US Army Corps
of Engineers®

OMAHA DISTRICT - POL-MCX

DOD STANDARD DESIGN AW 078-24-28

PRESSURIZED HYDRANT FUELING SYSTEM

TYPE III

ISSUE DATE: MARCH 2020

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

COVER

SHEET ID

G-001

INDEX

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OD74MS507.DWG	MS507	TRUCK FILL STAND DETAILS
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OD74S-001.PDF	S-001	STRUCTURAL NOTES
OD74S-002.PDF	S-002	PEMB NOTES AND C&C WIND LOADS
OD74S-100A.PDF	S-100A	PUMPHOUSE FOUNDATION AND SLAB PLAN
OD74S-100B.PDF	S-100B	PUMP SHELTER FOUNDATION AND SLAB PLAN
OD74S-101.PDF	S-101	PIPE SUPPORT PLAN
OD74S-400.PDF	S-400	CONTROL ROOM PLAN
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OD74S-503.PDF	S-503	STOOP SECTIONS
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OD74S-511.PDF	S-511	PIPE SUPPORT SECTIONS AND DETAILS SHEET 2 OF 5
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OD74A-101.PDF	A-101	PUMP HOUSE FLOOR PLAN
OD74A-102.PDF	A-102	PUMP SHELTER FLOOR PLAN
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OD74A-140.PDF	A-140	ROOF PLAN
OD74A-201.PDF	A-201	PUMP HOUSE BUILDING ELEVATIONS AND BUILDING SECTION
OD74A-202.PDF	A-202	PUMP SHELTER BUILDING ELEVATIONS AND BUILDING SECTIONS
OD74A-301.PDF	A-301	PUMP HOUSE WALL SECTIONS
OD74A-302.PDF	A-302	PUMP SHELTER WALL SECTIONS
OD74A-501.PDF	A-501	DOOR AND WINDOW DETAILS
OD74A-601.PDF	A-601	ROOM FINISH & DOOR SCHEDULES & INTERIOR ELEVATIONS

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FILE NAME	SHEET ID NO.	DESCRIPTION
OD74M-001.PDF	M-001	FUEL SYSTEM LEGEND AND NOTES
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OD74M-101B.PDF	M-101B	PIPING PLAN (WITH MICRONIC FILTER)
OD74M-201.PDF	M-201	FLOW DIAGRAM
OD74M-202.PDF	M-202	ISOMETRIC PIPING DIAGRAM
OD74M-203.PDF	M-203	SEQUENCE OF CONTROLS - SHEET 1 OF 2
OD74M-204.PDF	M-204	SEQUENCE OF CONTROLS - SHEET 2 OF 2
OD74M-301A.PDF	M-301A	PIPING SECTIONS
OD74M-301B.PDF	M-301B	PIPING SECTIONS
OD74M-302.PDF	M-302	PIPING SECTIONS
OD74M-303.PDF	M-303	PIPING SECTIONS AND DETAILS
OD74M-501.PDF	M-501	MECHANICAL DETAILS
OD74M-502.PDF	M-502	MECHANICAL DETAILS
OD74M-503.PDF	M-503	MECHANICAL DETAILS
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OD74M-505.PDF	M-505	UNDERGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS
OD74M-506.PDF	M-506	ABOVEGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS
OD74M-507.PDF	M-507	ABOVEGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS
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OD74MH102.PDF	MH102	PUMPHOUSE PLUMBING PLAN
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OD74MH502.PDF	MH502	PUMPHOUSE PLUMBING DETAILS

PUMPHOUSE, CONTINUED

ELECTRICAL

FILE NAME	SHEET ID NO.	DESCRIPTION
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OD74EL501.PDF	EL501	LIGHT FIXTURE DETAILS
OD74EL502.PDF	EL502	LIGHT FIXTURE DETAILS
OD74EL601.PDF	EL601	LIGHT FIXTURE SCHEDULE
OD74EP101.PDF	EP101	POWER PLAN
OD74EP201.PDF	EP201	ELECTRICAL ELEVATIONS
OD74EP501.PDF	EP501	ELECTRICAL DETAILS SHEET 1
OD74EP502.PDF	EP502	TELECOM & ATG BACKBOARDS
OD74EP601.PDF	EP601	ONE LINE DIAGRAM
OD74EP602.PDF	EP602	WIRING DIAGRAMS
OD74EP603.PDF	EP603	SCHEDULE SHEET
OD74EP604.PDF	EP604	SCHEDULE SHEET TWO
OD74EP605.PDF	EP605	EPDS WIRING DIAGRAM
OD74EP606.PDF	EP606	EPDS WIRING DIAGRAM
OD74EG101.PDF	EG101	ELECTRICAL GROUNDING PLAN
OD74EG102.PDF	EG102	LIGHTNING PROTECTION PLAN
OD74EG501.PDF	EG501	ELECTRICAL GROUNDING DETAILS
OD74EG502.PDF	EG502	ELECTRICAL GROUNDING DETAILS
OD74EG503.PDF	EG503	ELECTRICAL GROUNDING DETAILS
OD74EG504.PDF	EG504	ELECTRICAL GROUNDING DETAILS
OD74EG505.PDF	EG505	ELECTRICAL GROUNDING DETAILS
OD74EG506.PDF	EG506	ELECTRICAL GROUNDING DETAILS
OD74EG507.PDF	EG507	ELECTRICAL GROUNDING DETAILS
OD74EI101.PDF	EI101	ELECTRICAL CONTROL PLAN
OD74EI501.PDF	EI501	PUMP CONTROL PANEL ELEVATION
OD74EI502.PDF	EI502	GRAPHIC DISPLAY
OD74EI503.PDF	EI503	TERMINAL BLOCK CONNECTIONS (FOR FIELD DEVICES)
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OD74FA101.PDF	FA101	FIRE DETECTION SYSTEM PLAN
OD74FA501.PDF	FA501	FIRE ALARM RISER DIAGRAM
OD74FA502.PDF	FA502	FIRE ALARM MATRIX
OD74FA503.PDF	FA503	FIRE ALARM MOUNTING HEIGHTS

SPECIFICATIONS TO BE USED AS PART OF THIS STANDARD*

*ADDITIONAL SPECIFICATIONS ARE REQUIRED FOR A COMPLETE PROJECT

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01 33 23.33	AVIATION FUEL SYSTEM SPECIFIC SUBMITTAL REQUIREMENTS
01 78 23.33	OPERATION AND MAINTENANCE MANUALS FOR AVIATION FUEL SYSTEMS
05 59 10	ROLLING COVER FOR AVIATION REFUELING VAULTS
33 01 50.60	CLEANING OF PETROLEUM STORAGE TANKS
33 08 53	AVIATION FUEL DISTRIBUTION SYSTEM START UP (INCLUDE 33 08 55 FOR TRUCK OFFLOADS)
33 08 53.AT1	EQUIPMENT TESTS
33 08 53.AT2	PERFORMANCE TESTING
33 09 53	AVIATION FUEL PUMP CONTROL AND ANNUNCIATION SYSTEM
33 52 43.11	AVIATION FUEL MECHANICAL EQUIPMENT
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33 52 43.14	AVIATION FUEL CONTROL VALVES
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33 52 43.28	FILTER SEPARATOR, AVIATION FUELING SYSTEM
33 52 80	LIQUID FUELS PIPELING COATING SYSTEMS

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SHEET ID

G-002

ABBREVIATIONS

L	ANGLE
A/C	AIR CONDITIONING
A/C UNIT	AIR CONDITIONING UNIT
AB	ANCHOR BOLT
ABV	ABOVE
AC	ALTERNATING CURRENT
ACC	ACCESSIBLE
ACI	AMERICAN CONCRETE INSTITUTE
ACR	ACRYLIC PLASTIC
ACS DR	ACCESS DOOR
ACS PNL	ACCESS PANEL
ACSR	ALUMINUM CABLE STEEL REINFORCED
ACST	ACOUSTIC
ACT	ACOUSTICAL CEILING TILE
ADDM	ADDENDUM
ADH	ADHESIVE
ADJ	ADJACENT, ADJOINING, ADJUSTABLE
ADO	AUTOMATIC DOOR OPERATOR
AFF	ABOVE FINISHED FLOOR
AGGR	AGGREGATE
AHR	ANCHOR
AHU	AIR HANDLING UNIT
AI	AREA INLET
AIC	AMPERE INTERRUPTING CAPACITY
AISC	AMERICAN INSTITUTE OF STEEL CONSTRUCTION
A.L.	ACTIVE LEAF
ALT	ALTERNATE
ALUM	ALUMINUM
AMB	AMBIENT
AMP	AMPERE
ANOD	ANODIZE
ANSI	AMERICAN NATIONAL STANDARDS INSTITUTE
APPD	APPROVED
APPROX	APPROXIMATE
ARCH	ARCHITECT
ARI	AMERICAN REFRIGERATION INSTITUTE
ASB	ASBESTOS
ASC	ABOVE SUSPENDED CEILING
ASPH	ASPHALT
ATC	ACOUSTICAL TILE CEILING
AUTO	AUTOMATIC
AVG	AVERAGE
AWG	AMERICAN WIRE GAUGE
AWT	ACOUSTICAL WALL TREATMENT
BB	BULLETIN BOARD
BC	BOOKCASE
BD	BOARD
BDRY	BOUNDARY
BEJ	BRICK EXPANSION JOINT
BEV	BEVEL
BITUM	BITUMINOUS
BJT	BED JOINT
BL	BUILDING LINE
BLDG	BUILDING
BLW	BELOW
BM	BENCHMARK
BO	BOTTOM OF
BOT	BOTTOM
BP	BACK PLASTER(ED)
BRCG	BRACING
BRDG	BRIDGING
BRG	BEARING
BRG PL	BEARING PLATE
BRK	BRICK
BRKT	BRACKET
BRZ	BRONZE
BS	BOTH SIDES
BSMT	BASEMENT
Btu	BRITISH THERMAL UNIT
BtuH	BTU PER HOUR
BTWN	BETWEEN
BUR	BUILT-UP ROOFING
BW	BOTH WAYS
CAB	CABINET
CAP	CAPACITY
CB	CATCH BASIN
CCT	CUBICLE CURTAIN TRACK
CCTV	CLOSED CIRCUIT TELEVISION
CE	COVER ELEVATION
CEM	CEMENT
CEM PLAS	CEMENT PLASTER
CER	CERAMIC
CFI	CONDUCTIVE FLOORING
CFLG	COUNTERFLASHING
CFM	CUBIC FEET PER MINUTE
CG	CORNER GUARD
CH BD	CHALKBOARD
CHFR	CHAMFER
CHIM	CHIMNEY
CHK	CHECK
CHR PL	CHROME PLATED
CI	CAST IRON
CI	CURB INLET
CIP	CAST-IN-PLACE
CIRC	CIRCULAR
CJ	CONTROL JOINT
CJ	CONSTRUCTION JOINT
CKT	CIRCUIT
CKT BRKR	CIRCUIT BREAKER
CL	CENTER LINE
CLG	CEILING
CLG HT	CEILING HEIGHT
CLGL	CLEAR GLASS
CLL	CONTRACT LIMIT LINE
CLO	CLOSET
CLOS	CLOSURE
CLR	CLEAR(ANCE)
CLWG	CLEAR WIRED GLASS
cm	CENTIMETER(S)
CMP	CORRUGATED METAL PIPE
CMPST	COMPOSITE
CMU	CONCRETE MASONRY UNIT
CND	CONDUIT
CNL	CONDUCTIVE NEOPRENE LATEX
CNR	CORNER
CNTR	COUNTER
CO	CLEANOUT
CO2	CARBON DIOXIDE
COL	COLUMN
COM	COMMON
COMB	COMBUSTION
COMPT	COMPARTMENT
CONC	CONCRETE
CONN	CONNECT
CONSTR	CONSTRUCTION
CONT	CONTINUE
CONTR	CONTRACTOR
CORR	CORRIDOR
COV	COVER
CPRS	COMPRESSIBLE
CPT	CARPET
CRCMF	CIRCUMFERENCE
CRES	CORROSIVE RESISTANT STEEL
CRG	CROSS GRAIN
CRS	COURSE(S)
CSK	COUNTERSUNK
CSMT	CASEMENT
CT	CERAMIC TILE
CT	CURRENT TRANSFORMER
C TO C	CENTER TO CENTER
CTR	CENTER
CU	CONDENSING UNIT
Cu	COPPER
CU FT	CUBIC FEET
CUH	CABINET UNIT HEATER
CU YD	CUBIC YARDS
CV	CEILING VENT
CVH	CONDUCTIVE VINYL HOMOGENEOUS (SHEET TYPE)
CW	COLD WATER
CYL	CYLINDER
d	PENNY (AS IN NAIL - 10D)
DAT	DATUM
DB	DRY BULB
DBL	DOUBLE
DBL ACT DR	DOUBLE ACTING DOOR
DCJ	DOWELED CONTROL JOINT
DCJT	DUMMY CONTROL JOINT
DEG	DEGREE
DEMO	DEMOLITION
DEPR	DEPRESSION
DEPT	DEPARTMENT
DET	DETAIL
DF	DRINKING FOUNTAIN
DH	DOUBLE HUNG
DH	DUCT HEATER
DIA	DIAMETER
DIAG	DIAGONAL
DIM	DIMENSION
DISC	DISCONNECT
DISP	DISPENSER
DISTR PNL	DISTRIBUTION PANEL
DIV	DIVISION
DL	DEAD LOAD
DMPF	DAMPPROOFING
DMPR	DAMPER
DMT	DEMOUNTABLE
DN	DOWN
DR	DOOR
DR	DRAIN
DRB	DRAINBOARD
DR CL	DOOR CLOSER
DS	DOUBLE STRENGTH (GLASS)
DS	DOWNSPOUT
DT	DRAIN TILE
DVTL	DOVETAIL
DWG	DRAWING
DWLS	DOWELS
DWR	DRAWER
DWTR	DUMBWAITER
DX	DIRECT EXPANSION
E	EAST
EA	EACH
EAT	ENTERING AIR TEMPERATURE
EF	EACH FACE
EJ	EXPANSION JOINT
EL	ELEVATION - GRADE OR BUILDING
ELEC	ELECTRIC
EM	EXPANDED METAL
EMD	ESTIMATED MAXIMUM DEMAND
EMER	EMERGENCY
ENCL	ENCLOSE(URE)
ENTR	ENTRANCE, ENTERING
EP	ELECTRICAL PANELBOARD
EPRF	EXPLOSION PROOF
EPY	EPOXY COATING
EQ	EQUAL
EQUIP	EQUIPMENT
ESCAL	ESCALATOR
EST	ESTIMATE(D)
EWC	ELECTRIC WATER COOLER
EWS	EMERGENCY EYE WASH & SHOWER
EWT	ENTERING WATER TEMPERATURE
EXC	EXCAVATE
EXH	EXHAUST
EXH A	EXHAUST AIR
EXST	EXISTING
EXP	EXPANSION
EXP	EXPOSED
EXP BT	EXPANSION BOLT
EXT	EXTERIOR
F	FAHRENHEIT
FA	FIRE ALARM
FA	FRESH AIR
FAC	FIRE APPARATUS CLOSET
FAI	FRESH AIR INTAKE
F BRK	FIRE BRICK
FC	FOOT CANDLE
FC BRK	FACE BRICK
FCG	FACING
FCJ	FLOOR CONSTRUCTION JOINT
FCO	FLOOR CLEANOUT
FCU	FAN COIL UNIT
FD	FLOOR DRAIN
FDMPR	FIRE DAMPER
FDTN	FOUNDATION
FE	FIRE EXTINGUISHER
FEB	FIRE EXTINGUISHER BRACKET
FEC	FIRE EXTINGUISHER CABINET
FF	FACTORY FINISH
FGL	FIBERGLASS
FH	FIRE HYDRANT
FH	FLAT HEAD
FHC	FIRE HOSE CABINET
FHMS	FLAT HEAD MACHINE SCREW
FHR	FIRE HOSE RACK
FHS	FIRE HOSE STATION
FHWS	FLAT HEAD WOOD SCREW
FIG	FIGURE
FIN	FINISH
FIN FLR	FINISH FLOOR
FIXT	FIXTURE
FJT	FLUSH JOINT
FLASH	FLASHING
FLR	FLOOR
FLEX	FLEXIBLE
FLG	FLOORING
FLR PL	FLOOR PLATE
FLUOR	FLUORESCENT
FN	FENCE
FOC	FACE OF CONCRETE
FOF	FACE OF FINISH
FOM	FACE OF MASONRY
FOS	FACE OF STUD
FP	FIRE PARTITION
FP	FIREPROOF
FPM	FEET PER MINUTE
FR	FIRE RESISTANT
FR	FRAME
FRG	FORGED
FRMG	FRAMING
FRT	FIRE-RETARDANT
FS	FULL SIZE
FSTNR	FASTEN(ER)
FT	FEET
FTG	FOOTING
FURG	FURRING
FUT	FUTURE
FW	FIRE WATER
FWC	FABRIC WALL COVERING
G	NATURAL GAS
GA	GAGE
GAL	GALLON(S)
GALV	GALVANIZED
GALV STL	GALVANIZED STEEL
GB	GRAB BAR
GC	GENERAL CONTRACTOR
GEN	GENERAL
GF	GROUND FACE
GFCI	GROUND FAULT CIRCUIT INTERRUPTER
GFE	GOVERNMENT-FURNISHED EQUIPMENT
GFE/CI	GOVERNMENT-FURNISHED EQUIPMENT CONTRACTOR INSTALLED
GI	GALVANIZED IRON
GIP	GALVANIZED IRON PIPE
GKT	GASKET(ED)
GL	GLASS
GL BLK	GLASS BLOCK
GLF	GLASS FIBER
GLZ	GLAZING
GLZ CMU	GLAZED CONCRETE MASONRY UNITS
G	GROUND
GOVT	GOVERNMENT
GPM	GALLONS PER MINUTE
GPT	GYPSUM TILE
GRAN	GRANITE
GR LN	GRADE LINE
GRTG	GRATING
GST	GLAZED STRUCTURAL TILE
GSU	GLAZED STRUCTURAL UNITS
GT	GROUT
GWT	GLAZED WALL TILE
GYP	GYPSUM
GYP BD	GYPSUM BOARD
GYP PLAS	GYPSUM PLASTER
HB	HOSE BIBB
HC	HOLLOW CORE
HCD	HALON CONTAINMENT DAMPER
HCP	HANDICAPPED
HD	HEAD
HD	HEAVY DUTY
HDBD	HARDBOARD
HD JT	HEAD JOINT
HDR	HEADER
HDW	HARDWARE
HDWD	HARDWOOD
HES	HIGH EARLY-STRENGTH CEMENT
HEX	HEXAGON
HH	HANDHOLE
HK	HOOK(S)
HM	HOLLOW METAL
HNDRL	HANDRAIL
HORIZ	HORIZONTAL
HP	HIGH PRESSURE
HP	HORSEPOWER
HPT	HIGH POINT
HR	HOUR
HS	HIGH STRENGTH
HSGYP	HIGH-STRENGTH GYPSUM PLASTER
HSKPG	HOUSEKEEPING
HT	HEIGHT
HTG	HEATING
HTR	HEATER
HVAC	HEATING, VENTILATING AND AIR CONDITIONING
HYDR	HYDRAULIC
Hz	HERTZ
ID	INSIDE DIAMETER
IESNA	ILLUMINATING ENGINEERING SOCIETY OF NORTH AMERICA
ILK	INTERLOCK
IN	INCH
INCIN	INCINERATOR
INCL	INCLUDED
INSF	INSULATING FILL
INSUL	INSULATION
INT	INTERIOR
INTM	INTERMEDIATE
INV	INVERT
IP	IRON PIPE
IPS	IRON PIPE SIZE
I.P.S.	INSIDE PIPE SIZE
JAN CLO	JANITOR'S CLOSET
J-BOX	JUNCTION BOX
JCT	JUNCTION
JST	JOIST
JT	JOINT
KIP	KILOPOUND (1000 POUNDS)
KIT	KITCHEN
KOP	KNOCKOUT PANEL
KPL	KICKPLATE
kV	KILOVOLTS
kVA	KILOVOLT AMPERES
kVAR	KILOVOLT AMPERES REACTIVE
kW	KILOWATT
KWY	KEYWAY
LAB	LABORATORY
LAD	LADDER
LAM	LAMINATE
LAT	LEAVING AIR TEMPERATURE
LAU	LAUNDRY
LAV	LAVATORY
LB	LAG BOLT
LB	POUND
LBL	LABEL
LBR	LUMBER
LC	LIGHT CONTROL
LD	LOAD
LDG	LOADING
LG	LENGTH
LH	LEFT HAND(ED)
LIN	LINEAR
LKR	LOCKER
LL	LIVE LOAD
LLD	LEAD-LINED DOOR
LM	LUMEN
LMST	LIMESTONE
LNTL	LINTEL
LONG	LONGITUDINAL
LP	LIGHTPROOF
LPD	LIGHTPROOF DOOR
LPL	LIGHTPROOF LOUVER
LPT	LOW POINT
LR	LIVING ROOM
LS	LAWN SPRINKLER
LT	LIGHT
LT WT	LIGHTWEIGHT
LTG	LIGHTING
LTNG	LIGHTNING
LVR	LOUVER
LWC	LIGHTWEIGHT CONCRETE
LWT	LEAVING WATER TEMPERATURE
m	METER(S)
M&B	MATCHED AND BEADED
MACH	MACHINE
MAS	MASONRY
MATL	MATERIAL(S)
MAX	MAXIMUM
MB	MACHINE BOLTS
MBR	MEMBER
MC	MEDICINE CABINET
MCJ	MASONRY CONTROL JOINT
MCO	METAL-CASED OPENING
MDS	METAL DIVIDER STRIP
MECH	MECHANICAL
MECH RM	MECHANICAL ROOM
MED	MEDIUM
MEMB	MEMBRANE
MES	METAL EDGE STRIP
MFD	METAL FLOOR DECKING
MFG	MANUFACTURING
MFR	MANUFACTURER
MG	MOTOR GENERATOR
MGT	MATTE-GLAZED TILE
MH	MANHOLE
MI	MALLEABLE IRON
MIN	MINIMUM
MIRR	MIRROR
MISC	MISCELLANEOUS
ML	METAL LATH
ML	MONOLITHIC
MLDG	MOULDING
MLWK	MILLWORK
mm	MILLIMETER(S)
MNIC	MATERIAL NOT IN CONTRACT (INSTALLATION BY CONTRACTOR)
MO	MASONRY OPENING
MOD	MODULAR
MOD.	MODIFIED
MOT	MOTOR
MP	MOVABLE PARTITION
MR	MOP RECEPTOR
MRB	MARBLE BASE
MRD	METAL ROOF DECKING
MS	MACHINE SCREWS
MT	METAL THRESHOLD
MT	MOUNT
MTD	MOUNTED
MTFR	METAL FURRING
MTL	METAL
MVBL	MOVABLE
MULL	MULLION
N	NORTH
NAT	NATURAL
NC	NORMALLY CLOSED
NEC	NATIONAL ELECTRICAL CODE
NEMA	NATIONAL ELECTRICAL MANUFACTURERS ASSOCIATION
NFPA	NATIONAL FIRE PROTECTION ASSOCIATION
NI	NICKEL
NIC	NOT IN CONTRACT
NL	NAILABLE
N.L.	NEOPRENE LATEX
NM	NONMETALLIC
NO	NORMALLY OPEN
NO	NUMBER
NOM	NOMINAL
NR	NOISE REDUCTION
NRC	NOISE REDUCTION COEFFICIENT
N˜REQD	NOT REQUIRED
NTS	NOT TO SCALE
OA	OUTSIDE AIR
OBSC	OBSCURE
OBW	OBSERVATION WINDOW
OC	ON CENTER
OCEW	ON CENTER EACH WAY
OD	OUTSIDE DIAMETER
OFC	OFFICE
OGL	OBSCURE GLASS
OH	OVERHEAD
OHMS	OVALHEAD MACHINE SCREW
OHWS	OVALHEAD WOOD SCREW
OPH	OPPOSITE HAND
OPNG	OPENING
OPP	OPPOSITE
OPQ	OPAQUE
OPS	OPERATIONS
OS & Y	OUTSIDE SCREW AND YOKE
OWGL	OBSCURE WIRED GLASS
P	POLE
PA	PUBLIC ADDRESS
PAR	PARALLEL
PB	PANIC BAR
PBD	PARTICLE BOARD
PBS	PUSH BUTTON STATION
PC	PIECE
PCC	PRECAST CONCRETE
PCF	POUNDS PER CUBIC FOOT
PCP	CEMENT PLASTER (PORTLAND)
PD	PAVEMENT DRAIN
PED	PEDESTAL
PERF	PERFORATE(D)
PERIM	PERIMETER
PH	PHASE
PHAR	PHARMACY
PI	POINT OF INTERSECTION
PIPU	PREFAB ISOLATION POWER UNIT
PIV	POST INDICATING VALVE
PL	PLATE
PL	PROPERTY LINE
PLAM	PLASTIC LAMINATE
PLAS	PLASTER
PLAT	PLATFORM
PLBG	PLUMBING
PLF	POUNDS PER LINEAR FOOT
PLG	PILING
PL GL	PLATE GLASS
PLYWD	PLYWOOD
PNL	PANEL
PT	PAINT(ED)
POL	POLISHED
PORC	PORCELAIN
PORT	PORTABLE
PPGL	POLISHED PLATE GLASS
PPM	PARTS PER MILLION
PR	PAIR
PREFAB	PREFABRICATE(D)
PREFIN	PREFINISHED
PREFMD	PREFORMED
PRKG	PARKING
PROJ	PROJECT
PRV	PRESSURE-REGULATING VALVE
PS	PIPE SPACE
P.S.	PRESSED STEEL
PS CONC	PRESTRESSED CONCRETE
PSF	POUNDS PER SQUARE FOOT
PSI	POUNDS PER SQUARE INCH
PT	PNEUMATIC TUBE
PT.	POINT
PT CONC	POST-TENSIONED CONCRETE
PTD	PAPER TOWEL DISPENSER
PTN	PARTITION
PTR	PAPER TOWEL RECEPTACLE
PV	PAVED
PVC	POLYVINYL CHLORIDE
PVG	PAVING
PW	PASS WINDOW
QT	QUARRY TILE
QT.	QUART
QTR	QUARTER
1/4 RND	QUARTER ROUND
QTY	QUANTITY
R	RADIUS
R	RANGE
R	RISER
RA	RETURN AIR
RAB	RABBETED
RA GR	RETURN AIR GRILLE
RAR	RETURN AIR REGISTER
RB	RUBBER BASE, RESILIENT BASE
RBL	RUBBLE STONE
RBR	RUBBER
RC	REMOTE CONTROL
RCB	REMOTE CONTAINMENT BASIN
RCP	REINFORCED CONCRETE PIPE
RCVR	RECEIVER
RD	ROOF DRAIN
RDG INS	RIGID INSULATION
RECPT	RECEPTACLE
REC ROOM	RECREATION ROOM
RECT	RECTIFIER
REF	REFERENCE
REFL	REFLECT
REFR	REFRIGERATION
REG	REGISTER
REG	REGLET
REINF	REINFORCE
REM	REMOVE(ABLE)
REQD	REQUIRED
RESIL	RESILIENT
RET	RETURN
REV	REVISION
RFG	ROOFING
RH	RELATIVE HUMIDITY
RH	RIGHT HAND
RH	ROOF HATCH
RK	RACK
RLG	RAILING
RM	ROOM
RND	ROUND
RO	ROUGH OPENING
ROW	RIGHT OF WAY
RP	RETRACTABLE PARTITION
RPM	REVOLUTIONS PER MINUTE
RPRT	RAISED PATTERN RUBBER TILE
RTF	RUBBER TILE FLOOR
RVS	REVERSE
RVT	RIVET
RWC	RAINWATER CONDUCTOR
S	SOUTH
SA	SUPPLY AIR
SB	SPLASH BLOCK
S.B.	SECURITY BARS
SC	SOLID CORE
SCHED	SCHEDULE
SCRN	SCREEN
SCT	STRUCTURAL CLAY TILE
SD	STORM DRAIN
SDI	STEEL DOOR INSTITUTE
SECT	SECTION
SEQ	SEQUENCE
SFGL	SAFETY GLASS
SFTU	STRUCTURAL FACING TILE UNIT
SFU	STRUCTURAL FACING UNIT
SG	SHEET GLASS
SHLDR	SHOULDER
SHT	SHEET
SHTHG	SHEATHING
SHV	SHELVING
SIM	SIMILAR
SJI	STEEL JOIST INSTITUTE
SKLT	SKYLIGHT
SLNT	SEALANT
SLV	SLEEVE
SM	SHEET METAL
SMS	SHEET METAL SCREWS
SOV	SHUT OFF VALVE
SPC	SPACER
SPCL	SPECIAL
SPD	SOUNDPROOF DOOR
SPEC	SPECIFICATION
SPF	SOUNDPROOF
SP FIN	SPECIAL FINISH
SPH	SPACE HEATER
SPKR	SPEAKER
SQ	SQUARE
SQHD	SQUARE HEAD
S&R	SHELF AND ROD
SS	SERVICE SINK
SS	STANDING SEAM (ROOF)
SST	STAINLESS STEEL
STA	STATION
STD	STANDARD
STG	SEATING
STL	STEEL
STOR	STORAGE
ST PR	STATIC PRESSURE
STR	STRINGER
STRUCT	STRUCTURAL
STWY	STAIRWAY
SUB FL	SUBFLOOR
SUSP	SUSPENDED
SV	SHEET VINYL
SW	SWITCH
SWBD	SWITCHBOARD
SYMM	SYMMETRICAL
SYNTH	SYNTHETIC
SYS	SYSTEM
T	TREAD
TAN	TANGENT
TB	TOWEL BAR
TC	TERRA COTTA
TEL	TELEPHONE
TEMP	TEMPERATURE
TEMP	TEMPORARY
TER	TERRAZZO
TERM	TERMINAL
T&G	TONGUE AND GROOVE
TGL	TOGGLE
TH	TRUSS HEAD
THK	THICK(NESS)
THRES	THRESHOLD
TK BD	TACKBOARD
TKS	TACKSTRIP
TO	TOP OF
TOL	TOLERANCE
TOPO	TOPOGRAPHY
TOS	TOP OF SLAB
TOS	TOP OF STEEL
TOW	TOP OF WALL
TPD	TOILET PAPER DISPENSER
TPTN	TOILET PARTITION
TRANS	TRANSOM
TRANS	TRANSVERSE
TSTAT	THERMOSTAT
TV	TELEVISION
TYP	TYPICAL
UC	UNIT COOLER
UGND	UNDERGROUND
UH	UNIT HEATER
UL	UNDERWRITERS LABORATORIES
UNEX	UNEXCAVATED
UNFIN	UNFINISHED
UPS	UNINTERRUPTABLE POWER SUPPLY
UR	URINAL
UTIL	UTILITY
UV	UNIT VENTILATOR
V	VOLT
VAR	VARNISH
VB	VINYL BASE
VCT	VINYL COMPOSITION TILE
VCT	VITRIFIED CLAY TILE
VD	VAULT DOOR
VENT	VENTILATOR(TION)
VERT	VERTICAL
VEST	VESTIBULE
VF	VINYL FABRIC
VG	VERTICAL GRAIN
VH	VINYL HOMOGENEOUS
VJ	V-JOINT(ED)
VNR	VENEER
VOL	VOLUME
VR	VAPOR RETARDER
VRM	VERMICULITE
VS	VENT STACK
V.T.	VOLTAGE TRANSFORMER
VTR	VENT THRU ROOF
VWC	VINYL WALL COVERING
W	WEST
W/	WITH
WB	WET BULB
WBL	WOOD BLOCKING
WC	WATER CLOSET
W/C	WHEELCHAIR
WCD	WOOD-CASED OPENING
WD	WOOD
WD	WOOD DOOR
WDSP	WASTE DISPOSER
WDW	WINDOW
WF	WIDE FLANGE
WGL	WIRED GLASS
WH	WALL HUNG
WH	WATER HEATER
WHB	WHEEL BUMPER
WHM	WATT-HOUR METER
WI	WROUGHT IRON
WKSH	WORK SHOP
WM	WIRE MESH
W/O	WITHOUT
WP	WATERPROOF(ING)
WP	WEATHERPROOF
WP	WORKING POINT
WR	WASTE RECEPTACLE
WRB	WARDROBE
WS	WATERSTOP
W.S.	WASTE STACK
WSCT	WAINSCOT
WT	WEIGHT
WTH	WIDTH
W/W	WALL TO WALL
WWF	WELDED WIRE FABRIC
WWM	WELDED WIRE MESH
WWR	WELDED WIRE REINFORCEMENT
XFMR	TRANSFORMER
YD	YARD
YD	YARD DRAIN

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:
SUBMITTED BY:
SIZE: ANSI D

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

ABBREVIATIONS

SHEET ID
G-003

CIVIL LEGEND

EXISTING	NEW	
		BUILDINGS
		ROADS
		CURB & GUTTER
		WALKS
		RAILROAD
12	12	CONTOURS
+ 77.2	+ 77.2	SPOT GRADE ELEVATIONS
		DIRECTION OF DRAINAGE
		CULVERT
SD	SD	STORM DRAIN
		SUBDRAIN
		SUBDRAIN OUTLET LINE
W	W	WATER LINE
FW	FW	FIRE WATER LINE
S	S	SANITARY SEWER
FM	FM	FORCE MAIN
FW	FW	FIRE PROTECTION WATER LINE
WD	WD	WASTE DRAIN
OR	OR	SUBDRAIN FLUSHING & OBSERVATION RISER
		MANHOLE SELF EXPLANATORY\ DEPENDING ON TYPE OF UTILITY LINE
		CURB INLET
		AREA INLET
		FIRE HYDRANT
		GATE VALVE & VALVE BOX OR SERVICE STOP & BOX
PIV	PIV	POST INDICATOR VALVE
DH-2	DH-2	DRILL HOLE
MW-1	MW-2	MONITORING WELL
		CONTROL POINT
MT	MT	PROPERTY LINE MONUMENT

FENCES

EXISTING	NEW	
XX	XX	CHAIN LINK SECURITY
X	X	BARBED WIRE
		WOVEN WIRE
		WOOD

ARCHITECTURAL LEGEND

- EARTH
- CONCRETE
- CRUSHED ROCK
- GRAVEL
- CONCRETE MASONRY UNITS (PLAN)
- CONCRETE MASONRY UNITS (SECTION)
- AS INDICATED
- AS INDICATED
- BRICK
- WOOD (ROUGH)
- WOOD (FINISH)
- PLYWOOD
- METAL
- GYPSUM WALLBOARD } AS INDICATED
- PLASTER }
- RIGID INSULATION
- BLANKET INSULATION
- GLASS (ELEVATION)
- GLASS (LARGE SCALE SECTION)
- WOOD STUD PARTITION
- METAL STUD PARTITION

HEATING

- HPS — HIGH PRESSURE STEAM
- MPS — MEDIUM PRESSURE STEAM
- LPS — LOW PRESSURE STEAM
- HPC — HIGH PRESSURE CONDENSATE
- MPC — MEDIUM PRESSURE CONDENSATE
- LPC — LOW PRESSURE CONDENSATE
- PC — PUMPED CONDENSATE
- FW — FEED WATER
- HTWS — HIGH TEMPERATURE WATER SUPPLY
- HTWR — HIGH TEMPERATURE WATER RETURN
- HWS — HOT WATER HEATING SUPPLY
- HWR — HOT WATER HEATING RETURN
- GHWS — GLYCOL HOT WATER HEATING SUPPLY
- GHWR — GLYCOL HOT WATER HEATING RETURN
- BBD — BOILER BLOW-DOWN
- FOG — FUEL OIL GAGE LINE
- FOS — FUEL OIL SUPPLY
- FOF — FUEL OIL FILL
- FOR — FUEL OIL RETURN
- FOV — FUEL OIL TANK VENT
- G — GAS
- F & T TRAP
- THERMODYNAMIC TRAP
- BUCKET TRAP
- THERMOSTATIC TRAP
- F — FLOAT TRAP

MISCELLANEOUS PIPING

- A — COMPRESSED AIR
- VAC — VACUUM
- F — FIRE LINE
- F — UNDERSLAB FIRE LINE
- FC — FOAM CONCENTRATE FOR AFFF SYSTEMS

VALVES & FITTINGS

- GLOBE VALVE
- T — O, S, & Y GATE VALVE W/TAMPER SWITCH
- GATE VALVE
- WAFER CHECK VALVE
- HOSE GATE VALVE
- PLUG VALVE OR BALANCING COCK
- NEEDLE VALVE
- STRAINER
- RELIEF VALVE
- M — MOTOR OPERATED VALVE
- TEMPERATURE REGULATING VALVE
- S — SOLENOID VALVE
- PRESSURE REDUCING VALVE
- FLOAT VALVE
- BUTTERFLY VALVE
- BALL VALVE
- CALIBRATED BRONZE BALANCING VALVE OR AUTOMATIC BALANCING VALVE AS INDICATED
- PA — ANCHOR
- EXPANSION JOINT, SLIDING
- EXPANSION JOINT, BELLOWS
- ELBOW DOWN
- ELBOW UP
- TEE DOWN
- TEE UP
- CAP
- UNION
- PIPE INCREASER OR DECREASER
- FLANGE
- BLIND FLANGE

MECHANICAL LEGEND

DUCTWORK

- 20 x 12 SG / 700 CFM — SUPPLY GRILLE (SG)
- 20 x 12 RG / 700 CFM — RETURN (RG) OR EXHAUST (EG) GRILLE (NOTE AT FLR. OR CLG.)
- 20 x 12 SR / 700 CFM — SUPPLY REGISTER (SR) (A GRILLE + INTEGRAL VOL. CONTROL)
- 20 x 12 GR / 700 CFM — EXHAUST OR RETURN AIR INLET CEILING (INDICATE TYPE)
- 20 Ø / 700 CFM — SUPPLY OUTLET, CEILING ROUND (TYPE AS SPECIFIED) INDICATE FLOW DIRECTION
- 12 x 12 / 700 CFM — SUPPLY OUTLET, CEILING, RECTANGULAR (TYPE AS SPECIFIED) INDICATE FLOW DIRECTION
- OPPOSED BLADE DAMPERS
- PARALLEL BLADE DAMPERS
- DG 12 x 6 — DOOR GRILLE
- UNIT HEATER (VERTICAL)
- UNIT HEATER (HORIZONTAL)
- POWER OR GRAVITY ROOF VENTILATOR-EXHAUST (ERV)
- POWER OR GRAVITY ROOF VENTILATOR-SUPPLY (SRV)
- POINT OF CHANGE IN DUCT CONSTRUCTION (BY STATIC PRESSURE CLASS)
- 20 x 12 — DUCT (1ST FIGURE, SIDE SHOWN 2ND FIGURE, SIDE NOT SHOWN)
- ACOUSTICAL LINING DUCT DIMENSIONS FOR NET FREE AREA
- DIRECTION OF FLOW
- DUCT SECTION (SUPPLY)
- DUCT SECTION (EXHAUST OR RETURN)
- R — INCLINED RISE (R) OR DROP (D) ARROW IN DIRECTION OF AIR FLOW
- TRANSITIONS: GIVE SIZES. NOTE F.O.T. FLAT ON TOP OR F.O.B. FLAT ON BOTTOM IF APPLICABLE
- STANDARD BRANCH FOR SUPPLY & RETURN (NO SPLITTER)
- SPLITTER DAMPER
- VD — VOLUME DAMPER MANUAL OPERATION
- SEC. MOD — AUTOMATIC DAMPERS MOTOR OPERATED
- OR AD — ACCESS DOOR (AD) ACCESS PANEL (AP)
- FD AD — FIRE DAMPER: SHOW VERTICAL POS. SHOW HORIZ. POS.
- SD AD — SMOKE DAMPER
- TURNING VANES
- FLEXIBLE DUCT
- FLEXIBLE CONNECTION

PLUMBING

- DCW — DOMESTIC COLD WATER
- DHW — DOMESTIC HOT WATER
- RDHW — RECIRCULATING DOMESTIC HOT WATER
- SAN — SANITARY
- V — VENT
- ACID — ACID WASTE
- ACID — ACID VENT
- WF — WALL FAUCET
- WH — WALL HYDRANT
- CO — CLEAN OUT
- FCO — FLOOR CLEAN OUT
- D — FLOOR DRAIN
- CO — WALL CLEAN OUT
- ST — STORM DRAIN ABOVE FLOOR
- ST — STORM DRAIN BELOW FLOOR

REFRIGERATION

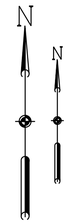
- RL — REFRIGERANT LIQUID
- RD — REFRIGERANT DISCHARGE (HOT GAS)
- RS — REFRIGERANT SUCTION
- CWS — CHILLED WATER SUPPLY
- CWR — CHILLED WATER RETURN
- C — CONDENSER WATER SUPPLY
- CR — CONDENSER WATER RETURN
- REFRIGERANT STRAINER
- THERMOSTATIC EXPANSION VALVE
- CHWS — CHILLED-HOT WATER SUPPLY
- CHWR — CHILLED-HOT WATER RETURN
- GCWS — GLYCOL CHILLED WATER SUPPLY
- GCWR — GLYCOL CHILLED WATER RETURN
- COND — CONDENSATE DRAIN LINE

TEMPERATURE CONTROLS

SEE TEMPERATURE CONTROL DRAWINGS FOR ADDITIONAL LEGEND

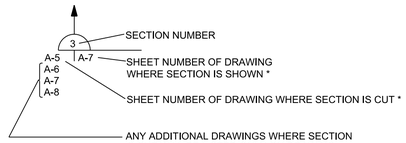
- (T) THERMOSTAT
- (OA) OUTDOOR AIR THERMOSTAT OR SENSOR (AS INDICATED)
- (S) TEMPERATURE SENSOR
- (N) NIGHT THERMOSTAT
- (PB) MANUAL OVER-RIDE SWITCH
- (E) EMCS SENSOR
- (P) PRESSURE SENSOR
- (H) HUMIDITY SENSOR

STANDARD NORTH ARROWS

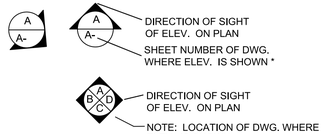


SECTION IDENTIFICATION

* SHEET NUMBERS OMITTED IF SECTION IS CUT AND DETAILED ON SAME DRAWING.



ELEVATION IDENTIFICATION



ARCHITECTURAL SYMBOLS

- (101) ROOM NUMBER
- (1) (A) COLUMN LINES NUMBER-LETTER (OPPOSITE DIR.)
- (101) DOOR NUMBERS
- (A) WINDOW TYPES
- (A) WALL AND PARTITION TYPES
- CENTER LINE
- MATCH LINE
- (X) DIRECTION OF SIGHT OF PHOTOGRAPH

GENERAL NOTES:

1. THESE LEGENDS ARE COMPOSED OF STANDARD SYMBOLS AND ARE PERTINENT TO THE CONDITIONS ON THIS SET OF DRAWINGS TO THE EXTENT APPLICABLE.
2. ADDITIONAL LEGENDS AND/OR ANOTHER LEGEND SHEET MAY APPEAR IN THIS SET OF DRAWINGS TO INDICATE SPECIFIC CONDITIONS IN LIEU OF SYMBOLS SHOWN ON THIS SHEET.
3. EXISTING FACILITIES TO BE REMOVED ARE INDICATED BY USE OF THESE SYMBOLS AND HATCHED THUSLY. ////////

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

LEGEND

SHEET ID

G-004

EXTERIOR ELECTRICAL LEGEND

EXIST	NEW	
40'-4	#2 40'-4	POLE, NO., LENGTH, AND CLASS AS INDICATED
6M	6M 12 MT	DOWN GUY AND ANCHOR. STRENGTH IN LBS. INDICATED (ANCHOR STRENGTH IS BASED ON HOLDING POWER IN CLASS 7 SOIL) "MT" INDICATES TWIN EYE ANCHOR ROD
	II 1 1	POLE MOUNTED ROADWAY OR AREA LIGHTING INSTALLATION, WATTS AS INDICATED, ROMAN NUMERAL INDICATES IES TYPE DISTRIBUTION
		POLE MOUNTED FLOODLIGHTING INSTALLATION. ARROWS INDICATE NO. OF LUMINAIRES AND APPROX. HORIZ. AIMING
4-#6 ACSR OHS — 2#6 OHS	WP	OVERHEAD POWERLINE-SECONDARY OR SERVICE DROP NO., SIZE AND TYPE OF CONDUCTOR AND LINE VOLTAGE AS INDICATED.
3#1 13.8KV OHP	OHP 3#1	OVERHEAD POWERLINE-PRIMARY DISTRIBUTION. NO., SIZE, AND TYPE OF CONDUCTORS AND LINE VOLTAGE AS INDICATED
OHC	OHC	OVERHEAD COMMUNICATIONS LINE
SL 1#6	AFL 1-#6 CWC	SERIES STREET LIGHT AND AIRFIELD LIGHTING CIRCUIT RESPECTIVELY. NO., SIZE AND TYPE OF WIRE AS INDICATED.
4#8, TYPE USE DBP	DBP	DIRECT BURIED LINE. THE LETTER "P" DESIGNATES PRIMARY POWER (#8 MIN. IF SINGLE-CONDUCTOR CABLES ARE USED), "S" SECONDARY POWER (LOW VOLTAGE), "C" A COMMUNICATIONS TYPE LINE. NUMBER, SIZE, AND TYPE OF CABLE AS INDICATED
DBS	DBS	
DBC	DBC	
4P	4P	UNDERGROUND DUCT LINE, CONCRETE ENCASED (SEE SPECS). NUMERAL INDICATES QUANTITY OF DUCTS (4" MIN. IF NOT IDENTIFIED). LETTER "P" INDICATES ELECTRICAL POWER LINE, "C" A COMMUNICATIONS TYPE LINE). NO., SIZE AND VOLTAGE OF CABLE AS INDICATED OR PER CROSS SECTION DETAIL
4P/2C	3-#3,15 KV 1-#3 600V +3 SPARE	
2C	2C	
UG	* UG	UNDERGROUND DISTRIBUTION-MISC. CONFIGURATIONS. NO. AND SIZE OF CONDUCTORS AND RACEWAY AS DESCRIBED (*) OR DETAILED
PB#4	HH#2 MH#4 A	PULLBOX, HANDHOLE OR MANHOLE. NO., AND TYPE AS INDICATED
EV	EV	UNDERGROUND ELECTRICAL EQUIPMENT VAULT (POWER OR CONTROLS)
EP	EP	ELECTRICAL EQUIPMENT IN PAD MOUNTED CABINET OR EQUIPMENT ASSEMBLY
△	10 ▲	INDIVIDUAL TRANSFORMER FOR OVERHEAD OR FENCED APPLICATIONS. ANSI VOLTAGE CONFIGURATION AS INDICATED, SINGLE NUMERAL IF PRESENT DESIGNATES KVA RATING
△	75 ▲	CONCRETE PAD MOUNTED TRANSFORMER INSTALLATION ANSI (C84.1) VOLTAGE CONFIGURATION AS INDICATED.
PE	PE	PHOTOELECTRIC CONTROL RELAY
R	R	AERIAL AUTOMATIC RECLOSER.
SS	SS	AERIAL AUTO SECTIONALIZER
#4 G		GROUNDING SYSTEM. ELECTRODE AND CONDUCTOR (COUNTERPOISE) (BARE COPPER) SIZE AS INDICATED
2" C		LIMITS OF CONDUIT CASING OR SLEEVE
		CAPPED CONDUIT

ELECTRICAL POWER DIAGRAM LEGEND

LVP 400A	DRAWOUT TYPE CIRCUIT BREAKER ASSEMBLY ("LVP" INDICATES LOW VOLTAGE POWER CB, "IC" INDICATES INSULATED CASE, "MC" INDICATES MOLDED CASE CB TYPE). SIZE AS INDICATED.
	DRAWOUT FUSE ASSEMBLY
3P 20 A	MOLDED CASE CIRCUIT BREAKER, FIXED TRIP. THREE POLE UNLESS DESIGNATED '1P' OR '2P'.
1600AF 1200AT	MOLDED CASE CIRCUIT BREAKER OF A GIVEN FRAME SIZE WITH ADJUSTABLE TRIP SETTINGS.
	FUSED CUTOUT OR FUSED SWITCH ASSEMBLY. VOLTAGE RATING AND SIZE AS INDICATED
	FUSE-POWER AND CONTROL APPLICATIONS RESPECTIVELY, SIZE AS INDICATED
50A 9KV	SURGE ARRESTOR - VOLTAGE RATING AND CLASS AS INDICATED
5	POWER FACTOR CORRECTION CAPACITOR - NUMBER DENOTES KVAR RATING
SS	GROUND CONNECTION - TO STANDARD ROD TYPE ELECTRODE. TO NEAREST STRUCTURAL STEEL (#6 MIN. CONDUCTOR IF NOT SHOWN)
	CONTROL INTERFACE OR OPERATING RELATIONSHIP BETWEEN 2 OR MORE DEVICES (KEY INTERLOCK BETWEEN BREAKERS, RELAY/CONTACTOR, ETC.)
1000	BUS NUMBER FOR ANALYSIS AND REFERENCE ONLY

1600A FB FB	FEEDER TYPE BUS DUCT (FB) OR METAL-ENCLOSED BUS ASSEMBLIES (HIGH OR MEDIUM VOLTAGE). (CU BUS IF NOT IDENTIFIED). AMPACITY AS INDICATED
	SEPARABLE CONNECTOR IN PRIMARY DISTRIBUTION LINE (ELBOW TERMINATOR AND BUSHING COMBINATION)- LOADBREAK AND NON-LOADBREAK STYLES RESPECTIVELY
KWH	KILOWATT-HOUR METER (WH IS WATT-HOUR METER)
1200:5 (3)	CURRENT TRANSFORMER (CT). SECOND NUMERAL OF TRANSFORMATION RATIO IDENTIFIES NOMINAL CURRENT OF METERING/ACCESSORY CIRCUIT. NUMERAL IN PARENTHESIS INDICATES QUANTITY OF CT'S
(3) 480 120	VOLTAGE (POTENTIAL) TRANSFORMER (VT/PT), DRAWOUT AND NON-DRAWOUT. QUANTITY AND VOLTAGE RATING AS INDICATED
	POWER & DISTRIBUTION TRANSFORMER, RATED kVA, VOLTAGE, CONNECTIONS, COOLING CLASS AND TYPE AS INDICATED.
△	TRANSFORMER DELTA CONNECTION DESIGNATION WHEN USED BY A TRANSFORMER SYMBOL.
	TRANSFORMER GROUNDED-WYE CONNECTION DESIGNATION WHEN USED BY A TRANSFORMER SYMBOL, DIRECT GROUNDED AND RESISTOR GROUNDED RESPECTIVELY. IF THE GROUND SYMBOL IS MISSING, THEN IT IS AN UNGROUNDED OR FLOATING WYE CONNECTION.
AS A VS V	AMMETER AND VOLTMETER WITH PHASE SELECTOR SWITCH
GFI #2 400 AT 0.3 s	GROUND FAULT INTERRUPTING EQUIPMENT (SEE SPECS) WITH TRIP SETTING AT DESIGNATED TIME DELAY INTERLOCKING CONTROL AS INDICATED
52 27B3 50N 51N	SENSOR, DEVICE OR APPARATUS (ELECTRICAL OR ELECTROMECHANICAL); NUMERAL IDENTIFIES TYPE OR FUNCTION PER ANSI/IEEE C37.2

INTERIOR ELECTRICAL LEGEND

	EXISTING AND NEW, RESPECTIVELY
A	INCANDESCENT OR H.I.D. LUMINAIRE LESS THEN 2' X 2' IN SIZE - LETTER IDENTIFIES CORRESPONDING SWITCH
+7'	WALL FIXTURE - MOUNTING HEIGHT INDICATED (TO FIXTURE ℄)
	FLUORESCENT OR HID LUMINAIRE 2' x 2' OR LARGER IN SIZE (THE OUTLET SYMBOL WILL NORMALLY BE OMITTED IN CONTINUOUS ROW CONFIGURATIONS)
	CEILING EXIT LIGHT. ARROWS IDENTIFY DIRECTION OF EGRESS
	WALL EXIT LIGHT - MOUNTING HEIGHT INDICATED (TO ℄), ARROWS IDENTIFY DIRECTION OF EGRESS
	LIGHTING CONTACTOR - NO. OF POLES, CURRENT AND VOLTAGE RATINGS AS INDICATED
EPS	EMERGENCY POWER SYSTEM FOR EGRESS LIGHTING - BATTERY INVERTER SET (OR FORWARD TRANSFER UPS), RATINGS AND PHYSICAL SIZE AS INDICATED
	BATTERY OPERATED EMERGENCY LIGHT SET, NO. OF LUMINAIRE HEADS AS INDICATED
E E OR E	FEEDER, DEVICE OR FIXTURE, AND FLUORESCENT TYPE FIXTURE, RESP. SUPPLIED FROM AN EMERGENCY CIRCUIT. THE SHADED PORTION OF THE FLUORESCENT SYMBOL INDICATES 2 LAMPS OF A 3 OR 4 LAMP FIXTURE ARE SUPPLIED FROM EMERGENCY POWER. A 1-LAMP OR 2-LAMP FIXTURE WILL BE SHOWN SHADED OR UNSHADED WITH THE 'E' ANNOTATION
J J	JUNCTION BOX, 4" SQUARE UNLESS NOTED OTHERWISE. CEILING AND WALL MOUNT TYPES INDICATED.
D	DIMMING CONTROL FOR LIGHTING
S_{TO}	MANUAL STARTER WITH THERMAL OVERLOADS (MOTOR RATED SWITCH)
S	SINGLE POLE SWITCH
S_2	DOUBLE POLE SINGLE THROW SWITCH
S_3	THREE WAY SWITCH
S_4	FOUR WAY SWITCH
S_P	SINGLE POLE SWITCH WITH PILOT LIGHT
S_T	TIMER OPERATED SWITCH
S_K	KEY OPERATED SWITCH
S_{MC}	MOMENTARY CONTACT SWITCH
	4'-0" UP LETTERS A, B, C, ETC. WHERE USED, IDENTIFY SWITCHED FIXTURES
20A	2P,3W GROUNDING TYPE RECEPTACLE - 125V, CONVENTIONAL DUPLEX & SIMPLEX "SW" INDICATES SPLIT WIRED, CO= CLOCKOUTLET, FO= FAN OUTLET, IG= ISOLATED GROUND TYPE OUTLETS, NEMA 5-XX SERIES. DEFAULT SIZE IS 15A. SEE NOTE 8.
X"	RECEPTACLE STRIP ASSEMBLY - DUPLEX NEMA 5-15 RECEPTACLES SPACED AT INTERVAL INDICATED (SEE FLOOR PLANS) IN SURFACE MOUNTED RACEWAY. WALL MOUNTED AT 4 FT. AFF, CONSECUTIVE PHASE CONNECTIONS (IN 3Ø APPLICATIONS) UNLESS NOTED OTHERWISE

NOTE 5

3/4HP	ELECTRIC WATER COOLER (DRINKING WATER DISPENSER) SIZE AS NOTED
SM SM R	INDIVIDUAL FLOOR OUTLET ASSEMBLY.'SM' DENOTES SURFACE MOUNTED TYPE (ABOVE FLOOR SERVICE FITTING), 'R' DENOTES RECESSED (FLUSH MOUNTED) TYPE, SEE SPECS
	RELOCATABLE SERVICE POST ASSEMBLY - LENGTH AS REQUIRED TO EXTEND ABOVE SUSPENDED CEILING. SEE NOTE 8.
	TELEPHONE OUTLET, SINGLE AND DUPLEX JACK CONFIGURATIONS (8 PIN JACKS). SEE SPECS. SYMBOL WITHOUT LEG(S) REQUIRES DUPLEX JACKS. A SQUARE AROUND THE DEVICE INDICATE IT IS FLOOR MOUNTED. HL=HOTLINE TELEPHONE, P= PUBLIC TELEPHONE, SEE NOTE 8.
12" X 4" CT	CABLE TRAY FOR COMMUNICATIONS AND DATA PROCESSING, DIMENSIONS AS INDICATED (W X D)
TTB-2 TTC#4 36X24X6	TELEPHONE TERMINAL BOARD (PLYWOOD BACKBOARD); TELEPHONE TERMINAL CABINET, SIZE AS INDICATED
UF P 3" UF C 7" UFD UFD	MULTIOUTLET CONFIGURATION IN UNDERFLOOR DUCT SYSTEM (SEE SPECS.). OPEN CIRCLE DENOTES BLANK INSERT LOCATION, SOLID DENOTES A DEVICE INSTALLATION; 'P' INDICATES A POWER DUCT WITH DUPLEX RECEPTACLES (NEMA 5-15), 'C' DENOTES COMMUNICATIONS DUCT W/BUSHED FITTING; FIGURES IDENTIFY NOMINAL WIDTH; UFD IDENTIFIES A SECTION OF FEEDER DUCT (NO INSERTS).
EF-3 M 2HP	MOTOR - USE AND SIZE AS INDICATED
#3 2S	MOTOR CONTROLLER - MAGNETIC OR AS INDICATED, UPPER NUMERAL DESIGNATES NEMA SIZE; LOWER LETTER, IF USED, INDICATES: 'R' - REVERSING TYPE, '2S' - TWO SPEED TYPE, 'FV'- FULL VOLTAGE TYPE (DEFAULT IF NOT INDICATED), 'RV' - REDUCED VOLTAGE TYPE, 'AT' - AUTO TRANSFORMER TYPE, 'PW' - PART WINDING TYPE.
	COMBINATION STARTER W/EXTERNALLY OPERATED DISCONNECT
	DISCONNECT SWITCH, SIZE AND TYPE AS INDICATED (OR 3P, 240V, 30A MIN)
	PUSHBUTTON CONTROL STATION - 1, 2, OR 3 BUTTONS "EPO" = EMERGENCY POWER OFF.
$S_{HOA\ 2P}$ SS	SELECTOR SWITCH (SEPARATE FROM STARTER)- 2 POSITION OR 3 POSITION AS INDICATED. IF NOT SPECIFIED ELSEWHERE, LEGEND PLATE DESIGNATIONS WILL BE 'ON-OFF' AND 'MAN-OFF-AUTO' (OR 'H,O,A.)
T	THERMOSTAT - SEE MECH. SPECS, 5'-0" UP
MCC-2	MOTOR CONTROL CENTER, FREE STANDING W/NO. OF 20" WIDE (MIN) VERTICAL SECTIONS INDICATED. SEE DIAGRAM AND/OR SCHEDULE FOR SIZES, RATINGS, AND LOADS
LP2 B	LIGHTING AND APPLIANCE TYPE PANELBOARD - FLUSH MOUNTED AND SURFACE MOUNTED TYPES, SEE CORRESPONDING PANEL SCHEDULE. OPEN SYMBOL INDICATES EXISTING
	DISTRIBUTION TYPE PANEL
MSB MSG	MAIN SWITCH BOARD OR MAIN SWITCH GEAR (ABBREVIATED OR SPELLED OUT), SEE FLOOR PLANS AND DIAGRAMS FOR DIMENSIONS, CLEARANCES, AND ELECTRICAL RATINGS
400A PB 30A 30/25	BUS DUCT ASSEMBLY WITH PLUG-IN POWER BOX CAPABILITY AT 2' INTERVALS, CURRENT RATING AS INDICATED. OPEN CIRCLE REPRESENTS A POSITION WITH BLANK COVER ONLY, SOLID CIRCLE A PLUG IN BOX WITH BREAKER OR SWITCH (SEE SPECS), RECEPT. SYMBOL IDENTIFIES A BOX WITH RECEPTACLE ATTACHED (FIGURES INDICATE RATING OF RECEPT AND OVERCURRENT DEVICE.
LP-2,4,6	BRANCH CIRCUIT AND FEEDER WIRING. LONG, SHORT, SINGLE DOT AND DOUBLE DOT HASH MARKS REPRESENT PHASE CONDUCTOR, NEUTRAL, EQUIPMENT GROUND, AND ISOLATED EQUIPMENT GROUND RESPECTIVELY (AS APPLICABLE). ARROWS AND LETTER/NUMERALS IDENTIFY HOME-RUN CIRCUITS. IF HASH MARKS ARE OMITTED BETWEEN HOME-RUNS, TRANSITION SEGMENTS, AND END-OF-LINE DEVICES, REQUIRED QUANITY IS UNDERSTOOD TO APPLY TO ALL UNMARKED INTERVENING SEGMENTS. A CIRCUIT WITHOUT ANY DESIGNATION INDICATES THE CIRCUIT IS TWO-WIRE (MIN #12 IN 1/2"C).
CO	CONDUIT ONLY - NO CONDUCTORS, PULL WIRE IF OVER 50'
UF	COMM OR POWER FEEDER INSTALLED UNDER FLOOR SLAB IN COATED R.S. CONDUIT UNLESS INDICATED OTHERWISE
	LIGHT LINE - EXISTING, OR BY OTHER TRADES
	HEAVY LINE - NEW ELECTRICAL WORK
	FUTURE WORK OR ELECTRICAL ITEM REPEATED FOR CLARITY (TO LIGHTING SHEET FROM POWER OR COMM DWG., ACROSS MATCH LINES, ETC.)
X XR	EXISTING EQUIPMENT; EXISTING EQUIPMENT AS RELOCATED (NEW LOCATION)
G	GENERATOR OR GENERATOR CONNECTION.
	STATIC GROUND ROD

FCP FCP	FIRE ALARM CONTROL PANEL, (SEE SPECS)
FAA FAA	FIRE ALARM ANNUNCIATION PROVISIONS, W/OR W/O GRAPHIC REPRESENTATION, SEE SPECS
FST FST	FIRE ALARM SIGNAL TRANSMITTING (WITH ANTENNA FOR FM RADIO TYPE), SEE SPECS
F	MANUAL FIRE ALARM STATION - 4'-0" A.F.F.
H CO F	ABORT STATION. "F"= FIRE; "H"=HALON; "CO"=CARBON DIOXIDE
F F F F M	FIRE ALARM WARNING DEVICE - BELL, CHIME, HORN AND MINIHORN, 6'-8" A.F.F.
F	FIRE ALARM WARNING DEVICE, VISIBLE ONLY - FLASHING LIGHT, CEILING MOUNTED AND WALL MOUNTED (6'-8" A.F.F.) RESPECTIVELY
M F F F F C	F.A. WARNING DEVICE, COMBINED AUDIBLE AND VISIBLE - FLASHING LIGHT WITH A MINIHORN, HORN, BELL, OR CHIME - 6'-8" A.F.F.
CR	HEAT DETECTOR - UNDIFFERENTIATED SYMBOL INDICATES FIXED TEMPERATURE OR COMBINATION F.T. AND RATE OF RISE TYPE, SEE SPECS; 'CR' INDICATES COMPENSATED RATE ("RATE ANTICIPATION") TYPE WITH TUBULAR SENSING ELEMENT REQUIRED
I D P	SMOKE DETECTOR, THE LETTER 'I' OR 'P', IF PRESENT, STIPULATES IONIZATION OR PHOTOELECTRIC TYPE. 'D' STIPULATES A DUCT TYPE SMOKE DETECTOR. WHERE DUCT DETECTORS ARE SHOWN IN PAIRS, LOCATIONS ARE IN SUPPLY AND RETURN DUCTS, A SINGLE DETECTOR WOULD BE INSTALLED IN THE SUPPLY DUCT IF THE LOCATION IS NOT OTHERWISE INDICATED.
OSY SV TS WFI	FIRE ALARM CONTACTS AT SOLENOID (OS & Y) VALVE, TAMPER SWITCH, ALARM CHECK VALVES, WATER FLOW INDICATOR AND FLOW SWITCH, SEE MECH. SPECS
	24-INCH LIGHTNING AIR TERMINAL.
	60-INCH LIGHTNING AIR TERMINAL.
	LIGHTNING PROTECTION MAIN CONDUCTOR

NOTES:

1. WHERE MORE THAN ONE SYMBOL FORMAT IS SHOWN, THE PREFERRED FORM IS SHOWN FIRST.
2. SUPPLEMENTAL ELECTRICAL LEGENDS MAY APPEAR IN THIS SET OF DRAWINGS TO ESTABLISH SYMBOLS FOR ITEMS NOT COVERED BY THIS SHEET OR TO INDICATE SPECIFIC CONDITIONS IN LIEU OF SYMBOLS SHOWN ON THIS SHEET.
3. NOT USED.
4. EXISTING ITEMS ARE DESIGNATED BY A THIN LINE OR AN OPEN SYMBOL; NEW ITEMS WITH A THICK LINE OR CLOSED (FILLED-IN) SYMBOL.
5. ELECTRIC LIGHT FIXTURES ARE IDENTIFIED BY EITHER OR BOTH OF THE FOLLOWING METHODS:

   234B1 (A) INDICATES FIXTURE TYPE, PER FIXTURE SCHEDULE, FOR ENTIRE ROOM OR AREA WHEN ADJACENT TO THE ROOM NAME OR NUMBER DESIGNATION OR FOR SINGLE FIXTURE WHEN ADJACENT TO THE FIXTURE SYMBOL.

   (K) (B) CAPITAL LETTER OR FIXTURE DESIGNATION INSIDE OR ADJACENT TO SYMBOL INDICATES FIXTURE TYPE FOR EACH FIXTURE PER FIXTURE SCHEDULE.
6. SIZES OF WIRE AND CABLE ARE BASED ON COPPER CONDUCTORS UNLESS INDICATED OTHERWISE.
7. LETTERS SUCH AS "WP", "EP" ADJACENT TO ANY SYMBOL INDICATE SPECIAL CONSTRUCTION IS REQUIRED. SEE ABBREVIATIONS SHEET FOR DEFINITIONS.
8. ALL RECEPTACLE AND COMMUNICATION OUTLETS SHALL BE MOUNTED 15 - INCHES A.F.F. AS MEASURED TO THE BOTTOM OF THE OUTLET BOX, UNLESS INDICATED OTHERWISE.

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U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

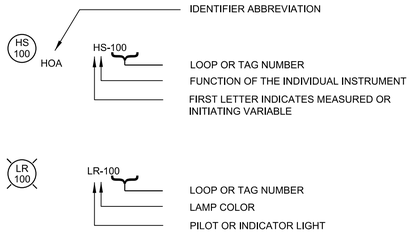
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

ELECTRICAL LEGEND

SHEET ID
G-005

INSTRUMENTATION

INSTRUMENT BALLOONS



INSTRUMENT BALLOON

INSTRUMENTATION LINES

PROCESS CONNECTION

ELECTRICAL SIGNALS

COMMUNICATION LINK

IDENTIFIER ABBREVIATION FOR INSTRUMENT BALLOONS

PB	PUSH BUTTON
SS	SELECTOR SWITCH
O/O	ON/OFF
HA	HAND/AUTOMATIC
HOA	HAND/OFF/AUTOMATIC
T	TOGGLE

INSTRUMENT SOCIETY OF AMERICA TABLE

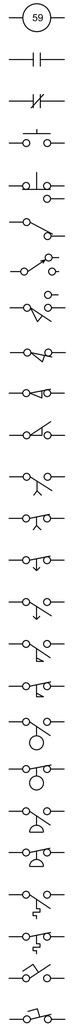
	FIRST LETTER(S)		SUCCEEDING LETTERS		
LETTER	**PROCESS OR INITIATING VARIABLE**	**MODIFIER**	**READOUT OR PASSIVE FUNCTION**	**OUTPUT FUNCTION**	**MODIFIER**
A	ANALYSIS(t)		ALARM		AMBER
B	BURNER FLAME		USERS CHOICE(t)	USERS CHOICE(t)	USERS CHOICE(t)
C	CONDUCTIVITY			CONTROL(LER)	
D	DENSITY OR SPACIFIC GRAVITY	DIFFERENTIAL			
E	VOLTAGE (EMF)		PRIMARY ELEMENT		
F	FLOW RATE	RATIO			
G	GAUGE		GLASS		GREEN
H	HAND (MANUAL)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER	SCAN			
K	TIME OR SCHEDULE			CONTROL STATION	
L	LEVEL		LIGHT(S) (PILOT)		LOW
M	MOISTURE OR HUMIDITY (ALSO, MOTOR)				MIDDLE OR INTERMEDIATE
N	USERS CHOICE(t)		USERS CHOICE(t)	USERS CHOICE(t)	USERS CHOICE(t)
O	USERS CHOICE(t)		ORIFICE		
P	PRESSURE (OR VACUUM)		POINT (TEST CONNECTION)		
Q	QUANTITY OR EVEN(t)	INTEGRATE	INTEGRATE (TOTALIZER)		
R	RADIOACTIVITY		RECORD OR PRINT		RED
S	SPEED OR FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT(TER)	
U	MULTIVARIABLE(t)		MULTIFUNCTION(t)	MULTIFUNCTION(t)	MULTIFUNCTION(t)
V	VISCOSITY			VALVE, DAMPER,LOUVER	
W	WEIGHT OR FORCE		WELL		WHITE
X	UNCLASSIFIED(t)		UNCLASSIFIED(t)	UNCLASSIFIED(t)	UNCLASSIFIED(t)
Y	USERS CHOICE(t)			RELAY OR COMPUTE(t)	
Z	POSITION			DRIVE ACTUATE OR UNCLASSIFIED FINAL CONTROL ELEMENT	

(t) WHEN USED EXPLANATION IS SHOWN ADJACENT TO INSTRUMENT SYMBOL. SEE ABBREVIATIONS AND LETTER SYMBOLS.

MISC ELECTRICAL SYSTEMS

BUILDING BLOCK FOR MISC DIFFERENT SYSTEMS. THESE WOULD REQUIRE A SUPPLEMENTAL LEGEND;
I=INTERCOM SYSTEM,
N=NURSE CALL SYSTEM,
P=PAGING SYSTEM,
SR=STAFF REGISTER,
S=SOUND SYSTEM,
TV=CABLE TV SYSTEM.
THE SUBSCRIPT BY THE SQUARE WOULD BE USED TO INDICATE VARIOUS TYPES OF COMPONENTS IN THE SYSTEM.

ELECTRICAL CONTROL DIAGRAM



ELECTRICAL DIAGRAM RELAY, LETTER OR NUMBER IN THE CIRCLE INDICATES THE RELAY DESIGNATION.

NORMALLY OPEN CONTACTS

NORMALLY CLOSED CONTACTS

PUSH BUTTON OPEN

PUSH BUTTON CLOSED

TWO POSITION SWITCH

THREE POSITION SWITCH

LIMIT SWITCH, NORMALLY OPEN

LIMIT SWITCH, NORMALLY OPEN, HELD CLOSED

LIMIT SWITCH, NORMALLY CLOSED

LIMIT SWITCH, NORMALLY CLOSED, HELD OPEN

TIME DELAY SWITCH, NORMALLY OPEN, TIMED DELAY CLOSED.

TIME DELAY SWITCH, NORMALLY CLOSED, TIME DELAY OPEN.

TIME DELAY SWITCH, NORMALLY CLOSED, TIME DELAY CLOSED.

TIME DELAY SWITCH, NORMALLY OPEN, TIME DELAY OPEN.

FLOW SWITCH, NORMALLY OPEN, CLOSE ON INCREASE.

FLOW SWITCH, NORMALLY CLOSED, OPEN ON INCREASE.

LIQUID LEVEL SWITCH, NORMALLY OPEN, CLOSE ON INCREASE.

LIQUID LEVEL SWITCH, NORMALLY CLOSED, OPEN ON INCREASE.

PRESSURE AND VACUUM SWITCH, NORMALLY OPEN, CLOSE ON RISE.

PRESSURE AND VACUUM SWITCH, NORMALLY CLOSED, OPEN ON RISE.

TEMPERATURE SWITCH, NORMALLY OPEN, CLOSE ON RISING TEMPERATURE.

TEMPERATURE SWITCH, NORMALLY CLOSED, OPEN ON RISING TEMPERATURE.

FOOT SWITCH, NORMALLY OPEN.

FOOT SWITCH, NORMALLY CLOSED.

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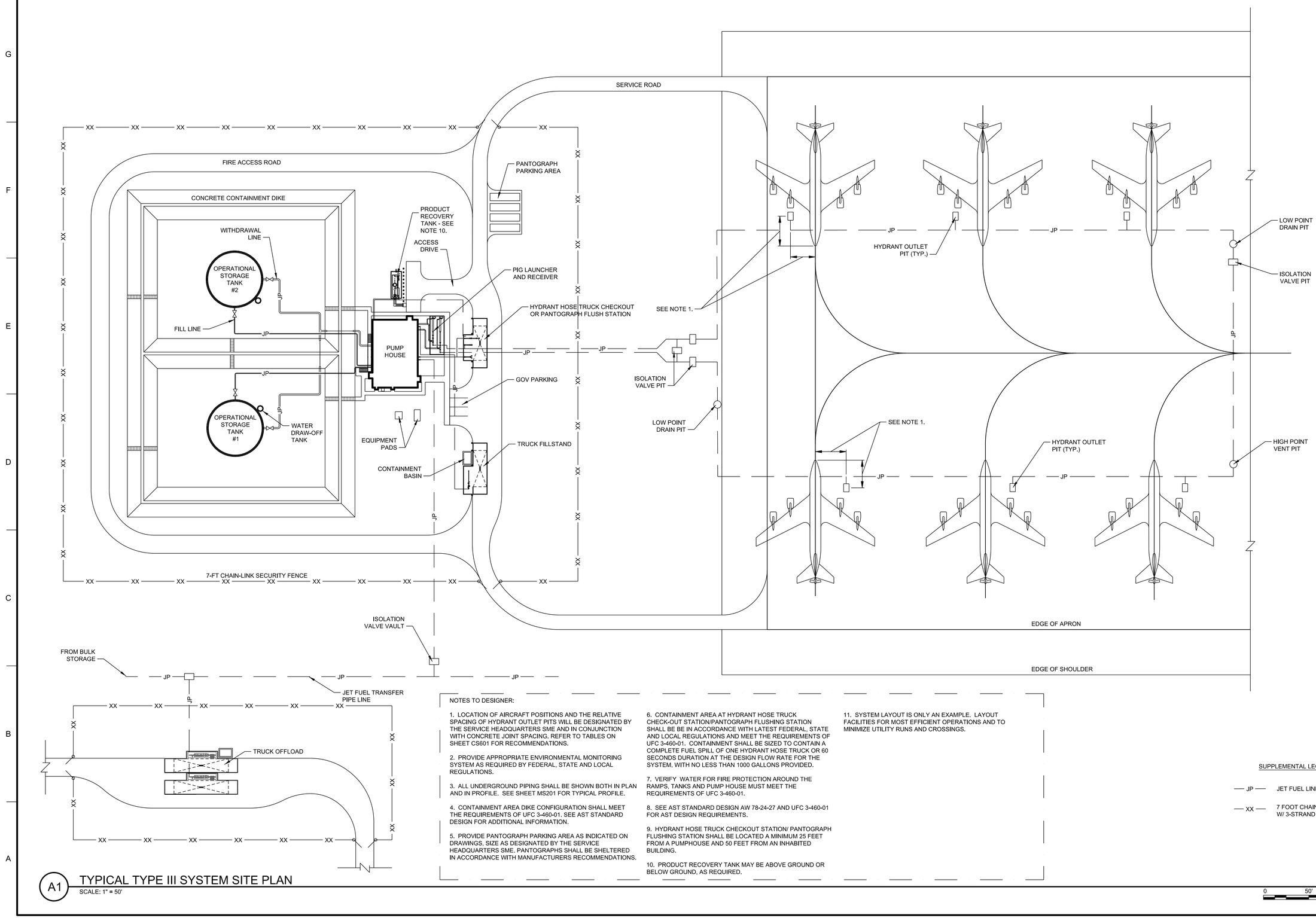
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

SUPPLEMENTAL
ELECTRICAL LEGEND

SHEET ID

G-006



A1 TYPICAL TYPE III SYSTEM SITE PLAN

SCALE: 1" = 50'

NOTES TO DESIGNER:

1. LOCATION OF AIRCRAFT POSITIONS AND THE RELATIVE SPACING OF HYDRANT OUTLET PITS WILL BE DESIGNATED BY THE SERVICE HEADQUARTERS SME AND IN CONJUNCTION WITH CONCRETE JOINT SPACING. REFER TO TABLES ON SHEET CS601 FOR RECOMMENDATIONS.

2. PROVIDE APPROPRIATE ENVIRONMENTAL MONITORING SYSTEM AS REQUIRED BY FEDERAL, STATE AND LOCAL REGULATIONS.

3. ALL UNDERGROUND PIPING SHALL BE SHOWN BOTH IN PLAN AND IN PROFILE. SEE SHEET MS201 FOR TYPICAL PROFILE.

4. CONTAINMENT AREA DIKE CONFIGURATION SHALL MEET THE REQUIREMENTS OF UFC 3-460-01. SEE AST STANDARD DESIGN FOR ADDITIONAL INFORMATION.

5. PROVIDE PANTOGRAPH PARKING AREA AS INDICATED ON DRAWINGS, SIZE AS DESIGNATED BY THE SERVICE HEADQUARTERS SME. PANTOGRAPHS SHALL BE SHELTERED IN ACCORDANCE WITH MANUFACTURERS RECOMMENDATIONS.

6. CONTAINMENT AREA AT HYDRANT HOSE TRUCK CHECK-OUT STATION/PANTOGRAPH FLUSHING STATION SHALL BE BE IN ACCORDANCE WITH LATEST FEDERAL, STATE AND LOCAL REGULATIONS AND MEET THE REQUIREMENTS OF UFC 3-460-01. CONTAINMENT SHALL BE SIZED TO CONTAIN A COMPLETE FUEL SPILL OF ONE HYDRANT HOSE TRUCK OR 60 SECONDS DURATION AT THE DESIGN FLOW RATE FOR THE SYSTEM, WITH NO LESS THAN 1000 GALLONS PROVIDED.

7. VERIFY WATER FOR FIRE PROTECTION AROUND THE RAMPS, TANKS AND PUMP HOUSE MUST MEET THE REQUIREMENTS OF UFC 3-460-01.

8. SEE AST STANDARD DESIGN AW 78-24-27 AND UFC 3-460-01 FOR AST DESIGN REQUIREMENTS.

9. HYDRANT HOSE TRUCK CHECKOUT STATION/ PANTOGRAPH FLUSHING STATION SHALL BE LOCATED A MINIMUM 25 FEET FROM A PUMPHOUSE AND 50 FEET FROM AN INHABITED BUILDING.

10. PRODUCT RECOVERY TANK MAY BE ABOVE GROUND OR BELOW GROUND, AS REQUIRED.

11. SYSTEM LAYOUT IS ONLY AN EXAMPLE. LAYOUT FACILITIES FOR MOST EFFICIENT OPERATIONS AND TO MINIMIZE UTILITY RUNS AND CROSSINGS.

SUPPLEMENTAL LEGEND

— JP — JET FUEL LINE

— XX — 7 FOOT CHAIN LINK FENCE W/ 3-STRAND BARBED WIRE

PLAN NORTH

0 50' 100'

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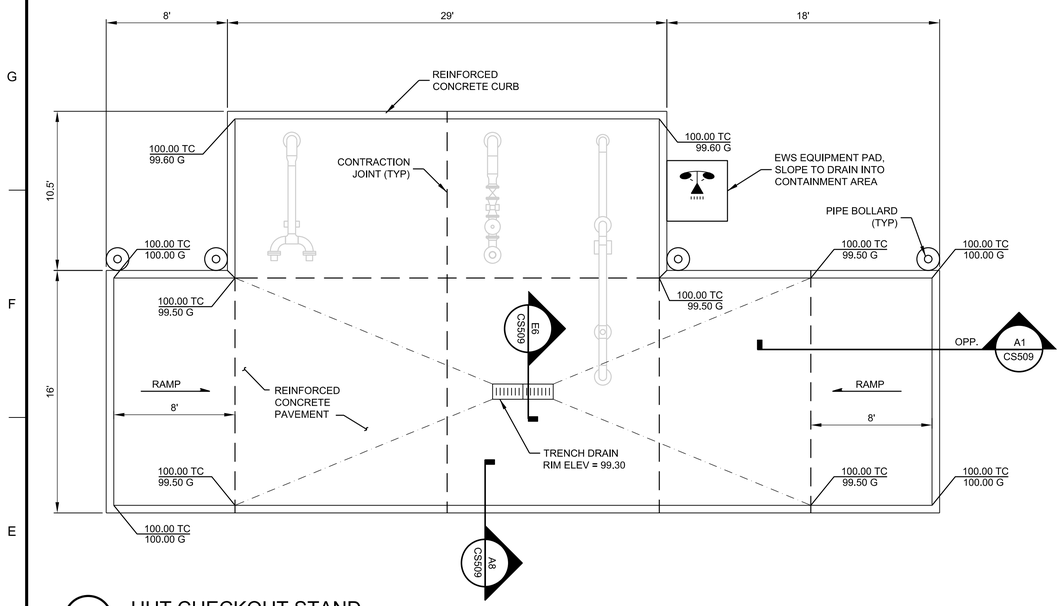
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

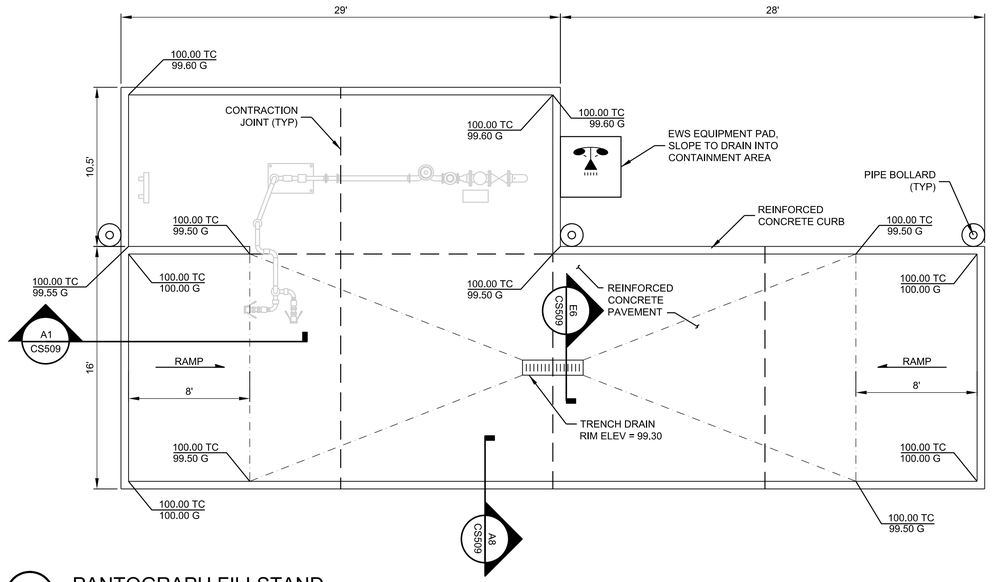
TYPICAL TYPE III SYSTEM SITE PLAN

SHEET ID

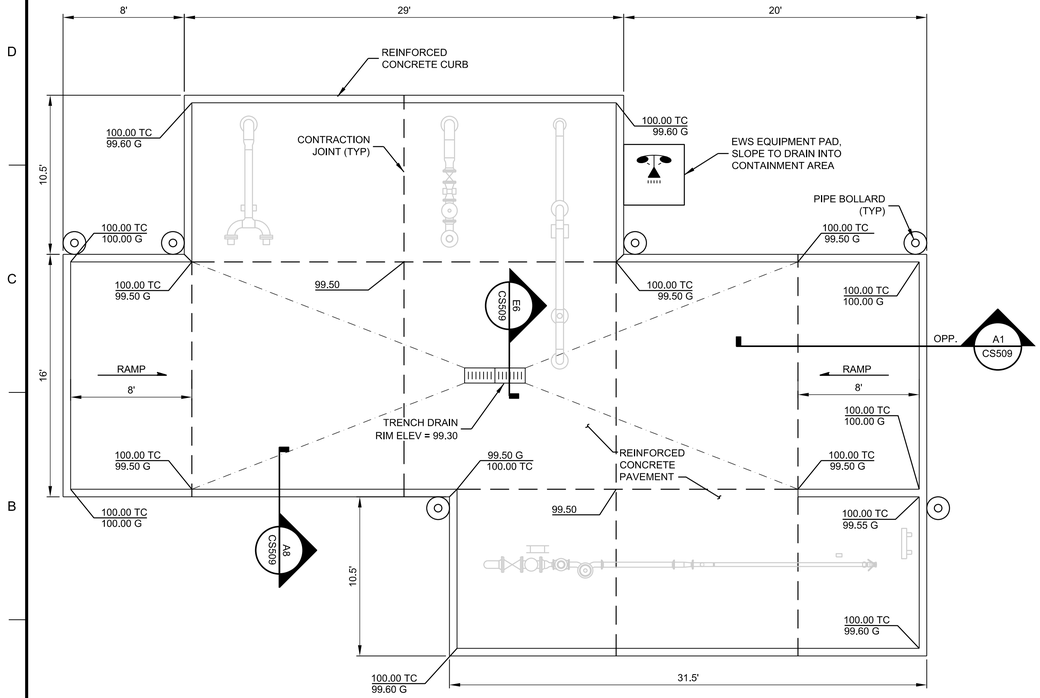
CS101



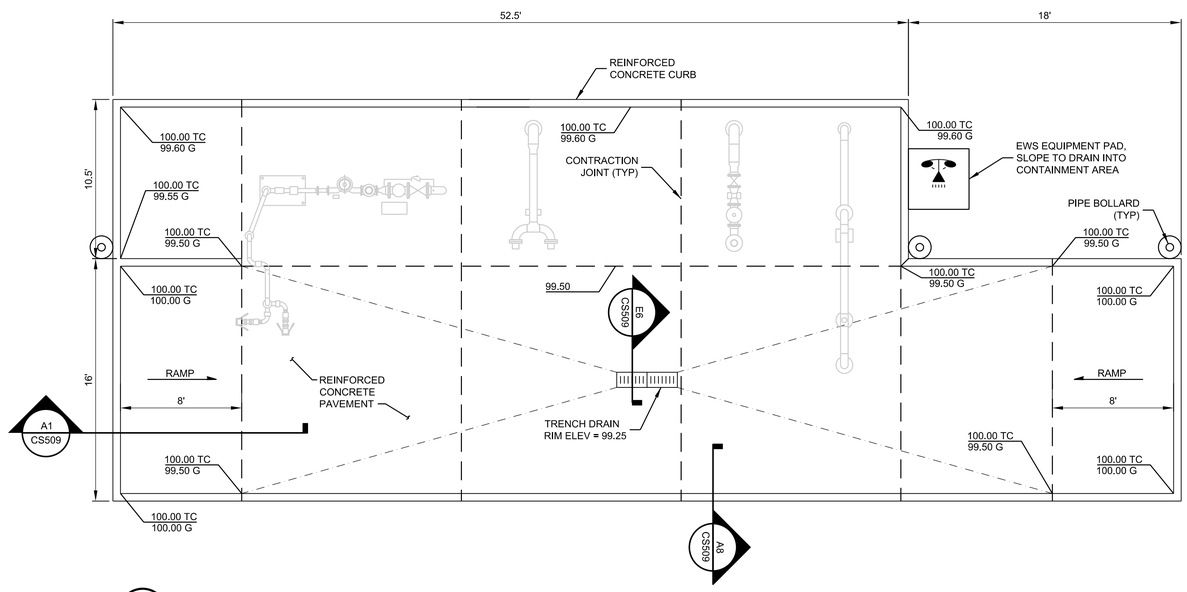
E1 HHT CHECKOUT STAND
SCALE: 1" = 5'



E6 PANTOGRAPH FILLSTAND
SCALE: 1" = 5'



A1 HHT CHECKOUT WITH HOSE FILLSTAND (TWO-WAY TRAFFIC)
SCALE: 1" = 5'



B6 HHT CHECKOUT AND PANTOGRAPH FILLSTAND (ONE WAY TRAFFIC)
SCALE: 1' = 5'

SEE DESIGNER NOTES ON CS502.

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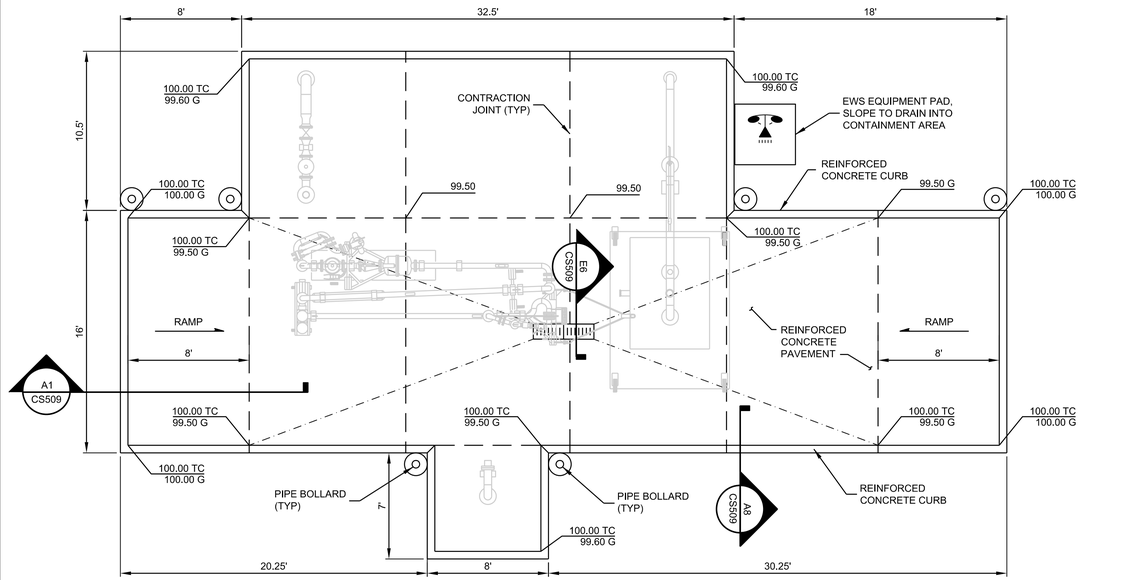
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

HHT CHECKOUT AND FILLSTAND DETAILS

SHEET ID
CS501



E1 PANTOGRAPH FLUSH STATION WITH HIGH REACH

SCALE: 1" = 5'

0 5' 10'

DESIGNER NOTES:

1. DESIGN EACH SPILL CONTAINMENT AREA TO CONTAIN THE MAXIMUM POTENTIAL FUEL IN ACCORDANCE WITH UFC 3-460-01 AND IN COMPLIANCE WITH STATE AND LOCAL REGULATIONS.

2. UTILIZE A REMOTE CONTAINMENT BASIN FOR PART OR ALL OF THE REQUIRED SPILL VOLUME FROM ONE OR MORE STATIONS, WITH AT LEAST THE MINIMUM VOLUME PERCENTAGE STORED REMOTELY PER UFC 3-460-01 REQUIREMENTS.

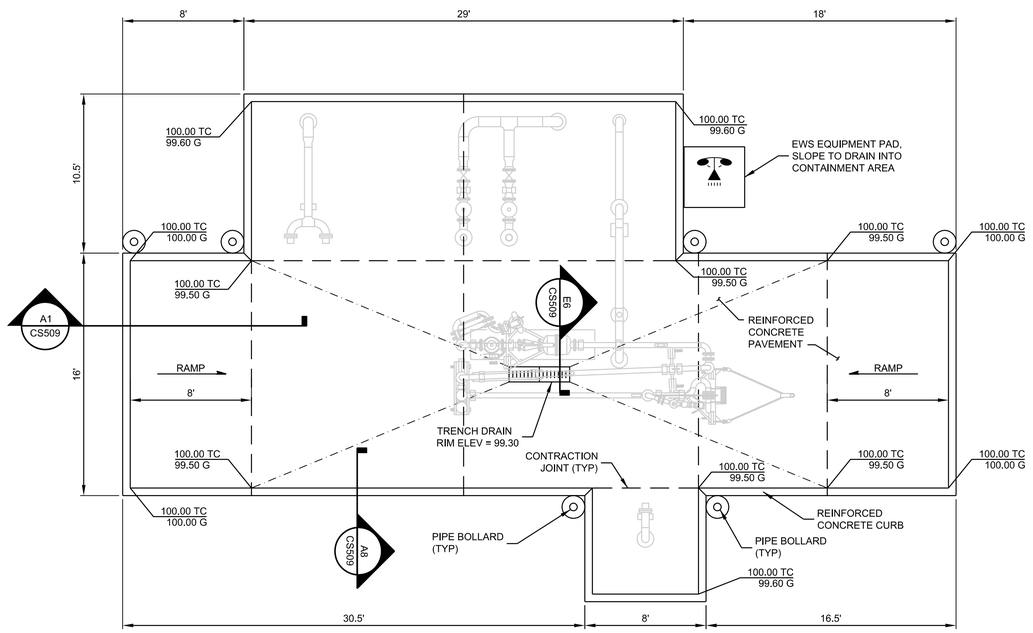
3. DO NOT COAT THE CONTAINMENT AREA CONCRETE SURFACES WITH PAINT OR EPOXY SEALERS DUE TO SAFETY HAZARDS CREATED BY SLIPPERY SURFACES AND MAINTENANCE PROBLEMS.

4. PROVIDE A CANOPY SHELTER OVER FILLSTANDS, OFFLOADS AND/OR HHT CHECKOUT STANDS TO PROTECT THE EQUIPMENT FROM THE ELEMENTS AS DIRECTED IN UFC 3-460-01. EXTEND CANOPIES BEYOND LIMITS OF EQUIPMENT 4 FEET HORIZONTALLY FOR EVERY 10 FEET OF VERTICAL HEIGHT.

5. PROVIDE SHELTERS, WITH ROLL-UP DOORS, FOR FILLSTAND EQUIPMENT AT OCONUS LOCATIONS WHEN DIRECTED BY THE SERVICE HEADQUARTER SME.

6. DESIGN TO PROVIDE ONE-WAY TRAFFIC UNLESS THERE IS NO OTHER WORKABLE SOLUTION AND TWO-WAY TRAFFIC IS APPROVED BY THE SERVICE HEADQUARTER SME.

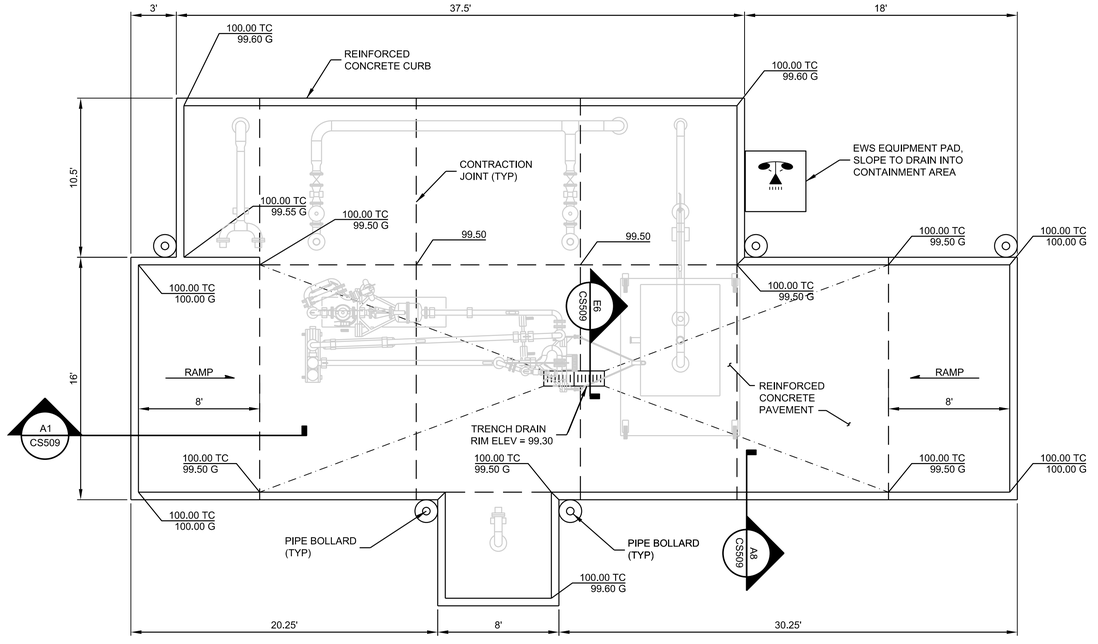
7. ADJUST CONTAINMENT AREA DIMENSIONS AND EQUIPMENT LOCATIONS AS NECESSARY BASED UPON THE EQUIPMENT REQUIRED AND THE TRUCKS UTILIZED AT THE INSTALLATION. VERIFY DESIGN COVERS ALL CURRENT AND FUTURE TRUCKS AND EQUIPMENT.



A1 HHT CHECKOUT AND PANTOGRAPH FLUSH STATION

SCALE: 1" = 5'

0 5' 10'



A6 HHT CHECKOUT AND PANTOGRAPH FLUSH STATION WITH HIGH REACH

SCALE: 1" = 5'

0 5' 10'

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SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

HHT CHECKOUT AND
PANTOGRAPH FLUSH STAND DETAILS

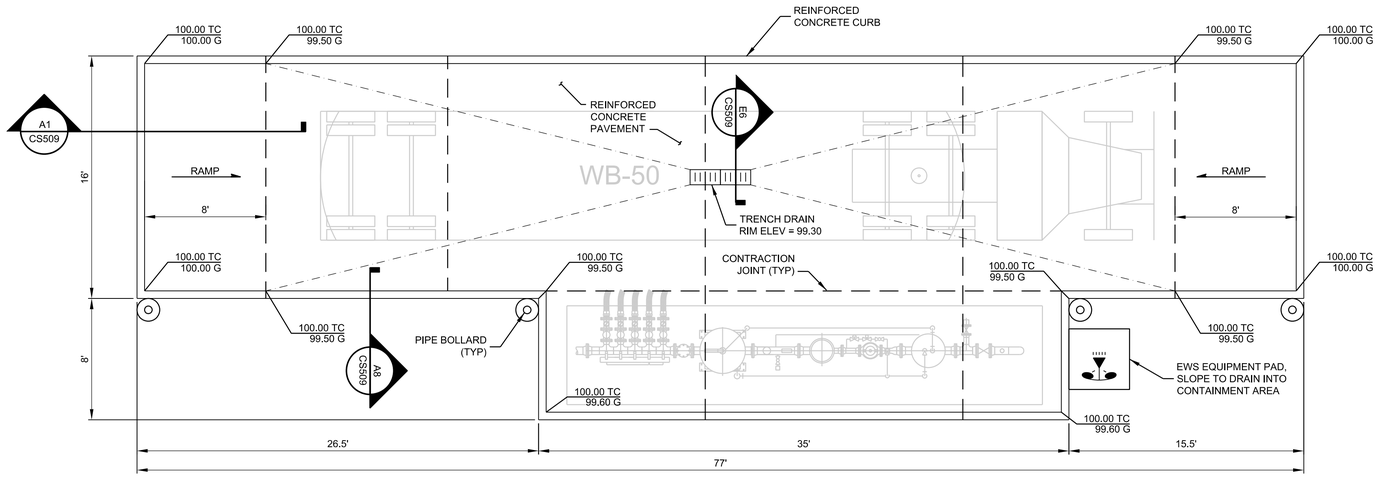
SHEET ID

CS502

DESIGNER NOTES:

1. LONGITUDINAL ROLLOVER CURB MAY BE USED IN PLACE OF VERTICAL CURB.

2. IF LONGITUDINAL VERTICAL CURB IS USED, PROVIDE BOLLARDS WHEN NECESSARY TO PROTECT VEHICLE TRAFFIC FROM HITTING VERTICAL CURB.



DESIGNER NOTES:

1. SEE ADDITIONAL DESIGNER NOTES ON CS502.

2. ENSURE GRAVITY DRAINAGE FROM THE COMMERCIAL DELIVERY TRUCK TO THE OFFLOADING EQUIPMENT. THIS INCLUDES A LEVEL PARKING AREA FOR THE LENGTH OF THE DELIVERY TRUCK AND ENSURING THAT THE RECIEPT CONNECTIONS ON THE OFFLOAD EQUIPMENT ARE LOWER THAN THE DELIVERY CONNECTIONS ON THE TRUCK. IN SOME LOCATIONS, THE DELIVERY CONNECTION IS AS LOW AS 18-INCHES ABOVE GRADE, WHICH MAY REQUIRE DEPRESSING THE EQUIPMENT PAD BELOW THE TRUCK PAD ELEVATION.

3. ADJUST CONTAINMENT AREA DIMENSIONS AND EQUIPMENT LOCATIONS AS NECESSARY BASED UPON THE EQUIPMENT REQUIRED AND THE DELIVERY TRUCKS UTILIZED AT THE SPECIFIC INSTALLATION.

A1 TRUCK OFFLOAD
SCALE: 1"=5'

0 5' 10'

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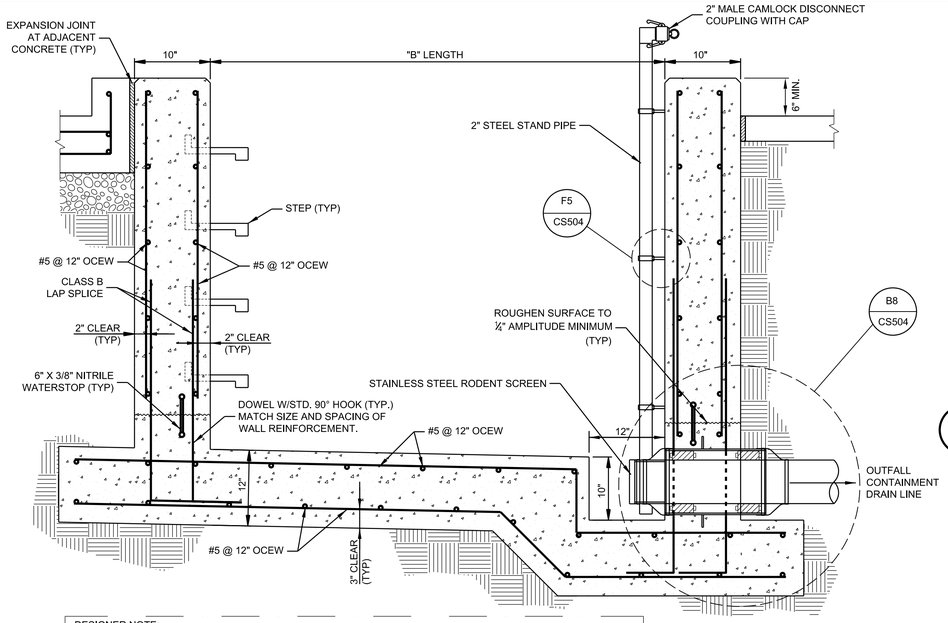
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

TRUCK OFFLOAD DETAIL

SHEET ID

CS503



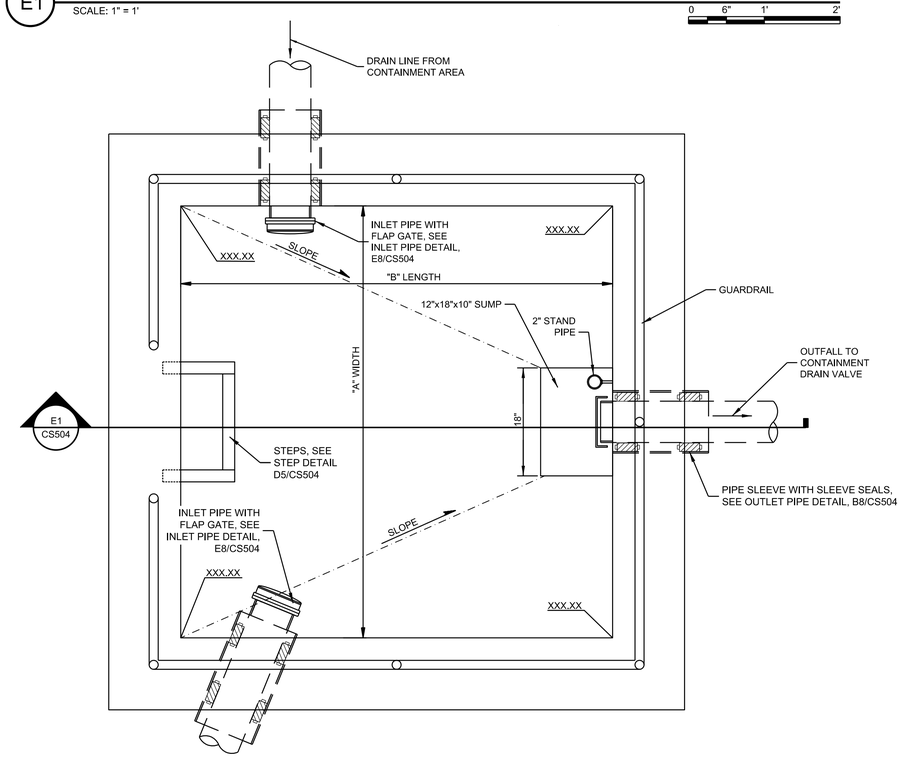
DESIGNER NOTE:

1. PLAN AND DETAILS SHOWN ARE TYPICAL, REINFORCED CONCRETE FOR THE BASINS SHALL BE REDESIGNED IF THE REQUIRED PLAN DIMESIONS EXCEED THOSE SHOWN OR IF DEPTH OF BASIN EXCEEDS 7'-0" BELOW GRADE

E1 CONTAINMENT BASIN SECTION

SCALE: 1" = 1'

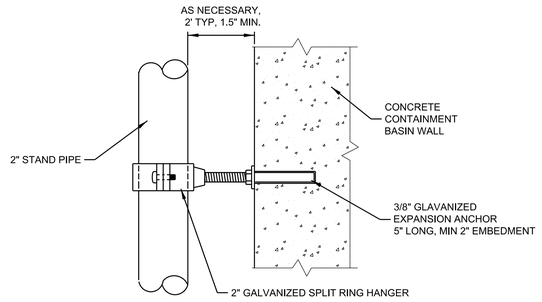
0 6" 1' 2'



A1 CONTAINMENT BASIN PLAN

SCALE: 1" = 1'

0 6" 1' 2'

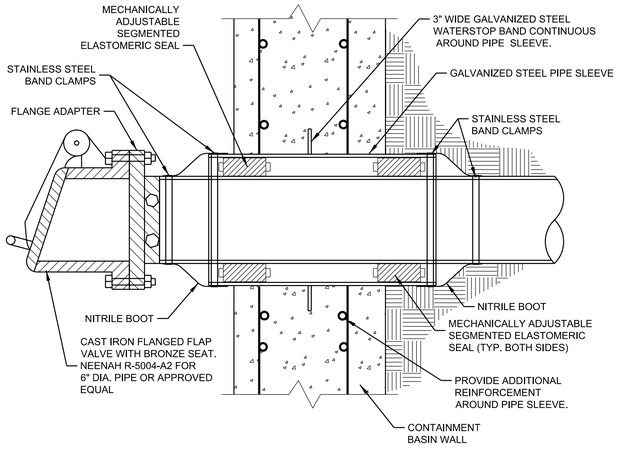


NOTES:

1. A MINIMUM OF THREE GUIDE BRACKETS SHALL BE PROVIDED FOR EACH STAND PIPE.
2. OTHER MEANS OF SECURELY MOUNTING THE STAND PIPE TO THE CONTAINMENT BASIN WALL ARE ACCEPTIBLE.

F5 STAND PIPE GUIDE BRACKET DETAIL

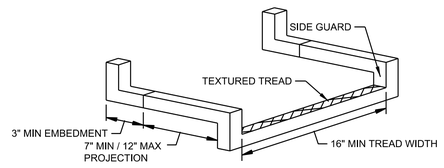
NO SCALE



E8 INLET PIPE DETAIL

SCALE: 1" = 0.5'

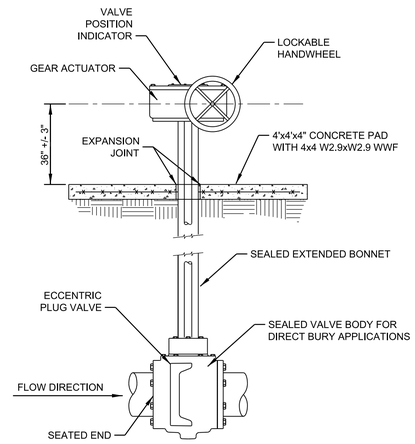
0 3" 6" 1'



NOTES:
1. STEPS SHALL BE A STANDARD MANUFACTURER'S PRODUCT MEETING ASTM C 478 AND OSHA REQUIREMENTS FOR MANHOLE STEPS, AS WELL AS THE REQUIREMENTS INDICATED ABOVE.
2. POLYPROPYLENE COMPOSITE STEPS SHALL NOT BE USED DUE TO POSSIBLE EXPOSURE TO JET FUEL.
3. THE LOWEST STEP SHALL BE LOCATED NOTE MORE THAN 12 INCHES ABOVE THE BASIN FLOOR. THE HIGHEST STEP SHALL BE LOCATED NOT MORE THAN 12 INCHES BELOW THE TOP OF THE BASIN WALL. STEPS SHALL BE ALIGNED VERTICALLY AND EVENLY SPACED AT A MINIMUM OF 12 INCHES AND MAXIMUM OF 16 INCHES.

D5 STEP DETAIL

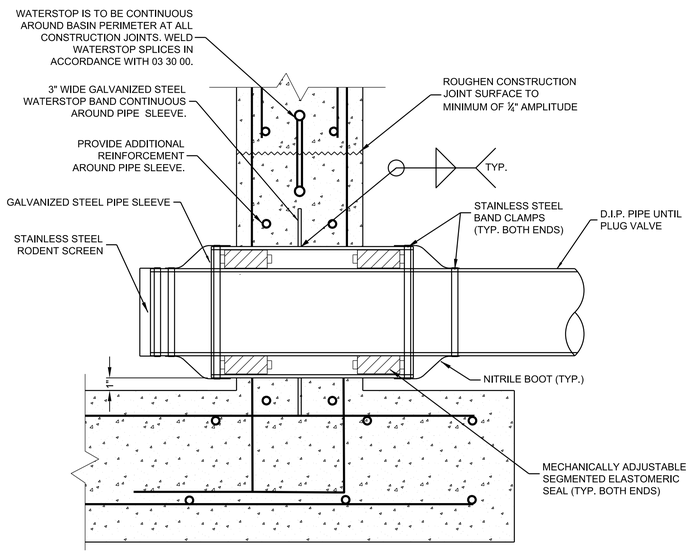
NO SCALE



NOTE: 100% PORT ECCENTRIC PLUG VALVE SHALL CONFORM TO AWWA C517 AND BE RESISTANT TO HYDROCARBONS (NITRILE RUBBER SEALS). GEAR ACTUATOR SHALL BE PROVIDED WITH A LOCKABLE HANDWHEEL AND VALVE POSITION INDICATOR.

A5 CONTAINMENT DRAIN VALVE DETAIL

NO SCALE



B8 OUTLET PIPE DETAIL

SCALE: 1" = 0.5'

0 3" 6" 1'

CONTAINMENT BASIN NOTES:

1. PROVIDE RE-ENTRANT CORNER REINFORCEMENT AROUND SUMP PIT.

DESIGNER NOTES:

1. PROVIDE FLAP GATES AS SHOWN WHEN MULTIPLE CONTAINMENT AREAS DRAIN TO A SINGLE CONTAINMENT BASIN TO PREVENT THE POSSIBILITY OF A SPILL FROM ONE AREA BACKING-UP INTO ANOTHER AREA. IF ONLY ONE INLET, SHOW RODENT SCREEN.

2. SET THE TOP OF THE CONTAINMENT BASIN NO LESS THAN 6-INCHES HIGHER THAN THE HIGHEST TOP OF CONTAINMENT PONDING ELEVATION OF ALL CONTAINMENT AREAS WHICH DRAIN TO THE BASIN.

3. CONTAINMENT BASINS MUST BE DESIGNED BY A STRUCTURAL ENGINEER IN ACCORDANCE WITH ACI 350.2R - CONCRETE STRUCTURES FOR CONTAINMENT OF HAZARDOUS MATERIALS. LATERAL EARTH PRESSURES AND BEARING CAPCITY ARE TO BE BASED ON THE RECOMMENDATIONS OF THE FINAL GEOTECHNICAL REPORT.

4. PROVIDE SLAB EXTENSION AS REQUIRED FOR BUOYANCY RESISTANCE. REQUIRED FACTOR OF SAFETY AGAINST BUOYANCY IS 1.5 WHEN BASIN IS EMPTY AND THE GROUND IS FULLY SATURATED TO GRADE.

US Army Corps of Engineers®

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DESIGNED BY:
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SIZE: ANSI D
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CONTRACT NO.:

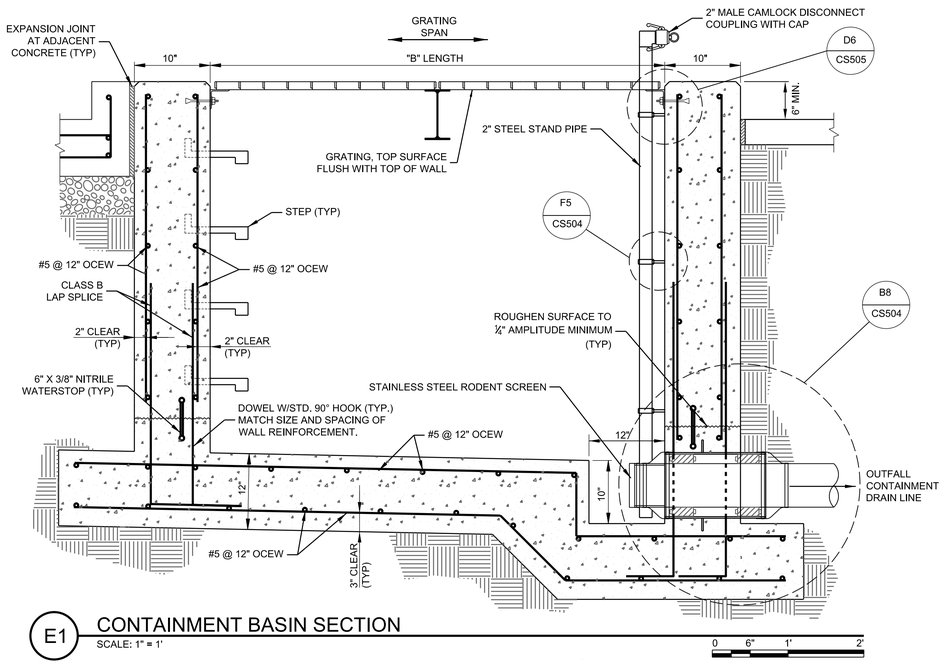
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CONTAINMENT BASIN DETAILS

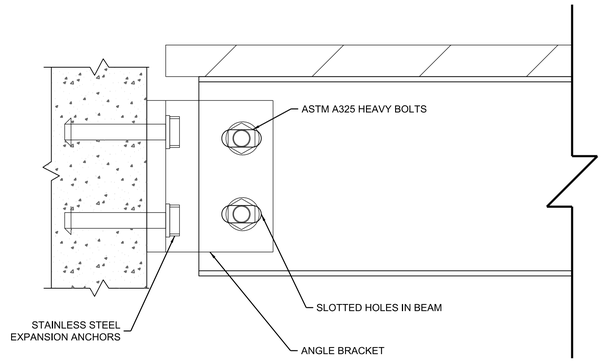
SHEET ID

CS504



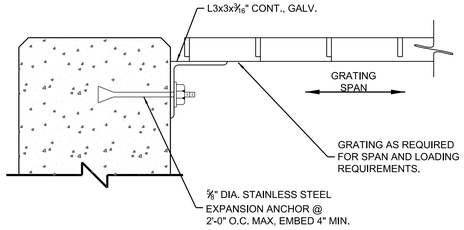
E1 CONTAINMENT BASIN SECTION

SCALE: 1" = 1'



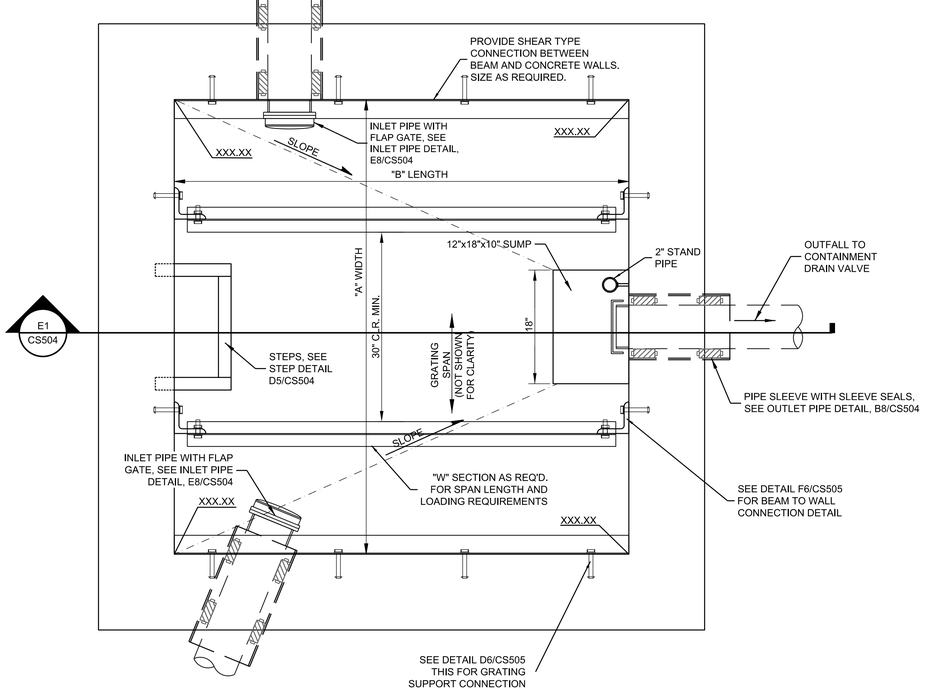
F6 BEAM TO WALL CONNECTION

NO SCALE



D6 GRATING SUPPORT DETAIL

NO SCALE



A1 CONTAINMENT BASIN PLAN

SCALE: 1" = 1'

CONTAINMENT BASIN NOTES:

1. PROVIDE RE-ENTRANT CORNER REINFORCEMENT AROUND SUMP PIT.

2. PROVIDE REMOVABLE GRATING AROUND LADDER AND SUMP. MINIMUM CLEARANCES AROUND LADDER ARE TO BE 30" CLEAR BEHIND THE CENTERLINE OF LADDER BEFORE ANY OBSTRUCTIONS, AND 15" CLEAR FROM THE CENTERLINE OF THE LADDER TO OBSTRUCTIONS ON EITHER SIDE.

3. ALL STRUCTURAL STEEL IS TO BE HOT-DIPPED GALVANIZED. GRATING MAY BE ALUMINUM OR HOT-DIPPED GALVANIZED STEEL.

DESIGNER NOTES:

1. USE THESE DETAILS WHEN REQUIRED BY THE CUSTOMER (I.E. BIRD CONTROL).

2. PROVIDE FLAP GATES AS SHOWN WHEN MULTIPLE CONTAINMENT AREAS DRAIN TO A SINGLE CONTAINMENT BASIN TO PREVENT THE POSSIBILITY OF A SPILL FROM ONE AREA BACKING-UP INTO ANOTHER AREA. IF ONLY ONE INLET, SHOW RODENT SCREEN.

3. SET THE TOP OF THE CONTAINMENT BASIN NO LESS THAN 6-INCHES HIGHER THAN THE HIGHEST TOP OF CONTAINMENT PONDING ELEVATION OF ALL CONTAINMENT AREAS WHICH DRAIN TO THE BASIN.

4. CONTAINMENT BASINS MUST BE DESIGNED BY A STRUCTURAL ENGINEER IN ACCORDANCE WITH ACI 350.2R - CONCRETE STRUCTURES FOR CONTAINMENT OF HAZARDOUS MATERIALS. ENSURE BASE SLAB IS SUFFICIENTLY THICK TO FULLY DEVELOP HOOKS WITHIN SLAB. LATERAL EARTH PRESSURES AND BEARING CAPCITY ARE TO BE BASED ON THE RECOMMENDATIONS OF THE FINAL GEOTECHNICAL REPORT.

5. PROVIDE SLAB EXTENSION AS REQUIRED FOR BUOYANCY RESISTANCE. REQUIRED FACTOR OF SAFETY AGAINST BUOYANCY IS 1.5 WHEN BASIN IS EMPTY AND THE GROUND IS FULLY SATURATED TO GRADE.

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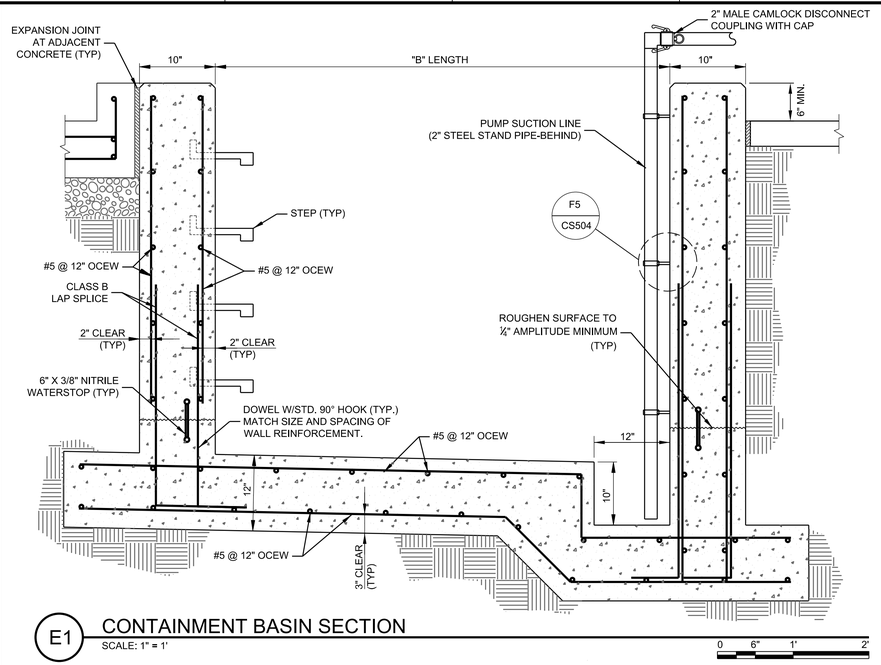
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CONTAINMENT BASIN DETAILS
(WITH GRATED COVER)

SHEET ID

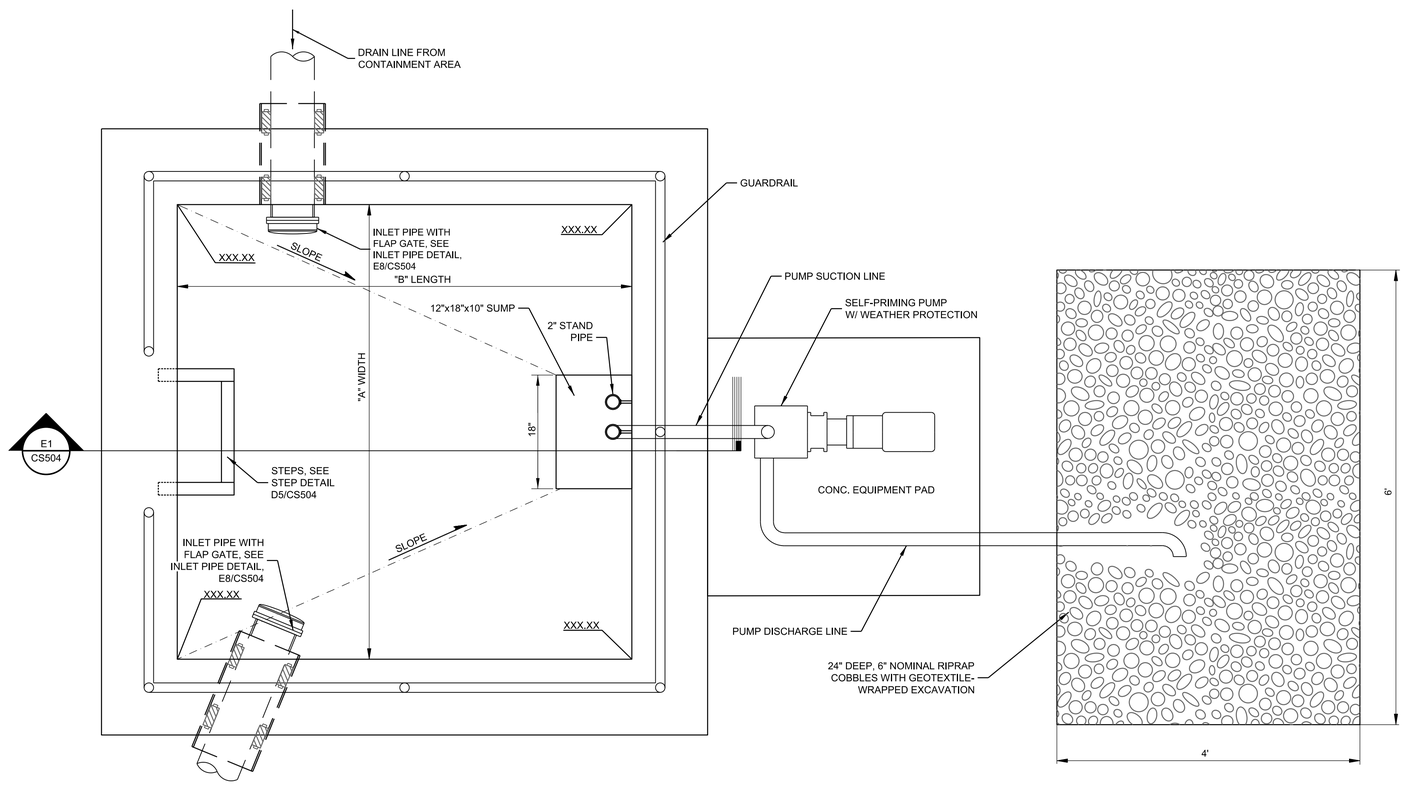
CS505



E1 CONTAINMENT BASIN SECTION

SCALE: 1" = 1'

0 6" 1' 2'



A1 CONTAINMENT BASIN PLAN

SCALE: 1" = 1'

0 6" 1' 2'

DESIGNER NOTES:

ADD TO SPECIFICATIONS, AS APPLICABLE:

PROVIDE A SELF PRIMING PUMP TO PUMP-OUT CLEAN STORM WATER FROM THE CONTAINMENT BASIN. THE PUMP SHALL BE AN ELECTRIC POWERED [DIAPHRAGM] PUMP THAT CAN RUN DRY WITHOUT DAMAGE AND THAT REMOVES ALL WATER WITHIN THE PUMP FOR FREEZE PROTECTION. PROVIDE A MANUAL ON-OFF SWITCH FOR THE PUMP. THE PUMP, MOTOR, AND ELECTRICAL APPURTENANCES SHALL HAVE THE APPROPRIATE HAZARD CLASSIFICATION RATING, AS DETERMINED IN ACCORDANCE WITH THE ELECTRICAL SECTION. IF NOT LOCATED WITHIN A HAZARDOUS AREA, THE PUMP AND MOTOR SHALL AT A MINIMUM BE TOTALLY ENCLOSED WASH DOWN (TEWD) RATED. SIZE THE PUMP TO REMOVE ALL WATER ACCUMULATED IN THE BASIN WITHIN 8 HOURS OF OPERATION.

CONTAINMENT BASIN NOTES:

1. PROVIDE RE-ENTRANT CORNER REINFORCEMENT AROUND SUMP PIT.

DESIGNER NOTES:

1. USE THESE DETAILS WHEN IT IS NOT POSSIBLE TO DRAIN THE BASIN BY GRAVITY.

2. PROVIDE FLAP GATES AS SHOWN WHEN MULTIPLE CONTAINMENT AREAS DRAIN TO A SINGLE CONTAINMENT BASIN TO PREVENT THE POSSIBILITY OF A SPILL FROM ONE AREA BACKING-UP INTO ANOTHER AREA. IF ONLY ONE INLET, SHOW RODENT SCREEN.

