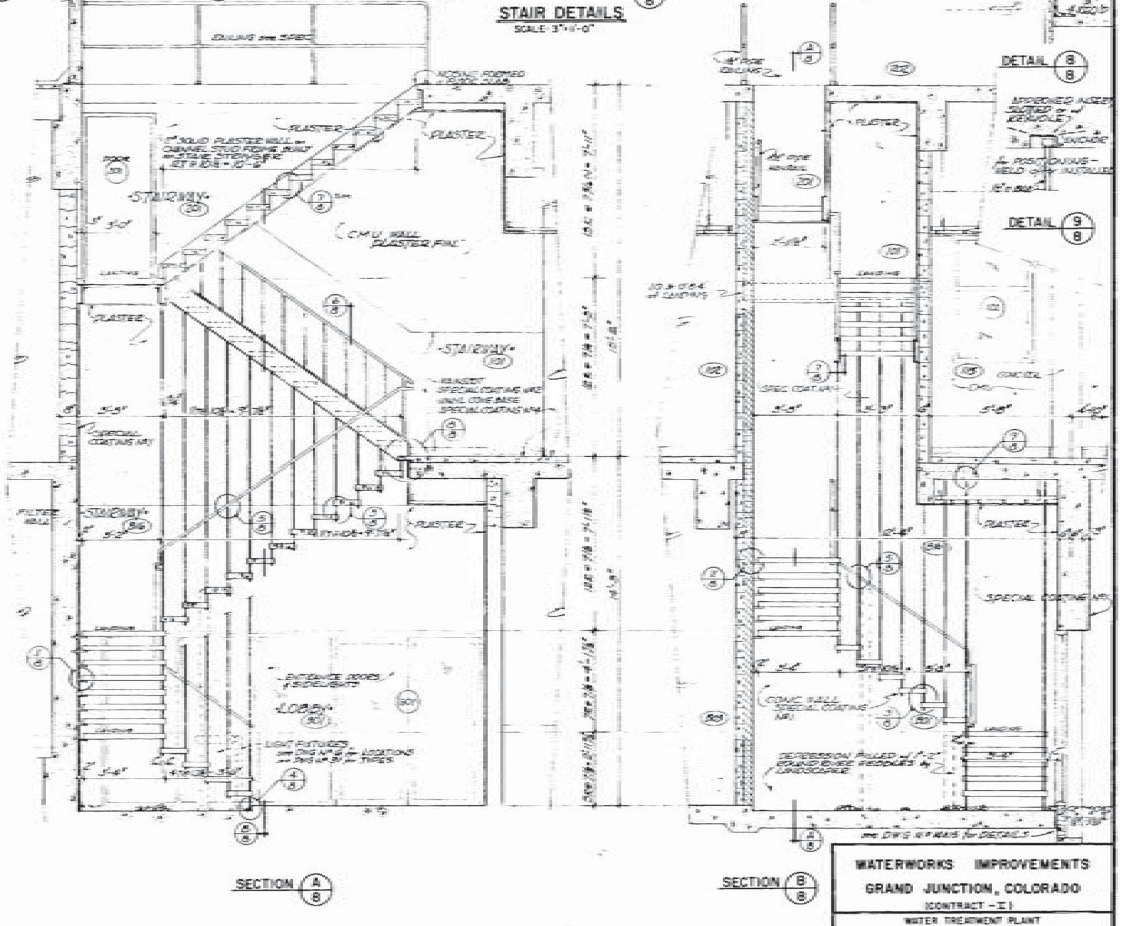

OPEN STORAGE
202
STAIRWAY
201
37'-0"

STORAGE FLOOR PLAN
SCALE: 1/8" = 1'-0"


DETAIL 2/8
DETAIL 11/8
DETAIL 3/8
DETAIL 5/8
DETAIL 4/8
DETAIL 6/8
DETAIL 7/8
EXPOSED AGGREGATE SURFACE
FILL w/ CONC
VINYL HANDRAIL
STAIR SUPPORT
DEPRESSED SLAB-FILL w/ 1"-2" ROCK
NEWEL POSTS
BALUSTERS
BOTTOM RAIL
FRAME-FILL w/ NON-SLIP CONC
EMBED in MASONRY

STAIR DETAILS
SCALE: 3" = 1'-0"


DETAIL 8/8
DETAIL 9/8
CEILING see SPEC
PLASTER
STAIRWAY
201
CMU WALL PLASTER FIN.
SPECIAL COATING
LOBBY
101
ENTRANCE DOORS & SIDELIGHTS
LIGHT FIXTURES
CONC WALL SPECIAL COATING
DEPRESSION FILLED w/ 1"-2" ROUND RIVER PEBBLES by LANDSCAPE
see DWG 10 & 11 for DETAILS
SECTION A/8
SECTION B/8

STAIRWAY SECTIONS
SCALE: 1/4" = 1'-0"

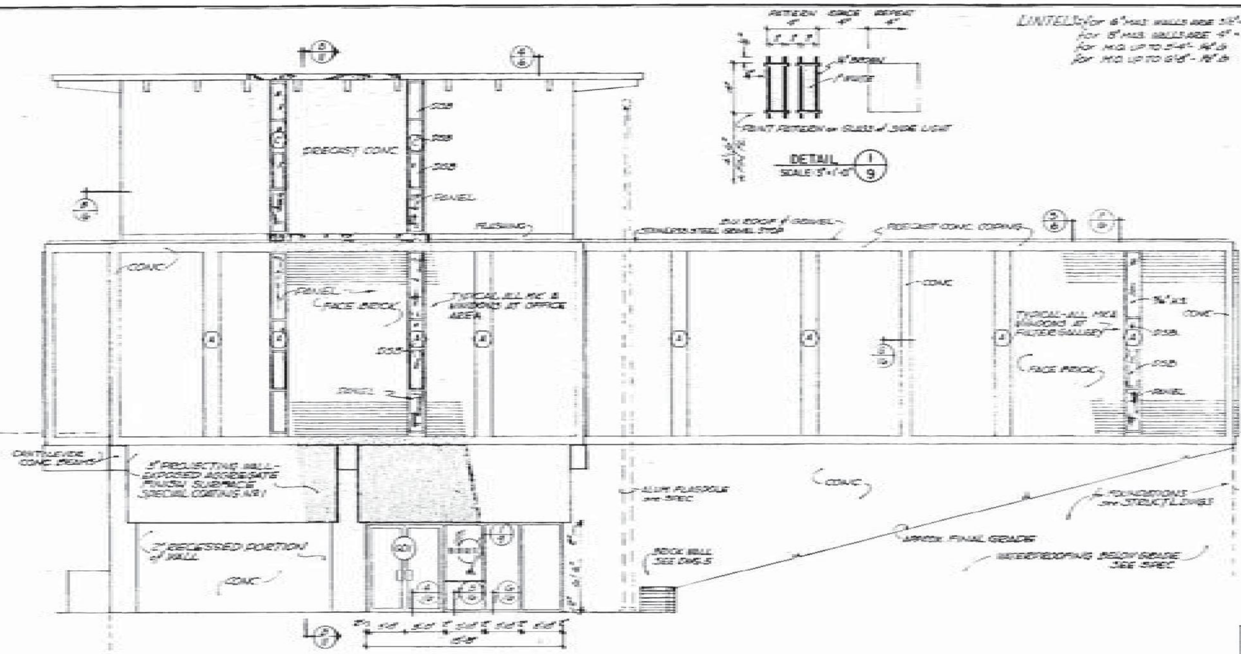
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ARCHITECTURAL
STORAGE FLOOR PLAN AND
STAIR SECTIONS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS • PLANNERS • CONSULTANTS

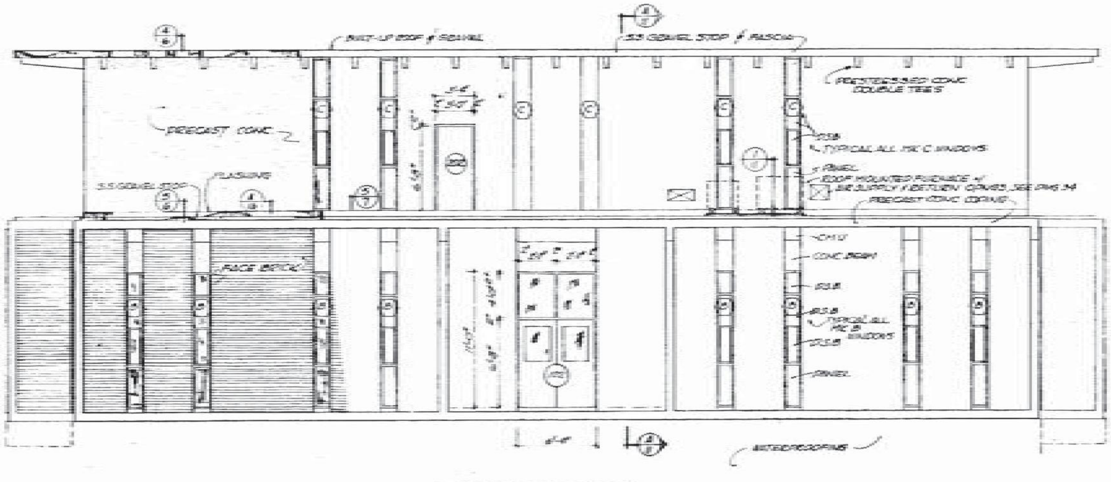
As Built		AT	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPR.

JOB 730810
DESIGNED J.B.
DRAWN J.B.
CHECKED K.D.H.
APPROVED
DATE DEC. 1987
SHEET 8 39

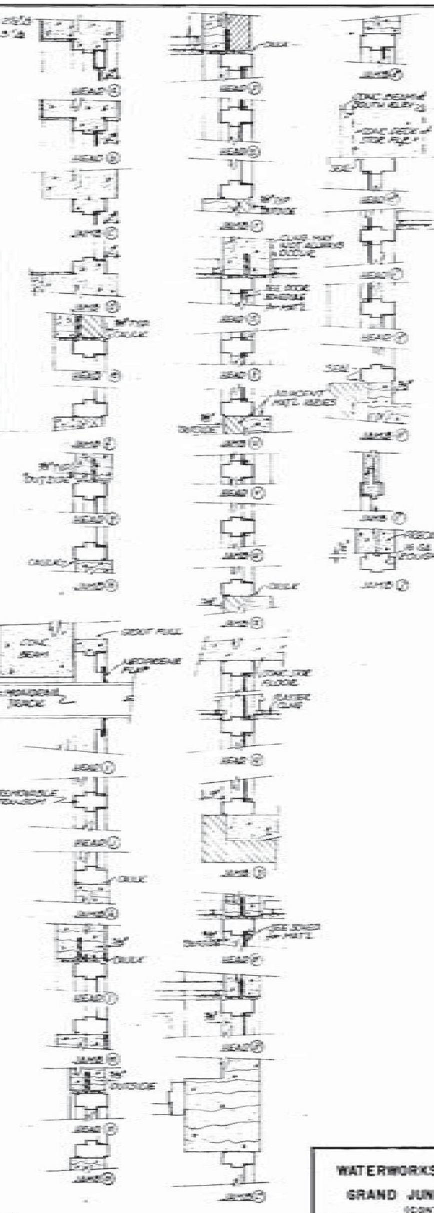

PATTERN
SPACE
REPEAT
PAINT PATTERN on GLASS of SIDE LIGHT
LINTELS for 6" M.S. WALLS ARE
for 8" M.S. WALLS ARE
PRECAST CONC
PANEL
FLASHING
B.U. ROOF & GRAVEL
STAINLESS STEEL GRAVEL STOP
PRECAST CONC. COPING
CONC
PANEL
FACE BRICK
TYPICAL ALL M.C. & WINDOWS AT OFFICE AREA
TYPICAL ALL M.C. & WINDOWS AT FILTER GALLERY
D.S.B.
CANTILEVER CONC. BEAMS
PROJECTING WALL EXPOSED AGGREGATE FINISH SURFACE SPECIAL COATING
RECESSED PORTION of WALL
ALUM. FLAGPOLE see SPEC
BRICK WALL SEE DWG.
APPROX. FINAL GRADE
FOUNDATIONS
WATERPROOFING BELOW GRADE SEE SPEC

DETAIL 1/9
SCALE: 3" = 1'-0"

WEST ELEVATION
SCALE: 1/4" = 1'-0"


BUILT-UP ROOF & GRAVEL
S.S. GRAVEL STOP & FASCIA
PRESTRESSED CONC DOUBLE TEES
PRECAST CONC.
S.S. GRAVEL STOP
FLASHING
D.S.B.
TYPICAL ALL M.C. WINDOWS
PANEL
ROOF MOUNTED FURNACE
PRECAST CONC. COPING
C.M.U.
CONC. BEAM
FACE BRICK
TYPICAL ALL M.C. B WINDOWS
WATERPROOFING

SOUTH ELEVATION
SCALE: 1/4" = 1'-0"


HEAD
JAMB
CAULK
OUTSIDE
CONC. BEAM
GROUT FULL
NEOPRENE FLAP
REMOVABLE TRANSOM
PRECAST CONC
SEAL

DOOR DETAILS
SCALE: 1 1/2" = 1'-0"

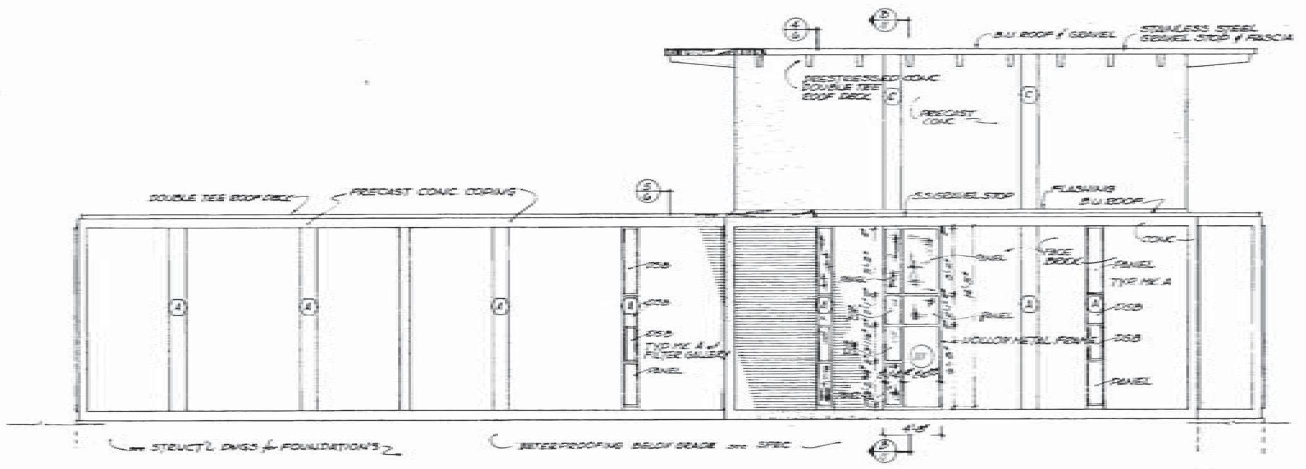
2-25-70	As Built		
DATE	DESCRIPTION REVISIONS	MADE	APPROVED

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ARCHITECTURAL
BUILDING ELEVATIONS
AND DETAILS

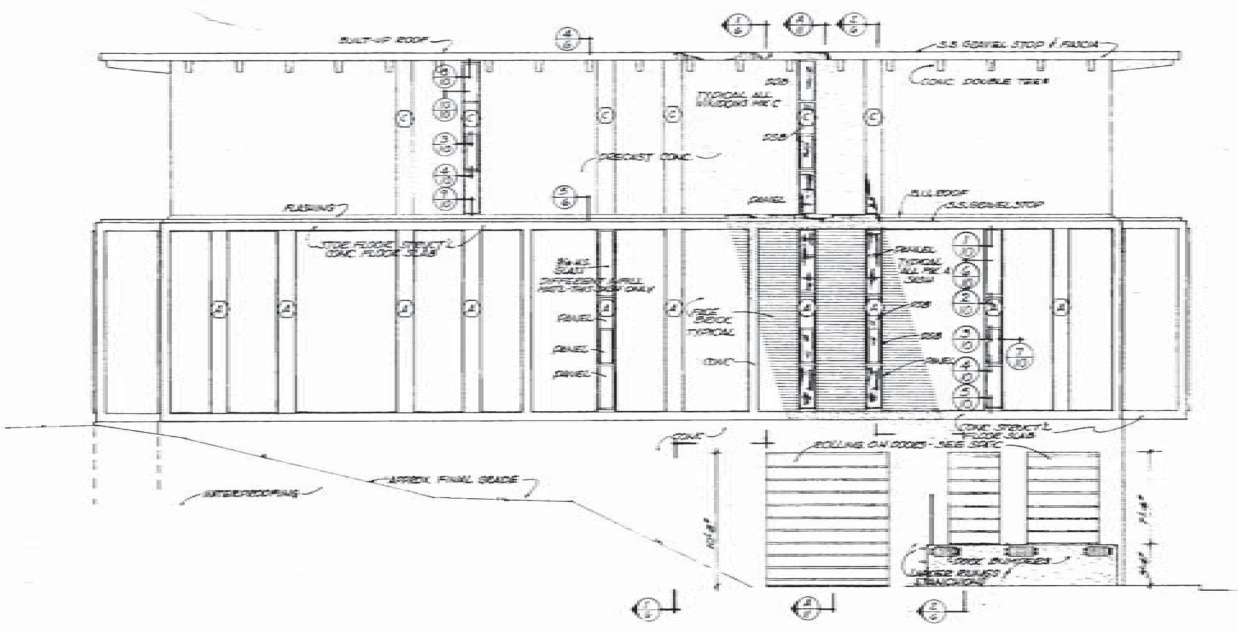
...NSON, DURHAM & RICHARDSON, INC.

JOB T3080
SHEET 9 of 39


B.U. ROOF & GRAVEL
STAINLESS STEEL GRAVEL STOP & FASCIA
PRESTRESSED CONC DOUBLE TEE ROOF DECK
PRECAST CONC
DOUBLE TEE ROOF DECK
PRECAST CONC. COPING
S.S. GRAVEL STOP
FLASHING
B.U. ROOF
CONC
FACE BRICK
PANEL
TYP MK A
DSB
TYP MK A w/ FILTER GALLERY
HOLLOW METAL FRAME
A
C
4'-8"
SEE STRUCT'L DWGS for FOUNDATION'S
WATERPROOFING BELOW GRADE SEE SPEC

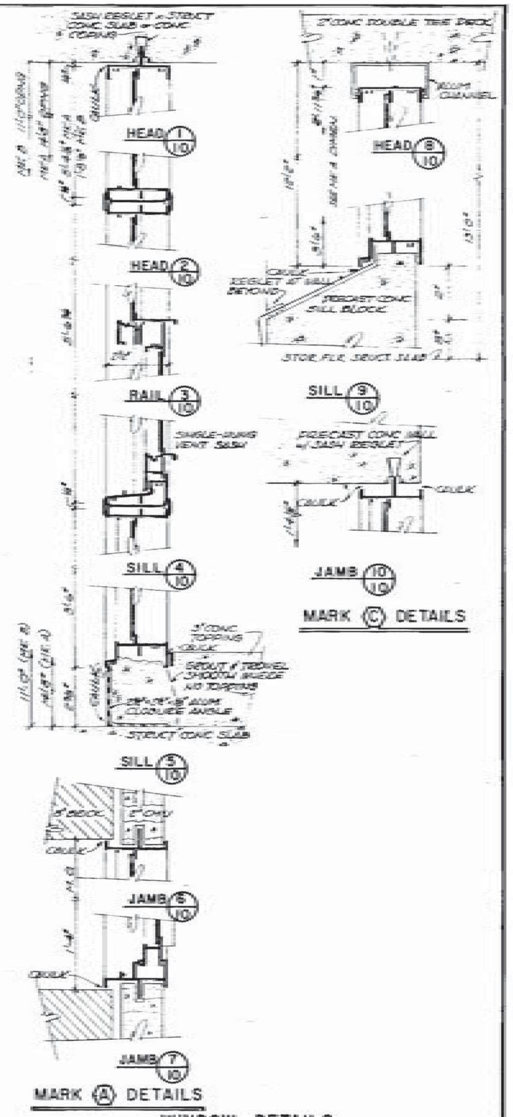
EAST ELEVATION

SCALE: 1/4" = 1'-0"


BUILT-UP ROOF
S.S. GRAVEL STOP & FASCIA
CONC DOUBLE TEES
TYPICAL ALL WINDOWS MK C
DSB
PRECAST CONC
PANEL
B.U. ROOF
S.S. GRAVEL STOP
FLASHING
TOP FLOOR STRUCT'L CONC FLOOR SLAB
3/4" x 8' GLASS DIFFERENT SPALL
FACE BRICK TYPICAL
CONC
TYPICAL ALL MK A SASH
CONC STRUCT'L FLOOR SLAB
ROLLING OH DOORS - SEE SPEC
DOCK BUMPERS
LADDER RUNGS & STANCHIONS
APPROX. FINAL GRADE
WATERPROOFING
A
C
10'-8"
7'-8"

NORTH ELEVATION

SCALE: 1/4" = 1'-0"


SASH REGLET in STRUCT CONC SLAB or CONC COPING
CAULK
HEAD 1/10
HEAD 2/10
RAIL 3/10
SINGLE-HUNG VENT SASH
SILL 4/10
3" CONC TOPPING
GROUT & TROWEL SMOOTH WHERE NO TOPPING
CLOSURE ANGLE
STRUCT CONC SLAB
SILL 5/10
8" BRICK
2" CMU
JAMB 6/10
JAMB 7/10
2" CONC DOUBLE TEE DECK
ALUM CHANNEL
HEAD 8/10
REGLET AT WALL BEYOND
PRECAST CONC SILL BLOCK
STOR FLR STRUCT SLAB
SILL 9/10
PRECAST CONC WALL w/ SASH REGLET
JAMB 10/10
MARK (C) DETAILS

MARK (A) DETAILS

WINDOW DETAILS

SCALE: 3" = 1'-0"

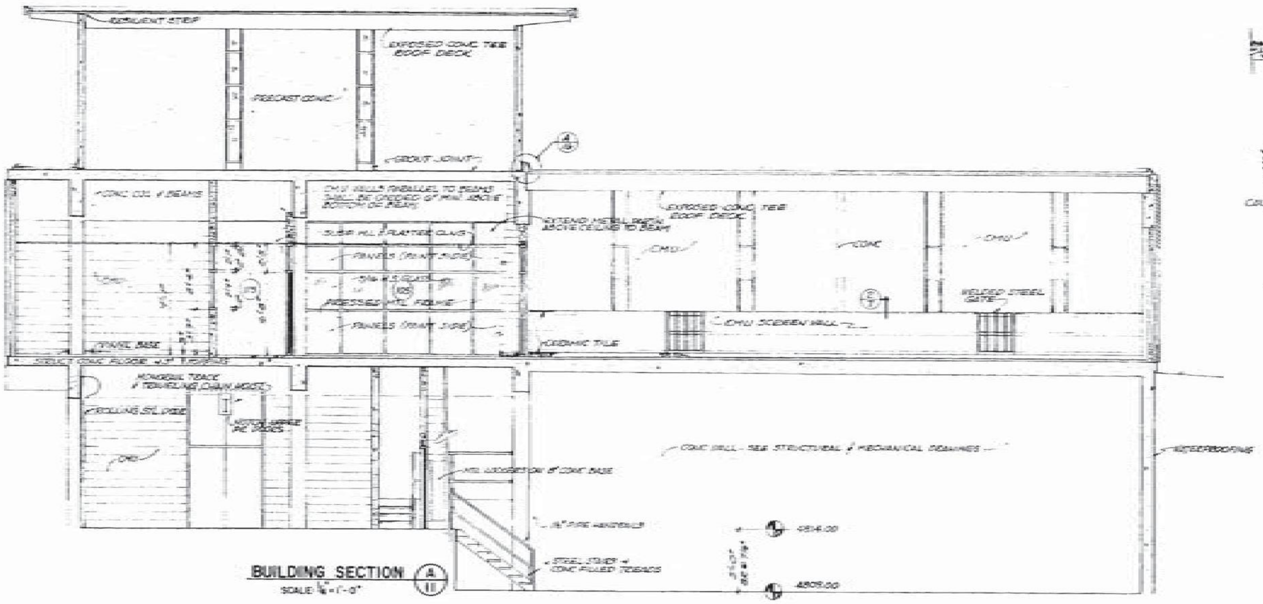
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ARCHITECTURAL
BUILDING ELEVATIONS AND
WINDOW DETAILS

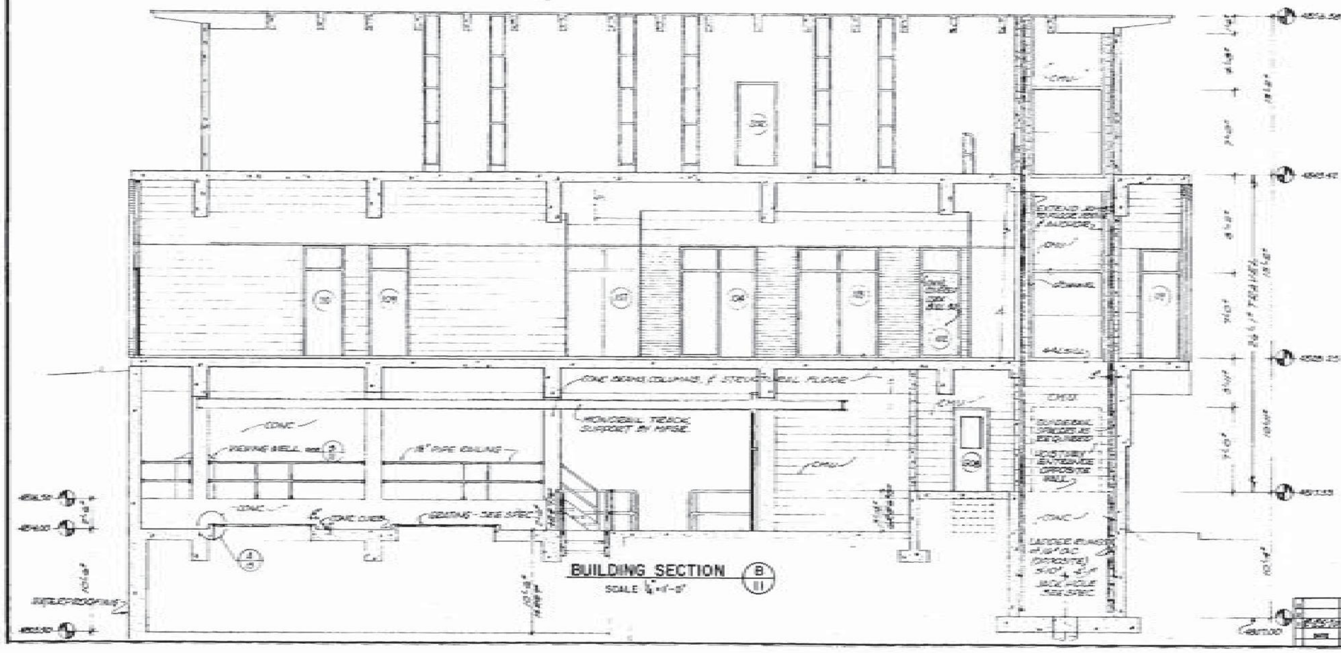
[illegible]NGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

As Built	A.T.	W.B.M.	
DATE	REVISION	MADE	APPROVED

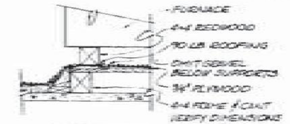
JOB T3080
DRAWN J.B.
CHECKED R.D.H.
APPROVED W.L.R.
DATE DEC. 1967
SHEET 10 of 39


RESILIENT STRIP
EXPOSED CONC TEE ROOF DECK
PRECAST CONC
GROUT JOINT
CONC COL & BEAMS
CMU WALLS PARALLEL TO BEAMS SHALL BE GROUTED 6" MIN. ABOVE BOTTOM OF BEAM
EXTEND METAL PARTN ABOVE CEILING TO BEAM
SUSP. ACL & PLASTER CLNG
PANELS (PAINT SIDE)
PRESSED MTL FRAME
PANELS (PAINT SIDE)
CMU
COVE BASE
CERAMIC TILE
CMU SCREEN WALL
WELDED STEEL GATE
CONC
STRUCT CONC FLOOR
MONORAIL TRACK & TRAVELING CHAIN HOIST
ROLLING STL DOOR
CMU
MTL LOCKERS ON 8" CONC BASE
1½" PIPE HANDRAILS
STEEL STAIR & CONC FILLED TREADS
CONC WALL - SEE STRUCTURAL & MECHANICAL DRAWINGS
WATERPROOFING
4814.00
4805.00

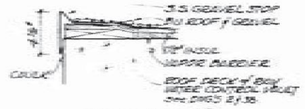
BUILDING SECTION (A/11)
SCALE: ⅛" = 1'-0"


CMU
EXTEND ... & ANCHOR
CMU
CONC BEAMS, COLUMNS, & STRUCTURAL FLOOR
MONORAIL TRACK SUPPORT BY MFGR.
CONC
VIEWING WELL
1½" PIPE RAILING
CONC
CONC CURB
GRATING - SEE SPEC
CMU
CMU
CONC
LADDER RUNGS
JACK HOLE SEE SPEC
WATERPROOFING
24'-1" TRAVEL
4856.58
4845.42
4828.25
4813.33
4816.50
4814.00
4803.50
4801.00

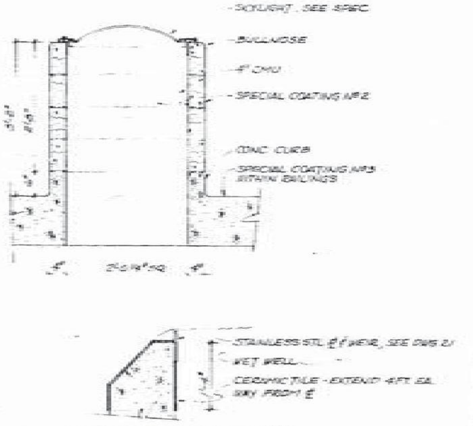
BUILDING SECTION (B/11)
SCALE ⅛" = 1'-0"


FURNACE
4x4 REDWOOD
90 LB ROOFING
OMIT GRAVEL BELOW SUPPORTS
3/4" PLYWOOD
4x4 FRAME & CANT VERIFY DIMENSIONS

FURNACE SUPPORT (1/11)
SCALE: 1½" = 1'-0"


S.S. GRAVEL STOP
BU ROOF & GRAVEL
1½" INSUL
VAPOR BARRIER
ROOF DECK & BOX WATER CONTROL VAULT SEE DWGS 2 & 35
CAULK

GRAVEL STOP (2/11)
SCALE: 1½" = 1'-0"


SKYLIGHT, SEE SPEC
BULLNOSE
4" CMU
SPECIAL COATING NO 2
CONC CURB
SPECIAL COATING NO 3 WITHIN RAILINGS
STAINLESS STL PL & WEIR, SEE DWG 21
WET WELL
CERAMIC TILE - EXTEND 4 FT. EA. WAY FROM ℄

VIEWING WELL SECTION (5/11)
SCALE: 1" = 1'-0"

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ARCHITECTURAL
BUILDING SECTIONS
AND DETAILS

ENGINEERS • PLANNERS • CONSULTANTS

DATE	DESCRIPTION	MADE	APPROV
	AS BUILT	A.T.	K.G.H.
	REVISIONS		

JOB 730810
SHEET 11 OF 39

·ROOM FINISH SCHEDULE·

ROOM DESIGNATION	ROOM Nº	REMARKS
WET WELL	001	
PUMP RM	002	
STAIRWAY	003	PAINT MTL
LOBBY	501	PLASTER CHG E & E WALL
PASSAGE	502	
JAN	503	
LOCKER	504	
FLOCC FEED AREA	505	
PIPE GALLERY	506	
STAIRS	507	PAINT
STAIRS	508	PAINT
PUMP DECK	509	SEE DWG [illegible] FOR FINISHES AT [illegible]
PRELIM TREATMENT AREA	510	
CHLORINE STOR	511	
AMMONIA STOR	512	
STAIRWAY	513	PAINT RAIL & SUPPORTS
ELEV MACH	514	
ELEVATOR (SHAFT)	515	
STAIRWAY	516	
STAIRWAY	101	[illegible]
OPERATOR'S OFFICE	102	PAINT PANELS IN METAL FRAMES
CORR	103	
TOILET	104	
JANITOR	105	[illegible] WEST WALL
CHLORINE FEEDER RM	106	
PASSAGE	107	PAINT [illegible]
CHEMICAL FEEDER RM	108	
CARBON FEEDER RM	109	PAINT OUTSIDE WALLS OF ROOM
ELEC EQUIP	110	
LABORATORY	111	PAINT PANELS IN METAL FRAMES
LAB STOR	112	
STOR	113	
CORR	114	[illegible] SOUTH WALL
CONFERENCE	115	
FILTER GALLERY	116	[illegible]
STAIRWAY	201	
OPEN STOR	202	

KEY

- • INDICATES FINISHED MATERIAL
- P PAINT FINISH
- 1 REFERS TO SPECIAL COATING SEE SPEC
- 2 DO
- 3 DO
- 4 DO

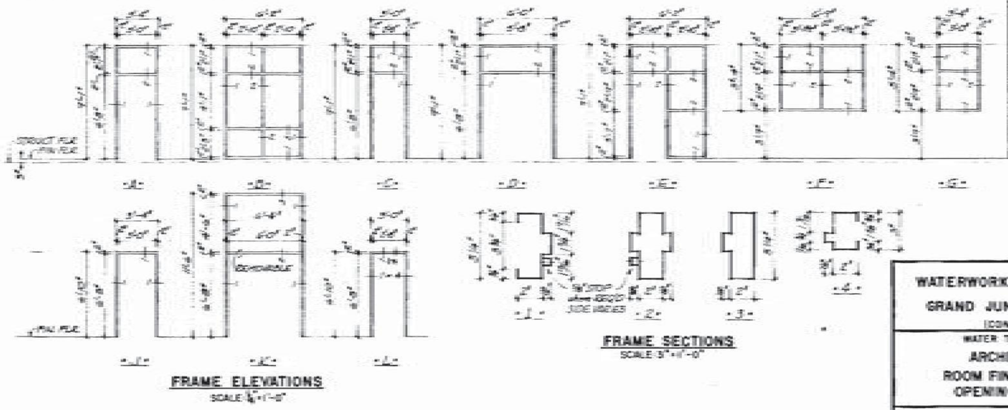
WEST – NORTH – EAST – SOUTH

·DOOR AND OPENING SCHEDULE·

OPNG Nº	FROM "OUTSIDE" RM Nº	TO "INSIDE" RM Nº	NUMBER	WIDTH	HEIGHT	THICKNESS	MATERIAL GA	TYPE	HAND	LOUVER SIZE	TRANSOM GLASS TYPE OR MATERIAL
601	EXT	501	PE	3-0	6-8	1¾	[illegible]	A	[illegible]	—	—
602	501	502	1	3-0	6-8	1¾	18	C	RHE	—	—
603	502	503	1	2-8	6-8	1¾	20	C	RH	20 × 14	—
604	502	504	1	2-8	6-8	1¾	20	C	RH	20 × 14	—
605	505	511	PE	3-0	6-8	1¾	20	C	RHE	—	DOORS
606	502	511	1	2-8	6-8	1¾	20	B	LH	—	—
607	501	513	1	3-0	6-8	1¾	20	C	RHE	—	—
608	513	512	1	2-8	6-8	1¾	20	B	RHE	—	—
609	513	514	1	2-8	6-8	1¾	20	C	RH	—	—
610	EXT	515	1	5-0	7-4	ROLLING DOOR — SPEC				—	—
611	EXT	512	1	4-0	7-4	"			"	—	—
612	EXT	511	1	7-6	10-6	"			"	—	—
605	SEE ABOVE	UPPER DOORS	PE	3-0	4-6	1¾	20	D	RHE	—	—
101	101	102	1	3-0	6-8	1¾	20	C	RHE	24 × 14	[illegible]
102	114	102	NONE	—	—	—	—	—	—	—	—
103	114	102	NONE	—	—	—	—	—	—	—	—
104	114	102	1	2-10	6-8	1¾	18	C	LH	—	[illegible]
105	103	102	NONE	—	—	—	—	—	—	—	—
106	116	102	NONE	—	—	—	—	—	—	—	—
107	103	116	PE	2-10	6-8	1¾	18	B	RH	—	[illegible]
108	103	104	1	2-8	6-8	1¾	18	C	RH	20 × 14	PANEL
109	107	105	1	3-0	6-8	1¾	20	C	LH	24 × 14	PANEL
110	107	106	1	2-10	6-8	1¾	20	B	RH	—	PANEL
111	EXT	107	1	2-10	6-8	1¾	18	C	RH	—	PANEL
112	108	109	1	2-8	6-8	1¾	20	B	RHE	—	PANEL
113	103	108	PE	2-8	6-8	1¾	20	B	RH	—	PANEL
114	114	110	PE	2-10	6-8	1¾	20	C	LHR	—	PANEL
115	114	111	1	2-10	6-8	1¾	18	C	RH	—	[illegible]
116	114	111	NONE	—	—	—	—	—	—	—	—
117	114	111	NONE	—	—	—	—	—	—	—	—
118	111	112	1	2-8	6-8	1¾	20	C	RH	—	PANEL
119	114	113	1	2-8	6-8	1¾	20	C	LH	20 × 14	PANEL
120	114	115	1	2-8	6-8	1¾	18	C	RH	20 × 14	[illegible]
121	115	116	NONE	—	—	—	—	—	—	—	—
122	EXT	116	PE	3-0	6-8	1¾	18	B	[illegible]	—	[illegible]
201	101	201	1	2-8	6-8	1¾	20	B	RHE	—	NONE
202	EXT	202	1	2-8	6-8	1¾	20	C	RH	—	NONE

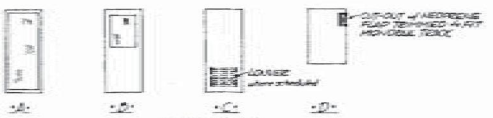
REMARKS: * REQ'D ONLY ON INACTIVE LEAF OF A PAIR; * NOT REQ'D ON INACTIVE LEAF; * — SEE REMARKS; * WEATHERSTRIP; * BULLETIN BD

SIGN No.	TEXT	No. LTRS.
1	EMPLOYEES ONLY	(14)
2	OPERATORS OFFICE	(16)
3	RESTROOM	(8)
4	JANITOR	(7)
5	CHLORINE FEEDER	(15)
6	CHEMICAL FEEDER	(15)
7	ELECTRICAL EQUIP	(16)
8	LABORATORY	(10)
9	STORAGE	(7)
10	CONFERENCE	(10)



FRAME ELEVATIONS
SCALE ¼"=1'-0"

FRAME SECTIONS
SCALE 3"=1'-0"



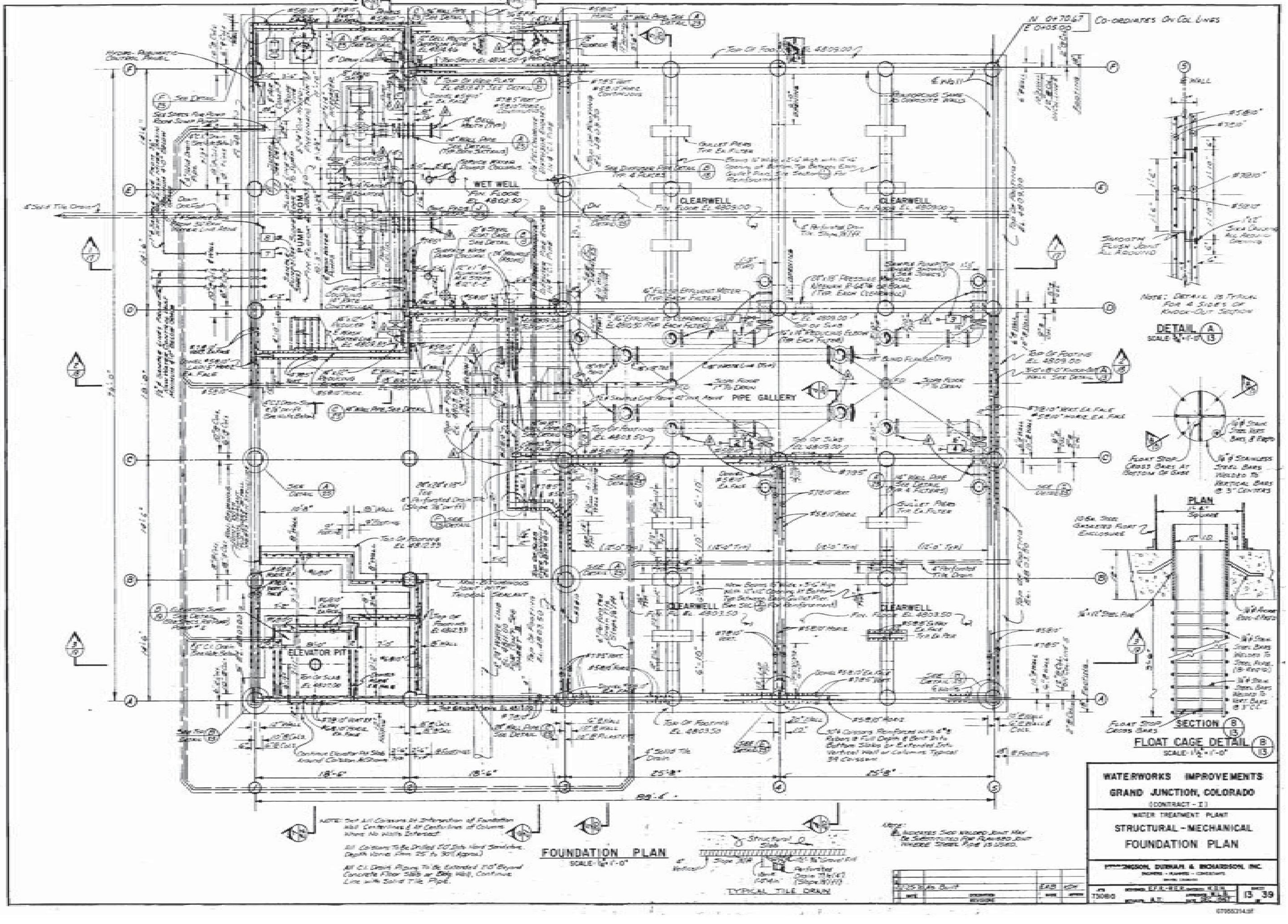
DOOR TYPES
NO SCALE

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT – II)
WATER TREATMENT PLANT
ARCHITECTURAL
ROOM FINISH, DOOR AND
OPENING SCHEDULES

[illegible], DURHAM & RICHARDSON, INC.
ENGINEERS · PLANNERS · CONSULTANTS

AS BUILT

T30810
J.B. J.B. R.D.H. W.L.B. DEC. 1967
SHEET 12 OF 39



Co-ordinates On Col Lines
N 0+70.67
E 0+05.00
PUMP ROOM
WET WELL
Fin. Floor EL 4803.50
CLEARWELL
Fin. Floor EL 4809.00
CLEARWELL
PIPE GALLERY
CLEARWELL
Fin. Floor EL 4803.50
CLEARWELL
Fin. Floor EL 4803.50
ELEVATOR PIT
Top Of Footing EL 4809.00
Top Of Footing EL 4803.50
Gullet Piers Typ. Ea. Filter
4" Perforated Tile Drain
6" Solid Tile Drain
18'-6"
18'-6"
25'-8"
25'-8"
88'-4"
76'-0"
DETAIL A/13
SCALE-3/4"=1'-0"
Note: Detail Is Typical For 4 Sides Of Knock-Out Section
Smooth Flush Joint All Around
PLAN
SECTION B/13
Float Stop Cross Bars
TYPICAL TILE DRAIN
Structural Slab
Perforated Drain Tile (4")

NOTE: Set All Caissons At Intersection of Foundation Wall Centerlines & At Centerlines of Columns Where No Walls Intersect.

All Caissons To Be Drilled 2'-0" Into Hard Sandstone. Depth Varies From 25' to 30' (Approx.)

All C.I. Drain Piping To Be Extended 2'-0" Beyond Concrete Floor Slab or Bldg. Wall, Continue Line with Solid Tile Pipe.

FOUNDATION PLAN

SCALE-1/8"=1'-0"

FLOAT CAGE DETAIL B/13

SCALE-1 1/2"=1'-0"

Note:
Indicates Shop Welded Joint May Be Substituted For Flanged Joint Where Steel Pipe Is Used.

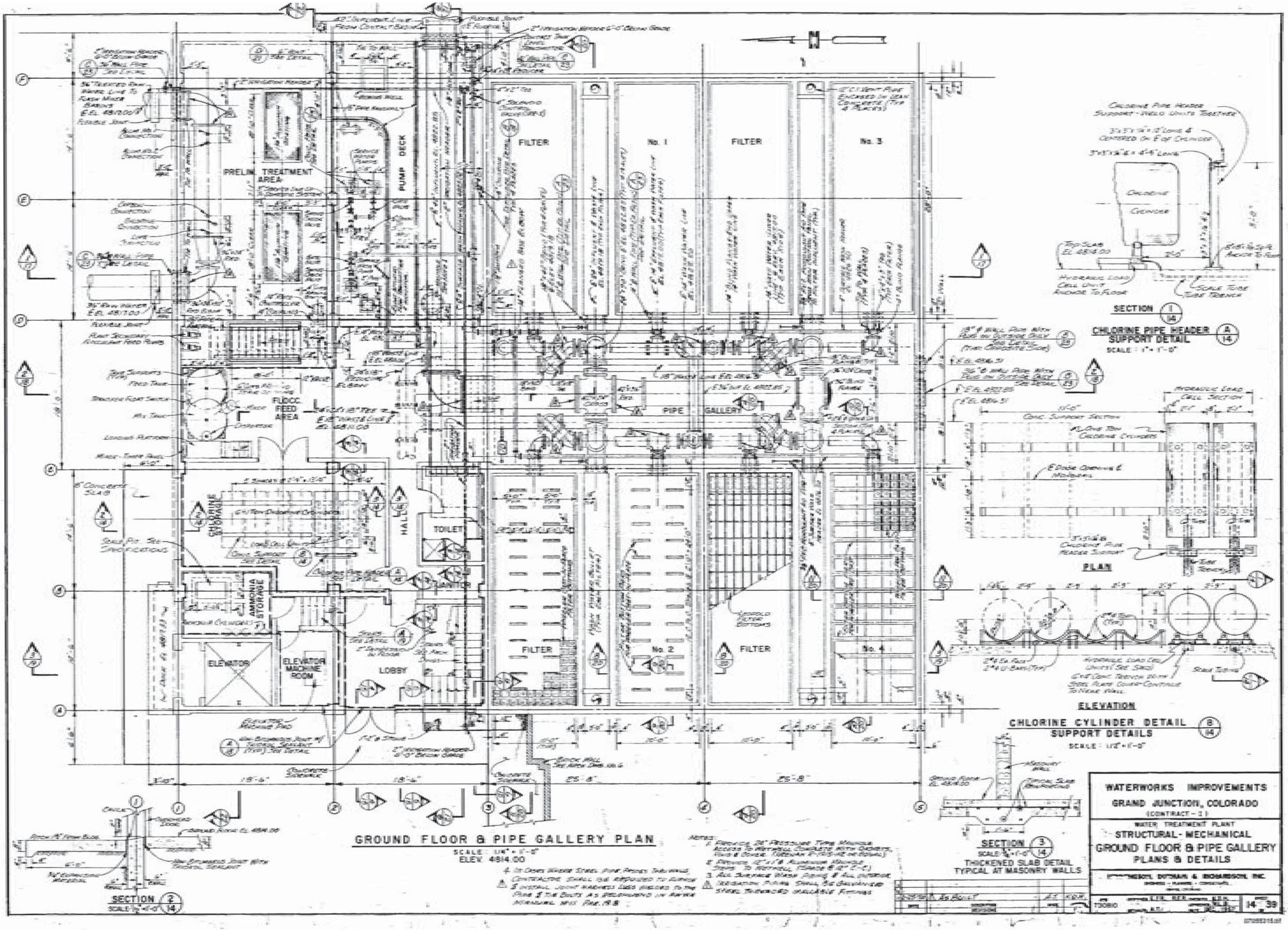
12-25-78	As Built	EAB	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPROVED

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
FOUNDATION PLAN

[illegible]NSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

JOB T30810
DESIGNED E.F.R.-R.E.R. CHECKED K.D.H.
DRAWN A.E. APPROVED W.L.S.
DATE DEC. 1957
SHEET 13 39


PRELIM. TREATMENT AREA
PUMP DECK
FILTER
No. 1
FILTER
No. 3
FLOCC. FEED AREA
PIPE GALLERY
CHLORINE STORAGE
HALL
TOILET
AMMONIA STORAGE
ELEVATOR
ELEVATOR MACHINE ROOM
LOBBY
FILTER
No. 2
FILTER
No. 4
SECTION 1/14
CHLORINE PIPE HEADER SUPPORT DETAIL A/14
SCALE: 1" = 1'-0"
PLAN
ELEVATION
CHLORINE CYLINDER DETAIL B/14
SUPPORT DETAILS
SCALE: 1/2" = 1'-0"
SECTION 3/14
SCALE: 3/4" = 1'-0"
THICKENED SLAB DETAIL
TYPICAL AT MASONRY WALLS
SECTION 2/14
25'-8"
18'-6"

GROUND FLOOR & PIPE GALLERY PLAN

SCALE: 1/4" = 1'-0"
ELEV. 4814.00

NOTES:
1. Provide 36" pressure type manhole access to wetwell complete with gaskets, bolts & cover. (Neenah R-1915-?? or equal)
2. Provide 12" x 1" aluminum manhole steps to wetwell. (Space @ 12" c-c)
3. All surface wash piping & all exterior irrigation piping shall be galvanized steel threaded malleable fittings.
4. In cases where steel pipe passes thru walls, contractor shall be required to furnish & install joint harness lugs welded to the pipe & tie bolts as recommended in AWWA manual M11 par. 19.8

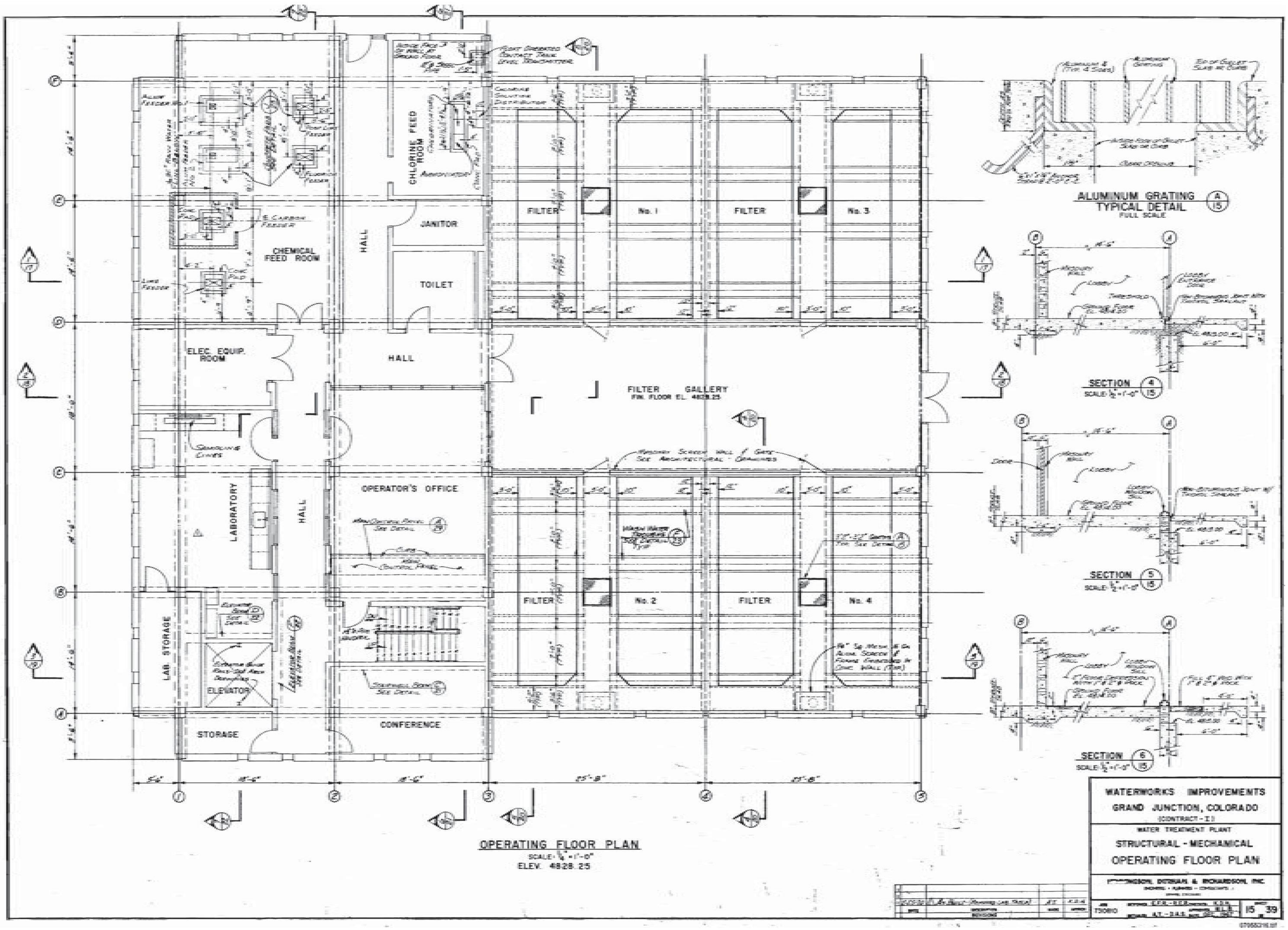
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

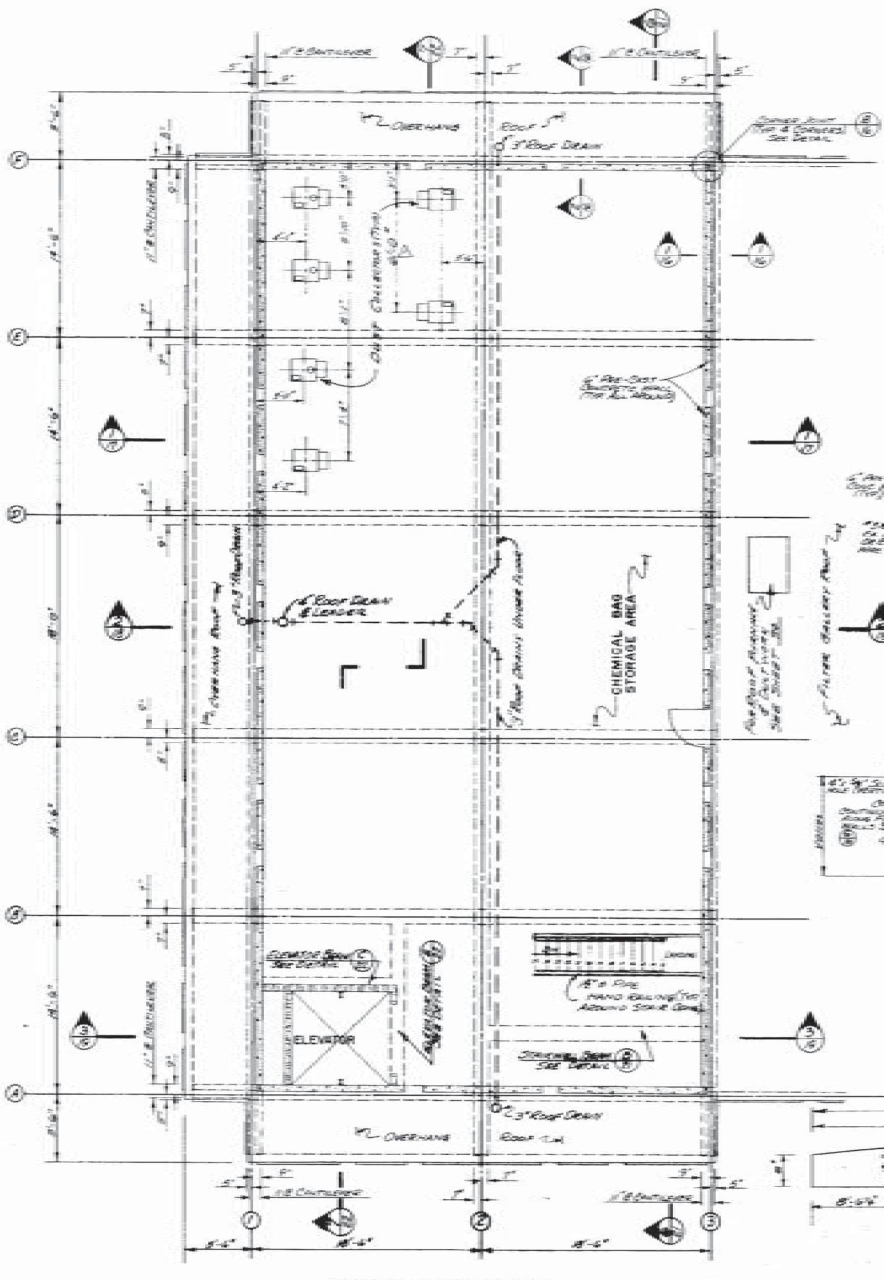
WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
GROUND FLOOR & PIPE GALLERY
PLANS & DETAILS

As Built

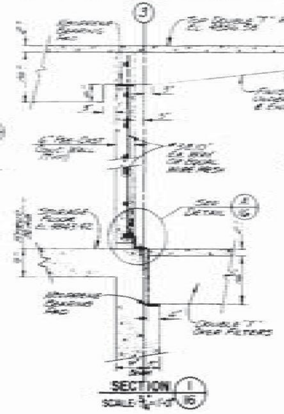
730810

14 / 39

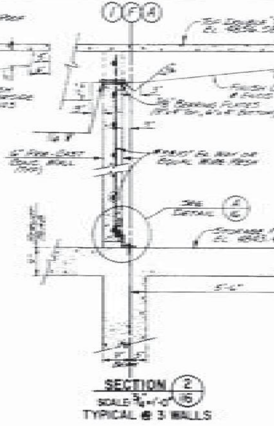

CHLORINE FEED ROOM
JANITOR
TOILET
HALL
CHEMICAL FEED ROOM
ELEC. EQUIP. ROOM
LABORATORY
OPERATOR'S OFFICE
LAB. STORAGE
ELEVATOR
STORAGE
CONFERENCE
FILTER
No. 1
No. 2
No. 3
No. 4
FILTER GALLERY
FIN. FLOOR EL. 4828.25
Masonry Screen Wall & Gate See Architectural Drawings
ALUMINUM GRATING TYPICAL DETAIL
FULL SCALE
SECTION 4/15
SCALE: 1/2"=1'-0"
SECTION 5/15
SCALE: 1/2"=1'-0"
SECTION 6/15
SCALE: 1/2"=1'-0"
OPERATING FLOOR PLAN
SCALE: 1/4"=1'-0"
ELEV. 4828.25
5'-6"
18'-6"
18'-6"
25'-8"
25'-8"
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)
WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
OPERATING FLOOR PLAN
DICKINSON, DOTHAN & RICHARDSON, INC.
T30810
15
39


CHEMICAL BAG STORAGE AREA
ELEVATOR
OVERHANG
ROOF
3" ROOF DRAIN
4" ROOF DRAIN & LEADER
FILTER GALLERY ROOF
DUST COLLECTORS
11'-8" CANTILEVER
A
B
C
D
E
F
1
2
3
5'-4"
18'-4"
18'-6"
14'-6"
18'-0"
8'-10"

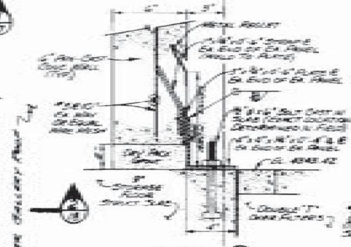
STORAGE FLOOR PLAN
SCALE: 1/8"=1'-0"
ELEV. 4943.42


3
STORAGE FLOOR EL. 4943.42
SEE DETAIL A/16
DOUBLE "T" SLAB FILTERS

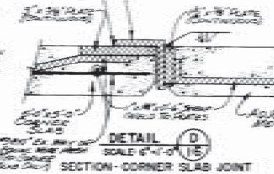
SECTION 1/16
SCALE: 3/8"=1'-0"


1 F A
STORAGE FLOOR EL. 4943.42
SEE DETAIL A/16
5'-6"

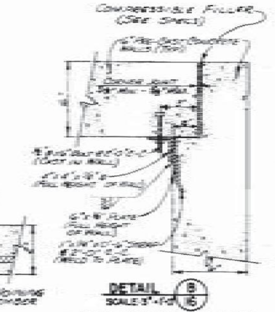
SECTION 2/16
SCALE: 3/8"=1'-0"
TYPICAL @ 3 WALLS


METAL FILLET
EL. 4943.42
"DOUBLE T" SLAB FILTERS

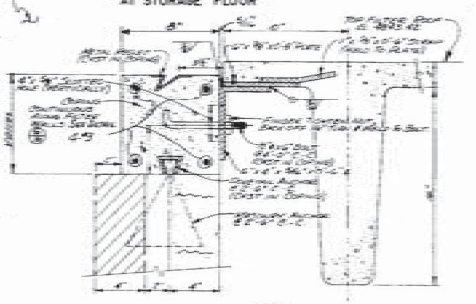
DETAIL A/16
SCALE: 3"=1'-0"
AT STORAGE FLOOR


ADJOINING MEMBER

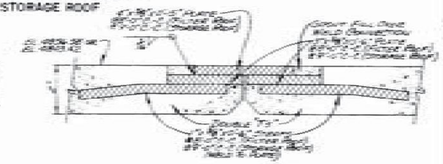
DETAIL D/16
SCALE: 6"=1'-0"
SECTION - CORNER SLAB JOINT
AT STORAGE ROOF


COMPRESSIBLE FILLER (SEE SPECS)

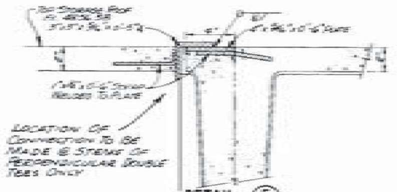
DETAIL B/16
SCALE: 3"=1'-0"
PLAN - CORNER WALL JOINT
AT STORAGE FLOOR



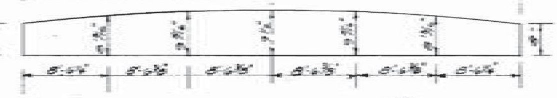
DETAIL F/16
SCALE: 3"=1'-0"
SECTION AT FILTER ROOF



DETAIL C/16
SCALE: 6"=1'-0"
SECTION - DOUBLE "T" SLAB JOINT TIE
AT FILTER & STORAGE ROOFS


LOCATION OF CONNECTION TO BE MADE @ STEMS OF PERPENDICULAR DOUBLE TEES ONLY

DETAIL E/16
SCALE: 3"=1'-0"
SECTION AT STORAGE ROOF



ELEVATION DETAIL OF PRE-CAST G/16
COPING ON FILTER BLDG AT
COL. LINES A & F
NO SCALE

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

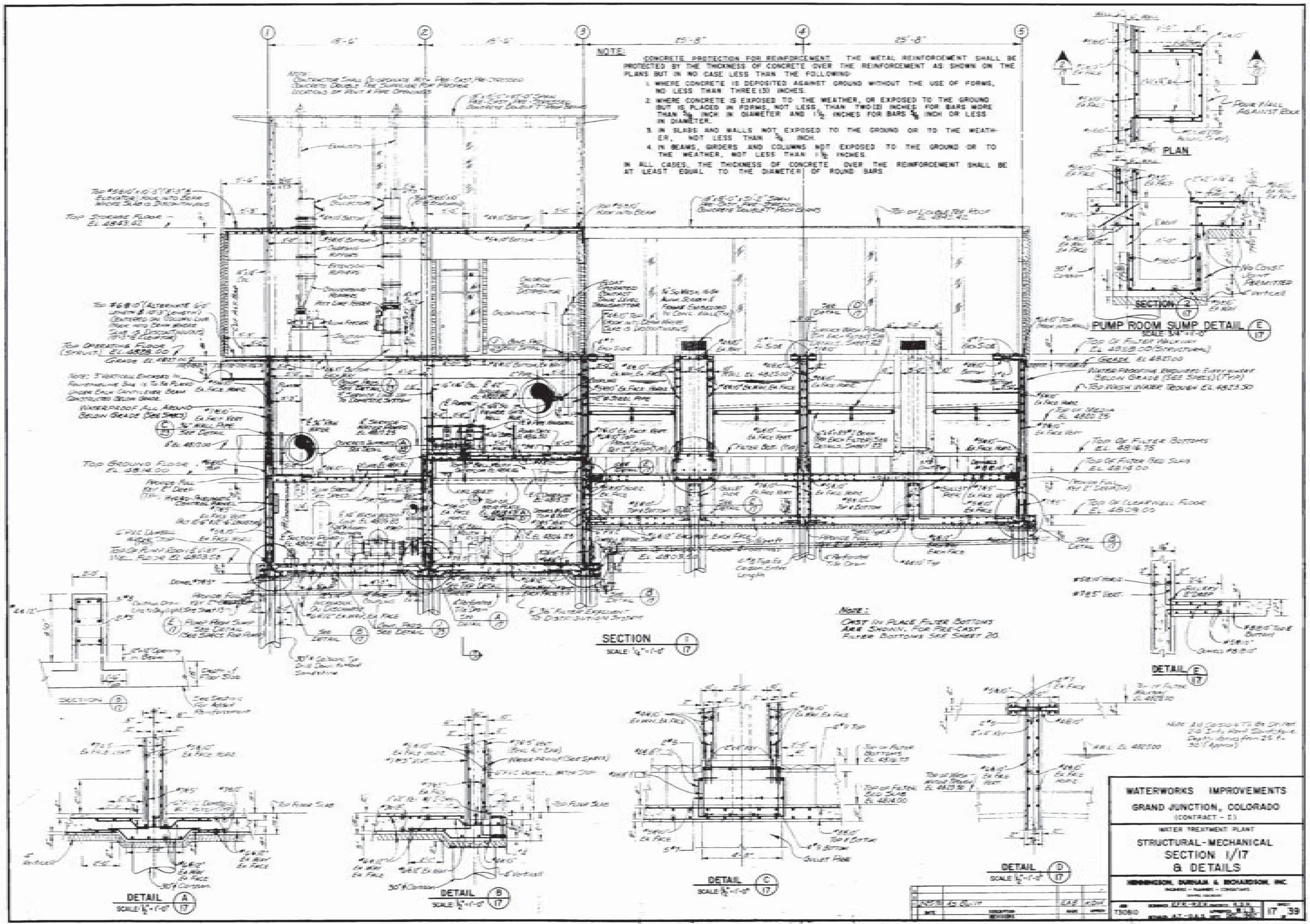
WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
STORAGE FLOOR PLAN
MISCELLANEOUS DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.

