CITY OF KEY WEST

RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

CITY OF KEY WEST PROJECT NO.:SE35031801

CITY OF KEY WEST ITB NO.:20-001

DECEMBER 2019

VICINITY MAP

SEAL OF THE CITY OF KEY WEST, FLORIDA

DISCIPLINE

SHT	DWG	DESCRIPTION
GENERAL		
01	G-01	COVER SHEET
02	G-02	GENERAL NOTES, LEGENDS, ABBREVIATIONS AND LOCATION MAP
CIVIL		
03	C-01	OVERALL SITE PLAN
04	C-02	STORMWATER POLLUTION PREVENTION PLAN
STRUCTURAL		
05	S-01	GENERAL NOTES
06	S-02	STANDARD SECTIONS AND DETAILS
MECHANICAL PROCESS		
07	M-01	DEEP WELL INJECTION PUMP SECTION
HAVC		
08	H-01	LEGEND, ABBREVIATIONS, AND GENERAL NOTES
09	H-02	OPERATIONS BUILDING PLAN - DEMO
10	H-03	OPERATIONS BUILDING PLAN
11	H-04	SCHEDULES, DETAILS AND SEQUENCE OF OPERATIONS
ELECTRICAL		
12	E-01	LEGENDS
13	E-02	ABBREVIATIONS & NOTES
14	E-03	OVERALL SITE PLAN
15	E-04	POWER DISTRIBUTION FUNCTIONAL DIAGRAM
16	E-05	SWITCHBOARD & MCC ONE-LINE DIAGRAM
17	E-06	PLC ONE-LINE DIAGRAM
18	E-07	OPERATIONS BUILDING POWER PLAN
19	E-08	SCHEMATICS
20	E-09	PANELBOARD SCHEDULE AND DETAILS
INSTRUMENTATION		
21	I-01	P&ID - LEGEND AND ABBREVIATIONS SHEET 1 OF 3
22	I-02	P&ID - LEGEND AND ABBREVIATIONS SHEET 2 OF 3
23	I-03	P&ID - LEGEND AND ABBREVIATIONS SHEET 3 OF 3
24	I-04	PARTIAL CONTROL BLOCK DIAGRAM
25	I-05	P&ID - DEEP WELL INJECTION PUMPS
26	I-06	DETAILS

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199322
SHEET
1 OF 26

FD7000
D9000

GENERAL NOTES

1. ALL CONSTRUCTION MATERIALS AND TESTING SHALL CONFORM TO THE APPLICABLE SPECIFICATIONS OF THE CITY OF KEY WEST, LOCAL, MONROE COUNTY, STATE OF FLORIDA, AND NATIONAL CODES.

2. IF SPECIFICATIONS OR DRAWINGS CONFLICT, CONTRACTOR SHALL NOTIFY THE CITY OF KEY WEST FOR MORE INFORMATION PRIOR TO PROCEEDING WITH THE WORK.

3. REVIEW OF THE SHOP DRAWINGS BY THE CITY OF KEY WEST OR AUTHORIZED REPRESENTATIVE IS ONLY FOR CONFORMANCE WITH THE DESIGN CONCEPT OF THE PROJECT AND COMPLIANCE WITH THE INFORMATION GIVEN IN THE CONTRACT DOCUMENTS. THE CONTRACTOR IS RESPONSIBLE FOR DIMENSIONS TO BE CONFIRMED AND CORRELATED AT THE SITE FOR INFORMATION THAT PERTAINS SOLELY TO THE FABRICATION, PROCESSES, OR TO THE MEANS, METHODS, TECHNIQUES, SEQUENCES AND PROCEDURES OF CONSTRUCTION AND FOR COORDINATION OF THE WORK OF ALL TRADES.

4. "SCREENED" (LIGHT) DELINEATION INDICATED ON THE DRAWINGS DENOTES EXISTING FACILITIES. "SCREENED" INFORMATION IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO THE ORDERING OF MATERIALS AND BEGINNING OF CONSTRUCTION. "BOLD" DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.

5. EXISTING UTILITIES AND STRUCTURES (UNDERGROUND, SURFACE, OR OVERHEAD) ARE INDICATED ONLY TO THE EXTENT THAT SUCH INFORMATION WAS KNOWN, OR MADE AVAILABLE TO, OR DISCOVERED BY THE ENGINEER IN PREPARING THE DRAWINGS. THE LOCATIONS, CONFIGURATIONS, AND ELEVATIONS OF SUBSURFACE FACILITIES AND UTILITIES ARE APPROXIMATE, AND NOT ALL UTILITIES AND FACILITIES MAY BE INDICATED.

UTILITY NOTES

1. CALL BEFORE YOU DIG. CONTRACTOR SHALL VERIFY PRECISE LOCATIONS AND ELEVATIONS OF ALL UTILITIES AND STRUCTURES, WHETHER INDICATED ON THE DRAWINGS OR NOT, IN THE FIELD IN ADVANCE OF EXCAVATING. THE CONTRACTOR SHALL CONTACT FLORIDA SUNSHINE ONE TO VERIFY UNDER GROUND UTILITIES WITHIN THE PROJECT SITE. THE FLORIDA SUNSHINE ONE TELEPHONE NUMBER IS 811.

2. CONTRACTOR SHALL BE RESPONSIBLE FOR REMOVAL, DEMOLITION, RECONSTRUCTION, AND RECONNECTION OF EXISTING FACILITIES AS REQUIRED TO COMPLETE THE WORK. IF REQUIRED AFTER FIELD VERIFICATION, CONTRACTOR SHALL COORDINATE WITH THE ENGINEER TO DETERMINE ANY NECESSARY MODIFICATIONS TO THE PROPOSED NEW WORK.

3. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE COST OF REPAIRING ALL DAMAGED UTILITIES.

4. BEFORE CONSTRUCTION IS STARTED, CONTRACTOR SHALL COORDINATE WITH THE OWNER OF EACH UTILITY AND DEFINE THE REQUIREMENTS AND METHODS TO ACCOMMODATE THE PROTECTION, TEMPORARY SUPPORT, ADJUSTMENT, OR RELOCATION OF ANY UTILITIES AFFECTED BY THE PROPOSED NEW WORK.

CIVIL NOTES

1. ALL EXISTING FEATURES TO REMAIN UNLESS OTHERWISE NOTED ON THE DRAWINGS.

2. CONTRACTOR SHALL COMPLY WITH THE GOVERNING AGENCY NPDES CONSTRUCTION REQUIREMENTS, AND SHALL PROVIDE APPROPRIATE MITIGATION MEASURES OR PROTECTION AND RESTORATION AT ALL LOCATIONS AS REQUIRED BY THEIR OPERATIONS, AND AS DIRECTED BY THE ENGINEER. CONTRACTOR SHALL BE RESPONSIBLE FOR EROSION AND SEDIMENT CONTROL DURING CONSTRUCTION. CONTRACTOR SHALL MAINTAIN AND REPAIR EROSION AND SEDIMENT CONTROL DEVICES THROUGHOUT THE DURATION OF CONSTRUCTION.

3. CLEAR THE SITE USING STANDARD CLEARING AND GRUBBING PROCEDURES.

4. SOD ALL DISTURBED AREAS.

5. CONTRACTOR SHALL BE RESPONSIBLE FOR THE REMOVAL AND DISPOSAL OF ANY CONSTRUCTION DEBRIS TO AN APPROVED FACILITY.

6. CONTRACTOR SHALL USE CAUTION WHEN WORKING NEAR OVERHEAD OR UNDER GROUND UTILITIES.

7. CONTRACTOR SHALL PROTECT AND MAINTAIN ALL EXISTING TREES, SHRUBS, AND PLANTS UNLESS OTHERWISE NOTED.

8. FINISHED GRADE ELEVATION AT ANY STRUCTURE, WHERE NOT ADJACENT TO PAVEMENT, SHALL BE APPROXIMATELY 6 INCHES BELOW FINISHED FLOOR ELEVATION UNLESS OTHERWISE NOTED.

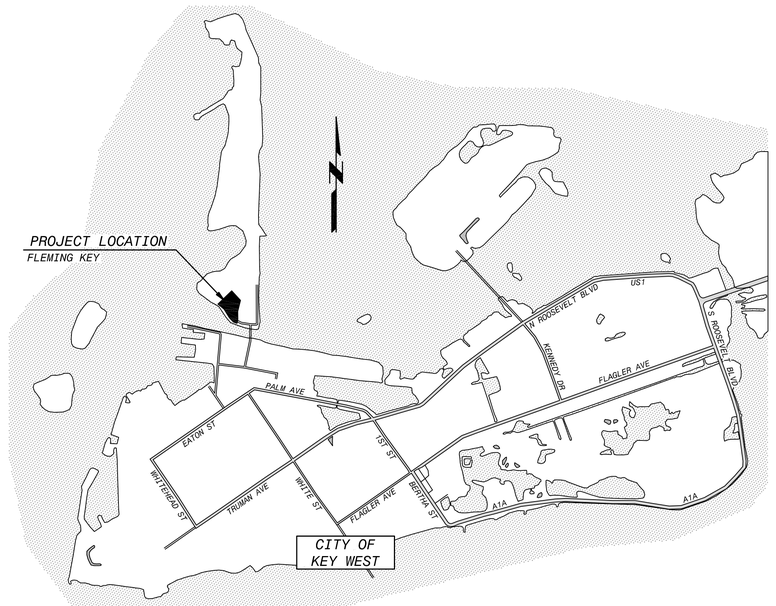
9. THE CONTRACTOR'S OPERATIONS SHALL CONFORM TO THE RULES AND REGULATIONS OF THE STATE CONSTRUCTION SAFETY ORDERS PERTAINING TO EXCAVATION AND TRENCHING.

10. IF ANY SIGNAGE IS DEMOLISHED OR DAMAGED DURING CONSTRUCTION THE CONTRACTOR WILL REPLACE IT IN KIND PER CITY OF KEY WEST SPECIFICATIONS.

GENERAL LEGEND

ABBREVIATIONS

@	AT
ABDN	ABANDON
BOT	BOTTOM
CB	CATCH BASIN
CLDIP	CEMENT LINED DUCTILE IRON PIPE
CONC	CONCRETE
CPE	CORRUGATED POLYETHYLENE
DF	DRAINAGE FORCE MAIN
DIA	DIAMETER
DIP	DUCTILE IRON PIPE
DR	DRIVE, DIMENSION RATIO
DRN	DRAIN
E	EAST
EL	ELEVATION
EW	EACH WAY
EX, EXST	EXISTING
FL	FLANGE
FM	FORCE MAIN
HORIZ	HORIZONTAL
INV	INVERT
IP	IRON POST
LT	LEFT
MAX	MAXIMUM
MH	MANHOLE
MIN	MINIMUM
MJ	MECHANICAL JOINT
N	NORTH
NO.	NUMBER
NTS	NOT TO SCALE
OC	ON CENTER
OD	OUTSIDE DIAMETER
PL	PROPERTY LINE
PP	POWER POLE
PVC	POLYVINYLCHLORIDE
RCP	REINFORCED CONCRETE PIPE
REQD	REQUIRED
RJ	RESTRAINED JOINT
RT	RIGHT
R/W	RIGHT OF WAY
S	SOUTH, SANITARY
SD	STORM DRAIN
SDR	STANDARD DIMENSION RATIO
SPECD	SPECIFIED
SS	STORM SEWER
SS, SST	STAINLESS STEEL
STA	STATION
STW	STORMWATER
T, TEL	TELEPHONE
TYP	TYPICAL
W	WEST, WATER
WT	WEIGHT



LOCATION MAP
NO SCALE

CODE CLASSIFICATION TABLE							
STRUCTURE, ROOM OR AREA		NFPA 820		FIRE CODE REQUIREMENTS		ELECTRICAL CODE	
NAME		TABLE, ROW, & LINE	FIRE PROTECT MEASURES		CLASS	GROUP	DIVISION
OPERATIONS BUILDING - ELECTRICAL ROOM		TABLE 5.2.2, ROW 27					
	UNCLASSIFIED		H				
OPERATIONS BUILDING - DEEP WELL INJECTION PUMPS		N/A					
	UNCLASSIFIED		FE				
ABBREVIATIONS							
CGD = COMBUSTIBLE GAS DETECTORS							
FDS = FIRE DETECTION SYSTEM							
FAS = FIRE ALARM SYSTEM							
FE = PORTABLE FIRE EXTINGUISHERS							
FSS = FIRE SUPPRESSION SYSTEM							
H = HYDRANT PROTECTION							
N/A = NOT APPLICABLE							

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

GENERAL
NOTES, LEGENDS, ABBREVIATIONS
AND LOCATION MAP

DESIGNED: MLM
DETAILED: DJW
CHECKED: MM,LB
APPROVED:
DATE: DECEMBER 2019

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PROJECT NO.
199322

G-02
SHEET
2 OF 26

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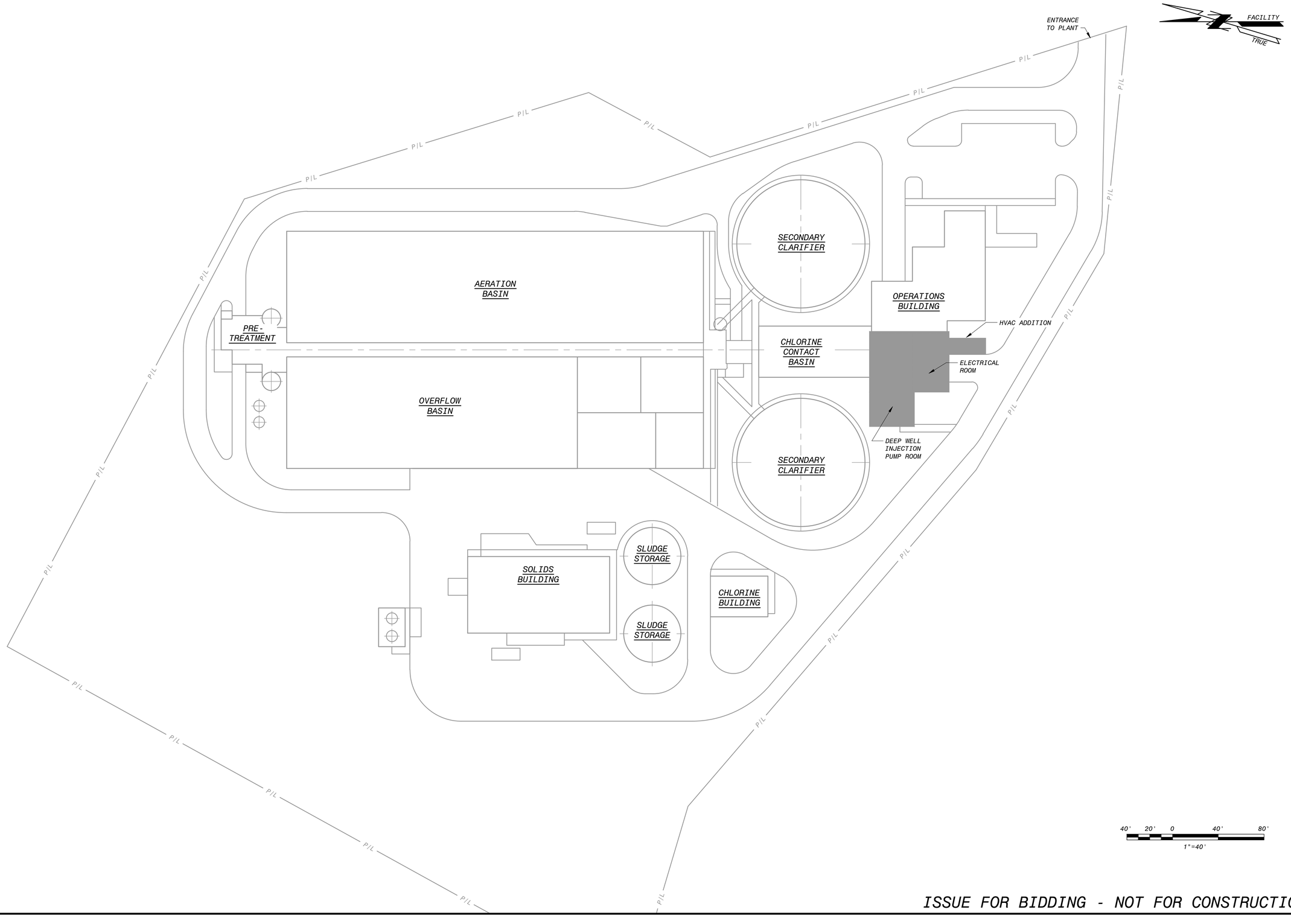
D199322



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CIVIL
OVERALL SITE PLAN

DESIGNED: MLM
DETAILED: DJW
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

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C-01
SHEET
3 OF 26

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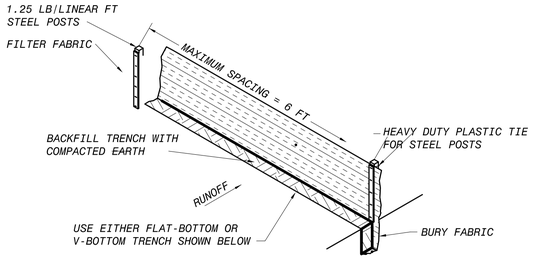
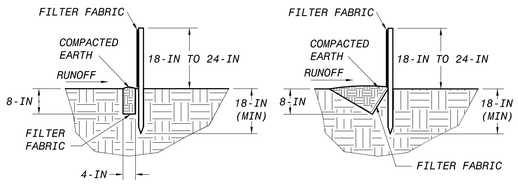


SILT FENCE INSTALLATION



FLAT-BOTTOM TRENCH DETAIL

V-SHAPED TRENCH DETAIL

SILT FENCE A
NO SCALE

SILT FENCE DETAIL

WHEN AND WHERE TO USE IT:
SILT FENCE IS APPLICABLE IN AREAS:

WHERE THE MAXIMUM SHEET OR OVERLAND FLOW PATH LENGTH TO THE FENCE IS 100-FEET. WHERE THE MAXIMUM SLOPE STEEPNESS (NORMAL [PERPENDICULAR] TO FENCE LINE) IS 2H:1V. THAT DO NOT RECEIVE CONCENTRATED FLOWS GREATER THAN 0.5 CFS.

DO NOT PLACE SILT FENCE ACROSS CHANNELS OR USE IT AS A VELOCITY CONTROL BMP.

STEEL POSTS:
USE 48-INCH LONG STEEL POSTS THAT MEET THE FOLLOWING MINIMUM PHYSICAL REQUIREMENTS: COMPOSED OF HIGH STRENGTH STEEL WITH MINIMUM YIELD STRENGTH OF 50,000 PSI. HAVE A STANDARD "T" SECTION WITH A NOMINAL FACE WIDTH OF 1.38-INCHES AND NOMINAL "T" LENGTH OF 1.48-INCHES. WEIGH 1.25 POUNDS PER FOOT (± 8%). HAVE A SOIL STABILIZATION PLATE WITH A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES ATTACHED TO THE STEEL POSTS. PAINTED WITH A WATER BASED BAKED ENAMEL PAINT.

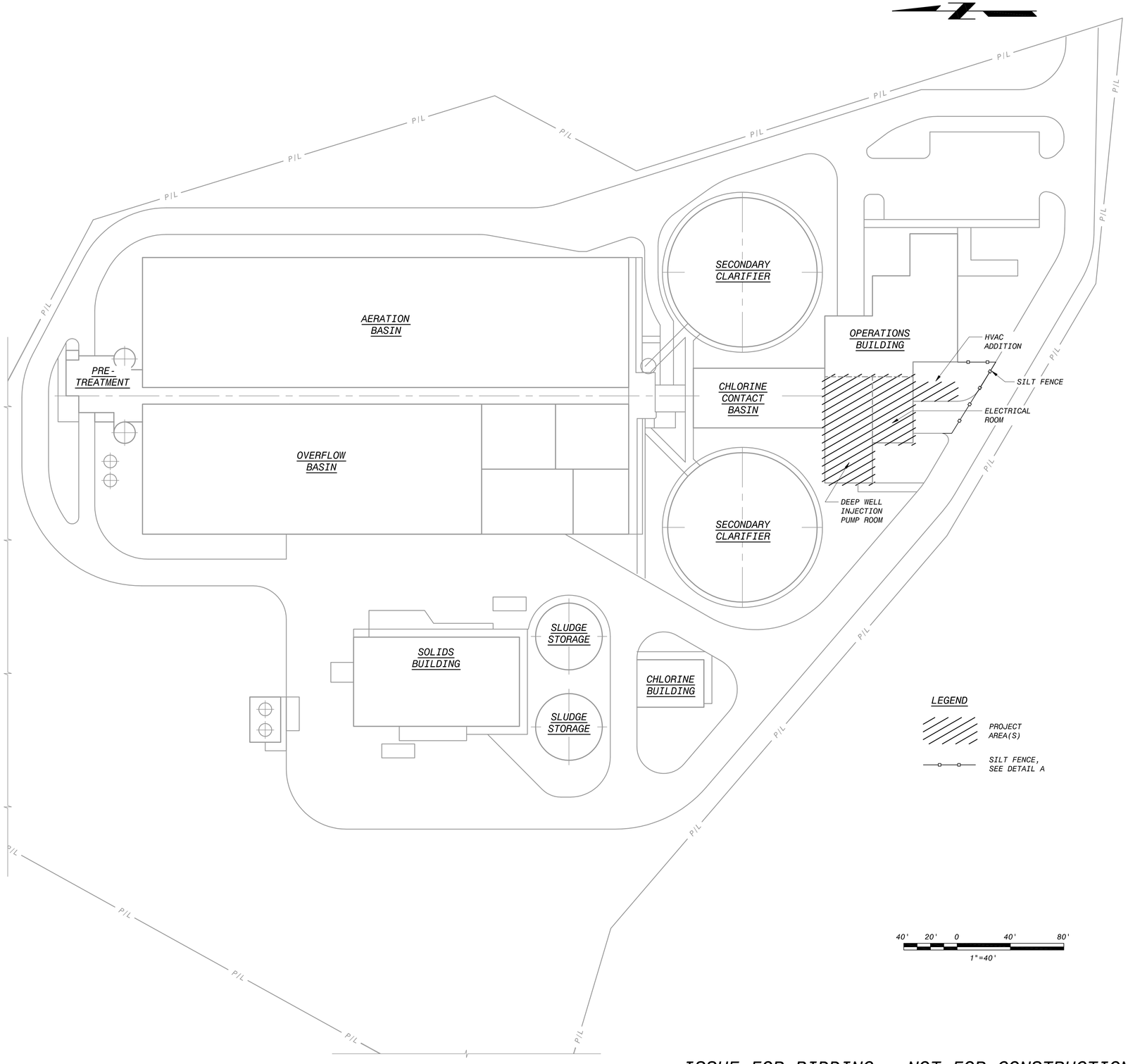
USE STEEL POSTS WITH A MINIMUM LENGTH OF 4-FEET, WEIGHING 1.25 POUNDS PER LINEAR FOOT (± 8%) WITH PROJECTIONS TO AID IN FASTENING THE FABRIC. EXCEPT WHEN HEAVY CLAY SOILS ARE PRESENT ON SITE, STEEL POSTS WILL HAVE A METAL SOIL STABILIZATION PLATE WELDED NEAR THE BOTTOM SUCH THAT WHEN THE POST IS DRIVEN TO THE PROPER DEPTH, THE PLATE WILL BE BELOW THE GROUND LEVEL FOR ADDED STABILITY.
THE SOIL PLATES SHOULD HAVE THE FOLLOWING CHARACTERISTICS:
- BE COMPOSED OF MINIMUM 15 GAUGE STEEL.
- HAVE A MINIMUM CROSS SECTION AREA OF 17-SQUARE INCHES.

GEOTEXTILE FILTER FABRIC:
FILTER FABRIC IS:
COMPOSED OF FIBERS CONSISTING OF LONG CHAIN SYNTHETIC POLYMERS COMPOSED OF AT LEAST 85% BY WEIGHT OF POLYOLEFINS, POLYESTERS, OR POLYAMIDES. FORMED INTO A NETWORK SUCH THAT THE FILAMENTS OR YARNS RETAIN DIMENSIONAL STABILITY RELATIVE TO EACH OTHER. FREE OF ANY TREATMENT OR COATING WHICH MIGHT ADVERSELY ALTER ITS PHYSICAL PROPERTIES AFTER INSTALLATION. FREE OF DEFECTS OR FLAWS THAT SIGNIFICANTLY AFFECT ITS PHYSICAL AND/OR FILTERING PROPERTIES. CUT TO A MINIMUM WIDTH OF 36 INCHES.