3. SET THE TOP OF THE CONTAINMENT BASIN NO LESS THAN 6-INCHES HIGHER THAN THE HIGHEST TOP OF CONTAINMENT PONDING ELEVATION OF ALL CONTAINMENT AREAS WHICH DRAIN TO THE BASIN.

4. CONTAINMENT BASINS MUST BE DESIGNED BY A STRUCTURAL ENGINEER IN ACCORDANCE WITH ACI 350.2R - CONCRETE STRUCTURES FOR CONTAINMENT OF HAZARDOUS MATERIALS. LATERAL EARTH PRESSURES AND BEARING CAPCITY ARE TO BE BASED ON THE RECOMMENDATIONS OF THE FINAL GEOTECHNICAL REPORT.

5. PROVIDE SLAB EXTENSION AS REQUIRED FOR BUOYANCY RESISTANCE. REQUIRED FACTOR OF SAFETY AGAINST BUOYANCY IS 1.5 WHEN BASIN IS EMPTY AND THE GROUND IS FULLY SATURATED TO GRADE.

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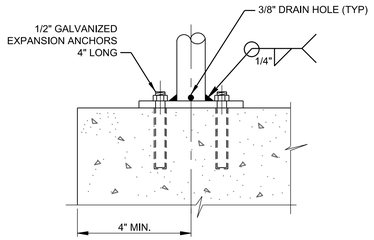
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

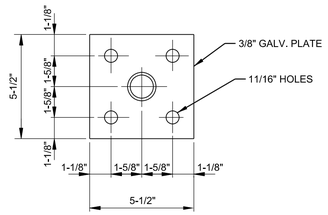
CONTAINMENT BASIN DETAILS (WITH PUMP OUT)

SHEET ID

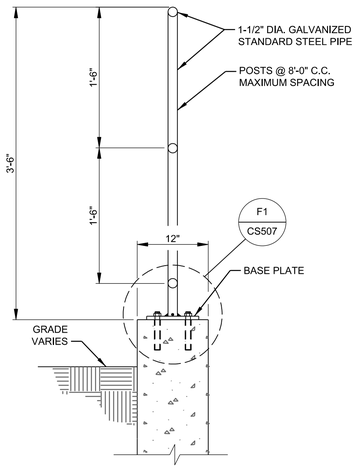
CS506



F1 GUARDRAIL
BASE PLATE ELEVATION
NO SCALE

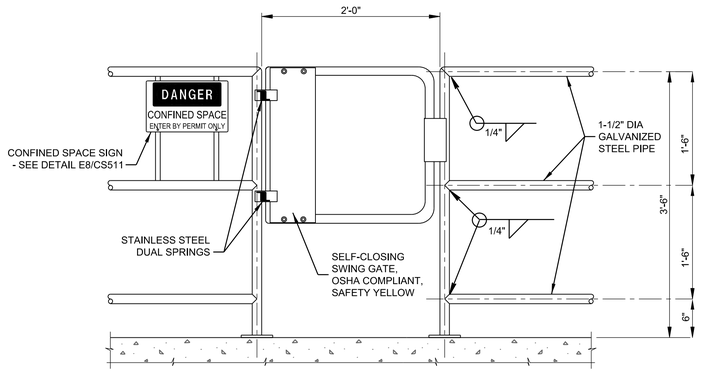


D1 GUARDRAIL BASE PLATE PLAN
NO SCALE



NOTES:
1. PIPE HANDRAIL, POSTS, BASE PLATE AND SIGN FRAMING SHALL BE HOT DIP GALVANIZED AFTER FABRICATION.

A1 GUARDRAIL SECTION
NO SCALE



NOTES:
1. PROVIDE GALVANIZED STEEL BARS FOR SIGN FRAMING AND STAINLESS STEEL FASTENERS.

A3 GUARDRAIL ELEVATION AT OPENING FOR STEPS
NO SCALE

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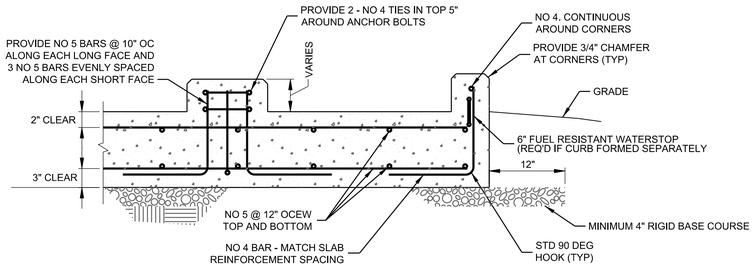
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CONTAINMENT BASIN DETAILS

SHEET ID
CS507



NOTES:
1. ADJUST PEDESTAL ELEVATIONS TO PROVIDE TANK SLOPE REQUIRED BY SPECIFICATIONS AND PROVIDE 1-FOOT OF CLEARANCE MINIMUM BETWEEN THE FINISHED GRADE AND LOWEST POINT ON TANK.

2. PEDESTAL DIMENSIONS ARE NOMINAL AND ARE TO BE ADJUSTED FOR THE SPECIFIC TANKS SELECTED BY THE CONTRACTOR.

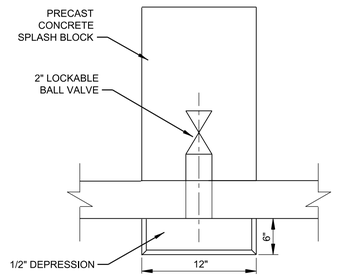
3. CENTER TANK SADDLES ON PEDESTALS.

4. PLACE BASE COURSE MATERIAL ON 6" MINIMUM COMPACTED SUBGRADE.

D1 PRODUCT RECOVERY TANK FOUNDATION PAD TYPICAL SECTION

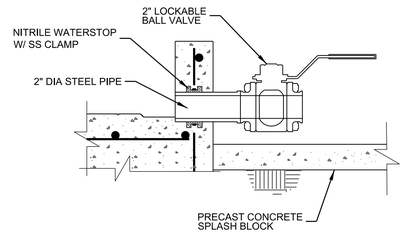
SCALE: 1" = 1'

0 6" 1' 2'



D5 BALL DRAIN VALVE PLAN

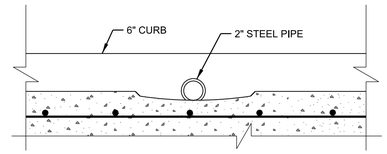
NO SCALE



NOTE: DRAIN PIPE SHALL BE 316 STAINLESS STEEL. LOCKABLE BALL VALVE SHALL BE FULL-PORT 316 STAINLESS STEEL.

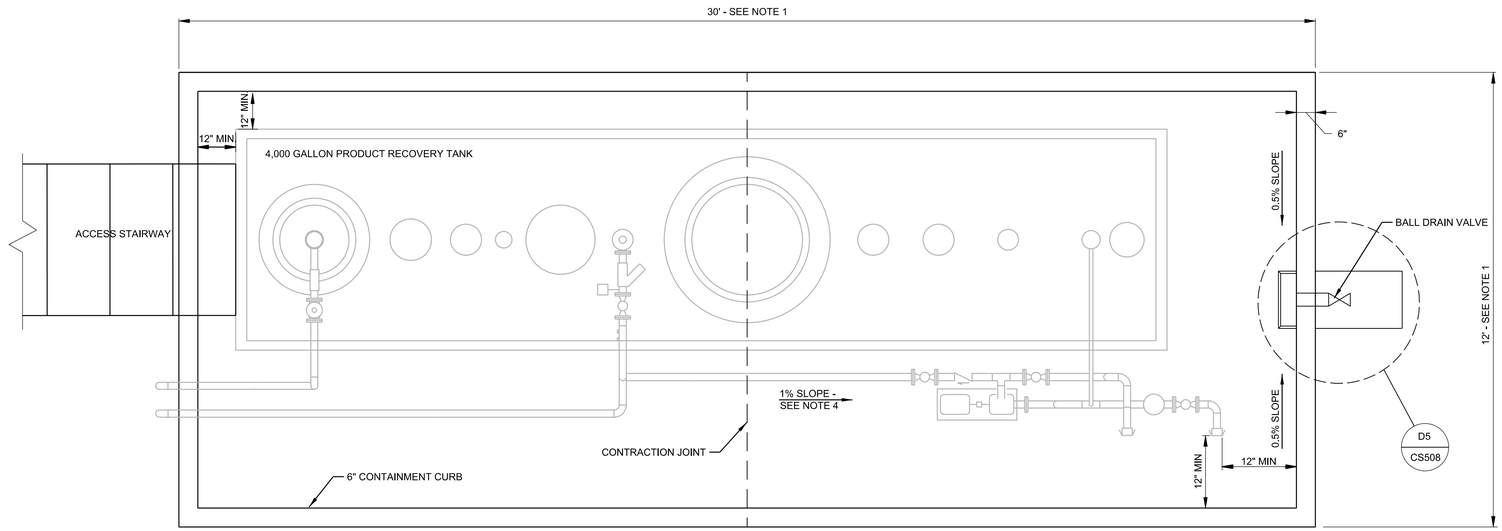
D7 BALL DRAIN VALVE SECTION

NO SCALE



D9 BALL DRAIN VALVE ELEVATION

NO SCALE



NOTES:
1. THE OVERALL DIMENSIONS OF THE PRODUCT RECOVERY TANK CONCRETE FOUNDATION PAD SHALL BE ADJUSTED AS NECESSARY BASED UPON THE DIMENSIONS OF THE ACTUAL TANK PROVIDED.

2. SEE MECHANICAL DRAWINGS FOR TANK DETAILS.

3. DESIGN AND INSTALL GALVANIZED STEEL STAIRS, PLATFORM, AND RAILINGS FOR SAFE ACCESS TO INSPECTION HATCHES AND PORTALS. THE PLATFORM SHALL EXTEND THE ENTIRE TANK LENGTH AND SHALL NOT REQUIRE THE OPERATORS TO REACH BEYOND THE RAILINGS TO REACH THE MANWAY OR TANK MOUNTED EQUIPMENT. STAIRS SHALL BE DESIGNED IN CONFORMANCE WITH 29 CFR 1910.25 "STAIRWAYS". RAILINGS SHALL BE PROVIDED AND DESIGNED IN CONFORMANCE WITH 29 CFR 1910.28 "DUTY TO HAVE FALL PROTECTION AND FALLING OBJECT PROTECTION" AND 29 CFR 1910.29 "FALL PROTECTION SYSTEMS AND FALLING OBJECT PROTECTION-CRITERIA AND PRACTICES". METAL BAR GRATING SHALL BE IN ACCORDANCE WITH THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURERS (NAAMM) METAL BAR GRATING MANUAL, MBG 531. PROVIDE MINIMUM 4'x4'x5" CONCRETE PAD AT THE STAIRWAY LANDING, WHICH MAY BE INTEGRAL WITH THE ADJACENT SIDEWALK.

4. SLOPE FOUNDATION PAD TO DRAIN. SET PEDESTAL ELEVATIONS TO ASSURE INNER TANK IS SLOPED BETWEEN 1.5% TO 3%.

5. SEE DIVISION 3 SPECIFICATIONS SECTIONS FOR CONCRETE, FORMWORK, WATERSTOPS, REINFORCEMENT, PLACEMENT, AND CURING.

6. LAP SPLICES AND CONCRETE COVER SHALL CONFORM TO THE REQUIREMENTS OF S-001 WHERE NOT SPECIFICALLY INDICATED ON THESE DETAILS.

7. JOINT SEALANT SHALL CONFORM TO SECTION 32 01 19.

8. SEE SHEET CS509 FOR CONTRACTION JOINT DETAILS.

A1 ABOVEGROUND PRODUCT RECOVERY TANK CONCRETE PAD PLAN

SCALE: 1" = 2'

0 1' 2' 4'

US Army Corps of Engineers®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

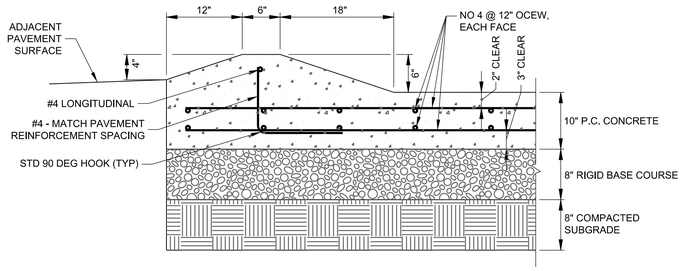
DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

ABOVEGROUND PRODUCT RECOVERY TANK DETAILS

SHEET ID

CS508

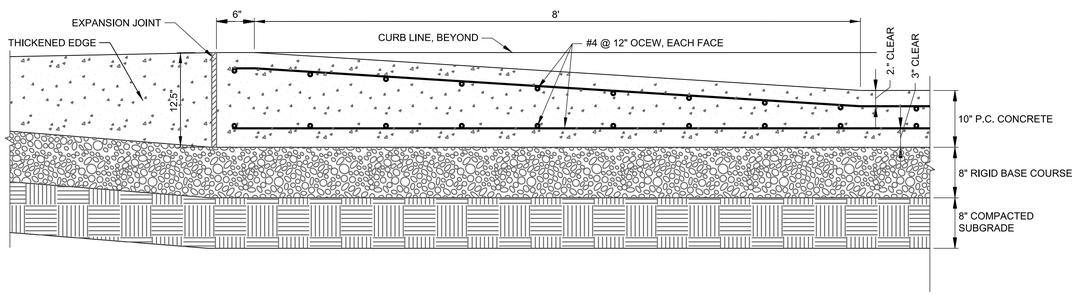
DESIGNER'S NOTE:
PAVEMENT SECTION(S) TO BE DESIGNED FOR EACH SITE BASED ON LOCAL TRAFFIC AND SOIL CONDITIONS.



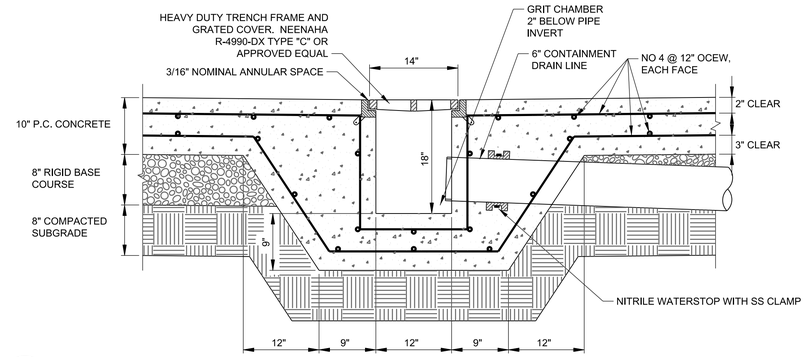
NOTE: CURB SHALL BE PLACED WITH NO COLD JOINT.

C1 REINFORCED ROLLOVER CONCRETE CURB SECTION
NO SCALE

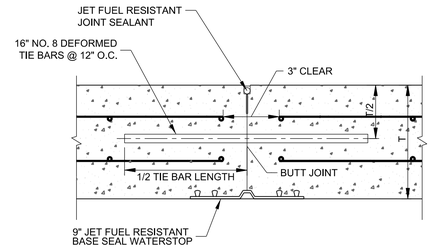
DESIGNER'S NOTE:
ROLLOVER CURB SECTION MAY ONLY BE USED FOR LONGITUDINAL CURB IN PLACE OF A VERTICAL CURB.



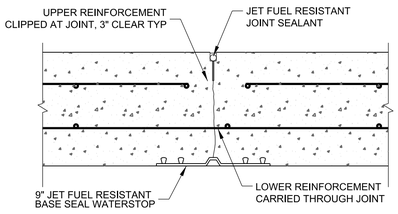
A1 TYPICAL CONTAINMENT AREA RAMP SECTION
SCALE: 1" = 1'



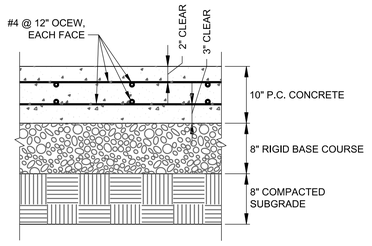
E6 TRENCH DRAIN DETAIL
NO SCALE



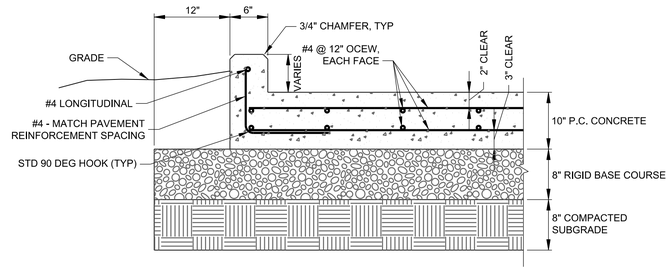
C6 CONSTRUCTION JOINT DETAIL
NO SCALE



C8 CONTRACTION JOINT DETAIL
NO SCALE



A6 TYPICAL REINFORCED CONCRETE PAVEMENT SECTION
NO SCALE



NOTE: CURB SHALL BE PLACED WITH NO COLD JOINT.

A8 REINFORCED CONCRETE CURB SECTION
NO SCALE

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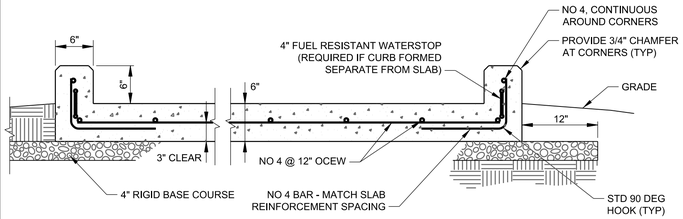
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

MISCELLANEOUS SITE DETAILS

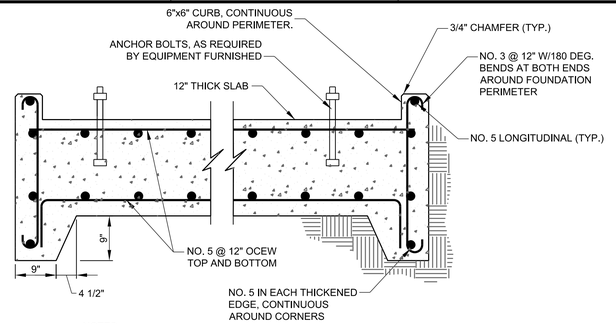
SHEET ID
CS509



NOTES:
1. PLACE BASE COURSE MATERIAL ON 6" OF COMPACTED SUBGRADE.

F1 PIG LAUNCH/RECEIVE CONCRETE PAD SECTION

SCALE: 1" = 1'

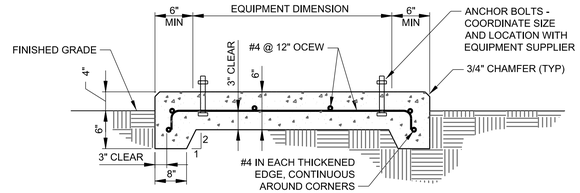


NOTES:
1. PROVIDE LOW POINT FOR DRAINAGE OF THE CURBED GENERATOR PAD WITH BALL DRAIN VALVE.

2. SEE SHEET CS508 FOR BALL DRAIN VALVE DETAILS.

F4 GENERATOR PAD SECTION

NO SCALE



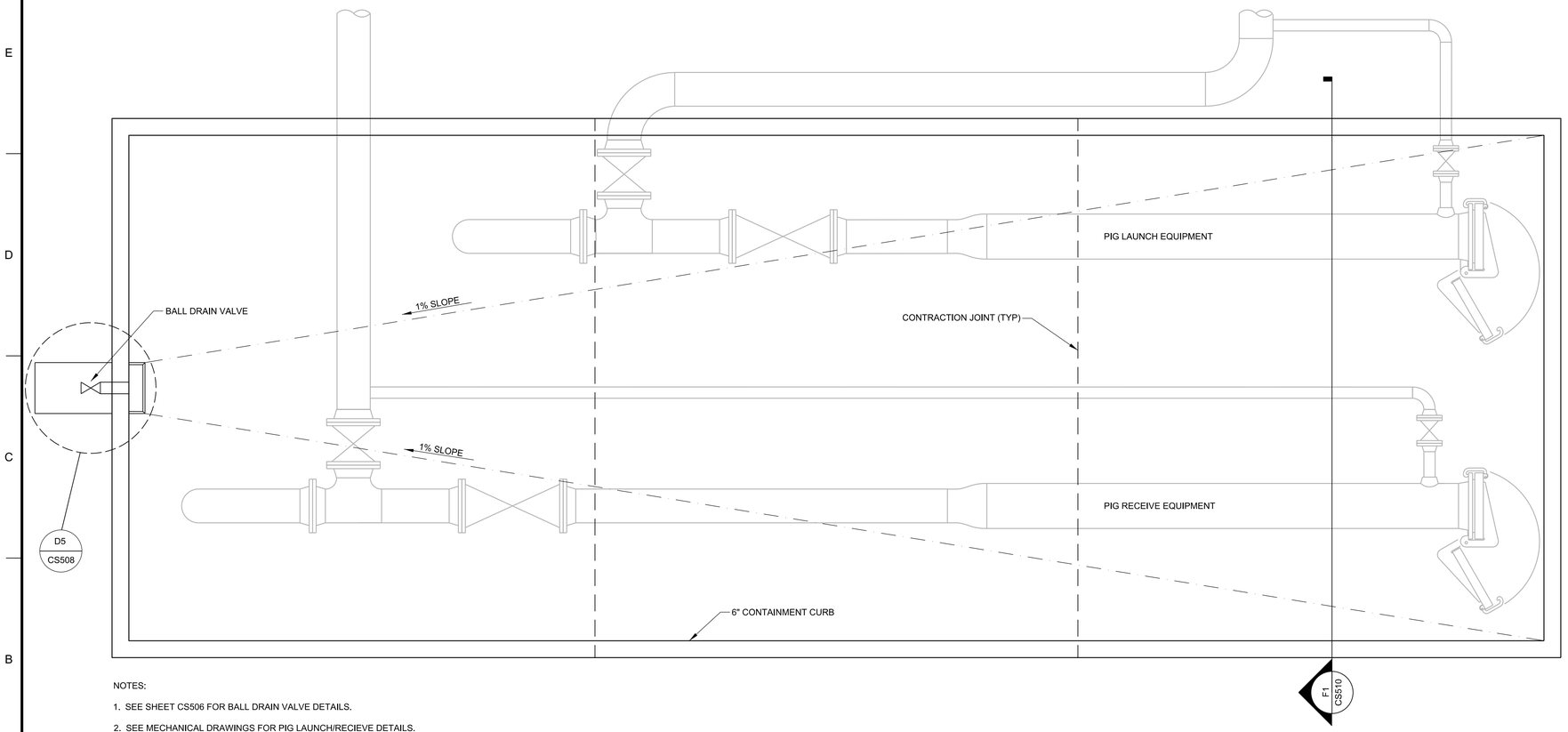
NOTES:

1. SEE CIVIL, MECHANICAL AND ELECTRICAL SHEETS FOR LOCATIONS OF EQUIPMENT PADS. THIS DETAIL APPLIES TO PADS OVER USTs.

2. THE PLAN DIMENSIONS OF EQUIPMENT BASES AND THIER ANCHOR BOLT LOCATIONS, SIZES, EMBEDMENTS AND PROJECTIONS SHALL SUIT THE REQUIREMENTS OF THE APPROVED EQUIPMENT FURNISHED.

F7 TYPICAL EXTERIOR EQUIPMENT PAD DETAIL

NO SCALE



NOTES:

1. SEE SHEET CS506 FOR BALL DRAIN VALVE DETAILS.

2. SEE MECHANICAL DRAWINGS FOR PIG LAUNCH/RECIEVE DETAILS.

3. SEE DIVISON 3 SPECIFICATION SECTIONS FOR CONCRETE, FORMWORK, WATERSTOPS, REINFORCEMENT, PLACEMENT AND CURING.

4. LAP SPLICES AND CONCRETE COVER SHALL CONFORM TO REQUIREMENTS OF S-001 WHERE NOT SPECIFICALLY INDICATED ON THESE DETAILS.

5. JOINT SEALANT SHALL CONFORM TO SECTION 32 01 19.

6. SEE SHEET CS507 FOR CONTRACTION JOINT DETAILS.

A1 CONCRETE PIG LAUNCH / RECIEVE EQUIPMENT PAD PLAN

SCALE: 1" = 2'

NOTES:

1. STEEL PIPE FOR PIPE BOLLARDS SHALL CONFORM TO SPECIFICATION SECTION 05 50 13 MISCELLANEOUS METAL FABRICATIONS.

2. PIPE BOLLARD SHALL BE [NPS 6" STANDARD WEIGHT STEEL PIPE, PAINTED BROWN (FS-20059) WITH 6" WIDE YELLOW REFLECTIVE TAPE BAND 6" BELOW THE TOP OF THE PIPE][NPS 6" STANDARD WEIGHT STEEL PIPE, PAINTED SAFETY YELLOW][6" DIAMETER SCHEDULE 40 STAINLESS STEEL PIPE WITH 6" WIDE WHITE REFLECTIVE STRIPE 6" BELOW THE TOP OF THE PIPE][NPS 6" STANDARD WEIGHT STEEL PIPE, GALVANIZED, AND PROVIDED WITH A YELLOW PLASTIC SLEEVE DESIGNED FOR THIS APPLICATION].

DESIGNER'S NOTE:
SELECT PIPE BOLLARD MATERIAL BASED UPON INSTALLATION AND SERVICE REQUIREMENTS.

A9 PIPE BOLLARD DETAIL

SCALE: 1" = 1'

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OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

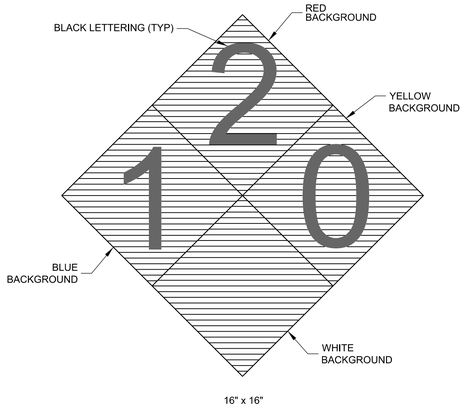
MISCELLANEOUS SITE DETAILS, CONTINUED

SHEET ID

CS510

AFVA 31-203 (18"x15")
AFVA 31-240 (36"x30")

E1 CONTROLLED AREA SIGN DETAIL
NO SCALE



E4 NFPA 704 HAZMAT SIGN DETAIL
NO SCALE

E6 DANGER SIGN DETAIL
NO SCALE

E8 CONFINED SPACE SIGN DETAIL
NO SCALE

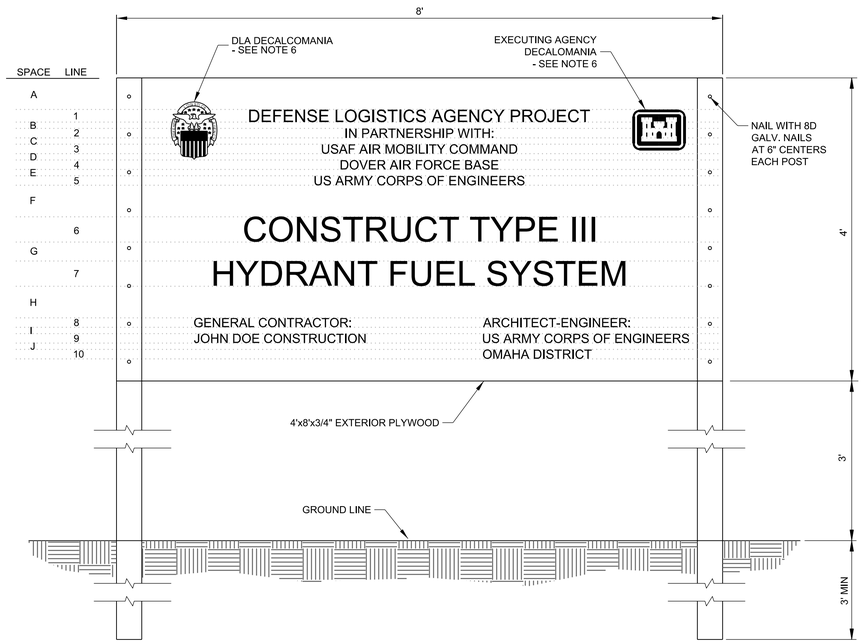
SIGN NOTES:

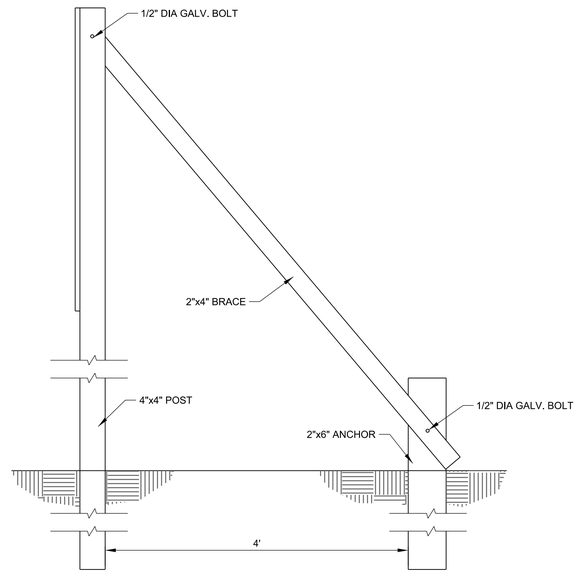
1. CONTROLLED AREA SIGNS SHALL BE INSTALLED ON THE OUTSIDE OF THE PERIMETER SECURITY FENCING. 18" x 15" (AFVA 31-203) SIGNS SHALL BE SPACED NO GREATER THAN 300 FEET APART. 36" x 30" (AFVA 31-240) SIGNS SHALL BE INSTALLED ON OR ADJACENT TO EACH VEHICLE AND PERSONNEL GATE.

2. DANGER AND NFPA SIGNS SHALL BE INSTALLED ON OR ADJACENT TO EACH VEHICLE AND PERSONNEL GATE.

3. SIGN PANELS SHALL BE 2MM THICK ALUMINUM. SIGN PANELS SHALL BE PROFESSIONALLY PREPARED (CLEANED AND DEGREASED) PRIOR TO APPLYING FACING. SIGN FACINGS SHALL BE PROFESSIONALLY APPLIED TO ALUMINUM SIGN PANELS.

DESIGNER'S NOTE:
EDIT UFGS 01 58 00 PROJECT IDENTIFICATION TO POINT TO THE SIGN DETAIL ON THIS SHEET. EDIT DETAIL TO FIT PROJECT.





PROJECT SIGN SCHEDULE					
SPACE	HEIGHT	LINE	DESCRIPTION	LETTER HEIGHT	STROKE
A	5"				
		1	DEFENSE LOGISTICS AGENCY PROJECT	2"	1/4"
B	1"				
		2	IN PARTNERSHIP WITH:	1.5"	3/16"
C	1"				
		3	SERVICE / COMMAND	1.5"	3/16"
D	1"				
		4	INSTALLATION NAME	1.5"	3/16"
E	1"				
		5	EXECUTION AGENT	1.5"	3/16"
F	5"				
		6	PROJECT NAME LINE 1	4"	1/2"
G	3"				
		7	PROJECT NAME LINE 2	4"	1/2"
H	5"				
		8	GENERAL CONTRACTOR / A-E	1.5"	3/16"
I	1"				
		9	GENERAL CONTRACTOR / A-E	1.5"	3/16"
J	1"				
		10	GENERAL CONTRACTOR / A-E	1.5"	3/16"

NOTES:

1. POSTS SHALL BE S4S.

2. PLYWOOD SHALL BE EXTERIOR TYPE, A-C GRADE.

3. BEFORE PAINTING, SURFACE SHALL BE CLEAN, DRY, FREE OF GREASE AND SANDED.

4. PAINT WITH ONE EXTERIOR OIL PRIME COAT AND EXTERIOR TYPE ALKYD, CONFORMING TO MASTER PAINTERS INSTITUTE MPI-9, MPI GLOSS LEVEL 6. COLOR SHALL MATCH SHERWIN WILLIAMS SW 2175.

5. ALL LETTERING SHALL BE EXTERIOR TYPE ALKYD. COLOR SHALL MATCH SHERWIN WILLIAMS SW 1900.

6. DECALCOMANIA FOR DEFENSE LOGISTICS AGENCY EMBLEM AND EXECUTING AGENCY INSIGNIA WILL BE FURNISHED BY THE CONTRACTING OFFICER FOR INSTALLATION BY THE CONTRACTOR.

7. ALL EXPOSED WOOD (POSTS, SUPPORTS, BACK, ETC.) SHALL BE PAINTED THE SAME BACKGROUND COLOR AS THE SIGN.

8. LETTERING STYLE SHALL BE EITHER HELIOS EXTRA BOLD CONDENSED, HELIOS BOLD II, HELVETICA BLACK ROMAN, OR HELVETICA BOLD ROMAN.

9. LOCATION OF SIGN TO BE COORDINATED WITH THE CONTRACTING OFFICER.

A1 DEFENSE LOGISTICS AGENCY PROJECT SIGN DETAIL
NO SCALE

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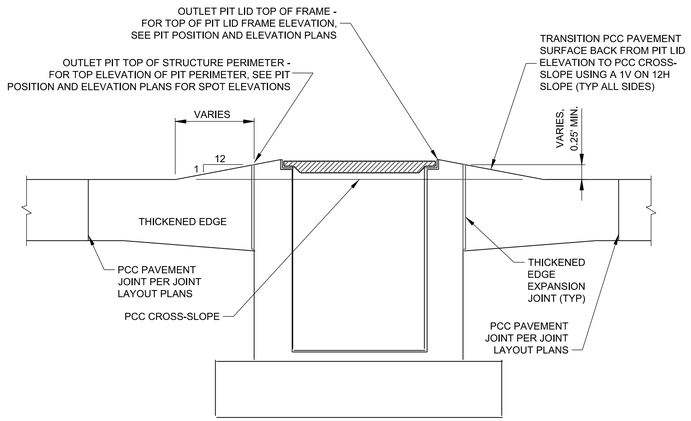
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

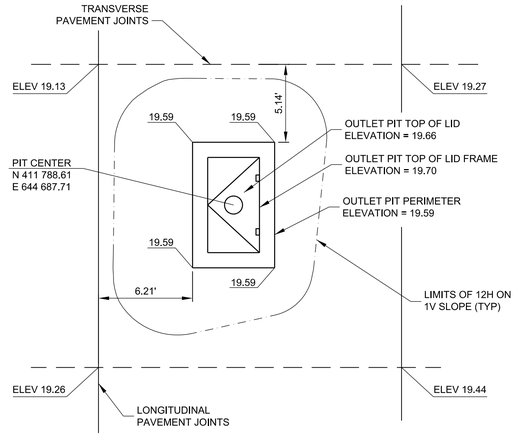
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

SIGNAGE DETAILS

SHEET ID
CS511



E1 HYDRANT OUTLET PIT SURFACE DRAINAGE DETAIL
NO SCALE

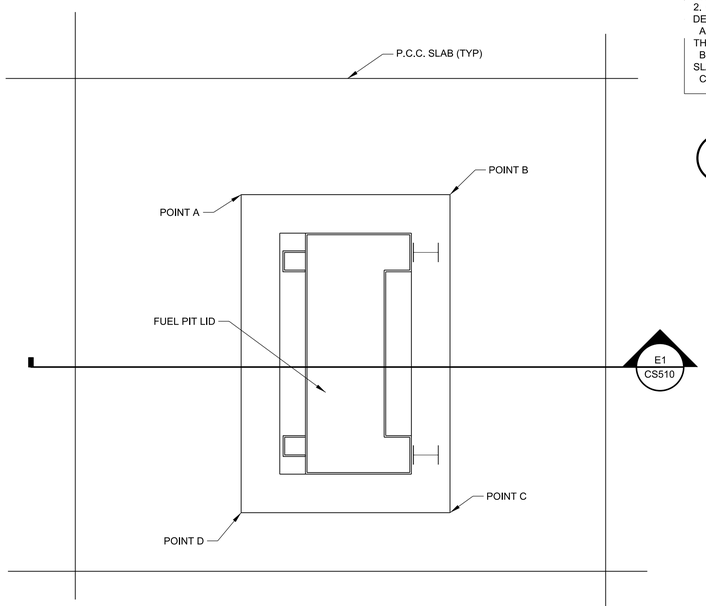


HYDRANT OUTLET PIT #1 ELEVATIONS

DESIGNER NOTES:

1. A MINIMUM OF THREE FEET SHALL BE PROVIDED BETWEEN THE HYDRANT OUTLET PIT OUTER WALL EXPANSION JOINT AND ANY PAVEMENT SLAB JOINTS.
2. OUTLET PIT POSITIONING WITHIN PAVEMENT SLABS SHALL FOLLOW THE FOLLOWING ORDER OF PREFERENCE FROM MOST DESIRED TO LEAST DESIRED:
   A. OUTLET PIT STRUCTURE WITHIN WITHIN ONE PAVEMENT SLAB, MEETING THE MINIMUM DISTANCE REQUIRED BETWEEN THE PIT WALL EXPANSION JOINT AND PERIMETER SLAB JOINTS.
   B. OUTLET PIT STRUCTURE WITHIN ONE SLAB, WITH THE OUTLET PIT EXTERIOR EXPANSION JOINT ALIGNED TO LAND ON A SLAB PERIMETER JOINT.
   C. OUTLET PIT STRUCTURE IN MULTIPLE SLABS, STRADDLING A PAVEMENT SLAB JOINT LINE.

D4 EXAMPLE OUTLET PIT POSITION AND ELEVATION PLAN
SCALE: 1" = 5'



NOTES:

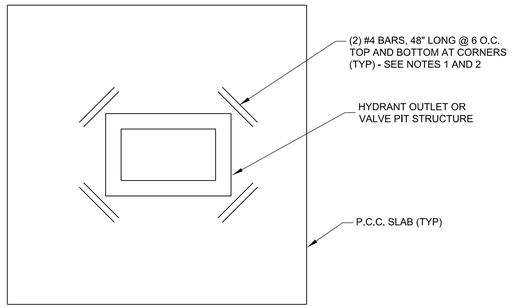
TOP OF HYDRANT FUEL PIT ELEVATIONS SHALL BE SET AS FOLLOWS:
1) DETERMINE THE LOCATIONS AND ELEVATIONS OF POINTS A THRU D IN THE EXISTING PCC SLAB TO BE REMOVED.
2) TOP OF PIT OUTSIDE PERIMETER ELEVATION - ADD 0.25' TO THE POINT WITH THE HIGHEST EXISTING ELEVATION.
3) TOP OF PIT LID FRAME ELEVATION - ADD ELEVATION CHANGE FROM PIT OUTSIDE PERIMETER. SEE STRUCTURAL PIT DETAILS FOR SLOPE AND WIDTH INFORMATION.
4) TOP OF PIT LID ELEVATION - SUBTRACT 0.04 FEET FROM THE TOP OF PIT LID FRAME ELEVATION.

ALL NEW PAVEMENT OUTSIDE OF THE 1 ON 12 PAVEMENT TRANSITION AREA SHALL BE CONTINUOUSLY SLOPED TO MATCH EXISTING.

DESIGNER NOTE:

DETAIL IS USED FOR SETTING ELEVATIONS FOR NEW PITS WITHIN EXISTING PAVEMENT. WHERE EXISTING INFORMATION IS AVAILABLE, DESIGNERS SHOULD SET PIT ELEVATIONS, WITH CONTRACTOR CONFIRMING EXISTING AND PROPOSED ELEVATIONS DURING CONSTRUCTION. EDIT NOTES ABOVE ACCORDINGLY.

A1 HYDRANT OUTLET PIT ELEVATION INSTRUCTION DETAL
NO SCALE

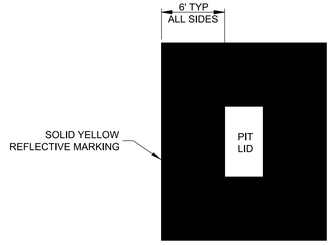


NOTES:

1. PROVIDE 3" CLEAR FROM TOP OF SLAB TO UPPER REINFORCEMENT AND 3" CLEAR FROM BOTTOM OF SLAB TO LOWER REINFORCEMENT.

2. PROVIDE 3" CLEAR FROM INNER BAR TO OUTSIDE OF HYDRANT OUTLET PIT WALL.

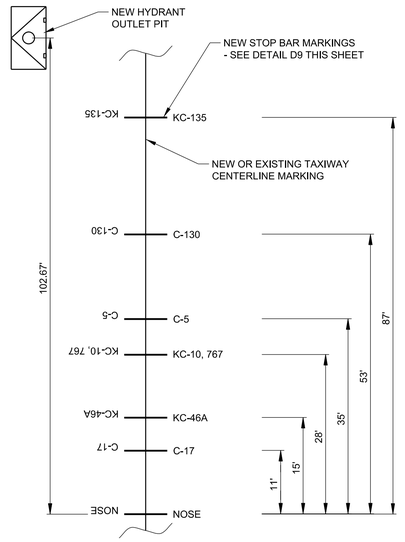
A4 HYDRANT OUTLET PIT AND VALVE PIT CORNER REINFORCING DETAILS
NO SCALE



DESIGNER NOTE:

PER UFC 3-260-04, OUTLET PIT MARKINGS SHOWN ARE OPTIONAL IN AREAS WHERE SNOW IS NOT A FACTOR.

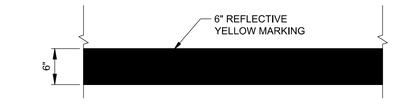
E7 HYDRANT OUTLET PIT MARKING DETAIL
NO SCALE



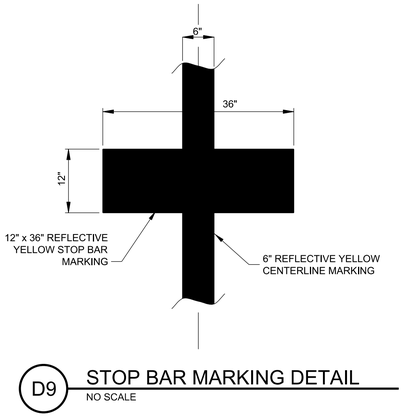
DESIGNER NOTE:

INCLUDE DETAIL WHERE MULTIPLE AIR FRAMES WILL UTILIZE AN OUTLET PIT. EDIT AS NECESSARY FOR SPECIFIC AIRCRAFT PER OUTLET CONNECTION LOCATION TABLES.

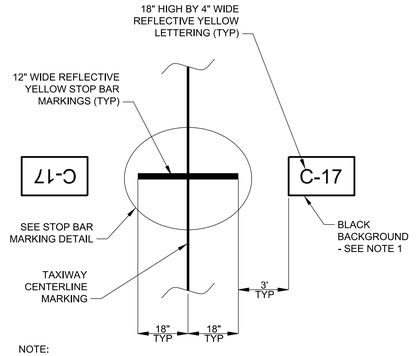
A7 STOP BAR LOCATION PLAN
NO SCALE



F9 TAXIWAY CENTERLINE MARKING DETAIL
NO SCALE



D9 STOP BAR MARKING DETAIL
NO SCALE



NOTE:

1. BLACK BACKGROUND SHALL EXTEND 6" ABOVE, BELOW, LEFT, AND RIGHT OF REFLECTIVE YELLOW LETTERING.

A9 STOP BAR LAYOUT DETAIL
NO SCALE

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DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

AIRFIELD HYDRANT OUTLET PIT DETAILS

SHEET ID
CS512

HYDRANT OUTLET CONNECTOR LOCATION

(WHEN USING HSV - SEE NOTE 1)

AIRCRAFT	DISTANCE AFT OF NOSE	DISTANCE FROM CENTERLINE	OUTLET PIT LID OPENING DIRECTION
C-5	55' +/- 5'	35' +/- 5' R	TOWARD CENTERLINE
C-17	100' +/- 5'	35' R	TOWARD CENTERLINE
C-130	60' +/- 5'	30' R	TOWARD CENTERLINE
C-141	100' +/- 5'	35' +/- 5' R	TOWARD CENTERLINE
B-1	105' +/- 5'	25' - 30' R	TOWARD NOSE
B-2	25'	45' +/- 3' L	TOWARD TAIL
B-52	30' + 4', - 7'	30' R	TOWARD CENTERLINE
KC-10	85' - 100'	30' - 35' R	TOWARD CENTERLINE
KC-135	30' + 4', - 7'	30' +/- 5' R	TOWARD CENTERLINE
E-4	105'	35' R	TOWARD CENTERLINE
KC-46A, 767	110' +/- 5'	30' - 35' R	TOWARD NOSE
UNIVERSAL (E-4, KC-10, C-5, C-141 C-17, 747, KC-46A) (SEE NOTE 4)	100' - 105'	30' - 35' R	TOWARD CENTERLINE

HYDRANT OUTLET CONNECTOR LOCATION

(WHEN USING 50 FOOT PANTOGRAPH - SEE NOTES 2 AND 3)

AIRCRAFT	DISTANCE AFT OF NOSE	DISTANCE FROM CENTERLINE	OUTLET PIT LID OPENING DIRECTION
C-5, C-17, C-130, C-141	90' - 100'	25' - 32' R	TOWARD CENTERLINE
KC-10, KC-46A, 747, B-1	90' - 100'	25' - 32' R	TOWARD CENTERLINE
KC-135	75' - 80'	25' - 32' R	TOWARD CENTERLINE
B-2	14' - 19'	24' - 29' L	TOWARD NOSE

NOTES:

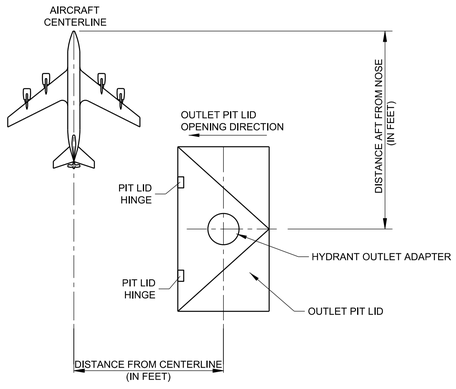
1. RECOMMENDED DISTANCES APPLY TO PIT VALVE LOCATIONS WHEN USING HYDRANT SERVICING VEHICLES. THEY DO NOT APPLY IF PANTOGRAPHS ARE TO BE USED.

2. PIT LID LOCKING BAR SHOULD BE ON THE AIRCRAFT TAIL SIDE OF PIT.

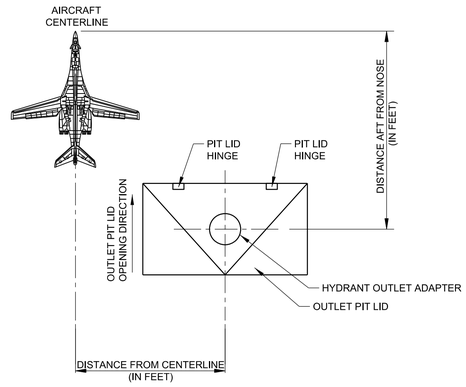
3. B-1 REQUIRES A 6-FOOT ADAPTER HOSE.

4. DETAILED GUIDANCE ON UNIVERSAL HYDRANT OUTLET CONNECTOR LOCATIONS MUST BE OBTAINED FROM THE APPLICABLE AIR FORCE COMMAND.

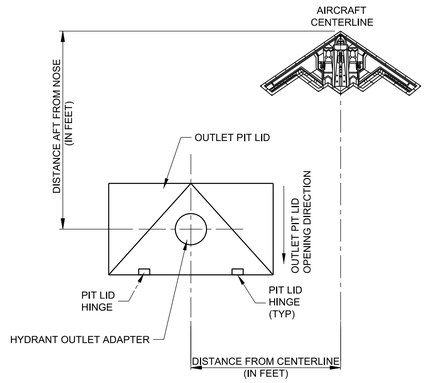
C1 HYDRANT OUTLET CONNECTOR LOCATION TABLES
NO SCALE



A1 TYPICAL HYDRANT OUTLET PIT DIAGRAM - OPENING TOWARDS CENTERLINE
NO SCALE



A4 TYPICAL HYDRANT OUTLET PIT DIAGRAM - OPENING TOWARDS NOSE
NO SCALE



A7 TYPICAL HYDRANT OUTLET PIT DIAGRAM - OPENING TOWARDS TAIL
NO SCALE

US Army Corps of Engineers®

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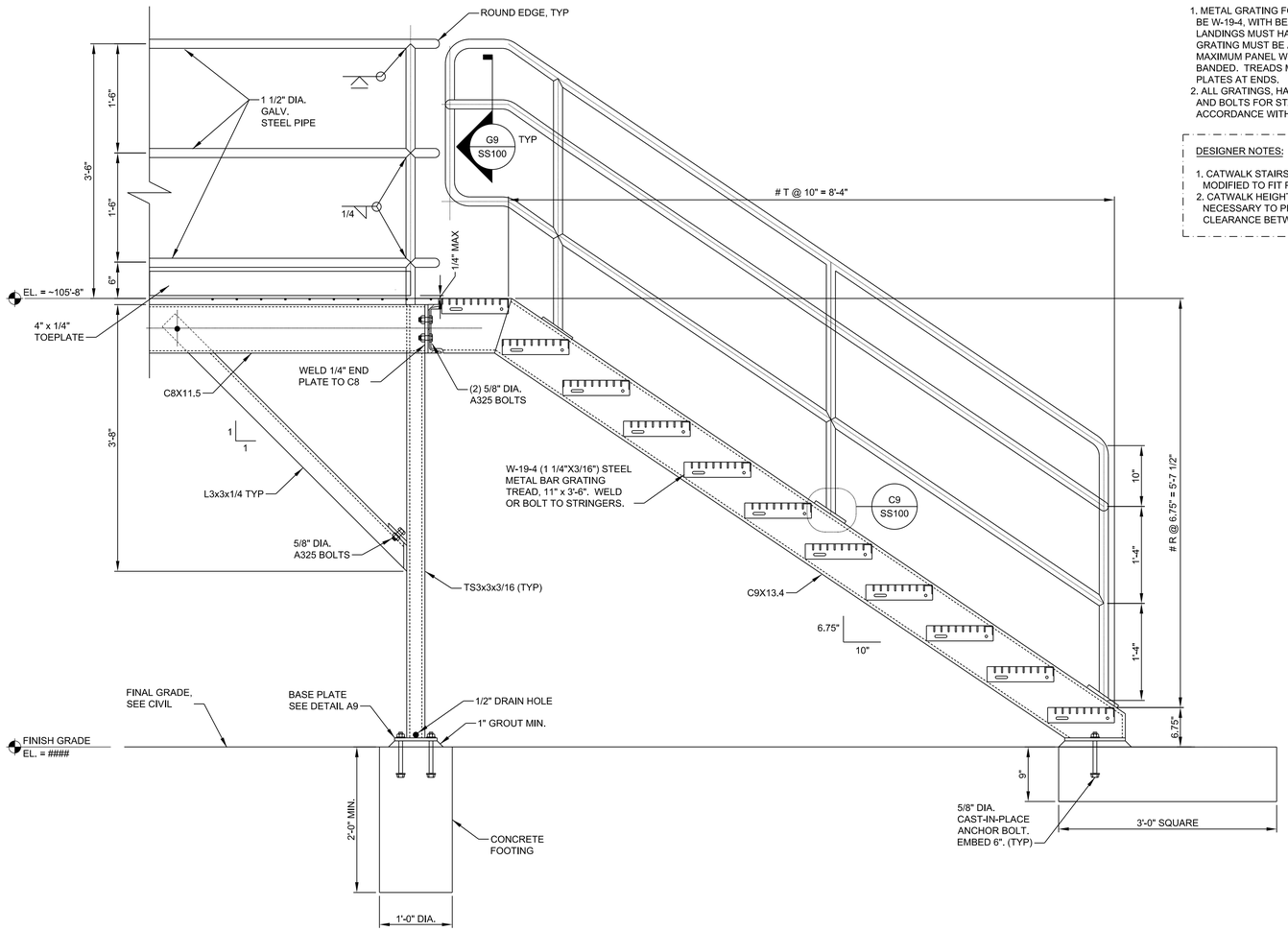
TYPE III

HYDRANT OUTLET PIT LOCATION TABLES

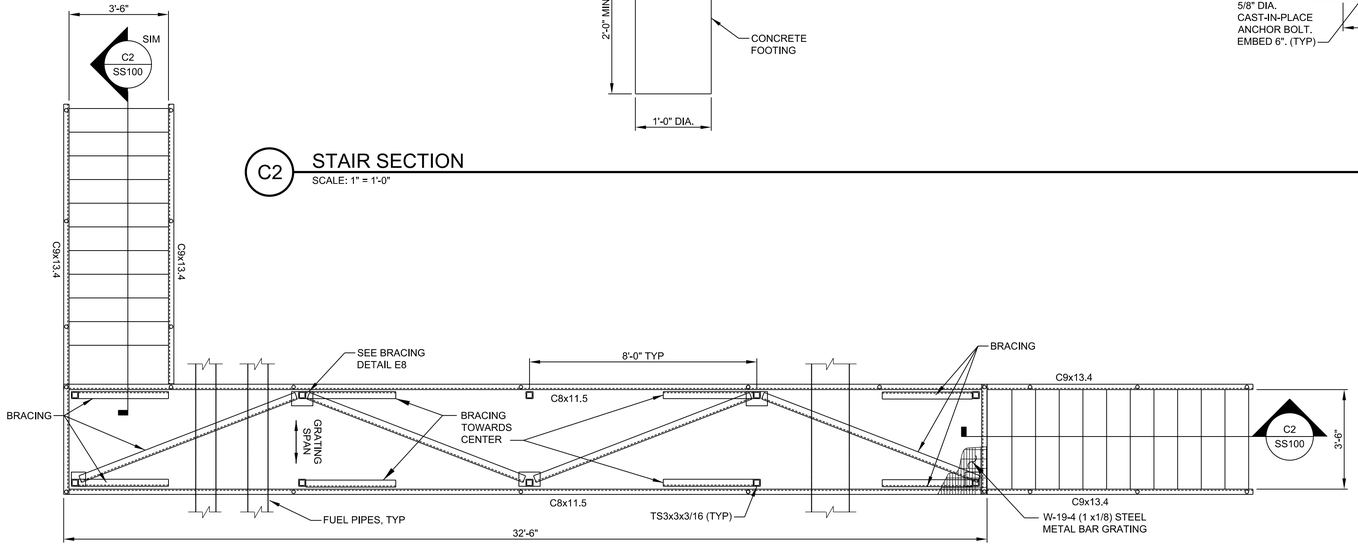
SHEET ID
CS601



C2 STAIR SECTION

SCALE: 1" = 1'-0"

0 6" 1' 2'



A1 PIPE CROSSING STAIRS PLAN

SCALE: 3/8" = 1'-0"

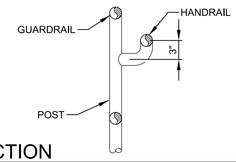
0 2' 4' 8'

GENERAL NOTES:

1. METAL GRATING FOR LANDINGS AND STAIR TREADS MUST BE W-19-4, WITH BEARING BARS AS INDICATED. TREADS AND LANDINGS MUST HAVE CHECKERED PLATE NOSINGS. GRATING MUST BE ANCHORED WITH SADDLE CLIPS. MAXIMUM PANEL WIDTH MUST BE 2'-0". EDGES MUST BE BANDED. TREADS MUST BE FABRICATED WITH CARRIER PLATES AT ENDS.
2. ALL GRATINGS, HANDRAILS, STRINGERS, ANGLES, PLATES AND BOLTS FOR STAIRS MUST BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.

DESIGNER NOTES:

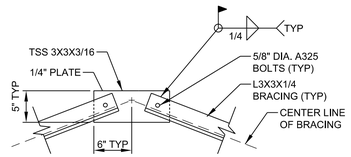
1. CATWALK STAIRS SHOWN ARE TYPICAL AND MUST BE MODIFIED TO FIT PROJECT SPECIFIC NEEDS.
2. CATWALK HEIGHT AND BRACING MUST BE ADJUSTED AS NECESSARY TO PROVIDE A MINIMUM OF 6 INCHES OF CLEARANCE BETWEEN STEEL MEMBERS AND FUEL PIPES.



G9 SECTION

SCALE: 1" = 1'-0"

0 6" 1' 2'

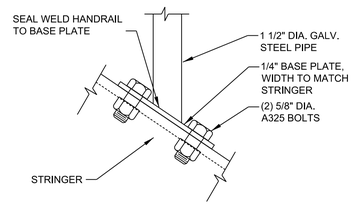


NOTE: DIKE ACCESS STAIR BRACING MUST BE LOCATED AT TOP OF PLATFORM.

E8 DIKE ACCESS STAIRS BRACING DETAIL

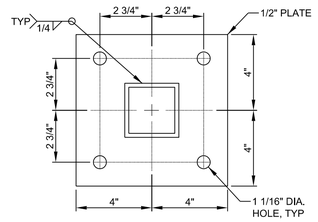
SCALE: 1" = 1'-0"

0 6" 1' 2'



C9 TYP HANDRAIL BASE PLATE

SCALE: 3" = 1'-0"



A9 BASE PLATE DETAIL

SCALE: 3" = 1'-0"

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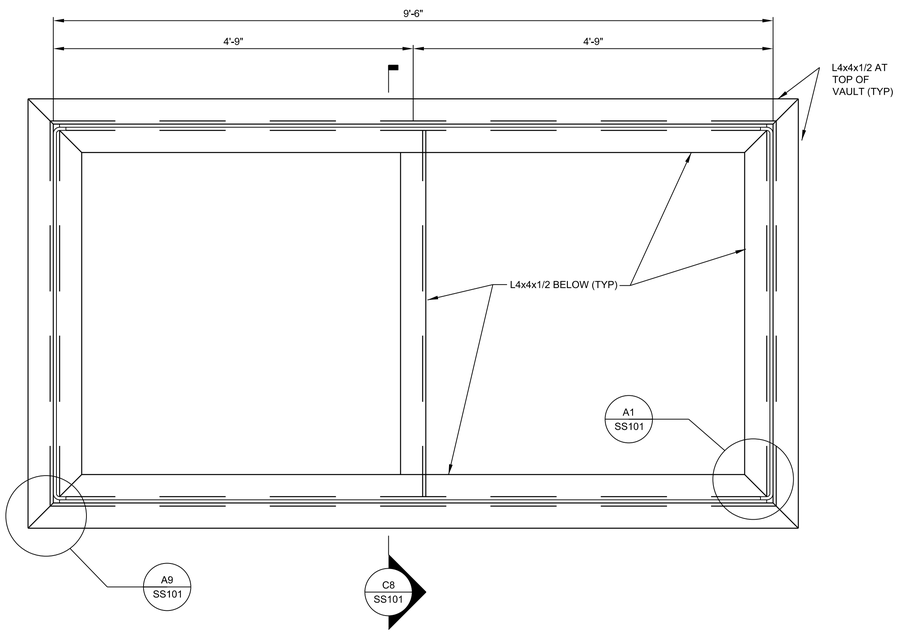
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

PIPE CROSSOVER STAIRS

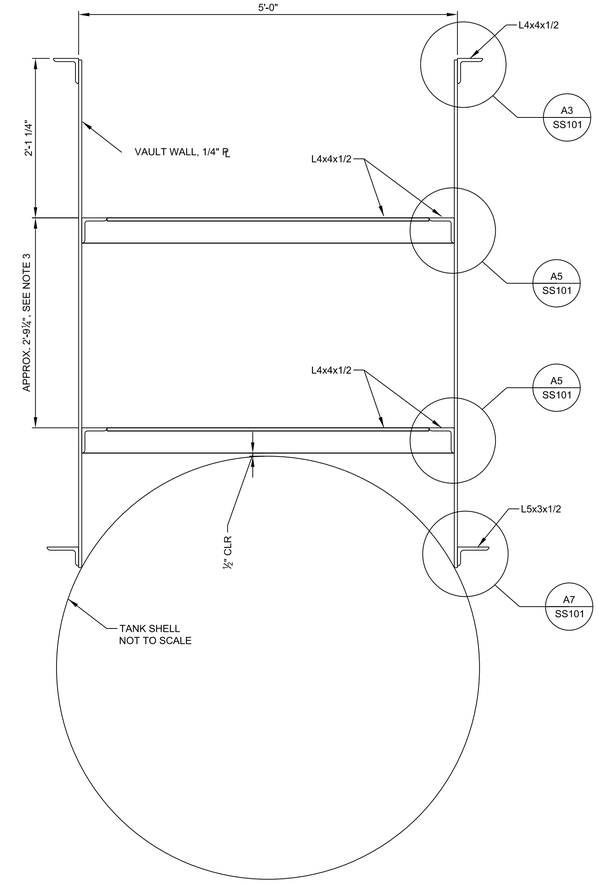
SHEET ID

SS100

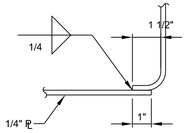


NOTES:
1. SEE SHEET M-504 & M-505 FOR PRODUCT RECOVERY TANK DETAILS AND SS501, SS502, SS503, SS504, & SS505 FOR ROLLING COVER DETAILS.
2. W-19-4 (1 1/4"X1/8") STEEL BAR GRATING NOT SHOWN. SEE M-504 NOTES.
3. TANK SLOPES AT 1.5% TO 3.0%. SEE M-504 AND M-505 FOR OVERALL DEPTH OF VAULT.

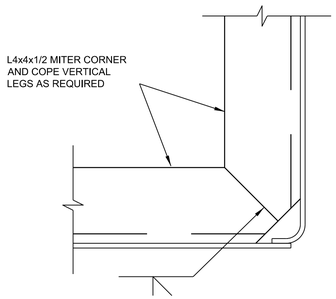
C4 TANK VAULT PLAN
SCALE: 1" = 1'-0"



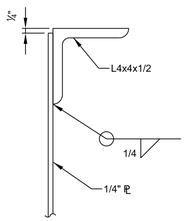
C8 SECTION 1
SCALE: 1" = 1'-0"



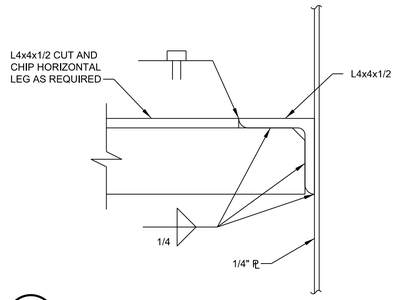
C1 TYPICAL CORNER DETAIL
SCALE: 3" = 1'-0"



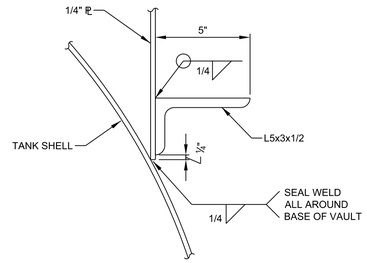
A1 DETAIL A
SCALE: 3" = 1'-0"



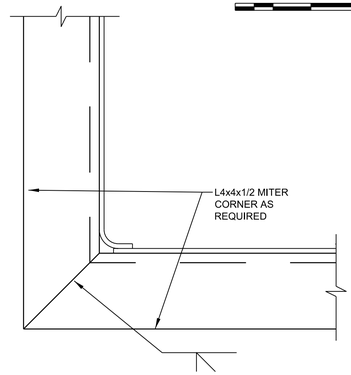
A3 DETAIL B
SCALE: 3" = 1'-0"



A5 DETAIL C
SCALE: 3" = 1'-0"



A7 DETAIL D
SCALE: 3" = 1'-0"



A9 DETAIL E
SCALE: 3" = 1'-0"

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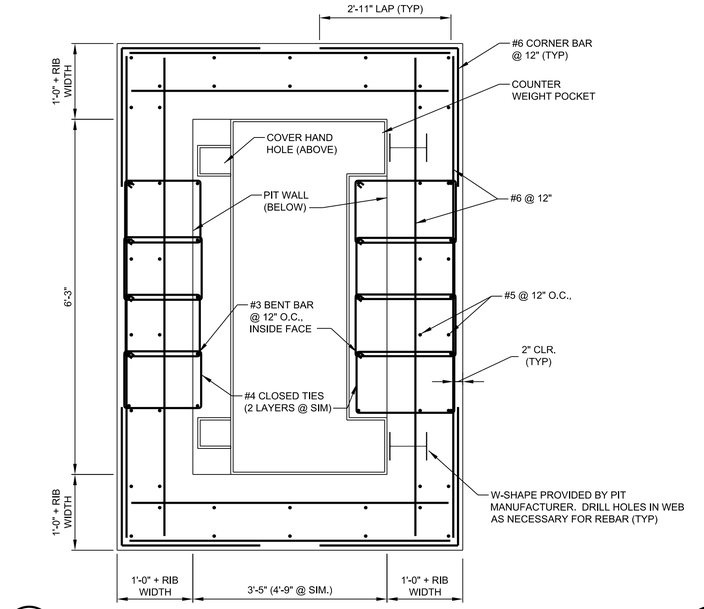
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

PRODUCT RECOVERY TANK VAULT DETAILS

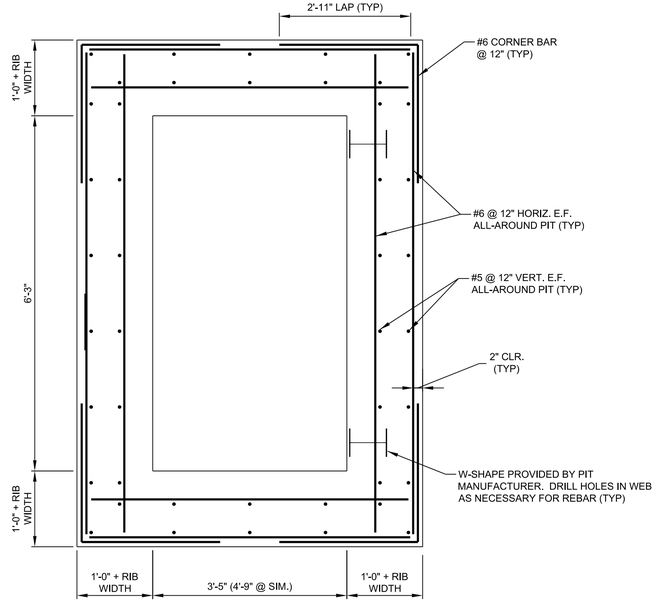
SHEET ID
SS101



E1 PIT OPENING SECTION

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

0 1' 2' 4'



E4 PIT MAIN WALL SECTION

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

0 1' 2' 4'

FUEL PIT NOTES:

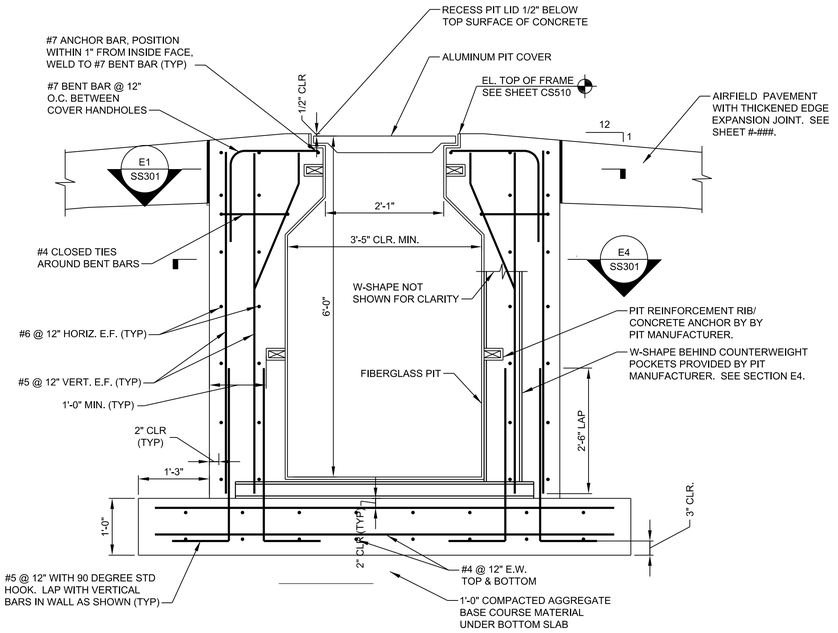
1. FUEL PIT DIMENSIONS SHALL BE AS STANDARD WITH THE MANUFACTURER AND NOT LESS THAN THOSE INDICATED, BUT EXCEEDING THE INDICATED DIMENSIONS ONLY BY THE AMOUNT OF THE CLOSEST STANDARD SIZE. ANY CHANGES TO THE REINFORCED CONCRETE REQUIRED TO MATCH THE CONFIGURATION OF THE SUPPLIED PITS SHALL BE PROVIDED BY THE CONTRACTOR AT NO ADDITIONAL COST TO THE GOVERNMENT AND SHALL BE SUBMITTED FOR APPROVAL.

MATERIAL NOTES:

1. REINFORCED CONCRETE:
   A. CONCRETE: SPECIFIED COMPRESSIVE STRENGTH f'c = [4,000 PSI][4,500 PSI][5,000 PSI] AT 28 DAYS FOR ALL WORK.
   B. REINFORCING BARS: SPECIFIED YIELD STRENGTH Fy = 60 KSI (GRADE 60).

PIT DESIGN NOTES TO THE DESIGNER:

1. PLAN AND DETAILS SHOWN ARE TYPICAL FOR THE APPLICATIONS SHOWN ON SHEETS MS501 & MS502. REINFORCED CONCRETE FOR THE HYDRANT PITS SHALL BE REDESIGNED IF THE REQUIRED DIMENSIONS EXCEED THOSE SHOWN. DEPTH OF ISOLATION VALVE PIT IS DEPENDENT ON PIPE PROFILE AND SHALL BE DESIGNED FOR SITE SPECIFIC INSTALLATION CONDITIONS.
2. WHEN REQUIRED, REINFORCED CONCRETE FOR THE PITS SHALL BE DESIGNED FOR SITE SPECIFIC LOADINGS INCLUDING THE EFFECTS OF LATERAL EARTH PRESSURE, HYDROSTATIC PRESURE AND THE EFFECTS OF SURCHARGE FROM AIRCRAFT WHEEL LOADS.

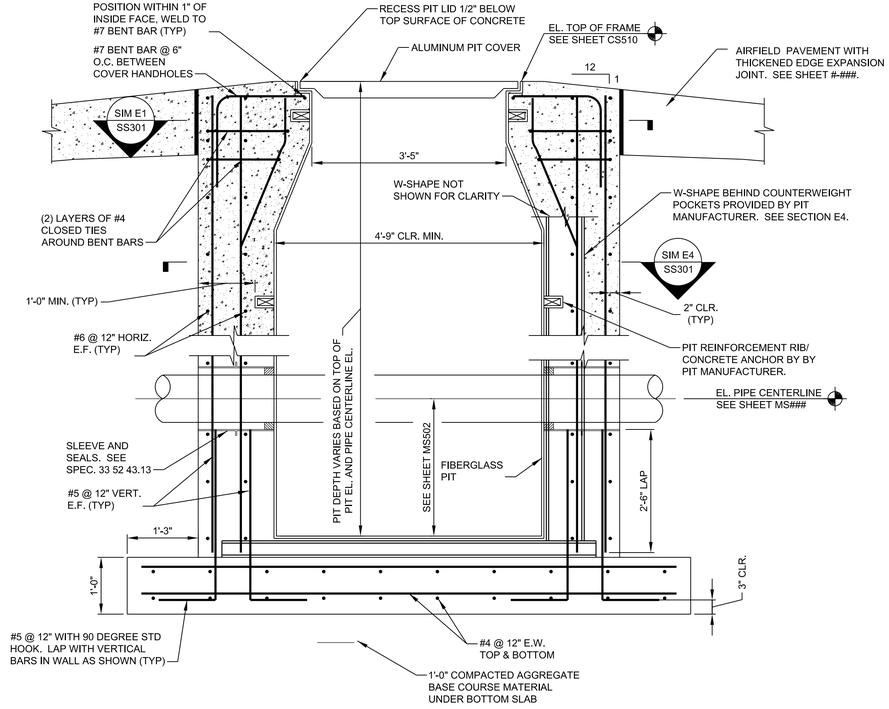


NOTE: REFERENCE SHEET MS501 FOR PIT DETAILS AND LID ORIENTATION.

A1 HYDRANT OUTLET PIT SECTION

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

0 1' 2' 4'



NOTE: REFERENCE SHEET MS502 FOR PIT DETAILS AND LID ORIENTATION.

A5 ISOLATION VALVE PIT SECTION

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

0 1' 2' 4'

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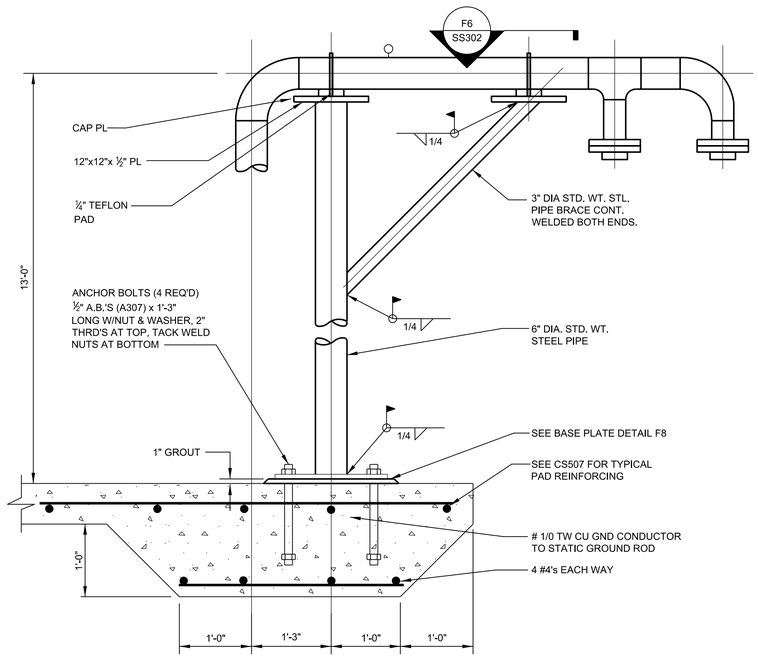
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

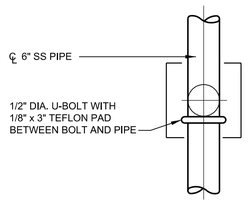
FUEL PIT PLANS & DETAILS
SHEET 1 OF 2

SHEET ID

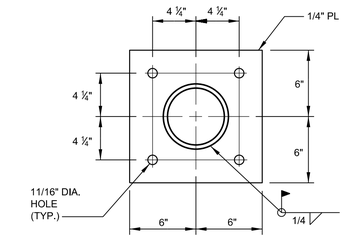
SS301



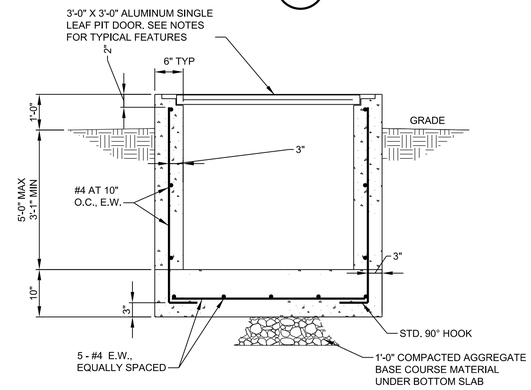
D3 PIPE SUPPORT SECTION
SCALE: NTS



F6 PIPE SUPPORT CAP PLATE DETAIL
SCALE: NTS



F8 PIPE SUPPORT BASE PLATE DETAIL
SCALE: NTS



D7 TYP HIGH POINT VENT VAULT OR LOW POINT DRAIN VAULT (UNPAVED AREAS)
SCALE: NTS

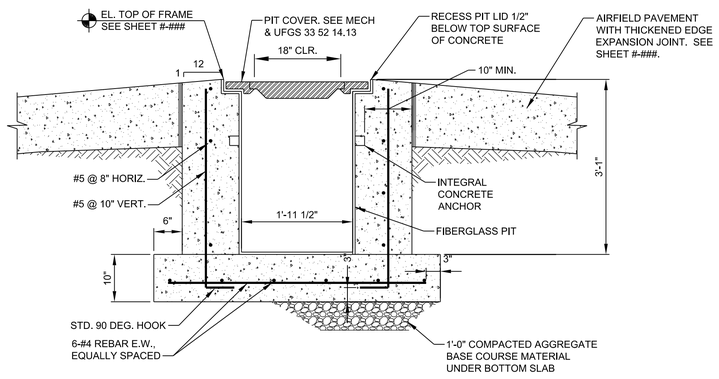
VAULT NOTES

MATERIALS:

1. CAST-IN-PLACE REINFORCED CONCRETE SHALL HAVE A SPECIFIED COMPRESSIVE STRENGTH, F'c, OF [4000 PSI][4500 PSI][5000 PSI] @ 28 DAYS FOR ALL WORK.
2. CONCRETE REINFORCING BARS SHALL HAVE A SPECIFIED YIELD STRENGTH OF 60 KSI (GRADE 60).
2. EXPANSION BOLTS SHALL CONFORM TO FED. SPEC. FF-S-325, GROUP II, TYPE 4, CLASS I, SIZE AS NOTED ON DRAWINGS.

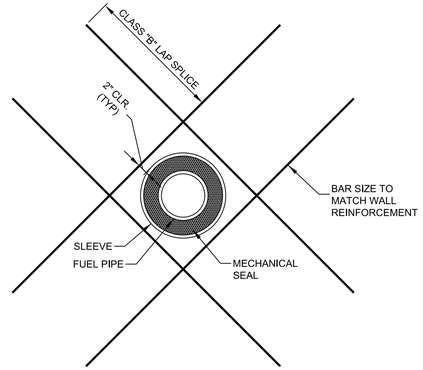
VAULT DOORS:

1. SEE SHEET MS503 FOR ADDITTIONAL DETAILS.
2. SINGLE LEAF VALVE PIT DOORS SHALL BE THE PRODUCT OF A COMPANY REGULARLY ENGAGED IN THE MANUFACTURE OF SUCH DOORS.
3. PIT DOORS SHALL BE DESIGNED TO WITHSTAND A LIVE LOAD OF 150 POUNDS PER SQUARE FOOT.
4. DOORS AND FRAMES SHALL BE OF EITHER ALUMINUM OR STEEL CONSTRUCTION AT THE OPTION OF THE CONTRACTOR UNLESS SPECIFICALLY CALLED OUT AS ALUMINUM. STEEL DOORS AND FRAMES SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A123.
5. DOOR SHALL OPEN TO 90 DEGREES AND SHALL BE EQUIPPED WITH HEAVY BRASS HINGES, STAINLESS STEEL PINS, COMPENSATING SPRINGS OR TORSION BARS, HOLD OPEN ARM AND SNAP LOCK WITH RELEASE HANDLE ON THE UNDERSIDE, AND REMOVABLE KEY HANDLE FOR RELEASING LOCK FROM ABOVE. HARDWARE SHALL BE ZINC PLATED AND CHROMATE SEALED.
6. DOORS SHALL DRAIN TO A CHANNEL FRAME TO PREVENT RAINWATER FROM ENTERING THE PIT. A 1 1/2" DRAINAGE COUPLING SHALL BE PROVIDED. DRAINS SHALL BE PROVIDED TO ALLOW DRAINAGE FROM THE CHANNEL FRAME ONTO THE SURROUNDING GRADE OR PAVEMENT.



NOTE: REFERENCE SHEET MS501 & MS502 FOR PIT DETAILS AND LID ORIENTATION.

A4 TYPICAL HIGH POINT VENT PIT OR LOW POINT DRAIN PIT (PAVED AREAS)
SCALE: NTS



NOTE: WHERE BASE SLAB DOES NOT ALLOW FULL EXTENSION OF EXTRA #5 BARS, EXTEND AS FAR AS POSSIBLE AND BEND HORIZONTAL. WHERE INTERSECTING WALL DOES NOT ALLOW FULL EXTENSION, PROVIDE 90 DEGREE BEND INTO INTERSECTING WALL.

A8 TYPICAL WALL PENETRATION DETAIL
SCALE: NTS

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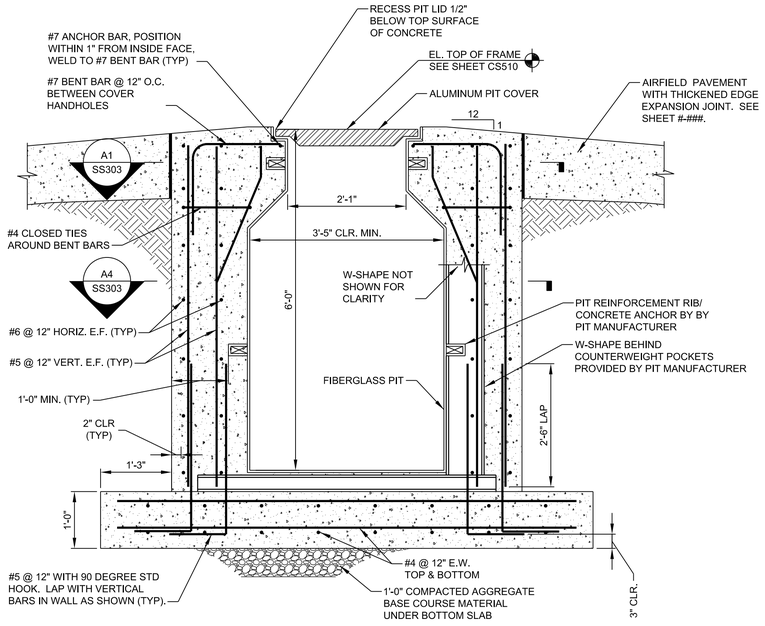
DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

FUEL VAULT PLAN AND DETAILS
SHEET 2 OF 2

SHEET ID
SS302



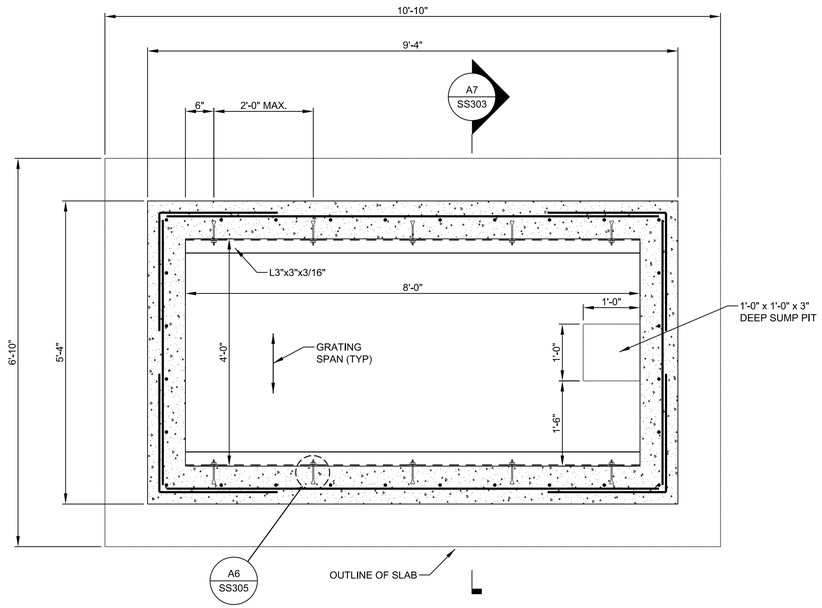
NOTE: REFERENCE SHEET MS506 FOR PIT DETAILS AND LID ORIENTATION.

D3 PANTOGRAPH HYDRANT OUTLET PIT SECTION

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

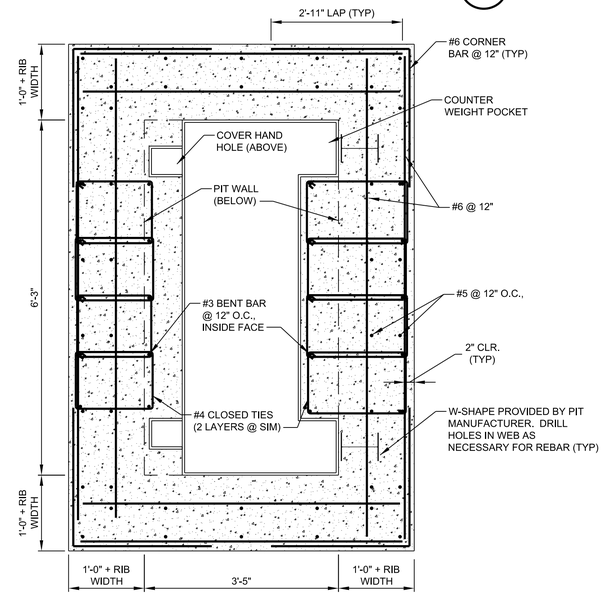
NOTES

1. REFER TO MS506 FOR PIPE PENETRATION INFORMATION.
2. REFER TO MS506 FOR ROLLING COVER DIRECTION.
3. REFER TO SS501-SS505 FOR ROLLING COVER DETAILS.
4. SEE SHEET SS305 FOR MISCELLANEOUS DETAILS.



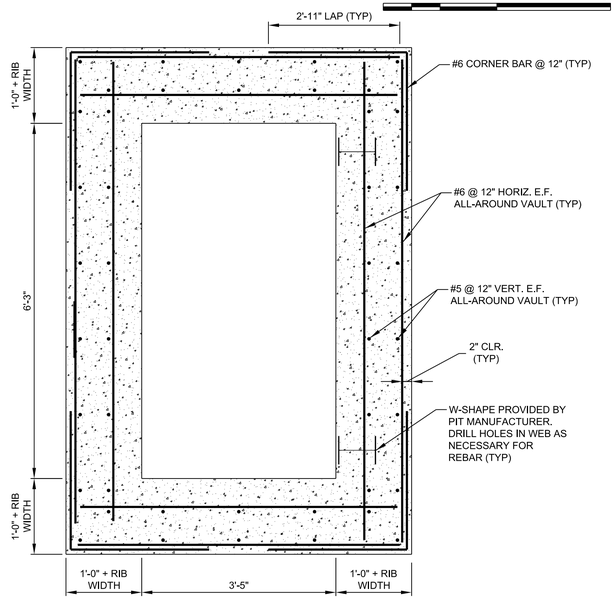
D7 PANTOGRAPH FLUSHING CONNECTION VAULT PLAN

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



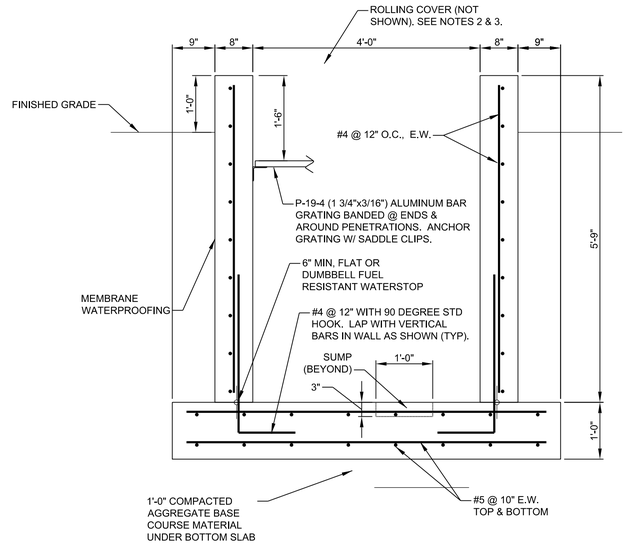
A1 PIT OPENING SECTION

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



A4 PIT MAIN WALL SECTION

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



A7 PANTOGRAPH FLUSHING CONNECTION VAULT ELEVATION

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

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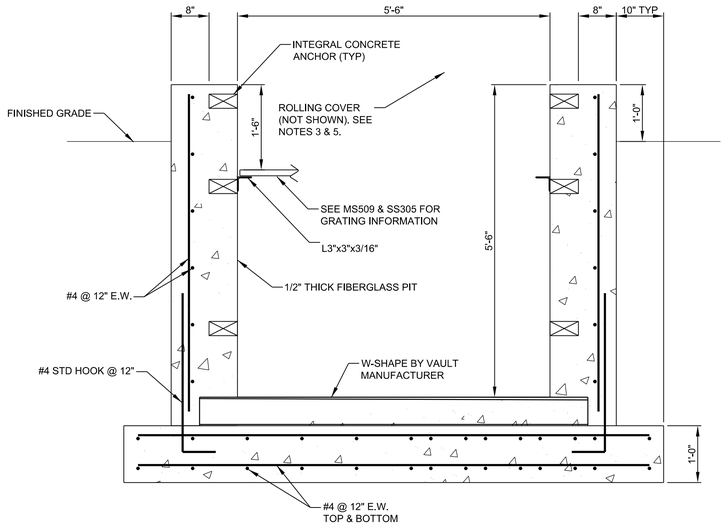
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

PANTOGRAPH PITS & VAULTS
SHEET 1 OF 2

SHEET ID

SS303



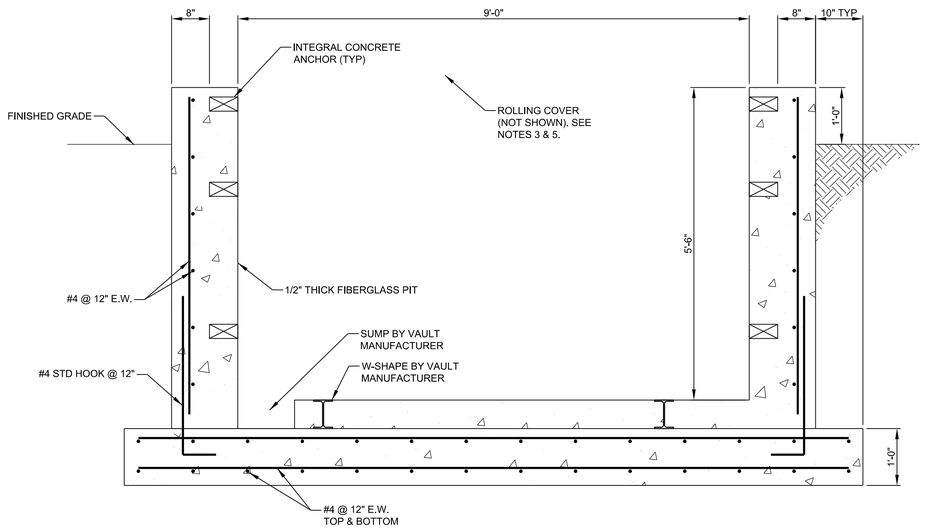
D3 TRUCK FILL PANTOGRAPH VAULT SECTION

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

0 1' 2' 4'

NOTES:

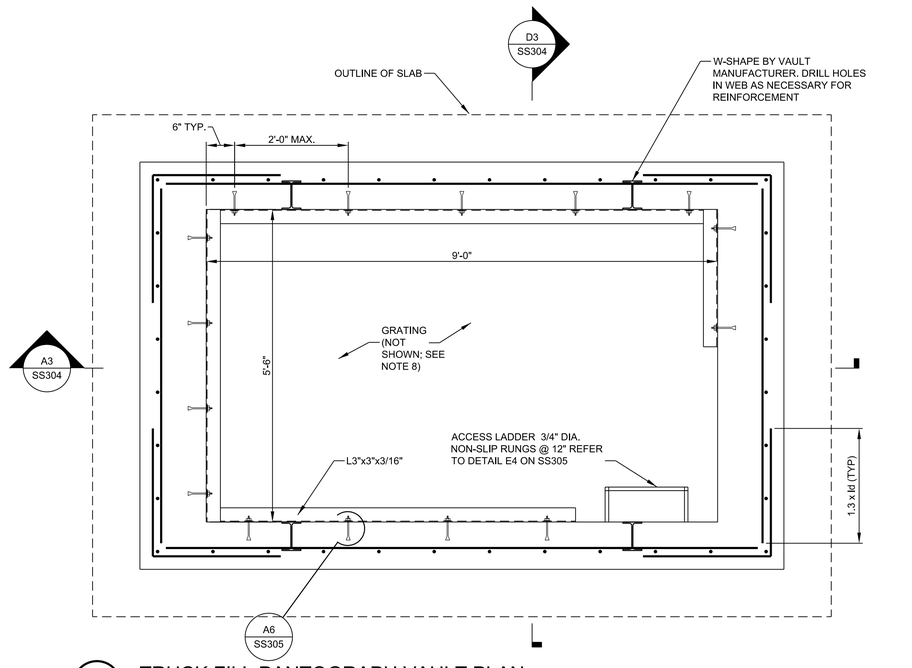
1. REFER TO SHEET MS509 FOR PENETRATION INFORMATION.
2. REFER TO SHEET MS509 FOR PIPING LAYOUT.
3. REFER TO SHEET MS509 FOR ROLLING COVER LAYOUT.
4. REFER TO SHEET MS509 FOR GRATING LAYOUT.
5. REFER TO SHEETS SS501-SS505 FOR ROLLING COVER DETAILS.
6. REFER TO SHEET SS305 FOR LADDER & MISCELLANEOUS DETAILS.
7. PROVIDE ADDITIONAL REINFORCEMENT AROUND PENETRATIONS. (SEE SHEET SS302)
8. INTERIOR GRATING FRAMING SHALL BE DESIGNED BY THE DESIGNER OF RECORD.



A3 TRUCK FILL PANTOGRAPH VAULT SECTION

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

0 1' 2' 4'



A7 TRUCK FILL PANTOGRAPH VAULT PLAN

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

0 1' 2' 4'

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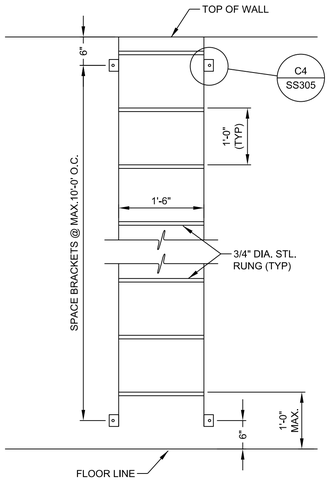
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

PANTOGRAPH PITS & VAULTS
SHEET 2 OF 2

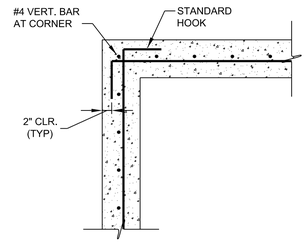
SHEET ID

SS304



E4 LADDER ELEVATION

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



E6 TYPICAL WALL CORNER DETAIL

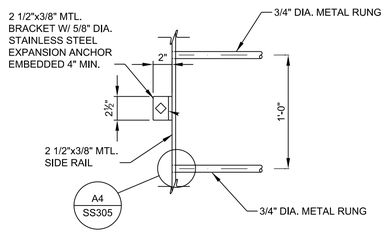
SCALE: 3/4" = 1'-0"

VALVE VAULT NOTES:

1. SEE SHEETS C#### & C#### FOR PIPING PLAN, GRADE AND PIPE CENTERLINE ELEVATIONS AND ADDITIONAL DETAILS.
2. REMOVABLE BAR GRATING NOT SHOWN ON PLAN FOR CLARITY.
3. SUPPORTS AND LADDER SHALL BE HOT-DIPPED GALVANIZED STEEL IN ACCORDANCE WITH ASTM A123. PROVIDE ISOLATION BETWEEN ALUMINUM GRATING AND GALVANIZED STEEL SUPPORTS.
4. CAST-IN-PLACE REINFORCED CONCRETE
   A. CONCRETE: SPECIFIED COMPRESSIVE STRENGTH F'c = [4,000][4,500][5,000] PSI @ 28 DAYS FOR ALL WORK.
   B. REINFORCING BARS: SPECIFIED YIELD STRENGTH Fy = 60 KSI (GRADE 60).
5. EXPANSION BOLTS SHALL CONFORM TO FED. SPEC. FF-S-325, GROUP II, TYPE 4, CLASS I, SIZE AS NOTED ON DRAWINGS.
6. PIT DOORS
   A. SEE SHEETS #-### & #-### FOR SIZE AND TYPE OF PIT DOOR.
   B. SINGLE AND DOUBLE LEAF VALVE PIT DOORS SHALL BE THE PRODUCT OF A COMPANY REGULARLY ENGAGED IN THE MANUFACTURE OF SUCH DOORS.
   C. PIT DOORS SHALL BE DESIGNED TO WITHSTAND A LIVE LOAD OF 150 POUNDS PER SQUARE FOOT.
   D. DOORS AND FRAMES SHALL BE OF EITHER ALUMINUM OR STEEL CONSTRUCTION AT THE OPTION OF THE CONTRACTOR UNLESS SPECIFICALLY CALLED OUT AS ALUMINUM. STEEL DOORS AND FRAMES SHALL BE HOT-DIP GALVANIZED IN ACCORDANCE WITH ASTM A 123.
   E. DOOR SHALL OPEN TO 90 DEGREES AND SHALL BE EQUIPPED WITH HEAVY BRASS HINGES, STAINLESS STEEL PINS, COMPENSATING SPRINGS OR TORSION BARS. HOLD OPEN ARM AND SNAP LOCK WITH RELEASE HANDLE ON THE UNDERSIDE AND REMOVABLE KEY HANDLE FOR RELEASING LOCK FROM ABOVE. HARDWARE SHALL BE ZINC PLATED AND CHROMATE SEALED.
   F. DOORS SHALL DRAIN TO A CHANNEL FRAME TO PREVENT RAINWATER FROM ENTERING THE PIT. A 1 1/2" DRAINAGE COUPLING SHALL BE PROVIDED. DRAINS SHALL BE PROVIDED TO ALLOW DRAINAGE FROM THE CHANNEL FRAME ONTO THE SURROUNDING GRADE OR PAVEMENT.

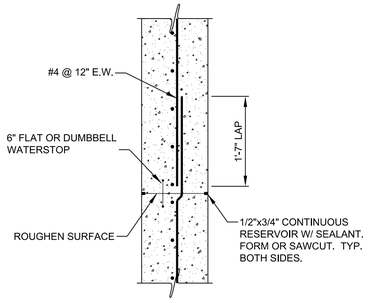
NOTES TO THE DESIGNER:

1. PLAN AND DETAILS SHOWN ARE TYPICAL. REINFORCED CONCRETE FOR THE PITS SHALL BE REDESIGNED IF THE REQUIRED PLAN DIMENSIONS EXCEED THOSE SHOWN OR IF DEPTH OF PIT EXCEEDS 7'-0" BELOW GRADE.
2. WHEN REQUIRED, REINFORCED CONCRETE FOR THE PITS SHALL BE DESIGNED FOR SITE SPECIFIC LOADINGS INCLUDING THE EFFECTS OF LATERAL EARTH PRESSURE, HYDROSTATIC PRESURE AND THE EFFECTS OF SURCHARGE. DESIGN OF THE PITS SHALL INCORPORATE THE USE OF WATERSTOPS AT CONSTRUCTION JOINTS, ON THE FORM TIES, AND INCREASED CONCRETE COVER ON REBAR TO PREVENT CORROSION. WHERE THE SOILS INVESTIGATION INDICATES THE WATER TABLE MAY RISE ABOVE THE FLOOR OF THE VAULT OR WHERE PREVIOUS EXPERIENCE INDICATES WATER LEAKAGE HAS BEEN A PROBLEM IN BELOW GRADE STRUCTURES, ADDITIONAL MEASURES MAY BE REQUIRED TO CONTROL MOISTURE INFILTRATION INTO THE PIT.



C4 ELEVATION OF BRACKET

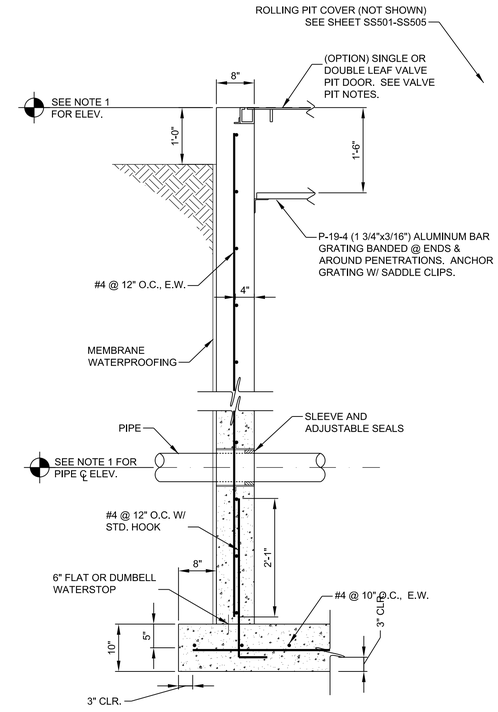
SCALE: NTS



NOTE: HORIZONTAL CONSTRUCTION JOINTS SHALL BE SHOWN ON SHOP DRAWINGS AND SUBMITTED FOR APPROVAL.

C6 OPTIONAL HORIZONTAL CJ

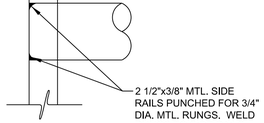
SCALE: NTS



A8 TYPICAL WALL SECTION

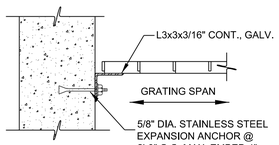
SCALE: 3/4" = 1'-0"

0 1' 2' 4'



A4 LADDER RUNG CONNECTION

SCALE: NTS



A6 SECTION

SCALE: 1-1/2" = 1'-0"

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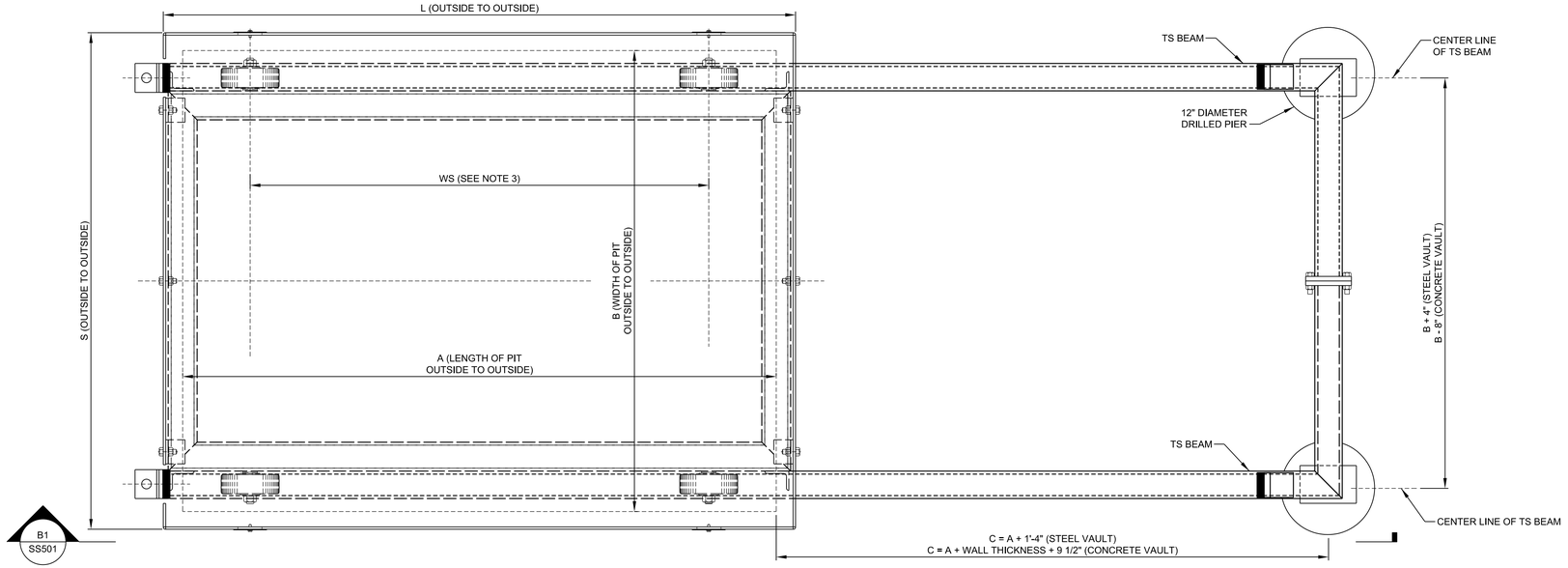
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

VALVE VAULTS
PLANS AND DETAILS

SHEET ID

SS305

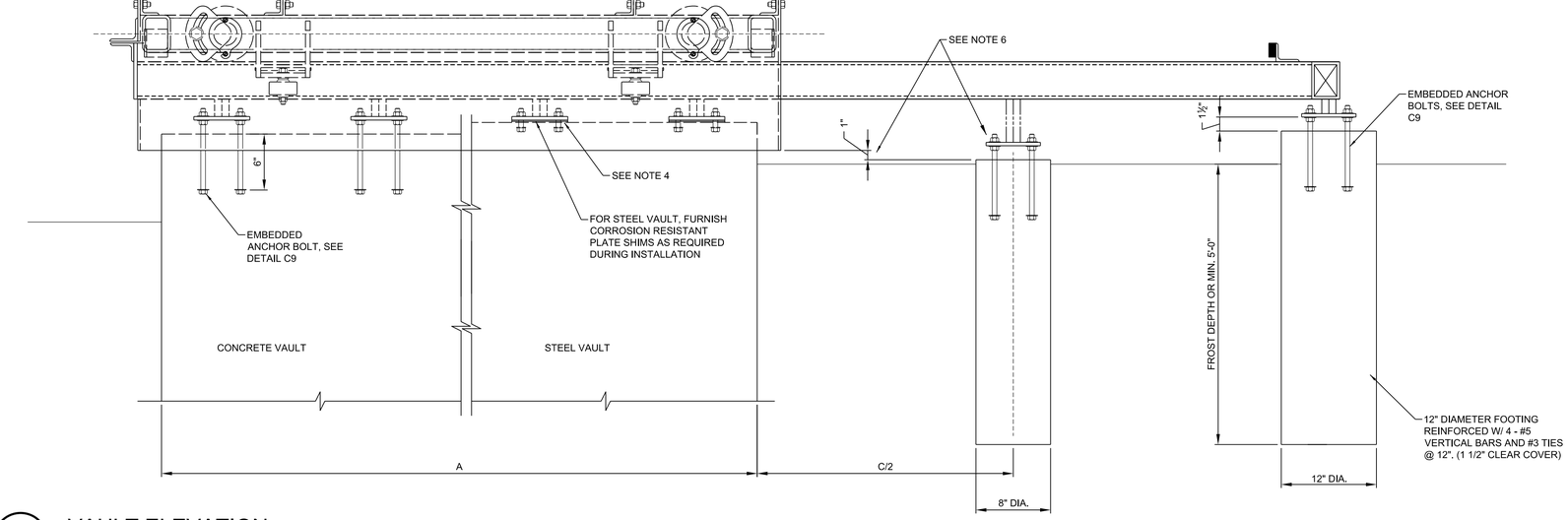


E1 VAULT PLAN

NTS

NOTES:

1. THE TRACK FOR STEEL ROLLING COVERS SHALL BE SHIMMED TO MAKE LEVEL AT THE VAULT. THE TRACK AT THE CONCRETE POST SHALL BE ADJUSTED WITH THE LEVELING NUTS. THE TRACK FOR CONCRETE ROLLING COVERS SHALL BE LEVELED BY ADJUSTING THE LEVELING NUTS.
2. THE ROLLING COVER SHALL BE FIELD TESTED BY THE CONTRACTOR TO ENSURE PROPER WHEEL ADJUSTMENTS TO ELIMINATE BINDING AND TRACK MISALIGNMENT. IN ADDITION, THE CONTRACTOR SHALL DEMONSTRATE TO THE CONTRACTING OFFICER'S REPRESENTATIVE THAT THE COVER AND COVER TRACKS ARE LEVEL.
3. IF "WS" (WHEEL SPACING) IS 8'-4" OR GREATER, A THIRD SET OF 6" DIA. WHEELS MUST BE PROVIDED AT "WS/2".
4. THE CONTRACTOR SHALL DRILL 3/4" DIA. MOUNTING HOLES IN THE STEEL VAULT ANGLE DURING INSTALLATION USING THE VAULT TRACK FOR TEMPLATE.
5. ALL FERROUS STEEL INCLUDING BOLTS, NUTS, AND WASHERS SHALL BE GALVANIZED UNLESS OTHERWISE INDICATED ON THESE DRAWINGS.
6. IF "C" IS 8'-4" OR GREATER, THEN AN 8" DIAMETER CONCRETE FOOTING, SIMILAR TO THE 12" DIA. FOOTING IN DETAIL B1 "VAULT ELEVATION", SHALL BE ADDED AT A DISTANCE OF C/2. THE HEIGHT OF CONCRETE PIER SHALL BE A MINIMUM OF 1" BELOW THE ROLLING PIT COVER.



B1 VAULT ELEVATION

NTS

C9 ANCHOR BOLT DETAIL

SCALE: NTS

VAULT SCHEDULE

VAULT NO.	LOCATION REF. SHEET	LENGTH A	WIDTH B	SHELL MATERIAL	TYPE	SHELL THICKNESS	STIFFENER THICKNESS	STEEL VAULT		CONCRETE VAULT	
								L	S	L	S
-	-	-	-	ALUMINUM	6016-T6	1/4"	1/4"	L = A + 10 5/8" + (2 x SHELL THICKNESS)	S = B + 1'-1" + (2 x SHELL THICKNESS)	L = A + 3 1/2" + (2 x SHELL THICKNESS)	S = B + 1" + (2 x SHELL THICKNESS)

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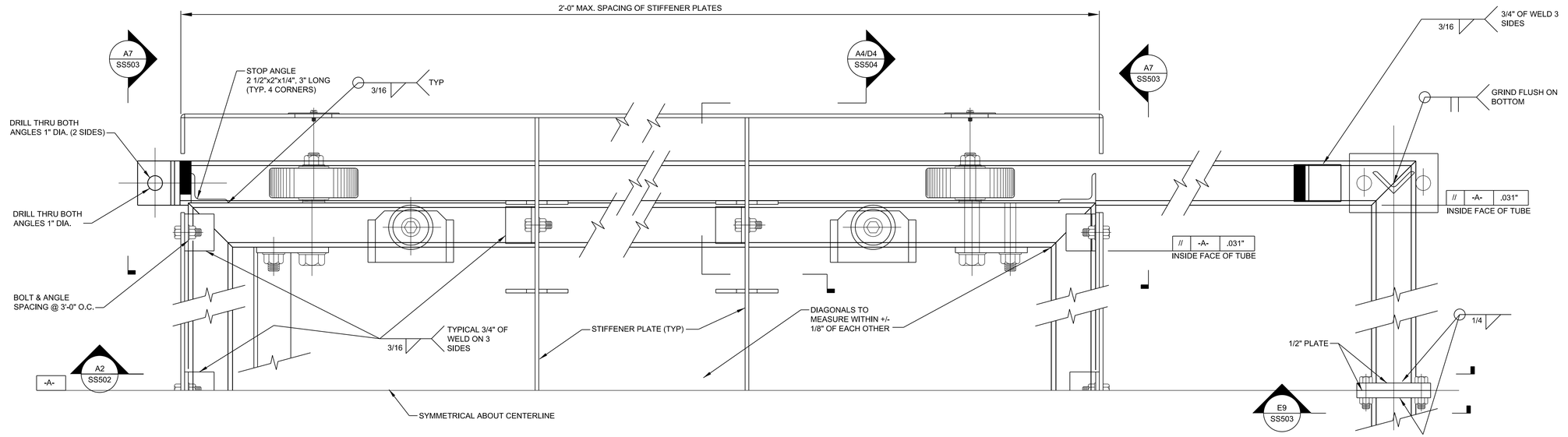
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

VAULT ROLLING COVER DETAILS
SHEET 1 OF 5

SHEET ID

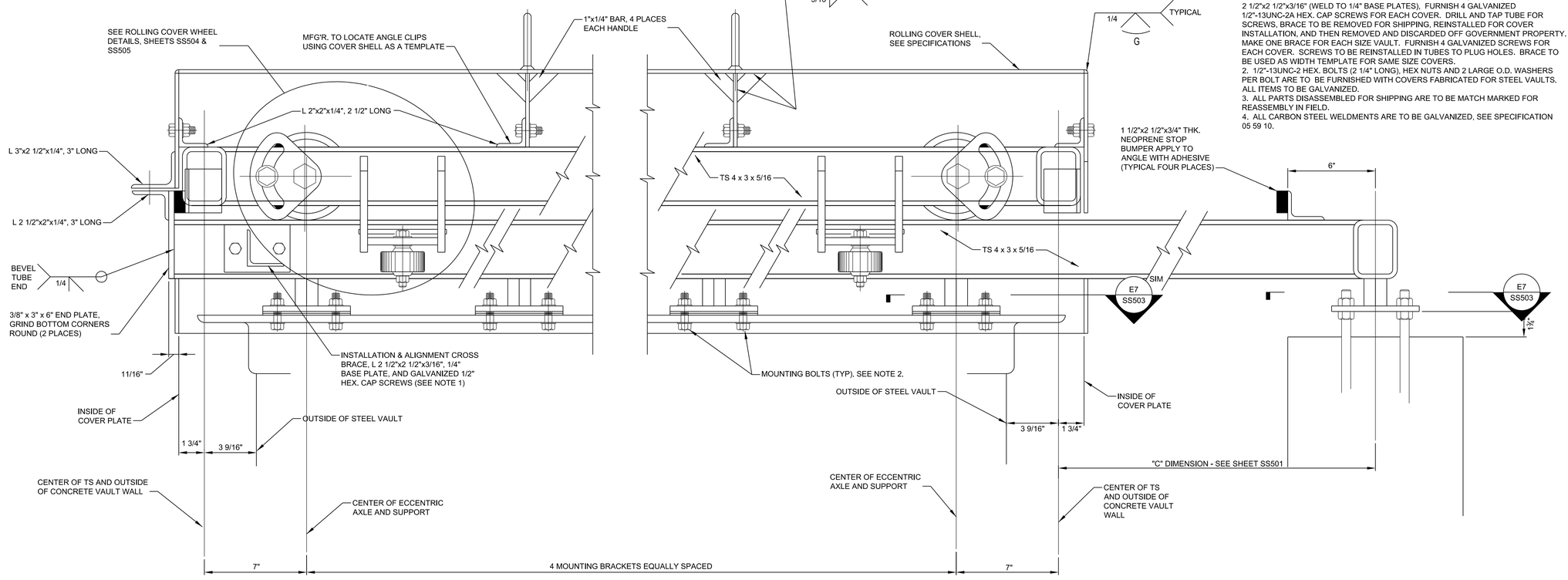
SS501



E2 HALF PLAN

SCALE: 3" = 1'-0"

0 3" 6" 1'



A2 SECTION 2

SCALE: 3" = 1'-0"

0 3" 6" 1'

NOTES:

1. UNFINISHED INSTALLATION & ALIGNMENT CROSS BRACE, STEEL ANGLE 2 1/2"x2 1/2"x3/16" (WELD TO 1/4" BASE PLATES), FURNISH 4 GALVANIZED 1/2"-13UNC-2A HEX. CAP SCREWS FOR EACH COVER. DRILL AND TAP TUBE FOR SCREWS, BRACE TO BE REMOVED FOR SHIPPING, REINSTALLED FOR COVER INSTALLATION, AND THEN REMOVED AND DISCARDED OFF GOVERNMENT PROPERTY. MAKE ONE BRACE FOR EACH SIZE VAULT. FURNISH 4 GALVANIZED SCREWS FOR EACH COVER. SCREWS TO BE REINSTALLED IN TUBES TO PLUG HOLES. BRACE TO BE USED AS WIDTH TEMPLATE FOR SAME SIZE COVERS.
2. 1/2"-13UNC-2 HEX. BOLTS (2 1/4" LONG), HEX NUTS AND 2 LARGE O.D. WASHERS PER BOLT ARE TO BE FURNISHED WITH COVERS FABRICATED FOR STEEL VAULTS. ALL ITEMS TO BE GALVANIZED.
3. ALL PARTS DISASSEMBLED FOR SHIPPING ARE TO BE MATCH MARKED FOR REASSEMBLY IN FIELD.
4. ALL CARBON STEEL WELDMENTS ARE TO BE GALVANIZED, SEE SPECIFICATION 05 59 10.

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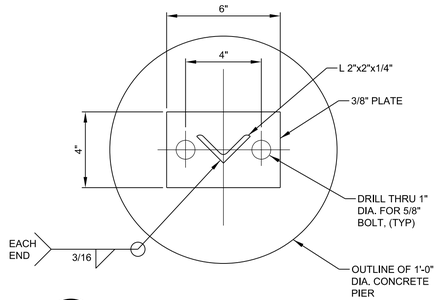
TYPE III

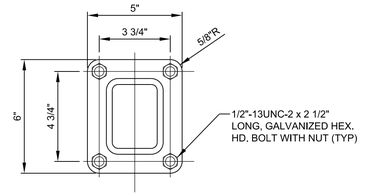
VAULT ROLLING COVER DETAILS
SHEET 2 OF 5

SHEET ID

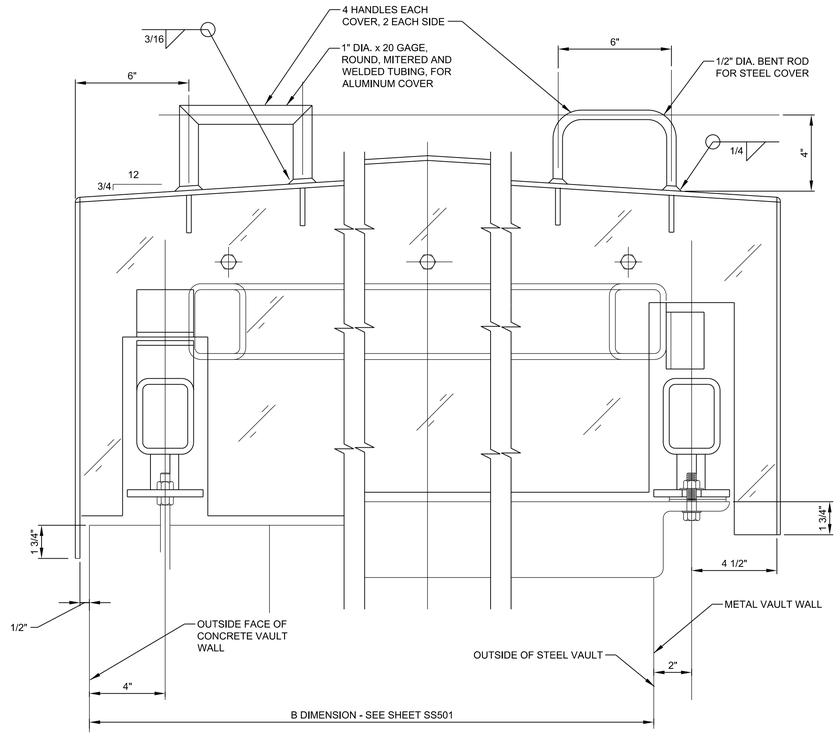
SS502



E7 SECTION
SCALE: 3" = 1'-0"



E9 SECTION
SCALE: 3" = 1'-0"



A7 SECTIONAL END ELEVATION
SCALE: 3" = 1'-0"

0 3" 6" 1'

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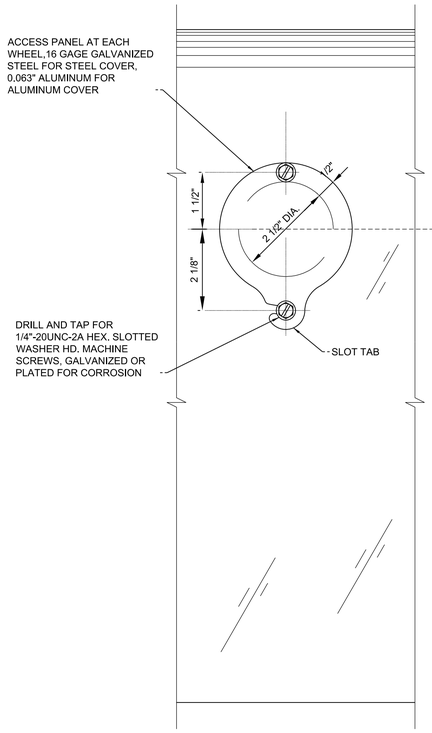
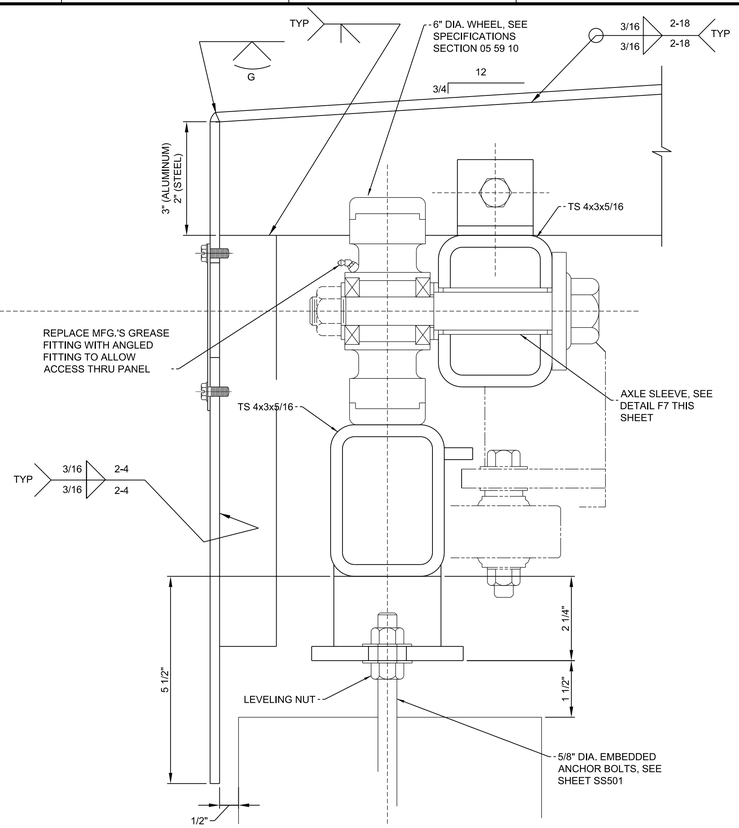
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

VAULT ROLLING COVER DETAILS
SHEET 3 OF 5

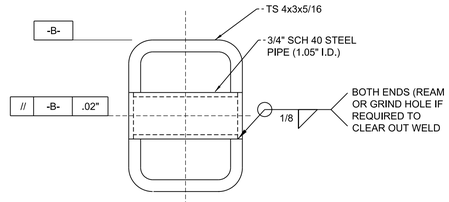
SHEET ID
SS503



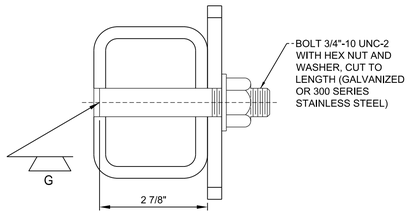
D1 EXTERIOR SIDE VIEW
SCALE: NTS



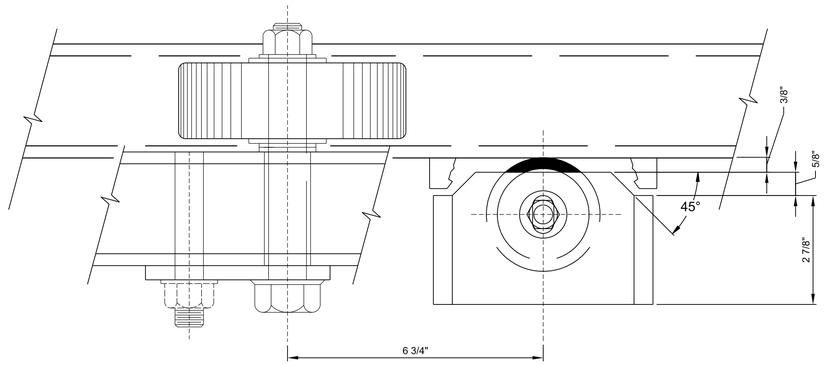
D4 AT PIER AND CONCRETE VAULT WALL
SCALE: NTS



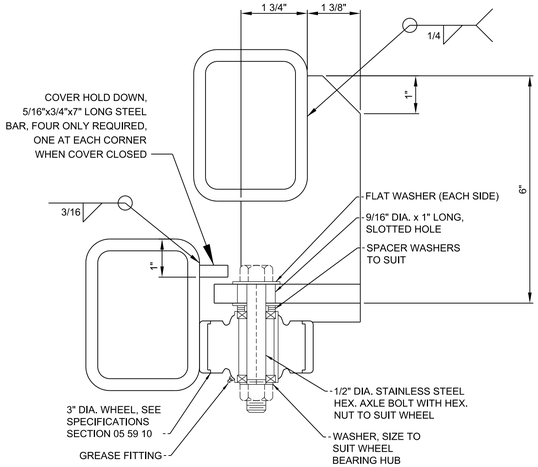
F7 AXLE SLEEVE
SCALE: NTS



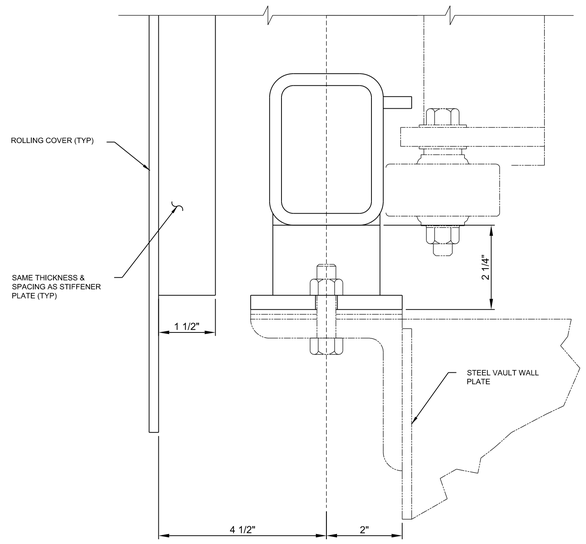
F9 SECTION
SCALE: NTS



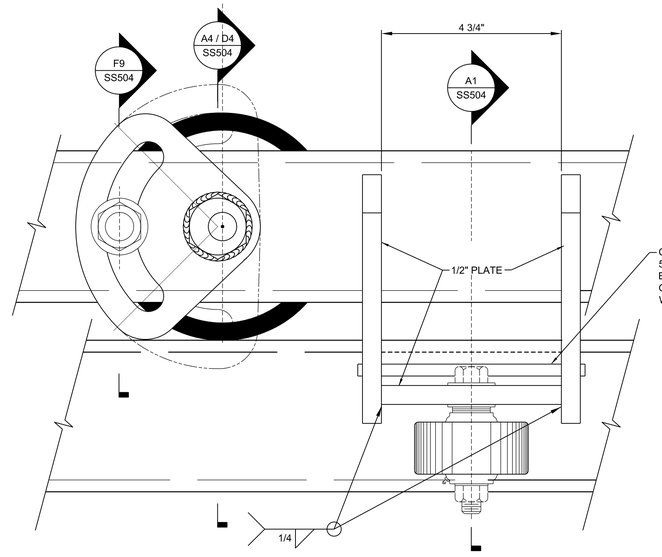
D7 PARTIAL PLAN
SCALE: NTS



A1 SECTION
SCALE: NTS



A4 AT METAL VAULT
SCALE: NTS



A7 ROLLING COVER WHEEL DETAILS
SCALE: NTS

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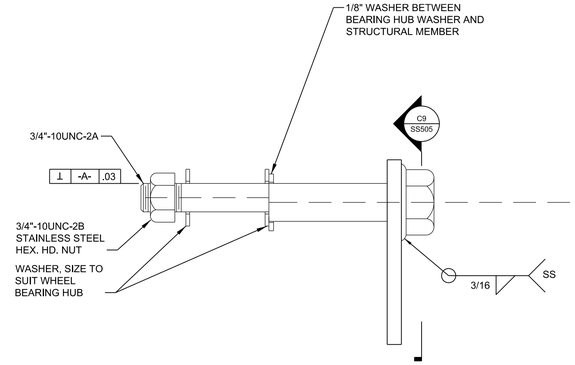
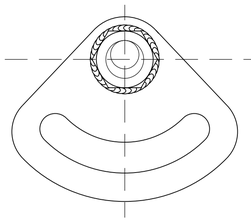
DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

VAULT ROLLING COVER DETAILS
SHEET 4 OF 5

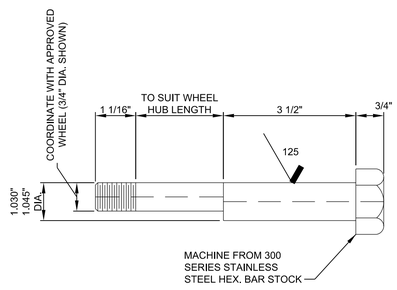
SHEET ID
SS504



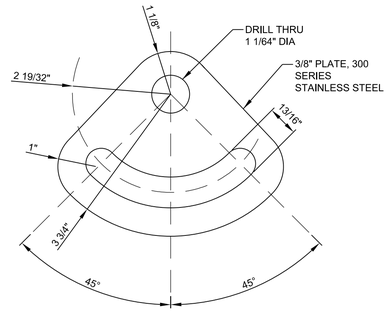
C6 ECCENTRIC AXLE ASSEMBLY
SCALE: NTS



C9 ECCENTRIC AXLE SECTION
SCALE: NTS



A6 ECCENTRIC BOLT
SCALE: NTS



A9 ADJUSTER
SCALE: NTS

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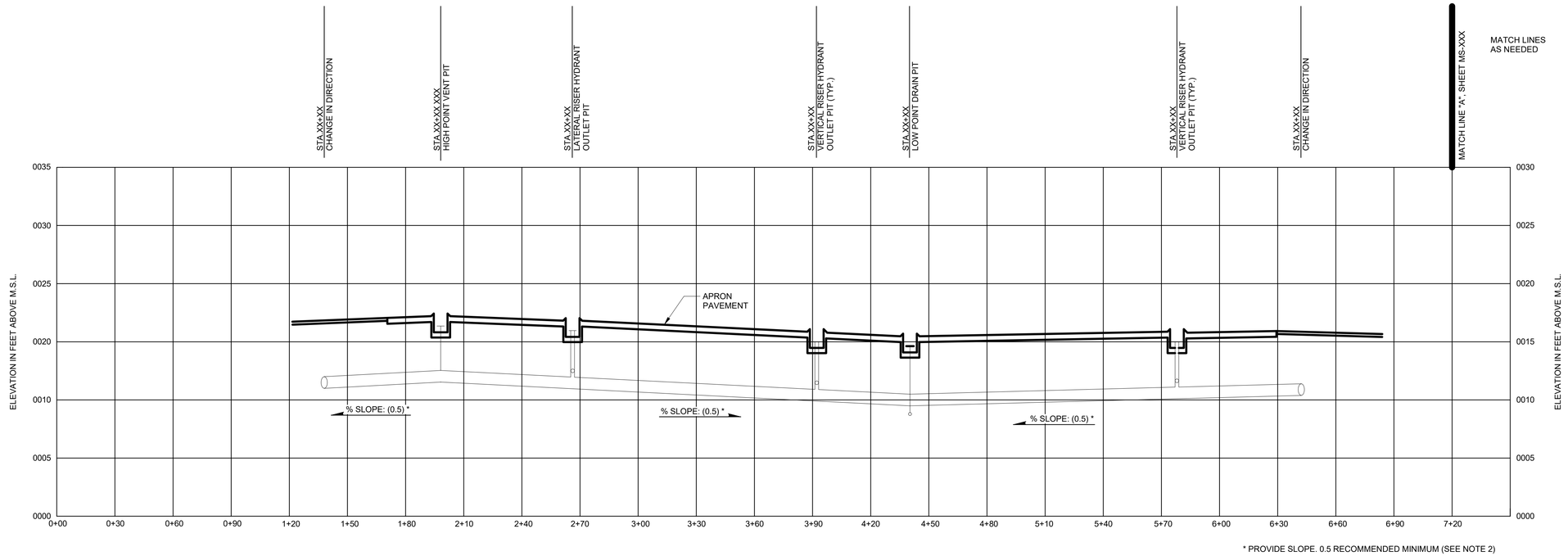
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

VAULT ROLLING COVER DETAILS
SHEET 5 OF 5

SHEET ID
SS505



* PROVIDE SLOPE. 0.5 RECOMMENDED MINIMUM (SEE NOTE 2)

D1 FUEL LINE PROFILE

SCALE: VERTICAL: 1" = 5'-0"
HORIZONTAL: 1" = 30'-0"

0 2.5' 5' 10'

0 15' 30' 60'

NOTES TO DESIGNER:

1. WHERE LOW POINT DRAINS AND/OR HIGH POINT VENTS ARE LOCATED NEAR HYDRANT OUTLET PITS. THE VENT/DRAIN PIPING MAY BE LOCATED IN THE OUTLET PIT.
2. PIPE PROFILES ARE REQUIRED FOR ALL PIPING THAT CONTAINS FUEL.
3. IF SLOPE IS LESS THAN 0.2%, A PIGGING STATION MUST BE PROVIDED. A MINIMUM OF ONE DRAIN FOR MAINTENANCE SHALL ALSO BE PROVIDED.

