

LAKE HAVASU CITY, ARIZONA

PROJECT NO. 108029

BOOSTER STATION 4 IMPROVEMENTS

FINAL DESIGN DRAWINGS

OCTOBER 2023



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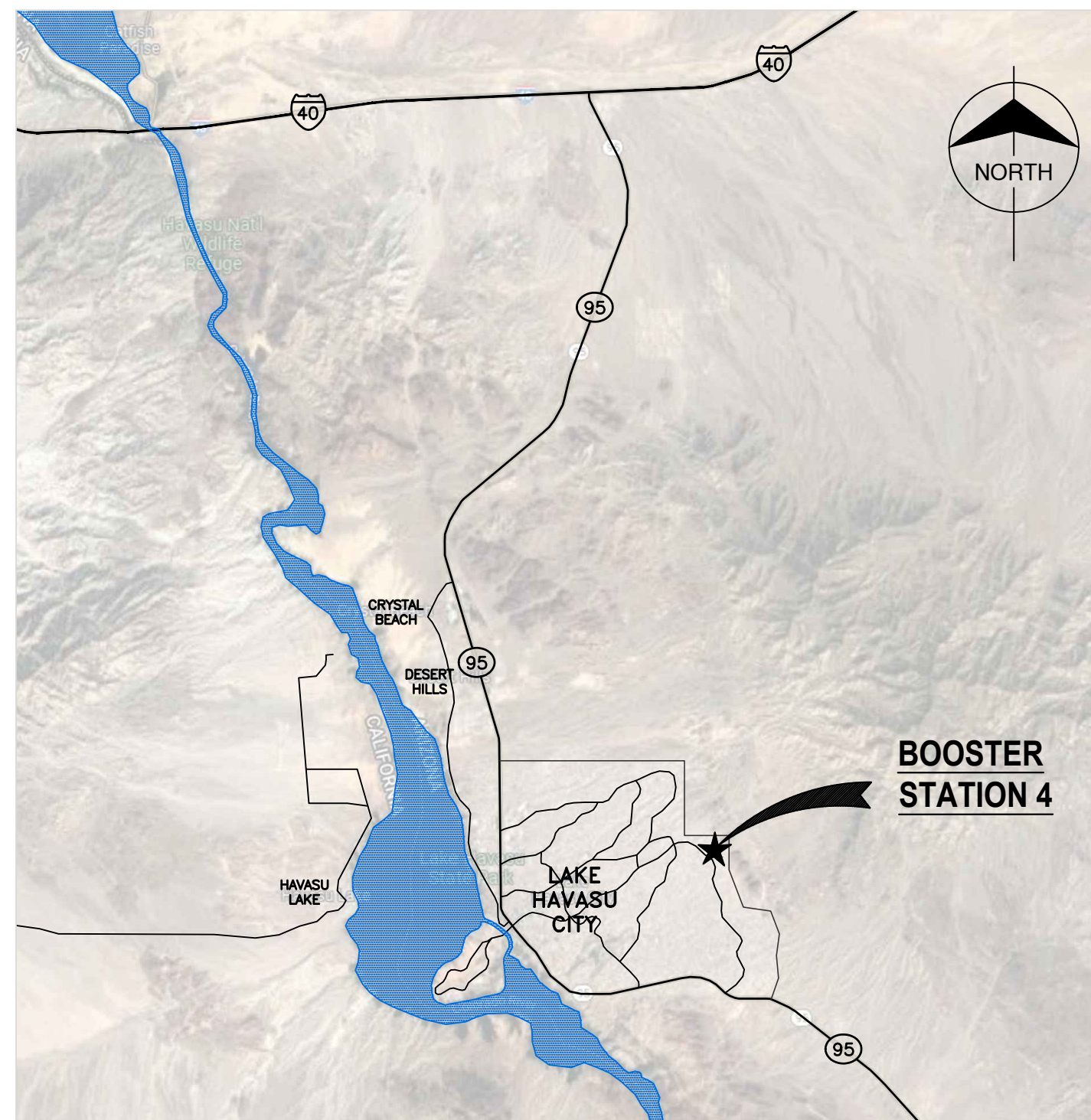
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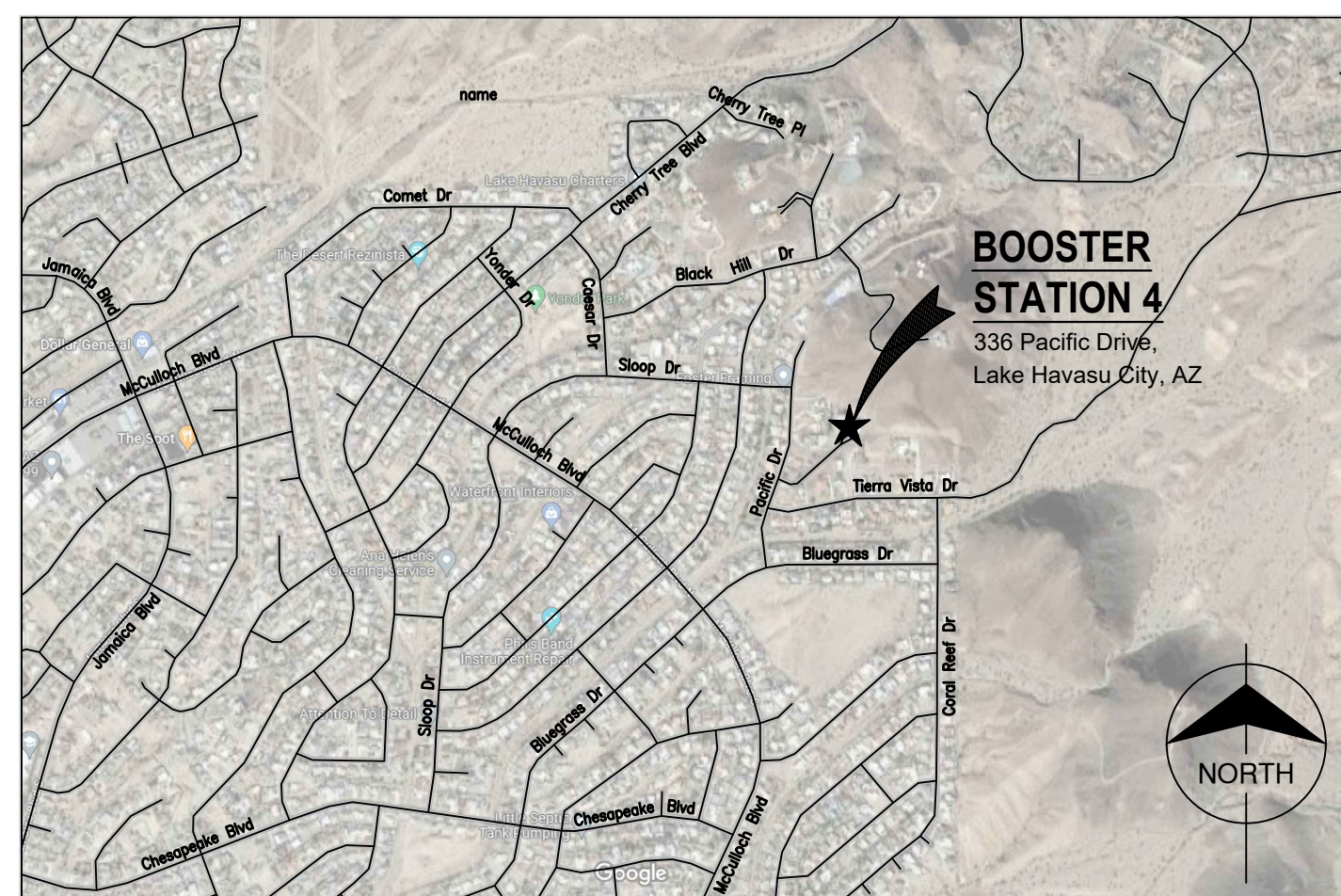
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LOCATION MAP



VICINITY MAP

CITY COUNCIL

- CAL SHEEHY MAYOR
- DAVID LANE VICE MAYOR
- JIM DOLAN COUNCIL MEMBER
- JENI COKE COUNCIL MEMBER
- NANCY CAMPBELL COUNCIL MEMBER
- MICHELE LIN COUNCIL MEMBER
- CAMERON MOSES COUNCIL MEMBER

CITY MANAGER

JESS KNUDSON

CITY ENGINEER

GREG FROSLIE, P.E.

PROJECT MANAGER

JASON HART

UTILITY CONTACTS

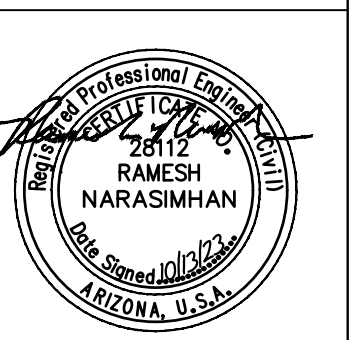
- LAKE HAVASU CITY (WASTEWATER) (928) 855-3999
- LAKE HAVASU CITY (WATER) (928) 855-2618
- SUDDEN LINK (928) 855-9855
- FRONTIER COMMUNICATION (928) 453-0541
- UNISOURCE ENERGY SERVICES (GAS) (928) 505-7025
- UNISOURCE ENERGY SERVICES (ELECTRIC) (928) 505-7031

NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB	Drawn by: KWB	Checked by: RN	Date: 07-07-23	Dwg scale: AS NOTED
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COVER SHEET



EXPIRATION DATE: 09/30/24

Sheet Number:
G-01
Sheet 1 of 26



GENERAL NOTES

GENERAL

1. THE CONTRACTOR SHALL BE RESPONSIBLE TO ENSURE THAT ALL IMPROVEMENTS ARE BUILT, CONSTRUCTED, AND/OR INSTALLED IN ACCORDANCE WITH THESE PROJECT PLANS AND THE TECHNICAL SPECIFICATIONS FOR THE WORK.
2. THE CONTRACTOR IS RESPONSIBLE FOR THE SURVEY, LAYOUT, AND STAKING OF THE PROPOSED IMPROVEMENTS FOR CONSTRUCTION PURPOSES.
3. IF THERE ARE ANY QUESTIONS REGARDING THE PLANS OR THE INTENT OF THE DESIGN, THE CONTRACTOR SHALL CONTACT THE ENGINEER AND DISCUSS THE ISSUE SO THAT IT IS CLARIFIED OR RESOLVED PRIOR TO THE START OF CONSTRUCTION.
4. THE CONTRACTOR SHALL TAKE THE NECESSARY STEPS AND PRECAUTIONS TO PROTECT AND SAFEGUARD ADJACENT IMPROVEMENTS AND PROPERTY FROM DAMAGE DUE TO CONSTRUCTION ACTIVITIES ASSOCIATED WITH THIS PROJECT.
5. THE CONTRACTOR SHALL BE RESPONSIBLE FOR IDENTIFYING AND OBTAINING ANY PERMITS NEEDED TO COMPLETE THE PROJECT, POTENTIALLY INCLUDING AN AGENCY BUSINESS LICENSE, RIGHT OF WAY WORK PERMIT, WATER USAGE AGREEMENT, ETC., AND INCLUDE THE COSTS FOR THE SAME, IF ANY, IN THE PROJECT BID PRICES.
6. ALL PROJECT IMPROVEMENTS INCLUDING BUT NOT LIMITED TO MANHOLE FRAMES, VALVE BOXES, VAULTS, HANDHOLES, FIRE HYDRANTS, ETC., SHALL BE SET OR RESET TO FINISHED GRADE OF THE SURROUNDING GROUND OR PAVEMENT SURFACE WHETHER OR NOT SPECIFICALLY CALLED OUT ON THE PLANS OR IN THE SPECIFICATIONS.

UTILITIES

1. THE EXISTENCE AND LOCATION OF UNDERGROUND UTILITIES OR UTILITY STRUCTURES SHOWN ON THESE PLANS SHOULD BE VERIFIED BASED ON AN AZ 811 UTILITY MAPPING REQUEST.
2. THE LOCATION OF THE UTILITIES MAY OR MAY NOT BE ACCURATELY SHOWN ON THE UTILITY MAPPING PROVIDED AND ON THE PROJECT PLANS.
3. THERE MAY BE OTHER UTILITY LINES AND FACILITIES PRESENT THAT ARE IN SERVICE OR HAVE BEEN ABANDONED WITHIN THE PROJECT CORRIDOR OR AREA THAT ARE NOT SHOWN ON THE MAPPING AND ON THE PLANS.
4. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING AZ811 (BLUE STAKE) PRIOR TO COMMENCING ANY DIGGING ACTIVITIES TO HAVE THE LOCATIONS OF THE UTILITIES MARKED IN THE FIELD AT THE PROJECT SITE. EXISTING PIPING, ELECTRICAL, AND UTILITIES ARE BASED ON EXISTING RECORDS. CONTRACTOR IS RESPONSIBLE FOR VERIFYING LOCATIONS OF ALL EXISTING PIPING, ELECTRICAL, AND UTILITIES AND AVOIDING DAMAGE TO THE SAME.
5. THE CONTRACTOR IS ALSO RESPONSIBLE FOR VISUALLY INSPECTING THE MARKED UTILITIES AT THE PROJECT SITE TO ASCERTAIN IF ANY POTENTIAL CONFLICTS EXIST BETWEEN THE PROPOSED IMPROVEMENTS UNDER THIS PROJECT AND THE EXISTING UTILITY FACILITIES.
6. THE CONTRACTOR SHALL 'POTHOLE' TO DETERMINE THE EXACT LOCATION AND DEPTH OF EXISTING UTILITY FACILITIES TO IDENTIFY ANY POTENTIAL CONFLICTS BETWEEN UTILITY FACILITIES AND THE PROPOSED IMPROVEMENTS AND, IF NEEDED, REVIEW THE INFORMATION WITH THE OWNER AND THE ENGINEER TO RESOLVE ANY POTENTIAL CONFLICT PRIOR TO CONSTRUCTION.
7. THE CONTRACTOR SHALL OBSERVE ALL POSSIBLE PRECAUTIONS WHEN WORKING IN CLOSE PROXIMITY TO EXISTING UTILITY LINES AND/OR STRUCTURES TO PROTECT THE SAME AND AVOID ANY DAMAGE TO THE UTILITY FACILITIES.
8. SHOULD ANY UTILITY FACILITY BE DAMAGED BY THE CONTRACTOR'S ACTIVITIES, THE CONTRACTOR SHALL CONTACT AND COORDINATE WITH THE UTILITY OWNER FOR THE REPAIR OF THE FACILITY AT NO ADDITIONAL COST TO THE PROJECT.

CONSTRUCTION JOBSITE SAFETY

1. THE CONTRACTOR ASSUMES SOLE AND COMPLETE RESPONSIBILITY FOR JOBSITE CONDITIONS DURING THE COURSE OF CONSTRUCTION OF THIS PROJECT INCLUDING SAFETY OF ALL PERSONS AND PROPERTY.
2. THIS SAFETY REQUIREMENT SHALL APPLY CONTINUOUSLY AND NOT BE LIMITED TO NORMAL WORKING HOURS.
3. NEITHER THE OWNER NOR THE ENGINEER WILL ENFORCE SAFETY MEASURES OR REGULATIONS.
4. THE CONTRACTOR IS SOLELY RESPONSIBLE FOR THE DESIGN, CONSTRUCTION, AND MAINTENANCE OF ALL SAFETY DEVICES INCLUDING SHORING.
5. THE CONTRACTOR SHALL BE SOLELY RESPONSIBLE FOR CONFORMING TO ALL LOCAL, STATE, AND FEDERAL SAFETY AND HEALTH STANDARDS, LAWS, AND REGULATIONS.
6. THE CONTRACTOR SHALL FOLLOW THE GUIDELINES AND REGULATIONS AS SET FORTH BY OSHA CONCERNING THE PROJECT WORK AND JOBSITE ACTIVITIES.
7. CONTRACTOR IS RESPONSIBLE FOR REVIEWING ALL PLANS FOR DEMOLITION ITEMS.
8. PROVIDE TEMPORARY THRUST RESTRAINT FOR EXISTING PIPING WHENEVER THE WORK REQUIRES. CONTRACTOR SHALL REPLACE OR RESTORE THE EXISTING RESTRAINT SYSTEM TO LIKE-NEW CONDITION.
9. DIMENSIONS AND ELEVATIONS FOR EQUIPMENT INSTALLATION TO BE DETERMINED BASED UPON EQUIPMENT MANUFACTURER SELECTED.
10. WHERE INDICATED, DIMENSIONS AND ELEVATIONS SHALL BE FIELD VERIFIED.
11. EXISTING EQUIPMENT TO BE REMOVED AND SALVAGED SHALL BE MARKED BY ENGINEER OR OWNER PRIOR TO WORK, UNLESS OTHERWISE NOTED ON THE CONTRACT DOCUMENTS.
12. ALTHOUGH SUCH WORK MAY NOT BE SPECIFICALLY INDICATED, FURNISH AND INSTALL SUPPLEMENTARY OR MISCELLANEOUS ITEMS, APPURTENANCES AND DEVICES INCIDENTAL TO, OR NECESSARY FOR A SOUND, SECURE AND COMPLETE INSTALLATION.
13. CONTRACTOR TO MAINTAIN ACCESS FOR EMERGENCY RESPONSE VEHICLES DURING CONSTRUCTION.
14. CONTRACTOR SHALL PROVIDE TEMPORARY SAFETY AND SECURITY FENCING AND SITE IMPROVEMENTS AS NEEDED AT NO EXTRA COST.
15. CONSTRUCTION DEBRIS SHALL BE REMOVED FROM THE SITE AND LEGALLY DISPOSED OF AT LEAST WEEKLY BY THE CONTRACTOR. KEEP SITE AREA CLEAN.
16. EXCAVATED SOIL IS TO BE USED TO FILL IN LOW SPOTS PRIOR TO BEING HAULED OFF SITE. CONTRACTOR SHALL ESTABLISH A SUITABLE STAGING AREA FOR STORAGE OF EXCAVATED SOIL.
17. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SECURITY AT THE SITE WHILE CONSTRUCTION IS IN PROGRESS. CONTRACTOR SHALL BE RESPONSIBLE FOR PROTECTING THE PUBLIC FROM ANY HAZARDS ARISING FROM CONSTRUCTION OPERATIONS AND PROTECTING EXISTING AND NEW IMPROVEMENTS FROM DAMAGE DUE TO ACCIDENT OR VANDALISM.
18. ALL MATERIALS WHICH MAY COME IN CONTACT WITH DRINKING WATER SHALL CONFORM TO NSF INTERNATIONAL STANDARD 60 AND 61.
19. REFER TO PROJECT SPECIFICATION FOR ANY SUPPLEMENT DETAILS REFERRED TO IN THE DRAWINGS.
20. MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE CONTRACTOR'S EXPENSE.
21. COORDINATES AND DIMENSIONS SHOWN FOR ROADWAY IMPROVEMENTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT.

22. ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
23. UNLESS SHOWN ON THE DRAWINGS, ALL DISTURBED AREAS NOT RECEIVING A HARD SURFACE OR GRAVEL SURFACE SHALL BE GRADED SMOOTH AND COMPACTED AS SPECIFIED.
24. CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION. EROSION CONTROL DEVICES, SILT FENCING, RUNOFF CONTAINMENT BERMS, AND STRAW BALES ARE THE MINIMUM REQUIRED.
25. CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO POSITIVELY PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE.
26. WHERE ALUMINUM IS TO BE EMBEDDED IN CONCRETE, THE ALUMINUM SHALL FIRST BE COATED WITH COAL TAR EPOXY.
27. BACKFILLING OF PIPING AND STRUCTURES SHALL NOT BE STARTED UNTIL INSTALLATION IS APPROVED BY THE OWNER.
28. UNLESS OTHERWISE NOTED, ALL PVC INSTALLED ABOVE GROUND SHALL BE PAINTED PER SPECIFICATION SECTION 09800.
29. THE CONTRACTOR SHALL ADJUST ALL EXISTING MANHOLES, VALVE BOXES, CLEANOUTS, BLIND FLANGED PIPING, AND FIRE HYDRANTS WITHIN WORK LIMITS REQUIRED TO MATCH PROPOSED FINAL GRADE.

GOVERNING BUILDING CODES:
 2018 INTERNATIONAL BUILDING CODE
 2017 NATIONAL ELECTRICAL CODE
 2018 INTERNATIONAL PLUMBING CODE
 2018 INTERNATIONAL FIRE CODE

ADEQ NOTES

1. CONTRACTOR SHALL BE RESPONSIBLE FOR DISINFECTION PER THE REQUIREMENTS OF BULLETIN NO. 10, CHAPTER 7.L.3 CONTRACTOR SHALL PROVIDE COPIES OF DISINFECTION TESTING RESULTS FROM AN ARIZONA STATE ACCREDITED LABORATORY TO SHOW THAT DISINFECTION HAS BEEN COMPLETED IN COMPLIANCE WITH ADEQ REQUIREMENTS.
2. NEW WATER SYSTEM COMPONENTS, INCLUDING PIPE, VALVES, FITTINGS, AND EQUIPMENT SHALL NOT BE PUT INTO SERVICE UNTIL DISINFECTION HAS BEEN COMPLETED IN ACCORDANCE WITH ENGINEERING BULLETIN NO. 8, AAC R9-8-266.B OR AWWA C652-92.
3. CONTRACTOR SHALL BE RESPONSIBLE FOR PRESSURE AND LEAKAGE TESTING PER THE REQUIREMENTS OF BULLETIN NO. 10, CHAPTER 7.L.2, PRESSURE AND LEAKAGE TESTING. TESTS SHALL BE WITNESSED BY THE ENGINEER AND/OR OWNER AND COPIES OF THE TESTING RESULTS SHALL BE PROVIDED TO THE ENGINEER.
4. IN ACCORDANCE WITH ARIZONA ADMINISTRATIVE CODE 0618 (A.A.C). R18-5-504, ALL CONSTRUCTION MATERIALS SHALL BE LEAD FREE.

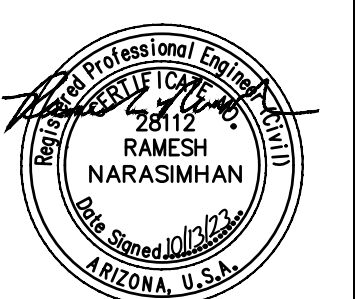


					DATE
					REVISIONS / SUBMISSIONS
					NO.

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB
 Drawn by: KWB
 Checked by: RN
 Date: 02-10-23
 Dwg scale: AS NOTED

GENERAL NOTES



EXPIRATION DATE: 09/30/24

Sheet Number:

G-02
 Sheet 2 of 26



ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
&	AND	LCP	LOCAL CONTROL PANEL
@	AT	LF	LINEAR FEET
∅	CENTERLINE	LHC	LAKE HAVASU CITY
∅	DIAMETER	LL	LOW LEVEL
ABC	AGGREGATE BASE COURSE	LLV	LONG LEG VERTICAL
AC	ASBESTOS CEMENT	LOC	LOCATION (S)
ADD	ADDITION OR ADDITIONAL	LPHH	LEVEL PROBE HIGH HIGH
ADEQ	ARIZONA DEPARTMENT OF ENVIRONMENTAL QUALITY	LS	LAND SURVEYOR
ADJ	ADJUST OR ADJUSTABLE	LT	LEFT OR LEVEL TRANSMITTER
AE	ANALYZER ELEMENT	MAX	MAXIMUM
AGGR	AGGREGATE	MCJ	MASONRY CONTROL JOINT
AL	ALIGNMENT	MFR	MANUFACTURER
ALUM	ALUMINUM	MG	MILLION GALLONS
ARV	AIR/VACUUM RELEASE VALVE	MGD	MILLION GALLONS PER DAY
ASL	AIR SUPPLY LINE	MH	MANHOLE
ASPH	ASPHALT	MIN	MINIMUM
ASTM	AMERICAN SOCIETY OF TESTING MATERIALS	MILS	MILLIMETER
AUTO	AUTOMATIC	MCF	MANUAL CLEANING FILTER
AUX	AUXILIARY	MJ	MECHANICAL JOINT
AVG	AVERAGE	MOV	MOTOR OPERATED VALVE
AWS	AMERICAN WELDING SOCIETY	MS	MECHANICAL STRAINER
		MSD	MECHANICAL STRAINER DRAIN
BDL	BOOSTER PUMP DISCHARGE LINE		
BF	BLIND FLANGE	NG	NATURAL GRADE
BFP	BACKFLOW PREVENTER	NO.	NUMBER
BFV	BUTTERFLY VALVE	NTS	NOT TO SCALE
BLV	BALL CHECK VALVE		
BM	BENCH MARK	OC	ON CENTER
BOF	BOTTOM OF FOOTING	OD	OUTSIDE DIAMETER
BP	BOOSTER PUMP	OF	OVERFLOW
BSL	BOOSTER PUMP SUCTION LINE	OS&Y	OUTSIDE SCREW & YOKE
CCP	CONSTRUCTION CONTROL POINT	PE	POLYETHYLENE
CFM	CUBIC FEET PER MINUTE	PDL	PREFILTER DRAIN LINE
CFS	CUBIC FEET PER SECOND	PF	PREFILTER
CJ	CONSTRUCTION JOINT	PI	PRESSURE INDICATOR
CL	CENTER LINE	PIL	PREFILTER INLET LINE
CLR	CLEAR	PLC	PROCESS LOGIC CONTROLLER
CLSM	CONCRETE LOW STRENGTH MATERIAL	PLT	PRESSURE LEVEL TRANSMITTER
CMU	CONCRETE MASONRY UNIT	PMP	PUMP
CND	CONDUIT	PR	PIPE RESTRAINT
CONC	CONCRETE	PRLV	PRESSURE RELIEF VALVE
CONT	CONTINUOUS	PRV	PRESSURE REDUCING VALVE
CONST	CONSTRUCTION	PSH	HIGH PRESSURE SWITCH
CU	CUBIC	PSI	POUNDS PER SQUARE INCH
CV	CHECK VALVE	PSV	PRESSURE SUSTAINING VALVE
CY	CUBIC YARD	PUE	PUBLIC UTILITY EASEMENT
		PVC	POLYVINYL CHLORIDE
		PWS	POTABLE WATER SUPPLY
D	DEEP		
DET	DETAIL	RCP	REINFORCED CONCRETE PIPE
DIA	DIAMETER	RED	REDUCER
DIM	DIMENSION	REINF	REINFORCEMENT
DI	DUCTILE IRON	RIO	REMOTE INPUT OUTPUT
DIP	DUCTILE IRON PIPE	RMJ	RESTRAINED MECHANICAL JOINT
DISCH	DISCHARGE	RMJ	RESTRAINED MECHANICAL JOINT
DPS	DIFFERENTIAL PRESSURE SWITCH	RPP	REDUCED PRESSURE PRINCIPLE
D/S	DOWNSTREAM	REQD	REQUIRED
		RRP	REGENERATION AND RINSE PUMP
		RT	RIGHT
		RW	RIGHT-OF-WAY
EA	EACH		
EF	EACH FACE	S	SLOPE
EJ	EXPANSION JOINT	SCH	SCHEDULE
EL	ELEVATION	SD	SANITARY DRAIN
ELEC	ELECTRONIC	SHT	SHEET
EP	EDGE OF PAVEMENT	SJ	SHRINKAGE JOINT
EQ	EQUALIZATION	SPECS	SPECIFICATIONS
EST	ESTIMATE	SQ	SQUARE
EW	EACH WAY	SS	STAINLESS STEEL
EXST	EXISTING	ST	STREET
		STA	STATION
		STD	STANDARD
		STL	STEEL
		SV	SOLENOID VALVE
		SWL	SERVICE WATER LINE
F	EDGE OF FILL AREA		
FAB	FABRICATED	T	THICKNESS
FCA	FLANGED COUPLING ADAPTER	T&B	TOP AND BOTTOM
FCV	FLOW CONTROL VALVE	TBD	TO BE DETERMINED
FD	FLOOR DRAIN	TBM	TEMPORARY BENCH MARK
FE	FLOW ELEMENT	TCE	TEMPORARY CONSTRUCTION EASEMENT
FF	FINISH FLOOR	THRU	THROUGH
FG	FINISH GRADE	TOC	TOP OF CURB
FIN	FINISH	TOCS	TOP OF CONCRETE SLAB
FL	FLANGED	TOF	TOP OF FOOTING
FRP	FIBERGLASS REINFORCED PLASTIC	TOP	TOP OF PIPE
FT	FEET	TOS	TOP OF SLAB
FTG	FOOTING	TOW	TOP OF WALL
		TS	TUBE STEEL
		TYP	TYPICAL
GAL	GALLON		
GALV	GALVANIZED	UGND	UNDERGROUND
GND EL	GROUND ELEVATION	UNO	UNLESS NOTED OTHERWISE
GPM	GALLONS PER MINUTE	U/S	UPSTREAM
GSN	GENERAL STRUCTURAL NOTES	UV	ULTRAVIOLET
GV	GATE VALVE		
H	HEIGHT	YD	YARDS
HDPE	HIGH DENSITY POLYETHYLENE		
HORIZ	HORIZONTAL		
HP	HORSE POWER		
HPT	HYDROPNEUMATIC TANK		
HWL	HIGH WATER LEVEL		
I	MOMENT OF INERTIA		
IBC	INTERNATIONAL BUILDING CODE		
ICBO	INTERNATIONAL CONFERENCE OF BUILDING OFFICIALS		
ID	INSIDE DIAMETER		
IE	INVERT ELEVATION		
IOP	INDEPENDENT OPERATING PRESSURE		
INV	INVERT		
IV	ISOLATION VALVE		
KW	KILOWATT		

