

FILE NAME: G:\14 Jobs\14-013 Dhhout - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\M-001 ABBREVIATIONS, LEGEND AND NOTES.dwg LAYOUT NAME: ABBREVIATIONS, LEGEND AND NOTES Legend and Notes PLOTTED: Friday, March 25, 2016 - 9:08am USER: wherrmon

MECHANICAL ABBREVIATIONS AND SYMBOLS

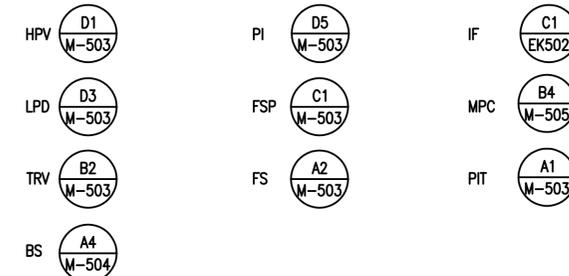
AAE	AUTOMATIC AIR ELEMATOR	m	METER
AAV	AUTOMATIC AIR VENT	MAX	MAXIMUM
AE	AIR ELIMINATOR	MCC	MOTOR CONTROL CENTER
AFF	ABOVE FINISHED FLOOR	MFG	MANUFACTURER
AFG	ABOVE FINISHED GRADE	MH	MANHOLE
API	AMERICAN PETROLEUM INSTITUTE	MIN	MINIMUM
ASTM	AMERICAN FOR TESTING AND MATERIALS	MOV	MOTOR OPERATED VALVE
ATG	AUTOMATIC TANK GAUGE	MPC	METER PROVING CONNECTION
BLDG	BUILDING	MSS	MANUFACTURER STANDARDIZATION SOCIETY
BOP	BOTTOM OF PIPE	N	NORTH
BPCV	BYPASS CONTROL VALVE	NC	NORMALLY CLOSED
BS	BASKET STRAINER	NIC	NOT IN CONTRACT
BV	BYPASS VENTURI	NO	NUMBER OR NORMALLY OPEN
CLR	CLEAR	NPT	NATIONAL PIPE THREAD
CM	CUBIC METER	NTS	NOT TO SCALE
CONC	CONCRETE	OA	OUTSIDE AIR
CS	CARBON STEEL	OC	ON CENTER
CV	CONTROL VALVE	OPS	OPERATIONS
DBB	DOUBLE BLOCK AND BLEED	OST	OPERATING STORAGE TANK
DEG	DEGREES	OTR	OVER THE ROAD
DIA	DIAMETER	OV	OVERFILL VALVE
DPT	DIFFERENTIAL PRESSURE INDICATING TRANSMITTER	P	PUMP
DRN	DRAIN	PCP	PUMP CONTROL PANEL
DWG	DRAWING	PI	PRESSURE INDICATOR
ECC	ECCENTRIC	PIT	PRESSURE INDICATING TRANSMITTER
ELEC	ELECTRICAL	PLC	PROGRAMMABLE LOGIC CONTROL
ELL	ELBOW	PRT	PRODUCT RECOVERY TANK
EQ	EQUAL	PS	PIPE SUPPORT
ETC	ET CETERA	PSI	POUNDS PER SQUARE INCH
EXIST	EXISTING	PV	PRESSURE/VACUUM
FIN	FINISHED	RED	REDUCER
FL	FUSIBLE LINK	REINF	REINFORCING
FM	FLOWMETER OR FORCED MAIN	REQ'D	REQUIRED
FOT	FLAT ON TOP	S	STRAINER
FP	FUEL PUMP	SCH	SCHEDULE
FQI	FLOW QUANTITY INDICATOR (FUEL METER)	SCV	SOLENOID CONTROL VALVE
FQM	FUEL QUANTITY MONITOR	SFI	SIGHT FLOW INDICATOR
F/S	FILTER/SEPARATOR	SHT	SHEET
FS	FILTER/SEPARATOR OR FLOW SWITCH	SRV	SAFETY RELIEF VALVE
FSCV	FILTER/SEPARATOR CONTROL VALVE	SS	STAINLESS STEEL
FSI	FILTER/SEPARATOR ISSUE	STA	STATION
FSP	FUEL SAMPLE POINT CONNECTION	SV	SOLENOID VALVE
FSR	FILTER SEPARATOR RECEIPT	SW	SOCKET WELD
GALV	GALVANIZED	TFCV	TRUCK LOADING CONTROL VALVE
GPM	GALLONS PER MINUTE	THK	THICK
HOA	HAND-OFF-AUTOMATIC	TOP	TOP OF PIPE
HPV	HIGH POINT VENT	TRV	THERMAL RELIEF VALVE
HSS	HOLLOW STRUCTURAL SECTION	TYP	TYPICAL
ID	INSIDE DIAMETER	UG	UNDERGROUND
IF	INSULATING FLANGE	UGE	UNDERGROUND ELECTRICAL
IV	ISSUE VENTURI	UON	UNLESS OTHERWISE NOTED
JA1	JET-A1 JET FUEL	VERT	VERTICAL
KPa	KILOPASCAL	WNF	WELD NECK FLANGE
LAH	LEVEL ALARM HIGH	WSP	WATER DRAW-OFF PUMP
LAHH	LEVEL ALARM HIGH-HIGH	⊙	AT
LAL	LEVEL ALARM LOW	⊕	CENTERLINE
LALL	LEVEL ALARM LOW-LOW	∅	DIAMETER
LCV	LEVEL CONTROL VALVE	⊖	PLATE
LI	LEVEL INDICATOR	±	PLUS/MINUS (APPROXIMATE)
LPD	LOW POINT DRAIN	%	PERCENT
LSH	LEVEL SWITCH HIGH	#	NUMBER
LSHH	LEVEL SWITCH HIGH-HIGH	5D	5 DIAMETERS
LSL	LEVEL SWITCH LOW	W/	WITH
LSLL	LEVEL SWITCH LOW-LOW		
L/S	LITERS PER SECOND		
M	MOTOR ACTIVATED		

MECHANICAL LEGEND

EXISTING	NEW	DESCRIPTION
		FLOW OR PRESSURE CONTROL VALVE
		FLOW OR PRESSURE CONTROL VALVE WITH INTEGRAL THERMAL RELIEF BYPASS (ARROW SHOWS DIRECTION OF RELIEF)
		DOUBLE BLOCK AND BLEED VALVE WITH INTEGRAL BYPASS THERMAL RELIEF (ARROW SHOWS DIRECTION OF BYPASS THERMAL RELIEF FLOW)
		DOUBLE BLOCK AND BLEED PLUG VALVE WITHOUT INTEGRAL BYPASS THERMAL RELIEF
		MOTORIZED ACTUATOR
		BALL VALVE
		BUTTERFLY VALVE
		CHECK VALVE
		HIGH POINT VENT
		WELD NECK FLANGE
		CONCENTRIC REDUCER
		ECCENTRIC REDUCER
		UNION
		THERMAL OR SAFETY RELIEF VALVE
		PRESSURE INDICATOR
		BASKET STRAINER WITH DIFFERENTIAL PRESSURE INDICATOR
		FLOW QUANTITY METER
		FUSIBLE LINK ACTUATOR
		FEMALE HOSE CONNECTION
		TANK CONNECTION NOZZLE
		FILTER/SEPARATOR
		AIR ELIMINATOR
		FLEXIBLE HOSE
		SWIVEL JOINTS
		BLIND FLANGE CONNECTION
		FLOW ARROW
		CONNECT TO EXISTING
		PIPE SUPPORT TYPE, SEE SHEETS M-506, S-508, & S-509
		KEYED NOTE
		FLOW SWITCH
		SOLENOID VALVE
		FUEL PUMP
		DEMOLISH, SEE DEMOLITION NOTES
		FUEL SAMPLE POINT CONNECTION
		UNDERGROUND LINE
		ABOVEGROUND LINE
		PIPE UTILITY LINE ABBREVIATION
		SIZE
		MATERIAL TYPE
		BITUMINOUS CONCRETE
		CONCRETE SLAB (PLAN)
		CONCRETE (SECTION)
		COMPACTED FILL
		COARSE AGGREGATE

MECHANICAL NOTES

- SEE G-003 FOR GENERAL NOTES AND SEQUENCE OF CONSTRUCTION.
- UNLESS OTHERWISE INDICATED, ALL RECEIPT AND RETURN PIPING AND FITTINGS SHALL BE INTERIOR AND EXTERIOR COATED CARBON STEEL. ALL TRUCK FILLSTAND SUPPLY PIPING AND FITTINGS, AND WHERE ELSEWHERE SPECIFIED OR INDICATED, SHALL BE STAINLESS STEEL. ALL CARBON STEEL PIPING SHALL BE INTERIOR AND EXTERIOR COATED. ALL UNDERGROUND OR ENCASED STAINLESS STEEL PIPING SHALL BE EXTERIOR COATED.
- ALL DIMENSIONS SHOWN WITHOUT A DECIMAL POINT ARE MILLIMETERS AND ALL THOSE SHOWN WITH A DECIMAL POINT ARE METERS, UNLESS OTHERWISE NOTED.
- PROVIDE HIGH POINT VENTS WHERE INDICATED AND AT ALL HIGH POINTS. PROVIDE LOW POINT DRAINS WHERE INDICATED AND AT ALL LOW POINTS.
- INSTALL FUEL PIPING WITH A MINIMUM SLOPE OF 0.2% DOWN FROM HIGH POINTS TO LOW POINTS, UNLESS OTHERWISE INDICATED.
- ALL NEW CONNECTIONS TO EXISTING PIPING SHALL BE MADE WITH WELD NECK FLANGES, UNLESS OTHERWISE INDICATED.
- SEE C-001, S-001, AND E-001 FOR OTHER LEGENDS, SYMBOLS AND ABBREVIATIONS. SEE SHEET M-602 FOR FUELING EQUIPMENT SCHEDULE.
- PIPE SUPPORTS WELDED TO STAINLESS STEEL SHALL BE STAINLESS STEEL AND PIPE SUPPORTS WELDED TO EXTERIOR COATED CARBON STEEL SHALL BE EXTERIOR COATED CARBON STEEL. ALL OTHER PIPE SUPPORTS AND OTHER MISCELLANEOUS METAL SHAPES SHALL BE HOT DIPPED GALVANIZED CARBON STEEL, UNLESS OTHERWISE INDICATED.
- EXISTING FUEL SYSTEMS SHALL REMAIN IN OPERATION THROUGHOUT THE PROJECT EXCEPT FOR INDIVIDUAL PIPELINES AND SYSTEMS TAKEN OUT OF SERVICE BRIEFLY TO MAKE THE FINAL PIPING CONNECTIONS. SEE G-003 FOR ALLOWABLE OUTAGES.
- HPV, LPD, TRV, PI, FSP, FS, IF, PIT, BS AND MPC ARE INDICATED ON THE PLANS WITH A LEADER AND AN ABBREVIATION. THE DETAILS ARE LOCATED AS FOLLOWS:

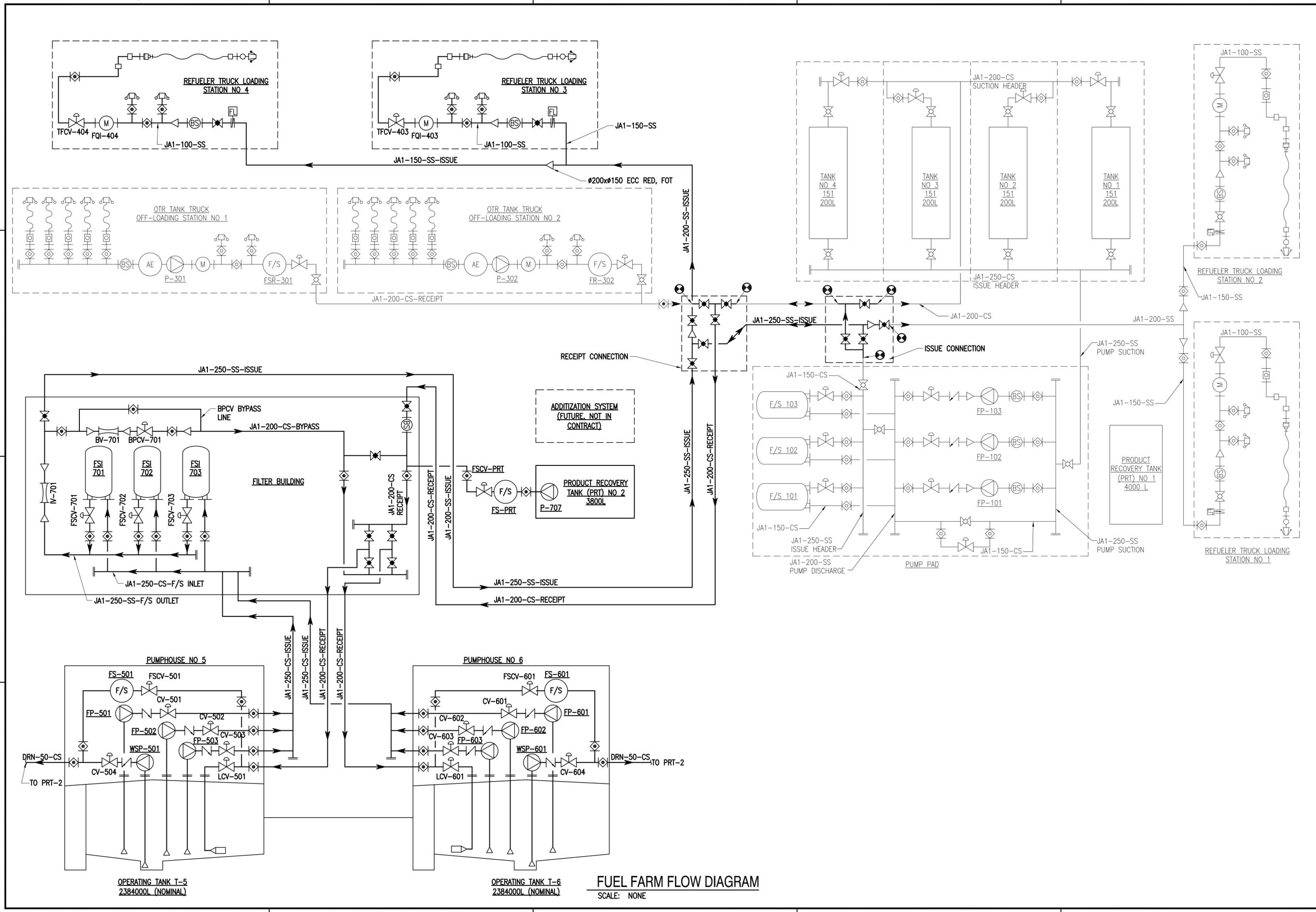


DEMOLITION NOTES

- WORK SHALL BE SEQUENCED. SEE G-003 FOR SEQUENCE OF CONSTRUCTION.
- UNLESS OTHERWISE INDICATED, ALL EXISTING FUEL PIPING IS CARBON STEEL.
- DEFINITIONS
 - "DEMOLISH" - REMOVE IN ITS ENTIRETY.
- THE ACTIVITY WILL, TO THE FULLEST EXTENT POSSIBLE, EMPTY THE ACTIVE UNDERGROUND AND ABOVEGROUND PIPELINES, TANKS AND EQUIPMENT. FOR BASIS OF BIDS, EXCEPT WHERE INDICATED, THE PIPES ARE FULL OF FUEL ON TOP OF 2" OF PETROLEUM CONTAMINATED SLUDGE AND WATER. THE SLUDGE AND WATER SHALL BE DISPOSED OF BY THE CONTRACTOR AT A DISPOSAL FACILITY OFFSITE. THE CONTRACTOR SHALL COORDINATE WITH THE CONTRACTING OFFICER FOR DISPOSAL OF THE PETROLEUM CONTAMINATED WATER. THE CONTRACTOR SHALL DRAIN, COLLECT, AND TURN OVER TO THE GOVERNMENT ANY FUEL NOT EMPTIED BY THE ACTIVITY.

DATE	APPR
DESCRIPTION	SYN
APPROVED: _____ FOR COMMANDER NAVFAC ACTIVITY: _____	
EMAIL BY ANDREA LEMON SATISFACTORY TO: DATE 04/04/2016 DES: DWN DRW: WMC CHK: WVB <<PM/IMP>> LET/RER BRANCH MANAGER CHIEF ENG/ARCH: E.J.G. <<<CR>>	
NAVAL FACILITIES ENGINEERING COMMAND NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DUBOULT AFRICA CAMP LEMONNIER DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES ABBREVIATIONS, LEGEND AND NOTES	
SCALE: AS NOTED PROJECT NO.: WORK ORDER NO.: NAVFAC DRAWING NO.: 14047081 SHEET 117 OF 186 M-001 <small>DRAWFORM REVISION: 10 MARCH 2009</small>	

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\14-002 OVERALL FLOW DIAGRAM.dwg LAYOUT NAME: OVERALL FLOW DIAGRAM PLOTTED: Friday, March 25, 2016 - 9:09am USER: wherrmann



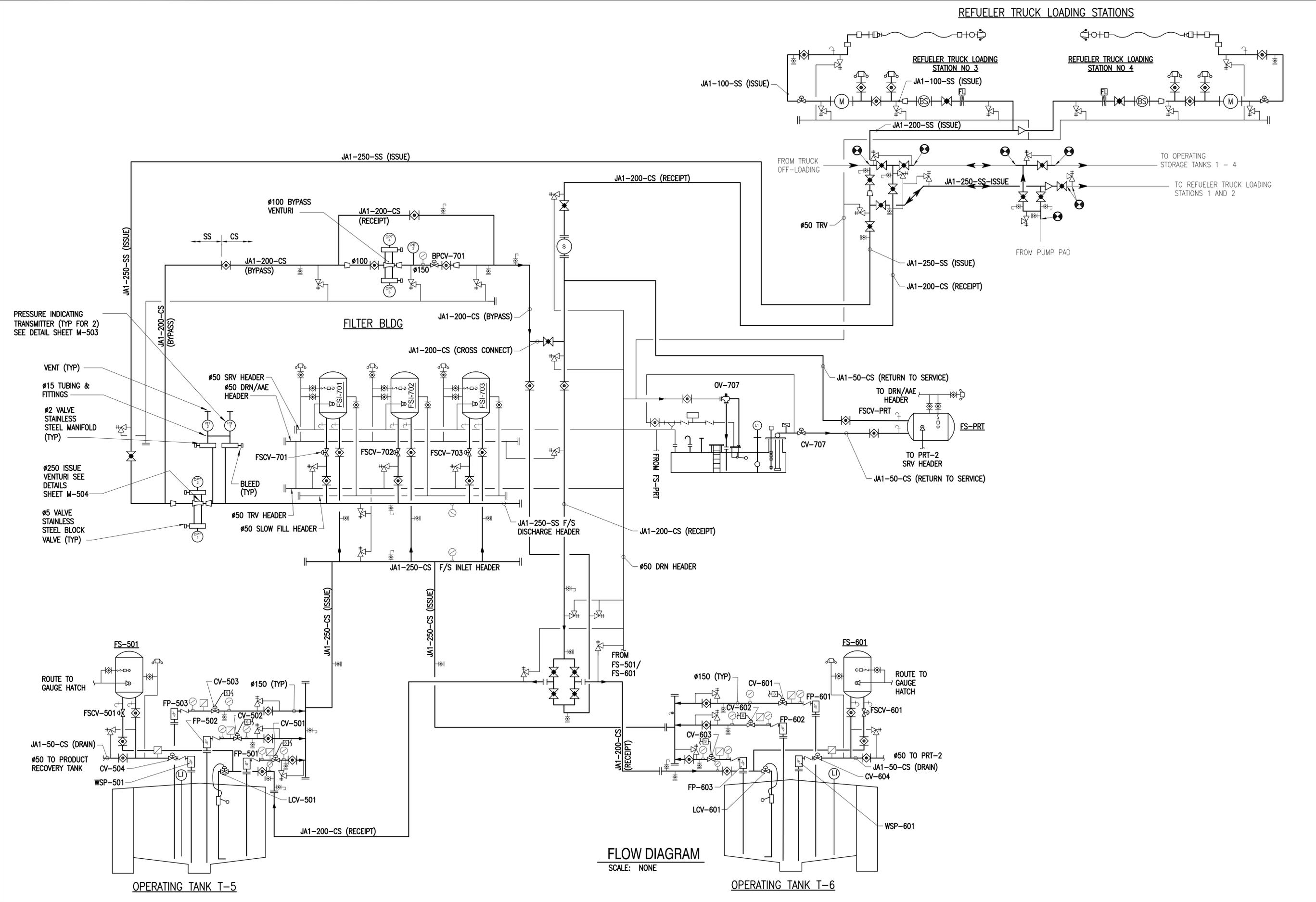
FUEL FARM FLOW DIAGRAM
SCALE: NONE

APPR	
DATE	
SYN	
DESCRIPTION	
A/E INFO	
APPROVED	
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO	DATE
DES <<PM/DR>>	DRW WMG
CHK WVB	
BRANCH MANAGER	
CHIEF ENG/ARCH	
<<<<>>	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI, AFRICA CAMP LEMONNIER	
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES OVERALL FLOW DIAGRAM	
SCALE:	AS NOTED
PROJECT NO.:	
WORK ORDER NO.:	
NAVFAC DRAWING NO.:	14047082
SHEET	118 OF 186
M-002	
DRAWING REVISION: 10 MARCH 2009	

FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\14-013 FLOW DIAGRAM.dwg LAYOUT NAME: FLOW DIAGRAM PLOTTED: Friday, March 25, 2016 - 9:10am USER: whiermann

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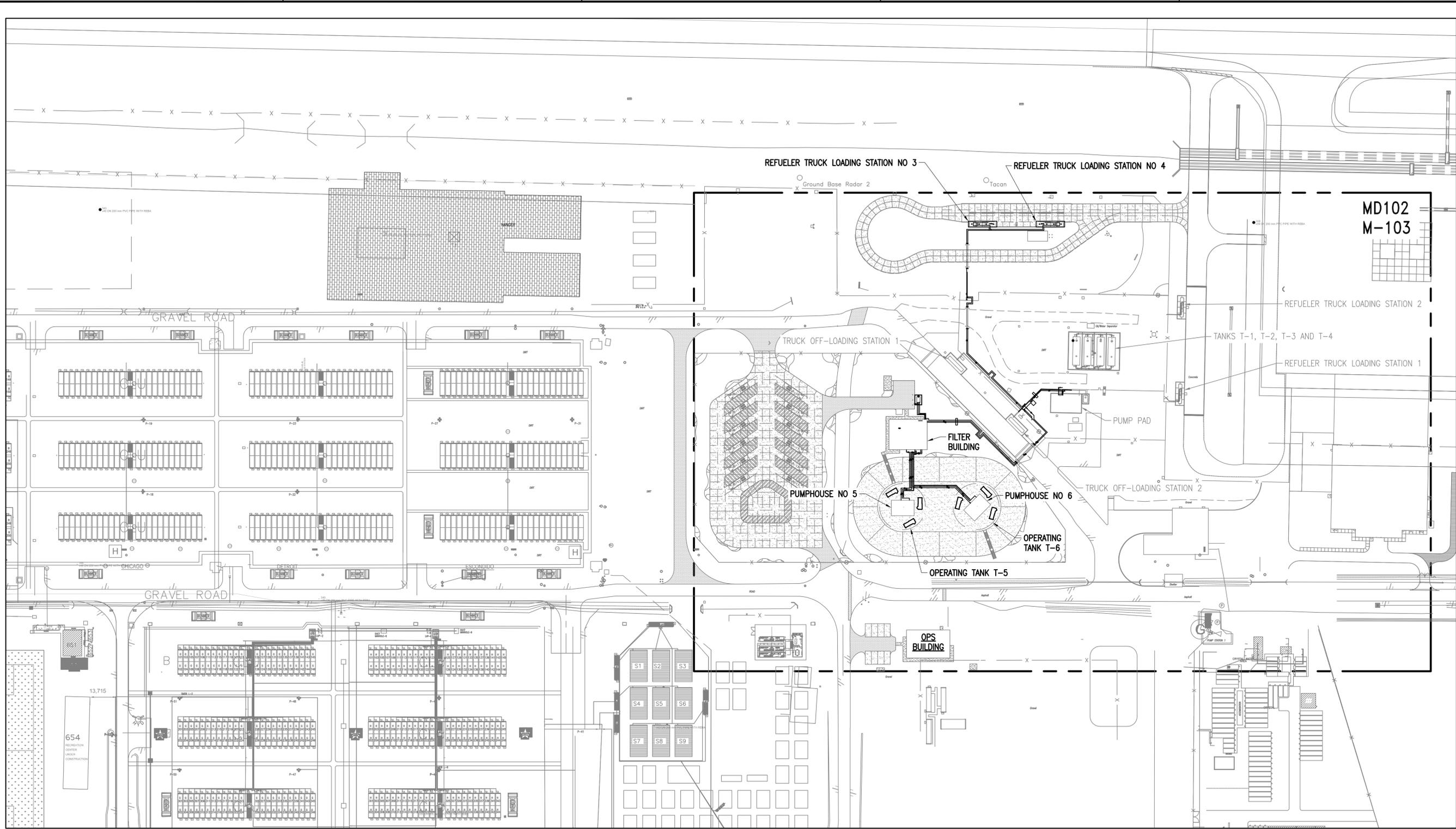


FLOW DIAGRAM
SCALE: NONE

1 2 3 4 5

APPROVED	DATE	DESCRIPTION	SYN
 COMMONWEALTH OF VIRGINIA DONALD W. NODES Lic. No. 037747 PROFESSIONAL ENGINEER			
Austin Brockenbrough ENGINEERING • CONSULTING			
APPROVED			
FOR COMMANDER NAVFAC			
ACTIVITY			
SATISFACTORY TO DATE			
DES	DWN	DRW	WMC CHK WVB
<<PM/DM>>			
BRANCH MANAGER			
CHIEF ENG/ARCH			
<<CR>>			
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DUBOITI, AFRICA CAMP LEMONIER DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES FLOW DIAGRAM			
SCALE: AS NOTED			
PROJECT NO.:			
WORK ORDER NO.:			
NAVFAC DRAWING NO. 14047083			
SHEET 119 OF 186			
M-003			
DRAWING REVISION: 10 MARCH 2009			

FILE NAME: G:\14_Jobs\14-013_Dibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-101 OVERALL SITE PLAN.dwg LAYOUT NAME: OVERALL SITE PLAN PLOTTED: Friday, March 25, 2016 - 9:10am USER: whermann

