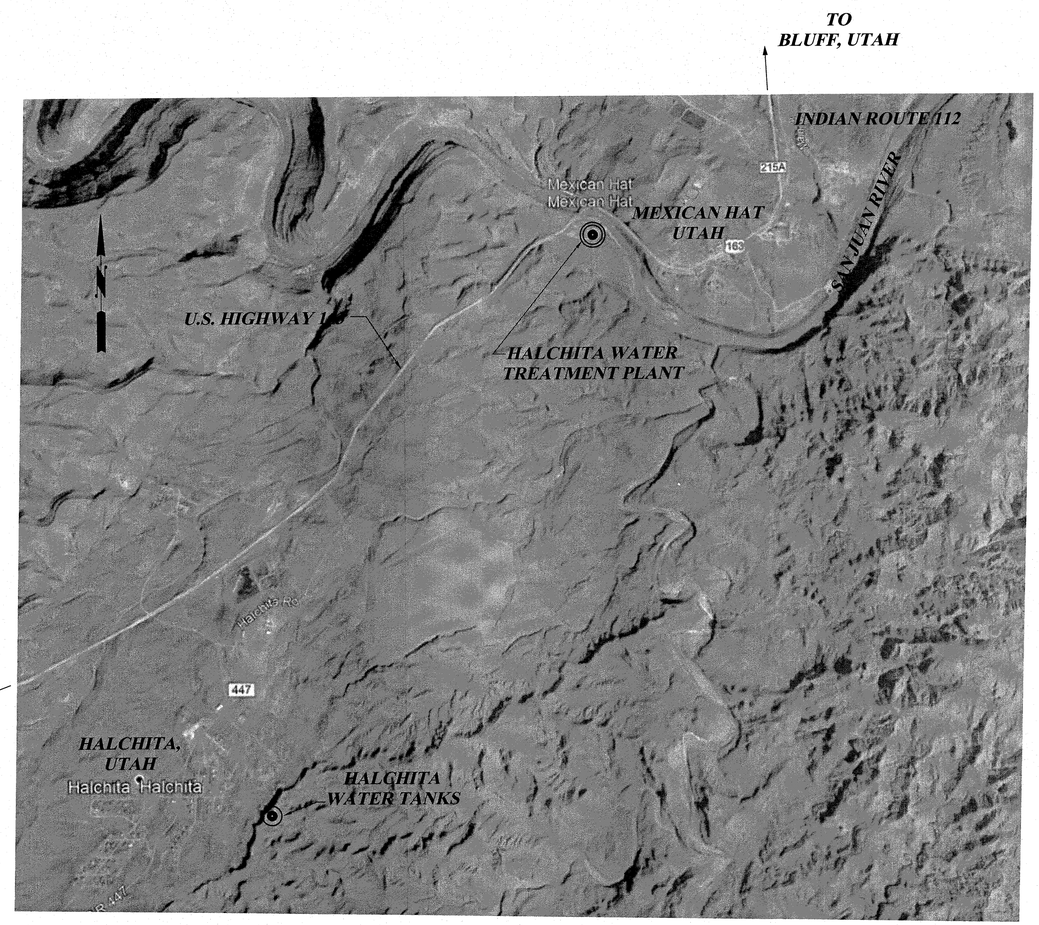
NAVAJO TRIBAL UTILITY AUTHORITY

HALCHITA WATER TREATMENT PLANT
R/O SYSTEM UPGRADE AND IMPROVEMENTS

MEXICAN HAT, UTAH

INDEX



SCALE: 1"=4000'

VICINITY MAP
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT

IMAGE TAKEN FROM GOOGLE EARTH
SCALE: 1"=1000'
APPROXIMATE

KURT A. SPOLAR
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17637
12-31-18
LICENSED PROFESSIONAL ENGINEER

NAVAJO TRIBAL UTILITY AUTHORITY

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TEL: (505)863-5440 WWW.DEPAULIENGINEERING.COM

for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

TITLE SHEET

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 1 - 1

GENERAL UTILITY CONSTRUCTION NOTES:

1. WORKMANSHIP AND MATERIALS FOR ITEMS OF WORK CONTAINED HEREIN SHALL SHALL CONFORM TO THE SPECIFICATIONS HEREIN AND IN THE CONTRACT DOCUMENTS. THE LATEST EDITION OF THE NAVAJO TRIBAL UTILITY STANDARDS AND THE NMDOT SPECIFICATIONS FOR HIGHWAY AND BRIDGE CONSTRUCTION SHALL ALSO BE

2. REMOVAL OF STRUCTURES AND OBSTRUCTIONS INCLUDING PIPING, VALVES, FITTINGS, SPECIALS, ASPHALT PAVEMENT, CONCRETE PAVEMENT, CULVERTS, TREES, SHRUBS, SIDEWALK, CURB & GUTTER, ROCK AND OTHER MISC. ITEMS THAT NEED TO BE REMOVED OR DISPOSED OF SHALL BE TAKEN TO DESIGNATED AREAS AND/OR AN APPROVED LANDFILL IN ACCORDANCE WITH PROVISIONS OF THE NEW MEXICO SOLID WASTE ACT PROVIDED HOWEVER, THAT RECYCLABLE MATERIAL MAY BE TAKEN TO APPROPRIATE COMPANIES.

3. WATER FOR CONSTRUCTION AND WATERLINE TESTING SHALL BE POTABLE WATER AND MAY BE TAKEN FROM A SOURCE(S) IDENTIFIED AND DESIGNATED BY NTUA . WATER FOR WATERLINE TESTING SHALL BE HAULED IN CLEAN, POTABLE WATER TANKERS. CONTRACTOR TO COORDINATE WITH NTUA WATER DEPARTMENT AS REQUIRED TO ACCESS WATER FACILITIES.

4. QUALITY CONTROL TESTING FOR PROJECT MATERIALS SHALL BE PERFORMED BY AN INDEPENDENT TESTING LAB AS HIRED BY THE CONTRACTOR. THE CONTRACTOR SHALL NOTIFY THE ENGINEER 24 HOURS IN ADVANCE WHEN CONCRETE PLACEMENTS ARE SCHEDULED. THE CONTRACTOR SHALL BE RESPONSIBLE FOR NOTIFYING THE TESTING LAB WHEN COMPACTION TESTS ARE NEEDED AND WHEN CONCRETE PLACEMENTS ARE GOING TO BE MADE. THE CONTRACTOR SHALL PROVIDE THE TESTING LAB ACCESS AT ANY TIME FOR TESTING AT THE CONSTRUCTION SITE. THE CONTRACTOR SHALL ASSIST THE TESTING LAB AS REQUIRED TO OBTAIN MATERIAL SAMPLES.

5. CONCRETE FOR THIS PROJECT SHALL BE 4000 PSI (28 DAY) CONCRETE WITH 4 1/2 - 7 1/2% ENTRAINED AIR. CONCRETE TO BE PLACED WITH NO MORE THAN 4" SLUMP WITH LIMITED WATER TO BE USED TO FACILITATE FINISHING. ALL REINFORCEMENT FOR CAST IN PLACE CONCRETE SHALL BE GRADE 40 OR 60 DEFORMED BARS AS SPECIFIED PER ASTM A615. CEMENT TO BE TYPE II. SEE THE CONTRACT DOCUMENTS FOR ADDITIONAL CONCRETE REQUIREMENTS.

6. THE CONTRACTOR SHOULD BE AWARE THAT NO CONSTRUCTION SHALL COMMENCE UNTIL ALL UTILITY LOCATIONS ARE MARKED. THE CONTRACTOR SHOULD EXPECT THAT SOME SHIFTS IN ALIGNMENT WILL BE MADE TO AVOID EXISTING UTILITIES AND MEET PROXIMITY REQUIREMENTS. THE CONTRACTOR SHALL PROVIDE EXPLORATORY EXCAVATION AT LOCATIONS SHOWN ON THE PROJECT DRAWINGS OR AS REQUIRED FOR ALIGNMENT CHANGES.

7. CONSTRUCTION STAKING: THE CONTRACTOR SHALL PROVIDE THE FOLLOWING CONSTRUCTION STAKING:

   A. WATERLINES - CENTERLINE OR OFFSET STAKES AT APPROX. 200 FT., P.I.S AND APPURTENANCES, CONTROL FOR GRADE STAKES WHERE GRADE IS CALLED FOR.
   B. SITE GRADING - STAKES FOR MAJOR STRUCTURES W/ CUTS AND FILLS. BASIC SITE CONTROL AND BENCH MARK.

   RANDOM BENCH MARKS WILL BE ESTABLISHED FOR USE BY THE CONTRACTOR. THE CONTRACTOR WILL BE RESPONSIBLE FOR BLUETOP STAKING FOR SUBGRADE AND BASE COURSE. DETAILED MEASUREMENTS AND ELEVATIONS FOR STRUCTURES, DRAINAGE FLOW LINES AND PIPELINES SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. OCCASIONAL LOCATION AND GRADE CHECKS SHALL BE PERFORMED BY THE ENGINEER. MEASUREMENT FOR DETERMINATION OF QUANTITIES SHALL BE ACCOMPLISHED MUTUALLY BY THE ENGINEER AND CONTRACTOR.

8. BASE COURSE FOR STREET CONSTRUCTION SHALL BE NMDOT TYPE I. GRAVEL (BASE COURSE) FOR DETOURS OR GRAVEL SURFACED ROADS AND DRIVEWAYS TO BE TYPE I OR TYPE II.

9. ALL ABANDONED LINES SHALL BE PLUGGED W/ CONCRETE (OR OTHER CEMENT BASED PRODUCTS) OR M.J. CAPS AT TIE-IN LOCATIONS UNLESS OTHERWISE NOTED. REMOVE OLD VALVES WHERE CALLED FOR, OTHERWISE REMOVE VALVE CANS & COMPACT BACKFILL OR INSTALL FLOWABLE FILL WITH OLD VALVE TO BE CLOSED AND REMAIN IN PLACE. PROVIDE 10' MINIMUM HORIZONTAL SEPARATION OF WATER AND SEWER LINES.

10. SUBMITTALS ARE REQUIRED FOR ALL MATERIALS AND EQUIPMENT PROPOSED FOR THE PROJECT WITH APPROVAL REQUIRED BY THE CITY. SCHEDULES FOR MANHOLE BARRELS, CONES AND RIMS SHALL BE PROVIDED.

11. EXISTING UTILITIES: EXISTING UTILITIES SHOWN ARE FROM UTILITY COMPANY MAPS, EVIDENCE ON THE GROUND AND CONVERSATION WITH UTILITY COMPANY OFFICIALS. THE EXACT LOCATION, DEPTH AND SIZE OF SOME OF THE LINES ARE UNKNOWN. CONTRACTOR TO VERIFY THE EXISTENCE AND LOCATION OF ALL UTILITIES PRIOR TO TRENCHING. UTILITIES THAT ARE DAMAGED OR CUT SHALL BE REPAIRED BY THE CONTRACTOR AT HIS COST. THE CONTRACTOR SHALL CALL 811 FOR "LOCATES" ON ALL UTILITIES PRIOR TO CONSTRUCTION.

12. WATERLINE PIPE TO BE INSTALL WITH A MINIMUM COVER OF 4.0' UNLESS OTHERWISE DESIGNATED. THE WATERLINE GRADES AND ELEVATIONS SHOWN ON THE PROJECT PROFILES ARE INTENDED TO GIVE THE CONTRACTOR A GENERAL IDEA OF SLOPES THAT WILL BE ENCOUNTERED IN THE INSTALLATION OF THE PIPE. THE DEPTHS SHOWN ON THE PROFILES SHOULD BE CONSIDERED AS MINIMUMS ESPECIALLY UNDER DRAINAGE DITCHES AND ARROYOS. WATERLINE AT AIR RELEASE SHALL BE INSTALLED WITH 5' OF MINIMUM COVER TO PROVIDE ADEQUATE CLEARANCE FOR AIR RELEASE VALVE, PIPING, AND APPURTENANCES.IN FLAT TERRAIN (LESS THAN 1% SLOPE) THE CONTRACTOR WILL BE EXPECTED TO MAINTAIN GRADES NEAR TO THOSE SHOWN ON THE PROJECT DRAWINGS. DEVIATIONS FROM THE GRADES DEPICTED COULD RESULT IN AIR POCKETS OR INADEQUATE PIPE COVER. PIPE IS TO GRADE UPHILL IN ALL LOCATIONS TO EITHER AN AIR RELEASE VALVE OR A RESERVOIR.

    DEPTH INCREASES MAY BE PERMITTED IN SOME LOCATIONS (NOT TO EXCEED 10 FT. IN COVER UNLESS APPROVED BY THE ENGINEER) TO ELIMINATE THE NEED FOR "CALLED FOR" FITTINGS. THE LOCATION OF VERTICAL POINTS OF INTERSECTION (PVI's) WHERE NO FITTINGS ARE CALLED FOR, ARE APPROXIMATE, THE REQUIRED DEFLECTION CAN BE ACHIEVED BY DEFLECTION OF ONE OR MORE NEARBY STANDARD JOINTS.

13. THE CONTRACTOR SHALL NOT TO EXCEED THE PIPE MANUFACTURERS RECOMMENDED MAXIMUM JOINT DEFLECTION, HORIZONTALLY OR VERTICALLY. THE CONTRACTOR SHALL DEVISE AND DEMONSTRATE A METHOD TO DETERMINE PIPE DEFLECTION AT A JOINT. PIPE SUBMITTALS ARE TO INCLUDE THE MANUFACTURERS MAX. RECOMMENDED JOINT DEFLECTION.

14. ALL PIPE BEDDING SHALL BE AN IMPORTED GRANULAR MATERIAL COMPACTED TO 95% S.P. TRENCH BACKFILL ABOVE BEDDING SHALL BE GRANULAR MATERIAL IN SPECIAL LOCATIONS WHERE CALLED FOR IN PROJECT DOCUMENTS. GRANULAR MATERIAL MAY BE TAKEN FROM ANY SUITABLE SOURCE. THE MATERIAL SHALL BE SANDY IN NATURE, FRIABLE WITH NO CLODS OR CLAY BALLS AND EXHIBIT MINIMAL "PUMPING" CHARACTERISTICS WHEN COMPACTED AT MOISTURE CONTENT SLIGHTLY BELOW OPTIMUM. IN ADDITION, MATERIAL SHALL MEET THE FOLLOWING REQUIREMENTS:

SIEVE SIZE	PERCENT PASSING
1"	100
NO. 4	40 - 100
NO. 200	LESS THAN 35
PI < 12	

ACCEPTABLE SOURCES ON PAST PROJECTS INCLUDE THE FOLLOWING:

1. LOCAL QUARRY OR STOCKPILE.

15. THE USE OF "WATER FLOODING" OR "WATER JETTING" TO ACHIEVE COMPACTION OF PIPE BEDDING OR BACKFILL WILL NOT BE PERMITTED . BACKFILL TO BE COMPLETED WITHIN 100' OF THE END OF PIPE DURING LINE CONSTRUCTION AT ALL TIMES AND TO END OF COMPLETED PIPE AT THE COMPLETION OF EACH WORKDAY.

16. FITTINGS TO BE MJ TYPE W/ RESTRAINING GLANDS UNLESS OTHERWISE NOTED. MAX. VERTICAL DEFLECTION ELLS THIS PROJECT TO BE 22.5°. ALL BOLTED FITTINGS, GLANDS, FLANGES & DUCTILE IRON PIPE TO BE WRAPPED OR SLEEVED WITH 2 PROTECTIVE LAYERS CONSISTING OF 8 MIL AWWA C105 POLYETHYLENE & V-BIO W/ STAGGERED JOINTS. THE POTENTIAL PUNCTURING OF WRAP BY RESTRAINING BOLTS AND GLANDS TO BE MITIGATED BY INSTALLING STYROFOAM OR OTHER MATERIAL ADJACENT TO BOLTS, TAPED IN PLACE, PRIOR TO INSTALLING PROTECTIVE WRAP. CONTRACTOR TO USE CAUTION WHEN POURING THRUST BLOCKS TO INSURE THAT MJ BOLTS ARE NOT COVERED WITH CONCRETE. WRAPPED PIPE TO BE CAREFULLY LIFTED INTO PLACE W/ SLINGS THAT WILL NOT DAMAGE THE WRAP (CHAINS NOT PERMITTED). LATERAL COMPACTION SHALL PROCEED IN A CAREFUL, CONTROLLED MANNER WHILE PROTECTING THE WRAP. WRAP TO BE HELD REASONABLY TIGHT AGAINST THE PIPE W/ TAPE OR OTHER APPROVED MEANS.

17. GATE VALVES TO BE AWWA RESILIENT WEDGE TYPE WITH EPOXY COATING INSIDE AND OUT. CHECK VALVES AND AIR RELEASE VALVES TO BE AS CALLED FOR IN THE SPECIFICATIONS AND DRAWINGS.

18. CONTRACTOR SHALL PROVIDE AND MAINTAIN TRAFFIC CONTROL DEVICES AS DESCRIBED IN USDOT/FHWA MANUAL ON UNIFORM TRAFFIC CONTROL DEVICES ON ALL PARTS OF THE PROJECT UNDER CONSTRUCTION. THE DEVICES SHALL INCLUDE, BUT NOT BE LIMITED TO, TYPE 1 BARRICADES TYPE 2 BARRICADES, CONES, DRUMS, WARNING SIGNS, DETOUR SIGNS, NIGHT TIME FLASHERS AND PORTABLE FLASHERS. THE DEVICES SHALL BE MAINTAINED, IN ACCORDANCE WITH THE TRAFFIC CONTROL PLAN AND PROJECT DOCUMENTS, SEVEN (7) DAYS A WEEK FOR THE DURATION OF THE PROJECT. CONTRACTOR SHALL MAKE ADJUSTMENTS TO THE TRAFFIC CONTROL PLAN DURING THE PROGRESSION OF WORK, TO ENSURE THAT LIFE AND PROPERTY ARE PROTECTED AT ALL TIMES.

19. PROPERTY CORNERS, BENCHMARKS AND CONTROL POINTS TO BE PROTECTED AT ALL TIMES. LOST OR DAMAGED POINTS DUE TO NEGLIGENCE SHALL BE REPLACED AT THE CONTRACTORS EXPENSE.

20. WATERLINE TIE-INS TO BE IN ACCORDANCE WITH THE CONTRACT DOCUMENTS AND THE PROJECT DRAWINGS AND SHALL INCLUDE ALL PIPE, SLEEVES, SPECIALS AND APPURTENANCES EXCEPT VALVES REQUIRED TO COMPLETE THE TIE-IN. FITTINGS AND PIPE INTERIORS TO BE WIPED DOWN WITH CHLORINE SOLUTION (50 PPM) AT WATER TIE-INS.

21. DUCTILE IRON PIPE WATERLINES SHALL BE PRESSURE TESTED AT 250 PSI AT THE LOW END OF TEST SEGMENTS FOR PIPELINES. TEST PRESSURE FOR PVC TO BE 200 PSI. THE LINE SEGMENT BEING TESTED MAY EXTEND UPHILL UNTIL RESULTING TEST PRESSURE IS NO LESS THAN 125 PSI. THE MAXIMUM LENGTH FOR A PRESSURE SEGMENT IS 1000 FT.

22. ALL PIPING SHALL BE SEALED AT WORK DAYS END TO PREVENT THE ENTRANCE OF INSECTS, MAMMALS AND REPTILES. CLOSURE SHALL ALSO BE SUCH AS TO PREVENT VANDALISM AND FLOOD DAMAGE. CLOSURE TO BE COVERED WITH EXCAVATED MATERIAL SO THAT THE END OF PIPE AND METHOD OF CLOSURE IS NOT VISIBLE. ADDITIONAL CLOSURE EFFORTS TO BE TAKEN, AS REQUIRED OR DIRECTED, ON WEEK ENDS AND OTHER PERIODS WHILE PIPELINE WORK IS SUSPENDED.

23. CONTRACTOR SHALL TAKE PRECAUTIONS AS REQUIRED TO PREVENT DAMAGE TO THE ENVIRONMENT ADJACENT TO CONSTRUCTION. CONTRACTOR TO REMOVE ONLY THE TREES, SHRUBS, GROUND COVER AND ROCK AS ABSOLUTELY NECESSARY TO COMPLETE THE PROJECT. TREES, EXCESS ROCK AND SPOIL SHALL BE REMOVED AND PROPERLY DISPOSED OF, PROVIDED HOWEVER, THAT EXCAVATED ROCK MAY BE USED AS EROSION CONTROL AS DIRECTED. STAGING AREAS TO BE LIMITED TO AREAS WHERE CONSTRUCTION IS PLANNED, CONSTRUCTION R/Ws OR AREAS PROPERLY SECURED FROM LANDOWNERS. ALL AREAS AFFECTED BY CONSTRUCTION TO BE PROPERLY CLEANED, GRADED AND DRESSED UPON COMPLETION. RE-SEEDING WILL BE REQUIRED IN SOME AREAS AS DIRECTED. CONTOUR BERMS WILL BE REQUIRED AS DIRECTED TO PREVENT RUNOFF FROM TRAVELING ALONG PIPELINE TRENCH.

24. CONTRACTOR SHALL DEVELOPE, SECURE APPROVAL OF, IMPLEMENT AND MAINTAIN A STORM WATER POLLUTION PREVENTION PLAN (SWPPP).

PARTIAL LIST OF INCIDENTALS:

1. INCIDENTAL CONSTRUCTION STAKING BY CONSTRACTOR - BLUE TOP STAKING FOR SUBGRADE AND BASE COURSE. CONTROL STAKES AS REQUIRED TO PLACE SAW CUTS IN CONCRETE PAVEMENT. MISC. STAKES AND MEASUREMENT FOR DETAILED CONSTRUCTION OF STRUCTURES AND APPURTENANCES.
2. STORM WATER POLLUTION PREVENTION - PERMITS, NOTICES, PLANS, IMPLEMENTATION AND MAINTENANCE OF PLANS UTILIZING EROSION AND SEDIMENT CONTROL DEVICES PROVIDED SHALL BE CARRIED OUT FOR ALL PORTIONS OF THIS PROJECT.
3. LANDSCAPE - REPLACE SHRUBS, TREES, RAILROAD TIES, DECORATIVE GRAVEL AND PLAYGROUND EQUIP. AS REQUIRED.
4. TRAFFIC AND PEDESTRIAN CONTROL - IMPLEMENTATION AND MAINTENANCE OF TRAFFIC CONTROL PLAN.
5. BASE COURSE RAISED TO PAVEMENT LEVEL IN DRIVEWAYS AND STREETS FOR PUBLIC TRAVEL PRIOR TO PLACEMENT OF FINAL SURFACING
6. LOCAL STANDBY PERSONNEL TO HANDLE 24 HOUR (INCLUDING WEEKENDS) EMERGENCIES.
7. PROPER DISPOSAL OF ALL TRASH, DEBRIS, AND WASTE INCLUDING HAULS TO DISPOSAL SITES AND GRADING.
8. ROCK & OTHER EXCAVATION & LATERAL BACKFILL FOR REINFORCED CONCRETE STRUCTURES.
9. MINOR GRADING, DIKES AND SWALES CALLED FOR ALONG WATER LINE INCLUDING DRESSING AND CLEANUP.
10. PRESSURE TESTING, DISINFECTION, BACTERIOLOGICAL TESTING, FLUSHING, COORDINATION WITH THE CITY NOTIFICATION OF THE PUBLIC FOR WATER LINE WORK. MEANS OF FLUSHING OTHER THAN APPARATUS AND LOCATIONS CALLED FOR.
11. WATER HAULING AS REQUIRED FOR CONSTRUCTION AND DUST CONTROL.
12. EXCAVATION AND POTHOLING INCLUDING BACKFILLING FOR UTILITIES & STRUCTURES FOR LOCATION & GRADE CHECKS AT PROPOSED WATER LINE CROSSINGS AS SHOWN ON PROJECT DRAWINGS AND AS MARKED BY UTILITY COMPANIES.
13. PROTECTION & MAINTENANCE OF PRIVATE & PUBLIC PROPERTY DURING STORMS & RUNOFF THAT MAY BE MORE VULNERABLE TO DAMAGE BECAUSE OF CONSTRUCTION.
14. MEASUREMENTS FOR PAY QUANTITIES.
15. REMOVE AND RE-INSTALL EXISTING TRAFFIC SIGNS, GUARD RAILS, FENCES AND MAIL BOXES..
16. PIPELINE ALIGNMENT ADJUSTMENTS DUE TO EXISTING UTILITIES AND STRUCTURES OR TO MAINTAIN POSITIVE SLOPE WITH MINIMUM BURY DEPTH.
17. PROTECTION OF HORIZONTAL AND VERTICAL SURVEY CONTROL MONUMENTS.
18. MOBILIZATION FOR ALL PROJECT LOTS UNLESS OTHERWISE NOTED.
19. HAULING FOR PIPE BEDDING AND BACKFILL.
20. EXISTING FENCE REMOVAL AND REPLACEMENT.
21. THE MAINTENANCE OF PROXIMITY REQUIREMENTS & THE REQUIRED CUTTING OF PIPE TO PROVIDE REQUIRED JOINT DISTANCE FROM SEWER LINES AS SHOWN ON MISC. DETAIL SHEETS.
22. BARRIER WALLS AT THE HEAD OF STEEP SLOPES.
23. GENERAL, LIABILITY, ETC. INSURANCE REQUIREMENTS FOR WORK WITHIN HIGHWAY RIGHTS OF WAY.
24. PROJECT SCHEDULE, SUBMITTALS, SHOP DRAWINGS, "LAYING SCHEDULES" AND CUT SHEETS.
25. REMOVAL AND REPLACEMENT OF EXISTING CULVERTS (CMP AND RCP)

ABBREVIATIONS

PVC	POLYVINYLCHLORIDE PLASTIC PIPE	R/W, ROW	RIGHTS-OF-WAY
G.R.P.	GLASS REINFORCED PLASTIC	CL	PIPE PRESSURE CLASS
D.I.P.	DUCTILE IRON PIPE	RR	RAILROAD
G.V.	GATE VALVE	PI	POINT-OF-INTERSECTION
MH	MANHOLE	PVI	POINT-OF-VERTICAL-INTERSECTION
FH	FIRE HYDRANT	ARV	AIR RELEASE VALVE
S.P.	STANDARD PROCTOR	HOR	HORIZONTAL
GALV, G.I..	GALVANIZED MATERIAL	FLG	FLANGE
ARS	AIR RELEASE STATION (TYPE 1 OR 2)	NTS	NOT TO SCALE
BF	BUTTERFLY VALVE	F.G., P.G.	FINISH GRADE, PROFILE GRADE
MJ	MECHANICAL JOINT	NTUA	NAVAJO TRIBAL UTILITY AUTHORITY
NTS	NOT TO SCALE		

SURVEY NOTES:

1. COORDINATES AN ELEVATIONS SHOWN ARE ON A LOCAL COORDINATES

UTILITY AND PUBLIC WORKS OFFICIALS:

WATER & SEWER UTILITY
COMPANY: NAVAJO TRIBAL UTILITY AUTHORITY
CONTACT: GREG BAHE
OFFICE #: 928-729-6114
P.O. BOX 170, FT. DEFIANCE, AZ 86504-0170

COMMUNICATION COMPANY
COMPANY: NAVAJO TRIBAL UTILITY AUTHORITY
CONTACT #1:_____
CONTACT #2:_____
P.O. BOX 170, FT. DEFIANCE, AZ 86504-0170

HIGHWAY/ROAD OFFICIAL
COMPANY: NAVAJO DEPARTMENT OF TRANSPORTATION
OFFICE #: (505) 371-8300
PO BOX 4620, WINDOW ROCK, AZ 86515

ELECTRIC COMPANY
COMPANY: NAVAJO TRIBAL UTILITY AUTHORITY
CONTACT #1:_____
CONTACT #2:_____
P.O. BOX 170, FT. DEFIANCE, AZ 86504-0170

PLAN SET LEGEND:

EXISTING		PROPOSED
6530	CONTOURS	6530
	DRAINAGE FLOW LINE	
DECIDEOUS EVERGREEN	CULVERT AND END FLARE	
	TREE	
	CONTROL POINT/ BENCH MARK	
	PROPERTY CORNER OR R/W MARKER	
W	WATERLINE	W
	WATERLINE GATE VALVE	
	WATER METER	
T	WATERLINE PLUG/CROSS/TEE	T
	AIR RELEASE VALVE	
	FIRE HYRDANT	
FM	FORCE MAIN	FM
SS	SEWER LINE	S
	LIFT STATION	
	MANHOLE	
	MANHOLE TO BE ABANDONED	
S	SEWER LINE TO BE ABANDONED	
SD	STORM DRAIN	SD
	POWER POLE	
	DOWN GUY	
OE	OVERHEAD ELECTRIC LINE	OE
UE	UNDERGROUND ELECTRIC	UE
	STREET LIGHT	
	YARD LIGHT	
G	GAS LINE	
	TELEPHONE RISER	
UT	UNDERGROUND TELEPHONE	
X	WIRE FENCING	X
	CHAIN LINK FENCING	
	WOOD FENCING	
	SIGN	
	MAIL BOX	
	SOIL TEST PIT LOCATION	1
	SOIL RESISTIVITY TEST LOCATION	1

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CAUTION
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NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

GENERAL NOTES

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 1 - 2

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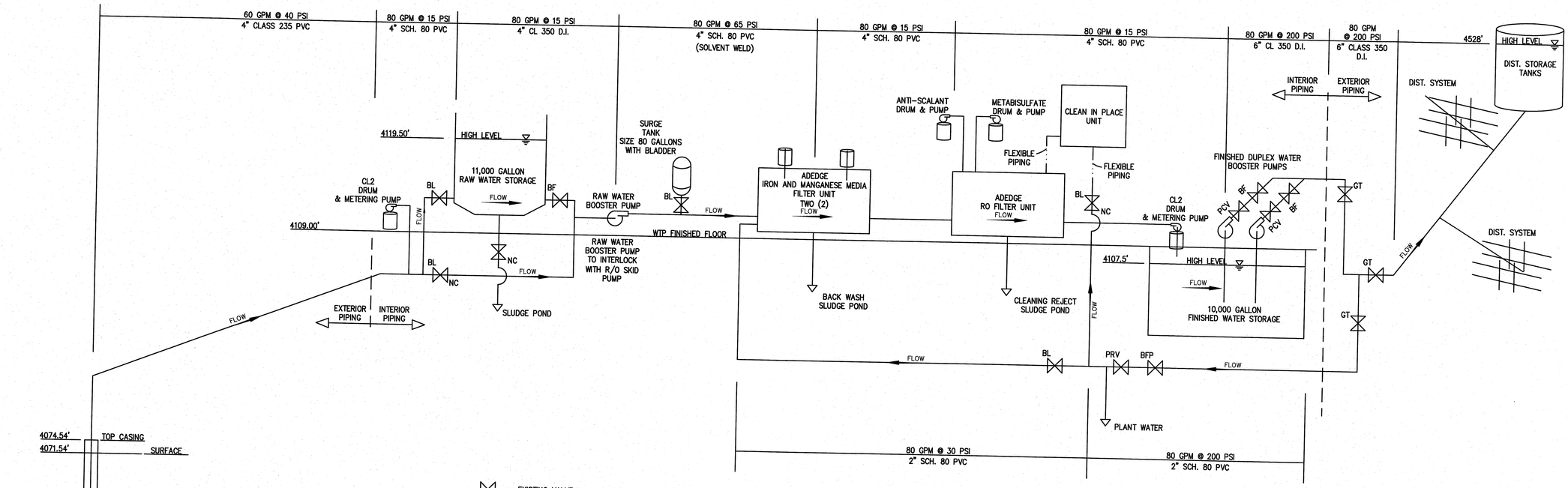

EXISTING VALVE

EXISTING VALVE – NORMALLY CLOSED

BF / NC — BUTTERFLY VALVE

BL — BALL VALVE

BL / NC — BALL VALVE – NORMALLY CLOSED

BFP — BACK FLOW PREVENTOR

PRV — PRESSURE REDUCING VALVE (200 PSI TO 30 PSI)

GV — GATE VALVE

GV / NC — GATE VALVE – NORMALLY CLOSED

PCV — PUMP CONTROL VALVE

GENERAL CONSTRUCTION NOTES:

1. SEE PLAN SHEETS FOR ADDITIONAL PIPE, FITTING, AND VALVE DETAILS.
2. ALL PIPE, FITTINGS VALVES AND SPECIALS SHALL BE RATED FOR 250 PSI WORKING PRESSURE.
3. INTERIOR PIPING TO BE SCH. 80 PVC WITH TREADED AND OR SOLVENT WELD JOINTS OR AS CALLED FOR ON PROJECT DRAWINGS
4. FLEXIBLE PIPING FOR CLEAN IN PLACE OPERATION TO BE FLEXIBLE WIRE REINFORCED TUBING.
5. BURIED PIPING TO BE C900 DR 18 CL 235 PVC OR CL 350 DUCTILE IRON WITH DUCTILE IRON FITTINGS AND RESTRAINING GLANDS (MEGA-LUGS)
6. EXPOSED PIPING TO BE CL 350 DUCTILE IRON WITH DUCTILE IRON FITTINGS AND RESTRAINING GLANDS (MEGA-LUGS)

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WATER TREATMENT PLANT SCHEMATIC
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NTUA
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R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