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
LCP	LOCAL CONTROL PANEL	LCP	LOCAL CONTROL PANEL
LF	LINEAR FEET	LF	LINEAR FEET
LHC	LAKE HAVASU CITY	LHC	LAKE HAVASU CITY
LL	LOW LEVEL	LL	LOW LEVEL
LLV	LONG LEG VERTICAL	LLV	LONG LEG VERTICAL
LOC	LOCATION (S)	LOC	LOCATION (S)
LPHH	LEVEL PROBE HIGH HIGH	LPHH	LEVEL PROBE HIGH HIGH
LS	LAND SURVEYOR	LS	LAND SURVEYOR
LT	LEFT OR LEVEL TRANSMITTER	LT	LEFT OR LEVEL TRANSMITTER
MAX	MAXIMUM	MAX	MAXIMUM
MCJ	MASONRY CONTROL JOINT	MCJ	MASONRY CONTROL JOINT
MFR	MANUFACTURER	MFR	MANUFACTURER
MG	MILLION GALLONS	MG	MILLION GALLONS
MGD	MILLION GALLONS PER DAY	MGD	MILLION GALLONS PER DAY
MH	MANHOLE	MH	MANHOLE
MIN	MINIMUM	MIN	MINIMUM
MILS	MILLIMETER	MILS	MILLIMETER
MCF	MANUAL CLEANING FILTER	MCF	MANUAL CLEANING FILTER
MJ	MECHANICAL JOINT	MJ	MECHANICAL JOINT
MOV	MOTOR OPERATED VALVE	MOV	MOTOR OPERATED VALVE
MS	MECHANICAL STRAINER	MS	MECHANICAL STRAINER
MSD	MECHANICAL STRAINER DRAIN	MSD	MECHANICAL STRAINER DRAIN
NG	NATURAL GRADE	NG	NATURAL GRADE
NO.	NUMBER	NO.	NUMBER
NTS	NOT TO SCALE	NTS	NOT TO SCALE
OC	ON CENTER	OC	ON CENTER
OD	OUTSIDE DIAMETER	OD	OUTSIDE DIAMETER
OF	OVERFLOW	OF	OVERFLOW
OS&Y	OUTSIDE SCREW & YOKE	OS&Y	OUTSIDE SCREW & YOKE
PE	POLYETHYLENE	PE	POLYETHYLENE
PDL	PREFILTER DRAIN LINE	PDL	PREFILTER DRAIN LINE
PF	PREFILTER	PF	PREFILTER
PI	PRESSURE INDICATOR	PI	PRESSURE INDICATOR
PIL	PREFILTER INLET LINE	PIL	PREFILTER INLET LINE
PLC	PROCESS LOGIC CONTROLLER	PLC	PROCESS LOGIC CONTROLLER
PLT	PRESSURE LEVEL TRANSMITTER	PLT	PRESSURE LEVEL TRANSMITTER
PMP	PUMP	PMP	PUMP
PR	PIPE RESTRAINT	PR	PIPE RESTRAINT
PRLV	PRESSURE RELIEF VALVE	PRLV	PRESSURE RELIEF VALVE
PRV	PRESSURE REDUCING VALVE	PRV	PRESSURE REDUCING VALVE
PSH	HIGH PRESSURE SWITCH	PSH	HIGH PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH	PSI	POUNDS PER SQUARE INCH
PSV	PRESSURE SUSTAINING VALVE	PSV	PRESSURE SUSTAINING VALVE
PUE	PUBLIC UTILITY EASEMENT	PUE	PUBLIC UTILITY EASEMENT
PVC	POLYVINYL CHLORIDE	PVC	POLYVINYL CHLORIDE
PWS	POTABLE WATER SUPPLY	PWS	POTABLE WATER SUPPLY
RCP	REINFORCED CONCRETE PIPE	RCP	REINFORCED CONCRETE PIPE
RED	REDUCER	RED	REDUCER
REINF	REINFORCEMENT	REINF	REINFORCEMENT
RIO	REMOTE INPUT OUTPUT	RIO	REMOTE INPUT OUTPUT
RMJ	RESTRAINED MECHANICAL JOINT	RMJ	RESTRAINED MECHANICAL JOINT
RMJ	RESTRAINED MECHANICAL JOINT	RMJ	RESTRAINED MECHANICAL JOINT
RPP	REDUCED PRESSURE PRINCIPLE	RPP	REDUCED PRESSURE PRINCIPLE
REQD	REQUIRED	REQD	REQUIRED
RRP	REGENERATION AND RINSE PUMP	RRP	REGENERATION AND RINSE PUMP
RT	RIGHT	RT	RIGHT
RW	RIGHT-OF-WAY	RW	RIGHT-OF-WAY
S	SLOPE	S	SLOPE
SCH	SCHEDULE	SCH	SCHEDULE
SD	SANITARY DRAIN	SD	SANITARY DRAIN
SHT	SHEET	SHT	SHEET
SJ	SHRINKAGE JOINT	SJ	SHRINKAGE JOINT
SPECS	SPECIFICATIONS	SPECS	SPECIFICATIONS
SQ	SQUARE	SQ	SQUARE
SS	STAINLESS STEEL	SS	STAINLESS STEEL
ST	STREET	ST	STREET
STA	STATION	STA	STATION
STD	STANDARD	STD	STANDARD
STL	STEEL	STL	STEEL
SV	SOLENOID VALVE	SV	SOLENOID VALVE
SWL	SERVICE WATER LINE	SWL	SERVICE WATER LINE
T	THICKNESS	T	THICKNESS
T&B	TOP AND BOTTOM	T&B	TOP AND BOTTOM
TBD	TO BE DETERMINED	TBD	TO BE DETERMINED
TBM	TEMPORARY BENCH MARK	TBM	TEMPORARY BENCH MARK
TCE	TEMPORARY CONSTRUCTION EASEMENT	TCE	TEMPORARY CONSTRUCTION EASEMENT
THRU	THROUGH	THRU	THROUGH
TOC	TOP OF CURB	TOC	TOP OF CURB
TOCS	TOP OF CONCRETE SLAB	TOCS	TOP OF CONCRETE SLAB
TOF	TOP OF FOOTING	TOF	TOP OF FOOTING
TOP	TOP OF PIPE	TOP	TOP OF PIPE
TOS	TOP OF SLAB	TOS	TOP OF SLAB
TOW	TOP OF WALL	TOW	TOP OF WALL
TS	TUBE STEEL	TS	TUBE STEEL
TYP	TYPICAL	TYP	TYPICAL
UGND	UNDERGROUND	UGND	UNDERGROUND
UNO	UNLESS NOTED OTHERWISE	UNO	UNLESS NOTED OTHERWISE
U/S	UPSTREAM	U/S	UPSTREAM
UV	ULTRAVIOLET	UV	ULTRAVIOLET
YD	YARDS	YD	YARDS

SYMBOLS

ELBOWS / FLANGED

 ELBOWS / WELDED

REDUCERS / FLANGED

 REDUCERS / WELDED

TEES / FLANGED

 TEES / WELDED

VALVES / FLANGED

 RESTRAINED EXPANSION JOINT (BELLOWS TYPE)

 DISMANTLING JOINT WITH RESTRAINING RODS

 FLANGED COUPLING ADAPTER WITH RESTRAINTS

 DIAPHRAGM VALVE, PROFILE

 PRESSURE SUSTAINING VALVE, PROFILE

 DIAPHRAGM VALVE, PLAN

 MAGNETIC FLOW METER

 PRESSURE RELIEF VALVE

 AIR RELIEF VALVE

 SAFETY POST (BOLLARD)

 SAMPLE TAP

 PRESSURE SWITCH LOW

 PRESSURE SWITCH HIGH

 FLOW SWITCH

 PRESSURE GAUGE

 EMERGENCY EYEWASH AND SHOWER

MECHANICAL JOINT

 END FITTINGS

90 DEGREE BENDS / PVC

 DOWN

 PLAN

 UP

TEES / PVC

 DOWN

 PLAN

 UP

GENERAL SYMBOLS

MARKERS

SECTION INDICATOR

 DETAIL INDICATOR

SECTION CUT

 SCALE

 TYPICAL DETAIL

(SECTIONS ARE LETTERED, DETAILS ARE NUMBERED)

EQUIPMENT TAG

EQUIPMENT TAG OR PIPE SYSTEM

 EQUIPMENT OR VALVE NUMBER

PIPE TAG

PIPE SIZE

 PIPING SYSTEM

 PIPE MATERIAL

PIPE MATERIAL

1 - DUCTILE IRON
 2 - STEEL
 3 - C-900 PVC
 4 - SCHEDULE 80 PVC
 5 - SCHEDULE 80 CPVC
 6 - COPPER
 7 - STAINLESS STEEL
 8 - SCH 80 BLACK STEEL
 9 - CAST IRON
 10 - PVC-SEWER PIPE

SHEET CATEGORY

G - GENERAL
 C - CIVIL
 S - STRUCTURAL
 M - MECHANICAL PROCESS
 E - ELECTRICAL
 I - INSTRUMENTATION

ABBREVIATIONS AND SYMBOLS

Designed by: GB
 Drawn by: KWB
 Checked by: RN
 Date: 02-10-23
 Dwg scale: AS NOTED

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

NO. REVISIONS / SUBMISSIONS

DATE

CELEBRATING 25 YEARS

Professional Engineer
25th Anniversary
RAMESH NARASIMHAN
ARIZONA, U.S.A.
 EXPIRATION DATE: 09/30/24

Sheet Number: **G-03**
 Sheet 3 of 26

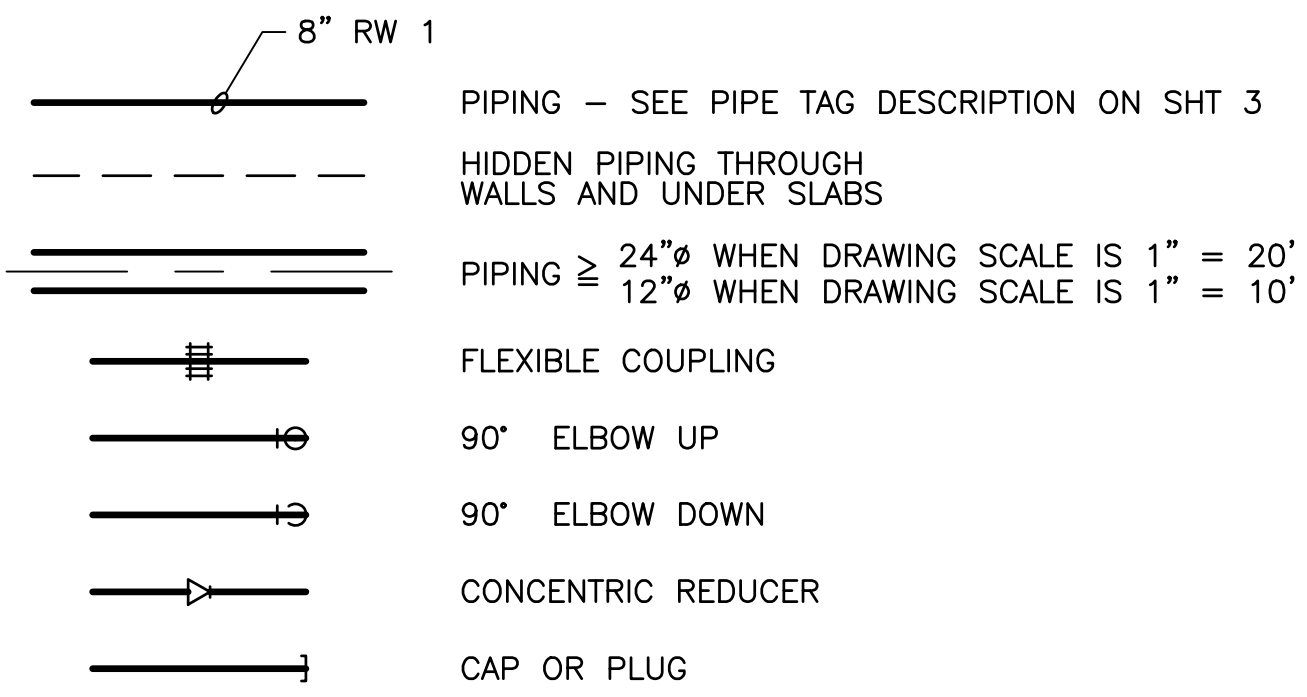
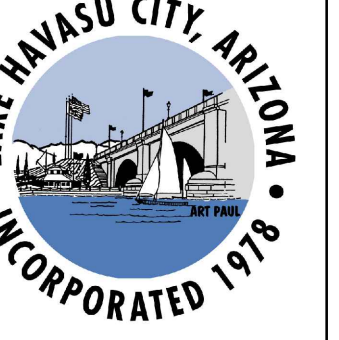
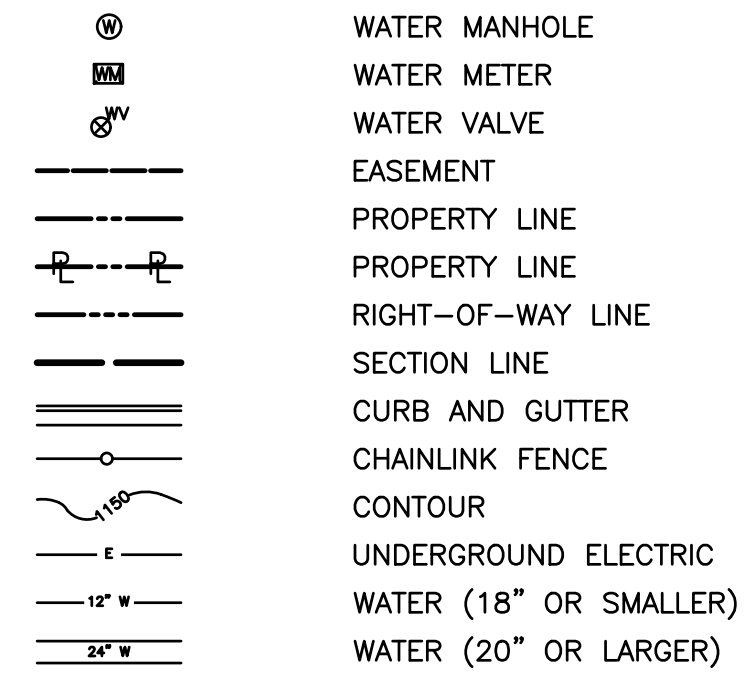
NCSE
 Engineers
 202 E. Eorfl Drive Suite 110
 Phoenix, AZ 85012
 Phone (602)629-0206
 http://www.ncseng.com/

GENERAL SITE NOTES:

- SOURCE OF TOPOGRAPHY SHOWN ON THE CIVIL PLANS IS A BASE MAP FROM RECORD DRAWINGS. EXISTING CONDITIONS MAY VARY FROM THOSE SHOWN ON THESE PLANS. THE CONTRACTOR SHALL VERIFY EXISTING CONDITIONS AND ADJUST WORK PLAN ACCORDINGLY PRIOR TO BEGINNING CONSTRUCTION.
- EXISTING TOPOGRAPHY, STRUCTURES, AND SITE FEATURES ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW FINISH GRADE, STRUCTURES, AND SITE FEATURES ARE SHOWN HEAVY-LINED.
- HORIZONTAL DATUM: NAD 83, ARIZONA CENTRAL ZONE
VERTICAL DATUM: NGVD 29
- MAINTAIN, RELOCATE, OR REPLACE EXISTING SURVEY MONUMENTS, CONTROL POINTS, AND STAKES WHICH ARE DISTURBED OR DESTROYED. PERFORM THE WORK TO PRODUCE THE SAME LEVEL OF ACCURACY AS THE ORIGINAL MONUMENT(S) IN A TIMELY MANNER, AND AT THE CONTRACTOR'S EXPENSE.
- COORDINATES AND DIMENSIONS SHOWN FOR ROADWAY IMPROVEMENTS ARE TO FACE OF CURB OR EDGE OF PAVEMENT.
- ELEVATIONS GIVEN ARE TO FINISH GRADE UNLESS OTHERWISE SHOWN. SLOPE UNIFORMLY BETWEEN CONTOURS AND SPOT ELEVATIONS SHOWN.
- UNLESS SHOWN ON THE GRADING & DRAINAGE DRAWINGS, ALL DISTURBED AREAS NOT RECEIVING A HARD SURFACE OR GRAVEL SURFACE SHALL BE GRADED SMOOTH AND COMPACTED AS SPECIFIED.
- CONTRACTOR SHALL BE RESPONSIBLE FOR IMPLEMENTING AND MAINTAINING EROSION CONTROL DEVICES DURING CONSTRUCTION. EROSION CONTROL INCLUDING DEVICES SILT FENCING, RUNOFF CONTAINMENT BERMS, AND STRAW BALES ARE THE MINIMUM REQUIRED.
- CONTRACTOR SHALL TAKE ALL OTHER MEASURES TO POSITIVELY PRECLUDE EROSION MATERIALS FROM LEAVING THE SITE.

GENERAL YARD PIPING AND UTILITIES NOTES:

- EXISTING UNDERGROUND UTILITIES OBTAINED FROM AS-BUILTS AND DRAWINGS PROVIDED BY CITY, UTILITIES MAPS, AND FROM FIELD SURVEY. CONTRACTOR SHALL FIELD VERIFY DEPTH AND LOCATION PRIOR TO EXCAVATION. PROTECT ALL EXISTING UTILITIES DURING CONSTRUCTION.
- FOR PIPING FLOW STREAM IDENTIFICATION, SEE PIPING SCHEDULE.
- EXISTING PIPING AND EQUIPMENT ARE SHOWN SCREENED AND/OR LIGHT-LINED. NEW PIPING AND EQUIPMENT ARE SHOWN HEAVY-LINED.
- UNLESS OTHERWISE SHOWN, ALL PIPING SHALL HAVE A MINIMUM OF 4' COVER.
- ALL PIPES SHALL HAVE A CONSTANT SLOPE BETWEEN INVERT ELEVATIONS UNLESS A FITTING IS SHOWN.
- ALL NEW WATER PIPES MUST BE PROPERLY FLUSHED, PRESSURE TESTED, CHLORINATED AND BACTERIOLOGICALLY TESTED, AS SPECIFIED.
- RESTORE DIRT AND/OR GRAVEL ROADS TO CONDITIONS THAT EXISTED BEFORE START OF CONSTRUCTION.
- CONTRACTOR TO PROVIDE PIPE WARNING TAPE AND TRACER WIRE ON PVC PIPING ON THE SITE. SEE SPECS. TRACER WIRE SHALL BE TERMINATED IN THREADED PVC PIPE ADJACENT TO STRUCTURES. SEE TYPICAL DETAIL.

YARD PIPING LEGEND**CIVIL LEGEND**

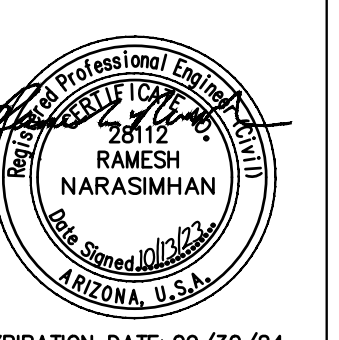
					DATE
					REVISIONS / SUBMISSIONS
					NO.

LAKE HAVASU CITY

BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB	Drawn by: KWB	Checked by: RN	Date: 02-10-23	Dwg scale: AS NOTED
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CIVIL NOTES AND LEGEND

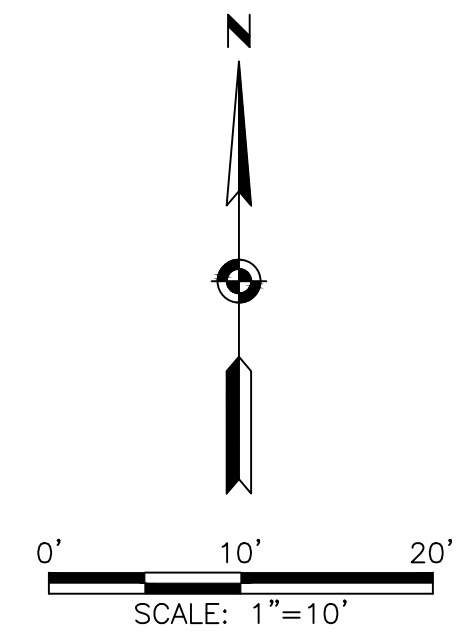
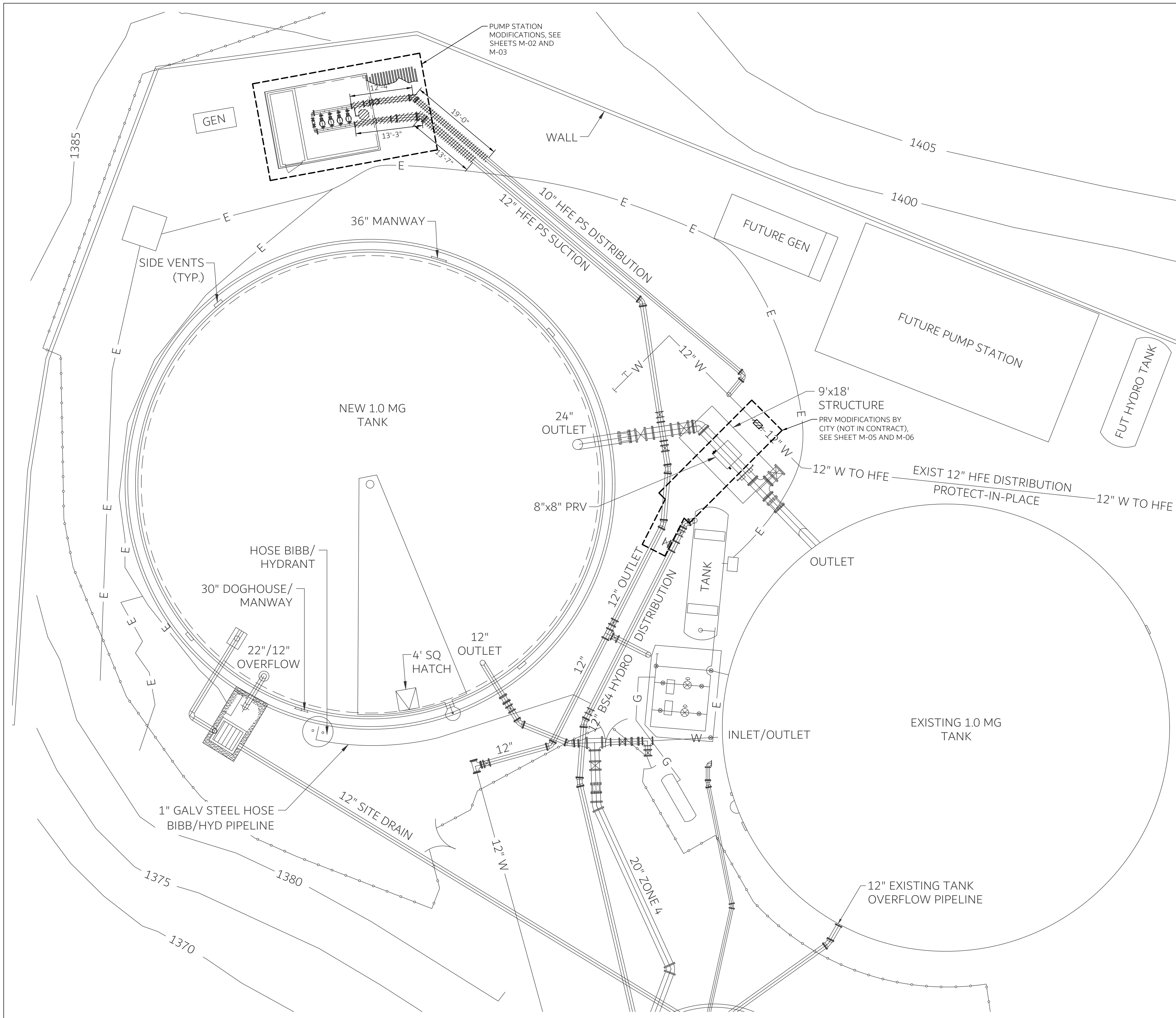


EXPIRATION DATE: 09/30/24

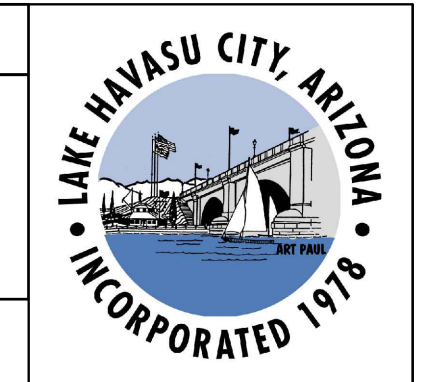
Sheet Number:

C-01
Sheet 4 of 26





NOTES:
 1. WHEN NEW FACILITIES ARE OPERATING, DEMOLITION OF EXISTING EQUIPMENT CAN COMMENCE, IN COORDINATION WITH OWNER.
 2. REMOVE EXISTING PIPE TO NEXT JOINT FOR CONNECTION.

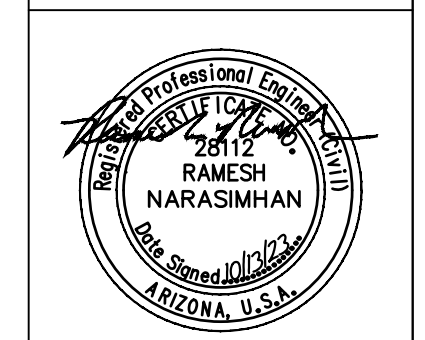


NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

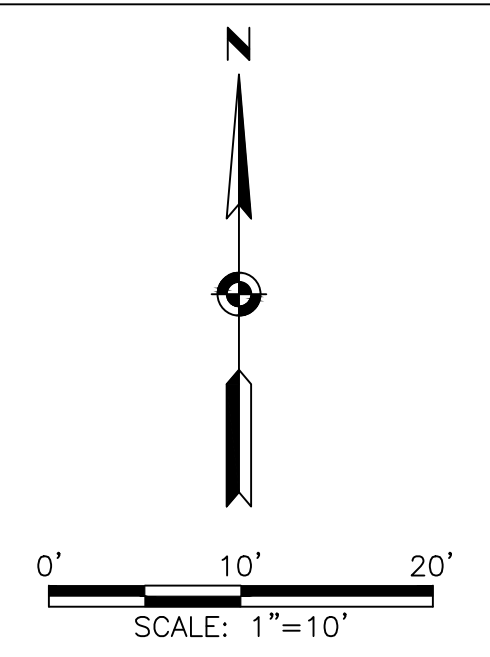
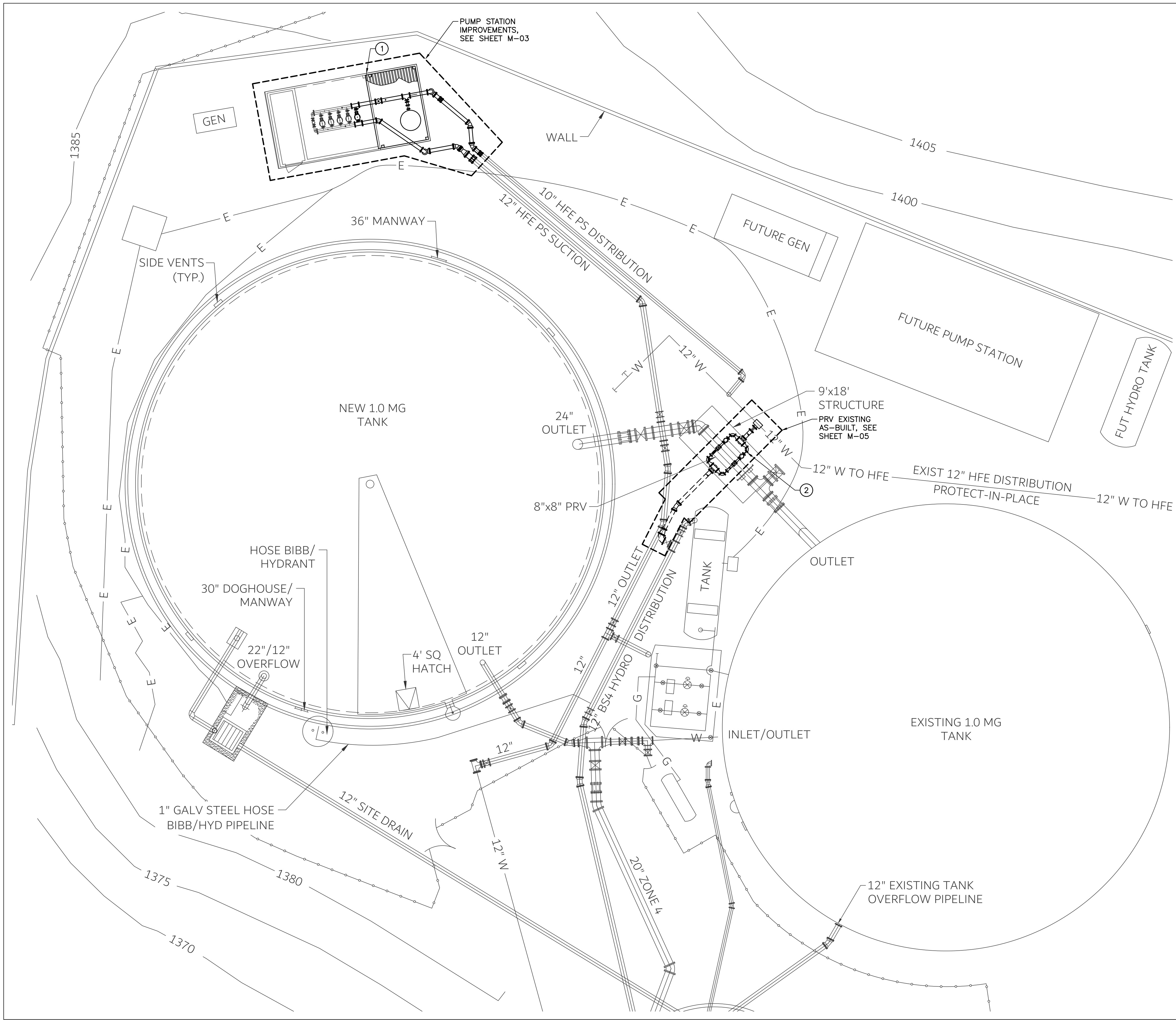
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DEMOLITION SITE PLAN



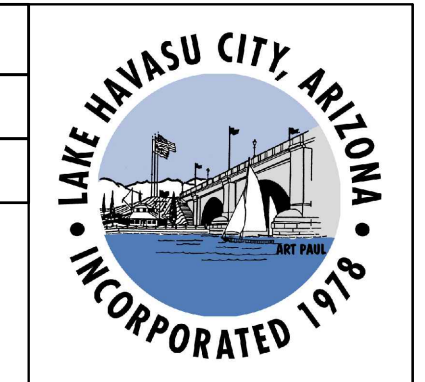
EXPIRATION DATE: 09/30/24
 Sheet Number:





CONSTRUCTION KEY NOTES

①	BOOSTER PUMP STATION SITE 4
②	HYDRO ZONE PRV STATION

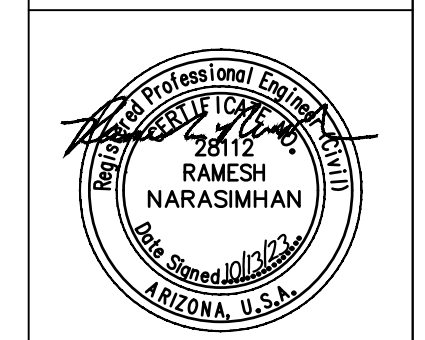


NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB	Drawn by: KWB	Checked by: RN	Date: 02-10-23	Dwg scale: AS NOTED
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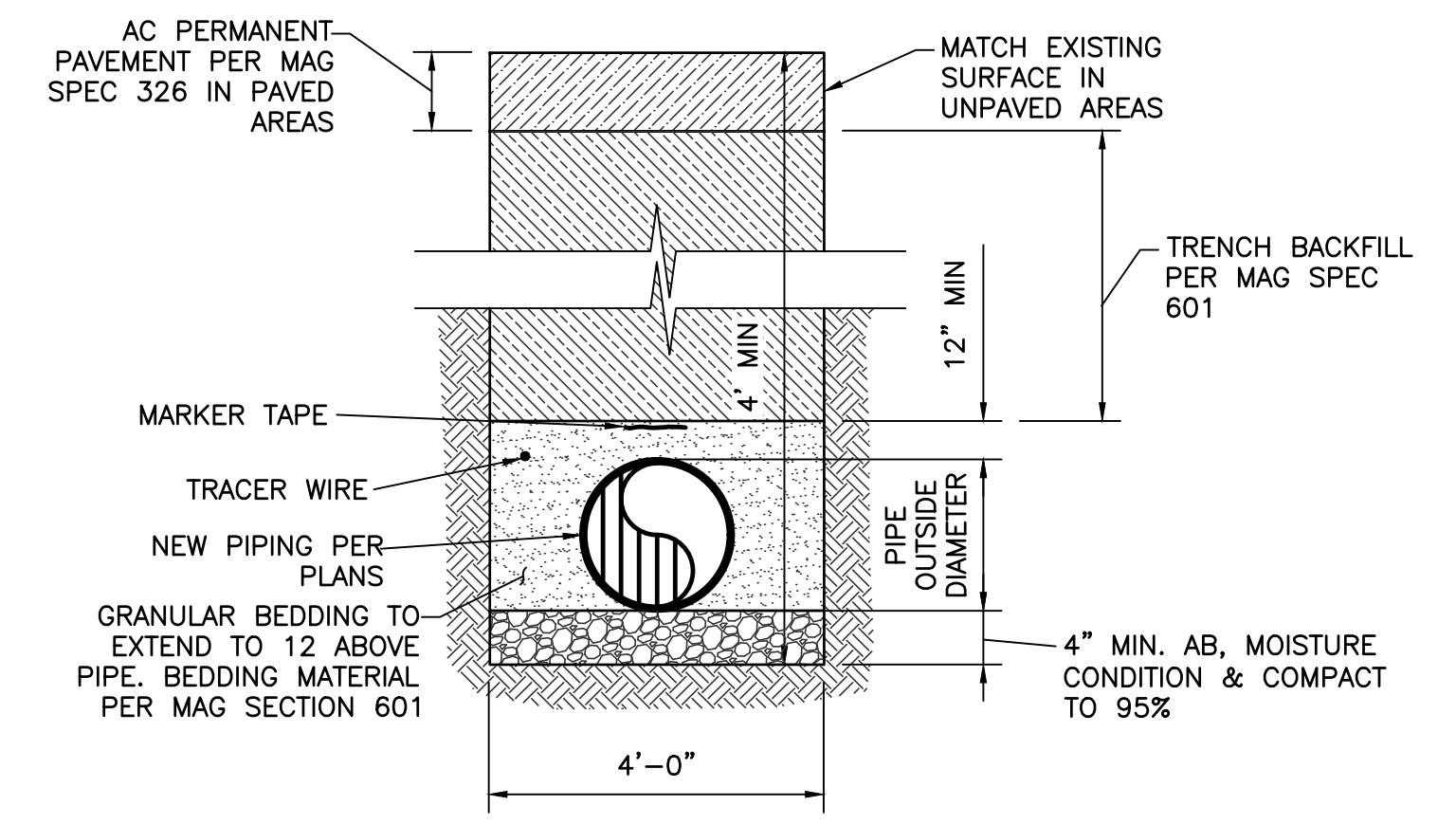
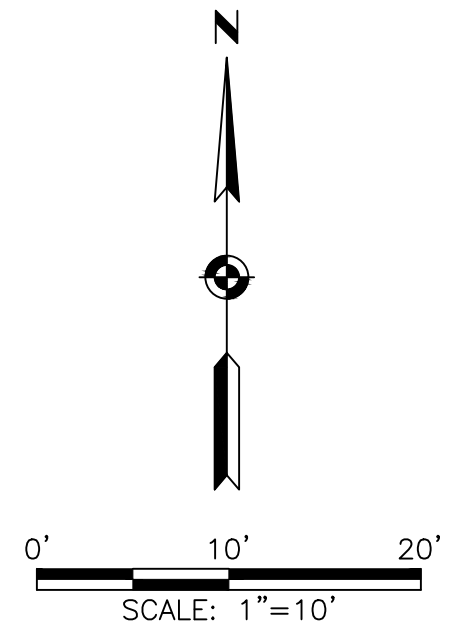
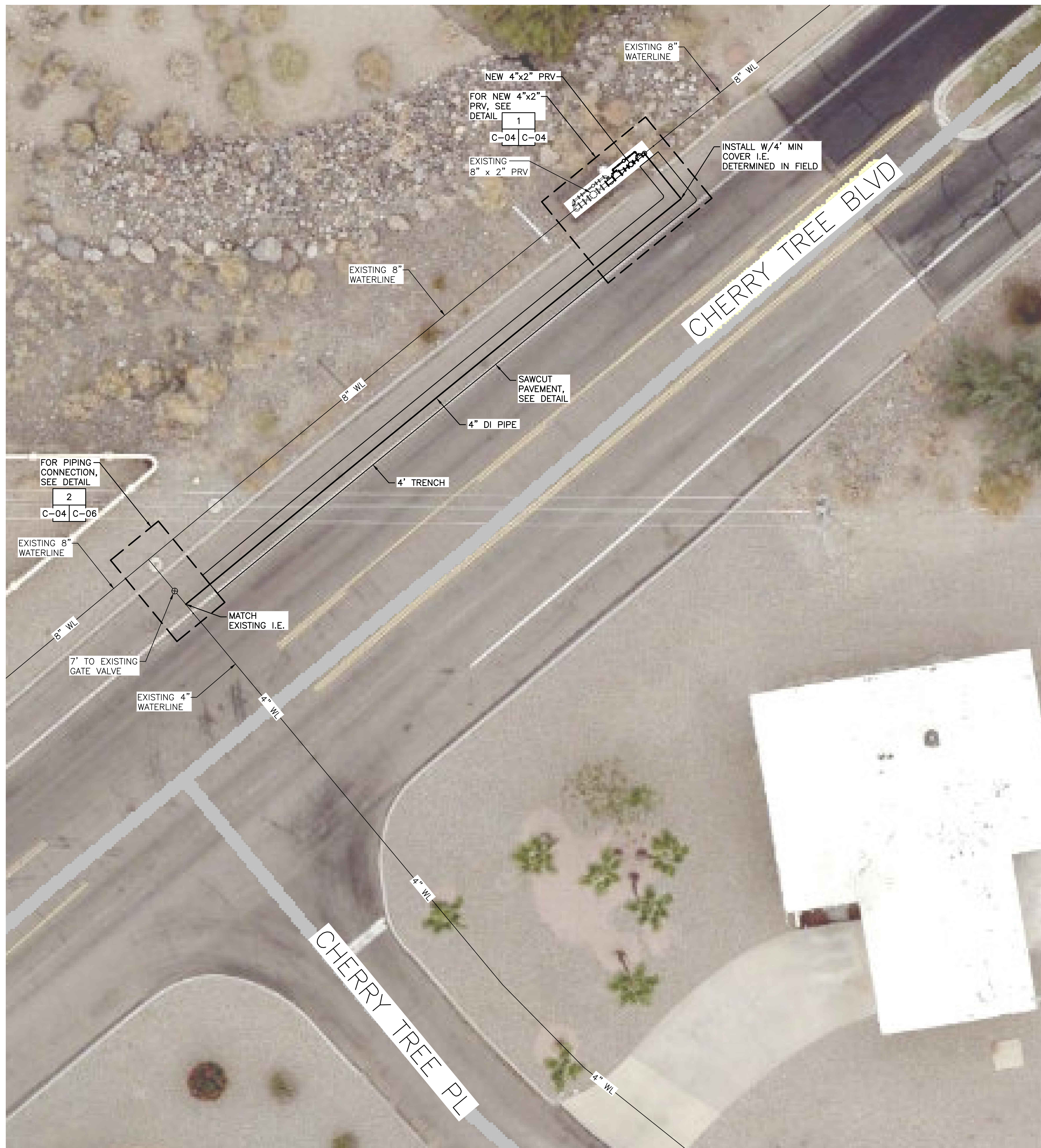
NEW FACILITIES
SITE PLAN



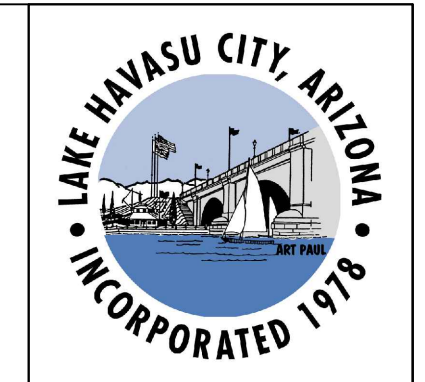
EXPIRATION DATE: 09/30/24
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TRENCH
SCALE: NTS

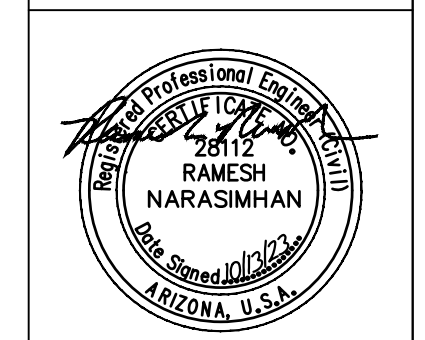


NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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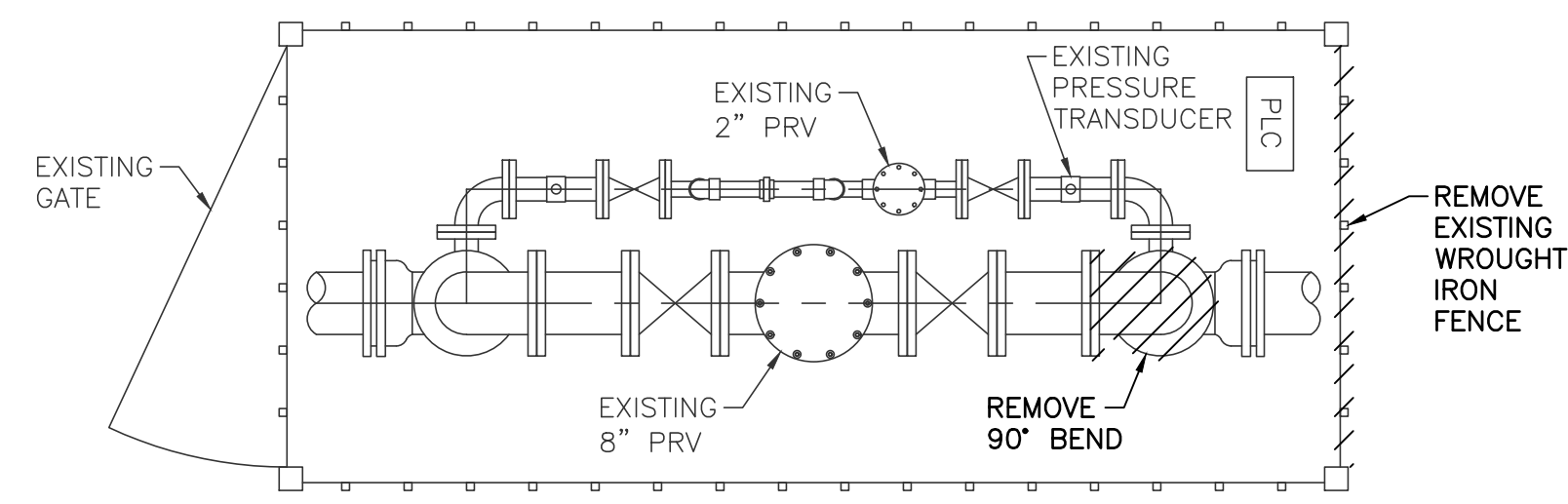
**CHERRY TREE
BLVD PRV
ADDITION**



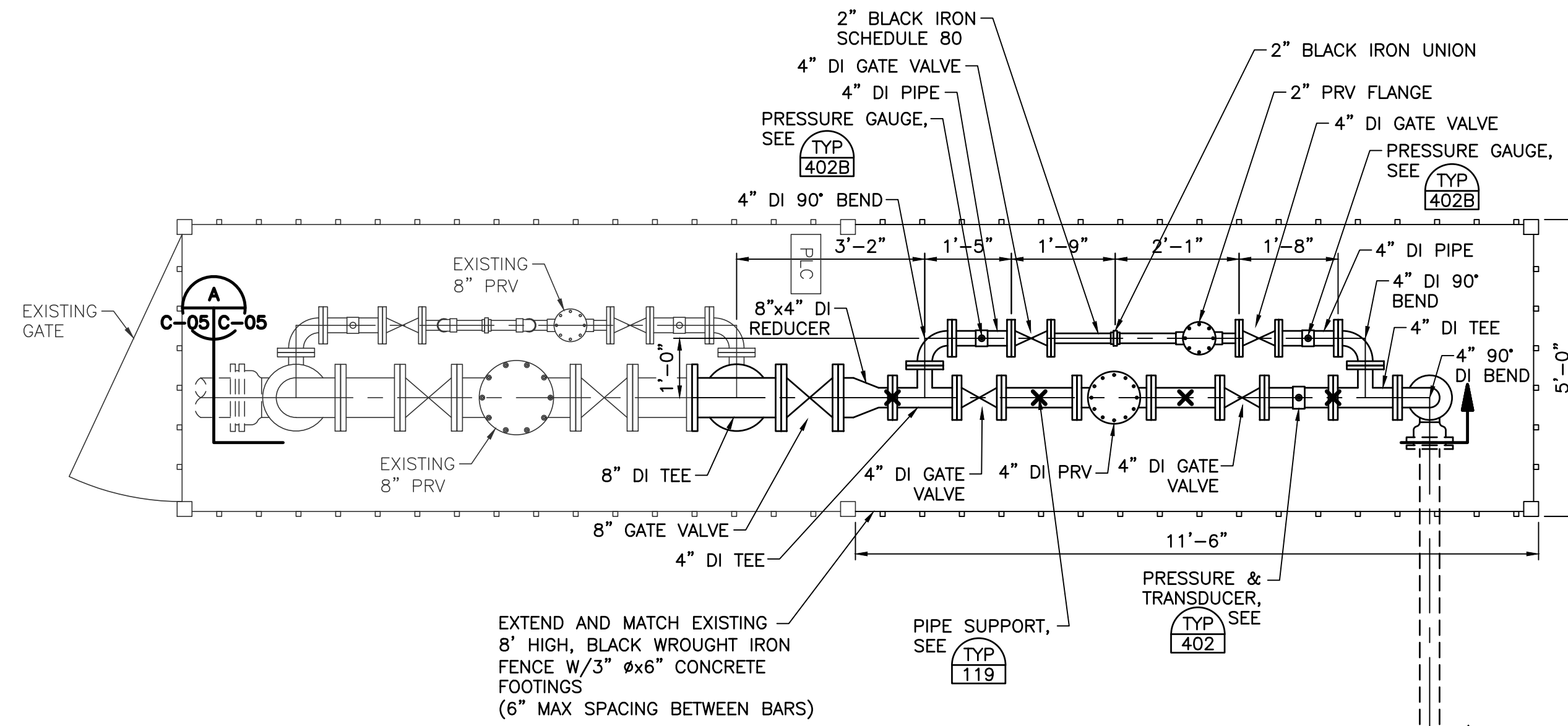
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Sheet Number:

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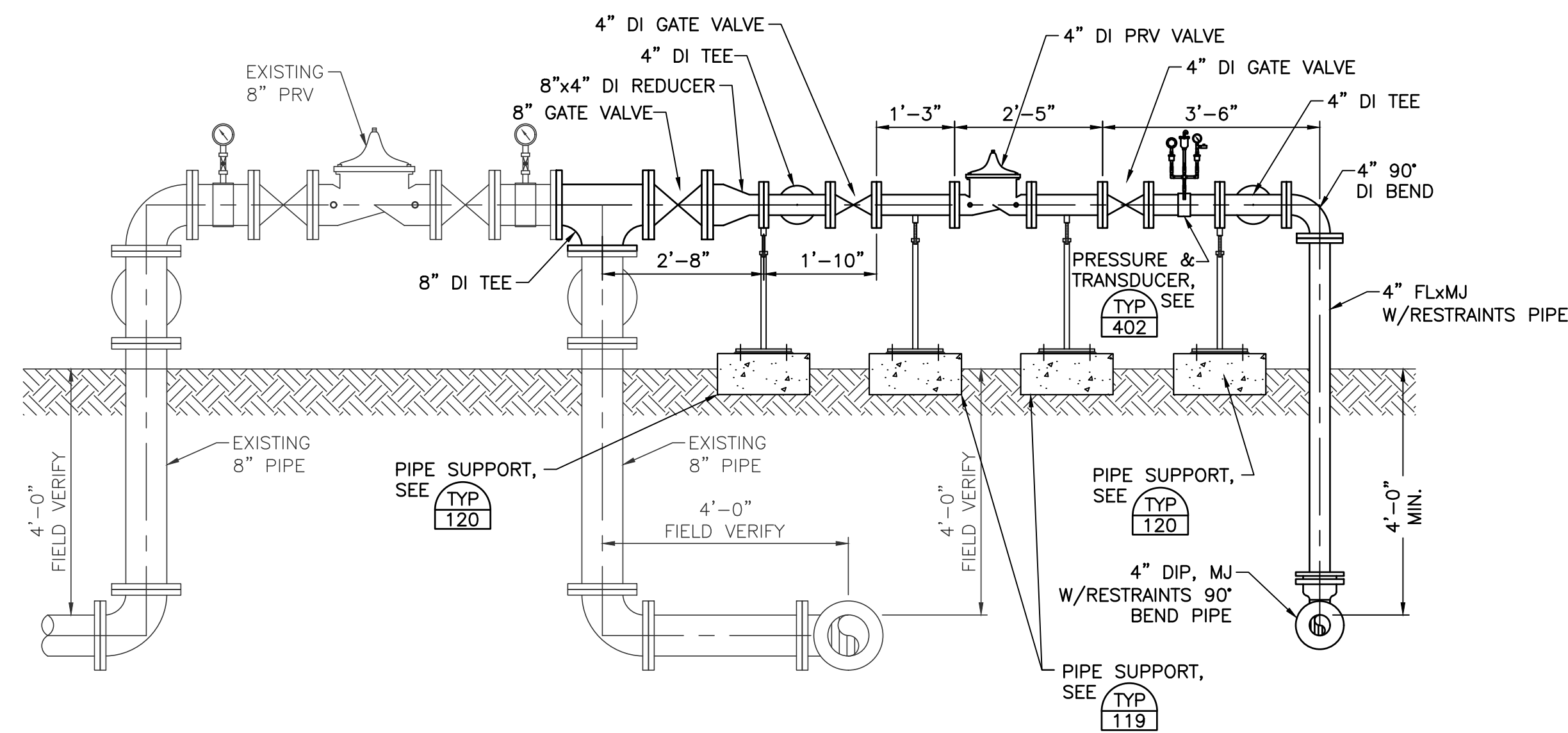


DEMO



MODIFICATIONS

PRV CONNECTION DETAIL
SCALE: 1/2"=1'-0"



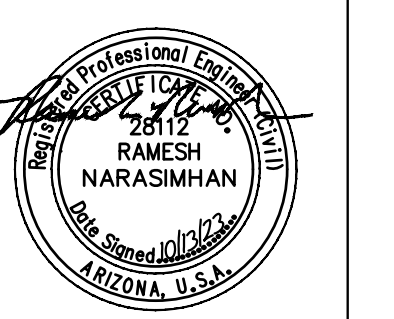
SECTION
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BOOSTER STATION 4 IMPROVEMENTS

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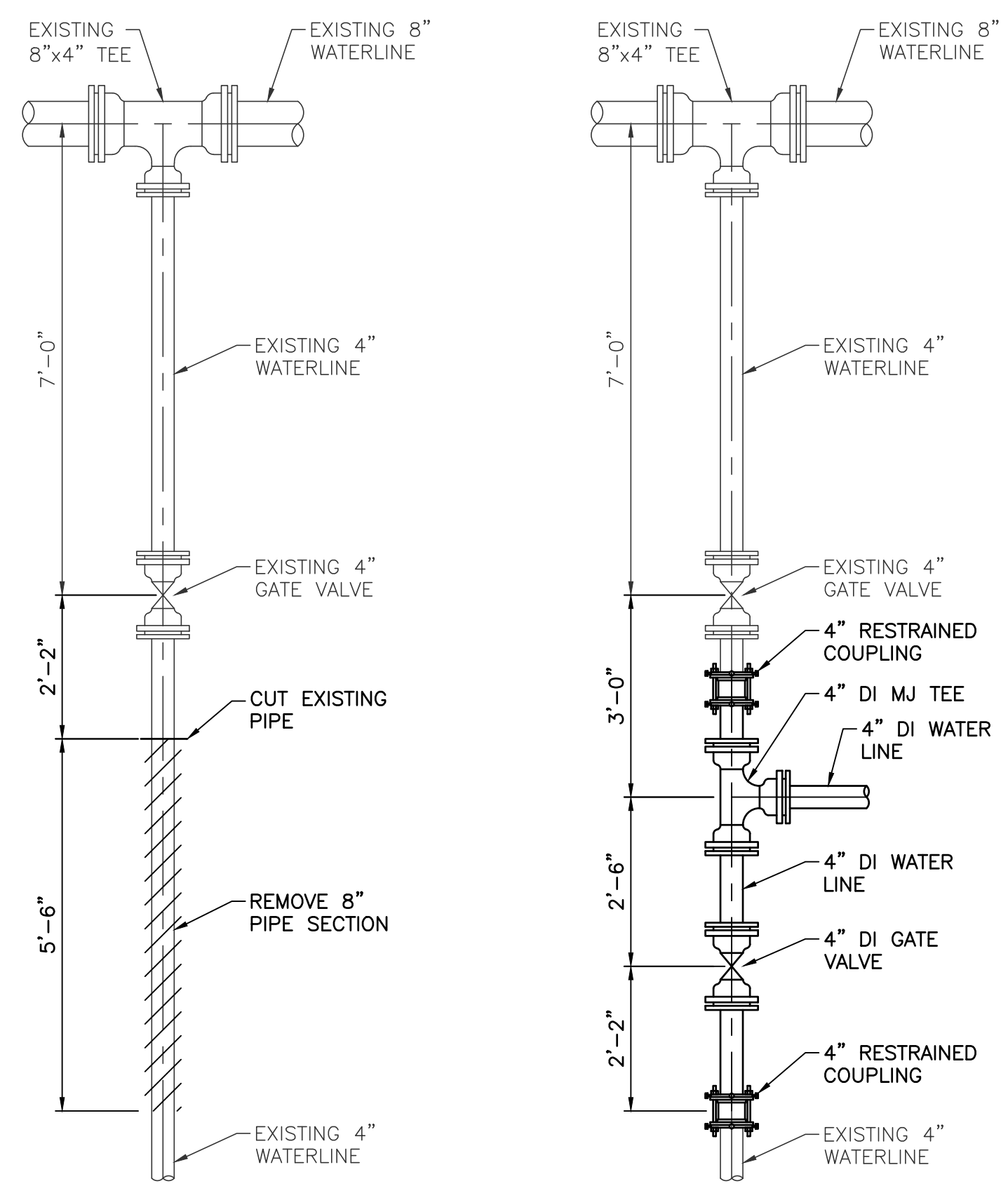
CHERRY TREE
BLVD ADDITION
DETAILS



EXPIRATION DATE: 09/30/24
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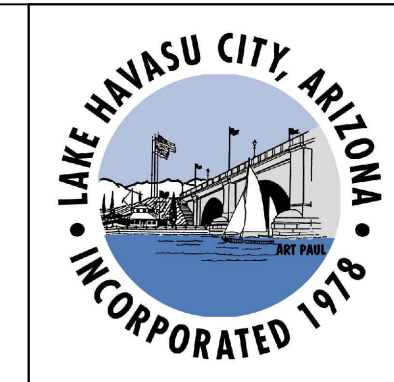




DEMOLITION

IMPROVEMENTS

PIPE CONNECTION DETAIL 2
SCALE: 1/2"=1'-0"
C-04 C-06

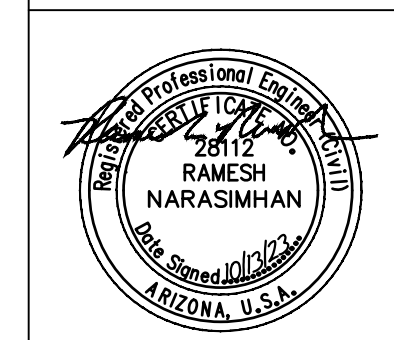


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LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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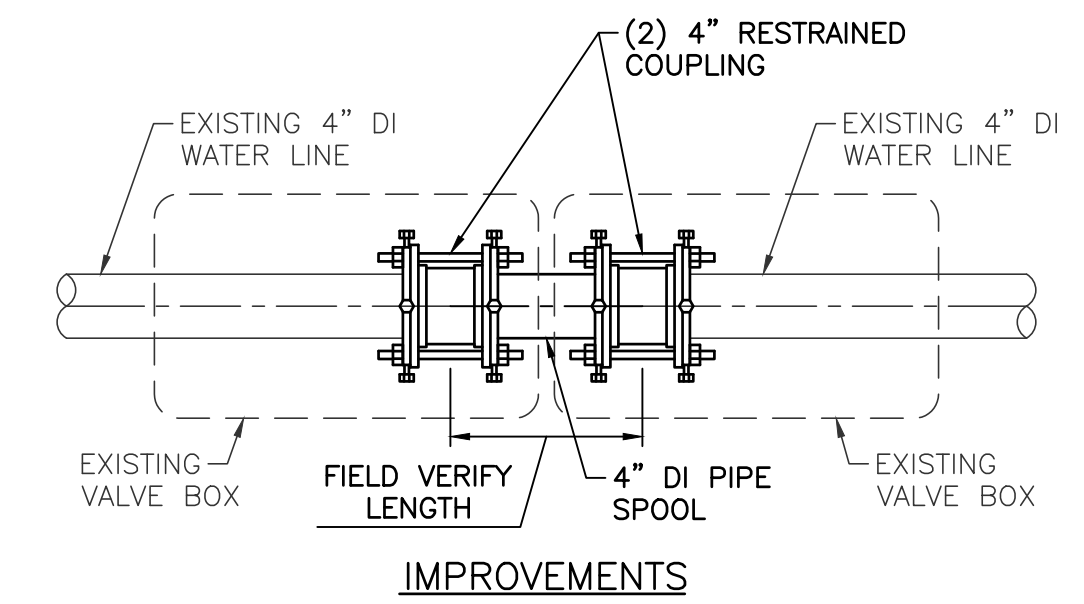
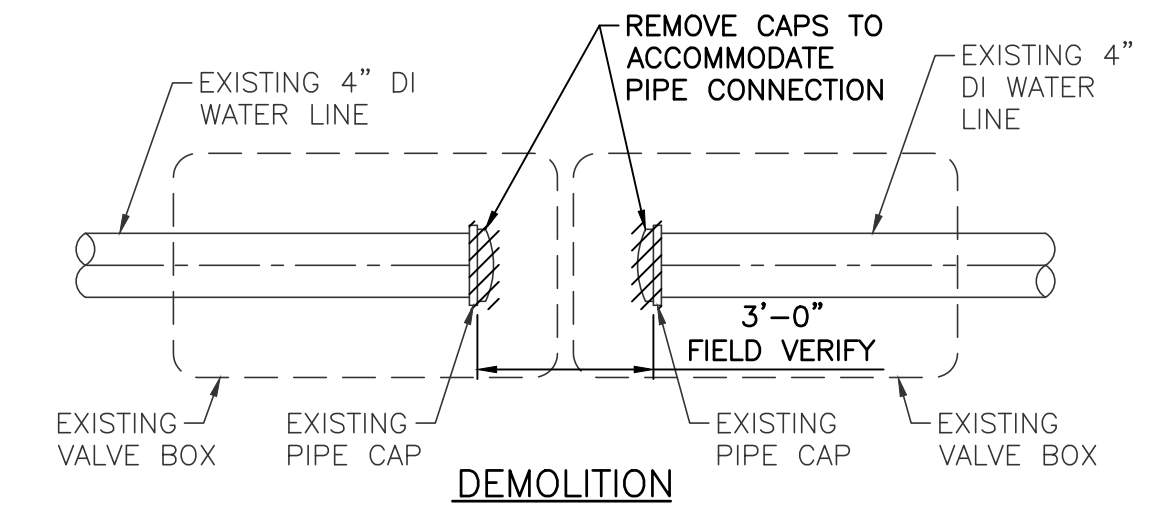
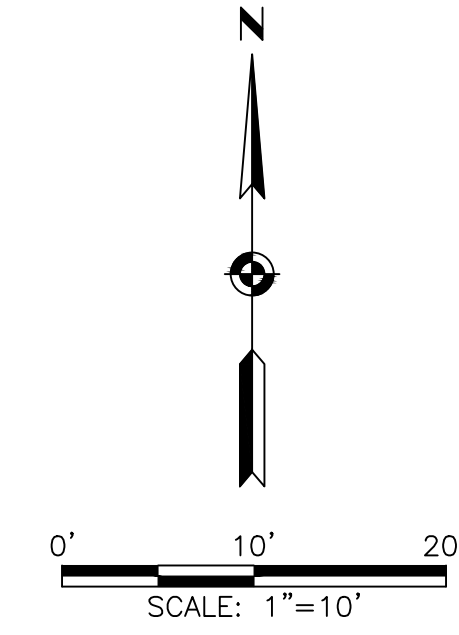
CHERRY TREE
BLVD PIPE
CONNECTION
DETAIL



EXPIRATION DATE: 09/30/24
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C-06
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DETAIL
SCALE: 1"=1'-0" 1
C-07 C-07