AS BUILT

73080

16 39


1
2
3
4
5
15'-6"
15'-6"
25'-8"
25'-8"
TOP OF DOUBLE TEE ROOF EL 4843.42
TOP STORAGE FLOOR EL 4843.42
TOP OPERATING FLOOR (STRUCT) EL 4828.00
GRADE EL 4827.00
TOP GROUND FLOOR EL 4814.00
TOP OF FILTER WALKWAY EL 4828.00 (STRUCTURAL)
GRADE EL 4827.00
TOP WASH WATER TROUGH EL 4823.50
TOP OF MEDIA EL 4820.75
TOP OF FILTER BOTTOMS EL 4816.75
TOP OF FILTER BED SLAB EL 4814.00
TOP OF CLEARWELL FLOOR EL 4809.00
CHLORINATOR
EXHAUSTS
PLAN
SECTION 2/17
PUMP ROOM SUMP DETAIL E/17
SCALE 3/4"=1'-0"
SECTION 1/17
SCALE 1/4"=1'-0"
NOTE: CAST IN PLACE FILTER BOTTOMS ARE SHOWN. FOR PRE-CAST FILTER BOTTOMS SEE SHEET 20.
SECTION B/17
DETAIL E/17
DETAIL A/17
SCALE 1/2"=1'-0"
DETAIL B/17
SCALE 1/2"=1'-0"
DETAIL C/17
SCALE 1/2"=1'-0"
DETAIL D/17
SCALE 1/2"=1'-0"

NOTE:

CONCRETE PROTECTION FOR REINFORCEMENT. THE METAL REINFORCEMENT SHALL BE PROTECTED BY THE THICKNESS OF CONCRETE OVER THE REINFORCEMENT AS SHOWN ON THE PLANS BUT IN NO CASE LESS THAN THE FOLLOWING:

1. WHERE CONCRETE IS DEPOSITED AGAINST GROUND WITHOUT THE USE OF FORMS, NO LESS THAN THREE (3) INCHES.
2. WHERE CONCRETE IS EXPOSED TO THE WEATHER, OR EXPOSED TO THE GROUND BUT IS PLACED IN FORMS, NOT LESS THAN TWO (2) INCHES FOR BARS MORE THAN 5/8 INCH IN DIAMETER AND 1 1/2 INCHES FOR BARS 5/8 INCH OR LESS IN DIAMETER.
3. IN SLABS AND WALLS NOT EXPOSED TO THE GROUND OR TO THE WEATHER, NOT LESS THAN 3/4 INCH.
4. IN BEAMS, GIRDERS AND COLUMNS NOT EXPOSED TO THE GROUND OR TO THE WEATHER, NOT LESS THAN 1 1/2 INCHES.

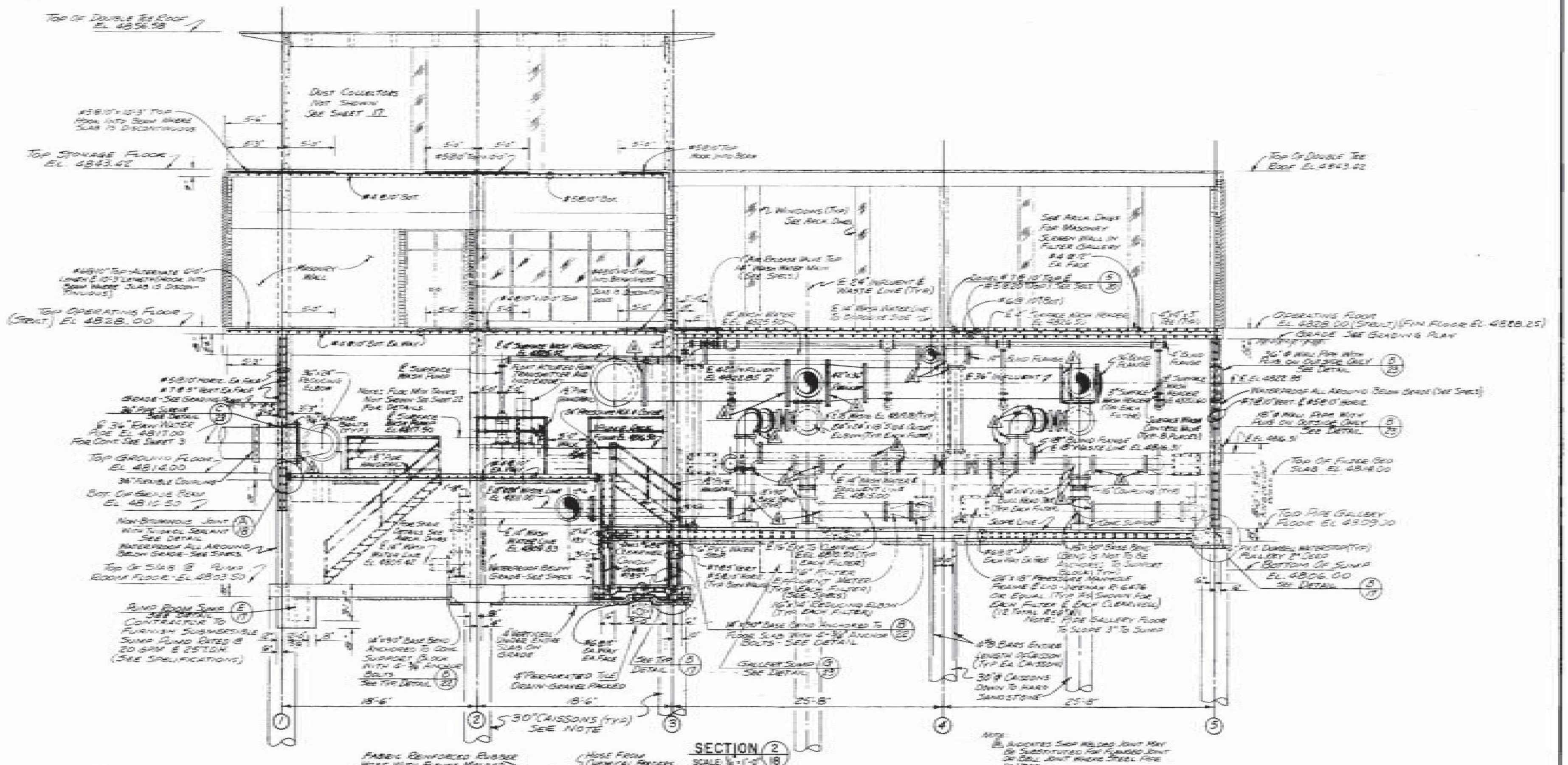
IN ALL CASES, THE THICKNESS OF CONCRETE OVER THE REINFORCEMENT SHALL BE AT LEAST EQUAL TO THE DIAMETER OF ROUND BARS.

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

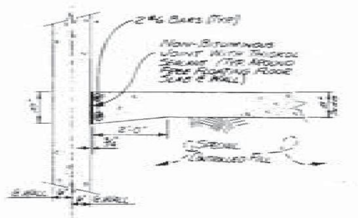
WATER TREATMENT PLANT
STRUCTURAL-MECHANICAL
SECTION 1/17
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

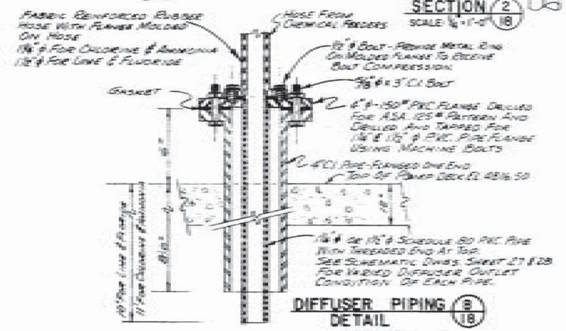
T3080
17 39


Top Of Double Tee Roof EL. 4856.58
Dust Collectors Not Shown See Sheet 17
Top Storage Floor EL. 4843.42
Top Of Double Tee Roof EL. 4843.42
Masonry Wall
Top Operating Floor (Struct) EL. 4828.00
Operating Floor EL. 4828.00 (Struct) (Fin Floor EL. 4828.25)
Grade See Grading Plan
Windows (Typ) See Arch. Dwgs
See Arch. Dwgs For Masonry Screen Wall In Filter Gallery
24" Influent & Waste Line (Typ)
36" Influent
Float Actuated Flow Transmitter And Indicator
Surface Wash Pump
Top Ground Floor EL. 4814.00
36" Flexible Coupling
Bot. Of Grave Bed EL. 4810.50
Non-Bituminous Joint With Thiokol Sealant See Detail
Waterproof All Around Below Grade - See Specs
Top Of Slab @ Pump Room Floor - EL. 4803.50
Pump Room Sump
Contractor To Furnish Submersible Sump Pump Rated @ 20 GPM & 25 TDH (See Specifications)
Top Of Filter Bed Slab EL. 4814.00
Top Pipe Gallery Floor EL. 4809.00
Bottom Of Sump EL. 4806.00 See Detail
4" Perforated Tile Drain-Gravel Packed
Gallery Sump - See Detail
30" Caissons Down To Hard Sandstone
4#8 Bars Entire Length Of Caisson (Typ Ea Caisson)
Note: Pipe Gallery Floor To Slope 3" To Sump
30" Caissons (Typ) See Note
18'-6"
18'-6"
25'-8"
25'-8"
1
2
3
4
5
Note: Accepted Shop Welded Joint May Be Substituted For Flanged Joint Or Bell Joint Where Steel Pipe Is Used.

SECTION 2/18
SCALE: 1/8" = 1'-0"


2#6 Bars (Typ)
Non-Bituminous Joint With Thiokol Sealant (Typ Around Free Floating Floor Slab & Wall)
2'-0"
Special Controlled Fill

FREE SLAB JOINT DETAIL A/18
SCALE: 3/4" = 1'-0"


Fabric Reinforced Rubber Hose With Flange Molded On Hose
1¼" Ø For Chlorine & Ammonia
1½" Ø For Lime & Fluoride
Hose From Chemical Feeders
½" Ø Bolt - Provide Metal Ring On Molded Flange To Receive Bolt Compression.
⅜" Ø × 3" C.I. Bolt
Gasket
4" Ø-150# PVC Flange Drilled For ASA 125# Pattern And Drilled And Tapped For 1¼" & 1½" Ø PVC Pipe Flange Using Machine Bolts
4" C.I. Pipe-Flanged One End
Top Of Pump Deck EL. 4816.50
1¼" Ø or 1½" Ø Schedule 80 PVC Pipe With Threaded End At Top. See Schematic Dwgs. Sheet 27 & 28 For Varied Diffuser Outlet Condition Of Each Pipe.

DIFFUSER PIPING DETAIL B/18
NO SCALE

NOTE: ALL CAISSONS TO BE DRILLED 2'-0" INTO HARD SANDSTONE DEPTH VARIES FROM APPROX. 25' TO 30'.

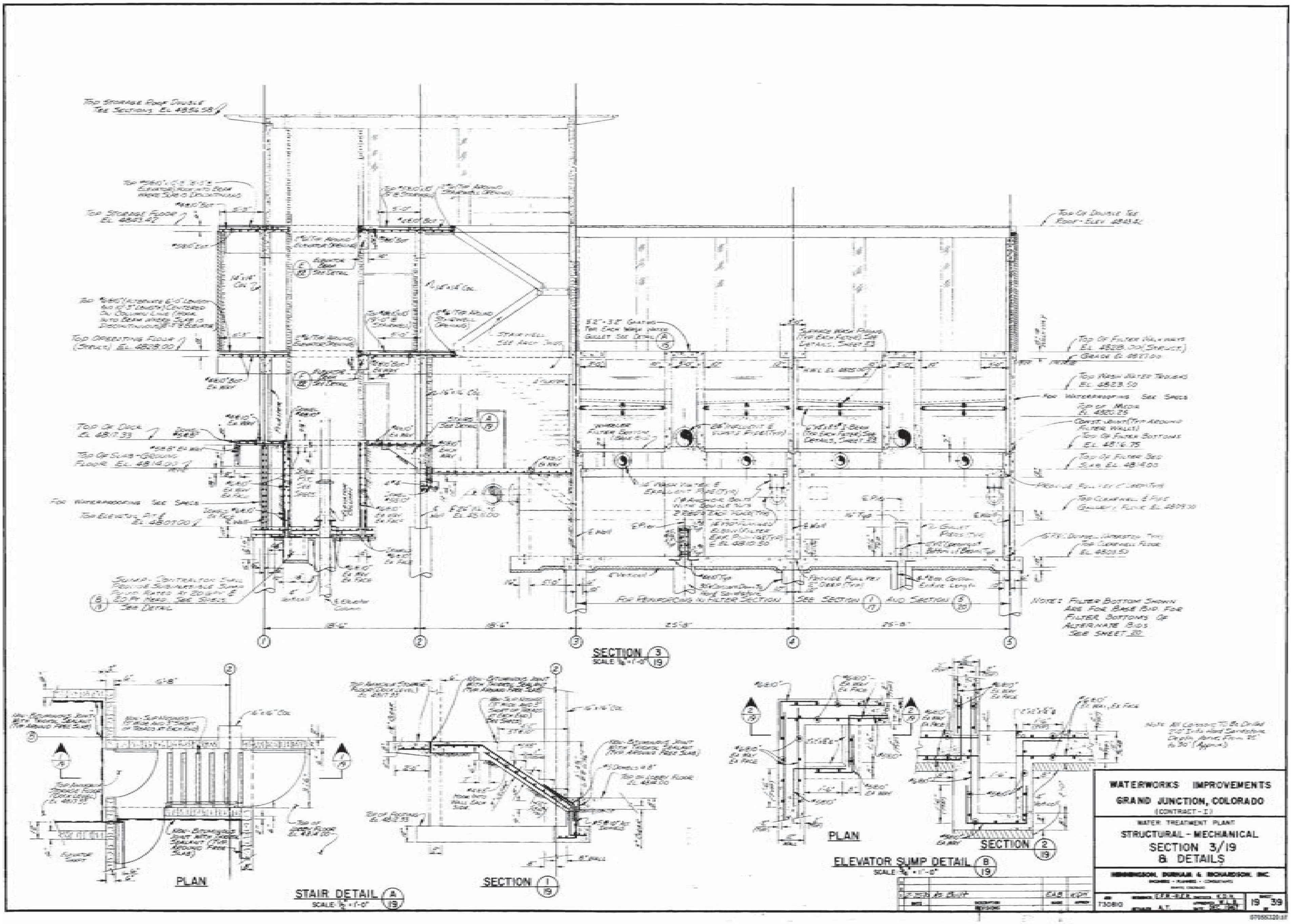
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
SECTION 2/18
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

8-25-75 As Built		A.F.	K.D.H.
DATE	DESCRIPTION REVISIONS	MADE	APPROV

JOB 730810
DESIGNED E.F.B.-R.E.R. CHECKED K.D.H.
DRAWN D.A.S. APPROVED W.L.B. DATE DEC. 1967
SHEET 18 39


Top Storage Roof Double Tee Sections El. 4856.58
Top Storage Floor El. 4843.42
Top Operating Floor (Struct.) El. 4828.00
Top Of Deck El. 4817.33
Top Of Slab-Ground Floor El. 4814.00
For Waterproofing See Specs
Top Elevator Pit El. 4807.00
14"x14" Col.
16"x16" Col.
Stair Well See Arch. Dwgs.
Elevator Beam See Detail
Sump - Contractor Shall Provide Submersible Sump Pump Rated At 20 GPM & 20 Ft Head. See Specs. See Detail
Top Of Double Tee Roof - Elev. 4843.42
3'2" x 3'2" Grating For Each Wash Water Gullet See Detail
Surface Wash Piping (Typ Each Filter) See Details, Sheet 23
Top Of Filter Walkways El. 4828.00 (Struct.)
Grade El. 4827.00
Top Wash Water Troughs El. 4823.50
For Waterproofing See Specs
Top Of Media El. 4820.25
Const. Joint (Typ Around Filter Walls)
Top Of Filter Bottoms El. 4816.75
Top Of Filter Bed Slab El. 4814.00
Wheeler Filter Bottom (Base Bid)
Provide Full Key 2" Deep (Typ)
Top Clearwell & Pipe Gallery Floor El. 4809.50
Top Clearwell Floor El. 4803.50
For Reinforcing In Filter Section See Section 1/17 And Section 5/20
Note: Filter Bottom Shown Are For Base Bid. For Filter Bottoms Of Alternate Bids See Sheet 20
18'-6"
18'-6"
25'-8"
25'-8"
1
2
3
4
5
SECTION 3/19
SCALE 1/8" = 1'-0"
PLAN
STAIR DETAIL A/19
SCALE 1/2" = 1'-0"
SECTION 1/19
Non-Bituminous Joint With Thiokol Sealant (Typ Around Free Slab)
Top Of Lobby Floor El. 4814.00
Top Of Footing El. 4812.93
PLAN
SECTION 2/19
ELEVATOR SUMP DETAIL B/19
SCALE 3/4" = 1'-0"
Note: All Caissons To Be Drilled 2'-0" Into Hard Sandstone. Depth Varies From 25' to 30' (Approx.)

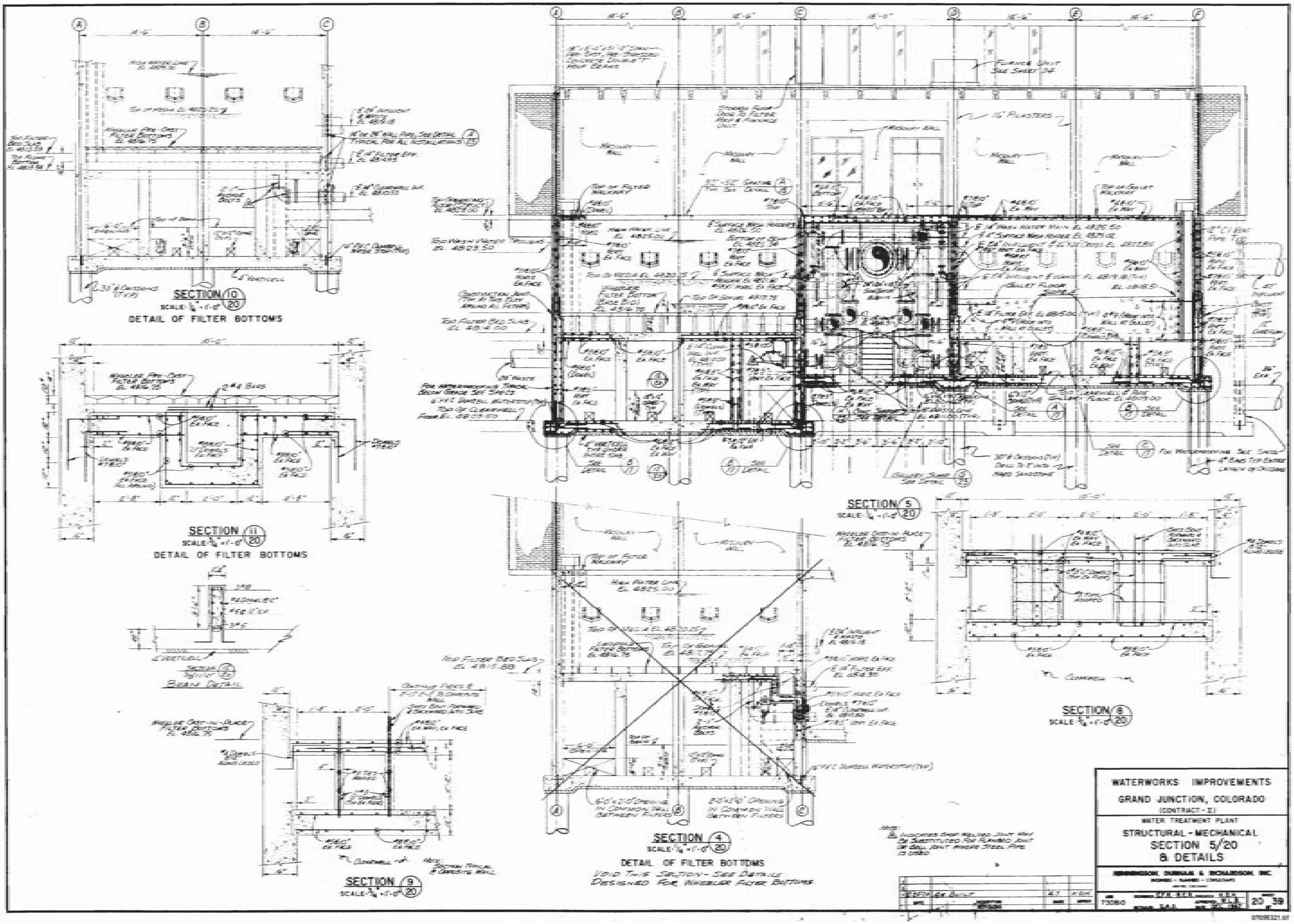
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
SECTION 3/19
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

12-25-63	As Built	EAB	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPR'D

T30810
E.F.R.-B.E.R.
K.D.H.
A.T.
W.L.B.
DEC. 1961
SHEET 19 OF 39


A
B
C
D
E
F
FURNACE UNIT SEE SHEET 34
16" PILASTERS
MASONRY WALL
TOP OF FILTER WALKWAY
TOP OF GULLET WALKWAY
GULLET FLOOR
HIGH WATER LINE EL 4825.00
TOP OF MEDIA EL 4820.75
TOP FILTER BED SLAB EL 4814.00
TOP OF CLEARWELL FLOOR EL 4803.50
30" Ø CAISSONS (TYP)
CLEARWELL
BEAM DETAIL

SECTION 10/20 SCALE $\frac{1}{4}$" = 1'-0"
DETAIL OF FILTER BOTTOMS

SECTION 11/20 SCALE $\frac{3}{4}$" = 1'-0"
DETAIL OF FILTER BOTTOMS

SECTION 5/20 SCALE $\frac{1}{4}$" = 1'-0"

SECTION 4/20 SCALE $\frac{1}{4}$" = 1'-0"
DETAIL OF FILTER BOTTOMS
VOID THIS SECTION - SEE DETAILS DESIGNED FOR WHEELER FILTER BOTTOMS

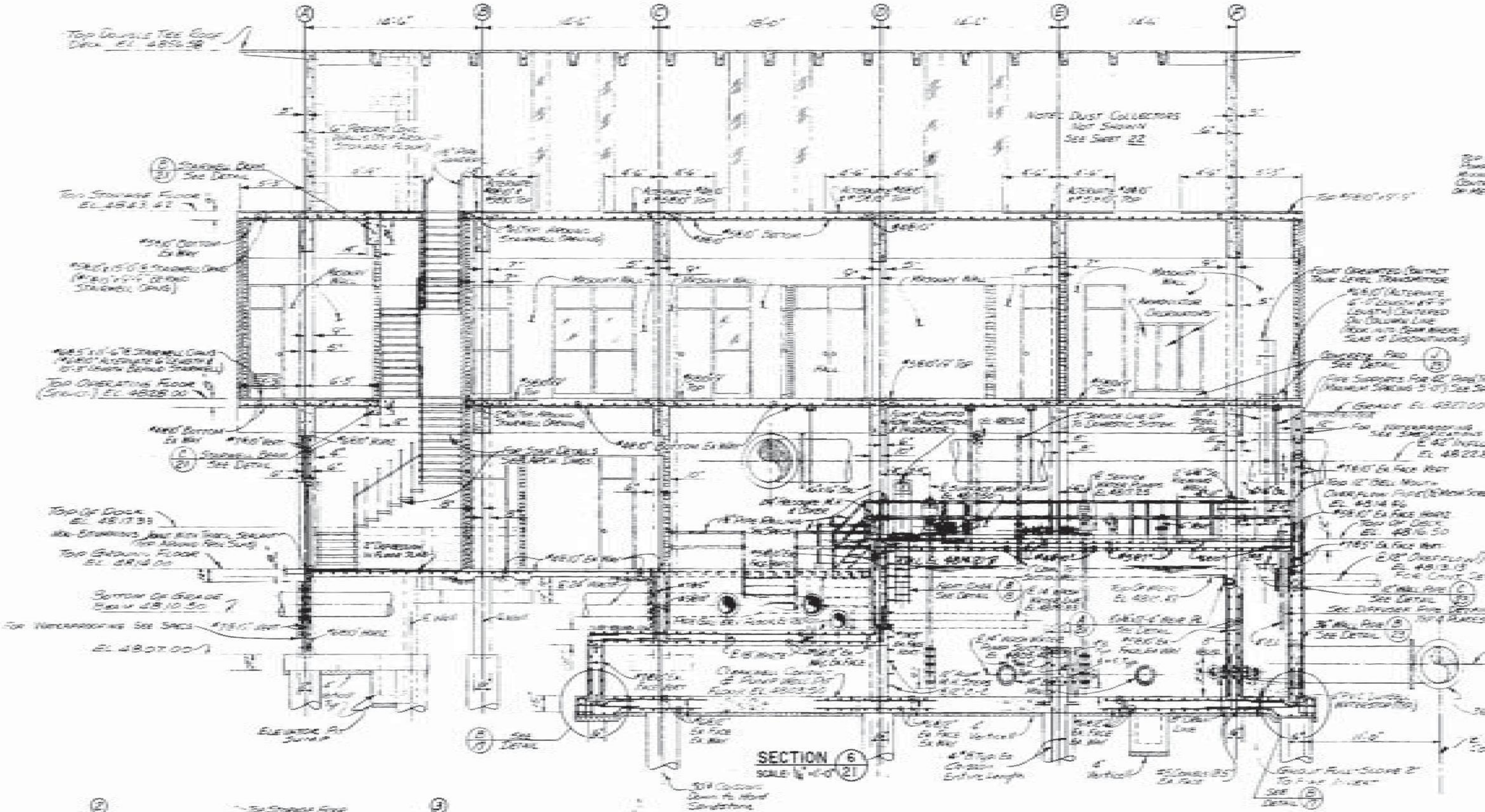
SECTION 8/20 SCALE $\frac{3}{4}$" = 1'-0"

SECTION 9/20 SCALE $\frac{3}{4}$" = 1'-0"

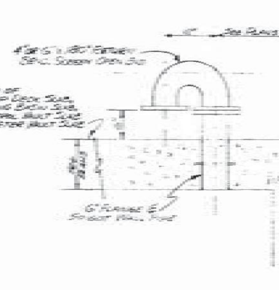
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)
WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
SECTION 5/20
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.

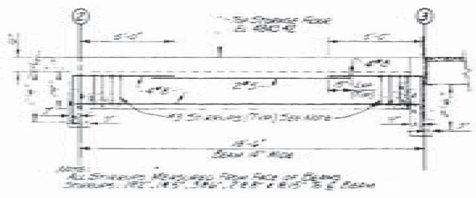
730810
20 / 39


A
B
C
D
E
F
16'-6"
16'-6"
18'-0"
16'-0"
16'-6"
Top Double Tee Roof Deck EL 4856.58
Note: Dust Collectors Not Shown See Sheet 22
Stairwell Beam See Detail
Top Storage Floor EL 4843.42
Top Operating Floor (Struct.) EL 4828.00
Stairwell Beam See Detail
Top Of Dock EL 4817.33
Top Ground Floor EL 4814.00
Bottom Of Grade Beam 4810.50
For Waterproofing See Specs
EL 4807.00
Elevator Pit Sump
Masonry Wall
Float Operated Contact Tank Level Transmitter
Concrete Pad See Detail
Pipe Supports For 12" Pipe (Typ) (Maximum Spacing 5'-0") See Specs
Grade EL 4827.00
For Waterproofing See Specifications
℄ 42" Influent EL 4822.85
Top 12" Bell Mouth Overflow Pipe (Remove Screen & Grating) EL 4814.62
Top Of Deck EL 4816.50
℄ 12" Overflow (To Daylight) EL 4813.13 For Cont. See Sheet 3
12" Wall Pipe See Detail
See Diffuser Pipe Detail
36" Wall Pipe See Detail
℄ EL 4806.25
36" x 30" Mech Jt Bell
℄ 36" Pipe For Cont. See Sheet 3
Grout Full-Slope 2" To Pipe Invert
See Detail
30' Caissons Down to Hard Sandstone
See Detail

SECTION 6/21
SCALE: 1/4" = 1'-0"

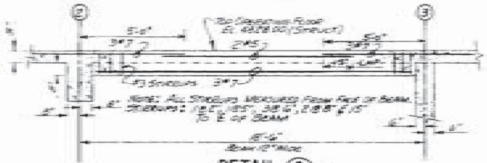

See Plans
6" Flange & Spigot Wall Pipe

DETAIL D/21
4" or 6" TYPICAL VENT PIPING
SCALE: 1" = 1'-0"


2
3
Top Storage Floor EL 4843.42
5'-0"
5'-0"
#3 Stirrups (Typ) See Note
15'-6"
Beam 14" Wide

Note: All Stirrups Measured From Face of Beams

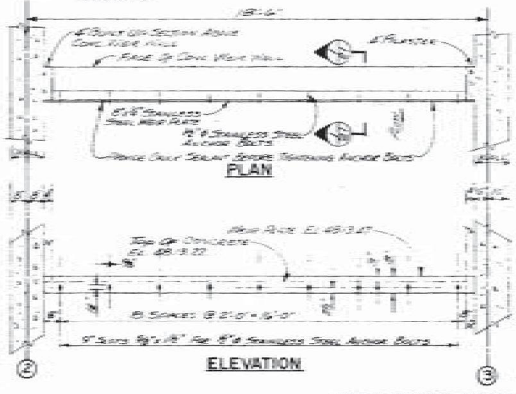
DETAIL B/21


2
3
5'-6"
Top Operating Floor EL 4828.00 (Struct.)
#3 Stirrups
15'-6"
Beam 12" Wide

Note: All Stirrups Measured From Face of Beam.

DETAIL C/21

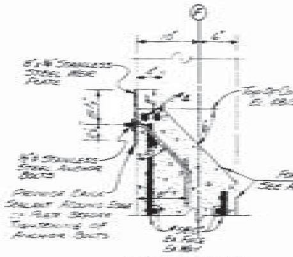
STAIRWELL BEAM DETAILS


18'-6"
Face Of Conc. Weir Wall
Plaster
Stainless Steel Weir Plate
Stainless Steel Anchor Bolts
Top Of Concrete EL 4813.22
Weir Plate EL 4813.47
2
3

PLAN

ELEVATION

WEIR PLATE DETAIL A/21
SCALE: 1/2" = 1'-0"


F
Stainless Steel Weir Plate
Top Of Conc. Weir EL 4813.22
Stainless Steel Anchor Bolts
For Tile See Arch. Dwgs.

SECTION 1/21
SCALE: 1 1/2" = 1'-0"

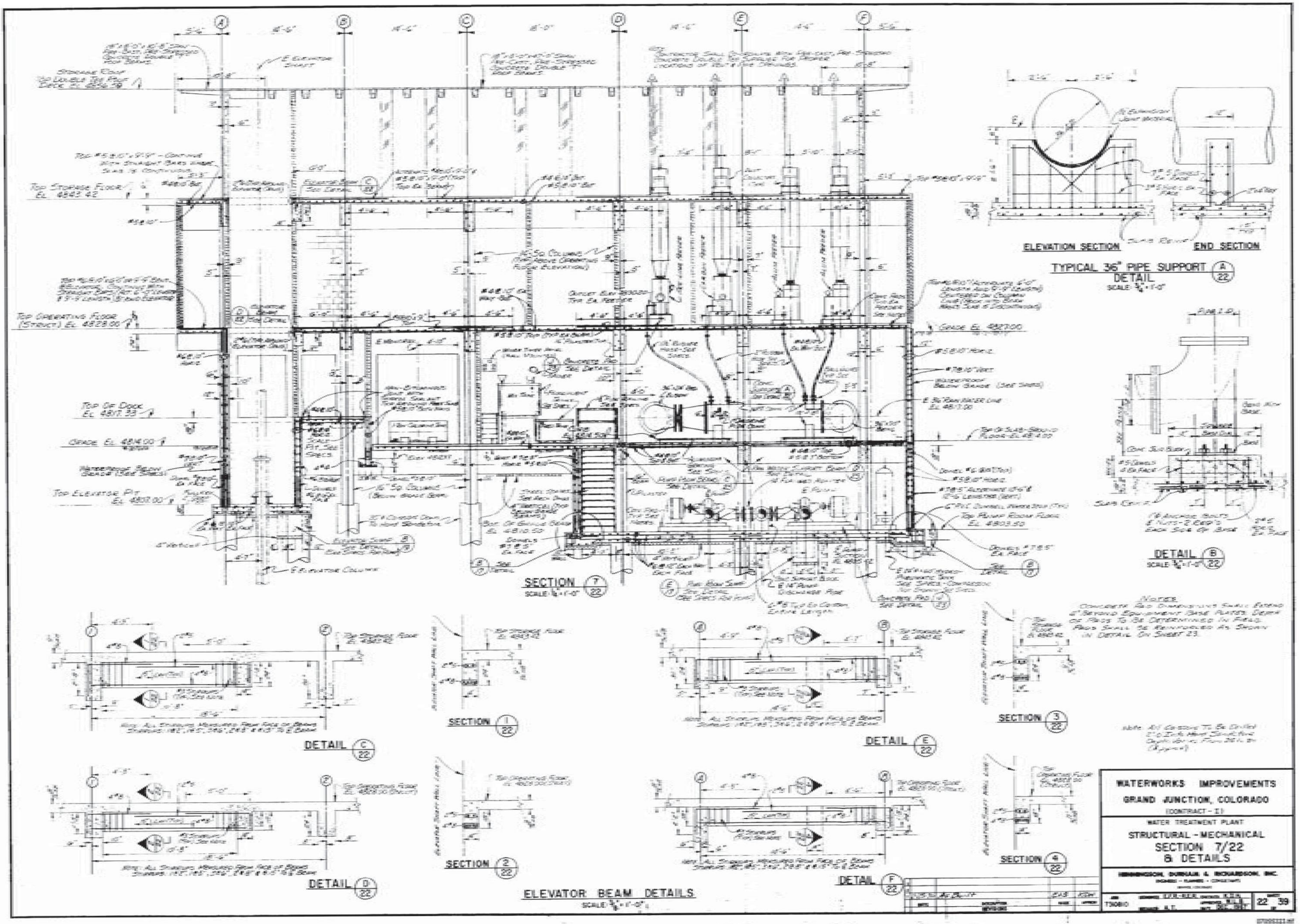
Note: All Caissons To Be Drilled 2'-0" Into Hard Sandstone Depth Varies From 25' to 30' (Approx)

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
SECTION 6/21
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

SHEET 21 39


SECTION 7/22
SCALE: 1/4" = 1'-0"
TYPICAL 36" PIPE SUPPORT A/22
DETAIL
SCALE: 3/4" = 1'-0"
ELEVATION SECTION
END SECTION
DETAIL B/22
SCALE: 3/4" = 1'-0"
DETAIL C/22
DETAIL D/22
DETAIL E/22
DETAIL F/22
SECTION 1/22
SECTION 2/22
SECTION 3/22
SECTION 4/22
ELEVATOR BEAM DETAILS
SCALE: 3/8" = 1'-0"
A
B
C
D
E
F
Top Storage Floor El 4843.42
Top Operating Floor (Struct) El 4828.00
Top of Dock El 4817.33
Grade El 4814.00
Top Elevator Pit El 4807.00
Grade El 4827.00
Top Pump Room Floor El 4803.50

NOTES

Concrete Pad Dimensions Shall Extend 4" Beyond Equipment Base Plates. Depth of Pads To Be Determined In Field. Pads Shall Be Reinforced As Shown In Detail On Sheet 23.

Note: All Caissons To Be Drilled [illegible]

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

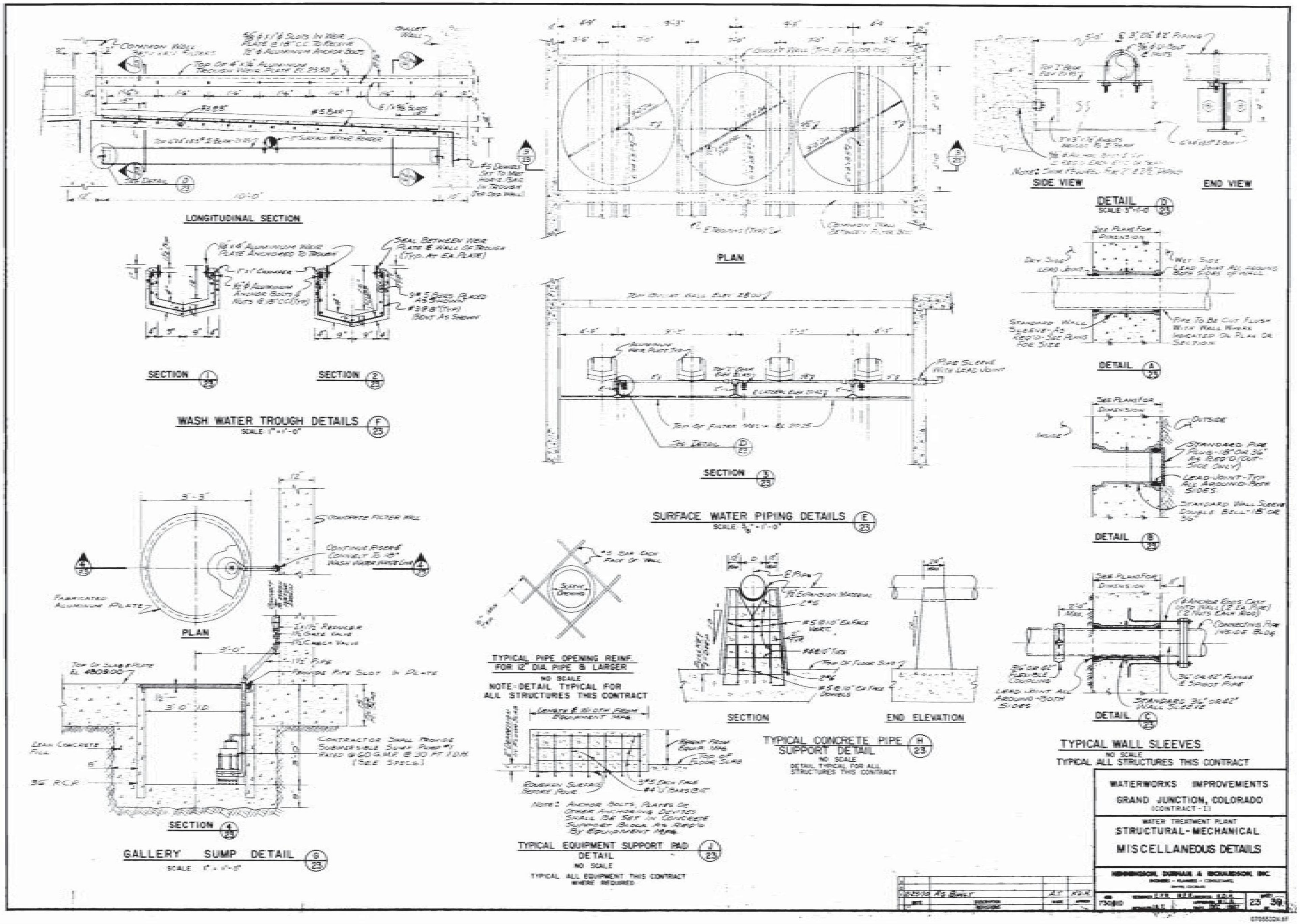
WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
SECTION 7/22
& DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

T30810

As Built

SHEET 22 OF 39



LONGITUDINAL SECTION
Common Wall
Top Of 4"x¼" Aluminum Trough Weir Plate El. 23.50
#5 Bar
See Detail D/23
#5 Dowels
10'-0"
SECTION 1/23
SECTION 2/23
¼"x4" Aluminum Weir Plate Anchored To Trough
1"x1" Chamfer
Seal Between Weir Plate & Wall Of Trough (Typ. At Ea. Plate)
WASH WATER TROUGH DETAILS F/23
SCALE 1" = 1'-0"
PLAN
Gullet Wall
Common Wall Between Filter
SECTION 3/23
Top Outlet Wall Elev 28.00
Aluminum Weir Plate (Typ)
Pipe Sleeve With Lead Joint
Top Of Filter Media El. 20.25
See Detail D/23
SURFACE WATER PIPING DETAILS E/23
SCALE 3/8" = 1'-0"
SIDE VIEW
END VIEW
DETAIL D/23
SCALE 3" = 1'-0"
DETAIL A/23
See Plans For Dimension
Dry Side
Wet Side
Lead Joint All Around Both Sides Of Wall
Standard Wall Sleeve - As Req'd - See Plans For Size
Pipe To Be Cut Flush With Wall Where Indicated On Plan Or Section
DETAIL B/23
Outside
Inside
Standard Pipe Plug - 18" Or 36" As Req'd (Outside Only)
Lead Joint - Typ All Around - Both Sides
Standard Wall Sleeve Double Bell - 18" Or 36"
DETAIL C/23
Connecting Pipe (Inside Bldg)
36" Or 42" Flexible Coupling
Lead Joint All Around Both Sides
36" Or 42" Flange & Spigot Pipe
Standard 36" Or 42" Wall Sleeve
TYPICAL WALL SLEEVES
NO SCALE
TYPICAL ALL STRUCTURES THIS CONTRACT
PLAN
9'-3"
Concrete Filter Wall
Fabricated Aluminum Plate
1½" Reducer
1½" Gate Valve
1½" Check Valve
1½" Pipe
Provide Pipe Slot In Plate
Top Of Slab & Plate El. 4809.00
Lean Concrete Fill
36" RCP
Contractor Shall Provide Submersible Sump Pump Rated @ 20 G.P.M. @ 30 FT. T.D.H. (See Specs.)
SECTION 4/23
GALLERY SUMP DETAIL G/23
SCALE 1" = 1'-0"
#5 Bar Each Face Of Wall
Sleeve Opening
TYPICAL PIPE OPENING REINF. FOR 12" DIA PIPE & LARGER
NO SCALE
NOTE: DETAIL TYPICAL FOR ALL STRUCTURES THIS CONTRACT
Length & Width From Equipment Mfg.
Roughen Surface Before Pour
Height From Equip. Mfg.
Top Of Floor Slab
Note: Anchor Bolts, Plates Or Other Anchoring Devices Shall Be Set In Concrete Support Block As Req'd By Equipment Mfg.
TYPICAL EQUIPMENT SUPPORT PAD J/23
DETAIL
NO SCALE
TYPICAL ALL EQUIPMENT THIS CONTRACT WHERE REQUIRED
Pipe
Expansion Material
#5 @ 10" Ea Face Vert.
Top Of Floor Slab
#5 @ 10" Ea Face Dowels
SECTION
END ELEVATION
TYPICAL CONCRETE PIPE SUPPORT DETAIL H/23
NO SCALE
DETAIL TYPICAL FOR ALL STRUCTURES THIS CONTRACT
As Built
A.T.
K.S.R.

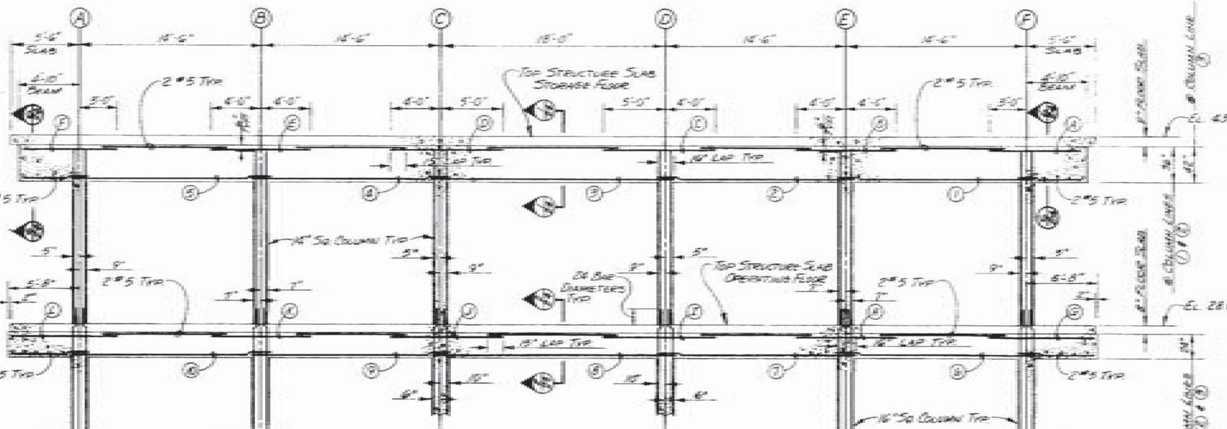
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
STRUCTURAL - MECHANICAL
MISCELLANEOUS DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.

73080

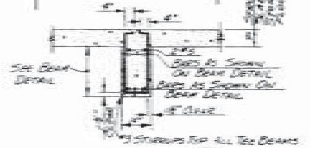
23 39



A
B
C
D
E
F
5'-6" Slab
15'-6"
15'-0"
4'-10" Beam
2 #5 Typ
Top Structure Slab Storage Floor
Top Structure Slab Operating Floor
16" Lap Typ
15" Lap Typ
14" Sq Column Typ
16" Sq Column Typ
24 Bar Diameters Typ
EL 43.42
EL 28.00

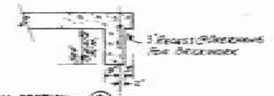
Note: All Stirrups Measured From Face Of Columns
Stirrups For Beams Supporting Storage Floor
Column Lines ① & ③: 1 @ 2", 2 @ 5", 3 @ 6", 1 @ 10" & @ 15" To ℄ Span
Column Line ②: 1 @ 2" & @ 15" To ℄ Span
Stirrups For Beams Supporting Operating Floor
Column Lines ①, ② & ③: 1 @ 2", 1 @ 6", 1 @ 12" & @ 15" To ℄ Span

BEAM DETAIL
AT COLUMN LINES ① ② & ③
SCALE - NONE



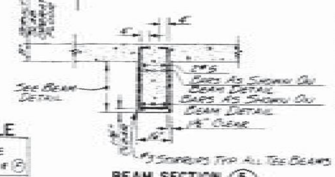
See Beam Detail
2 #5
Bars As Shown On Beam Detail
1½" Clear
#3 Stirrups Typ All Tee Beams

BEAM SECTION $\frac{4}{24}$
SCALE - NONE



3" Reveal @ Overhangs For Brickwork

BEAM SECTION $\frac{6}{24}$
SCALE: NONE



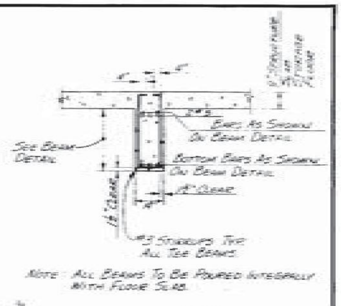
See Beam Detail
2 #5
Bars As Shown On Beam Detail
1½" Clear
#3 Stirrups Typ All Tee Beams

BEAM SECTION $\frac{5}{24}$
SCALE - NONE

BEAM BAR SCHEDULE

Beam Bar Schedule For Column Lines ①, ② & ③

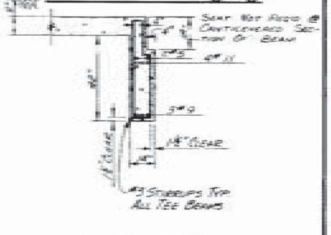
Bar Designation	Column Line	Number & Size of Bars
A	1	2-#5
	2	2-#5
	3	2-#5
B	1	3-#9
	2	4-#6
	3	3-#9
C	1	4-#9
	2	4-#9
	3	4-#10
D	1	4-#6
	2	4-#7
	3	4-#10
E	1	3-#9
	2	3-#7
	3	3-#9
F	1	2-#5
	2	2-#5
	3	2-#5
G	1	WALL
	2	3-#9
	3	WALL
H	1	WALL
	2	2-#7
	3	WALL
I	1	WALL
	2	3-#8
	3	WALL
J	1	WALL
	2	3-#8
	3	3-#8
K	1	WALL
	2	2-#7
	3	WALL
L	1	3-#6
	2	2-#5
	3	3-#10
1	1	3-#9
	2	2-#6
	3	3-#9
2	1	3-#6
	2	2-#6
	3	3-#9
3	1	2-#7
	2	4-#6
	3	3-#9
4	1	3-#6
	2	3-#6
	3	3-#9
5	1	3-#8
	2	2-#6
	3	3-#9
6	1	WALL
	2	2-#8
	3	WALL
7	1	WALL
	2	2-#7
	3	WALL
8	1	WALL
	2	2-#8
	3	2-#8
9	1	WALL
	2	2-#8
	3	WALL
10	1	WALL
	2	3-#8
	3	WALL



See Beam Detail
2 #5
Bars As Shown On Beam Detail
Bottom Bars As Shown On Beam Detail
1½" Clear
#3 Stirrups Typ All Tee Beams

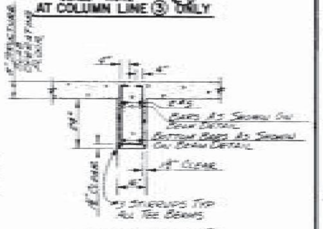
Note: All Beams To Be Poured Integrally With Floor Slab.

BEAM SECTION $\frac{1}{24}$
SCALE - NONE
TYP. AT COLUMN LINES ① & ②



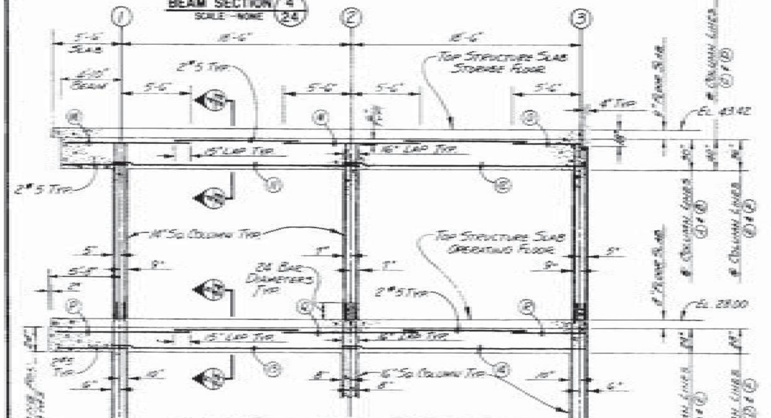
Seat Not Req'd @ Cantilevered Section Of Beam
3 #9
1½" Clear
#3 Stirrups Typ All Tee Beams

BEAM SECTION $\frac{1}{24}$
SCALE - NONE
AT COLUMN LINE ③ ONLY



2 #5
Bars As Shown On Beam Detail
Bottom Bars As Shown On Beam Detail
1½" Clear
#3 Stirrups Typ All Tee Beams

BEAM SECTION $\frac{2}{24}$
SCALE - NONE
TYP. AT COLUMN LINES ① ② & ③



1
2
3
5'-6" Slab
15'-6"
2 #5 Typ
Top Structure Slab Storage Floor
Top Structure Slab Operating Floor
15" Lap Typ
16" Lap Typ
14" Sq Column Typ
16" Sq Column Typ
24 Bar Diameters Typ
EL 43.42
EL 28.00

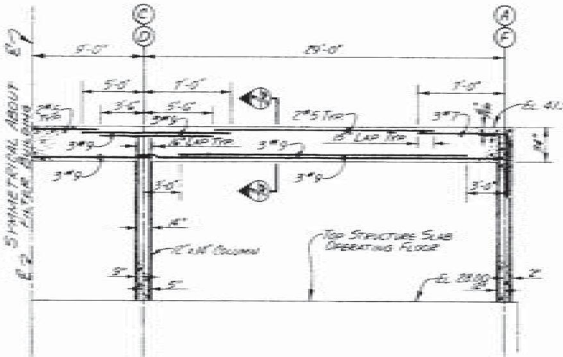
Note: All Stirrups Measured From Face Of Columns
Stirrups For Beams Supporting Storage Floor
Column Line Ⓐ: 1 @ 2", 3 @ 6", 2 @ 10" & @ 15" To ℄ Span
Column Line Ⓑ: 1 @ 2", 1 @ 6" & @ 15" To ℄ Span
Column Lines Ⓒ & Ⓓ: 1 @ 2", 1 @ 8", 1 @ 12" & @ 15" To ℄ Span
Column Line Ⓔ: 1 @ 2", 1 @ 6", 1 @ 12" & @ 15" To ℄ Span
Column Line Ⓕ: 1 @ 2", 3 @ 6", 1 @ 10" & @ 15" To ℄ Span
Stirrups For Beams Supporting Operating Floor
All Column Lines: 1 @ 2", 1 @ 6", 1 @ 12" & @ 15" To ℄ Span

BEAM DETAIL
AT COLUMN LINES Ⓐ Ⓑ Ⓒ Ⓓ Ⓔ & Ⓕ
SCALE - NONE

BEAM BAR SCHEDULE

Beam Bar Schedule For Column Lines Ⓐ, Ⓑ, Ⓒ, Ⓓ, Ⓔ & Ⓕ

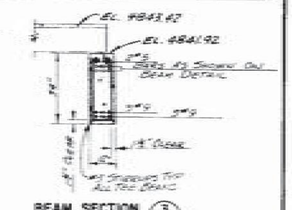
Bar Designation	Column Line	Number & Size of Bars
M	A	2-#6
	B	2-#6
	C	2-#6
	D	2-#6
	E	2-#6
	F	3-#7
N	A	3-#10
	B	3-#7
	C	4-#10
	D	4-#10
	E	3-#10
	F	3-#10
O	A	2-#6
	B	2-#6
	C	2-#6
	D	2-#6
	E	2-#6
	F	2-#6
P	A	3-#7
	B	3-#7
	C	3-#9
	D	3-#9
	E	3-#9
	F	3-#7
Q	A	3-#9
	B	2-#8
	C	3-#10
	D	3-#10
	E	3-#9
	F	3-#10
R	A	3-#9
	B	3-#7
	C	3-#10
	D	3-#10
	E	3-#9
	F	3-#10
11	A	3-#9
	B	3-#8
	C	3-#10
	D	3-#10
	E	3-#9
	F	3-#9
12	A	3-#9
	B	3-#8
	C	3-#10
	D	3-#10
	E	3-#9
	F	3-#9
13	A	WALL
	B	3-#7
	C	3-#9
	D	3-#9
	E	[illegible]
	F	[illegible]
14	A	[illegible]
	B	[illegible]
	C	[illegible]
	D	[illegible]
	E	[illegible]
	F	[illegible]



Ⓒ Ⓓ
Ⓐ Ⓕ
℄ Symmetrical About ℄ Filter Building
5'-0"
29'-0"
2 #5 Typ
3 #9
16" Lap Typ
15" Lap Typ
12" x 16" Column
Top Structure Slab Operating Floor
EL 41.92
EL 28.00

Note: All Stirrups Measured From Face Of Columns
Stirrup Spacing
Column Line ⑤: 1 @ 2", 3 @ 5", 3 @ 6", 3 @ 8", 3 @ 10", 0 @ 12" & @ 15" To ℄ Span
Beam 12" Wide

BEAM DETAIL
AT COLUMN LINE ⑤
SCALE - NONE



EL 4843.42
EL 4841.92
2 #5
Bars As Shown On Beam Detail
3 #9
1½" Clear
#3 Stirrups Typ All Tee Beams

BEAM SECTION $\frac{3}{24}$
SCALE - NONE

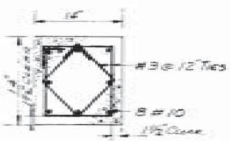
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
STRUCTURAL
BEAM FRAMING DETAILS
& SCHEDULES

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

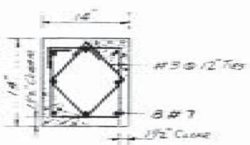
3	7-25-74 As Built	AT	KGH
NO.	DATE / DESCRIPTION / REVISION	MADE	APPR.

730810 DAS 24 39


14"
14"
#3 @ 12" Ties
8 #10
1½" Clear

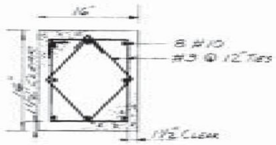
TYPICAL COLUMN & PILASTER SUPPORTING STORAGE FLOOR ON COLUMN LINES ①&③

SCALE 1½" = 1'-0"


14"
14"
#3 @ 12" Ties
8 #7
1½" Clear

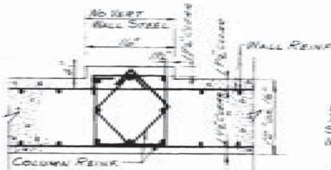
TYPICAL COLUMN SECTION SUPPORTING STORAGE FLOOR ON COLUMN LINE ②

SCALE 1½" = 1'-0"


16"
16"
8 #10
#3 @ 12" Ties
1½" Clear

TYPICAL COLUMN SECTION SUPPORTING OPERATING FLOOR

SCALE 1½" = 1'-0"


No Vert Wall Steel
16"
Wall Reinf.
Column Reinf.

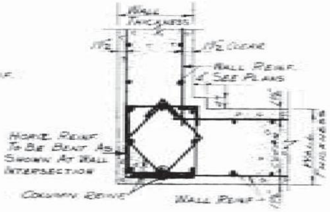
TYPICAL PILASTER DETAIL

SCALE 1½" = 1'-0"

NOTE:

COLUMNS WHICH ARE POURED INTEGRAL WITH THE WALL ARE NOTED AS PILASTERS. AT PILASTERS HORIZONTAL WALL REINFORCEMENT IS EXTENDED THROUGH THE PILASTER, AND THE VERTICAL WALL REINFORCING IS INTERRUPTED AND COLUMN REINFORCMENT SHALL BE PLACED AS SHOWN.

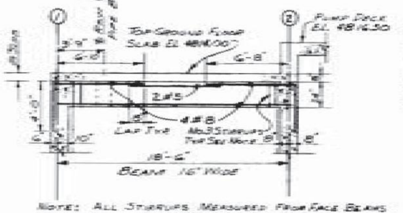
DETAIL (A/25)


Wall Thickness
1½" Clear
Wall Reinf. See Plans
Horiz. Reinf. To Be Bent As Shown At Wall Intersection
Column Reinf.
Wall Reinf.
Wall Thickness

TYPICAL CORNER PILASTER

SCALE 1½" = 1'-0"

DETAIL (B/25)


①
②
Raw Water Pipe Beam
Top Ground Floor Slab El. 4814.00
Pump Deck El. 4816.50
3'-9"
6'-8"
6'-8"
2 #5
4 #8
Lap Typ.
No. 3 Stirrups Typ. See Note
10"
8"
18'-6"
Beam 16" Wide

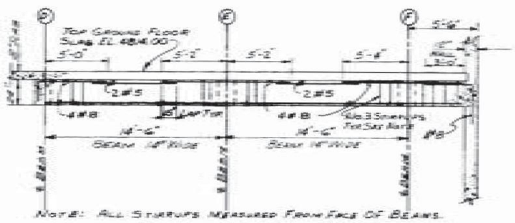
Note: All Stirrups Measured From Face Beams Stirrups: 1@2", 1@5", 3@6", 2@8", ℄@15" To ℄ Beam

PUMP ROOM BEAM DETAIL

BEAMS ON COLUMN Ⓓ Ⓔ & Ⓕ

DETAIL (C/25)

SCALE: ⅛" = 1'-0"


Ⓓ
Ⓔ
Ⓕ
Top Ground Floor Slab El. 4814.00
5'-0"
5'-2"
5'-2"
5'-6"
5'-6"
2 #5
2 #5
4 #8
Lap Typ.
4 #8
No. 3 Stirrups Typ. See Note
#8
14'-6"
14'-6"
Beam 14" Wide
Beam 14" Wide
℄ Beam

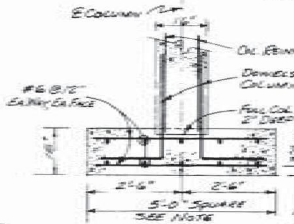
Note: All Stirrups Measured From Face Of Beams. Stirrups: 1@2", 1@5", 3@6", 2@8", ℄@15" To ℄ Beam Typ. For Both Spans.

PUMP ROOM BEAM DETAIL

RAW WATER PIPE SUPPORT BEAM

DETAIL (D/25)

SCALE: ⅛" = 1'-0"

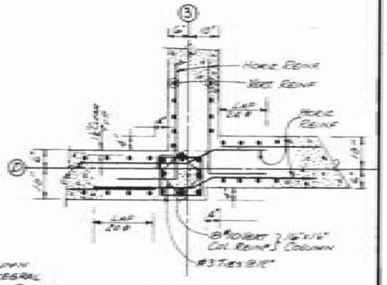

℄ Column
16"
Col. Reinf.
Dowels To Match Column Reinf.
Full Col. Key 2" Deep
#6 @ 12" Ea. Way, Ea. Face
2'-6"
2'-6"
5'-0" Square
See Note

TYPICAL COLUMN FOOTING

Note: Where Column Footings Are Integral With Floor Slabs Slab Reinforcement Shall Be Extended Into Footing Area

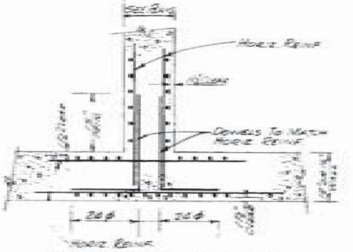
DETAIL (J/25)

SCALE: ¾" = 1'-0"


③
16"
16"
Horiz. Reinf.
Vert. Reinf.
Lap 24 ø
Horiz. Reinf.
Ⓓ
Lap 24 ø
8 #10 Vert. } 16"x16" Col. Reinf. } Column
#3 Ties @ 12"

DETAIL (K/25)

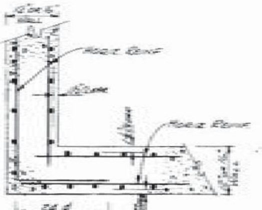
SCALE: ¾" = 1'-0"


See Plans
Horiz. Reinf.
1½" Clear
Dowels To Match Horiz. Reinf.
24 ø
24 ø
Horiz. Reinf.