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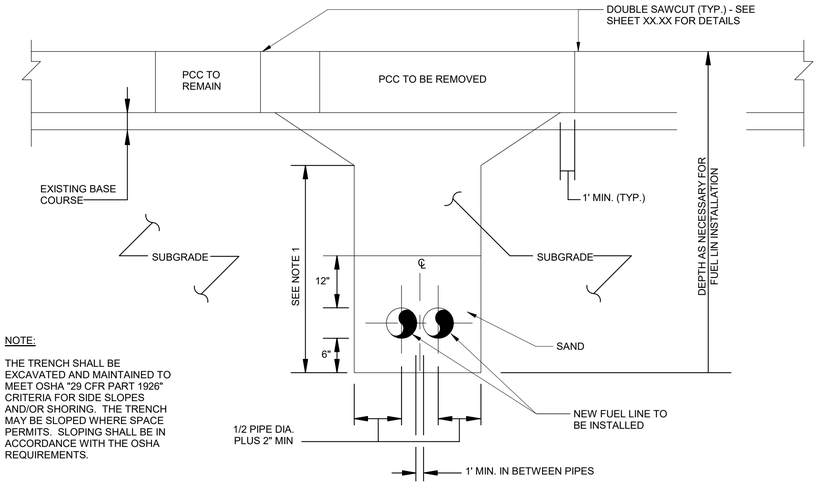
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL LINE PROFILE

SHEET ID

MS201

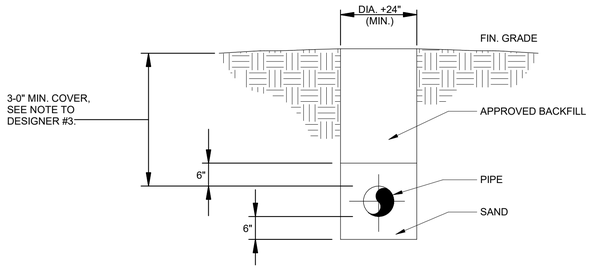


NOTE:

THE TRENCH SHALL BE EXCAVATED AND MAINTAINED TO MEET OSHA "29 CFR PART 1926" CRITERIA FOR SIDE SLOPES AND/OR SHORING. THE TRENCH MAY BE SLOPED WHERE SPACE PERMITS. SLOPING SHALL BE IN ACCORDANCE WITH THE OSHA REQUIREMENTS.

E1 UNDER PAVEMENT DOUBLE PIPE TRENCH DETAIL

SCALE: NTS



NOTE:

ANGLE OF REPOSE FOR TRENCH SHALL BE BASED ON ACTUAL SOIL CONDITIONS AND TRENCH DEPTH.

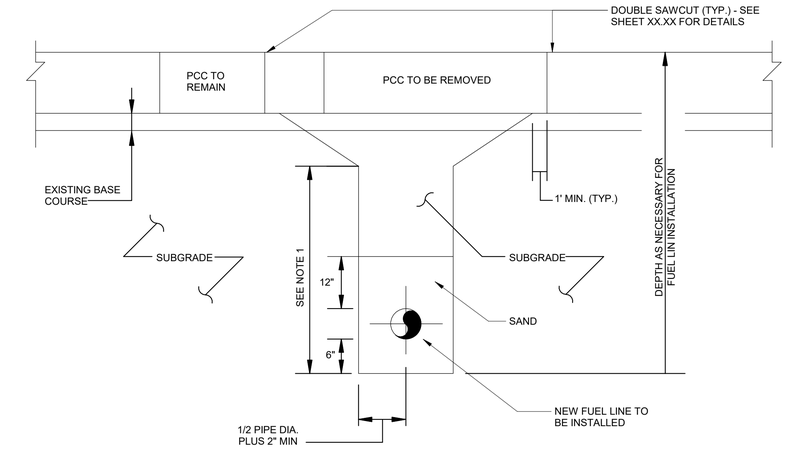
NOTES TO DESIGNER:

1. MINIMUM COVER ON PIPING SHALL BE THE LARGER OF 3'-0", 1'-6" BELOW BOTTOM OF RIGID PAVEMENT, BELOW SUBGRADE, OR BELOW FROST LINE. INCREASE DEPTH OF COVER AS REQUIRED TO SUIT DESIGN CONDITIONS INCLUDING LIVE AND DEAD LOADS, TYPE OF PIPE, CONSTRUCTION CONDITIONS, BACKFILL MATERIAL, AND PAVEMENT DESIGN.
2. MINIMUM SEPARATION IS 1'-0". IF ONE OF THE PIPES IS LARGER THAN 16" IN DIAMETER, MINIMUM SEPARATION SHALL BE THE DIMENSION OF THE LARGEST PIPE. COORDINATE WITH CATHODIC PROTECTION REQUIREMENTS.
3. ARMY TM 5-813-5, PARAGRAPH 3.2.E REQUIRES THAT CASING BE PROVIDED FOR PRESSURE WATER LINES UNDER AIRCRAFT PAVEMENT (WHERE AIRCRAFT TAXI UNDER THEIR OWN POWER). HOWEVER, NO REGULATIONS COVER FUEL LINES UNDER AIRCRAFT PAVEMENT. IT MIGHT BE A GOOD IDEA TO REQUIRE CASING FOR CRITICAL TAXIWAYS AND RUNWAYS. CASING PIPE FOR FUEL LINES UNDER CRITICAL TAXIWAYS AND RUNWAYS SHALL BE EVALUATED ON A CASE BY CASE CONSIDERATION, BUT ARE NOT REQUIRED.

E6 SINGLE PIPE TRENCH DETAIL

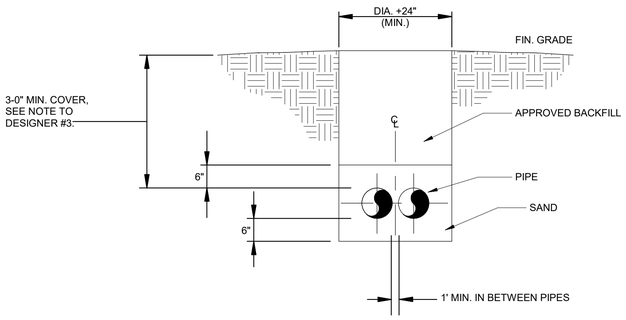
SCALE: 1/2" = 1'-0"

0 1' 2' 4'



B1 UNDER PAVEMENT SINGLE PIPE TRENCH DETAIL

SCALE: NTS



B6 DOUBLE PIPE TRENCH DETAIL

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

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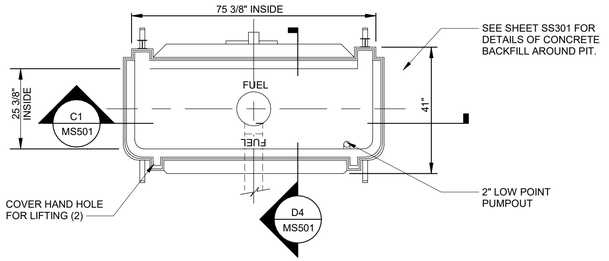
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL LINE DETAILS

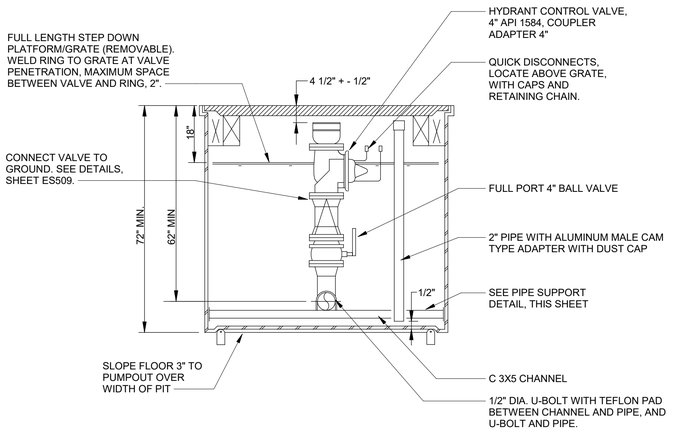
SHEET ID

MS202



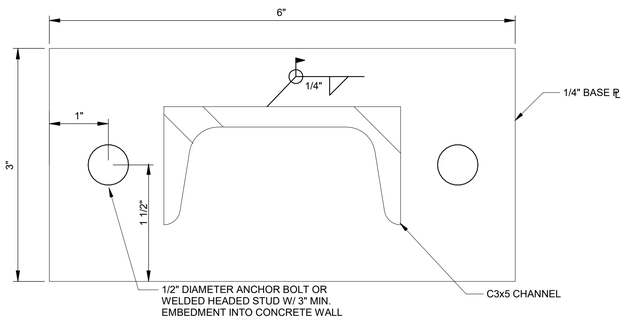
F1 HYDRANT OUTLET PIT DETAIL (FOR HYDRANT HOSE TRUCK)

SCALE: NTS



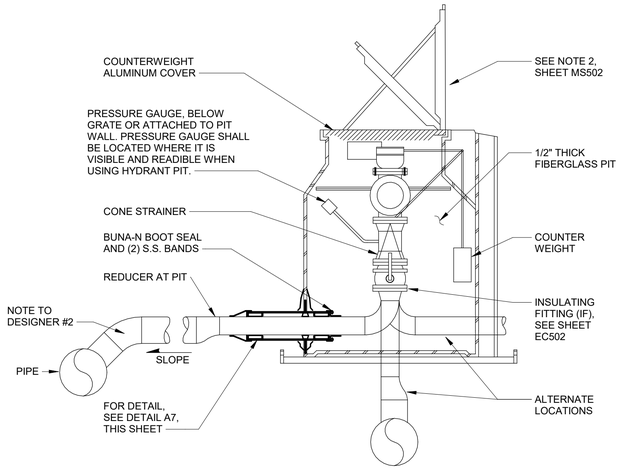
C1 HYDRANT OUTLET PIT

SCALE: NTS



A1 PIT PIPE SUPPORT DETAIL

SCALE: NTS



D4 HYDRANT OUTLET PIT SECTION

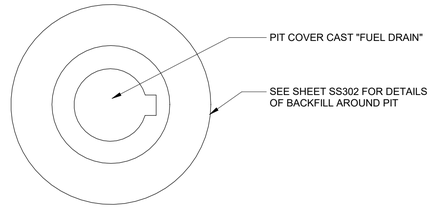
SCALE: NTS

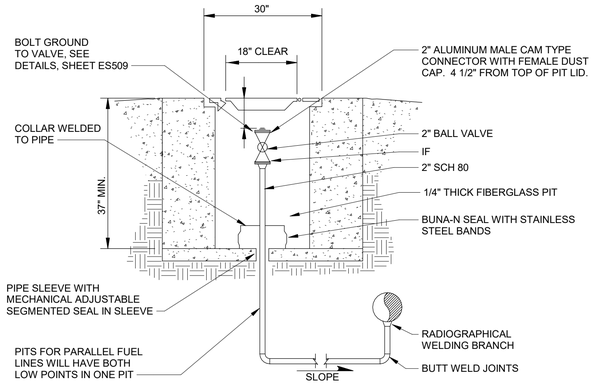
NOTES:

1. FOR GENERAL NOTES, SEE SHEET MS502.

NOTES TO DESIGNER:

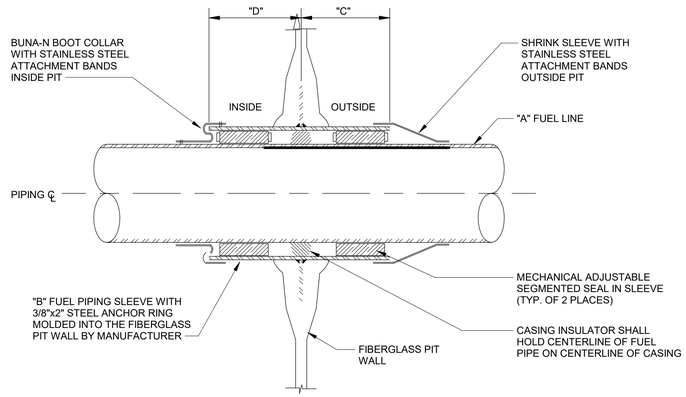
1. ALL PITS SHOWN ON THIS SHEET ARE FOR ON-APRON OR ON-SHOULDER USE.
2. BRANCH LINE SIZE IS SIZED PER SURGE ANALYSIS.





D7 TYPICAL LOW POINT DRAIN PIT

SCALE: NTS



"A" FUEL PIPE DIAMETER	"B" SLEEVE PIPE DIAMETER	"C" SLEEVE LENGTH EXTERIOR	"D" SLEEVE LENGTH INTERIOR
3"	6"	16"	4"
4"	8"	16"	4"
12"	16"	18"	4"

A7 FIBERGLASS PIT WALL PENETRATION

SCALE: NTS

US Army Corps of Engineers ®

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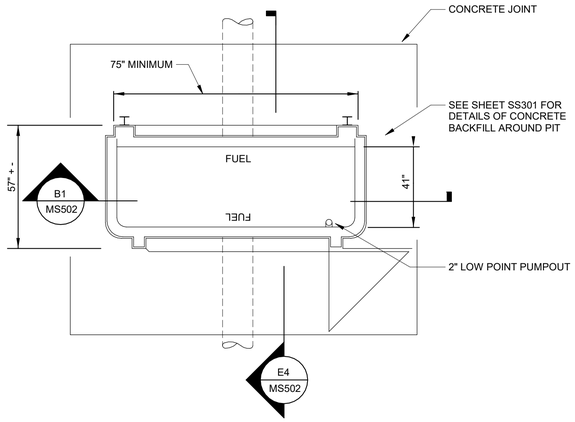
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL PIT DETAILS (ON APRON)

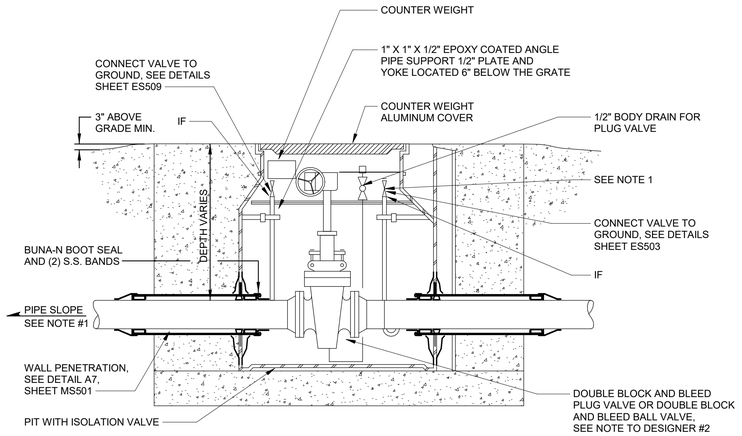
SHEET ID

MS501



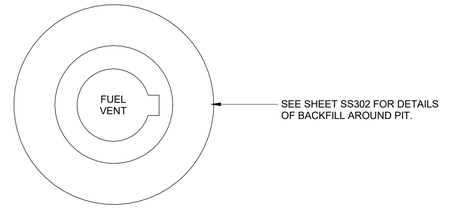
E1 ISOLATION VALVE PIT DETAIL

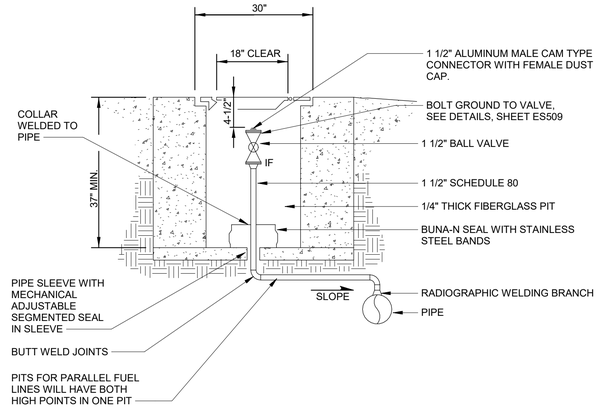
SCALE: NTS



E4 ISOLATION VALVE PIT SECTION

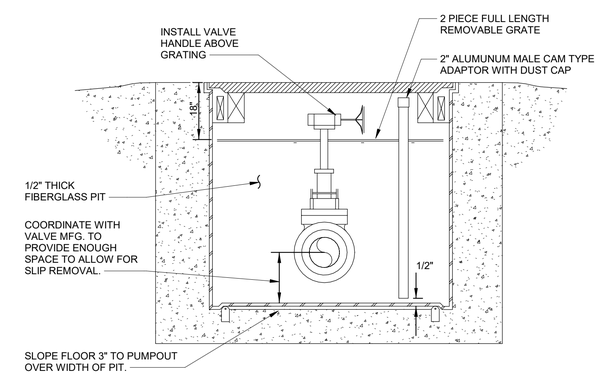
SCALE: NTS





D8 TYPICAL HIGH POINT VENT PIT

SCALE: NTS



B1 ISOLATION VALVE PIT

SCALE: NTS

NOTES:

1. PROVIDE A 1 1/2" HIGH POINT VENT AND A 2" LOW POINT DRAIN WITH INSULATING FLANGES AT EACH ISOLATION PIT WITH THE DRAIN CONNECTIONS AT THE HIGHER SIDE OF THE VALVE WHEN LOOKING AT THE SLOPE OF PIPE, (AT THE VALVE) AND THE VENT CONNECTION AT THE LOWER SIDE OF THE VALVE. VENT AND DRAIN SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND VALVES AND QUICK DISCONNECTS SHALL BE LOCATED ABOVE THE GRATE. PROVIDE A 1/8" THICK BUNA-N WRAP AROUND THE VENT AND DRAIN PIPE AT THE SUPPORTS.
2. PIT LID HINGE TO BE PARALLEL TO THE AIRCRAFT CENTERLINE AND LID TO OPEN TOWARD THE AIRCRAFT (OR AS DIRECTED BY THE SME).
3. PIT SERVICE SHALL BE INTEGRALLY CAST WITH 1/16" LETTERS ON THE PIT LID.

NOTES TO DESIGNER:

1. SEE SHEET MS501 FOR NOTES TO DESIGNERS.
2. CHANGE PIT FOR PIGGABLE SYSTEM.
3. PROVIDE A PRESSURE RELIEF VALVE AROUND THE PLUG VALVE. THE DIRECTION OF RELIEF SHALL DEPEND ON THE DIRECTION OF OTHER RELIEFS OR A PRODUCT RECOVERY TANK. ENSURE THE CASCADING PRESSURES DON'T ADD UP TO MORE THAN THE PIPING PRESSURE CLASS.

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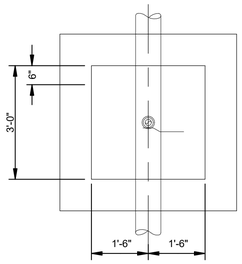
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL PIT DETAILS (ON APRON)

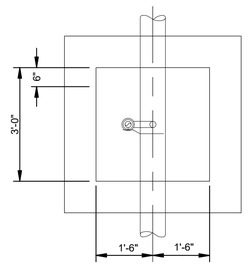
SHEET ID

MS502



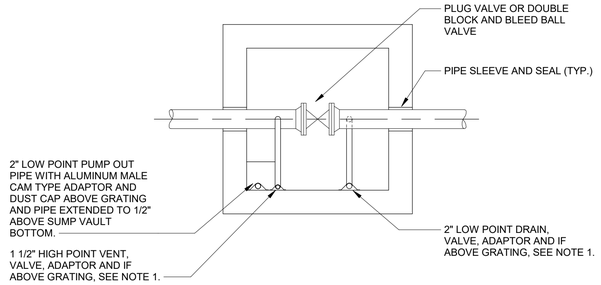
F1 HIGH POINT VENT VAULT PLAN

SCALE: NTS



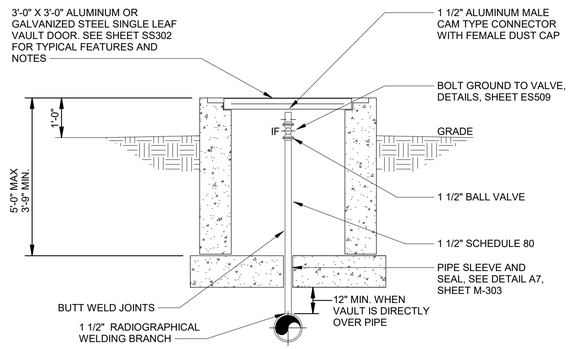
F4 LOW POINT VENT VAULT PLAN

SCALE: NTS



F7 ISOLATION VALVE VAULT PLAN

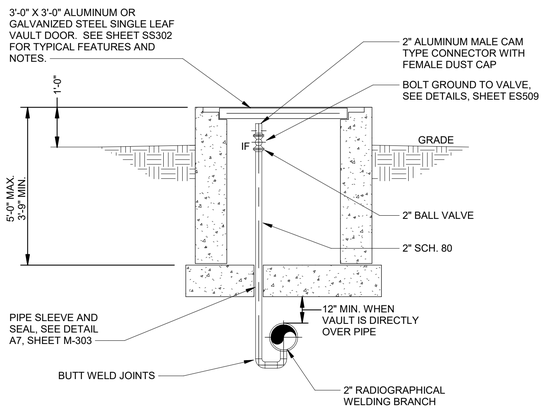
SCALE: NTS



C1 HIGH POINT VENT VAULT ELEVATION

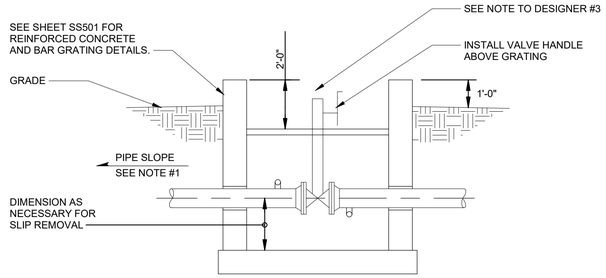
SCALE: NTS

NOTE: SITE FROST DEPTH FOR BOTTOM OF VAULT.



C4 LOW POINT VENT VAULT ELEVATION

SCALE: NTS



C7 ISOLATION VALVE VAULT ELEVATION

SCALE: NTS

NOTES:

1. PROVIDE A 1 1/2" HIGH POINT VENT AND A 2" LOW POINT DRAIN WITH INSULATING FLANGES AT EACH ISOLATION VAULT WITH THE DRAIN CONNECTIONS AT THE HIGHER SIDE OF THE VALVE WHEN LOOKING AT THE SLOPE OF PIPE AND THE VENT CONNECTION AT THE LOWER SIDE OF THE VALVE. VENT AND DRAIN SHALL BE IN ACCORDANCE WITH SPECIFICATIONS AND VALVES AND QUICK DISCONNECTS SHALL BE LOCATED ABOVE THE GRATE. PROVIDE A 1/8" THICK BUNA-N, RAP AROUND THE VENT AND DRAIN PIPE AT THE SUPPORTS.
2. ALL VAULT LIDS SHALL BE MARKED WITH THE NAME OF THE VAULT.

VAULT NOTES:

1. SEE STRUCTURAL SHEET SS103 FOR ROLLING VAULT COVER.

NOTES TO DESIGNER:

1. ALL VAULTS SHOWN ON THIS SHEET ARE FOR OFF-SHOULDER AND OFF APRON AREAS. PROVIDE FIBERGLASS LINER IF DIRECTED BY SME. SEE DETAILS ON SHEET SS501 AND SS302.
2. REINFORCED CONCRETE FOR THE VAULT SHALL BE DESIGNED FOR SITE SPECIFIC LOADINGS INCLUDING THE EFFECTS OF LATERAL EARTH PRESSURE, HYDROSTATIC PRESSURE AND THE EFFECTS OF SURCHARGE. DESIGN OF THE VAULT SHALL INCORPORATE THE USE OF WATERSTOPS AT CONSTRUCTION JOINTS, ON THE FORM TIES, AND INCREASED CONCRETE COVER ON REBAR TO PREVENT CORROSION. SEE SHEETS SS301 THROUGH SS305 FOR TYPICAL DETAILS. WHERE THE SOILS INVESTIGATION INDICATES THE WATER TABLE MAY RISE ABOVE THE FLOOR OF THE VAULT OR WHERE PREVIOUS EXPERIENCE INDICATES WATER LEAKAGE HAS BEEN A PROBLEM IN BELOW GRADE STRUCTURES, ADDITIONAL MEASURES MAY BE REQUIRED TO CONTROL MOISTURE INFILTRATION INTO THE VAULT.
3. PROVIDE AN ALUMINUM ROLLING VAULT COVER (OR GALVANIZED STEEL LEAF VAULT DOOR IF DIRECTED BY SME).
4. FOR AIRFIELD CLEAR ZONES, REDUCE VAULTS FROM 1'-0" ABOVE GRADE TO 3" ABOVE GRADE.
5. PROVIDE LATERAL BRACING FOR SMALL BORE PIPING THAT EXCEEDS 8' IN LENGTH.

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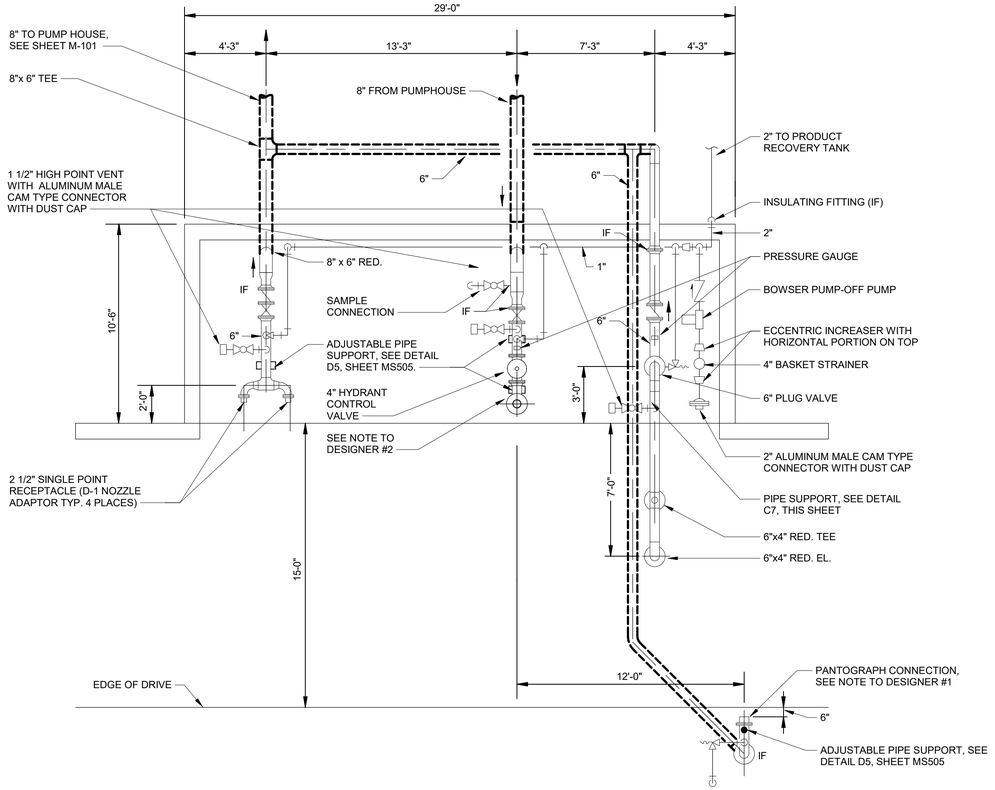
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL VAULT DETAILS (OFF APRON)

SHEET ID

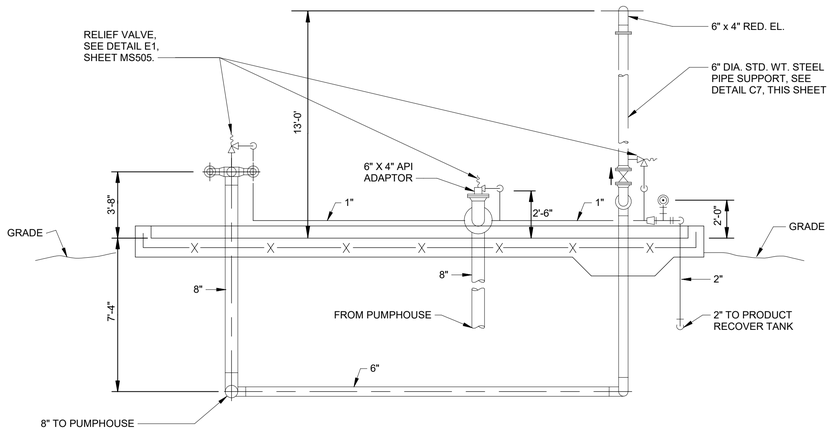
MS503



D1 HYDRANT HOSE TRUCK CHECK-OUT / PANTOGRAPH FLUSH STATION PLAN

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

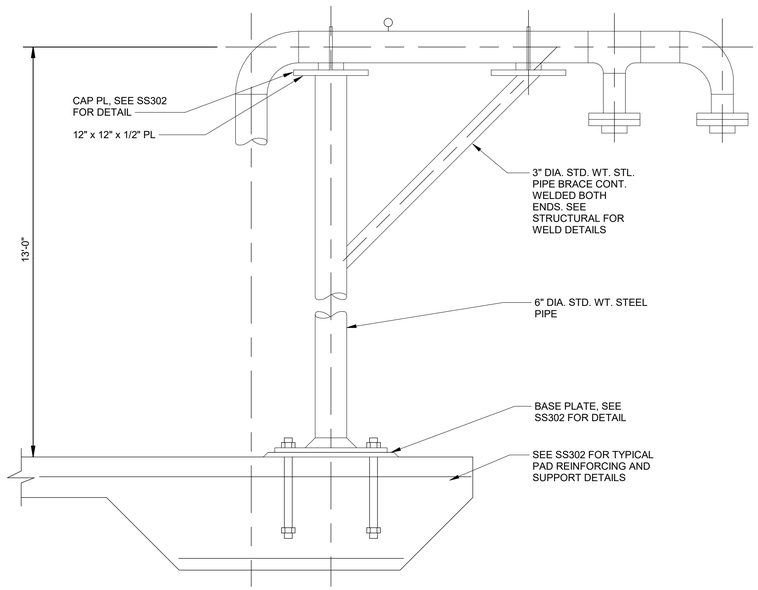
0 2' 4' 8'



A1 HYDRANT HOSE TRUCK CHECK-OUT/PANTOGRAPH FLUSH STATION ELEVATION

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

0 2' 4' 8'



B6 PIPE SUPPORT ELEVATION

SCALE: NTS

NOTES TO DESIGNER:

1. DELETE PANTOGRAPH LINE IF PANTOGRAPHS ARE NOT USED.
2. USE 45 DEG. ELBOW INSTEAD OF 90 DEG. FOR PANTOGRAPH FLUSH STATION.

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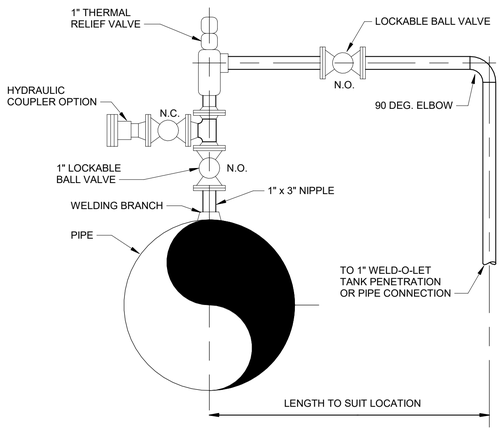
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

HYDRANT HOSE TRUCK CHECK-OUT/PANTOGRAPH FLUSH DETAILS

SHEET ID

MS504

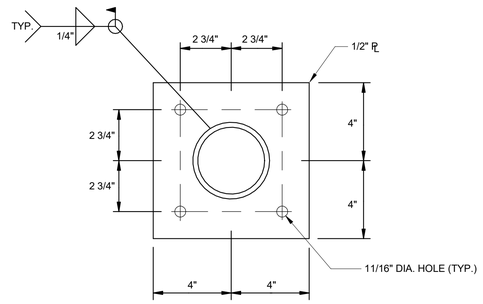


NOTE:

ALL FITTINGS TO BE SOCKET-WELD TYPE (INCLUDING THE WELDING BRANCH) EXCEPT AS INDICATED, ALL VALVES SHALL BE FLANGED.

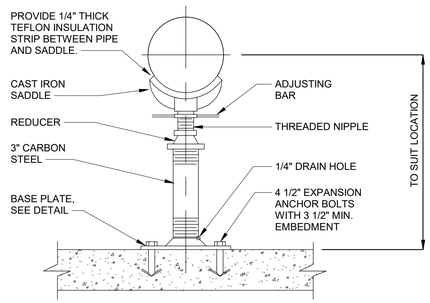
E1 THERMAL RELIEF VALVE PIPING

SCALE: NTS



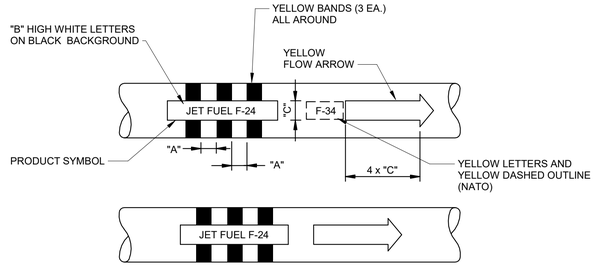
F5 ADJUSTABLE SADDLE BASE PLATE

SCALE: NTS



D5 ADJUSTABLE SADDLE SUPPORT DETAIL

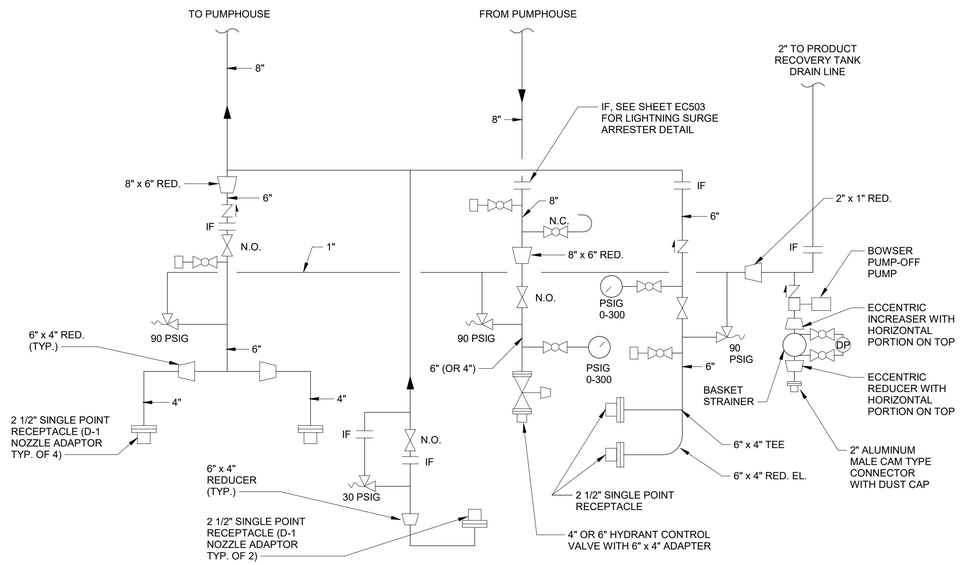
SCALE: NTS



SIZES OF LETTERS AND BANDS			
PIPE DIAMETER (INCHES)	A BAND WIDTH AND SPACING (INCHES)	B TITLE LETTER SIZE (INCHES)	C BACKGROUND AND ARROWS (INCHES)
UNDER 3	3	0.5	1
3 - 6	3	1	2
6 - 9	3	2	3
OVER 9	4	3	4.5

E8 PRODUCT FLOW SYMBOL DETAILS

SCALE: NTS



A5 HYDRANT HOSE TRUCK CHECK-OUT / PANTOGRAPH FLUSH STATION PIPING DIAGRAM

SCALE: NTS

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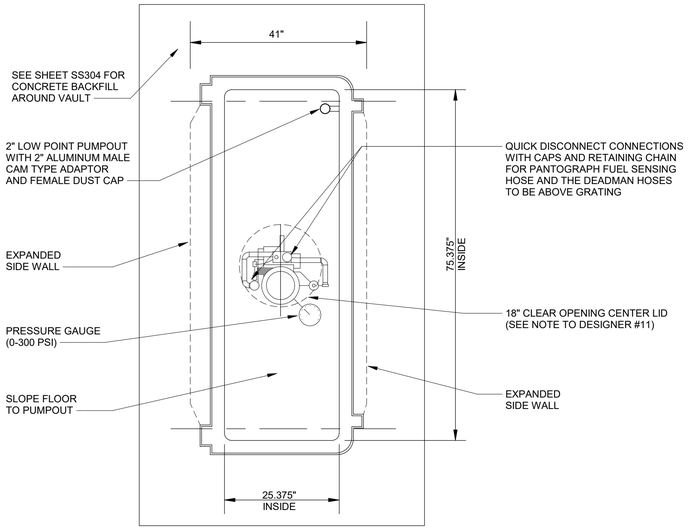
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

HYDRANT HOSE TRUCK CHECK-OUT/PANTOGRAPH FLUSH DETAILS

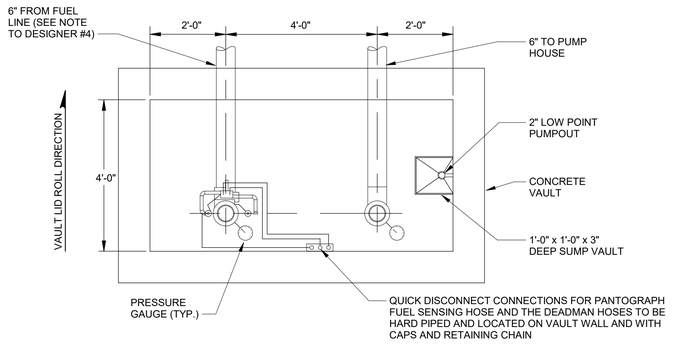
SHEET ID

MS505



E1 PANTOGRAPH HYDRANT OUTLET VAULT PLAN

SCALE: NTS



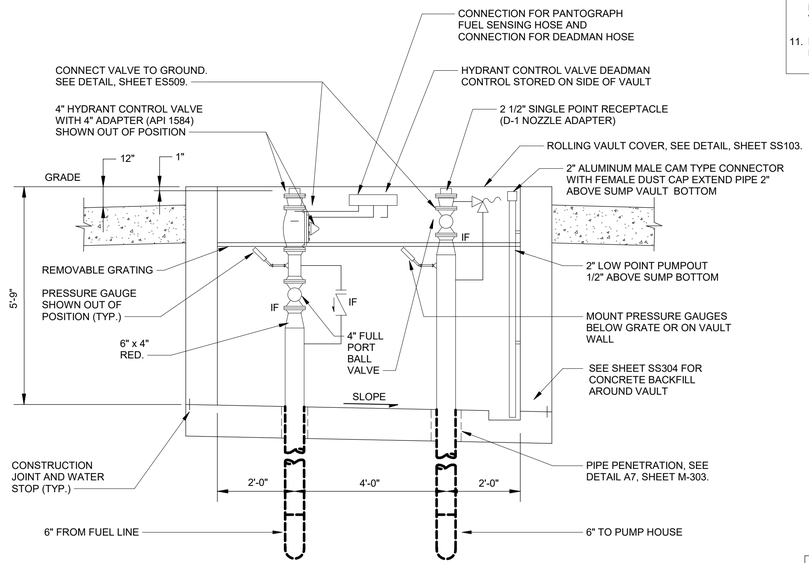
F5 PANTOGRAPH FLUSHING CONNECTION PLAN

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES TO DESIGNER:

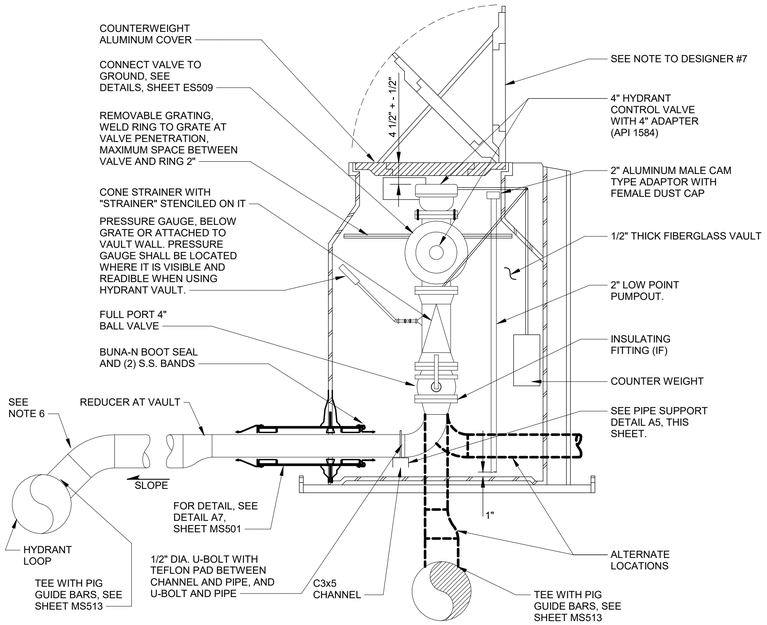
1. VAULT SERVICE SHALL BE INTEGRALLY CAST WITH 1/16" DEEP LETTERS.
2. METHOD OF VAULT DRAINAGE SHALL BE AS DETERMINED BY THE SME.
3. IF ANY VAULT DEPTH EXCEEDS 5'-0" A/E/ SHALL PROVIDE EXHAUST FANS FOR VENTILATION IF DIRECTED BY THE SME. IF SO DIRECTED, DUCT FAN TO DRAW AIR 6" ABOVE VAULT FLOOR.
4. PIPING MAY BE ABOVEGROUND IF EQUIPMENT FITS OVER ADAPTORS.
5. THESE VAULTS ARE USED WHEN PANTOGRAPHS ARE USED IN PLACE OF HYDRANT HOSE TRUCKS AND AS DIRECTED BY SME.
6. BRANCH LINE SIZE AS INDICATED UNLESS SURGE ANALYSIS INDICATES LARGER.
7. VAULT LID HINGE TO BE PARALLEL TO THE AIRCRAFT CENTERLINE AND LID TO OPEN TOWARD THE AIRCRAFT OR AS DIRECTED BY THE SME. SEE SHEET CS601.
8. PROVIDE LEAK DETECTION PIPE AS DIRECTED APPLICABLE GOVERNING STANDARDS.
9. ALL VAULTS SHOWN ON THIS SHEET ARE FOR ON-APRON OR ON SHOULDER USE.
10. REINFORCED CONCRETE FOR THE PANTOGRAPH FLUSH VAULT SHALL BE DESIGNED FOR SITE SPECIFIC LOADINGS INCLUDING THE EFFECTS OF LATERAL EARTH PRESSURE, HYDROSTATIC PRESSURE AND THE EFFECTS OF SURCHARGE. DESIGN OF THE VAULT SHALL INCORPORATE THE USE OF WATERSTOPS AT CONSTRUCTION JOINTS, ON THE FORM TIES, AND INCREASED CONCRETE COVER ON REBAR TO PREVENT CORROSION. SEE SHEET SS304 FOR TYPICAL DETAILS. WHERE THE SOILS INVESTIGATION INDICATES THE WATER TABLE MAY RISE ABOVE THE FLOOR OF THE VAULT OR WHERE PREVIOUS EXPERIENCE INDICATES WATER LEAKAGE HAS BEEN A PROBLEM IN BELOW GRADE STRUCTURES, ADDITIONAL MEASURES MAY BE REQUIRED TO CONTROL MOISTURE INFILTRATION INTO THE VAULT. VAULT WALL THICKNESS SHALL BE INCREASED IF REQUIRED TO MEET DESIGN CRITERIA.
11. PROVIDE THE PANTOGRAPH HYDRANT OUTLET COVER WITH A CENTER OPENING LID IF DIRECTED BY SME.



C5 PANTOGRAPH FLUSHING CONNECTION SECTION

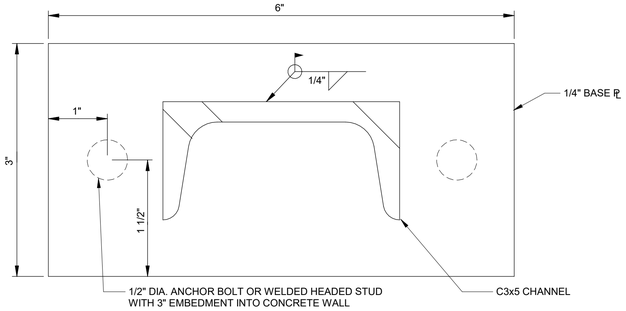
SCALE: 1/2" = 1'-0"

0 1' 2' 4'



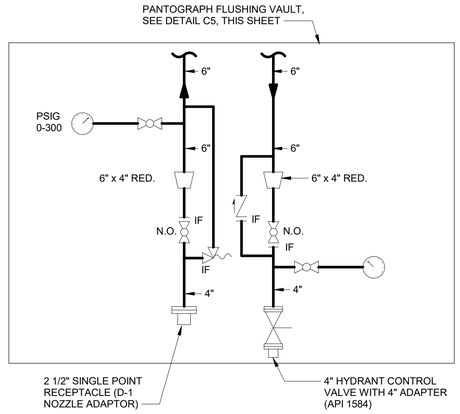
A1 PANTOGRAPH HYDRANT OUTLET VAULT SECTION

SCALE: NTS



A5 VAULT OUTLET PIPE SUPPORT DETAIL

SCALE: NTS



A8 PANTOGRAPH FLUSHING CONNECTION

SCALE: NTS

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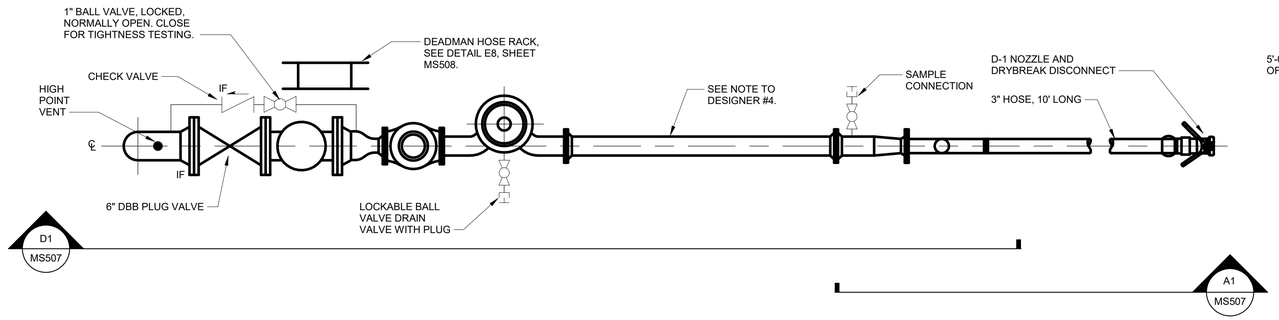
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

DETAILS

SHEET ID

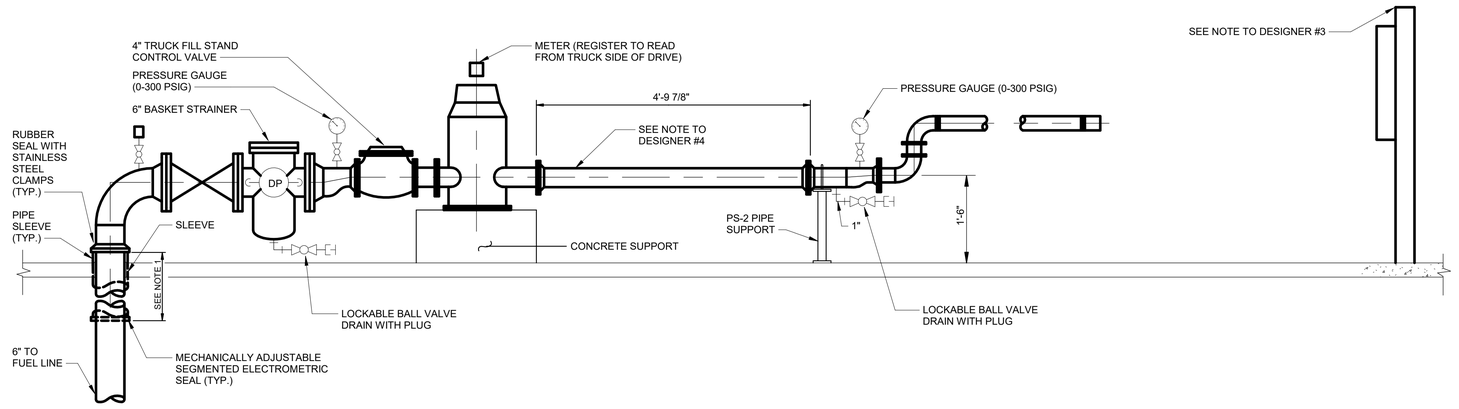
MS506



F1 TRUCK FILL STAND PLAN (WITH HOSE)

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

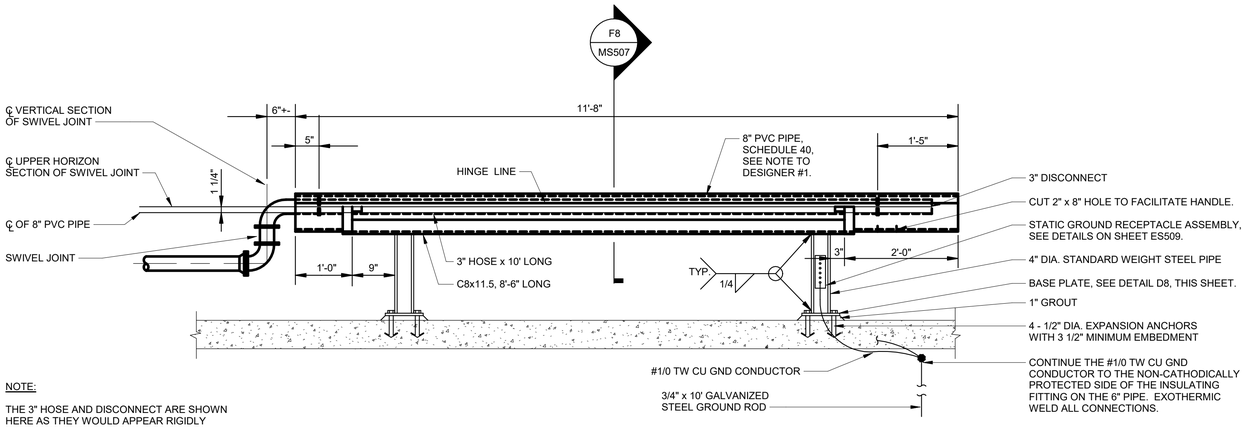
0 1' 2' 4'



D1 TRUCK FILL STAND

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

0 1' 2' 4'



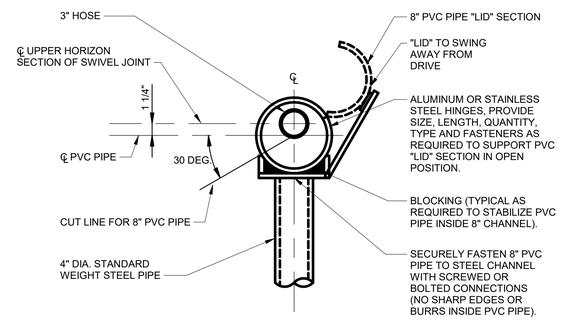
NOTE:

THE 3" HOSE AND DISCONNECT ARE SHOWN HERE AS THEY WOULD APPEAR RIGIDLY EXTENDED FROM THE FLANGED SWIVEL JOINT. THE FLEXIBLE HOSE WILL ACTUALLY LAY IN THE BOTTOM OF THE PVC PIPE.

A1 TRUCK FILL STAND HOSE

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

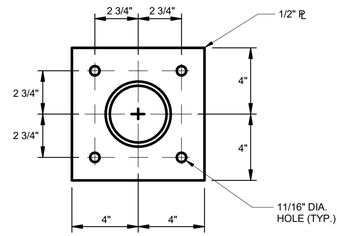
0 1' 2' 4'



F8 TRUCK FILL STAND HOSE RACK

SCALE: 1-1/2" = 1'-0"

0 1' 2' 4'



D8 BASE PLATE DETAIL

SCALE: NTS

NOTES TO DESIGNER:

1. HOSE HOLDER MUST BE S.S., ALUMINUM, OR PVC PER SME.
2. PANTOGRAPH OR HOSE PER SME.
3. PROVIDE GROUND PROVING/TRUCK OVERFILL DEVICE AS DIRECTED BY SME.
4. CONSULT WITH SME TO DETERMINE REQUIREMENTS FOR SPOOL PIECE OR INJECTOR AND BYPASS.
5. ALL PRESSURE GAUGES, DIFFERENTIAL PRESSURE GAUGES, STATIC GROUND RECEPTACLES, AND SAMPLE CONNECTIONS SHALL BE VISIBLE AND USABLE FROM THE TRUCK SIDE.
6. A PILOT OPERATED RELIEF VALVE (PORV) IS ACCEPTABLE IN LIEU OF THE CHECK VALVE RELIEF WITH ISOLATION VALVE AT TRUCK FILLSTANDS.

NOTES:

1. THE TOP OF THE SLEEVE SHALL BE A MINIMUM OF 6" ABOVE GRADE AND THE BOTTOM OF THE SLEEVE SHALL BE BELOW FROST.

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CONTRACT NO.:

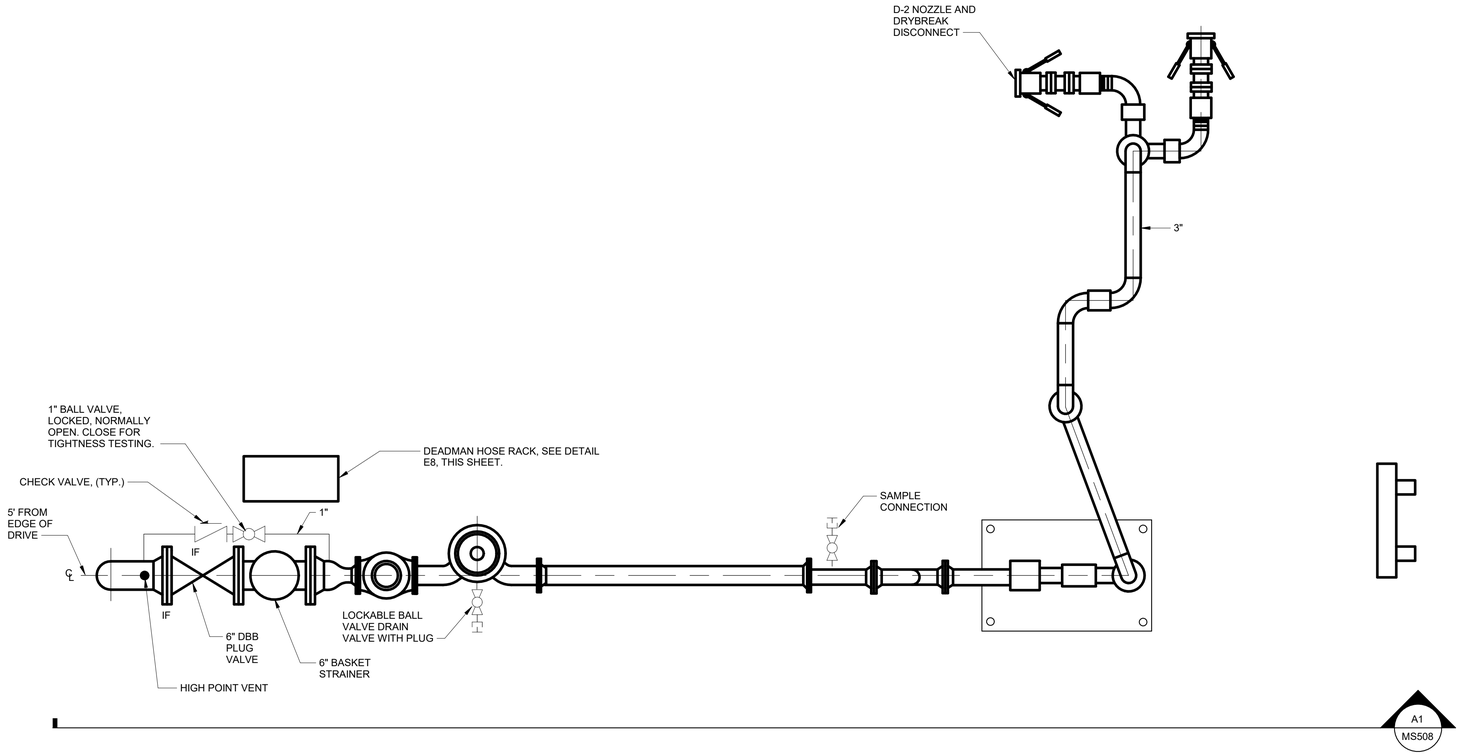
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

TRUCK FILL STAND DETAILS

SHEET ID

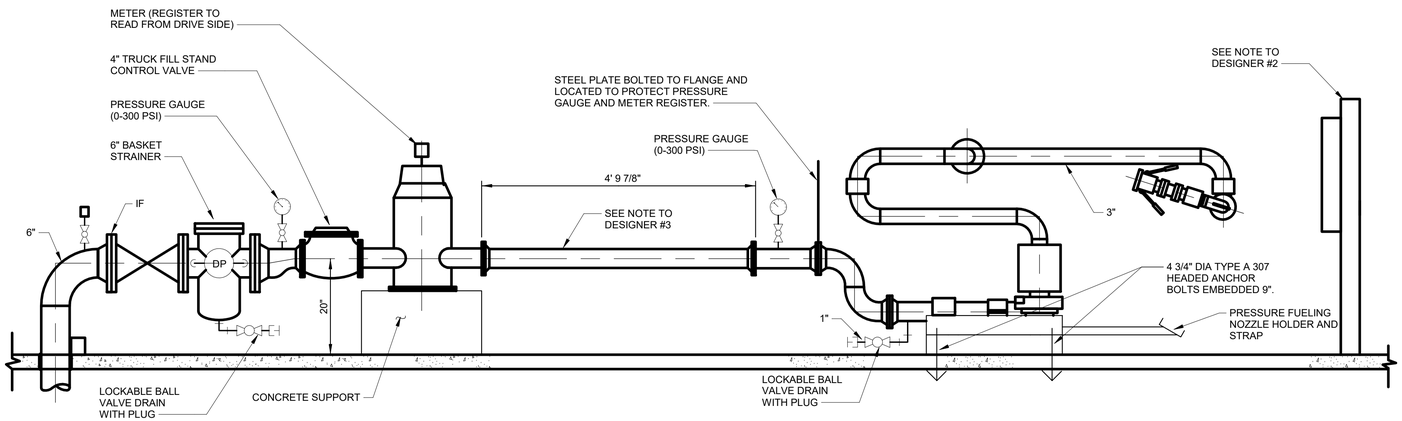
MS507



D1 TRUCK FILL STAND PLAN (WITH PANTOGRAPH)

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

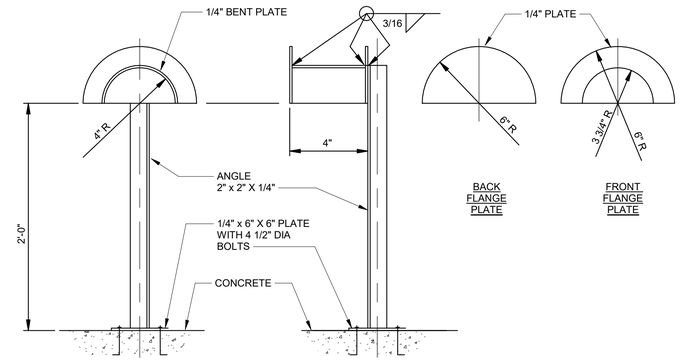
0 1' 2' 4'



A1 TRUCK FILL STAND (WITH PANTOGRAPH)

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

0 1' 2' 4'



E8 HOSE RACK DETAIL

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'

NOTES TO DESIGNER:

1. SEE SHEET MS507 FOR DESIGNER NOTES.
2. PROVIDE GROUND PROVING/TRUCK OVERFILL DEVICE AS DIRECTED BY SME.
3. CONSULT WITH SME TO DETERMINE REQUIREMENTS FOR SPOOL PIECE OR INJECTOR AND BYPASS.
4. A PILOT OPERATED RELIEF VALVE (PORV) IS ACCEPTABLE IN LIEU OF THE CHECK VALVE RELIEF WITH ISOLATION VALVE AT TRUCK FILLSTANDS.

NOTES:

1. THE TOP OF THE SLEEVE SHALL BE A MINIMUM OF 6" ABOVE GRADE AND THE BOTTOM OF THE SLEEVE SHALL BE BELOW FROST.

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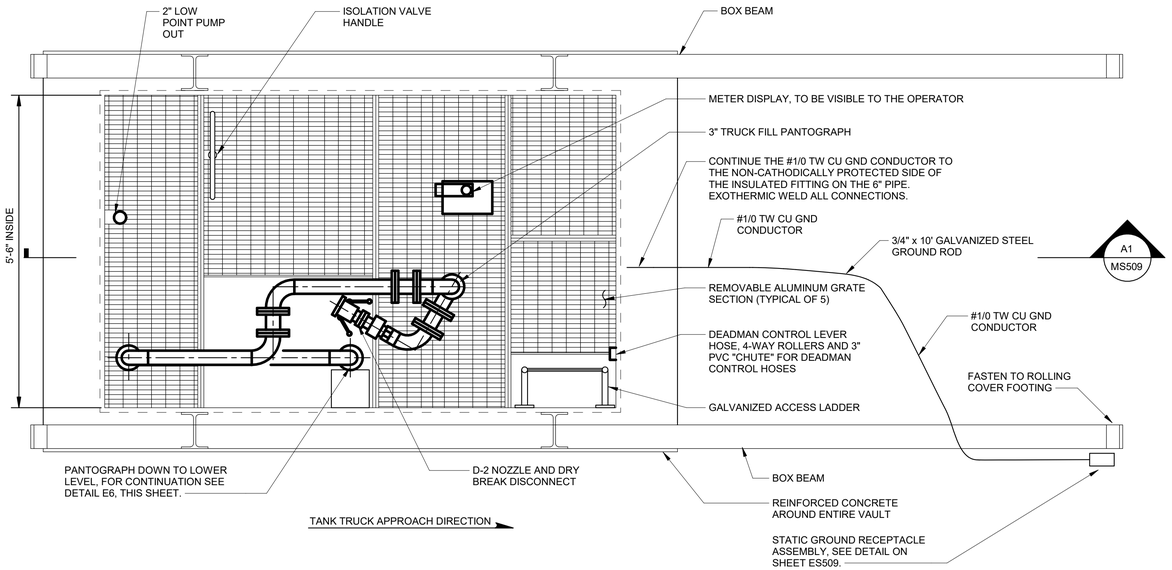
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

TRUCK FILL STAND DETAILS

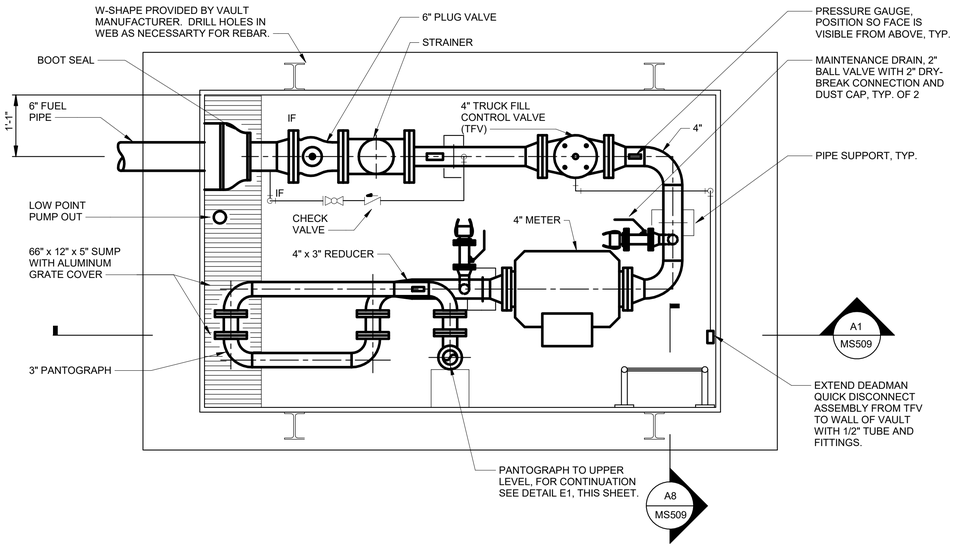
SHEET ID

MS508



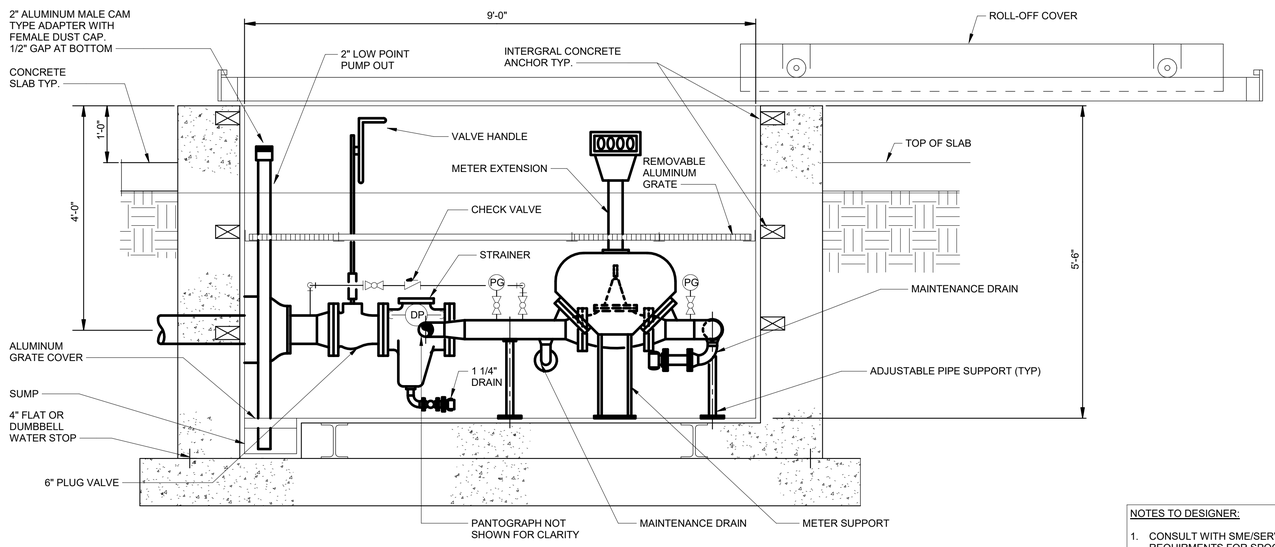
E1 TRUCK FILL PANTOGRAPH VAULT UPPER LEVEL DETAIL

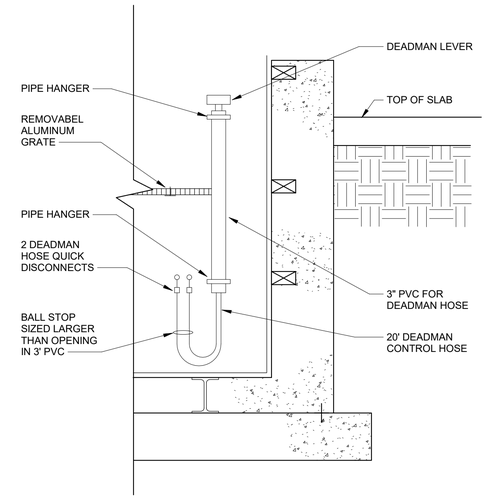
SCALE: 3/4" = 1'-0"



E6 TRUCK FILL PANTOGRAPH VAULT LOWER LEVEL DETAIL

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





NOTES TO DESIGNER:

1. CONSULT WITH SME/SERVICE CONTROL POINT TO DETERMINE REQUIRMENTS FOR SPOOL PIECE OR INJECTOR AND BYPASS.

A1 TRUCK FILL PANTOGRAPH VAULT

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

A8 TRUCK FILL PANTOGRAPH VAULT DEADMAN

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

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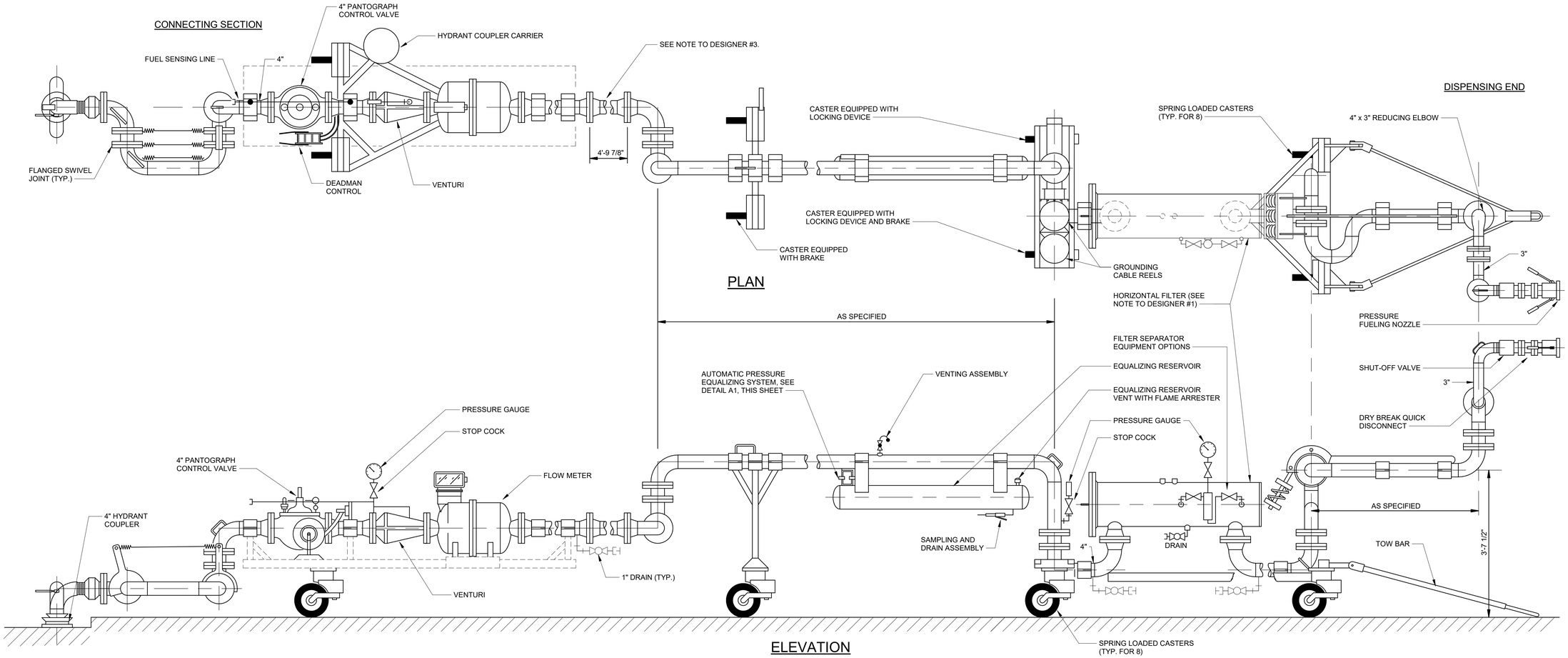
TRUCK FILL PANTOGRAPH VAULT

SHEET ID

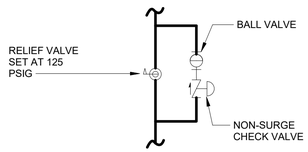
MS509



C1 FUELING SYSTEM PANTOGRAPH DISPENSING POSITION

SCALE: 1" = 1'-0"

0 6" 1' 2'



A1 AUTOMATIC PRESSURE EQUALIZING SYSTEM

SCALE: NTS

NOTES TO DESIGNER:

1. CONTACT SME/SCP TO DETERMINE FILTRATION DEVICE AT PANTOGRAPH.
2. CONTACT SCP FOR SPECIFIC GUIDANCE REGARDING TYPE OF PANTOGRAPH TO BE USED.
3. CONSULT WITH SME/SCP TO DETERMINE REQUIREMENTS FOR SPOOL PIECE OR INJECTOR AND BYPASS.

NOTES:

1. THE PANTOGRAPH ILLUSTRATED IS NOT OF A GOVERNMENT DESIGN BUT IS REPRESENTATIVE OF ONE MANUFACTURER AND IS NOT INTENDED TO RESTRICT PRODUCTS OF OTHER MANUFACTURERS. THE PANTOGRAPH MUST BE CERTIFIED BY THE AIR FORCE SYSTEM SAFETY ENGINEERING ANALYSIS (AFSSEA) TEAM.

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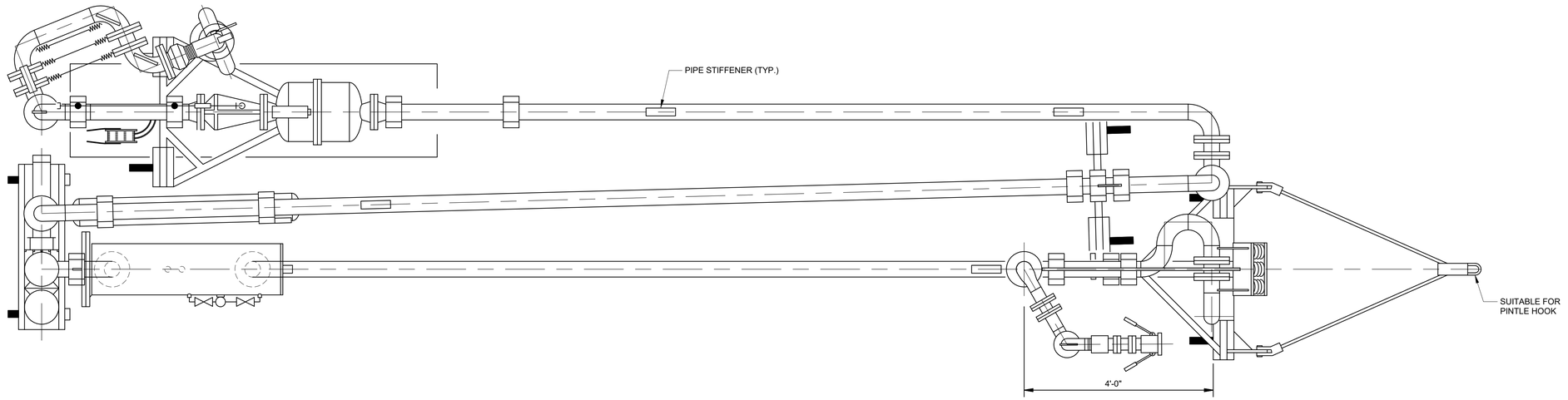
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PANTOGRAPH PLAN AND ELEVATION

SHEET ID

MS510



E1 FUELING SYSTEM PANTOGRAPH TRANSPORT POSITION

SCALE: 1" = 1'-0"

0 6" 1' 2'

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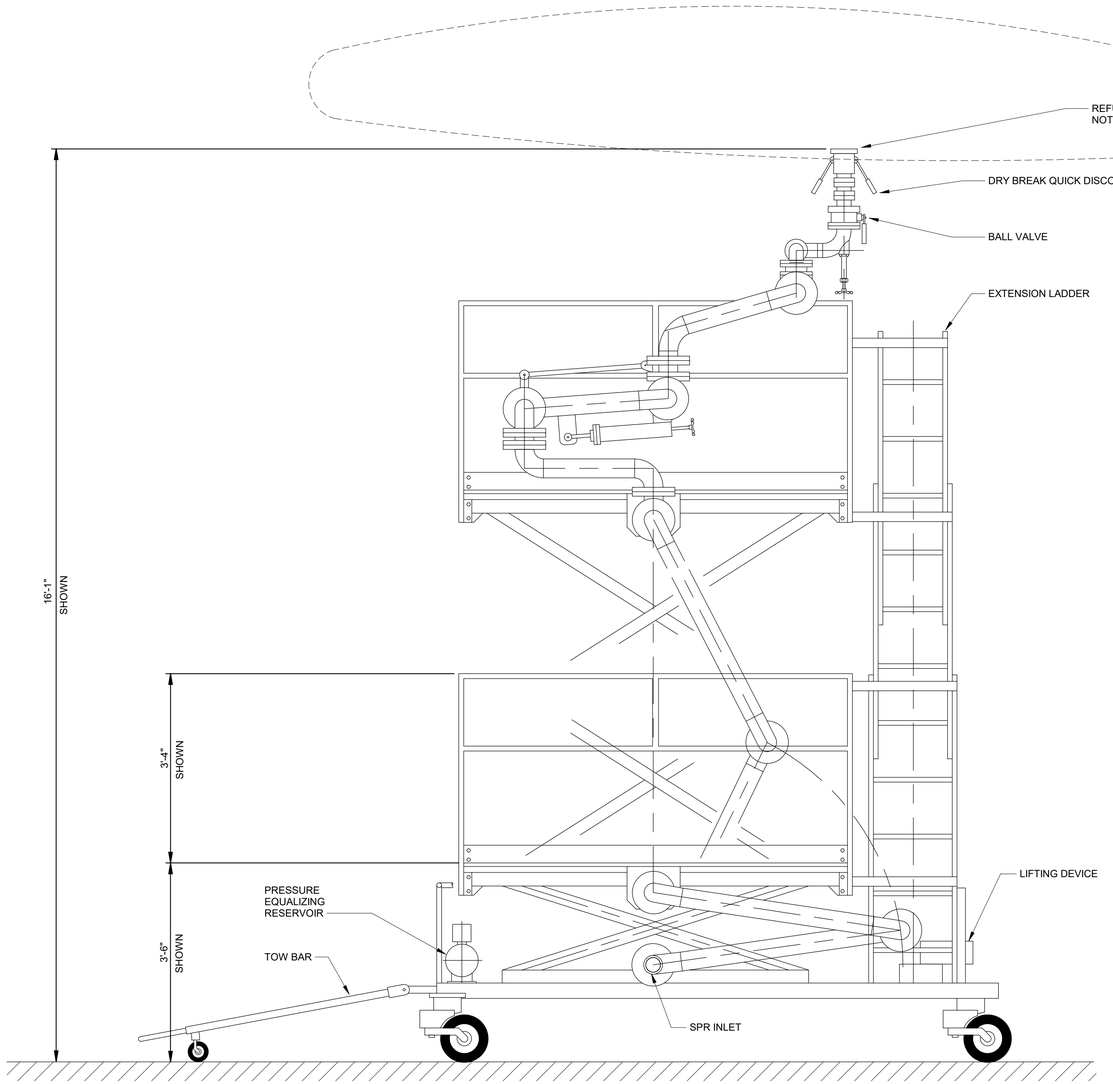
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PANTOGRAPH PLAN AND ELEVATION

SHEET ID

MS511



ELEVATION

(FOR USE ON DC-10's, 747's, 757's AND 767's)

B3 FUELING SYSTEM PANTOGRAPH HIGH REACH UNIT DETAIL

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

0 1' 2' 4'

NOTES TO DESIGNER:

1. TWO NOZZLES MAY BE NEEDED. CONSULT SME.

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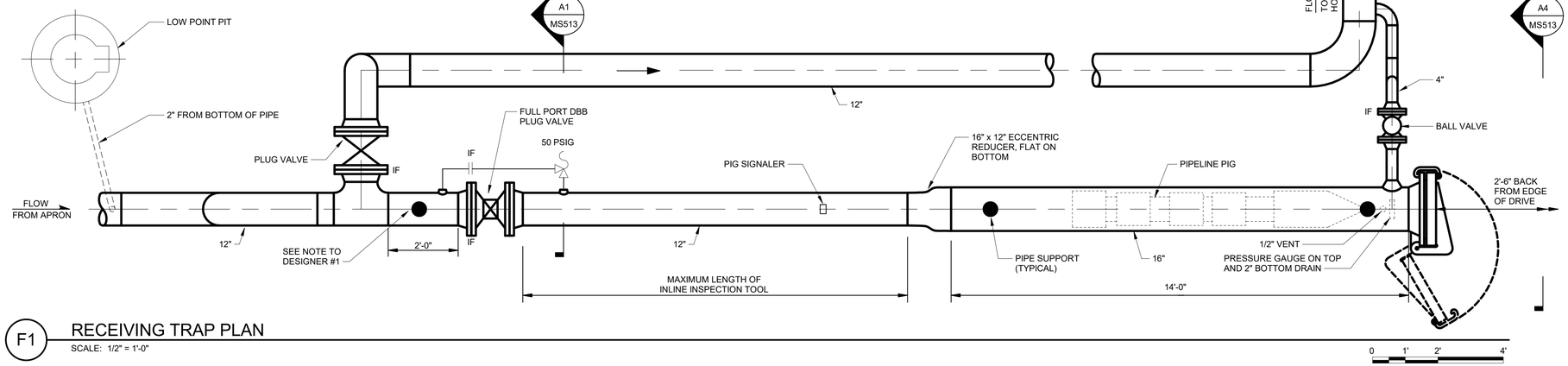
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PANTOGRAPH HIGH REACH, UNDERWING UNIT

SHEET ID

MS512



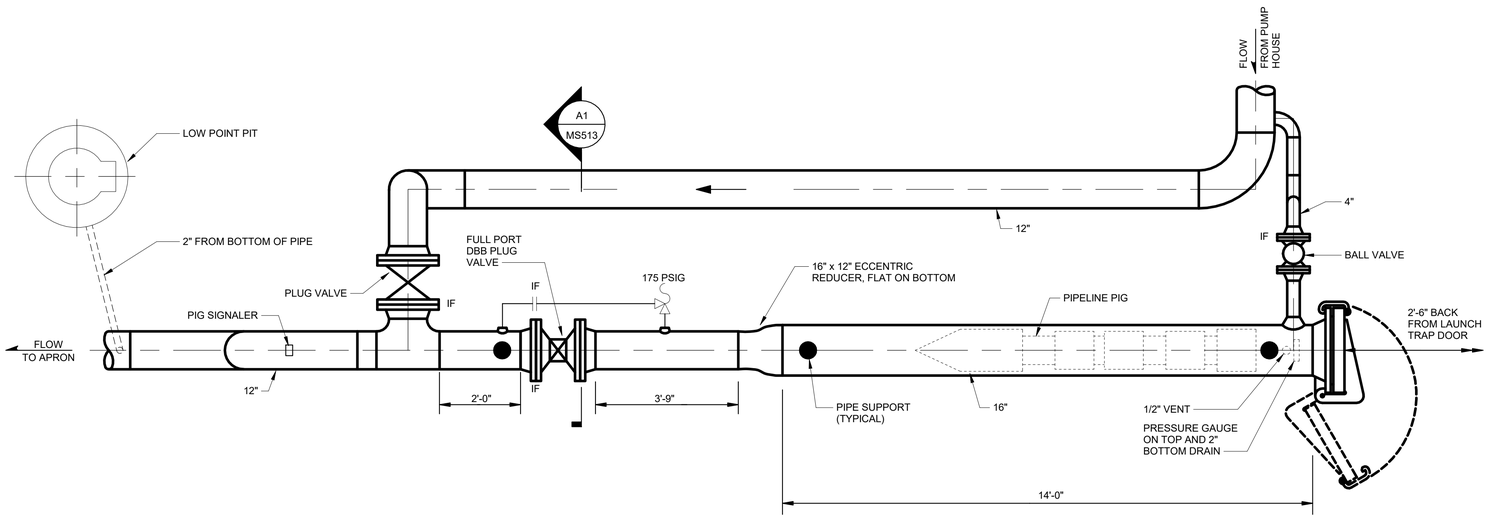
F1 RECEIVING TRAP PLAN

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES TO DESIGNER:

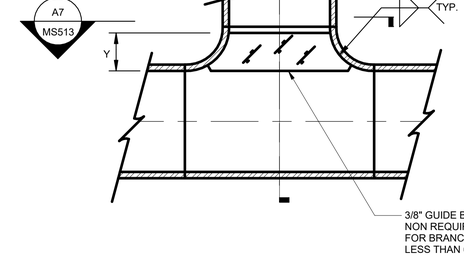
1. PROVIDE PIG LAUNCH AND RECEIVING TRAPS FOR ALL NEW UNDERGROUND TRANSFER LINES AND HYDRANT LOOPS.



C1 LAUNCH TRAP PLAN

SCALE: 1/2" = 1'-0"

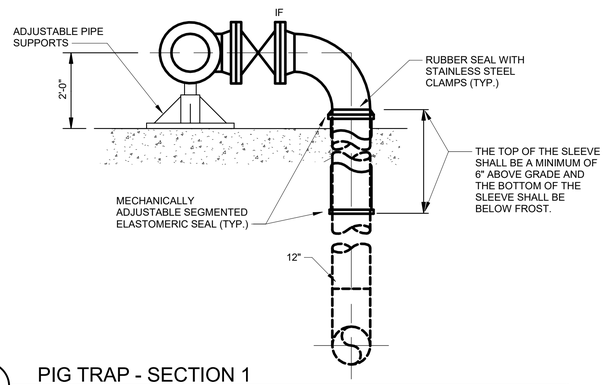
0 1' 2' 4'



GUIDE BAR DIMENSION TABLE		
BRANCH SIZE	X	Y
6"	1 5/8"	2"
8"	2"	2"
10"	2 5/8"	2"
12"	3"	1 1/2"
14"	3"	1 1/2"

C8 TEE WITH GUIDE BARS ELEVATION

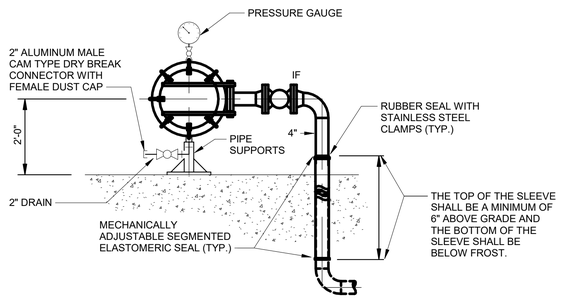
SCALE: NTS



A1 PIG TRAP - SECTION 1

SCALE: 1/2" = 1'-0"

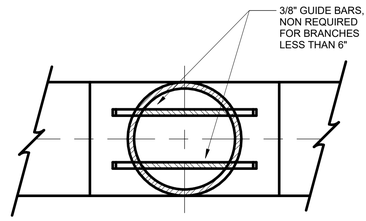
0 1' 2' 4'



A4 PIG TRAP - SECTION 2

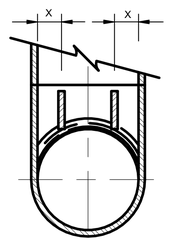
SCALE: 1/2" = 1'-0"

0 1' 2' 4'



A7 TEE WITH GUIDE BARS PLAN

SCALE: NTS



A9 TEE WITH GUIDE BARS SECTION

SCALE: NTS

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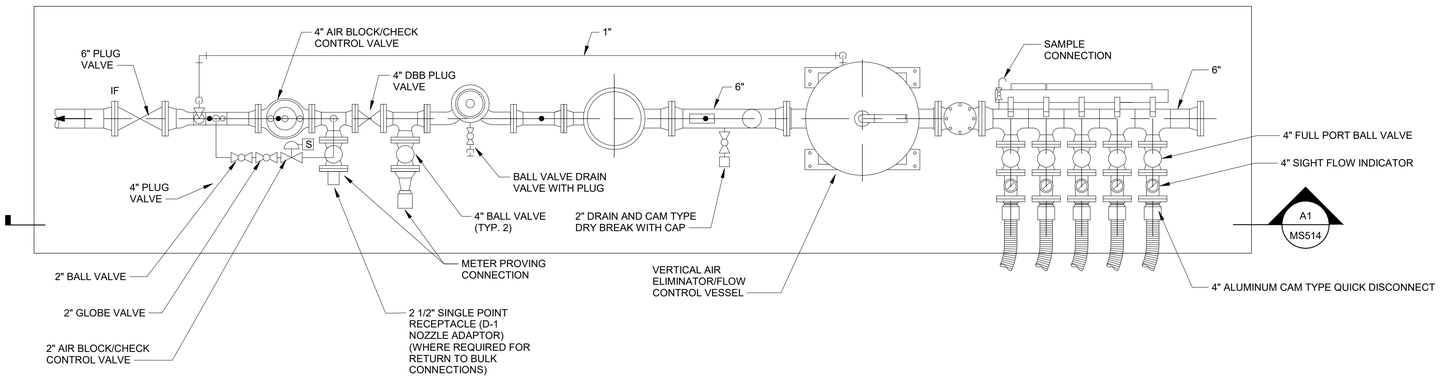
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPELINE PIG TRAP PLANS, SECTIONS, AND DETAILS

SHEET ID

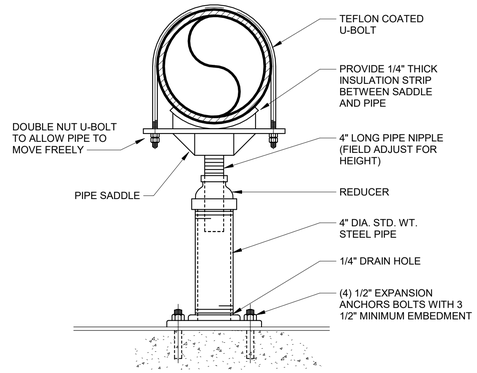
MS513



E1 TRUCK OFFLOAD PLAN

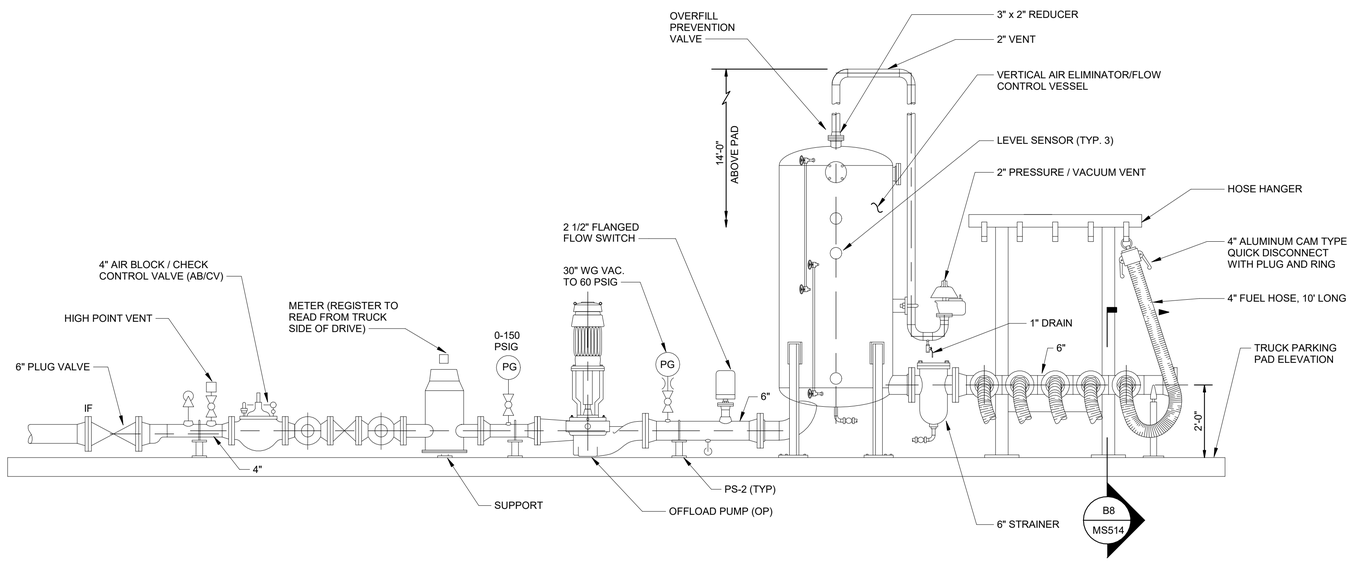
SCALE: 1/2" = 1'-0"

0 1' 2' 4'



F8 ADJUSTABLE PIPE SUPPORT DETAIL (PS-2)

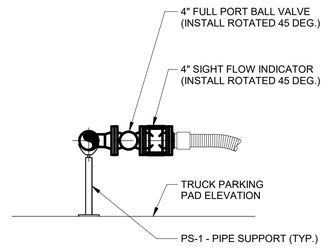
SCALE: NTS



A1 TRUCK OFFLOAD ELEVATION

SCALE: 1/2" = 1'-0"

0 1' 2' 4'



B8 TRUCK OFFLOAD HOSE CONNECTION

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES TO DESIGNER:

1. SOME LOCATIONS USE ONE SKID TO SERVE TWO OFFLOAD POINTS, CONSULT SME

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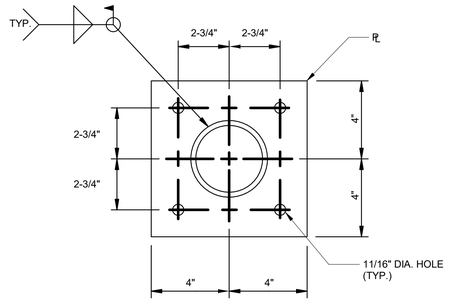
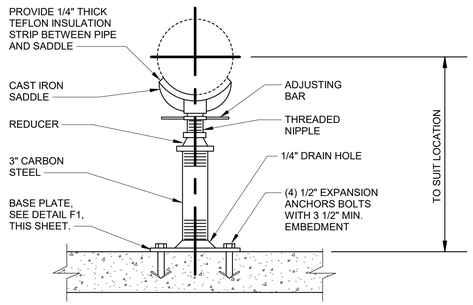
TRUCK OFFLOAD SECTIONS AND DETAILS

SHEET ID

MS514

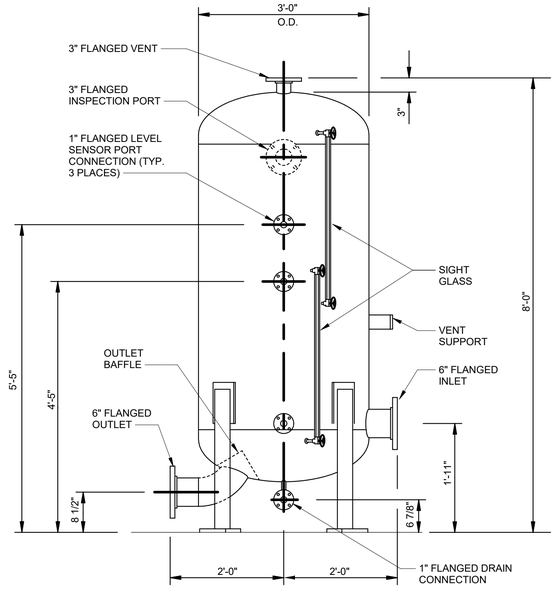


BASE PLATE



D1 ADJUSTABLE PIPE SADDLE SUPPORT DETAIL (PS-1)

SCALE: NTS



D4 600 GPM VERTICAL AIR ELIMINATOR TANK DETAIL

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

0 1' 2' 4'

SEQUENCE OF OPERATION

TRUCK OFFLOAD

THE TRUCK OFFLOAD SYSTEM SKID IS SETUP TO OFFLOAD ONE TRUCK WITH ONE OFFLOAD PUMP (OP). A START BUTTON IS LOCATED AT EACH OFFLOAD STATION.

TO INITIATE A TRUCK OFFLOAD, AN OPERATOR CONNECTS AN OFFLOAD HOSE TO EACH TRUCK COMPARTMENT CONNECTION, OPENS EACH ASSOCIATED COUPLER AND BALL VALVE. FUEL WILL FLOW TO THE AIR ELIMINATOR TANK. WHEN THE LOWER LEVEL SENSOR IS COVERED BY FUEL AND THE START BUTTON IS PUSHED, THE PUMP WILL BE ALLOWED TO START.

AS LONG AS THE LOWER LEVEL SENSOR IS COVERED WITH FUEL, THE PUMP WILL CONTINUE TO RUN. IF FUEL LEVEL DROPS BELOW THE LOWER LEVEL SENSOR, THE CONTROL SYSTEM WILL STOP THE PUMP.

WHILE THE PUMP IS RUNNING, IF ONLY THE LOWER LEVEL SENSOR IS COVERED WITH FUEL THE 2" AIR BLOCK/CHECK VALVE IN THE DISCHARGE LINE WILL BE OPEN TO CONTROL THE FLOW AT 150 GPM. THE 4" AIR BLOCK/CHECK VALVE WILL REMAIN CLOSED.

IF THE FUEL LEVEL IN THE AIR ELIMINATOR TANK RISES AND THE MIDDLE LEVEL SENSOR IS COVERED BY FUEL, SOLENOID "B" WILL BE ENERGIZED ON THE 4" AIR BLOCK/CHECK VALVE, AND THE 4" VALVE WILL OPEN TO CONTROL THE FLOW AT 300 GPM. THE 2" AIR BLOCK/CHECK VALVE WILL BE ENERGIZED TO CLOSE.

IF THE FUEL LEVEL IN THE AIR ELIMINATOR TANK DROPS BELOW THE MIDDLE LEVEL SENSOR, SOLENOID "B" WILL BE DE-ENERGIZED ON THE 4" AIR BLOCK/CHECK VALVE, AND THE VALVE WILL CLOSE, AND THE 2" AIR BLOCK/CHECK VALVE WILL OPEN TO CONTROL THE FLOW AT 150 GPM AS LONG AS THE LOWER LEVEL SENSOR IS COVERED BY FUEL.

IF THE FUEL LEVEL IN THE AIR ELIMINATOR TANK RISES AND THE UPPER LEVEL SENSOR IS COVERED BY FUEL, SOLENOID "A" WILL BE ENERGIZED ON THE 4" AIR BLOCK/CHECK VALVE, AND THE VALVE WILL THEN MODULATE TO CONTROL THE FLOW AT 600 GPM. THE 2" AIR BLOCK/CHECK VALVE WILL REMAIN CLOSED.

IF THE FUEL LEVEL IN THE AIR ELIMINATOR TANK DROPS BELOW THE UPPER LEVEL SENSOR, SOLENOID "A" WILL BE DE-ENERGIZED ON THE 4" AIR BLOCK / CHECK VALVE, AND THE VALVE WILL THEN MODULATE TO CONTROL THE FLOW AT 300 GPM AS LONG AS THE LOWER AND THE MIDDLE LEVEL SENSORS ARE COVERED BY FUEL.

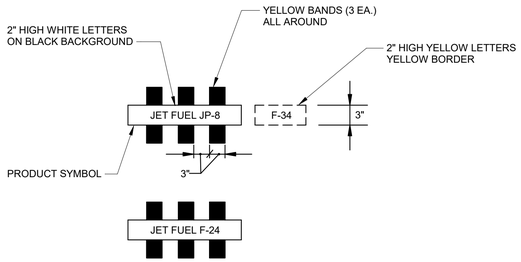
AIR BLOCK / CHECK VALVE				
CONDITION	4" VALVE ACTION	2" VALVE ACTION	SOLENOID "A"	SOLENOID "B"
LOW LEVEL SENSOR IN FUEL	CLOSED	DE-ENERGIZED OPEN 150 GPM	DE-ENERGIZED	DE-ENERGIZED
MIDDLE LEVEL SENSOR IN FUEL	HALF OPEN 300 GPM	ENERGIZED CLOSED	DE-ENERGIZED	ENERGIZED
UPPER LEVEL SENSOR IN FUEL	MOST OPEN 600 GPM	ENERGIZED CLOSED	ENERGIZED	ENERGIZED

NOTES:

1. SEE FUEL SYSTEM LEGEND, SHEET M-001.

NOTES TO DESIGNER:

1. SIZE OF OFFLOAD PUMP TO BE PROVIDED BY SCP.
2. PROVIDE 2 1/2" SPR FOR RETURN TO BULK CONNECTIONS WHERE DIRECTED BY SCP.



A4 AIR ELIMINATOR PRODUCT SYMBOL DETAIL

SCALE: NTS

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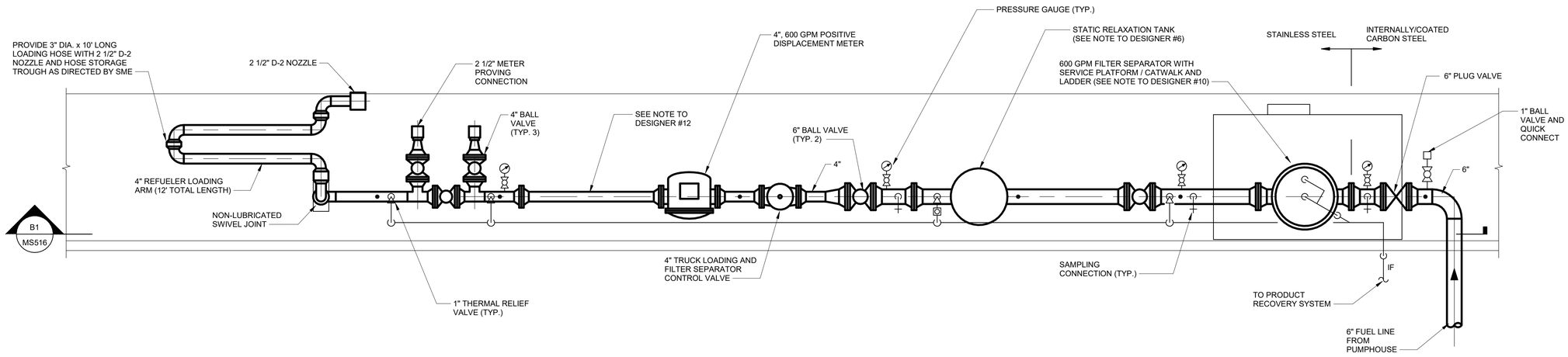
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

TRUCK OFFLOAD DETAILS

SHEET ID

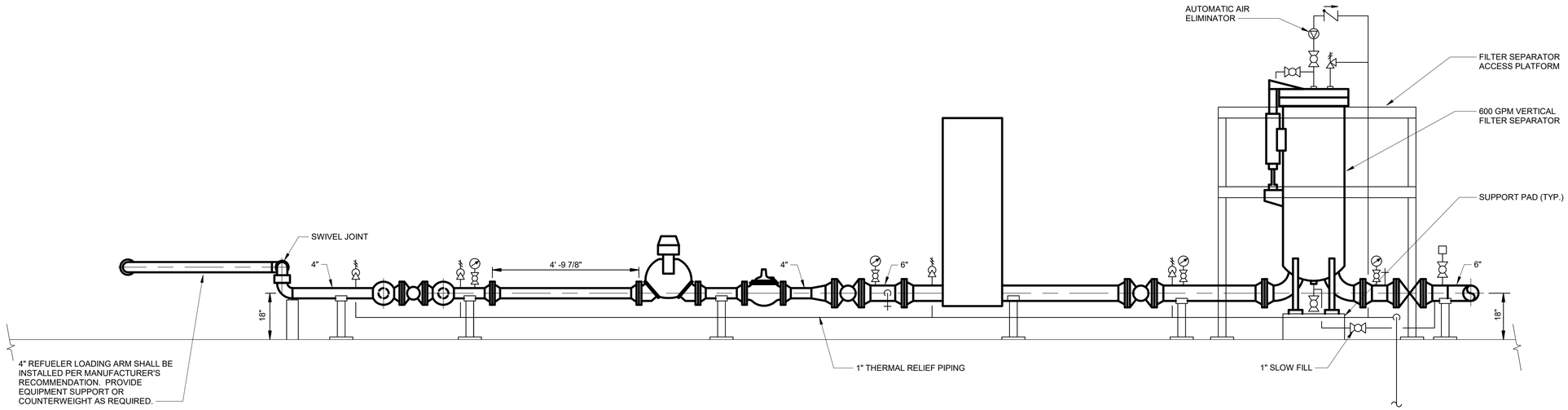
MS515



E1 TYPE 2 REFUELER TRUCK LOADING SYSTEM PLAN

SCALE: 1/2" = 1'-0"

0 1' 2' 4'



B1 TYPE 2 REFUELER TRUCK LOADING SYSTEM ELEVATION

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES TO DESIGNER:

1. PROVIDE THERMAL RELIEF BETWEEN ISOLATED PIPING SECTIONS.
2. PROVIDE SAMPLING CONNECTIONS AND PRESSURE GAUGES AS SHOWN OR AS DIRECTED BY SME.
3. SEE UFC 3-460-1 AND UFGS 33 52 43 FOR ADDITIONAL REQUIREMENTS.
4. PROVIDE EMERGENCY EYEWASH FACILITIES PER OSHA REGULATIONS, AFOSH 91-501, AND UFC 3-460-01.
5. PIPING MATERIALS SHALL BE 100% NON-CORROSIVE IE STAINLESS STEEL OR ALUMINUM. WHERE PERMITTED BY UFC 3-460-1, CARBON STEEL OR INTERNALLY COATED CARBON STEEL PIPING MAY BE USED IF DIRECTED BY SME.
6. 30 SECOND STATIC RELAXATION TANK REQUIRED FOR JP-5. AT 600 GPM, TANK CAPACITY EQUALS 300 GALS.
7. PROVIDE A HIGH PERFORMANCE WAFER TRUNION VALVE W/ 165°F FUSIBLE LINK AT GROUND LEVEL WHEN PIPING RISES AT FUELING ISLANDS AS AN OPTIONAL ITEM FOR NAVY AND ARMY INSTALLATIONS.
8. WHEN REFUELER FILL STAND IS CONSTRUCTED AS A BRANCH OFF AN AIRCRAFT DIRECT FUELING SYSTEM USING ALL NON-CORROSIVE PIPING, SEE DETAIL, SHEET MS508.
9. USE A TYPE 2 WHEN REFUELER FILL STAND IS SUPPLIED FROM STORAGE VIA AN INTERNALLY EPOXY COATED OR UNCOATED CARBON STEEL SYSTEM.
10. PROVIDE AUTOMATIC SELF CHECKING OVERFILL PROTECTION AND GROUND VERIFICATION DEVICE WITH INTRINSICALLY SAFE ELECTRIC DEADMAN CONTROL AS DIRECTED BY SME.
11. CONSULT WITH SME/SERVICE CONTROL POINT TO DETERMINE REQUIREMENT FOR SPOOL PIECE OR INJECTOR AND BYPASS.
12. USE HORIZONTAL FILTER SEPERATORS FOR ARMY AND NAVY PROJECTS.

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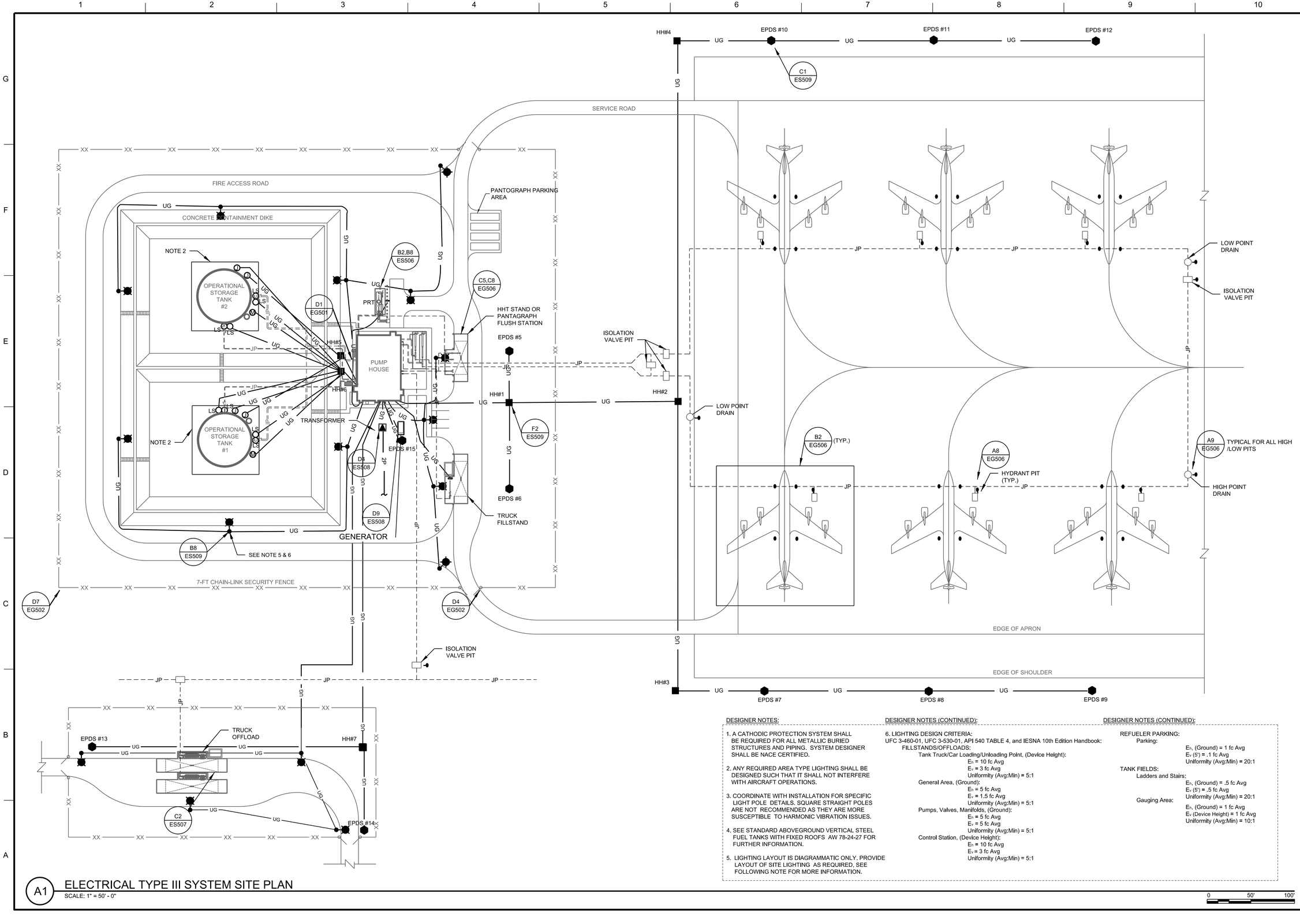
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

REFUELER TRUCK LOADING SYSTEM PLANS, SECTIONS, AND GENERAL NOTES

SHEET ID

MS516



DESIGNER NOTES:

1. A CATHODIC PROTECTION SYSTEM SHALL BE REQUIRED FOR ALL METALLIC BURIED STRUCTURES AND PIPING. SYSTEM DESIGNER SHALL BE NACE CERTIFIED.
2. ANY REQUIRED AREA TYPE LIGHTING SHALL BE DESIGNED SUCH THAT IT SHALL NOT INTERFERE WITH AIRCRAFT OPERATIONS.
3. COORDINATE WITH INSTALLATION FOR SPECIFIC LIGHT POLE DETAILS. SQUARE STRAIGHT POLES ARE NOT RECOMMENDED AS THEY ARE MORE SUSCEPTIBLE TO HARMONIC VIBRATION ISSUES.
4. SEE STANDARD ABOVEGROUND VERTICAL STEEL FUEL TANKS WITH FIXED ROOFS AW 78-24-27 FOR FURTHER INFORMATION.
5. LIGHTING LAYOUT IS DIAGRAMMATIC ONLY. PROVIDE LAYOUT OF SITE LIGHTING AS REQUIRED, SEE FOLLOWING NOTE FOR MORE INFORMATION.