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LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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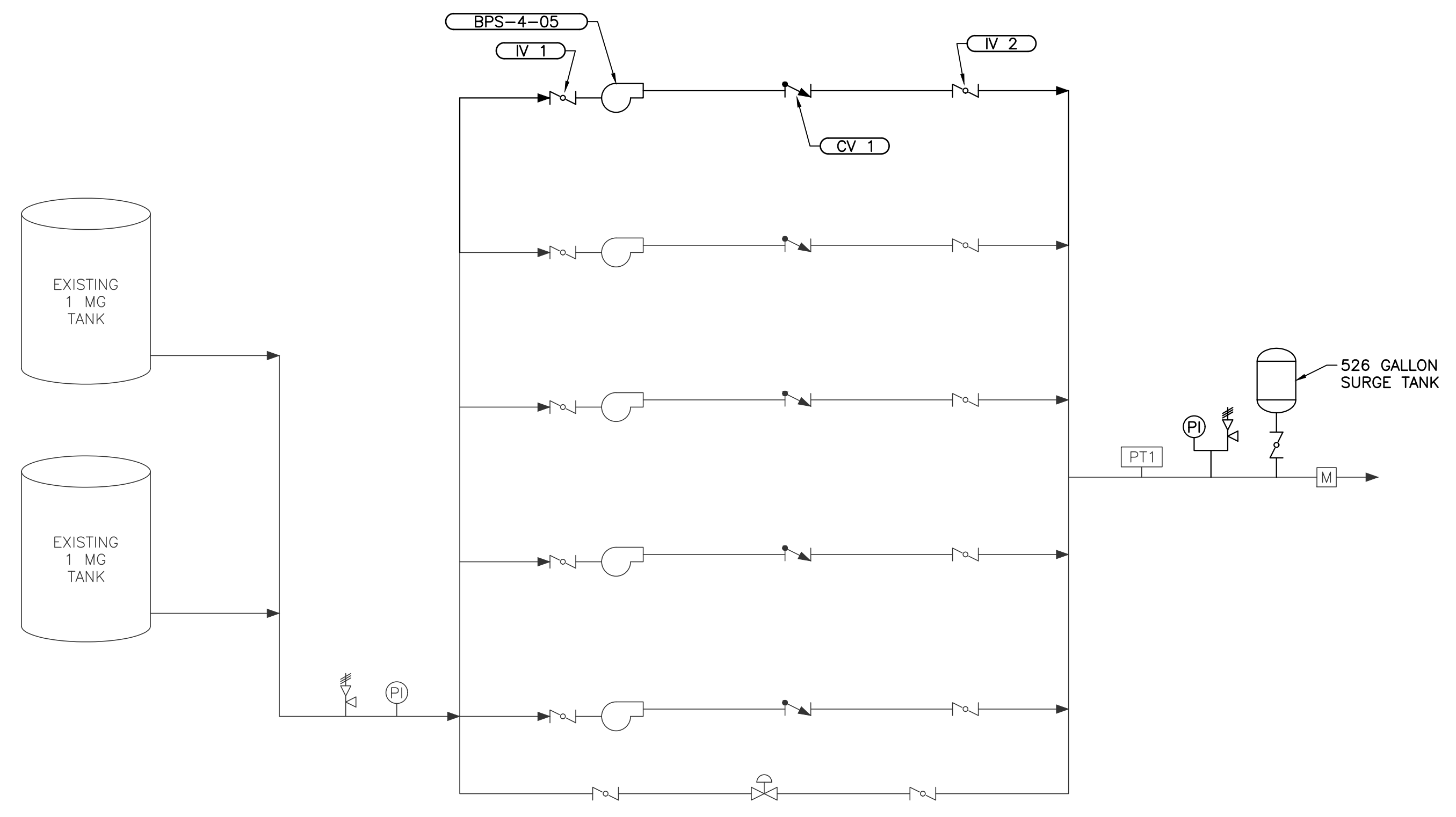
CHERRY TREE PL
PIPING
MODIFICATION
PLAN AND DETAIL



EXPIRATION DATE: 09/30/24
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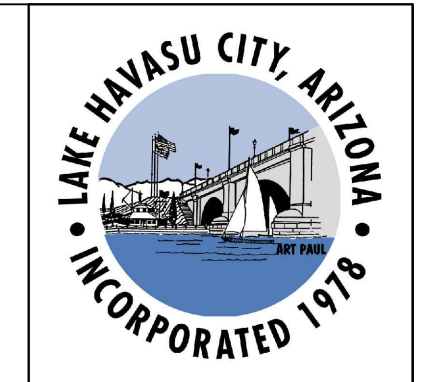




FACILITY SCHEMATIC

SCHEMATIC SYMBOL LEGEND:

	AIR COMPRESSOR
	AIR/VAC VALVE
	BUTTERFLY VALVE
	CHECK VALVE
	EQUIPMENT TAG NUMBER
	MAGNETIC FLOW METER
	PRESSURE GAUGE
	PRESSURE REDUCING VALVE
	PRESSURE SWITCH HIGH
	PRESSURE SWITCH LOW LOW
	PRESSURE TRANSMITTER
	PUMP
	TANK LEVEL TRANSMITTER

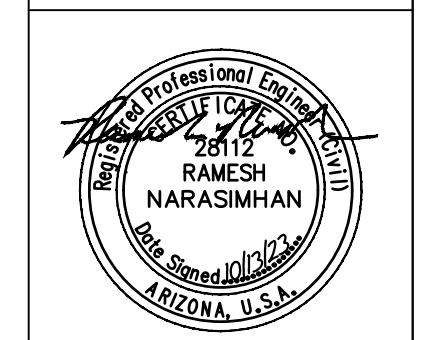


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FACILITY SCHEMATIC



EXPIRATION DATE: 09/30/24
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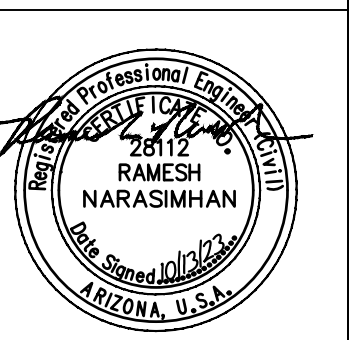
DEMOLITION KEY NOTES	
1	REMOVE AND REPLACE 8" FLOW METER
2	REMOVE 1 SEGMENT OF 8" PIPING
3	REMOVE EXISTING 300 GALLON SURGE TANK AND PIPING
4	REMOVE 90° DI BEND
5	REMOVE 45° MJ BEND
6	REMOVE 45° MJ BEND
7	REMOVE 45° MJ BEND
8	REMOVE PRESSURE GAUGE
9	REMOVE AIR RELEASE VALVE
NOTES:	
1.	----

NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

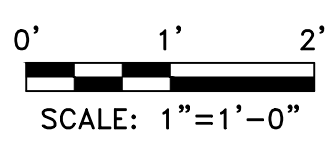
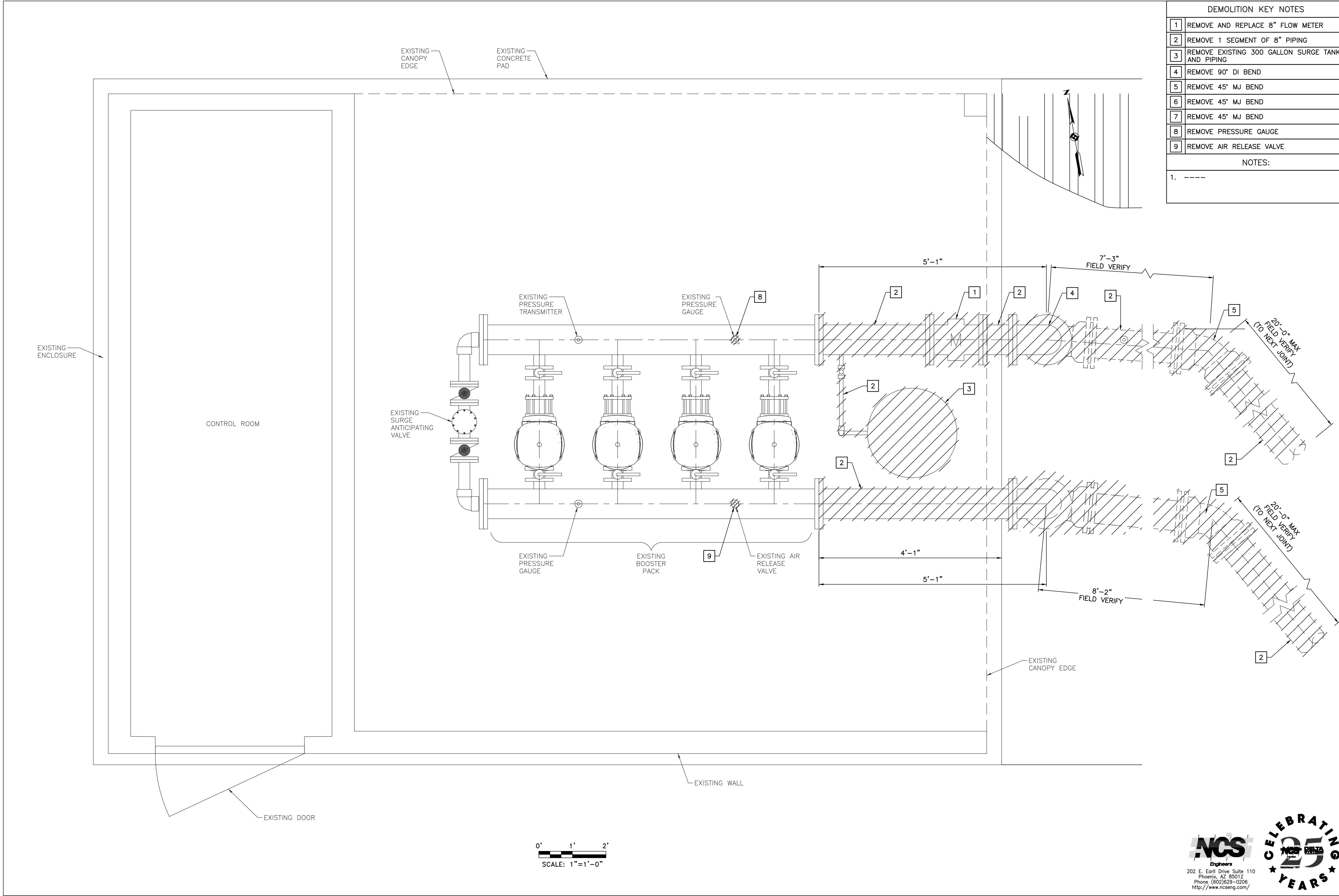
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Checked by:	RN
Date:	02-10-223
Dwg scale:	AS NOTED

BOOSTER PUMP STATION 4 IMPROVEMENTS DEMOLITION PLAN



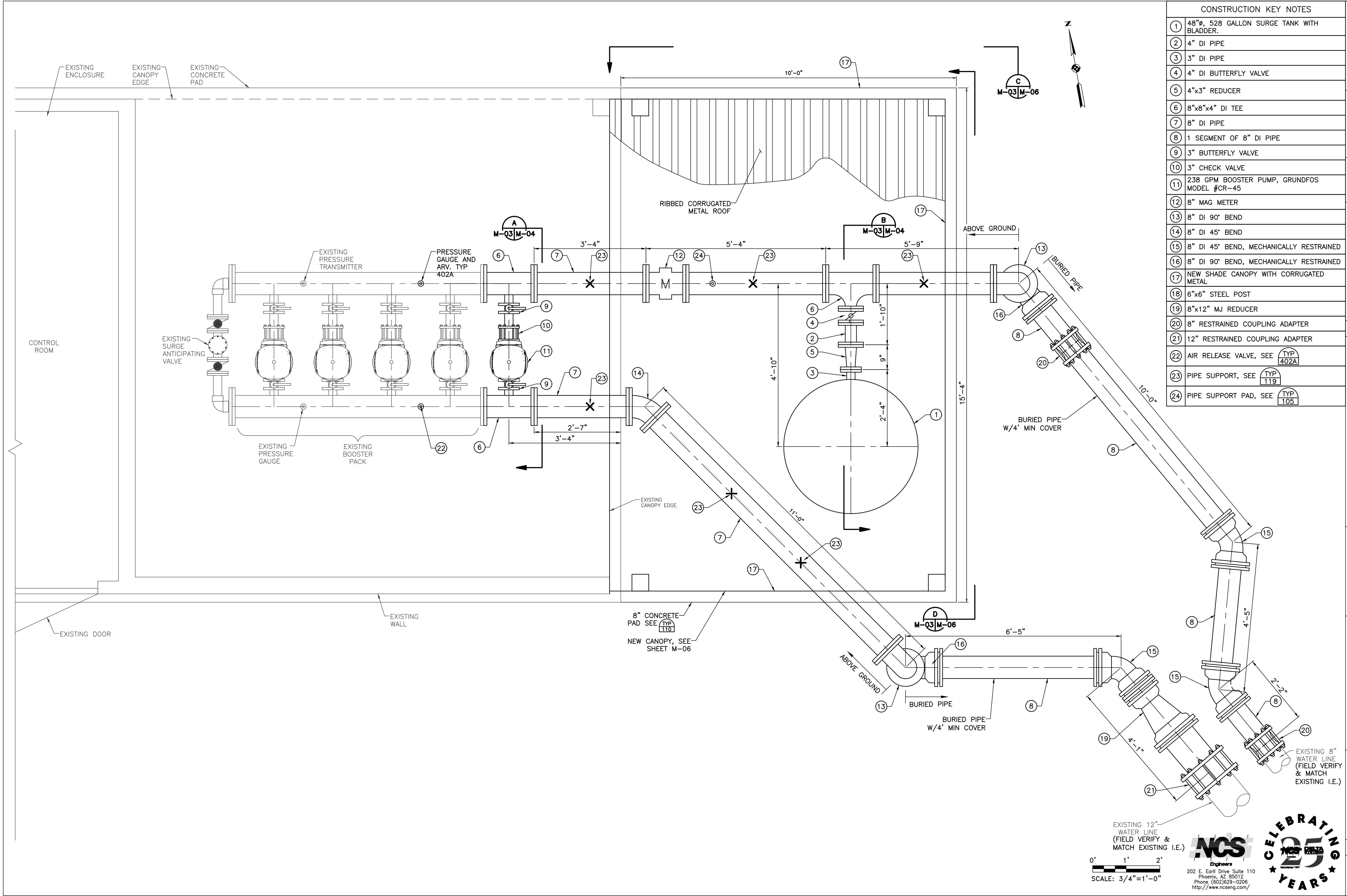
Sheet Number:

M-02
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CELEBRATING 25 YEARS

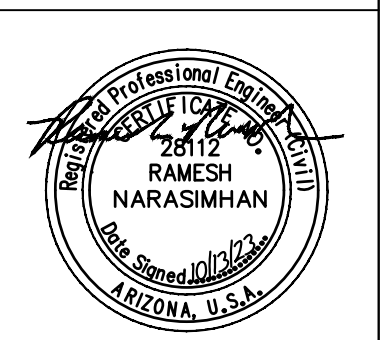


CONSTRUCTION KEY NOTES	
1	48" Ø, 528 GALLON SURGE TANK WITH BLADDER.
2	4" DI PIPE
3	3" DI PIPE
4	4" DI BUTTERFLY VALVE
5	4"x3" REDUCER
6	8"x8"x4" DI TEE
7	8" DI PIPE
8	1 SEGMENT OF 8" DI PIPE
9	3" BUTTERFLY VALVE
10	3" CHECK VALVE
11	238 GPM BOOSTER PUMP, GRUNDFOS MODEL #CR-45
12	8" MAG METER
13	8" DI 90° BEND
14	8" DI 45° BEND
15	8" DI 45° BEND, MECHANICALLY RESTRAINED
16	8" DI 90° BEND, MECHANICALLY RESTRAINED
17	NEW SHADE CANOPY WITH CORRUGATED METAL
18	6"x6" STEEL POST
19	8"x12" MJ REDUCER
20	8" RESTRAINED COUPLING ADAPTER
21	12" RESTRAINED COUPLING ADAPTER
22	AIR RELEASE VALVE, SEE TYP 402A
23	PIPE SUPPORT, SEE TYP 119
24	PIPE SUPPORT PAD, SEE TYP 105

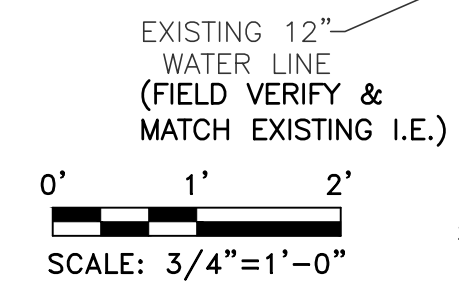
LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

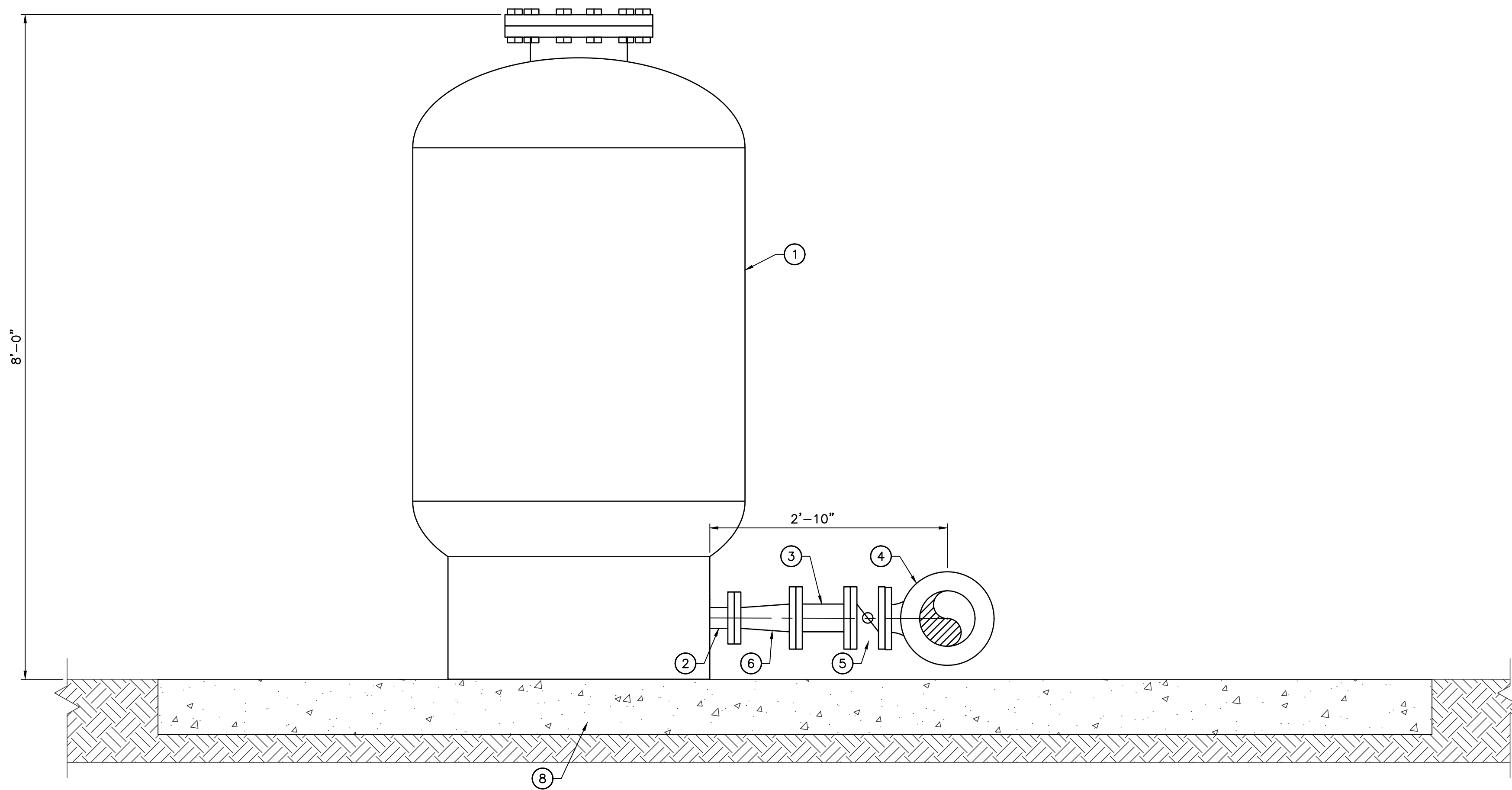
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Checked by:	RN
Date:	02-10-2023
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BOOSTER PUMP STATION IMPROVEMENTS PLAN

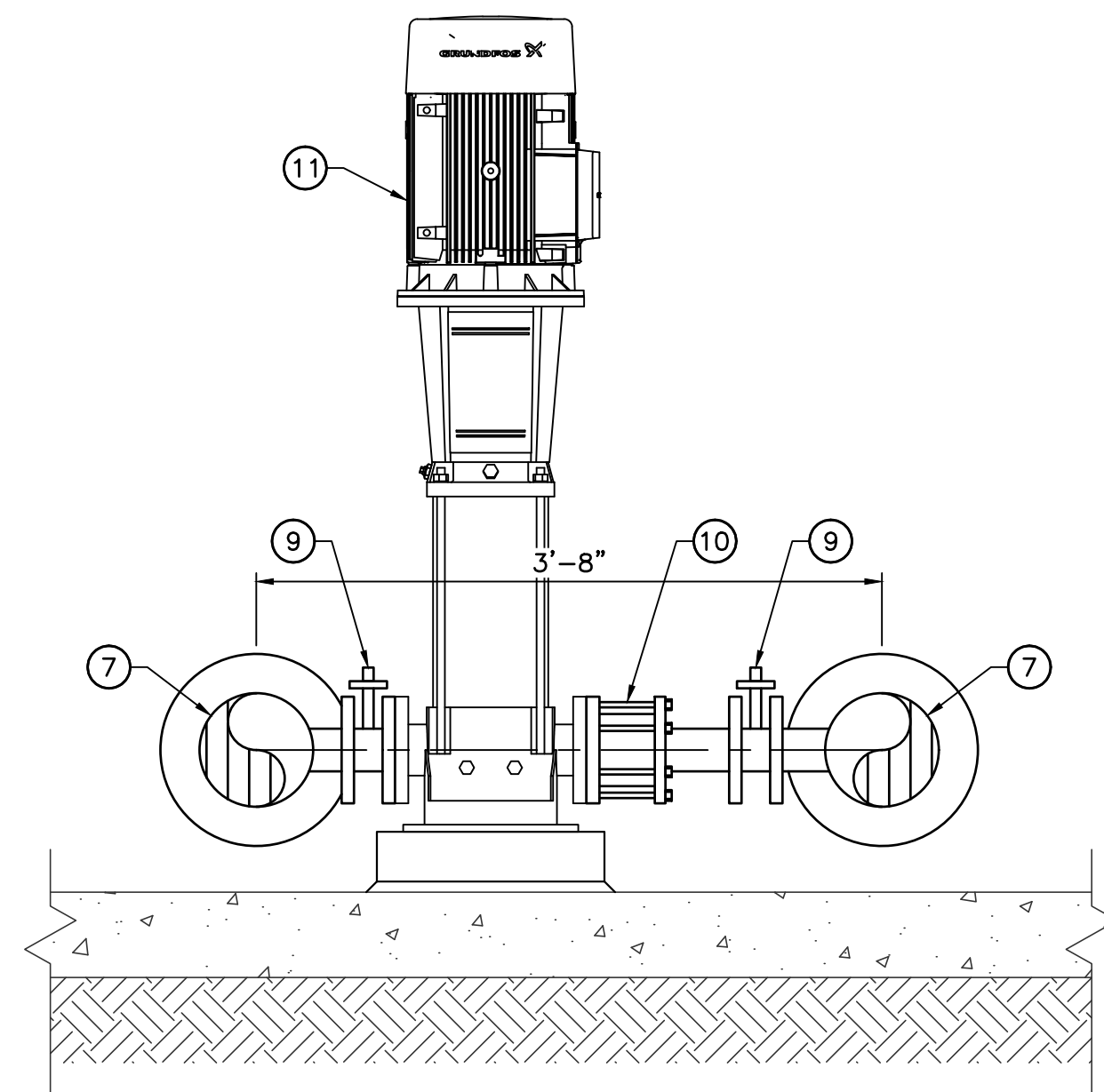


EXPIRATION DATE: 09/30/24
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M-03
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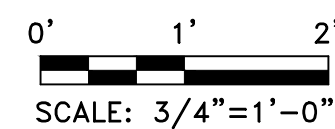




SECTION B
SCALE: 1/2"=1'-0" M-03 M-04



SECTION A
SCALE: 1/2"=1'-0" M-03 M-04

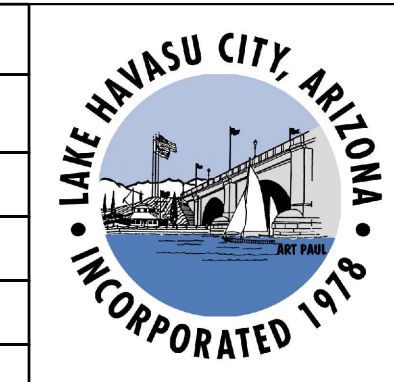


CONSTRUCTION KEY NOTES

①	48"ø, 528 GALLON SURGE TANK WITH BLADDER.
②	3" DI PIPE
③	4" DI PIPE
④	8"x8"x4" DI TEE
⑤	4" DI BUTTERFLY VALVE
⑥	4"x3" REDUCER
⑦	8"x4" DI TEE
⑧	10'x15'-4"x8" CONCRETE PAD, SEE TYP 110
⑨	3" BUTTERFLY VALVE
⑩	3" CHECK VALVE
⑪	238 GPM BOOSTER PUMP, GRUNDFOS MODEL #CR-45

NOTES:

1. ----

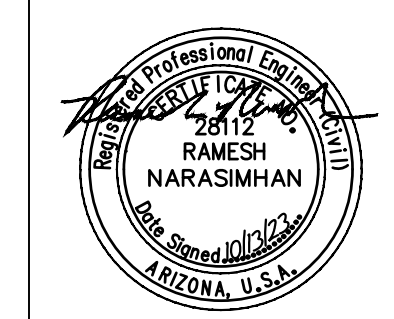


LAKE HAVASU CITY

BOOSTER STATION 4 IMPROVEMENTS

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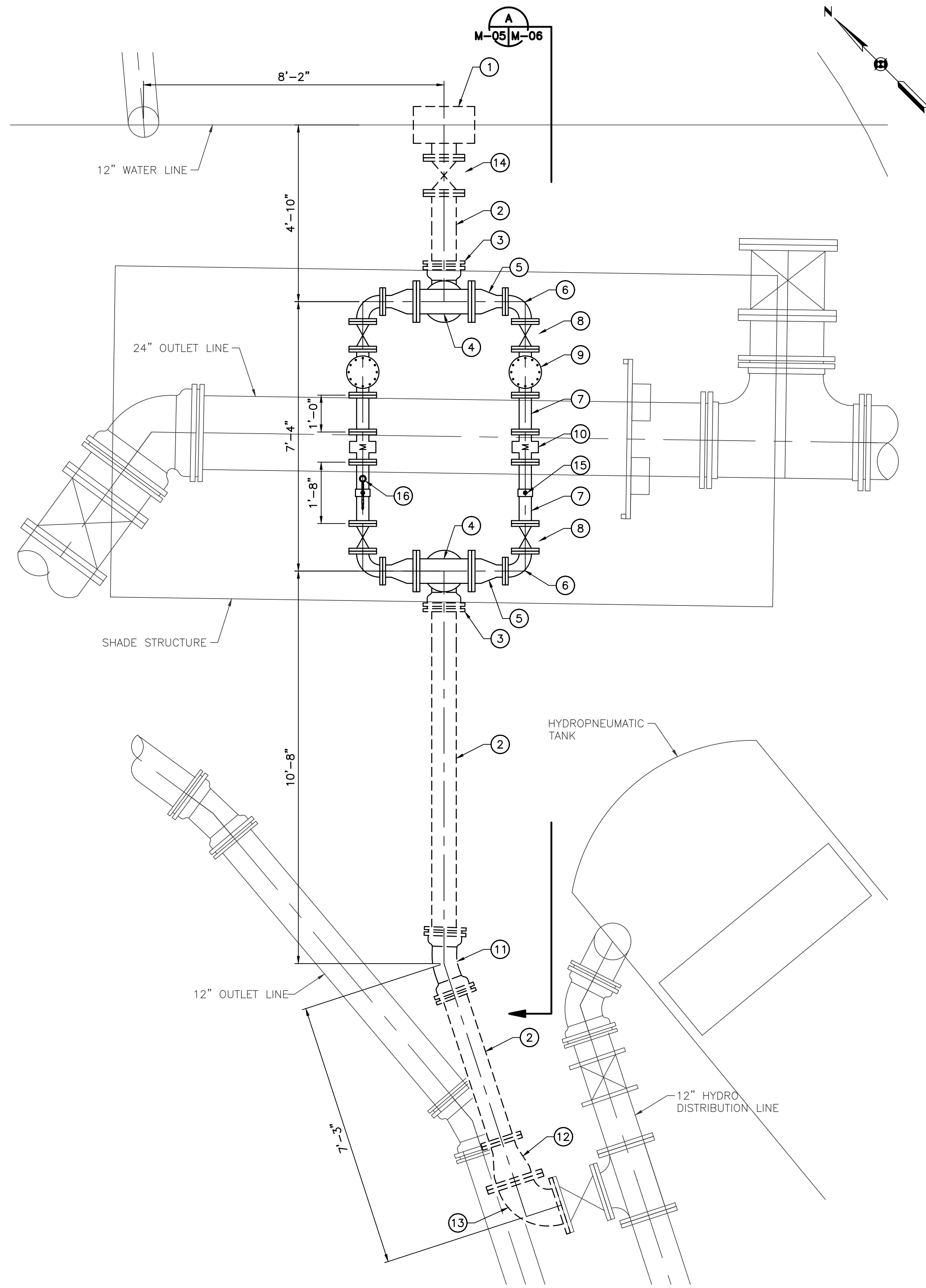
BOOSTER PUMP
STATION SECTIONS



EXPIRATION DATE: 09/30/24
Sheet Number:

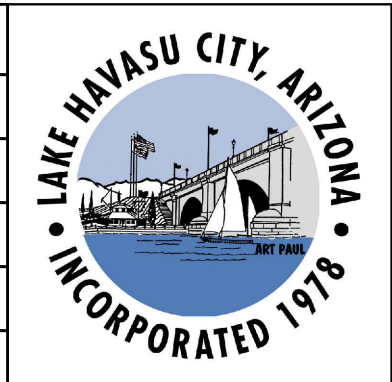
M-04
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HYDRO ZONE PRV PLAN
SCALE: 1/2"=1'-0"

KEY NOTES	
①	12"x8" HOT TAP SLEEVE
②	8" DI PIPE
③	8" DI 90° BEND, MECHANICAL RESTRAINED
④	8" DI TEE
⑤	8"x4" DI REDUCER
⑥	4" DI 90° ELBOW
⑦	4" DI PIPE
⑧	4" DI GATE VALVE
⑨	4" DI PRESSURE REDUCING VALVE
⑩	4" DI FLOW METER
⑪	8" 22.5° BEND, MECHANICALLY RESTRAINED
⑫	12"x8" REDUCER, MECHANICALLY RESTRAINED
⑬	12" 90° BEND, MECHANICALLY RESTRAINED
⑭	8" DI GATE VALVE
⑮	4" PRESSURE TRANSDUCER WITH GAUGE
⑯	PRESSURE GAUGE



NO.	REVISIONS / SUBMISSIONS	DATE

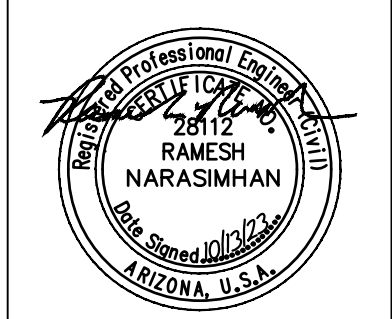
LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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PRV STATION
PLANS