PLAN - TYPICAL INTERSECTING WALL WITHOUT COLUMN

DETAIL (E/25)

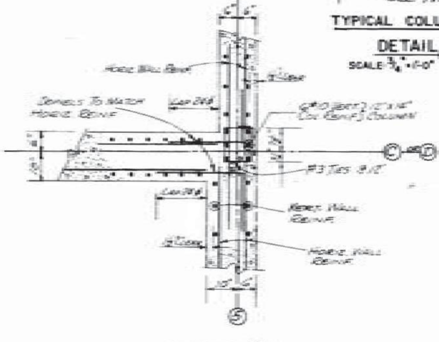
SCALE: ¾" = 1'-0"


12" or 16" Wall
Horiz. Reinf.
1½" Clear
Horiz. Reinf.
24 ø

PLAN - TYPICAL CORNER WALL WITHOUT COLUMN

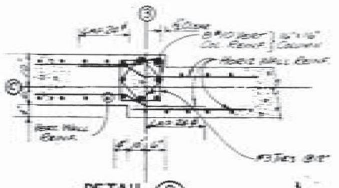
DETAIL (F/25)

SCALE: ¾" = 1'-0"


6"
6"
Horiz. Wall Reinf.
Dowels To Match Horiz. Reinf.
Lap 24 ø
6 #10 Vert. } 12"x16" Col. Reinf. } Column
Ⓒ Ⓓ
#3 Ties @ 12"
Lap 24 ø
Vert. Wall Reinf.
Horiz. Wall Reinf.
10"
6"
⑤

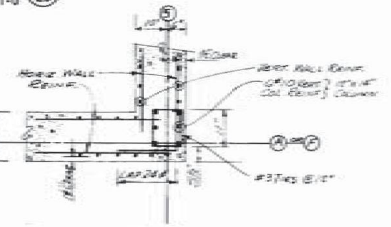
DETAIL (I/25)

SCALE: ¾" = 1'-0"


③
Lap 24 ø
8 #10 Vert. } 16"x16" Col. Reinf. } Column
Horiz. Wall Reinf.
Ⓔ
Vert. Wall Reinf.
Lap 24 ø
#3 Ties @ 12"

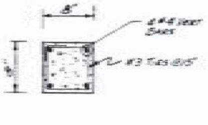
DETAIL (G/25)

SCALE: ¾" = 1'-0"


⑤
10"
Horiz. Wall Reinf.
Vert. Wall Reinf.
6 #10 Vert. } 12"x16" Col. Reinf. } Column
Ⓐ Ⓕ
Lap 24 ø
#3 Ties @ 12"

DETAIL (H/25)

SCALE: ¾" = 1'-0"


8"
8"
4 #4 Vert. Bars
#3 Ties @ 15"

TYPICAL COLUMN DETAIL (L/25)

SCALE: ¾" = 1'-0"

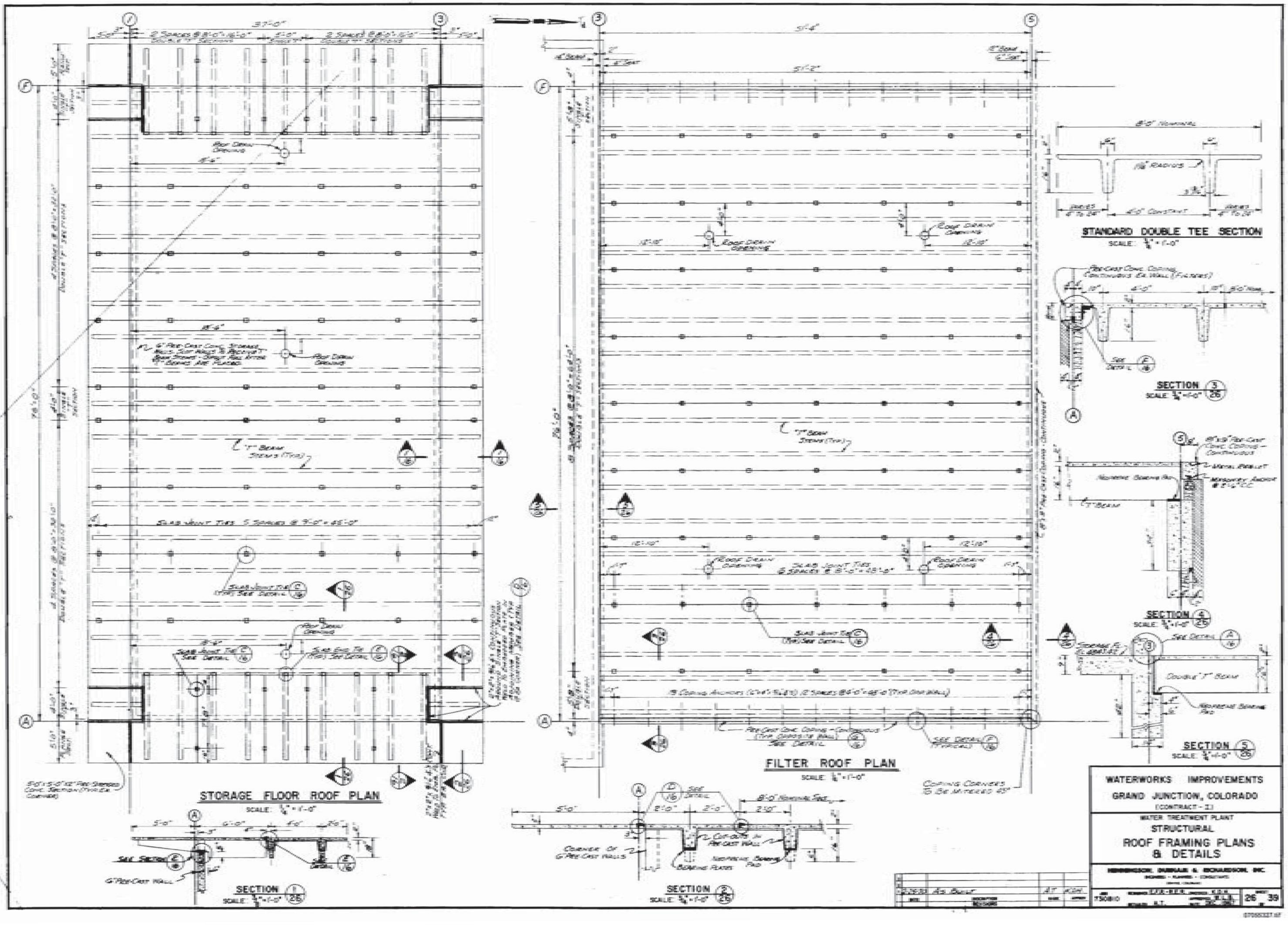
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
STRUCTURAL
COLUMN SCHEDULE
& STRUCTURAL DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS · PLANNERS · CONSULTANTS

	DATE	DESCRIPTION REVISIONS	MADE	APPROV.
	8-25-78	As Built	A.T.	KDH

JOB 750810
DRAWN AT - WWW
CHECKED KDH
APPROVED WLB
SHEET 25 OF 39


STORAGE FLOOR ROOF PLAN
SCALE: 1/8" = 1'-0"
FILTER ROOF PLAN
SCALE: 1/8" = 1'-0"
STANDARD DOUBLE TEE SECTION
SCALE: 3/4" = 1'-0"
8'-0" NOMINAL
1/2" RADIUS
4'-0" CONSTANT
VARIES 4" TO 24"
SECTION 1/26
SCALE: 1/4" = 1'-0"
SECTION 2/25
SCALE: 3/4" = 1'-0"
SECTION 3/26
SCALE: 3/4" = 1'-0"
SECTION 4/25
SCALE: 3/4" = 1'-0"
SECTION 5/26
SCALE: 3/4" = 1'-0"
37'-0"
51'-4"
51'-2"
76'-0"
2 SPACES @ 8'-0" = 16'-0" DOUBLE "T" SECTIONS
5'-0" SINGLE "T"
SLAB JOINT TIES 5 SPACES @ 9'-0" = 45'-0"
SLAB JOINT TIES 6 SPACES @ 8'-0" = 48'-0"
ROOF DRAIN OPENING
"T" BEAM STEMS (TYP.)
SLAB JOINT TIE (TYP.) SEE DETAIL C/16
SLAB END TIE (TYP.) SEE DETAIL E/16
6" PRE-CAST CONC. STORAGE WALLS, SLOT WALLS TO RECEIVE "T" BEAM STEMS - GROUT FILL AFTER "T" BEAMS ARE PLACED.
5'-0" x 5'-0" x 12" PRE-STRESSED CONC. SECTION (TYP. EA. CORNER)
19 COPING ANCHORS (C1/4" x 3 1/2" x 1'-8") 12 SPACES @ 4'-0" = 48'-0" (TYP. OPP. WALL)
PRE-CAST CONC. COPING - CONTINUOUS (TYP. OPPOSITE WALL) SEE DETAIL G/16
SEE DETAIL F/16 (TYPICAL)
COPING CORNERS TO BE MITERED 45°
8" x 8" PRE-CAST CONC. COPING - CONTINUOUS
PRE-CAST CONC. COPING (CONTINUOUS EA. WALL (FILTERS))
METAL REGLET
MASONRY ANCHOR @ 2'-0" C.C.
NEOPRENE BEARING PAD
"T" BEAM
DOUBLE "T" BEAM
STORAGE FL. EL. 4843.83
SEE DETAIL A/16
CUT-OUTS IN PRE-CAST WALL
CORNER OF 6" PRE-CAST WALLS
BEARING PLATES
8'-0" NOMINAL SEC.
6" PRE-CAST WALL
SEE SECTION E/16
SEE DETAIL

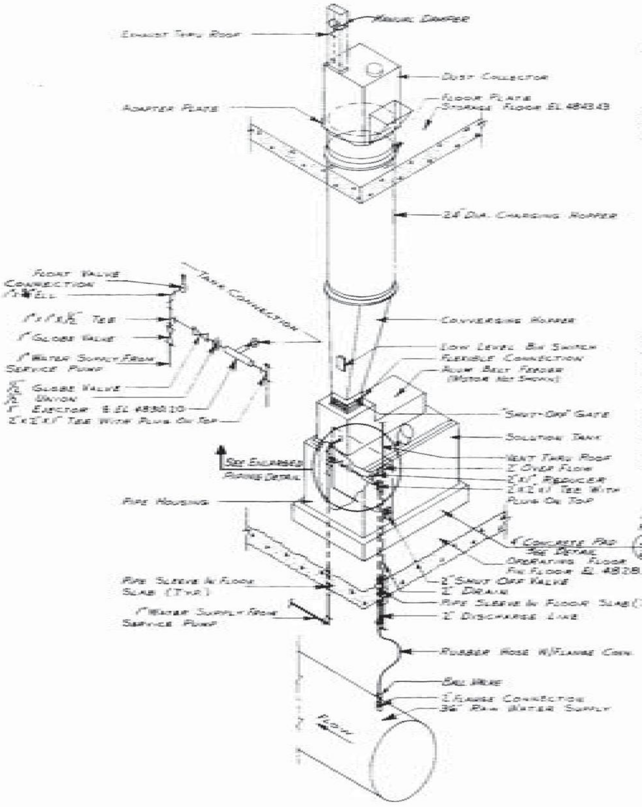
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
STRUCTURAL
ROOF FRAMING PLANS
& DETAILS

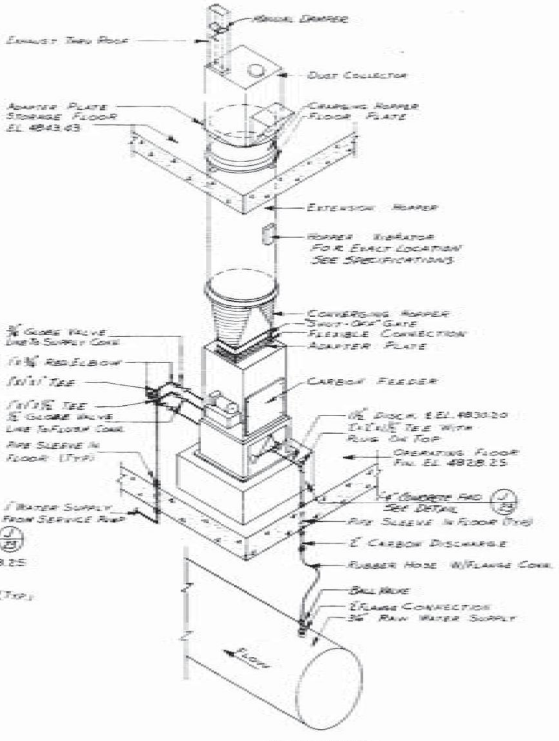
HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

2-26-93	As Built	A.T.	K.D.H.
DATE	DESCRIPTION REVISIONS	MADE	APPROV.

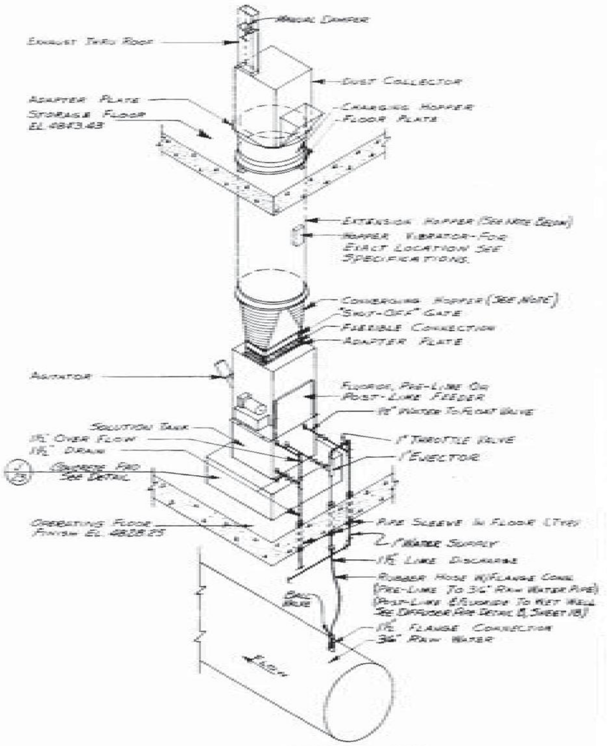
JOB 750810
DESIGNED E.F.S.-R.E.R.
CHECKED K.D.H.
APPROVED R.L.L.
DRAWN A.T.
SHEET 26 OF 39


Manual Damper
Exhaust Thru Roof
Dust Collector
Adapter Plate
Floor Plate
Storage Floor EL 4843.43
24" Dia. Charging Hopper
Float Valve Connection
1"x½" Ell
1"x1"x½" Tee
1" Globe Valve
1" Water Supply From Service Pump
Tank Connection
½" Globe Valve
½" Union
1" Ejector & EL 4830.10
2"x2"x1" Tee With Plug On Top
Converging Hopper
Low Level Bin Switch
Flexible Connection
Alum Belt Feeder (Motor Not Shown)
"Shut-Off" Gate
Solution Tank
See Enlarged Piping Detail
Vent Thru Roof
2" Over Flow
2"x1" Reducer
2"x2"x1" Tee With Plug On Top
Pipe Housing
4" Concrete Pad See Detail
J/23
Operating Floor Fin. Floor EL 4828.25
Pipe Sleeve In Floor Slab (Typ.)
2" Shut Off Valve
2" Drain
Pipe Sleeve In Floor Slab (Typ.)
1" Water Supply From Service Pump
2" Discharge Line
Rubber Hose W/Flange Conn.
Ball Valve
2" Flange Connection
36" Raw Water Supply
Flow

SCHEMATIC
ALUM FEEDER
2 REQUIRED


Manual Damper
Exhaust Thru Roof
Dust Collector
Adapter Plate
Storage Floor EL 4843.43
Charging Hopper
Floor Plate
Extension Hopper
Hopper Vibrator For Exact Location See Specifications
Converging Hopper
"Shut-Off" Gate
Flexible Connection
Adapter Plate
Carbon Feeder
¾" Globe Valve Line To Supply Conn.
1"x¾" Red. Elbow
1"x1"x1" Tee
1"x1"x¾" Tee
¾" Globe Valve Line To Floor Conn.
Pipe Sleeve In Floor (Typ)
1½" Disch. & EL 4830.20
2"x2"x1½" Tee With Plug On Top
Operating Floor Fin. EL 4828.25
4" Concrete Pad See Detail
J/23
1" Water Supply From Service Pump
Pipe Sleeve In Floor (Typ)
2" Carbon Discharge
Rubber Hose W/Flange Conn.
Ball Valve
2" Flange Connection
36" Raw Water Supply
Flow

SCHEMATIC
CARBON FEEDER
1 REQUIRED


Manual Damper
Exhaust Thru Roof
Dust Collector
Adapter Plate
Storage Floor EL 4843.43
Charging Hopper
Floor Plate
Extension Hopper (See Note Below)
Hopper Vibrator-For Exact Location See Specifications.
Converging Hopper (See Note)
"Shut-Off" Gate
Flexible Connection
Adapter Plate
Agitator
Fluoride, Pre-Lime Or Post-Lime Feeder
½" Water To Float Valve
Solution Tank
1½" Over Flow
1½" Drain
J/23
Concrete Pad See Detail
1" Throttle Valve
1" Ejector
Operating Floor Finish EL 4828.25
Pipe Sleeve In Floor (Typ)
1" Water Supply
1½" Lime Discharge
Rubber Hose W/Flange Conn. (Pre-Lime To 36" Raw Water Pipe) (Post-Lime & Fluoride To Wet Well See Diffuser Pipe Detail & Sheet 18)
Ball Valve
1½" Flange Connection
36" Raw Water
Flow

SCHEMATIC FOR
PRE-LIME, POST-LIME & FLUORIDE
FEEDERS
1 EACH REQUIRED

NOTE: Converging Hopper For Fluoride Machine Is To Be Mounted Directly Below Storage Floor Slab & Continue With A 16"x20" Extension Hopper Down To Top Of Fluoride Machine Complete With Shut Off Gate, Flexible Connections And Adapter Plates

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT-II)

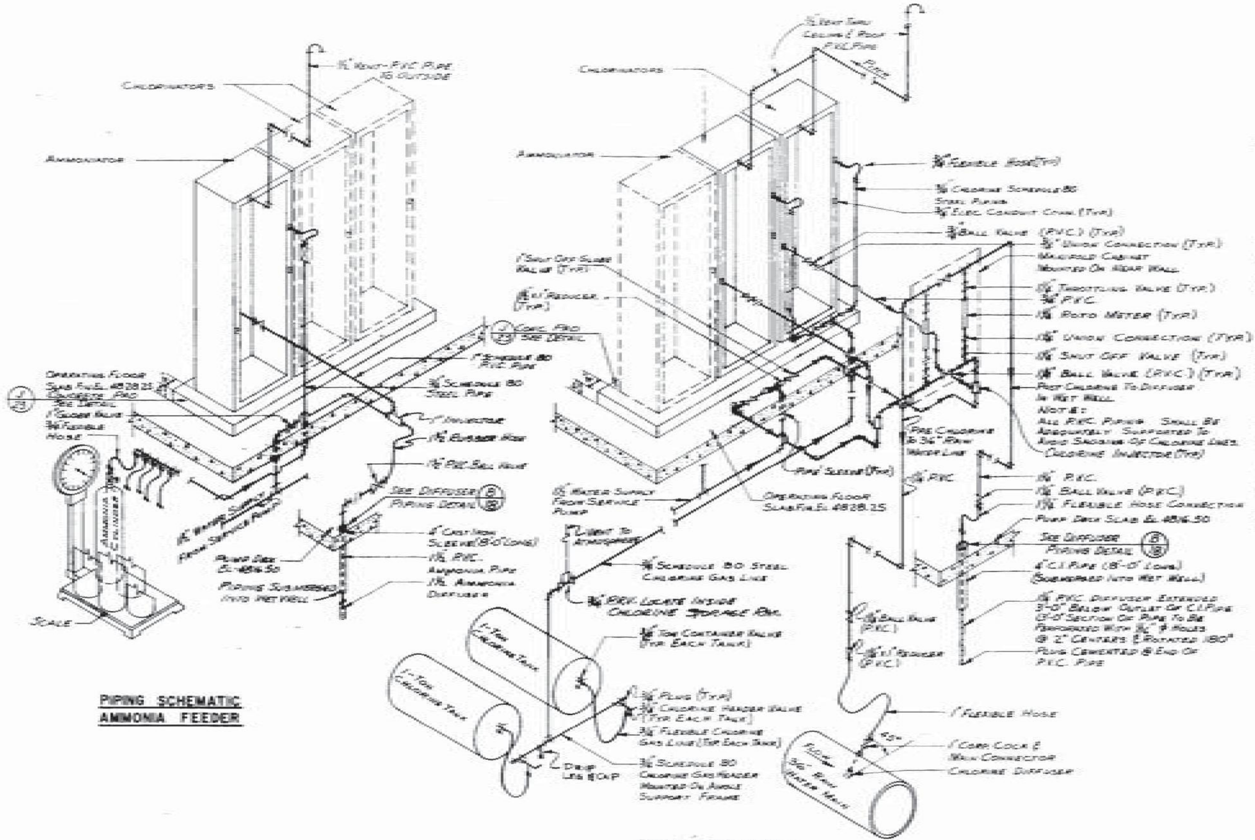
WATER TREATMENT PLANT
MECHANICAL
EQUIPMENT PIPING
SCHEMATICS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

[illegible]	As Built	AT	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPROV.

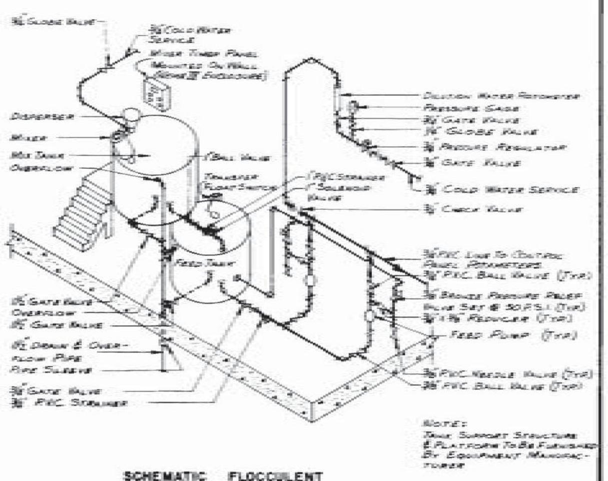
JOB 730810
DESIGNED E.F.R.
DRAWN AT
CHECKED KDH
APPROVED W.B.
DATE DEC. 1967
SHEET 27 OF 39

07055328.tif


1 1/2" Vent-PVC Pipe To Outside
Chlorinators
Ammoniator
Operating Floor Slab Fin.El. 4828.25
Concrete Pad See Detail
1/23
1" Globe Valve
3/4" Flexible Hose
1" Schedule 80 PVC Pipe
3/4" Schedule 80 Steel Pipe
1" Injector
1 1/2" Rubber Hose
1 1/2" PVC Ball Valve
See Diffuser Piping Detail
B/18
1 1/2" Water Supply From Service Pump
4" Cast Iron Sleeve (8'-0" Long)
1 1/2" PVC Ammonia Pipe
1 1/2" Ammonia Diffuser
Pump Deck El. 4816.50
Piping Submerged Into Wet Well
Ammonia Cylinder
Scale
1 1/2" Vent Thru Ceiling & Roof PVC Pipe
Chlorinators
Ammoniator
3/4" Flexible Hose (Typ)
3/4" Chlorine Schedule 80 Steel Piping
3/4" Elec. Conduit Conn. (Typ)
3/4" Ball Valve (PVC) (Typ)
3/4" Union Connection (Typ)
Manifold Cabinet Mounted On Rear Wall
1" Shut Off Globe Valve (Typ)
1 1/2" x 1" Reducer (Typ)
1/23 Conc. Pad See Detail
1 1/2" Throttling Valve (Typ)
3/4" PVC
1 1/2" Roto Meter (Typ)
1 1/2" Union Connection (Typ)
1 1/2" Shut Off Valve (Typ)
1 1/2" Ball Valve (PVC) (Typ)
Post Chlorine To Diffuser In Wet Well
Note: All PVC Piping Shall Be Adequately Supported To Avoid Sagging Of Chlorine Lines.
Chlorine Injector (Typ)
Pre Chlorine To 36" Raw Water Line
Pipe Sleeve (Typ)
1 1/2" PVC
1 1/2" Water Supply From Service Pump
Operating Floor Slab Fin.El. 4828.25
1 1/2" PVC
1 1/2" Ball Valve (PVC)
1 1/2" Flexible Hose Connection
Pump Deck Slab El. 4816.50
See Diffuser Piping Detail
B/18
4" C.I. Pipe (8'-0" Long) (Submerged Into Wet Well)
1 1/2" PVC Diffuser Extended 3'-0" Below Outlet Of C.I. Pipe 3'-0" Section Of Pipe To Be Perforated With 3/16" Ø Holes @ 2" Centers & Rotated 180°
Plug Cemented @ End Of PVC Pipe
Vent To Atmosphere
3/4" Schedule 80 Steel Chlorine Gas Line
3/4" PRV. Locate Inside Chlorine Storage Rm.
3/4" Ton Container Valve (Typ Each Tank)
1-Ton Chlorine Tank
1-Ton Chlorine Tank
3/4" Plug (Typ)
3/4" Chlorine Header Valve (Typ Each Tank)
3/4" Flexible Chlorine Gas Line (Typ Each Tank)
Drip Leg & Cap
3/4" Schedule 80 Chlorine Gas Header Mounted On Angle Support Frame
1 1/2" Ball Valve (PVC)
1 1/2" x 1" Reducer (PVC)
1" Flexible Hose
45°
1" Corp. Cock & Main Connector
Chlorine Diffuser
Flow
36" Raw Water Main

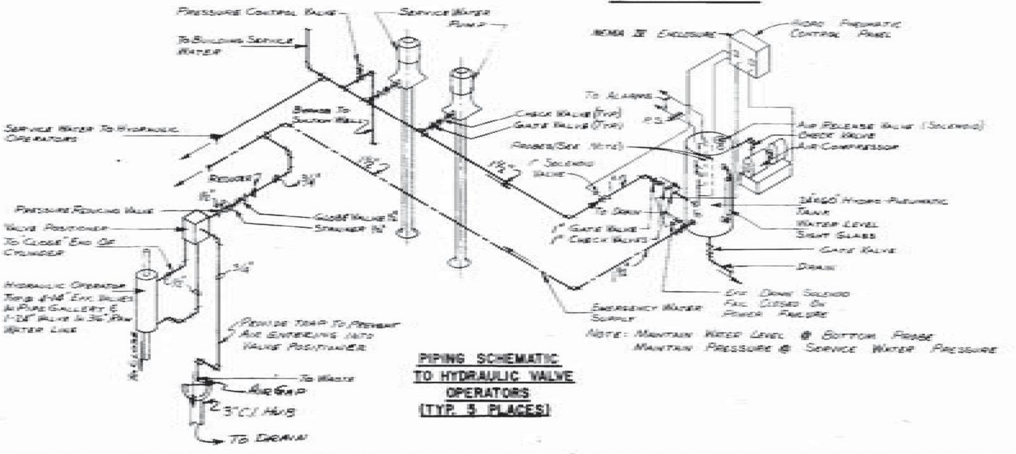
PIPING SCHEMATIC
AMMONIA FEEDER

PIPING SCHEMATIC
CHLORINE FEEDERS


3/4" Globe Valve
3/4" Cold Water Service
Mixer Timer Panel Mounted On Wall (Nema III Enclosure)
Disperser
Mixer
Mix Tank
Overflow
1" Ball Valve
Transfer Float Switch
1" PVC Strainer
1" Solenoid Valve
Feed Tank
Dilution Water Rotometer
Pressure Gage
3/4" Gate Valve
3/4" Globe Valve
3/4" Pressure Regulator
3/4" Gate Valve
3/4" Cold Water Service
3/4" Check Valve
3/4" PVC Line To Control Panel Rotameters
3/4" PVC Ball Valve (Typ)
3/4" Bronze Pressure Relief Valve Set @ 50 P.S.I. (Typ)
3/4" x 3/8" Reducer (Typ)
Feed Pump (Typ)
1 1/2" Gate Valve
Overflow
1 1/2" Gate Valve
1 1/2" Drain & Overflow Pipe
Pipe Sleeve
3/4" Gate Valve
3/4" PVC Strainer
3/8" PVC Needle Valve (Typ)
3/8" PVC Ball Valve (Typ)

NOTE:
Tank Support Structure & Platform To Be Furnished By Equipment Manufacturer

SCHEMATIC FLOCCULENT
MIX & FEED TANK


Pressure Control Valve
Service Water Pump
To Building Service Water
Service Water To Hydraulic Operators
Bypass To Suction Well
Reducer
3/4"
1 1/2"
1 1/2"
Pressure Reducing Valve
Globe Valve 1/2"
Strainer 1/2"
Valve Positioner
To "Close" End Of Cylinder
3/4"
Hydraulic Operator Typ @ 4-14" Exh. Valves In Pipe Gallery & 1-28" Valve In 36" Raw Water Line
Provide Trap To Prevent Air Entering Into Valve Positioner
To Waste
Air Gap
3" C.I. Hub
To Drain
NEMA III Enclosure
Hydro Pneumatic Control Panel
To Alarms
P.S.
Check Valve (Typ)
Gate Valve (Typ)
Probes (See Note)
1" Solenoid Valve
To Drain
1" Gate Valve
1" Check Valves
Air Release Valve (Solenoid)
Check Valve
Air Compressor
24"x60" Hydro-Pneumatic Tank
Water Level Sight Glass
Gate Valve
Drain
Emergency Water Supply
Em. Drain Solenoid Fail Closed On Power Failure

NOTE: Maintain Water Level @ Bottom Probe
Maintain Pressure @ Service Water Pressure

PIPING SCHEMATIC
TO HYDRAULIC VALVE
OPERATORS
(TYP. 5 PLACES)

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

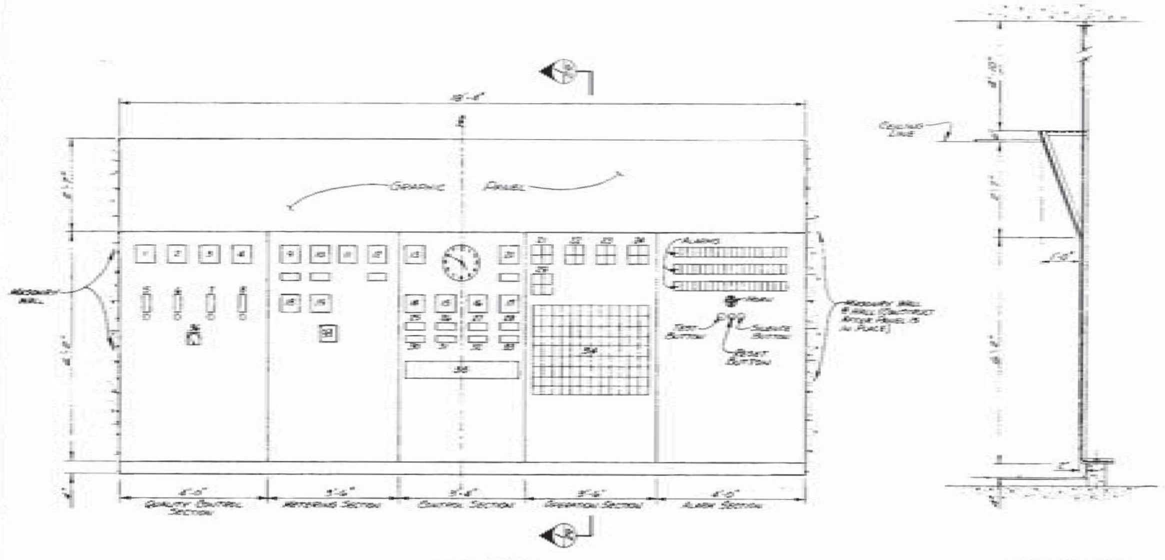
WATER TREATMENT PLANT
MECHANICAL
EQUIPMENT PIPING
SCHEMATICS

HENNINGSON, DURHAM & RICHARDSON, INC.

2-20-76	As Built	A.T.	K.R.H.

730810

28 39



ELEVATION

SECTION 1/29

MAIN CONTROL PANEL - DETAIL A/29

SCALE: 3/4" = 1'-0"

ALARM SCHEDULE

List of Alarms	
Alarm No.	Description
1	High Raw Water Turbidity
2	High Water Level Contact Basin
3	Mantey Heights Tank High Level
4	Mantey Heights Tank Low Level
5	Reservoir No. 1 & No. 2 High Level
6	Reservoir No. 1 & No. 2 Low Level
7	Chlorine Storage Room Leak
8	Chlorine Feeder Room Leak
9	Clearwell High Level
10	Low Service Water Pressure
11	High Filter Head Loss (One Alarm For All Filters)
12	Low Hydro-Pneumatic Tank Level
13	High Hydro-Pneumatic Tank Level
14	Clearwell Low Level
15	Low Chemical Feeder Hopper Level (One Alarm For All Feeders)
16	Chemical Feed Off Normal (One Alarm For All Feeders)
17	Low Chlorine Pressure
18	Incomplete Backwash Sequence
19	High Raw Water Pressure (Sensor In Raw Water Control Vault)
20	High Water Level Gallery Sump
21	High Water Level Pump Room Sump
22	High Water Level Elevator Pit
23	No Flow From Kannah Creek Influent Line
24	No Flow From Hallenbeck Reservoir Influent Line

Notes:
1. Provide Relays And Blank Alarm Points For A Minimum Of 6 Spare Alarm Points.
2. Instrumentation And Control Supplier Shall Furnish All Alarm Initiating Devices.

Main Control Panel						
Inst. No.	Description	** Type	Range	Alarm Contacts Yes	Alarm Contacts No	Remarks
1	Raw Water Turbidity Meter Recorder	I-R	0-100 ppm	✓		1 Pen Records Point Sampled - 1 Pen Records Value (Meter Mtd. Behind Panel)
2	Finished Water Turbidity Meter Recorder	I-R	0-5 ppm	✓		1 Pen Records Point Sampled - 1 Pen Records Value (Meter Mtd. Behind Panel)
3	pH	I-R	2-12	High/Low		2 Pen (Meters Mtd. Behind Panel)
4	Chlorine Residual	I-R	0-3 ppm		✓	(Meter Mtd. Behind Panel)
5	Polyelectrolyte Rotameters - Filter No. 1				✓	
6	Polyelectrolyte Rotameters - Filter No. 2				✓	
7	Polyelectrolyte Rotameters - Filter No. 3				✓	
8	Polyelectrolyte Rotameters - Filter No. 4				✓	
9	Kannah Creek Flow	IRTD	0-8 mgd	✓		
10	Hallenbeck Reservoir Flow	IRTD	0-12 mgd	✓		
11	Clearwell Effluent	IR	0-20 mgd			
12	Main Raw Water Influent	IRTD	0-20 mgd			Controller On High Level
13	Contact Basin Level	I		✓		Filter Rate Controller
14	Flow And Head Loss - Filter No. 1	I-R	0-3 mgd 0-10 ft	✓		2 Pen Recorder & Filter Rate Controller
15	Flow And Head Loss - Filter No. 2	I-R	0-3 mgd 0-10 ft	✓		2 Pen Recorder & Filter Rate Controller
16	Flow And Head Loss - Filter No. 3	I-R	0-3 mgd 0-10 ft	✓		2 Pen Recorder & Filter Rate Controller
17	Flow And Head Loss - Filter No. 4	I-R	0-3 mgd 0-10 ft	✓		2 Pen Recorder & Filter Rate Controller
18	Mantey Heights Tank Level	I-R	0-40 Ft.	✓		
19	Reservoir No. 1 And No. 2 Level	I-R	0-25 Ft.	✓		2 Pen
20	Backwash Rate Controller	IRT.	0-8 mgd			
21	Backwash Pump - Controls No. 1 W/Automatic Alternator					Manual - Automatic / On-Off W/Lights
22	Backwash Pump - Controls No. 2 W/Automatic Alternator					Manual - Automatic / On-Off W/Lights
23	Service Water Pump - Controls No. 1 W/Selector Switch					Manual - Automatic / On-Off W/Lights
24	Service Water Pump - Controls No. 2 W/Selector Switch					Manual - Automatic / On-Off W/Lights
25	Filter Backwash Selector Button W/Light - Filter No. 1					
26	Filter Backwash Selector Button W/Light - Filter No. 2					
27	Filter Backwash Selector Button W/Light - Filter No. 3					
28	Filter Backwash Selector Button W/Light - Filter No. 4					
29	Surface Wash Pump Controls					Manual - Automatic / On-Off W/Lights
30	Start Backwashing					Push Button W/Light
31	Stop Backwashing					Push Button W/Light
32	Extend Backwashing					Push Button
33	Three Digital Readout with Selector	D				For Inst. 9-10-11-12 Locate Front Of Panel Centered Below Inst. [illegible]
34	Control Valves - Manual-Automatic/Open-Close Switches					Number Of Valves As On Graphic Panel
35	Indicating Lights For Pumps					
36	*Alum Manual Rate Set Controller					

Note: All Instruments & Lights To Have Screw Mounted Name Plates As Per Specifications. Provide Manual Reset For Alarms After Alarm Condition.

* Furnished By Chemical Feeder Supplier, Installed In Main Control Panel By Instrumentation & Control Supplier.

** Instrument Type: I-Indicator, R-Recorder, T-Totalizer, D-Digital Readout

MAIN CONTROL PANEL INSTRUMENT SCHEDULE

	As Built		
Date	Description Revisions	Made	Approved

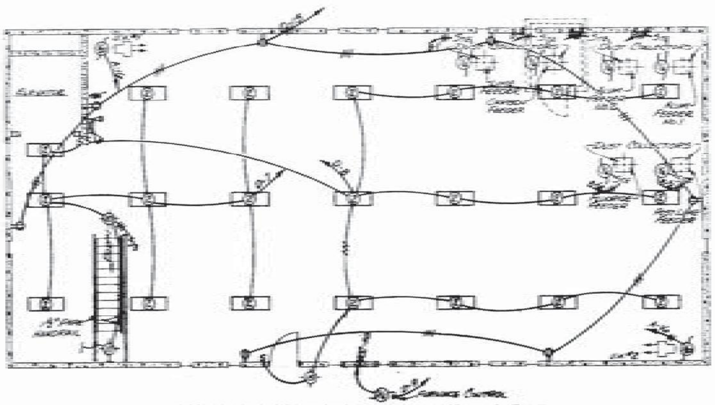
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
METERING & CONTROLS
MAIN CONTROL PANEL
ELEVATIONS, SECTIONS
& SCHEDULES

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS
DENVER, COLORADO

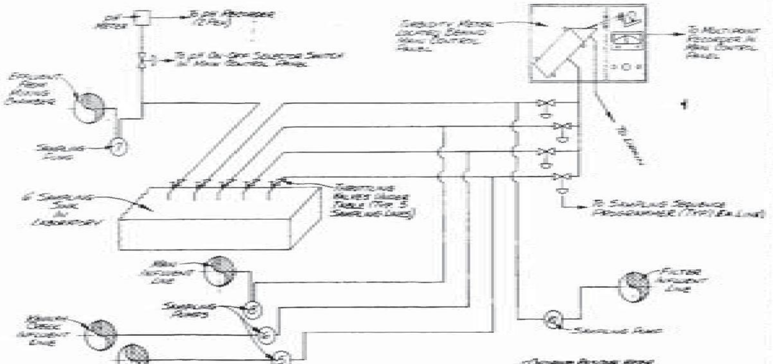
730810

Sheet 29 of 39


Elevator
Dust Collectors
Furnace Control

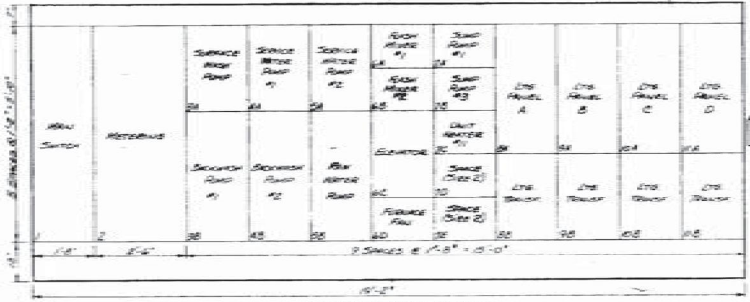
LIGHTING PLAN - STORAGE FLOOR - ELEV. 4843.42

SCALE 3/16" = 1'-0"


Turbidity Meter Located Behind Main Control Panel
To Multipoint Recorder in Main Control Panel
To Drain
To Sampling Sequence Programmer (Typ) Ea. Line
6 Sampling Sink in Laboratory
Throttling Valves Under Table (Typ 5 Sampling Lines)
Sampling Pumps
Sampling Pump
Filter Influent Line

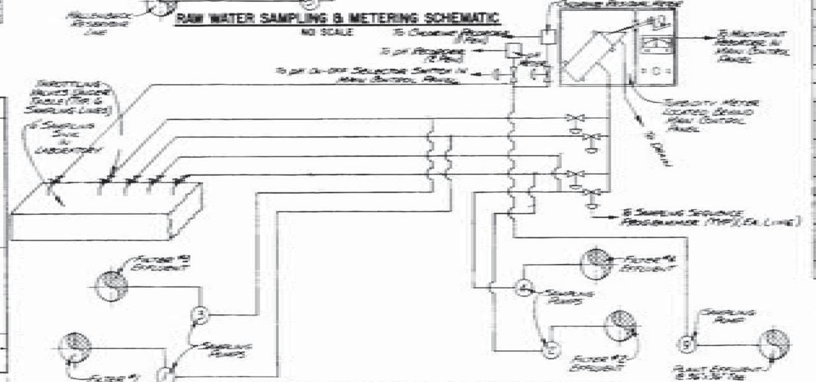
RAW WATER SAMPLING & METERING SCHEMATIC

NO SCALE


Main Switch
Metering
Surface Wash Pump
Service Water Pump #1
Service Water Pump #2
Floc Mixer #1
Floc Mixer #2
Sump Pump #1
Sump Pump #3
Unit Heater #1
Elevator
Space (Size 2)
Space (Size 2)
Furnace Fan
Backwash Pump #1
Backwash Pump #2
Raw Water Pump
Ltg Panel A
Ltg Panel B
Ltg Panel C
Ltg Panel D
Ltg Transf
9 Spaces @ 1'-8" = 15'-0"
18'-2"

MOTOR CONTROL CENTER

SCALE 3/4" = 1'-0"


Chlorine Residual Meter
To Multipoint Recorder in Main Control Panel
Turbidity Meter Located Behind Main Control Panel
To Drain
To Sampling Sequence Programmer (Typ) Ea. Line
Throttling Valves Under Table (Typ 6 Sampling Lines)
6 Sampling Sink in Laboratory
Filter #3 Effluent
Filter #4 Effluent
Filter #1 Effluent
Filter #2 Effluent
Sampling Pumps
Sampling Pump
Plant Effluent

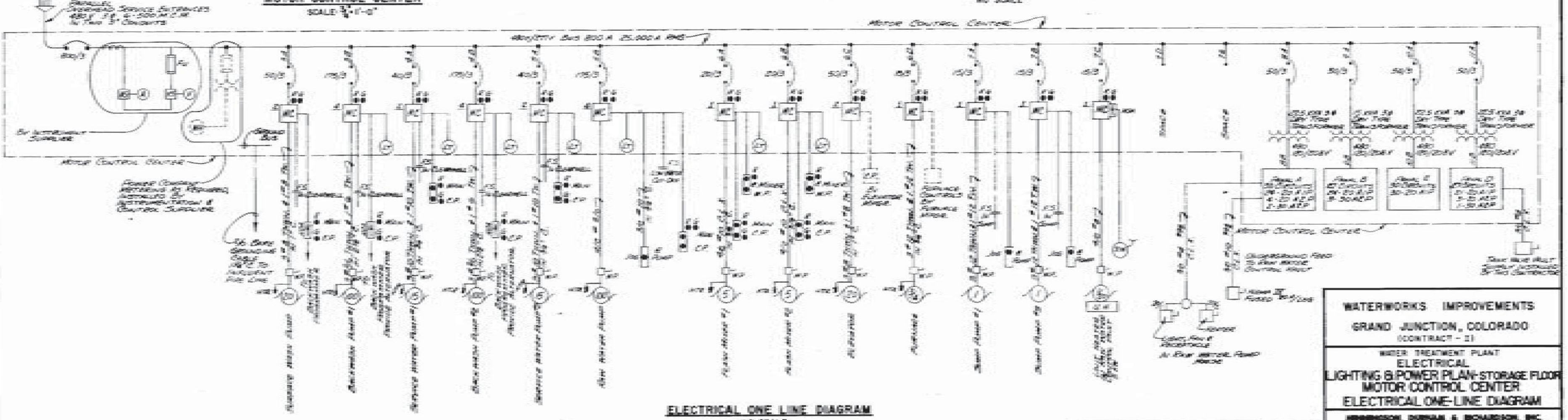
FINISHED WATER SAMPLING & METERING SCHEMATIC

NO SCALE

ELECTRICAL LEGEND

Electrical Legend	
Symbol	Description
○	Ceiling Outlet - Numeral Indicates Fixture Manufacturer & Cat. No.
○	Bracket Outlet - Ditto for Numerals
○	15A, 125V, 1 Circuit; 15A 250V, 1 Circuit General Electric Cat. No. 4956-1
○	Duplex Convenience Outlet
○ WP	Weather-Proof Outlet
S	Single Pole Switch
S_2	Switch - Numeral Indicates No. of Poles
○	Motor - Numeral Indicates H.P. Size w/Heater Where Shown
▣	Motor Controller - Numeral Indicates Size
S^{TE}	Fractional H.P. Motor Thermal Element
□	Non-Fusible Disconnect Switch - Size Indicated
▣	Start - Stop Pushbutton Station
Ⓣ	Thermostat
◀	Telephone Outlet
—	Conduit - Cross-Lines Indicate No. of Conductors if Greater Than 2
WP	Indicates Weather-Proof Means & Encl.
EX	Indicates Explosion-Proof Means & Encl.
▣ PB	Momentary Contact P.B. Station
▣	Time Delay Relay
▣	Hand-Off Automatic Selector Switch
PS	Pressure Switch
┼	Limit Switch
●	Thermostat w/Summer-Off-Winter Switch
○	Elapsed Time Meter
FS	Float Operated Switch
⊠	Emergency Light Unit - Lumitron Aux 1-4-2 (2 Lamps) w/Wall Bracket
▣	Indicates Conduit Size
VP	Indicates Vapor-Proof
■	Telephone Buzzer

Note:
1) For Electrical Unit Heater Schedule See Sheet 31.
2) Receptacles On Storage Floor To Be Surface Mounted.


Parallel Overhead Service Entrances 480V 3Ø 4-500 MCM in Two 3" Conduits
Motor Control Center
480V 3Ø 3W Bus 800A 25,000A RMS
By Instrument Supplier
Ground Bus
Power Company Metering As Required Installed By Instrumentation & Control Supplier
Space
Space
Panel A
Panel B
Panel C
Panel D
Motor Control Center
Underground Feed To Raw Water Control Vault
Light, Fan & Receptacle
Heater
At Raw Water Pump House
Tank Wave Built Supply Installed By This Contractor

ELECTRICAL ONE LINE DIAGRAM

NO SCALE

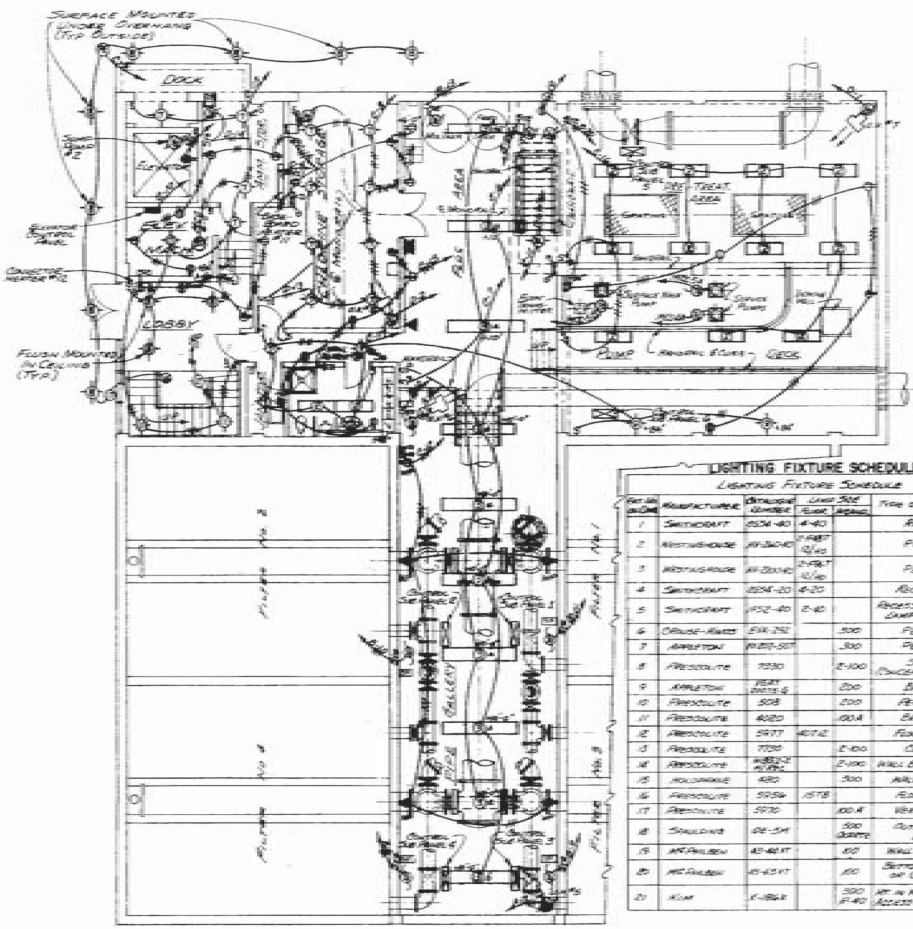
1	8-28-80	As Built	AT	KDH
NO.	DATE	DESCRIPTION REVISIONS	MADE	APPR'D

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ELECTRICAL
LIGHTING & POWER PLAN-STORAGE FLOOR
MOTOR CONTROL CENTER
ELECTRICAL ONE-LINE DIAGRAM

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS
DENVER, COLORADO

JOB 750810
SHEET 30 OF 39


SURFACE MOUNTED UNDER OVERHANG (TYP OUTSIDE)
DOCK
ELEVATOR
LOBBY
FLUSH MOUNTED IN CEILING (TYP)
PRE-TREAT AREA
PUMP
GALLERY
PIPE GALLERY
FILTER No. 1
FILTER No. 2
FILTER No. 3
FILTER No. 4

GROUND FLOOR PLAN

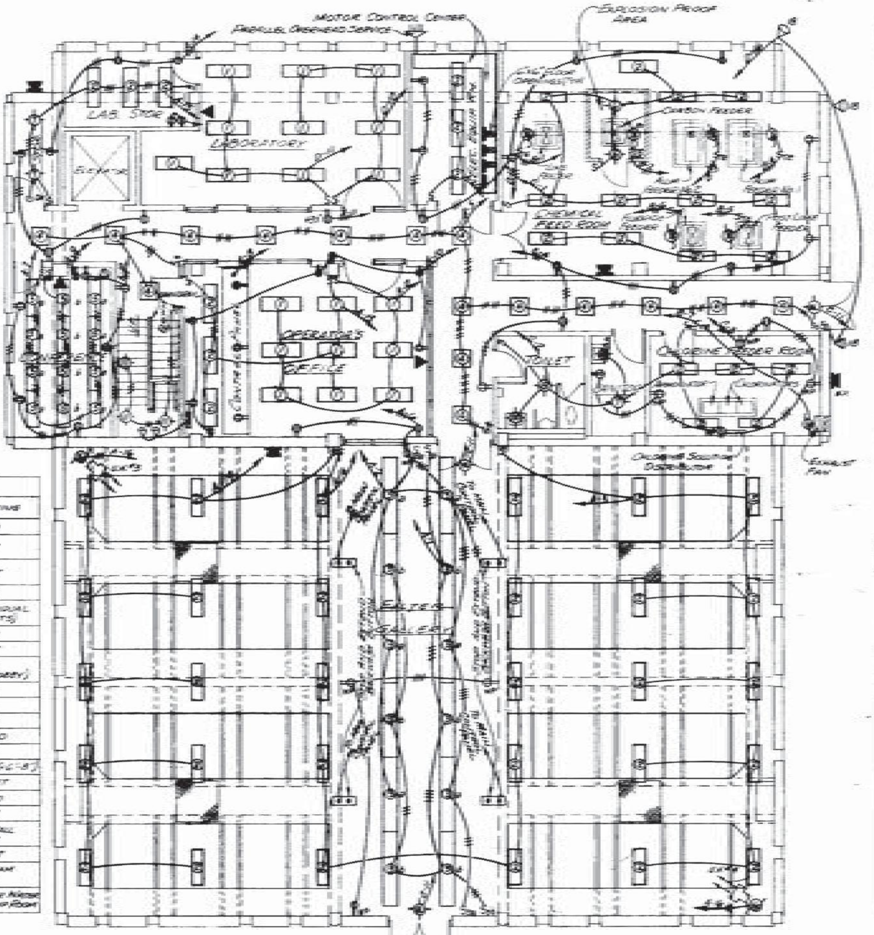
ELEV. 4814.00

SCALE 3/16" = 1'-0"

LIGHTING FIXTURE SCHEDULE

Lighting Fixture Schedule

Fix. No.	Manufacturer	Catalogue Number	Lamp Size Fluor.	Lamp Size Incand.	Type of Mounting
1	Smithcraft	8534-40	4-40		Recessed
2	Westinghouse	[illegible]	2-F48T 12/40		Pendant
3	Westinghouse	[illegible]	2-F96T 12/40		Pendant
4	Smithcraft	8534-20	4-20		Recessed
5	Smithcraft	1452-40	2-40		Recessed (Individual Lamp Ballasts)
6	Crouse-Hinds	EVA-252		300	Pendant
7	Appleton	[illegible]		300	Pendant
8	Prescolite	7030		2-100	Surface (Enclosed in Lobby)
9	Appleton	[illegible]		200	Bracket
10	Prescolite	508		200	Pendant
11	Prescolite	4020		100A	Bracket
12	Prescolite	5977	40T12		Floor Stand
13	Prescolite	7030		2-100	Ceiling
14	Prescolite	[illegible]		2-100	Wall Bracket (6'-8")
15	Holophane	480		300	Wall Bracket
16	Prescolite	5954	15T8		Floor Stand
17	Prescolite	5970		100A	Vertically
18	Spaulding	06-5M		500 Quartz	Outside Wall Bracket
19	McPhilben	42-46XT		100	Wall Bracket
20	McPhilben	45-65XT		100	Bottom of Beam or Ceiling
21	Kim	[illegible]		300 F-40	Mt. in Wall Under Window Access from Pump Room

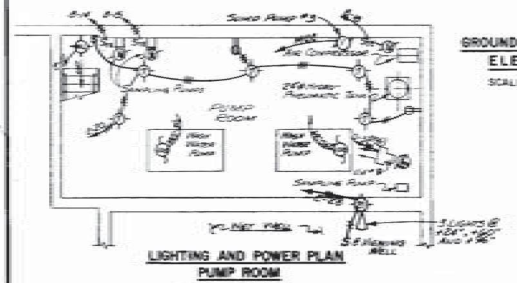

MOTOR CONTROL CENTER
PARALLEL OVERHEAD SERVICE
EXPLOSION PROOF AREA
LAB. STORE
LABORATORY
ELEVATOR
CARBON FEEDER
CHEMICAL FEED ROOM
OPERATOR'S OFFICE
TOILET
CHLORINE FEEDER ROOM
CHLORINE SOLUTION DISTRIBUTOR
EXHAUST FAN
GALLERY

OPERATING FLOOR PLAN

ELEV. 4828.25

SCALE 3/16" = 1'-0"

NOTE: ALL LIGHTING FIXTURES SHALL BE PLACED AT THE ELEVATION OF THE SUSPENDED CEILINGS WHERE APPLICABLE, OTHERWISE AT 10'0" ABOVE FLOOR ELEVATION UNLESS OTHERWISE NOTED.

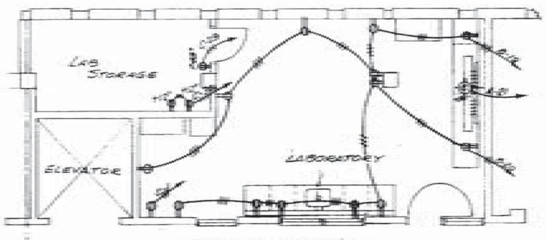

SUMP PUMP #3
AIR COMPRESSOR
SAMPLING PUMPS
PUMP ROOM
WASH WATER PUMP
SAMPLING PUMP
3 LIGHTS @ 4'-0" AUG. 6'-0"
S.E. METERING WELL

LIGHTING AND POWER PLAN

PUMP ROOM

ELEV. 4803.50

SCALE: 3/16" = 1'-0"


LAB STORAGE
ELEVATOR
LABORATORY

ELECTRICAL POWER PLAN

LABORATORY

ELEV. 4828.25

SCALE: 1/4" = 1'-0"

12-29-10	As Built	A.T.	KDM
DATE	DESCRIPTION REVISIONS	MADE	APPR.

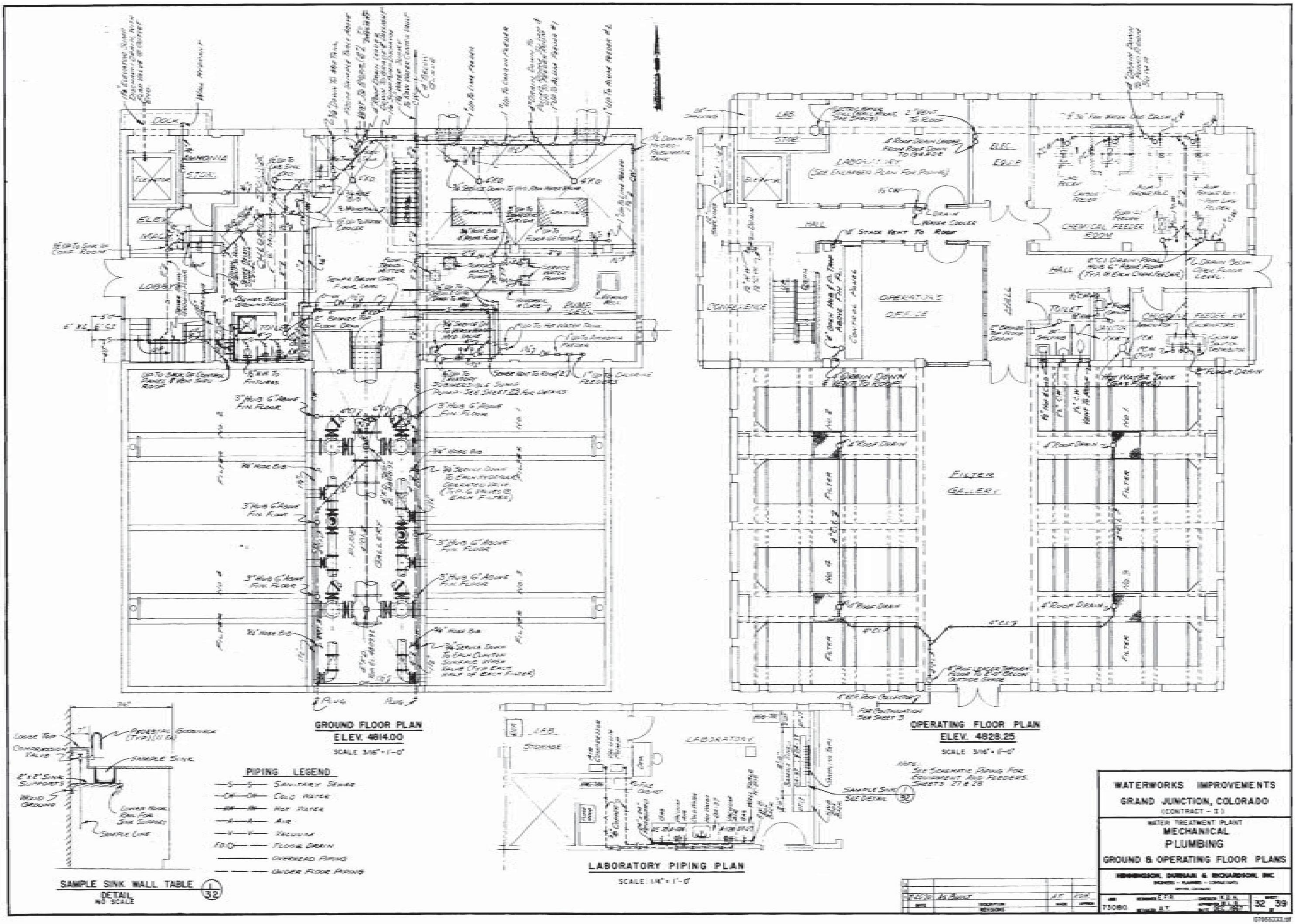
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
ELECTRICAL
LIGHTING & POWER
GROUND & OPERATING
FLOOR PLANS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS · PLANNERS · CONSULTANTS

T30810

SHEET 31 OF 39


GROUND FLOOR PLAN
ELEV. 4814.00
SCALE 3/16" = 1'-0"
OPERATING FLOOR PLAN
ELEV. 4828.25
SCALE 3/16" = 1'-0"
Note:
See Schematic Piping For Equipment And Feeders. Sheets 27 & 28
LABORATORY PIPING PLAN
SCALE: 1/4" = 1'-0"
SAMPLE SINK WALL TABLE
DETAIL
NO SCALE
1
32
PIPING LEGEND
—S—S— Sanitary Sewer
—CW—CW— Cold Water
—HW—HW— Hot Water
—A—A— Air
—V—V— Vacuum
F.D.○— Floor Drain
—— Overhead Piping
— — Under Floor Piping
Loose Top
Compression Valve
2" x 2" Sink Supports
Wood Ground
Pedestal Gooseneck (Typ.)
Sample Sink
Lower Hook Rail For Sink Support
Sample Line
36"
Dock
Elevator
Ammonia
Stor.
Elev.
Mach.
Lobby
Chlorine
Toilet
Gallery
Pipe
Pump Sec.
Filter No. 1
Filter No. 2
Filter No. 3
Filter No. 4
3" Hub 6" Above Fin. Floor
3/4" Hose Bib
3/4" Service Down To Each Hydraulic Operated Valve (Typ. 6 Valves @ Each Filter)
3/4" Service Down To Each Clarifier Surface Wash Valve (Typ. Each Half of Each Filter)
Plug
Up To Back Of Control Panel & Vent Thru Roof
Sewer Vent To Roof (2)
1" Up To Chlorine Feeders
1" Up To Ammonia Feeder
Up To Hot Water Tank
Service Water Pumps
Sump Below Core Floor Level
2" Bronze Top Floor Drain
4 F.D.
3/4" Service Down To Hyd. Raw Water Valve
1/2" Down To Hydro-Pneumatic Tank
1" Up To Lime Feeder
1" Up To Chlorine Feeder
1" Up To Alum Feeder #1
1" Up To Alum Feeder #2
Wall Hydrant
1/2" Up To Sink In Conf. Room
Lab
Stor.
Elevator
Laboratory
(See Enlarged Plan For Piping)
4" Roof Drain Leader From Roof Down To Grade
2" Vent To Roof
Elec. Equip.
Hall
Drain
Water Cooler
4" Stack Vent To Roof
Conference
Operations Office
Control Panel
4" Drain Hub & FD Trap Above Fin. Fl.
Chemical Feeder Room
2" C.I. Drain From Hub 6" Above Floor (Typ. @ Each Chem. Feeder)
2" Drain Below Oper. Floor Level
Toilet
Janitor
Chlorine Feeder Rm
Chlorinators
Floor Drain
Hot Water Tank (Gas Fired)
4" Drain Down & Vent To Roof
Filter Gallery
Filter
No. 1
No. 2
No. 3
No. 4
4" Roof Drain
4" C.I.P.
4" Roof Leader Through Floor To 5'-0" Below Outside Grade
For Continuation See Sheet 3
Sample Sink See Detail
Lab Storage
Air Compressor
Vacuum Pump
File Cabinet
Laboratory

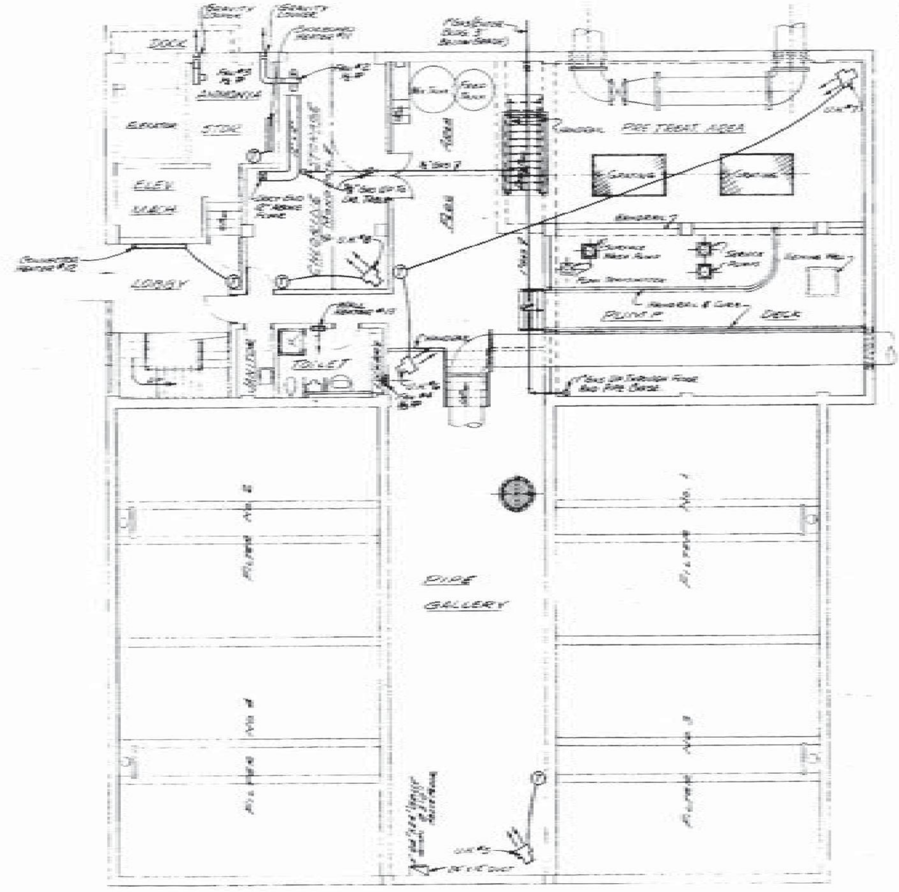
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
MECHANICAL
PLUMBING
GROUND & OPERATING FLOOR PLANS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

12-25-70	As Built	A.T.	[illegible]
DATE	DESCRIPTION REVISIONS	MADE	APPROV.