USE ONLY FABRIC APPEARING ON SCDOT APPROVAL SHEET #34 MEETING THE REQUIREMENTS OF THE MOST CURRENT EDITION OF THE FDOT STANDARD SPECIFICATIONS FOR HIGHWAY CONSTRUCTION.

INSTALLATION:
EXCAVATE A TRENCH APPROXIMATELY 6-INCHES WIDE AND 6-INCHES DEEP WHEN PLACING FABRIC BY HAND. PLACE 12-INCHES OF GEOTEXTILE FABRIC INTO THE 6-INCH DEEP TRENCH, EXTENDING THE REMAINING 6-INCHES TOWARDS THE UPSLOPE SIDE OF THE TRENCH. BACKFILL THE TRENCH WITH SOIL OR GRAVEL AND COMPACT.BURY 12-INCHES OF FABRIC INTO THE GROUND WHEN PNEUMATICALLY INSTALLING SILT FENCE WITH A SLICING METHOD. PURCHASE FABRIC IN CONTINUOUS ROLLS AND CUT TO THE LENGTH OF THE BARRIER TO AVOID JOINTS. WHEN JOINTS ARE NECESSARY, WRAPPED THE FABRIC TOGETHER AT A SUPPORT POST WITH BOTH ENDS FASTENED TO THE POST, WITH A 6-INCH MINIMUM OVERLAP. INSTALL POSTS TO A MINIMUM DEPTH OF 24-INCHES. INSTALL POSTS A MINIMUM OF 1- TO 2- INCHES ABOVE THE FABRIC, WITH NO MORE THAN 3-FEET OF THE POST ABOVE THE GROUND. SPACE POSTS TO MAXIMUM 6-FEET CENTERS. ATTACH FABRIC TO WOOD POSTS USING STAPLES MADE OF HEAVY-DUTY WIRE AT LEAST 1½-INCH LONG, SPACED A MAXIMUM OF 6-INCHES APART. STAPLE A 2-INCH WIDE LATHE OVER THE FILTER FABRIC TO SECURELY FASTEN IT TO THE UPSLOPE SIDE OF WOODEN POSTS. ATTACH FABRIC TO THE STEEL POSTS USING HEAVY-DUTY PLASTIC TIES THAT ARE EVENLY SPACED AND PLACED IN A MANNER TO PREVENT SAGGING OR TEARING OF THE FABRIC. IN CALL CASES, TIES SHOULD BE AFFIXED IN NO LESS THAN 4 PLACES. INSTALL THE FABRIC A MINIMUM OF 24-INCHES ABOVE THE GROUND. WHEN NECESSARY, THE HEIGHT OF THE FENCE ABOVE GROUND MAY BE GREATER THAN 24-INCHES. IN TIDAL AREAS, EXTRA SILT FENCE HEIGHT MAY BE REQUIRED. THE POST HEIGHT WILL BE TWICE THE EXPOSED POST HEIGHT. POST SPACING WILL REMAIN THE SAME AND EXTRA HEIGHT FABRIC WILL BE 4-, 5-, OR 6-FEET TALL. LOCATE SILT FENCE CHECKS EVERY 100 FEET MAXIMUM AND AT LOW POINTS. INSTALL THE FENCE PERPENDICULAR TO THE DIRECTION OF FLOW AND PLACE THE FENCE THE PROPER DISTANCE FROM THE TOE OF STEEP SLOPES TO PROVIDE SEDIMENT STORAGE AND ACCESS FOR MAINTENANCE AND CLEANOUT.

INSPECTION AND MAINTENANCE:
INSPECT EVERY SEVEN CALENDAR DAYS AND WITHIN 24-HOURS AFTER EACH RAINFALL EVENT THAT PRODUCES ½-INCHES OR MORE OF PRECIPITATION. CHECK FOR SEDIMENT BUILDUP AND FENCE INTEGRITY. CHECK WHERE RUNOFF HAS ERODED A CHANNEL BENEATH THE FENCE, OR WHERE THE FENCE HAS SAGGED OR COLLAPSED BY FENCE OVERTOPPING. IF THE FENCE FABRIC TEARS, BEGINS TO DECOMPOSE, OR IN ANY WAY BECOMES INEFFECTIVE, REPLACE THE SECTION OF FENCE IMMEDIATELY. REMOVE SEDIMENT ACCUMULATED ALONG THE FENCE WHEN IT REACHES 1/3 THE HEIGHT OF THE FENCE, ESPECIALLY IF HEAVY RAINS ARE EXPECTED. REMOVE TRAPPED SEDIMENT FROM THE SITE OR STABILIZE IT ON SITE. REMOVE SILT FENCE WITHIN 30 DAYS AFTER FINAL STABILIZATION IS ACHIEVED OR AFTER TEMPORARY BEST MANAGEMENT PRACTICES (BMPS) ARE NO LONGER NEEDED. PERMANENTLY STABILIZE DISTURBED AREAS RESULTING FROM FENCE REMOVAL.



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STORMWATER POLLUTION PREVENTION PLAN

DESIGNED: MLM
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199322

C-02
SHEET
4 OF 26

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STRUCTURAL NOTES

GENERAL

1. THE APPLICABLE BUILDING CODE IS THE 2015 INTERNATIONAL BUILDING CODE (IBC) AND THE 2017 FLORIDA BUILDING CODE (FBC), 6TH EDITION.
2. THE REQUIREMENTS INDICATED ON THIS SHEET ARE INTENDED AS A BASIC SUMMARY OF THE MATERIAL AND CONSTRUCTION REQUIREMENTS FOR THE PROJECT. ADDITIONAL, MORE STRINGENT REQUIREMENTS ARE GIVEN IN THE PROJECT DETAIL DRAWINGS AND SPECIFICATIONS.
3. ALL STRUCTURAL RELATED SHOP DRAWINGS SHALL BE REVIEWED BY THE ENGINEER PRIOR TO CONSTRUCTION.
4. STRUCTURES MAY BE BUOYANT WHEN EMPTY DURING CONSTRUCTION. CONTRACTOR SHALL PROTECT STRUCTURES AGAINST FLOTATION UNTIL CONSTRUCTION IS COMPLETE.

CAST-IN-PLACE CONCRETE

1. A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4,000 PSI WAS UTILIZED IN THE DESIGN OF STRUCTURAL REINFORCED CONCRETE. SEE SPECIFICATIONS FOR CONSTRUCTION STRENGTH REQUIREMENTS.
2. THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN THOSE SPECIFIED OR SHOWN ON THE PLANS, SHALL BE ACCEPTABLE TO THE ENGINEER PRIOR TO PLACING CONCRETE.

REINFORCING STEEL

1. ALL REINFORCING BAR SHALL BE GRADE 60, DEFORMED, ASTM A615, UNLESS NOTED OTHERWISE.
2. DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS THE CLEAR DISTANCE BETWEEN THE BAR AND THE CONCRETE SURFACE.
3. NO WELDING OF REINFORCING BARS SHALL BE PERMITTED UNLESS APPROVAL IS OBTAINED FROM THE ENGINEER PRIOR TO CONSTRUCTION.

POST-INSTALLED ANCHORS

1. POST-INSTALLED ANCHORS SHALL INCLUDE ADHESIVE ANCHORS (THREADED RODS, BOLTS OR REINFORCING BARS), EXPANSION ANCHORS, AND UNDERCUT ANCHORS INSTALLED INTO HARDENED CONCRETE OR MASONRY. SEE THE ANCHORAGE IN CONCRETE AND MASONRY SPECIFICATION SECTION FOR ADDITIONAL REQUIREMENTS.
2. POST-INSTALLED ANCHORS SHALL ONLY BE USED WHERE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL OBTAIN APPROVAL FROM ENGINEER PRIOR TO USING POST-INSTALLED ANCHORS FOR MISSING OR MISPLACED CAST-IN-PLACE ANCHORS.
3. CARE SHALL BE TAKEN TO AVOID CONFLICTS WITH EXISTING REINFORCING STEEL AND OTHER EMBEDDED ITEMS WHEN DRILLING HOLES. REINFORCING BARS SHALL NOT BE DAMAGED DURING DRILLING OR ANCHOR INSTALLATION. HOLES SHALL BE DRILLED AND CLEANED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS. ANCHORS SHALL BE INSTALLED PER THE PRODUCT MANUFACTURER'S INSTRUCTIONS AT NOT LESS THAN MINIMUM EDGE DISTANCES AND/OR SPACINGS INDICATED IN THE MANUFACTURER'S LITERATURE.
4. SUBSTITUTION REQUESTS FOR PRODUCTS OTHER THAN THOSE LISTED IN THE SPECIFICATION OR INDICATED ON THE DRAWINGS SHALL BE SUBMITTED TO ENGINEER FOR REVIEW AND APPROVAL. PRODUCT ICC-ESR EVALUATION REPORTS SHALL BE INCLUDED WITH THE SUBMITTAL PACKAGE. IF REQUESTED, CALCULATIONS PREPARED BY A REGISTERED PROFESSIONAL ENGINEER USING METHODS AND PROCEDURES REQUIRED BY THE BUILDING CODE MAY BE REQUIRED AS PART OF THE SUBMITTAL PACKAGE.
5. UNLESS NOTED OTHERWISE, THE MINIMUM EMBEDMENT PROVIDED FOR ADHESIVE ANCHORED REINFORCING BARS SHALL DEVELOP THE FULL TENSILE STRENGTH OF THE BAR.
6. SPECIAL INSPECTION WILL BE PROVIDED FOR ALL POST-INSTALLED ANCHORS.

SOIL AND FOUNDATIONS

1. FOUNDATION CONSTRUCTION SHALL NOT BEGIN UNTIL ANY REQUIRED SPECIAL INSPECTION HAS BEEN COMPLETED AND THE CONTRACTOR NOTIFIED TO PROCEED.
2. TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHALL BE GIVEN TO THE ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
3. UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST WALLS WHICH SUPPORT A CONCRETE SLAB OR WALKWAY UNTIL THE TOP SLAB OR WALKWAY HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED THE SPECIFIED DESIGN STRENGTH.
4. THE FOLLOWING NET ALLOWABLE BEARING PRESSURES WERE UTILIZED IN THE DESIGN OF THE FOUNDATIONS:
   - MAT FOUNDATIONS = 1500 PSF

EXISTING STRUCTURES

1. THE DRAWINGS DEPICT WORK AT EXISTING STRUCTURES. ALL DIMENSIONS AND ALL DEPICTIONS SHALL BE FIELD VERIFIED BY THE CONTRACTOR PRIOR TO ORDERING MATERIALS, STARTING FABRICATION, OR STARTING CONSTRUCTION.
2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DEMOLITION BEYOND THE LIMITS IDENTIFIED ON THE DRAWINGS.
3. REINFORCEMENT FOR ANY EXISTING CONCRETE OR MASONRY ELEMENT SHALL NOT BE DAMAGED UNLESS THE ELEMENT IS TO BE DEMOLISHED. WHEN LOCATING EXISTING REINFORCEMENT IS REQUIRED, IT SHALL BE LOCATED USING NON-DESTRUCTIVE METHODS. REINFORCING STRANDS IN EXISTING PRESTRESSED CONCRETE SHALL NOT BE CUT, UNLESS INDICATED ON THE DRAWINGS OR OTHERWISE AUTHORIZED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY DAMAGE, REPAIRS OR STRUCTURAL MODIFICATIONS THAT ARE REQUIRED DUE TO DAMAGE OF CONCRETE, MASONRY OR REINFORCEMENT THAT HAS BEEN IDENTIFIED ON THE DRAWINGS TO REQUIRE FIELD VERIFICATION.
4. CORE DRILLING AND SAW CUTTING SHALL NOT BE PERFORMED UNLESS INDICATED ON THE DRAWINGS OR APPROVED BY ENGINEER.
5. EXPOSED CONCRETE SURFACES THAT REMAIN AFTER DEMOLITION SHALL BE REPAIRED TO MATCH ADJACENT CONCRETE SURFACES.
6. UNLESS OTHERWISE INDICATED ON THE DRAWINGS, EXPOSED CONCRETE SURFACES WITH REINFORCEMENT, ANCHOR BOLTS, HANGER RODS, OR OTHER EXPOSED METAL EMBEDMENTS SHALL BE REPAIRED BY CUTTING OFF THE METAL AT THE FACE OF THE CONCRETE, GRINDING SMOOTH, AND COATING. COATING SHALL EXTEND A MINIMUM OF 1" BEYOND THE EDGE OF ANY EXPOSED METAL.

LOADING CRITERIA

1. DEAD LOAD ..... CALCULATED
2. LIVE LOADS:
   NOT APPLICABLE..... N/A
3. WIND LOAD:
   ULTIMATE DESIGN WIND SPEED..... 200 MPH
   NOMINAL DESIGN WIND SPEED..... 155 MPH
   EXPOSURE..... D
   RISK CATEGORY..... III
4. SEISMIC LOAD:
   MAPPED MCE SHORT PERIOD SPECTRAL RESPONSE ACCELERATION (S_S)..... 0.021g
   MAPPED MCE ONE SECOND PERIOD SPECTRAL RESPONSE ACCELERATION (S_1)..... 0.013g
   DESIGN SPECTRAL RESPONSE ACCELERATION AT SHORT PERIODS (S_{DS})..... 0.022g
   DESIGN SPECTRAL RESPONSE ACCELERATION AT ONE SECOND PERIOD (S_{D1})..... 0.021g
   SITE CLASS..... D
   RISK CATEGORY..... III
   SEISMIC DESIGN CATEGORY..... A
5. SNOW LOAD:
   GROUND SNOW LOAD (P_g)..... ZERO PSF
6. DESIGN FLOOD ELEVATION (DFE)..... EL 8.00 (USGS)

SPECIAL INSPECTIONS

1. CODE REQUIRED SPECIAL INSPECTIONS AND TESTS WILL BE CONDUCTED BY APPROVED AGENCIES EMPLOYED BY THE OWNER IN ACCORDANCE WITH THE APPLICABLE BUILDING CODE.
2. THE STATEMENT OF SPECIAL INSPECTIONS WILL BE PREPARED BY THE REGISTERED DESIGN PROFESSIONAL IN RESPONSIBLE CHARGE DURING CONSTRUCTION.
3. EACH CONTRACTOR RESPONSIBLE FOR THE CONSTRUCTION OF A MAIN WIND OR SEISMIC FORCE RESISTING SYSTEM, DESIGNATED SEISMIC SYSTEM OR A WIND OR SEISMIC RESISTING COMPONENT LISTED IN THE STATEMENT OF SPECIAL INSPECTIONS SHALL SUBMIT A WRITTEN STATEMENT OF RESPONSIBILITY TO THE BUILDING OFFICIAL AND OWNER PRIOR TO COMMENCEMENT OF WORK ON THE SYSTEM OR COMPONENT.
4. SEE THE QUALITY CONTROL SECTION AND THE CODE REQUIRED SPECIAL INSPECTIONS AND PROCEDURES SECTION OF THE SPECIFICATIONS FOR FURTHER CLARIFICATION OF RESPONSIBILITIES.
5. SPECIAL INSPECTIONS FOR SEISMIC RESISTANCE WILL BE PERFORMED AS DESCRIBED IN THE STATEMENT OF SPECIAL INSPECTIONS.
6. STRUCTURAL OBSERVATION WILL BE PERFORMED BY A REGISTERED DESIGN PROFESSIONAL RETAINED BY THE OWNER. THE STRUCTURAL OBSERVER WILL PREPARE A STATEMENT IDENTIFYING THE FREQUENCY AND EXTENT OF THE STRUCTURAL OBSERVATIONS.

ISSUE FOR BIDDING - NOT FOR CONSTRUCTION

NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

ELIAS A. POURLADIAN LICENSE NO.86809 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Elias A. Pourladian on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Engineer of Record: ELIAS A. POURLADIAN
Date: 2020.01.03 08:38:43-06'00'
Florida License No.: No. 86809

BLACK & VEATCH

Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

STRUCTURAL
GENERAL NOTES

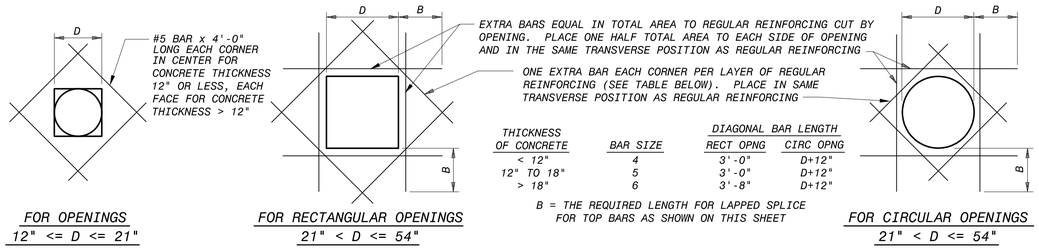
DESIGNED: EAP
DETAILED: JPS
CHECKED: MM, LB
APPROVED: EAP
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
199322

S-01
SHEET
5 OF 26

FD199322
D199322



THICKNESS OF CONCRETE	BAR SIZE	DIAGONAL BAR LENGTH RECT OPNG	DIAGONAL BAR LENGTH CIRC OPNG
< 12"	4	3'-0"	D+12"
12" TO 18"	5	3'-0"	D+12"
> 18"	6	3'-8"	D+12"

B = THE REQUIRED LENGTH FOR LAPPED SPLICE FOR TOP BARS AS SHOWN ON THIS SHEET

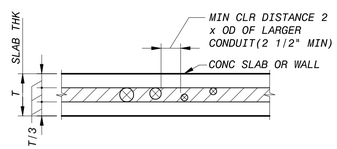
FOR OPENINGS 12" <= D <= 21"

FOR RECTANGULAR OPENINGS 21" < D <= 54"

FOR CIRCULAR OPENINGS 21" < D <= 54"

TYPICAL EXTRA REINFORCING AT OPENINGS 12" TO <= 54"

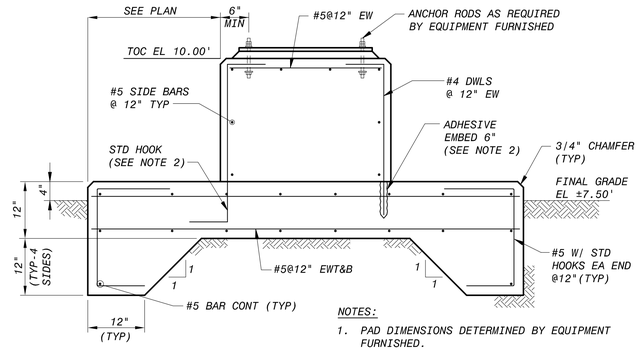
(TYPICAL REQUIRED UNLESS ADDITIONAL REINFORCEMENT SPECIFICALLY INDICATED AT OPENINGS ON DRAWINGS)



NOTES:
1. PLACE CONDUIT ONLY IN SHADED AREA.
2. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.

CONDUIT PLACING DETAIL

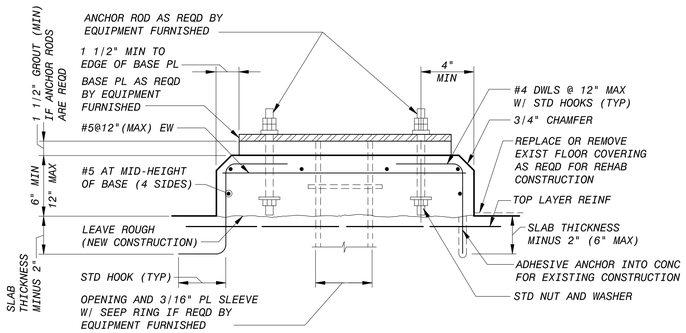
NO SCALE



NOTES:
1. PAD DIMENSIONS DETERMINED BY EQUIPMENT FURNISHED.
2. AT CONTRACTOR'S OPTION, POST- INSTALLED DOWELS MAY BE USED IN LIEU OF CAST-IN-PLACE STD HOOK DOWELS.

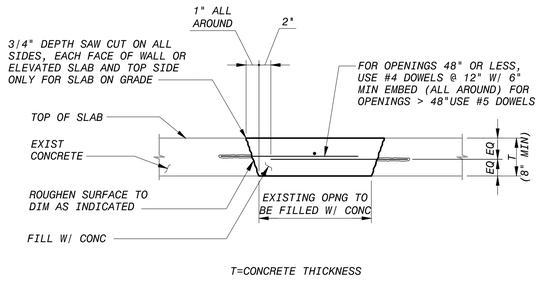
A HVAC EQUIPMENT PAD

- 3/4" = 1'-0"



B EQUIPMENT BASE

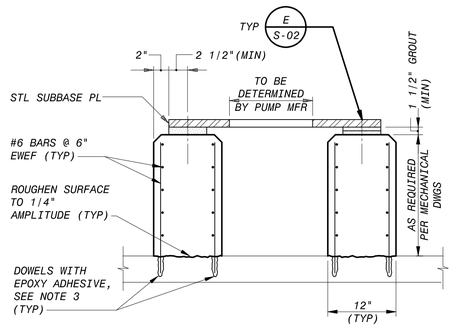
NO SCALE



T=CONCRETE THICKNESS

C INFILL FOR EXISTING OPENING

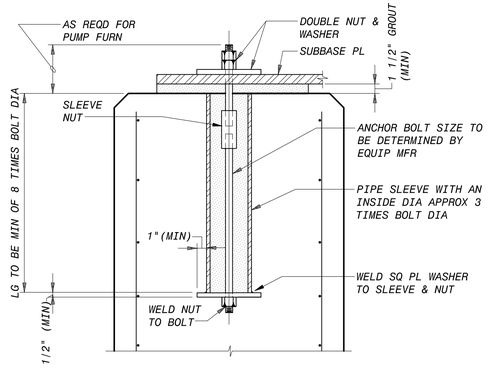
NO SCALE



NOTES:
1. CONTRACTOR TO COORDINATE WITH PUMP MFR FOR DIMENSIONS OF PUMP BASE.
2. MAINTAIN A MINIMUM 4-1/2" EDGE DISTANCE ALL AROUND FOR ANCHOR BOLTS.
3. DOWELS SHALL BE EMBED A MINIMUM OF 6" OR THE EXISTING SLAB THICKNESS MINUS 3".

D DEEP WELL INJECTION PUMP BASE

- NO SCALE



VERTICAL DIFFUSION PUMP ANCHOR BOLT DETAIL

E
- NO SCALE

LENGTH OF LAPPED SPLICES FOR REINFORCEMENT (INCHES)

(UNLESS NOTED OTHERWISE ON THE DRAWINGS)

(f'c=4000 PSI)

BAR SIZE *	BEAMS & COLUMNS **TOP BARS	BEAMS & COLUMNS OTHERS	WALLS & SLABS **TOP BARS	WALLS & SLABS OTHERS	BAR SIZE
3	16	16	16	16	3
4	19	16	19	16	4
5	24	18	24	18	5
6	33	26	29	22	6
7	55	42	48	37	7
8	69	53	60	46	8
9	84	65	74	57	9
10	103	79	91	70	10
11	122	94	108	83	11

* LAP SPLICE LENGTH FOR BARS OF DIFFERENT SIZES SHALL BE THE GREATER OF THE SMALL BAR LAP LENGTH OR 0.75x THE LARGER BAR LAP LENGTH.

** TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR. HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS. VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS.

CONCRETE COVER FOR REINFORCEMENT

LOCATION	MINIMUM COVER
UNFORMED SURFACES ADJACENT TO EXCAVATION	3"
SURFACES INSIDE OF OZONE CONTACTORS EXPOSED TO OZONE IN WATER OR AIR	3"
TOP SURFACES OF SLABS THAT ARE SUBMERGED	3"
FORMED SURFACES THAT ARE SUBMERGED, AND FORMED OR TOP SURFACES EXPOSED TO WEATHER, SATURATED AIR, OR EARTH.	2"
OTHER LOCATIONS:	
BEAMS OR GIRDERS	1 1/2"
SLABS, WALLS AND JOISTS	
#6 AND LARGER	1 1/2"
#5 AND SMALLER	1"

NOTES:
1. COVER IS MEASURED TO NEAREST BAR, STIRRUP, TIE, OR SPIRAL, AS APPLICABLE.
2. TOLERANCES FOR CONCRETE COVER AND THE FABRICATION AND PLACING OF REINFORCEMENT SHALL CONFORM TO ACI 117.