PLANT PROCESS SCHEMATIC

SCALE:	SHOWN
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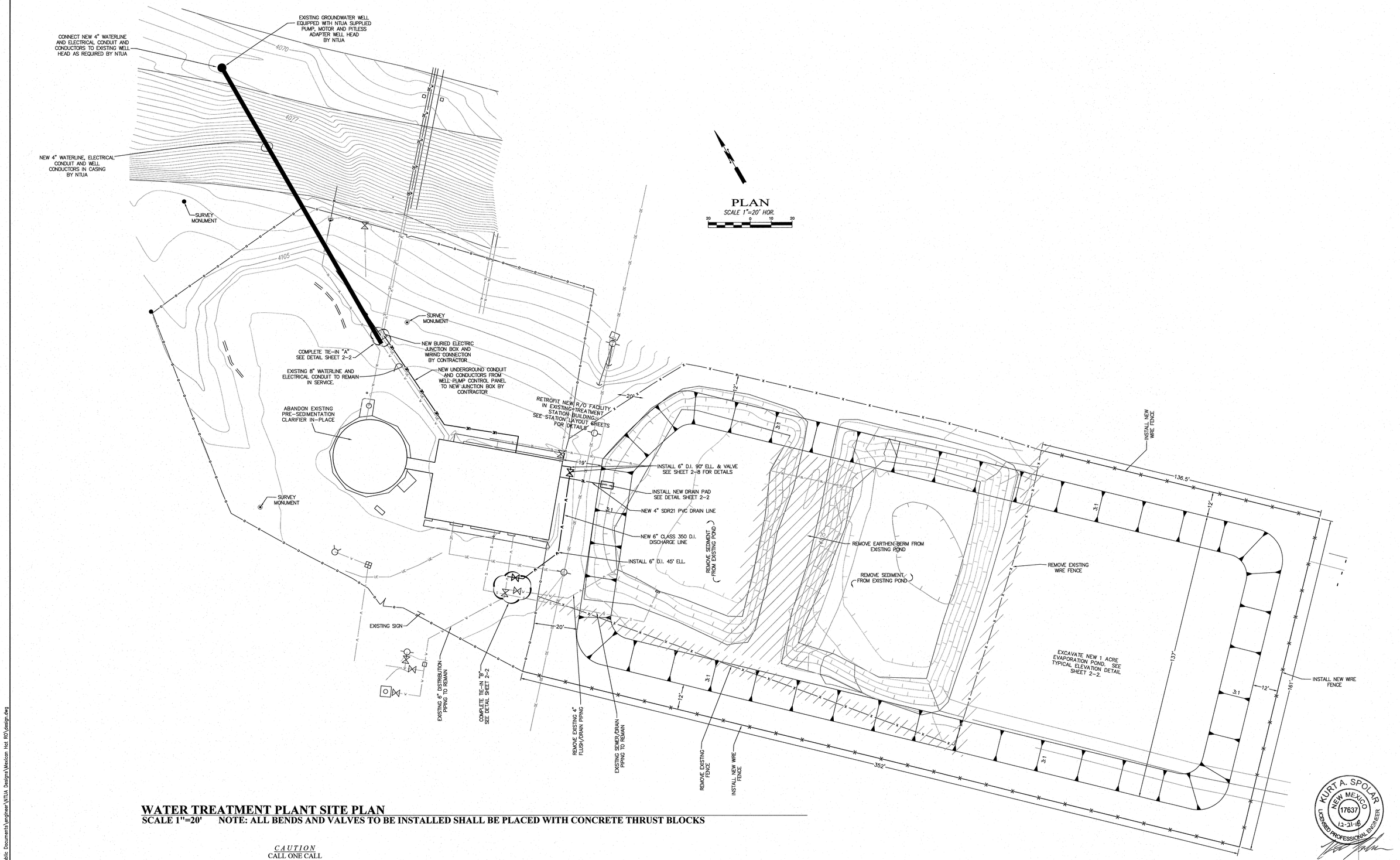
SHEET
1 - 3



WATER TREATMENT PLANT SITE PLAN

SCALE 1"=20' NOTE: ALL BENDS AND VALVES TO BE INSTALLED SHALL BE PLACED WITH CONCRETE THRUST BLOCKS

CAUTION
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MEXICAN HAT, UTAH

SITE PLAN & YARD PIPING

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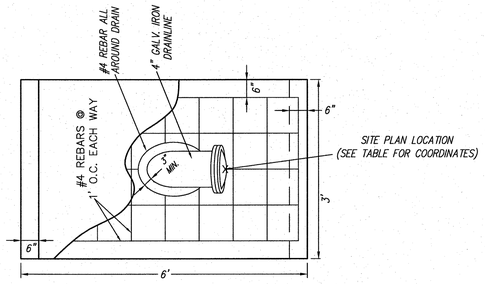
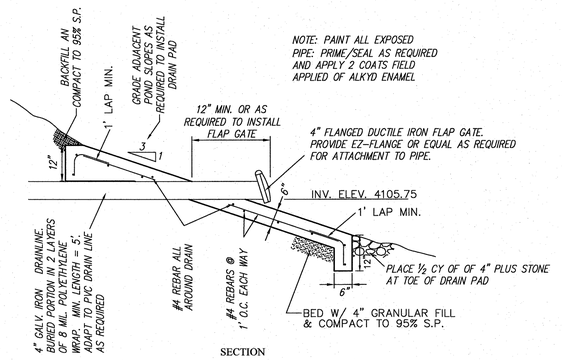
SHEET 2 - 1

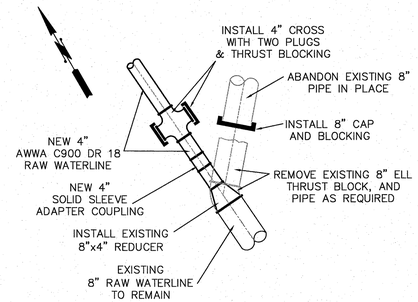


PLAN



SECTION

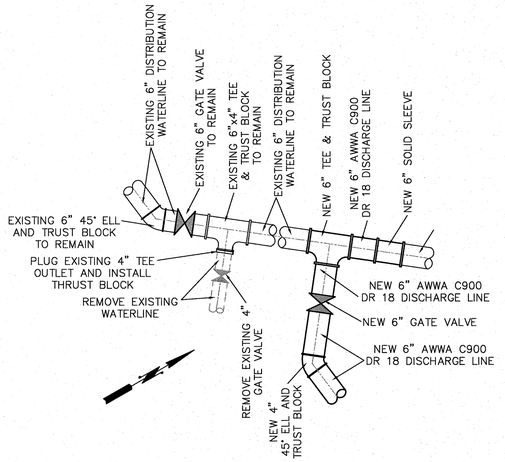
DRAIN PAD DETAIL
NTS - BY CONTRACTOR



TIE–IN "A" NOTES:

1. PROVIDE 4" AND 8" SOLID SLEEVES TO TIE–IN TO EXISTING 8" WATERLINE AS REQUIRED.
2. DEFLECT JOINTS AS REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. DEFLECTION SHALL BE AT PIPE AND FITTING JOINTS AND WITHIN THE MANUFACTURES RECOMMENDED LIMITS.
3.
4. NEW ELECTRICAL JUNCTION BOX AND ELECTICAL CONDUITS AND WIRING NOT SHOWN SEE PLAN SHEET AND ELECTRICAL DRAWINGS FOR DETAILS

TIE-IN "A"
4" TO 8" RAW WATERLINE TIE-IN
BY NTUA



TIE–IN "B" NOTES:

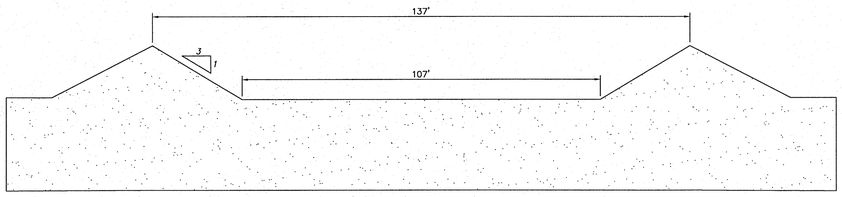
1. PROVIDE 6" SOLID SLEEVES TO TIE–IN TO EXISTING 6" WATERLINE AS REQUIRED.
2. DEFLECT JOINTS AS REQUIRED FOR VERTICAL AND HORIZONTAL ALIGNMENT. DEFLECTION SHALL BE AT PIPE AND FITTING JOINTS AND WITHIN THE MANUFACTURES RECOMMENDED LIMITS.

TIE-IN "B"
6" DISCHARGE LINE TIE-IN
BUY CONTRACTOR

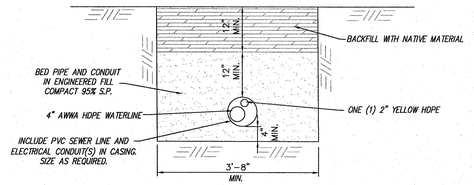
GENERAL TIE–IN NOTES:

1. EXISTING CONFIGURATIONS AT TIE–INS ARE BASED ON CONSTRUCTION DRAWINGS, ASBUILT DRAWINGS, AND SURFACE INFORMATION.
2. CONTRACTOR SHALL CAREFULLY EXPOSE AND VERIFY EXISTING LINES SIZE, LOCATION (VERTICAL AND HORIZONTAL), AND MATERIAL AS REQUIRED. PRIOR TO WATERLINE CONSTRUCTION.
3. ACTUAL FIELD LOCATION OF EXISTING WATERLINES MAY REQUIRE ALTERATIONS TO PROPOSED WATERLINE ALIGNMENT AND/OR GRADE. ADDITIONAL OR ALTERNATIVE FITTINGS SHALL BE PROVIDED AS REQUIRED.
4. ALL FITTINGS AND SLEEVES TO BE MJ TYPE WITH RESTRAINING GLANDS

TIE-IN DETAILS
NTS



STORAGE POND ELEVATION DETAIL
NTS
BY NTUA



RAW WATERLINE & ELECTRICAL CONDUIT CASING DETAIL
NTS
BY NTUA

CAUTION
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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

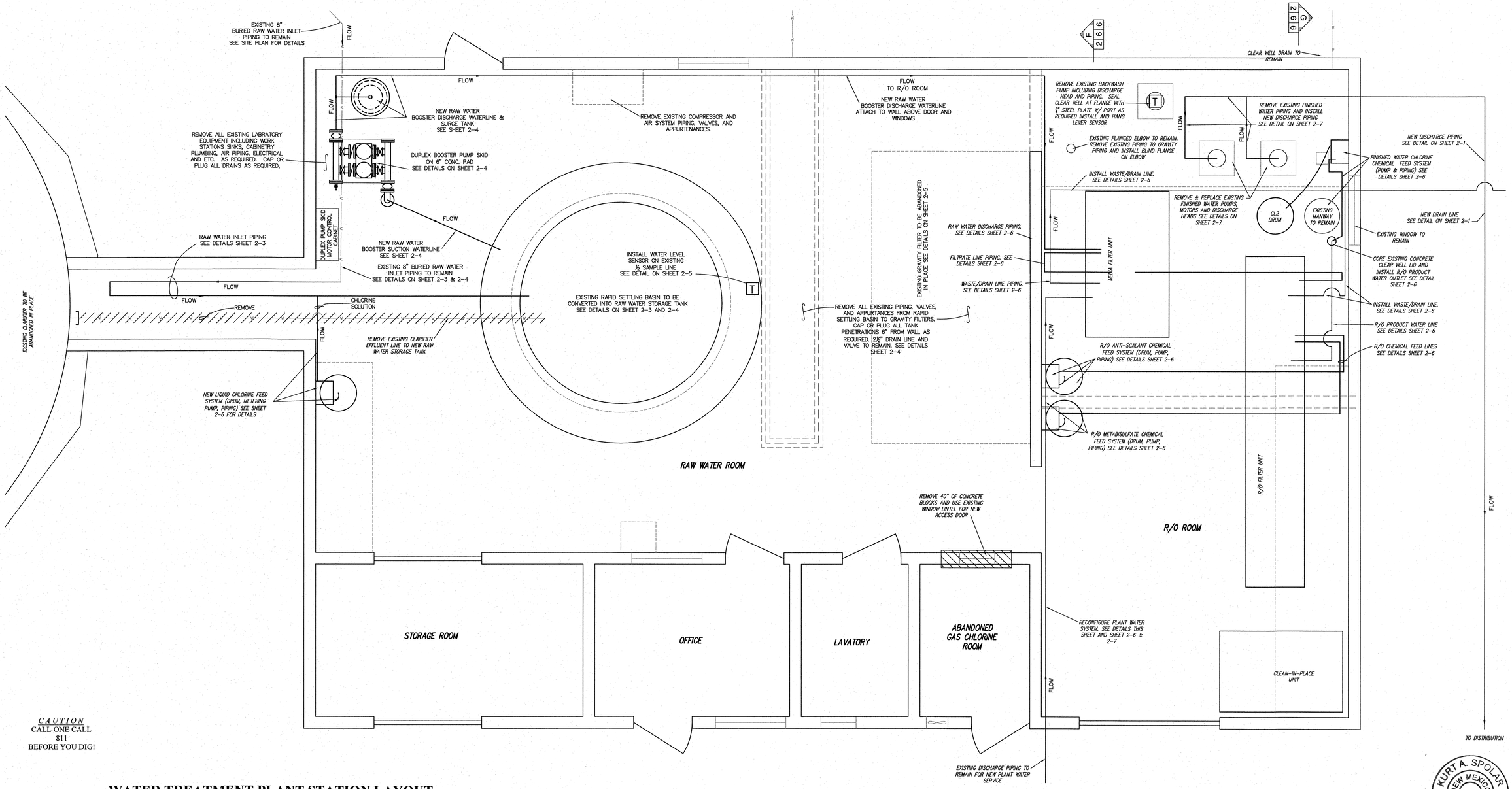
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

SITE PLAN & YARD PIPING

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 2 - 2



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WATER TREATMENT PLANT STATION LAYOUT
SCALE 3/8"=1'

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FORT DEFIANCE, ARIZONA

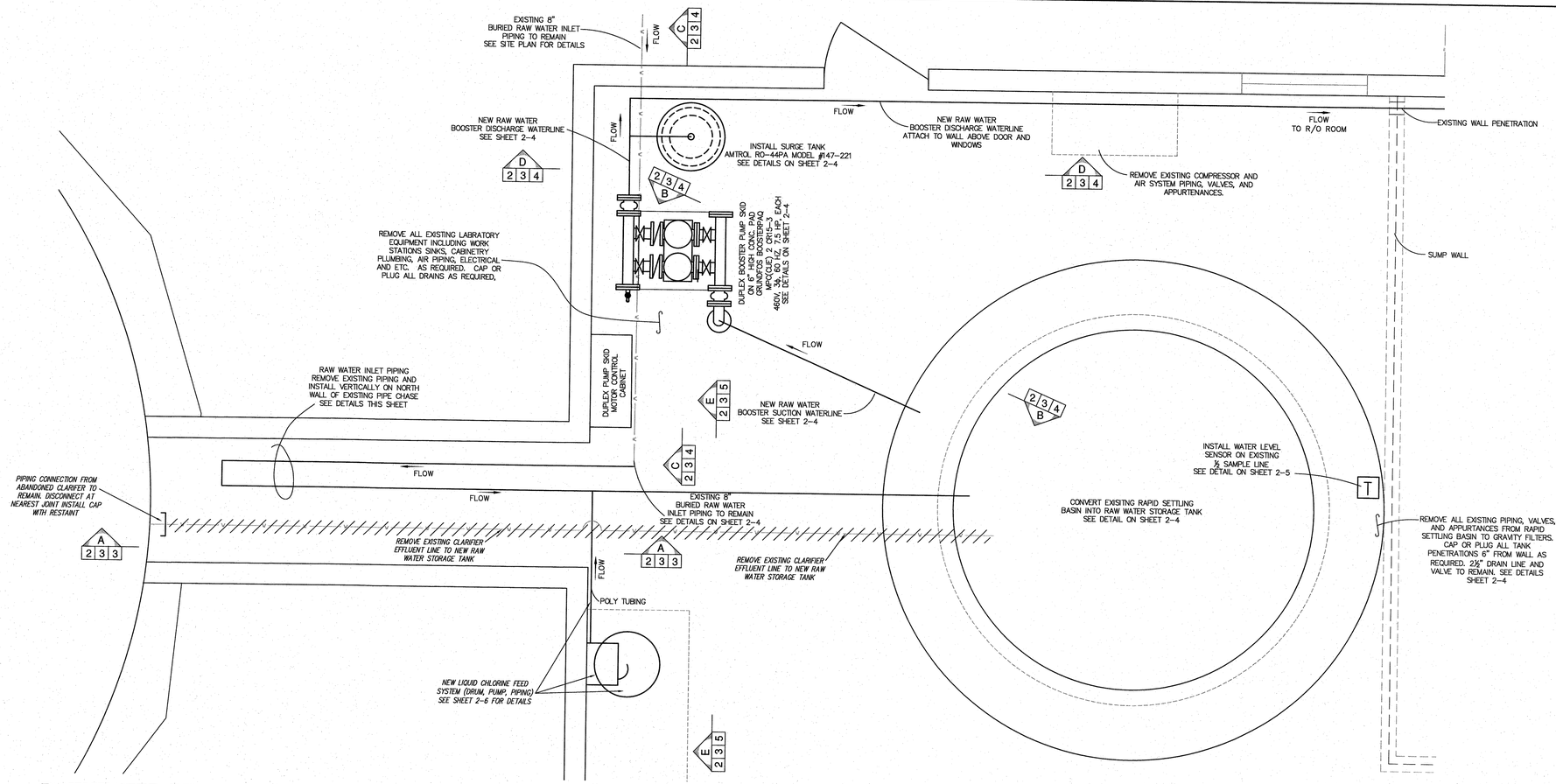
NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

GENERAL STATION LAYOUT

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 2 -3



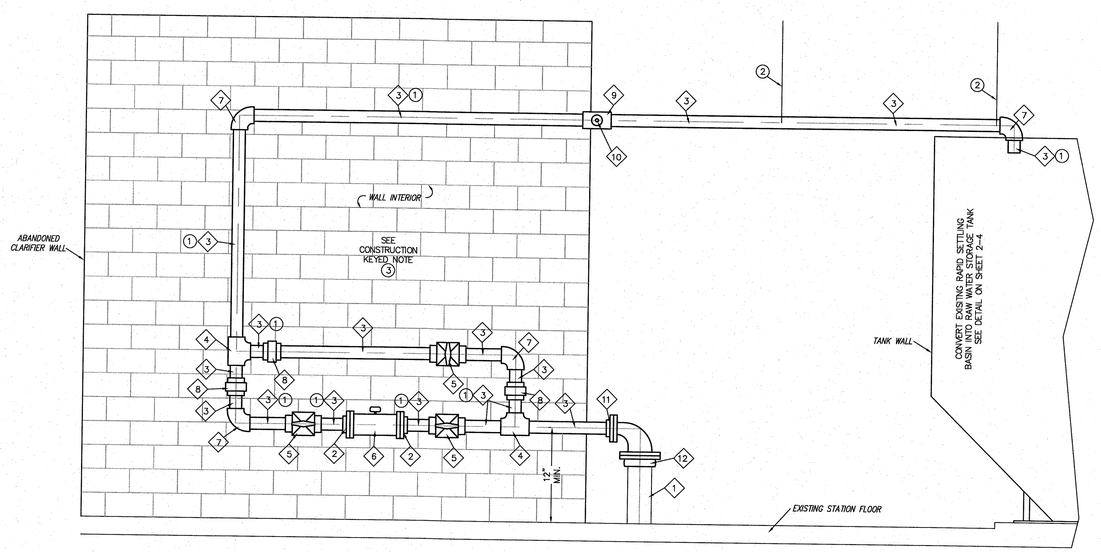
RAW WATER PIPING PLAN
SCALE 1/2"=1'

RAW WATER INLET PIPING SCHEDULE:

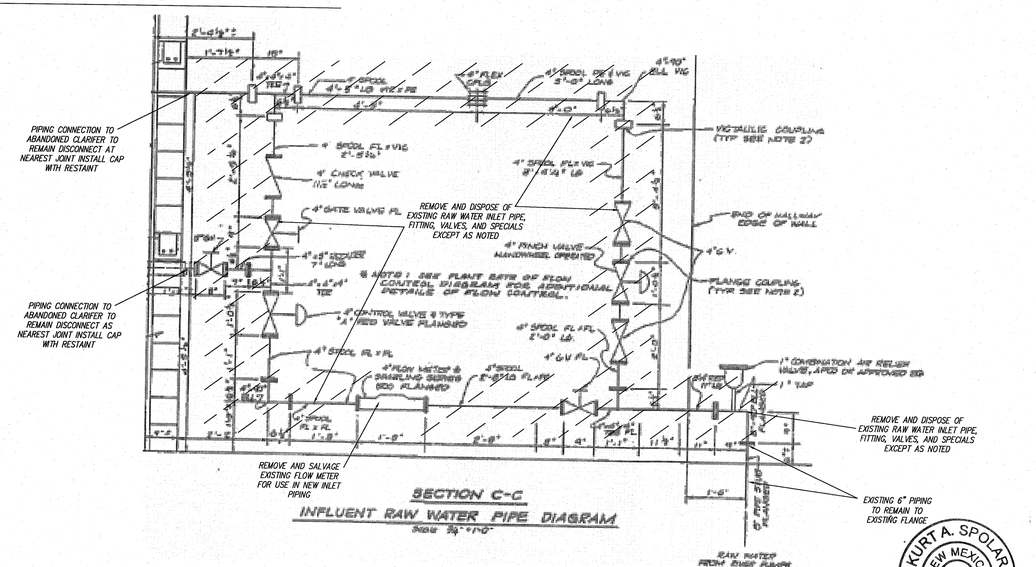
1. EXISTING 8" RAW WATER INLET PIPE
2. 8"x4" FLANGED DUCTILE IRON REDUCING ELL, 90°
3. 4" SCH 80 PVC PIPE
4. 4" SCH 80 PVC TEE
5. 4" PVC BALL VALVE (SPEARS TU2000 INDUSTRIAL OR EQUAL) SOCKET BY SOCKET
6. EXISTING 4" ELECTROMAGNETIC FLOW METER. CONNECT TO SCADA SYSTEM AS REQUIRED
7. 4" SCH 80 PVC 90° ELL.
8. 4" SCH 80 PVC UNION
9. 4"X2" SCH 80 PVC REDUCING TEE
10. 2"x1" SCH 80 PVC BUSHING (SPGTxFIP)
11. 4" SCH 80 PVC SOLVENT WELD FLANGE ADAPTER
12. REMOVE EXISTING COUPLING AND INSTALL RESTRAINED FLANGE ADAPTER (EBBIA SERIES 2100 MEGA-FLANGE OR EQUAL)

CONSTRUCTION KEYED NOTES:

1. ATTACHED PIPING TO CMU WALL AS REQUIRED PER DETAILS ON SHEET 2-5
2. SUPPORTS SUSPENDED OUTLET PIPE INTO RAW WATER STORAGE TANK BY TWO (2) PIPE HANGERS. SEE DETAIL ON SHEET 2-5
3. PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED



NEW RAW INLET PIPING PROFILE
SCALE 1/2"=1'



EXISTING RAW INLET PIPING DEMOLITION DETAIL
NTS

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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

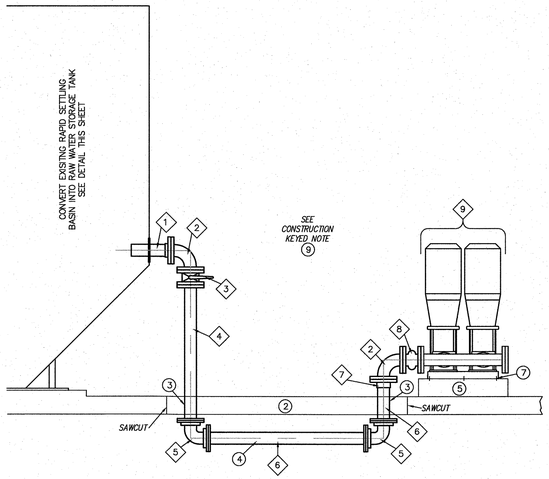
RAW WATER INLET PIPING

SCALE: SHOWN
DATE: JULY 2018
DRAWN BY: KAS
CHECKED BY: MDP

SHEET 2 - 4

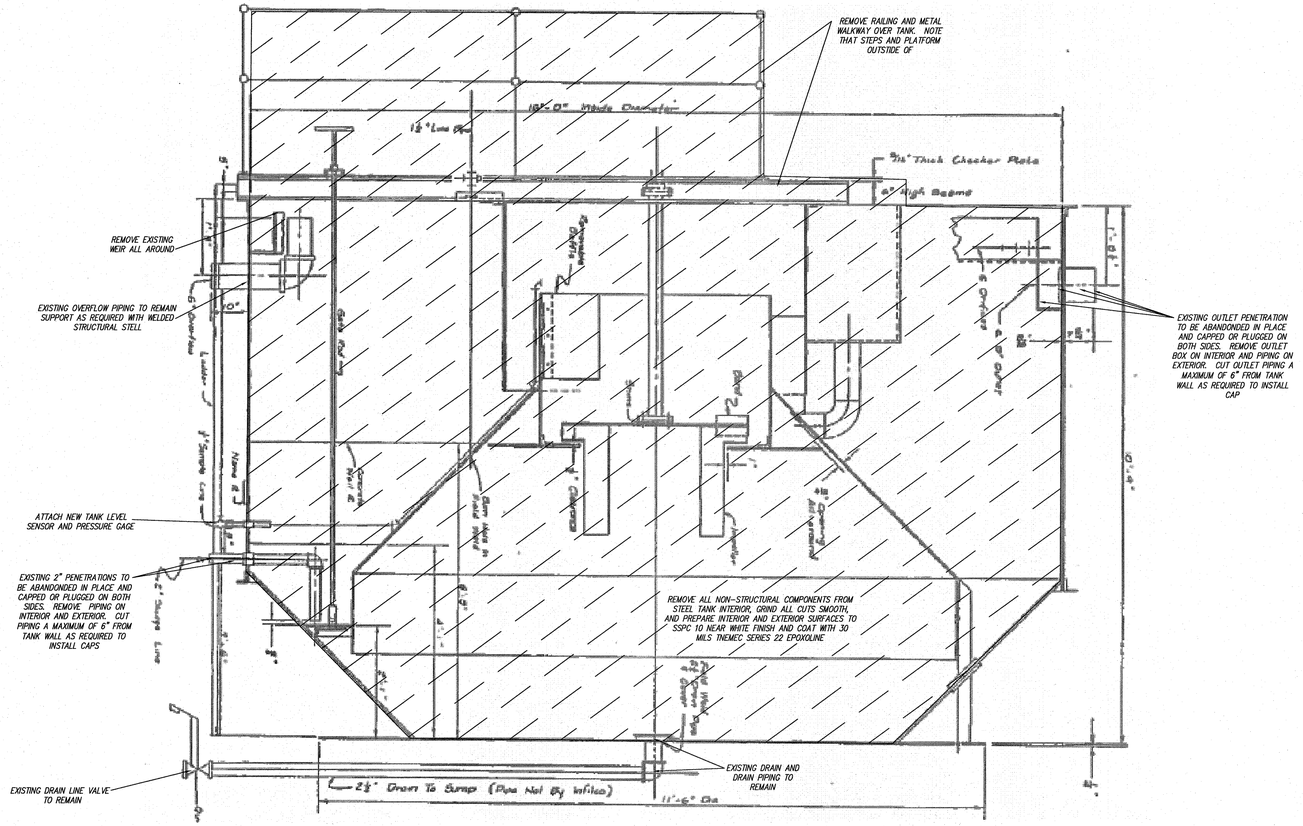
KURT A. SPOLAR
NEW MEXICO
17637
12-31-18
LICENSED PROFESSIONAL ENGINEER

W:\RGLEYVILLE\ C:\Users\Public\Public Documents\engineer\NTUA Designs\Mexican Hat R/O design.dwg

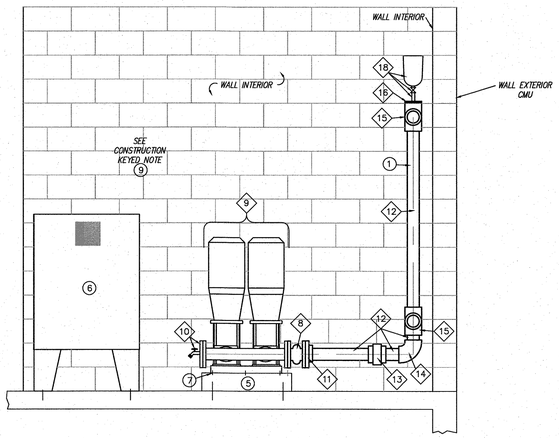


B NEW RAW BOOSTER SUCTION PIPING PROFILE
2 3 4 NTS

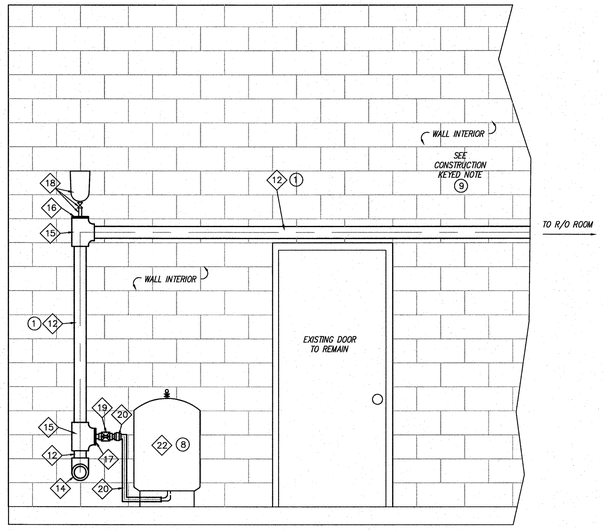
PUMPS AND PIPING SHOWN IN PROFILE. SEE SHEET 2-3 RAW WATER PIPING PLAN FOR LAYOUT.
INSTALL ALL PIPING, ALL PUMPS, AND CONCRETE PUMP PAD BEFORE PLACING FLOOR PATCH.