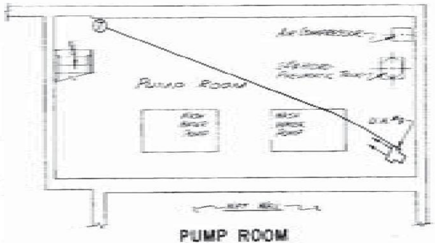
730810
E.F.R.
R.D.H.
A.T.
DEC. 1967
SHEET 32 OF 39


DOCK
GRAVITY DAMPER
GRAVITY LOUVER
AMMONIA
ELEVATOR
STOR
ELEV. MACH.
LOBBY
CHLORINE STORAGE
PRE TREAT AREA
PUMP
DECK
TOILET
JANITOR
FILTER No. 2
FILTER No. 1
FILTER No. 4
FILTER No. 3
PIPE GALLERY

GROUND FLOOR PLAN

EL. 4814.00

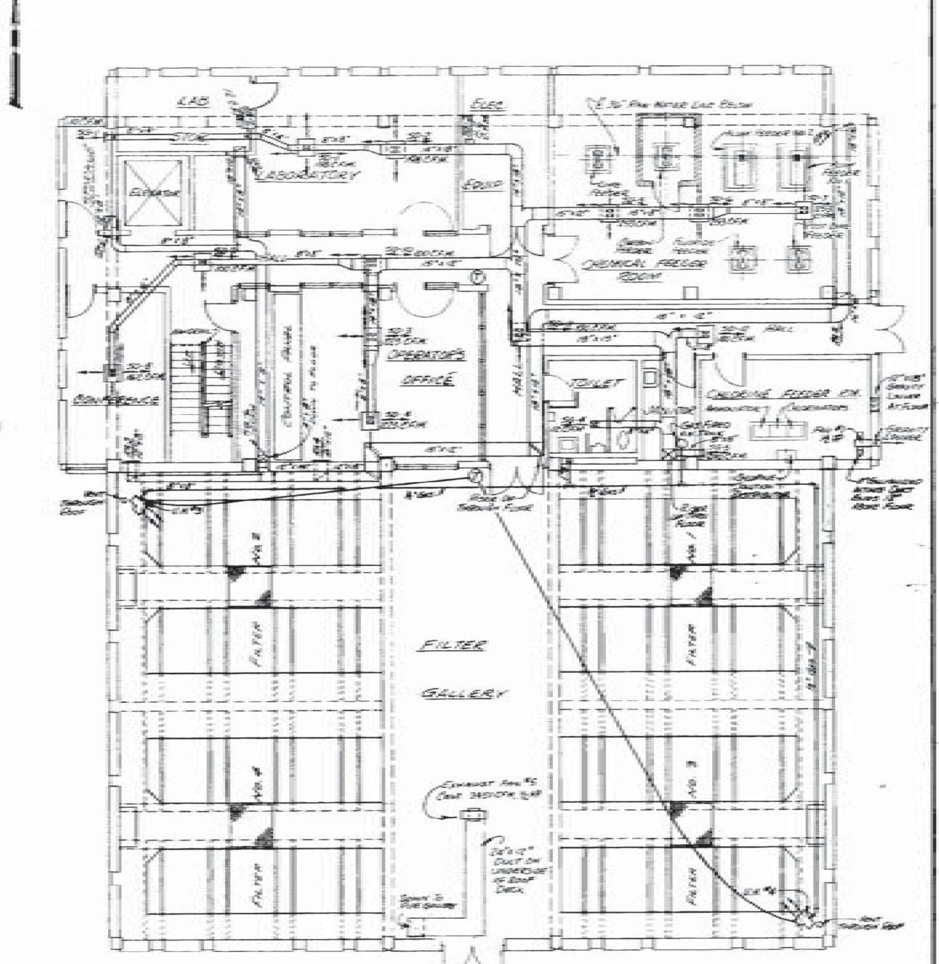
SCALE: 3/16" = 1'-0"


AIR COMPRESSOR
PUMP ROOM

PUMP ROOM

EL. 4803.50

SCALE: 3/16" = 1'-0"


LAB
ELEC.
STOR
LABORATORY
ELEVATOR
EQUIP
CHEMICAL FEEDER ROOM
HALL
CONFERENCE
CONTROL PANEL
OPERATOR'S OFFICE
TOILET
CHLORINE FEEDER RM.
FILTER No. 2
FILTER No. 1
FILTER No. 4
FILTER No. 3
FILTER GALLERY
EXHAUST FAN #5

OPERATING FLOOR PLAN

EL. 4828.00

SCALE: 3/16" = 1'-0"

WATERWORKS IMPROVEMENTS

GRAND JUNCTION, COLORADO

(CONTRACT - II)

WATER TREATMENT PLANT

MECHANICAL

HEATING AND VENTILATING

GROUND & OPERATING FLOOR PLANS

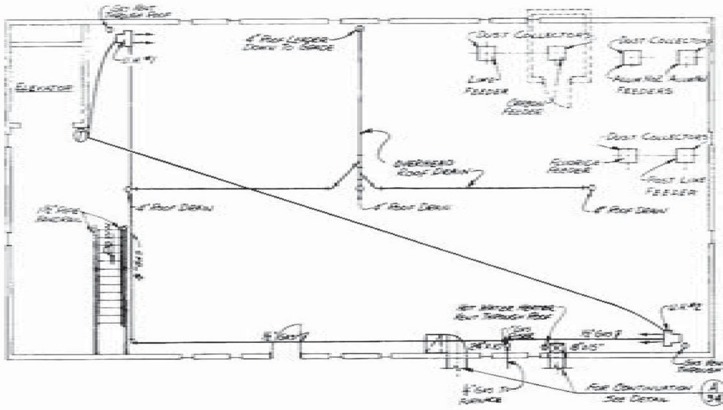
HENNINGSON, DURHAM & RICHARDSON, INC.

ENGINEERS - PLANNERS - CONSULTANTS

AS BUILT

73080

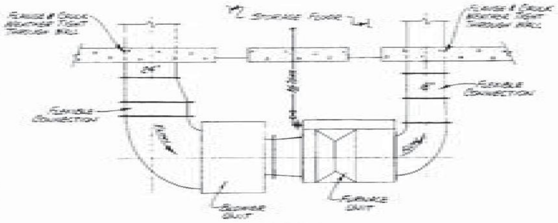
33 38



Gas vent through roof
Elevator
4" Roof leader down to grade
Dust collectors
Lime feeder
Carbon feeder
Dust collectors
Alum no. 2 feeders
Overhead roof drain
Dust collectors
Fluoride feeder
Post lime feeder
4" Roof drain
4" Roof drain
4" Roof drain
1½" Pipe handrail
Hot water heater vent through roof
Gas vent through roof
For continuation see detail
A
34

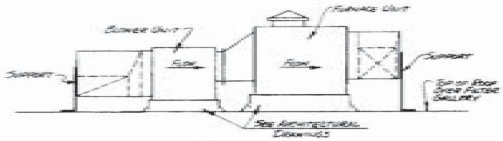
STORAGE FLOOR PLAN
PLUMBING & HEATING

(ELEV. 4843.42)
SCALE: 3/16" = 1'-0"



Flange & collar weather tight through wall
Storage floor
24"
Flexible connection
Flow
Blower unit
Furnace unit
18"
Flexible connection
Flange & collar weather tight through wall

PLAN



Blower unit
Furnace unit
Support
Flow
Flow
Support
Top of roof over filter gallery
See architectural drawings

ELEVATION

FURNACE DETAIL (A/34)

SCALE: 1/2" = 1'-0"

HEATER SCHEDULE

HEATER SCHEDULE					
NO.	LOCATION	TYPE	BTU OUTPUT	KW REQ.	SUPPLY
	UNIT HEATERS:				
1	CHEMICAL STORAGE ROOM	L.P.G.	50,000	———	120V, 1ø
2	CHEMICAL STORAGE ROOM	L.P.G.	50,000	———	120V, 1ø
3	FILTER GALLERY	L.P.G.	60,000	———	120V, 1ø
4	FILTER GALLERY	L.P.G.	60,000	———	120V, 1ø
5	PIPE GALLERY	ELECTRIC	6,000	2	208V, 1ø
6	PUMP AREA	ELECTRIC	6,000	2	208V, 1ø
7	PUMP AREA	ELECTRIC	6900	2	208V, 1ø
8	CHLORINE STORAGE ROOM	ELECTRIC	6000	2	208V, 1ø
9	PUMP PIT	ELECTRIC	5000	2	208V, 1ø
10	RAW WATER VAULT	ELECTRIC	10,000	5	480V, 1ø
	BASEBOARD HEATERS:				
11	AMMONIA STORAGE ROOM	ELECTRIC		0.80	208V, 1ø
12	LOBBY (CONVECTOR)	ELECTRIC		4.0	208V, 1ø
13	GROUND FLOOR TOILET	ELECTRIC		1.50	208V, 1ø

EXHAUST FAN SCHEDULE

EXHAUST FAN SCHEDULE				
NO.	LOCATION	TYPE	C.F.M.	HP
1	CHLORINE FEEDER ROOM	CENTRIFUGAL	1300	1/2
2	CHLORINE STORAGE ROOM	CENTRIFUGAL	1525	1/2
3	AMMONIA STORAGE ROOM	CENTRIFUGAL	1130	1/2
4	GROUND FLOOR TOILET	PROPELLER	575	1/8
5	FILTER GALLERY ROOF	CENTRIFUGAL	3450	1/4

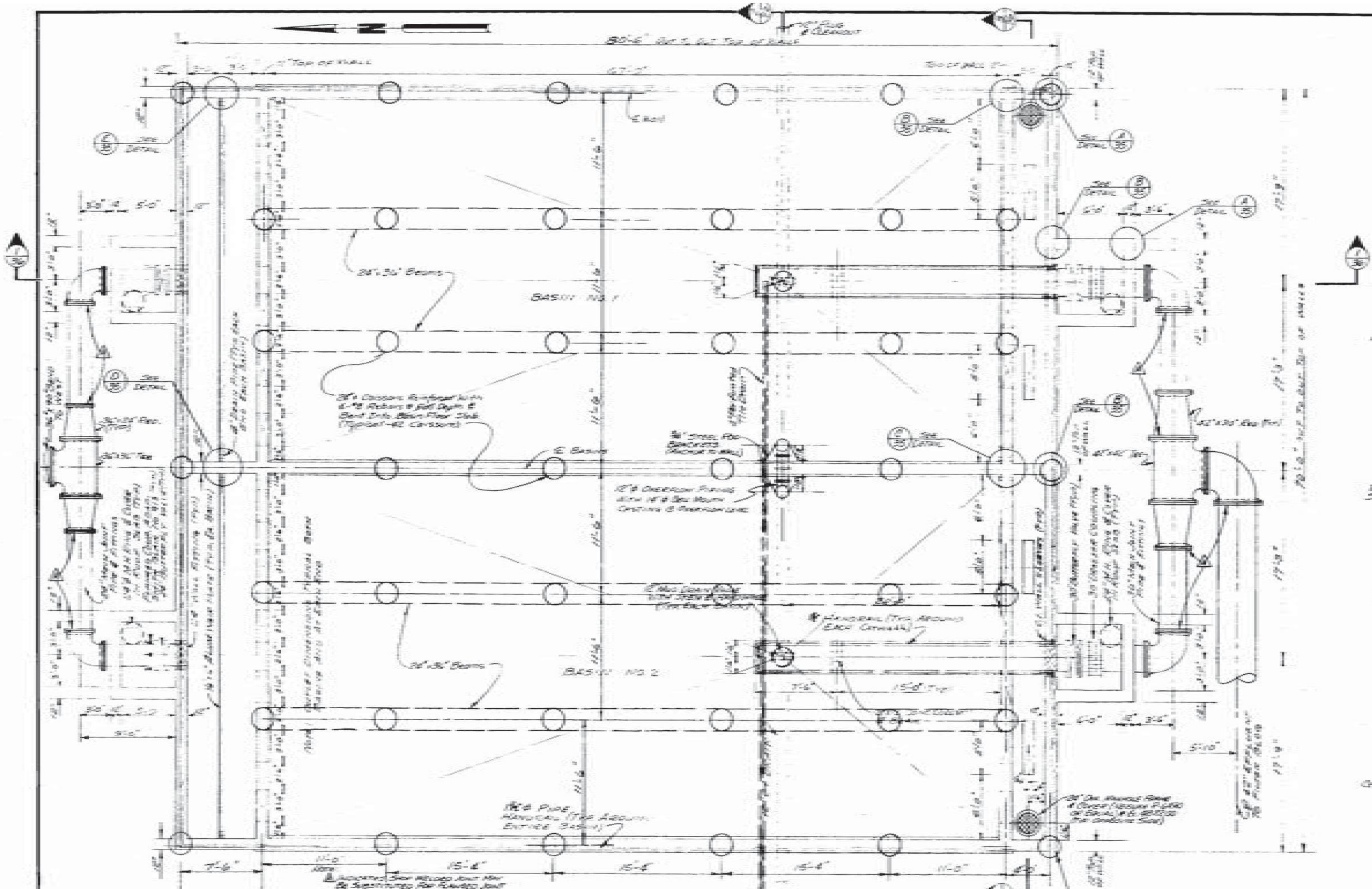
12-29-70	AS BUILT	A.T.	KDH
DATE	DESCRIPTION REVISIONS	MADE	APPROVED

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
MECHANICAL
PLUMBING-HEATING-VENTILATING
STORAGE FLOOR PLAN

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS
DENVER, COLORADO

JOB 730810
DESIGNED E.F.R.
CHECKED K.D.H.
TRACED D.A.S.
APPROVED W.L.B.
DATE DEC. 1967
SHEET 34 OF 39

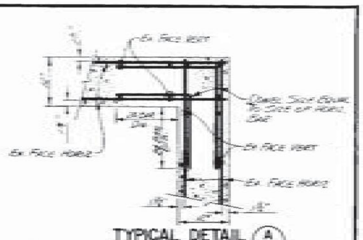

N
80'-6" Out To Out Top of Wall
67'-0"
Top of Wall
See Detail
24"x30" Beams
Basin No. 1
Basin No. 2
28"ø Caissons Reinforced With 6-#8 Rebars Full Depth & Bent Into Basin Floor Slab (Typical-42 Caissons)
℄ Basins
℄ Rail
8" Basin Ring (Typ. Each End Each Basin)
36"x36" Tee
36"x24" Red. (Typ.)
10" Plug & Cleanout
12"ø Overflow Piping With 14"ø Bell Mouth Casting @ Overflow Level
3/4" Steel Pipe Brackets (Anchor to Wall)
4" Perforated Tile Drain
Handrail (Typ. Around Each Catwalk)
1 1/2"ø Pipe Handrail (Typ. Around Entire Basin)
11'-0"
15'-4"
15'-4"
15'-4"
11'-0"
7'-6"
11'-6"
5'-0"
6'-0"
3'-6"
5'-10"
42"x30" Red. (Typ.)
40"x40" Tee
30" Butterfly Valve (Typ.)
30" Dresser Couplings
24" M.H. Ring & Cover In Roof Slab (Typ.)
30" Mech. Joint Ring & Fittings
79'-0" Out To Out Top of Walls
24" Dia. Manhole Frame & Cover
N 1400.50
E 0440.00
Outside Corner Top of Wall
Note: △ Indicates Shop Welded Joint May Be Substituted For Flanged Joint Or Bell Joint Where Steel Pipe Is Used
Note: Overall Dimensions Refer to Outside Faces of Walls

PLAN - CONTACT BASINS

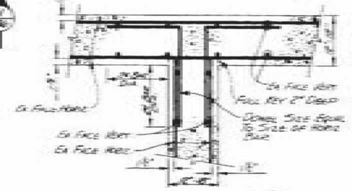
SCALE: 1/8" = 1'-0"

4" Perforated Tile Drain For Continuation See Grading Plan

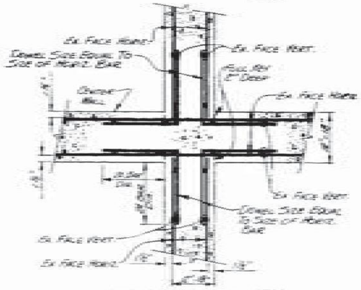
Note: Set All Caissons At Intersection of Wall & Beam Centerlines. All Caissons To Be Drilled 2'0" Into Hard Sandstone. Depth varies 26' & 30' (Approx.)


Ex. Face Vert.
Dowel Size Equal To Size of Horiz. Bar
Ex. Face Vert.
Ex. Face Horiz.
Ex. Face Horiz.

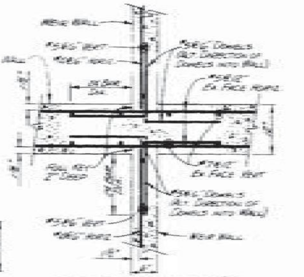
TYPICAL DETAIL A/35
SCALE: 1" = 1'-0"


Ex. Face Vert.
Full Key 2" Deep
Dowel Size Equal To Size of Horiz. Bar
Ex. Face Horiz.
Ex. Face Vert.
Ex. Face Horiz.

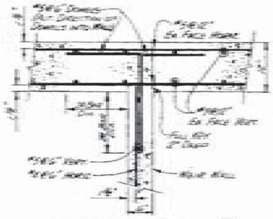
TYPICAL DETAIL B/35
SCALE: 1" = 1'-0"


Ex. Face Horiz.
Ex. Face Vert.
Dowel Size Equal To Size of Horiz. Bar
Full Key 2" Deep
Center Wall
Ex. Face Horiz.
Ex. Face Vert.
Dowel Size Equal To Size of Horiz. Bar
Ex. Face Vert.
Ex. Face Horiz.

TYPICAL DETAIL C/35
SCALE: 1" = 1'-0"


Weir Wall
#5@6" Vert.
#5@6" Horiz.
Center Wall
#5@6" Dowels (Alt. Direction of Dowels Into Wall)
#5@12" Ex. Face Horiz.
Full Key 2" Deep
Ex. Face Vert.
#5@6" Dowels (Alt. Direction of Dowels Into Wall)
#5@6" Vert.
#5@6" Horiz.
Weir Wall

TYPICAL DETAIL D/35
SCALE: 1" = 1'-0"


#5@6" Dowels (Alt. Direction of Dowels Into Wall)
#5@12" Ex. Face Horiz.
#5@12" Ex. Face Vert.
Full Key 2" Deep
#5@6" Vert.
#5@6" Horiz.
Weir Wall

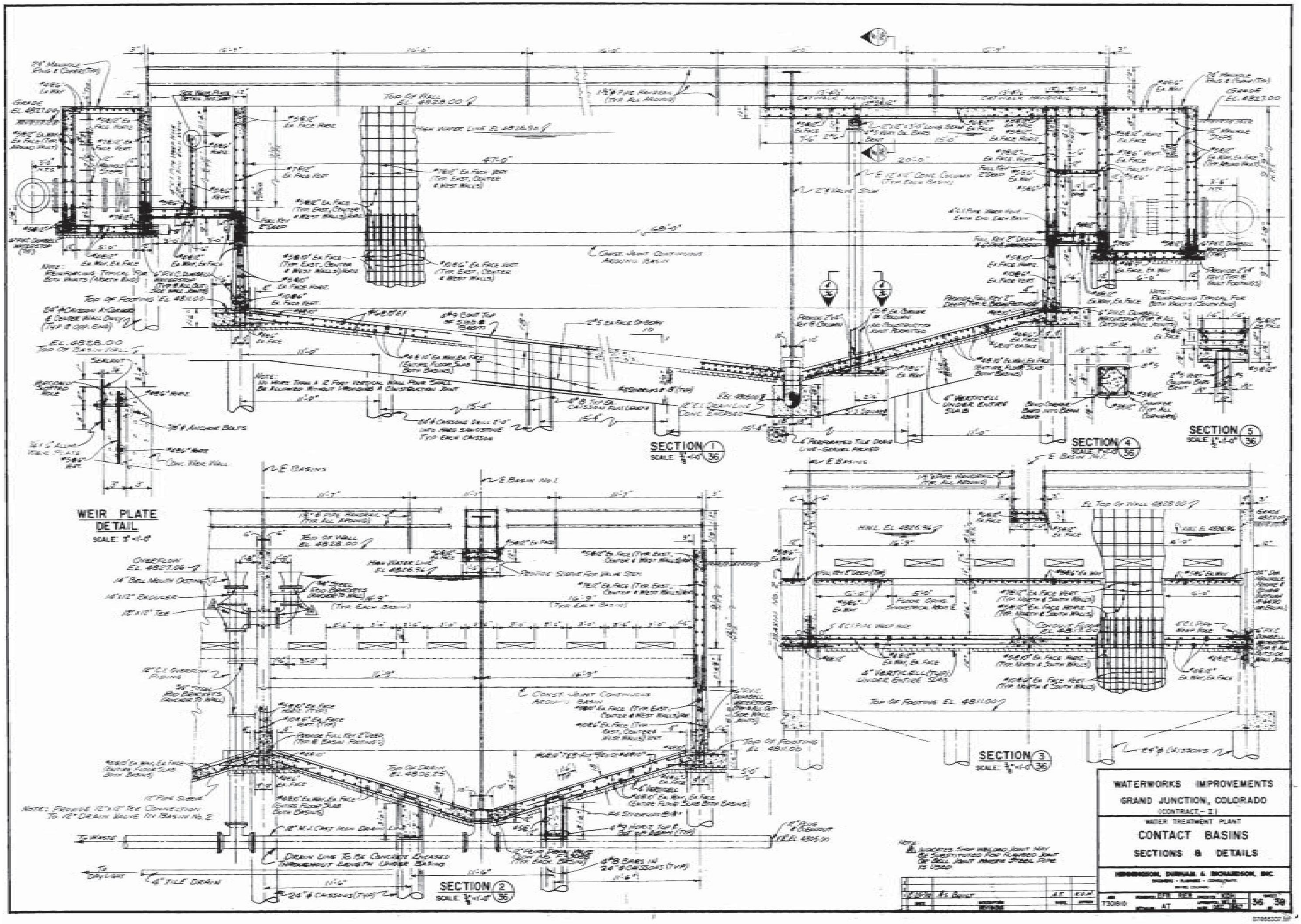
TYPICAL DETAIL E/35
SCALE: 1" = 1'-0"

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
CONTACT BASINS
PLAN & DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

730810
35 39


SECTION 1
SCALE: 3/8"=1'-0" 36
SECTION 2
SCALE: 3/8"=1'-0" 36
SECTION 3
SCALE: 3/8"=1'-0" 36
SECTION 4
SCALE: 3/4"=1'-0" 36
SECTION 5
SCALE: 1/2"=1'-0" 36
WEIR PLATE DETAIL
SCALE: 3"=1'-0"
Top Of Wall EL 4828.00
High Water Line EL 4826.96
Top Of Footing EL 4811.00
Grade EL 4827.00
24" Manhole Ring & Cover (Typ)
Const Joint Continuous Around Basin
4" Perforated Tile Drain
4" Tile Drain
To Waste
To Daylight
Overflow EL 4827.96
14" Bell Mouth Overflow
14"x12" Reducer
12"x12" Tee
Drain Line To Be Concrete Encased Throughout Length Under Basins
Note: Provide 12"x12" Tee Connection To 12" Drain Valve In Basin No. 2
24" ∅ Caissons (Typ)
Top Of Drain EL 4806.25
E Basins
E Basin No. 1

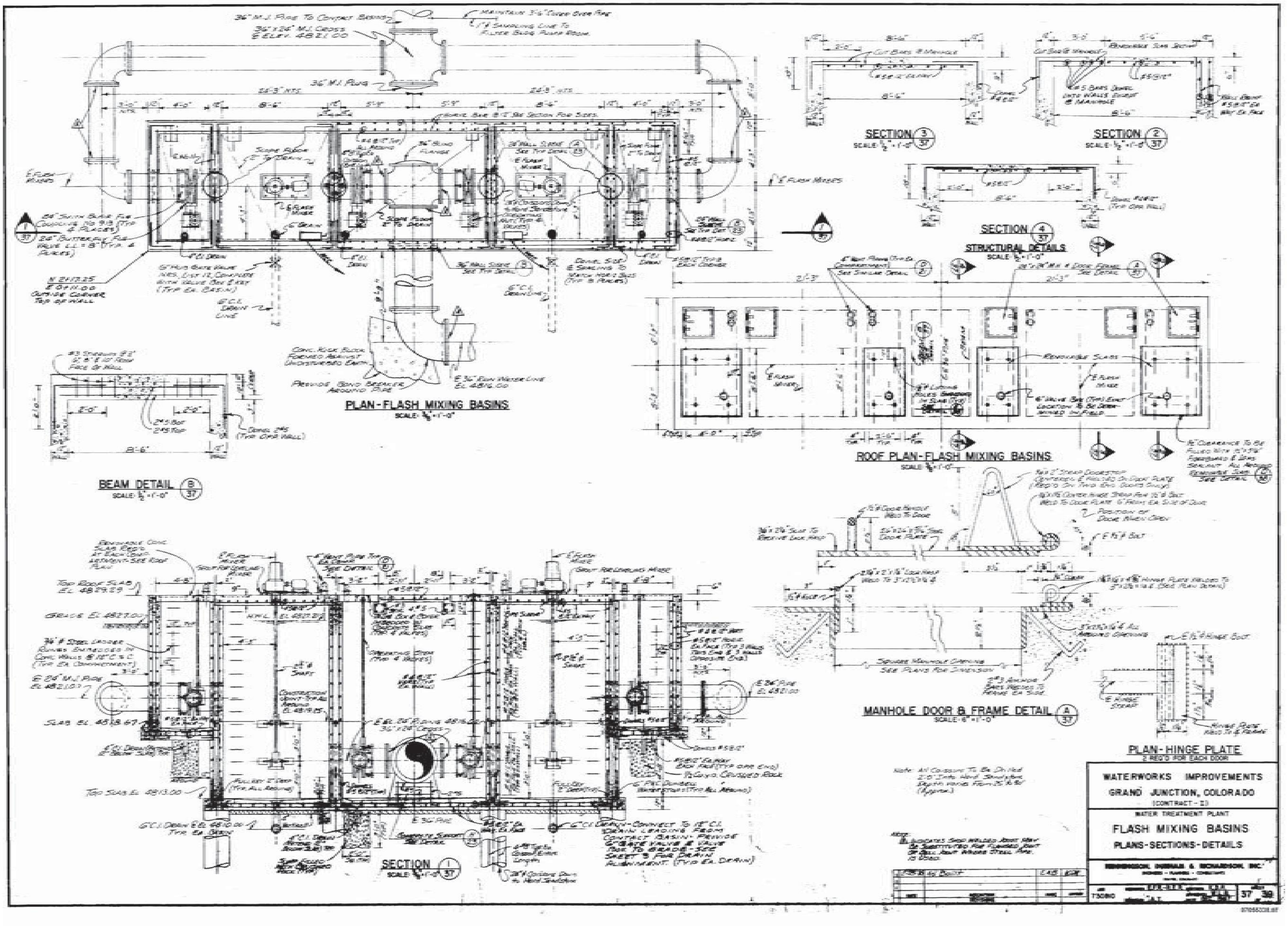
Note:
Indicates Shop Welded Joint May Be Substituted For Flanged Joint Or Bell Joint Where Steel Pipe Is Used.

As Built

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)
WATER TREATMENT PLANT
CONTACT BASINS
SECTIONS & DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.

T30610
AT
36 39

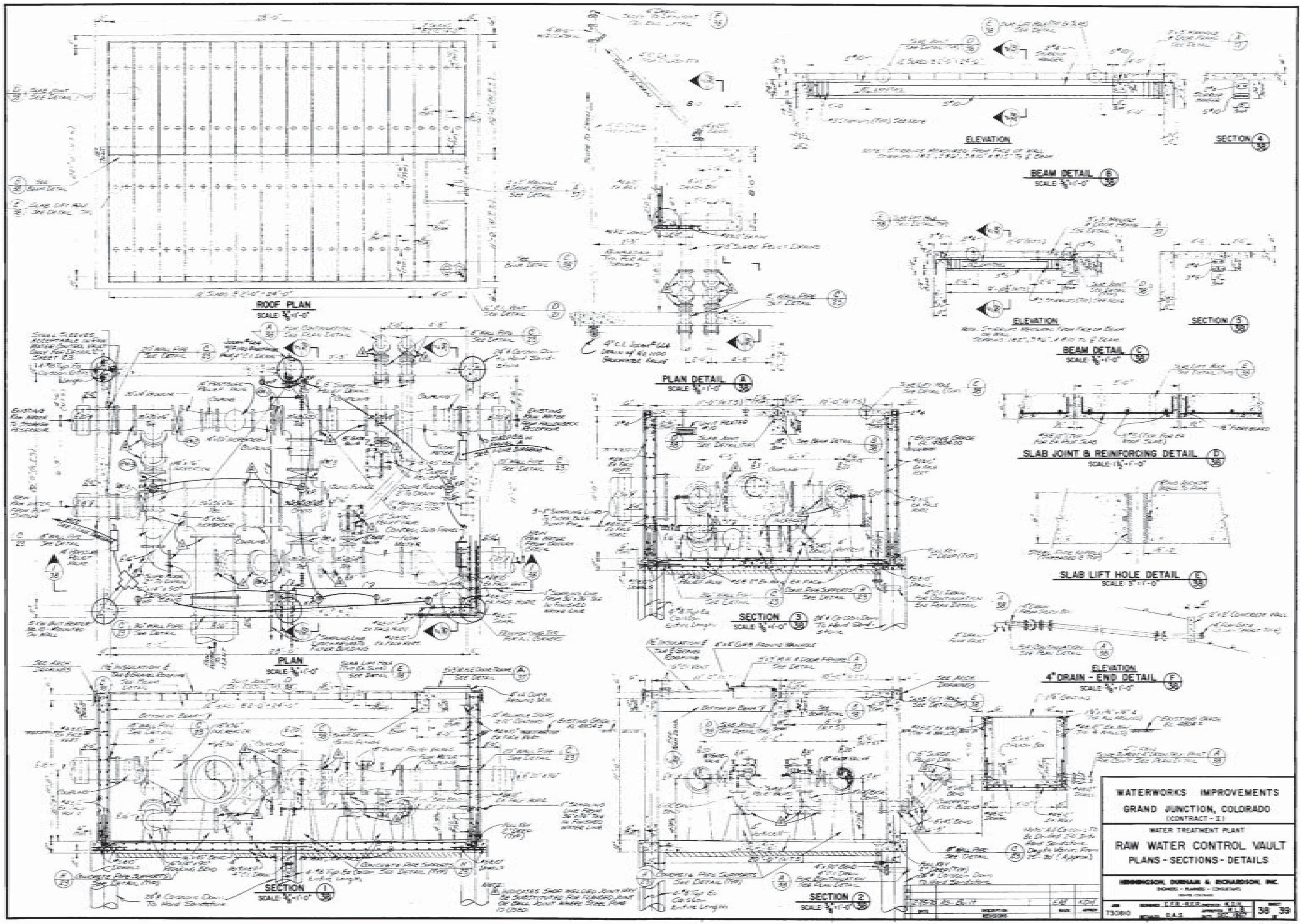

PLAN-FLASH MIXING BASINS
SCALE: 3/8" = 1'-0"
BEAM DETAIL
SCALE: 1/2" = 1'-0"
SECTION 3/37
SCALE: 1/2" = 1'-0"
SECTION 2/37
SCALE: 1/2" = 1'-0"
SECTION 4/37
STRUCTURAL DETAILS
SCALE: 1/2" = 1'-0"
ROOF PLAN-FLASH MIXING BASINS
SCALE: 3/8" = 1'-0"
SECTION 1/37
SCALE: 3/8" = 1'-0"
MANHOLE DOOR & FRAME DETAIL A/37
SCALE: 6" = 1'-0"
PLAN-HINGE PLATE
2 REQ'D FOR EACH DOOR
36" M.J. Pipe To Contact Basins
36" x 24" M.J. Cross
E Elev. 4821.00
36" M.J. Plug
Maintain 3'-6" Cover Over Pipe
1" Ø Sampling Line To Filter Bldg Pump Room
Removable Slabs
Square Manhole Opening
See Plans For Dimension

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
FLASH MIXING BASINS
PLANS-SECTIONS-DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

T3080
37 39

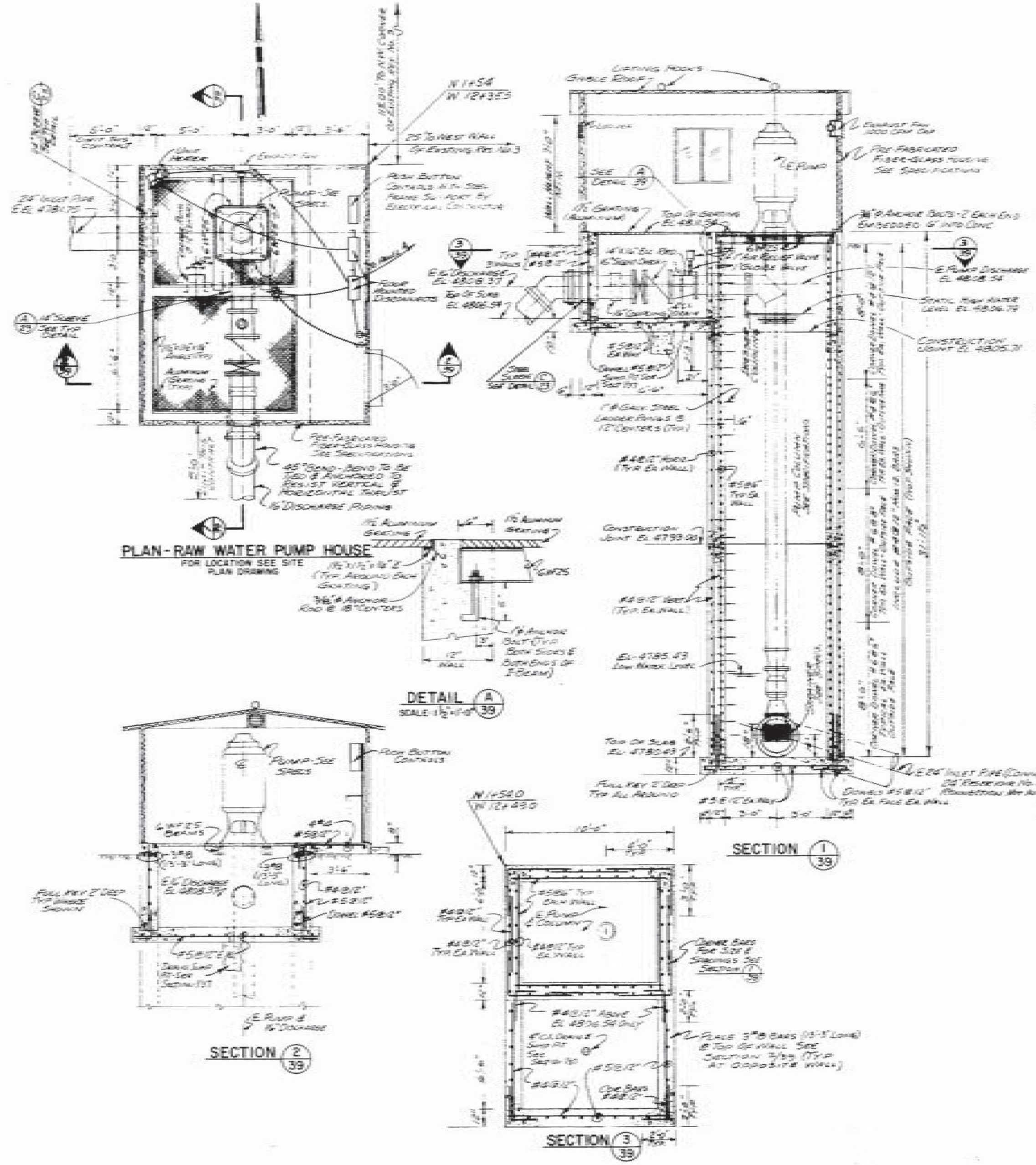

ROOF PLAN
SCALE: 3/8"=1'-0"
PLAN
SCALE: 3/8"=1'-0"
SECTION ①
SCALE: 3/8"=1'-0"
SECTION ②
SCALE: 3/8"=1'-0"
SECTION ③
SCALE: 3/8"=1'-0"
PLAN DETAIL Ⓐ
SCALE: 3/8"=1'-0"
ELEVATION
BEAM DETAIL Ⓑ
SCALE: 3/8"=1'-0"
SECTION ④
ELEVATION
BEAM DETAIL Ⓒ
SCALE: 3/8"=1'-0"
SECTION ⑤
SLAB JOINT & REINFORCING DETAIL Ⓓ
SCALE: 1 1/2"=1'-0"
SLAB LIFT HOLE DETAIL Ⓔ
SCALE: 3"=1'-0"
ELEVATION
4" DRAIN - END DETAIL Ⓕ
SCALE: 3/8"=1'-0"
2-25-83 AS BUILT
DATE
DESCRIPTION
REVISIONS

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - II)

WATER TREATMENT PLANT
RAW WATER CONTROL VAULT
PLANS - SECTIONS - DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS

T30810
E.F.R.-R.F.R.
K.D.H.
D.A.S.
DEC. 1980
SHEET 38 OF 39


N 1+54
W 12+353
25' To West Wall Of Existing Res. No. 3
118.00' To N.W. Corner Of Existing Res. No. 3
5'-0"
5'-0"
3'-0"
3'-6"
Unit Heater
Exhaust Fan
Pump-See Specs.
24" Inlet Pipe E.EL. 4781.75
Push Button Controls with Steel Frame Support By Electrical Contractor
Floor Mounted Disconnects
A 16" Sleeve See Typ Detail 23
Pre-Fabricated Fiber-Glass Housing See Specifications
45° Bend - Bend To Be Tied & Anchored To Resist Vertical & Horizontal Thrust
16" Discharge Piping
1½" Aluminum Grating
6"
1½" Aluminum Grating
GW25
3/8" x 1½" x 1/4" Z (Typ. Around Each Grating)
3/4" Ø Anchor Rod @ 18" Centers
1" Ø Anchor Bolt (Typ Both Sides & Both Ends of I-Beam)
3"
12" Wall
Lifting Hooks
Gable Roof
Exhaust Fan 1000 CFM Cap
Pre-Fabricated Fiber-Glass Housing See Specifications
℄ Pump
See Detail A 39
1½" Grating (Aluminum)
Top Of Grating EL 4812.54
3/4" Ø Anchor Bolts - 2 Each End Embedded 6" Into Conc
Typ 3 Walls
16" Discharge EL 4806.37
Top Of Slab EL 4806.54
16" x 16" Ecc. Red.
16" Swing Check
Air Relief Valve
Globe Valve
16" Coupling
℄ Pump Discharge EL 4808.54
Static High Water Level EL 4806.79
Construction Joint EL 4805.31
Steel Sleeve C See Detail 23
1" Ø Galv. Steel Ladder Rungs @ 12" Centers (Typ)
#4 @ 12" Horiz. (Typ Ea. Wall)
#5 @ 6" Typ Ea. Wall
Pump Column See Specifications
Construction Joint EL 4793.98
#4 @ 12" Vert. (Typ. Ea. Wall)
EL 4785.43 Low Water Level
Top Of Slab EL 4780.43
Full Key 2" Deep Typ All Around
#5 @ 12" Ea. Way
Dowels #5 @ 12" Typ. Ea. Face Ea. Wall
℄ 26" Inlet Pipe (Connect To Existing 26" Reservoir No. 3 Effluent Connection Made In This Contract)
3'-0"
3'-0"
31'-1½"
N 1+52.0
W 12+49.0
12'-0"
4'-0"
#5 @ 6" Typ Each Wall
℄ Pump & Column
#4 @ 12" Typ Ea. Wall
Corner Bars For Size & Spacings See Section 1/39
#4 @ 12" Above EL 4806.54 Only
4" C.I. Drain Sump Pit See Section 1/39
Place 3-#8 Bars (13'-3" Long) @ Top Of Wall See Section 2/39 (Typ At Opposite Wall)
#5 @ 12"
Cor Bars #4 @ 12"
Pump-See Specs.
Push Button Controls
6 WF 25 Beams
16" Discharge EL 4806.37
Full Key 2" Deep Typ Where Shown
℄ Pump & 16" Discharge
Dowel #5 @ 12"

PLAN - RAW WATER PUMP HOUSE

FOR LOCATION SEE SITE PLAN DRAWING

DETAIL (A/39)

SCALE: 1½" = 1'-0"

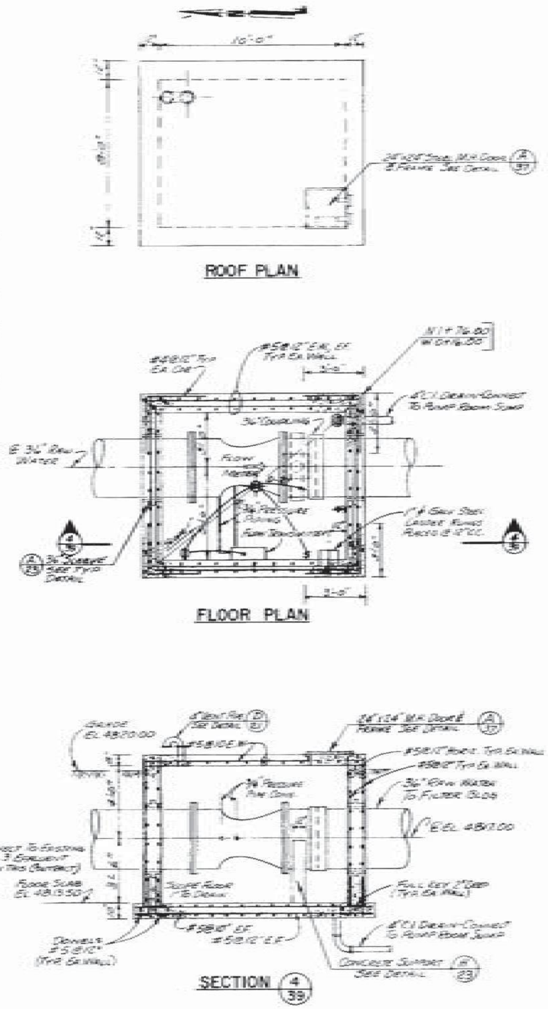
SECTION (1/39)

SECTION (2/39)

SECTION (3/39)

RAW WATER PUMP HOUSE DETAILS

SCALE: 3/16" = 1'-0"


10'-0"
24" x 24" Steel M.H. Cover & Frame See Detail A 37
#4 @ 12" Typ Ea. Cor.
#5 @ 12" E.W., E.F. Typ Ea. Wall
N 1+76.80
W 0+16.80
3'-0"
4" C.I. Drain-Connect To Pump Room Sump
℄ 36" Raw Water
36" Coupling
Flow Meter
3/4" Pressure Piping
Flow Transmitter
A 36" Sleeve See Typ Detail 23
1" Ø Galv. Steel Ladder Rungs Placed @ 12" C.C.
2'-0"
Grade EL 4820.00
4" Vent Pipe D See Detail 21
#5 @ 10" E.W.
24" x 24" M.H. Door & Frame See Detail A 37
#5 @ 12" Horiz. Typ. Ea. Wall
#5 @ 12" Typ Ea. Wall
3/4" Pressure Pipe Conn.
36" Raw Water To Filter Bldg.
℄ EL 4817.00
Floor Slab EL 4813.50
Slope Floor To Drain
Full Key 2" Deep (Typ Ea. Wall)
Dowels #5 @ 10" (Typ Ea. Wall)
#5 @ 10" E.F.
#5 @ 12" E.F.
4" C.I. Drain-Connect To Pump Room Sump
Concrete Support See Detail H 23

ROOF PLAN

FLOOR PLAN

SECTION (4/39)

RAW WATER FLOW METER VAULT DETAILS

SCALE: 3/8" = 1'-0"

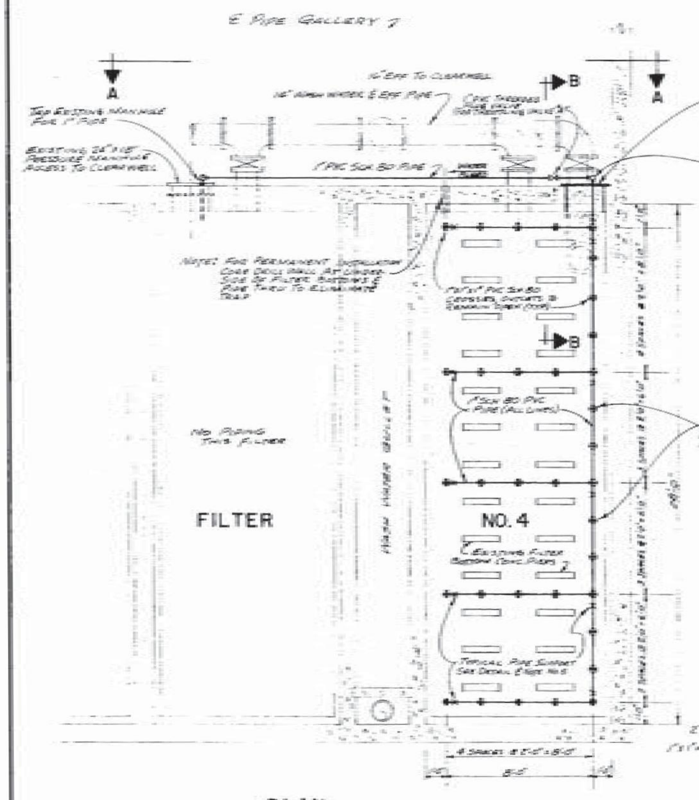
WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO
(CONTRACT - I)

WATER TREATMENT PLANT
RAW WATER PUMPING STATION
RAW WATER FLOW METER VAULT
PLANS - SECTIONS - DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC.
ENGINEERS - PLANNERS - CONSULTANTS
DENVER, COLORADO

DATE	DESCRIPTION REVISIONS	MADE	APPROVED

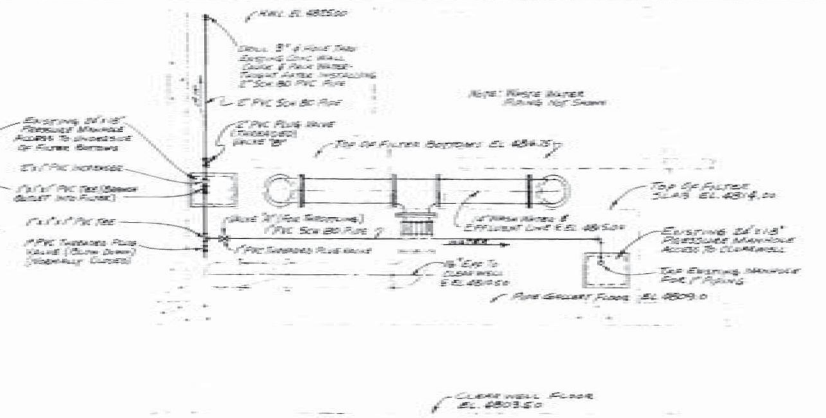
JOB 730810
DESIGNED E.F.R.-R.E.B. CHECKED K.S.H.
DRAWN A.T. APPROVED W.L.B.
DATE DEC. 1967
SHEET 39 OF 39


℄ Pipe Gallery
A
A
B
B
16" Eff To Clearwell
16" Wash Water & Eff Pipe
1" PVC Threaded Plug Valve (For Throttling) Valve "A"
Tap Existing Manhole For 1" Pipe
Existing 24"x18" Pressure Manhole Access To Clearwell
1" PVC Sch 80 Pipe
Water
Existing 24"x18" Pressure Manhole Access To Underside Of Filter Bottoms
Note: For Permanent Installation Core Drill Wall At Underside Of Filter Bottoms & Pipe Thru To Eliminate Trap
1"x1"x1" PVC Sch 80 Crosses, Outlets To Remain Open (Typ)
1" Sch 80 PVC Pipe (All Lines)
Intermediate Connections For Additional Laterals If Required (Typ)
No Piping This Filter
FILTER
Wash Water Gullet
NO. 4
Existing Filter Bottom Conc Pipes
Typical Pipe Support See Detail & Note No 5
4 Spaces @ 2'-0" = 8'-0"
8'-5"
28'-0"

PLAN

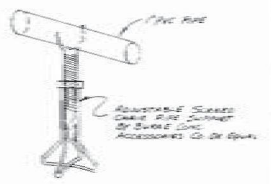
FILTER UNDERDRAIN AIR RELEASE PIPING

SCALE: 3/8"=1'-0"


HWL EL 4825.00
Drill 3" ∅ Hole Thru Existing Conc Wall Caulk & Pack Water-Tight After Installing 2" Sch 80 PVC Pipe
2" PVC Sch 80 Pipe
Note: Waste Water Piping Not Shown
2" PVC Plug Valve (Threaded) Valve "B"
Top Of Filter Bottoms EL 4816.75
2"x1" PVC Increaser
1"x1"x1" PVC Tee (Branch Outlet Into Filter)
1"x1"x1" PVC Tee
1" PVC Threaded Plug Valve (Blow Down) (Normally Closed)
Valve "A" (For Throttling)
1" PVC Sch 80 Pipe
1" PVC Threaded Plug Valve
16" Wash Water & Effluent Line ℄ EL 4815.00
Top Of Filter Slab EL 4814.00
Water
Existing 24"x18" Pressure Manhole Access To Clearwell
Tap Existing Manhole For 1" Piping
16" Eff To Clearwell ℄ EL 4811.50
Pipe Gallery Floor EL 4809.0
Clearwell Floor EL 4803.50

SECTION A-A

SCALE: 3/8"=1'-0"

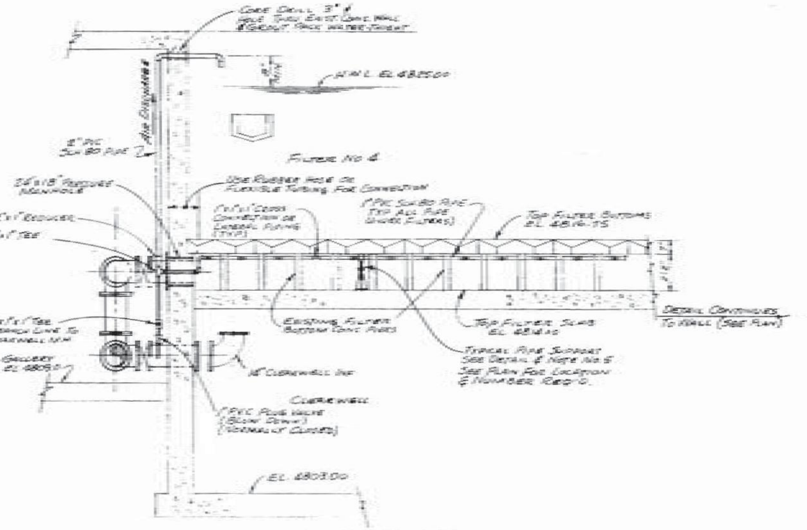

1" PVC Pipe
Adjustable Screed Chair Pipe Support By Burke Conc Accessories Co Or Equal

PIPE SUPPORT DETAIL

NO SCALE

NOTES

1. Valves To Be Equal To "Cabut" TU Series Union Type Ball Valve.
2. All Fittings Under Filter To Be Threaded Schedule 80. Use No Solvent Welded Connections.
3. Valve "A" Is Intended To Be Used To Throttle Flow Of Water From The Underside Of The Filter Into The Clearwell. This Valve Must Be Closed During Backwashing.
4. Valve "B" Is To Be Closed Only If Excessive Pumping Of Water Together With Air Occurs.
5. Piping Within Filter Underdrain Is To Be Supported By Adjustable Pipe Screed Chairs As Manufactured By Burke Concrete Accessories, Inc. Chairs Are To Be Galvanized.


Core Drill 3" ∅ Hole Thru Exist Conc Wall & Grout Pack Water-Tight
HWL EL 4825.00
Air Discharge
2" PVC Sch 80 Pipe
Filter No 4
24"x18" Pressure Manhole
Use Rubber Hose Or Flexible Tubing For Connection
2"x1" Reducer
1"x1"x1" Tee
1"x1"x1" Cross Connection Of Lateral Piping (Typ)
1" PVC Sch 80 Pipe Typ All Pipe Under Filters)
Top Filter Bottoms EL 4816.75
Existing Filter Bottom Conc Pipes
Top Filter Slab EL 4814.00
Detail Continues To Wall (See Plan)
1"x1"x1" Tee Branch Line To Clearwell M.H.
Pipe Gallery Floor EL 4809.0
16" Clearwell Inf
Typical Pipe Support See Detail & Note No 5 See Plan For Location & Number Req'd.
Clearwell
1" PVC Plug Valve (Blow Down) (Normally Closed)
EL 4803.00

SECTION B-B

SCALE: 3/8"=1'-0"

WATERWORKS IMPROVEMENTS
GRAND JUNCTION, COLORADO

FILTER PLANT MODIFICATIONS
AIR RELEASE PIPING
PLANS & DETAILS

HENNINGSON, DURHAM & RICHARDSON, INC

Set No.________

CITY OF GRAND JUNCTION WATER TREATMENT PLANT

FILTER UPGRADE PROJECT

GRAND JUNCTION, COLORADO

CONSTRUCTION SET

JVA, Incorporated
214 8th St, Suite 210
Glenwood Springs, CO 81601
Phone: 970.404.3100
Web: www.jvajva.com
E-mail: info@jvajva.com

DECEMBER 2016

PREPARED UNDER THE SUPERVISION OF

____

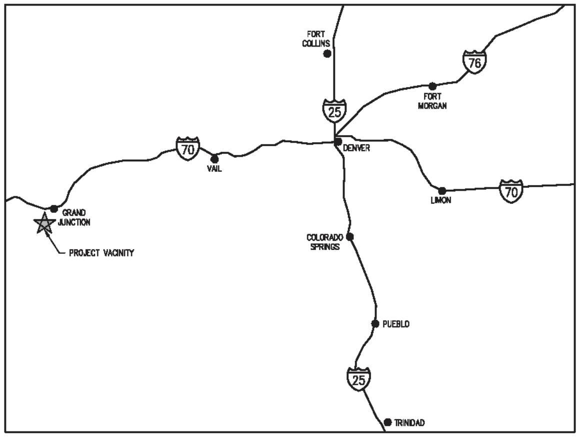
JVA, Inc.

CONTACTS

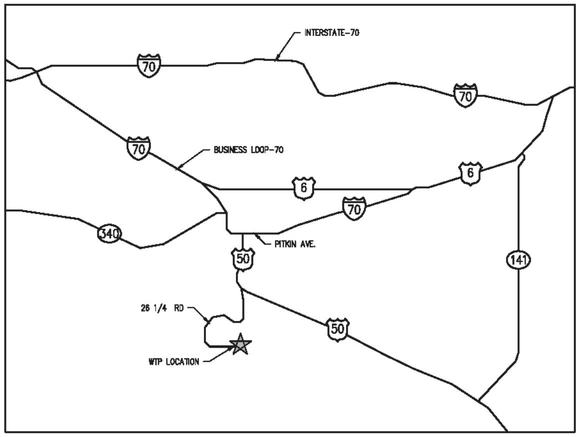
OWNER:	CITY OF GRAND JUNCTION 250 NORTH 5TH STREET GRAND JUNCTION, CO 81501 BRET GUILLORY, P.E.	(470) 244-1590
ENGINEER:	JVA, INC 214 8TH STREET, SUITE 210 GLENWOOD SPRINGS, CO 81601 COOPER BEST, P.E.	(970) 404-3100
ELECTRICAL ENGINEER:	BROWNS HILL ENGINEERING 8119 SHAFFER PARKWAY LITTLETON, CO 80127 TED WILLE, P.E.	(720) 344-7771
MECHANICAL ENGINEER:	MEC, INC. 4191 W. 98TH WAY WESTMINSTER, CO 80031 BRYAN MOEN, P.E.	(303) 907-4285

DRAWING INDEX

SHEET NO.	TITLE
G0.0	COVER SHEET
G0.1	LEGEND, NOTES AND ABBREVIATIONS
P1.0	OPERATING FLOOR – DEMO PLAN
P1.1	LOWER LEVEL AND PIPE GALLERY – DEMO PLAN – PHASE I
P1.2	LOWER LEVEL AND PIPE GALLERY – DEMO PLAN – PHASE II
P1.3	FILTER BOTTOM / CLEARWELL – DEMO PLAN – PHASE I
P1.4	FILTER BOTTOM / CLEARWELL – DEMO PLAN – PHASE II
P1.5	SECTIONS – DEMO PLAN – PHASE I & II
P2.0	OPERATING FLOOR – UPGRADE PLAN
P2.1	LOWER LEVEL AND PIPE GALLERY – UPGRADE PLAN
P2.2	FILTER BOTTOM / CLEARWELL – UPGRADE PLAN
P2.3	SECTIONS A & B – UPGRADE PLAN
P2.4	SECTION C – UPGRADE PLAN
P2.5	BLOWER ROOM PLAN AND SECTION – UPGRADE PLAN PLAN
PD1.0	PROCESS DETAILS
M2.5	MECHANICAL PLAN –BLOWER ROOM
E0.0	ELECTRICAL LEGEND
E1.0	ELECTRICAL BUILDING PLAN
E2.0	ELECTRICAL ONE-LINE DIAGRAM
ED1.0	ELECTRICAL DETAILS


FORT COLLINS
76
FORT MORGAN
25
70
VAIL
DENVER
LIMON
70
GRAND JUNCTION
PROJECT VACINITY
COLORADO SPRINGS
PUEBLO
25
TRINIDAD

VICINITY MAP
NTS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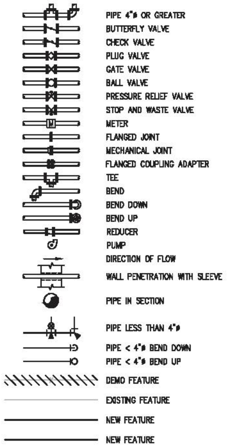
70
70
BUSINESS LOOP-70
6
6
70
340
PITKIN AVE.
50
141
26 1/4 RD
50
WTP LOCATION

PROJECT LOCATION MAP
NTS

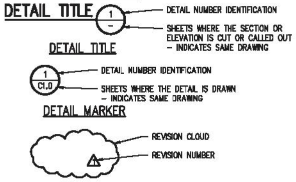
ABBREVIATIONS

AB	ANCHOR BOLT
ABAN	ABANDON
ABC	AGGREGATE BASE COURSE
AC	AIR CONDITIONING
ACKV	AUTOMATIC CHECK VALVE
ACOUS	ACOUSTICAL
ACP	ASPHALTIC CONCRETE PAVING
ACTR	ACTUATOR
AD	AREA DRAIN OR ACCESS DOOR
ADDL	ADDITIONAL
ADDM	ADDENDUM
ADJ	ADJUSTABLE
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AHU	AIR HANDLING UNIT
AL	ALUMINUM
ALT	ALTERNATE
AMT	AMOUNT
APPROX	APPROXIMATE
ARCH	ARCHITECT(URAL)
ARV	AIR RELIEF VALVE
ASME	AMERICAN SOCIETY MECHANICAL ENGINEERS
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
ASPH	ASPHALT
ASSY	ASSEMBLY
ASYM	ASYMMETRICAL
ATS	AUTOMATIC TRANSFER SWITCH
AUTO	AUTOMATIC
AVG	AVERAGE
AVS	AUTOMATIC VALVE STATION
B	BLOWER
B&F	BELL AND FLANGE
BB	BOND BEAM
BAF	BAFFLE
BC	BACK OF CURB
BE	BELL END
BF	BOTTOM FACE
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BLK	BLOCK
BM	BENCH MARK
BMPS	BEST MANAGEMENT PRACTICES
BOD	BIOCHEMICAL OXYGEN DEMAND
BOT	BOTTOM
BS	BACKSIGHT
BSMT	BASEMENT
BU	BELL UP
BV	BALL VALVE
BCV	BUTTERFLY CHECK VALVE
C/C	CENTER TO CENTER
CA	CITRIC ACID SUPPLY LINE
CB	CATCH BASIN
CCW	COUNTER CLOCKWISE
CDOT	COLORADO DEPARTMENT OF TRANSPORTATION
CEB	CONCRETE EQUIPMENT BASE
CHKV	CHECK VALVE
CIP	CAST IRON PIPE
CIMJ	CAST IRON MECHANICAL JOINT
CISP	CAST IRON SOIL PIPE
CJ	CONSTRUCTION JOINT
CL	CENTER LINE OR CHAIN LINK
CLG	CEILING
CLR	CLEAR
CMP	CORRUGATED METAL PIPE
CMU	CONCRETE MASONRY UNIT
CO	CLEAN OUT
CONC	CONCRETE
CONSTR	CONSTRUCTION
CONT	CONTINUOUS(ATION)
CP	CENTRIFUGAL PUMP
CPLG	COUPLING
CPVC	CHLORINATED POLYVINYL CHLORIDE
CR	CONCENTRIC REDUCER
CTR	CENTER
CV	CHECK VALVE
CW	COLD WATER
CY	CUBIC YARDS
DCO	DOUBLE CLEAN OUT
DEMO	DEMOLITION
DI	DEIONIZATION
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DISP	DISPENSER
DL	DEAD LOAD
DMJ	DUCTILE MECHANICAL JOINT
DN	DOWN
DR	DRAIN
DWG	DRAWING
DWL	DOWEL
DWN	DRAWN
DWV	DRAIN WASTE AND VENT
EA	EACH
ECC	ECCENTRIC
EF	EACH FACE OR ELECTRICAL FAN
EFF	EFFLUENT
EJ	EXPANSION JOINT
EL	ELEVATION
ELB	ELBOW
ELEC	ELECTRICAL
ENGR	ENGINEER
EOA	EDGE OF ASPHALT
EOP	EDGE OF PAVEMENT
EQ	EQUAL
EQL SP	EQUALLY SPACED
EQUIP	EQUIPMENT
EQUIV	EQUIVALENT
ESMT	EASEMENT
EST	ESTIMATE
EUH	ELECTRIC UNIT HEATER
EW	EACH WAY
EXH	EXHAUST
EXP BT(S)	EXPANSION BOLT(S)
EXP JT	EXPANSION JOINT
EXIST	EXISTING
EXIST GR	EXISTING GRADE
EXT	EXTERIOR
EXTN	EXTENSION
F/F	FACE TO FACE
FCA	FLANGE COUPLING ADAPTER
FD	FLOOR DRAIN
FDN	FOUNDATION
FED	FEDERAL
FES	FLARED END SECTION
FIN	FINISH
FIN FL	FINISH FLOOR
FIN GR	FINISH GRADE
FL	FLOWLINE
FLR	FLOOR
FF	FLOOR FINISH
FN	FENCE
FOC	FACE OF CONCRETE
FPM	FEET PER MINUTE
FP	FEED POINT
FPS	FEET PER SECOND
FPW	FIRE PROTECTION WATER SUPPLY
FR	FRAME
FRP	FIBERGLASS REINFORCED PLASTIC
FSTNR	FASTENER
FT	FEET
FTG	FOOTING OR FITTING
FUR	FURNACE
G	GAS
GA	GAUGE
GAL	GALLON
GALV	GALVANIZED
GIP	GALVANIZED IRON PIPE
GND	GROUND
GPD	GALLONS PER DAY
GPM	GALLONS PER MINUTE
GR BM	GRADE BEAM
GRC	GALVANIZED RIGID CONDUIT
GRTG	GRATING
GSP	GALVANIZED STEEL PIPE
GV	GATE VALVE
GWB	GYPSUM WALL BOARD
H	HIGH
HB	HOSE BIB
HDWL	HEADWALL
HNDRL	HAND RAIL
HNDWL	HANDWHEEL
HORIZ	HORIZONTAL
HP	HORSEPOWER
HR	HOUR
HS	HIGH STRENGTH
HVAC	HEATING, VENTILATION, AIR CONDITIONING
HW	HOT WATER
HWL	HIGH WATER LINE
HWY	HIGHWAY
HYD	HYDRANT
INCL	INCLUDED
INCR	INCREASER
ID	INSIDE DIAMETER
IF	INSIDE FACE
INF	INFLUENT
INL	INLET
INSTL	INSTALLATION
INSTR	INSTRUMENT
INSUL	INSULATION
INTR	INTERIOR
INV	INVERT
INV EL	INVERT ELEVATION
ISA	INSTRUMENT SOCIETY OF AMERICA
ISO	ISOMETRIC
JST	JOIST
JTS	JOINTS
KO	KNOCKOUT
KPL	KICK PLATE
KWY	KEYWAY
L	LEFT OR LITER
LAB	LABORATORY
LSCAPE	LANDSCAPE(ING)
LATL	LATERAL
LAV	LAVATORY
LB(S)	POUND(S)
LCMU	LIGHTWEIGHT CONCRETE MASONRY UNIT
LF	LINEAR FOOT
LG	LENGTH
LH	LATENT HEAT
LKR	LOCKER
LL	LIVE LOAD, LOOSE LINTEL
LOC	LOCATION
LP	LOW PRESSURE OR LIGHT POLE
LRG	LARGE
LT	LIGHT
LT WT	LIGHTWEIGHT
LWC	LIGHTWEIGHT CONCRETE
LWL	LOW WATER LEVEL
MAINT	MAINTENANCE
MAN	MANUAL
MATL	MATERIAL
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MECH	MECHANICAL
MED	MEDIUM
MFM	MAGNETIC FLOW METER
MFR	MANUFACTURER
MG	MILLION GALLONS OR MILLIGRAMS
MGD	MILLION GALLONS PER DAY
MGMT	MANAGEMENT
MH	MANHOLE
MIN	MINIMUM
MISC	MISCELLANEOUS
MJ	MECHANICAL JOINT
MLSS	MIXED LIQUID SUSPENDED SOLIDS
MO	MASONRY OPENING
MRGWB	MOISTURE RESISTANT
MTG	MOUNTING
N	NITROGEN
NAC	NaOCL SUPPLY LINE
NAL	NaAlO2 SUPPLY LINE
NIC	NOT IN CONTRACT
NP	NO PAINT
NPL	NAMEPLATE
NPT	NATIONAL PIPE THREAD
NPW	NON-POTABLE WATER
NRS	NON-RISING STEM
NS	NEAR SIDE
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
OF	OUTSIDE FACE
OPNG	OPENING
OPP	OPPOSITE
OPT	OPTIONAL
P	PUMP
PA	PIPE ANCHOR
PAR	PARALLEL
PC	POINT OF CURVE, OR PORTLAND CEMENT
PCO	PRESSURE CLEAN OUT
PCP	PROGRESSING CAVITY PUMP
PCR	POINT OF CURVE RETURN
PD	PUMP DISCHARGE LINE
PE	PLAIN END
PERM	PERMANENT
PERP	PERPENDICULAR
PG	PRESSURE GAGE
PI	POINT OF INTERSECTION
PIVC	POINT OF INTERSECTION FOR VERTICAL CURVE
PL	PLATE OR PROPERTY LINE
PLBG	PLUMBING
PLYWD	PLYWOOD
PNT	PAINT
POLY	POLYETHYLENE
PORT	PORTABLE
POS	POSITIVE
PPM	PARTS PER MILLION
PRCST	PRECAST
PREFAB	PREFABRICATED
PREFIN	PREFINISHED
PRELIM	PRELIMINARY
PREP	PREPARATION
PROJ	PROJECT
PROP	PROPERTY
PRS	PRESSURE REDUCING STATION
PRV	PRESSURE REDUCING VALVE OR PRESSURE RELIEF VALVE
PS	PIPE SUPPORT
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAGE
PT	POINT OF TANGENCY
PTD	PAINTED
PTRV	PRESSURE TEMPERATURE RELIEF VALVE
PV	PLUG VALVE
PVC	POINT OF VERTICAL CURVE OR POLYVINYL CHLORIDE
PVG	PAVING
PVMT	PAVEMENT
PW	POTABLE WATER
Q_{AVG}	AVERAGE DAILY FLOW
Q_{MAX}	MAXIMUM DAILY FLOW
Q_{PEAK}	PEAK HOUR FLOW
QCV	QUICK COUPLER VALVE
QTR	QUARTER
QTY	QUANTITY
R	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RC	REINFORCED CONCRETE
RCP	REINFORCED CONCRETE PIPE
RD	ROOF DRAIN
RED	REDUCER
REC	RECESSED
RECT	RECTANGULAR
REF	REFERENCE
REHAB	REHABILITATION
REINF	REINFORCE (D) (ING) (MENT)
REQD	REQUIRED
RESIL	RESILIENT
RFCA	RESTRAINED FLANGED COUPLING ADAPTER
RFG	ROOFING
RH	RIGHT HAND
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RPBP	REDUCED PRESSURE BACKFLOW PREVENTER
RPM	REVOLUTIONS PER MINUTE
RPS	REVOLUTIONS PER SECOND
RR	RAILROAD
RRAS	RAPID RETURN ACTIVATED SLUDGE
RTN	RETURN
SA	SUPPLY AIR
SALV	SALVAGE
SAN	SANITARY
SB	SPLASH BLOCK
SCFM	STANDARD CUBIC FEET PER MINUTE
SCH	SCHEDULE
SCRN	SCREEN
SD	STORM DRAIN
SDR	STANDARD DIMENSION RATIO
SECT	SECTION
SHLDR	SHOULDER
SHT	SHEETING
SHTHG	SHEATHING
SIM	SIMILAR
SLV	SLEEVE
SM	SMOOTH
SP	SPACE (ING)
SPEC	SPECIFICATION
SQ	SQUARE
SQ IN	SQUARE INCH
SQ YD	SQUARE YARD
SS	SANITARY SEWER
SST	STAINLESS STEEL
SST BT	STAINLESS STEEL BOLT
STA	STATION
STD	STANDARD
STL	STEEL
STL JST	STEEL JOIST
STL PL	STEEL PLATE
STRUCT	STRUCTURAL
STRUCT STL	STRUCTURAL STEEL
SUPP	SUPPLY
SUSP CLG	SUSPENDED CEILING
SV	SOLENOID VALVE
SVC	SERVICE
SW	SIDEWALK
SWMP	STORM WATER MANAGEMENT PLAN
SYMM	SYMMETRICAL
SYS	SYSTEM
T	TEE
T&B	TOP AND BOTTOM
T&G	TONGUE AND GROOVE
T&P	TEMPERATURE AND PRESSURE
TB	TOP OF BEAM
TBC	TOP BACK OF CURB
TBM	TEMPORARY BENCH MARK
TE	TOP ELEVATION
TEMP	TEMPORARY
TF	TOP OF FOOTING
TFA	TO FLOOR ABOVE
TFB	TO FLOOR BELOW
TFF	TOP OF FINISH FLOOR
THD	THREAD (ED)
THK	THICK
TJ	TOP OF JOIST
TOB	TOP OF BANK
TOC	TOP OF CONCRETE OR TOP OF CURB
TOE	THREADED ONE END
TOF	TOP OF FOOTING
TOG	TOP OF GRATING
TOT	TOTAL
TP	TOP OF PAVEMENT
TR	TOP OF RIM
TSL	TOP OF SLAB
TST	TOP OF STEEL
TW	TOP OF WALL
TYP	TYPICAL
UBC	UNIFORM BUILDING CODE
UNGD	UNDERGROUND
UE	UNDERGROUND ELECTRIC
ULT	ULTIMATE
UN	UNION
UNFIN	UNFINISHED
UNIF	UNIFORM
UNIV	UNIVERSAL
UTL	UTILITY
UV	ULTRAVIOLET
VAC	VACUUM
VB	VALVE BOX
VCP	VITRIFIED CLAY PIPE
VERT	VERTICAL
VP	VENT PIPE
VTR	VENT THROUGH ROOF
W	WIDE OR WIDTH
W/	WITH
W/O	WITHOUT
W/W	WALL TO WALL
WAS	WASTE ACTIVATED SLUDGE
WC	WATER CLOSET
WCO	WALL CLEANOUT
WD	WIDTH OR WOOD
WDW	WINDOW
WF	WIDE FLANGE
WH	WALL HYDRANT
WHSE	WAREHOUSE
WI	WROUGHT IRON
WL	WATER LINE OR WIND LOAD
WP	WASTE PIPE
WPR	WORKING PRESSURE
WQCE	WATER QUALITY CONTROL ELEVATION
WS	WETTED SURFACE
WSE	WATER SURFACE ELEVATION
WT	WEIGHT
WTR	WATER
WTRPRF	WATERPROOFING
WW	WASTEWATER
WWF	WELDED WIRE FABRIC
X SECT	CROSS SECTION
YCO	YARD CLEANOUT
YD	YARD DRAIN
YH	YARD HYDRANT
YR	YEAR