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ELIAS A POURLADIAN LICENSE NO.86809 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Engineer of Record: ELIAS A. POURLADIAN
Florida License No.: No. 86809
Date: 2020.01.03 08:36:51-06'00'

BLACK & VEATCH

Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

STRUCTURAL
STANDARD SECTIONS AND DETAILS

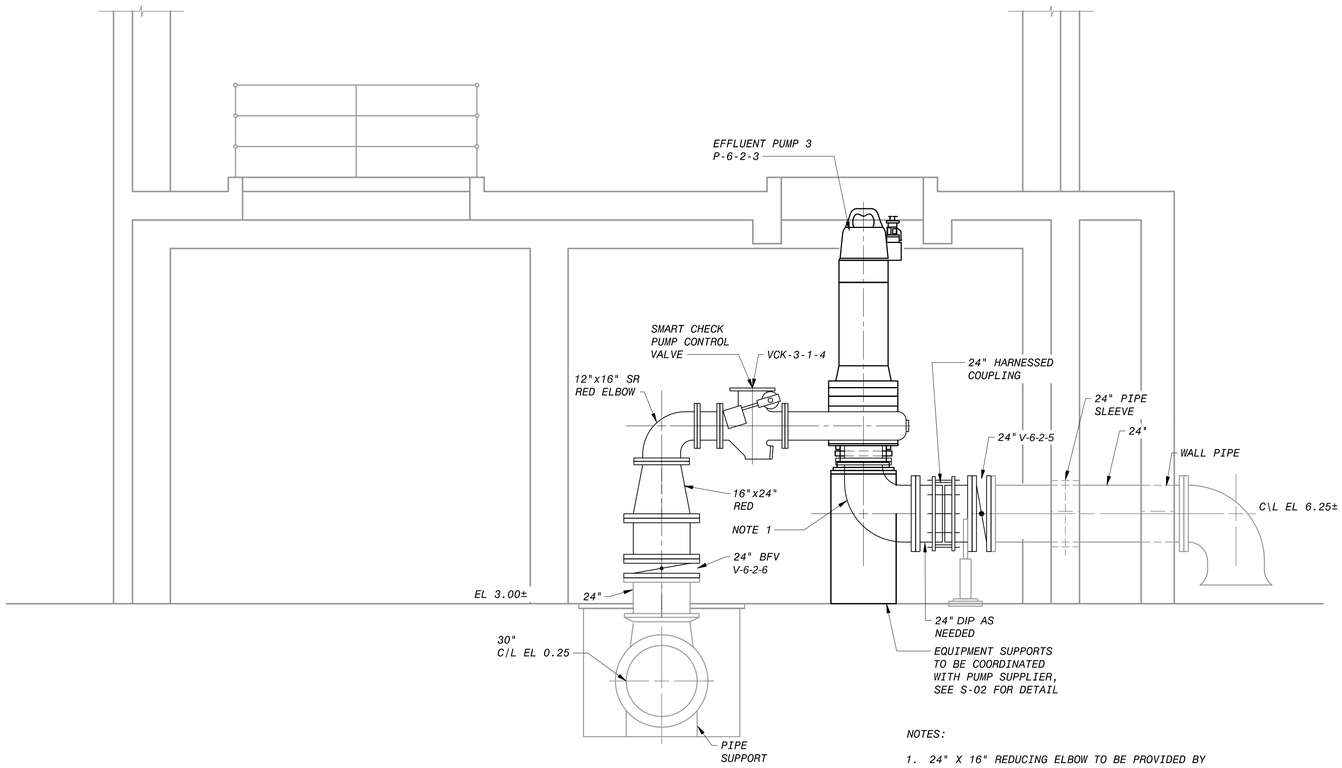
DESIGNED: -
DETAILED: -
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
199322

S-02
SHEET
6 OF 26

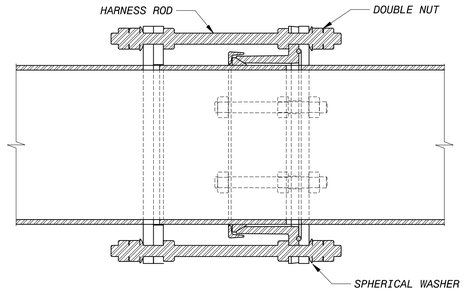
F0199322
D199322



NOTES:

1. 24" X 16" REDUCING ELBOW TO BE PROVIDED BY THE PUMP SUPPLIER FOR INSTALLATION BY THE CONTRACTOR. CONTRACTOR TO CONFIRM ACTUAL DIMENSIONS AND COORDINATE FINAL PIPE SPOOL DIMENSIONS ACCORDINGLY.

INJECTION PUMP MODIFICATION SECTION
3/8" = 1'-0"



A PUMP SUCTION/DISCHARGE JOINT HARNESS
3" = 1'-0"

TABLE 1 - HARNESS RODS

PUMP TAG MUMBER	SUCTION/DISCHARGE	CONNECTION SIZE	NUMBER OF HARNESS RODS	DIAMETER OF HARNESS RODS
P-6-2-3	SUCTION	24"	2	1/2"

NOTES:

1. UNLESS OTHERWISE INDICATED, TIE BOLTS SHALL BE SPACED INIFORMLY AROUND THE PIPE, BEGINNING WITH THE FIRST TWO AT THE HORIZONTAL CENTERLINE OF THE PIPE, SUBJECT TO THE APPROVAL OF THE ENGINEER.
2. SIZE AND NUMBER OF TIE BOLTS IS BASED ON THE HYDRAULIC SUBSTITUTE STANDARDS FOR ALLOWABLE MAXIMUM STRENGTH. ALTERNATING DESIGN OR APPEARANCE SHALL BE ALLOWED ONLY UPON APPROVAL BY THE ENGINNER.
3. SPHERICAL WASHERS SHALL BE INSTALLED FOR ANGULARITY ADJUSTMENT.

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NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

LUCAS BOTERO LICENSE No 67242 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

MECHANICAL PROCESS
DEEP WELL INJECTION PUMP SECTION

DESIGNED: MMP
DETAILED: DJW
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
199322

M-01
SHEET
7 OF 26

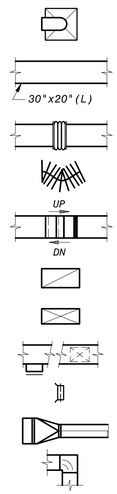
F0199322
D199322

HVAC LEGENDS, ABBREVIATIONS & GENERAL NOTES

SYSTEM ABBREVIATIONS

CWR	CHILLED WATER RETURN
CWS	CHILLED WATER SUPPLY
C	CONDENSATE DRAIN
CDWR	CONDENSER WATER RETURN
CDWS	CONDENSER WATER SUPPLY
HWR	HEATING WATER RETURN
HWS	HEATING WATER SUPPLY
LPC	LOW PRESSURE CONDENSATE
LPS	LOW PRESSURE STEAM (<15 PSIG)
R	REFRIGERANT

HVAC LEGEND



DIFFUSER FOR FLEXIBLE DUCT

DUCTWORK DIMENSIONS, THE FIRST DIMENSION IS THE SIDE SEEN OR SIDE THE LEADER LINE TOUCHES. SEE GENERAL MECHANICAL NOTES.

FLEXIBLE CONNECTION

FLEXIBLE DUCTWORK

INCLINED RISE (UP) OR DROP (DN) IN RESPECT TO DIRECTION OF AIRFLOW

NEGATIVE PRESSURE DUCT

POSITIVE PRESSURE DUCT

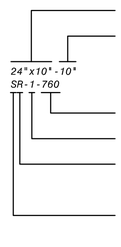
REGISTER, GRILLE OR DIFFUSER

ROUND OR FLEXIBLE DUCT TAKEOFF

ROUND TO SQUARE TRANSITION

TURNING VANES

AIR INLET & OUTLET IDENTIFICATIONS



SIZE-LENGTH BY WIDTH (INCHES)

FLEXIBLE DUCT DIAMETER (INCHES, IF USED)

CFM THRU DEVICE

DEVICE DESIGNATION

DEVICE GROUP:
R-REGISTER, G-GRILLE,
D-DIFFUSER

DEVICE TYPE:
S-SUPPLY, E-EXHAUST,
R-RETURN, T-TRANSFER

CONTROLS & INSTRUMENTATION LEGEND

CS	CONTROL STATION
DG	DRAFT GAUGE
E E	ELECTRIC OPERATOR (EXPLOSION PROOF)
E M	ELECTRIC OPERATOR (MODULATING)
E	ELECTRIC OPERATOR (2 POSITION)
EVS 1	EMERGENCY VENTILATION SWITCH W/ NUMBER
FS	FLOW SWITCH
	GAUGE ACTIVATOR/ISOLATOR
H 1	HUMIDISTAT W/ NUMBER
LS	LEVEL SWITCH
PDS 1	PRESSURE DIFFERENTIAL SWITCH W/ NUMBER
P	PRESSURE GAUGE W/ SHUTOFF VALVE
PS	PRESSURE SWITCH
SMD 1	SMOKE DETECTOR W/ NUMBER
S	SOLENOID OPERATOR
	THERMOMETER - DIAL TYPE
	THERMOMETER - STEM TYPE
TS 1	TEMPERATURE SENSOR WITH NUMBER
T 1	THERMOSTAT WITH NUMBER
V	VACUUM GAUGE W/ SHUTOFF VALVE

MECHANICAL ABBREVIATIONS

A

A	ALARM
AC	AIR COMPRESSOR
AD	ACCESS DOOR
AF	AIR FLOW, AIRFOIL
AFD	ADJUSTABLE FREQUENCY DRIVE
AFF	ABOVE FINISH FLOOR
AFM	AIR FLOW MONITOR
AHU	AIR HANDLING UNIT
ALUM	ALUMINUM
AP	ACCESS PANEL
APPROX	APPROXIMATE
AS	AIR SEPARATOR
ATU	AIR TERMINAL UNIT
AUTO	AUTOMATIC
AVG	AVERAGE

B

B	BELT DRIVE, BLOW THROUGH
BDD	BACKDRAFT DAMPER
BF	BLIND FLANGE
BFF	BELOW FINISH FLOOR
BFP	BACKFLOW PREVENTER
BH	BASEBOARD HEATER
BI	BACKWARD INCLINED, BUILT-IN THERMOSTAT
BL	BOTTOM LEVEL
BLDG	BUILDING
BLR	BLOWER
BOD	BOTTOM OF DUCT ELEVATION
BOT	BOTTOM
BTUH	BRITISH THERMAL UNITS PER HOUR
BU	BELL-UP
BV	BALL VALVE

C

C	CHANNEL, CONVECTOR, COOLING, COOLING (MAKE ON RISE)
CB	CENTRIFUGAL BLOWER
CBD	COUNTERBALANCE BACKDRAFT DAMPER
CC	COOLING COIL
CD	CONTROL DAMPER
CDWP	CONDENSER WATER PUMP
CENTR	CENTRIFUGAL
CF	CABINET FAN
CFM	CUBIC FEET PER MINUTE
CH	CONVECTION HEATER
C/L	CENTERLINE
CO	CLEANOUT
CONC	CONCRETE
CONN	CONNECTION
CONT	CONTINUATION
CS	CONTROL STATION
CT	COOLING TOWER
CU	CONDENSING UNIT
CV	CHECK VALVE, CONTROL VALVE
CWP	CHILLED WATER PUMP

D

D	DIRECT DRIVE, DRAW-THRU
DB	DRY BULB
DDC	DIRECT DIGITAL CONTROL
DEH	DEHUMIDIFIER
DF	DUCT FAN
DIA	DIAMETER
DM	DUCT MOUNTED
DN	DOWN
DX	DIRECT EXPANSION

E

E	ELECTRIC, ELECTRIC OPERATOR, EXHAUST
EA	EACH, EXHAUST AIR
EAT	ENTERING AIR TEMPERATURE
EC	ECONOMIZER, EVAPORATIVE COOLER
ECH	ELECTRIC CABINET HEATER
ECP	EQUIPMENT CONTROL PANEL
EDH	ELECTRIC DUCT HEATER
EF	EXHAUST FAN
EFF	EFFICIENCY
EGS	EMERGENCY GAS SCRUBBER
EIH	ELECTRIC INFRARED HEATER
EL	ELEVATION
EP	EXPLOSION PROOF EQUIP EQUIPMENT
ES	EMERGENCY SWITCH
ESP	EXTERNAL STATIC PRESSURE
ET	EXPANSION TANK
EUH	ELECTRIC UNIT HEATER
EV	EXHAUST VALVE
EVS	EMERGENCY VENTILATION SWITCH
EWT	ENTERING WATER TEMPERATURE
EXIST	EXISTING

F

F	DEGREES FAHRENHEIT
FBD	FACE AND BYPASS DAMPER
FC	FORWARD CURVE, FAN COIL
FD	FIRE DAMPER
FCU	FAN COIL UNIT
FDB	DEGREES FAHRENHEIT DRY BULB
FEF	FUME EXHAUST FAN
FLEX	FLEXIBLE
FM	FLOW METER
FPM	FEET PER MINUTE
FR	FUNNEL RECEPTOR
FRP	FIBERGLASS REINFORCED PLASTIC PIPE
FS	FLOW SWITCH
FSD	COMBINATION FIRE/SMOKE DAMPER
FT	FEET, FIN TUBE HEATER
FUR	FURNACE
FWB	DEGREES FAHRENHEIT WET BULB

G

GA	GAUGE
GALV	GALVANIZED
GIH	GAS INFRARED HEATER
GPM	GALLONS PER MINUTE
GUH	GAS UNIT HEATER
GV	GATE VALVE

H

H	HAND OPERATOR, HEATING, HEATING (MAKE ON FALL), HEIGHT, HORIZONTAL, HUMIDISTAT
HC	HEATING COIL
HCH	HEATING WATER CABINET HEATER
HE	HEAT EXCHANGER
HO	HAND-OFF
HOA	HAND-OFF-AUTO
HP	HEAT PUMP, HORSEPOWER
HR	HEAT RECOVERY UNIT
HUH	HEATING WATER UNIT HEATER
HUM	HUMIDIFIER
HWB	HEATING WATER BOILER
HWP	HEATING WATER PUMP
HZ	HERTZ

I

I	INTAKE
ID	INSIDE DIAMETER
IN	INCHES
INV	INVERT

K

KW	KILOWATT

L

L	LINED DUCT, LOUVER
LAT	LEAVING AIR TEMPERATURE
LBS	POUNDS
LD	COMBINATION LOUVER/DAMPER
LI	LEVEL INDICATOR
LS	LEVEL SWITCH
LWT	LEAVING WATER TEMPERATURE

M

MAU	MAKEUP AIR UNIT
MAX	MAXIMUM
MCA	MINIMUM CIRCUIT AMPS
ME	MIST ELIMINATOR
MFR	MANUFACTURER
MOCP	MAXIMUM OVERCURRENT PROTECTION
MIN	MINIMUM
MOD	MODULATING

N

NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER
NPSHR	NET POSITIVE SUCTION HEAD REQUIRED

O

OA	OUTSIDE AIR
OD	OUTSIDE DIAMETER

P

P	PNEUMATIC
PD	PRESSURE DROP (INCHES OF WATER FOR AIR, FEET OF WATER FOR FLUIDS)
PAC	PACKAGED AIR CONDITIONING UNIT
PAH	PACKAGED AIR HANDLING UNIT
PDS	PRESSURE DIFFERENTIAL SWITCH
PF	PROPELLER FAN
PHP	PACKAGED HEAT PUMP
PL	PLATE
POS	POSITION
PPM	PARTS PER MILLION
PROP	PROPELLER
PRS	PRESSURE REDUCING STATION
PRV	POWER ROOF VENTILATOR, PRESSURE REDUCING VALVE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
PSIA	POUNDS PER SQUARE INCH ABSOLUTE
PSIG	POUNDS PER SQUARE INCH GAUGE
PTAC	PACKAGED TERMINAL AIR CONDITIONER

R

RA	REACTIVATION AIR, RETURN AIR
RAC	ROOM AIR CONDITIONER
RCS	REMOTE CONTROL STATION
REQD	REQUIRED
RH	RELATIVE HUMIDITY, ROOF HOOD
RSF	ROOF SUPPLY FAN

S

SA	SUPPLY AIR
SCD	SMOKE CONTROL DAMPER
SCFM	STANDARD CUBIC FEET PER MINUTE
SF	SQUARE FEET, SUPPLY FAN
SH	SHEET
SIM	SIMILAR
SMD	SMOKE DETECTOR
SP	STATIC PRESSURE (INCHES OF WATER)
SPS	STATIC PRESSURE SENSOR
SS	STAINLESS STEEL
STD	STANDARD
SV	SERVICE VALVE, SHUTOFF VALVE, SOLENOID VALVE

T

T	THERMOSTAT
TCP	TEMPERATURE CONTROL PANEL
TCV	TEMPERATURE CONTROL VALVE
TE	TEMPERATURE ELEMENT
TL	TOP LEVEL
TS	TIP SPEED
TYP	TYPICAL

V

V	VERTICAL
VAC	VACUUM OUTLET
VANE	VANEAXIAL
VAV	VARIABLE AIR VOLUME
VCD	VOLUME CONTROL DAMPER
VF	VANEAXIAL FAN

W

W	WIDE FLANGE, WIDTH
WB	WET BULB
WC	WATER CHILLER WATER COLUMN
WF	WALL FAN
WG	WATER GAUGE
WH	WALL HEATER
WM	WALL MOUNTED
WST	WATER STORAGE TANK
WT	WEIGHT
WV	WATER CONTROL VALVE

Z

ZD	ZONE DAMPER

GENERAL HVAC NOTES

1. THIS IS GENERAL LEGEND AND ABBREVIATION SHEET FOR HVAC DRAWINGS. SOME ITEMS CONTAINED ON THIS SHEET MAY NOT BE USED ON THIS SPECIFIC PROJECT.
2. ALL MECHANICAL HVAC WORK SHALL BE IN ACCORDANCE WITH THE FOLLOWING APPLICABLE CODES:
   2017 FLORIDA BUILDING CODE
   2017 FLORIDA BUILDING CODE - MECHANICAL
   2017 FLORIDA BUILDING CODE - ENERGY CONSERVATION
3. FOR ROOFTOP EQUIPMENT CURBS, FLUES, AND FLASHING DETAILS, SEE ARCHITECTURAL DRAWINGS.
4. SEE STRUCTURAL DRAWINGS FOR ALL EQUIPMENT BASE DETAILS.
5. "SCREENED" DELINEATION DENOTES EXISTING AND NEW FACILITIES AND IS FOR REFERENCE ONLY. "LIGHT" LINE DELINEATION DENOTES EXISTING MECHANICAL EQUIPMENT AND SYSTEMS. EXISTING FACILITY AND MECHANICAL SYSTEMS INFORMATION WAS TAKEN FROM PREVIOUS DRAWINGS, CONSTRUCTION RECORDS, DATA, AND FIELD SURVEY INFORMATION. ACTUAL LOCATION, ARRANGEMENT, AND DIMENSIONS SHALL BE FIELD VERIFIED AND WORK INSTALLED TO MEET ACTUAL CONDITIONS AND LOCATIONS ENCOUNTERED. "BOLD" (DARK) DELINEATION IS NEW WORK TO BE CONSTRUCTED UNDER THIS CONTRACT.
6. ALL MATERIALS, FITTINGS, COVERS, AND EQUIPMENT INSTALLED IN RETURN AIR PLENUMS SHALL BE NONCOMBUSTIBLE AND UL LISTED FOR USE IN RETURN AIR PLENUMS.
7. ALL PIPE AND DUCT PENETRATIONS THROUGH FIRE RESISTANCE RATED ASSEMBLIES SHALL BE PROVIDED WITH FIRESTOP SYSTEMS, EQUIPMENT AND ACCESSORIES TO RESIST THE PASSAGE OF FIRE, SMOKE AND OTHER GASES. THE ORIGINAL FIRE RESISTANCE RATING OF THE ASSEMBLY PENETRATED SHALL BE MAINTAINED FOR ALL TYPES OF PENETRATIONS. SEE ARCHITECTURAL DRAWINGS FOR RATED ASSEMBLY LOCATIONS.
8. METAL ROOF DECKING OR BOTTOM CHORD OF BAR JOISTS SHALL NOT BE USED FOR THE SUPPORT OF EQUIPMENT, PIPING, OR DUCTWORK.
9. ALL HANGERS, BRACKETS, OR BRACES FOR PIPING, DUCTWORK AND EQUIPMENT ARE NOT INDICATED ON THE DRAWINGS. REFER TO THE SPECIFICATIONS FOR SUPPORT REQUIREMENTS NOT SHOWN ON THE PLANS.
10. OUTSIDE AIR INLETS SHALL BE LOCATED A MINIMUM OF 10' AWAY FROM ANY EXHAUST AIR OR PLUMBING VENT OUTLET.
11. ALL EQUIPMENT, PIPING AND DUCTWORK FINAL LOCATIONS SHALL BE COORDINATED TO AVOID INTERFERENCES WITH STRUCTURE, OTHER PIPING, EQUIPMENT, DUCTWORK, AND CONDUIT. UNLESS SPECIFICALLY DIMENSIONED, THE PIPE AND DUCTWORK ROUTING SHOWN IS INTENDED TO INDICATE GENERAL LOCATION ONLY. INSTALL DUCTWORK TO ALLOW FOR PIPING TO BE ROUTED NEAR WALLS.
12. ALL PIPING AND DUCTWORK SHALL BE ROUTED AS HIGH AS POSSIBLE WITH A MINIMUM HEIGHT OF 8'-0" ABOVE THE WALKING SURFACE UNLESS OTHERWISE INDICATED BY A CENTERLINE OR BOTTOM OF DUCT ELEVATION.
13. DUCTWORK SHALL BE FABRICATED, REINFORCED, SUPPORTED AND SEALED FOR OPERATING PRESSURES INDICATED IN THE SCHEDULES FOR THE EQUIPMENT IT SERVES. ALL DUCTWORK SHALL HAVE A MINIMUM SMACNA PRESSURE CLASSIFICATION OF ONE INCH.
14. DUCT SIZES INDICATED ARE CLEAR DIMENSIONS INSIDE THE DUCT OR DUCT LINING. SHEET METAL SIZES ARE LARGER FOR INTERNALLY LINED DUCTWORK.
15. MINIMUM INSULATION THICKNESSES FOR DUCTWORK SHALL BE AS INDICATED IN THE SPECIFICATIONS UNLESS OTHERWISE INDICATED ON THE PLANS WITH A "L" OR "W" DESIGNATION. WHERE AN INSULATION THICKNESS IS INDICATED ON THE DRAWINGS, IT SHALL GOVERN. THE FOLLOWING DENOTES THE DIFFERENT INSULATION THICKNESSES INDICATED ON THE DRAWINGS:
    L,L1 - 1 INCH INTERNALLY LINED — W,W1 - 1 INCH EXTERNALLY WRAPPED
    L15 - 1.5 INCH INTERNALLY LINED — W15 - 1.5 INCH EXTERNALLY WRAPPED
    L2 - 2 INCH INTERNALLY LINED — W2 - 2 INCH EXTERNALLY WRAPPED
16. DUCT CONNECTIONS TO EQUIPMENT, PIPING SIZES TO EQUIPMENT, AND EQUIPMENT SUPPORTS SHALL BE VERIFIED AND ADJUSTED TO MATCH ACTUAL EQUIPMENT FURNISHED.
17. THE LOCATION OF PIPING AND VALVES TO THE AIR HANDLING EQUIPMENT SHALL NOT INTERFERE WITH FILTER REMOVAL OR AIR HANDLING EQUIPMENT SERVICING.
18. ROOFTOP EQUIPMENT SHALL NOT BE LOCATED SUCH THAT ACCESS TO CONTROLS AND TO PERFORM SERVICE FOR EQUIPMENT IS LOCATED WITHIN 10 FEET OF THE BUILDING EDGE.
19. CONTROL DAMPER SIZES SHALL MATCH DIMENSIONS OF ASSOCIATED LOUVER UNLESS OTHERWISE INDICATED.
20. ALL RELIEF VALVES SHALL BE PIPED TO 12" AFF.
21. SEISMIC/WIND LOADING RESTRAINTS|BRACING SHALL BE PROVIDED FOR ALL EQUIPMENT, DUCTWORK, AND ACCESSORIES IN ACCORDANCE WITH THE LATEST SMACNA SEISMIC RESTRAINT MANUAL AND LOCAL BUILDING CODES. CONTRACTOR SHALL BE RESPONSIBLE FOR THE DESIGN OF ALL SEISMIC AND WIND SUPPORTS AND ADDITIONAL/MISCELLANEOUS STEEL REQUIRED FOR PROPER INSTALLATION OF SUPPORTS. SUPPORTS AND SEISMIC/WIND RESTRAINTS DESIGN SUBMITTALS SHALL BEAR THE STAMP AND SIGNATURE OF AN ENGINEER LICENSED IN THE STATE OF FLORIDA.
22. INSULATION SHALL BE PROVIDED FOR EQUIPMENT, PIPING AND DUCT SYSTEMS AS INDICATED IN THE SPECIFICATIONS.