CONVERSION OF EXISTING RAPID SETTLING BASIN TO RAW WATER STORAGE
NTS



C NEW RAW BOOSTER DISCHARGE PIPING PROFILE
2 3 4 NTS



D NEW RAW BOOSTER SUCTION PIPING PROFILE
2 3 4 NTS

RAW WATER BOOSTER PIPING SCHEDULE:

1. INSTALL NEW 4" STEEL SUCTION PORT ON EXISTING STEEL TANK SEE DETAIL ON SHEET 2-5
2. 4" FLANGED DUCTILE IRON 90° ELL.
3. 4" FLANGED BUTTERFLY VALVE WITH HAND LEVER OPERATOR MUELLER LINESEAL III OR EQUAL
4. 4" CL 350 DUCTILE IRON (FLANGExP.E.) LENGTH AS REQUIRED
5. 4" M.J. DUCTILE IRON 90° ELL.
6. 4" CL 350 DUCTILE IRON PIPE (P.E.xP.E.) LENGTH AS REQUIRED
7. 4" SCH MEGA-FLANGE ADAPTER
8. 4" FLG'D SPHERICAL MOLDED EXPANSION JOINT W LIMIT/CONTROL RODS AS REQUIRED (MIN. LENGTH OF 6") PROCO STYLE 230 OR EQUAL
9. DUPLEX BOOSTER SKID ON 6" PUMP PEDESTAL GRUNDFOS BOOSTERPAQ MPC(CUE) 2 CR15-3 460V, 3ϕ, 60 HZ, 7.5 HP
10. HIGH QUALITY 1/4 TURN BRASS BODIED HOSE BIB ON TAPPED BLIND FLANGE.
11. 4" PVC SOLVENT WELD FLANGE ADAPTER
12. 4" SCH. 80 PVC PIPE
13. 4" SCH 80 PVC UNION
14. 4" SCH 80 PVC 90° ELL.
15. 4" SCH 80 PVC TEE
16. 4"x1" SCH 80 PVC BUSHING (SPGTxFIP)
17. 4"x1½" SCH 80 PVC BUSHING (SPGTxFIP)
18. 1" COMBINATION AIR RELEASE VALVE PRATT WCV01 OR EQUAL WITH HIGH QUALITY BRASS BODIED STAINLESS STEEL BALL VALVE ON 1" GALVANIZED IRON PIPE.
19. 1½" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET
20. 1½" SCH 80 PVC UNION
21. 1½" SCH 80 PVC PIPE AND FITTINGS ADAPT TO PRESSURE SURGE TANK AS REQUIRED
22. AMTROL RO-44PA MODEL #147-221 SURGE TANK OR EQUAL

CONSTRUCTION KEYED NOTES:

1. ATTACHED PIPING TO CMU WALL AS REQUIRED PER DETAILS ON SHEET 2-5
2. SAWCUT, REMOVE AND REPLACE EXISTING CONCRETE FLOOR AS REQUIRED FOR BURIED PIPE INSTALLATION. EXISTING FLOOR REINFORCEMENT TO BE REPLACED WITH 8" MINIMUM LAPS TO EXISTING BARS AND/OR DOWLING 6" INTO EXISTING CONCRETE AND SETTING NEW REBAR WITH EPOXY.
3. WRAP PIPE IN TWO (2) LAYERS OF 30# FELT WRAP THROUGH CONCRETE FLOOR
4. WRAP BURIED PIPE IN TWO (2) LAYERS OF 8 MIL. POLYETHELENE WRAP (SEE BURIED PIPE DETAIL SHEET 2-5)
5. INSTALL 6" HIGH CONCRETE PUMP PEDESTAL SEE DETAIL SHEET 2-5
6. MOTOR STARTER PANEL WITH VARIABLE SPEED DRIVE PER PUMP SKID MANUFACTURER. ANCHOR TO FLOOR OR WALL PER MANUFACTURER'S RECOMMENDATIONS.
7. ANCHOR PUMP SKID BASE TO PUMP SKID PEDESTAL PER MANUFACTURERS RECOMMENDATIONS
8. ANCHOR SURGE TANK TO FLOOR PER MANUFACTURERS RECOMMENDATIONS
9. PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED

CAUTION
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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

RAW WATER BOOSTER PIPING

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

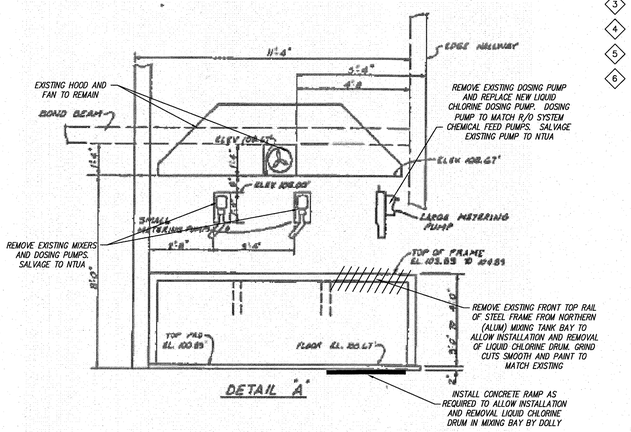
SHEET 2 - 5

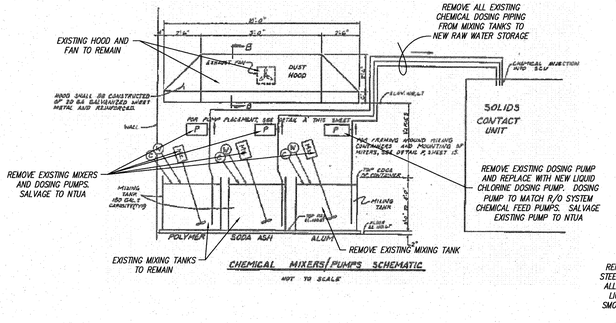
LIQUID CHLORINE PIPING SCHEDULE:

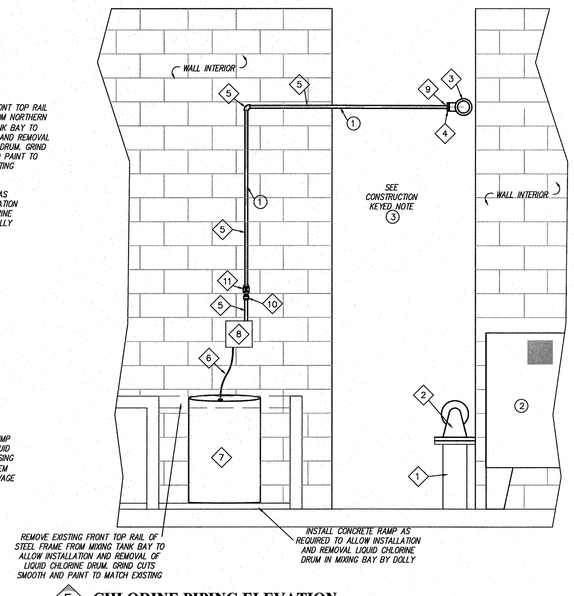
1. EXISTING 8" FLANGED RAW WATER INLET PIPE (RAW WATER INLET PIPING)
2. 8"x4" FLANGED DUCTILE IRON REDUCING ELL (RAW WATER INLET PIPING)
3. 4"x2" SCH 80 PVC REDUCING TEE (RAW WATER INLET PIPING)
4. 2"x1" SCH 80 PVC BUSHING (SPGTxFIP) (RAW WATER INLET PIPING)
5. 1" SCHEDULE 80 PVC CHLORINATION PIPE AND FITTINGS AS REQUIRED
6. 1/2" O.D. (3/8" I.D.) FLEXIBLE POLYETHYLENE LIQUID CHLORINE SUPPLY PIPING RUN NEATLY ALONG WALL AND ADAPT AS REQUIRED
7. LIQUID CHLORINE DRUM (FURNISHED BY OTHERS)
8. CHLORINE LIQUID DOSING PUMP MATCH CHEMICAL DOSING PUMPS SUPPLIED BY R/O MANUFACTURER. MOUNT ON WALL AS REQUIRED
9. 1" CL2 INJECTION PIPING CONNECT TO 1" THREADED BUSHING AS REQUIRED.
10. 1" SCH 80 PVC UNION
11. 1" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET

CONSTRUCTION KEYED NOTES:

1. ATTACHED PIPING TO CMU WALL AS REQUIRED PER DETAILS ON SHEET 2-5
2. MOTOR STARTER PANEL WITH VARIABLE SPEED DRIVE PER PUMP SKID MANUFACTURER
3. PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED







CHLORINE PIPING ELEVATION

E | 2 3 5 | SCALE 1/2"=1'

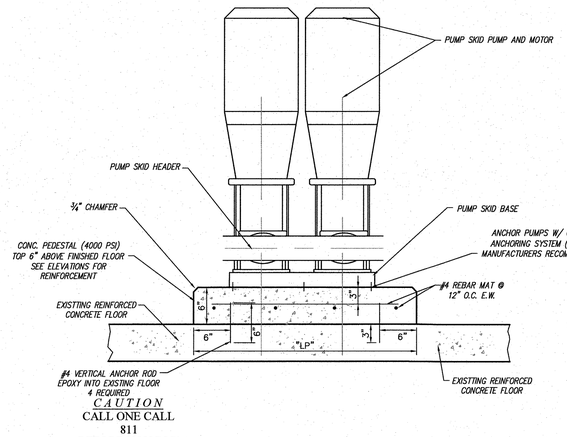
RAW WATER CHLORINATION DETAILS

NTS

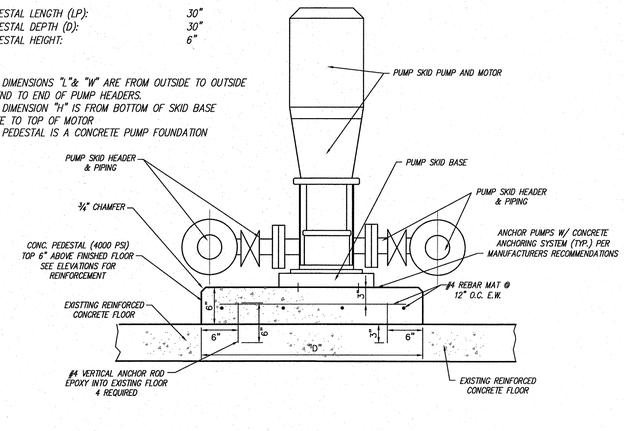
PUMP SKID AND PEDESTAL DIMENSION TABLE

SKID FOOTPRINT LENGTH (L):	29.35"
SKID FOOTPRINT WIDTH (W):	44.17"
SKID FOOTPRINT HEIGHT (H):	37.55"
SKID WIDTH BETWEEN HEADER 6'S (W2):	35.17"
SKID BASE DIMENSIONS PER PUMP SKID MANUFACTURER	
SKID PEDESTAL LENGTH (LP):	30"
SKID PEDESTAL DEPTH (D):	30"
SKID PEDESTAL HEIGHT:	6"

NOTES:
1. SKID DIMENSIONS "L"& "W" ARE FROM OUTSIDE TO OUTSIDE OR END TO END OF PUMP HEADERS.
2. SKID DIMENSION "H" IS FROM BOTTOM OF SKID BASE PLATE TO TOP OF MOTOR
3. SKID PEDESTAL IS A CONCRETE PUMP FOUNDATION



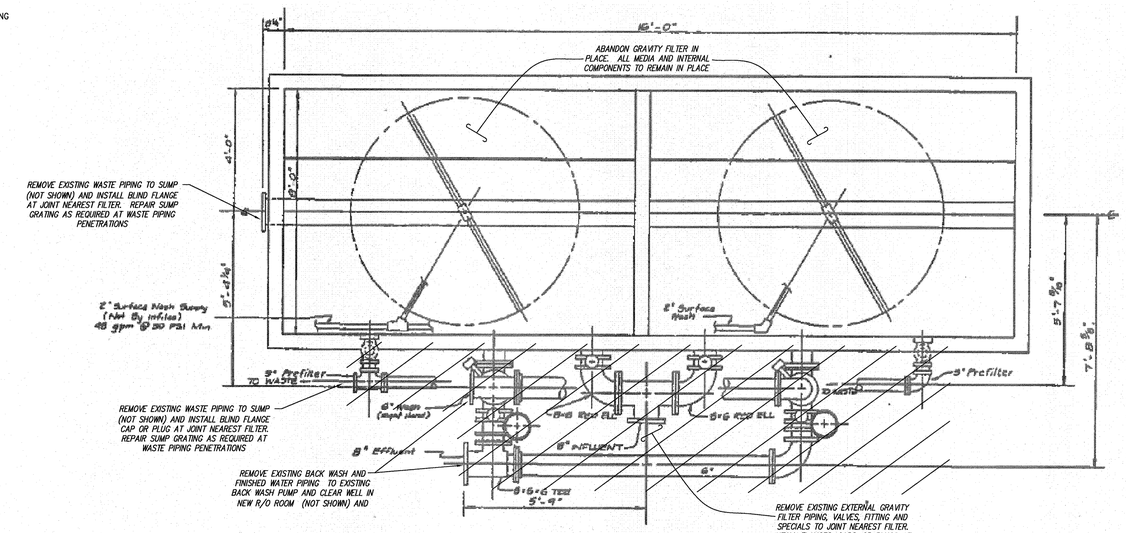
ELEVATION "A"



ELEVATION "B"

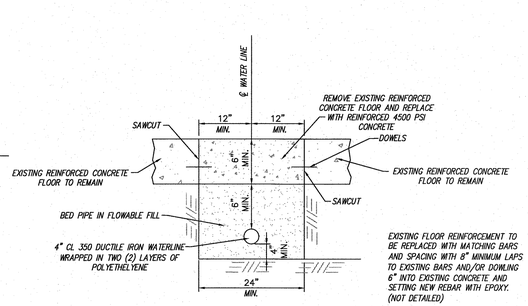
PUMP PEDESTAL DETAIL

NTS



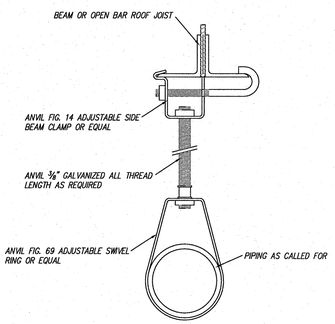
GRAVITY FILTER ABANDONMENT DETAIL

NTS

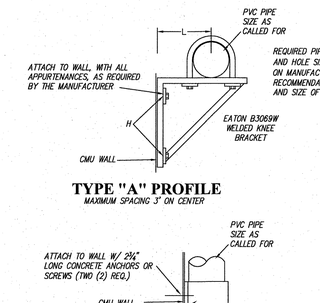


INTERIOR BUIRED PIPING DETAIL

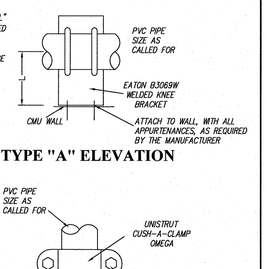
NTS



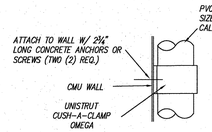
PIPE HANGER
MAXIMUM SPACING 6' ON CENTER



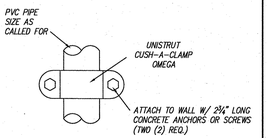
TYPE "A" PROFILE
MAXIMUM SPACING 3' ON CENTER



TYPE "A" ELEVATION



TYPE "B" PROFILE
MAXIMUM SPACING 3' ON CENTER



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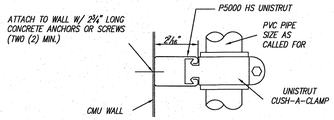
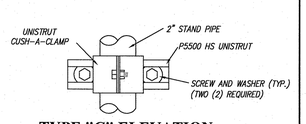
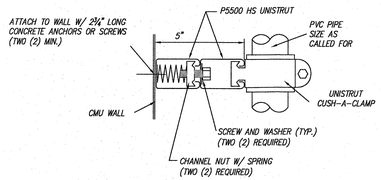


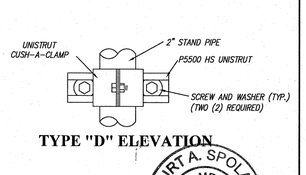
TYPE "C" PROFILE
MAXIMUM SPACING 3' ON CENTER



TYPE "C" ELEVATION



TYPE "D" PROFILE- VERTICAL
MAXIMUM SPACING 2' ON CENTER



TYPE "D" ELEVATION

PIPE HANGERS, WALL SUPPORTS & PENETRATIONS

NTS

ALL MATERIAL AND HARDWARE TO BE UNISTRUT, ANVIL, EATON, OR EQUAL

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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

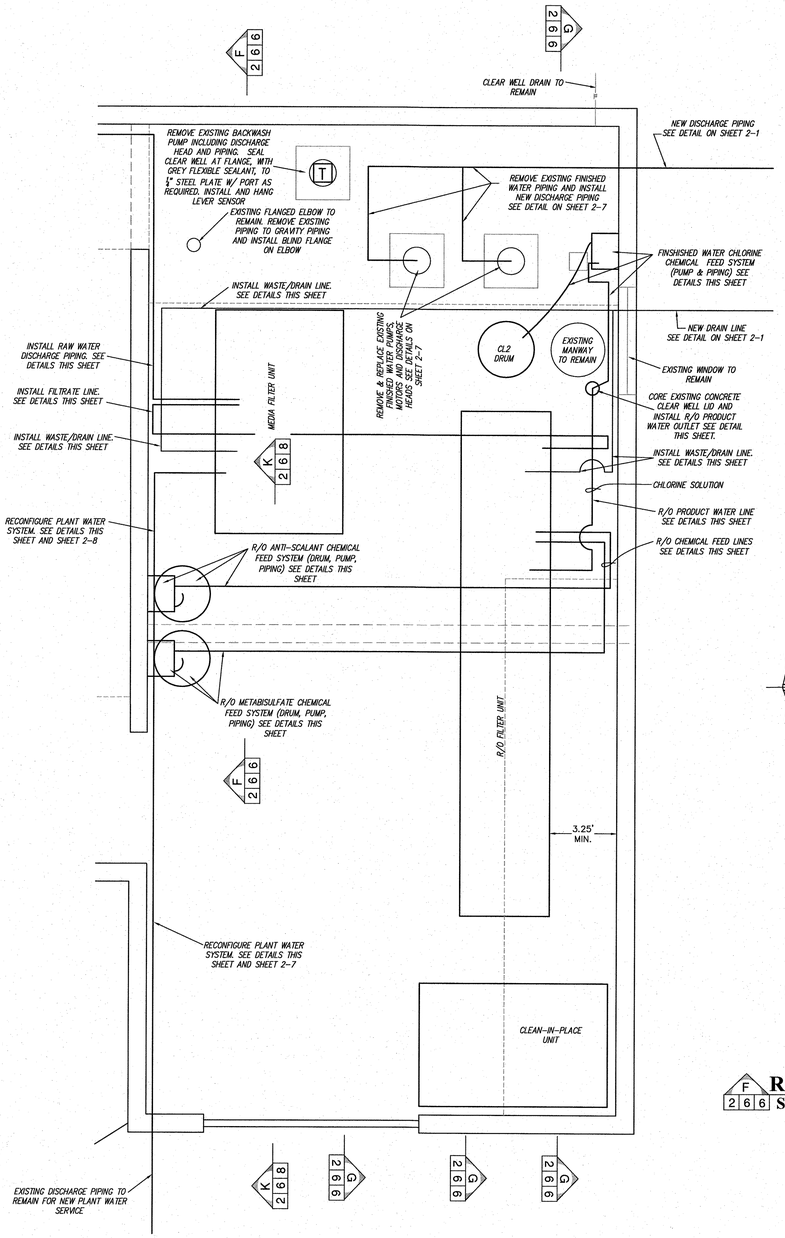
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

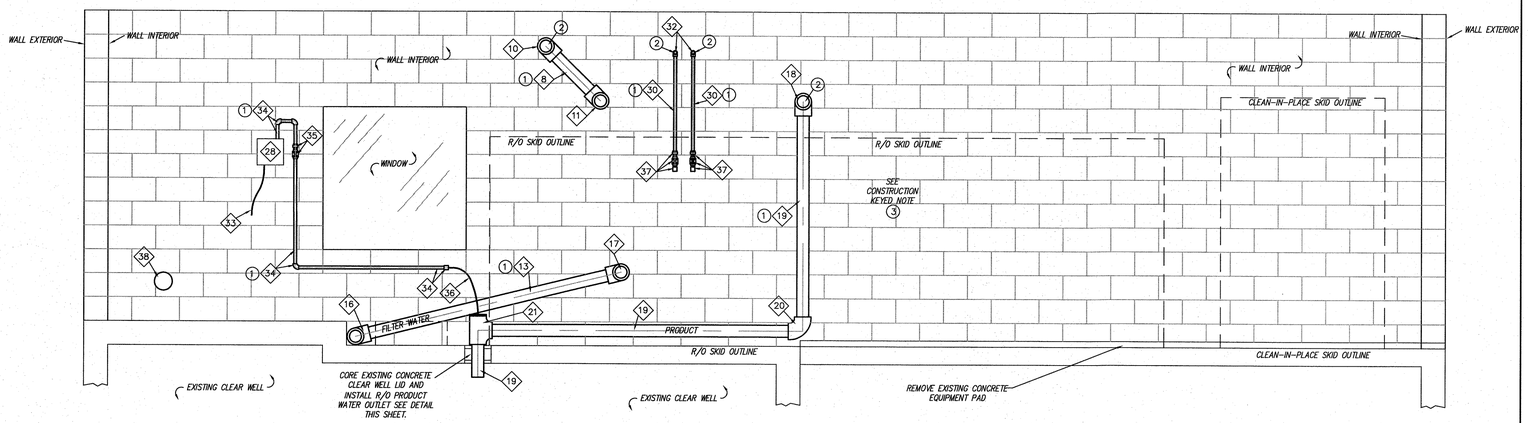
RAW WATER CHLORINATION AND PIPING DETAILS

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

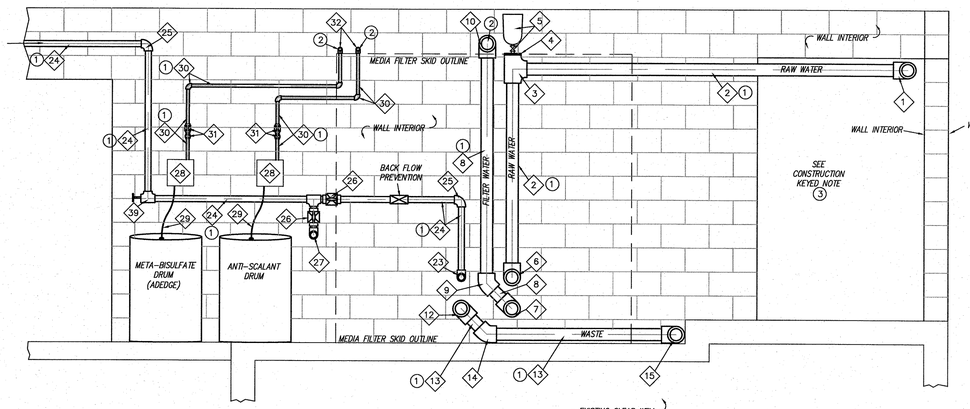
SHEET 2 - 6



R/O ROOM PIPING PLAN
SCALE 3/8" = 1'



G R/O SYSTEM MEDIA FILTER PIPING ELEVATION
2 6 6 SCALE 1/2" = 1'



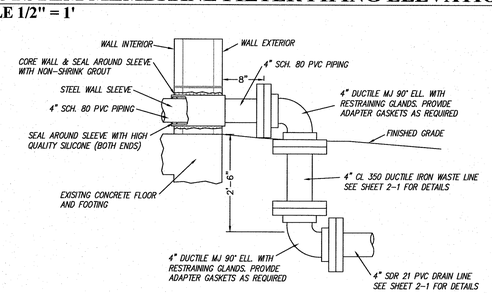
F R/O SYSTEM MEMBRANE FILTER PIPING ELEVATION
2 6 6 SCALE 1/2" = 1'

R/O ROOM PIPING SCHEDULE:

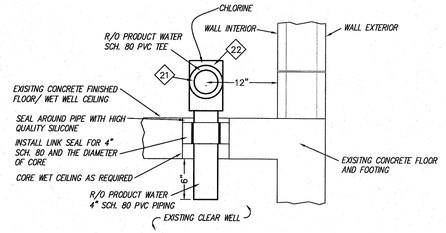
1. 4" SCH. 80 PVC 90° ELL. (RAW WATER)
2. 4" SCH. 80 PVC PIPE (RAW WATER)
3. 4" SCH 80 PVC TEE ((RAW WATER)
4. 4"x1" SCH 80 PVC BUSHING (SPGTxFIP)
5. 1" COMBINATION AIR RELEASE VALVE PRATT WCV01 OR EQUAL WITH HIGH QUALITY BRASS BODIED STAINLESS STEEL BALL VALVE ON 1" GALVANIZED IRON PIPE.
6. 4" SCH. 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO MEDIA FILTER SKID (RAW WATER)
7. 4" SCH. 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO MEDIA FILTER SKID (FILTRATE WATER)
8. 4" SCH 80 PVC PIPE (FILTRATE WATER)
9. 4" SCH 80 PVC 45° ELL. (FILTRATE WATER)
10. 4" SCH 80 PVC 90° ELL & SCH 80 PVC OVERHEAD BETWEEN FILTER AND R/O UNITS (FILTRATE WATER)
11. 4" SCH. 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO R/O FILTER SKID (FILTRATE WATER)
12. 4" SCH 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO MEDIA FILTER SKID (WASTE LINE)
13. 4" SCH 80 PVC PIPE (WASTE LINE)
14. 4" SCH 80 PVC 45° ELL (WASTE LINE)
15. 4" SCH 80 PVC 90° ELL AND PIPE RUN ALONG CLEAR WELL STEP TO R/O WASTE TEE. ATTACH PIPE TO VERITCAL WALL OF STEP AS REQUIRED (WASTE LINE)
16. 4" SCH 80 PVC TEE AND PIPE RUN ALONG CLEAR WELL STEP TO MEDIA FILTER 90° ELL. AND PIPE WALL PENETRATION TO CONNECT EXTERIOR DRAIN LINE. ATTACH PIPE TO VERITCAL WALL OF STEP AS REQUIRED. SEE DETAIL THIS SHEET FOR WASTE LINE WALL PENETRATION (WASTE LINE).
17. 4" SCH 80 PVC 90° ELL, PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO R/O FILTER SKID (WASTE LINE)
18. 4" SCH 80 PVC 90° ELL, PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO R/O FILTER SKID (PRODUCT WATER)
19. 4" SCH 80 PVC PIPE (PRODUCT WATER)
20. 4" SCH 80 PVC 90° ELL. (PRODUCT WATER)
21. 4" SCH 80 PVC TEE (PRODUCT WATER)
22. 4"X1" SCH 80 PVC BUSHING (PRODUCT WATER)
23. 2" SCH. 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO MEDIA FILTER SKID (PLANT WATER)
24. 2" SCH. 80 PVC PIPE (PLANT WATER)
25. 2" SCH 80 PVC 90° ELL (PLANT WATER)
26. 2" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET
27. 2" SCH. 80 PVC 90° ELL WITH ADDITIONAL FITTINGS AND FLEXIBLE PIPING AS REQUIRED TO CONNECT TO CLEAN-IN-PLACE UNIT. PROVIDE FLEXIBLE PIPING AS RECOMMENDED BY R/O SYSTEM MANUFACTURER.
28. CHEMICAL DOSING PUMP PROVIDED BY R/O MANUFACTURER
29. 1/2" O.D. (3/8" I.D.) FLEXIBLE POLYETHYLENE LIQUID CHEMICAL SUPPLY PIPING RUN NEATLY ALONG WALL. ATTACH AND ADAPT AS REQUIRED.
30. 1" SCHEDULE 80 PVC PIPE AND FITTINGS AS REQUIRED (CHEMICAL FEED LINES)
31. 1" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET AND SCH 80 PVC UNION (CHEMICAL FEED LINES)
32. 1" SCH 80 PVC 90° ELL & SCH 80 PVC OVERHEAD BETWEEN CHEMICAL FEED PUMP AND R/O UNITS (CHEMICAL FEED LINES)
33. 1/2" O.D. (3/8" I.D.) FLEXIBLE POLYETHYLENE LIQUID CHLORINE SUPPLY PIPING RUN NEATLY ALONG WALL AND ADAPT AS REQUIRED
34. 1" SCHEDULE 80 PVC PIPE AND FITTINGS AS REQUIRED (CL2 FEED LINE)
35. 1" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET AND SCH 80 PVC UNION (CL2 FEED LINE)
36. 1/2" O.D. (3/8" I.D.) FLEXIBLE POLYETHYLENE LIQUID CHLORINE SUPPLY PIPING AS REQUIRED BETWEEN CHLORINE FEED PIPING AND R/O UNITS DISCHARGE TEE. RUN PIPING NEATLY ALONG WALL AND ADAPT AS REQUIRED (CL2 FEED LINE)
37. 1" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET, SCH 80 PVC UNION, SCH 80 PVC COUPLINE AND ADDITIONAL SCH. 80 PVC 90° ELL., PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO R/O FILTER SKID (CHEMICAL FEED LINES)
38. 6" DUCTILE IRON FINISHED WATER PIPING SEE SHEET 2-7 FOR DETAILS
39. 2" SCH 80 PVC TEE WITH BIB (PLANT WATER)

CONSTRUCTION KEYED NOTES:

1. ATTACHED PIPING TO CMU WALL AS REQUIRED PER DETAILS ON SHEET 2-5
2. SUPPORTS SUSPENDED OUTLET PIPE INTO RAW WATER STORAGE TANK BY TWO (2) PIPE HANGERS. SEE DETAIL ON SHEET 2-5
3. PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED



R/0 ROOM DRAIN LINE WALL PIPING PENETRATION
NTS



R/0 PRODUCT WATER FLOOR PIPING PENETRATION
NTS

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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

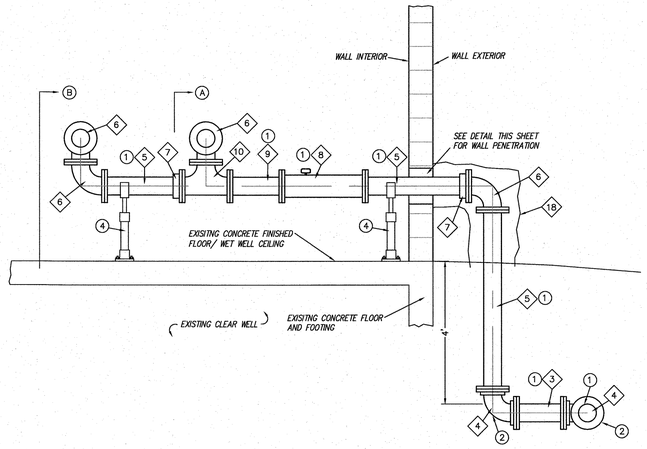
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

R/O SYSTEM PIPING

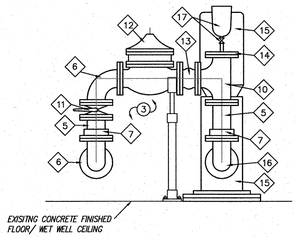
SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 2 - 7



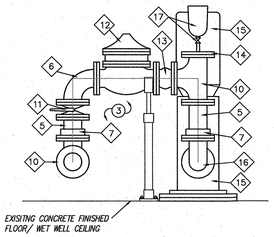
J | 2 7 7 R/O ROOM FINISHED WATER BOOSTER PIPING ELEVATION

SCALE 1/2" = 1'



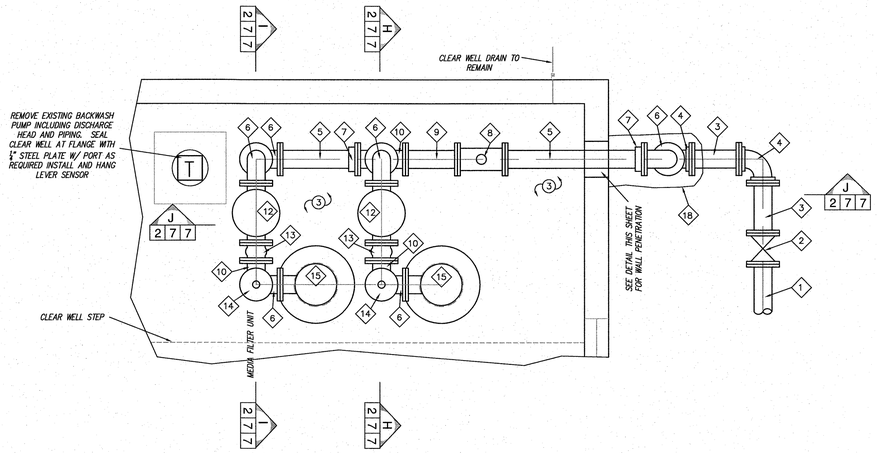
I | 2 7 7 R/O ROOM FINISHED WATER BOOSTER PIPING ELEVATION

SCALE 1/2" = 1'



H | 2 7 7 R/O ROOM FINISHED WATER BOOSTER PIPING ELEVATION

SCALE 1/2" = 1'



R/O ROOM FINISHED WATER BOOSTER PIPING PLAN

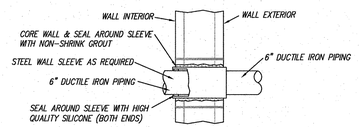
SCALE 1/2" = 1'

FINISHED WATER BOOSTER PIPING SCHEDULE:

1. NEW 6" AWWA C900 CL235 PVC WATERLINE (DISCHARGE LINE) *SEE SHEET 2-1 FOR DETAILS*
2. *6" MJ RESILIENT WEDGE GATE VALVE*
3. *6" CL 350 DUCTILE IRON WATERLINE*
4. 6" MJ DUCTILE IRON 90° ELL.
5. *6" FLG×PE CL 350 DUCTILE IRON WATERLINE LENGTH AS REQUIRED*
6. *6" FLANGED DUCTILE IRON 90° ELL.*
7. *6" MEGA-FLANGE ADAPTER OR EQUAL*
8. *6" ELSTER MAG METER PER NTUA SPECIFICATIONS*
9. 6" FLANGED CL 350 DUCTILE IRON WATERLINE (L = 2'-6")
10. 6" FLANGED DUCTILE IRON TEE
11. *6" FLANGED BUTTERFLY VALVE WITH HAND LEVER OPERATOR MUELLER LINESEAL III OR EQUAL*
12. 6" PUMP CONTROL VALVE (CLA-VAL 60-11 OR EQUAL) (TYP. 2)
13. *4" FLANGED SPHERICAL MOLDED EXPANSION JOINT W LIMIT/CONTROL RODS AS REQUIRED (MIN. LENGTH OF 6") PROCO STYLE 240 OR EQUAL*
14. BLIND FLANGE WITH 1" TAP FOR AIR RELEASE ASSEMBLY
15. *REMOVE EXISTING FINISHED WATER PUMPS, MOTORS AND DISCHARGE HEADS AND REPLACE WITH SIMMONS VERTICAL TURBINE S/N 444-101, 8 STAGE SMBH BOWL ASSEMBLY W/ BRONZE BUSHINGS, SPC4 WATER LUBE DISCHARGE HEAD WITH MECHANICAL SEAL AND FOUNDATION PLATE, 4"x161/2" TBE COLUMN ASSEMBLY, 40 HP NIDEC VAS ELECTRIC MOTOR, 460/3/60, 3600 RPM WP1 ENCLOSURE, AND 6" CLIP ON BASKET STRAINER WITH STAINLESS STEEL SCREEN.*
16. 6" FLANGED 90° ELL OR REDUCING 90° ELL AS REQUIRED TO CONNECT TO PUMP DISCHARGE HEAD
17. *1" COMBINATION AIR RELEASE VALVE PRATT WCV01 OR EQUAL WITH HIGH QUALITY BRASS BODIED STAINLESS STEEL BALL VALVE ON 1" GALVANIZED IRON PIPE.*
18. CUSTOM FIT ANTIFREEZE INSULATED JACKET WITH INTERNAL LOOPS FOR HEAT TRACE RATED FOR TEMPERATURES DOWN TO 0° FERENHIET. THERMAXX INSULATED JACKET OR EQUAL

CONSTRUCTION KEYED NOTES:

1. *WRAP BURIED DUCTILE IRON PIPE AND FITTINGS IN TWO LAYERS OR 8 MIL POLYETHYLENE WRAP*
2. *PROVIDE THRUST BLOCKS (NOT SHOWN AT ALL VERTICAL AND HORIZONTAL BENDS*
3. *PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED*
4. *STANDON (OR EQUAL) PIPE SUPPORT WITH SCH 40 STEEL PIPE AS REQUIRED. ANCHOR TO FLOOR PER MANUFACTURERS RECOMMENDATIONS*



FINISHED WATER LINE WALL PIPING PENETRATION

NTS

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12-31-18
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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

FINISHED WATER PIPING

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 2 - 8

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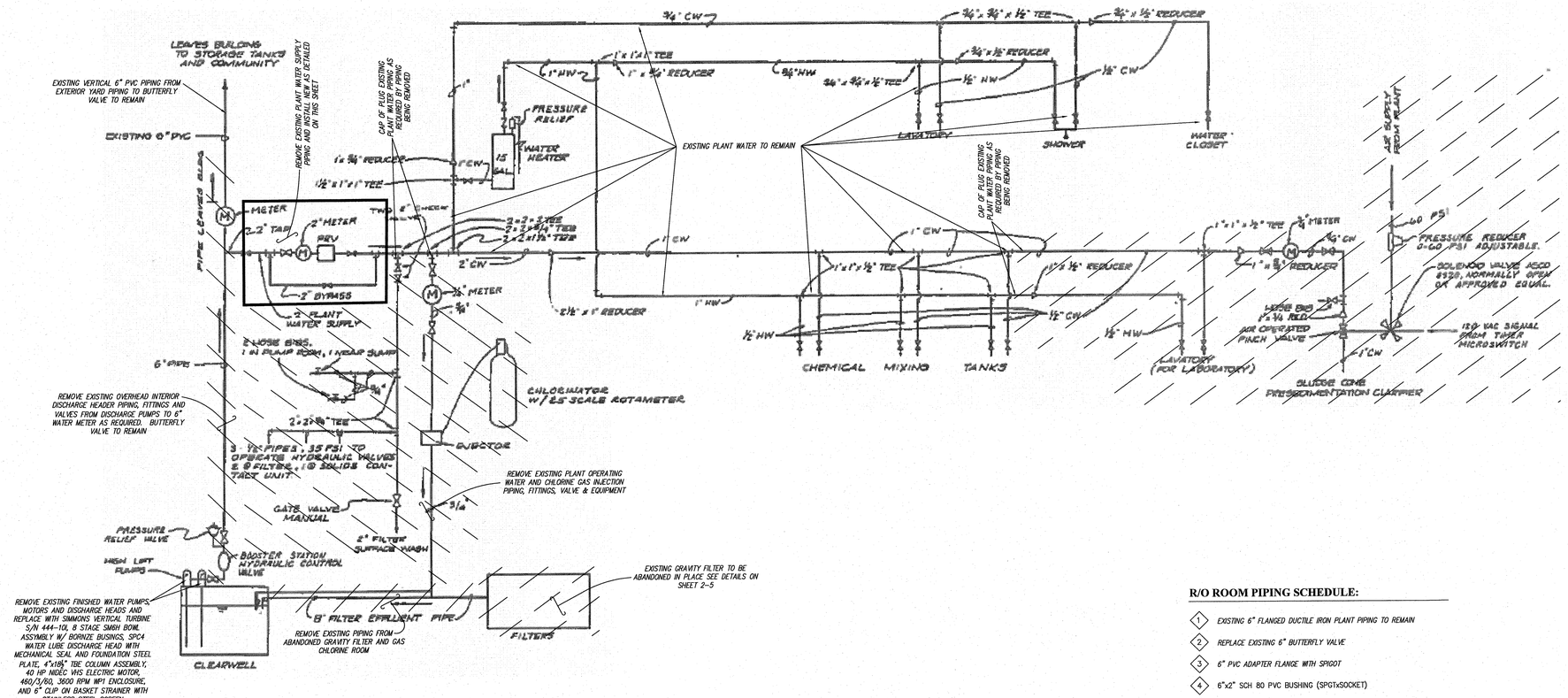
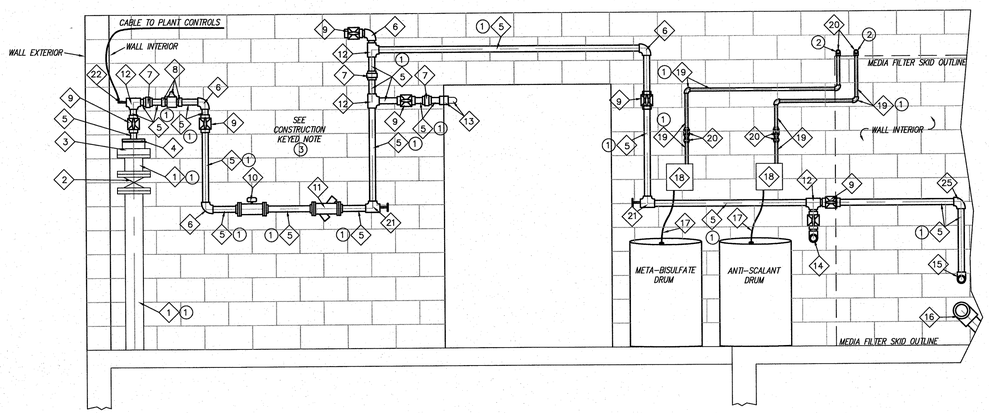


FINISHED WATER BOOSTER PUMP SCHEMATIC

NTS



REVISED PLANT WATER PIPING ELEVATION

K
2 6 8 SCALE 1/2"= 1'

R/O ROOM PIPING SCHEDULE:

1. EXISTING 6" FLANGED DUCTILE IRON PLANT PIPING TO REMAIN
2. REPLACE EXISTING 6" BUTTERFLY VALVE
3. 6" PVC ADAPTER FLANGE WITH SPIGOT
4. 6"x2" SCH 80 PVC BUSHING (SPGTxSOCKET)
5. 2" SCH. 80 PVC PIPE
6. 2" SCH. 80 PVC 90° ELL
7. 2" SCH. 80 PVC UNION
8. 2" CLA-VAL CRD-L PRESSURE REDUCING VALVE OR EQUAL WITH SCH.80 PV ADAPTERS FOR PIPE CONNECTION AS REQUIRED
9. 2" PVC BALL VALVE (SPEARS COMPACT OR EQUAL) SOCKET BY SOCKET
10. 2" ELSTER MAG METER PER NTUA SPECIFICATIONS ADAPT TO SCH. 80 PVC PIPING AS REQUIRED
11. 2" DOUBLE CHECK REDUCED PRESSURE BACK FLOW PREVENTOR ADAPT TO SCH. 80 PVC PIPING AS REQUIRED
12. 2" SCH. 80 PVC TEE
13. CONNECT TO EXISTING PLANT WATERLINES, PROVIDE FITINGS AND ADAPTERS AS REQUIRED
14. 2" SCH. 80 PVC 90° ELL WITH ADDITIONAL FITTINGS AND FLEXIBLE PIPING AS REQUIRED TO CONNECT TO CLEAN-IN-PLACE UNIT. PROVIDE FLEXIBLE PIPING AS RECOMMENDED BY R/O SYSTEM MANUFACTURER.
15. 2" SCH. 80 PVC 90° ELL, PIPING, AND SPECIALS AS REQUIRED TO CONNECT TO MEDIA FILTER SKID
16. 4" SCH. 80 PVC WASTE LINE PIPING SEE SHEET 2-6 FOR DETAILS
17. 1/2" O.D. (3/8" I.D.) FLEXIBLE POLYETHYLENE LIQUID CHEMICAL SUPPLY PIPING RUN NEATLY ALONG WALL AND ADAPT AS REQUIRED
18. CHEMICAL DOSING PUMP PROVIDED BY R/O MANUFACTURER
19. 1" SCHEDULE 80 PVC PIPE AND FITTINGS AS REQUIRED (CHEMICAL FEED LINES)
20. 1" SCH 80 PVC 90° ELL & SCH 80 PVC OVERHEAD BETWEEN CHEMICAL FEED PUMP AND R/O UNITS (CHEMICAL FEED LINES)
21. 2" SCH 80 PVC TEE WITH BIB (PLANT WATER)
22. PRESSURE TRANSDUCER WITH 1/2" THREADED CONNECTION AND CABLE TO PLANT CONTROLS WITHOUT SPLINE.

CONSTRUCTION KEYED NOTES:

1. ATTACHED PIPING TO CMU WALL AS REQUIRED PER DETAILS ON SHEET 2-5
2. SUPPORTS SUSPENDED OUTLET PIPE INTO RAW WATER STORAGE TANK BY TWO (2) PIPE HANGERS. SEE DETAIL ON SHEET 2-5
3. PROVIDE ADDITIONAL FITTINGS, COUPLINGS, BUSHINGS, REDUCERS, ETC. AS REQUIRED

KURT A. SPOLAR NEW MEXICO 17637 LICENSED PROFESSIONAL ENGINEER 12-21-18

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for the NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

PLANT WATER PIPING

SCALE: SHOWN
DATE: JULY 2018
DRAWN BY: KAS
CHECKED BY: MDP

SHEET 2 - 9

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PLAN LEGEND

- HOMERUN ((1) HOT, (1) NEUTRAL) (#12 MIN)
- EXPOSED CONDUIT
- UNDERGROUND CONDUIT DUCTBANK
- CONDUIT STUBUP
- CONDUIT TURNED DOWN
- CONDUIT RUN CONCEALED IN CEILING, FLOOR, OR IN WALLS
- UTILITY CONDUIT DUCTBANK
- EXISTING CONDUIT
- GROUNDING ELECTRODE CONDUCTOR
- OHE — EXISTING OVERHEAD ELECTRIC
- E — EXISTING UNDERGROUND ELECTRIC
- FENCE
- 20 — 240V SIMPLEX RECEPTACLE (NUMBER DENOTES CIRCUIT AMPS)
- 20 — 480V SIMPLEX RECEPTACLE (NUMBER DENOTES CIRCUIT AMPS)
- 120V, 20A SIMPLEX RECEPTACLE
- 120V, 20A DUPLEX RECEPTACLE
- $ — 120V, 20A SPST SWITCH
- $M — MANUAL MOTOR STARTER
- TELEPHONE JACK
- J OR J — JUNCTION BOX
- UJB — UNDERGROUND JUNCTION BOX
- MS — MOTION DETECTOR
- R — ALARM BEACON
- ALARM HORN
- POLE MOUNTED AREA LIGHT
- NON-FUSED DISCONNECT SWITCH
- F — FUSED DISCONNECT SWITCH
- CB — CIRCUIT BREAKER STYLE DISCONNECT SWITCH
- COMBINATION MOTOR STARTER
- S — SOLENOID VALVE (ENERGIZE TO CLOSE)
- S — SOLENOID VALVE (ENERGIZE TO OPEN)
- BUTTERFLY VALVE
- PLUG VALVE
- GATE VALVE
- HR — ALARM BEACON
- WALL MOUNTED LIGHT
- CXXXX — CONDUIT DESIGNATION
- GROUND ROD AND WELL
- PANELBOARD
- EXHAUST FAN
- LT — LEVEL TRANSMITTER
- PC — PHOTOCELL
- PI — PRESSURE GAUGE
- PS — PRESSURE SWITCH
- PT — PRESSURE TRANSMITTER
- T — THERMOSTAT
- NS — INTRUSION ALARM SWITCH
- LE — LEVEL ELEMENT
- H — SIREN/HORN
- FE — FLOW ELEMENT

SINGLE LINE DIAGRAM AND SCHEMATIC LEGEND

- INTERNAL WIRING / FIELD WIRING / TERMINAL BLOCK / TERMINAL BLOCK
- R — ALARM BEACON
- R — PILOT LIGHT (LETTER DENOTES COLOR)
- H — R — PUSH-TO-TEST PILOT LIGHT (LETTER DENOTES COLOR)
- CR — CONTROL RELAY
- 20 — MOTOR (20 DENOTES MOTOR HORSEPOWER)
- PRESSURE SWITCH CLOSES ON RISING PRESSURE
- PRESSURE SWITCH OPENS ON RISING PRESSURE
- NORMALLY OPEN CONTACT TIME TO CLOSE (ON DELAY)
- NORMALLY CLOSED CONTACT TIME TO OPEN (ON DELAY)
- TEMPERATURE SWITCH CLOSES ON RISING TEMPERATURE
- ETM — ELAPSED TIME METER
- FUSE
- FUSED TERMINAL BLOCK
- OVERLOAD (ELECTRONIC TYPE)
- EARTH GROUND CONNECTION
- SIREN/HORN
- ANTENNA
- OVERLOAD
- DISCONNECT SWITCH (N.O.)
- DISCONNECT SWITCH (N.C.)
- TERMINAL BLOCK
- CURRENT TRANSFORMER
- POWER TRANSFORMER
- CIRCUIT BREAKER WITH DOOR OPERATED HANDLE
- CIRCUIT BREAKER
- NORMALLY OPEN CONTACTS
- NORMALLY CLOSED CONTACTS
- CONTROL RELAY CONTACTS CONTROLLED BY PLC DISCRETE OUTPUT (N.O.)
- CONTROL RELAY CONTACTS CONTROLLED BY PLC DISCRETE OUTPUT (N.C.)
- LIGHTING CONTACTOR OR MOTOR STARTER (NUMBER INDICATES NEMA RATING) — 1
- NORMALLY OPEN MOMENTARY-CONTACT PUSHBUTTON
- NORMALLY CLOSED MOMENTARY-CONTACT PUSHBUTTON
- 3-POSITION SELECTOR SWITCH
- PUSH-PULL EMERGENCY STOP PUSHBUTTON
- LEVEL PROBE
- EXHAUST FAN

GENERAL ELECTRICAL REQUIREMENTS

A. THE COMPLETED INSTALLATION SHALL CONFORM TO ALL APPLICABLE FEDERAL, STATE AND LOCAL CODE ORDINANCES AND REGULATIONS. CONTRACTOR SHALL OBTAIN NECESSARY PERMITS AND INSPECTIONS REQUIRED BY THE GOVERNING AUTHORITIES. ALL WORK SHALL BE DONE IN A NEAT, WORKMANLIKE, FINISHED AND SAFE MANNER, ACCORDING TO THE LATEST PUBLISHED N.E.C.A. STANDARDS OF INSTALLATION, UNDER COMPETENT SUPERVISION. INSTALL GROUNDING AS REQUIRED BY THE NATIONAL ELECTRIC CODE (2014).

B. VISIT THE SITE TO BECOME FAMILIAR WITH EXISTING CONDITIONS AND ALL OTHER FACTORS WHICH MAY AFFECT THE EXECUTION OF THIS WORK.

C. ALL MATERIALS SHALL BE NEW AND OF THE BEST QUALITY, MANUFACTURED IN ACCORDANCE WITH NEMA, ANSI, U.L. OR OTHER APPLICABLE STANDARDS. THE USE OF MANUFACTURER'S NAMES, MODELS AND NUMBERS IS INTENDED TO ESTABLISH STYLE, QUALITY, APPEARANCE USEFULNESS AND BID PRICE. PROPOSED SUBSTITUTIONS SHALL BE SUBMITTED IN WRITING AND REVIEWED BY THE ENGINEER BEFORE ORDERING.

D. PROTECT ALL ELECTRICAL MATERIAL AND EQUIPMENT INSTALLED UNDER THIS CONTRACT AGAINST DAMAGE BY OTHER TRADES, WEATHER CONDITIONS OR ANY OTHER CAUSES. EQUIPMENT FOUND DAMAGED OR IN OTHER THAN NEW CONDITION WILL BE REJECTED AS DEFECTIVE.

E. LEAVE THE SITE CLEAN, REMOVE ALL DEBRIS, EMPTY CARTONS, TOOLS, CONDUIT, WIRE SCRAPS AND ALL MISCELLANEOUS SPARE EQUIPMENT AND MATERIALS USED IN THE WORK DURING CONSTRUCTION. ALL COMPONENTS SHALL BE FREE OF DUST, GRIT AND FOREIGN MATERIALS, LEFT AS NEW BEFORE FINAL ACCEPTANCE OF WORK.

F. REFER TO OTHER PLANS FOR EXACT LOCATION OF EQUIPMENT AND ARCHITECTURAL FEATURES.

G. REFER TO SPECIFICATIONS FOR ADDITIONAL PROJECT REQUIREMENTS.

H. TYPICAL DETAILS APPLY IN ALL CASES WHETHER SPECIFICALLY REFERRED TO OR NOT.

I. THESE CONTRACT DOCUMENTS ARE SUBJECT TO THE INTERPRETATION BY THE ENGINEER. ALL QUESTIONS REGARDING THESE CONTRACT DOCUMENTS SHALL BE BROUGHT TO THE ENGINEER. ANYONE WHO TAKES UPON THEMSELF THE INTERPRETATION OF THESE CONTRACT DOCUMENTS OR MAKES REVISIONS TO THE SAME WITHOUT CONFERRING WITH THE DESIGN ENGINEER SHALL BE RESPONSIBLE FOR THE CONSEQUENCES THEREOF.

J. ALL UNDERGROUND CONDUIT TO BE SCHEDULE 40 PVC. MINIMUM DEPTH 24", MINIMUM SIZE 3/4". ALL CONDUIT EXPOSED TO BE TYPE GRS, MINIMUM SIZE 3/4". PROVIDE EACH PVC CONDUIT WITH A BELL END WHERE ENTERING FREE STANDING EQUIPMENT. INSTALL LFMC AT EQUIPMENT WHICH IS SUBJECT TO VIBRATION OR REQUIRE MOVEMENT FOR MAINTENANCE PURPOSES. PROVIDE NECESSARY REDUCER WHERE EQUIPMENT FURNISHED CANNOT ACCEPT 3/4" SIZE FLEXIBLE CONDUIT. LIMIT FLEXIBLE CONDUIT LENGTH TO 3' MAXIMUM.

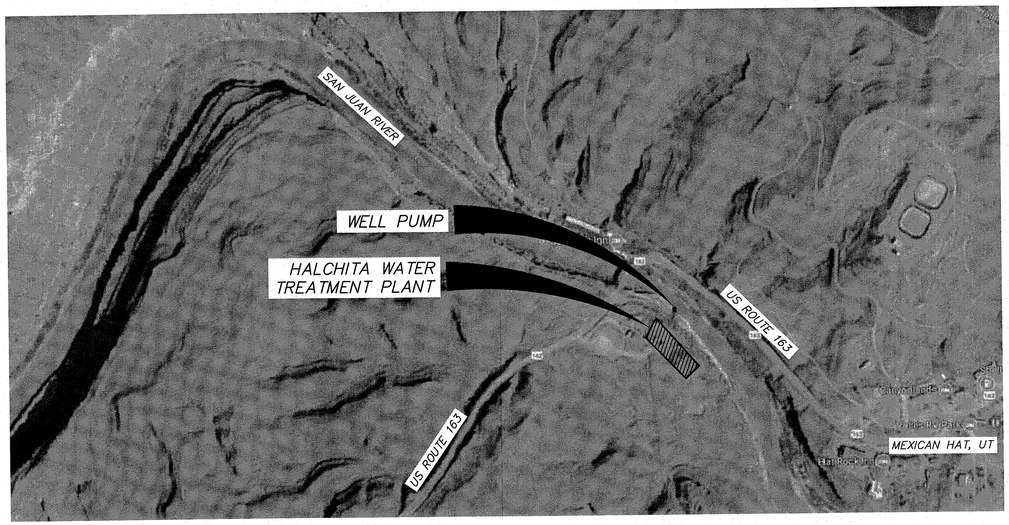
K. ALL CIRCUIT CONDUCTORS SHALL BE "XHHW-2" STRANDED COPPER. MINIMUM CONDUCTOR SIZE FOR POWER SHALL BE #12 AWG WITH #12 GND. MINIMUM CONDUCTOR SIZE FOR CONTROL SHALL BE #14 AWG WITH #14 GND. ANALOG SIGNAL CABLES SHALL CONSIST OF #16 AWG TWISTED SHIELDED PAIR COPPER CONDUCTORS WITH OVERALL PVC JACKET RATED 600V AND RATED FOR WET LOCATIONS. ETHERNET CABLES SHALL BE CATEGORY 5E AND RATED FOR WET LOCATIONS, WHERE APPLICABLE. COMMUNICATION CABLES SHALL BE RATED FOR 300V AND SHALL BE SIZE, TYPE, MATERIALS AS REQUIRED BY THE SPECIFIC SYSTEM SPECIFICATION OR EQUIPMENT MFR.

L. LOCATION OF ELECTRICAL EQUIPMENT SHALL BE SCALED FROM THE SITE PLAN. UPON COMPLETION OF WORK, FURNISH A SET OF RED-LINED "AS-BUILT" DRAWINGS, THAT ACCURATELY REFLECTS FINAL LOCATION OF UNDERGROUND CONDUIT AND OTHER ELECTRICAL EQUIPMENT.

ABBREVIATIONS

A/C	AIR CONDITIONING
AI	ANALOG INPUT
AFF	ABOVE FINISHED FLOOR
AFG	ABOVE FINISHED GRADE
AO	ANALOG OUTPUT
APS	ARIZONA PUBLIC SERVICE
BLDG	BUILDING
BPS	BOOSTER PUMP STATION
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CL2	CHLORINE
CMU	CONCRETE MASONRY UNIT
COM	COMMON
CPT	CONTROL POWER TRANSFORMER
Cu	COPPER
DI	DISCRETE INPUT
DISC	DISCONNECT
DIST	DISTRIBUTION
DO	DISCRETE OUTPUT
DPDT	DOUBLE-POLE DOUBLE-THROW
DWG	DRAWING
(E)	EXISTING
E.C.	EMPTY CONDUIT
ELEC	ELECTRICAL
EMT	ELECTRICAL METALLIC TUBING
ENCL	ENCLOSURE
FIT	FLOW INDICATING TRANSMITTER
FS	FUSE
GEC	GROUNDING ELECTRODE CONDUCTOR
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GND	GROUND
GRS	GALVANIZED RIGID STEEL
IC	INSTRUMENT CABLE
INST	INSTRUMENT
IMC	INTERMEDIATE METAL CONDUIT
J-BOX	JUNCTION BOX
LCC	LIGHTING CONTROL CABINET
LFMC	LIQUIDTIGHT FLEXIBLE METAL CONDUIT
LIT	LEVEL INDICATING TRANSMITTER
MBJ	MAIN BONDING JUMPER
MCB	MAIN CIRCUIT BREAKER
MFR	MANUFACTURER
MIN	MINIMUM
MLO	MAIN LUG ONLY
MTD	MOUNTED
MTS	MANUAL TRANSFER SWITCH
MUE	MULTI-USE EASEMENT
NTS	NOT TO SCALE
PCP	PUMP CONTROL PANEL
PIT	PRESSURE INDICATING TRANSMITTER
PQM	POWER QUALITY METER
PR	PAIR
PRESS	PRESSURE
PUE	PUBLIC UTILITIES EASEMENT
REQ'TS	REQUIREMENTS
RO	REVERSE OSMOSIS
ROW	RIGHT OF WAY
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOFT STARTER
S/S	START/STOP
SCA	SHORT CIRCUIT AMPS
SES	SERVICE ENTRANCE SECTION
SPC	SPARE CONDUIT
SPD	SURGE PROTECTIVE DEVICE
STT	SHIELDED TWISTED TRIAD
SW	SWITCH
TSP	TWISTED SHIELDED PAIR
TST	TWISTED SHIELDED TRIAD
TTB	TELEPHONE TERMINAL BLOCK
TYP	TYPICAL
UV	ULTRAVIOLET
VLV	VALVE
VFD	VARIABLE FREQUENCY DRIVE
WDT	WASTE DURATION TIMER
WIU	WHILE-IN-USE
WP	WEATHERPROOF
WTP	WATER TREATMENT PLANT
XFMR	TRANSFORMER

VICINITY MAP



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12/21/18
Date Signed
ARIZONA, U.S.A.
Expires 3/31/20

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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

LEGEND, ABBREVIATIONS, AND NOTES

SCALE:	AS SHOWN
DATE:	DECEMBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E1

Saved:December 18, 2018 File:16066-E1.dwg Drafter:Bob

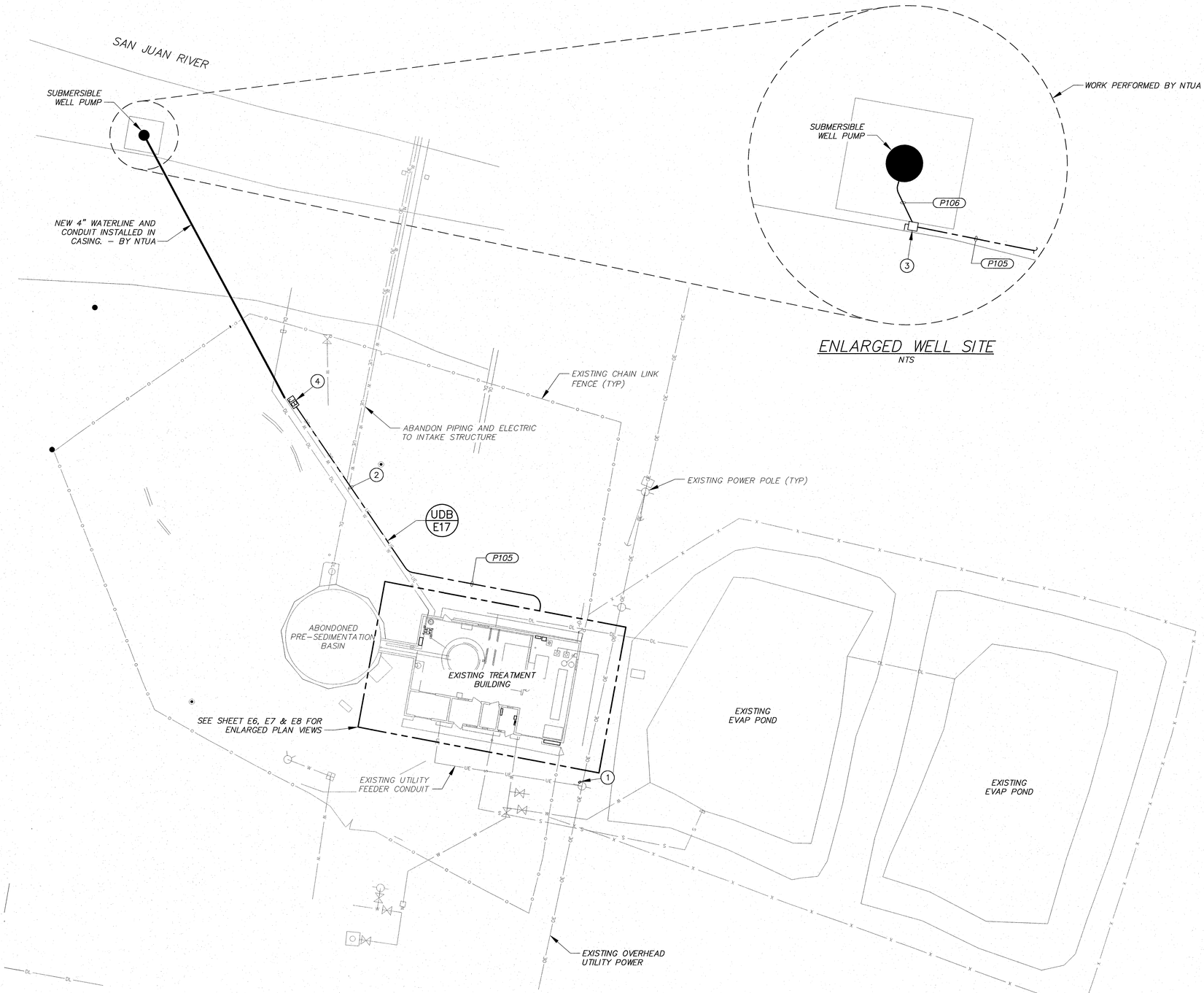
GENERAL NOTES

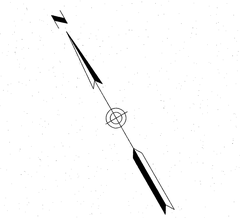
A. SEE SHEET E5 FOR CONDUIT AND CONDUCTOR SCHEDULE.

B. ALL CONDUIT RISERS TRANSITIONING FROM BELOW GRADE SHALL BE PVC COATED RIGID CONDUIT. RISERS SHALL INCLUDE AN ELBOW TO ATTACH TO PVC FITTING/CONDUIT AND EXTEND 6" MINIMUM AFG.

KEY NOTES

1. EXISTING UTILITY TRANSFORMERS TO BE REPLACED BY NTUA. COORDINATE WITH NTUA TO DISCONNECT POWER, REPLACE TRANSFORMERS AND REMOVE EXISTING METER, SERVICE MAST, CONDUIT, CONDUCTORS AND WEATHERHEAD.
2. INSTALL ELECTRICAL CONDUIT IN JOINT–USE TRENCH WITH WATERLINE PER DETAIL ON CIVIL PLANS.
3. INSTALL DISCONNECT SWITCH PER DETAIL "D" ON SHEET E17. DISCONNECT SHALL BE CAPABLE OF BEING LOCKED IN THE ON AND OFF POSITION.
4. INSTALL UNDERGROUND JUNCTION BOX PER DETAIL "UJB" ON SHEET E17. CONDUIT AND CONDUCTORS BETWEEN JUNCTION BOX AND WELL WILL BE INSTALLED BY NTUA.





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FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

ELECTRICAL SITE PLAN

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
E2

Saved: December 21, 2018 File: 16066–E2.dwg Drafter: User

480V, 3 ϕ LOAD CALCULATIONS

LOAD DESCRIPTION	KVA	H.P.	AMPS
WELL PUMP	--	7.5	11.0
RAW WATER BOOSTER PUMP No.1	--	5	7.6
RAW WATER BOOSTER PUMP No.2 (STANDBY)	--	5	0.0
RO SYSTEM CONTROL PANEL	20	--	24.0
FINISHED WATER PUMP No.1	--	40	52.0
FINISHED WATER PUMP No.2 (STANDBY)	--	40	0.0
TREATMENT ROOM HEATER (15KW)	15	--	18.0
CIP RECEPTACLE	12.5	--	15.0
75KVA TRANSFORMER	75	--	90.2
LARGE ROOM HEATERS (15KW EACH)	30	--	36.1
PANEL B TRANSFORMER (MPC)	10	--	12.0
SUBTOTAL =			265.9
+25% OF LARGEST MOTOR (40HP) =			13.0
MINIMUM SERVICE SIZE =			**278.9**
SELECTED SERVICE SIZE =			600A

PANEL: B | VOLTAGE: 480 - 120/240V, 1Ø, 10KVA | PRIMARY: 30A (15KAIC)
TYPE: MINI-POWER CENTER | ENCLOSURE: SURFACE (NEMA 3R) | SECONDARY: 60A (10KAIC)

	CIRCUIT DESCRIPTION	BKR	CIR	ϕA	ϕB	CIR	BKR	CIRCUIT DESCRIPTION
	WELL PUMP CONTROLLER		1	250				
				360		2		TREATMENT ROOM RECEPTACLES
X	TREATMENT ROOM LIGHTING		3		450			
					180	4		RAW WATER CHLORINE PUMP (RECEPTACLE)
			5					
						6		
			7					
						8		
			9					
						10		
	CONNECTED VA PER PHASE			610	630	NOTES:		
	CONNECTED AMPS PER PHASE			5.1	5.3	"X" DENOTES CONTINUOUS LIGHTING LOAD		
	CONTINUOUS LIGHTING LOAD (25%) VA			0	113	"XX" DENOTES LARGEST MOTOR LOAD		
	DEMAND VA PER PHASE			610	743			
	TOTAL AMPS PER PHASE			5.1	6.2			

GENERAL DEMOLITION NOTES

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B. ALL REMOVED MATERIAL NOT BEING SALVAGED BY OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR FOR REMOVAL AND DISPOSAL.