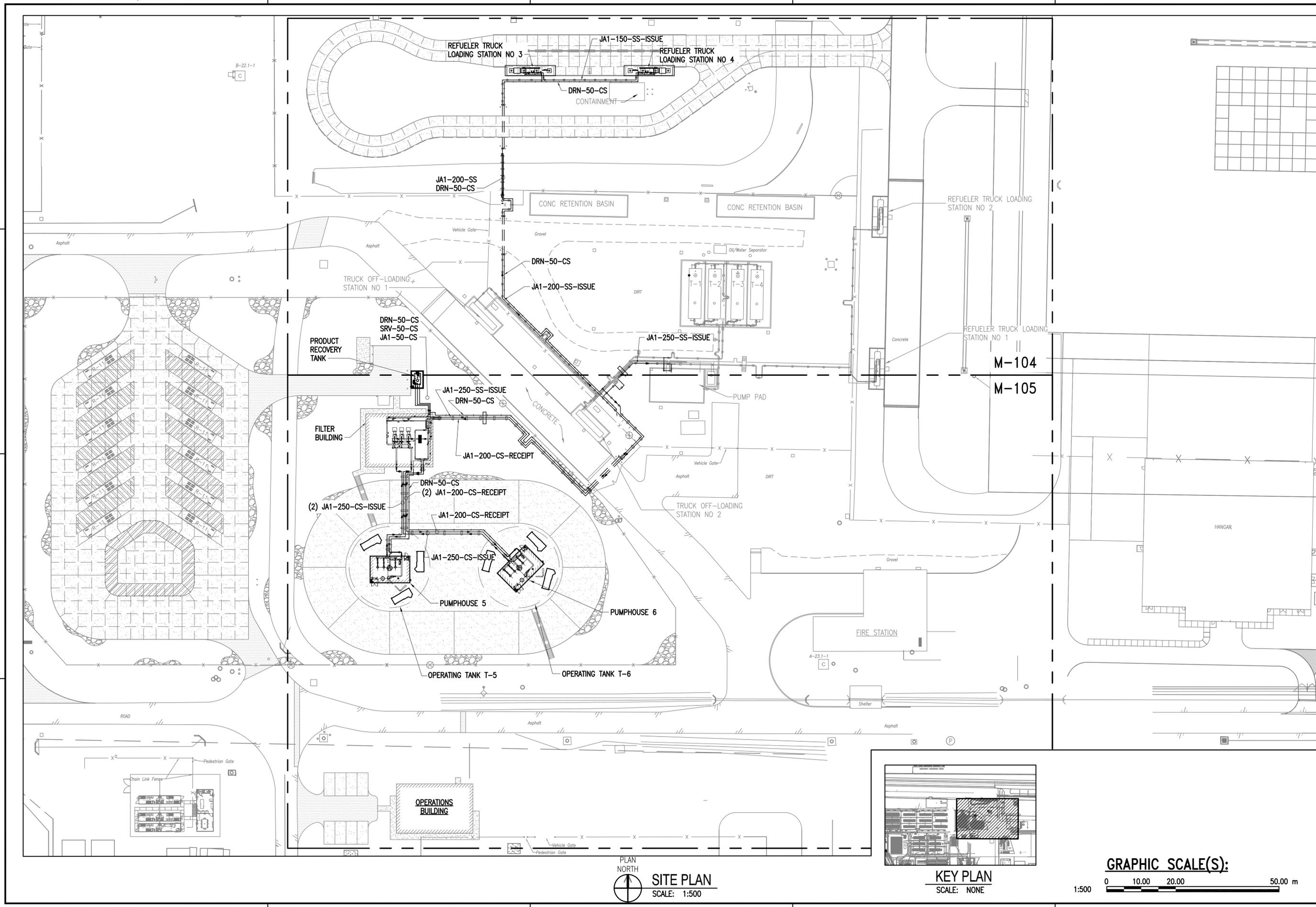


PLAN NORTH
OVERALL SITE PLAN
SCALE: 1:1000

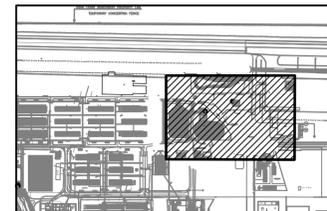


APPR	
DATE	
DESCRIPTION	
SYM	
APPROVED	A/E INFO
FOR COMMANDER NAVFAC ACTIVITY	
SATISFACTORY TO	DATE
DES <<PM/IMP>> DWN	DRW WMC CHK WVB
BRANCH MANAGER	
CHIEF ENG/ARCH	<<CR>>
NAVAL FACILITIES ENGINEERING COMMAND	
NAVAL FACILITIES ENGINEERING COMMAND	
NORFOLK, VIRGINIA	
DUBOUTI, AFRICA	
DEPARTMENT OF THE NAVY	
ATLANTIC DIVISION	
CAMP LEMONNIER	
DESC 1701/P-1701	
CONSTRUCT FUEL STORAGE FACILITIES	
OVERALL SITE PLAN	
SCALE:	AS NOTED
PROJECT NO.:	
WORK ORDER NO.:	
NAVFAC DRAWING NO.:	14047084
SHEET	120 OF 186
M-101	
<small>DRAWING REVISION: 10 MARCH 2009</small>	

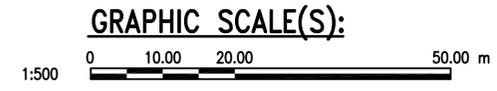
FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-103 MECHANICAL SITE PLAN.dwg LAYOUT NAME: MECHANICAL SITE PLAN PLOTTED: Friday, March 25, 2016 - 9:11am USER: whermann



PLAN NORTH
SITE PLAN
SCALE: 1:500

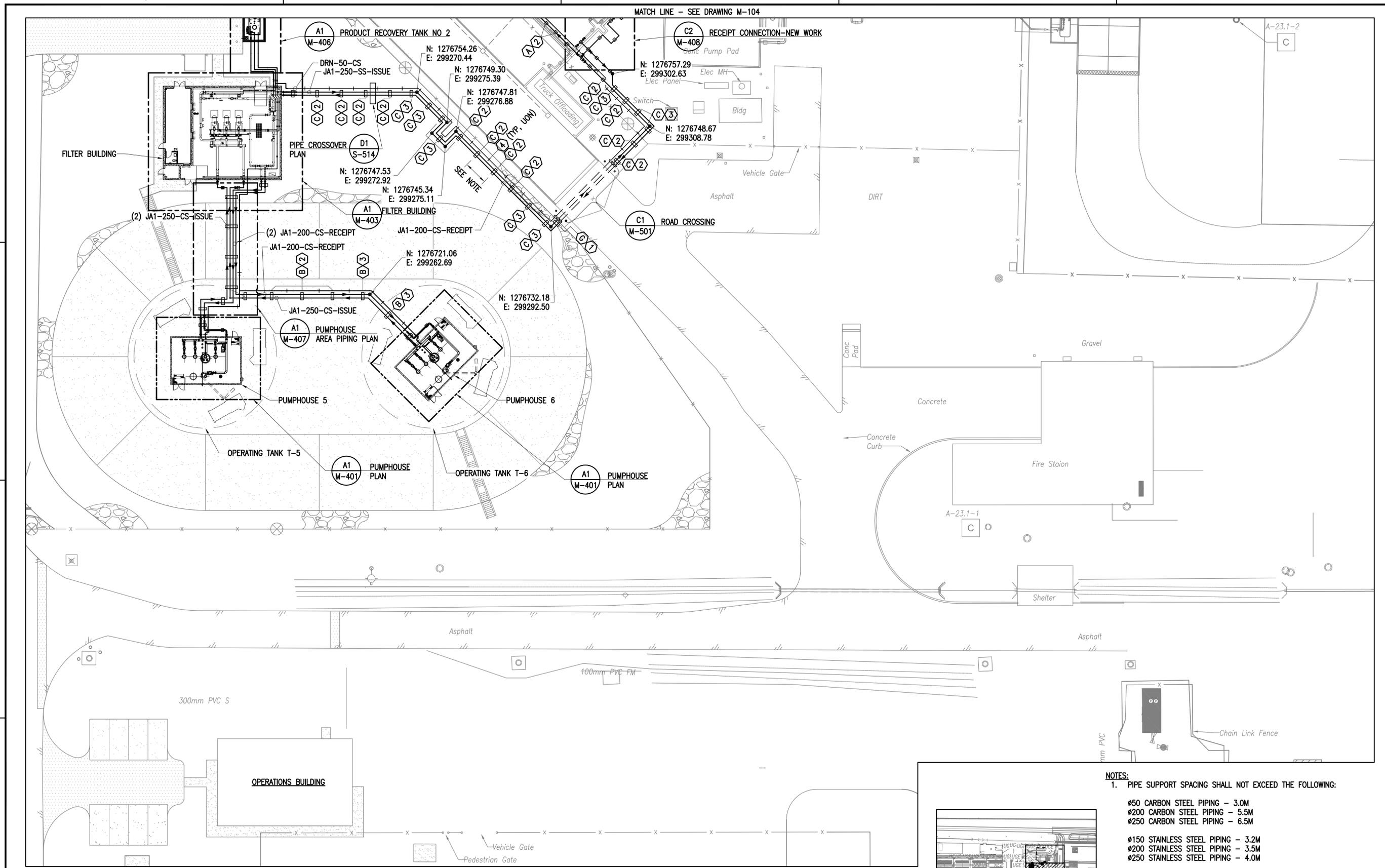


KEY PLAN
SCALE: NONE

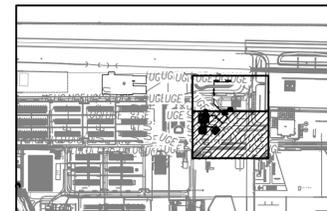


APPR	DATE	SYN	DESCRIPTION
 NAVFAC COMMONWEALTH OF VIRGINIA DONALD W. NODDES Lic. No. 037747 PROFESSIONAL ENGINEER			
Austin Brockenbrough ENGINEERING - CONSULTING			
APPROVED			
FOR COMMANDER NAVFAC			
ACTIVITY			
SATISFACTORY TO DATE			
DES	DWN	DRW	WMC CHK WVB
<<PM/DR>>			
BRANCH MANAGER			
CHIEF ENG/ARCH			
<<<<>>			
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI AFRICA CAMP LEMONNIER			
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES MECHANICAL SITE PLAN			
SCALE: AS NOTED			
PROJECT NO.:			
WORK ORDER NO.:			
NAVFAC DRAWING NO. 14047086			
SHEET 122 OF 186			
M-103			
DRAWING REVISION: 10 MARCH 2009			

FILE NAME: G:\14_jobs\14-013_Dibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-105 PARTIAL SITE PLAN.dwg LAYOUT NAME: PARTIAL SITE PLAN.dwg PLOTTED: Friday, March 25, 2016 - 9:12am USER: whermom



PLAN NORTH
PARTIAL SITE PLAN (A1)
SCALE: 1:300 M-103



KEY PLAN
SCALE: NONE

- NOTES:**
- PIPE SUPPORT SPACING SHALL NOT EXCEED THE FOLLOWING:
 #50 CARBON STEEL PIPING - 3.0M
 #200 CARBON STEEL PIPING - 5.5M
 #250 CARBON STEEL PIPING - 6.5M

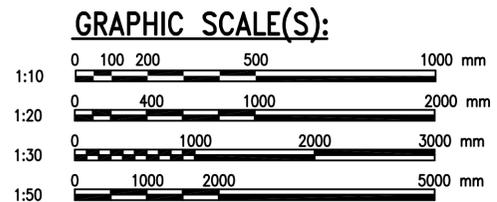
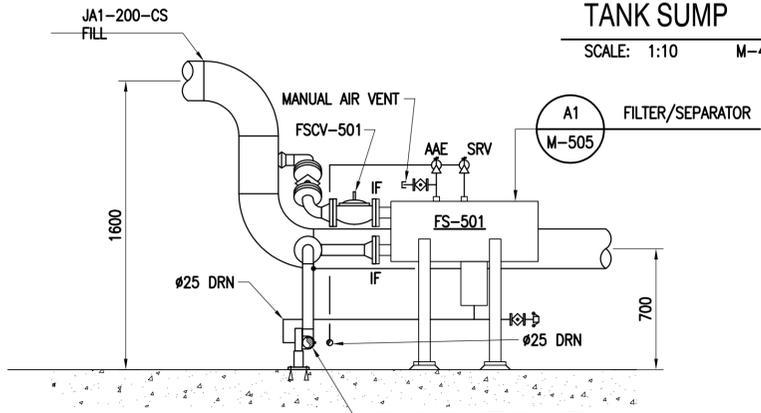
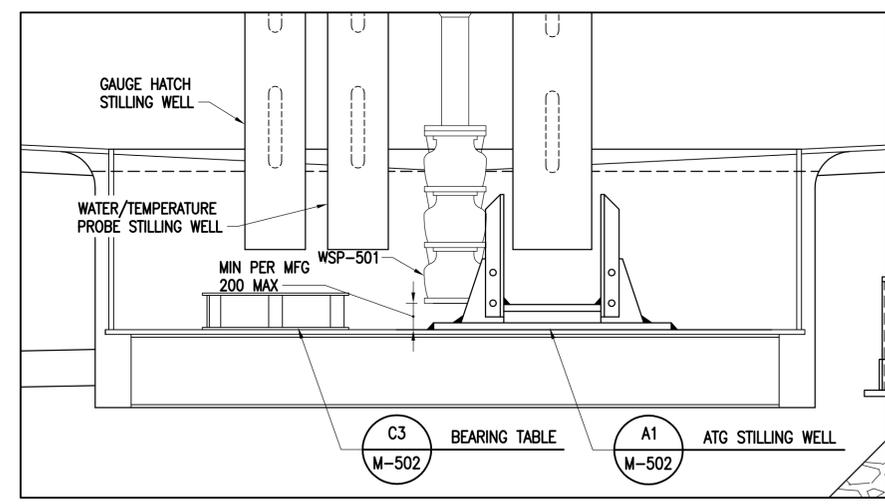
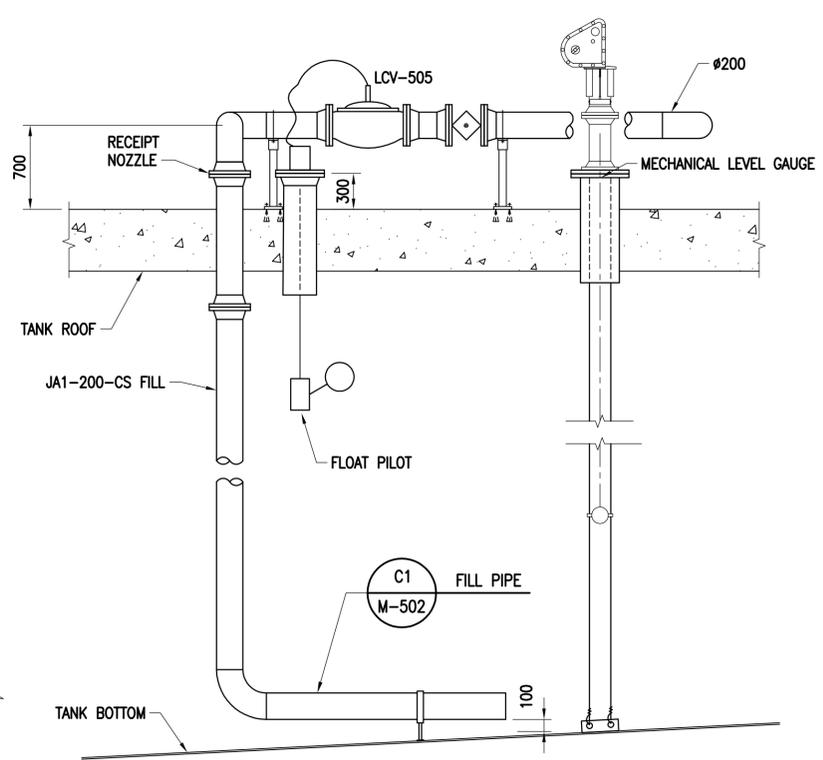
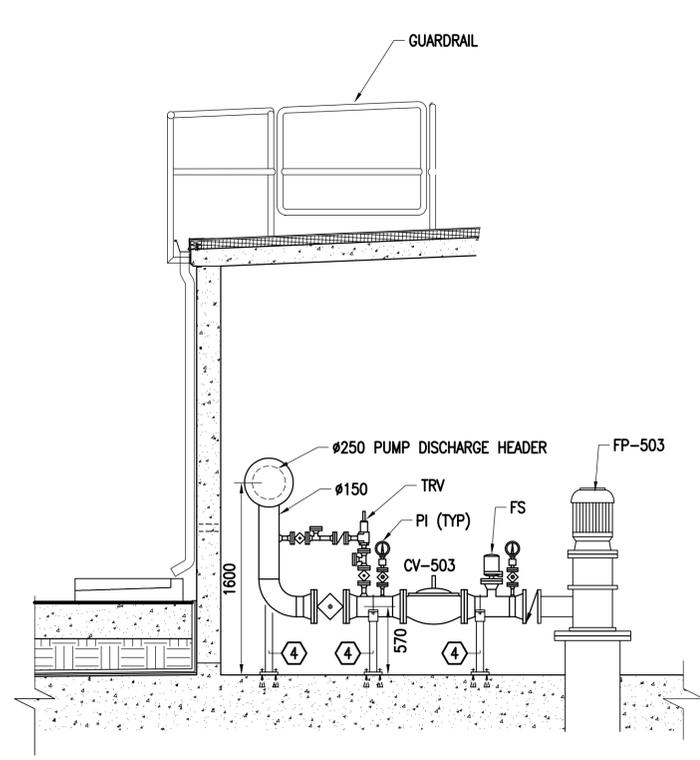
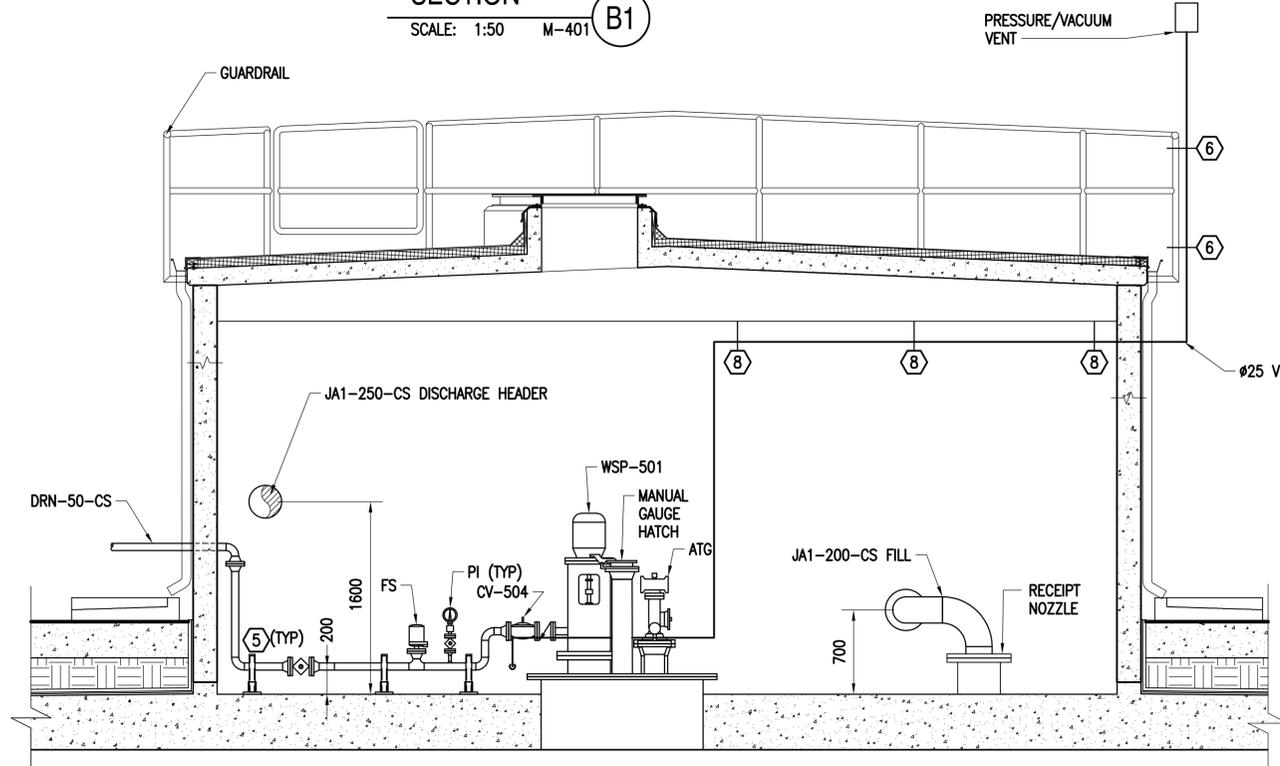
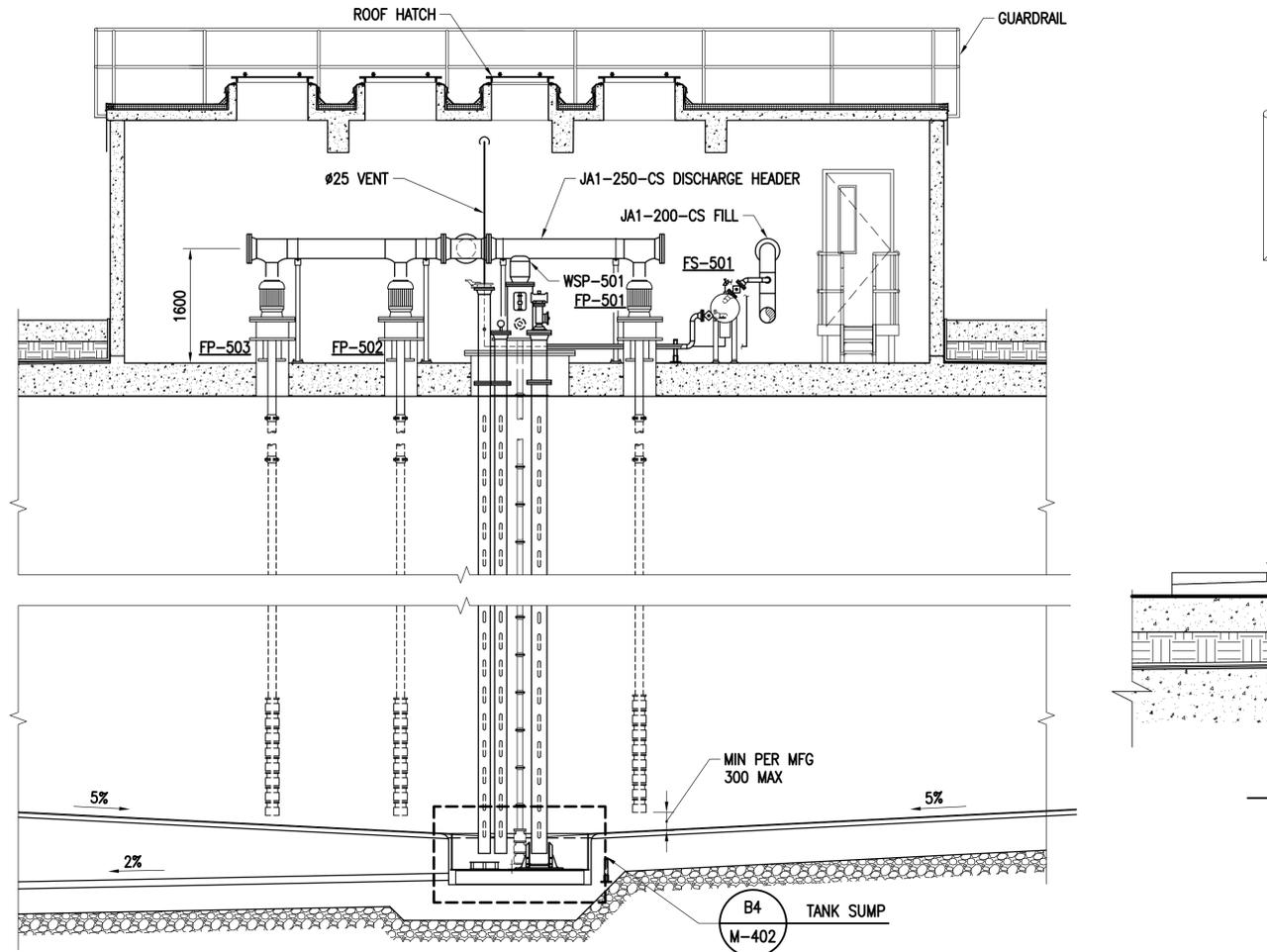
 #150 STAINLESS STEEL PIPING - 3.2M
 #200 STAINLESS STEEL PIPING - 3.5M
 #250 STAINLESS STEEL PIPING - 4.0M
 - TYPE A, B, AND C TYPE SUPPORT BASES SHALL BE PROVIDED WITH A TYPE 7 SUPPORT, IN ADDITION TO INDICATED PIPE SUPPORT TYPE, WHERE #50 PIPING RUNS PARALLEL TO PIPING.

