REQUEST FOR PROPOSALS

FOR

Rancho Las Virgenes Composting Facility: Centrate Treatment 24-inch Pump Suction Header and Valve Replacement Design

PROPOSALS DUE by 3:00 p.m., March 26, 2020

LAS VIRGENES – TRIUNFO JOINT POWERS AUTHORITY
4232 LAS VIRGENES ROAD
CALABASAS, CA 91302
818.251.2100

February 2020

REQUEST FOR PROPOSALS
Las Virgenes – Triunfo Joint Powers Authority

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ATTACHMENTS

- Drawings for the Centrate Treatment Project - 2009
- Photos of the valves and pipeline during construction
- Contractor's original valve submittal for 2009 Centrate Treatment Project
- Professional Services Agreement

I. BACKGROUND INFORMATION

The Las Virgenes Municipal Water District (LVMWD) is a special district established in 1958. The District's service area consists of 122-square miles in western Los Angeles County and includes the incorporated cities of Hidden Hills, Calabasas, Agoura Hills and Westlake Village, as well as unincorporated areas. The District provides potable water, recycled water and wastewater service to a population of approximately 70,000. The Triunfo Water and Sanitation District (TWSD), located within southeastern Ventura County, is a joint venture partner with LVMWD in wastewater and recycled water service. The TWSD service area encompasses 50 square miles and serves a population of approximately 30,000.

The joint venture operates the Tapia Water Reclamation Facility (Tapia) and The Rancho Las Virgenes Composting Facility (Rancho). Solids generated during wastewater treatment at Tapia are pumped to Rancho where they are processed by mesophilic anaerobic digestion and dewatering (centrifugation) producing Class B bio-solids. After being dewatered by a centrifuge, the biosolids are mixed with wood chips and composted to produce Class A "exceptional quality" product.

Centrate generated in the dewatering process has a high ammonia concentration and requires treatment before it is returned to Tapia via the sanitary sewer. In 2009, two existing Aquastore glass lined steel tanks (approximately 700,000 gallons each) were converted into centrate treatment tanks. Treatment with these tanks has proven to be very successful with a consistent nitrogen removal rate of over 80%. In 2018, to provide redundancy in centrate treatment, a third glass lined steel tank for centrate storage was constructed with a capacity of 480,000 gallons.

With the addition of the storage tank, operations staff would like to use both of the 700,000-gallon centrate treatment tanks simultaneously to allow for better nitrogen removal. For this to occur, the leaking valves in the 24-inch Pump Suction Header need to function. These valves are buried and encased in concrete and have proven difficult to access, and repair (see drawings C-3 through C-5 of the attached Centrate Treatment Project – 2009 drawings). The scope of this RFP is evaluate the existing valves and suction header and provide a recommendation for either re-routing the pipeline with new valves or replacement of the existing valves. The scope of work should include design and services during bidding and construction.

II. SCOPE OF WORK

The proposed scope of work includes the following tasks; however, the consultant should include additional tasks as necessary for the ultimate success of the project:

1. Evaluation of the existing centrate treatment systems pump suction header and valves:
    - Review attached documentation and make recommendations on the improvements that would allow for the replacement of the existing valves and allow for better access for future repairs.
    - The valves can be removed and replaced with new valves (not necessarily from the same manufacturer), or the suction header and valves can be brought above ground and the existing header can be abandoned.

2. After JPA staff approval of recommendations, produce plans and specifications for bidding the project.
    - Centrate treatment operations should have minimal interruption during the project. Some items of work may need to be scheduled to occur during certain rigid timeframes to minimize impacts.
    - Provide a digital copy of the plans and specifications. (Specifications shall be in MS Word format, drawings are to be in AutoCAD and Adobe Acrobat format).

3. Receive and incorporate JPA staff input/direction.

4. Perform site visits and meetings with District staff as necessary.

5. Provide support services during bidding and construction.

6. Other proposed services and tasks.

III. SERVICES OR DATA PROVIDED BY DISTRICT

The District will provide the following data, access, services or resources:

- Access to the facilities.
- Available records.
- District staff to answer questions.

IV. MINIMUM CONSULTANT QUALIFICATIONS

- The selected firm shall have staff registered as a State of California Professional Engineer.
- The District's standard Consultant Agreement is included as an attachment. The consultant shall have the ability to execute the agreement in this form Professional liability insurance in the amount of $2 million.
- Proven experience on at least three recently completed projects of similar scope.

V. PROPOSAL REQUIREMENTS

1) Legal name of firm with address, telephone number and the name of at least one principal.
2) Project understanding and approach.
3) A recommended scope of work, which clearly displays an understanding of the project, including a proposed schedule.
4) List of assumptions or recommended services that are not a part of the proposal.
5) Names and résumés of individual(s) proposed to perform the services, including proof of professional registrations, as appropriate.
6) Names, qualifications and principals of any sub-consultants to be utilized in providing the service(s).
7) References for three recently completed projects of similar scope, including contact person and telephone number.
8) Description of the firm's internal quality control process.
9) Certificate of professional liability insurance.
10) Cost to perform the services, a schedule of rates and any anticipated rate changes.

VI. EVALUATION CRITERIA

Proposals will be evaluated based upon the following:

1) A comprehensive and understandable Scope of Work.
2) Expertise in performing the Scope of Work.
3) The quality of performance on similar past projects, including those on which the proposed team has worked together.
4) The ability to meet time schedules and complete the work within established budgets.
5) The firm's history and resource capacity to perform the requested service.
6) The experience and qualifications of assigned personnel.
7) The cost of proposal.

VII. REQUEST FOR PROPOSAL SCHEDULE

Request for Proposals	February 24, 2020
Pre-proposal Meetings	If requested by consultant
Proposal Due Date (3:00 p.m.)	March 26, 2020

Please submit a digital copy of your proposal no later than 3:00 p.m. on March 26, 2020 by e-mailing or delivering them to:

Attn: Brett Dingman, P.E.
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302
bdingman@lvmwd.com

For questions, or to arrange a tour. Please contact Brett Dingman (818) 251-2330, bdingman@lvmwd.com.

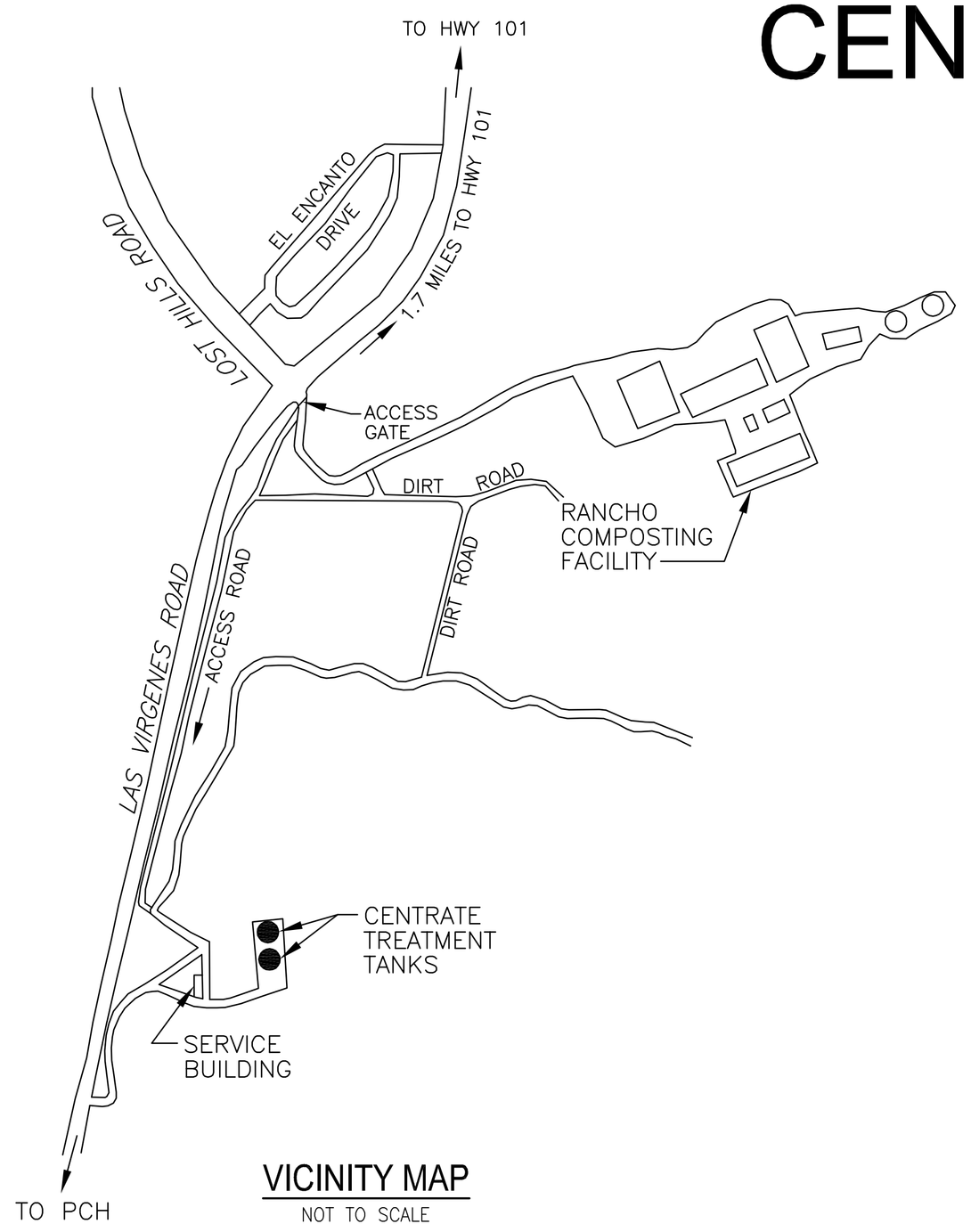
Drawings for Centrate Treatment Project, 2009

LAS VIRGENES MUNICIPAL WATER DISTRICT

LOS ANGELES COUNTY, CALIFORNIA

CONSTRUCTION PLANS FOR

TAPIA BNR PROJECT
CENTRATE TREATMENT



VICINITY MAP

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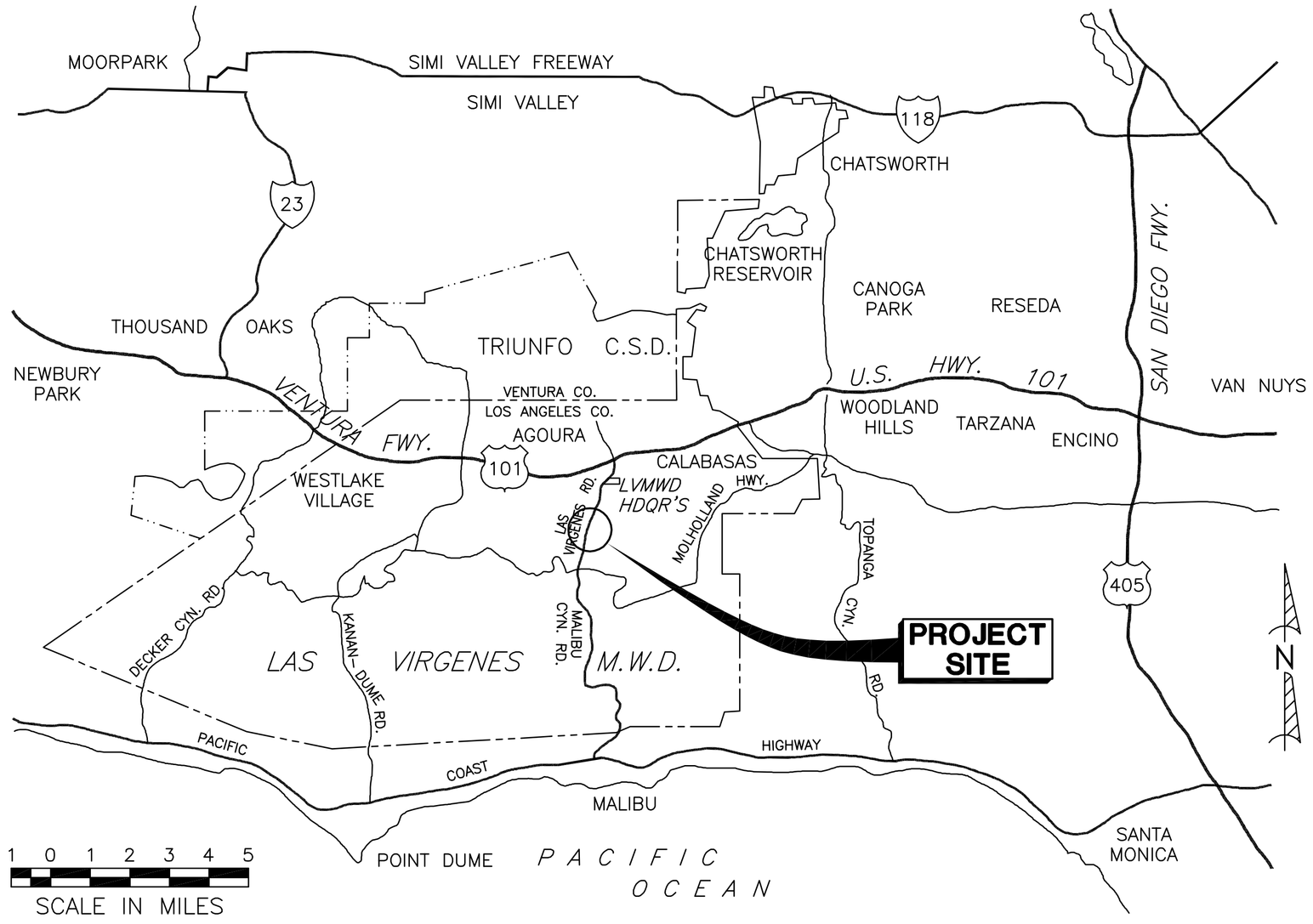

LOCATION MAP

NOT TO SCALE

RECORD DRAWING

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DESIGNED BY: RE
DRAWN BY: KM
CHECKED BY: RH
DATE: 2/26/08

PROJECT ENGINEER: ROBERT D. ELLISON
REG NUMBER: 38094 EXP DATE: 3-31-09
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

BOYLE engineering corporation
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

TITLE SHEET

DRAWING: G-1
SHEET: 1 OF 32 SHEETS

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ABBREVIATIONS

ANSI	AMERICAN NATIONAL STANDARD INSTITUTE
APPROX	APPROXIMATELY
APWA	AMERICAN PUBLIC WORKS ASSOCIATION
AR	AIR RELEASE
ASSY	ASSEMBLY
ASTM	AMERICAN SOCIETY FOR TESTING AND MATERIALS
AV	AIR RELEASE VALVE
AWWA	AMERICAN WATER WORKS ASSOCIATION
BFV	BUTTERFLY VALVE
BLDG	BUILDING
BO	BLOW OFF
BRKT	BRACKET
BUR CBL	BURIED CABLE
CL	CENTERLINE
CML	CEMENT MORTAR LINED
CML&C	CEMENT MORTAR LINED & COATED
C.O.	CLEAN OUT
COL	COLUMN
CONC	CONCRETE
CONST	CONSTRUCT
CU	COPPER
DIA	DIAMETER
DIM	DIMENSION
DIP	DUCTILE IRON PIPE
DWG	DRAWING
(E)	EXISTING
EA	EACH
EL	ELEVATION
EXIST	EXISTING
FD	FOUND
FE	FLANGED END
FL	FLOOR
FT	FEET
FM	FORCE MAIN
FS	FAR SIDE
GA	GAUGE
GALV	GALVANIZED
GI	GALVANIZED IRON
GPM	GALLONS PER MINUTE
ID	INSIDE DIAMETER
JT	JOINT
L	LENGTH
LVMWD	LAS VIRGENES MUNICIPAL WATER DISTRICT
MAX	MAXIMUM
MGD	MILLION GALLONS PER DAY
MIN	MINIMUM
MJ	MECHANICAL JOINT
MTLS	MATERIALS
NAVD	NORTH AMERICAN VERTICAL DATUM
NGVD	NATIONAL GEODETIC VERTICAL DATUM
NS	NEARSIDE
NTS	NOT TO SCALE
OPER	OPERATION
PA	PRESSURIZED AIR
P&ID	PROCESS AND INSTRUMENTATION DIAGRAM
PP	POWER POLE
PROP	PROPOSED
PSI	POUNDS PER SQUARE INCH
R	RADIUS
RAS	RETURN ACTIVATED SLUDGE
RCE	REGISTERED CIVIL ENGINEER
REQ'D	REQUIRED
RS	RAW SLUDGE
RW	RECLAIMED WATER, RECYCLED WATER
SST	STAINLESS STEEL
STL	STEEL
STD	STANDARD
SCH	SCHEDULE SPECS SPECIFICATIONS
SQ	SQUARE
TDH	TOTAL DYNAMIC HEAD
TYP	TYPICAL
WAS	WASTE ACTIVATED SLUDGE

GENERAL NOTES

1. THE EXISTING TOPOGRAPHICAL FEATURES SHOWN ON THE DRAWINGS WERE OBTAINED FROM THE LATEST RECORD DRAWING INFORMATION PROVIDED FROM LAS VIRGENES MUNICIPAL WATER DISTRICT (LVMWD) AS PART OF THE BID PROCESS, AND PRIOR TO CONSTRUCTION, THE CONTRACTOR SHALL EXAMINE THE SITE OF THE PROPOSED WORK AND MAKE ALL NECESSARY INVESTIGATIONS TO DEFINE THOROUGHLY ALL DIFFICULTIES INVOLVED IN THE COMPLETION OF ALL WORK REQUIRED PURSUANT TO THE REQUIREMENTS OF THE CONTRACT DOCUMENTS. ELEVATIONS OBTAINED FROM RECORD DRAWINGS ARE NGVD 29. ELEVATIONS ON DRAWIING C-10 ARE FROM RECENT SURVEY AND ARE NAVD 88.
2. PROVIDE A MINIMUM OF 3.0 FEET OF COVER OVER ALL PIPE TO BE INSTALLED ON THE PROJECT UNLESS OTHERWISE SHOWN.
3. THE DRAWINGS DEPICT THE APPROXIMATE LOCATION OF UNDERGROUND UTILITIES, WHICH WERE DETERMINED FROM LVMWD RECORD DRAWINGS. THE CONTRACTOR SHALL VERIFY THE EXACT HORIZONTAL AND VERTICAL LOCATION OF UNDERGROUND UTILITIES IN THE AREA OF CONSTRUCTION PRIOR TO PROCEEDING WITH THE WORK. THE CONTRACTOR SHALL MAKE ALL NECESSARY ARRANGEMENTS AND PAY ALL COSTS ASSOCIATED WITH THE TEMPORARY RELOCATION, SUPPORT, MONITORING, PROTECTION, OR OTHER INTERACTION WITH UTILITY FEATURES WHICH MIGHT BE AFFECTED BY THE WORK. PROVIDE REQUIRED NOTICE TO OTHERS FOR SUCH WORK TO ALLOW THE PROJECT TO CONTINUE IN ACCORDANCE WITH THE CONTRACT SCHEDULE. THE COST OF SUCH WORK SHALL BE INCORPORATED INTO THE VARIOUS ITEMS OF WORK REQUIRING AND RELATED TO SUCH RELOCATION, SUPPORT THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL MONITORING OR PROTECTION DAMAGE WHICH MIGHT RESULT FROM HIS FAILURE TO EXACTLY LOCATE AND PROTECT ANY AND ALL UTILITIES, WHETHER ABOVE OR BELOW GRADE. ANY DAMAGE SHALL BE REPAIRED AT NO ADDITIONAL COST TO OWNER.
4. RESTORE ALL PROPERTY AND INFRASTRUCTURE, INCLUDING UTILITIES DISTURBED BY CONSTRUCTION OPERATIONS TO THE CONDITIONS WHICH EXISTED PRIOR TO CONSTRUCTION. THE COST OF SUCH RESTORATION SHALL BE INCLUDED IN THE UNIT PRICES BID FOR THE VARIOUS ITEMS OF WORK REQUIRING SUCH RESTORATION.
5. THE CONTRACTOR SHALL NOT ADVERSELY IMPACT DRAINAGE SYSTEMS DURING CONSTRUCTION. TEMPORARILY RECONFIGURE THE DRAINAGE SYSTEMS, WHICH MIGHT BE IMPACTED BY CONSTRUCTION AS THE WORK PROCEEDS, TO NOT CAUSE ADVERSE IMPACTS TO SURFACE WATER DRAINAGE EFFICIENCY. DO NOT IMPAIR SURFACE WATER DRAINAGE CAPACITY. FOLLOW THE REQUIREMENTS OF THE APPROVED POLLUTION PREVENTION PLAN FOR THE PROJECT.
6. MAINTAIN ACCESS TO ALL EXISTING PLANT OPERATIONS UNTIL NEW OPERATIONS HAVE BEEN TESTED AND ACCEPTED BY THE DISTRICT.
7. ALL WORK TO BE IN ACCORDANCE WITH LVMWD STANDARD SPECIFICATIONS UNLESS OTHERWISE.
8. FURNISH, FABRICATE, AND INSTALL TANK PLC PANEL (ICP-2) AS SHOWN IN THE DRAWINGS. WIRE FIELD INSTRUMENTS AND DEVICES AS SHOWN IN THE DRAWINGS.
9. MODIFY EXISTING PUMP STATION PLC PANEL (ICP-1) AS SHOWN IN THE DRAWINGS. WIRE FIELD DEVICES AS SHOWN IN THE DRAWINGS.
10. PLC PROGRAM OR OPERATOR INTERFACE PROGRAMMING IS NOT PART OF THE CONTRACT AND IS PERFORMED BY OTHERS. DO NOT INCLUDE ANY PLC OR OPERATOR INTERFACE PROGRAMMING COSTS IN BID.

CONSTRUCTION WORK WITHIN OPERATING FACILITY

1. BEFORE PREPARING SHOP DRAWINGS OR ORDERING EQUIPMENT OR MATERIALS THAT CONNECT TO EXISTING PIPES AND FACILITIES, FIELD MEASURE DIAMETERS AND OTHER RELEVANT DIMENSIONS.
2. DAMAGE TO COATINGS, LININGS, AND FINISHES SHALL BE REPAIRED PER SPECIFICATIONS OR TO MATCH PRE-JOB CONDITIONS.
3. WORK SHALL BE COORDINATED WITH THE CONTINUING OPERATIONS OF THE FACILITY. ANY WORK REQUIRING A TEMPORARY OUTAGE OF EQUIPMENT SHALL BE SCHEDULED WITH THE OWNER, WHO WILL DETERMINE THE MAXIMUM DURATION OF THE OUTAGE.
4. DO NOT OPERATE VALVES, SWITCHES, OR OTHER PLANT EQUIPMENT, EXCEPT WITH THE OWNER'S EXPLICIT PERMISSION.
5. ANY WORK INVOLVING AN OUTAGE OF BOTH TANKS SHALL OCCUR BETWEEN JULY 1 AND SEPTEMBER 1.

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BOYLE SHEET INDEX

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C-2	TANK AND PIPING DETAILS
C-3	DETAILS
C-4	DETAILS
C-5	INSTRUMENTATION EQUIPMENT AND DETAILS
C-5A	INSTRUMENTATION EQUIPMENT AND DETAILS
C-6	VAULT AND VALVE DETAILS
C-7	TANK AND PIPING DETAILS
C-7A	RECYCLED WATER PIPE MODIFICATIONS AND DETAILS
C-8	ODOR CONTROL PLAN
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E-8	ELECTRICAL DETAILS
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MSO DRAWINGS

SHEETS 1 THROUGH 12

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DATE 2/26/08

PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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5851 Thille St. Suite 201
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

GENERAL NOTES & ABBREVIATIONS

DRAWING G-2
SHEET 2 OF 32 SHEETS

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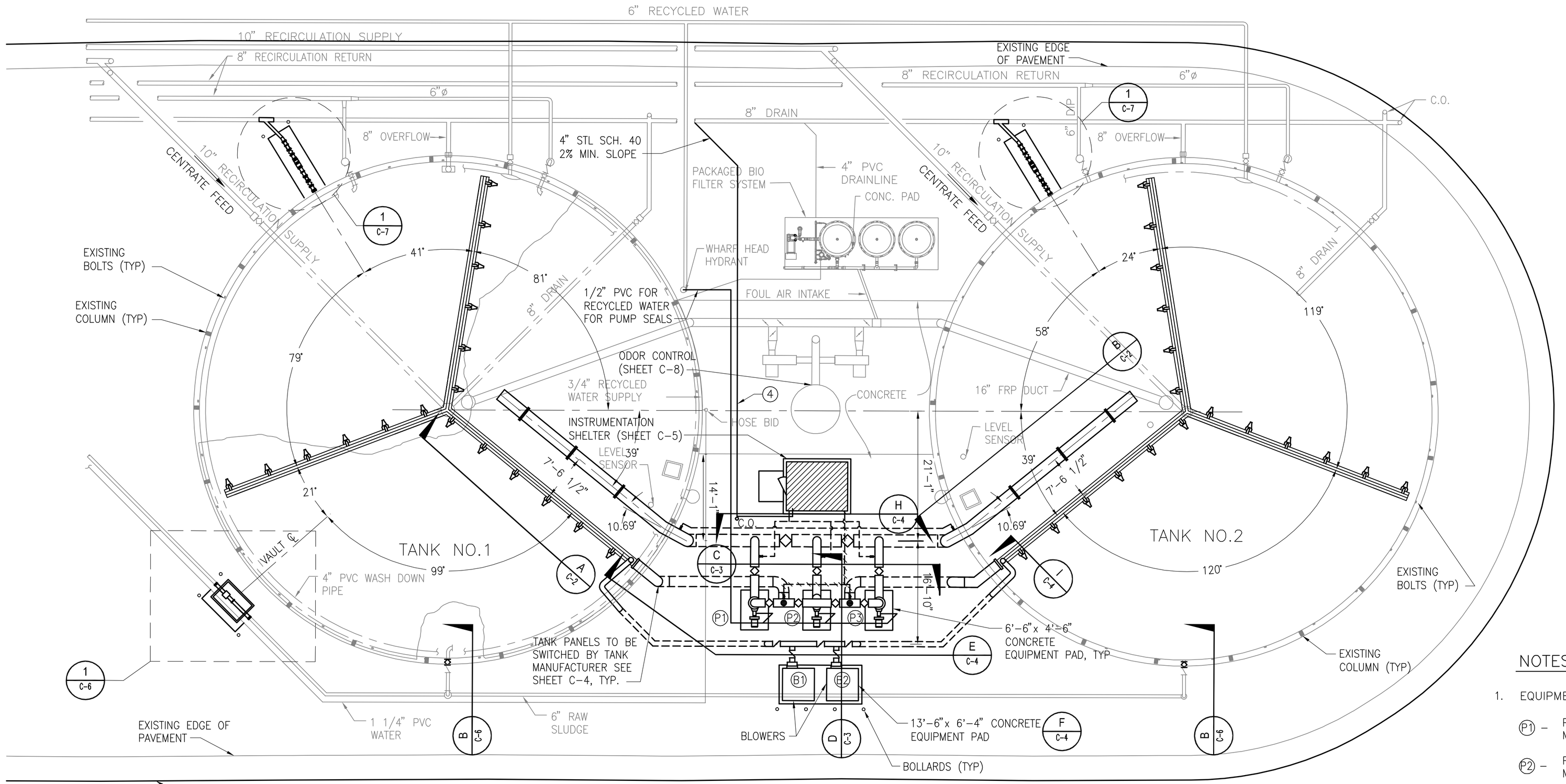

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PLAN

SCALE: 1"=10'

NOTES:

1. EQUIPMENT TAGS:
   - (P1) – PUMP : 0601-P-2A1, MOTOR : 0601-M-2A1
   - (P2) – PUMP : 0601-P-2A2, MOTOR : 0601-M-2A2
   - (P3) – PUMP : 0601-P-2B2, MOTOR : 0601-M-2B2
   - (B1) – BLOWER: 0601-BLR-1A1
   - (B2) – BLOWER: 0601-BLR-2A1
2. ALL EXISTING PIPES ARE DUCTILE IRON UNLESS LABELED OTHERWISE.
3. ALL NEW OUT-OF-BASIN PIPE IS FBE STEEL STD. WEIGHT UNLESS LABELED OTHERWISE.
4. INSTALL PIPE UNDER CONCRETE PAD USING PIERCING, JETTING OR AUGERING

RECORD DRAWING

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

TANK SITE PLAN

DRAWING C-1
SHEET 3 OF 32 SHEETS

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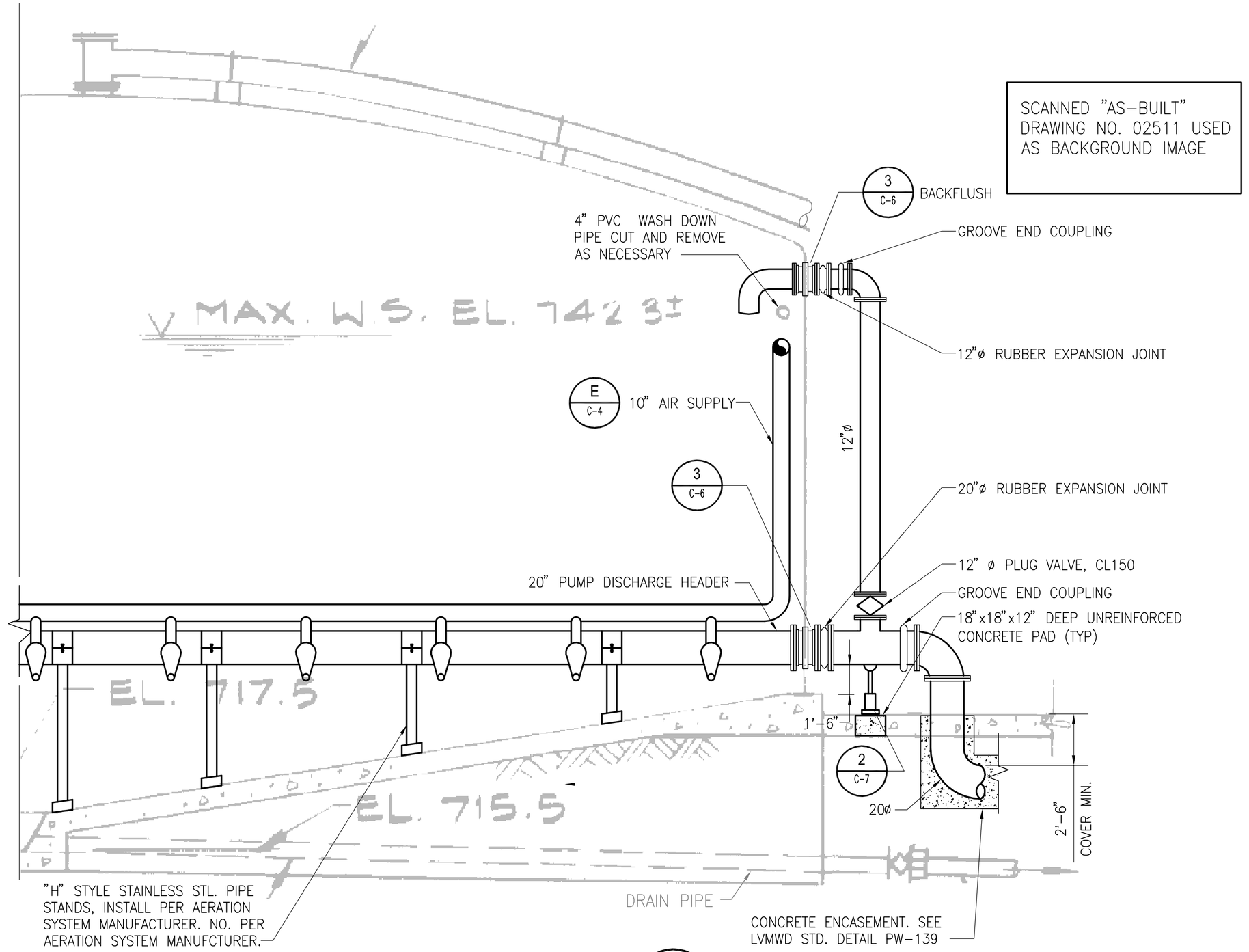
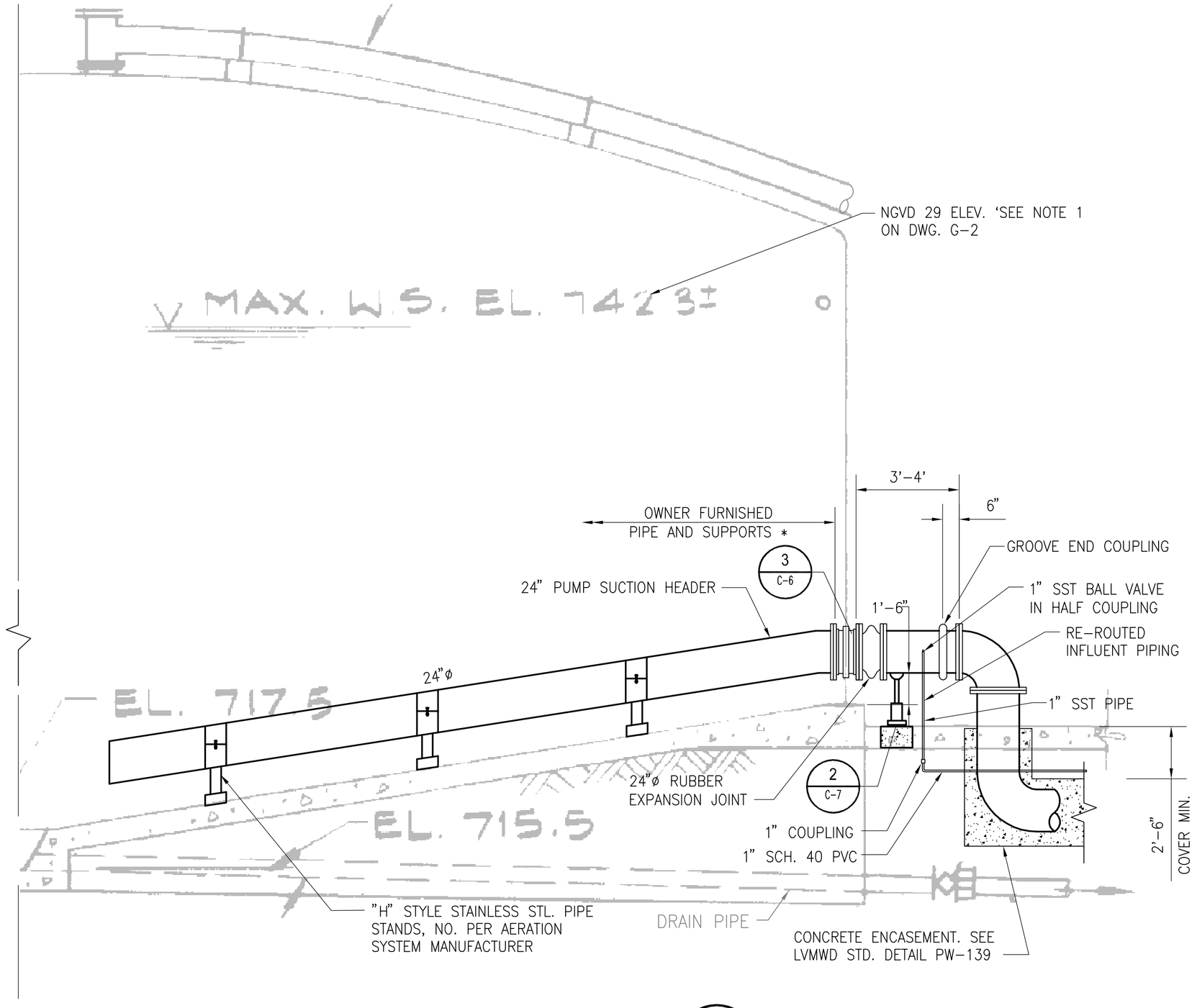


SECTION A

SCALE: 1/4" = 1'



SECTION B

SCALE: 1/4" = 1'

* CONTRACTOR TO INSTALL

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TAPIA BNR PROJECT - CENTRATE TREATMENT

TANK AND PIPING DETAILS

DRAWING C-2
SHEET 4 OF 32 SHEETS

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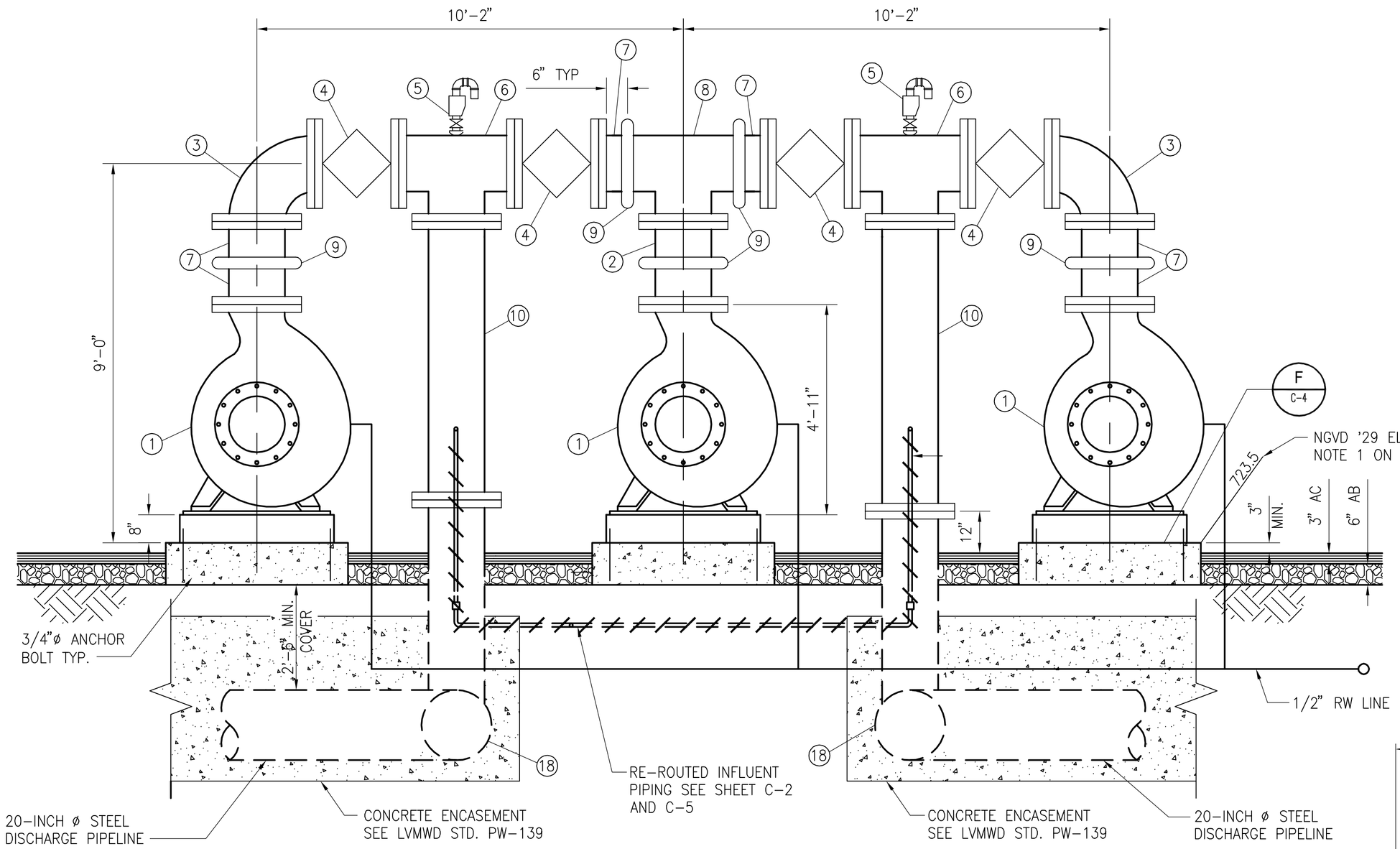

SECTION C

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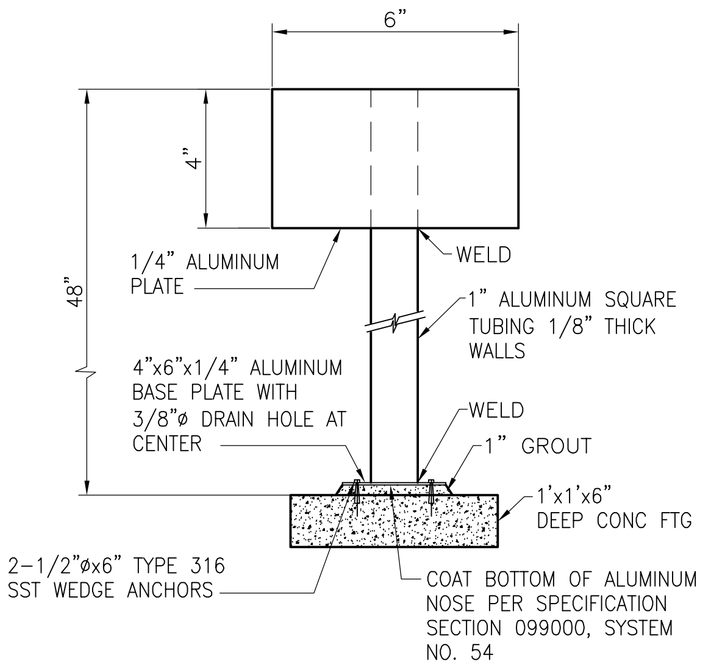


STANCHION F

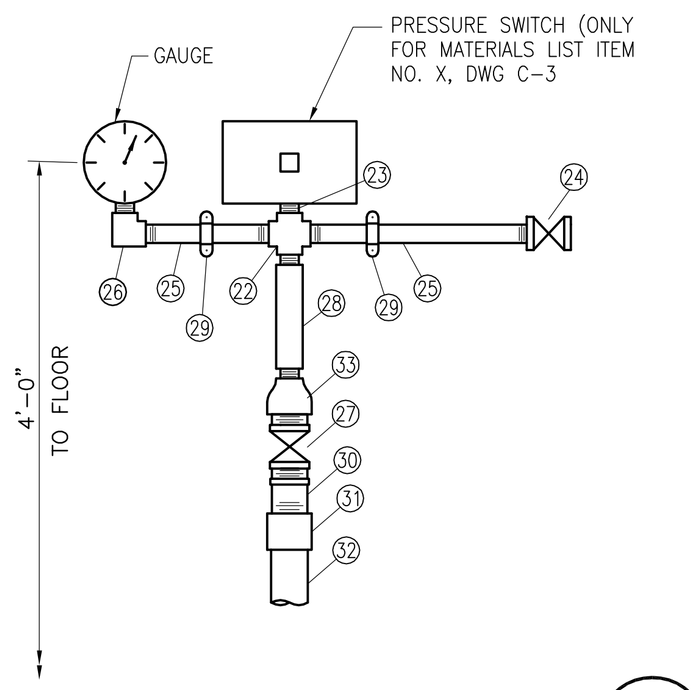
SCALE: NTS

MATERIALS LIST

1. HORIZONTAL END SUCTION CENTRIFUGAL PUMP-SULZER MODEL APT. 52-16
2. 16-INCH PIPE SPOOL STL GE x FLG 12" LONG
3. 90° BEND, 16-INCH, STL FLG x FLG
4. PLUG VALVE, 16-INCH, CL 150
5. 2-INCH AIR VALVE ASSY
6. 16-INCH TEE, STL, FLG x FLG x FLG
7. 16-INCH PIPE SPOOL, STL, GROOVED END x FLG (SHIPPED LOOSE FOR FIELD ASSY)
8. 16-INCH TEE, STL, GROOVED END x GROOVED END x FLG
9. GROOVE-END COUPLING
10. 16-INCH STL FLGxFLG (SHIP ON FLG LOOSE FOR FIELD ASSY)
11. 16-INCH PIPE SPOOL, STL, GROOVED END x FLG (SHIPPED LOOSE FOR FIELD ASSY)
12. 90° BEND, 16-INCH, STL FLG x FLG
13. KAESER BLOWER, MODEL NO. FB 790C (OWNER FURNISHED)
14. 10-INCH BUTTERFLY VALVE (AIR SERVICE)
15. 1-INCH SST BALL VALVE IN HALF COUPLING
16. 1-INCH COUPLING
17. 24"x24"x16" TEE, STL
18. 16"x24" REDUCING ELBOW
19. 16" SPOOL (SHIP ONE FLG LOOSE)
20. PRESSURE GAGE, SWITCH ASSEMBLY

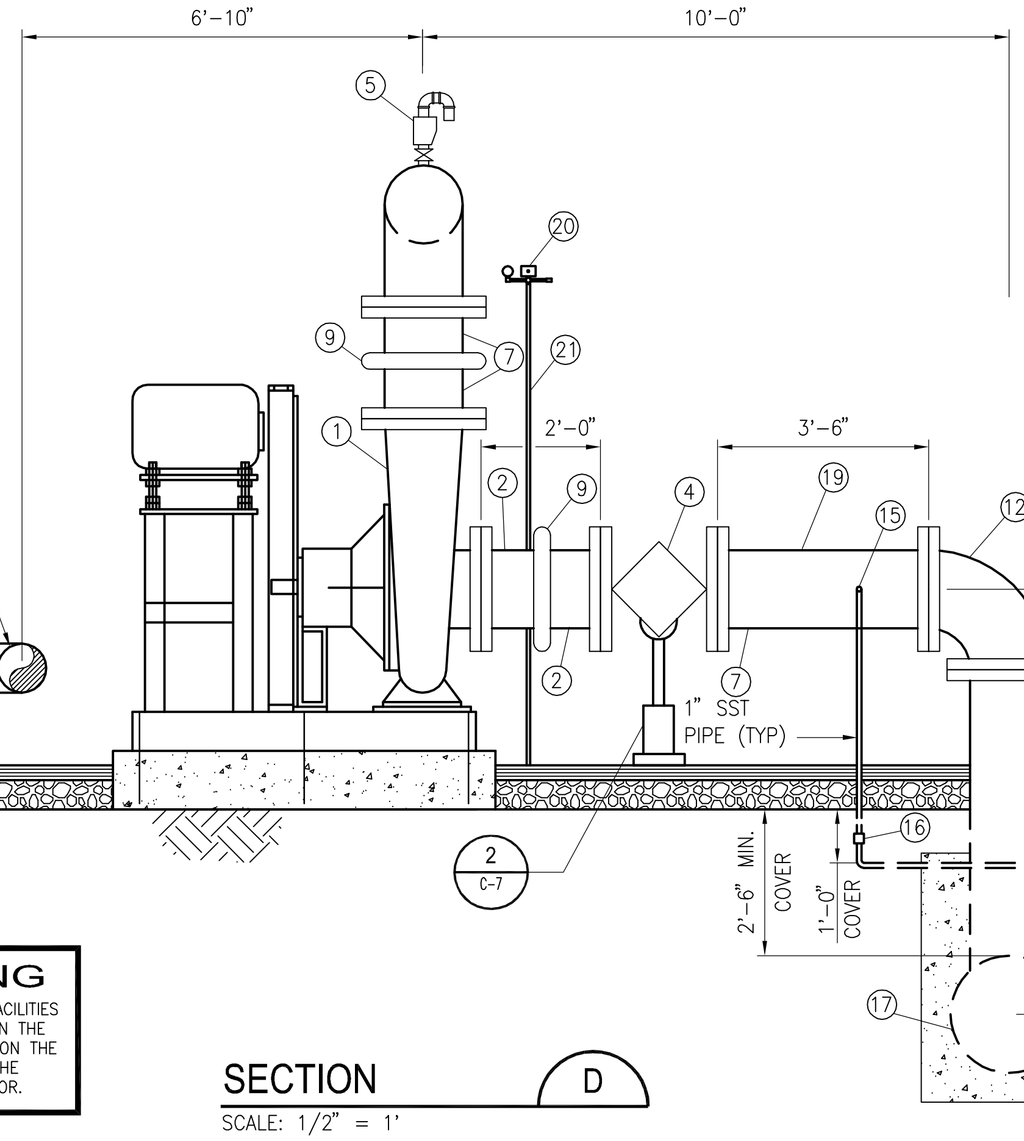
    PRESSURE GAGE: 0-30 psi
    PRESSURE SWITCH: 0-30 psi

    E
21. STANCHION F
22. 1/4" STAINLESS STEEL FEMALE CROSS.
23. 1/4" STAINLESS STEEL HEX NIPPLES.
24. 1/4" STAINLESS STEEL BALL VALVE RATED TO MINIMUM OF 600 PSI.
25. 1/4" x 4" STAINLESS STEEL NIPPLE.
26. 1/4" STAINLESS STEEL 90° FEMALE ELBOW.
27. 1/2" STAINLESS STEEL BALL VALVE RATED TO MINIMUM OF 600 PSI.
28. 1/4" S.S. ASHCROFT DAMPENER.
29. S.S. STRAP.
30. 1/4" STAINLESS STEEL TEE.
31. NYLON BUSHING
32. BRASS COUPLING FPT x SOLDER
33. 3/4" COPPER PIPE.
34. 1/4" x 1/2" STAINLESS STEEL REDUCER.



PRESSURE GAUGE, TRANMITTER AND SWITCH DETAIL E

SCALE: NTS



SECTION D

SCALE: 1/2" = 1'

RECORD DRAWING

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REV	DESCRIPTION	APPR
7		
6		
5		
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2		
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY: RE
DRAWN BY: KM
CHECKED BY: RH
DATE: 2/26/08

PROJECT ENGINEER: ROBERT D. ELLISON
REG NUMBER: 38094
EXP DATE: 3-31-09
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

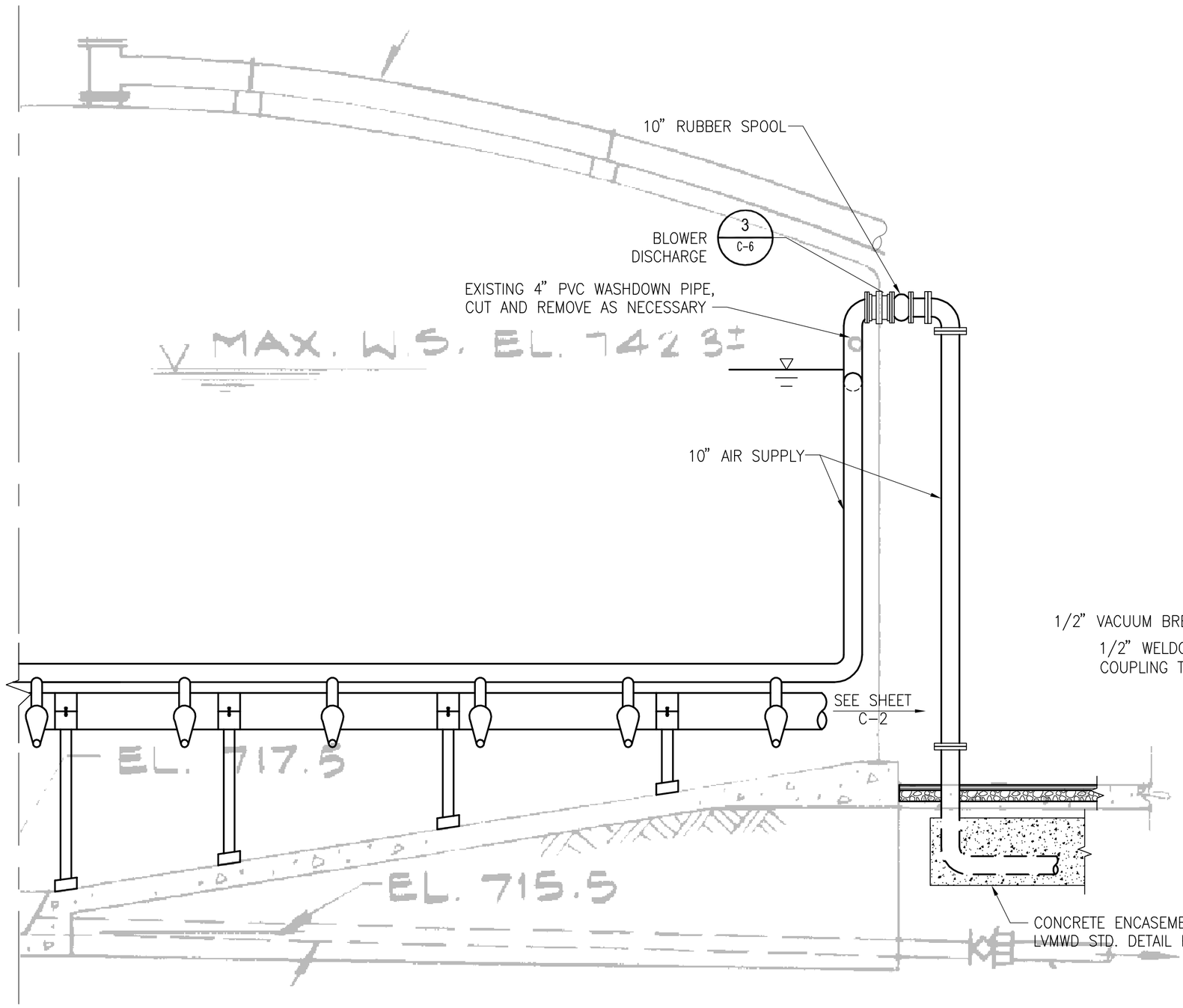
LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

DETAILS

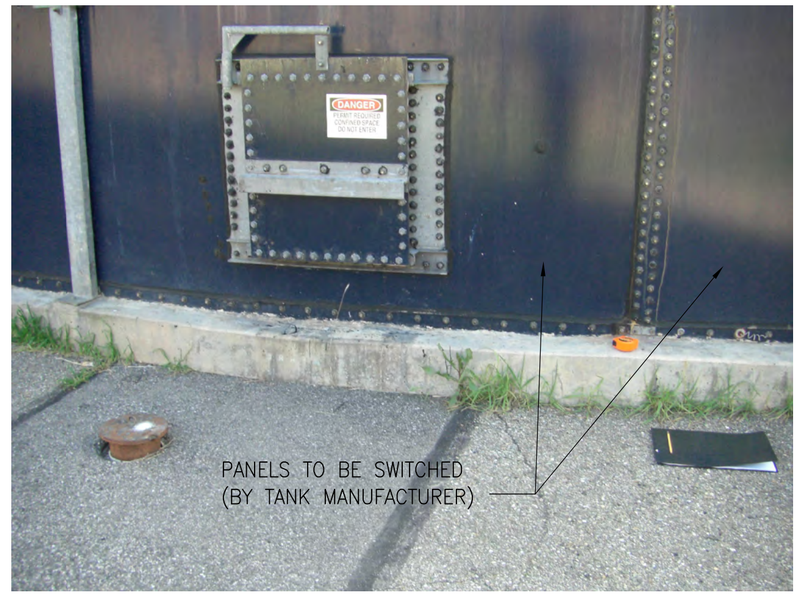
DRAWING C-3
SHEET 5 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\D02 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-03.dwg USER: davidal
DATE: Oct 13, 2009 9:50am XREFS: g-bd IMAGES: SCAN2218_000.tif 02511.tif LVMWD_COLOR.TIF TRIUNFO.TIF



SECTION E

SCALE: 1/4" = 1'

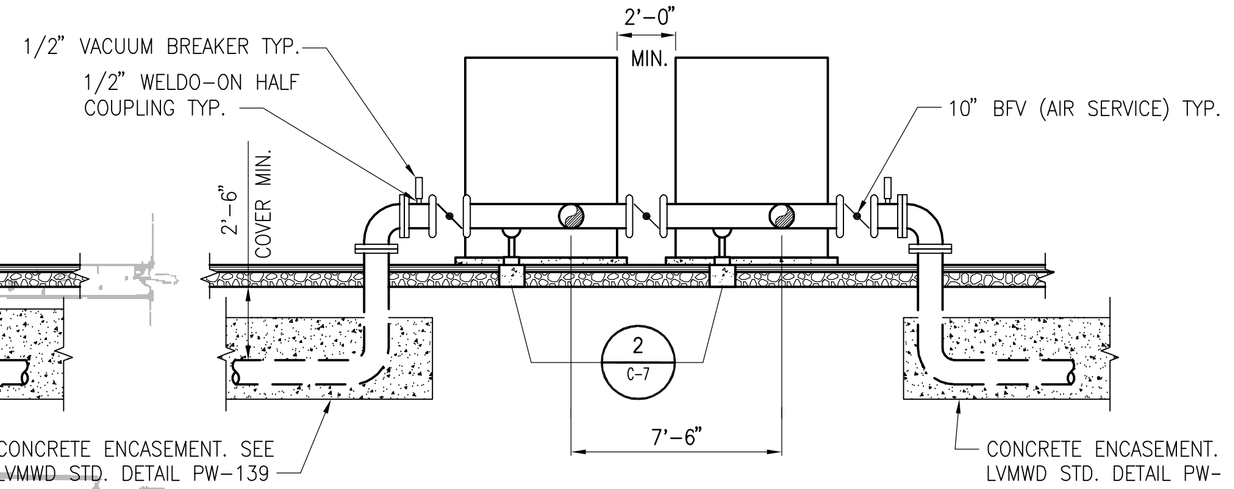


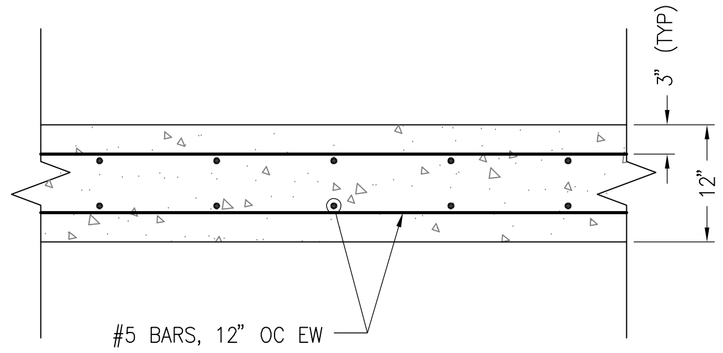
TANK NO.1 MODIFICATIONS

SCALE: NTS

TANK NO.2 MODIFICATIONS

SCALE: NTS





CONCRETE PAD F

SCALE: 1" = 1'

RECORD DRAWING

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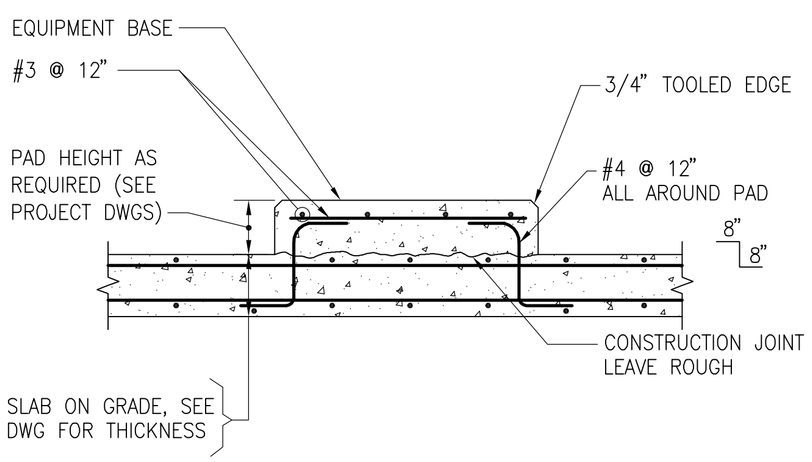
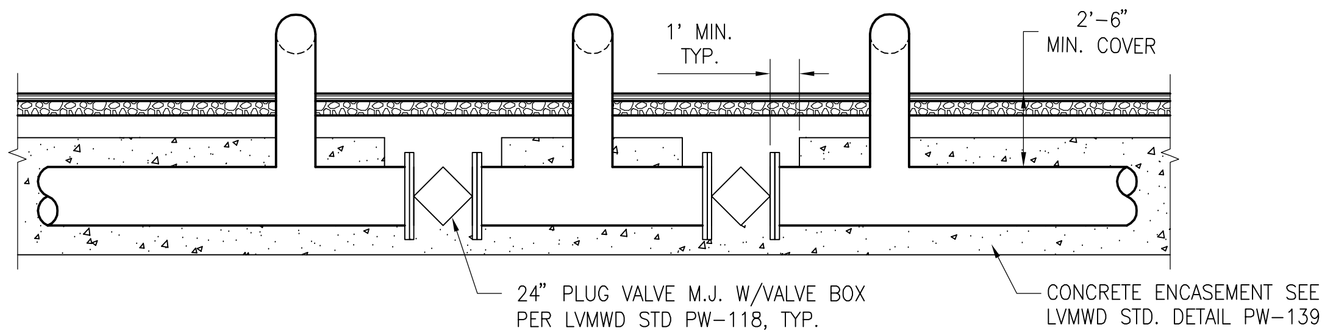


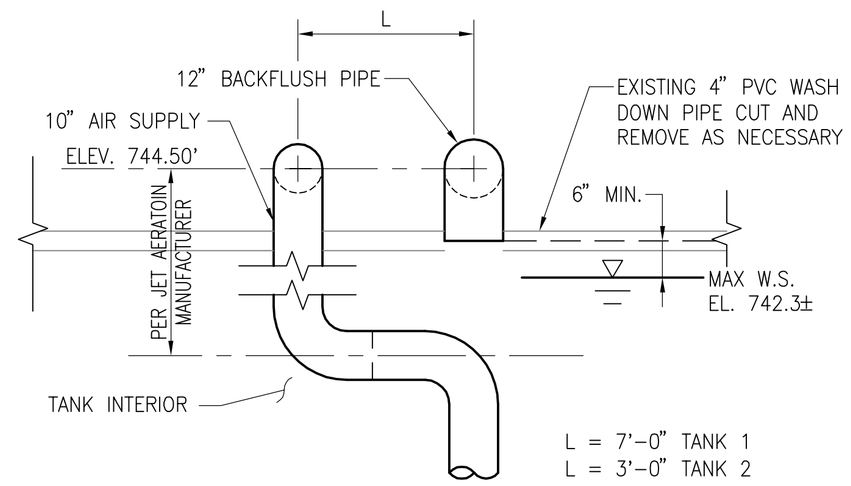
EQUIPMENT PAD G

SCALE: NONE



SECTION H

SCALE: 1/4" = 1'



SECTION I

SCALE: NONE

REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY RE
DRAWN BY KM
CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

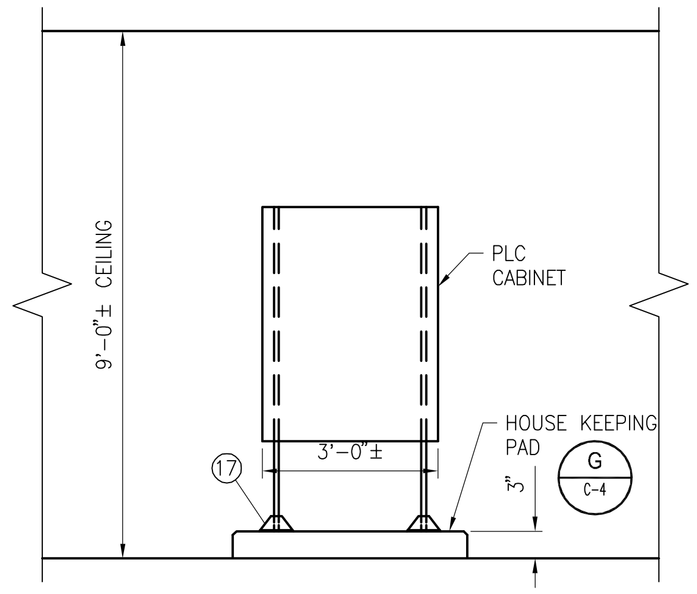
LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

DETAILS

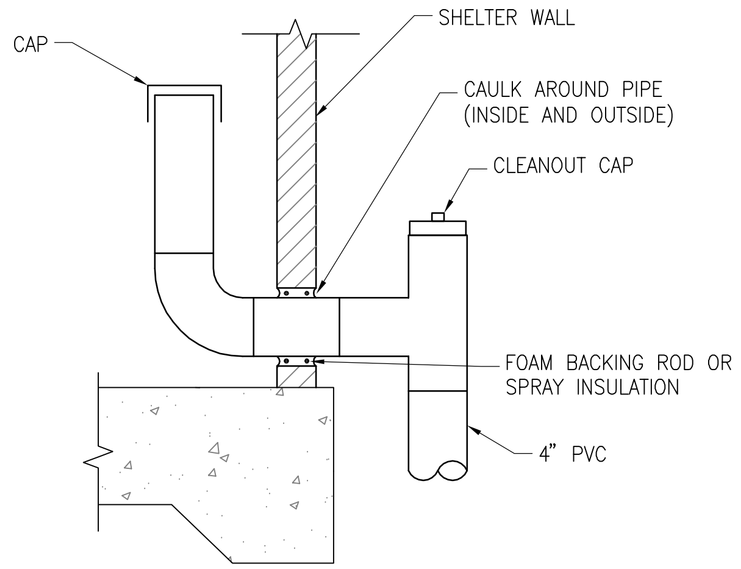
DRAWING C-4
SHEET 6 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0302 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-04.dwg
DATE: Oct 13, 2009 9:51am
XREFS: g-bd
IMAGES: 02511.tif CIMG0209.JPG CIMG0210.JPG
USER: davisol LVMWD_COLOR.TIF TRIUNFO.TIF



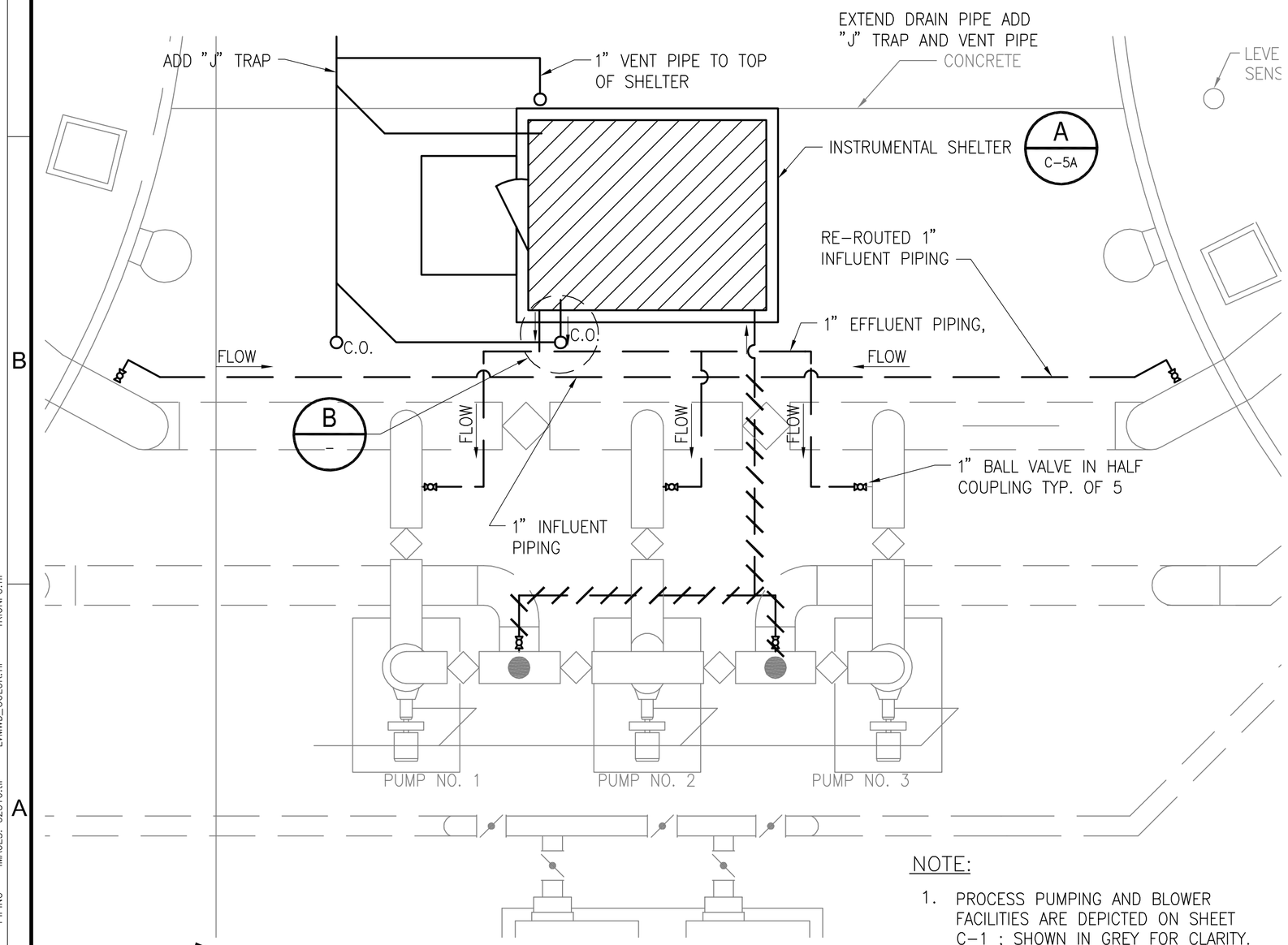
PLC SUPPORT (A)

SCALE: NTS



DRAIN PIPE PENETRATION (B)

SCALE: NTS



NOTE:

1. PROCESS PUMPING AND BLOWER FACILITIES ARE DEPICTED ON SHEET C-1 ; SHOWN IN GREY FOR CLARITY.

SITE PLAN

SCALE: 1/4"=1'

INSTRUMENTATION PARTS LIST

1. 1-INCH PIPE
2. 6-IN X 1-IN REDUCER, WITH FPT OUTLET
3. 6-INCH PIPE, FLANGE X BUTT WELD
4. 6-INCH PIPE CLAMP, FASTENED TO BACKBOARD
5. CHEMICAL PROBE, THREADED INTO (OR HUNG FROM) BLIND FLANGE
   a. DISSOLVED OXYGEN / TEMP: HACH MODEL LDO PROBE
   b. pH: HACH MODEL DIGITAL ORP SENSOR PEEK PROBE OR APPROVED EQUAL
   c. AMMONIA: HACH MODEL KTO: NH4D SC100 PROBE OR APPROVED EQUAL
   d. NITRATE: HACH MODEL NITRATAX PLUS SC SENSOR OR APPROVED EQUAL
   e. ORP: HACH MODEL DIGITAL ORP SENSOR PEEK PROBE OR APPROVED EQUAL
6. 1-INCH UNION-COUPLED OUTLET
7. BLIND FLANGE WITH TAPPED HOLE
8. 1/2-INCH PIPE, PE X MPT (IF REQ'D)
9. HOSE CLAMP, REDUCING
10. DATA CABLE, ROUTE TO ANALYZER, CONTROLLER OR PLC
11. PRESSURE GAUGE, 0 TO 25 PSI DIAPHRAM SEAL
12. TEE, 1-INCH X 3/8-INCH (OR AS REQ'D)
13. STREET ELBOW, 1-INCH
14. METER, STRAP-ON, ULTRASONIC TYPE, WITH LOCAL READOUT. DATA CABLE TO REACH EACH PROBE. MODEL: SONIC PRO S3 MODEL NO: SC-X-1-A1-010-SD-L-G-M-AL-E. MANUFACTURED BY BLU-WHITE IND. OR EQUAL.
15. UNISTRUT BRACKET, P2348, GALV.. CONNECT TO CEILING WITH 1/4-INCH SST (OR GALV) MOLLY ANCHORS (4 EACH). CONNECT TO CHANNEL WITH 3/8-INCH BOLT AND SPRING WASHER, GALV, 2 EACH.
16. UNISTRUT CHANNEL, P1000, GALV.
17. UNISTRUT BRACKET, P2348, GALV.. CONNECT TO FLOOR WITH 1/2-INCH SST WEDGE ANCHORS (2 EACH). CONNECT TO CHANNEL WITH 3/8-INCH BOLT AND SPRING WASHER, GALV, 2 EACH.
18. 1/4" MANUAL AIR RELEASE ASSEMBLY (BALL VALVE).
19. ANALYZER: HACH MODULE, SC1000 DISPLAY WITH GSM
20. DIAPHRAGM

INSTRUMENTATION NOTES

1. ALL PIPE MATERIALS TO BE TYPE 304 SST
2. MTLS TO BE RATED / TESTED FOR 50 PSI
3. THROTTLE VALVE ON MANIFOLD INLET PIPE TO PROVIDE MAX. 5 PSI
4. THROTTLE VALVE ON HEADER PIPE TO PROVIDE ABOUT 5 GPM TOTAL FLOW
5. RELOCATE STRAP-ON METER TO VERIFY MINIMUM FLOW OF 1 GPM @ EACH PROBE
6. CROSS CHECK DIMENSIONS WITH PROBE MANUFACTURER BEFORE FABRICATION

RECORD DRAWING

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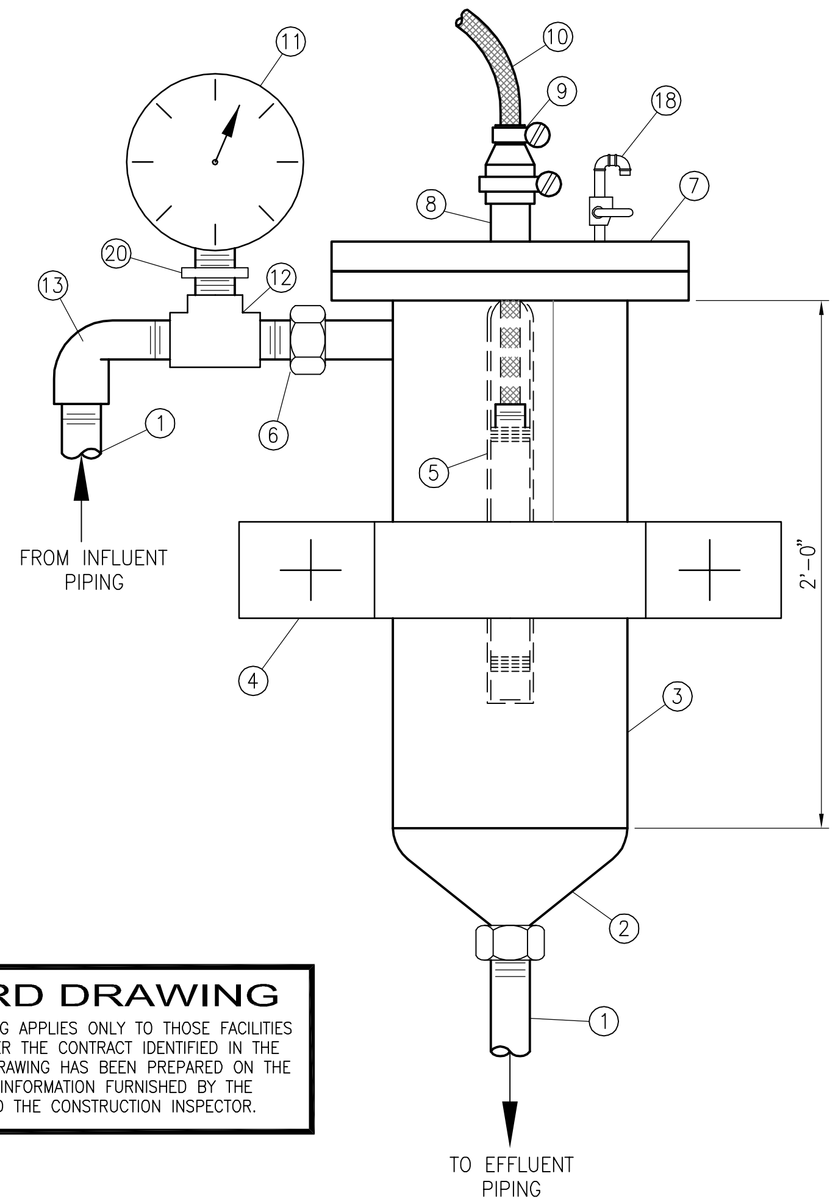

ASSEMBLY DETAIL (C)

SCALE: NTS

REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY RE
DRAWN BY KM
CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER: ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION EQUIPMENT AND DETAILS

DRAWING C-5
SHEET 7 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\D002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-05.dwg
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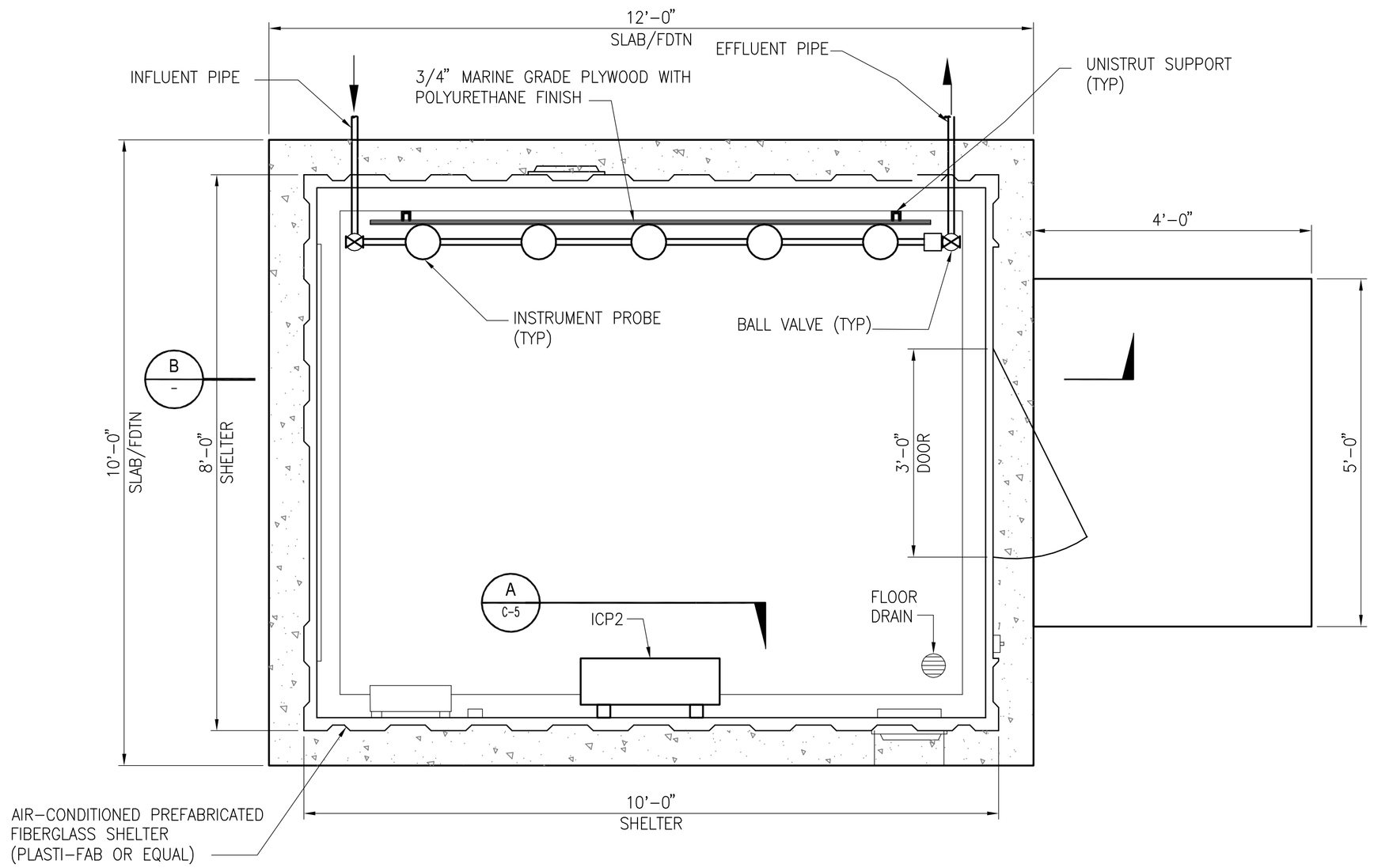
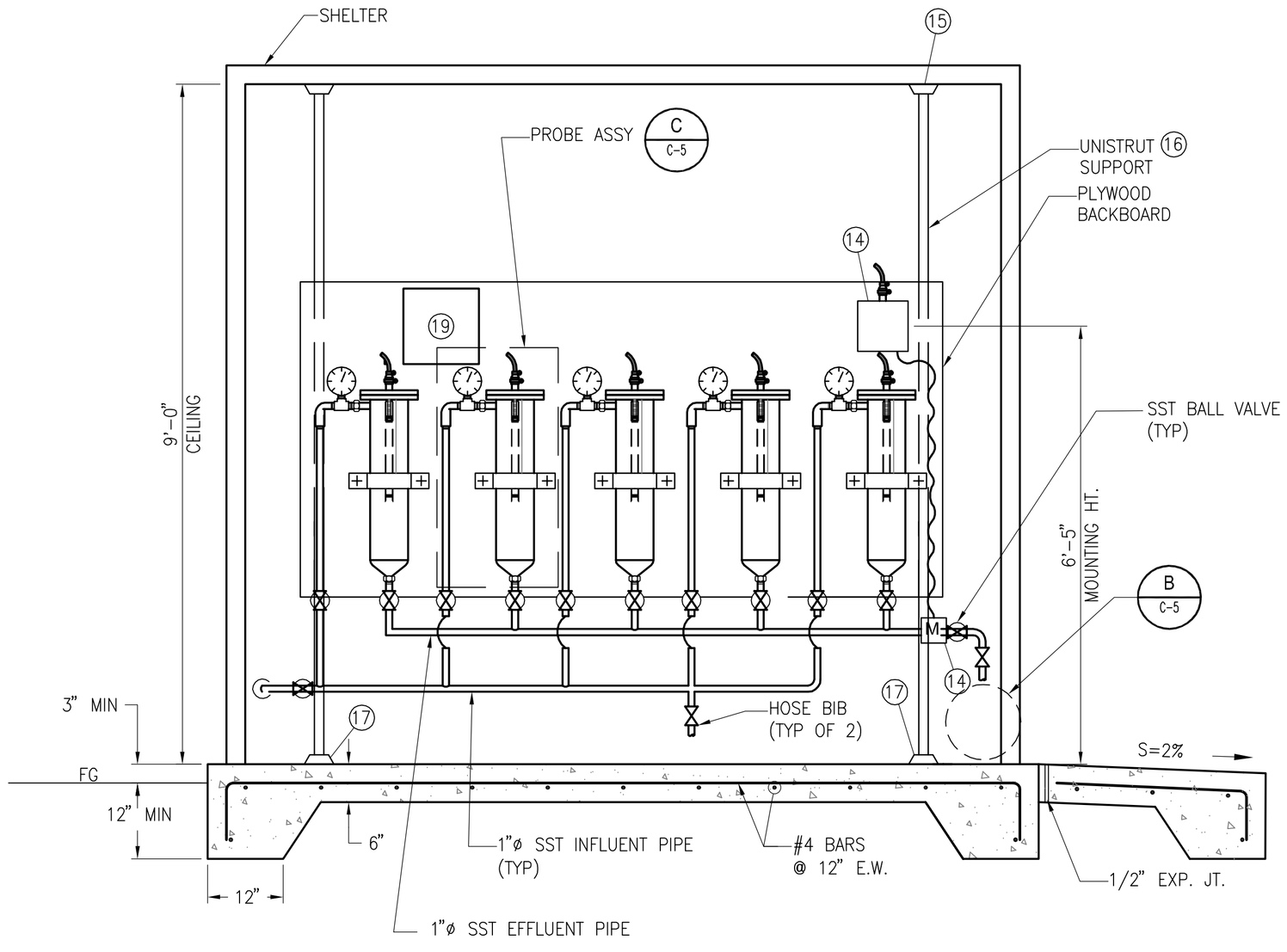


INSTRUMENTATION SHELTER PLAN (A)

SCALE: 3/4"=1'-0"



INSTRUMENTATION SHELTER SECTION (B)

SCALE: 3/4"=1'-0"

INSTRUMENTATION PARTS LIST

1. 1-INCH PIPE
2. 6-IN X 1-IN REDUCER, WITH FPT OUTLET
3. 6-INCH PIPE, FLANGE X BUTT WELD
4. 6-INCH PIPE CLAMP, FASTENED TO BACKBOARD
5. CHEMICAL PROBE, THREADED INTO (OR HUNG FROM) BLIND FLANGE
   a. DISSOLVED OXYGEN / TEMP: HACH MODEL LDO PROBE
   b. pH: HACH MODEL DIGITAL ORP SENSOR PEEK PROBE OR APPROVED EQUAL
   c. AMMONIA: HACH MODEL KTO: NH4D SC100 PROBE OR APPROVED EQUAL
   d. NITRATE: HACH MODEL NITRATAX PLUS SC SENSOR OR APPROVED EQUAL
   e. ORP: HACH MODEL DIGITAL ORP SENSOR PEEK PROBE OR APPROVED EQUAL
6. 1-INCH UNION-COUPLED OUTLET
7. BLIND FLANGE WITH TAPPED HOLE
8. 1/2-INCH PIPE, PE X MPT (IF REQ'D)
9. HOSE CLAMP, REDUCING
10. DATA CABLE, ROUTE TO ANALYZER, CONTROLLER OR PLC
11. PRESSURE GAUGE, 0 TO 25 PSI DIAPHRAM SEAL
12. TEE, 1-INCH X 3/8-INCH (OR AS REQ'D)
13. STREET ELBOW, 1-INCH
14. METER, STRAP-ON, ULTRASONIC TYPE, WITH LOCAL READOUT. DATA CABLE TO REACH EACH PROBE. MODEL: SONIC PRO S3 MODEL NO: SC-X-1-A1-010-SD-L-G-M-AL-E. MANUFACTURED BY BLU-WHITE IND. OR EQUAL.
15. UNISTRUT BRACKET, P2348, GALV.. CONNECT TO CEILING WITH 1/4-INCH SST (OR GALV) MOLLY ANCHORS (4 EACH). CONNECT TO CHANNEL WITH 3/8-INCH BOLT AND SPRING WASHER, GALV, 2 EACH.
16. UNISTRUT CHANNEL, P1000, GALV.
17. UNISTRUT BRACKET, P2348, GALV.. CONNECT TO FLOOR WITH 1/2-INCH SST WEDGE ANCHORS (2 EACH). CONNECT TO CHANNEL WITH 3/8-INCH BOLT AND SPRING WASHER, GALV, 2 EACH.
18. 1/4" MANUAL AIR RELEASE ASSEMBLY (BALL VALVE).
19. ANALYZER: HACH MODULE, SC1000 DISPLAY WITH GSM
20. DIAPHRAGM

INSTRUMENTATION NOTES

1. ALL PIPE MATERIALS TO BE TYPE 304 SST
2. MTLS TO BE RATED / TESTED FOR 50 PSI
3. THROTTLE VALVE ON MANIFOLD INLET PIPE TO PROVIDE MAX. 5 PSI
4. THROTTLE VALVE ON HEADER PIPE TO PROVIDE ABOUT 5 GPM TOTAL FLOW
5. RELOCATE STRAP-ON METER TO VERIFY MINIMUM FLOW OF 1 GPM @ EACH PROBE
6. CROSS CHECK DIMENSIONS WITH PROBE MANUFACTURER BEFORE FABRICATION

RECORD DRAWING

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
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DESIGNED BY RE
DRAWN BY KM
CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION EQUIPMENT AND DETAILS