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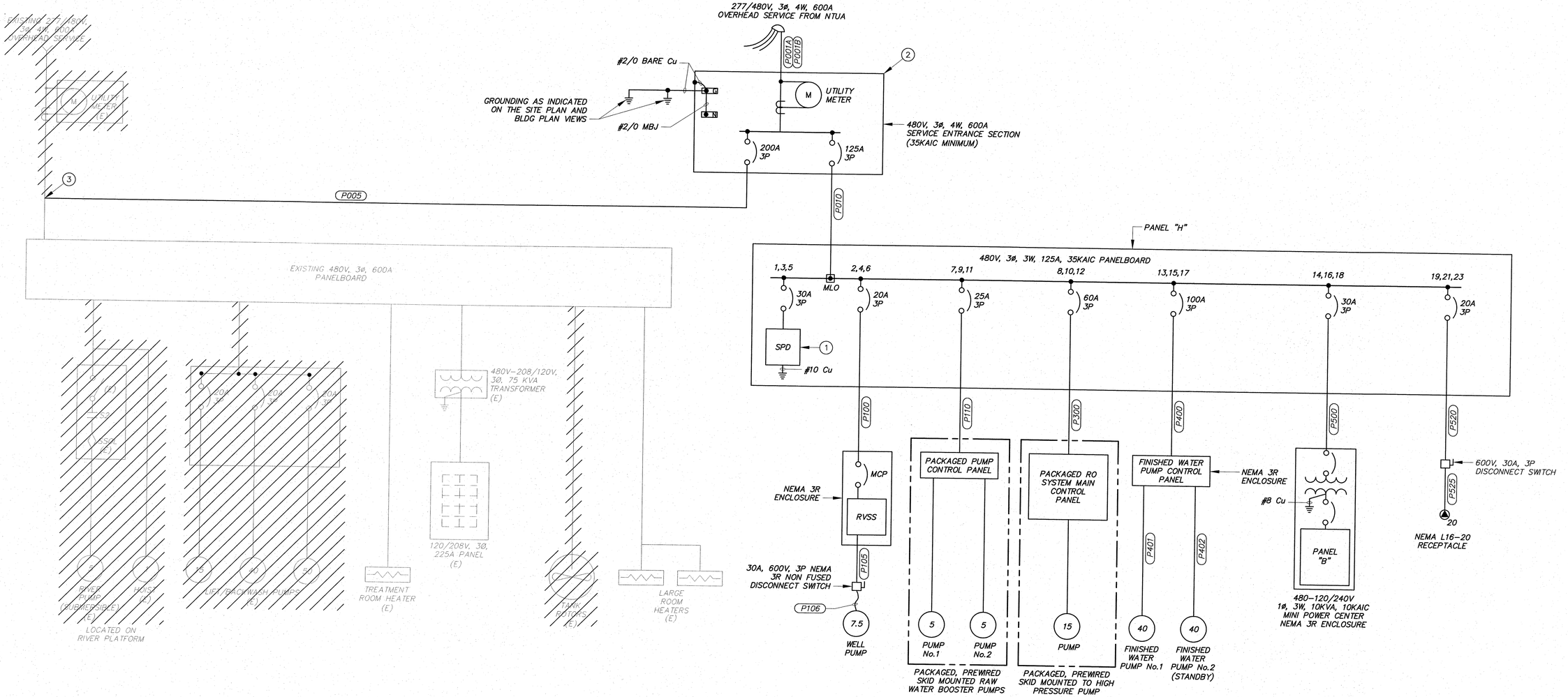
D. THE CONTRACTOR SHALL PERFORM ALL WORK ON THIS PROJECT WHILE THE EXISTING FACILITIES AND SURROUNDING UTILITIES ARE OPERATING. ALL CONNECTIONS OF NEW WORK TO EXISTING FACILITIES SHALL BE PERFORMED IN A MANNER TO MINIMIZE DOWN TIMES, OPERATIONAL UPSETS AND AS SPECIFIED AND SHOWN ON THESE SHEETS.

KEY NOTES

1. SPD SHALL INCLUDE 200KA SURGE CURRENT RATING, AIC COMPATIBLE WITH PANEL BUS, UL 1449 3RD EDITION LISTING, SURGE COUNTER AND STATUS LED'S.
2. INSTALL NEW SES, RISER CONDUIT AND WEATHERHEAD. COORDINATE WITH NTUA FOR REQUIRED RISER CONDUCTOR SIZE AND POWER RECONNECTION.
3. SEE KEY NOTE 6 ON SHEET E7 FOR CONDUIT RE-CONNECTION AND CONDUCTOR INSTALLATION.



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Professional Engineer Certificate 30025 DARWIN REYNOLDS 12/21/18 Date Signed ARIZONA, U.S.A. Expires 3/31/20

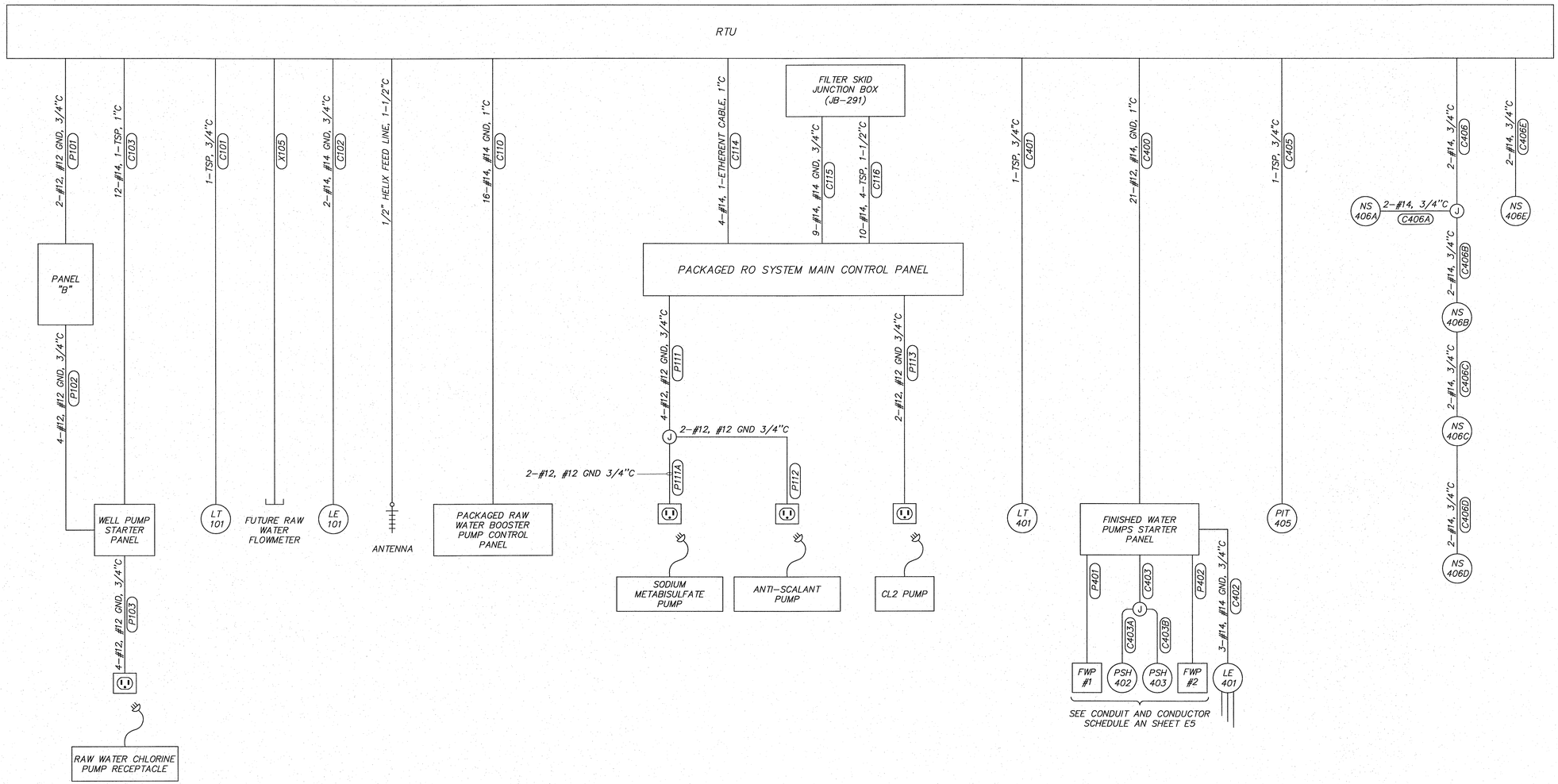
NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

SINGLE LINE DIAGRAM

SCALE: AS SHOWN
DATE: DECEMBER 2018
DRAWN BY: BB
CHECKED BY: JJ G

SHEET E3



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NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

CONDUIT BLOCK DIAGRAM

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
E4

CONDUIT & CONDUCTOR SCHEDULE

	CONDUIT		CONDUCTORS				ROUTING INFORMATION		
	TAG	SIZE	POWER	CNTRL	GND	FROM	TO	REMARKS
	P001A	3"	4-#350KCMIL			SERVICE ENTRANCE SECTION	RISER CONDUIT	CONNECTION TO SERVICE DROP FROM NTUA
	P001B	3"	4-#350KCMIL			SERVICE ENTRANCE SECTION	RISER CONDUIT	CONNECTION TO SERVICE DROP FROM NTUA
	P005	4"	3-#3/0		#6	SERVICE ENTRANCE SECTION	EXISITNG 480V PANELBOARD	UTILIZING EXISITNG CONDUIT
	P010	2"	3-#1		#6	SERVICE ENTRANCE SECTION	PANEL "H"	
	P100	3/4"	3-#12		#12	PANEL "H"	WELL PUMP CONTROLLER	
	P101	3/4"	2-#12		#12	PANEL "B"	RTU	
	P102	3/4"	4-#12		#12	PANEL "B"	WELL PUMP CONTROLLER	PANEL "B" CKT-2 (CONTROL) CKT-6 (CHLORINE RECEPT)
	P103	3/4"	4-#12		#12	WELL PUMP CONTROLLER	RAW WATER PRE-CHLORINE PUMP RECEPTACLE	
	P105	3/4"	3-#12		#12	WELL PUMP CONTROLLER	WELL PUMP DISCONNECT SWITCH	DISCONNECT IS LOCATED NEAR WELL
*	P106	3/4"	3-#12		#12	WELL PUMP DISCONNECT SWITCH	WELL PUMP	
	P110	3/4"	3-#10		#10	PANEL "H"	PKG'D RAW WATER BOOSTER PUMP CONTROL PANEL	
	P111	3/4"	4-#12		#12	PKG'D RO SYSTEM MAIN CONTROL PANEL	JUNCTION BOX AT METERING PUMP	VIA RECEPTACLE
	P111A	3/4"	2-#12		#12	JUNCTION BOX AT METERING PUMP	SODIUM METABISULFATE METERING PUMP	VIA RECEPTACLE
	P112	3/4"	2-#12		#12	JUNCTION BOX AT METERING PUMP	ANTI-SCALANT METERING PUMP	VIA RECEPTACLE
	P113	3/4"	2-#12		#12	PKG'D RO SYSTEM MAIN CONTROL PANEL	POST CHLORINATION METERING PUMP	VIA RECEPTACLE
	P300	1"	3-#6		#10	PANEL "H"	PKG'D RO SYSTEM MAIN CONTROL PANEL	
	P400	1 1/4"	3-#3		#8	PANEL "H"	FINISHED WATER PUMP CONTROL PANEL	
	P401	1 1/4"	3-#3		#8	FINISHED WATER PUMP CONTROL PANEL	FINISHED WATER PUMP No. 1	
	P402	1 1/4"	3-#3		#8	FINISHED WATER PUMP CONTROL PANEL	FINISHED WATER PUMP No. 2	
	P500	3/4"	3-#10		#10	PANEL "H"	PANEL "B" TRANSFORMER	
	P520	3/4"	3-#12		#12	PANEL "H"	DISCONNECT SWITCH AT 480 RECEPTACLE	
	P525	3/4"	3-#12		#12	DISCONNECT SWITCH AT 480 RECEPTACLE	480V RECEPTACLE	
	C101	3/4"			1-TSP	RTU	EXISTING WIRE TROUGH	LT-101
	C101A	3/4"			1-TSP	EXISTING WIRE TROUGH	RAW WATER STORAGE TANK LEVEL TRANSMITTER	LT-101
	C102	3/4"		3-#14	#14	RTU	EXISTING WIRE TROUGH	LE-101
	C102A	3/4"		3-#14	#14	EXISTING WIRE TROUGH	RAW WATER STORAGE TANK LEVEL PROBE HOLDER	LE-101
	C103	1"		12-#14, 1 TSP		RTU	WELL PUMP CONTROLLER	SIGNALS AND CONTROL
	C110	1"		16-#14	#14	RTU	PKG'D RAW WATER BOOSTER PUMP CONTROL PANEL	SIGNALS AND CONTROL
	C114	1"		4-#14, 1-CAT 5		RTU	PKG'D RO SYSTEM MAIN CONTROL PANEL	SIGNALS AND CONTROL
	C115	3/4"	9-#14		#14	PKG'D RO SYSTEM MAIN CONTROL PANEL	FILTER SKID JUNCTION BOX (JB-291)	120V CONTROL
	C116	1 1/2"		10-#14, 4-TSP		PKG'D RO SYSTEM MAIN CONTROL PANEL	FILTER SKID JUNCTION BOX (JB-291)	SIGNAL
	C400	1"		21-#14	#14	RTU	FINISHED WATER PUMP CONTROL PANEL	SIGNAL AND CONTROL
	C401	3/4"			1-TSP	RTU	CLEARWELL LEVEL TRANSMITTER	LT-401
	C402	3/4"		3-#14	#14	FINISHED WATER PUMP CONTROL PANEL	CLEARWELL LEVEL PROBE HOLDER	LE-402
	C403	1/2"	4-#14		#14	FINISHED WATER PUMP CONTROL PANEL	JUNCTION BOX FINISHED WATER PUMPS	PSH-402 & PSH-403
	C403A	1/2"	2-#14		#14	JUNCTION BOX AT FINISHED PUMPS	FINISHED WATER PUMP No. 1 PRESSURE SWITCH	PSH-402
	C403B	1/2"	2-#14		#14	JUNCTION BOX AT FINISHED PUMPS	FINISHED WATER PUMP No. 2 PRESSURE SWITCH	PSH-403
	C405	3/4"		1-TSP		RTU	PIT-405	DISTRIBUTION TANK LEVEL
	C406	3/4"		2-#14		RTU	JUNCTION BOX IN ELECTRICAL ROOM	
	C406A	3/4"		2-#14		JUNCTION BOX IN ELECTRICAL ROOM	INTRUSION SWITCH AND JUNCTION BOX IN TREATMENT	NS-406A VIA CONDULET
	C406B	3/4"		2-#14		JUNCTION BOX AT TREATMENT ROOM DOOR	INTRUSION SWITCH AT EAST ROLL UP DOOR	NS-406B
	C406C	3/4"		2-#14		INTRUSION SWITCH AT OFFICE DOOR	INSTRUSION SWITCH AT STORAGE ROOM ENTRY DOOR	NS-406C
	C406D	3/4"		2-#14		INSTRUSION SWITCH AT STORAGE ROOM DOOR	INSTRUSION SWITCH AT WEST ROLL UP DOOR	NS-406D
	C406E	3/4"		2-#14		RTU	INSTRUSION SWITCH AT NORTH ENTRY	NS-406E
	X105	3/4"		2-#14		RTU	DISCHARGE FLOWMETER	FUTURE SIGNAL

* DENOTES CONDUIT NOT INDICATED ON PLAN VIEW(S) OR ELEVATION(S) FOR CLARITY

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for the
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FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

CONDUIT AND CONDUCTOR SCHEDULE

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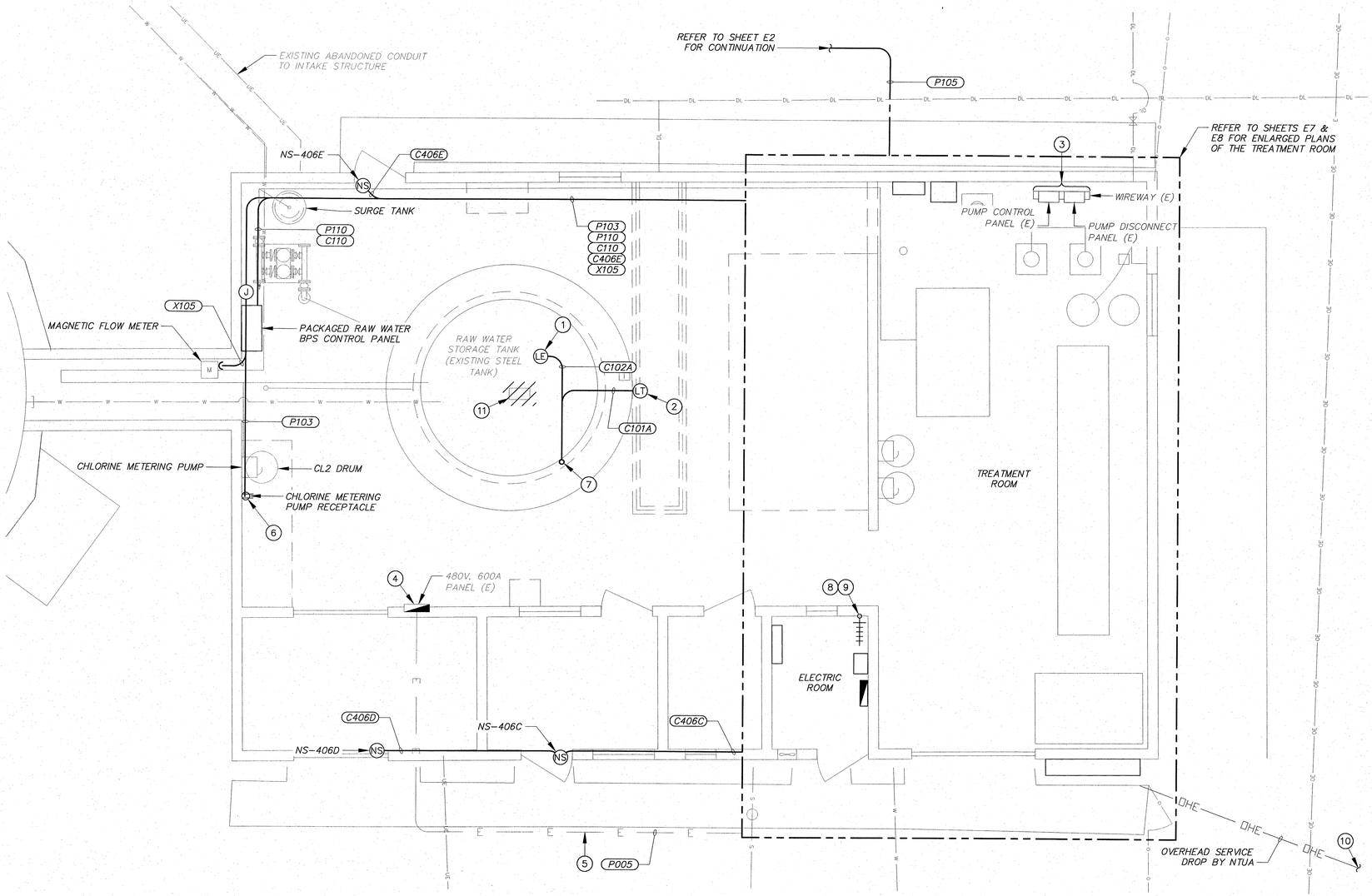
SHEET
E5



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GENERAL NOTES

A. ALL EXPOSED CONDUITS TO BE TYPE IMC.

B. ALL BRANCH CIRCUIT CONDUCTORS TO BE STRANDED COPPER TYPE THHN. SIZE SHALL BE #12 AWG WITH #12 GROUND UNLESS OTHERWISE INDICATED.

C. ALL 120V RECEPTACLES TO BE INSTALLED +18" ABOVE FINISHED FLOOR/GRADE UNLESS OTHERWISE INDICATED.

D. SEE SHEET E5 FOR CONDUIT AND CONDUCTOR SCHEDULE.

E. FURNISH AND INSTALL 3/4" CONDUITS, FITTINGS, PULL BOX, ETC AS REQUIRED FOR RECEPTACLES AND EQUIPMENT. USE #10 AWG CONDUCTORS WITH #10 AWG GND FOR 30A AND 25A CIRCUITS. USE #12 AWG CONDUCTORS WITH #12 AWG GND FOR 20A CIRCUITS. DO NOT EXCEED 6 CURRENT CARRYING CONDUCTORS PER CONDUIT.

F. SEE SHEET E17 FOR ELECTRICAL DETAILS.

KEY NOTES

1. INSTALL LEVEL PROBE HOLDER (LE-101) ON EXISTING STRUCTURE.
2. INSTALL LEVEL TRANSMITTER (LT-101) ON EXISTING 1/2" SAMPLE LINE.
3. DEMOLISH (2) EXISTING PANELS IN THIS AREA. DEMOLISH ASSOCIATED WIREWAY AND CONDUCTORS BACK TO SOURCE.
4. REMOVE EXISTING UTILITY FEED CONDUCTORS FEEDING THIS PANEL.
5. RECONNECT FEEDER CONDUIT TO NEW SERVICE ENTRANCE SECTION. PULL NEW CONDUCTORS FROM SES TO 480V DISTRIBUTION PANEL PER CONDUIT AND CONDUCTOR SCHEDULE ON SHEET E5.
6. INSTALL A 120V, 20A SIMPLEX RECEPTACLE OUTLET AT CL2 PUMP LOCATION.
7. TRANSITION CONDUITS C101A AND C102A TO EXISTING WIREWAY. EXTEND CABLES AND/OR CONDUCTORS THROUGH WIREWAY TO ASSOCIATED CONDUITS AT ELECTRICAL ROOM. SEE SHEET E7 FOR LOCATION OF CONDUITS C101 AND C102.
8. CORE DRILL THROUGH THE UPPER LEVEL WALL, EXTEND THE ANTENNA HELIAX CABLE IN A 1-1/2" RIGID CONDUIT 10 FEET ABOVE ROOF. THIS HEIGHT IS SUBJECT TO CHANGE PENDING RESULTS OF THE RADIO PATH STUDY PERFORMED BY NTUA.
9. INSTALL ANTENNA PER DETAIL "ANT" ON SHEET E18.
10. EXISTING POLE MOUNTED UTILITY METER, CONDUIT AND CONDUCTORS TO BE REMOVED.
11. DISCONNECT AND REMOVE TANK ROTOR CONTROL CABINET AND CONDUIT AND CONDUCTORS BACK TO IT SOURCE.

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for the NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

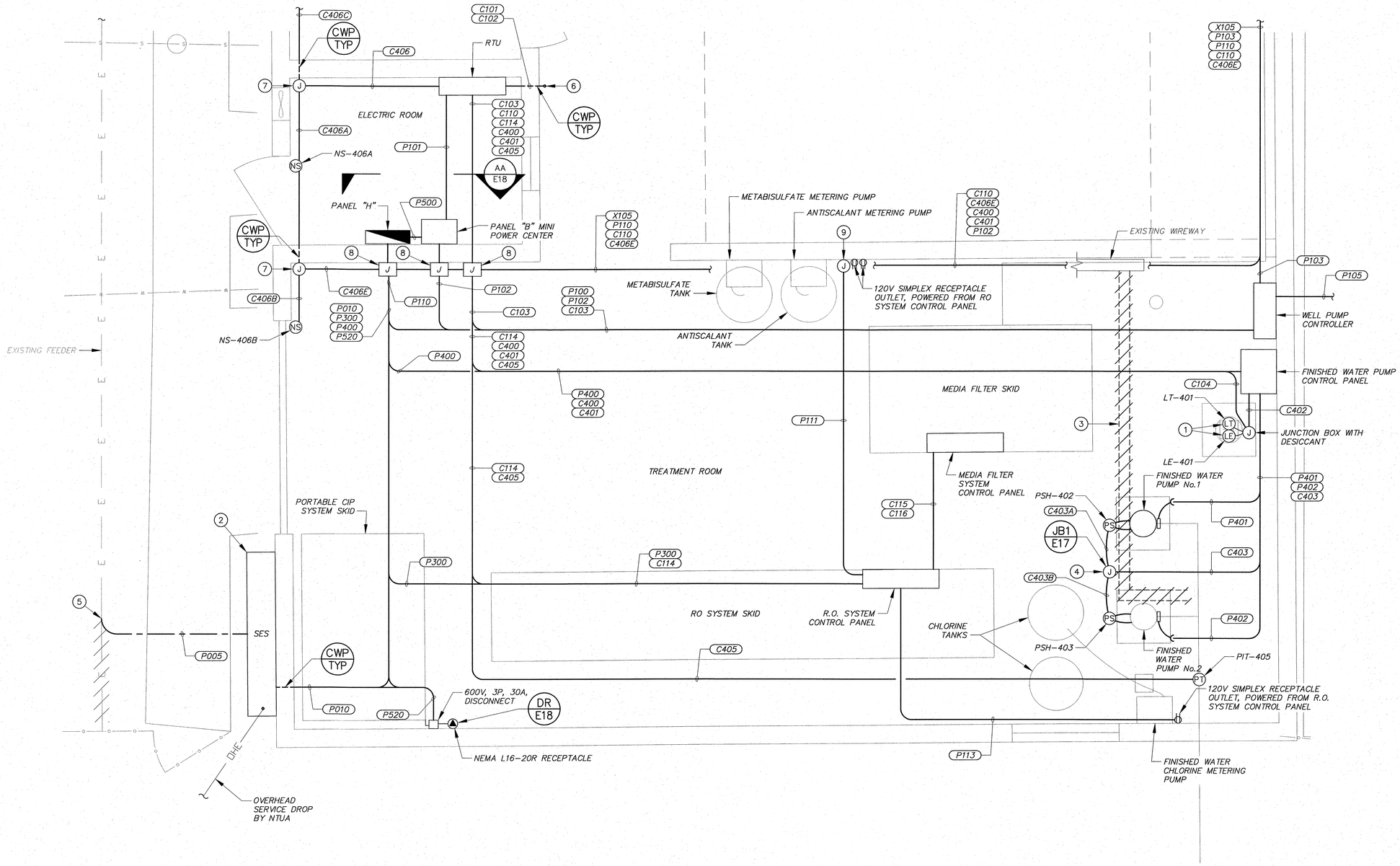
NO.	BY	DATE	

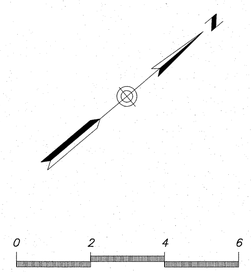
NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

TREATMENT BUILDING ELECTRICAL PLAN

SCALE:	AS SHOWN
DATE:	DECEMBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E6





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B. ALL REMOVED MATERIAL NOT BEING SALVAGED BY OWNER SHALL BECOME THE PROPERTY OF THE CONTRACTOR FOR REMOVAL AND DISPOSAL.

C. ALL DEMOLISHED AND REMOVED MATERIAL SHALL BE HAULED OFF SITE AND DISPOSED OF AT AN APPROVED LANDFILL, OR OTHER APPROVED LOCATION.

D. THE CONTRACTOR SHALL PERFORM ALL WORK ON THIS PROJECT WHILE THE EXISTING FACILITIES AND SURROUNDING UTILITIES ARE OPERATING. ALL CONNECTIONS OF NEW WORK TO EXISTING FACILITIES SHALL BE PERFORMED IN A MANNER TO MINIMIZE DOWN TIMES, OPERATIONAL UPSETS AND AS SPECIFIED AND SHOWN ON THESE SHEETS.

GENERAL NOTES

A. ALL EXPOSED CONDUITS TO BE TYPE IMC.

B. ALL BRANCH CIRCUIT CONDUCTORS TO BE STRANDED COPPER TYPE THHN. SIZE SHALL BE #12 AWG WITH #12 GROUND UNLESS OTHERWISE INDICATED.

C. ALL 120V RECEPTACLES TO BE INSTALLED +18" ABOVE FINISHED FLOOR/GRADE UNLESS OTHERWISE INDICATED.

D. SEE SHEET E5 FOR CONDUIT AND CONDUCTOR SCHEDULE.

E. FURNISH AND INSTALL 3/4" CONDUITS, FITTINGS, PULL BOX, ETC AS REQUIRED FOR RECEPTACLES AND EQUIPMENT. USE #10 AWG CONDUCTORS WITH #10 AWG GND FOR 30A AND 25A CIRCUITS. USE #12 AWG CONDUCTORS WITH #12 AWG GND FOR 20A CIRCUITS. DO NOT EXCEED 6 CURRENT CARRYING CONDUCTORS PER CONDUIT.

F. SECURE CONDUITS TO RAFTERS AND CMU WALLS USING SHALLOW STRUT AND CONDUIT CLAMPS

G. SEE SHEETS E17 & E18 FOR ELECTRICAL DETAILS AND ELEVATIONS.

KEY NOTES

1. INSTALL LEVEL ELEMENT AND LEVEL TRANSMITTER ON NEW BLIND FLANGE.
2. INSTALL NEW SES, CONDUIT AND CONDUCTORS BACK TO NEW WEATHERHEAD. COORDINATE WITH NTUA FOR REQUIRED CONDUCTOR LENGTHS FROM WEATHERHEAD TO POLE-MOUNTED TRANSFORMERS, AND FOR RECONNECTION OF POWER.
3. REMOVE EXISTING WIRE TROUGH BACK TO WEST WALL OF TREATMENT ROOM. COVER OPENING WITH 10GA METAL MINIMUM.
4. EXTEND A 3/4" CONDUIT FROM OVERHEAD TO A JUNCTION BOX MOUNTED ON A STRUT STAND, EXTEND 1/2" LFMC TO EACH PRESSURE SWITCH.
5. DIG DOWN BELOW GRADE AND INTERCEPT EXISTING FEEDER CONDUIT. REROUTE CONDUIT FROM THE EXISTING 480V DISTRIBUTION PANEL TO THE NEW SES. DEMOLISH THE EXISTING CONDUIT BACK TO THE POWER POLE.
6. TRANSITION CONDUITS C101 AND C102 INTO THE EXISTING WIREWAY. EXTEND CONDUCTORS THROUGH WIREWAY TO CONDUITS C101A AND C102A AT THE RAW WATER STORAGE TANKS. SEE SHEET E6 FOR CONDUIT C101A AND C102A CONDUIT LOCATION.
7. SURFACE MOUNTED 4" X 4" X 4" NEMA 1 JUNCTION BOX TO THE CMU WALK.
8. INSTALL 12" X 12" X 8" NEMA 1 JUNCTION BOXES ABOVE EXISTING PIPING AND TRANSITION ALL CONDUITS INSTALLED OVERHEAD IN ELECTRIC ROOM TO THE TREATMENT ROOM. EXTEND CONDUITS FROM JUNCTION BOXES TO BE ROUTED OVERHEAD OR WALL MOUNTED IN THE TREATMENT ROOM.
9. SURFACE MOUNT A 4" X 4" X 4" NEMA 3R JUNCTION BOX ON THE CMU WALL. EXTEND CONDUITS AND CONDUCTORS TO RECEPTACLE LOCATIONS SO THAT CHEMICAL PUMPS CAN BE PLUGGED INTO THE DESIGNATED RECEPTACLE.

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for the NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

ENLARGED TREATMENT ROOM POWER PLAN

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

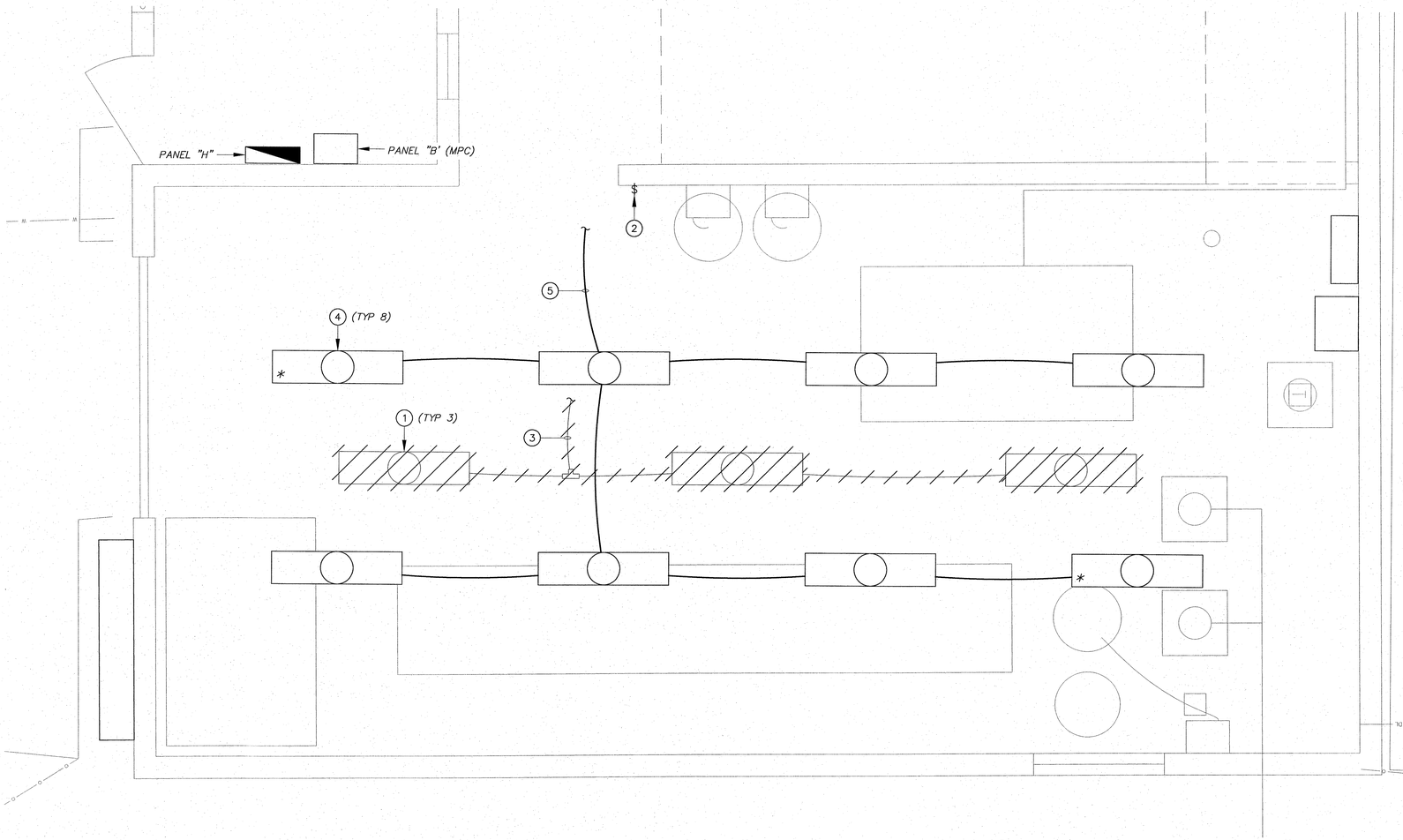
SHEET E7

GENERAL NOTES

A. ALL EXPOSED CONDUITS TO BE TYPE EMT, MINIMUM SIZE 3/4".
B. ALL BRANCH CIRCUIT CONDUCTORS TO BE STRANDED COPPER TYPE THHN.
D. SEE SHEET E5 FOR CONDUIT AND CONDUCTOR SCHEDULE.
E. FURNISH AND INSTALL 3/4" CONDUITS, FITTINGS, PULL BOX, ETC AS REQUIRED FOR LUMINAIRES. USE #12 AWG CONDUCTORS WITH #12 AWG GND FOR 15A AND 20A CIRCUITS. DO NOT EXCEED 4 CURRENT CARRYING CONDUCTORS PER CONDUIT.