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MICHELE F. ROTH LICENSE NO.82002 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Engineer of Record: MICHELE F ROTH
Florida License No.: No. 82002

BLACK & VEATCH

Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

HVAC LEGEND, ABBREVIATIONS, AND GENERAL NOTES

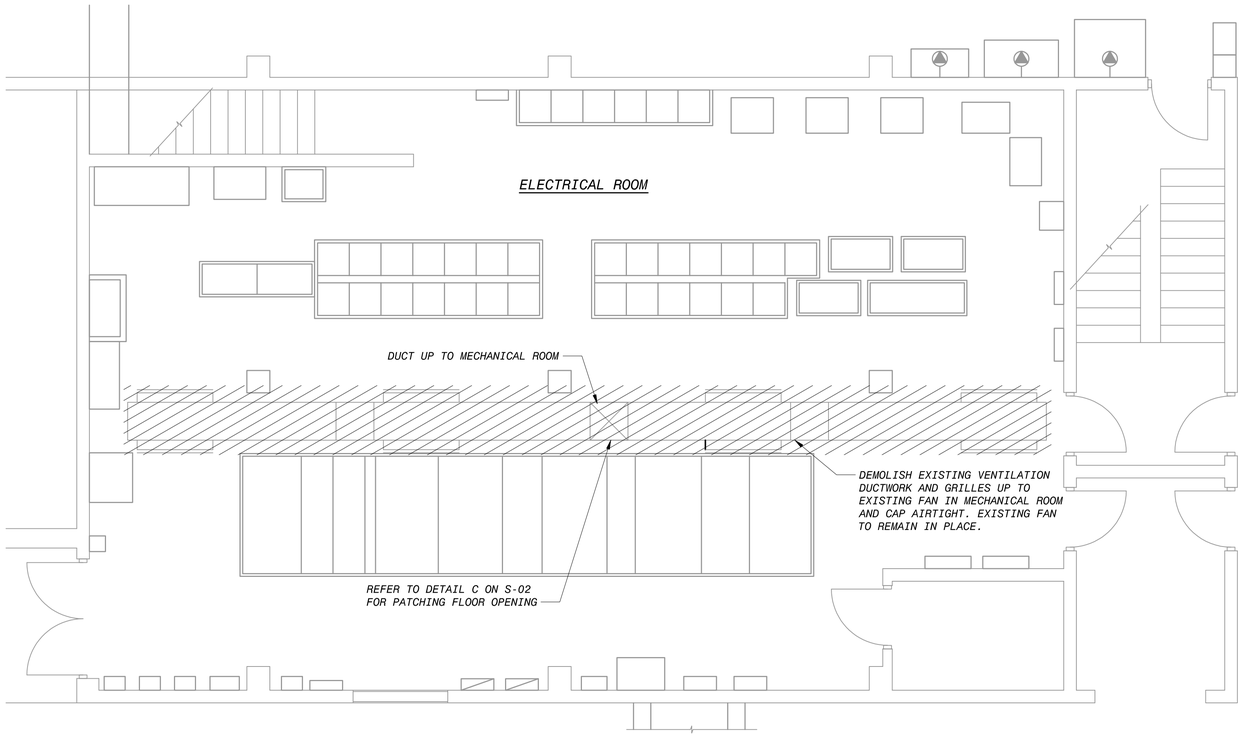
DESIGNED: DV
DETAILED: BAR
CHECKED: MFR
APPROVED: MFR
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 199322

H-01
SHEET 8 OF 26

FD199322
D199322



OPERATING BUILDING PLAN - DEMO
1/4" = 1'-0"

MECHANICAL ROOM - DEMO
NO SCALE

4' 2' 0 4' 8'
1/4"=1'-0"

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

HVAC
OPERATIONS BUILDING PLAN - DEMO

DESIGNED: DV
DETAILED: BAR
CHECKED: MFR
APPROVED: MFR
DATE: DECEMBER 2019

0 1/2 1
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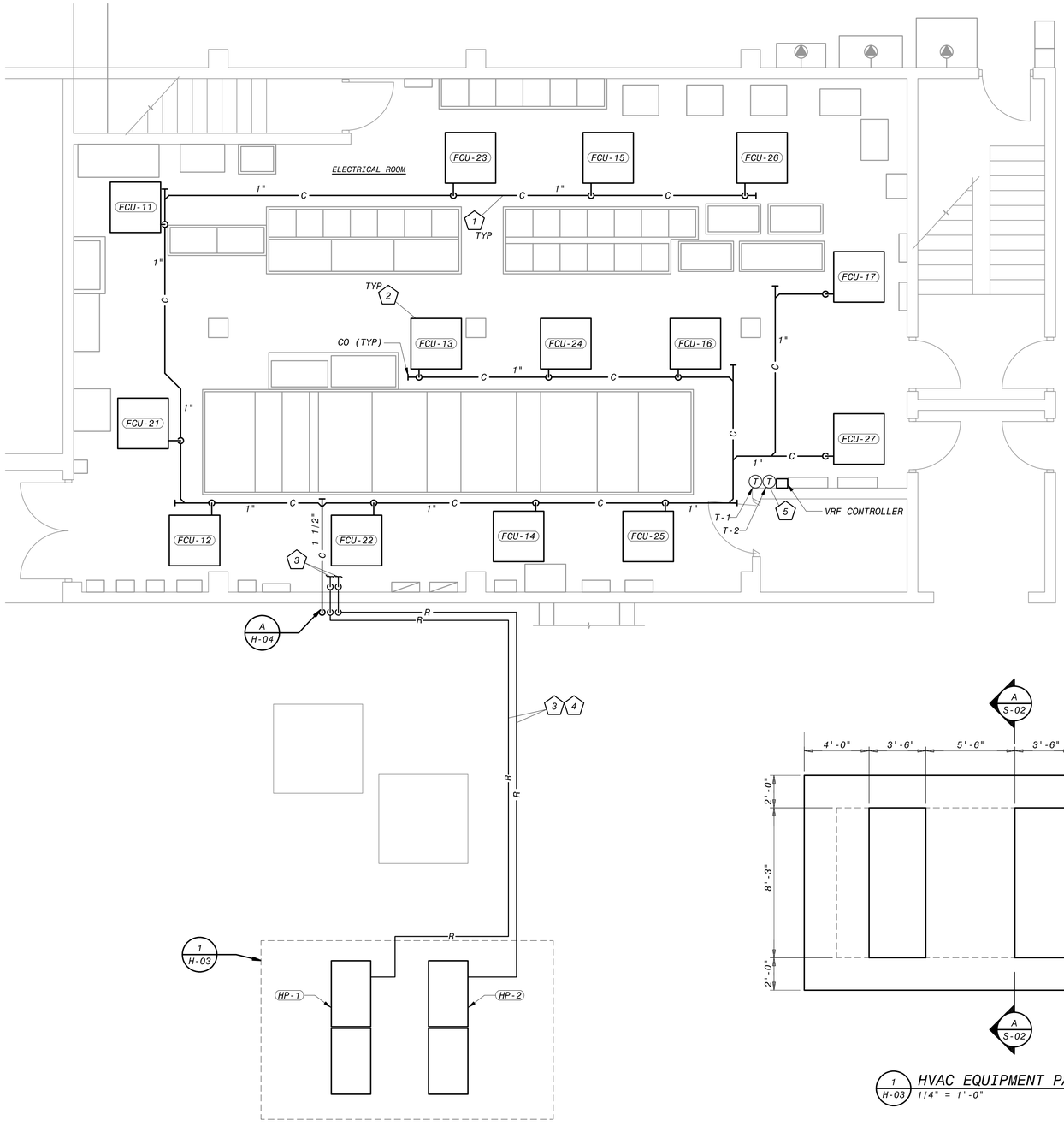
PROJECT NO.
199322

H-02
SHEET
9 OF 26

F0109222
D199322



OPERATING BUILDING PLAN

1/4" = 1'-0"

1 H-03 HVAC EQUIPMENT PAD

1/4" = 1'-0"

SHEET KEYNOTES:

1. CONDENSATE PIPING SHALL BE ROUTED MINIMUM 6" ABOVE ELEVATION OF TOP OF ELECTRICAL EQUIPMENT. NO PIPING IS PERMITTED TO BE ROUTED ABOVE ANY ELECTRICAL EQUIPMENT.
2. BOTTOM OF FAN COIL CASSETTE UNITS SHALL BE MOUNTED 6" ABOVE TOP OF ELECTRICAL EQUIPMENT COORDINATE WITH EXISTING LIGHTING AND CONDUIT.
3. REFRIGERANT PIPING SHALL BE ROUTED AND PROVIDED IN QUANTITY AND SIZE ACCORDING TO MANUFACTURER'S RECOMMENDATIONS. REFRIGERANT PIPING INSIDE ELECTRICAL ROOM SHALL BE ROUTED MINIMUM 6" ABOVE ELEVATION OF TOP OF ELECTRICAL EQUIPMENT. NO PIPING IS PERMITTED TO BE ROUTED ABOVE ANY ELECTRICAL EQUIPMENT
4. SUPPORT REFRIGERANT PIPING ACCORDING TO SPECIFICATION SECTION 15140.
5. PROVIDE ONE THERMOSTAT PER OUTSIDE UNIT AND ONE VRF CONTROLLER MOUNTED TO WALL. REFER TO SEQUENCE OF OPERATIONS FOR MORE INFORMATION.

4' 2' 0 4' 8'

1/4"=1'-0"

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DEEP WELL INJECTION PUMP AND HVAC

HVAC
OPERATIONS BUILDING PLAN

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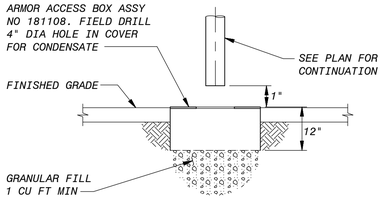
H-03 SHEET 10 OF 26

F0199322
D199322

METER BOX FOR DRAIN TO BE 10" CIRCULAR BOX. ARMOR ACCESS BOX ASSY NO 181108. FIELD DRILL 4" DIA HOLE IN COVER FOR CONDENSATE



CONDENSATE DRAIN SUMP (A)

NO SCALE

HVAC SEQUENCE OF OPERATION

1. AIR CONDITIONING SYSTEMS.

1.1. VARIABLE REFRIGERANT FLOW (VRF) SYSTEMS. THE VRF SYSTEMS WILL BE CONTROLLED BY THE MANUFACTURER'S DIGITAL VRF CONTROLLER INTERFACE. ALL VRF EQUIPMENT AND THERMOSTATS WILL CONNECT TO AND COMMUNICATE WITH THE VRF CONTROLLER. EACH VRF SYSTEM CONSISTS OF A SINGLE OUTDOOR HEAT PUMP UNIT AND SEVEN INDOOR FAN COIL UNITS. EACH VRF SYSTEM SHALL BE CONTROLLED BY A SINGLE THERMOSTAT. THE THERMOSTAT SHALL ENERGIZE THE OUTDOOR AND INDOOR UNITS TO PROVIDE COOLING AND COMMUNICATE DEMAND TO THE VRF CONTROLLER. THE OUTDOOR HEAT PUMP UNITS SHALL BE MODULATED BY THE VRF CONTROLLER TO MAINTAIN SPACE TEMPERATURE SETPOINTS. THE VRF CONTROLLER SHALL CONTROL THE VRF SYSTEMS IN A LEAD/LAG CONFIGURATION AND ALTERNATE THE LEAD UNIT TO EQUALIZE RUNTIME.

OUTDOOR UNIT	ASSOCIATED INDOOR UNITS	THERMOSTAT
HP-1	FCU-11, FCU-12, FCU-13, FCU-14, FCU-15, FCU-16, FCU-17	T-1
HP-2	FCU-21, FCU-22, FCU-23, FCU-24, FCU-25, FCU-26, FCU-27	T-2

2. THERMOSTAT SETPOINTS

2.1 THERMOSTAT SETPOINTS SHALL BE AS INDICATED BELOW, UNLESS THE SETPOINT HAS BEEN DESCRIBED PREVIOUSLY IN THIS SEQUENCE OF OPERATIONS.

AIR CONDITIONED AREAS:	85°F

SCHEDULE NOTES:

FAN COIL SCHEDULE:
NOTES:
1. FACTORY INSTALLED CONDENSATE LIFT MECHANISM
2. PROVIDE WITH DISCONNECT SWITCH
3. 4-WAY AIR DISTRIBUTION GRILLE

HEAT PUMP SCHEDULE:
OUTDOOR COIL ENTERING AIR TEMPERATURE:
COOLING - 105° F DESIGN | 55° F MIN
HEATING - 55° F (HEAT PUMP)

NOTES:
1. VARIABLE REFRIGERANT FLOW
2. UNIT IS SUBJECT TO CORROSION FROM A HYDROGEN SULFIDE LADEN ATMOSPHERE. ALL AIRSTREAM COMPONENTS AND EXPOSED HEAT TRANSFER COMPONENTS SHALL BE GIVEN A PROTECTIVE FACTORY COATING OF HERESITE OR APPROVED EQUAL. CONTROL PANELS, WIRING CONNECTIONS AND OTHER SENSITIVE ELECTRONICS SHALL HAVE A CONFORMAL COATING APPLIED.
3. UNIT CONSISTS OF TWO IDENTICAL UNITS AND MANUFACTURER'S TWINNING KIT.
4. UNIT IS SUPPLIED AS HEAT PUMP, BUT HEATING CAPACITY IS NOT REQUIRED.

FAN COIL SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	AIRFLOW (CFM)	AIR PD (IN WC)	EAT (FDB)	EAT (FWB)	LAT (FDB)	COOLING CAPACITY (BTUH) SENSIBLE	COOLING CAPACITY (BTUH) TOTAL	FAN MOTOR WATTS	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	APPROX WEIGHT (LBS)	NOTES
FCU-11	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-12	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-13	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-14	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-15	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-16	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-17	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-21	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-22	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-23	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-24	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-25	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-26	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3
FCU-27	ELEC RM	MITSUBISHI	TPLFYP036	1000	---	85	63	56	31700	31800	120	208	1	66	1,2,3

HEAT PUMP SCHEDULE

UNIT NUMBER	LOCATION	MANUFACTURER	MODEL	COOLING CAPACITY (BTUH)	COOLING MINIMUM CAPACITY STEPS	COOLING SUCTION TEMPERATURE (F) MINIMUM	COOLING SUCTION TEMPERATURE (F) MAXIMUM	HEATING CAPACITY (BTUH)	POWER SUPPLY VOLTS	POWER SUPPLY PHASE	MINIMUM CIRCUIT AMPACITY (PER MODULE)	ARI MINIMUM EFFICIENCY	MATCHED WITH INDOOR UNIT	APPROX WEIGHT (LBS)	NOTES
HP-1	OUTSIDE	MITSUBISHI	TUHYP240	221500	VARIABLE	---	---	---	480	3	19/19	11.8 EER	FCU-11 THRU FCU-17	1260	1,2,3,4
HP-2	OUTSIDE	MITSUBISHI	TUHYP240	221500	VARIABLE	---	---	---	480	3	19/19	11.8 EER	FCU-21 THRU FCU-27	1260	1,2,3,4

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Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

HVAC
SCHEDULES, DETAILS AND SEQUENCE OF OPERATIONS

DESIGNED: DV
DETAILED: BAR
CHECKED: MFR
APPROVED: MFR
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
199322

H-04
SHEET
11 OF 26

FD1000222
D1083222

ELECTRICAL LEGENDS

ONE-LINE DIAGRAM LEGEND

1500KVA
2.4KV Δ - 480Y/277V
3%Z, 60HZ
TRANSFORMER WITH PRIMARY AND SECONDARY VOLTAGE, AND KVA RATING AS NOTED

CS 4#14,3/4"
20 3P-60 22:3#8,#10G, 4#14,2"
CIRCUIT NO.22 WITH 3#8 INSULATED CONDUCTORS AND 1#10 GROUND WIRE FOR A 20HP MOTOR WITH 3 POLE, 60A, MOTOR DISCONNECT SWITCH AND 4#14 INSULATED CONDUCTORS FOR AUXILIARY ITEM, AS FOR EXAMPLE A CONTROL STATION, ALL IN 2" CONDUIT.

AUXILIARY ITEMS MAY NOT BE COMPLETELY SHOWN
HS
20 3P-60 22:3#8,#10G 4#14,2"
CONDUCTORS FOR AUXILIARY ITEM SHALL NOT PASS THROUGH MOTOR DISCONNECT SWITCH.

AUXILIARY ITEMS MAY NOT BE COMPLETELY SHOWN
15
ONE-LINE SHOWING POWER AND CONTROL TO A PACKAGE UNIT, AS FOR EXAMPLE A STEAM GENERATOR OR AN AIR HANDLING UNIT, SHALL IMPLY THAT ANY AND ALL ASSOCIATED EQUIPMENT SHALL ALSO BE INSTALLED AND WIRED AS REQUIRED BY THE EQUIPMENT FURNISHED.

INDICATES THAT ALL OR PART OF CIRCUIT MAY BE ROUTED IN DUCT BANK OR UNDERGROUND. CONDUIT SIZE SHOWN ON ONE-LINE IS ABOVE GROUND AND/OR INSIDE OF STRUCTURE. SEE DUCT BANK SCHEDULE AND SECTIONS FOR CONDUIT SIZE OF UNDERGROUND PORTION OF CIRCUIT.

HIGH VOLTAGE DRAWOUT AIR OR VACUUM CIRCUIT BREAKER

3P-20
LOW VOLTAGE AIR CIRCUIT BREAKER, 3 POLE, 20 AMPERE

S4
SIZE 4 COMBINATION MAGNETIC MOTOR STARTER

LOW VOLTAGE DRAWOUT AIR CIRCUIT BREAKER

HIGH VOLTAGE DRAWOUT CONTACTOR

FUSE AND DISCONNECT SWITCH

S2
SIZE 2 COMBINATION MAGNETIC MOTOR STARTER, REVERSING OR 2 SPEED

S1
SIZE 1 COMBINATION REDUCED VOLTAGE AUTOTRANSFORMER

POTENTIAL TRANSFORMER

CURRENT TRANSFORMER

CURRENT OR POTENTIAL TEST SWITCH

G GENERATOR

K KIRK KEY INTERLOCK

E ELECTRICAL INTERLOCK

R RESISTOR

59G PROTECTION RELAY WITH IEEE DEVICE FUNCTION AS SHOWN

V SINGLE-FUNCTION METER

SURGE OR LIGHTNING ARRESTER

SURGE ARRESTER WITH SURGE CAPACITOR

GROUND CONNECTION

SCHEMATIC SYMBOLS

- WIRE CONNECTION POINT
- EXTERNAL CONNECTION POINT
- NORMALLY OPEN CONTACT
- NORMALLY CLOSED CONTACT
- STARTER, CONTACTOR OR RELAY COIL
- NORMALLY OPEN PUSH BUTTON
- NORMALLY CLOSED PUSH BUTTON
- MAINTAINED PUSH BUTTON
- NORMALLY CLOSED GEARED LIMIT SWITCH
- NORMALLY OPEN GEARED LIMIT SWITCH
- INDICATING LIGHT
- FUSE
- POTENTIOMETER
- CAPACITOR
- DIODE
- RESISTOR
- CONTROL POWER TRANSFORMER
- SWITCH
- MS MANUAL STARTER
- OL OVERLOAD
- OVERLOAD
- ELECTRODE
- FLOAT SWITCH (CLOSING ON RISING LEVEL)
- FLOAT SWITCH (OPENING ON RISING LEVEL)
- P PRESSURE SWITCH (CLOSING ON RISING PRESSURE)
- P PRESSURE SWITCH (OPENING ON RISING PRESSURE)
- V VACUUM SWITCH (CLOSING ON INCREASING VACUUM)
- V VACUUM SWITCH (OPENING ON INCREASING VACUUM)
- TEMPERATURE SWITCH (CLOSING ON RISING TEMPERATURE)
- TEMPERATURE SWITCH (OPENING ON RISING TEMPERATURE)
- FLOW ACTUATED SWITCH (CLOSING ON INCREASE IN FLOW)
- FLOW ACTUATED SWITCH (OPENING ON INCREASE IN FLOW)
- ON TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- ON TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY OPEN, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL OPEN AFTER A TIME DELAY)
- OFF TIME DELAY CONTACT (NORMALLY CLOSED, WHEN THE COIL IS DE-ENERGIZED THE CONTACT WILL CLOSE AFTER A TIME DELAY)
- TORQUE SWITCH (NORMALLY OPEN)
- TORQUE SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY OPEN)
- LIMIT SWITCH (NORMALLY OPEN, HELD CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED)
- LIMIT SWITCH (NORMALLY CLOSED, HELD OPEN)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY OPEN, CLOSING ON INCREASING DIFF.)
- DIFFERENTIAL PRESSURE SWITCH (NORMALLY CLOSED, OPENING ON INCREASING DIFF.)

SWITCH & OUTLET SYMBOLS

- S SINGLE POLE SWITCH
- S_2 TWO POLE SWITCH
- S_{3A} THREE-WAY SWITCH CONTROLLING LIGHTS WITH "A" DESIGNATION
- S_4 FOUR-WAY SWITCH
- S^{C1}_{M} MOMENTARY SWITCH CONTROLLING CONTACTOR C1
- S^{DM}_{A} DIMMING WALL SWITCH CONTROLLING LIGHTS WITH "A" DESIGNATION
- S^{OS}_{A} WALL SWITCH OCCUPANCY SENSOR CONTROLLING LIGHTS WITH "A" DESIGNATION
- DUPLEX RECEPTACLE 120 VOLT
- SIMPLEX RECEPTACLE
- RANGE RECEPTACLE
- TWISTLOCK RECEPTACLE
- 30 240V, 1Ø RECEPTACLE, TYPICAL AMPERE RATING NOTED
- 60 480V, 3Ø WELDING RECEPTACLE, TYPICAL AMPERE RATING NOTED
- 120 VOLT DUPLEX RECEPTACLE (UPS)
- DUPLEX FLOOR OUTLET
- TELEPHONE OUTLET
- TELEPHONE FLOOR OUTLET
- CX COAXIAL CABLE OUTLET
- DATA NETWORK OUTLET

MISCELLANEOUS SYMBOLS

- STROBE
- HORN & STROBE
- HORN
- T THERMOSTAT
- J JUNCTION BOX
- GROUND ROD
- GROUND ROD WITH TEST WELL
- GROUND CONNECTION
- DISCONNECT SWITCH
- COMBINATION STARTER
- POWER PANEL
- LIGHTING PANEL
- MISCELLANEOUS PANEL
- LIGHTING CONTACTOR
- CAMERA
- PE PHOTOELECTRIC SENSOR, PHOTOCELL
- OS CEILING MOUNTED OCCUPANCY SENSOR
- OS WALL MOUNTED OCCUPANCY SENSOR

BREAKER DETAILS

DETAIL A

52 — 5KV, 1200A, 49KA
A 5KV CLASS MEDIUM-VOLTAGE, DRAWOUT, VACUUM OR AIR INSULATED CIRCUIT BREAKER WITH A 1,200 AMPERE FRAME. BREAKER HAS A 49,000 AMPERE MAXIMUM FAULT CURRENT INTERRUPTING RATING.

DETAIL B

3P-50
A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 50 AMPERE TRIP RATING. TRIP UNIT IS NON-ADJUSTABLE THERMAL-MAGNETIC TYPE.

1000AT / 1200AF — SST, LSIG, AFRD
A LOW VOLTAGE FIXED MOUNTED MOLDED CASE CIRCUIT BREAKER WITH A 1200 AMPERE FRAME AND A 1000 AMPERE TRIP RATING. TRIP UNIT IS ADJUSTABLE SOLID-STATE TYPE WITH LONG-TIME, SHORT-TIME, INSTANTANEOUS, GROUND FAULT AND ARC-FLASH REDUCTION PROTECTION FEATURES.

DETAIL C

800AT / 1000AS / 1600AF — AFRD
A LOW VOLTAGE, DRAWOUT, POWER OR INSULATED CASE CIRCUIT BREAKER WITH A 1600A FRAME AND SOLID-STATE TRIP UNIT. TRIP UNIT HAS A SENSOR MODULE RATED FOR 1000 AMPERES AND WITH A TRIP RATING OF 800 AMPERES AND ARC-FLASH REDUCTION PROTECTION FEATURES.