LEGEND



SYMBOLS


DETAIL TITLE
1
–
DETAIL NUMBER IDENTIFICATION
SHEETS WHERE THE SECTION OR ELEVATION IS CUT OR CALLED OUT – INDICATES SAME DRAWING
DETAIL TITLE
1
C1.0
DETAIL NUMBER IDENTIFICATION
SHEETS WHERE THE DETAIL IS DRAWN – INDICATES SAME DRAWING
DETAIL MARKER
REVISION CLOUD
REVISION NUMBER

GENERAL NOTES:

1. ALL MATERIALS AND WORKMANSHIP SHALL BE IN CONFORMANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF THE CITY OF GRAND JUNCTION, GRAND JUNCTION FIRE DEPARTMENT, COLORADO DEPARTMENT OF PUBLIC HEALTH AND ENVIRONMENT, AND ALL APPLICABLE STATE AND LOCAL STANDARDS AND SPECIFICATIONS. THE CONTRACTOR SHALL HAVE IN POSSESSION AT THE JOB SITE AT ALL TIMES ONE (1) SIGNED COPY OF APPROVED PLANS, STANDARDS AND SPECIFICATIONS. CONTRACTOR SHALL CONSTRUCT AND MAINTAIN EMERGENCY ACCESS ROUTES TO THE SITE AND STRUCTURE AT ALL TIMES PER THE LOCAL FIRE PROTECTION DISTRICT REQUIREMENTS. THE CONTRACTOR SHALL OBTAIN WRITTEN APPROVAL FOR ANY VARIANCE TO THE ABOVE DOCUMENTS. NOTIFY ENGINEER OF ANY CONFLICTING STANDARDS OR SPECIFICATIONS. IN THE EVENT OF ANY CONFLICTING STANDARD OR SPECIFICATION, THE MORE STRINGENT OR HIGHER QUALITY STANDARD, DETAIL OR SPECIFICATION SHALL APPLY.
2. THE CONTRACTOR SHALL OBTAIN, AT HIS OWN EXPENSE, ALL APPLICABLE CODES, LICENSES, STANDARD SPECIFICATIONS, PERMITS, BONDS, ETC., WHICH ARE NECESSARY TO PERFORM THE PROPOSED WORK, INCLUDING, BUT NOT LIMITED TO AN ELECTRICAL PERMIT THROUGH THE CITY OF GRAND JUNCTION.
3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE REQUIRED PARTY (OWNER, ENGINEER AND/OR UTILITY OWNER) AT LEAST 48 HOURS PRIOR TO THE START OF ANY CONSTRUCTION. THE CONTRACTOR SHALL CONTINUE WITH NOTIFICATIONS THROUGHOUT THE PROJECT AS REQUIRED BY THE STANDARDS AND SPECIFICATIONS.
4. THE LOCATIONS OF EXISTING UTILITIES ARE SHOWN IN THE APPROXIMATE LOCATION BASED ON INFORMATION BY OTHERS. NOT ALL UTILITIES MAY BE SHOWN. THE CONTRACTOR SHALL DETERMINE THE EXACT SIZE, LOCATION AND TYPE OF ALL EXISTING UTILITIES WHETHER SHOWN OR NOT BEFORE COMMENCING WORK. THE ENGINEER AND/OR OWNER ASSUMES NO RESPONSIBILITY FOR THE ACCURACY OR COMPLETENESS SHOWN ON THE PLANS. THE CONTRACTOR SHALL BE FULLY AND SOLELY RESPONSIBLE FOR ANY AND ALL DAMAGES AND COSTS WHICH MIGHT OCCUR BY THE CONTRACTOR'S FAILURE TO EXACTLY LOCATE AND PRESERVE ANY AND ALL UTILITIES. THE CONTRACTOR SHALL NOTIFY ALL PUBLIC AND PRIVATE UTILITY COMPANIES AND DETERMINE THE LOCATION OF ALL EXISTING UTILITIES PRIOR TO PROCEEDING WITH GRADING AND CONSTRUCTION. ALL WORK PERFORMED IN THE AREA OF UTILITIES SHALL BE PERFORMED AND INSPECTED ACCORDING TO THE REQUIREMENTS OF THE UTILITY OWNER. LIKEWISE, THE CONTRACTOR SHALL BE RESPONSIBLE FOR LOCATING AND MAPPING ANY EXISTING UTILITY (INCLUDING DEPTH) WHICH MAY CONFLICT WITH THE PROPOSED CONSTRUCTION, AND FOR RELOCATING ENCOUNTERED UTILITIES AS DIRECTED BY THE ENGINEER. CONTRACTOR SHALL CONTACT AND RECEIVE APPROVAL FROM THE CITY OF GRAND JUNCTION AND ENGINEER BEFORE RELOCATING ANY ENCOUNTERED UTILITIES. CONTRACTOR IS RESPONSIBLE FOR SERVICE CONNECTIONS, AND RELOCATING AND RECONNECTING AFFECTED UTILITIES AS COORDINATED WITH UTILITY OWNER AND/OR ENGINEER, INCLUDING NON-MUNICIPAL UTILITIES (TELEPHONE, GAS, CABLE, ETC., WHICH SHALL BE COORDINATED WITH THE UTILITY OWNER). THE CONTRACTOR SHALL IMMEDIATELY CONTACT ENGINEER UPON DISCOVERY OF A UTILITY DISCREPANCY OR CONFLICT. AT LEAST 48 HOURS PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL NOTIFY THE UTILITY NOTIFICATION CENTER OF COLORADO (1-800-922-1987, WWW.UNCC.ORG).
5. THE CONTRACTOR SHALL BE SOLELY AND COMPLETELY RESPONSIBLE FOR CONDITIONS AT AND ADJACENT TO THE JOB SITE, INCLUDING SAFETY OF ALL PERSONS AND PROPERTY DURING THE PERFORMANCE OF THE WORK.
6. ALL SURPLUS MATERIALS, TOOLS, AND TEMPORARY STRUCTURES, FURNISHED BY THE CONTRACTOR, SHALL BE REMOVED FROM THE PROJECT SITE BY THE CONTRACTOR. ALL DEBRIS AND RUBBISH CAUSED BY THE OPERATIONS OF THE CONTRACTOR SHALL BE REMOVED, AND THE AREA OCCUPIED DURING CONSTRUCTION ACTIVITIES SHALL BE RESTORED TO ITS ORIGINAL CONDITION, WITHIN 48 HOURS OF PROJECT COMPLETION, UNLESS OTHERWISE DIRECTED BY THE MUNICIPALITY OR OWNER'S REPRESENTATIVE.
7. ELEVATIONS WERE TAKEN FROM THE 1967 CITY OF GRAND JUNCTION WTP IMPROVEMENT PROJECT BY HENNINGSON, DURHAM & RICHARDSON. THE FINISHED FLOOR ELEVATIONS WERE USED TO SET ELEVATIONS AND HORIZONTAL OFFSETS. THE 1967 HENNINGSON, DURHAM & RICHARDSON DRAWINGS ARE AVAILABLE AT HTTP://ARCGIS-FS.CI.GRANDJCT.CO.US/MAPS/07055300.PDF. CONTRACTOR TO REFER TO PREVIOUS DRAWINGS FOR EXISTING INFORMATION. COORDINATE AND VERIFY ALL VERTICAL AND HORIZONTAL DATA SHOWN AND REPORT ANY IRREGULARITIES OR DISCREPANCIES TO ENGINEER PRIOR TO CONSTRUCTION.
8. PIPE LENGTHS AND HORIZONTAL CONTROL POINTS SHOWN ARE FROM CENTER OF STRUCTURES, END OF FLARED END SECTIONS, ETC. SEE STRUCTURE DETAILS FOR EXACT HORIZONTAL CONTROL LOCATION. CONTRACTOR IS RESPONSIBLE FOR ADJUSTING ACTUAL PIPE LENGTHS TO ACCOUNT FOR STRUCTURES AND LENGTH OF FLARED END SECTIONS.
9. THE CONTRACTOR SHALL FURNISH THE ENGINEER OF RECORD A COMPLETE SET OF CONSTRUCTION RECORD DRAWINGS ("AS-BUILTS"), FOR THE CONSTRUCTED IMPROVEMENTS. THE PLANS SHALL SHOW SUFFICIENT DIMENSION TIES TO PERMANENT SURFACE FEATURES FOR ALL BURIED FACILITIES TO ALLOW FOR FUTURE LOCATING. ENGINEER WILL PRODUCE FINAL RECORD DRAWINGS.
10. CONTRACTOR SHALL PROVIDE ALL TEMPORARY PROCESS, POWER, AND UTILITY SERVICE BYPASSES AND CONNECTIONS AS REQUIRED BY THE WORK AND AS REQUIRED TO SUSTAIN CONTINUOUS OPERATIONS OF THE FACILITY.
11. CONTRACTOR SHALL PROVIDE TEMPORARY THRUST RESTRAINTS AND PIPE SUPPORTS FOR ANY EXISTING FACILITIES AND/OR UTILITIES AS REQUIRED TO PERFORM THE WORK. ANY EXISTING RESTRAINT, PIPE SUPPORT, OR SUPPORT SYSTEM SHALL BE RESTORED AT THE CONTRACTOR'S EXPENSE IF ANY DAMAGE OCCURRS.

GENERAL DEMO NOTES:

1. CONTRACTOR TO FIELD VERIFY EXISTING CONDITIONS, DIMENSIONS, AND ELEVATIONS PRIOR TO CONSTRUCTION AND/OR FABRICATION. EXISTING PIPE LOCATIONS ARE APPROXIMATE.
2. REMOVE CONCRETE TO THE LIMITS NOTED. IN EXPOSED AREAS NOT COVERED BY NEW CONSTRUCTION, REMOVE REINFORCEMENT AND EMBEDMENTS 1" BEYOND FINISHED SURFACE AND PATCH SURFACE WITH GROUT TO MATCH ADJACENT FINISHED SURFACE.
3. REMOVE CONCRETE ANCHORS, ANCHOR BOLTS, AND OTHER EMBEDMENTS FOR MATERIALS AND EQUIPMENT BEING REMOVED. IN EXPOSED AREAS NOT COVERED BY NEW CONSTRUCTION, REMOVE CONCRETE ANCHORS, ANCHOR BOLTS, AND OTHER EMBEDMENTS 1" BEYOND FINISHED SURFACE AND PATCH SURFACE TO MATCH ADJACENT FINISHED SURFACE.
4. WHERE EQUIPMENT IS INDICATED TO BE REMOVED, REMOVE ALL ASSOCIATED POWER AND CONTROL WIRING AND CONDUIT BACK TO SOURCE. WHERE CONDUIT SYSTEMS CONTAIN CIRCUITS TO OTHER EQUIPMENT THAT REMAINS, RETAIN THESE CIRCUITS AND RELOCATE EXISTING CONDUIT AND EXTEND EXISTING CIRCUITS AS REQUIRED FOR THE INSTALLATION OF NEW EQUIPMENT.
5. REMOVE ALL SUPPORTS ASSOCIATED WITH REMOVED PIPING, DUCTWORK, CONDUIT, AND EQUIPMENT. REMOVE RODS AND FASTENERS FROM CEILINGS, FLOORS, AND WALLS WITH CARE. WHERE SURFACE HAS BEEN MARRED, CHIPPED, SPAWLED, ETC. AS A RESULT OF REMOVAL, PATCH AND PAINT TO MATCH ADJACENT FINISHED SURFACE.
6. WHERE OPENINGS ARE LEFT IN WALLS OR SLABS DUE TO REMOVED PIPING, EQUIPMENT, OR OTHER WORK, PATCH OPENING TO MATCH ADJACENT SURFACES UNLESS NOTED OTHERWISE. THE PERIMETER OF OPENINGS IN CONCRETE WALLS AND SLABS EXPOSED TO EARTH, WEATHER, OR WATER SHALL BE LINED WITH A GASKET TYPE WATERSTOP PRIOR TO PATCHING THE WALL.

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Phone 970.404.3100
www.jvajva.com E-mail: info@jvajva.com

NO.	DATE	DES'D	DWN	REVISION DESCRIPTION

DESIGNED BY:	AMR
DRAWN BY:	LLG
CHECKED BY:	JJM/CDB
JOB #:	2538c
DATE:	DECEMBER 2016

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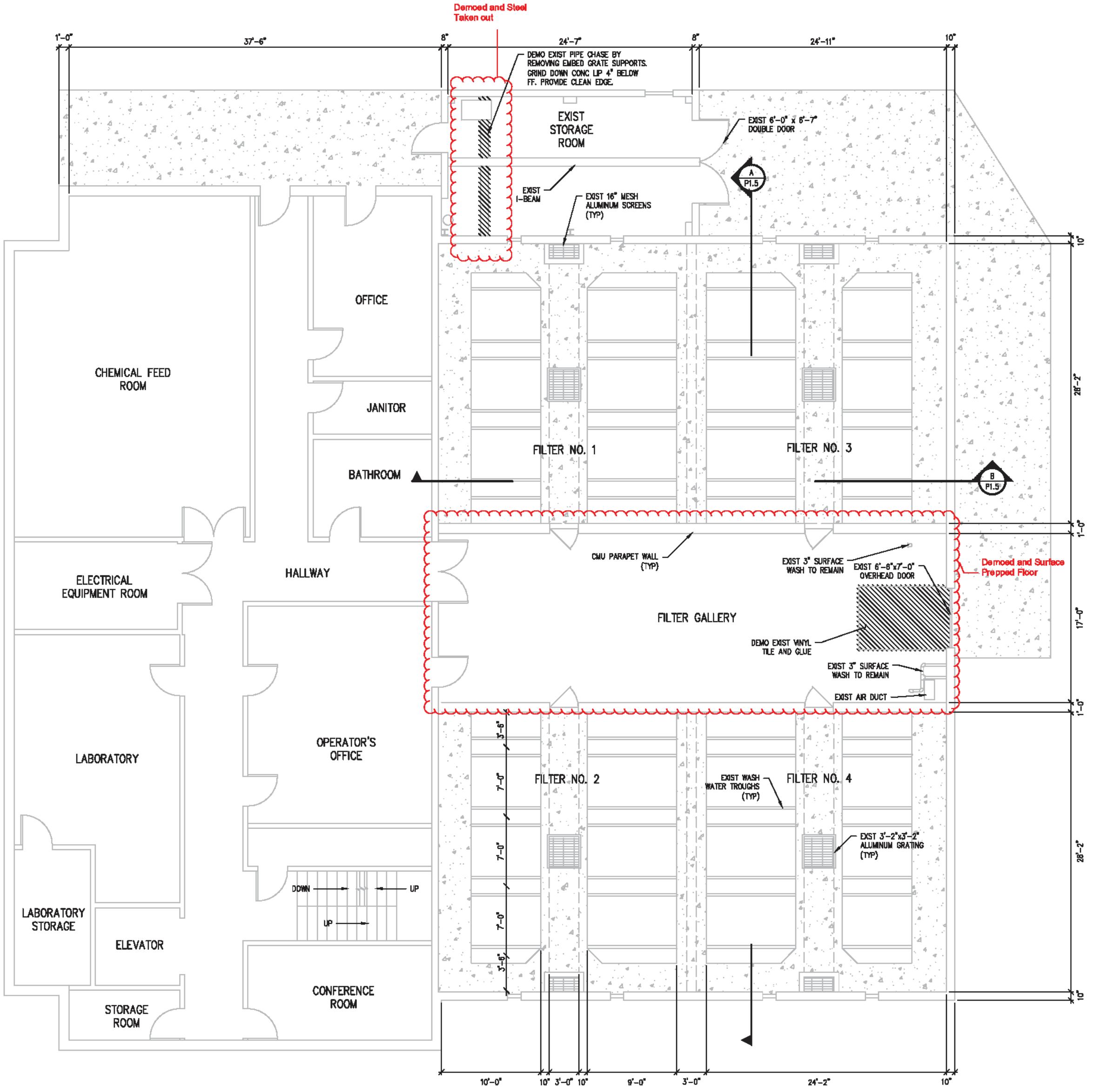
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

LEGEND, NOTES AND ABBREVIATIONS

SHEET NO.
G0.1


Demoed and Steel Taken out
1'-0"
37'-6"
8"
24'-7"
8"
24'-11"
10"
DEMO EXIST PIPE CHASE BY REMOVING EMBED GRATE SUPPORTS. GRIND DOWN CONC LIP 4" BELOW FF. PROVIDE CLEAN EDGE.
EXIST STORAGE ROOM
EXIST 6'-0" x 6'-7" DOUBLE DOOR
A P1.5
EXIST I-BEAM
EXIST 16" MESH ALUMINUM SCREENS (TYP)
10"
OFFICE
CHEMICAL FEED ROOM
JANITOR
28'-2"
FILTER NO. 1
FILTER NO. 3
BATHROOM
B P1.5
1'-0"
CMU PARAPET WALL (TYP)
EXIST 3" SURFACE WASH TO REMAIN
EXIST 6'-6"x7'-0" OVERHEAD DOOR
Demoed and Surface Prepped Floor
ELECTRICAL EQUIPMENT ROOM
HALLWAY
FILTER GALLERY
17'-0"
DEMO EXIST VINYL TILE AND GLUE
EXIST 3" SURFACE WASH TO REMAIN
EXIST AIR DUCT
1'-0"
3'-6"
OPERATOR'S OFFICE
LABORATORY
FILTER NO. 2
EXIST WASH WATER TROUGHS (TYP)
FILTER NO. 4
7'-0"
EXIST 3'-2"x3'-2" ALUMINUM GRATING (TYP)
28'-2"
7'-0"
DOWN
UP
UP
7'-0"
LABORATORY STORAGE
ELEVATOR
3'-6"
CONFERENCE ROOM
10"
STORAGE ROOM
10'-0"
10"
3'-0"
10"
9'-0"
3'-0"
24'-2"
10"

OPERATING FLOOR PLAN

3/16" = 1'-0"

4 0 4 8 12

SCALE OF FEET

CONSULTING ENGINEERS

JVA, Incorporated
214 8th Street, Suite 210
Glenwood Springs, CO 81601
Phone 970.404.3100
www.jvajva.com E-mail: info@jvajva.com

REVISION DESCRIPTION

NO.	DATE	DESCRIPTION	DSGD	DWN

DESIGNED BY:	AMR
DRAWN BY:	LLG
CHECKED BY:	JJM/CDB
JOB #:	2538c
DATE:	DECEMBER 2016

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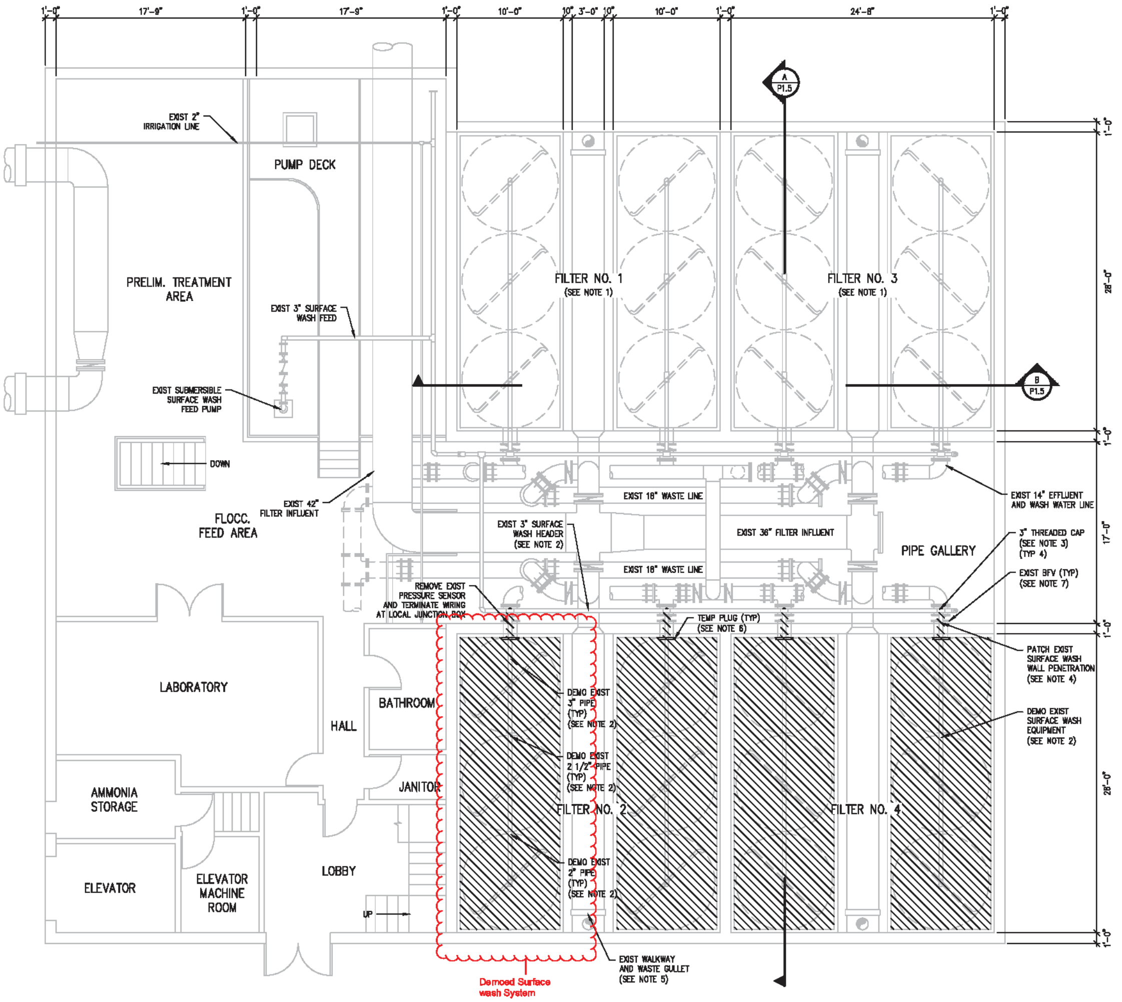
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

OPERATIONS LEVEL
DEMO PLAN

SHEET NO.

P1.0

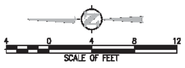

1'-0"
17'-9"
1'-0"
17'-9"
1'-0"
10'-0"
10"
3'-0"
10"
10'-0"
1'-0"
24'-8"
1'-0"
1'-0"
28'-0"
1'-0"
17'-0"
1'-0"
28'-0"
1'-0"
A
P1.5
B
P1.5
EXIST 2" IRRIGATION LINE
PUMP DECK
PRELIM. TREATMENT AREA
EXIST 3" SURFACE WASH FEED
EXIST SUBMERSIBLE SURFACE WASH FEED PUMP
DOWN
EXIST 42" FILTER INFLUENT
FLOCC. FEED AREA
FILTER NO. 1 (SEE NOTE 1)
FILTER NO. 3 (SEE NOTE 1)
EXIST 16" WASTE LINE
EXIST 36" FILTER INFLUENT
EXIST 16" WASTE LINE
EXIST 3" SURFACE WASH HEADER (SEE NOTE 2)
EXIST 14" EFFLUENT AND WASH WATER LINE
3" THREADED CAP (SEE NOTE 3) (TYP 4)
PIPE GALLERY
EXIST BFV (TYP) (SEE NOTE 7)
REMOVE EXIST PRESSURE SENSOR AND TERMINATE WIRING AT LOCAL JUNCTION BOX
TEMP PLUG (TYP) (SEE NOTE 6)
PATCH EXIST SURFACE WASH WALL PENETRATION (SEE NOTE 4)
DEMO EXIST SURFACE WASH EQUIPMENT (SEE NOTE 2)
LABORATORY
BATHROOM
HALL
JANITOR
DEMO EXIST 3" PIPE (TYP) (SEE NOTE 2)
DEMO EXIST 2 1/2" PIPE (TYP) (SEE NOTE 2)
DEMO EXIST 2" PIPE (TYP) (SEE NOTE 2)
FILTER NO. 2
FILTER NO. 4
AMMONIA STORAGE
ELEVATOR
ELEVATOR MACHINE ROOM
LOBBY
UP
EXIST WALKWAY AND WASTE GULLET (SEE NOTE 5)
Demoed Surface wash System

LOWER LEVEL AND PIPE GALLERY PLAN

3/16" = 1'-0"

PHASE I DEMO NOTES:

1. FILTERS 1 AND 3 MUST REMAIN IN OPERATION WHILE FILTERS 2 AND 4 ARE BEING DEMOED. ONCE FILTERS 2 AND 4 ARE FULLY FUNCTIONAL AND OPERATIONAL, CONTRACTOR CAN BEGIN DEMO WORK ON FILTERS 1 AND 3, AFTER OWNERS APPROVAL.
2. DEMO ALL SURFACE WASH EQUIPMENT, PIPING, SUPPORTS, BEAMS, SPRAY NOZZLES, ETC. FROM INSIDE FILTERS UP TO SURFACE WASH HEADER AS SHOWN (TYP).
3. INSTALL THREADED CAP IN SURFACE WASH HEADER WHERE FILTER SURFACE WASH PIPING WAS DEMOED.
4. PATCH PIPE PENETRATION BY ROUGHENING CONCRETE SURFACE TO 1/4" AMPLITUDE, INSTALLING EXPANDING TYPE WATERSTOP (WATERSTOP RX OR EQUAL), AND PATCH WITH NON-SHRINK GROUT TO MATCH EXISTING WALL SURFACES.
5. PROTECT EXIST WALKWAY, WASTE GULLET AND TROUGHS DURING DEMO PHASE.
6. PROTECT VALVES, SEAL EFFLUENT PIPE LEAVING THE FILTERS WITH WATERTIGHT SEAL (I.E. TEMP PLUG).
7. CITY TO ISOLATE EFFLUENT VALVE PRIOR TO DEMO.


4
0
4
8
12
SCALE OF FEET

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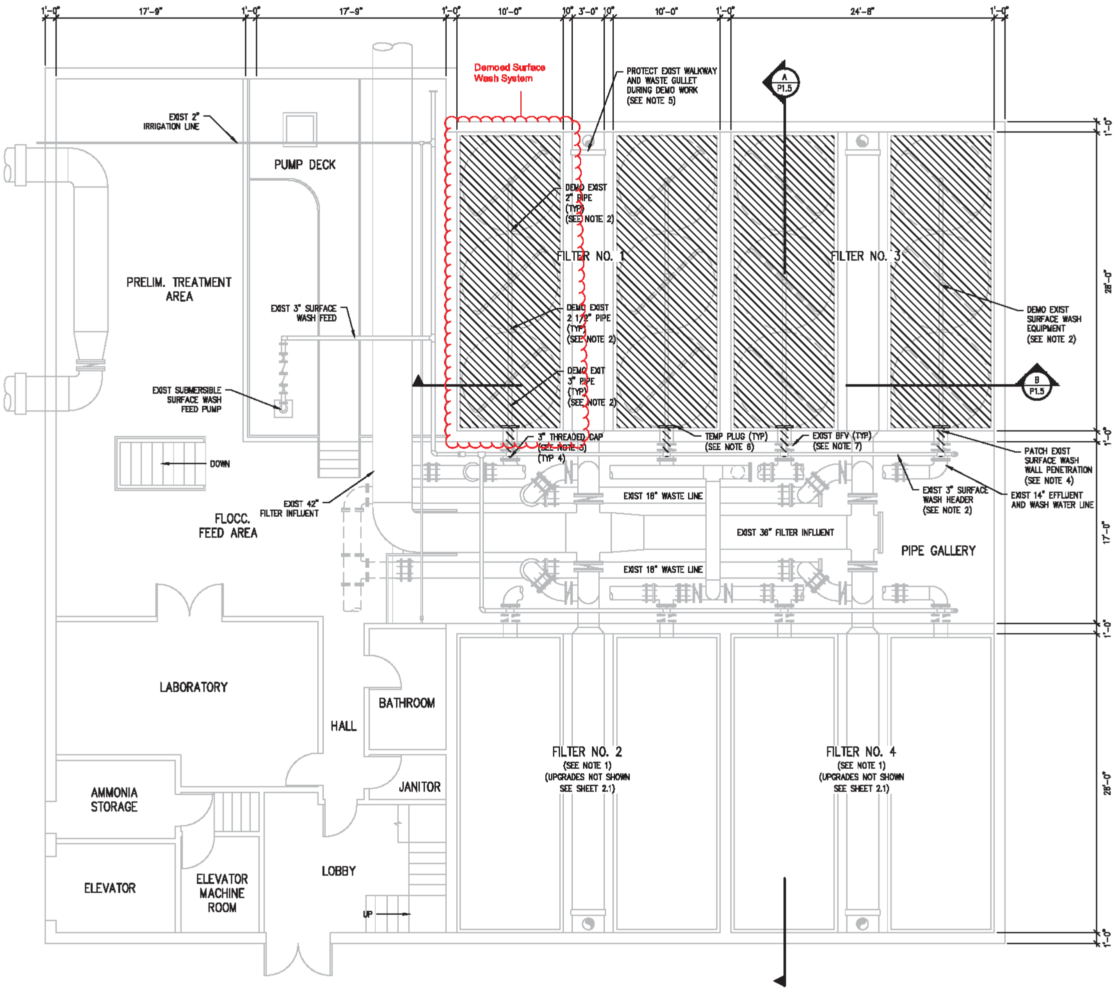
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

LOWER LEVEL AND PIPE GALLERY
DEMO PLAN - PHASE I

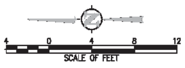
SHEET NO.
P1.1


1'-0"
17'-9"
1'-0"
17'-9"
1'-0"
10'-0"
10"
3'-0"
10"
10'-0"
1'-0"
24'-8"
1'-0"
Demoed Surface Wash System
PROTECT EXIST WALKWAY AND WASTE GULLET DURING DEMO WORK (SEE NOTE 5)
A
P1.5
EXIST 2" IRRIGATION LINE
PUMP DECK
DEMO EXIST 2" PIPE (TYP) (SEE NOTE 2)
FILTER NO. 1
FILTER NO. 3
PRELIM. TREATMENT AREA
EXIST 3" SURFACE WASH FEED
DEMO EXIST 2 1/2" PIPE (TYP) (SEE NOTE 2)
DEMO EXIST SURFACE WASH EQUIPMENT (SEE NOTE 2)
EXIST SUBMERSIBLE SURFACE WASH FEED PUMP
DEMO EXIT 3" PIPE (TYP) (SEE NOTE 2)
B
P1.5
DOWN
3" THREADED CAP (SEE NOTE 3) (TYP 4)
TEMP PLUG (TYP) (SEE NOTE 6)
EXIST BFV (TYP) (SEE NOTE 7)
PATCH EXIST SURFACE WASH WALL PENETRATION (SEE NOTE 4)
EXIST 3" SURFACE WASH HEADER (SEE NOTE 2)
EXIST 14" EFFLUENT AND WASH WATER LINE
EXIST 42" FILTER INFLUENT
EXIST 18" WASTE LINE
FLOCC. FEED AREA
EXIST 36" FILTER INFLUENT
PIPE GALLERY
EXIST 18" WASTE LINE
1'-0"
28'-0"
1'-0"
17'-0"
1'-0"
28'-0"
1'-0"
LABORATORY
BATHROOM
HALL
FILTER NO. 2 (SEE NOTE 1) (UPGRADES NOT SHOWN SEE SHEET 2.1)
FILTER NO. 4 (SEE NOTE 1) (UPGRADES NOT SHOWN SEE SHEET 2.1)
JANITOR
AMMONIA STORAGE
ELEVATOR
ELEVATOR MACHINE ROOM
LOBBY
UP

LOWER LEVEL AND PIPE GALLERY PLAN
3/16" = 1'-0"

PHASE II DEMO NOTES:

1. FILTERS 2 AND 4 MUST BE IN OPERATION WHILE FILTERS 1 AND 3 ARE BEING DEMOED.
2. DEMO ALL SURFACE WASH EQUIPMENT, PIPING, SUPPORTS, BEAMS, SPRAY NOZZLES, ETC. FROM INSIDE FILTERS UP TO SURFACE WASH HEADER AS SHOWN (TYP).
3. INSTALL THREADED CAP IN SURFACE WASH HEADER WHERE FILTER SURFACE WASH PIPING WAS DEMOED.
4. PATCH PIPE PENETRATION BY ROUGHENING CONCRETE SURFACE TO 1/4" AMPLITUDE, INSTALLING EXPANDING TYPE WATERSTOP (WATERSTOP RX OR EQUAL), AND PATCH WITH NON-SHRINK GROUT TO MATCH EXISTING WALL SURFACES.
5. PROTECT EXIST WALKWAY, WASTE GULLET AND TROUGHS DURING DEMO PHASE.
6. PROTECT VALVES, SEAL EFFLUENT PIPE LEAVING THE FILTERS WITH WATERTIGHT SEAL (I.E. TEMP PLUG).
7. CITY TO ISOLATE EFFLUENT VALVE PRIOR TO DEMO.


4
0
4
8
12
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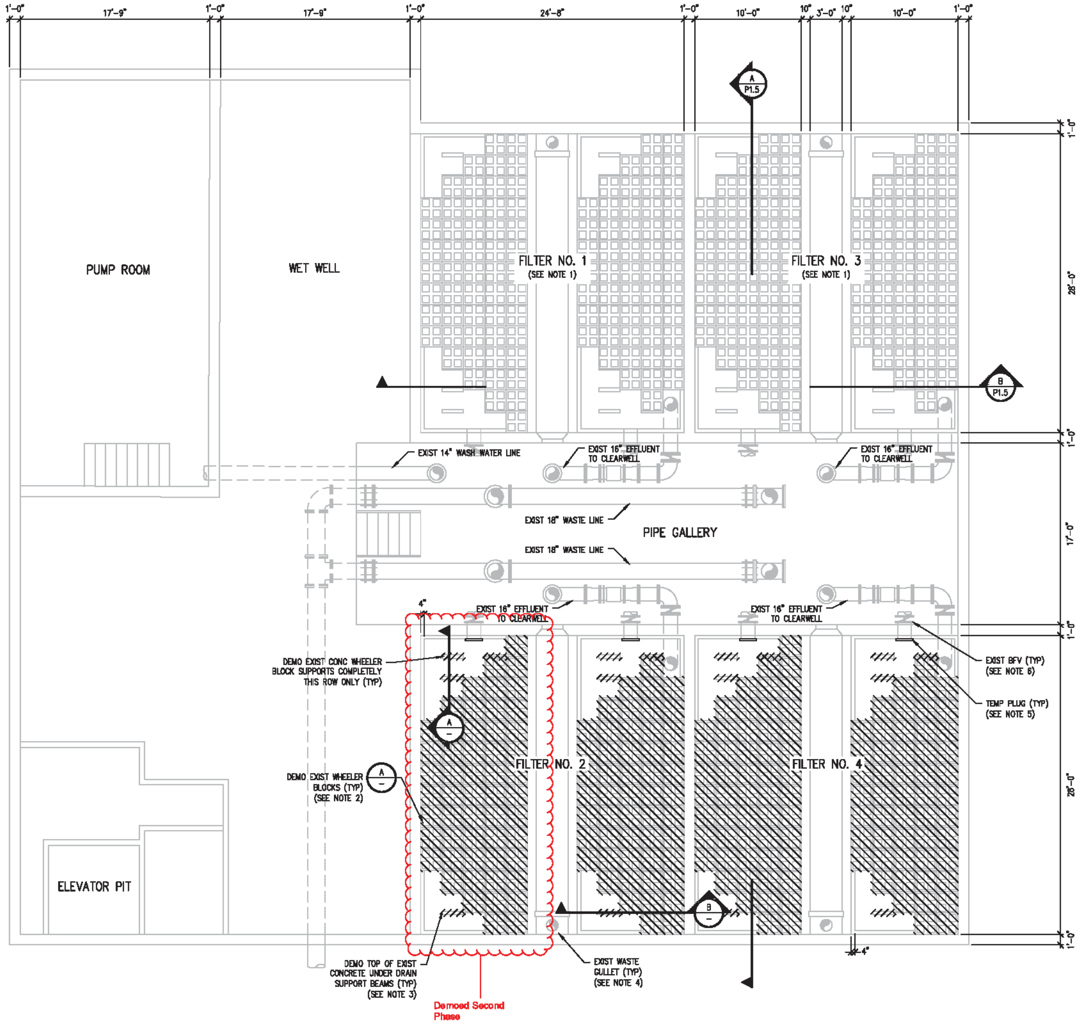
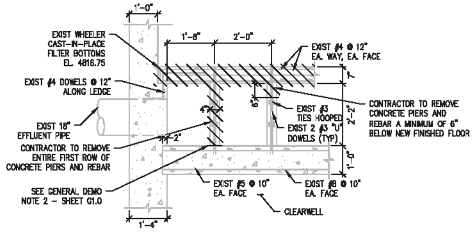
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

LOWER LEVEL AND PIPE GALLERY
DEMO PLAN - PHASE II

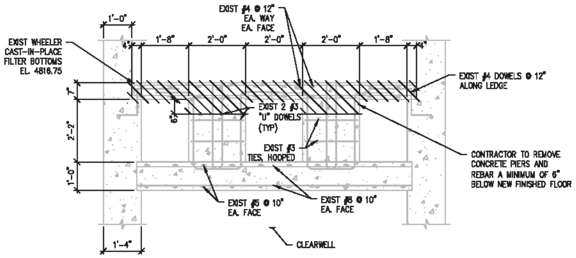
SHEET NO.
P1.2


1'-0"
17'-9"
1'-0"
17'-9"
1'-0"
24'-8"
1'-0"
10'-0"
10"
3'-0"
10"
10'-0"
1'-0"
A
P1.5
PUMP ROOM
WET WELL
FILTER NO. 1
(SEE NOTE 1)
FILTER NO. 3
(SEE NOTE 1)
B
P1.5
1'-0"
28'-0"
1'-0"
17'-0"
1'-0"
28'-0"
1'-0"
EXIST 14" WASH WATER LINE
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 18" WASTE LINE
PIPE GALLERY
EXIST 18" WASTE LINE
4"
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 16" EFFLUENT TO CLEARWELL
DEMO EXIST CONC WHEELER BLOCK SUPPORTS COMPLETELY THIS ROW ONLY (TYP)
EXIST BFV (TYP) (SEE NOTE 6)
TEMP PLUG (TYP) (SEE NOTE 5)
A
FILTER NO. 2
FILTER NO. 4
DEMO EXIST WHEELER BLOCKS (TYP) (SEE NOTE 2)
A
ELEVATOR PIT
B
4"
DEMO TOP OF EXIST CONCRETE UNDER DRAIN SUPPORT BEAMS (TYP) (SEE NOTE 3)
EXIST WASTE GULLET (TYP) (SEE NOTE 4)
Demoed Second Phase

FILTER BOTTOM/CLEARWELL PLAN
3/16" = 1'-0"


1'-0"
EXIST WHEELER CAST-IN-PLACE FILTER BOTTOMS EL. 4816.75
1'-8"
2'-0"
EXIST #4 @ 12" EA. WAY, EA. FACE
EXIST #4 DOWELS @ 12" ALONG LEDGE
7"
6"
4"
EXIST #3 TIES HOOPED
CONTRACTOR TO REMOVE CONCRETE PIERS AND REBAR A MINIMUM OF 6" BELOW NEW FINISHED FLOOR
EXIST 18" EFFLUENT PIPE
2'-2"
EXIST 2 #3 "U" DOWELS (TYP)
2"
CONTRACTOR TO REMOVE ENTIRE FIRST ROW OF CONCRETE PIERS AND REBAR
1'-0"
SEE GENERAL DEMO NOTE 2 - SHEET G1.0
EXIST #5 @ 10" EA. FACE
EXIST #8 @ 10" EA. FACE
CLEARWELL
1'-4"

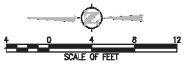
SECTION A
NTS


EXIST #4 @ 12" EA. WAY EA. FACE
1'-0"
EXIST WHEELER CAST-IN-PLACE FILTER BOTTOMS EL. 4816.75
4"
1'-8"
2'-0"
2'-0"
2'-0"
1'-8"
4"
EXIST #4 DOWELS @ 12" ALONG LEDGE
7"
EXIST 2 #3 "U" DOWELS (TYP)
6"
2'-2"
EXIST #3 TIES, HOOPED
CONTRACTOR TO REMOVE CONCRETE PIERS AND REBAR A MINIMUM OF 6" BELOW NEW FINISHED FLOOR
1'-0"
EXIST #5 @ 10" EA. FACE
EXIST #8 @ 10" EA. FACE
1'-4"
CLEARWELL

SECTION B
NTS

PHASE I DEMO NOTES:

1. FILTERS 1 AND 3 MUST REMAIN IN OPERATION WHILE FILTERS 2 AND 4 ARE BEING DEMOED. ONCE FILTERS 2 AND 4 ARE FULLY FUNCTIONAL AND OPERATIONAL, CONTRACTOR CAN BEGIN DEMO WORK ON FILTERS 1 AND 3, AFTER OWNERS APPROVAL.
2. DEMO OF FILTERS INCLUDES REMOVAL OF ALL SURFACE WASH EQUIPMENT WITHIN FILTERS, SAND, ANTHRACITE, GRAVEL, WHEELER UNDERDRAINS AND CONCRETE AS NEEDED TO PREPARE THE FILTER FOR THE ADDITION OF AIR SCOUR AND NEW LEOPOLD UNDERDRAINS.
3. DEMO EXIST CONCRETE SUPPORT BLOCKS A MINIMUM OF 6" BELOW FINISHED FLOOR.
4. PROTECT EXIST WALKWAY, WASTE GULLET AND TROUGHS DURING DEMO PHASE.
5. PROTECT VALVES, SEAL EFFLUENT PIPE LEAVING THE FILTERS WITH WATERTIGHT SEAL (I.E. TEMP PLUG).
6. CITY TO ISOLATE EFFLUENT VALVE PRIOR TO DEMO.


4
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4
8
12
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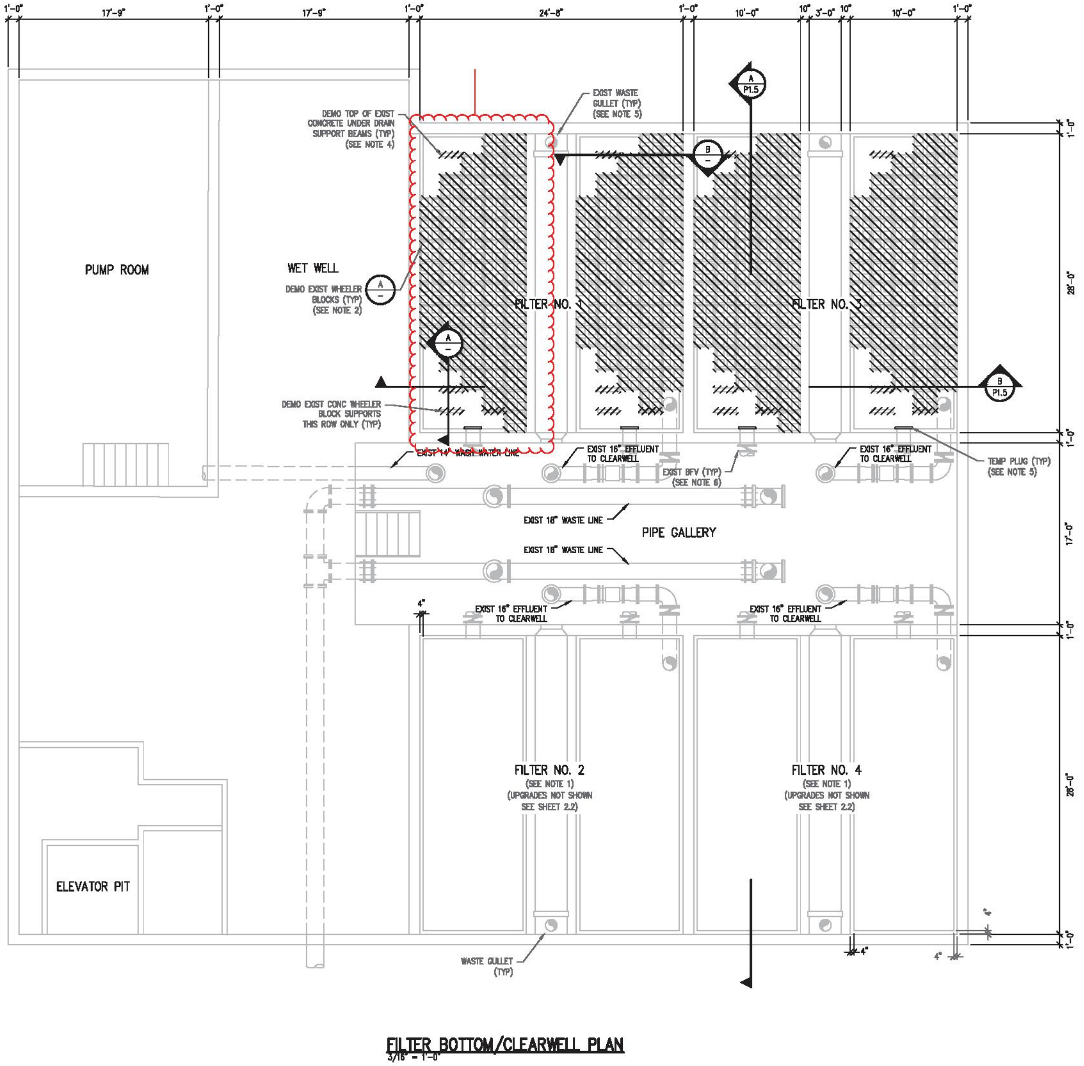
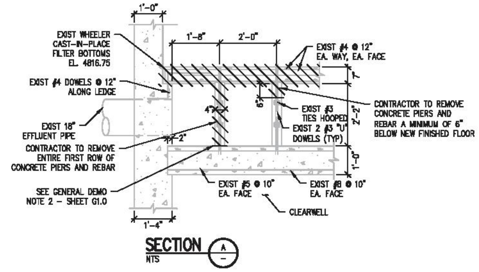
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

FILTER BOTTOM / CLEARWELL
DEMO PLAN - PHASE I

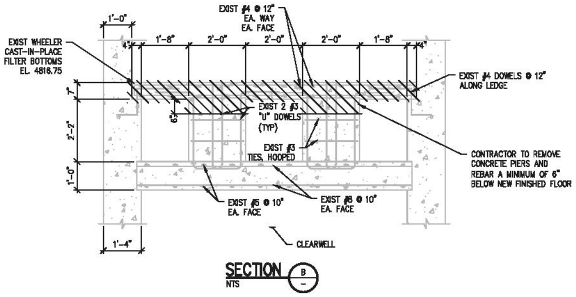
SHEET NO.
P1.3


1'-0"
17'-9"
1'-0"
17'-9"
1'-0"
24'-8"
1'-0"
10'-0"
10"
3'-0"
10"
10'-0"
1'-0"
28'-0"
17'-0"
28'-0"
PUMP ROOM
WET WELL
ELEVATOR PIT
DEMO TOP OF EXIST CONCRETE UNDER DRAIN SUPPORT BEAMS (TYP) (SEE NOTE 4)
DEMO EXIST WHEELER BLOCKS (TYP) (SEE NOTE 2)
DEMO EXIST CONC WHEELER BLOCK SUPPORTS THIS ROW ONLY (TYP)
EXIST WASTE GULLET (TYP) (SEE NOTE 5)
A P1.5
B P1.5
A –
B –
FILTER NO. 1
FILTER NO. 3
EXIST 14" WASH WATER LINE
EXIST 16" EFFLUENT TO CLEARWELL
EXIST BFV (TYP) (SEE NOTE 6)
TEMP PLUG (TYP) (SEE NOTE 5)
EXIST 18" WASTE LINE
PIPE GALLERY
EXIST 18" WASTE LINE
EXIST 16" EFFLUENT TO CLEARWELL
4"
FILTER NO. 2 (SEE NOTE 1) (UPGRADES NOT SHOWN SEE SHEET 2.2)
FILTER NO. 4 (SEE NOTE 1) (UPGRADES NOT SHOWN SEE SHEET 2.2)
WASTE GULLET (TYP)

FILTER BOTTOM/CLEARWELL PLAN
3/16" = 1'-0"


1'-0"
1'-8"
2'-0"
EXIST WHEELER CAST-IN-PLACE FILTER BOTTOMS EL. 4816.75
EXIST #4 DOWELS @ 12" ALONG LEDGE
EXIST 16" EFFLUENT PIPE
CONTRACTOR TO REMOVE ENTIRE FIRST ROW OF CONCRETE PIERS AND REBAR
SEE GENERAL DEMO NOTE 2 – SHEET G1.0
EXIST #4 @ 12" EA. WAY, EA. FACE
CONTRACTOR TO REMOVE CONCRETE PIERS AND REBAR A MINIMUM OF 6" BELOW NEW FINISHED FLOOR
EXIST #3 TIES HOOPED
EXIST 2 #3 "U" DOWELS (TYP)
EXIST #5 @ 10" EA. FACE
EXIST #5 @ 10" EA. FACE
CLEARWELL
1'-4"
2'-2"
1'-0"
7"
4"
6"
2"

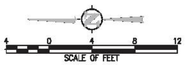
SECTION A
NTS


EXIST #4 @ 12" EA. WAY EA. FACE
1'-0"
1'-8"
2'-0"
2'-0"
2'-0"
1'-8"
4"
EXIST WHEELER CAST-IN-PLACE FILTER BOTTOMS EL. 4816.75
EXIST #4 DOWELS @ 12" ALONG LEDGE
EXIST 2 #3 "U" DOWELS (TYP)
EXIST #3 TIES, HOOPED
CONTRACTOR TO REMOVE CONCRETE PIERS AND REBAR A MINIMUM OF 6" BELOW NEW FINISHED FLOOR
EXIST #5 @ 10" EA. FACE
EXIST #5 @ 10" EA. FACE
CLEARWELL
7"
6"
2'-2"
1'-0"
1'-4"

SECTION B
NTS

PHASE II DEMO NOTES:

1. FILTERS 2 AND 4 MUST BE IN OPERATION WHILE FILTERS 1 AND 3 ARE BEING DEMOED.
2. DEMO OF FILTERS INCLUDES REMOVAL OF ALL SURFACE WASH EQUIPMENT WITHIN FILTERS, SAND, ANTHRACITE, GRAVEL, WHEELER UNDERDRAINS AND CONCRETE AS NEEDED TO PREPARE THE FILTER FOR THE ADDITION OF AIR SCOUR AND NEW LEOPOLD UNDERDRAINS.
3. DEMO EXIST CONCRETE SUPPORT BLOCKS A MINIMUM OF 6" BELOW FINISHED FLOOR.
4. PROTECT EXIST WALKWAY, WASTE GULLET AND TROUGHS DURING DEMO PHASE.
5. PROTECT VALVES, SEAL EFFLUENT PIPE LEAVING THE FILTERS WITH WATERTIGHT SEAL (I.E. TEMP PLUG).
6. CITY TO ISOLATE EFFLUENT VALVE PRIOR TO DEMO.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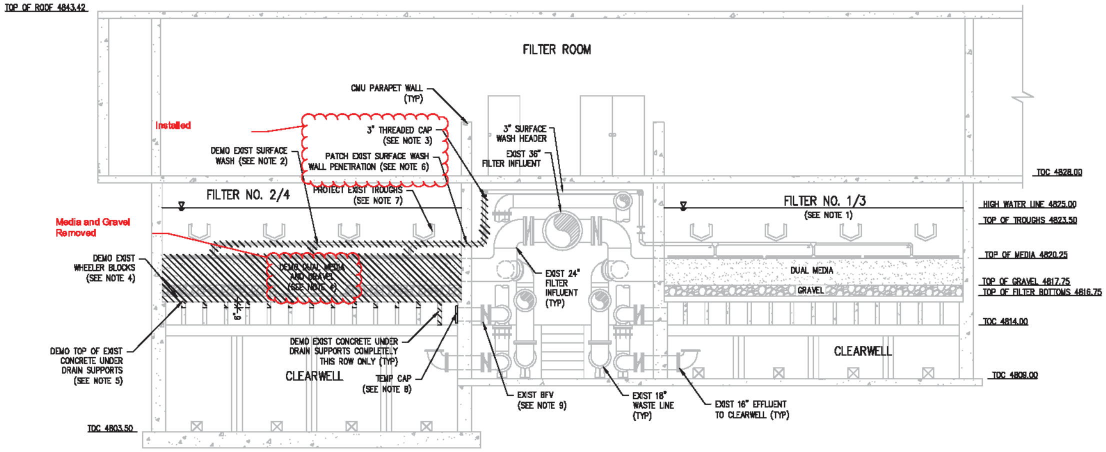
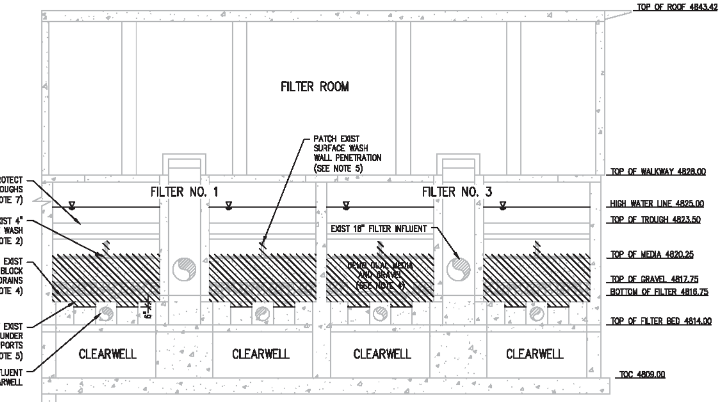
WTP FILTER UPGRADE PROJECT

FILTER BOTTOM / CLEARWELL
DEMO PLAN - PHASE II

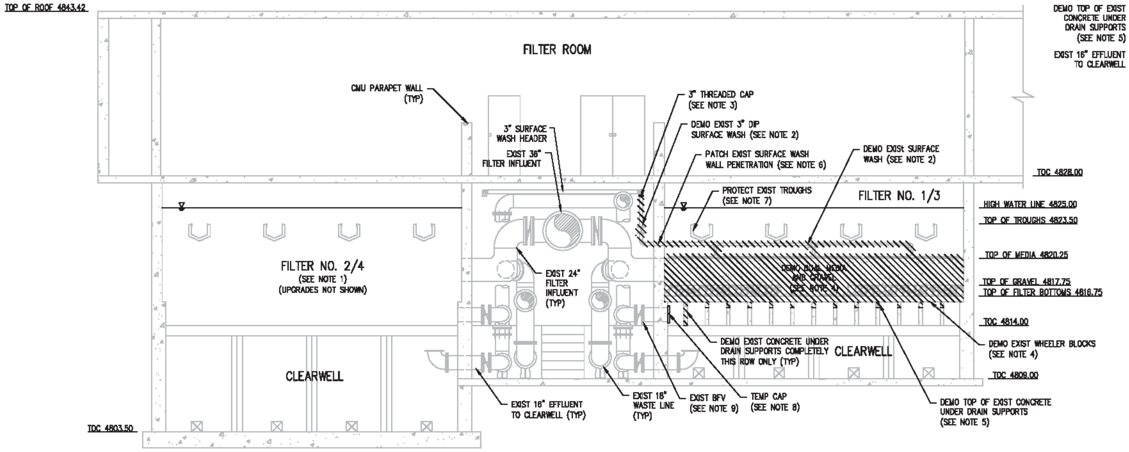
SHEET NO.
P1.4


TOP OF ROOF 4843.42
FILTER ROOM
CMU PARAPET WALL (TYP)
Installed
3" THREADED CAP (SEE NOTE 3)
DEMO EXIST SURFACE WASH (SEE NOTE 2)
PATCH EXIST SURFACE WASH WALL PENETRATION (SEE NOTE 6)
3" SURFACE WASH HEADER
EXIST 36" FILTER INFLUENT
PROTECT EXIST TROUGHS (SEE NOTE 7)
FILTER NO. 2/4
Media and Gravel Removed
DEMO EXIST WHEELER BLOCKS (SEE NOTE 4)
DEMO DUAL MEDIA AND GRAVEL (SEE NOTE 4)
6"
DEMO TOP OF EXIST CONCRETE UNDER DRAIN SUPPORTS (SEE NOTE 5)
DEMO EXIST CONCRETE UNDER DRAIN SUPPORTS COMPLETELY THIS ROW ONLY (TYP)
CLEARWELL
TEMP CAP (SEE NOTE 8)
TOC 4803.50
EXIST 24" FILTER INFLUENT (TYP)
EXIST BFV (SEE NOTE 9)
EXIST 18" WASTE LINE (TYP)
EXIST 16" EFFLUENT TO CLEARWELL (TYP)
FILTER NO. 1/3
(SEE NOTE 1)
DUAL MEDIA
GRAVEL
CLEARWELL
TOC 4828.00
HIGH WATER LINE 4825.00
TOP OF TROUGHS 4823.50
TOP OF MEDIA 4820.25
TOP OF GRAVEL 4817.75
TOP OF FILTER BOTTOMS 4816.75
TOC 4814.00
TOC 4809.00

SECTION – PHASE I DEMO (A / P1.0)
3/16" = 1'-0"


TOP OF ROOF 4843.42
FILTER ROOM
PATCH EXIST SURFACE WASH WALL PENETRATION (SEE NOTE 5)
PROTECT EXIST TROUGHS (SEE NOTE 7)
DEMO EXIST 4" SURFACE WASH (SEE NOTE 2)
DEMO EXIST WHEELER BLOCK UNDER DRAINS (TYP) (SEE NOTE 4)
DEMO TOP OF EXIST CONCRETE UNDER DRAIN SUPPORTS (SEE NOTE 5)
EXIST 16" EFFLUENT TO CLEARWELL
FILTER NO. 1
FILTER NO. 3
EXIST 18" FILTER INFLUENT
DEMO DUAL MEDIA AND GRAVEL (SEE NOTE 4)
6"
CLEARWELL
CLEARWELL
CLEARWELL
CLEARWELL
TOP OF WALKWAY 4828.00
HIGH WATER LINE 4825.00
TOP OF TROUGH 4823.50
TOP OF MEDIA 4820.25
TOP OF GRAVEL 4817.75
BOTTOM OF FILTER 4816.75
TOP OF FILTER BED 4814.00
TOC 4809.00

FILTER SECTION (B / P1.0)
1/4" = 1'-0"


TOP OF ROOF 4843.42
FILTER ROOM
CMU PARAPET WALL (TYP)
3" SURFACE WASH HEADER
EXIST 36" FILTER INFLUENT
3" THREADED CAP (SEE NOTE 3)
DEMO EXIST 3" DIP SURFACE WASH (SEE NOTE 2)
PATCH EXIST SURFACE WASH WALL PENETRATION (SEE NOTE 6)
DEMO EXISt SURFACE WASH (SEE NOTE 2)
PROTECT EXIST TROUGHS (SEE NOTE 7)
FILTER NO. 1/3
FILTER NO. 2/4
(SEE NOTE 1)
(UPGRADES NOT SHOWN)
EXIST 24" FILTER INFLUENT (TYP)
DEMO DUAL MEDIA AND GRAVEL (SEE NOTE 4)
CLEARWELL
CLEARWELL
DEMO EXIST CONCRETE UNDER DRAIN SUPPORTS COMPLETELY THIS ROW ONLY (TYP)
DEMO EXIST WHEELER BLOCKS (SEE NOTE 4)
EXIST 16" EFFLUENT TO CLEARWELL (TYP)
EXIST 18" WASTE LINE (TYP)
EXIST BFV (SEE NOTE 9)
TEMP CAP (SEE NOTE 8)
DEMO TOP OF EXIST CONCRETE UNDER DRAIN SUPPORTS (SEE NOTE 5)
TOC 4803.50
TOC 4828.00
HIGH WATER LINE 4825.00
TOP OF TROUGHS 4823.50
TOP OF MEDIA 4820.25
TOP OF GRAVEL 4817.75
TOP OF FILTER BOTTOMS 4816.75
TOC 4814.00
TOC 4809.00

SECTION – PHASE II DEMO (A / P1.0)
3/16" = 1'-0"

DEMO NOTES:

1. FILTERS 1 AND 3 MUST REMAIN IN OPERATION WHILE FILTERS 2 AND 4 ARE BEING DEMOED. ONCE FILTERS 2 AND 4 ARE FULLY FUNCTIONAL AND OPERATIONAL, CONTRACTOR CAN BEGIN DEMO WORK ON FILTERS 1 AND 3, AFTER OWNERS APPROVAL.
2. DEMO ALL SURFACE WASH EQUIPMENT, PIPING, SUPPORTS, BEAMS, SPRAY NOZZLES, ETC. FROM INSIDE FILTERS AND UP DEMO ALL SURFACE WASH EQUIPMENT, PIPING, SUPPORTS, BEAMS, SPRAY NOZZLES, ETC. FROM INSIDE FILTERS 2 AND 4 UP TO SURFACE WASH HEADER AS SHOWN (TYP).
3. INSTALL 3" THREADED CAP IN SURFACE WASH WHERE FILTER SURFACE WASH PIPING WAS DEMOED (I.E. TEMP PLUG).
4. DEMO OF FILTERS INCLUDES REMOVAL OF SAND, ANTHRACITE, GRAVEL, WHEELER UNDERDRAINS AND CONCRETE AS NEEDED TO PREPARE THE FILTER FOR THE ADDITION OF AIR SCOUR AND NEW LEOPOLD UNDERDRAINS.
5. DEMO EXIST CONCRETE SUPPORT BLOCKS A MINIMUM OF 6" BELOW FINISHED FLOOR.
6. PATCH PIPE PENETRATION BY ROUGHENING CONCRETE SURFACE TO 1/4" AMPLITUDE, INSTALLING EXPANDING TYPE WATERSTOP – WATERSTOP RX OR EQUAL, AND PATCH WITH NON-SHRINK GROUT TO MATCH EXISTING WALL SURFACES.
7. PROTECT EXIST WALKWAY, WASTE GULLET AND TROUGHS DURING DEMO PHASE.
8. PROTECT VALVES, SEAL EFFLUENT PIPE LEAVING THE FILTERS WITH WATERTIGHT SEAL (IE. TEMP PLUG).
9. CITY TO ISOLATE EFFLUENT VALVE PRIOR TO DEMO.