GRAPHIC SCALE(S):



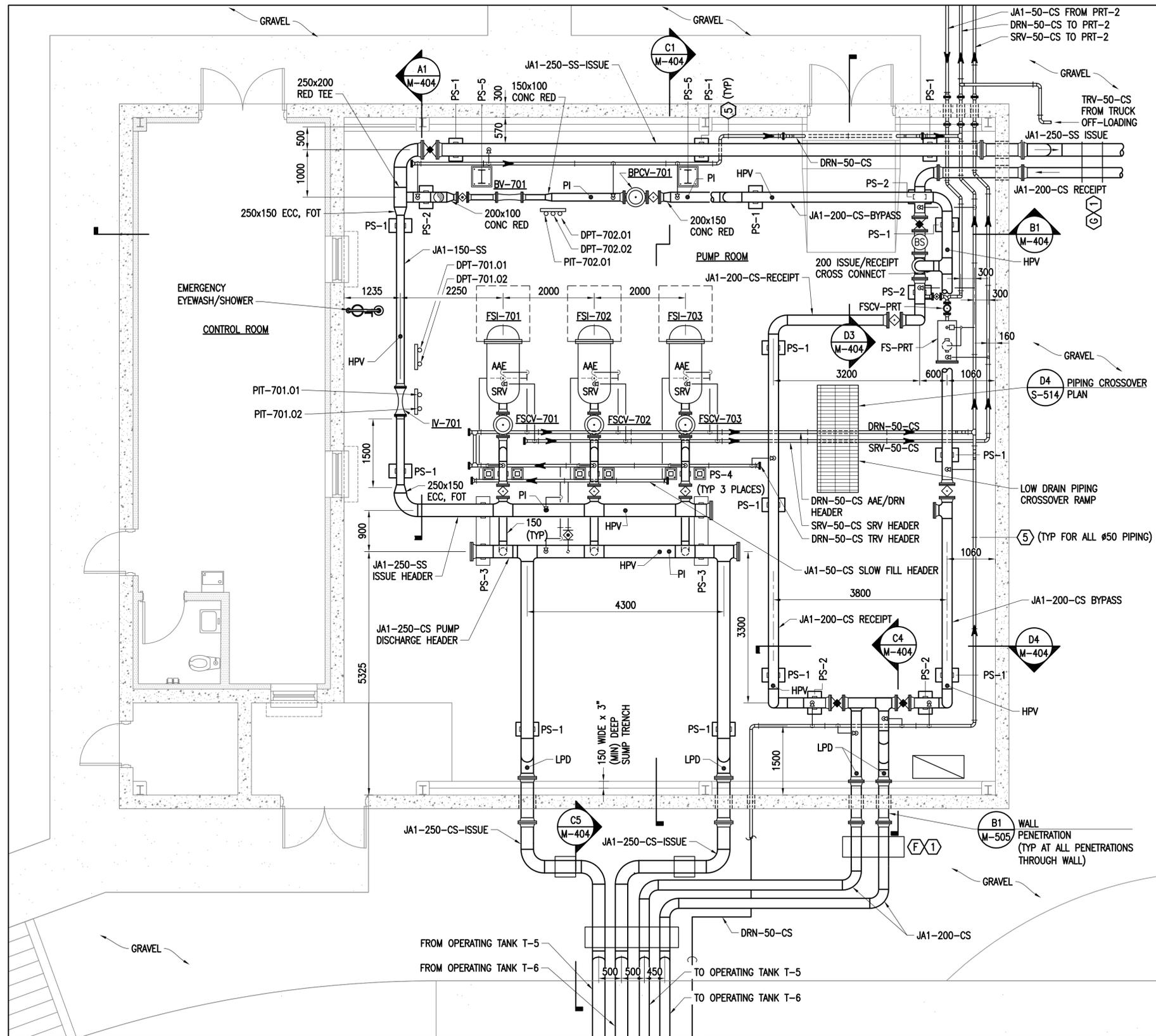
APPR	
DATE	
SYN	DESCRIPTION
 NAVFAC COMMONWEALTH OF VIRGINIA DONALD W. NODES Lic. No. 037747 PROFESSIONAL ENGINEER	
Austin Brockenbrough ENGINEERING - CONSULTING	
APPROVED	A/E INFO
FOR COMMANDER NAVFAC	ACTIVITY
SATISFACTORY TO	DATE
DES: DWN	DRW: WMG
CHK: WVB	
BRANCH MANAGER	
CHIEF ENG/ARCH	
DATE	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI, AFRICA CAMP LEMONNIER DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES PARTIAL SITE PLAN	
SCALE:	AS NOTED
PROJECT NO.:	
WORK ORDER NO.:	
NAVFAC DRAWING NO.:	14047088
SHEET	124 OF 186
M-105	
DRAWFORM REVISION: 10 MARCH 2009	

FILE NAME: G:\14 Jobs\14-013 Djboutir - Fuel Storage Facility - NAVFAC LANTLANT AutoCAD\M-402 PUMPHOUSE PIPING SECTIONS.dwg LAYOUT NAME: PUMPHOUSE PIPING SECTIONS - PLOTTED: Friday, March 25, 2016 - 9:13am USER: whiermann



APPROVED	DATE	APPR
SYN	DESCRIPTION	D
Brockenbrough ENGINEERING - CONSULTING		
APPROVED	A/E INFO	
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO	DATE	
DES	DWN	DRW WMG
CHK	WVB	
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<<CR>>		
NAVAL FACILITIES ENGINEERING COMMAND NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION CAMP LEMONIER NORFOLK, VIRGINIA DUBOULT, AFRICA		
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES PUMPHOUSE PIPING SECTIONS		
SCALE:	AS NOTED	
PROJECT NO.:	14047090	
WORK ORDER NO.:		
NAVFAC DRAWING NO.:	14047090	
SHEET	126	OF 186
M-402		
DRAWING REVISION: 10 MARCH 2009		

FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-403 FILTER BUILDING PIPING.dwg LAYOUT NAME: FILTER BUILDING PIPING PLOTTED: Friday, March 25, 2016 - 9:13am USER: wherrmann

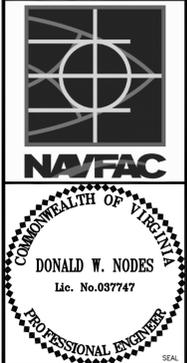


NOTE: SEE STRUCTURAL SHEETS FOR PIPE SUPPORT DEFINITIONS

PLAN NORTH
FILTER BUILDING
 SCALE: 1:50
 M-105 A1

GRAPHIC SCALE(S):
 0 1000 2000 5000 mm
 1:50

SYN	DESCRIPTION	DATE	APPR



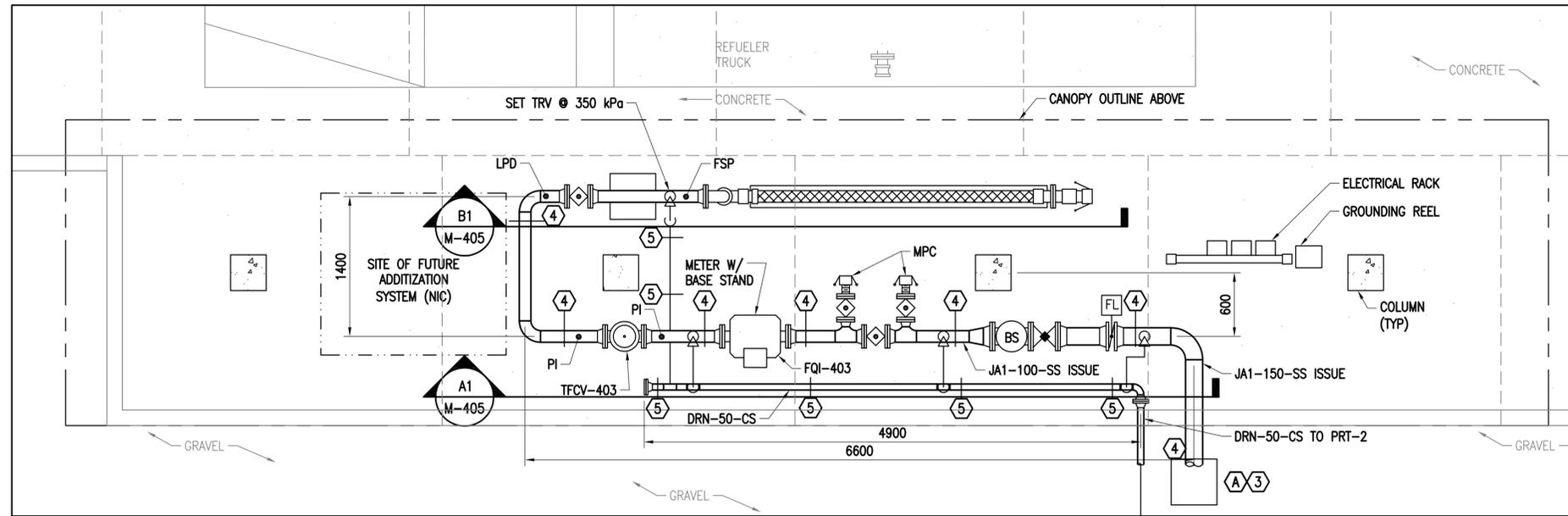
Austin
Brockenbrough
 ENGINEERING - CONSULTING

APPROVED
 FOR COMMANDER NAVFAC
 ACTIVITY
 SATISFACTORY TO DATE
 DES: DWN | DRW: WMG | CHK: WVB
 BRANCH MANAGER
 CHIEF ENG/ARCH
 <<<<<<>>>>>>

DEPARTMENT OF THE NAVY
 ATLANTIC DIVISION
 CAMP LEMONNIER
 NAVAL FACILITIES ENGINEERING COMMAND
 NAVAL FACILITIES ENGINEERING COMMAND
 NORFOLK, VIRGINIA
 DIBOUTI, AFRICA
DESC 1701/P-1701
CONSTRUCT FUEL STORAGE FACILITIES
 FILTER BUILDING PIPING

SCALE: AS NOTED
 PROJECT NO.:
 WORK ORDER NO.:
 NAVFAC DRAWING NO.: 14047091
 SHEET 127 OF 186
M-403
DRAWING REVISION: 10 MARCH 2009

FILE NAME: G:\14_Jobs\14-013_Djibouti - Fuel Storage Facility - Fuel Storage Facility - Refueler Truck Loading Station No. 3 - REFUELER TRUCK LOADING PLAN - PLOTTED: Friday, March 25, 2016 - 9:14am USER: whermm

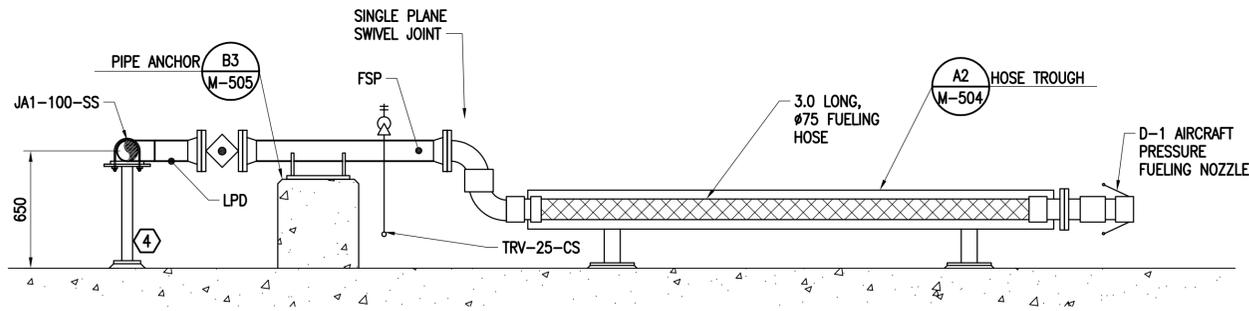


NOTE:
REFUELER TRUCK STATION LOADING STATION NO 4 SIMILAR

PLAN NORTH

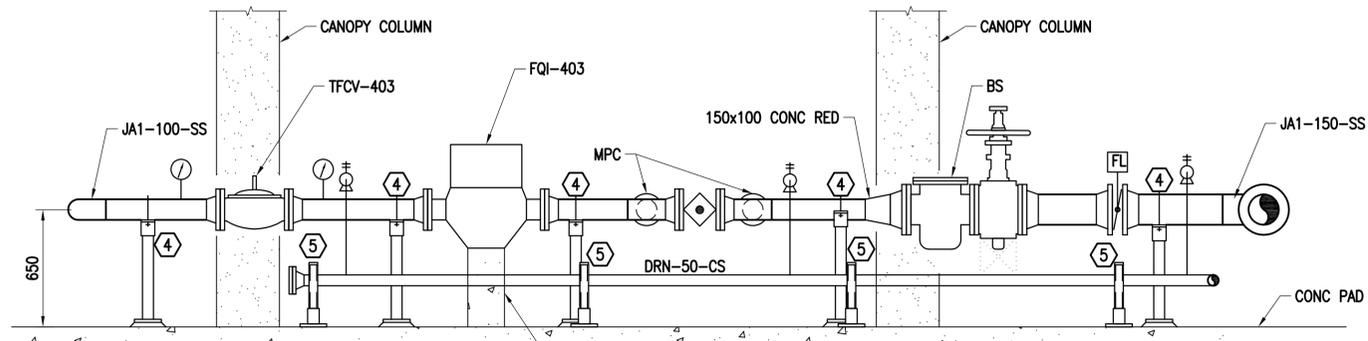
REFUELER TRUCK LOADING STATION NO 3

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SECTION B1

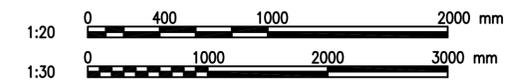
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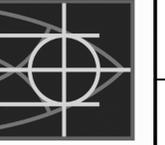
SECTION A1

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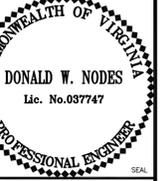
GRAPHIC SCALE(S):



SYN	DESCRIPTION	DATE	APPR



NAVFAC



Austin
Brockenbrough
ENGINEERING - CONSULTING

APPROVED

FOR COMMANDER NAVFAC
ACTIVITY

SATISFACTORY TO DATE

DES: DWN | DRW: WMG | CHK: WVB

BRANCH MANAGER

CHIEF ENG/ARCH

<<<CR>>

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION
CAMP LEMONNIER

NAVAL FACILITIES ENGINEERING COMMAND
NAVFAC LANT/COMNAVFACFORC
NAVFAC LANT/COMNAVFACFORC
NAVFAC LANT/COMNAVFACFORC
NAVFAC LANT/COMNAVFACFORC

DJIBOUTI AFRICA

DESC 1701/P-1701
CONSTRUCT FUEL STORAGE FACILITIES
REFUELER TRUCK LOADING PLAN

SCALE: AS NOTED

PROJECT NO.: 14047093

WORK ORDER NO.

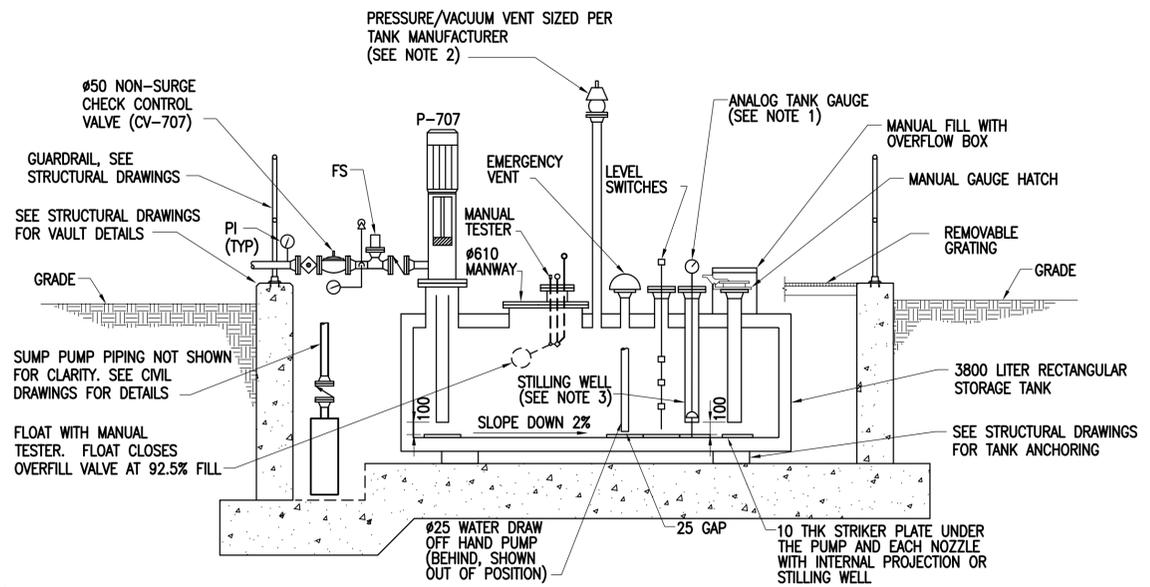
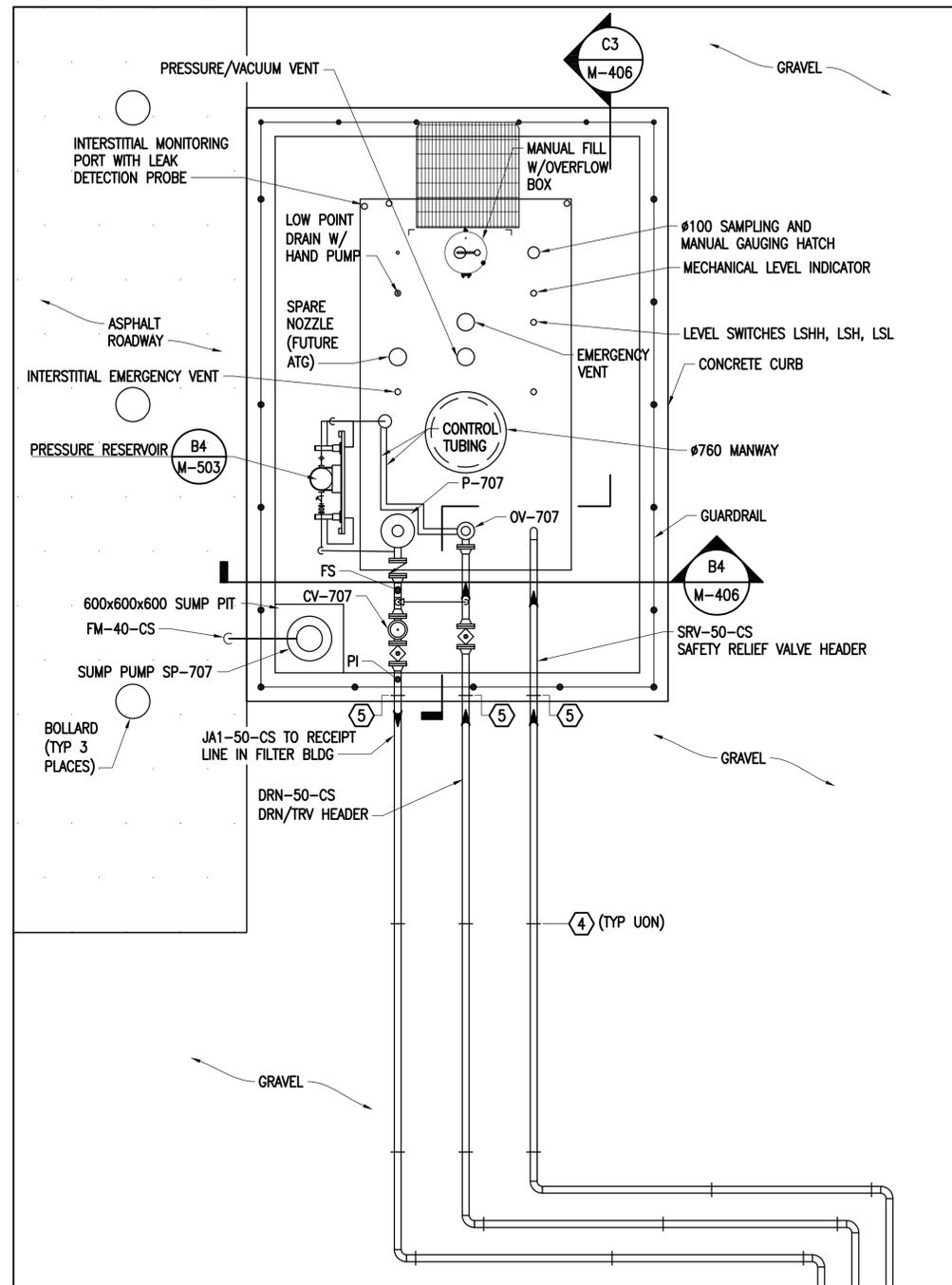
NAVFAC DRAWING NO. 14047093

SHEET 129 OF 186

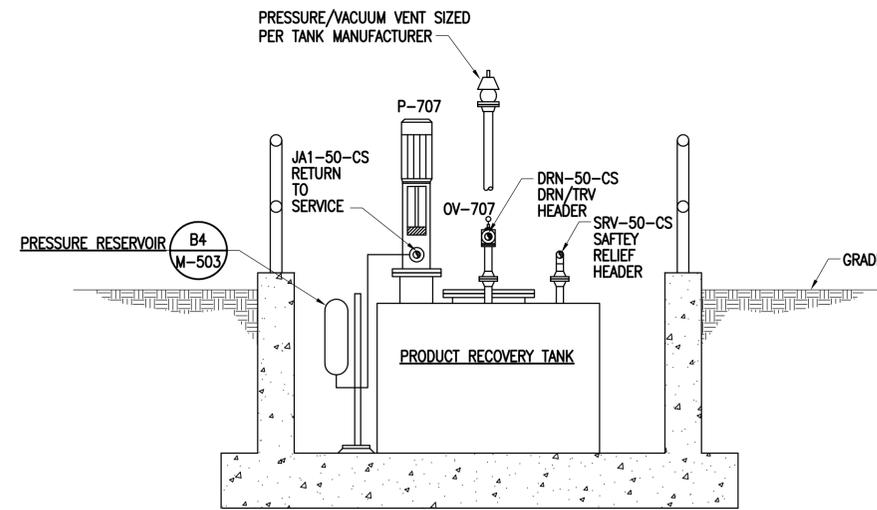
M-405

DRAWFORM REVISION: 10 MARCH 2009

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-406 PRODUCT RECOVERY TANK.dwg LAYOUT NAME: PRODUCT RECOVERY TANK PLOTTED: Friday, March 25, 2016 - 9:15am USER: whitemom



- NOTES:**
1. WATER DRAW OFF NOZZLE WITH HAND PUMP BEHIND SHOWN OUT OF POSITION.
 2. SPARE NOZZLE BEHIND NOT SHOWN.
 3. PROVIDE STILLING WELL WITH (4) Ø15 HOLES.
 4. PROVIDE TANK FILL NOZZLES (SRV AND DRN/TRV) WITH INTERNAL FILL LINE TERMINATING 100 ABOVE TANK FLOOR. PROVIDE STRIKER PLATE UNDER BOTH NOZZLES.
 5. NOT ALL TANK APPURTENANCES SHOWN.

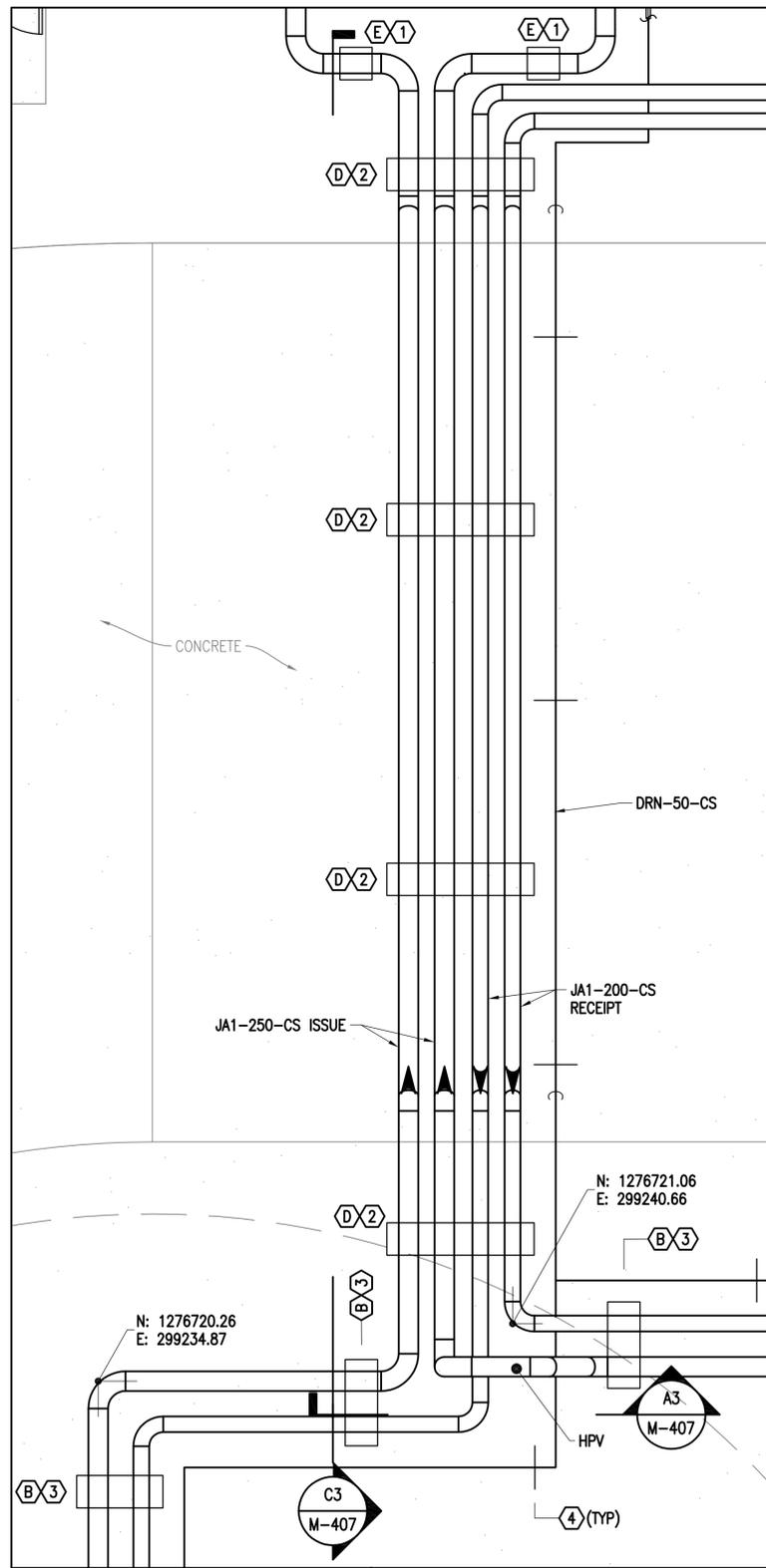


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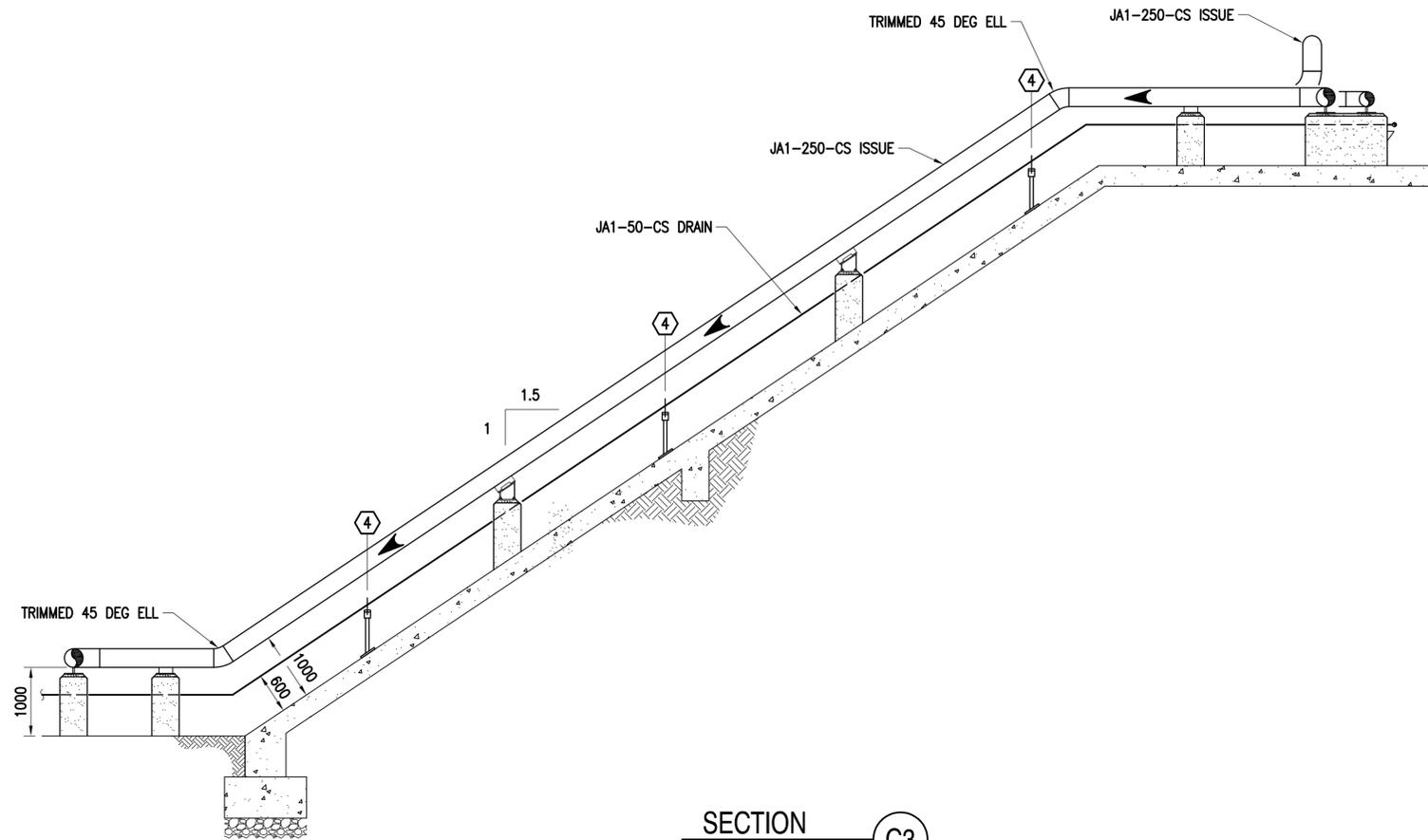


APPROVED	DATE	APP'R
DESCRIPTION	DATE	APP'R
SYN	DATE	APP'R
Brockenbrough ENGINEERING - CONSULTING		
APPROVED		
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO	DATE	
DES <<PM/DR>>	DRW <CHK>	WVB
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<<<<>>		
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION CAMP LEMONNIER NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI, AFRICA		
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES PRODUCT RECOVERY TANK		
SCALE:	AS NOTED	
PROJECT NO.:		
WORK ORDER NO.:		
NAVFAC DRAWING NO.:	14047094	
SHEET	130	OF 186
M-406		
DRAWFORM REVISION: 10 MARCH 2009		