DESIGNER NOTES (CONTINUED):

6. LIGHTING DESIGN CRITERIA:
UFC 3-460-01, UFC 3-530-01, API 540 TABLE 4, and IESNA 10th Edition Handbook:
FILLSTANDS/OFFLOADS:
Tank Truck/Car Loading/Unloading Point, (Device Height):
E_h = 10 fc Avg
E_v = 3 fc Avg
Uniformity (Avg:Min) = 5:1
General Area, (Ground):
E_h = 5 fc Avg
E_v = 1.5 fc Avg
Uniformity (Avg:Min) = 5:1
Pumps, Valves, Manifolds, (Ground):
E_h = 5 fc Avg
E_v = 5 fc Avg
Uniformity (Avg:Min) = 5:1
Control Station, (Device Height):
E_h = 10 fc Avg
E_v = 3 fc Avg
Uniformity (Avg:Min) = 5:1

DESIGNER NOTES (CONTINUED):

REFUELER PARKING:
Parking:
$E_{h,}$ (Ground) = 1 fc Avg
E_v (5') = .1 fc Avg
Uniformity (Avg:Min) = 20:1
TANK FIELDS:
Ladders and Stairs:
$E_{h,}$ (Ground) = .5 fc Avg
E_v (5') = .5 fc Avg
Uniformity (Avg:Min) = 20:1
Gauging Area:
$E_{h,}$ (Ground) = 1 fc Avg
E_v (Device Height) = 1 fc Avg
Uniformity (Avg:Min) = 10:1

A1 ELECTRICAL TYPE III SYSTEM SITE PLAN
SCALE: 1" = 50' - 0"

0 50' 100'

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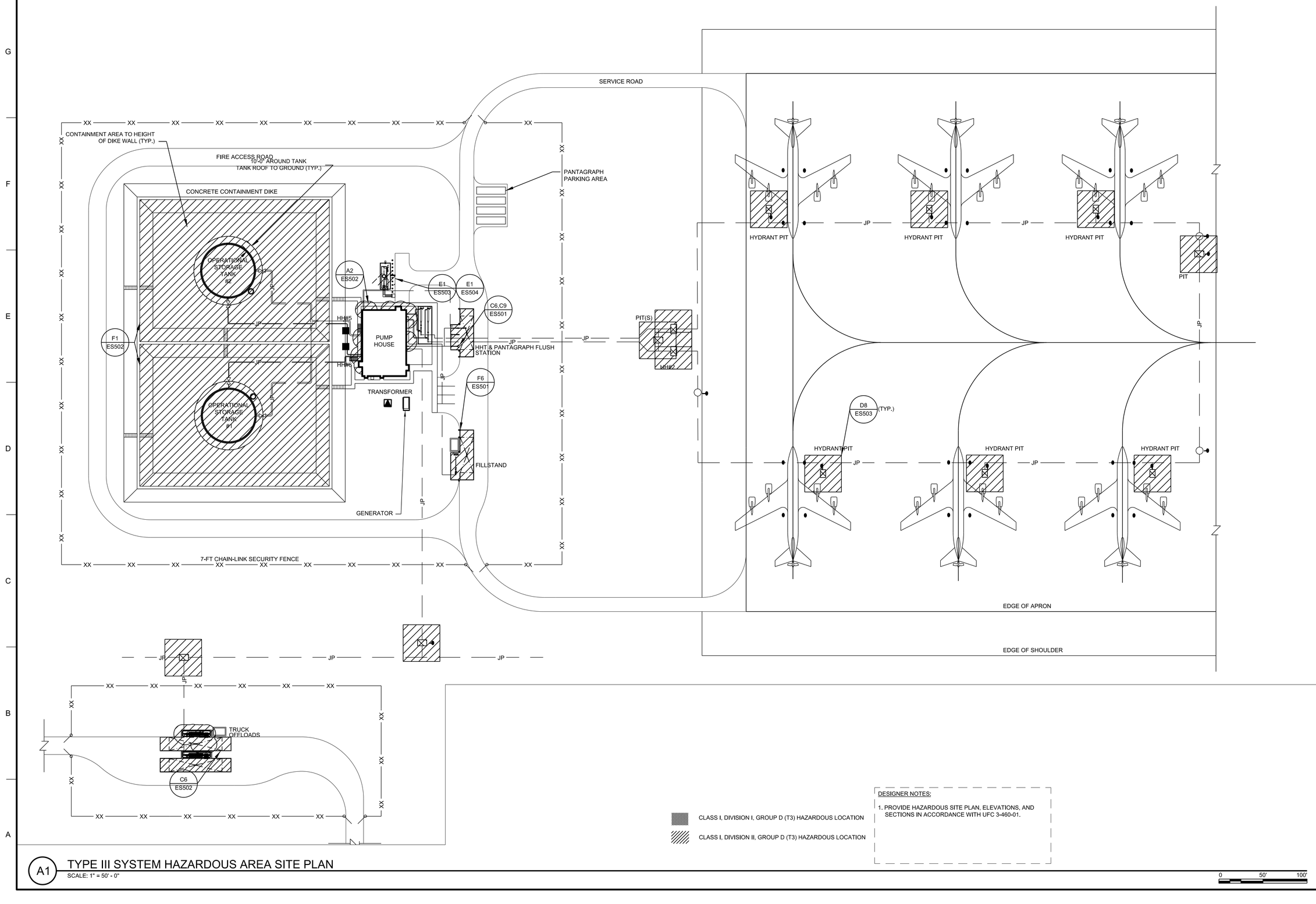
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

ELECTRICAL SITE PLAN

SHEET ID
ES101



DESIGNER NOTES:

1. PROVIDE HAZARDOUS SITE PLAN, ELEVATIONS, AND SECTIONS IN ACCORDANCE WITH UFC 3-460-01.

A1 TYPE III SYSTEM HAZARDOUS AREA SITE PLAN

SCALE: 1" = 50' - 0"

0 50' 100'

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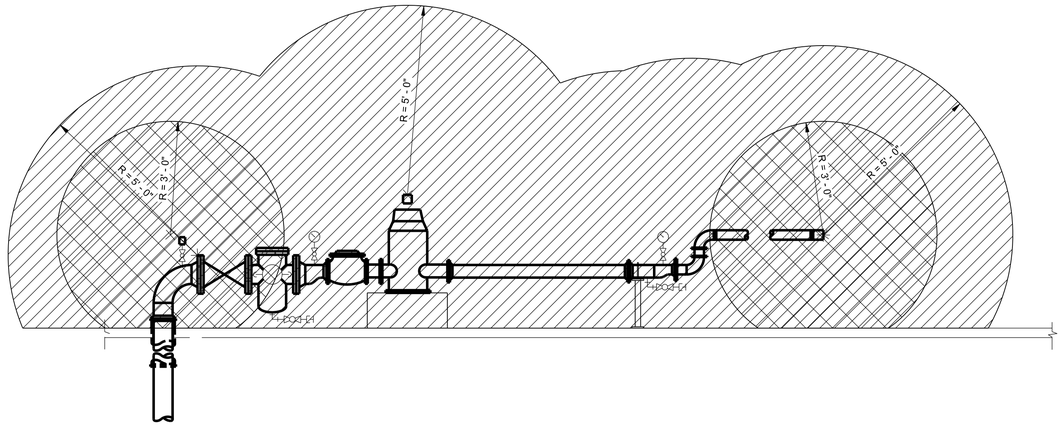
TYPE III

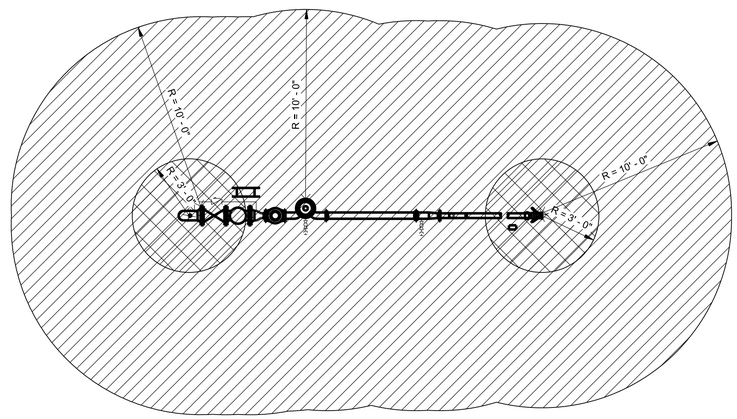
ELECTRICAL HAZARDOUS AREA SITE PLAN

SHEET ID

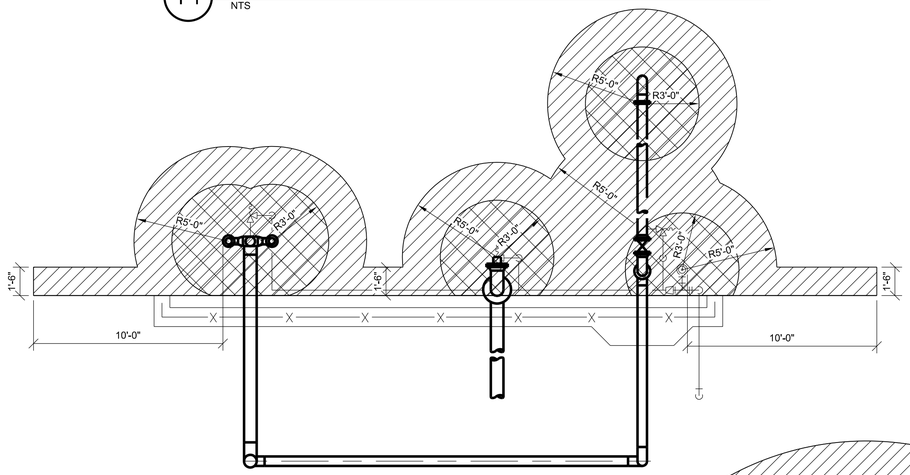
ES102



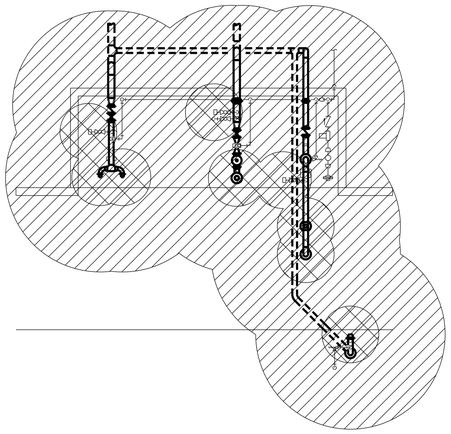
F1 FILLSTAND HOSE ELVATION
NTS



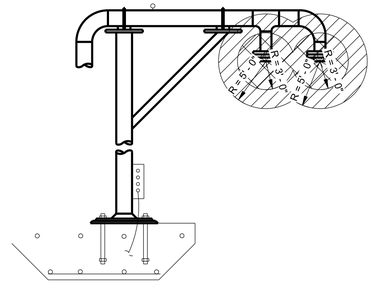
F6 FILLSTAND HOSE PLAN
NTS



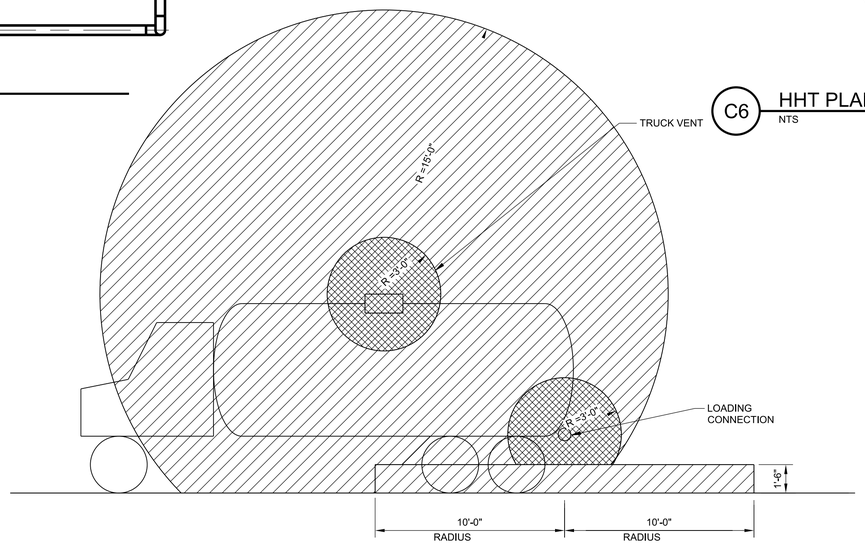
C2 HHT ELEVATION
NTS



C6 HHT PLAN
NTS



C8 HHT UNDERWING ELEVATION
NTS



A3 REFUELER
NTS

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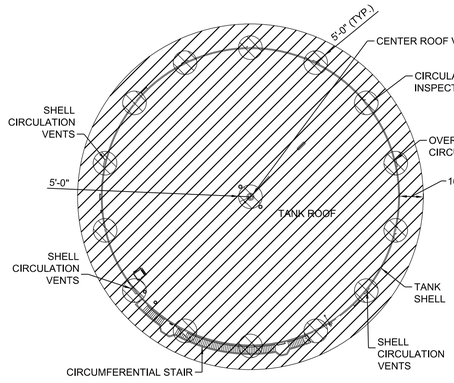
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

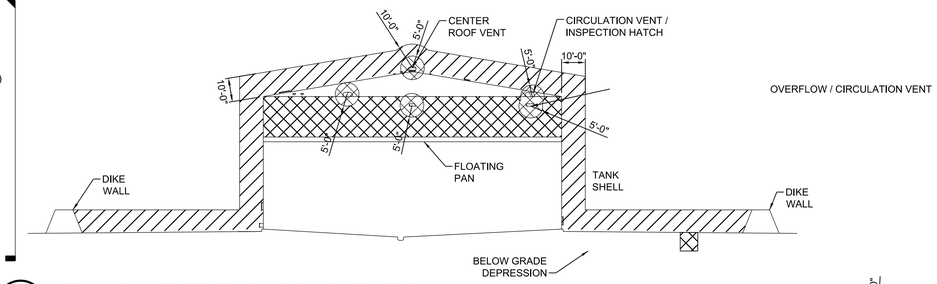
HAZARDOUS AREA DETAILS

SHEET ID
ES501



PLAN

F3
ES502



OVERFLOW / CIRCULATION VENT

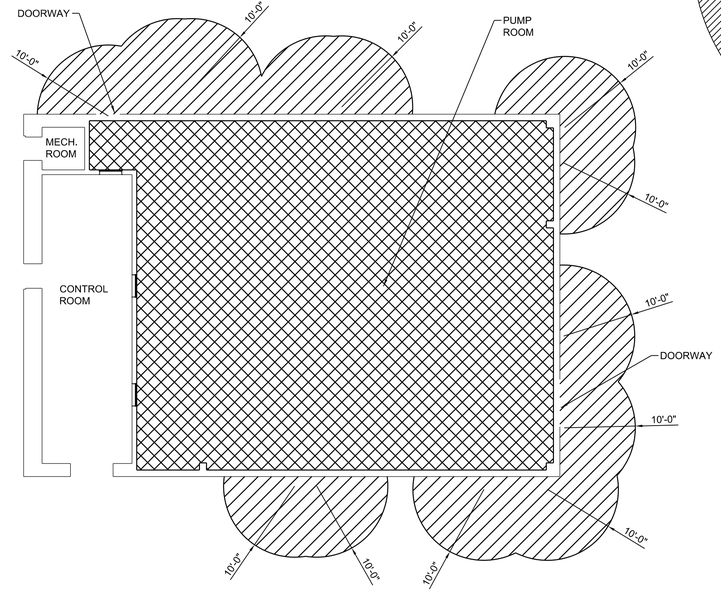
ELEVATION

F3 TANKS HAZARDOUS AREA ELEVATION
NTS

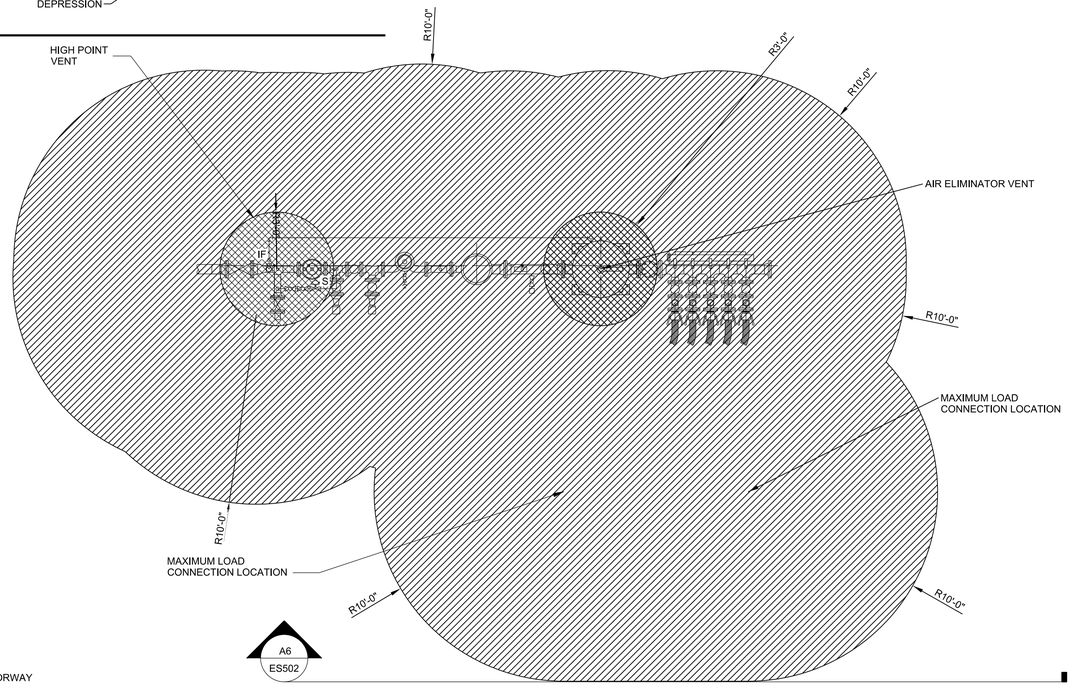
F1 TANKS HAZARDOUS AREA
NTS

CLASS I, DIVISION I, GROUP D (T3) HAZARDOUS LOCATION

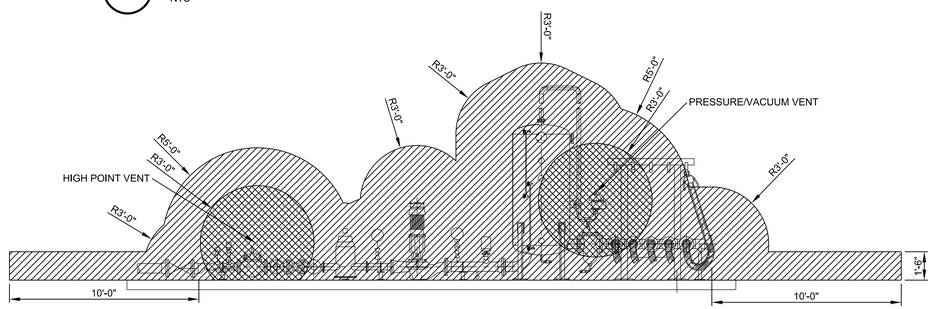
CLASS I, DIVISION II, GROUP D (T3) HAZARDOUS LOCATION



A2 PUMPHOUSE/SHELTER HAZARDOUS AREA
NTS



C6 OFFLOAD HAZARDOUS AREA PLAN
NTS



A6 OFFLOAD HAZARDOUS AREA ELEVATION
NTS

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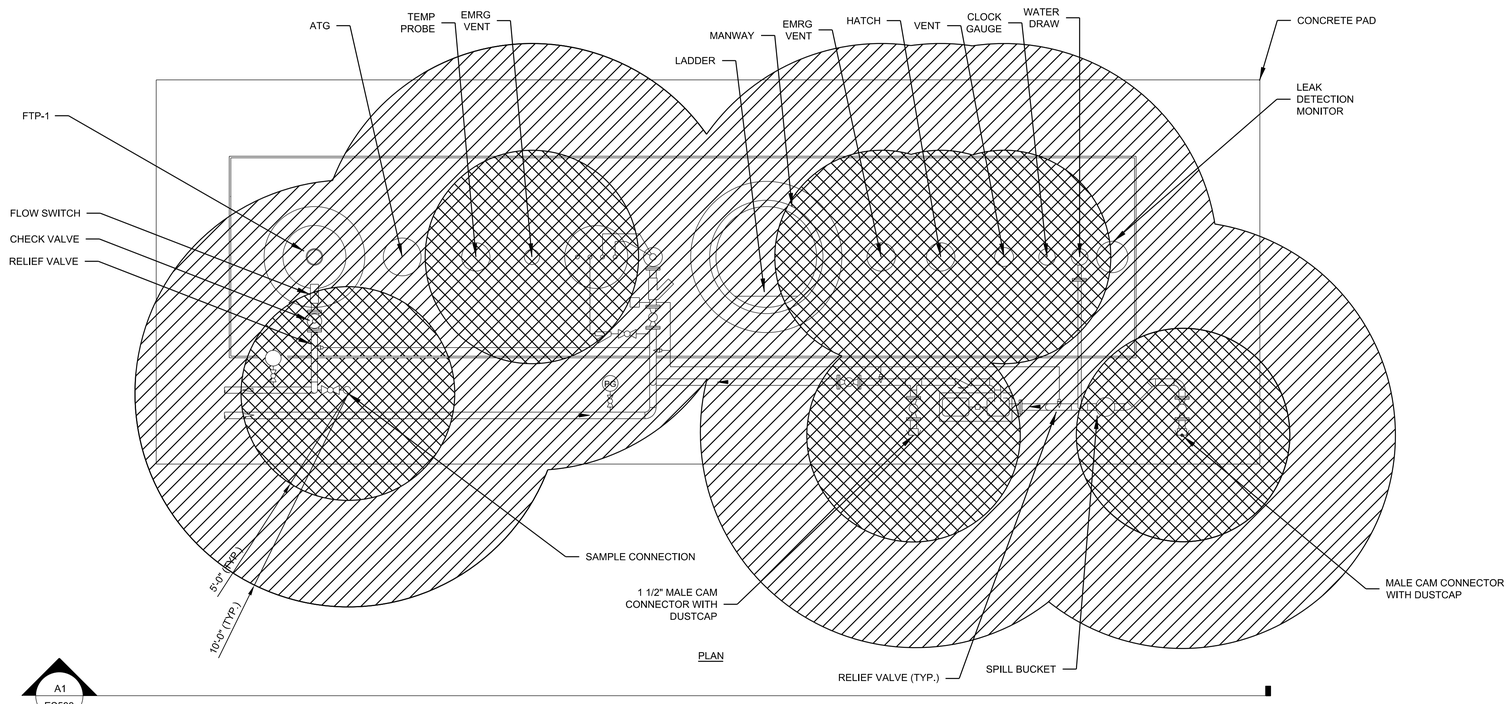
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

HAZARDOUS AREA DETAILS

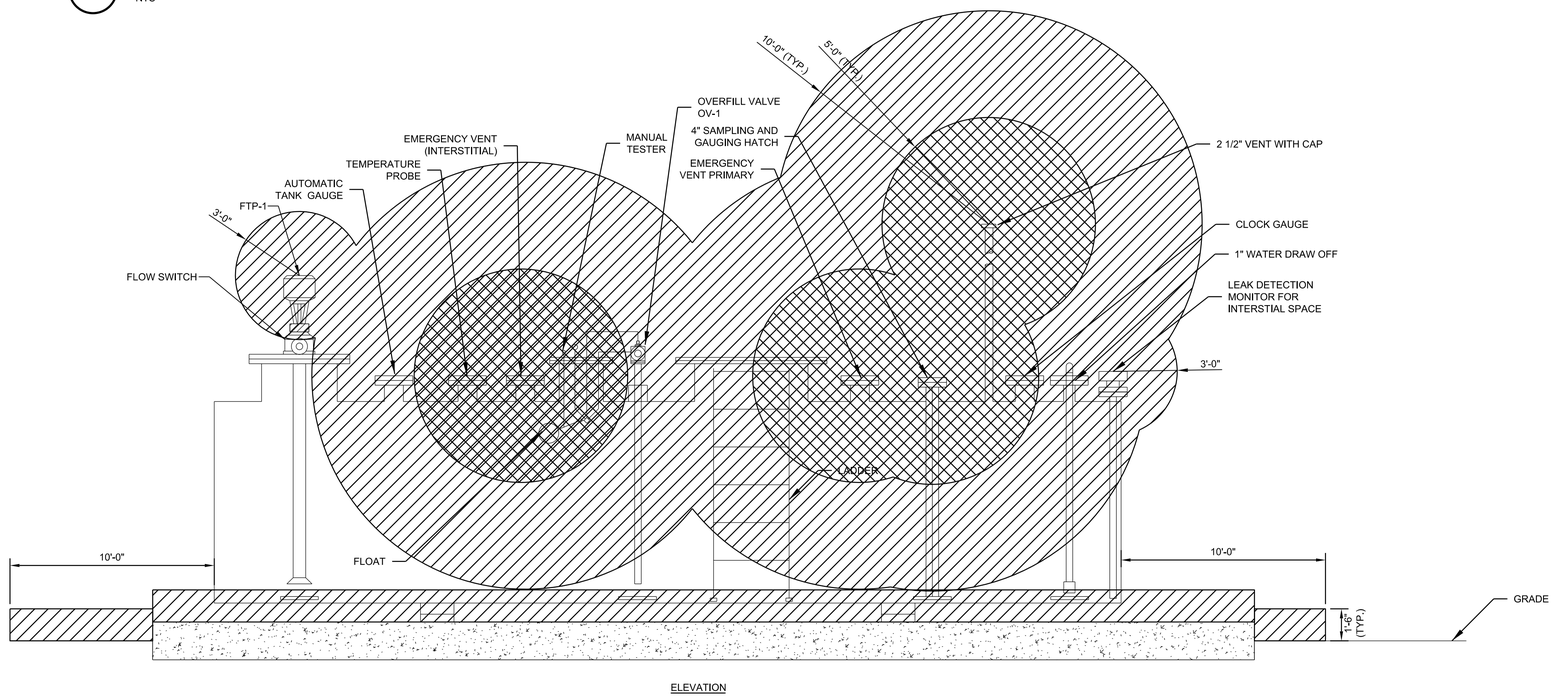
SHEET ID

ES502

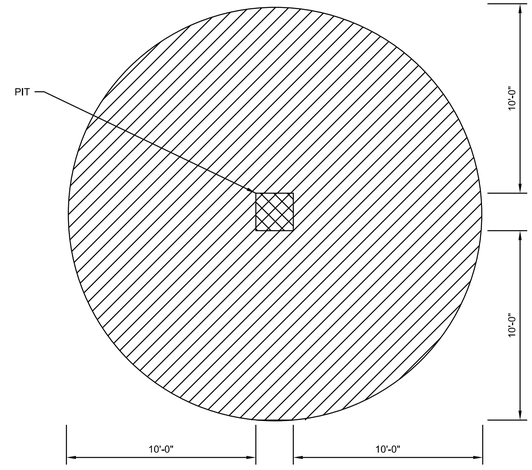


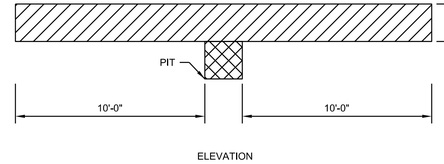
A1
ES503

E1 ABOVEGROUND PRODUCT RECOVERY TANK PLAN VIEW
NTS



A1 ABOVEGROUND PRODUCT RECOVERY TANK
NTS





D8 FUEL PITS HAZARDOUS AREAS
NTS

CLASS I, DIVISION I, GROUP D (T3) HAZARDOUS LOCATION

CLASS I, DIVISION II, GROUP D (T3) HAZARDOUS LOCATION

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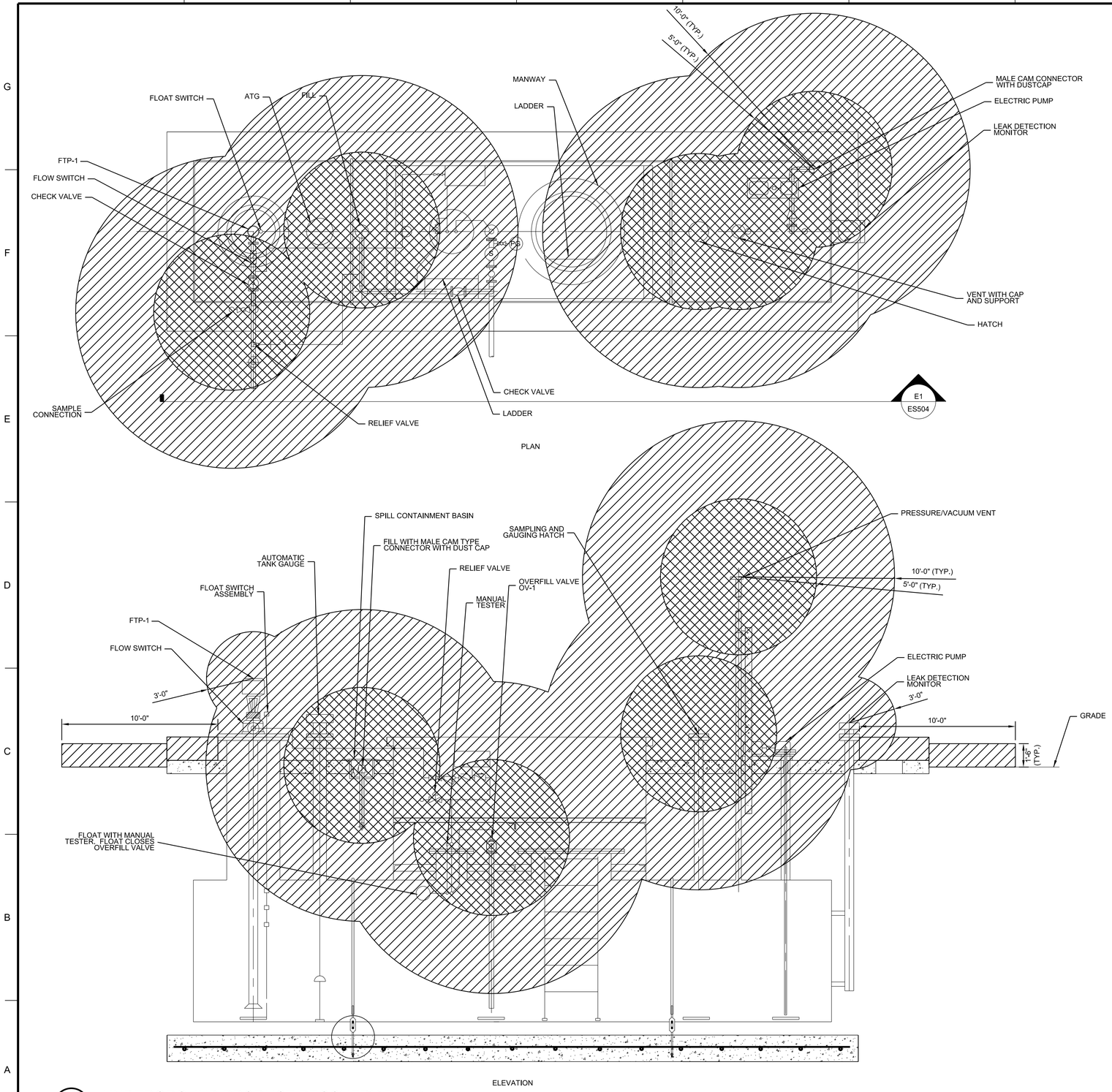
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

HAZARDOUS AREA DETAILS

SHEET ID
ES503



A1 UNDERGROUND PRODUCT RECOVERY TANK
NTS

CLASS I, DIVISION I, GROUP D (T3) HAZARDOUS LOCATION

CLASS I, DIVISION II, GROUP D (T3) HAZARDOUS LOCATION

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PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

HAZARDOUS AREA DETAILS

SHEET ID

ES504

DESIGNER NOTES:

1. SEE OPERATING TANK STANDARD AW 78-24-27 FOR FURTHER INFORMATION

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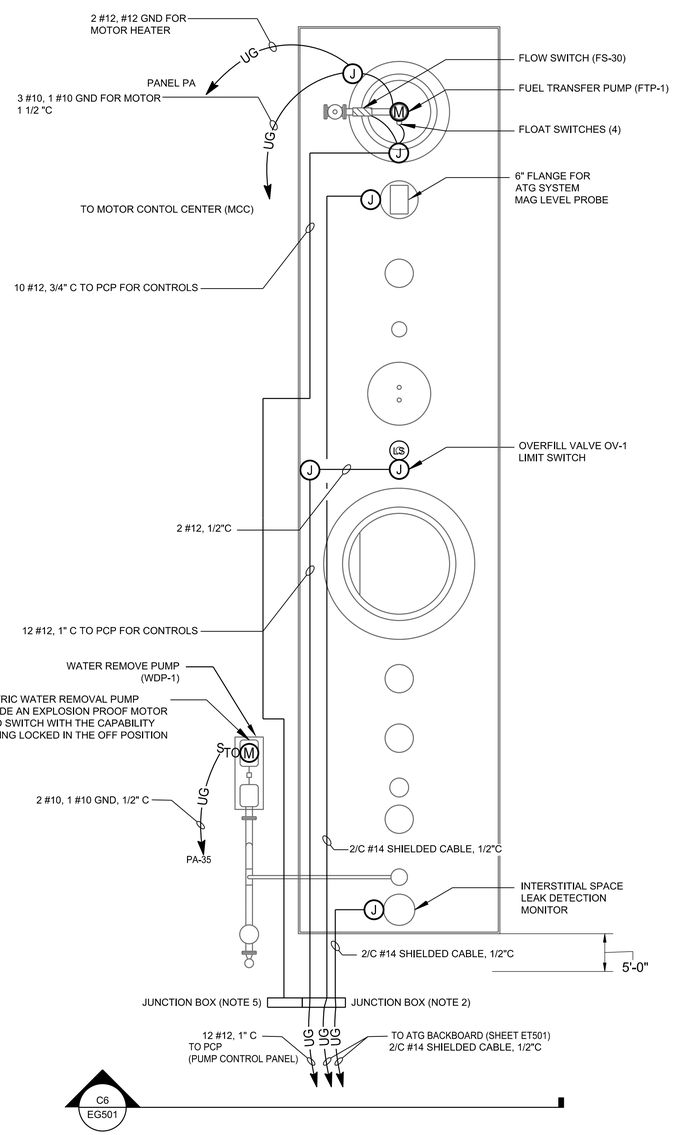
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

TANK DETAILS

SHEET ID

ES505



NOTES:

1. THE VOLUME WITHIN A 5 FT RADIUS FROM THE TOP OF THE TANK VENT SHALL BE CONSIDERED A CLASS 1, DIVISION 1, GROUP D HAZARDOUS LOCATION.

2. SEE THIS SHEET FOR MOUNTING RACK DETAIL.

3. ALL HOMERUNS GO TO THE PUMPHOUSE CONTROL ROOM.

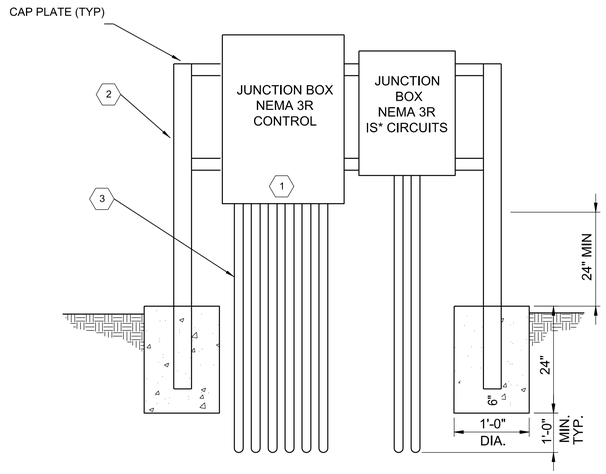
4. REFERENCE MECHANICAL SHEET M-506 FOR ACTUAL LAYOUT OF APPURTENANCES.

5. ALL INTRINSICALLY SAFE CIRCUITS SHALL BE INSTALLED AS REQUIRED BY NFPA 70 ARTICLE 504. THIS INCLUDES ARTICLE 504.30.

B2 ABOVEGROUND* PRODUCT RECOVERY TANK ELECTRICAL PLAN

SCALE: NTS

* UNDERGROUND PRT IS SIMILAR



*** INTRINSICALLY SAFE**

KEY NOTES:

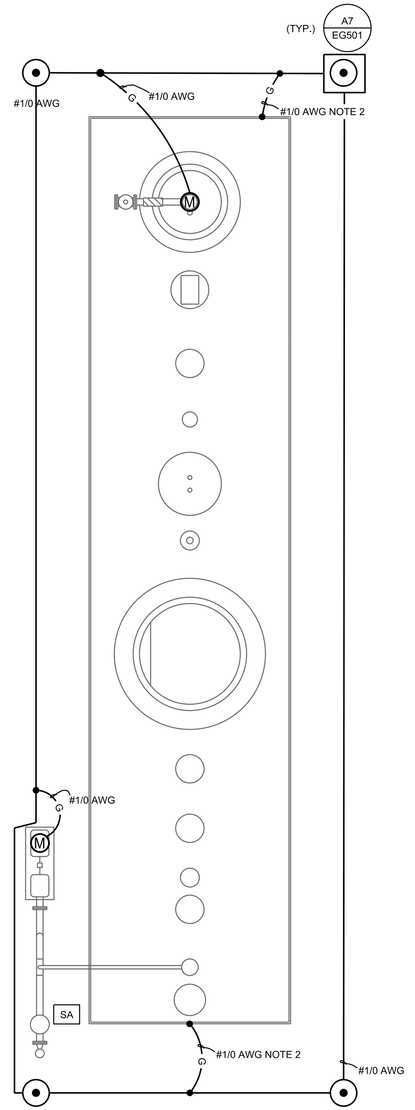
1. FOR CONDUIT AND CONDUCTOR REQUIREMENTS SEE PRODUCT RECOVERY TANK ELECTRICAL PLAN VIEW ON THIS SHEET.

2. PROVIDE A STEEL SUPPORT CONSTRUCTED OF TUBULAR STEEL (TS) 2 1/2" x 2 1/2" x 3/16"; USE WELDED CONSTRUCTION.

3. ALL CONDUITS ABOVE GRADE AND ALL ELBOWS BELOW GRADE SHALL BE GALVANIZED RIGID STEEL.

B5 PRODUCT RECOVERY TANK EQUIPMENT STRUCTURE

SCALE: NTS



NOTES:

1. SEE EG SERIES FOR GROUNDING DETAILS.

2. CONNECTION NOT REQUIRED ON UNDERGROUND TANK.

B8 ABOVEGROUND RECOVERY TANK GROUNDING PLAN

SCALE: NTS

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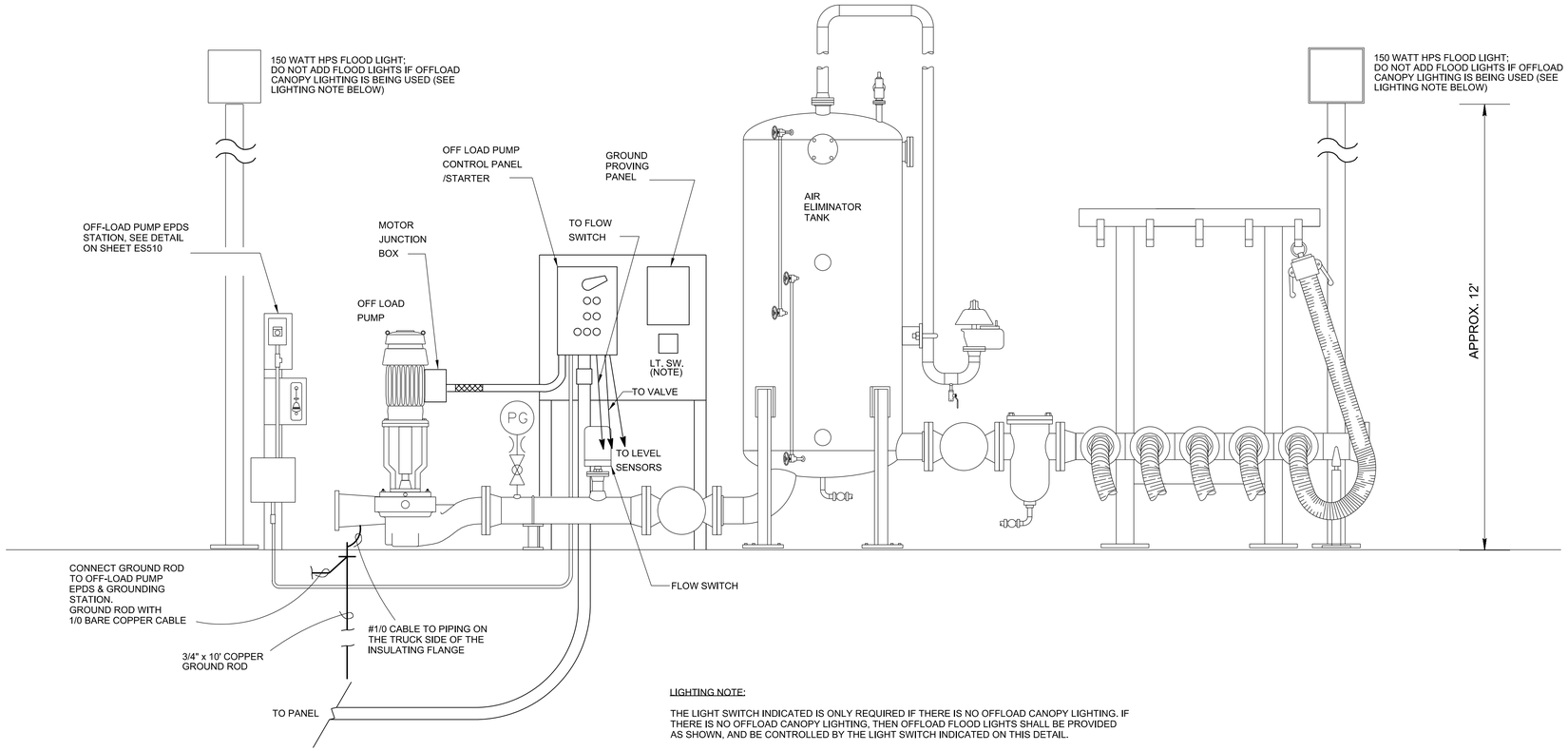
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

ABOVEGROUND PRODUCT RECOVERY TANK DETAILS

SHEET ID

ES506



LIGHTING NOTE:

THE LIGHT SWITCH INDICATED IS ONLY REQUIRED IF THERE IS NO OFFLOAD CANOPY LIGHTING. IF THERE IS NO OFFLOAD CANOPY LIGHTING, THEN OFFLOAD FLOOD LIGHTS SHALL BE PROVIDED AS SHOWN, AND BE CONTROLLED BY THE LIGHT SWITCH INDICATED ON THIS DETAIL.

C2 OFFLOAD STAND DETAIL

SCALE: NTS

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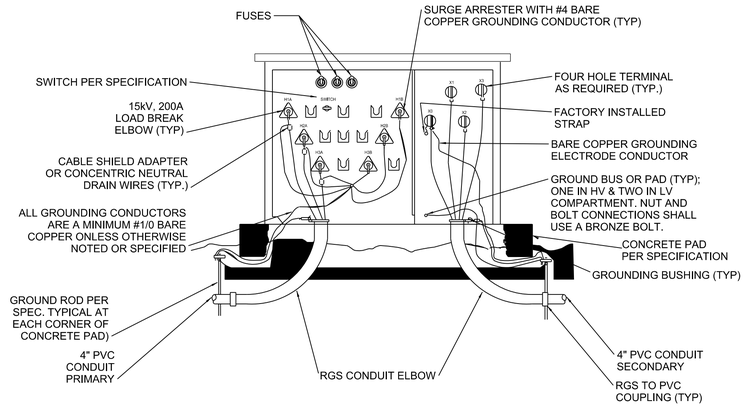
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

OFFLOAD STAND DETAIL

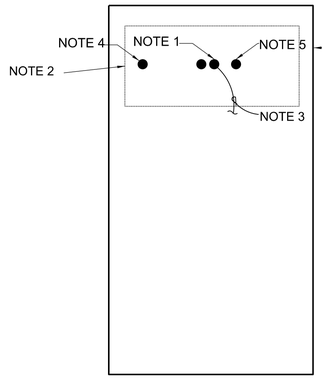
SHEET ID

ES507



D4 PAD MOUNTED TRANSFORMER GROUNDING DETAIL

NTS LOOP FEED, DEAD FRONT, DELTA - GROUNDED WYE TRANSFORMER



NOTE

1. ROUGH-IN OF CONDUITS IN SLAB SHALL BE PER MANUFACTURER RECOMMENDATION AND APPROVED SHOP DRAWINGS. CONNECT TO RESPECTIVE ELECTRICAL COMPONENTS AS INDICATED.

2. PROVIDE OPENING IN PAD FOR RACEWAYS AT MANUFACTURE RECOMMENDED LOCATION(S).

3. POWER FEEDERS FROM GENERATOR CIRCUIT BREAKERS.

4. GROUND ROD

5. CONTROL WIRING 6#10 (MIN)

D7 GENERATOR PAD DETAIL

SCALE: NTS

DESIGNER NOTES:

1. COORDINATE ALL PRIMARY ELECTRICAL DESIGN WITH SPECIFIC BASE ELECTRICAL UTILITY REQUIREMENTS.

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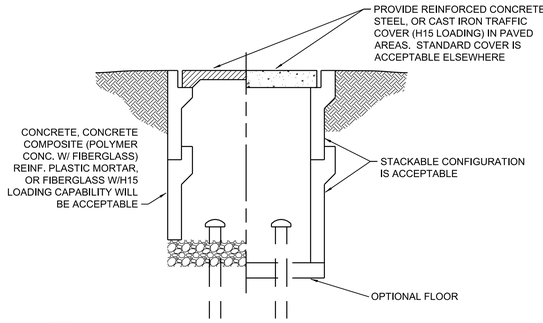
DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

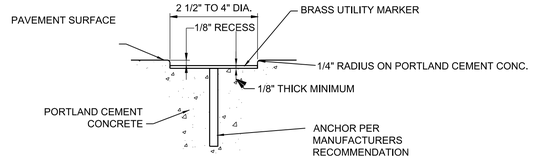
TRANSFORMER GROUNDING DETAILS

SHEET ID

ES508



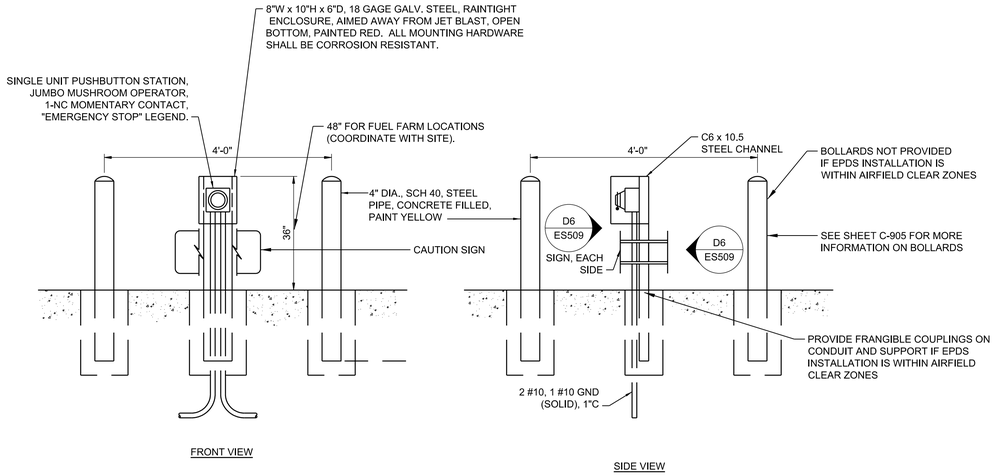
F2 ELECTRCAL OR TELEPHONE HANDHOLE DETAIL
SCALE: NTS



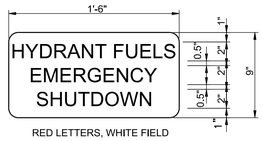
NOTE:

UTILITY MARKERS SHALL BE PLACED APPROXIMATELY EVERY 200' ALONG UTILITY LINES AND WHERE THE UTILITY CHANGES DIRECTION.

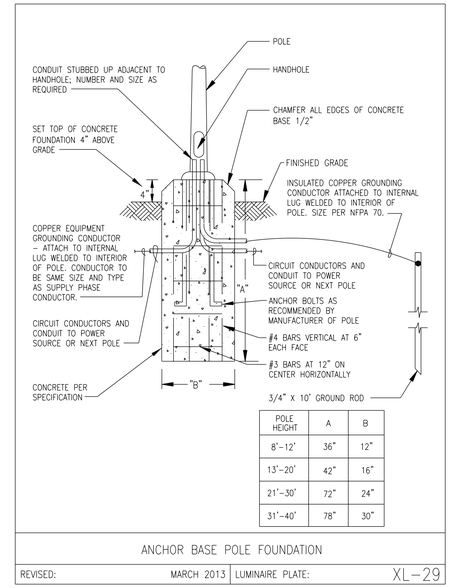
F5 UTILITY MARKER DETAIL
SCALE: NTS



C1 EMERGENCY POWER DOWN STATION (EPDS)
SCALE: NTS



D6 CAUTION SIGN
SCALE: NTS



POLE HEIGHT	A	B
8'–12'	36"	12"
13'–20'	42"	16"
21'–30'	72"	24"
31'–40'	78"	30"

ANCHOR BASE POLE FOUNDATION

REVISED: MARCH 2013 | LUMINAIRE PLATE: XL–29

B8 LIGHT POLE ANCHOR BASE POLE FOUNDATION
SCALE: NTS

DESIGNER NOTES:

1. BOLLARDS FOR EPDS SYSTEM ARE NOT CONSIDERED FRANGIBLE AND MUST NOT BE PROVIDED NEAR AIRFIELD CLEAR ZONES.

2. FINAL APPROVAL FOR EPDS IS FROM THE AIRFIELD MANAGER. IN SOME CASES THEY MAY BE CONSIDERED OBSTRUCTIONS AND REQUIRE OBSTRUCTION LIGHTS.

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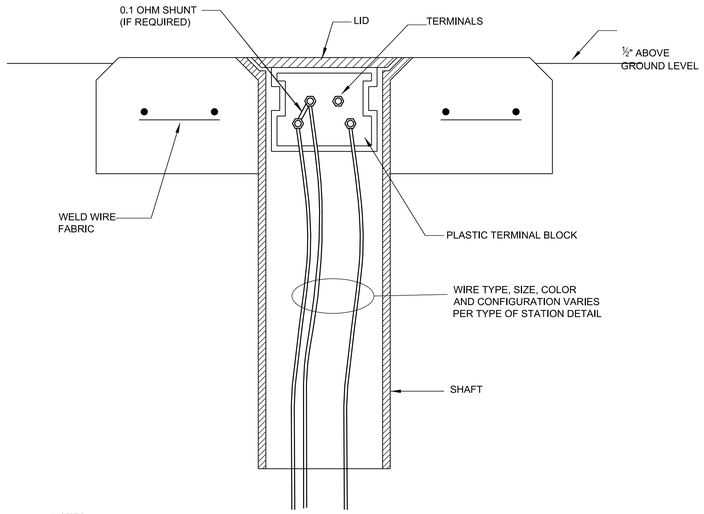
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

SITE DETAILS

SHEET ID
ES509



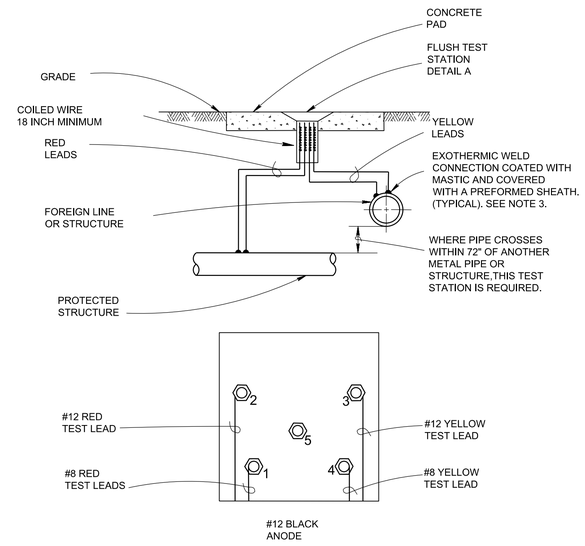
NOTES:

1. WIRES SHALL HAVE SUFFICIENT SLACK TO EXTEND 18" ABOVE TOP OF BOX.

2. POUR CONCRETE PAD AROUND TEST BOX. 18"x18"x6".

3. TEST STATIONS INSTALLED IN PAVED AREAS SHALL BE INSTALLED PER DETAIL B5 ON THIS SHEET.

E2 FLUSH TEST STATION DETAIL
NTS



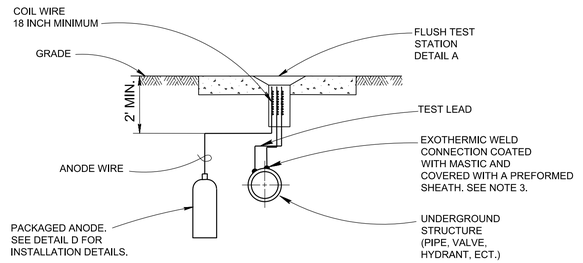
NOTES:

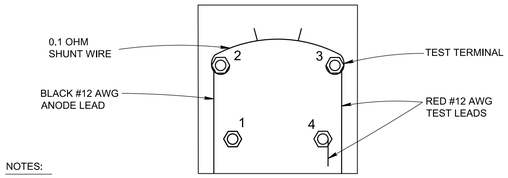
1. TEST STATION TERMINAL BLOCK CONDUCTORS AT THE TEST STATION SHALL BE TAGGED FOR IDENTIFICATION.

2. PROVIDE TEST STATION WHERE REQUIRED BY DRAWINGS AND SPECS.

3. WRAP WIRE UNDER PIPE AND CONNECT AT THE TOP OF THE PIPE.

E5 FOREIGN LINE CROSSING TEST STATION DETAIL
NTS





NOTES:

1. TEST STATION TERMINAL BLOCK CONDUCTORS IN THE TEST STATION SHALL BE TAGGED FOR IDENTIFICATION.

2. IF THERE IS MORE THAN ONE ANODE INDICATED FOR A TEST STATION, CONNECT THE ANODES TO A COMMON HEADER AND RUN THE HEADER TO THE TEST STATION. ALTERNATE ANODE LOCATION, SO THAT THE ANODES ARE ON ONE SIDE OF THE PIPE AND THEN THE OTHER SIDE AT NEXT STATION.

3. WRAP WIRE UNDER PIPE AND CONNECT AT THE TOP OF THE PIPE.

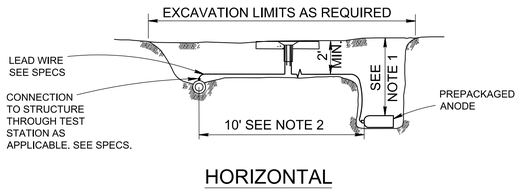
4. 0.01 OHM SHUNT IS NOT ALLOWED FOR MAGNESIUM ANODES.

T1 ONE 17 LB ANODES

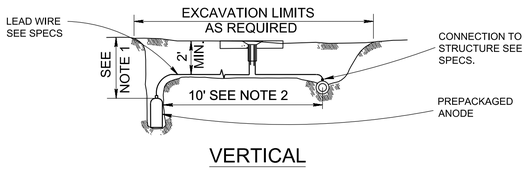
T2 TWO 17 LB ANODES

T3 THREE 17 LB ANODES

E8 ANODE TEST STATION DETAIL
NTS



HORIZONTAL



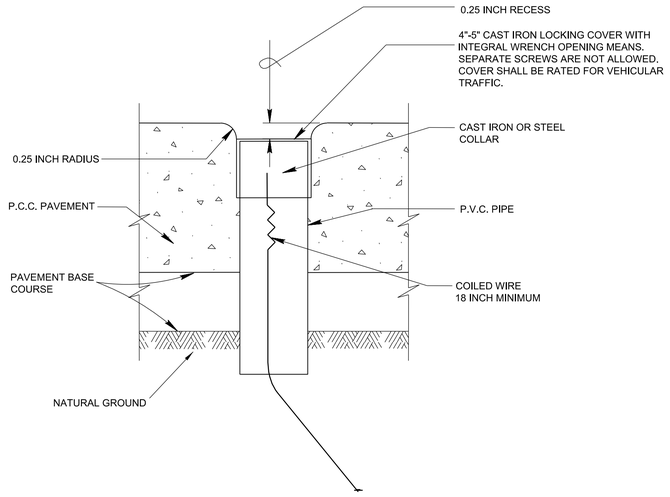
VERTICAL

NOTES:

1. ANODE TO BE INSTALLED AT A DEPTH EQUAL TO OR EXCEEDING DEPTH OF STRUCTURE, BUT IN NO CASE LESS THAN 3'-0".

2. IN AREAS SUCH AS THE AIRCRAFT APRON WHERE THE PAVEMENT REMOVAL DOES NOT ALLOW A 10 FT SEPARATION, A REDUCTION IN DISTANCE DOWN TO 5 FT IS ALLOWED.

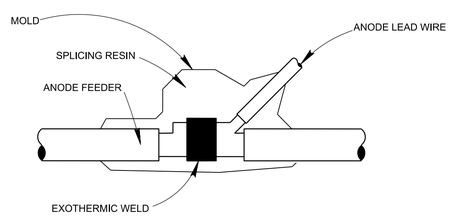
B2 GALVANIC ANODE INSTALLATION DETAIL
NTS



NOTES:

1. TEST STATIONS IN CONCRETE SHALL BE LOCATED 5 FT TO THE SIDE OF THE PIPE. TEST STATION SHALL NOT BE LOCATED CLOSER THAN 1 FT TO A CONSTUCTION JOINT.

B5 CATHODIC PROTECTION ACCESS PORT IN PAVEMENT
NTS



B8 SPLICE DETAIL
NTS

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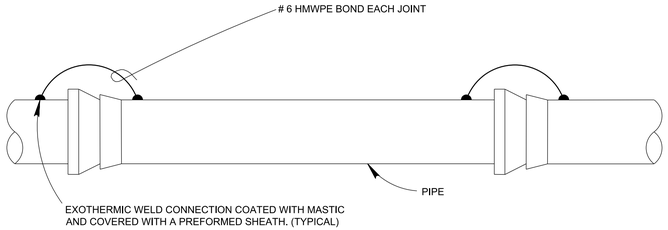
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CATHODIC PROTECTION DETAILS
SHEET 1

SHEET ID
EC501



NOTES:

1. THIS BONDING METHOD IS TO BE USED AT MECHANICAL JOINTS, FLEXIBLE COUPLINGS, OR TRANSITION COUPLINGS.

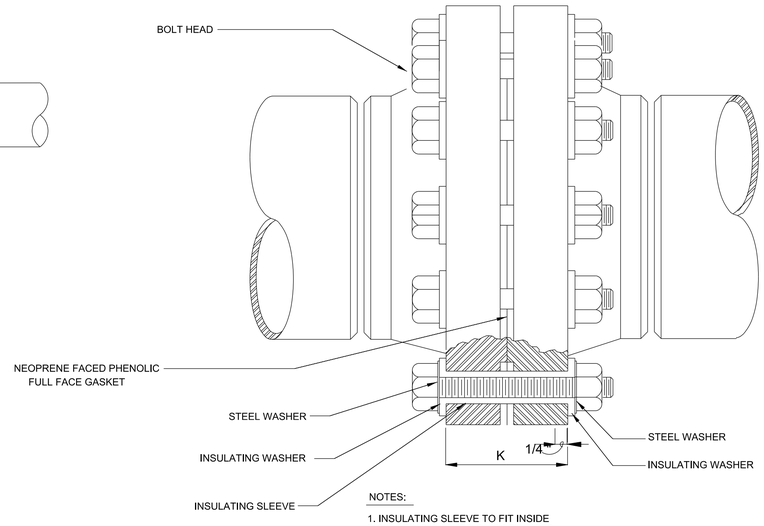
F1 BONDING DETAIL
NTS

COLOR CODING:
THIS SYSTEM OF COLOR CODING SHALL BE USED ON BOTH GALVANIC AND IMPRESSED CURRENT SYSTEMS.

BLACK - ANODE
RED - FUEL SUPPLY
BLUE - REFERENCE CELL
YELLOW - FOREIGN STRUCTURE
ORANGE - DRAIN LINE

ALPHA/NUMERIC TAGS SHALL BE USED WHERE THERE ARE MULTIPLE ITEMS IN ONE CABINET OR TEST STATION (E.G. SEVERAL ANODES EACH WITH A WIRE SHALL HAVE A TAG SUCH AS 1, 2, 3, ETC.).

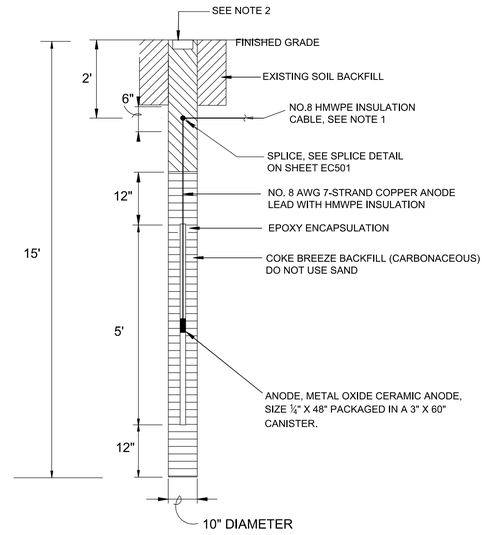
EACH TEST STATION SHALL COME WITH A STAMPED BRASS TAG WITH A UNIQUE IDENTIFIER NUMBER INDICATING THE TEST STATION NUMBER.



NOTES:

1. INSULATING SLEEVE TO FIT INSIDE INSULATING WASHER ON BOTH SIDES OF INSULATING FLANGE.

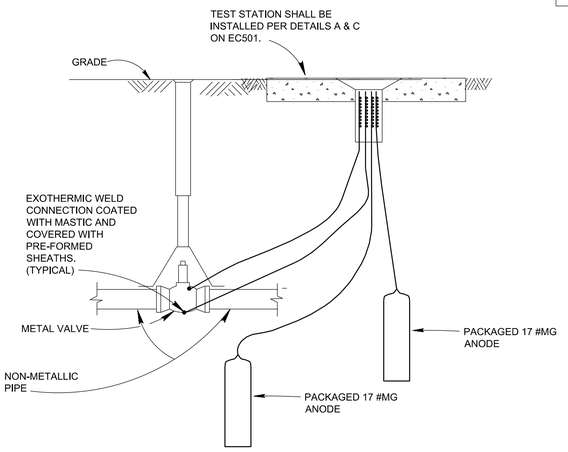
E5 INSULATING FLANGE ASSEMBLY
NTS



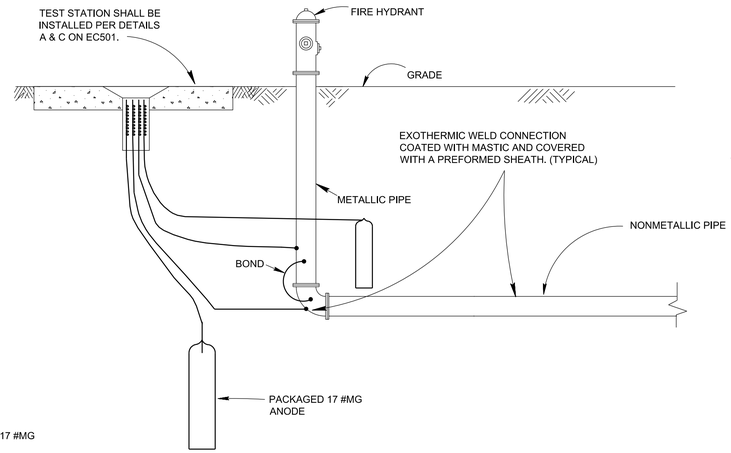
NOTES:

1. PROVIDE A 6" WIDE ORANGE WARNING TAPE 6" BELOW GRADE OVER ALL CATHODIC PROTECTION DIRECT BURIED CABLE. THE TYPE SHALL READ "CATHODIC PROTECTION CABLE BURIED BELOW"
2. PROVIDE 8" X 8" X 3" CONCRETE MARKER LABELED "ANODE" FLUSH WITH THE FINISHED GRADE.
3. SPACING IS AS SHOWN OR STATED ON THE SITE DRAWING EC1XX SHEETS.

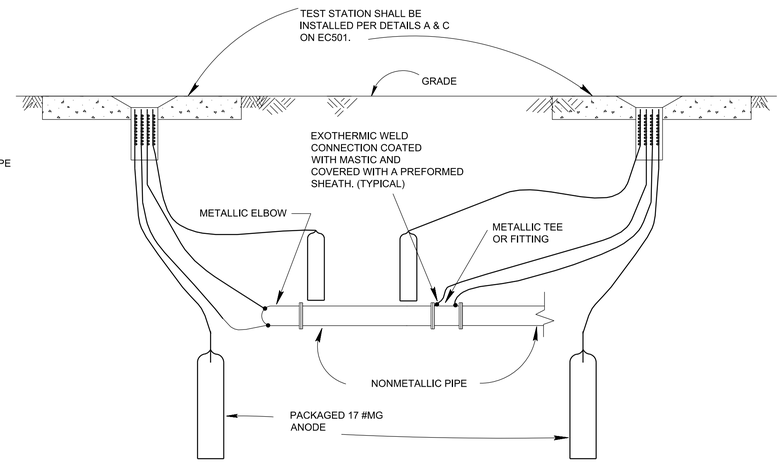
E8 TYPICAL VERTICAL INSTALLATION CERAMIC ANODE
NTS



B2 METAL VALVE ANODE INSTALLATION DETAIL



B4 HYDRANT ANODE INSTALLATION DETAIL
NTS



B8 METALLIC COMPONENT INSTALLATION DETAIL
NTS

NOTES:

1. DETAILS B2, B4, AND B8 APPLY FOR THOSE ITEMS INSTALLED ON NONMETALLIC PIPE SYSTEMS.

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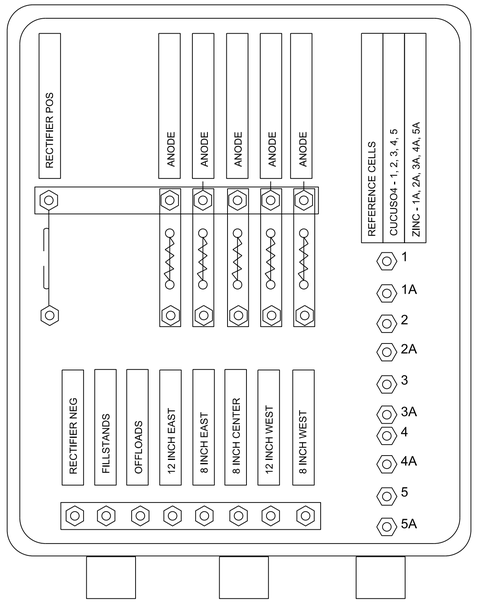
U.S. ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CATHODIC PROTECTION DETAILS
SHEET 2

SHEET ID
EC502



NOTES:

1. PROVIDE SHUNTS WITH THE APPROPRIATE POWER RATINGS. SEE SPECIFICATIONS. SHUNTS SHALL BE O.01 OHM.

2. ALL UNDERGROUND CONNECTIONS SHALL BE ENCASED TO BE WATERTIGHT.

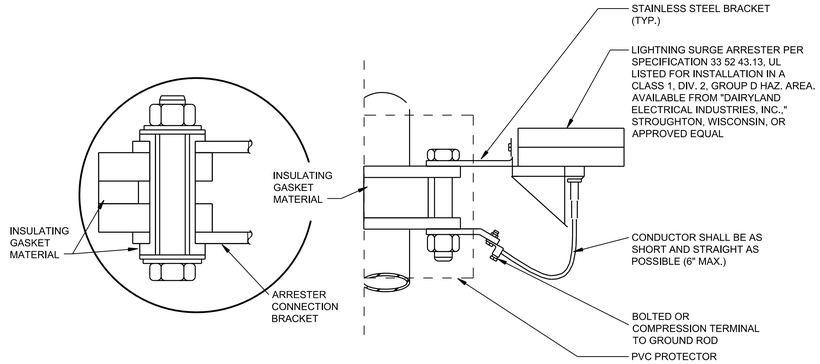
3. PROVIDE ETCHED LABELS BY EACH TERMINAL INDICATING THE NUMBER AND/OR FUNCTION.

4. ALL TERMINALS SHALL BE SOLDERLESS TYPE AND ALL WIRES SHALL HAVE RING OR LUG TERMINATIONS.

5. PROVIDE 24"H X 24" W X 6" D NEMA 4X ENCLOSURE WITH HINGED COVER AND LOCKABLE STAINLESS STEEL HARDWARE.

6. LAYOUT OF TERMINALS CAN BE ADJUSTED. NOTE THAT IF ANOTHER ANODE CONFIGURATION IS USED, THE NUMBER OF ANODE CONDUCTORS COULD CHANGE. CABINET SHALL BE ADJUSTED IN SIZE ACCORDINGLY.

E2 TERMINAL CABINET
SCALE: NTS



NOTES:

1. WRAP ENTIRE INSULATING FLANGE IN PVC PIPING AND SECURE WITH STAINLESS STEEL BAND CLAMP. LEAVE LIGHTNING SURGE ARRESTER EXPOSED.

F5 LIGHTNING SURGE ARRESTER
NTS

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DOD STANDARD DESIGN A/W 078-24-28
PRESSURIZED HYDRANT FUELING SYSTEM
TYPE III

CATHODIC PROTECTION DETAILS
SHEET 3

SHEET ID
EC503

STRUCTURAL NOTES:

A. GENERAL NOTES:

1. REFERENCE ELEVATION OF 100'-0" CORRESPONDS TO THE FOLLOWING MEAN SEA LEVEL ELEVATION (SEE CIVIL DWGS): ### FT

2. THE STRUCTURAL DRAWINGS SHALL BE USED IN CONJUNCTION WITH THE CIVIL, ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS AND SPECIFICATIONS.

3. WHERE SECTION IS SHOWN AND DETAILED, OTHER SECTIONS OF SIMILAR CONDITION SHALL BE DETAILED THE SAME OR OPPOSITE HAND, WHETHER SPECIFICALLY NOTED OR NOT.

4. ALL VERTICAL ELEVATIONS ARE BASED ON THE CONTROL ELEVATION FROM SURVEY BY OTHERS.

5. CONTRACTOR SHALL VERIFY ALL DIMENSIONS BEFORE STARTING WORK AND THE CONTRACTING OFFICER SHALL BE NOTIFIED IMMEDIATELY OF ANY DISCREPANCY.

6. THE CONTRACTOR SHALL VERIFY THE REQUIREMENTS OF OTHER DISCIPLINES AS TO SLEEVES, CHASES, HANGERS, INSERTS, ANCHORS, HOLES, PENETRATIONS, AND OTHER ADDITIONAL ITEMS TO BE PLACED OR SET IN THE STRUCTURAL WORK.

7. THE CONTRACTOR SHALL PROVIDE TEMPORARY SHORING AND BRACING REQUIRED TO ERECT AND HOLD THE STRUCTURE IN PROPER ALIGNMENT UNTIL PERMANENT SUPPORTS AND LATERAL BRACING ARE IN PLACE.

8. CONTRACTING OFFICER'S APPROVAL MUST BE SECURED FOR ALL SUBSTITUTIONS.

9. THE STRUCTURES HAVE BEEN DESIGNED IN ACCORDANCE WITH THE PROVISIONS OF THE FOLLOWING:

UFC 1-200-01, DoD BUILDING CODE (GENERAL REQUIREMENTS
UFC 3-301-01, STRUCTURAL ENGINEERING
UFC 3-320-06A, CONCRETE FLOOR SLABS ON GRADE SUBJECTED TO HEAVY LOAD
ICC IBC, INTERNATIONAL BUILDING CODE
ASCE 7 MINIMUM DESIGN LOADS FOR BUILDINGS AND OTHER STRUCTURES
ACI 318, BUILDING CODE REQUIREMENTS FOR STRUCTURAL CONCRETE
TMS 402/602, BUILDING CODE REQUIREMENTS AND SPECIFICATION FOR MASONRY STRUCTURES
MBMA MBSM, METAL BUILDING SYSTEMS MANUAL
AISC STEEL CONSTRUCTION MANUAL

B. DESIGN LOADS:

1. RISK CATEGORY: III

2. COLLATERAL ROOF DEAD LOADS FOR MISCELLANEOUS SUSPENDED MECHANICAL AND ELECTRICAL EQUIPMENT = 4 PSF

3. LIVE LOADS:
ROOF LIVE LOAD, Lr = 20 PSF
LATERAL LOAD ON INTERIOR WALLS & PARTITIONS, L = 5 PSF
PUMP ROOM SLAB LIVE LOAD, L = 150 PSF
CONTROL ROOM SLAB LIVE LOAD, L = 50 PSF

4. SNOW LOADS:
SNOW IMPORTANCE FACTOR, Is = 1.10
GROUND SNOW LOAD, Pg = ## PSF
SNOW EXPOSURE FACTOR, Ce = #.##
SNOW THERMAL FACTOR, Ct = #.##
ROOF SLOOPE FACTOR, Cs = #.##
FLAT ROOF SNOW LOAD, Pf = ## PSF
SLOPED ROOF SNOW LOAD, Ps = ## PSF

5. WIND LOADS:
BASIC WIND SPEED, V = ### MPH
WIND EXPOSURE CATEGORY = #
GUST EFFECT FACTOR, G = 0.85
INTERNAL PRESSURE COEFFICIENT, GCpi = 0.18
SEE S-002 FOR COMPONENT AND CLADDING WIND LOADS

6. SEISMIC LOADS:
SEISMIC IMPORTANCE FACTOR, Ie = 1.25
MAPPED SPECTRAL RESPONSE ACCELERATION AT SHORT PERIOD, Ss = #.###g
MAPPED SPECTRAL RESPONSE ACCELERATION AT 1S PERIOD, S1 = #.###g
SITE CLASSIFICATION: #
DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIOD, Sds = #.###g
DESIGN SPECTRAL RESPONSE ACCELERATION AT 1S PERIOD, Sd1 = #.###g
SEISMIC DESIGN CATEGORY: #
ANALYTICAL PROCEDURE: EQUIVALENT LATERAL ANALYSIS
CONTROL ROOM:
SEISMIC FORCE RESISTING SYSTEM: REINFORCED MASONRY SHEAR WALLS
SEISMIC RESPONSE COEFFICIENT, Cs = #.##
DESIGN BASE SHEAR, V = ##.# KIPS
RESPONSE MODIFICATION COEFFICIENT, R = 2.0

7. THE FOLLOWING CRANE LOADS WERE UTILIZED FOR THE CRANE DESIGN:
BRIDGE CRANE WEIGHT = 5,000 LBS
CRANE RUNWAY BEAMS = 41 PLF
HOIST WEIGHT = 300 LBS
LIVE LOAD = 2,000 LBS

C. SOILS AND FOUNDATION NOTES:

1. SEE SPECIFICATION SECTION 31 00 00 FOR EARTHWORK REQUIREMENTS.

2. WHEN WORKING NEAR EXISTING OR NEW CONSTRUCTION, THE CONTRACTOR SHALL EXERCISE EXTREME CAUTION TO NOT UNDERMINE, DISTURB, DAMAGE, OR CAUSE CONSIDERABLE MOVEMENT, CRACKING, OR SETTLEMENT OF THE ADJACENT CONSTRUCTION IN ANY WAY.

3. THE CONTRACTOR SHALL HIRE A GEOTECHNICAL ENGINEER, REGISTERED AND LICENSED IN THE STATE WHERE THE WORK WILL BE ACCOMPLISHED, TO INSPECT ALL FOUNDATION SUBGRADE AND ENSURE IT MEETS THE STATED ALLOWABLE SOIL BEARING CAPACITY. SUBGRADES SHALL BE INSPECTED AND APPROVED BY THE CONTRACTOR'S GEOTECHNICAL ENGINEER AND INSPECTED BY THE CONTRACTING OFFICER PRIOR TO PLACING CONCRETE. ANY SUBGRADE NOT MEETING THE STATED CAPACITY SHALL BE BROUGHT TO THE ATTENTION OF THE CONTRACTING OFFICER.

4. ALL EXCAVATION SHALL BE PERFORMED SO THAT THE SITE AND AREA IMMEDIATELY SURROUNDING THE SITE WHICH AFFECTS CONSTRUCTION OPERATIONS WILL BE CONTINUALLY AND EFFECTIVELY DRAINED. THE CONTRACTOR SHALL PROVIDE DRAINAGE AND DE-WATERING AS REQUIRED TO ENSURE THAT ALL FOOTING EXCAVATIONS ARE ACCOMPLISHED WITH SUBGRADE SOIL REMAINING DRY AND FIRM UNTIL AFTER FOOTINGS ARE PLACED AND BACKFILLED. REMOVAL OF SURFACE WATER, GROUNDWATER AND ANY PERCHED WATER CONDITIONS THAT MIGHT BE ENCOUNTERED DURING EXCAVATIONS SHALL BE ACCOMPLISHED BY APPROVED MEANS.

5. DO NOT PLACE FOUNDATION CONCRETE ON FROZEN OR SATURATED SUBGRADE.

6. ENSURE THAT EARTH-FORMED FOOTINGS CONFORM TO THE SHAPE, LINES, AND THICKNESS INDICATED ON THE FOUNDATION PLAN, SECTIONS, AND FOOTING SCHEDULES. EXCAVATION WIDTHS SHALL BE A MINIMUM OF 4" GREATER THAN DIMENSIONS INDICATED.

7. DO NOT INSTALL FOUNDATIONS UNTIL FOUNDATION WORK HAS BEEN COORDINATED WITH ADJACENT UNDERGROUND UTILITIES.

8. NO UNBALANCED BACKFILLING SHALL BE DONE AGAINST CONCRETE WALLS UNLESS WALLS ARE SECURELY BRACED AGAINST OVERTURNING, EITHER BY TEMPORARY CONSTRUCTION BRACING OR BY PERMANENT CONSTRUCTION.

9. SOIL DESIGN PROPERTIES
MAX ALLOWABLE NET SOIL BEARING PRESSURE = #,### PSF
CONCRETE/SOIL COEFFICIENT OF SLIDING = #.##
MIN FOUNDATION SLIDING FACTOR OF SAFETY = 1.5
MIN FOUNDATION UPLIFT FACTOR OF SAFETY = 1.5
MIN FOUNDATION OVERTURNING FACTOR OF SAFETY = 1.5
FROST PENETRATION = ## IN
DESIGN FOOTING DEPTH = # - #"

D. CONCRETE NOTES:

1. CONCRETE MATERIAL PROPERTIES SHALL CONFORM TO THE FOLLOWING:
MINIMUM 28 DAY COMPRESSIVE STRENGTH,: [4,000 PSI][4,500 PSI][5,000 PSI]
MAX WATER/CEMENT RATIO: [0.45][0.40]
MAX WATER SOLUBLE CHLORIDE ION IN CONCRETE (% BY WEIGHT OF CEMENT) (ASTM C1218): 0.30
FINE AGGREGATES AND COARSE AGGREGATES SHALL CONFORM TO ASTM C33

2. MIXING WATER SHALL MEET ASTM C1602, EXCEPT THAT WATER KNOWN TO BE POTABLE DOES NOT NEED TO BE TESTED. MIXING WATER SHALL NOT CONTAIN CHLORIDE ION CONCENTRATION IN EXCESS OF 1,000 PPM OR SULFATES AS SO^4 IN EXCESS OF 1,300 PPM.

3. AIR-ENTRAINING ADMIXTURES SHALL MEET ASTM C233. CHEMICAL ADMIXTURES SHALL MEET ASTM C494. A CERTIFICATE OF COMPLIANCE SIGNED BY THE MANUFACTURER SHALL BE FURNISHED FOR EACH SHIPMENT OF ADMIXTURE USED. IF MORE THAN ONE ADMIXTURE IS USED, PROVIDE DOCUMENTATION OF COMPATIBILITY.

4. REINFORCING BARS SHALL CONFORM TO ASTM A615 OR ASTM A706, GRADE 60 FOR DEFORMED BARS. DOWELS AND ANCHORS SHALL MEET ASTM A615 OR ASTM A36.

5. HORIZONTAL EXPANSION JOINT FILLER SHALL MEET ASTM D1751. BACKER MATERIAL SHALL MEET ASTM D5249.

6. ALL CONCRETE SLABS SHALL BE PLACED ON A 6" CAPILLARY WATER BARRIER.

7. ALL FLOOR SLABS SHALL BE TREATED WITH A SEALER/HARDENER.

8. ALL FLOOR JOINTS IN THE PUMP ROOM AREA SHALL BE SEALED WITH JET FUEL RESISTANT SEALANT.

9. ALL REINFORCING STEEL AND EMBEDDED ITEMS SUCH AS ANCHOR RODS AND WELD PLATES SHALL BE ACCURATELY PLACED IN THE POSITIONS SHOWN AND ADEQUATELY TIED AND SUPPORTED BEFORE CONCRETE IS PLACED TO PREVENT DISPLACEMENT BEYOND PERMITTED TOLERANCES. PROVIDE ACCESSORIES NECESSARY TO PROPERLY SUPPORT REINFORCING AT POSITIONS SHOWN ON DRAWINGS.

10.EXPOSED EDGES OF CONCRETE SHALL BE CHAMFERED 3/4".

11. CLEAR COVER TO REINFORCEMENT FOR CAST-IN-PLACE CONCRETE SHALL BE AS FOLLOWS UNLESS NOTED OTHERWISE:
CAST AGAINST OR PERMANENTLY EXPOSED TO EARTH: 3"
EXPOSED TO EARTH OR WEATHER:
#5 OR SMALLER: 1 1/2"
#6 OR LARGER: 2"
NOT EXPOSED TO WEATHER OR IN CONTACT WITH GROUND:
SLABS, WALLS, JOISTS AND #11 OR SMALLER: 3/4"
OTHER: 1 1/2"

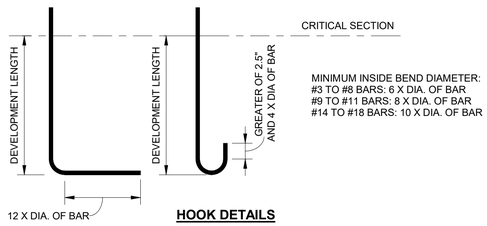
12. BAR CENTER TO CENTER SPACING (S) IS DEFINED AS BELOW.

13. REINFORCING BAR DEVELOPMENT AND LAP SPLICE LENGTHS SHALL BE AS SHOWN IN THIS TABLES BELOW UNLESS OTHERWISE NOTED ON THE DRAWINGS. DEVELOPMENT AND SPLICE LENGTH SHOWN SHALL NOT APPLY IF ANY OF THE FOLLOWING CONDITIONS OCCUR:
28 DAY CONCRETE COMPRESSIVE STRENGTH, f'c < 4,000 PSI
REINFORCEMENT YIELD STRENGTH, fy > 60,000 PSI
CONCRETE COVER IS NOT MET
LIGHT WEIGHT CONCRETE IS USED.
THE REINFORCEMENT IS EPOXY COATED

DEVELOPMENT AND SPLICE LENGTHS				
BAR SIZE	DEVELOPMENT LENGTH		SPLICE LENGTH	
	OTHER	TOP*	OTHER	TOP*
#3	1'-3"	1'-7"	1'-7"	2'-1"
#4	1'-7"	2'-1"	2'-1"	2'-9"
#5	2'-0"	2'-7"	2'-7"	3'-5"
#6	2'-5"	3'-1"	3'-1"	4'-1"
#7	3'-6"	4'-6"	4'-6"	5'-11"
#8	4'-0"	5'-2"	5'-2"	6'-9"
#9	4'-6"	5'-10"	5'-10"	7'-7"
#10	5'-1"	6'-7"	6'-7"	8'-6"
#11	5'-7"	7'-3"	7'-3"	9'-6"

DEVELOPMENT LENGTHS OF HOOKED BARS	
BAR SIZE	LENGTH OR MIN. EMBEDMENT
#3	8"
#4	10"
#5	1'-0"
#6	1'-3"
#7	1'-5"
#8	1'-7"
#9	1'-10"
#10	2'-1"
#11	2'-3"

*TOP BARS ARE DEFINED AS HORIZONTAL REINFORCEMENT SUCH THAT MORE THAN 12 INCHES OF FRESH CONCRETE IS CAST IN THE MEMBER BELOW THE DEVELOPMENT LENGTH OR SPLICE



HOOK DETAILS

E. STRUCTURAL CARBON STEEL NOTES:

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL AND DESIGN OF CONNECTIONS SHALL BE IN ACCORDANCE WITH AISC 360 "SPECIFICATION OR STRUCTURAL STEEL BUILDINGS" AND AISC 303 "CODE OF STANDARD PRACTICE FOR BUILDING AND BRIDGES".

2. STRUCTURAL CARBON STEEL SHALL CONFORM TO THE FOLLOWING:

WIDE FLANGE SHAPES	ASTM A992, Fy = 50 KSI
CHANNELS, PLATES, ANGLES	ASTM A36, Fy = 36 KSI
HSS HOLLOW SHAPES	ASTM A500, GRADE C, Fy = 50 KSI
HIGH STRENGTH BOLTS	ASTM A325.
WELDED STEEL ANCHOR STUDS	ASTM A108
ANCHOR BOLTS WITH NUT AND WASHER	ASTM F1554, Fy = 36 KSI
EXPANSION BOLTS	CID 1923A TYPE 4

3. WELDING SHALL CONFORM TO AMERICAN WELDING SOCIETY "STRUCTURAL WELDING CODE" LATEST EDITION, AWS D1.1. WELDING ELECTRODES SHALL CONFORM TO E70XX.

4. FIELD CUTTING FOR THE STRUCTURAL STEEL MEMBERS SHALL NOT BE PERMITTED. BOLT HOLES SHALL NOT BE CUT OR ENLARGED BY FLAME CUTTING IN THE FIELD.

5. ALL FIELD-BOLTED SHEAR CONNECTIONS SHALL BE SNUG TIGHT BEARING-TYPE CONNECTIONS, THREADS INCLUDED IN THE SHEAR PLANE.

E. STRUCTURAL STAINLESS STEEL NOTES:

1. FABRICATION AND ERECTION OF STRUCTURAL STEEL AND DESIGN OF CONNECTIONS SHALL BE IN ACCORDANCE WITH AISC 360 "SPECIFICATION OR STRUCTURAL STEEL BUILDINGS" AND AISC 303 "CODE OF STANDARD PRACTICE FOR BUILDING AND BRIDGES".

2. STRUCTURAL CARBON STEEL SHALL CONFORM TO THE FOLLOWING:
PLATES ASTM A240 TYPE 304L, Fy = 30 KSI
ANCHOR BOLTS ASTM A193 CLASS 2 GRADE B8
NUTS ASTM A194 GRADE 8

3.WELDING SHALL CONFORM TO AWS D1.6. WELDING ELECTRODES SHALL CONFORM TO E308L-XX.

F. MASONRY NOTES:

1. MASONRY MATERIAL PROPERTIES SHALL CONFORM TO THE FOLLOWING:
DESIGN STRENGTH, f'm = 2,000 PSI
CMU: ASTM C90, TYPE NORMAL WEIGHT
MORTAR: ASTM C270 TYPE S, MINIMUM COMPRESSIVE STRENGTH f'c = 2,000 PSI
GROUT: ASTM C476, MINIMUM COMPRESSIVE STRENGTH AT 28 DAYS, f'c = 2,000 PSI

2. PROVIDE HORIZONTAL JOINT REINFORCEMENT (NOT SHOWN) AT 16" O.C.

3. PROVIDE VERTICAL REINFORCING CONSISTING OF #4 BARS AT 32" O.C. MAX. PROVIDE ADDITIONAL VERTICAL REINFORCING AT OPENINGS, MASONRY CONTROL JOINTS. AND CORNERS AS INDICATED.

4. THE CONTRACTOR SHALL PROVIDE ADEQUATE TEMPORARY BRACING FOR ALL MASONRY WALLS DURING CONSTRUCTION.

5. USE 8 INCH DEEP LINTELS, THE THICKNESS OF THE WALLS, REINFORCED WITH 2-#4 BARS, AT OPENINGS WHERE LINTELS ARE NOT DETAILED. LINTEL REINFORCING SHALL EXTEND THE GREATER OF 48 BAR DIAMETERS OR 2'-0" BEYOND OPENING.

6. STIRRUPS AND TIES SHALL EXTEND FROM THE CLOSEST HORIZONTAL COURSE JOINT ABOVE THE OPENING TO THE CLOSEST HORIZONTAL COURSE JOINT BELOW THE OPENING.

7. LAP SPLICE LENGTHS SHALL BE AS FOLLOWS FOR GROUT WITH A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 2000 PSI:
#4 15"
#5 23"
#6 32"

F. OPEN WEB STEEL JOISTS NOTES:

1. DESIGN, FABRICATE, AND ERECT JOISTS IN ACCORDANCE WITH THE STEEL JOIST INSTITUTE (SJI) STANDARD SPECIFICATIONS, LATEST EDITION.

2. ROOF JOISTS SHALL BE DESIGNED IN ACCORDANCE WITH THE LOADS PROVIDED ON SHEETS S-001 AND S-002. IF LARGER JOISTS ARE REQUIRED THAN WHAT IS SHOWN ON THE PLANS TO ADEQUATELY RESIST THE LOADS, THEN THEY SHALL BE DESIGNED AND FURNISHED BY THE JOIST MANUFACTURER AT NO ADDITIONAL COST TO THE GOVERNMENT.

3. JOIST BRIDGING SIZE AND SPACING SHALL BE DETERMINED BY THE JOIST MANUFACTURER.

4. A LOAD OF 50 LB OR LESS MAY BE APPLIED AT ANY LOCATION ALONG THE BOTTOM OR TOP CHORD OF ANY JOIST. A LOAD OF 200 LB OR LESS MAY BE APPLIED TO THE BOTTOM OR TOP CHORD OF ANY JOIST AT A BOTTOM OR TOP CHORD PANEL POINT. IF ANY LOAD GREATER THAN 200 LBS MUST BE ADDED TO A JOIST AFTER FABRICATION OF THE JOIST, THE JOIST MANUFACTURER SHALL BE CONSULTED AND APPROPRIATE ALTERATIONS MADE.

5. APPROXIMATE LOCATION AND WEIGHT FOR MECHANICAL AND ELECTRICAL EQUIPMENT ARE SHOWN ON ROOF FRAMING PLANS. EXACT LOCATION AND WEIGHT OF EQUIPMENT TO BE HUNG FROM JOISTS SHALL BE COORDINATED BY CONTRACTOR WITH EQUIPMENT SUPPLIER AND JOIST SUPPLIER. JOISTS SHALL BE DESIGNED TO SUPPORT MECHANICAL EQUIPMENT PROVIDED.

6. JOIST DEFLECTIONS SHALL BE LIMITED TO L/240 FOR LIVE LOADS.

7. CONTRACTOR SHALL COORDINATE THE REQUIREMENTS OF ALL TRADES PROPOSING TO HANG EQUIPMENT OR MATERIAL FROM THE JOIST TO ENSURE THE REQUIREMENTS OF NOTES 4, 5, AND 6 ARE MET.

8. K SERIES STEEL JOISTS SHALL BE WELDED TO SUPPORTS WITH (2) 1 INCH LONG BY 1/8 INCH FILLET WELDS MINIMUM UNLESS NOTED OTHERWISE.

G. STEEL DECK NOTES:

1. STEEL DECK SHALL CONFORM TO THE STEEL DECK SPECIFICATIONS AND LOAD TABLES OF THE STEEL DECK INSTITUTE (SDI).

2. ALL HOLES AND OPENINGS REQUIRED SHALL BE COORDINATED WITH APPROPRIATE TRADE.

3. REINFORCEMENT AROUND HOLES AND OPENINGS SHALL BE AS FOLLOWS:
OPENING LESS THAN 6" WIDE: NO REINFORCEMENT REQUIRED
OPENING 6" TO 12" WIDE: PROVIDE A 0.0474 INCH THICK STEEL SHEET WITH A WIDTH OF 12" WIDER AND LONGER THAN THE OPENING AND ATTACHED TO STEEL DECK AT EACH CORNER AND AT 6" O.C.

4. INSTALL DECK TO COVER A MINIMUM OF 3 SPAN LENGTHS.

H. BRIDGE CRANE NOTES:

1. BRIDGE CRANE SHALL BE AS FOLLOWS:
CRANE TYPE: HAND CHAIN DRIVEN UNDERHUNG BRIDGE CRANE
HOIST TYPE: HAND GEARED TROLLY
CAPACITY: 1 TON (2,000 LBS)
SERVICE CLASSIFICATION: CLASS A (INFREQUENT)
HOOK HEIGHT ELEVATION: 112'-0"

2. ALL ENDS OF RUNWAY BEAMS SHALL BE PROTECTED BY END STOPS. THE BRIDGE CRANE SHALL BE PROVIDED WITH RUBBER BUMPERS TO MATE WITH THE END STOPS.

3. MINIMUM HEADROOM HOIST OR COPED BRIDGE BEAM SHALL BE UTILIZED AS REQUIRED TO MEET HOOK HEIGHT AND CLEARANCE REQUIREMENTS. COORDINATE WITH METAL BUILDING MANUFACTURER FOR DIMENSIONS OF METAL BUILDING FRAME.

4. SEE FRAMING PLANS FOR CRANE HOOK COVERAGE REQUIREMENTS AND LOCATION OF RUNWAY BEAMS.

5. BRIDGE CRANE SUPPLIER SHALL DESIGN AND PROVIDE RUNWAY BEAMS AND CONNECTIONS TO ROOF SYSTEM.

6. COORDINATE CONNECTION OF RUNWAY BEAMS TO STEEL MOMENT FRAMES WITH THE METAL BUILDING MANUFACTURER.

7. SEE DESIGN NOTES ON THIS SHEET FOR LOADING ASSUMPTIONS.

8. BRIDGE CRANE AND HOIST SHALL CONSIST OF NON-SPARKING AND NON-CORRODING COMPONENTS.

NOTES TO THE DESIGNER:
1. ITEMS INDICATED BY A "#" ARE TO BE DETERMINED BY THE DESIGNER.
2. NOTES PROVIDED ARE TYPICAL NOTES. DESIGNER SHALL REVISE NOTES TO MEET PROJECT REQUIREMENTS.
3. FOUNDATION DETAILS SHOWN ARE TYPICAL FOR AN ENCLOSED, UNHEATED PUMPHOUSE WHERE DESIGN FOR FROST IS A CONSIDERATION. ALTERNATE FOUNDATION DETAILS MAY BE PREFERRED FOR OPEN PUMP SHELTERS OR IN LOCATIONS WHERE A SLAB WITH A THICKENED EDGE MAY BE SUITABLE.
4. A SUBSURFACE INVESTIGATION SHALL BE PERFORMED AND A FOUNDATION ANALYSIS SHALL BE PREPARED. FOUNDATION DESIGN AND SUBGRADE PREPARATION SHALL BE IN ACCORDANCE WITH THE RECOMMENDATIONS OF THE FOUNDATION ANALYSIS.
5. THE FOUNDATION MUST BE DESIGNED FOR THE LOADS IMPOSED BY THE METAL BUILDING. FOUNDATION DESIGN LOADS MUST BE SHOWN ON THE DRAWINGS FOR VERIFICATION AND COORDINATION. NOTES ARE PROVIDED FOR THE CONTRACTOR TO REDESIGN THE FOUNDATION IF THE LOADS ON THE DRAWINGS ARE EXCEEDED
6. SITE SPECIFIC DESIGN CRITERIA INCLUDING DESIGN LOADS (DEAD, LIVE, COLLATERAL, WIND, SNOW, CRANE AND SEISMIC) AND THE RECOMMENDATIONS OF THE FOUNDATION REPORT (ALLOWABLE BEARING PRESSURES, TYPE OF FOUNDATION, SOIL DENSITY, AND LATERAL EARTH PRESSURE COEFFICIENTS) SHALL BE SHOWN ON THE CONTRACT DRAWINGS.
7. THE STRUCTURE IS CLASSIFIED AS ESSENTIAL PER UFC 3-310-01 AND SHALL THEREFORE BE A MINIMUM OF RISK CATEGORY III.
8. CONCRETE STRENGTH AND OTHER PROPERTIES SHALL BE ADJUSTED TO MEET DURABILITY REQUIREMENTS IN ACI 318 (EX. 4,500 PSI FOR CONCRETE SUBJECT TO FREEZING AND THAWING).

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MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

STRUCTURAL NOTES

SHEET ID
S-001

I. PRE-ENGINEERED METAL BUILDING NOTES:

1. THE PRE-ENGINEERED METAL BUILDING (PEMB) SYSTEM CONSISTS OF A RIGID CLEAR SPAN STRUCTURE. THE LATERAL FORCE RESISTING SYSTEM, ALL LATERAL BRACING, AND THE ROOF DIAPHRAGM SHALL ALL BE DESIGNED BY THE PEMB MANUFACTURER. THE DESIGN OF THE BUILDING SYSTEM SHALL BE IN ACCORDANCE WITH THE LATEST EDITIONS OF IBC, ASCE, AISC, AND THE METAL BUILDING SYSTEMS MANUAL. DESIGN AND CALCULATIONS FROM THE PEMB MANUFACTURER SHALL BE DESIGNED AND STAMPED BY A REGISTERED PROFESSIONAL ENGINEER.

2. PRE-ENGINEERED METAL BUILDING SHALL BE DESIGNED TO SUSTAIN THE LOADS ON S-001 AND SHALL MEET THE LOADING REQUIREMENTS IN ASCE 7 AND UFC 3-301-01. COMPONENTS AND CLADDING WIND LOADS SHALL NOT BE LESS THAN THOSE GIVEN ON THIS SHEET. LOAD COMBINATIONS SHALL BE IN ACCORDANCE WITH ASCE 7 UNLESS THE MBMA METAL BUILDING SYSTEMS MANUAL OR IBC LOAD COMBINATIONS ARE MORE STRINGENT. COORDINATE WITH CONTRACTOR FOR ACTUAL BRIDGE CRANE LOADS. SEE SHEET S-401 FOR LOCATION OF BRIDGE CRANE.

3. FOR ALLOWABLE FOUNDATION LOADS AT COLUMN LOCATIONS, REFER TO THE FRAME REACTION TABLE ON THIS SHEET. IF ACTUAL BUILDING LOADS EXCEED THOSE LISTED, CONTRACTOR SHALL BE RESPONSIBLE FOR REQUIRED FOUNDATION RE-DESIGN AND MODIFICATION. BUILDING SUPPLIER SHALL SUBMIT FOUNDATION LOADS FOR REVIEW AND APPROVAL. FOUNDATION REDESIGN SHALL BE PERFORMED BY A STRUCTURAL ENGINEER WHO IS A REGISTERED PROFESSIONAL ENGINEER (PE). CONTRACTOR SHALL SUBMIT CALCULATIONS AND DESIGN FOR APPROVAL WHERE FOOTING REDESIGN IS REQUIRED.

4. ANCHOR BOLTS SHALL BE POSITIVELY LOCATED USING 1/8" SHEET METAL TEMPLATES FOR ALL COLUMN BASE PLATES. PROVISION SHALL BE MADE FOR ALL ANCHOR BOLTS TO BE RIGIDLY HELD IN POSITION DURING CONCRETE CURING. ANCHOR BOLTS SHALL NOT BE TIGHTENED PRIOR TO 14 DAYS FOLLOWING CONCRETE PLACEMENT. ANCHOR BOLT PLACEMENT AND SIZE IS BASED ON THE CONCRETE CAPACITY ONLY. THE PEMB MANUFACTURER SHALL DESIGN THE BASE PLATE AND STEEL CONNECTION FOR THE LOADS FROM THE PEMB.

5. ROOF SHALL BE X-BRACED AS REQUIRED FOR LATERAL STABILITY.

6. THE CONTRACTOR SHALL BE RESPONSIBLE FOR SIZING AND PLACING BUILDING X-BRACING AND OTHER STRUCTURAL MEMBERS SUCH THAT THEY DO NOT INTERFERE WITH DOORS, LOUVERS, FANS, HOODS, AND OTHER MECHANICAL AND ELECTRICAL ITEMS LOCATED ALONG THE BUILDING'S WALLS AND ROOF.

7. THE BUILDING FOUNDATION WAS DESIGNED BASED UPON THE FOLLOWING CRITERIA CONCERNING THE PRE-ENGINEERED METAL BUILDING SUPERSTRUCTURE AND SHALL BE INCORPERATED IN THE PEMB MANUFACTURERS DESIGN:

A. FUTURE EXPANSIONS OR ADDITIONS TO THIS BUILDING ARE NOT CONSIDERATIONS.
B. FRAMING AT LINES 2 AND 3 CONSIST OF RIGID CLEAR SPAN FRAMES.
C. FRAMING AT LINES 1 AND 4 CONSIST OF END-WALL FRAMING WITH RIGID CLEAR SPAN FRAMES THAT SUPPORT 1/2 BAY LENGTH AND END-WALL COLUMNS.
D. CROSS BRACING (ROD BRACING) SHALL BE PROVIDED IN COLUMN LINES A & D BETWEEN GRIDLINES 2 & 3.
E. DOWNWARD, UPLIFT, AND LATERAL REACTIONS FROM THE MOMENT FRAME COLUMNS ARE CARRIED BY SPREAD FOOTINGS.

8. CONCRETE PIERS AND FOUNDATION SHALL NOT BE PLACED PRIOR TO CONTRACTING OFFICER'S APPROVAL OF THE METAL BUILDING SHOP DRAWING SUBMITTALS.

9. STORY DRIFT SHALL NOT EXCEED 1/240 TIMES THE STORY HEIGHT FOR WIND AND SEISMIC DESIGN.

10. STRUCTURAL MATERIAL DESIGN AND CONSTRUCTION SHALL CONFORM TO THE REQUIREMENTS ON S-001 AND IN THE SPECIFICATIONS.

11. LOADS INDUCED TO FRAMES CAUSED BY FOUNDATION MOVEMENTS OF 1/2" AT BASE PLATES HORIZONTALLY AND/OR VERTICALLY SHALL BE INCLUDED IN THE DESIGN OF THE STRUCTURE.

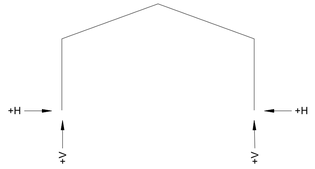
12. PEMB MANUFACTURER SHALL DESIGN AND PROVIDE FRAMING AROUND ROOF PENETRATIONS. COORDINATE EXACT SIZE AND LOCATION OF OPENINGS WITH ACTUAL MECHANICAL EQUIPMENT SUPPLIED.

NOTES TO THE DESIGNER:
1. THE STRUCTURAL DESIGNER WILL BE REQUIRED TO DESIGN THE FOOTINGS AND PROVIDE MAXIMUM LOADS TO THE PEMB MANUFACTURER OR MODIFY THE DRAWINGS TO REQUIRE THE CONTRACTOR TO DESIGN THE FOUNDATION. VERTICAL LOAD REACTIONS SHALL INCLUDE VERTICAL LOADS ON ROOF, VERTICAL LOAD FROM CROSS BRACING (ROD BRACING) CAUSED BY HORIZONTAL LOAD ON THE BUILDING, AND VERTICAL LOAD RESULTING FROM THE MOMENT FRAMES CAUSED BY LATERAL LOADS ON THE MOMENT FRAME. SLIDING RESISTANCE SHALL ALSO INCLUDE REDUCED SLIDING CAPACITY RESULTING FROM SIMULTANEOUS UPLIFT.
2. REVISE NOTES AS NECESSARY FOR PROJECT SPECIFIC NEEDS.
3. DETAILS AND SECTIONS ARE SHOWN FOR THE PUMPHOUSE ONLY. DETAILS AND SECTIONS SHALL BE MODIFIED FOR THE PUMP HOUSE AND ARE SIMILAR. PUMPHOUSE ONLY COMPONENTS AND PUMP SHELTER ONLY STRUCTURAL COMPONENTS ARE PROVIDED IN THEIR OWN WORKSETS TO PROVIDE EASE OF REMOVING COMPONENTS THAT DO NOT APPLY. PUMPHOUSE ONLY COMPONENTS ARE VISIBLE BY DEFAULT AND PUMP SHELTER ONLY COMOPONENTS ARE HIDDEN, WITH THE EXCEPTION OF THE PUMP SHELTER FOUNDATION AND SLAB PLAN.

COMPONENTS AND CLADDING WIND LOAD PRESSURES SCHEDULE

EFFECTIVE WIND AREA (SF)	WIND PRESSURE (PSF)									
	ZONE 1		ZONE 2		ZONE 3		ZONE 4		ZONE 5	
10	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#
20	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#
50	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#
100	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#
200	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#
500	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#	-##.#

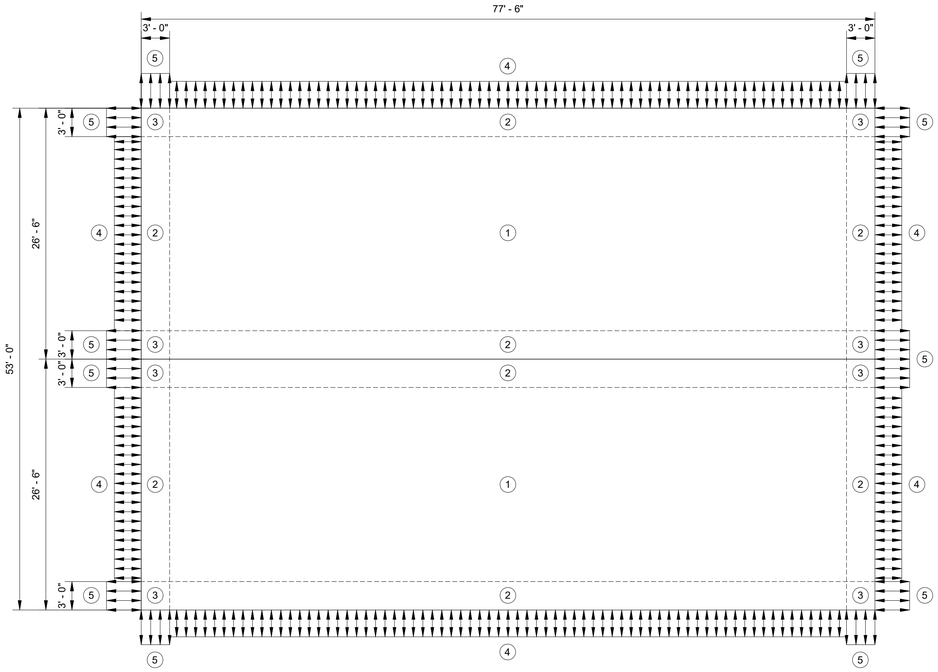
NOTES:
1. PRESSURES SHOWN ARE APPLIED NORMAL TO THE SURFACE AND ARE UNFACTORED PER ASCE 7.
2. POSITIVE AND NEGATIVE SIGNS SIGNIFY PRESSURES ACTING TOWARD AND AWAY FROM THE SURFACE, RESPECTIVELY.
3. FOR EFFECTIVE WIND AREAS BETWEEN THOSE GIVEN, VALUES MAY BE INTERPOLATED OR THE VALUES MAY BE THAT ASSOCIATED WITH THE LOWER EFFECTIVE WIND AREA.



FRAME REACTIONS, KIPS						
ASCE 7 LOAD COMB.	FOOTING F1		FOOTING F2		FOOTING F3	
	H	V	H	V	H	V
MAX LRFD COMB. (+)	#	#	#	#	#	#
MIN LRFD COMB. (-)	#	#	#	#	#	#
MAX ASD COMB. (+)	#	#	#	#	#	#
MIN ASD COMB. (-)	#	#	#	#	#	#

NOTES:
1. LOADS SHOWN ABOVE ARE THE REACTIONS AT THE BASE OF THE BUILDING FRAME COLUMNS (TOP OF CONCRETE PILASTERS).
2. WHERE THE BUILDING FRAME LOADS EXCEED THE MOST CURRENT ASCE 7 LOAD COMBINATIONS PROVIDED ABOVE, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL CALCULATIONS PERFORMED BY A LICENSED STRUCTURAL ENGINEER (PE) THAT SHOW WHETHER A REDESIGN OF THE FOOTINGS ARE NECESSARY. IF A REDESIGN IS NECESSARY, THE CONTRACTOR SHALL SUBMIT FOR APPROVAL CALCULATIONS AND NEW FOOTING DESIGN PERFORMED BY A LICENSED STRUCTURAL ENGINEER (PE).
3. FOR END COLUMNS, POSITIVE H ACTS TOWARDS THE INTERIOR OF THE BUILDING AND NEGATIVE H ACTS AWAY FROM THE INTERIOR OF THE BUILDING.
4. SEE [S-100A][S-100B] FOR LOCATIONS OF EACH FOOTING AND FOOTING IDENTIFICATIONS.

B2 FRAME REACTIONS
SCALE: NTS



B6 COMPONENTS & CLADDING LOADING DIAGRAM
SCALE: 1/8" = 1'-0"

0 4' 8' 16'

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MARK	DESCRIPTION	DATE

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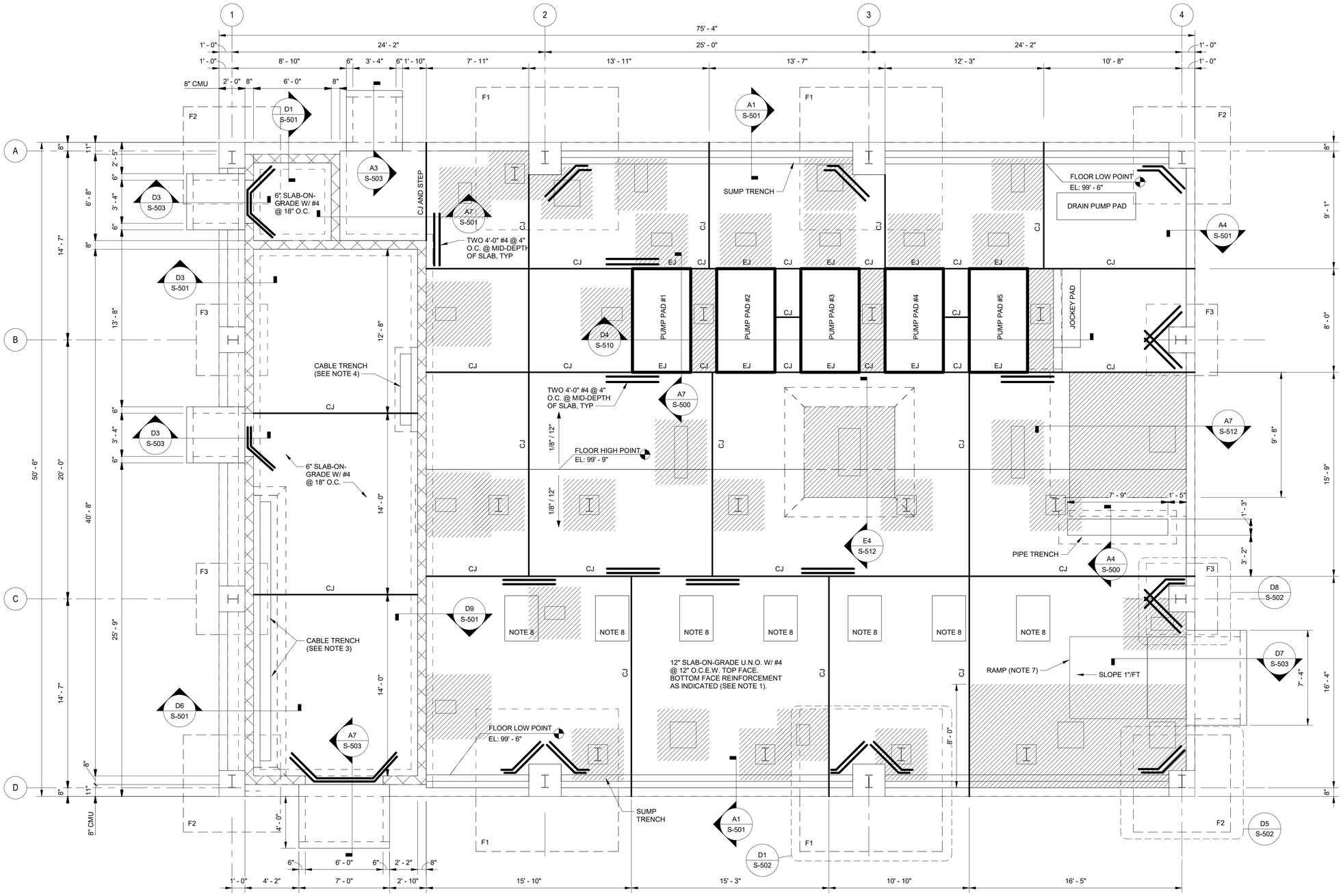
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PEMB NOTES AND C&C WIND LOADS

SHEET ID
S-002



NOTES:
1. SEE SCHEDULE ON S-600 AND PIPE SUPPORT PLAN ON S-101 FOR BOTTOM FACE REINFORCEMENT WITHIN LIMITS OF SHADED AREA.
2. SLAB-ON-GRADE CONTRACTION JOINTS ARE DENOTED "CJ" IN PLAN. AT CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED FOR CONTRACTION JOINTS. SEE S-500 FOR SLAB-ON-GRADE AND JOINT DETAILS. EXPANSION JOINTS ARE DENOTED "EJ" ON THE PLAN.
3. MOTOR CONTROL CENTER AND MAIN DISTRIBUTION SWITCHGEAR, APPROXIMATELY 20'-0" LONG.
4. POWER CONTROL PANEL TRENCH, APPROXIMATELY 5'-6" LONG.
5. PUMP ROOM FLOOR SLAB SHALL BE SLOPED TO DRAINS AT 1/8"/FT. SEE PLAN.
6. IF PEMB LOADS EXCEED THOSE THAT THE FOUNDATION WAS DESIGNED FOR, THE CONTRACTOR SHALL BE REQUIRED TO REDESIGN THE FOUNDATION. SEE PRE-ENGINEERED METAL BUILDING NOTES ON SHEET S-002.
7. CONCRETE RAMP IS SHOWN. STEEL OR ALUMINUM RAMPS MAY BE SUBMITTED FOR APPROVAL.
8. SEE MECHANICAL FOR FILTER SEPARATOR PAD LOCATIONS. SEE F1/S-500 FOR FILTER SEPARATOR PAD DETAIL.

NOTES TO THE DESIGNER:
1. UPDATE FOOTING AND PEDESTAL SCHEDULE PER FOUNDATION DESIGN.

FOOTING AND PEDESTAL SCHEDULE

MARK	FOOTINGS			BOTTOM OF FOOTING ELEVATION	PEDESTAL			TOP OF PEDESTAL EL.	DETAIL
	SIZE	TOP REINF.	BOTTOM REINF.		SIZE	REINFORCING	TIES		
F1	##'-#" X ##'-#" X ##"	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	30" X 30"	16 #7 VERT. BARS	#3 @ 12" O.C.	100'-0"	A1/S-502
F2	##'-#" X ##'-#" X ##"	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	24" X 24"	16 #6 VERT. BARS	#3 @ 12" O.C.	100'-0"	A5/S-502
F3	##'-#" X ##'-#" X ##"	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	24" X 24"	16 #6 VERT. BARS	#3 @ 12" O.C.	100'-0"	A8/S-502

A2 PUMPHOUSE FOUNDATION AND SLAB PLAN
SCALE: 1/4" = 1'-0"

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DESIGNED BY:
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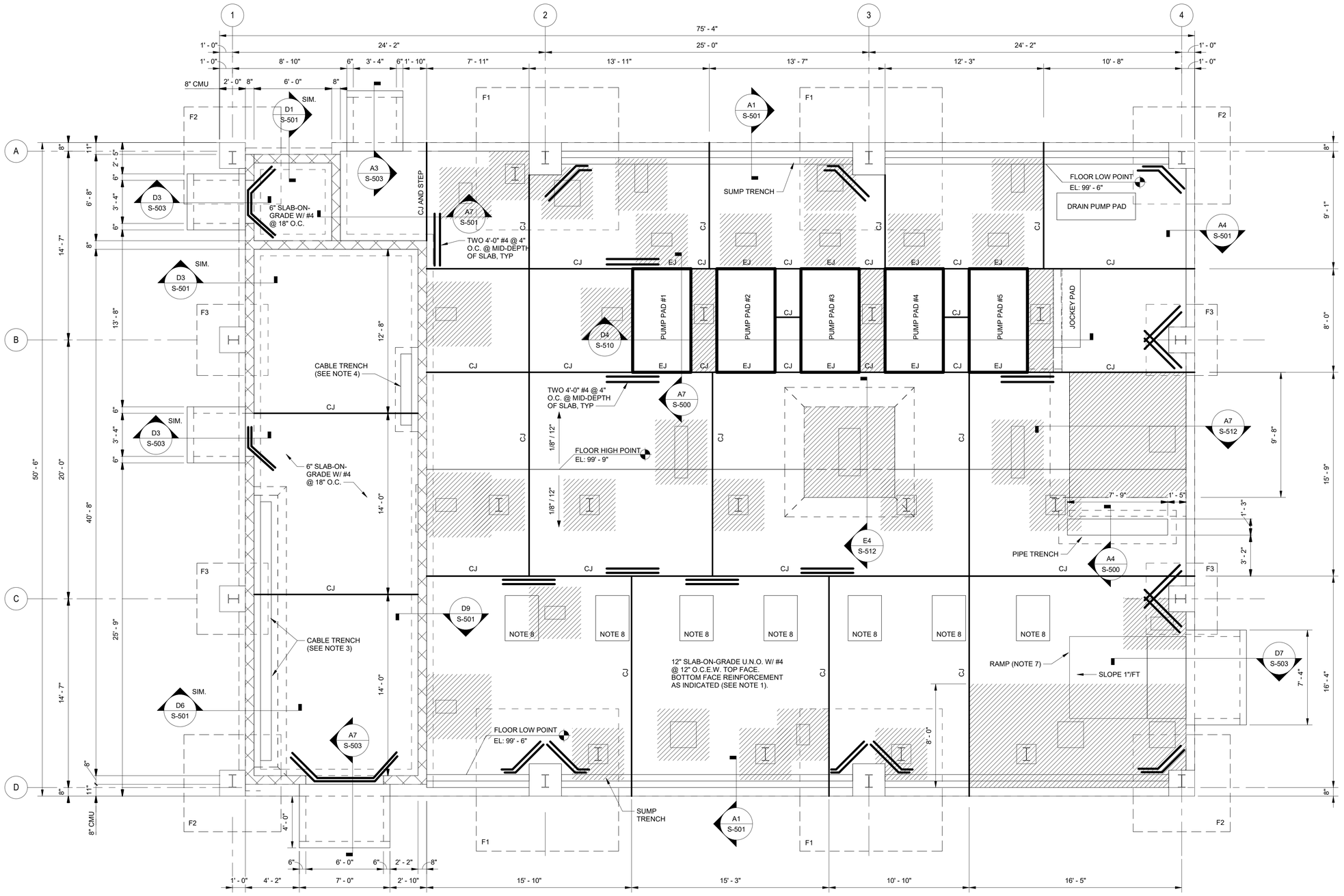
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMPHOUSE FOUNDATION AND SLAB PLAN

SHEET ID
S-100A



NOTES:
1. SEE SCHEDULE ON S-600 AND PIPE SUPPORT PLAN ON S-101 FOR BOTTOM FACE REINFORCEMENT WITHIN LIMITS OF SHADED AREA.
2. SLAB-ON-GRADE CONTRACTION JOINTS ARE DENOTED "CJ" IN PLAN. AT CONTRACTOR'S OPTION, CONSTRUCTION JOINTS MAY BE SUBSTITUTED FOR CONTRACTION JOINTS. SEE S-500 FOR SLAB-ON-GRADE AND JOINT DETAILS. EXPANSION JOINTS ARE DENOTED "EJ" ON THE PLAN.
3. MOTOR CONTROL CENTER AND MAIN DISTRIBUTION SWITCHGEAR, APPROXIMATELY 20'-0" LONG.
4. POWER CONTROL PANEL TRENCH, APPROXIMATELY 5'-6" LONG.
5. PUMP ROOM FLOOR SLAB SHALL BE SLOPED TO DRAINS AT 1/8"/FT. SEE PLAN.
6. IF PEMB LOADS EXCEED THOSE THAT THE FOUNDATION WAS DESIGNED FOR, THE CONTRACTOR SHALL BE REQUIRED TO REDESIGN THE FOUNDATION. SEE PRE-ENGINEERED METAL BUILDING NOTES ON SHEET S-002.
7. CONCRETE RAMP IS SHOWN. STEEL OR ALUMINUM RAMPS MAY BE SUBMITTED FOR APPROVAL.
8. SEE MECHANICAL FOR FILTER SEPARATOR PAD LOCATIONS. SEE F1/S-500 FOR FILTER SEPARATOR PAD DETAIL.

NOTES TO THE DESIGNER:
1. UPDATE FOOTING AND PEDESTAL SCHEDULE PER FOUNDATION DESIGN.

FOOTING AND PEDESTAL SCHEDULE

MARK	FOOTINGS			BOTTOM OF FOOTING ELEVATION	PEDESTAL			TOP OF PEDESTAL EL.	DETAIL
	SIZE	TOP REINF.	BOTTOM REINF.		SIZE	REINFORCING	TIES		
F1	##'-#" X ##'-#" X ##	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	30" X 30"	16 #7 VERT. BARS	#3 @ 12" O.C.	100'-0"	A1/S-502
F2	##'-#" X ##'-#" X ##	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	24" X 24"	16 #6 VERT. BARS	#3 @ 12" O.C.	100'-0"	A5/S-502
F3	##'-#" X ##'-#" X ##	## @ ##" O.C.E.W.	## @ ##" O.C.E.W.	##'-#"	24" X 24"	16 #6 VERT. BARS	#3 @ 12" O.C.	100'-0"	A8/S-502

A2 PUMP SHELTER FOUNDATION AND SLAB PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

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SUBMITTED BY:
SIZE: ANSI D
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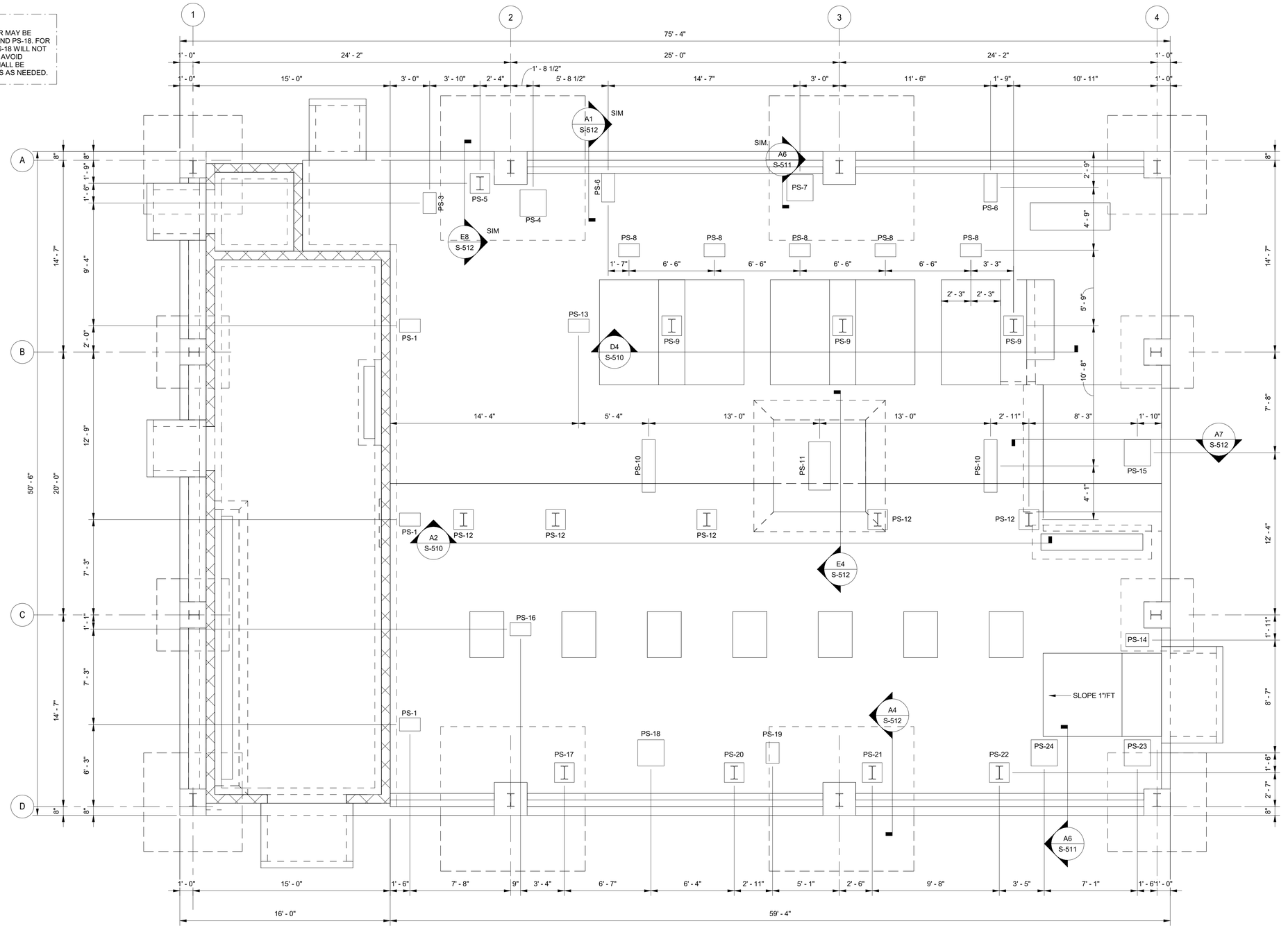
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMP SHELTER FOUNDATION AND SLAB PLAN

SHEET ID
S-100B

NOTES TO THE DESIGNER:
1. FOR SOME PROJECTS A MICRONIC FILTER MAY BE REQUIRED THAT INTERFERES WITH PS-17 AND PS-18. FOR THESE INSTANCES IT IS EXPECTED THAT PS-18 WILL NOT BE NEEDED AND PS-17 CAN BE SHIFTED TO AVOID CONFLICT. THE STRUCTURAL DESIGNER SHALL BE RESPONSIBLE FOR MOVING PIPE SUPPORTS AS NEEDED.



NOTE:
1. ENSURE THAT THE PIPE SUPPORTS AND PIPES DO NOT INTERFERE WITH THE BUILDING COLUMNS AND/OR THEIR PEDESTALS.
2. SEE PIPE SUPPORT SCHEDULE ON SHEET S-600.

A2 PUMPHOUSE PIPE SUPPORT PLAN
SCALE: 1/4" = 1'-0"

0 2' 4' 8'

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

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SUBMITTED BY:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT PLAN

SHEET ID

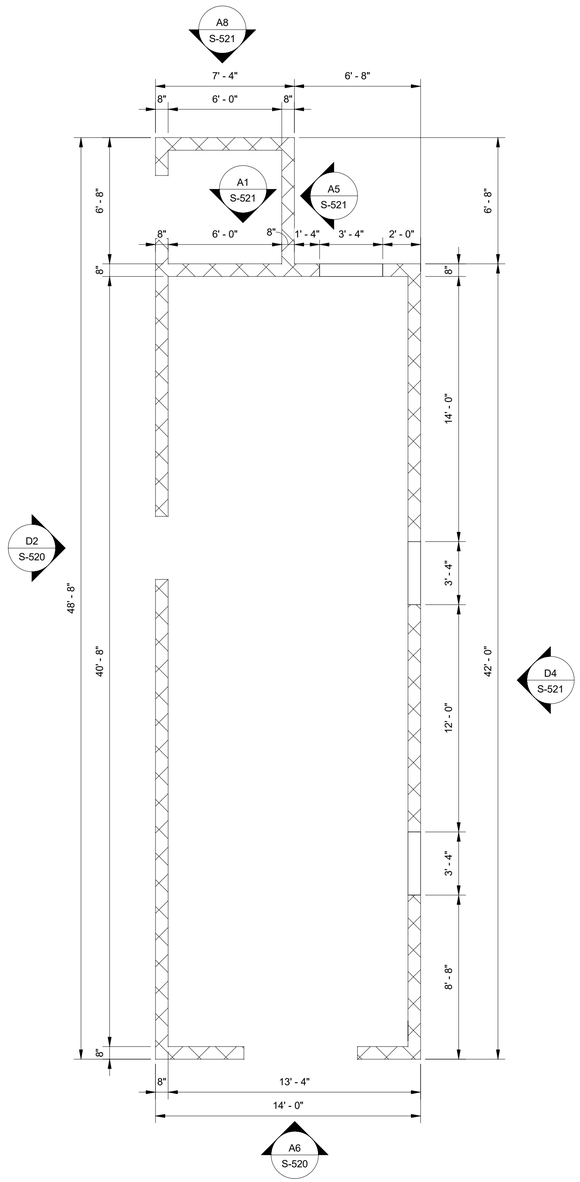
S-101

COMPOSITE STEEL DECK MATERIAL SCHEDULE

DECK TYPE	MINIMUM THICKNESS	MINIMUM YIELD STRENGTH	MINIMUM STEEL SECTION PROPERTIES			MINIMUM SHEET WIDTH	DECK FINISH
			I	S+	S-		
1 1/2" DEEP COMPOSITE	0.0239 IN	33 KSI	0.136 IN^4/FT	0.132 IN^3/FT	0.120 IN^3/FT	36 IN	GALVANIZED

COMPOSITE STEEL DECK FASTENER SCHEDULE

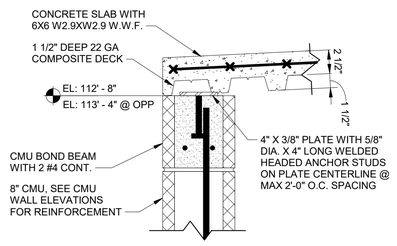
FASTENER LOCATION	FASTENER REQUIREMENTS
DECK TO JOISTS	5/8" MIN DIA. PUDDLE WELD AT 12" O.C. MAX (36/4 PATTERN)
DECK TO WALL PLATES	5/8" MIN DIA. PUDDLE WELD AT 12" O.C. MAX (36/4 PATTERN)
DECK SIDE LAPS	1 1/4" SEAM WELD OR EQUIVALENT MECHACNICAL FASTENER PER DECK SPAN



A2 MASONRY WALL PLAN

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

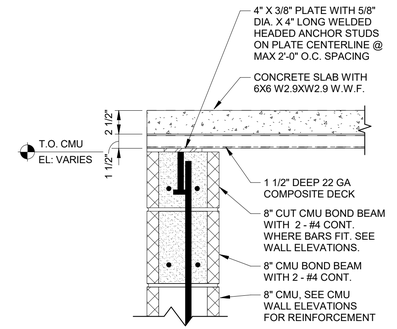
0 2' 4' 8'



E6 DECK BEARING DETAIL A

SCALE: 1 1/2" = 1'-0"

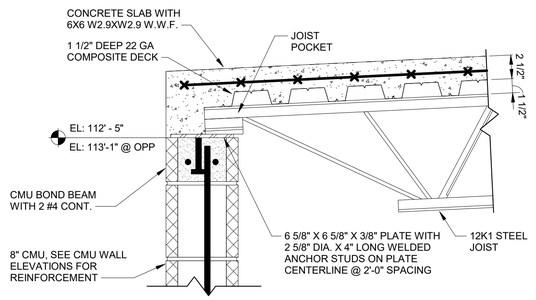
0 6" 1' 2'



C6 DECK BEARING DETAIL B

SCALE: 1 1/2" = 1'-0"

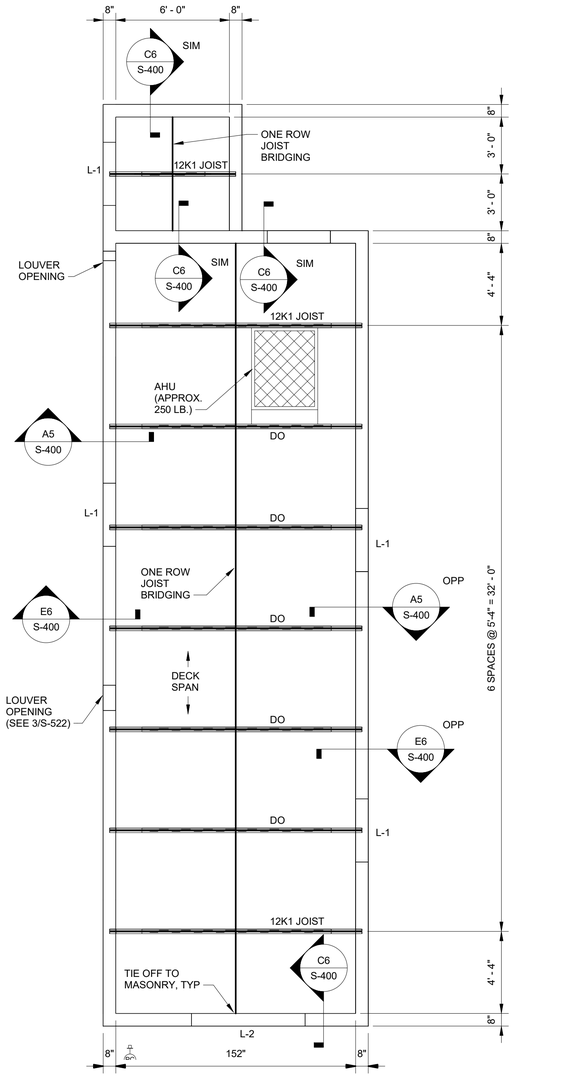
0 6" 1' 2'



A5 JOIST BEARING DETAIL

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'



NOTES:
1. CONTRACTOR SHALL DESIGN AND PROVIDE FRAMING FOR JOIST SUPPORTED EQUIPMENT AND SHALL SUBMIT THE DESIGNS FOR APPROAVAL. SEE SHEET MH501 FOR TYPICAL SEISMIC BRACING.
2. L-# MASONRY LINTEL. SEE DETAIL ON SHEET S-522.

A8 MASONRY ROOF FRAMING PLAN

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

0 2' 4' 8'

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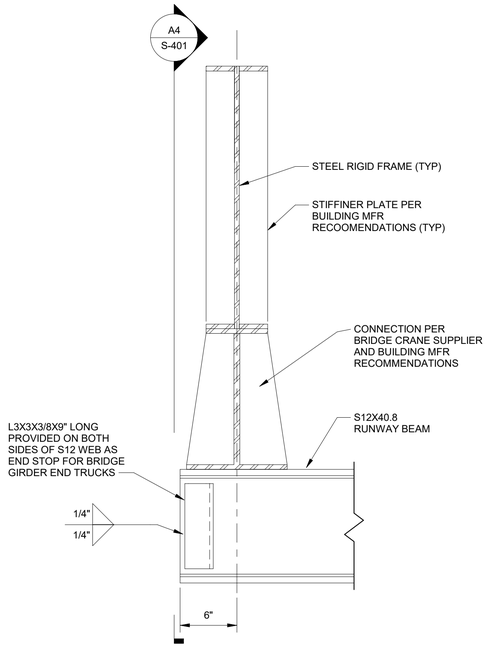
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL ROOM PLAN

SHEET ID

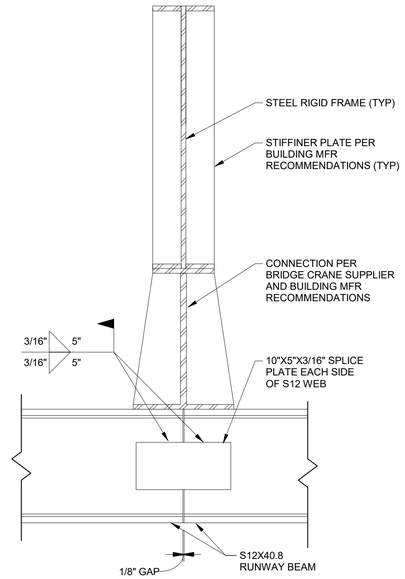
S-400



D1 DETAIL A

SCALE: 1 1/2" = 1'-0"

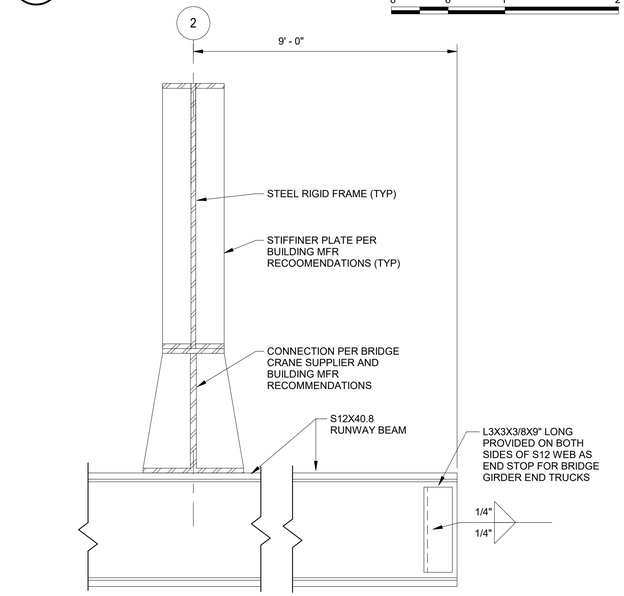
0 6" 1' 2'



D4 DETAIL B

SCALE: 1 1/2" = 1'-0"

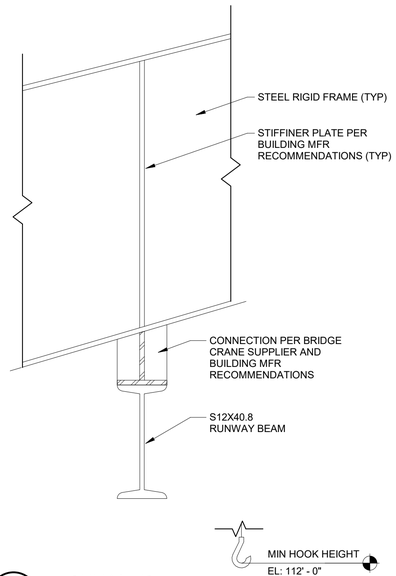
0 6" 1' 2'



A1 DETAIL C

SCALE: 1 1/2" = 1'-0"

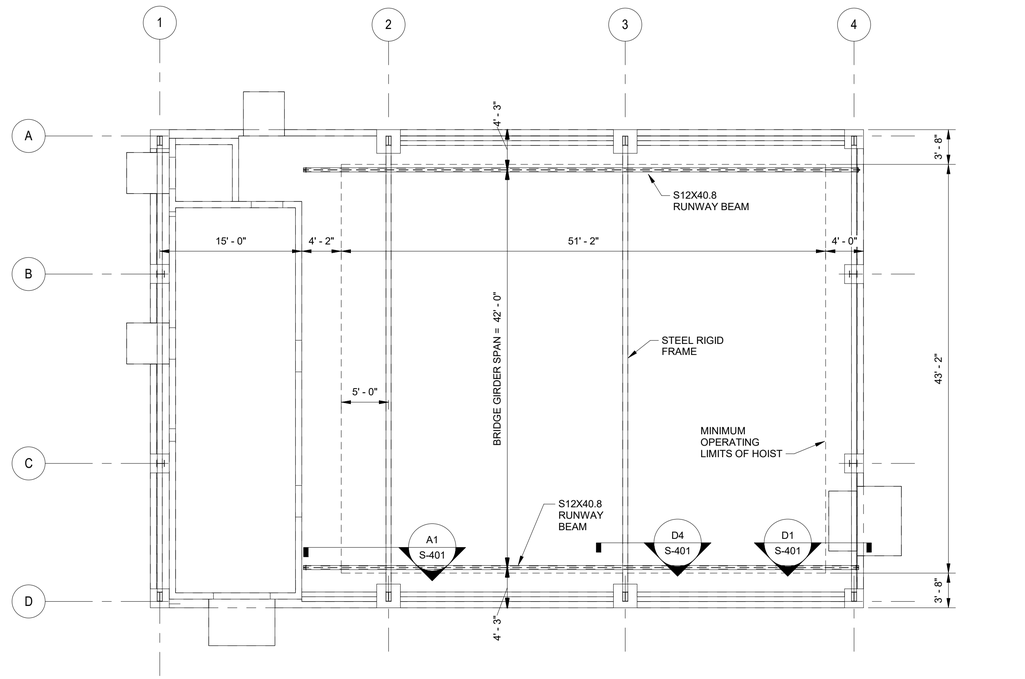
0 6" 1' 2'



A4 DETAIL D

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'



BRIDGE CRANE NOTES:
1. SEE BRIDGE CRANE NOTES ON SHEET S-001.