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NO.	DATE	DES'D	DWN	REVISION DESCRIPTION

DESIGNED BY:	AMR
DRAWN BY:	LLG
CHECKED BY:	JJM/CDB
JOB #:	2538c
DATE:	DECEMBER 2018

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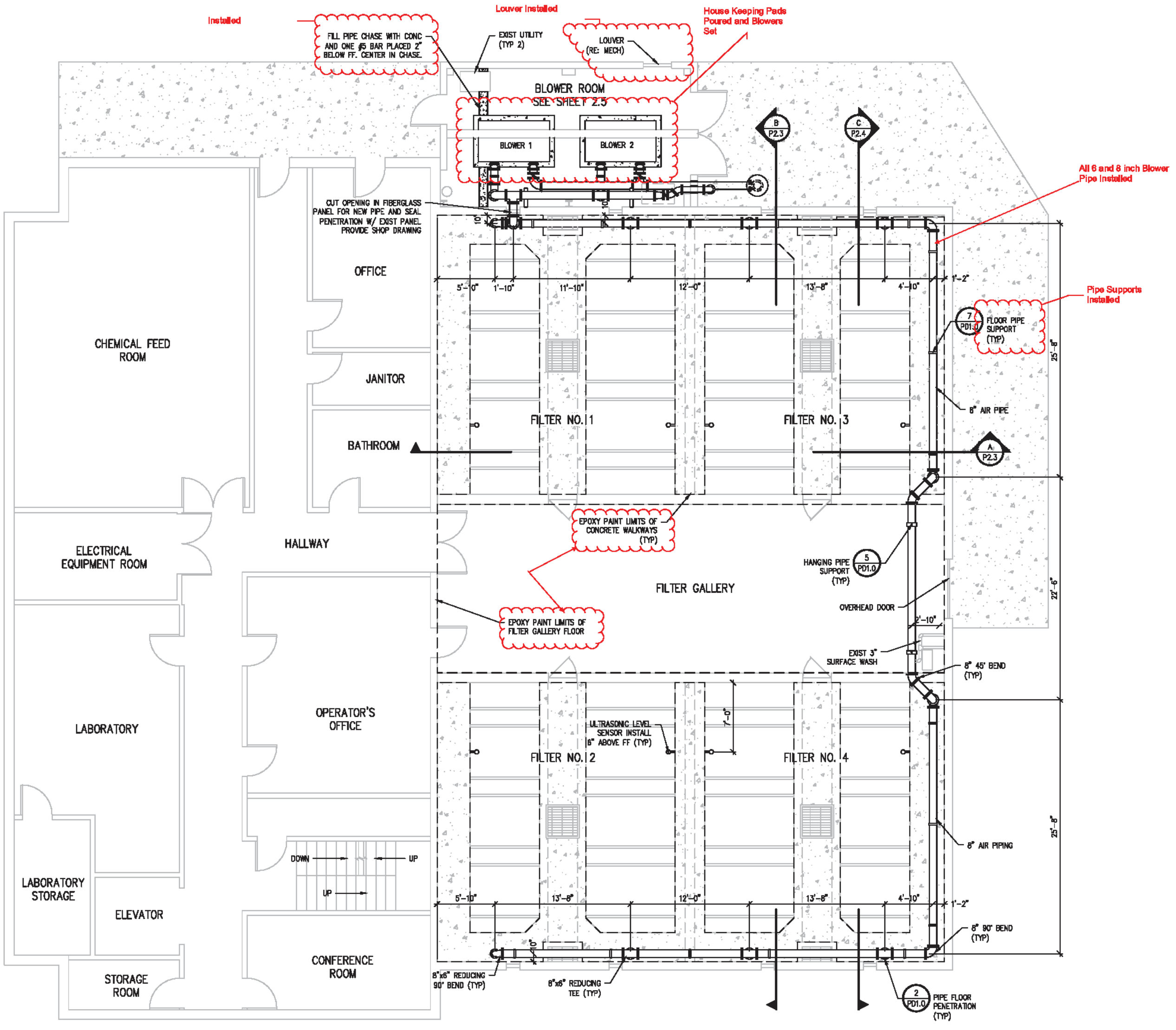
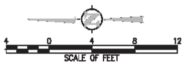
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

SECTION A
DEMO PLAN - PHASE I & II

SHEET NO.
P1.5


Installed
FILL PIPE CHASE WITH CONC AND ONE #5 BAR PLACED 2" BELOW FF. CENTER IN CHASE.
Louver Installed
EXIST UTILITY (TYP 2)
LOUVER (RE: MECH)
House Keeping Pads Poured and Blowers Set
BLOWER ROOM
SEE SHEET 2.5
BLOWER 1
BLOWER 2
B P2.3
C P2.4
All 6 and 8 inch Blower Pipe Installed
CUT OPENING IN FIBERGLASS PANEL FOR NEW PIPE AND SEAL PENETRATION W/ EXIST PANEL PROVIDE SHOP DRAWING
10"
OFFICE
5'-10"
1'-10"
11'-10"
12'-0"
13'-8"
4'-10"
1'-2"
Pipe Supports Installed
7 PD1.0 FLOOR PIPE SUPPORT (TYP)
25'-8"
CHEMICAL FEED ROOM
JANITOR
8" AIR PIPE
FILTER NO. 1
FILTER NO. 3
BATHROOM
A P2.3
EPOXY PAINT LIMITS OF CONCRETE WALKWAYS (TYP)
ELECTRICAL EQUIPMENT ROOM
HALLWAY
HANGING PIPE SUPPORT (TYP)
5 PD1.0
FILTER GALLERY
OVERHEAD DOOR
22'-6"
EPOXY PAINT LIMITS OF FILTER GALLERY FLOOR
2'-10"
EXIST 3" SURFACE WASH
8" 45' BEND (TYP)
LABORATORY
OPERATOR'S OFFICE
ULTRASONIC LEVEL SENSOR INSTALL 6" ABOVE FF (TYP)
7'-0"
FILTER NO. 2
FILTER NO. 4
8" AIR PIPING
DOWN
UP
UP
LABORATORY STORAGE
ELEVATOR
5'-10"
13'-8"
12'-0"
13'-8"
4'-10"
1'-2"
8" 90' BEND (TYP)
10"
CONFERENCE ROOM
STORAGE ROOM
8"x6" REDUCING 90' BEND (TYP)
8"x6" REDUCING TEE (TYP)
2 PD1.0 PIPE FLOOR PENETRATION (TYP)

OPERATING FLOOR PLAN
3/16" = 1'-0"


4
0
4
8
12
SCALE OF FEET

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NO.	DATE	DES'D	DWN	REVISION DESCRIPTION

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DRAWN BY:	LLG
CHECKED BY:	JJM/CDB
JOB #:	2538c
DATE:	DECEMBER 2016

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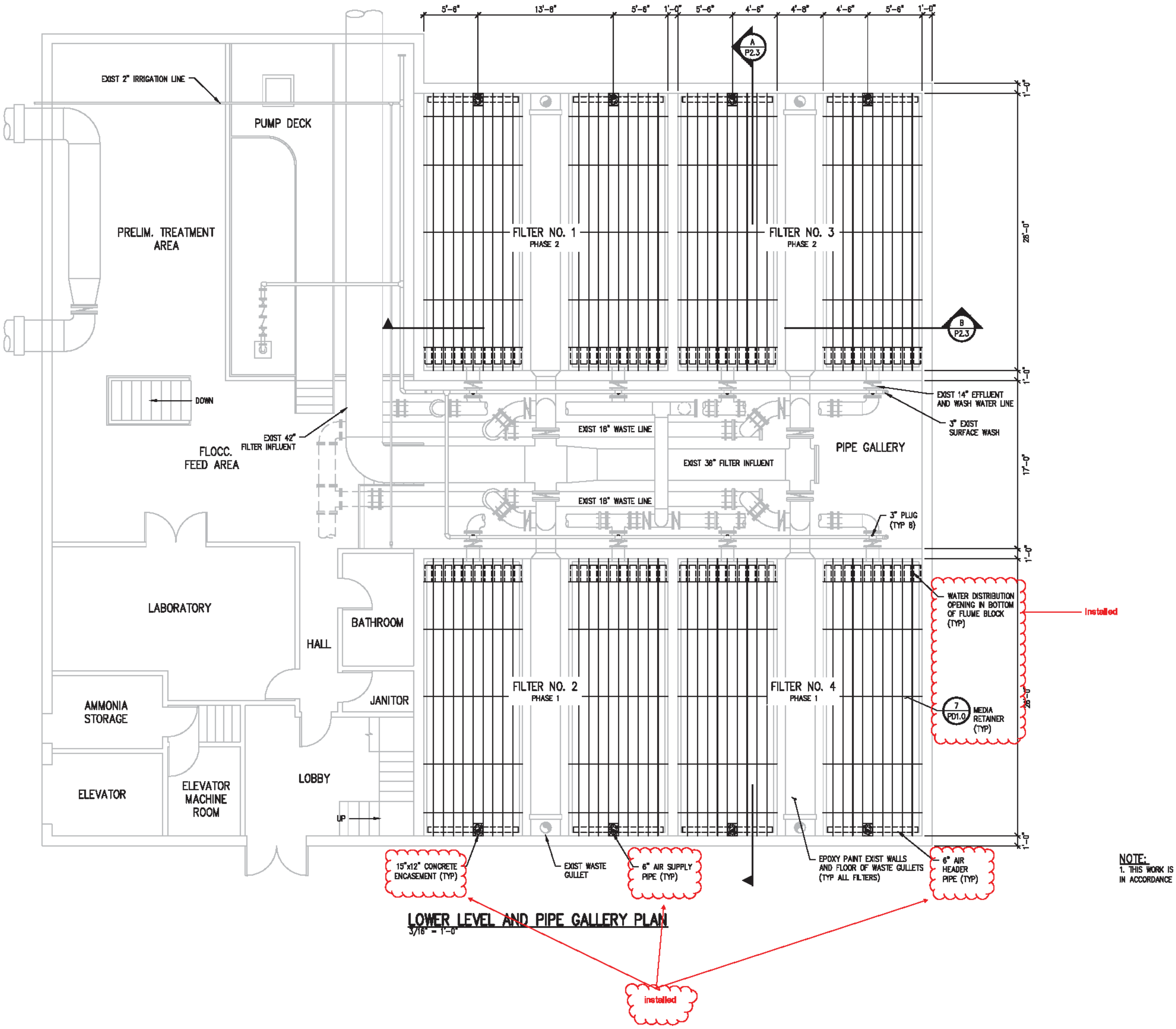
WTP FILTER UPGRADE PROJECT

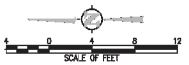
OPERATING FLOOR
UPGRADE PLAN

SHEET NO.
P2.0


5'-6"
13'-8"
5'-6"
1'-0"
5'-6"
4'-6"
4'-8"
4'-6"
5'-6"
1'-0"
A
P2.3
EXIST 2" IRRIGATION LINE
PUMP DECK
PRELIM. TREATMENT AREA
FILTER NO. 1
PHASE 2
FILTER NO. 3
PHASE 2
B
P2.3
1'-0"
25'-0"
1'-0"
17'-0"
1'-0"
25'-0"
1'-0"
DOWN
EXIST 42" FILTER INFLUENT
FLOCC. FEED AREA
EXIST 18" WASTE LINE
EXIST 36" FILTER INFLUENT
EXIST 18" WASTE LINE
EXIST 14" EFFLUENT AND WASH WATER LINE
3" EXIST SURFACE WASH
PIPE GALLERY
3" PLUG (TYP 8)
LABORATORY
HALL
BATHROOM
JANITOR
WATER DISTRIBUTION OPENING IN BOTTOM OF FLUME BLOCK (TYP)
Installed
AMMONIA STORAGE
FILTER NO. 2
PHASE 1
FILTER NO. 4
PHASE 1
7
PD1.0
MEDIA RETAINER (TYP)
ELEVATOR
ELEVATOR MACHINE ROOM
LOBBY
UP
15"x12" CONCRETE ENCASEMENT (TYP)
EXIST WASTE GULLET
6" AIR SUPPLY PIPE (TYP)
EPOXY PAINT EXIST WALLS AND FLOOR OF WASTE GULLETS (TYP ALL FILTERS)
6" AIR HEADER PIPE (TYP)
installed

LOWER LEVEL AND PIPE GALLERY PLAN
3/16" = 1'-0"

NOTE:
1. THIS WORK IS TO BE PERFORMED IN TWO PHASES IN ACCORDANCE W/ DEMO PLANS.


N
4
0
4
8
12
SCALE OF FEET

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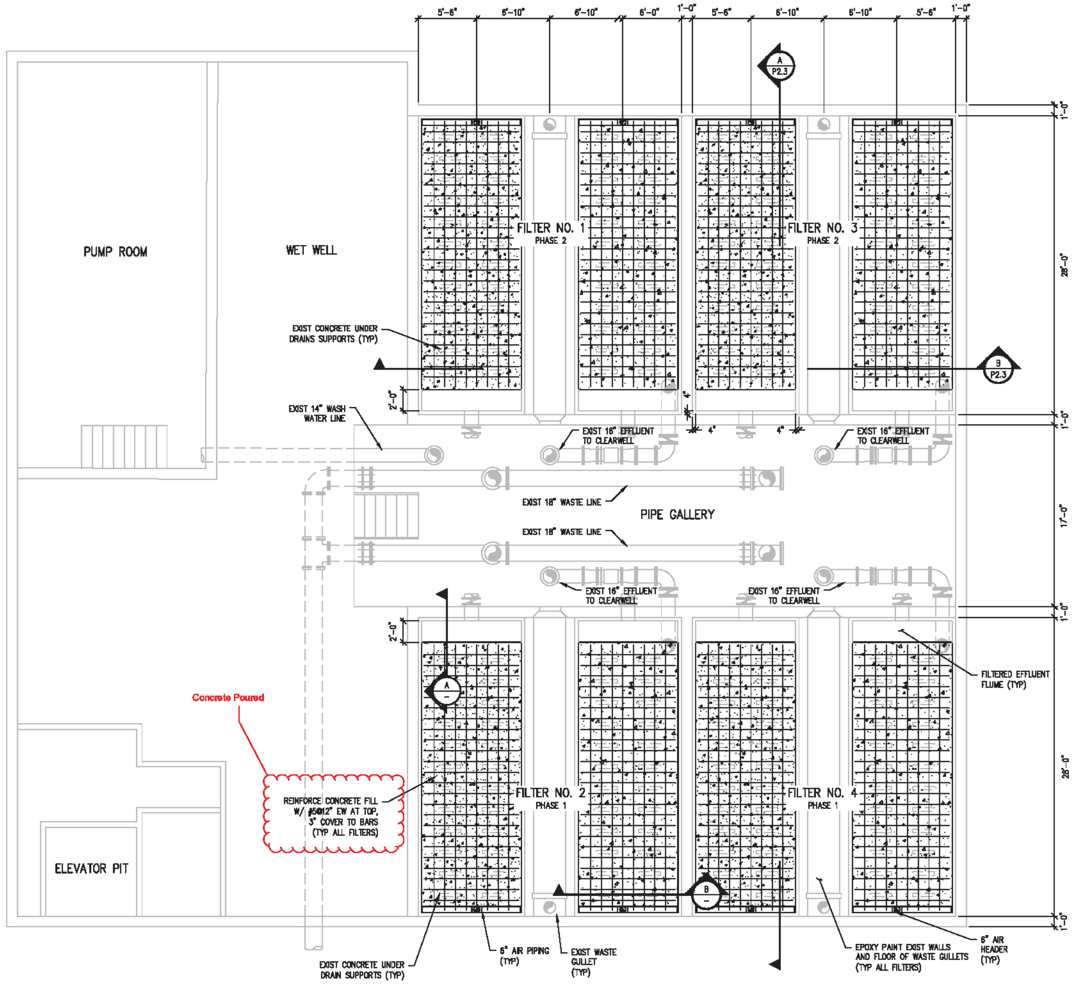
WTP FILTER UPGRADE PROJECT

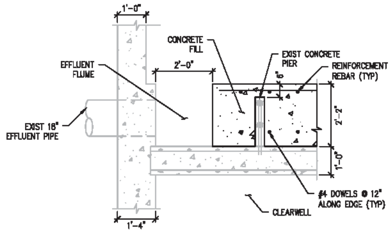
LOWER LEVEL AND PIPE GALLERY
UPGRADE PLAN - PHASE I & II

SHEET NO.
P2.1


5'-6"
6'-10"
6'-10"
6'-0"
1'-0"
5'-6"
6'-10"
6'-10"
5'-6"
1'-0"
A
P2.3
PUMP ROOM
WET WELL
FILTER NO. 1
PHASE 2
FILTER NO. 3
PHASE 2
EXIST CONCRETE UNDER DRAINS SUPPORTS (TYP)
B
P2.3
2'-0"
4"
4"
4"
EXIST 14" WASH WATER LINE
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 18" WASTE LINE
PIPE GALLERY
EXIST 18" WASTE LINE
EXIST 16" EFFLUENT TO CLEARWELL
EXIST 16" EFFLUENT TO CLEARWELL
1'-0"
28'-0"
1'-0"
17'-0"
1'-0"
28'-0"
1'-0"
2'-0"
A
FILTERED EFFLUENT FLUME (TYP)
Concrete Poured
REINFORCE CONCRETE FILL W/ #5@12" EW AT TOP, 3" COVER TO BARS (TYP ALL FILTERS)
FILTER NO. 2
PHASE 1
FILTER NO. 4
PHASE 1
ELEVATOR PIT
B
EXIST CONCRETE UNDER DRAIN SUPPORTS (TYP)
6" AIR PIPING (TYP)
EXIST WASTE GULLET (TYP)
EPOXY PAINT EXIST WALLS AND FLOOR OF WASTE GULLETS (TYP ALL FILTERS)
6" AIR HEADER (TYP)

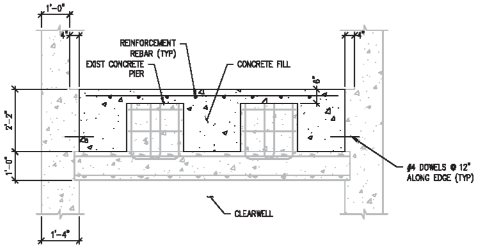
FILTER BOTTOM/CLEARWELL PLAN

3/16" = 1'-0"


1'-0"
CONCRETE FILL
EXIST CONCRETE PIER
REINFORCEMENT REBAR (TYP)
EFFLUENT FLUME
2'-0"
6"
2'-2"
EXIST 18" EFFLUENT PIPE
1'-0"
#4 DOWELS @ 12" ALONG EDGE (TYP)
CLEARWELL
1'-4"

SECTION A/–

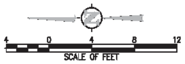
NTS


1'-0"
4"
4"
REINFORCEMENT REBAR (TYP)
EXIST CONCRETE PIER
CONCRETE FILL
6"
2'-2"
1'-0"
#4 DOWELS @ 12" ALONG EDGE (TYP)
CLEARWELL
1'-4"

SECTION B/–

NTS

NOTE:
1. THIS WORK IS TO BE PERFORMED IN TWO PHASES IN ACCORDANCE W/ DEMO PLANS.


4
0
4
8
12
SCALE OF FEET

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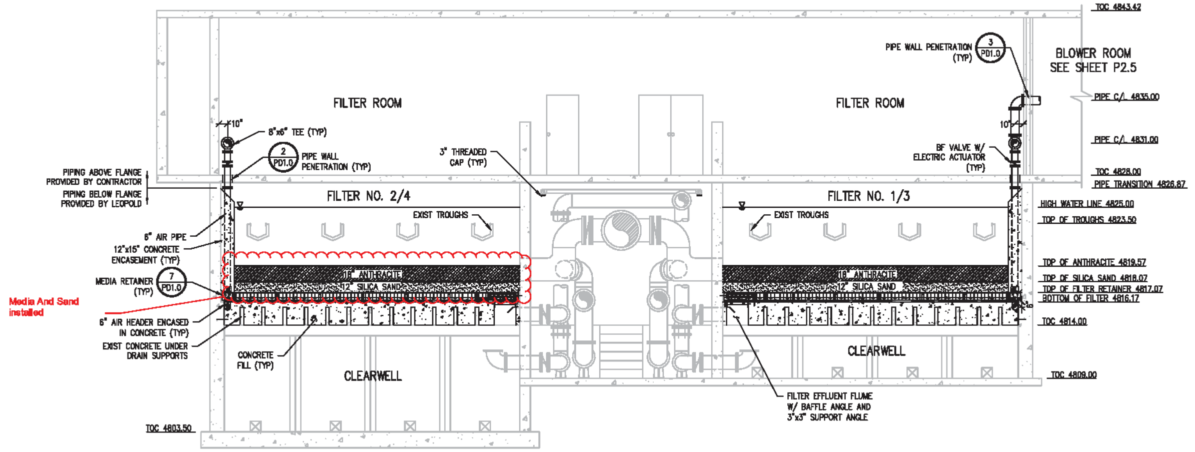
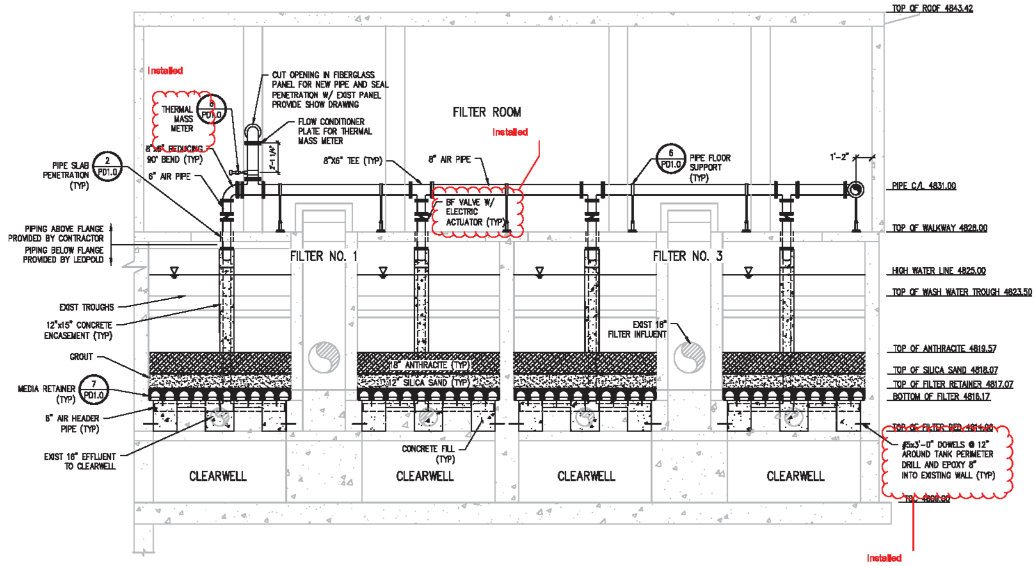
WTP FILTER UPGRADE PROJECT

FILTER BOTTOM / CLEARWELL PLAN
UPGRADE PLAN - PHASE I & II

SHEET NO.
P2.2


TOC 4843.42
PIPE WALL PENETRATION (TYP)
3
PD1.0
BLOWER ROOM
SEE SHEET P2.5
FILTER ROOM
FILTER ROOM
PIPE C/L 4835.00
10"
PIPE C/L 4831.00
8"x6" TEE (TYP)
2
PD1.0
PIPE WALL PENETRATION (TYP)
3" THREADED CAP (TYP)
BF VALVE W/ ELECTRIC ACTUATOR (TYP)
TOC 4828.00
PIPE TRANSITION 4826.87
PIPING ABOVE FLANGE PROVIDED BY CONTRACTOR
PIPING BELOW FLANGE PROVIDED BY LEOPOLD
FILTER NO. 2/4
FILTER NO. 1/3
HIGH WATER LINE 4825.00
EXIST TROUGHS
EXIST TROUGHS
TOP OF TROUGHS 4823.50
6" AIR PIPE
12"x15" CONCRETE ENCASEMENT (TYP)
TOP OF ANTHRACITE 4819.57
18" ANTHRACITE
18" ANTHRACITE
TOP OF SILICA SAND 4818.07
12" SILICA SAND
12" SILICA SAND
TOP OF FILTER RETAINER 4817.07
BOTTOM OF FILTER 4816.17
MEDIA RETAINER (TYP)
7
PD1.0
Media And Sand installed
6" AIR HEADER ENCASED IN CONCRETE (TYP)
TOC 4814.00
EXIST CONCRETE UNDER DRAIN SUPPORTS
CONCRETE FILL (TYP)
CLEARWELL
CLEARWELL
TOC 4809.00
FILTER EFFLUENT FLUME W/ BAFFLE ANGLE AND 3"x3" SUPPORT ANGLE
TOC 4803.50

PIPE GALLERY (A / P2.0)
3/16" = 1'-0"


TOP OF ROOF 4843.42
Installed
CUT OPENING IN FIBERGLASS PANEL FOR NEW PIPE AND SEAL PENETRATION W/ EXIST PANEL PROVIDE SHOW DRAWING
THERMAL MASS METER
5
PD1.0
FLOW CONDITIONER PLATE FOR THERMAL MASS METER
FILTER ROOM
Installed
8"x6" REDUCING 90° BEND (TYP)
2'-1 1/4"
8"X6" TEE (TYP)
8" AIR PIPE
6
PD1.0
PIPE FLOOR SUPPORT (TYP)
1'-2"
PIPE SLAB PENETRATION (TYP)
2
PD1.0
6" AIR PIPE
PIPE C/L 4831.00
BF VALVE W/ ELECTRIC ACTUATOR (TYP)
TOP OF WALKWAY 4828.00
PIPING ABOVE FLANGE PROVIDED BY CONTRACTOR
PIPING BELOW FLANGE PROVIDED BY LEOPOLD
FILTER NO. 1
FILTER NO. 3
HIGH WATER LINE 4825.00
TOP OF WASH WATER TROUGH 4823.50
EXIST TROUGHS
12"x15" CONCRETE ENCASEMENT (TYP)
EXIST 16" FILTER INFLUENT
GROUT
TOP OF ANTHRACITE 4819.57
18" ANTHRACITE (TYP)
12" SILICA SAND (TYP)
TOP OF SILICA SAND 4818.07
MEDIA RETAINER (TYP)
7
PD1.0
TOP OF FILTER RETAINER 4817.07
BOTTOM OF FILTER 4816.17
6" AIR HEADER PIPE (TYP)
TOP OF FILTER BED 4814.00
#5x3'-0" DOWELS @ 12" AROUND TANK PERIMETER DRILL AND EPOXY 8" INTO EXISTING WALL (TYP)
EXIST 16" EFFLUENT TO CLEARWELL
CONCRETE FILL (TYP)
CLEARWELL
CLEARWELL
CLEARWELL
CLEARWELL
TOC 4809.00
Installed

FILTER SECTION (B / P2.0)
1/4" = 1'-0"

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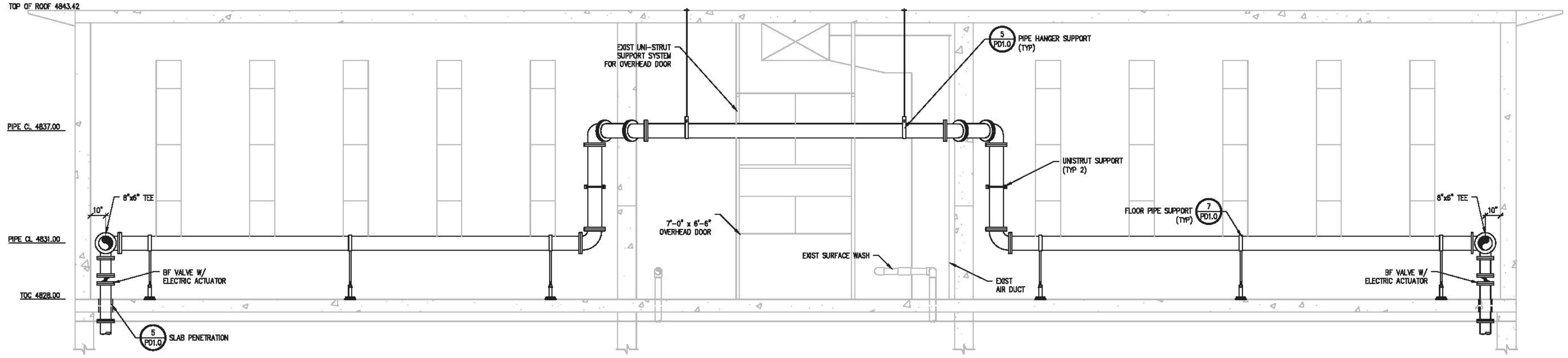
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

SECTION A & B
UPGRADE PLAN - PHASE I & II

SHEET NO.
P2.3


TOP OF ROOF 4843.42
PIPE CL 4837.00
PIPE CL 4831.00
TOC 4828.00
10"
8"x6" TEE
BF VALVE W/ ELECTRIC ACTUATOR
5 PD1.0 SLAB PENETRATION
EXIST UNI-STRUT SUPPORT SYSTEM FOR OVERHEAD DOOR
7'-0" x 6'-6" OVERHEAD DOOR
EXIST SURFACE WASH
EXIST AIR DUCT
5 PD1.0 PIPE HANGER SUPPORT (TYP)
UNISTRUT SUPPORT (TYP 2)
FLOOR PIPE SUPPORT (TYP) 7 PD1.0
8"x6" TEE
10"
BF VALVE W/ ELECTRIC ACTUATOR

AIR PIPING (C / P2.0)
3/8" = 1'-0"

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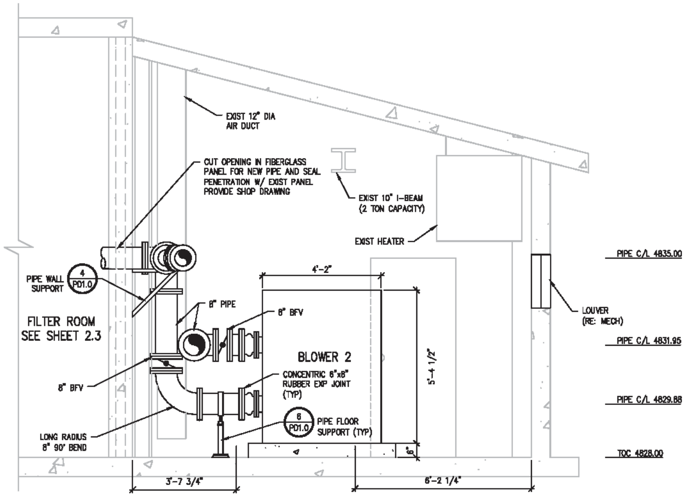
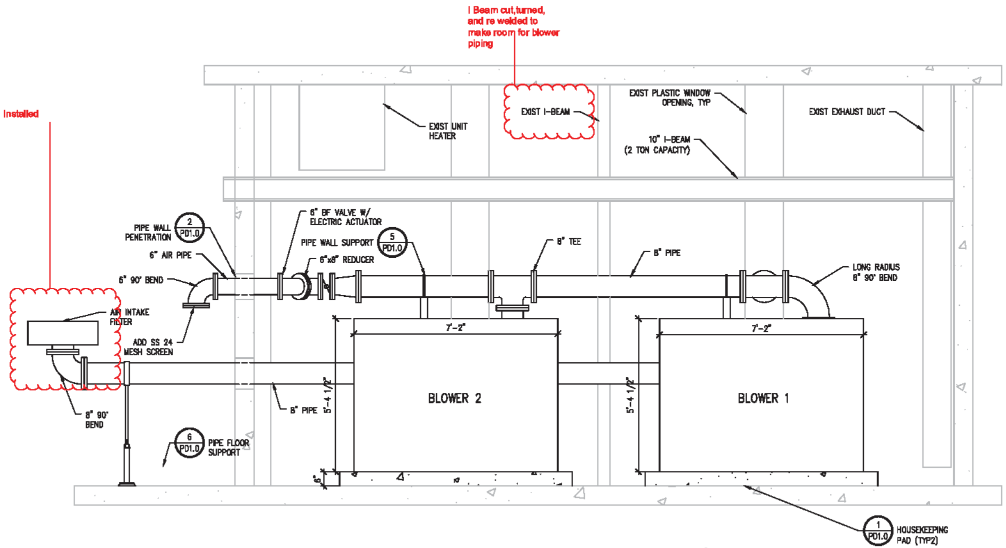
WTP FILTER UPGRADE PROJECT

SECTION C AND AIR SCOUR PIPING DETAIL
UPGRADE PLAN

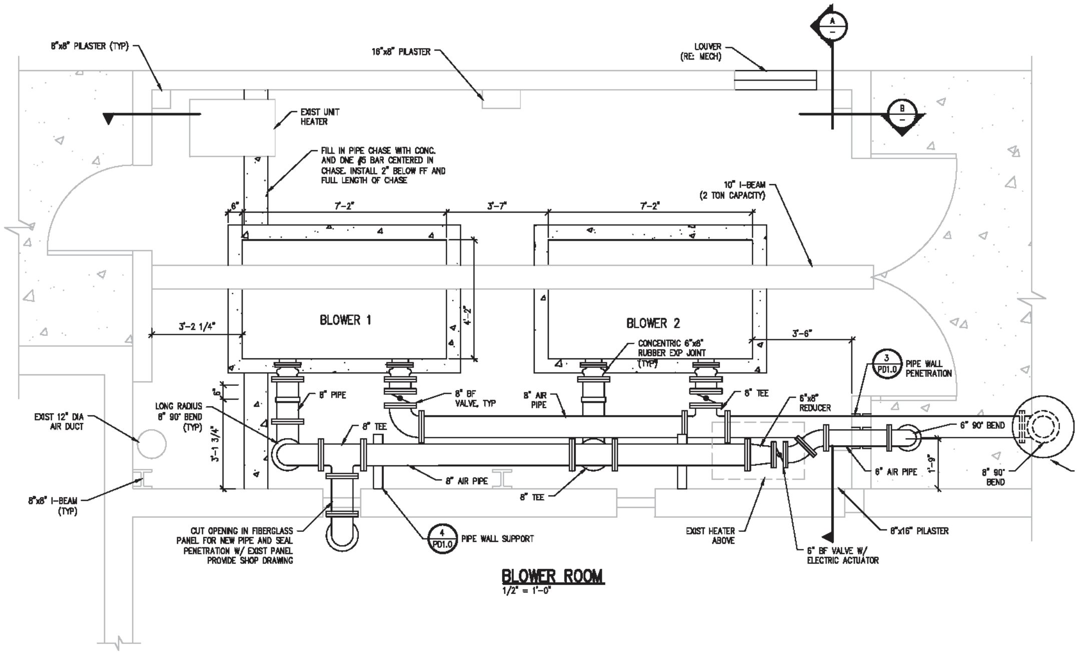
SHEET NO.
P2.4


EXIST 12" DIA
AIR DUCT
CUT OPENING IN FIBERGLASS
PANEL FOR NEW PIPE AND SEAL
PENETRATION W/ EXIST PANEL
PROVIDE SHOP DRAWING
EXIST 10" I-BEAM
(2 TON CAPACITY)
EXIST HEATER
PIPE C/L 4835.00
PIPE WALL SUPPORT
4
PD1.0
FILTER ROOM
SEE SHEET 2.3
8" PIPE
8" BFV
4'-2"
LOUVER
(RE: MECH)
PIPE C/L 4831.95
BLOWER 2
5'-4 1/2"
8" BFV
CONCENTRIC 6"x8"
RUBBER EXP JOINT
(TYP)
PIPE C/L 4829.88
6
PD1.0
PIPE FLOOR
SUPPORT (TYP)
LONG RADIUS
8" 90' BEND
8"
TOC 4828.00
3'-7 3/4"
6'-2 1/4"

SECTION A –
1/2" = 1'-0"


I Beam cut,turned,
and re welded to
make room for blower
piping
Installed
EXIST UNIT
HEATER
EXIST I-BEAM
EXIST PLASTIC WINDOW
OPENING, TYP
EXIST EXHAUST DUCT
10" I-BEAM
(2 TON CAPACITY)
PIPE WALL
PENETRATION
2
PD1.0
6" BF VALVE W/
ELECTRIC ACTUATOR
PIPE WALL SUPPORT
5
PD1.0
6" AIR PIPE
6"x8" REDUCER
8" TEE
8" PIPE
6" 90' BEND
LONG RADIUS
8" 90' BEND
AIR INTAKE
FILTER
ADD SS 24
MESH SCREEN
7'-2"
7'-2"
8" 90'
BEND
8" PIPE
5'-4 1/2"
BLOWER 2
5'-4 1/2"
BLOWER 1
6
PD1.0
PIPE FLOOR
SUPPORT
6"
1
PD1.0
HOUSEKEEPING
PAD (TYP2)

SECTION B –
1/2" = 1'-0"


A
–
8"x8" PILASTER (TYP)
16"x8" PILASTER
LOUVER
(RE: MECH)
B
–
EXIST UNIT
HEATER
FILL IN PIPE CHASE WITH CONC.
AND ONE #5 BAR CENTERED IN
CHASE. INSTALL 2" BELOW FF AND
FULL LENGTH OF CHASE
10" I-BEAM
(2 TON CAPACITY)
6"
7'-2"
3'-7"
7'-2"
BLOWER 1
4'-2"
3'-2 1/4"
BLOWER 2
CONCENTRIC 6"x8"
RUBBER EXP JOINT
(TYP)
3'-6"
3
PD1.0
PIPE WALL
PENETRATION
6"
8" PIPE
8" BF
VALVE, TYP
8" AIR
PIPE
8" TEE
6"x8"
REDUCER
LONG RADIUS
8" 90' BEND
(TYP)
EXIST 12" DIA
AIR DUCT
3'-1 3/4"
8" TEE
6" 90' BEND
6" AIR PIPE
1'-9"
8" 90'
BEND
8" AIR PIPE
8" TEE
8"x8" I-BEAM
(TYP)
CUT OPENING IN FIBERGLASS
PANEL FOR NEW PIPE AND SEAL
PENETRATION W/ EXIST PANEL
PROVIDE SHOP DRAWING
4
PD1.0
PIPE WALL SUPPORT
EXIST HEATER
ABOVE
6" BF VALVE W/
ELECTRIC ACTUATOR
8"x16" PILASTER

BLOWER ROOM
1/2" = 1'-0"

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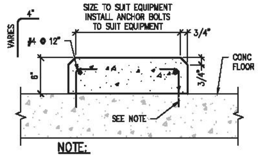
WTP FILTER UPGRADE PROJECT

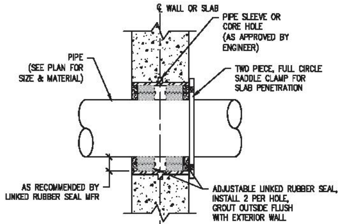
BLOWER ROOM PLAN AND SECTION
UPGRADE PLAN

SHEET NO.
P2.5

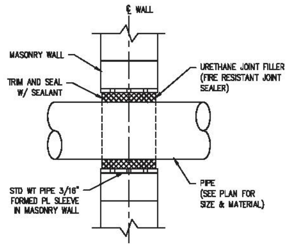

SIZE TO SUIT EQUIPMENT
INSTALL ANCHOR BOLTS
TO SUIT EQUIPMENT
4"
VARIES
#4 @ 12"
3/4"
6"
3/4"
CONC FLOOR
SEE NOTE

NOTE:
DRILL CONCRETE FLOOR 7/8"⌀x6" AT 12" OC, BLOW HOLE CLEAN OF DUST AND DIRT WITH OIL FREE COMPRESSED AIR. EPOXY GROUT REBAR IN HOLE. ALLOW FOR PROPER SET TIME PRIOR TO POURING CONCRETE EQUIPMENT BASE.

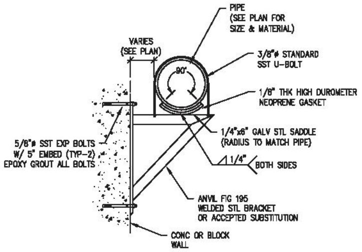
CONCRETE HOUSEKEEPING PAD DETAIL
NTS
1 / P2.5


℄ WALL OR SLAB
PIPE SLEEVE OR CORE HOLE (AS APPROVED BY ENGINEER)
PIPE (SEE PLAN FOR SIZE & MATERIAL)
TWO PIECE, FULL CIRCLE SADDLE CLAMP FOR SLAB PENETRATION
AS RECOMMENDED BY LINKED RUBBER SEAL MFR
ADJUSTABLE LINKED RUBBER SEAL, INSTALL 2 PER HOLE, GROUT OUTSIDE FLUSH WITH EXTERIOR WALL

WALL OR SLAB PENETRATION WITH CORE HOLE DETAIL
NTS
2 / P2.0

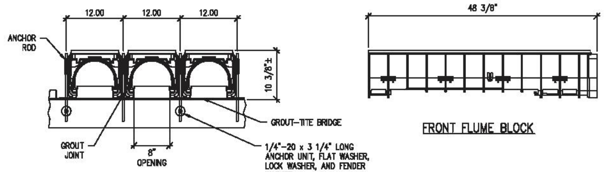

℄ WALL
MASONRY WALL
TRIM AND SEAL W/ SEALANT
URETHANE JOINT FILLER (FIRE RESISTANT JOINT SEALER)
STD WT PIPE 3/16" FORMED PL SLEEVE IN MASONRY WALL
PIPE (SEE PLAN FOR SIZE & MATERIAL)

MASONRY WALL PIPE PENETRATION DETAIL
NTS
3 / P2.0


PIPE (SEE PLAN FOR SIZE & MATERIAL)
VARIES (SEE PLAN)
90°
3/8"⌀ STANDARD SST U-BOLT
1/8" THK HIGH DUROMETER NEOPRENE GASKET
5/8"⌀ SST EXP BOLTS W/ 5" EMBED (TYP-2) EPOXY GROUT ALL BOLTS
1/4"x6" GALV STL SADDLE (RADIUS TO MATCH PIPE)
1/4"
BOTH SIDES
ANVIL FIG 195 WELDED STL BRACKET OR ACCEPTED SUBSTITUTION
CONC OR BLOCK WALL

NOTE:
FOR MASONRY WALLS USE HIT-HY 70 ADHESIVE SYSTEM. STEEL ANCHORS SHALL BE MINIMUM 1/2"⌀ WITH SCREEN TUBE INSERTS.

WALL PIPE SUPPORT DETAIL
NTS
4 / P2.0


12.00
12.00
12.00
ANCHOR ROD
10 3/8"±
GROUT-TITE BRIDGE
GROUT JOINT
8" OPENING
1/4"-20 x 3 1/4" LONG ANCHOR UNIT, FLAT WASHER, LOCK WASHER, AND FENDER WASHER
48 3/8"

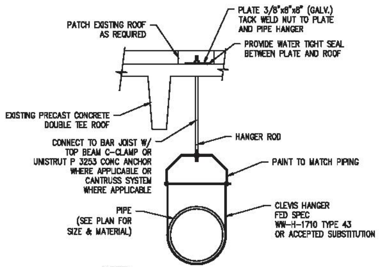
FRONT FLUME BLOCK

ANCHOR ROD NOTE:
DRILL (2) HOLES 5" (127mm) DEEP IN FLOOR, FILL HOLES WITH A SUITABLE EPOXY SYSTEM, SET ANCHOR "L" ROD. TOP OF ANCHOR ROD TO BE 11" FROM HIGHEST POINT OF THE FILTER FLOOR.

EPOXY SYSTEM:
"HILTI HIT RE500" or "EPCON C6". (HOLE DIAMETER AS SPECIFIED BY EPOXY MANUFACTURER.)

NOTES:
1. LEOPOLD FILTER BLOCK TO BE STRUCTURAL HDPE.
2. BRIDGING TO BE INSTALLED BETWEEN FLUME BLOCK TO RETAIN GROUT OVER FLUME.
3. EQUIPMENT SHALL BE INSTALLED IN ACCORDANCE WITH THE LEOPOLD INSTALLATION INSTRUCTIONS AND TOLERANCES SHOWN ON THE DRAWINGS AND O&M MANUAL. READ ALL INSTRUCTIONS PRIOR TO RECEIVING, STORING, INSTALLING AND OPERATING FILTER EQUIPMENT.
4. ALL MOUNTING BRACKETS TO BE STAINLESS STEEL, TYPE 304 AND ALL HARDWARE TO BE STAINLESS STEEL, TYPE 18-8 EXCEPT AS NOTED.
5. THE FILTER FLOORS, MUST HAVE A ROUGH SURFACE EQUIVALENT TO A MINIMUM 1/8 INCH GROOVE BROOM FINISH PRIOR TO PLACING THE BASE GROUT.
6. THE FILTER MUST NOT INCLUDE EXPANSION JOINTS WITHIN THE FILTER BOX.
7. DIMENSIONS AND OTHER INFORMATION PRESENTED ON THE LEOPOLD PROJECT DRAWINGS REPRESENT LEOPOLD'S BEST INTERPRETATION OF THE PROJECT PLANS AND SPECIFICATIONS AS PREPARED BY OTHERS. AS SUCH, DURING THE APPROVAL PROCESS, THE PURCHASER SHALL THOROUGHLY REVIEW AND VERIFY ALL DIMENSIONS WITH RESPECT TO ACTUAL FIELD CONDITIONS. LEOPOLD DRAWINGS ARE SUPPLIED IN THE PROJECT MANUEL.
8. ANCHOR RODS AND ANCHOR ROD EPOXY MUST BE INSTALLED IN ACCORDANCE WITH THE INSTALLATION INSTRUCTIONS AND TOLERANCES SHOWN ON ALL DRAWINGS, THE O&M MANUAL, AND THE EPOXY MANUFACTURER'S INSTRUCTIONS. ENSURE PROPER ANCHOR ROD LOCATION, HOLE SIZES, HEIGHTS, EMBEDMENT DEPTHS, AND EPOXY PENETRATION.

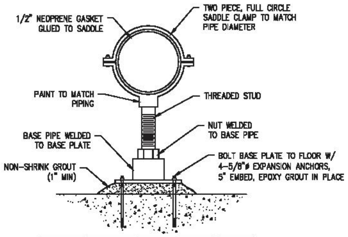
MEDIA RETAINER DETAIL
NTS
7 / P2.1


PATCH EXISTING ROOF AS REQUIRED
PLATE 3/8"x6"x6" (GALV.) TACK WELD NUT TO PLATE AND PIPE HANGER
PROVIDE WATER TIGHT SEAL BETWEEN PLATE AND ROOF
EXISTING PRECAST CONCRETE DOUBLE TEE ROOF
CONNECT TO BAR JOIST W/ TOP BEAM C-CLAMP OR UNISTRUT P 3253 CONC ANCHOR WHERE APPLICABLE OR CANTRUSS SYSTEM WHERE APPLICABLE
HANGER ROD
PAINT TO MATCH PIPING
PIPE (SEE PLAN FOR SIZE & MATERIAL)
CLEVIS HANGER FED SPEC WW-H-1710 TYPE 43 OR ACCEPTED SUBSTITUTION

NOTE:
TOTAL LOADING ON EACH CONCRETE INSERT SHALL NOT EXCEED MANUFACTURE'S RECOMMENDED LOADINGS.

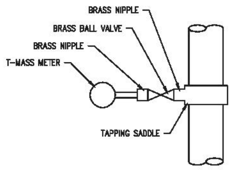
PIPE SIZE	HANGER ROD ⌀
2" & SMALLER	3/8"
2 1/2"	1/2"
3" & 4"	5/8"
6" THRU 12"	3/4"

PIPE HANGER DETAIL
NTS
5 / P2.0


1/2" NEOPRENE GASKET GLUED TO SADDLE
TWO PIECE, FULL CIRCLE SADDLE CLAMP TO MATCH PIPE DIAMETER
PAINT TO MATCH PIPING
THREADED STUD
NUT WELDED TO BASE PIPE
BASE PIPE WELDED TO BASE PLATE
BOLT BASE PLATE TO FLOOR W/ 4-5/8"⌀ EXPANSION ANCHORS, 5" EMBED, EPOXY GROUT IN PLACE
NON-SHRINK GROUT (1" MIN)

PIPE SIZE	CLAMP SIZE	THREADED STUD ⌀	BASE PLATE	BASE PIPE
2", 3"	.375"x1.5"	.75"	6"x6"	2"
4"-12"	.5"x2"	1"	6"x6"	2"
14"-16"	.625"x3"	1.5"	12"x12"	3"
18"-24"	.75"x4"	2"	12"x12"	4"

FLOOR PIPE SUPPORT DETAIL
NTS
6 / P2.0


BRASS NIPPLE
BRASS BALL VALVE
BRASS NIPPLE
T-MASS METER
TAPPING SADDLE

THERMAL MASS METER DETAIL
NTS
8 / P2.3

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NO.	DATE	DES'D	D'WN	REVISION DESCRIPTION

DESIGNED BY:	AMR
DRAWN BY:	LLG
CHECKED BY:	JJM/CDB
JOB #:	2538c
DATE:	DECEMBER 2016

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CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

PROCESS DETAILS

SHEET NO.
PD1.0

EXHAUST FAN SCHEDULE

ITEM	MANUFACTURER/ MODEL	LOCATION/ SERVICE	CFM	ESP	FAN RPM	MAX FAN SONES	ELEC. DATA			MAX OPERATING WEIGHT (LBS)	OVERALL DIMENSIONS	NOTES
							SIZE	VOLT	PH			
EF 1	COOK/ 225C5B	ROOF/ EXHAUST	3,500	.25	596	8.0	1/2 HP	120	1	200	44"DIA X 36" TALL	①②③

NOTES:

① ROOF MOUNTED FAN WITH 14" TALL ROOF CURB, ROTARY BELT TENSIONR, GRAVITY BACKDRAFT DAMPER, GALVANIZED BIRDSCREEN AND NEMA 1 PRE-WIRED DISCONNECT.

② PROVIDE MOTOR STARTER AND REVERSE ACTING THERMOSTAT SET TO TURN FAN ON WHEN SPACE TEMPERATURE EXCEEDS 85 DEG. F.

③ INTERLOCK EXHAUST FAN TO OPEN ALL L-1 OUTSIDE AIR INTAKE LOUVER WHEN FAN OPERATES.

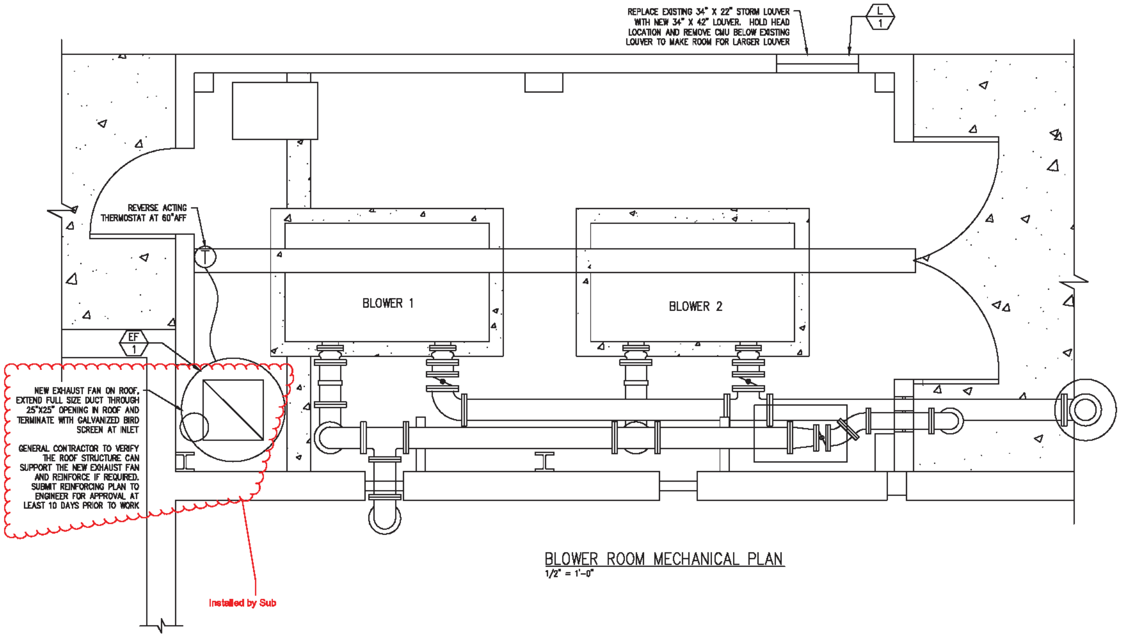
LOUVER SCHEDULE

ITEM	MANUFACTURER/ MODEL	LOCATION/ SERVICE	CFM	MAX. PD (IN)	% FREE AREA	WIDTH (IN)	HEIGHT (IN)	NOTES
L 1	RUSKIN/ LC6375D	WALL/ INTAKE	-	-	-	34	42	①②

NOTES:

① FURNISH WITH 18 GUAGE MINIMUM GALVANIZED STEEL DRAINABLE BLADES, AND BIRDSCREEN

② PROVIDE BAROMETRIC BACKDRAFT DAMPER ON ROOM SIDE OF LOUVER.


REPLACE EXISTING 34" X 22" STORM LOUVER WITH NEW 34" X 42" LOUVER. HOLD HEAD LOCATION AND REMOVE CMU BELOW EXISTING LOUVER TO MAKE ROOM FOR LARGER LOUVER
L 1
REVERSE ACTING THERMOSTAT AT 60"AFF
T
BLOWER 1
BLOWER 2
EF 1
NEW EXHAUST FAN ON ROOF, EXTEND FULL SIZE DUCT THROUGH 25"X25" OPENING IN ROOF AND TERMINATE WITH GALVANIZED BIRD SCREEN AT INLET
GENERAL CONTRACTOR TO VERIFY THE ROOF STRUCTURE CAN SUPPORT THE NEW EXHAUST FAN AND REINFORCE IF REQUIRED. SUBMIT REINFORCING PLAN TO ENGINEER FOR APPROVAL AT LEAST 10 DAYS PRIOR TO WORK
Installed by Sub

BLOWER ROOM MECHANICAL PLAN

1/2" = 1'-0"

GENERAL NOTES

1. ALL WORK SHALL BE INSTALLED IN ACCORDANCE WITH ALL APPLICABLE STATE CODES, LOCAL CODES, AND OWNER'S STANDARDS INDICATED BY THE CONSTRUCTION DOCUMENTS.
2. MECHANICAL DRAWINGS ARE DIAGRAMMATIC AND DO NOT NECESSARILY INDICATE EVERY REQUIRED OFFSET, FITTING, ETC. DRAWINGS ARE NOT TO BE SCALED FOR DIMENSIONS. TAKE ALL DIMENSIONS FROM CERTIFIED EQUIPMENT DRAWINGS AND FROM THE STRUCTURE ITSELF BEFORE FABRICATING ANY WORK, VERIFY ALL SPACE REQUIREMENTS COORDINATING WITH OTHER TRADES, AND INSTALL THE SYSTEMS IN THE SPACE PROVIDED WITHOUT EXTRA CHARGES TO THE OWNER.
3. CONTRACTOR SHALL COORDINATE WORK INDICATED WITH OTHER TRADES. VERIFY FIT OF MECHANICAL SYSTEMS PRIOR TO FABRICATION. COORDINATE ALL WALL AND ROOF OPENING REQUIREMENTS BEFORE CONSTRUCTION.
4. PROVIDE ALL EQUIPMENT SCHEDULED OR INDICATED ON THE DRAWINGS BUT NOT INCLUDED WITHIN THE SPECIFICATIONS INCLUDING ANY REQUIRED BUT NOT LISTED MISC ITEMS NEEDED TO PROVIDE COMPLETELY OPERATIONAL SYSTEMS AS INDICATED WHETHER SPECIFICALLY CALLED FOR OR NOT. INSTALLATION SHALL CONFORM TO MANUFACTURERS RECOMMENDATIONS AND APPLICABLE CODES. PROVIDE SUBMITTALS FOR ALL PROPOSED EQUIPMENT AND MATERIALS TO BE UTILIZED. PROVIDE OPERATION AND MAINTENANCE MANUAL FOR ALL SYSTEMS AND EQUIPMENT AT END OF PROJECT.
5. ELECTRICAL CHARACTERISTICS OF MECHANICAL EQUIPMENT SHALL BE VERIFIED WITH ELECTRICAL DRAWINGS AND ELECTRICAL CONTRACTOR PRIOR TO EQUIPMENT ORDER RELEASE. ADDITIONAL ELECTRICAL WORK RESULTING FROM EQUIPMENT SUBSTITUTION IS THE RESPONSIBILITY OF THE CONTRACTOR.
6. AT THE COMPLETION OF WORK, PROVIDE TESTING AND BALANCING SERVICES FOR MECHANICAL SYSTEM. SUBMIT WRITTEN REPORT TO ENGINEER LISTING SYSTEM AIRFLOWS, ELECTRIC DATA, TEMPERATURES, AND PRESSURE DROPS. AIR BALANCE REPORT REQUIRED PRIOR TO SCHEDULING FINAL MECHANICAL INSPECTION.
7. AT THE COMPLETION OF THE WORK AND PRIOR TO FINAL ACCEPTANCE, ALL PARTS OF THE WORK INSTALLED UNDER THIS SPECIFICATION SHALL BE THOROUGHLY CLEANED.
8. ALL EQUIPMENT, MATERIALS, AND INSTALLATION IS TO BE WARRANTEED FOR ONE YEAR TO BE FREE FROM DEFECT. PROVIDE WRITTEN WARRANTY TO OWNER.
9. THE OWNER AND ENGINEER ARE NOT RESPONSIBLE FOR THE CONTRACTOR'S SAFETY PRECAUTIONS OR TO MEANS, METHODS, TECHNIQUES, CONSTRUCTION SEQUENCES, OR PROCEDURES REQUIRED TO PERFORM HIS WORK.
10. THIS CONTRACTOR SHALL FIELD VERIFY LOCATIONS AND SIZES OF ALL EXISTING EQUIPMENT, DUCTWORK, PIPING, ELECTRICAL CONDUIT, STRUCTURAL MEMBERS, ETC., PRIOR TO STARTING OF CONSTRUCTION. COORDINATE CONFLICTS WITH THE GENERAL CONTRACTOR.
11. THIS CONTRACTOR SHALL COORDINATE ALL REQUIRED EXISTING BUILDING SERVICE SYSTEM OUTAGES WITH BUILDING OWNER.
12. PATCH AND REPAIR TO MATCH EXISTING, ANY WALL/CEILINGS/ROOF TO BE ACCESSED TO ROUTE PIPING, DUCTWORK, LOUVERS AND EXHAUST FAN.

MECHANICAL SPECIFICATIONS

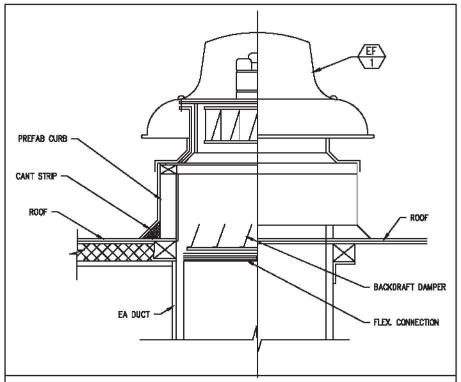
EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED OF GALVANIZED STEEL PER SMACNA DUCT CONSTRUCTION STANDARDS. EXHAUST AIR DUCTWORK SHALL BE CONSTRUCTED FOR 1" W.C. STATIC PRESSURE.

DUCT HANGERS SHALL BE CONSTRUCTED OF ALUMINUM OR GALVANIZED STEEL TO MATCH DUCT MATERIAL. DUCTS SHALL BE SUPPORTED AND CONNECTED TO THE STRUCTURE PER IMC AND SMACNA DUCT CONSTRUCTION STANDARDS.

MECHANICAL EQUIPMENT SHALL BE SECURED AND INSTALLED PER MANUFACTURERS RECOMMENDATIONS AND APPLICABLE SECTIONS OF THE JURISDICTIONAL BUILDING AND MECHANICAL CODES.

ROOF CURB ASSEMBLIES SHALL CONSIST OF HEAVY GAUGE GALVANIZED STEEL CONSTRUCTION, WITH INTEGRAL BASE PLATE, 3# DENSITY INSULATION AND 2 X 2 NAILER.

AN INDEPENDENT TEST AND BALANCE FIRM WHICH IS AABC OR NEBB CERTIFIED SHALL BE RETAINED FOR CHECK/TEST-START-UP AND TESTING AND BALANCING OF AIR AND WATER SYSTEMS. THE TEST REPORT SHALL BE IN A FORMAT APPROVED BY AABC FOR SYSTEMS OF THIS TYPE AND COMPLEXITY. QUALIFICATIONS OF INDEPENDENT TEST AND BALANCE FIRM SHALL BE SUBMITTED FOR REVIEW.


EF 1
PREFAB CURB
CANT STRIP
ROOF
ROOF
BACKDRAFT DAMPER
FLEX. CONNECTION
EA DUCT

ROOF EXHAUST FAN DETAIL

NO SCALE

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NO.	DATE	DES'D	DWN	REVISION DESCRIPTION

DESIGNED BY:	BEM
DRAWN BY:	BEM
CHECKED BY:	BEM
JOB #:	2538c
DATE:	AUGUST 2016

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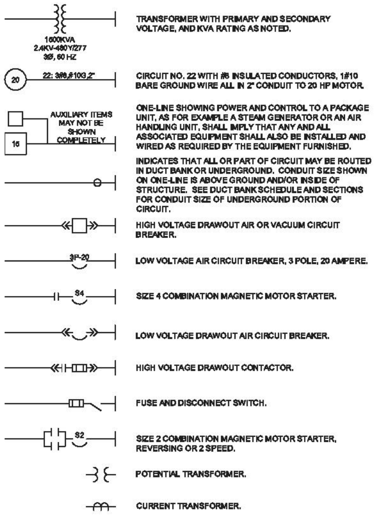
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

BLOWER ROOM
MECHANICAL PLAN

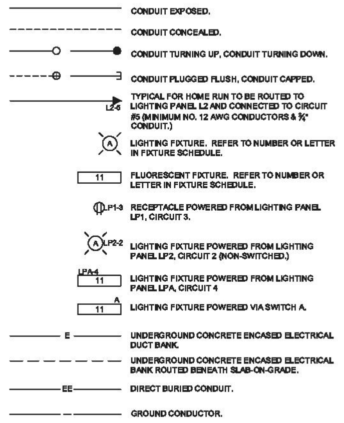
SHEET NO.
M2.5

ONE LINE DIAGRAM LEGEND



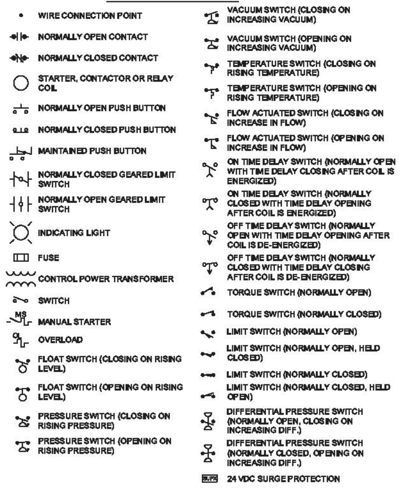
- TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND KVA RATING AS NOTED.
- CIRCUIT NO. 22 WITH #6 INSULATED CONDUCTORS, 1#10 BARE GROUND WIRE ALL IN 2" CONDUIT TO 20 HP MOTOR.
- ONE-LINE SHOWING POWER AND CONTROL TO A PACKAGE UNIT, AS FOR EXAMPLE A STEAM GENERATOR OR AN AIR HANDLING UNIT, SHALL IMPLY THAT ANY AND ALL ASSOCIATED EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY THE EQUIPMENT FURNISHED.
- INDICATES THAT ALL OR PART OF CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN ON ONE-LINE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULE AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.
- HIGH VOLTAGE DRAWOUT AIR OR VACUUM CIRCUIT BREAKER.
- LOW VOLTAGE AIR CIRCUIT BREAKER, 3 POLE, 20 AMPERE.
- SIZE 4 COMBINATION MAGNETIC MOTOR STARTER.
- LOW VOLTAGE DRAWOUT AIR CIRCUIT BREAKER.
- HIGH VOLTAGE DRAWOUT CONTACTOR.
- FUSE AND DISCONNECT SWITCH.
- SIZE 2 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 2 SPEED.
- POTENTIAL TRANSFORMER.
- CURRENT TRANSFORMER.