DRAWING C-5A
SHEET 8 OF 32 SHEETS

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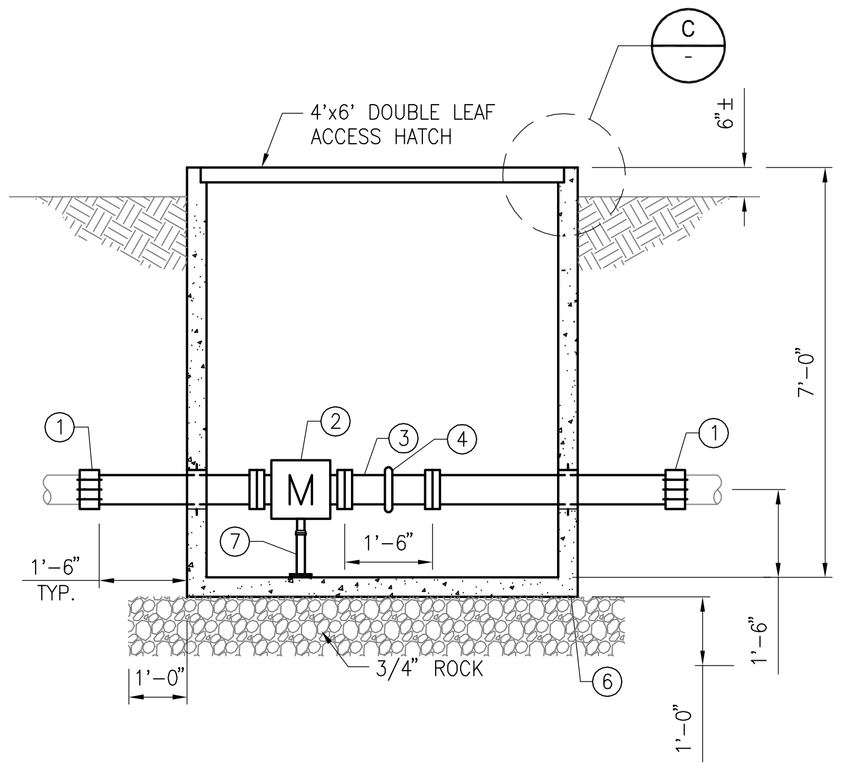
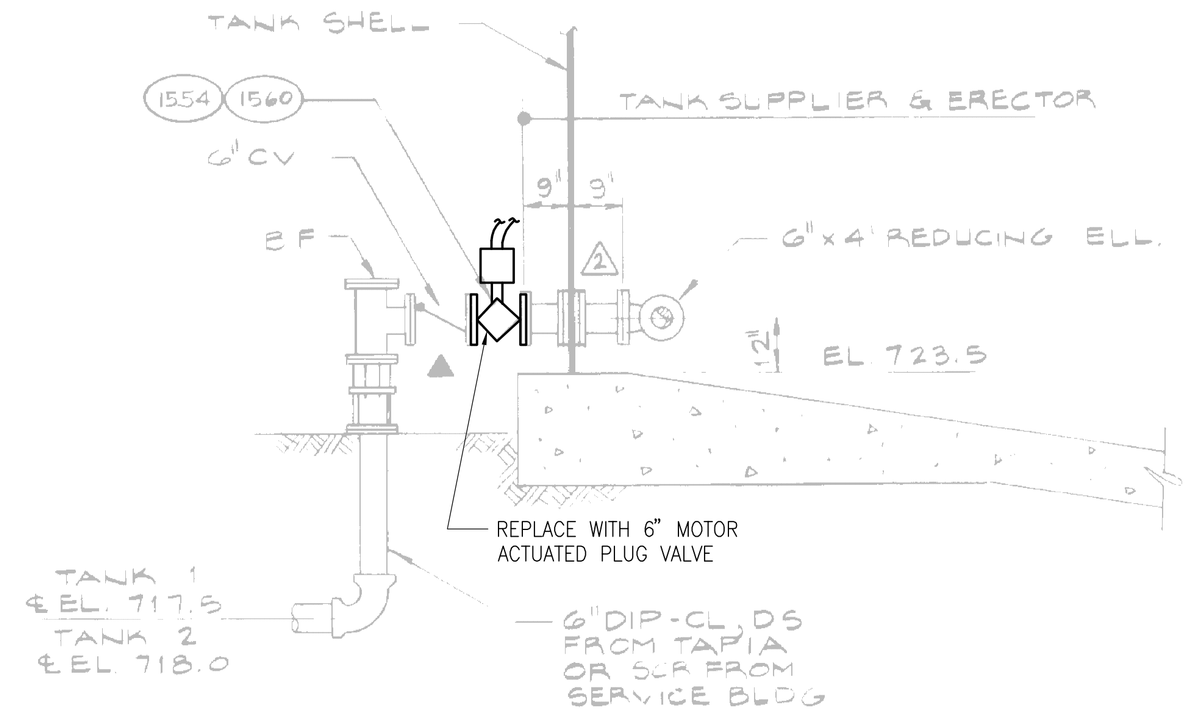


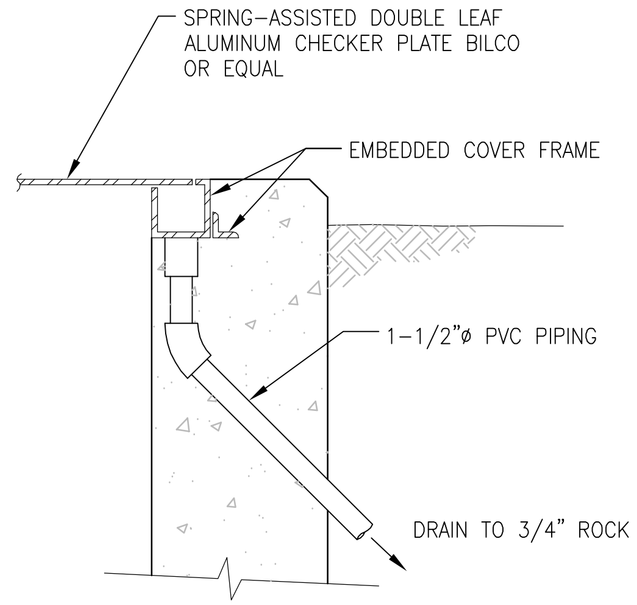
SECTION A

SCALE: 1/2" = 1'



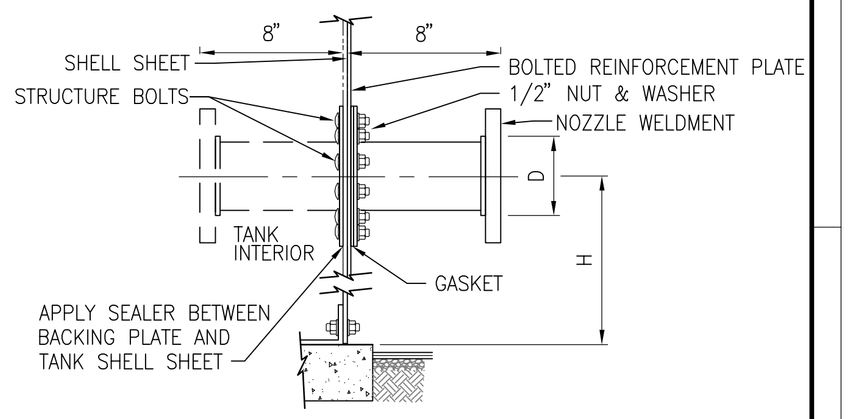
SECTION B

SCALE: NTS



SECTION C

SCALE: 1/2" = 1'



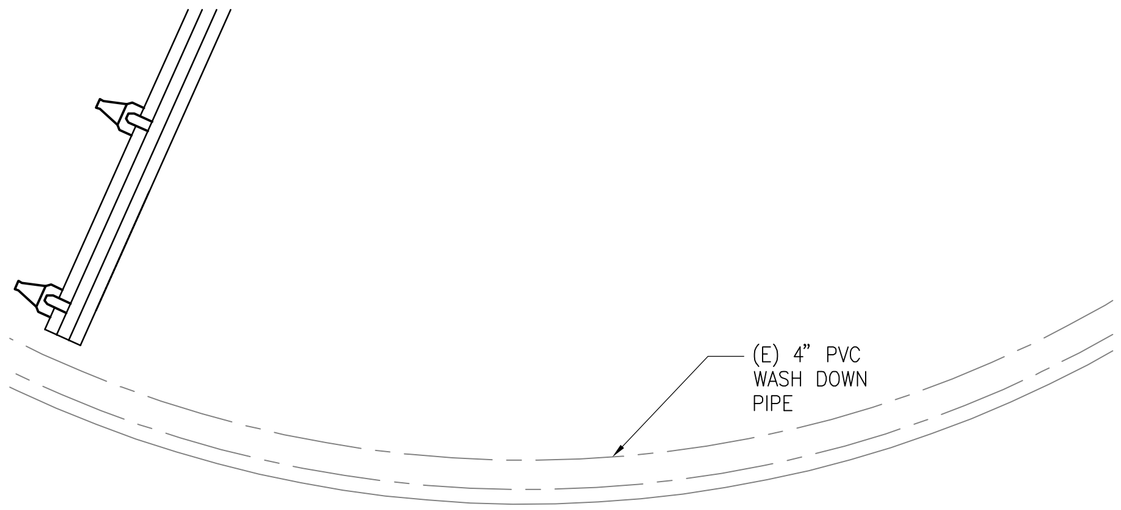
ELEVATION

SCALE: NTS

SCHEDULE

LOCATION	D	H	INTERIOR STUB	SHEET
PUMP SUCTION	24"	2' 4-1/2"	YES	C-2
PUMP DISCHARGE	20"	2' 4-1/2"	YES	C-2
BLOWER DISCHARGE	10"	21' 0"	YES	C-4
BACKFLUSH	12"	21' 0"	YES	C-2
AUTOMATED OUTLET 1	8"	2' 4-1/2"	NO	C-7
AUTOMATED OUTLET 2	8"	7' 1-1/2"	NO	C-7

* FLANGES SHALL BE ANSI 150 BOLT PATTERN



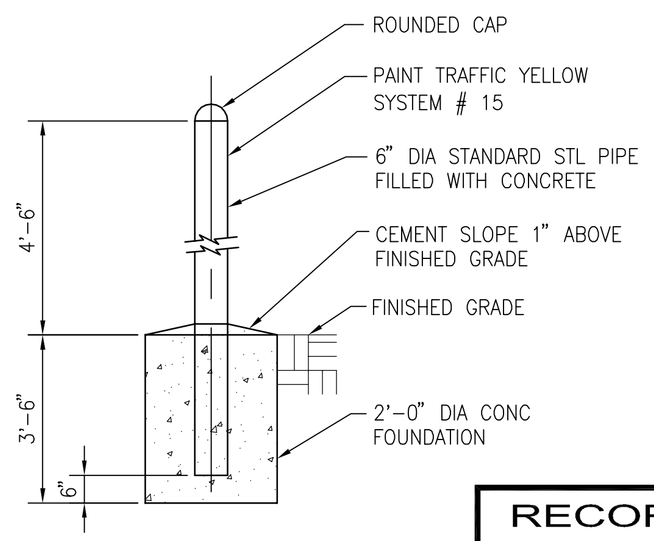
AUTOMATED SLUDGE INJECTION

SCALE: 1/4" = 1'

SCANNED "AS-BUILT" DRAWING NO. 02511 USED AS BACKGROUND IMAGE

REFERENCE NOTES

1. FLEXIBLE COUPLING
2. MAGNETIC FLOW METER
3. 6" DUCTILE IRON PIPE
4. GROOVE END COUPLING
6. 6'x4' CONCRETE VAULT
7. PIPE SUPPORT (2 / C-7)
8. BOLLARD (2 / -)



BOLLARD

SCALE: NTS

RECORD DRAWING

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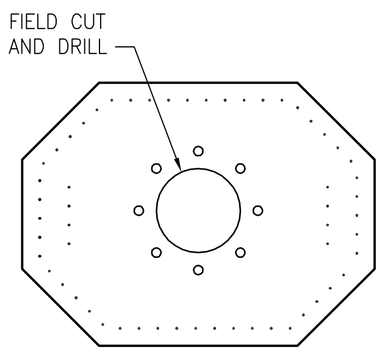

BOLTED REINFORCEMENT PLATE

SCALE: NTS

NOTES:
ALL TANK PENETRATIONS TO BE INSTALLED BY TANK MANUFACTURER. CONTACT BOB RUTLEDGE OF AQUA STORE TANKS (310) 972-3655

TANK PENETRATION DETAIL

SCALE: NTS

REV	DESCRIPTION	APPR
7		
6		
5		
4		
3		
2		
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY	RE
DRAWN BY	KM
CHECKED BY	RH
DATE	2/26/08
PROJECT ENGINEER	ROBERT D. ELLISON
REG NUMBER	38094
EXP DATE	3-31-09
PROJECT NUMBER	16817.00
CADD STANDARDS	BOYLE

BOYLE engineering corporation
5851 Thille St. Suite 201
Ventura, California 93003
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WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

VAULT AND VALVE DETAILS

DRAWING C-6
SHEET 9 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-06.dwg USER: dsviel
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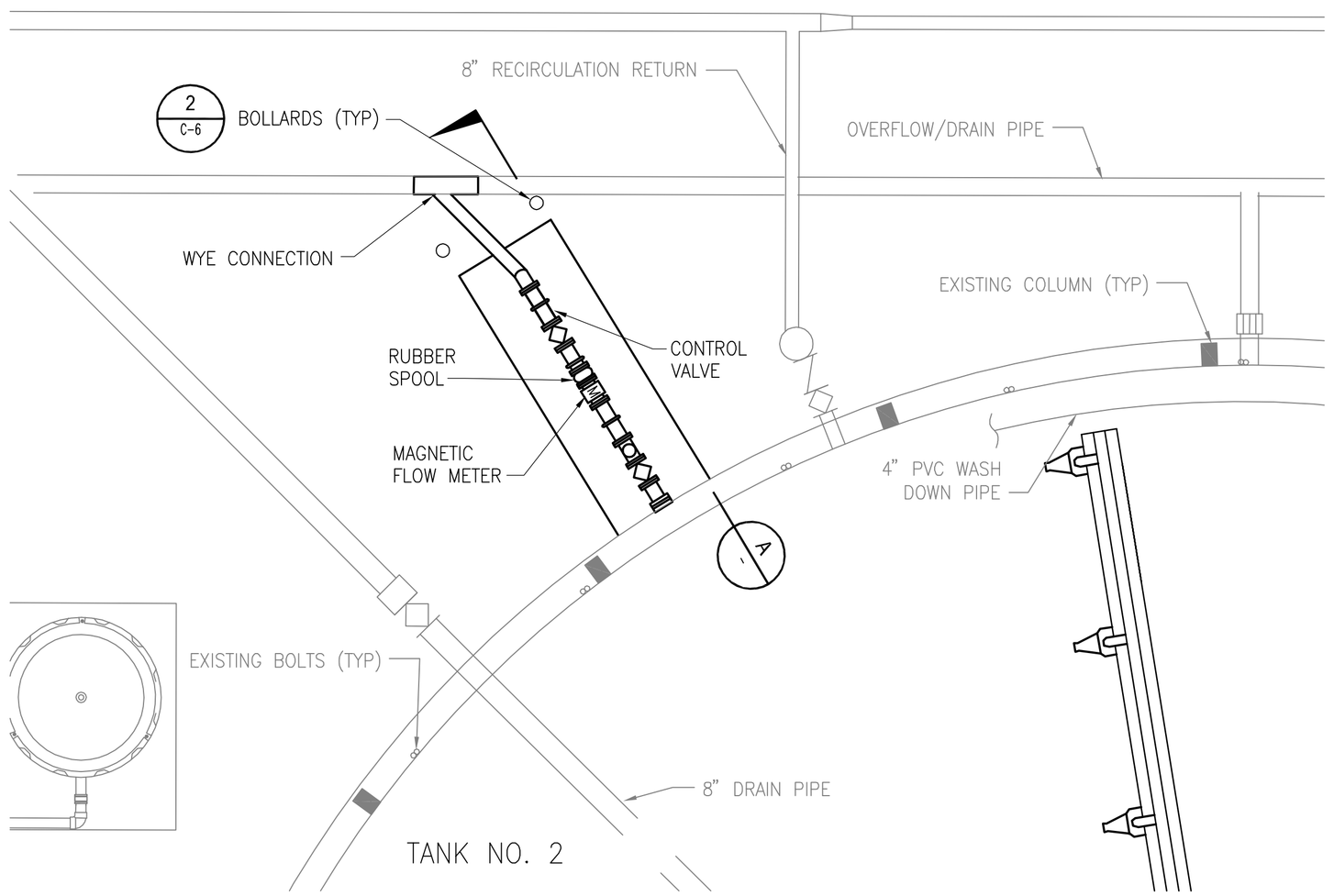
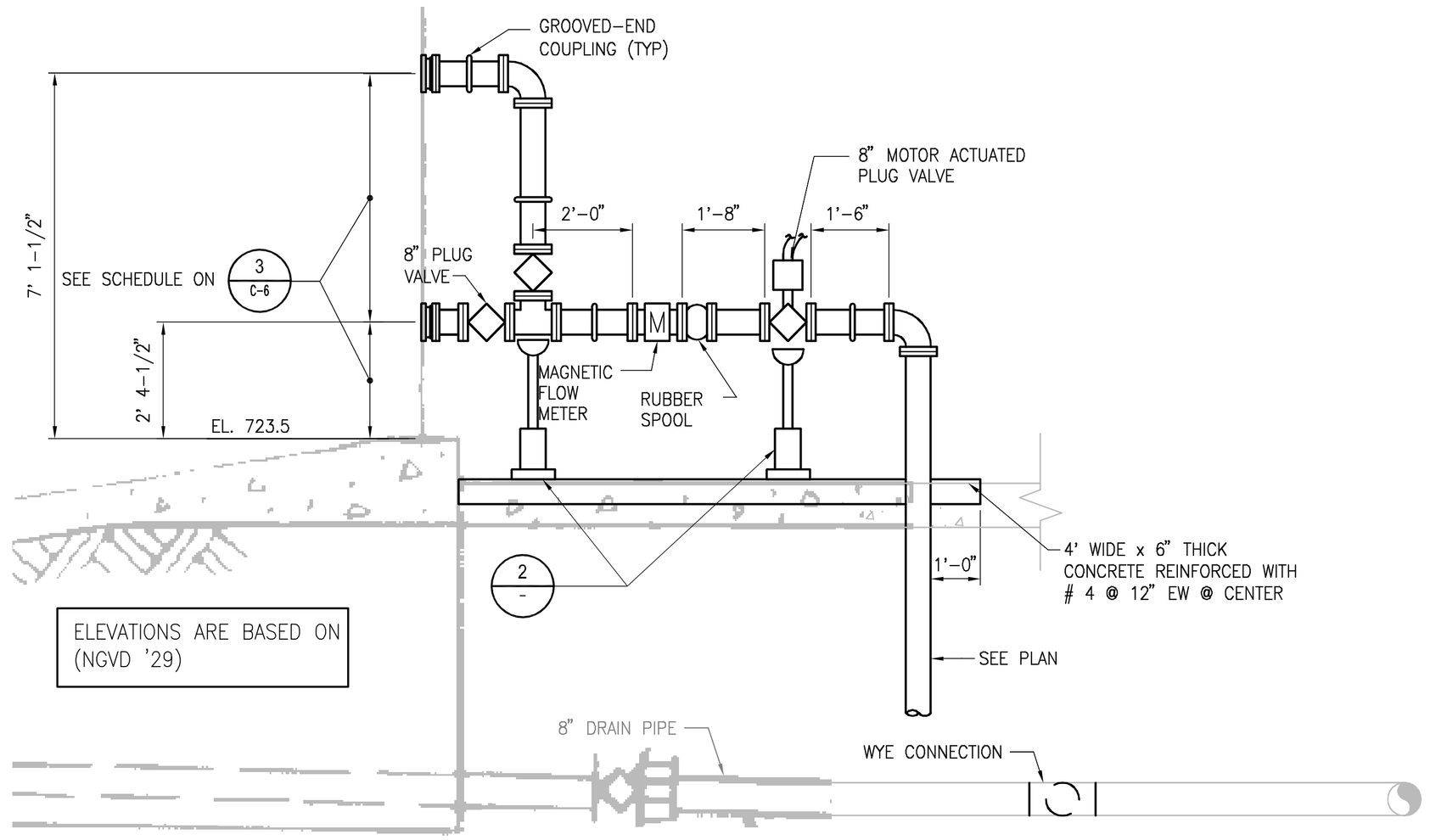


SCANNED "AS-BUILT" DRAWING NO. 02511 USED AS BACKGROUND IMAGE

PLAN DETAIL 1

SCALE: 1/4" = 1'



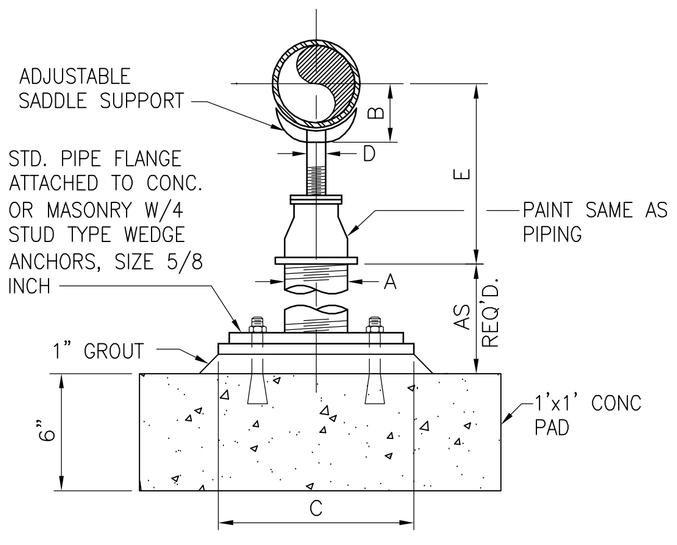
AUTOMATED OUTLET VALVE SECTION A

SCALE: 1/2" = 1'

PIPE SIZE	A	B	C	D	E	
					MIN.	MAX.
2-1/2	2-1/2	3-1/2	9	1-1/2	8	13
3	2-1/2	3-3/4	9	1-1/2	8-1/4	13-1/4
3-1/2	2-1/2	4	9	1-1/2	8-1/2	13-1/2
4	3	4-1/4	9	2-1/2	9-1/4	14
5	3	4-7/8	9	2-1/2	10	14-3/4
6	3	5-1/2	9	2-1/2	10-1/2	15-1/4
8	3	6-7/8	9	2-1/2	11-3/4	16-1/2
10	3	8-1/2	9	2-1/2	13-1/2	18-1/4
12	3	9-15/16	9	2-1/2	15	19-3/4
14	4	10-15/16	11	3	16-1/4	20-1/4
16	4	12-3/8	11	3	17-3/4	22-1/4
18	6	13-7/8	13-1/2	3-1/2	19-1/2	24
20	6	15-3/8	13-1/2	3-1/2	21	25-1/2
24	6	17-15/16	13-1/2	4	23-3/4	28-1/4

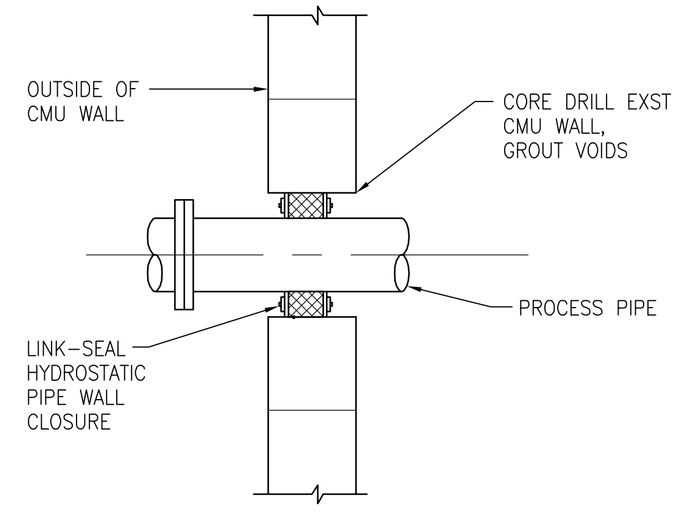
NOTES:

1. PROVIDE NEOPRENE WAFFLE ISOLATION PAD SIMILAR TO MASON TYPE "W" OR KORFUND KORPAD 40, UNDER SUPPORT FOOT WHEN PIPING IS ISOLATED OR SUPPORT IS ADJACENT TO MECHANICAL EQUIPMENT.
2. FOR BASE, HEIGHT, & FLANGE DIMENSIONS, SEE TABLE AT RIGHT



PIPE SUPPORT 2

NTS



WALL PENETRATION DETAIL 3

SCALE: NONE

RECORD DRAWING

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY RE
DRAWN BY KM
CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003 805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

TANK AND PIPING DETAILS

DRAWING C-7
SHEET 10 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-07.dwg
DATE: Oct 13, 2009 9:54am
USER: dsvisel
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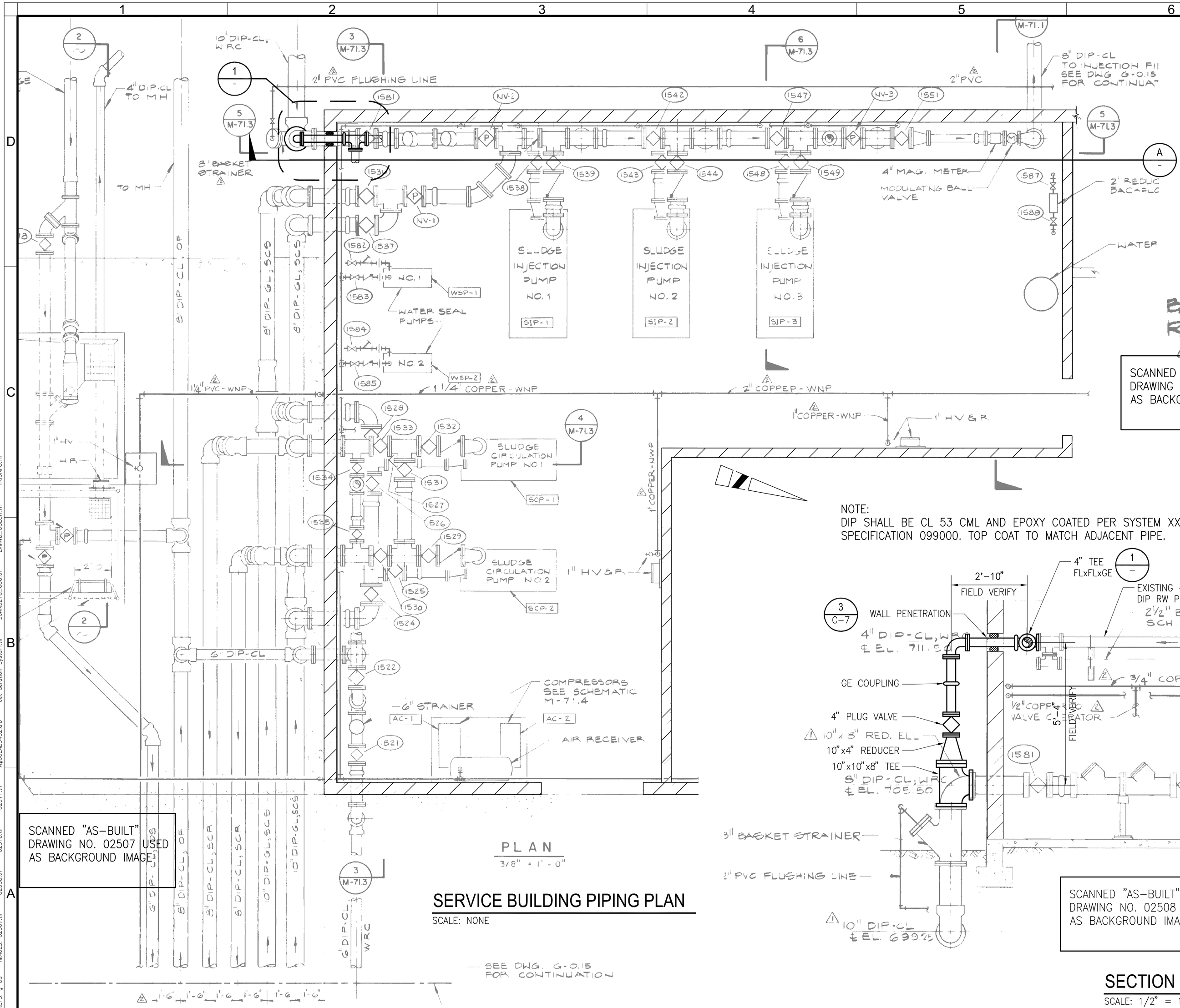


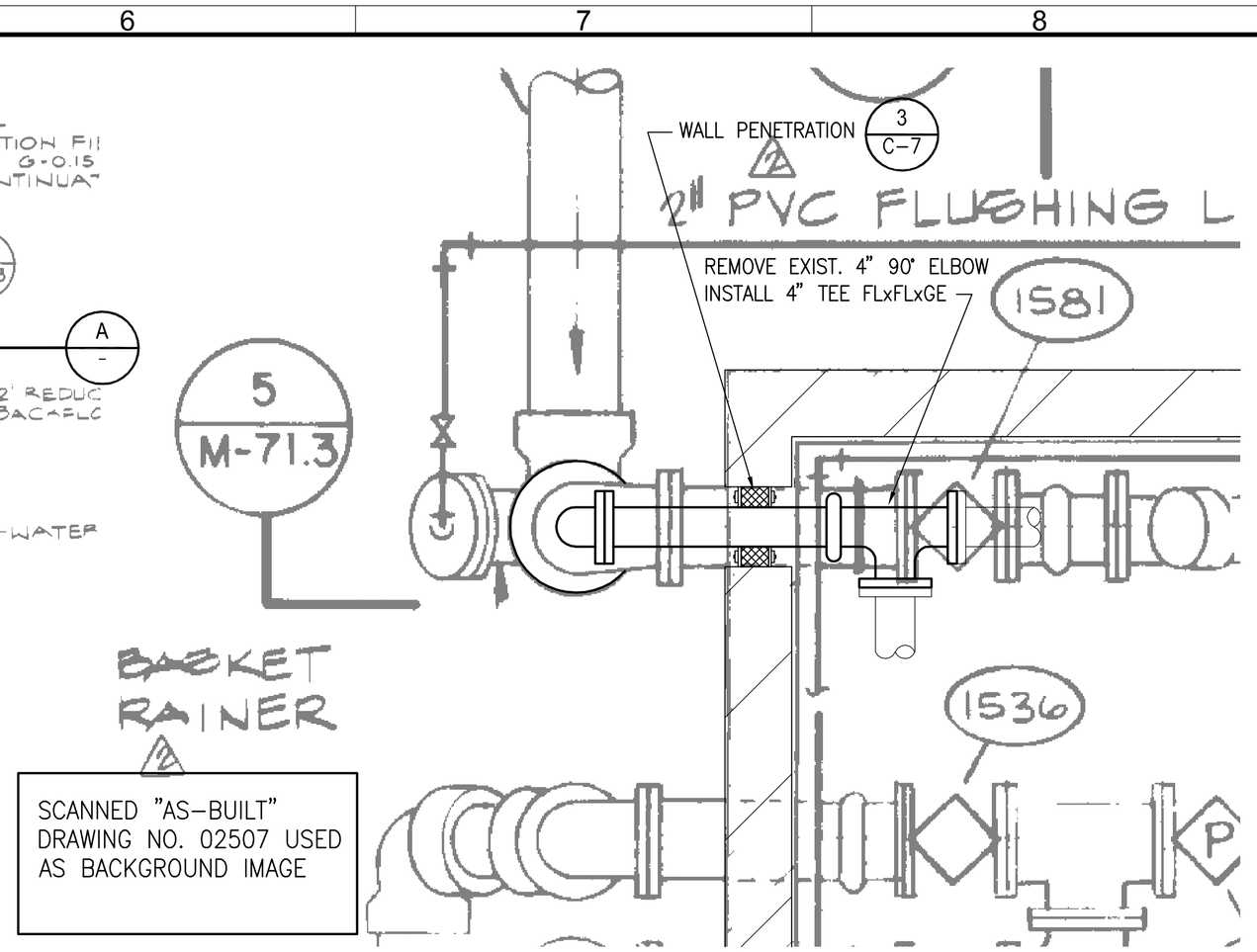
SCANNED "AS-BUILT" DRAWING NO. 02507 USED AS BACKGROUND IMAGE

PLAN

3/8" = 1'-0"

SERVICE BUILDING PIPING PLAN

SCALE: NONE

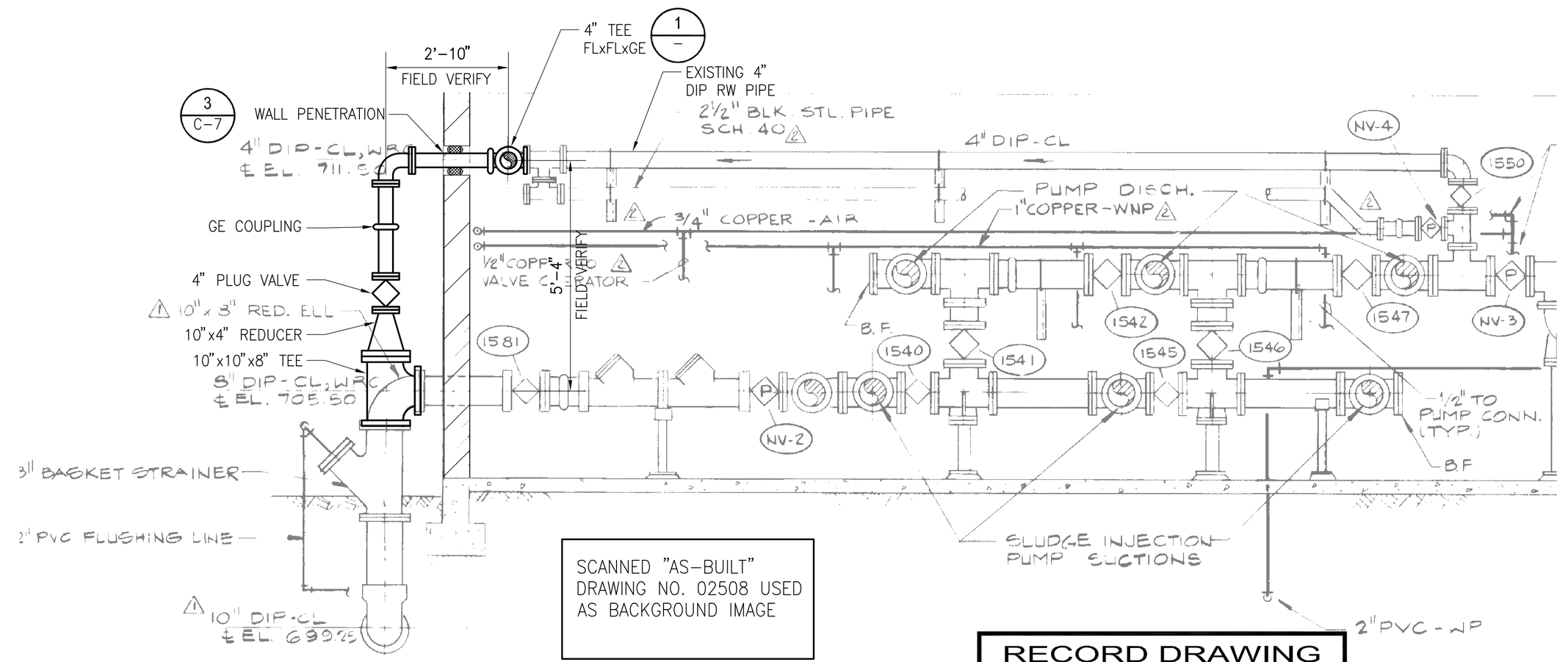


SCANNED "AS-BUILT" DRAWING NO. 02508 USED AS BACKGROUND IMAGE

PLAN DETAIL 1

SCALE: NONE

NOTE:
DIP SHALL BE CL 53 CML AND EPOXY COATED PER SYSTEM XX PER SPECIFICATION 099000. TOP COAT TO MATCH ADJACENT PIPE.



SCANNED "AS-BUILT" DRAWING NO. 02508 USED AS BACKGROUND IMAGE

SECTION A

SCALE: 1/2" = 1'

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REV	DESCRIPTION	APPR
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1	10-16-09 AS BUILT	

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CHECKED BY RH
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PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094
EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

RECYCLED WATER PIPE MODIFICATIONS AND DETAILS

DRAWING C-7A
SHEET 11 OF 32 SHEETS

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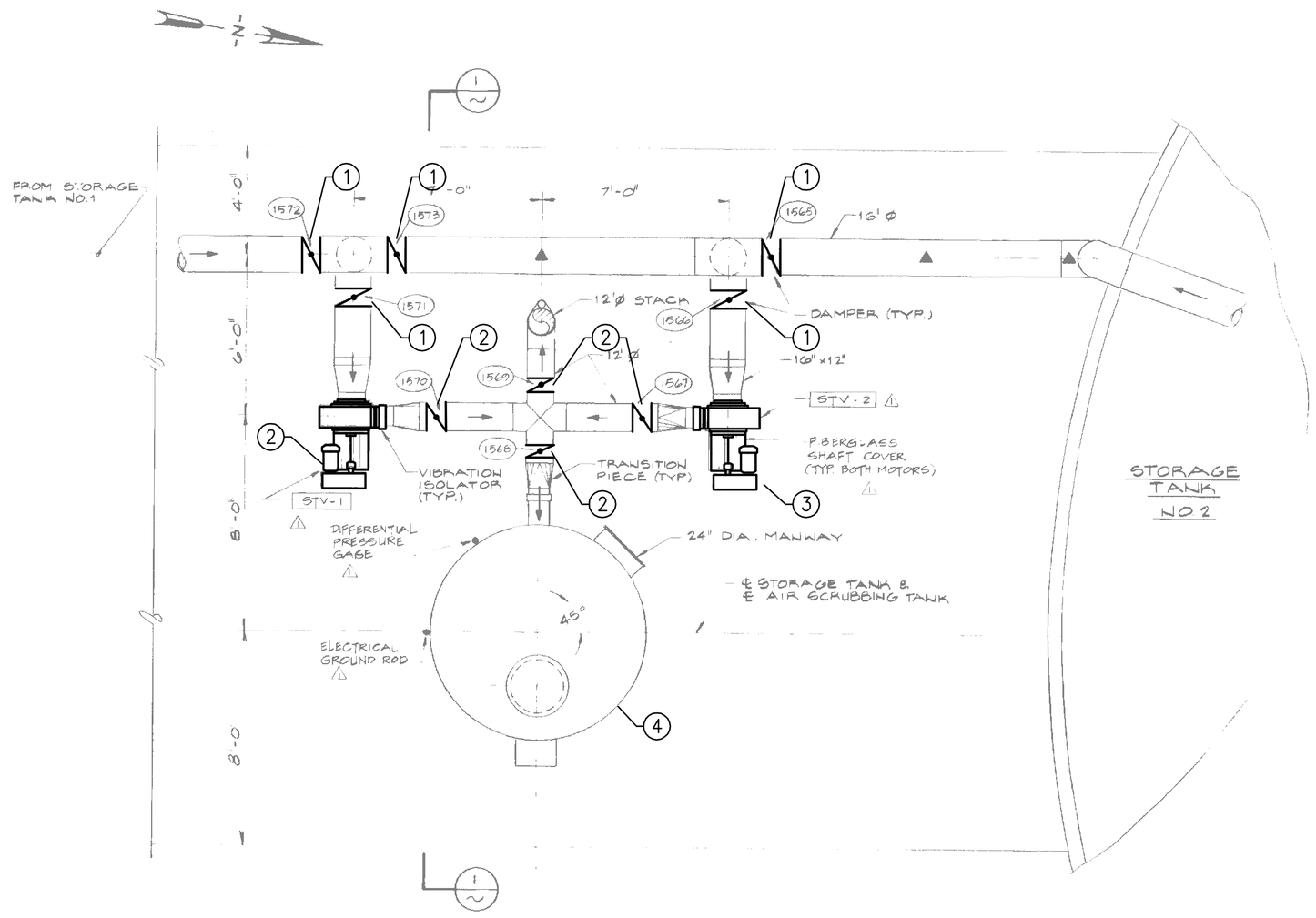


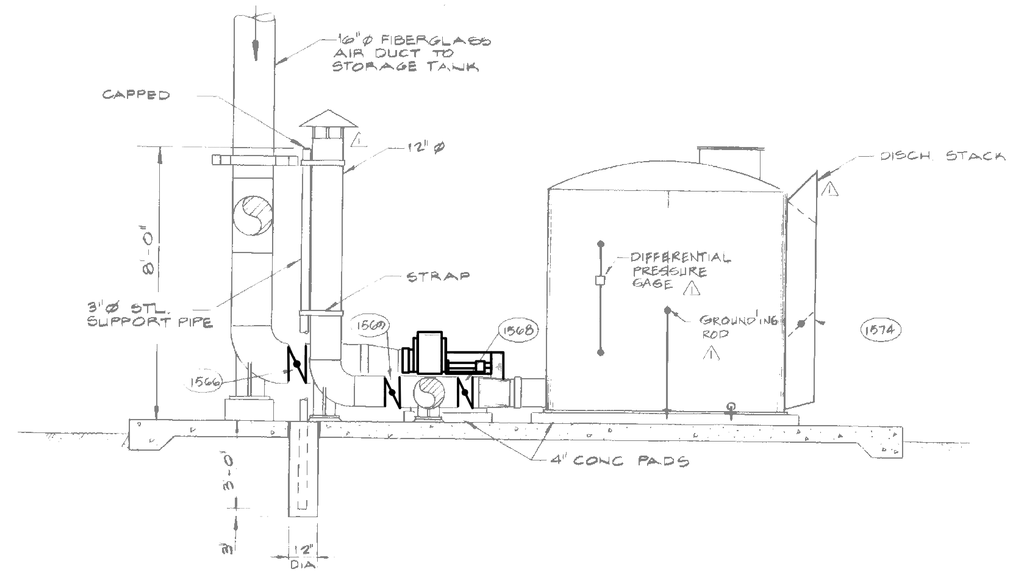
PLAN

SCALE: 1/4"=1'

REFERENCE NOTES

1. 16" DAMPER REMOVE AND REPLACE
2. 12" DAMPER REMOVE AND REPLACE
3. 15 HP BLOWER 2550 CFM REMOVE AND REPLACE IN KIND
4. REPLACE CARBON FILTER MEDIA (CANISTER IS APPROX. 8-FOOT DIAMETER BY 10-FOOT HIGH)

SCANNED "AS-BUILT" DRAWING NO. 02512 USED AS BACKGROUND IMAGE



ELEVATION

SCALE: 1/4"=4'

SCANNED "AS-BUILT" DRAWING NO. 02512 USED AS BACKGROUND IMAGE

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DESIGNED BY: RE
DRAWN BY: KM
CHECKED BY: RH
DATE: 2/26/08

PROJECT ENGINEER: ROBERT D. ELLISON
REG NUMBER: 38094 EXP DATE: 3-31-09
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

BOYLE engineering corporation
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Ventura, California 93003
805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

ODOR CONTROL PLAN

DRAWING C-8
SHEET 12 OF 32 SHEETS

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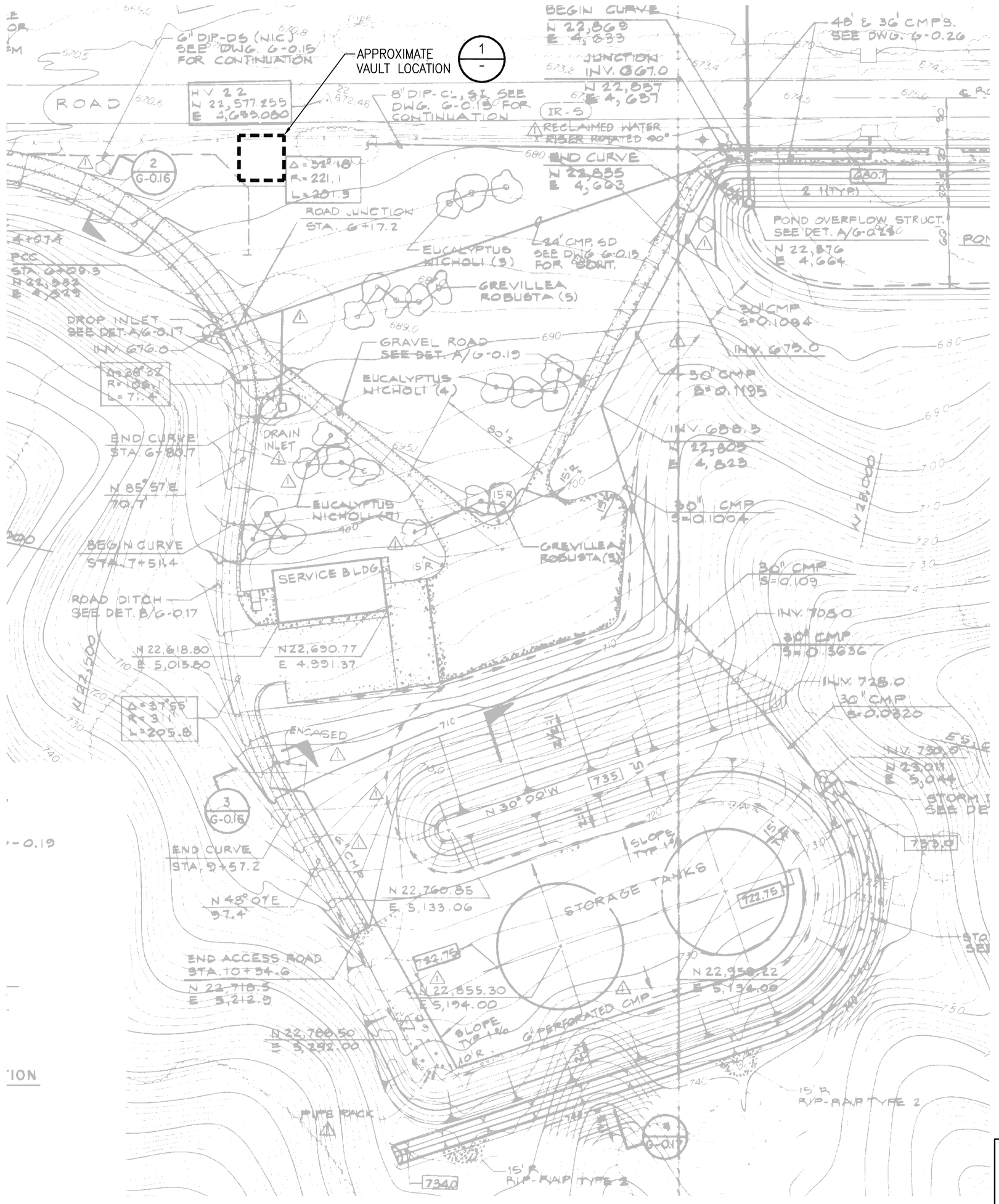
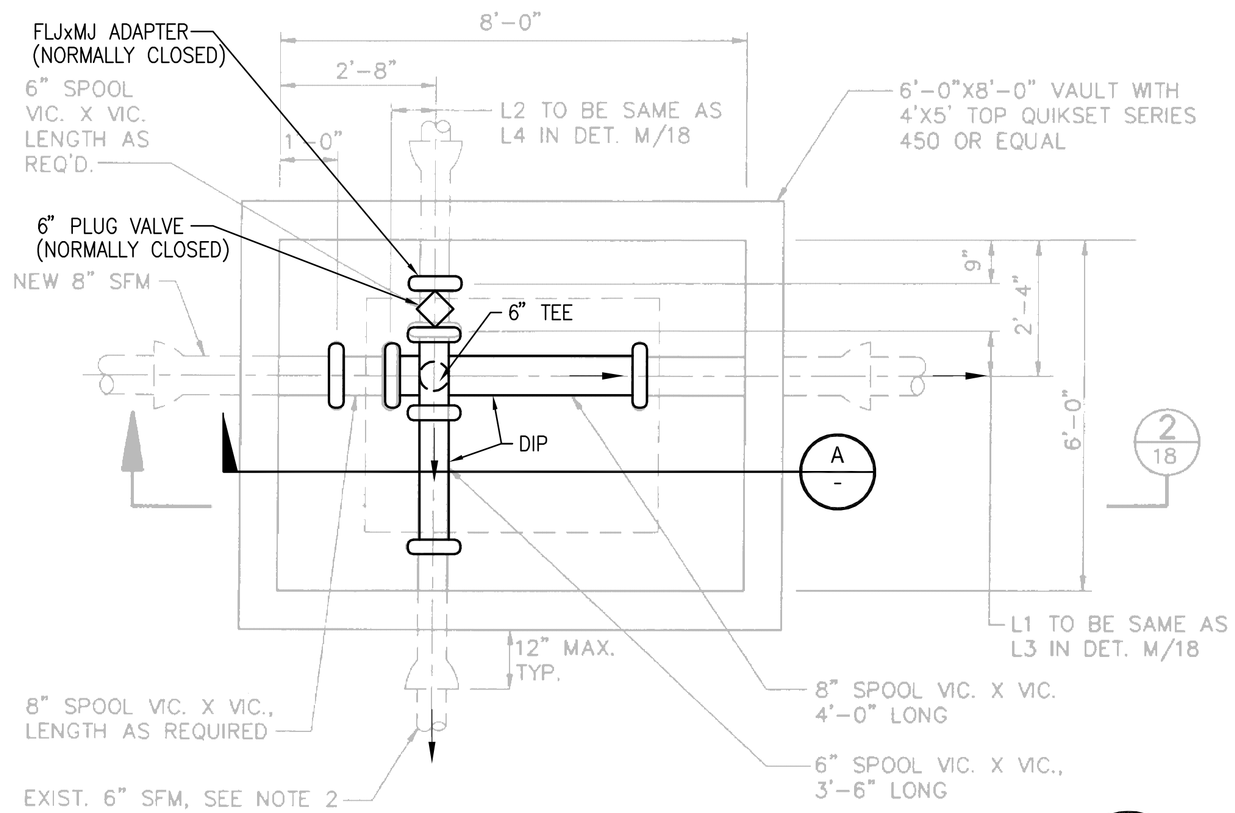


LOCATION PLAN

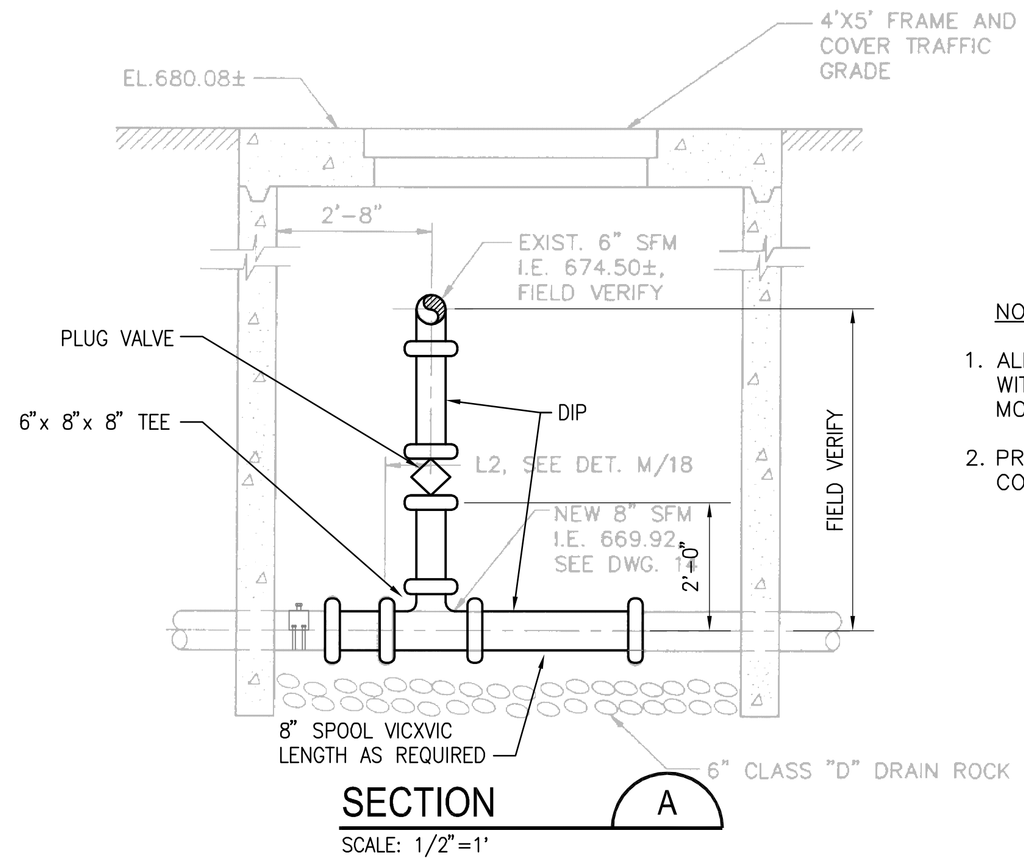
SCALE: 1"=50'

SCANNED "AS-BUILT" DRAWING NO. 02472 USED AS BACKGROUND IMAGE



SLUDGE FOR MAIN INTERCONNECTION PLAN 1

SCALE: 1/2"=1'



SECTION A

SCALE: 1/2"=1'

NOTES:

1. ALL NEW DIP TO BE CL53 WITH TYPE V CEMENT MORTAR LINING
2. PROVIDE ASPHALTIC COATING ON ALL NEW DIP

SCANNED "AS-BUILT" DRAWING NO. 02558 USED AS BACKGROUND IMAGE

RECORD DRAWING

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DRAWN BY KM
CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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5851 Thille St. Suite 201
Ventura, California 93003 805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

RAW SLUDGE INTERCONNECTION PLAN

DRAWING C-9
SHEET 13 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\C-09.dwg USER: dsvical
DATE: Oct 13, 2009 9:56cm XREFS: g-bd IMAGES: 02472.tif 02558.tif LVMWD_COLOR.TIF TRIUNFO.TIF

EXISTING 3" AC PAVEMENT REMOVE

NEW AC PAVEMENT 3" AC ON 6" BASE AC PAVEMENT SHALL BE PG-64-10 PER SSPWC AND CRUSHED AGGREGATE BASE PER SSPWC 200-2.2

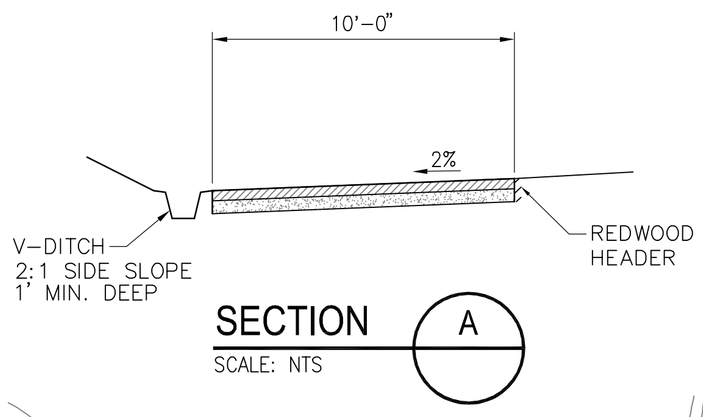
NEW AC PAVEMENT 3" AC ON 6" BASE AC PAVEMENT SHALL BE PG-64-10 PER SSPWC AND CRUSHED AGGREGATE BASE PER SSPWC 200-2.2 WITH A 2% MIN CROSS SLOPE

REDWOOD HEADER

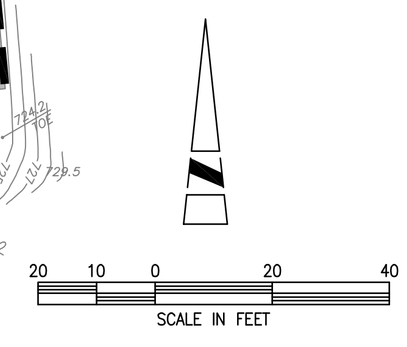
MATCH EXISTING FINISH GRADES, EXCEPT WHERE NOTED

SCANNED "AS-BUILT" DRAWING NO. 02472 USED AS BACKGROUND IMAGE

ELEVATIONS ARE BASED ON (NAVD '88) THIS SHEET ONLY



SECTION A
SCALE: NTS



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AC PAVEMENT REPLACEMENT

SCALE: 1" = 20'

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7		
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1	10-16-09 AS BUILT	

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CHECKED BY RH
DATE 2/26/08

PROJECT ENGINEER
ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3-31-09
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

AC PAVEMENT REPAIR

DRAWING C-10
SHEET 14 OF 32 SHEETS

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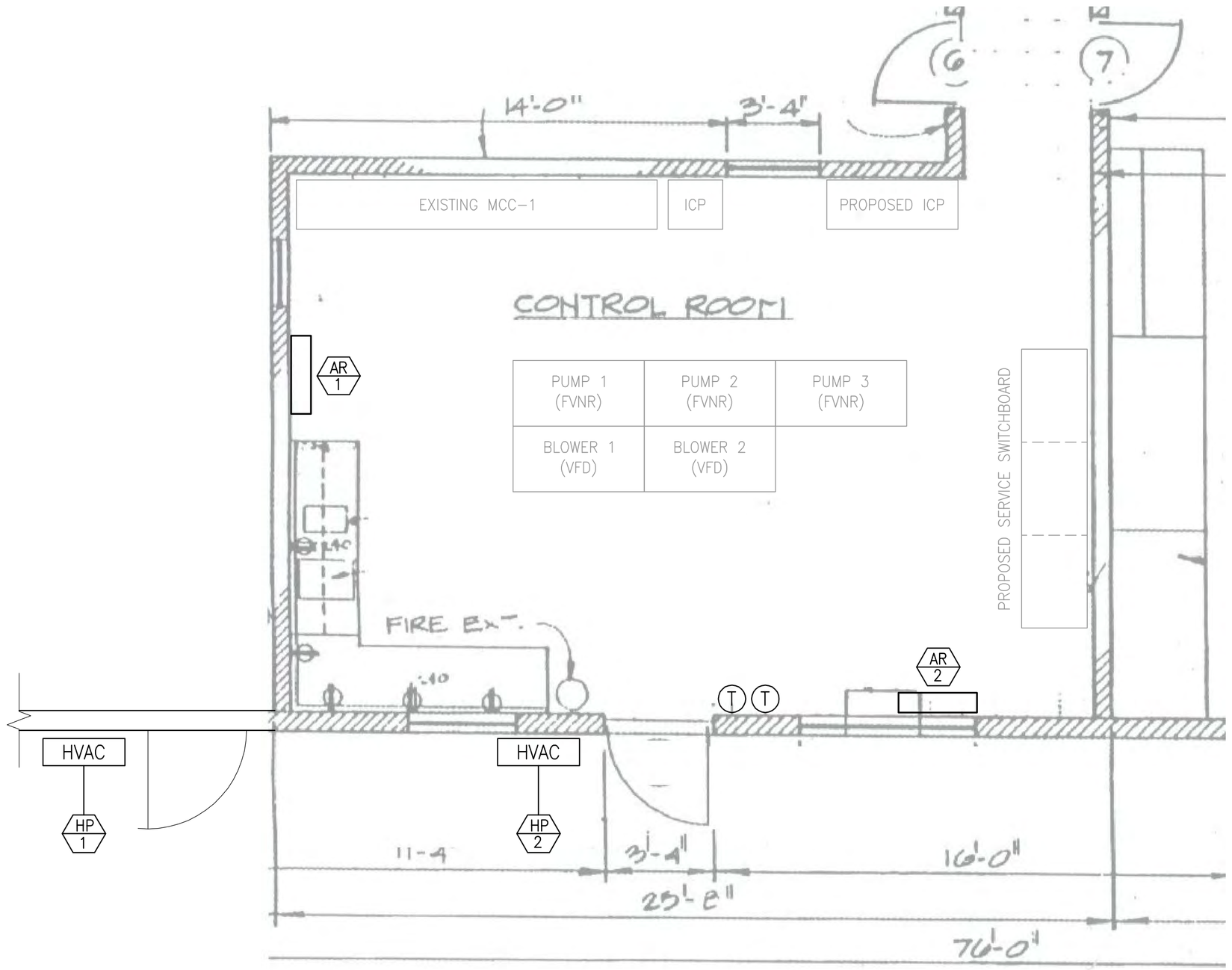
pdf 6 (191)
WCMAP.pdf

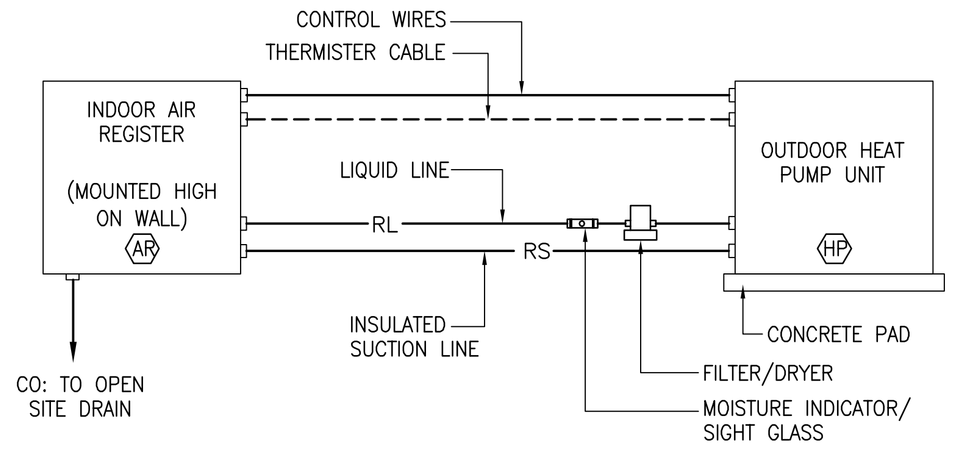


MECHANICAL EQUIPMENT LAYOUT

SCALE: 3/8" = 1'

1' 0 1' 2' 3' 5' 7'

SCALE IN FEET



NOTE: SIZES PER MANUFACTURER'S SPECIFICATIONS

TYPICAL INSTALLATION-HIGH WALL HEAT PUMP SYSTEMS

N.T.S.

HVAC NOTES:

1. SEAL OPENINGS AROUND PIPING PENETRATIONS THROUGH WALLS AND FLOORS TO MAINTAIN RATING INTEGRITY.
2. INSTALL EQUIPMENT IN ACCESSIBLE LOCATION.
3. COORDINATE EXACT LOCATION OF CORE DRILLING, CUTTING OF FLOOR SLAB, OR WALLS OF THE BUILDING WITH THE ARCHITECHTURAL AND STRUCTURAL DRAWINGS.
4. CUTTING, BORING, SAW CUTTING, OR DRILLING THROUGH NEW OR EXISTING STRUCTURAL ELEMENTS TO BE DONE ONLY WHEN SO DETAILED ON THE DRAWINGS OR ACCEOPTED BY THE OWNER'S REP.
5. COORDINATE TEMPERATURE SENSOR AND THERMOSTAT LOCATION WITH FLOOR PLANS AND ELEVATION WITH LIGHT SWITCH. TEMPERATURE SENSOR AND THERMOSTAT ELEVATION TO BE INSTALLED BETWEEN 36" AND 48" ABOVE FINISHED FLOOR.
6. PROTECT ALL MATERIALS INCLUDING PIPES FROM DUST AND DEBRIS AND KEEP OPEN END OF PIPES COVERED AT ALL TIMES UNTIL READY FOR INSTALLATION.
7. INSTALL ALL EQUIPMENT ACCORDING TO MANUFACTURER'S RECOMMENDATION.
8. AFTER COMPLETION OF WORK, CONTRACTOR SHALL ENSURE A COMPLETE AND FULLY FUNCTIONAL HVAC SYSTEM IN ACCORDANCE WITH THE SPECIFICATIONS, AND ALL LOCAL BUILDING CODES AND REGULATION.

ABBREVATIONS

ABBREV.	DESCRIPTION
CFM	CUBIC FEET PER MINUTE
CO	CONDENSATE
CU	CONDENSING UNIT – OUTDOORS
DB	DRY–BULB
DN	DOWN
DWG	DRAWING
EA	EXHAUST AIR or EACH (CONTEXT)
EF	EXHAUST FAN
ENT	ENTERING
A.	EQUIPMENT
FC	FAN COIL UNIT – INDOORS
FLA	FULL LOAD AMPS
FT	FEET
HP	HORSEPOWER OR HEAT PUMP (CONTEXT)
HZ	HERTZ
LBS	POUNDS
MAX	MAXIMUM
MBH	MINIMUM CIRCUIT AMPS
MIN	MINIMUM CIRCUIT AMPS
NO	NUMBER
NTS	NOT TO SCALE
PH	PHASE
RPM	REVOLUTIONS PER MINUTE
SA	SUPPLY AIR
SEER	SEASONAL ENERGY EFFICIENCY RATIO
SHT	SHEET
SP	STATIC PRESSURE
TYP	TYPICAL
WB	WET–BULB
WC	WATER COLUMN
WG	WATER GAUGE
WT	WEIGHT

HVAC EQUIPMENT SCHEDULE

EQUIPMENT NO.	DISCRIPTION
HP 1, HP 2	CARRIER MODEL # 38BK–024–3, OUTDOOR HEAT PUMP UNIT, SEER=11.0, FAN 1/8 HP 1720 CFM, 208–230v, 1PH, 60HZ. MCA=15.3, FLA=12.4, OPERATING WEIGHT = 167 LB EA.
AR 1, AR 2	CARRIER MODEL # 40QNH–024–3, HIGH WALL AIR REGISTER UNIT, FAN 49 WATS 570 CFM, 208–230v, 1PH, 60HZ. MCA=6.8, FLA=7.8, NET COOLING CAPACITY = 23,000 BTU/HR, NET HEETING CAPCITY = 21,000 BTU/HR. OPERATING WEIGHT = 43 LB EA.
T	SET–BACK WIRELESS PROGRAMMABLE THERMOSTAT – PROVIDE BY UNIT MANUFACTURER WITH WALL MOUNTING BRACKET

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PROJECT ENGINEER ROBERT D. ELLISON
REG NUMBER 38094 EXP DATE 3–31–09
PROJECT NUMBER 16817.00
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

MECHANICAL EQUIPMENT LAYOUT

DRAWING M-1
SHEET 15 OF 32 SHEETS

Nov. 27, 2007

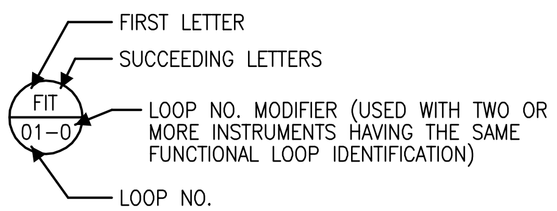
DWG: F:\LVMWD\16817.00 – Tapia BNR\0002 – Centrate Treatment\CAD\AS BUILTS 10–16–09\M–01.dwg USER: dsvisol
DATE: Oct 13, 2009 9:59am XREFS: g–bd IMAGES: Base.JPG LVMWD_COLOR.TIF TRIUNFO.TIF

INSTRUMENTATION, SYSTEMS, & AUTOMATION SOCIETY TABLE

IDENTIFICATION LETTERS

	FIRST–LETTER		SUCCEEDING–LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	CONDUCTIVITY			CONTROL	
D	USER'S CHOICE	DIFFERENTIAL			
E	VOLTAGE		SENSOR (PRIMARY ELEMENT)		
F	FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE, INTERMEDIATE
N	USER'S CHOICE		PLC/RTU INPUT	USER'S CHOICE	NORMAL
O	USER'S CHOICE		ORIFICE, RESTRICTION		
P	PRESSURE, VACUUM		POINT (TEST) CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RADIATION		RECORD		
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, MECHANICAL ANALYSIS			VALVE,DAMPER LOUVER	
W	WEIGHT, FORCE		WELL		
X	UNCLASSIFIED	X AXIS	UNCLASSIFIED(*)	UNCLASSIFIED(*)	UNCLASSIFIED(*)
Y	EVENT, STATE OR PRESENCE	Y AXIS		RELAY, COMPUTE CONVERT	
Z	POSITION, DIMENSION	Z AXIS		DRIVER, ACTUATOR, UNCLASSIFIED FINAL CONTROL ELEMENT	

INSTRUMENT IDENTIFICATION



FIELD MOUNTED INSTRUMENT

REAR OF PANEL MOUNTED INSTRUMENT

FRONT OF PANEL MOUNTED INSTRUMENT

ILLUMINATED HANDSWITCH

PLC (PROGRAMMABLE LOGIC CONTROLLER)

SCS (SUPERVISORY CONTROL STATION)

INTERLOCK

INSTRUMENT LINE SYMBOLS

PRIMARY PROCESS FLOW

SECONDARY PROCESS FLOW, CONNECTION TO PROCESS FLOW, MECHANICAL LINK OR INSTRUMENT SUPPLY

PNEUMATIC SIGNAL OR UNDEFINED SIGNAL FOR PROCESS FLOW DIAGRAMS

CAPILLARY TUBING (FILLED SYSTEM)

ELECTRIC SIGNAL (DISCRETE)

ELECTRIC SIGNAL (ANALOG, TSP)

ELECTRIC SIGNAL (ANALOG, TST)

DATA COMMUNICATION

BUILDING OR FACILITY BOUNDARY

MULTI–CIRCUIT ELECTRIC SIGNALS (NUMBER OF SIGNALS ILLUSTRATED IN PARENTHESIS)

I–5 01 LOGICAL OR HARDWIRE SIGNAL NUMBER (SHOWN SIGNAL "01" ORIGINATED IN DWG. I–5)

01 I–5 LOGICAL OR HARDWIRE SIGNAL NUMBER (SHOWN SIGNAL "01" SENT TO DWG. I–5)

ACTUATORS OR OPERATORS

Ⓜ MOTOR (MODULATING)

Ⓜ MOTOR (OPEN/CLOSE)

Ⓢ SOLENOID

Ⓖ GEARBOX

PUMPS & COMPRESSORS

CENTRIFUGAL PUMP

VERTICAL TURBINE PUMP

BLOWER

RECORD DRAWING

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PRIMARY ELEMENTS

ULTRASONIC LEVEL SENSOR

FLOW TUBE

ANNUBAR

PROPELLER METER

MAGNETIC FLOW METER

FLOOD SWITCH

VALVES & GATES

BUTTERFLY

GATE

KNIFE GATE

SWING CHECK

BALL

GLOBE

DIAPHRAGM

PLUG

ECCENTRIC PLUG

LUBRICATED PLUG

3–WAY GLOBE

BALL CHECK

PRESSURE RELIEF VAVLE

PINCH VALVE

MOTOR OPERATED BUTTERFLY (MODULATING)

MOTOR OPERATED BUTTERFLY (OPEN/CLOSE)

PRESSURE REDUCING REGULATOR

SOLENOID CONTROL

3–WAY SOLENOID

NEEDLE VALVE

PINCH VALVE

DIAPHRAGM ACTUATED

PRESSURE RELIEF

EDUCTOR

SECONDARY PROCESS DIAPHRAGM SEAL

INSTRUMENT ABBREVIATIONS

AC	ALTERNATING CURRENT
AI	ANALOG INPUT
AL	ALARM
AO	ANALOG OUTPUT
AM	AUTO–MANUAL
AMR	AUTO–MANUAL–REMOTE
AVG	AVERAGE
BW	BACKWASH
CA	COMMON ALARM
C	CLOSE
CCC	CENTRAL CONTROL CENTER
CCP	CENTRIFUGE CONTROL PANEL
DC	DIRECT CURRENT
DI	DISCRETE INPUT
DO	DISCRETE OUTPUT
ETM	ELAPSED TIME METER
HL	HIGH–LOW
HLO	HIGH–LOW–OFF
HLOR	HIGH–LOW–OFF–REMOTE
HOA	HAND–OFF–AUTO
I/O	INPUT/OUTPUT
LCP	LOCAL CONTROL PANEL
LL	LOCAL LEVEL
LP	LOCAL PRESSURE
LOS	LOCK–OUT–STOP
LOR	LOCAL–OFF–REMOTE
LPU	LINE PROTECTION UNIT
LR	LOCAL–REMOTE
MCC	MOTOR CONTROL CENTER
MCS	MASTER CONTROL STATION
MODEM	MODULATE–DEMODULATE
NIC	NOT IN CONTRACT
O	OPEN
OC	OPEN–CLOSE
OCA	OPEN–CLOSE–AUTO
OIC	OPEN–INTERMEDIATE–CLOSED
OO	ON–OFF
OOA	ON–OFF–AUTO
OOR	ON–OFF–REMOTE
ORO	OFF–RESET–ON
OSC	OPEN–STOP–CLOSE
OSCA	OPEN–STOP–CLOSE–AUTO
OSCR	OPEN–STOP–CLOSE–REMOTE
P/A	PULSE TO ANALOG
P&ID	PROCESS & INSTRUMENTATION DIAGRAM
PD	PULSE DURATION
PF	PULSE FREQUENCY
PID	PROPORTIONAL–INTEGRAL–DERIVATIVE
PRPRV	PRESSURE REDUCING–PRESSURE RELIEF VALVE
PRV	PRESSURE RELIEF VALVE
PS	DC POWER SUPPLY
RIOP	REMOTE I/O PANEL
RSP	REMOTE SET POINT
RTD	RESISTANCE TEMPERATURE DETECTOR
RTDI	RTD INPUT MODULE
RTU	REMOTE TERMINAL UNIT
SCC	SYSTEM CONTROL CENTER (UV)
SCS	SUPERVISORY CONTROL STATION
SP	SET POINT
SS	START–STOP
TEMP	TEMPERATURE
TOT	TOTALIZATION
TPC	TIME PROPORTIONAL CONTROL
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TURB	TURBIDITY

REV	DESCRIPTION	APPR
1	10–16–09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
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DESIGNED BY ES
DRAWN BY MG
CHECKED BY GY
DATE 2/26/08

PROJECT ENGINEER EFREM S. SORKIN
REG NUMBER 14555 EXP DATE 6–30–08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003 805–644–9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

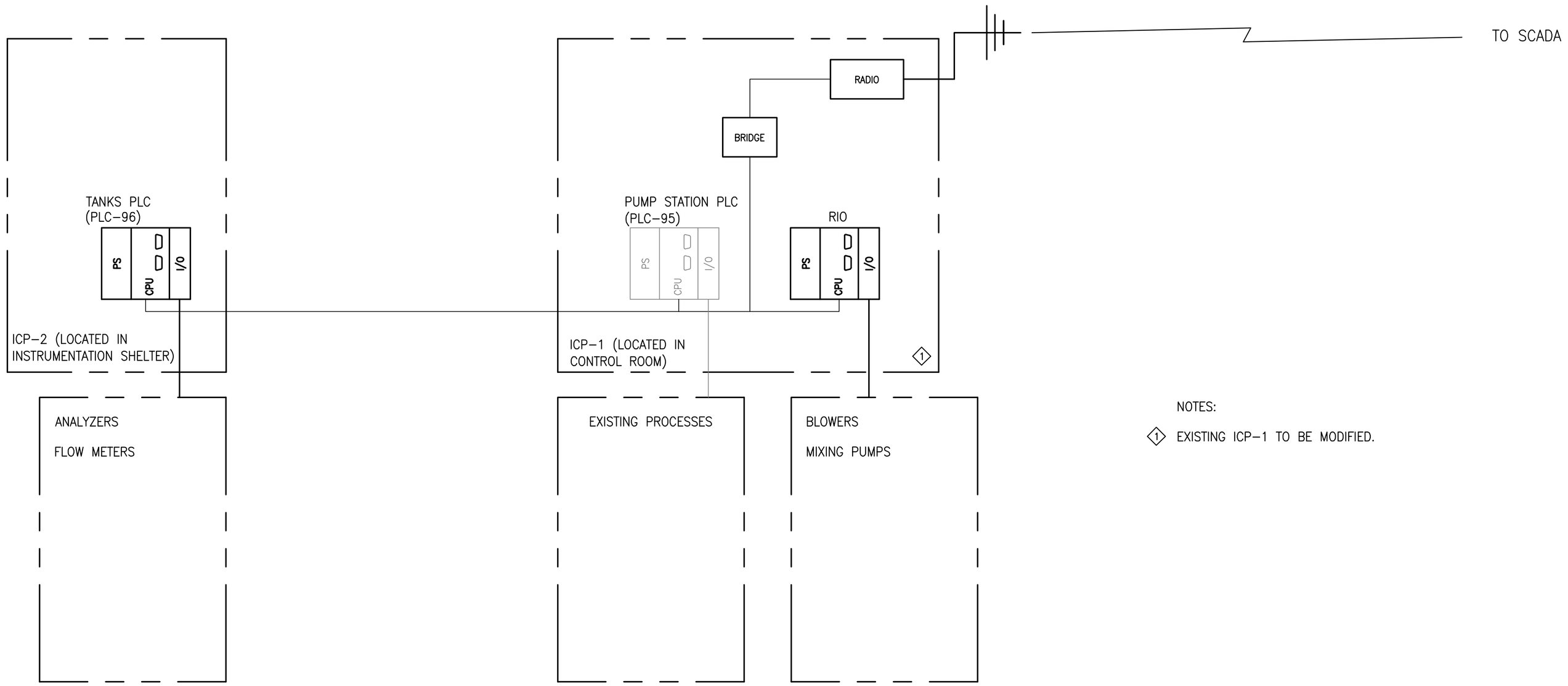
LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION LEGEND AND SYMBOLS

DRAWING N-1
SHEET 16 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\N-1.dwg USER: dsvisel
DATE: Oct 13, 2009 9:59am XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF



NOTES:

1. EXISTING ICP-1 TO BE MODIFIED.

RECORD DRAWING

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

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PROJECT ENGINEER: EFREM S. SORKIN
REG NUMBER: 14555 EXP DATE: 6-30-08
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

COMMUNICATION BLOCK PROGRAM

DRAWING: N-2
SHEET: 17 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\N-2.dwg
DATE: Oct 13, 2009 12:45pm
XREFS: g-bd
IMAGES: LVMWD_COLOR.TIF
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USER: dovisol

SCS

PLC-96
(@ ICP-2)

LAH 003 · YAR 001 · FIR 001 · FQIR 113 · HS 113 · FQIK 113 · HS 111 · YIR 111A

FQY 113 (TOT, RESET, SP) · FQY 113 (BATCH)

YAR 115 · FIR 115 · FQIR 119 · FIK 119 · ZIK 117 · YIR 117 · ZIR 117 · YIR 117A

FQY 119 (TOT, SP) · FC 119 (PID)

FQIR 123 · HS 123 · FQIK 123 · HS 121 · YIR 121A

FQY 123 (TOT, RESET, SP) · FQY 123 (BATCH)

YAR 125 · FIR 125 · FQIR 129 · FIK 129 · ZIK 127 · YIR 127 · ZIR 127 · YIR 127A

FQY 129 (TOT, SP) · FC 129 (PID)

YN 003 · YN 001 · FN 001 · YC 111 · YN 111 · YN 111A · YN 115 · FN 115 · ZC 117 · YN 117 · ZN 117 · YN 117A · YC 121 · YN 121 · YN 121A · YN 125 · FN 125 · ZC 127 · YN 127 · ZN 127 · YN 127A

FAIL · OC (2) · REMOTE · OCR · OSCR · AC

HS 111 · ZS 111A · HS 117 · FIT 115 · ZT 117 · ZS 117A · HS 121 · ZS 121A · FIT 125 · HS 127 · ZT 127 · ZS 127A

FIT 001 · LSH 003 · FE 001 · FE 115 · FE 125

TANK #1 · TANK #2

0601-MOV-111 · 0601-MOV-121 · 0601-FCV-117 · 0601-FCV-127

FROM SLUDGE FORCE MAIN · METER VAULT · FLOOD

FROM AERATION BLOWERS · FROM MIXING PUMP · TO MIXING PUMPS · TO SEWER

N-4 A · N-4 B · N-4 C · N-4 D · N-4 E · N-4 F

NOTES

1. LOCATED IN SHELTER.

RECORD DRAWING

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AREA - 06
SYSTEM - 01

REV	DESCRIPTION	APPR
7		
6		
5		
4		
3		
2		
1	10-16-09 AS BUILT	

VERIFY SCALES
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CHECKED BY GY
DATE 2/26/08

PROJECT ENGINEER EFREM S. SORKIN
REG NUMBER 14555 EXP DATE 6-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE engineering corporation
5851 Thille St. Suite 201
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

CENTRATE TREATMENT P&ID

DRAWING N-3
SHEET 18 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\N-3.dwg
DATE: Oct 13, 2009 10:01am
USER: dovisol
XREFS: g-bd
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SCS

PLC-95
(@ ICP-1)

YIR 211A, YIR 211B, YAR 211C, SIK 211D, SIR 211E, YAR 211F

PIR 211, HS 215 (PUMP SELECTION)

YIR 221A, YIR 221B, YAR 221C, SIK 221D, SIR 221E, YAR 221F

PIR 221

YIR 401, HS 403, JQIR 405

HS 311A, YIR 311B, YIR 311C, YAR 311D

HS 321A, YIR 321B, YIR 321C, YAR 321D

HS 331A, YIR 331B, YIR 331C, YAR 331D

BLOWER CONTROL LOGIC

TOT JQY 405

DO YC 211, DI YN 211A, DI YN 211B, DI YN 211C, AO SC 211D, AI SN 211E, DI YN 211F

AI PN 211

DO YC 221, DI YN 221A, DI YN 221B, DI YN 221C, AO SC 221D, AI SN 221E, DI YN 221F

AI PN 221

DI YN 401, DO YC 403, DI YN 405

DO YC 311A, DI YN 311B, DI YN 311C, DI YN 311D

DO YC 321A, DI YN 321B, DI YN 321C, DI YN 321D

DO YC 331A, DI YN 331B, DI YN 331C, DI YN 331D

4, 5, 6, 7, 2, 3 — WARNING

A, A

4, 5, 6, 7, 2, 3 — WARNING

A, A

POWER OK

POWER FAILURE RESET

KYZ PULSE

CALL, READY, RUN, FAIL

CALL, READY, RUN, FAIL

CALL, READY, RUN, FAIL

CALL, READY, RUN, FAIL

BLOWER #1
VFD 1A1
(SEE DWG. E-7)

BLOWER #2
VFD 2A1
(SEE DWG. E-7)

SWITCHBOARD
(SEE DWG. E-2)

PUMP 1 | PUMP 2 | PUMP 3

MIXING PUMP STATION MCC
(SEE DWG. E-6)

8, LOW OIL LEVEL, FILTER DIRTY, 1

8, LOW OIL LEVEL, FILTER DIRTY, 1

AC, AC, AC

TSH 210C, TE 210B, M, LSL 210, PDSH 210, PSH 210D, TSH 210A, PIT 211

AERATION BLOWER #1 ◇9
0601-BLR-1A1

TO TANK NO.1 — A — N-3

TSH 220C, TE 220B, M, LSL 220, PDSH 220, PSH 220D, TSH 220A, PIT 221

AERATION BLOWER #2 ◇9
0601-BLR-2A1

TO TANK NO.2 — C — N-3

TSH 311, M, PSHL 311

FROM TANK NO.1 — N-3 — E

FROM INSTRUMENT PANEL (IP) — N-5 — I

MIXING PUMP #1
0601-P-2A1

TSH 321, M, PSHL 321

MIXING PUMP #2
0601-P-2A2

TSH 331, M, PSHL 331

MIXING PUMP #3
0601-P-2B2

FROM TANK NO.2 — N-3 — F

FROM INSTRUMENT PANEL (IP) — N-5 — J

TO INSTRUMENT PANEL (IP) — G — N-5

TO TANK NO.1 — B — N-3

TO TANK NO.2 — D — N-3

TO INSTRUMENT PANEL (IP) — H — N-5

NOTES

1. HIGH DISCHARGE TEMP.
2. SPEED COMMAND
3. SPEED FEEDBACK
4. CALL
5. RUN
6. READY
7. FAIL
8. HIGH TEMPERATURE INSIDE AIR BLOWER ENCLOSURE
9. SEE SECTION 431219 FOR BLOWER EQUIPMENT AND INSTRUMENTATION

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AREA - 06
SYSTEM - 01

REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

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DRAWN BY MG
CHECKED BY GY
DATE 2/26/08

PROJECT ENGINEER EFREM S. SORKIN
REG NUMBER 14555 EXP DATE 6-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
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805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

CENTRATE AERATION BLOWERS &
MIXING PUMPS P&ID

DRAWING N-4
SHEET 19 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\N-4.dwg
DATE: Oct 13, 2009 10:07am
USER: davisal
XREFS: g-bd
IMAGES: LVMWD_COLOR.TIF
TRIUNFO.TIF

SCS

FIR 400 | FQIR 400 | AIR 401A | AIR 401B | AIR 402 | AIR 403 | AIR 404 | EIR 911 | YIR 913 | YAR 915

FQY 400

PLC-96
(@ ICP-2)

AI FN 400 | AI AN 401A | AI AN 401B | AI AN 402 | AI AN 403 | AI AN 404 | AI EN 911 | DI YN 913 | DI YN 915

pH | TEMP | AC POWER OK

NOTES

1. LOCATED IN ICP-2.

INSTRUMENT PANEL (IP)

AIT 401 (AC) | AIT 402 (DO) | AIT 403 (NH3) | AIT 404 (NITRATE)

PI 401 / AE 401 | PI 402 / AE 402 | PI 403 / AE 403 | PI 404 / AE 404

PROBE ASSEMBLY (TYP.)