COMMUNICATION SYMBOLS

- HORN SPEAKER
- DUAL HORN SPEAKER
- WALL MOUNTED CONE SPEAKER
- SK CEILING MOUNTED CONE SPEAKER

CONDUIT & WIRING INSTALLATION LEGEND

- CONDUIT EXPOSED
- CONDUIT CONCEALED
- CONDUIT TURNING UP. CONDUIT TURNING DOWN.
- CONDUIT PLUGGED FLUSH. CONDUIT CAPPED.
- L2-5 TYPICAL FOR HOME RUN TO BE ROUTED TO LIGHTING PANEL L2 & CONNECTED TO CIRCUIT #5 (MINIMUM NO. 12 AWG CONDUCTORS AND 3/4" CONDUIT)
- 1 LP1-1 A POLE OR STANCHION MOUNTED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.
- 1 LP1-1 A WALL MOUNTED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.
- 1 LP1-1 A CEILING, PENDANT, OR RECESSED LIGHTING FIXTURE. REFER TO NUMBER OR LETTER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1. CONTROLLED VIA FROM SWITCH A.
- LP1-1 RECEPTACLE POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1.
- LP1-1 A / 1 LINEAR LIGHTING FIXTURE. REFER TO FIXTURE NUMBER IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL LP1, CIRCUIT 1, VIA SWITCH A.
- LP1-1 / EX EXIT LIGHTING FIXTURE. REFER TO FIXTURE NUMBER OR LETTERS IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL 1, CIRCUIT 1.
- LP1-1 / EM EMERGENCY LIGHTING FIXTURE. REFER TO FIXTURE NUMBER OR LETTERS IN FIXTURE SCHEDULE. POWERED FROM LIGHTING PANEL 1, CIRCUIT 1.
- E UNDERGROUND CONCRETE ENCASED ELECTRICAL DUCT BANK
- UNDERGROUND CONCRETE ENCASED ELECTRICAL BANK ROUTED BENEATH SLAB-ON-GRADE
- EE DIRECT BURIED CONDUIT
- GROUND CONDUCTOR
- UE UE UNDERGROUND ELECTRIC
- OH OH OVERHEAD CIRCUIT

PROTECTION/RELAY DEVICE NUMBERS

25 - SYNCHRONIZING OR SYNCHRONISM-CHECK DEVICE
27 - UNDERVOLTAGE RELAY
32 - DIRECTIONAL POWER RELAY
37 - UNDERCURRENT OR UNDERPOWER RELAY
46 - REV. PHASE OR PHASE-BAL. CURRENT RELAY
47 - PHASE SEQ. OR PHASE BAL. VOLTAGE RELAY
49 - MACHINE OR TRANSFORMER THERMAL RELAY
50 - INSTANTANEOUS OVERCURRENT
51 - AC TIME OVERCURRENT RELAY
52 - AC CIRCUIT BREAKER
59 - OVERVOLTAGE RELAY
63 - PRESSURE SWITCH
64 - GROUND DETECTOR RELAY
67 - AC DIRECTIONAL OVERCURRENT RELAY
71 - LIQUID OR GAS LEVEL RELAY
81 - FREQUENCY RELAY
83 - AUTOMATIC SELECTIVE CONTROL OR TRANSFER RELAY
86 - LOCKOUT RELAY
87 - DIFFERENTIAL PROTECTIVE RELAY

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Florida License No.: No. 48268

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL LEGENDS

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 199322

E-01
SHEET 12 OF 26

F0199322
D199322

ELECTRICAL ABBREVIATIONS & NOTES

ELECTRICAL GENERAL NOTES

1. SOLID LINES (————————) INDICATE NEW WORK OR EQUIPMENT.
2. SCREENED LINES (————————) INDICATE EXISTING WORK OR EQUIPMENT.
3. DASHED LINES (– – – – – – – – –) INDICATE FUTURE WORK OR EQUIPMENT.
4. REFER TO INDIVIDUAL DISCIPLINE CONTRACT DRAWINGS FOR ADDITIONAL ABBREVIATIONS, DETAILS, AND GENERAL DESIGN NOTES.
5. LEGEND SHEETS ARE GENERAL. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
6. INFORMATION RELATED TO CIRCUIT IDENTIFICATION, WIRE & CONDUIT SIZES, AND ROUTING, IS ON THE FOLLOWING DRAWING TYPES.
   - A. ONE-LINE DIAGRAMS SHOW CIRCUIT IDENTIFICATION, WIRE QUANTITY AND SIZES, AND CONDUIT SIZE WITHIN STRUCTURES. ONE-LINE DIAGRAMS ALSO INDICATE ORIGIN AND DESTINATION OF CIRCUITS, AND IDENTIFY CIRCUITS ROUTED UNDERGROUND.
   - B. FOR CIRCUITS WITHOUT UNDERGROUND PORTIONS, BUILDING FLOOR PLANS SHOW LOCATION OF EQUIPMENT FOR DETERMINING CIRCUIT LENGTH WITHIN THE STRUCTURE. FOR CIRCUITS WITH UNDERGROUND PORTIONS, ANTICIPATED PENETRATION OF UNDERGROUND CONDUITS ARE SHOWN ON STRUCTURE PLANS FOR DETERMINING THE LENGTH OF THE IN-STRUCTURE PORTIONS OF CIRCUITS. BUILDING FLOOR PLANS MAY ALSO SHOW HOME RUNS FOR LIGHTING, RECEPTACLE, AND OTHER MISCELLANEOUS EQUIPMENT CIRCUITS.
   - C. SITE PLANS INDICATE THE GENERAL ROUTING OF UNDERGROUND CONDUITS AND DUCT BANKS. CIRCUITS ROUTED IN UNDERGROUND CONDUITS OR DUCT BANKS ARE INDICATED IN DUCT BANK SECTIONS REFERENCED ON THE SITE PLAN.
   - D. DUCT BANK SECTIONS AND SCHEDULES IDENTIFY CONDUIT SIZE, CONDUIT MATERIAL, ARRANGEMENT OF THE UNDERGROUND CONDUITS, AND CIRCUITS ROUTED IN EACH UNDERGROUND CONDUIT.

AREA DESIGNATIONS

THE SPECIAL AREA DESIGNATION BOXES, AS DEFINED BELOW, ARE LOCATED ON THE PLAN DRAWINGS TO DEFINE ELECTRICAL INSTALLATION REQUIREMENTS. DESIGNATION BOXES ARE LOCATED WITHIN ROOM OR BELOW ROOM NUMBER. ALL INDOOR AREAS NOT INDICATED OTHERWISE ARE AREA TYPE 1 AND MINIMUM NEMA TYPE 1 ENCLOSURES.

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED SCHEDULE 80 PVC RIGID NON-METALLIC CONDUIT WITH PVC FITTINGS, BOXES AND ACCESSORIES.
AREA TYPE 4	INDOOR WET LOCATIONS SUCH AS VAULTS, HOSEDOWN AREAS, BASEMENTS, ETC. MINIMUM NEMA TYPE 4 ENCLOSURE FOR EQUIPMENT AND GASKETED FITTINGS IN A CONDUIT SYSTEM.
AREA TYPE 7A	CLASS I, DIVISION 1 AREA AS DEFINED BY NEC. ALL EQUIPMENT AND CONDUIT SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 7B	CLASS I, DIVISION 2, GROUP C AND D (METHANE, GASOLINE) AS DEFINED BY NEC. EQUIPMENT AND CONDUITS SYSTEMS SHALL BE RATED FOR USE IN THIS AREA.
AREA TYPE 12	INDOOR, DRY, DIRTY AREA. REQUIRES MINIMUM NEMA TYPE 12 GASKETED ENCLOSURES FOR ALL EQUIPMENT AND GASKETED FITTINGS IN CONDUIT SYSTEMS.

GENERAL REQUIREMENTS

1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ROUTING ALL CONDUITS NOT SHOWN ON THE PLANS. THIS SHALL INCLUDE ALL CONDUITS SHOWN ON THE ONE-LINES AND HOME-RUNS SHOWN ON THE PLAN DRAWINGS. CONDUITS SHALL BE ROUTED AS DEFINED IN THE SPECIFICATION.
2. SPARE WIRES SHALL BE TAPED AND COILED AND LABELED TO INDICATE WHERE OTHER END OF SPARE WIRE IS LOCATED.
3. IF EQUIPMENT SUPPLIED BY MANUFACTURER HAS A LARGER LOAD THAN VALUE SHOWN, THE CABLE CONDUIT AND ELECTRICAL EQUIPMENT SHALL BE ENLARGED, AS REQUIRED, TO ACCOMMODATE THE HIGHER VALUE.
4. THE CONTRACTOR SHALL BE RESPONSIBLE FOR FURNISHING PROPERLY SIZED STARTER OVERLOADS FOR EQUIPMENT FURNISHED.
5. LIGHTING AND RECEPTACLE CIRCUITS DESIGNATED ON THE FLOOR PLANS ARE NOT SHOWN ON THE ONE-LINES. CONDUCTORS FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM NO. 12AWG. CONDUIT FOR LIGHTING, RECEPTACLES, AND MISCELLANEOUS 120VAC CIRCUITS SHALL BE MINIMUM 3/4".
6. IN AREAS WHERE THERE ARE OVERHEAD BRIDGE CRANES, HOISTS, ETC. NO CONDUITS SHALL BE RUN OVERHEAD THAT WILL INTERFERE WITH THE OPERATION OF THE EQUIPMENT.

ELECTRICAL ABBREVIATIONS

A

A	AMBER, AMPERE, ALARM
AC	ALTERNATING CURRENT
ACB	AIR CIRCUIT BREAKER
ACR	ACCESS CARD READER
AF	AMPERE FRAME
AFD	ADJUSTABLE FREQUENCY DRIVE
AFRD	ARC-FLASH REDUCTION DEVICE
AM	AMMETER
ANN	ANNUNCIATOR
AR	ALARM RELAY
AS	AMMETER SWITCH, AMPERE SENSOR
AT	AMPERE TRIP
ATS	AUTOMATIC TRANSFER SWITCH
AUX	AUXILIARY
AWG	AMERICAN WIRE GAUGE

B

B	BUS
BC	BATTERY CHARGER
BKR	BREAKER
BR	BRAKE
BT	BEARING TEMPERATURE

C

C	CLOSE, COUNTER, CONTACTOR, CONTROL, CCTV CAMERA
CAP	CAPACITOR
CB	CIRCUIT BREAKER
CB"A"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN)
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN)
CD	CONTROL DAMPER
CI	CELL INTERLOCK
CKT	CIRCUIT
CL2	CHLORINE
COS	CABLE OPERATED SWITCH
CP	CONTROL PANEL
CPT	CONTROL POWER TRANSFORMER
CR	CURRENT OF CONTROL RELAY, CARD READER
CS	CONTROL STATION
CT	CYCLE TIMER OR CURRENT TRANSFORMER
CTC	CYCLE TIMER CLUTCH
CTM	CYCLE TIMER MONITOR
2/C	2 CONDUCTOR
4"C	4" CONDUIT

D

DC	DIRECT CURRENT, DOOR CONTACT
DI	DOOR INTERLOCK
DM	DAMPER MOTOR, DEMAND METER, DIMMER SWITCH
DPDT	DOUBLE POLE DOUBLE THROW
DPST	DOUBLE POLE SINGLE THROW
DPR	DIFFERENTIAL PRESSURE REGULATOR
DPS	DIFFERENTIAL PRESSURE SWITCH
DS	DISCONNECT SWITCH, DOOR SWITCH, DESKTOP STATION
DVLS	DISCHARGE VALVE LIMIT SWITCH

E

E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE
EC	EMPTY CONDUIT
EDS	ELECTRICAL DOOR STRIKE
EL	ELEVATION, EMERGENCY LIGHT
EMH	ELECTRICAL MANHOLE
ER	ELECTRODE RELAY
ES	END SWITCH, REQUEST TO EXIT SENSOR
E-STOP	EMERGENCY STOP
ETM	ELAPSED TIME METER
EX	EXISTING
EXP	EXPLOSION PROOF

F

F	FORWARD, FIELD
FO	FIBER OPTIC
FPR	FEEDER PROTECTION RELAY
FS	FLOW SWITCH

G

G	GREEN, GROUND, GENERATOR, GROUND FAULT
GD	GROUND DETECTOR
GEN	GENERATOR
GFCI,GFI	GROUND FAULT CURRENT INTERRUPTOR, GROUND FAULT INTERRUPTOR
GLS	GEARED LIMIT SWITCH
GPR	GENERATOR PROTECTION RELAY
GND	GROUND
#8G	#8 GROUND WIRE

H

H	HIGH, HUMIDISTAT
HH	HANDHOLE
HMT	HIGH MOTOR TEMPERATURE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
HP	HORSEPOWER
HS	HAND STATION
HWCO	HIGH WATER CUTOFF
HZ	HERTZ (CYCLE)

I

I/O	INPUT/OUTPUT
I	INSTANTANEOUS
IJB	INTERCOM JUNCTION BOX

J

J,JB	JUNCTION BOX

K

K	KEY INTERLOCK
KAIC	THOUSAND AMPERES INTERRUPTING CURRENT
KCMIL	THOUSAND CIRCULAR MIL
KO	KEY OPERATED
KV	KILOVOLT
KVA	KILOVOLT AMPERE
KVAR	KILOVAR
KW	KILOWATT
KWH	KILOWATT HOUR

L

L	LOW, LEVEL, LONG-TIME
LA	LIGHTNING ARRESTER
LAN	LOCAL AREA NETWORK
LC	LIGHTING CONTRACTOR
LCE	LIGHTING CONTACTOR ENCLOSURE
LCP	LIGHTING CONTROL ENCLOSURE
LCS	LOCAL CONTROL PANEL
LOA	LOCAL CONTROL STATION
LOR	LOCAL-OFF-AUTO
LOS	LOCAL-OFF-REMOTE
LP	LOCK OUT STOP
LS	LIGHTING PANEL
LTG	LIMIT OR LEVEL SWITCH
LWCO	LIGHTING
	LOW WATER CUTOFF

M

M	MAGNETIC MOTOR STARTER
MA	MILLIAMPERE
MCB	MAIN CIRCUIT BREAKER
MCC	MOTOR CONTROL CENTER
MCLU	MOTOR CONTROL LINEUP
MD	MOISTURE DETECTOR, MOTION DETECTOR
MDL	MAGNETIC DOOR LOCK
MFR	MANUFACTURER
MH	MANHOLE, MOUNTING HEIGHT
MOV	MOTOR OPERATED VALVE
MPR	MOTOR PROTECTION RELAY
MS	MANUAL MOTOR STARTER
MSH	MOTOR SPACE HEATER
MTS	MANUAL TRANSFER SWITCH
MV	MILLIVOLT, MEDIUM VOLTAGE
MVA	MEGAVOLT AMPERE

N

N	NEUTRAL
NGR	NEUTRAL GROUNDING RESISTOR
NGT	NEUTRAL GROUNDING TRANSFORMER
NC	NORMALLY CLOSED
NO	NORMALLY OPEN, NUMBER

O

O	OPEN
OL	OVERLOAD
OOA	ON-OFF-AUTO
OOR	ON-OFF-REMOTE
OS	OCCUPANCY SENSOR
O/U	OVER/UNDER

P

P	PRIMARY, POWER, POLE
PCS	PLANT CONTROL SYSTEM
PB	PUSH BUTTON, PULL BOX
PE	PHOTOELECTRIC SENSOR, PHOTOCELL
PF	POWER FACTOR
PFCC	POWER FACTOR CORRECTION CAPACITOR
PH	PHASE
PL	PILOT LIGHT
PLC	PROGRAMMABLE LOGIC CONTROLLER
PP	POWER PANEL
PR	PAIR
PRS	PROXIMITY SWITCH
PS	PRESSURE SWITCH
PT	POTENTIAL TRANSFORMER, PROGRAM TIMER

Q

NOT USED

R

R	RED, RAISE, RELAY, REVERSE
RECP	RECEPTACLE
RES	RESISTOR
RH	REMOTE HANDSET
RT	REPEATING TIMER
RTD	RESISTANCE TEMPERATURE DETECTOR
RTU	REMOTE TERMINAL UNIT
RVSS	REDUCED VOLTAGE SOLID STATE STARTER

S

S	SHORT-TIME, SHIELDED, STARTER
SA	SURGE ARRESTER, SPEAKER AMPLIFIER
SCADA	SUPERVISORY CONTROL AND DATA ACQUISITION
SF6	SULFUR HEXAFLOURIDE
SH	SPACE HEATER
SN	SOLID NEUTRAL
SO	SOLENOID OILER
SP	SINGLE POLE
SPD	SURGE PROTECTION DEVICE
SPDT	SINGLE POLE DOUBLE THROW
SPST	SINGLE POLE SINGLE THROW
SS	SELECTOR SWITCH, START/STOP, STAINLESS STEEL
SSM	SOLID-STATE METERING
SSS	SOLID STATE STARTER
SST	SOLID-STATE TRIP
SUPV	SUPERVISORY CONTROL
SV	SOLENOID VALVE
SWB,SWBD	SWITCHBOARD
SWG,SWGR	SWITCHGEAR

T

T	THERMOSTAT, TIMER, TOTALIZER, TRANSFORMER
TACH	TACHOMETER
TB	TERMINAL BLOCK
TC	TIMER CLUTCH
TD	TIME DELAY RELAY
TEMP	TEMPERATURE
TM	TIMER MOTOR
TQ	TORQUE
TR	TIMER RELAY, TRIAD
TS	TEMPERATURE SWITCH
TTB	TELEPHONE TERMINAL BOARD

U

UG	UNDERGROUND
UPS	UNINTERRUPTIBLE POWER SUPPLY

V

V	VOLTS, VOLTAGE RESTRAINED
VA	VOLT AMPERE
VAR	VARMETER
VFD	VARIABLE FREQUENCY DRIVE
VI	VACUUM INTERRUPTER
VLS	VALVE LIMIT SWITCH
VM	VOLTMETER
VPI	VALVE POSITION INDICATOR
VS	VOLTMETER SWITCH

W

W	WHITE, WATTS
WH	WATTHOUR METER
WM	WATT METER
WP	WEATHERPROOF
WPI	WEATHERPROOF IN-USE
WS	WALL STATION

X

X	AUXILIARY RELAY
XFMR	TRANSFORMER
XP	EXPLOSION PROOF

Y

Y	YELLOW

Z

Z	AUXILIARY RELAY, IMPEDANCE
ZS	POSITION SWITCH
ZSS	ZERO SPEED SWITCH

1-1PR#16S	ONE, SINGLE PAIR, TWISTED SHIELDED #16 CABLE
3-7/C#14	THREE, SINGLE, SEVEN CONDUCTOR #14 MULTICONDUCTOR CONTROL CABLES

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Florida License No.: No. 48268

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Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
ABBREVIATIONS & NOTES

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1

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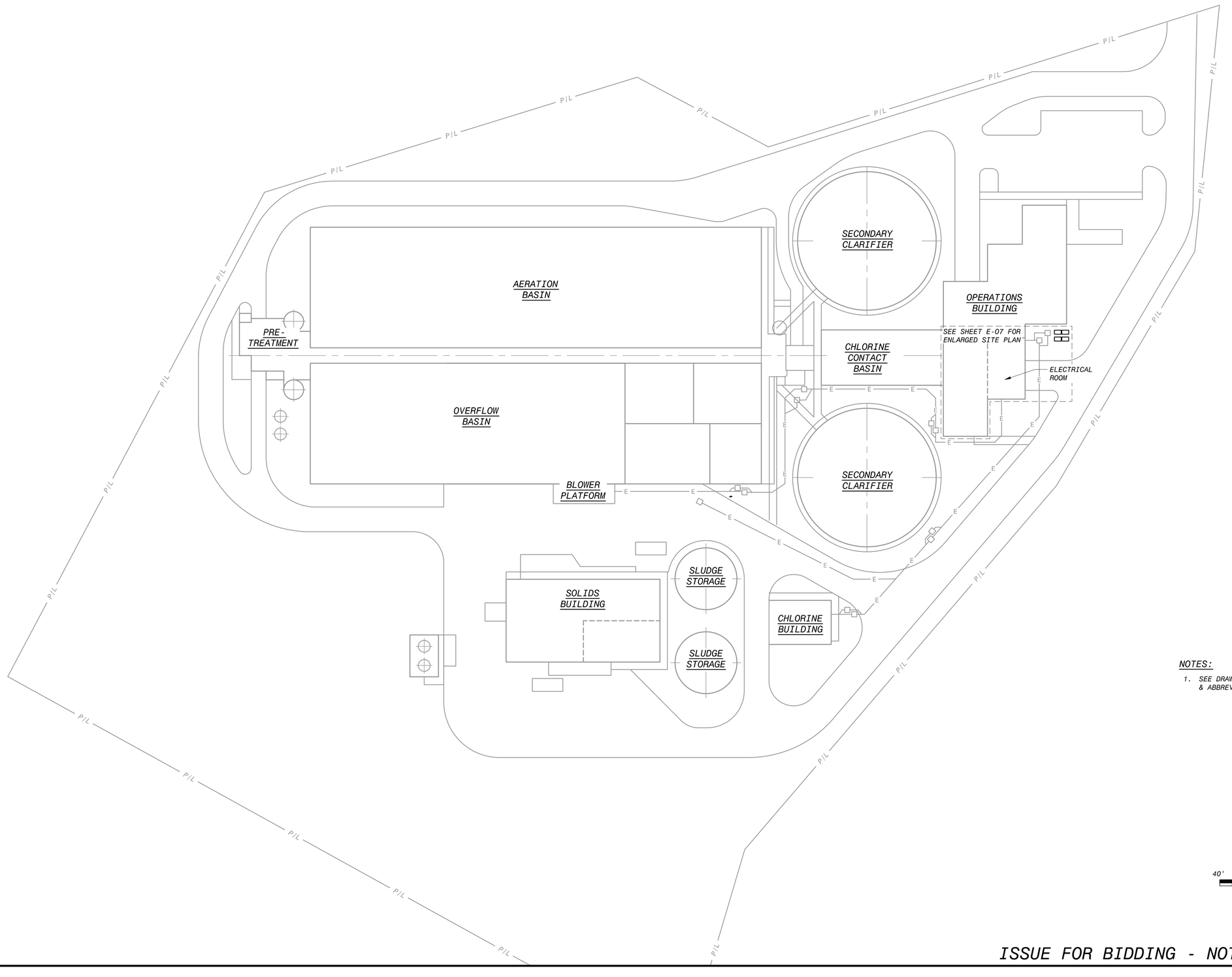
PROJECT NO.
199322

E-02
SHEET
13 OF 26



NOTES:

1. SEE DRAWINGS E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

40' 20' 0 40' 80'

1"=40'

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
OVERALL SITE PLAN

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

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14 OF 26

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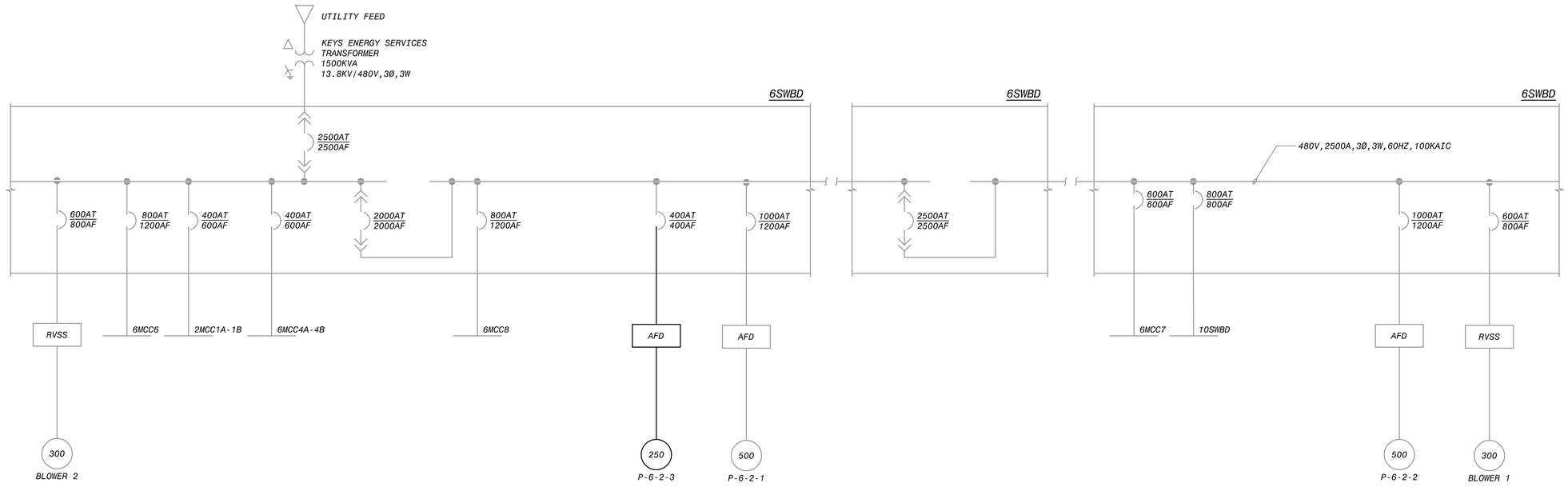