KEY NOTES

1. DEMOLISH EXISTING LUMINAIRES, CONDUIT AND CONDUCTORS BETWEEN LUMINAIRES.
2. EXISTING LIGHT SWITCH, CONDUIT AND CONDUCTORS TO WIREWAY ABOVE DOOR TO REMAIN UNDISTURBED.
3. TEMPORARILY REMOVE EXISTING SWITCH LEG CONDUCTORS BACK TO WIREWAY ABOVE DOOR.
4. INSTALL NEW LUMINAIRES TO STEEL ROOF STRUCTURAL SUPPORTS USING SELF-TAPPING SCREWS.
5. INSTALL CONDUIT FROM WIREWAY ABOVE DOOR TO LUMINAIRE. REPULL EXISTING SWITCH LEG NEUTRAL AND GROUND AND EXTEND TO OTHER SEVEN LIGHTS.



LUMINAIRE SCHEDULE

SYMBOL	VOLTS	LAMP(S)	FIXTURE	DESCRIPTION	MANUFACTURER
	120V	32-38W LED 4000K		LED, 48" LONG SURFACE MOUNTED LUMINAIRE WITH POLYCARBONATE LENS. LUMINAIRE TO BE WHITE IN COLOR.	LITHONIA (ZL2N-L48-3000LM-MDD-MVOLT-40K-80CRI-WH) OR APPROVED EQUAL

0 2 4 6

SCALE IN FEET

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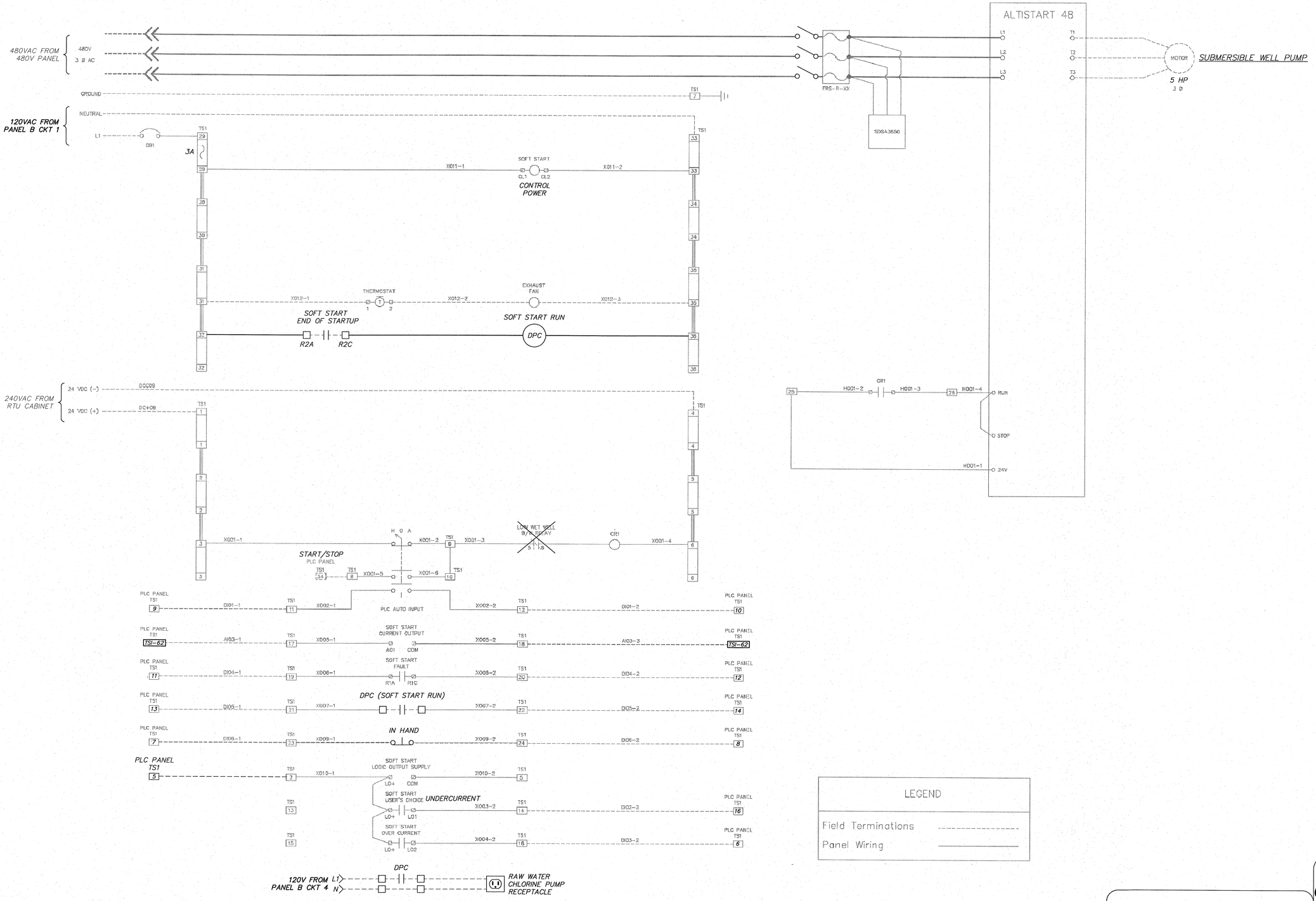
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

ENLARGED TREATMENT ROOM LIGHTING PLAN

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E8



LEGEND	
Field Terminations	----------
Panel Wiring	————

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for the NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

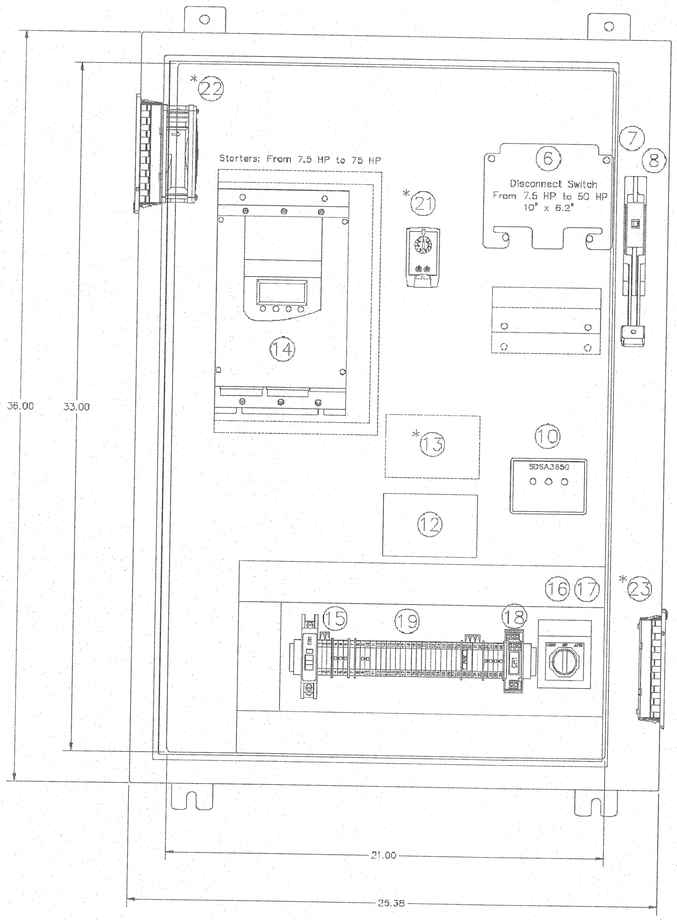
NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

WELL PUMP MOTOR CONTROL SCHEMATIC

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E9

Saved: August 20, 2018 File: 16066-E9.dwg Drafter: Brandon Rickerd



BILL OF MATERIALS

ITEM	QTY	PART NO.	DESCRIPTION	MFG
1	1 or 1	SCE-36SA2610LPPL A-36SA2610LPPL	SINGLE-DOOR TYPE 12 ENCLOSURE SINGLE DOOR TYPE 12 ENCLOSURE	SAGINAW HOFFMAN
2	1 or 1	SCE-36P24 A-36P24	BACKPLANE BACKPLANE	SAGINAW HOFFMAN
3	1	E2X4LG6	2X4 WIRING DUCT	PANDUIT
4	1	C2LG6	2" DUCT COVER	PANDUIT
5	1	1492DR6	EXTENDED DIN RAIL	ALLEN BRADLEY
6	1	REFER TO TABLE 1	DISCONNECT	SQUARE D
7	1	9422-A1	HANDLE	SQUARE D
8	1	9422	DOOR MOUNT	SQUARE D
9	3	REFER TO TABLE 1	480V DISCONNECT FUSE	BUSSMAN
10	1	SDSA3650	SECONDARY SURGE ARRESTER	SQUARE D
11	.	.	.	.
12	1	XMO40V02	CLASS 8501-TYPE X 20 A RELAY	SQUARE D
13*	1	1500-G-L1-S7	INDUCTION CONTROL RELAY	B/W CONTROL
14	1	REFER TO TABLE 1	ALTISTART 48	SQUARE D
15	1	QOU115	15A CIRCUIT BREAKER	SQUARE D
16	1	9001KS43BH2	HOA	SQUARE D
17	1	KN150WP	HOA LEGEND PLATE	SQUARE D
18	2	UMK22-REL24	DPDT 24 DC RELAY	PHOENIX CONTACT
19	44	UK5 N	UK5 N TERMINALS	PHOENIX CONTACT
20	1	USLKG5	GROUND TERMINAL	PHOENIX CONTACT
21*	1	FLZ 53C	THERMOSTAT	PFANNENBERG
22*	1	PF 22000	FAN FILTER KIT	PFANNENBERG
23*	1	PFA 20000	LOUVER FILTER KIT	PFANNENBERG

13 - WILL BE USED IF THERE IS NO SUBMERSIBLE TRANSMITTER AVAILABLE..*
21,22*,23* - WILL BE USED ON ALL INDOOR APPLICATIONS..*

TABLE 1 - ADDITIONAL PART NUMBERS

STARTER	APPLICATION	ALTISTART 48	DISCONNECT	DISCONNECT FUSE	
10 HP	5 HP	ATS48D17Y	TCF33	FRS-R-15	THIS PROJECT
15 HP	10 HP	ATS48D22Y	TCF33	FRS-R-30	
20 HP	15 HP	ATS48D32Y	TDF63	FRS-R-40	
25 HP	20 HP	ATS48D38Y	TDF63	FRS-R-45	
30 HP	25 HP	ATS48D47Y	TDF63	FRS-R-60	
40 HP	30 HP	ATS48D62Y	TEF10	FRS-R-70	
50 HP	40 HP	ATS48D75Y	TEF10	FRS-R-90	
60 HP	50 HP	ATS48D88Y	TEF10	FRS-R-110	

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30025
DARWIN REYNOLDS
12/21/18
Date Signed
ARIZONA, U.S.A.
Expires 3/31/20

NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

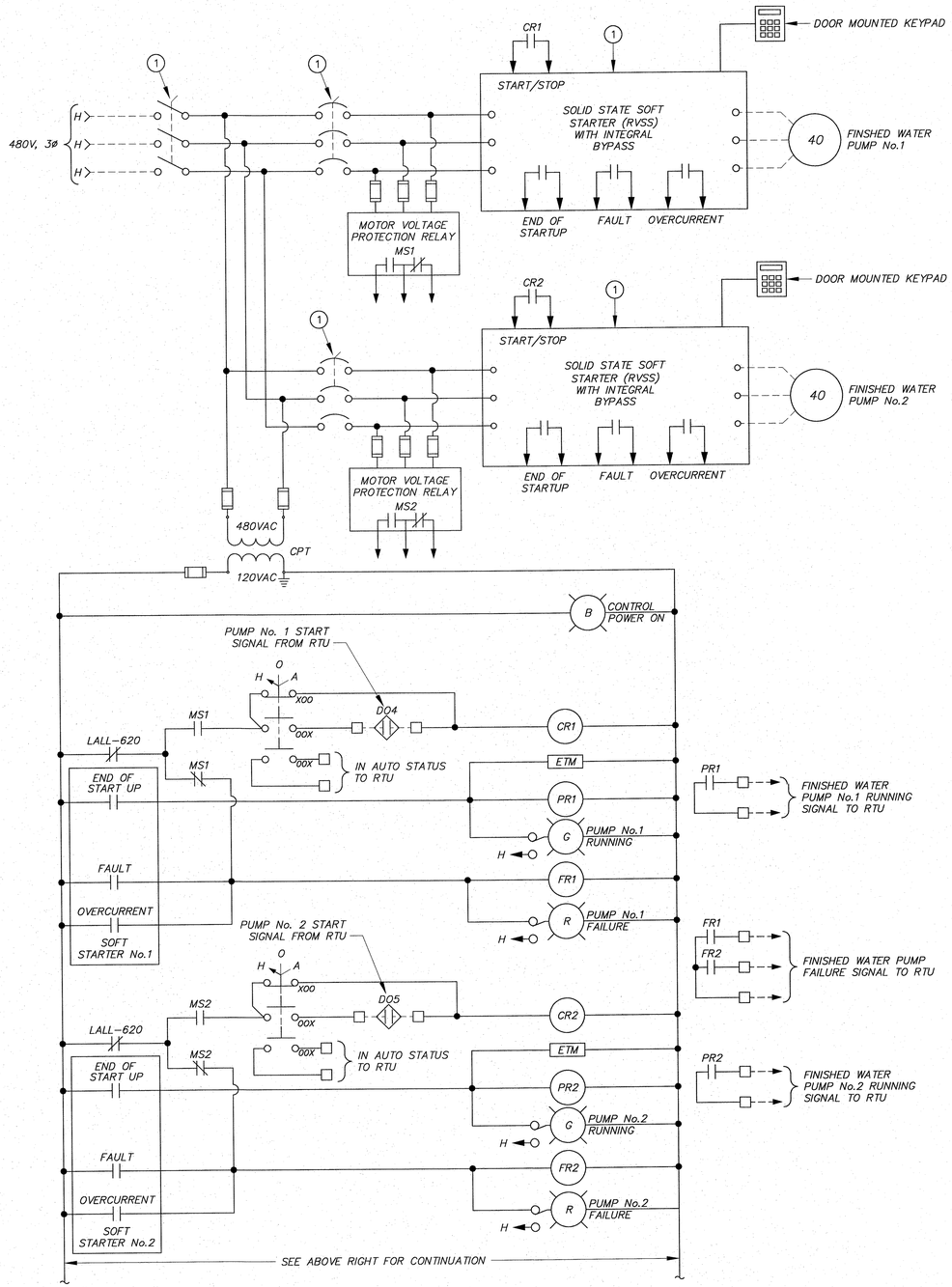
WELL PUMP CONTROL PANEL
SCHEMATIC DIAGRAM

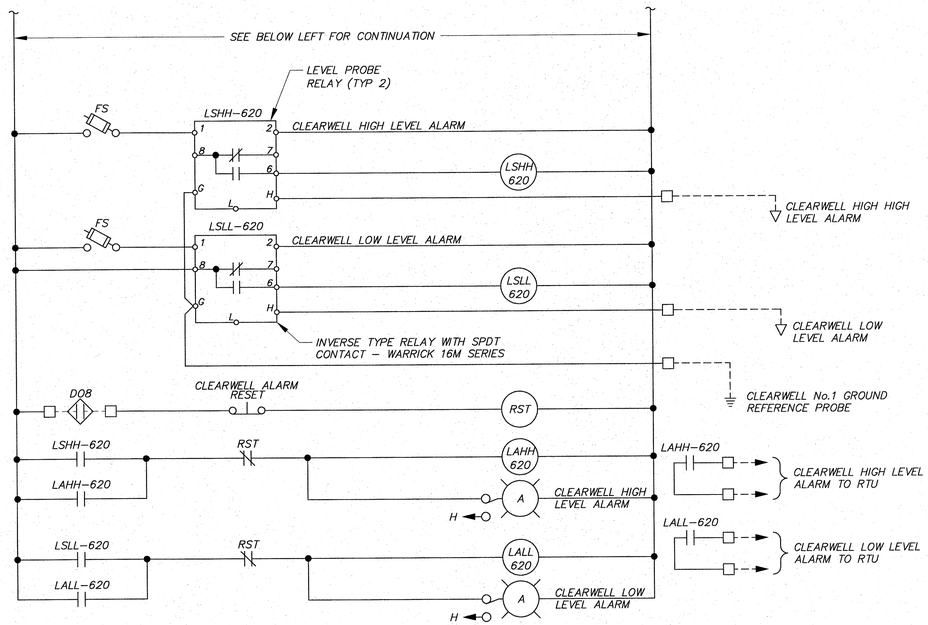
SCALE: AS SHOWN
DATE: DECMEBER 2018
DRAWN BY: BB
CHECKED BY: JLG

SHEET
E10

KEY NOTE

(1) SIZE OVERCURRENT PROTECTIVE DEVICES, CONDUCTORS AND SOFT STARTERS FOR 50 HP MOTORS FUTURE MAX PUMP SIZE) WHILE ALSO PROTECTING 40 HP MOTORS.





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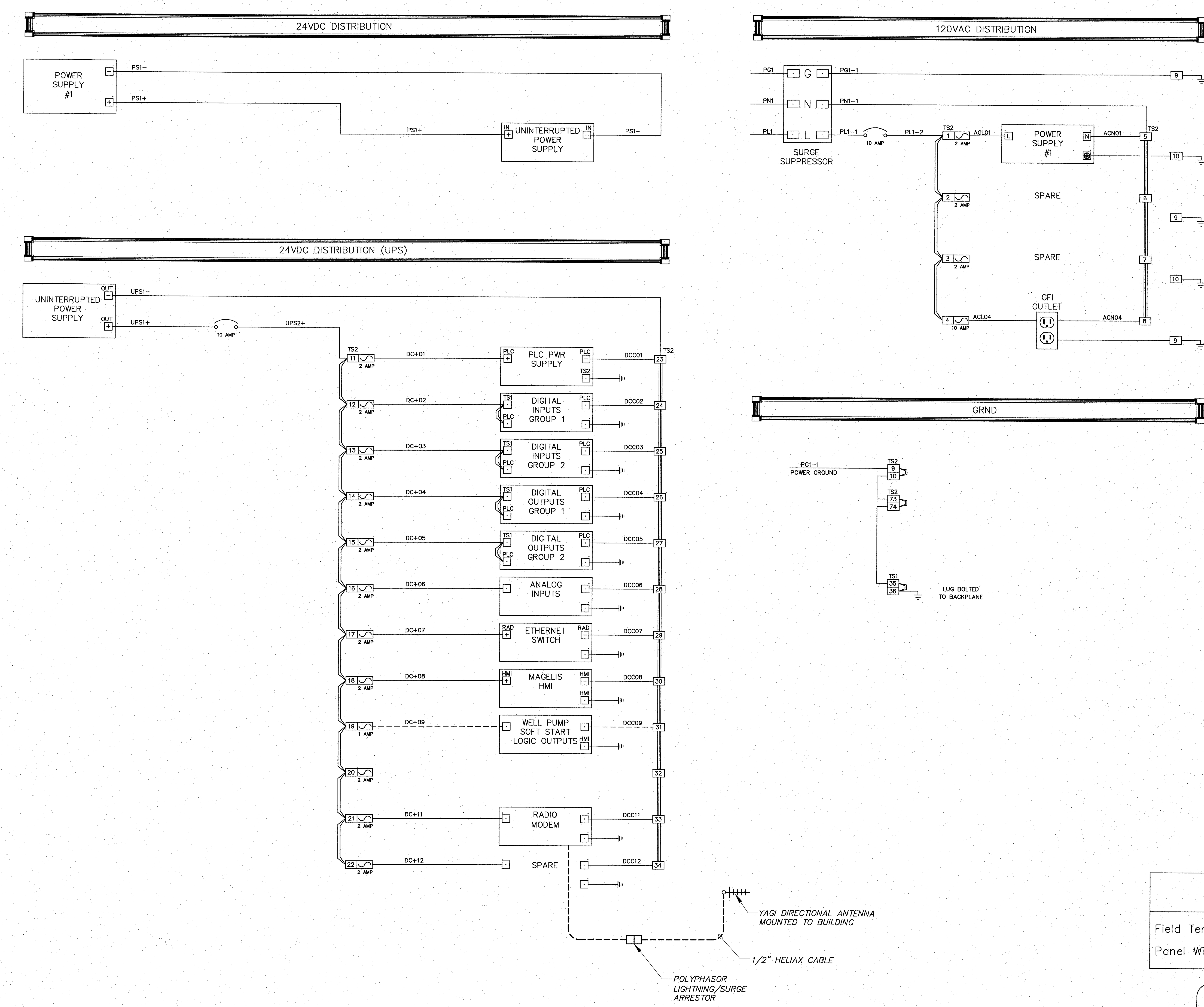
NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

FINISHED WATER PUMP CONTROL PANEL SCHEMATIC

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E11



LEGEND

Field Terminations	- - - - - - - - - -
Panel Wiring	————————

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NO.	BY	DATE	

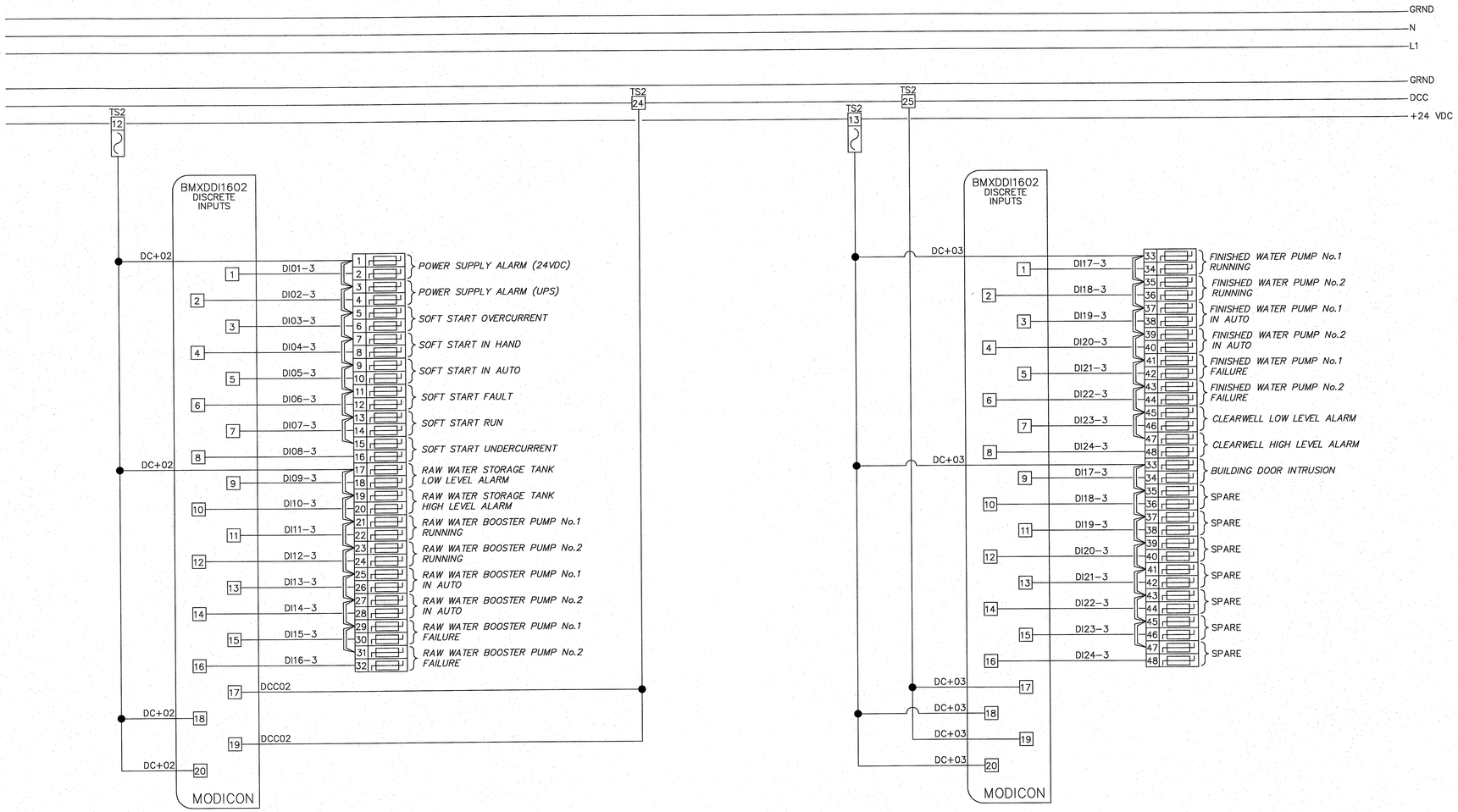
NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

RTU SCHEMATIC DIAGRAM
POWER

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
E12

POWER DISTRIBUTION ON THIS PAGE REFLECTS "LOGICAL" SCHEMATIC. SEE "DC DISTRIBUTION" DRAWING AND "AC DISTRIBUTION" DRAWING FOR POINT TO POINT TERMINATIONS.



LEGEND	
Field Terminations	- - - - - - - - - - - -
Panel Wiring	———————

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FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

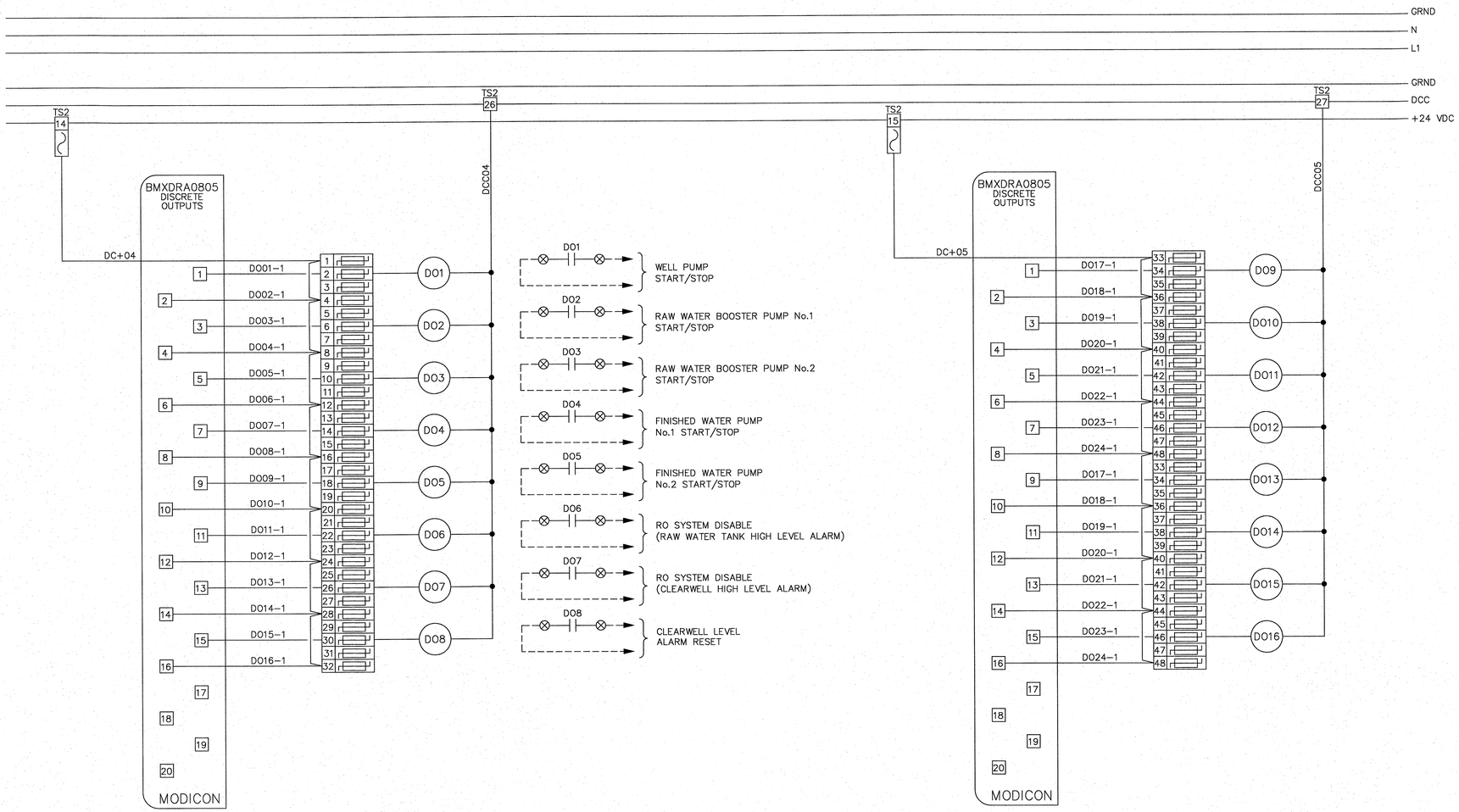
NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

RTU SCHEMATIC DIAGRAM
DISCRETE INPUTS

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET E13

POWER DISTRIBUTION ON THIS PAGE REFLECTS "LOGICAL" SCHEMATIC. SEE "DC DISTRIBUTION" DRAWING AND "AC DISTRIBUTION" DRAWING FOR POINT TO POINT TERMINATIONS.