FIT 400 (AC)

FE 400

FROM MIXING PUMPS

N-4 G

N-4 H

I N-4

J N-4

TO MIXING PUMPS

ET 911 (1) BATTERY VOLTAGE

ES 913 (1)

ZS 915 SHELTER INTRUSION SWITCH

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AREA - 06
SYSTEM - 01

REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION PANEL P&ID

DRAWING N-5
SHEET 20 OF 32 SHEETS

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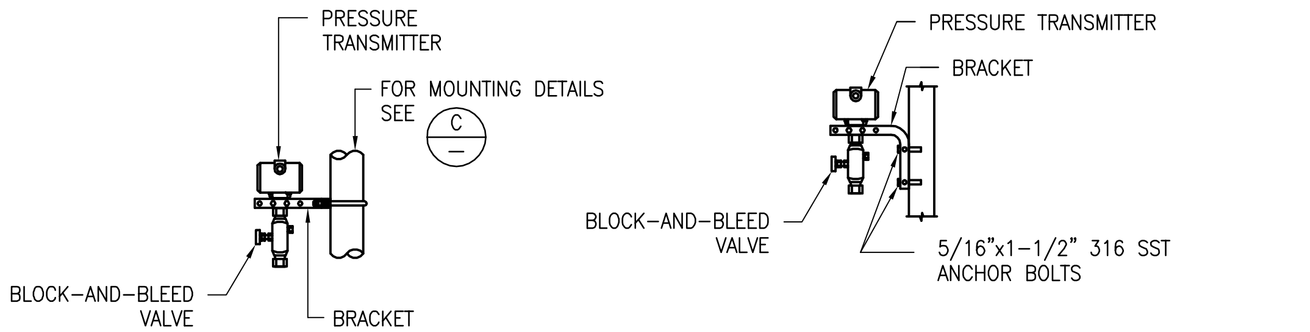
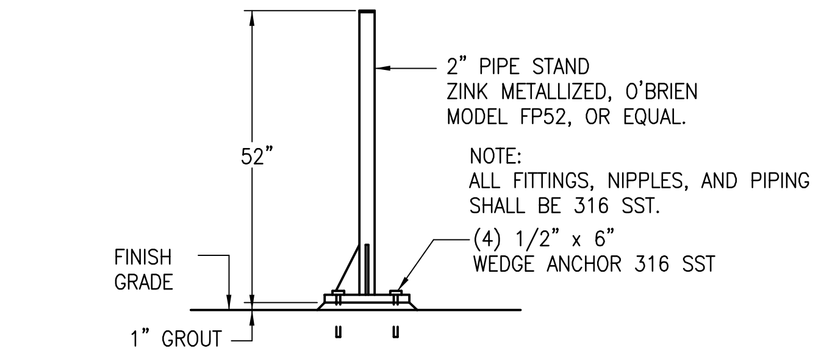
DATE: Oct 13, 2009 10:02am XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF



PIPE MOUNTING BRACKET — A

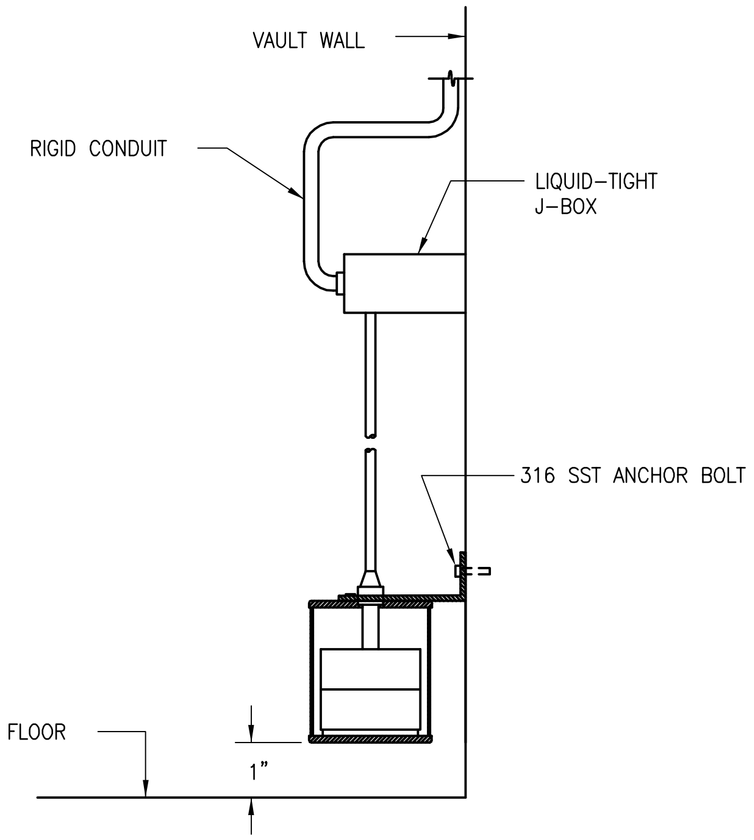
WALL MOUNTING BRACKET — B



INSTRUMENT PIPE STAND MOUNTING — C

PRESSURE TRANSMITTER MOUNTING — 1

SCALE: NONE



FLOOD LEVEL SWITCH — 2

SCALE: NONE

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

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DESIGNED BY: ES
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CHECKED BY: GY
DATE: 2/26/08

PROJECT ENGINEER: EFREM S. SORKIN
REG NUMBER: 14555
EXP DATE: 6-30-08
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION DETAILS

DRAWING: N-6
SHEET: 21 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\N-6.dwg USER: dsvisol
DATE: Oct 13, 2009 12:46pm XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF

ELECTRICAL SYMBOLS - PLANS

CLG	WALL	SYMBOL DESCRIPTION
		DUPLEX RECEPTACLE, GFI TYPE, WP
J	J	JUNCTION BOX
	$	LIGHTING SWITCH, WP
		LIGHTING FIXTURE, TYPE A
03		CONDUIT REFERENCE
CKTS		120/240V CIRCUITS IN ONE OR MORE CONDUITS, AS REQUIRED
		RIGID CONDUIT IN SLAB OR UNDER GROUND
		RIGID CONDUIT CONCEALED
G		GROUNDING CONDUCTOR 30" BELOW GRADE
A–1,3		HOMERUN TO PANEL A, CIRCUITS 1 & 3
		CONDUIT BENDS TOWARD OBSERVER
		CONDUIT BENDS AWAY FROM OBSERVER
J		FLEXIBLE CONDUIT CONNECTION
		PANELBOARD
		DISCONNECT SWITCH
$M		MANUAL STARTER
XXX		HOMERUN PER CONDUIT SCHEDULE

ELECTRICAL SYMBOLS - SCHEMATIC DIAGRAMS

NORMALLY OPEN	NORMALLY CLOSED	SYMBOL DESCRIPTION
		CONTACT
		TIMED CONTACT CONTACT ACTION RETARDED ON ENERGIZATION
		TIMED CONTACT CONTACT ACTION RETARDED ON DE–ENERGIZATION
		LEVEL SWITCH
		PRESSURE SWITCH
		PUSH BUTTON SINGLE CIRCUIT MOMENTARY CONTACT
		TEMPERATURE SWITCH
		LIMIT SWITCH
		SELECTOR SWITCH
O/L'S		MOTOR OVERLOAD HEATER CONTACTS
		MOTOR OVERLOAD HEATER
A		PILOT LIGHT R= RED, W= WHITE, G= GREEN, A= AMBER
CR PR AR		RELAY, 120VAC
TD		TIME DELAY RELAY. TIME DELAY ON ENERGIZATION
TD TDOD		TIME DELAY RELAY. TIME DELAY ON DE–ENERGIZATION
M		STARTER COIL
S		SOLENOID OPERATED VALVE
ETM		ELAPSED TIME METER
		FUSE
		CONTROL POWER TRANSFORMER
		GROUND
		MOTOR SPACE HEATER
		WIRING WITHIN MCC, FURNISHED BY MCC MANUFACTURER, UON
		FIELD WIRING
		WIRE TERMINAL IN MOTOR STARTER

ELECTRICAL SYMBOLS - SINGLE LINE DIAGRAM

DEVICE	SYMBOL DESCRIPTION
M	UTILTIY METER
	DRY–TYPE TRANSFORMER
	POTENTIAL TRANSFORMER
	CURRENT TRANSFORMER
	FUSE
30A 3P	CIRCUIT BREAKER, 3P – 3 POLE, MCP – MOTOR CIRCUIT PROTECTOR
40	MOTOR, 40 HORSEPOWER
	GROUND
	FUSED DISCONNECT SWITCH WITH CURRENT LIMITING FUSES
PM	PHASE FAILURE MONITOR
VFD	VARIABLE FREQUENCY DRIVE
DMWH	ENERGY MONITOR
TVSS	TRANSIENT VOLTAGE SURGE SUPRESSOR

ELECTRICAL ABBREVIATIONS

A	AMPERES, ANALOG
AC	ALTERNATING CURRENT
AICS	AMPERES INTERRUPTING CAPACITY, SYMMETRICAL
BC	BARE COPPER
C	CONDUIT
CB	CIRCUIT BREAKER
CO	CONDUIT ONLY
CPT	CONTROL POWER TRANSFORMER
CW	COOL WHITE
DC	DIRECT CURRENT
ELEV	ELEVATION
ETM	ELAPSED TIME METER
EXIST	EXISTING
F	FLUORESCENT
FIT	FLOW TRANSMITTER
FLEX	FLEXIBLE
G, GND	GROUND
GFI	GROUND FAULT INTERRUPTER
H	HALOGEN
HOA	HAND OFF AUTOMATIC
HP	HORSEPOWER
HPS	HIGH PRESSURE SODIUM
ICP	INSTRUMENTATION CONTROL PANEL
KVA	KILOVOLT–AMPERE
KW	KILOWATT
LIT	LEVEL INDICATOR TRANSMITTER
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
N	NEUTRAL
NC	NORMALLY CLOSED
NIC	NOT IN CONTRACT
NL	NIGHT LIGHT
NO	NORMALLY OPEN
NO.	NUMBER
NTS	NOT TO SCALE
OL'S	MOTOR OVERLOAD CONTACTS
P	POLE
PB	PUSHBUTTON, PULLBOX
PFM	PHASE FAILURE MONITOR
PH	PHASE
PSHL	PRESSURE SWITCH HIGH/LOW
PSL	PRESSURE SWITCH LOW
PIT	PRESSURE TRANSMITTER
SN	SOLID NEUTRAL
SWBD	SWITCHBOARD
T	TELEPHONE
TEL	TELEMETRY
TSP	TWISTED SHIELDED PAIR
TYP	TYPICAL
UON	UNLESS OTHERWISE NOTED
V	VOLT
VFD	VARIABLE FREQUENCY DRIVE
W	WATT, WIRE
WP	WEATHERPROOF
XFMR	TRANSFORMER
ZS	LIMIT SWITCH

UTILITY CONTACTS

SCE
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THOUSAND OAKS, CA. 91361

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EMAIL: peter.dancel@sce.com

RECORD DRAWING

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Feb. 4, 2008

REV	DESCRIPTION	APPR
1	10–16–09 AS BUILT	

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DRAWN BY DD
CHECKED BY PT
DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9–30–08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE engineering corporation
5851 Thille St. Suite 201
Ventura, California 93003
805–644–9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

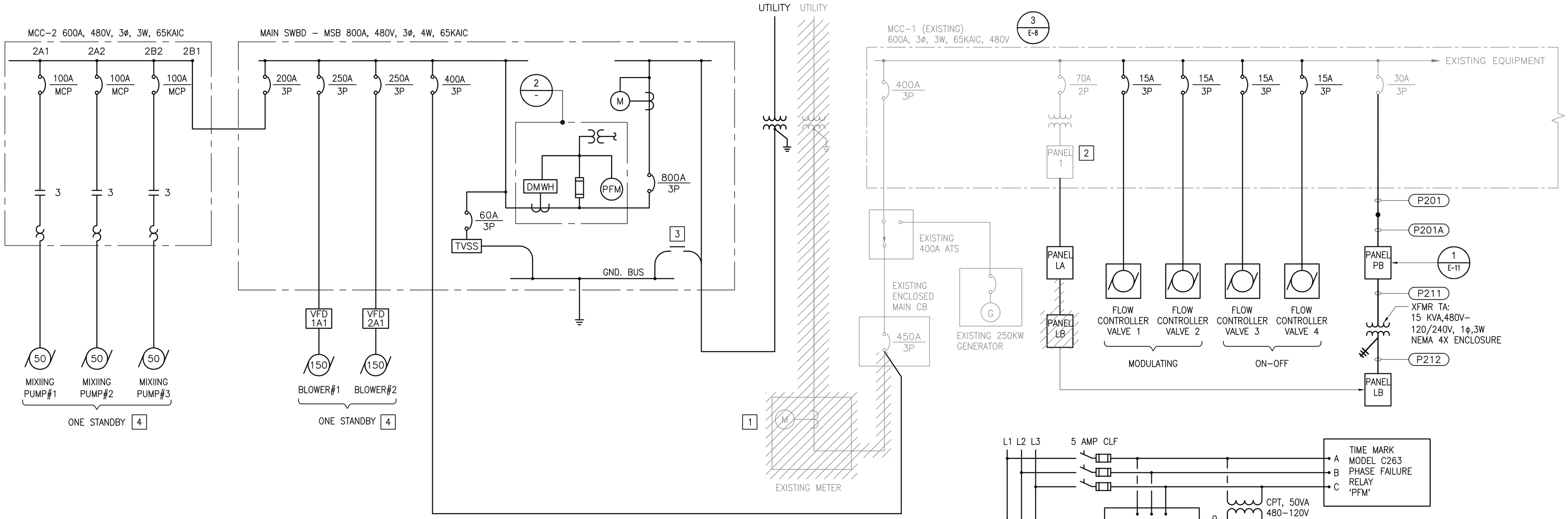
LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

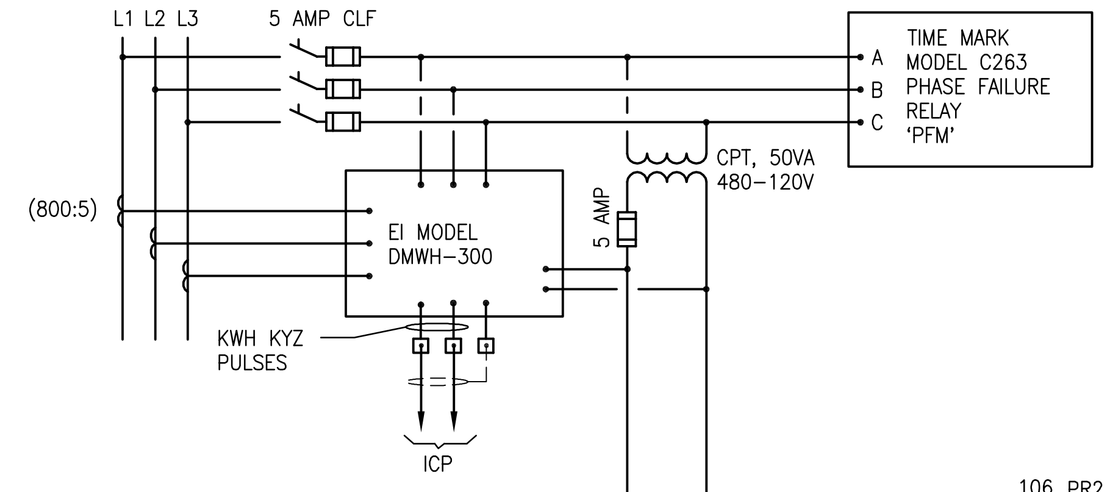
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

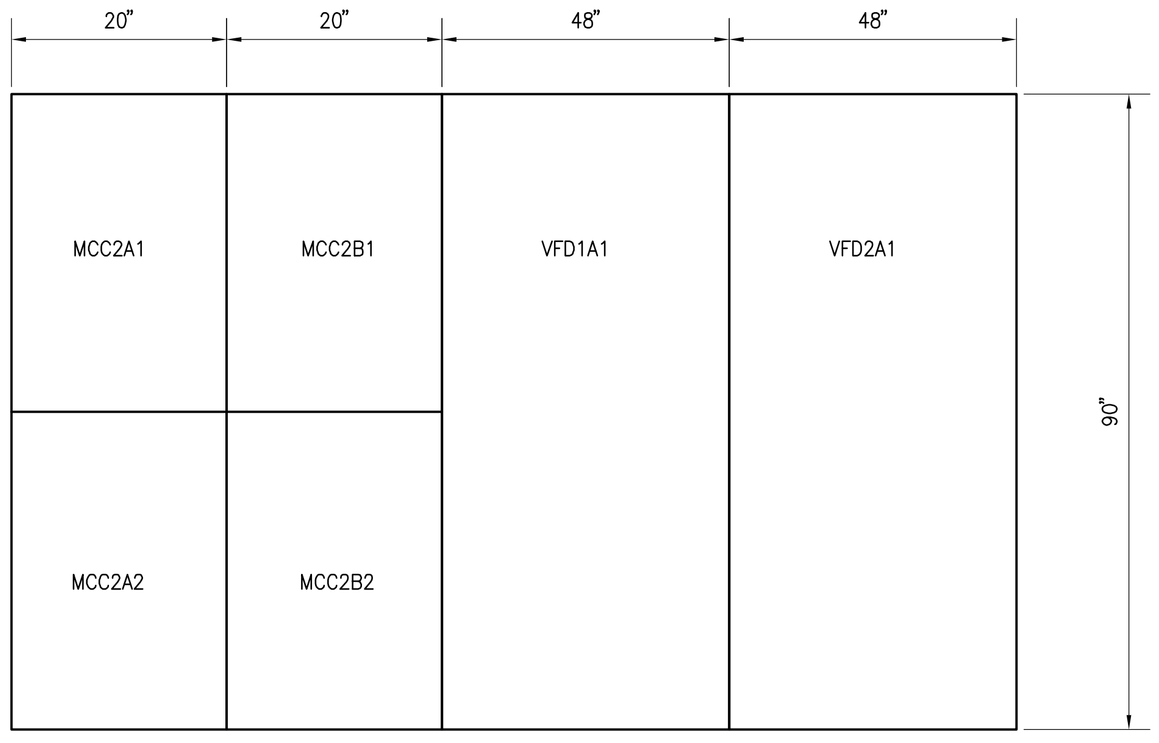
ELECTRICAL SYMBOLS AND ABBREVIATIONS

DRAWING E-1
SHEET 22 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 – Tapia BNR\0002 – Centrate Treatment\CAD\AS BUILTS 10–16–09\E–0182.dwg USER: dovisol
DATE: Oct 13, 2009 10:09am XREFS: g–bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF







SINGLE LINE DIAGRAM 1

MCC-2 & VFDS ELEVATION 3

STATION POWER METER AND MONITORING SCHEMATIC DIAGRAM 2

NOTES:

1. REMOVE EXISTING SERVICE SWITCHBOARD.
2. REPLACE EXISTING CIRCUIT BREAKER AT CKT 23,25 WITH A 70A/2P BREAKER TO FEED NEW PANEL 'LA'.
3. NEUTRAL LINK.
4. NOT BACKED UP BY EXISTING STANDBY GENERATOR.

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CADD STANDARDS BOYLE

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9–30–08
PROJECT NUMBER 16817.00

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

SINGLE LINE DIAGRAM

DRAWING E-2
SHEET 23 OF 32 SHEETS

Mar. 12, 2009

DWG: F:\LVMWD\16817.00 – Tapia BNR\D02 – Centrate Treatment\CAD\AS BUILTS 10–16–09\E–02R1.dwg USER: davidsol
DATE: Oct 13, 2009 10:10am XREFS: g–bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF

CONTINUED ON DRAWING E-4

P102 P104 P106 P107 P108 P111 P117 P121 P127 D102 D104 D311 D321 D331 N01 P201A

N01 P201A

P117

D117

A117

V-117

FE-115

M115

2 E-8 GROUNDING FLOW METER

P127

D127

V-127

A127

M125

FE-125

GROUNDING FLOW METER 2 E-8

D127 M125 A127

D117 M115 A117

1 E-5 2 E-5

LEVEL SENSOR

ICP-2

PANEL PB

LEVEL SENSOR

D121

A221

A211

GROUNDING FLOW METER 2 E-8

FE-001

LSH-003

D003

M001

TANK NO.1

TANK NO.2

V-111

D111

P111

JBOX MOUNTING TYP. 4 E-8

V-121

P121

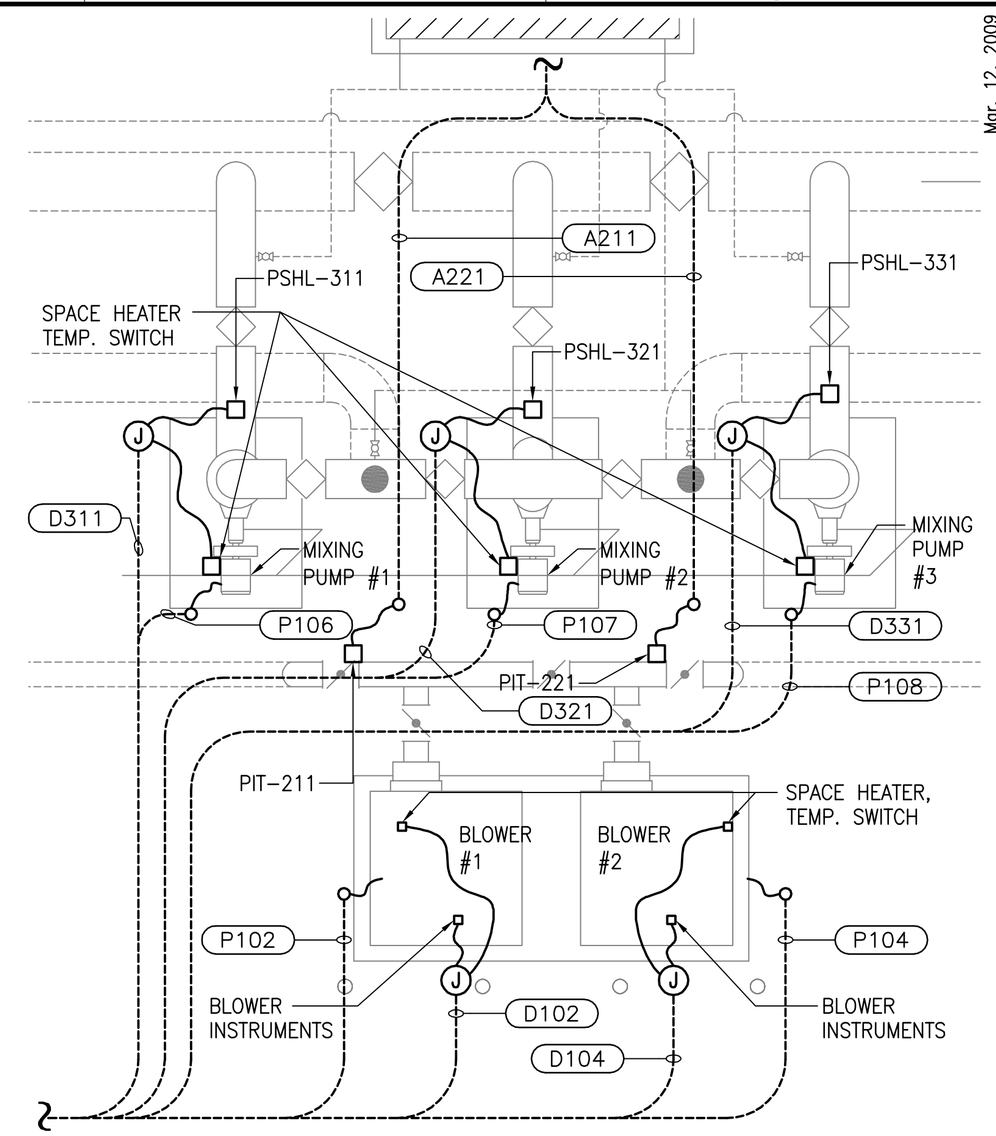
2 –

P102 P104 P106 P107 P108 D102 D104 D311 D321 D331

ELECTRICAL PLAN

SCALE: 1"=10'

1 –



DETAIL

SCALE: 1"=4'

2 –

Mar. 12, 2009

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REV	DESCRIPTION	APPR
7		
6		
5		
4		
3		
2		
1	10-16-09 AS BUILT	

VERIFY SCALES
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DESIGNED BY AH
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CHECKED BY PT
DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

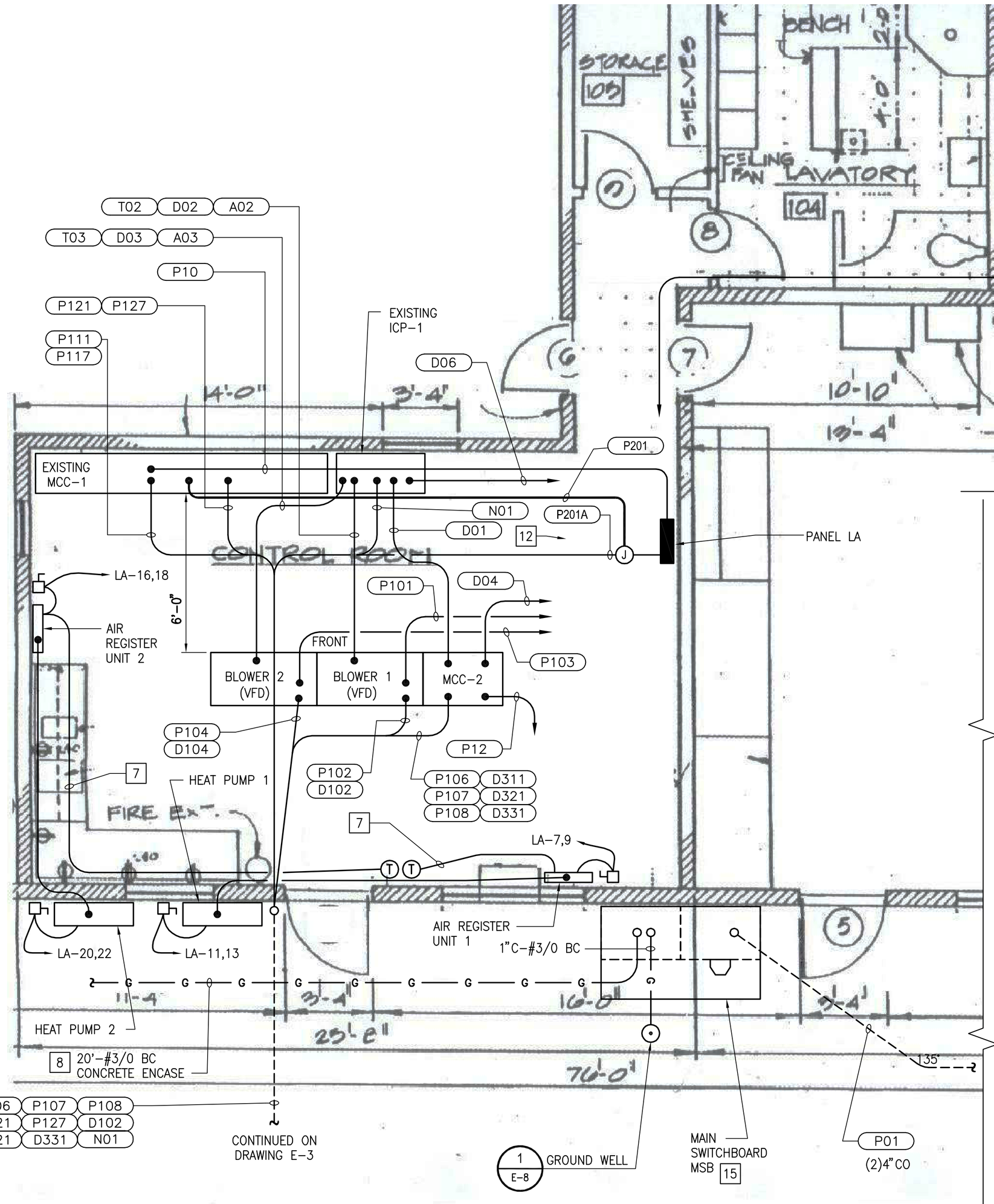
TANK ELECTRICAL SITE PLAN

DRAWING E-3
SHEET 24 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-0381.dwg
DATE: Oct 13, 2009 10:11am
XREFS: g-bd
PIPING
IMAGES: LVMWD_COLOR.TIF
TRIUNFO.TIF
USER: dsvisel

NOTES:

1. TRANSFORMER PAD, ASSOCIATED GROUNDING & PROTECTIVE BARRIERS FOR SCE TRANSFORMER, PER SCE REQUIREMENTS.
2. (2) 4" CONDUITS UNDERGROUND FOR SCE PRIMARY CONDUCTORS TO STUB UP 1'-0" ABOVE GRADE, AND CAP AT UTILITY POLE TO BE DESIGNATED DURING COORDINATION WITH SCE. ASSUME 300' RUN.
3. REMOVE CONDUCTORS, CAP CONDUITS AT REMOVED SERVICE SWITCHBOARD.
4. REMOVE SWITCHBOARD. CAP CONDUITS
5. TRENCH AND RESTORE TO EXISTING CONDITION.
6. SCE TO REMOVE CONDUCTORS.
7. CONDUIT AND CABLE PER MANUFACTURER RECOMMENDATIONS.
8. CONCRETE SHALL BE 5" x 5" MIN. IN CROSS SECTION AREA.
9. TRENCHING WILL REQUIRE CUTTING INTO EXISTING CONCRETE PAVEMENT. PATCH PAVEMENT TO ORGINAL CONDITION.
10. 3' x 4' PULLBOX WITH TRAFFIC RATED COVER PER SCE REQUIREMENTS.
11. INSTALL HORIZONTAL RUNS OF CONDUITS ABOVE CEILING IN ATTIC SPACE.
12. MOVE EXISTING LIGHTING FIXTURE 12" SOUTH.
13. EXISTING UTILITY XFMR PAD TO BE REUSED.
14. REFER TO SCE DRAWINGS FOR MORE DETAILS & REQUIREMENTS.
15. INSTALL ON 3-1/2" THICK CONCRETE HOUSEKEEPING PAD. ANCHOR SWITCHBOARD TO CONCRETE SIDEWALK AND/OR WALL PER MANUFACTURERS REQUIREMENTS FOR SEISMIC BRACING.

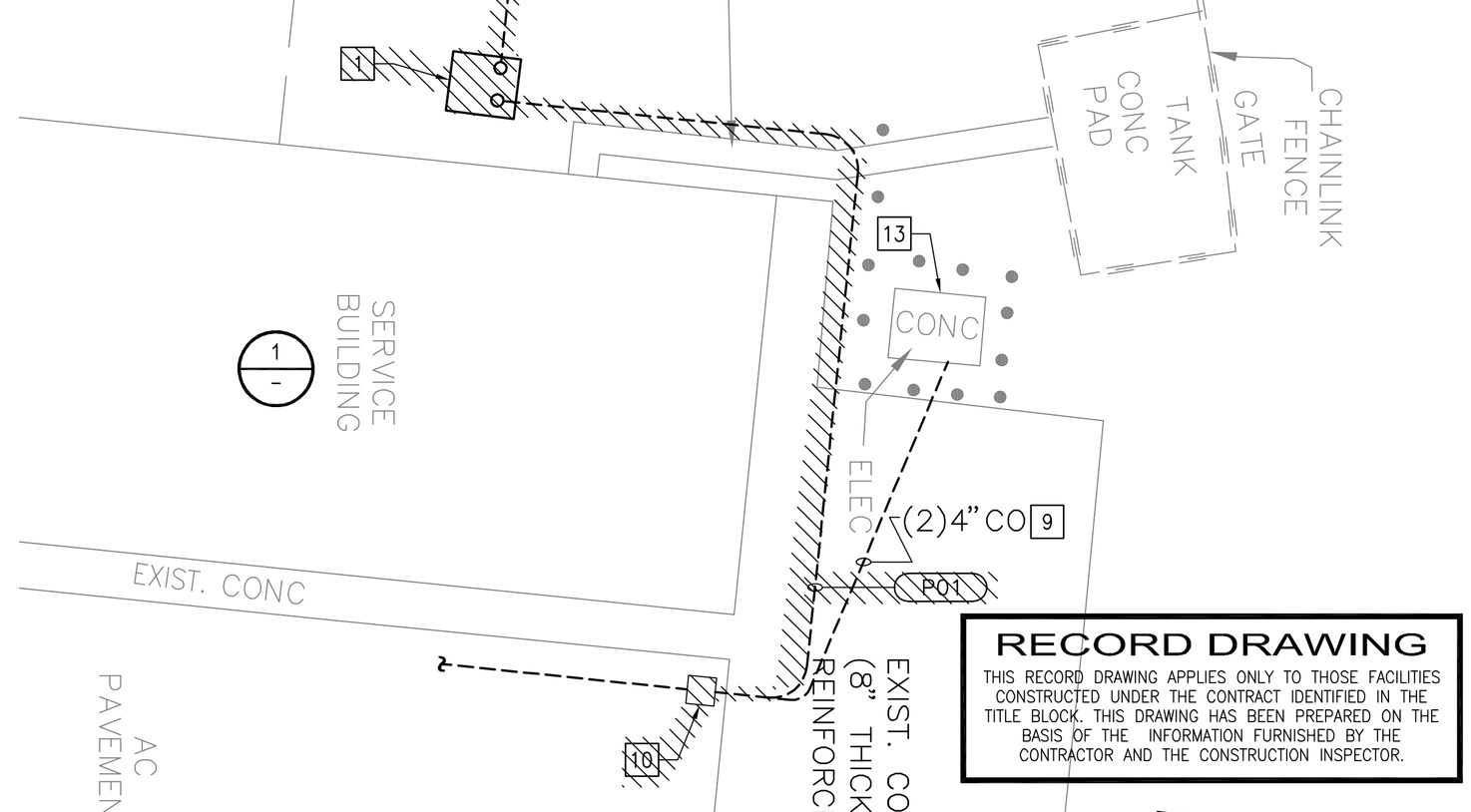


1' 0 1' 2' 3' 5' 7'
SCALE IN FEET

SERVICE BUILDING ELECTRICAL PLAN 11

SCALE: 3/8" = 1'

1 / –



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SERVICE BUILDING ELECTRICAL SITE PLAN 14

SCALE: 1" = 10'

2 / –

10 5 0 10 20
SCALE IN FEET

REV	DESCRIPTION	APPR
7		
6		
5		
4		
3		
2		
1	10-16-09 AS BUILT	

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DESIGNED BY	RE
DRAWN BY	KM
CHECKED BY	RH
DATE	2/26/08

PROJECT ENGINEER: ROBERT D. ELLISON
REG NUMBER: 38094 EXP DATE: 3-31-09
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

ELECTRICAL BUILDING PLAN

DRAWING E-4
SHEET 25 OF 32 SHEETS

Mar 12, 2009

DWG: F:\LVMWD\16817.00 - Tapia BNR\0202 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-0484.dwg USER: dsvicol
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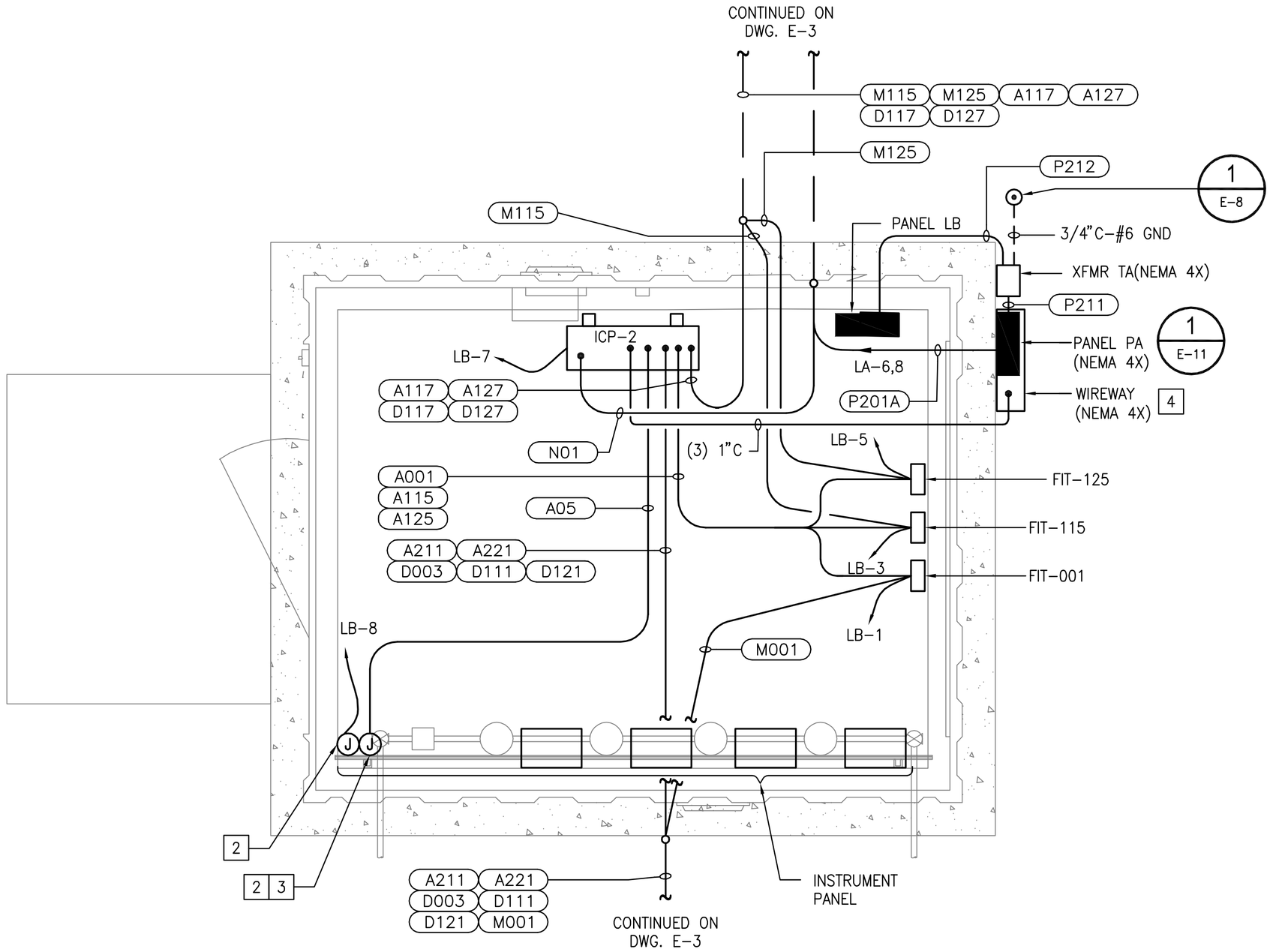


INSTRUMENTATION SHELTER POWER PLAN

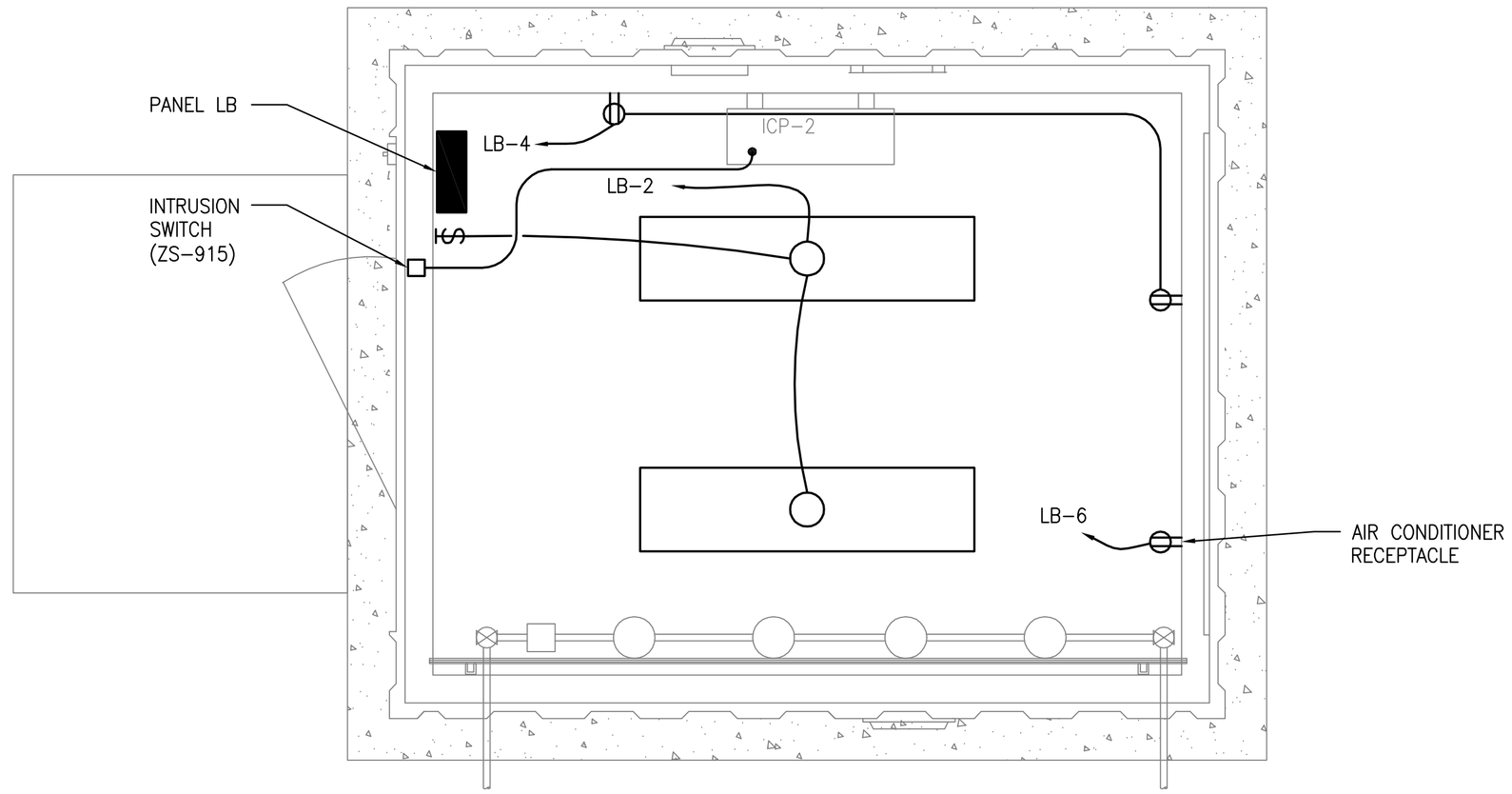
SCALE: 3/4" = 1'-0"

1 / -

NAME: PANEL LB				FED FROM: PANEL LA					MOUNTING: SURFACE					ENCLOSURE: NEMA 1			
BUS (Amps): 100		VOLTAGE, Ph, W: 120/240, 1-Ph, 3-W						MAIN (Amps): 60 / 2 P				KAIC: 10	TOP or BOTTOM FEED: SEE PLANS			
LOCATION: INSTRUMENTIAON SHELTER								ADDITIONAL FEATURE:								
DESCRIPTION	LOAD VA A	LOAD VA B		NOTES	QTY	BRKR TRIP	BRKR P	CKT REF	CKT REF	BRKR P	BRKR TRIP	QTY	NOTES	LOAD VA A	LOAD VA B		DESCRIPTION
FIT-001	100				1	15	1	1	2	1	15	2		128			LIGHTING
FIT-115		100			1	15	1	3	4	1	20	2			360		RECEPTACLE
FIT-125	100				1	15	1	5	6	1	15	1		180			AIR COND. RECEPTACLE
ICP-2		300			1	15	1	7	8	1	15	1			200		INSTRUMENT PANEL
SPARE						15	1	9	10	1	15						SPARE
SPARE						15	1	11	12	1	20						SPARE
TOTAL VA (Odd Ckts)/ PH	200	400												310	560		TOTAL VA (Even Ckts)/ PH
TOTAL VA (All Ckts)/ PH	510	960															
TOTALS = 1,470 VA. AVERAGE AMPS/PH= 6.1 A																	
AVERAGE: VA / PH= 740 VA																	

NOTES
- VA SUMS AND AVERAGES ARE ROUNDED TO THE NEAREST : 10 VA.
- QUANTITIES IN 'QTY' COLUMN, IF ANY, INDICATE NUMBER OF POWER CONSUMING OUTLETS CONNECTED TO THE RELEVANT CIRCUIT.
- THIS IS A MAIN-BREAKER TYPE PANEL. A BRANCH BREAKER SHALL NOT BE USED AS A MAIN BREAKER.
- THERE ARE NO CONTINUOUS LOADS OF SIGNIFICANCE FED FROM THIS PANELBOARD.

NUMBERED NOTES
(NOT USED)



INSTRUMENTATION SHELTER LIGHTING PLAN 1

SCALE: 3/4" = 1'-0"

2 / -

CONDUIT RUN REF.		CONDUIT SIZE	CONDUCTORS PER CONDUIT QT'Y	SIZE	GND	FROM	TO	REMARKS
P201		3/4"	3	# 8	# 10	MCC-1 (EXIST.)	J-BOX	
P201A		3/4"	3	# 8	# 10	J-BOX	PANEL PB	TO REPLACE CONDUCTORS OF PANEL LB IN EXISTING 3/4" CONDUIT
P211		1"	2	# 6	# 8	PANEL PB	XFMR - TB	
P212		1-1/4"	3	# 4	# 8	XFMR - TB	PANEL LB	

NOTES:

1. ELECTRICAL WORK WITHIN THIS DETAIL (DETAIL 2) SHALL BE PROVIDED AS PART OF WORK DESCRIBED IN SPEC. 133419.
2. PROVIDED WITH INSTRUMENT PANEL.
3. EXTEND TWISTED SHIELDED CABLE IN FLEXIBLE CONDUIT TO INSTRUMENTS & TERMINATE.
4. RUN (3)1" CONDUITS FROM WIREWAY TO PANEL PA

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

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DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
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WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

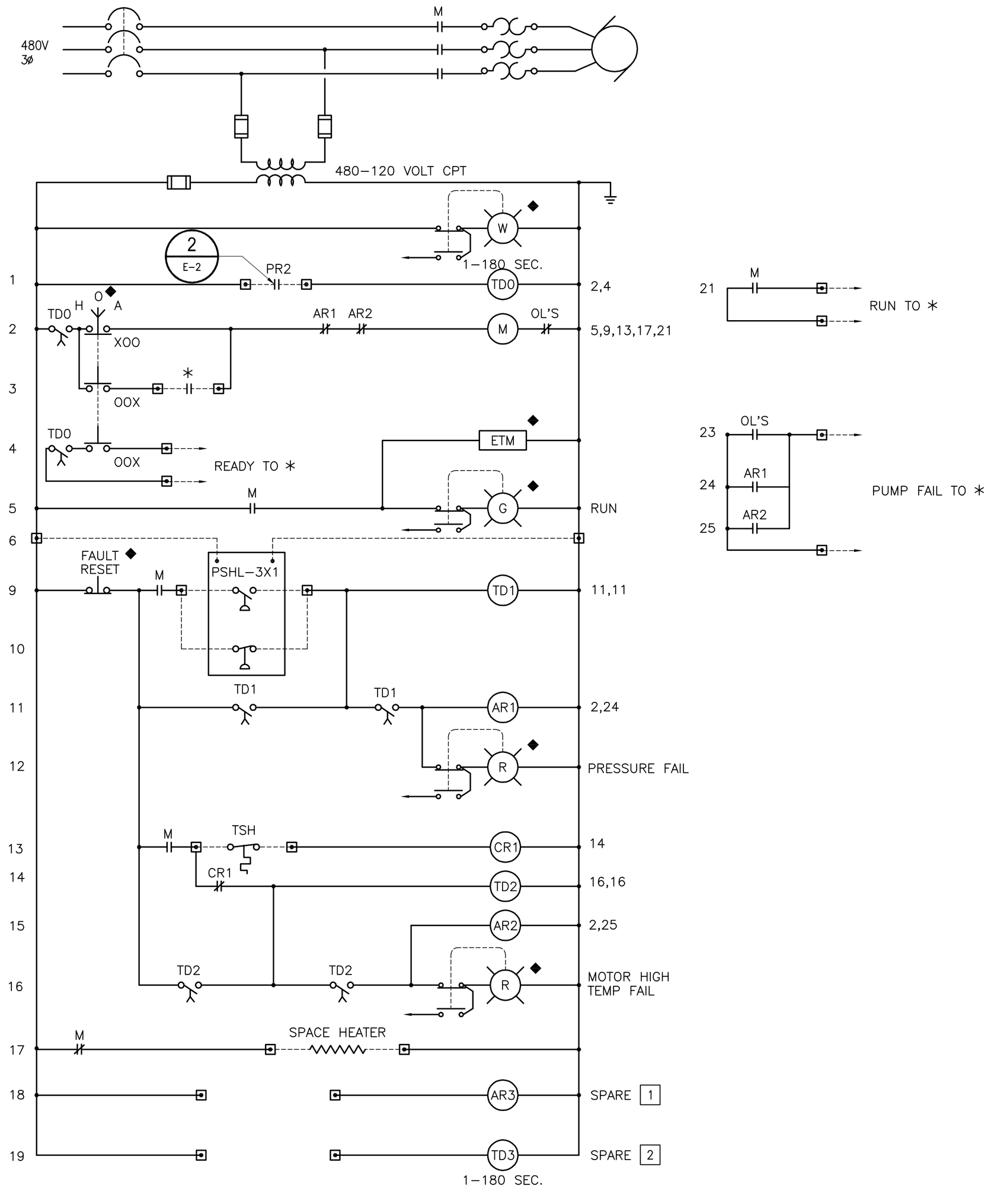
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

INSTRUMENTATION SHELTER ELECTRICAL PLANS

DRAWING E-5
SHEET 26 OF 32 SHEETS

Mar. 12, 2009

DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-0581.dwg USER: davisol
DATE: Oct 13, 2009 10:15am XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF



PUMP CONTROL SCHEMATIC

TYPICAL

1

–

NOTES:

1. SPARE RELAYS TO HAVE 2 NC AND 2 NO CONTACTS. ALL CONTACTS SHALL BE WIRED TO TERMINALS.
2. SPARE RELAY TO HAVE 1 NC AND 1 NO CONTACT. ALL CONTACTS SHALL BE WIRED TO TERMINALS.

SYMBOLS (THIS DWG. ONLY)

∗ ICP

◆ DOOR MOUNTED

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REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

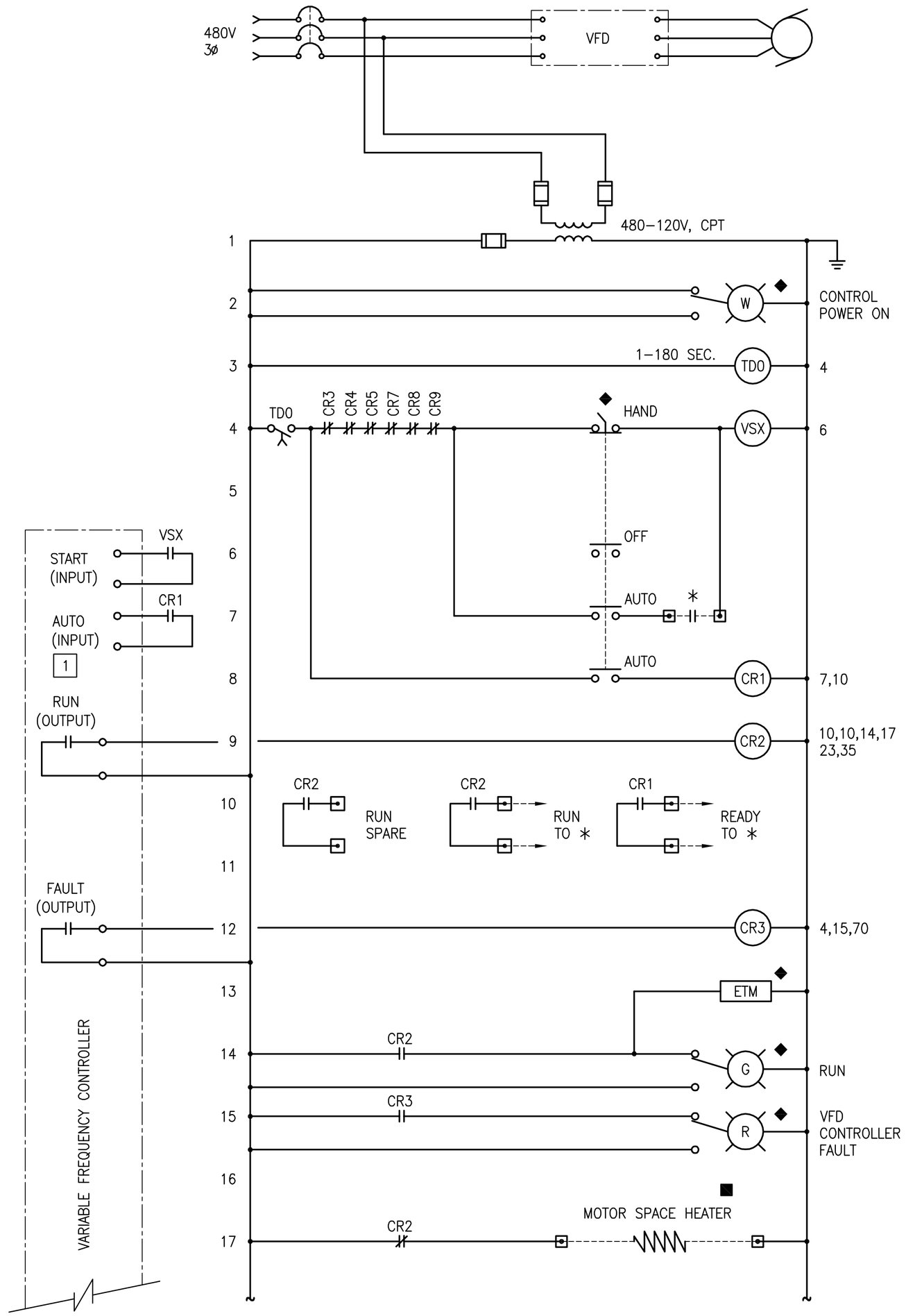
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

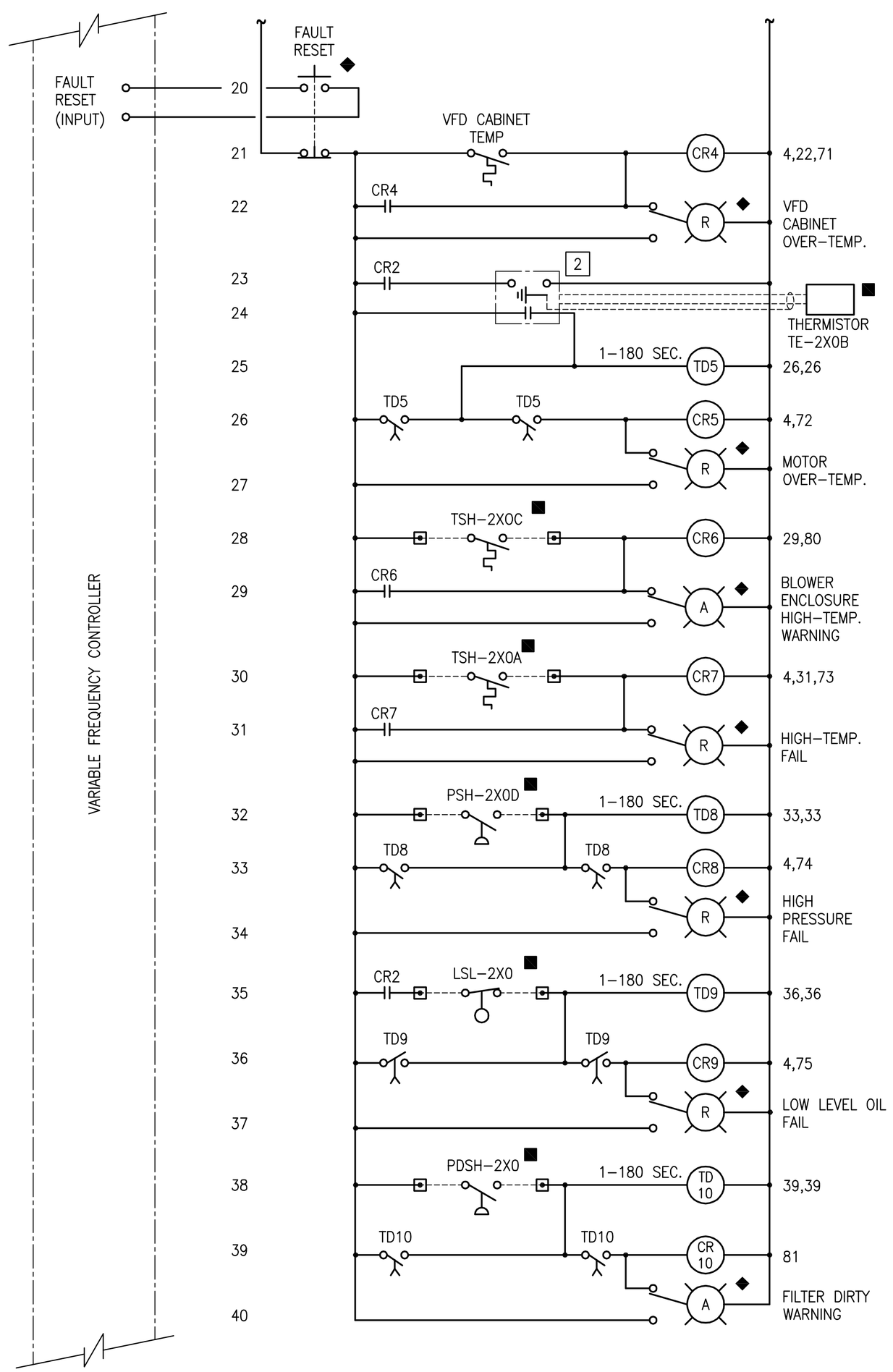
PUMP CONTROL SCHEMATIC DIAGRAM

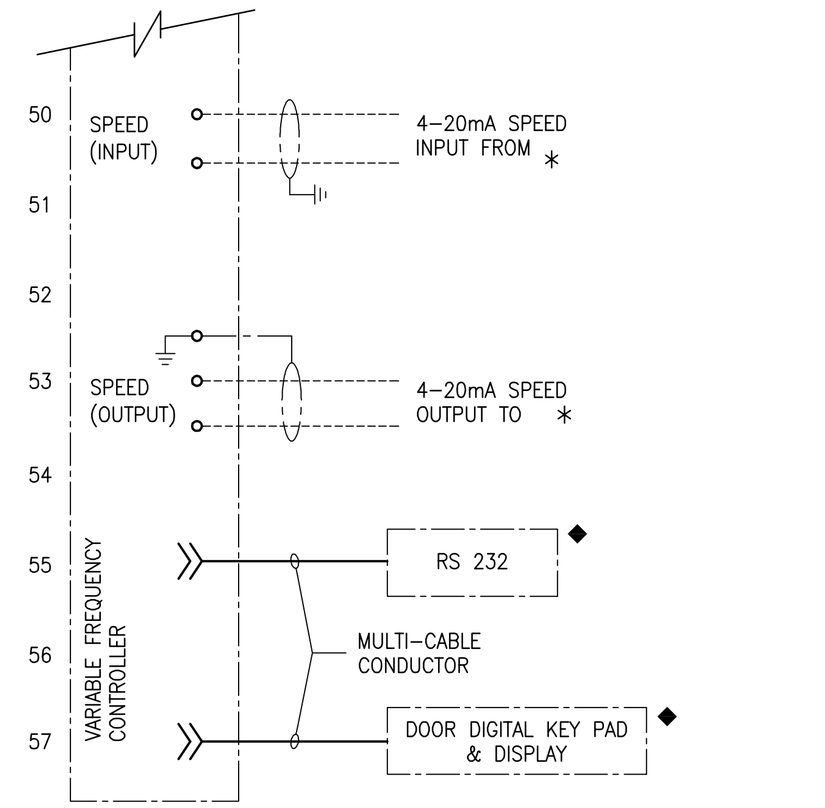
DRAWING E-6
SHEET 27 OF 32 SHEETS

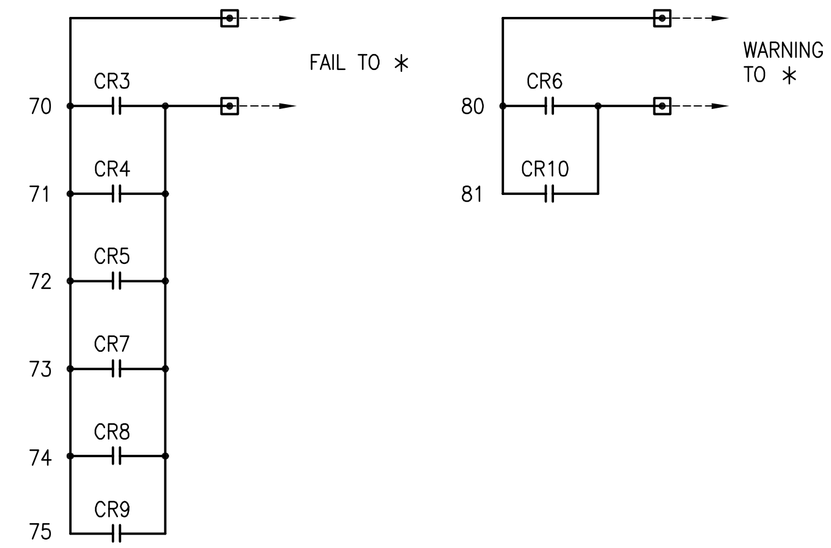
Feb. 5, 2008

DWG: F:\LVMWD\16817.00 - Tapia BNR\002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-06.dwg USER: dsvisol
DATE: Oct 13, 2009 10:16am XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF









Feb. 5, 2008

NOTES:

1. CLOSED CONTACT AT AUTO INPUT SHALL ALLOW THE FREQUENCY CONTROLLER TO RESPOND TO 4–20mA EXTERNAL SPEED INPUT.
2. THERMISTOR MOTOR PROTECTION RELAY.

SYMBOLS: (This Drawing Only)

- * ICP–1
- ■ FIELD MOUNTED
- ◆ DOOR MOUNTED

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BLOWER CONTROL SCHEMATIC

(TYPICAL OF 2)

1 / –

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DATE	2/26/08
PROJECT ENGINEER	PARSEKH L. TOPJIAN
REG NUMBER	012845
EXP DATE	9–30–08
PROJECT NUMBER	16817.00
CADD STANDARDS	BOYLE

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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

BLOWER CONTROL SCHEMATIC DIAGRAM

DRAWING E-7
SHEET 28 OF 32 SHEETS

DWG: F:\LVMWD\16817.00 – Tapia BNR\0202 – Centrate Treatment\CAD\AS BUILTS 10–16–09\E–07.dwg
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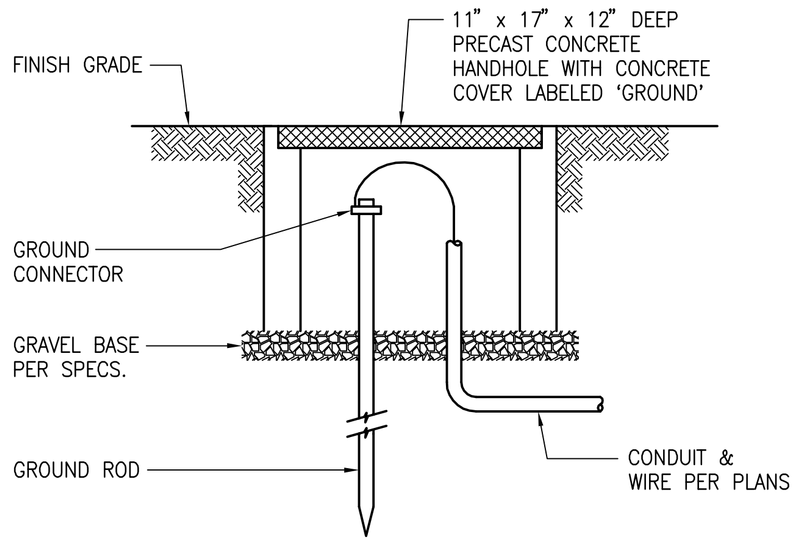
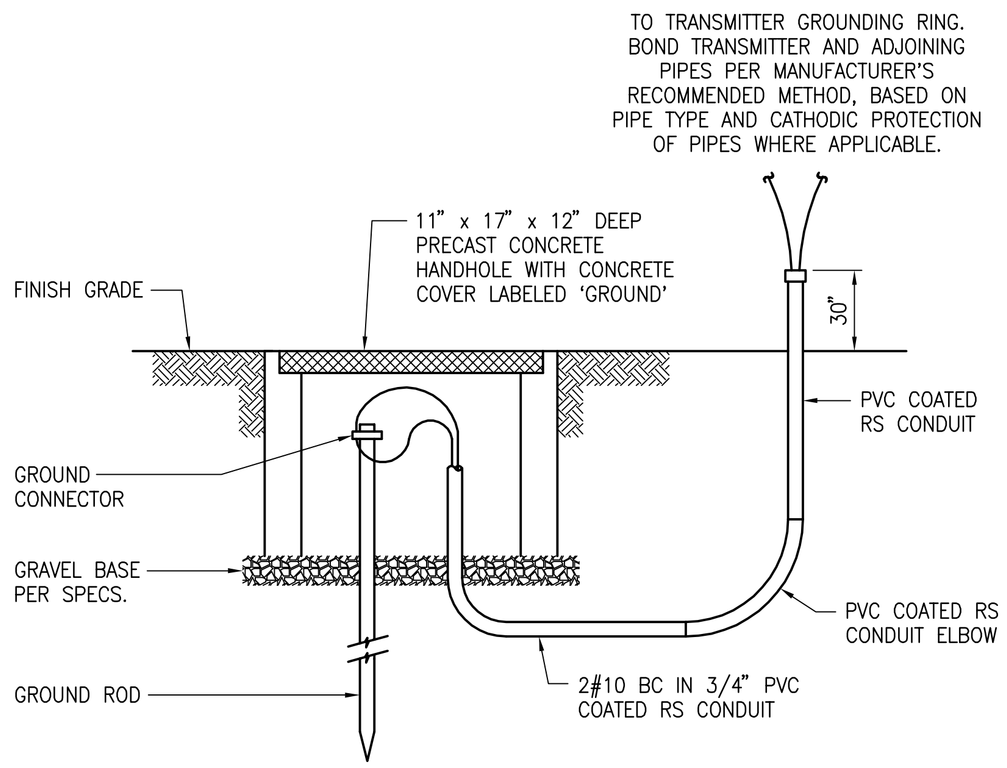
USER: davidol



GROUND WELL DETAIL

NTS

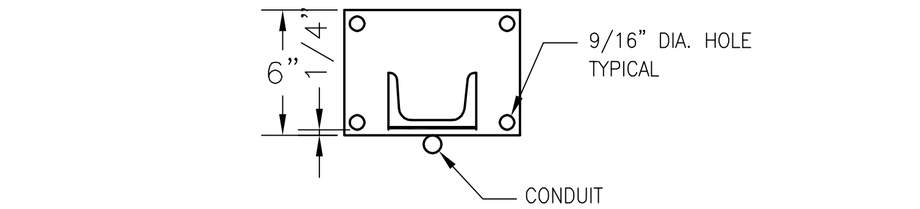
1 / –



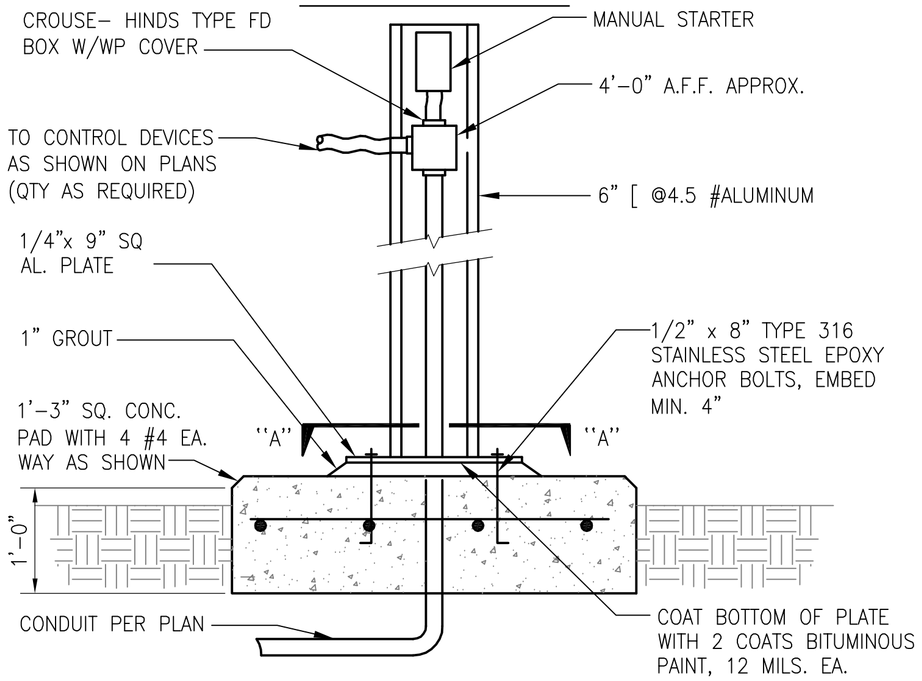
GROUNDING FLOW TRANSMITTER DETAIL

NTS

2 / –



SECTION ''A–A''



JBOX MOUNTING

NTS

4 / –

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EXISTING MCC [1]

MODIFICATIONS

3 / –

NOTES:

1. WESTINGHOUSE FIVE STARTER MOTOR CONTROL CENTER.
2. ADD TWO CIRCUIT BREAKERS PER SINGLE LINE DIAGRAM IN EACH BLANK SPARE. (TOTAL OF 4 CIRCUIT BREAKERS)

REV	DESCRIPTION	APPR
1	10–16–09 AS BUILT	

VERIFY SCALES
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DESIGNED BY: AH
DRAWN BY: DD
CHECKED BY: PT
DATE: 2/26/08

PROJECT ENGINEER: PARSEKH L. TOPJIAN
REG NUMBER: 012845
EXP DATE: 9–30–08
PROJECT NUMBER: 16817.00
CADD STANDARDS: BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003
805–644–9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

ELECTRICAL DETAILS

DRAWING: E-8
SHEET: 29 OF 32 SHEETS

Feb. 6, 2008

DWG: F:\LVMWD\16817.00 – Tapia BNR\0002 – Centrate Treatment\CAD\AS BUILTS 10–16–09\E–08.dwg USER: dsvisel
DATE: Oct 13, 2009 10:17am XREFS: g–bd HPM2604.JPG HPM2605.JPG LVMWD_COLOR.TIF TRIUNFO.TIF

NAME: PANEL LA	FED FROM: EXIST. LIGHTING PANEL								MOUNTING: SURFACE							ENCLOSURE: NEMA 1
BUS (Amps): 100	VOLTAGE: Ph, W: 120/240, 1-Ph, 3-W								MAIN (Amps): MLO / 2 P						KAIC: 10	TOP or BOTTOM FEED: TOP
LOCATION: OPERATION ROOM									ADDITIONAL FEATURE:							

DESCRIPTION	LOAD VA A	LOAD VA B		NOTES	QTY	BRKR TRIP	BRKR P	CKT REF		BRKR P	BRKR TRIP	QTY	NOTES	LOAD VA A	LOAD VA B		DESCRIPTION
SPARE						20	1	1	2	2	100		M				MAIN INCOMING
SPARE						20	1	3	4								
SPARE						20	1	5	6	2	30		1	510			PANEL LB
AIR REGISTER UNIT 1		200				20	2	7	8						960		
===	200							9	10	1	20						SPARE
HEAT PUMP 1		1,800			1	30	2	11	12	1	20						SPARE
===	1,800							13	14	1	20						SPARE
SPARE						20	1	15	16	2	15				200		AIR REGESTER UNIT 2
SPARE						20	1	17	18					200			===
SPARE						20	1	19	20	2	30		1		1,800		HEAT PUMP 2
SPARE						20	1	21	22					1,800			===
SPARE						20	1	23	24	1	20						SPARE
SPARE						20	1	25	26	1	20						SPARE
SPARE						20	1	27	28	1	20						SPARE
SPARE						20	1	29	30	1	20						SPARE
TOTAL VA (Odd Ckts)/ PH	2,000	2,000												2,510	2,960		TOTAL VA (Even Ckts)/ PH
TOTAL VA (All Ckts)/ PH	4,510	4,960															

TOTALS = 9,470 VA, AVERAGE AMPS/PH= 39 A

AVERAGE: VA / PH= 4,740 VA

NOTES

- VA SUMS AND AVERAGES ARE ROUNDED TO THE NEAREST : 10 VA.
- QUANTITIES IN 'QTY' COLUMN, IF ANY, INDICATE NUMBER OF POWER CONSUMING OUTLETS CONNECTED TO THE RELEVANT CIRCUIT.
- 'M' IN THE 'NOTES.' COLUMN INDICATES THAT RELEVANT BRANCH BREAKER IS USED AS THE MAIN BREAKER OF THIS PANEL.
- THERE ARE NO CONTINUOUS LOADS OF SIGNIFICANCE FED FROM THIS PANELBOARD.

NUMBERED NOTES

1- USE 2#10,#10 GND CONDUCTORS

2- USE 3#10,#10 GND CONDUCTORS

CONDUIT RUN REF.	PARALLEL CONDUITS PER RUN (=1 UON)	CONDUIT SIZE	CONDUCTORS PER CONDUIT QTY	CONDUCTORS PER CONDUIT SIZE	CONDUCTORS PER CONDUIT GND	FROM	TO	REMARKS
P01	3	5"CO				UTILITY XFMR	MAIN SWBRD - MSB	
MAIN SWBRD -MSB								
P11	2	2-1/2"	3	# 4/0	# 1	MAIN SWBRD - MSB	SERVICE DISCONNECT (EXIST.)	
P12		2-1/2"	3	# 4/0	# 4	MAIN SWBRD - MSB	MCC-2	
P101		3"	3	350kcmil	# 2	MAIN SWBRD - MSB	BLOWER #1 (VFD 1A1)	
P102		3"	3	250kcmil	# 2	BLOWER #1 (VFD 1A1)	BLOWER #1	
P103		3"	3	350kcmil	# 2	MAIN SWBRD - MSB	BLOWER #2 (VFD 2A1)	
P104		3"	3	250kcmil	# 2	BLOWER #2 (VFD 2A1)	BLOWER #2	
MCC-2								
P106		1-1/2"	3	# 1	# 6	MCC-2	MIXING PUMP #1	
P107		1-1/2"	3	# 1	# 6	MCC-2	MIXING PUMP #2	
P108		1-1/2"	3	# 1	# 6	MCC-2	MIXING PUMP #3	
SERVICE DISCONNECT (EXIST.)								
MCC-1 (EXIST.)								
P10		1-1/4"	3	# 2	# 8	EXIST. LIGHTING PANEL	PANEL LA	
P111		3/4"	3	# 12	# 12	MCC-1 (EXIST.)	MOV-111	
P117		3/4"	3	# 12	# 12	MCC-1 (EXIST.)	FCV-117	
P121		3/4"	3	# 12	# 12	MCC-1 (EXIST.)	MOV-121	
P127		3/4"	3	# 12	# 12	MCC-1 (EXIST.)	FCV-127	
INSTRUMENTATION								
D01		1-1/2"	30	# 14	# 14	EXIST. PLC	MCC-2	INCLUDES SPARES
D02		1"	14	# 14	# 14	EXIST. PLC	BLOWER #1 (VFD 1A1)	INCLUDES SPARES
A02		1"	2	#18 TSP		EXIST. PLC	BLOWER #1 (VFD 1A1)	
T02		1"CO				EXIST. PLC	BLOWER #1 (VFD 1A1)	FUTURE DATA CABLE
D03		1"	14	# 14	# 14	EXIST. PLC	BLOWER #2 (VFD 2A1)	INCLUDES SPARES
A03		1"	2	#18 TSP		EXIST. PLC	BLOWER #2 (VFD 2A1)	
T03		1"CO				EXIST. PLC	BLOWER #2 (VFD 2A1)	FUTURE DATA CABLE
D04		3/4"	6	# 14	# 14	MAIN SWBRD - MSB	MCC-2	
A05		1-1/2"	8	#18 TSP		ICP-2	INSTRUMENT PANEL	INCLUDES SPARES
D06		3/4"	4	# 14	# 14	ICP-2	MAIN SWBRD - MSB	
			1	#18 TSP				
N01		1"	1	DATA		EXIST. PLC	ICP-2	
A001		3/4"	1	#18 TSP		ICP-2	FIT-001	
			2	# 14	# 14			
M001		1"		(mc)		FIT-001	FE-001	
A115		1"	1	#18 TSP		ICP-2	FIT-115	
			2	# 14	# 14			
M115		1"		(mc)		FIT-115	FE-115	
A125		1"	1	#18 TSP		ICP-2	FIT-125	
			2	# 14	# 14			
M125		1"		(mc)		FIT-125	FE-125	
D003		1"	2	# 14	# 14	ICP-2	LSH-003	
D111		3/4"	9	# 14	# 14	ICP-2	MOV-111	
A117		1"	2	#18 TSP		ICP-2	FCV-117	
D117		3/4"	5	# 14		ICP-2	FCV-117	
D121		1"	9	# 14	# 14	ICP-2	MOV-121	
A127		1"	2	#18 TSP		ICP-2	FCV-127	
D127		3/4"	5	# 14		ICP-2	FCV-127	
A211		3/4"	1	#18 TSP		ICP-2	PIT-211	
A221		3/4"	1	#18 TSP		ICP-2	PIT-221	
D102		1"	14	# 14	# 14	BLOWER #1 (VFD 1A1)	BLOWER INSTRUMENTS	INCLUDES SPARES
			1	#18 TSP			THERMISTOR	
			2	# 12			SPACE HTR	
D104		1"	14	# 14	# 14	BLOWER #2 (VFD 2A1)	BLOWER INSTRUMENTS	INCLUDES SPARES
			1	#18 TSP			THERMISTOR	
			2	# 12			SPACE HTR	
D311		3/4"	4	# 14	# 14	MCC-2	PSHL-311	INCLUDES 120VAC SUPPLY
			2	# 14			TEMP SWITCH	
			2	# 12			SPACE HTR	
D321		3/4"	4	# 14	# 14	MCC-2	PSHL-321	INCLUDES 120VAC SUPPLY
			2	# 14			TEMP SWITCH	
			2	# 12			SPACE HTR	
D331		3/4"	4	# 14	# 14	MCC-2	PSHL-331	INCLUDES 120VAC SUPPLY
			2	# 14			TEMP SWITCH	
			2	# 12			SPACE HTR	

LOAD DESCRIPTION	HP or KVA	VOLTAGE	PHASE	CON-NECTED LOADS (KVA)	MAXIMUM DEMAND (KVA)	MAXIMUM DEMAND (AMPS)	DEMAND FACTOR
MCC-1 (EXIST.)	(SUM)	480	3	282	282	340	
BLOWER 1	150 HP	480	3	150	150	180	
(25% of BLOWER 1)		480	3	37	37	45	
BLOWER 2	150 HP	480	3	0.0	0.0	0.0	
PUMP 1	50 HP	480	3	54	54	65	
PUMP 2	50 HP	480	3	54	54	65	
PUMP 3	50 HP	480	3	0.0	0.0	0.0	
MAIN SWBRD	**(SUM)**	**480**	**3**	577	519	624	**0.9**

NOTES:

(mc) SUPPLIED UNDER ANOTHER DISCIPLINE, OR SUPPLIED WITH EQUIPMENT BY MANUFACTURER. INSTALLED BY CONTRACTOR.

RECORD DRAWING

THIS RECORD DRAWING APPLIES ONLY TO THOSE FACILITIES CONSTRUCTED UNDER THE CONTRACT IDENTIFIED IN THE TITLE BLOCK. THIS DRAWING HAS BEEN PREPARED ON THE BASIS OF THE INFORMATION FURNISHED BY THE CONTRACTOR AND THE CONSTRUCTION INSPECTOR.