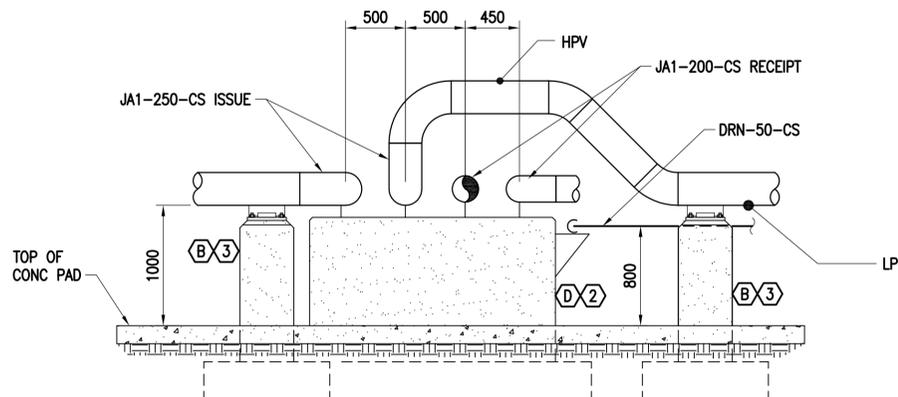
FILE NAME: G:\14_Jobs\14-013_Dibouti - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\M-407_PUMPHOUSE AREA PIPING PLAN.dwg LAYOUT NAME: PUMPHOUSE AREA PIPING PLAN PLOTTED: Friday, March 25, 2016 - 9:15am USER: wherrmann



PLAN NORTH
PUMPHOUSE AREA PIPING PLAN (A1)
 SCALE: 1:50
 M-105

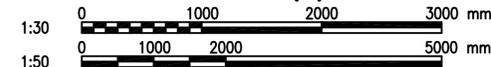


SECTION (C3)
 SCALE: 1:50
 M-407



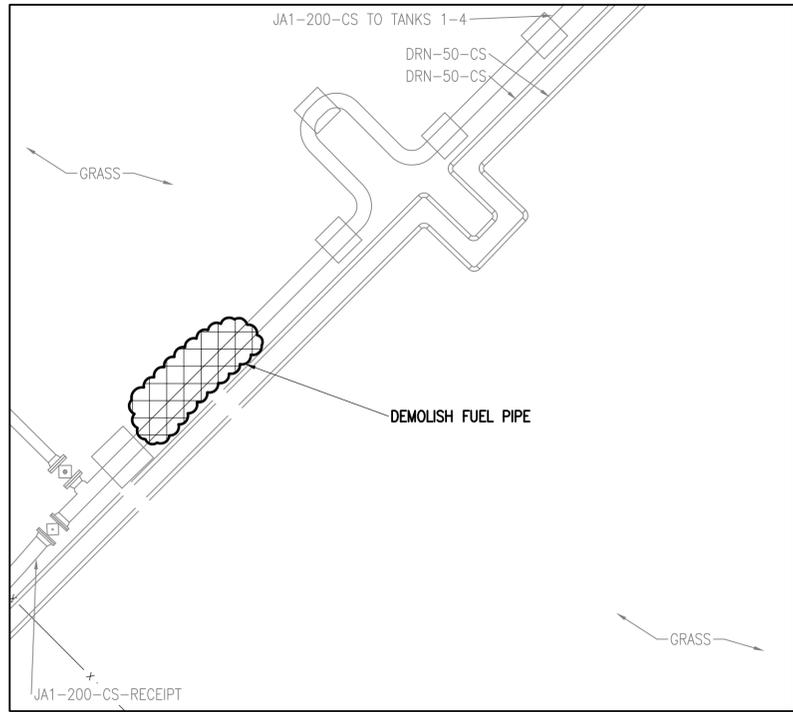
SECTION (A3)
 SCALE: 1:30
 M-407

GRAPHIC SCALE(S):

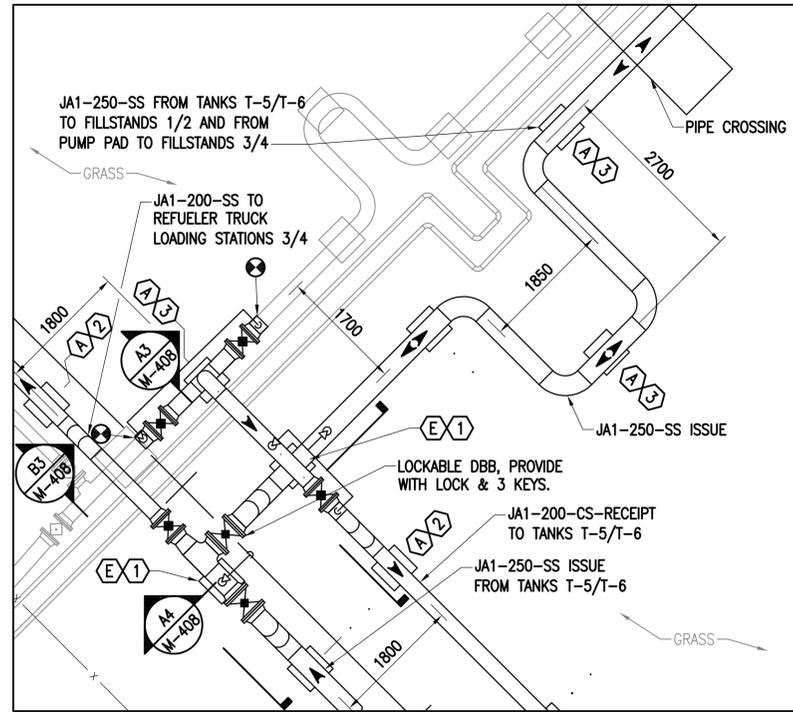


APPR	
DATE	
DESCRIPTION	
SYN	
APPROVED	A/E INFO
FOR COMMANDER NAVFAC	
ACTIVITY	
SATISFACTORY TO	DATE
DES: DWN	DRW: WMG
CHK: WVB	
BRANCH MANAGER	
CHIEF ENG/ARCH	
<<CR>>	
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI, AFRICA CAMP LEMONNIER DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES PUMPHOUSE AREA PIPING PLAN	
SCALE:	AS NOTED
PROJECT NO.:	
WORK ORDER NO.	
NAVFAC DRAWING NO.	14047095
SHEET	131 OF 186
M-407	
DRAWFORM REVISION: 10 MARCH 2009	

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT/CAD AutoCAD\M-408 PIPING CONNECTIONS.dwg LAYOUT NAME: PIPING CONNECTIONS PLOTTED: Friday, March 25, 2016 - 9:16am USER: wherrmann



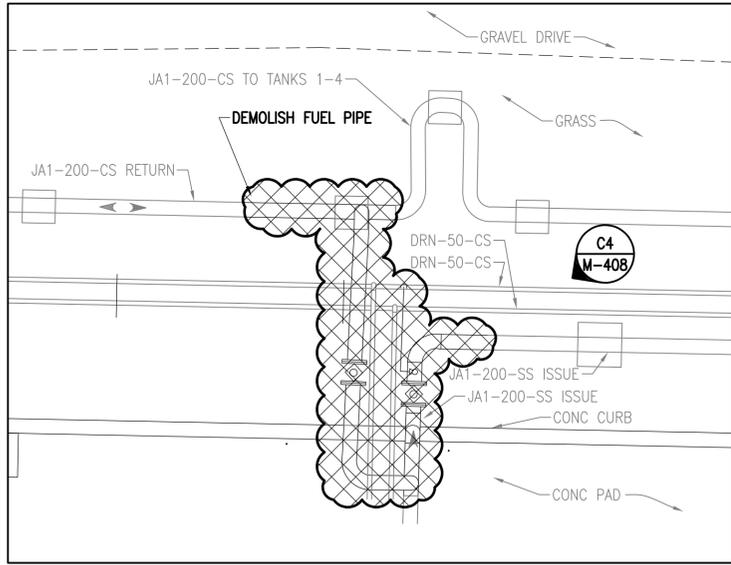
PLAN NORTH
RECEIPT CONNECTION - DEMOLITION (C1)
 SCALE: 1:50 MD102



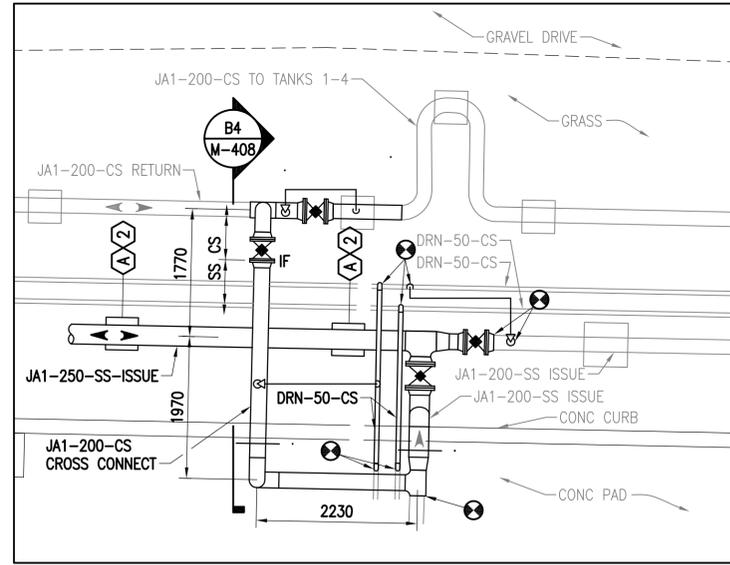
PLAN NORTH
RECEIPT CONNECTION - NEW WORK (C2)
 SCALE: 1:50 M-105



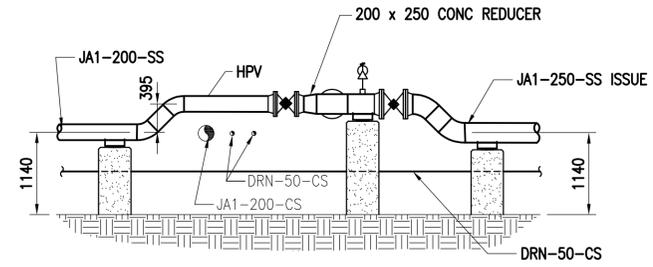
PHOTOGRAPH (C4)
 SCALE: NONE M-408



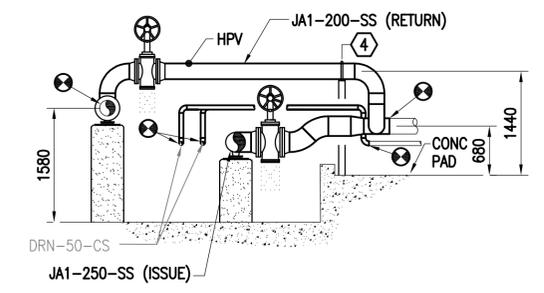
PLAN NORTH
ISSUE CONNECTION - DEMOLITION (A1)
 SCALE: 1:50 MD102



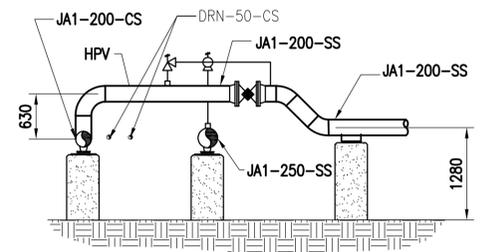
PLAN NORTH
ISSUE CONNECTION - NEW WORK (A2)
 SCALE: 1:50 M-104



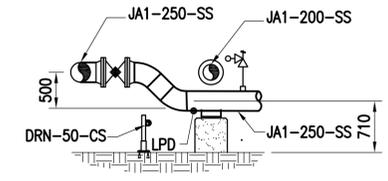
SECTION (B3)
 SCALE: 1:50 M-408



SECTION (B4)
 SCALE: 1:50 M-408

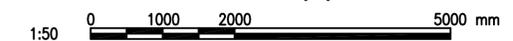


SECTION (A3)
 SCALE: 1:50 M-408



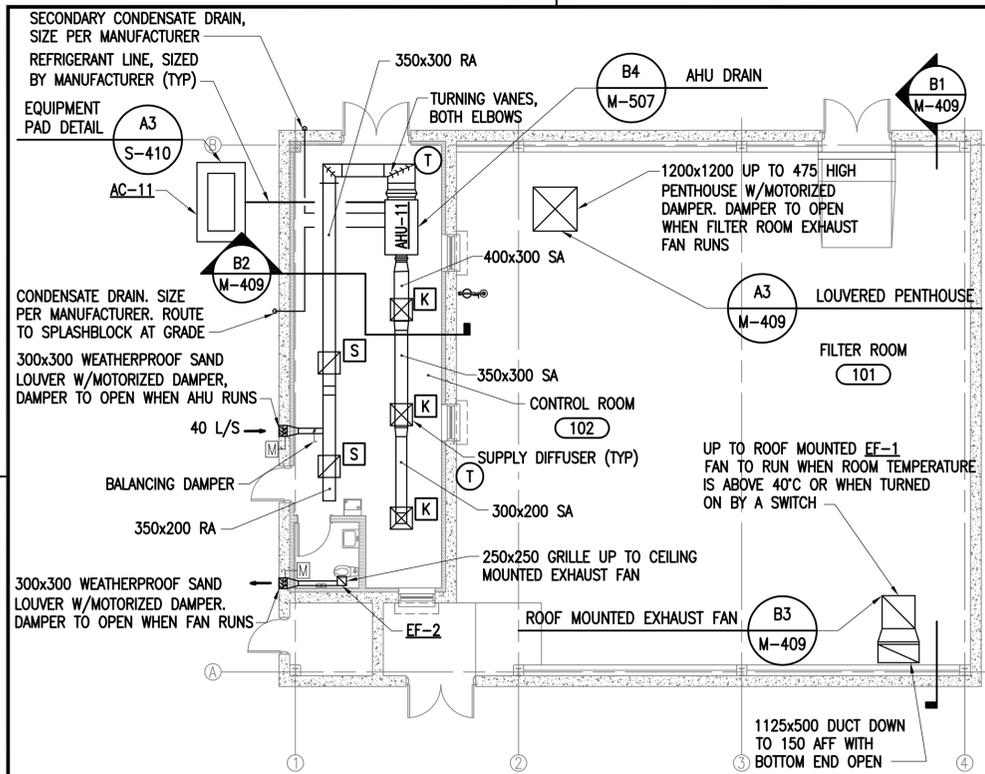
SECTION (A4)
 SCALE: 1:50 M-408

GRAPHIC SCALE(S):

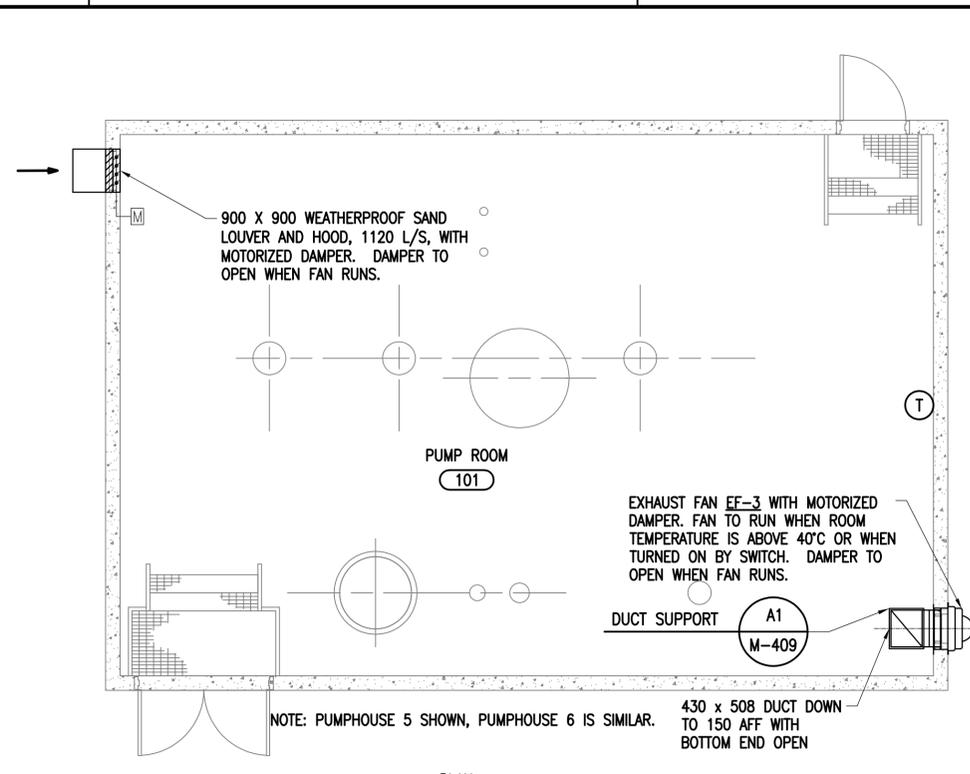


APPROVED	DATE	DESCRIPTION	SYN
 NAVFAC COMMONWEALTH OF VIRGINIA DONALD W. NODES Lic. No. 037747 PROFESSIONAL ENGINEER			
Austin Brockenbrough ENGINEERING • CONSULTING			
APPROVED	A/E INFO		
FOR COMMANDER NAVFAC	ACTIVITY		
SATISFACTORY TO	DATE		
DES	DWN	DRW	WMC
<<PM/DR>>		CHK	WVB
BRANCH MANAGER			
CHIEF ENG/ARCH			
<<CR>>			
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC LANT/CAD	DIBOUTI AFRICA
ATLANTIC DIVISION	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC LANT/CAD	DIBOUTI AFRICA
CAMP LEMONNIER	NAVFAC LANT/CAD	NAVFAC LANT/CAD	DIBOUTI AFRICA
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES PIPING CONNECTIONS			
SCALE:	AS NOTED		
PROJECT NO.:			
WORK ORDER NO.:			
NAVFAC DRAWING NO.:	14047096		
SHEET	132	OF	186
M-408 <small>DRAWING REVISION: 10 MARCH 2009</small>			

FILE NAME: G:\14 Jobs\14-013 Dibuair - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\M-409 FILTER BLDG & PUMP HOUSE HVAC PLAN AND DETAILS.dwg LAYOUT NAME: FILTER BLDG & PUMP HOUSE HVAC PLAN AND DETAILS PLOTTED: Friday, March 25, 2016 - 9:16am USER: wherrmann



PLAN NORTH
FILTER BUILDING HVAC PLAN
 SCALE: 1:100



PLAN NORTH
PUMPHOUSE HVAC PLAN
 SCALE: 1:50

HVAC NOTES:

1. THESE DRAWINGS ARE DIAGRAMMATIC IN NATURE AND ARE NOT INTENDED TO SHOW THE EXACT LOCATIONS OF COMPONENTS, NOR SHOW ALL SYSTEM COMPONENTS. CONTRACTOR SHALL VERIFY STRUCTURAL AND ELECTRICAL INSTALLATIONS AND DRAWINGS TO AVOID OBSTRUCTIONS OR INTERFERENCE.
2. MOUNT ALL MECHANICAL EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
3. ALL DUCT TO EQUIPMENT CONNECTIONS SHALL BE MADE WITH FLEXIBLE CONNECTORS.
4. ALL DUCT SHALL HAVE 50mm EXTERNAL INSULATION.
5. ALL REFRIGERANT AND CONDENSATE PIPING SHALL BE ROUTED IN THE WALLS OR ABOVE THE CEILING UNLESS OTHERWISE INDICATED.

SEQUENCE OF OPERATIONS:

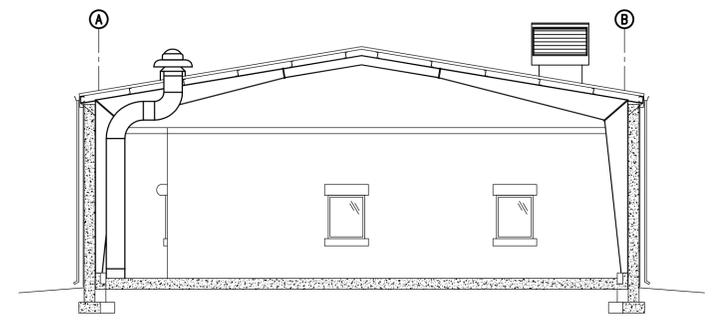
- EF-1 SEQUENCE OF OPERATION:**
 EXHAUST FAN SHALL RUN WHEN TEMPERATURE IN SPACE REACHES 30°C OR WHEN TURNED ON BY SWITCH. EXHAUST FAN IS INTERLOCKED WITH MOTORIZED DAMPER IN PENTHOUSE.
- EF-2 SEQUENCE OF OPERATION:**
 EXHAUST FAN SHALL RUN WHEN TURNED ON BY SWITCH. EXHAUST FAN IS INTERLOCKED WITH MOTORIZED DAMPER.
- EF-3/EF-4 SEQUENCE OF OPERATION:**
 EXHAUST FAN SHALL RUN WHEN TEMPERATURE IN SPACE REACHES 40°C OR WHEN TURNED ON BY SWITCH. EXHAUST FAN IS INTERLOCKED WITH MOTORIZED DAMPER.
- AHU/AC SEQUENCE OF OPERATION:**
 AHU FAN SHALL RUN CONTINUOUSLY. AC SHALL BE CYCLED ON AND OFF AS CALLED FOR BY THE THERMOSTAT AND THE MANUFACTURER'S STANDARD CONTROL SEQUENCE.

MECHANICAL ABBREVIATIONS

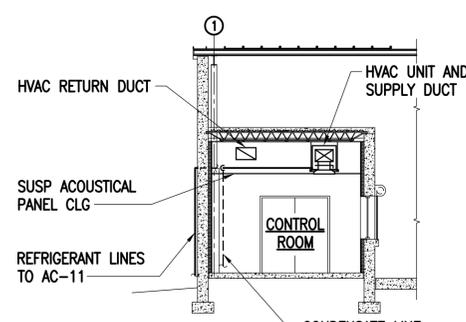
A	AMPS	MECH	MECHANICAL
AC	AIR CONDITIONING CONDENSING UNIT	MIN	MINIMUM
AHU	AIR HANDLING UNIT	MOC	MAXIMUM OVER CIRCUIT PROTECTION
C	CELSIUS	OA	OUTSIDE AIR
CO	CLEANOUT	PA	PASCAL
DB	DRY BULB	PERF	PERFORATED
ELEC	ELECTRICAL	RM	ROOM
EA	EXHAUST AIR	RH	RELATIVE HUMIDITY
EER	ENERGY EFFICIENCY RATIO	SA	SUPPLY AIR
EF	EXHAUST FAN	SP	STATIC PRESSURE
ERV	ENERGY RECOVERY VENTILATOR	TEMP	TEMPORARY
FH	FUME HOOD	TLT	TOILET
HZ	HERTZ	TYP	TYPICAL
JAN	JANITOR	W/	WITH
KW	KILOWATT	%	PERCENT
L/S	LITERS PER SECOND	.	DEGREES
MCA	MINIMUM CIRCUIT AMPACITY		

MECHANICAL (HVAC) LEGEND

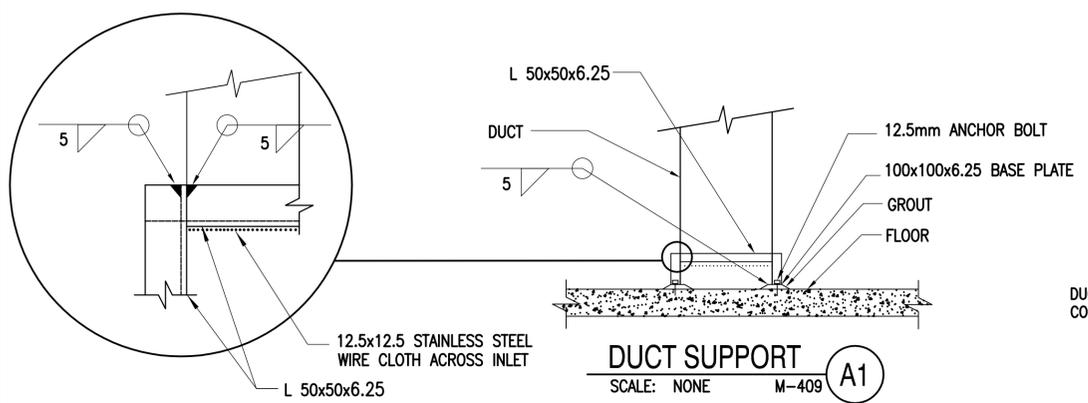
- DUCT
- FLEXIBLE DUCT
- ⊗ SUPPLY DIFFUSER
- ⊘ EXHAUST/RETURN GRILLE
- ⊙ THERMOSTAT
- ⌈ CAP
- ⊞ MOTORIZED DAMPER



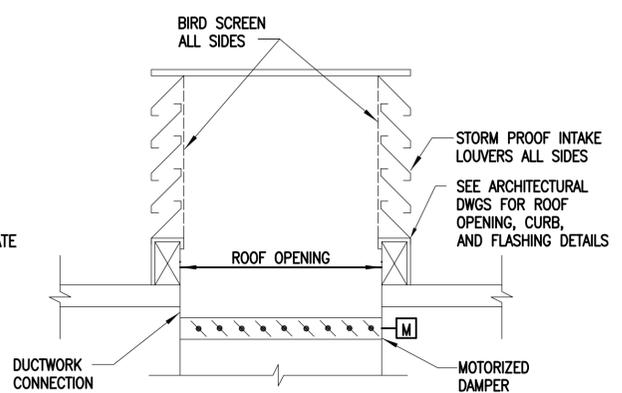
SECTION
 SCALE: 1:100 M-409 **B1**



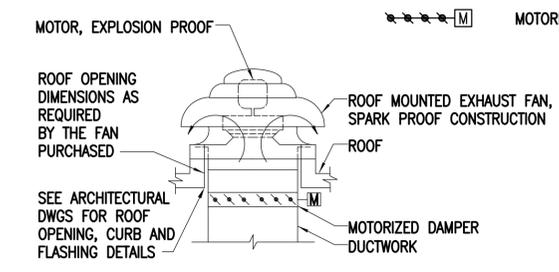
SECTION
 SCALE: 1:100 M-409 **B2**



DUCT SUPPORT
 SCALE: NONE M-409 **A1**

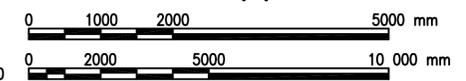


LOUVERED PENTHOUSE
 SCALE: NONE M-409 **A3**



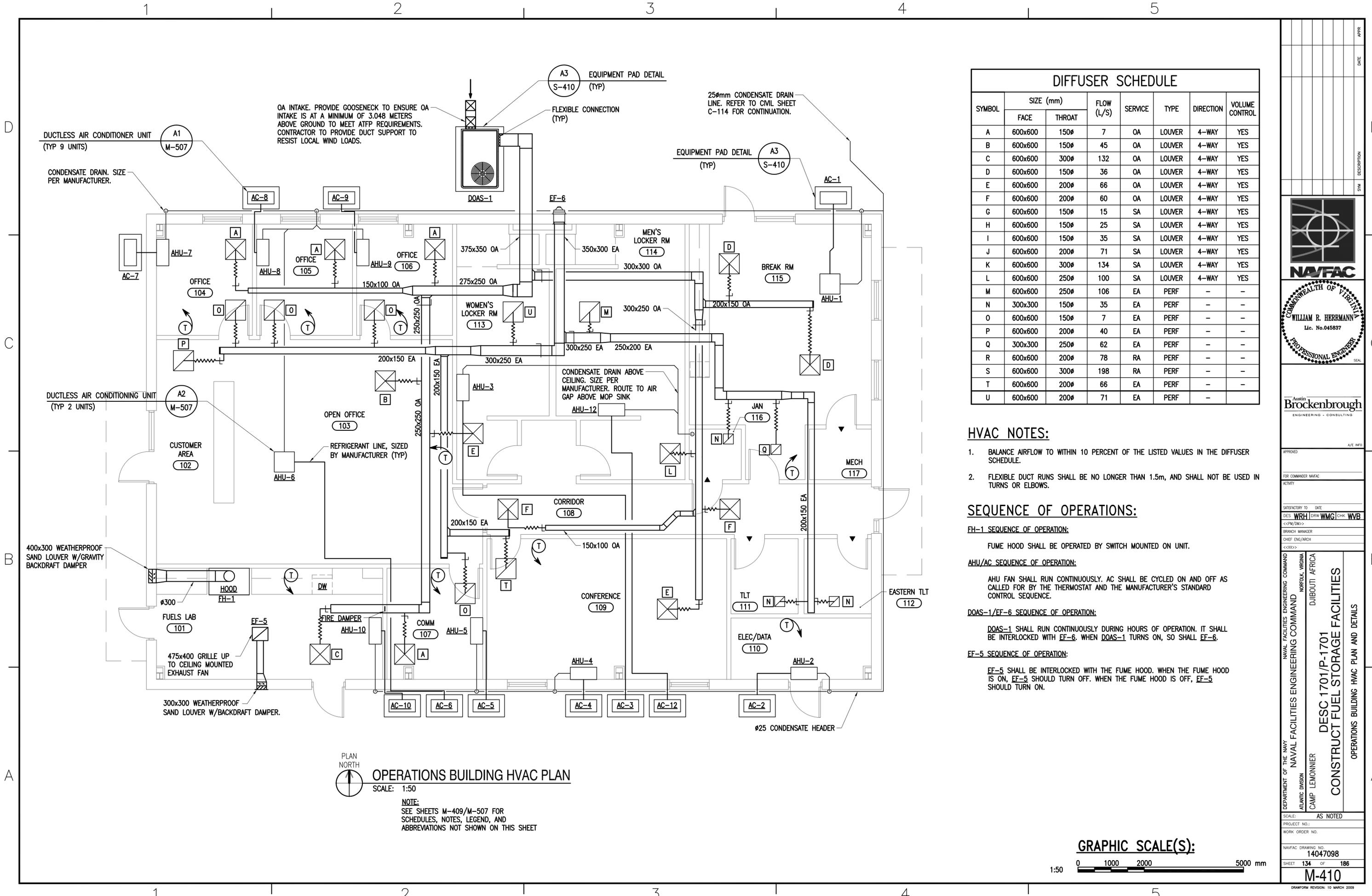
ROOF MOUNTED EXHAUST FAN
 SCALE: NONE M-409 **B3**