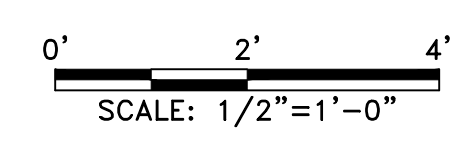
FOR RECORD
DRAWING PURPOSES

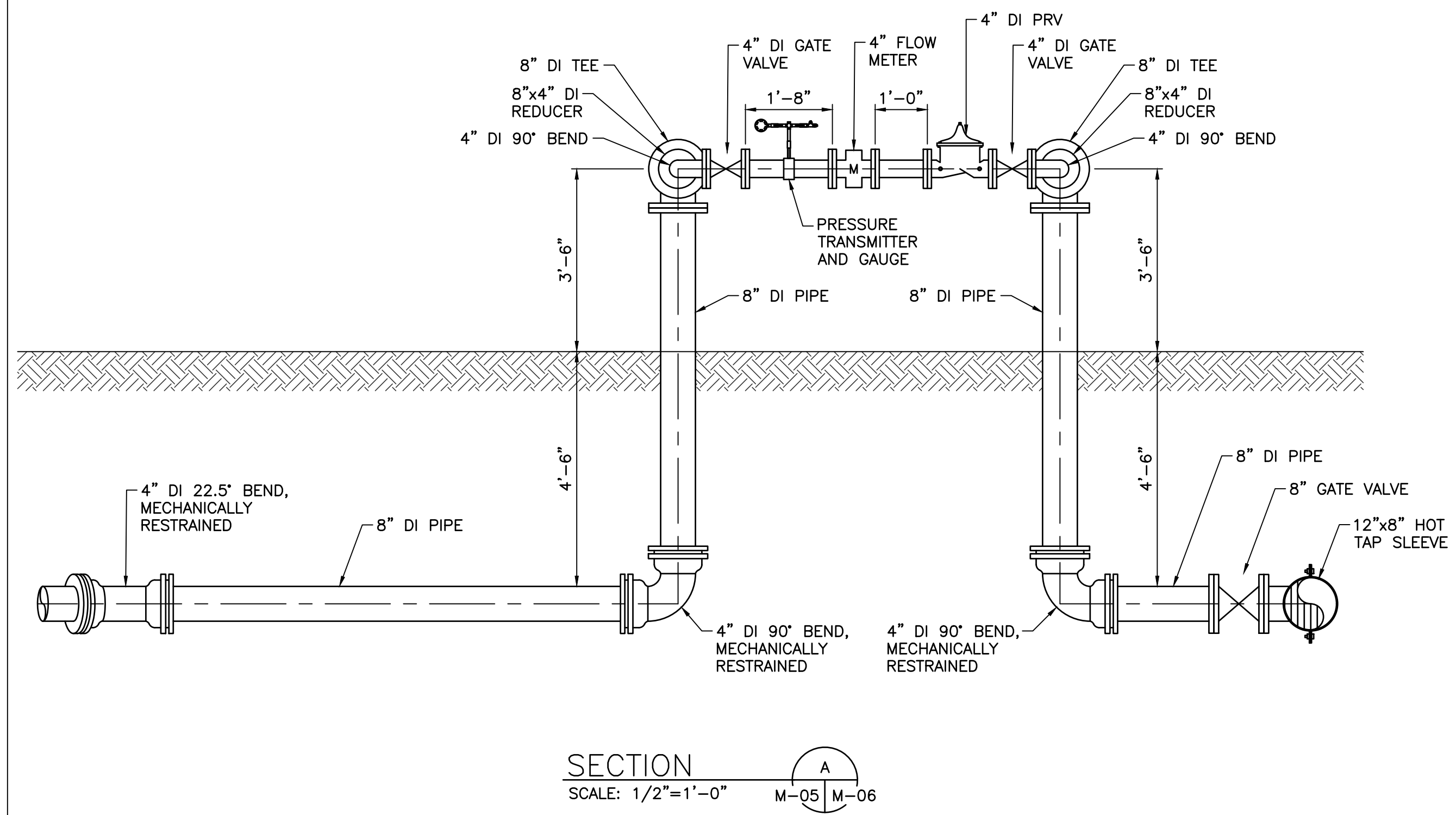
NOT IN CONTRACT



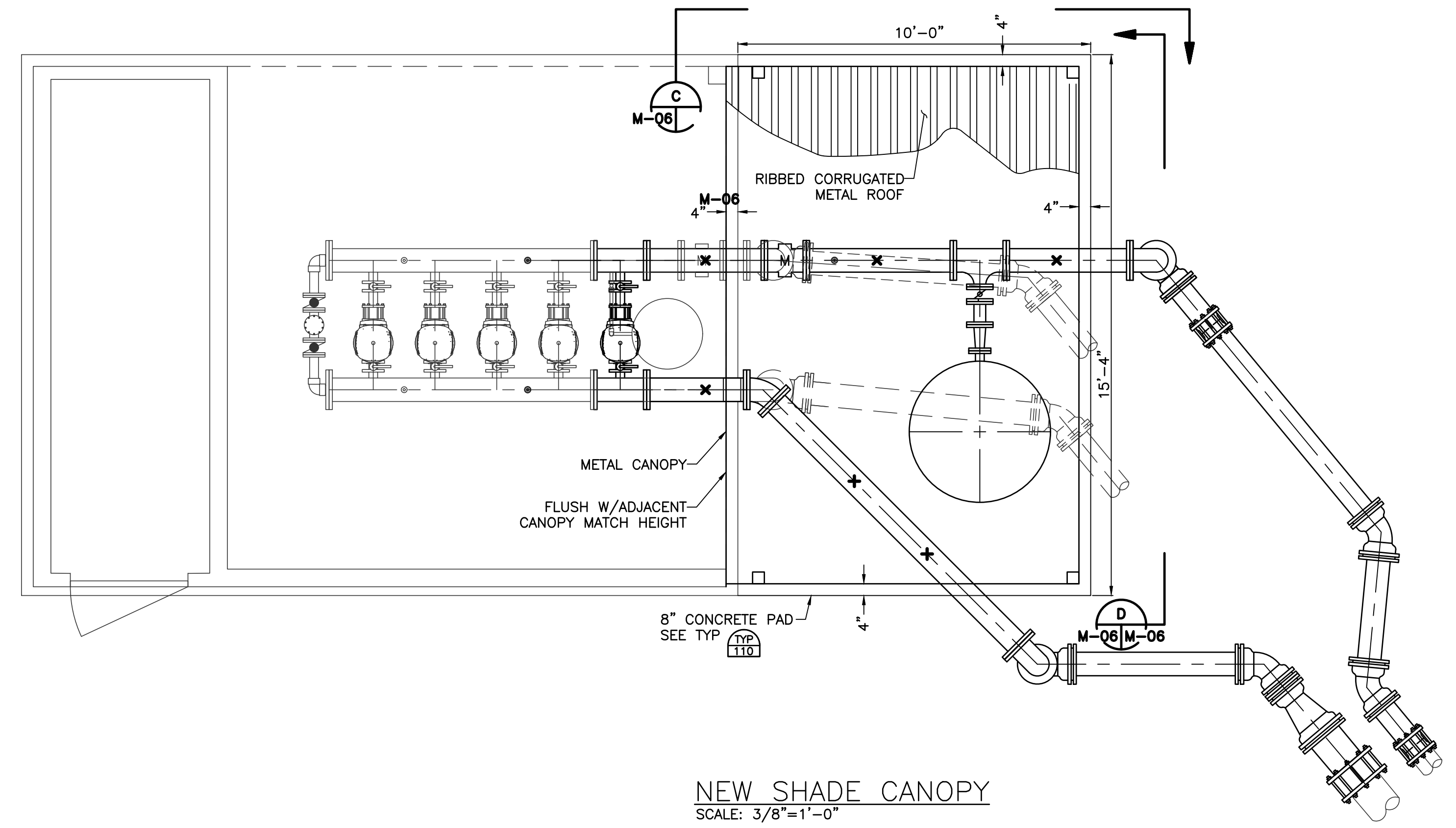
EXPIRATION DATE: 09/30/24
Sheet Number:

M-05
Sheet 15 of 26

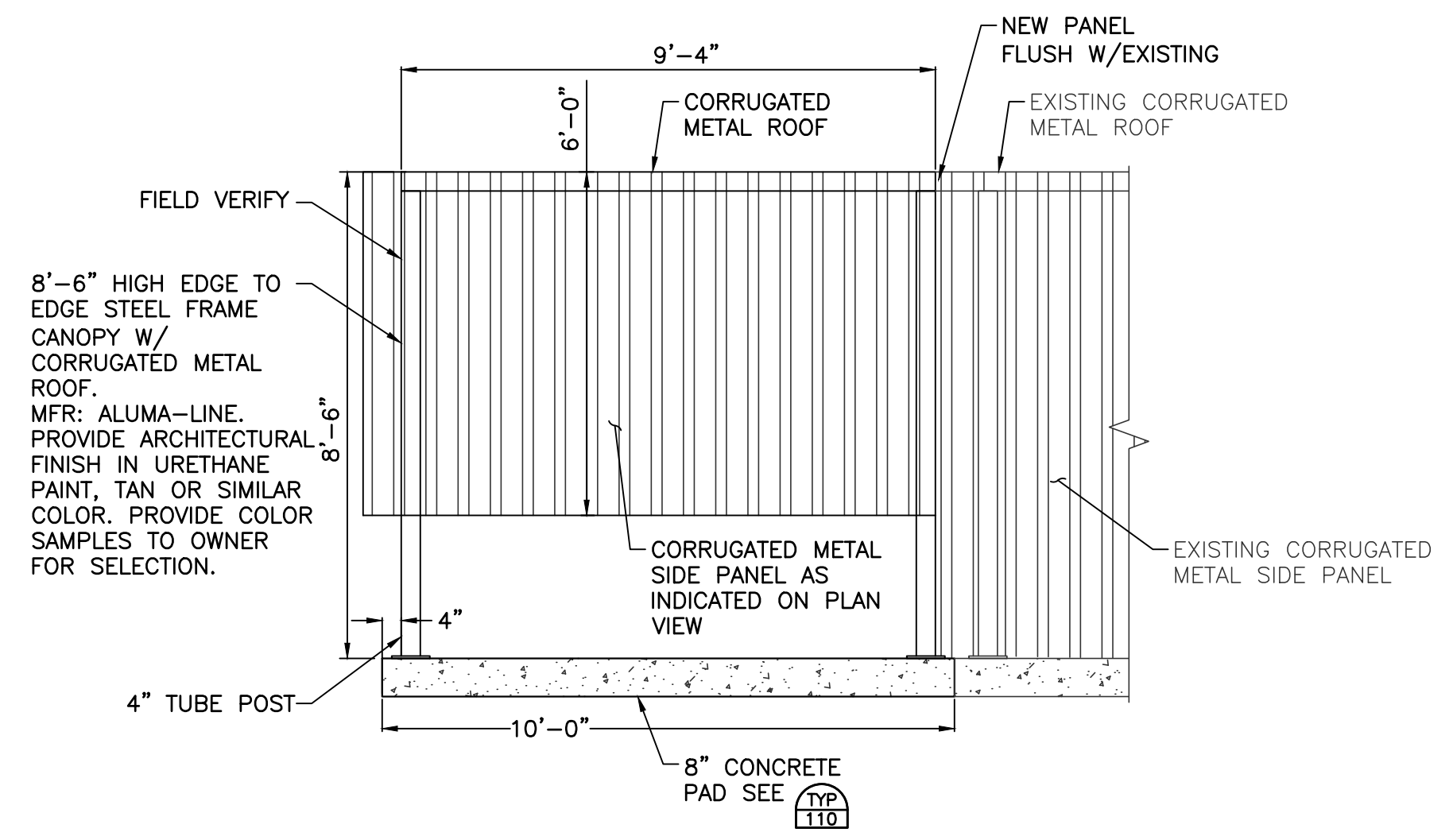




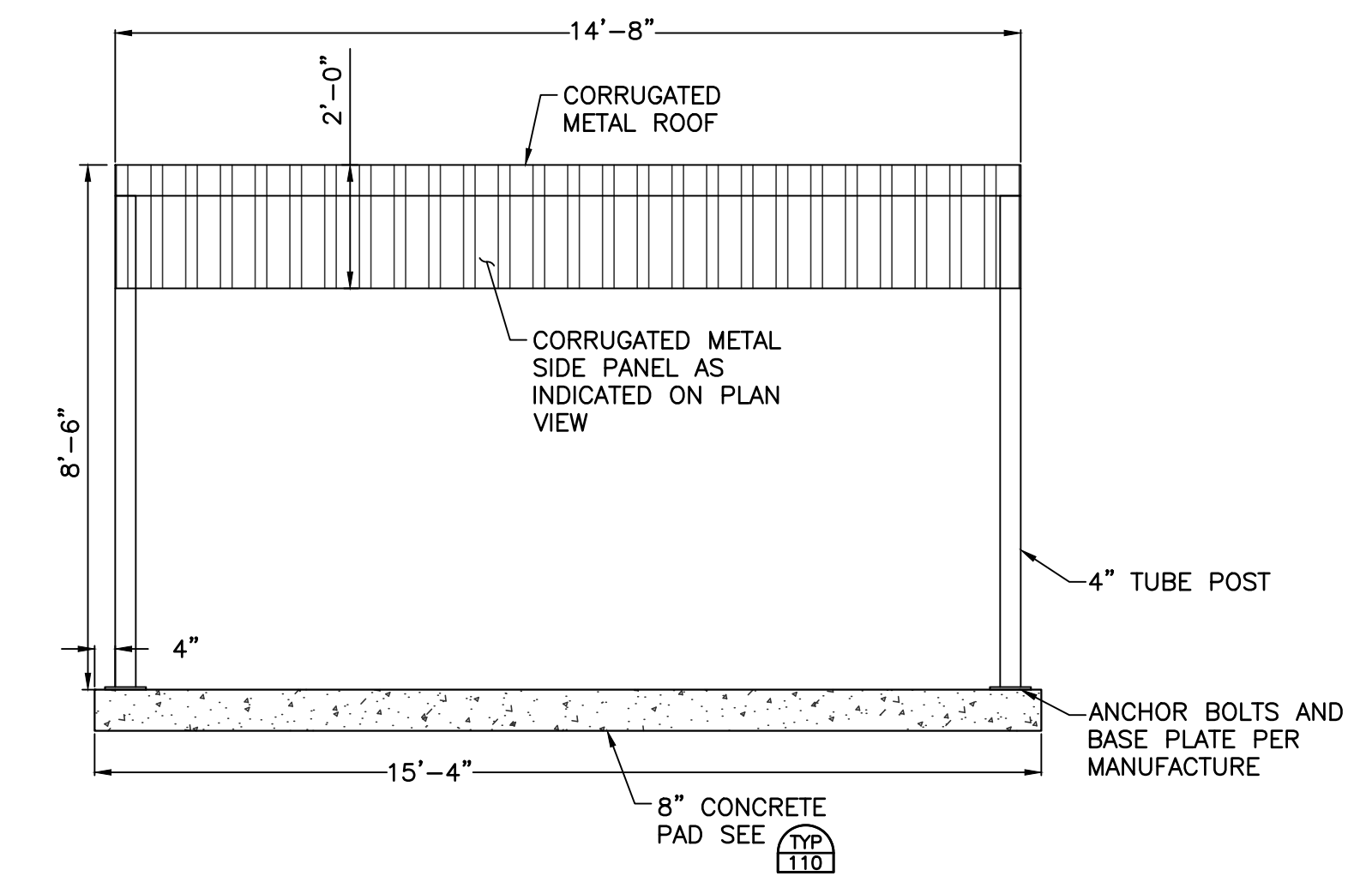
SECTION A
SCALE: 1/2"=1'-0"
M-05 M-06



NEW SHADE CANOPY
SCALE: 3/8"=1'-0"



SECTION C
SCALE: 3/8"=1'-0"
M-06 M-06



SECTION D
SCALE: 3/8"=1'-0"
M-06 M-06

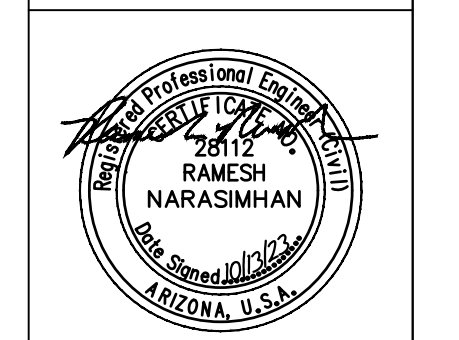
FOR RECORD DRAWING PURPOSES

NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB
Drawn by: KWB
Checked by: RN
Date: 02-10-23
Dwg scale: AS NOTED

PRV STATION SECTION AND DETAILS

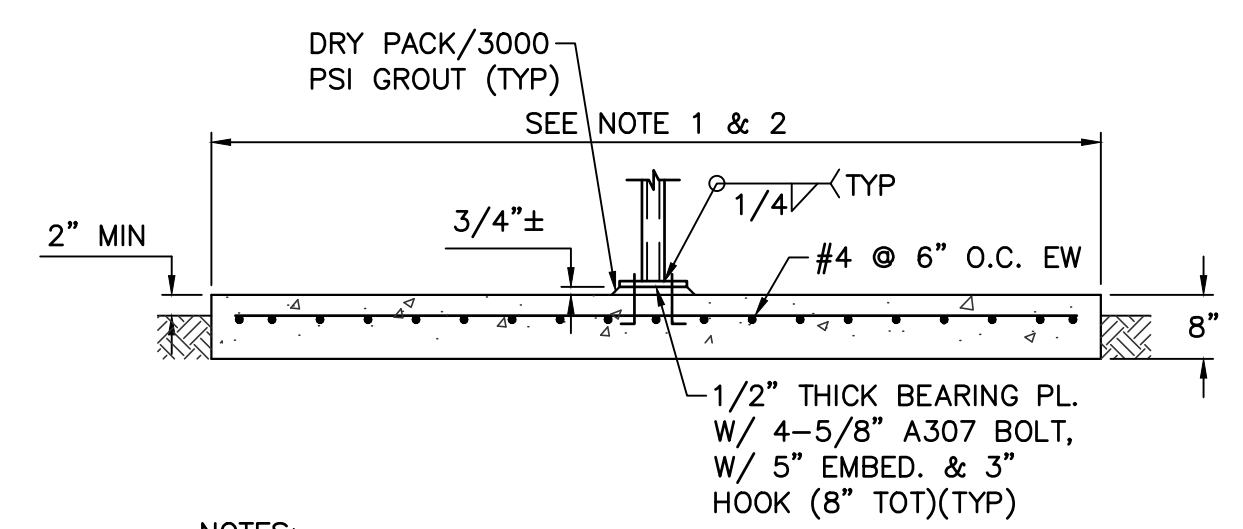


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Sheet Number:

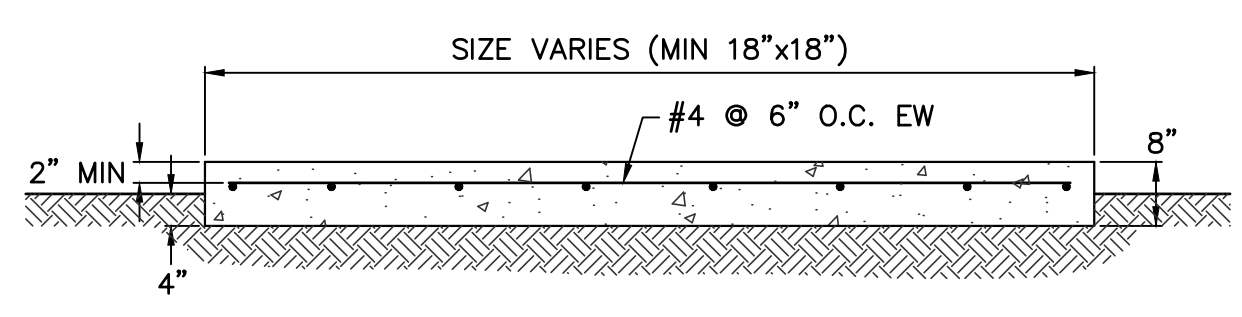
M-06
Sheet 16 of 26



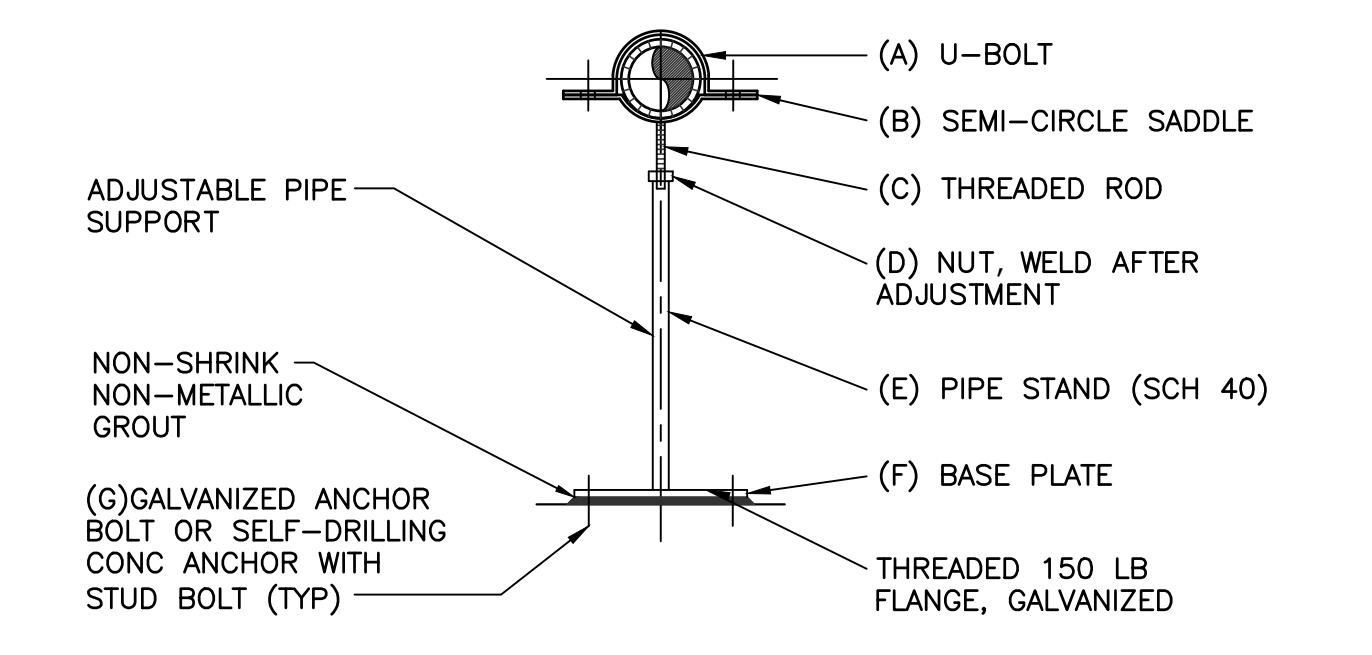
202 E. Earll Drive Suite 110
Phoenix, AZ 85012
Phone (602)629-0206
http://www.ncseng.com/



PIPE SUPPORT PAD (TYP 105)
SCALE: NTS



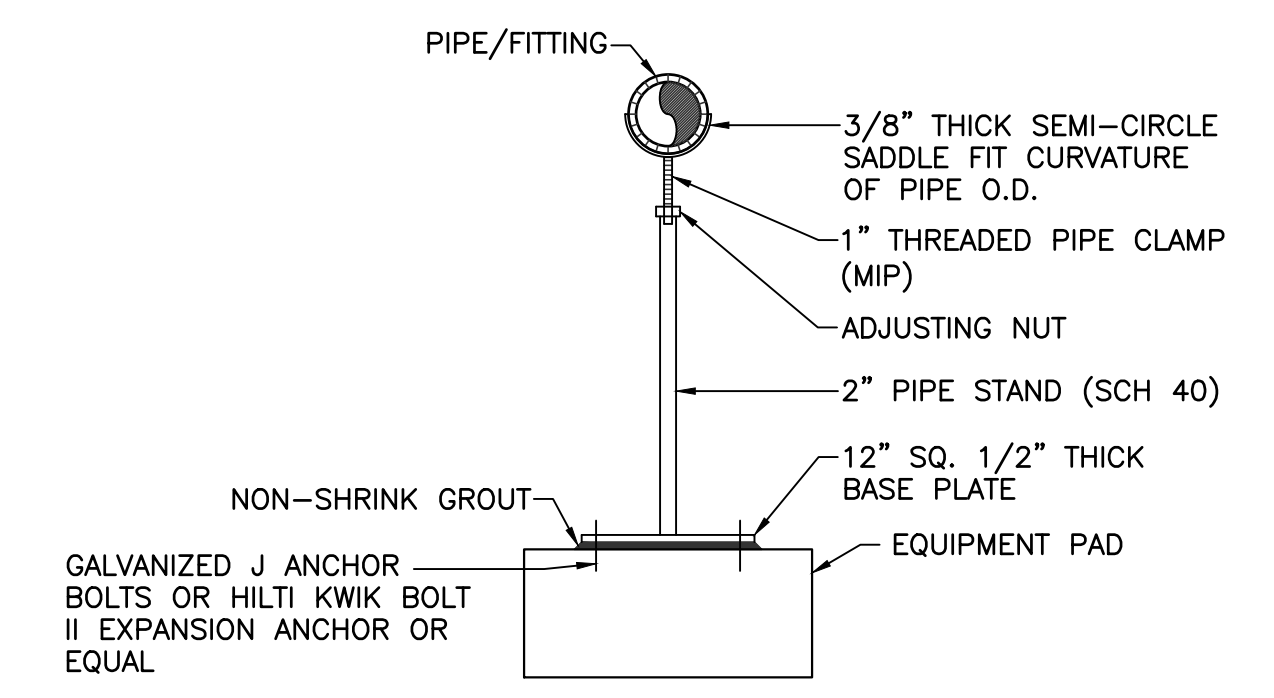
EQUIPMENT PAD (TYP 110)
SCALE: NTS



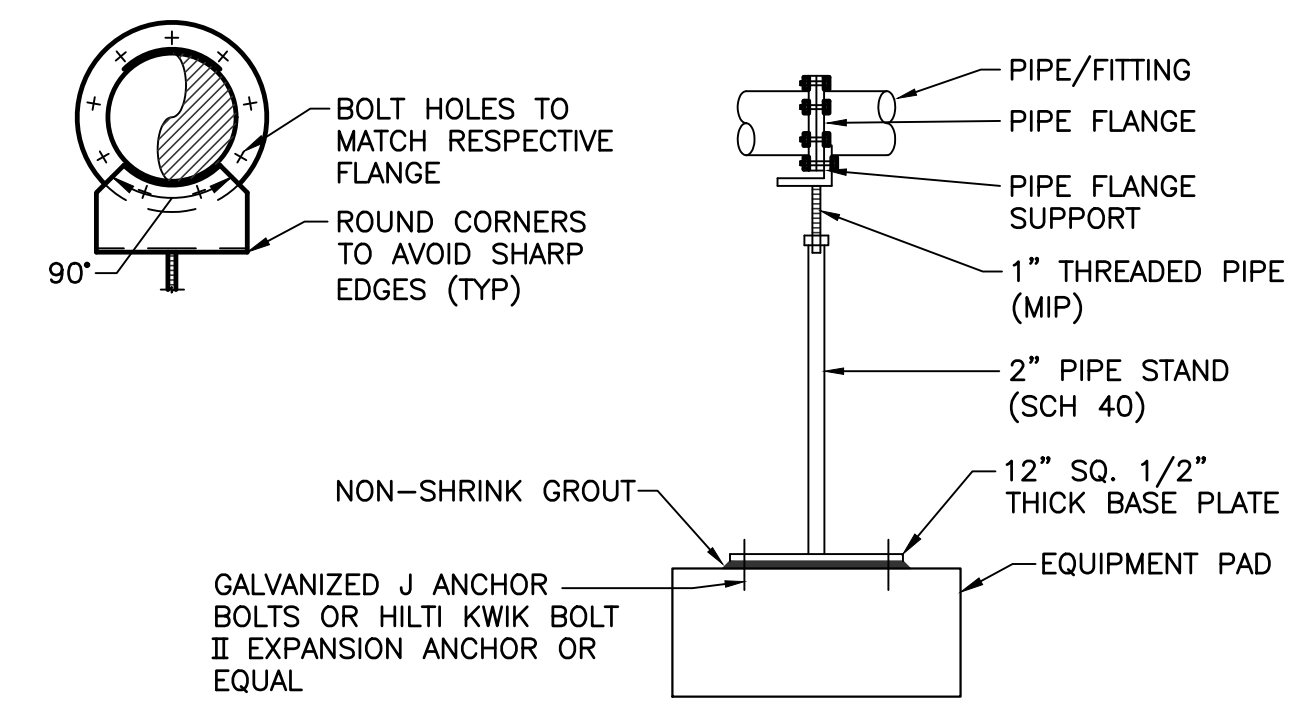
PIPE SIZE	A	B	C, D	E	F	G
2"-4"	1/2"	2"x1/4"	1"	1 1/2" ϕ	6"x6"x3/8"	4-1/2" DIA
6"-10"	5/8"	2"x1/4"	1 1/2"	2" ϕ	6"x6"x3/4"	4-1/2" DIA
12"-18"	3/4"	3"x3/8"	2"	3" ϕ	10"x10"x3/8"	4-5/8" DIA

NOTE:
1. ALL ADJUSTABLE PIPE SUPPORTS SHALL BE CARBON STEEL.
2. PROVIDE 5" EMBEDMENT FOR ALL ANCHOR BOLTS AND ANCHORS INTO CONCRETE SLAB.