REV	DESCRIPTION	APPR
7		
6		
5		
4		
3		
2		
1	10-16-09 AS BUILT	

VERIFY SCALES

BAR IS ONE INCH ON ORIGINAL DRAWING

IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY AH
DRAWN BY DD
CHECKED BY PT
DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE ENGINEERING CORPORATION
5851 Thille St. Suite 201
Ventura, California 93003 805-644-9704
WWW.BOYLEENGINEERING.COM

TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

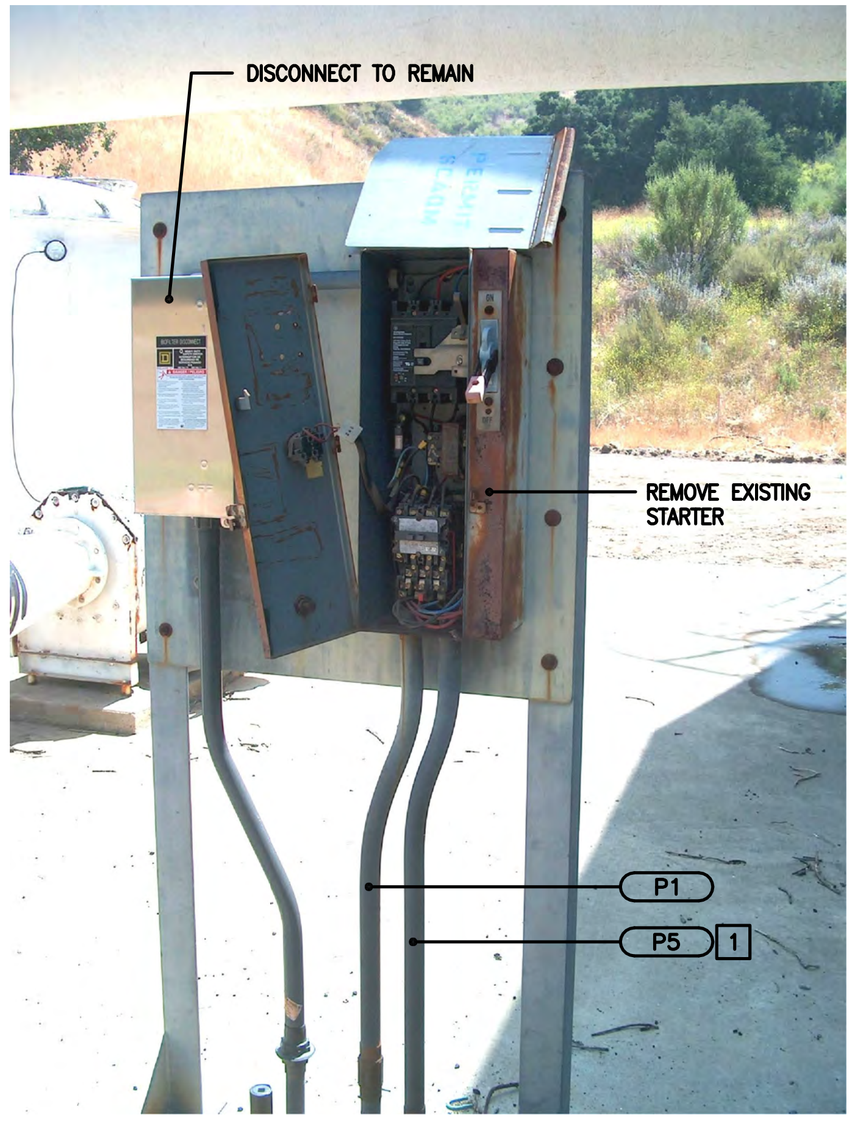
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

PANEL, LOAD ,& CONDUIT SCHEDULES

DRAWING E-9
SHEET 30 OF 32 SHEETS

Feb. 6, 2008

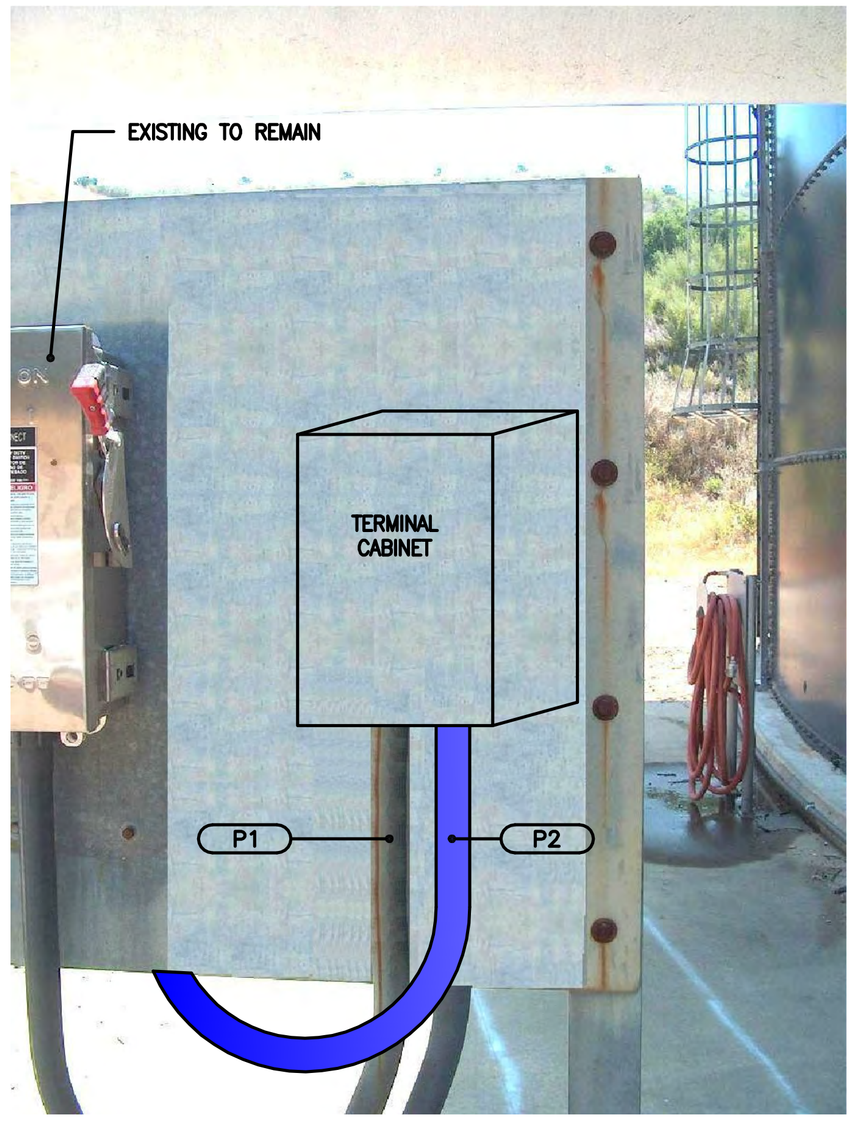
DWG: F:\LVMWD\16817.00 - Tapia BNR\0002 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-09.dwg USER: dsvioul
DATE: Oct 13, 2009 10:19am XREFS: g-bd IMAGES: LVMWD_COLOR.TIF TRIUNFO.TIF



EXISTING EQUIPMENT SUPPORT - DEMOLITION

1

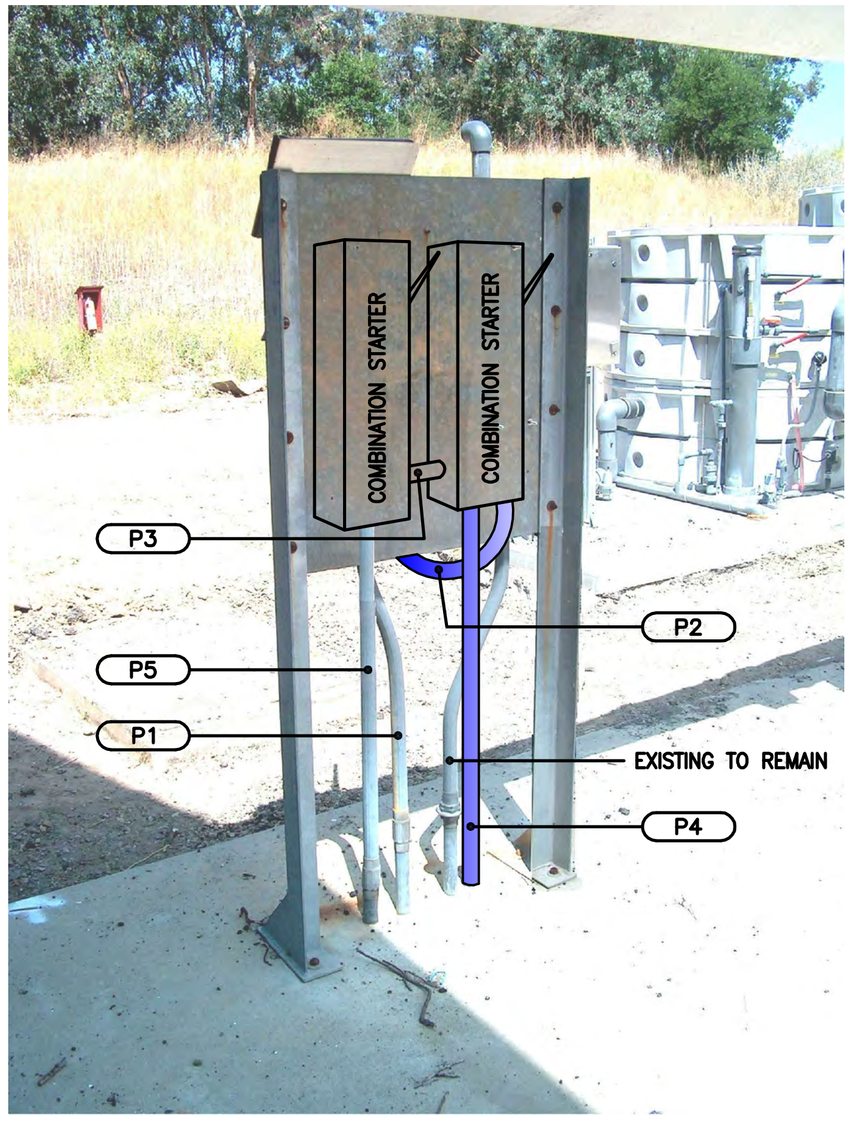
NOT TO SCALE



NEW TERMINAL CABINET DETAIL

2

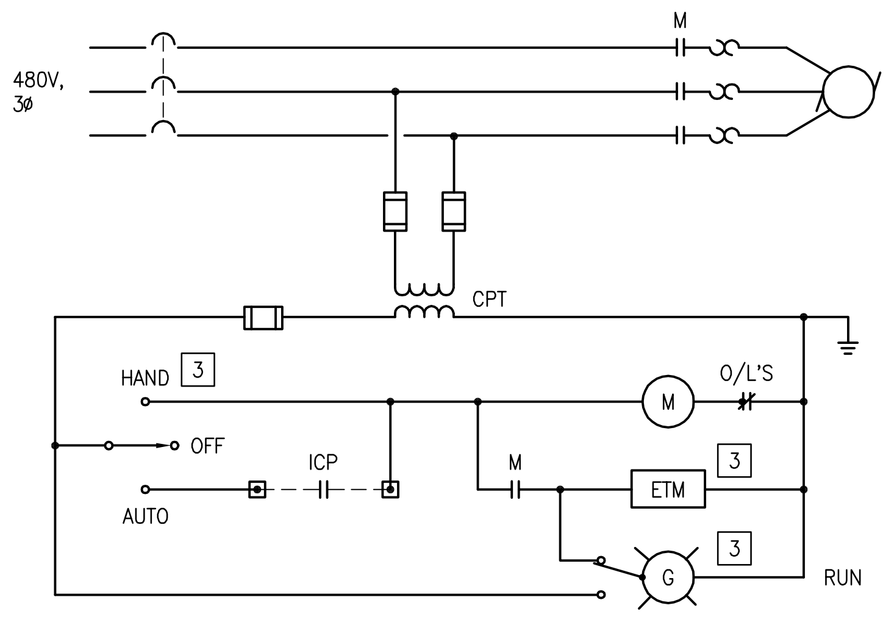
NOT TO SCALE



NEW COMBINATION STARTER DETAIL

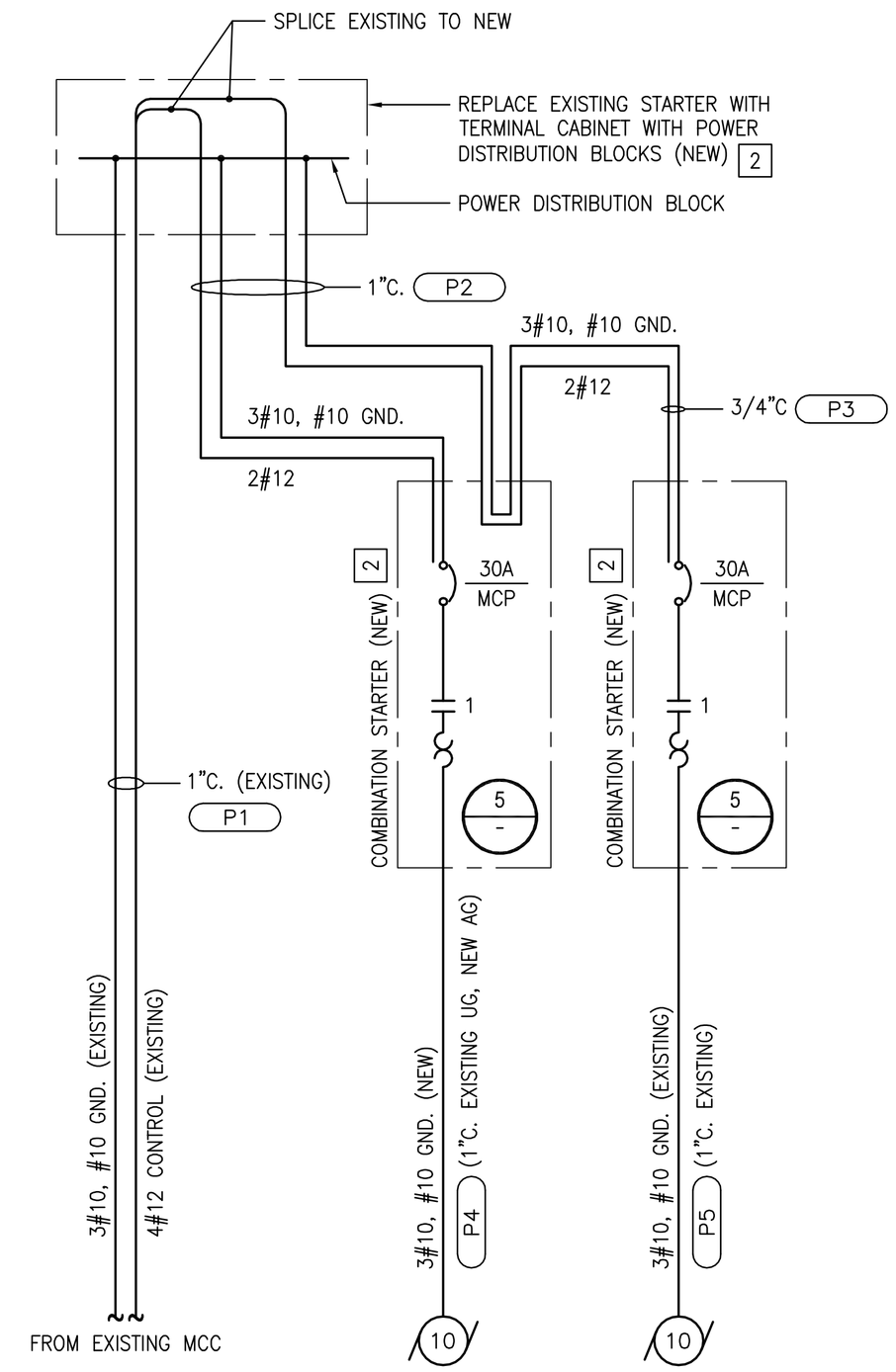
3

NOT TO SCALE



ODOR CONTROL PUMP SCHEMATIC DIAGRAM

5



SINGLE LINE DIAGRAM

4

NOTES:

1. REROUTE.
2. NEMA 4X ENCLOSURE.
3. DOOR MOUNTED.

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
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DESIGNED BY AH
DRAWN BY DD
CHECKED BY PT
DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

BOYLE engineering corporation
5851 Thille St. Suite 201
Ventura, California 93003
805-644-9704
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT
EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

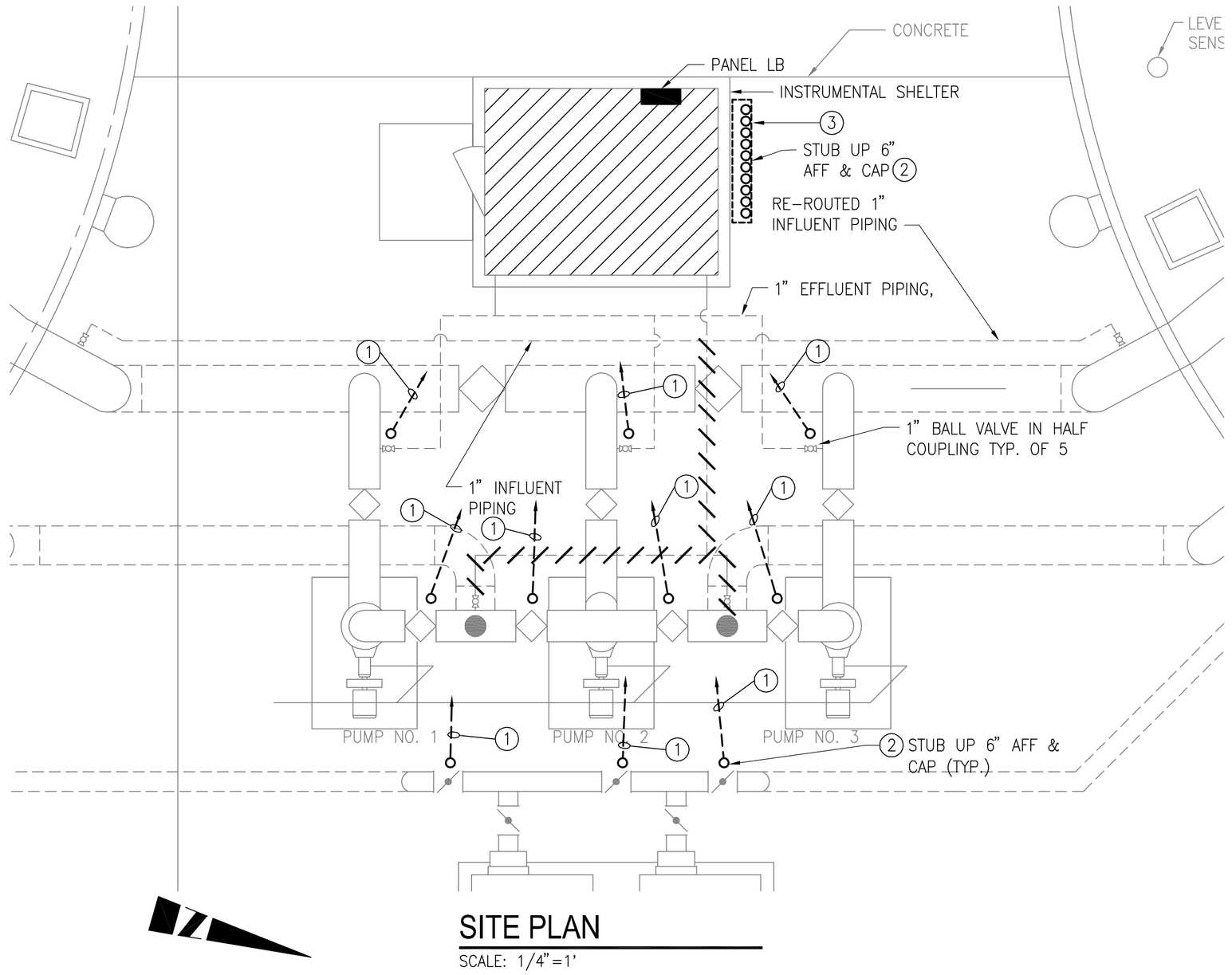
ELECTRICAL DETAILS

DRAWING E-10
SHEET 31 OF 32 SHEETS

June 23, 2008

DWG: F:\LVMWD\16817.00 - Tapia BNR\0202 - Centrate Treatment\CAD\AS BUILTS 10-16-09\E-10R1.dwg USER: dovlovl
DATE: Oct 13, 2009 10:27am XREFS: g-bd IMAGES: BlockoPanel.JPG ExistPanel.JPG FrontPanel.JPG LVMWD_COLOR.TIF TRIUNFO.TIF

Mar. 12 2009

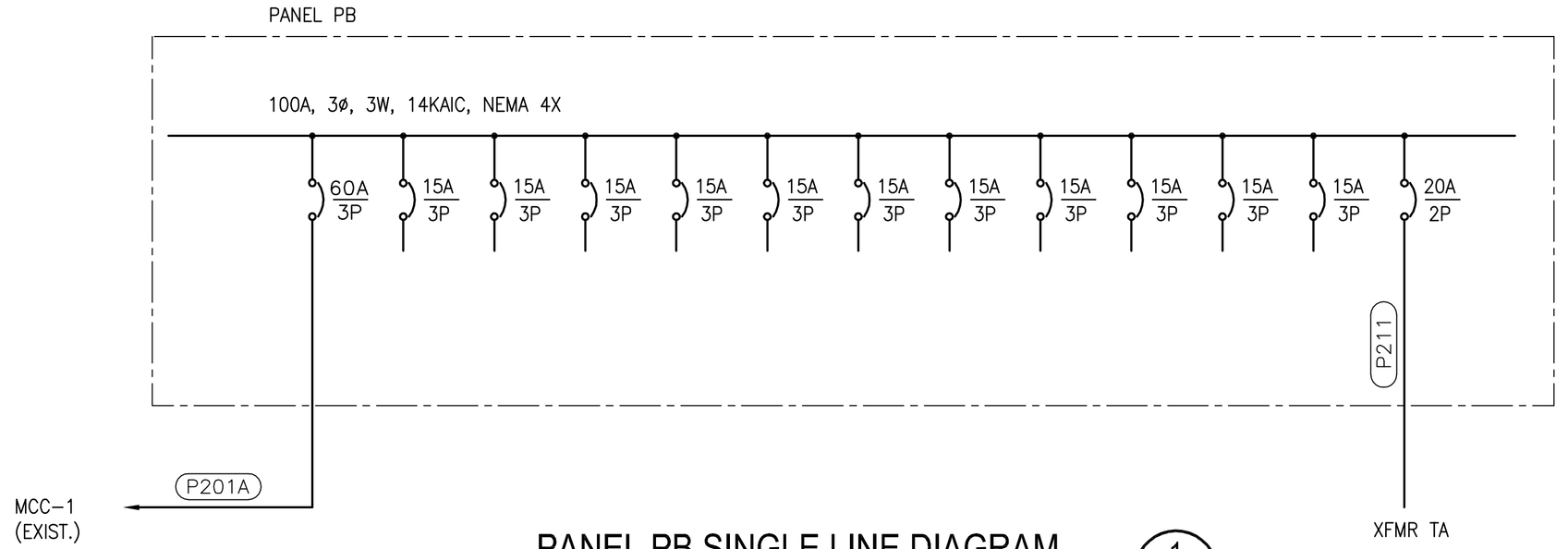


SITE PLAN

SCALE: 1/4"=1'

NOTES

1. 3/4" C RUN UNDERGROUND & STUB UP NEAR INSTRUMENT SHELTER. CONDUIT TO BE USED FOR FUTURE POWER & CONTROL WIRES (TYP).
2. STUBS ABOVE GRADE AND ASSOCIATED ELBOWS BELOW GRADE SHALL BE PVC COATED RIGID STEEL.
3. WIREWAY. SEE E-5



PANEL PB SINGLE LINE DIAGRAM

(SEE DWG. E-5 FOR LOCATION)

1

RECORD DRAWING

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REV	DESCRIPTION	APPR
1	10-16-09 AS BUILT	

VERIFY SCALES
BAR IS ONE INCH ON ORIGINAL DRAWING
IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY

DESIGNED BY
DRAWN BY
CHECKED BY
DATE 2/26/08

PROJECT ENGINEER PARSEKH L. TOPJIAN
REG NUMBER 012845 EXP DATE 9-30-08
PROJECT NUMBER 16817.00
CADD STANDARDS BOYLE

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5851 Thille St. Suite 201
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TRIUNFO SANITATION DISTRICT

LAS VIRGENES MUNICIPAL WATER DISTRICT EST. 1958

LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT

ELECTRICAL SITE PLAN

DRAWING E-11
SHEET 32 OF 32 SHEETS

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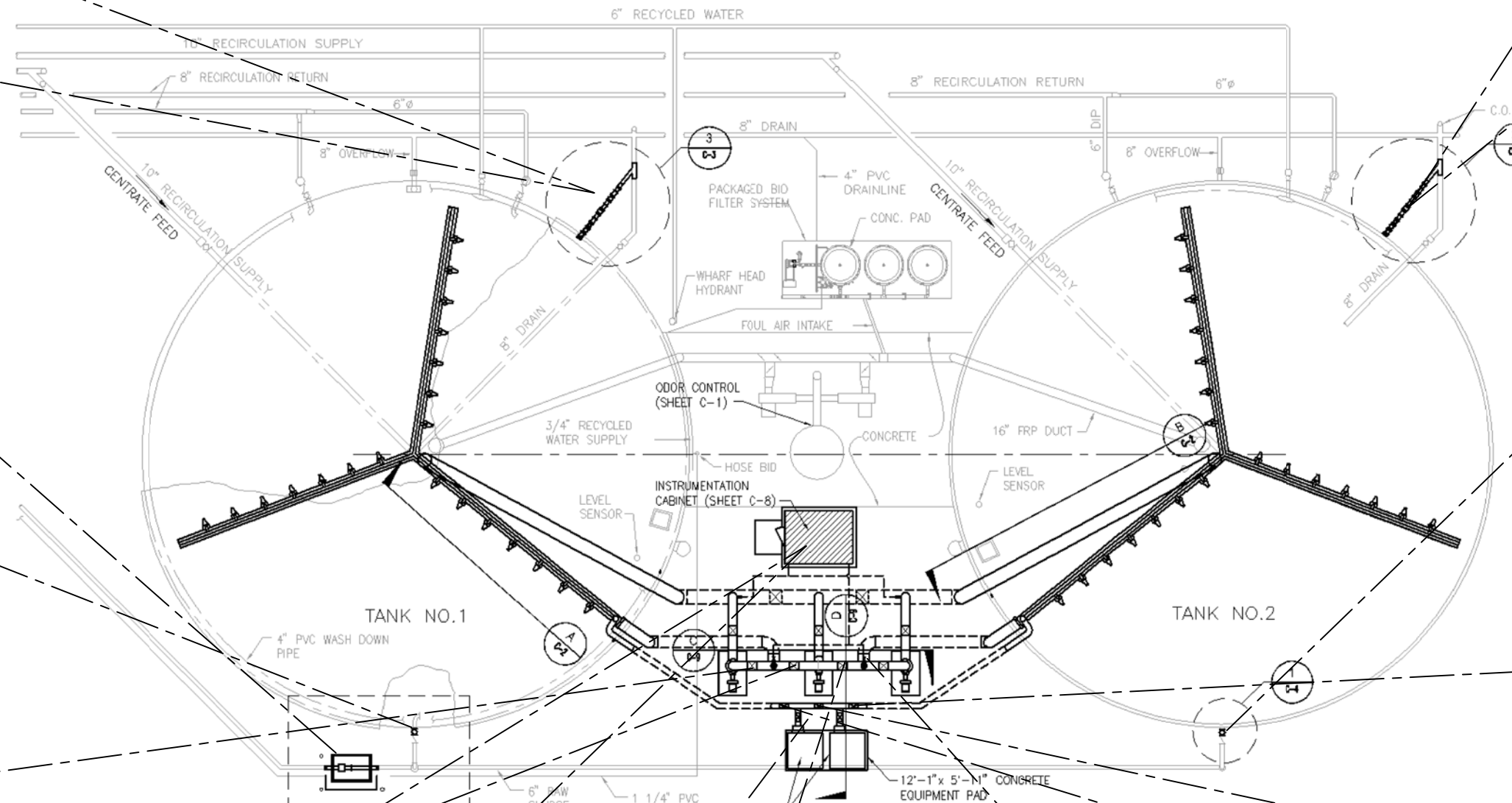
DATE: Oct 13, 2009 10:26am XREFS: g-bd TRIUNFO.TIF
IMAGES: LVMWD_COLOR.TIF PIPING



FIT 115 — TANK 1 CENTRATE FLOW [PLC-96: AI 30010]

YN 115 — TANK 1 CENTRATE FLOW TROUBLE [PLC-96: DI 10005]

YN 117 — TANK 1 CENTRATE VALVE REMOTE [PLC-96: DI 10013]

YN 117 A — TANK 1 CENTRATE VALVE OPEN LIMIT [PLC-96: DI 10014]

YN 117 B — TANK 1 CENTRATE VALVE CLOSE LIMIT [PLC-96: DI 10015]

ZC 117 — TANK 1 CENTRATE VALVE POSITION SETPOINT [PLC-96: AO 40001]

ZN 117 — TANK 1 CENTRATE VALVE POSITION FEEDBACK [PLC-96: AI 30011]

FIT 001 — SLUDGE FLOW [PLC-96: AI 30009]

YN 001 — SLUDGE FLOW TROUBLE [PLC-96: DI 10004]

YN 003 — FLOW METER VAULT FLOODED [PLC-96: DI 10003]

YN 111 — TANK 1 SLUDGE VALVE REMOTE [PLC-96: DI 10009]

YN 111 A — TANK 1 SLUDGE VALVE OPEN LIMIT [PLC-96: DI 10010]

YN 111 B — TANK 1 SLUDGE VALVE CLOSE LIMIT [PLC-96: DI 10011]

YC 111 A — TANK 1 SLUDGE VALVE OPEN CALL [PLC-96: DO 00001]

YC 111 B — TANK 1 SLUDGE VALVE CLOSE CALL [PLC-96: DO 00002]

YN 151 — MIXER VALVE 1 REMOTE [PLC-96: DI 10045]

YN 151 A — MIXER VALVE 1 OPEN LIMIT [PLC-96: DI 10046]

YN 151 B — MIXER VALVE 1 CLOSE LIMIT [PLC-96: DI 10047]

YC 151 — MIXER VALVE 1 OPEN CALL [PLC-96: DO 00013]

YN 152 — MIXER VALVE 2 REMOTE [PLC-96: DI 10049]

YN 152 A — MIXER VALVE 2 OPEN LIMIT [PLC-96: DI 10050]

YN 152 B — MIXER VALVE 2 CLOSE LIMIT [PLC-96: DI 10051]

YC 152 — MIXER VALVE 2 OPEN CALL [PLC-96: DO 00014]

AIT 401 A — CENTRATE PH [PLC-96: AI 30002]

AIT 401 B — CENTRATE TEMP [PLC-96: AI 30003]

AIT 402 — CENTRATE DISSOLVED OXYGEN [PLC-96: AI 30004]

AIT 403 — CENTRATE AMMONIA [PLC-96: AI 30005]

AIT 404 — CENTRATE ORP [PLC-96: AI 30007]

EN 911 — BATTER VOLTAGE [PLC-96: AI 30001]

YN 915 — SHACK SECURITY [PLC-96: DI 10001]

YN 913 — AC POWER OK [PLC-96: DI 10002]

AIT 404 — CENTRATE NITRATE [PLC-96: AI 30006]

FIT 400 — CENTRATE SAMPLE FLOW [PLC-96: AI 30008]

PIT 211 — BLOWER 1 PRESSURE [PLC-96: AI 30014]

PIT 221 — BLOWER 2 PRESSURE [PLC-96: AI 30015]

YN 153 — MIXER VALVE 3 REMOTE [PLC-96: DI 10053]

YN 153 A — MIXER VALVE 3 OPEN LIMIT [PLC-96: DI 10054]

YN 153 B — MIXER VALVE 3 CLOSE LIMIT [PLC-96: DI 10055]

YC 153 — MIXER VALVE 3 OPEN CALL [PLC-96: DO 00015]

YN 154 — MIXER VALVE 4 REMOTE [PLC-96: DI 10057]

YN 154 A — MIXER VALVE 4 OPEN LIMIT [PLC-96: DI 10058]

YN 154 B — MIXER VALVE 4 CLOSE LIMIT [PLC-96: DI 10059]

YC 154 — MIXER VALVE 4 OPEN CALL [PLC-96: DO 00016]

YN 141 — BLOWER VALVE 1 REMOTE [PLC-96: DI 10033]

YN 141 A — BLOWER VALVE 1 OPEN LIMIT [PLC-96: DI 10034]

YN 141 B — BLOWER VALVE 1 CLOSE LIMIT [PLC-96: DI 10035]

YC 141 — BLOWER VALVE 1 OPEN CALL [PLC-96: DO 00010]

YN 142 — BLOWER VALVE 2 REMOTE [PLC-96: DI 10037]

YN 142 A — BLOWER VALVE 2 OPEN LIMIT [PLC-96: DI 10038]

YN 142 B — BLOWER VALVE 2 CLOSE LIMIT [PLC-96: DI 10039]

YC 142 — BLOWER VALVE 2 OPEN CALL [PLC-96: DO 00011]

FIT 125 — TANK 2 CENTRATE FLOW [PLC-96: AI 30012]

YN 125 — TANK 2 CENTRATE FLOW TROUBLE [PLC-96: DI 10006]

YN 127 — TANK 2 CENTRATE VALVE REMOTE [PLC-96: DI 10021]

YN 127 A — TANK 2 CENTRATE VALVE OPEN LIMIT [PLC-96: DI 10022]

YN 127 B — TANK 2 CENTRATE VALVE CLOSE LIMIT [PLC-96: DI 10023]

ZC 127 — TANK 2 CENTRATE VALVE POSITION SETPOINT [PLC-96: AO 40002]

ZN 127 — TANK 2 CENTRATE VALVE POSITION FEEDBACK [PLC-96: AI 30013]

YN 121 — TANK 2 SLUDGE VALVE REMOTE [PLC-96: DI 10017]

YN 121 A — TANK 2 SLUDGE VALVE OPEN LIMIT [PLC-96: DI 10018]

YN 121 B — TANK 2 SLUDGE VALVE CLOSE LIMIT [PLC-96: DI 10019]

YC 121 A — TANK 2 SLUDGE VALVE OPEN CALL [PLC-96: DO 00003]

YC 121 B — TANK 2 SLUDGE VALVE CLOSE CALL [PLC-96: DO 00004]

YN 143 — BLOWER VALVE 3 REMOTE [PLC-96: DI 10041]

YN 143 A — BLOWER VALVE 3 OPEN LIMIT [PLC-96: DI 10042]

YN 143 B — BLOWER VALVE 3 CLOSE LIMIT [PLC-96: DI 10043]

YC 143 — BLOWER VALVE 3 OPEN CALL [PLC-96: DO 00012]

REGISTERED PROFESSIONAL ENGINEER — LLOYD TRI OF — No. E014247 EXP. 06/30/2009 — ELECTRICAL — STATE OF CALIFORNIA

SCALES ARE APPROXIMATE, USE AS GUIDELINE ONLY.
0 1/2 1 2 3 4
GRAPHIC SCALE — FULL INCHES ON ORIGINAL

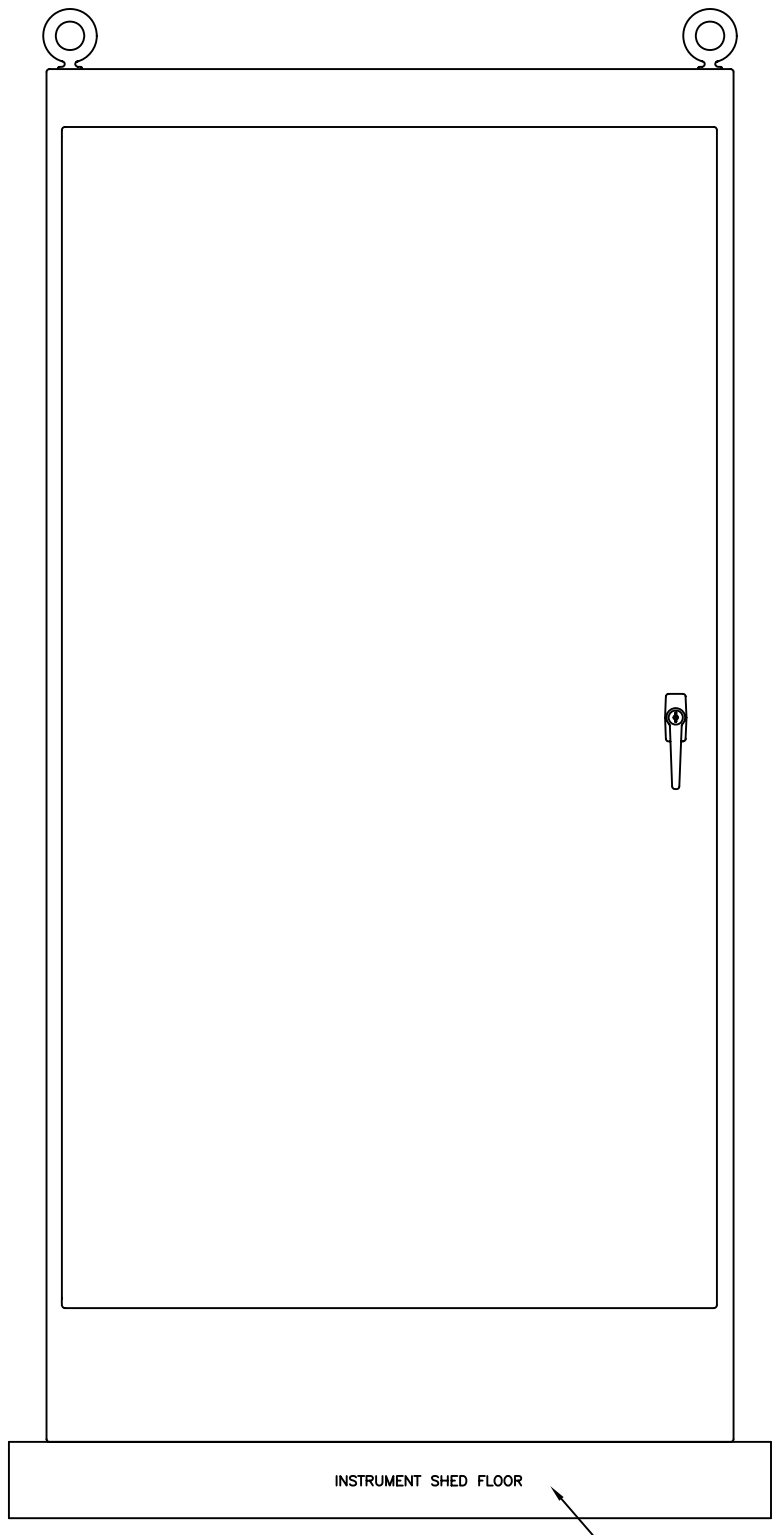
MSO 10/2009 1291-021

MSO
17752 Mitchell, Suite E
Irvine, CA 92614 PH. (949) 250-8668
2985 East Hillcrest Drive, Suite 101
Thousand Oaks, CA 91362 PH. (805) 379-8668

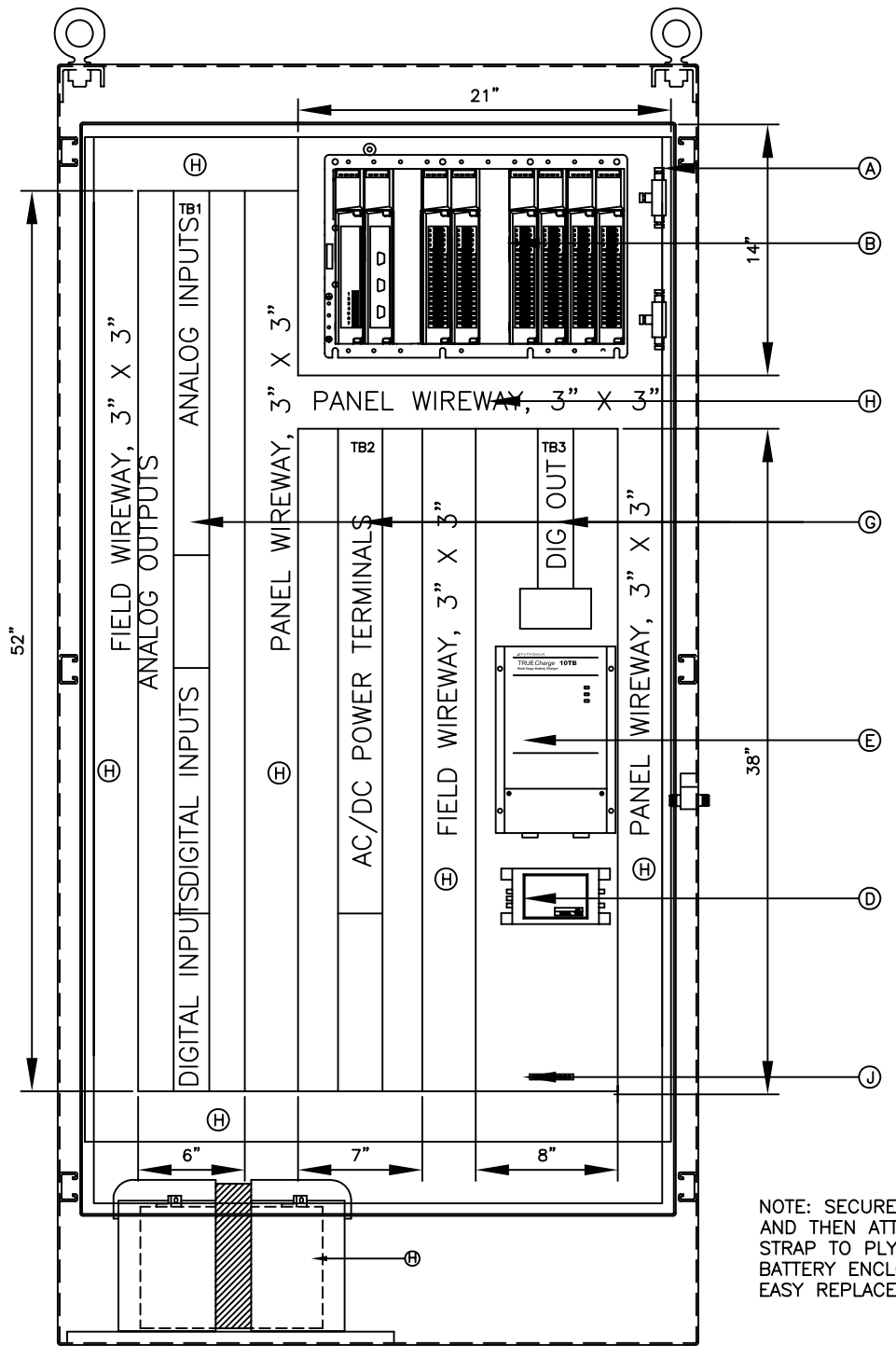
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
TANK EQUIPMENT LOCATION DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 1 OF 12
DRAWING No. 1291-21
JOB No. 1291
SCALE: NTS
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL



NOTE: CREATE A 42" X 27" X 4" HOUSEKEEPING PAD FOR PLC ENCLOSURE. USE 2000 PSI CONCRETE AND #4 REBARS AT 6" INTERVALS.



NOTE: SECURE 3/4" PLYWOOD TO BASE AND THEN ATTACH BATTERY ENCLOSURE STRAP TO PLYWOOD TO SECURELY HOLD BATTERY ENCLOSURE IN PLACE AND ALLOW EASY REPLACEMENT OF BATTERY.

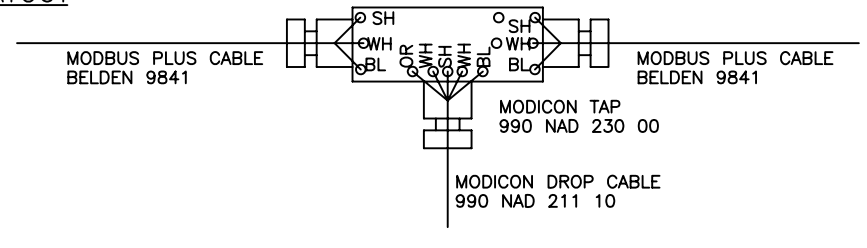
ENCLOSURE LAYOUT

RANCHO CENTRATE TANKS PANEL PARTS LIST			
ITEM	QUANTITY	DESCRIPTION	MANUFACTURER, PART NUMBER
A	1	NEMA 4/12 ENCLOSURE, 72"X36"X24"	HOFFMAN A-723624FS
	1	ENCLOSURE BACK PLATE	HOFFMAN A-7236F1
B	1	PROGRAMMABLE LOGIC CONTROLLER	MODICON 140 CPU 434 12A
	1	TEN SLOT BACKPLANE	MODICON 140 XBP 010 00
	1	POWER SUPPLY 24 VDC, 8 AMP	MODICON 140 CPS 224 00
	2	DIGITAL INPUT MODULE, 24 VDC	MODICON 140 DDI 353 00
	1	RELAY OUTPUT MODULE, 24 VDC	MODICON 140 DRA 840 00
	2	ANALOG INPUT MODULE, 8 PT.	MODICON 140 AVI 030 00
	1	ANALOG OUTPUT MODULE, 8 PT.	MODICON 140 ACO 040 00
	6	MODULE TERMINAL STRIP, 40 PT	MODICON 140 XTS 002 00
	2	MODBUS PLUS TAP	MODICON 990 NAD 230 00
	2	MODICON DROP CABLE	MODICON 990 NAD 211 10
C	1	POWER SUPPLY, 24 VDC, 120W	IDEC PS5R-SF24
D	1	DC/DC CONVERTER 12/24 VDC, 100W	VICOR VI-LO3-CW
E	1	BATTERY CHARGER, 12 VDC	XANTREX, TRUECHARGE 10TB
F	1	BATTERY, 12 VDC, 75 AMP HOUR	C&D MPS-12-75
	1	BATTERY CASE W/ HOLD DOWN STRAP	
	2	BATTERY CONNECTORS	MCMASTER-CARR 7043K21
G	45	FUSE TERMINALS	ALLEN BRADLEY 1492-H6
	3	FUSE TERMINALS END PLATES	ALLEN BRADLEY 1492-37
	5	FUSE TERMINALS JUMPER BARS	ALLEN BRADLEY 1492-N49, SJS
	260	FEED THRU TERMINALS	ALLEN BRADLEY 1492-J3
	6	FEED THRU TERMINALS ENDPLATES	ALLEN BRADLEY 1492-EBJ3
	9	FEED THRU TERMINALS JUMPER BARS	ALLEN BRADLEY 1492-CJJ510
	32	FEED THRU TERMINALS JUMPER BARS	ALLEN BRADLEY 1492-CJJ52
	24	DISCONNECT TERMINALS	ALLEN BRADLEY 1492-JKD3
	30	GROUND TERMINALS	ALLEN BRADLEY 1492-JG3
	6	TERMINAL STRIP END BARRIER	ALLEN BRADLEY 1492-ERL35
	3	TERMINAL STRIP	WEIDMULLER
	24	TERMINAL STRIP SUPPORTS	WEIDMULLER 49492
	4	TERMINAL MARKER CARDS	ALLEN BRADLEY 1492- J SERIES
	50	AGC FUSES, 1A, 2A, 5A, 10A	
H	1	WIREWAY 3"X3"X6', WHITE	TAYLOR HIGH DENISTY
	1	WIREWAY COVER, 3"X6', WHITE	TAYLOR HIGH DENISTY
J	1	GROUND BAR	
K	15	PRECISION RESISTORS, 250 OHM 3 WATT	VISHAY DALE RS-2B 250
	1	PRECISION RESISTORS, 30K OHM 3 WATT	VISHAY DALE RS-2B 30K
	1	PRECISION RESISTORS, 10K OHM 3 WATT	VISHAY DALE RS-2B 10K
L	AS REQ'D	FERRULES, 18 AWG	FERRULESDIRECT.COM

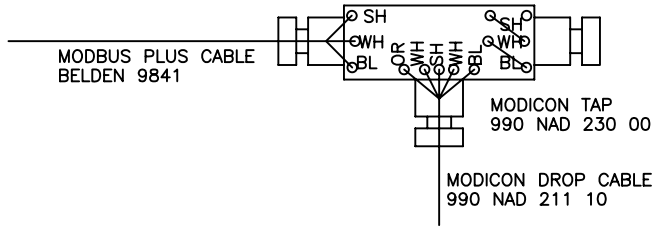
PANEL CONSTRUCTION NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL INTERIOR CONTROL PANEL WIRING (SHOWN SOLID) SHALL BE #18 AWG THHN OR HW, COLOR AS INDICATED.
2. ALL FIELD WIRING (SHOWN IN DASHED LINES) SHALL BE #14 AWG w/ TYPE THHN/THWN INSULATION, COLOR AS INDICATED, UNLESS SIZE INDICATED.
3. ALL WIRES UNDER 12 AWG SHALL USE WIRE FERRULES IN PANEL TERMINAL WHERE APPROPRIATE.
4. ALL WIRES SHALL HAVE HEAT SHRINK WIRE LABELS AS INDICATED; BRADY PS-187-150W.
5. ALL WIRES SHALL HAVE LABELS ON BOTH ENDS OF THE WIRE AS SHOWN ON THE DRAWINGS.
6. TERMINAL SUPPORTS SHALL BE PLACED AT 8" INTERVALS FOR ALL TERMINAL RAILS.
7. ALL EQUIPMENT, TERMINAL RAILS, AND WIRE DUCT SHALL BE MOUNTED WITH 10-32 SCREWS TO THE BACK PLATE WILL BE DRILLED AND TAPPED FOR THE SCREWS.
8. NO SELF TAPPING SCREWS SHALL BE ALLOWED FOR ANY MOUNTING.
9. MOUNT A CHART FOR FUSE SIZE AND FUNCTION ON INSIDE OF PANEL.
10. AFTER PANEL IS COMPLETED CONSTRUCTION, A FACTORY INSPECTION WILL BE PERFORMED AT THE CONTRACTORS SITE TO TEST ALL FUNCTIONS OF THE PANELS OPERATION.

SPARE PARTS LIST			
ITEM	QUANTITY	DESCRIPTION	MANUFACTURER, PART NUMBER
A	1	PROGRAMMABLE LOGIC CONTROLLER	MODICON 140 CPU 434 12A
	1	POWER SUPPLY 24 VDC, 8 AMP	MODICON 140 CPS 224 00
	1	DIGITAL INPUT MODULE, 24 VDC	MODICON 140 DDI 353 00
	1	RELAY OUTPUT MODULE, 24 VDC	MODICON 140 DRA 840 00
	1	ANALOG INPUT MODULE, 8 PT.	MODICON 140 AVI 030 00
	1	ANALOG OUTPUT MODULE, 8 PT.	MODICON 140 ACO 040 00
	1	ANALOG INPUT/OUTPUT MODULE BASE	MODICON 170 AMM 090 00
	1	COMMUNICATIONS CARD	MODICON 170 PNT 111 20
B	1	POWER SUPPLY, 24 VDC, 120W	IDEC PS5R-SF24
C	1	DC/DC CONVERTER 12/24 VDC, 100W	VICOR VI-LO3-CW
D	1	BATTERY CHARGER, 12 VDC	XANTREX, TRUECHARGE 10TB



MODBUS PLUS INLINE TAP WIRING SCHEMATIC



MODBUS PLUS TERMINATOR TAP WIRING SCHEMATIC

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRT OF
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-022
MSO 10/2009

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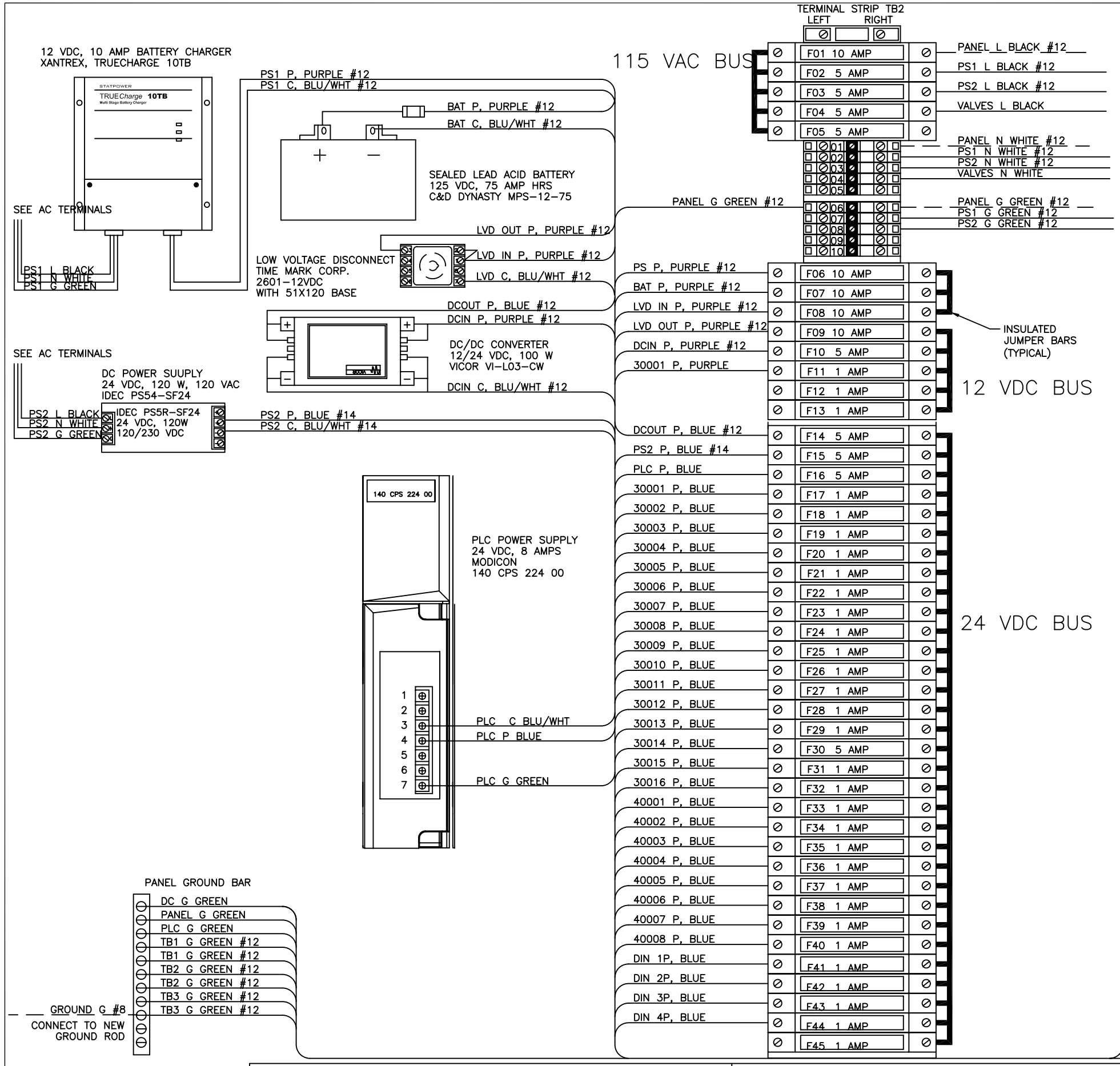
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-2) PANEL LAYOUT, PARTS LIST, AND COMMUNICATION SCHEMATIC

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 2 OF 12
DRAWING No. 1291-022
JOB No. 1291
SCALE: 1" = 5"
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL



TERMINAL BLOCK TYPES AND PART NUMBERS LEGEND

FRONT VIEW	PART NUMBER	MANUFACTURER	DESCRIPTION
	996497	WEIDMULLER	SLOTTED ASSEMBLY RAIL, 35mm
	1492-J3	ALLEN BRADLEY	FEED-THROUGH TERMINAL BLOCK
	1492-EBJ3	ALLEN BRADLEY	END SECTION FOR FEED THROUGH TERMINAL
	1492-CJJ5-10	ALLEN BRADLEY	JUMPER BAR - 10 BLOCKS
	1492-JD3	ALLEN BRADLEY	DOUBLE LEVEL FEED-THROUGH TERMINAL BLOCK
	1492-EBJD3	ALLEN BRADLEY	END SECTION FOR DOUBLE LEVEL FEED THROUGH
	1492-H6	ALLEN BRADLEY	FUSE HOLDER TERMINAL BLOCK 1 1/4" X 1/4" FUSE
	1492-N37	ALLEN BRADLEY	
	1492-SJS	ALLEN BRADLEY	JUMPER BAR - 10 BLOCKS
	1492-JKD3	ALLEN BRADLEY	DISCONNECT SWITCH TERMINAL BLOCK
	1492-JG3	ALLEN BRADLEY	GROUND TO RAIL TERMINAL BLOCK
	1492-ERL35	ALLEN BRADLEY	END BRACKET
	EGU 4/24 45946	WEIDMULLER	SURGE PROTECTION TERMINAL BLOCK
	049492	WEIDMULLER	TO SUPPORT TERMINAL RAIL AND ISOLATE TERMINAL STRIP FROM PANEL BACKPLATE MOUNT UNDER TERMINAL RAIL AT 8" INTERVALS

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-023
MSO 02/2008

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT
PLC (ICP-2) PANEL POWER DISTRIBUTION WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 3 OF 12
DRAWING No. 1291-023
JOB No. 1291
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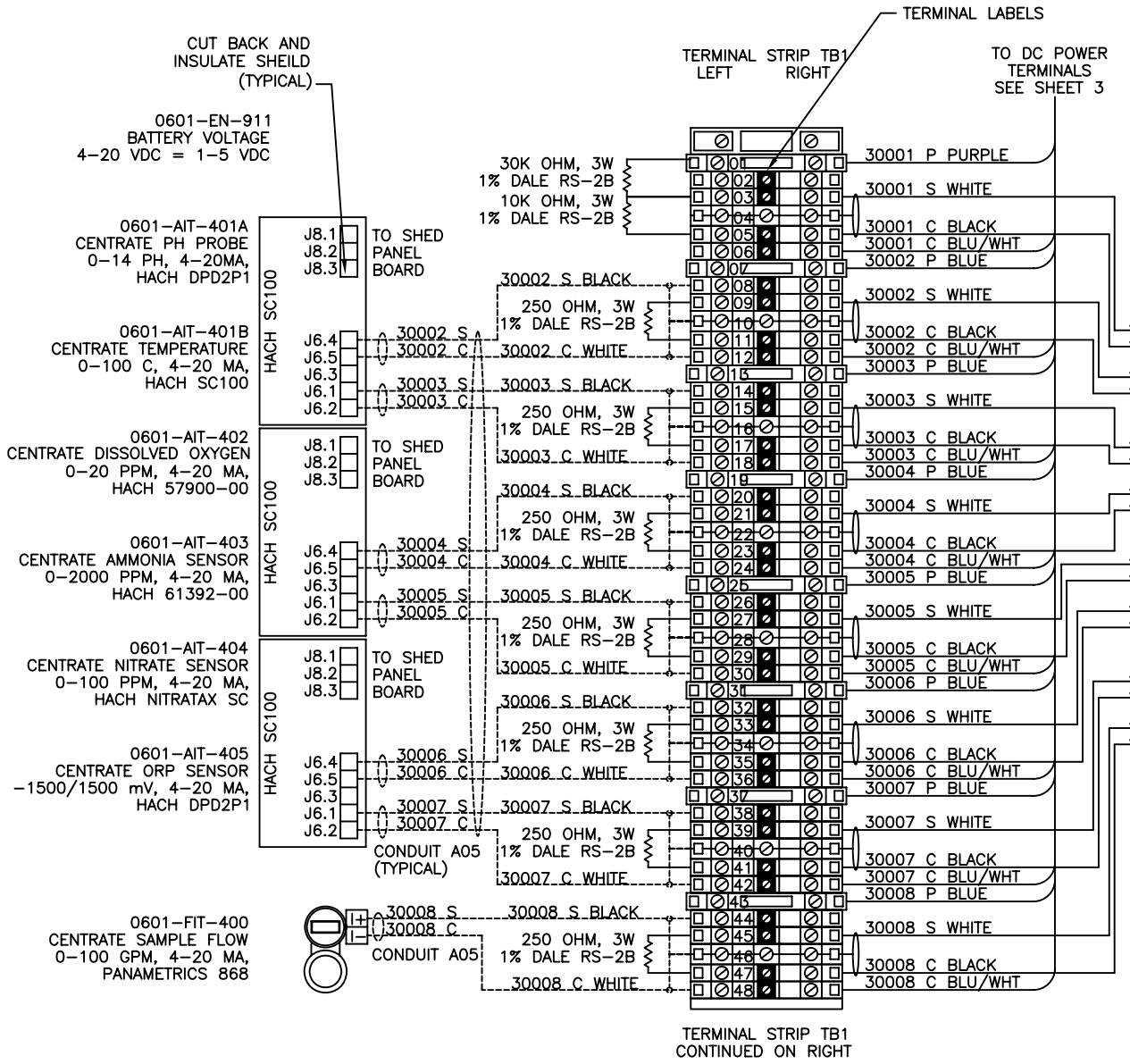

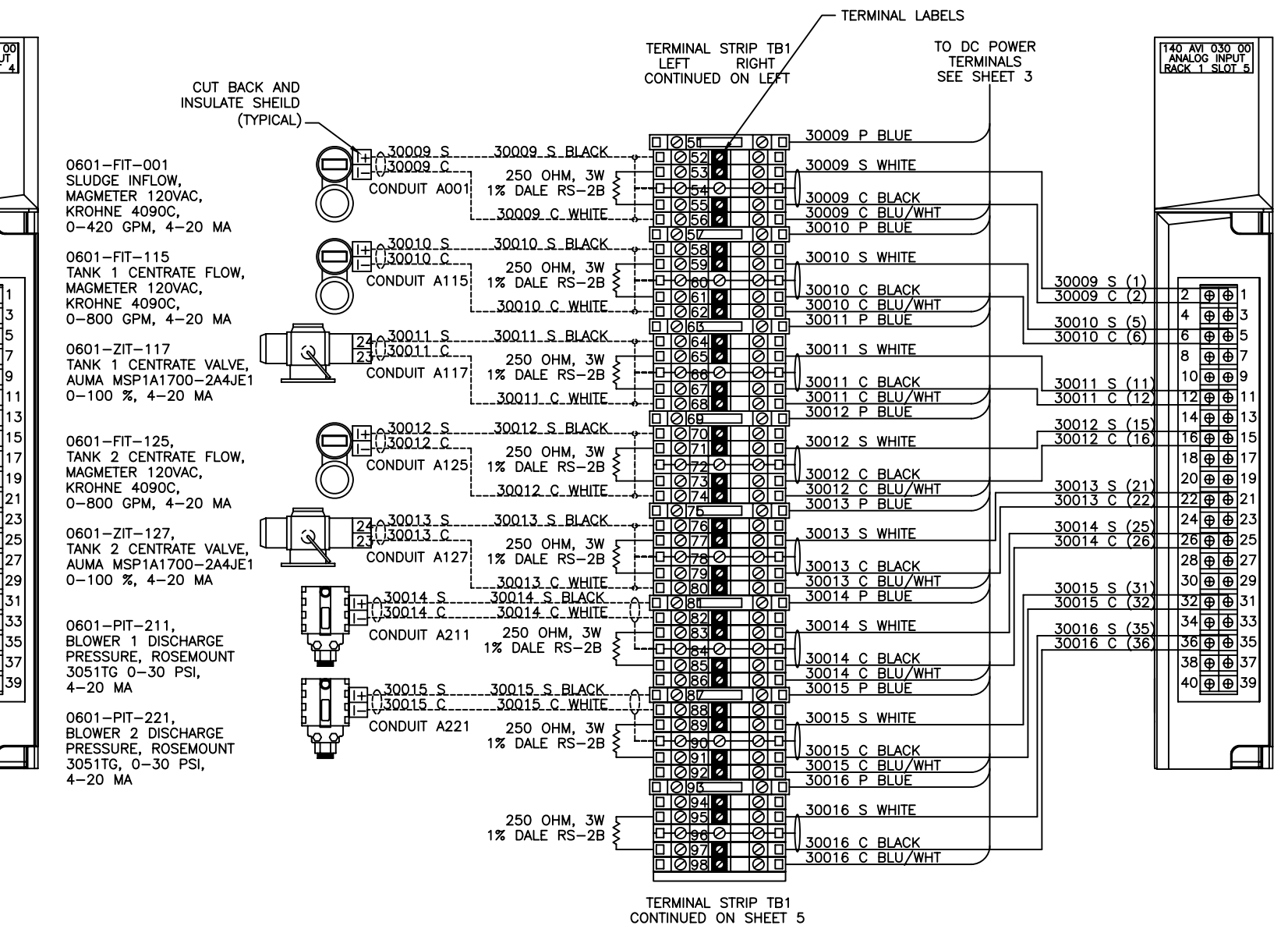

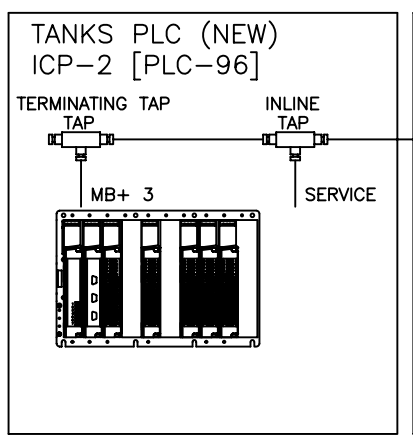

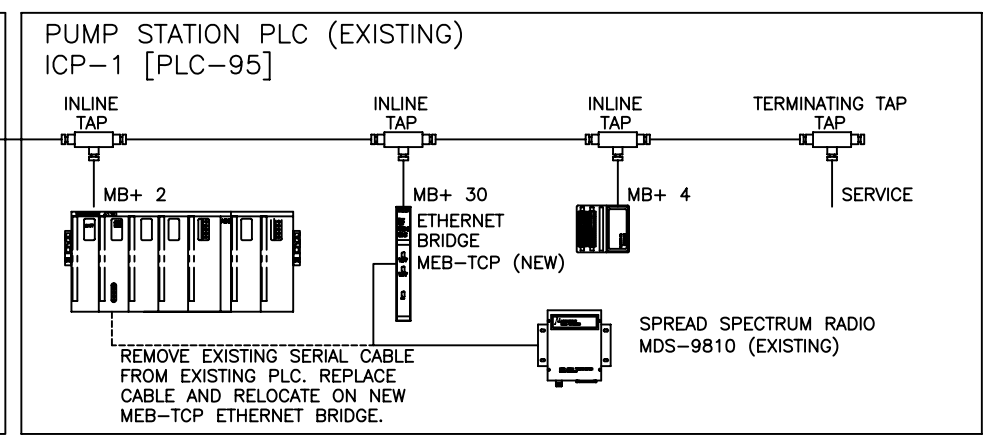

COMMUNICATIONS SCHEMATIC (MODBUS PLUS)

REGISTERED PROFESSIONAL ENGINEER LLOYD TRTOK No. E014247 EXP. 06/30/2009 ELECTRICAL STATE OF CALIFORNIA

1291-024 MSO 10/2009

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-2) PANEL ANALOG INPUT AND COMMUNICATION WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 4 OF 12
DRAWING No. 1291-024
JOB No. 1291
SCALE: FULL SIZE
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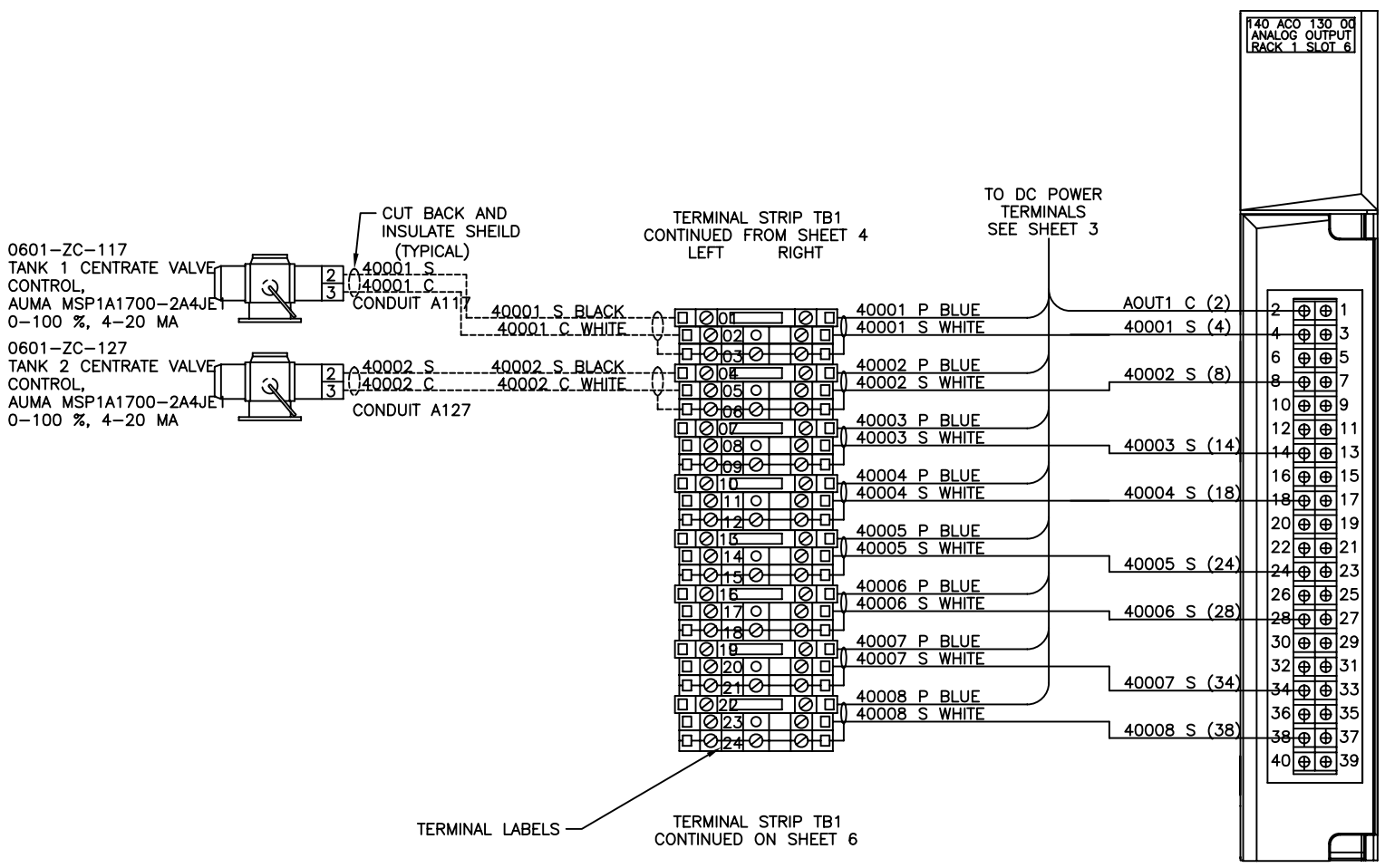
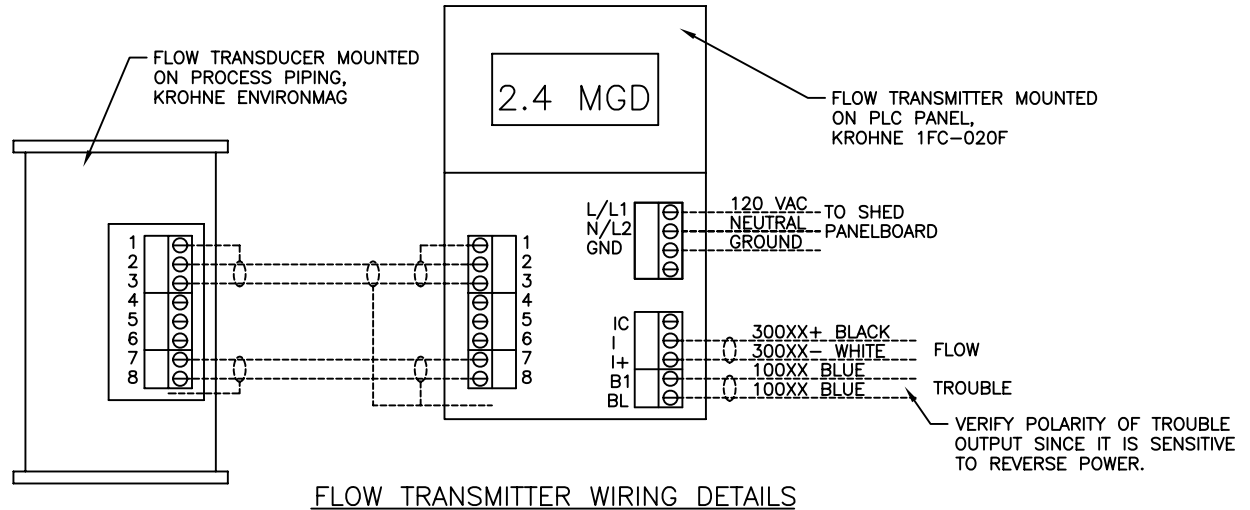
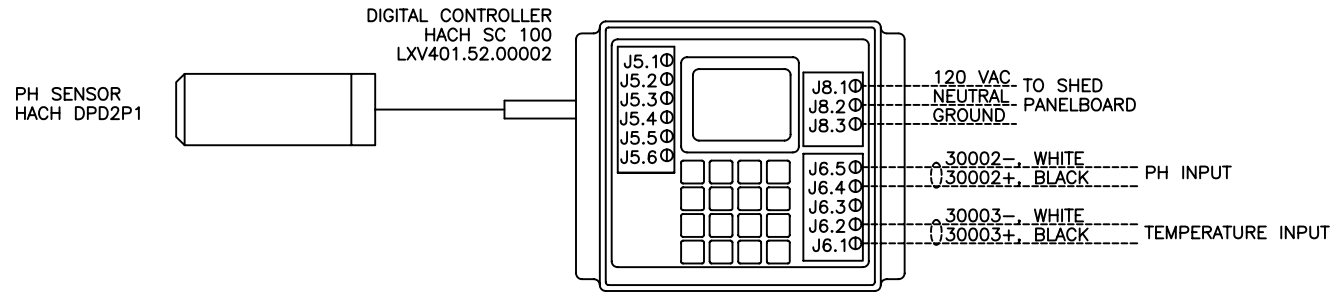
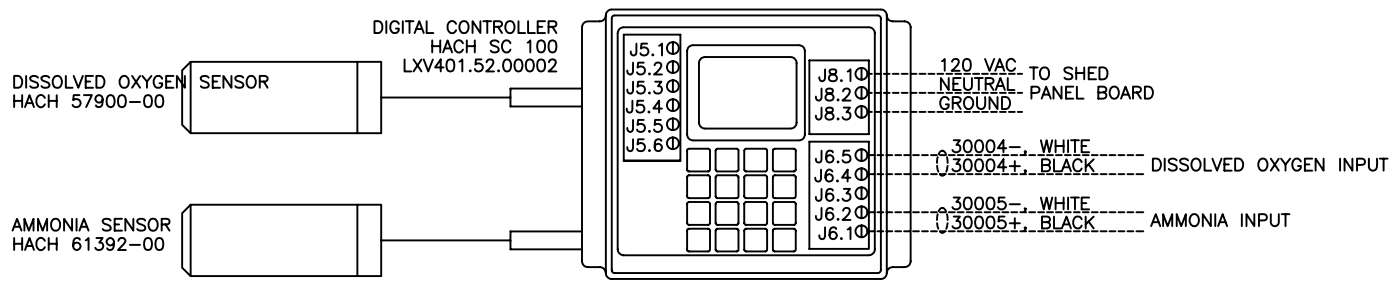




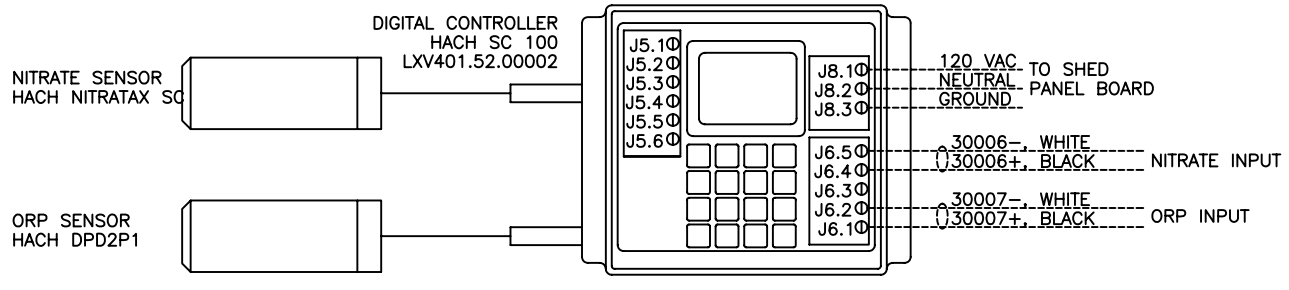
FLOW TRANSMITTER WIRING DETAILS



PH/TEMP TRANSMITTER WIRING DETAILS



DISSOLVED OXYGEN/NH3 TRANSMITTER WIRING DETAILS



DISSOLVED NITRATE/ORP TRANSMITTER WIRING DETAILS

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. E014247
EXP. 06/30/2009
ELECTRICAL
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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-2) PANEL ANALOG OUTPUT
WIRING DETAILS AND SCHEMATICS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
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SHEET 5 OF 12
DRAWING No. 1291-025
JOB No. 1291
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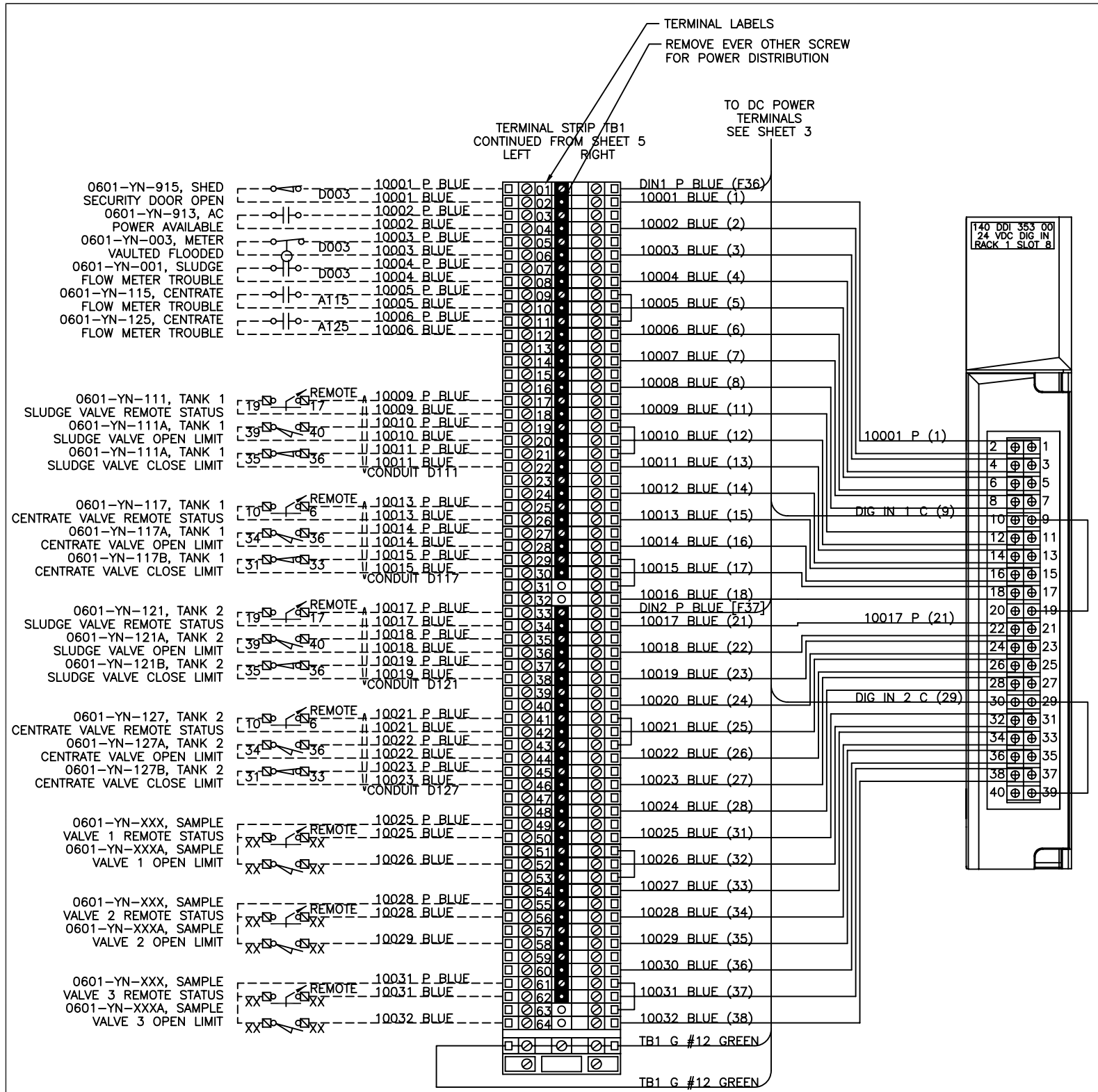

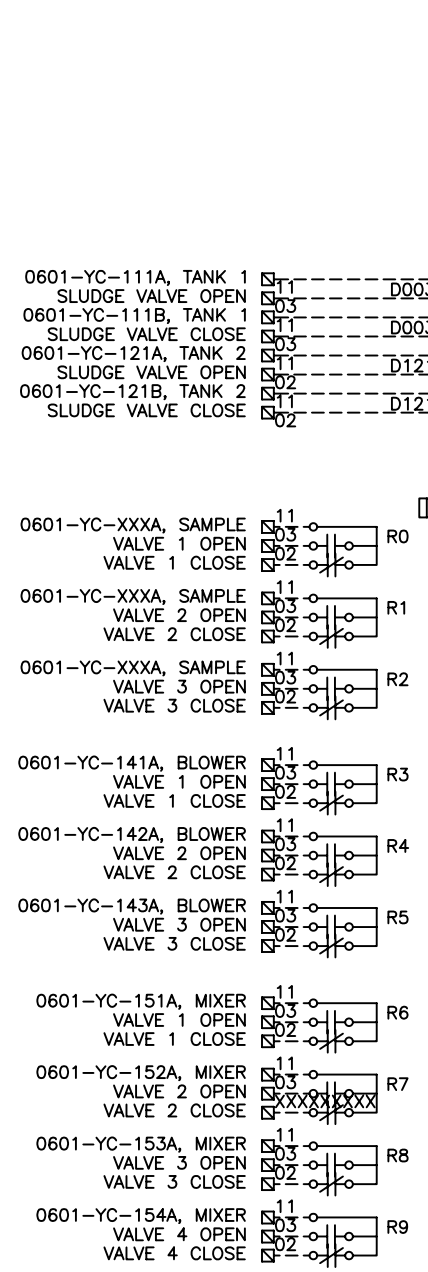

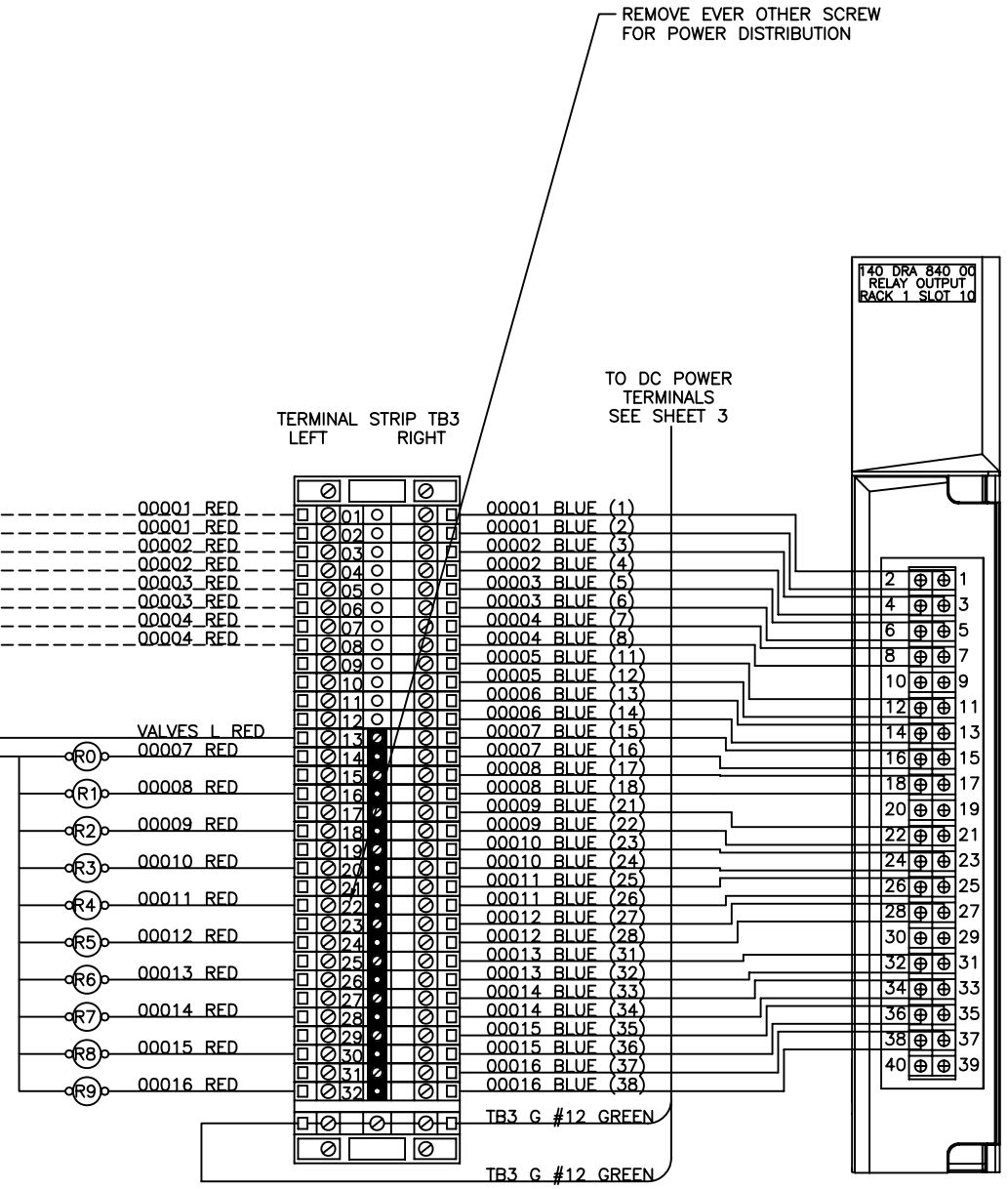

CONSTRUCTION NOTES:
FURNISH AND SUPPLY 10 SPDT RELAYS, 120 VAC COIL, 5 AMP CONTACTS AND INSTALL BELOW OUTPUT TERMINALS.