PLANT ELECTRICAL LOAD TABULATION		
DISTRIBUTION BOARD	CONNECTED (KVA)	RUNNING (KVA)
10SWBD	217.8	78.9
6MCC4A-4B	345.3	69.9
2MCC1A-1B	125.7	53.2
6MCC8	403.1	109.8
6MCC7	248.7	89.7
6MCC6	140.2	93.6
6SWBD PROCESS LOADS	2000	833
TOTAL KVA AT 460V	3480.8	1378.1
TOTAL AMPS AT 460V	4368.8	1729.7

CALCULATED FAULT CURRENT (INFINITE BUS) AT PRIMARY POINT OF CONNECTION	
DISTRIBUTION BOARD	AVAILABLE FAULT CURRENT @480V
6SWBD	54 KA

PARTIAL POWER DISTRIBUTION FUNCTIONAL DIAGRAM

NOTES:

1. SEE DRAWINGS E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
POWER DISTRIBUTION FUNCTIONAL DIAGRAM

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

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E-04
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15 OF 26

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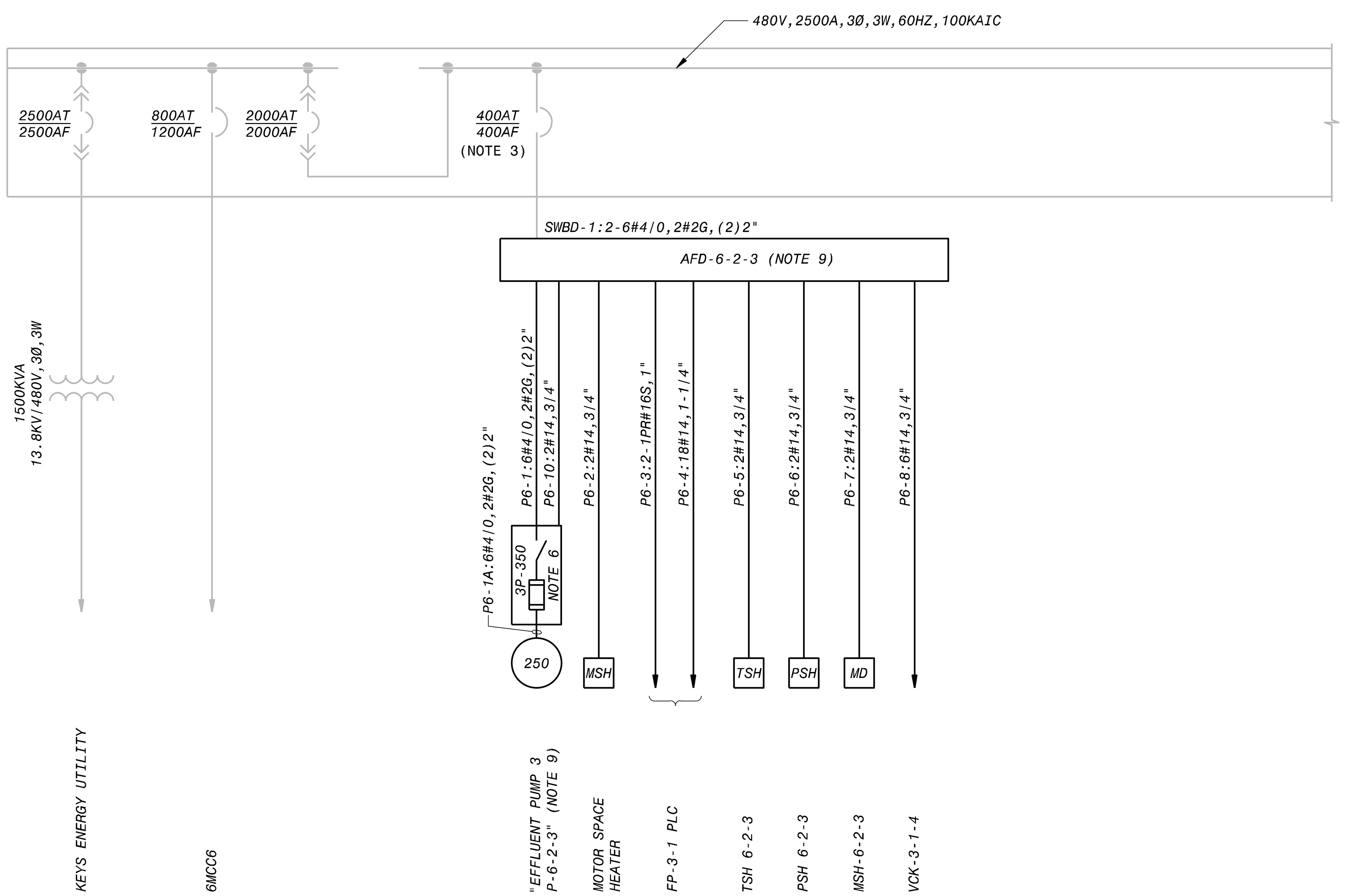
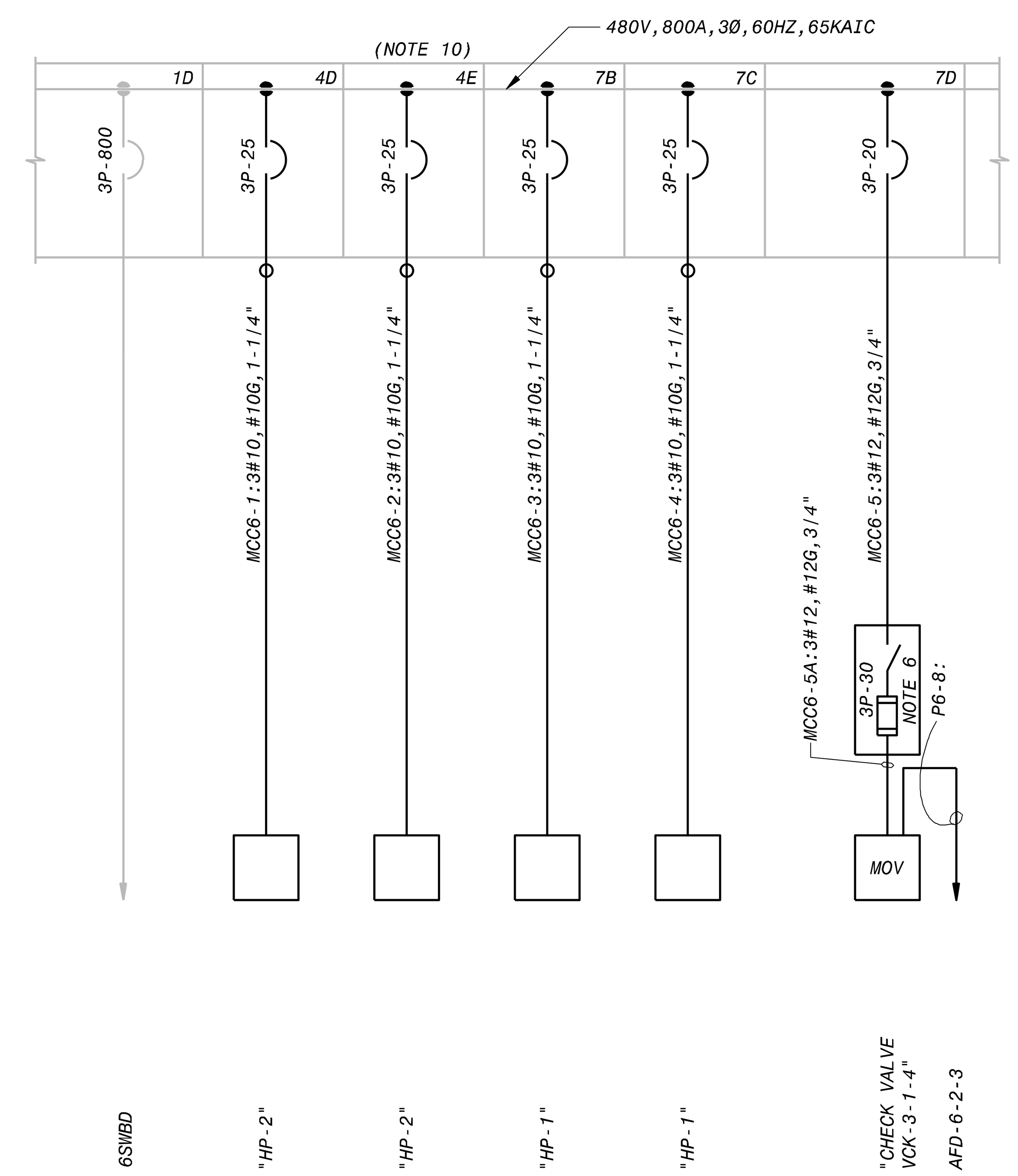


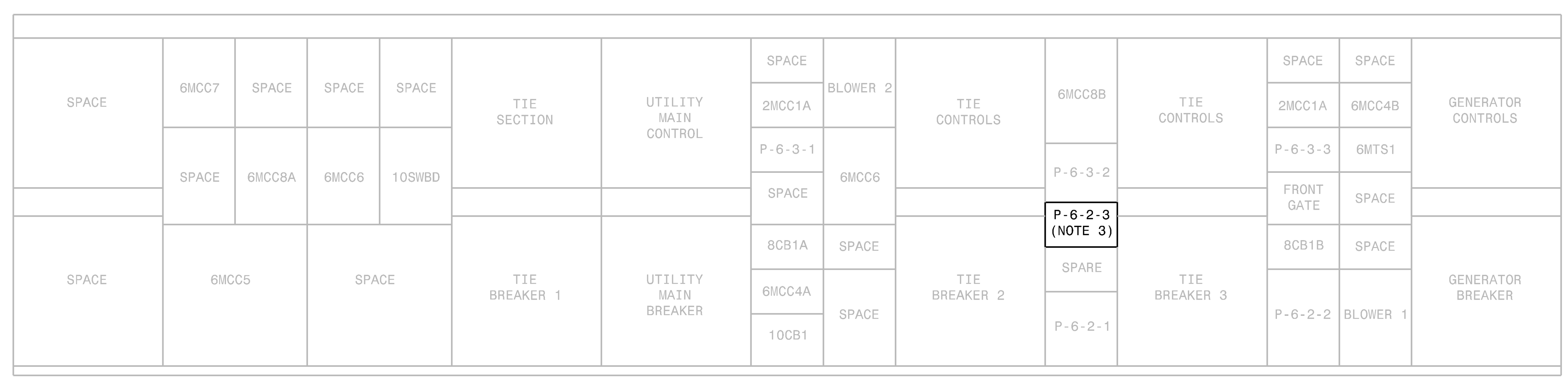
EXISTING 6SWBD PARTIAL ONE-LINE DIAGRAM

(OPERATIONS BUILDING)



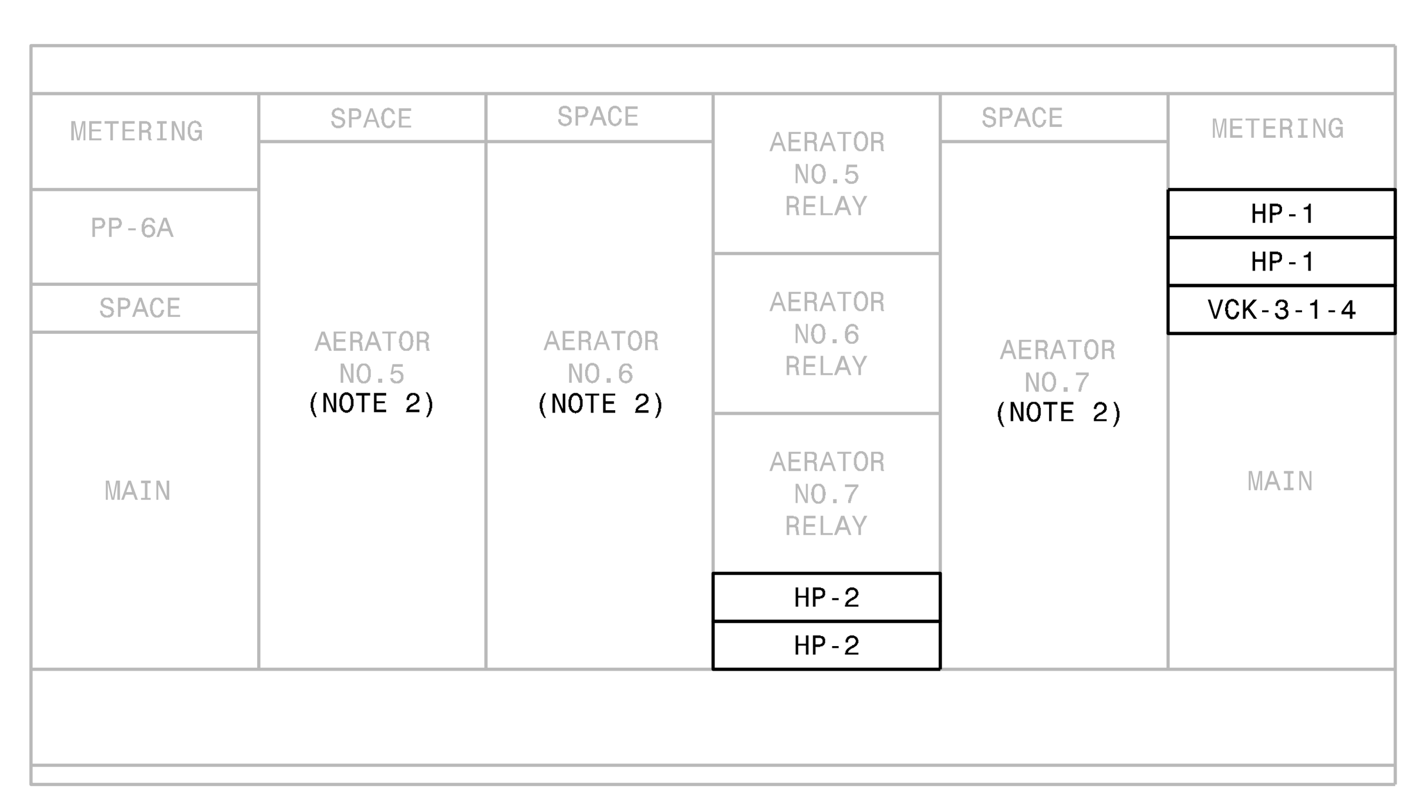
EXISTING 6MCC6 PARTIAL ONE-LINE DIAGRAM

(OPERATIONS BUILDING)



EXISTING 6SWBD FRONT ELEVATION (NOTE 4)

NO SCALE



EXISTING 6MCC6 FRONT ELEVATION (NOTE 5)

NO SCALE

NOTES:

1. SEE DRAWINGS E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. RELABEL EXISTING STARTERS AS SPARE.
3. CONTRACTOR SHALL REUSE EXISTING 400A FRAME BREAKER AND SET TRIP TO 400A.
4. EXISTING 6SWBD IS A WESTINGHOUSE POW-R-LINE WRI SWITCHBOARD.
5. EXISTING 6MCC6 IS A WESTINGHOUSE SERIES 2100 MOTOR CONTROL CENTER.
6. DISCONNECTS FOR AFD DRIVEN MOTORS SHALL INCLUDE AUXILIARY POSITION FEEDBACK SWITCH FOR USE IN SHUTDOWN OF THE AFD. FUSES SHALL BE SIZED ACCORDING TO MANUFACTURER RECOMMENDATION. SEE SCHEMATIC E-10 FOR DETAILS.
7. SWITCHBOARD AND MCC NAMEPLATE WORDING IS SHOWN IN QUOTATION MARKS (" ") ON ONE-LINE DIAGRAM.
8. AFD CABLES SHALL BE AS SPECIFIED IN SECTION 16050 FIGURE 15-16050.
9. AFD AND PUMP TO BE PROVIDED BY OWNER. CONTRACTOR SHALL INSTALL.
10. CONTRACTOR SHALL INSTALL NEW BREAKERS IN EXISTING SPACE.

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
SWITCHBOARD & MCC ONE-LINE DIAGRAM

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MW, LB
APPROVED:
DATE: DECEMBER 2019

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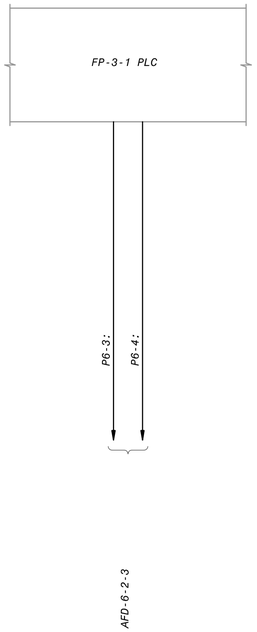
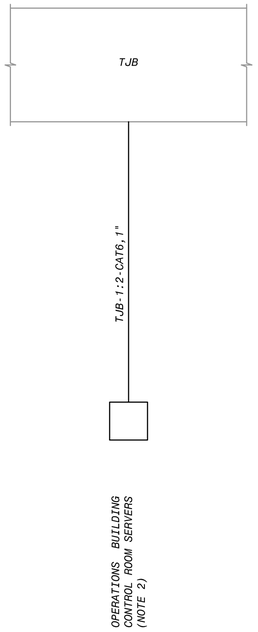
E-05



EXISTING FP-3-1 PLC PARTIAL ONE-LINE DIAGRAM
(OPERATIONS BUILDING)



EXISTING TJB PARTIAL ONE-LINE DIAGRAM
(OPERATIONS BUILDING)

NOTES:

1. SEE DRAWINGS E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. CONTROL ROOM IS LOCATED IN THE OPERATIONS BUILDING SOUTH OF THE COMM ROOM.

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NO.	BY	CHK	APP	DATE	REVISIONS AND RECORD OF USE

MARK E. MAGELLA LICENSE NO.48268 STATE OF FLORIDA PROFESSIONAL ENGINEER

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Engineer of Record: MARK E. MAGELLA

Florida License No.: No. 48268

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Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065 Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
PLC ONE-LINE DIAGRAM

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO.
199322

E-06
SHEET
17 OF 26

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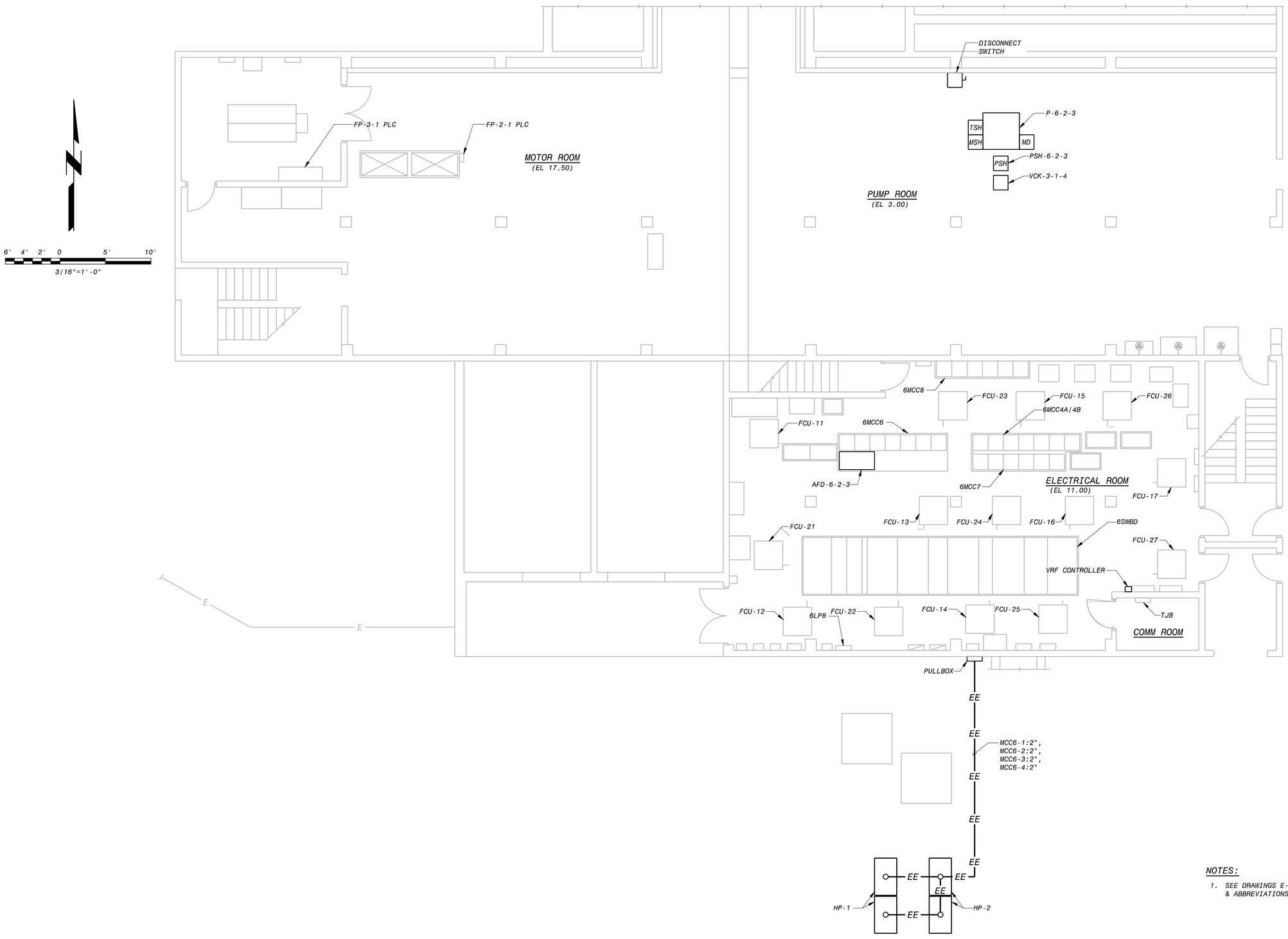

ELECTRICAL ROOM POWER PLAN
3/16" = 1'-0"

NOTES:

1. SEE DRAWINGS E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
OPERATIONS BUILDING POWER PLAN

DESIGNED:	HNE
DETAILED:	AMJ
CHECKED:	MM, LB
APPROVED:	
DATE:	DECEMBER 2019

0 1/2 1
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PROJECT NO.
199322

E-07
SHEET
18 OF 26

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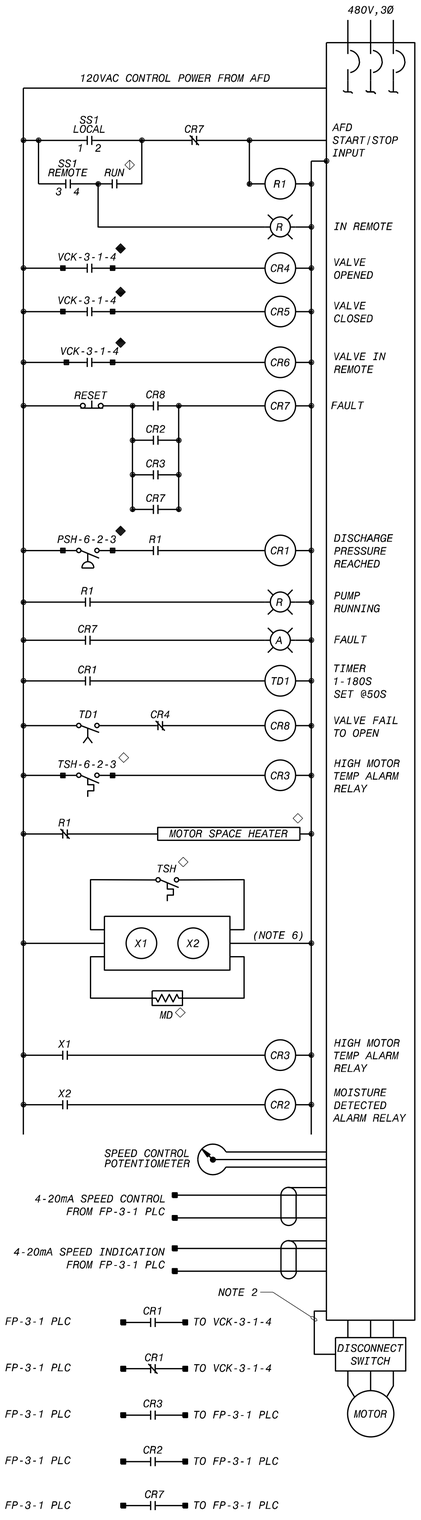
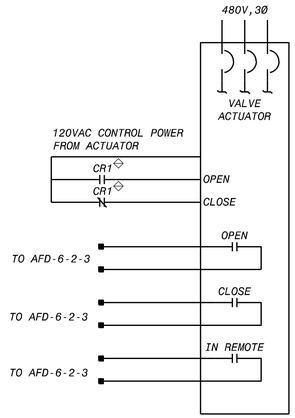
222



EFFLUENT PUMP P-6-2-3



OPEN-CLOSE VALVE VCK-3-1-4

SYMBOL LEGEND:

- ◇ AT DRIVEN EQUIPMENT
- ◆ REMOTE FROM STARTER AND DRIVEN EQUIPMENT
- ◈ AT FP-3-1 PLC
- ⟐ AT AFD-6-2-3

SWITCH DEVELOPMENTS:

SS1

CONTACTS	POSITION		
	LOCAL	OFF	REMOTE
1-2	X		
3-4			X
5-6			X

NOTES:

1. SEE DRAWING E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. DISCONNECT SWITCH SHALL INCLUDE AUXILIARY CONTACT SWITCH TO SIGNAL AFD OF SWITCH POSITION.
3. CONTROL SETTINGS, ALARM LIMITS, TIME SETTINGS AND SIMILAR ADJUSTABLE LIMITS ARE INTENDED TO BE FOR INITIAL STARTUP, ADJUSTABLE SETTINGS SHALL BE TESTED AND CHANGED BY THE CONTRACTOR, IF REQUIRED FOR PROPER SEQUENCING AND OPERATION.
4. UNLESS OTHERWISE NOTED, DEVICES SHOWN ON THIS DRAWING SHALL BE SUPPLIED AS AN INTEGRAL PART OF THE AFD. DEVICES LOCATED OUTSIDE OF OR REMOTE FROM THE AFD SHALL BE IDENTIFIED WITH A LOCATION SYMBOL AS DEFINED IN THE SCHEMATIC SYMBOL LEGEND.
5. FOR DETAILED CONTROL DESCRIPTION FOR EACH PIECE OF EQUIPMENT, SEE SPECIFICATION 13550.
6. MOISTURE AND MOTOR TEMP CONTROLS SHALL BE FURNISHED BY PUMP SUPPLIER AND TO BE INSTALLED BY CONTRACTOR.