CONDUIT & WIRING INSTALLATION LEGEND



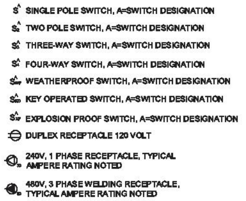
- CONDUIT EXPOSED.
- CONDUIT CONCEALED.
- CONDUIT TURNING UP, CONDUIT TURNING DOWN.
- CONDUIT PLUGGED FLUSH, CONDUIT CAPPED.
- TYPICAL FOR HOME RUN TO BE ROUTED TO LIGHTING PANEL L2 AND CONNECTED TO CIRCUIT #5 (MINIMUM NO. 12 AWG CONDUCTORS & ¾" CONDUIT.)
- LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE.
- FLUORESCENT FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE.
- RECEPTACLE POWERED FROM LIGHTING PANEL LP1, CIRCUIT 3.
- LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LP2, CIRCUIT 2 (NON-SWITCHED.)
- LIGHTING FIXTURE POWERED FROM LIGHTING PANEL LPA, CIRCUIT 4
- LIGHTING FIXTURE POWERED VIA SWITCH A.
- UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK.
- UNDERGROUND CONCRETE ENCASED ELECTRICAL BANK ROUTED BENEATH SLAB-ON-GRADE.
- DIRECT BURIED CONDUIT.
- GROUND CONDUCTOR.

SCHEMATIC SYMBOLS



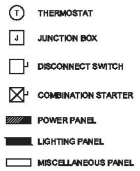
- WIRE CONNECTION POINT
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- STARTER, CONTACTOR OR RELAY COIL
- NORMALLY OPEN PUSH BUTTON
- NORMALLY CLOSED PUSH BUTTON
- MAINTAINED PUSH BUTTON
- NORMALLY CLOSED GEARED LIMIT SWITCH
- NORMALLY OPEN GEARED LIMIT SWITCH
- INDICATING LIGHT
- FUSE
- CONTROL POWER TRANSFORMER
- SWITCH
- MANUAL STARTER
- OVERLOAD
- FLOAT SWITCH (CLOSING ON RISING LEVEL)
- FLOAT SWITCH (OPENING ON RISING LEVEL)
- PRESSURE SWITCH (CLOSING ON RISING PRESSURE)
- PRESSURE SWITCH (OPENING ON RISING PRESSURE)
- VACUUM SWITCH (CLOSING ON INCREASING VACUUM)
- VACUUM SWITCH (OPENING ON INCREASING VACUUM)
- TEMPERATURE SWITCH (CLOSING ON RISING TEMPERATURE)
- TEMPERATURE SWITCH (OPENING ON RISING TEMPERATURE)
- FLOW ACTUATED SWITCH (CLOSING ON INCREASE IN FLOW)
- FLOW ACTUATED SWITCH (OPENING ON INCREASE IN FLOW)
- ON TIME DELAY SWITCH (NORMALLY OPEN WITH TIME DELAY CLOSING AFTER COIL IS ENERGIZED)
- ON TIME DELAY SWITCH (NORMALLY CLOSED WITH TIME DELAY OPENING AFTER COIL IS ENERGIZED)
- OFF TIME DELAY SWITCH (NORMALLY OPEN WITH TIME DELAY OPENING AFTER COIL IS DE-ENERGIZED)
- OFF TIME DELAY SWITCH (NORMALLY CLOSED WITH TIME DELAY CLOSING AFTER COIL IS DE-ENERGIZED)
- TORQUE SWITCH (NORMALLY OPEN)
- TORQUE SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY OPEN)
- LIMIT SWITCH (NORMALLY OPEN, HELD CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED, HELD OPEN)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY OPEN, CLOSING ON INCREASING DIFF.)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY CLOSED, OPENING ON INCREASING DIFF.)
- 24 VDC SURGE PROTECTION

SWITCH & OUTLET SYMBOLS



- SINGLE POLE SWITCH, A=SWITCH DESIGNATION
- TWO POLE SWITCH, A=SWITCH DESIGNATION
- THREE-WAY SWITCH, A=SWITCH DESIGNATION
- FOUR-WAY SWITCH, A=SWITCH DESIGNATION
- WEATHERPROOF SWITCH, A=SWITCH DESIGNATION
- KEY OPERATED SWITCH, A=SWITCH DESIGNATION
- EXPLOSION PROOF SWITCH, A=SWITCH DESIGNATION
- DUPLEX RECEPTACLE 120 VOLT
- 240V, 1 PHASE RECEPTACLE, TYPICAL AMPERE RATING NOTED
- 480V, 3 PHASE WELDING RECEPTACLE, TYPICAL AMPERE RATING NOTED

MISCELLANEOUS SYMBOLS



- THERMOSTAT
- JUNCTION BOX
- DISCONNECT SWITCH
- COMBINATION STARTER
- POWER PANEL
- LIGHTING PANEL
- MISCELLANEOUS PANEL

ABBREVIATIONS

A	AMBER, AMPERE, ALARM
AC	ALTERNATING CURRENT
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISHED FLOOR
AM	AMMETER
ATO	AUTOMATIC THROWOVER
AWG	AMERICAN WIRE GAUGE
C	CLOSE, COUNTER, CONTACTOR
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CD	CONTROL DAMPER
CKT	CIRCUIT
CL2	CHLORINE
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CS	CONTROL STATION
CT	CYCLE TIMER, CURRENT TRANSFORMER
CTM	CYCLE TIMER MOTOR
2/C	2 CONDUCTOR
4"C	4" CONDUIT
DC	DIRECT CURRENT
DM	DAMPER MOTOR, DEMAND METER
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPS	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH
E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EMH	ELECTRICAL MANHOLE
ETM	ELAPSED TIME METER
EX	EXISTING
F	FORWARD
FS	FLOW SWITCH
G	GREEN, GROUND
GFI	GROUND FAULT INTERRUPTER
GLS	GEARED LIMIT SWITCH
#6G	#6 GROUND WIRE
H	HIGH, HUMIDISTAT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)
I/O	INPUT/OUTPUT
J	JUNCTION BOX
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR
L	LOW, LEVEL
LA	LIGHTNING ARRESTOR
LAN	LOCAL AREA NETWORK
LP	LIGHTING PANEL
LS	LIMIT SWITCH, LEVEL SWITCH
LWCO	LOW WATER CUTOFF
M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCM	THOUSAND CIRCULAR MIL
MD	MOISTURE DETECTOR
MH	MANHOLE, MOUNTING HEIGHT
MOV	MOTOR OPERATED VALVE
MS	MANUAL MOTOR STARTER
MSH	MOTOR SPACE HEATER
N	NEUTRAL
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
O	OPEN
OL	OVERLOAD
PB	PUSH BUTTON, PULL BOX
PF	POWER FACTOR METER
PH	PHASE (CHEMICAL TERM)
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER, PROGRAM TIMER
2P	2 POLE
R	RED, RAISE, RELAY, REVERSE
RECP	RECEPTACLE
RGS	RIGID GALVANIZED STEEL
RTD	RESISTANCE TYPE TEMP DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE STARTER
S2	SIZE 2 STARTER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SP	SINGLE POLE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SS	SELECTOR SWITCH
SV	SOLENOID VALVE
SWB	SWITCHBOARD
SWGR	SWITCHGEAR
T	THERMOSTAT, TIMER, TOTALIZER
TACH	TACHOMETER
TB	TERMINAL BLOCK
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TQ	TORQUE
TS	TEMPERATURE SWITCH
UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY
V	VOLTS
VA	VOLT AMPERE
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
W	WHITE, WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
XFMR	TRANSFORMER
XP	EXPLOSION PROOF
Y	YELLOW
Z	AUXILIARY RELAY
ZS	POSITION SWITCH

AREA DESIGNATIONS

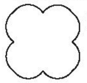
THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES, AND ACCESSORIES.
AREA TYPE 4	INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.
AREA TYPE 7A	CLASS 1, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 7B	CLASS 1, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 12	INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.
AREA TYPE 4X	OUTDOOR AND INDOOR WET LOCATIONS SUBJECT TO CORROSION. CONDUIT SYSTEM SHOULD BE PVC COATED RIGID GALVANIZED STEEL WITH PVC COATED FITTINGS, BOXES, AND STAINLESS STEEL HARDWARE.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATIONS.
2. SPARE WIRES SHALL BE TAPED AND COILED.
3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMODATE THE HIGHER VALUE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.
5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12 AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM ¾".
6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC., NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

GENERAL NOTES

1. SOLID LINES —— INDICATE NEW WORK OR EQUIPMENT.
2. DOTTED LINES .... INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES _ _ _ INDICATE FUTURE WORK OR EQUIPMENT.
4. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
5. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.
   - A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.
   - B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   - C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   - D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.
6.  CLOUDED MARKINGS INDICATE WORK IN EXISTING AREAS THAT IS NEW OR NEW WORK ON AN EXISTING PIECE OF EQUIPMENT.

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NO.	DATE	DES'D	D'WN	REVISION DESCRIPTION

DESIGNED BY: TFW
DRAWN BY: TFW
CHECKED BY: MK
JOB #: 2538c
DATE: DECEMBER 2016

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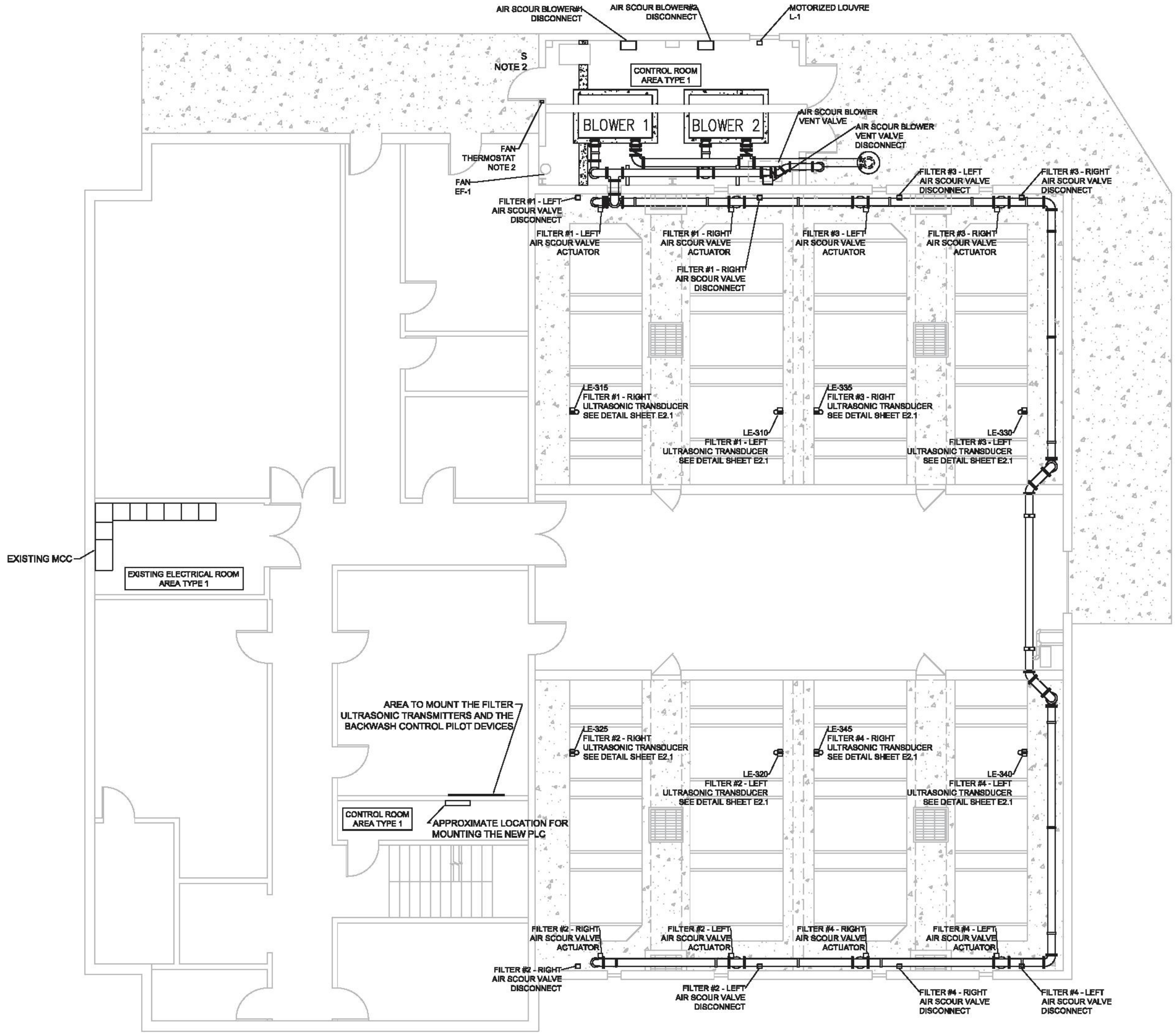
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

ELECTRICAL LEGEND

SHEET NO.
E0.0


AIR SCOUR BLOWER#1 DISCONNECT
AIR SCOUR BLOWER#2 DISCONNECT
MOTORIZED LOUVRE L-1
S NOTE 2
CONTROL ROOM AREA TYPE 1
BLOWER 1
BLOWER 2
AIR SCOUR BLOWER VENT VALVE
AIR SCOUR BLOWER VENT VALVE DISCONNECT
FAN THERMOSTAT NOTE 2
FAN EF-1
FILTER #1 - LEFT AIR SCOUR VALVE DISCONNECT
FILTER #1 - LEFT AIR SCOUR VALVE ACTUATOR
FILTER #1 - RIGHT AIR SCOUR VALVE ACTUATOR
FILTER #1 - RIGHT AIR SCOUR VALVE DISCONNECT
FILTER #3 - LEFT AIR SCOUR VALVE DISCONNECT
FILTER #3 - RIGHT AIR SCOUR VALVE DISCONNECT
FILTER #3 - LEFT AIR SCOUR VALVE ACTUATOR
FILTER #3 - RIGHT AIR SCOUR VALVE ACTUATOR
LE-315 FILTER #1 - RIGHT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-310 FILTER #1 - LEFT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-335 FILTER #3 - RIGHT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-330 FILTER #3 - LEFT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
EXISTING MCC
EXISTING ELECTRICAL ROOM AREA TYPE 1
AREA TO MOUNT THE FILTER ULTRASONIC TRANSMITTERS AND THE BACKWASH CONTROL PILOT DEVICES
CONTROL ROOM AREA TYPE 1
APPROXIMATE LOCATION FOR MOUNTING THE NEW PLC
LE-325 FILTER #2 - RIGHT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-320 FILTER #2 - LEFT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-345 FILTER #4 - RIGHT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
LE-340 FILTER #4 - LEFT ULTRASONIC TRANSDUCER SEE DETAIL SHEET E2.1
FILTER #2 - RIGHT AIR SCOUR VALVE ACTUATOR
FILTER #2 - LEFT AIR SCOUR VALVE ACTUATOR
FILTER #4 - RIGHT AIR SCOUR VALVE ACTUATOR
FILTER #4 - LEFT AIR SCOUR VALVE ACTUATOR
FILTER #2 - RIGHT AIR SCOUR VALVE DISCONNECT
FILTER #2 - LEFT AIR SCOUR VALVE DISCONNECT
FILTER #4 - RIGHT AIR SCOUR VALVE DISCONNECT
FILTER #4 - LEFT AIR SCOUR VALVE DISCONNECT

PROCESS PLAN

3/16" = 1'-0"

NOTES:

1. CONDUITS FOR THE VALVE ACTUATORS AND THE ULTRASONIC TRANSDUCERS SHALL ROUTE TO THE WALL IN AS SHORT A WAY AS POSSIBLE TO MINIMIZE TRIP HAZARDS ON THE WALKWAY. WHEN THE CONDUIT IS ROUTED ALONG THE SIDE OF THE WALKWAY, IT SHALL BE LOCATED OFF THE WALKWAY.
2. A NEW THERMOSTAT SHALL BE PROVIDED AND INSTALLED TO CONTROL THE EXISTING FAN IN THE BLOWER ROOM. THE NEW THERMOSTAT SHALL BE WIRED IN PARALLEL TO THE EXISTING MANUAL SWITCH FOR THE FAN ON THE OUTSIDE OF THE DOOR. THE CONTROLS SHALL BE WIRED INTO THE NEW FAN STARTER, WHICH SHALL BE PROVIDED BY THE HVAC CONTRACTOR, SO THAT EITHER THE SWITCH OR THE THERMOSTAT CAN TURN THE FAN ON WHEN CALLED FOR.

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NO.	DATE	DES'D	DWN	REVISION DESCRIPTION

DESIGNED BY:	TPW
DRAWN BY:	TPW
CHECKED BY:	MK
JOB #:	2538c
DATE:	DECEMBER 2016

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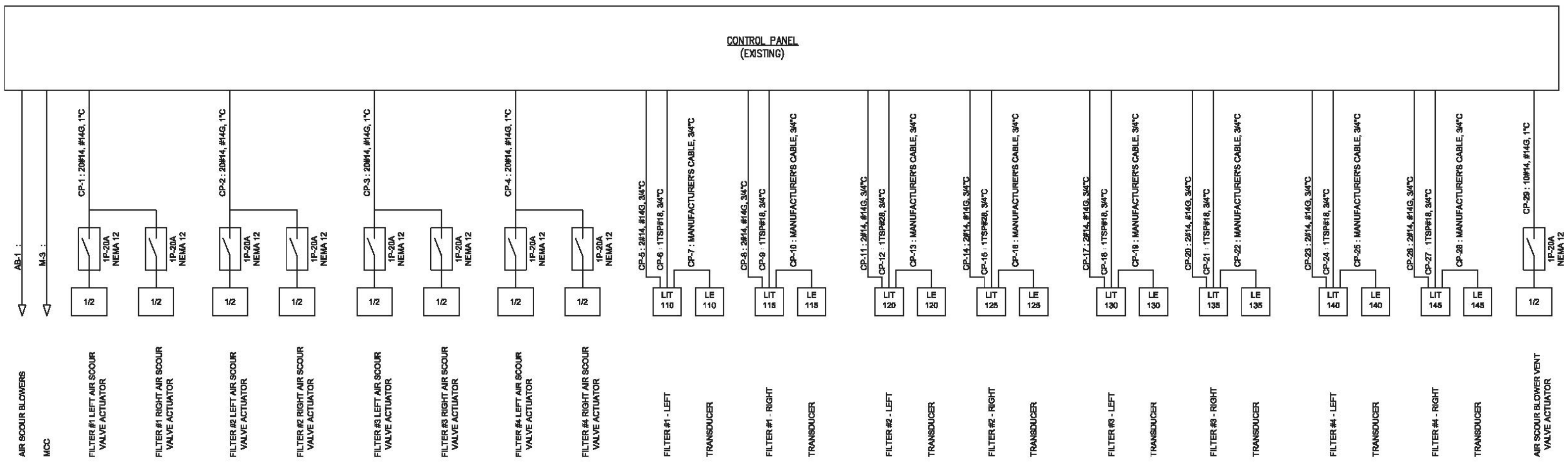
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

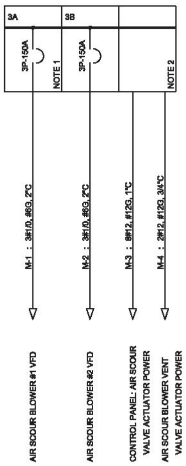
ELECTRICAL
BUILDING PLAN

SHEET NO.

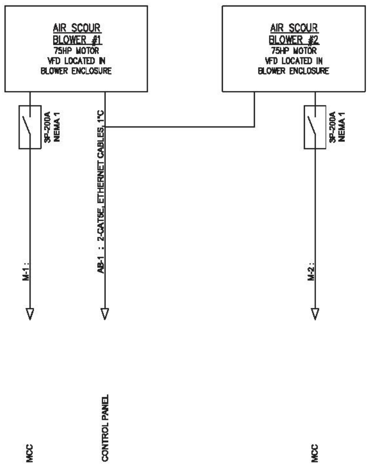
E1.0


CONTROL PANEL
(EXISTING)
AB-1 :
AIR SCOUR BLOWERS
M-3 :
MCC
CP-1 : 20#14, #14G, 1"C
1P-20A
NEMA 12
1/2
FILTER #1 LEFT AIR SCOUR
VALVE ACTUATOR
FILTER #1 RIGHT AIR SCOUR
VALVE ACTUATOR
CP-2 : 20#14, #14G, 1"C
FILTER #2 LEFT AIR SCOUR
VALVE ACTUATOR
FILTER #2 RIGHT AIR SCOUR
VALVE ACTUATOR
CP-3 : 20#14, #14G, 1"C
FILTER #3 LEFT AIR SCOUR
VALVE ACTUATOR
FILTER #3 RIGHT AIR SCOUR
VALVE ACTUATOR
CP-4 : 20#14, #14G, 1"C
FILTER #4 LEFT AIR SCOUR
VALVE ACTUATOR
FILTER #4 RIGHT AIR SCOUR
VALVE ACTUATOR
CP-5 : 2#14, #14G, 3/4"C
CP-6 : 1TSP#18, 3/4"C
CP-7 : MANUFACTURER'S CABLE, 3/4"C
LIT 110
LE 110
FILTER #1 - LEFT
TRANSDUCER
CP-8 : 2#14, #14G, 3/4"C
CP-9 : 1TSP#18, 3/4"C
CP-10 : MANUFACTURER'S CABLE, 3/4"C
LIT 115
LE 115
FILTER #1 - RIGHT
TRANSDUCER
CP-11 : 2#14, #14G, 3/4"C
CP-12 : 1TSP#28, 3/4"C
CP-13 : MANUFACTURER'S CABLE, 3/4"C
LIT 120
LE 120
FILTER #2 - LEFT
TRANSDUCER
CP-14 : 2#14, #14G, 3/4"C
CP-15 : 1TSP#28, 3/4"C
CP-16 : MANUFACTURER'S CABLE, 3/4"C
LIT 125
LE 125
FILTER #2 - RIGHT
TRANSDUCER
CP-17 : 2#14, #14G, 3/4"C
CP-18 : 1TSP#18, 3/4"C
CP-19 : MANUFACTURER'S CABLE, 3/4"C
LIT 130
LE 130
FILTER #3 - LEFT
TRANSDUCER
CP-20 : 2#14, #14G, 3/4"C
CP-21 : 1TSP#18, 3/4"C
CP-22 : MANUFACTURER'S CABLE, 3/4"C
LIT 135
LE 135
FILTER #3 - RIGHT
TRANSDUCER
CP-23 : 2#14, #14G, 3/4"C
CP-24 : 1TSP#18, 3/4"C
CP-25 : MANUFACTURER'S CABLE, 3/4"C
LIT 140
LE 140
FILTER #4 - LEFT
TRANSDUCER
CP-26 : 2#14, #14G, 3/4"C
CP-27 : 1TSP#18, 3/4"C
CP-28 : MANUFACTURER'S CABLE, 3/4"C
LIT 145
LE 145
FILTER #4 - RIGHT
TRANSDUCER
CP-29 : 10#14, #14G, 1"C
AIR SCOUR BLOWER VENT
VALVE ACTUATOR

CONTROL PANEL
ONE-LINE DIAGRAM
ONLY NEW OR MODIFIED CIRCUITS ARE SHOWN

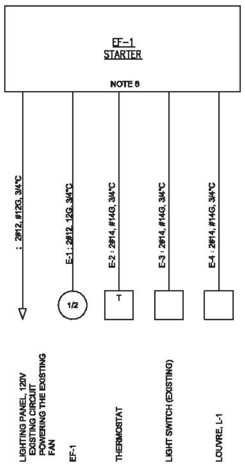

3A
3P-150A
NOTE 1
3B
3P-150A
NOTE 2
M-1 : 3#1/0, #6G, 2"C
AIR SCOUR BLOWER #1 VFD
M-2 : 3#1/0, #6G, 2"C
AIR SCOUR BLOWER #2 VFD
M-3 : 8#12, #12G, 1"C
CONTROL PANEL: AIR SCOUR
VALVE ACTUATOR POWER
M-4 : 2#12, #12G, 3/4"C
AIR SCOUR BLOWER VENT
VALVE ACTUATOR POWER

EXISTING WTP MCC
ONLY ADDED OR MODIFIED
CIRCUITS ARE SHOWN


AIR SCOUR
BLOWER #1
75HP MOTOR
VFD LOCATED IN
BLOWER ENCLOSURE
3P-200A
NEMA 1
M-1 :
MCC
AB-1 : 2-CAT5E, ETHERNET CABLES, 1"C
CONTROL PANEL
AIR SCOUR
BLOWER #2
75HP MOTOR
VFD LOCATED IN
BLOWER ENCLOSURE
3P-200A
NEMA 1
M-2 :
MCC

AIR SCOUR BLOWER #1
ONE-LINE DIAGRAM

AIR SCOUR BLOWER #2
ONE-LINE DIAGRAM


EF-1
STARTER
NOTE 6
: 2#12, #12G, 3/4"C
LIGHTING PANEL, 120V
EXISTING CIRCUIT
POWERING THE EXISTING
FAN
1/2
E-1 : 2#12, 12G, 3/4"C
EF-1
T
E-2 : 2#14, #14G, 3/4"C
THERMOSTAT
E-3 : 2#14, #14G, 3/4"C
LIGHT SWITCH (EXISTING)
E-4 : 2#14, #14G, 3/4"C
LOUVRE, L-1

EF-1
ONE-LINE DIAGRAM

NOTES:
1. RETROFIT THIS BUCKET AS DESCRIBED ON SHEET E2.1.
2. 4 NEW 1P-15A BREAKERS SHALL BE ADDED IN LIGHTING PANEL A IN THE EXISTING MCC FOR POWERING THE NEW AIR SCOUR VALVE ACTUATORS AND ONE NEW 1P-15A BREAKER SHALL BE ADDED FOR THE NEW AIR SCOUR BLOWER VENT VALVE.
3. ONE BREAKER FROM LP-A SHALL POWER BOTH AIR SCOUR ACTUATORS FOR EACH FILTER.
4. ALL THE EXISTING EQUIPMENT IN THIS MCC BUCKET SHALL BE REMOVED AND TURNED OVER TO THE OWNER. THE BUCKET SHALL BE RETROFITTED IN THE FIELD WITH A 3P-150A BREAKER TO MATCH THE BUCKET BELOW IT. THE BREAKER SHALL BE LUGGED TO THE MAIN BUS THE SAME AS THE BREAKER BELOW IT.
5. ALL WIRING ASSOCIATED WITH THE AIR SCOUR ACTUATORS SHALL LAND ON NEW TERMINAL BLOCKS ON THE BACK SIDE OF THE EXISTING CONTROL PANEL.
6. THE EF-1 STARTER, MOTOR, AND THERMOSTAT ARE TO BE PROVIDED BY THE HVAC CONTRACTOR. ELECTRICAL CONTRACTOR SHALL PROVIDE CONDUIT AND WIRING AS SHOWN ON THE ONE-LINE DIAGRAM. THE CIRCUIT TO POWER THE FAN EXISTS TO THE EXISTING FAN THAT IS IN THE SAME LOCATION.

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DESIGNED BY:	TFW
DRAWN BY:	TFW
CHECKED BY:	MK
JOB #:	2638c
DATE:	DECEMBER 2016

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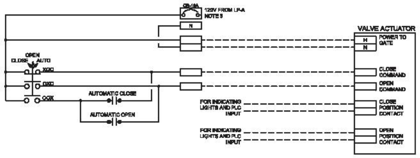
CITY OF GRAND JUNCTION
WTP FILTER UPGRADE PROJECT

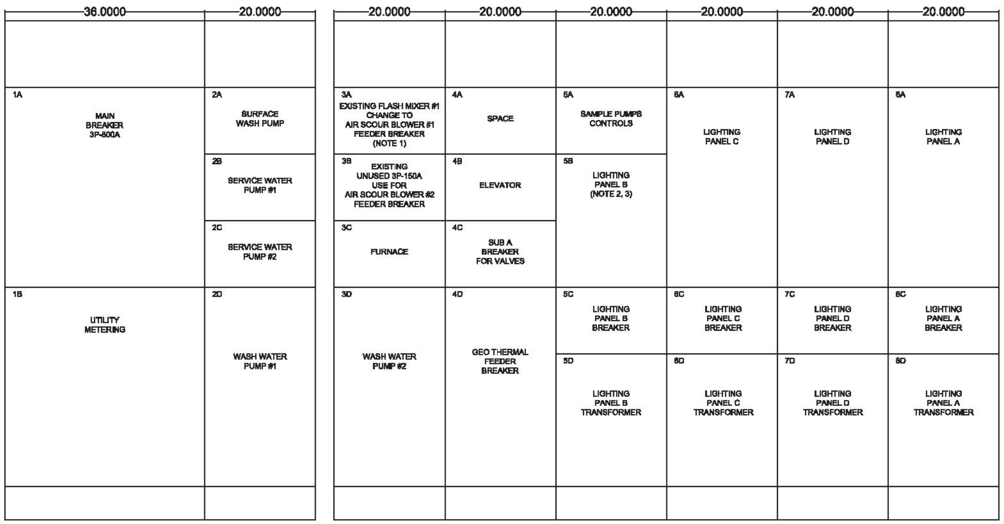
ELECTRICAL
ONE-LINE DIAGRAMS

SHEET NO.
E2.0

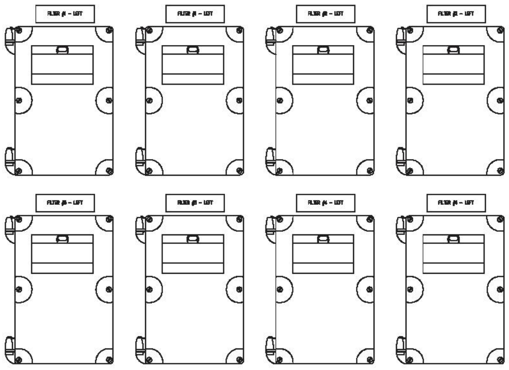

CB-15A
120V FROM LP-A
NOTE 3
N
VALVE ACTUATOR
H
N
POWER TO GATE
OPEN
CLOSE
AUTO
XOO
OXO
OOX
AUTOMATIC CLOSE
AUTOMATIC OPEN
CLOSE COMMAND
OPEN COMMAND
FOR INDICATING LIGHTS AND PLC INPUT
CLOSE POSITION CONTACT
FOR INDICATING LIGHTS AND PLC INPUT
OPEN POSITION CONTACT

CONTROL WIRING FOR EACH
AIR SCOUR VALVE ACTUATOR
TYPICAL FOR ALL 8 ACTUATORS
(NOTE 4)

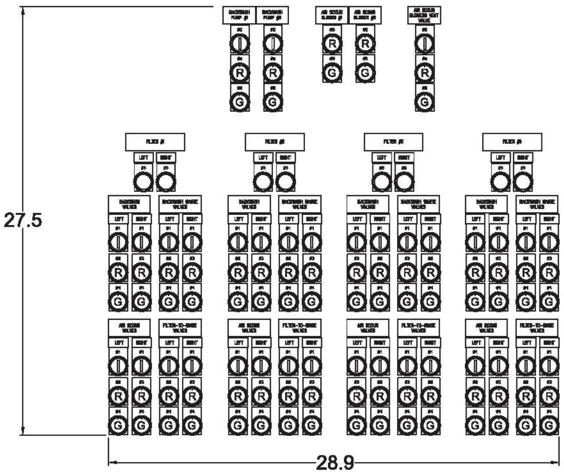
NAMEPLATES	
NAMEPLATE #	NAMEPLATE DESCRIPTION
#1	CLOSE - OPEN - AUTO
#2	HAND - OFF - AUTO
#3	CLOSED
#4	OPENED
#5	BACKWASH INITIATE
#6	RUNNING
#7	OFF


36.0000
20.0000
20.0000
20.0000
20.0000
20.0000
20.0000
20.0000
1A
MAIN BREAKER 3P-800A
1B
UTILITY METERING
2A
SURFACE WASH PUMP
2B
SERVICE WATER PUMP #1
2C
SERVICE WATER PUMP #2
2D
WASH WATER PUMP #1
3A
EXISTING FLASH MIXER #1 CHANGE TO AIR SCOUR BLOWER #1 FEEDER BREAKER (NOTE 1)
3B
EXISTING UNUSED 3P-150A USE FOR AIR SCOUR BLOWER #2 FEEDER BREAKER
3C
FURNACE
3D
WASH WATER PUMP #2
4A
SPACE
4B
ELEVATOR
4C
SUB A BREAKER FOR VALVES
4D
GEO THERMAL FEEDER BREAKER
5A
SAMPLE PUMPS CONTROLS
5B
LIGHTING PANEL B (NOTE 2, 3)
5C
LIGHTING PANEL B BREAKER
5D
LIGHTING PANEL B TRANSFORMER
6A
LIGHTING PANEL C
6C
LIGHTING PANEL C BREAKER
6D
LIGHTING PANEL C TRANSFORMER
7A
LIGHTING PANEL D
7C
LIGHTING PANEL D BREAKER
7D
LIGHTING PANEL D TRANSFORMER
8A
LIGHTING PANEL A
8C
LIGHTING PANEL A BREAKER
8D
LIGHTING PANEL A TRANSFORMER

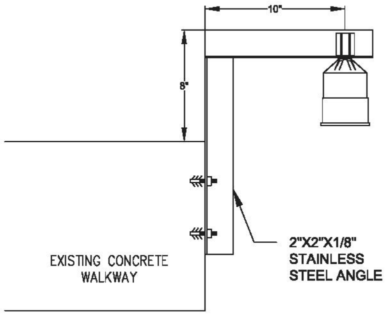
ELEVATION OF
EXISTING MCC



FILTER ULTRASONIC TRASNSMITTERS
ON CONTROL PANEL


BACKWASH PUMP #1
BACKWASH PUMP #2
AIR SCOUR BLOWER #1
AIR SCOUR BLOWER #2
AIR SCOUR BLOWERS VENT VALVE
FILTER #1
FILTER #2
FILTER #3
FILTER #4
LEFT
RIGHT
BACKWASH VALVES
BACKWASH WASTE VALVES
AIR SCOUR VALVES
FILTER-TO-WASTE VALVES
R
G
27.5
28.9

BACKWASH CONTROL LAYOUT
ON CONTROL PANEL


10"
8"
EXISTING CONCRETE WALKWAY
2"X2"X1/8" STAINLESS STEEL ANGLE

FILTER ULTRASONIC TRANSDUCER
MOUNTING DETAIL

NOTES:
1. ALL THE EXISTING EQUIPMENT IN THIS MCC BUCKET SHALL BE REMOVED AND TURNED OVER TO THE OWNER. THE BUCKET SHALL BE RETROFITTED IN THE FIELD WITH A 3P-150A BREAKER TO MATCH THE BUCKET BELOW IT. THE BREAKER SHALL BE LUGGED TO THE MAIN BUS THE SAME AS THE BREAKER BELOW IT.
2. 4 NEW 1P-15A BREAKERS SHALL BE ADDED IN LIGHTING PANEL B IN THE EXISTING MCC FOR POWERING THE NEW AIR SCOUR VALVE ACTUATORS.
3. ONE BREAKER FROM LP-B SHALL POWER BOTH AIR SCOUR ACTUATORS FOR EACH FILTER.
4. ALL WIRING ASSOCIATED WITH THE AIR SCOUR ACTUATORS SHALL LAND ON NEW TERMINAL BLOCKS ON THE BACK SIDE OF THE EXISTING CONTROL PANEL.
5. THE EXISTING CONTROLS IN THE CONTROL PANEL FOR THE BACKWASH PUMPS, BACKWASH VALVES, BACKWASH WASTE VALVES, AND FILTER-TO-WASTE VALVES SHALL BE REWIRED TO BE CONTROLLED BY THE NEW PLC.

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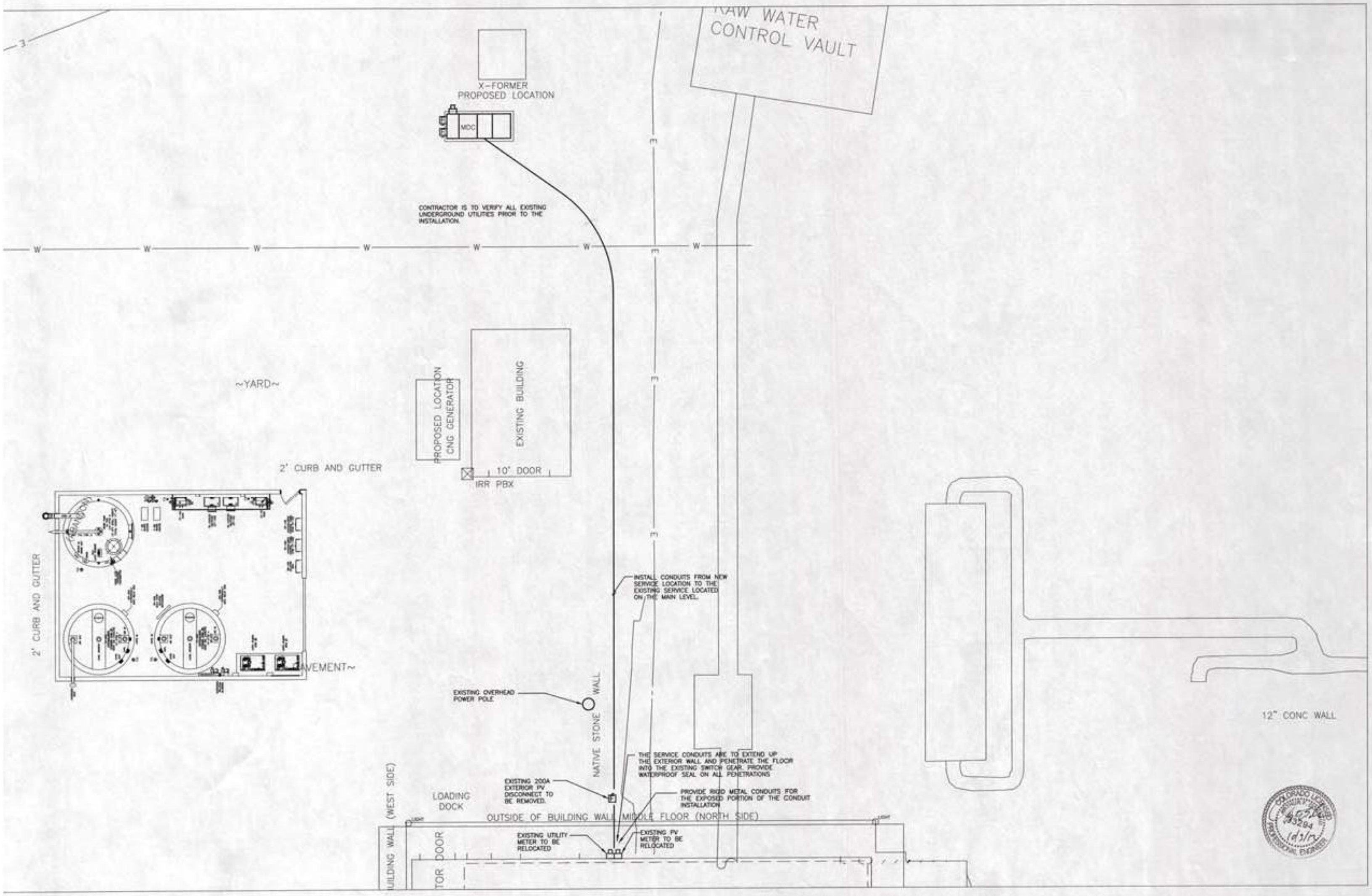
WTP FILTER UPGRADE PROJECT

ELECTRICAL
DETAILS

SHEET NO.
ED1.0


RAW WATER
CONTROL VAULT
X-FORMER
PROPOSED LOCATION
MDC
CONTRACTOR IS TO VERIFY ALL EXISTING UNDERGROUND UTILITIES PRIOR TO THE INSTALLATION.
W
3
~YARD~
PROPOSED LOCATION
CNG GENERATOR
EXISTING BUILDING
10' DOOR
IRR PBX
2' CURB AND GUTTER
2' CURB AND GUTTER
~PAVEMENT~
INSTALL CONDUITS FROM NEW SERVICE LOCATION TO THE EXISTING SERVICE LOCATED ON THE MAIN LEVEL.
EXISTING OVERHEAD POWER POLE
NATIVE STONE WALL
THE SERVICE CONDUITS ARE TO EXTEND UP THE EXTERIOR WALL AND PENETRATE THE FLOOR INTO THE EXISTING SWITCH GEAR. PROVIDE WATERPROOF SEAL ON ALL PENETRATIONS
EXISTING 200A EXTERIOR PV DISCONNECT TO BE REMOVED.
PROVIDE RIGID METAL CONDUITS FOR THE EXPOSED PORTION OF THE CONDUIT INSTALLATION
LOADING DOCK
OUTSIDE OF BUILDING WALL MIDDLE FLOOR (NORTH SIDE)
BUILDING WALL (WEST SIDE)
TOR DOOR
LIGHT
EXISTING UTILITY METER TO BE RELOCATED
EXISTING PV METER TO BE RELOCATED
12" CONC WALL

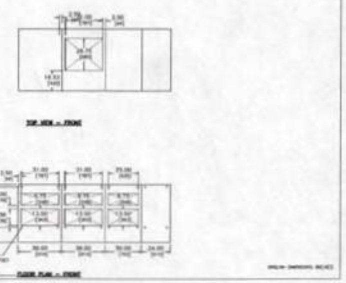
REV	DATE	REVISION DESCRIPTION	BY	BY	BY	BY

Consulting
Engineers, Inc.
Mechanical & Electrical Engineers
569 S. Westgate Dr., Suite 1
Grand Junction, CO 81505
phone: 970-241-8709,
fax: 970-241-9514

12-089
DATE DRAWN: 10-02-12
DRAWN BY:
CHECKED BY:

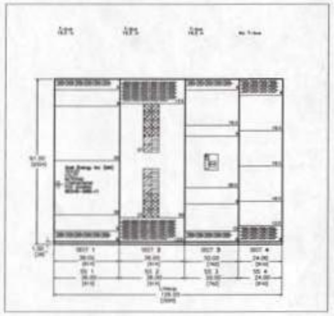
ORCHARD MESA WATER TREATMENT PLANT
ELECTRICAL RELOCATION PROJECT
CITY OF GRAND JUNCTION, COLORADO

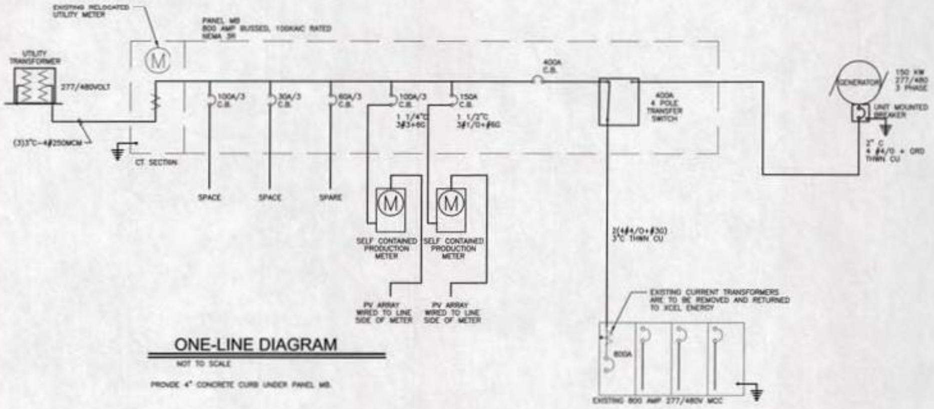
SCALE: AS SHOWN
DRAWING NO.: E1-1
REV.:


TOP VIEW - FRONT
FLOOR PLAN - FRONT

SERVICE DIMENSIONS

SECTIONS ARE TO BE REARRANGED AS SHOWN IN THE ELEVATION DRAWING.

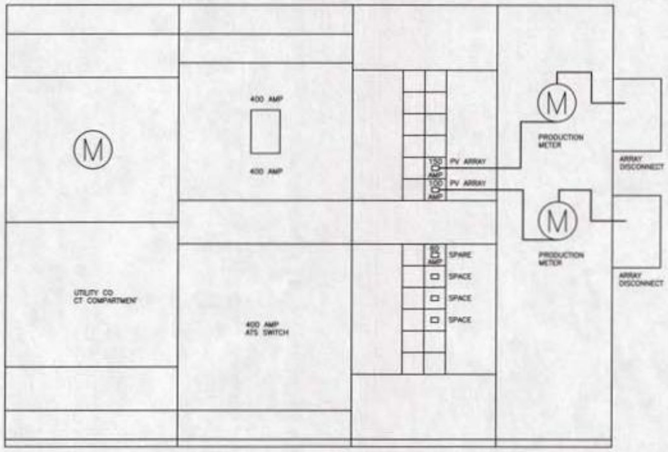



EXISTING RELOCATED UTILITY METER
PANEL MB
800 AMP BUSSED, 100KAIC RATED
NEMA 3R
UTILITY TRANSFORMER
277/480VOLT
M
(3)3"C-4#250MCM
CT SECTION
100A/3 C.B.
30A/3 C.B.
60A/3 C.B.
100A/3 C.B.
150A C.B.
1 1/4"C 3#3+6G
1 1/2"C 3#1/0+#6G
SPACE
SPACE
SPARE
M
M
SELF CONTAINED PRODUCTION METER
SELF CONTAINED PRODUCTION METER
PV ARRAY WIRED TO LINE SIDE OF METER
PV ARRAY WIRED TO LINE SIDE OF METER
400A C.B.
400A 4 POLE TRANSFER SWITCH
GENERATOR
150 KW 277/480 3 PHASE
UNIT MOUNTED BREAKER
2" C
4 #4/0 + GRD
THWN CU
2(4#4/0+#3G)
3"C THWN CU
EXISTING CURRENT TRANSFORMERS ARE TO BE REMOVED AND RETURNED TO XCEL ENERGY
800A
EXISTING 800 AMP 277/480V MCC

ONE-LINE DIAGRAM

NOT TO SCALE

PROVIDE 4" CONCRETE CURB UNDER PANEL MB.


M
UTILITY CO
CT COMPARTMENT
400 AMP
400 AMP
400 AMP
ATS SWITCH
150 AMP
PV ARRAY
100 AMP
PV ARRAY
60 AMP
SPARE
SPACE
SPACE
SPACE
M
PRODUCTION METER
ARRAY DISCONNECT
M
PRODUCTION METER
ARRAY DISCONNECT

SERVICE ELEVATION

NOT TO SCALE

PROVIDE 4" CONCRETE CURB UNDER PANEL MB.
THE TWO PRODUCTION METERS ARE TO BE INSTALLED ON THE FRONT OF THE FOURTH SECTION AND THE TWO ARRAY DISCONNECTS ARE TO BE MOUNTED ONTO THE SIDE OF THE FOURTH SECTION. PROVIDE ALL LABELING REQUIRED BY THE UTILITY COMPANY FOR THE PV METERS AND THE DISCONNECTS. THE BREAKERS INSTALLED FOR THE PV ARRAYS ARE TO BE BACKFEED RATED BREAKERS WITH LOCKOUT ABILITY.

REV.	DATE:	REVISION DESCRIPTION	BY	BY	BY	BY

Bighorn Consulting Engineers, Inc.
Mechanical & Electrical Engineers
569 S. Westgate Dr., Suite 1
Grand Junction, CO 81505
phone: 970-241-8709,
fax: 970-241-9514

FILENAME:	
PROJECT NO.:	12-089
DATE DRAWN:	10-02-12
DRAWN BY:	
CHECKED BY:	

CITY OF GRAND JUNCTION

ORCHARD MESA WATER TREATMENT PLANT
ELECTRICAL RELOCATION PROJECT
CITY OF GRAND JUNCTION, COLORADO

SCALE:	DRAWING NO.:	REV.:
AS SHOWN	E1-2	

REV	DATE	DESCRIPTION	DRAWN	CHECK	APPROVE
3	4/24/12	REVISED TANK SIZES	SM	SM	SM
4	6/4/12	ADDED WATER HEATERS	SM	SM	SM

GRAND JUNCTION WTP

CT–75 & CT–150 SKID MOUNTED
ON–SITE SODIUM HYPOCHLORITE GENERATION SYSTEMS
PIPING AND INSTRUMENTATION DIAGRAM

PRELIMINARY DESIGN
PROPOSAL ONLY
NOT FOR CONSTRUCTION

DRAWING STATUS: ISSUED FOR PROPOSAL

CLORTEC®
UAT

Severn Trent Water Purification, Inc.
2660 Columbia Street
Torrance , California 90503 USA
Tel: 310-618-9700 Fax: 310-618-1384
www.severntrentservices.com

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FRACTIONS	±1/16"	±1.5mm
.X	±0.1"	±2.5mm
.XX	±0.01	±0.51mm
.XXX	±0.005"	±0.127mm
ANGLES	±1 DEG	

SCALE: NTS

CUSTOMER:

PROJECT: GRAND JUNCTION WTP

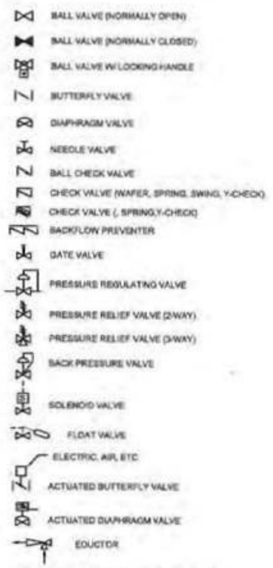
TITLE: CT–75 & CT–150 (225 LBS/DAY) SKID MOUNTED ON–SITE SODIUM HYPOCHLORITE GENERATION SYSTEMS PIPING AND INSTRUMENTATION DIAGRAM

PREPARED BY:	SM	DATE:	03.30.12	DWG NO.:	Q431750–I–01
CHECKED BY:	SM	DATE:	03.30.12	JOB NO.:	Q4–3175
APPROVED BY:	SM	DATE:	03.30.12	P/N:	–

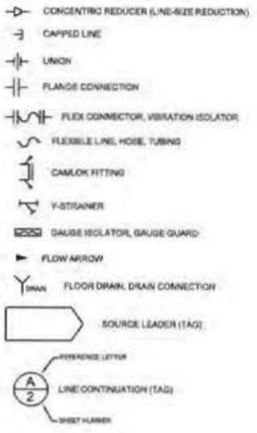
REV: 4

1 of 1

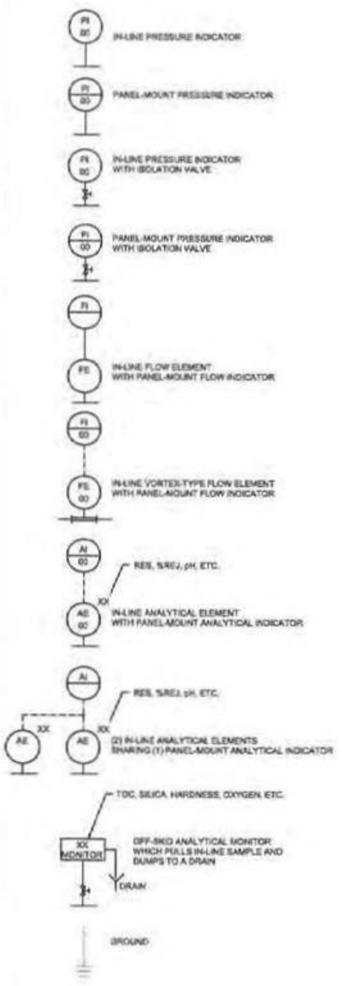
VALVE SYMBOLS


BALL VALVE (NORMALLY OPEN)
BALL VALVE (NORMALLY CLOSED)
BALL VALVE W/ LOCKING HANDLE
BUTTERFLY VALVE
DIAPHRAGM VALVE
NEEDLE VALVE
BALL CHECK VALVE
CHECK VALVE (WAFER, SPRING, SWING, Y-CHECK)
CHECK VALVE (, SPRING,Y-CHECK)
BACKFLOW PREVENTER
GATE VALVE
PRESSURE REGULATING VALVE
PRESSURE RELIEF VALVE (2-WAY)
PRESSURE RELIEF VALVE (3-WAY)
BACK PRESSURE VALVE
SOLENOID VALVE
FLOAT VALVE
ELECTRIC, AIR, ETC.
ACTUATED BUTTERFLY VALVE
ACTUATED DIAPHRAGM VALVE
EDUCTOR

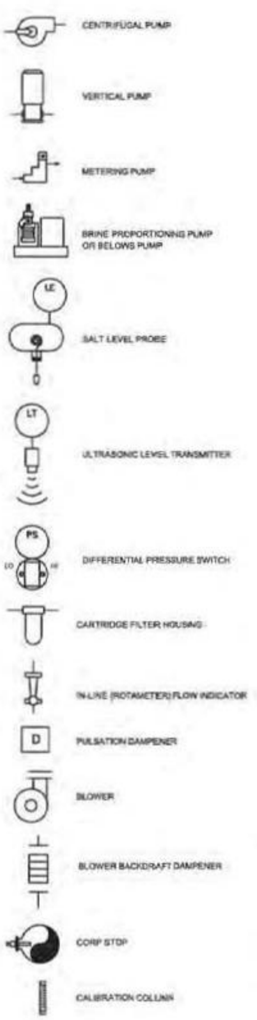
CONNECTION SYMBOLS


CONCENTRIC REDUCER (LINE-SIZE REDUCTION)
CAPPED LINE
UNION
FLANGE CONNECTION
FLEX CONNECTOR, VIBRATION ISOLATOR
FLEXIBLE LINE, HOSE, TUBING
CAMLOK FITTING
Y-STRAINER
GAUGE ISOLATOR, GAUGE GUARD
FLOW ARROW
DRAIN
FLOOR DRAIN, DRAIN CONNECTION
SOURCE LEADER (TAG)
REFERENCE LETTER
A
2
LINE CONTINUATION (TAG)
SHEET NUMBER

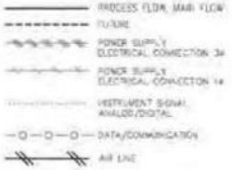
INSTRUMENTATION SYMBOLS


PI
00
IN-LINE PRESSURE INDICATOR
PI
00
PANEL-MOUNT PRESSURE INDICATOR
PI
00
IN-LINE PRESSURE INDICATOR WITH ISOLATION VALVE
PI
00
PANEL-MOUNT PRESSURE INDICATOR WITH ISOLATION VALVE
FI
FE
IN-LINE FLOW ELEMENT WITH PANEL-MOUNT FLOW INDICATOR
FI
00
FE
00
IN-LINE VORTEX-TYPE FLOW ELEMENT WITH PANEL-MOUNT FLOW INDICATOR
AI
00
RES, %REJ, pH, ETC.
XX
AE
00
IN-LINE ANALYTICAL ELEMENT WITH PANEL-MOUNT ANALYTICAL INDICATOR
AI
RES, %REJ, pH, ETC.
XX
XX
AE
AE
(2) IN-LINE ANALYTICAL ELEMENTS SHARING (1) PANEL-MOUNT ANALYTICAL INDICATOR
TOC, SILICA, HARDNESS, OXYGEN, ETC.
XX
MONITOR
OFF-SKID ANALYTICAL MONITOR WHICH PULLS IN-LINE SAMPLE AND DUMPS TO A DRAIN
DRAIN
GROUND

EQUIPMENT SYMBOLS


CENTRIFUGAL PUMP
VERTICAL PUMP
METERING PUMP
BRINE PROPORTIONING PUMP OR BELOWS PUMP
LE
SALT LEVEL PROBE
LT
ULTRASONIC LEVEL TRANSMITTER
PS
LO
HI
DIFFERENTIAL PRESSURE SWITCH
CARTRIDGE FILTER HOUSING
IN-LINE (ROTAMETER) FLOW INDICATOR
D
PULSATION DAMPENER
BLOWER
BLOWER BACKDRAFT DAMPENER
CORP STOP
CALIBRATION COLUMN

LINE SYMBOLS


PROCESS FLOW, MAIN FLOW
FUTURE
POWER SUPPLY ELECTRICAL CONNECTION 3ø
POWER SUPPLY ELECTRICAL CONNECTION 1ø
INSTRUMENT SIGNAL ANALOG/DIGITAL
DATA/COMMUNICATION
AIR LINE

ABBREVIATIONS

ACC	ACID CLEANING CART
AC	ACTIVATED CARBON
ADV	ACTUATED DIAPHRAGM VALVE
AE	ANALYTICAL ELEMENT
AI	ANALYTICAL INDICATOR
AIT	ANALYTICAL INDICATOR TRANSMITTER
BFV	BUTTERFLY VALVE
BL	BLOWER
BR	BRINE
BP	BRINE PUMP
BPV	BACK PRESSURE VALVE
BV	BALL VALVE
CC	CALIBRATION COLUMN
CP	CONTROL PANEL
CS	CORP STOP
CV	CHECK VALVE
CWS	CITY WATER SUPPLY
DPS	DIFFERENTIAL PRESSURE SWITCH
DPSL	DIFFERENTIAL PRESSURE SWITCH LOW
DV	DIAPHRAGM VALVE
EC	ELECTROLYTIC CELL
ECR	ELECTROLYTIC CELL RACK
ECS	ELECTROLYTIC CELL SKID
ED	EDUCTOR
FE	FLOW ELEMENT
FI	FLOW INDICATOR
FIL	FILTER CARTRIDGE
FIT	FLOW INDICATOR TRANSMITTER
FM	FLOWMETER
FS	FLOW SWITCH
FSL	FLOW SWITCH LOW
H2	HYDROGEN
HD	HYDROGEN DETECTOR
HI	HIGH
HM	HARDNESS MONITOR
HS	HYPOCHLORITE SOLUTION
HTR	HEATER
HV	HAND VALVE
HX	HEAT EXCHANGER
ISB	INTRINSICALLY SAFE BARRIER
JB	JUNCTION BOX
LCP	LOCAL CONTROL PANEL
LE	LEVEL ELEMENT
LIT	LEVEL INDICATOR TRANSMITTER
LMS	LIMIT SWITCH
LO	LOW
LS	LEVEL SWITCH
LSL	LEVEL SWITCH LOW
LT	LEVEL TRANSMITTER
MCP	MASTER CONTROL PANEL
MP	METERING PUMP
MV	MOTORIZED VALVE
NaCL	SODIUM CHLORIDE
NaOCL	SODIUM HYPOCHLORITE
N.C	NORMALLY CLOSED
NPW	NON-POTABLE WATER
OSHG	ON-SITE HYPOCHLORITE GENERATION
P	PUMP
PD	PULSATION DAMPENER
PI	PRESSURE INDICATOR
PIT	PRESSURE INDICATING TRANSMITTER
PLC	PROGRAMMABLE LOGIC CONTROLLER
PPD	POUNDS PER DAY
PRV	PRESSURE REGULATING VALVE
PRV	PRESSURE RELIEF VALVE
PS	PRESSURE SWITCH
PSB	POWER SUPPLY BOX
PSL	PRESSURE SWITCH LOW
PT	PRESSURE TRANSMITTER
PVC	POLYVINYL CHLORIDE
R	RECTIFIER
RSU	REMOTE START UNIT
SH	SODIUM HYPOCHLORITE
SHCLR	SODIUM HYPOCHLORITE
SV	SOLENOID VALVE
SP	STAND PIPE
SPW	SUPPLIED POTABLE WATER
SW	SOFTENED WATER
TK	TANK
TC	TEMPERATURE CONTROL
TE	TEMPERATURE ELEMENT
TI	TEMPERATURE INDICATOR
TS	TEMPERATURE SWITCH
TSH	TEMPERATURE SWITCH HIGH
TSL	TEMPERATURE SWITCH LOW
VFD	VARIABLE FREQUENCY DRIVE
WC	WATER CHILLER
WH	WATER HEATER
YST	Y-STRAINER

REV	DATE	DESCRIPTION	DRAWN	CHECK	APPROVE
3	4/24/12	REVISED TANK SIZE	SM	SM	SM
4	6/[illegible]/12	ADDED WATER HEATERS	SM	SM	SM

GENERAL NOTES

1. THIS DRAWING IS FOR EQUIPMENT PROCESS FLOW INFORMATION PURPOSES ONLY. ALL EQUIPMENT, COMPONENTS, INSTRUMENTS, DEVICES, PIPING, FITTINGS, VALVES & CONDUIT SHOWN ON THIS DRAWING ARE NOT NECESSARILY SUPPLIED & INSTALLED BY CLORTEC. REFER TO CONTRACT DOCUMENTS, CLORTEC SCOPE OF SUPPLIES FOR CLORTEC RESPONSIBILITY IN THIS PROJECT.
2. ALL PIPING FITTINGS & VALVES ARE SCH. 80. ALL TUBING ARE BLACK POLYETHYLENE.
3. ELECTRICAL POWER, WATER SUPPLY, POINT OF INJECTION AND SCADA ARE PROVIDED BY OTHERS.
4. ALL UNDER GROUND WORK, CONCRETE WORK, WALL AND ROOF PENETRATIONS ARE DONE BY OTHERS.
5. ALL ELECTRICAL CONDUITS, WIRING ,JUNCTION AND PULL BOXES WILL BE PROVIDED BY OTHERS.
6. ALL PAINTING AND COATING TO BE PROVIDED BY OTHERS.
7. ALL BACKBOARDS AND SUPPORTS TO BE PROVIDED BY OTHERS.
8. CUSTOMER TO PROVIDE WATER SUPPLY PRESSURE & TEMPERATURE.
9. ALL ELECTRICAL DISCONNECT SWITCHES ARE PROVIDED BY OTHERS.
10. FOR 1500 AMP RECTIFIER UNITS: RECTIFIER POWER DISTRIBUTION BLOCK WILL ACCEPT A SINGLE CONDUCTOR PER POLE, 400 MCM TO #6 AWG. ACTUAL WIRE SIZE WILL BE DETERMINED BY THE ELECTRICAL CONTRACTOR TO MEET NEC CODE.

    FOR 300 AMP RECTIFIER UNITS: RECTIFIER POWER DISTRIBUTION BLOCK WILL ACCEPT A SINGLE CONDUCTOR PER POLE, 2/0 TO #14 AWG. ACTUAL WIRE SIZE WILL BE DETERMINED BY THE ELECTRICAL CONTRACTOR TO MEET NEC CODE.