A6 BRIDGE GIRDER LOCATION PLAN

SCALE: 1/8" = 1'-0"

0 4' 8' 16'

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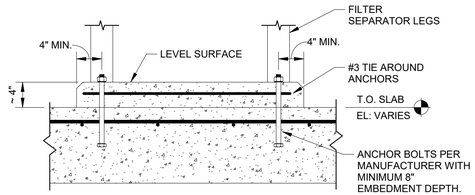
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

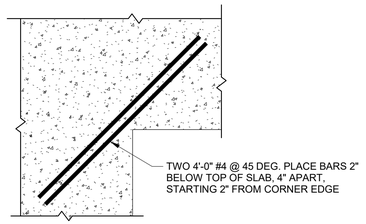
BRIDGE CRANE PLAN AND DETAILS

SHEET ID

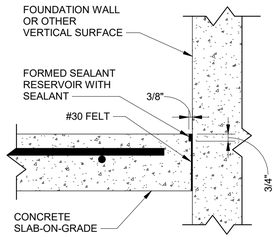
S-401



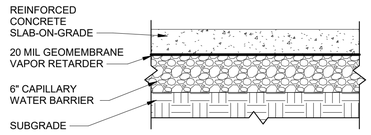
F1 FILTER SEPARATOR PADS
SCALE: 1" = 1'-0"



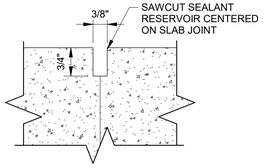
D2 RE-ENTRANT CORNER
SCALE: NTS



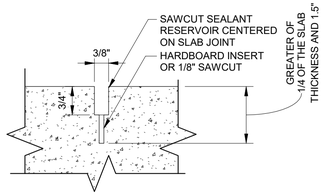
E4 SLAB AT VERT. SURFACE
SCALE: NTS



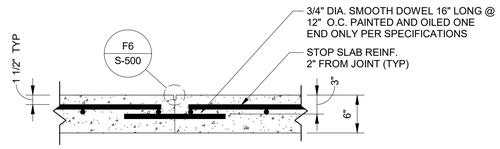
D4 WATER VAPOR RETARDER
SCALE: NTS



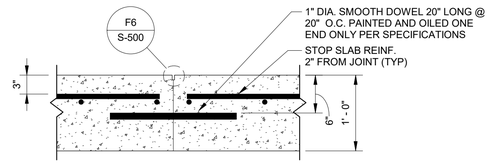
F6 DETAIL A
SCALE: NTS



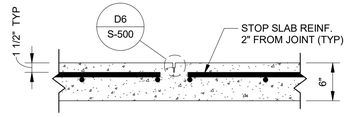
D6 DETAIL B
SCALE: NTS



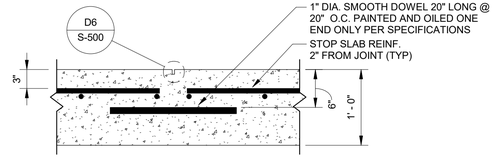
G8 CONSTRUCTION JOINT (CJ) FOR 6" SLAB
SCALE: NTS



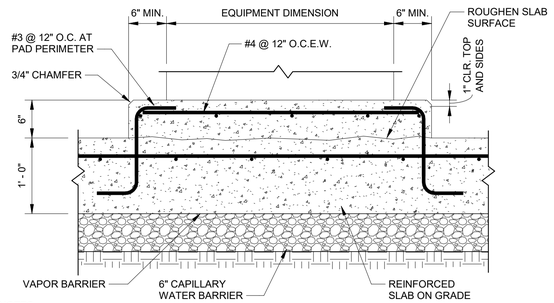
F8 CONSTRUCTION JOINT (CJ) FOR 12" SLAB
SCALE: NTS



E8 CONTRACTION JOINT (CJ) FOR 6" SLAB
SCALE: NTS

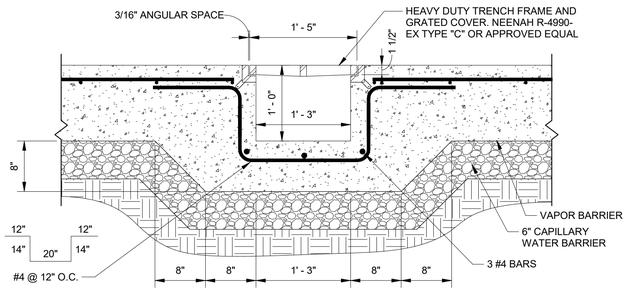


D8 CONTRACTION JOINT (CJ) FOR 12" SLAB
SCALE: NTS

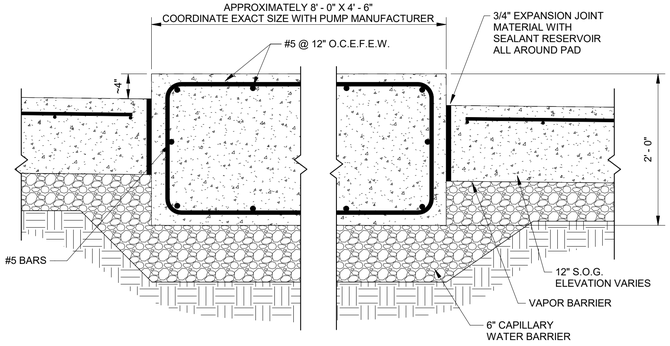


NOTES:
1. SEE MECHANICAL AND STRUCTURAL PLANS FOR LOCATION OF JOCKEY PAD.
2. THE PLAN DIMENSIONS OF EQUIPMENT BASES AND THEIR ANCHOR BOLT LOCATIONS, SIZES, EMBEDMENTS, AND PROJECTIONS SHALL SUIT THE REQUIREMENTS OF THE APPROVED EQUIPMENT FURNISHED.

A1 JOCKEY PUMP AND DRAIN PUMP PAD
SCALE: 1" = 1'-0"



A4 TRENCH
SCALE: 1" = 1'-0"



A7 PUMP PAD SECTION
SCALE: 1" = 1'-0"

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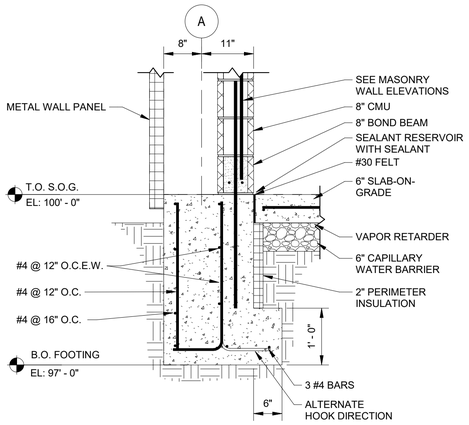
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

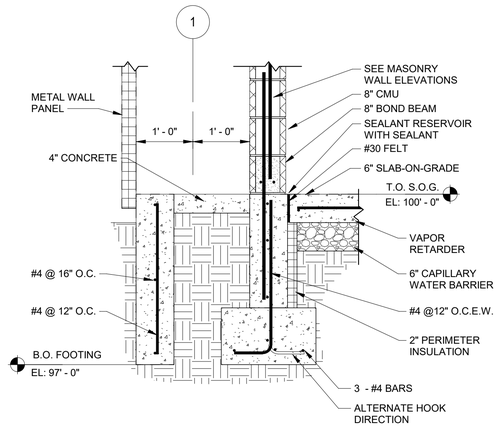
STRUCTURAL SLAB AND PAD DETAILS

SHEET ID
S-500

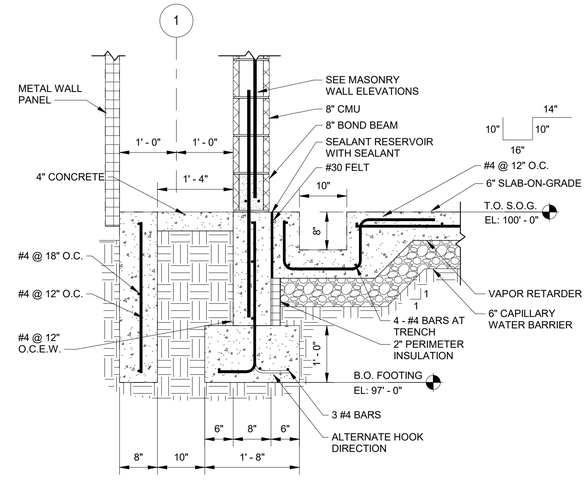
NOTES TO THE DESIGNER:
1. ADJUST BOTTOM OF FOOTING AND BOTTOM OF WALL ELEVATIONS AS REQUIRED FOR SITE REQUIREMENTS. SEE UFC3-301-01 FOR MINIMUM FROST DEPTH REQUIREMENTS.



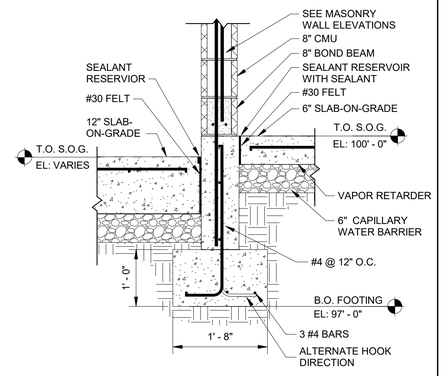
D1 FOUNDATION SECTION 1
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



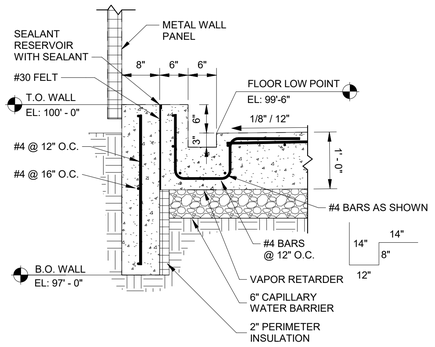
D3 FOUNDATION SECTION 2
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



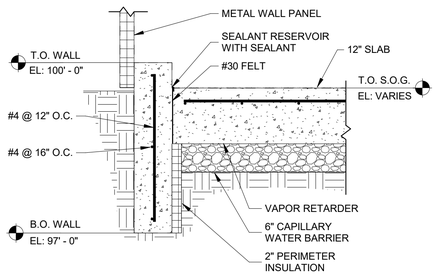
D6 FOUNDATION SECTION 3
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



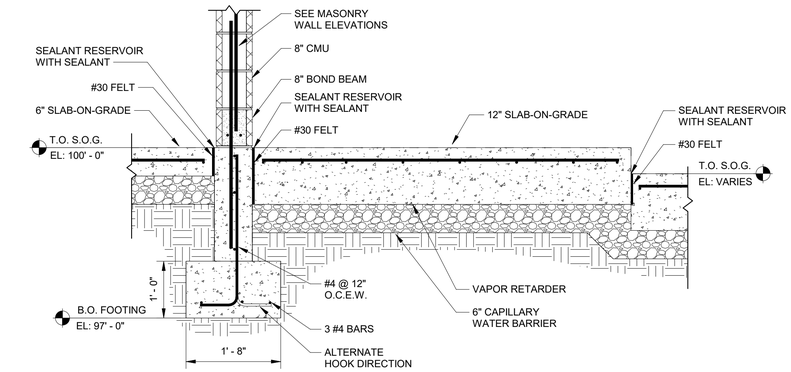
D9 FOUNDATION SECTION 4
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



A1 FOUNDATION SECTION 5
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



A4 FOUNDATION SECTION 6
SCALE: 3/4" = 1'-0"
0 1' 2' 4'



A7 FOUNDATION SECTION 7
SCALE: 3/4" = 1'-0"
0 1' 2' 4'

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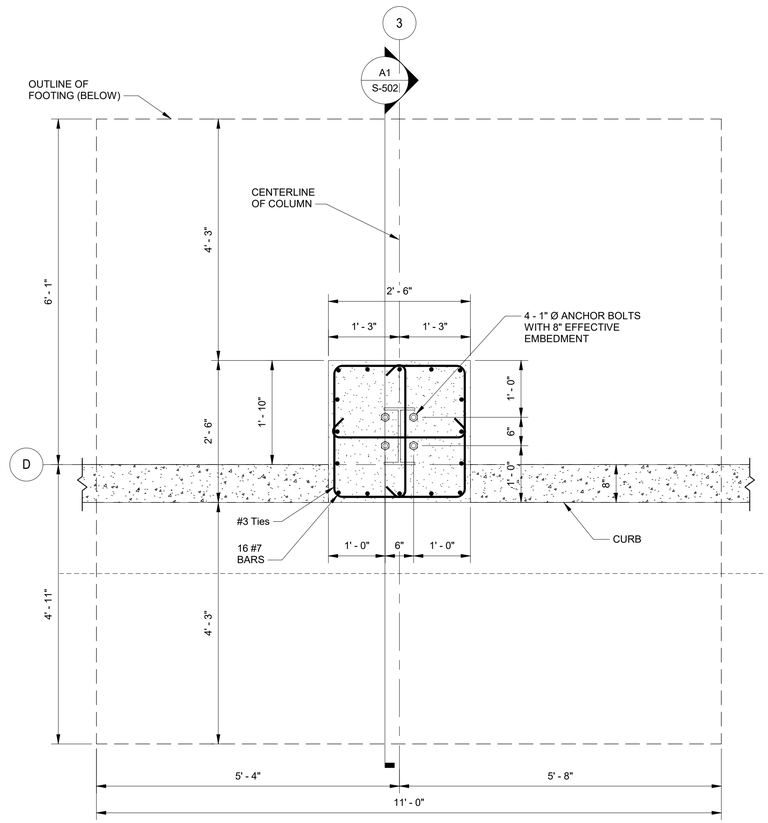
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FOUNDATION SECTIONS

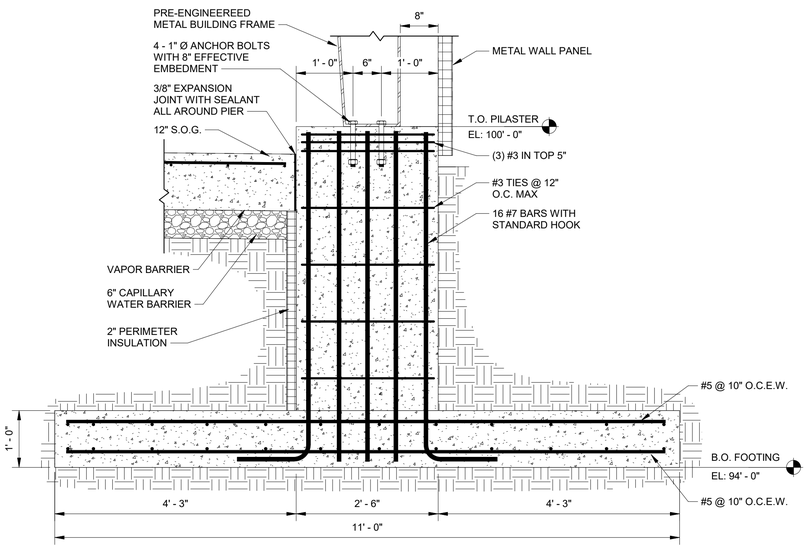
SHEET ID
S-501



D1 INTERIOR PEDESTAL (F1)

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

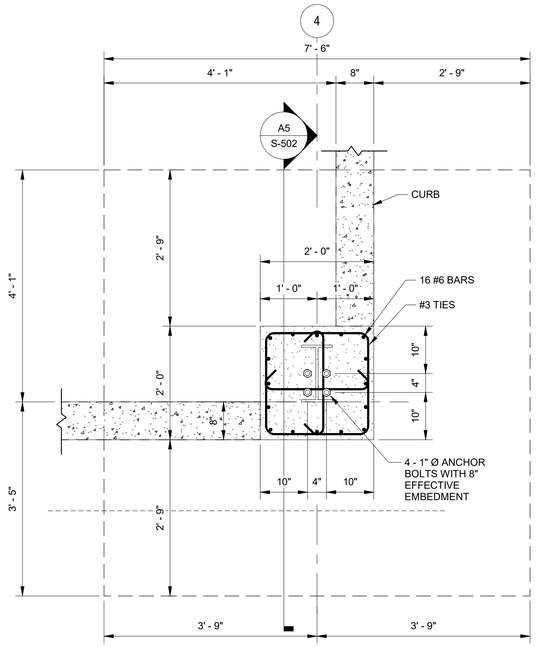
0 1' 2' 4'



A1 INTERIOR PEDESTAL SECTION (F1)

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

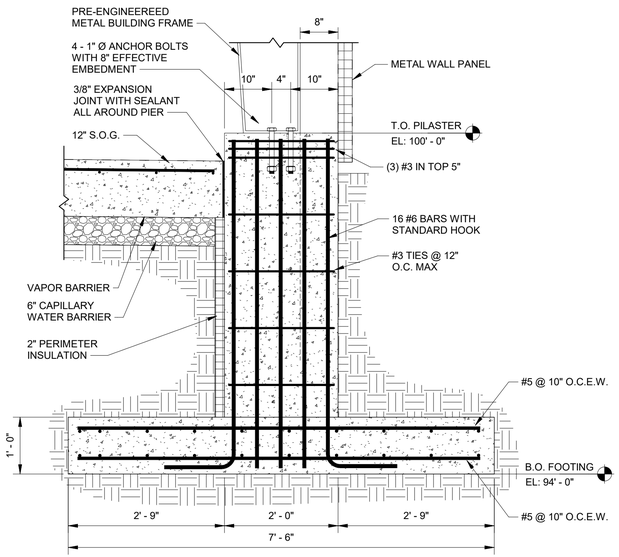
0 1' 2' 4'



D5 CORNER PEDESTAL (F2)

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

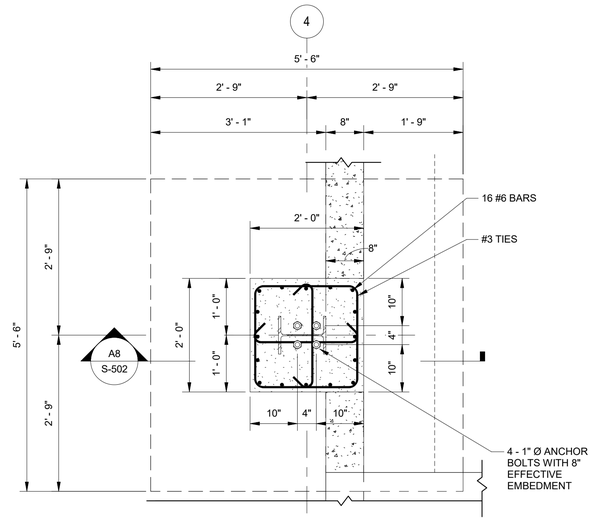
0 1' 2' 4'



A5 CORNER PEDESTAL SECTION (F2)

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

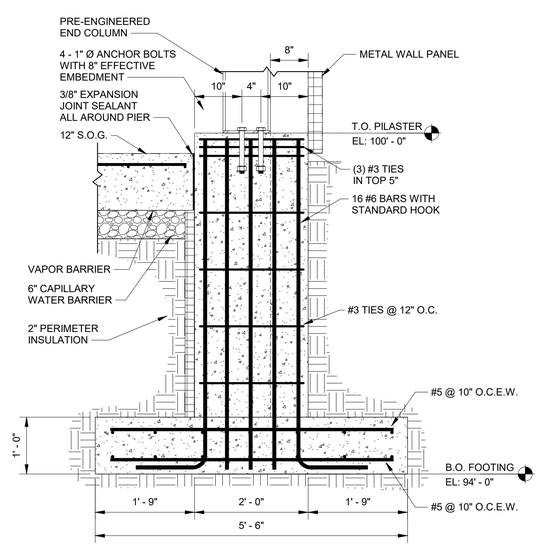
0 1' 2' 4'



D8 INTERIOR PEDESTAL (F3)

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

0 1' 2' 4'



A8 INTERIOR PEDESTAL SECTION (F3)

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

0 1' 2' 4'

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DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

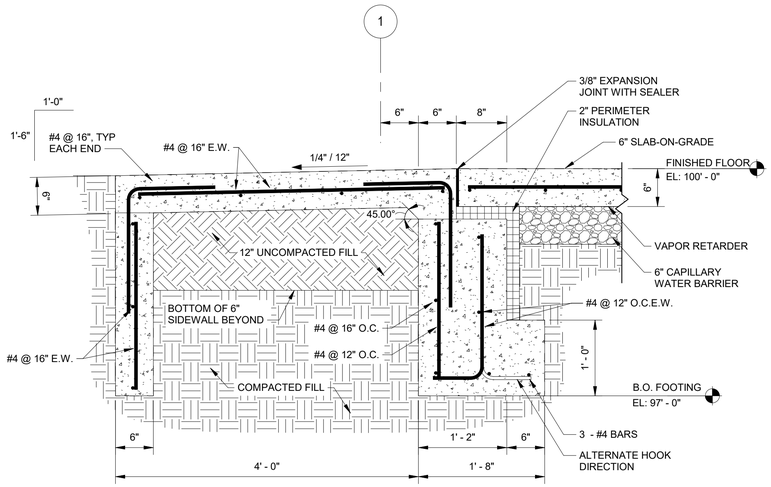
PEDESTAL SECTIONS & DETAILS

SHEET ID

S-502

NOTES TO THE FOUNDATION DESIGNER:

1. THE FOUNDATION MUST BE DESIGNED FOR THE LOADS IMPOSED BY THE METAL BUILDING. FOUNDATION DESIGN LOADS MUST BE SHOWN ON THE DRAWING FOR VERIFICATION ON S-002.
2. PLAN AND DETAILS SHOWN ARE FOR A TYPICAL INSTALLATION AND DO NOT RELIEVE THE STRUCTURAL ENGINEER OF RESPONSIBILITY FOR THE STRUCTURAL DESIGN. REVISE AS NECESSARY. REVISE PEDESTALS, FOOTINGS, DIMENSIONS, REINFORCEMENT, ANCHOR BOLTS, AND OTHER STRUCTURAL COMPONENTS AS NECESSARY. THE FOUNDATION MUST BE DESIGNED FOR SITE SPECIFIC CRITERIA INCLUDING DESIGN LOADS (DEAD, LIVE, ROOF LIVE, WIND, SNOW, CRANE AND SEISMIC) AND THE RECOMMENDATIONS OF THE FOUNDATION REPORT (ALLOWABLE BEARING PRESSURES, TYPE OF FOUNDATION, SOIL DENSITY, AND LATERAL EARTH PRESSURE COEFFICIENTS).
3. BOTTOM OF FOOTINGS SHALL BE REVISED BY THE DESIGNER TO MEET SITE CONDITIONS AND TO PROVIDE STRUCTURAL STABILITY. MINIMUM BOTTOM OF FOOTING ELEVATION AND SLAB SUBGRADE PREPARATION SHALL BE AS RECOMMENDED BY THE FINAL FOUNDATION REPORT. FOOTINGS MAY NEED TO BE DEEPER THAN THAT REQUIRED FOR FROST DEPTH FOR STRUCTURAL STABILITY.

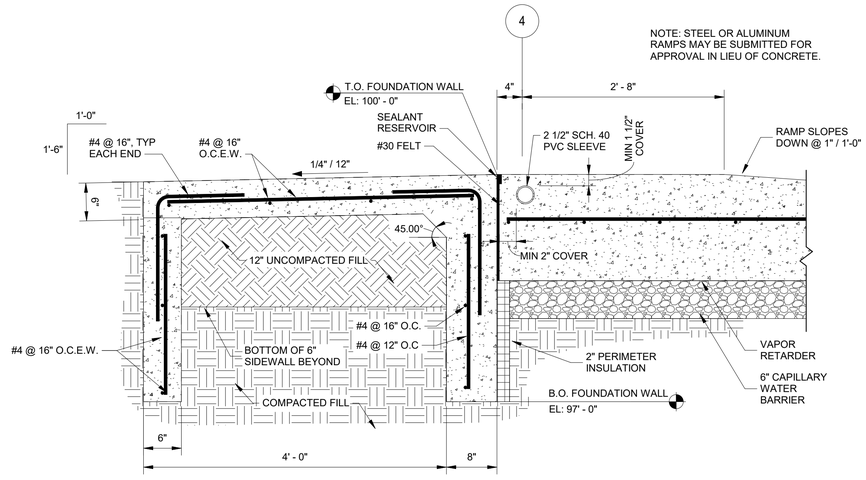


D3 STOOP SECTION 1

SCALE: 1" = 1'-0"

0 6" 1' 2'

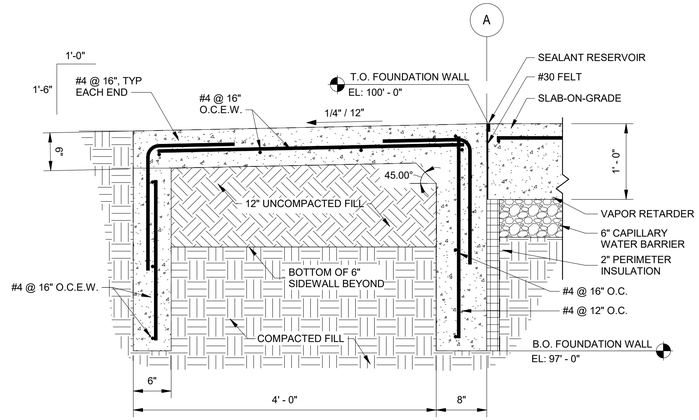
NOTES TO THE DESIGNER:
1. ADJUST BOTTOM OF FOOTING AND BOTTOM OF FOUNDATION WALL ELEVATIONS AS REQUIRED FOR SITE REQUIREMENTS. SEE UFC3-301-01 FOR MINIMUM FROST DEPTH REQUIREMENTS.



D7 STOOP SECTION 2

SCALE: 1" = 1'-0"

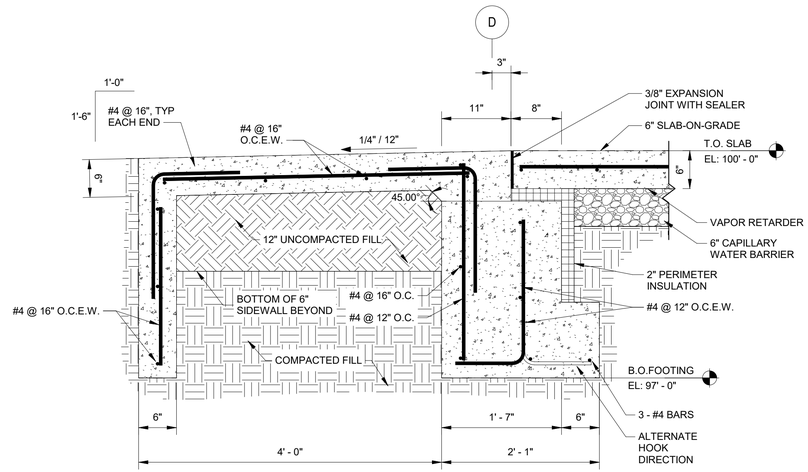
0 6" 1' 2'



A3 STOOP SECTION 3

SCALE: 1" = 1'-0"

0 6" 1' 2'



A7 STOOP SECTION 4

SCALE: 1" = 1'-0"

0 6" 1' 2'

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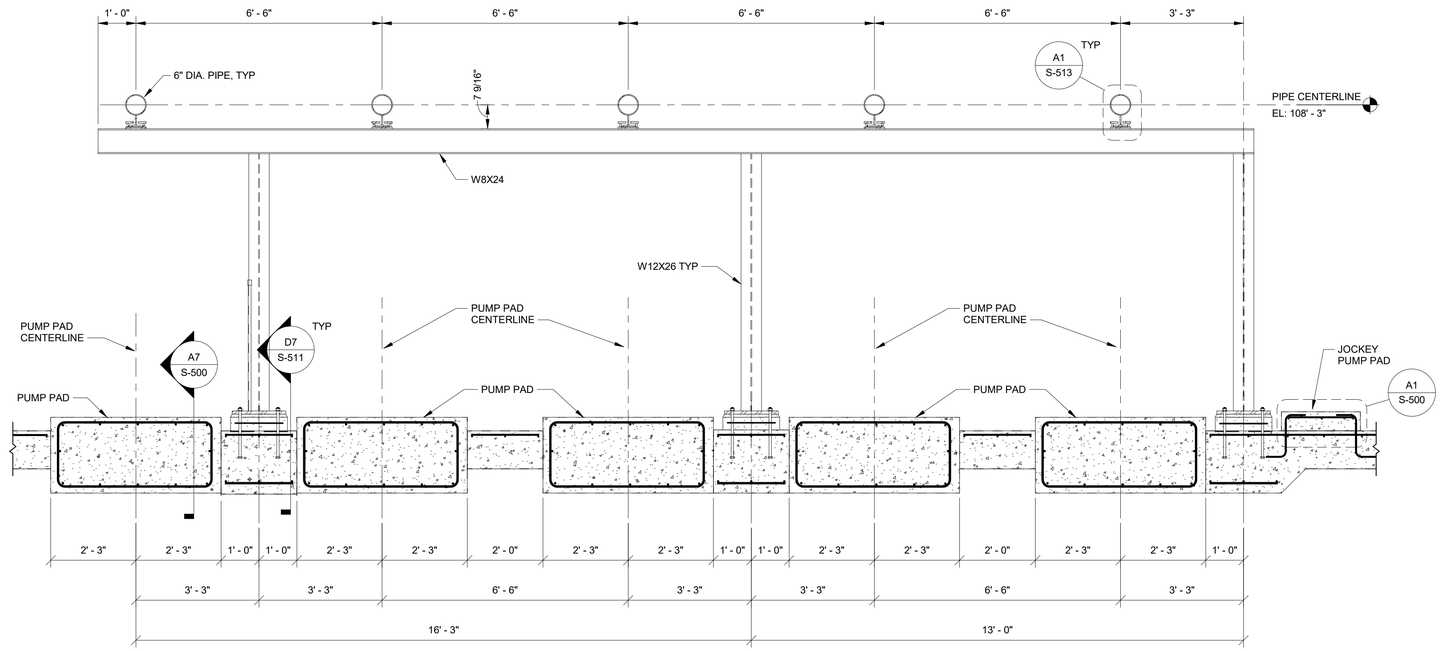
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

STOOP SECTIONS

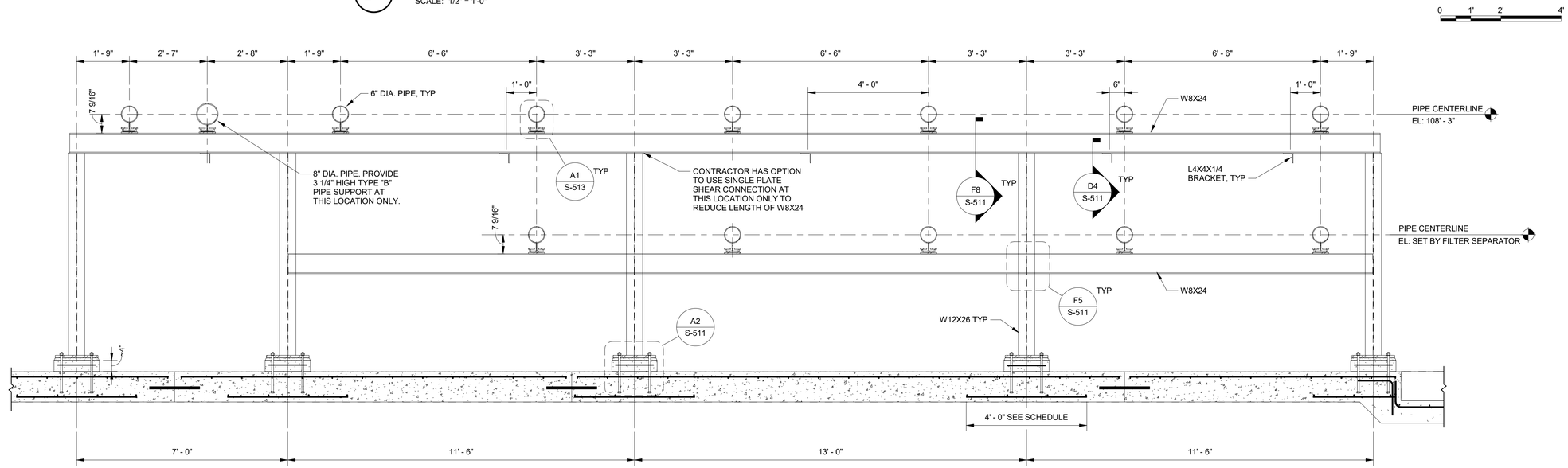
SHEET ID

S-503



D4 PS-9 SECTION

SCALE: 1/2" = 1'-0"



A2 PS-12 SECTION

SCALE: 1/2" = 1'-0"

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DESIGNED BY:
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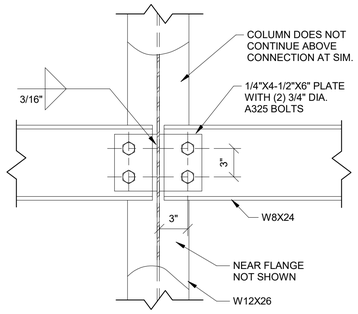
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SECTIONS AND DETAILS SHEET 1 OF 5

SHEET ID

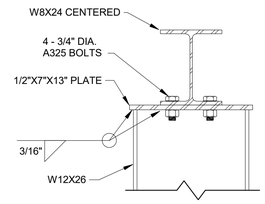
S-510



F5 PS-12 SINGLE PLATE SHEAR CONNECTION

SCALE: 1 1/2" = 1'-0"

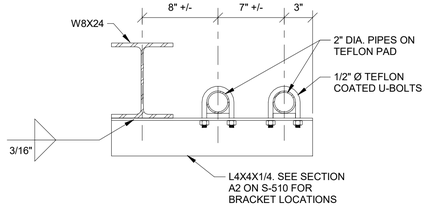
0 6" 1' 2'



F8 PS-9, 12 STEEL CONNECTION

SCALE: 1 1/2" = 1'-0"

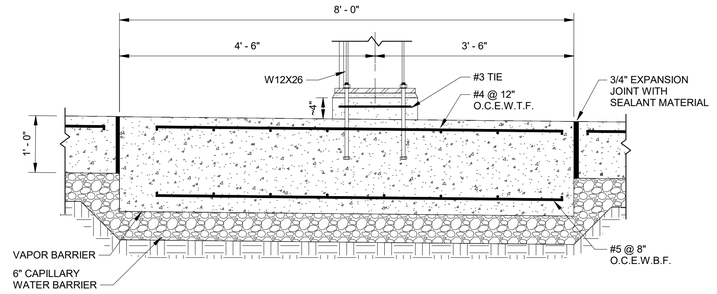
0 6" 1' 2'



D4 PS-9 BRACKET SUPPORT

SCALE: 1 1/2" = 1'-0"

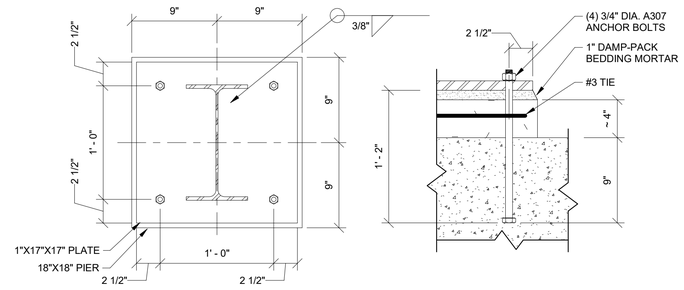
0 6" 1' 2'



D7 PS-9 PIPE SUPPORT BASE SECTION

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

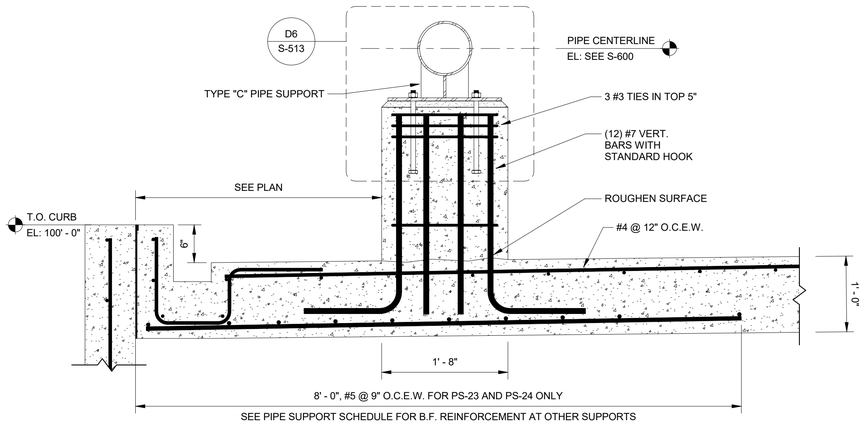
0 1' 2' 4'



A2 PS-5, 9, 12, 17, 20, 21, 22 TYP COLUMN BASE

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'



A6 PS-4, 7, 18, 23, 24 SECTION

SCALE: 1" = 1'-0"

0 6" 1' 2'

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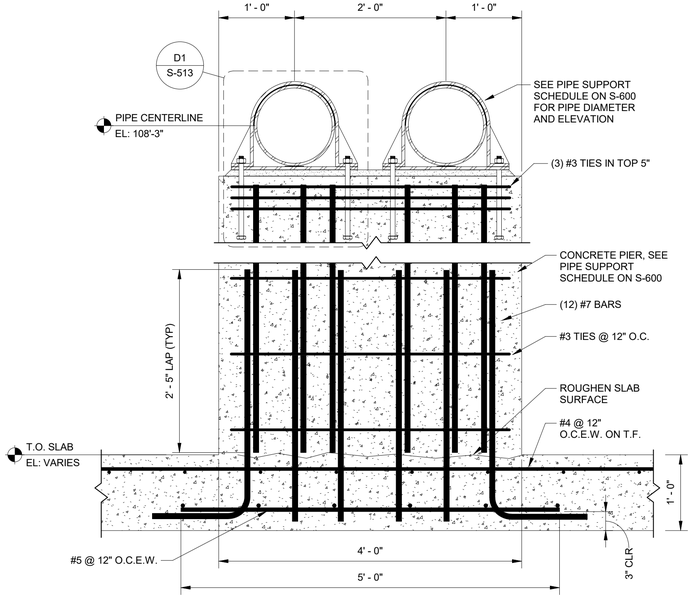
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SECTIONS AND DETAILS SHEET 2 OF 5

SHEET ID

S-511

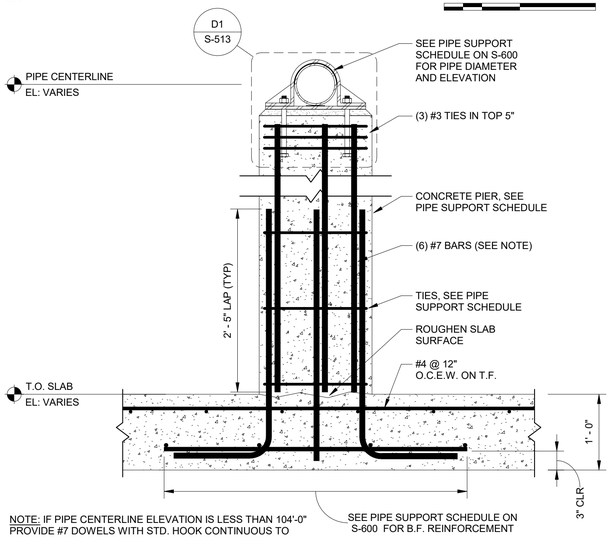


NOTE: SEE PIPE SUPPORT SCHEDULE ON SHEET S-600 FOR B.F. REINFORCEMENT AND LENGTH.

D1 PS-10 SECTION

SCALE: 1" = 1'-0"

0 6" 1' 2'

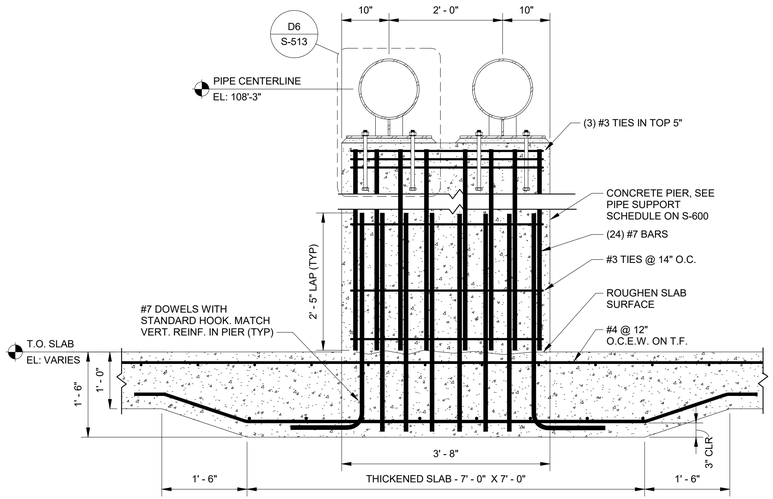


NOTE: IF PIPE CENTERLINE ELEVATION IS LESS THAN 104'-0" PROVIDE #7 DOWELS WITH STD. HOOK CONTINUOUS TO TOP OF PIER. DO NOT PROVIDE #7 VERTICAL BARS.

A1 PS-1, 3, 6, 8, 13, 14, 16, 19 SECTION

SCALE: 1" = 1'-0"

0 6" 1' 2'

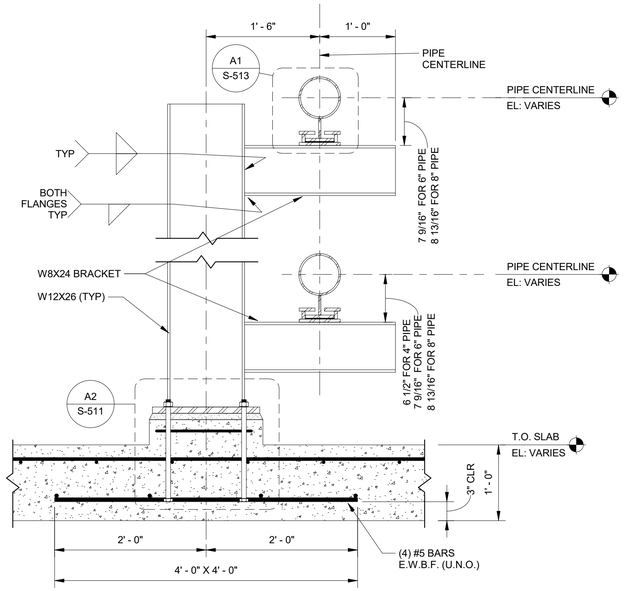


NOTE: SEE PIPE SUPPORT SCHEDULE ON SHEET S-600 FOR B.F. REINFORCEMENT AND LENGTH.

E4 PS-11 SECTION

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

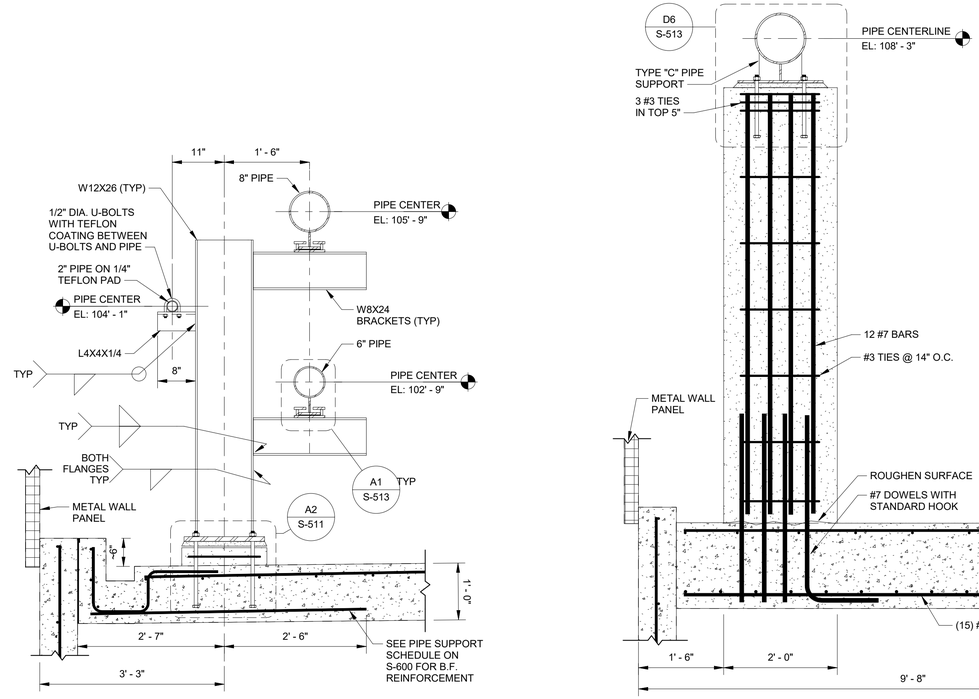
0 6" 1' 2'



E8 PS-5, 17, 20 SECTION

SCALE: 1" = 1'-0"

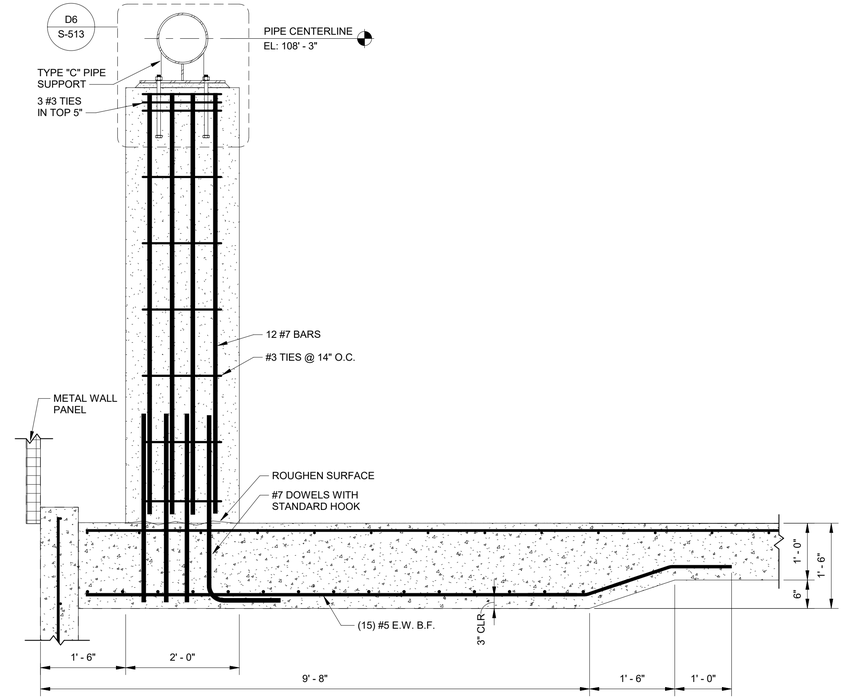
0 6" 1' 2'



A4 PS-21 SECTION (PS-22 SIMILAR)

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

0 6" 1' 2'



A7 PS-15 SECTION

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

0 6" 1' 2'

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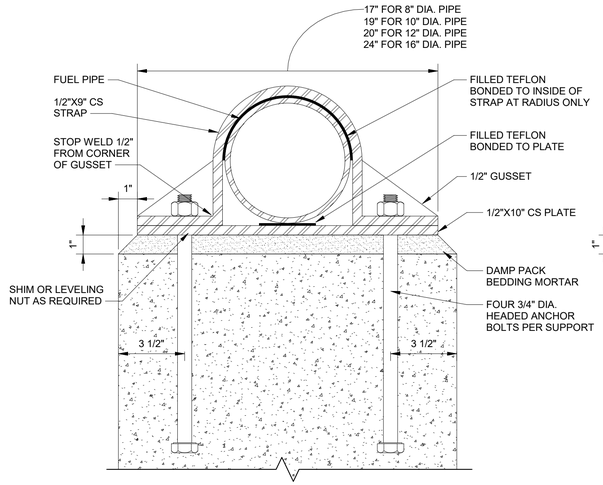
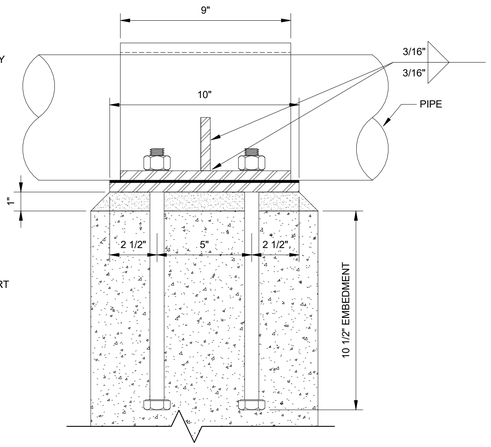
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SECTIONS AND DETAILS SHEET 3 OF 5

SHEET ID

S-512



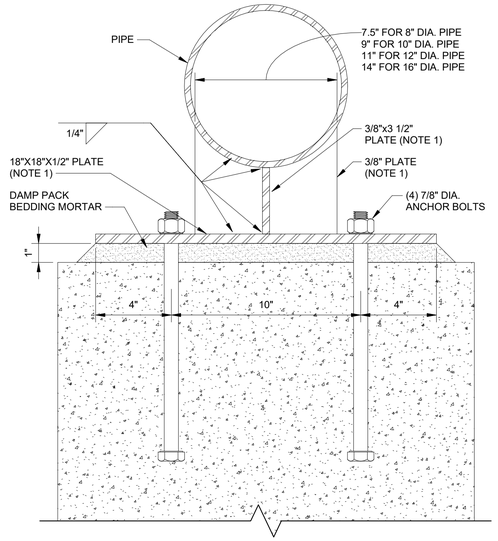


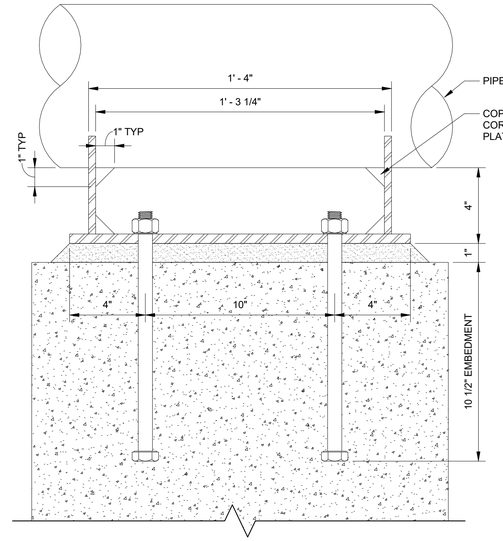
NOTES:
1. ALL CARBON STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES.

D1 PIPE SUPPORT TYPE "A" DETAIL

SCALE: 3" = 1'-0"

0 3" 6" 1'



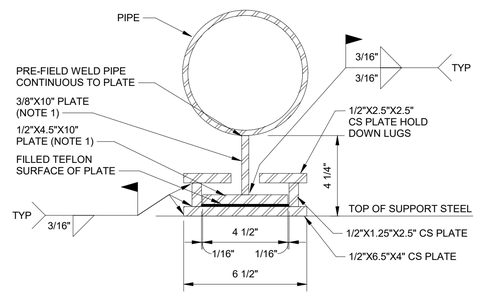


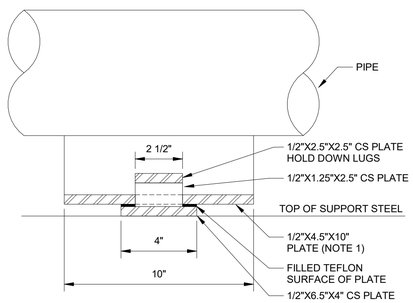
NOTES:
1. PROVIDE CARBON STEEL (CS) PLATES WHERE CS PIPES ARE USED AND PROVIDE STAINLESS STEEL (SS) PLATES WHERE STAINLESS STEEL PIPES ARE USED. THIS NOTE APPLIES ONLY TO THOSE PLATES INDICATED
2. ALL STAINLESS STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES. ALL CARBON STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES.
3.ENSURE ALL CORNERS OF THE CENTER 3/8" PLATE ARE COPED AS NOTED TO PREVENT INTERSECTING WELDS.

D6 PIPE SUPPORT TYPE "C" DETAIL

SCALE: 3" = 1'-0"

0 3" 6" 1'



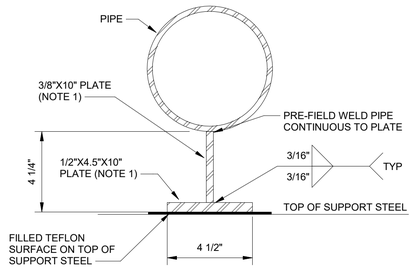


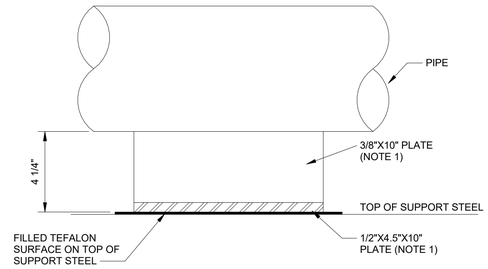
NOTES:
1. PROVIDE CARBON STEEL (CS) PLATES WHERE CS PIPES ARE USED AND PROVIDE STAINLESS STEEL (SS) PLATES WHERE STAINLESS STEEL PIPES ARE USED.
THIS NOTE APPLIES ONLY TO THOSE PLATES INDICATED.
2. ALL STAINLESS STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES. ALL CARBON STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES.

A1 PIPE SUPPORT TYPE "B" DETAIL

SCALE: 3" = 1'-0"

0 3" 6" 1'





NOTES:
1. PROVIDE CARBON STEEL (CS) PLATES WHERE CS PIPES ARE USED AND PROVIDE STAINLESS STEEL (SS) PLATES WHERE STAINLESS STEEL PIPES ARE USED. THIS NOTE APPLIES ONLY TO THOSE PLATES INDICATED.
2. ALL STAINLESS STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES. ALL CARBON STEEL ELEMENTS SHALL HAVE THE SAME MECHANICAL PROPERTIES.

A6 PIPE SUPPORT TYPE "FREE" DETAIL

SCALE: 3" = 1'-0"

0 3" 6" 1'

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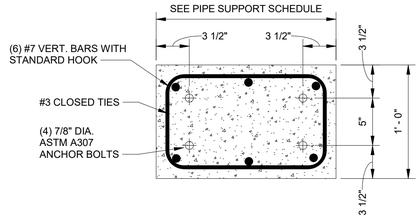
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SECTIONS AND DETAILS SHEET 4 OF 5

SHEET ID

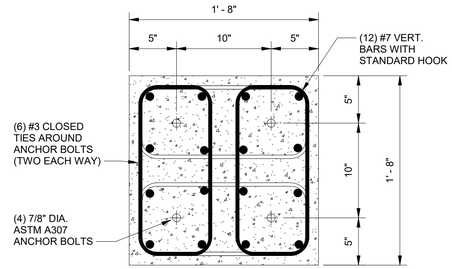
S-513



D5 PS-1, 3, 6, 8, 13, 14, 16, 19 PIER DETAIL

SCALE: 1 1/2" = 1'-0"

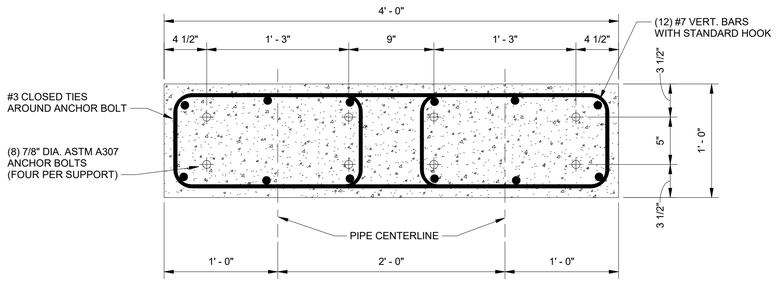
0 6" 1' 2'



D8 PS-4, 7, 15, 18, 23, 24 PIER DETAIL

SCALE: 1 1/2" = 1'-0"

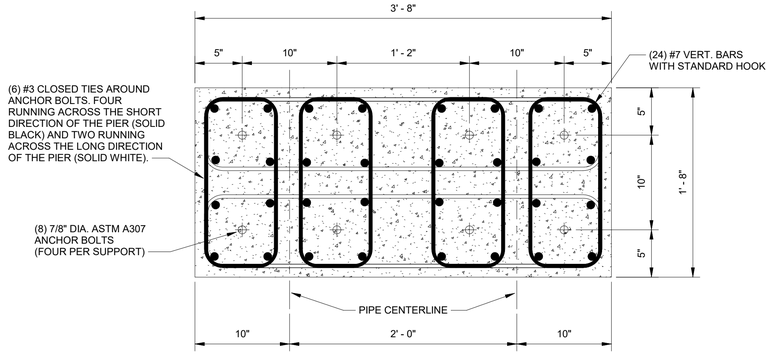
0 6" 1' 2'



A1 PS-10 PIER DETAIL

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'



A6 PS-11 PIER DETAIL

SCALE: 1 1/2" = 1'-0"

0 6" 1' 2'

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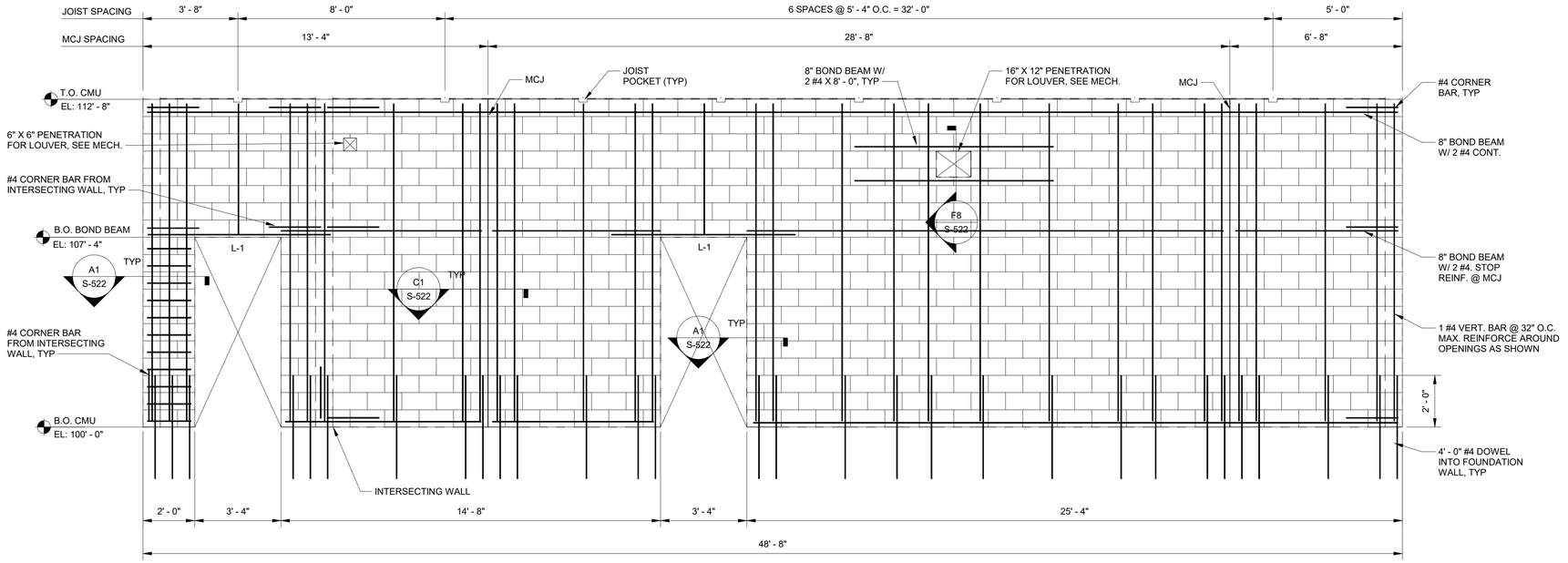
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SECTIONS AND DETAILS SHEET 5 OF 5

SHEET ID

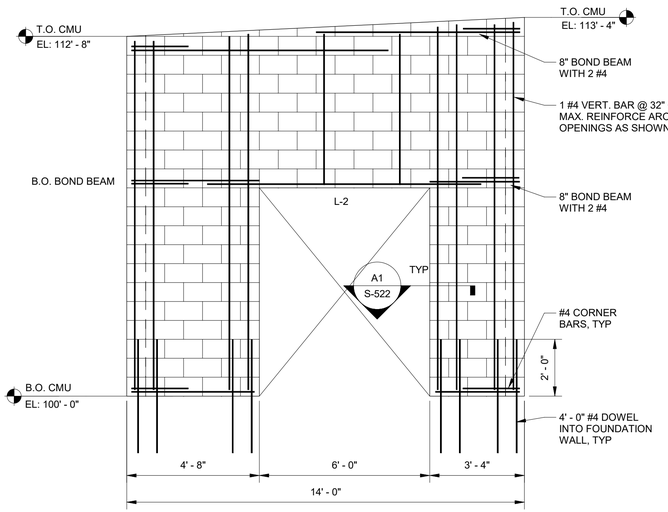
S-514



D2 MASONRY ELEVATION A

SCALE: 3/8" = 1'-0"

0 2' 4' 8'



A6 MASONRY ELEVATION B

SCALE: 3/8" = 1'-0"

0 2' 4' 8'

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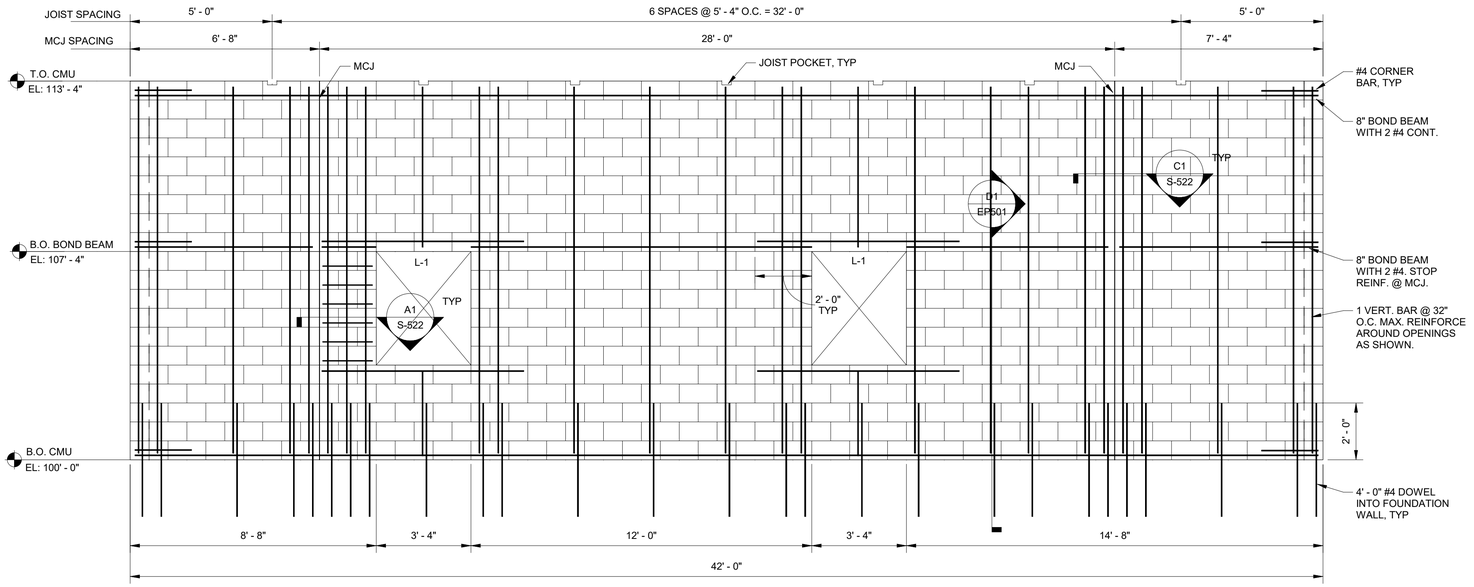
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL ROOM MASONRY ELEVATIONS SHEET 1 OF 2

SHEET ID

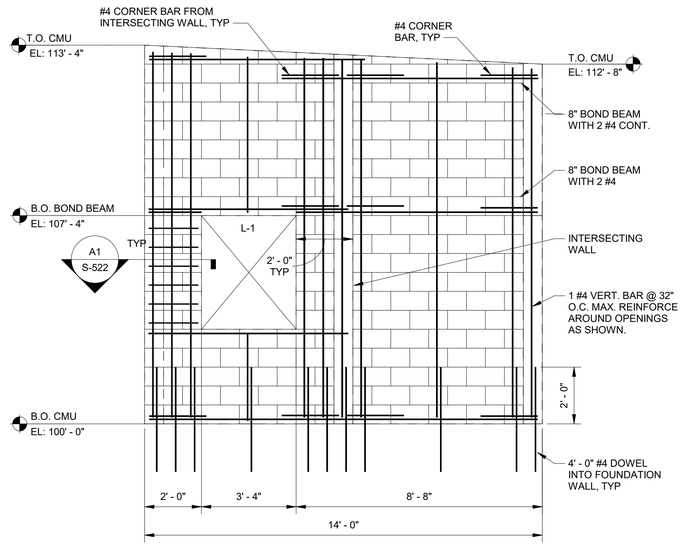
S-520



D4 MASONRY ELEVATION C

SCALE: 3/8" = 1'-0"

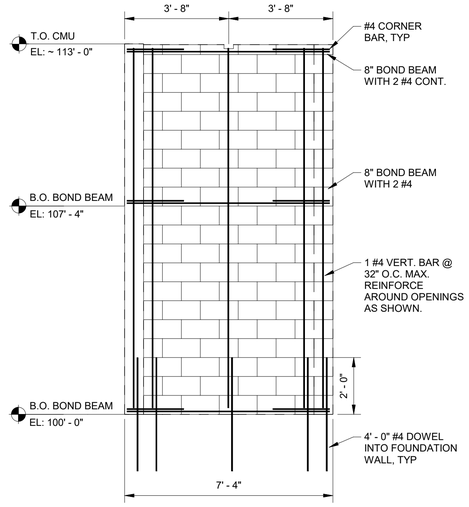
0 2' 4' 8'



A1 MASONRY ELEVATION D

SCALE: 3/8" = 1'-0"

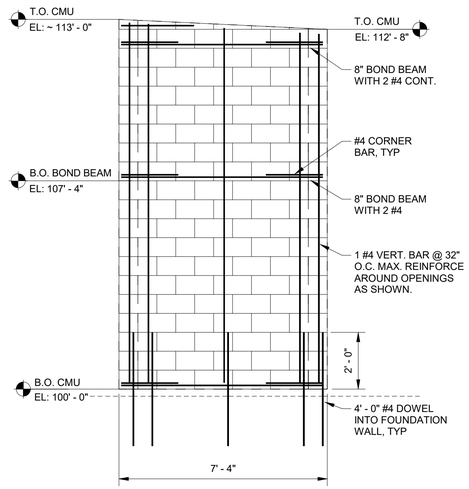
0 2' 4' 8'



A5 MASONRY ELEVATION E

SCALE: 3/8" = 1'-0"

0 2' 4' 8'



A8 MASONRY ELEVATION F

SCALE: 3/8" = 1'-0"

0 2' 4' 8'

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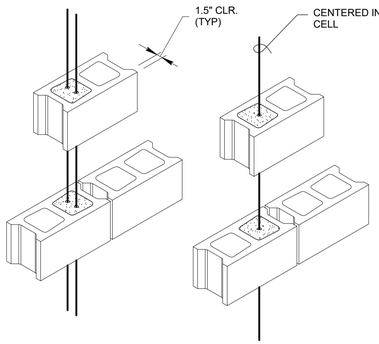
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL ROOM MASONRY ELEVATIONS SHEET 2 OF 2

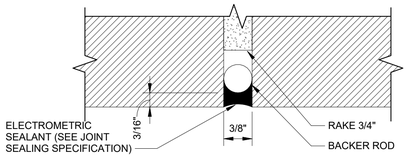
SHEET ID

S-521



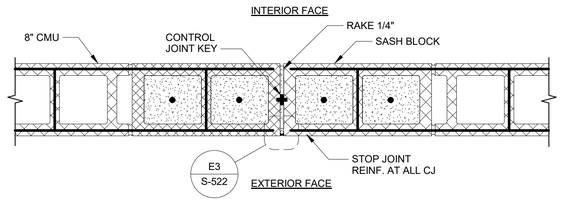
F1 TYP VERT. REINF. FOR SINGLE AND DOUBLE STIFFENERS

SCALE: NTS



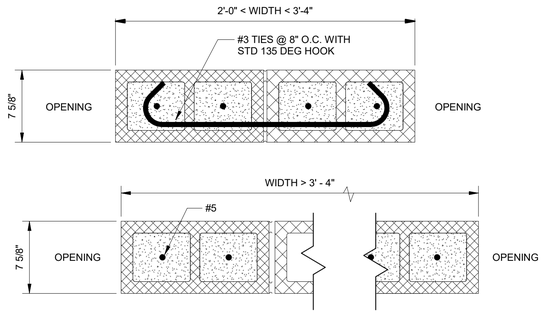
E3 DETAIL "A"

SCALE: NTS



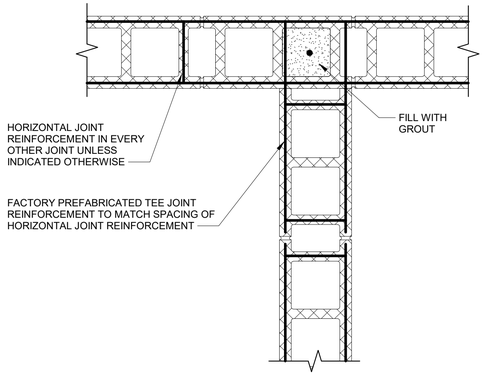
C1 CMU CONTROL JOINT (M.C.J.)

SCALE: NTS



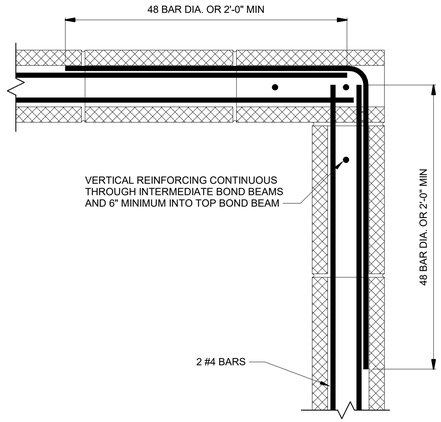
A1 CMU REINFORCEMENT ADJACENT TO OPENING

SCALE: NO SCALE



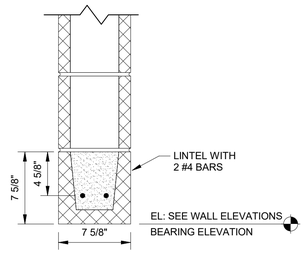
F5 INTERSECTION OF CMU WALLS

SCALE: NTS



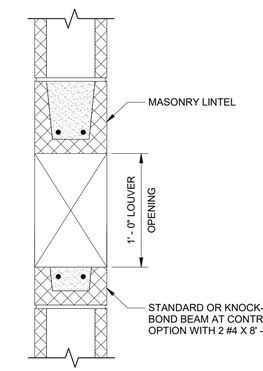
C5 BOND BEAM AT CORNER

SCALE: NTS



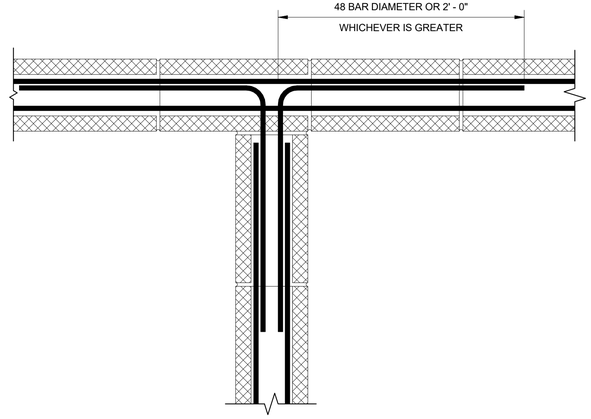
A5 LINTEL L-1

SCALE: 1 1/2" = 1'-0"



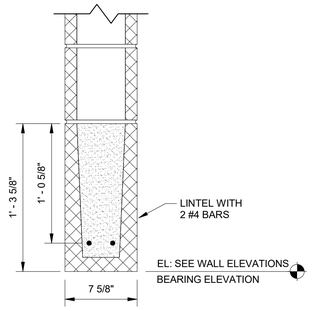
F8 SECTION AT LOUVER

SCALE: 1 1/2" = 1'-0"



C8 INTERSECTION OF BOND BEAM

SCALE: NTS



A8 LINTEL L-2

SCALE: 1 1/2" = 1'-0"

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL ROOM MASONRY DETAILS

SHEET ID

S-522

PUMPHOUSE PIPE SUPPORT SCHEDULE

PIPE SUPPORT NO.	PIPE DIAMETER	PIPE CENTER LINE ELEVATION	PS TYPE (SEE S-513)	CONCRETE PIERS				B.F. SLAB/PAD REINF. BENEATH PIER		SECTION
				SIZE	VERTICAL REINF.	CLOSED TIES	DETAIL	REINFORCEMENT	LENGTH	
PS-1	8"	110'-3"	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	6 - #5 E.W.	5'-0" E.W. SEE PLAN	A1/S-512
PS-3	8"	101'-9"	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-4	8"	101'-9"	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	4 - #5 E.W.	4'-0" E.W.	A6/S-511
PS-5	8"	101'-9" & 103'-9"	B	18" X 18"	-	1 - #3	A2/S-511	4 - #5 E.W.	4'-0" E.W.	E8/S-512
PS-6	16"	SEE NOTE 1	A	26" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-7	16"	SEE NOTE 1	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	4 - #5 E.W.	4'-0" E.W.	A6/S-511
PS-8	8"	SEE NOTE 1	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-9	6"	108'-3"	B	18" X 18"	-	1 - #3	A2/S-511	#5 @ 8" E.W.	SEE DETAIL	D4/S-510
PS-10	12"	108'-3"	A	48" X 12"	12 - #7	#3 @ 12"	A1/S-514	#5 @ 12" E.W.	5'-0" X 4'-0" SEE PLAN	D1/S-512
PS-11	12"	108'-3"	C	44" X 20"	24 - #7	#3 @ 12"	A6/S-514	8 - #5 E.W.	7'-0" E.W. SEE PLAN	E4/S-512
PS-12	6" & 8"	108'-3"	B	18" X 18"	-	1 - #3	A2/S-511	4 - #5 E.W.	4'-0" E.W.	A2/S-510
	6"	SEE NOTE 2	B							
PS-13	8"	108'-3"	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-14	10"	108'-3"	A	21" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-15	10"	108'-3"	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	15 - #5 E.W.	SEE PLAN	A7/S-512
PS-16	8"	108'-3"	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-17	8"	102'-9" & 110'-3"	B	18" X 18"	-	1 - #3	A2/S-511	4 - #5 E.W.	4'-0" E.W.	E8/S-512
PS-18	8"	102'-9"	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	4 - #5 E.W.	4'-0" E.W.	A6/S-511
PS-19	8"	102'-9"	A	19" X 12"	6 - #7	#3 @ 12"	D5/S-514	4 - #5 E.W.	4'-0" E.W.	A1/S-512
PS-20	8"	110'-3"	B	18" X 18"	-	1 - #3	A2/S-511	4 - #5 E.W.	4'-0" E.W.	E8/S-512
PS-21	2"	104'-1"	B	18" X 18"	-	1 - #3	A2/S-511	4 - #5 E.W.	4'-0" E.W.	A4/S-512
	6"	102'-9"	B							
	8"	105'-9"	B							
PS-22	2"	104'-1"	B	18" X 18"	-	1 - #3	A2/S-511	#5 @ 9" E.W.	SEE PLAN	A4/S-512 SIMILAR
	4"	102'-9"	B							
	8"	105'-9"	B							
PS-23	12"	102'-9"	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	#5 @ 9" E.W.	SEE PLAN	A6/S-511
PS-24	12"	102'-9"	C	20" X 20"	12 - #7	#3 @ 12"	D8/S-514	#5 @ 9" E.W.	SEE PLAN	A6/S-511

PIPE SUPPORT NOTES:
1. CENTERLINE ELEVATION SHALL BE SET BY PUMP (APPROXIMATE ELEVATION IS 101'-9") AND SHALL NOT EXCEED ELEVATION 102'-3". COORDINATE WITH PUMP MANUFACTURER.
2. CENTERLINE ELEVATION SET BY FILTER/SEPARATOR. COORDINATE WITH FILTER/SEPARATOR MANUFACTURER.
3. ENSURE THAT THE PIPE SUPPORTS AND PIPES DO NOT INTERFERE WITH THE BUILDING COLUMNS AND/OR PEDESTALS.

US Army Corps of Engineers ®

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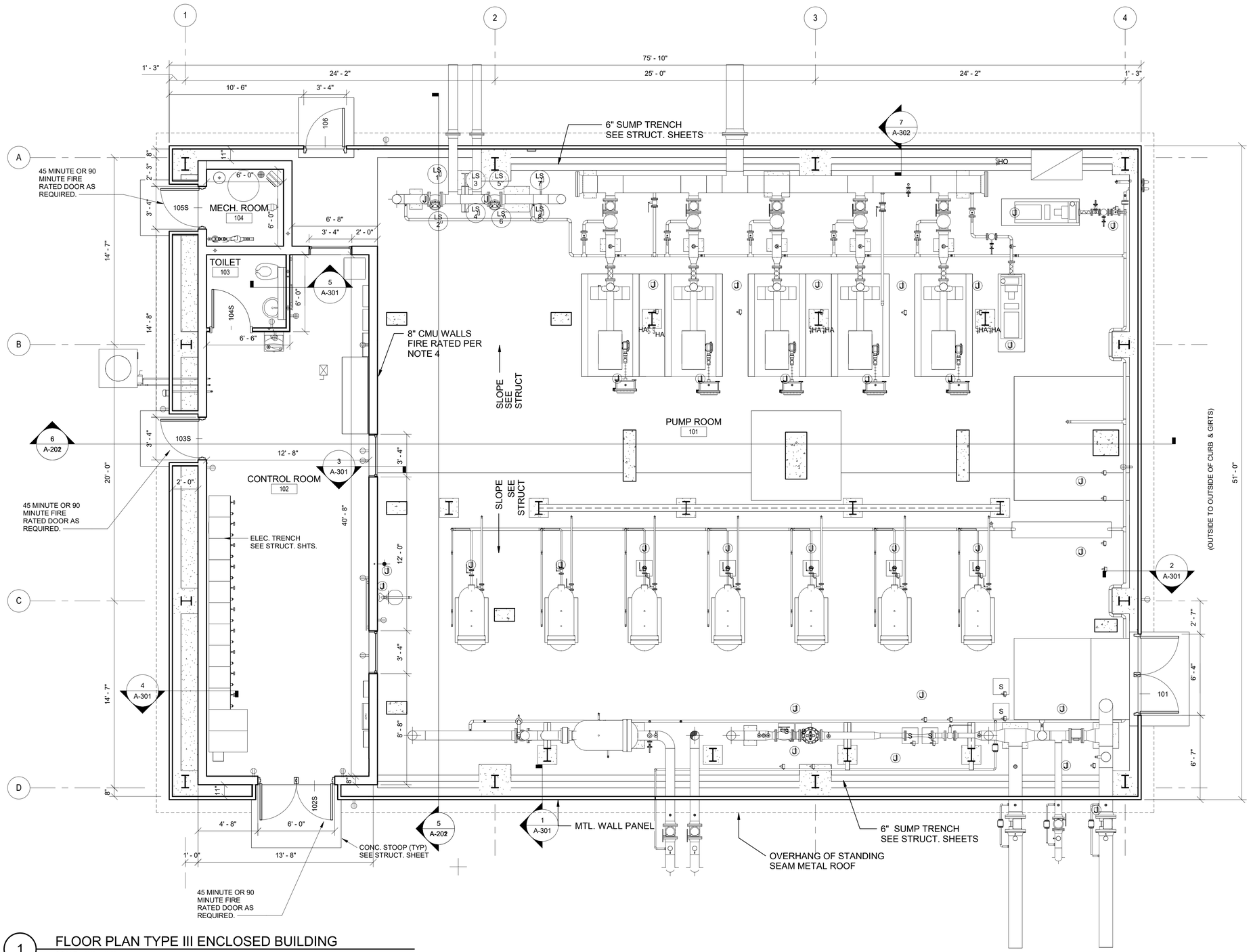
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPE SUPPORT SCHEDULE

SHEET ID

S-600



1 FLOOR PLAN TYPE III ENCLOSED BUILDING

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

GENERAL NOTES:

1. MINOR VARIATIONS IN THE BUILDING DIMENSIONS MAY BE SUBMITTED FOR REVIEW AND POSSIBLE APPROVAL IF REQUIRED TO CONFORM TO AN INDIVIUAL BUILDING SUPPLIER'S STANDARD.
2. ALL CMU WALL SHALL BE 8" UNITS.
3. CONFORM TO THE INSTALLATION DESIGN GUIDE AND ARCHITECTURAL COMPATIBILITY STANDARDS FOR ALL APPLICABLE REQUIREMENTS.
4. CONTROL ROOM AND MECHANICAL ROOM PERIMETER WALLS, WINDOWS AND ROOF ARE TO HAVE A 2-HOUR FIRE RATING IF THE BUILDING IS NOT PROVIDED WITH AN AUTOMATIC FIRE SUPPRESSION SYSTEM, WITH EXTERIOR DOORS RATED FOR 90-MINUTES WTH CLOSURES. IF A FIRE SUPPRESSION SYSTEM IS PROVIDED, THE WALL/WINDOW/ROOF AND DOOR RATINGS MAY BE REDUCED TO 1-HOUR AND 45-MINUTES RATINGS, RESPECTIVELY." .

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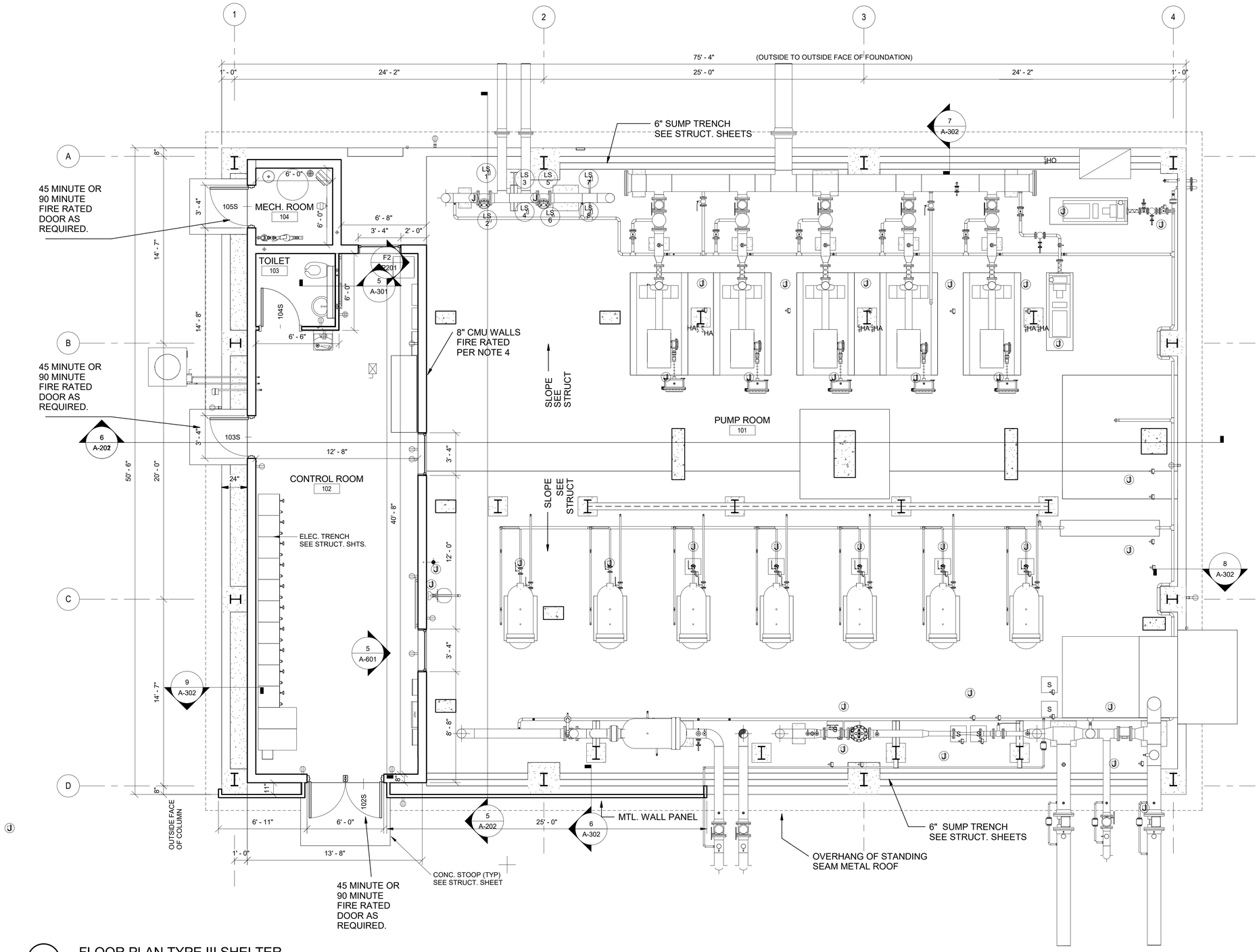
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMP HOUSE
FLOOR PLAN

SHEET ID

A-101



1 FLOOR PLAN TYPE III SHELTER

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

GENERAL NOTES:

1. MINOR VARIATIONS IN THE BUILDING DIMENSIONS MAY BE SUBMITTED FOR REVIEW AND POSSIBLE APPROVAL IFREQUIRED TO CONFORM TO AN INDIVIUAL BUILDING SUPPLIER'S STANDARD.
2. ALL CMU WALL SHALL BE 8" UNITS.
3. CONFORM TO THE INSTALLATION DESIGN GUIDE AND ARCHITECTURAL COMPATIBILITY STANDARDS FOR ALL APPLICABLE REQUIREMENTS.
4. CONTROL ROOM AND MECHANICAL ROOM PERIMETER WALLS, WINDOWS AND ROOF ARE TO HAVE A 2-HOUR FIRE RATING IF THE BUILDING IS NOT PROVIDED WITH AN AUTOMATIC FIRE SUPPRESSION SYSTEM, WITH EXTERIOR DOORS RATED FOR 90-MINUTES WTH CLOSURES. IF A FIRE SUPPRESSION SYSTEM IS PROVIDED, THE WALL/WINDOW/ROOF AND DOOR RATINGS MAY BE REDUCED TO 1-HOUR AND 45-MINUTES RATINGS, RESPECTIVELY.

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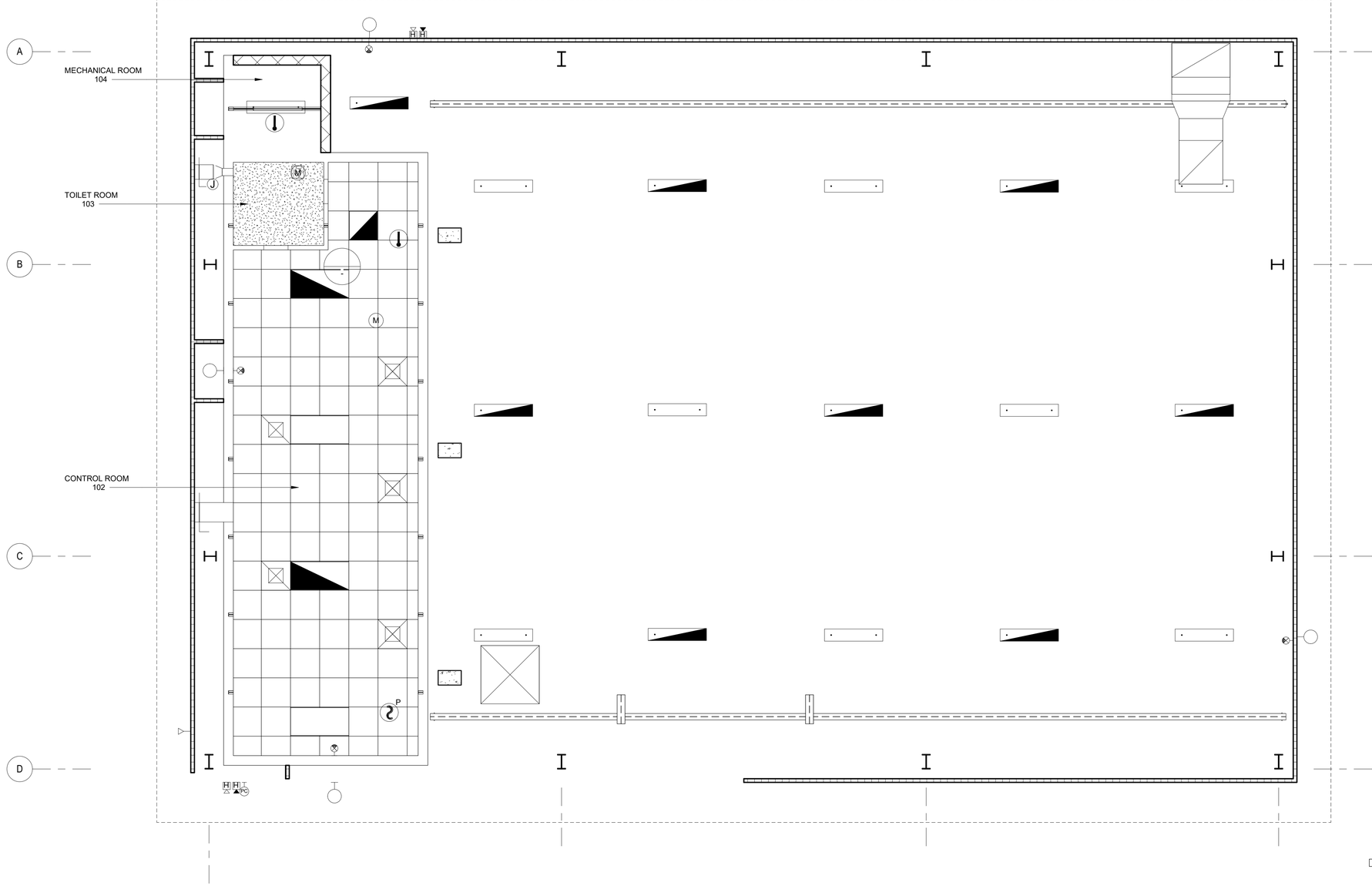
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMP SHELTER
FLOOR PLAN

SHEET ID

A-102



CEILING LEGEND:

- 2' X 2' ACT CEILING
- RECESSED CAN LIGHTING FIXTURE
- SMOKE DETECTOR (REFER TO FA DWGS)
- EXIT SIGN LOCATION (REFER TO FA DWGS)
- 1' X 1' DOWNLIGHT
- 1' X 8' PENDANT
- 2' x 4' DOWNLIGHT
- DIFFUSER
- RETURN

1 CEILING PLAN
SCALE: 1/4" = 1'-0"

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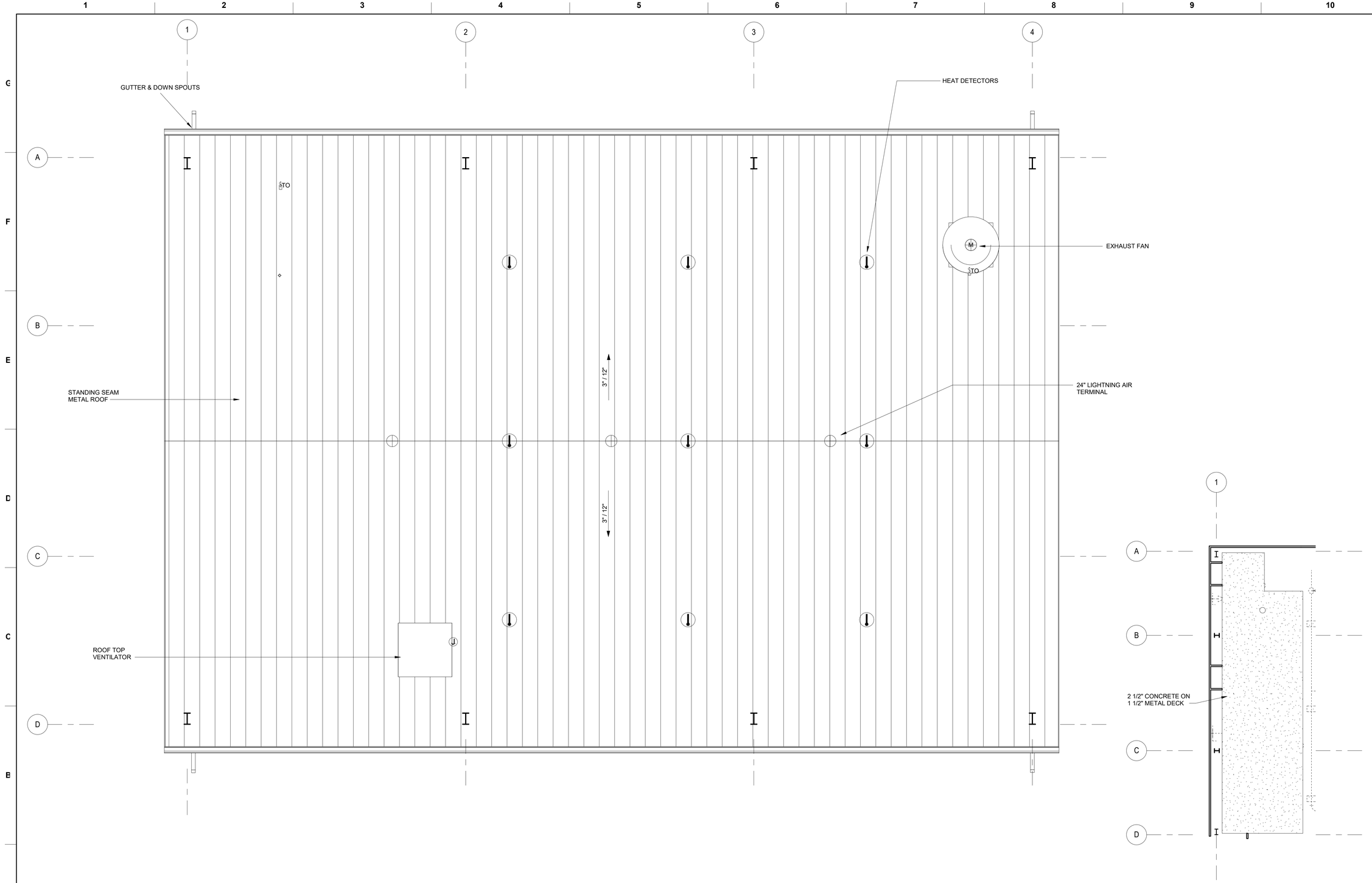
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CEILING PLAN

SHEET ID

A-130



1 ROOF PLAN
SCALE: 1/4" = 1'-0"

2 CONTROL ROOM ROOF PLAN
SCALE: 1/8" = 1'-0"

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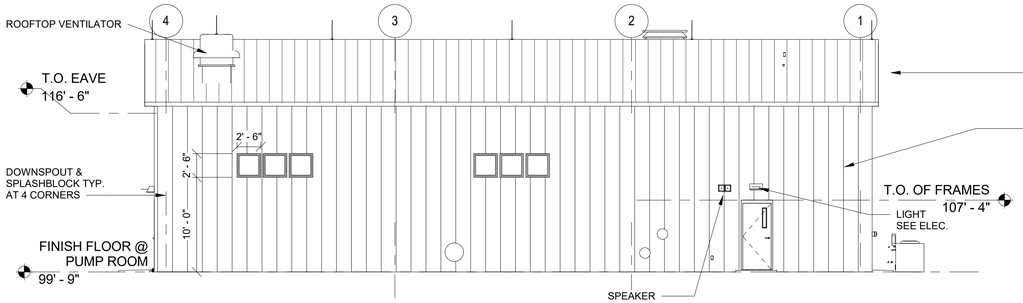
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

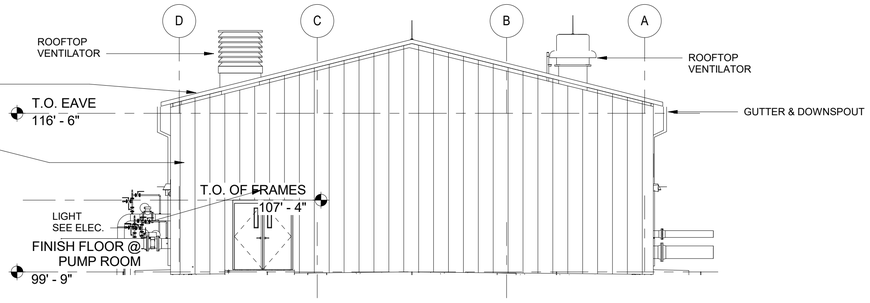
ROOF PLAN

SHEET ID

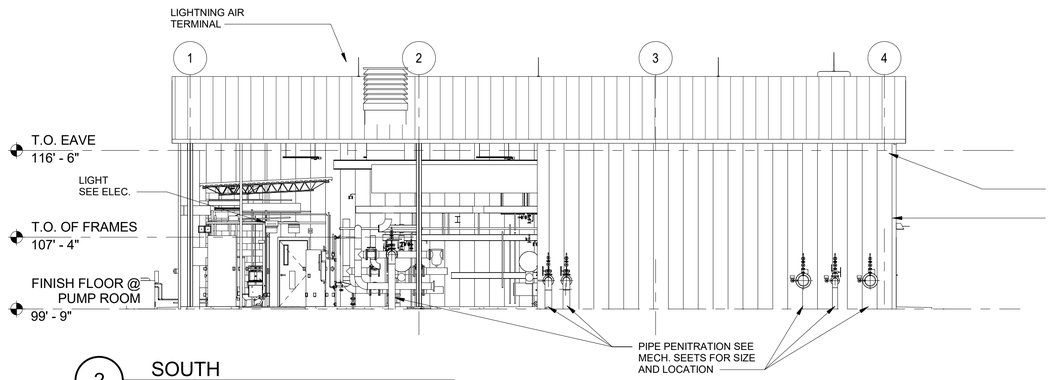
A-140



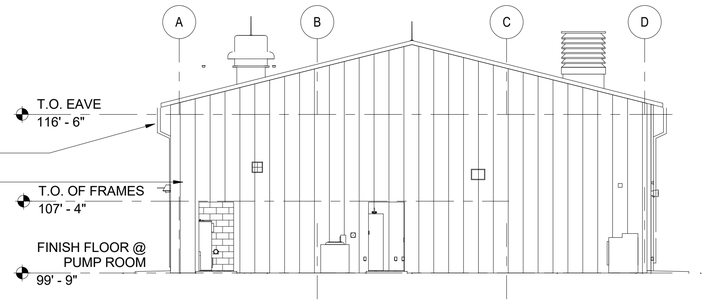
1 NORTH
SCALE: 1/8" = 1'-0"



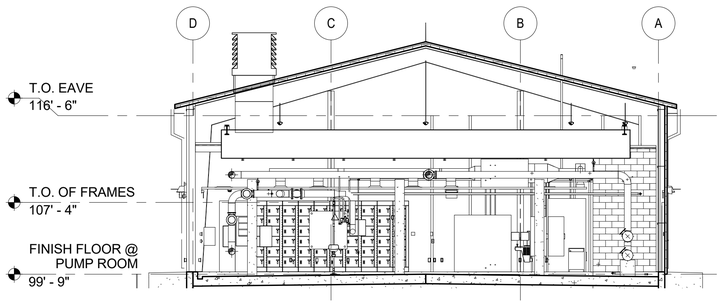
3 EAST
SCALE: 1/8" = 1'-0"



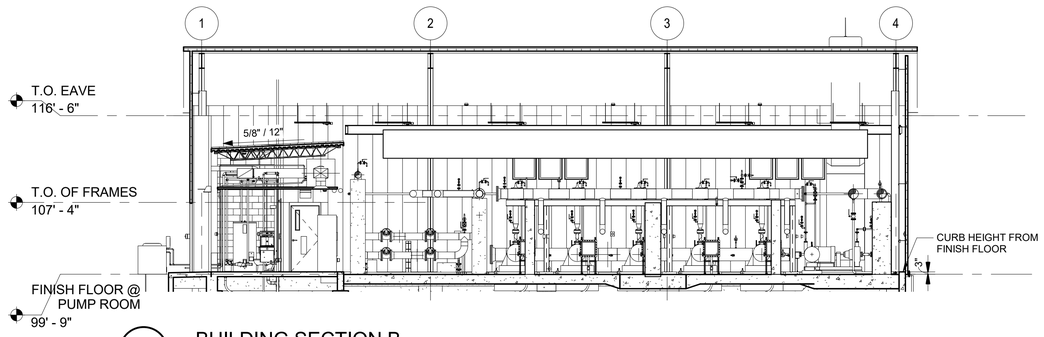
2 SOUTH
SCALE: 1/8" = 1'-0"



4 WEST
SCALE: 1/8" = 1'-0"



5 BUILDING SECTION A
SCALE: 1/8" = 1'-0"



6 BUILDING SECTION B
SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. ROOF SLOPES SHOWN ARE MINIMUM AND SHALL BE COORDINATED WITH THE INSTALLATIONS STANDARDS AND GEOGRAPHIC CONDITIONS AS REQUIRED TO ACCOMODATE SNOW AND OTHER LOADING CONDITIONS.

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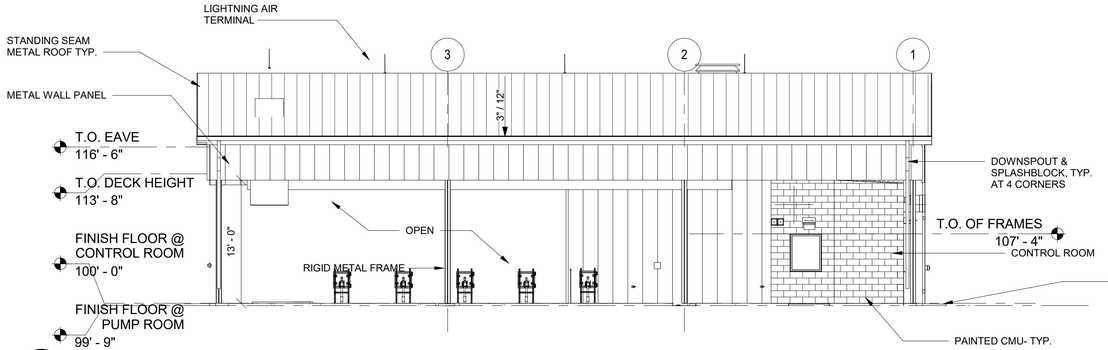
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 079-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMP HOUSE BUILDING ELEVATIONS AND BUILDING SECTION

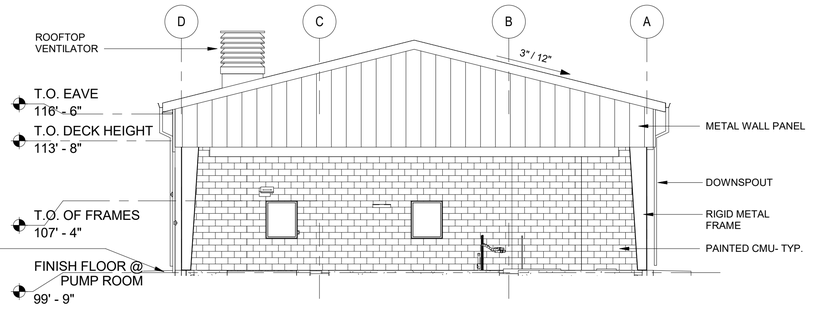
SHEET ID

A-201



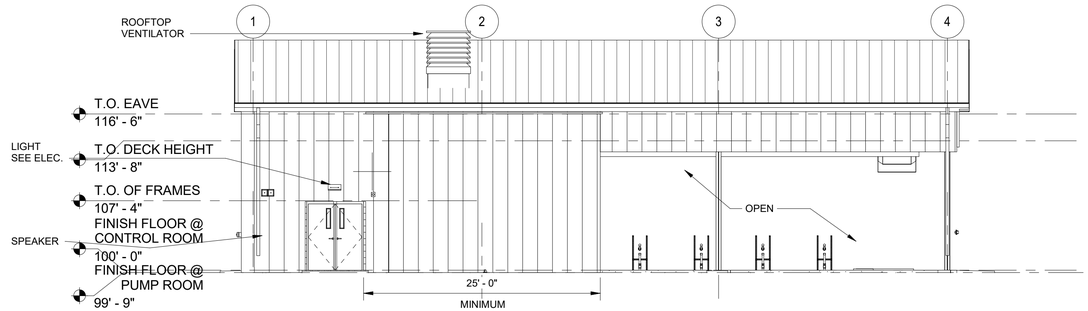
1 NORTH- PS

SCALE: 1/8" = 1'-0"



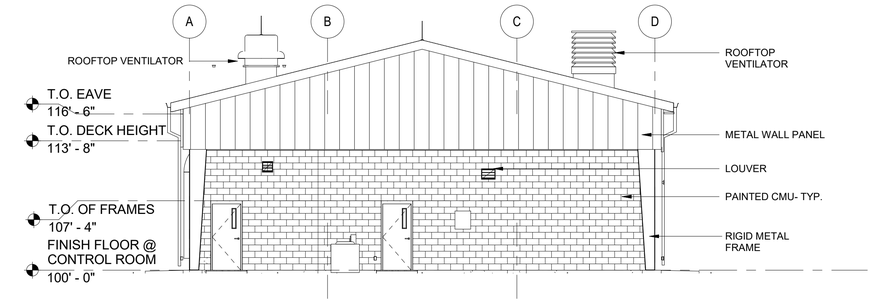
3 EAST- PS

SCALE: 1/8" = 1'-0"



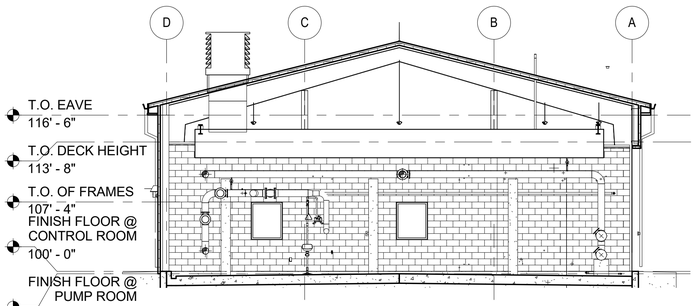
2 SOUTH- PS

SCALE: 1/8" = 1'-0"



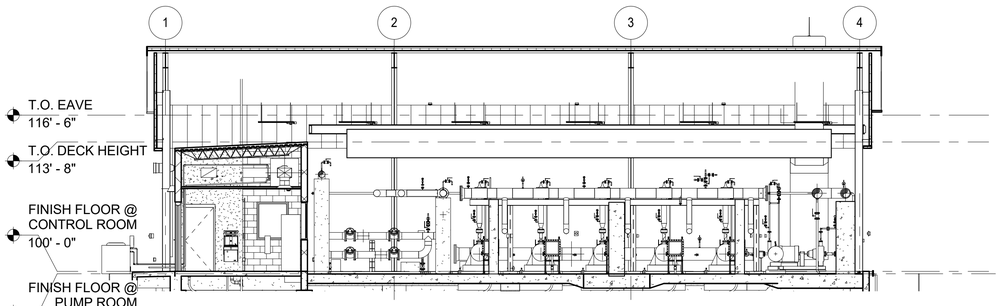
4 WEST- PS

SCALE: 1/8" = 1'-0"



5 BUILDING SECTION A- PS

SCALE: 1/8" = 1'-0"



6 BUILDING SECTION B- PS

SCALE: 1/8" = 1'-0"

GENERAL NOTES:

1. ROOF SLOPES SHOWN ARE MINIMUM AND SHALL BE COORDINATED WITH THE INSTALLATIONS STANDARDS AND GEOGRAPHIC CONDITIONS AS REQUIRED TO ACCOMODATE SNOW AND OTHER LOADING CONDITIONS.

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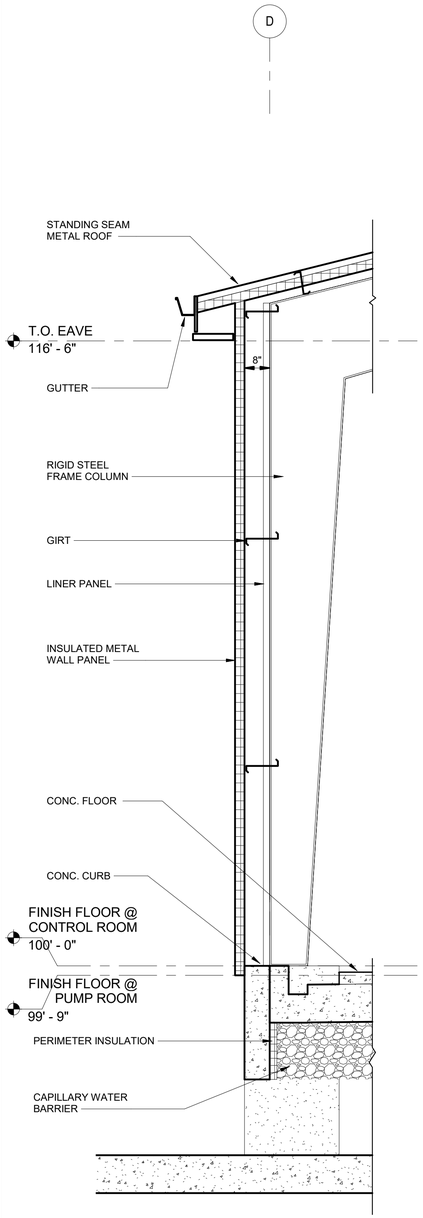
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 075-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

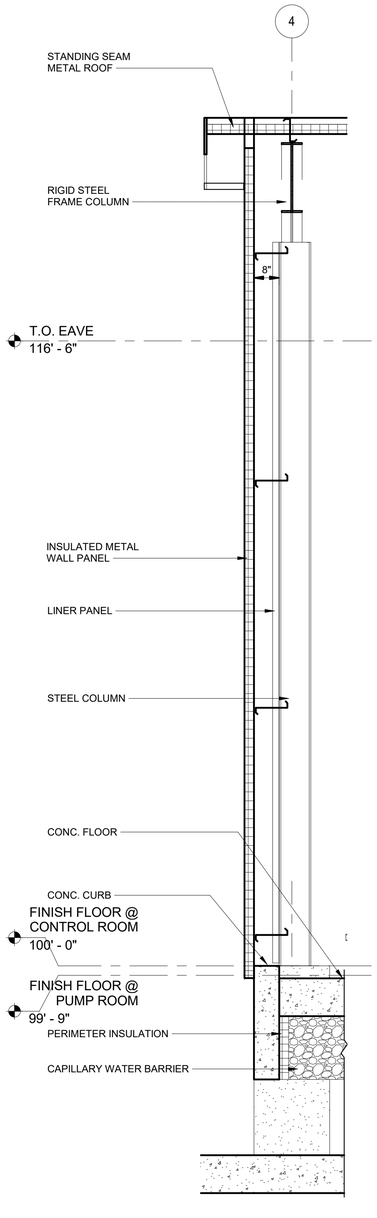
PUMP SHELTER BUILDING ELEVATIONS AND BUILDING SECTIONS

SHEET ID

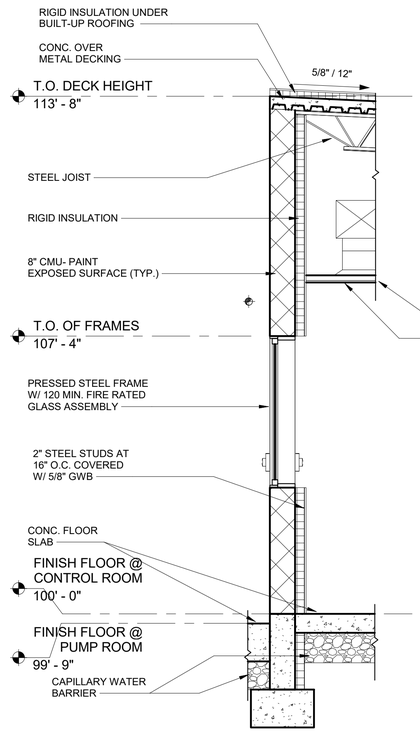
A-202



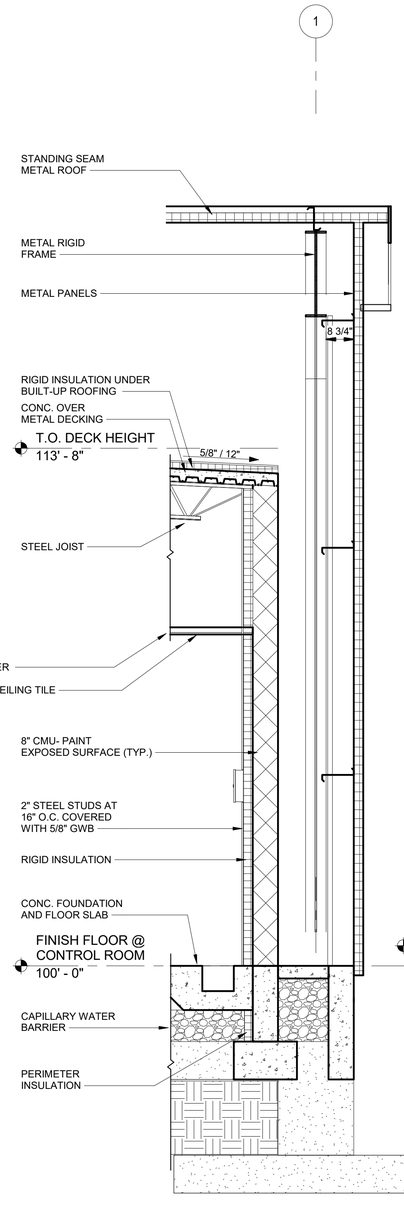
1 WALL SECTION 1
SCALE: 1/2" = 1'-0"



2 WALL SECTION 2
SCALE: 1/2" = 1'-0"



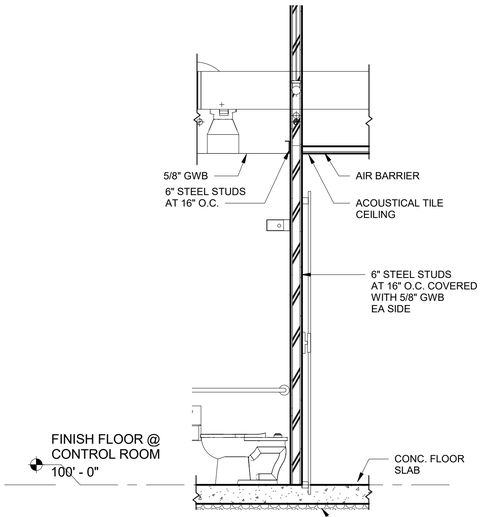
3 WALL SECTION 3
SCALE: 1/2" = 1'-0"



4 WALL SECTION 4
SCALE: 1/2" = 1'-0"

NOTES:

1. WINDOW TO BE 2-HOUR FIRE RATED IF PUMPHOUSE IS NOT PROVIDED WITH AN AUTOMATIC FIRE SUPPRESSION SYSTEM. IF A FIRE SUPPRESSION SYSTEM IS PROVIDED, THE WINDOW RATING MAY BE REDUCED TO A 1-HOUR RATING.
2. SEE NOTES ON A-101 FOR CONTROL ROOM FIRE RATING REQUIREMENTS.



5 WALL SECTION 5
SCALE: 1/2" = 1'-0"

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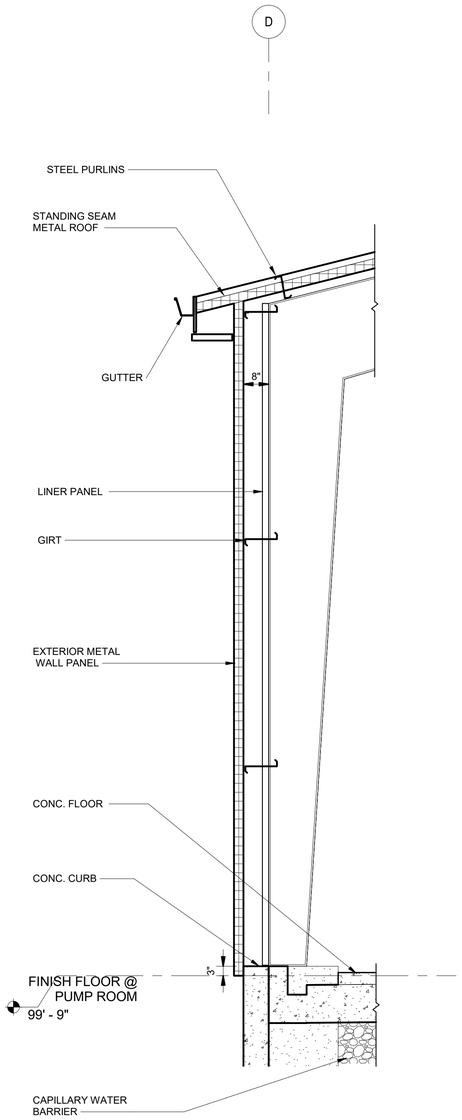
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

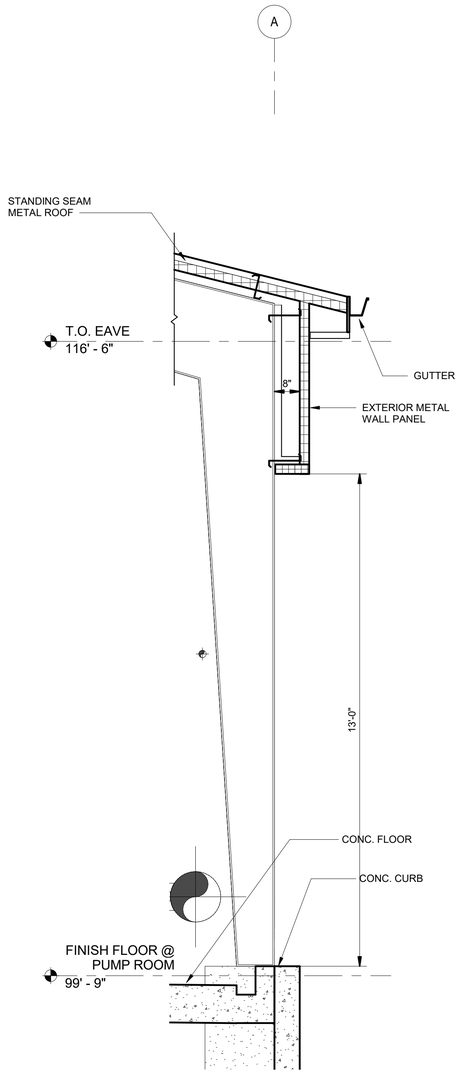
PUMP HOUSE
WALL SECTIONS

SHEET ID
A-301



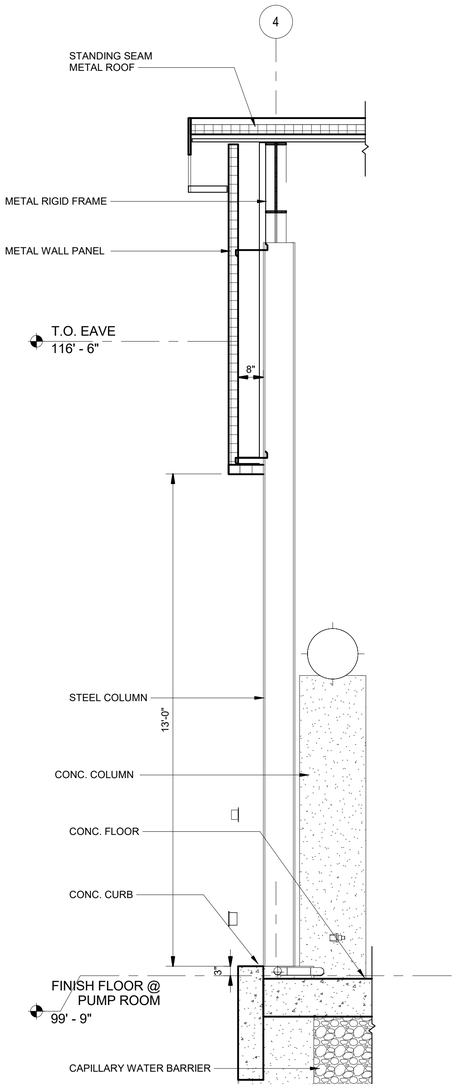
6 WALL SECTION 6

SCALE: 1/2" = 1'-0"



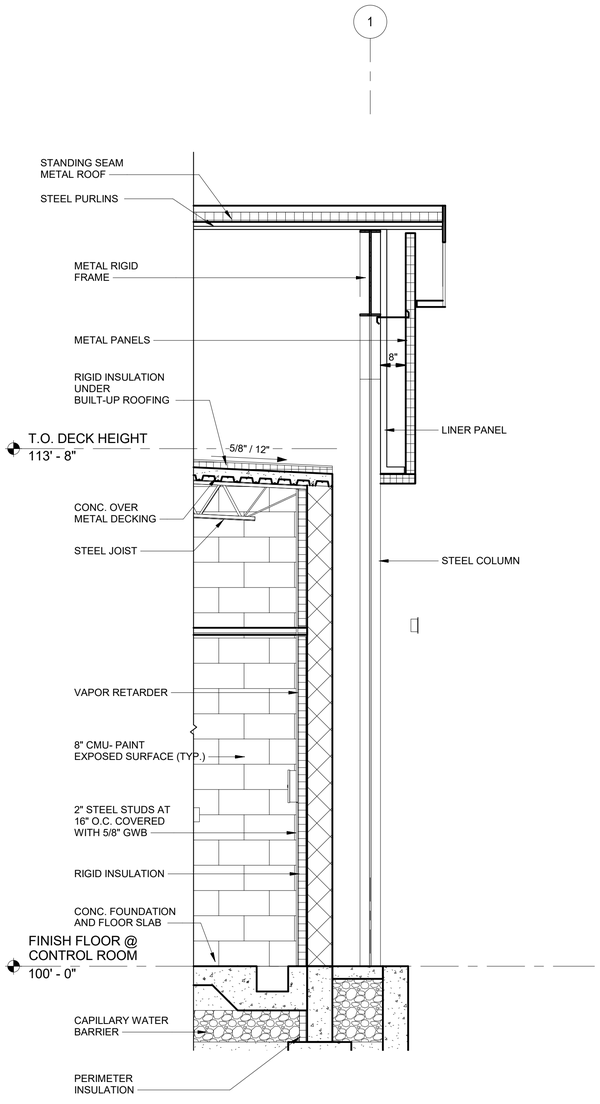
7 WALL SECTION 7

SCALE: 1/2" = 1'-0"



8 WALL SECTION 8

SCALE: 1/2" = 1'-0"



9 WALL SECTION 9

SCALE: 1/2" = 1'-0"

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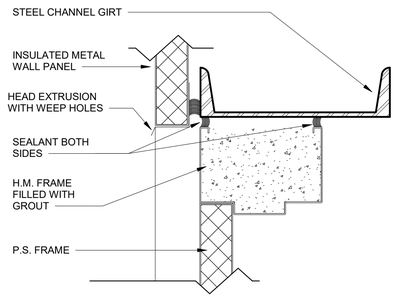
OMAHA DISTRICT

DOD STANDARD DESIGN AW 079-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

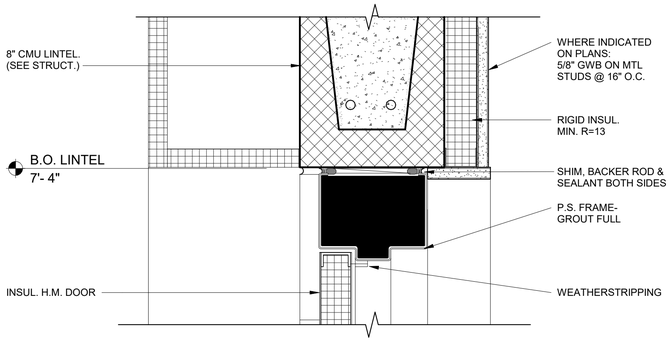
PUMP SHELTER WALL SECTIONS

SHEET ID

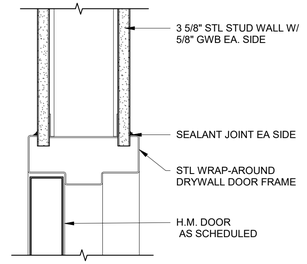
A-302



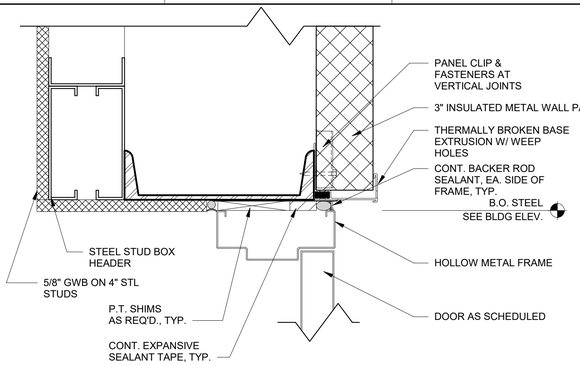
A HEAD DETAIL
SCALE: 3" = 1'-0"



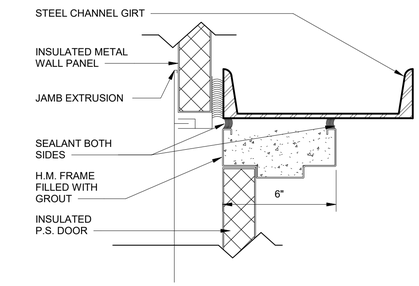
D HEAD SILL
SCALE: 3" = 1'-0"



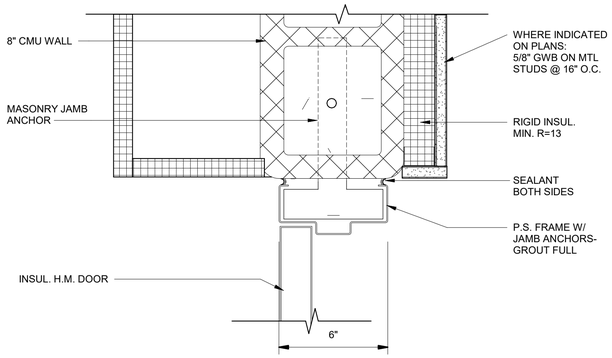
H DOOR HEAD
SCALE: 3" = 1'-0"



N HM DOOR HEAD @ EXTERIOR WALL
SCALE: 3" = 1'-0"

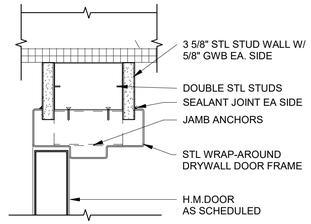


B JAMB DETAIL.
SCALE: 3" = 1'-0"



E JAMB DETAIL
SCALE: 3" = 1'-0"

NOTE: STUD SIZE WILL BE DEPENDENT ON TYPE AND AMOUNT OF INSULATION PROVIDE MIN. W/ RIGID-2" MIN. W/ BATT 4" STUDS



J DOOR JAMB
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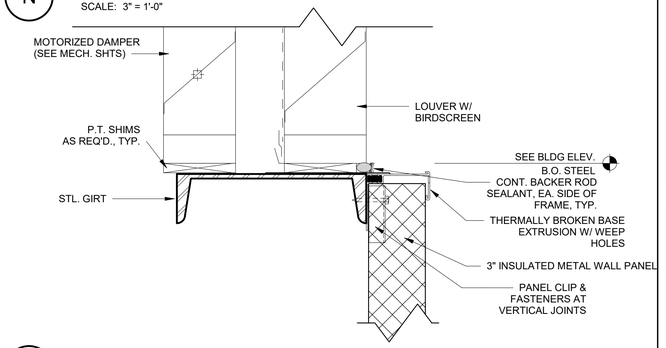
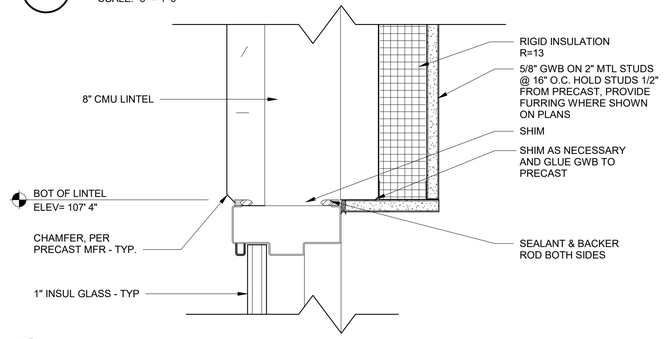
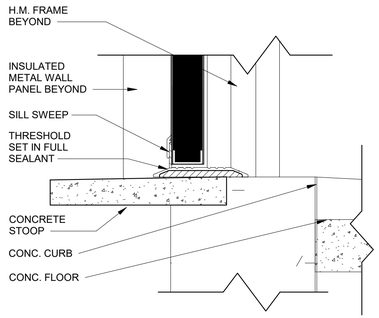


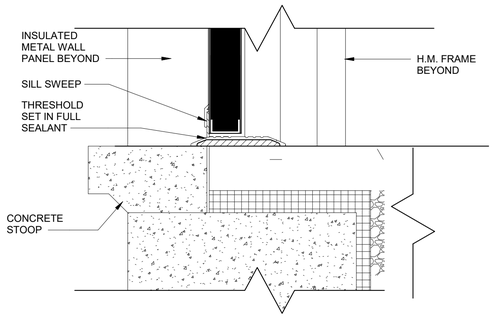
P JAMB @ EXTERIOR WALL
SCALE: 3" = 1'-0"



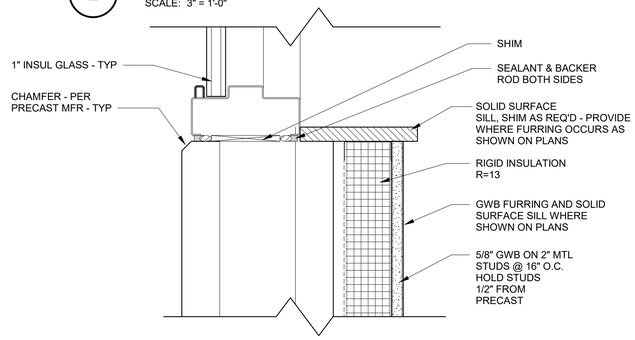
L WINDOW HEAD @ INTERIOR WALL
SCALE: 3" = 1'-0"



C SILL @ EXTERIOR DETAIL
SCALE: 3" = 1'-0"



F SILL DETAIL
SCALE: 3" = 1'-0"



M WINDOW SILL @ INTERIOR WALL
SCALE: 3" = 1'-0"

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

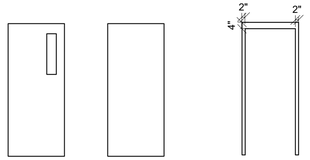
DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

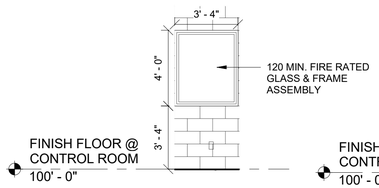
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

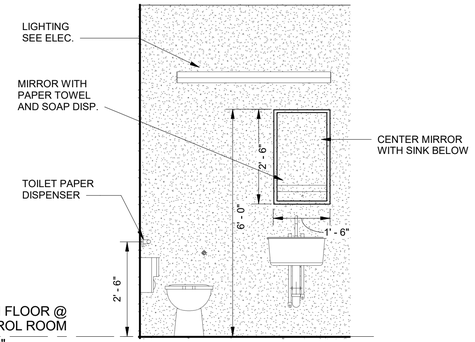
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

DOOR AND WINDOW DETAILS

SHEET ID
A-501







TYPICAL TOILET ELEVATION

NOTE:
REDUCE WINDOW TO 60 MIN. FIRE RATING
IF BUILDING IS SPRINKLED.