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL SCHEMATICS

DESIGNED: HNE
DETAILED: AMJ
CHECKED:
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
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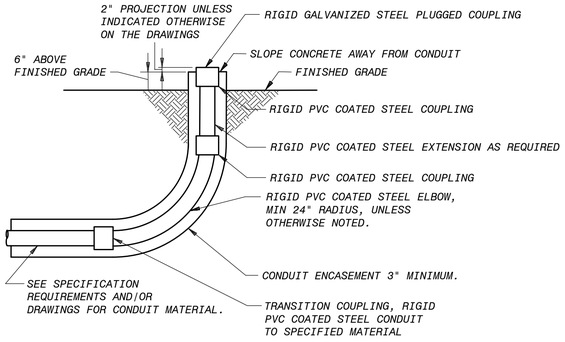
PROJECT NO. 199322

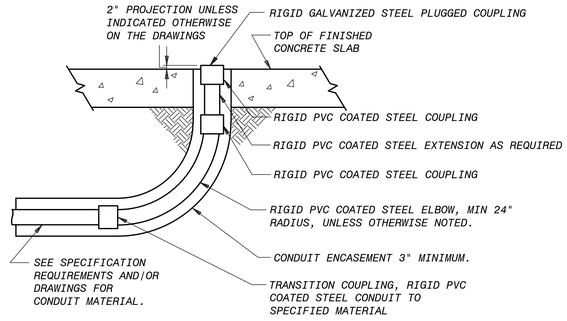
E-08
SHEET 19 OF 26

FD199322 D199322



TYPICAL CONDUIT RISER TERMINATING IN SOIL

NO SCALE



TYPICAL CONDUIT RISER TERMINATING IN CONCRETE SLAB

NO SCALE

			PANELBOARD: 6LP8 (EXISTING)						MAINS: 3P-100A MAIN BREAKER			
PHASE			SERVICE: 120/208V, 3PH, 4W, S/N				BUS: COPPER		LOCATION: OPERATIONS BUILDING	PHASE		
"A"	"B"	"C"	MOUNTING: WALL MOUNTED				RATING: 100A			"A"	"B"	"C"
V.A.	V.A.	V.A.	LOAD	P	BKR	CKT #	BKR	P	LOAD	V.A.	V.A.	V.A.
			INFLUENT ROOF RECPT.	1	20	1 2	20	1	ANOX ZONE PLC PANEL			
			EFFLUENT GND LVL LIGHTS	1	20	3 4	20	1	FILTER PLC PANEL			
			LTG CONTACTOR 6LC	1	20	5 6	20	1	FILTER 1 CONTROLS			
			ALUM FEED 1	1	20	7 8	20	1	FILTER 2 CONTROLS			
			ALUM FEED 2	1	20	9 10	20	1	FILTER 3 CONTROLS			
			ALUM FEED 3	1	20	11 12	20	1	FILTER 4 CONTROLS			
			LSH-12-1-1	1	20	13 14	20	1	DRAIN AND HIGH PRESS			
			LIT-12-1-1	1	20	15 16	20	1	SPARE			
			LSH-2-3-2	1	20	17 18	20	1	TURBIDITY METER			
			LIT-2-3-2	1	20	19 20	20	1	AIR DRYER			
			RECEPT. AERATION BASIN	1	20	21 22	20	1	VRF CONTROLLER		36	
			INFLUENT PUMP LIGHTS	1	20	23 24	20	1	SPARE			
			FP-2-15	1	20	25 26	20	1	SPARE			
			FP-2-16	1	20	27 28	20	1	SPARE			
			AIT-12-11	1	20	29 30	20	1	LIT-12-11-1, LIT-12-11-2			
			UV STRUCTURE LIGHTS	1	20	31 32	20	1	FP12-1C			
			UV STRUCTURE SPARE	1	20	33 34	20	1	LIT-12-11-1-1, LIT-12-11-2-1			
			SPACE	-	-	35 36	20	2	FCU-11,FCU-12,FCU-13,FCU-14,			525
			UV STRUCTURE SPARE	1	20	37 38	-	-	FCU-15,FCU-16,FCU-17	525		
			SPACE	-	-	39 40	20	2	FCU-21,FCU-22,FCU-23,FCU-24,		525	
			SPACE	-	-	41 42	-	-	FCU-25,FCU-26,FCU-27			525
0			TOTAL "A"		525				TOTAL "A"	525		
	0		TOTAL "B"		561				TOTAL "B"		561	
		0	TOTAL "C"		1050				TOTAL "C"			1050
			TOTAL =		2136							

TYPICAL DIRECT BURIED CONDUIT SECTION

NO SCALE

NOTES:

1. SEE DRAWING E-01 & E-02 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

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Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

ELECTRICAL
PANELBOARD SCHEDULE AND DETAILS

DESIGNED: HNE
DETAILED: AMJ
CHECKED: MM, LB
APPROVED:
DATE: DECEMBER 2019

0 1/2 1
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PROJECT NO.
199322

E-09
SHEET
20 OF 26

F:\199322
D:\199322

EQUIPMENT IDENTIFICATION DESCRIPTION

SYSTEM CODE - DENOTES ASSOCIATED SYSTEM STREAM
FUNCTION CODE - DENOTES ASSOCIATED EQUIPMENT ABBREVIATION
SEQUENCE CODE - UNIQUE ALPHA-NUMERIC IDENTIFIER

SSS- FFF -999

PIPELINE IDENTIFICATION DESCRIPTION

PIPE SIZE - INCHES UNLESS OTHERWISE NOTED
PROCESS CODE - DENOTES ASSOCIATED PROCESS STREAM
MATERIAL CODE - DENOTES ASSOCIATED MATERIAL ABBREVIATION

SSS- PPP -MTL

LINE SYMBOLS

- MAJOR PROCESS PIPING OR FLOW CHANNEL
- SECONDARY PROCESS PIPING
- MISCELLANEOUS PIPING
- SCREENED LINE DENOTES EXISTING PIPE OR EQUIPMENT
- DASHED LINE DENOTES FUTURE PIPE AND EQUIPMENT
- ELECTRIC SIGNAL
- HYDRAULIC SIGNAL
- PNEUMATIC SIGNAL
- SIGNAL CONNECTION POINT
- CONTROL SYSTEM BACKBONE NETWORK SIGNAL (ETHERNET)
- FIELD DEVICE NETWORK SIGNAL (ETHERNET)
- NON-STANDARD OR INDEPENDENT CONTROL SYSTEM NETWORK SIGNAL (AS NOTED ON DRAWINGS)

- B | I-XX — SIGNAL LINE GOING TO ANOTHER SHEET
- B | I-XX — SIGNAL LINE FROM ANOTHER SHEET (MATCH LETTERS)
- B | I-XX — PROCESS LINE COMING/GOING TO/FROM ANOTHER SHEET
  - MATCH SHEET NO. IDENTIFIER
  - MATCH LINE NO.
- B — SIGNAL CONNECTION WITHIN THE SAME SHEET
- FLOW ARROW FOR PROCESS PIPING
- PROCESS LINES CROSSING (NOT CONNECTED)

MECHANICAL EQUIPMENT SYMBOLS

- VAPORIZER: AMBIENT
- PARTICULATE FILTER
- ROTARY SCROLL COMPRESSOR
- AIR FILTER
- WATER FILTER: CARTRIDGE TYPE
- WATER FILTER: MEMBRANE TYPE
- MIXER
- COMPRESSOR
- VALVE: MATERIAL HANDLING ROTARY
- AIR REGULATOR
- STATIC MIXER
- HEAT EXCHANGER: TYPE 1
- HEAT EXCHANGER: TYPE 2
- HEAT EXCHANGER: FINNED TUBE
- HEAT EXCHANGER: SHELL & TUBE
- HEAT EXCHANGER: PLATE & FRAME
- HEAT EXCHANGER: SPIRAL
- HEAT EXCHANGER: DOUBLE PIPE
- HEAT EXCHANGER: AIR
- BOILER
- AFTERCOOLER
- FILTER SEPARATOR
- SILENCER
- HYDROCYCLONE

PUMP & BLOWER SYMBOLS

- CENTRIFUGAL PUMP OR OTHER TYPE NOT SPECIFIED
- SUBMERGED CENTRIFUGAL PUMP
- SCREW (LIFT) PUMP
- ROTARY PUMP
- PROGRESSING CAVITY PUMP
- POSITIVE DISPLACEMENT PUMP
- PLUNGER PUMP
- VERTICAL PUMP
- SUMP PUMP
- CENTRIFUGAL FAN
- CENTRIFUGAL BLOWER
- POSITIVE DISPLACEMENT BLOWER
- COMPRESSOR: RECIPROCATING
- COMPRESSOR: ROTARY SCREW
- COMPRESSOR: LIQUID RING
- MOTOR DRIVEN DIAPHRAGM METERING PUMP
- SOLENOID PUMP
- PERISTALTIC PUMP
- DRUM PUMP
- DOUBLE DIAPHRAGM PUMP
- ELECTRIC MOTOR

WATER & WASTEWATER SYMBOLS

- OZONE GENERATOR WITH POWER SUPPLY
- OZONE GENERATOR
- GRIT CONCENTRATOR & DEWATERING SCREW
- BAR SCREEN: MECHANICAL
- GRIT COLLECTOR: VORTEX TYPE
- RECTANGULAR BASIN
- SOLIDS COLLECTOR
- SOLIDS COLLECTOR W/SETTLING PLATES
- RECTANGULAR SEDIMENTATION BASIN
- UV HORIZONTAL BULBS
- MANUAL BAR SCREEN
- GAS FLARE
- GRIT CLASSIFIER
- GRAVITY FILTER
- GRAVITY THICKENER
- CIRCULAR SEDIMENTATION BASIN
- DAF
- BELT FILTER PRESS
- GRAVITY BELT THICKENER
- CENTRIFUGE
- RECTANGULAR SEDIMENTATION BASIN WITH SETTLING PLATES
- GRIT BASIN
- SLUDGE GRINDER: INLINE
- SLUDGE GRINDER: CHANNEL MOUNTED
- GRIT CONCENTRATOR

PRIMARY ELEMENT & FITTING SYMBOLS

- DIAPHRAGM SEAL
- PRIMARY FLOW ELEMENT: ORIFICE PLATE
- PRIMARY FLOW ELEMENT: FLUME
- PRIMARY FLOW ELEMENT: TURBINE OR PROPELLER-TYPE
- PRIMARY FLOW ELEMENT: ELECTROMAGNETIC
- THERMAL DISPERSION OR THERMAL MASS TYPE FLOW ELEMENT
- PRIMARY FLOW ELEMENT: TRANSIT-TIME ULTRASONIC
- FLOW CONDITIONER
- LE CON — CONDUCTANCE TYPE LEVEL SENSOR
- LE RAD — RADAR TYPE LEVEL SENSOR
- LE BUB — BUBBLER TYPE LEVEL SENSOR
- ANNULAR TYPE DIAPHRAGM SEAL
- PRIMARY FLOW ELEMENT: POSITIVE DISPLACEMENT
- PRIMARY FLOW ELEMENT: VENTURI TUBE, FLOW NOZZLE, OR FLOW TUBE. * SEE MEASUREMENT SYMBOL NOTATIONS LIST
- PRIMARY FLOW ELEMENT: WEIR
- PRIMARY FLOW ELEMENT: PITOT TUBE
- PRIMARY FLOW ELEMENT: CORIOLIS
- HORN OR SIREN
- FG — ROTAMETER
- LE US — ULTRASONIC TYPE LEVEL SENSOR
- LE DP — PRESSURE SENSING LEVEL SENSOR
- PILOT LIGHT
- REDUCER - CONCENTRIC
- REDUCER - ECCENTRIC
- FLANGE
- D — DRAIN - BELL-UP
- D — DRAIN - FUNNEL
- FLEXIBLE CONNECTION
- CAP
- PLUG
- T — TRAP
- FLAME CHECK
- SURGE CHAMBER
- FLAME ARRESTER
- SEDIMENT TRAP
- P — INSTRUMENT PURGE OR FLUSHING DEVICE
- UNION
- HOSE CONNECTION
- STRAINER - Y TYPE
- STRAINER - BASKET
- Q — QUICK CONNECT
- VENT
- VENT - SCREENED
- COUPLING
- LG — SIGHTGLASS
- MOISTURE SEPARATOR
- EXPANSION LOOP
- SUCTION DIFFUSER

CHEMICAL FEED EQUIPMENT SYMBOLS

- DIFFUSER: TANK
- DIFFUSER: CHANNEL
- INJECTOR
- RUPTURE DISK
- PULSATION DAMPNER
- CHLORINE CYLINDER
- VAPOR SUPERHEATER
- PRESSURE BUILDING COIL
- SPECTACLE, BLIND, CLOSED
- SPECTACLE, BLIND, OPEN
- CALIBRATION COLUMN
- EXPANSION TANK OR FUNNEL
- WEIGH SCALE
- DRIP LEG HEATER
- TOTE
- AS — AUTOMATIC SWITCHOVER
- PASTE TYPE LIME SLAKER
- EDUCTOR
- GAS FEEDER
- EVAPORATOR
- DRY CHEMICAL FEEDER
- TON CONTAINER
- POLYMER BLENDER FEEDER
- POLYMER BLENDER FEEDER
- POLYMER INJECTION RING
- DIFFUSER
- DIFFUSER - PLAN
- CO2 VAPORIZOR
- COMBINATION SHOWER/ EYEWASH FOUNTAIN
- EYEWASH FOUNTAIN
- SHOWER

VALVE & GATE SYMBOLS

- GATE: SLUICE OR SLIDE
- VALVE: GATE OR OTHER TWO-WAY TYPE NOT OTHERWISE IDENTIFIED
- VALVE: BALL
- VALVE: GLOBE
- VALVE: BUTTERFLY
- VALVE: ECCENTRIC PLUG
- VALVE: NON-ECCENTRIC PLUG
- VALVE: THREE WAY
- VALVE: FOUR WAY
- VALVE: CHECK
- VALVE: DIAPHRAGM
- VALVE: VPORT BALL
- VALVE: MUD
- VALVE: THERMAL SHUTOFF
- VALVE: NEEDLE
- VALVE: SLEEVE
- GATE: FLAP
- VALVE: VENTED BALL
- VALVE: DIVERTER
- VALVE: PRESSURE REDUCING
- VALVE: PRESSURE SUSTAINING
- VALVE: PRESSURE REDUCING (SELF ACTUATING TYPE)
- VALVE: PRESSURE SUSTAINING (SELF ACTUATING TYPE)
- P — VALVE: PILOT ACTUATED RELIEF
- VALVE: VACUUM RELIEF
- VALVE: PRESSURE RELIEF
- VALVE: PRESSURE/VACUUM RELIEF
- VALVE: ANGLE
- VALVE: SET STOP
- VALVE: PINCH
- VALVE: STOP CHECK
- VALVE: TELESCOPING
- VALVE: COMBINATION AIR
- VALVE: AIR RELEASE
- VALVE: AIR VACUUM
- VALVE: CHLORINE WITH YOKE
- M — CHLORINE VACUUM REGULATOR
- VALVE: KNIFE GATE
- BACKFLOW PREVENTER
- VACUUM BREAKER
- EXPLOSION RELIEF
- VALVE: GENERIC ROTARY

VALVE AND GATE ACTUATOR SYMBOLS

- HANDWHEEL ACTUATOR
- S — SOLENOID
- S R — SOLENOID - MANUAL RESET
- S R R — SOLENOID - REMOTE RESET
- PRESSURE BALANCED DIAPHRAGM
- M — INTELLIGENT ELECTRIC
- M SM — SMALL MOTOR ACTUATOR
- I/P — CURRENT - TO-PNEUMATIC ACTUATOR
- E/H — ELECTRIC-HYDRAULIC
- SPRING-DIAPHRAGM ACTUATOR OR OTHERWISE UNSPECIFIED
- P — PNEUMATIC ACTUATOR
- P DA — PNEUMATIC ACTUATOR DOUBLE ACTING
- P SC — PNEUMATIC ACTUATOR SPRING CLOSE
- P SO — PNEUMATIC ACTUATOR SPRING OPEN
- FLOAT OPERATED VALVE
- SPRING OR WEIGHT ACTUATED RELIEF OR SAFETY VALVE ACTUATOR LOADED VALVE
- QUICK OPENING VALVE
- QUICK CLOSING VALVE
- LOADING/BACK PRESSURE VALVE

MATERIAL HANDLING EQUIPMENT SYMBOLS

- CYCLONE SEPARATER
- DUMPSTER
- BIN: LIVE BOTTOM
- BIN: SLIDING FRAME
- SCREEN: SINGLE VIBRATORY
- SCREEN: DOUBLE VIBRATORY
- GRINDER
- BIN - CLOSED TOP
- BIN - OPEN TOP
- HORIZONTAL BAR SCREEN
- MIXER: PUGMILL
- MIXER: BLENDER
- CONVEYOR: BELT
- CONVEYOR: VIBRATORY
- H — PISTON CAKE PUMP: SINGLE
- H H — PISTON CAKE PUMP: DOUBLE
- CONVEYOR: SCREW
- HOPPER
- DUST HOPPER

GENERAL NOTES

1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2009). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM THE P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT.
4. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS ONLY AND MAY DIFFER FROM LEGENDS FOR OTHER SHEETS.

ISSUE FOR BIDDING - NOT FOR CONSTRUCTION

F0199322
D1199322

DATE	REVISIONS AND RECORD OF USE	NO.	BY	CHK	APP

LAWRENCE BROUILLETTE — LICENSE — NO.57973 — STATE OF FLORIDA — PROFESSIONAL ENGINEER

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Date: 2020.01.03 09:40:05-05'00'
Engineer of Record: LAWRENCE BROUILLETTE
Florida License No.: No. 57973

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Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

INSTRUMENTATION
P&ID - LEGEND AND ABBREVIATIONS
SHEET 1 OF 3

DESIGNED:	LJB
DETAILED:	LJB
CHECKED:	BLB
APPROVED:	LJB
DATE:	DECEMBER 2019

0 1/2 1
IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 199322

I-01
SHEET 21 OF 26

INSTRUMENT AND I/O ABBREVIATIONS

MEANINGS OF IDENTIFICATION LETTERS

LETTER	FIRST LETTER: MEASURED OR INITIATING VARIABLE	FIRST LETTER: VARIABLE MODIFIER	SUCCEEDING LETTERS: READOUT OR PASSIVE FUNCTION	SUCCEEDING LETTERS: OUTPUT OR ACTIVE FUNCTION	SUCCEEDING LETTERS: FUNCTION MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
C	USER'S CHOICE			CONTROL	CLOSE
D	USER'S CHOICE	DIFFERENTIAL			DEVIATION
E	VOLTAGE (EMF)		SENSOR, PRIMARY ELEMENT		
F	FLOW, FLOW RATE	RATIO (FRACTION)			
G	USER'S CHOICE		GLASS, GAUGE, VIEWING DEVICE		
H	HAND (MANUALLY INITIATED)				HIGH
I	CURRENT (ELECTRICAL)		INDICATE		
J	POWER		SCAN		
K	TIME OR TIME-SCHEDULE	TIME RATE OF CHANGE		CONTROL STATION	
L	LEVEL		LIGHT		LOW
M	USER'S CHOICE	MOMENTARY			MIDDLE OR INTERMEDIATE
N	USER'S CHOICE		USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
O	TORQUE		ORIFICE (RESTRICTION)		OPEN
P	PRESSURE OR VACUUM		POINT (TEST CONNECTION)		
Q	QUANTITY	INTEGRATE OR TOTALIZE	INTEGRATE OR TOTALIZE		
R	RADIATION		RECORD		RUN
S	SPEED OR FREQUENCY	SAFETY		SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	
V	VIBRATION OR MECHANICAL ANALYSIS			VALVE, DAMPER OR LOUVER	
W	WEIGHT OR FORCE		WELL, PROBE		
X	UNCLASSIFIED	X-AXIS	ACCESORY DEVICES OR UNCLASSIFIED	UNCLASSIFIED	UNCLASSIFIED
Y	EVENT, STATE, OR PRESENCE	Y-AXIS		AUXILIARY DEVICES	
Z	POSITION, DIMENSION	Z-AXIS		DRIVE, ACTUATOR OR FINAL CTRL ELEMENT	

GENERAL NOTES

1. IN GENERAL, THE P&ID SYMBOLS AND DEVICE IDENTIFICATIONS ARE BASED ON INTERNATIONAL SOCIETY OF AUTOMATION, STANDARD PRACTICE ANSI/ISA-5.1 (2009). SOME MODIFICATIONS, ADDITIONS, AND ALTERATIONS HAVE BEEN MADE AS NEEDED TO ACCOMMODATE THE PROJECT REQUIREMENTS.
2. SOME CONTROL AND INTERLOCK REQUIREMENTS WHICH CAN BE MORE CLEARLY ILLUSTRATED ON SCHEMATIC DRAWINGS HAVE BEEN OMITTED FROM P&ID DRAWINGS.
3. THIS IS A GENERAL LEGEND SHEET. SOME SYMBOLS AND ABBREVIATIONS MAY NOT BE UTILIZED ON THIS SPECIFIC PROJECT. PIPING AND EQUIPMENT LEGEND APPLIES TO P&ID SHEETS.