GRAPHIC SCALE(S):



APPROVED	DATE	APPR
DESCRIPTION	SYN	DATE
FOR COMMANDER NAVFAC	A/E INFO	
ACTIVITY		
SATISFACTORY TO DATE		
DES WRH	DRW WMG	CHK WVB
<<PM/IMP>>		
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<CDS>>		
NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC	DIBOUTI AFRICA
NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC	DIBOUTI AFRICA
CAMP LEMONNIER		
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES FILTER BLDG & PUMP HOUSE HVAC PLAN AND DETAILS		
SCALE: AS NOTED		
PROJECT NO.: 14047097		
WORK ORDER NO.		
NAVFAC DRAWING NO. 14047097		
SHEET 133 OF 186		
M-409		
<small>DRAWING REVISION: 10 MARCH 2009</small>		

FILE NAME: G:\14 Jobs\14-013 Dhhout - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\M-410 OPERATIONS BUILDING HVAC PLAN AND DETAILS.dwg LAYOUT NAME: OPERATIONS BUILDING HVAC PLAN AND DETAILS PLOTTED: Friday, March 25, 2016 - 9:16am USER: wherrmann



PLAN NORTH
OPERATIONS BUILDING HVAC PLAN
 SCALE: 1:50
 NOTE:
 SEE SHEETS M-409/M-507 FOR
 SCHEDULES, NOTES, LEGEND, AND
 ABBREVIATIONS NOT SHOWN ON THIS SHEET

DIFFUSER SCHEDULE							
SYMBOL	SIZE (mm)		FLOW (L/S)	SERVICE	TYPE	DIRECTION	VOLUME CONTROL
	FACE	THROAT					
A	600x600	150φ	7	OA	LOUVER	4-WAY	YES
B	600x600	150φ	45	OA	LOUVER	4-WAY	YES
C	600x600	300φ	132	OA	LOUVER	4-WAY	YES
D	600x600	150φ	36	OA	LOUVER	4-WAY	YES
E	600x600	200φ	66	OA	LOUVER	4-WAY	YES
F	600x600	200φ	60	OA	LOUVER	4-WAY	YES
G	600x600	150φ	15	SA	LOUVER	4-WAY	YES
H	600x600	150φ	25	SA	LOUVER	4-WAY	YES
I	600x600	150φ	35	SA	LOUVER	4-WAY	YES
J	600x600	200φ	71	SA	LOUVER	4-WAY	YES
K	600x600	300φ	134	SA	LOUVER	4-WAY	YES
L	600x600	250φ	100	SA	LOUVER	4-WAY	YES
M	600x600	250φ	106	EA	PERF	-	-
N	300x300	150φ	35	EA	PERF	-	-
O	600x600	150φ	7	EA	PERF	-	-
P	600x600	200φ	40	EA	PERF	-	-
Q	300x300	250φ	62	EA	PERF	-	-
R	600x600	200φ	78	RA	PERF	-	-
S	600x600	300φ	198	RA	PERF	-	-
T	600x600	200φ	66	EA	PERF	-	-
U	600x600	200φ	71	EA	PERF	-	-

HVAC NOTES:

- BALANCE AIRFLOW TO WITHIN 10 PERCENT OF THE LISTED VALUES IN THE DIFFUSER SCHEDULE.
- FLEXIBLE DUCT RUNS SHALL BE NO LONGER THAN 1.5m, AND SHALL NOT BE USED IN TURNS OR ELBOWS.

SEQUENCE OF OPERATIONS:

FH-1 SEQUENCE OF OPERATION:

FUME HOOD SHALL BE OPERATED BY SWITCH MOUNTED ON UNIT.

AHU/AC SEQUENCE OF OPERATION:

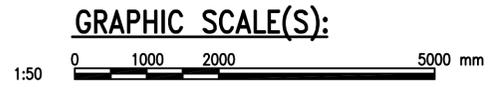
AHU FAN SHALL RUN CONTINUOUSLY. AC SHALL BE CYCLED ON AND OFF AS CALLED FOR BY THE THERMOSTAT AND THE MANUFACTURER'S STANDARD CONTROL SEQUENCE.

DOAS-1/EF-6 SEQUENCE OF OPERATION:

DOAS-1 SHALL RUN CONTINUOUSLY DURING HOURS OF OPERATION. IT SHALL BE INTERLOCKED WITH EF-6. WHEN DOAS-1 TURNS ON, SO SHALL EF-6.

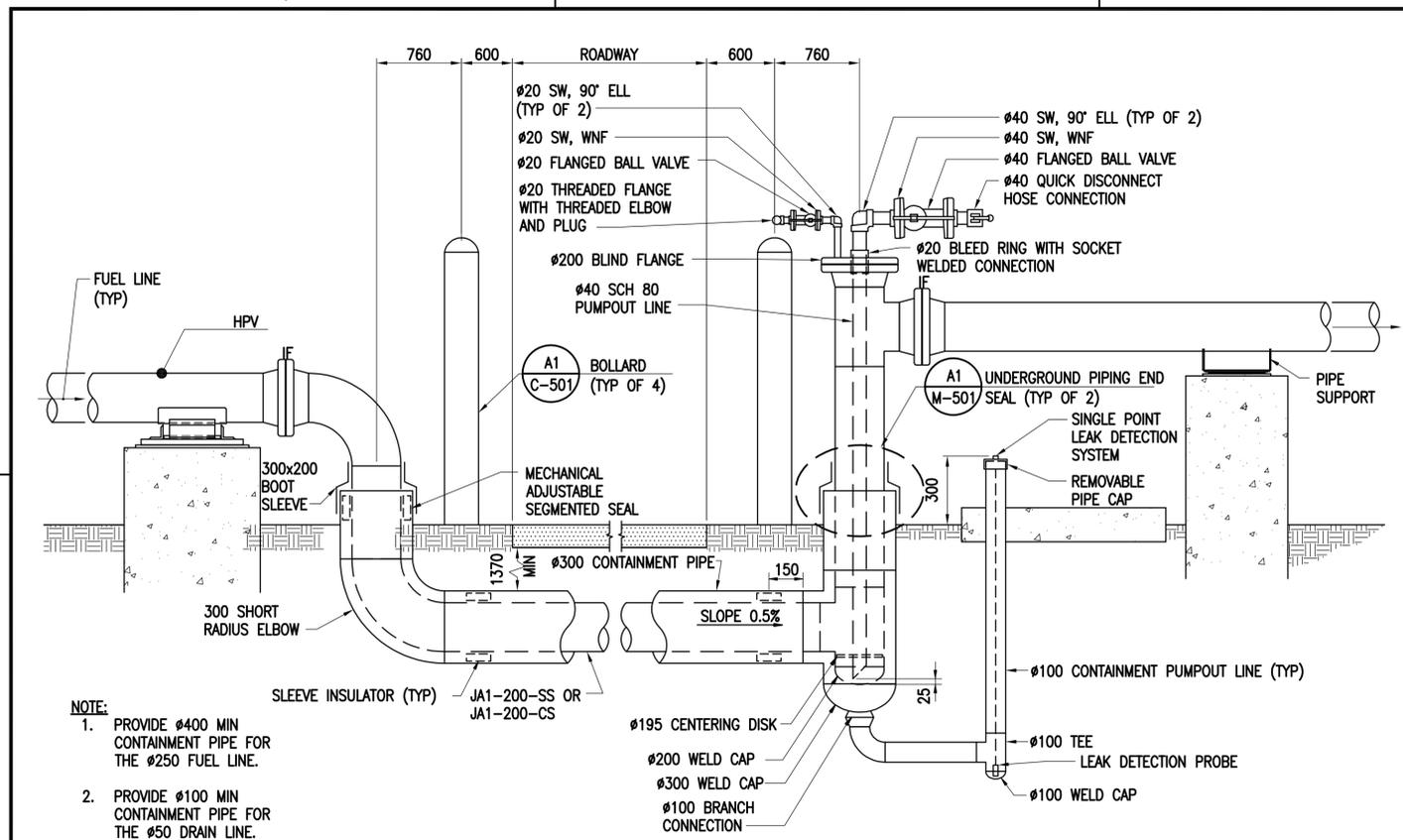
EF-5 SEQUENCE OF OPERATION:

EF-5 SHALL BE INTERLOCKED WITH THE FUME HOOD. WHEN THE FUME HOOD IS ON, EF-5 SHOULD TURN OFF. WHEN THE FUME HOOD IS OFF, EF-5 SHOULD TURN ON.

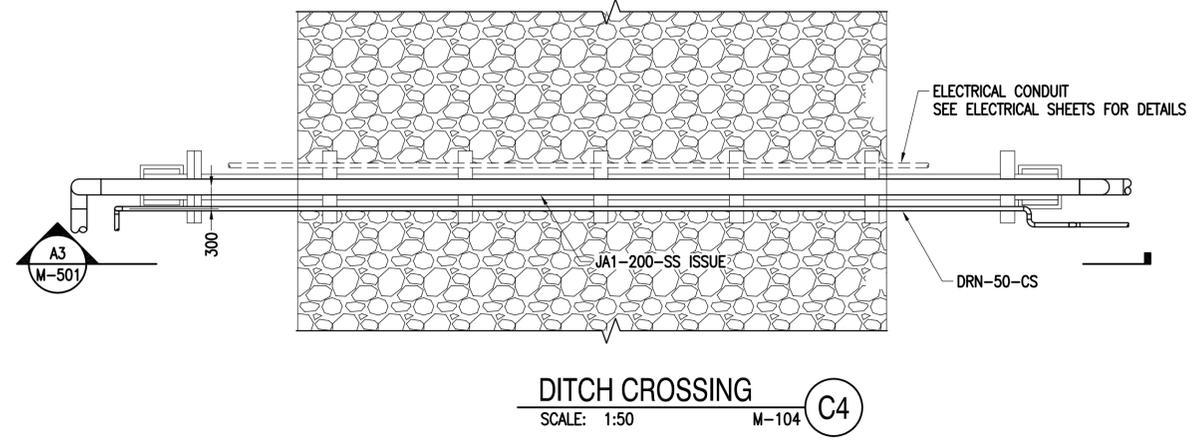


APPR	
DATE	
SYN	DESCRIPTION
 NAVFAC COMMONWEALTH OF VIRGINIA WILLIAM R. HERRMANN Lic. No. 045837 PROFESSIONAL ENGINEER	
Austin Brockenbrough ENGINEERING - CONSULTING	
APPROVED	A/E INFO
FOR COMMANDER NAVFAC ACTIVITY	
SATISFACTORY TO DATE	
DES	WRH DRW WMG CHK WVB
<<PM/DM>>	
BRANCH MANAGER	
CHIEF ENG/ARCH	
<<CR>>	
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND
ATLANTIC DIVISION	NORFOLK, VIRGINIA
CAMP LEMONIER	DUBOULT, AFRICA
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES OPERATIONS BUILDING HVAC PLAN AND DETAILS	
SCALE:	AS NOTED
PROJECT NO.:	
WORK ORDER NO.:	
NAVFAC DRAWING NO.:	14047098
SHEET	134 OF 186
M-410	
DRAWFORM REVISION: 10 MARCH 2009	

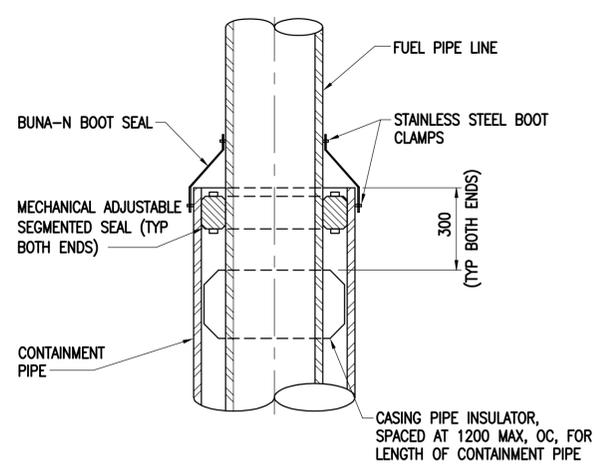
FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\CAD AutoCAD\M-501 DITCH AND ROAD CROSSING DETAILS.dwg LAYOUT NAME: DITCH AND ROAD CROSSING DETAILS PLOTTED: Friday, March 25, 2016 - 9:16am USER: wherrmon



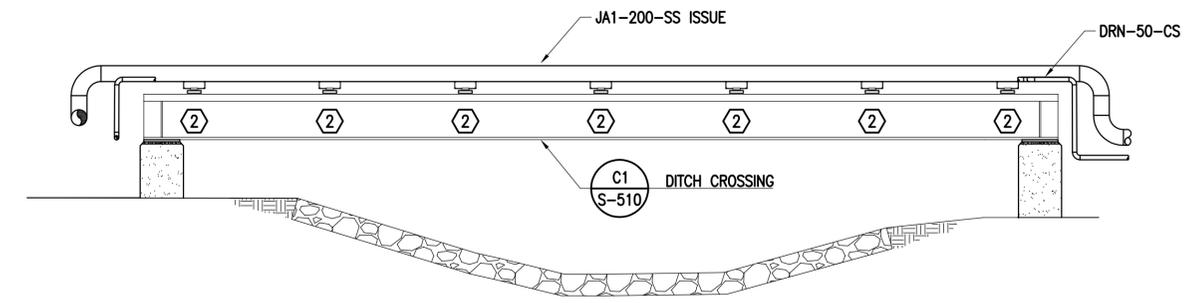
- NOTE:**
1. PROVIDE #400 MIN CONTAINMENT PIPE FOR THE #250 FUEL LINE.
 2. PROVIDE #100 MIN CONTAINMENT PIPE FOR THE #50 DRAIN LINE.
 3. CONTAINMENT PIPE SHALL BE SCHEDULE 120 CARBON STEEL PIPING.



ROAD CROSSING C1
SCALE: NONE M-104 M-105



UNDERGROUND PIPING END SEAL A1
SCALE: NONE M-501

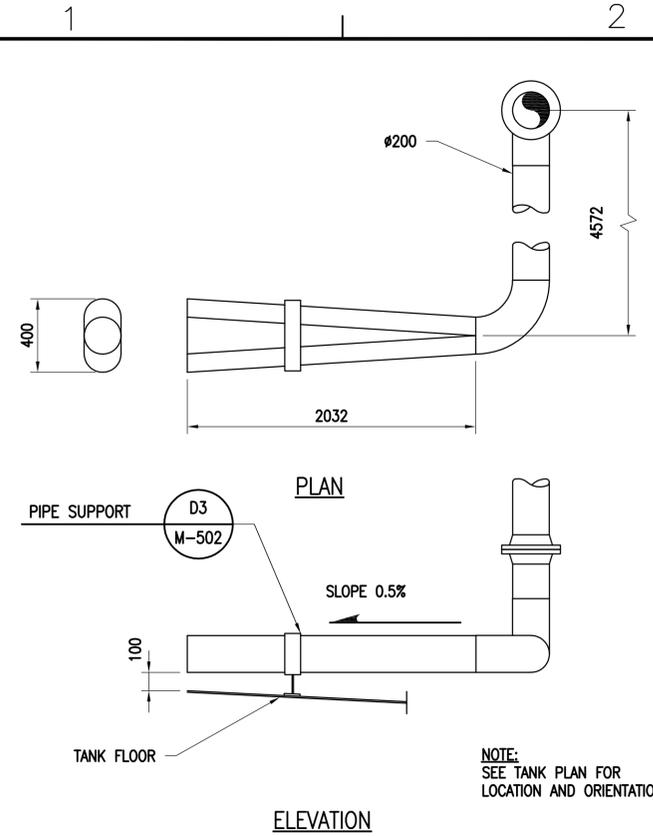


SECTION A3
SCALE: 1:50 M-501

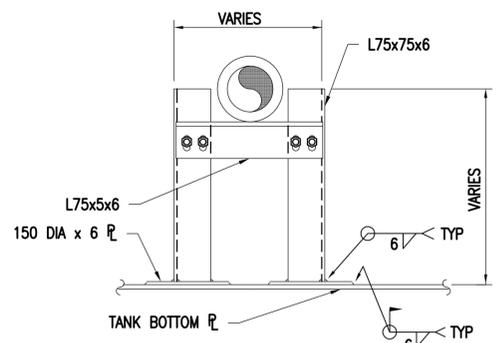
GRAPHIC SCALE(S):



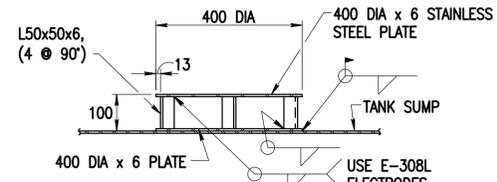
APPROVED	DATE	DESCRIPTION	SYN
 NAVFAC COMMONWEALTH OF VIRGINIA DONALD W. NODDES Lic. No. 037747 PROFESSIONAL ENGINEER			
Austin Brockenbrough ENGINEERING • CONSULTING			
APPROVED	A/E INFO		
FOR COMMANDER NAVFAC			
ACTIVITY			
SATISFACTORY TO DATE			
DES	DWN	DRW	WMC
<<PM/DM>>		CHK	WVB
BRANCH MANAGER			
CHIEF ENG/ARCH			
<<CR>>			
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND NAVAL FACILITIES ENGINEERING COMMAND NORFOLK, VIRGINIA DIBOUTI, AFRICA CAMP LEMONNIER DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES DITCH AND ROAD CROSSING DETAILS			
SCALE: AS NOTED			
PROJECT NO.:			
WORK ORDER NO.:			
NAVFAC DRAWING NO. 14047099			
SHEET 135 OF 186			
M-501			
DRAWING REVISION: 10 MARCH 2009			



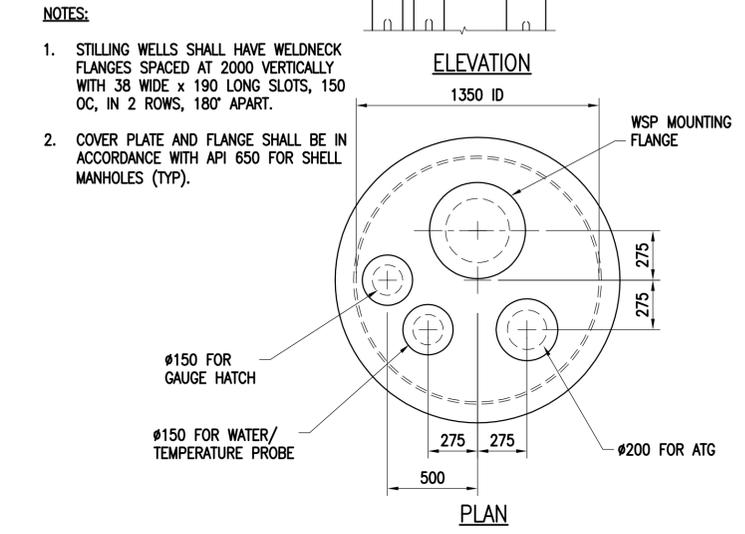
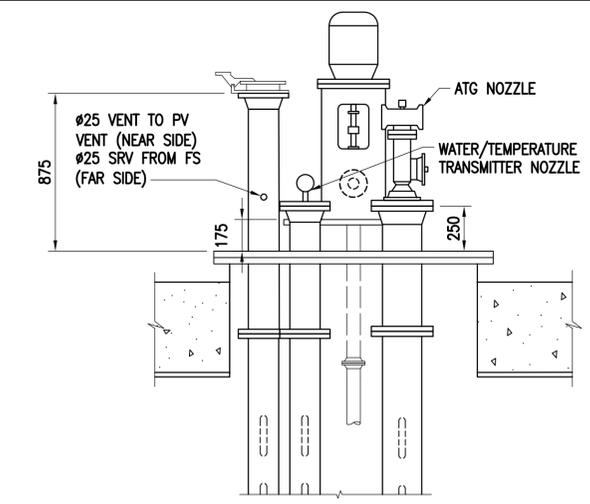
PIPE SUPPORT
SCALE: NONE M-502 (D3)



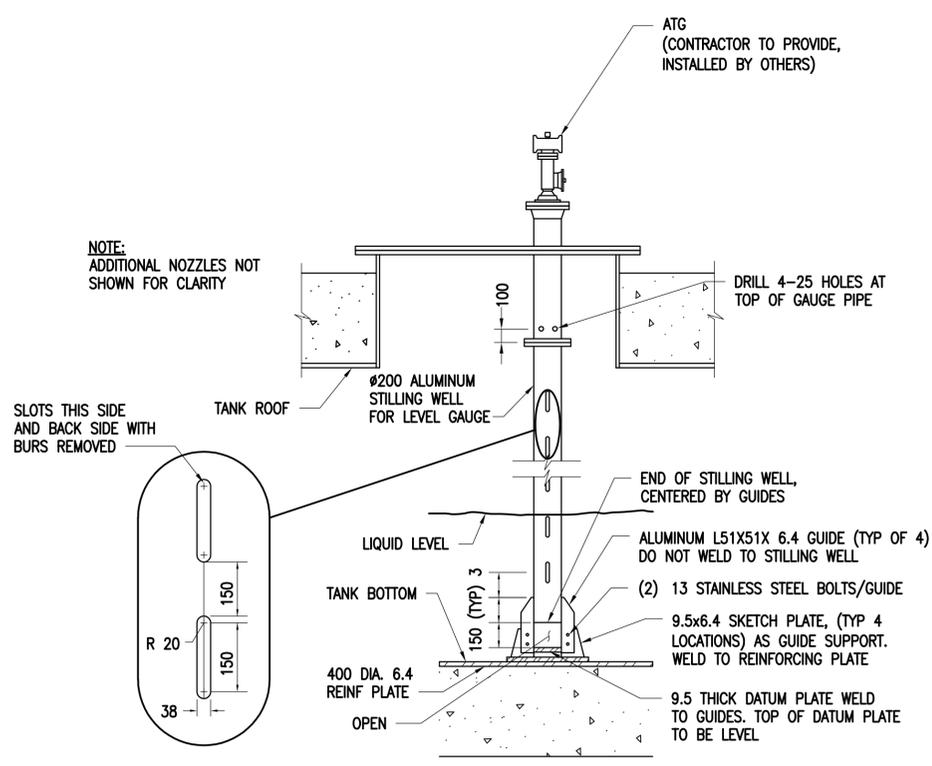
PIPE SUPPORT
SCALE: 1:10 M-502 (D3)



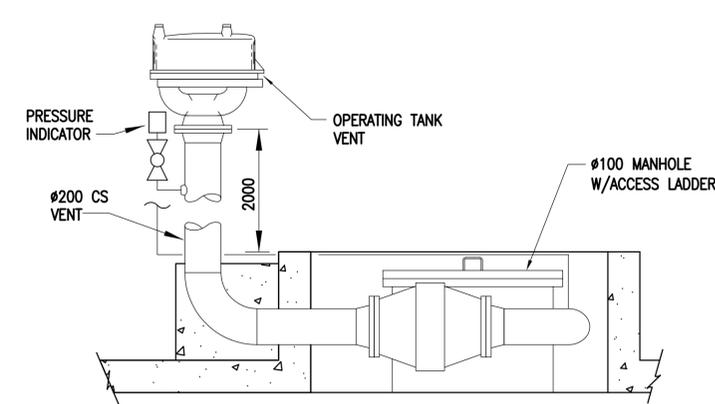
BEARING TABLE
SCALE: 1:10 M-402 (C3)



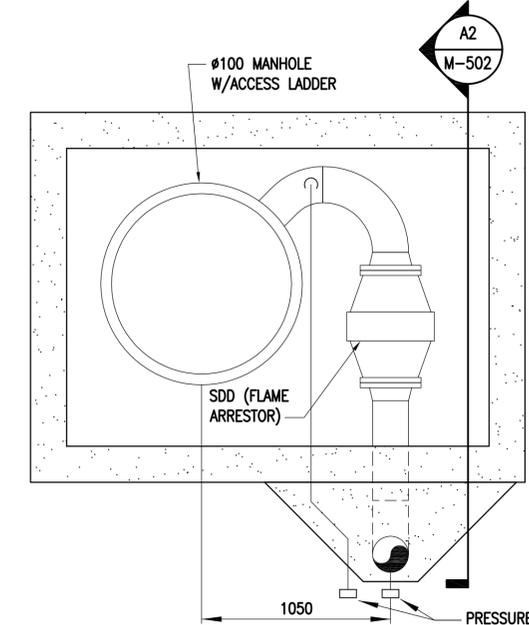
TANK FLANGE
SCALE: 1:20 M-401 (C4)



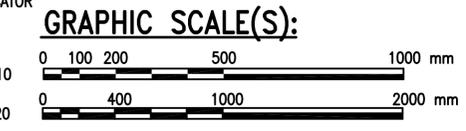
ATG STILLING WELL
SCALE: NONE M-402 (A1)



SECTION
SCALE: 1:20 M-502 (A2)



MANHOLE W/VENT
SCALE: 1:20 M-401 (A4)



NOTES:
1. ASSEMBLE PIPE SUPPORTS WITH SLOTTED BOLT HOLES AND ASTM A193 STAINLESS STEEL NUTS AND BOLTS.
2. SPACE SUPPORT AT 2450 OC MAX

NOTES:
1. STILLING WELLS SHALL HAVE WELDNECK FLANGES SPACED AT 2000 VERTICALLY WITH 38 WIDE x 190 LONG SLOTS, 150 OC, IN 2 ROWS, 180° APART.
2. COVER PLATE AND FLANGE SHALL BE IN ACCORDANCE WITH API 650 FOR SHELL MANHOLES (TYP).