ROOM FINISH SCHEDULE

WT	ROOM NAME	FLOOR	BASE	WALLS				CEILING		NOTES & REMARKS (SEE NOTES)
				NORTH	EAST	SOUTH	WEST	MAT.	HEIGHT	
101	PUMP ROOM	CONC.	-	WALL PANL	WALL PANL	WALL PANL	WALL PANL	EXP.		CEILIING HEIGHT VARIES
102	CONTROL ROOM	VCT.	RB	GWB	GWB	GWB	GWB	ACT.	9' - 0"	
103	TOILET	VCT.	RB	GWB	GWB	GWB	GWB	GWB	8' - 0"	
104	MECH. ROOM	CONC.	-	CONC.	CONC.	CONC.	CONC.	EXP.		CEILIING HEIGHT VARIES

NOTE:
REFER TO BUILDING ELEVATIONS
TO LOCATE FULL HEIGHT EXTERIOR WALLS

PUMPHOUSE DOOR SCHEDULE

DOOR NO.	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THICKNESS	TYPE	DOOR MATERIAL	FRAME TYPE	FRAME MATERIAL	FRAME DETAILS HEAD	FRAME DETAILS JAMB	SILL DETAIL	FIRE RATING	HARDWARE	COMMENTS:
101	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	A/A-501	B/A-501	C/A-501			SEE GENERAL NOTES ON A-101
101	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	A/A-501	B/A-501	C/A-501			SEE GENERAL NOTES ON A-101
102S	2' - 10"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-101
102S	2' - 10"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-101
103S	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-101
104S	3' - 0"	7' - 0"	1 3/4"	F	HM	A	P.S.	H/A-501	J/A-501	-			SEE GENERAL NOTES ON A-101
105S	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-101
106	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	A/A-501	B/A-501	C/A-501-SIM.			SEE GENERAL NOTES ON A-101

PUMPSHELTER DOOR SCHEDULE

DOOR NO.	DOOR SIZE WIDTH	DOOR SIZE HEIGHT	DOOR SIZE THICKNESS	TYPE	DOOR MATERIAL	FRAME TYPE	FRAME MATERIAL	FRAME DETAILS HEAD	FRAME DETAILS JAMB	SILL DETAIL	FIRE RATING	HARDWARE	COMMENTS:
102S	2' - 10"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-102
102S	2' - 10"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-102
105S	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-102
103S	3' - 0"	7' - 0"	1 3/4"	N	HM	A	P.S.	D/A-501	E/A-501	F/A-501			SEE GENERAL NOTES ON A-102
104S	3' - 0"	7' - 0"	1 3/4"	F	HM	A	P.S.	H/A-501	J/A-501	-			SEE GENERAL NOTES ON A-102

DOOR NOTES:

1. DOOR HARDWARE FOR ALL EXTERIOR DOORS SHALL BE EQUIPPED WITH PANIC TYPE HARDWARE.
2. DOOR FRAMES SHALL BE WELDED TYPE JOINTS FOR ALL STEEL FRAMES.
3. DOORS INDICATED WITH A "S" SHALL BE RETAINED FOR THE PUMPSHELTER SCHEDULE.
4. DOORS WITH A FIRE RATING MUST HAVE CLOSERS INSTALLED.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ROOM FINISH & DOOR SCHEDULE & INTERIOR ELEVATIONS

SHEET ID

A-601

SAFETY NOTES:

1. BEFORE DOING ANY WORK ON THE EXISTING FUEL SYSTEM, FUEL LIQUIDS AND VAPORS SHALL BE REMOVED FROM THE SYSTEMS.
2. THE CONTRACTING OFFICER SHALL BE NOTIFIED [TWO] WEEKS BEFORE STARTING WORK ON THE SYSTEM. THE [CONTRACTOR][GOVERNMENT] WILL BE RESPONSIBLE FOR REMOVING ALL FUEL FROM THE SYSTEM. RESIDUAL FUEL WILL REMAIN IN LOW POINTS AND WILL BE THE RESPONSIBILITY OF THE CONTRACTOR TO DISPOSE OF IN AN APPROVED MANNER.
3. PIPING AND FUEL APPURTENANCES TO BE REMOVED SHALL BE FLUSHED WITH WATER AND THE WATER DISPOSED OF IN ACCORDANCE WITH SPEC 33 01 50.60 (CLEANING OF PETROLEUM STORAGE TANKS). CLEANING SHALL ALSO BE IN ACCORDANCE WITH LOCAL REGULATIONS.
4. PIPE TO BE CUT SHALL BE CUT BY "COLD CUT" METHOD, IE; MULTI-WHEELED HAND CUTTER OR PNEUMATIC DRIVEN SPARKLESS ROTARY CUTTER.
5. THE AREA WHERE THE OPEN EXISTING PIPE IS LOCATED SHALL BE CONTINUOUSLY MONITORED FOR FUEL FUMES AND OXYGEN CONCENTRATION WITH A PROPERLY CALIBRATED COMBUSTIBLE GAS DETECTOR WHILE WORK IS BEING PERFORMED IN THE AREA. WHENEVER THE GAS DETECTOR DETECTS FUEL FUMES, WORK SHALL STOP UNTIL THE AREA IS VAPOR FREED BY THE CONTRACTOR.
6. THE SECTION OF EXISTING PIPE BEING WELDED SHALL BE VAPOR FREED BEFORE WELDING. A "HOT" WORK PERMIT SHALL ALSO BE OBTAINED BEFORE WELDING TO EXISTING PIPES OR IN THE AREA OF THE PUMPHOUSE.
7. WELDING TO EXISTING FUEL LINES:
   A. THE CONTRACTING OFFICER SHALL BE NOTIFIED [TWO] WEEKS BEFORE STARTING WELDING ON EXISTING PIPE SO THAT THE BASE LIQUID FUELS MAINTENANCE SAFETY COORDINATOR AND THE CONTRACTOR CAN DETERMINE THE WELDING PROCEDURES TO BE FOLLOWED.
   B. BEFORE WELDING TO AN EXISTING FUEL PIPE, THE PIPE SHALL BE COMPLETELY DRAINED AND PROPERLY ISOLATED BY BLINDING, DISCONNECTING, OR CLOSING A DOUBLE BLOCK AND BLEED PLUG VALVE AND THE PIPE SHALL BE VAPOR FREED BY INERTING, USING DRY ICE, NITROGEN GAS, OR OTHER METHODS APPROVED BY THE BASE LIQUID FUELS MAINTENANCE SAFETY COORDINATOR. CLAY PLUGS ARE NOT ALLOWED.
   C. THE AREA WHERE THE PIPE IS BEING WELDING AND AT THE PIPE WELD SHALL BE CONTINUOUSLY MONITORED FOR FUEL FUMES AND OXYGEN LEVELS WITH PROPERLY CALIBRATED COMBUSTIBLE GAS DETECTORS.
   D. WHENEVER THE AREA GAS DETECTOR DETECTS FUEL FUMES GREATER THAN 10% OF LEL OR OXYGEN LEVELS GREATER THAN 23.5%, OR THE GAS DETECTOR AT THE PIPE DETECTS FUEL FUMES GREATER THAN 0% OF LEL ON OXYGEN LEVELS GREATER THAN 6%, WORK SHALL BE STOPPED UNTIL THE AREA IS VAPOR FREED BY THE CONTRACTOR AND OXYGEN LEVELS ARE LOWERED.
   E. A HAZARDOUS FREE ZONE SHALL BE MAINTAINED DURING WORK ON THE EXISTING FUEL PIPE. THE FREE ZONE SHALL BE AN AREA 50 FEET AROUND THE WORK BEING DONE ON THE EXISTING PIPE. THE FREE ZONE SHALL BE FREE FROM SOURCES OF IGNITION AND SHALL BE CONTINUOUSLY MONITORED FOR FUEL FUMES WITH A PROPERLY CALIBRATED COMBUSTIBLE GAS DETECTOR AND SHALL REQUIRE ANY ELECTRIC MOTOR IN THE AREA TO BE A CLASS I, DIVISION I, GROUP D MOTOR AND SHALL HAVE A MAXIMUM TEMPERATURE RATING OF T2D (419 DEG F) AS DEFINED BY NFPA 70.
8. CARE SHALL BE TAKEN WHEN DIGGING IN THE AREA OF EXISTING OPERATIONAL FUEL LINES. PROBES SHALL BE USED TO LOCATE THE PIPE. EXCAVATION SHALL BE BY HAND DIGGING FROM WITHIN 18 INCHES VERTICALLY ABOVE AND 4 FEET HORIZONTALLY OF EXISTING FUEL LINES. BASE FUELS PERSONNEL SHALL BE NOTIFIED THROUGH THE CONTRACTING OFFICER [7] DAYS IN ADVANCE OF EXCAVATIONS, SO THAT THEY CAN BE ON SITE WHENEVER EXCAVATIONS ARE IN PROGRESS.

FUEL SYSTEM LEGEND:

AAV	AUTOMATIC AIR VENT
BPCV	BACK PRESSURE CONTROL VALVE
CS	CARBON STEEL
CV	NON-SURGE CHECK VALVE WITH RATE OF FLOW CONTROLLER
D/FV	DEFUEL/FLUSH VALVE
DPT	DIFFERENTIAL PRESSURE TRANSMITTER
ESO	EMERGENCY SHUT-OFF VALVE
FP	FUELING PUMP
FSCV	FILTER SEPARATOR CONTROL VALVE
FSI	FILTER SEPARATOR ISSUE
FSR	FILTER SEPARATOR RECEIVING
HLV	HIGH LIQUID LEVEL SHUT-OFF VALVE
IF	INSULATING FLANGE
MAV	MANUAL AIR VENT
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
O.V.	OVER FILL VALVE
PCV	PRESSURE CONTROL VALVE
PS	PIPE SUPPORT
SFI	SIGHT FLOW INDICATOR
SS	STAINLESS STEEL
WC	WATER COLUMN
PRP	PRODUCT RETURN PUMP
DP	DIFFERENTIAL PRESSURE GAUGE
DPT	DIFERENTIAL PRESSURE TRANSMITTER
LI	LIQUID LEVEL INDICATOR
M	METER
PIT	PRESSURE INDICATIONG TRANSMITTER
PG	PRESSURE GAUGE - SEE DETAIL ON SHEET M-502
PS	PRESSURE SENSOR
TS	TEMPERATURE SENSOR
S	BASKET STRAINER
FS	FLOW SWITCH
	CONTROL VALVE
	SIGHT FLOW INDICATOR
	ANGLE TYPE CONTROL VALVE
	LINE SIZE REDUCER
	BALL VALVE
JP	JET FUEL LINE
	WYE STRAINER
	PLUG VALVE
	CAP
	CONNECTOR
	FLEXIBLE BALL JOINT
	FLEXIBLE HOSE
	CHECK VALVE
	NEEDLE VALVE
IF	INSULATING FLANGE
%	LIMIT SWITCH
	SAMPLE CONNECTION - SEE DETAIL ON SHEET M-503
	CONTROL VALVE WITH SOLENOID OPERATED PILOT SYSTEM
	HYDRANT CONTROL VAVLVE
	NON-SURGE CHECK VALVE WITH RATE OF FLOW CONTROLLER
OR OR	RELIEF VALVE - SEE DETAIL ON SHEET M-502
	MOTORIZED VALVE
	ORIFICE

DESIGNER NOTES:

SUBJECT MATTER EXPERT (SME) IS DEFINED AS SERVICE HEADQUARTERS SME:
AIR FORCE - THE AIR FORCE FUELS FACILITIES SUBJECT MATTER EXPERT (HQ AFCEC/COS),
ARMY - HEADQUARTERS, U.S. ARMY CORPS OF ENGINEERS, POL-MCX FACILITIES PROPONENT (CECW-EC) THROUGH THE ARMY PETROLEUM CENTER (APC),
NAVY/MARINE CORPS - NAVFAC POL FACILITY SUBJECT MATTER EXPERT (NAVFAC EXWC, PW54).

1. FOR FUELS QUALITY AND OPERATIONS QUESTIONS, CONTACT THE SERVICE CONTROL POINT (SCP) FOR GUIDANCE. FOR DESIGN AND CRITERIA QUESTIONS, CONTACT THE SERVICE SME.
2. OPERATING TANK LEVEL ALARM ACTUATION POINTS SHALL BE COORDINATED WITH THE OPERATING TANKS SELECTED.
3. IF SUITABLE ON-BASE BULK STORAGE TANKS ARE LOCATED WITHIN ONE MILE OF THE FUELING APRON, THEY MAY BE USED AS OPERATING TANKS IF APPROVED BY SME. HOWEVER, IT IS NOT RECOMMENDED TO USE TANKAGE THAT RECEIVES DIRECTLY FROM OFF BASE SOURCES VIA PIPELINE. USE OF THESE TANKS WILL REQUIRE APPROVAL OF THE SME. IF EXISTING STORAGE TANKS ARE USED, THEY SHALL BE MODIFIED TO CONFORM TO REQUIREMENTS FOR OPERATING TANKS.
4. FIRE DETECTION/SUPPRESSION SYSTEM SHALL BE PROVIDED IN THE PUMP HOUSE AS REQUIRED BY UFC 3-460-01.
5. SME SHALL DETERMINE REQUIREMENTS FOR PANTOGRAPH FLUSHING CONNECTION VS. HYDRANT HOSE TRUCK CHECK-OUT STATION.
6. RELIEF VALVES SHALL BE PROVIDED AT EACH LOCATION WHERE SEGMENTS OF PIPE CAN BE ISOLATED BY VALVING OR BLINDING. CASCADING RELIEF VALVES SHALL BE PREVENTED AS MUCH AS POSSIBLE TO PREVENT ADDITIVE PRESSURES FROM GETTING TOO LARGE.
7. PROVIDE FLANGES WITH INSULATING GASKET KITS AT ALL LOCATIONS WHERE DISSIMILAR METALS, BETWEEN PIPELINES THAT MAY CONTACT ONE ANOTHER, OR WHERE ISOLATION OF CATHODIC PROTECTION SYSTEM IS REQUIRED.
8. HHLA SHALL BE LOCATED AT A LEVEL BELOW THE OPERATING TANK OVERFLOW.
9. ALL THERMAL RELIEF VALVES, W/O SPECIFIED SET PRESSURE SHALL BE SET AT A PRESSURE 10% GREATER THAN THE PUMP DEAD HEAD PRESSURE, NOT TO EXCEED 265 PSIG. LOCK EACH RELIEF LINE BLOCK VALVE OPEN WITH CAR SEALS.
10. SEE SHEET REQUIREMENTS. A/E SHALL VERIFY 'IF' LOCATIONS.
11. PROVIDE HIGH POINT VENTS AND LOW POINT DRAINS AS REQUIRED TO ENSURE COMPLETE DRAINAGE AND COMPLETE AIR VENTING OF FUEL PIPING.
12. PIPE SIZE 12" OR LARGER PER SURGE ANALYSIS.
13. TAKE OFF TO TRUCK FILL STAND IS ON LOOP OR IN PUMP HOUSE PER SME. WHERE TAKE OFF IS ON LOOP, INSTALL LOOP ISOLATION VALVES WITH CROSS OVER TO ALLOW CONTINUED OPERATION OF THE FILLSTAND WHILE ISOLATING THE HYDRANT LOOP.
14. EMERGENCY SHUT OFF IS EITHER BY CLOSING MANUAL VALVE OR BY PROVIDING A SOLENOID CONTROL ON THE FILTER SEPARATOR CONTROL VALVE, PER SME.
15. SIZE OF HYDRANT LOOP PIPING SHALL BE BASED ON SURGE ANALYSIS AS WELL AS THE NEED, LOCATION, AND SIZE OF HYDRAULIC SURGE ARRESTORS.
16. THE USE OF SURGE ARRESTORS SHALL BE BASED ON THE SURGE ANALYSIS OR AS DIRECTED BY THE SME.
17. ADAPT PUMP HOUSE LAYOUT BASED ON SITE SPECIFIC REQUIREMENTS.
18. SEE AST STANDARD AND UFC 3-460-01 FOR DESIGN REQUIREMENTS.

US Army Corps of Engineers ®

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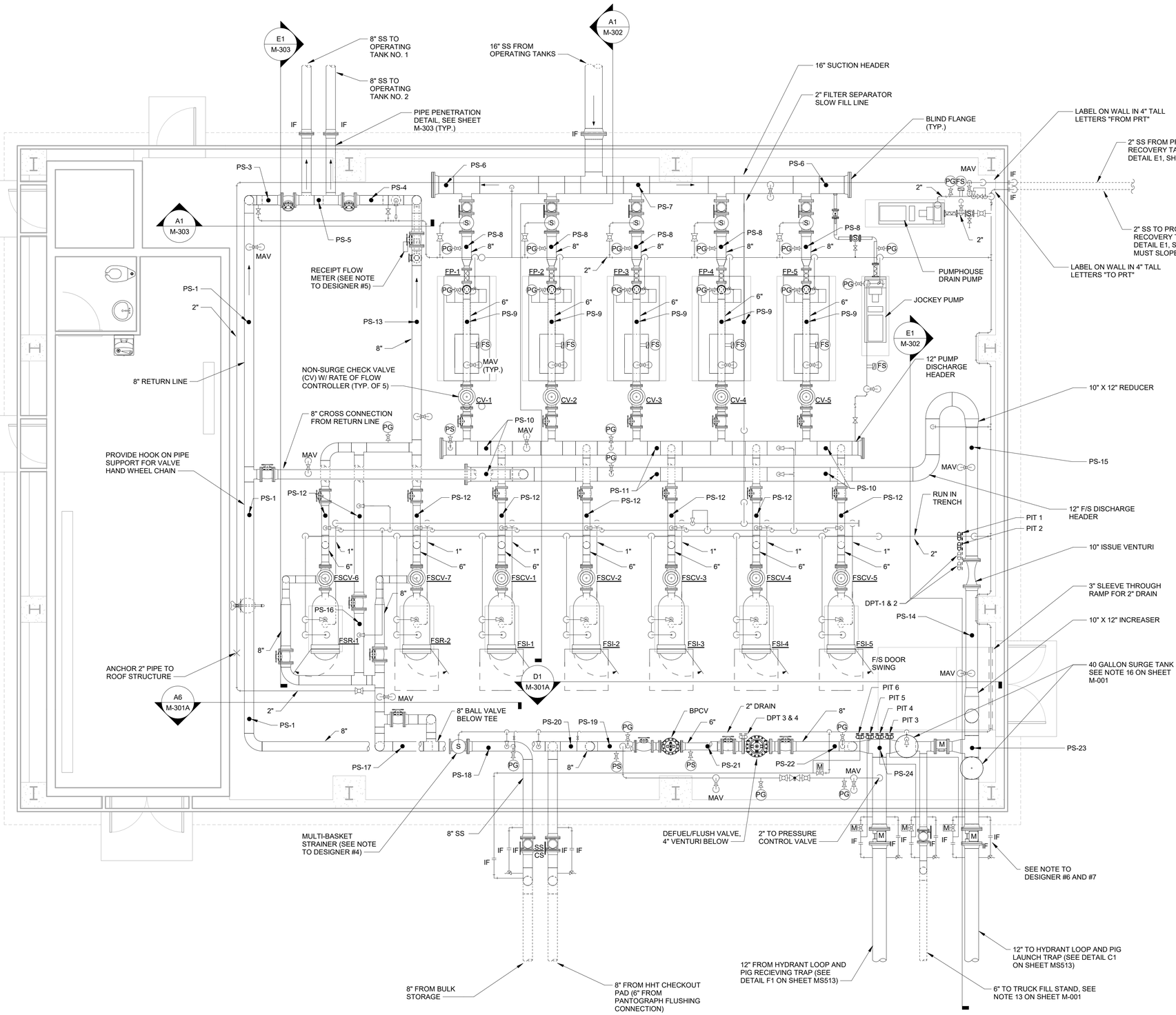
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FUEL SYSTEM LEGEND AND NOTES

SHEET ID

M-001



NOTES TO DESIGNER:

1. LARGE FILLED DOTS ON PIPING INDICATE PIPE SUPPORT LOCATIONS, SEE SHEET S-101.
2. ALL PRESSURIZED HYDRANT FUELING SYSTEM PIPE MATERIALS SHALL BE PER UFC 3-460-01.
3. SYSTEMS OTHER THAN 2400 GPM SHALL HAVE PIPING RESIZED PER SURGE ANALYSIS.
4. MICRONIC FILTER MAY BE NECESSARY. SEE UFC 3-460-1, IF TRANSFER LINE IS FROM OFF-BASE COMMERCIAL PIPELINE, OR AS DIRECTED BY THE FUELS QUALITY MANAGER. PROVIDE A PAIR OF MICRONIC FILTER IF SO DIRECTED BY SME.
5. PROVIDE FLOW METER, ORIFICE, AND ISOLATION BALL VALVES AS DIRECTED BY THE SME.
6. PROVIDE CONTAINMENT PAD UNDER EXTERIOR VALVES WHEN REQUIRED BY LOCAL ENVIRONMENTAL REGULATIONS.
7. PROVIDE ELECTRIC MOTOR OPERATORS ON 12" VALVES IF DIRECTED BY SME.
8. CONSIDER USING VERTICAL INLINE CENTRIFUGAL PUMPS

A1 PIPING PLAN

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

0 2' 4' 8'

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE ANSI D
ISSUE DATE: MARCH 2020
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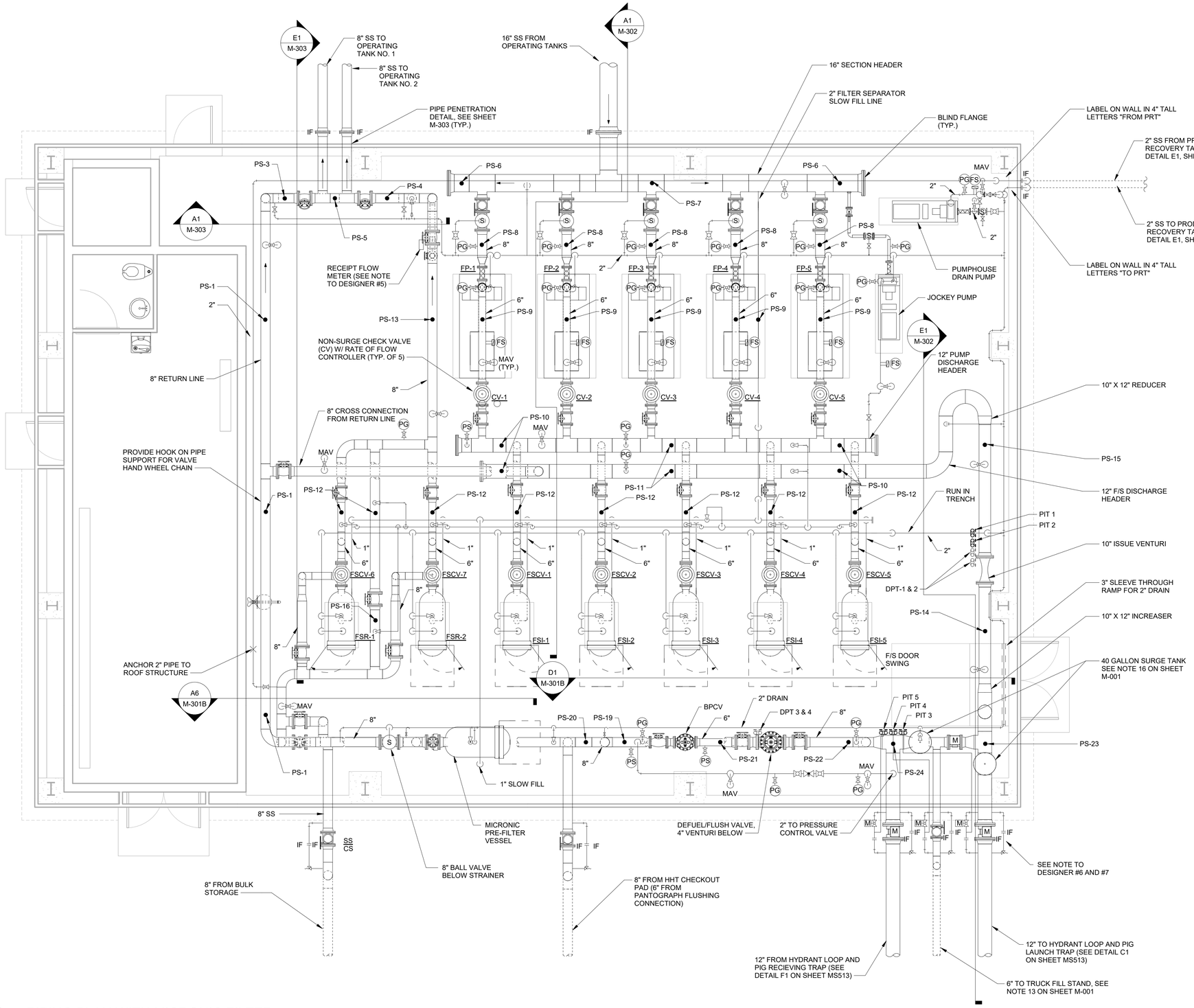
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING PLAN

SHEET ID

M-101A



NOTES TO DESIGNER:

1. LARGE FILLED DOTS ON PIPING INDICATE PIPE SUPPORT LOCATIONS, SEE SHEET S-101.
2. ALL PRESSURIZED HYDRANT FUELING SYSTEM PIPE MATERIALS SHALL BE PER UFC 3-460-01.
3. SYSTEMS OTHER THAN 2400 GPM SHALL HAVE PIPING RESIZED PER SURGE ANALYSIS.
4. MICRONIC FILTER MAY BE NECESSARY. SEE UFC 3-460-1, IF TRANSFER LINE IS FROM OFF-BASE COMMERCIAL PIPELINE, OR AS DIRECTED BY THE FUELS QUALITY MANAGER. PROVIDE A PAIR OF MICRONIC FILTER IF SO DIRECTED BY SME.
5. PROVIDE FLOW METER, ORIFICE, AND ISOLATION BALL VALVES AS DIRECTED BY THE SME.
6. PROVIDE CONTAINMENT PAD UNDER EXTERIOR VALVES WHEN REQUIRED BY LOCAL ENVIRONMENTAL REGULATIONS.
7. PROVIDE ELECTRIC MOTOR OPERATORS ON 12" VALVES IF DIRECTED BY SME.
8. CONSIDER USING VERTICAL INLINE CENTRIFUGAL PUMPS

A1 PIPING PLAN WITH MICRONIC FILTER

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

0 2' 4' 8'

US Army Corps of Engineers ®

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CONTRACT NO.:

DESIGNED BY:
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SUBMITTED BY:
SIZE: ANSI D

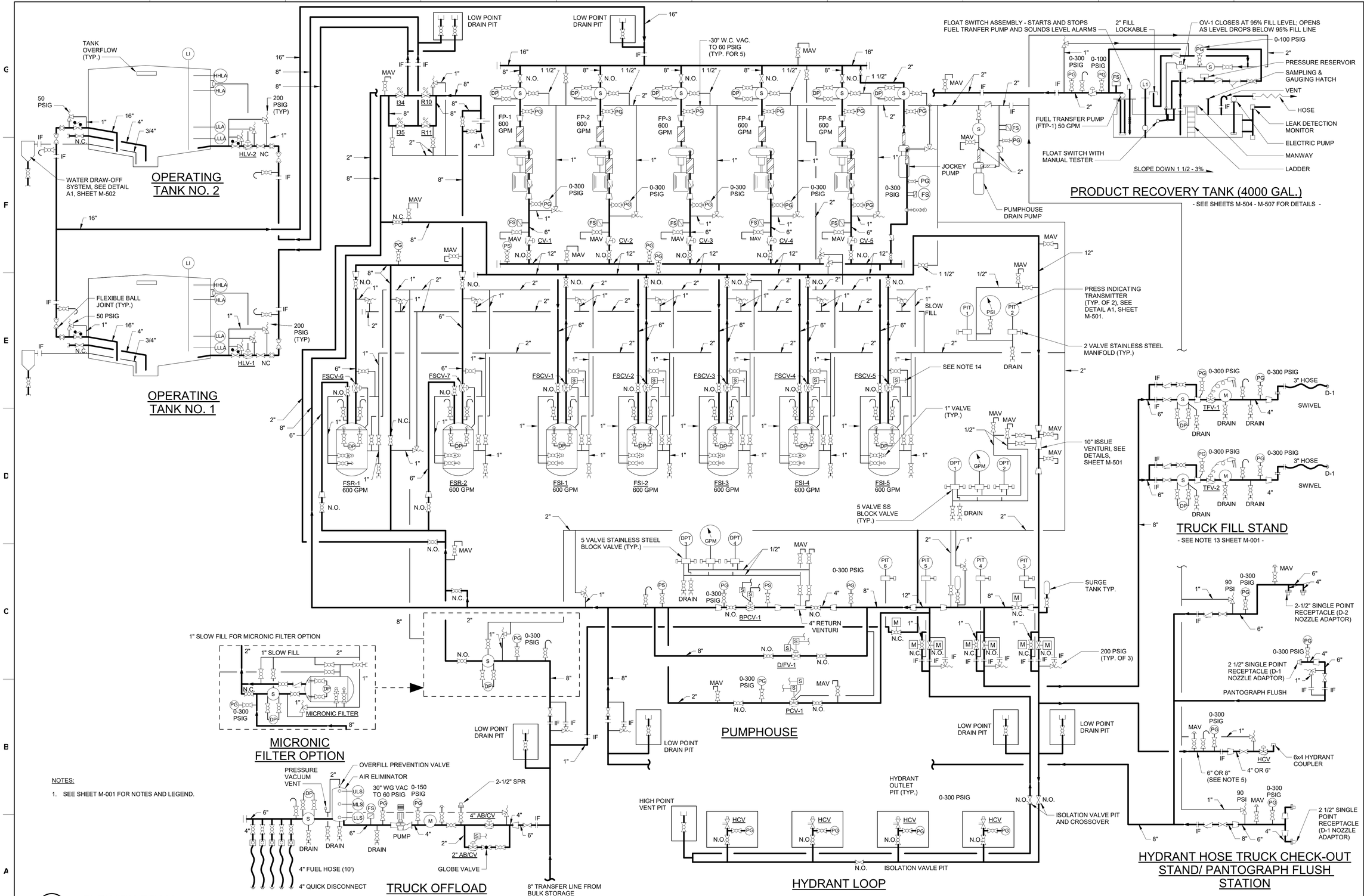
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING PLAN (WITH MICRONIC FILTER)

SHEET ID

M-101B



A1 FLOW DIAGRAM

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

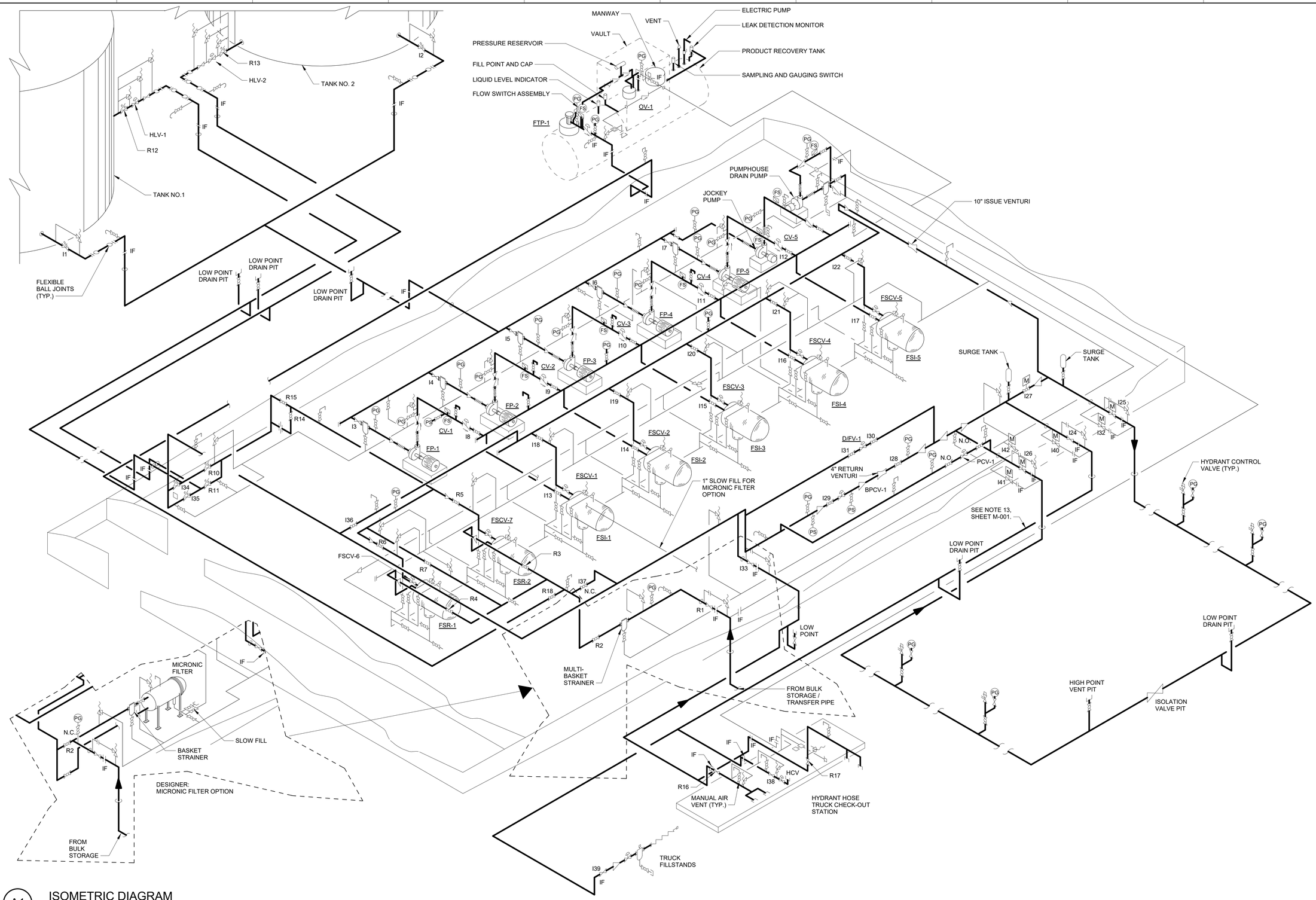
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FLOW DIAGRAM

SHEET ID

M-201



A1 ISOMETRIC DIAGRAM

SCALE: NTS

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ISOMETRIC PIPING DIAGRAM

SHEET ID

M-202

SEQUENCE OF OPERATION

(SEE NOTE TO DESIGNER #1, THIS SHEET)

SYSTEM IN "AUTOMATIC MODE" - "IDLE CONDITION"

THE TYPE III SYSTEM IS INTENDED TO REMAIN CONTINUOUSLY PRESSURIZED WHILE IN THE IDLE CONDITON. THIS ALLOWS THE SYSTEM TO RESPOND AUTOMATICALLY / IMMEDIATELY TO AIRCRAFT REFUELING AND DEFUELING MISSION REQUIREMENTS.

PERIODICALLY, WHILE IN THE IDLE CONDITION WITH NO AIRCRAFT REFUELING OR DEFUELING DEMANDS, THE SYSTEM WILL LOSE MINIMUM PRESSURE REQUIREMENTS. WHEN THIS OCCURS, THE CONTROL SYSTEM WILL AUTOMATICALLY REPRESSURIZE IN THE FOLLOW SEQUENCE.

1. AS SYSTEM PRESSURE AT PRESSURE INDICATING TRANSMITTER PIT-1 OR PIT-2 DROPS BELOW SET POINT OF 65 PSIG, THE CONTROL SYSTEM WILL START A 15 SECOND DELAY TIMER. IF AFTER 15 SECONDS THE PRESSURE IS BETWEEN 60-65 PSIG, THE JOCKEY PUMP (JP-1) SHALL BE ENERGIZED (THE JOCKEY PUMP SHALL NOT RUN WHILE ANY FUELING PUMP IS RUNNING.).
   - THE PRESSURE CONTROL VALVE (PCV) SOLENOID "A" SHALL BE ENERGIZED TO DISABLE OR HOLD PCV CLOSED WHILE ANY PUMP IS RUNNING.
2. WITH NO FUELING DEMAND, SYSTEM PRESSURE AT PRESSURE INDICATING TRANSMITTER PIT-1 OR PIT-2 WILL RISE. WHEN SYSTEM PRESSURE RISES ABOVE SET PRESSURE OF 70 PSIG, THE CONTROL SYSTEM WILL STOP THE JOCKEY PUMP (JP-1).

AT THIS POINT THE SYSTEM HAS RETURNED TO A PRESSURIZED IDLE CONDITION.

SYSTEM IN "AUTOMATIC" MODE REFUELING CONDITION

DO NOT ATTEMPT TO EXCEED THE SYSTEM CAPACITY OF 2,400 GPM.

TO INITIATE AN AIRCRAFT FUELING OPERATION, AN OPERATOR CONNECTS FUELING EQUIPMENT SUCH AS A HYDRANT HOSE TRUCK (HHT), A HYDRANT CART OR A PANTOGRAPH TO AN AIRCRAFT AND TO A SELECTED HYDRANT CONTROL VALVE. HYDRANT CONTROL VALVES MAY HAVE EITHER AIR OPERATED OR HYDRAULIC (LINE PRESSURE) "DEADMAN" SYSTEMS AND MUST MATCH THE TYPE REFUELER BEING USED. WHEN THE OPERATOR OPENS THE HYDRANT CONTROL VALVE BY USE OF THE "DEADMAN", THE FOLLOWING SEQUENCE OCCURS:

1. AS SYSTEM PRESSURE AT PRESSURE INDICATING TRANSMITTER PIT-1 OR PIT-2 DROPS BELOW SET POINT OF 60 PSIG, THE CONTROL SYSTEM WILL BE INITIATED FOR THE FOLLOWING FUNCTIONS:
   - THE BACK PRESSURE CONTROL VALVE (BPCV) SOLENOID WILL BE ENERGIZED TO ENABLE BPCV TO MODULATE OPEN AT ITS SET POINT.
   - THE DEFUEL / FLUSH VALVE IS EQUIPPED WITH TWO SOLENOIDS. SOLENOID "A" WILL BE DE-ENERGIZED TO DISABLE OR HOLD THE DEFUEL / FLUSH VALVE CLOSED AND SOLENOID "B" WILL BE DE-ENERGIZED ANY TIME SYSTEM IS AN "AUTOMATIC" MODE.

NOTE: SOLENOID "B" IS ENERGIZED WHEN SYSTEM IS IN THE "DEFUEL / FLUSH" MODE".

SYSTEM IN "AUTOMATIC" MODE REFUELING CONDITION (CONT.)

2. THE LEAD FUELING PUMP WILL ESTABLISH A FLOW OF 600+ GPM THROUGH THE SYSTEM ISSUE VENTURI AND THE PRESSURE UPSTREAM OF THE BPCV WILL INCREASE UNTIL THE BPCV SET POINT OF [X] PSIG (AS DETERMINED BY THE HYDRAULICS OF THE SYSTEM) IS REACHED. AT THIS PRESSURE, THE BPCV WILL START TO OPEN AND THE VALVE WILL MODULATE AS REQUIRED TO PASS SUFFICIENT FLOW THROUGH THE RETURN VENTURI TO MAINTAIN PRESSURE UPSTREAM OF THE VALVE.

3. WITH DPT-1 OR DPT-2 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE OF 600+ GPM AND DPT-3 OR DPT-4 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE THRU THE RETURN VENTURI OF GREATER THAN +40 GPM AND LESS THAN +560 GPM, THE LEAD FUELING PUMP WILL CONTINUE TO RUN AND THE BPCV WILL CONTINUE MODULATING TO PASS FLOW AS NECESSARY TO MAINTAIN UPSTREAM PRESSURE REQUIREMENT AND NO ADDITIONAL CONTROL FUNCTIONS WILL BE INITIATED UNTIL SYSTEM OPERATING CONDITIONS CHANGE.

   A. IF DPT-3 OR DPT-4 SENSES A DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE THRU THE RETURN VENTURI OF GREATER THAN 560+ GPM FOR 300 SECONDS (ADJUSTABLE), THE CONTROL SYSTEM WILL INITIATE CONTROL SIGNALS FOR THE FOLLOWING FUNCTIONS:
      - THE BPCV SOLENOID WILL BE DE-ENERGIZED TO CLOSE THE BPCV.
      - SIGNAL TO STOP LEAD PUMP. THIS SHALL OCCURE WHEN PRESSURE INDICATING TRANSMITTER PIT-1 OR PIT-2 RISES ABOVE SET POINT OF 140 PSIG FOR A PERIOD OF 2 SECONDS.
      - THE PCV SOLENOID WILL BE DE-ENERGIZED (SIMULTANEOUSLY WITH SIGNAL TO DE-ENERGIZE THE BPCV SOLENOID AND THE ENERGIZING OF THE TIMER FOR DEFUEL/FLUSH VALVE SOLENOID "A") TO BLEED SYSTEM TO 75 PSIG.
      - THE DEFUEL/FLUSH VALVE SOLENOID "A" ADJUSTABLE TIMER WILL BE ENERGIZED (SIMULTANEOUSLY WITH SIGNAL TO DE-ENERGIZE THE BPCV SOLENOID) TO BLEED SYSTEM PRESSURE.

4. WITH DPT-1 OR DPT-2 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE OF 600+ GPM THROUGH THE ISSUED VENTURI AND DPT-3 OR DPT-4 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE OF LESS THAN 40+ GPM THROUGH THE RETURN VENTURI FOR A PERIOD OF 10 SECONDS, (TIME INTERVAL FOR ALL SUBSEQUENT PUMPS) A SUBSEQUENT PUMP (SECOND) WILL BE STARTED.

5. WITH DPT-1 OR DPT-2 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE OF 1200+ GPM THROUGH THE ISSUED VENTURI AND DPT-3 OR DPT-4 SENSING DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE GREATER THAN 40+ GPM BUT LESS THAN 700+ GPM, THE LEAD FUELING PUMP AND SECOND FUELING PUMP WILL CONTINUE TO RUN AND THE BPVC WILL CONTINUE MODULATING TO PASS FLOW AS NECESSARY TO MAINTAIN UPSTREAM PRESSURE REQUIREMENT AND NO ADDITIONAL CONTROL FUNCTIONS WILL BE INITIATED UNTIL SYSTEM OPERATING CONDITIONS CHANGE.

   A. IF DPT-3 OR DPT-4 SENSES A DIFFERENTIAL PRESSURE CORRESPONDING TO A FLOW RATE THRU THE RETURN VENTURI OF GREATER THAN 700+ GPM FOR 15 SECONDS (TIME INTERVAL FOR ALL SUBSEQUENT PUMPS). THE CONTROL SYSTEM WILL INITIATE CONTROL SIGNALS TO SHUT DOWN THE SUBSEQUENT (SECOND) FUELING PUMP, LEAVING THE SYSTEM TO OPERATE AS DESCRIBED IN PARAGRAPH 3.

      NOTE:

      THE REMAINING SUBSEQUENT FUELING PUMPS WILL BE STARTED USING DPT-1 OR DPT-2 AND STOPPED AS DESCRIBED HEREIN BEFORE IN PARAGRAPH 4, 5, AND 5A. THE LEAD FUELING PUMP SHUT DOWN AND RETURN TO IDLE CONDITION WILL BE AS DESCRIBED IN PARAGRAPH 3A.

      IN THE EVENT A FUELING PUMP IS AUTOMATICALLY CALLED ON AND FAILS TO START OR FAILS AFTER SUCCESSFULLY STARTING (AS INDICATED BY OPEN CONTACTS ON THE ASSOCIATED PUMP DISCHARGE FLOW SWITCH FOR A 15 SECOND INTERVAL), THE AFFECTED FUELING PUMP WILL BE CALLED OFF AND THE NEXT IDLE FUELING PUMP IN THE PRE-DETERMINED SEQUENCE OF 4 PUMPS THAT WILL BE CALLED ON AUTOMATICALLY.

SYSTEM IN "AUTOMATIC" MODE DEFUELING CONDITION

TO INITIATE AN AIRCRAFT DEFUELING OPERATION, AN OPERATOR CONNECTS A HYDRANT HOSE TRUCK (HHT) TO AIRCRAFT AND TO AN AIR OPERATED "DEADMAN" HYDRANT CONTROL VALVE, THE HHT HAS AN ON-BOARD DEFUEL PUMP. TYPICALLY, THIS PUMP IS CAPABLE OF DELIVERING 300 GPM AT 165 PSIG. AS THE OPERATOR STARTS THE ON-BOARD HHT DEFUEL PUMP THE FOLLOWING SEQUENCE OCCURS:

1. IF PUMPS ARE RUNNING (DEFUEL/FLUSH VALVE CLOSED) THE FUEL BEING REMOVED FROM THE AIRCRAFT WILL EITHER GO TO THE OTHER AIRCRAFT(S) CONNECTED TO THE SYSTEM OR WILL MODULATE BPCV OPEN TO RETURN FUEL TO OPERATING TANKS.
   -OR-
2. IF PUMPS ARE NOT RUNNING (DEFUEL/FLUSH VALVE ENABLED) THE FUEL BEING REMOVED FROM THE AIRCRAFT WILL MODULATE BOTH PCV (AT 75 PSIG) AND DEFUEL/FLUSH VALVE (AT 80 PSIG) OPEN TO ALLOW FUEL TO PASS TO OPERATING TANKS.

SYSTEM IN "FLUSH" MODE

IF SYSTEM HAS NOT BEEN USED FOR SEVERAL DAYS OR IF FUEL SAMPLES INDICATE THE PRESENCE OF WATER OR EXCESSIVE SEDIMENT, PROCEDURE SHALL BE INITIATED IN THE FOLLOWING SEQUENCE:

1. PLACE THE MODE SELECTOR SWITCH IN THE "FLUSH" MODE. THIS WILL DE-ENERGIZE THE BPCV SOLENOID LOCKING THE BPCV CLOSED AND ENERGIZE DEFUEL/FLUSH VALVE SOLENOID "B" ALLOWING DEFUEL/FLUSH VALVE TO OPEN.
2. POSITION MANUALLY OPERATED VALVES IN THE SYSTEM TO REQUIRED POSITIONS TO DIRECT FUEL THROUGH THE DESIRED FLOW PATH (I.E., TRANSFERRING FUEL FROM ONE OPERATING TANK AND ROUTING THIS FUEL THROUGH THE RECEIVING FILTER SEPARATORS, ETC.).
3. SELECT PUMP TO BE USED FOR FLUSHING, PLACE THE FUELING PUMPS HAND-OFF-AUTO SELECTOR SWITCH IN THE "HAND" POSITION. THIS WILL START PUMP. NOTE: ADDITIONAL PUMP(S) MAY BE STARTED MANUALLY TO OBTAIN THE DESIRED FLUSHING FLOW RATE. ADDITIONAL PUMPS MUST ONLY BE TURNED ON AFTER RETURN FLOW IS STABLE, TYPICALLY AFTER 30 SECONDS.
4. STOP FUEL PUMPS BY PLACING THE MODE SELECTOR SWITCH IN THE "OFF" POSITION ONE AT A TIME WITH NO LESS THAN 30 SECONDS BETWEEN EACH SHUTDOWN. TURN THE PCP TO "OFF" POSITION.
5. FOLLOWING THE FLUSHING PROCEDURE, POSITION MANUALLY OPERATED VALVES TO THEIR NORMALLY OPENED OR CLOSED POSITIONS.
6. PLACE THE FUELING PUMPS HAND-OFF-AUTO SELECTOR SWITCH IN THE "AUTO" POSITION.
7. PLACE THE MODE SELECTOR SWITCH IN THE "AUTOMATIC" MODE FROM THE "FLUSH" MODE.
8. OBSERVE SYSTEM OPERATION TO ENSURE SYSTEM RETURNS TO PRESSURED IDLE CONDITION.

AN ADDITIONAL FEATURE OF THIS "FLUSH" MODE INCLUDES CAPABILITY FOR "DEFUEL" OPERATIONS. WHILE IN THIS MODE, SYSTEM PRESSURE IS REDUCED TO A STATIC PRESSURE EQUAL TO THE LEVEL TO FUEL IN THE OPERATING TANKS(S). THEREFORE, IT IS POSSIBLE TO ACCOMPLISH "RAPID DEFUELS" FOR KC-135'S UTILIZING SUITABLE REFUELING EQUIPMENT ("RAPID DEFUEL" IS WITH AIRCRAFT ENGINES RUNNING).

(FOR CONTINUATION SEE M-205)

NOTES TO DESIGNER:

1. REFER TO UFGS 33 09 53 FOR ADDITIONAL SEQUENCE OF OPERATIONS GUIDANCE.

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OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

SEQUENCE OF CONTROLS SHEET 1 OF 2

SHEET ID

M-203

(CONTINUED FROM M-204)

SYSTEM IN TIGHTNESS TEST MODE

TO INITIATE A SYSTEM TIGHTNESS TEST: (SEE NOTE TO DESIGNER #1, THIS SHEET)

1. PLACE THE MODE SELECTOR SWITCH IN THE "TIGHTNESS TEST" MODE. THIS WILL ENERGIZE THE PRESSURE TEST PANEL. ELECTRIC MOTOR OPERATORS CLOSE VALVES I25 AND I26 AND OPEN I27. ENERGIZE D/FV SOLENOIDS 'A' & 'B' TO HOLD VALVE CLOSED. MANUALLY CLOSE I24.

2. FOLLOWING THE TEST PROCEDURES, SWITCH THE MODE SELECTOR SWITCH TO "AUTO" POSITION. THE ELECTRIC MOTOR OPERATORS CLOSE VALVE I27, OPEN VALVES I25 AND I26, AND THE SYSTEM WILL RUN THROUGH A NORMAL SHUTDOWN PROCEDURE MANUALLY OPEN I24.

EMERGENCY OPERATION - PLC'S DOWN

1. PLACE ALL FUELING PUMP SELECTOR SWITCHES IN THE "OFF" POSITION.

2. ENSURE SELECTED OPERATING TANK(S) INLET AND OUTLET VALVES ARE OPEN.

3. CLOSE INLET SIDE BALL VALVE TO PCV.

4. MANUALLY BY-PASS SOLENOID ON BPCV ALLOWING VALVE TO MODULATE AT SET POINT.

5. MANUALLY START FUELING PUMP(S) AS REQUIRED BY PLACING SELECTOR SWITCHES IN THE "HAND" POSITION. OPERATOR TO READ MECHANICAL INDICATORS ON DIFFERENTIAL PRESSURE TRANSMITTERS (DPT) LOCATED AT THE RETURN VENTURI. IF DPT'S SHOW LESS THAN [40] [60] GPM RETURNING TO OPERATING TANKS(S), MANUALLY START AN ADDITIONAL FUELING PUMP. IF DPT'S SHOW MORE THAN [700] [990] GPM, MANUALLY STOP A FUELING PUMP. MANUALLY STOP LAST FUELING PUMP AFTER EMERGENCY OPERATION IS COMPLETE.

NOTE:

OPERATOR IS REQUIRED TO CONTINUOUSLY VERIFY OPERATING TANK(S) FUEL LEVEL TO ENSURE ADEQUATE FUEL SUPPLY IS AVAILABLE. FUEL LEVEL VERIFICATION SHALL BE BY MEANS OF THE OPERATING TANK(S) GROUND LEVEL READING GAUGE. UPON COMPLETION OF EMERGENCY OPERATION, OPERATOR SHALL OPEN INLET SIDE BALL VALVE TO PCV. CLOSE SOLENOID BY-PASS VALVE ON BPCV AND RETURN FUELING PUMP SELECTOR SWITCHES TO ORIGINAL POSITIONS.

STORAGE TANK SELECTION "AUTOMATIC MODE" OR "PRESSURE TEST MODE"

TO INITIATE FUELING OPERATION IN THE "AUTOMATIC MODE OR THE TIGHTNESS TEST MODE", THE 4-VALVE MANIFOLD AND THE TANK OUTLET (WITHDRAWAL) VALVES MUST BE IN THE PROPER POSITION, AS SHOWN IN THE VALVE POSITION MATRIX, TO ENABLE FUELING OPERATIONS.

NOTE TO DESIGNER:

THE SYSTEM IN TIGHTNESS TEST MODE ASSUMES I25, I26, AND I27 HAVE ELECTRICAL MOTOR OPERATORS. IF DIRECTED BY SME TO USE MANUAL VALVES, RE-WRITE TEST MODE ACCORDINGLY.

MANUAL VALVE OPERATION:

1. FILLING OF THE OPERATION TANK T1 (T2)
   OPEN VALVES: R1, R2, R3, R4, R5, R6, R10, (R11), R12, (R13)
   CLOSE VALVE: I34, (I35), I36, I37, R7, R11 (R10)
   NOTE: FOR SLOW FILLING, CLOSE R15 AND OPEN R14. WHEN THE TANK IS EITHER THREE FEET ABOVE THE FILL NOZZLE OR THE FLOATING PAN HAS LIFTED, THEN CLOSE R14 AND R15 AND RESUME NORMAL FILLING.

2. FUELING OF AIRCRAFT FROM OPERATING TANK T1 (T2)
   OPEN VALVES: I1, (I2) I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I19, I20, I21, I22, I25, I26, I28, I29, I30, I31, I34, (I35), R12 (R13)
   CLOSE VALVES: I2, (I1), I27, I35,(I34), I36, I37, R10, (R11)

3. FILLING TANKS AT HYDRANT HOSE TRUCK CHECK OUT STATION OR PANTOGRAPH FLUSHING PIT FROM OPERATING TANK T1, (T2)
   OPEN VALVES: I1, (I2), I3, I4, I5, I6, I7, I8, I10, I11, I12, I13, I14, I15, I16, I17, I19, I20, I21, I22, I25, I26, I28, I29, I30, I31, I34, (I35), R6 (R7), R17
   CLOSE VALVES: I2 (I1), I27, I35 (I34), I36, I37, R10 (R11)

4. EMPTYING OF TANK TRUCKS VIA HHT CHECK OUT STATION OR PANTOGRAPH FLUSHING PIT INTO OPERATION TANK TI (T2)
   OPEN VALVES: I33, I37, R3, R4, MR5, R6, R7, R10, (R11), R12 (R13), R16
   CLOSE VALVES: I34, (I35), R2, R7, R11 (R10)

5. EMPTYING OF REMAINING FUEL FROM OPERATING TANK TI (T2) TO OPERATING TANK T2 (T1)
   OPEN VALVES: I1, (I2), I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I36, I35, (I34), R13, (R12)
   CLOSE VALVES: I2 (I1), I29, I31, I34, (I35), R11, (R10)

6. EMPTYING OF PRODUCT RECOVERY TANK INTO OPERATING TANK T1, (T2)
   OPEN VALVES: R3, R4, R5, R6, R7, R10, (R11), R12, (R13)
   CLOSE VALVES: I34, (I35), I37, R11 (R10)

7. DEFUELING OF AIRCRAFT OR MULTIPLE REFUELING PUMP INTO OPERATING TANK T1 (T2)
   OPEN VALVES: I26, I28, I29, I30, I31, I34, (I35), R12 (R13)
   CLOSE VALVES: I27, I36, I37, I35 (I34), R10 (R11)

8. CROSS PUMPING FROM OPERATING TANK T1 (T2) INTO OPERATING TANK T2 (T1) VIA FILTER SEPARATORS
   OPEN VALVES: I1 (I2), I3, I4, I5, I6, I7, I8, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I27, I30, I31, I37, R3, R4, R5, R6, R7, R10 (R11), R13 (R12)
   CLOSE VALVES: I2 (I1), I25, I26, I28, I34 (I35), R11 (R10)

9. FLUSHING OF LOOP FROM OPERATING TANK T1 (T2) THRU RECEIVING FILTER SEPARATORS AND RETURNING TO OPERATING TANK T1 (T2)
   OPEN VALVES: I1 (I2), I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I25, I26, I28, I30, I31, I37, R3, R4, R5, R6, R7, R10 (R11), R12 (R13)
   CLOSE VALVES: I2 (I1), I27, I34, (I35), R11 (R10)

10. PANTOGRAPH FLUSHING FROM OPERATING TANK T1 (T2), THRU PANTOGRAPH FLUSHING CONNECTION AND RETURNING TO OPERATING TANK T1 (T2)
    OPEN VALVES: I1 (I2), I3, I4, I5, I6, I7, I8, I9, I10, I11, I12, I13, I14, I15, I16, I17, I18, I19, I20, I21, I22, I27, I28, I32, I33, I34, (I35), R12 (R13), R16
    CLOSE VALVES: I2 (I1), I25, I26, I35, (I34), I36, I37, R13 (R12)

REMARKS:

DURING THE ABOVE DESCRIBED OPERATIONS, ALL MANUAL DRAIN AND VENT VALVES SHALL BE CLOSED. AUTOMATIC AIR VENTS, AUTOMATIC FILTER SEPARATOR DRAINS AND RELIEF VALVES SHALL REMAIN OPERATIONAL.

EMERGENCY STOP AND RESET:

1. DEPRESSION OF ANY EMERGENCY STOP PUSHBUTTON OR ACTUATION OF THE FIRE ALARM SYSTEM SHALL STOP FUELING PUMPS [AND DE-ENERGIZE THE NON-SURGE VALVE'S SOLENOID CAUSING THE VALVES TO CLOSE] IF THIS FEATURE IS DIRECTED TO BE USED. THIS ACTION IS EXECUTED WITHOUT REGARD FOR WHETHER PUMPS WERE AUTOMATICALLY CALLED ON OR MANUALLY STARTED.

2. IN ORDER TO RESET SYSTEM AFTER AN ALARM, DEPRESS "RESTART" PUSHBUTTON LOCATED AT PUMP CONTROL PANEL.

BACK PRESSURE CONTROL VALVE (BPCV) OPERATION - TWO SOLENOID			
CONDITION	VALVE ACTION	SOLENOID 'A'	SOLENOID 'B'
"AUTOMATIC" MODE PUMP START-UP	ENABLE	ENERGIZED	DE-ENERGIZED
"AUTOMATIC" MODE PRIOR TO LEAD PUMP SHUT-OFF	CLOSE	DE-ENERGIZED	DE-ENERGIZED
"FLUSH" MODE	ENABLE	ENERGIZED	DE-ENERGIZED
TIGHTNESS TEST MODE	ENABLE	DE-ENERGIZED	ENERGIZED

PRESSURE CONTROL VALVE (PCV) OPERATION - TWO SOLENOID			
CONDITION	VALVE ACTION	SOLENOID 'A'	SOLENOID 'B'
"AUTOMATIC" MODE LEAD PUMP OFF	ENABLE	DE-ENERGIZED	DE-ENERGIZED
"AUTOMATIC" MODE PUMP(S) ON	CLOSE	ENERGIZED	DE-ENERGIZED
"FLUSH" MODE PUMP(S) ON	CLOSE	ENERGIZED	DE-ENERGIZED
"FLUSH" MODE PUMP(S) OFF	ENABLE	DE-ENERGIZED	DE-ENERGIZED
TIGHTNESS TEST MODE	CLOSE	ENERGIZED	ENERGIZED

DEFUEL / FLUSH VALVE (FV) OPERATION - TWO SOLENOID			
CONDITION	VALVE ACTION	SOLENOID 'A'	SOLENOID 'B'
"FLUSH" MODE	OPEN	DE-ENERGIZED	ENERGIZED
"AUTOMATIC" MODE PUMP(S) ON	CLOSE	DE-ENERGIZED	DE-ENERGIZED
"AUTOMATIC" MODE LEAD PUMP OFF	ENABLE	ENERGIZED	DE-ENERGIZED
TIGHTNESS TEST MODE	CLOSE	DE-ENERGIZED	DE-ENERGIZED

OPERATION	VALVE POSITION					
	TANK #1			TANK #2		
	I1	I34	R10	I2	I35	R11
RECIRCULATION TO TANK NO. 1 & BUILT RECEIPT TO TANK NO. 2	OPEN	OPEN	CLOSED	CLOSED	CLOSED	OPEN
RECIRCULATION TO TANK NO. 2 & BUILT RECEIPT TO TANK NO. 1	CLOSED	CLOSED	OPEN	OPEN	OPEN	CLOSED
RECIRCULATION THROUGH RECEIPT FILTER SEPARATORS TO TANK NO. 1	OPEN	CLOSED	OPEN	CLOSED	CLOSED	CLOSED
RECIRCULATION THROUGH RECEIPT FILTER SEPARATORS TO TANK NO. 2	CLOSED	CLOSED	CLOSED	OPEN	CLOSED	OPEN
RECIRCULATION TO TANK NO. 1 & TANK NO. 2 IS ISOLATED	OPEN	OPEN	CLOSED	CLOSED	CLOSED	CLOSED
RECIRCULATION TO TANK NO. 2 & TANK NO. 1 ISOLATED	CLOSED	CLOSED	CLOSED	OPEN	OPEN	CLOSED

CONDITION	VALVE ACTION	SOLENOID
TRUCK FILLSTAND CONTROL VALVE	OPEN	DE-ENERGIZED
	CLOSED	ENERGIZED (TRUCK HIGH LEVEL SENSOR)
TANK HIGH LEVEL SHUT OFF VALVE	OPEN	DE-ENERGIZED
	CLOSED	ENERGIZED

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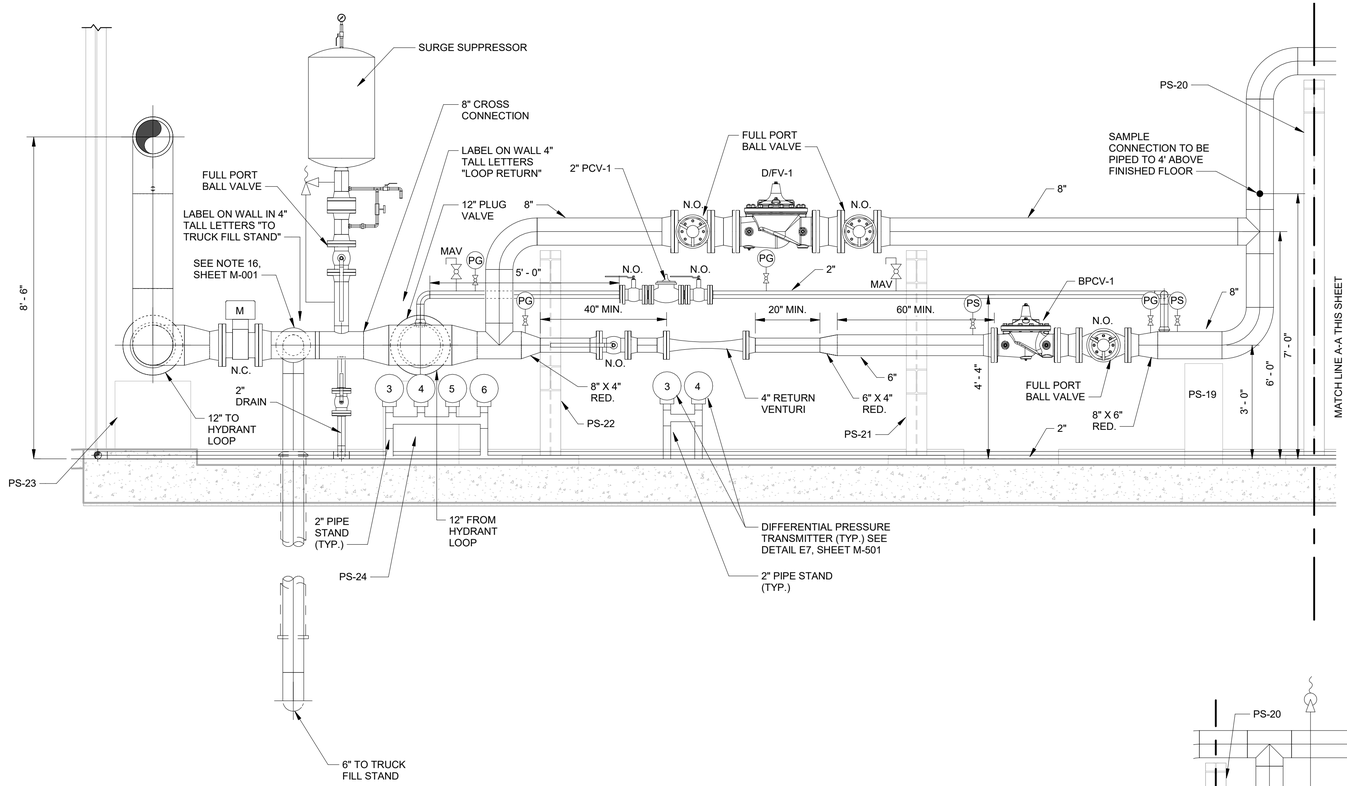
DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

SEQUENCE OF CONTROLS SHEET 2 OF 2

SHEET ID

M-204



D1 SECTION 1A (WITHOUT MICRONIC FILTER)

SCALE: 1/2" = 1'-0"

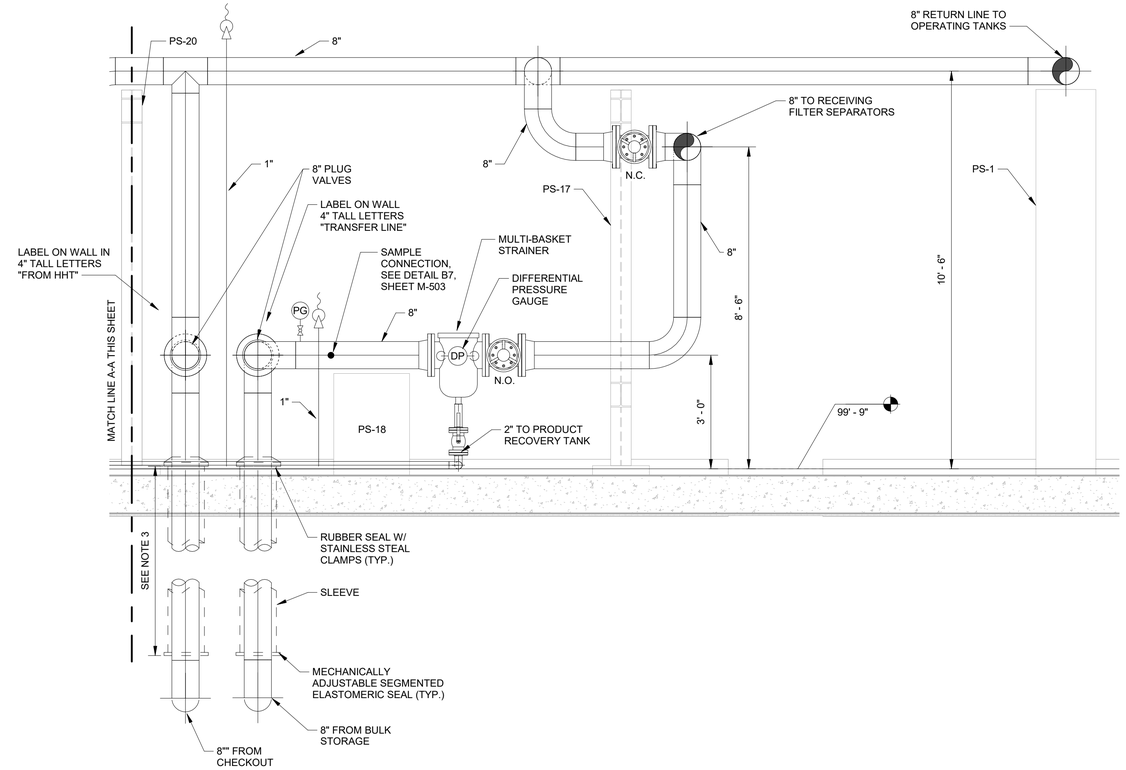
0 1' 2' 4'

NOTES:

1. VALVE STEMS ON ALL MANUAL VALVES SHALL BE HORIZONTAL OR ABOVE WITH OPERATORS ON TOP OF VALVES.
2. SUPPORT 2" DRAIN LINES WITH PIPE CENTERLINE 3" ABOVE FINISHED FLOOR USE CHANNEL SUPPORTS WITH U BOLT ANCHORING.
3. THE TOP OF THE SLEEVE SHALL BE A MINIMUM OF 6" ABOVE GRADE AND THE BOTTOM OF THE SLEEVE SHALL BE BELOW FROST.
4. DIMENSIONS BASED ON A FLOOR ELEVATION OF 99'-9".

NOTES TO DESIGNER:

1. SHOWN WITHOUT MICRONIC FILTER. SEE M-301B FOR WITH MICRONIC FILTER.



A6 SECTION 2A (WITHOUT MICRONIC FILTER)

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
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CONTRACT NO.:

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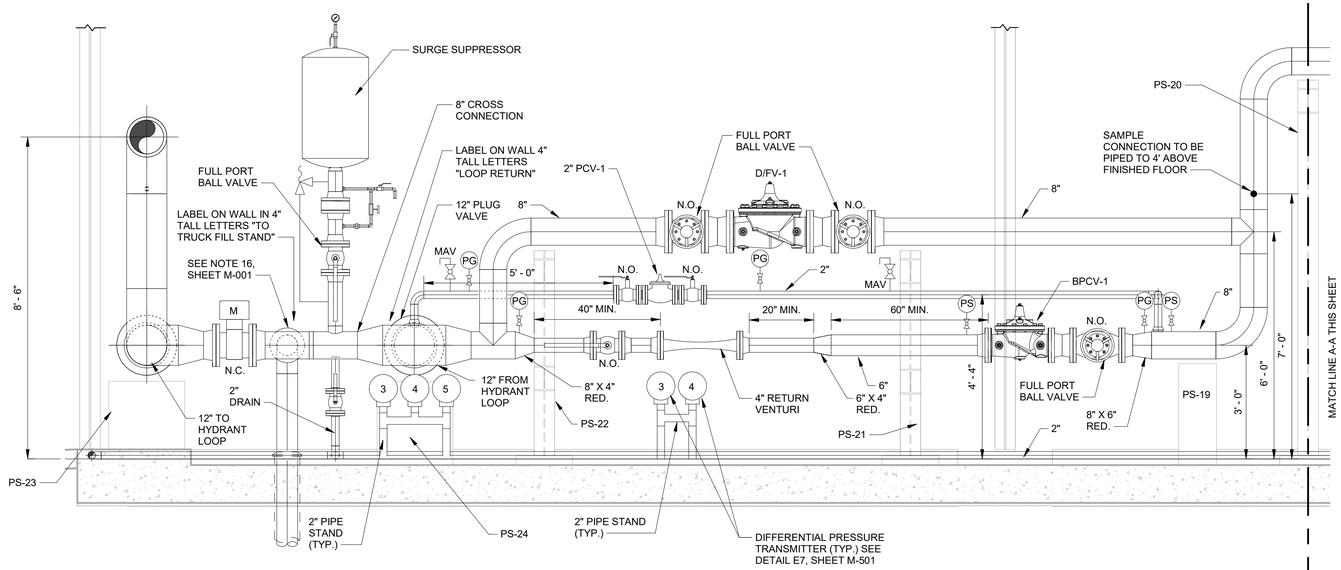
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING SECTIONS

SHEET ID

M-301A



D1 SECTION 1B (WITH MICRONIC FILTER)

SCALE: 1/2" = 1'-0"

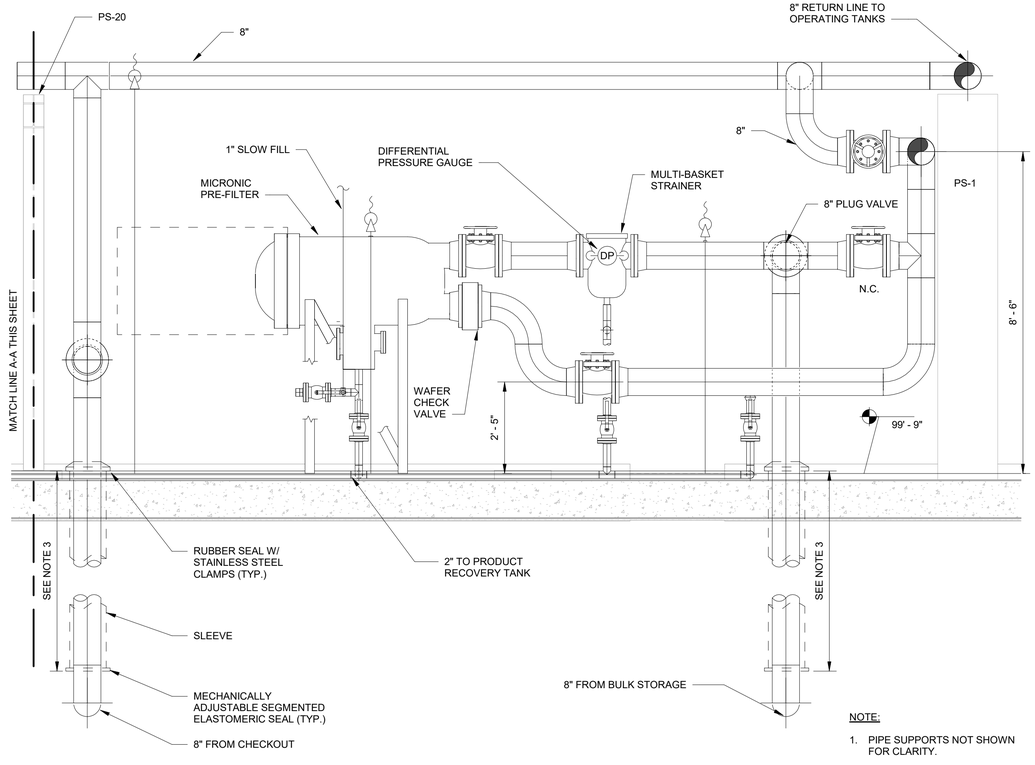
0 1' 2' 4'

NOTES:

1. VALVE STEMS ON ALL MANUAL VALVES SHALL BE HORIZONTAL OR ABOVE WITH OPERATORS ON TOP OF VALVES.
2. SUPPORT 2" DRAIN LINES WITH PIPE CENTERLINE 3" ABOVE FINISHED FLOOR. USE CHANNEL SUPPORTS WITH U BOLT ANCHORING.
3. THE TOP OF THE SLEEVE SHALL BE A MINIMUM OF 6" ABOVE GRADE AND THE BOTTOM OF THE SLEEVE SHALL BE BELOW FROST.
4. DIMENSION BASED ON FLOOR ELEVATION OF 99'-9".

NOTES TO DESIGNER:

1. SHOWN WITH MICRONIC FILTER. SEE M-301A FOR NO MICRONIC FILTER.
2. MICRONIC FILTER TO BE SIZED PER UFC 3-460-01; ENSURE IT IS NOT LARGER THAN ANY SINGLE RECEIPT FILTER.



NOTE:

1. PIPE SUPPORTS NOT SHOWN FOR CLARITY.

A6 SECTION 2B (WITH MICRONIC FILTER)

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

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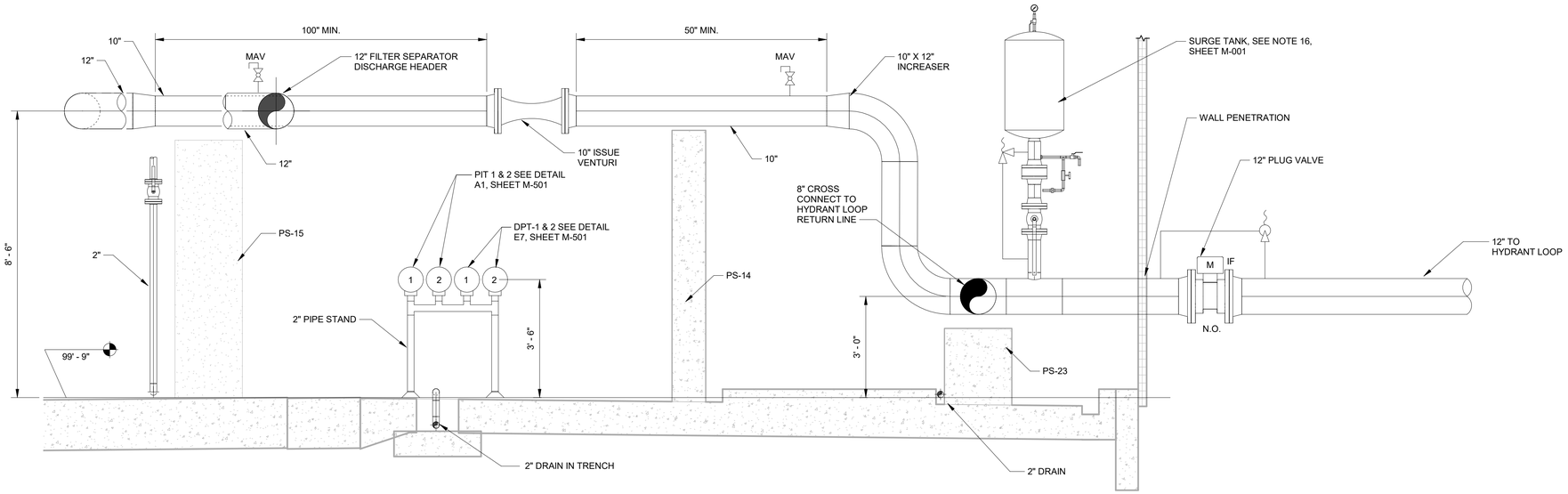
DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING SECTIONS

SHEET ID

M-301B



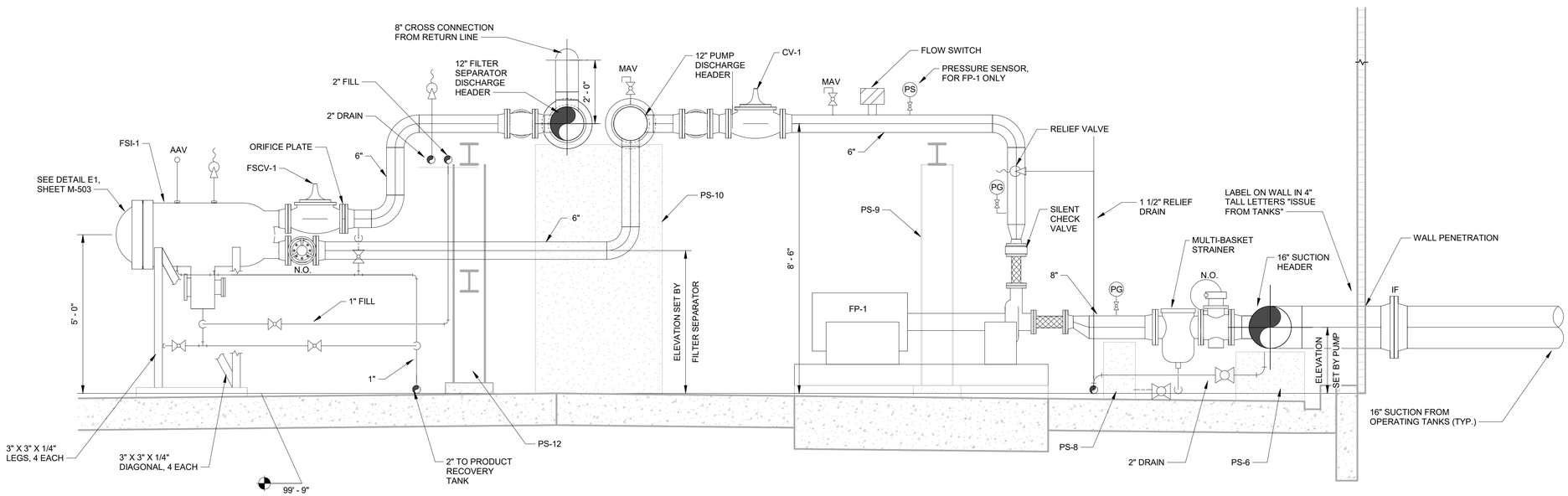
E1 SECTION 3

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

NOTES:

1. VALVE STEMS ON ALL MANUAL VALVES SHALL BE HORIZONTAL OR ABOVE WITH OPERATORS ON TOP OF VALVES.
2. SUPPORT 2" DRAIN LINES WITH PIPE CENTERLINE 3" ABOVE FINISHED FLOOR USE CHANNEL SUPPORTS WITH U BOLT ANCHORING.
3. DIMENSIONS BASED ON A FLOOR ELEVATION OF 99'-9".



A1 SECTION 4

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

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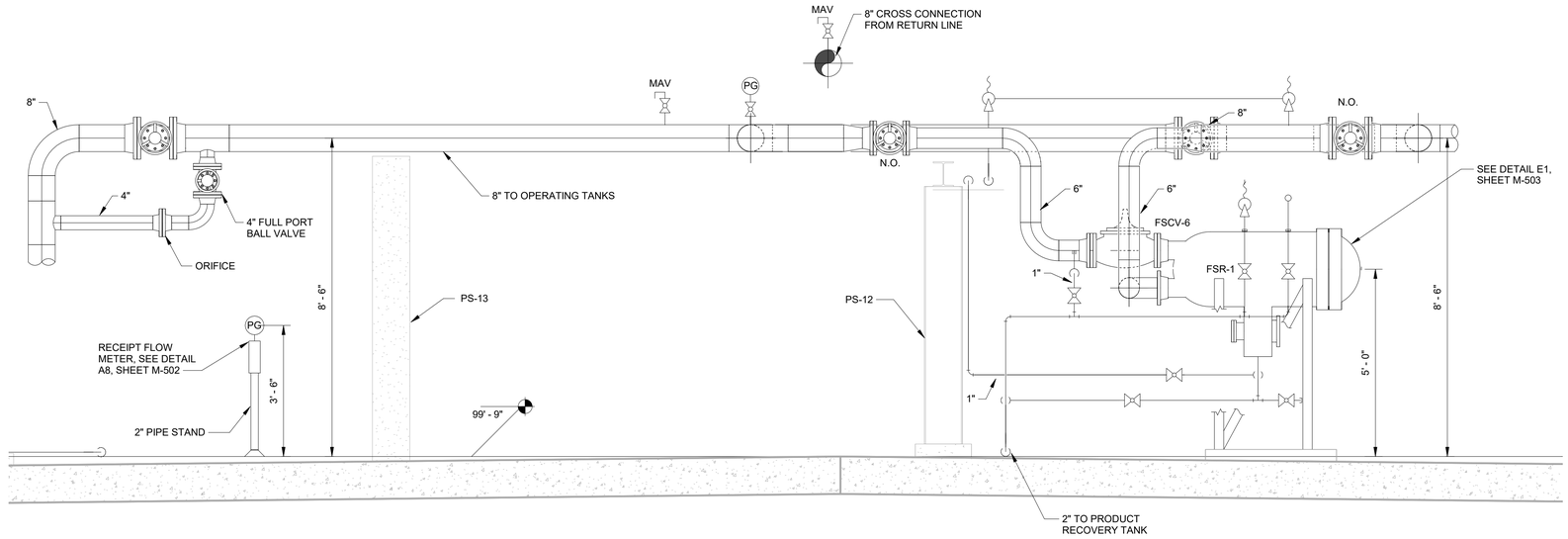
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING SECTIONS

SHEET ID

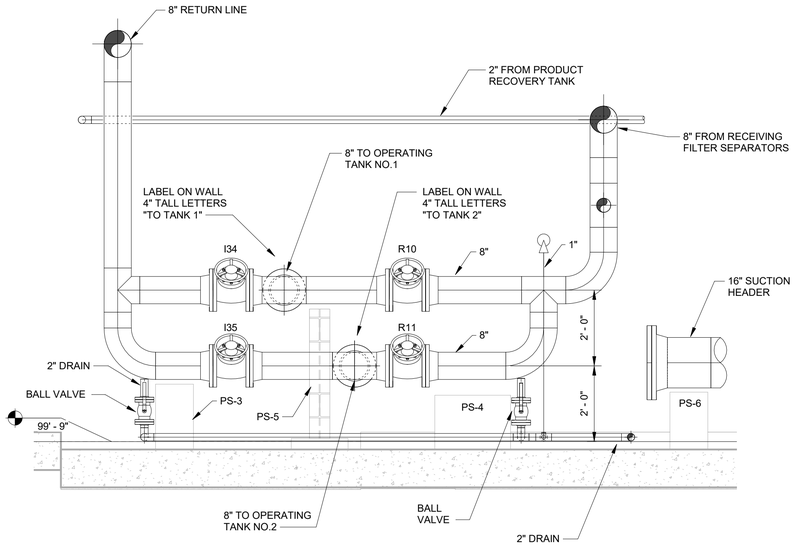
M-302



E1 SECTION 5

SCALE: 1/2" = 1'-0"

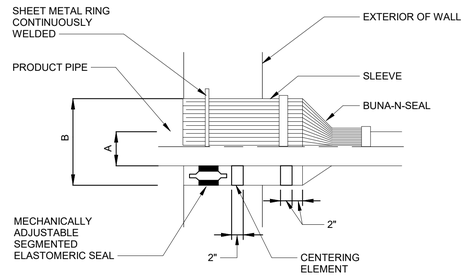
0 1' 2' 4'



A1 SECTION 6

SCALE: 1/2" = 1'-0"

0 1' 2' 4'



PRODUCT PIPE	A	B
12"	12 3/4" DIAMETER	16" DIAMETER
8"	8 5/8" DIAMETER	12 3/4" DIAMETER
6"	6 5/8" DIAMETER	10 3/4" DIAMETER
4"	4 1/2" DIAMETER	8 5/8" DIAMETER
2"	2 3/8" DIAMETER	3 1/2" DIAMETER

A7 PIPE PENETRATION DETAIL

SCALE: NTS

NOTES:

1. VALVE STEMS ON ALL MANUAL VALVES SHALL BE HORIZONTAL OR ABOVE WITH OPERATORS ON TOP OF VALVES.
2. SUPPORT 2" DRAIN LINES WITH PIPE CENTERLINE 3" ABOVE FINISHED FLOOR USE CHANNEL SUPPORTS WITH U BOLT ANCHORING.
3. THE TOP OF THE SLEEVE SHALL BE A MINIMUM OF 6" ABOVE GRADE AND THE BOTTOM OF THE SLEEVE SHALL BE BELOW FROST.
4. DIMENSIONS BASED ON A FLOOR ELEVATION OF 99'-9".

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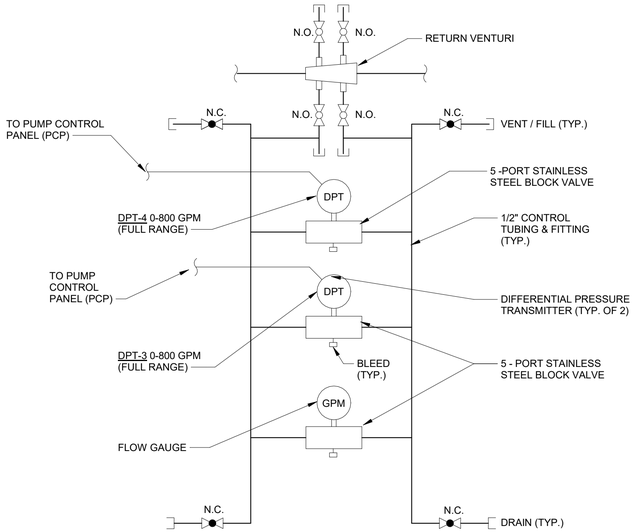
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PIPING SECTIONS AND DETAILS

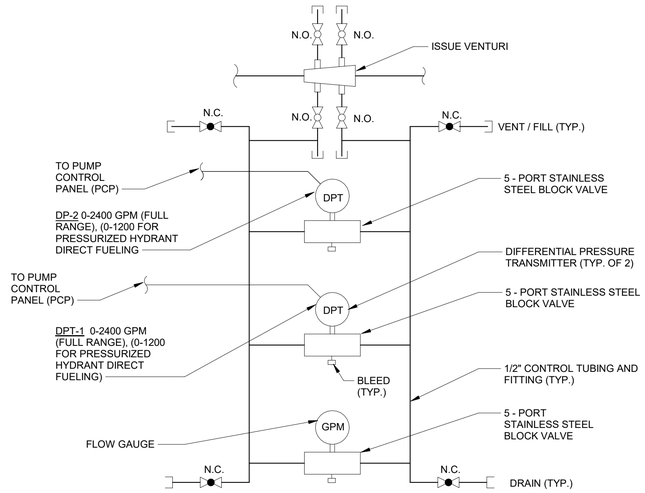
SHEET ID

M-303



E1 RETURN VENTURI TUBE CONTROL DIAGRAM

SCALE: NTS

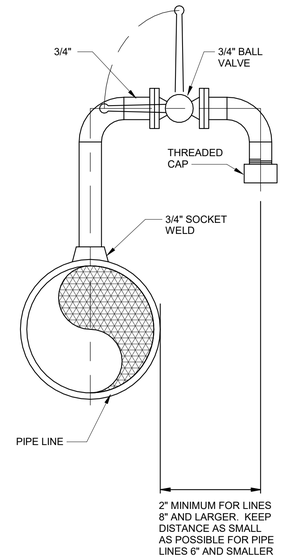


E4 ISSUE VENTURI TUBE CONTROL DIAGRAM

SCALE: NTS

A1 ISSUE VENTURI DPT & PIT PIPING DETAIL

SCALE: NTS



A5 MANUAL AIR VENT

SCALE: NTS

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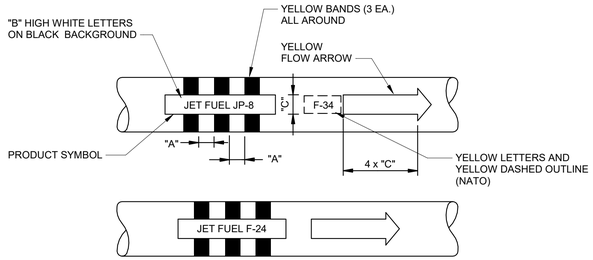
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

MECHANICAL DETAILS

SHEET ID

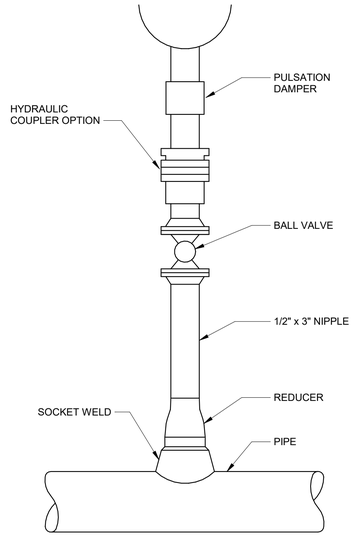
M-501



SIZES OF LETTERS AND BANDS			
PIPE DIAMETER (INCHES)	A BAND WIDTH AND SPACING (INCHES)	B TITLE LETTER SIZE (INCHES)	C BACKGROUND AND ARROWS (INCHES)
UNDER 3	3	0.5	1
3 - 6	3	1	2
6 - 9	3	2	3
OVER 9	4	3	4.5

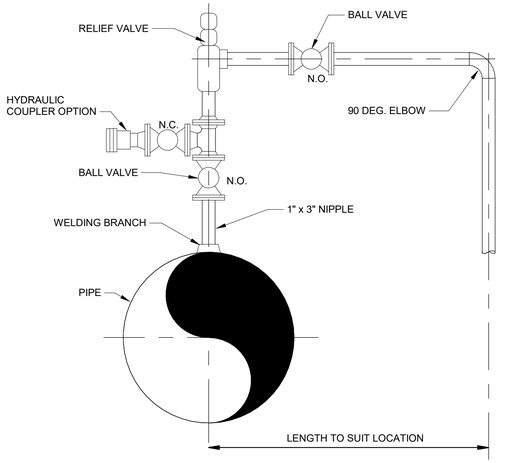
E1 PRODUCT FLOW SYMBOL DETAIL

SCALE: NTS



E5 PRESSURE GAUGE PIPE CONNECTION DETAIL

SCALE: NTS

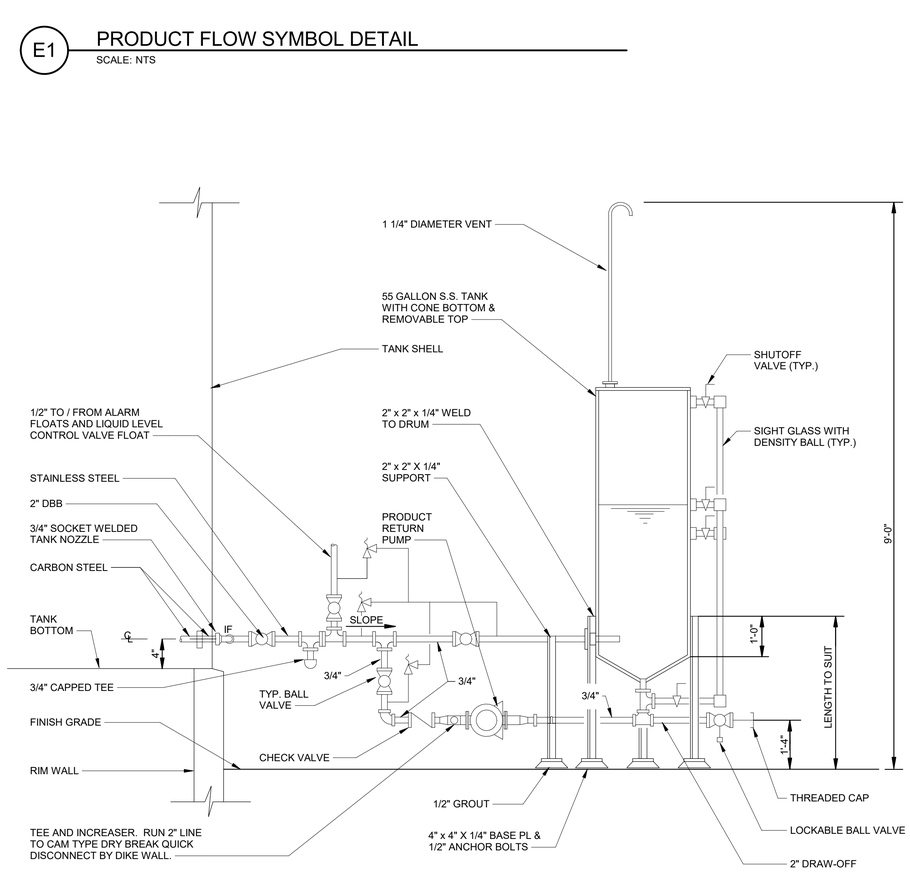


NOTE:

ON FILTER SEPARATORS, LOCK BALL VALVE OPEN USING PLASTIC STRAPS (CAR SEALS)

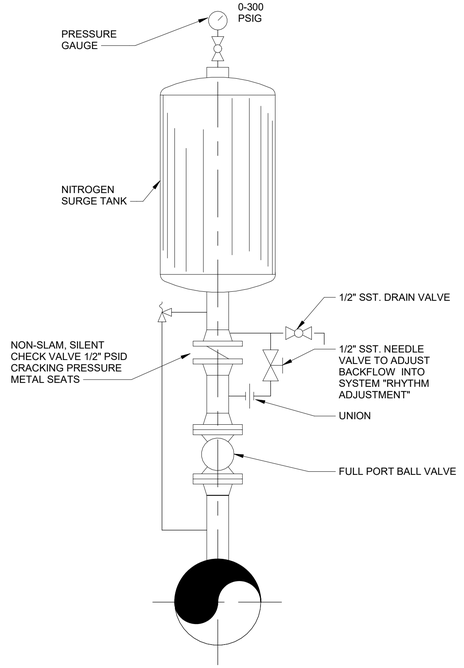
E8 RELIEF VALVE PIPING DETAIL

SCALE: NTS



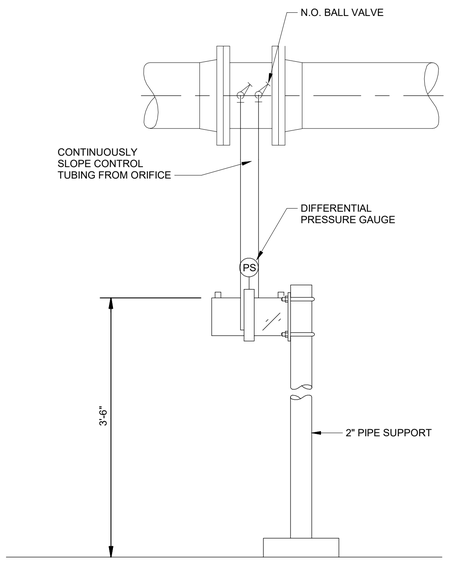
A1 WATER DRAW OFF SYSTEM DETAIL

SCALE: NTS



A6 SURGE SUPPRESSOR TANK DETAIL

SCALE: NTS



A8 RECEIPT FLOW METER DETAIL

SCALE: NTS

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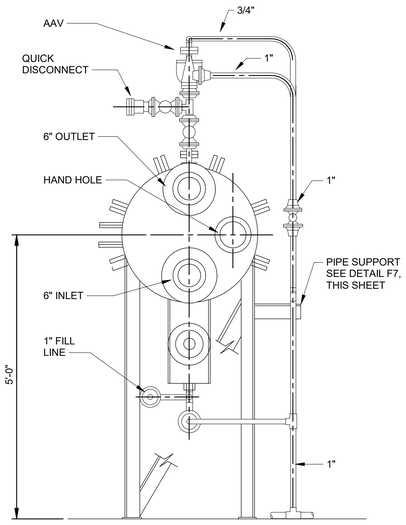
DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

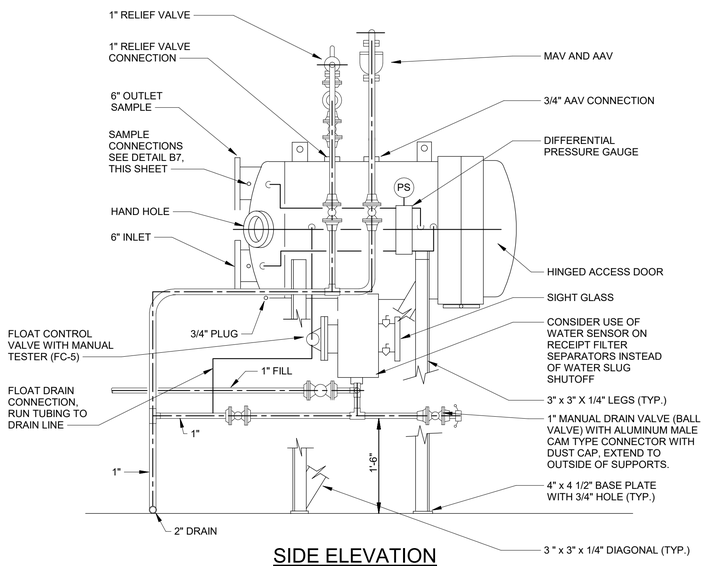
MECHANICAL DETAILS

SHEET ID

M-502



END ELEVATION



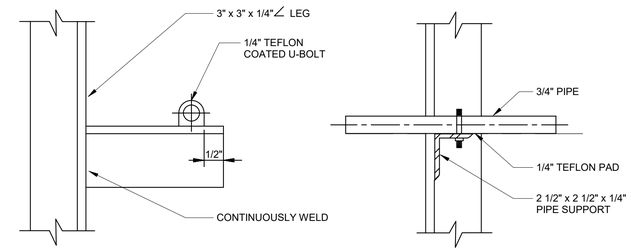
SIDE ELEVATION

TYPICAL FOR FSI-1 THRU FSI-5 AND FSR-1 AND FSR-2

E1 FILTER SEPARATOR DETAILS

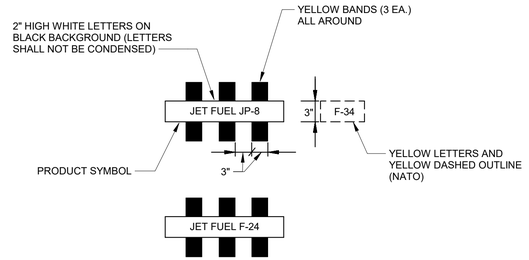
SCALE: 3/4" = 1'-0"

0 1' 2' 4'



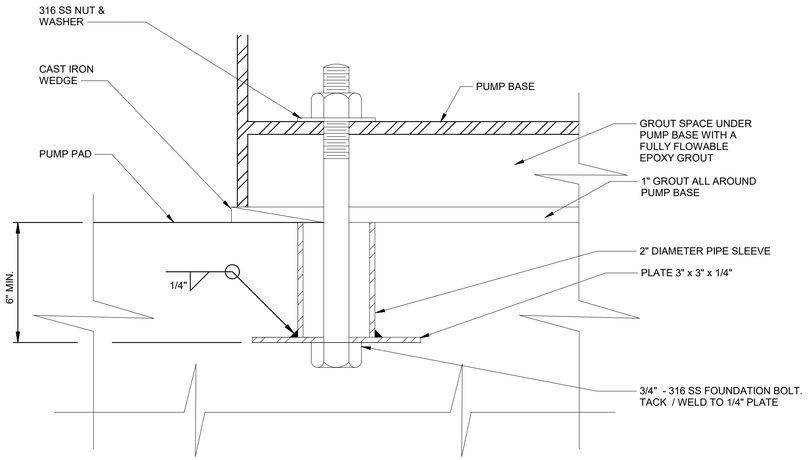
F7 FILTER SEPARATOR PIPE SUPPORT DETAIL

SCALE: NTS



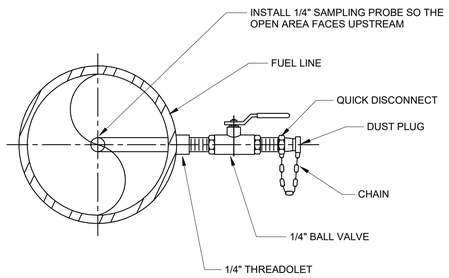
D7 FILTER SEPARATOR PRODUCT SYMBOL DETAIL

SCALE: NTS



B1 TYPICAL PUMP BASE MOUNTING DETAIL

SCALE: NTS



B7 SAMPLE CONNECTION DETAIL

SCALE: NTS

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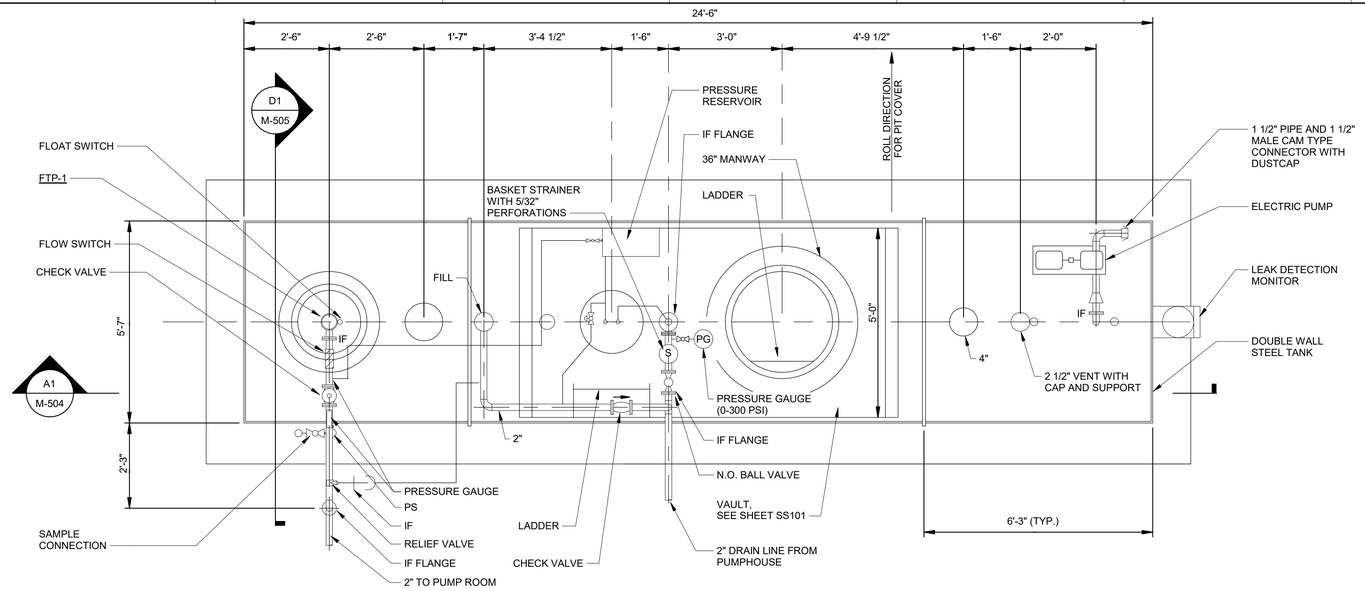
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

MECHANICAL DETAILS

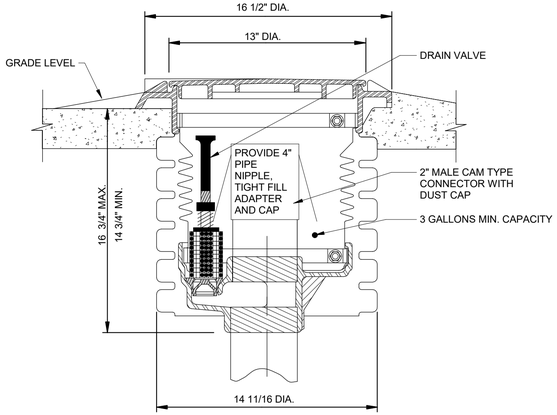
SHEET ID

M-503



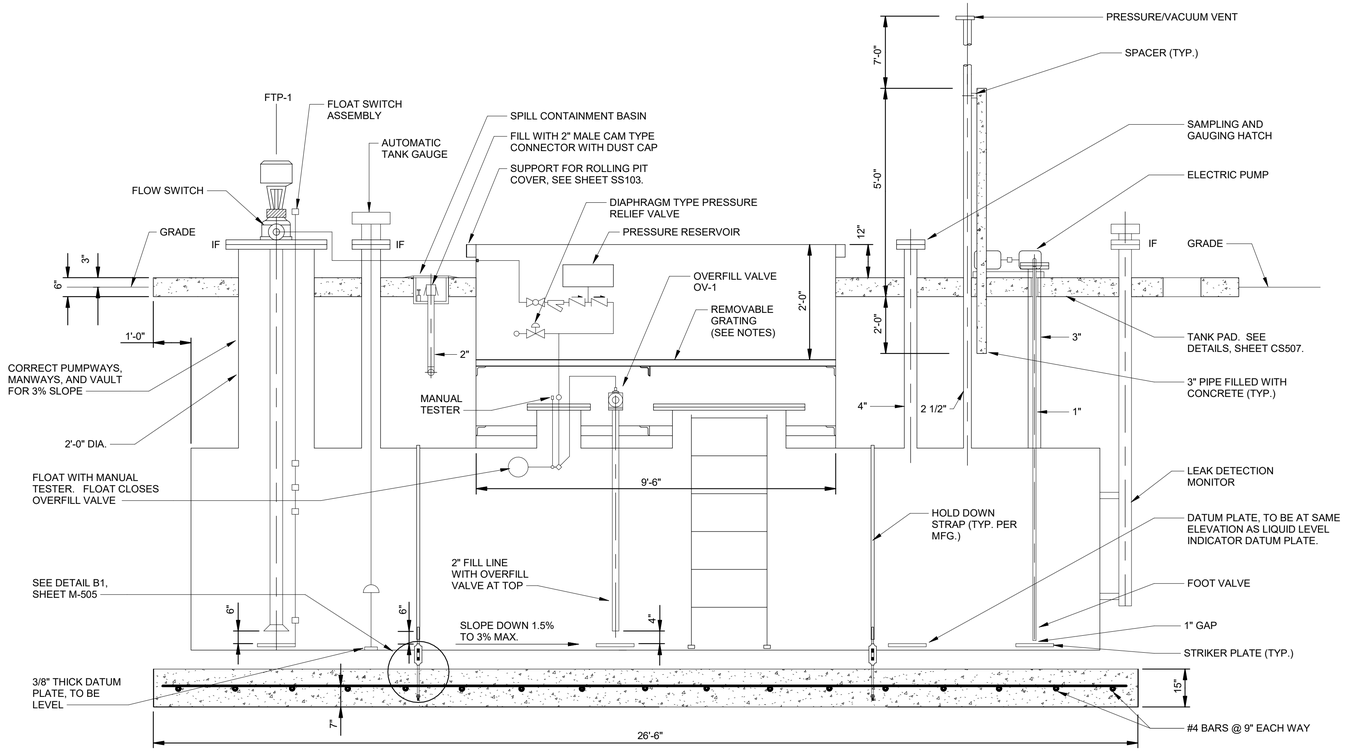
E1 4000 GALLON UNDERGROUND PRODUCT RECOVERY TANK DETAIL

SCALE: NTS



E7 FILL LINE SPILL CONTAINMENT BASIN DETAIL

SCALE: NTS



A1 4000 GALLON UNDERGROUND PRT ELEVATION

SCALE: NTS

MATERIAL NOTES:

1. MISC. STEEL:
   A. BARS FOR TANK ANCHOR STRAPS; SPECIFIED YIELD STRENGTH Fy = 36 KSI (ASTM A36)
   B. CONCRETE REINFORCING BARS; SPECIFIED YIELD STRENGTH Fy = 60 KSI (GRADE 60)

UBAR GRATING NOTES:

1. W-19-4 (1 1/4" x 1/8") STEEL
2. GRATING SHALL BE FABRICATED IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF THE NATIONAL ASSOCIATION OF ARCHITECTURAL METAL MANUFACTURER'S (NAAMM) BAR GRATING MANUAL.
3. GRATING SHALL BE REMOVABLE.
4. EDGES OF BAR GRATINGS SHALL BE BANDED WITH BARS 1/8" LESS IN DEPTH THAN THE BEARING BARS. BANDING BARS SHALL BE FLUSH TOP OF BEARING BARS.
5. BAR GRATING SHALL BE GALVANIZED IN ACCORDANCE WITH ASTM A 123.
6. MAXIMUM WIDTH OF BAR GRATING SEGMENT SHALL BE 4'-0".

TANK VOLUME	ACTION
95%	HLSOV (OV-1)
90%	HHLA
85%	HLA
70%	PUMP START
20%	PUMP STOP
OV-1 CLOSES LAST TO SATISFY BPVC REQUIREMENTS.	

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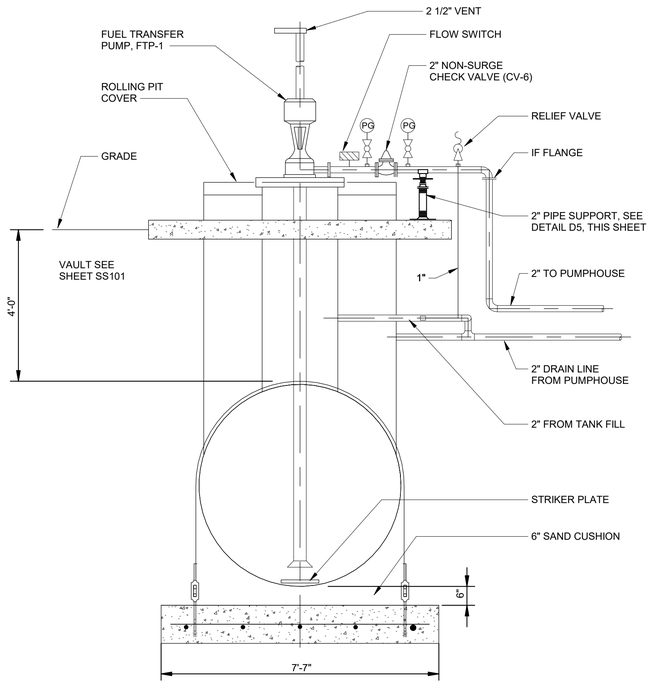
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

UNDERGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS

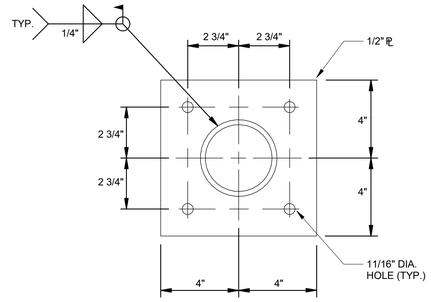
SHEET ID

M-504

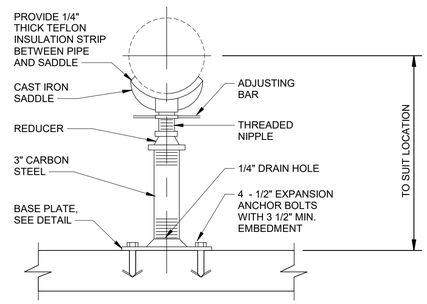


D1 4000 GALLON UNDERGROND PRT SECTION

SCALE: NTS

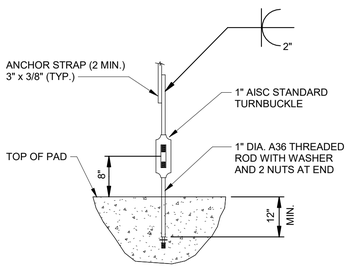


BASE PLATE



D5 ADJUSTABLE PIPE SADDLE SUPPORT DETAIL

SCALE: NTS



B1 ANCHOR DETAIL

SCALE: NTS

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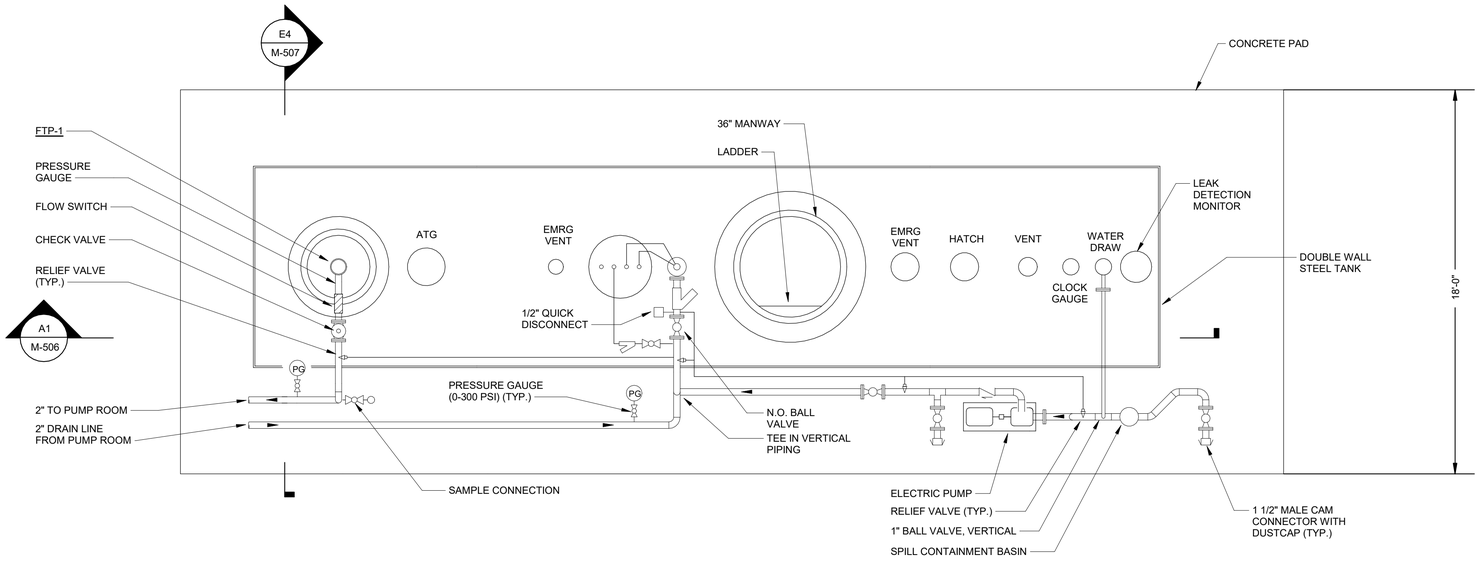
UNDERGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS

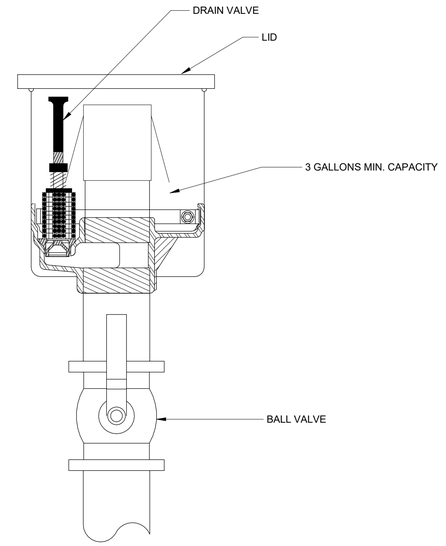
SHEET ID

M-505



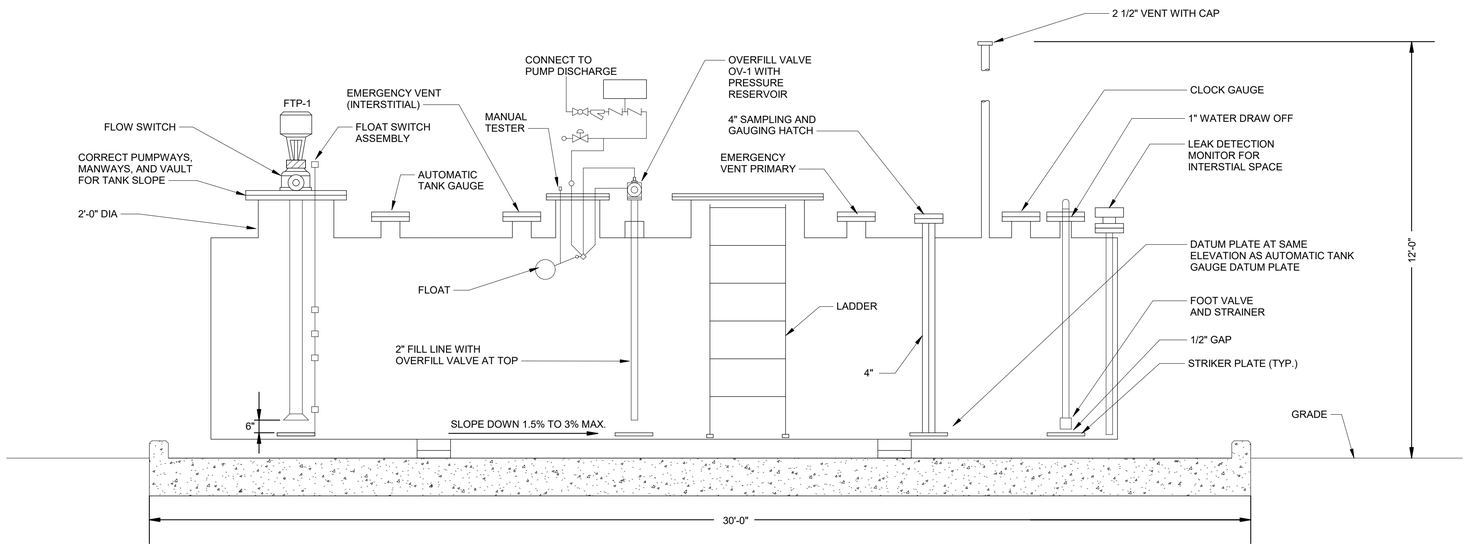
E1 4000 GALLON ABOVEGROUND PRODUCT RECOVERY TANK PLAN

SCALE: NTS



E8 SPILL CONTAINMENT BASIN DETAIL

SCALE: NTS



TANK VOLUME	ACTION
95%	HLSOV (OV-1)
90%	HHLA
85%	HLA
70%	PUMP START
20%	PUMP STOP
OV-1 CLOSES LAST TO SATISFY BPVC REQUIREMENTS.	

A1 4000 GALLON ABOVEGROUND PRT ELEVATION

SCALE: NTS

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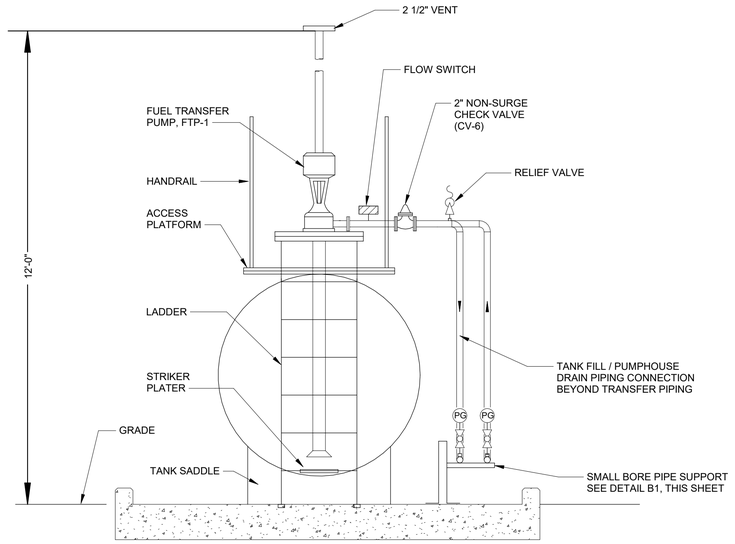
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ABOVEGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS

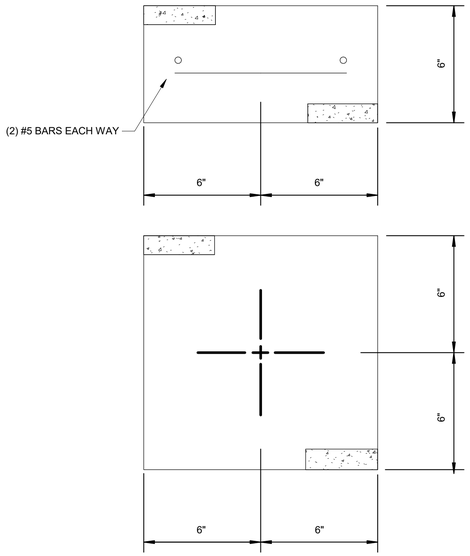
SHEET ID

M-506



E4 4000 GALLON ABOVEGROUND PRT SECTION

SCALE: NTS

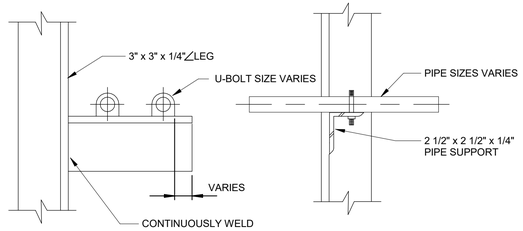


B8 CONCRETE BASE FOR SMALL BORE PIPE SUPPORT

SCALE: NTS

NOTES:

1. USE CONCRETE BASE OUTSIDE OF AREAS OF CONCRETE CONTAINMENT WHERE SMALL BORE PIPE SUPPORT ARE REQUIRED.

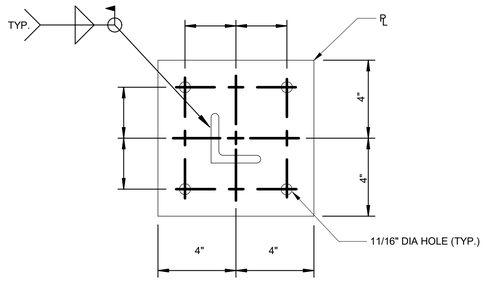


B1 SMALL BORE PIPE SUPPORT DETAIL

SCALE: NTS

NOTES:

1. U-BOLTS SHALL BE COATED OR OTHER MEANS TO PROTECT THE PIPING FROM THE METAL OF THE U-BOLT.
2. A TEFLON PAD SHALL BE INSERTED BETWEEN THE SUPPORT AND THE PIPE.