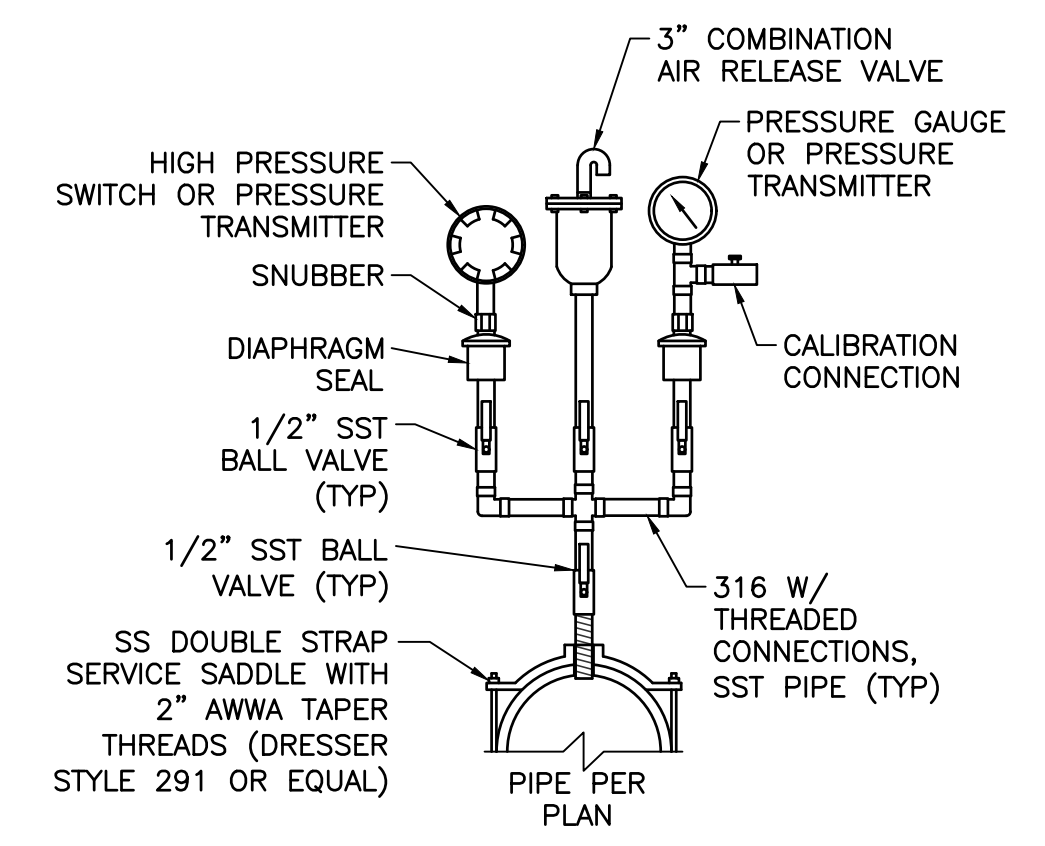
ADJUSTABLE PIPE SUPPORT (TYP 118)
SCALE: 1"=1'-0"



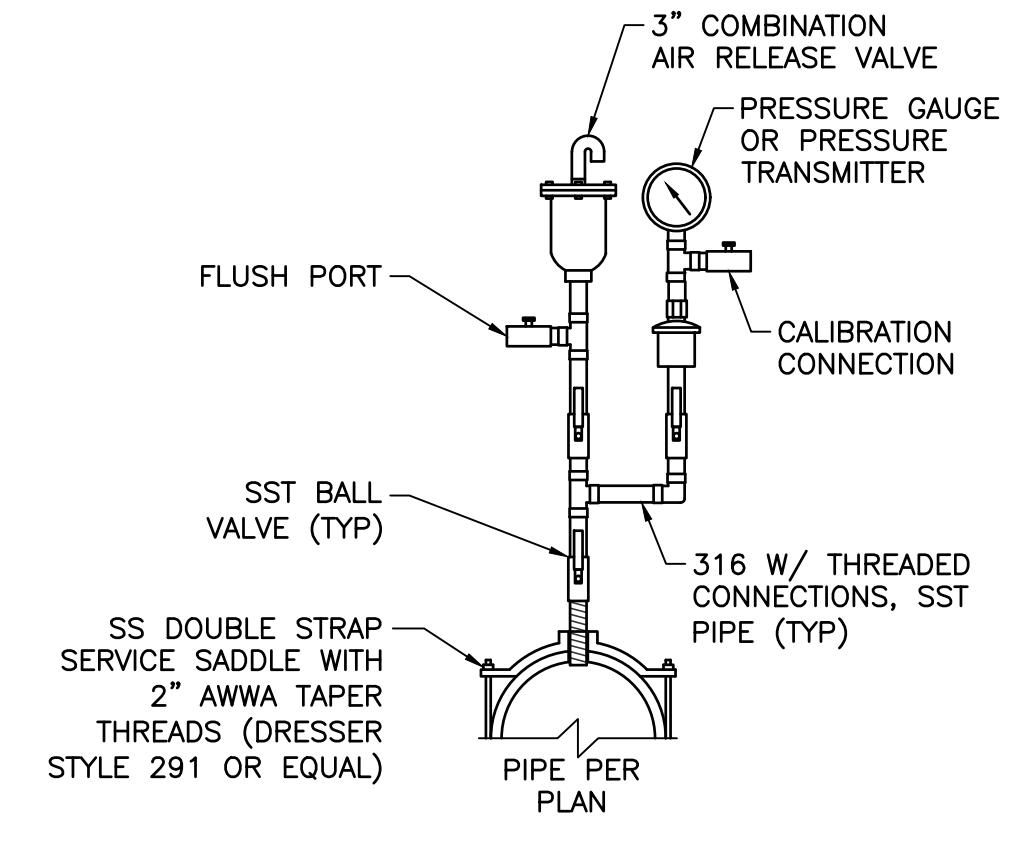
ADJUSTABLE PIPE SADDLE SUPPORT (TYP 119)
SCALE: NTS



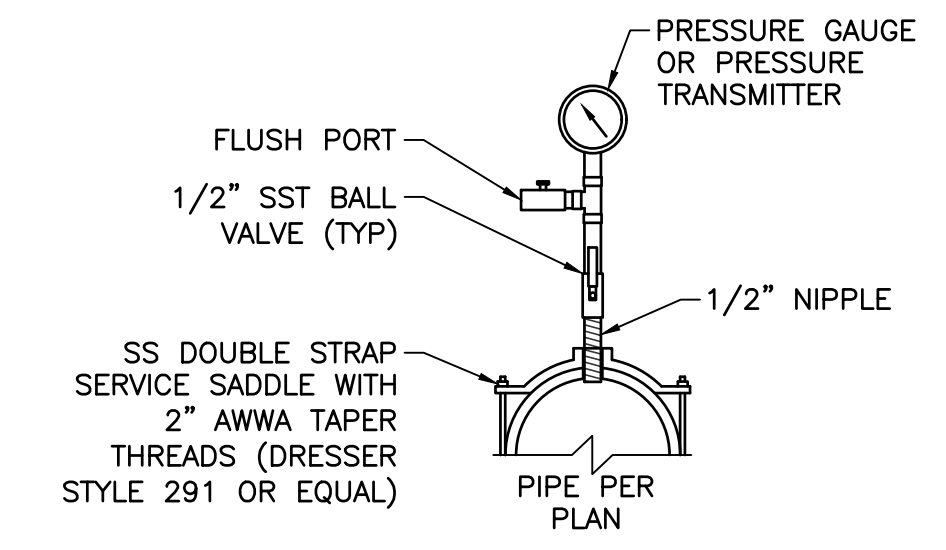
ADJUSTABLE PIPE FLANGE SUPPORT BOLTED TO FLANGE (TYP 120)
SCALE: 1"=1'-0"



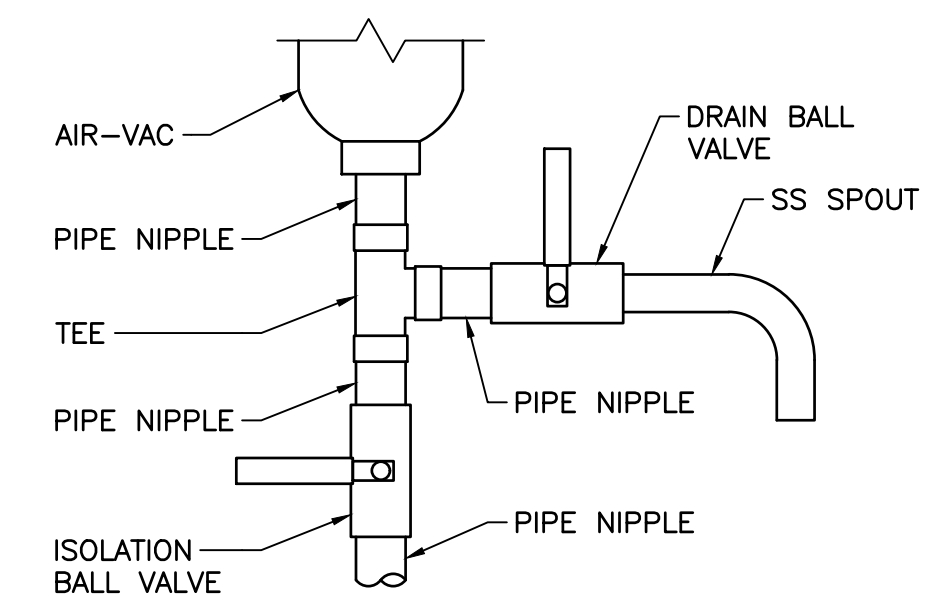
HIGH PRESSURE SWITCH-AIR RELEASE VALVE-PRESSURE GAUGE, TAP (TYP 402)
SCALE: NTS



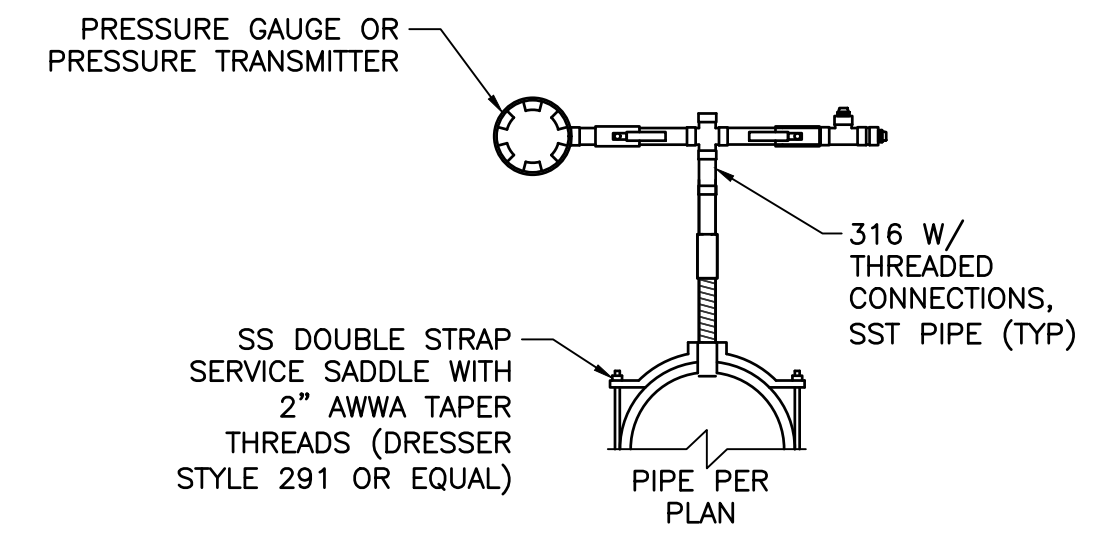
AIR RELEASE VALVE PRESSURE GAUGE, TAP (TYP 402A)
SCALE: NTS



PRESSURE GAUGE (TYP 402B)
SCALE: NTS



AIR-VAC CONNECTION DETAIL (TYP 403)
SCALE: NTS



PRESSURE GAUGE AND TRANSMITTER (TYP 402A)
SCALE: NTS

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LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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TYPICAL MECHANICAL DETAILS-1

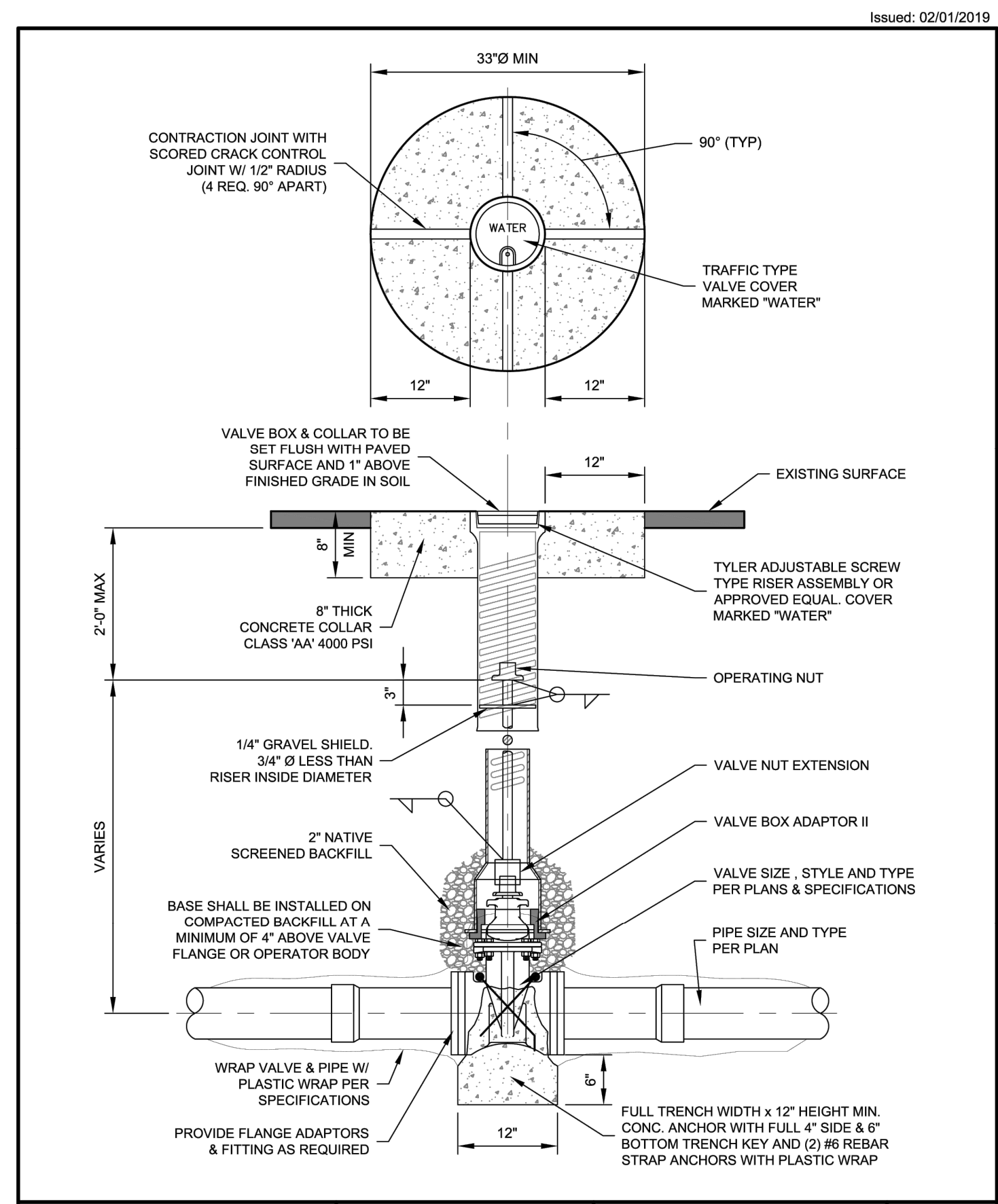


EXPIRATION DATE: 09/30/24
Sheet Number:

M-07
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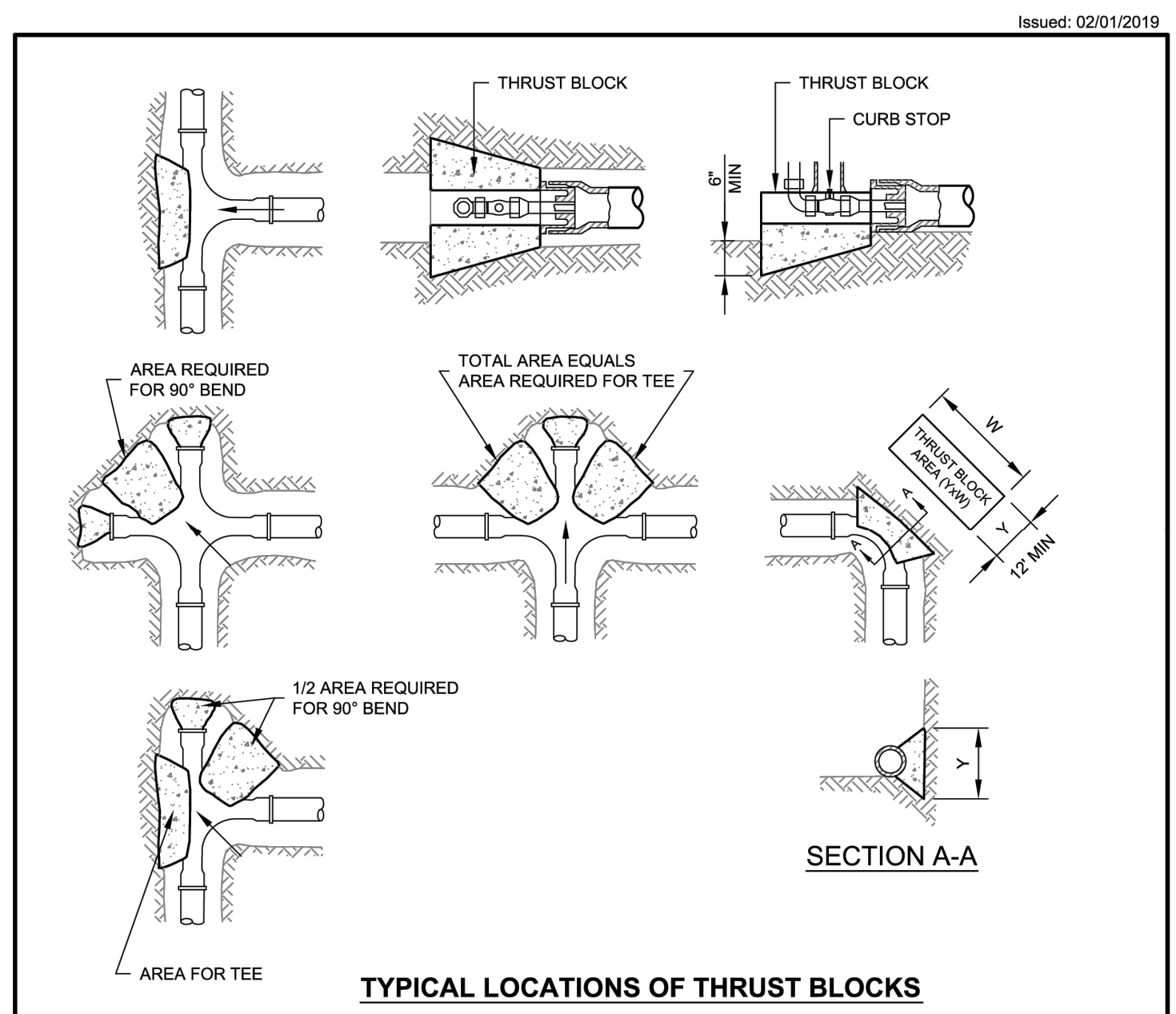


NCS Engineers
202 E. Eorll Drive Suite 110
Phoenix, AZ 85012
Phone (602)629-0206
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	Standard Details	Valve / Valve Riser	Scale: <u>N.T.S.</u>
	Water Improvements		Detail No. 300

A:\City Operations and Development\Engineering\Programs\Standards\Developing Public Works Standards\LHC Standard Details\LHC Series 300 Water\DWG\DETAIL 300.dwg



NOTES:

- TABLE IS BASED ON 2,000 P.S.I. TEST PRESSURE AND 3,000 LBS/SQ. FT. SOIL. IF CONDITIONS ARE FOUND TO INDICATE SOIL BEARING IS LESS, THE AREAS SHALL BE INCREASED ACCORDINGLY.
- AREAS FOR PIPES LARGER THAN 16" SHALL BE CALCULATED FOR EACH PROJECT.
- FORM ALL NON-BEARING VERTICAL SURFACES.
- THRUST BLOCKS ARE TO EXTEND TO UNDISTURBED GROUND. CONCRETE TO BE CLASS "AA" 4000 PSI. FORM AS REQUIRED TO KEEP CLEAR OF JOINTS.
- ALL DI PIPE AND FITTINGS TO BE DOUBLE POLY WRAPPED BEFORE THRUST BLOCK INSTALLATION.

PIPE SIZE	WATER PIPE	
	TEE, DEAD END, 90° BEND	45° & 22 1/2° BENDS
4" OR LESS	3	3
6"	4	3
8"	6	3
10"	10	5
12"	14	7
16"	24	12

	Standard Details	Thrust Blocks For Water Lines	Scale: <u>N.T.S.</u>
	Water Improvements		Detail No. 317

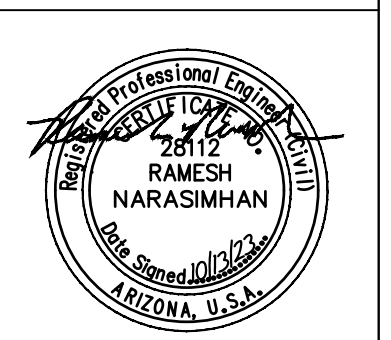
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LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: GB	Drawn by: KWB	Checked by: RN	Date: 02-10-23	Dwg scale: NOT TO SCALE
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TYPICAL MECHANICAL DETAILS-2

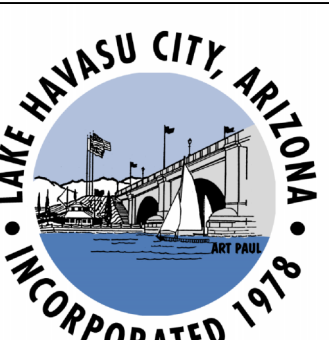


Expiration Date: 09/30/24
 Sheet Number:

M-08
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LAKE HAVASU CITY

BOOSTER STATION 4 IMPROVEMENTS

Table with 5 columns: Designed by, Drawn by, Checked by, Date, Dwg scale.

ELECTRICAL NOTES, SYMBOLS, AND LEGEND



EXPIRATION DATE: 12/31/24

Sheet Number: E-01

Sheet 19 of 26



Table with 5 columns: NO., REVISIONS / SUBMISSIONS, DATE.

Schematic Diagram Symbols table with columns for symbol, description, and notes.

Power Single Line Diagram Symbols table with columns for symbol, description, and notes.

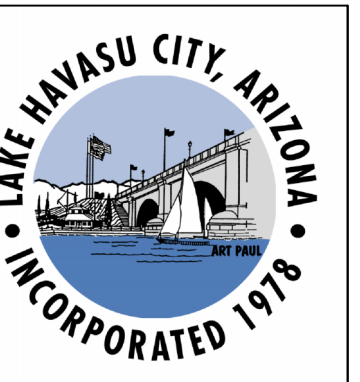
Site Plan Symbols table with columns for symbol, description, and notes.

Circuit Schedule Legend table with columns for symbol, description, and notes.

Electrical Abbreviations table with columns for symbol, description, and notes.

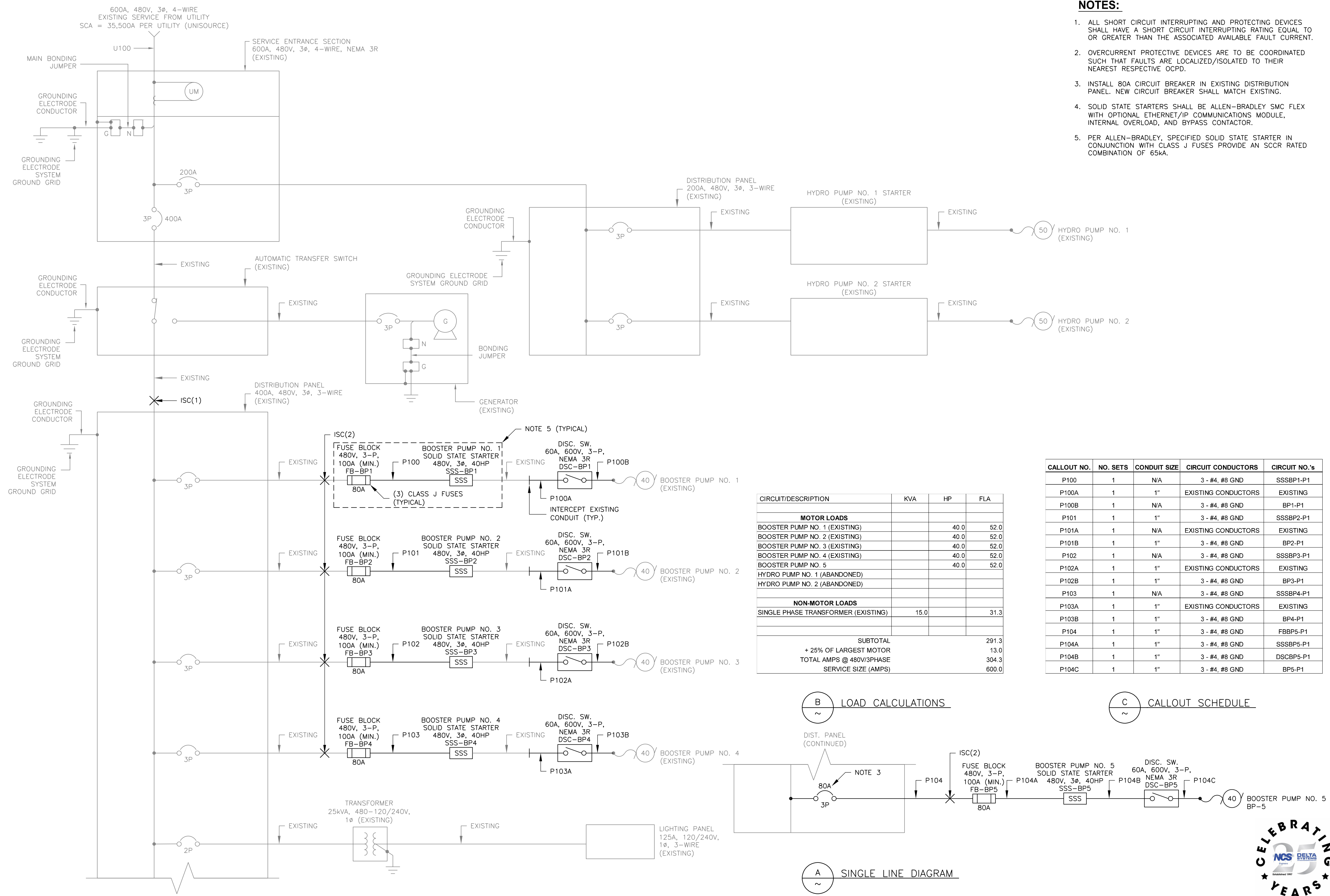
Electrical Linetypes table with columns for line style, description, and notes.

General Notes table with columns for note number, text, and notes.



NOTES:

1. ALL SHORT CIRCUIT INTERRUPTING AND PROTECTING DEVICES SHALL HAVE A SHORT CIRCUIT INTERRUPTING RATING EQUAL TO OR GREATER THAN THE ASSOCIATED AVAILABLE FAULT CURRENT.
2. OVERCURRENT PROTECTIVE DEVICES ARE TO BE COORDINATED SUCH THAT FAULTS ARE LOCALIZED/ISOLATED TO THEIR NEAREST RESPECTIVE OCPD.
3. INSTALL 80A CIRCUIT BREAKER IN EXISTING DISTRIBUTION PANEL. NEW CIRCUIT BREAKER SHALL MATCH EXISTING.
4. SOLID STATE STARTERS SHALL BE ALLEN-BRADLEY SMC FLEX WITH OPTIONAL ETHERNET/IP COMMUNICATIONS MODULE, INTERNAL OVERLOAD, AND BYPASS CONTACTOR.
5. PER ALLEN-BRADLEY, SPECIFIED SOLID STATE STARTER IN CONJUNCTION WITH CLASS J FUSES PROVIDE AN SCCR RATED COMBINATION OF 65KA.