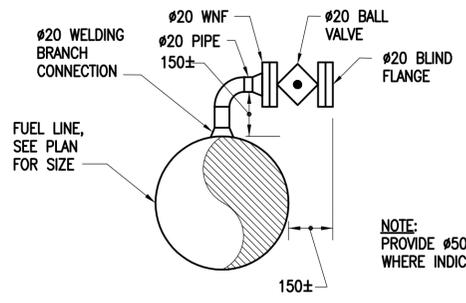
NOTE:
ADDITIONAL NOZZLES NOT SHOWN FOR CLARITY

NOTE:
PRESSURE INDICATOR SHALL HAVE A RANGE OF OF -2.5 kPa TO 2.5 kPa

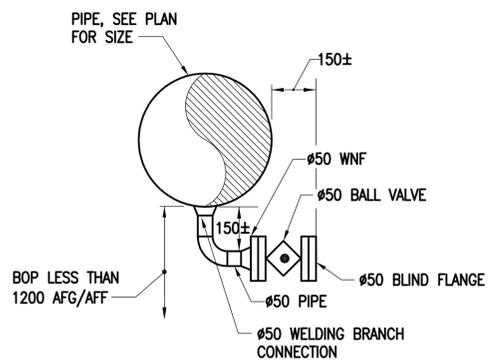
NOTE:
ROLLING COVER NOT SHOWN FOR CLARITY.

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\14040 AutoCAD\M-502 OPERATING TANK DETAILS.dwg LAYOUT NAME: OPERATING TANK DETAILS PLOTTED: Friday, March 25, 2016 - 9:17am USER: whiermann

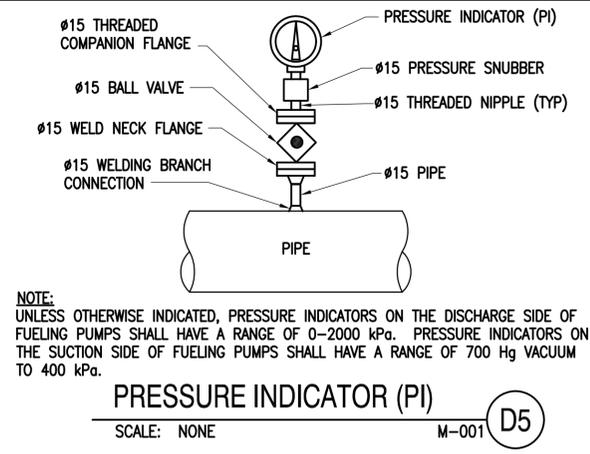
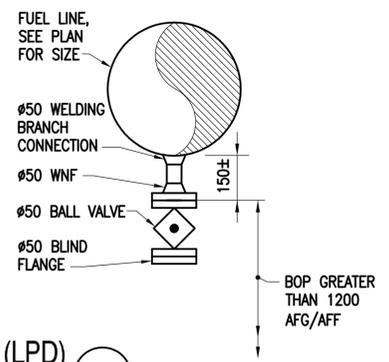
APPROVED	DATE	APPR
FOR COMMANDER NAVFAC	ACTIVITY	DESCRIPTION
SATISFACTORY TO	DATE	
DES: DWN	DRW: WMG	CHK: WVB
<<PM/DM>>		
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<CR>>		
NAVAL FACILITIES ENGINEERING COMMAND	NORFOLK, VIRGINIA	
NAVAL FACILITIES ENGINEERING COMMAND	DJIBOUTI, AFRICA	
DEPARTMENT OF THE NAVY	CAMP LEONORRING TANK DETAILS	
ATLANTIC DIVISION	DESC 1701/P-1701	
	CONSTRUCT FUEL STORAGE FACILITIES	
	OPERATING TANK DETAILS	
SCALE: AS NOTED		
PROJECT NO.:		
WORK ORDER NO.		
NAVFAC DRAWING NO.	14047100	
SHEET	136 OF 186	
M-502		
DRAWING REVISION: 10 MARCH 2009		



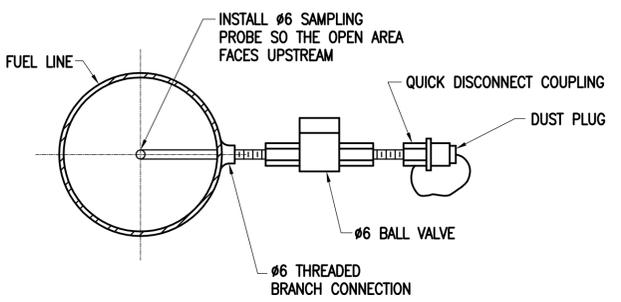
HIGH POINT VENT (HPV)
SCALE: NONE M-001 **D1**



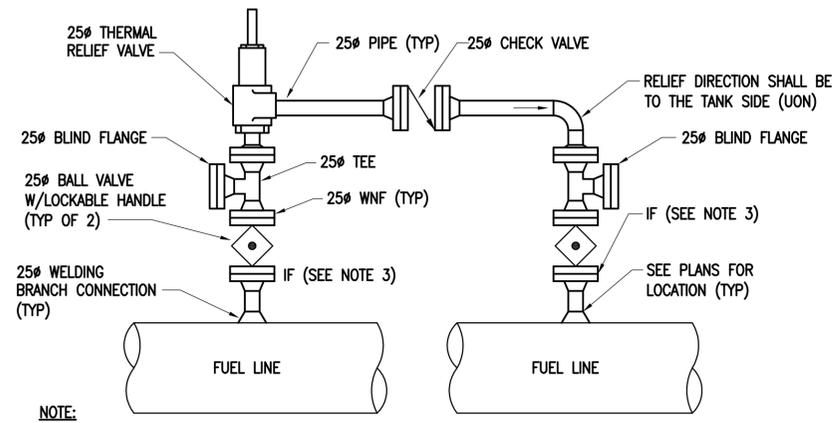
LOW POINT DRAIN (LPD)
SCALE: NONE M-001 **D3**



PRESSURE INDICATOR (PI)
SCALE: NONE M-001 **D5**

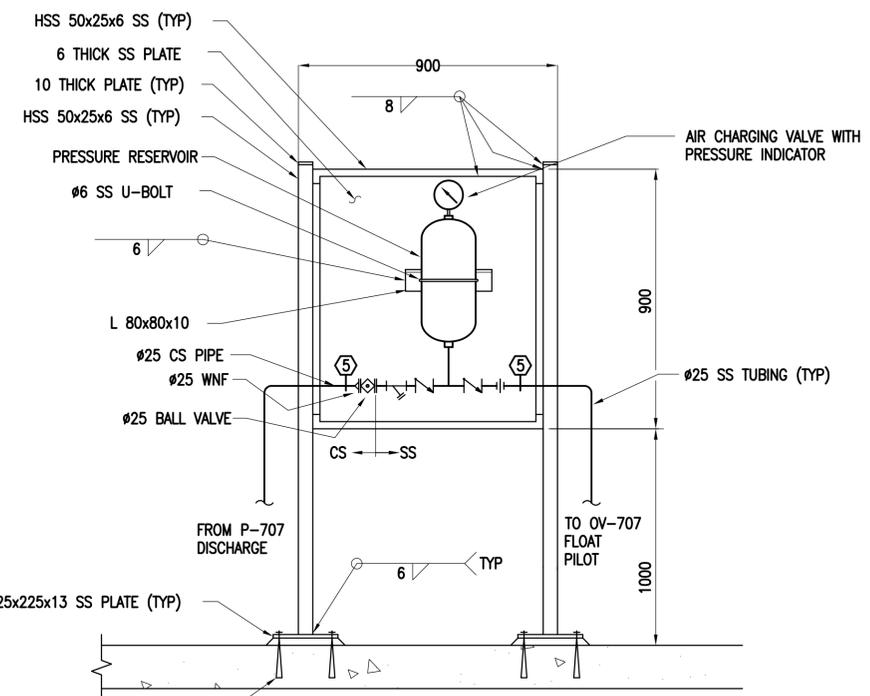


FUEL SAMPLE POINT CONNECTION (FSP)
SCALE: NONE M-001 **C1**



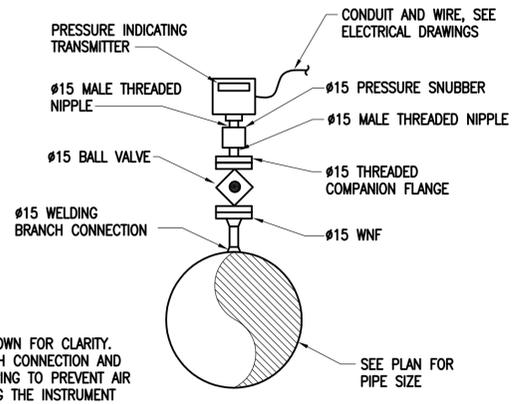
- NOTE:**
1. ALL INTEGRAL AND EXTERNAL THERMAL RELIEF VALVES SHALL BE SET TO OPEN AT A PRESSURE OF 1500 kPa, UNLESS OTHERWISE INDICATED.
 2. THERMAL RELIEF VALVES SHALL BE INSTALLED IN THE VERTICAL POSITION OR PER MANUFACTURERS INSTRUCTIONS.
 3. PROVIDE AN INSULATING GASKET (IF) WHEN LOCATED ON CATHODICALLY PROTECTED FUEL LINES OR WHERE DISSIMILAR METALS ARE ENCOUNTERED (STAINLESS TO CARBON STEEL).

THERMAL RELIEF VALVE (TRV)
SCALE: NONE M-001 **B2**

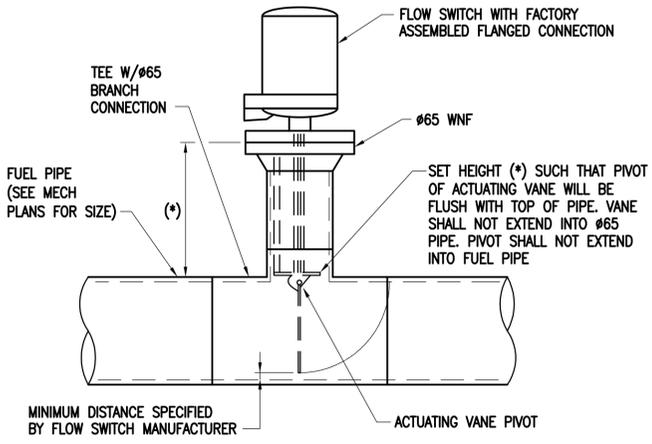


- NOTES:**
1. CHECK VALVES, STRAINER AND PRESSURE RESERVOIR SHALL BE PRODUCTS OF CONTROL VALVE MANUFACTURER.

PRESSURE RESERVOIR
SCALE: NONE M-406 **B4**



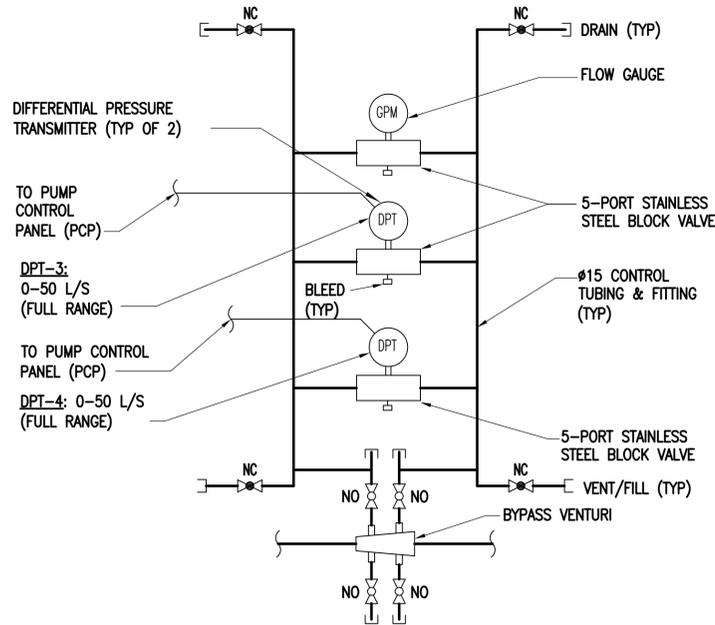
PRESSURE INDICATING TRANSMITTER (PIT)
SCALE: NONE M-001 **A1**



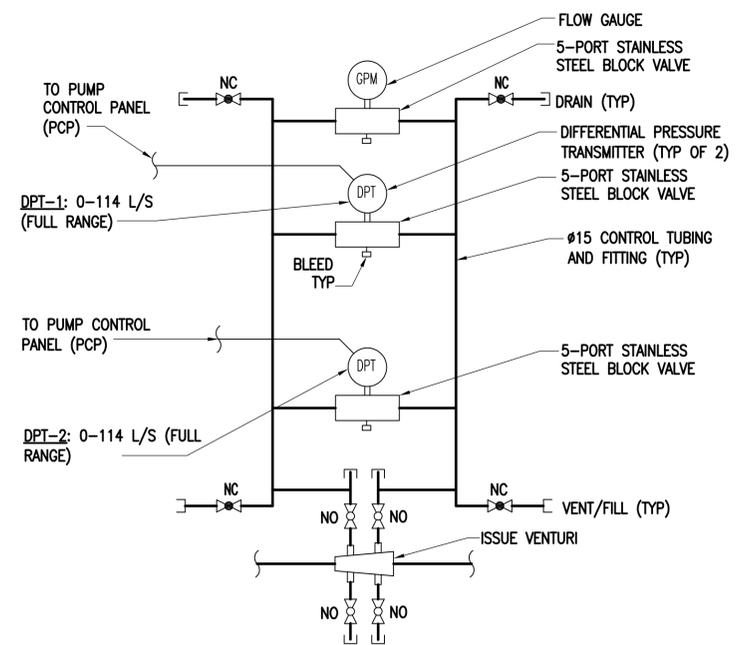
FLOW SWITCH (FS)
SCALE: NONE M-001 **A2**

APPROVED	DATE	DESCRIPTION	SYN
APPROVED	DATE	ACTIVITY	A/E INFO
FOR COMMANDER NAVFAC			
SATISFACTORY TO	DATE		
DES: DWN	DRW: WMG	CHK: WVB	
<<PM/DM>>			
BRANCH MANAGER			
CHIEF ENG/ARCH			
<<CR>>			
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC AFRICA	DUBOULTI AFRICA
ATLANTIC DIVISION	CAMP LEMONIER	DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES	
PIPING DETAILS			
SCALE:	AS NOTED		
PROJECT NO.:			
WORK ORDER NO.:			
NAVFAC DRAWING NO.:	14047101		
SHEET	137	OF	186
M-503			
DRAWFORM REVISION: 10 MARCH 2009			

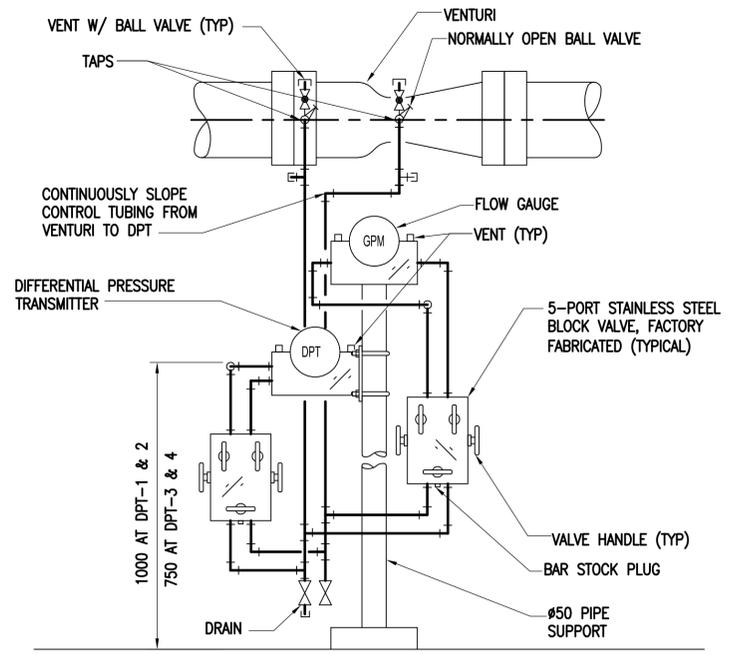
FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANT/DAO AutoCAD\M-503 PIPING DETAILS.dwg LAYOUT NAME: PIPING DETAILS PLOTTED: Friday, March 25, 2016 - 9:17am USER: wherrmann



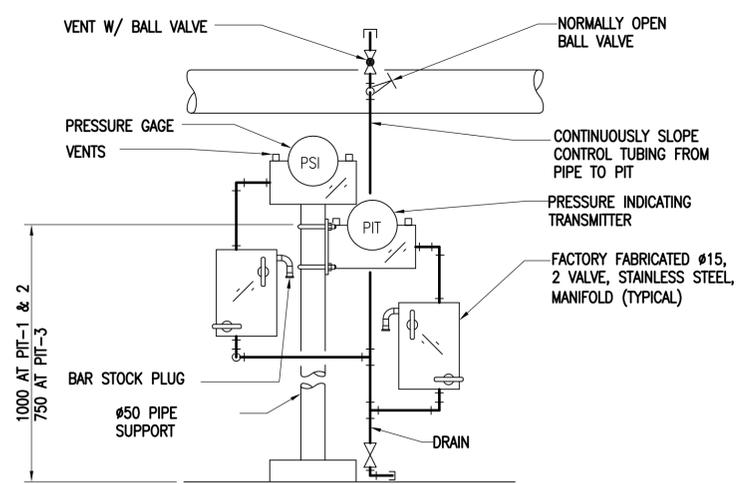
BYPASS VENTURI TUBE CONTROL DIAGRAM
SCALE: NONE M-404 (C1)



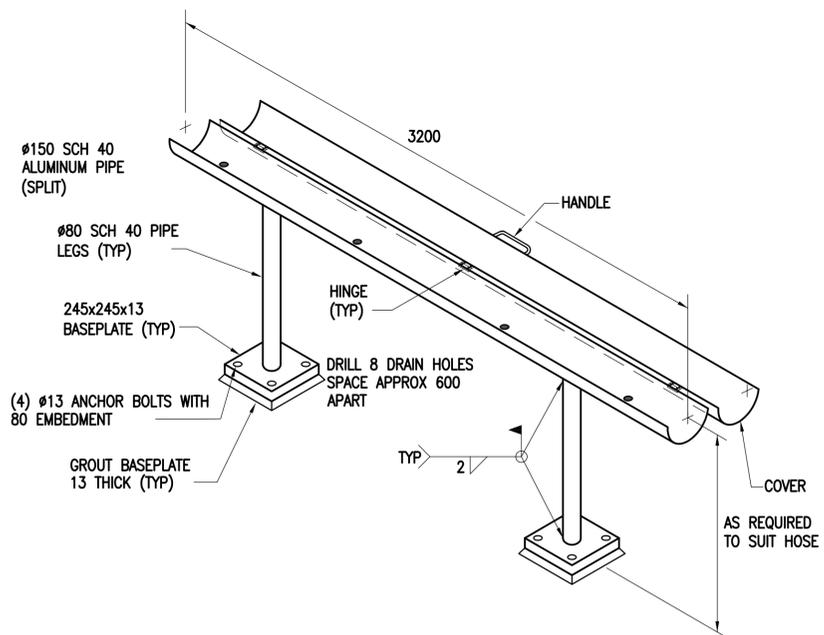
ISSUE VENTURI TUBE CONTROL DIAGRAM
SCALE: NONE M-404 (C2)



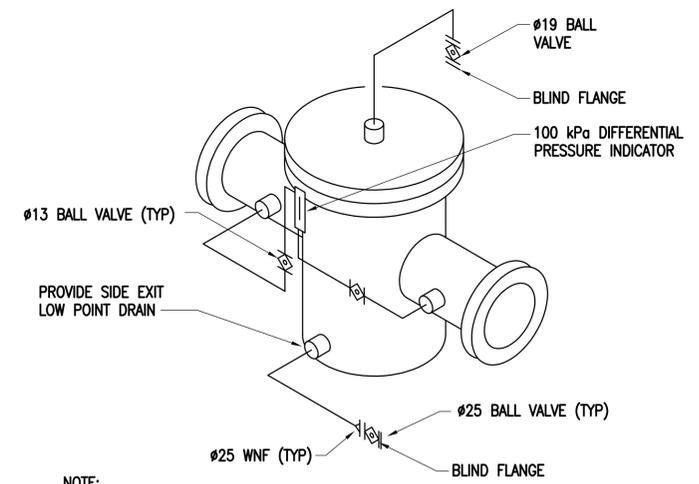
DIFFERENTIAL PRESSURE INDICATING TRANSMITTER (DPT) PIPING
SCALE: NONE M-404 (C4)



PRESSURE INDICATING TRANSMITTER (PIT) PIPING
SCALE: NONE M-404 (A1)



HOSE TROUGH
SCALE: NONE M-405 (A2)

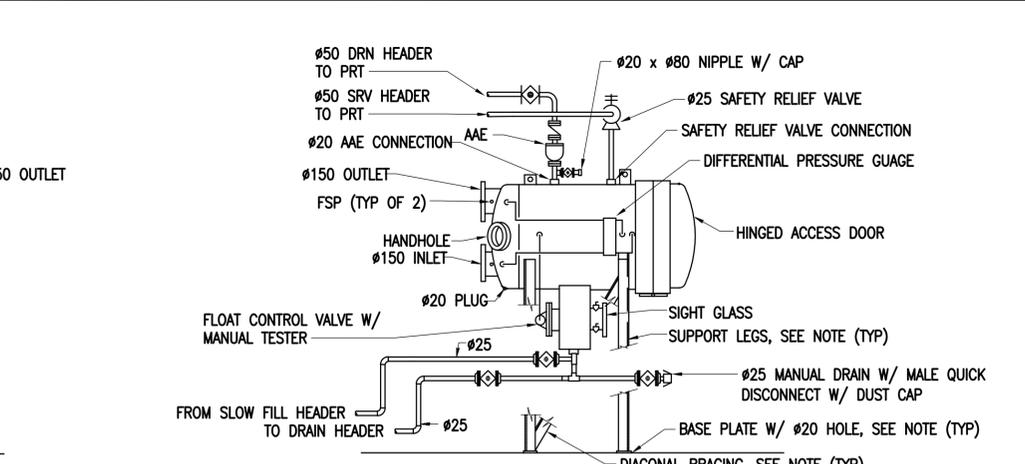
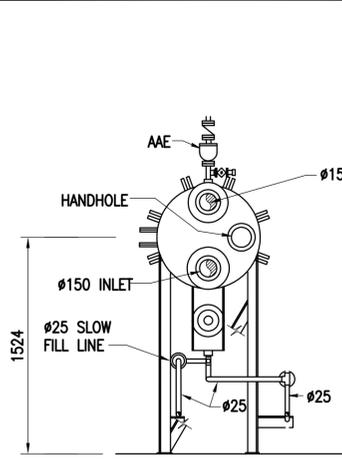


NOTE:
FOR DIFFERENTIAL PRESSURE INDICATOR, USE STAINLESS STEEL TUBING, COMPRESSION FITTINGS AND MOUNT ALL TO A STAINLESS STEEL PLATE GAUGE PANEL MOUNTED TO STRAINER FLANGE.

BASKET STRAINER (BS)
SCALE: NONE M-001 (A4)

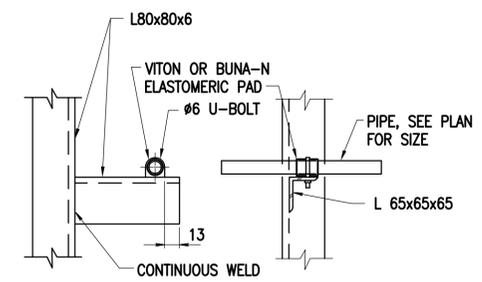
FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\M-504 MISCELLANEOUS DETAILS.dwg LAYOUT NAME: MISCELLANEOUS DETAILS PLOTTED: Friday, March 25, 2016 - 9:17am USER: wharmon

APPROVED	DATE	APPR
DESCRIPTION	DATE	APPR
SYN	DATE	APPR
 NAVFAC COMMONWEALTH OF VIRGINIA DONALD W. NODES Lic. No. 037747 PROFESSIONAL ENGINEER		
Austin Brockenbrough ENGINEERING • CONSULTING		
APPROVED		
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO DATE		
DES	DRW	CHK
DWN	WMC	WVB
<<PM/DM>>		
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<CR>>		
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC LANTCOM
ATLANTIC DIVISION	NAVAL FACILITIES ENGINEERING COMMAND	NORFOLK, VIRGINIA
CAMP LEMONIER	DUBOULT, AFRICA	
DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES MISCELLANEOUS DETAILS		
SCALE: AS NOTED		
PROJECT NO.:		
WORK ORDER NO.:		
NAVFAC DRAWING NO.:		
14047102		
SHEET 138 OF 186		
M-504 <small>DRAWING REVISION: 10 MARCH 2009</small>		

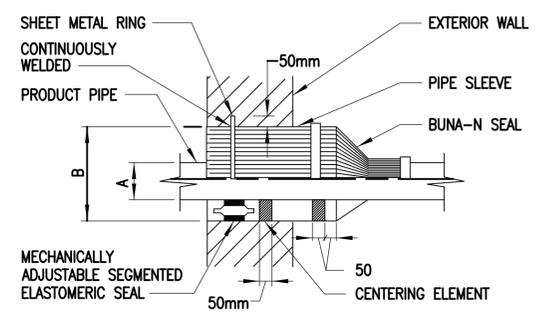


NOTE:
BASE PLATE, SUPPORT LEGS AND DIAGONAL BRACING TO BE SIZED BY F/S MFG.