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICE
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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-2) PANEL DIGITAL INPUT AND OUTPUT WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 6 OF 12
DRAWING No. 1291-026
JOB No. 1291
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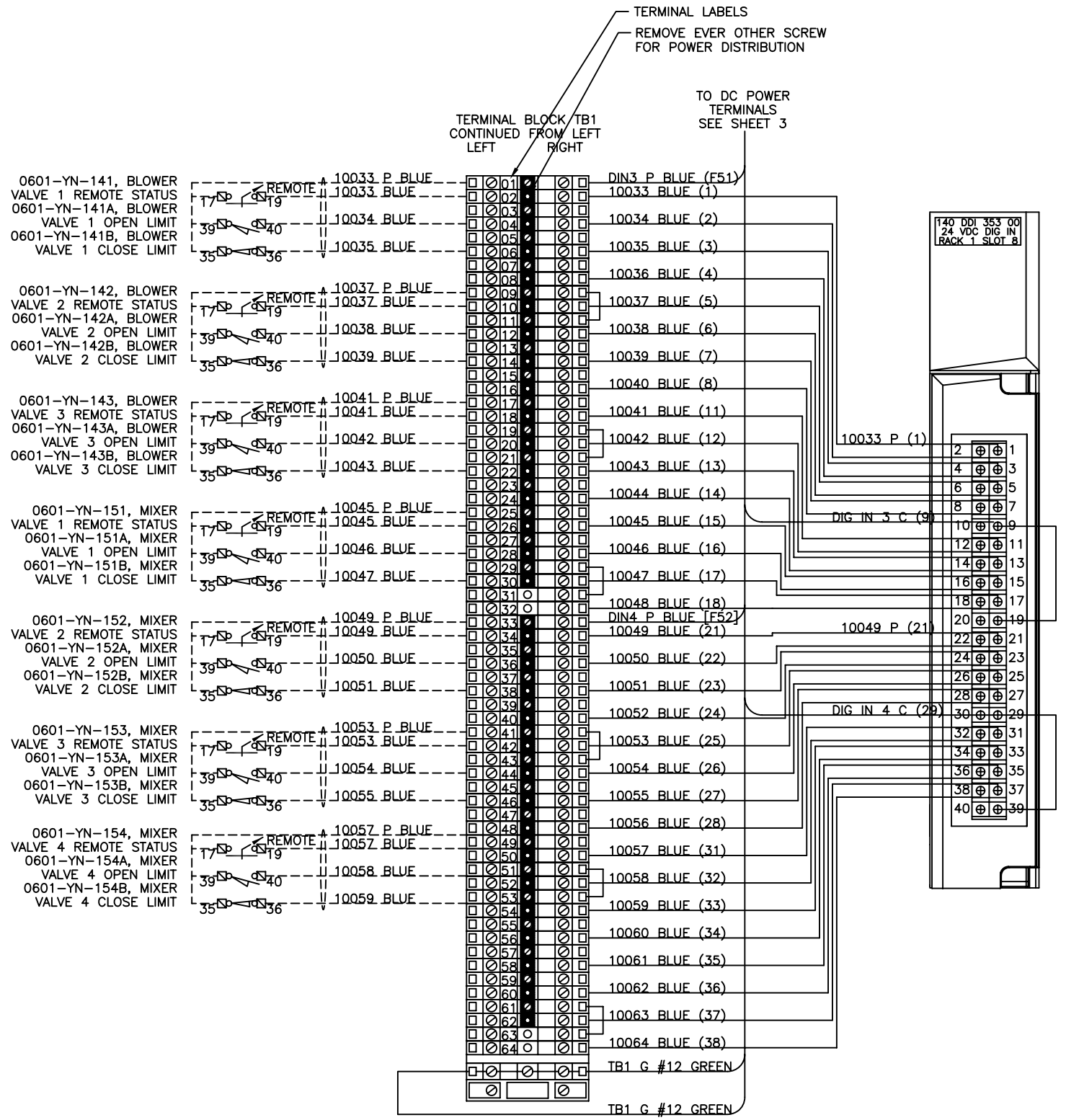

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LLOYD TRICE
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EXP. 06/30/2009
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STATE OF CALIFORNIA

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-2) PANEL DIGITAL INPUT AND OUTPUT WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 6a OF 12
DRAWING No. 1291-026
JOB No. 1291
SCALE: FULL SIZE
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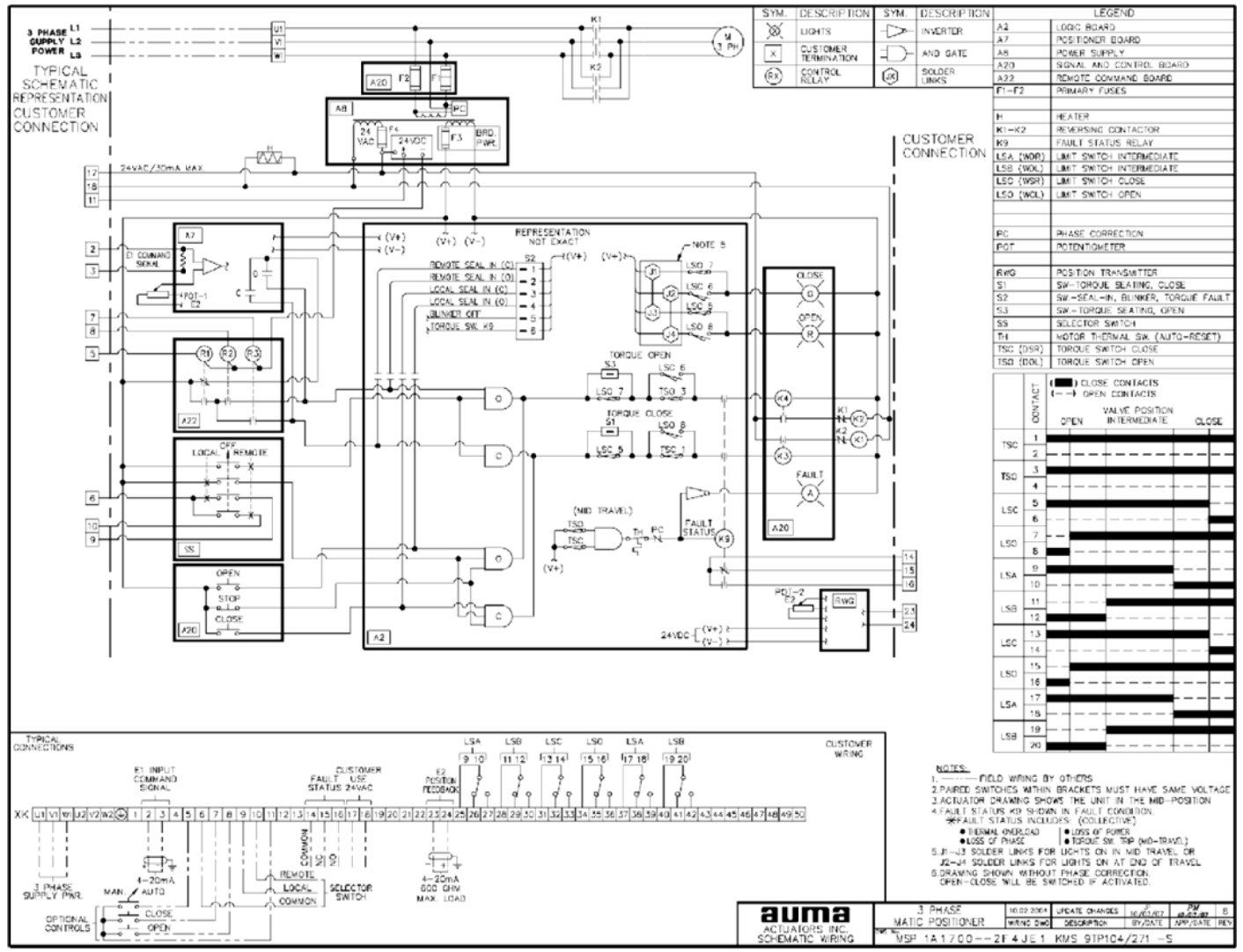

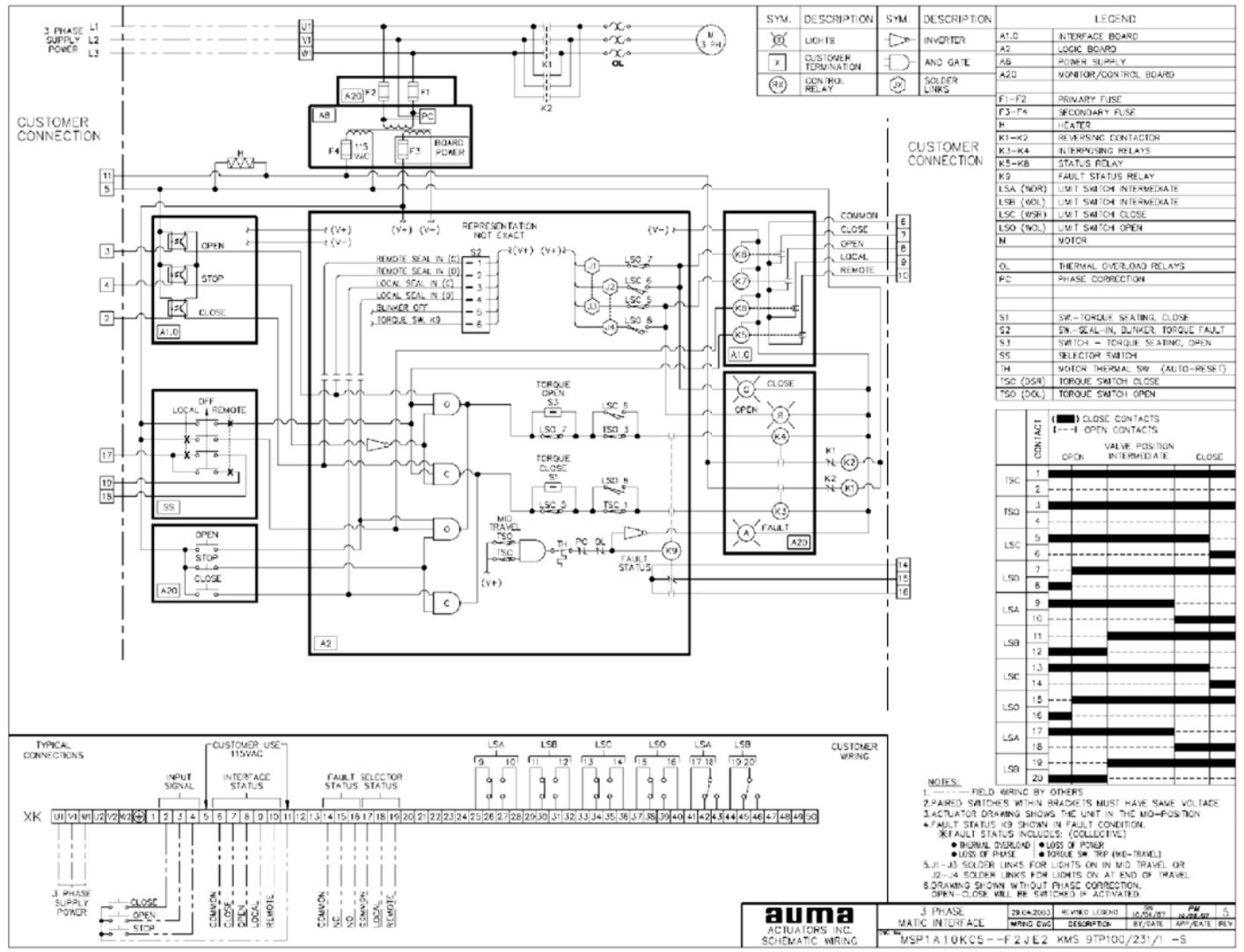

MODULATING VALVE WIRING SCHEMATIC

TYPICAL FOR VALVES 0601-YN-117 (TANK 1 OUTLET)
AND 0601-YN-127 (TANK 2 OUTLET)

OPEN/CLOSE VALVE WIRING SCHEMATIC

TYPICAL FOR VALVES 0601-YN-111 (TANK 1 SLUDGE)
AND 0601-YN-121 (TANK 2 SLUDGE)
AUMA #MSP1A10KCS--F2JE2 KMS-9TP100/231/1-S

TYPICAL FOR VALVES BLOWER ISOLATION VALVES (0601-YN-141 TO 0601-YN-143)
AND MIXER ISOALTION VALVES (0601-YN-151 TO 0601-YN-154)
AUMA #MSP1A10KCS--F2JEQ KMS-9TP100/201-S

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRTOK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-026
10/2008/2008

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT
VALVE WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
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SHEET 6B OF 12
DRAWING No. 1291-026
JOB No. 1291
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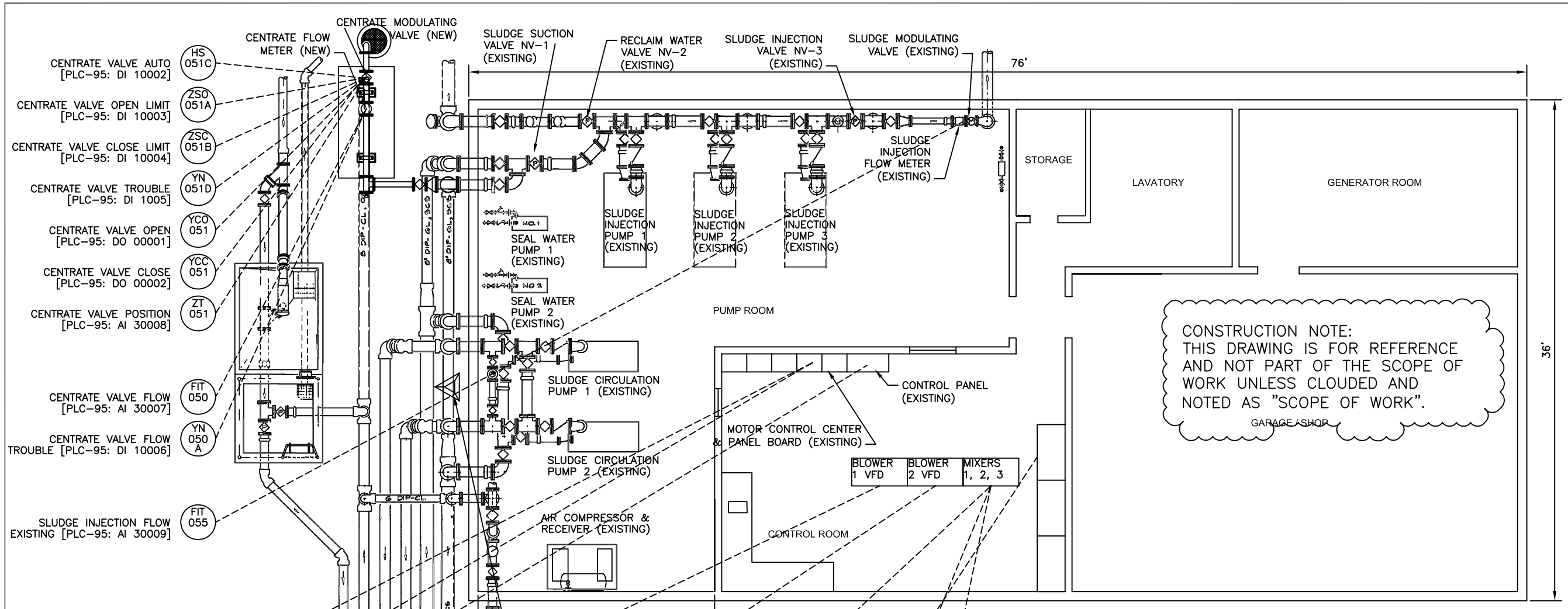

RANCHO FARM INJECTION PUMP STATION PLAN VIEW

SCALE :NTS

RANCHO FARM STORAGE TANKS PLAN VIEW

SCALE :NTS

REGISTERED PROFESSIONAL ENGINEER — LLOYD TRTOK — No. E014247 — EXP. 06/30/2009 — ELECTRICAL — STATE OF CALIFORNIA

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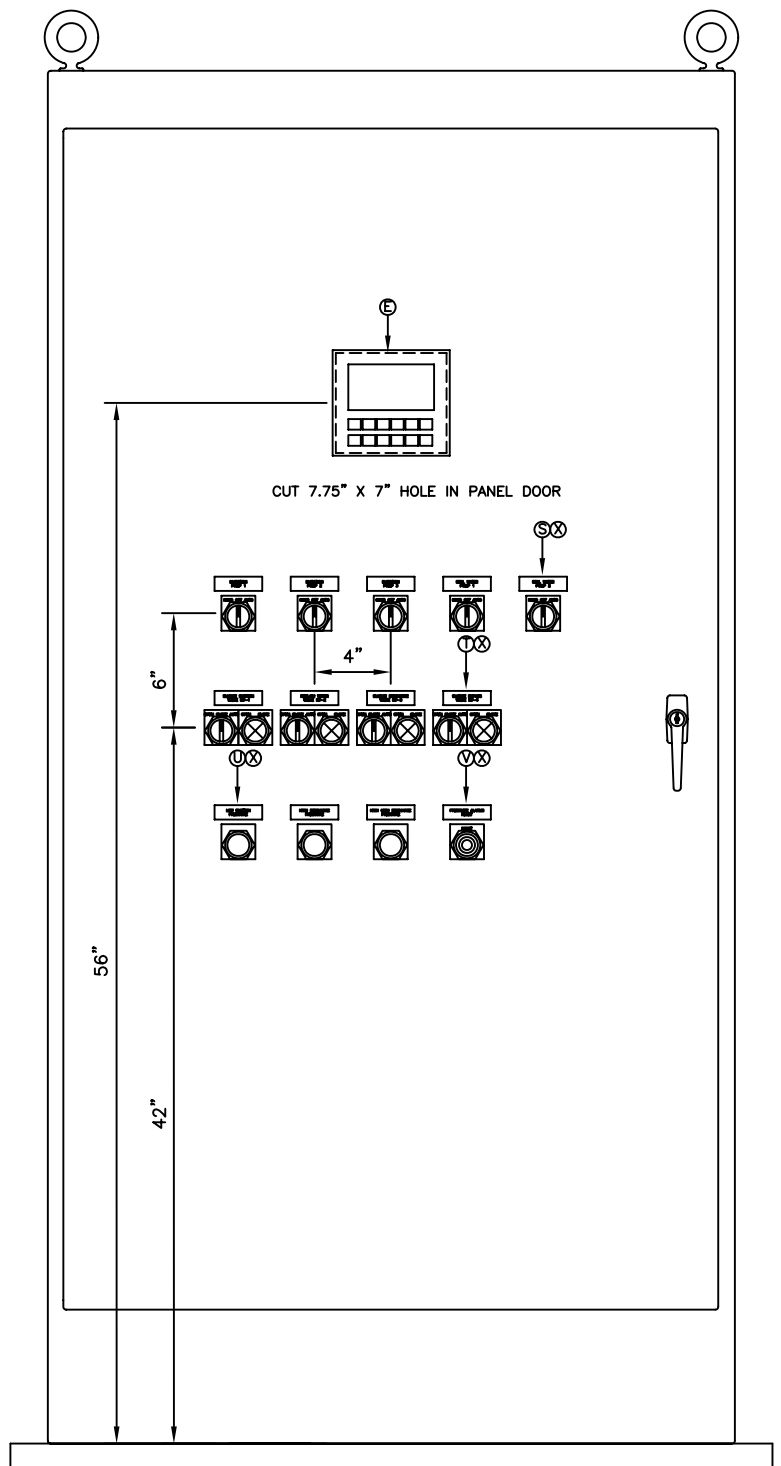
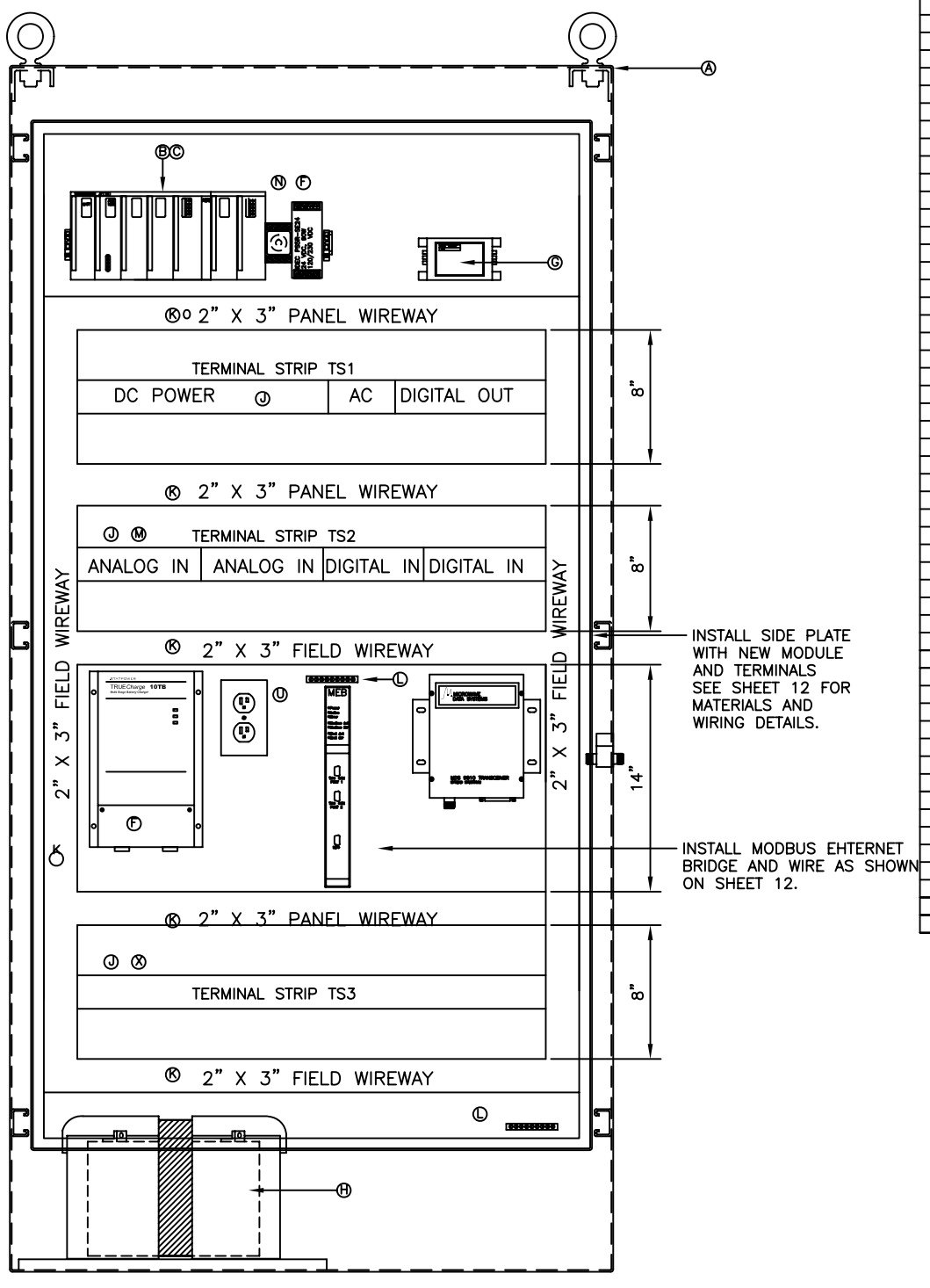
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PUMP STATION EQUIPMENT LOCATION DIAGRAM

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 7 OF 12
DRAWING No. 1291-027
JOB No. 1291
SCALE: NONE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL



NOTE: EXISTING HOUSEKEEPING PAD FOR PLC ENCLOSURE MOUNTING, CUT HOLE FOR CONDUIT ENTRANCE AS NOTED ON SHEET 2.



ENCLOSURE LAYOUT

NOTE: SECURE 3/4" PLYWOOD TO BASE AND THEN ATTACH BATTERY ENCLOSURE STRAP TO PLYWOOD TO SECURELY HOLD BATTERY ENCLOSURE IN PLACE AND ALLOW EASY REPLACEMENT OF BATTERY.

RANCHO FARM INJECTION PUMP STATION PANEL PARTS LIST

ITEM	QUANTITY	DESCRIPTION	MANUFACTURER, PART NUMBER
A	1	NEMA 4/12 ENCLOSURE, 72"X36"X24"	HOFFMAN A-723624FS
	1	ENCLOSURE BACK PLATE	HOFFMAN A-7236F1
B	1	PROGRAMMABLE LOGIC CONTROLLER	MODICON PC-E984-275
	1	PLC PRIMARY RACK	MODICON AS-HDTA-200
	1	PLC SECONDARY RACK	MODICON AS-HDTA-202
	2	ANALOG INPUT MODULE, 4 PT	MODICON AS-BADU-206
	2	DIGITAL INPUT MODULE, 16 PT	MODICON AS-BDEP-216
	1	RELAY OUTPUT MODULE, 8 PT	MODICON AS-BDAP-208
C	2	SERIAL CABLE CONNECTOR DB25/RJ45	MODICON 110 XCA 204 01
	2	SERIAL CABLE RJ45, 9 FEET	MODICON 110 XCA 282 03
D	1	SPREAD SPECTRUM RADIO, 900 MHZ, 0.5 W	MDS 9810
	1	RADIO JUMPER CABLE, 3 FT, N-N MALES	ANDREWS F1A-PNMNM-3
	1	RADIO SURGE PROTECTOR, 900 MHZ, TYPE N	POLYPHASER IS-B50LN-C2
	1	RADIO CABLE, 50 OHM, 1/2" XXX FEET	ANDREWS FSJ4-50B
	2	RADIO CABLE CONNECTOR, 50 OHM, N MALE	ANDREWS F4PNM
	1	YAGI RADIO ANTENNA, 900 HZ, TYPE N	KATHRIEN SCALA TY-900N
E	1	PANEL INTERFACE DISPLAY	GENERAL ELECTRIC IC752DFT000
F	1	BATTERY CHARGER, 12 VDC, 10 AMP	STATPOWER, TRUECHARGE 10TB
	1	POWER SUPPLY, 24 VDC, 90 W, DIN RAIL MOUNTED	IDEC PS5R-SE24
G	1	DC/DC CONVERTER 12/24 75 W	VICOR VI-LO3-CX
H	1	BATTERY, 12 VDC SEALED LEAD ACID	DYNASTY UPS12-170
	2	BATTERY QUICK DISCONNECTS	MCMASTER-CARR 7043K21
	1	BATTERY CASE W/ HOLD DOWN STRAP	
J	30	FUSE TERMINALS	CUTLER HAMMER C383THS
	3	FUSE TERMINALS JUMPER BARS	CUTLER HAMMER C383JCTHS10
	300	FEED THROUGH TERMINALS	CUTLER HAMMER C383RK25
	8	FEED THROUGH TERMINALS ENDPLATES	CUTLER HAMMER C383AP4
	3	FEED THROUGH TERMINALS JUMPER BARS	CUTLER HAMMER C383TJ90
	8	DISCONNECT TERMINALS	CUTLER HAMMER C383TK4M
	10	GROUND TERMINALS	CUTLER HAMMER C383SL4
	12	TERMINAL STRIP END BARRIER	CUTLER HAMMER C383ES35
		TERMINAL BLOCK NUMBERS	CUTLER HAMMER C383 SERIES
	4	TERMINAL STRIP	WEIDMULLER 996497
	10	TERMINAL STRIP SUPPORT BLOCKS	WEIDMULLER 049492
K	4	WIRE WAY 2"X3"X6', WHITE, HIGH DENSITY	TAYLOR HIGH DENSITY
	4	WIRE WAY COVER, 2"X6', WHITE	TAYLOR HIGH DENSITY
L	1	GROUND BAR	
M	7	RESISTOR, 500 OHMS, 3W 1.0%	DALE RS-2B 500 1.0
	2	RESISTOR, 10K OHMS, 3W, 1.0%	DALE RS-2B 10K 1.0
N	1	LOW VOLTAGE DISCONNECT RELAY	TIME MARK CORP. 2601-12DC
	1	LOW VOLTAGE DISCONNECT BASE	TIME MARK CORP. 51X120
O	1	GFI RECEPTACLE	
P	2	LASER LEVEL TRANSDUCER, 4 WIRE, 6 M	K-TEK SSXP-AC W\ 4" PVC
	2	LOOP POWERED DISPLAY, 4-20 MA, CONDUIT MOUNT	ACTION INSTRUMENTS VP560C
Q	1	FLOW METER TUBE & TRANSMITTER, 4", HART, 4-20 MA,	KROHNE EVIRONMAX, 4090C
S	5	HAND SWITCH, 3 POSITION, MAINTAINED, ILLUMINATED	ALLEN BRADLEY 800T-16JRH2KB7AX
	5	HAND SWITCH LEGEND, HAND OFF AUTO	ALLEN BRADLEY 800T-X511
	5	HAND SWITCH AUXILIARY CONTACTS	ALLEN BRADLEY 800T-XA
T	4	HAND SWITCH, 3 POSITION, MAINTAINED	ALLEN BRADLEY 800T-H2B
	4	HAND SWITCH LEGEND, OPEN CLOSE AUTO	ALLEN BRADLEY 800T-X559E
	4	PILOT LIGHT, 120 VAC, LED, DUAL INPUT, RED, GREEN	ALLEN BRADLEY 800T-PCL216
	4	PILOT LIGHT LEGEND, OPEN CLOSE	ALLEN BRADLEY 800T-X532
U	3	PILOT LIGHT, 120 VAC, PTT, RED, LED	
V	1	PUSH BUTTON, NC	ALLEN BRADLEY 800T-A6D2
X	14	NAME PLATES, 1" X 4" 1/4" WHITE ON BLACK TEXT	ALLEN BRADLEY 800T-QTH10R
Y	3	TIME ON DELAY RELAYS, DPDT, 120 VAC, ADJUSTABLE TIME	ALLEN BRADLEY 700FSMUU23
X	3	GENERAL PURPOSE RELAYS, 120 VAC, 3PDT	ALLEN BRADLEY 700HF34A1,700HN139

SPARE PARTS LIST

QUANTITY	DESCRIPTION	MANUFACTURER, PART NUMBER
1	PROGRAMMABLE LOGIC CONTROLLER	MODICON PC-E984-275
1	ANALOG INPUT MODULE, 4 PT	MODICON AS-BADU-206
1	DIGITAL INPUT MODULE, 16 PT	MODICON AS-BDEP-216
1	RELAY OUTPUT MODULE, 8 PT	MODICON AS-BDAP-208
1	SPREAD SPECTRUM RADIO, 900 MHZ, 0.5W	MDS 9810
1	BATTERY CHARGER, 12 VDC, 10 AMP	STATPOWER, TRUECHARGE 10TB
1	DC/DC CONVERTER 12/24 75 W	VICOR VI-LO3-CX
1	DC POWER SUPPLY, 24 VDC, 90 W	IDEC PS5R-SE24

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. E011247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-028
MSO 10/2009

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-1) PANEL LAYOUT, PARTS LIST AND MISCELANEOUS DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 8 OF 12
DRAWING No. 1291-028
JOB No. 1291
SCALE: 1' = 5"
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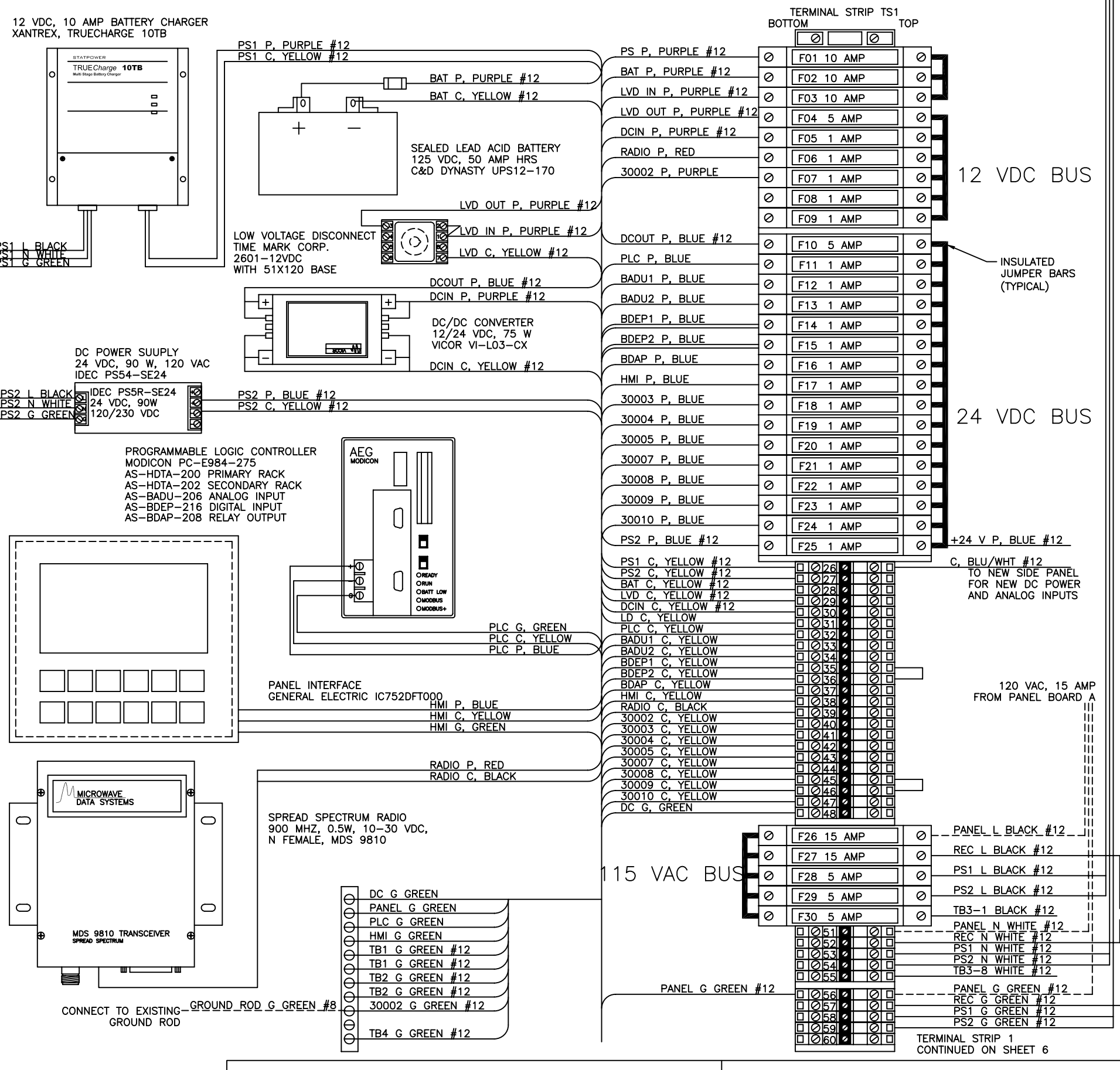

TERMINAL BLOCK TYPES AND PART NUMBERS

FRONT VIEW	PART NUMBER	MANUFACTURER	DESCRIPTION
	996497	WEIDMULLER	SLOTTED ASSEMBLY RAIL, 35mm
	C383RK25	CH	FEED-THROUGH TERMINAL BLOCK
	C383AP4	CH	END SECTION FOR FEED THROUGH TERMINAL
	C383TJ90	CH	JUMPER BAR – 10 BLOCKS
	C383THS	CH	FUSE HOLDER TERMINAL BLOCK 1 1/4" X 1/4" FUSE
	C383JCTHS10	CH	JUMPER BAR – 10 BLOCKS
	C383TK4M	CH	DISCONNECT SWITCH TERMINAL BLOCK
	C383SL4	CH	GROUND TO RAIL TERMINAL BLOCK
	C383ES35	CH	END BRACKET
	EGU 4/24 45946	WEIDMULLER	SURGE PROTECTION TERMINAL BLOCK
	049492	WEIDMULLER	TO SUPPORT TERMINAL RAIL AND ISOLATE TERMINAL STRIP FROM PANEL BACKPLATE MOUNT UNDER TERMINAL RAIL AT 8" INTERVALS

PANEL CONSTRUCTION NOTES:

1. UNLESS OTHERWISE SPECIFIED, ALL INTERIOR CONTROL PANEL WIRING (SHOWN SOLID) SHALL BE #18 AWG THHN OR HW, COLOR AS INDICATED.
2. ALL FIELD WIRING (SHOWN IN DASHED LINES) SHALL BE #14 AWG w/ TYPE THHN/THWN INSULATION, COLOR AS INDICATED, UNLESS SIZE INDICATED.
3. ALL WIRES UNDER 12 AWG SHALL USE WIRE FERRULES IN PANEL TERMINAL WERE APPROPRIATE.
4. ALL WIRES SHALL HAVE HEAT SHRINK WIRE LABELS AS INDICATED; BRADEY PS-187-150W.
5. ALL WIRES SHALL HAVE LABELS ON BOTH ENDS OF THE WIRE AS SHOWN ON THE DRAWINGS.
6. TERMINAL SUPPORTS SHALL BE PLACED AT 8" INTERVALS FOR ALL TERMINAL RAILS.
7. ALL EQUIPMENT, TERMINAL RAILS, AND WIRE DUCT SHALL BE MOUNTED WITH 10-32 SCREWS TO THE BACK PLATE WILL BE DRILLED AND TAPPED FOR THE SCREWS.
8. NO SELF TAPPING SCREWS SHALL BE ALLOWED FOR ANY MOUNTING.
9. MOUNT A CHART FOR FUSE SIZE AND FUNCTION ON INSIDE OF PANEL.

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRTOK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-029
MSO 10/2009

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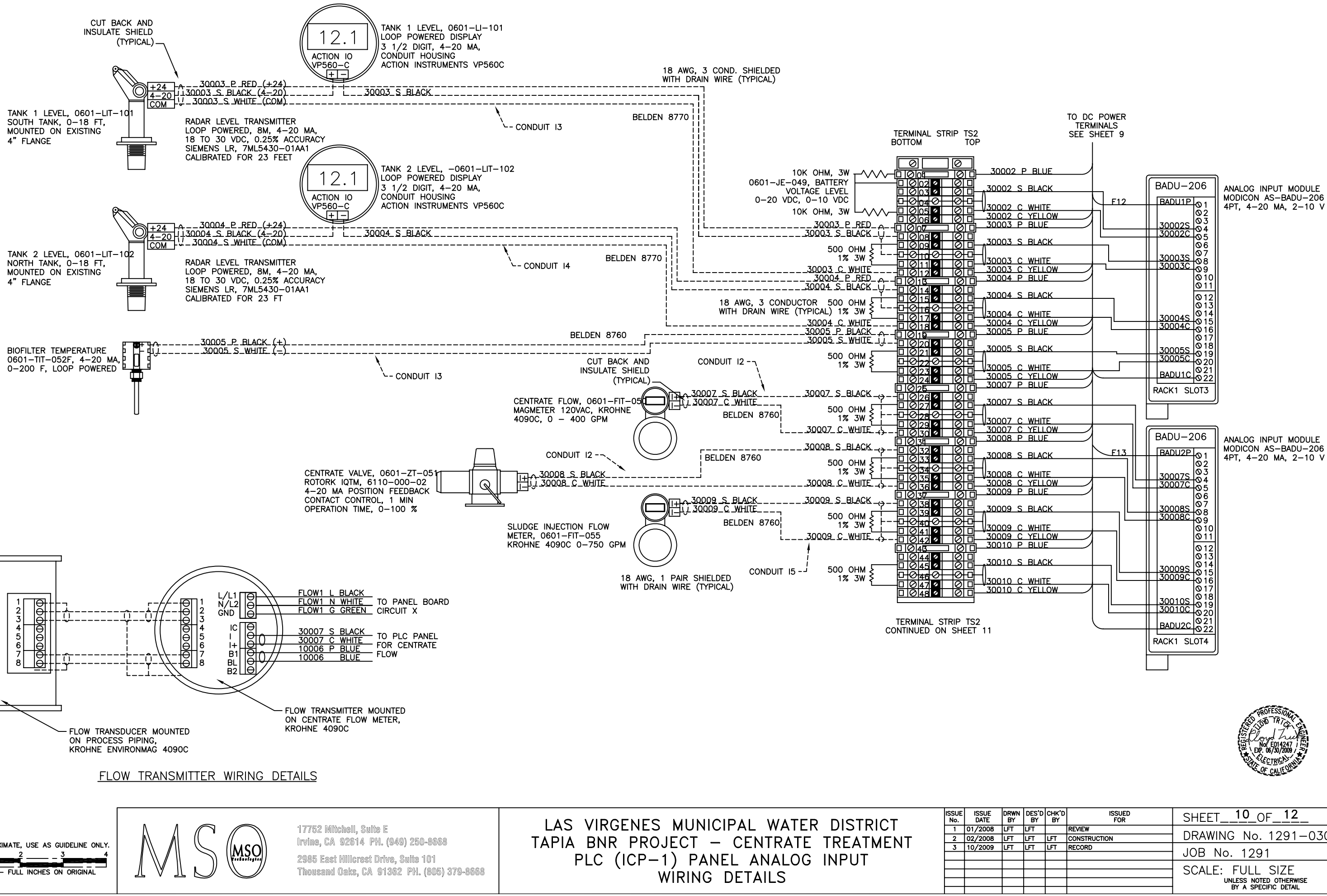
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-1) PANEL AC
AND DC POWER DISTRIBUTION WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 9 OF 12
DRAWING No. 1291-029
JOB No. 1291
SCALE: FULL SIZE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL



FLOW TRANSMITTER WIRING DETAILS

REGISTERED PROFESSIONAL ENGINEER
FLOYD TRTEK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-030
MSO 10/2009

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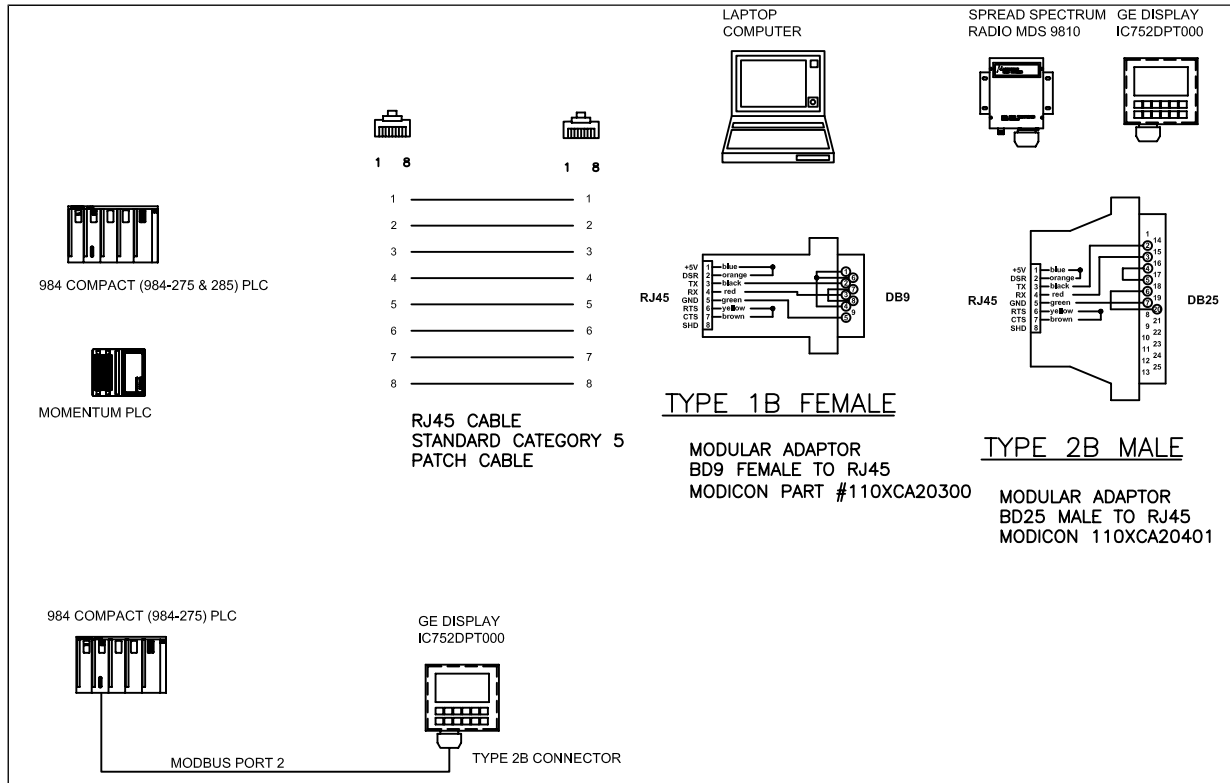
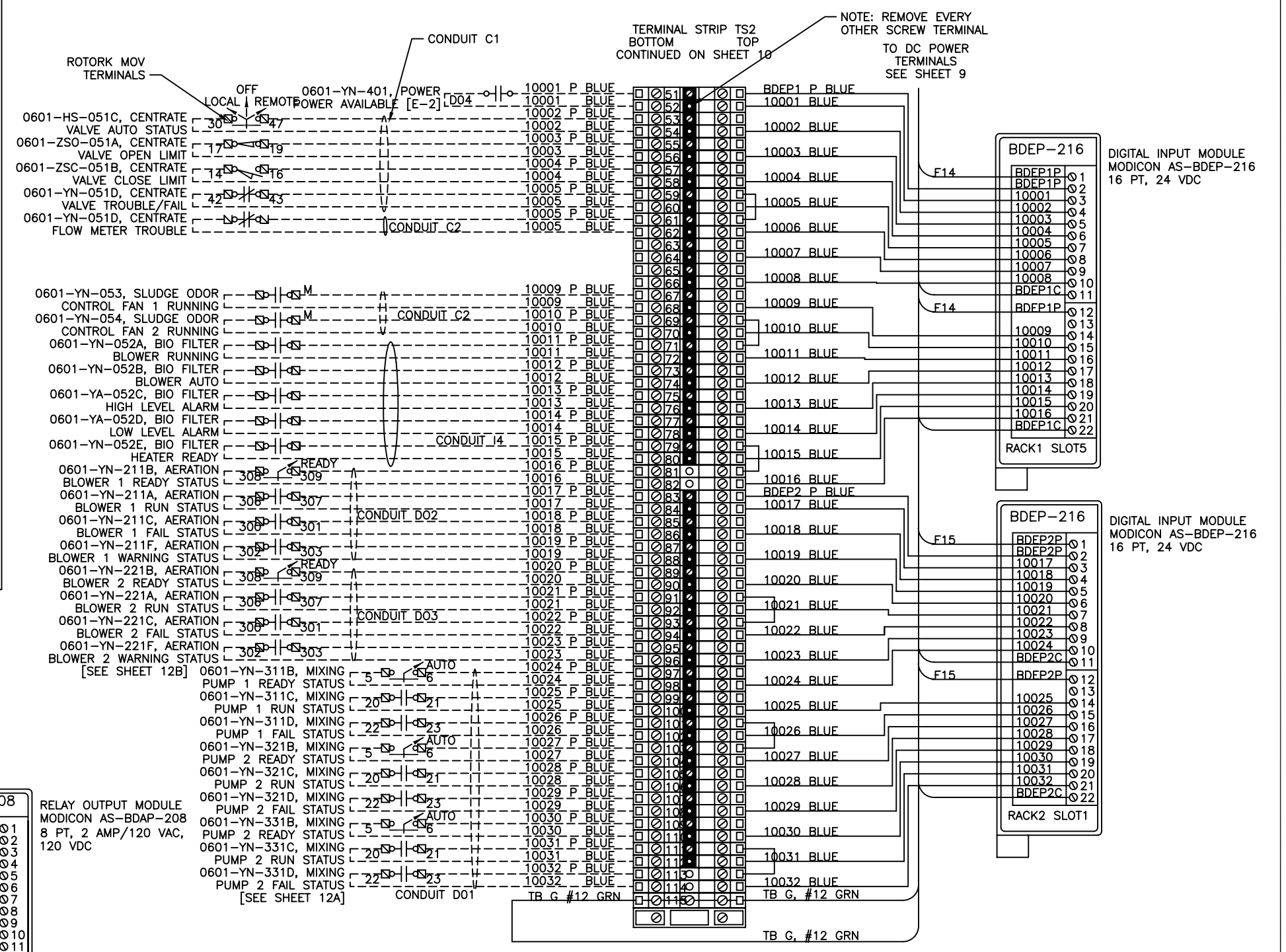
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT
PLC (ICP-1) PANEL ANALOG INPUT WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 10 OF 12
DRAWING No. 1291-030
JOB No. 1291
SCALE: FULL SIZE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL



COMMUNICATION WIRING SCHEMATICS



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GRAPHIC SCALE – FULL INCHES ON ORIGINAL

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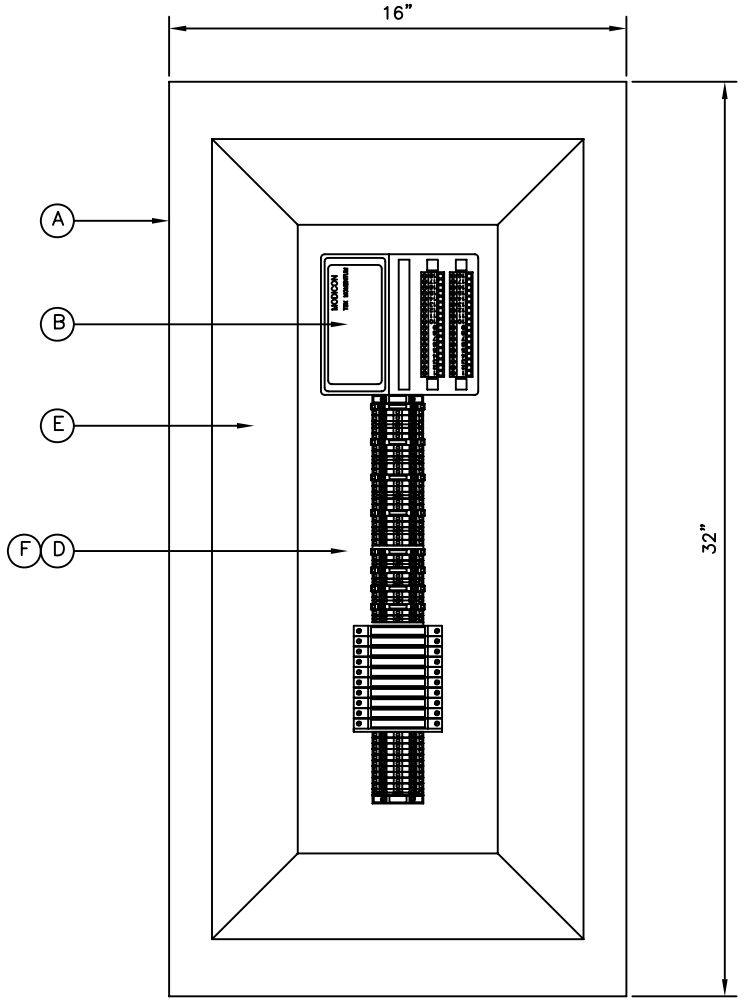
LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
PLC (ICP-1) PANEL DIGITAL INPUT, OUTPUT AND COMMUNICATION WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 11 OF 12
DRAWING No. 1291-031
JOB No. 1291
SCALE: FULL SIZE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL

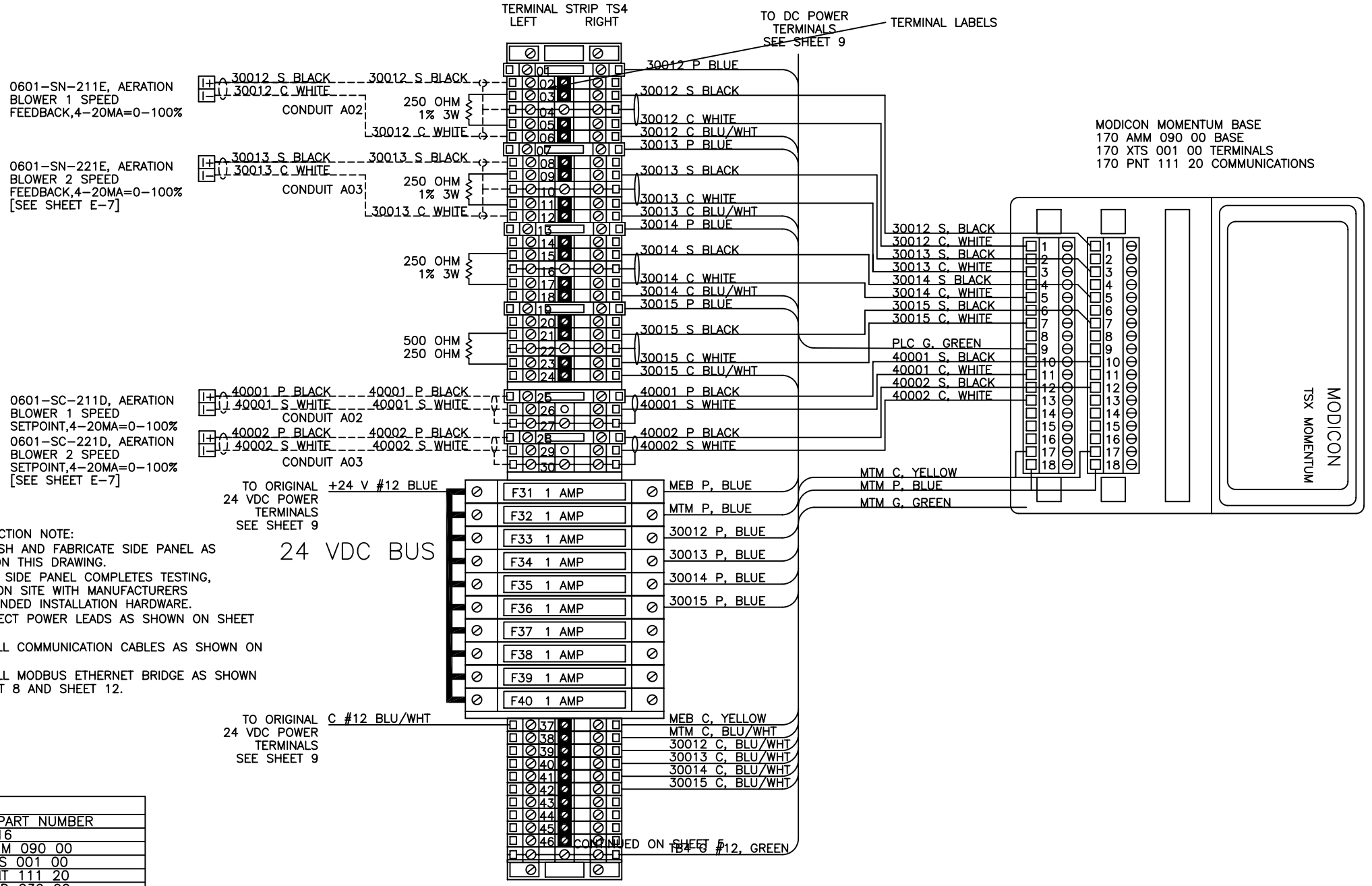
1291-031
MSO 10/2009



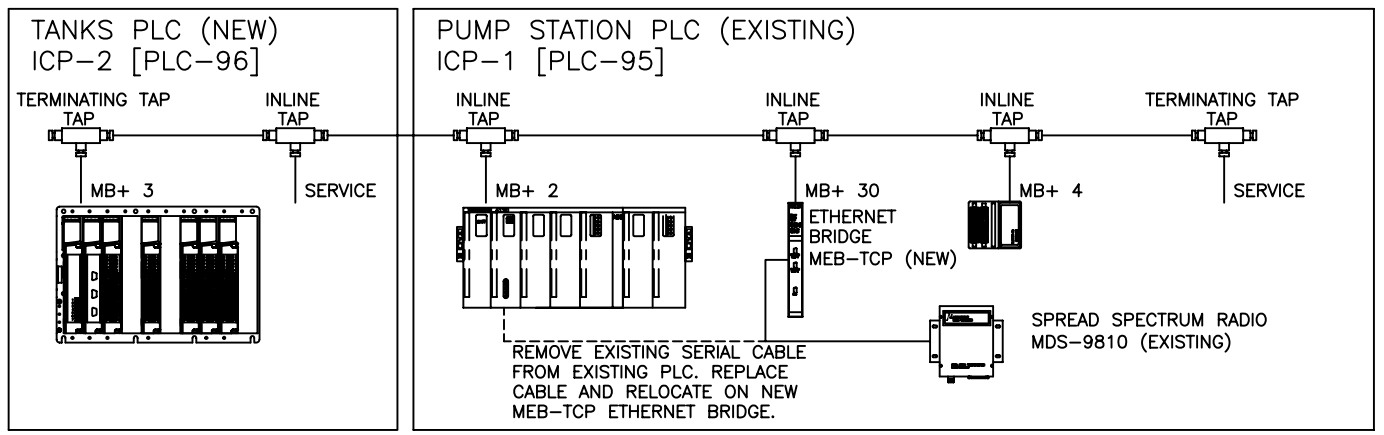
SIDE PANEL LAYOUT

SCALE 1 = 5"

CONSTRUCTION NOTE:
1) FURNISH AND FABRICATE SIDE PANEL AS SHOWN ON THIS DRAWING.
2) WHEN SIDE PANEL COMPLETES TESTING, INSTALL ON SITE WITH MANUFACTURERS RECOMMENDED INSTALLATION HARDWARE.
3) CONNECT POWER LEADS AS SHOWN ON SHEET 9.
4) INSTALL COMMUNICATION CABLES AS SHOWN ON SHEET 4.
5) INSTALL MODBUS ETHERNET BRIDGE AS SHOWN ON SHEET 8 AND SHEET 12.



RANCHO FARM PUMP STATION PANEL MODIFICATIONS PARTS LIST			
ITEM	QUANTITY	DESCRIPTION	MANUFACTURER, PART NUMBER
A	1	ENCLOSURE SIDE MOUNT PANEL, 32" X 16"	HOFFMAN A-32P16
B	1	ANALOG INPUT/OUTPUT BASE	MODICON 170 AMM 090 00
	1	ANALOG INPUT/OUTPUT TERMINALS	MODICON 170 XTS 001 00
	1	COMMUNICATIONS CARD	MODICON 170 PNT 111 20
	4	MODBUS PLUS TAP	MODICON 990 NAD 230 00
	4	MODBUS PLUS TAP CABLE	MODICON 990 NAD 211 10
C	1	MODBUS ETHERNET BRIDGE	NR&D MEB-TCP
	1	MODBUS ETHERNET BRIDGE CHASSIS	NR&D NRK2-NT
	1	MODBUS ETHERNET RS422 SERIAL CABLES	NR&D SC902
D	10	FUSE TERMINALS	ALLEN BRADLEY 1492-H6
	1	FUSE TERMINALS JUMPER BARS	ALLEN BRADLEY 1492-N49, SJS
	1	FUSE TERMINALS END PLATE	ALLEN BRADLEY 1492-37
	30	FEED THROUGH TERMINALS	ALLEN BRADLEY 1492-J3
	4	FEED THROUGH TERMINALS ENDPLATES	ALLEN BRADLEY 1492-EBJ3
	8	FEED THROUGH TERMINALS JUMPER BARS, 2 POLE	ALLEN BRADLEY 1492-CJJ5-2
	1	FEED THROUGH TERMINALS JUMPER BARS, 10 POLE	ALLEN BRADLEY 1492-CJJ5-10
	6	DISCONNECT TERMINALS	ALLEN BRADLEY 1492-JKD3
	7	GROUND TERMINALS	ALLEN BRADLEY 1492-JG3
	2	TERMINAL STRIP END BARRIER	ALLEN BRADLEY 1492-ERL35
		TERMINAL BLOCK NUMBERS	ALLEN BRADLEY 1492-J SERIES
	1	TERMINAL STRIP	WEIDMULLER 996497
	4	TERMINAL STRIP SUPPORT BLOCKS	WEIDMULLER 049492
E	1	WIRE WAY 2"X3"X6', WHITE, HIGH DENSITY	TAYLOR HIGH DENSITY
	1	WIRE WAY COVER, 2"X6', WHITE	TAYLOR HIGH DENSITY
F	4	RESISTOR, 250 OHMS, 3W 1.0%	DALE RS-2B 250 1.0
G	4	FERRULE, 18 AWG	FERRULESDIRECT.COM



COMMUNICATIONS SCHEMATIC (MODBUS PLUS)

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291-032
MSO 10/2009

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT - CENTRATE TREATMENT
PLC (ICP-1) PANEL ANALOG INPUT AND COMMUNICATION WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 12 OF 12
DRAWING No. 1291-032
JOB No. 1291
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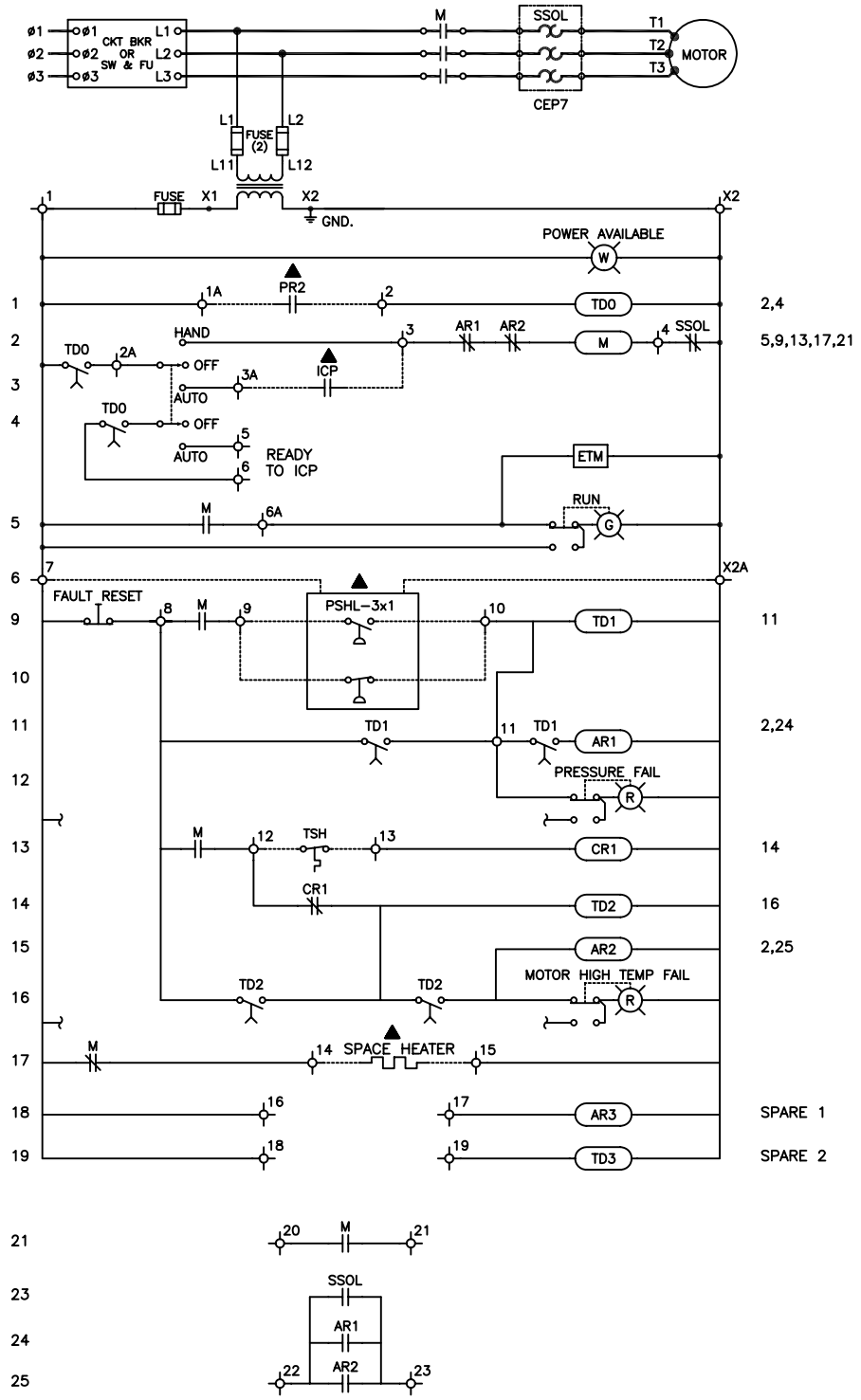
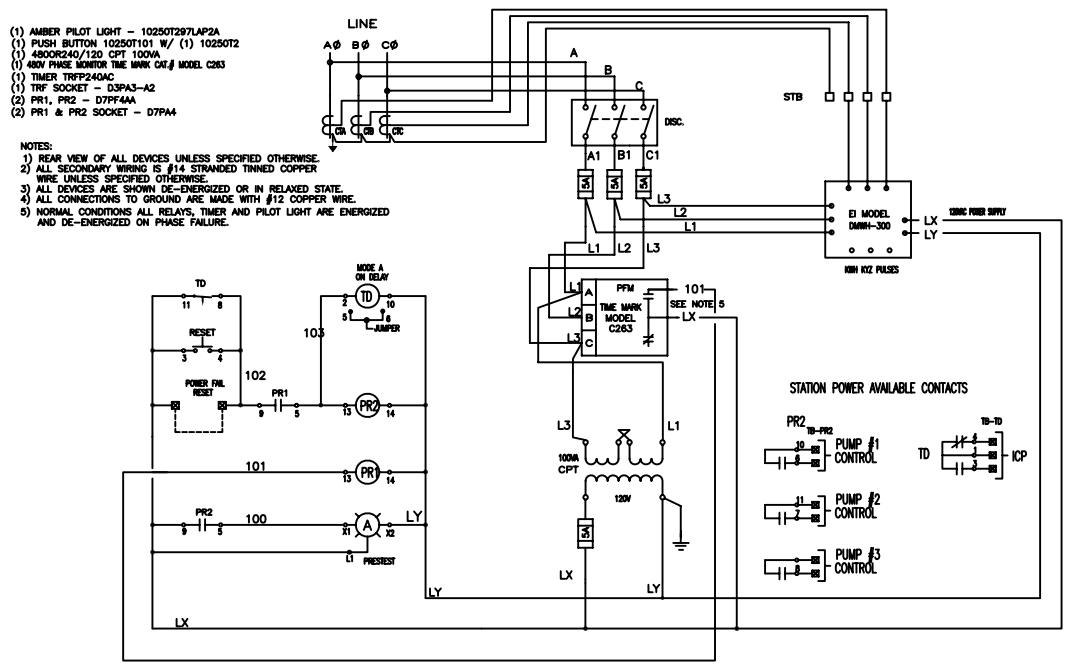


MIXER WIRING SCHEMATICS



POWER MONITORING WIRING SCHEMATICS

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
MCC WIRING SCHEMATICS
POWER MONITOR AND MIXER DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 12A OF 12
DRAWING No. 1291–032
JOB No. 1291
SCALE: FULL SIZE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. E014247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

1291–032A
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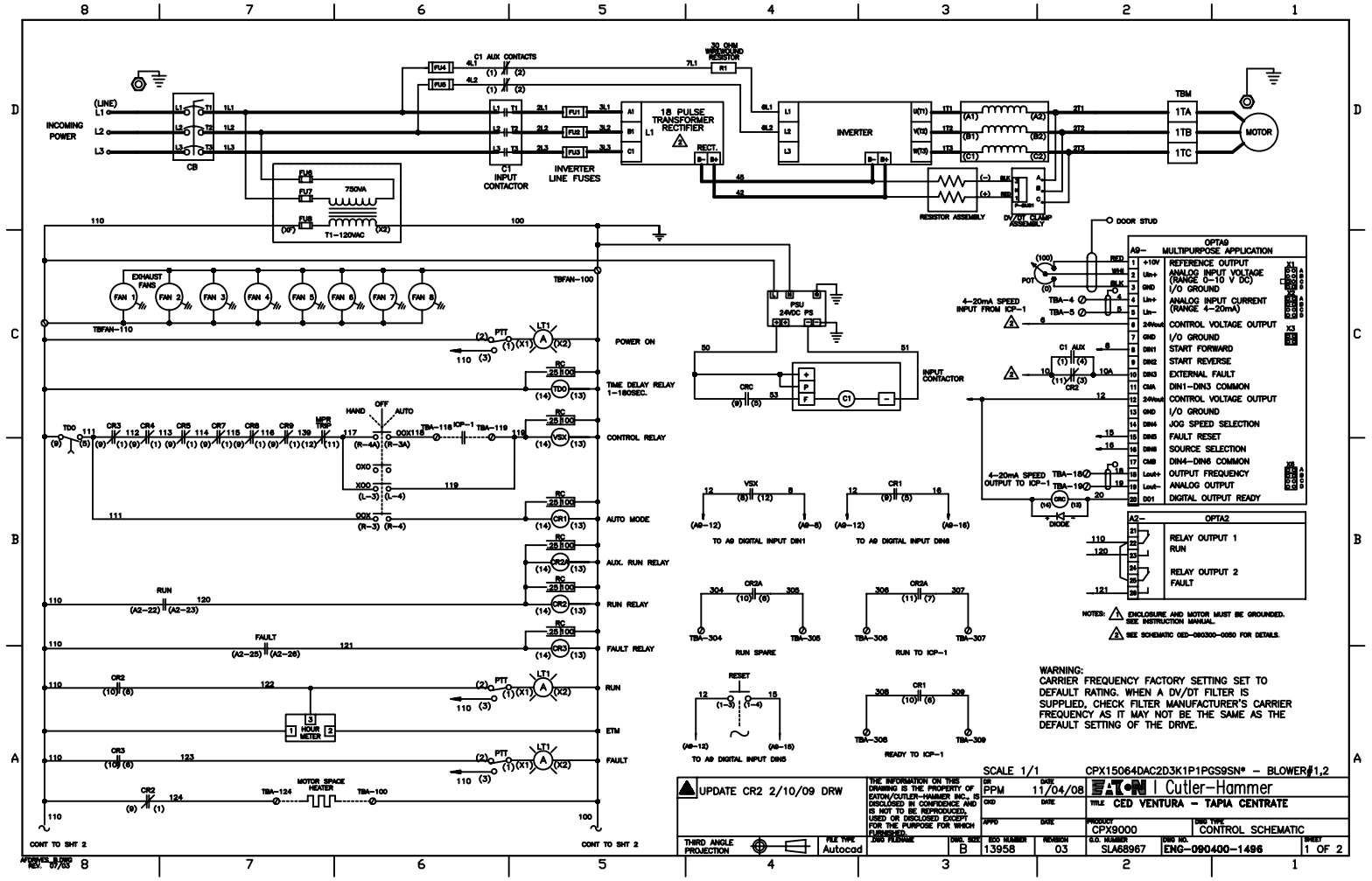

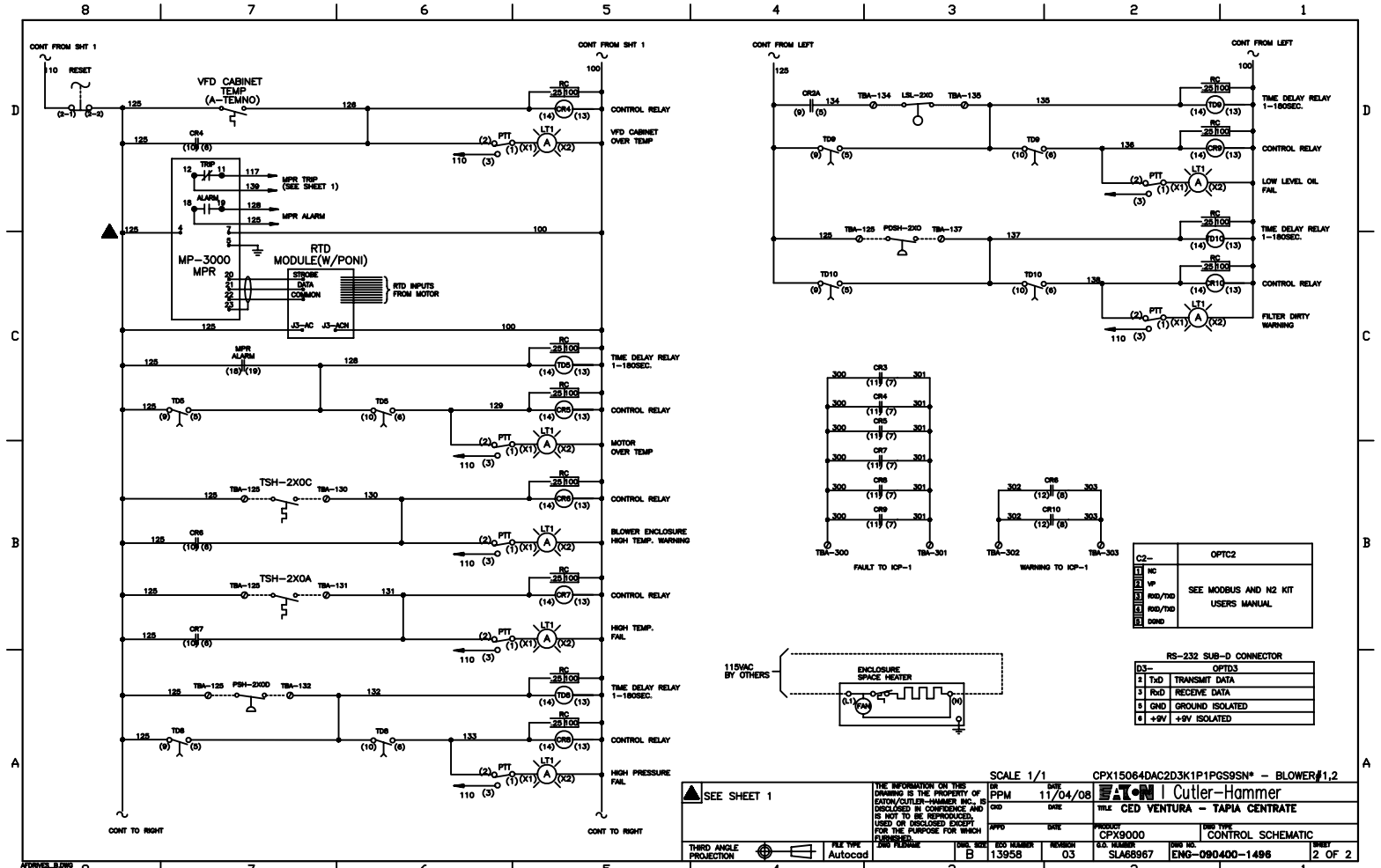

REGISTERED PROFESSIONAL ENGINEER
LLOYD TRICK
No. EQ14247
EXP. 06/30/2009
ELECTRICAL
STATE OF CALIFORNIA

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LAS VIRGENES MUNICIPAL WATER DISTRICT
TAPIA BNR PROJECT – CENTRATE TREATMENT
MCC WIRING SCHEMATICS
BLOWER WIRING DETAILS

ISSUE No.	ISSUE DATE	DRWN BY	DES'D BY	CHK'D BY	ISSUED FOR
1	01/2008	LFT	LFT		REVIEW
2	02/2008	LFT	LFT	LFT	CONSTRUCTION
3	10/2009	LFT	LFT	LFT	RECORD

SHEET 12B OF 12
DRAWING No. 1291-032
JOB No. 1291
SCALE: FULL SIZE
UNLESS NOTED OTHERWISE BY A SPECIFIC DETAIL

1291-032
MSO 10/2009

Photos of Suction Header and Valves


10.22.2008


EXTEND TO HERE


11.03.2008


EXTEND TO HERE
CAUTION
10.22.2008

Centrate Treatment Valve Submittal

Inspector's Copy

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April 29, 2008
16817.01

Brett Dingman
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302

Las Virgenes Municipal Water District
Construction Submittal Review
Tapia BNR Project – Centrate Treatment
Submittal 08: Plug Valves/ Electric Actuators 400520, 409210

We are returning three (3) copies of the noted submittal with the following comments:

Spec. No.	Sub.	Action	Description	Comments
		1	Cover Sheet (2 pages)	No comments
400520		2	Plug Valve Drawings/ Description (9 pages)	Provide bi-directional valves per specification for reverse flow shutoff.
409210		3	Actuator Data sheet Dimensions/Electrical Schematics/Proof of Design Test (22 pages)	Identify protective coating on actuators. Submittal says KN protection. Provide explanation of KN coating.

The submittals reviewed by Boyle Engineering Corporation are only for general conformance with the design concept of the project and general compliance with the plans and specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment, and work required by the contract; the proper fitting and construction of the work; the accuracy and completeness of the submittal; selecting fabrication processes and techniques of construction; and performing the work in a safe manner.

ACTION
"1": No exceptions taken.
"2": Make corrections noted/No other exceptions taken. Please submit revised copy for file.
"3": Make corrections noted/Resubmit.
"4": Rejected/Revise and resubmit.
"5": Accepted for information only or not required.

Please call me if you have any questions.

Boyle Engineering Corporation

Dan Ellison, PE
Project Manager

MILLIKEN VALVE COMPANY. INC.

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

Transmittal Form

To: HD Supply
3155 N. Indian Avenue
Perris, CA 92571-3208
Attn: Chase Stallings

Date: 4/14/08

Milliken Order #: 1103632ML

Project: Tapia BNR, Las Virgenes MWD

Your P.O. #: LOI

As requested, we are forwarding the following information:

For Approval XX Number of Sets_____

For Records_____

Item	Qty	Description	Document Number
1	2	½" 603 Threaded eccentric plug valve, epoxy seat, Buna coated plug, with lever, with 10-12 mils exterior Ameron 400 blue epoxy	S 49063
2	2	8" 606D grooved for ductile pipe, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M5 Gear), with 316SS Bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49318
3	1	4" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M3 Gear), with 316SS bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110
4	4	8" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M5 Gear), with 316SS Bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110
5	2	12" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M8 Gear), with 316SS bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110

Agent: Kelly Brians/SW Valve

Name: Angela S. Jackson
Title: Sales Coordinator

MILLIKEN VALVE COMPANY

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

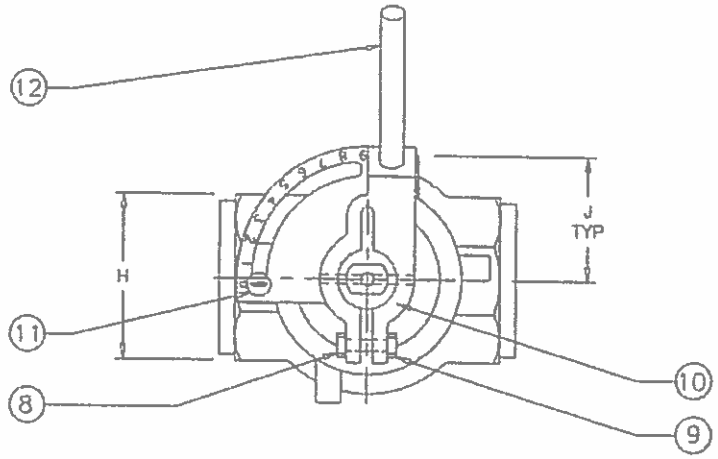
Transmittal Form

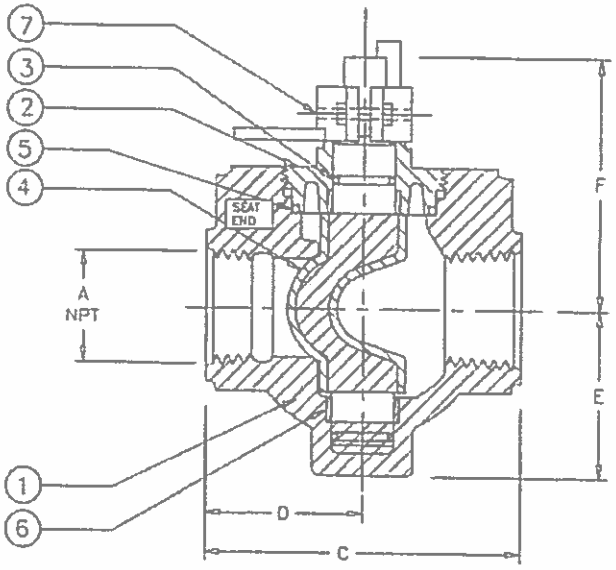
To: HD Supply

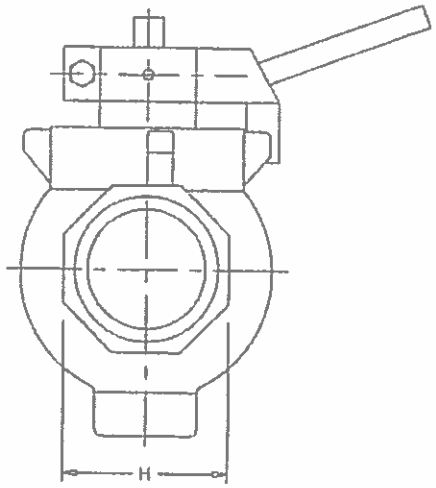
Date: 4/14/08
Milliken Order #: 1103632ML
Page: 2

Project:Las Virgenes MWD

Item	Qty	Description	Document Number
6	7	16" Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M8 Gear) , with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy & 10-12 mils exterior Ameron 400 blue epoxy	S 49036
7	4	24" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (Mastergear MJF50/S5) with 316SS Bolting with ~~10-12~~ 16 mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49859
8	2	6" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy & 10-12 mils exterior Ameron 400 blue epoxy, with AUMA SA07.5-13B/GS63.3 Electric Motor for open/close service, 480V/3PH/60Hz, NEMA 4X enclosure, with reversing starters, transformer, 110VAC interface board, overload relays for the MATIC, O/S/C pushbuttons, 3 lights, L/O/R selector switch, special conduit entries (Qty 2-1/2")	S 49698I
9	2	8" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy, with AUMA SAR07.5-13B/GS80.3 Electric Motor for Modulating service, 480V/3PH/60Hz, NEMA 4X enclosure, with reversing starters, transformer, 4-20ma positioner, dual precision potentiometer (5K/5K ohms), RWG position transmitter (4-20ma DC output), solid state starters, O/S/C pushbuttons, 3 lights, L/O/R selector switch, special conduit entries (Qty 2-1/2")	S 49698I
10		AUMA Actuator Wiring Diagrams/data sheets	
11		Ameron 400 epoxy paint data sheet	
12		CV chart	
13		Proof of Design Tests	
14		Gearbox detail drawing for 20" & smaller valves	S 49624
15		Mastergear MJF50/S5 detail drawings	Catalog Cuts
16		Millcentric plug valve brochure	







VALVE SIZE	A	C	D	E	F	H	J	WEIGHT
1/2	0.50	3.75	2.10	2.00	3.75	1.88	2.0	4
3/4	0.75	3.80	2.00	2.00	3.75	2.00	2.0	4
1	1.00	3.75	2.01	2.00	3.75	1.88	2.0	4
1-1/4	1.25	4.75	2.63	2.38	4.45	2.75	2.3	7
1-1/2	1.50	4.90	2.63	2.38	4.30	2.75	2.3	7
2	2.00	5.25	2.90	3.30	5.30	3.25	2.5	12

ITEM	QTY	DESCRIPTION	MATERIAL
12	1	HANDLE	STEEL
11	1	MEMORY STOP	ALUMINUM
10	1	TORQUE COLLAR	ALUMINUM
9	1	MACHINE SCREW	STEEL/ZINC
8	1	LOCKNUT	STEEL/ZINC
7	1	SPRING PIN	SPRING STEEL
6	2	BUSHING	BRONZE
5	1	O-RING	ELASTOMER AS SPEC.
4	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
3	3	O-RING	ELASTOMER AS SPEC.
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B

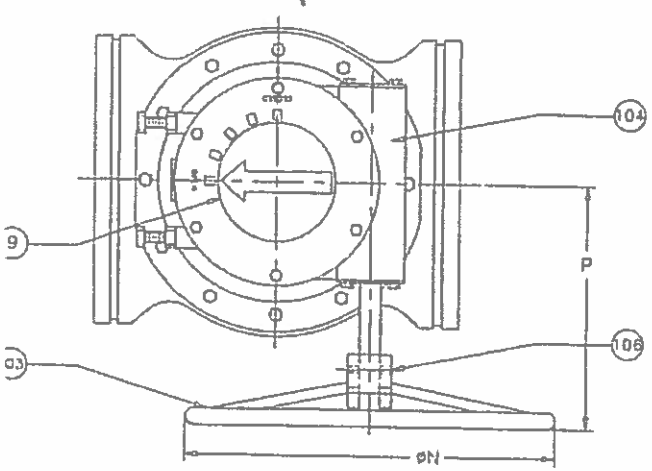
MILLIKEN VALVE CO

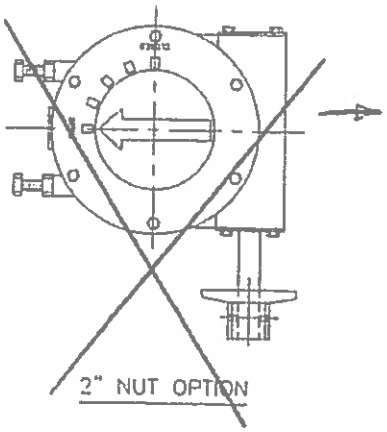
DATE	REVISIONS	BY
12/99	CAP WAS BONNET	CR
9/00	Released all valve Dimensions. Changes made	JS

BY CR | DATE 4/97 | SCALE NONE
CHK'D | DIMENSIONS INCHES

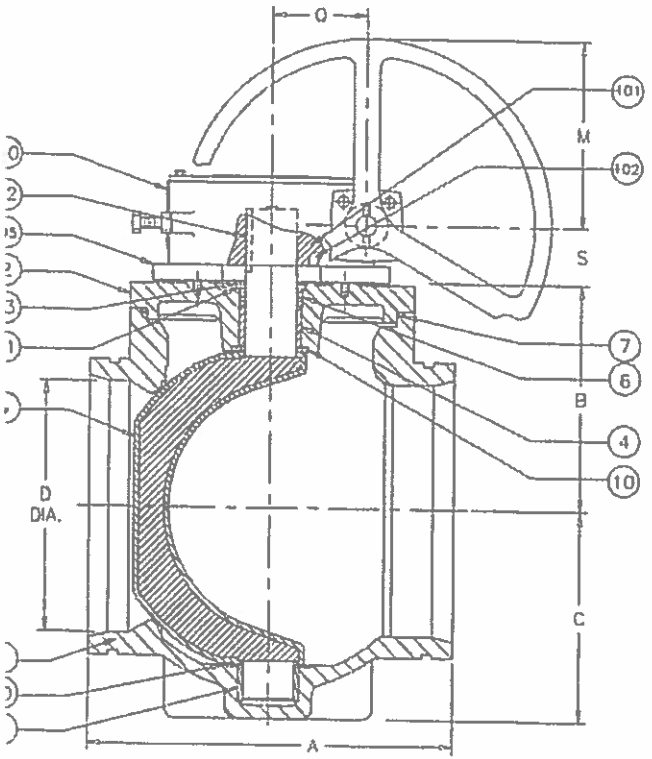
TITLE:
1/2" TO 2" FIG. 603
MILLCENTRIC PLUG VALVE,
W/ SCREWED ENDS
TORQUE COLLAR
& WRENCH

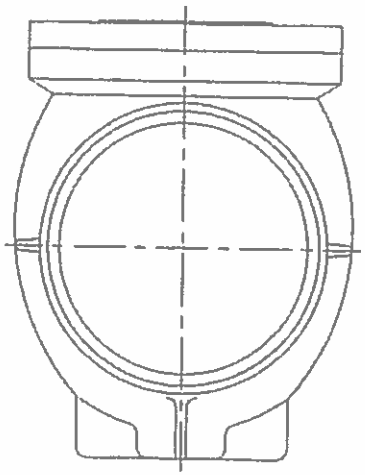
DWG. NO. S49063



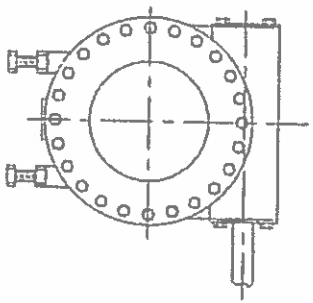


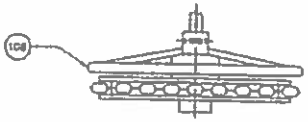
VALVE SIZE	DUCT. PIPE A	STEEL PIPE	B	C	D	M	N	P	Q	S
3	9.06	8.5	3.34	3.75	3	3	6	9.5	2.56	2.25
4	10.25	10.13	4.31	4.5	4	3	6	9.5	2.56	2.5
5	N/A	12.38	5.56	5.75	5	3	6	9.5	2.56	2.5
6	12.5	12.38	5.56	5.75	6	3	6	9.5	2.56	2.5
8	14	13.88	7.38	7.63	8	6	12	9.5	3.16	2.25
10	16.56	16.44	9.13	8.88	10	6	12	11.25	4.63	2.5
12	18	18	10.81	10	12	6	12	11.25	4.63	2.5
14	21.63	21.5	10.81	10	14	6	12	11.25	4.63	2.0



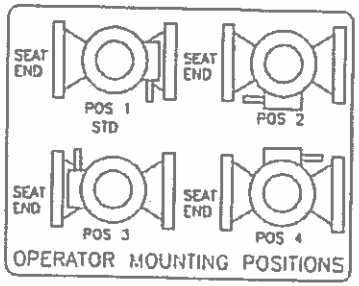


MEMORY STOP GEARBOX OPTION





CHAINWHEEL OPTION



OPERATOR MOUNTING POSITIONS

ITEM	QTY	DESCRIPTION	MATERIAL
108	1	CHAINWHEEL	DUCTILE IRON
106	1	SPRING PIN	STEEL
105	1	RISER PLATE	CAST IRON
104	1	WORMGEAR	STEEL
103	1	HANDWHEEL	DUCTILE IRON
102	2	SLEEVE BEARING	BRONZE
101	1	QUAD GEAR	DUCTILE IRON
50	1	HOUSING	CAST IRON
13	1	RETAINING RING	SPRING STEEL
12	1	KEY	STEEL
11	1	WASHER	BRASS
10	2	WASHER	PTFE
9	1	INDICATOR CAP	PLASTIC
7	1	'O' RING	ELAS. AS SPEC.
6	2	'U' CUP SEALS	ELAS. AS SPEC.
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	BONNET	CAST IRON
1	1	BODY	DUCTILE IRON

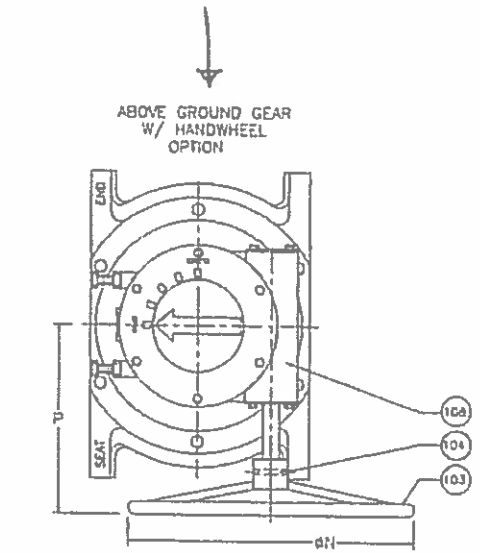
MILLIKEN VALVE CO

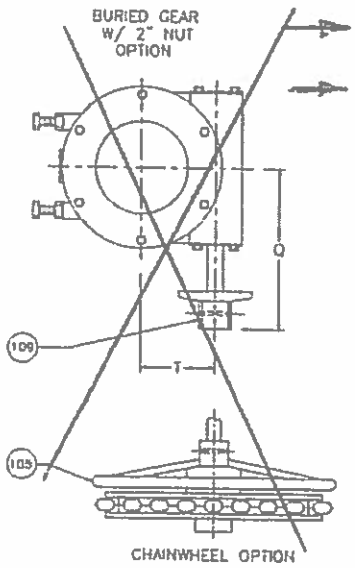
BY	DATE	SCALE
CR	6/96	NONE
CHK'D		DIMENSIONS INCHES

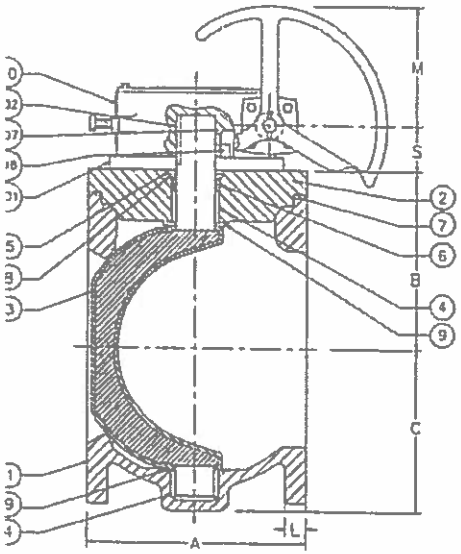
DATE	REVISIONS	BY
11/99	ADDED ITEM 108, HOUSING WAS OPERATOR, RETAINING RING WAS SNAP RING ITEM 11 WAS BRONZE	CR
3/05	ADD 3" DUCTILE	CS

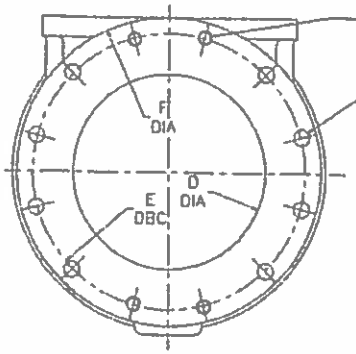
TITLE: 3"-14" FIG. 806 MILLCENTRIC PLUG VALVE, GROOVED END, GEAR OPERATED, W/ HANDWHEEL OR 2" NUT MEMORY GEAR OPT.