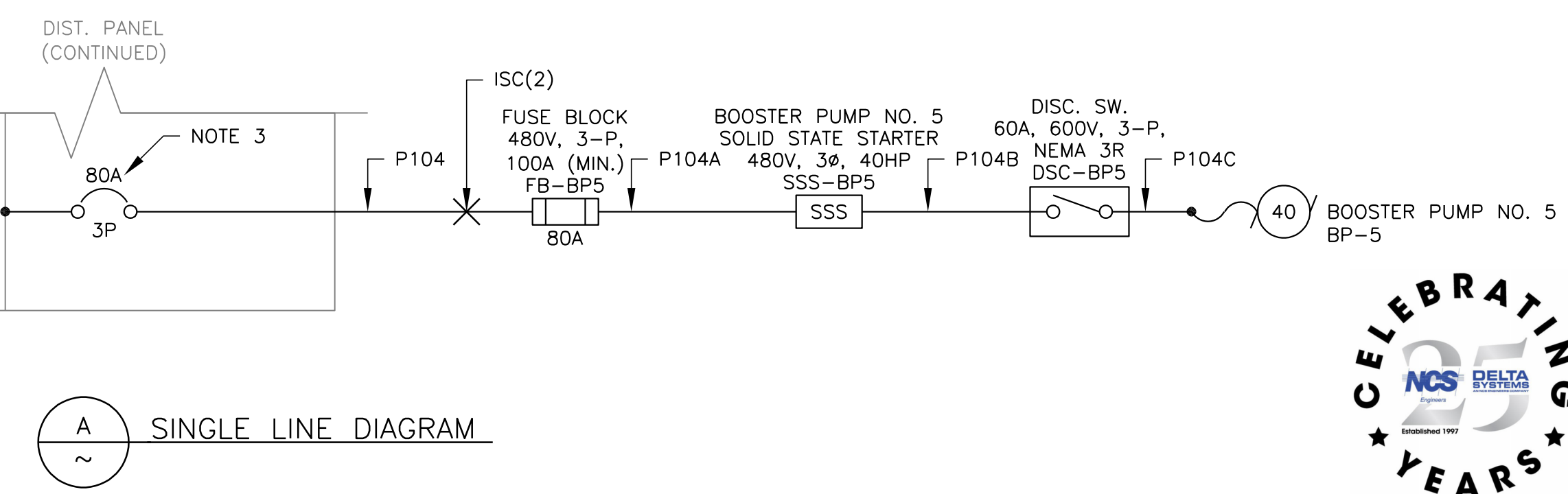


CIRCUIT/DESCRIPTION	KVA	HP	FLA
MOTOR LOADS			
BOOSTER PUMP NO. 1 (EXISTING)		40.0	52.0
BOOSTER PUMP NO. 2 (EXISTING)		40.0	52.0
BOOSTER PUMP NO. 3 (EXISTING)		40.0	52.0
BOOSTER PUMP NO. 4 (EXISTING)		40.0	52.0
BOOSTER PUMP NO. 5		40.0	52.0
HYDRO PUMP NO. 1 (ABANDONED)			
HYDRO PUMP NO. 2 (ABANDONED)			
NON-MOTOR LOADS			
SINGLE PHASE TRANSFORMER (EXISTING)	15.0		31.3
SUBTOTAL			291.3
+ 25% OF LARGEST MOTOR			13.0
TOTAL AMPS @ 480V/3PHASE			304.3
SERVICE SIZE (AMPS)			600.0

CALLOUT NO.	NO. SETS	CONDUIT SIZE	CIRCUIT CONDUCTORS	CIRCUIT NO.'s
P100	1	N/A	3 - #4, #8 GND	SSSBP1-P1
P100A	1	1"	EXISTING CONDUCTORS	EXISTING
P100B	1	N/A	3 - #4, #8 GND	BP1-P1
P101	1	1"	3 - #4, #8 GND	SSSBP2-P1
P101A	1	N/A	EXISTING CONDUCTORS	EXISTING
P101B	1	1"	3 - #4, #8 GND	BP2-P1
P102	1	N/A	3 - #4, #8 GND	SSSBP3-P1
P102A	1	1"	EXISTING CONDUCTORS	EXISTING
P102B	1	1"	3 - #4, #8 GND	BP3-P1
P103	1	N/A	3 - #4, #8 GND	SSSBP4-P1
P103A	1	1"	EXISTING CONDUCTORS	EXISTING
P103B	1	1"	3 - #4, #8 GND	BP4-P1
P104	1	1"	3 - #4, #8 GND	FBBP5-P1
P104A	1	1"	3 - #4, #8 GND	SSSBP5-P1
P104B	1	1"	3 - #4, #8 GND	DSCBP5-P1
P104C	1	1"	3 - #4, #8 GND	BP5-P1

B LOAD CALCULATIONS

C CALLOUT SCHEDULE



NO.	REVISIONS / SUBMISSIONS	DATE

**LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS**

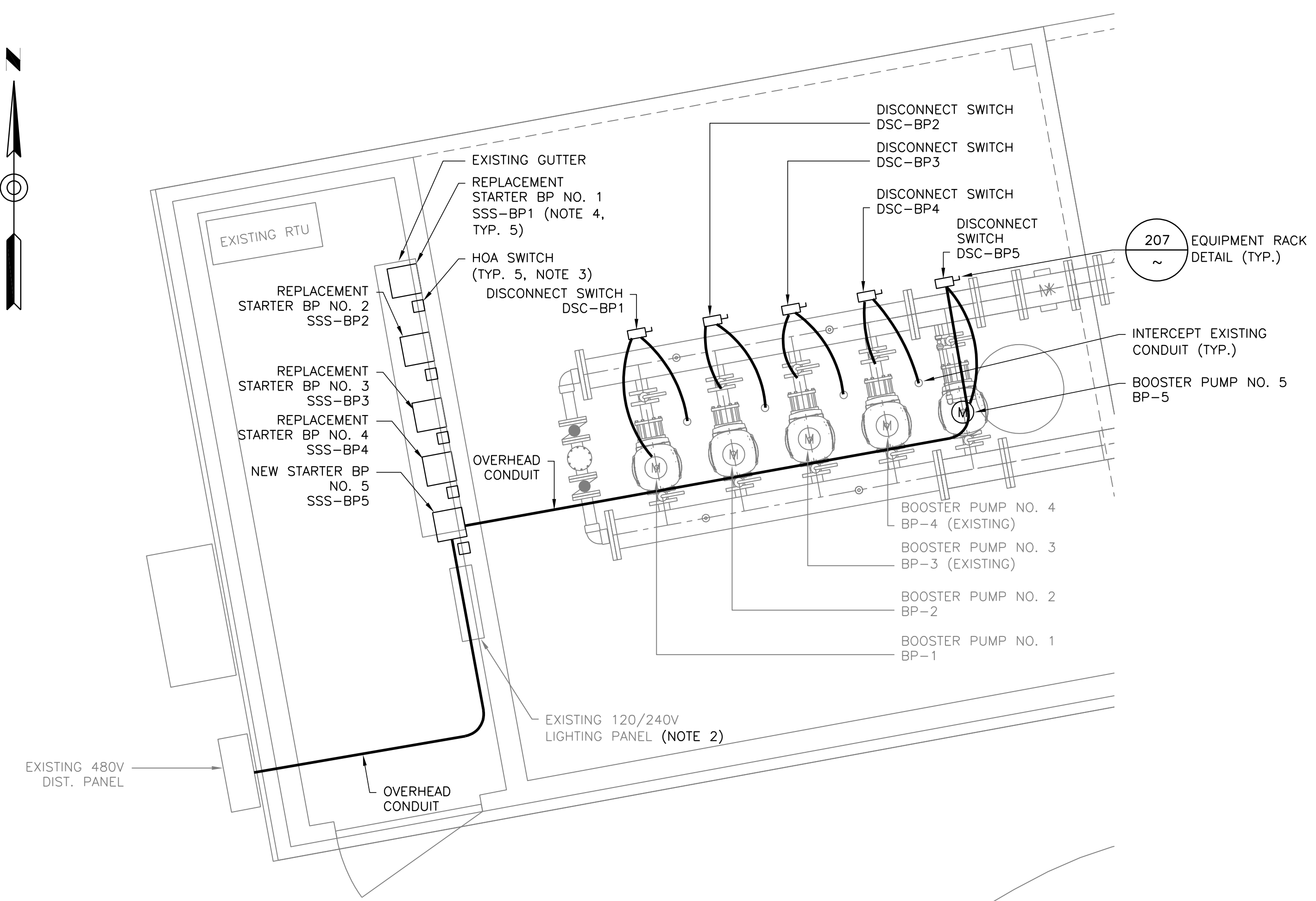
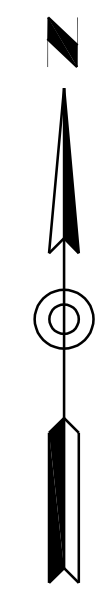
Designed by: DLN
 Drawn by: JHA
 Checked by: AGA
 Date: 10/13/23
 Dwg scale: AS NOTED

**BOOSTER STATION 4
SINGLE LINE
DIAGRAM**

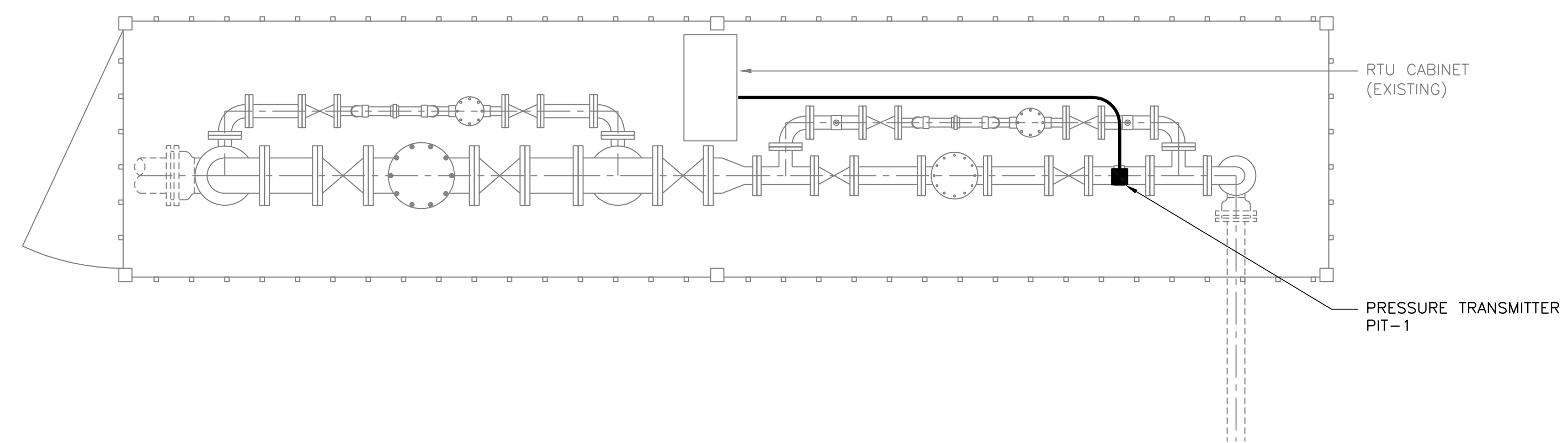
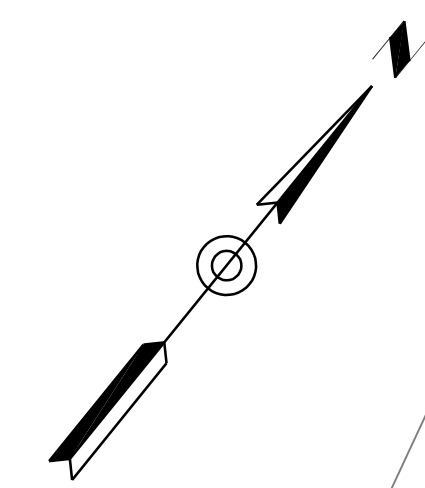
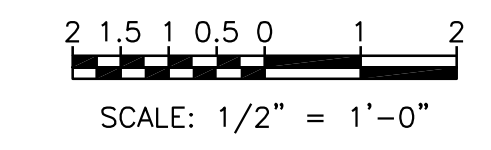
Professional Engineer
 74459
 AARON G. ARMENTA
 Registered Professional Engineer
 ARIZONA, U.S.A.
 EXPIRATION DATE: 12/31/24

Sheet Number:
E-02
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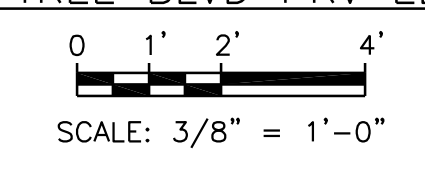




(A) BOOSTER PUMP STATION 4 ELECTRICAL PLAN



(B) CHERRY TREE BLVD PRV ELECTRICAL PLAN



NOTES:

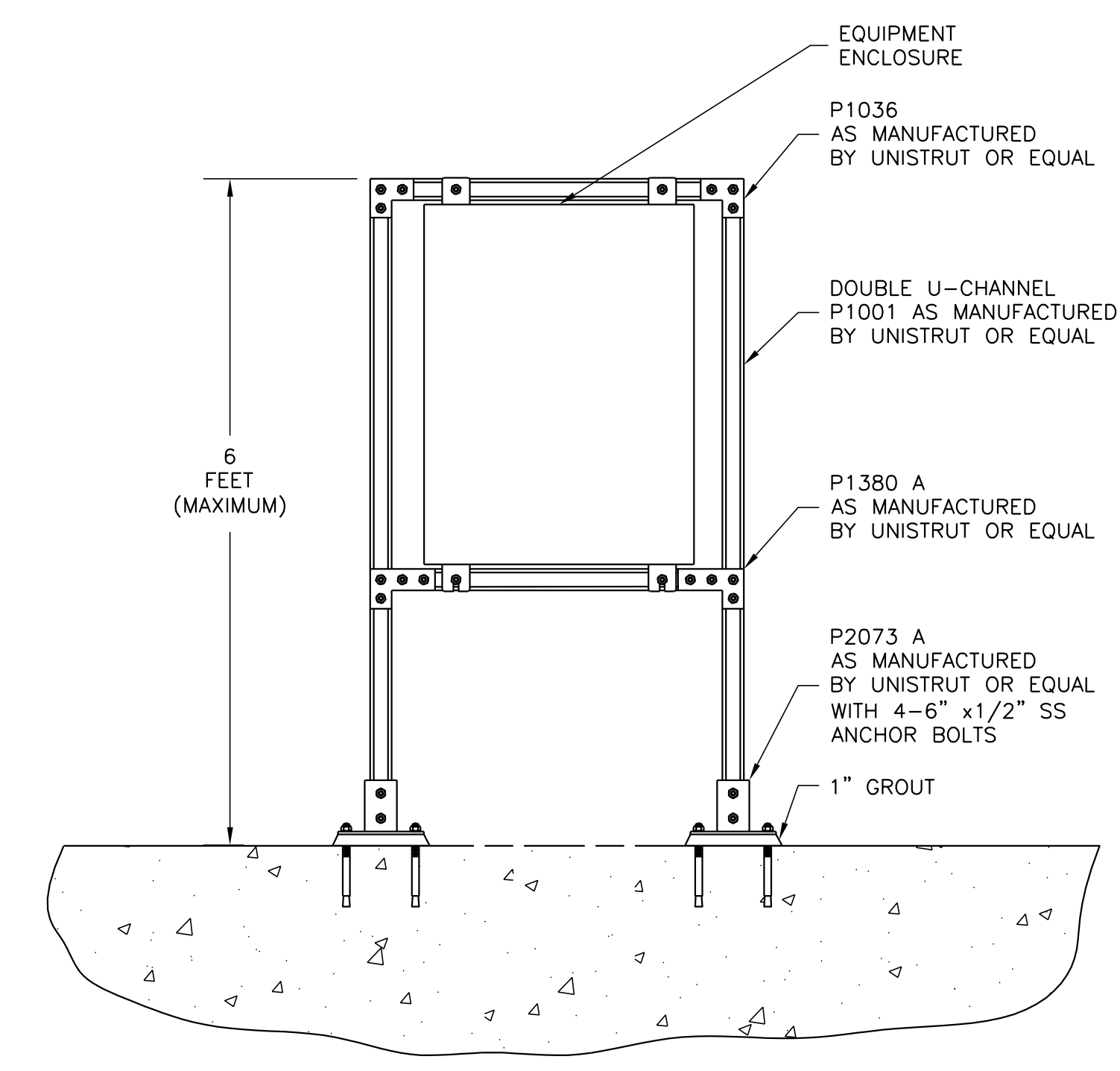
1. CONDUIT ROUTING SHOWN IS SCHEMATIC IN NATURE ACTUAL CONDUIT ROUTING SHALL BE FIELD DETERMINED. REFER TO CONDUIT BLOCK DIAGRAM FOR CONDUIT INFORMATION/REQUIREMENTS INCLUDING TO/FROM INFO, CONTENTS, TAG #'S, SIZES ETC.
2. INSTALL FIVE 20A CIRCUIT BREAKERS (CONSISTENT WITH EXISTING BREAKERS) INSIDE EXISTING LIGHTING PANEL TO PROVIDE CONTROL POWER FOR EACH BOOSTER PUMP STARTER. PULL 2 - #12 & #12 GROUND THWN CONDUCTORS FOR EACH CIRCUIT. UPDATE PANEL SCHEDULE TO REFLECT ADDED CIRCUITS.
3. HOA SWITCHES SHALL BE MOUNTED ON/IN SINGLE GANG BOXES MOUNTED ADJACENT TO RESPECTIVE STARTER.
4. REPLACEMENT STARTERS SHALL BE MOUNTED IN SAME LOCATION AS EXISTING STARTERS SO AS TO BE ABLE TO LEVERAGE EXISTING CONDUITS. MOUNTING LOCATION FOR REPLACEMENT STARTER 'SSS-BP4' SHALL BE ADJUSTED AS NECESSARY FROM EXISTING STARTER TO FREE UP SUFFICIENT SPACE TO MOUNT NEW STARTER 'SSS-BP5'.
5. 120V CONTROL POWER WIRING TO SOFT STARTS AND ETHERNET COMMUNICATION CABLES BETWEEN SOFT STARTS AND RTU SHALL BE ROUTED THROUGH WIREWAYS (I.E. PANDUIT; NOT SHOWN) MOUNTED ON PLYWOOD WALLS. REFER TO CONDUIT BLOCK DIAGRAM FOR ADDITIONAL DETAILS.
6. FUSE BLOCKS SHALL BE MOUNTED BELOW THEIR RESPECTIVE STARTER.

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LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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ELECTRICAL SITE PLANS



(207 TYP) EQUIPMENT RACK DETAIL - NON-CLASSIFIED AREAS
 NOT TO SCALE



EXPIRATION DATE: 12/31/24

Sheet Number:

E-04

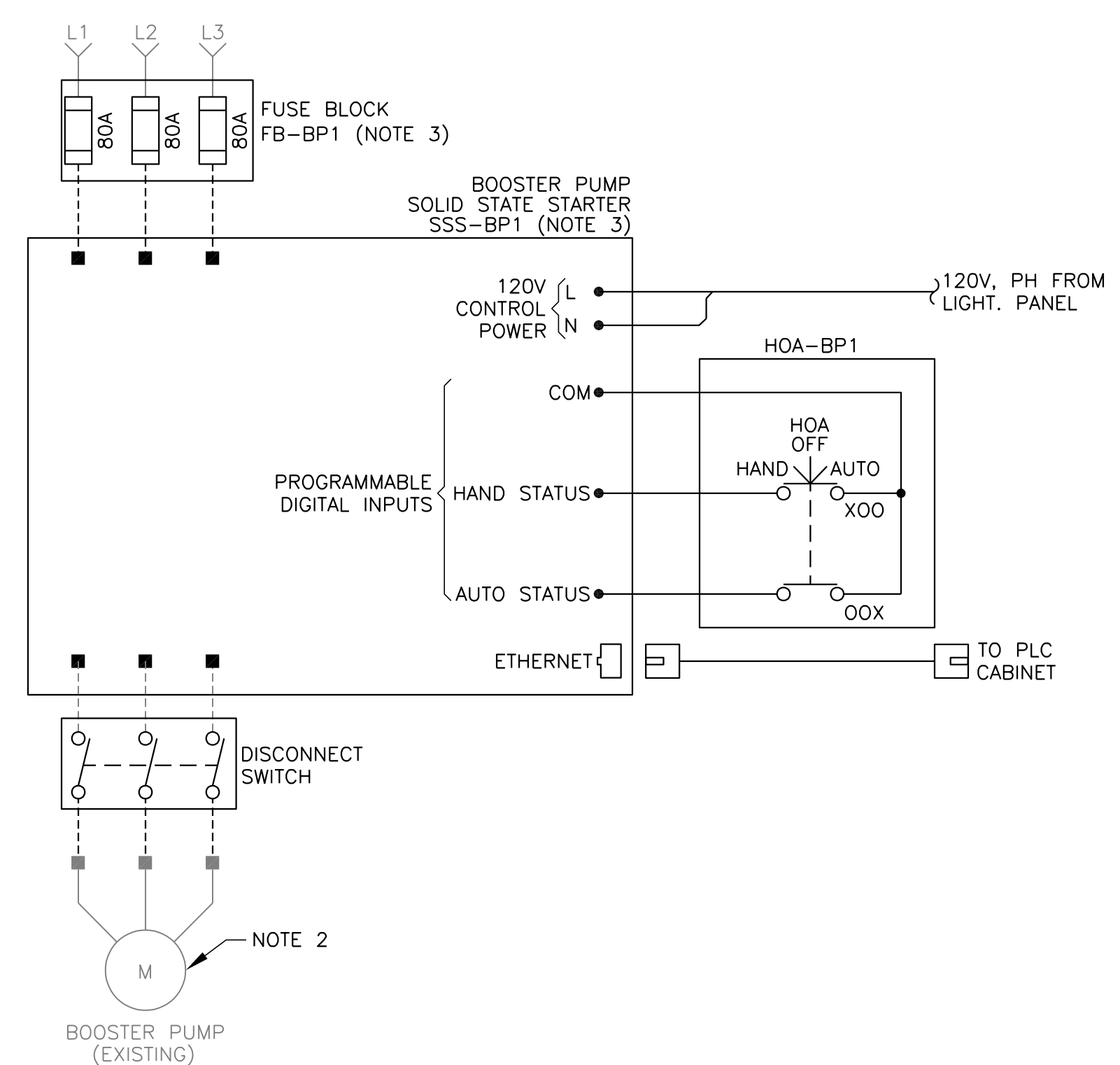
Sheet 22 of 26



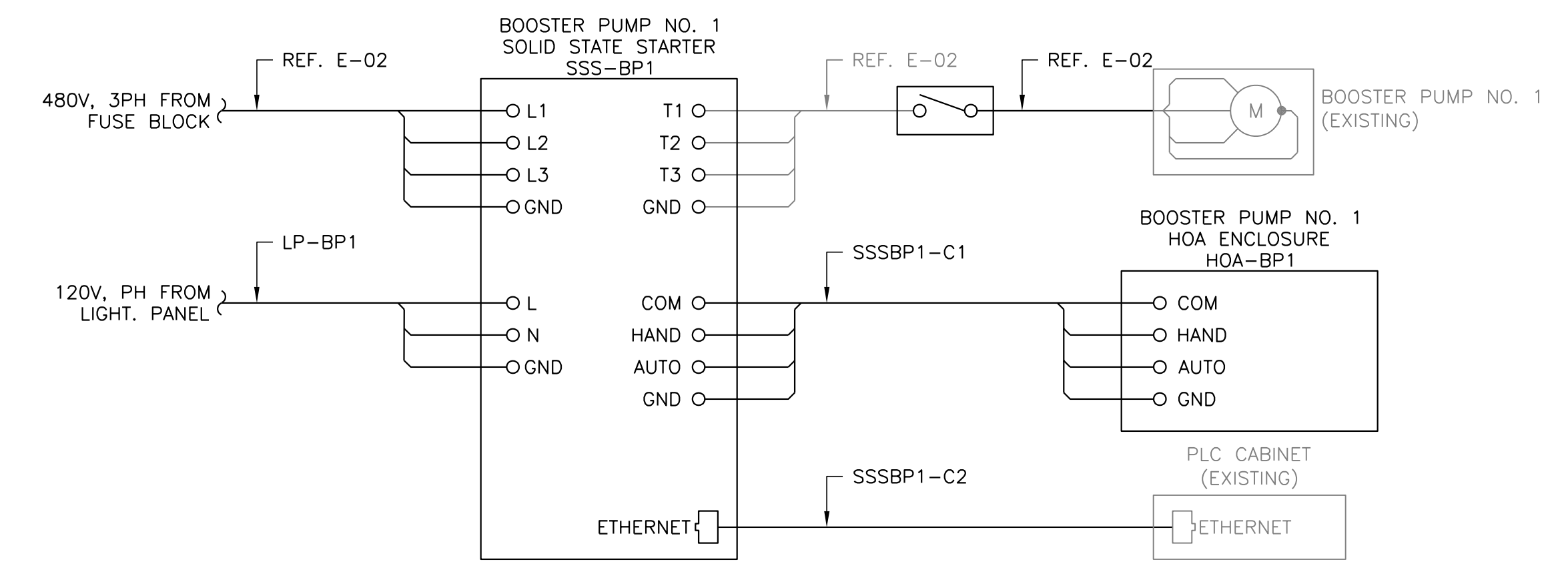


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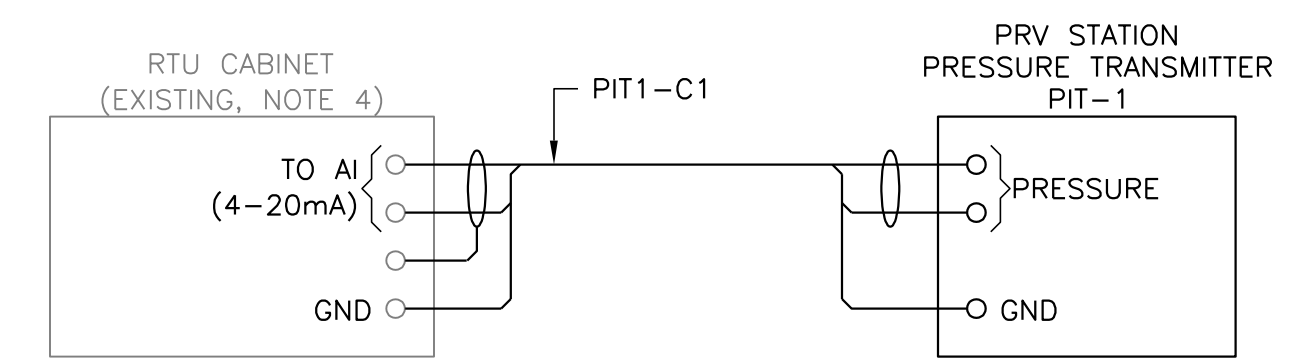
1. REFER TO SHEET E-03 FOR MASTER CIRCUIT SCHEDULE.
2. BOOSTER PUMPS 1, 2, 3, AND 4 ARE EXISTING, BOOSTER PUMP 5 IS NEW.
3. ENSURE ALL ELECTRICAL CONNECTIONS ON SOFT STARTS AND FUSE BLOCKS ARE PROPERLY COVERED TO PREVENT SHOCK HAZARD.
4. PRESSURE TRANSMITTER SHALL BE WIRED TO EXISTING SPARE ANALOG INPUT INSIDE RTU CABINET.



A TYPICAL BOOSTER PUMP SOLID STATE STARTER (SSS-BP1) SCHEMATIC DIAGRAM
 SCHEMATIC TYPICAL FOR SSS-BP2, SSS-BP3, SSS-BP4, & SSS-BP5



B TYPICAL BOOSTER PUMP SOLID STATE STARTER (SSS-BP1) CONNECTION DIAGRAM
 CONNECTION TYPICAL FOR SSS-BP2, SSS-BP3, SSS-BP4, & SSS-BP5



C PRV STATION CONNECTION DIAGRAM
 CONNECTION

NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

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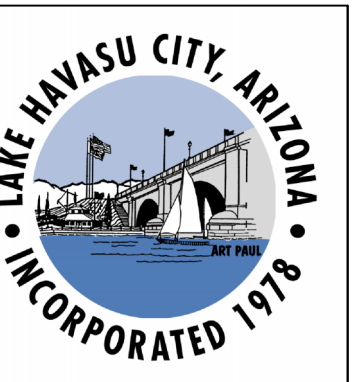
SCHEMATIC & CONNECTION DIAGRAMS



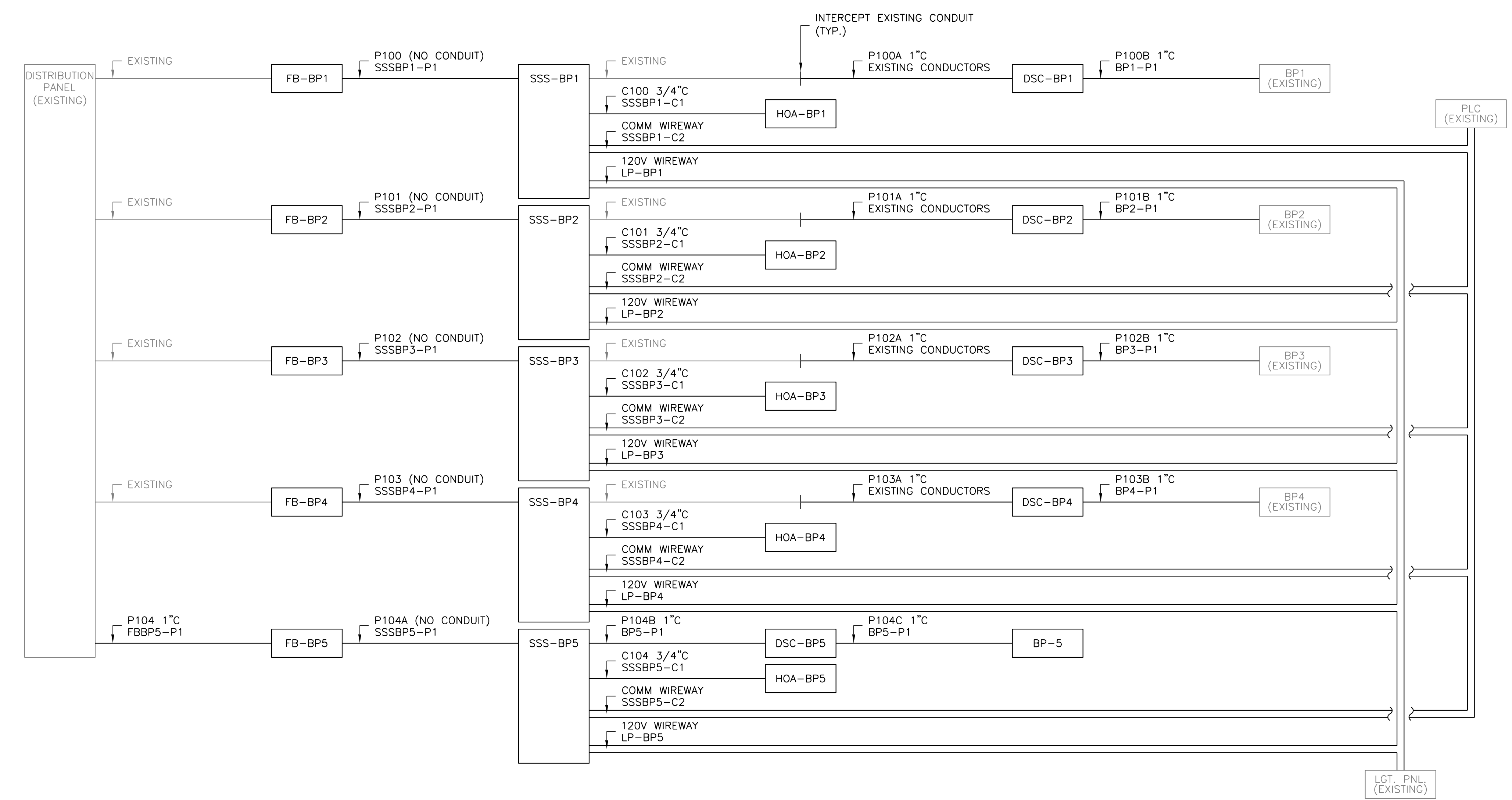
EXPIRATION DATE: 12/31/24
 Sheet Number:

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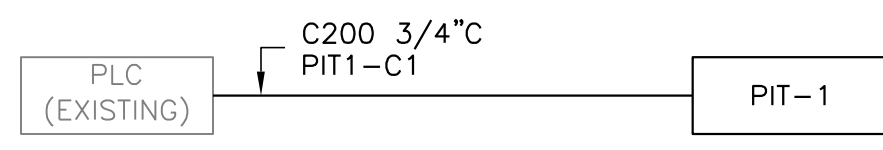




LEGEND:
 C100 1" RTU100-1 ← CONDUIT NUMBER & SIZE
 ← CIRCUIT NUMBER(S)



A BOOSTER STATION 4 CONDUIT BLOCK DIAGRAM



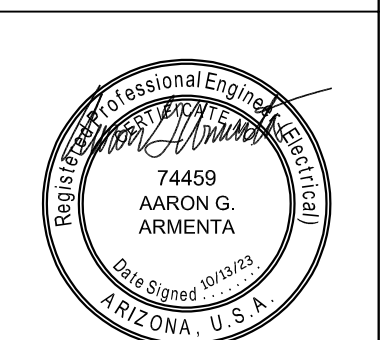
B PRV STATION CONDUIT BLOCK DIAGRAM

NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
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CONDUIT BLOCK DIAGRAMS



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Sheet Number:

E-06
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BOOSTER STATION 4 IMPROVEMENTS