LEGEND	
Field Terminations	- - - - - - - - - - - -
Panel Wiring	————————

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NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

RTU SCHEMATIC DIAGRAM
DISCRETE OUTPUTS

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
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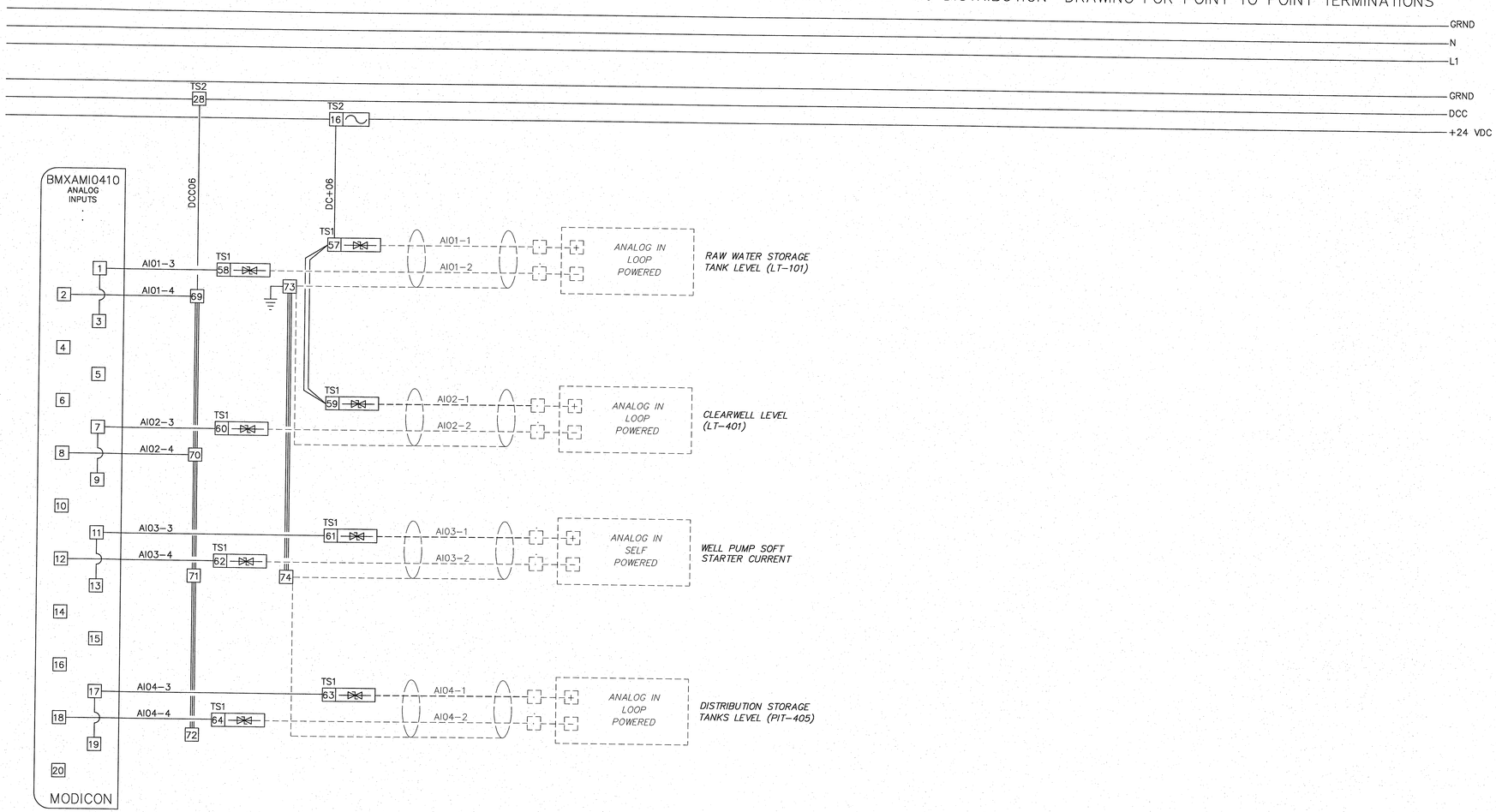
SHEET E14

POWER DISTRIBUTION ON THIS PAGE REFLECTS "LOGICAL" SCHEMATIC. SEE "DC DISTRIBUTION" DRAWING AND "AC DISTRIBUTION" DRAWING FOR POINT TO POINT TERMINATIONS



LEGEND	
Field Terminations	- - - - - - - - - - - -
Panel Wiring	———————

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DARWIN
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6/12/21/18
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Expires 3/31/20

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FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

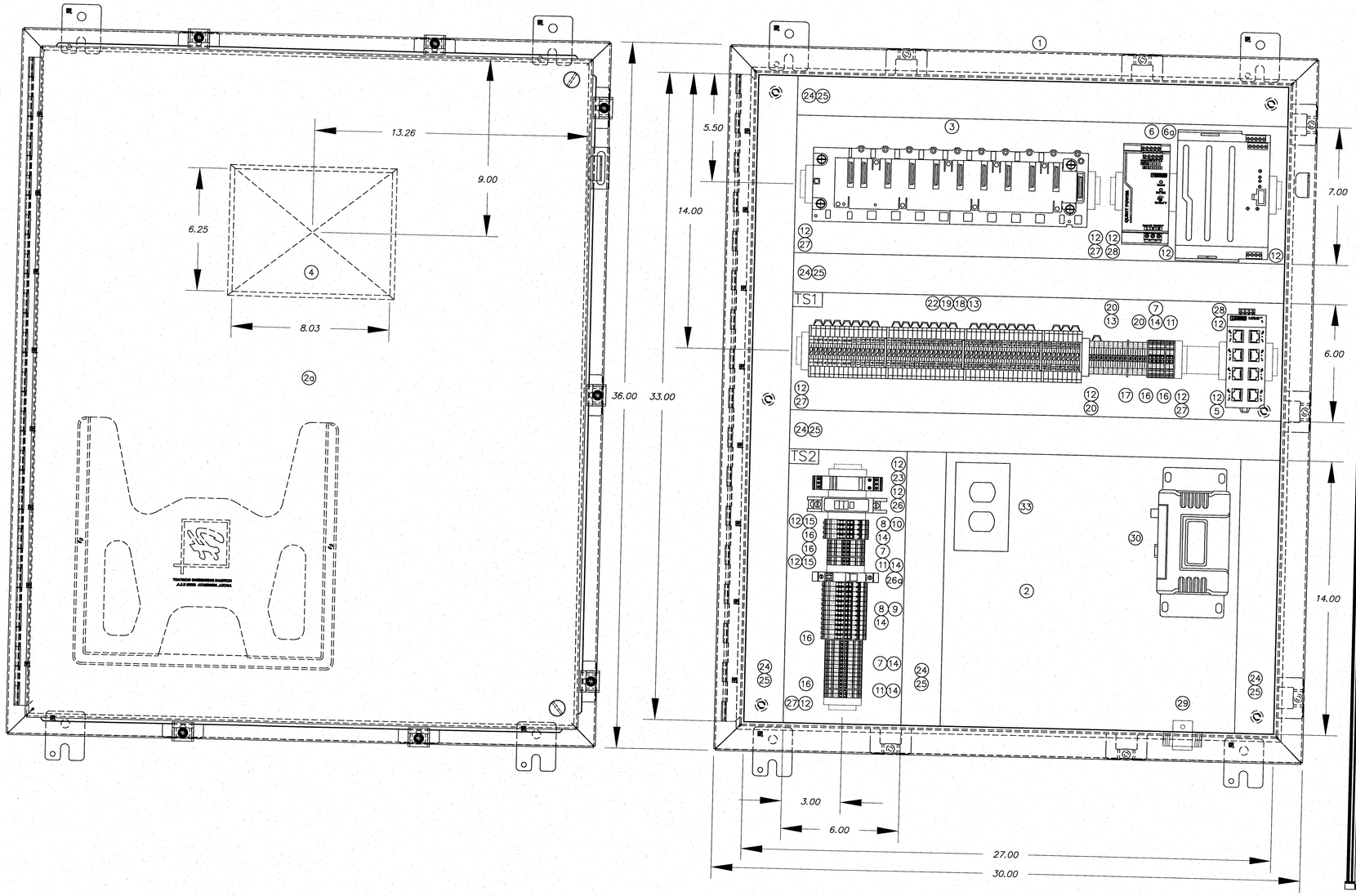
NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

RTU SCHEMATIC DIAGRAM
ANALOG INPUTS

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
E15

Saved: August 20, 2018 File: 16066-E15.dwg Drafter: Brandon Rickerd



BILL OF MATERIALS

ITEM	QTY	PART NO.	DESCRIPTION	MFG
1	1	A-36H30DLP	SINGLE-DOOR TYPE 4 ENCLOSURE	HOFFMAN
2	1	A-36P30	BACKPLANE	HOFFMAN
2a	1	A-NADFK	SWING OUT PANEL KIT	HOFFMAN
3*	.	M340	MODICON M340 BOM	MODICON
3a	1	BMXXBM0800	8-SLOT RACK MODULE	MODICON
3b	1	BMXCPS3020	POWER SUPPLY MODULE	MODICON
3c	1	BMX342020	CPU PROCESSOR MODULE	MODICON
3d	2	BMXDDI1602	DIGITAL INPUT MODULE	MODICON
3e	2	BMXDDO1602	DIGITAL OUTPUT MODULE	MODICON
3f	1	BMXAMI0410	ANALOG INPUT MODULE	MODICON
3g	–	–	–	–
3h	4	BMXFTB2010	REMOVABLE CONNECTION BLOCK – SCREW CLAMP	MODICON
4	1	HMIGTO4310	7.5 GRAPHIIC TERMINAL TOUCHSCREEN (MAGELIS)	SCHNEIDER ELECTRIC
5	1	FL SWITCH SFN 8TX	INDUSTRIAL EHTERNET SWITCH	PHOENIX CONTACT
6	1	QUINT-PS/1AC/ 24DC/10	POWER SUPPLY 22.5-28.5V ADJUSTABLE	PHOENIX CONTACT
6a	1	QUINT-UPS/24DC /24DC/10/3.4AH	UNINTERRUPTIBLE POWER SUPPLY	PHOENIX CONTACT
7	AN	UT2,5	UT2,5 TERMINALS	PHOENIX CONTACT
8	AN	UT4TG	FUSE TERMINAL BASE	PHOENIX CONTACT
9	AN	P-FU5X20LED24	FUSE PLUG	PHOENIX CONTACT
10	AN	P-FU5X20LA250	FUSE PLUG	PHOENIX CONTACT
11	AN	UT2,5PE	GROUNDING TERMINAL	PHOENIX CONTACT
12	15	E/NS35N	END CLAMP	PHOENIX CONTACT
13	4	FBI 20-6 BU #3032208	FIXED BRIDGE	PHOENIX CONTACT
14	4	FBS 20-5 BU #3036929	INSERTION BRIDGE	PHOENIX CONTACT
15	AN	D-UT2,5/10	END COVER	PHOENIX CONTACT
16	AN	ATP-UT	PARTITION PLATES	PHOENIX CONTACT
17	AN	ATP-UK	PARTITION PLATES	PHOENIX CONTACT
18	AN	DP-UKK3/5BK #2770833	SLKK5 SPACER PLATE	PHOENIX CONTACT
19	AN	D-UKK3/5BK #2770228	SLKK5 ENDCOVER	PHOENIX CONTACT
20	AN	TT-UK5/24DC #2794699	TERMITRAB UK5 W/SUPPRESSOR DIODE	PHOENIX CONTACT
21	AN	D-TERMITRAB UK5	END COVER	PHOENIX CONTACT
22	AN	TT-SLKK5/24DC #2794903	TERMITRAB SLKK5 W/VARISTOR 24DC (MOV)	PHOENIX CONTACT
23	1	PT2PE/S120FM	TERMITRAB AC SURGE PROTECTION	PHOENIX CONTACT
24	AN	F2X4LG6	TYPE F NARROW SLOT WIRING DUCT	PANDUIT
25	AN	C2LG6	WIRING DUCT COVER	PANDUIT
26	1	TMC 61C 10A #0902072	CIRCUIT BREAKER	PHOENIX CONTACT
26a	1	UT6-TMCM 10A #0916610	CIRCUIT BREAKER	PHOENIX CONTACT
27	AN	1492DR6	EXTENDED DIN RAIL	ALLEN BRADLEY
28	AN	1492-DR5	DIN RAIL	ALLEN BRADLEY
29	1	IS-50NX-C2	LIGHTNING ARRESTER	POLYPHASER
30	1	ORBIT OR TRANSNET	902 – 928 MHz RADIO SPREAD SPECTRUM	GEMDS
31	2	CAT6	ETHERNET PATCH CABLE (4' – BLACK)	BELDEN
32	1	.	CABLE – PLC TO MODEM (TO LENGTH)	.
33	1	DRUBGFI15	DIN RAIL UTILITY BOX	HUBBELL

AN – As needed
3* – BOM – To include items 3a–3h.

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for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

RTU CABINET LAYOUT & BOM

DARCOR ELECTRICAL CONSULTING ENGINEERS
7600 N. 16TH ST.
SUITE 212
PHOENIX, AZ 85020
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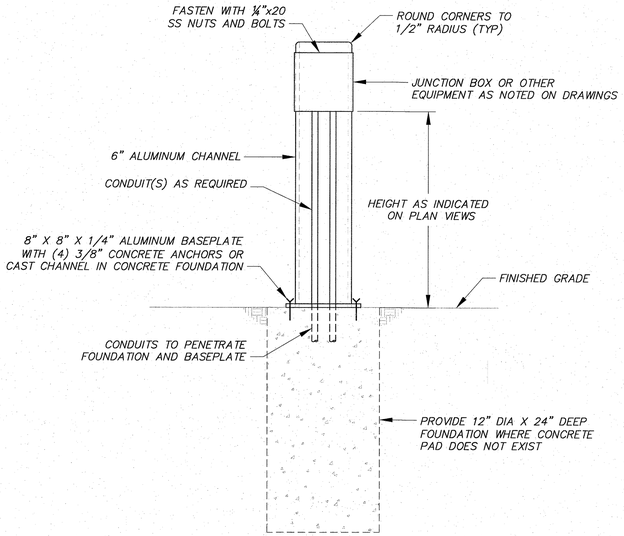
WWW.DARCORINC.COM

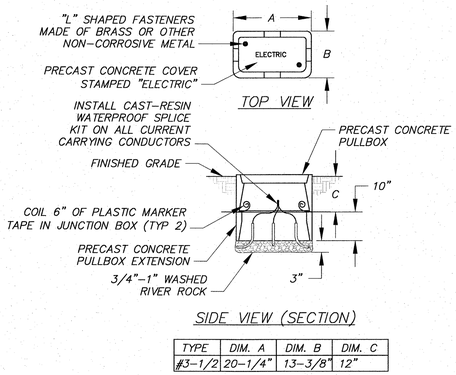
Registered Professional Engineer Certificate
30025
DARWIN
REYNOLDS
Date Signed 12/21/18
ARIZONA, U.S.A.
Expires 3/31/20

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
E16



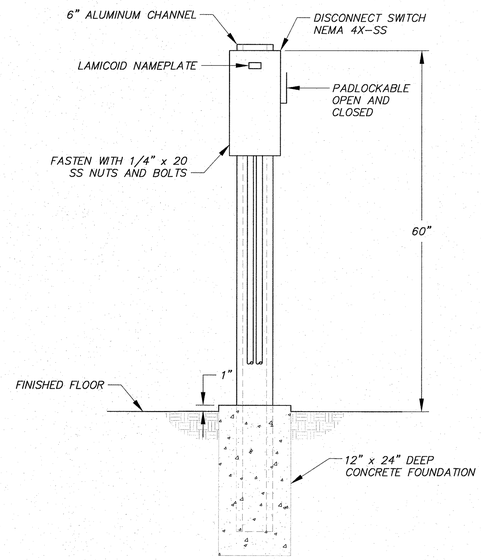
JB1 TYP — MOUNTING STAND DETAIL
NTS



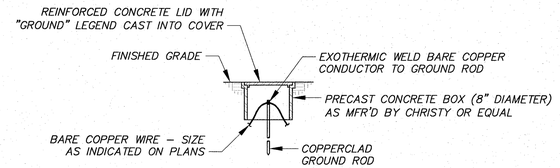
SIDE VIEW (SECTION)

TYPE	DIM. A	DIM. B	DIM. C
#3-1/2	20-1/4"	13-3/8"	12"

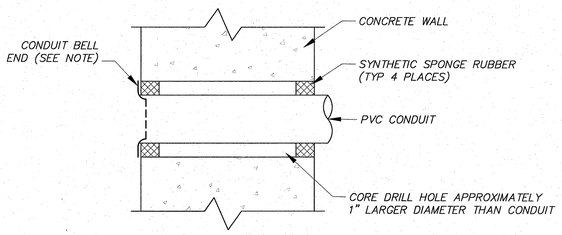
UJB TYP — TYPICAL UNDERGROUND JUNCTION BOX DETAIL
NTS



D — TYPICAL DISCONNECT SWITCH MOUNTING DETAIL
NTS

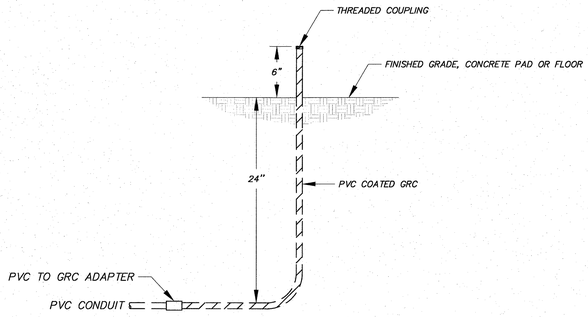


GRW TYP — TYPICAL GROUND ROD AND WELL DETAIL
NTS



NOTE: WHERE CONDUIT TERMINATES IN VAULT, HANDHOLE, WETWELL, ETC., INSTALL A CONDUIT BELL END ON END OF CONDUIT, UNLESS OTHERWISE INDICATED.

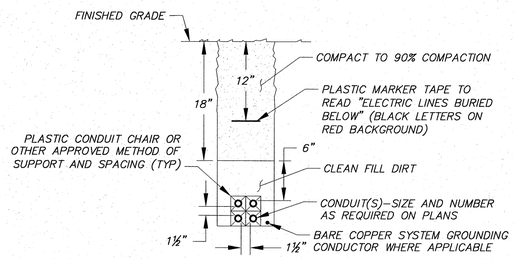
CWP TYP — TYPICAL CONCRETE WALL PENETRATION DETAIL
NTS



NOTES:

1. ALL DIMENSIONS INDICATED ABOVE ARE MINIMUM.
2. MAINTAIN 12" SEPARATION BETWEEN 480V CONDUITS AND LOW VOLTAGE CONDUITS.
3. THIS DETAIL DOES NOT APPLY TO UTILITY DUCTBANKS.
4. THIS DETAIL APPLIES IN ALL CASES WHETHER SPECIFICALLY REFERRED TO OR NOT.
5. PVC CONDUIT MAY STUBUP TO FREE-STANDING ELECTRICAL EQUIPMENT. INSTALL BELL ENDS FLUSH WITH BOTTOM OF ENCLOSURE.

CSD TYP — TYPICAL CONDUIT STUBUP DETAIL
NTS



NOTES:

1. ALL DIMENSIONS INDICATED ABOVE ARE MINIMUM.
2. SPARE CONDUITS MUST BE LOCATED ON TOP OF DUCTBANKS.
3. THIS DETAIL APPLIES IN ALL CASES WHETHER SPECIFICALLY REFERRED TO OR NOT.
4. THIS DETAIL DOES NOT APPLY TO UTILITY DUCTBANKS.

UDB TYP — TYPICAL UNDERGROUND CONDUIT DUCTBANK DETAIL
NTS

DARCOR ELECTRICAL CONSULTING ENGINEERS
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Professional Engineer CERTIFICATE 30025 DARWIN REYNOLDS Date Signed 12/21/18 ARIZONA, U.S.A. Expires 3/31/20

DePAULI ENGINEERING & SURVEYING LLC
- CIVIL ENGINEERS AND LAND SURVEYORS -
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NTUA
HALCHITA WATER TREATMENT PLANT
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ELECTRICAL EQUIPMENT ELEVATIONS AND DETAILS

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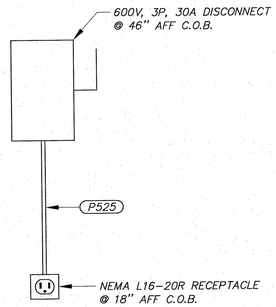
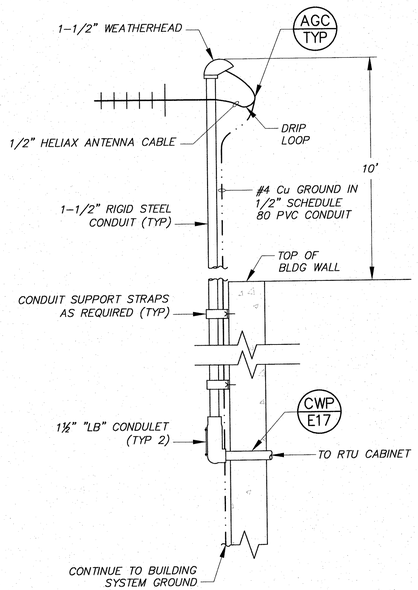
SHEET E17

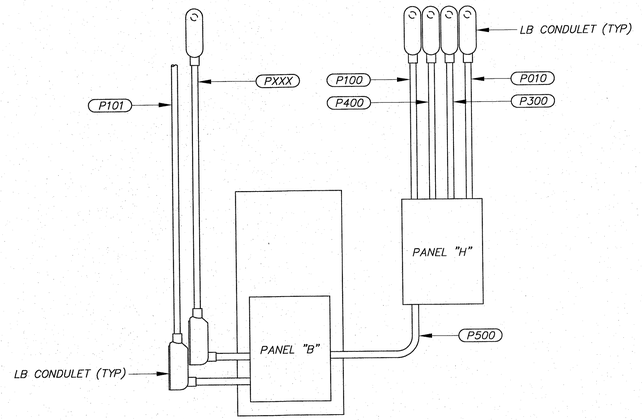
Saved: August 20, 2018 File: 16066-E17.dwg Drafter: Brandon Rickerd



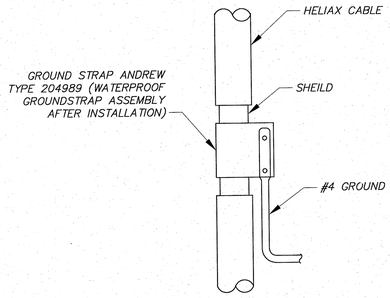
DR E7 480V DISCONNECT AND RECEPTACLE DETAIL
NTS



ANT TYP TREATMENT BUILDING RTU ANTENNA DETAIL
NTS



AA E7 PANEL "H" AND PANEL "B" ELEVATION
NTS



AGC TYP RTU ANTENNA FEEDLINE GROUNDING DETAIL
NTS

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SHEET E18

Saved: August 20, 2018 File:16066-E18.dwg Drafter:Brandon Rickerd

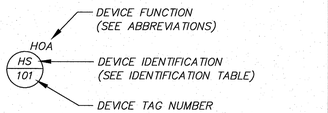
INSTRUMENT IDENTIFICATION TABLE

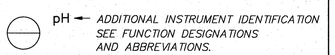
	FIRST LETTER	SUCCEEDING LETTER(S)	
	MEASURED VARIABLE	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS	ALARM	
B	BURNER , COMBUSTION		
C	CONDUCTIVITY	CONTROL	CLOSED
D	DENSITY	DIFFERENTIAL	
E	VOLTAGE	PRIMARY ELEMENT	
F	FLOW RATE	FAILURE	FAST
G	GAUGE	GLASS, VIEWING DEVICE	
H	HAND (MANUAL)		HIGH
I	CURRENT (ELECTRICAL)	INDICATE	
J	POWER		
K	TIME, RATE OF CHANGE		
L	LEVEL		LOW
M	MOTION		MIDDLE
N	INTRUSION		NORMAL
O	TORQUE		OPEN
P	PRESSURE, VACUUM		
Q	QUANTITY	INTEGRATE, TOTALIZE	
R	RADIATION	RECORD OR PRINT	
S	SPEED, FREQUENCY	SWITCH	SLOW
T	TEMPERATURE	TRANSMIT	
U	MULTIVARIABLE	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION	VALVE, LOUVER	
W	WEIGHT, FORCE	WELL	
X	UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, PRESENCE	RELAY, COMPUTE, CONVERT	
Z	POSITION	DRIVER, ACTUATOR,	

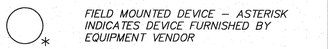
ABBREVIATIONS

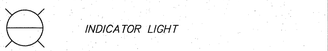
AI	ANALOG INPUT
AO	ANALOG OUTPUT
CV	CONTROL VALVE
D	DECANT WATER
DCS	DISTRIBUTED CONTROL SYSTEM
DI	DIGITAL INPUT
DO	DIGITAL OUTPUT
DS	DIGESTED SLUDGE
(E)	EXISTING
ETM	ELAPSED TIME METER
FA	FOUL AIR
FC	FAIL CLOSED
FE	FINAL EFFLUENT
FeCL2	FERROUS CHLORIDE
F/S	FAST/SLOW
GS	GRIT SLURRY
HOA	HAND–OFF–AUTO
HOR	HAND–OFF–REMOTE
HS	HYDRAULIC SUPPLY
HMI	HUMAN MACHINE INTERFACE
I/O	INPUT/OUTPUT
IAS	INSTRUMENT AIR SUPPLY
L/R	LOCAL/REMOTE
LAN	LOCAL AREA NETWORK
LCP	LOCAL CONTROL PANEL
M/A	MANUAL/AUTO
MCC	MOTOR CONTROL CENTER
MMI	MAN MACHINE INTERFACE
MH	MANHOLE
NaOCL	SODIUM HYPOCHLORITE
NPW	NON POTABLE WATER
NS	NITROGEN SUPPLY
NaHSO3	SODIUM BISULFITE
NTU	TURBIDITY
OF	OVER FLOW
OIS	OPERATOR INTERFACE STATION
OL	OVERLOAD
OT	OVERTORQUE
O/O	ON/OFF (MAINTAINED)
PCP	PROCESS CONTROL PANEL
PI	PROCESS INFLUENT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PS	PRIMARY SLUDGE
RAS	RETURN ACTIVATED SLUDGE
RF	RADIO FREQUENCY
RIO	REMOTE INPUT/OUTPUT
RS	RAW SEWAGE
RST	RESET
SBR	SEQUENCING BATCH REACTOR
SLC	SINGLE LOOP CONTROLLER
SP	SET POINT
SPD	SPEED
SPC	SET POINT CONTROL
S/S	START/STOP (MOMENTARY)
SSS	SOLID STATE SOFT STARTER
UW	UTILITY/PROCESS WATER
VFD	VARIABLE FREQUENCY DRIVE
WAS	WASTE ACTIVATED SLUDGE
1/2/B	PUMP 1/PUMP 2/BOTH

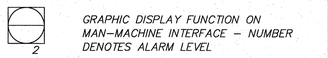
INSTRUMENT SYMBOLS

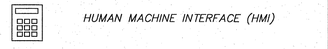


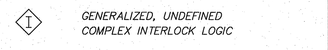




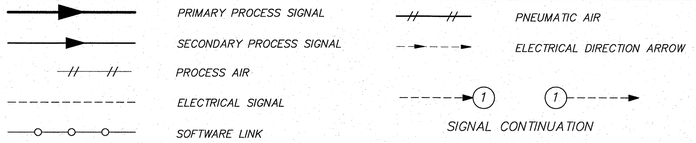




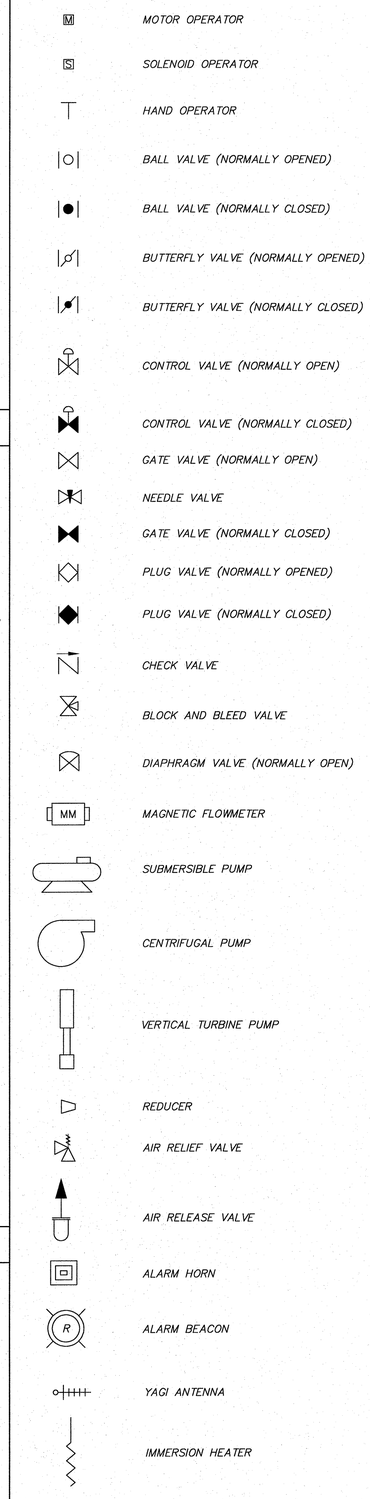


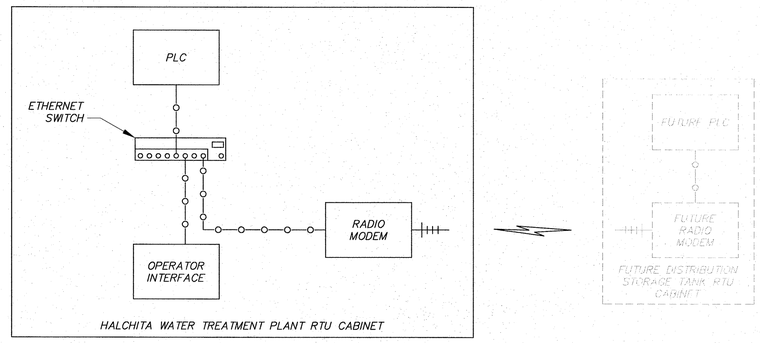


INSTRUMENT LINES



PROCESS FLOW AND MECHANICAL EQUIPMENT SYMBOLS





SCADA BLOCK DIAGRAM

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NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

P&ID
SYMBOLS AND ABBREVIATIONS

SCALE:	AS SHOWN
DATE:	DECMEBER 2018
DRAWN BY:	BB
CHECKED BY:	JLG

SHEET
I1

RTU CABINET

OPERATOR INTERFACE

SOFT START OVERCURRENT
SOFT START IN HAND
SOFT START FAULT
SOFT START CURRENT
SOFT START RUN
SOFT START UNDERCURRENT
RAW WATER STORAGE TANK LOW LEVEL ALARM
RAW WATER STORAGE TANK HIGH LEVEL ALARM
RAW WATER STORAGE TANK LEVEL INDICATION/TRENDING
RAW WATER STORAGE TANK LOW LEVEL WARNING SETPOINT
RAW WATER STORAGE TANK HIGH LEVEL WARNING SETPOINT
RAW WATER STORAGE TANK LOW LEVEL WARNING
RAW WATER STORAGE TANK HIGH LEVEL WARNING
WELL PUMP START LEVEL SETPOINT
WELL PUMP STOP LEVEL SETPOINT
RAW WATER BOOSTER PUMP No.1 RUNNING
RAW WATER BOOSTER PUMP No.1 IN AUTO
RAW WATER BOOSTER PUMP No.1 FAILURE
RAW WATER BOOSTER PUMP No.2 RUNNING
RAW WATER BOOSTER PUMP No.2 IN AUTO
RAW WATER BOOSTER PUMP No.2 FAILURE

PROGRAMMABLE LOGIC CONTROLLER (PLC)

OVERCURRENT
IN HAND
FAULT
START/STOP
CURRENT
RUN
UNDERCURRENT
LOW LEVEL
HIGH LEVEL
LEVEL (4-20mA)
PUMP No.1 START/STOP
PUMP No.2 START/STOP
PUMP No.1 RUNNING
PUMP No.1 IN AUTO
PUMP No.1 FAILURE
PUMP No.2 RUNNING
PUMP No.2 IN AUTO
PUMP No.2 FAILURE

PUMP STARTER
ETM KIQ 100
HOA HS 100A
RUN YI 100
FAULT UA 100
PAH 100
HS 100B RST
KEYPAD

TYPICAL OF 3 SIGNALS

CONDUCTIVITY LEVEL PROBES AND HOLDER

LE 101

LT 101

SUBMERSIBLE LEVEL TRANSMITTER (0-12FT)

RAW WATER STORAGE TANK

DRAIN TO SETTLING POND

WELL PUMP

CHLORINE TANK

METERING PUMP

PACKAGED PUMP CONTROL PANEL

PSH 110
PI 110
PSH 120
PI 120

PUMP No.1

PUMP No.2

* PACKAGED RAW WATER BOOSTER PUMP SKID

SURGE TANK

BFV-217

PACKAGED MEDIA FILTER SYSTEM JUNCTION BOX (JB-291)

SIGNALS TO/FROM R.O. SYSTEM CONTROL PANEL

PT 261
PI 201 0-100 PSI

FIT 251A
FE 251A
MM

FIT 251B
FE 251B
MM

PI 202A
PI 202B
PI 203A
PI 203B

MEDIA FILTER MFC-225A

MEDIA FILTER MFC-225B

PT 262
PI 204

I3 TO PACKAGED R.O. SYSTEM SKID

BACKWASH OUTLET

* PACKAGED MEDIA FILTER SYSTEM SKID

BACKWASH

I3 FROM DISTRIBUTION STORAGE TANKS

* INDICATES EQUIPMENT THAT IS FURNISHED BY ADEDGE.