DWG. NO. 549318





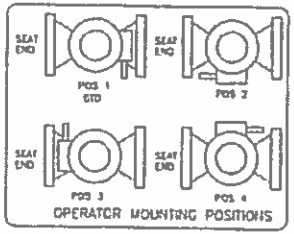




VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	232-07 (20:1)	7.5	3.25	3.50	2.5	5.50	7.00	0.75	4	--	-	0.69	2.5	5	4.75	4.75	2.0	2.00
3	232-07 (20:1)	8	3.34	3.75	3	6.00	7.50	0.75	4	--	-	0.75	2.5	5	4.75	4.75	2.0	2.00
4	M3 (30:1)	9	4.31	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2	2.56
5	M3 (30:1)	10	5.56	5.75	5	8.50	10	0.88	6	0.75	2	0.94	3	6	9.50	8	2	2.56
6	M3 (30:1)	10.50	5.56	5.75	6	9.50	11	0.88	6	0.75	2	1	3	6	9.50	8	2	2.56
8	M5 (50:1)	11.50	7.38	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13	6	12	11.25	8	2.3	3.16
10	M8 (80:1)	13	9.13	8.88	10	14.25	16	1	8	0.88	4	1.19	6	12	11.63	10	2.5	4.63
12	M8 (80:1)	14	10.81	10	12	17.00	19	1	8	0.88	4	1.25	6	12	11.63	10	2.5	4.63
14	M8 (80:1)	17	12.75	13	14	18.75	21	1.13	8	1	4	1.38	6	12	11.63	10	2.5	4.63

SIZE	GEAR	# OF TURNS
2.5"	20:1	5
3"	20:1	5
4"	30:1	7 1/2
5"	30:1	7 1/2
6"	30:1	7 1/2
8"	50:1	12 1/2
10"	80:1	20
12"	80:1	20
14"	80:1	20

ITEM	QTY	DESCRIPTION	MATERIAL
109	1	2" NUT	DUCTILE IRON
108	1	WORM GEAR	AISA 4140 STEEL
107	1	QUAD GEAR	DUCTILE IRON
106	2	SLEEVE BEARING	BRONZE
105	1	CHAINWHEEL	DUCTILE IRON
104	1	SPRING PIN	1095 STEEL
103	1	HANDWHEEL	DUCTILE IRON
102	1	KEY	1018 STEEL
101	1	RISER RING	A536 DI
50	1	HOUSING	CAST IRON
9	2	WASHER	PTFE
8	1	WASHER	BRASS
7	1	O RING	ELAS AS SPEC.
6	2	U CUP SEAL	ELAS AS SPEC.
5	1	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC	DUCTILE IRON
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B



OPERATOR MOUNTING POSITIONS

MILLIKEN VALVE CO

BY CR | DATE 10/95 | SCALE NONE | CHK'D | DIMENSIONS INCHES

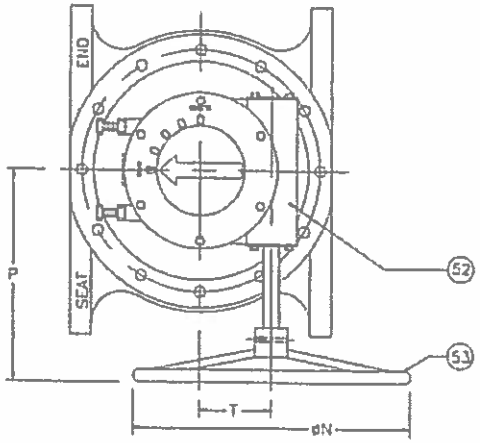
DATE	REVISIONS	BY
12/97	REVISED GEAR DIM FOR 2.5" & 3" WAS NOT NOW AGREES W/232-07	CR
1/98	ITEM 6 WAS SHOWN	CR
08/03	ADDED MTRL TYPE	JC

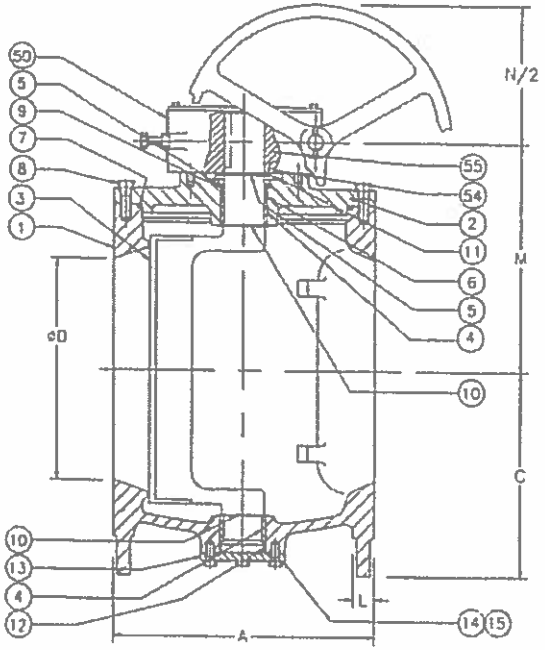
TITLE: 2-1/2" TO 14" FIG. 601 MILLCENTRIC PLUG VALVE, FLANGED, GEAR OPERATED W/ HANDWHEEL, 2" NUT, OR CHAINWHEEL OPTION

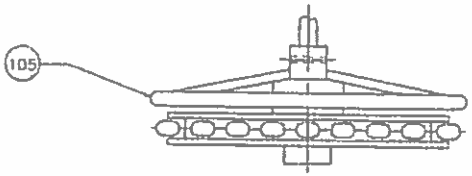
DWG. NO. S49110

VALVE SIZE	A	C	D	E	F	G	H	J	K	L	M	N	P	T	FLANGE STYLE	GEAR SIZE
14	17	13	14	18.75	21	1.13	8	1	4	1.13	15.06	18	11.63	4.75	CL125	M80
16	17.75	14	16	21.25	23.25	1.13	8	1	8	1.44	15.81	18	11.63	4.75	CL125	M80
18	21.50	15	18	22.75	25	1.25	8	1.13	8	1.56	17	18	11.63	4.75	CL125	M80
20	23.50	16	20	25	27.50	1.25	12	1.13	8	1.69	20.44	18	11.63	4.75	CL125	M80

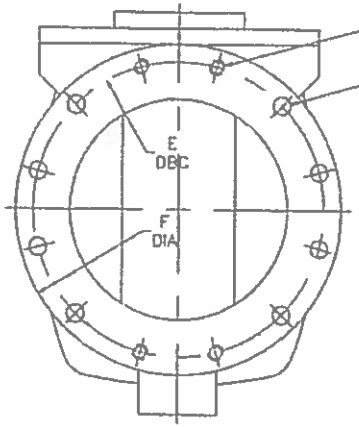
ABOVE GROUND GEAR W/ HANDWHEEL OPTION

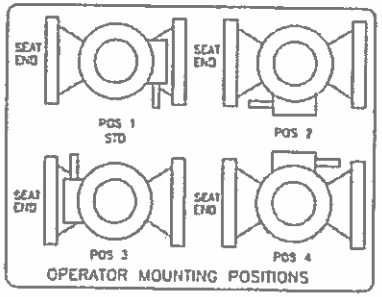






CHAINWHEEL OPTION





OPERATOR MOUNTING POSITIONS

** OPTIONAL

ITEM	QTY.	DESCRIPTION	MATERIAL
*4 105		CHAINWHEEL	
55	1	QUADRANT	DUCTILE IRON
54	2	SLEEVE BEARING	BRONZE
53	1	HANDWHEEL	DUCTILE IRON
52	1	WORM GEAR	STEEL
50	1	HOUSING	CAST IRON
15	AR	LOCKWASHER	STEEL/ZINC
14	AR	CAP SCREW	STEEL/ZINC
13	1	TRUNION COVER	CAST IRON
12	1	O RING	ELAS. AS SPEC.
11	1	SUPPORT WASHER	STEEL
10	2	WASHER	PTFE
9	1	WASHER	BRASS
8	AR	CAP SCREW	STEEL/ZINC
7	1	O RING	ELAS. AS SPEC.
6	2	U CUP SEALS	ELAS. AS SPEC.
5	2	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	CAP	A126 CL B
1	1	BODY	A126 CL B

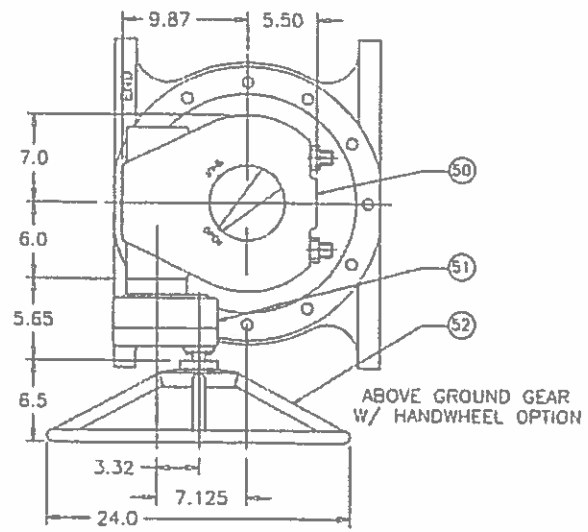
MILLIKEN VALVE CO

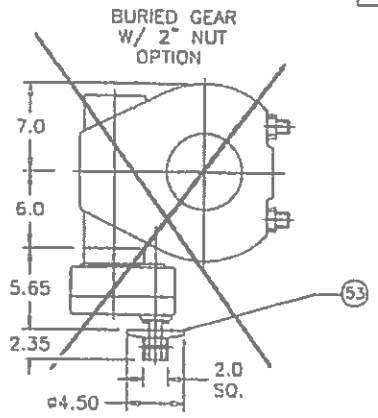
DATE	REVISIONS	BY
11/95	ADDED 60" & 72"	CR
8/98	REMOVED 24"-72" TO DWG# S49735	CR
7/03	ADDED CHAINWHEEL	SS

BY	DATE	SCALE
CR	10/95	NONE
CHK'D		DIMENSIONS INCHES

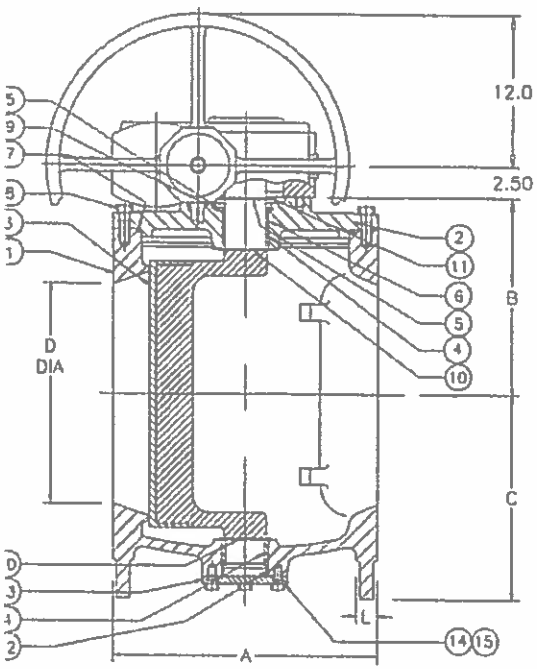
TITLE: FIG. 601 14"-20" MILLCENTRIC PLUG VALVE FLANGED GEAR OPERATED W/ HANDWHEEL

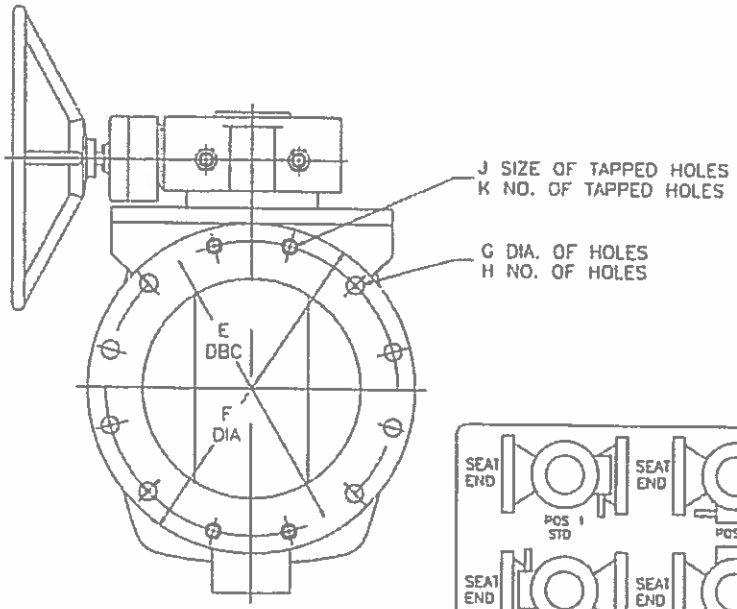
DWG. NO. S49036





VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L
24	42	19.38	21.63	24	29.50	32	1.38	20	–	–	1.88
30	51	23.44	24.75	30	36	38.75	1.38	28	–	–	2.13





ITEM	QTY.	DESCRIPTION	MATERIAL
53	1	2" NUT OPTION	
52	1	HANDWHEEL OPTION	
51	1	5:1 SPUR GEAR	
50	1	GEAR OPERATOR	
15	AR	LOCKWASHER	STEEL/ZINC
14	AR	CAP SCREW	STEEL/ZINC
13	1	TRUNION COVER	CAST IRON
12	1	O RING	ELAS. AS SPEC.
11	1	SUPPORT WASHER	STEEL
10	2	WASHER	PTFE
9	1	WASHER	STEEL
8	AR	CAP SCREW	STEEL/ZINC
7	1	O RING	ELAS. AS SPEC.
6	2	U CUP SEALS	ELAS. AS SPEC.
5	2	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	BRONZE
3	1	PLUG ELASTOMER AS SPEC.	A126 CL B
2	1	CAP	A126 CL B
1	1	BODY	A126 CL B

MILLIKEN VALVE CO

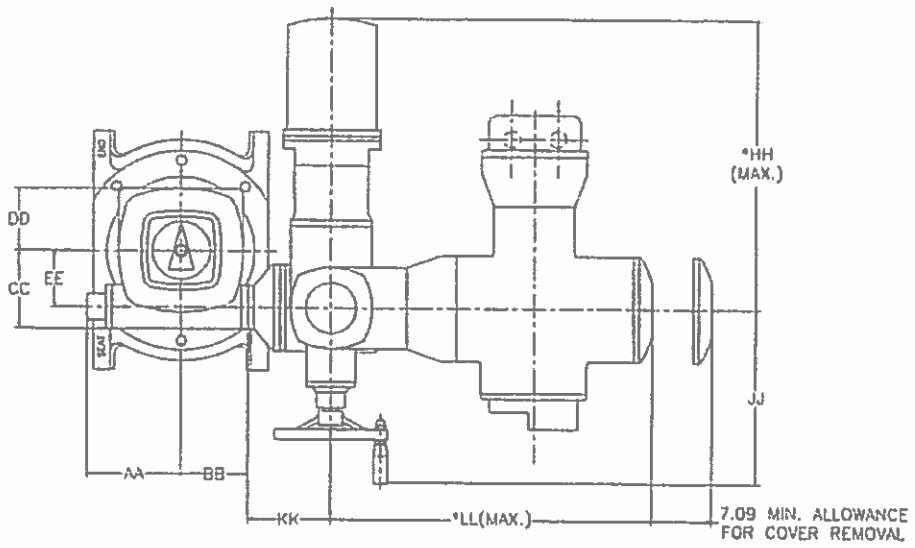
BY	DATE	SCALE
CR	9/99	NONE

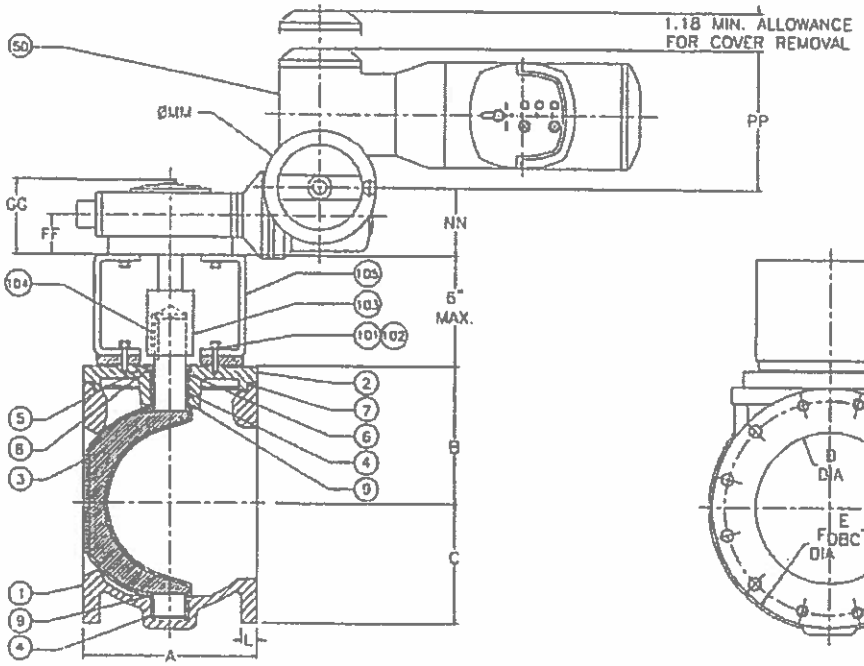
CHK'D | DIMENSIONS: INCHES

DATE	REVISIONS	BY
11/99	ITEM 3 WAS D.I. ITEM 4 WAS 316 S.S. ITEM 9 WAS BRASS	CR

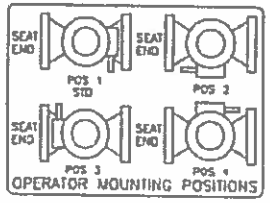
TITLE:
FIG. 601
24"–30" MILLCENTRIC
PLUG VALVE, FLANGED,
W/ MASTERGEAR

DWG. NO. S49859





*NOTE:
DIMENSION DEPENDENT
UPON CONTROL ASSEMBLY.



VALVE SIZE	GEAR SIZE	A	B	C	D	E	F	G	H	J	K	L
3	M3	8	3.34	3.75	3	6.00	7.50	0.75	4	--	-	0.75
4	M3	9	4.31	4.50	4	7.50	9	0.75	6	0.63	2	0.94
5	M3	10	5.56	5.75	5	8.50	10	0.88	6	0.75	2	0.94
6	M3	10.50	5.56	5.75	6	9.50	11	0.88	6	0.75	2	1
8	M5	11.50	7.38	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13
10	M8	13	9.13	8.88	10	14.25	16	1	8	0.88	4	1.19
12	M8	14	10.81	10	12	17.00	19	1	8	0.88	4	1.25
14	M8	17	12.75	13	14	18.75	21	1.13	10	1	2	1.38

ACT. MODEL	*HH	JJ	KK	*LL	MM	NN	PP
SA07.1	16.2	9.21	3.19	18.0	5.51	4.02	7.75
SA07.5	16.2	9.84	3.19	18.0	6.30	4.02	7.75
SA10.1	17.2	10.08	3.27	18.0	7.87	4.53	7.75
SA14.1	20.9	12.80	4.49	7.9	12.40	6.02	8.74

GEAR MODEL	AA	BB	CC	DD	EE	FF	GG
GS40.3	3.78	3.94	2.68	2.05	1.58	1.26	2.76
GS50.3	3.78	3.94	3.03	2.48	1.97	1.58	3.15
GS63.3	5.00	4.92	3.70	2.95	2.48	1.77	3.70
GS80.3	5.20	5.12	4.37	3.47	3.15	2.24	4.21
GS100.3	7.17	7.48	5.83	4.13	3.94	2.95	5.59

ITEM	QTY	DESCRIPTION	MATERIAL
105	1	BRACKET	STEEL
104	AR	KEY	STEEL
103	1	COUPLING	STEEL
102	AR	CAP SCREW	STEEL/ZINC
101	AR	LOCK WASHER	STEEL/ZINC
50	1	OPERATOR	
9	2	WASHER	PTFE
8	1	WASHER	BRONZE
7	1	O RING	ELAS AS SPEC.
6	2	U CUP SEAL	ELAS AS SPEC.
5	1	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B

MILLIKEN VALVE CO

BY	DATE	SCALE
SS	8/01	NONE

DATE	REVISIONS	BY

TITLE: FIG. 601
3"-14" MILLCENTRIC
PLUG VALVE, FLANGED,
W/ AUMA SA/GS SERIES
W/ INTEGRAL PUSH
BUTTON STATION

DWG. NO. S49898 1

auma®

Auma Actuators Inc.
Phone (724) 743-AUMA (2862)
Fax (724) 743-4711
www.auma-usa.com

Please send any replies to: Sue Hite

Customer PO #: MV1103632

Dear Customer,

This is the Initial Order Submittal for your PO # as listed above. This submittal contains all drawings and data sheets for the Auma products purchased on this order.

Manufacturing is currently being held for this order pending receipt of customer approval and release.

Please contact the Order Administration Department (Sue Hite) should you have questions or comments concerning the contents of this submittal.

Regards,
Auma Actuators

Files included:

Customer PO Item	DataSheet		Part No.	End User Tag
1	1	A080713-AUTODS-001.PDF	A080713-AUTODS-001.PDF	

ACTUATOR SCHEMATIC WIRING DRAWING:	MSP 1A1700–2F4JE1 KMS TP104-241 (EC-01) -S REV-000.PDF
ACTUATOR DIMENSIONAL DRAWING:	SD 111521 REV-000.PDF
OUTPUT DRIVE/MOUNTING FLANGE DRAWING:	SK 099241 REV-001.PDF

Customer PO Item	DataSheet		Part No.	End User Tag
2	2	A080713-AUTODS-002.PDF	A080713-AUTODS-002.PDF	

ACTUATOR SCHEMATIC WIRING DRAWING:	MSP 1A10KC5–F2JE2 KMS 9TP100-231-1 -S REV-005.PDF
ACTUATOR DIMENSIONAL DRAWING:	SD 111522 REV-000.PDF
OUTPUT DRIVE/MOUNTING FLANGE DRAWING:	SK 099241 REV-001.PDF

4.6.09

Actuator Data Sheet

AUMA Comm No.: A080713-DS001

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862 Fax: (724) 743-4711

Customer: MILLIKEN VALVE COMPANY
P.O. No: MV1103632
Customer Item: 1
Qty: 2

Project: LAS VIRGENES, CA
Valve/Gate Size & Type: 8" PLUG VALVE
Part No:
AUMA Lines:2, 3, 4, 5, 6

AUMA Actuator Model: SAR07.5-13B

Motor Model:	VD63-4/45	NEMA 4X
Phase:	3-PHASE	POT 5/5K WIRE WOUND WITH RWG-1 SAR
Voltage:	480/60	12.01-14.0 TURNS=REDUCTION 22:1
Duty (min.):	15	MOUNT TO GS GEARBOX
HP:	1/8	STANDARD TEMP -20 F TO +175 F
RPM:	1680	24V CONTROL UNIT HEATER
NEC:	H	HANDWHEEL 6.3" SA07 STANDARD
FLA (amps):	0.6	NO MDPI (S)
LRA (amps):	1.6	FT LB TORQUE DIAL SA07.5
Operating Time (sec):	60	4 GTLS 3 STAGE
Stroke:	90 Degrees	AUMA STANDARD SILVER-GRAY COROTHANE
Turns:	13	
Output RPM:	13	

Output Drive Type: MACHINED B NUT - SA07.5

Gearbox: AUMA GS80.3 WORM GEARBOX (RR)
STYLE RR STD
KN CORROSION PROTECTION -STD
90 DEGREE SWING ANGLE STD
MOUNTING FLANGE FA14 W/OUT SPIGOT STD
POINTER COVER IP68-3 STD
-20F TO +175F - STD
AUMA STANDARD SILVER-GRAY COROTHANE
Direction to close: CW

Output Drive Type: MACHINED COUPLING - GS80.3
BORE: 1.625 / 1.630"
KEYWAY: 0.437 / 0.439"
FUW 7/16" SQUARE KEY

Motor Control: AUMA MATIC W/ POSITIONER
480 VOLT 3 PHASE WITH POWER SUPPLY 24V
POSITIONER SS STARTERS
PB-3 SS-3POS AUX CONTACT
NEMA 4X
AUMA STANDARD SILVER-GRAY COROTHANE
P&S 100MM (1) 1-1/4" (2) 1/2"

Open:	Limit switch
Closed:	Limit switch
Faceplate:	
Pushbuttons:	Open, Stop, Close
Selector Switch:	Local, Off, Remote
Lights:	Open, Fault, Closed (Red, Amber, Green)

Drawings:
ACTUATOR SCHEMATIC WIRING DRAWING
MSP 1A1700--2F4JE1 KMS TP104-241 (EC-01) -S REV-000
ACTUATOR DIMENSIONAL DRAWING
SD 111521 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DRAWING
SK 099241 REV-001

Certified By: Sue Hite **Certified Date:** 3/27/2008 **Revision:** 0

Actuator Data Sheet

AUMA Comm No.: A080713-DS002

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862 Fax: (724) 743-4711

Customer: MILLIKEN VALVE COMPANY
P.O. No: MV1103632
Customer Item: 2
Qty: 2

Project: LAS VIRGENES, CA
Valve/Gate Size & Type: 6" PLUG VALVE
Part No:
AUMA Lines: 7, 8, 9, 10, 11

AUMA Actuator Model: SA07.5-13B

Motor Model:	VD63-4/45
Phase:	3-PHASE
Voltage:	480/60
Duty (min.):	15
HP:	1/8
RPM:	1680
NEC:	H
FLA (amps):	0.6
LRA (amps):	1.6
Operating Time (sec):	60
Stroke:	90 Degrees
Turns:	13
Output RPM:	13

NEMA 4X
MOUNT TO GS GEARBOX
STANDARD TEMP -20 F TO +175 F
110V-250V CONTROL UNIT HEATER
HANDWHEEL 6.3" SA07 STANDARD
NO MDPI (S)
4 GTLS 3 STAGE
AUMA STANDARD SILVER-GRAY COROTHANE
FT LB TORQUE DIAL SA07.5

Output Drive Type: MACHINED B NUT - SA07.5

Gearbox: AUMA GS63.3 WORM GEARBOX (RR)
STYLE RR STD
KN CORROSION PROTECTION -STD
90 DEGREE SWING ANGLE STD
MOUNTING FLANGE FA12 W/OUT SPIGOT STD
POINTER COVER IP68-3 STD
-20F TO +175F - STD
AUMA STANDARD SILVER-GRAY COROTHANE
Direction to close: CW

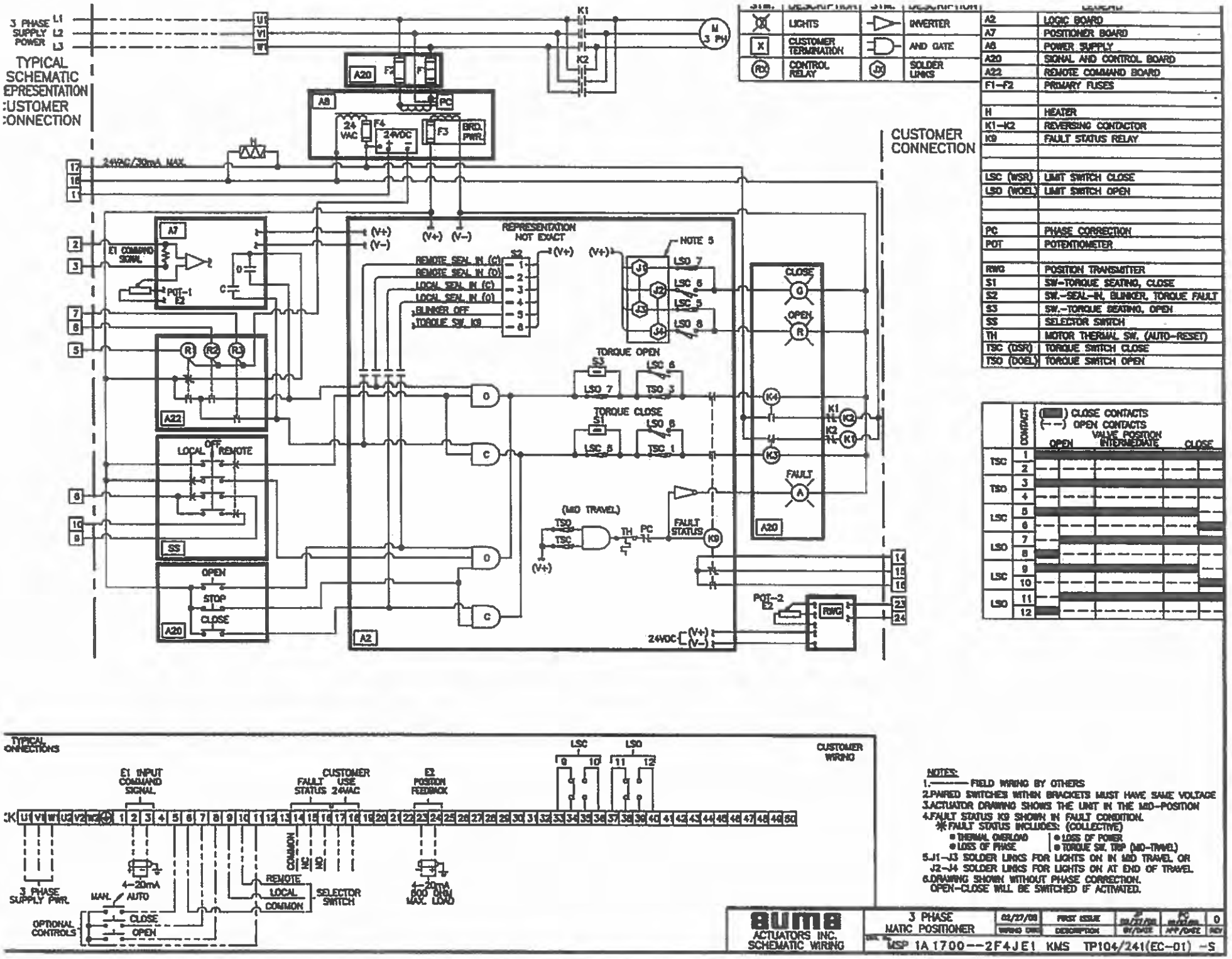
Output Drive Type: MACHINED COUPLING - GS63.3
BORE: 1.250 / 1.255"
KEYWAY: 0.250 / 0.252"
FUW 1/4" SQUARE KEY

Motor Control: AUMA MATIC W/ 110V INTERFACE BOARD
INTERFACE 115VAC NO EMERGENCY MECH START
STARTER SIZE A 110V WITH OL
.65 TO 1 AMP OVERLOAD
480 VOLT 3 PHASE WITH POWER SUPPLY 115V
NEMA 4X
AUMA STANDARD SILVER-GRAY COROTHANE
PB-3 SS-3POS AUX CONTACT
P&S 100MM (1) 1-1/4" (2) 1/2"

Overload Relays:	0.8 amps
Open:	Limit switch
Closed:	Limit switch
Faceplate:	
Pushbuttons:	Open, Stop, Close
Selector Switch:	Local, Off, Remote
Lights:	Open, Fault, Closed (Red, Amber, Green)

Drawings:
ACTUATOR SCHEMATIC WIRING DRAWING
MSP 1A10KC5--F2JE2 KMS 9TP100-231-1 -S REV-005
ACTUATOR DIMENSIONAL DRAWING
SD 111522 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DRAWING
SK 099241 REV-001

Certified By: Sue Hite **Certified Date:** 3/27/2008 **Revision:** 0

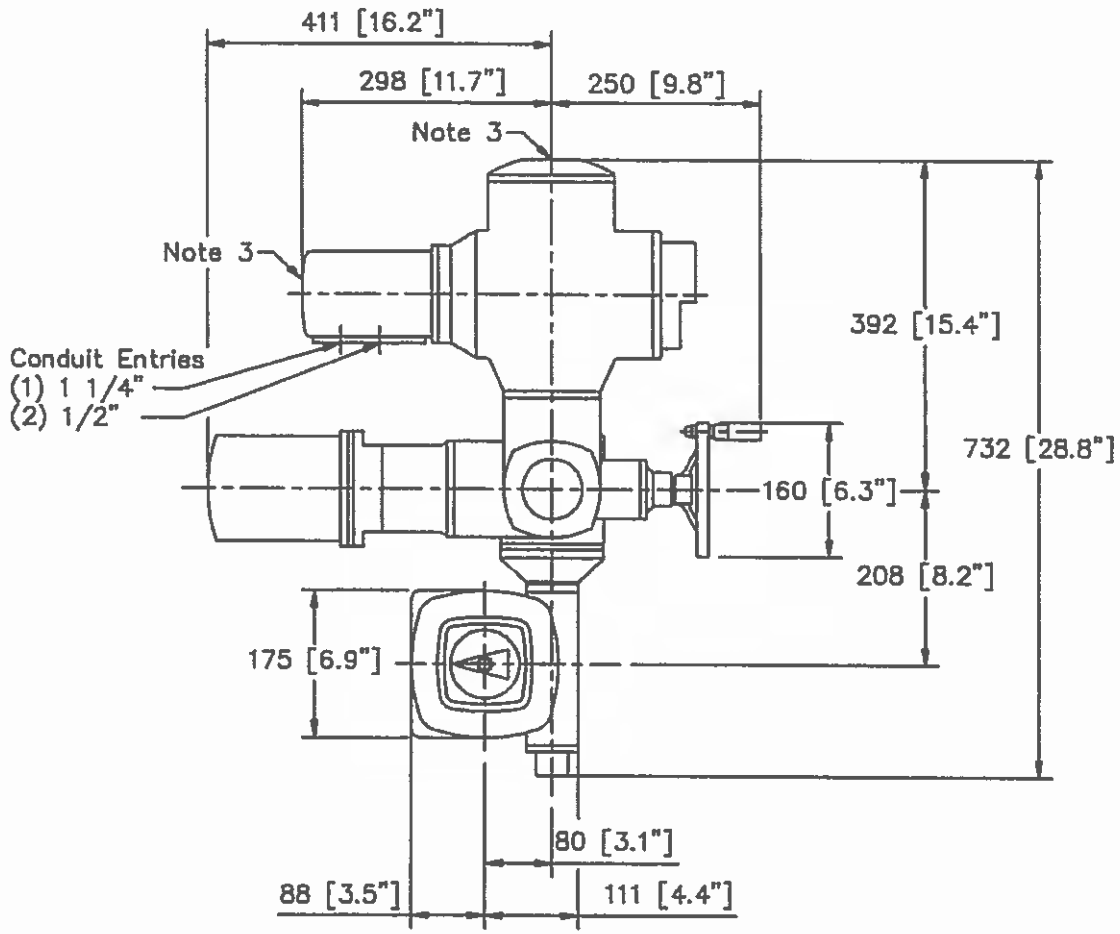


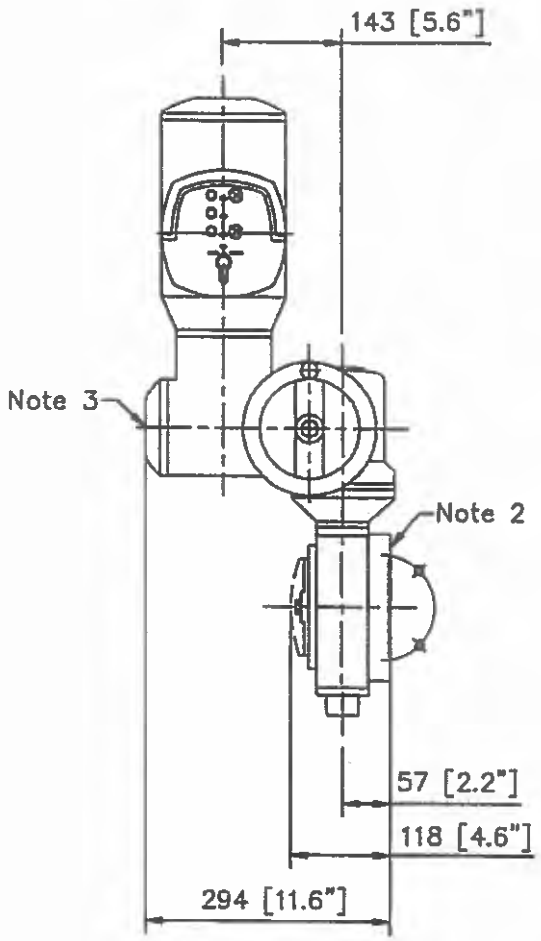
LIGHTS		INVERTER	
CUSTOMER TERMINATION	X	AND GATE	
CONTROL RELAY	RX	SOLDER LINKS	JX

A2	LOGIC BOARD
A7	POSITIONER BOARD
A8	POWER SUPPLY
A20	SIGNAL AND CONTROL BOARD
A22	REMOTE COMMAND BOARD
F1–F2	PRIMARY FUSES
H	HEATER
K1–K2	REVERSING CONTACTOR
K9	FAULT STATUS RELAY
LSC (WSR)	LIMIT SWITCH CLOSE
LSO (WOEL)	LIMIT SWITCH OPEN
PC	PHASE CORRECTION
POT	POTENTIOMETER
RWG	POSITION TRANSMITTER
S1	SW–TORQUE SEATING, CLOSE
S2	SW.–SEAL–IN, BLINKER, TORQUE FAULT
S3	SW.–TORQUE SEATING, OPEN
SS	SELECTOR SWITCH
TH	MOTOR THERMAL SW. (AUTO–RESET)
TSC (DSR)	TORQUE SWITCH CLOSE
TSO (DOEL)	TORQUE SWITCH OPEN

NOTES:
1. ——— FIELD WIRING BY OTHERS
2. PAIRED SWITCHES WITHIN BRACKETS MUST HAVE SAME VOLTAGE
3. ACTUATOR DRAWING SHOWS THE UNIT IN THE MID–POSITION
4. FAULT STATUS K9 SHOWN IN FAULT CONDITION.
   * FAULT STATUS INCLUDES: (COLLECTIVE)
   - THERMAL OVERLOAD
   - LOSS OF PHASE
   - LOSS OF POWER
   - TORQUE SW. TRIP (MID–TRAVEL)
5. J1–J3 SOLDER LINKS FOR LIGHTS ON IN MID TRAVEL OR J2–J4 SOLDER LINKS FOR LIGHTS ON AT END OF TRAVEL.
6. DRAWING SHOWN WITHOUT PHASE CORRECTION. OPEN–CLOSE WILL BE SWITCHED IF ACTIVATED.

auma ACTUATORS INC. SCHEMATIC WIRING	3 PHASE MATIC POSITIONER	02/27/08	FIRST ISSUE			0
		WIRING DWG	DESCRIPTION	BY/DATE	APP/DATE	REV
	DWG. NO. MSP 1A 1700--2F4JE1 KMS TP104/241(EC-01) -S					





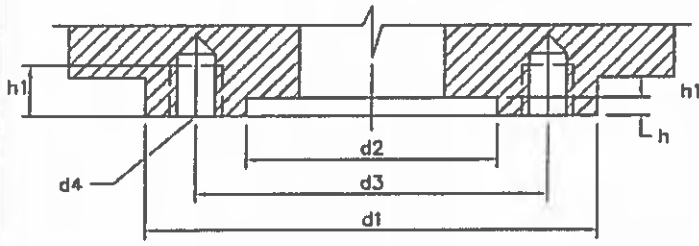
Notes:

1. Metric tolerance per ISO 2768–m.
   Dimensons in brackets [] are in inches and rounded to one decimal place.
2. See appropriate drive drawing.
3. Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.
4. Consult factory for more detailed dimensionals.
5. Actuator dimensions will not exceed drawing dimensions.

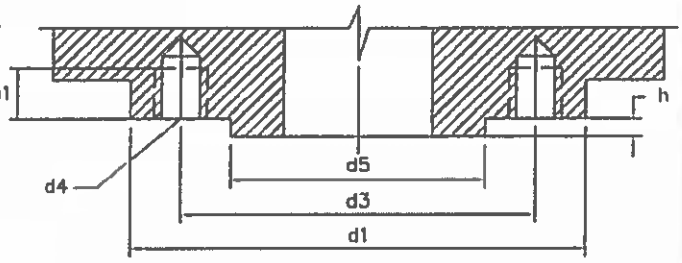
auma ACTUATORS INC.	SA(R)07.1–07.5/AM02.1–100 GS80.3 (STYLE RR–RL)	FIRST ISSUE	JL 04/04/08	JL 04/04/08	0
		DESCRIPTION	BY / DATE	APP / DATE	REV
		DWG. NO. Okw00800		SD111521	

AUMA ACTUATORS, INC.

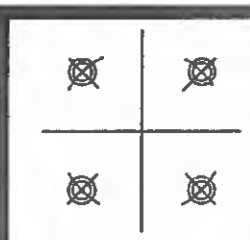
FA10 – FA40



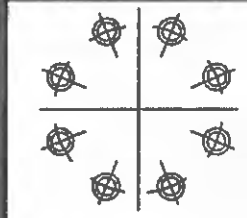
F48 – F60



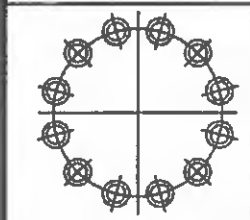
GEARBOX MODEL	FLANGE TYPE	d1	d2 (H8)	d3 ± 0.01	(qty.)d4	h	h1	d5 (f8)
GS50.3	FA10	4.9	3.346	4.00	(4) 3/8–16	0.157	0.63	–
GS63.3	FA12	5.9	4.134	4.92	(4) 1/2–13	0.157	0.75	–
GS80.3	FA14	6.9	4.527	5.51	(4) 5/8–11	0.197	0.98	–
GS100.3	FA16	8.3	5.512	6.50	(4) 3/4–10	0.197	1.26	–
GS125.3	FA25	11.8	8.858	10.00	(8) 5/8–11	0.197	0.98	–
GS160.3	FA25	11.8	7.874	10.00	(8) 5/8–11	0.236	1.00	–
GS200.3	FA30	13.8	9.055	11.75	(8) 3/4–10	0.236	1.26	–
GS250.3	FA35	16.3	10.236	14.00	(8) 1–8	0.236	1.57	–
GS315	FA40	18.7	11.811	16.00	(8) 1 1/2–6 (4)	0.393	2.00	–
GS400	F48	22.1	–	19.01	(12) M36 x 4.0	0.275	2.00	14.567
GS500	F60	35.8	–	23.74	(20) M36 x 4.0	0.275	2.20	18.500



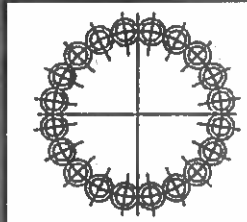
4 HOLE PATTERN
(FA10 – FA16)



8 HOLE PATTERN
(FA25 – FA40)



12 HOLE PATTERN
(F 48)

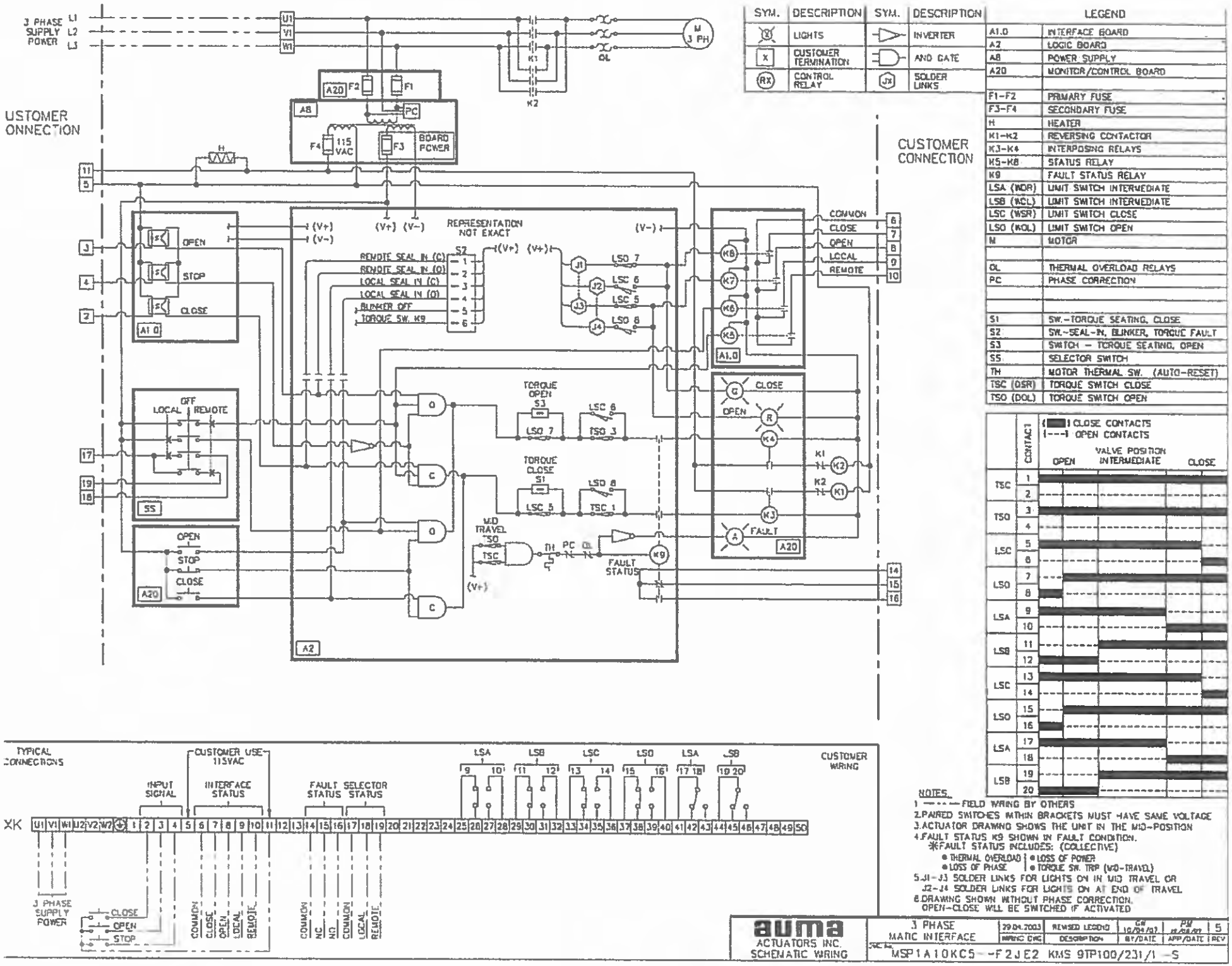


20 HOLE PATTERN
(F 60)

Notes:
1. All dimensions are in inches.
2. Unless specified tolerance per ISO 2768-m.
3. FA Flange per MSS STANDARD SP-101 unless otherwise noted.
4. FA40 Thread size 1 1/2-6 not per MSS STANDARD SP-101.
5. F Flange per ISO 5211.

STANDARD MOUNTING FLANGE DIMENSIONS

GS50.3 - GS500	BY/DATE MK 11/01/06	APP/DATE JL 11/01/06	DWG. NO. SK099241	REV 1



SYM.	DESCRIPTION	SYM.	DESCRIPTION
⊗	LIGHTS	▷	INVERTER
X	CUSTOMER TERMINATION	&	AND GATE
RX	CONTROL RELAY	Jx	SOLDER LINKS

LEGEND	
A1.0	INTERFACE BOARD
A2	LOGIC BOARD
A8	POWER SUPPLY
A20	MONITOR/CONTROL BOARD
F1-F2	PRIMARY FUSE
F3-F4	SECONDARY FUSE
H	HEATER
K1-K2	REVERSING CONTACTOR
K3-K4	INTERPOSING RELAYS
K5-K8	STATUS RELAY
K9	FAULT STATUS RELAY
LSA (NOR)	LIMIT SWITCH INTERMEDIATE
LSB (NCL)	LIMIT SWITCH INTERMEDIATE
LSC (WSR)	LIMIT SWITCH CLOSE
LSO (NOL)	LIMIT SWITCH OPEN
M	MOTOR
OL	THERMAL OVERLOAD RELAYS
PC	PHASE CORRECTION
S1	SW.-TORQUE SEATING, CLOSE
S2	SW.-SEAL-IN, BLINKER, TORQUE FAULT
S3	SWITCH - TORQUE SEATING, OPEN
SS	SELECTOR SWITCH
TH	MOTOR THERMAL SW. (AUTO-RESET)
TSC (OSR)	TORQUE SWITCH CLOSE
TSO (OSL)	TORQUE SWITCH OPEN

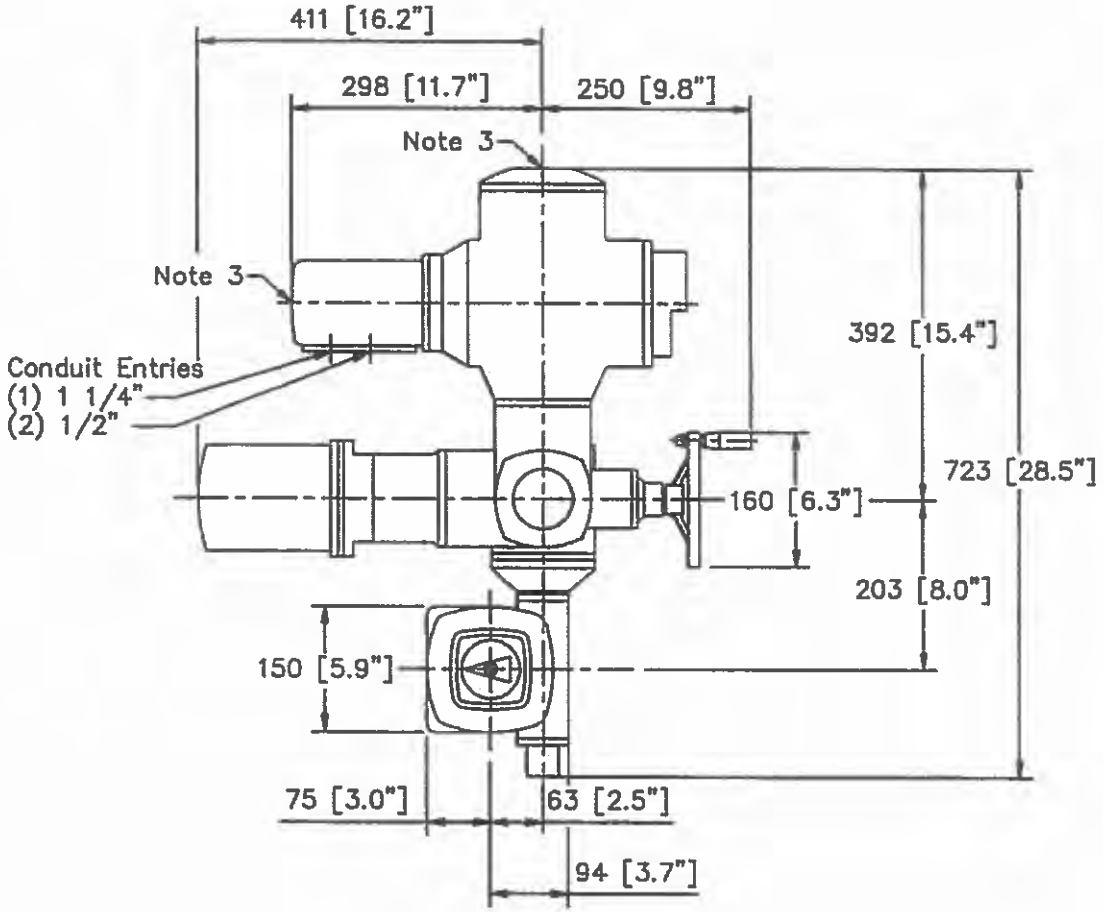
NOTES.
1 ——·——·— FIELD WIRING BY OTHERS
2.PAIRED SWITCHES WITHIN BRACKETS MUST HAVE SAME VOLTAGE
3.ACTUATOR DRAWING SHOWS THE UNIT IN THE MID-POSITION
4.FAULT STATUS K9 SHOWN IN FAULT CONDITION.
*FAULT STATUS INCLUDES: (COLLECTIVE)
- THERMAL OVERLOAD
- LOSS OF PHASE
- LOSS OF POWER
- TORQUE SW. TRIP (MID-TRAVEL)

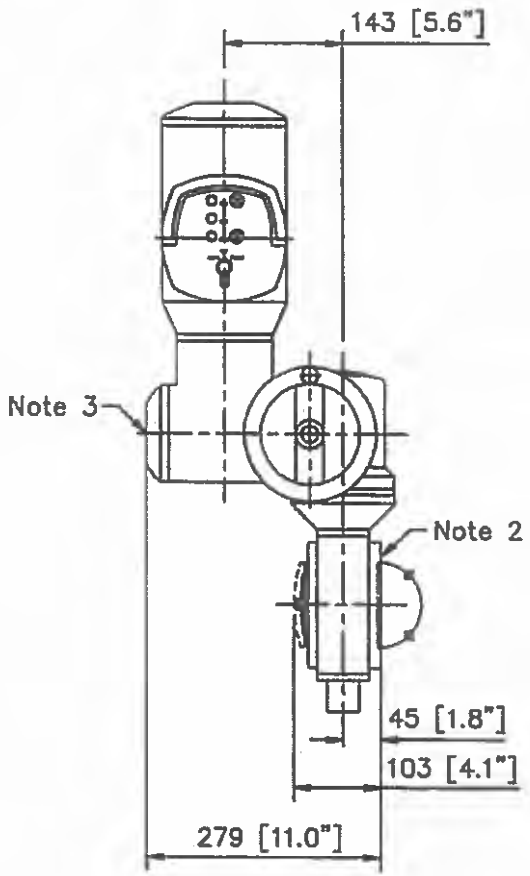
5.J1-J3 SOLDER LINKS FOR LIGHTS ON IN MID TRAVEL OR
J2-J4 SOLDER LINKS FOR LIGHTS ON AT END OF TRAVEL
6.DRAWING SHOWN WITHOUT PHASE CORRECTION.
OPEN-CLOSE WILL BE SWITCHED IF ACTIVATED

auma
ACTUATORS INC.
SCHEMATIC WIRING

3 PHASE MATIC INTERFACE	29.04.2003	REVISED LEGEND	GW 10/04/03	PW 10/04/03	5
	WIRING DWG	DESCRIPTION	BY/DATE	APP/DATE	REV

SAC-P MSP1A10KC5--F2JE2 KMS 9TP100/231/1 -S





Notes:

1. Metric tolerance per ISO 2768-m.
   Dimensons in brackets [] are in inches and rounded to one decimal place.
2. See appropriate mounting flange drawing.
3. Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.
4. Consult factory for more detailed dimensionals.
5. Actuator dimensions will not exceed drawing dimensions.

auma ACTUATORS INC.	SA (R) 07.1-07.5/AM02.1-100 GS63.3 (STYLE RR-RL)	FIRST ISSUE		0
		DWG. NO. DXBP0800		SD111522

AMERON
INTERNATIONAL
Performance Coatings & Finishes

Amerlock® 400

High-solids epoxy coating

Product Data/ Application Instructions

- VOC compliant
- High-performance general maintenance coating for new or old steel
- Cures through wide temperature range
- Self-priming topcoat over most existing coatings
- Can be overcoated with wide range of topcoats
- Compatible with prepared damp surfaces
- Compatible with adherent rust remaining on prepared surfaces
- 5 mils or more in a single coat
- Resists high humidity and moisture

Amerlock's low solvent level meets VOC requirements, reduces the chances for film pinholing and solvent entrapment at the substrate-coating interface, often a major cause of coating failure with conventional epoxies and lower solids systems.

Amerlock 400 is available in a variety of colors, including aluminum, and therefore does not require a topcoat. For extended weatherability or special uses, a topcoat may be desired.

Typical Uses

Amerlock 400 is used in those areas where blasting is impractical or impossible. As a maintenance coating, Amerlock 400 protects steel structures in industrial facilities, bridges, tank exteriors, marine weathering, offshore, oil tanks, piping, roofs, water towers and other exposures. Amerlock 400 has good chemical resistance to splash/spillage, fumes and immersion in neutral, fresh and salt water (see resistance table). Contact your Ameron representative for specific information.

Typical Properties

Physical

Abrasion resistance (ASTM D4060)	
1 kg load/1000 cycles	weight loss
CS-17 wheel	102 mg
Impact resistance (ASTM D2794)	
Direct	24 in · lb
Reverse	6 in · lb
Moisture vapor transmission (ASTM F1249)	4.49 g/m²
Adhesion (ASTM D4541)	900 psi

Performance

Salt spray (ASTM B117) 3000 hours	
Face blistering	None
Humidity (ASTM D2247) 750 hours	
Face corrosion, blistering	None
Immersion (NACE TM-01-69) fresh water 1 year	
blistering	None

NSF

Physical Data

Finish	Semigloss
Color	Standard, Rapid Response, custom colors and aluminum

White and light colors may show yellowing on aging. Use of Amercoat 861 with white or light colors will slightly discolor. Do not use Amercoat 861 with 400FD cure. With white and light colors, 400FD cure will cause yellowing.

Yellow, red and orange colors will fade faster than other colors due to the replacement of lead-based pigments with lead-free pigments in these colors.

Components	2
Curing mechanism	Solvent release and chemical reaction between components
Volume solids (ASTM D2697 modified)	
400, 400FD	83% ± 3%
400AL	88% ± 3%
Dry film thickness (per coat)	4-8 mils (100-200 microns)
Coats	1 or 2

Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)		
400	1331	32.6
400AL	1412	34.7
5 mils (125 microns)		
400	266	6.5
400AL	282	6.9

VOC	lb/gal	g/L
400 mixed	1.4	168
mixed/thinned (½ pt/gal)	1.7	204
400AL mixed	1.0	120
mixed/thinned (1½ pt/gal)	2.0	240
400FD mixed	1.2	144
mixed/thinned (½ pt/gal)	1.6	192

Temperature resistance,	wet		dry	
400	°F	°C	°F	°C
continuous	100	38	200	93
intermittent	100	38	350	177
with 880				
continuous	100	38	425	218
intermittent	100	38	450	232

Some discoloration and darkening will occur at temperatures greater than 200°F; this will not affect film integrity or coating performance.

Flash point (SETA)	°F	°C
400 resin	131	55
400 cure	85	29
400FD cure	87	30
400AL resin	110	43
400AL cure	116	47
Amercoat® 8	20	-7
Amercoat 65	78	25
Amercoat 12	2	-17

Qualifications

USDA – Incidental food contact
NFPA – Class A

NSF Standard 61 – For use in drinking water:
Amerlock 400 only
- Colors: Ivory, White, Medium Grey, RT 1805 Blue
- Numbers of Coats: 2-4
- Sequence of Coats: Any combination of listed colors
- Maximum Field Use Dry Film Thickness (in mils) : 24
- Maximum Thinner 12% Amercoat #65 by volume; 12% Amercoat #8 by volume (alternate)
- Recoat / Cure Time: 12 hours / 7 days
- Number of Coats: Use of Amercoat #8 Thinner is limited to tanks of 250,000 gallons or greater
- Tanks 1,000 gallons or greater
- Pipes 21 inches in diameter or greater
- Valves 6 inches in diameter or greater

**Certain restrictions do apply*

Chemical Resistance Guide

Environment	Immersion		Splash and Spillage		Fumes and Weather	
	400	400AL	400	400AL	400	400AL
Acidic	*	*	F	F	G	G
Alkaline	*	*	E	G	E	E
Solvents	*	*	G	G	E	E
Salt water	E	E	E	E	E	E
Water	E	E	E	E	E	E

F-Fair G-Good E-Excellent

**Contact your Ameron representative.*

This table is only a guide to show typical resistances of Amerlock 400 and 400AL. For specific recommendations, contact your Ameron representative for your particular corrosion protection needs.

Systems using Amerlock 400 or 400AL

1st coat	2nd Coat ***	3rd coat ***
400	None	None
400	450HS	None
Amershield™ 400**	None 400	None
Dimetcote® 9, 9FT or 9HS	400	None
Dimetcote 9, 9FT or 9HS	400	450HS

***Water immersion.*

****For color contrast when 2 coats of 400AL are used, 400AL red can be used as first coat.*

Recoat/Topcoat time minimum (hours)	°F/°C 90/32	70/21	50/10
400	8	16	30
400 with 1 pt 861	4	7	16
400FD	2	3½	10
400AL	3	12	48
400AL with ½ pt 861	3	5	12

Recoat/Topcoat time @ 70°F (21°C)

System	Maximum time
400/400	3 months
400 with 861/400	1 month
400FD/400FD	2 weeks
400/Amershield or 450HS	1 month
400/5405	1 day
400FD/Amershield or 450HS	7 days
400 with 861/Amershield or 450HS	2 weeks

Note: If maximum time is exceeded, roughen surface. For topcoats (finish coats) not listed, see Product Data sheet for specific topcoat time limitations.

Surface Preparation

Coating performance is, in general, proportional to the degree of surface preparation. Abrasive blasting is usually the most effective and economical method. When this is impossible or impractical, Amerlock 400 can be applied over mechanically cleaned surfaces. All surfaces must be clean, dry and free of all contaminants, including salt deposits.

Amerlock 400 may be used over most types of properly prepared and tightly adhering coatings. A test patch is recommended for use over existing coatings.

Steel – Remove all loose rust, dirt, moisture, grease or other contaminants from surface. Power-tool clean SSPC-SP3 or hand-tool clean SSPC-SP2. For more severe environments, dry abrasive blast SSPC-SP7. Water blasting is also acceptable. For immersion service – dry abrasive blast SSPC-SP10.

Aluminum – Remove oil, grease or soap film with neutral detergent or emulsion cleaner, treat with Alodine® 1200, Alumiprep® or equivalent or blast lightly with fine abrasive.

Application Data

Applied over	Steel, concrete, aluminum, galvanizing
Surface preparation	
Steel	SSPC-SP2, 3, 6, 7, 10 or 11
Concrete	ASTM D4259 or 4260
Aluminum	Alodine®, Alumiprep® or light abrasive blast
Galvanizing	Galvaprep® or light abrasive blast
Method	Airless or conventional spray. Brush or roller may require additional coats.
Mixing ratio (by volume)	1 part resin to 1 part cure

Pot life (hours)

861 Accelerator Amount	Amerlock /mixed 5 gal	°F/°C 90/32	70/21	50/10	32/0
None	400	1½	2½	4	7
	400AL	3½	5½	10	15
	400FD	1	1½	2½	4
½ pt	400	1	1½	2½	4
	400AL	1	1½	2½	4
1 pt	400	½	1	1½	2

Pot life is the period of time after mixing that a five-gallon unit of material is sprayable when thinned as recommended. Mixture may appear fluid beyond this time, but spraying and film build characteristics may be impaired.

Environmental conditions

Product	Air and Surface Temperature
Amerlock 400 or 400 AL	40° to 122°F (4° to 50°C)
Amerlock with 861	20° to 122°F (-6° to 50°C)
Amerlock 400FD cure	20° to 122°F (-6° to 50°C)

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation. At freezing temperatures, surface must be free of ice.

Do not use Amerlock 400AL on water damp surfaces. Do not use 400FD cure with 400AL resin.

Drying time (ASTM D1640) (hours)

861 Amt	Amerlock /mixed 5 gal	touch °F/°C 120/49	90/32	70/21	50/10	32/0	20/-6
None	400	1½	4½	9	28	96	NR
	400AL	1	4	12	36	96	NR
	400FD cure	½	1	2	8	24	48
½ pt	400	1½	3	5	24	72	120
	400AL	1	1½	2½	5	10	24
1 pt	400	1	2	4	15	48	96

Drying time continued

					through		
None	400	6	12	20	40	140	NR
	400AL	1½	7½	24	72	216	NR
	400FD cure	1½	2½	4½	13	38	96
½ pt	400	3	6	10	30	96	180
	400AL	2	4	9	24	48	120
1 pt	400	2½	5	9	24	72	160
				Cure for immersion (days)			
None	400	2	4	7	21	NR	NR
	400AL	2	4	7	21	NR	NR
	400FD cure	1	2	3	7	21	NR
½ pt	400AL	1	2	3	7	21	NR
1 pt	400	1	2	3	7	21	NR

Amercoat 861 Accelerator will slightly discolor Amerlock 400 white and other Amerlock light colors. Do not use 861 Accelerator with 400FD cure.

NR = Not recommended

Thinner	Amercoat 8 or 65
Equipment cleaner	Thinner or Amercoat 12

Galvanizing – Remove oil or soap film with detergent or emulsion cleaner, then use zinc treatment such as Galvaprep® or equivalent or blast lightly with fine abrasive.

Concrete – Acid etching (ASTM D4260) or abrasive blast (ASTM D4259) new concrete cured a minimum of 14 days.

Application Equipment

The following is a guide; suitable equipment from other manufacturers may be used. Changes in pressure, hose and tip size may be needed for proper spray characteristics.

Airless spray – Standard equipment such as Graco Bulldog 30:1 or larger, with a 0.017- to 0.021-inch fluid tip.

Conventional spray – Industrial equipment, such as DeVilbiss MBC or JGA or Binks 18 or 62 spray gun. A moisture and oil trap in the main air supply line, a pressure material pot with mechanical agitator and separate regulators of air and fluid pressure are recommended.

Power mixer – Jiffy Mixer powered by an air or explosion-proof electric motor.

Brush or roller – Additional coats may be required to attain proper thickness.

Application Procedure

1. Flush all equipment with thinner or Amercoat® 12 before use.
2. Stir resin using an explosion-proof power mixer to disperse pigments.
3. Add cure to resin. Mix thoroughly until uniformly blended to a workable consistency. For low temperature application, use Amercoat 861 accelerator or 400FD cure. Do not use Amercoat 861 when using Amerlock 400FD cure or with Amerlock white or light colors as color variation may result. Do not exceed the 1 pint Amercoat 861 accelerator per 5 gallon unit recommendation. Do not use 400FD cure with 400AL resin.
4. Do not mix more material than can be used within the expected pot life.
5. For optimum application, material should be from 50° to 90°F (10° to 32°C). Above 122°F (50°C), sagging may occur.
6. Use only Ameron recommended thinners. Above 85°F (29°C) use Amercoat 8, at lower temperatures use Amercoat 65. A small amount of thinner greatly reduces viscosity; excessive thinning will cause running or sagging. Thin cautiously as follows:

Amercoat 8 or 65 thinner	400 and 400FD	400AL
Airless – up to	¼ pt/gal	1½ pt/gal
Conventional – up to	½ pt/gal	1½ pt/gal

Below 50°F additional thinning may be needed and multiple coats required to achieve specified thickness.

7. To minimize orange peel appearance, adjust conventional spray equipment to obtain adequate atomization at lowest air pressure.
8. Apply a wet coat in even, parallel passes with 50 percent overlap to avoid holidays, bare areas and pinholes. If required, cross spray at right angles.
9. When applying Amerlock 400 directly over inorganic zincs or zinc rich primers, a mist coat/full coat technique may be required to minimize bubbling. This will depend on the age of the Dimetcote®, surface roughness and conditions during curing.

Note – Do not use Amerlock 400AL on water damp surfaces

10. Ventilate confined areas with clean air between coats and while curing the final coat. Prevent moisture condensation on the surface between coats.
11. Repair damaged areas by brush or spray.
12. Clean equipment with thinner or Amercoat 12 immediately after use.

Shipping Data

Packaging unit	2 gal	5 gal
cure	1-gal can	2.5-gal can
resin	1-gal can	2.5-gal can
Shipping weight (approx)	lbs	kg
2-gal unit		
400 cure	12.5	5.7
400FD cure	12.2	5.5
400 resin	13.7	6.2
400AL cure	12.1	5.5
400AL resin	11.0	5.0
5-gal unit		
400 cure	31.8	14.4
400FD cure	31.2	14.2
400 resin	35.0	15.9
400AL cure	30.9	14.0
400AL resin	28.3	12.8

Shelf life when stored indoors at 40° to 100°F (4° to 38°C)
resin and cure — 1 year from shipment date.

Numerical values are subject to normal manufacturing tolerances, color and testing variances. Allow for application losses and surface irregularities.

This mixed product is photochemically reactive as defined by the South Coast Air Quality Management District's Rule 102 or equivalent regulations.

Safety Precautions

Read each component's material safety data sheet before use. Mixed material has hazards of each component. Safety precautions must be strictly followed during storage, handling and use.

CAUTION – Improper use and handling of this product can be hazardous to health and cause fire or explosion.

Do not use this product without first taking all appropriate safety measures to prevent property damage and injuries. These measures may include, without limitation: implementation of proper ventilation, use of proper lamps, wearing of proper protective clothing and masks, tenting and proper separation of application areas. Consult your supervisor. Proper ventilation and protective measures must be provided during application and drying to keep solvent vapor concentrations within safe limits and to protect against toxic hazards. Necessary safety equipment must be used and ventilation requirements carefully observed, especially in confined or enclosed spaces, such as tank interiors and buildings.

This product is to be used by those knowledgeable about proper application methods. Ameron makes no recommendation about the types of safety measures that may need to be adopted because these depend on application and space, of which Ameron is unaware and over which it has no control.

If you do not fully understand the warnings and instructions or if you cannot strictly comply with them, do not use the product.

Note: Consult Code of Federal Regulations Title 29, Labor, parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable federal, state and local regulations on safe practices in coating operations.

This product is for industrial use only. Not for residential use.

Limitation of Liability

Ameron's liability on any claim of any kind, including claims based upon Ameron's negligence or strict liability, for any loss or damage arising out of, connected with, or resulting from the use of the products, shall in no case exceed the purchase price allocable to the products or part thereof which give rise to the claim. **In no event shall Ameron be liable for consequential or incidental damages.**

Warranty

Ameron warrants its products to be free from defects in material and workmanship. Ameron's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at Ameron's option, to either replacement of products not conforming to this Warranty or credit to Buyer's account in the invoiced amount of the nonconforming products. Any claim under this Warranty must be made by Buyer to Ameron in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, whichever is earlier. Buyer's failure to notify Ameron of such nonconformance as required herein shall bar Buyer from recovery under this Warranty.

Ameron makes no other warranties concerning the product. No other warranties, whether expressed, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply. In no event shall Ameron be liable for consequential or incidental damages.

Any recommendation or suggestion relating to use of the products made by Ameron, whether in its technical literature, or in response to specific inquiry, or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by Buyers having requisite skill and know-how in the industry, and therefore it is for Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

AMERON INTERNATIONAL

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Ameron B.V. • J. F. Kennedylaan 7, 4191 MZ Geldermalsen, The Netherlands • (31) 345-587-587

MILLIKEN VALVE COMPANY

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

MILLCENTRIC FLOW (CV) CHART

Valve Size	Milliken CV
3"	635 gpm
4"	1,120 gpm
6"	2,359 gpm
8"	4,182 gpm
10"	7,073 gpm
12"	8,366 gpm
14" *	8,505 gpm
14" **	4,631 gpm
16"	9,365 gpm
18"	11,411 gpm
20"	13,612 gpm
24"	21,343 gpm
30"	36,445 gpm
36"	47,871 gpm

*round port
**rectangular port
9/07

Lloyd's Register

Project: Proof of Design Tests

Certificate No.: LIV 202965/1

Client: Hattersley Newman Hender Ltd.
Milliken Valve Company Inc.

Office: Liverpool

Client's Order No.: R904720

Date: 8 February 1993

Order Status: Complete

Inspection dates First: 23.11.92

Final: 14.1.93

This is to certify that at the request of the above client the undersigned Surveyor to this Society did attend at their Ormskirk works on and between the above dates for the purpose of witnessing testing as under noted on:-

6" Fig 601 Millcentric Eccentric Plug Valves.
in accordance with section 5.5 of A.W.W.A. C504-80.

Three of the above valves were selected and hydro static tested to 350psi on the body for 1 minute no deformation or leakage found and on the seat to 350 psi for 1 minute no deformation or leakage found. Each valve in turn was then subjected to 10000 operational under hydraulic pressure of as follows.

1. Valve closed.
2. Hydraulic pressure of 175 psi applied.
3. Valve opens to fully open and zero pressure.
4. Back to operation 1.

On completion of 10,000 cycles each valve was subjected to a seat leakage test of 175 psi for 1 minute and found tight.

The valves were then opened up and inspected and no visible deterioration was noted.

.....

D.G. Sutton.
Surveyor to Lloyd's Register.

Mueller Group, Inc.
Research and Development Center

20 Thurber Blvd.
Smithfield, RI 02917
401-349-3020
401-349-3021 Fax

Test Report MUAD02-1
Proof-of-Design Test
Milliken 24" Figure 601 Plug Valve
June 6th 2003

Test Objective:
This test was performed to evaluate the capability of a Milliken Figure 601 Plug Valve to meet the Proof-of-Design requirements of ANSI/AWWA C504-00 Section 5, Paragraphs 5.2.4 through 5.4.2.3.

Description of test valve.
The valve tested was a Milliken 24" Figure 601 eccentric plug valve with a rectangular elastomer coated plug. The valve pressure rating was 150 CWP. Valve design was in accordance with MSS-SP-78 1998.

Test Apparatus:
The valve was actuated by a Morin model B 575U D000 Cylinder Actuator, driven by air over water reservoirs. The end flanges of the valve were closed by test heads, and the valve was pressurized to 150 psig in each closed cycle by a centrifugal pump fed by a water reservoir. Valve discharge on opening was returned to the same reservoir. A directional solenoid valve initiated by an electronic timer controlled the open/close cycling of the valve. The same device recorded open/close cycles. The open/close/open cycle of the valve was 45 seconds. Test pressure was monitored by a 0 – 500 psig pressure gauge, serial # MF-01-007, Calibrated 7/15/02, recalibration due 8/21/03.

Test procedure:
The valve shell was pressurized to 300 psig with the plug in the open position, and inspected for external leakage. No leakage was evident. The plug was then closed and the valve pressurized to 300 psig seat upstream. No leakage or permanent deflection was observed. This procedure was repeated with the pressure seat downstream. Again no leakage or permanent deflection was observed.
The valve was cycled fully open /closed/fully open for 5,000 cycles with 150 psig applied to the plug at each closed cycle. The valve was inspected for leakage at 1,000 cycle intervals. At the completion of 5,000 cycles the valve was tested in both flow directions for leakage past the plug. No leakage was observed.

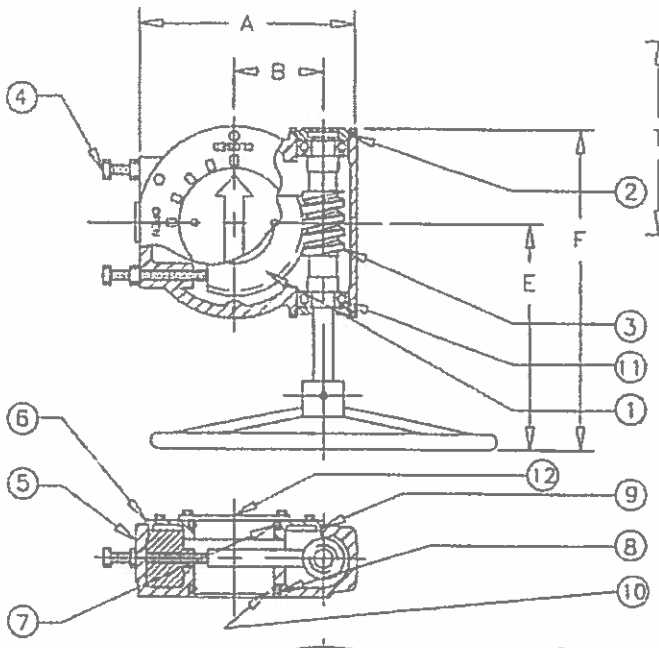
Conclusion:
The 24" Milliken figure 601 Plug Valve meets ANSI/AWWA C504-00 Proof-of-Design requirements as specified in Section 5 Paragraphs 5.2.4 through 5 4.2.3.

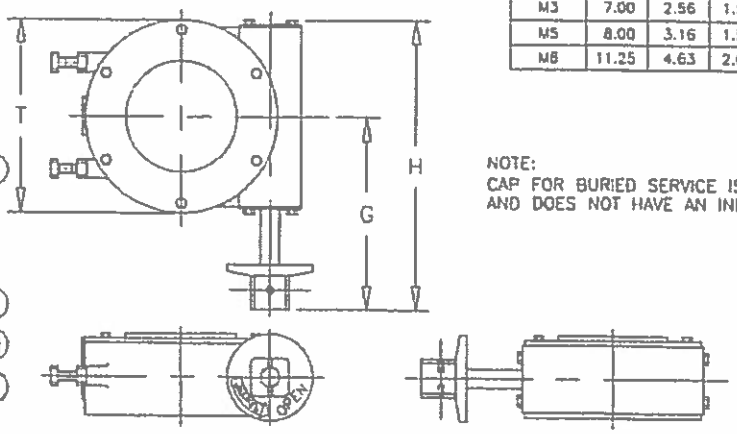
Robert Engelhardt - Senior Laboratory Technician

W Bryce Scobie - Chief Engineer

Subscribed and sworn to before me in
Providence County Rhode Island on the
10th day of June 2003

Renee M. Pelletier
Notary Public - Rhode Island
My Commission Expires
February 25, 2004

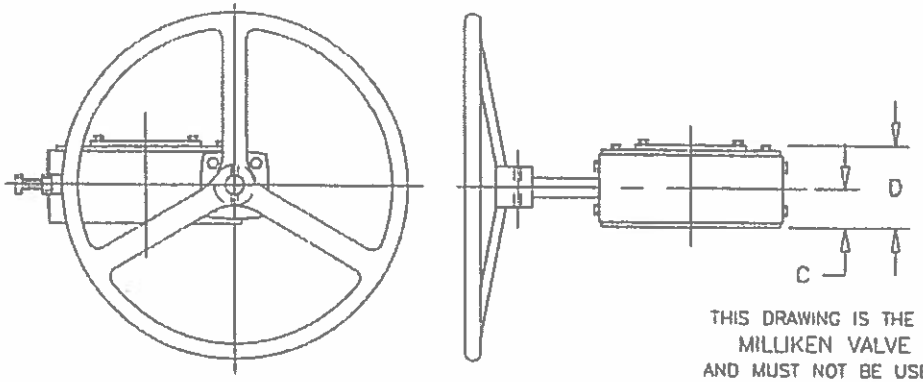




BURIED SERVICE GEAR WITH 2" NUT

OPER.	A	B	C	D	E	F	G	H	T
M3	7.00	2.56	1.50	3.34	9.5	11.7	8.0	11.3	6
M5	8.00	3.16	1.50	3.56	11.3	14.7	8.0	11.4	7.25
M8	11.25	4.63	2.00	4.72	11.6	16.2	10.0	14.6	10.0

NOTE:
CAP FOR BURIED SERVICE IS ONE PIECE
AND DOES NOT HAVE AN INDICATOR PLATE



ABOVE GROUND GEAR WITH HANDWHEEL

ITEM	QTY	DESCRIPTION	MATERIAL
12	1	INDICATING COVER	ALUMINUM
11	2	BEARING	STEEL ROLLER BEARINGS
10	1	O-RING	NITRILE
9	1	O-RING	NITRILE
8	2	SLEEVE BEARING	BRONZE
7	2	O-RING	NITRILE
6	1	CAP	SAME AS HOUSING
5	1	GEAR HOUSING	DUCTILE IRON
4	2	STOP LUG	STL/ZINC OR 316 STN. STL.
3	1	WORM GEAR	HARDENED STEEL
2	2	O-RING	NITRILE
1	1	QUAD GEAR	DUCTILE IRON A536

MILLIKEN VALVE CO

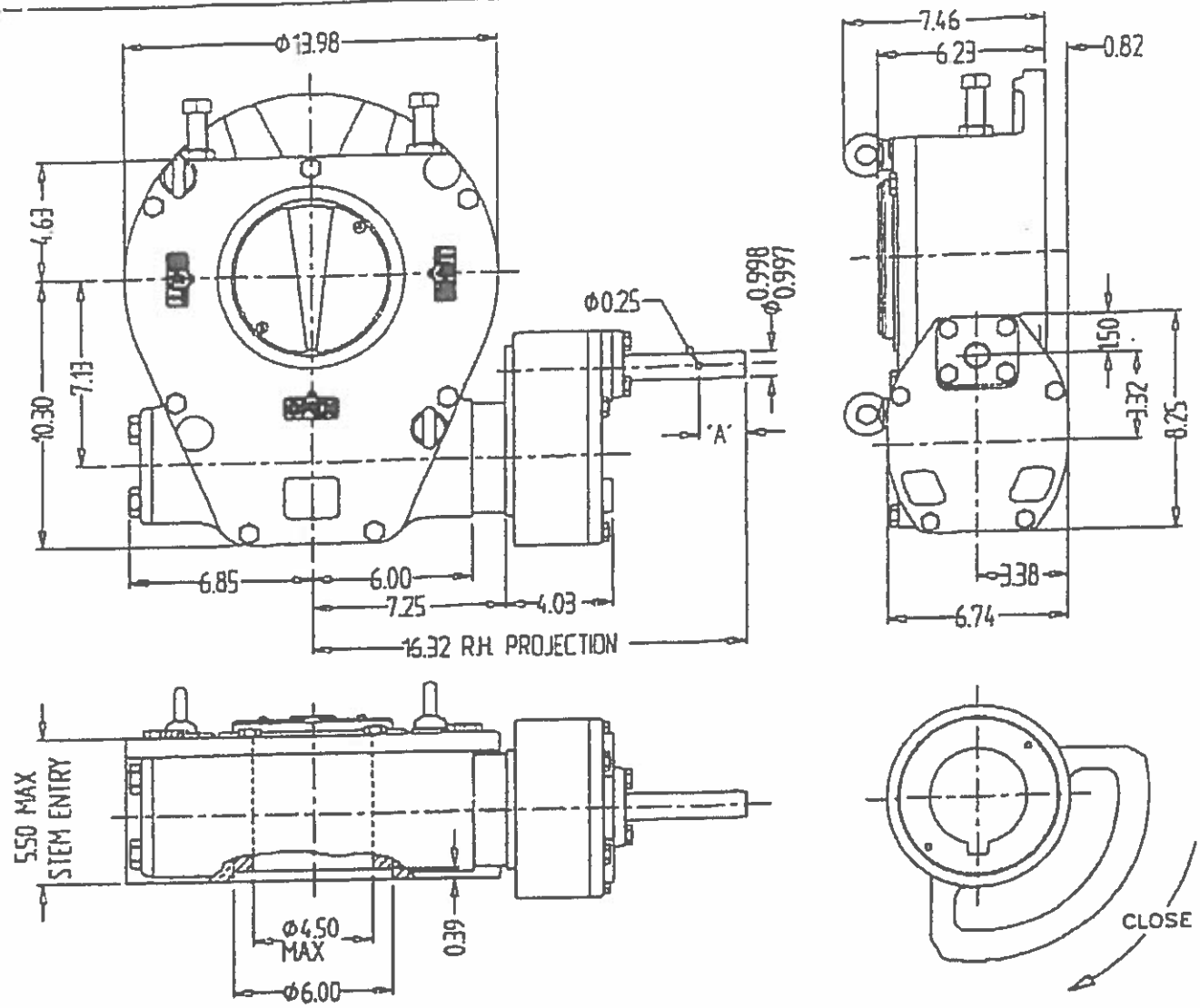
BY: CR | DATE: 8/97 | SCALE: NONE
CHK'D:

DATE	REVISIONS	BY
5/98	ADJ. SEGMENT LENGTH STOP BOLT THREAD STOP BOLT LENGTH BEARING ITEM	CR
8/98	BILL OF MAT. WORM GEAR WAS STEEL	CR
9/07	ADD "T" DIMENSION	FS

TITLE: MILLIKEN GEAR

DWG. NO. S49624

ACTUATOR TYPE - MJF50/S5



OUTPUT KEYWAY DETAILS
SHOWN IN OPEN POSITION

GENERAL INFORMATION

TRAVEL	90° ±5° AT BOTH ENDS
RATIO	250:1
TURNS TO CLOSE	625
MECHANICAL ADVANTAGE	730 ±10%
MAXIMUM OUTPUT TORQUE	105000 in-lbs
MAXIMUM INPUT TORQUE	1438 in-lbs

MOUNTING HOLE DETAL:

PREFERED BOLT CIRCLE STRADDLING C_L	10.00" (F25)
MAXIMUM BOLT CIRCLE STRADDLING C_L	11.75"
MAXIMUM BOLT CIRCLE ON C_L	11.75"
MINIMUM BOLT CIRCLE	7.25"

APPROXIMATE WEIGHT 220.5 lbs (100 kg)

HANDWHEEL DATA		
Φ	'A'	RIM PULL AT MAX. TORQUE
10"	1.25"	288 lbs
12"	1.25"	240 lbs
14"	1.25"	205.5 lbs
18"	1.75"	160 lbs
24"	1.75"	120 lbs
30"	1.75"	96 lbs
36"	1.75"	80 lbs

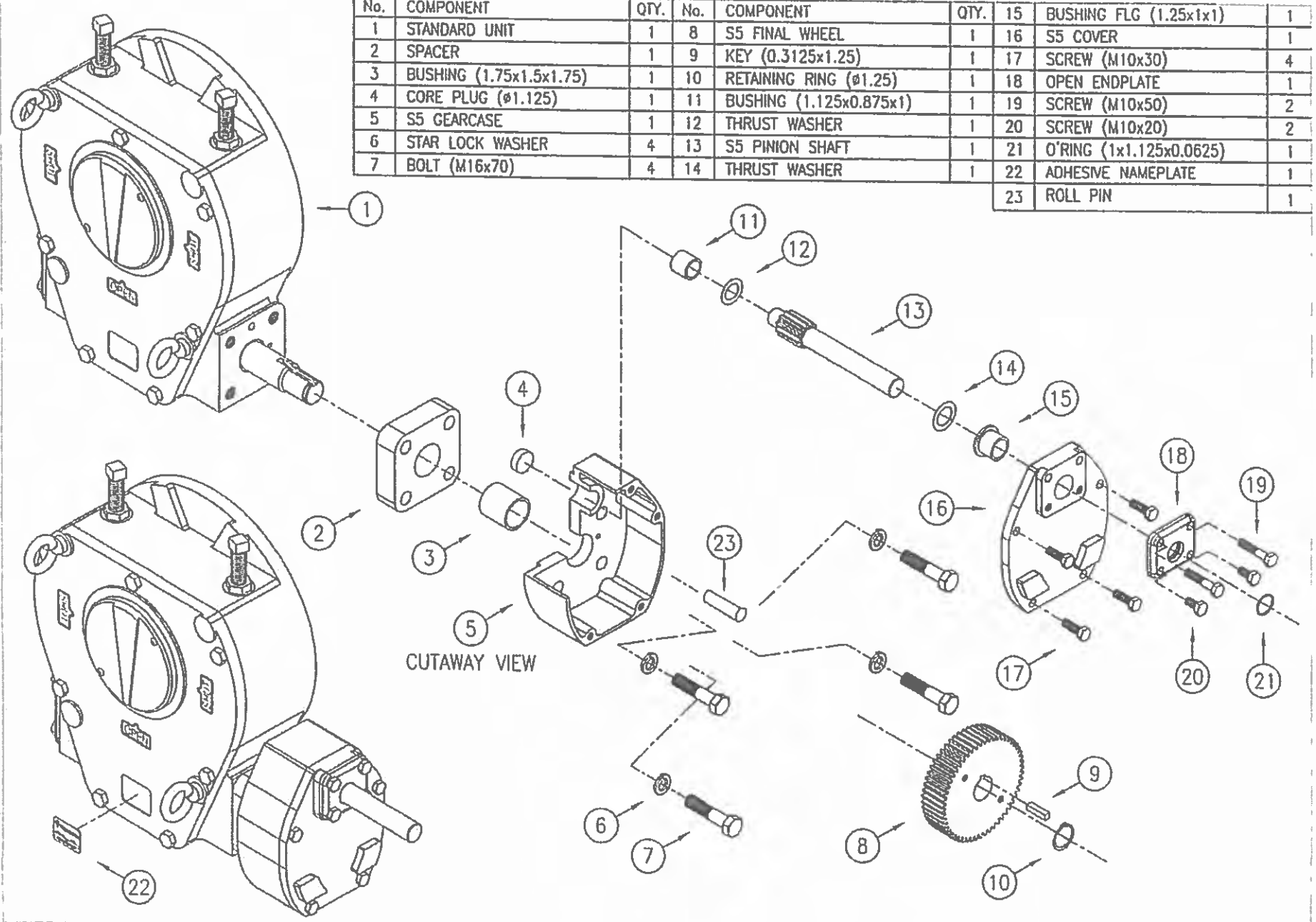
MASTERGEAR
DIVISION OF REGAL-BELOIT CORPORATION
5466 EAST RIDGTON RD. · SOUTH BELOIT, IL 61080

DIMENSIONS IN	DO NOT SCALE	DRAWING No.
INCHES		MJ 7028
	APPROVED BY JRH	REV. A 2/9/98

MJF50/S5 MATERIAL LIST

ITEM	MATERIAL
1	SEE MJF50 MATERIAL LIST
2	CAST IRON
3	SINTERED BRONZE
4	PLATED STEEL
5	CAST IRON
6	PLATED STEEL
7	HARDENED STEEL
8	CARBON STEEL
9	CARBON STEEL
10	STEEL
11	SINTERED BRONZE
12	HARDENED STEEL
13	CARBON STEEL
14	HARDENED STEEL
15	SINTERED BRONZE
16	CAST IRON
17	HARDENED STEEL
18	CAST IRON
19	HARDENED STEEL
20	HARDENED STEEL
21	NITRILE
22	ALUMINUM
23	HARDENED STEEL

No.	COMPONENT	QTY.	No.	COMPONENT	QTY.	15	BUSHING FLG (1.25x1x1)	1
1	STANDARD UNIT	1	8	S5 FINAL WHEEL	1	16	S5 COVER	1
2	SPACER	1	9	KEY (0.3125x1.25)	1	17	SCREW (M10x30)	4
3	BUSHING (1.75x1.5x1.75)	1	10	RETAINING RING (ø1.25)	1	18	OPEN ENDPLATE	1
4	CORE PLUG (ø1.125)	1	11	BUSHING (1.125x0.875x1)	1	19	SCREW (M10x50)	2
5	S5 GEARCASE	1	12	THRUST WASHER	1	20	SCREW (M10x20)	2
6	STAR LOCK WASHER	4	13	S5 PINION SHAFT	1	21	O'RING (1x1.125x0.0625)	1
7	BOLT (M16x70)	4	14	THRUST WASHER	1	22	ADHESIVE NAMEPLATE	1
						23	ROLL PIN	1

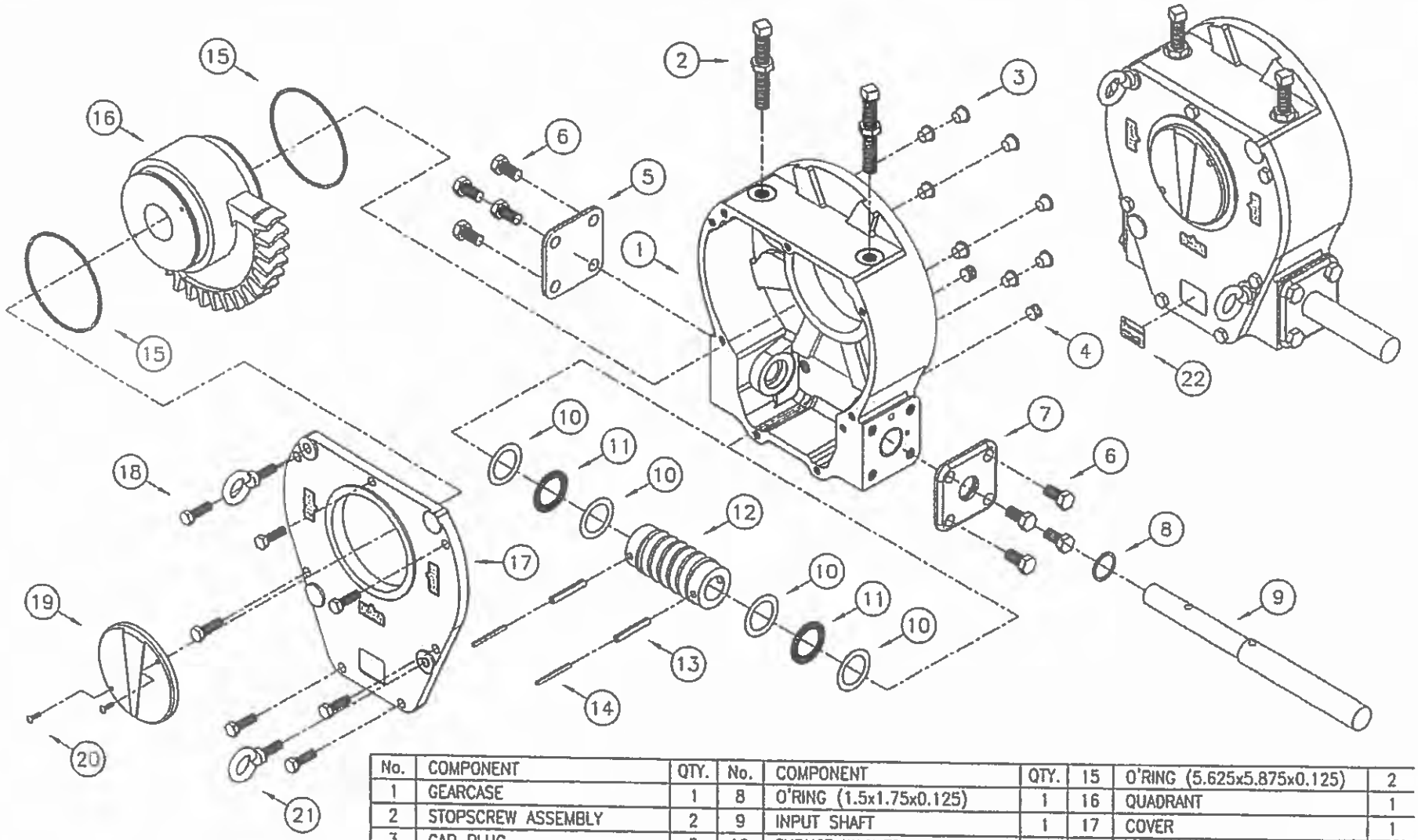


MASTERGEAR | ENVIRONMENTAL SPECIFICATION: SL039 | 9/2/99

90° OUTPUT UNIT	UNIT: MJF	S5 SPUR BOX	MJF/S5/SL039	REV: B

MJF50 MATERIAL LIST

ITEM	MATERIAL
1	CAST IRON
2	HARDENED STEEL
3	PLASTIC
4	CAST IRON
5	CAST IRON
6	HARDENED STEEL
7	CAST IRON
8	NITRILE
9	CARBON STEEL
10	HARDENED STEEL
11	HARDENED STEEL
12	ALLOY STEEL
13	HARDENED STEEL
14	HARDENED STEEL
15	NITRILE
16	DUCTILE IRON
17	CAST IRON
18	HARDENED STEEL
19	CAST IRON
20	HARDENED STEEL
21	CAST IRON
22	ALUMINUM



No.	COMPONENT	QTY.	No.	COMPONENT	QTY.	No.	COMPONENT	QTY.
1	GEARCASE	1	8	O'RING (1.5x1.75x0.125)	1	15	O'RING (5.625x5.875x0.125)	2
2	STOPSCREW ASSEMBLY	2	9	INPUT SHAFT	1	16	QUADRANT	1
3	CAP PLUG	8	10	THRUST WASHER	4	17	COVER	1
4	PRESS PLUG (ø0.375)	2	11	NEEDLE BEARING	5	18	SCREW (M12x40)	7
5	CLOSED ENDPLATE	1	12	WORM	1	19	INDICATOR CAP	1
6	SCREW (M16x30)	8	13	ROLL PIN (10x65)	2	20	SCREW (M6x25)	2
7	OPEN ENDPLATE	1	14	ROLL PIN (6x65)	2	21	EYE BOLT (M12x40)	2
						22	ADHESIVE NAMEPLATE	1

MJF | STANDARD UNIT | MJF/SL039 | REV. A

SL039 4/3/95

MILLIKEN

MILLCENTRIC

ECCENTRIC PLUG VALVE

The Milliken criteria of quality, reliability, safety and value are embodied in the MILLCENTRIC Eccentric valve, setting higher standards for dependable performance with excellent features achieved by the utilization of the very latest design and manufacturing techniques.