B5 BASE PLATE FOR SMALL BORE PIPE SUPPORT

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

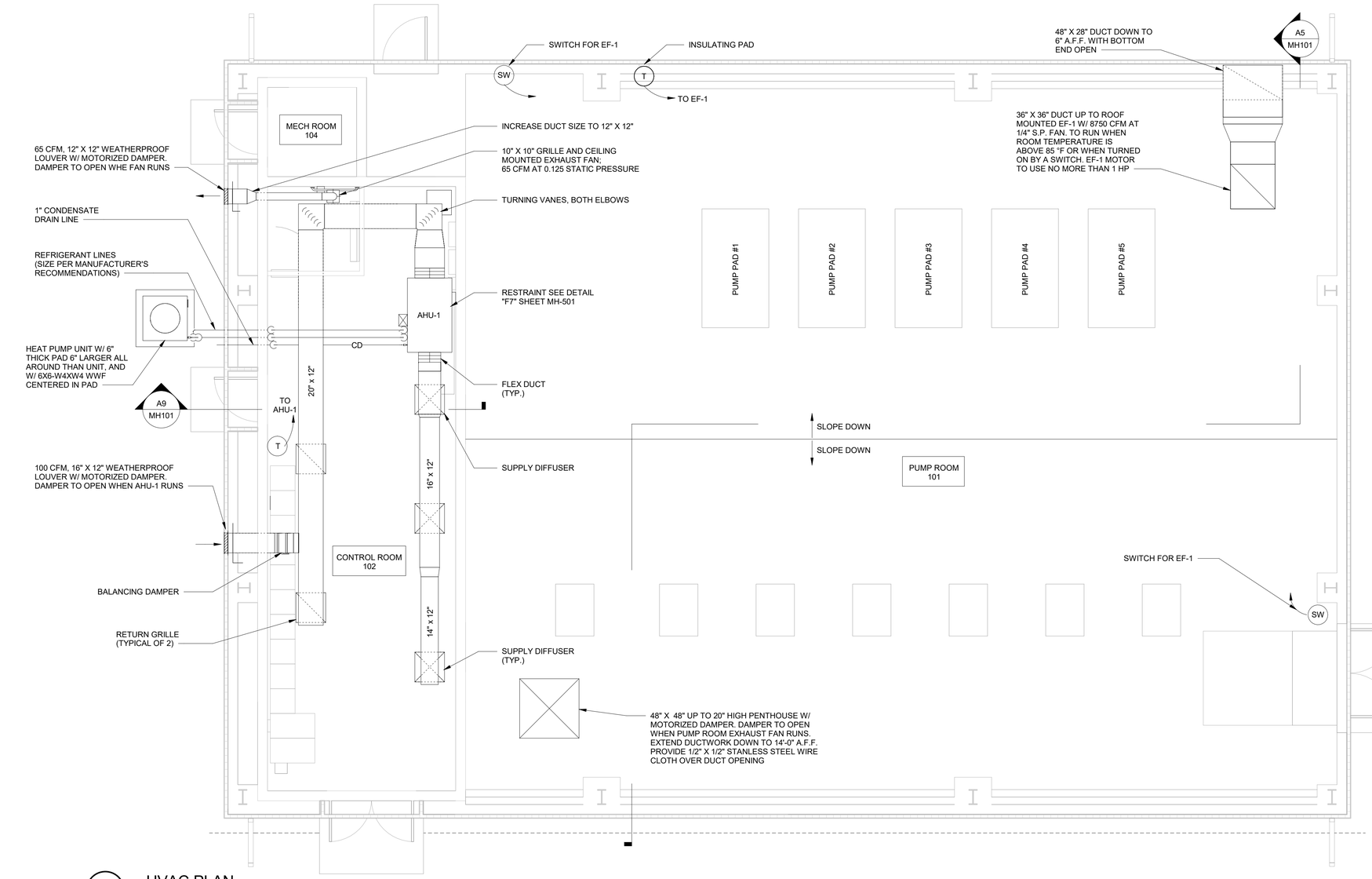
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ABOVEGROUND PRODUCT RECOVERY TANK SECTIONS AND DETAILS

SHEET ID

M-507

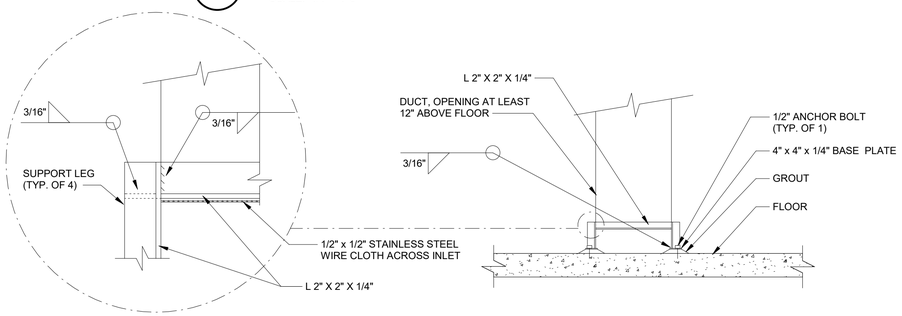


B2 HVAC PLAN

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

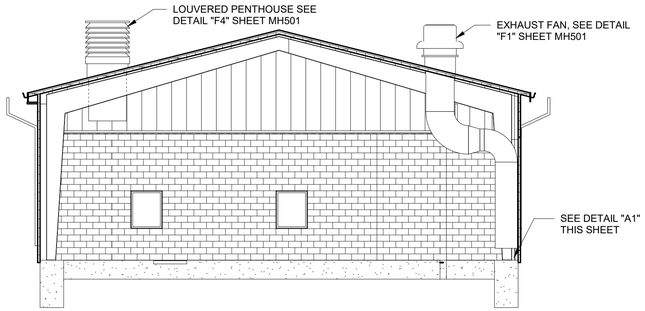
NOTES TO THE DESIGNER:

1. EXPECTED SNOW ACCUMULATION SHALL BE DETERMINED AND FAN OUTLET OR HOOD INLET SHALL BE RAISED ABOVE THAT HEIGHT.
2. HEATING AND VENTILATION FOR PUMPHOUSE AND HEATING AND AIR CONDITIONING FOR CONTROL ROOM SHALL BE PROVIDED.
3. THE ENTIRE VOLUME UNDER THE PUMPHOUSE SHELTER EXCEPT THE VOLUME INSIDE THE CONTROL ROOM, SHALL BE CONSIDERED A CLASS 1, DIVISION 1 GROUP D (T2D-419F) HAZARDOUS LOCATION. ALL ELECTRICAL EQUIPMENT INSTALLED WITHIN THE HAZARDOUS AREA SHALL BE SPECIFICALLY APPROVED BY UL OR FACTORY MUTUAL FOR THE ABOVE HAZARDOUS AREA CLASSIFICATION. (SEE ELECTRICAL FOR HAZARDOUS CLASSIFICATION.)
4. AMBIENT DESIGN TEMPERATURES SHALL BE TAKEN INTO ACCOUNT AND AUXILIARY HEATING SHALL BE PROVIDED AS NEEDED.
5. WHERE FOREIGN SYSTEMS IMPEDE THE DEDICATED ELECTRICAL EQUIPMENT SPACE, RE-ROUTE OR RE-SITE THOSE SYSTEMS.



A1 DUCT SUPPORT DETAIL

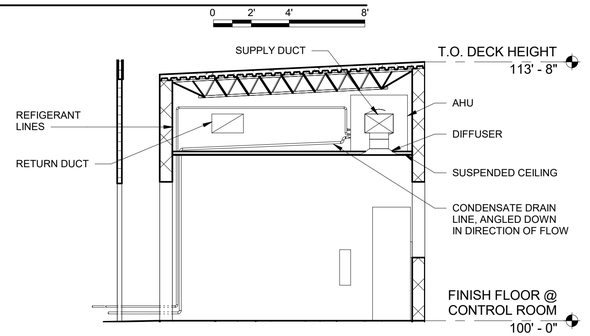
SCALE: NTS



A5 PUMP ROOM SECTION

SCALE: 1/8" = 1'-0"

0 4' 8' 16'



A9 CONTROL ROOM SECTION

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

0 2' 4' 8'

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MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
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SIZE: ANSI D

ISSUE DATE: MARCH 2020
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CONTRACT NO.:

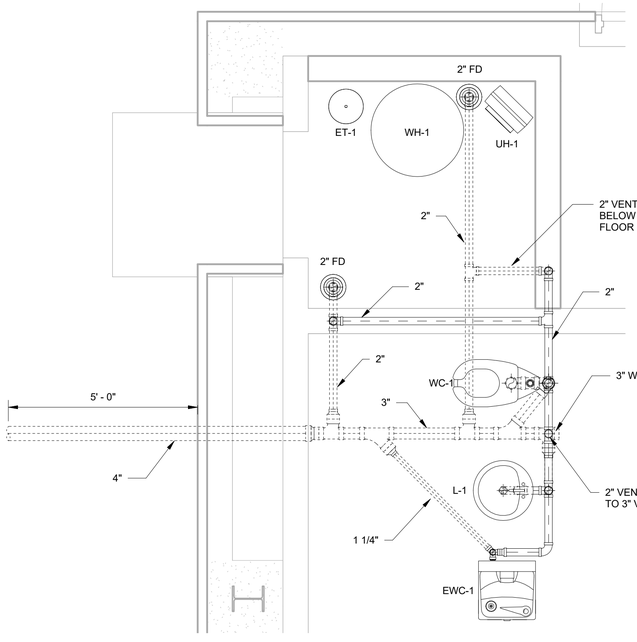
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMPHOUSE MECHANICAL PLAN

SHEET ID

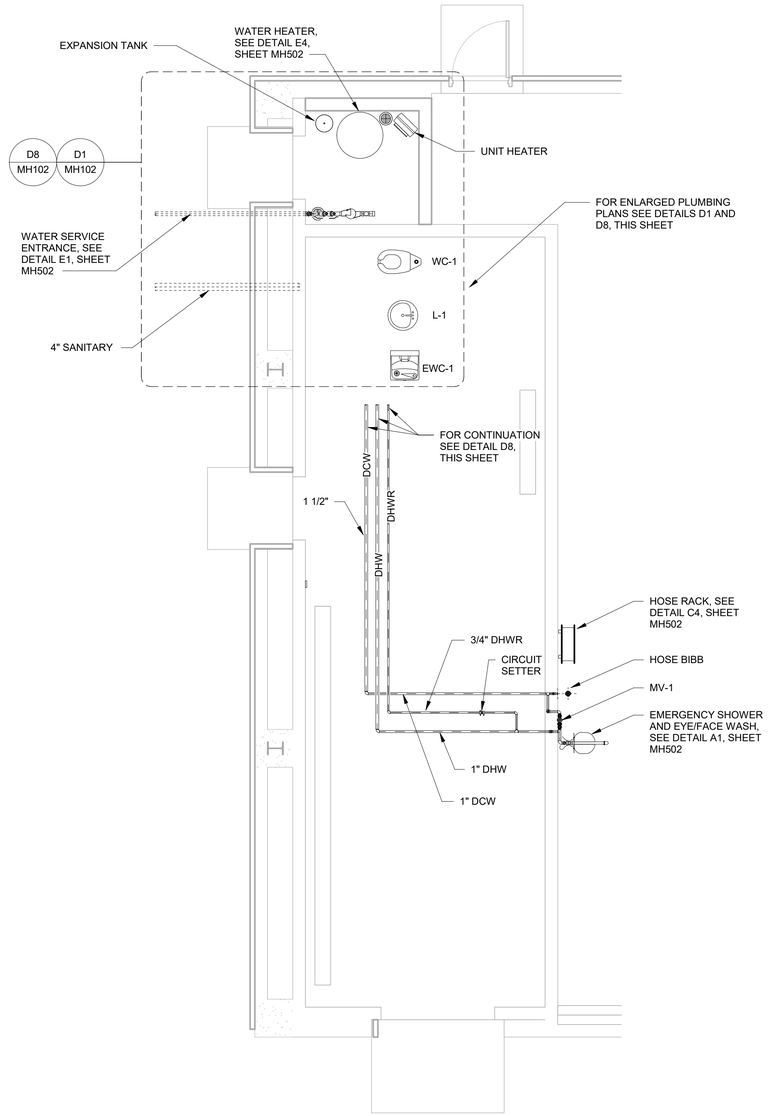
MH101



D1 ENLARGED WASTE AND VENT PLAN

SCALE: 1/2" = 1'-0"

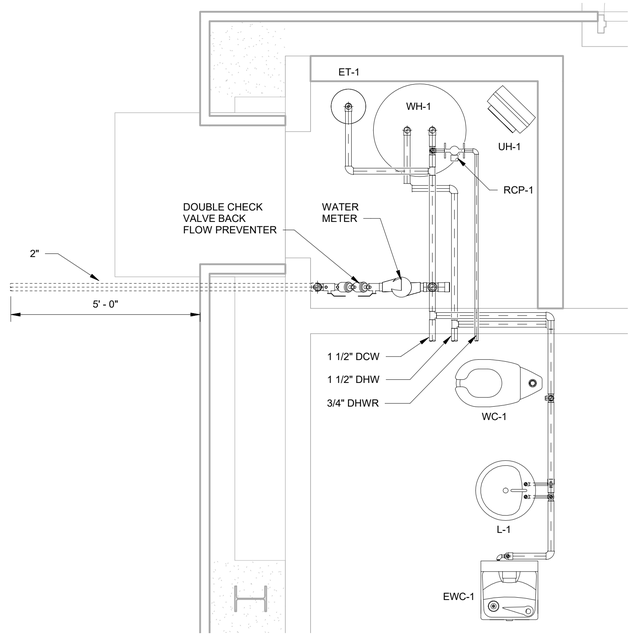
0 1' 2' 4'



A4 PLUMBING PLAN

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

0 2' 4' 8'



D8 ENLARGED DOMESTIC WATER PLAN

SCALE: 1/2" = 1'-0"

0 1' 2' 4'

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

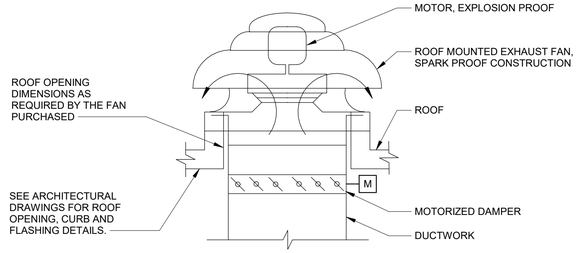
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMPHOUSE PLUMBING PLAN

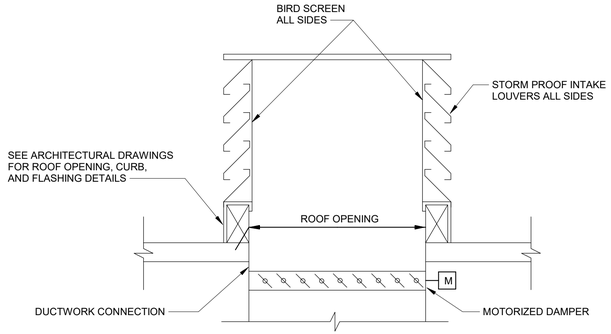
SHEET ID

MH102



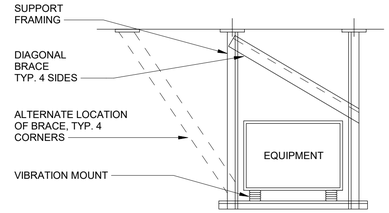
F1 ROOF MOUNTED EXHAUST FAN DETAIL

SCALE: NTS



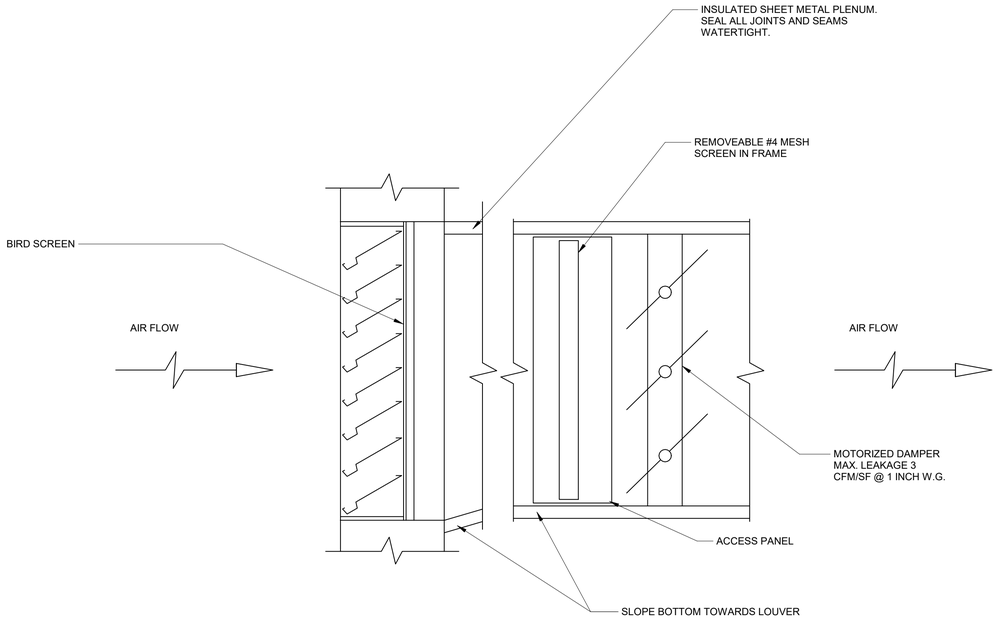
F4 LOUVERED PENTHOUSE DETAIL

SCALE: NTS



F7 SEISMIC RESTRAINT FOR EQUIPMENT

SCALE: NTS



B1 LOUVER DETAIL

SCALE: NTS

US Army Corps of Engineers ®

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DRAWN BY:
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SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
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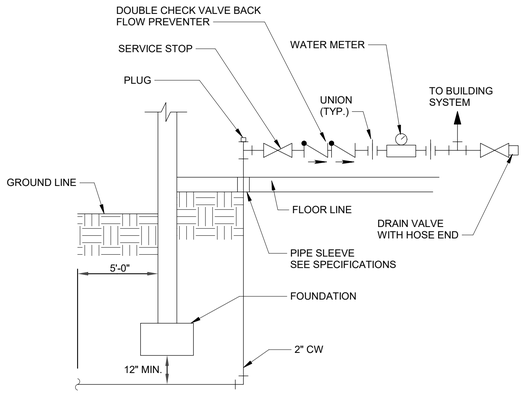
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMPHOUSE MECHANICAL DETAILS

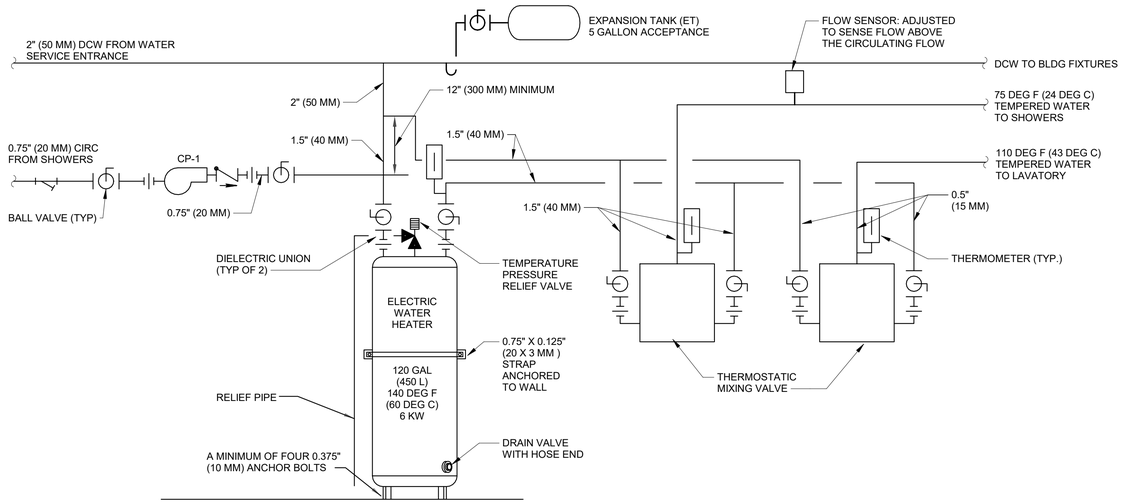
SHEET ID

MH501



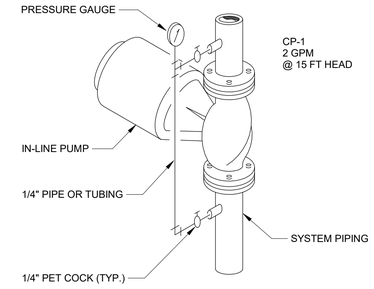
E1 WATER SERVICE ENTRANCE

SCALE: NTS



E4 ELECTRIC WATER HEATER DETAIL

SCALE: NTS

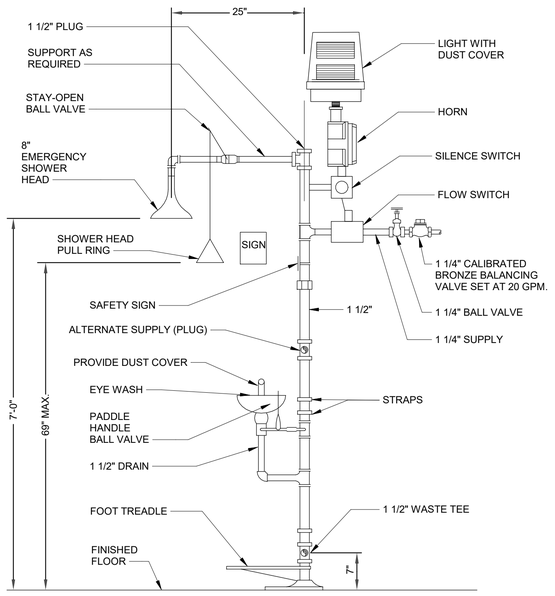


NOTE:

EXTERNAL GAGE TAPS ON PIPES SHALL NOT BE REQUIRED WHEN PUMP IS PROVIDED WITH FLANGE GAUGE CONNECTOR.

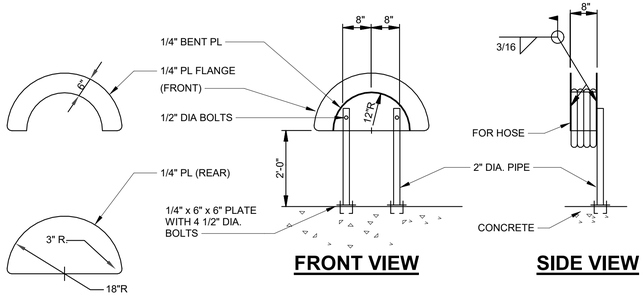
E9 CIRCULATING PUMP

SCALE: NTS



A1 FREEZE PROOF EMERGENCY SHOWER

SCALE: NTS



C4 HOSE RACK DETAILS

SCALE: 1/2" = 1'-0"

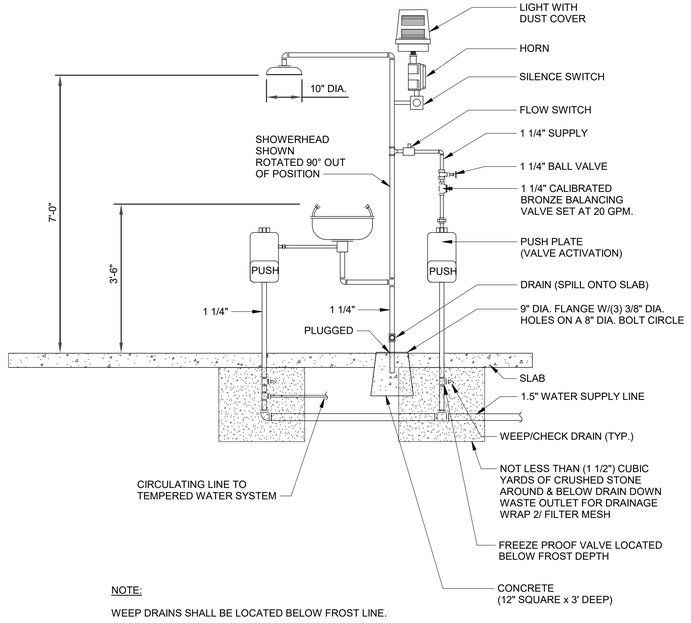
0 1' 2' 4'

NOTES TO DESIGNER:

1. IN AREAS SUBJECT TO FREEZING CONDITIONS, SHOWER AND APPURTENANCES SHALL BE HEAT TRACED (WITH THERMOSTATIC CONTROL), INSULATED, AND COVERED BY MOLDED ABS PLASTIC JACKETING, ALL OF WHICH SHALL BE A STANDARD PRODUCT OF THE SHOWER MANUFACTURER. HOSE BIBB ADJACENT TO SHOWER SHALL BE HEAT TRACED ALSO.

1. EXTERIOR EMERGENCY SHOWER IS RECOMMENDED IN UNHEATED PUMP SHELTERS WHERE FREEZING COULD OCCUR.

2. EMERGENCY SHOWER/EYEWASH NOT REQUIRED AT TRUCK FILLSTANDS OR HHT CHECKOUT, BUT AT A MINIMUM A PORTABLE EYEWASH IS REQUIRED (COULD BE LOCATED IN TRUCK)



NOTE:

WEEP DRAINS SHALL BE LOCATED BELOW FROST LINE.

A7 EXTERIOR EMERGENCY SHOWER

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

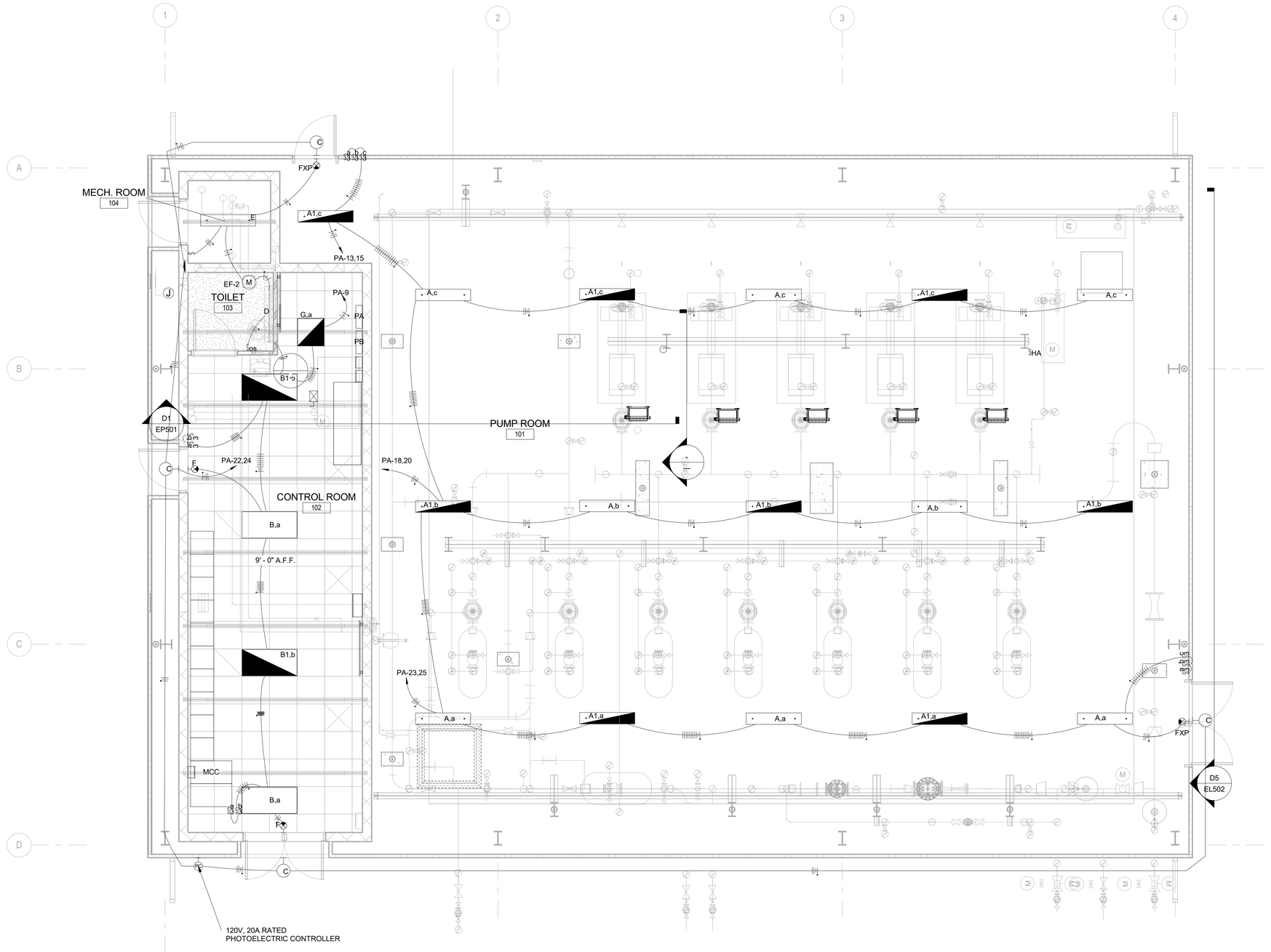
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMPHOUSE PLUMBING DETAILS

SHEET ID

MH502



B1 LIGHTING PLAN

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

DESIGNER NOTES:

1. PROVIDE EXTERIOR LIGHTS ON PUMP SHELTERS AT HIGHER ELEVATIONS, AS REQUIRED.

2. LIGHTING DESIGN CRITERIA:
UFC 3-460-01, UFC 3-530-01, API 540 TABLE 4, and IESNA 10th Edition Handbook:

PUMP HOUSE/SHELTER:

Pump Room:
- E_h = 20 fc Avg @ 3'-6" AFF
- E_v = 5 fc Avg @ 3'-6" AFF
- Uniformity (Avg:Min) = 3:1

Control Room Ambient:
- E_h = 30 fc Avg @ 2'-6" AFF
- E_v = 15 fc Avg @ 3'-6" AFF
- Uniformity (Avg:Min) = 2:1

Toilet Room:
- E_h = 5 fc Avg @ 0'-6" AFF
- E_v - 3 fc Avg @ 3'-0" - 5'-0" AFF
- Uniformity (Avg:Min) = 2:1

Mechanical Room:
- E_h - 20 fc Avg @ 3'-6" AFF
- E_v - 5 fc Avg @ 3'-6" AFF
- Uniformity (Avg:Min) = 3:1

NOTES:

1.THE ENTIRE VOLUME UNDER THE PUMP HOUSE SHELTER EXCEPT THE VOLUME INSIDE THE CONTROL ROOM, MECHANICAL ROOM, AND TOILET ROOM SHALL BE CONSIDERED A CLASS 1, DIVISION 1 GROUP D, (T3 392 F), HAZARDOUS LOCATION. ALL ELECTRICAL EQUIPMENT INSTALLED WITHIN THE HAZARDOUS AREA SHALL BE SPECIFICALLY APPROVED BY UL OR FACTORY MUTUAL FOR THE ABOVE HAZARDOUS AREA CLASSIFICATION.

2. EACH CONDUIT ORIGINATING IN OR PASSING THROUGH OR UNDER A HAZARDOUS AREA AND PENETRATING CONTROL ROOM WALLS, ROOF, OR FLOOR SHALL HAVE EXPLOSION PROOF SEALING FITTINGS INSTALLED IN THE INTERIOR OF THE CONTROL ROOM PER NFPA 70 ARTICLE 501.15.

3. CONNECT EF-2 TO THE LIGHT SWITCH.

4. CONDUIT AND CABLE SCHEDULE IS LOCATED ON SHEET EP604.

5. ALL METALLIC CONDUITS THAT ARE NOT ATTACHED TO A GROUNDED PANEL OR ENCLOSURE SHALL BE GROUNDED USING A GROUNDED BUSHING.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

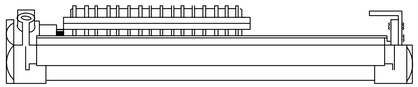
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

LIGHTING PLAN

SHEET ID

EL101



FEATURES

LAMP TYPE: LED/75 CRI

PROFILE: 4 TUBES; 4000K (CCT); 10000 LUMENS

SHIELDING: CLEAR TEMPERED GLASS

DRIVER: DRIVER HAS 1.5kV SURGE PROTECTION, 120-277V

NOM. DIMENSIONS: 23.2" W X 11.3 " H X 53" L

GENERAL DESCRIPTION

HOUSING: COPPER FREE (LESS THAN .4% COPPER), HEAVY GAUGE ALUMINUM CAST END PLATES

LAMP GUARD: STAINLESS STEEL WIRE GUARD

MOUNTING: POSITIVE CLAMP MOUNTING BRACKETS, ANGLE MOUNTING BRACKET, OR EXTENDED MOUNTING BRACKET

REFLECTORS: COPPER FREE, HEAVY GAUGE, EXTRUDED ALUMINUM PAINTED

FINISH: NATURAL ALUMINUM

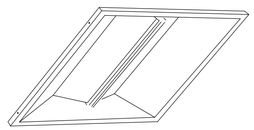
RATING: NEC CLASS I, DIV. 1 & 2, GROUPS C & D

EMERGENCY BATTERY BACKUP WITH EMERGENCY DRIVER

BUILT IN FAILURE DETECTION

E1 FIXTURE TYPE "A" & "A1"

SCALE: NTS



LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-FORMED, COLD ROLLED STEEL, WITH ONE-PIECE LOWER REFLECTOR HAVING TEXTURED, HIGH REFLECTANCE, WHITE POLYESTER POWDER-COATED FINISH. OPTIONAL SIZES OF 1FT x 4FT, 2FT x 2FT, AND 2FT x 4FT AVAILABLE.
2. LIGHT SOURCE - UPWARD-FACING LEDS WITH DIFFUSE LENS TO ELIMINATE DIRECT VIEW OF LIGHT SOURCE. 3500K COLOR TEMPERATURE UON, MAXIMUM BINNING TOLERANCE OF A 4-STEP MCADAM ELLIPSE, MINIMUM EFFICACY OF 90 LUMENS/WATT, WITH A MINIMUM CRI OF 80. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
4. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED IN LUMINAIRE SCHEDULE.
5. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP. IC RATED WHEN INDICATED.
6. MOUNTING - RECESSED IN SUSPENDED ACOUSTICAL TILE OR HARD CEILING.
7. EMERGENCY DRIVER AS REQUIRED BY DRAWINGS.

DIRECT/INDIRECT LED TROFFER

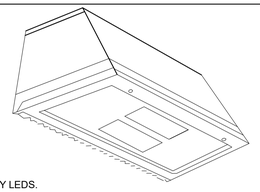
REVISED: APRIL 2016 | LIGHTING PLATE: NL-1

A1 FIXTURE TYPE "B" & "B1"

SCALE: NTS

FEATURES:

OPTICS:
7000 LUMENS .
NEMA TYPE IV DISTRIBUTION.
LIGHT SOURCE - 4000K WITH 70 CRI.
ZERO UPLIGHT.



ELECTRICAL:
LIGHT SOURCE SHALL BE 30 HIGH-EFFICACY LEDS.
120 VOLT OPERATION.
INTEGRAL BATTERY RATED FOR -20 TO 60 DEGREE C FOR A MINIMUM DURATION OF 90 MINUTES.
CONTROLLED BY MOTION SENSOR TO BE PROVIDED WITH THE LIGHT FIXTURE.
RATED LIFE SHALL BE 100,000 HOURS AT 25°C.
POWER SOURCE POWER FACTOR >90%, THD <20%.
SURGE PROTECTION SHALL MEET A MINIMUM CATEGORY B (PER ANSI/IEEE C62.41.2).

CONSTRUCTION:
PRECISION-MOLDED ACRYLIC LENSE FOR WALL-MOUNT APPLICATIONS.
SINGLE-PIECE DIE-CAST ALUMINUM HOUSING.
DIE-CAST DOOR FRAME, FULLY GASKETED WITH A ONE-PIECE SOLID SILICONE GASKET TO KEEP OUT MOISTURE AND DUST, WITH AN IP65 RATING FOR THE LUMINAIRE.
DIMENSIONS: 7 1/8" HEIGHT X 16 3/8" WIDTH X 9 5/16" DEPTH

FINISH:
ZINC-INFUSED THERMOSET POWDER COAT FINISH WITH MINIMUM 3 MILS THICKNESS.
COLOR SHALL BE DARK BRONZE.
NON-TEXTURED FINISH.

INSTALLATION:
UNIVERSAL MOUNTING PLATE WITH INTEGRAL MOUNTING SUPPORT ARMS.

LISTINGS:

CSA CERTIFIED TO U.S. AND CANADIAN STANDARDS.
LIGHT ENGINES ARE IP66 RATED.
LUMINAIRE - IP65 RATED.
SUITABLE FOR WET LOCATIONS WHEN MOUNTED WITH THE LENSES DOWN.
RATED FOR -30°C MINIMUM AMBIENT.

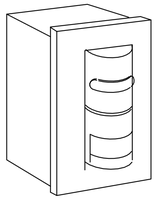
MANUFACTUER REFERENCE:
LITHONIA SERIES CSXW LED OR AN APPROVED EQUIVALENT.

D4 FIXTURE TYPE "C"

SCALE: NTS

CORPS OF ENGINEERS DEPARTMENT OF THE ARMY

TYPE: S_{OS}



FEATURES

PATTERN: 170 DEGREE
COVERAGE: 300-1500 SF

TIME DELAY: ADJUSTABLE 15 SECONDS TO 30 MINUTES

OPTIONS

WEATHER-PROOF FOR OUTDOOR LOCATIONS
TEMPERATURE RANGE: -20 TO +110 DEGREES F

NOM. DIMENSIONS: 4 1/ 2" H X 15/16" D X 4 5/8" W

GENERAL DESCRIPTION

HOUSING: IMPACT RESISTANT INJECTION MOLDED ABS

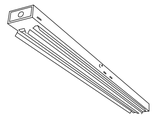
MOUNTING: WALL MOUNTED BETWEEN TOP OF OBSTRUCTIONS AND CEILING

ELECTRICAL: LOW VOLTAGE, 120 VOLT

FINISH: WHITE (INDOORS); BRONZE (OUTDOORS)

A4 WALL MOUNTED ULTRASONIC & INFRARED OCCUPANCY SENSOR

SCALE: NTS



LUMINAIRE REQUIREMENTS:

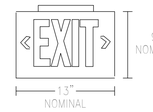
1. HOUSING - DIE-FORMED, COLD-ROLLED STEEL, WITH REINFORCEMENT RIBS FOR RIGIDITY AND SPECULAR ALUMINUM OR HIGHLY-REFLECTIVE PAINTED STEEL REFLECTORS. OPTIONAL LENGTHS OF 4FT OR 8FT.
2. FINISH - MULTI-STAGE PHOSPHATE BONDING TREATMENT FINISHED WITH HIGH-REFLECTANCE, WHITE POLYESTER POWDER COAT, PAINTED AFTER FABRICATION.
3. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, 3500K CCT UON, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, AND MINIMUM EFFICACY OF 100 LUMENS/WATT. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
4. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
5. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
6. MOUNTING - SURFACE ON CEILING OR SUSPENDED.
7. OPTIONS - WIRE GUARD, CHAIN, STEM OR SWIVEL STEM HANGERS.
8. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

LED INDUSTRIAL STRIP

REVISED: APRIL 2016 | LIGHTING PLATE: NL-7

1 FIXTURE TYPE "D"

SCALE: NTS



LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-CAST ALUMINUM OR HIGH-IMPACT, UV-STABILIZED, INJECTION-MOLDED THERMOPLASTIC. SINGLE OR DOUBLE-FACED AS INDICATED.
2. FINISH (ON CAST ALUMINUM HOUSING ONLY) - TEXTURED POWDER COAT FINISH OPTIONS INCLUDE WHITE, WHITE WITH BRUSHED ALUMINUM FACE, BLACK, OR BLACK WITH BRUSHED ALUMINUM FACE.
3. LETTERS/CHEVRONS - MINIMUM 6" HIGH WITH 3/4" STROKE. RED OR GREEN LETTERS AS INDICATED. PROVIDE CHEVRONS AS INDICATED EITHER LEFT, RIGHT OR BOTH DIRECTIONS AS INDICATED. CHEVRONS PUNCHED OUT THROUGH HOUSING AS REQUIRED.
4. EMERGENCY PACK - SOLID-STATE, CONSTANT-CURRENT TYPE BATTERY CHARGER WITH MAINTENANCE-FREE, NICKEL-CADMIUM BATTERY, AC-ON INDICATOR LAMP AND TEST SWITCH.
5. MOUNTING - UNIVERSAL MOUNTING KIT FOR CEILING, WALL OR END-OF-FIXTURE MOUNTING.
6. ILLUMINATION - PROVIDED BY RED, GREEN OR WHITE HIGH-OUTPUT LEDS INSIDE OF FIXTURE HOUSING. PROVIDE POLYSTYRENE DIFFUSER IN COLOR INDICATED WITH FREQUENCY-MATCHED SILKSCREEN COATING FOR MAXIMUM LED LIGHT OUTPUT.
7. CERTIFICATION - UL LISTED AND CERTIFIED FOR DAMP LOCATIONS; RATED FOR CLASS 1, DIVISION 1, GROUP D HAZARDOUS LOCATIONS.

LED EXIT SIGN

REVISED: AUGUST 2004 | LIGHTING PLATE: NL-63

A8 FIXTURE TYPE "F" & FXP

SCALE: NTS

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-26 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

LIGHT FIXTURE DETAILS

SHEET ID

EL501

LUMINAIRE REQUIREMENTS:

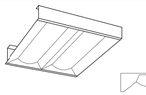
1. HOUSING - DIE-FORMED, COLD-ROLLED STEEL, WITH REINFORCEMENT RIBS FOR RIGIDITY; END CAPS SAME MATERIAL AS HOUSING, SECURED WITH TABS, SCREWS OR RIVETS. WHITE ENAMEL FINISH APPLIED AFTER FABRICATION. OPTIONAL LENGTHS OF 2FT OR 4FT.
2. LENS - ACRYLIC PRISMATIC OR WHITE OPAL TO PROVIDE EVEN ILLUMINATION AND TO ELIMINATE PIXILATION FROM LED LIGHT SOURCE.
3. LIGHT SOURCE - SOLID STATE LEDS WITH MINIMUM 50K HOURS RATED LIFE AT L70, 3500K CCT UON, MINIMUM 80 CRI, MAXIMUM 4-STEP MCADAM ELLIPSE BINNING TOLERANCE FOR COLOR CONSISTENCY, AND MINIMUM EFFICACY OF 90 LUMENS/WATT. INITIAL LUMEN OUTPUT AS INDICATED IN LUMINAIRE SCHEDULE.
4. DRIVER - REPLACEABLE, INTEGRAL, HIGH-EFFICIENCY DRIVER WITH MINIMUM 0.9 PF, OPERATING VOLTAGE OF 120-277V, THERMAL MANAGEMENT, < 20% TOTAL HARMONIC DISTORTION. ON-OFF CONTROL, STEP-DIMMABLE OR FULLY DIMMABLE AS INDICATED.
5. CERTIFICATION - UL 1598, DAMP LOCATION, DLC QUALIFIED, AND ROHS COMPLIANT. COMPLIES WITH LM79, LM80 AND TM21 TESTING STANDARDS. UL 924 WHEN EQUIPPED WITH EMERGENCY BATTERY BACK-UP.
6. MOUNTING - SURFACE.
7. OPTIONS - INTEGRAL MOTION SENSOR, EMERGENCY BACK-UP.
8. THIS SKETCH IS A NON-PROPRIETARY GRAPHIC REPRESENTATION OF A LUMINAIRE THAT MAY MEET THE SPECIFICATION REQUIREMENTS. IT IS NOT INTENDED TO INDICATE A CERTAIN MANUFACTURER OR PREFERENCE.

WALL MOUNTED LED

REVISED: APRIL 2016 | LIGHTING PLATE: NL-9

D1 FIXTURE TYPE "E"

SCALE: NTS



TYPE G

LUMINAIRE REQUIREMENTS:

1. HOUSING - DIE-FORMED, COLD-ROLLED STEEL, WITH REINFORCEMENT RIBS FOR RIGIDITY. ENDCAPS SECURED WITH TABS, SCREWS OR RIVETS. FIXTURE SHALL NOT PERMANENTLY DEFORM OUT OF "SQUARE" WHEN PICKED UP FROM ANY CORNER.
2. FINISH - MULTI-STAGE PHOSPHATE BONDING TREATMENT FINISHED WITH HIGH REFLECTANCE (MINIMUM 85%), BAKED WHITE ENAMEL FINISH.
3. REFLECTORS - TWO-PIECE CURVED ALUMINUM WITH MATTE WHITE FINISH.
4. SHIELDING - HIGH-TRANSMISSION ACRYLIC.
5. LAMPS - SEE LIGHTING FIXTURE SCHEDULE.
6. DRIVER - CLASS P, THERMALLY-PROTECTED, HIGH POWER FACTOR (≥0.95), ELECTRONIC TYPE WITH SOUND RATING A. SEE SPECIFICATION OR LIGHTING FIXTURE SCHEDULE FOR DRIVER OPTIONS AND SPECIFICS. DRIVER SHALL BE DIMMABLE TO 10% WHERE CONNECTION TO DIMMING SWITCHES IS INDICATED ON THE DRAWINGS.
7. CERTIFICATION - UL LISTED AND LABELED.
8. PHOTOMETRICS - MINIMUM VALUE OF COEFFICIENT OF UTILIZATION (CU) AND EFFICIENCY, GIVEN INTERIOR CAVITY REFLECTANCES OF 80-50-20:

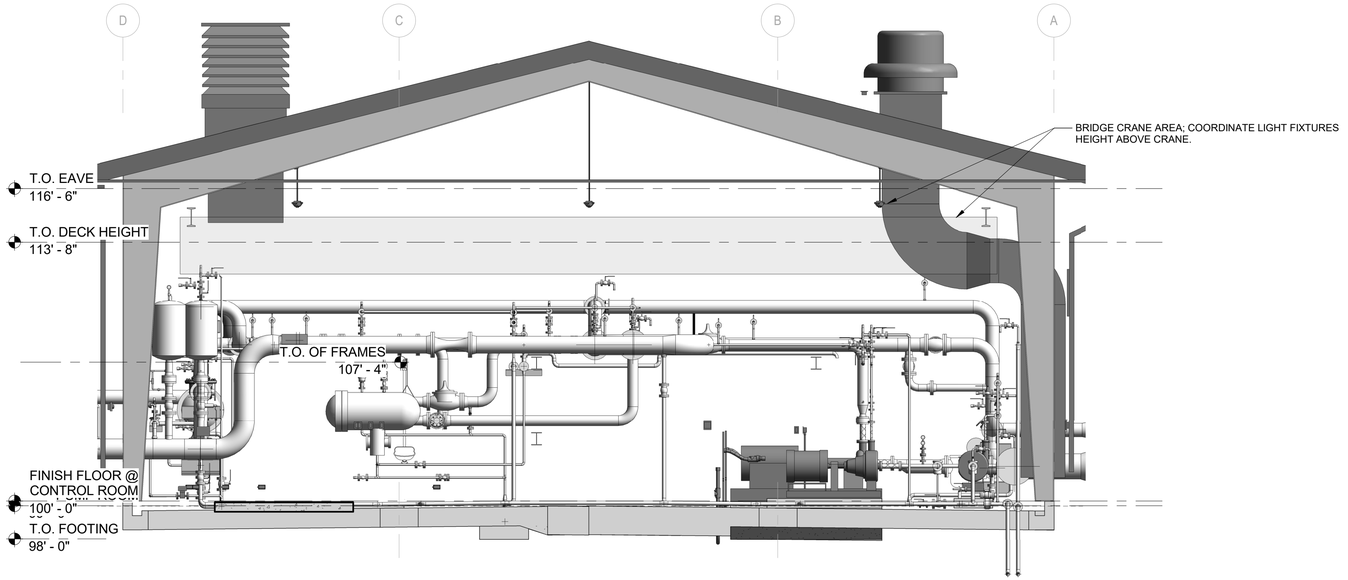
RCR	CU
1	92
2	80
3	70
4	64

HIGH EFFICIENCY RECESSED 2' X 2' FIXTURE

REVISED: AUGUST 2004 | LIGHTING PLATE: NL-81

A1 FIXTURE TYPE "G"

SCALE: NTS



D5 PUMPHOUSE LIGHT ELEVATION

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

0 0 6" 2' 4' 8' 2'

US Army Corps of Engineers ®

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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

LIGHT FIXTURE DETAILS

SHEET ID

EL502

LIGHTING FIXTURE SCHEDULE									
FIXTURE SYMBOL	COUNT	LAMP TYPE	LAMP WATTS	LAMP QTY	VOLTS	MIN FIXT LUMENS OUTPUT	MOUNTING HEIGHT A.F.F.	BASIS OF DESIGN	REMARKS
A	8	LED	94 W	4	208 V	10800 Lms	SUSPENDED 15'-9"	A) Holophane HXPL10L44TAS B) AZZ XP100L44LU	RATED FOR CLASS 1, DIVISION 1, GROUP D HAZARDOUS LOCATIONS. THE MOUNTING HEIGHT SHALL BE COORDINATED SO THE BRIDGE CRANE WILL PASS UNDER THE LIGHTS.
A1	8	LED	94 W	4	208 V	10800 Lms	SUSPENDED 15'-9"	A) Holophane HXPL10L44TAS B) AZZ XP100L44LU	RATED FOR CLASS 1, DIVISION 1, GROUP D HAZARDOUS LOCATIONS. THE MOUNTING HEIGHT SHALL BE COORDINATED SO THE BRIDGE CRANE WILL PASS UNDER THE LIGHTS; SELF -TEST EMERGENCY DRIVER WITH REMOTE SWITCH; WITH FIXTURE (WHERE REQUIRED).
B	2	LED	55 W	1	120 V	5689 Lms	RECESSED	A) Lithonia 2RTL4 60L EZ1 LP840 B) Cree CR24-20L-40K-10V C) Columbia LEPC24-40MWG-LL-_-EDU	UL LISTED FOR DRY LOCATION.
B1	2	LED	55 W	1	120 V	5689 Lms	RECESSED	A) Lithonia 2RTL4 40L EZ1 LP840 B) Cree CR24-20L-40K-10V C) Columbia LEPC24-40MWG-LL-_-EDU	UL LISTED FOR DRY LOCATION; EMERGENCY DRIVER OR BATTERY PACK SUPPLEMENTAL TO THE FIXTURE (WHERE REQUIRED).
C	4	LED	18 W	1	208 V	1450 Lms	WALL 9'-0"	A) Lithonia WST LED P1 40K VF MVOLT B) Visionaire VSC-1-T3-16LC-3-4K-UNV-WM-BZ-EBPL-DIM	UL LISTED FOR WET LOCATION; 0-10V DIMMING DRIVER; PROVIDE EMERGENCY BATTERY BACKUP (WHERE REQUIRED). WHERE LOCATED ON THE BUILDING EXTERIOR, EMERGENCY BATTERY PACK SHALL BE COLD-WEATHER RATED.
D	1	LED	36 W	1	120 V	2000 Lms	WALL 7'-6"	A) Cooper Neo-Ray S23-DW-1L40-ETG-4-U-DD-S93HTS B) Philips 29x1LAGWN04_1 C) Prudential BIO-LIN-LED4-HO-4-**-SAL-D1	UL LISTED FOR DRY LOCATION.
E	1	LED	48 W	1	120 V	4000 Lms	SUSPENDED 10'-6"	A) Columbia LCS4-40ML B) Eaton RZL-NL-3L40-1C-UNV-4 C) HE Williams 75-4-L50-840-WG-7514 D) Lithonia MSL 4000LM L/LV MVOLT GZ10 35K 80CRI LCHOSZU E) LSI S-4-LED-HO-NW-WG240 F) Philips LBX55L840-UNV	UL LISTED FOR DAMP LOCATION; EMERGENCY DRIVER (WHERE REQUIRED) MAY BE RATED FOR DRY LOCATION. PROVIDE WIRE GUARD WITH FIXTURE WHEN NOT PROVIDED WITH LOUVERS/BAFFLE.
F	2	LED	6 W		120 V		WALL	Holophane MEX S SD	PARALLEL TO WALL; SINGLE-SIDED; EMERGENCY BATTERY POWER; SELF-DIAGNOSTICS.
FXP	2	LED	6 W				WALL	Holophane HDXE S AM PW EM	UL844 RATED FOR CLASS I, DIVISION 2, GROUPS A, B, C, AND D; UL 924; RATED FOR WET LOCATIONS, MINIMUM NEMA 4/IP65; PARALLEL TO WALL; SINGLE-SIDED; EMERGENCY BATTERY POWER; SELF-DIAGNOSTICS.
G	1	LED	23 W	1	120 V	2000 Lms	RECESSED	A) Cree CR22-20L-35K-S B) Columbia LEPC22-40MWG-LL-_-EDU C) Metalux 22AC-LD5-23-UNV-L840-CD1 D) Lithonia 2RTL2 20L EZ1 LP840	UL LISTED FOR DRY LOCATION; EMERGENCY DRIVER OR BATTERY PACK SUPPLEMENTAL TO THE FIXTURE (WHERE REQUIRED).

GENERAL LIGHTING NOTES:

1. BASIS OF DESIGN IS INCLUDED TO ASSIST THE CONTRACTOR IN UNDERSTANDING THE DESIGN INTENT IN SELECTING FIXTURES CONSISTENT WITH THE INTENT. THE DESIGN BASIS ILLUSTRATES THE PHYSICAL, OPTICAL, AND ELECTRICAL ATTRIBUTES REQUIRED. ALTERNATE FIXTURES BY OTHER MANUFACTURERS ARE ALLOWABLE IF THEY SATISFY THE DETAILS AND SPECIFICATIONS, AND THE PHYSICAL, OPTICAL, AND ELECTRICAL ATTRIBUTES OF THE DESIGN BASIS IDENTIFIED IN THESE SCHEDULES. ALTERNATE FIXTURES SHALL NOT BE ORDERED PRIOR TO APPROVAL BY THE DOR. SEE REMARKS REGARDING SPECIFIC OPTIONS TO INCORPORATE (FOR EXAMPLE, WHERE EMERGENCY BATTERY BACKUP IS REQUIRED BY BEING LABELED "EMERGENCY" OR "E" BUT OMITTED FROM THE CATALOG NUMBER, AN EMERGENCY BALLAST/DRIVER SHALL BE PROVIDED FOR SUCH FIXTURE).

2. THE MINIMUM CRI FOR ALL LED LAMPS SHALL BE 70.

3. LAMP/FIXTURE LUMEN OUTPUT, LAMP/FIXTURE RATED LIFE, BALLAST/DRIVER INPUT WATTAGE, AND BALLAST/DRIVER FACTOR, NOT INDICATED ON THIS SCHEDULE, SHALL COMPLY WITH SPECIFICATION SECTION 26 51 00: INTERIOR LIGHTING.

4. ALL FIXTURES, LAMPS, DRIVERS, AND BALLASTS SHALL BE RATED FOR STARTING AT ZERO DEGREES FAHRENHEIT UNLESS OTHERWISE NOTED.

5. ALL BALLASTS/DRIVERS INCLUDING EMERGENCY BALLASTS/DRIVERS SHALL BE INTEGRAL TO THE FIXTURE AND SHALL BE FACTORY INSTALLED UNLESS OTHERWISE NOTED.

6. ALL FIXTURES SHALL BE FACTORY PREWIRED WITH HIGH TEMPERATURE WIRE, AND SHALL BE COMPLETELY ASSEMBLED AND TESTED PRIOR TO SHIPMENT.

7. FIXTURES SHALL BE COMPATIBLE WITH THE CEILING TYPE IN WHICH THEY ARE INSTALLED. RECESSED FIXTURES INSTALLED IN PLASTER CEILINGS SHALL INCLUDE PLASTER FRAMES.

8. INDUSTRIAL AND STRIP FIXTURES MOUNTED IN ATTIC SPACES, MECHANICAL/ELECTRICAL ROOMS AND SIMILAR UTILITY EQUIPMENT SPACES SHALL BE CHAIN MOUNTED UNLESS OTHERWISE INDICATED AND SHALL BE LOCATED IN CONSULTATION WITH THE CONTRACTING OFFICER'S REPRESENTATIVE TO AVOID INTERFERENCE WITH OR BY OTHER EQUIPMENT.

9. LAMPS AND FIXTURES CONNECTED TO DIMMING BALLASTS/DRIVERS SHALL BE OPERATED AT FULL OUTPUT FOR NO LESS THAN 100 HOURS PRIOR TO DIMMING.

10. FIXTURES IDENTIFIED AS RATED FOR WET LOCATIONS SHALL BE ALLOWED TO UTILIZE A UL LISTED DAMP LOCATION EMERGENCY BATTERY BALLAST/DRIVER WHERE INDICATED IN THE SCHEDULE REMARKS COLUMN.

11. ALL REFERENCES TO SPACING AND MOUNTING HEIGHTS ARE MEASURED FROM THE FIXTURE CENTERLINE UNLESS OTHERWISE NOTED.

12. ALL EMERGENCY AND EXIT FIXTURES SHALL BE SELF-TESTING, SELF-DIAGNOSTIC TYPE.

13. FIXTURE QUANTITIES LISTED IN SCHEDULES ARE PROVIDED AS A COURTESY BASED ON THE LAYOUT AT TIME OF AWARD. CONTRACTOR IS RESPONSIBLE FOR VERIFYING QUANTITIES BASED ON THE FIXTURES SHOWN ON THE LIGHTING PLANS.

US Army Corps of Engineers ®

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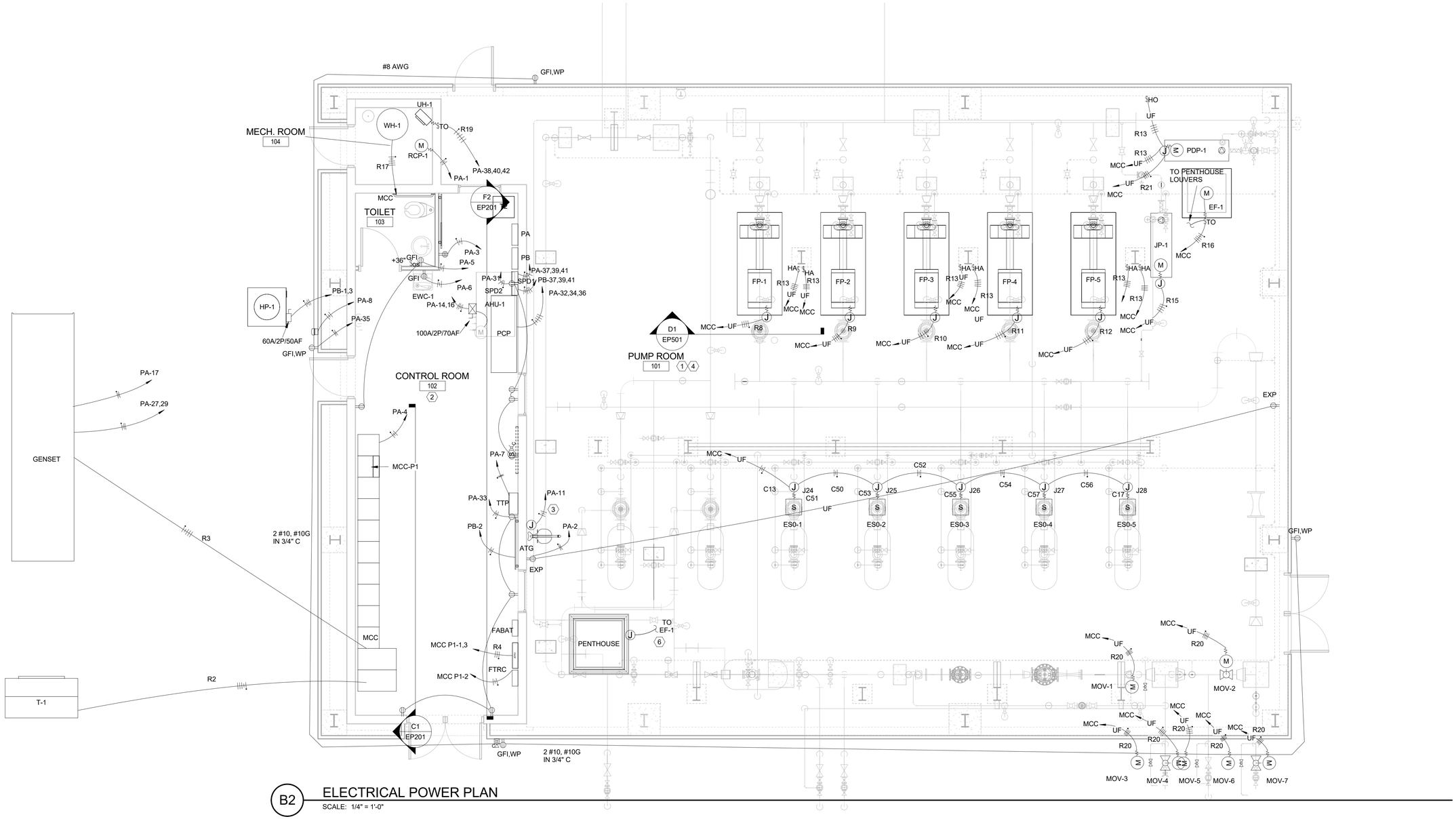
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

LIGHT FIXTURE SCHEDULE

SHEET ID

EL601



B2 ELECTRICAL POWER PLAN

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

SUPPLEMENTAL POWER LEGEND:

H	VIBRATING HORN, 100 dB AT 10 FEET	S	SOLENOID OPERATOR ON VALVE
H	RESONATING HORN, 100 dB AT 10 FEET WITH SOUND DISTINCT FROM VIBRATING HORN	-WW-	FLEXIBLE CONDUIT
	JUMBO MUSHROOM PUSHBUTTON STATION, 1-NC MOMENTARY CONTACT, MOUNT AT 6' AFF	J	JUNCTION BOX OR CONDULET PER N.E.C.
PIT 1	PRESSURE INDICATING TRANSMITTER	R1, C1, J1	POWER, CONTROL, JUNCTION BOX LABELS PER CONDUIT AND CABLE SCHEDULES ON SHEET EP604
DPT 1	DIFFERENTIAL PRESSURE TRANSMITTER	T	TELEPHONE SYSTEM BELL/STROBE LIGHT
PS 1	PRESSURE SENSOR	S_{HA}	KEYED HAND-AUTO SELECTOR SWITCH AND RUN LIGHT (SEE KEYED NOTE 5)
		EPDS	EMERGENCY POWER DOWN STATION
		FS	FLOW SWITCH
		EXP	HAZARDOUS AREA RATED

KEYED NOTES:

1.THE ENTIRE VOLUME UNDER THE PUMP HOUSE SHELTER EXCEPT THE VOLUME INSIDE THE CONTROL ROOM, MECHANICAL ROOM, AND TOILET ROOM SHALL BE CONSIDERED A CLASS 1, DIVISION 1 GROUP D, (T3 392 F), HAZARDOUS LOCATION. ALL ELECTRICAL EQUIPMENT INSTALLED WITHIN THE HAZARDOUS AREA SHALL BE SPECIFICALLY APPROVED BY UL OR FACTORY MUTUAL FOR THE ABOVE HAZARDOUS AREA CLASSIFICATION.

2. EACH CONDUIT ORIGINATING IN OR PASSING THROUGH OR UNDER A HAZARDOUS AREA AND PENETRATING CONTROL ROOM WALLS, ROOF, OR FLOOR SHALL HAVE EXPLOSION PROOF SEALING FITTINGS INSTALLED IN THE INTERIOR OF THE CONTROL ROOM PER NFPA 70 ARTICLE 501.15.

3. CONNECTION FOR EYE WASH/SHOWER AND HOSE BIB HEAT TAPE. 500 WATTS WITH INTEGRAL THERMOSTAT.

4. A MEANS SHALL BE PROVIDED FOR THE FUTURE REMOVAL OF EQUIPMENT WITHOUT THE TURNING OR REMOVAL OF CONDUIT IN HAZARDOUS LOCATIONS. THIS MAY BE ACCOMPLISHED BY THE INSTALLATION OF AN APPROPRIATE EXPLOSION PROOF UNION AT OR NEAR THE CONDUIT ENTRANCE TO THE ENCLOSURE. UNION SHALL BE RATED FOR THE HAZARDOUS CLASSIFICATION LISTED ABOVE.

5. KEYED HAND-AUTO SWITCH WILL BE KEYED ALIKE WITH THE CORRESPONDING KEYED HOA SWITCH IN THE MCC. SEE SHEET EP602.

6. SUPPLY POWER FROM SPARE CIRCUIT IN PANELBOARD.

GENERAL NOTES:

1. CONDUIT AND CABLE SCHEDULE IS LOCATED ON SHEET EP604.

2. ALL METALLIC CONDUITS THAT ARE NOT ATTACHED TO A GROUNDED PANEL OR ENCLOSURE SHALL BE GROUNDED USING A GROUNDED BUSHING.

DESIGNER NOTES:

1. IF A PUMP SHELTER IS TO BE DESIGNED, RATHER THAN A PUMP HOUSE, DELETE THE PUMP ROOM EXHAUST FAN.

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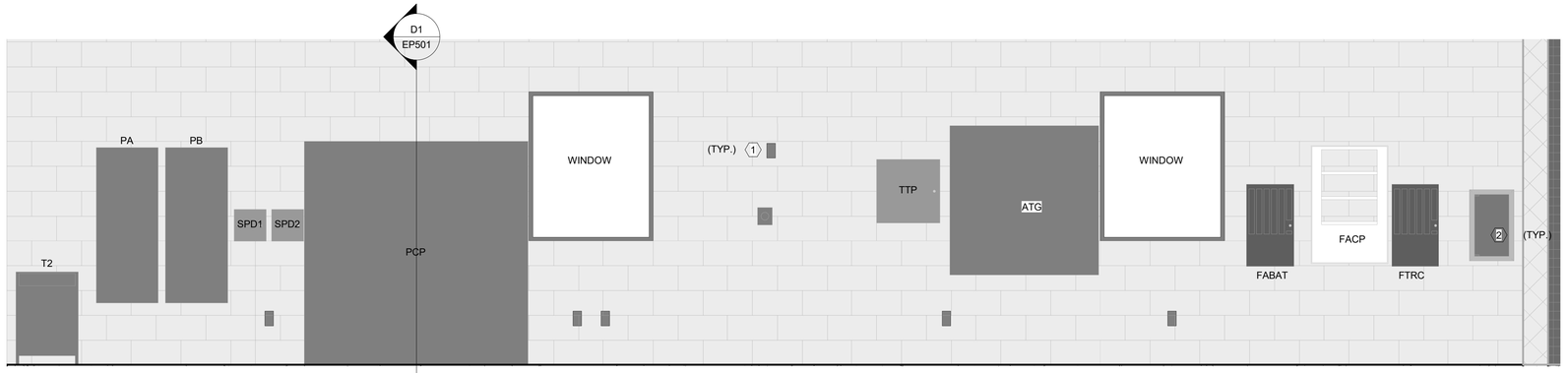
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

POWER PLAN

SHEET ID

EP101



F2 CONTROL ROOM ELEVATION

SCALE: 1/2" = 1'-0"

C1 MCC SECTION

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

C7 MCC INCOMING MAIN SIDE ELEVATION

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

C9 MCC SIDE ELEVATION

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

KEYNOTES:

1. COORDINATE ALL DEDICATED RECEPTACLES WITH ACTUAL FINAL EQUIPMENT LOCATIONS.

2. CONTRACTOR SHALL VERIFY ALL ELECTRICAL EQUIPMENT LOCATIONS WITH OTHER CRAFTS. IF CONFLICTS ARISE, CONTACT THE COR IMMEDIATELY.

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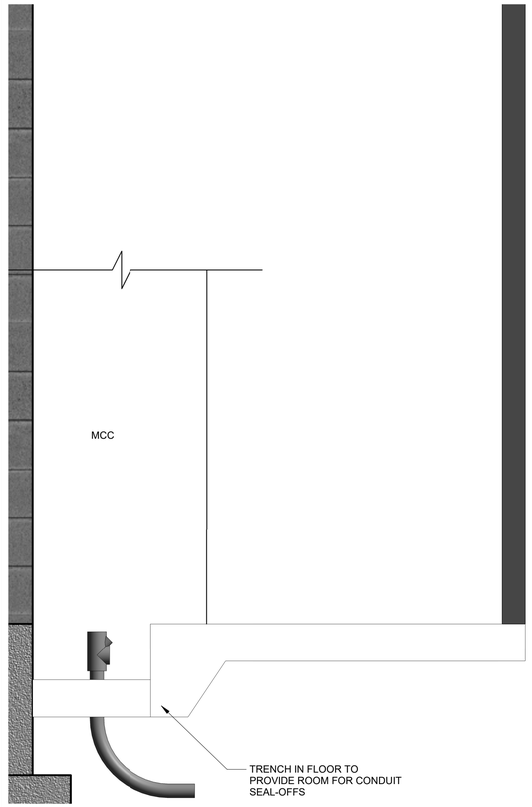
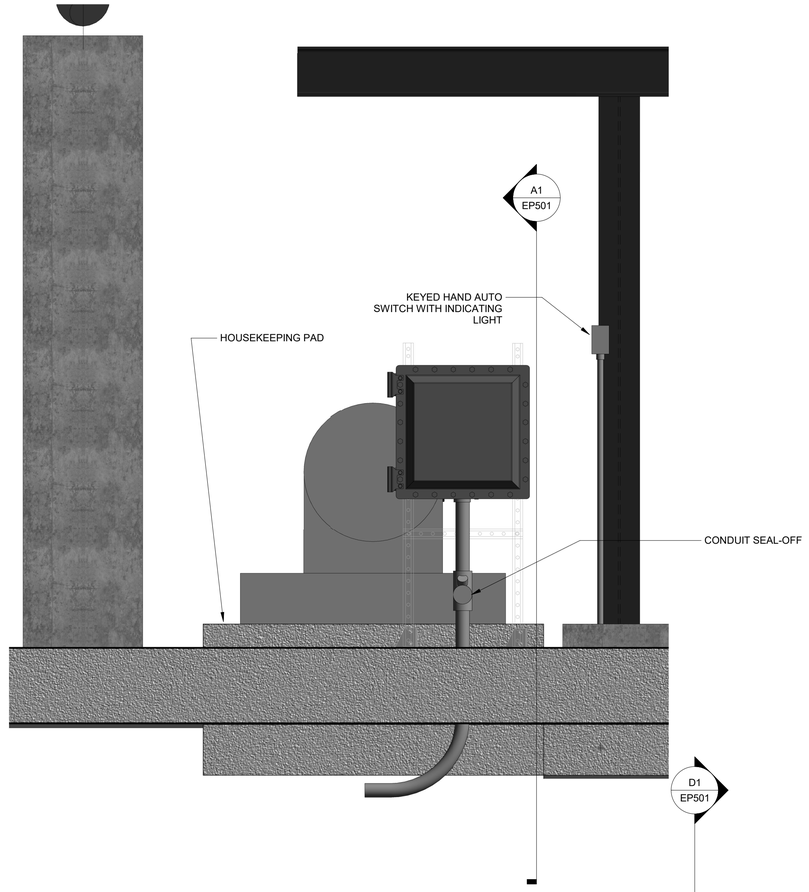
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL ELEVATIONS

SHEET ID

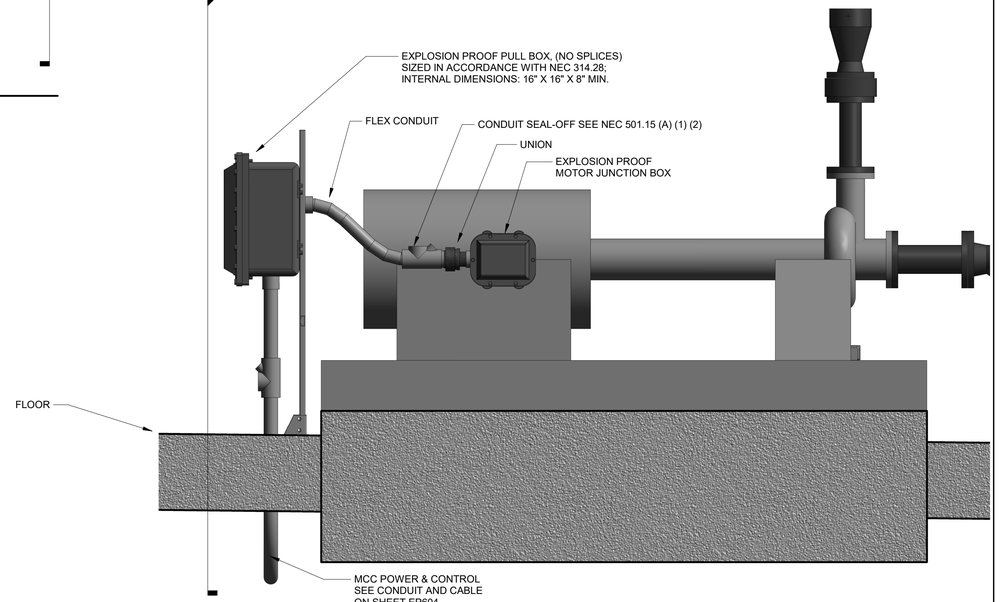
EP201





D1 MOTOR CONNECTION DETAIL

SCALE: NTS



A1 MOTOR CONNECTION DETAIL 2

SCALE: NTS

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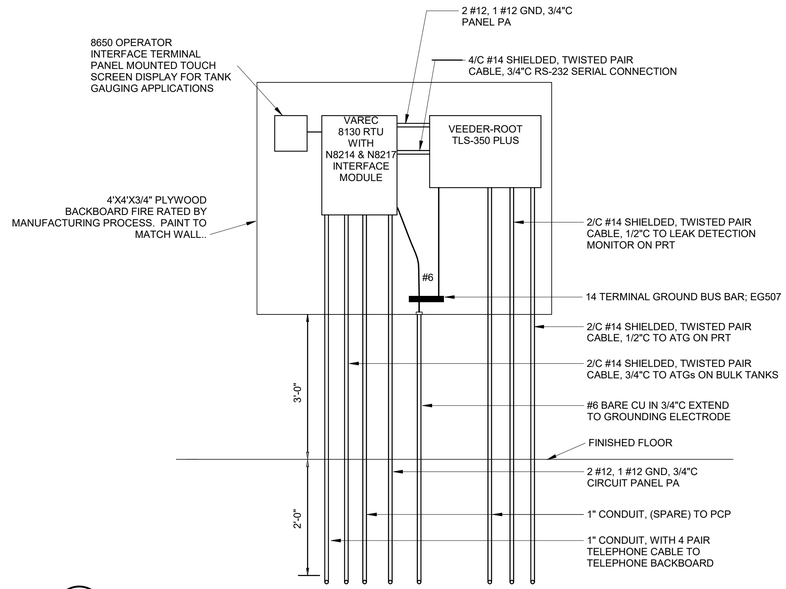
DOD STANDARD DESIGN A/V 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL DETAILS SHEET 1

SHEET ID

EP501



E2 ATG BACKBOARD

SCALE: NTS

THE RTU AND PANEL MONITOR ARE PROVIDED BY SPEC
SECT. 33 52 43.11. ALL CONDUIT FOR ATG SYSTEM SHALL BE RIGID
STEEL, (GALVANIZED ABOVEGROUND AND PVC COATED UNDERGROUND).
THE ATG SYSTEM FOR THE BULK TANKS SHALL BE ENRAF 854 TYPE.
THE ATG SYSTEM FOR THE PRT SHALL BE VEEDER-ROOT TLS-350 PLUS TYPE.

DESIGNER NOTES:

1. IF ANOTHER TYPE OF ATG SYSTEM IS TO BE USED INSTEAD OF THE ENRAF TYPE, THIS DETAIL SHOULD BE MODIFIED TO SHOW THE APPROPRIATE REQUIREMENTS FOR THAT TYPE OF ATG SYSTEM.

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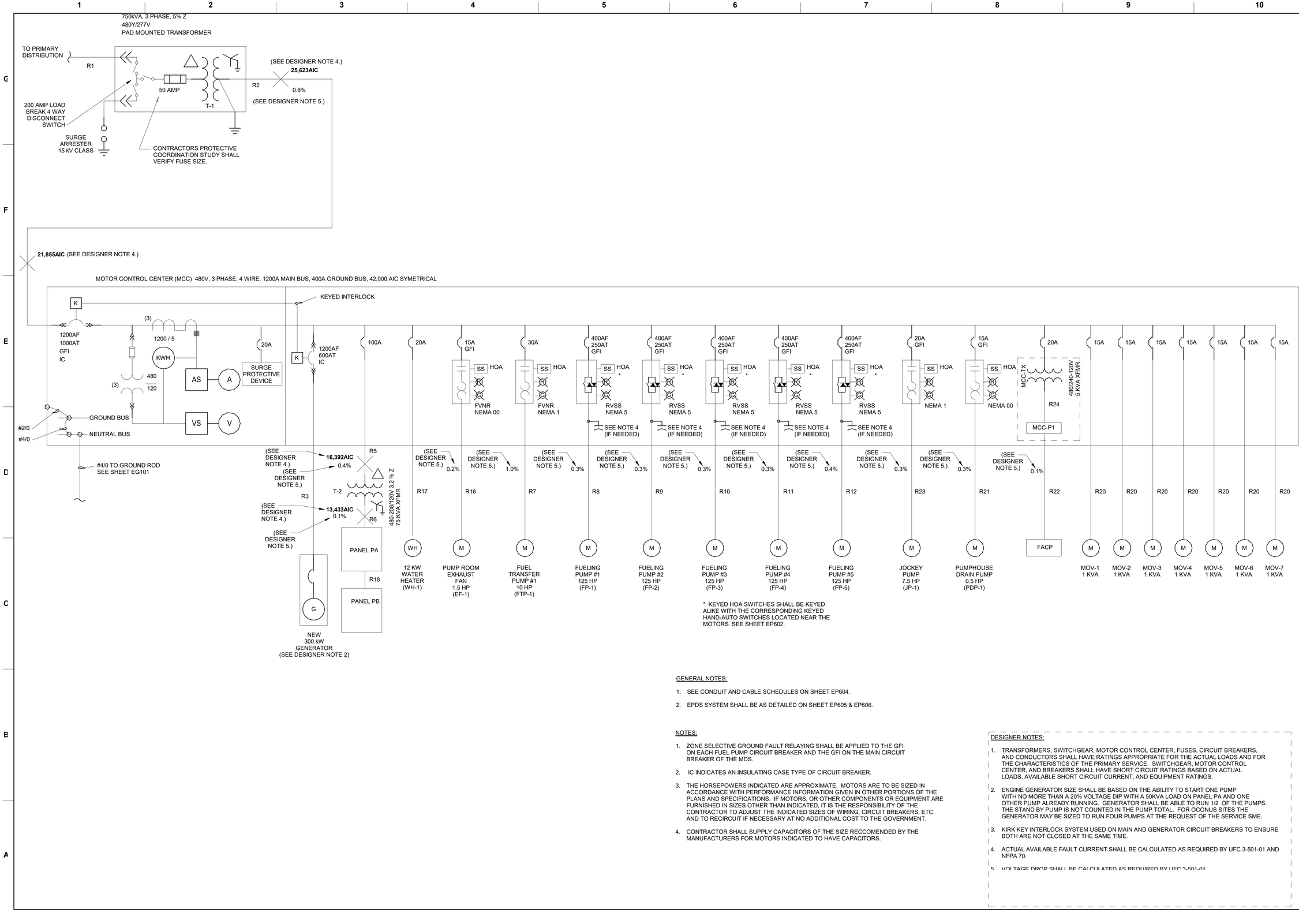
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-2428 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ATG BACKBOARDS

SHEET ID

EP502



GENERAL NOTES:

1. SEE CONDUIT AND CABLE SCHEDULES ON SHEET EP604.
2. EPDS SYSTEM SHALL BE AS DETAILED ON SHEET EP605 & EP606.

NOTES:

1. ZONE SELECTIVE GROUND FAULT RELAYING SHALL BE APPLIED TO THE GFI ON EACH FUEL PUMP CIRCUIT BREAKER AND THE GFI ON THE MAIN CIRCUIT BREAKER OF THE MDS.
2. IC INDICATES AN INSULATING CASE TYPE OF CIRCUIT BREAKER.
3. THE HORSEPOWERS INDICATED ARE APPROXIMATE. MOTORS ARE TO BE SIZED IN ACCORDANCE WITH PERFORMANCE INFORMATION GIVEN IN OTHER PORTIONS OF THE PLANS AND SPECIFICATIONS. IF MOTORS, OR OTHER COMPONENTS OR EQUIPMENT ARE FURNISHED IN SIZES OTHER THAN INDICATED, IT IS THE RESPONSIBILITY OF THE CONTRACTOR TO ADJUST THE INDICATED SIZES OF WIRING, CIRCUIT BREAKERS, ETC. AND TO RECIRCUIT IF NECESSARY AT NO ADDITIONAL COST TO THE GOVERNMENT.
4. CONTRACTOR SHALL SUPPLY CAPACITORS OF THE SIZE RECCOMENDED BY THE MANUFACTURERS FOR MOTORS INDICATED TO HAVE CAPACITORS.

DESIGNER NOTES:

1. TRANSFORMERS, SWITCHGEAR, MOTOR CONTROL CENTER, FUSES, CIRCUIT BREAKERS, AND CONDUCTORS SHALL HAVE RATINGS APPROPRIATE FOR THE ACTUAL LOADS AND FOR THE CHARACTERISTICS OF THE PRIMARY SERVICE. SWITCHGEAR, MOTOR CONTROL CENTER, AND BREAKERS SHALL HAVE SHORT CIRCUIT RATINGS BASED ON ACTUAL LOADS, AVAILABLE SHORT CIRCUIT CURRENT, AND EQUIPMENT RATINGS.
2. ENGINE GENERATOR SIZE SHALL BE BASED ON THE ABILITY TO START ONE PUMP WITH NO MORE THAN A 20% VOLTAGE DIP WITH A 50KVA LOAD ON PANEL PA AND ONE OTHER PUMP ALREADY RUNNING. GENERATOR SHALL BE ABLE TO RUN 1/2 OF THE PUMPS. THE STAND BY PUMP IS NOT COUNTED IN THE PUMP TOTAL. FOR OCONUS SITES THE GENERATOR MAY BE SIZED TO RUN FOUR PUMPS AT THE REQUEST OF THE SERVICE SME.
3. KIRK KEY INTERLOCK SYSTEM USED ON MAIN AND GENERATOR CIRCUIT BREAKERS TO ENSURE BOTH ARE NOT CLOSED AT THE SAME TIME.
4. ACTUAL AVAILABLE FAULT CURRENT SHALL BE CALCULATED AS REQUIRED BY UFC 3-501-01 AND NFPA 70.
5. VOLTAGE DROP SHALL BE CALCULATED AS REQUIRED BY UFC 3-501-01

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DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

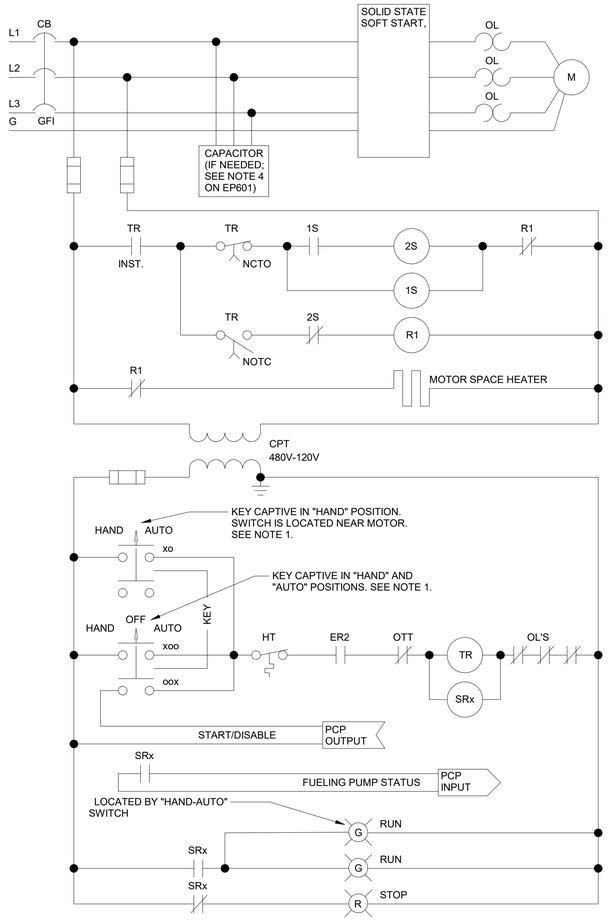
ONE LINE DIAGRAM

SHEET ID

EP601

SUPPLEMENTAL LEGEND:

CR	CONTROL RELAY
DM	DAMPER MOTOR
ER	EMERGENCY/SAFTEY SYSTEM RELAY
HT	MOTOR HIGH TEMPERATURE
MC	MOTOR CONTROLLER
MCP	MOTOR CIRCUIT PROTECTOR
OTT	OVER TEMPERATURE THERMOSTAT
ON	AUTOTRANSFORMER
SR	STATUS RELAY
TR	TIMER RELAY
EPDS	EMERGENCY POWER DOWN STATION
PCP	PUMP CONTROL PANEL
FCC	FUELS CONTROL CENTER
ESO	EMERGENCY SHUTOFF VALVE



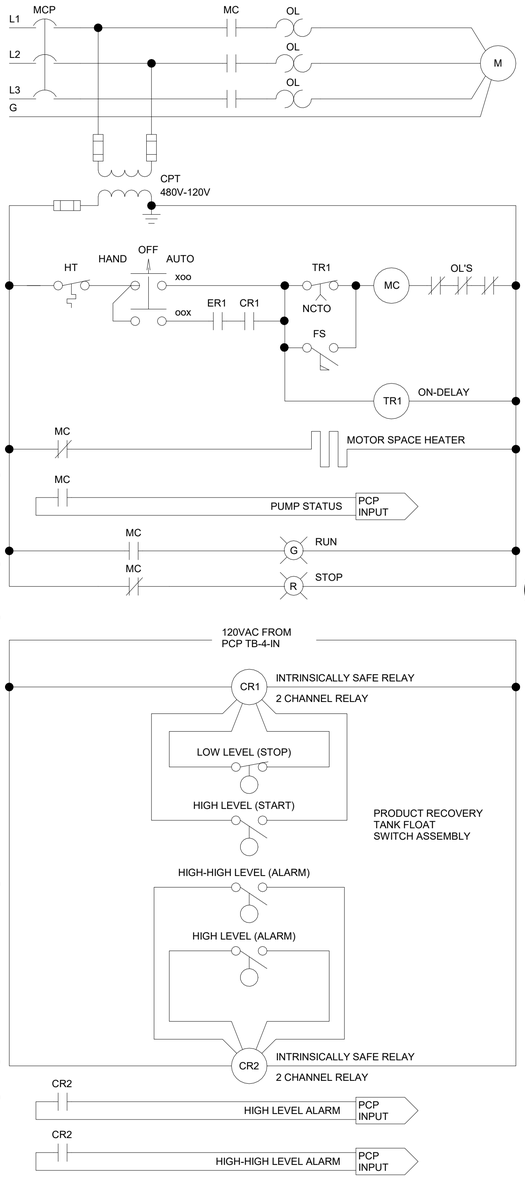
TYPICAL FUELING PUMP (FP-x)

x = 1 FOR FP-1
x = 2 FOR FP-2
x = 3 FOR FP-3
x = 4 FOR FP-4
x = 5 FOR FP-5

NOTES:

1. KEYED LOCKS FOR LOCAL HAND-AUTO SWITCHES AND CORRESPONDING MCC HOA SWITCHES SHALL BE KEYED ALIKE. KEYED LOCKS FOR HAND-AUTO SWITCHES AND NON-CORRESPONDING MCC HOA SWITCHES SHALL NOT BE KEYED ALIKE.

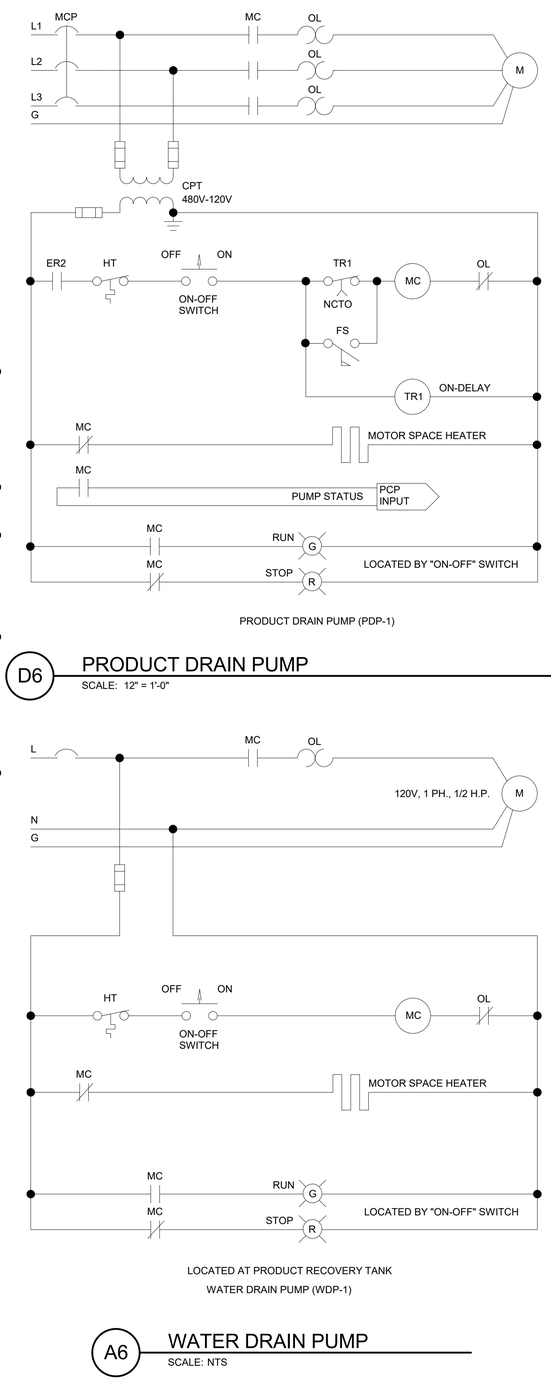
A1 TYPICAL FUEL PUMP
SCALE: NTS



FUELING TRANSFER PUMP (FTP-1)

LOCATED AT PRODUCT RECOVERY TANK

A4 TYPICAL FUEL TRANSFER PUMP
SCALE: NTS

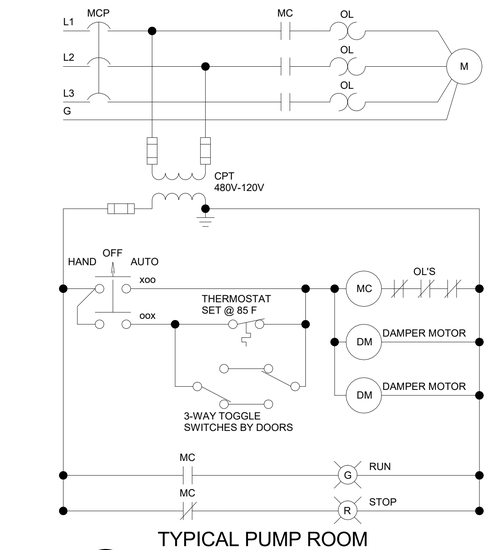


PRODUCT DRAIN PUMP (PDP-1)

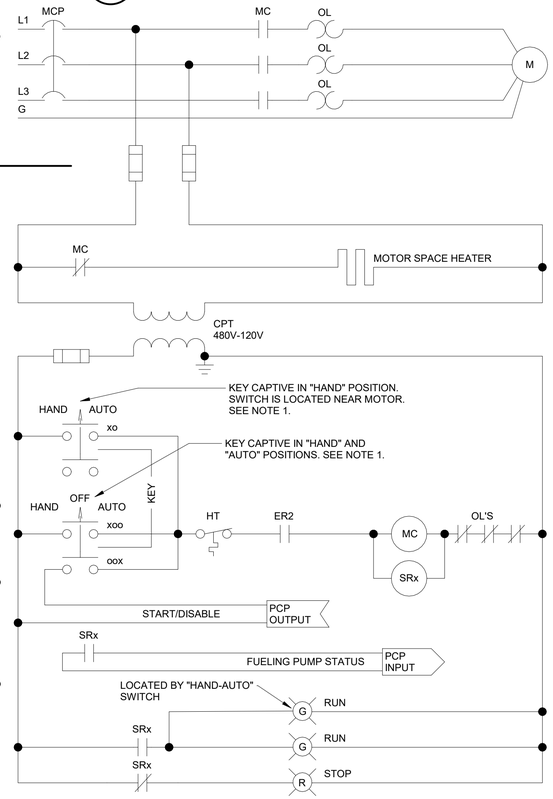
D6 PRODUCT DRAIN PUMP
SCALE: 12" = 1'-0"

LOCATED AT PRODUCT RECOVERY TANK
WATER DRAIN PUMP (WDP-1)

A6 WATER DRAIN PUMP
SCALE: NTS



E8 TYPICAL PUMP ROOM EXHAUST FAN (EF-1)
SCALE: NTS



JOCKEY PUMP (JP-1)

A8 TYPICAL JOCKEY PUMP
SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

WIRING DIAGRAMS

SHEET ID

EP602

MECHANICAL EQUIPMENT - ELECTRICAL CONNECTION SCHEDULE

	KVA	DESCRIPTION	LOCATION	VOLTS	PH	FLA	APPROX. HP	PKG UNIT	NEMA ENCL.	DISCONNECT TYPE	DISCONNECT SIZE	DISCONNECT FUSE	STARTER TYPE	STARTER SIZE	POWER FACTOR CORRECTION SEE DESIGNER NOTE 1	SOURCE	CIRCUIT	SUPPLY CIRCUIT	REMARKS
AHU-1	11,440 VA	AIR HANDLING UNIT	CONTROL ROOM #102	208 V	1	44.0 A	7.50 hp	Yes	1	FUSED	100A	70A	FVNR	1	-	PA	14,16	NOTE 3	NOTE 4
EF-1	2,390 VA	EXHAUST FAN #1	PUMPROOM #101	460 V	3	3.0 A	3.00 hp	No	-	-	-	-	FVNR	1	-	MCC	NOTE 2	NOTE 3	NOTE 4 FOR PENTHOUSE
EF-2	500 VA	BATHROOM EXHAUST FAN	TOILET ROOM #103	115 V	1	4.4 A	0.06 hp	No	-	-	-	-	-	-	-	PA	9	2-#12AWG, 1 -#12 GND	SWITCHED WITH LIGHT SWITCH; NOTE 4
FP-1	124,290 VA	FUEL PUMP #1	PUMPROOM #101	460 V	3	156.0 A	125.00 hp	No	-	-	-	-	SS	5	17.5 kVAR	MCC	NOTE 2	NOTE 3	
FP-2	124,290 VA	FUEL PUMP #2	PUMPROOM #101	460 V	3	156.0 A	125.00 hp	No	-	-	-	-	SS	5	17.5 kVAR	MCC	NOTE 2	NOTE 3	
FP-3	124,290 VA	FUEL PUMP #3	PUMPROOM #101	460 V	3	156.0 A	125.00 hp	No	-	-	-	-	SS	5	17.5 kVAR	MCC	NOTE 2	NOTE 3	
FP-4	124,290 VA	FUEL PUMP #4	PUMPROOM #101	460 V	3	156.0 A	125.00 hp	No	-	-	-	-	SS	5	17.5 kVAR	MCC	NOTE 2	NOTE 3	
FP-5	124,290 VA	FUEL PUMP #5	PUMPROOM #101	460 V	3	156.0 A	125.00 hp	No	-	-	-	-	SS	5	17.5 kVAR	MCC	NOTE 2	NOTE 3	
FTP-1	11,150 VA	FUEL TRANSFER PUMP	EXTERIOR LOCATION	460 V	3	14.0 A	10.00 hp	No	-	-	-	-	FVNR	1	-	MCC	NOTE 2	NOTE 3	
HP-1	8,010 VA	HEAT PUMP	CONTROL ROOM #102	208 V	1	30.8 A	5.00 hp	Yes	4	FUSED	60A	50A	FVNR	1	-	PB	1,3	NOTE 3	
JP-1	9,140 VA	JOCKEY PUMP	PUMPROOM #101	460 V	3	11.0 A	7.50 hp	No	-	-	-		FVNR	1	-	MCC	NOTE 2	NOTE 3	
PDP-1	880 VA	PDP-1	PUMPROOM #101	460 V	3	1.1 A	0.50 hp	No	-	-	-		FVNR	1	-	MCC	NOTE 2	NOTE 3	
RCP-1	50 VA	RECIRCULATING PUMP	MECHANICAL ROOM #104	115 V	1	0.7 A	0.06 hp	No	-	-	-	-	-	-	-	PA	1	2-#12AWG, 1 -#12 GND	
WDP-1	1,130 VA	WATER DRAIN PUMP	EXTERIOR LOCATION	115 V	1	9.8 A	0.50 hp	No	-	-	-	-	FVNR	0	-	PA	10	NOTE 3	
WH-1	12,000 VA	WATER HEATER	MECHANICAL ROOM #104	480 V	3	25.0 A	0.00 hp	No	-	-	-	-	-	-	-	MCC	NOTE 2	NOTE 3	

DESIGNER NOTES:

1. SEE UFC 3-520-01 FOR CAPACITIVE CORRECTION. THIS DESIGN IS BASED ON 0.95 pf CORRECTION, CONTRACTOR SHALL SUPPLY CAPCITORS OF THE SIZE RECOMMENDED BY MANUFACTURER OF MOTORS.

NOTES:

1. COORDINATE WITH FINAL ELECTRICAL CONNECTIONS, CONDUCTORS, RACEWAY, CIRCUIT BREAKER FRAME AND TRIP, STARTER SIZE AND TYPE, DISCONNECTING, STARTER, DEVICES AND SIZES, (AS APPLICABLE) WITH ACTUAL EQUIPMENT PROVIDED.

2. SEE ONE-LINE FOR FURTHER CIRCUIT INFORMATION AND REQUIREMENTS.

3. SEE CONDUIT AND CABLE SCHEDULE,(POWER), FOR FURTHER INFORMATION AND REQUIREMENTS.

4. POWER FOR MOTORIZED DAMPER MOTOR(S) IS FROM CIRCUIT PB-5.

Branch Panel: PA

Location: CONTROL ROOM 102
Supply From: T2, 0 V/480 V, Three Phase, 3 Wires, Delta
Mounting: Surface
Enclosure: Type 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
Sections: 1
Fault Duty (Min.): 22,000
Mains Type: MCB
Frame Rating: 225 A
MCB Rating: 200 A

Notes:

CKT	LOAD	LT	CB	P	A		B		C		P	CB	LT	LOAD	CKT
1	RCP-1	M...	15 A	1	45 VA	400 VA					1	20 A	R...	PUMPROOM RECPT.	2
3	COMMUNICATION RECPT.	R...	20 A	1			500 VA	500 VA			1	20 A	O...	EPDS CIRCUIT	4
5	CONTROL ROOM RECPT. #1	R...	20 A	1					400 VA	560 VA	1	20 A	R...	EWC-1	6
7	TIGHTNESS TESTING PANEL	O...	20 A	1	700 VA	1000 VA					1	20 A	O...	TELEPHONE RINGER	8
9	CONTROL ROOM, MECH & BATHROOM LIGHTS	L...	20 A	1			850 VA	1127 VA			1	20 A	M...	WDP-1	10
11	HEAT TRACE EYEWASH	O...	20 A	1					1000 VA	1550 VA	1	20 A	LE...	EXTERIOR SITE LIGHT CIRCUIT #2	12
13	PUMPHOUSE LIGHTS #3	L...	20 A	2	87 VA	5720 VA					2	80 A	M...	AHU-1	14
15	--	--	--	--			87 VA	5720 VA			--	--	--	--	16
17	GENSET BLOCK HEATER	O...	20 A	1					2500 VA	73 VA	2	20 A	L...	PUMPHOUSE LIGHTS #2	18
19	EXTERIOR SITE LIGHT CIRCUIT #1	LE...	20 A	2	620 VA	73 VA					--	--	--	--	20
21	--	--	--	--			620 VA	78 VA			2	20 A	LE...	BUILDING DOOR EXTERIOR LIGHTS	22
23	PUMPHOUSE LIGHTS #1	L...	20 A	2					84 VA	78 VA	--	--	--	--	24
25	--	--	--	--	73 VA	16517 VA					3	100 A	LE...	PB	26
27	GENSET BATTER CHARGER	O...	20 A	2			500 VA	14567 VA			--	--	--	--	28
29	--	--	--	--					500 VA	11833 VA	--	--	--	--	30
31	CONTROL ROOM RECPT. #2	R...	20 A	1	800 VA	1000 VA					3	20 A	O...	PCP	32
33	CONTROL ROOM RECPT. #3	R...	20 A	1			800 VA	1000 VA			--	--	--	--	34
35	EXTERIOR RECPT.	R...	20 A	1					800 VA	1000 VA	--	--	--	--	36
37	SPD	Po...	20 A	3	333 VA	1000 VA					3	20 A	M...	UH-1	38
39	--	--	--	--			333 VA	1000 VA			--	--	--	--	40
41	--	--	--	--					333 VA	1000 VA	--	--	--	--	42
			Total Load:		28173 VA		27443 VA		21519 VA						
			Total Amps:		242 A		236 A		179 A						

Legend:

Load Classification		Connected Load	Demand Factor	Estimated Demand	Panel Totals	
L	Lighting	826 VA	125.00%	1032 VA		
LE	Lighting - Exterior	3877 VA	125.00%	4846 VA	**Total Conn. Load:**	68141 VA
LM	Largest Motor	19448 VA	114.71%	22308 VA	**Total Est. Demand:**	55616 VA
M	Motor	3413 VA	80.00%	2731 VA	**Total Conn. Current:**	189 A
R	Receptacle	4260 VA	100.00%	4260 VA	**Total Est. Demand Current:**	154 A
Spare		31300 VA	50.00%	15650 VA		
Other		0 VA	0.00%	0 VA		
O	Other	3880 VA	100.00%	3880 VA		

Notes:

Branch Panel: PB

Location: CONTROL ROOM 102
Supply From: PA
Mounting: Surface
Enclosure: Type 1
Volts: 120/208 Wye
Phases: 3
Wires: 4
Sections: 1
Fault Duty (Min.): 12,000
Mains Type: MLO
Frame Rating: 100 A
MCB Rating: 0 A

Notes:

CKT	LOAD	LT	CB	P	A		B		C		P	CB	LT	LOAD	CKT
1	HP-1	M...	50 A	2	4004 VA	180 VA					1	20 A	O...	ATG	2
3	--	--	--	--			4004 VA	930 VA			1	20 A	LE...	EXTERIOR LIGHT CIRCUIT #3	4
5	MOTORIZED DAMPERS HVAC	M...	20 A	1					500 VA	1000 VA	1	20 A	--	SPARE	6
7	SPARE	--	20 A	1	1000 VA	1000 VA					1	20 A	--	SPARE	8
9	SKULLY	O...	20 A	1			1000 VA	1000 VA			1	20 A	--	SPARE	10
11	SPARE	--	20 A	1					1000 VA	1000 VA	1	20 A	--	SPARE	12
13	SPARE	--	20 A	1	1000 VA	4300 VA					3	30 A	--	SPARE	14
15	SPARE	--	20 A	1			1000 VA	4300 VA			--	--	--	--	16
17	SPARE	--	20 A	1					1000 VA	4300 VA	--	--	--	--	18
19	SPARE	--	20 A	1	1000 VA	1000 VA					1	20 A	--	SPARE	20
21	SPARE	--	20 A	1			1000 VA	1000 VA			1	20 A	--	SPARE	22
23	SPARE	--	20 A	1					1000 VA	1700 VA	2	20 A	--	SPARE	24
25	SPARE	--	20 A	1	1000 VA	1700 VA					--	--	--	--	26
27	SPACE ONLY	--	--	--			0 VA	0 VA			--	--	--	SPACE ONLY	28
29	SPACE ONLY	--	--	--					0 VA	0 VA	--	--	--	SPACE ONLY	30
31															32
33															34
35															36
37	SPD	O...	20 A	3	333 VA										38
39	--	--	--	--			333 VA								40
41	--	--	--	--					333 VA						42
			Total Load:		16517 VA		14567 VA		11833 VA						
			Total Amps:		141 A		125 A		99 A						

Legend:

Load Classification		Connected Load	Demand Factor	Estimated Demand	Panel Totals	
LE	Lighting - Exterior	930 VA	125.00%	1163 VA		
LM	Largest Motor	8008 VA	125.00%	10010 VA	**Total Conn. Load:**	41918 VA
M	Motor	500 VA	80.00%	400 VA	**Total Est. Demand:**	28403 VA
Spare		31300 VA	50.00%	15650 VA	**Total Conn. Current:**	116 A
O	Other	1180 VA	100.00%	1180 VA	**Total Est. Demand Current:**	79 A

Notes:

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

SCHEDULE SHEET

SHEET ID

EP603

CONDUIT AND CABLE SCHEDULE (POWER)									
CKT NO	CIRCUIT		CONDUIT		CONDUCTORS PER CONDUIT				NOTES
	FROM	TO	QTY	SIZE	QTY	SIZE	GND	TYPE	
R1	PRIMARY DISTRIBUTION	T-1 PRIMARY	2	4"	3	1 (15kV)		XLP	1 SPARE 4" CONDUIT
R2	T-1 SECONDARY	MCC	4	4"	4	500		THWN	1 SPARE 4" CONDUIT
R3	MCC	GENERATOR	2 1	4" 2"	4	250	2	THWN TW	POWER CONDUCTORS SEE NOTE #1
R4	MCC-P1	FACP	1	1/2 "	2	12	12	THWN	DEDICATED FIRE ALARM CIRCUIT
R5	MCC	T-2 PRIMARY	1	1 1/2 "	3	1/0	6	THWN	
R6	T-2 SECONDARY	PANEL PA	1	3"	4	250	2	THWN	
R7	MCC	FTP-1	1	1 1/2 "	3 11	10 12	10	TW TW	MOTOR HEATER & CONTROLS
R8	MCC	FP-1	1	2"	3 4	3/0 12	3	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R9	MCC	FP-2	1	2"	3 4	3/0 12	3	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R10	MCC	FP-3	1	2"	3 4	3/0 12	3	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R11	MCC	FP-4	1	2"	3 4	3/0 12	3	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R12	MCC	FP-5	1	2"	3 4	3/0 12	3	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R13	MCC	HA SWITCH & LIGHT	1	3/4 "	4	12		TW	CONTROLS
R14	PANEL PA	WDP-1	1	3/4 "	2	10	10	THWN	TO HO SWITCH & LIGHT
R15	MCC	JOCKEY PUMP	1	3/4 "	3 4	12 12	12	THWN TW	MOTOR HEATER & HIGH TEMP. SW
R16	MCC	PUMP ROOM EXHAUST FAN	1	3/4 "	3	12	12	TW	CONDUIT SIZE AND CONTROL CONDUCTORS AS REQUIRED
R17	MCC	WATER HEATER	1	3/4 "	3	12	12	TW	
R18	PANEL PA	PANEL PB	1	1 1/2 "	4	2	2	THWN	
R19	PANEL PA	UNIT HEATER	1	1/2 "	3	12	12	TW	
R20	MCC	MOV-#	1	1/2 "	3	12	12	TW	
R21	MCC	PDP-1	1	3/4 "	3 4	12 12	12	THWN TW	MOTOR HEATER & HIGH TEMP. SW

NOTES:

1. PROVIDE CONDUCTORS FOR SITE SPECIFIC GENERATOR AUXILLARY EQUIPMENT AS REQUIRED.

Switchboard: MCC

Location: CONTROL ROOM 102
Supply From: SERVICE XFMR
Mounting: FLOOR
Enclosure: Type 1

Volts: 480 Three
Phases: 3
Wires: 3

Fault Duty (Min.): 22,000
Mains Type:
Frame Rating:
MCB Rating:

Notes:

CKT	LOAD	P	FRAME	CB	A	B	C	REMARKS
1	FP-1	3	400 A	400 A	41430 VA	41430 VA	41430 VA	
2	FP-2	3	400 A	400 A	41430 VA	41430 VA	41430 VA	
3	FP-3	3	400 A	400 A	41430 VA	41430 VA	41430 VA	
4	FP-4	3	400 A	400 A	41430 VA	41430 VA	41430 VA	
5	FP-5	3	400 A	400 A	41430 VA	41430 VA	41430 VA	
6	JP-1	3	150 A	20 A	3047 VA	3047 VA	3047 VA	
7	T2	3	150 A	20 A	28173 VA	27443 VA	21519 VA	
8	WH-1	3	150 A	20 A	4000 VA	4000 VA	4000 VA	
9	MOV-1	3	150 A	15 A	333 VA	333 VA	333 VA	
10	MOV-2	3	150 A	15 A	333 VA	333 VA	333 VA	
11	MOV-7	3	150 A	15 A	333 VA	333 VA	333 VA	
12	MOV-3	3	150 A	15 A	333 VA	333 VA	333 VA	
13	MOV-5	3	150 A	15 A	333 VA	333 VA	333 VA	
14	MOV-6	2	150 A	15 A	333 VA	333 VA		
15	MOV-4	3	150 A	15 A	333 VA	333 VA	333 VA	
16	EF-1	3	150 A	15 A	797 VA	797 VA	797 VA	
17	MCC-TX	2	150 A	20 A	2500 VA	2500 VA		
18	FTP-1	3	150 A	30 A	3718 VA	3718 VA	3718 VA	
19	SPD 480V	3	150 A	20 A	250 VA	250 VA	250 VA	
20	SPACE ONLY	--	--	--	0 VA			--
				Total Connected Load:	248845 VA	248298 VA	240091 VA	
				Total Amps:	903 A	901 A	866 A	

Legend:

Load Classification		Connected Load	Demand Factor	Estimated Demand	Panel Totals	
L	Lighting	826 VA	125.00%	1032 VA		
LE	Lighting - Exterior	3877 VA	125.00%	4846 VA	**Total Conn. Load:**	723626 VA
LM	Largest Motor	150916 VA	121.89%	183953 VA	**Total Est. Demand:**	639137 VA
M	Motor	508722 VA	80.00%	406978 VA	**Total Conn. Current:**	870 A
R	Receptacle	4260 VA	100.00%	4260 VA	**Total Est. Demand Current:**	769 A
Spare		31300 VA	50.00%	15650 VA		
Other		0 VA	0.00%	0 VA		
O	Other	15880 VA	100.00%	15880 VA		

Notes:

CONDUIT AND CABLE SCHEDULE (CONTROL)									
CKT NO	CIRCUIT		CONDUIT		CONDUCTORS PER CONDUIT				NOTES
	FROM	TO	QTY	SIZE	QTY	SIZE	GND	TYPE	
C1	PCP	J1	1	1"	20	14		TW	
C2	J1	FS-1	1	1/2 "	4	14		TW	
C3	J1	J2	1	1"	16	14		TW	
C4	J2	FS-2	1	1/2 "	4	14		TW	
C5	J2	J3	1	1"	12	14		TW	
C6	J3	FS-3	1	1/2 "	4	14		TW	
C7	J3	J4	1	3/4 "	8	14		TW	
C8	J4	FS-4	1	1/2 "	4	14		TW	
C9	J4	J5	1	1/2 "	4	14		TW	
C10	J5	FS-5	1	1/2 "	4	14		TW	
C11	PCP	J6	1	1"	2	2/C 14		TC	SHIELDED CABLE
C12	J6	PIT-1 & PIT-2	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C13	PCP	J24	1	1/2 "	2	12	12	TW	
C14	PCP	J7	1	1"	2	2/C 14		TC	SHIELDED CABLE
C15	J7	DPT-1 & DPT-2	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C16	PCP	J8	1	1"	2	2/C 14		TC	SHIELDED CABLE
C17	J28	ESO-5	1	1/2 "	2	12	12	TW	EMERGENCY SHUT OFF
C18	PCP	J12	1	1"	2	2/C 14		TC	SHIELDED CABLE
C19	J12	PS1 OR PS2	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C20	J8	DPT-3	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C21	J8	DPT-4	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C22	PCP	PS3	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C23	PCP	J10	1	1"	12	14		TW	
C24	J10	BPCV-1 A&B	1	1/2 "	2	14		TW	
C25	J10	J11	1	3/4 "	8	14		TW	
C26	J11	D/FV-1 A & B	1	1/2 "	2	14		TW	
C27	J11	PCV A&B	1	1/2 "	2	14		TW	
C28	PCP	MCC	1	2"	40	14		TW	CONTROL, INCLUDES SPARES
C29	PCP	J20	1	1/2 "	2	14		TW	
C30	PCP	HORNS	1	1/2 "	4	14		TW	
C31	TIGHTNESS TEST PANEL	J14	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C32	J14	PIT-3	1	1/2 "	1	2/C 14		TC	SHIELDED CABLE
C33	PCP	J15	1	2"	20	14		TW	CONTROL, INCLUDES SPARES
C34	J15	LS1 THRU LS4	1	1/2 "	2	14		TW	
C35	J15	J16	1	1"	10	14		TW	CONTROL, INCLUDES SPARES
C36	J16	LS5 THRU LS8	1	1/2 "	2	14		TW	
C37	PCP	J17	1	1"	16	14		TW	CONTROL TO MOVS
C38	J17	MOVs	1	3/4 "	8	14		TW	CONTROL TO MOVS
C39	PCP	J18	1	2"	40	14		TW	CONTROL TO MOVS
C40	J18	MOVs	1	3/4 "	8	14		TW	CONTROL TO MOVS
C41	PCP	J19	1	3/4 "	6	14		TW	CONTROL, INCLUDES SPARES
C42	J19	HLA OR LLA	1	1/2 "	2	14		TW	CONTROL
C43	PCP	TTP	1	1/2 "	-	-		-	ROUGH IN FOR TTP
C44	PCP	J21	1	1/2 "	4	14		TW	CONTROL TO EYEWASH
C45	J21	FS-7	1	1/2 "	4	14		TW	CONTROL TO EYEWASH FS.
C46	PCP	J22	1	1/2 "	2	12	12	TW	RECEIPT FILTER WATER SENS.
C47	J22	SW1	1	1/2 "	2	12	12	TW	RECEIPT FILTER WATER SENS.
C48	PCP	J23	1	1/2 "	2	12	12	TW	
C49	J23	SW2	1	1/2 "	2	12	12	TW	RECEIPT FILTER WATER SENS.
C50	J24	J25	1	3/4 "	2	12	12	TW	
C51	J24	ESO-1	1	1/2 "	2	12	12	TW	EMERGENCY SHUT OFF
C52	J25	J26	1	1/2 "	2	12	12	TW	
C53	J26	ESO-2	1	1/2 "	2	12	12	TW	EMERGENCY SHUT OFF
C54	J26	J27	1	1/2 "	2	12	12	TW	
C55	J27	ESO-3	1	1/2 "	2	12	12	TW	EMERGENCY SHUT OFF
C56	J27	J28	1	1/2 "	2	12	12	TW	
C57	J27	ESO-4	1	1/2 "	2	12	12	TW	EMERGENCY SHUT OFF

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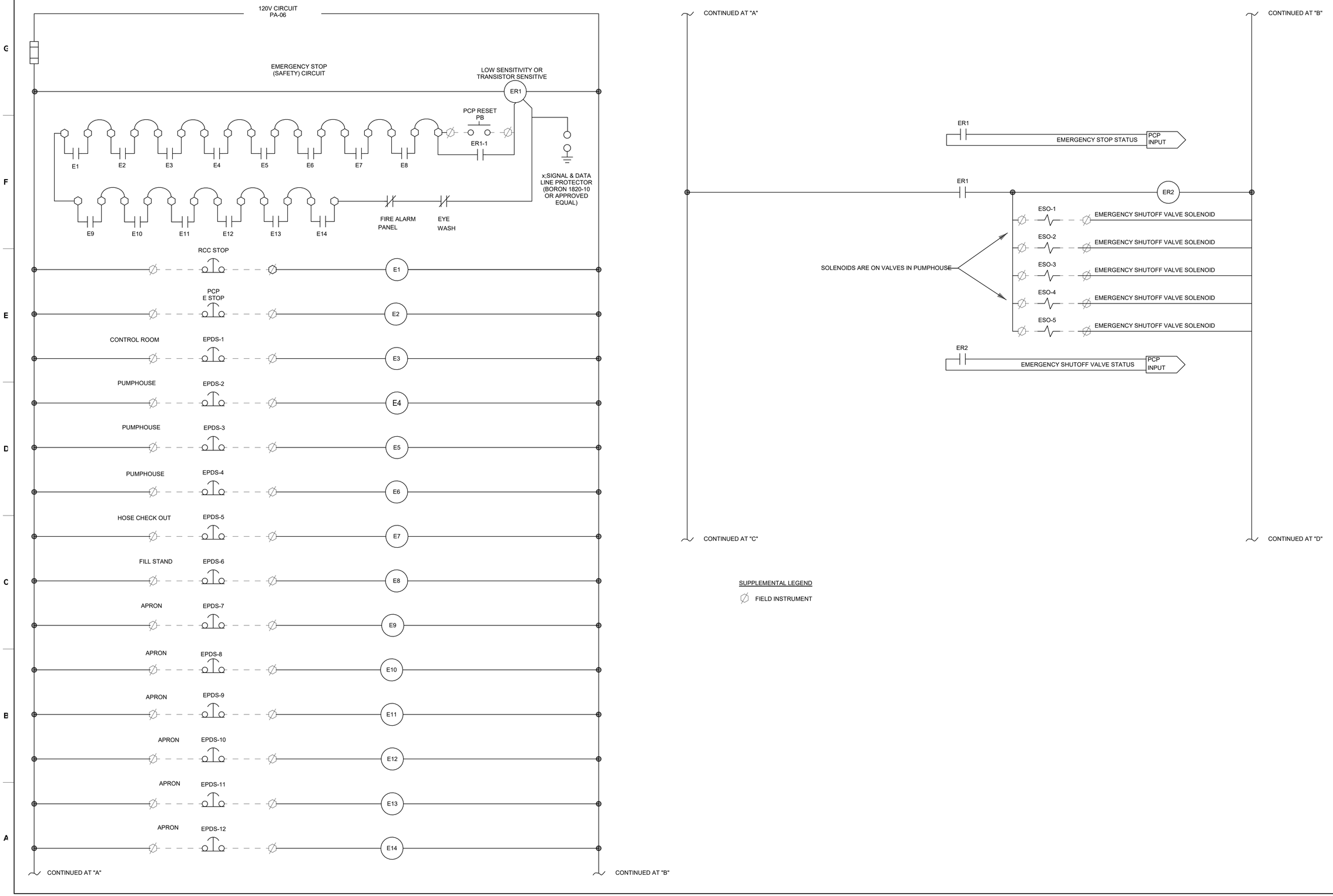
OMAHA DISTRICT

DOD STANDARD DESIGN A/W 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

SCHEDULE SHEET TWO

SHEET ID

EP604



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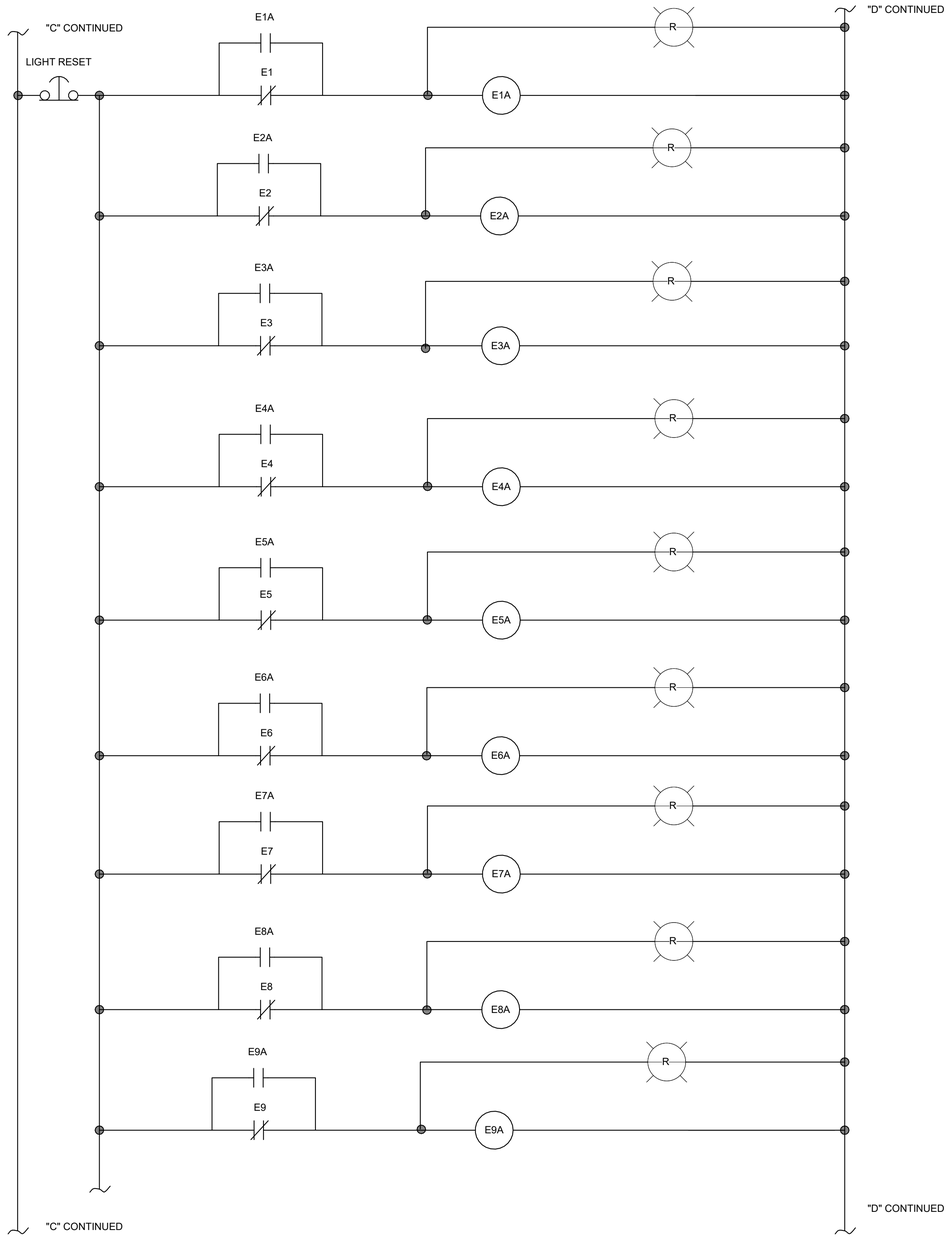
OMAHA DISTRICT

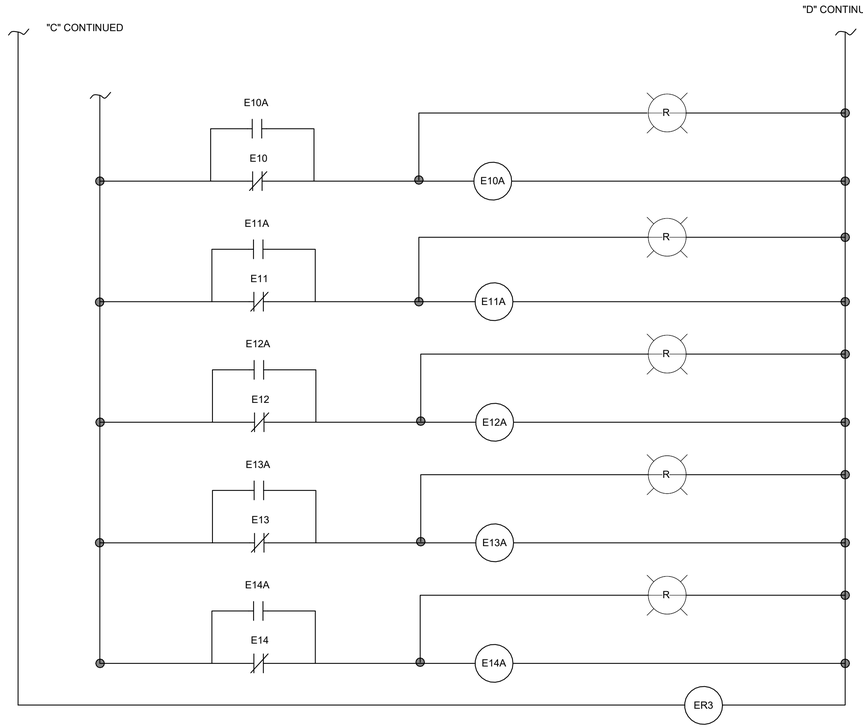
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

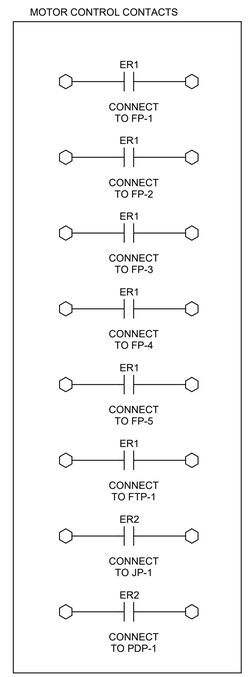
EPDS WIRING DIAGRAM

SHEET ID

EP605







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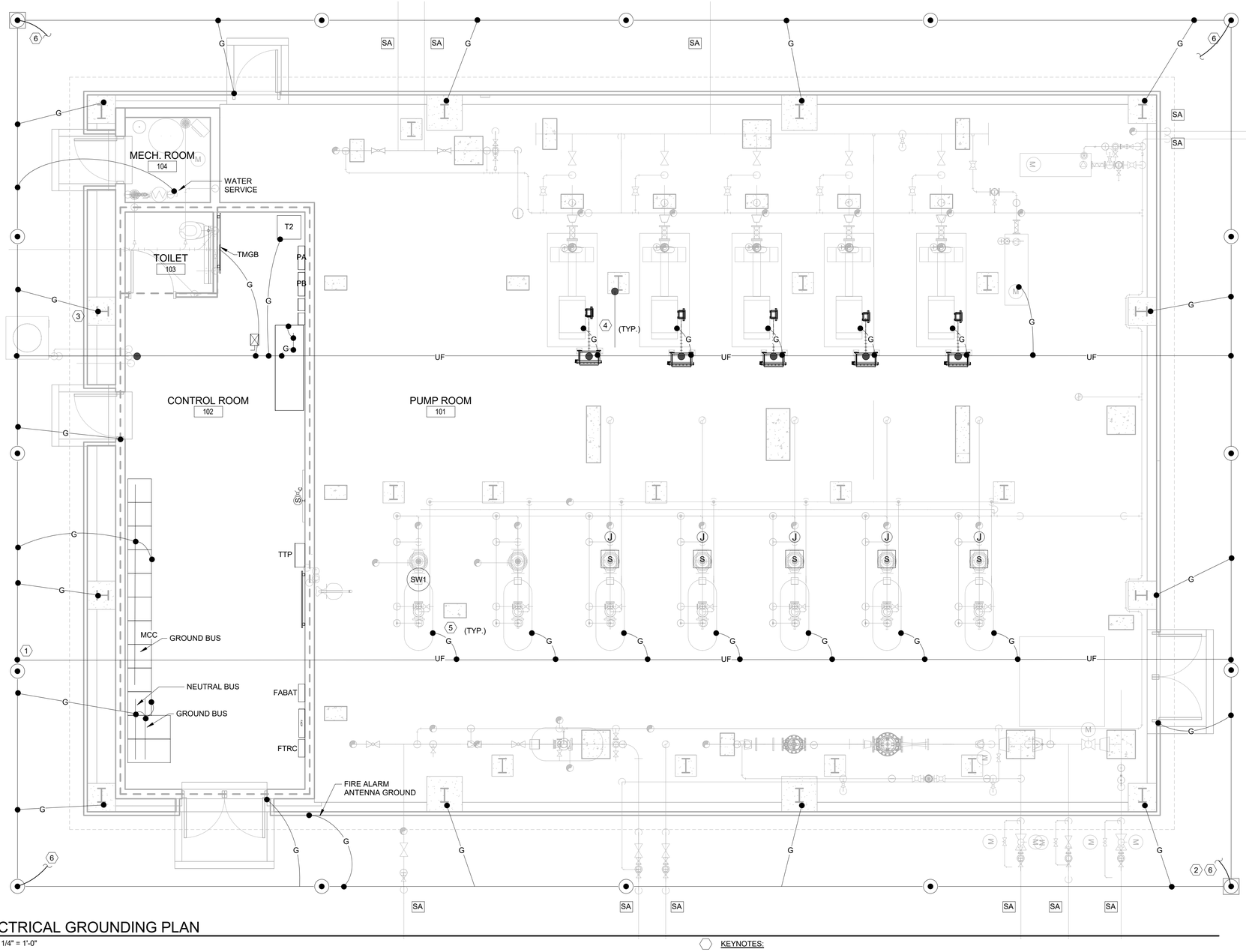
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

EPDS WIRING DIAGRAM

SHEET ID

EP606



A2 ELECTRICAL GROUNDING PLAN

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

KEYNOTES:

1. SEE THE CABLE TO CABLE GROUNDING CONNECTION DETAIL ON SHEET EG501.
2. SEE THE GROUND ROD DETAIL ON SHEET EG501.
3. SEE THE COLUMN GROUNDING DETAIL ON SHEET EG502.
4. SEE THE FUELING PUMP MOTOR GROUNDING DETAIL ON SHEET EG502.
5. SEE THE FILTER SEPERATOR GROUNDING DETAIL ON SHEET EG501.
6. CONTINUED ON SHEET EG102.