ISSUE FILTER/SEPARATOR
SCALE: NONE M-404 **D1**

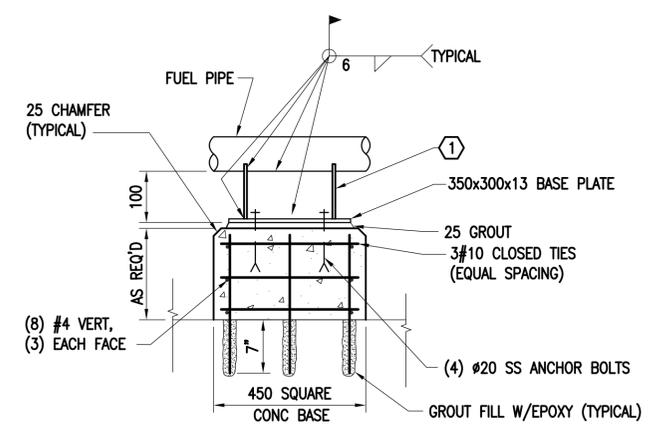


PIPE SUPPORT
SCALE: NONE M-505 **D3**



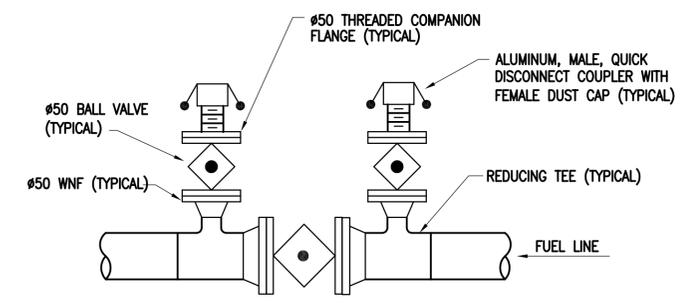
PRODUCT PIPE	A (DIA)	B (DIA)
300	324	350
250	273	324
200	219	324
150	168	273
100	115	219
50	60	168

PIPE PENETRATION
SCALE: NONE M-401, M-403, M-404 **B1**

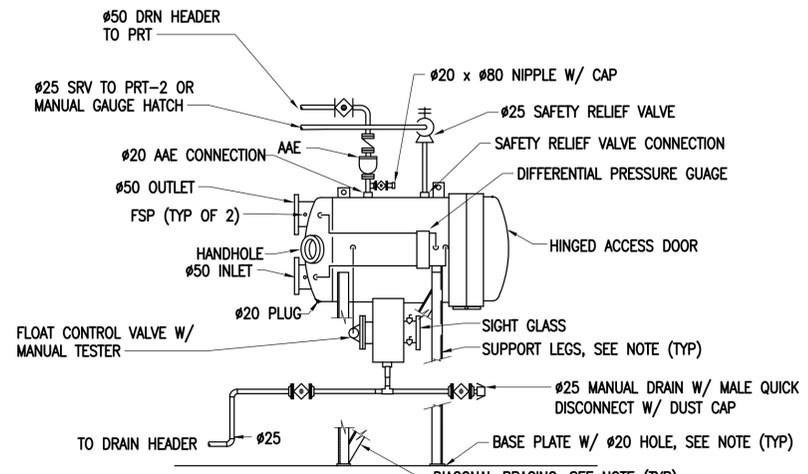
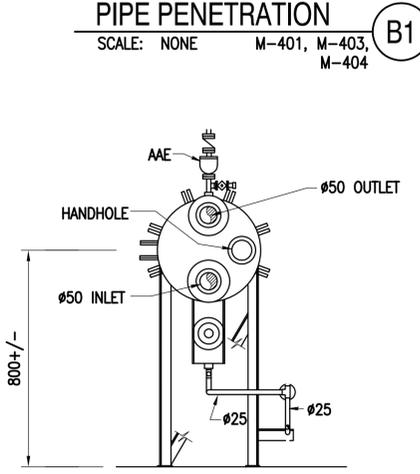


NOTE:
FOR STAINLESS STEEL PIPING, BASE PLATE AND ANCHOR SHALL BE STAINLESS STEEL.

PIPE ANCHOR
SCALE: NONE M-405 **B3**



METER PROVING CONNECTION (MPC)
SCALE: NONE M-001 **B4**

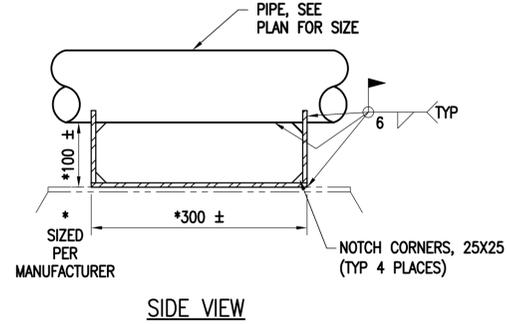
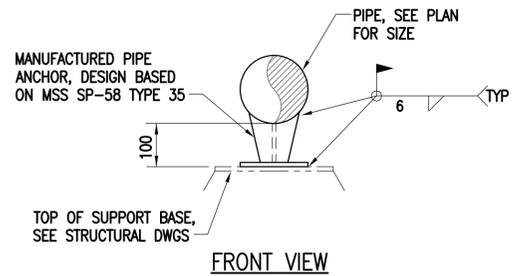


NOTE:
BASE PLATE, SUPPORT LEGS AND DIAGONAL BRACING TO BE SIZED BY F/S MFG.

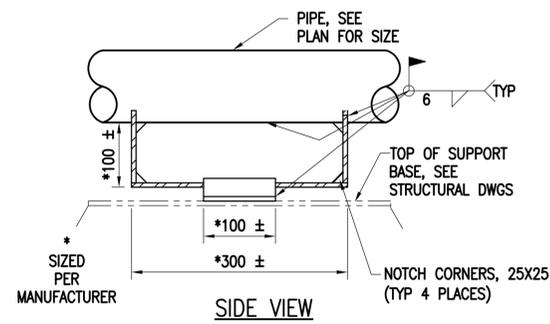
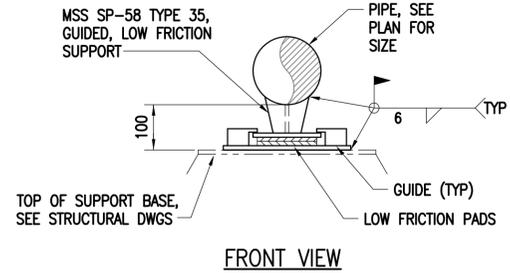
PRT AND PUMPHOUSE FILTER/SEPARATOR
SCALE: NONE M-402, M-404 **A1**

FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANT/DAO AutoCAD\M-505 MISCELLANEOUS DETAILS.dwg LAYOUT NAME: MISCELLANEOUS DETAILS.dwg PLOTTED: Friday, March 25, 2016 - 9:17am USER: wharmon

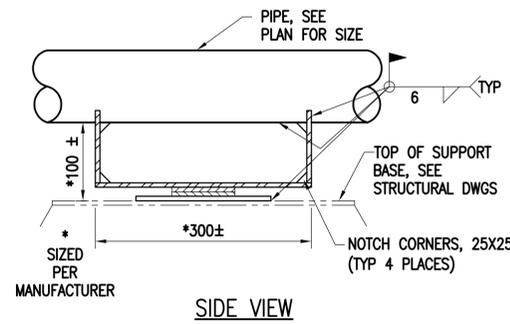
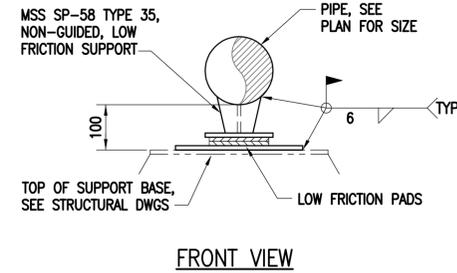
 COMMONWEALTH OF VIRGINIA DONALD W. NODES Lic. No. 037747 PROFESSIONAL ENGINEER	Austin Brockenbrough ENGINEERING • CONSULTING APPROVED: _____ FOR COMMANDER NAVFAC ACTIVITY _____ SATISFACTORY TO: _____ DATE _____ DES: DWN DRW: WMC CHK: WVB <<PM/DM>> BRANCH MANAGER _____ CHIEF ENG/ARCH _____ <<<DES>>
DEPARTMENT OF THE NAVY NAVAL FACILITIES ENGINEERING COMMAND ATLANTIC DIVISION CAMP LEMONIER NORFOLK, VIRGINIA DUBOULT AFRICA	DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES MISCELLANEOUS DETAILS
SCALE: AS NOTED PROJECT NO.: _____ WORK ORDER NO.: _____ NAVFAC DRAWING NO.: 14047103 SHEET 139 OF 186 M-505 <small>DRAWFORM REVISION: 10 MARCH 2009</small>	



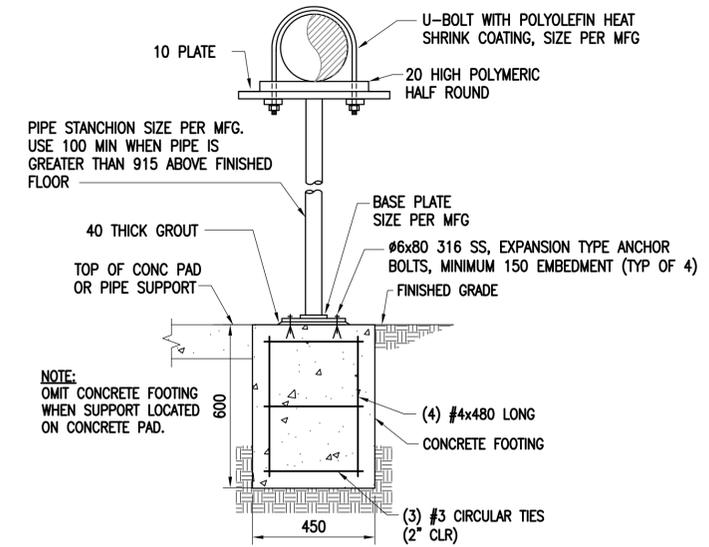
TYPE 1 ANCHORED PIPE SUPPORT
SCALE: NONE



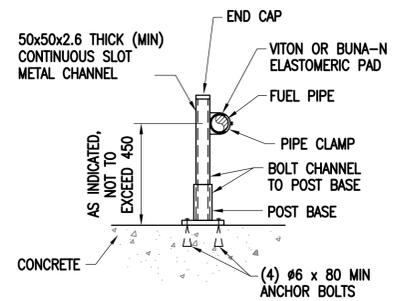
TYPE 2 GUIDED PIPE SUPPORT
SCALE: NONE



TYPE 3 UNGUIDED PIPE SUPPORT
SCALE: NONE

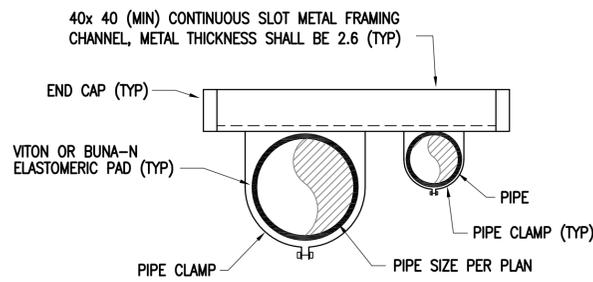


TYPE 4 FLOOR SUPPORTED LARGE PIPE SUPPORT
SCALE: NONE



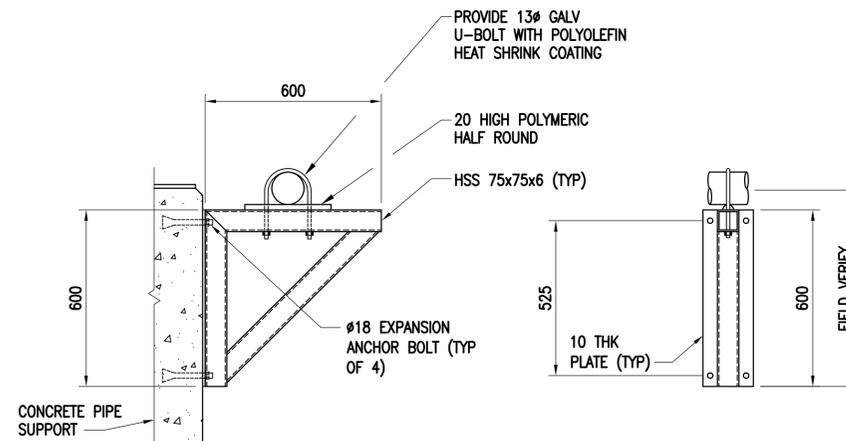
NOTE: CHANNEL, CLAMP, POST BASE, CAP AND MOUNTING HARDWARE SHALL BE A PRODUCT OF A SINGLE MANUFACTURER AND SHALL BE 304 OR 316 STAINLESS STEEL

TYPE 5 SMALL PIPE SUPPORT
SCALE: NONE

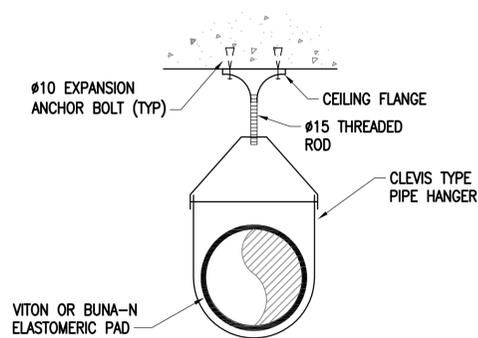


NOTE: CHANNEL, CLAMP, POST BASE, CAP AND MOUNTING HARDWARE SHALL BE A PRODUCT OF A SINGLE MANUFACTURER AND SHALL BE 304 OR 316 STAINLESS STEEL

TYPE 6 SMALL PIPE SUPPORT
SCALE: NONE



TYPE 7 PIPE SUPPORT
SCALE: NONE



TYPE 8 CLEVIS TYPE PIPE SUPPORT
SCALE: NONE

APPROVED	DATE	APPR
DESCRIPTION	DATE	APPR
SYN	DATE	APPR
APPROVED	A/E INFO	
FOR COMMANDER NAVFAC		
ACTIVITY		
SATISFACTORY TO	DATE	
DES DWN	DRW WMC	CHK WVB
<<PM/DM>>		
BRANCH MANAGER		
CHIEF ENG/ARCH		
<<<CS>>		
DEPARTMENT OF THE NAVY	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC
ATLANTIC DIVISION	NAVAL FACILITIES ENGINEERING COMMAND	NAVFAC
CAMP LEMONIER	NAVFAC	NAVFAC
	DUBOULT, AFRICA	NAVFAC
	DESC 1701/P-1701	NAVFAC
	CONSTRUCT FUEL STORAGE FACILITIES	NAVFAC
	PIPE SUPPORT DETAILS	NAVFAC
SCALE:	AS NOTED	
PROJECT NO.:		
WORK ORDER NO.:		
NAVFAC DRAWING NO.:	14047104	
SHEET	140	OF 186
M-506		
DRAWFORM REVISION: 10 MARCH 2009		

FILE NAME: G:\14 Jobs\14-013 Djbouti - Fuel Storage Facility - NAVFAC LANTCOM AutoCAD\14-506 PIPE SUPPORT DETAILS.dwg LAYOUT NAME: PIPE SUPPORT DETAILS PLOTTED: Friday, March 25, 2016 - 9:15am USER: wherrmann

SPLIT SYSTEM AIR CONDITIONER SCHEDULE

UNITS	FAN DATA			COIL DATA						DESIGN BASED ON DAIKIN INDOOR MODEL	
	SUPPLY AIR (L/S)	POWER INPUT (kW)	VOLTS/PHASE /HZ	TOTAL LOAD (kW)	SENSIBLE LOAD (kW)	COOLING					MIN EER
						ENTERING AIR TEMPERATURE	LEAVING AIR TEMPERATURE	DRY BULB (°C)	WET BULB (°C)		
AHU-1/AC-1	362	.5	220/1/50	11.1	5.5	27.6	23.1	15.0	14.8	2.9	FCRN125EXV1
AHU-2/AC-2	214	0.57	220/1/50	2.4	2.4	24.4	8.0	15.0	3.2	4.8	FTXR28KVMA
AHU-3/AC-3	34	0.57	220/1/50	1.3	1.3	24.6	18.2	15.0	14.4	4.8	FTXR28KVMA
AHU-4/AC-4	281	1.07	220/1/50	4.2	3.2	24.8	19.2	15.4	14.9	3.9	FTXR42KVMA
AHU-5/AC-5	36	0.57	220/1/50	0.5	0.4	24.6	18.2	15.0	14.4	4.8	FTXR28KVMA
AHU-6/AC-6	367	1.47	220/1/50	4.7	4.1	24.6	18.6	15.3	14.7	3.3	FTXR50KVMA
AHU-7/AC-7	71	0.57	220/1/50	.9	.8	24.6	18.2	15.2	14.6	4.8	FTXR28KVMA
AHU-8/AC-8	60	0.57	220/1/50	.7	.7	24.6	18.4	15.4	14.8	4.8	FTXR28KVMA
AHU-9/AC-9	66	0.57	220/1/50	.8	.7	24.5	18.3	15.2	14.6	4.8	FTXR28KVMA
AHU-10/AC-10	98	0.57	220/1/50	1.3	1.1	24.4	18.1	15.0	14.5	4.8	FTXR28KVMA
AHU-11/AC-11	404	2.25	220/1/50	6.7	5.0	25.5	19.4	15.2	14.7	3.1	FDYQN71LAV1
AHU-12/AC-12	72	0.57	220/1/50	2.0	2.0	24.6	18.2	15.0	14.4	4.8	FTXR28KVMA

REMARKS
1. PROVIDE FACTORY CONDENSATE PUMP FOR ALL AIR HANDLING UNITS

DEDICATED OUTSIDE AIR SYSTEM SCHEDULE

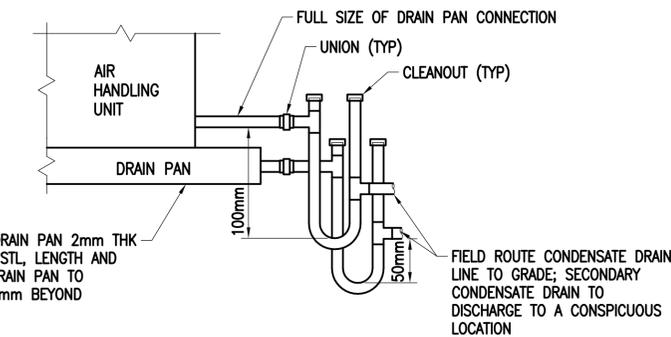
UNIT	OUTSIDE AIR FLOW RATE (L/S)	EXTERNAL STATIC PRESSURE (PA)	SUPPLY FAN MOTOR (kW)	MCA (A)	MOCP (A)	VOLTS/PHASE/HZ	LEAVING AIR TEMP (°C)	ENTERING AIR TEMP (°C)
DOAS-1	629	250	0.61	28.8	45	380/3/50	24	44

FAN/BLOWER SCHEDULE

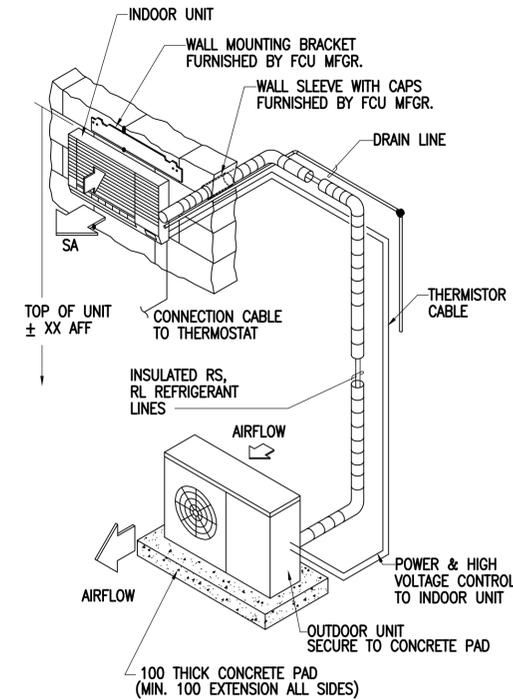
UNIT	FLOW RATE (L/S)	EXTERNAL STATIC PRESSURE (PA)	FAN MOTOR (kW)	VOLTS/PHASE/HZ	REMARKS
FH-1	132/208	62	0.25	220/1/50	FLOW RATE AT SASH 60%/100% OPEN
EF-1	2430	62	1.5	380/3/50	EXPLOSION PROOF MOTOR; ROOF MOUNT
EF-2	31	25	0.03	220/1/50	CEILING MOUNT
EF-3	1120	62	0.25	380/3/50	PUMPHOUSE 5/EXPLOSION PROOF MOTOR; WALL MOUNT
EF-4	1120	62	0.25	380/3/50	PUMPHOUSE 6/EXPLOSION PROOF MOTOR; WALL MOUNT
EF-5	132	62	0.25	220/1/50	CEILING MOUNT
EF-6	478	62	0.12	220/1/50	OPERATIONS BUILDING; WALL MOUNT

OPERATING CONDITIONS

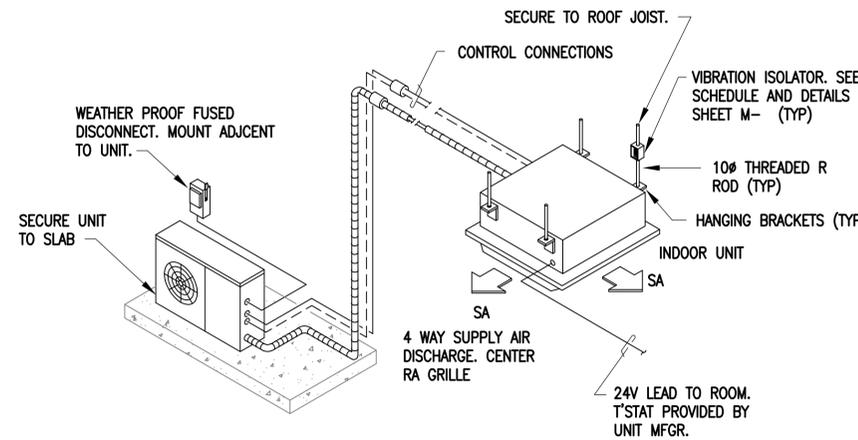
INDOORS			OUTDOORS		
SUMMER	WINTER		SUMMER	WINTER	
°C DB	% RH	°C DB	°C DB	% RH	°C DB
24	50	22	44	60	30



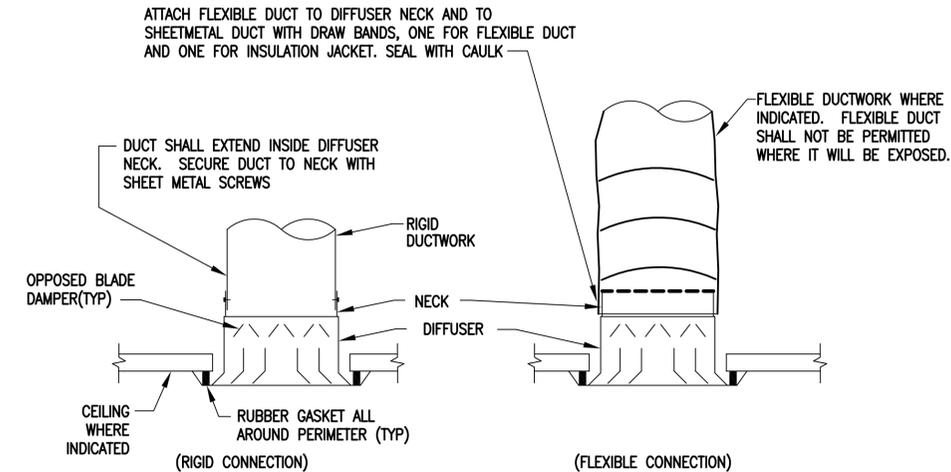
AHU DRAIN SCALE: NONE M-409 B4



DUCTLESS AIR CONDITIONER UNIT SCALE: NONE M-410 A1



DUCTLESS AIR CONDITIONER UNIT SCALE: NONE M-410 A2



DUCT TO DIFFUSER/REGISTER CONNECTION SCALE: NONE (TYP. FOR ALL DIFFUSER/REGISTERS) M-409 A4

APPR DATE

SYN DESCRIPTION

COMMONWEALTH OF VIRGINIA
WILLIAM R. HERRMANN
Lic. No. 045837
PROFESSIONAL ENGINEER

Austin
Brockenbrough
ENGINEERING • CONSULTING

APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES WRH | DRW WMC | CHK WVB

BRANCH MANAGER

CHIEF ENG/ARCH

NAVAL FACILITIES ENGINEERING COMMAND
NORFOLK, VIRGINIA
DUBOULT AFRICA
CAMP LEMONIER

DEPARTMENT OF THE NAVY
ATLANTIC DIVISION

DESC 1701/P-1701
CONSTRUCT FUEL STORAGE FACILITIES

HVAC SCHEDULES AND DETAILS

SCALE: AS NOTED

PROJECT NO.: 14047105

WORK ORDER NO.

NAVFAC DRAWING NO. 14047105

SHEET 141 OF 186

M-507

DRAWING REVISION: 10 MARCH 2009

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT/DAO AutoCAD\14-507 HVAC SCHEDULES AND DETAILS.dwg LAYOUT NAME: HVAC SCHEDULES AND DETAILS

SEQUENCE OF OPERATIONS

GENERAL:

- 1. THE TERMS DISABLED AND ENABLED APPEAR THROUGHOUT THIS SEQUENCE. WHEN APPLIED TO VALVES, THE TERMS SHALL APPLY ONLY TO HYDRAULICALLY OPERATED, SOLENOID VALVE ACTUATED, DIAPHRAGM TYPE, GLOBE STYLE CONTROL VALVES. WHEN A VALVE IS ENABLED, ITS PILOT SYSTEM SHALL ALLOW THE VALVE TO EITHER OPEN OR REMAIN OPEN WHENEVER THE UPSTREAM PRESSURE EXCEEDS THE DOWNSTREAM PRESSURE. WHEN A VALVE IS DISABLED, ITS PILOT SYSTEM SHALL FORCE THE VALVE TO EITHER CLOSE OR REMAIN CLOSED WHENEVER THE UPSTREAM PRESSURE EXCEEDS THE DOWNSTREAM PRESSURE.
2. VALUES GIVEN HERE FOR SET POINTS (TIME DELAYS, PRESSURE FLOW RATES, ETC) ARE INITIAL START UP VALUES ONLY. ADJUST THESE VALUES IN THE FIELD AS NECESSARY TO ENSURE A COMPLETE AND EFFECTIVE SYSTEM.
3. THIS IS A SEQUENCE OF OPERATIONS AND DOES NOT NECESSARILY ADDRESS ALL REQUIRED TIME DELAYS AND INTERLOCKS TO PERFORM PROPERLY.
4. THE SEQUENCE OF OPERATIONS IS IDENTICAL FOR EACH OF THE TWO FUEL STORAGE TANKS. THE LEAD PUMP SELECTOR SWITCH SHALL BE USED TO SELECT THE OPERATING TANK.
5. A LOW FLOW ALARM SHALL BE ANNUNCIATED WHEN SENSED BY THE FLOW SWITCH ASSOCIATED WITH ANY PUMP. IF THE LOW FLOW CONDITION CONTINUES FOR 30 SECONDS, THE ASSOCIATED PUMP SHALL BE SHUT DOWN AND AN ALARM ANNUNCIATED AT THE OPERATOR INTERFACE.
6. PUMPS SHALL BE SHUT DOWN AND AN ALARM ANNUNCIATED AT THE OPERATOR INTERFACE WHEN THE LEVEL IN ANY OF THE TANKS RISES TO THE HIGH-HIGH LEVEL (AS SENSED BY THE HIGH-HIGH LEVEL SWITCH) OR WHEN THE LEVEL IN ANY OF THE TANKS DESCENDS TO THE LOW-LOW LEVEL (AS SENSED BY THE LOW-LOW LEVEL SWITCH). PROVIDE A PROGRAMMABLE OVERRIDE FOR THE PUMP SHUTDOWN FEATURE.