BODY

Conforming to AWWA C504 wall thickness, the Millcentric valve body casting is in ASTM A126 CL B cast iron using high pressure molding techniques. Alternative flanged, grooved or mechanical joint ends are available.
Flange diameter, thickness and drilling conform to ANSI B16.1 Class 125 or 250.
Grooved ends meet AWWA C-606 for ductile or steel pipe. Mechanical joints to AWWA C111 (ANSI A21.11).

SEAT

The Millcentric valve incorporates as standard, on 3" and larger, a welded 90% nickel seat for corrosion and erosion resistance specially profiled for low torque and extended seat life.
An alternative corrosion resistant epoxy seat is available for general service duties.

STEM SEAL

High integrity sealing by combining the advantages of a resilient and abrasion resistant U-Cup seal. From vacuum to high pressure, the self-adjusting sealing system (per AWWA C504) gives positive, trouble-free service and is retained independently of the plug stem or external torque device.

BEARINGS

The plug rotates in permanently lubricated 316 grade stainless steel bearings on 20" and smaller, and permanently lubricated bronze bearings on 24" and larger, located in the body and bonnet, along with upper and lower PTFE thrust washers, which ensure consistently low operating torque.

- Computer Aided Design
- High integrity casting
- CNC manufacturing delivers consistent sizes on all components

All complemented by rigorous Quality Control System

PLUG

Supported on integral trunnions, the plug face is covered with a elastomer that is molded 2½"-12" and vulcanized on 14" and larger to the casting providing tight shut off even under vacuum conditions. High integrity corrosion-free sealing is achieved by a variety of abrasion resistant elastomers which protect the plug right up to the trunnions. When assembled, the light compression of the elastomers onto PTFE thrust washers, prevents entry of abrasive materials into the bearings.

BONNET SEAL

Superior "O" ring sealing with metal/metal contact means lower bolting stresses compared with compression gaskets.

FLOW

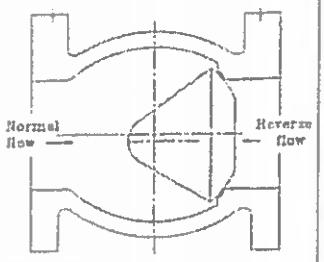
The port design (round on 2½-12" and rectangular on 14" and larger) with streamlined internal contours gives high capacity straight through flow in the full open position, reducing turbulence and pressure drop and the effect of erosive media. Handling of sludges and slurries is therefore enhanced.

INTERCHANGEABLE

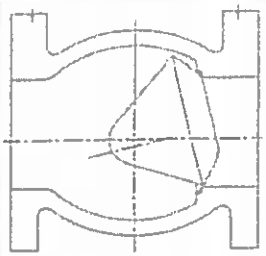
Because of common face to face dimensions with wedge gate valves (3"-12"), fitting the tight shut-off rotary MILLCENTRIC valve into existing systems is accomplished without pipeline modifications.

TRAVEL STOPS

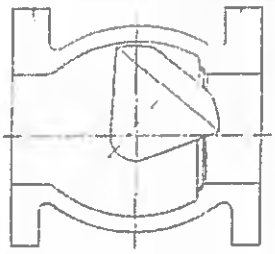
Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Millcentric valves



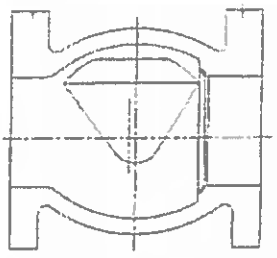
- Valve in closed position for bubble tight shut-off
- Normal flow direction gives pressure assisted sealing
- Torques are low even in reverse flow.



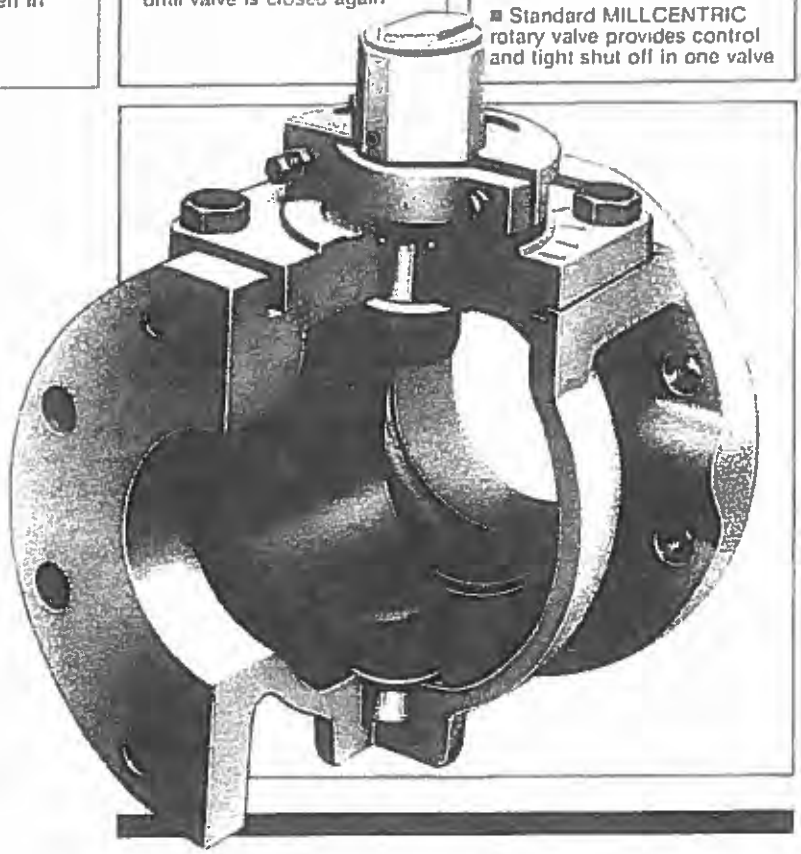
- Plug rotates away from the seat for instant opening
- Seat wear and operating torque reduced
- No further seat contact until valve is closed again



- Design of MILLCENTRIC valve allows modulating control over the full 90° travel
- Ideally suited for balancing service
- Standard MILLCENTRIC rotary valve provides control and tight shut off in one valve



- Plug is out of flow path when fully open
- Straight through, uninterrupted smooth flow
- Round port reduces turbulence and erosion, lowers pumping costs and can be "pigged" to clean the pipeline



INSTALLATION

The MILLCENTRIC valve is suitable for flow and shut-off in either direction. Seat end downstream is the preferred orientation and any reverse flow requirement should be stated at the time of order. For use on fluids with suspended solids, installation with the seat upstream and the valve stem horizontal may be preferable; plug rotation to the top of the valve will ensure smooth operation.

IN-LINE MAINTENANCE

In the unlikely event of gland leakage, the stem seals can be easily replaced without removing the bonnet. Access to the body for cleaning or inspection does not require removal from the line.

MODULAR CONSTRUCTION

Design of the bonnet and stem allows for on-site adaptation of gear operators, power actuators, or extension devices on to standard valves. Conversion can be easily undertaken without removing the valve bonnet, thereby minimizing downtime.

POWER OPERATION

Pneumatic, electric or hydraulic operation is available, complete with accessories such as limit switches, solenoid valves and positioners when required.

ELASTOMERS AVAILABLE FOR MILLCENTRIC VALVE

Natural rubber is also available.

Nitrile

A general purpose material sometimes referred to as BUNA-N or HYCAR with a -20°F to 225°F temperature range. Used on sewage, water, hydrocarbon and mineral oils.

EPDM

An excellent polymer for use on chilled water through to LP steam applications having a temperature range of -35°F to 250°F. Resistance to many acids, alkalies, detergents, phosphate esters, alcohols and glychols is an added benefit.

Neoprene

This versatile material shows outstanding resistance to abrasion and ozone. Chemical resistance to a wide range of petroleum based products and dilute acids and alkalies. Temperature range -20°F to 225°F.

Viton

Retention of mechanical properties at high temperature is an important feature of this elastomer: temperature range is -10°F to 400°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.

PRESSURE RATING

12" and smaller	ANSI 125	175 psi ←
14" and larger	ANSI 125	150 psi ←
12" and smaller	ANSI 250	400 psi
14"-36"	ANSI 250	300 psi

Body Hydrotest = 200% of rated pressure
Seat Test = 120% of rated pressure

MILLCENTRIC VALVE - SERIES 600

ORDERING INFORMATION

Valve Types	Designation
Mechanical Joint	600
ANSI 125 Flanged	601 ←
ANSI 250 Flanged	602
ANSI 125 Grooved End for Steel Pipe	606S
ANSI 125 Grooved End for Ductile Iron Pipe	606D ←
Seat	
Nickel	N ←
Epoxy	E
Elastomer Trim	
EPDM	0
Nitrile (Buna)	1 ←
Viton	2
Neoprene	3
Natural	4
Gear Operators	
Buried Gear with 2" nut	BG
Above Ground Gear with Indicator and Handwheel	AG
Memory Stop Gearbox with Handwheel	MG

Example: 4" 601 N3AG
4" ANSI 125 Flanged with Nickel Seat, Neoprene Elastomer and Above Ground Gear with Indicator and Handwheel

VALVES ARE ONLY SUPPLIED FOR BI-DIRECTIONAL SHUT-OFF IF SPECIFIED AT TIME OF ORDER.

ELASTOMER SELECTION CHART

The chart below is to assist in the selection of elastomers for some common fluids. It doesn't mean other elastomers are not suitable within varying limits. Temperature, concentration, and mixture all affect chemical attack. If there is any doubt regarding compatibility, specific conditions should be referred to engineering for recommendations. The chart below is to serve as a guide only.

Service	Elastomer	Average Useful Temp. Range
Acetone	EPDM	-35°F to 250°F
Air	EPDM	-35°F to 250°F
Air w/Oil	Nitrile	0°F to 212°F
Alcohol, Amyl	EPDM	0°F to 212°F
Alcohol, Aromatic	Viton	10°F to 250°F
Alcohol, Butyl	Neoprene	-20°F to 225°F
Alcohol, Denatured	Nitrile	-20°F to 212°F
Alcohol, Ethyl	EPDM	-35°F to 250°F
Alcohol, Grain	Nitrile	-20°F to 225°F
Alcohol, Isospropyl	Neoprene	-20°F to 225°F
Alcohol, Methyl	EPDM	-35°F to 250°F
Ammonia, Anhydrous	Neoprene	-20°F to 225°F
Ammonium Nitrate	EPDM	-35°F to 250°F
Ammonia, Water	EPDM	-35°F to 250°F
Animal Fats	Nitrile	-20°F to 212°F
Black Liquor	EPDM	-35°F to 250°F
Blast Furnace Gas	Neoprene	-20°F to 225°F
Butane	Nitrile	-20°F to 212°F
Bunker Oil "C"	Nitrile	-20°F to 212°F
Calcium Chloride	EPDM	-35°F to 250°F
Carbon Dioxide	EPDM	-35°F to 250°F
Carbon Monoxide (Cold)	Neoprene	-20°F to 150°F
Carbon Monoxide (Hot)	Viton	10°F to 300°F
Carbon Tetrachloride	Viton	10°F to 300°F

Service	Elastomer	Average Useful Temp. Range
Caustic Soda	EPDM	-35°F to 250°F
Cement Slurry	EPDM	-35°F to 250°F
Copper Sulphate	EPDM	-35°F to 250°F
Creosote (Coal)	Nitrile	-20°F to 212°F
Coal Slurry	Nitrile	-20°F to 212°F
Diesel Fuel No 1	Nitrile	-20°F to 212°F
Diethylene Glycol	EPDM	-35°F to 250°F
Ethylene Glycol	EPDM	-35°F to 250°F
Fatty Acid	Nitrile	-20°F to 212°F
Fuel Oil No 2	Nitrile	-20°F to 212°F
Fertilizer Liquid ($H_4N_2O_3$)	EPDM	-35°F to 250°F
Gasoline, Aeg	Nitrile	-20°F to 212°F
Gas, Natural	Nitrile	-20°F to 212°F
Glue, Animal	Nitrile	-20°F to 212°F
Green Liquor	EPDM	-35°F to 250°F
Hydraulic Oil (Petro)	Nitrile	-20°F to 212°F
Hydrogen	Nitrile	-20°F to 212°F
JP3, JP5	Viton	0°F to 300°F
Kerosene	Nitrile	-20°F to 212°F
Ketone	EPDM	-35°F to 250°F
Lime Slurry	EPDM	-35°F to 250°F
Methane	Nitrile	-20°F to 212°F
Methyl Ethyl Ketone	EPDM	-35°F to 250°F
Naptha (Benzin)	Nitrile	-20°F to 212°F

Service	Elastomer	Average Useful Temp. Range
Oil, Animal	Nitrile	-20°F to 212°F
Oil, Mobil Therm Light	Viton	10°F to 250°F
Oil, Mobil Therm 600	Viton	10°F to 250°F
Oil, Mobil Therm 603	Nitrile	-20°F to 212°F
Oil, Lubricating	Nitrile	-20°F to 212°F
Oil, Vegetable	Nitrile	-20°F to 212°F
Paint, Latex	Nitrile	-20°F to 212°F
Phosphate Ester	EPDM	-35°F to 250°F
Propane	Nitrile	-20°F to 212°F
Rape Seed Oil	EPDM	-35°F to 250°F
Sewage (w/oils)	Nitrile	-20°F to 212°F
Sodium Hydroxide 20%	EPDM	-35°F to 250°F
Starch	EPDM	-35°F to 250°F
Steam to 300°F	EPDM	-35°F to 300°F
Stoddard Solvent	Nitrile	-20°F to 80°F
Sulphuric Acid 10% 50%	Neoprene	-35°F to 158°F
Sulphuric Acid 100%	Viton	10°F to 300°F
Trichloroethylene Dry	Viton	10°F to 250°F
Triethanol Amine	EPDM	-35°F to 300°F
Varnish	Viton	10°F to 300°F
Water, Fresh	EPDM	-35°F to 250°F
Water, Salt	EPDM	-35°F to 250°F
Xylene	Viton	10°F to 300°F

Inspector's Copy

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FAX: (805)642-8277
www.boyleengineering.com

April 29, 2008
16817.01

Brett Dingman
Las Virgenes Municipal Water District
4232 Las Virgenes Road
Calabasas, CA 91302

Las Virgenes Municipal Water District
Construction Submittal Review
Tapia BNR Project – Centrate Treatment
Submittal 08: Plug Valves/ Electric Actuators 400520, 409210

We are returning three (3) copies of the noted submittal with the following comments:

Spec. No.	Sub.	Action	Description	Comments
		1	Cover Sheet (2 pages)	No comments
400520		2	Plug Valve Drawings/ Description (9 pages)	Provide bi-directional valves per specification for reverse flow shutoff.
409210		3	Actuator Data sheet Dimensions/Electrical Schematics/Proof of Design Test (22 pages)	Identify protective coating on actuators. Submittal says KN protection. Provide explanation of KN coating.

The submittals reviewed by Boyle Engineering Corporation are only for general conformance with the design concept of the project and general compliance with the plans and specifications and shall not be construed as relieving the Contractor of the full responsibility for: providing materials, equipment, and work required by the contract; the proper fitting and construction of the work; the accuracy and completeness of the submittal; selecting fabrication processes and techniques of construction; and performing the work in a safe manner.

ACTION
"1": No exceptions taken.
"2": Make corrections noted/No other exceptions taken. Please submit revised copy for file.
"3": Make corrections noted/Resubmit.
"4": Rejected/Revise and resubmit.
"5": Accepted for information only or not required.

Please call me if you have any questions.

Boyle Engineering Corporation

Dan Ellison, PE
Project Manager

MILLIKEN VALVE COMPANY. INC.

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

Transmittal Form

To: HD Supply
3155 N. Indian Avenue
Perris, CA 92571-3208
Attn: Chase Stallings

Date: 4/14/08

Milliken Order #: 1103632ML

Project: Tapia BNR, Las Virgenes MWD

Your P.O. #: LOI

As requested, we are forwarding the following information:

For Approval XX Number of Sets_____

For Records_____

Item	Qty	Description	Document Number
1	2	½" 603 Threaded eccentric plug valve, epoxy seat, Buna coated plug, with lever, with 10-12 mils exterior Ameron 400 blue epoxy	S 49063
2	2	8" 606D grooved for ductile pipe, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M5 Gear), with 316SS Bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49318
3	1	4" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M3 Gear), with 316SS bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110
4	4	8" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M5 Gear), with 316SS Bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110
5	2	12" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M8 Gear), with 316SS bolting, with 16 ~~10-12~~ mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49110

Agent: Kelly Brians/SW Valve

Name: Angela S. Jackson
Title: Sales Coordinator

MILLIKEN VALVE COMPANY

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

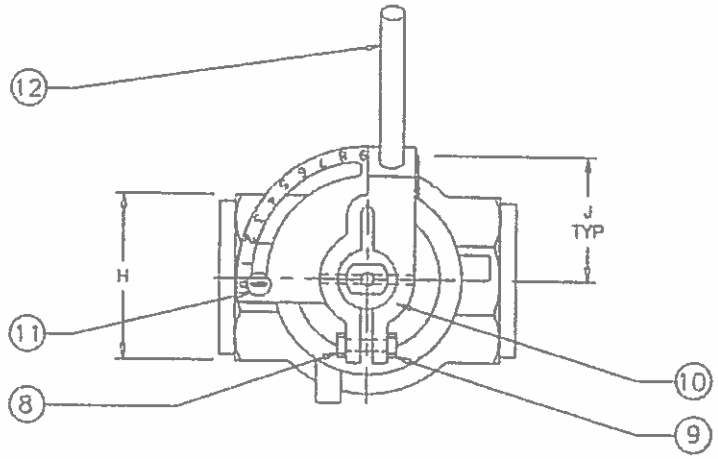
Transmittal Form

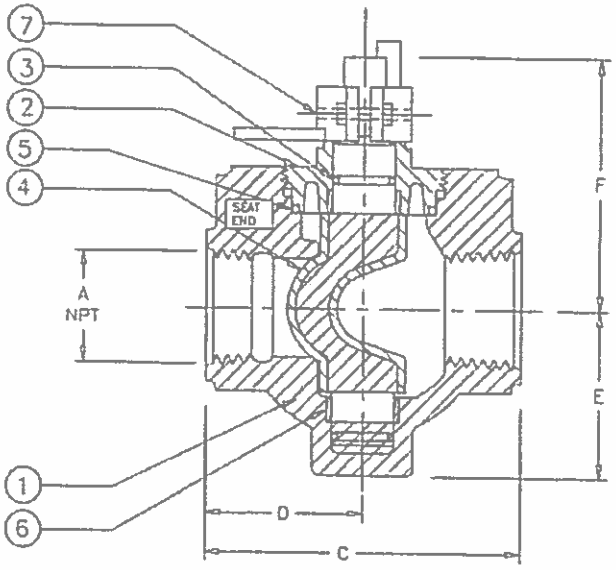
To: HD Supply

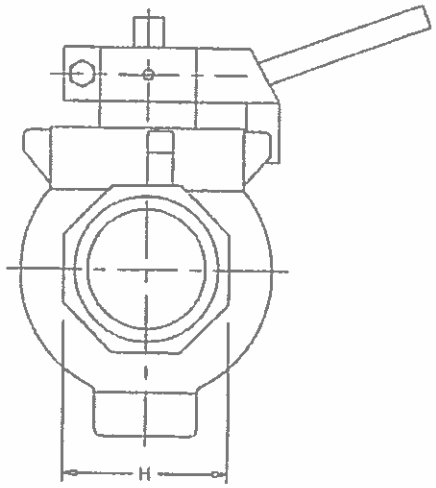
Date: 4/14/08
Milliken Order #: 1103632ML
Page: 2

Project:Las Virgenes MWD

Item	Qty	Description	Document Number
6	7	16" Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (M8 Gear) , with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy & 10-12 mils exterior Ameron 400 blue epoxy	S 49036
7	4	24" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with Above ground Indicating Gear & Handwheel (Mastergear MJF50/S5) with 316SS Bolting with ~~10-12~~ 16 mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy	S 49859
8	2	6" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy & 10-12 mils exterior Ameron 400 blue epoxy, with AUMA SA07.5-13B/GS63.3 Electric Motor for open/close service, 480V/3PH/60Hz, NEMA 4X enclosure, with reversing starters, transformer, 110VAC interface board, overload relays for the MATIC, O/S/C pushbuttons, 3 lights, L/O/R selector switch, special conduit entries (Qty 2-1/2")	S 49698I
9	2	8" 601 Flanged plug valve, welded Nickel Seat, Buna coated plug, with 316SS Bolting, with ~~10-12~~ 16 mils interior Ameron 400 black epoxy, & 10-12 mils exterior Ameron 400 blue epoxy, with AUMA SAR07.5-13B/GS80.3 Electric Motor for Modulating service, 480V/3PH/60Hz, NEMA 4X enclosure, with reversing starters, transformer, 4-20ma positioner, dual precision potentiometer (5K/5K ohms), RWG position transmitter (4-20ma DC output), solid state starters, O/S/C pushbuttons, 3 lights, L/O/R selector switch, special conduit entries (Qty 2-1/2")	S 49698I
10		AUMA Actuator Wiring Diagrams/data sheets	
11		Ameron 400 epoxy paint data sheet	
12		CV chart	
13		Proof of Design Tests	
14		Gearbox detail drawing for 20" & smaller valves	S 49624
15		Mastergear MJF50/S5 detail drawings	Catalog Cuts
16		Millcentric plug valve brochure	







VALVE SIZE	A	C	D	E	F	H	J	WEIGHT
1/2	0.50	3.75	2.10	2.00	3.75	1.88	2.0	4
3/4	0.75	3.80	2.00	2.00	3.75	2.00	2.0	4
1	1.00	3.75	2.01	2.00	3.75	1.88	2.0	4
1-1/4	1.25	4.75	2.63	2.38	4.45	2.75	2.3	7
1-1/2	1.50	4.90	2.63	2.38	4.30	2.75	2.3	7
2	2.00	5.25	2.90	3.30	5.30	3.25	2.5	12

ITEM	QTY	DESCRIPTION	MATERIAL
12	1	HANDLE	STEEL
11	1	MEMORY STOP	ALUMINUM
10	1	TORQUE COLLAR	ALUMINUM
9	1	MACHINE SCREW	STEEL/ZINC
8	1	LOCKNUT	STEEL/ZINC
7	1	SPRING PIN	SPRING STEEL
6	2	BUSHING	BRONZE
5	1	O-RING	ELASTOMER AS SPEC.
4	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
3	3	O-RING	ELASTOMER AS SPEC.
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B

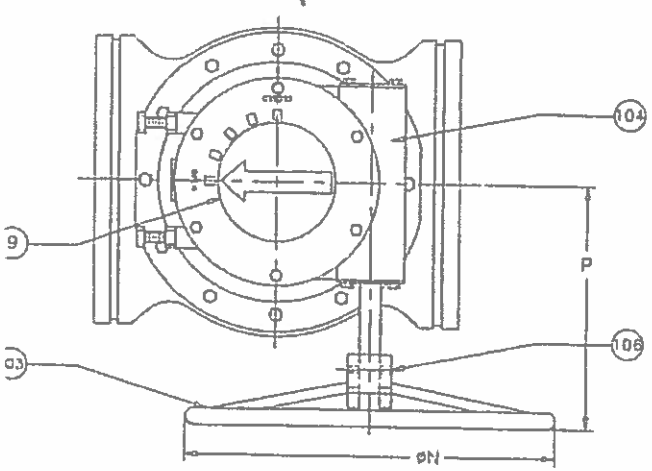
MILLIKEN VALVE CO

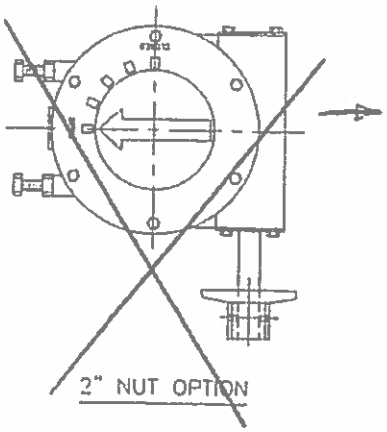
DATE	REVISIONS	BY
12/99	CAP WAS BONNET	CR
9/00	Released all valve Dimensions. Changes made	JS

BY CR | DATE 4/97 | SCALE NONE
CHK'D | DIMENSIONS INCHES

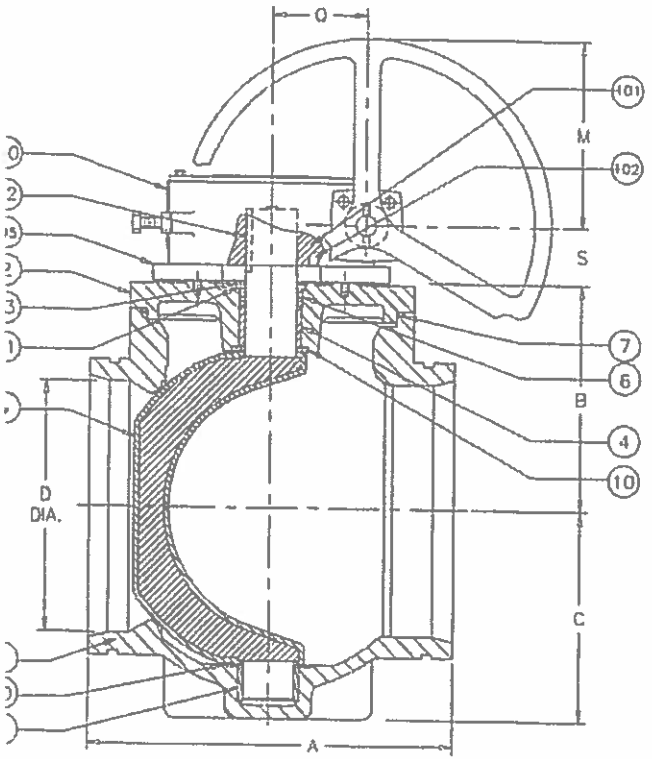
TITLE:
1/2" TO 2" FIG. 603
MILLCENTRIC PLUG VALVE,
W/ SCREWED ENDS
TORQUE COLLAR
& WRENCH

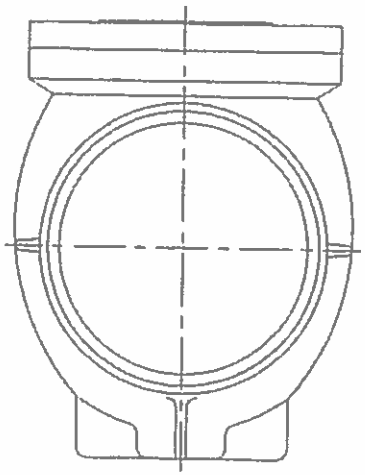
DWG. NO. S49063



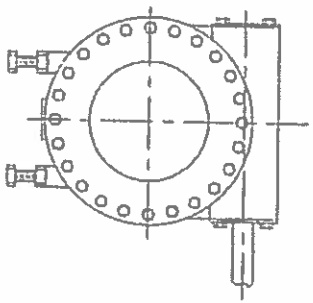


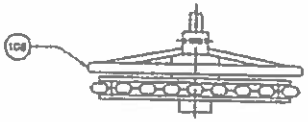
VALVE SIZE	DUCT. PIPE A	STEEL PIPE	B	C	D	M	N	P	Q	S
3	9.06	8.5	3.34	3.75	3	3	6	9.5	2.56	2.25
4	10.25	10.13	4.31	4.5	4	3	6	9.5	2.56	2.5
5	N/A	12.38	5.56	5.75	5	3	6	9.5	2.56	2.5
6	12.5	12.38	5.56	5.75	6	3	6	9.5	2.56	2.5
8	14	13.88	7.38	7.63	8	6	12	9.5	3.16	2.25
10	16.56	16.44	9.13	8.88	10	6	12	11.25	4.63	2.5
12	18	18	10.81	10	12	6	12	11.25	4.63	2.5
14	21.63	21.5	10.81	10	14	6	12	11.25	4.63	2.0



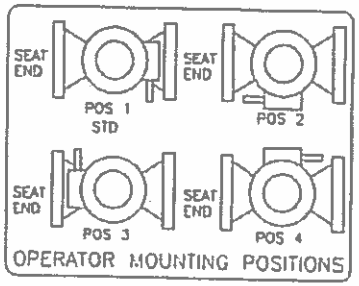


MEMORY STOP GEARBOX OPTION





CHAINWHEEL OPTION



OPERATOR MOUNTING POSITIONS

ITEM	QTY	DESCRIPTION	MATERIAL
108	1	CHAINWHEEL	DUCTILE IRON
106	1	SPRING PIN	STEEL
105	1	RISER PLATE	CAST IRON
104	1	WORMGEAR	STEEL
103	1	HANDWHEEL	DUCTILE IRON
102	2	SLEEVE BEARING	BRONZE
101	1	QUAD GEAR	DUCTILE IRON
50	1	HOUSING	CAST IRON
13	1	RETAINING RING	SPRING STEEL
12	1	KEY	STEEL
11	1	WASHER	BRASS
10	2	WASHER	PTFE
9	1	INDICATOR CAP	PLASTIC
7	1	'O' RING	ELAS. AS SPEC.
6	2	'U' CUP SEALS	ELAS. AS SPEC.
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	BONNET	CAST IRON
1	1	BODY	DUCTILE IRON

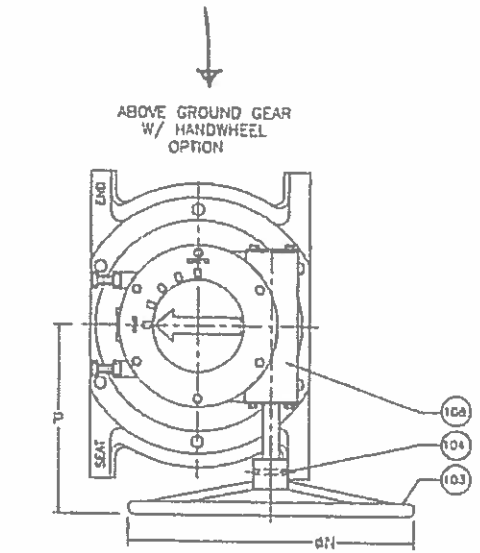
MILLIKEN VALVE CO

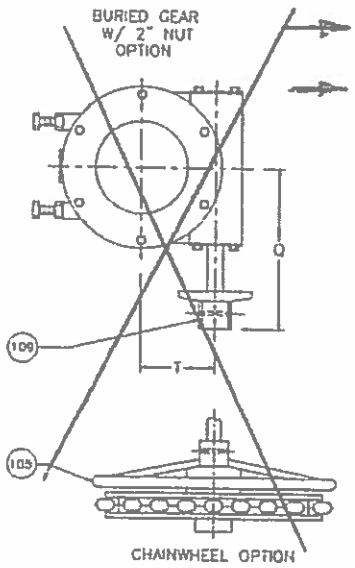
BY	DATE	SCALE
CR	6/96	NONE
CHK'D		DIMENSIONS INCHES

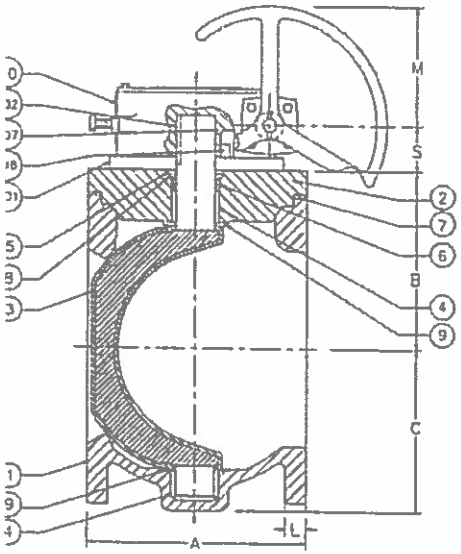
DATE	REVISIONS	BY
11/99	ADDED ITEM 108, HOUSING WAS OPERATOR, RETAINING RING WAS SNAP RING ITEM 11 WAS BRONZE	CR
3/05	ADD 3" DUCTILE	CS

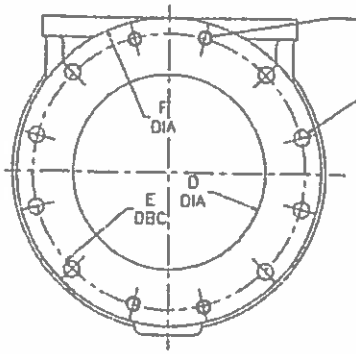
TITLE: 3"-14" FIG. 806 MILLCENTRIC PLUG VALVE, GROOVED END, GEAR OPERATED, W/ HANDWHEEL OR 2" NUT MEMORY GEAR OPT.

DWG. NO. 549318





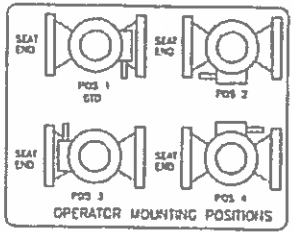




VALVE SIZE	GEAR SIZE & RATIO	A	B	C	D	E	F	G	H	J	K	L	M	N	P	Q	S	T
2.5	232-07 (20:1)	7.5	3.25	3.50	2.5	5.50	7.00	0.75	4	--	-	0.69	2.5	5	4.75	4.75	2.0	2.00
3	232-07 (20:1)	8	3.34	3.75	3	6.00	7.50	0.75	4	--	-	0.75	2.5	5	4.75	4.75	2.0	2.00
4	M3 (30:1)	9	4.31	4.50	4	7.50	9	0.75	6	0.63	2	0.94	3	6	9.50	8	2	2.56
5	M3 (30:1)	10	5.56	5.75	5	8.50	10	0.88	6	0.75	2	0.94	3	6	9.50	8	2	2.56
6	M3 (30:1)	10.50	5.56	5.75	6	9.50	11	0.88	6	0.75	2	1	3	6	9.50	8	2	2.56
8	M5 (50:1)	11.50	7.38	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13	6	12	11.25	8	2.3	3.16
10	M8 (80:1)	13	9.13	8.88	10	14.25	16	1	8	0.88	4	1.19	6	12	11.63	10	2.5	4.63
12	M8 (80:1)	14	10.81	10	12	17.00	19	1	8	0.88	4	1.25	6	12	11.63	10	2.5	4.63
14	M8 (80:1)	17	12.75	13	14	18.75	21	1.13	8	1	4	1.38	6	12	11.63	10	2.5	4.63

SIZE	GEAR	# OF TURNS
2.5"	20:1	5
3"	20:1	5
4"	30:1	7 1/2
5"	30:1	7 1/2
6"	30:1	7 1/2
8"	50:1	12 1/2
10"	80:1	20
12"	80:1	20
14"	80:1	20

ITEM	QTY	DESCRIPTION	MATERIAL
109	1	2" NUT	DUCTILE IRON
108	1	WORM GEAR	AISA 4140 STEEL
107	1	QUAD GEAR	DUCTILE IRON
106	2	SLEEVE BEARING	BRONZE
105	1	CHAINWHEEL	DUCTILE IRON
104	1	SPRING PIN	1095 STEEL
103	1	HANDWHEEL	DUCTILE IRON
102	1	KEY	1018 STEEL
101	1	RISER RING	A536 DI
50	1	HOUSING	CAST IRON
9	2	WASHER	PTFE
8	1	WASHER	BRASS
7	1	O RING	ELAS AS SPEC.
6	2	U CUP SEAL	ELAS AS SPEC.
5	1	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC	DUCTILE IRON
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B



OPERATOR MOUNTING POSITIONS

MILLIKEN VALVE CO

BY CR | DATE 10/95 | SCALE NONE | CHK'D | DIMENSIONS INCHES

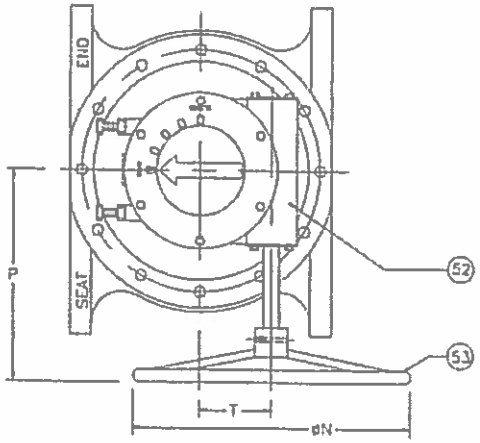
DATE	REVISIONS	BY
12/97	REVISED GEAR DIM FOR 2.5" & 3" WAS NOT NOW AGREES W/232-07	CR
1/98	ITEM 6 WAS SHOWN	CR
08/03	ADDED MTRL TYPE	JC

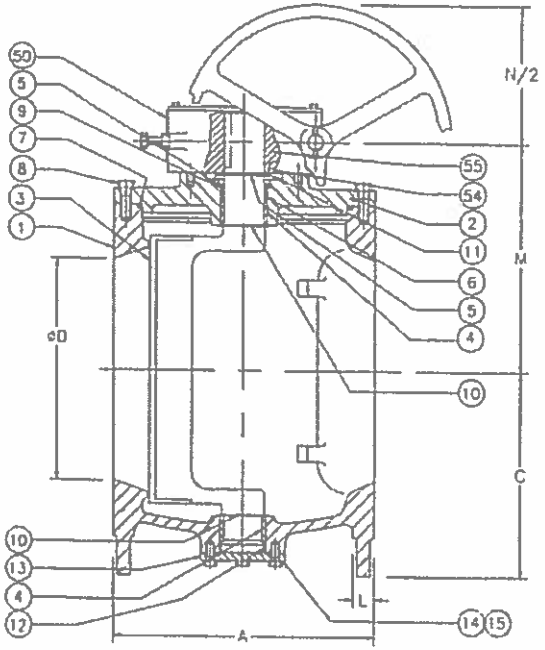
TITLE: 2-1/2" TO 14" FIG. 601 MILLCENTRIC PLUG VALVE, FLANGED, GEAR OPERATED W/ HANDWHEEL, 2" NUT, OR CHAINWHEEL OPTION

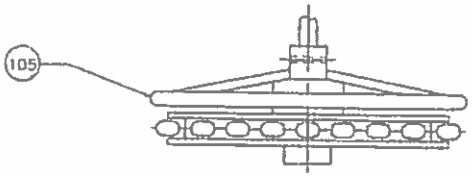
DWG. NO. S49110

VALVE SIZE	A	C	D	E	F	G	H	J	K	L	M	N	P	T	FLANGE STYLE	GEAR SIZE
14	17	13	14	18.75	21	1.13	8	1	4	1.13	15.06	18	11.63	4.75	CL125	M80
16	17.75	14	16	21.25	23.25	1.13	8	1	8	1.44	15.81	18	11.63	4.75	CL125	M80
18	21.50	15	18	22.75	25	1.25	8	1.13	8	1.56	17	18	11.63	4.75	CL125	M80
20	23.50	16	20	25	27.50	1.25	12	1.13	8	1.69	20.44	18	11.63	4.75	CL125	M80

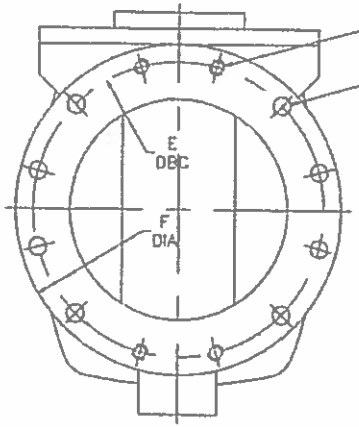
ABOVE GROUND GEAR W/ HANDWHEEL OPTION

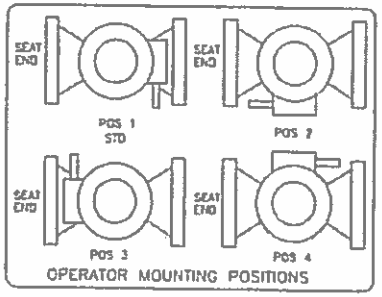






CHAINWHEEL OPTION





OPERATOR MOUNTING POSITIONS

** OPTIONAL

ITEM	QTY.	DESCRIPTION	MATERIAL
*4 105		CHAINWHEEL	
55	1	QUADRANT	DUCTILE IRON
54	2	SLEEVE BEARING	BRONZE
53	1	HANDWHEEL	DUCTILE IRON
52	1	WORM GEAR	STEEL
50	1	HOUSING	CAST IRON
15	AR	LOCKWASHER	STEEL/ZINC
14	AR	CAP SCREW	STEEL/ZINC
13	1	TRUNION COVER	CAST IRON
12	1	O RING	ELAS. AS SPEC.
11	1	SUPPORT WASHER	STEEL
10	2	WASHER	PTFE
9	1	WASHER	BRASS
8	AR	CAP SCREW	STEEL/ZINC
7	1	O RING	ELAS. AS SPEC.
6	2	U CUP SEALS	ELAS. AS SPEC.
5	2	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	CAP	A126 CL B
1	1	BODY	A126 CL B

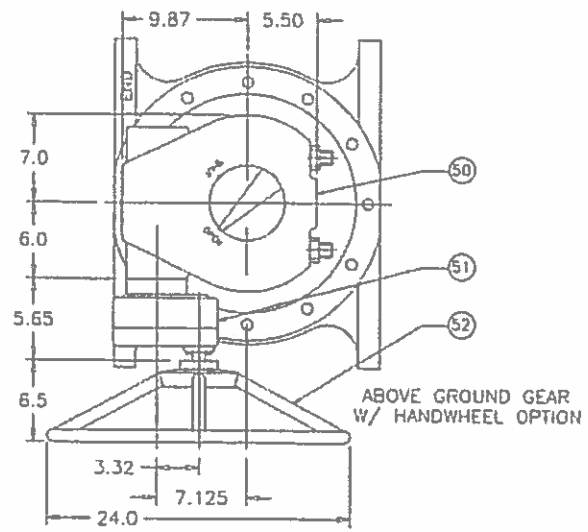
MILLIKEN VALVE CO

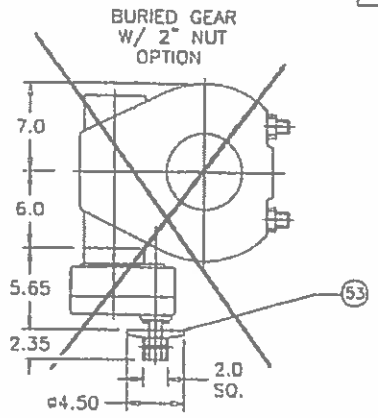
DATE	REVISIONS	BY
11/95	ADDED 60" & 72"	CR
8/98	REMOVED 24"-72" TO DWG# S49735	CR
7/03	ADDED CHAINWHEEL	SS

BY	DATE	SCALE
CR	10/95	NONE
CHK'D		DIMENSIONS INCHES

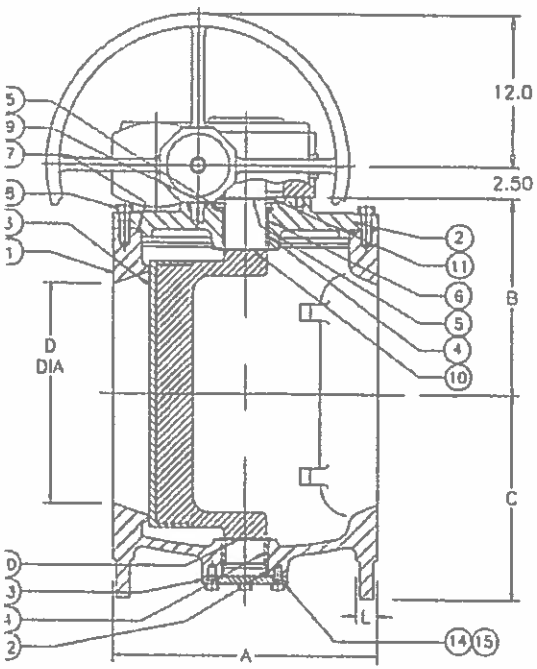
TITLE: FIG. 601 14"-20" MILLCENTRIC PLUG VALVE FLANGED GEAR OPERATED W/ HANDWHEEL

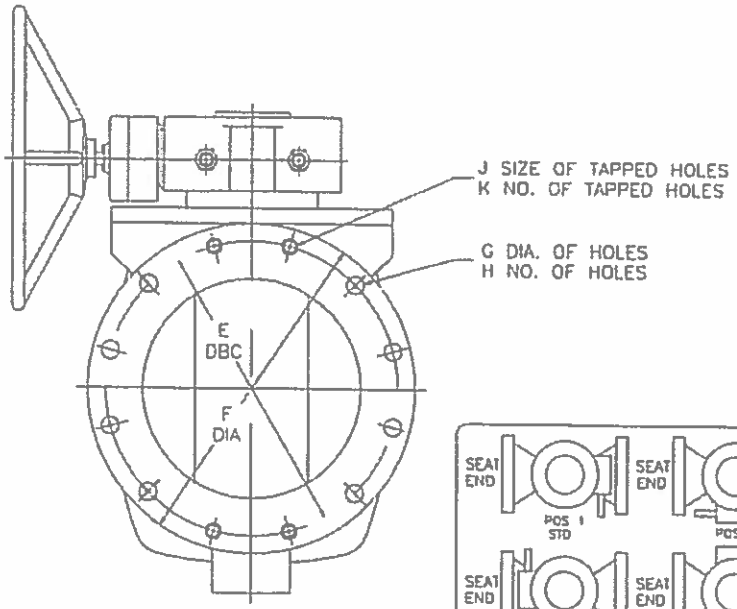
DWG. NO. S49036





VALVE SIZE	A	B	C	D	E	F	G	H	J	K	L
24	42	19.38	21.63	24	29.50	32	1.38	20	–	–	1.88
30	51	23.44	24.75	30	36	38.75	1.38	28	–	–	2.13





ITEM	QTY.	DESCRIPTION	MATERIAL
53	1	2" NUT OPTION	
52	1	HANDWHEEL OPTION	
51	1	5:1 SPUR GEAR	
50	1	GEAR OPERATOR	
15	AR	LOCKWASHER	STEEL/ZINC
14	AR	CAP SCREW	STEEL/ZINC
13	1	TRUNION COVER	CAST IRON
12	1	O RING	ELAS. AS SPEC.
11	1	SUPPORT WASHER	STEEL
10	2	WASHER	PTFE
9	1	WASHER	STEEL
8	AR	CAP SCREW	STEEL/ZINC
7	1	O RING	ELAS. AS SPEC.
6	2	U CUP SEALS	ELAS. AS SPEC.
5	2	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	BRONZE
3	1	PLUG ELASTOMER AS SPEC.	A126 CL B
2	1	CAP	A126 CL B
1	1	BODY	A126 CL B

MILLIKEN VALVE CO

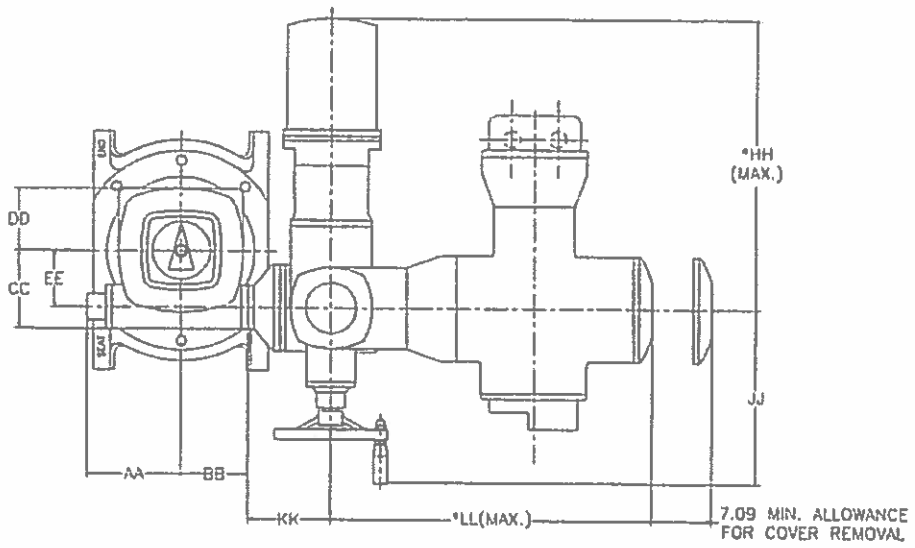
BY	DATE	SCALE
CR	9/99	NONE

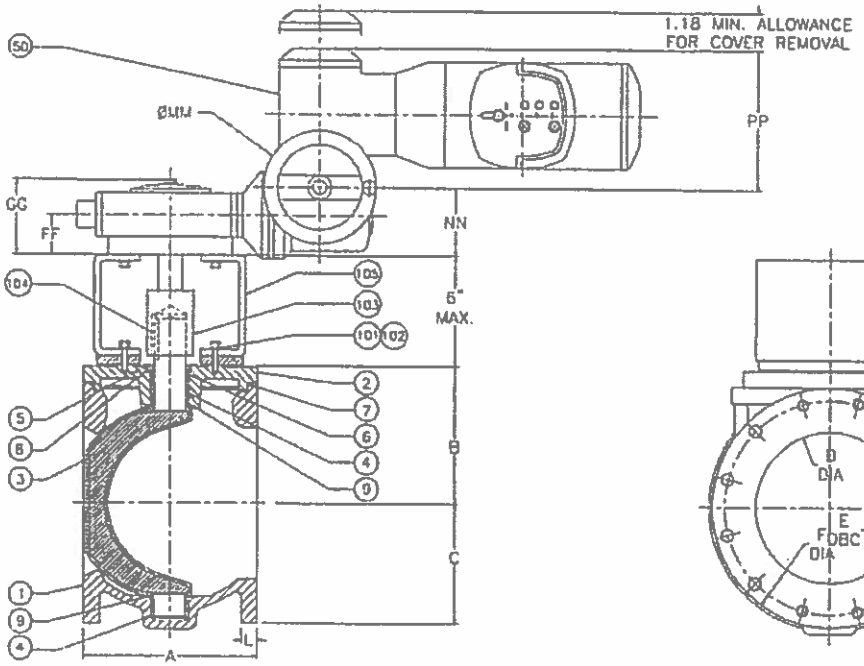
CHK'D | DIMENSIONS: INCHES

DATE	REVISIONS	BY
11/99	ITEM 3 WAS D.I. ITEM 4 WAS 316 S.S. ITEM 9 WAS BRASS	CR

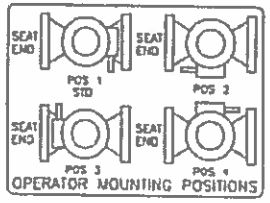
TITLE:
FIG. 601
24"–30" MILLCENTRIC
PLUG VALVE, FLANGED,
W/ MASTERGEAR

DWG. NO. S49859





*NOTE:
DIMENSION DEPENDENT
UPON CONTROL ASSEMBLY.



VALVE SIZE	GEAR SIZE	A	B	C	D	E	F	G	H	J	K	L
3	M3	8	3.34	3.75	3	6.00	7.50	0.75	4	--	-	0.75
4	M3	9	4.31	4.50	4	7.50	9	0.75	6	0.63	2	0.94
5	M3	10	5.56	5.75	5	8.50	10	0.88	6	0.75	2	0.94
6	M3	10.50	5.56	5.75	6	9.50	11	0.88	6	0.75	2	1
8	M5	11.50	7.38	7.63	8	11.75	13.50	0.88	6	0.75	2	1.13
10	M8	13	9.13	8.88	10	14.25	16	1	8	0.88	4	1.19
12	M8	14	10.81	10	12	17.00	19	1	8	0.88	4	1.25
14	M8	17	12.75	13	14	18.75	21	1.13	10	1	2	1.38

ACT. MODEL	*HH	JJ	KK	*LL	MM	NN	PP
SA07.1	16.2	9.21	3.19	18.0	5.51	4.02	7.75
SA07.5	16.2	9.84	3.19	18.0	6.30	4.02	7.75
SA10.1	17.2	10.08	3.27	18.0	7.87	4.53	7.75
SA14.1	20.9	12.80	4.49	7.9	12.40	6.02	8.74

GEAR MODEL	AA	BB	CC	DD	EE	FF	GG
GS40.3	3.78	3.94	2.68	2.05	1.58	1.26	2.76
GS50.3	3.78	3.94	3.03	2.48	1.97	1.58	3.15
GS63.3	5.00	4.92	3.70	2.95	2.48	1.77	3.70
GS80.3	5.20	5.12	4.37	3.47	3.15	2.24	4.21
GS100.3	7.17	7.48	5.83	4.13	3.94	2.95	5.59

ITEM	QTY	DESCRIPTION	MATERIAL
105	1	BRACKET	STEEL
104	AR	KEY	STEEL
103	1	COUPLING	STEEL
102	AR	CAP SCREW	STEEL/ZINC
101	AR	LOCK WASHER	STEEL/ZINC
50	1	OPERATOR	
9	2	WASHER	PTFE
8	1	WASHER	BRONZE
7	1	O RING	ELAS AS SPEC.
6	2	U CUP SEAL	ELAS AS SPEC.
5	1	RETAINING RING	SPRING STEEL
4	2	SLEEVE BEARING	316 STN. STEEL
3	1	PLUG ELASTOMER AS SPEC.	DUCTILE IRON
2	1	CAP	A 126 CL B
1	1	BODY	A 126 CL B

MILLIKEN VALVE CO

BY	DATE	SCALE
SS	8/01	NONE

DATE	REVISIONS	BY

TITLE: FIG. 601
3"-14" MILLCENTRIC
PLUG VALVE, FLANGED,
W/ AUMA SA/GS SERIES
W/ INTEGRAL PUSH
BUTTON STATION

DWG. NO. S49898 1

auma®

Auma Actuators Inc.
Phone (724) 743-AUMA (2862)
Fax (724) 743-4711
www.auma-usa.com

Please send any replies to: Sue Hite

Customer PO #: MV1103632

Dear Customer,

This is the Initial Order Submittal for your PO # as listed above. This submittal contains all drawings and data sheets for the Auma products purchased on this order.

Manufacturing is currently being held for this order pending receipt of customer approval and release.

Please contact the Order Administration Department (Sue Hite) should you have questions or comments concerning the contents of this submittal.

Regards,
Auma Actuators

Files included:

Customer PO Item	DataSheet		Part No.	End User Tag
1	1	A080713-AUTODS-001.PDF	A080713-AUTODS-001.PDF	

ACTUATOR SCHEMATIC WIRING DRAWING:	MSP 1A1700–2F4JE1 KMS TP104-241 (EC-01) -S REV-000.PDF
ACTUATOR DIMENSIONAL DRAWING:	SD 111521 REV-000.PDF
OUTPUT DRIVE/MOUNTING FLANGE DRAWING:	SK 099241 REV-001.PDF

Customer PO Item	DataSheet		Part No.	End User Tag
2	2	A080713-AUTODS-002.PDF	A080713-AUTODS-002.PDF	

ACTUATOR SCHEMATIC WIRING DRAWING:	MSP 1A10KC5–F2JE2 KMS 9TP100-231-1 -S REV-005.PDF
ACTUATOR DIMENSIONAL DRAWING:	SD 111522 REV-000.PDF
OUTPUT DRIVE/MOUNTING FLANGE DRAWING:	SK 099241 REV-001.PDF

4.6.09

Actuator Data Sheet

AUMA Comm No.: A080713-DS001

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862 Fax: (724) 743-4711

Customer: MILLIKEN VALVE COMPANY
P.O. No: MV1103632
Customer Item: 1
Qty: 2

Project: LAS VIRGENES, CA
Valve/Gate Size & Type: 8" PLUG VALVE
Part No:
AUMA Lines:2, 3, 4, 5, 6

AUMA Actuator Model: SAR07.5-13B

Motor Model:	VD63-4/45	NEMA 4X
Phase:	3-PHASE	POT 5/5K WIRE WOUND WITH RWG-1 SAR
Voltage:	480/60	12.01-14.0 TURNS=REDUCTION 22:1
Duty (min.):	15	MOUNT TO GS GEARBOX
HP:	1/8	STANDARD TEMP -20 F TO +175 F
RPM:	1680	24V CONTROL UNIT HEATER
NEC:	H	HANDWHEEL 6.3" SA07 STANDARD
FLA (amps):	0.6	NO MDPI (S)
LRA (amps):	1.6	FT LB TORQUE DIAL SA07.5
Operating Time (sec):	60	4 GTLS 3 STAGE
Stroke:	90 Degrees	AUMA STANDARD SILVER-GRAY COROTHANE
Turns:	13	
Output RPM:	13	

Output Drive Type: MACHINED B NUT - SA07.5

Gearbox: AUMA GS80.3 WORM GEARBOX (RR)
STYLE RR STD
KN CORROSION PROTECTION -STD
90 DEGREE SWING ANGLE STD
MOUNTING FLANGE FA14 W/OUT SPIGOT STD
POINTER COVER IP68-3 STD
-20F TO +175F - STD
AUMA STANDARD SILVER-GRAY COROTHANE
Direction to close: CW

Output Drive Type: MACHINED COUPLING - GS80.3
BORE: 1.625 / 1.630"
KEYWAY: 0.437 / 0.439"
FUW 7/16" SQUARE KEY

Motor Control: AUMA MATIC W/ POSITIONER
480 VOLT 3 PHASE WITH POWER SUPPLY 24V
POSITIONER SS STARTERS
PB-3 SS-3POS AUX CONTACT
NEMA 4X
AUMA STANDARD SILVER-GRAY COROTHANE
P&S 100MM (1) 1-1/4" (2) 1/2"

Open:	Limit switch
Closed:	Limit switch
Faceplate:	
Pushbuttons:	Open, Stop, Close
Selector Switch:	Local, Off, Remote
Lights:	Open, Fault, Closed (Red, Amber, Green)

Drawings:
ACTUATOR SCHEMATIC WIRING DRAWING
MSP 1A1700--2F4JE1 KMS TP104-241 (EC-01) -S REV-000
ACTUATOR DIMENSIONAL DRAWING
SD 111521 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DRAWING
SK 099241 REV-001

Certified By: Sue Hite **Certified Date:** 3/27/2008 **Revision:** 0

Actuator Data Sheet

AUMA Comm No.: A080713-DS002

AUMA Actuators, Inc. USA
www.auma-usa.com
Phone: (724) 743-2862 Fax: (724) 743-4711

Customer: MILLIKEN VALVE COMPANY
P.O. No: MV1103632
Customer Item: 2
Qty: 2

Project: LAS VIRGENES, CA
Valve/Gate Size & Type: 6" PLUG VALVE
Part No:
AUMA Lines: 7, 8, 9, 10, 11

AUMA Actuator Model: SA07.5-13B

Motor Model:	VD63-4/45
Phase:	3-PHASE
Voltage:	480/60
Duty (min.):	15
HP:	1/8
RPM:	1680
NEC:	H
FLA (amps):	0.6
LRA (amps):	1.6
Operating Time (sec):	60
Stroke:	90 Degrees
Turns:	13
Output RPM:	13

NEMA 4X
MOUNT TO GS GEARBOX
STANDARD TEMP -20 F TO +175 F
110V-250V CONTROL UNIT HEATER
HANDWHEEL 6.3" SA07 STANDARD
NO MDPI (S)
4 GTLS 3 STAGE
AUMA STANDARD SILVER-GRAY COROTHANE
FT LB TORQUE DIAL SA07.5

Output Drive Type: MACHINED B NUT - SA07.5

Gearbox: AUMA GS63.3 WORM GEARBOX (RR)
STYLE RR STD
KN CORROSION PROTECTION -STD
90 DEGREE SWING ANGLE STD
MOUNTING FLANGE FA12 W/OUT SPIGOT STD
POINTER COVER IP68-3 STD
-20F TO +175F - STD
AUMA STANDARD SILVER-GRAY COROTHANE
Direction to close: CW

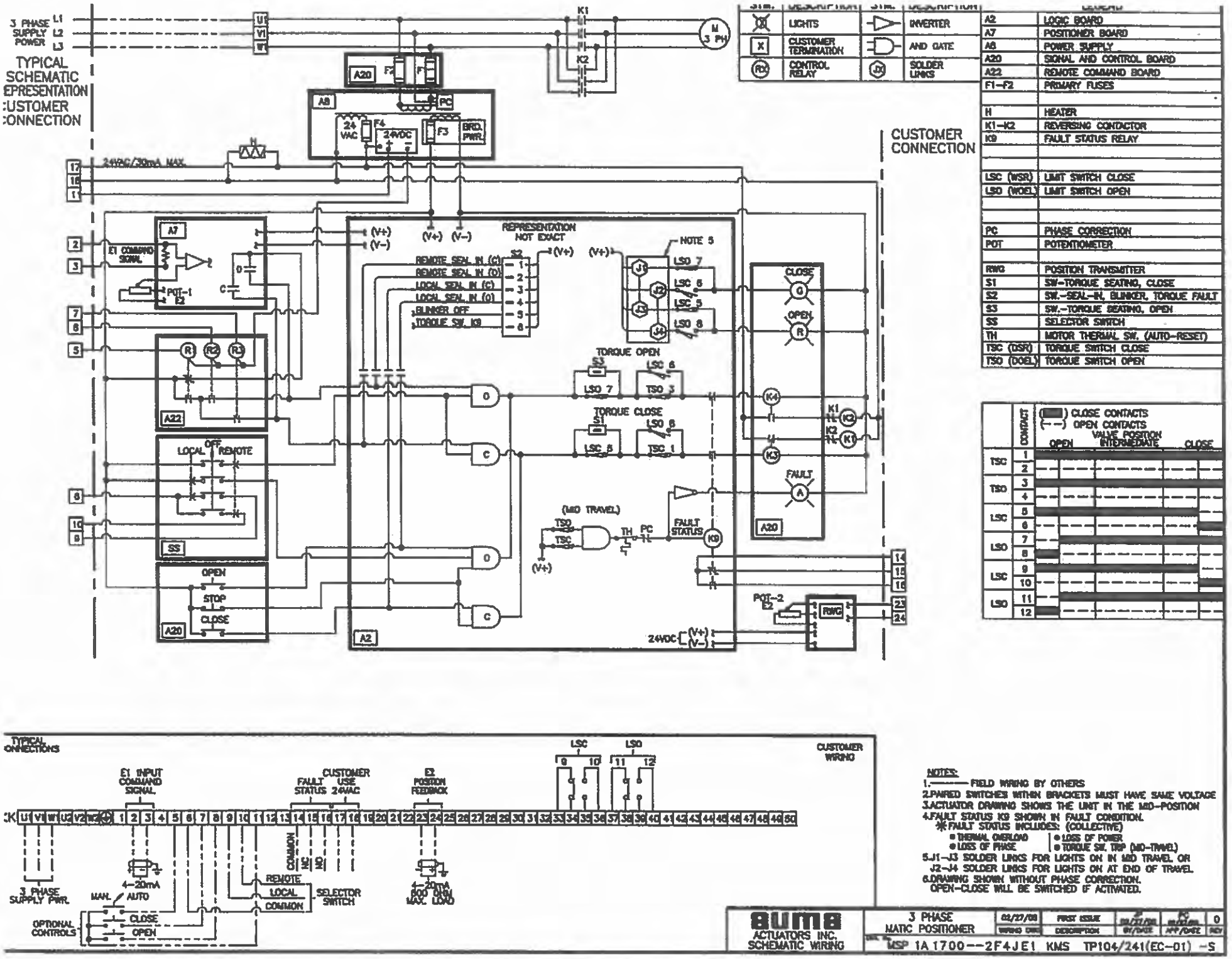
Output Drive Type: MACHINED COUPLING - GS63.3
BORE: 1.250 / 1.255"
KEYWAY: 0.250 / 0.252"
FUW 1/4" SQUARE KEY

Motor Control: AUMA MATIC W/ 110V INTERFACE BOARD
INTERFACE 115VAC NO EMERGENCY MECH START
STARTER SIZE A 110V WITH OL
.65 TO 1 AMP OVERLOAD
480 VOLT 3 PHASE WITH POWER SUPPLY 115V
NEMA 4X
AUMA STANDARD SILVER-GRAY COROTHANE
PB-3 SS-3POS AUX CONTACT
P&S 100MM (1) 1-1/4" (2) 1/2"

Overload Relays:	0.8 amps
Open:	Limit switch
Closed:	Limit switch
Faceplate:	
Pushbuttons:	Open, Stop, Close
Selector Switch:	Local, Off, Remote
Lights:	Open, Fault, Closed (Red, Amber, Green)

Drawings:
ACTUATOR SCHEMATIC WIRING DRAWING
MSP 1A10KC5--F2JE2 KMS 9TP100-231-1 -S REV-005
ACTUATOR DIMENSIONAL DRAWING
SD 111522 REV-000
OUTPUT DRIVE/MOUNTING FLANGE DRAWING
SK 099241 REV-001

Certified By: Sue Hite **Certified Date:** 3/27/2008 **Revision:** 0

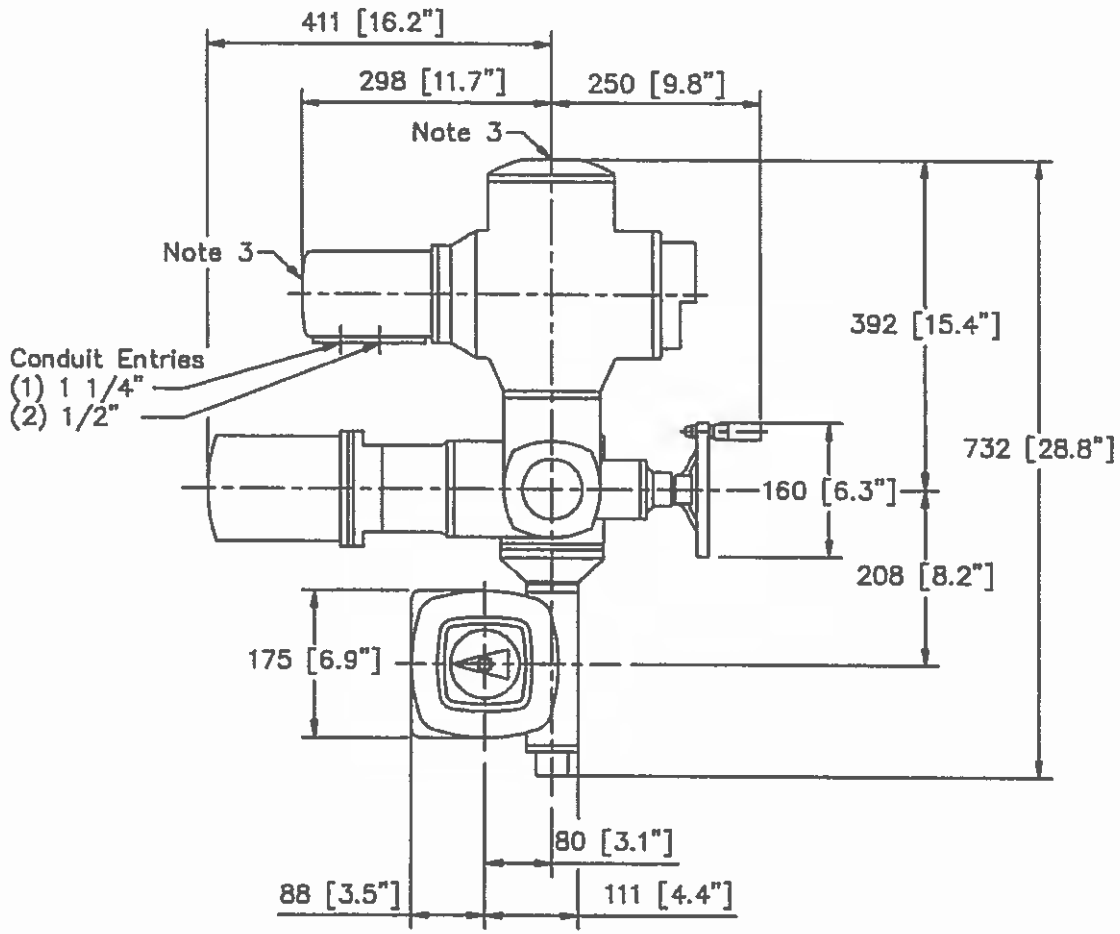


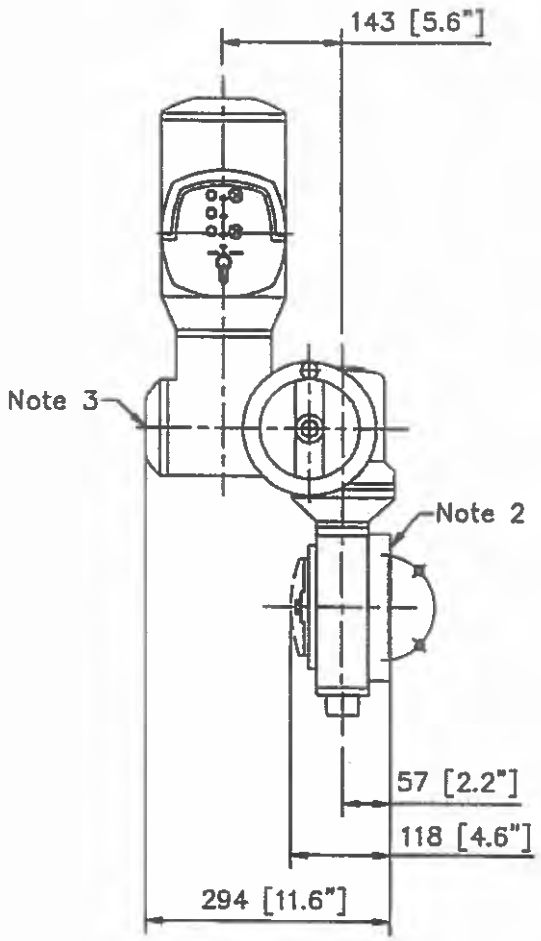
LIGHTS		INVERTER	
CUSTOMER TERMINATION	X	AND GATE	
CONTROL RELAY	RX	SOLDER LINKS	JX

A2	LOGIC BOARD
A7	POSITIONER BOARD
A8	POWER SUPPLY
A20	SIGNAL AND CONTROL BOARD
A22	REMOTE COMMAND BOARD
F1–F2	PRIMARY FUSES
H	HEATER
K1–K2	REVERSING CONTACTOR
K9	FAULT STATUS RELAY
LSC (WSR)	LIMIT SWITCH CLOSE
LSO (WOEL)	LIMIT SWITCH OPEN
PC	PHASE CORRECTION
POT	POTENTIOMETER
RWG	POSITION TRANSMITTER
S1	SW–TORQUE SEATING, CLOSE
S2	SW.–SEAL–IN, BLINKER, TORQUE FAULT
S3	SW.–TORQUE SEATING, OPEN
SS	SELECTOR SWITCH
TH	MOTOR THERMAL SW. (AUTO–RESET)
TSC (DSR)	TORQUE SWITCH CLOSE
TSO (DOEL)	TORQUE SWITCH OPEN

NOTES:
1. ——— FIELD WIRING BY OTHERS
2. PAIRED SWITCHES WITHIN BRACKETS MUST HAVE SAME VOLTAGE
3. ACTUATOR DRAWING SHOWS THE UNIT IN THE MID–POSITION
4. FAULT STATUS K9 SHOWN IN FAULT CONDITION.
   * FAULT STATUS INCLUDES: (COLLECTIVE)
   - THERMAL OVERLOAD
   - LOSS OF PHASE
   - LOSS OF POWER
   - TORQUE SW. TRIP (MID–TRAVEL)
5. J1–J3 SOLDER LINKS FOR LIGHTS ON IN MID TRAVEL OR J2–J4 SOLDER LINKS FOR LIGHTS ON AT END OF TRAVEL.
6. DRAWING SHOWN WITHOUT PHASE CORRECTION. OPEN–CLOSE WILL BE SWITCHED IF ACTIVATED.

auma ACTUATORS INC. SCHEMATIC WIRING	3 PHASE MATIC POSITIONER	02/27/08	FIRST ISSUE			0
		WIRING DWG	DESCRIPTION	BY/DATE	APP/DATE	REV
	DWG. NO. MSP 1A 1700--2F4JE1 KMS TP104/241(EC-01) -S					





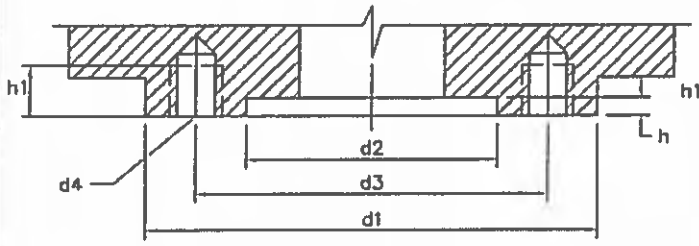
Notes:

1. Metric tolerance per ISO 2768–m.
   Dimensons in brackets [] are in inches and rounded to one decimal place.
2. See appropriate drive drawing.
3. Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.
4. Consult factory for more detailed dimensionals.
5. Actuator dimensions will not exceed drawing dimensions.

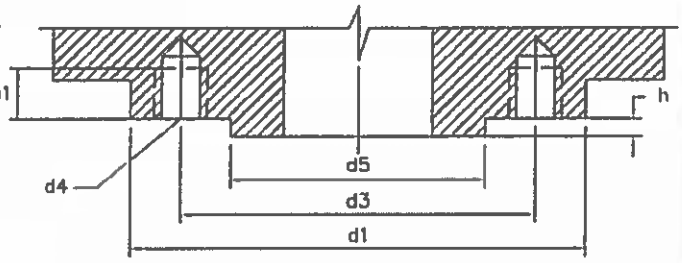
auma ACTUATORS INC.	SA(R)07.1–07.5/AM02.1–100 GS80.3 (STYLE RR–RL)	FIRST ISSUE	JL 04/04/08	JL 04/04/08	0
		DESCRIPTION	BY / DATE	APP / DATE	REV
		DWG. NO. Okw00800		SD111521	

AUMA ACTUATORS, INC.

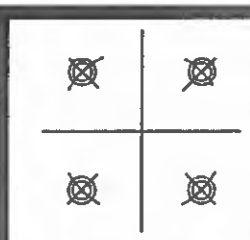
FA10 – FA40



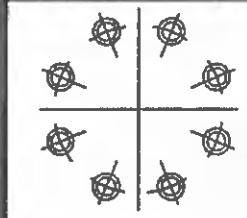
F48 – F60



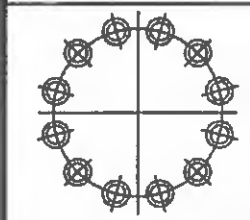
GEARBOX MODEL	FLANGE TYPE	d1	d2 (H8)	d3 ± 0.01	(qty.)d4	h	h1	d5 (f8)
GS50.3	FA10	4.9	3.346	4.00	(4) 3/8–16	0.157	0.63	–
GS63.3	FA12	5.9	4.134	4.92	(4) 1/2–13	0.157	0.75	–
GS80.3	FA14	6.9	4.527	5.51	(4) 5/8–11	0.197	0.98	–
GS100.3	FA16	8.3	5.512	6.50	(4) 3/4–10	0.197	1.26	–
GS125.3	FA25	11.8	8.858	10.00	(8) 5/8–11	0.197	0.98	–
GS160.3	FA25	11.8	7.874	10.00	(8) 5/8–11	0.236	1.00	–
GS200.3	FA30	13.8	9.055	11.75	(8) 3/4–10	0.236	1.26	–
GS250.3	FA35	16.3	10.236	14.00	(8) 1–8	0.236	1.57	–
GS315	FA40	18.7	11.811	16.00	(8) 1 1/2–6 (4)	0.393	2.00	–
GS400	F48	22.1	–	19.01	(12) M36 x 4.0	0.275	2.00	14.567
GS500	F60	35.8	–	23.74	(20) M36 x 4.0	0.275	2.20	18.500



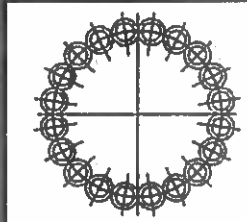
4 HOLE PATTERN
(FA10 – FA16)



8 HOLE PATTERN
(FA25 – FA40)



12 HOLE PATTERN
(F 48)

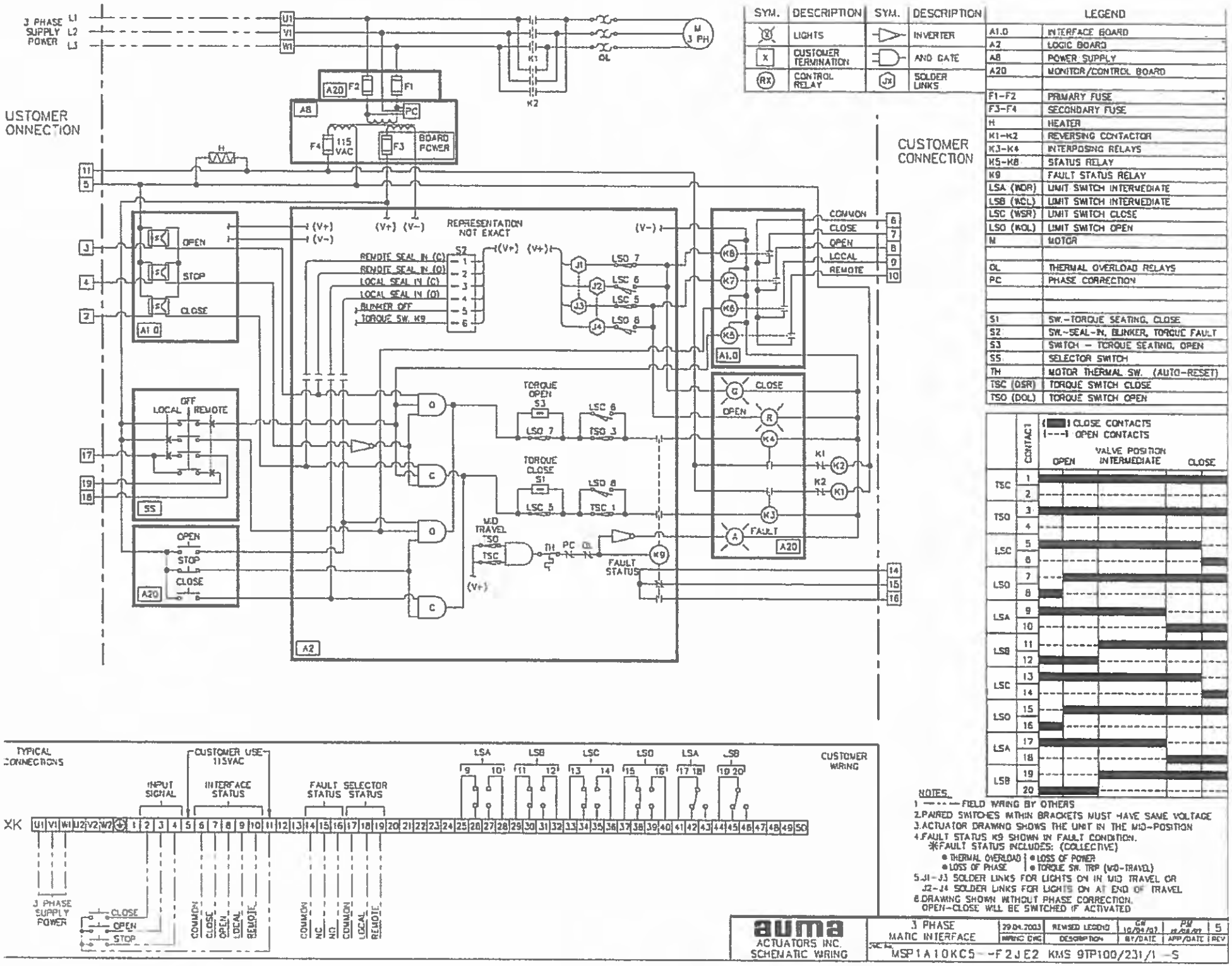


20 HOLE PATTERN
(F 60)

Notes:
1. All dimensions are in inches.
2. Unless specified tolerance per ISO 2768-m.
3. FA Flange per MSS STANDARD SP-101 unless otherwise noted.
4. FA40 Thread size 1 1/2-6 not per MSS STANDARD SP-101.
5. F Flange per ISO 5211.