SUPPLEMENTAL LIGHTNING PROTECTION AND GROUNDING LEGEND

- AIR TERMINAL, 24" MINIMUM HEIGHT
- 3/4"x10' GROUND ROD
- 3/4"x10' GROUND ROD WITH TEST WELL
- MAIN GROUND BAR
- LIGHTNING PROTECTION MAIN AND DOWN CONDUCTOR, MIN. SIZE PER NFPA 780
- —G— #4/0 BARE COPPER OR AS INDICATED
- SA INSULATING FLANGE SURGE ARRESTER, PER SPECIFICATION 33 52 43.13 AND DETAIL ON SHEET EC503.
- —UF— #1/0 BARE COPPER UNDERFLOOR

PLAN NORTH

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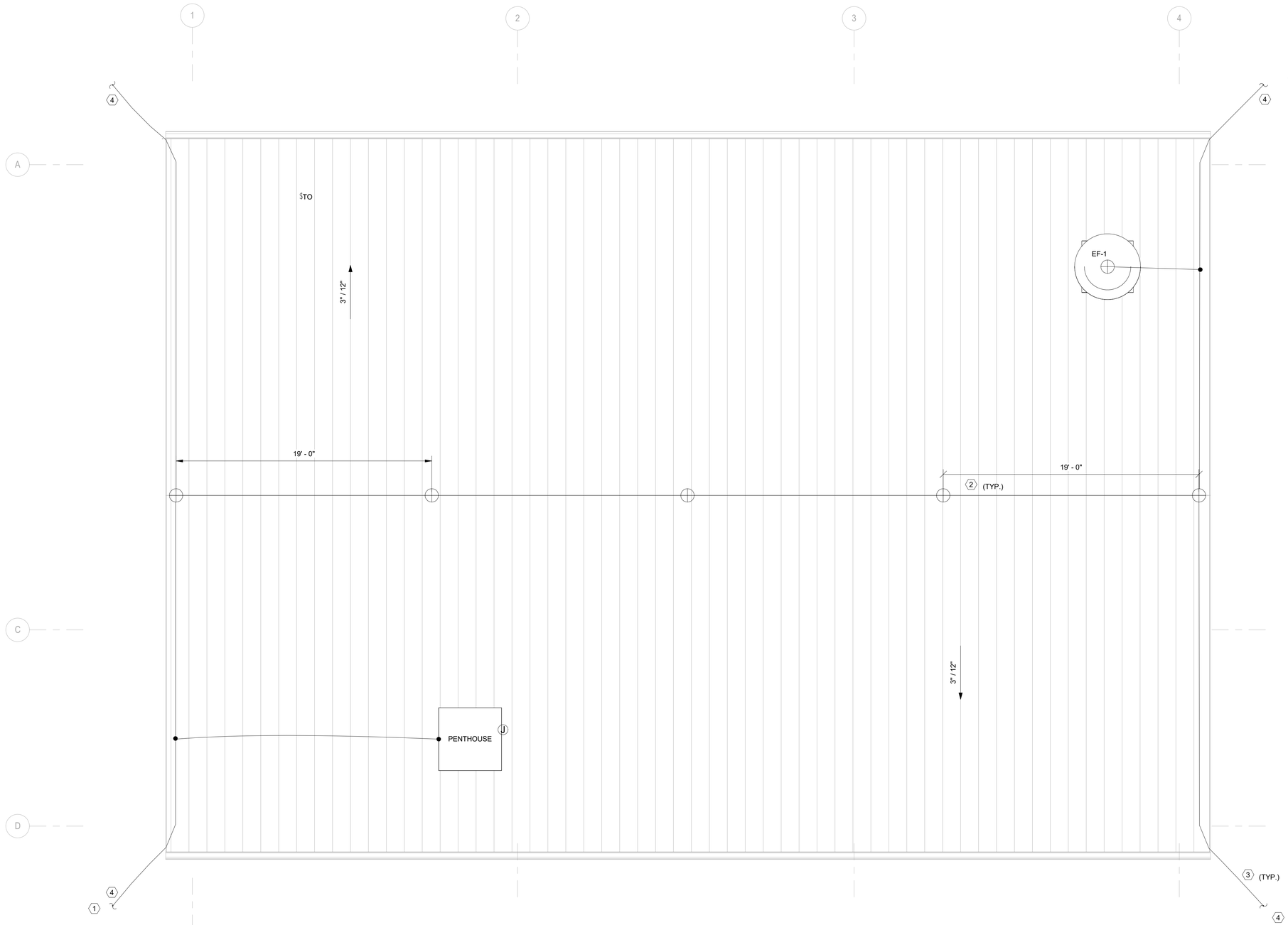
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL GROUNDING PLAN

SHEET ID

EG101



KEYNOTES:

1. SEE THE GROUND ROD DETAIL ON SHEET EG501.

2. SEE LIGHTNING PROTECTION TERMINAL DETAIL ON SHEET EG505.

3. THE DOWN CONDUCTORS SHALL BE RUN DOWN THE COLUMN IN PVC CONDUIT. THE DOWN CONDUCTORS SHALL HAVE EITHER A STRAIGHT OR PARALLEL (ACCESSIBLE) SPLICE INSTALLED NEAR GROUND LEVEL JUST BEFORE THE CABLES ENTER THE GROUND.

4. CONTINUED ON SHEET EG101.

B2 LIGHTNING PROTECTION PLAN

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

PLAN NORTH

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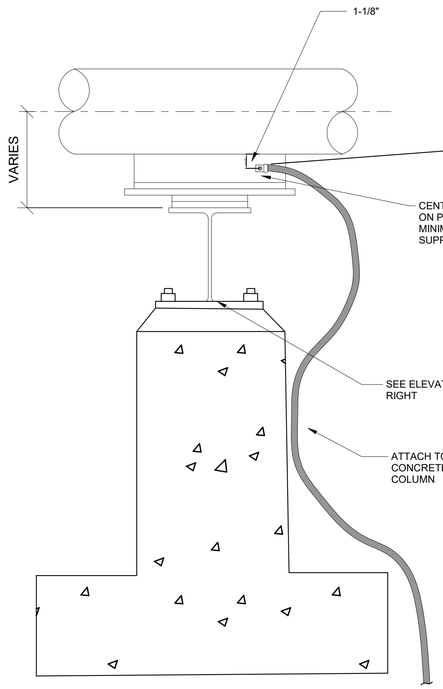
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

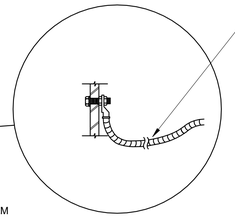
LIGHTNING PROTECTION PLAN

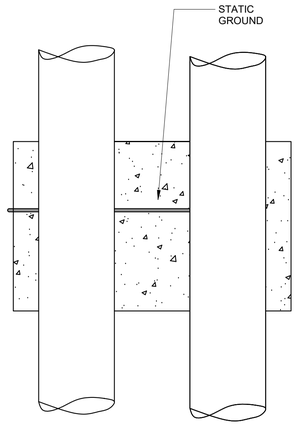
SHEET ID

EG102

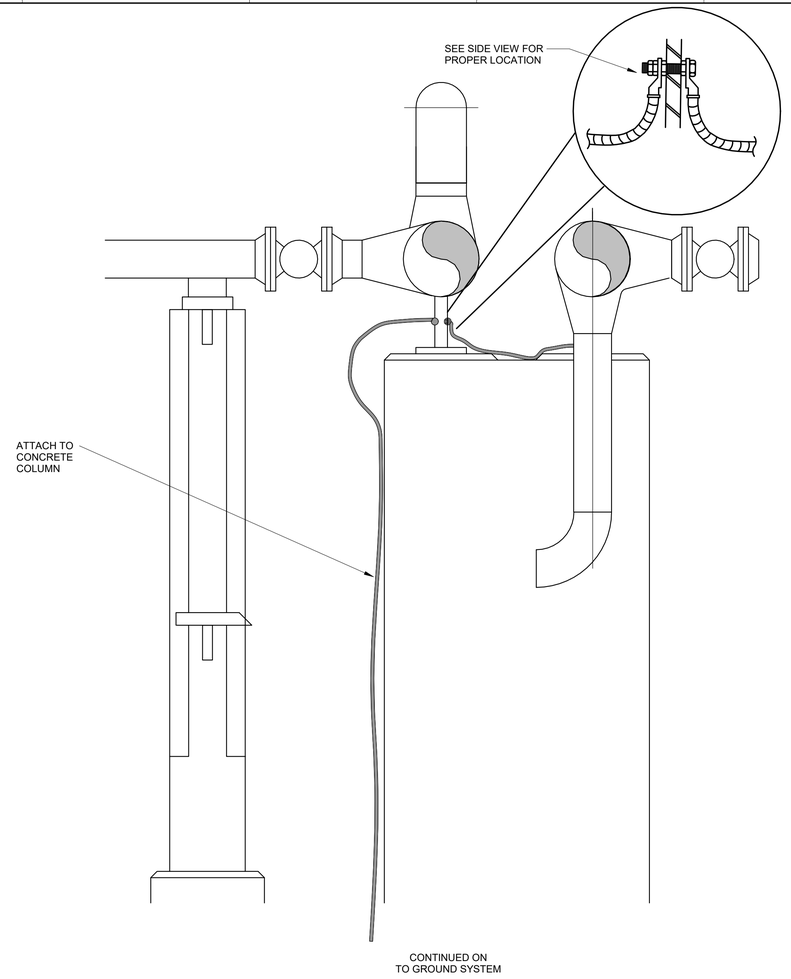


SIDE VIEW



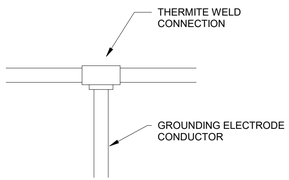


TOP VIEW



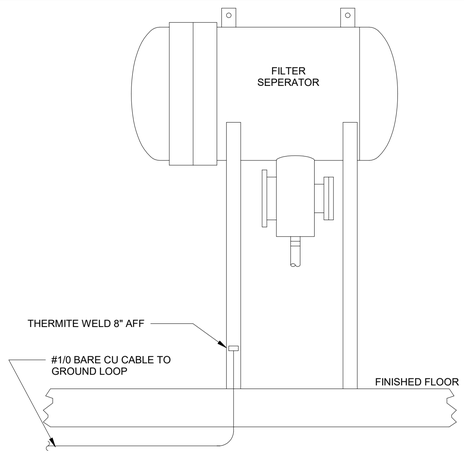
D1 PIPE SUPPORT GROUNDING

SCALE: NTS



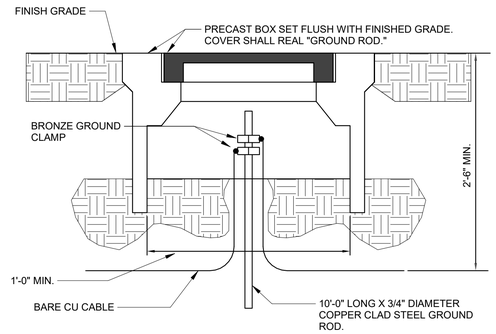
B1 CABLE-TO-CABLE GROUNDING CONNECTION DETAIL

SCALE: NTS



A4 FILTER SEPERATOR GROUNDING DETAIL

SCALE: N.T.S.



A7 GROUND ROD BOX DETAIL

SCALE: N.T.S.

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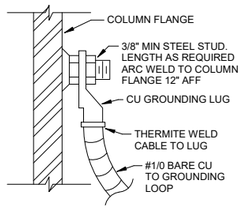
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL GROUNDING DETAILS

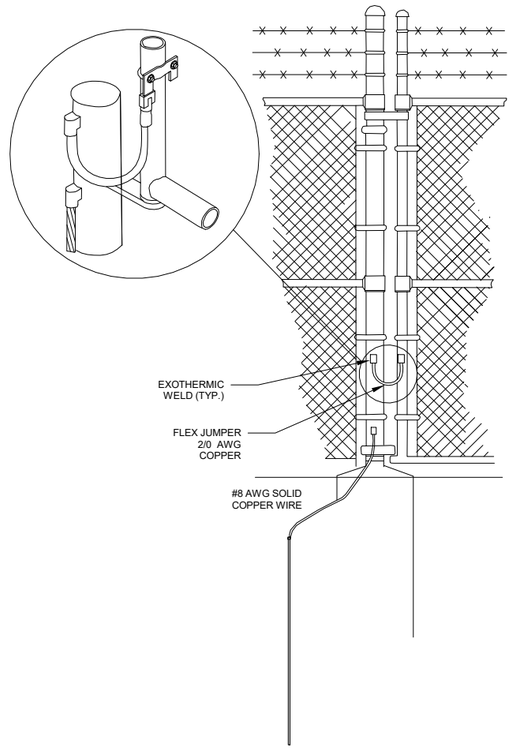
SHEET ID

EG501



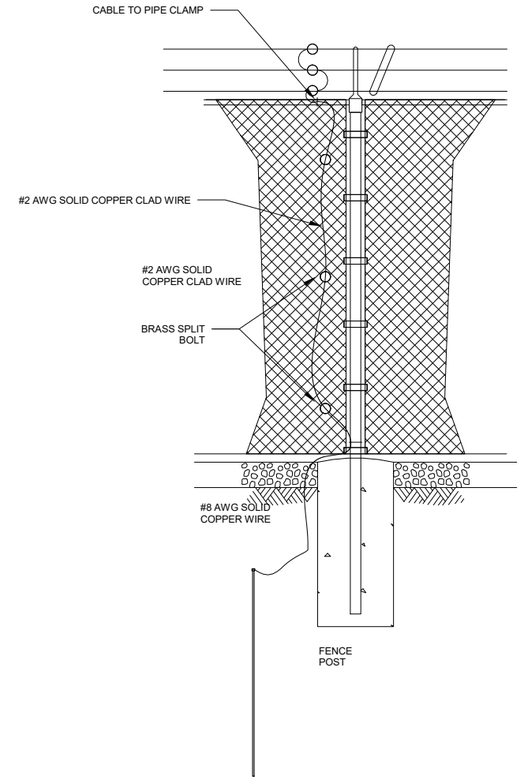
F1 STEEL COLUMN GROUNDING DETAIL

SCALE: NTS



D4 FENCE GROUNDING, GATE DETAIL

SCALE: NTS



D7 FENCE GROUNDING DETAIL

SCALE: NTS

B1 FUELING PUMP MOTOR GROUNDING DETAIL

SCALE: NTS

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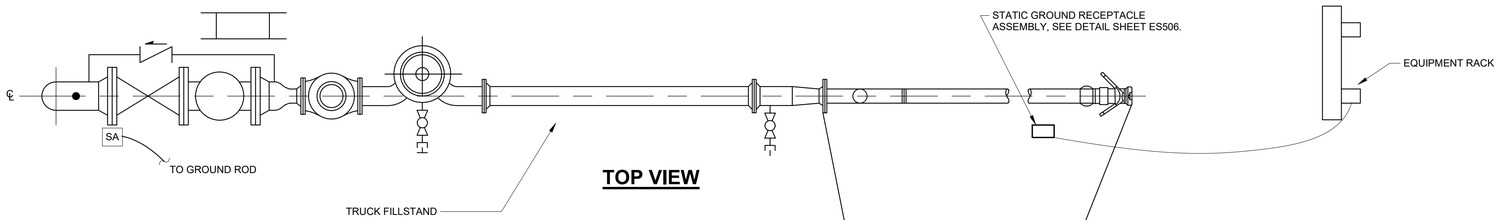
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III
FINAL BACKCHECK

ELECTRICAL GROUNDING DETAILS

SHEET ID

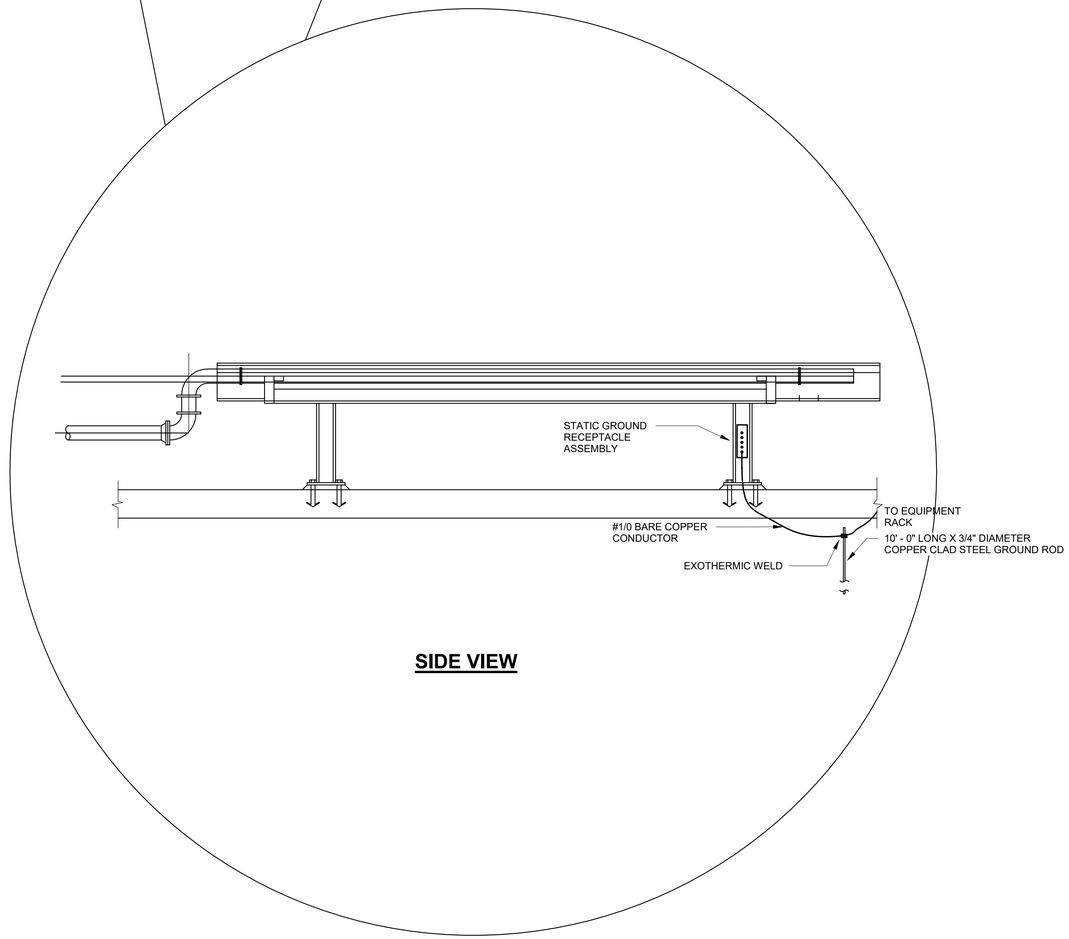
EG502



TOP VIEW

NOTES:

1. COORDINATE EQIUPMENT RACK LOCATION WITH CUSTOMER.



SIDE VIEW

1 TRUCK FILL STAND GROUNDING

SCALE: NTS

US Army Corps of Engineers ®

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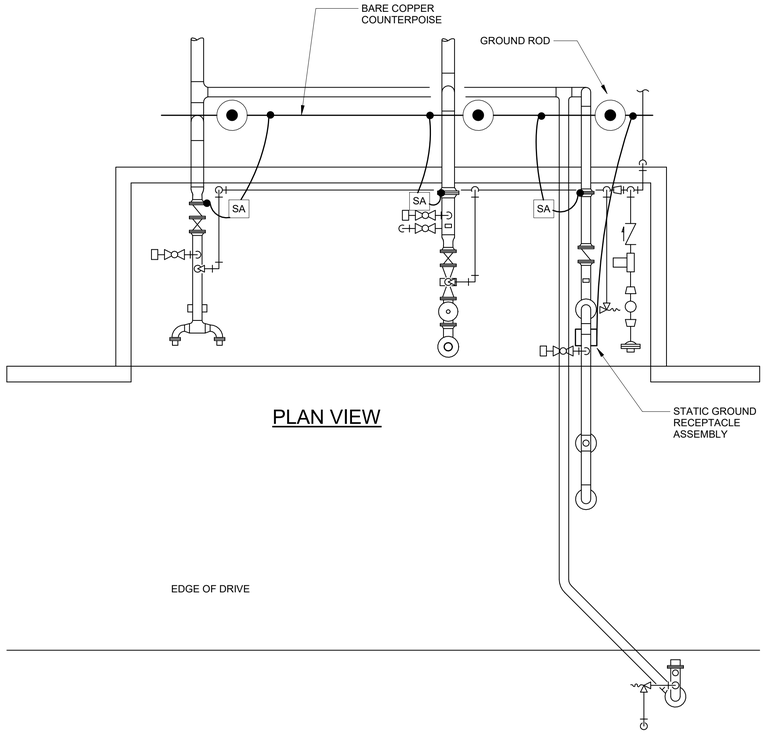
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

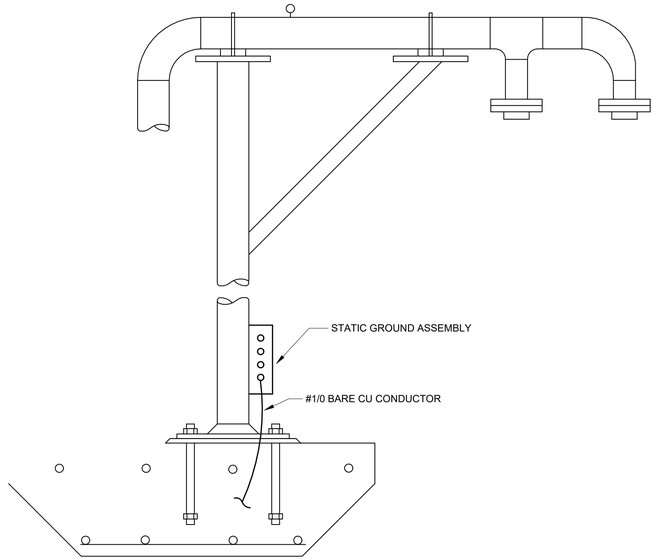
ELECTRICAL GROUNDING DETAILS

SHEET ID

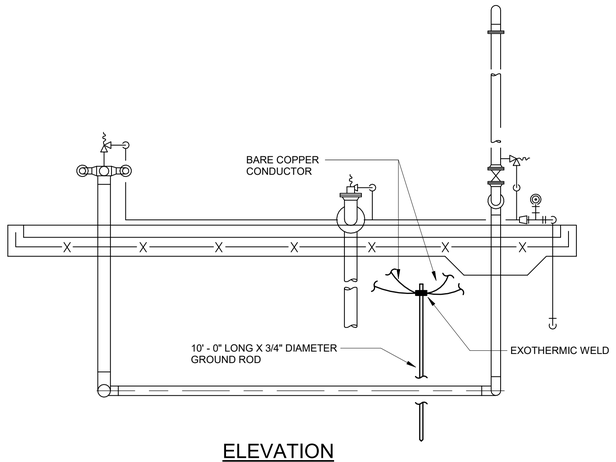
EG503



PLAN VIEW



ELEVATION



ELEVATION

1 HYDRANT HOSE TRUCK GROUNDING

SCALE: NTS

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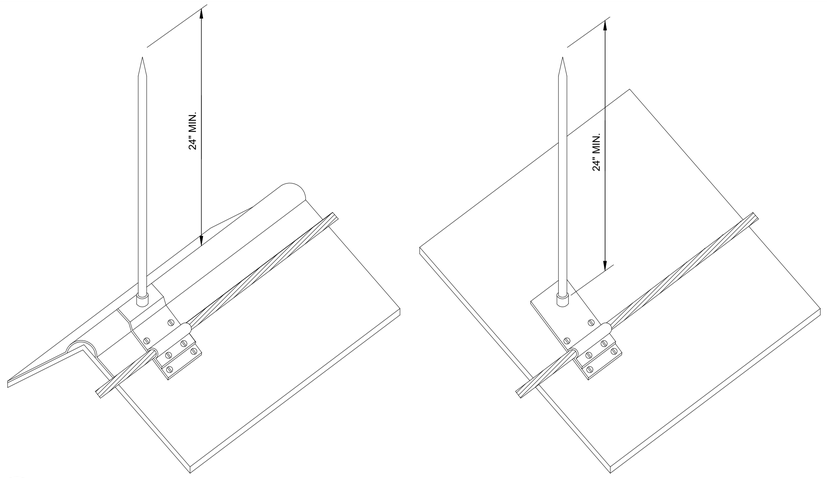
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL GROUNDING DETAILS

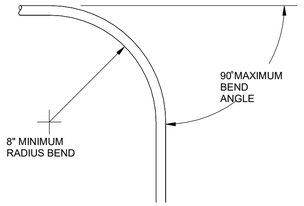
SHEET ID

EG504



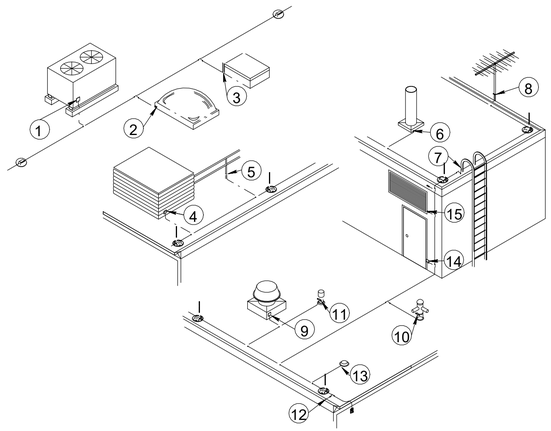
E1 LIGHTNING PROTECTION POINT SLOPED MOUNTING DETAIL

SCALE: NTS



D1 CONDUCTOR BEND RADIUS

SCALE: NTS



BONDING NOTES:
1. ITEMS 1-10 SHOWN IN DIAGRAM ARE TYPICAL BODIES OF CONDUCTANCE AS NOTED BELOW. USE FULL SIZE MAIN CONDUCTOR AND APPROPRIATE FITTING FOR CONNECTION.

2. ITEM 11 (PLUMBING VENTS) REQUIRES BONDING WITH MAIN SIZE CABLE ONLY IF WITHIN 6'-0" OF SYSTEM.

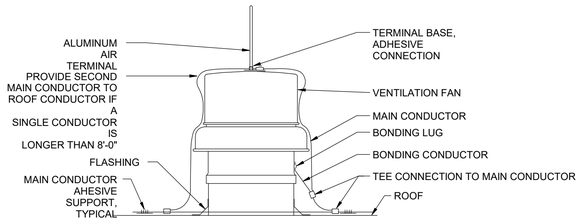
3. ITEMS 12-15 ARE TYPICAL BODIES OF CONDUCTANCE AS NOTED BELOW. USE SECONDARY SIZE SMALLER CONDUCTOR AND APPROPRIATE FITTING FOR CONNECTION (ITEM 12 TYPICALLY OCCURS AT EACH DOWN-LEAD AND ROOF LEVEL CHANGE AS SHOWN).

4. BONDING CONNECTIONS SHOWN ARE TYPICAL EXAMPLES. MAKE ALL CONNECTIONS REQUIRED TO MEET CODES AS NOTED BELOW. ADJUST FITTING TYPE AS REQUIRED TO SUIT FIELD CONDITIONS.

5. BONDING DIAGRAM REPRESENTS BONDING FOR TYPICAL BONDING CONDITIONS FOUND FOR GENERAL BUILDING CONSTRUCTION. BONDING FOR CMF ROOF SHALL SUIT INSTALLED WORK. SEE MECHANICAL AND ARCHITECTURAL DRAWINGS FOR FANS, VENTS, ETC.

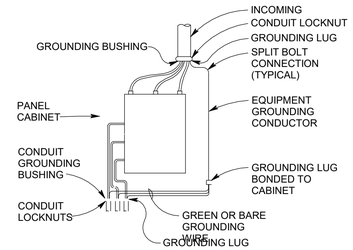
A1 LIGHTNING PROTECTION DETAIL

SCALE: NTS



D4 EXHAUST FAN GROUNDING

SCALE: NTS

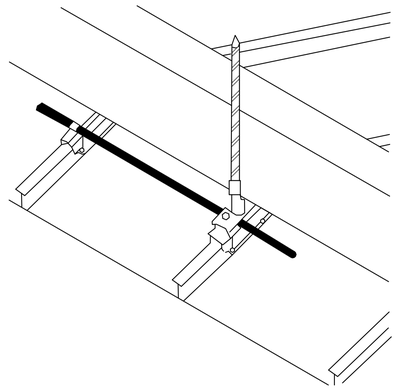


NOTES:
1. ALL WIRES TO BE NEATLY LACED.
2. AT THE POINT OF ATTACHMENT OF THE GROUNDING LUG TO THE CABINET,
THE SURFACES SHALL BE SCRAPED FREE OF PAINT AND THOROUGHLY CLEANED TO INSURE PROPER BONDING.
3. NEUTRAL CONDUCTOR NOT SHOWN FOR CLARITY.

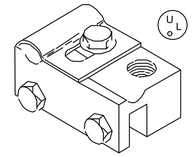
A4 TYPICAL PANEL GROUNDING

SCALE: NTS

NOTE 1: ADHESIVE STYLE POINT BASE IS INDICATED. NO SCREW PENETRATIONS OF THE ROOF ARE ACCEPTABLE.
CONTRACTOR MAY ALSO PROVE STANDING SEAM CLAMP STYLE POINT BASES, INDICATED BELOW.

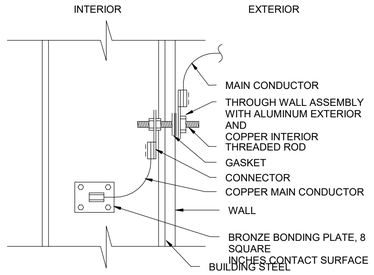


BRONZE OR ALUMINUM CAST LIGHTNING ROD OR AIR TERMINAL BASE FOR STANDING SEAM ROOFING SYSTEMS.
BOTTOM GROOVE 1/2" WIDE BY 3/4" DEEP TO SECURE ON SEAM WITH TWO SET SCREWS. ADJUSTIBLE CABLE CONNECTOR FOR CONDUCTOR EITHER PARALLEL OR PERPENDICULAR TO THE SEAM. AVAILABLE FOR ALL AIR TERMINALS OR LIGHTNING RODS 3/8", 1/2" AND 5/8" DIAMETER. SHALL BE UL LISTED FOR INTENDED PURPOSE.



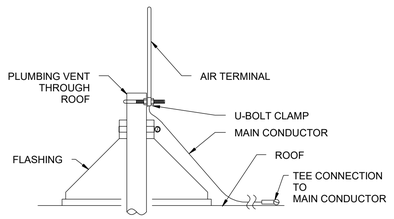
E7 LIGHTNING PROTECTION POINT STANDING SEAM

SCALE: NTS



C7 LIGHTNING PROTECTION BONDING

SCALE: NTS



A7 PLUMBING VENT

SCALE: NTS

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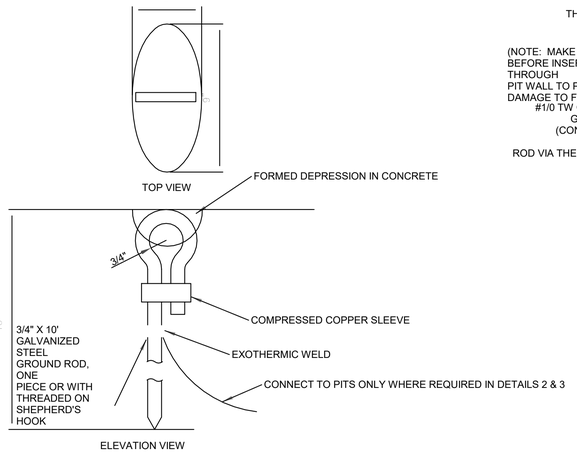
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

ELECTRICAL GROUNDING DETAILS

SHEET ID

EG505

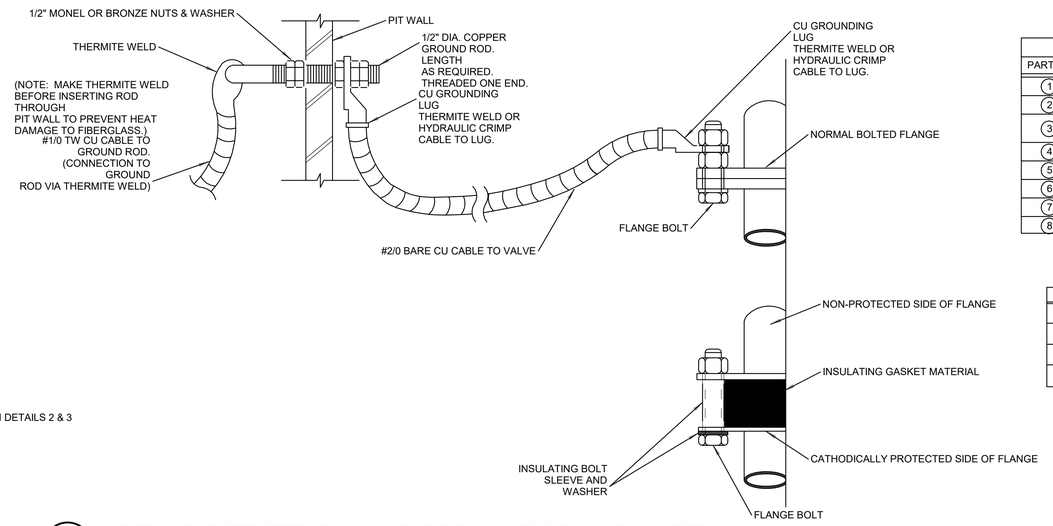


E2 STATIC GROUND DETAIL

SCALE: NTS

NOTES:

1. WHEN STATIC GROUND IS LOCATED IN NEW CONCRETE, IT SHALL BE INSTALLED PRIOR TO CONCRETE PLACEMENT AND THE FRESH CONCRETE SHALL BE FORMED AROUND THE GROUND EYE AS SHOWN.
2. WHEN THE STATIC GROUND IS LOCATED IN EXISTING CONCRETE, THE CONCRETE SHALL BE BORED WITH A SIX INCH DIAMETER CORE TO FULL DEPTH, THE GROUND ROD SHALL BE INSTALLED IN THE CENTER OF THE HOLE AND THEN THE HOLE SHALL BE FILLED WITH GROUT THAT CONFORMS TO ASTM C 1107 GRADE A, B, OR C AND FORMED AROUND THE GROUND ROD AS SHOWN.
3. WHEN THE STATIC GROUND IS LOCATED IN A DIRT/GRASS AREA, IT SHALL BE INSTALLED IN A 12"X12"X4" CONCRETE PAD.
4. STATIC GROUNDS SHALL PROVIDE A RESISTANCE OF NO MORE THAN 10,000 OHMS.
5. EACH STATIC GROUND SHALL HAVE IT'S RESISTANCE TESTED JUST PRIOR TO TURN OVER TO THE USER. THE TESTS SHALL BE RECORDED IN A BOOKLET TO BE PROVIDED TO THE USER. THE TEST DATE, RESISTANCE, AND LOCATION SHALL BE RECORDED FOR EACH STATIC GROUND.



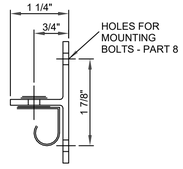
F4 PIT CABLE PENETRATION AND PIT FLANGE GROUNDING DETAIL

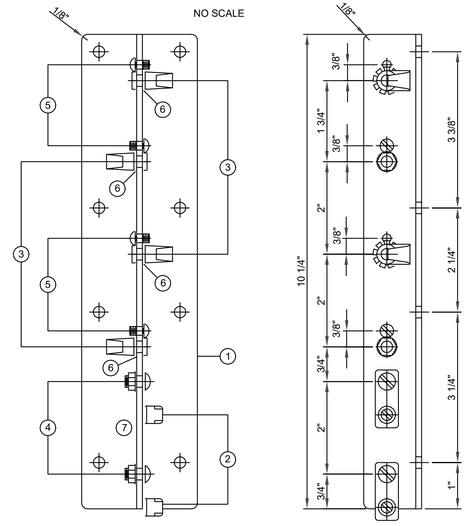
SCALE: NTS

BILL OF MATERIALS		
PART NO.	QUANTITY	DESCRIPTION
1	1	ALUMINUM T-BAR, 10 1/4 X 2 1/2 X 1 1/4 X 1/8
2	2	GROUND WIRE TERMINAL, BURNDY KA29U (OR EQUAL)
3	4	RECEPTACLE,MS 90298. KINGS ELECTRONICS PART NO. K-3943. ORDER FROM NEWARK, POWELL, OR RICHIE.
4	2	TERMINAL MOUNTING BOLTS, 1/4 X 24 X 1/2
5	4	SET SCREW, SELF-TOPPING, 8 X 32 X 1/2
6	4	LOCK WASHER, STAR, 3/8 "
7	2	LOCK WASHER, SPRING, 1/4 "
8	4	ASSEMBLY MOUNTING BOLTS, 1/4 X 24 X 1

HOLE DATA

PART	DIAMETER
1	5/16"
3	3/8"
4	5/16"
5	7/64"





D8 STATIC GROUND RECEPTACLE ASSEMBLY

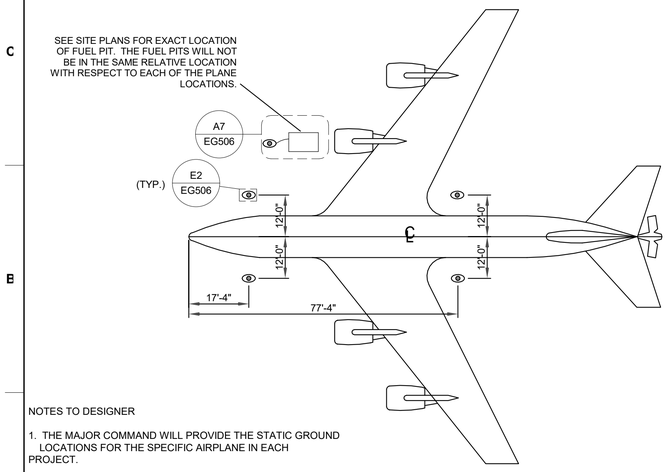
SCALE: NTS

C5 FILLSTAND GROUND PROVING STATION

SCALE: NTS

1. REFUELER OVERFILL PROTECTION CONTROL UNIT - SCULLEY INTELLITROL OGV TYPE. FOR SINGLE-COMPARTMENT TANK TRUCKS. NEMA 7 STYLE HOUSING. INCLUDES GROUND VERIFICATION AND TRUCK IDENTIFICATION.
3. EXPLOSION PROOF CONDUIT UNION (TYPICAL)
4. CKT. PB-9 (2#10, 1 #10G) 3/4" C.
5. TO NEXT UNIT IF MORE THAN ONE
6. CONDUIT OUTLET BODY - NEMA 7 STYLE HOUSING (TYPICAL)
7. CONDUIT SEAL FITTING. (TYPICAL)
8. JUNCTION BOX - NEMA 7, NEMA 4
9. CABLE JUNCTION BOX/TRUCK CONNECTION WITH 30' CABLE FOR USE WITH ITEM 1.
11. 4-1/2" CONCRETE ANCHORS AND ½"x5"x10" BASEPLATE W/ 1" (MIN.) NON-SHRINK GROUT. (TYPICAL) PRIME AND FINISH PAINT BASEPLATE.
12. C4x7.5 CHANNEL. PRIME AND FINISH PAINT.

3 #12, ¾" C TO SOLENOID ON TRUCK FILL STAND CONTROL VALVE.



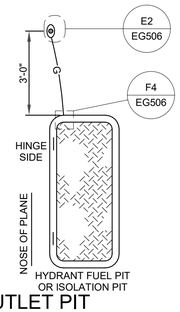
NOTES TO DESIGNER

1. THE MAJOR COMMAND WILL PROVIDE THE STATIC GROUND LOCATIONS FOR THE SPECIFIC AIRPLANE IN EACH PROJECT.

A1 KC-135 STATIC GROUND LOCATION DETAIL

SCALE: NTS

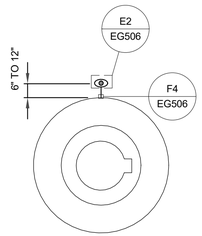
SEE SHEET ES101 FOR LOCATIONS OF PLANES ON THE APRON.



HYDRANT OUTLET PIT OR ISOLATION PIT GROUND PLACEMENT DETAIL (PANTOGRAPH AND HYDRANT HOSE TRUCK)

A7

SCALE: NTS



A9 HIGH/LOW POINT PIT GROUND PLACEMENT DETAIL

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
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SUBMITTED BY:
SIZE: ANSI D
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

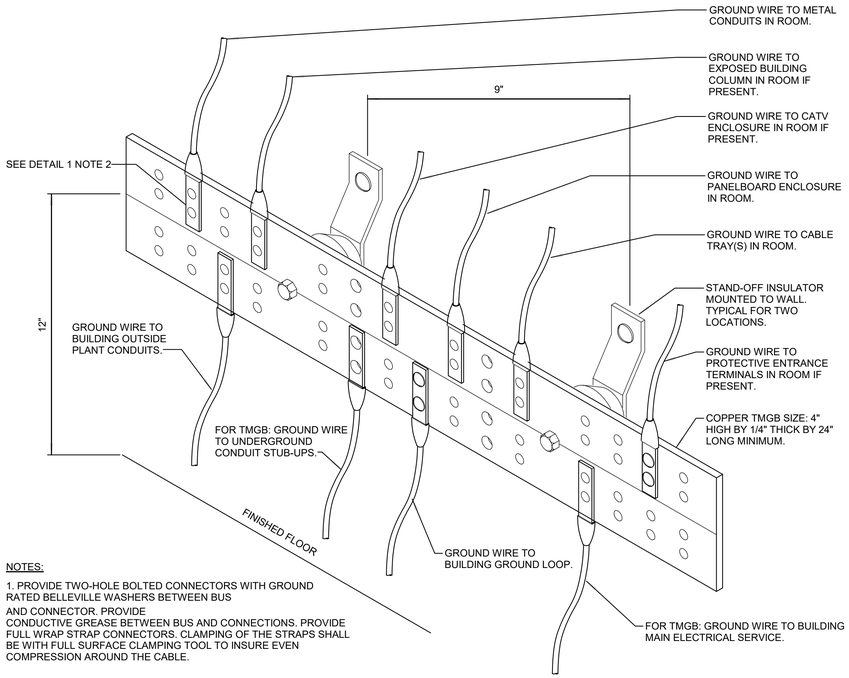
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

GROUNDING DETAILS

SHEET ID

EG506



NOTES:

1. PROVIDE TWO-HOLE BOLTED CONNECTORS WITH GROUND RATED BELLEVILLE WASHERS BETWEEN BUS AND CONNECTOR. PROVIDE CONDUCTIVE GREASE BETWEEN BUS AND CONNECTIONS. PROVIDE FULL WRAP STRAP CONNECTORS. CLAMPING OF THE STRAPS SHALL BE WITH FULL SURFACE CLAMPING TOOL TO INSURE EVEN COMPRESSION AROUND THE CABLE.

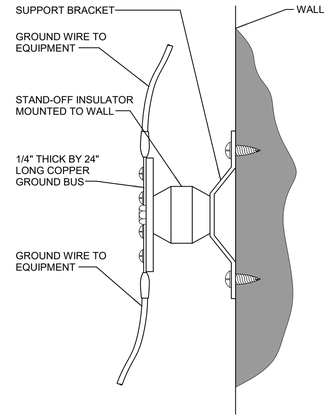
GENERAL SHEET NOTES

1. GROUND CONDUCTOR SIZES ARE IDENTIFIED AS MINIMUMS. PROVIDE ACTUAL CABLE SIZE BASED ON ACTUAL CABLE ROUTING AND ANSI J-STD-607A STANDARDS IF LARGER.

2. ALL GROUND CABLES SHALL BE LABELED AT BOTH ENDS.

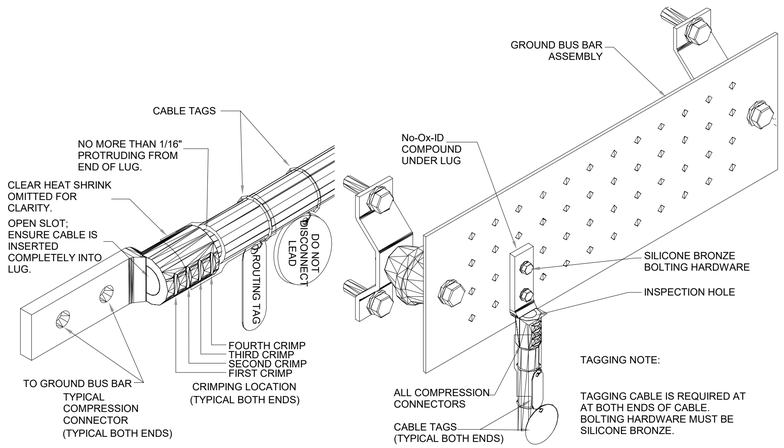
3. ALL GROUNDING CONDUCTORS ARE NOT SHOWN. SEE PLANS AND SPECIFICATIONS FOR ADDITIONAL GROUNDING CONDUCTORS OR REQUIREMENTS.

4. PROVIDE EXOTHERMIC WELD CONNECTIONS AND BOLTED LUG CONNECTIONS AT GROUND BARS AS PER SPECIFICATIONS.



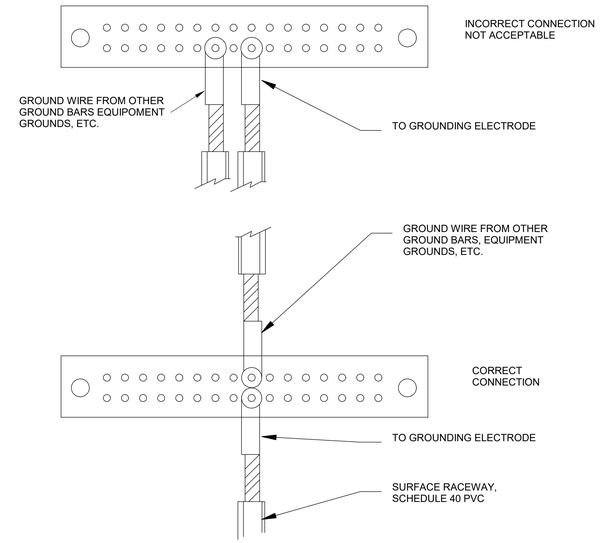
D1 BUS BAR DETAIL

SCALE: NTS



B1 CRIMPING DETAIL

SCALE: NTS



1 SL GROUND DETAILS

SCALE: NTS

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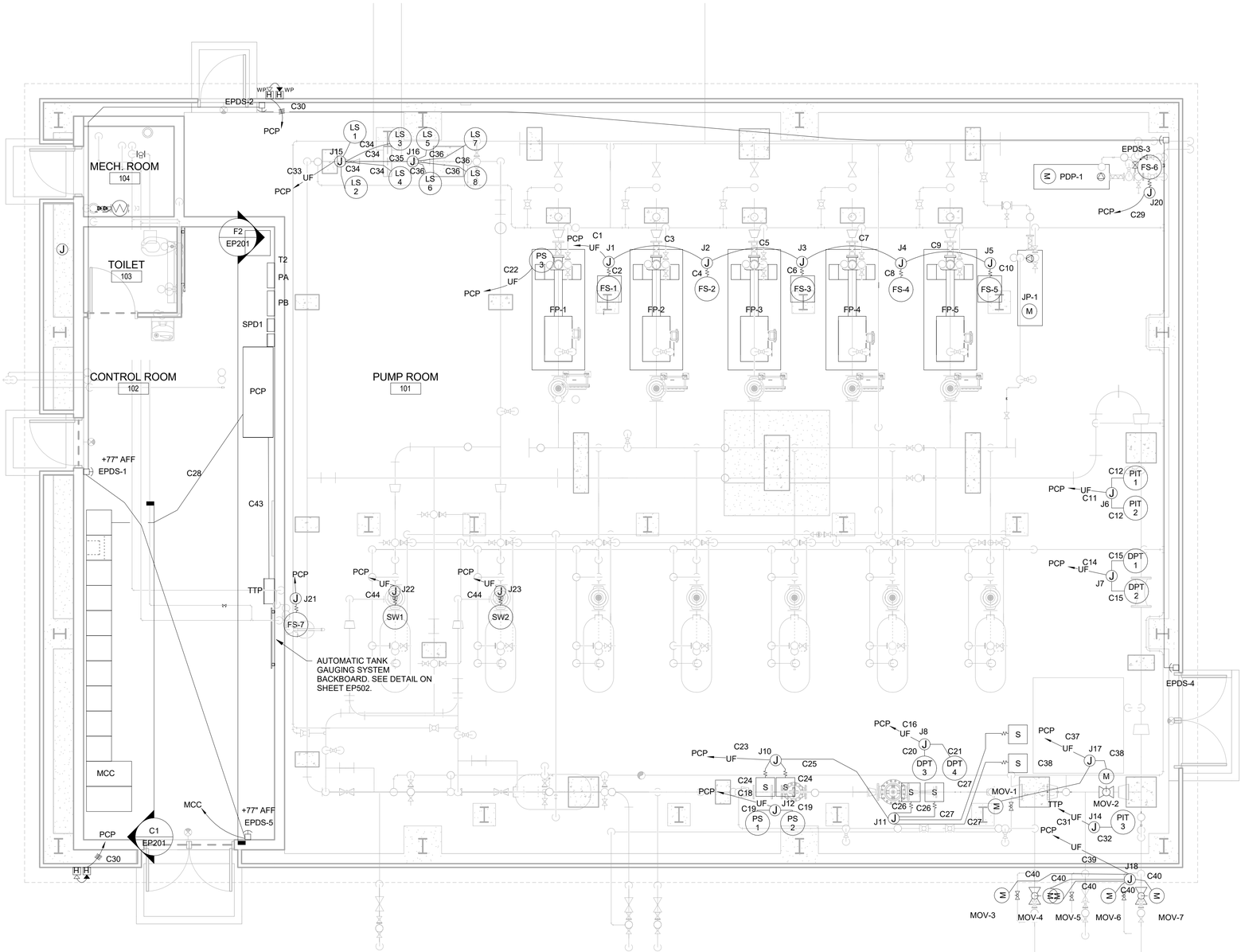
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

GROUNDING DETAILS

SHEET ID

EG507



B1 ELECTRICAL CONTROL PLAN

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

NOTES

1.THE ENTIRE VOLUME UNDER THE PUMP HOUSE SHELTER EXCEPT THE VOLUME INSIDE THE CONTROL ROOM, MECHANICAL ROOM, AND TOILET ROOM SHALL BE CONSIDERED A CLASS 1, DIVISION 1 GROUP D, (T3 392 F), HAZARDOUS LOCATION. ALL ELECTRICAL EQUIPMENT INSTALLED WITHIN THE HAZARDOUS AREA SHALL BE SPECIFICALLY APPROVED BY UL OR FACTORY MUTUAL FOR THE ABOVE HAZARDOUS AREA CLASSIFICATION.

2. EACH CONDUIT ORIGINATING IN OR PASSING THROUGH OR UNDER A HAZARDOUS AREA AND PENETRATING CONTROL ROOM WALLS, ROOF, OR FLOOR SHALL HAVE EXPLOSION PROOF SEALING FITTINGS INSTALLED IN THE INTERIOR OF THE CONTROL ROOM PER NFPA 70 ARTICLE 501.15.

3. CONNECTION FOR EYE WASH/SHOWER AND HOSE BIB HEAT TAPE. 500 WATTS WITH INTEGRAL THERMOSTAT.

4. A MEANS SHALL BE PROVIDED FOR THE FUTURE REMOVAL OF EQUIPMENT WITHOUT THE TURNING OR REMOVAL OF CONDUIT IN HAZARDOUS LOCATIONS. THIS MAY BE ACCOMPLISHED BY THE INSTALLATION OF AN APPROPRIATE EXPLOSION PROOF UNION AT OR NEAR THE CONDUIT ENTRANCE TO THE ENCLOSURE. UNION SHALL BE RATED FOR THE HAZARDOUS CLASSIFICATION LISTED ABOVE.

5. CONDUIT AND CABLE SCHEDULE IS LOCATED ON SHEET EP604.

6. ALL METALLIC CONDUITS THAT ARE NOT ATTACHED TO A GROUNDED PANEL OR ENCLOSURE SHALL BE GROUNDED USING A GROUNDED BUSHING.

7. KEYED HAND-AUTO SWITCH WILL BE KEYED ALIKE WITH THE CORRESPONDING KEYED HOA SWITCH IN THE MCC. SEE SHEET EP602.

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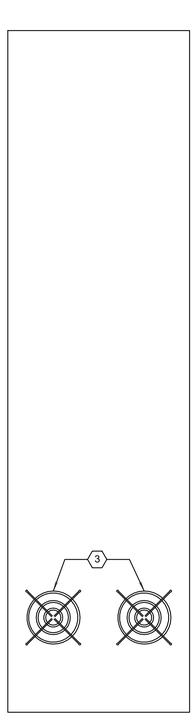
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

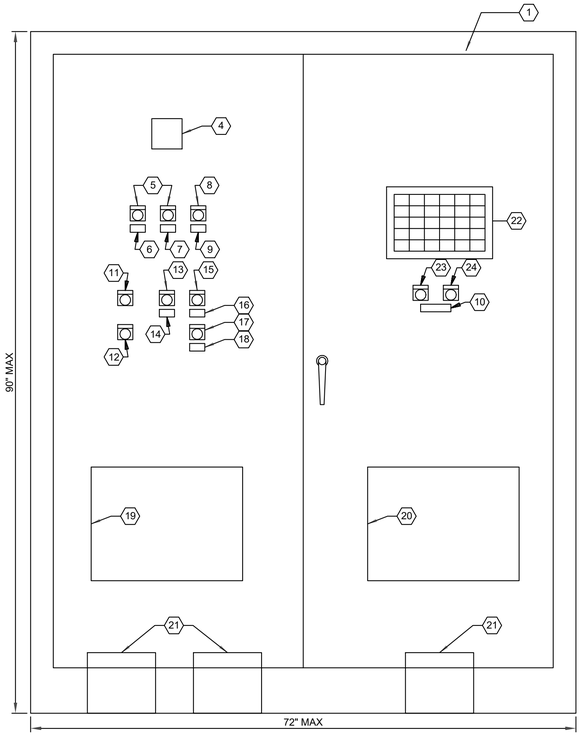
ELECTRICAL CONTROL PLAN

SHEET ID

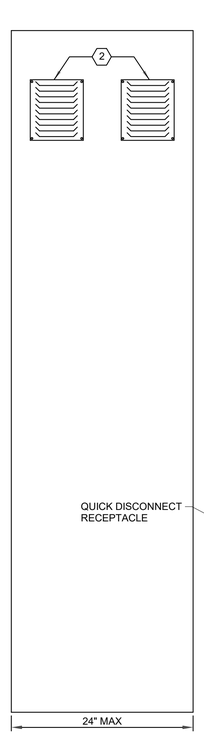
EI101



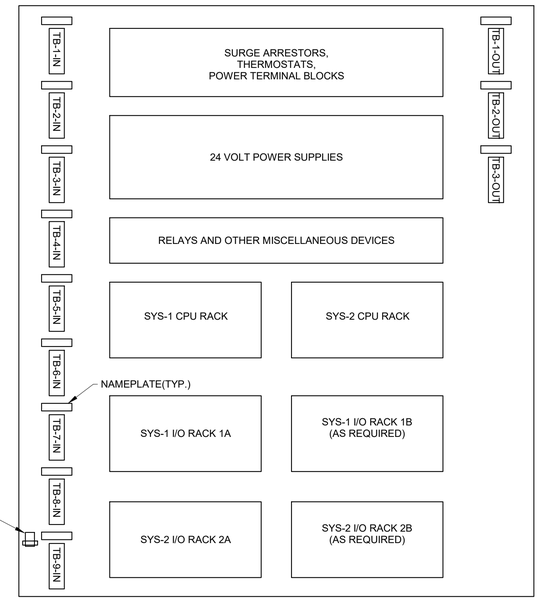
LEFT SIDE VIEW



FRONT VIEW



RIGHT SIDE VIEW



INTERIOR BACKPLAIN MOUNTING PANEL

PUMP CONTROL PANEL LEGEND	
ITEM	DESCRIPTION
1	FREE STANDING ENCLOSURE
2	VENTS
3	FANS
4	VIBRATING ALARM HORN (70db at 10 ft)
5	GREEN INDICATOR LIGHT
6	NAMEPLATE "CPU-1 ON"
7	NAMEPLATE "CPU-2 ON"
8	WHITE INDICATOR LIGHT
9	NAMEPLATE "EMERGENCY CIRCUIT POWER ON"
10	NAMEPLATE "ANNUNCIATOR SYSTEM"
11	RED JUMBO MUSHROOM MOMENTARY CONTACT PUSHBUTTON WITH LEGEND PLATE "EMERGENCY STOP"
12	MOMENTARY CONTACT PUSHBUTTON WITH LEGEND PLATE "EMERGENCY STOP RESET"
13	2 POSITION MAINTAINED CONTACT SELECTOR SWITCH WITH LEGEND PLATE " SYS-1 SYS-2"
14	NAMEPLATE "SYSTEM INPUT SELECT"
15	4 POSITION KEY OPERATED MAINTAINED CONTACT SELECTOR SWITCH WITH LEGEND PLATE "AUTO OFF FLUSH TEST"

PUMP CONTROL PANEL LEGEND CONT.	
ITEM	DESCRIPTION
16	NAMEPLATE "FUELING MODE SELECT"
17	5 POSITION MAINTAINED CONTACT SELECTOR SWITCH WITH LEGEND PLATE "1 2 3 4 5" (CIRCULAR AROUND SWITCH)
18	NAMEPLATE "LEAD FUEL PUMP"
19	LOCKABLE CABINET LOCATED WITHIN THE PCP FOR THE LAPTOP COMPUTER.
20	CABINET WITHIN PCP FOR SPARE PARTS
21	UNINTERRUPTABLE POWER SUPPLY (UPS) WITHIN CABINET
22	BACKLIGHT WINDOW ANNUNCIATOR
23	MOMENTARY CONTACT PUSHBUTTON WITH LEGEND PLATE "TEST"
24	MOMENTARY CONTACT PUSHBUTTON WITH LEGEND PLATE "ACKNOWLEDGE"
25	
26	
27	
28	
29	
30	

NOTES:

1. PROVIDE WIRE MANAGEMENT DUCTS

2. FOLLOW THE ABOVE LAYOUT AS CLOSE AS POSSIBLE TO PROVIDE UNIFORMITY WITH EXISTING AND FUTURE FUELING SYSTEM CONTROL PANELS.

3. SEE SHEETS EI502 THRU EI504 AND EI601 FOR OTHER CONTROL PANEL RELATED REQUIREMENTS.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

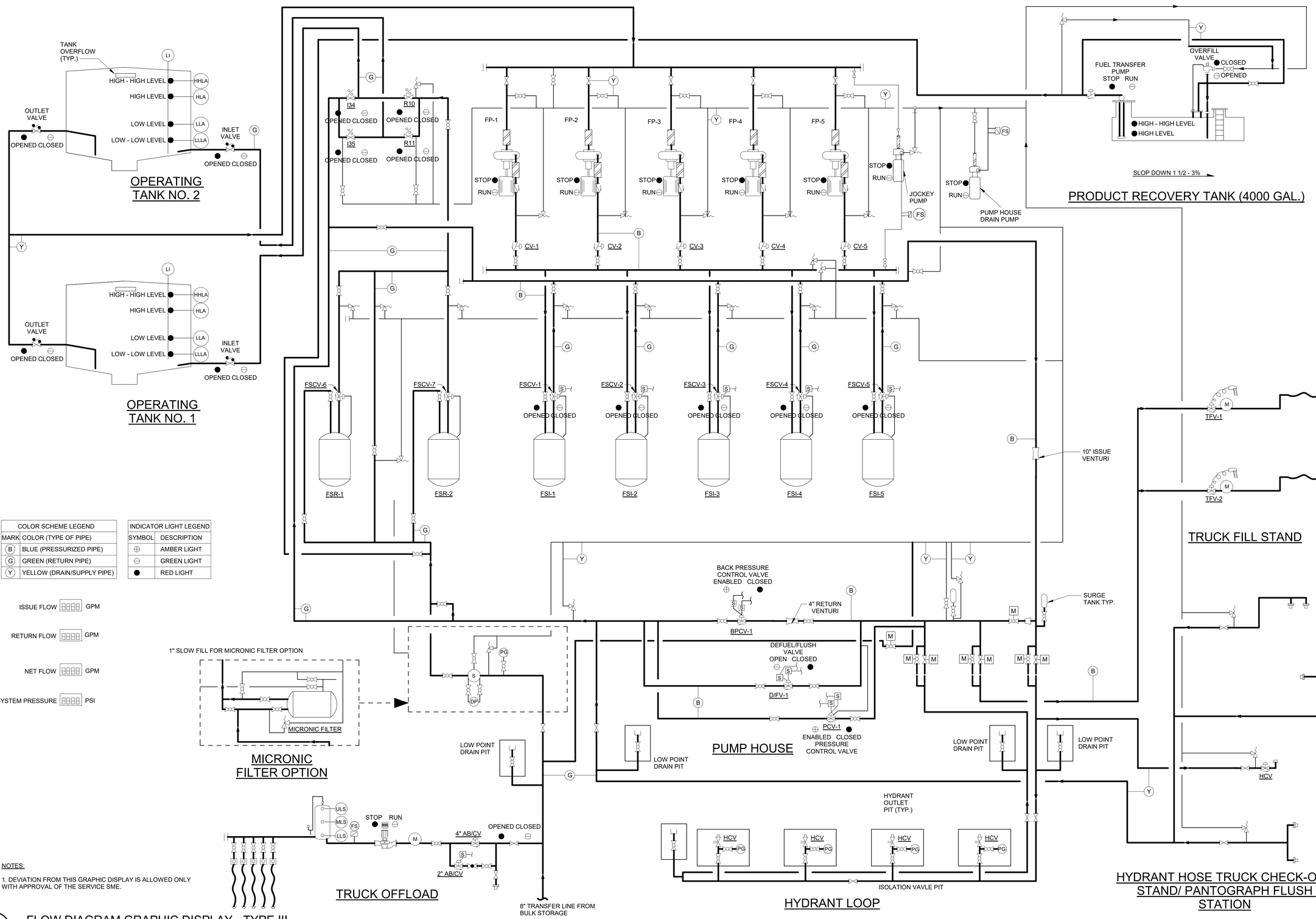
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

PUMP CONTROL PANEL ELEVATION

SHEET ID

EI501



COLOR SCHEME LEGEND	
MARK	COLOR (TYPE OF PIPE)
B	BLUE (PRESSURIZED PIPE)
G	GREEN (RETURN PIPE)
Y	YELLOW (DRAIN/SUPPLY PIPE)

INDICATOR LIGHT LEGEND	
SYMBOL	DESCRIPTION
⊕	AMBER LIGHT
⊖	GREEN LIGHT
●	RED LIGHT

ISSUE FLOW ____ GPM

RETURN FLOW ____ GPM

NET FLOW ____ GPM

SYSTEM PRESSURE ____ PSI

NOTES:

1. DEVIATION FROM THIS GRAPHIC DISPLAY IS ALLOWED ONLY WITH APPROVAL OF THE SERVICE SME.

A1 FLOW DIAGRAM GRAPHIC DISPLAY - TYPE III

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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DRAWN BY:
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SUBMITTED BY:
ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:
SIZE: ANSI D

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

GRAPHIC DISPLAY

SHEET ID

EI502

TB-1-IN
PUMP STATUS
Non-redundant

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

NONREDUNDANT 120V UPS (-) (+)

SR1	1	
FP-1	2	
	3	
SR2	4	
FP-2	5	
	6	
SR3	7	
FP-3	8	
	9	
SR4	10	
FP-4	11	
	12	
SR5	13	
FP-5	14	
	15	
MC	16	
FTP-1	17	
	18	
MC	19	
JP-1	20	
	21	

TB-2-IN
FLOW SWITCH
System #1

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

SYSTEM-1 120V UPS (-) (+)

	1	
FS-1	2	
	3	
	4	
FS-2	5	
	6	
	7	
FS-3	8	
	9	
	10	
FS-4	11	
	12	
	13	
FS-5	14	
	15	
	16	
FS-6	17	
	18	

TB-3-IN
FLOW SWITCH
System #2

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

SYSTEM-2 120V UPS (-) (+)

	1	
FS-1	2	
	3	
	4	
FS-2	5	
	6	
	7	
FS-3	8	
	9	
	10	
FS-4	11	
	12	
	13	
FS-5	14	
	15	
	16	
FS-6	17	
	18	

TB-4-IN
OPERATIONAL TANKS
System #1

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

SYSTEM-1 120V UPS (-) (+)

	1	
TANK #1 OUTLET VALVE CLOSED	2	
	3	
TANK # 1 HHLA	4	
	5	
	6	
TANK #1 HLA	7	
	8	
	9	
TANK #1 LLA	10	
	11	
	12	
TANK #1 LLLA	13	
	14	
	15	
TANK #2 OUTLET VALVE CLOSED	16	
	17	
	18	
TANK #2 HHLA	19	
	20	
	21	
TANK # 2 HLA	22	
	23	
	24	
TANK #2 LLA	25	
	26	
	27	
TANK #2 LLLA	28	
	29	
	30	
SPARE	31	
	32	
	33	

TB-5-IN
OPERATIONAL TANKS
System #2

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

SYSTEM-2 120V UPS (-) (+)

	1	
TANK #1 OUTLET VALVE CLOSED	2	
	3	
TANK # 1 HHLA	4	
	5	
	6	
TANK #1 HLA	7	
	8	
	9	
TANK #1 LLA	10	
	11	
	12	
TANK #1 LLLA	13	
	14	
	15	
TANK #2 OUTLET VALVE CLOSED	16	
	17	
	18	
TANK #2 HHLA	19	
	20	
	21	
TANK # 2 HLA	22	
	23	
	24	
TANK #2 LLA	25	
	26	
	27	
TANK #2 LLLA	28	
	29	
	30	
SPARE	31	
	32	
	33	

TB-6-IN
MISCELLANEOUS
Non-redundant

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

NONREDUNDANT 120V UPS (-) (+)

	1	
PRODUCT RECOVERY TANK OVERFILL VALVE	2	
	3	
PRODUCT RECOVERY TANK LEAK DETECTION	4	
	5	
CR2	6	
PRODUCT RECOVERY TANK HHLA	7	
	8	
CR3	9	
PRODUCT RECOVERY TANK HLA	10	
	11	
ER1	12	
EMERGENCY STOP STATUS	13	
	14	
ER2	15	
EMERGENCY SHUTOFF VALVE STATUS	16	
	17	
ER3	18	
EMERGENCY CIRCUIT POWER STATUS	19	
	20	
	21	
PUMPROOM EMERGENCY SHOWER FLOWSWITCH	22	
	23	
	24	
TANK 1 INLET VALVE OPEN	25	
	26	
	27	
TANK 2 INLET VALVE OPEN	28	
	29	
	30	
I34 VALVE OPEN	31	
	32	
	33	
I34 VALVE CLOSED	34	
	35	
	36	

CONTINUED

TB-6-IN
MISCELLANEOUS
Non-redundant

CONTINUED

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

(+) (-) (-)

I35 VALVE OPEN	37	
	38	
	39	
I35 VALVE CLOSED	40	
	41	
	42	
R10 VALVE OPEN	43	
	44	
	45	
R10 VALVE CLOSED	46	
	47	
	48	
R11 VALVE OPEN	49	
	50	
	51	
R11 VALVE CLOSED	52	
	53	
	54	
I1 VALVE OPEN	55	
	56	
	57	
I1 VALVE CLOSED	58	
	59	
	60	
I2 VALVE OPEN	61	
	62	
	63	
I2 VALVE CLOSED	64	
	65	
	66	
MOV1 OPEN	67	
	68	
	69	
MOV1 CLOSED	70	
	71	
	72	

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

(+) (-) (-)

MOV2 OPEN	73	
	74	
	75	
MOV2 CLOSED	76	
	77	
	78	
MOV3 OPEN	79	
	80	
	81	
MOV3 CLOSED	82	
	83	
	84	
MOV4 OPEN	85	
	86	
	87	
MOV4 CLOSED	88	
	89	
	90	
MOV5 OPEN	91	
	92	
	93	
MOV5 CLOSED	94	
	95	
	96	
MOV6 OPEN	97	
	98	
	99	
MOV6 CLOSED	100	
	101	
	102	
MOV7 OPEN	103	
	104	
	105	
MOV7 CLOSED	106	
	107	
	108	

TB-6-IN
MISCELLANEOUS
Non-redundant

CONTINUED

SYSTEM-1 DISCRETE INPUT MODULE | SYSTEM-2 DISCRETE INPUT MODULE

(+) (-) (-)

SW1 ACTIVE	109	
	110	
	111	
SW2 ACTIVE	112	
	113	
	114	
FS-7 (EMER. SHOWER)	115	
	116	
	117	
	118	
SPARE	119	
	120	
	121	
	122	
SPARE	123	
	124	
	125	
	126	
SPARE	127	
	128	
	129	
	130	

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

DESIGNED BY:
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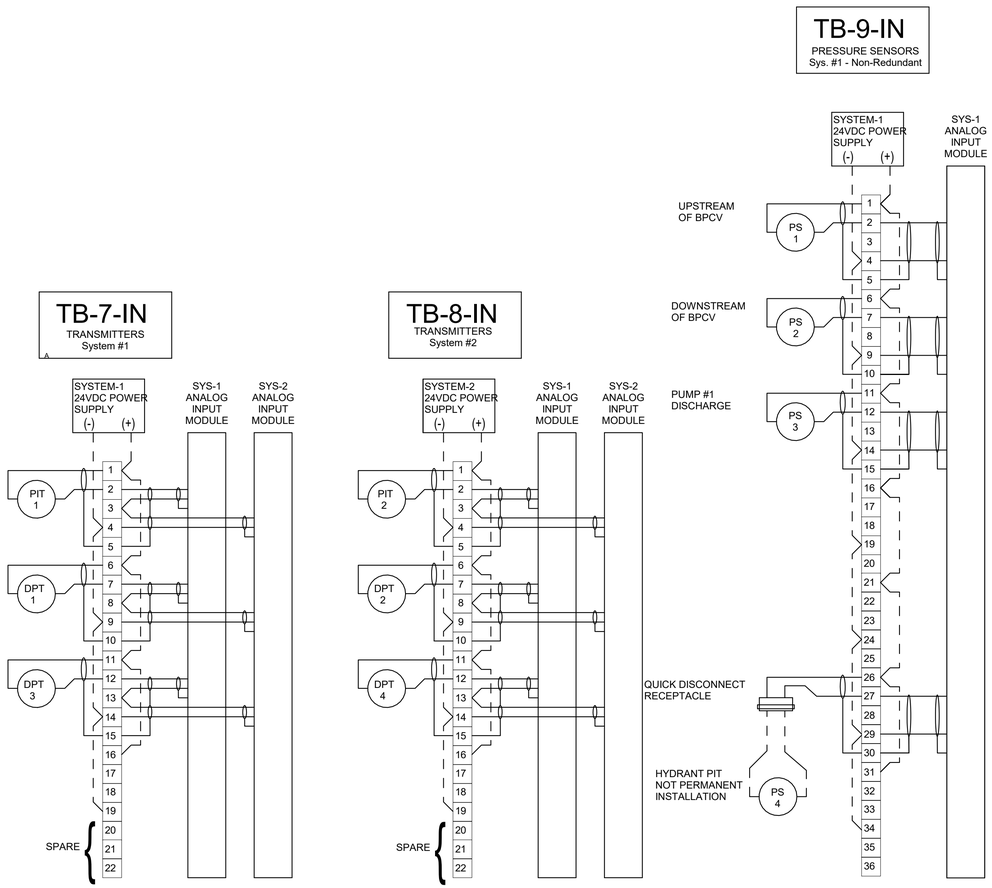
US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

TERMINAL BLOCK CONNECTIONS (FOR FIELD DEVICES)

SHEET ID

EI503



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SIZE: ANSI D

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OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

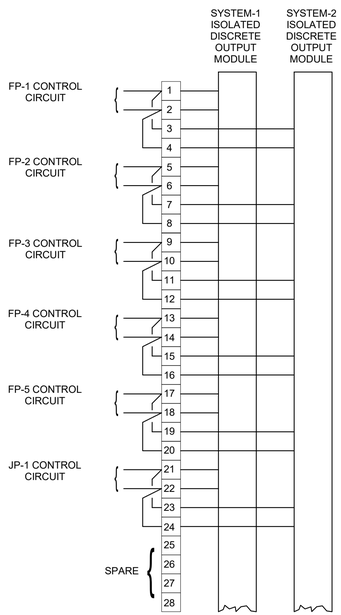
TERMINAL BLOCK CONNECTIONS (FOR FIELD DEVICES) CONTINUED

SHEET ID

EI504

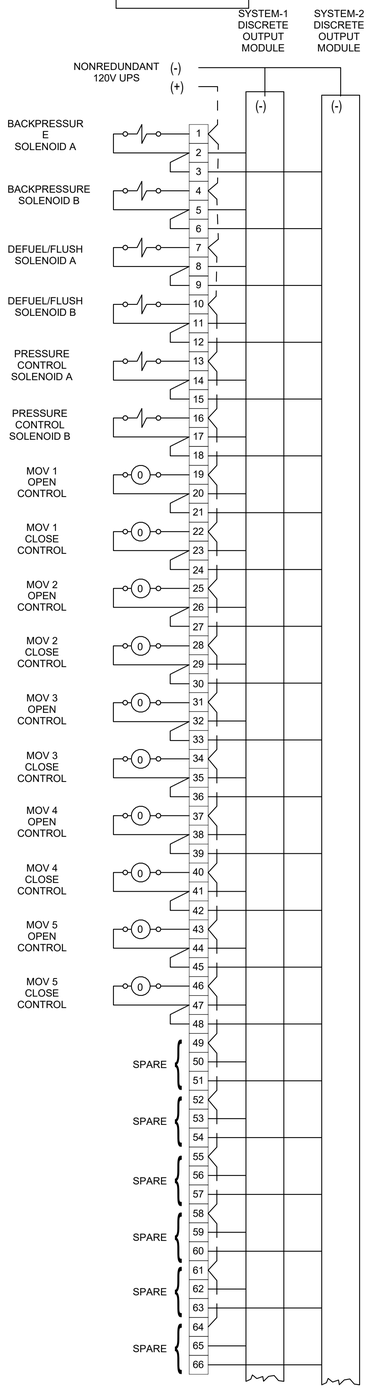
TB-1-OUT

AUTO PUMP START/DISABLE



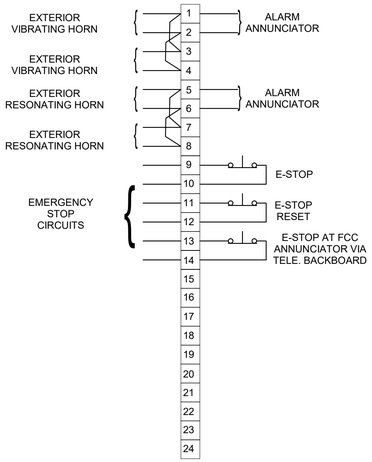
TB-2-OUT

MISCELLANEOUS 120VAC



TB-3-OUT

MISCELLANEOUS Non-Redundent



TB-1-IN

PUMP STATUS Non-redundent

FIRST LINE OF TEXT SHALL BE 1/4 " HEIGHT AND THE SECOND AND/OR THIRD LINES SHALL BE 1/8 " HEIGHT. SEE THIS SHEET FOR FULL TEXT.

TYPICAL TERMINAL BLOCK NAMEPLATE

NOTE:

THESE TERMINAL BLOCK CONNECTIONS ARE INTENDED TO SHOW CONNECTIONS TO FIELD DEVICES ONLY. THE PUMP CONTROL PANEL MANUFACTURER MAY REQUIRE SEVERAL MORE TERMINAL BLOCKS FOR CONNECTIONS TO ANNUNCIATOR, GRAPHICS PANEL, PERSONAL COMPUTER, HORNS, ETC.

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

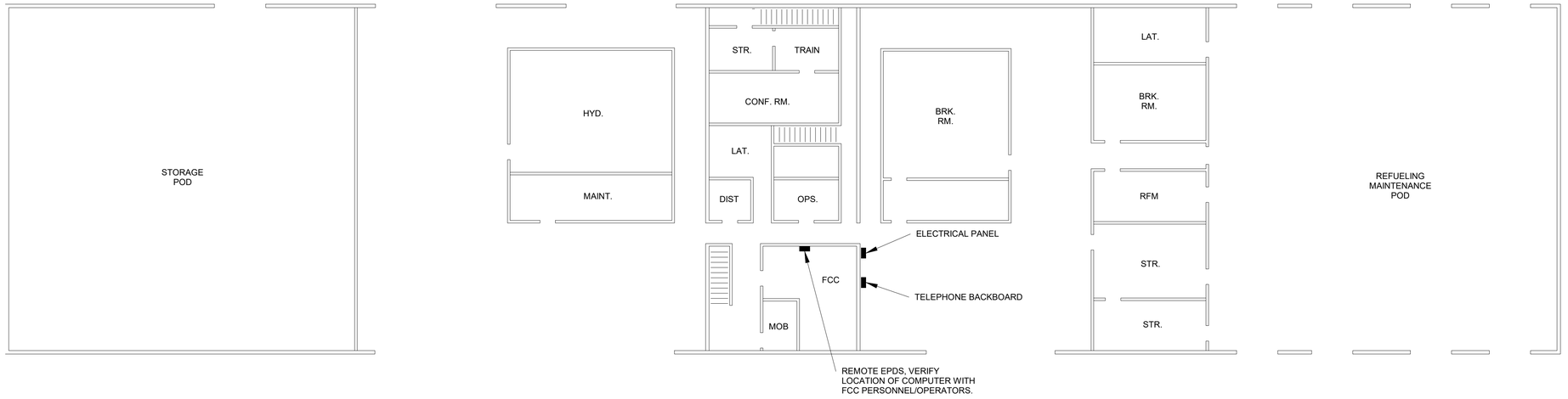
TERMINAL BLOCK DIAGRAMS

SHEET ID

EI505

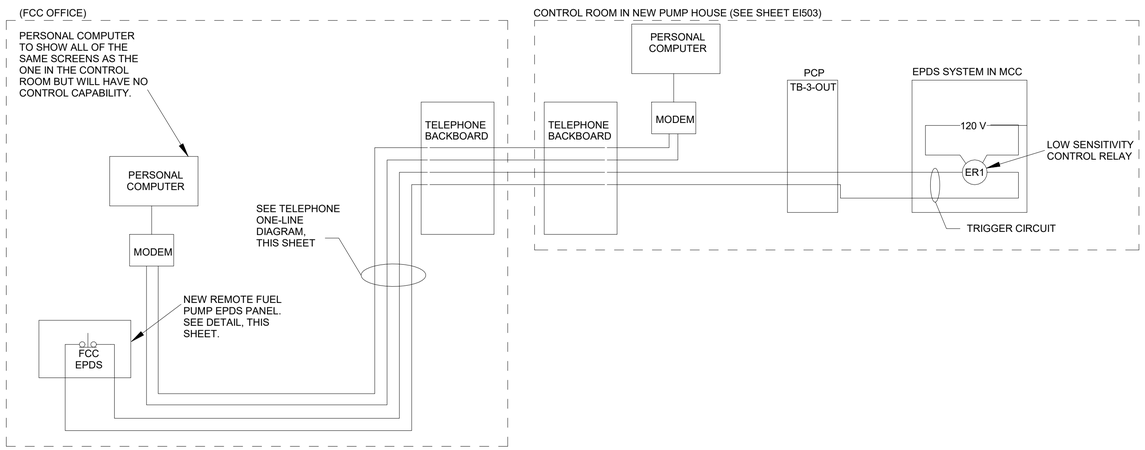
NOTES TO DESIGNER

1. PLACE THE APPROPRIATE FCC INFORMATION ON THIS SHEET.



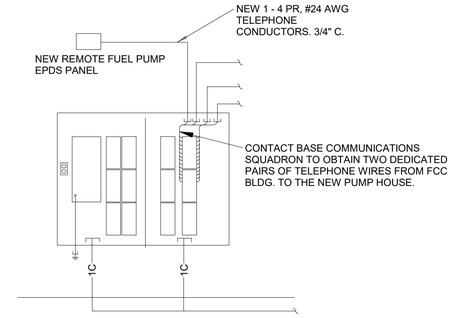
E1 TYPICAL EXISTING FUELS CONTROL CENTER (FCC) BLDG. FLOOR PLAN

SCALE: NTS



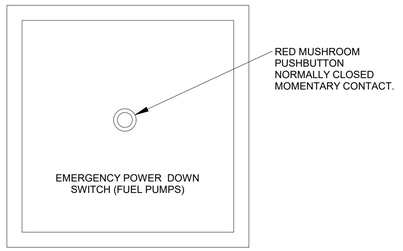
B1 FCC OFFICE/CONTROL ROOM REMOTE EPDS AND COMPUTER SCHEMATIC

SCALE: NTS



C7 TYPICAL EXISTING FCC TELEPHONE BACKBOARD

SCALE: NTS



A6 REMOTE FUEL PUMP EPDS PANEL

SCALE: NTS

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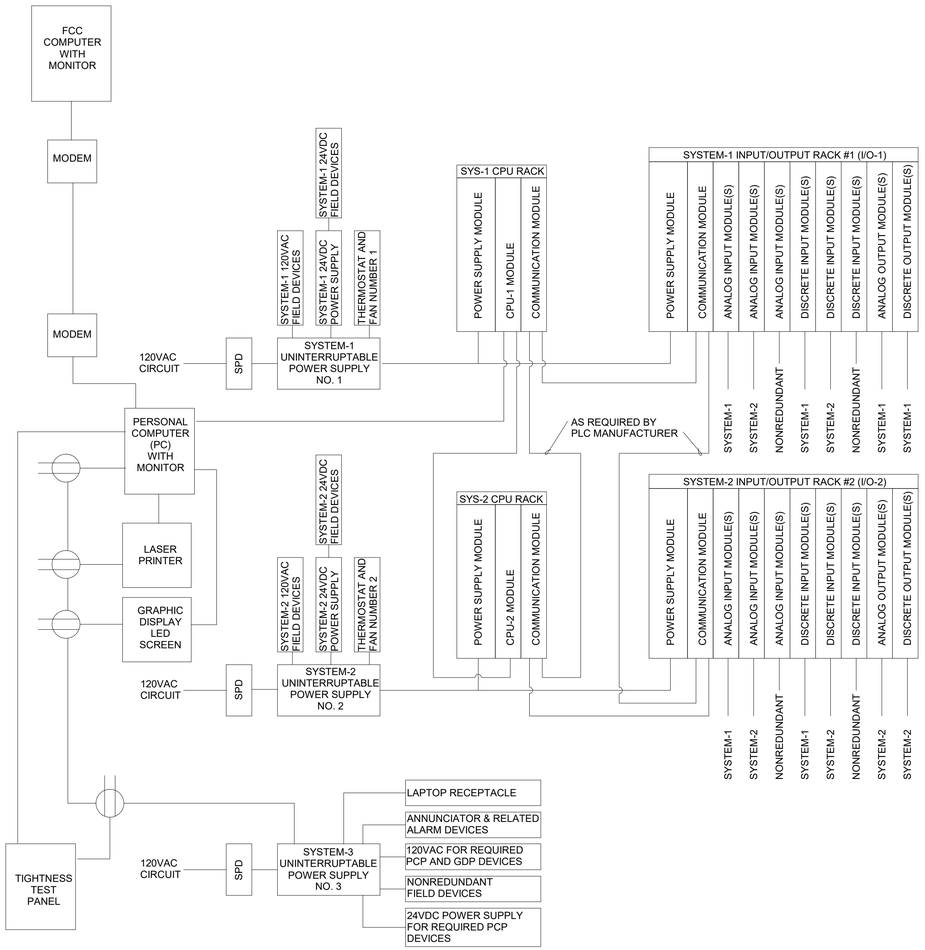
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

EPDS CONTROLS AT FCC

SHEET ID

EI506



OPERATING TANK #1 HIGH-HIGH LEVEL	(RED)	OPERATING TANK #2 HIGH-HIGH LEVEL	(RED)	(BLANK)	(RED)	FUEL PUMP #1 FAILURE	(WHITE)	EMERGENCY STOP	(RED)
OPERATING TANK #1 HIGH LEVEL	(WHITE)	OPERATING TANK #2 HIGH LEVEL	(WHITE)	(BLANK)	(WHITE)	FUEL PUMP #2 FAILURE	(WHITE)	EMERGENCY SHOWER ALARM	(RED)
OPERATING TANK #1 LOW LEVEL	(WHITE)	OPERATING TANK #2 LOW LEVEL	(WHITE)	FSR #1 FILTER SEPERATOR RECEIPT #1	(WHITE)	FUEL PUMP #3 FAILURE	(WHITE)	SYSTEM-1 PLC FAILURE	(WHITE)
OPERATING TANK #1 LOW-LOW LEVEL	(RED)	OPERATING TANK #2 LOW-LOW LEVEL	(RED)	FSR #2 FILTER SEPERATOR RECEIPT #2	(WHITE)	FUEL PUMP #4 FAILURE	(WHITE)	SYSTEM-1 DATA FAILURE	(WHITE)
PRODUCT RECOVERY TANK HIGH-HIGH LEVEL	(RED)	PRODUCT RECOVERY TANK OVERFILL VALVE CLOSED	(WHITE)	4 VALVE MANIFOLD/TANK SETUP ERROR	(RED)	FUEL PUMP #5 FAILURE	(WHITE)	SYSTEM-2 PLC FAILURE	(WHITE)
PRODUCT RECOVERY TANK HIGH LEVEL	(WHITE)	PRODUCT RECOVERY TANK LEAK DETECTED	(WHITE)	PCP HIGH TEMPERATURE	(WHITE)	JOCKEY PUMP #1 FAILURE	(WHITE)	SYSTEM-2 DATA FAILURE	(WHITE)

NOTES:

1. (WHITE) - WHITE WINDOW WITH BLACK LETTERS
2. (RED) - RED WINDOW WITH WHITE LETTERS
3. RED WINDOW ALARMS (CRITICAL) SHALL SOUND THE EXTERIOR RESONATING HORNS AND PUMP CONTROL PANEL HORN. THE WHITE WINDOW ALARMS (NON-CRITICAL) SHALL SOUND THE EXTERIOR VIBRATING HORNS AND THE PUMP CONTROL PANEL HORN.
4. CRITICAL ALARMS SHALL STOP ALL PUMPS RUNNING IN AUTOMATIC MODE.

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DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL SYSTEM DIAGRAMS

SHEET ID

EI601

SYSTEM-2 PLC IN PCP

SYSTEM-1 PLC IN PCP

PUMP CONTROL PANEL (PCP)

EPDS PANEL

MCC

DI OPEN/CLOSED
DI OPEN/CLOSED
DI CLOSED
DI CLOSED
DI OPEN
DI OPEN
DI LOW-LOW
DI LOW-LOW
DI LOW
DI LOW
DI HIGH
DI HIGH
DI HIGH-HIGH
DI HIGH-HIGH
DI I1 OPEN
DI I1 CLOSED
DI HIGH-HIGH
DI HIGH-HIGH
DI HIGH
DI HIGH
DI LOW
DI LOW
DI I2 OPEN
DI I2 CLOSED
DI LOW-LOW
DI LOW-LOW
DI I35 OPEN
DI I35 CLOSED
DI I34 OPEN
DI I34 CLOSED
DI R10 OPEN
DI R10 CLOSED
DI R11 OPEN
DI R11 CLOSED
DI FSR #1 ACTIVATED
DI FSR#2 ACTIVATED

LSHH 17
LSHH 16
LSL 15
LSHH 14
OPERATING TANK NUMBER 1

LSHH 27
LSH 26
LSL 25
LSLL 24
OPERATING TANK NUMBER 2

ZS 10
ZS 11
OUTLET VALVE

ZS 12
ZS 13
INLET VALVE

ZS 20
ZS 21
OUTLET VALVE

ZS 22
ZS 23
INLET VALVE

ZS 70
ZS 71
I34 VALVE

ZS 74
ZS 75
R10 VALVE

ZS 72
ZS 73
I35 VALVE

ZS 76
ZS 77
R11 VALVE

SW 1
FILTER SEPARATOR

FILTER SEPARATOR
SW 2

FROM PRODUCT RECOVERY TANK

FROM BULK STORAGE

MATCH LINE - SEE SHEET EI603

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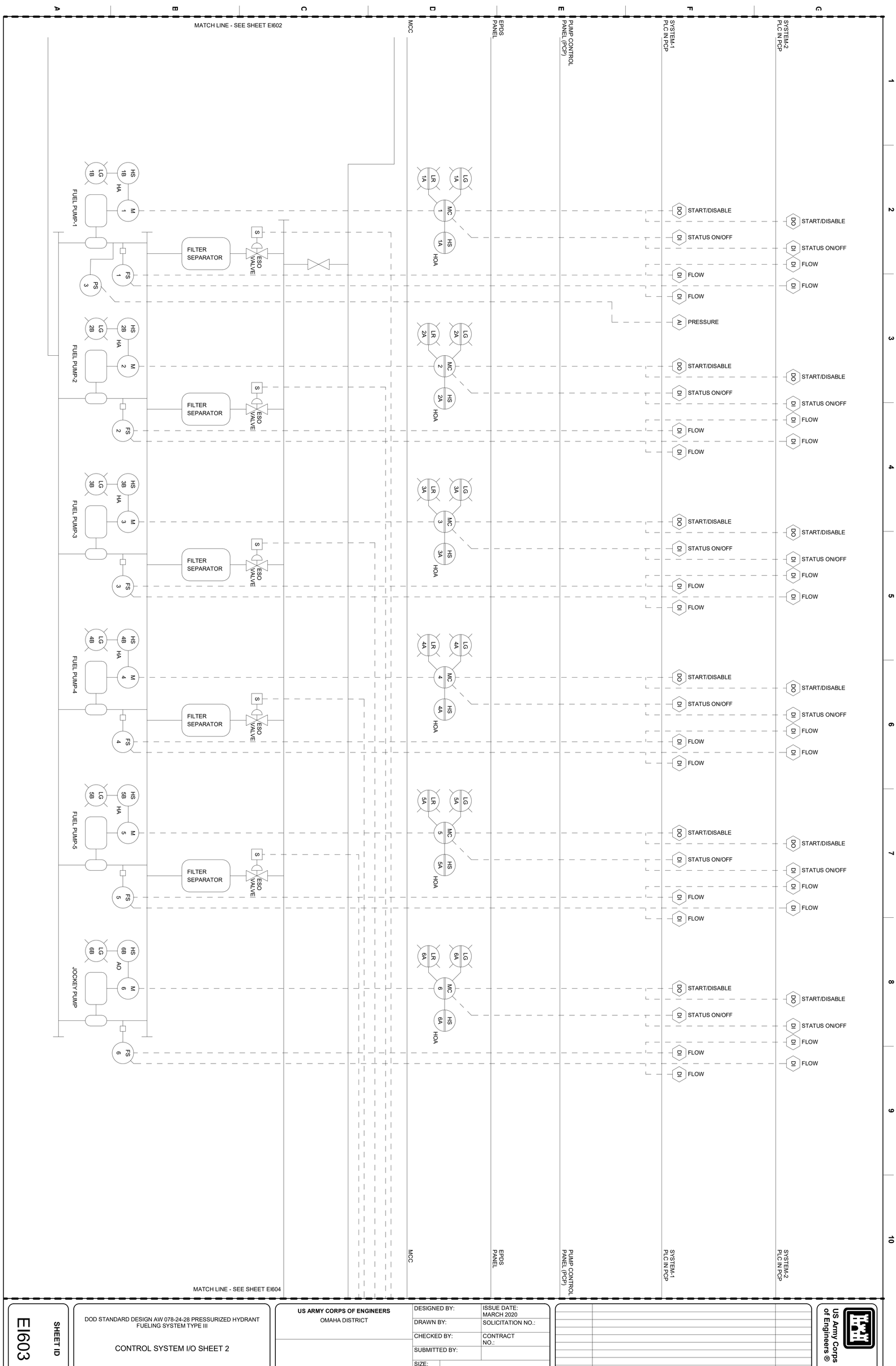
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL SYSTEM I/O SHEET 1

SHEET ID

EI602



SHEET ID: EI603	DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III CONTROL SYSTEM I/O SHEET 2	US ARMY CORPS OF ENGINEERS OMAHA DISTRICT	DESIGNED BY: / ISSUE DATE: MARCH 2020 DRAWN BY: / SOLICITATION NO.: CHECKED BY: / CONTRACT NO.: SUBMITTED BY: SIZE: ANSI D

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1 2 3 4 5 6 7 8 9 10

G

SYSTEM-2 PLC IN PCP

PRESSURE AI | PRESSURE AI | FLOW RATE AI | FLOW RATE AI | MOV OPEN DO | MOV CLOSE DO | MOV OPEN DO | MOV CLOSE DO | LEAK TEST MOV OPEN DO | LEAK TEST MOV CLOSE DO | MOV OPEN DO | MOV CLOSE DO | FLOW RATE AI | FLOW RATE AI | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | LEAK DI | OPEN/CLOSED DI | HIGH LEVEL DI | HIGH-HIGH LEVEL DI | STATUS ON/OFF DI | STATUS ON/OFF DI

SYSTEM-2 PLC IN PCP

F

SYSTEM-1 PLC IN PCP

PRESSURE AI | PRESSURE AI | FLOW RATE AI | FLOW RATE AI | MOV OPEN DO | MOV CLOSE DO | MOV OPEN DO | MOV CLOSE DO | LEAK TEST MOV OPEN DO | LEAK TEST MOV CLOSE DO | MOV OPEN DO | MOV CLOSE DO | FLOW RATE AI | FLOW RATE AI | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | PRESSURE AI | ENERGIZE/DE-ENERGIZE DO | ENERGIZE/DE-ENERGIZE DO | PRESSURE AI | LEAK DI | OPEN/CLOSED DI | HIGH LEVEL DI | HIGH-HIGH LEVEL DI | STATUS ON/OFF DI | STATUS ON/OFF DI

SYSTEM-1 PLC IN PCP

PUMP CONTROL PANEL (PCP)

E

EPDS PANEL

EPDS PANEL

TO TIGHTNESS TEST PANEL

PRESSURE AI

D

MCC

MCC

START/STOP I-1

LG 30A | LR 30A | MC 30 | HS 30 HOA

START/STOP I-2

LG 7A | LR 7A | MC 7 | HS 7A HR

C

PIT 1 | PIT 2 | PDT 1 | PDT 2 — ISSUE VENTURI

M | M | M | M

PIT 3

PDT 3 | PDT 4 — RETURN VENTURI

PS 1 — S S — BACKPRESSURE CONTROL VALVE (BPCV)

PS 2

S S — DEFUEL/FLUSH VALVE (D/FV)

S S — PRESSURE CONTROL VALVE (PCV)

ZS 32 — OVERFILL VALVE (OV)

FROM PUMP HOUSE

M 30 | FS 30

TO PUMP HOUSE

P — FUEL TRANSFER PUMP (FTP)

XS 33 — LEAK DETECTION RELAY

LSHH 34 | LSH 31 | LSH 30 | LSL 30

PRODUCT RECOVERY TANK

HS 7B AO | M 7 | LG 7B | FS 7 — PUMPHOUSE DRAIN PUMP

B

TO HYDRANT HOSE CHECKOUT AND TRUCK FILL STANDS

TO APRON FUEL LOOP

FROM APRON FUEL LOOP

FROM HYDRANT HOSE TRUCK CHECKOUT

A

MATCH LINE - SEE SHEET EI603

MATCH LINE - SEE SHEET EI605

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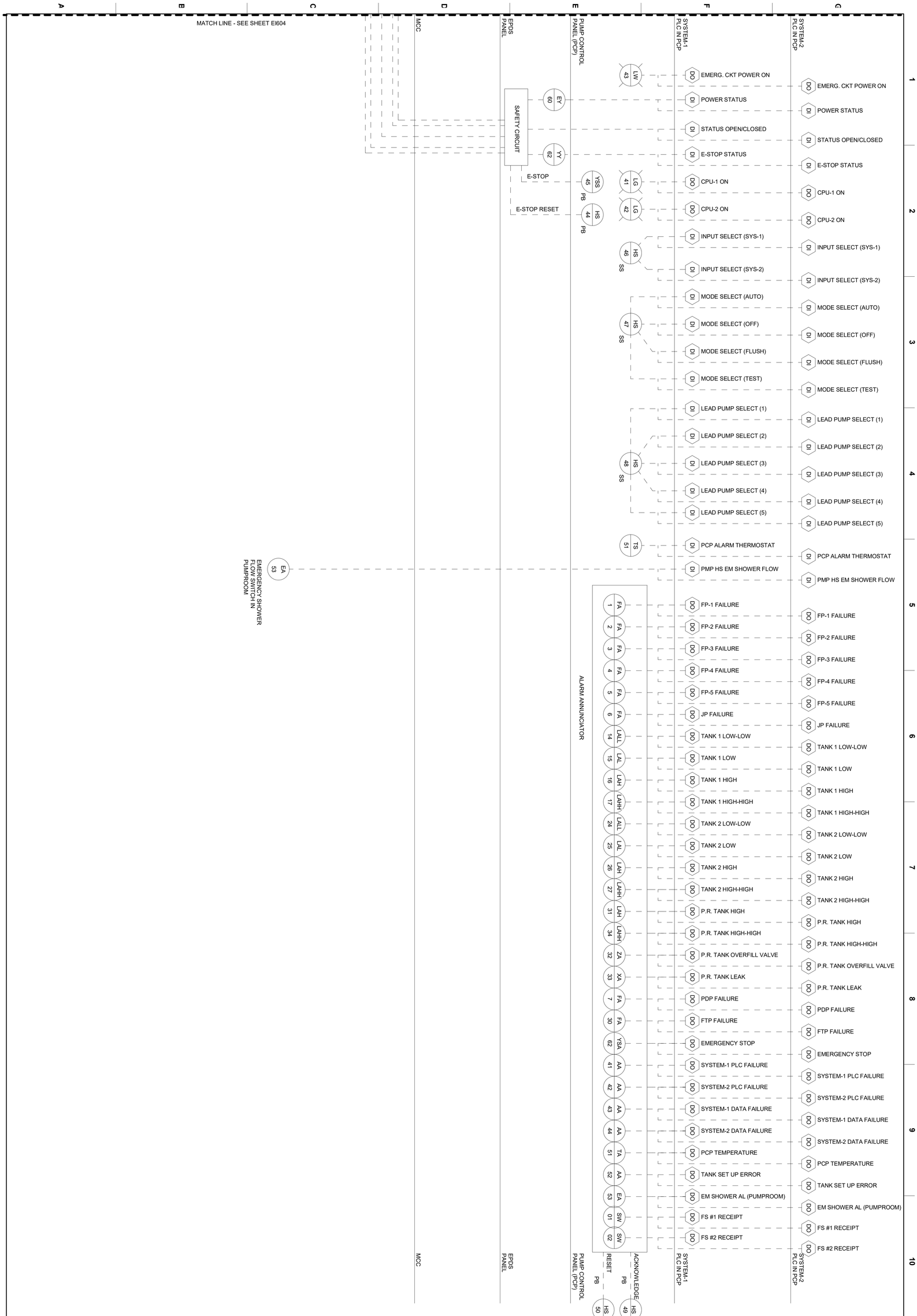
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

CONTROL SYSTEM I/O SHEET 3

SHEET ID

EI604



SHEET ID: EI605	DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III CONTROL SYSTEM I/O SHEET 4	US ARMY CORPS OF ENGINEERS OMAHA DISTRICT	DESIGNED BY: / ISSUE DATE: MARCH 2020 DRAWN BY: / SOLICITATION NO.: CHECKED BY: / CONTRACT NO.: SUBMITTED BY: SIZE: ANSI D

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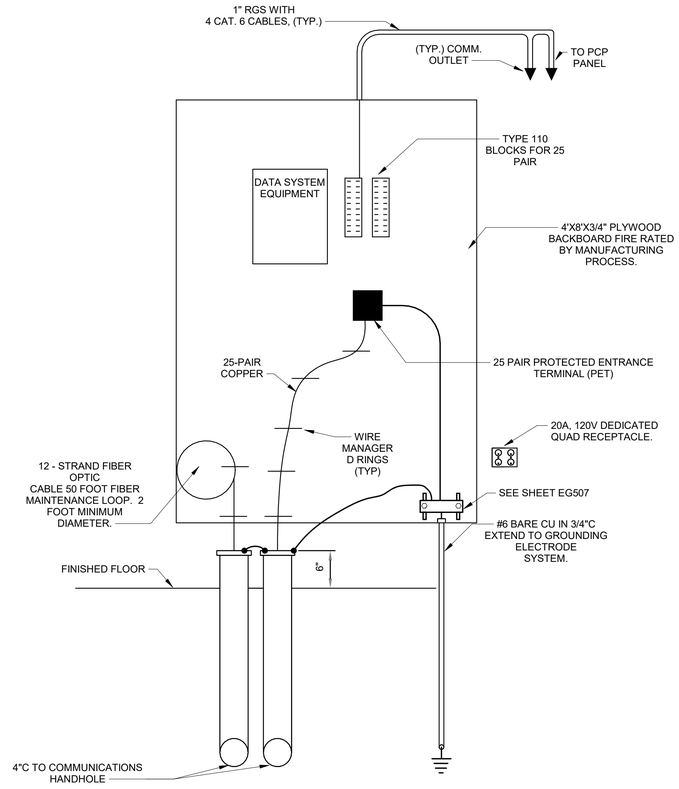

NOTES:

1. 4" CONDUIT WITH 4 - 1 1/4" INNER DUCT, WITH OUTSIDE PLANT MIN 25-PAIR #24 AWG OUTSIDE PLANT VOICE SERVICE ENTRANCE CABLE.

2. 4" CONDUIT WITH 4 - 1 1/4" INNER DUCT TO RUN 12-STRAND 62.5/125um MULTI-MODE FIBER OPTIC OUTSIDE PLANT SERVICE ENTRANCE CABLE. MOUNT FIBER OPTIC LIU OR PATCH PANEL WITH TIA/EIA "SC" TYPE CONNECTOR, (604-3A).

3. OSP CONDUCTORS SHIELDS, ARMOR, AND METALLIC STRENGTH MEMBERS MUST BE BONDED TO THE LIGHTNING PROTECTION SYSTEM. SEE SHEET EG601 FOR FURTHER REQUIREMENTS.

4. RISER IS TYPICAL ONLY. SEE FLOOR PLANS FOR EXACT NUMBER AND LOCATIONS OF OUTLETS, RACKS, AND CABLE TRAY.

5. CONTRACTOR SHALL TERMINATE HORIZONTAL CAT 6 EIGHT CONDUCTOR, TWISTED PAIR ON RACK MOUNTED 110 BLOCKS WITH CONNECTORS.

6. GROUND TTB's RACKS, CABLE TRAYS, ETC., PER ANSI/TIA/EIA 607A.

7. FOR VOICE PATCH PANEL, WALL MOUNTED 100-PAIR 110-TYPE BLOCKS, SHALL HAVE C4 CONNECTORS FOR THE FIRST FIVE SLOTS AND C5 AT THE END OF EACH 25 PAIRS. 110 PUNCH DOWN BLOCKS NEED TO BE ANSI/TIA/EIA 568-A CAT 6 COMPLIANT.

8. DUCT STUB-UPS FOR DATA AND COMMUNICATIONS CABLING SHALL BE SEALED. PROVIDE MECHANICAL PLUGS FOR EMPTY DUCTS ON BOTH ENDS. TEMPORARY MECHANICAL PLUGS SHALL BE PROVIDED FOR DUCTS UNTIL CABLING IS INSTALLED AND COMPLETED.

D4 TELECOMMUNICATIONS BACKBOARD

SCALE: N.T.S.

DESIGNER NOTES:

1. DOR IS REQUIRED TO COORDINATE WITH ACTUAL FACILITY REQUIREMENTS.

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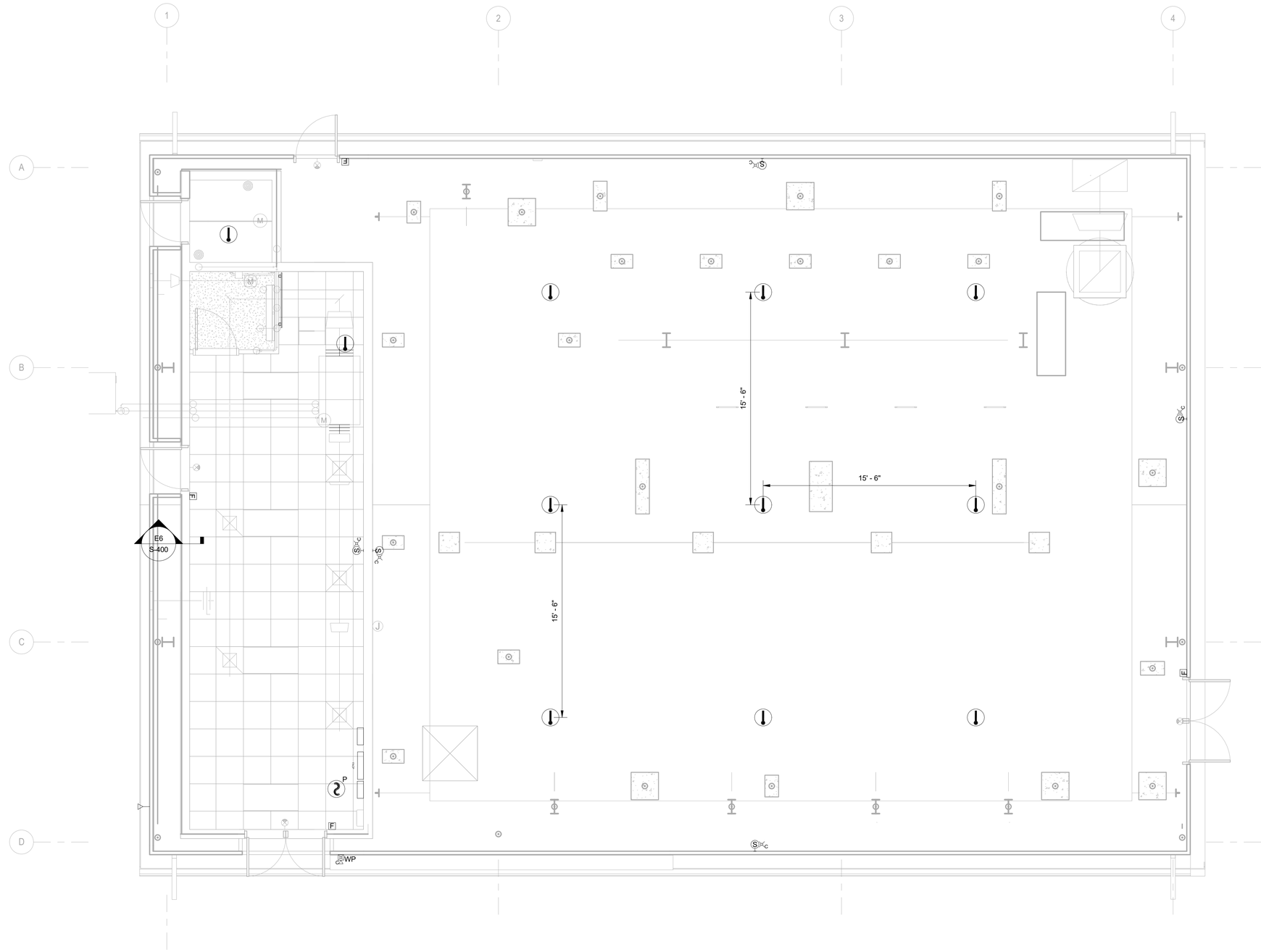
DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

TELECOMMUNICATIONS BACKBOARD

SHEET ID

ET501



A1 FIRE ALARM

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

0 2' 4' 8'

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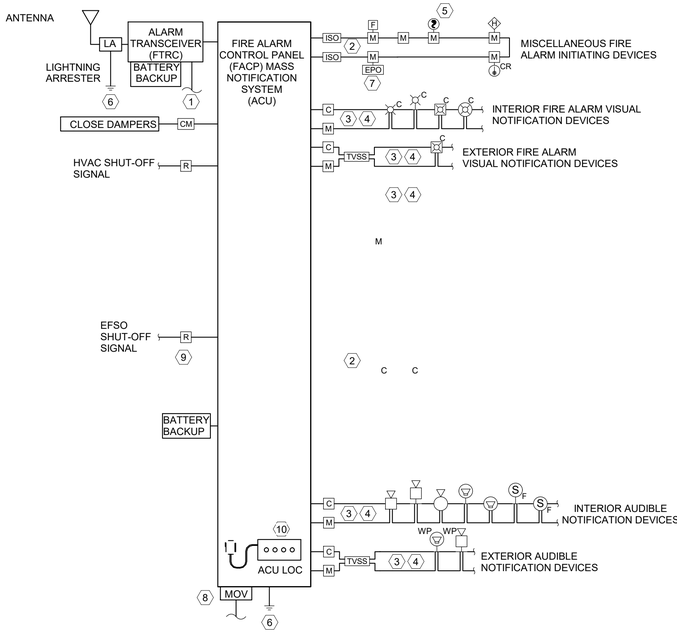
DOD STANDARD DESIGN AW 078-2428 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FIRE DETECTION SYSTEM PLAN

SHEET ID

FA101



C2 FIRE ALARM RISER DIAGRAM

SCALE: NTS

KEYNOTES:

1. CONNECT TO 120 VAC, 20 AMP DEDICATED CIRCUIT FROM PANEL MCC-P1. TRANSIENT VOLTAGE SURGE SUPPRESSION (TVSS) IS TO BE POWERED FROM PANEL MCC-P1.

2. PROVIDE ADDITIONAL SIGNALING LINE CIRCUITS AS REQUIRED FOR THE QUANTITY OF DEVICES REQUIRED. RISER IS DIAGRAMATTIC IN NATURE AND SHOWS TYPICAL DEVICES, BUT NOT COMPREHENSIVE QUANTITIES.

3. PROVIDE ADDITIONAL NOTIFICATION APPLIANCE CIRCUITS AND REMOTE POWER SUPPLIES, AS REQUIRED, SUCH THAT VOLTAGE DROP DOES NOT EXCEED THE MAXIMUM ALLOWED BY THE MANUFACTURER PER CIRCUIT. ADDITIONAL NOTIFICATION CIRCUITS AND ADDITIONAL POWER SUPPLIES MAY BE REQUIRED, DEPENDING ON THE EQUIPMENT PROVIDED. SMOKE DETECTORS SHALL BE PROVIDED ABOVE REMOTE SUPPLIES AND CONNECTED TO FACP INITIATING DEVICE LOOP.

4. MAXIMUM NUMBER OF NOTIFICATION DEVICES PER CIRCUIT SHALL BE IN ACCORDANCE WITH THE CONTROL PANEL LIMITATIONS. CONDUCTOR INTEGRITY MONITORING IS REQUIRED.

5. PROVIDE SMOKE DETECTOR TO PROTECT FIRE ALARM/MASSS NOTIFICATION PANEL AND ANY REMOTE NOTIFICATION POWER SUPPLIES.

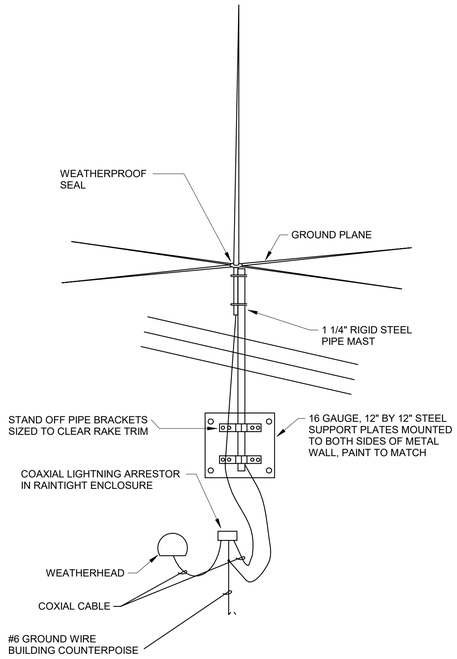
6. PROVIDE GROUND PER NFPA 70.

7. HVAC SHUTDOWN SWITCH (EPO). EPO SHALL BE LOCATED EITHER IN OR ADJACENT TO LOC.

8. CABINET MOUNTED METAL OXIDE VARISTOR (MOV) BASED SURGE PROTECTION DEVICE (SPD), AT THE FACP POWER INPUT. THE DEVICE SHALL SUPPLEMENT THE SPD INTEGRAL TO THE FACP/ACU. THE DEVICE SHALL BE UL 1449 LISTED (3RD EDITION) AND SHALL SATISFY THE REQUIREMENTS OF IEEE C62.41.

9. TO EPDS RELAY PANEL CONTACT. SEE EP SERIES SHEETS FOR LOCATION.

10. LOCAL OPERATING CONSOLE (LOC) WITH INTEGRAL MICROPHONE.



C7 FIRE ALARM ANTENNA DIAGRAM

SCALE: NTS

GENERAL NOTES:

1. RISER IS DIAGRAMMATIC REPRESENTATION OF THE FIRE ALARM/MASS NOTIFICATION SYSTEM AND IS NOT CONSIDERED COMPLETE. SEE FIREL ALARM/MASS NOTIFICATION PLANS FOR LOCATIONS OF INITIATING DEVICES AND NOTIFICATION APPLIANCES. PROVIDE DEVICES FOR A COMPLETE FUNCTIONAL SYSTEM NOT LIMITED TO ADDRESSABLE MONITOR MODULES FOR ALL DEVICES THAT DO NOT HAVE ADDRESS AND CONTROL MODULES TO CONTROL AUXILIARY FUNCTIONS.

2. FACP SHALL HAVE TVSS ON ALL FIRE ALARM CIRCUITS ENTERING AND LEAVING THE FACILITY, INCLUDING, BUT NOT LIMITED TO THE POWER SUPPLY CIRCUITS TO THE FACP AND CIRCUITS INTERFACING WITH THE FIRE ALARM RECEIVING STATIONS, (COMMUNICATIONS CIRCUITS), ANTENNA SYSTEMS.

3. VERIFY QUANTITY AND LOCATIONS OF TAMPER SWITCHES , WATER FLOW SIWTCHES, PRESSURE SUITCHES, SOLONOIDS, AND THEIR RESPECTIVE MONITOR AND CONTROL MODULES WITH FIRE PROTECTION INSTALLER.

4. REFER TO FIRE ALARM/MASS NOTIFICATION FLOOR PLANS AND SPECIFICATIONS FOR PRELIMINARY QUANTITY AND LOCATIONS OF INDICATIONS AND NOTIFICATIONS DEVICES AND REMOTE LOCAL OPERATING CONSOLES.

5. BATTERY CALCULATIONS MUST BE SUBMITTED TO VERIFY THE POWER SUPPLY PROVIDED IS CAPABLE OF SUPPORTING THE ELECTRICAL LOAD OF THE NEW DEVICES.

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FIRE ALARM RISER DIAGRAM

SHEET ID

FA501

SYSTEM INPUTS

SYSTEM OUTPUTS

		ANNUNCIATION AT LOCAL PANELS (FACP)							TRANSMIT SIGNAL TO HEADEND EQUIPMENT FLEC VIA DEDICATED ZONE ON TRANSCEIVER								FIRE SUPPRESION SYSTEM, CONTROL, AND AUXILIARY FUNCTIONS											BUILDING NOTIFICATION											FACP FUNCTION		
	ALARM DEVICES	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
1	MANUAL FIRE ALARM PULL STATIONS - CONTROL ROOM	●				●			●									●				●		●						●	●									1
2	MANUAL FIRE ALARM PULL STATIONS - PUMP ROOM	●				●			●									●				●		●						●	●									2
3	SMOKE DETECTORS - ABOVE FACP	●							●			●						●				●		●						●	●									3
4	HVAC SHUTDOWN (EPO STATION AT LOC)																	●				●		●																4
5	(RESERVED)																																							5
6	HEAT DETECTORS	●							●			●						●				●		●						●	●									6
7	(RESERVED)																																							7
8	(RESERVED)																																							8
9	(RESERVED)																																							9
10	(RESERVED)																																							10
	SUPERVISORY DEVICES	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
11	(RESERVED)																																							11
12	SUPERVISORY TAMPER SWITCH - TRANSCEIVER DOOR		●							●																														12
13	CONTROL COMPONENT COMMON TROUBLE CONDITION		●							●																														13
14	(RESERVED)																																							14
15	(RESERVED)																																							15
16	(RESERVED)																																							16
17	(RESERVED)																																							17
18	(RESERVED)																																							18
	TROUBLE FUNCTIONS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
19	INITIATING DEVICE CIRCUIT OPEN			●	●						●																													19
20	INITIATING DEVICE CIRCUIT SHORT			●	●						●																													20
21	INITIATING DEVICE CIRCUIT GROUND			●	●						●																													21
22	NOTIFICATION APPLIANCE CIRCUIT OPEN			●	●						●																													22
23	NOTIFICATION APPLIANCE CIRCUIT SHORT			●	●						●																													23
24	NOTIFICATION APPLIANCE CIRCUIT GROUND			●	●						●																													24
25	AC POWER FAILURE			●							●																													25
26	TEST MODE			●							●																													26
27	LOW BATTERY VOLTAGE			●							●																													27
28	SUPERVISED COMPONENT FAILURE			●							●																													28
29	SMOKE DETECTOR DISCONNECTION/TAMPER			●	●						●																													29
	PANEL FUNCTIONS	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
30	SYSTEM SILENCE			●							●												●															●		30
31	SYSTEM RESET																						●																●	31
	MASS NOTIFICATION SYSTEM	A	B	C	D	E	F	G	H	I	J	K	L	M	N	O	P	Q	R	S	T	U	V	W	X	Y	Z	AA	BB	CC	DD	EE	FF	GG	HH	JJ	KK	LL	MM	
32	VOICE MESSAGE SYSTEM ACTIVATED						●						●								●										●								32
33	ANNOUNCEMENT FROM BASEWIDE SYSTEM VIA ANTENNA/RECIEVER							●					●						●		●										●								33
34	PRERECORDED MESSAGE ACTIVATED AT ACU (TYP. FOR EACH BUTTON)							●					●							●	●										●								34
35	PRERECORDED MESSAGE ACTIVATED AT LOC (TYP. FOR EACH BUTTON)							●					●							●	●										●								35
36	LOC LIVE VOICE ACTIVATED							●					●							●	●										●								36
37	MASS NOTIFICATION TROUBLE				●									●																										37
38	(RESERVED)																																							38
39	(RESERVED)																																							39
40	(RESERVED)																																							40

AUDIO-VISUAL FIRE ALARM INDICATION BY ZONE
AUDIO-VISUAL SUPERVISORY INDICATION BY DEVICE
AUDIO-VISUAL COMMON TROUBLE INDICATION
AUDIO-VISUAL TROUBLE INDICATION BY ZONE
AUDIO-VISUAL ALARM INDICATION BY DEVICE
AUDIO-VISUAL TROUBLE INDICATION FOR MNS ANNOUNCEMENT
TROUBLE INDICATOR FA MAC INTERRUPTED FOR MNS ANNOUNCEMENT
COMMON FIRE ALARM SIGNAL FOR BUILDING
COMMON SUPERVISORY SIGNAL FOR BUILDING
COMMON TROUBLE SIGNAL FOR BUILDING
WATERFLOW
SUPERVISORY SIGNAL FOR BUILDING
MASS NOTIFICATION SYSTEM ACTIVE
MASS NOTIFICATION PANEL TROUBLE
SHUT DOWN ALL HVAC/FCU & CLOSE DAMPERS IN OFFICE SPACE
SIGNAL FROM BASE MASS NOTIFICATION EQUIPMENT
SIGNAL TO BASE MASS NOTIFICATION EQUIPMENT
MUTE FA FOR MNS ANNOUNCEMENT
ACTIVATE "HOLD ON" SIGNAL TO EGRESS LIGHTING CONTROLS
DEACTIVATE "HOLD ON" SIGNAL TO EGRESS LIGHTING CONTROLS
SHUT DOWN EPOS SAFETY CIRCUIT
FACILITY FIRE EVACUATION/MASS NOTIFICATION VISUAL SIGNAL - CLEAR STROBES
FACILITY FIRE EVACUATION AUDIO SIGNAL THROUGH SPEAKERS - ALARM TONE
MASS NOTIFICATION AUDIO SIGNAL THROUGH SPEAKERS
EXTERIOR WATERFLOW HORN/STROBE
SILENCE PANEL AND BUILDING FIRE ALARM AUDIBLE/VISUAL NOTIFICATION APPLIANCES STOP
CONTROL PANEL RETURNS TO NORMAL (AUDIBLES AND VISUALS STOP)

A1 FIRE ALARM MATRIX DIAGRAM

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

DESIGNED BY:
DRAWN BY:
CHECKED BY:
SUBMITTED BY:
SIZE: ANSI D

ISSUE DATE: MARCH 2020
SOLICITATION NO.:
CONTRACT NO.:

US ARMY CORPS OF ENGINEERS
OMAHA DISTRICT

DOD STANDARD DESIGN AW 078-24-28 PRESSURIZED HYDRANT FUELING SYSTEM TYPE III

FIRE ALARM MATRIX

SHEET ID

FA502

NOTES:

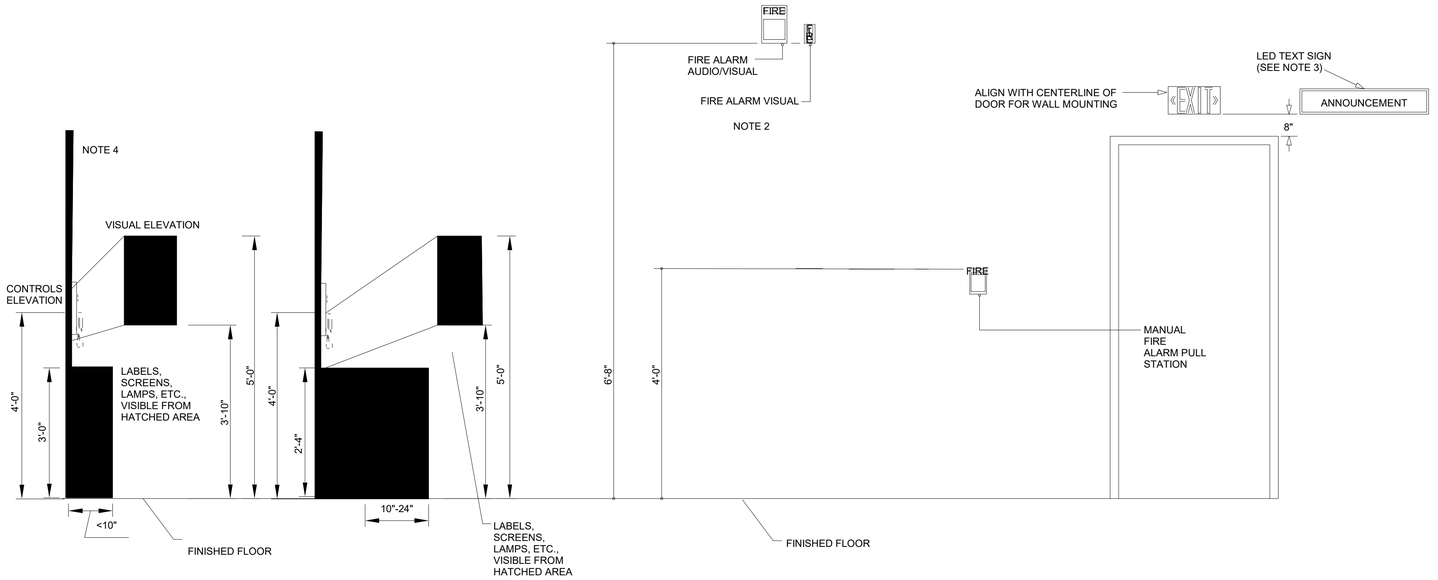
1. THESE MOUNTING HEIGHTS APPLY UNLESS SPECIFIED OR NOTED OTHERWISE ON DRAWINGS.

FIRE ALARM/ANNOUNCEMENT NOTES:

2. WHERE LOW CEILING HEIGHTS DO NOT PERMIT WALL MOUNTING AT A MINIMUM OF 80", WALL-MOUNTED VISIBLE APPLIANCES SHALL BE MOUNTED WITHIN 6" OF CEILING.

3. CONTRACTOR SHALL INSTALL LED TEXT SIGN IN ACCORDANCE WITH SPECIFICATION 28 31 76.

4. LOC CONTROLS SHALL BE MOUNTED AS SPECIFIED IN NFPA 72; 24.5.14.



C2 Mounting Height Detail

SCALE: NTS

US Army Corps of Engineers ®

MARK	DESCRIPTION	DATE

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FIRE ALARM MOUNTING HEIGHTS

SHEET ID

FA503