REFUELER TRUCK LOADING PUMPS (FP-501/FP-502/FP-503, FP-601/FP-602/FP-603)

- 1. EACH PUMP SHALL HAVE A LOCAL CONTROL STATION AT THE PUMP. AN ADDITIONAL CONTROL STATION SHALL BE PROVIDED ON THE MOTOR CONTROL CENTER (MCC) AND A CONTROL STATION AT EACH REFUELER TRUCK LOADING STATION. LOCAL PUMP CONTROL STATIONS HAVE A KEYED HAND-OFF SWITCH. THE MCC CONTROL STATION SHALL HAVE A KEYED HAND-OFF-AUTOMATIC (HOA) SWITCH, START AND STOP PUSH BUTTONS AND A RUN INDICATOR LIGHT. THE LOADING POSITION CONTROL STATION SHALL HAVE START AND STOP PUSH BUTTONS AND A RUN INDICATOR LIGHT. EACH PUMP'S RUN STATUS SHALL BE INDICATED ON THE OPERATOR INTERFACE.
2. IF THE HOA SWITCH AT THE MCC IS SET TO HAND, THE PUMP CONTROL LOGIC SHALL NOT INCLUDE ANY PLC CONTROL FUNCTIONS (PUMP WILL ONLY STOP FOR HARD WIRED INTERLOCKS). WITH THE HOA SET TO OFF, THE PUMP SHALL NOT RUN. IF THE HOA SWITCH IS SET TO AUTOMATIC, THE PLC SHALL ENABLE OR DISABLE THE OPERATION OF THE PUMP. THE PUMP MUST STILL BE STARTED BY THE PUSH BUTTONS, BUT IT CAN BE STOPPED VIA BY THE PUSH BUTTONS OR STOPPED AUTOMATICALLY THROUGH THE PLC. THE PUMP CONTROL LOGIC SHALL INCLUDE ALL PLC CONTROL FUNCTIONS (PUMP WILL STOP FOR HARD WIRED INTERLOCKS AS WELL AS FOR PLC PROGRAMMED FEATURES). THE OPERATOR INTERFACE SHALL INDICATE THE POSITION OF THE HOA SWITCH.
3. PUMPS SHALL BE SHUT DOWN WHEN THE LEVEL IN ANY OF THE OPERATING STORAGE TANKS (T-1/T-2/T-3/T-4/T-5/T-6) OR THE PRODUCT RECOVERY TANK (PRT-2) REACHES THE HIGH-HIGH LEVEL AS SENSED BY THE HIGH-HIGH LEVEL SWITCHES.
4. WHEN THE LEVEL IN OPERATING TANKS T-5 OR T-6 REACHES THE LOW-LOW LEVEL AS SENSED BY THE LOW-LOW LEVEL SWITCH, THE PUMPS ASSOCIATED WITH THAT TANK ONLY WILL SHUT DOWN.
5. THE REFUELER TRUCK LOADING POSITION CONTROL STATION SHALL ONLY CONTROL THE PUMPS THAT HAVE BEEN SET TO AUTOMATIC AT THE MCC. THE STARTING ORDER OF THE PUMPS SHALL BE SET VIA LEAD PUMP SELECTOR SWITCH AT THE PUMP CONTROL PANEL. WHEN A START PUSH BUTTON IS PRESSED AT A LOADING POSITION, THE LEAD PUMP SHALL BE STARTED. WHEN IN THE "SEPARATE" MODE, PUMPS SHALL BE STARTED FROM THE FILLSTAND CONTROL STATIONS AT THE NEW TRUCK FILLSTANDS (CONTROLS AT THE EXISTING FILLSTANDS HAVE NO EFFECT ON NEW SYSTEM). WHEN IN "COMBINED" MODE, PUMPS CAN BE STARTED THROUGH THE CONTROL STATIONS AT THE NEW TRUCK FILLSTANDS AND THE EXISTING FILLSTANDS. IN THIS MODE, FUEL IS SUPPLIED TO BOTH THE NEW AND EXISTING TRUCK FILLSTANDS FROM THE NEW TANKS, AND THE EXISTING PUMPS WILL NOT START.
6. IN THE "SEPARATE" MODE, THE LEAD PUMP SHALL RUN UNTIL THE STOP PUSH BUTTON IS PRESSED WITH ONE FILLSTAND ISSUING FUEL (OR SOME OTHER CONTROL INTERLOCK SHUTS THE PUMP DOWN.) WHEN A START PUSHBUTTON IS PRESSED AT THE SECOND LOADING POSITION, THE SECOND PUMP IN THE SERIES SHALL BE STARTED. THE PUMP SHALL RUN UNTIL, WITH TWO FILLSTANDS ISSUING FUEL, A STOP PUSH BUTTON IS PRESSED (OR SOME OTHER CONTROL INTERLOCK SHUTS THE PUMP DOWN.)
7. IN THE "COMBINED" MODE, THE LEAD PUMP SHALL RUN UNTIL THE STOP PUSH BUTTON IS PRESSED WITH ONE FILLSTAND ISSUING FUEL (OR SOME OTHER CONTROL INTERLOCK SHUTS THE PUMP DOWN.) WITH THE LEAD PUMP RUNNING, WHEN A START PUSHBUTTON IS PRESSED AT A SECOND LOADING POSITION, THE SECOND PUMP IN THE SERIES SHALL BE STARTED. IF A THIRD START PUSHBUTTON IS DEPRESSED AT A THIRD LOADING POSITION, THE THIRD PUMP IN THE SERIES SHALL BE STARTED. THE PLC SHALL COUNT STARTS AND STOPS AT THE NEW AND EXISTING FILLSTANDS TO INDICATE HOW MANY FUELING STATIONS ARE ISSUING FUEL. WHEN THREE OR MORE FILLSTANDS ARE ISSUING FUEL, THREE PUMPS WILL CONTINUE TO RUN. WHEN TWO FILLSTANDS ARE ISSUING FUEL, TWO PUMPS WILL CONTINUE TO RUN. WHEN ONE FILLSTAND IS ISSUING FUEL, ONLY THE LEAD PUMP WILL CONTINUE TO RUN.
8. A LOW FLOW ALARM SHALL BE ANNUNCIATED WHEN SENSED BY THE FLOW SWITCH AT THE PUMP. IF THE LOW FLOW CONDITION CONTINUES FOR 30 SECONDS, THE ALARM SHALL SOUND AND THE PUMP SHALL BE SHUT DOWN.
9. THE PLC SHALL CONSTANTLY MONITOR ISSUE AND BYPASS FLOW THROUGH THE ISSUE AND BYPASS VENTURIS. IF ISSUE FLOW EQUALS TO THE BYPASS FLOW +/- 2.5 L/S FOR 10 MINUTES, ALL PUMPS SHALL BE SHUT DOWN.

TANK OVERFILL PROTECTION LEVEL CONTROL VALVE (LCV-501, LCV-601)

- 1. LEVEL CONTROL VALVE IS A HYDRAULICALLY OPERATED FLOAT ACTUATED LEVEL CONTROL VALVE THAT SHALL CLOSE AT THE DESIGNATED LEVEL VIA THE MECHANICAL OPERATION OF THE FLOAT.
2. SOLENOID VALVE ON EACH LEVEL CONTROL VALVE SHALL BE A NORMALLY CLOSED VALVE AND SHALL BE ENERGIZED WHEN THE LEVEL IN THE TANK IS BELOW THE HIGH-HIGH LEVEL, AS SENSED BY THE HIGH-HIGH LEVEL SWITCH. 60 SECONDS AFTER THE LEVEL IN THE TANK REACHES THE HIGH-HIGH LEVEL THE SOLENOID VALVE SHALL BE DE-ENERGIZED TO FORCE THE LEVEL CONTROL VALVE TO CLOSE. THE SOLENOID VALVE SHALL REMAIN DE-ENERGIZED UNTIL THE LEVEL IN THE TANK FALLS BELOW THE HIGH LEVEL AS SENSED BY THE LEVEL SWITCH.
3. SOLENOID OPERATED PILOT CONTROL VALVE SHALL BE PROVIDED WITH A MANUAL BYPASS VALVE TO ALLOW FILLING OF THE TANK DURING A LOSS OF POWER. THE MANUAL BYPASS SHALL HAVE A POSITION SWITCH TO PROVIDE A POSITION ALARM IF THE VALVE IS IN THE BYPASS POSITION. THE ALARM SHALL BE ACTIVATED WHEN POWER IS RESTORED IF THE SOLENOID OPERATED PILOT CONTROL VALVE'S MANUAL BYPASS VALVE IS STILL IN THE MANUAL BYPASS POSITION.

LOW-LOW/LOW/HIGH/HIGH-HIGH LEVEL ALARM SYSTEM (LSLL-506/LSL-506/LSH-506/LSHH-506, LSLL-606/LSL-606/LSH-606/LSHH-606)

- 1. WHEN THE LEVEL IN THE TANK REACHES THE LOW-LOW LEVEL AS SENSED BY THE LEVEL SWITCH, AN ALARM SHALL BE ANNUNCIATED AT THE OPERATOR INTERFACE. THE ALARM CONDITION SHALL REMAIN ON UNTIL THE LEVEL IN THE TANK GOES ABOVE THE LOW LEVEL AS SENSED BY THE LEVEL SWITCH.
2. WHEN THE LEVEL IN THE TANK REACHES THE LOW LEVEL AS SENSED BY THE LEVEL SWITCH, AN ALARM SHALL BE ANNUNCIATED AT THE OPERATOR INTERFACE. THE ALARM CONDITION SHALL REMAIN ON UNTIL THE LEVEL IN THE TANK GOES ABOVE THE LOW LEVEL AS SENSED BY THE LEVEL SWITCH.
3. WHEN THE LEVEL IN THE TANK REACHES THE HIGH LEVEL AS SENSED BY THE HIGH LEVEL SWITCH, AN ALARM SHALL BE ANNUNCIATED AT THE OPERATOR INTERFACE. THE ALARM CONDITION SHALL REMAIN ON UNTIL THE LEVEL IN THE TANK GOES BELOW THE HIGH LEVEL AS SENSED BY THE LEVEL SWITCH.
4. WHEN THE LEVEL IN THE TANK REACHES THE HIGH-HIGH LEVEL AS SENSED BY THE HIGH-HIGH LEVEL SWITCH, AN ALARM SHALL BE ANNUNCIATED AT THE OPERATOR INTERFACE. THE ALARM CONDITION SHALL REMAIN ON UNTIL THE LEVEL IN THE TANK GOES BELOW THE HIGH-HIGH LEVEL AS SENSED BY THE LEVEL SWITCH.

TRUCK FILLSTANDS:

- 1. THE TRUCK LOADING CONTROL VALVE SHALL OPEN WHEN THE DEADMAN SWITCH IS DEPRESSED, THE GROUND PROVING CONNECTION SHOWS A POSITIVE GROUND, AND THE LEVEL OF FUEL IN THE TRUCK IS BELOW THE OVERFILL CONDITION AS SENSED BY THE TRUCK OVERFILL SYSTEM.
2. THE TRUCK LOADING CONTROL VALVE SHALL CLOSE WHEN THE DEADMAN SWITCH IS RELEASED, THE GROUND PROVING SYSTEM SHOWS A LOSS OF GROUNDING OR THE OVERFILL PROTECTION SYSTEM INDICATES AN OVERFILL CONDITION.

PRODUCT RECOVERY TANK (PRT-2)

- 1. THE PUMP SHALL HAVE A LOCAL CONTROL STATION. AN ADDITIONAL CONTROL STATION SHALL BE PROVIDED ON THE MOTOR CONTROL CENTER (MCC). THE LOCAL CONTROL STATION SHALL HAVE START AND STOP PUSH BUTTONS AND A RUN INDICATION LIGHT. THE MCC CONTROL STATION SHALL HAVE A KEYED HAND-OFF-AUTOMATIC (HOA) SWITCH, START AND STOP PUSH BUTTONS AND A RUN INDICATION LIGHT. THE PUMP'S RUN STATUS SHALL BE INDICATED ON THE OPERATOR INTERFACE.
2. IF THE HOA SWITCH AT THE MCC IS SET TO HAND, THE PUMP CONTROL LOGIC SHALL NOT INCLUDE ANY PLC CONTROL FUNCTIONS (PUMP WILL ONLY STOP FOR HARD WIRED INTERLOCKS). WITH THE HOA SET TO OFF, THE PUMP SHALL NOT RUN. IF THE HOA SWITCH IS SET TO AUTOMATIC, THE PLC SHALL ENABLE OR DISABLE THE OPERATION OF THE PUMP. THE PUMP MUST STILL BE MANUALLY STARTED BY THE PUSH BUTTONS, BUT IT CAN BE STOPPED MANUALLY BY THE PUSHBUTTONS OR STOPPED AUTOMATICALLY THROUGH THE PLC. THE PUMP CONTROL LOGIC SHALL INCLUDE ALL PLC CONTROL FUNCTIONS (PUMP WILL STOP FOR HARD WIRED INTERLOCKS AS WELL AS FOR PLC PROGRAMMED FEATURES). THE OPERATOR INTERFACE SHALL INDICATE THE POSITION OF THE HOA SWITCH.
3. THE PUMP'S STATUS SHALL BE INDICATED ON THE OPERATOR INTERFACE.
4. THE PUMP SHALL BE SHUT DOWN WHEN THE LEVEL IN THE PRODUCT RECOVERY TANK REACHES THE LOW LEVEL OR THE HIGH-HIGH LEVEL AS SENSED BY THE LEVEL SWITCHES.
5. A LOW FLOW ALARM SHALL BE ANNUNCIATED WHEN SENSED BY THE FLOW SWITCH AT THE PUMP. IF THE LOW FLOW CONDITION CONTINUES FOR 30 SECONDS, THE PUMP SHALL BE SHUTDOWN.
6. THE PUMP SHALL SHUT DOWN WHEN THE LEVEL IN ANY OPERATING STORAGE TANK REACHES THE HIGH-HIGH LEVEL AS SENSED BY THE HIGH-HIGH LEVEL SWITCHES.

EMERGENCY OPERATION-PLC CPU'S DOWN:

- 1. IN THE EVENT BOTH PLC CPU'S ARE DOWN, THE FOLLOWING EMERGENCY REFUELING SEQUENCE MAY BE FOLLOWED:
A. PLACE PCP MODE SELECTOR SWITCHES IN THE "OFF" POSITION.
B. ENSURE SELECTED OPERATING TANK(S) INLET AND OUTLET VALVES ARE OPEN.
C. MANUALLY START FUELING PUMP(S) AS REQUIRED BY PLACING SELECTOR SWITCH(ES) IN THE "HAND" POSITION.
NOTE: OPERATOR IS REQUIRED TO CONTINUOUSLY VERIFY OPERATING TANK(S) FUEL LEVEL TO ENSURE AN ADEQUATE FUEL SUPPLY IS AVAILABLE. FUEL LEVEL VERIFICATION SHALL BE BY MEANS OF THE OPERATING TANK(S) MECHANICAL LEVEL GAUGE. UPON COMPLETION OF EMERGENCY OPERATION, OPERATOR SHALL RETURN FUELING PUMP SELECTOR SWITCHES TO THEIR ORIGINAL POSITIONS.

EMERGENCY STOP AND RESET:

- 1. DEPRESSION OF ANY EMERGENCY STOP PUSHBUTTON SHALL STOP ALL FUELING PUMPS AND DE-ENERGIZE THE EMERGENCY SHUT-OFF SOLENOIDS ON THE FILTER/SEPARATOR CONTROL VALVES AND DE-ENERGIZE THE SOLENOIDS ON THE TANK HIGH LEVEL CONTROL VALVES, CAUSING THE VALVES TO CLOSE. THIS ACTION IS EXECUTED WITHOUT REGARD FOR WHETHER PUMPS WERE AUTOMATICALLY CALLED ON OR MANUALLY STARTED.
2. IN ORDER TO RESET THE SYSTEM AFTER AN ALARM, DEPRESS THE "RESET" PUSHBUTTON LOCATED AT THE PUMP CONTROL PANEL AFTER RESETTING THE INITIALLY ACTIVATED EMERGENCY STOP PUSHBUTTON STATION.

TRUCK OFF-LOADING STATION 1:

- 1. THE CONTROL LOGIC FOR TRUCK OFF-LOADING STATION NO. 1 CURRENTLY RESIDES WITHIN THE EXISTING PLC. THE FUNCTIONS SHALL BE REMOVED FROM THE EXISTING PLC AND REPLACED WITH RELAY LOGIC AS DESCRIBED UNDER THIS PROJECT.
2. THE FOLLOWING SEQUENCE OF OPERATION IS FOR THE LOCAL CONTROL STATION:
A. WITH THE PUMP SET TO AUTOMATIC, THE PUMP SHALL NOT START UNTIL THE START PUSH BUTTON HAS BEEN PRESSED, GROUND HAS BEEN PROVEN, AND THE LEVEL IN THE AIR ELIMINATOR TANK HAS RISEN TO THE LOW LEVEL AS SENSED BY THE LEVEL SWITCH. SIMULTANEOUSLY WITH THE PUMP START, THE SOLENOID VALVES ON THE RATE OF FLOW CONTROL VALVE SHALL BE SET TO PROVIDE THE LOW FLOW RATE SETTING.
B. WHEN THE FUEL LEVEL IN THE AIR ELIMINATOR TANK RISES TO THE HIGH LEVEL, THE SOLENOID VALVES ON THE RATE OF FLOW CONTROL VALVE SHALL BE SET TO PROVIDE THE MEDIUM FLOW RATE SETTING.
C. WHEN THE FUEL LEVEL IN THE AIR ELIMINATOR TANK RISES TO THE HIGH-HIGH LEVEL, THE SOLENOID VALVES ON THE RATE OF FLOW CONTROL VALVE SHALL BE SET TO PROVIDE THE HIGH FLOW RATE SETTING.
D. WHEN THE FUEL LEVEL IN THE AIR ELIMINATOR DESCENDS TO THE HIGH-HIGH LEVEL, THE SOLENOID VALVES SHALL BE SET TO RETURN THE RATE OF FLOW CONTROL VALVE TO ITS MEDIUM FLOW RATE SETTING.
E. WHEN THE FUEL LEVEL IN THE AIR ELIMINATOR DESCENDS TO THE HIGH LEVEL, THE SOLENOID VALVES SHALL BE SET TO RETURN THE RATE OF FLOW CONTROL VALVE TO ITS LOW FLOW SETTING.
F. WHEN THE FUEL LEVEL IN THE AIR ELIMINATOR DESCENDS TO THE LOW LEVEL, THE PUMP SHALL SHUT DOWN.
G. THE STATUS OF THE LEVEL SWITCHES ON THE AIR ELIMINATOR SHALL BE DISPLAYED ON THE LOCAL CONTROL STATION.
H. THE PUMP SHALL BE SHUT DOWN (HARD WIRED INTERLOCK) AND AN ALARM ANNUNCIATED AT THE LOCAL CONTROL STATION WHEN GROUND VERIFICATION IS LOST OR AN EMERGENCY STOP INITIATED.
I. THE PUMP SHALL BE SHUT DOWN WHEN THE LEVEL IN ANY OF THE FUEL STORAGE TANKS RISES TO THE HIGH-HIGH LEVEL. PROVIDE A PROGRAMMABLE OVERRIDE FOR THE PUMP SHUT DOWN FEATURE.
J. A LOW FLOW ALARM SHALL BE ANNUNCIATED AS SENSED BY THE FLOW SWITCH AT THE PUMP. IF THE LOW FLOW CONDITION CONTINUES FOR 30 SECONDS, THE PUMP SHALL BE SHUT DOWN.

FILE NAME: G:\14 Jobs\14-013 Dibuair - Fuel Storage Facility - NAVFAC LANTCOM Amd640\14-013 SEQUENCE OF OPERATIONS\14-013 SEQUENCE OF OPERATIONS.dwg LAYOUT NAME: SEQUENCE OF OPERATIONS PLOTTED: Friday, March 25, 2016 - 9:18am USER: wherrmann

Professional Engineer seal for Donald W. Nodes, License No. 037747. Project information for NAVFAC LANTCOM Atlantic Division Camp Lemonnier, including drawing title 'DESC 1701/P-1701 CONSTRUCT FUEL STORAGE FACILITIES SEQUENCE OF OPERATION', drawing number '14047106', and sheet number '142 OF 186'. Includes logos for NAVFAC and Brockenbrough Engineering & Consulting.

FILE NAME: G:\14 Jobs\14-013 Djibouti - Fuel Storage Facility - NAVFAC LANT\DAO AutoCAD\14-602 SCHEDULES.dwg LAYOUT NAME: SCHEDULES PLOTTED: Friday, March 25, 2016 - 9:18am USER: whermann

EQUIPMENT SCHEDULE

EQUIPMENT NUMBER	EQUIPMENT NAME	EQUIPMENT DESCRIPTION
OPERATING TANKS		
T-5 T-6	STORAGE TANK	2 384 CM (NOMINAL) VERTICAL CUT AND COVER UST
LCV-501 LCV-601	HIGH LIQUID LEVEL SHUT OFF VALVE	#200 CONTROL VALVE FLOAT PILOT OVERFILL PROTECTION SOLENOID PILOT OVERFILL PROTECTION DIFFERENTIAL PRESSURE CONTROL = 103 KPa CHECK, FAIL CLOSED AGAINST REVERSE FLOW IN CHECK CONDITION
FP-501 FP-502 FP-503 FP-601 FP-602 FP-603	FUELING PUMP	SEE PUMP SCHEDULE
CV-501 CV-502 CV-503 CV-601 CV-602 CV-603	NON-SURGE CHECK VALVE (FP-501, FP-502, FP-503, FP-601, FP-602, FP-603)	#150 CONTROL VALVE FLOW = 41 L/S DIFFERENTIAL PRESSURE CONTROL = 103 KPa CHECK, FAIL CLOSED AGAINST REVERSE FLOW IN CHECK CONDITION
WSP-501 WSP-601	WATER DRAW-OFF PUMP	SEE PUMP SCHEDULE
CV-504 CV-604	NON-SURGE CHECK VALVE (WSP-501, WSP-601)	#50 CONTROL VALVE FLOW = 3 L/S DIFFERENTIAL PRESSURE CONTROL = 103 KPa CHECK, FAIL CLOSED AGAINST REVERSE FLOW IN CHECK CONDITION
FS-501 FS-601	SIDESTREAM FILTRATION FILTER/SEPARATOR	CAPACITY = 3 L/S HORIZONTAL
FSCV-501 FSCV-601	SIDESTREAM FILTRATION FILTER/SEPARATOR CONTROL VALVE	#50 CONTROL VALVE FLOW = 3 L/S WATER SHUTDOWN CHECK, FAIL CLOSED IN REVERSE FLOW
FILTER BUILDING		
FSI-701 FSI-702 FSI-703	ISSUE FILTER/SEPARATOR	CAPACITY = 37.9 L/S HORIZONTAL
FSCV-701 FSCV-702 FSCV-703	ISSUE FILTER/SEPARATOR CONTROL VALVE	#150 CONTROL VALVE FLOW = 37.9 L/S WATER SHUT-DOWN CHECK, FAIL CLOSED IN REVERSE FLOW EFSO SOLENOID PILOT
BPCV-701	BYPASS PRESSURE CONTROL VALVE	#150 CONTROL VALVE PRESSURE CONTROL = 1400 KPa CHECK, FAIL CLOSED IN REVERSE FLOW
IV-701	ISSUE VENTURI	SEE SPECIFICATIONS FOR RANGE
BV-701	BYPASS VENTURI	SEE SPECIFICATIONS FOR RANGE
PRT-2	PRODUCT RECOVERY TANK	3.8 CM (NOMINAL) HORIZONTAL AST
FS-PRT	PRODUCT RECOVERY TANK FILTER/SEPARATOR	CAPACITY = 3 L/S HORIZONTAL
FSCV-PRT	PRODUCT RECOVERY TANK FILTER/SEPARATOR CONTROL VALVE	#50 CONTROL VALVE FLOW = 3 L/S WATER SHUTDOWN CHECK, FAIL CLOSED IN REVERSE FLOW
OV-707	OVERFILL VALVE FOR PRODUCT RECOVERY TANK	#50 CONTROL VALVE OVERFILL CONTROL THERMAL RELIEF = 1483 kPa LIMIT SWITCH SIGNAL ON ACTIVATION
P-707	FUEL TRANSFER PUMP	SEE PUMP SCHEDULE
REFUELER TRUCK LOADING STATION		
TFCV-403 TFCV-404	TRUCK LOADING CONTROL VALVE	#100 CONTROL VALVE PRESSURE CONTROL = 241 KPa SURGE CONTROL = 585 KPa DIFFERENTIAL PRESSURE CONTROL = 103 KPa ADJUST PRESSURE TO MAX FILL RATE OF 33.1 L/S
FQI-403 FQI-404	FLOW QUANTITY INDICATOR (POSITIVE DISPLACEMENT METER)	CAPACITY = 37.9 L/s

PUMP SCHEDULE

MARK	FLOW (L/S)	TDH (m)	RPM	EFFICIENCY	MOTOR DATA		STARTER		SERVICE	CONFIGURATION	LOCATION	REMARKS
					KW	V/PH/Hz	SIZE	ENCLOSURE				
FP-501 FP-502 FP-503	37.9	163.4	1500	70%	75	380/3/50	NEMA 4	MCC	JET A-1	API-610 CENTRIFUGAL	OPERATING TANK T-5	VERTICAL TURBINE
FP-601 FP-602 FP-603	37.9	163.4	1500	70%	75	380/3/50	NEMA 4	MCC	JET A-1	API-610 CENTRIFUGAL	OPERATING TANK T-6	VERTICAL TURBINE
WSP-501	3	-	1500	-	4	380/3/50	-	MCC	JET A-1/WATER	API-610 CENTRIFUGAL	OPERATING TANK T-5	VERTICAL TURBINE
WSP-601	3	-	1500	-	4	380/3/50	-	MCC	JET A-1/WATER	API-610 CENTRIFUGAL	OPERATING TANK T-6	VERTICAL TURBINE
P-707	3	-	1500	-	4	380/3/50	-	MCC	JET A-1/WATER	API-610 CENTRIFUGAL	PRODUCT RECOVERY TANK PRT-2	RETURN TO SERVICE

FILTER/SEPERATOR CONTROL VALVE (FSCV-701, FSCV-702, FSCV-703)

CONDITION	VALVE ACTION	SOLENOID
EMERGENCY STOP PUSH BUTTON DEPRESSED	CLOSED	ENERGIZED
ALL OTHER SITUATIONS	ENABLE, MODULATE	DE-ENERGIZED

OPERATING TANK HIGH LEVEL CONTROL VALVE (LCV-501, LCV-601)

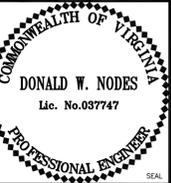
CONDITION	VALVE ACTION	SOLENOID
EMERGENCY STOP PUSH BUTTON DEPRESSED	CLOSED	ENERGIZED
HIGH-HIGH LEVEL ALARM	CLOSED	ENERGIZED
ALL OTHER SITUATIONS	ENABLE, MODULATE	DE-ENERGIZED

OPERATING TANK LEVEL SET POINT TABLE

TANK	SETTING				
	LALL	LAL	LAH	LCV	LAHH
T-5	510	690	6480	6650	6820
T-6	510	690	6480	6650	6820

NOTES:

- FOR PUMPS:**
 FLOWRATE (L/S) IS A MINIMUM VALUE
 TOTAL DYNAMIC HEAD (m) IS A MINIMUM VALUE
 RPM IS A MAXIMUM DESIGN VALUE
 EFFICIENCY (%) IS A MINIMUM VALUE AND IS A PRODUCT OF PUMP AND MOTOR EFFICIENCY
 MOTOR DRIVER SIZE (kW) IS A MAXIMUM VALUE
 SPECIFIC GRAVITY = 0.84 (BASIS OF DESIGN)
- FOR VALVES:**
 SET POINTS ARE INITIAL SET POINTS ONLY AND MAY BE FIELD ADJUSTED AT COMMISSIONING.



APPROVED

FOR COMMANDER NAVFAC

ACTIVITY

SATISFACTORY TO DATE

DES: DWN | DRW: WMG | CHK: WVB

<<PM/DM>>

BRANCH MANAGER

CHIEF ENG/ARCH

<<CR>>

DEPARTMENT OF THE NAVY

NAVAL FACILITIES ENGINEERING COMMAND

ATLANTIC DIVISION

CAMP LEMONNIER

NORFOLK, VIRGINIA

DJIBOUTI, AFRICA

DESC 1701/P-1701

CONSTRUCT FUEL STORAGE FACILITIES

SCHEDULES

SCALE: AS NOTED

PROJECT NO.:

WORK ORDER NO.

NAVFAC DRAWING NO. 14047107

SHEET 143 OF 186

M-602

DRAWING REVISION: 10 MARCH 2009