STANDARD MOUNTING FLANGE DIMENSIONS

GS50.3 - GS500	BY/DATE MK 11/01/06	APP/DATE JL 11/01/06	DWG. NO. SK099241	REV 1



SYM.	DESCRIPTION	SYM.	DESCRIPTION
⊗	LIGHTS	▷	INVERTER
X	CUSTOMER TERMINATION	&	AND GATE
RX	CONTROL RELAY	Jx	SOLDER LINKS

LEGEND	
A1.0	INTERFACE BOARD
A2	LOGIC BOARD
A8	POWER SUPPLY
A20	MONITOR/CONTROL BOARD
F1-F2	PRIMARY FUSE
F3-F4	SECONDARY FUSE
H	HEATER
K1-K2	REVERSING CONTACTOR
K3-K4	INTERPOSING RELAYS
K5-K8	STATUS RELAY
K9	FAULT STATUS RELAY
LSA (NOR)	LIMIT SWITCH INTERMEDIATE
LSB (NCL)	LIMIT SWITCH INTERMEDIATE
LSC (WSR)	LIMIT SWITCH CLOSE
LSO (NOL)	LIMIT SWITCH OPEN
M	MOTOR
OL	THERMAL OVERLOAD RELAYS
PC	PHASE CORRECTION
S1	SW.-TORQUE SEATING, CLOSE
S2	SW.-SEAL-IN, BLINKER, TORQUE FAULT
S3	SWITCH - TORQUE SEATING, OPEN
SS	SELECTOR SWITCH
TH	MOTOR THERMAL SW. (AUTO-RESET)
TSC (OSR)	TORQUE SWITCH CLOSE
TSO (OSL)	TORQUE SWITCH OPEN

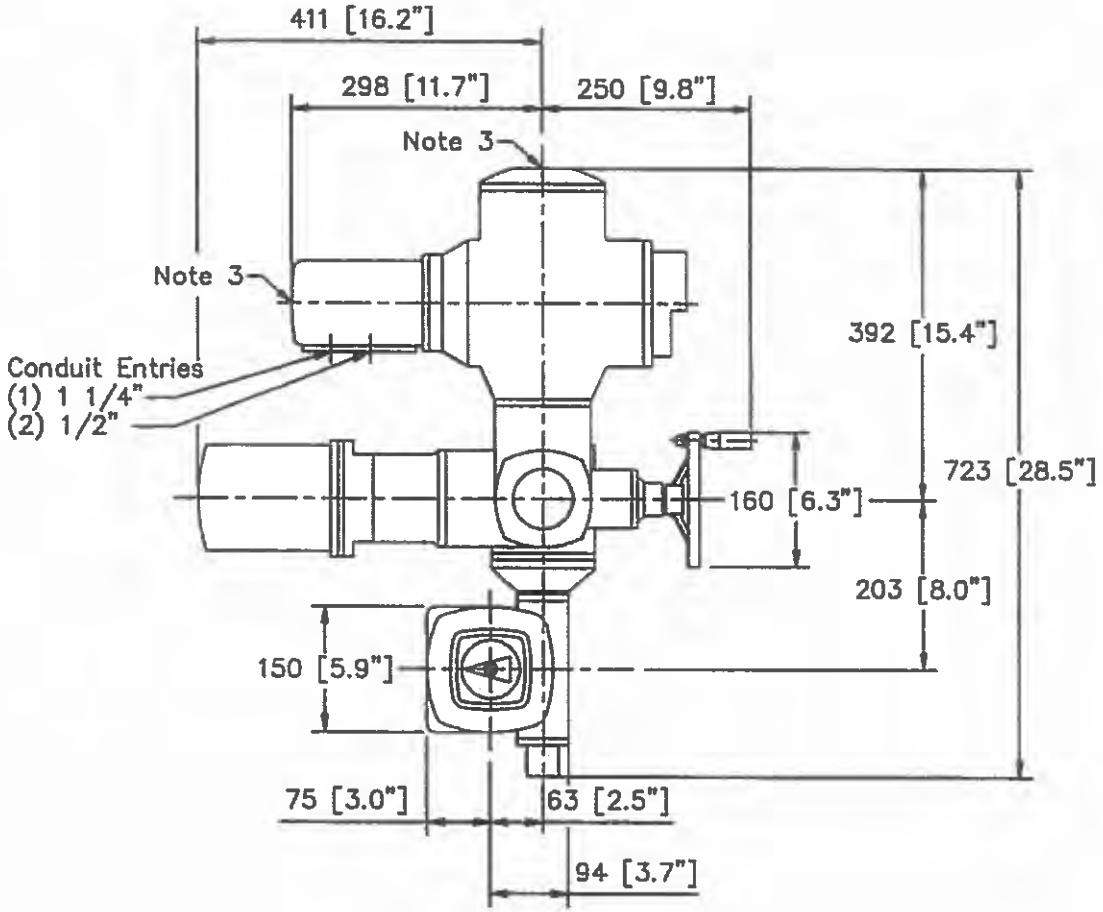
NOTES.
1 ——·——·— FIELD WIRING BY OTHERS
2.PAIRED SWITCHES WITHIN BRACKETS MUST HAVE SAME VOLTAGE
3.ACTUATOR DRAWING SHOWS THE UNIT IN THE MID-POSITION
4.FAULT STATUS K9 SHOWN IN FAULT CONDITION.
*FAULT STATUS INCLUDES: (COLLECTIVE)
- THERMAL OVERLOAD
- LOSS OF PHASE
- LOSS OF POWER
- TORQUE SW. TRIP (MID-TRAVEL)

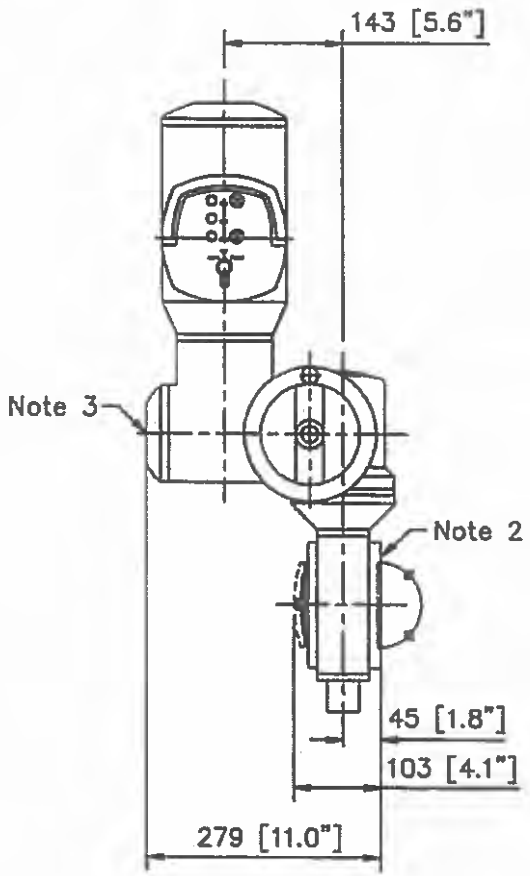
5.J1-J3 SOLDER LINKS FOR LIGHTS ON IN MID TRAVEL OR
J2-J4 SOLDER LINKS FOR LIGHTS ON AT END OF TRAVEL
6.DRAWING SHOWN WITHOUT PHASE CORRECTION.
OPEN-CLOSE WILL BE SWITCHED IF ACTIVATED

auma
ACTUATORS INC.
SCHEMATIC WIRING

3 PHASE MATIC INTERFACE	29.04.2003	REVISED LEGEND	GW 10/04/03	PW 10/04/03	5
	WIRING DWG	DESCRIPTION	BY/DATE	APP/DATE	REV

SAC-P MSP1A10KC5--F2JE2 KMS 9TP100/231/1 -S





Notes:

1. Metric tolerance per ISO 2768-m.
   Dimensons in brackets [] are in inches and rounded to one decimal place.
2. See appropriate mounting flange drawing.
3. Seven inch minimum clearance recommended for removal of access cover and equipment adjustment.
4. Consult factory for more detailed dimensionals.
5. Actuator dimensions will not exceed drawing dimensions.

auma ACTUATORS INC.	SA (R) 07.1-07.5/AM02.1-100 GS63.3 (STYLE RR-RL)	FIRST ISSUE		0
		DWG. NO. DXBP0800		SD111522

AMERON
INTERNATIONAL
Performance Coatings & Finishes

Amerlock® 400

High-solids epoxy coating

Product Data/ Application Instructions

- VOC compliant
- High-performance general maintenance coating for new or old steel
- Cures through wide temperature range
- Self-priming topcoat over most existing coatings
- Can be overcoated with wide range of topcoats
- Compatible with prepared damp surfaces
- Compatible with adherent rust remaining on prepared surfaces
- 5 mils or more in a single coat
- Resists high humidity and moisture

Amerlock's low solvent level meets VOC requirements, reduces the chances for film pinholing and solvent entrapment at the substrate-coating interface, often a major cause of coating failure with conventional epoxies and lower solids systems.

Amerlock 400 is available in a variety of colors, including aluminum, and therefore does not require a topcoat. For extended weatherability or special uses, a topcoat may be desired.

Typical Uses

Amerlock 400 is used in those areas where blasting is impractical or impossible. As a maintenance coating, Amerlock 400 protects steel structures in industrial facilities, bridges, tank exteriors, marine weathering, offshore, oil tanks, piping, roofs, water towers and other exposures. Amerlock 400 has good chemical resistance to splash/spillage, fumes and immersion in neutral, fresh and salt water (see resistance table). Contact your Ameron representative for specific information.

Typical Properties

Physical

Abrasion resistance (ASTM D4060)	
1 kg load/1000 cycles	weight loss
CS-17 wheel	102 mg
Impact resistance (ASTM D2794)	
Direct	24 in · lb
Reverse	6 in · lb
Moisture vapor transmission (ASTM F1249)	4.49 g/m²
Adhesion (ASTM D4541)	900 psi

Performance

Salt spray (ASTM B117) 3000 hours	
Face blistering	None
Humidity (ASTM D2247) 750 hours	
Face corrosion, blistering	None
Immersion (NACE TM-01-69) fresh water 1 year	
blistering	None

NSF

Physical Data

Finish	Semigloss
Color	Standard, Rapid Response, custom colors and aluminum

White and light colors may show yellowing on aging. Use of Amercoat 861 with white or light colors will slightly discolor. Do not use Amercoat 861 with 400FD cure. With white and light colors, 400FD cure will cause yellowing.

Yellow, red and orange colors will fade faster than other colors due to the replacement of lead-based pigments with lead-free pigments in these colors.

Components	2
Curing mechanism	Solvent release and chemical reaction between components
Volume solids (ASTM D2697 modified)	
400, 400FD	83% ± 3%
400AL	88% ± 3%
Dry film thickness (per coat)	4-8 mils (100-200 microns)
Coats	1 or 2

Theoretical coverage	ft²/gal	m²/L
1 mil (25 microns)		
400	1331	32.6
400AL	1412	34.7
5 mils (125 microns)		
400	266	6.5
400AL	282	6.9

VOC	lb/gal	g/L
400 mixed	1.4	168
mixed/thinned (½ pt/gal)	1.7	204
400AL mixed	1.0	120
mixed/thinned (1½ pt/gal)	2.0	240
400FD mixed	1.2	144
mixed/thinned (½ pt/gal)	1.6	192

Temperature resistance,	wet		dry	
400	°F	°C	°F	°C
continuous	100	38	200	93
intermittent	100	38	350	177
with 880				
continuous	100	38	425	218
intermittent	100	38	450	232

Some discoloration and darkening will occur at temperatures greater than 200°F; this will not affect film integrity or coating performance.

Flash point (SETA)	°F	°C
400 resin	131	55
400 cure	85	29
400FD cure	87	30
400AL resin	110	43
400AL cure	116	47
Amercoat® 8	20	-7
Amercoat 65	78	25
Amercoat 12	2	-17

Qualifications

USDA – Incidental food contact
NFPA – Class A

NSF Standard 61 – For use in drinking water:
Amerlock 400 only
- Colors: Ivory, White, Medium Grey, RT 1805 Blue
- Numbers of Coats: 2-4
- Sequence of Coats: Any combination of listed colors
- Maximum Field Use Dry Film Thickness (in mils) : 24
- Maximum Thinner 12% Amercoat #65 by volume; 12% Amercoat #8 by volume (alternate)
- Recoat / Cure Time: 12 hours / 7 days
- Number of Coats: Use of Amercoat #8 Thinner is limited to tanks of 250,000 gallons or greater
- Tanks 1,000 gallons or greater
- Pipes 21 inches in diameter or greater
- Valves 6 inches in diameter or greater

**Certain restrictions do apply*

Chemical Resistance Guide

Environment	Immersion		Splash and Spillage		Fumes and Weather	
	400	400AL	400	400AL	400	400AL
Acidic	*	*	F	F	G	G
Alkaline	*	*	E	G	E	E
Solvents	*	*	G	G	E	E
Salt water	E	E	E	E	E	E
Water	E	E	E	E	E	E

F-Fair G-Good E-Excellent

**Contact your Ameron representative.*

This table is only a guide to show typical resistances of Amerlock 400 and 400AL. For specific recommendations, contact your Ameron representative for your particular corrosion protection needs.

Systems using Amerlock 400 or 400AL

1st coat	2nd Coat ***	3rd coat ***
400	None	None
400	450HS	None
Amershield™ 400**	None 400	None
Dimetcote® 9, 9FT or 9HS	400	None
Dimetcote 9, 9FT or 9HS	400	450HS

***Water immersion.*

****For color contrast when 2 coats of 400AL are used, 400AL red can be used as first coat.*

Recoat/Topcoat time minimum (hours)	°F/°C 90/32	70/21	50/10
400	8	16	30
400 with 1 pt 861	4	7	16
400FD	2	3½	10
400AL	3	12	48
400AL with ½ pt 861	3	5	12

Recoat/Topcoat time @ 70°F (21°C)

System	Maximum time
400/400	3 months
400 with 861/400	1 month
400FD/400FD	2 weeks
400/Amershield or 450HS	1 month
400/5405	1 day
400FD/Amershield or 450HS	7 days
400 with 861/Amershield or 450HS	2 weeks

Note: If maximum time is exceeded, roughen surface. For topcoats (finish coats) not listed, see Product Data sheet for specific topcoat time limitations.

Surface Preparation

Coating performance is, in general, proportional to the degree of surface preparation. Abrasive blasting is usually the most effective and economical method. When this is impossible or impractical, Amerlock 400 can be applied over mechanically cleaned surfaces. All surfaces must be clean, dry and free of all contaminants, including salt deposits.

Amerlock 400 may be used over most types of properly prepared and tightly adhering coatings. A test patch is recommended for use over existing coatings.

Steel – Remove all loose rust, dirt, moisture, grease or other contaminants from surface. Power-tool clean SSPC-SP3 or hand-tool clean SSPC-SP2. For more severe environments, dry abrasive blast SSPC-SP7. Water blasting is also acceptable. For immersion service – dry abrasive blast SSPC-SP10.

Aluminum – Remove oil, grease or soap film with neutral detergent or emulsion cleaner, treat with Alodine® 1200, Alumiprep® or equivalent or blast lightly with fine abrasive.

Application Data

Applied over	Steel, concrete, aluminum, galvanizing
Surface preparation	
Steel	SSPC-SP2, 3, 6, 7, 10 or 11
Concrete	ASTM D4259 or 4260
Aluminum	Alodine®, Alumiprep® or light abrasive blast
Galvanizing	Galvaprep® or light abrasive blast
Method	Airless or conventional spray. Brush or roller may require additional coats.
Mixing ratio (by volume)	1 part resin to 1 part cure

Pot life (hours)

861 Accelerator Amount	Amerlock /mixed 5 gal	°F/°C 90/32	70/21	50/10	32/0
None	400	1½	2½	4	7
	400AL	3½	5½	10	15
	400FD	1	1½	2½	4
½ pt	400	1	1½	2½	4
	400AL	1	1½	2½	4
1 pt	400	½	1	1½	2

Pot life is the period of time after mixing that a five-gallon unit of material is sprayable when thinned as recommended. Mixture may appear fluid beyond this time, but spraying and film build characteristics may be impaired.

Environmental conditions

Product	Air and Surface Temperature
Amerlock 400 or 400 AL	40° to 122°F (4° to 50°C)
Amerlock with 861	20° to 122°F (-6° to 50°C)
Amerlock 400FD cure	20° to 122°F (-6° to 50°C)

Surface temperatures must be at least 5°F (3°C) above dew point to prevent condensation. At freezing temperatures, surface must be free of ice.

Do not use Amerlock 400AL on water damp surfaces. Do not use 400FD cure with 400AL resin.

Drying time (ASTM D1640) (hours)

861 Amt	Amerlock /mixed 5 gal	touch °F/°C 120/49	90/32	70/21	50/10	32/0	20/-6
None	400	1½	4½	9	28	96	NR
	400AL	1	4	12	36	96	NR
	400FD cure	½	1	2	8	24	48
½ pt	400	1½	3	5	24	72	120
	400AL	1	1½	2½	5	10	24
1 pt	400	1	2	4	15	48	96

Drying time continued

					through		
None	400	6	12	20	40	140	NR
	400AL	1½	7½	24	72	216	NR
	400FD cure	1½	2½	4½	13	38	96
½ pt	400	3	6	10	30	96	180
	400AL	2	4	9	24	48	120
1 pt	400	2½	5	9	24	72	160
				Cure for immersion (days)			
None	400	2	4	7	21	NR	NR
	400AL	2	4	7	21	NR	NR
	400FD cure	1	2	3	7	21	NR
½ pt	400AL	1	2	3	7	21	NR
1 pt	400	1	2	3	7	21	NR

Amercoat 861 Accelerator will slightly discolor Amerlock 400 white and other Amerlock light colors. Do not use 861 Accelerator with 400FD cure.

NR = Not recommended

Thinner	Amercoat 8 or 65
Equipment cleaner	Thinner or Amercoat 12

Galvanizing – Remove oil or soap film with detergent or emulsion cleaner, then use zinc treatment such as Galvaprep® or equivalent or blast lightly with fine abrasive.

Concrete – Acid etching (ASTM D4260) or abrasive blast (ASTM D4259) new concrete cured a minimum of 14 days.

Application Equipment

The following is a guide; suitable equipment from other manufacturers may be used. Changes in pressure, hose and tip size may be needed for proper spray characteristics.

Airless spray – Standard equipment such as Graco Bulldog 30:1 or larger, with a 0.017- to 0.021-inch fluid tip.

Conventional spray – Industrial equipment, such as DeVilbiss MBC or JGA or Binks 18 or 62 spray gun. A moisture and oil trap in the main air supply line, a pressure material pot with mechanical agitator and separate regulators of air and fluid pressure are recommended.

Power mixer – Jiffy Mixer powered by an air or explosion-proof electric motor.

Brush or roller – Additional coats may be required to attain proper thickness.

Application Procedure

1. Flush all equipment with thinner or Amercoat® 12 before use.
2. Stir resin using an explosion-proof power mixer to disperse pigments.
3. Add cure to resin. Mix thoroughly until uniformly blended to a workable consistency. For low temperature application, use Amercoat 861 accelerator or 400FD cure. Do not use Amercoat 861 when using Amerlock 400FD cure or with Amerlock white or light colors as color variation may result. Do not exceed the 1 pint Amercoat 861 accelerator per 5 gallon unit recommendation. Do not use 400FD cure with 400AL resin.
4. Do not mix more material than can be used within the expected pot life.
5. For optimum application, material should be from 50° to 90°F (10° to 32°C). Above 122°F (50°C), sagging may occur.
6. Use only Ameron recommended thinners. Above 85°F (29°C) use Amercoat 8, at lower temperatures use Amercoat 65. A small amount of thinner greatly reduces viscosity; excessive thinning will cause running or sagging. Thin cautiously as follows:

Amercoat 8 or 65 thinner	400 and 400FD	400AL
Airless – up to	¼ pt/gal	1½ pt/gal
Conventional – up to	½ pt/gal	1½ pt/gal

Below 50°F additional thinning may be needed and multiple coats required to achieve specified thickness.

7. To minimize orange peel appearance, adjust conventional spray equipment to obtain adequate atomization at lowest air pressure.
8. Apply a wet coat in even, parallel passes with 50 percent overlap to avoid holidays, bare areas and pinholes. If required, cross spray at right angles.
9. When applying Amerlock 400 directly over inorganic zincs or zinc rich primers, a mist coat/full coat technique may be required to minimize bubbling. This will depend on the age of the Dimetcote®, surface roughness and conditions during curing.

Note – Do not use Amerlock 400AL on water damp surfaces

10. Ventilate confined areas with clean air between coats and while curing the final coat. Prevent moisture condensation on the surface between coats.
11. Repair damaged areas by brush or spray.
12. Clean equipment with thinner or Amercoat 12 immediately after use.

Shipping Data

Packaging unit	2 gal	5 gal
cure	1-gal can	2.5-gal can
resin	1-gal can	2.5-gal can
Shipping weight (approx)	lbs	kg
2-gal unit		
400 cure	12.5	5.7
400FD cure	12.2	5.5
400 resin	13.7	6.2
400AL cure	12.1	5.5
400AL resin	11.0	5.0
5-gal unit		
400 cure	31.8	14.4
400FD cure	31.2	14.2
400 resin	35.0	15.9
400AL cure	30.9	14.0
400AL resin	28.3	12.8

Shelf life when stored indoors at 40° to 100°F (4° to 38°C)
resin and cure — 1 year from shipment date.

Numerical values are subject to normal manufacturing tolerances, color and testing variances. Allow for application losses and surface irregularities.

This mixed product is photochemically reactive as defined by the South Coast Air Quality Management District's Rule 102 or equivalent regulations.

Safety Precautions

Read each component's material safety data sheet before use. Mixed material has hazards of each component. Safety precautions must be strictly followed during storage, handling and use.

CAUTION – Improper use and handling of this product can be hazardous to health and cause fire or explosion.

Do not use this product without first taking all appropriate safety measures to prevent property damage and injuries. These measures may include, without limitation: implementation of proper ventilation, use of proper lamps, wearing of proper protective clothing and masks, tenting and proper separation of application areas. Consult your supervisor. Proper ventilation and protective measures must be provided during application and drying to keep solvent vapor concentrations within safe limits and to protect against toxic hazards. Necessary safety equipment must be used and ventilation requirements carefully observed, especially in confined or enclosed spaces, such as tank interiors and buildings.

This product is to be used by those knowledgeable about proper application methods. Ameron makes no recommendation about the types of safety measures that may need to be adopted because these depend on application and space, of which Ameron is unaware and over which it has no control.

If you do not fully understand the warnings and instructions or if you cannot strictly comply with them, do not use the product.

Note: Consult Code of Federal Regulations Title 29, Labor, parts 1910 and 1915 concerning occupational safety and health standards and regulations, as well as any other applicable federal, state and local regulations on safe practices in coating operations.

This product is for industrial use only. Not for residential use.

Limitation of Liability

Ameron's liability on any claim of any kind, including claims based upon Ameron's negligence or strict liability, for any loss or damage arising out of, connected with, or resulting from the use of the products, shall in no case exceed the purchase price allocable to the products or part thereof which give rise to the claim. **In no event shall Ameron be liable for consequential or incidental damages.**

Warranty

Ameron warrants its products to be free from defects in material and workmanship. Ameron's sole obligation and Buyer's exclusive remedy in connection with the products shall be limited, at Ameron's option, to either replacement of products not conforming to this Warranty or credit to Buyer's account in the invoiced amount of the nonconforming products. Any claim under this Warranty must be made by Buyer to Ameron in writing within five (5) days of Buyer's discovery of the claimed defect, but in no event later than the expiration of the applicable shelf life, or one year from the delivery date, whichever is earlier. Buyer's failure to notify Ameron of such nonconformance as required herein shall bar Buyer from recovery under this Warranty.

Ameron makes no other warranties concerning the product. No other warranties, whether expressed, implied, or statutory, such as warranties of merchantability or fitness for a particular purpose, shall apply. In no event shall Ameron be liable for consequential or incidental damages.

Any recommendation or suggestion relating to use of the products made by Ameron, whether in its technical literature, or in response to specific inquiry, or otherwise, is based on data believed to be reliable; however, the products and information are intended for use by Buyers having requisite skill and know-how in the industry, and therefore it is for Buyer to satisfy itself of the suitability of the products for its own particular use and it shall be deemed that Buyer has done so, at its sole discretion and risk. Variation in environment, changes in procedures of use, or extrapolation of data may cause unsatisfactory results.

AMERON INTERNATIONAL

Ameron U.S.A. • 13010 Morris Rd, Suite 400, Alpharetta, GA 30004 • (678) 393-0653
Ameron B.V. • J. F. Kennedylaan 7, 4191 MZ Geldermalsen, The Netherlands • (31) 345-587-587

MILLIKEN VALVE COMPANY

2625 Brodhead Road, Suite 100 Phone (610) 861-8803
Bethlehem, PA 18020-9081 FAX (610) 861-8094

MILLCENTRIC FLOW (CV) CHART

Valve Size	Milliken CV
3"	635 gpm
4"	1,120 gpm
6"	2,359 gpm
8"	4,182 gpm
10"	7,073 gpm
12"	8,366 gpm
14" *	8,505 gpm
14" **	4,631 gpm
16"	9,365 gpm
18"	11,411 gpm
20"	13,612 gpm
24"	21,343 gpm
30"	36,445 gpm
36"	47,871 gpm

*round port
**rectangular port
9/07

Lloyd's Register

Project: Proof of Design Tests

Certificate No.: LIV 202965/1

Client: Hattersley Newman Hender Ltd.
Milliken Valve Company Inc.

Office: Liverpool

Client's Order No.: R904720

Date: 8 February 1993

Order Status: Complete

Inspection dates First: 23.11.92

Final: 14.1.93

This is to certify that at the request of the above client the undersigned Surveyor to this Society did attend at their Ormskirk works on and between the above dates for the purpose of witnessing testing as under noted on:-

6" Fig 601 Millcentric Eccentric Plug Valves.
in accordance with section 5.5 of A.W.W.A. C504-80.

Three of the above valves were selected and hydro static tested to 350psi on the body for 1 minute no deformation or leakage found and on the seat to 350 psi for 1 minute no deformation or leakage found. Each valve in turn was then subjected to 10000 operational under hydraulic pressure of as follows.

1. Valve closed.
2. Hydraulic pressure of 175 psi applied.
3. Valve opens to fully open and zero pressure.
4. Back to operation 1.

On completion of 10,000 cycles each valve was subjected to a seat leakage test of 175 psi for 1 minute and found tight.

The valves were then opened up and inspected and no visible deterioration was noted.

.....

D.G. Sutton.
Surveyor to Lloyd's Register.

Mueller Group, Inc.
Research and Development Center

20 Thurber Blvd.
Smithfield, RI 02917
401-349-3020
401-349-3021 Fax

Test Report MUAD02-1
Proof-of-Design Test
Milliken 24" Figure 601 Plug Valve
June 6th 2003

Test Objective:
This test was performed to evaluate the capability of a Milliken Figure 601 Plug Valve to meet the Proof-of-Design requirements of ANSI/AWWA C504-00 Section 5, Paragraphs 5.2.4 through 5.4.2.3.

Description of test valve.
The valve tested was a Milliken 24" Figure 601 eccentric plug valve with a rectangular elastomer coated plug. The valve pressure rating was 150 CWP. Valve design was in accordance with MSS-SP-78 1998.

Test Apparatus:
The valve was actuated by a Morin model B 575U D000 Cylinder Actuator, driven by air over water reservoirs. The end flanges of the valve were closed by test heads, and the valve was pressurized to 150 psig in each closed cycle by a centrifugal pump fed by a water reservoir. Valve discharge on opening was returned to the same reservoir. A directional solenoid valve initiated by an electronic timer controlled the open/close cycling of the valve. The same device recorded open/close cycles. The open/close/open cycle of the valve was 45 seconds. Test pressure was monitored by a 0 – 500 psig pressure gauge, serial # MF-01-007, Calibrated 7/15/02, recalibration due 8/21/03.

Test procedure:
The valve shell was pressurized to 300 psig with the plug in the open position, and inspected for external leakage. No leakage was evident. The plug was then closed and the valve pressurized to 300 psig seat upstream. No leakage or permanent deflection was observed. This procedure was repeated with the pressure seat downstream. Again no leakage or permanent deflection was observed.
The valve was cycled fully open /closed/fully open for 5,000 cycles with 150 psig applied to the plug at each closed cycle. The valve was inspected for leakage at 1,000 cycle intervals. At the completion of 5,000 cycles the valve was tested in both flow directions for leakage past the plug. No leakage was observed.

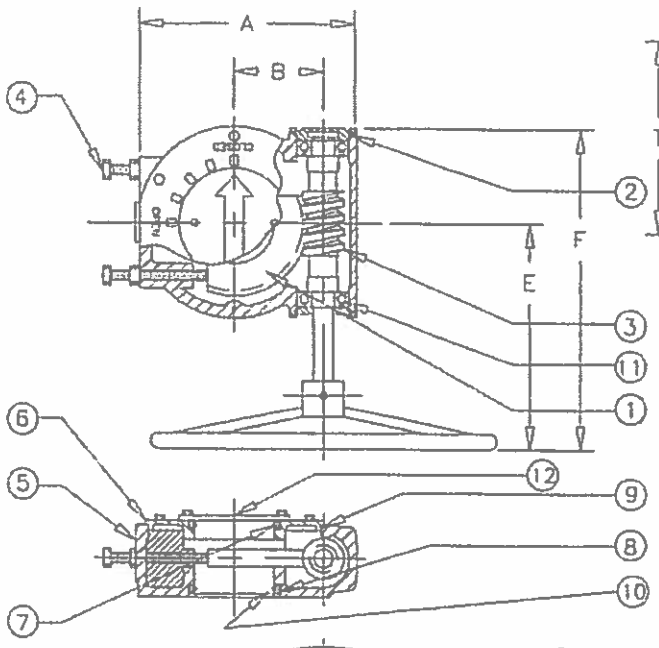
Conclusion:
The 24" Milliken figure 601 Plug Valve meets ANSI/AWWA C504-00 Proof-of-Design requirements as specified in Section 5 Paragraphs 5.2.4 through 5 4.2.3.

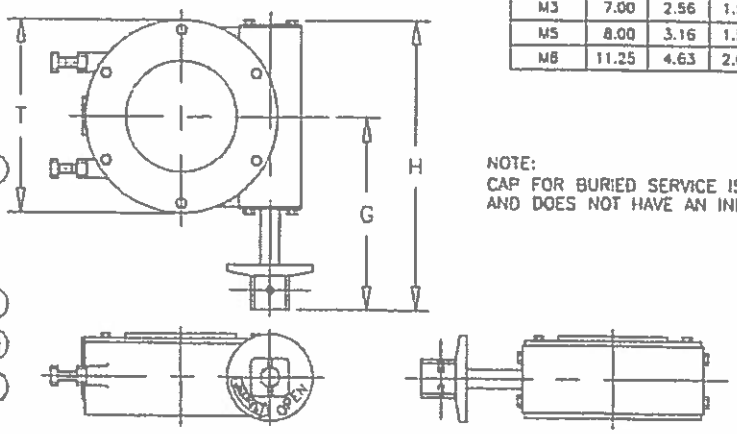
Robert Engelhardt - Senior Laboratory Technician

W Bryce Scobie - Chief Engineer

Subscribed and sworn to before me in
Providence County Rhode Island on the
10th day of June 2003

Renee M. Pelletier
Notary Public - Rhode Island
My Commission Expires
February 25, 2004

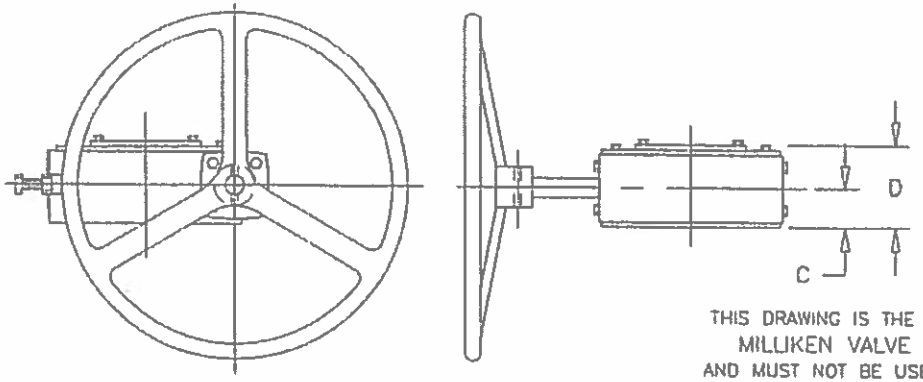




BURIED SERVICE GEAR WITH 2" NUT

OPER.	A	B	C	D	E	F	G	H	T
M3	7.00	2.56	1.50	3.34	9.5	11.7	8.0	11.3	6
M5	8.00	3.16	1.50	3.56	11.3	14.7	8.0	11.4	7.25
M8	11.25	4.63	2.00	4.72	11.6	16.2	10.0	14.6	10.0

NOTE:
CAP FOR BURIED SERVICE IS ONE PIECE
AND DOES NOT HAVE AN INDICATOR PLATE



ABOVE GROUND GEAR WITH HANDWHEEL

ITEM	QTY	DESCRIPTION	MATERIAL
12	1	INDICATING COVER	ALUMINUM
11	2	BEARING	STEEL ROLLER BEARINGS
10	1	O-RING	NITRILE
9	1	O-RING	NITRILE
8	2	SLEEVE BEARING	BRONZE
7	2	O-RING	NITRILE
6	1	CAP	SAME AS HOUSING
5	1	GEAR HOUSING	DUCTILE IRON
4	2	STOP LUG	STL/ZINC OR 316 STN. STL.
3	1	WORM GEAR	HARDENED STEEL
2	2	O-RING	NITRILE
1	1	QUAD GEAR	DUCTILE IRON A536

MILLIKEN VALVE CO

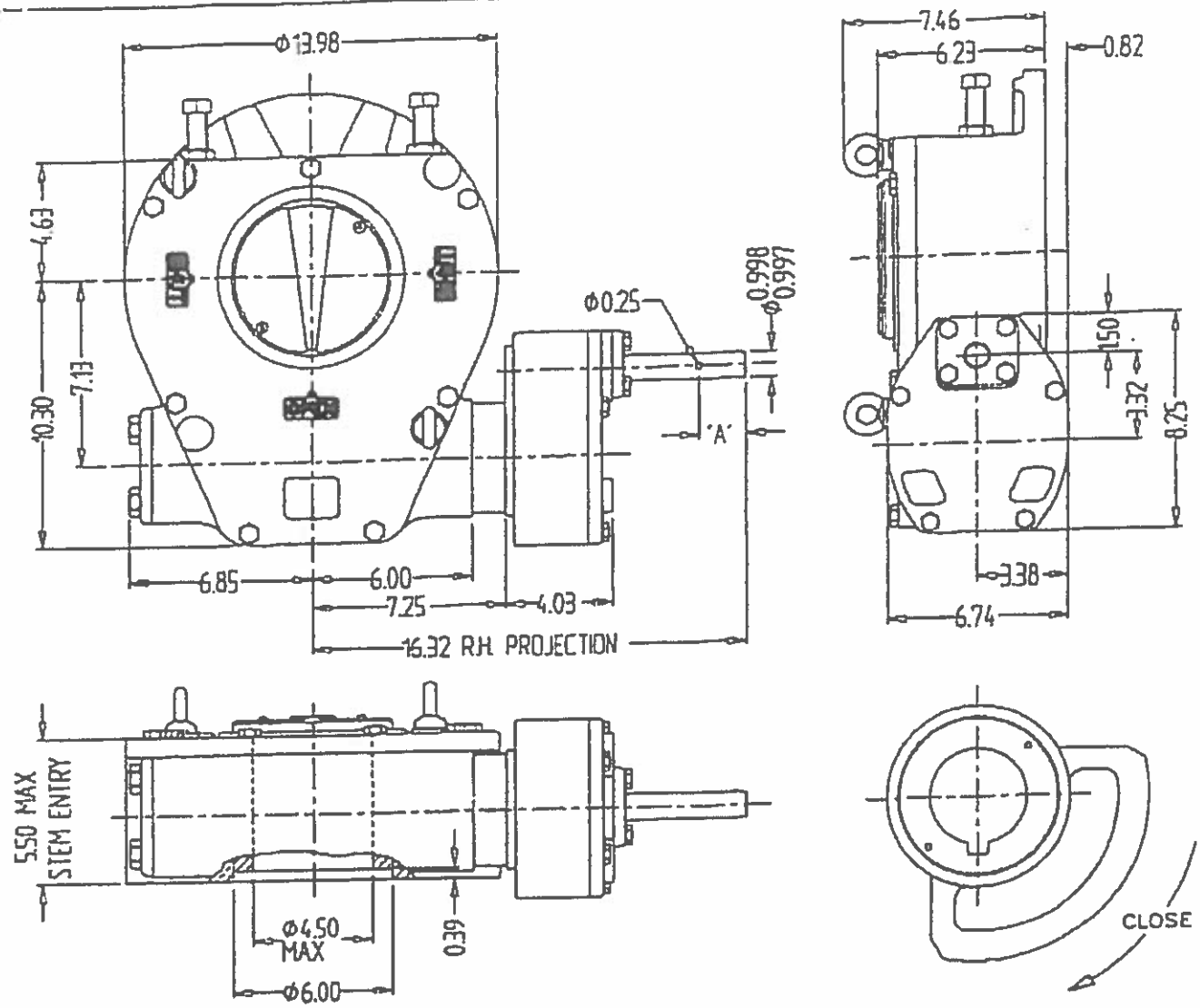
BY: CR | DATE: 8/97 | SCALE: NONE
CHK'D:

DATE	REVISIONS	BY
5/98	ADJ. SEGMENT LENGTH STOP BOLT THREAD STOP BOLT LENGTH BEARING ITEM	CR
8/98	BILL OF MAT. WORM GEAR WAS STEEL	CR
9/07	ADD "T" DIMENSION	FS

TITLE: MILLIKEN GEAR

DWG. NO. S49624

ACTUATOR TYPE - MJF50/S5



OUTPUT KEYWAY DETAILS
SHOWN IN OPEN POSITION

GENERAL INFORMATION

TRAVEL	90° ±5° AT BOTH ENDS
RATIO	250:1
TURNS TO CLOSE	625
MECHANICAL ADVANTAGE	730 ±10%
MAXIMUM OUTPUT TORQUE	105000 in-lbs
MAXIMUM INPUT TORQUE	1438 in-lbs

MOUNTING HOLE DETAL:

PREFERED BOLT CIRCLE STRADDLING C_L	10.00" (F25)
MAXIMUM BOLT CIRCLE STRADDLING C_L	11.75"
MAXIMUM BOLT CIRCLE ON C_L	11.75"
MINIMUM BOLT CIRCLE	7.25"

APPROXIMATE WEIGHT 220.5 lbs (100 kg)

HANDWHEEL DATA		
Φ	'A'	RIM PULL AT MAX. TORQUE
10"	1.25"	288 lbs
12"	1.25"	240 lbs
14"	1.25"	205.5 lbs
18"	1.75"	160 lbs
24"	1.75"	120 lbs
30"	1.75"	96 lbs
36"	1.75"	80 lbs

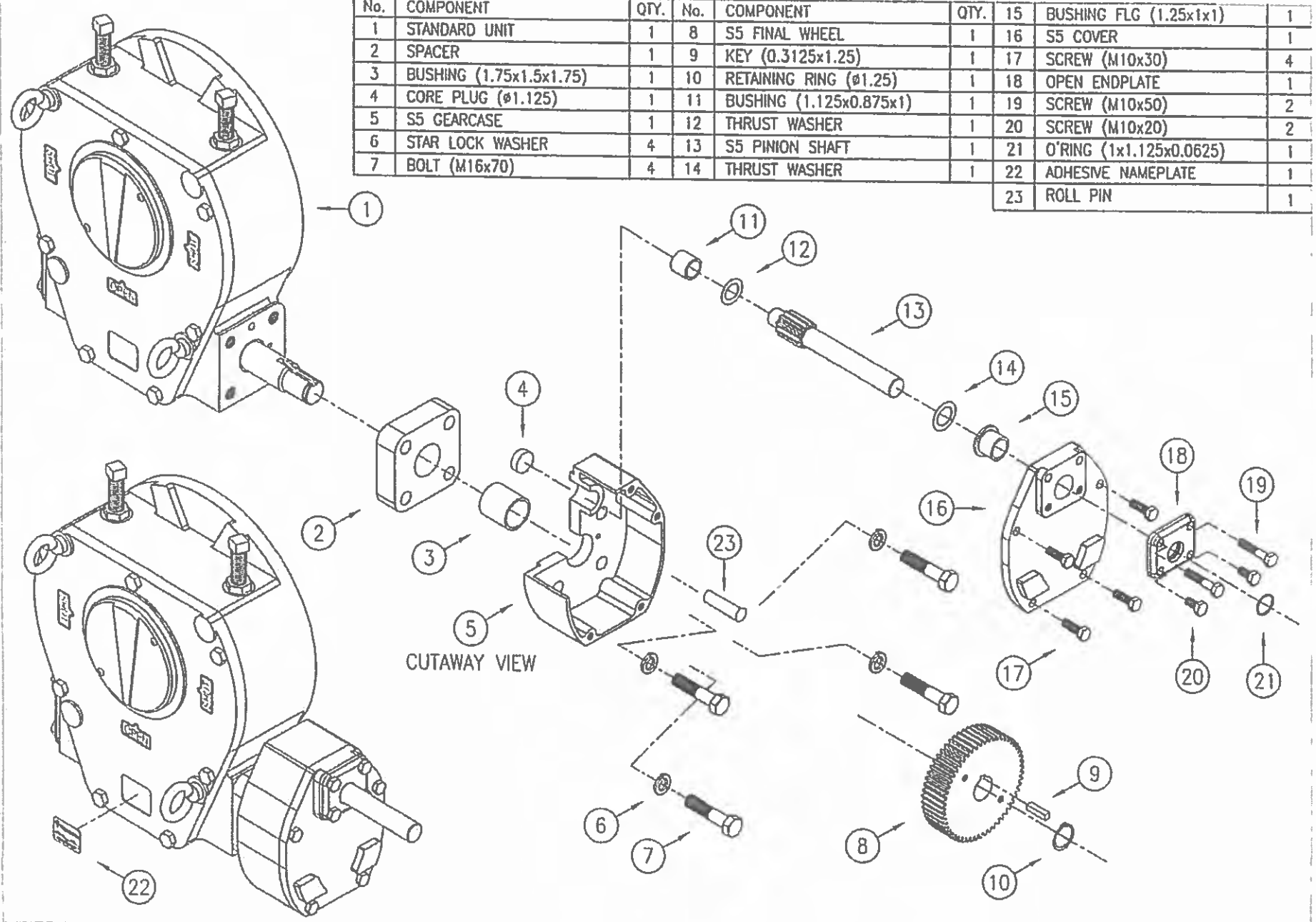
MASTERGEAR
DIVISION OF REGAL-BELOIT CORPORATION
5466 EAST RIDGTON RD. · SOUTH BELOIT, IL 61080

DIMENSIONS IN	DO NOT SCALE	DRAWING No.
INCHES		MJ 7028
	APPROVED BY JRH	REV. A 2/9/98

MJF50/S5 MATERIAL LIST

ITEM	MATERIAL
1	SEE MJF50 MATERIAL LIST
2	CAST IRON
3	SINTERED BRONZE
4	PLATED STEEL
5	CAST IRON
6	PLATED STEEL
7	HARDENED STEEL
8	CARBON STEEL
9	CARBON STEEL
10	STEEL
11	SINTERED BRONZE
12	HARDENED STEEL
13	CARBON STEEL
14	HARDENED STEEL
15	SINTERED BRONZE
16	CAST IRON
17	HARDENED STEEL
18	CAST IRON
19	HARDENED STEEL
20	HARDENED STEEL
21	NITRILE
22	ALUMINUM
23	HARDENED STEEL

No.	COMPONENT	QTY.	No.	COMPONENT	QTY.	15	BUSHING FLG (1.25x1x1)	1
1	STANDARD UNIT	1	8	S5 FINAL WHEEL	1	16	S5 COVER	1
2	SPACER	1	9	KEY (0.3125x1.25)	1	17	SCREW (M10x30)	4
3	BUSHING (1.75x1.5x1.75)	1	10	RETAINING RING (ø1.25)	1	18	OPEN ENDPLATE	1
4	CORE PLUG (ø1.125)	1	11	BUSHING (1.125x0.875x1)	1	19	SCREW (M10x50)	2
5	S5 GEARCASE	1	12	THRUST WASHER	1	20	SCREW (M10x20)	2
6	STAR LOCK WASHER	4	13	S5 PINION SHAFT	1	21	O'RING (1x1.125x0.0625)	1
7	BOLT (M16x70)	4	14	THRUST WASHER	1	22	ADHESIVE NAMEPLATE	1
						23	ROLL PIN	1

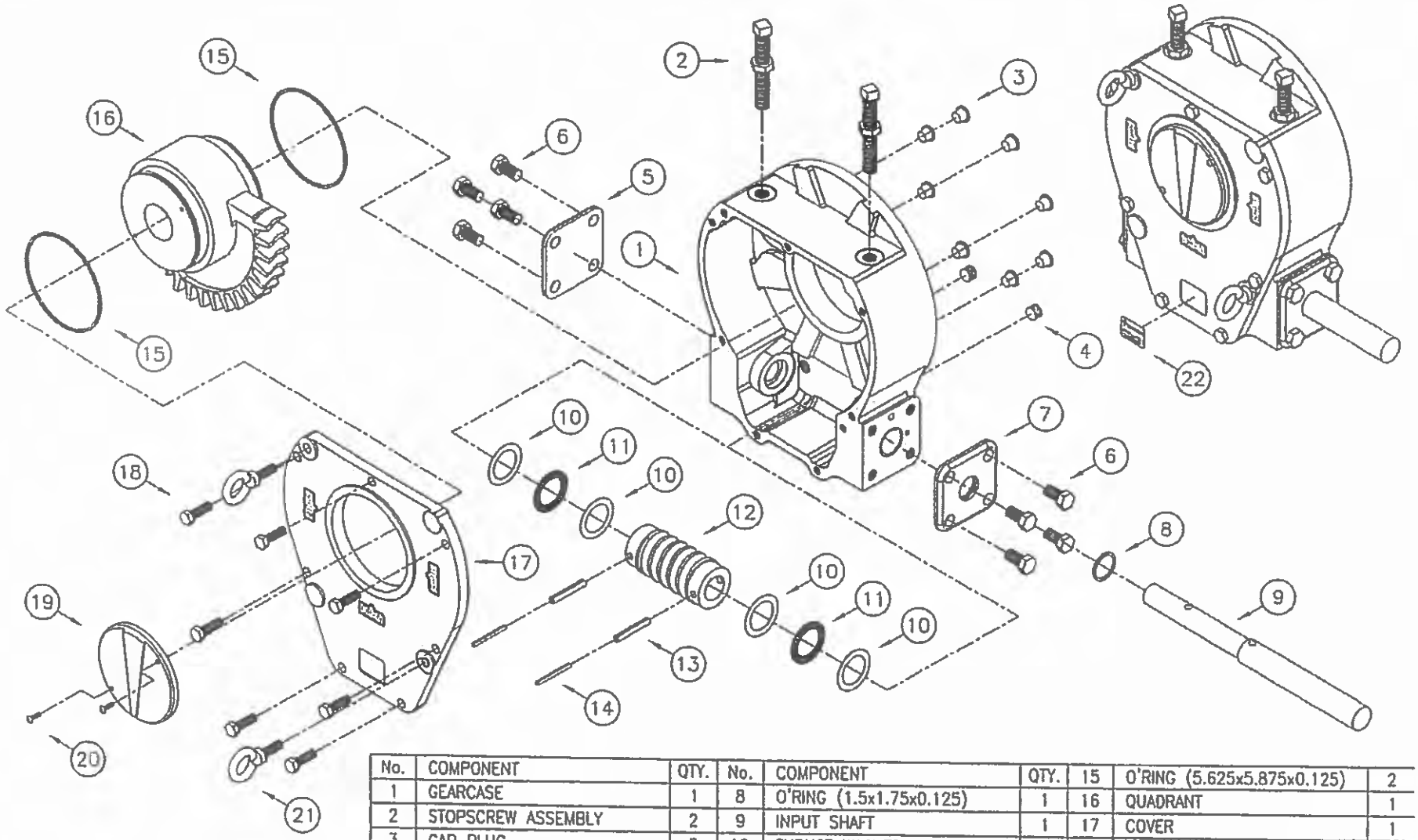


MASTERGEAR | ENVIRONMENTAL SPECIFICATION: SL039 | 9/2/99

90° OUTPUT UNIT	UNIT: MJF	S5 SPUR BOX	MJF/S5/SL039	REV: B

MJF50 MATERIAL LIST

ITEM	MATERIAL
1	CAST IRON
2	HARDENED STEEL
3	PLASTIC
4	CAST IRON
5	CAST IRON
6	HARDENED STEEL
7	CAST IRON
8	NITRILE
9	CARBON STEEL
10	HARDENED STEEL
11	HARDENED STEEL
12	ALLOY STEEL
13	HARDENED STEEL
14	HARDENED STEEL
15	NITRILE
16	DUCTILE IRON
17	CAST IRON
18	HARDENED STEEL
19	CAST IRON
20	HARDENED STEEL
21	CAST IRON
22	ALUMINUM



No.	COMPONENT	QTY.	No.	COMPONENT	QTY.	No.	COMPONENT	QTY.
1	GEARCASE	1	8	O'RING (1.5x1.75x0.125)	1	15	O'RING (5.625x5.875x0.125)	2
2	STOPSCREW ASSEMBLY	2	9	INPUT SHAFT	1	16	QUADRANT	1
3	CAP PLUG	8	10	THRUST WASHER	4	17	COVER	1
4	PRESS PLUG (ø0.375)	2	11	NEEDLE BEARING	5	18	SCREW (M12x40)	7
5	CLOSED ENDPLATE	1	12	WORM	1	19	INDICATOR CAP	1
6	SCREW (M16x30)	8	13	ROLL PIN (10x65)	2	20	SCREW (M6x25)	2
7	OPEN ENDPLATE	1	14	ROLL PIN (6x65)	2	21	EYE BOLT (M12x40)	2
						22	ADHESIVE NAMEPLATE	1

MJF | STANDARD UNIT | MJF/SL039 | REV. A

SL039 4/3/95

MILLIKEN

MILLCENTRIC

ECCENTRIC PLUG VALVE

The Milliken criteria of quality, reliability, safety and value are embodied in the MILLCENTRIC Eccentric valve, setting higher standards for dependable performance with excellent features achieved by the utilization of the very latest design and manufacturing techniques.

BODY

Conforming to AWWA C504 wall thickness, the Millcentric valve body casting is in ASTM A126 CL B cast iron using high pressure molding techniques. Alternative flanged, grooved or mechanical joint ends are available.
Flange diameter, thickness and drilling conform to ANSI B16.1 Class 125 or 250.
Grooved ends meet AWWA C-606 for ductile or steel pipe. Mechanical joints to AWWA C111 (ANSI A21.11).

SEAT

The Millcentric valve incorporates as standard, on 3" and larger, a welded 90% nickel seat for corrosion and erosion resistance specially profiled for low torque and extended seat life.
An alternative corrosion resistant epoxy seat is available for general service duties.

STEM SEAL

High integrity sealing by combining the advantages of a resilient and abrasion resistant U-Cup seal. From vacuum to high pressure, the self-adjusting sealing system (per AWWA C504) gives positive, trouble-free service and is retained independently of the plug stem or external torque device.

BEARINGS

The plug rotates in permanently lubricated 316 grade stainless steel bearings on 20" and smaller, and permanently lubricated bronze bearings on 24" and larger, located in the body and bonnet, along with upper and lower PTFE thrust washers, which ensure consistently low operating torque.

- Computer Aided Design
- High integrity casting
- CNC manufacturing delivers consistent sizes on all components

All complemented by rigorous Quality Control System

PLUG

Supported on integral trunnions, the plug face is covered with a elastomer that is molded 2½"-12" and vulcanized on 14" and larger to the casting providing tight shut off even under vacuum conditions. High integrity corrosion-free sealing is achieved by a variety of abrasion resistant elastomers which protect the plug right up to the trunnions. When assembled, the light compression of the elastomers onto PTFE thrust washers, prevents entry of abrasive materials into the bearings.

BONNET SEAL

Superior "O" ring sealing with metal/metal contact means lower bolting stresses compared with compression gaskets.

FLOW

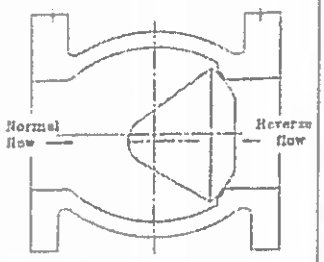
The port design (round on 2½-12" and rectangular on 14" and larger) with streamlined internal contours gives high capacity straight through flow in the full open position, reducing turbulence and pressure drop and the effect of erosive media. Handling of sludges and slurries is therefore enhanced.

INTERCHANGEABLE

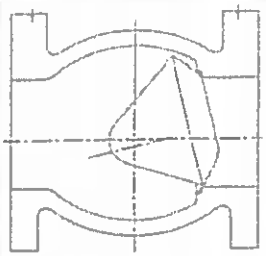
Because of common face to face dimensions with wedge gate valves (3"-12"), fitting the tight shut-off rotary MILLCENTRIC valve into existing systems is accomplished without pipeline modifications.

TRAVEL STOPS

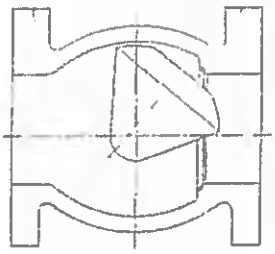
Adjustable open and closed travel stops are fitted as standard on both wrench and gear operated Millcentric valves



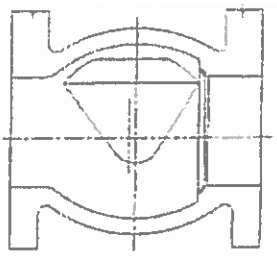
- Valve in closed position for bubble tight shut-off
- Normal flow direction gives pressure assisted sealing
- Torques are low even in reverse flow.



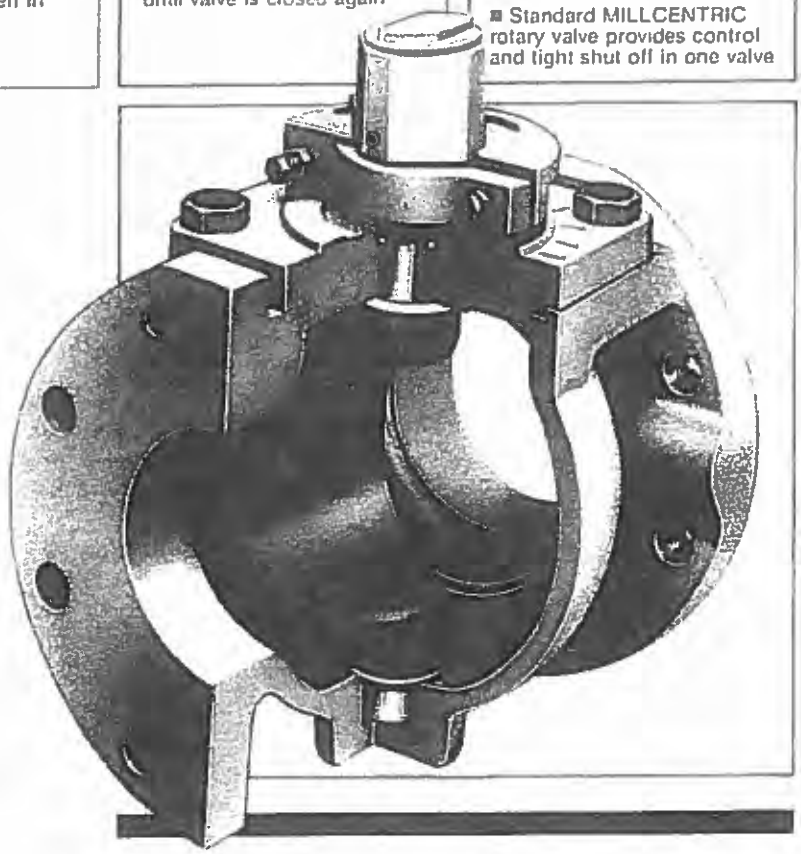
- Plug rotates away from the seat for instant opening
- Seat wear and operating torque reduced
- No further seat contact until valve is closed again



- Design of MILLCENTRIC valve allows modulating control over the full 90° travel
- Ideally suited for balancing service
- Standard MILLCENTRIC rotary valve provides control and tight shut off in one valve



- Plug is out of flow path when fully open
- Straight through, uninterrupted smooth flow
- Round port reduces turbulence and erosion, lowers pumping costs and can be "pigged" to clean the pipeline



INSTALLATION

The MILLCENTRIC valve is suitable for flow and shut-off in either direction. Seat end downstream is the preferred orientation and any reverse flow requirement should be stated at the time of order. For use on fluids with suspended solids, installation with the seat upstream and the valve stem horizontal may be preferable; plug rotation to the top of the valve will ensure smooth operation.

IN-LINE MAINTENANCE

In the unlikely event of gland leakage, the stem seals can be easily replaced without removing the bonnet. Access to the body for cleaning or inspection does not require removal from the line.

MODULAR CONSTRUCTION

Design of the bonnet and stem allows for on-site adaptation of gear operators, power actuators, or extension devices on to standard valves. Conversion can be easily undertaken without removing the valve bonnet, thereby minimizing downtime.

POWER OPERATION

Pneumatic, electric or hydraulic operation is available, complete with accessories such as limit switches, solenoid valves and positioners when required.

ELASTOMERS AVAILABLE FOR MILLCENTRIC VALVE

Natural rubber is also available.

Nitrile

A general purpose material sometimes referred to as BUNA-N or HYCAR with a -20°F to 225°F temperature range. Used on sewage, water, hydrocarbon and mineral oils.

EPDM

An excellent polymer for use on chilled water through to LP steam applications having a temperature range of -35°F to 250°F. Resistance to many acids, alkalies, detergents, phosphate esters, alcohols and glychols is an added benefit.

Neoprene

This versatile material shows outstanding resistance to abrasion and ozone. Chemical resistance to a wide range of petroleum based products and dilute acids and alkalies. Temperature range -20°F to 225°F.

Viton

Retention of mechanical properties at high temperature is an important feature of this elastomer: temperature range is -10°F to 400°F. It also has excellent resistance to oils, fuels, lubricants and most mineral acids and aromatic hydrocarbons.

PRESSURE RATING

12" and smaller	ANSI 125	175 psi ←
14" and larger	ANSI 125	150 psi ←
12" and smaller	ANSI 250	400 psi
14"-36"	ANSI 250	300 psi

Body Hydrotest = 200% of rated pressure
Seat Test = 120% of rated pressure

MILLCENTRIC VALVE - SERIES 600

ORDERING INFORMATION

Valve Types	Designation
Mechanical Joint	600
ANSI 125 Flanged	601 ←
ANSI 250 Flanged	602
ANSI 125 Grooved End for Steel Pipe	606S
ANSI 125 Grooved End for Ductile Iron Pipe	606D ←
Seat	
Nickel	N ←
Epoxy	E
Elastomer Trim	
EPDM	0
Nitrile (Buna)	1 ←
Viton	2
Neoprene	3
Natural	4
Gear Operators	
Buried Gear with 2" nut	BG
Above Ground Gear with Indicator and Handwheel	AG
Memory Stop Gearbox with Handwheel	MG

Example: 4" 601 N3AG
4" ANSI 125 Flanged with Nickel Seat, Neoprene Elastomer and Above Ground Gear with Indicator and Handwheel

VALVES ARE ONLY SUPPLIED FOR BI-DIRECTIONAL SHUT-OFF IF SPECIFIED AT TIME OF ORDER.

ELASTOMER SELECTION CHART

The chart below is to assist in the selection of elastomers for some common fluids. It doesn't mean other elastomers are not suitable within varying limits. Temperature, concentration, and mixture all affect chemical attack. If there is any doubt regarding compatibility, specific conditions should be referred to engineering for recommendations. The chart below is to serve as a guide only.

Service	Elastomer	Average Useful Temp. Range
Acetone	EPDM	-35°F to 250°F
Air	EPDM	-35°F to 250°F
Air w/Oil	Nitrile	0°F to 212°F
Alcohol, Amyl	EPDM	0°F to 212°F
Alcohol, Aromatic	Viton	10°F to 250°F
Alcohol, Butyl	Neoprene	-20°F to 225°F
Alcohol, Denatured	Nitrile	-20°F to 212°F
Alcohol, Ethyl	EPDM	-35°F to 250°F
Alcohol, Grain	Nitrile	-20°F to 225°F
Alcohol, Isospropyl	Neoprene	-20°F to 225°F
Alcohol, Methyl	EPDM	-35°F to 250°F
Ammonia, Anhydrous	Neoprene	-20°F to 225°F
Ammonium Nitrate	EPDM	-35°F to 250°F
Ammonia, Water	EPDM	-35°F to 250°F
Animal Fats	Nitrile	-20°F to 212°F
Black Liquor	EPDM	-35°F to 250°F
Blast Furnace Gas	Neoprene	-20°F to 225°F
Butane	Nitrile	-20°F to 212°F
Bunker Oil "C"	Nitrile	-20°F to 212°F
Calcium Chloride	EPDM	-35°F to 250°F
Carbon Dioxide	EPDM	-35°F to 250°F
Carbon Monoxide (Cold)	Neoprene	-20°F to 150°F
Carbon Monoxide (Hot)	Viton	10°F to 300°F
Carbon Tetrachloride	Viton	10°F to 300°F

Service	Elastomer	Average Useful Temp. Range
Caustic Soda	EPDM	-35°F to 250°F
Cement Slurry	EPDM	-35°F to 250°F
Copper Sulphate	EPDM	-35°F to 250°F
Creosote (Coal)	Nitrile	-20°F to 212°F
Coal Slurry	Nitrile	-20°F to 212°F
Diesel Fuel No 1	Nitrile	-20°F to 212°F
Diethylene Glycol	EPDM	-35°F to 250°F
Ethylene Glycol	EPDM	-35°F to 250°F
Fatty Acid	Nitrile	-20°F to 212°F
Fuel Oil No 2	Nitrile	-20°F to 212°F
Fertilizer Liquid ($H_4N_2O_3$)	EPDM	-35°F to 250°F
Gasoline, Aeg	Nitrile	-20°F to 212°F
Gas, Natural	Nitrile	-20°F to 212°F
Glue, Animal	Nitrile	-20°F to 212°F
Green Liquor	EPDM	-35°F to 250°F
Hydraulic Oil (Petro)	Nitrile	-20°F to 212°F
Hydrogen	Nitrile	-20°F to 212°F
JP3, JP5	Viton	0°F to 300°F
Kerosene	Nitrile	-20°F to 212°F
Ketone	EPDM	-35°F to 250°F
Lime Slurry	EPDM	-35°F to 250°F
Methane	Nitrile	-20°F to 212°F
Methyl Ethyl Ketone	EPDM	-35°F to 250°F
Naptha (Benzin)	Nitrile	-20°F to 212°F

Service	Elastomer	Average Useful Temp. Range
Oil, Animal	Nitrile	-20°F to 212°F
Oil, Mobil Therm Light	Viton	10°F to 250°F
Oil, Mobil Therm 600	Viton	10°F to 250°F
Oil, Mobil Therm 603	Nitrile	-20°F to 212°F
Oil, Lubricating	Nitrile	-20°F to 212°F
Oil, Vegetable	Nitrile	-20°F to 212°F
Paint, Latex	Nitrile	-20°F to 212°F
Phosphate Ester	EPDM	-35°F to 250°F
Propane	Nitrile	-20°F to 212°F
Rape Seed Oil	EPDM	-35°F to 250°F
Sewage (w/oils)	Nitrile	-20°F to 212°F
Sodium Hydroxide 20%	EPDM	-35°F to 250°F
Starch	EPDM	-35°F to 250°F
Steam to 300°F	EPDM	-35°F to 300°F
Stoddard Solvent	Nitrile	-20°F to 80°F
Sulphuric Acid 10% 50%	Neoprene	-35°F to 158°F
Sulphuric Acid 100%	Viton	10°F to 300°F
Trichloroethylene Dry	Viton	10°F to 250°F
Triethanol Amine	EPDM	-35°F to 300°F
Varnish	Viton	10°F to 300°F
Water, Fresh	EPDM	-35°F to 250°F
Water, Salt	EPDM	-35°F to 250°F
Xylene	Viton	10°F to 300°F

Professional Services Agreement

Las Virgenes Municipal Water District
PROFESSIONAL SERVICES AGREEMENT

This Professional Services Agreement ("Agreement") is entered into this ____ day of _____, 20Choose an item. by and between Las Virgenes Municipal Water District ("Agency"), and Consultant ("Consultant"). Agency and Consultant are sometimes individually referred to as "Party" and collectively as "Parties."

1. PURPOSE.

1.1 Project.

Consultant desires to perform and assume responsibility for the provision of certain professional services required by the Agency on the terms and conditions set forth in this Agreement and Agency desires to engage Consultant to render such services for project ("Project") as set forth in this Agreement and its attached exhibits.

Now therefore, in consideration of the mutual covenants and agreements set forth herein, the Parties do contract and agree as follows:

2. TERMS.

2.1 Scope of Services.

2.1.1 General Scope of Services. Consultant promises and agrees to furnish to the Agency all labor, materials, tools, equipment, services, and incidental and customary work necessary to fully and adequately supply the professional services necessary for the Project ("Services"). The Services are more particularly described in the attached **Exhibit "A"** ("Scope of Services"). All Services shall be subject to, and performed in accordance with, this Agreement, the exhibits attached hereto and incorporated herein by reference, and all applicable local, state and federal laws, rules, and regulations.

2.1.2 Term. [*This Agreement shall commence on the date above written and shall continue until completion of the Services described above.*

or

*The term of this Agreement shall be from Date to Date, as set forth in the attached **Exhibit "B"** ("Fee Schedule") unless earlier terminated as provided herein. Consultant shall complete the Services within the term of this Agreement and shall meet any other established schedules and deadlines. The Parties may, by mutual, written consent, extend the term of this Agreement if necessary to complete the Services.*]

2.2 Consideration.

2.2.1 Compensation. *Consultant shall receive compensation, including authorized reimbursements, for all Services rendered under this Agreement at the rates set forth in the Fee Schedule. The total compensation shall not exceed* written dollar value *Dollars ($XXX.00) without written approval by Agency. Extra Work may be authorized, as described below, and if authorized, will be compensated at the rates and manner set forth in this Agreement.*

Or

Agency agrees to pay Consultant compensation, including authorized reimbursements, in accordance with the completion and acceptance of the task, milestones, and Deliverables delineated in the Scope of Work and Fee Schedule.

2.2.2 Payment. Consultant shall submit to Agency a monthly itemized statement which indicates work completed and hours of Services rendered by Consultant. The statement shall describe the Services and supplies provided since the initial commencement date, or since the start of the subsequent billing periods, as appropriate, through the date of the statement. Agency shall pay all approved charges within forty-five (45) days of receiving such statement.

2.2.3 Extra Work. At any time during the term of this Agreement, Agency may request that Consultant perform Extra Work. As used herein, "Extra Work" means any work which is determined by Agency to be necessary for the proper completion of the Project, but which the Parties did not reasonably anticipate would be necessary at the execution of this Agreement. Consultant shall not perform, nor be compensated for, Extra Work without written authorization by Agency.

2.3 Responsibilities of Consultant.

2.3.1 Independent Contractor. The Services shall be performed by Consultant or under its supervision. Consultant will determine the means, methods and details of performing the Services subject to the requirements of this Agreement. Consultant is an independent contractor and not an employee of Agency. Except as Agency may specify in writing, Consultant shall have no authority, expressed or implied, to act on behalf of Agency in any capacity whatsoever as an agent. Any additional personnel performing the Services under this Agreement on behalf of Consultant shall also not be employees of Agency and shall at all times be under Consultant's exclusive direction and control.

2.3.2 Payment of Subordinates. Consultant shall pay all wages, salaries, and other amounts due such personnel in connection with their performance of Services under this Agreement and as required by law. Consultant shall be responsible for all reports and obligations respecting such additional personnel, including, but not limited to: social security

taxes, income tax withholding, unemployment insurance, disability insurance, and workers' compensation insurance.

2.3.3 Standard of Care. Consultant shall perform all Services under this Agreement in a skillful and competent manner, consistent with the standards generally recognized as being employed by professionals in the same discipline in the State of California. Consultant represents and maintains that it is skilled in the professional calling necessary to perform the Services. Consultant warrants that all employees and subconsultants shall have sufficient skill and experience to perform the Services assigned to them.

2.3.4 Licensing. Consultant represents that it, its employees and subconsultants have all licenses, permits, qualifications, and approvals of whatever nature that are legally required to perform the Services, and that such licenses and approvals shall be maintained throughout the term of this Agreement.

2.3.5 Conformance to Applicable Requirements. All work prepared by Consultant shall be subject to the approval of Agency.

2.3.6 Substitution of Key Personnel. Consultant has represented to Agency that certain key personnel will perform and coordinate the Services under this Agreement. Key Consultant personnel to be assigned to this Agreement are identified in the List of Key Consultant Personnel set forth in the attached **Exhibit "C"** ("Key Personnel"). Key Personnel shall be available to perform under the terms and conditions of this Agreement immediately upon commencement of the term of this Agreement. Should one or more of such personnel become unavailable, Consultant may substitute other personnel of at least equal competence upon written approval of Agency. The Agency shall have the right to approve or disapprove the reassignment or substitution of Consultant key personnel listed in Exhibit C for any reason at its sole discretion. In the event that Agency and Consultant cannot agree as to the substitution of key personnel, Agency shall be entitled to terminate this Agreement for cause.

2.3.7 Unavailability of Key Personnel. In the event individual key personnel listed in Exhibit C are terminated either by the Consultant or the individual, with or without cause, or if individual key personnel are otherwise unavailable to perform services for the Consultant, the Consultant shall provide to the Agency written notification detailing the circumstances of the unavailability of the individual key personnel and designating replacement personnel prior to the effective date of individual key personnel termination or unavailability date, to the maximum extent feasible, but no later than five (5) business days after the effective date of the individual key personnel termination or unavailability. The Consultant shall propose replacement personnel that have a level of experience and expertise equivalent to the unavailable individual key personnel for Agency review and approval.

2.3.8 Removal of Consultant Personnel. The Consultant agrees to remove personnel from performing work under this Agreement if reasonably requested to do so by the Agency within 24 hours or as soon thereafter as is practicable.

2.3.9 Laws and Regulations. Consultant shall keep itself fully informed of and in compliance with all local, state and federal laws, rules and regulations in any manner affecting the performance of the Project or the Services, including all Cal/OSHA requirements, and shall give all notices required by law. Consultant shall be liable for all violations of such laws and regulations in connection with Services. If the Consultant performs any work knowing it to be contrary to such laws, rules, and regulations, Consultant shall be solely responsible for all costs arising therefrom.

2.3.10 Labor Code Provisions.

(a) Prevailing Wages. Consultant is aware of the requirements of California Labor Code Section 1720, et seq., and 1770, et seq., as well as California Code of Regulations, Title 8, Section 16000, et seq., ("Prevailing Wage Laws"), which require the payment of prevailing wage rates and the performance of other requirements on "public works" and "maintenance" projects. If the Services are being performed as part of an applicable "public works" or "maintenance" project, as defined by the Prevailing Wage Laws, and if the total compensation is $1,000 or more, Consultant agrees to fully comply with such Prevailing Wage Laws. Consultant shall comply with all prevailing wage requirements under the California Labor Code and Consultant shall forfeit as penalty to the Agency a sum of not more than $200.00 for each calendar day, or portion thereof, for each worker paid less than the prevailing rates. This penalty shall be in addition to any shortfall in wages paid. The Agency has obtained the general prevailing rate of wages, as determined by the Director of the Department of Industrial Relations, a copy of which is on file in the Agency's office and shall be made available for viewing to any interested party upon request. Consultant shall make copies of the prevailing rates of per diem wages for each craft, classification, or type of worker needed to execute the Services available to interested parties upon request and shall post copies at the Consultant's principal place of business and at the Project site.

(b) Registration and Labor Compliance. If the Services are being performed as part of an applicable "public works" or "maintenance" project, then, in addition to the foregoing, pursuant to Labor Code sections 1725.5 and 1771.1, the Consultant and all subconsultants must be registered with the Department of Industrial Relations ("DIR"). Consultant shall maintain registration for the duration of the Project and require the same of any subconsultants. This Project may also be subject to compliance monitoring and enforcement by the Department of Industrial Relations. It shall be Consultant's sole responsibility to comply with all applicable registration and labor compliance requirements, including the submission of payroll records directly to the DIR.

(c) Labor Certification. By its signature hereunder, Consultant certifies that it is aware of the provisions of Section 3700 of the California Labor Code which require every employer to be insured against liability for Workers' Compensation or to undertake self-insurance in accordance with the provisions of that Code and agrees to comply with such provisions before commencing the performance of the Services.

2.3.11 Accounting Records. Consultant shall maintain complete and accurate records with respect to all costs and expenses incurred under this Agreement. All such records shall be clearly identifiable. Consultant shall allow a representative of Agency during normal business hours to examine, audit, and make transcripts or copies of such records and any other documents created pursuant to this Agreement. Consultant shall allow inspection of all work, data, documents, proceedings, and activities related to the Agreement for a period of four (4) years from the date of final payment under this Agreement.

2.4 Representatives of the Parties.

2.4.1 Agency's Representative. The Agency hereby designates its General Manager, or his or her designee, to act as its representative for the performance of this Agreement ("Agency's Representative"). Consultant shall not accept direction or orders from any person other than the Agency's Representative or his or her designee.

2.4.2 Consultant's Representative. Consultant hereby designates XXXXXX, or his or her designee, to act as its representative for the performance of this Agreement ("Consultant's Representative"). Consultant's Representative shall have full authority to represent and act on behalf of the Consultant for all purposes under this Agreement. The Consultant's Representative shall supervise and direct the Services, using their best skill and attention, and shall be responsible for all means, methods, techniques, sequences, and procedures and for the satisfactory coordination of all portions of the Services under this Agreement.

2.5 Indemnification.

To the fullest extent permitted by law, Consultant shall immediately indemnify and hold the Agency, its directors, officials, officers, employees, volunteers, and agents free and harmless from any and all claims, demands, causes of action, costs, expenses, liability, loss, damage, or injury of any kind, in law or equity, to property or persons, including wrongful death, in any manner arising out of, pertaining to, or incident to any alleged acts, errors, or omissions of Consultant, its officials, officers, employees, subcontractors, consultants, or agents in connection with the performance of the Consultant's Services, the Project, or this Agreement, including without limitation the payment of all consequential damages, attorneys' fees and costs, including expert witness fees. Notwithstanding the foregoing, to the extent Consultant's Services are subject to Civil Code Section 2782.8, the above indemnity shall be limited, to the extent required by Civil Code Section 2782.8, to claims that arise out of, pertain to, or relate to the negligence, recklessness, or willful misconduct of the Consultant.

Consultant shall immediately defend, with Counsel of Agency's choosing and at Consultant's own cost, expense and risk, any and all claims, suits, actions, or other proceedings of every kind that may be brought or instituted against Agency or its directors, officials, officers, employees, volunteers, and agents. Consultant shall pay and satisfy any judgment, award, or decree that may be rendered against Agency or its directors, officials, officers, employees, volunteers, and agents as part of any such claim, suit, action, or other proceeding. Consultant

shall also reimburse Agency for the cost of any settlement paid by Agency or its directors, officials, officers, employees, agents, or volunteers as part of any such claim, suit, action, or other proceeding. Such reimbursement shall include payment for Agency's attorneys' fees and costs, including expert witness fees. Consultant's obligation to defend and indemnify shall survive expiration or termination of this Agreement, and shall not be restricted to insurance proceeds, if any, received by the Agency, its directors, officials, officers, employees, agents, or volunteers.

2.6 Insurance.

2.6.1 Time for Compliance. Consultant shall not commence Work under this Agreement until it has provided evidence satisfactory to the Agency that it has secured all insurance required under this section. In addition, Consultant shall not allow any subconsultant to commence work on any subcontract until it has provided evidence satisfactory to the Agency that the subconsultant has secured all insurance required under this section. Failure to provide and maintain all required insurance shall be grounds for the Agency to terminate this Agreement for cause.

2.6.2 Minimum Requirements. Consultant shall, at its expense, procure and maintain for the duration of the Agreement insurance against claims for injuries to persons or damages to property which may arise from or in connection with the performance of the Agreement by the Consultant, its agents, representatives, employees, or subconsultants. Consultant shall also require all of its subconsultants to procure and maintain the same insurance for the duration of the Agreement. Such insurance shall meet at least the following minimum levels of coverage:

(a) Commercial General Liability. Coverage for commercial general liability insurance shall be at least as broad as Insurance Services Office (ISO) Commercial General Liability Coverage (Occurrence Form CG 0001). Consultant shall maintain limits no less than $2,000,000 per occurrence, or the full per occurrence limits of the policies available, whichever is greater, for bodily injury, personal injury, and property damage. If Commercial General Liability Insurance or other form with general aggregate limit or product-completed operations aggregate limit is used, including but not limited to form CG 2503, either the general aggregate limit shall apply separately to this Agreement/location or the general aggregate limit shall be twice the required occurrence limit.

(b) Automobile Liability. Coverage shall be at least as broad as the latest version of the Insurance Services Office Business Auto Coverage form number CA 0001, code 1 (any auto). Consultant shall maintain limits no less than $1,000,000 per accident for bodily injury and property damage. The automobile liability policy shall cover all owned, non-owned, and hired automobiles.

(c) Workers' Compensation and Employer's Liability Insurance. Consultant shall maintain Workers' Compensation insurance as required by the State of California and Employer's Liability Insurance in an amount no less than $1,000,000 per accident

for bodily injury or disease. The insurer shall agree to waive all rights of subrogation against the Agency, its directors, officials, officers, employees, agents, and volunteers for losses paid under the terms of the insurance policy which arise from work performed by the Consultant.

(d) Professional Liability. Consultant shall procure and maintain, and require its subconsultants to procure and maintain, for a period of five (5) years following completion of the Project, errors and omissions liability insurance appropriate to their profession covering Consultant's wrongful acts, negligent actions, errors, or omissions. The retroactive date (if any) is to be no later than the effective date of this Agreement. Consultant shall purchase a one-year extended reporting period: i) if the retroactive date is advanced past the effective date of this Agreement; ii) if the policy is canceled or not renewed; or iii) if the policy is replaced by another claims-made policy with a retroactive date subsequent to the effective date of this Agreement. Such insurance shall be in an amount not less than $2,000,000 per claim.

(e) Excess Liability (if necessary). The limits of Insurance required in this Agreement may be satisfied by a combination of primary and umbrella or excess insurance. Any umbrella or excess coverage shall contain or be endorsed to contain a provision that such coverage shall also apply on a primary and non-contributory basis for the benefit of the Agency (if agreed to in a written contract or agreement) before the Agency's own primary or self-Insurance shall be called upon to protect it as a named insured. The policy shall be endorsed to state that the Agency, its directors, officials, officers, employees, agents, and volunteers shall be covered as additional insured at least as broad a form as CG 20 10 11 85 or the latest versions of both CG 20 10 and CG 20 37. The coverage shall contain no special limitations on the scope of protection afforded to the Agency, its directors, officials, officers, employees, agents, and volunteers.

2.6.3 All Coverages. The general liability and automobile liability policy shall include or be endorsed to state that: (1) the Agency, its directors, officials, officers, employees, agents, and volunteers shall be covered as additional insured with respect to work by or on behalf of the Consultant, including materials, parts, or equipment furnished in connection with such work using as broad a form as CG 20 10 11 85 or the latest versions of both CG 20 10 and CG 20 37; and (2) the insurance coverage shall be primary insurance as respects the Agency, its directors, officials, officers, employees, agents, and volunteers using as broad a form as CG 20 01 04 13, or if excess, shall stand in an unbroken chain of coverage excess of the Consultant's scheduled underlying coverage. Any insurance or self-insurance maintained by the Agency, its directors, officials, officers, employees, agents, and volunteers shall be excess of the Consultant's insurance and shall not be called upon to contribute with it in any way.

(a) The insurance policies required above shall contain or be endorsed to contain the following specific provisions:

(i) The policies shall contain a waiver of transfer rights of recovery ("waiver of subrogation") against Agency, its board members, officers, employees, agents, and volunteers, for any claims arising out of the work of Consultant.

(ii) Policies may provide coverage which contains deductible or self-insured retentions. Such deductible and/or self-insured retentions shall not be applicable with respect to the coverage provided to Agency under such policies. Consultant shall be solely responsible for deductible and/or self-insured retention and Agency, at its option, may require Consultant to secure the payment of such deductible or self-insured retentions by a surety bond or an irrevocable and unconditional letter of credit. The insurance policies that contain deductibles or self-insured retentions in excess of $25,000 per occurrence shall not be acceptable without the prior approval of Agency.

(iii) Prior to start of work under this Agreement, Consultant shall file with Agency evidence of insurance as required above from an insurer or insurers certifying to the required coverage. The coverage shall be evidenced on a certificate of insurance signed by an authorized representative of the insurer(s).

(iv) Each policy required in this section shall contain a policy cancellation clause that provides the policy shall not be cancelled or otherwise terminated by the insurer or the Consultant or reduced in coverage or in limits except after thirty (30) days' prior written notice by certified mail, return receipt requested, has been given to the Agency, Attention: Director of Finance & Administration.

(v) Insurance required by this Agreement shall be placed with insurers licensed by the State of California to transact insurance business of the types required herein. Each insurer shall have a current Best Insurance Guide rating of not less than A: VII unless prior approval is secured from the Agency as to the use of such insurer.

(vi) Consultant shall include all subcontractors as insureds under its policies or shall furnish separate certificates and endorsements for each subcontractor. All coverages for subcontractors shall be subject to all of the requirements stated herein. Consultant shall maintain evidence of compliance with the insurance requirements by the subcontractors at the job site and make them available for review by Agency.

2.6.4 Reporting of Claims. Consultant shall report to the Agency, in addition to Consultant's insurer, any and all insurance claims submitted by Consultant in connection with the Services under this Agreement.

2.7 Termination of Agreement.

2.7.1 Grounds for Termination. Agency may, by written notice to Consultant, terminate the whole or any part of this Agreement without liability to the Agency if Consultant fails to perform or commits a substantial breach of the terms hereof. Either Party may terminate this agreement on thirty (30) days' written notice for any reason. Upon termination, Consultant shall be compensated only for those Services which have been adequately rendered to Agency, and Consultant shall be entitled to no further compensation. If the Agreement is

terminated by Consultant without cause, Consultant shall reimburse Agency for additional costs to be incurred by Agency in obtaining the work from another consultant.

2.8 Ownership of Materials and Confidentiality.

2.8.1 Documents & Data; Licensing of Intellectual Property. This Agreement creates a non-exclusive and perpetual license for Agency to copy, use, modify, reuse, or sublicense any and all copyrights, designs, and other intellectual property embodied in plans, specifications, studies, drawings, estimates, and other documents or works of authorship fixed in any tangible medium of expression, including but not limited to, physical drawings or data magnetically or otherwise recorded on computer diskettes, which are prepared or caused to be prepared by Consultant under this Agreement ("Documents & Data"). The Consultant shall deliver to Agency on demand or upon completion of the Project, all such Documents & Data which shall be and remain the property of the Agency. If the Agency uses any of the data, reports, and documents furnished or prepared by the Consultant for projects other than the project shown on Exhibit A, the Consultant shall be released from responsibility to third parties concerning the use of the data, reports, and documents. The Consultant may retain copies of the materials. The Agency may use or reuse the materials prepared by Consultant without additional compensation to Consultant.

2.8.2 Confidentiality. All Documents & Data, either created by or provided to Consultant in connection with the performance of this Agreement, shall be held confidential by Consultant. All Documents & Data shall not, without the prior written consent of Agency, be used or reproduced by Consultant for any purposes other than the performance of the Services. Consultant shall not disclose, cause, or facilitate the disclosure of the Documents & Data to any person or entity not connected with the performance of the Services or the Project. Nothing furnished to Consultant that is otherwise known to Consultant or is generally known, or has become known, to the related industry shall be deemed confidential. Consultant shall not use Agency's name or insignia, photographs of the Project, or any publicity pertaining to the Services or the Project in any magazine, trade paper, newspaper, television, or radio production, or other similar medium without the prior written consent of Agency.

2.9 Subcontracting/Subconsulting.

2.9.1 Prior Approval Required. Consultant shall not subcontract any portion of the work required by this Agreement, except as expressly stated herein, without prior written approval of Agency. Subcontracts, if any, shall contain a provision making them subject to all provisions stipulated in this Agreement.

3. General Provisions.

3.1.1 Notices. All notices permitted or required under this Agreement shall be given to the respective parties at the following address, or at such other address as the respective parties may provide in writing for this purpose:

Agency:	**Consultant:**
Las Virgenes Municipal Water District Attn: District Contact 4232 Las Virgenes Road Calabasas, CA 91302	Consultant, Contact & Address

Such notice shall be deemed made when personally delivered or when mailed, upon deposit in the U.S. Mail, first class postage prepaid and registered or certified addressed to the Party at its applicable address. Actual notice shall be deemed adequate notice on the date actual notice occurred, regardless of the method of service.

3.1.2 Equal Opportunity Employment. Consultant represents that it is an equal opportunity employer and it shall not discriminate against any subconsultant, employee or applicant for employment because of race, religion, color, national origin, handicap, ancestry, sex, or age. Such non-discrimination shall include, but not be limited to, all activities related to initial employment, upgrading, demotion, transfer, recruitment or recruitment advertising, layoff, or termination.

3.1.3 Time of Essence. Time is of the essence for each and every provision of this Agreement. The acceptance of late performance shall not waive the right to claim damages for such breach nor constitute a waiver of the requirement of timely performance of any obligations remaining to be performed.

3.1.4 Agency's Right to Employ Other Consultants. Agency reserves the right to employ other consultants in connection with this Project.

3.1.5 Successors and Assigns. This Agreement shall be binding on the successors and assigns of the Parties.

3.1.6 Assignment or Transfer. Consultant shall not assign, hypothecate, or transfer, either directly or by operation of law, this Agreement or any interest herein without the prior written consent of the Agency.

3.1.7 Amendment. This Agreement may not be altered or amended except in a writing signed by both Parties.

3.1.8 Waiver. No waiver of any default shall constitute a waiver of any other default or breach, whether of the same or other covenant or condition.

3.1.9 No Third Party Beneficiaries. There are no intended third party beneficiaries of any right or obligation assumed by the Parties.

3.1.10 Invalidity; Severability. If any portion of this Agreement is declared invalid, illegal, or otherwise unenforceable by a court of competent jurisdiction, the remaining provisions shall continue in full force and effect.

3.1.11 Governing Law. This Agreement shall be governed by the laws of the State of California. Venue shall be in Los Angeles County.

3.1.12 Attorneys' Fees. If either Party commences an action against the other Party, either legal, administrative or otherwise, arising out of or in connection with this Agreement, the prevailing party in such litigation shall be entitled to have and recover from the losing party reasonable attorneys' fees and all other costs of such action.

3.1.13 Authority to Enter Agreement. Consultant has all requisite power and authority to conduct its business and to execute, deliver, and perform the Agreement. Each Party warrants that the individuals who have signed this Agreement have the legal power, right, and authority to make this Agreement and bind each respective Party.

3.1.14 Counterparts. This Agreement may be signed in counterparts, each of which shall constitute an original.

3.1.15 Integration. This Agreement represents the entire understanding of Agency and Consultant as to those matters contained herein. No prior oral or written understanding shall be of any force or effect with respect to those matters covered hereunder.

[*Signature Page following*]

IN WITNESS WHEREOF, the Parties hereby have caused this Agreement to be executed the date first written above:

APPROVED:	APPROVED:
Las Virgenes Municipal Water District	**CONSULTANT**
_____	_____
David W. Pedersen	Name
General Manager	Title

EXHIBIT A
SCOPE OF SERVICES

EXHIBIT B
FEE SCHEDULE

EXHIBIT C
KEY PERSONNEL