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RAW WATER SUPPLY P&ID

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CHECKED BY: JLG

SHEET I2

RTU CABINET

OPERATOR INTERFACE

RAW WATER STORAGE TANK LOW LEVEL ALARM

COMMUNICATION FAILURE

CLEARWELL HIGH LEVEL ALARM

PROGRAMMABLE LOGIC CONTROLLER (PLC)

RO SYSTEM DISABLE

MODBUS TCP/IP

RO SYSTEM DISABLE

PACKAGED R.O. SYSTEM CONTROL PANEL *
(MCP-291)

SIGNALS TO/FROM MEDIA FILTER SYSTEM J-BOX

FIT 303 *
FE 303 *
MM *

LOCATED ON HYDRAULIC PANEL

RECIRCULATION LINE

PIT 305 *
PT 305 *
PI 305 *
BLV-309 *

REJECTED WATER LINE

FIT 305 *
FE 305 *
MM *

14 TO SETTLING PONDS

R.O. MEMBRANE (TYP 3)

RMH-303 *

RMH-302 *

RMH-301 *

PIT 303 *
PT 303 *
PI 308 * 0-100PSI

PSH 301 *

CLEAN IN PLACE

CONNECTION FOR PORTABLE CLEAN IN PLACE UNIT

FIT 304 *
FE 304 *
MM *

AIT 302 *
AE 302
PI 310
AIT 303 *
AE 303

14 TO CLEARWELL

AIT 301 *
AE 301
BFV-301 *

12 FROM PACKADED MEDIA FILTER SYSTEM SKID

FIT 302 *
FE 302 *
MM *

PI 305

PREFILTER * FLT-301

TI 301 *
PI 306

PSL 301 *

PI 361 *

RO HIGH PRESSURE PUMP

FIT 301 *
301 301 *
MM *

BYPASS/BLENDING

* PACKAGED R.O. SYSTEM SKID

12 TO MEDIA FILTER SKID

BACKWASH

14 FROM DISTRIBUTION STORAGE TANKS

SODIUM METABISULFITE *

METERING PUMP *

ANTISCALANT TANK *

METERING PUMP *

FINISHED WATER CHLORINE TANK

METERING PUMP

* INDICATES EQUIPMENT THAT IS PART OF A PACKAGED SYSTEM

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SHEET
I3

Saved: August 20, 2018 File: 16066-I3.dwg Drafter: Brandon Rickerd


RTU CABINET
OPERATOR INTERFACE
RO UNIT ENABLE LEVEL SETPOINT
RO UNIT DISABLE LEVEL SETPOINT
CLEAR WELL LEVEL INDICATION/TRENDING
CLEAR WELL LOW LEVEL WARNING SETPOINT
CLEAR WELL LOW LEVEL WARNING
CLEAR WELL HIGH LEVEL WARNING SETPOINT
CLEAR WELL HIGH LEVEL WARNING
CLEAR WELL LEVEL ALARM RESET
CLEAR WELL LOW LEVEL ALARM
CLEAR WELL HIGH LEVEL ALARM
FINISHED WATER PUMP No.1 IN AUTO
FINISHED WATER PUMP No.1 RUNNING
FINISHED WATER PUMP No.1 FAILURE
FINISHED WATER PUMP START LEVEL SETPOINT
FINISHED WATER PUMP STOP LEVEL SETPOINT
FINISHED WATER PUMP No.2 IN AUTO
FINISHED WATER PUMP No.2 RUNNING
FINISHED WATER PUMP No.2 FAILURE
DISTRIBUTION STORAGE TANK LOW LEVEL ALARM
DISTRIBUTION STORAGE TANK HIGH LEVEL ALARM
DISTRIBUTION STORAGE TANK LEVEL INDICATION/TRENDING
DISTRIBUTION STORAGE TANK LOW LEVEL WARNING SETPOINT
DISTRIBUTION STORAGE TANK HIGH LEVEL WARNING SETPOINT
DISTRIBUTION STORAGE TANK LOW LEVEL WARNING
DISTRIBUTION STORAGE TANK HIGH LEVEL WARNING
BUILDING DOOR INTRUSION ALARM
POWER SUPPLY ALARM (24VDC)
POWER SUPPLY ALARM (UPS)
PROGRAMMABLE LOGIC CONTROLLER (PLC)
RESET
LOW LEVEL
HIGH LEVEL
LEVEL (4-20mA)
PUMP No.1 START/STOP
PUMP No.1 IN AUTO
PUMP No.1 RUNNING
PUMP No.1 FAILURE
PUMP No.2 START/STOP
PUMP No.2 IN AUTO
PUMP No.2 RUNNING
PUMP No.2 FAILURE
LEVEL (4-20mA)
INTRUSION
ALARM
ALARM
JSL 406
24VDC POWER SUPPLY
JSL 407
UPS
MODBUS TCP/IP
RADIO MODEM
ANTENNA CABLE
(TO FUTURE TANK SITE RTU)
PUMP CONTROL PANEL
LAL 401
LAH 401
HS 401
RST
ETM
HOA
KIQ 402
HS 402
IAH 402
YI 402
TAH 402
CAH 402
HS 402
RST
ETM
HOA
KIQ 403
HS 403
IAH 403
YI 403
TAH 403
CAH 403
HS 403
RST
RVSS
YI 404
RVSS
DUPLEX PUMP CONTROLS
RVSS & KEYPAD (TYP 2)
NS 406A
NS 406B
NS 406C
NS 406D
NS 406E
BUILDING DOOR INTRUSION ALARM SWITCHES
PSH 402
PI 402
PIT 405
0-300 PSI
PSH 403
PI 403
CONDUCTIVITY LEVEL PROBES AND HOLDER
LE 402
FINISHED WATER PUMP NO.1
FINISHED WATER PUMP NO.2
I3
FILTERED WATER FROM R.O. FILTER PACKAGED SYSTEM SKID
SUBMERSIBLE LEVEL TRANSMITTER (0-6FT)
LT 401
CLEARWELL
I3
TO CIP UNIT AND MEDIA FILTER SKID
BACKWASH
DISTRIBUTION STORAGE TANK No.1
DISTRIBUTION STORAGE TANK No.2
TO THE TOWN OF MEXICAN HAT
* INDICATES EQUIPMENT THAT IS PART OF A PACKAGED SYSTEM

DARCOR ELECTRICAL CONSULTING ENGINEERS
7600 N. 16TH ST. SUITE 212 PHOENIX, AZ 85020
Ph: (602) 795-2699
WWW.DARCORINC.COM

30025 DARWIN REYNOLDS 12/21/18 ARIZONA U.S.A. Expires 3/31/20

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DePAULI ENGINEERING & SURVEYING LLC
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307 SOUTH 4th STREET GALLUP, NM 87301
TEL: (505)863-5440 WWW.DEPAULIENGINEERING.COM

for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

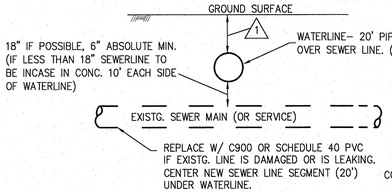
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
MEXICAN HAT, UTAH

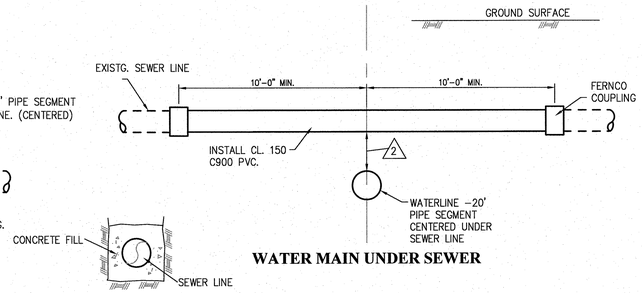
FILTERED WATER P&ID

SCALE: AS SHOWN
DATE: DECMEBER 2018
DRAWN BY: BB
CHECKED BY: JLG

SHEET I4

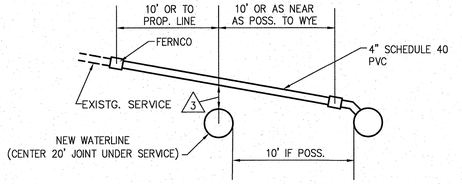


WATER MAIN OVER SEWER

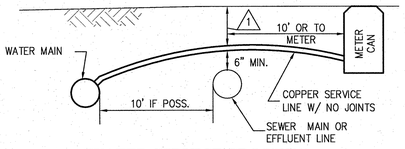


WATER MAIN UNDER SEWER

ENCASEMENT DETAIL



SEWER SERVICE CROSSING



WATER SERVICE CROSSING

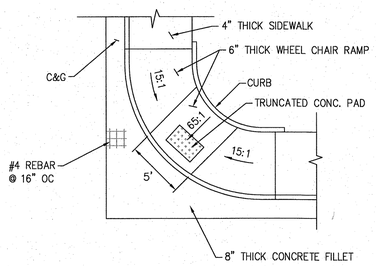
KEYED NOTES:

1. 1. 36" MIN. IF POSSIBLE
   2. 30" MIN. IF APPROVED BY THE ENGINEER
2. 1. 18" MIN. & ENCASE SEWER PAST COUPLINGS
3. 1. 6" MIN.

PROXIMITY OF WATER AND SEWER LINES: WHENEVER POSSIBLE IT IS DESIRABLE TO LAY PARALLEL WATER AND SEWER MAINS AT LEAST 10 FEET APART HORIZONTALLY WITH THE WATERLINE AT A HIGHER ELEVATION THAN THE SEWER. WHEN WATER AND SEWER LINES CROSS EACH OTHER, THE WATERLINE SHALL BE AT LEAST 18" ABOVE THE SEWER, OTHERWISE THE CROSSINGS SHALL CONFORM TO DETAILS ABOVE. ALL WATER SERVICE LINES SHALL CROSS ABOVE SEWER MAINS.

WATER & SEWER CROSSING DETAILS

NTS

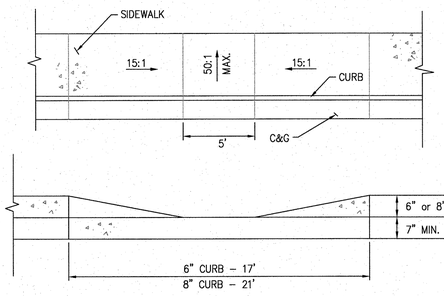


WHEEL CHAIR RAMP NOTES:

1. WHEEL CHAIR RAMPS SHALL CONFORM TO CITY OF GALLUP STANDARD DRAWINGS SERIES 2400. ADDITIONAL WHEEL CHAIR RAMP LAYOUTS, TYPES, DETAILS AND REQUIREMENTS ARE CONTAINED IN DRAWINGS 2416.0 THROUGH 2416.5 OF THE SERIES.

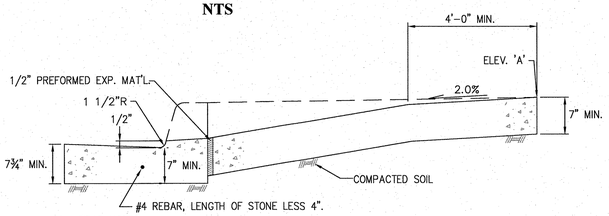
WHEEL CHAIR RAMP DETAILS

NTS



DEPRESSED SIDEWALK DRAIN

NTS

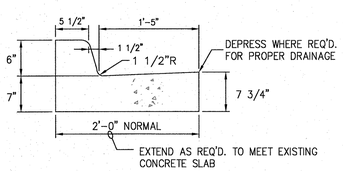


DRIVEPAD NOTES:

1. DRIVEPAD SHALL CONFORM TO CITY OF GALLUP STANDARD DRAWINGS SERIES 2400. ADDITIONAL DRIVEPAD DETAILS AND REQUIREMENTS ARE CONTAINED IN DRAWINGS 2410.0, 2410.1, AND 2410.2. OF THE SERIES.
2. ELEV. 'A' MUST BE NO LOWER THAN TOP OF CURB ELEVATION (NORMAL SITUATION).
3. SLOPE FROM UPPER PAD LEVEL TO SIDEWALK NOT TO EXCEED 10%.

DRIVEPAD SECTION

NTS

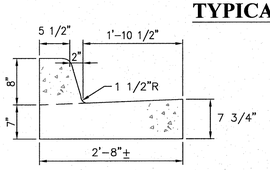


6" CURB AND GUTTER

CURB & GUTTER NOTES:

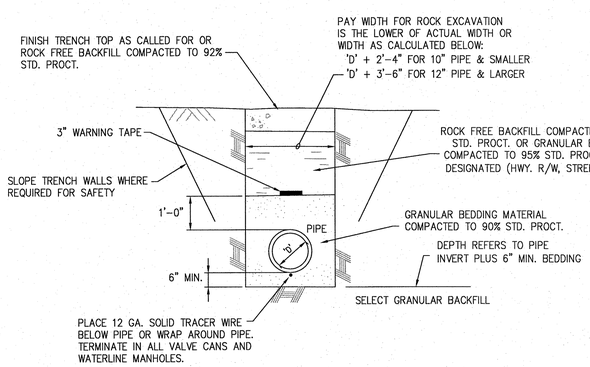
1. CURB AND GUTTER SHALL CONFORM TO CITY OF GALLUP STANDARD DRAWINGS SERIES 2400. ADDITIONAL CURB & GUTTER TYPES, DETAILS AND REQUIREMENTS ARE CONTAINED IN DRAWINGS 2415.0 AND 2415.1 OF THE SERIES.
2. CURB & GUTTER STONES SHALL HAVE MAX. 10' LENGTH WITH EXPANSION MATERIAL EVERY THIRD JOINT UNLESS OTHERWISE NOTED.
3. DIMENSIONS HEREON SHALL GOVERN UNLESS OTHERWISE DIRECTED BY THE ENGINEER.

CURB & GUTTER SECTIONS



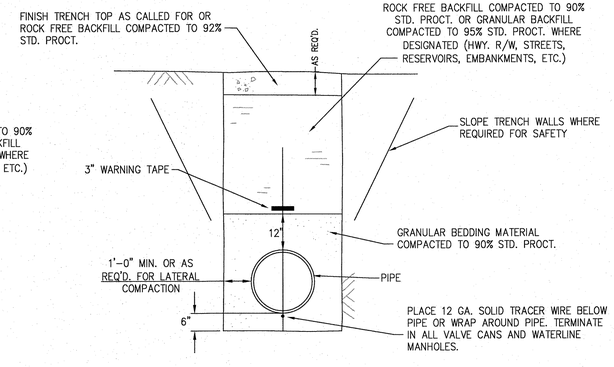
8" CURB & GUTTER SECTION

CAUTION
CALL ONE CALL
811
BEFORE YOU DIG!



ROCK EXCAVATION DETAIL

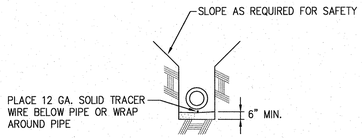
NTS



NOTE:
SEE MISC. CITY DETAIL THIS SHEET FOR ROCK PAY WIDTH WHEN APPLICABLE

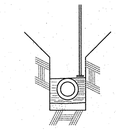
TYPICAL TRENCH DETAIL

NTS



PLACE PIPE ON FIRM ACCURATELY GRADED COMPACTED GRANULAR MATERIAL 6" MINIMUM THICKNESS COMPACTED TO 90% STD. PROCT. CUT OUT FOR BELL.

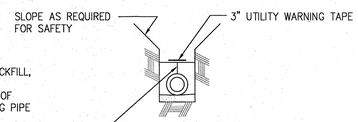
PLACEMENT STEP 1



PLACE 8"–10" LOOSE LAYERS SELECT BACKFILL, NEAR OPTIMUM MOISTURE CONTENT AND COMPACT, EACH LAYER UNTIL NEAR TOP OF PIPE. USE CAUTION TO AVOID DISTURBING PIPE ALIGNMENT. MAXIMUM DIFFERENTIAL IN COMPATED BACKFILL HEIGHTS NOT TO EXCEED 6".

PLACEMENT STEP 2

TEST FREQUENCIES TO BE DETERMINED BY THE ENGINEER.

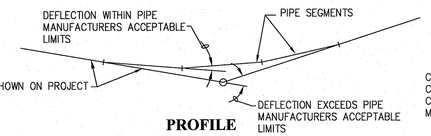


PLACEMENT STEP 3

DEPICTED ABOVE ARE ACCEPTABLE METHODS FOR PLACING PIPE

PIPE PLACEMENT METHOD

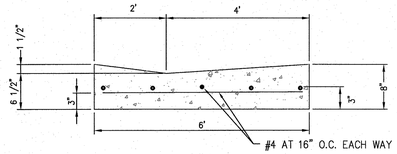
NTS



PROFILE

CONTRACTOR IS CAUTIONED NOT TO COMPROMISE REQUIRED PIPELINE COVER WHEN USING DEFLECTION @ MULTIPLE JOINTS

VERTICAL PIPE DEFLECTION (MULTIPLE JOINTS)

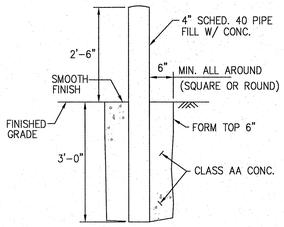


VALLEY GUTTER NOTES:

1. VALLEY GUTTER SHALL CONFORM TO CITY OF GALLUP STANDARD DRAWINGS SERIES 2400. ADDITIONAL VALLEY GUTTER INCLUDING FILLET LAYOUTS, TYPES, DETAILS AND REQUIREMENTS ARE CONTAINED IS DRAWINGS 2418.0 AND 2418.1 OF THE SERIES.

TYPICAL VALLEY GUTTER DETAIL

NTS

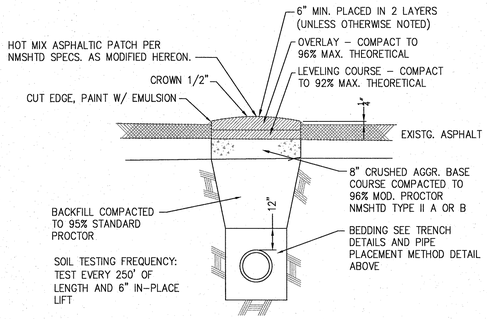


PAINT W/ TWO COMPONENT SYSTEM PER PROJECT SPECIFICATIONS

BOLLARD DETAIL

NTS

HOT MIX ASPHALTIC MATERIAL TO CONFORM NMSHTD SPECIFICATIONS PROVIDED HOWEVER THAT MIX SHALL CONTAIN ADDITIONAL FINES & ASPHALTIC CEMENT BY MUTUAL AGREEMENT BETWEEN THE ENGINEER & CONTRACTOR.



MAXIMUM PAVING PATCH PAY WIDTH
ACTUAL WIDTH BASED ON TRENCH WIDTH GOVERNED BY SAFETY REQUIREMENTS. PATCHING REQ'D. BECAUSE OF CARELESS CONSTRUCTION NOT ELIGIBLE FOR PAYMENT.

ASPHALTIC PATCH DETAIL

NTS

KURT A. SPOLAR
NEW MEXICO
17637
12-31-12
LICENSED PROFESSIONAL ENGINEER

DePAULI ENGINEERING & SURVEYING LLC
- CIVIL ENGINEERS AND LAND SURVEYORS -
307 SOUTH 4th STREET GALLUP, NM 87301
TEL: (505)863-5440 WWW.DEPAULIENGINEERING.COM

for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

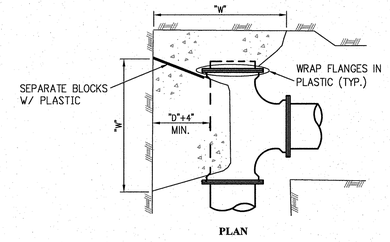
NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

MISCELLANEOUS GENERAL DETAILS

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 3 - 1

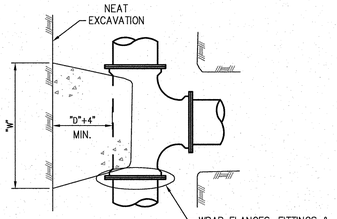


PLAN

PLUGGED TEE

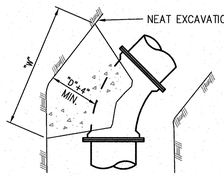
NOTE: HIGHLY SATURATED OR UNCONSOLIDATED SOILS MAY REQUIRE AN INCREASE IN THRUST BLOCK SIZE. VERIFY W/ PROJECT ENGINEER.

NOTE: BACKFILL SHALL NOT BE PLACED UNTIL THRUST BLOCK CONCRETE HAS FIRMLY SET.



PLAN

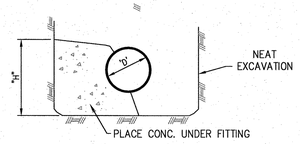
TEE



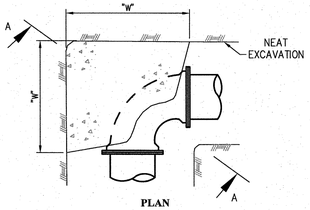
PLAN

TYPICAL ELL

NOTE: PROVIDE "MEGALUG" GLANDS FOR MJ CONNECTIONS.

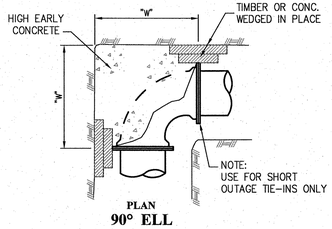


SECTION A-A



PLAN

90° ELL



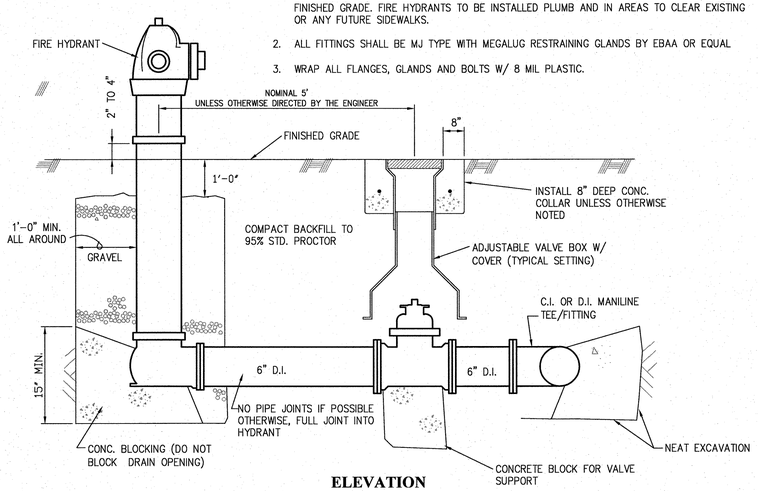
PLAN

90° ELL

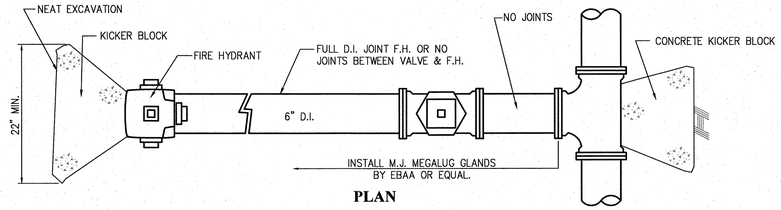
MINIMUM THRUST BLOCK DIMENSIONS FOR HORIZONTAL FITTINGS

PIPE	TEE		90° ELL		45° ELL		22 1/2°- 11 1/4° ELL	
"D"	"W"	"H"	"W"	"H"	"W"	"H"	"W"	"H"
4"	14"	10"	14"	10"	12"	10"	12"	10"
6"	18"	14"	18"	14"	16"	12"	14"	10"
8"	24"	16"	22"	16"	18"	16"	16"	14"
10"	30"	30"	30"	30"	24"	16"	18"	12"
12"	32"	32"	32"	32"	30"	18"	20"	14"
14"	36"	36"	36"	36"	32"	24"	24"	16"
16"	48"	36"	48"	36"	36"	26"	30"	18"
18"	50"	38"	50"	38"	38"	28"	32"	20"
24"	58"	40"	58"	40"	40"	30"	36"	26"
30"	66"	46"	66"	46"	48"	34"	44"	34"

NOTE:
1. CONTRACTOR TO PROVIDE HYDRANT BARREL HEIGHT AS REQ'D. FOR PROPER HEIGHT ABOVE FINISHED GRADE. FIRE HYDRANTS TO BE INSTALLED PLUMB AND IN AREAS TO CLEAR EXISTING OR ANY FUTURE SIDEWALKS.
2. ALL FITTINGS SHALL BE MJ TYPE WITH MEGALUG RESTRAINING GLANDS BY EBAA OR EQUAL
3. WRAP ALL FLANGES, GLANDS AND BOLTS W/ 8 MIL PLASTIC.



ELEVATION



PLAN

FIRE HYDRANT ASSEMBLY BID ITEM TO INCLUDE TEE, PIPING FROM MAIN, VALVE & BOX.

FIRE HYDRANT DETAILS

NTS

WATER SPECIFICATIONS

NOTE: REFERENCES TO PUBLISHED SPECIFICATIONS ARE FOR LATEST REVISION THEREOF.

A. WATERLINES AND APPURTENANCES FOR POTABLE WATER

1. Ductile Iron: Ductile iron for waterlines shall be of the size and class specified, cement lined and shall conform to AWWA C104 and C151. Joints for ductile iron pipe shall be rubber ring "push-on" or as specified on the drawings. Ductile iron pipe shall be wrapped 8 mil polyethylene per AWWA C105.

2. PVC: PVC Waterlines shall conform to requirements of AWWA specification C900 with O.D. equivalent to cast iron with rubber ring "push-on" type gaskets.

3. Fittings and Specials: Fittings and specials shall be ductile iron cement lined mechanical joint ductile iron conforming to AWWA C104 and C110 with retainer glands. Fittings and specials shall be wrapped in two layers of 8 mil. polyethylene

4. Gate Valves: Gate valves 2" and larger shall be epoxy coated, iron body, resilient wedge, non-rising stem valves rated for 250 psi and shall conform to AWWA C-509 or C515. Valves less than 2" in diameter shall be high quality all brass ball valves. Valve boxes shall be ductile iron, adjustable length type. Connections for 2" and larger gate valves shall be mechanical joint with stainless steel trim unless otherwise noted.

5. Fire Hydrants: Fire hydrants shall have a 6" diameter inlet with 5 1/4" valve opening and shall be rated for 150 psi working pressure. Connections for fire hydrants shall be mechanical joint and shall conform to AWWA C502. Fire hydrants shall be Mueller Centurion A 423.

6. Testing and Disinfection of Waterlines and Appurtenances

6.1. Testing of Waterlines: All Waterlines shall be tested after installation in accordance with AWWA Specification C600, provided allowable line leakage shall not be more than $NDP^{0.5}/7400$ gallons per hour where N = number of joints, D = pipe diameter in inches and P = test pressure in psi.

Average Test Pressure (psi)	Allowable Leakage per 100 Joints (gallons/hr.) Pipe Dimension						
	4"	6"	8"	10"	12"	14"	16"
200	0.76	1.15	1.53	1.91	2.29	2.68	3.06

6.2. Disinfection of Waterlines: Completed lines shall be treated with chlorine solution of not less than 50 parts per million kept in contact for at least 24 hours. After the 24 hour period, the line shall be flushed until the residual chlorine has been reduced to NTUA system residual. Water in the new line shall be sampled by the contractor for biological testing after a period of 48 hrs. Required tests shall be the responsibility of the contractor. Tests to indicate compliance with NMED Standards prior to tying-in.

Disinfection procedures shall be in accordance w/ AWWA C651 specifications and as modified hereon.

Chlorine solution shall normally be introduced at the lowest elevation of the water line. The solution shall be pumped into the line in such a manner as to prevent trapping air. Contractor shall provide filling, sampling and air release taps as required.

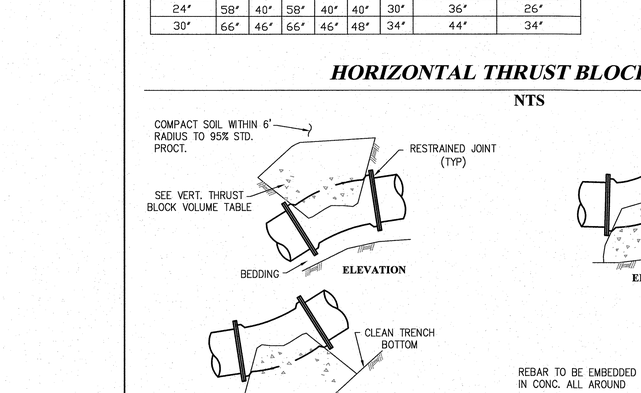
Liquid chlorine concentrate or gas shall be used for chlorine solution. Powder chlorine concentrate will not be permitted. (See Water Line Filling and Flushing Methods)

7. Waterline Filling and Flushing Methods: lines shall be filled w/ chlorine solution, pressure tested, flushed to lower residual and then tested for biological conformance prior to any tie-ins by either of the following methods. contractor to be responsible for apparatus required including methods of pipe & fitting restraint under pressure.

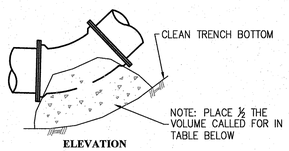
Method 1: Fill the line with pre-mixed chlorine solution from clean water tanker. NOTE: chlorine concentrate may be introduced while pumping water into line, if continued disbursement is assured. After pressure test and 24 hour contact period, replace chlorinated water with low residual water by pumping from clean water tanker. Complete biological sampling and testing after 48 hrs. Tie-in to city system when test results are acceptable. flush lines with city pressure.

Method 2: Connect to new main and existing city main with a line equipped with 2 check valves and a manual valve or with a standard commercial backflow preventor. NOTE: The connecting line and accessories are usually of a smaller size than the mains. Fill the new main through the connecting line while introducing a separate chlorine concentrate feed. Close the valve and disconnect the connecting line. Complete pressure testing and 24 hour contact period. Reconnect the line and flush to acceptable residual from the city main. Close the valve and disconnect the connecting line. Conduct biological sampling for testing after 48 hrs. Tie-in to city main when test results are acceptable. Flush lines to achieve scouring velocity with city pressure.

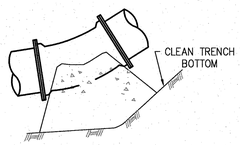
8. Water Service Lines:
   a. Corp. Stop – cc tapered inlet by compression fitting as Mueller 110 with stainless steel gripper band.
   b. Service Line – Type "K" soft drawn copper 3/4" min.
   c. 1/8th or 1/4 Bends – Compression or to corp stop. (w/ ss gripper band)
   d. Couplings – Compression by Compression. (w/ ss gripper band)
   e. Saddles to be brass, double strap as FORD 202BS or equal. Maintain 2' min. between pipe end and tap.



ELEVATION



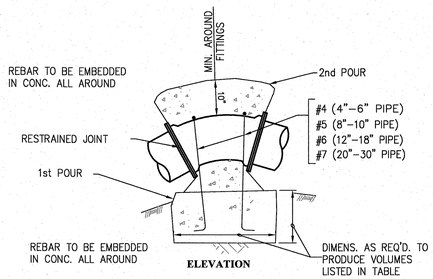
ELEVATION



ELEVATION

VERTICAL THRUST BLOCK -11 1/4° ELLS
VERTICAL THRUST BLOCK VOLUMES (FT)^3

PIPE SIZE	*45° ELL*	*22½° ELL*	*11¼° ELL*
4"	8	4	–
6"	14	8	–
8"	25	13	–
10"	40	21	10
12"	60	31	17
14"	85	45	26
16"	115	58	33
18"	125	64	39
24"	150	76	45
30"	180	89	55



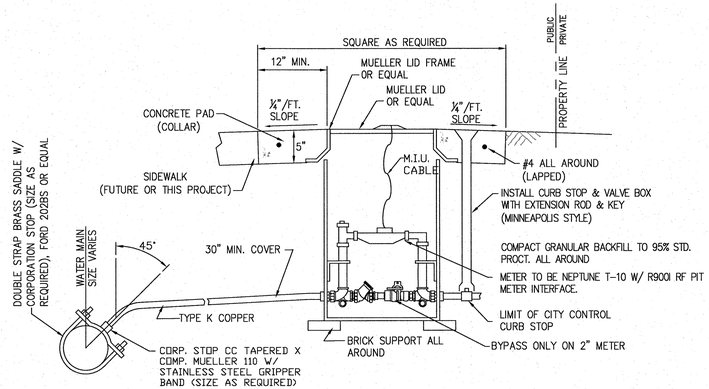
ELEVATION

VERTICAL THRUST BLOCK -22 1/2° & 45° ELLS

SEE GENERAL NOTES FOR LIMITATIONS ON VERTICAL FITTING DEFLECTIONS THIS PROJECT AND RESTRAINT REQUIREMENTS FOR ELLS & ADJACENT PIPE.

VERTICAL THRUST BLOCK DETAILS

NTS



5/8"X3/4" MUELLER E-Z SETTER METER BOX OR EQUAL

MODEL 203-RS-15-30-F-S-A-N
15" BOX DIA.
30" BOX DEPTH
LOCKWING ANGLE BALL VALVE (FULL PORT)
A.S.S.E. DUAL CHECK
ALUM. BOTT.

700097 LID FRAME
282924 LID
790162 PAD

MUELLER SHUT OFF VALVE (CURB STOP)
MODEL H-15159

MUELLER VALVE BOX
MODEL H-10332

MUELLER EXTENSION ROD
MODEL 82863

1" MUELLER E-Z SETTER METER BOX OR EQUAL

MODEL 330-RS-18-26-F-S-A-S
18" BOX DIA.
26" BOX DEPTH
LOCKWING ANGLE BALL VALVE (FULL PORT)
A.S.S.E. DUAL CHECK
ALUM. BOTT.

70098 LID FRAME
282925 LID
790163 PAD

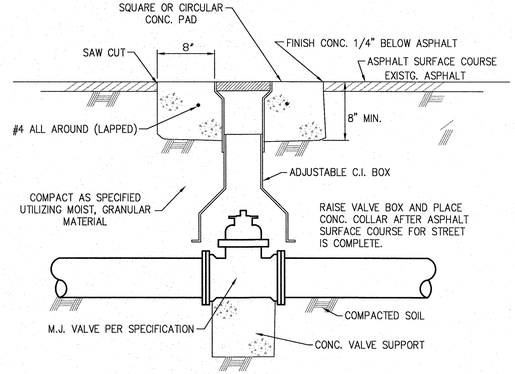
2" MUELLER E-Z SETTER METER BOX OR EQUAL

MUELLER-550-VB-27-36-F-B-A-N

70098 LID FRAME
282925 LID
790165 PAD
BYPASS REQUIRED

WATER SERVICE METER BOX DETAILS

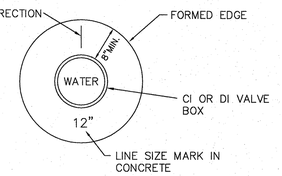
5/8"x3/4"; 1" AND 2" SIZE
NTS



NOTE: WRAP ALL FLANGES, GLANDS AND BOLTS W/ 8 MIL PLASTIC.

TYPICAL VERICAL VALVE SETTING

NTS



TYPICAL VALVE BOX MARKINGS

CAUTION
CALL ONE CALL
811
BEFORE YOU DIG!

KURT A. SPOLAR
NEW MEXICO
17637
12-31-18
LICENSED PROFESSIONAL ENGINEER

DePAULI ENGINEERING & SURVEYING LLC
- CIVIL ENGINEERS AND LAND SURVEYORS -
307 SOUTH 4th STREET GALLUP, NM 87301
TEL: (505)863-5440 WWW.DEPAULIENGINEERING.COM

for the
NAVAJO TRIBAL UTILITY AUTHORITY
FORT DEFIANCE, ARIZONA

NO.	BY	DATE	

NTUA
HALCHITA WATER TREATMENT PLANT
R/O SYSTEM RETRO-FIT
MEXICAN HAT, UTAH

MISCELLANEOUS WATER DETAILS

SCALE:	SHOWN
DATE:	JULY 2018
DRAWN BY:	KAS
CHECKED BY:	MDP

SHEET 3-2