PRELIMINARY DESIGN
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DRAWING STATUS: ISSUED FOR PROPOSAL

CLORTEC®
UAT

Severn Trent Water Purification, Inc.
2660 Columbia Street
Torrance , California 90503 USA
Tel: 310-618-9700 Fax: 310-618-1384
www.severntrentservices.com

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FRACTIONS	±1/16"	±1.5mm
.X	±0.1"	±2.5mm
.XX	±0.01	±0.25mm
.XXX	±0.005"	±0.125mm
ANGLES	±1.0DEG	

SCALE: NTS

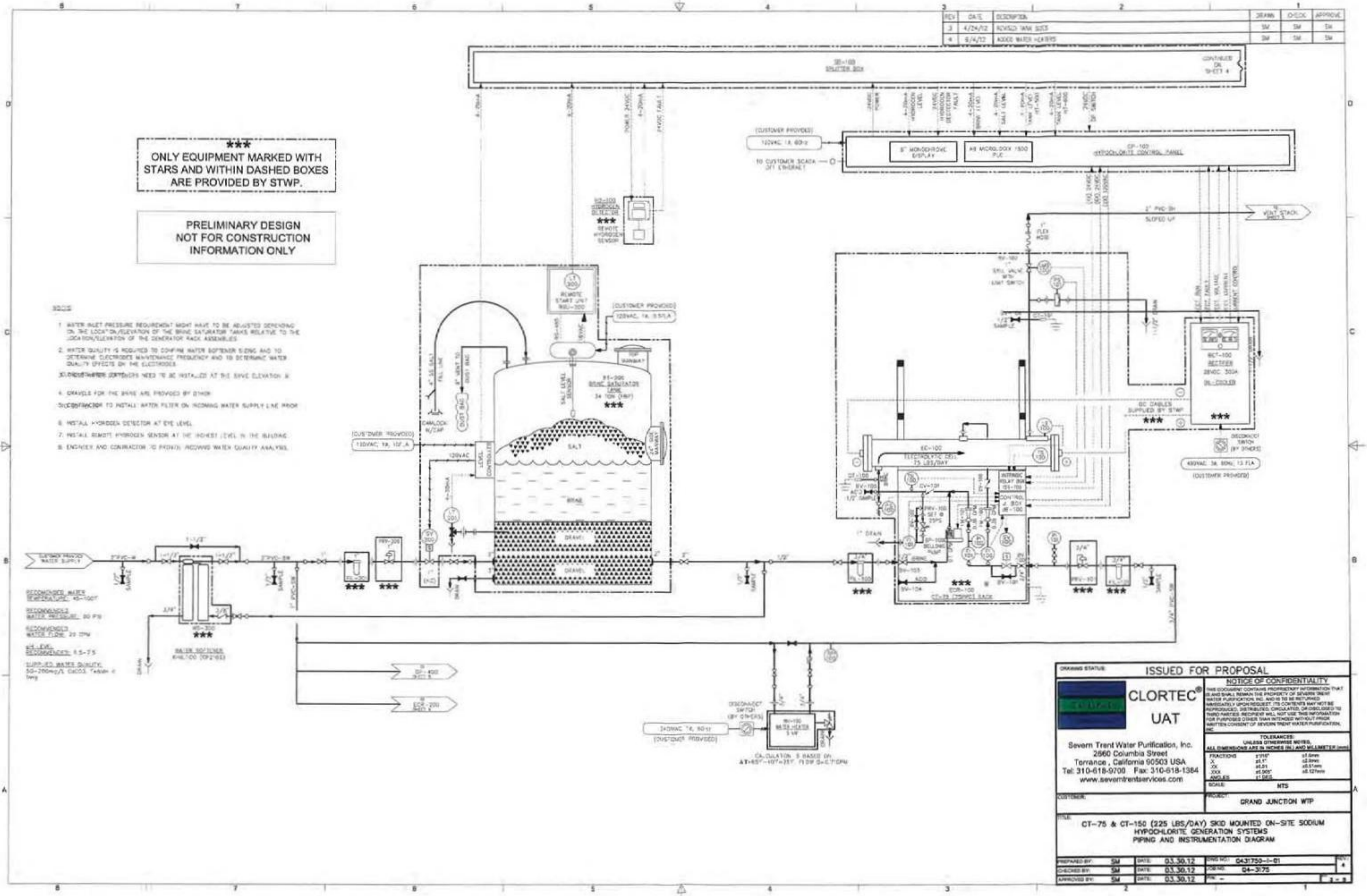
CUSTOMER:

PROJECT: GRAND JUNCTION WTP

TITLE: CT-75 & CT-150 (225 LBS/DAY) SKID MOUNTED ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEMS
PIPING AND INSTRUMENTATION DIAGRAM

PREPARED BY:	SM	DATE:	03.30.12	DWG NO.: 0431750-I-01	REV.: 4
CHECKED BY:	SM	DATE:	03.30.12	JOB NO.: 04-3175	
APPROVED BY:	SM	DATE:	03.30.12	P/N: –	1 of 1

REV	DATE	DESCRIPTION	DRAWN	CHECK	APPROVE
3	4/24/12	REVISED TANK SIZES	SM	SM	SM
4	6/4/12	ADDED WATER HEATERS	SM	SM	SM


SB-100
SPLITTER BOX
CONTINUED ON SHEET 4
4-20mA
POWER 24VDC
24VDC FAULT
(CUSTOMER PROVIDED)
120VAC 1A 60Hz
TO CUSTOMER SCADA OFF ETHERNET
6" MONOCHROME DISPLAY
AB MICROLOGIX 1500 PLC
CP-100
HYPOCHLORITE CONTROL PANEL
HS-100
HYDROGEN DETECTOR
REMOTE HYDROGEN SENSOR
REMOTE START UNIT
120VAC, 1A, 0.5FLA
FILL LINE
DUST BAG
CAMLOCK W/CAP
MANWAY
SALT LEVEL SENSOR
BS-300
BRINE SATURATOR
34 TON (FRP)
SALT
BRINE
GRAVEL
24" SIDE MANWAY
LEVEL CONTROLLER
120VAC
120VAC, 1A, 10FLA
CUSTOMER PROVIDED WATER SUPPLY
2"PVC-W
1-1/2"
WS-300
WATER SOFTENER
DRAIN
SAMPLE
2"PVC-SW
PRV-300
FS-300
1/2"
3/4"
2" PVC-SH
SLOPED UP
VENT STACK SHEET 5
1" FLEX HOSE
SOL VALVE WITH LIMIT SWITCH
1-1/2" DRAIN
1/2" SAMPLE
EC-100
ELECTROLYTIC CELL
75 LBS/DAY
INTERFACE RELAY BOX
CONTROL J. BOX
PRV-100
SET @ 25PSI
BELLOWS PUMP
1" DRAIN
ECR-100
CT-75 (75PPD) RACK
DC CABLES SUPPLIED BY STWP
RECT-100
RECTIFIER
28VDC 300A
OIL-COOLED
DISCONNECT SWITCH (BY OTHERS)
480VAC, 3Φ, 60Hz, 13 FLA
(CUSTOMER PROVIDED)
PRV-10
3/4" PVC-SW
DF-400 SHEET 5
ECR-200 SHEET 4
DISCONNECT SWITCH (BY OTHERS)
240VAC, 1A, 60Hz
(CUSTOMER PROVIDED)
WH-100
WATER HEATER
3 kW
CALCULATION IS BASED ON:
ΔT=65°-40°=25°, FLOW Q=0.7GPM
***

***
ONLY EQUIPMENT MARKED WITH STARS AND WITHIN DASHED BOXES ARE PROVIDED BY STWP.

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION
INFORMATION ONLY

NOTES:

1. WATER INLET PRESSURE REQUIREMENT MIGHT HAVE TO BE ADJUSTED DEPENDING ON THE LOCATION/ELEVATION OF THE BRINE SATURATOR TANKS RELATIVE TO THE LOCATION/ELEVATION OF THE GENERATOR RACK ASSEMBLIES.
2. WATER QUALITY IS REQUIRED TO CONFIRM WATER SOFTENER SIZING AND TO DETERMINE ELECTRODES MAINTENANCE FREQUENCY AND TO DETERMINE WATER QUALITY EFFECTS ON THE ELECTRODES.
3. ~~ENCLOSURE WATER SOFTENER~~ [illegible]S NEED TO BE INSTALLED AT THE SAME ELEVATION A
4. GRAVELS FOR THE BRINE ARE PROVIDED BY OTHER.
5. ~~CONTRACTOR~~ TO INSTALL WATER FILTER ON INCOMING WATER SUPPLY LINE PRIOR
6. INSTALL HYDROGEN DETECTOR AT EYE LEVEL.
7. INSTALL REMOTE HYDROGEN SENSOR AT THE HIGHEST LEVEL IN THE BUILDING.
8. ENGINEER AND CONTRACTOR TO PROVIDE INCOMING WATER QUALITY ANALYSIS.

RECOMMENDED WATER TEMPERATURE: 45-100F

RECOMMENDED WATER PRESSURE: 80 PSI

RECOMMENDED WATER FLOW: 20 GPM

pH LEVEL RECOMMENDED: 6.5-7.5

SUPPLIED WATER QUALITY: 50-200mg/L CaCO3, T-Alk < 5mg

DRAWING STATUS: ISSUED FOR PROPOSAL

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UAT

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.X	±0.1"	±2.0mm
.XX	±0.01	±0.51mm
.XXX	±0.005"	±0.127mm
ANGLES	±1 DEG.	

SCALE: NTS

CUSTOMER:

PROJECT: GRAND JUNCTION WTP

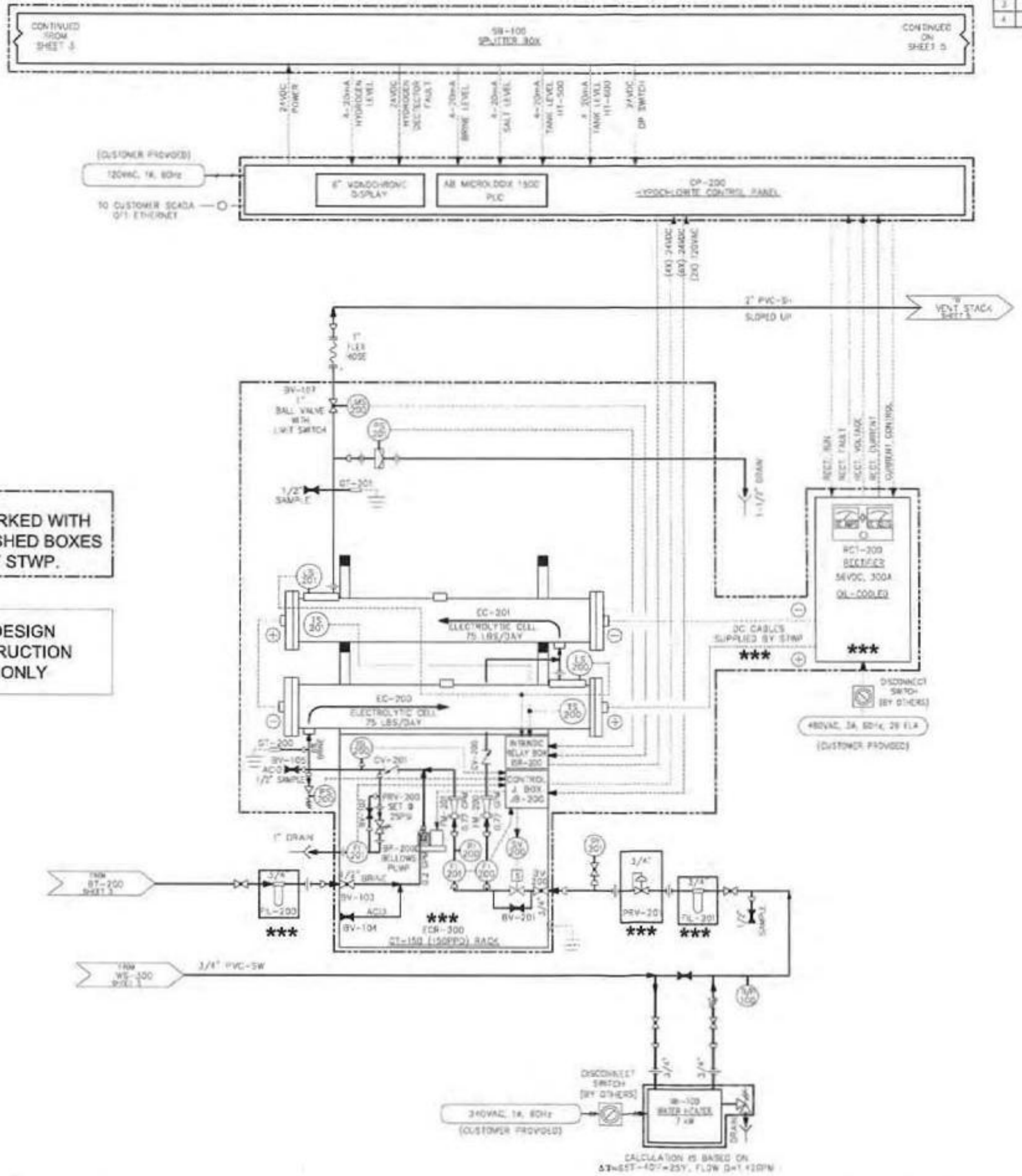
TITLE: CT-75 & CT-150 (225 LBS/DAY) SKID MOUNTED ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEMS
PIPING AND INSTRUMENTATION DIAGRAM

PREPARED BY:	SM	DATE:	03.30.12	DWG NO: 0431750-I-01	REV: 4
CHECKED BY:	SM	DATE:	03.30.12	JOB NO: 04-3175	
APPROVED BY:	SM	DATE:	03.30.12	P/N: –	3 - 8

REV	DATE	DESCRIPTION	DRAWN	CHECK	APPROVE
3	4/24/12	REVISED TANK SIZES	SW	SV	SM
4	8/4/12	ADDED WATER HEATERS	SW	SV	SM

***
ONLY EQUIPMENT MARKED WITH
STARS AND WITHIN DASHED BOXES
ARE PROVIDED BY STWP.

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION
INFORMATION ONLY


CONTINUED FROM SHEET 3
SB-100 SPLITTER BOX
CONTINUED ON SHEET 5
24VDC POWER
4-20mA HYDROGEN LEVEL
24VDC HYDROGEN DETECTOR FAULT
4-20mA BRINE LEVEL
4-20mA SALT LEVEL
4-20mA TANK LEVEL HT-500
4-20mA TANK LEVEL HT-600
24VDC DP SWITCH
(CUSTOMER PROVIDED)
120VAC, 1Ф, 60Hz
TO CUSTOMER SCADA O/T ETHERNET
6" MONOCHROME DISPLAY
AB MICROLOGIX 1500 PLC
CP-200 HYPOCHLORITE CONTROL PANEL
(4X) 24VDC
(6X) 24VDC
(2X) 120VAC
2" PVC-SH SLOPED UP
VENT STACK SHEET 5
1" FLEX HOSE
BV-107 1" BALL VALVE WITH LIMIT SWITCH
ZS 200
PS 201
1/2" SAMPLE
GT-201
1-1/2" DRAIN
RECT. RUN
RECT. FAULT
RECT. VOLTAGE
RECT. CURRENT
CURRENT CONTROL
RCT-200 RECTIFIER 56VDC, 300A OIL-COOLED
***
DC CABLES SUPPLIED BY STWP
***
DISCONNECT SWITCH (BY OTHERS)
480VAC, 3Ф, 60Hz, 28 FLA
(CUSTOMER PROVIDED)
LS 201
TS 201
EC-201 ELECTROLYTIC CELL 75 LBS/DAY
LS 200
EC-200 ELECTROLYTIC CELL 75 LBS/DAY
TS 200
GT-200
BV-105
ACID
1/2" SAMPLE
FS 200
CV-201
CV-200
INTRINSIC RELAY BOX IBR-200
CONTROL J. BOX JB-200
PRV-200 SET @ 25PSI
BP-200 BELLOWS PUMP
1" DRAIN
FI 201
FI 200
PI 200
FI 201
SV 200
FROM BT-200 SHEET 3
3/4" FL-200
***
1/2" BRINE
BV-103
ACID
BV-104
***
ECR-300
CT-150 (150PPD) RACK
BV-201
BV 200
3/4"
PI 301
3/4" PRV-201
***
3/4" FL-201
***
1/2" SAMPLE
FROM WS-300 SHEET 3
3/4" PVC-SW
TW 100
3/4"
3/4"
DISCONNECT SWITCH (BY OTHERS)
240VAC, 1Ф, 60Hz
(CUSTOMER PROVIDED)
WH-100 WATER HEATER 7 kW
DRAIN
CALCULATION IS BASED ON ΔT=65T-40T=25Y, FLOW Q=1.1GPM

DRAWING STATUS: ISSUED FOR PROPOSAL

CLORTEC®
UAT

Severn Trent Water Purification, Inc.
2660 Columbia Street
Torrance , California 90503 USA
Tel: 310-618-9700 Fax: 310-618-1384
www.severntrentservices.com

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FRACTIONS	±1/16"	±1.5mm
.X	±0.1"	±2.5mm
.XX	±0.01	±0.51mm
.XXX	±0.005"	±0.127mm
ANGLES	±1 DEG	

SCALE: NTS

CUSTOMER:

PROJECT: GRAND JUNCTION WTP

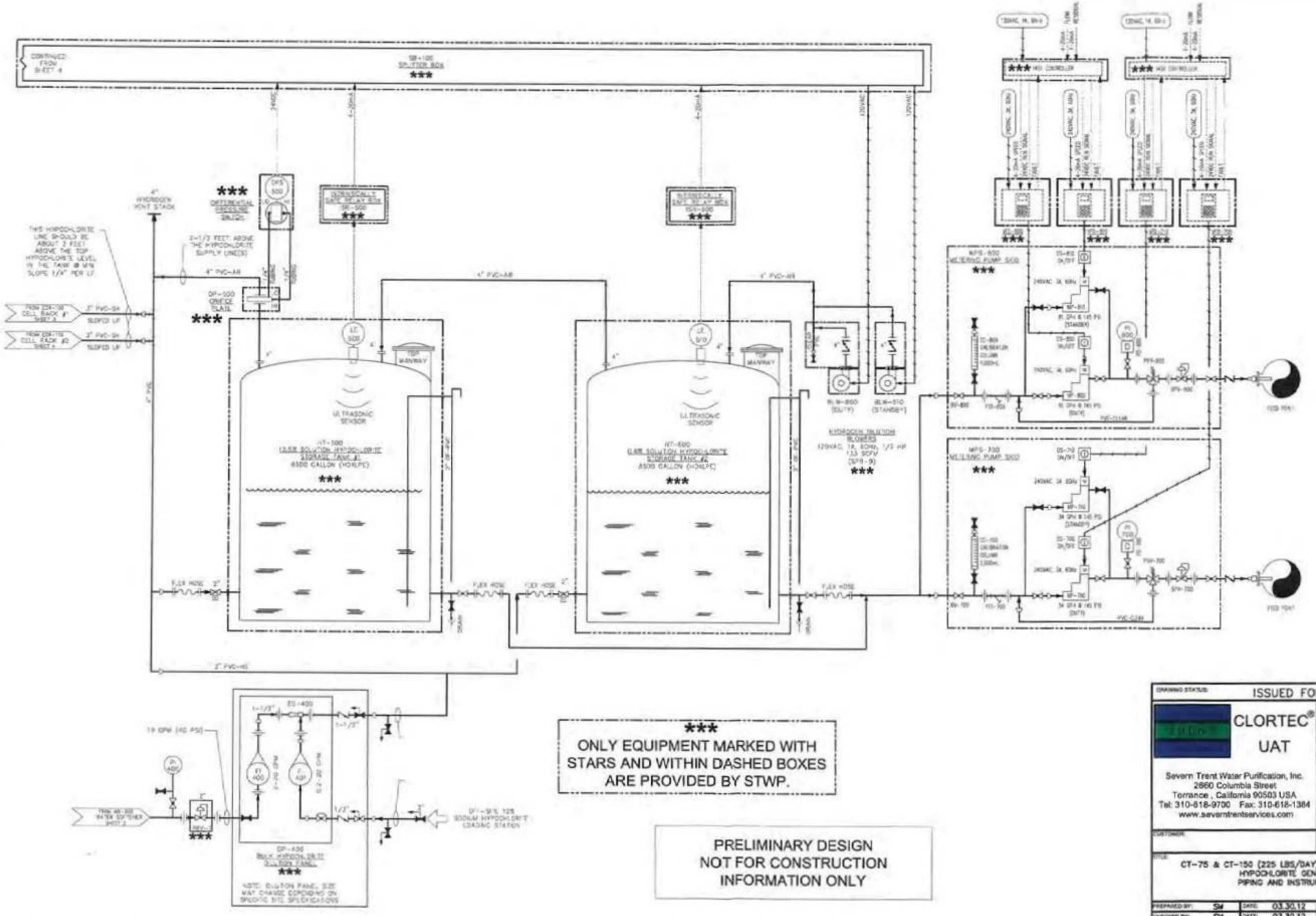
TITLE:
CT-75 & CT-150 (225 LBS/DAY) SKID MOUNTED ON-SITE SODIUM
HYPOCHLORITE GENERATION SYSTEMS
PIPING AND INSTRUMENTATION DIAGRAM

PREPARED BY:	SM	DATE:	03.30.12	DWG NO.:	0431750-I-01
CHECKED BY:	SM	DATE:	03.30.12	JOB NO.:	Q4-3175
APPROVED BY:	SM	DATE:	03.30.12	P/N:	–

REV: 4

4 OF 5

REV	DATE	DESCRIPTION	DRAWN	CHECK	APPROVE
3	4/24/12	REVISED TANK SIZES	SM	SM	SM
4	6/4/12	ADDED WATER HEATERS	SM	SM	SM


CONTINUED FROM SHEET 4
SB-100 SPLITTER BOX
***
24VDC
4-20mA
4" HYDROGEN VENT STACK
***
DIFFERENTIAL PRESSURE SWITCH
DPS 500
LO HI
INTRINSICALLY SAFE RELAY BOX ISR-500
***
INTRINSICALLY SAFE RELAY BOX ISR-600
***
THIS HYPOCHLORITE LINE SHOULD BE ABOUT 2 FEET ABOVE THE TOP HYPOCHLORITE LEVEL IN THE TANK @ MIN SLOPE 1/4" PER LF
2-1/2 FEET ABOVE THE HYPOCHLORITE SUPPLY LINE(S)
4" PVC-AR
1/4" TUBING
OP-500 ORIFICE PLATE
***
FROM EDR-100 CELL RACK #1 SHEET 3
FROM EDR-110 CELL RACK #2 SHEET 4
3" PVC-SH
SLOPED UP
4" PVC
LT 500
LT 600
TOP MANWAY
ULTRASONIC SENSOR
HT-500
12.5% SOLUTION HYPOCHLORITE STORAGE TANK #1
8500 GALLON (HDXLPE)
***
HT-600
0.8% SOLUTION HYPOCHLORITE STORAGE TANK #2
8500 GALLON (HDXLPE)
***
FLEX HOSE
2"
DRAIN
2" PVC-HS
BLW-600 (DUTY)
BLW-610 (STANDBY)
HYDROGEN DILUTION BLOWERS
120VAC, 1Ø, 60Hz, 1/3 HP
133 SCFV
(SFR-9)
***
120VAC
120VAC, 1Ø, 60Hz
FLOW
4-20mA
RETURN
*** HSV CONTROLLER
240VAC, 3Ø, 60Hz
4-20mA SPEED
24VDC RUN SIGNAL
FAULT
VFD-800
VFD-810
VFD-710
VFD-700
***
MPS-800 METERING PUMP SKID
***
DS-810 ON/OFF
DS-800 ON/OFF
240VAC, 3Ø, 60Hz
MP-810
81 GPH @ 145 PSI (STANDBY)
MP-800
81 GPH @ 145 PSI (DUTY)
CC-800 CALIBRATION COLUMN 1,000mL
PI 800
PSV-800
BPV-800
IV-800
FIS-800
PVC-CLEAR
FEED POINT
MPS-700 METERING PUMP SKID
***
DS-710 ON/OFF
DS-700 ON/OFF
MP-710
34 GPH @ 145 PSI (STANDBY)
MP-700
34 GPH @ 145 PSI (DUTY)
CC-700 CALIBRATION COLUMN 1,000mL
PI 700
PSV-700
BPV-700
IV-700
FIS-700
19 GPM (40 PSI)
PI 400
FROM WS-300 WATER SOFTENER SHEET 2
PRV-3
***
1-1/2"
ES-400
FI 400
FI 401
1/2"
OFF-SITE 12% SODIUM HYPOCHLORITE LOADING STATION
DP-430 BULK HYPOCHLORITE DILUTION PANEL
***
NOTE: DILUTION PANEL SIZE MAY CHANGE DEPENDING ON SPECIFIC SITE SPECIFICATIONS

***
ONLY EQUIPMENT MARKED WITH STARS AND WITHIN DASHED BOXES ARE PROVIDED BY STWP.

PRELIMINARY DESIGN
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INFORMATION ONLY

DRAWING STATUS: ISSUED FOR PROPOSAL

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.XX	±0.01	±0.51mm
.XXX	±0.005"	±0.127mm
ANGLES	±1 DEG.	

SCALE: NTS

CUSTOMER:

PROJECT: GRAND JUNCTION WTP

TITLE: CT-75 & CT-150 (225 LBS/DAY) SKID MOUNTED ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEMS
PIPING AND INSTRUMENTATION DIAGRAM

PREPARED BY:	SM	DATE:	03.30.12	DWG NO.:	0431750-I-01
CHECKED BY:	SM	DATE:	03.30.12	JOB NO.:	04-3175
APPROVED BY:	SM	DATE:	03.30.12	P/N:	–

REV: 4

5 - 5

Appendix C

Equipment layout

			BY	BY	BY
2	05-23-12	CHANGED ROOM DIM., RELOCATED SALT FILL LINE &ROOL-UP DOOR, ADDED SIDE DOOR	JPM	JPM	
3	06-03-12	RELOCATED DOUBLE DOORS & DILUTION PANEL, ADDED PANELS/DISC. SW./VFDs	JPM	JPM	

GRAND JUNCTION WTP

CT–75 & CT–150 (225 LBS/DAY) RACK MOUNTED
ON–SITE SODIUM HYPOCHLORITE GENERATION SYSTEM
EQUIPMENT LAYOUT

PRELIMINARY DESIGN
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SCALE: NTS

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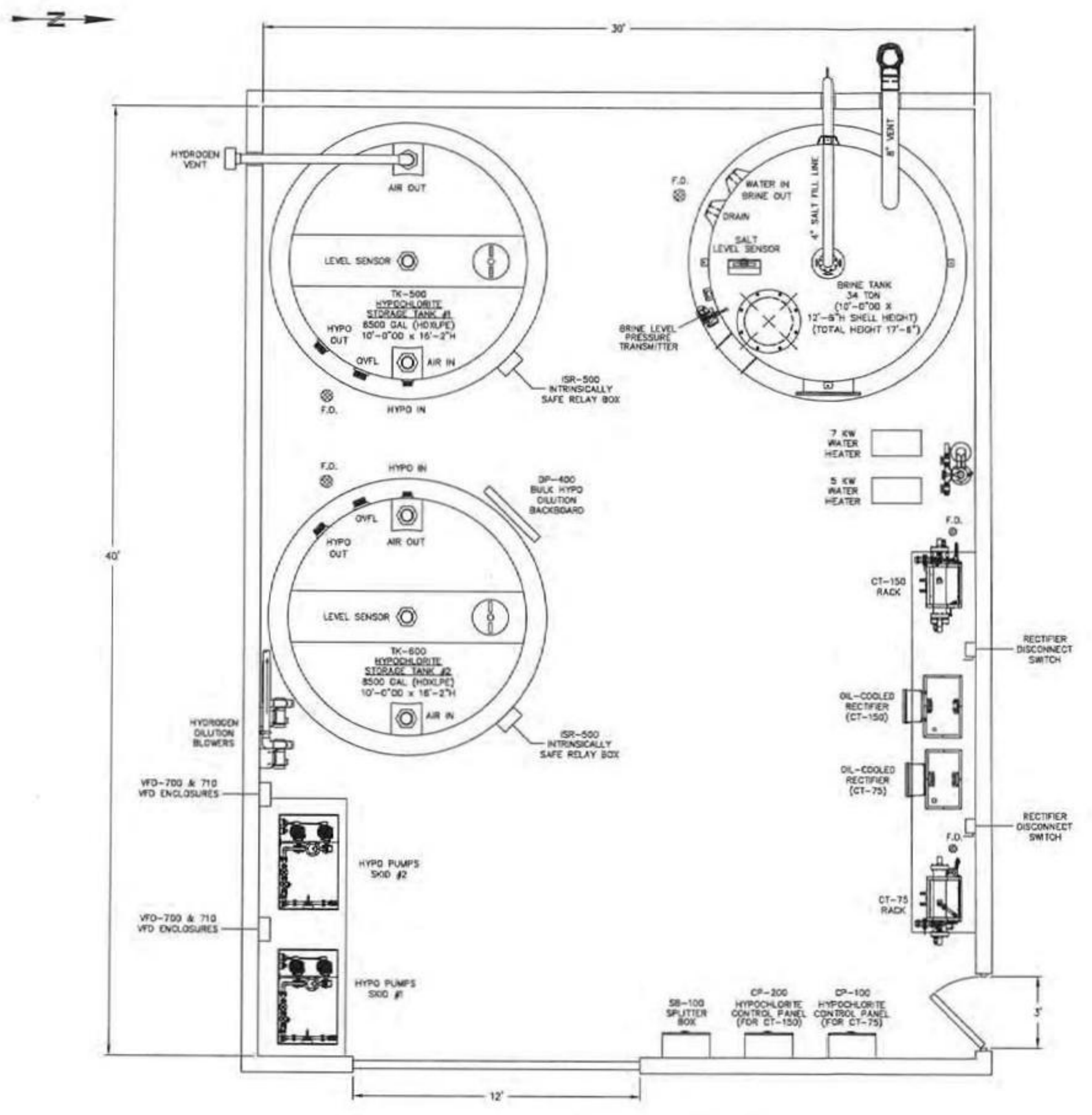
PROJECT: GRAND JUNCTION WTP

TITLE:
CT–150 & CT–75 (225 LBS/DAY) RACK MOUNTED
ON–SITE SODIUM HYPOCHLORITE GENERATION SYSTEM
EQUIPMENT LAYOUT

PREPARED BY:	B.C.W	DATE:	02.25.12	DWG NO.:	B431751–ML–01	REV.
CHECKED BY:	J.P.M	DATE:	02.25.12	JOB NO.:	04–3175	3
APPROVED BY:	[illegible]	DATE:	[illegible]			

REV	DATE	DESCRIPTION	DRAWN BY	CHECKED BY	APPROVED BY
2	05-23-12	CHANGED ROOM DIM., RELOCATED SALT FILL LINE &ROLL-UP DOOR, ADDED SIDE DOOR	JPM	JPM	
3	06-03-12	RELOCATED DOUBLE DOORS & DILUTION PANEL, ADDED PANELS/DISC. SW/VFDs	JPM	JPM	


N
30'
40'
12'
3'
HYDROGEN VENT
AIR OUT
LEVEL SENSOR
TK-500
HYPOCHLORITE STORAGE TANK #1
8500 GAL (HDXLPE)
10'-0"OD x 16'-2"H
HYPO OUT
OVFL
AIR IN
F.D.
HYPO IN
ISR-500 INTRINSICALLY SAFE RELAY BOX
F.D.
WATER IN
BRINE OUT
DRAIN
SALT LEVEL SENSOR
4" SALT FILL LINE
8" VENT
BRINE TANK
34 TON
(10'-0"OD X
12'-6"H SHELL HEIGHT)
(TOTAL HEIGHT 17'-6")
BRINE LEVEL PRESSURE TRANSMITTER
7 KW WATER HEATER
5 KW WATER HEATER
F.D.
HYPO IN
DP-400 BULK HYPO DILUTION BACKBOARD
OVFL
HYPO OUT
AIR OUT
LEVEL SENSOR
TK-600
HYPOCHLORITE STORAGE TANK #2
8500 GAL (HDXLPE)
10'-0"OD x 16'-2"H
AIR IN
ISR-500 INTRINSICALLY SAFE RELAY BOX
HYDROGEN DILUTION BLOWERS
VFD-700 & 710 VFD ENCLOSURES
HYPO PUMPS SKID #2
VFD-700 & 710 VFD ENCLOSURES
HYPO PUMPS SKID #1
F.D.
CT-150 RACK
RECTIFIER DISCONNECT SWITCH
OIL-COOLED RECTIFIER (CT-150)
OIL-COOLED RECTIFIER (CT-75)
RECTIFIER DISCONNECT SWITCH
F.D.
CT-75 RACK
SB-100 SPLITTER BOX
CP-200 HYPOCHLORITE CONTROL PANEL (FOR CT-150)
CP-100 HYPOCHLORITE CONTROL PANEL (FOR CT-75)

HYPOCHLORITE GENERATION ROOM

PRELIMINARY DESIGN
NOT FOR CONSTRUCTION

NOTES:

1. AT LEAST 3 FEET CLEARANCE IS REQUIRED IN FRONT OF THE RECTIFIER, THE CONTROL PANEL, THE CELL RACK AND THE HYPO PUMP SKID.
2. SUFFICIENT CLEARANCE IS REQUIRED BETWEEN THE TANKS FOR ACCESS OF SIDE FITTINGS.

DRAWING STATUS: ISSUED FOR PROPOSAL

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XX	±0.02	±0.51mm
XXX	±0.005"	±0.127mm
ANGLES	±1 DEG	

SCALE: NTS

CUSTOMER:

PROJECT: GRAND JUNCTION WTP

TITLE:
CT-150 & CT-75 (225 LBS/DAY) RACK MOUNTED
ON-SITE SODIUM HYPOCHLORITE GENERATION SYSTEM
EQUIPMENT LAYOUT

PREPARED BY:	B.C.W	DATE:	02.25.12	DWG NO.:	B431751-ML-01	REV. 3
CHECKED BY:	J.P.M	DATE:	02.25.12	JOB NO.:	04-3175	
APPROVED BY:		DATE:				

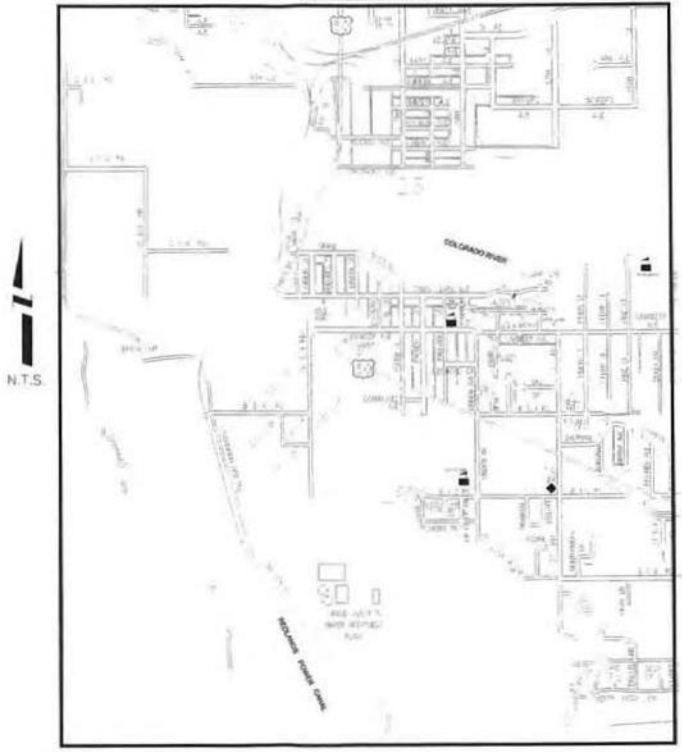
C:\DOCUME~1\justinv\LOCALS~1\Temp\XPgrpwise\B431751-ML-01 (Rev3).dwg, 8/1/2012 9:54:05 AM, \\ipp://Cityhall-lfs.ci.grandjct.c

PROJECT NO. F005003

WATER TREATMENT PLANT
ON-SITE HYPO CHLORITE SYSTEM
JULY, 2012

1 ——— Cover Sheet
C1 ——— Project Control Map
A1 ——— ARCHITECTURAL
S1 ——— STRUCTURAL
E1 – E2 ——— ELECTRICAL
M1 ——— MECHANICAL
P1 ——— PIPING SCHEMATIC

VICINITY MAP



UTILITIES AND AGENCIES

AGENCY	NAME	POSITION	ROLE	MAILING ADDRESS	STREET ADDRESS	CITY, STATE	VOICE-WK	FAX
GRAND JUNCTION, CITY OF	xx	PROJECT ENGINEER	PROJECT ENGINEER	250 N. 5th STREET	250 N. 5th STREET	GRAND JCT., CO 81501	(970) XXX-XXXX	(970) 256-4022
GRAND JUNCTION, CITY OF	BRET GUILLORY	UTILITY ENGINEER	SANITARY SEWER	250 N. 5th STREET	250 N. 5th STREET	GRAND JCT., CO 81501	(970) 244-1590	(970) 256-4022
GRAND VALLEY IRRIGATION CO.	PHIL BERTRAND		IRRIGATION	688 26 ROAD	688 26 ROAD	GRAND JCT., CO 81506	(970) 242-2762	
BRESNAN	CHUCK WEIDMAN	MANAGER	CABLE TV	2502 FORESIGHT CIRCLE	2502 FORESIGHT CIRCLE	GRAND JCT., CO 81504	(970) 245-8750	(970) 245-6803
U.S. WEST/QWEST	CHRIS JOHNSON	ENGINEER	TELEPHONE	2524 BLICHMANN AVE	2524 BLICHMANN AVE	GRAND JCT., CO 81504	(970) 244-4311	(970) 240-4349
UTE WATER	DARYL MOORE	SUPERVISOR	WATER	PO BOX 460		GRAND JCT., CO 81502	(970) 242-7491	(970) 242-9189
XCEL	DAN STEINKIRCHNER	UNIT MANAGER	GAS, ELECTRIC	2538 BLICHMANN AVE	2538 BLICHMANN AVE	GRAND JCT., CO 81506	(970) 244-2656	(970) 244-2661

NOTE: NOTIFY AFFECTED UTILITY VENDOR 48 HOURS PRIOR TO EXCAVATIONS THAT WILL EXPOSE UTILITY LINES. THE COVER SHEET WILL HAVE A LISTING OF UTILITY VENDORS AND TELEPHONE NUMBERS.

	DESCRIPTION	DATE
REVISION △	______	– ______
REVISION △	______	– ______
REVISION △	______	– ______
REVISION △	______	– ______

CITY OF Grand Junction COLORADO

Public Works & Planning
Engineering Division

COLORADO LICENSED PROFESSIONAL ENGINEER
JUSTIN JAY VENSEL
45010
7-31-12

DRAWING STATUS:
● PROGRESS
○ FINAL CONSTRUCTION DRAWINGS
○ ASBUILT

DESIGNED BY:
JUSTIN VENSEL, PROJECT ENGINEER ——— DATE

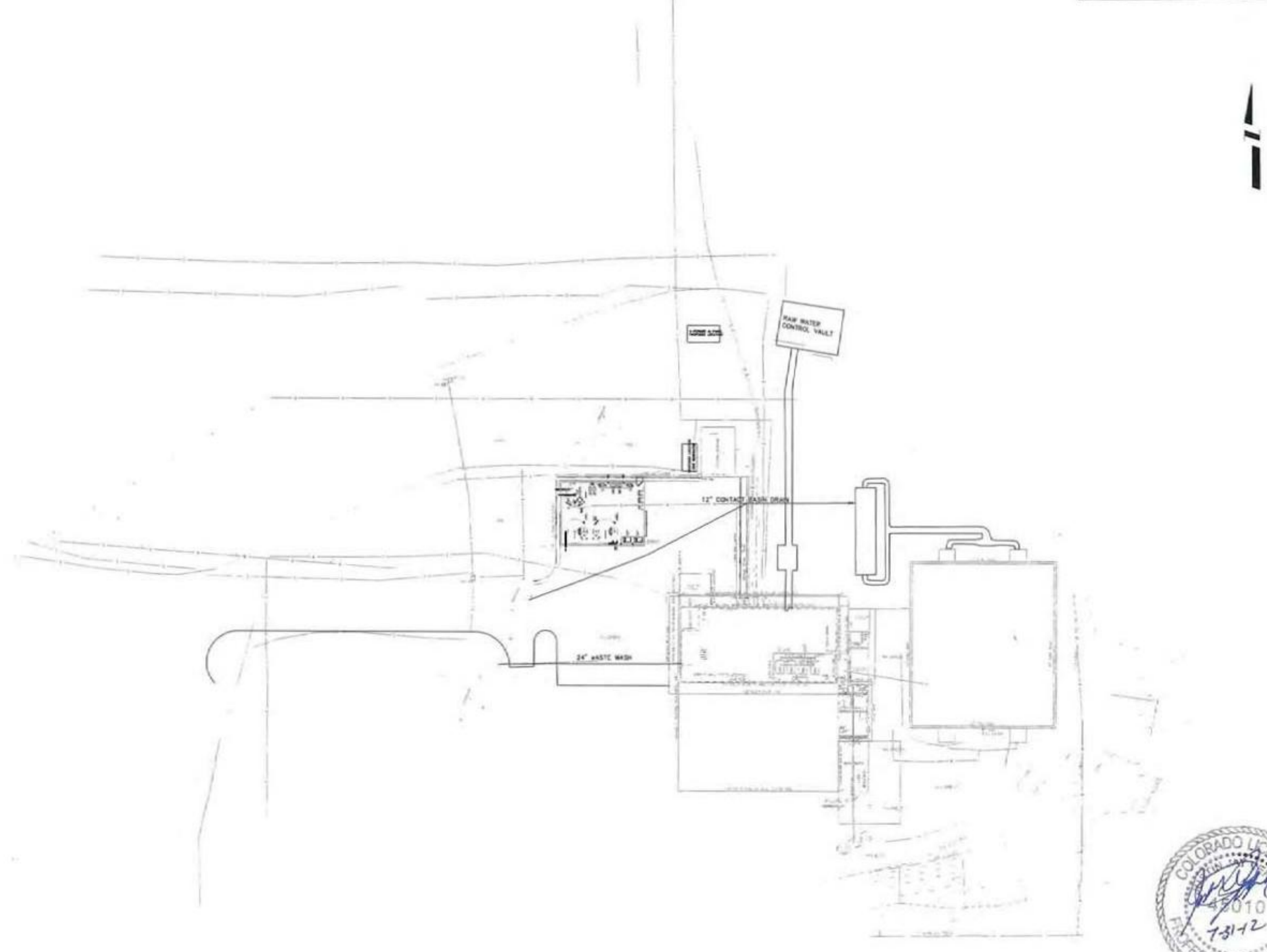
REVIEWED BY:
BRET GUILLORY, UTILITY ENGINEER ——— DATE

AUTHORIZED FOR CONSTRUCTION
BRET GUILLORY, UTILITY ENGINEER ——— DATE

ACCEPTED AS CONSTRUCTED
JUSTIN VENSEL, PROJECT ENGINEER ——— DATE

ON-SITE HYPO CHLORITE SYSTEM, JULY, 2012, Plan Set No. __

PROJECT NO. –F005003


RAW WATER CONTROL VAULT
12" CONTACT BASIN DRAIN
24" WASTE WASH

7-31-12

DESCRIPTION	DATE
REVISION △	–
REVISION △	–
REVISION △	–
REVISION △	–

DRAWN BY LJV DATE 7-11-12
DESIGNED BY LJV DATE 7-11-12
CHECKED BY LJV DATE 7-11-12
APPROVED BY ______ DATE ______

SCALE
1:20

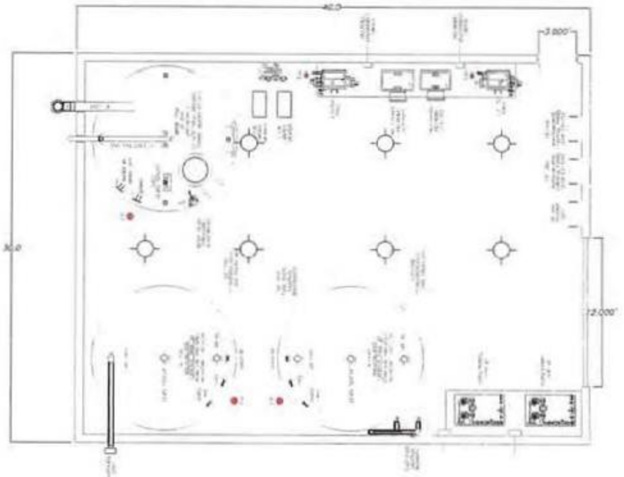
CITY OF Grand Junction COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

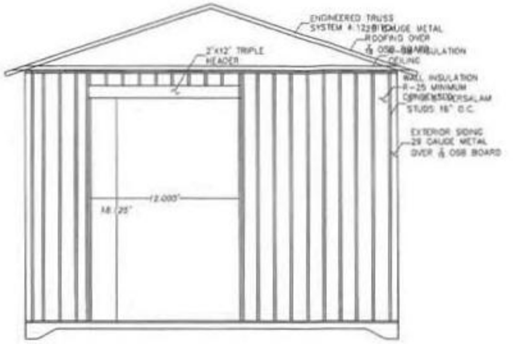
ON-SITE HYPO-CHLORITE SYSTEM
PROJECT CONTROL MAP

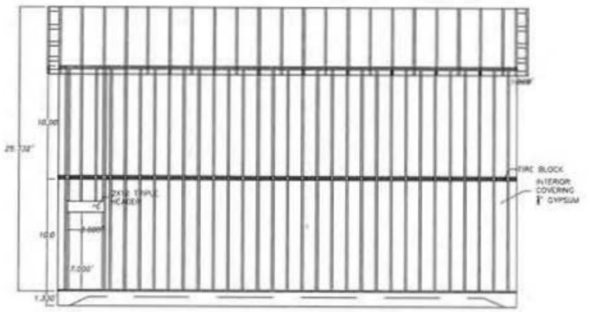
C1

PROJECT NO. F005003


40.0
3.000'
30.0
12.000'

BUILDING EQUIPMENT LAYOUT
SCALE 1:5


ENGINEERED TRUSS SYSTEM
29 GAUGE METAL ROOFING OVER 5/8 OSB BOARD
INSULATION
CEILING
2"X12" TRIPLE HEADER
WALL INSULATION R-25 MINIMUM
STUDS 16" O.C.
EXTERIOR SIDING 29 GAUGE METAL OVER 5/8 OSB BOARD
12.000'
18.125'


25.732'
10.00
10.0
1.300
2X12 TRIPLE HEADER
7.000'
FIRE BLOCK
INTERIOR COVERING 5/8" GYPSUM

BUILDING PROFILE
VIEW LOOKING SOUTH
SCALE 1:5

45010
7-31-12

DESCRIPTION	DATE
REVISION △ ______	- ______
REVISION △ ______	- ______
REVISION △ ______	- ______
REVISION △ ______	- ______

DRAWN BY ______ DATE ______
DESIGNED BY ______ DATE ______
CHECKED BY ______ DATE ______
APPROVED BY ______ DATE ______

SCALE
N.T.S.

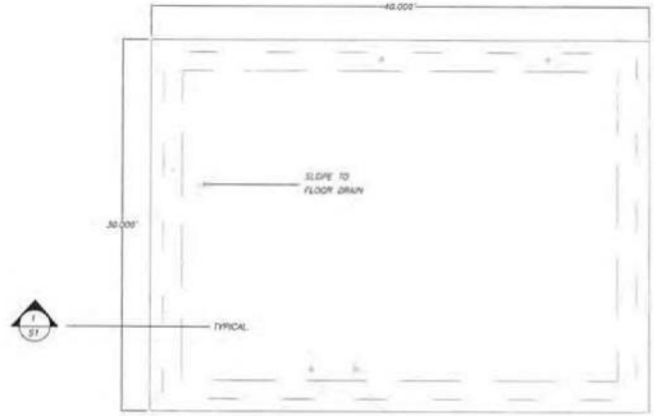
CITY OF Grand Junction COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

ON-SITE HYPO-CHLORITE SYSTEM
ARCHITECTURAL

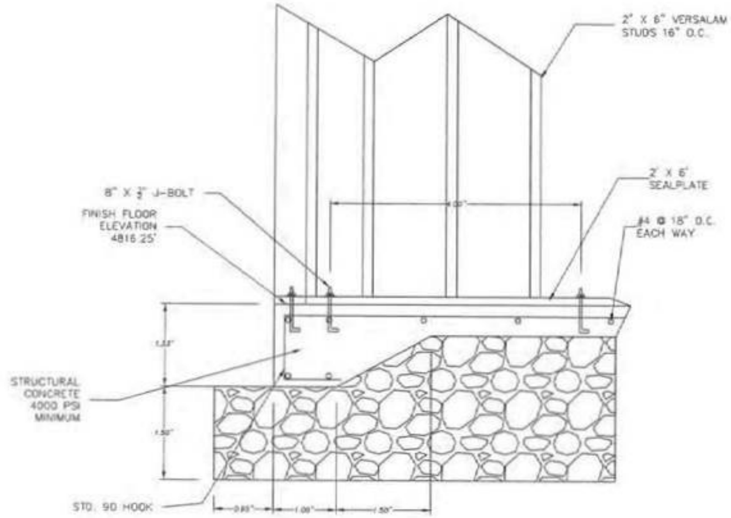
A
1

PROJECT NO. F005003


40.000'
30.000'
SLOPE TO FLOOR DRAIN
1
S1
TYPICAL

GENERAL NOTES

1. LIVE LOADS USED IN DESIGN
   - A. ROOF (SNOW)----30PSF
   - B. WIND
     - EXPOSURE----C
     - BUILDING CATEGORY----II
     - IMPORTANCE FACTOR (Iw)----1.0
     - V 3s----90 MPH
     - V fm----75 MPH
   - C. SEISMIC
     - SEISMIC USE GROUP----I
     - IMPORTANCE FACTOR (Ie)----1.0
2. CONCRETE
   - A. ALL CONCRETE SHALL DEVELOPE 4,000 PSI COMPRESSIVE STRENGTH IN 28 DAYS.
   - B. ALL REINFORCEMENT SHALL CONFORM TO ASTM A615, GRADE 60.
   - C. NO SPLICES OF REINFORCEMENTS SHALL BE MADE EXCEPT AS DETAILED OR AUTHORIZED BY THE ENGINEER OF RECORD LAP SPLICES SHALL BE A MINIMUM OF 30 BAR DIAMETERS. MAKE ALL BARS CONTINUOUS AROUND CORNERS.
   - D. STAGGER SPLICES A MINIMUM OF 4.0' FOR TOP AND BOTTOM CONTINUOUS BARS IN FOUNDATIONS UNLESS OTHERWISE NOTED.
3. WOOD
   - A. ALL BEAMS AND HEADERS SHALL BE HEM-FIR NO. 2 OR BETTER WITH Fb = 850PSI AND E = 1,300,000 PSI.
   - B. ALL STUDS SHALL BE VERSA-LAM STUD GRADE WITH Fb = 2400 PSI AND E = 1,700,000 PSI.
4. FOUNDATIONS
   FOUNDATION DESIGN IS BASED UPON RECOMMENDATIONS BY GROUND ENGINEERING JOB NO ??????. RECOMMENDATIONS IN THIS REPORT SHOULD BE FOLLOWED.
   - A. ALLOWABLE SOIL BEARING PRESSURE----???? PSI
   - B. MODULUS OF SUBGRADE REACTION----??? PCI
   - C. SOILS ENGINEER OF RECORD SHALL EXAMINE EXCAVATION TO VERIFY CONDITIONS PRIOR TO CONSTRUCTION.
5. VERIFY ALL DIMENSIONS PRIOR TO CONSTRUCTION.


2" X 6" VERSALAM STUDS 16" O.C.
2" X 6" SEALPLATE
#4 @ 18" O.C. EACH WAY
8" X ½" J-BOLT
FINISH FLOOR ELEVATION 4816.25'
4.00"
1.33"
STRUCTURAL CONCRETE 4000 PSI MINIMUM
1.50"
STD. 90 HOOK
0.83"
1.00"
1.50"

5010
7-31-12

DESCRIPTION	DATE
REVISION △ ____	- ____
REVISION △ ____	- ____
REVISION △ ____	- ____
REVISION △ ____	- ____

DRAWN BY JJV DATE 7-11-12
DESIGNED BY JJV DATE 7-11-12
CHECKED BY JJV DATE 7-11-12
APPROVED BY ____ DATE ____

SCALE
N.T.S.

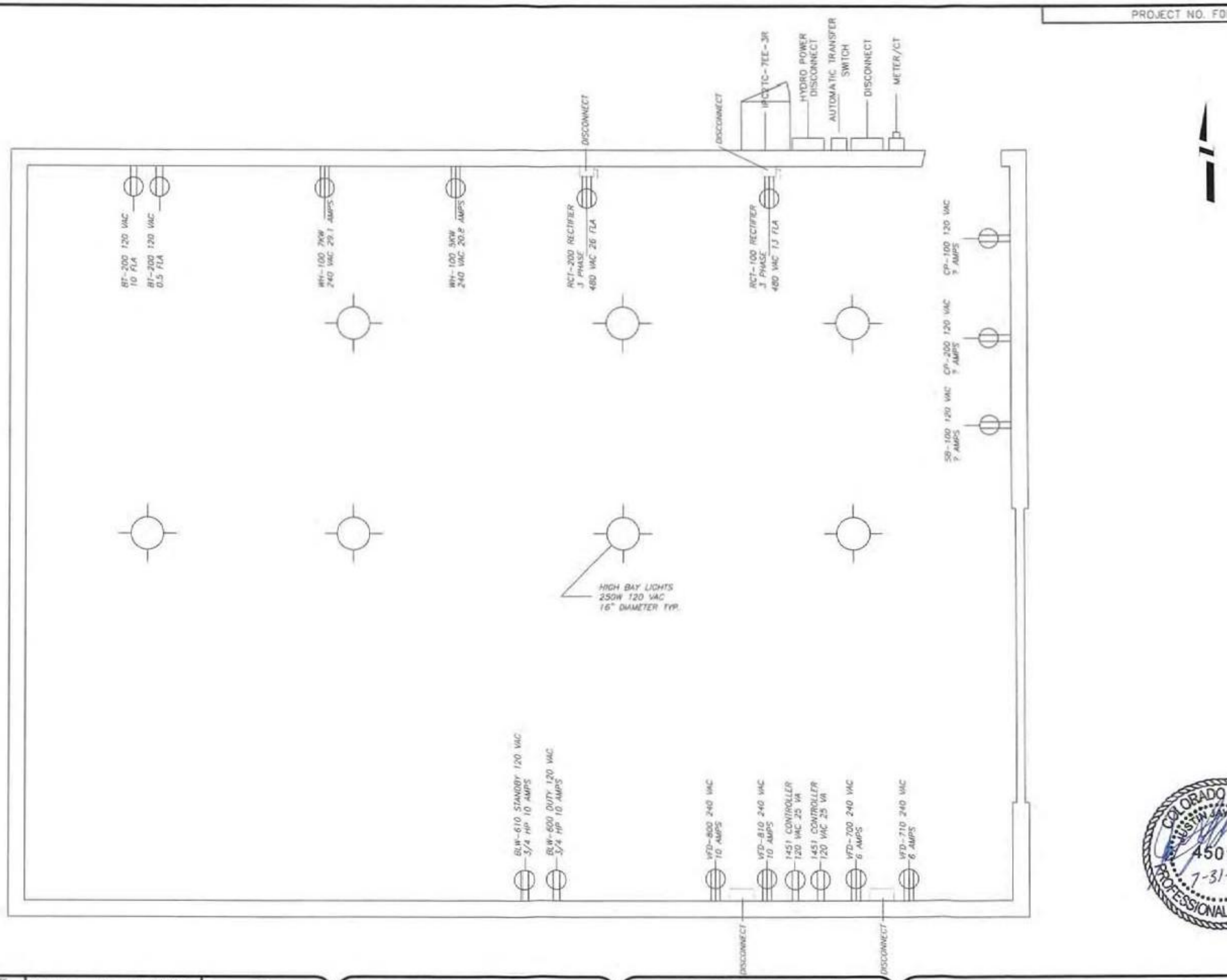
CITY OF Grand Junction COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

ON-SITE HYPO-CHLORITE SYSTEM
STRUCTURAL

S
1

PROJECT NO. F005003


BT-200 120 VAC 10 FLA
BT-200 120 VAC 0.5 FLA
WH-100 7KW 240 VAC 29.1 AMPS
WH-100 5KW 240 VAC 20.8 AMPS
DISCONNECT
RCT-200 RECTIFIER 3 PHASE 480 VAC 26 FLA
DISCONNECT
IPC-TC-7EE-3R
RCT-100 RECTIFIER 3 PHASE 480 VAC 13 FLA
HYDRO POWER DISCONNECT
AUTOMATIC TRANSFER SWITCH
DISCONNECT
METER/CT
CP-100 120 VAC 7 AMPS
CP-200 120 VAC 7 AMPS
SB-100 120 VAC 7 AMPS
HIGH BAY LIGHTS 250W 120 VAC 16" DIAMETER TYP.
BLW-610 STANDBY 120 VAC 3/4 HP 10 AMPS
BLW-600 DUTY 120 VAC 3/4 HP 10 AMPS
VFD-800 240 VAC 10 AMPS
DISCONNECT
VFD-810 240 VAC 10 AMPS
1451 CONTROLLER 120 VAC 25 VA
1451 CONTROLLER 120 VAC 25 VA
VFD-700 240 VAC 6 AMPS
DISCONNECT
VFD-710 240 VAC 6 AMPS

JUSTIN JAY VENSEL
45010
7-31-12

DESCRIPTION	DATE
REVISION △	-
REVISION △	-
REVISION △	-
REVISION △	-

DRAWN BY JJV DATE 7/12/12
DESIGNED BY JJV DATE 7/12/12
CHECKED BY JJV DATE 7/12/12
APPROVED BY ____ DATE ____

SCALE
N.T.S.

CITY OF Grand Junction COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

ON-SITE HYPO-CHLORITE SYSTEM
ELECTRICAL

E
1

PROJECT NO. F005003

[illegible]

JUSTIN JAY VENGEL
45010

DESCRIPTION	DATE
REVISION △	
REVISION △	
REVISION △	
REVISION △	

DRAWN BY	AJV	DATE	07/11/12
DESIGNED BY	AJV	DATE	07/11/12
CHECKED BY	AJV	DATE	07/11/12
APPROVED BY		DATE	

SCALE
N.T.S.

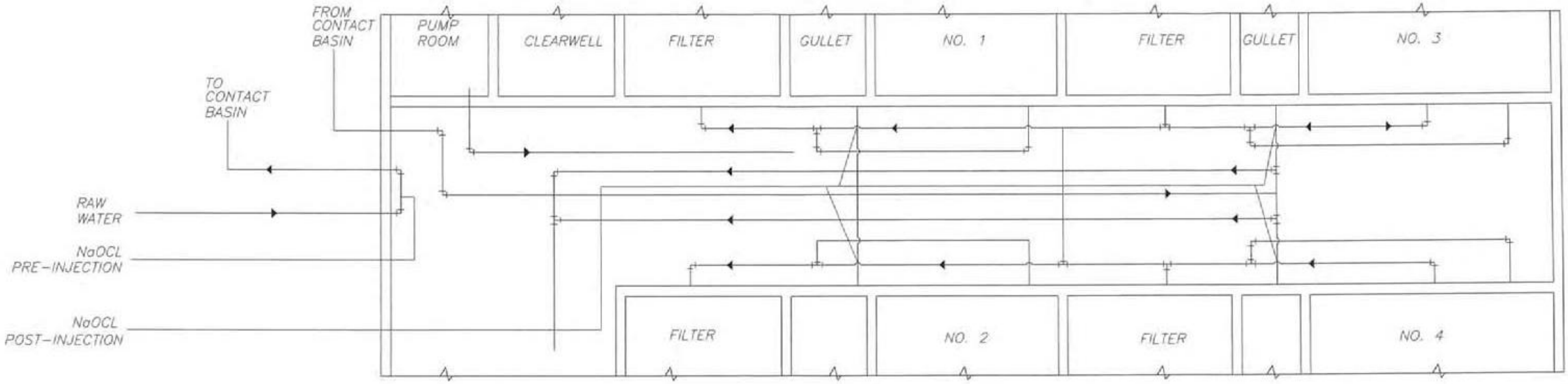
CITY OF
Grand Junction
COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

ON-SITE HYPO-CHLORITE SYSTEM
ELECTRICAL

E
2

PROJECT NO. F005003


FROM CONTACT BASIN
PUMP ROOM
CLEARWELL
FILTER
GULLET
NO. 1
FILTER
GULLET
NO. 3
TO CONTACT BASIN
RAW WATER
NaOCL PRE-INJECTION
NaOCL POST-INJECTION
FILTER
NO. 2
FILTER
NO. 4

45010
7-31-12

DESCRIPTION	DATE
REVISION △	-
REVISION △	-
REVISION △	-
REVISION △	-

DRAWN BY JJV DATE 07/19/12
DESIGNED BY JJV DATE 07/19/12
CHECKED BY JJV DATE 07/19/12
APPROVED BY DATE

SCALE
N.T.S.

CITY OF Grand Junction COLORADO

PUBLIC WORKS
AND PLANNING
ENGINEERING DIVISION

ON-SITE HYPO-CHLORITE SYSTEM
PLANT FLOW SCHEMATICS

P
1

ACORD®

CERTIFICATE OF LIABILITY INSURANCE

DATE (MM/DD/YYYY) 8/22/2018

THIS CERTIFICATE IS ISSUED AS A MATTER OF INFORMATION ONLY AND CONFERS NO RIGHTS UPON THE CERTIFICATE HOLDER. THIS CERTIFICATE DOES NOT AFFIRMATIVELY OR NEGATIVELY AMEND, EXTEND OR ALTER THE COVERAGE AFFORDED BY THE POLICIES BELOW. THIS CERTIFICATE OF INSURANCE DOES NOT CONSTITUTE A CONTRACT BETWEEN THE ISSUING INSURER(S), AUTHORIZED REPRESENTATIVE OR PRODUCER, AND THE CERTIFICATE HOLDER.

IMPORTANT: If the certificate holder is an ADDITIONAL INSURED, the policy(ies) must be endorsed. If SUBROGATION IS WAIVED, subject to the terms and conditions of the policy, certain policies may require an endorsement. A statement on this certificate does not confer rights to the certificate holder in lieu of such endorsement(s).

PRODUCER CIA-Leavitt Insurance Agency, Inc. 100 Premium Way, PO Box 5002 Alamosa CO 81101	CONTACT NAME: Brenda Edgar PHONE (A/C, No, Ext): (719)589-3611 E-MAIL ADDRESS: brenda-edgar@leavitt.com	FAX (A/C, No): (800)746-4434	
	INSURER(S) AFFORDING COVERAGE		NAIC #
	INSURER A : Burlington Insurance Co		23620
INSURED Mountain Peak Controls, Inc. 13551 West 43rd Drive, Unit A Golden CO 80403	INSURER B : Acuity		014184
	INSURER C : RSUI Indemnity Company		22314
	INSURER D : Pinnacol Assurance		41190
	INSURER E : CRC Insurance Services		B0260
	INSURER F :		

COVERAGES

CERTIFICATE NUMBER: 17-18, 18-19 REVISION NUMBER:

THIS IS TO CERTIFY THAT THE POLICIES OF INSURANCE LISTED BELOW HAVE BEEN ISSUED TO THE INSURED NAMED ABOVE FOR THE POLICY PERIOD INDICATED. NOTWITHSTANDING ANY REQUIREMENT, TERM OR CONDITION OF ANY CONTRACT OR OTHER DOCUMENT WITH RESPECT TO WHICH THIS CERTIFICATE MAY BE ISSUED OR MAY PERTAIN, THE INSURANCE AFFORDED BY THE POLICIES DESCRIBED HEREIN IS SUBJECT TO ALL THE TERMS, EXCLUSIONS AND CONDITIONS OF SUCH POLICIES. LIMITS SHOWN MAY HAVE BEEN REDUCED BY PAID CLAIMS.

INSR LTR	TYPE OF INSURANCE	ADDL INSD	SUBR WVD	POLICY NUMBER	POLICY EFF (MM/DD/YYYY)	POLICY EXP (MM/DD/YYYY)	LIMITS	
A	☒ COMMERCIAL GENERAL LIABILITY	X		0376CRP0010206	12/8/2017	12/8/2018	EACH OCCURRENCE	$ 1,000,000
	☐ CLAIMS-MADE ☒ OCCUR						DAMAGE TO RENTED PREMISES (Ea occurrence)	$ 50,000
	☐						MED EXP (Any one person)	$
	☐						PERSONAL & ADV INJURY	$ 1,000,000
	GEN'L AGGREGATE LIMIT APPLIES PER:						GENERAL AGGREGATE	$ 2,000,000
	☐ POLICY ☒ PRO-JECT ☐ LOC						PRODUCTS - COMP/OP AGG	$ 2,000,000
	OTHER:							$
B	AUTOMOBILE LIABILITY			Z85616	11/1/2017	11/1/2018	COMBINED SINGLE LIMIT (Ea accident)	$ 1,000,000
	☒ ANY AUTO						BODILY INJURY (Per person)	$
	☐ ALL OWNED AUTOS ☐ SCHEDULED AUTOS						BODILY INJURY (Per accident)	$
	☐ HIRED AUTOS ☐ NON-OWNED AUTOS						PROPERTY DAMAGE (Per accident)	$
							Underinsured motorist BI	$ 1,000,000
C	☒ UMBRELLA LIAB ☒ OCCUR			NHA244300	2/7/2018	2/7/2019	EACH OCCURRENCE	$ 2,000,000
	☐ EXCESS LIAB ☐ CLAIMS-MADE						AGGREGATE	$
	☐ DED ☒ RETENTION $ 10,000							$
D	WORKERS COMPENSATION AND EMPLOYERS' LIABILITY Y/N	N / A		4070487	6/1/2018	6/1/2019	☒ PER STATUTE ☐ OTH-ER	
	ANY PROPRIETOR/PARTNER/EXECUTIVE OFFICER/MEMBER EXCLUDED? ☐ **(Mandatory in NH)**						E.L. EACH ACCIDENT	$ 1,000,000
	If yes, describe under DESCRIPTION OF OPERATIONS below						E.L. DISEASE - EA EMPLOYEE	$ 1,000,000
							E.L. DISEASE - POLICY LIMIT	$ 1,000,000
E	Technology & Professional			LCY835578	8/21/2018	8/21/2019	$2,500 Deductible	$1,000,000

DESCRIPTION OF OPERATIONS / LOCATIONS / VEHICLES (ACORD 101, Additional Remarks Schedule, may be attached if more space is required)

City of Grand Junction and the officers and employees are Additional Insured in regards to General Liability when required by written cotnract. THIS CERTIFICATE IS SUBJECT TO THE TERMS AND CONDITIONS OF THE POLICY

CERTIFICATE HOLDER	CANCELLATION
duaneh@gjcity.org City of Grand Junction 250 N. 5th Street Second Floor, Room # 245 Grand Junction, CO 81501	**SHOULD ANY OF THE ABOVE DESCRIBED POLICIES BE CANCELLED BEFORE THE EXPIRATION DATE THEREOF, NOTICE WILL BE DELIVERED IN ACCORDANCE WITH THE POLICY PROVISIONS.** AUTHORIZED REPRESENTATIVE Paige Bentley/JECHRI Paige Bentley

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THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location(s) Of Covered Operations
Any person or organization for whom you are performing operations, but only if you have agreed, in a written contract, to add such person or organization as an additional insured on your policy for that location or part thereof, provided such written contract is fully executed prior to an "occurrence" in which coverage is sought under this policy.	Any and All Locations.
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

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POLICY NUMBER: 0376CRP0010206

COMMERCIAL GENERAL LIABILITY
CG 20 10 07 04

THIS ENDORSEMENT CHANGES THE POLICY. PLEASE READ IT CAREFULLY.

ADDITIONAL INSURED – OWNERS, LESSEES OR CONTRACTORS – SCHEDULED PERSON OR ORGANIZATION

This endorsement modifies insurance provided under the following:

COMMERCIAL GENERAL LIABILITY COVERAGE PART

SCHEDULE

Name Of Additional Insured Person(s) Or Organization(s):	Location(s) Of Covered Operations
Any person or organization for whom you are performing operations, but only if you have agreed, in a written contract, to add such person or organization as an additional insured on your policy for that location or part thereof, provided such written contract is fully executed prior to an "occurrence" in which coverage is sought under this policy.	Any and All Locations.
Information required to complete this Schedule, if not shown above, will be shown in the Declarations.	

A. **Section II – Who Is An Insured** is amended to include as an additional insured the person(s) or organization(s) shown in the Schedule, but only with respect to liability for "bodily injury", "property damage" or "personal and advertising injury" caused, in whole or in part, by:

1. Your acts or omissions; or
2. The acts or omissions of those acting on your behalf;

in the performance of your ongoing operations for the additional insured(s) at the location(s) designated above.

B. With respect to the insurance afforded to these additional insureds, the following additional exclusions apply:

This insurance does not apply to "bodily injury" or "property damage" occurring after:

1. All work, including materials, parts or equipment furnished in connection with such work, on the project (other than service, maintenance or repairs) to be performed by or on behalf of the additional insured(s) at the location of the covered operations has been completed; or
2. That portion of "your work" out of which the injury or damage arises has been put to its intended use by any person or organization other than another contractor or subcontractor engaged in performing operations for a principal as a part of the same project.

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