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P&ID SYMBOLS
AND LEGEND



EXPIRATION DATE: 12/31/24

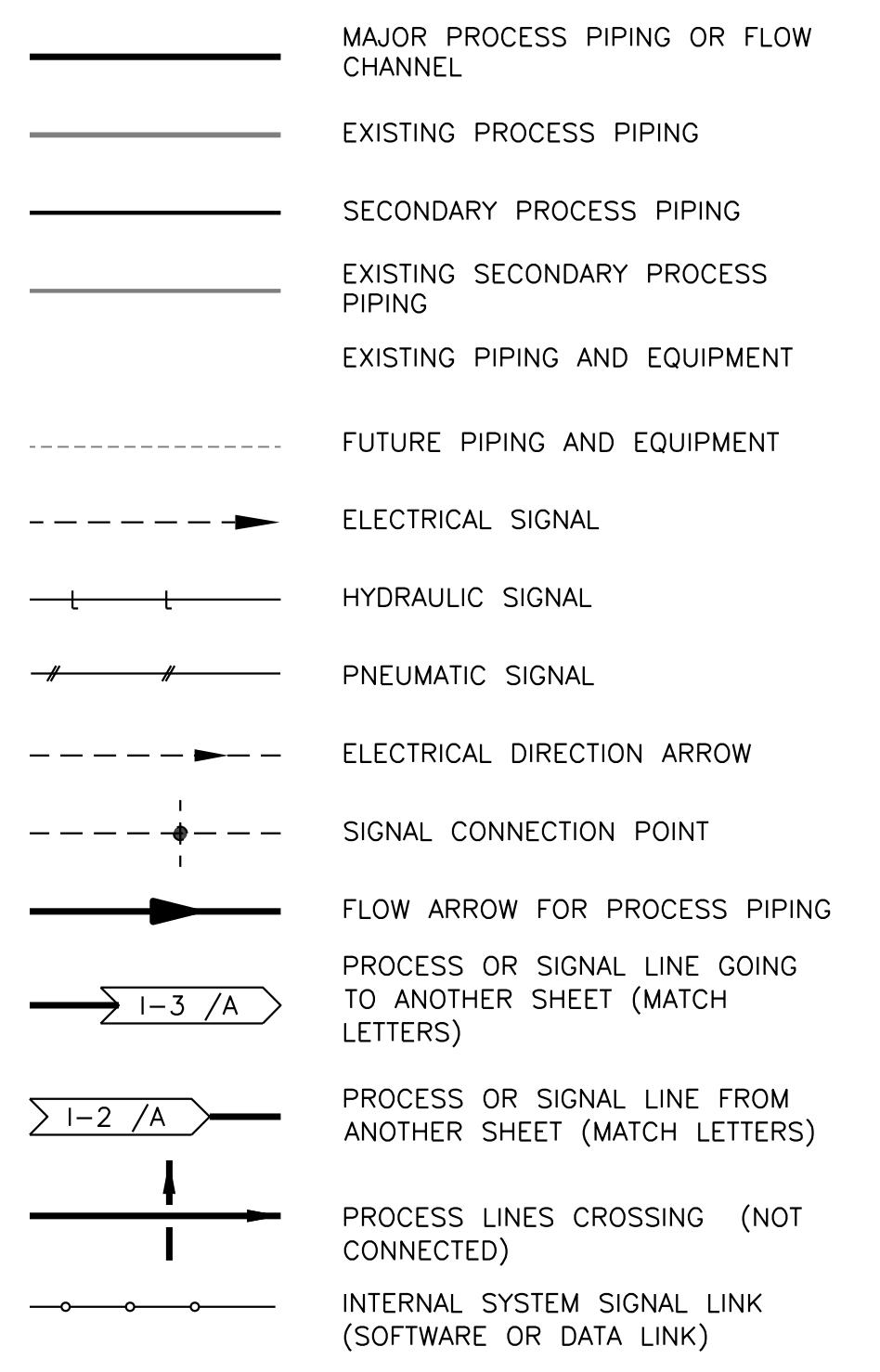
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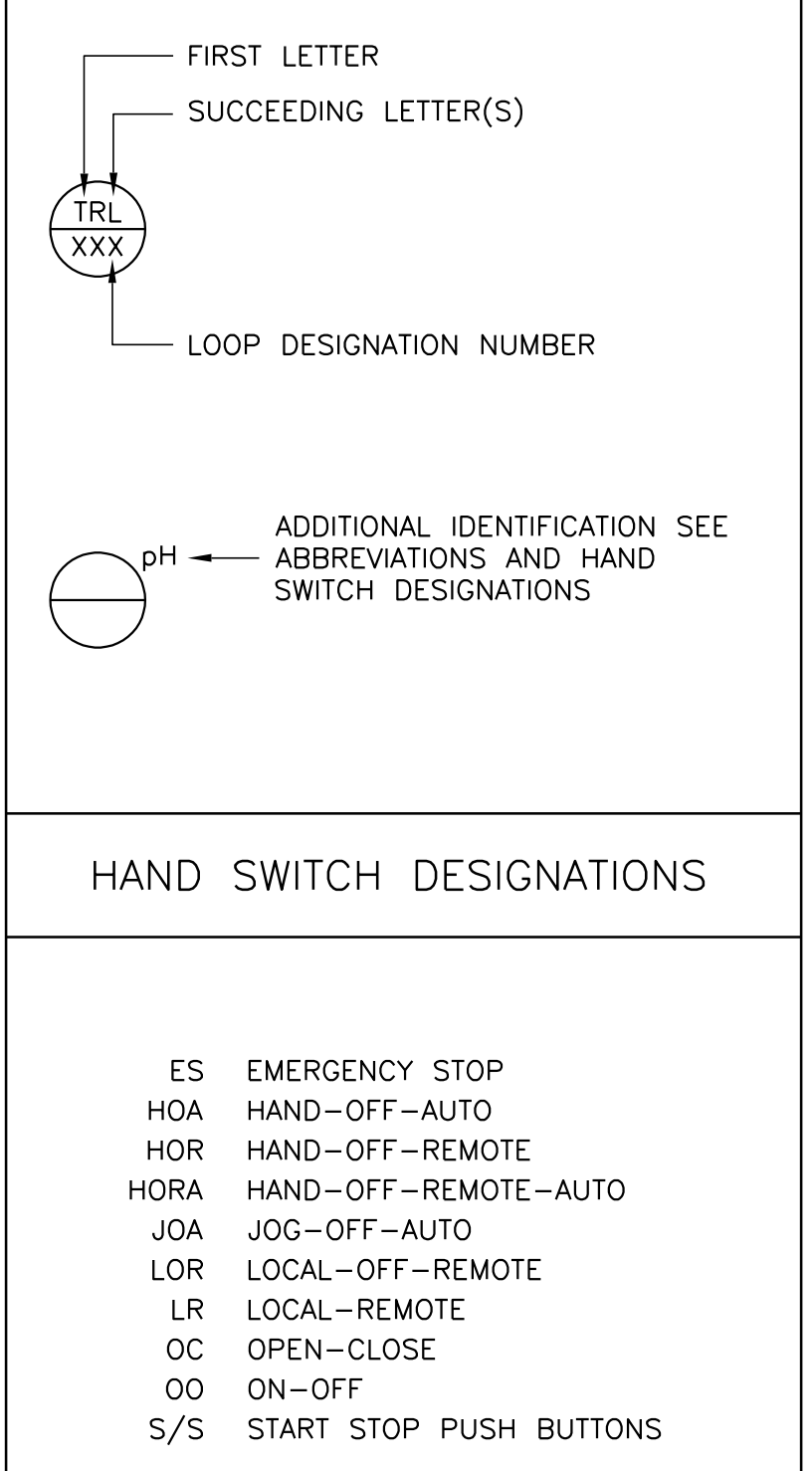
Sheet 25 of 26



LINE SYMBOLS



TAG NUMBERS AND DESIGNATIONS



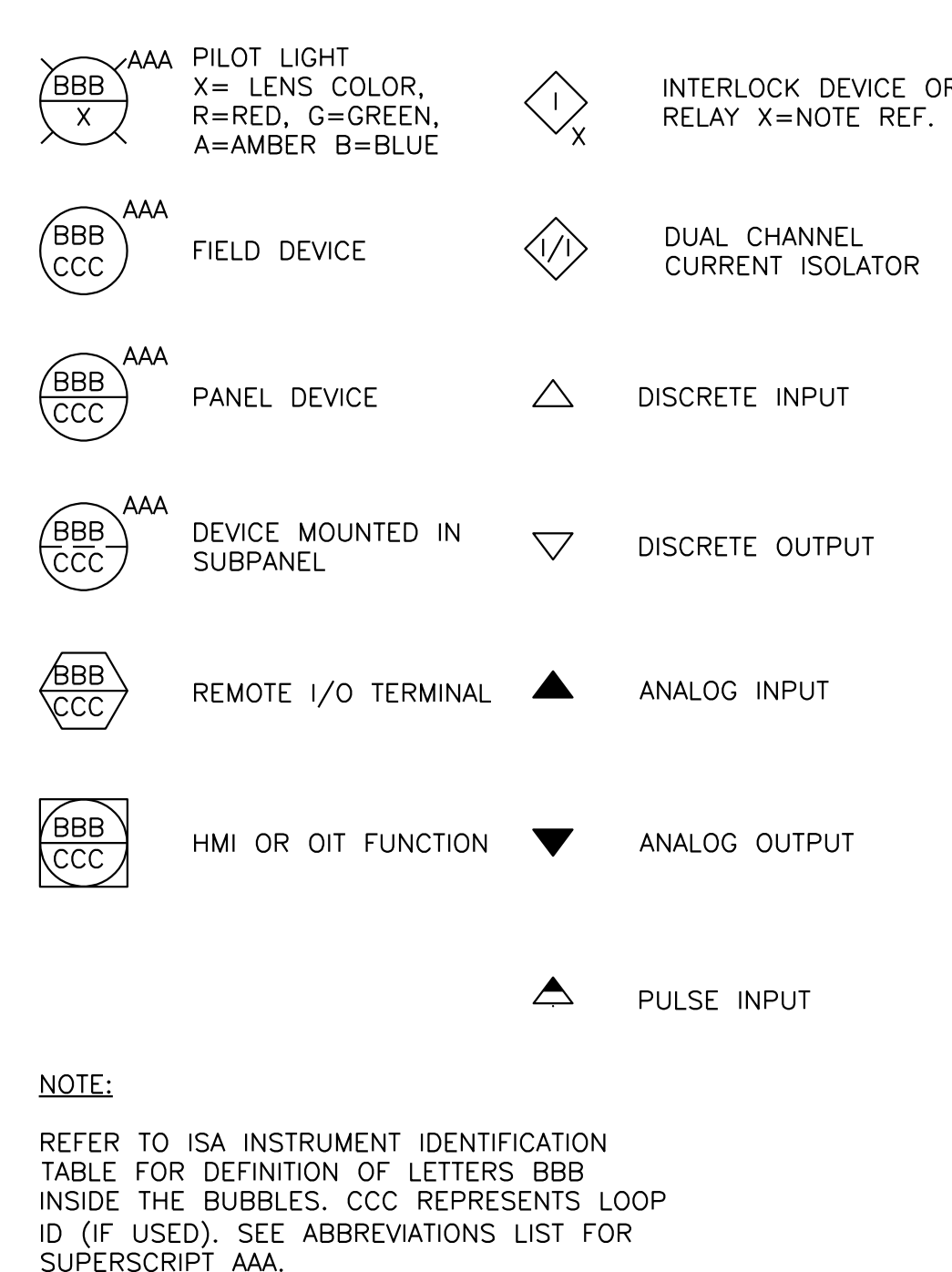
P&ID ABBREVIATIONS

Table of P&ID abbreviations including A (Ampere), AFD (Adjustable Frequency Drive), AI (Analog Input), AIC (Amps Interrupting Capacity), ARV (Air Relief Valve), AO (Analog Output), AS (Air Supply), ATS (Automatic Transfer Switch), AUTO (Automatic), CB (Circuit Breaker), CL2 (Chlorine), CON (Contactor), CU (Copper), CV (Control Valve), DCS (Distributed Control System), DI (Discrete Input), DO (Dissolved Oxygen, Discrete Output), DP (Differential Pressure), DWG (Drawing), EGO (Emergency Gas Off), ETM (Elapsed Time Meter), ETMF (Elapsed Time Meter - Fast Speed), ETMS (Elapsed Time Meter - Slow Speed), EOL (Electronic Overload), EXIST (Existing), FA (Foul Air), FC (Fail Closed), FE (Final Effluent), FR (Forward-Reverse), FS (Float Switch), FVNR (Full Voltage Non-Reversing), FW (Finished Water), GND (Ground), GAL (Gallons), GPD (Gallons Per Day), GPH (Gallons Per Hour), GPM (Gallons Per Minute), H, HI (High), H2S (Hydrogen Sulfide), HMI (Human Machine Interface), HOA (Hand-Off-Auto Current), IO (Input/Output), IOE (Internal-Off-External), JB (Junction Box), L, LO (Low), LAN (Local Area Network), LC (Loop Controller), LCP (Local Control Panel), LOS (Lock-Off-Stop), LR (Local/Remote), LS (Level (i.e., float) Switch), M (Motor), MA (Manual/Auto), mA (Milliamp), MC (Manufacture Cable), MCC (Motor Control Center), MCP (Motor Circuit Protector), MFR(S) (Manufacturer(s)), MGD (Million Gallons Per Day), MGL (Milligrams Per Liter), MH (Manhole), MLR (Mixed Liquor Return), MO (Moisture), MOD (Modulated), MTU (Master Telemetry Unit), NPW (Non-Potable Water), NS (Nitrogen Supply), NTU (Turbidity), O/C (Open / Close), OCA (Open-Close-Auto), OCR (Open-Close-Remote), OIT (Operator Interface Terminal), OL (Overload), OO (On/Off (Maintained)), OOA (On-Off-Auto), OOR (On-Off-Remote), OSC (Open-Stop-Close), PAH (Pressure Alarm High), PER (Permissive), PLC (Programmable Logic Controller), PNL (Panel), PO (Pulse Output), POS (Position), POT (Potentiometer), PPG (Pounds Per Gallon), PPH (Pounds Per Hour), PPM (Parts Per Million), PR (Pair), PRES (Pressure), PS (Pressure Switch), PSI (Pounds Per Square Inch), PV (Process Variable), RAS (Return Activated Sludge), RAW (Raw Water), REM (Remote), RF (Radio Frequency), RIO (Remote Input Output), RS (Raw Sewage), RSP (Raw Sewage Pump), RST (Reset), RTD (Resistance Temperature Detector), RTU (Remote Telemetry Unit), RUNf (Run (Fast Speed)), RUNs (Run (Slow Speed)), SB (Sludge Blanket), SEQ (Service Entrance Equipment), SES (Service Entrance Section), SLC (Single Loop Controller), SLOS (Start-Lock-Off-Stop), SO2 (Sulfur Dioxide), SOV (Solenoid Operated Valve), SP (Set Point), SPD (Speed), SPR (Spare), SS (Start/Stop (Maintained)), SSS (Solid State Starter (Soft Start)), STR (Motor Starter), TAH (Temperature Alarm High), T/M (Temperature and/or Moisture), TEMP (Temperature), TS (Temperature Switch), TSS (Total Suspended Solids), UG (Underground), USD (Up/Stop/Down), VFD (Variable Frequency Drive), W (Water), WAS (Waste Activated Sludge), WW (Wastewater), WMTR (Transmitter), ZS (Position (i.e., Limit) Switch).

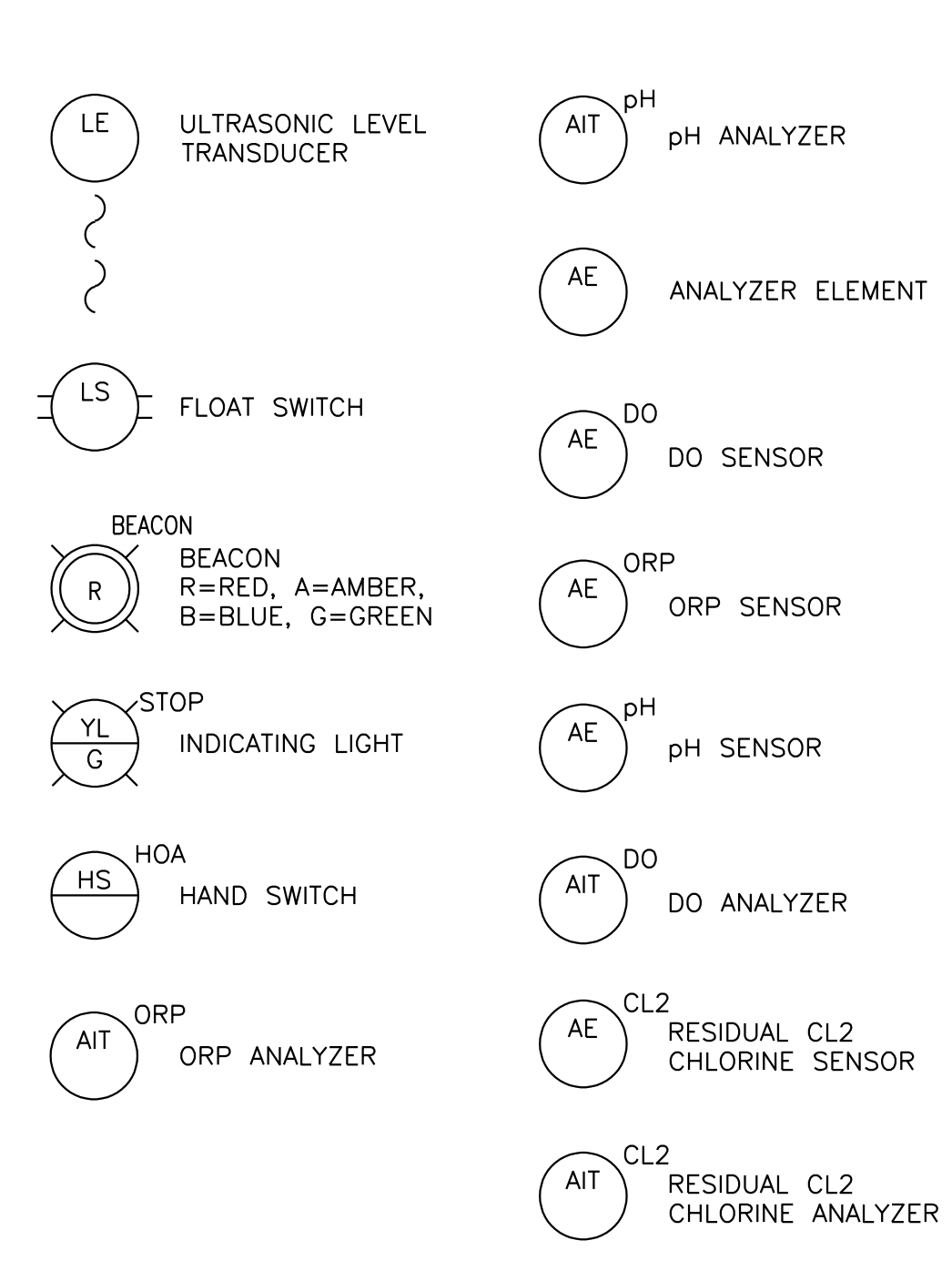
ISA INSTRUMENT IDENTIFICATION TABLE

ISA Instrument Identification Table with columns for First Letters (Measured or Initiating Variable, Modifier) and Succeeding Letters (Readout or Passive Function, Output Function, Modifier).

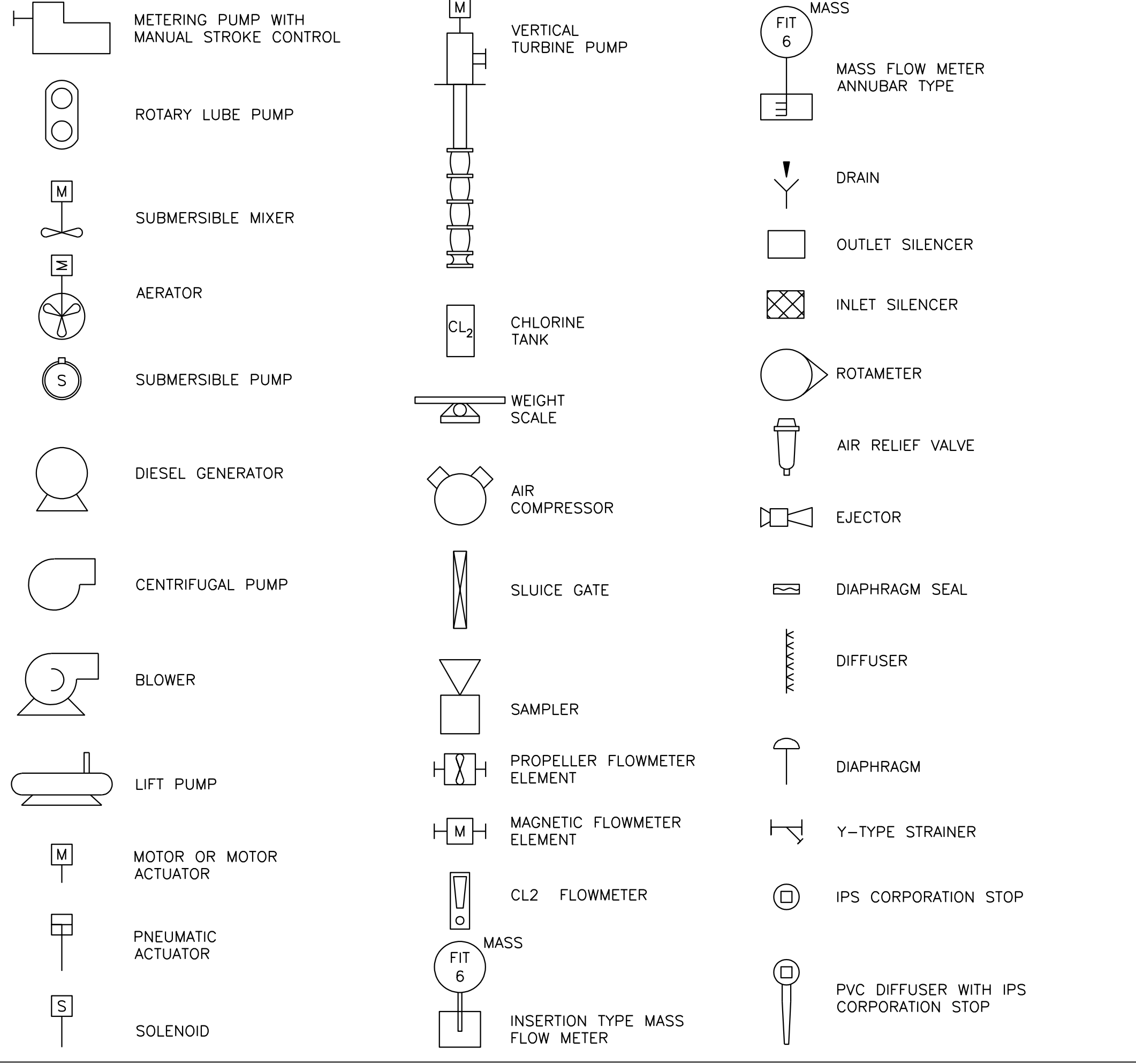
P&ID INTERFACE SYMBOLS



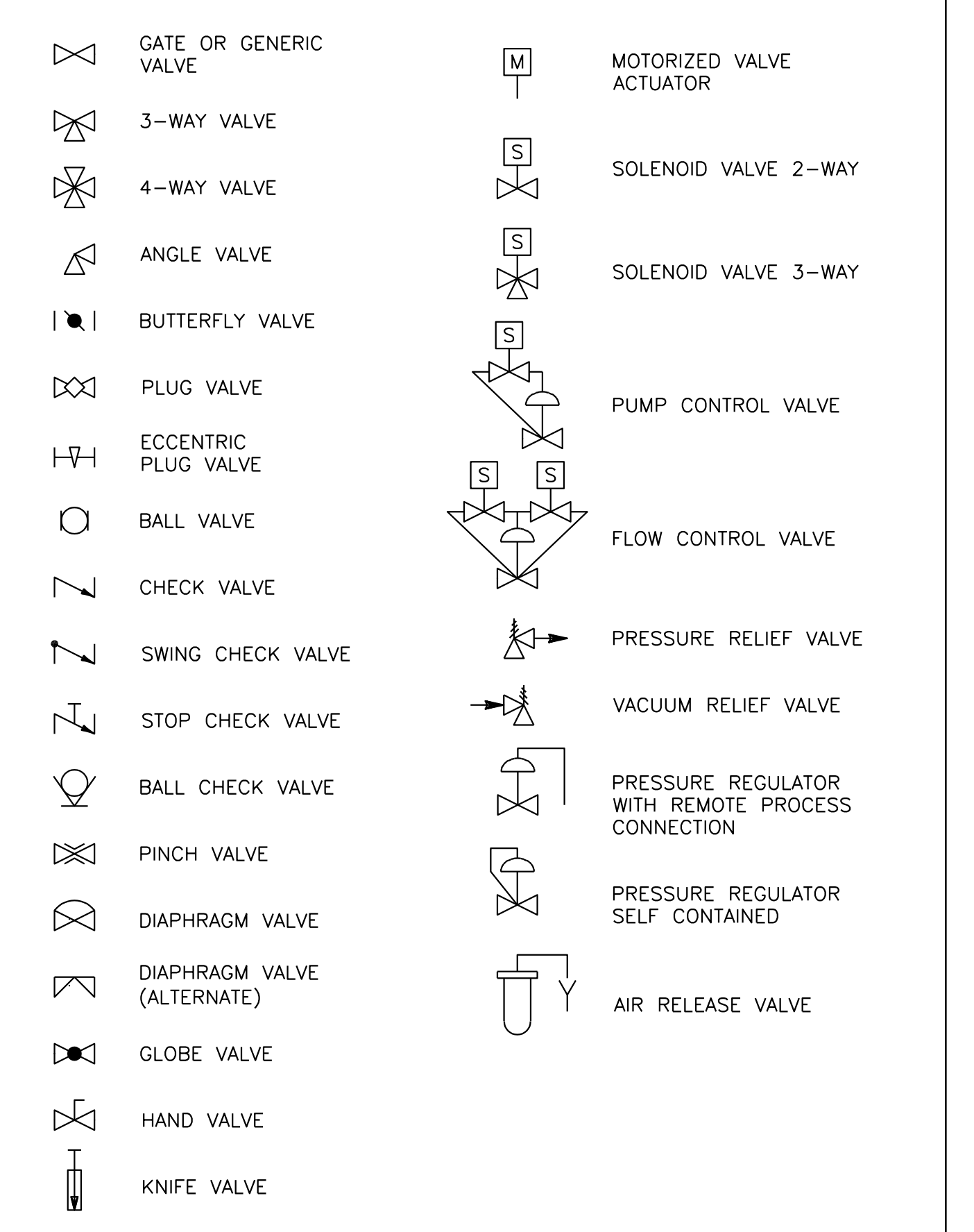
SENSING, INDICATION, AND CONTROL SYMBOLS

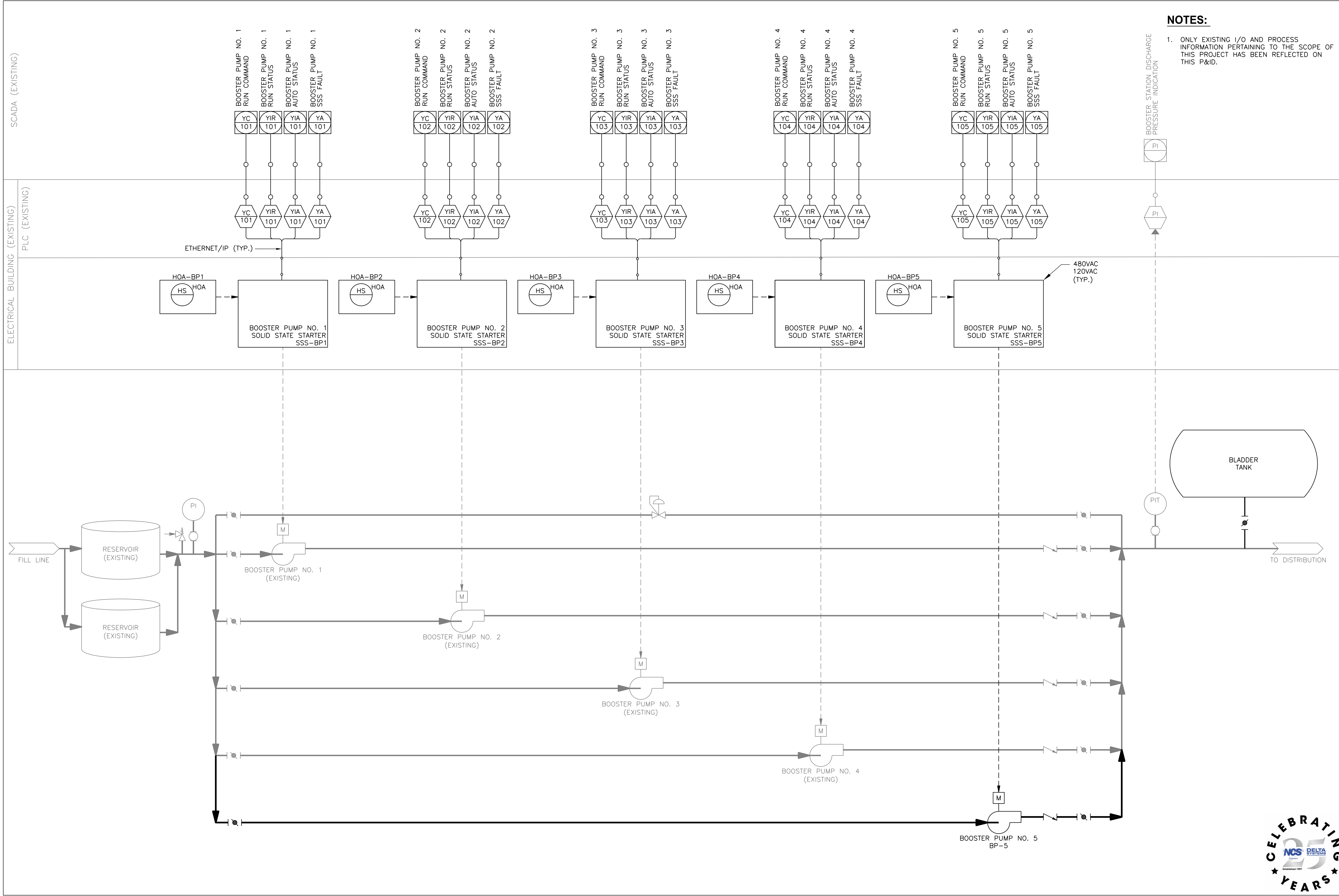


P&ID EQUIPMENT AND PROCESS SYMBOLS



P&ID VALVE SYMBOLS





NOTES:
 1. ONLY EXISTING I/O AND PROCESS INFORMATION PERTAINING TO THE SCOPE OF THIS PROJECT HAS BEEN REFLECTED ON THIS P&ID.



NO.	REVISIONS / SUBMISSIONS	DATE

LAKE HAVASU CITY
BOOSTER STATION 4 IMPROVEMENTS

Designed by: DLN
Drawn by: JHA
Checked by: AGA
Date: 10/13/23
Dwg scale: AS NOTED

P&ID



EXPIRATION DATE: 12/31/24
 Sheet Number:

I-02
 Sheet 26 of 26