PIPELINE MATERIAL CODE ABBREVIATIONS

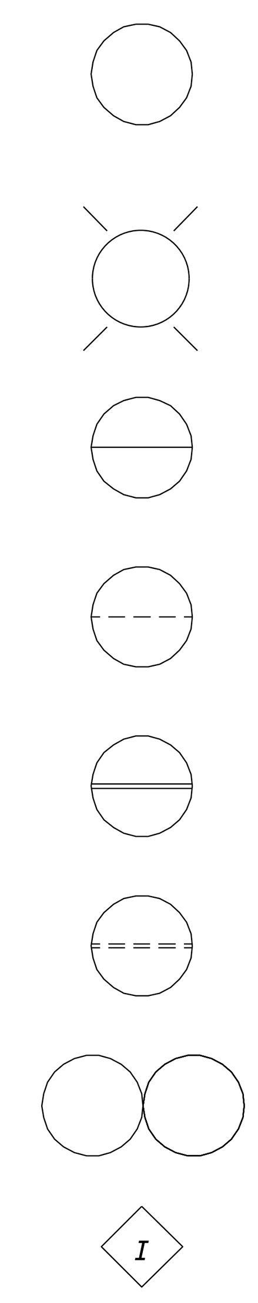
PCCP	SECTION 02612, PRESTRESSED CONCRETE CYLINDER PIPE
CBWS	SECTION 02614, CONCRETE BAR-WRAPPED, STEEL CYLINDER PIPE
LHCPP	SECTION 02616, LOW HEAD CONCRETE PRESSURE PIPE
RCP	SECTION 02618, CONCRETE PIPE
PVC	SECTION 15061, POLYVINYL CHLORIDE PIPE
DIP	SECTION 15061, DUCTILE IRON PIPE
SP	SECTION 15062, STEEL PIPE
LWS-XX	SECTION 15063, LIGHT WALL STEEL PIPE
SS-XX1	SECTION 15064, STAINLESS STEEL PIPE, TUBING, AND ACCESSORIES
CSG-XX	SECTION 15065, MISCELLANEOUS STEEL PIPE, TUBING, AND ACCESSORIES
CS-XX	SECTION 15065, MISCELLANEOUS STEEL PIPE, TUBING, AND ACCESSORIES
FRPE-XX	SECTION 15066, FIBERGLASS REINFORCED PLASTIC PIPE (EXHAUST AIR SERVICE)
FRP-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PVC-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
CPVC-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PE-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PP-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
PVDF-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
RPT-XX	SECTION 15067, MISCELLANEOUS PLASTIC PIPE, TUBING, AND ACCESSORIES
SS	SECTION 15068, AWWA STAINLESS STEEL PIPE
CI-XX	SECTION 15069, CAST IRON SOIL PIPE AND ACCESSORIES
CU-XX	SECTION 15070, COPPER TUBING AND ACCESSORIES
BR-XX	SECTION 15060, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
HS-XX	SECTION 15060, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
TG-XX	SECTION 15060, MISCELLANEOUS PIPING AND PIPE ASSEMBLY
CRP-XX	SECTION 15060, MISCELLANEOUS PIPING AND PIPE ASSEMBLY

1. XX= numbers 01-20

INSTRUMENT AND I/O ABBREVIATION DEFINITIONS

AAH	ANALYZER ALARM HIGH
AAHH	ANALYZER ALARM HIGH-HIGH
AAL	ANALYZER ALARM LOW
AALL	ANALYZER ALARM LOW-LOW
AAX	ALARM HORN
AAL	STROBE ALARM LIGHT
AE	ANALYZER SENSOR
AI	ANALYZER INDICATION
AIT	ANALYZER INDICATING TRANSMITTER
ASH	ANALYZER SWITCH HIGH
ASHH	ANALYZER SWITCH HIGH-HIGH
CB	CONTROL BLOCK REFERENCE (SCADA LEVEL)
FAL	FLOW ALARM LOW
FAH	FLOW ALARM HIGH
FC	FLOW CONTROLLER
FI	FLOW DIGITAL INDICATOR (LED OR SCREEN)
FIC	FLOW INDICATING CONTROLLER
FE	PRIMARY FLOW ELEMENT/SENSOR
FG	FLOW SIGHT GAUGE
FIT	FLOW INDICATING TRANSMITTER
FQG	FLOW TOTALIZING GAUGE
FQIT	FLOW TOTALIZING INDICATING TRANSMITTER
FSH	FLOW SWITCH HIGH
FSL	FLOW SWITCH LOW
FY	FLOW SIGNAL CONVERTER, REPEATER, OR ISOLATOR
HIC	HAND INDICATING CONTROLLER
HMS	MOMENTARY PUSHBUTTON OR SELECTOR SWITCH
HS	HAND SWITCH
IE	CURRENT ELEMENT/SENSOR
IAH	CURRENT ALARM HIGH (MOTOR OVERLOAD)
ISH	CURRENT SWITCH HIGH USED TO DETECT HIGH TORQUE)
JA	POWER FAILURE ALARM
JI	POWER INDICATOR
JL	POWER INDICATING LIGHT
JIT	POWER INDICATING TRANSMITTER
KQI	TIME TOTALIZING INDICATOR
LAL	LEVEL ALARM LOW
LALL	LEVEL ALARM LOW-LOW
LAH	LEVEL ALARM HIGH
LAHH	LEVEL ALARM HIGH-HIGH
LE	PRIMARY LEVEL ELEMENT/SENSOR
LG	LEVEL SIGHT GAUGE
LI	LEVEL INDICATOR (LED OR SCREEN)
LSL	LEVEL SWITCH LOW
LSLL	LEVEL SWITCH LOW LOW
LSH	LEVEL SWITCH HIGH
LSHH	LEVEL SWITCH HIGH-HIGH
LY	LEVEL SIGNAL CONVERTER, ISOLATOR, OR REPEATER
OAH	TORQUE ALARM HIGH
OAHH	TORQUE ALARM HIGH HIGH
OSH	TORQUE SWITCH HIGH
OSHH	TORQUE SWITCH HIGH-HIGH
PAL	PRESSURE ALARM LOW
PALL	PRESSURE ALARM LOW-LOW
PAH	PRESSURE ALARM HIGH
PAHH	PRESSURE ALARM HIGH-HIGH
PDG	DIFFERENTIAL PRESSURE GAUGE
PDI	DIFFERENTIAL PRESSURE INDICATOR (LED OR SCREEN)
PDIT	DIFFERENTIAL PRESSURE INDICATING TRANSMITTER
PDAH	DIFFERENTIAL PRESSURE ALARM HIGGH
PDAHH	DIFFERENTIAL PRESSURE ALARM HIGH-HIGH
PDSH	DIFFERENTIAL PRESSURE SWITCH HIGH
PDSHH	DIFFERENTIAL PRESSURE SWITCH HIGH-HIGH
PDSL	DIFFERENTIAL PRESSURE SWITCH LOW
PDSLL	DIFFERENTIAL PRESSURE SWITCH LOW-LOW
PE	PRESSURE SENSOR
PG	PRESSURE GAUGE
PI	PRESSURE INDICATOR (LED OR SCREEN)
PIT	PRESSURE INDICATING TRANSMITTER
PSL	PRESSURE SWITCH LOW
PSH	PRESSURE SWITCH HIGH
SI	SPEED INDICATION (LED OR SCREEN)
SC	SPEED CONTROL
SIT	SPEED INDICATING TRANSMITTER
SSL	SPEED SWITCH LOW
SIT	SPEED INDICATING TRANSMITTER
TAH	TEMPERATURE ALARM HIGH
TAHH	TEMPERATURE ALARM HIGH-HIGH
TAL	TEMPERATURE ALARM LOW
TDI	DIFFERENTIAL TEMPERATURE INDICATOR (LED OR SCREEN)
TDIT	DIFFERENTIAL TEMPERATURE TRANSMITTER
TE	TEMPERATURE SENSOR/RESISTANCE
TSH	TEMPERATURE SWITCH HIGH
TSHH	TEMPERATURE SWITCH HIGH HIGH
TSL	TEMPERATURE SWITCH LOW
TG	TEMPERATURE GAUGE
TI	TEMPERATURE INDICATOR (LED OR SCREEN)
TIT	TEMPERATURE INDICATING TRANSMITTER
UA	MULTIVARIABLE/COMMON ALARM/COMMON FAULT
UCR	RUN COMMAND
UCS	STOP COMMAND
VAH	VIBRATION ALARM HIGH
WE	PRIMARY WEIGHT SENSOR/LOAD CELL
WG	WEIGHT GAUGE
WIT	WEIGHT INDICATING TRANSMITTER
YA	GENERAL ALARM EVENT
YI	EVENT INDICATION (LED OR SCREEN)
YIR	RUNNING INDICATION
YIS	STOPPED INDICATION
YL	EVENT INDICATING LIGHT
YLR	RUNNING INDICATING LIGHT
YLS	STOPPED INDICATING LIGHT
ZI	POSITION INDICATOR
ZIC	CLOSED INDICATION
ZIO	OPEN INDICATION
ZLC	CLOSED INDICATING LIGHT
ZLO	OPEN INDICATING LIGHT
ZSC	CLOSED POSITION SWITCH
ZSO	OPEN POSITION SWITCH
ZIT	POSITION INDICATING TRANSMITTER
ZT	POSITION TRANSMITTER

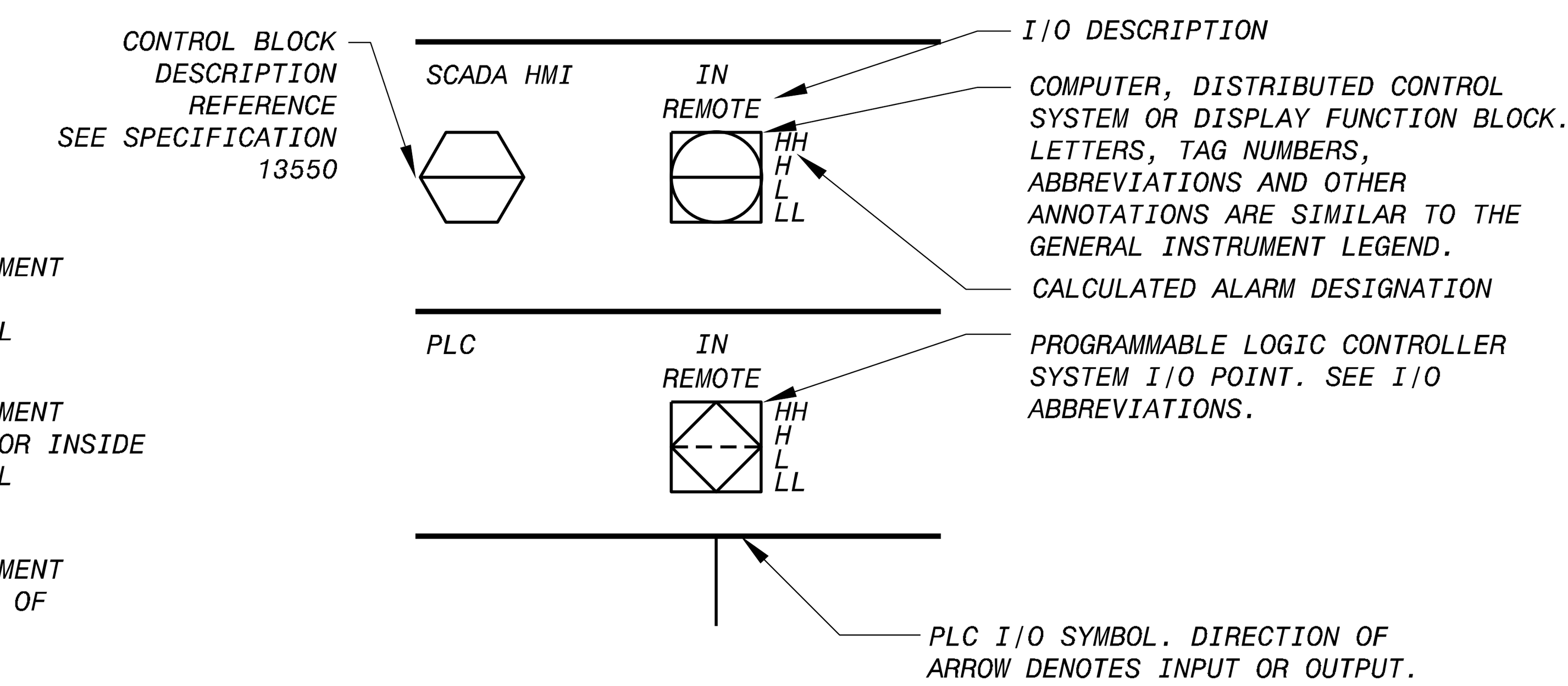
GENERAL INSTRUMENT SYMBOLS



- FIELD MOUNTED DISCRETE INSTRUMENT
- PILOT LIGHT
- DISCRETE INSTRUMENT MOUNTED ON FACE PRIMARY OF PANEL
- DISCRETE INSTRUMENT MOUNTED BEHIND OR INSIDE OF PRIMARY PANEL
- DISCRETE INSTRUMENT MOUNTED ON FACE OF LOCAL PANEL
- DISCRETE INSTRUMENT MOUNTED BEHIND OR INSIDE OF LOCAL PANEL
- SINGLE INSTRUMENT HOUSING CONTAINING TWO (OR MORE) INSTRUMENTATION FUNCTIONS
- GENERAL CONTROL INTERLOCK FUNCTION, SEE SCHEMATICS AND SYSTEM SPECIFICATIONS FOR SPECIFIC FUNCTION

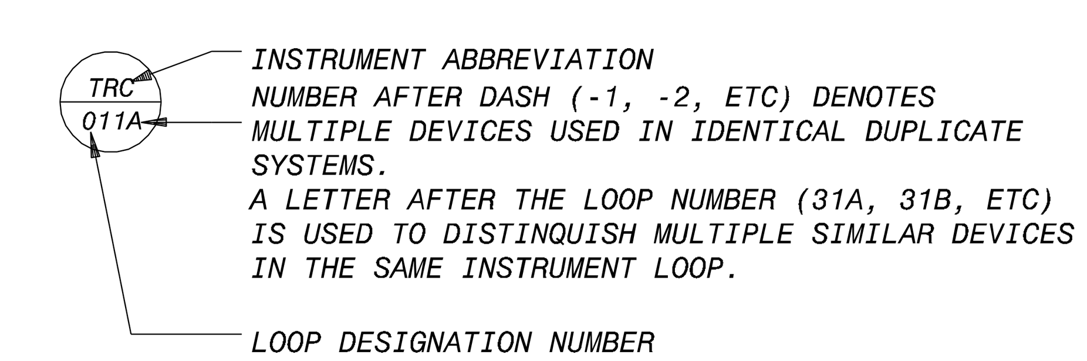
DIGITAL SYSTEMS INTERFACE SYMBOLS

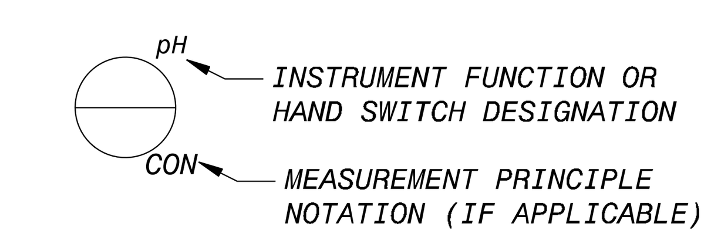
NOTE: REFER TO DETAILED SYSTEM SPECIFICATIONS FOR FUNCTIONAL DESCRIPTION. ALSO SEE I/O SCHEDULES FOR COMPLETE INPUT AND OUTPUT LISTINGS.



- △ DISCRETE INPUT
- ▽ DISCRETE OUTPUT
- ▲ ANALOG INPUT
- ▼ ANALOG OUTPUT
- △ PULSE INPUT

INSTRUMENTATION SYMBOLOGY AND DESIGNATIONS





FUNCTION DESIGNATIONS AND ABBREVIATIONS

MEASUREMENT PRINCIPLE NOTATIONS

CON	CONDUCTANCE
DP	DIFFERENTIAL PRESSURE SENSING
FLN	FLOW NOZZLE
FLT	FLOW TUBE
GWR	GUIDED WAVE RADAR
RAD	RADAR
US	ULTRASONIC
VENT	VENTURI TUBE

CALCULATED ALARM DESIGNATIONS

L	LOW
LL	LOW-LOW
H	HIGH
HH	HIGH-HIGH

INDICATING LIGHT/ALARM DESIGNATIONS

OVRLD	OVERLOAD
TRQ HI	TORQUE HIGH
TRQ HI-HI	TORQUE HIGH-HIGH

INSTRUMENT FUNCTIONS

K	GAIN OR ATTENUATE (INPUT:OUTPUT)
-K	GAIN AND REVERSE
Σ	ADD OR SUM (ADD AND SUBTRACT)
Δ	SUBTRACT (DIFFERENCE)
√‾	EXTRACT SQUARE ROOT
÷	DIVIDE
F(X)	CHARACTERIZE SIGNAL
>	HIGH-SELECT
<	LOW-SELECT
×	MULTIPLY
∫	INTEGRATE (TIME INTEGRAL)
CH4	METHANE
CL2	CHLORINE RESIDUAL
CO2	CARBON DIOXIDE
DO	DISSOLVED OXYGEN
H2S	HYDROGEN SULFIDE
LEL	LOWER EXPLOSIVE LIMIT
MCC	MOTOR CONTROL CENTER
MLSS	MIXED LIQUOR SUSPENDED SOLIDS
O2	OXYGEN (PURITY)
O3	OZONE
pH	pH
TURB	TURBIDITY

HAND SWITCH DESIGNATIONS

FR	FORWARD-REVERSE
HOA	HAND-OFF-AUTO
HOR	HAND-OFF-REMOTE
LOA	LOCAL-OFF-AUTO
LOR	LOCAL-OFF-REMOTE
LR	LOCAL REMOTE
OCA	OPEN-CLOSE-AUTO
OOA	ON-OFF-AUTO
OC	OPEN-CLOSE
OO	ON-OFF
OOR	ON-OFF-REMOTE
OSC	OPEN-STOP-CLOSE
RST	RESET
SIL	SILENCE

TRANSDUCER & CONVERTER DESIGNATION

E	VOLTAGE
FSK	FREQUENCY SHIFT KEYING
H	HYDRAULIC
I	CURRENT
P	PNEUMATIC PULSE
PD	PULSE DURATION
PF	PULSE FREQUENCY
R	RESISTANCE (ELECTRICAL)

EXAMPLE: I/P = CURRENT TO PNEUMATIC TRANSDUCER

POWER SUPPLY ABBREVIATIONS

AS	AIR SUPPLY
ES	ELECTRIC SUPPLY
GS	GAS SUPPLY
HS	HYDRAULIC SUPPLY
NS	NITROGEN SUPPLY
SS	STEAM SUPPLY
WS	WATER SUPPLY
120V	120VAC

120V —— POWER SUPPLY SOURCE LABEL. USED ONLY WHERE NECESSARY TO HELP CLARIFY AN INSTRUMENT OR SYSTEM FUNCTION.

ISSUE FOR BIDDING - NOT FOR CONSTRUCTION

NO.	DATE	REVISIONS AND RECORD OF USE	BY	CHK	APP

LAWRENCE BROUILLETTE LICENSE NO.57973 STATE OF FLORIDA PROFESSIONAL ENGINEER

This item has been digitally signed and sealed by Lawrence Brouillette on the date adjacent to the seal. Printed copies of this document are not considered signed and sealed and the signature must be verified on any electronic copies.

Date: 2020.01.03 09:43:23-05'00'

Engineer of Record: LAWRENCE BROUILLETTE

Florida License No.: No. 57973

BLACK & VEATCH

Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065 Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

INSTRUMENTATION
P&ID - LEGEND AND ABBREVIATIONS
SHEET 2 OF 3

DESIGNED: LJB
DETAILED: LJB
CHECKED: BLB
APPROVED: LJB
DATE: DECEMBER 2019

0 1/2 1

IF THIS BAR DOES NOT MEASURE 1" THEN DRAWING IS NOT TO FULL SCALE

PROJECT NO. 199322

I-02

SHEET 22 OF 26

FD199322
D199322

SYSTEM CODE ABBREVIATIONS

ACE	ACETIC ACID
ACT	ACETYLENE
GAC	ACTIVATED CARBON - GRANULAR
AIR	AERATION AIR/PROCESS AIR
AER	AERATION SYSTEM
ARW	AIR WASH
ALS	ALUMINUM SULFATE
NSO4	AMMONIUM SULFATE
NH3	ANHYDROUS AMMONIA
AS	ANTI-SEALANT
NHOH	AQUA AMMONIA
ARG	ARGON
ASH	ASH
BWH	BACKWASH - MEMBRANE/FILTER
BAL	BALLASTED FLOCCULATION
BIO	BIOSOLIDS
BIT	BIOTOWER
BLS	BLENDED SLUDGE
BNR	BNR
BRN	BRINE
CACL	CALCIUM HYPOCHLORITE
CATS	CALCIUM THIOSULFATE
CO2	CARBON DIOXIDE
CAS	CARBON SLURRY
HCO3	CARBONIC ACID
CEN	CENTRATE
CEB	CHEMICAL ENHANCED BACKWASH - MEMBRANE
CL2	CHLORINE
CLO2	CHLORINE DIOXIDE
CA	CITRIC ACID
CIP	CLEAN IN PLACE
COA	COAGULATION
CAI	COMPRESSED AIR - INSTRUMENT
CMS	COMPRESSED AIR - SERVICE
CUS	COPPER SULFATE
CI	CORROSION INHIBITOR
DCL	DECHLORINATION
DET	DETERGENT
DWT	DEWATERING
FUE	DIESEL FUEL
DGG	DIGESTER GAS
DGM	DIGESTER GAS MIXING
DGS	DIGESTER SLUDGE
DGA	DIGESTION - AEROBIC
DIG	DIGESTION - ANAEROBIC
DCB	DISINFECTION CONTACT BASIN
DAF	DISSOLVED AIR FLOTATION
DRN	DRAINAGE
EFP	EFFLUENT PUMPING
EXH	ENGINE EXHAUST
EQB	EQUALIZATION BASIN
FEC	FERRIC CHLORIDE
FES	FERRIC SULFATE
FRC	FERROUS CHLORIDE
FRS	FERROUS SULFATE
FLT	FILTRATION
FLC	FLOCCULATION
GOX	GASEOUS OXYGEN
GSL	GASOLINE
GRS	GREASE
GRT	GRIT
HEL	HELIUM
HFL	HYDRAULIC FLUID
HCL	HYDROCHLORIC ACID
HFS	HYDROFLUOSILIC ACID (FLUORIDE)
HYD	HYDROGEN
PER	HYDROGEN PEROXIDE
INC	INCINERATION
INFP	INFLUENT PUMPING
INT	INTAKE
LAG	LAGOON STORAGE
LAP	LAND APPLICATION
CAH	LIME - HYDRATED
CAO	LIME - QUICKLIME
LIM	LIME STABILIZATION
LOX	LIQUID OXYGEN
LPG	LP GAS OR PROPANE GAS
MGOH	MAGNESIUM HYDROXIDE
MEM	MEMBRANE
MEG	METHANE GAS
MTH	METHANOL
MXL	MIXED LIQUOR
NG	NATURAL GAS
NIT	NITROGEN
NIO	NITROUS OXIDE
ODC	ODOR CONTROL
OIL	OIL
FO	OIL - FUEL
OZN	OZONE
OZD	OZONE DESTRUCT
PPP	PHOSPHATE
PO4	PHOSPHORIC ACID
PCL	POLYALUMINUM CHLORIDE
POLF	POLYMER
KMN	POTASSIUM PERMANGANATE
PAC	POWDERED ACTIVATE CARBON
PAR	PRE-AERATION
PSD	PRESEDIMENTATION
PRC	PRIMARY CLARIFICATION
PSC	PRIMARY SCUM
PRS	PRIMARY SLUDGE
WWP	RAW WASTEWATER PUMPING
RWP	RAW WATER PUMPING
RWS	RAW WATER STORAGE
RCS	RECIRCULATED SLUDGE
RCW	RECLAIMED WATER
REF	REFRIGERANT
RES	RESIDUALS
RAS	RETURN ACTIVATED SLUDGE
ROS	REVERSE OSMOSIS
SCR	SCREENINGS
SCL	SECONDARY CLARIFICATION
SSC	SECONDARY SCUM
SEP	SEPTAGE
SET	SETTLED WATER
SEW	SEWAGE
NAC	SODA ASH
NAL	SODIUM ALUMINATE
NAM	SODIUM ALUMINATE
NBC	SODIUM BICARBONATE
NHS	SODIUM BISULFITE
NCL	SODIUM CHLORIDE
NCL2	SODIUM CHLORITE
NAF	SODIUM FLUORIDE
NAX	SODIUM HEXAMETAPHOSPHATE
NAOH	SODIUM HYDROXIDE
NOCL	SODIUM HYPOCHLORITE
NASF	SODIUM SILICOFLUORIDE
STM	STEAM
STS	STORM SEWER
STW	STORM WATER
SO2	SULFUR DIOXIDE
HSO4	SULFURIC ACID
SW	SURFACE WASH
TERT	TERTIARY TREATMENT
TPRS	THICKENED PRIMARY SLUDGE
TWAS	THICKENED WASTE ACTIVATED SLUDGE
THCK	THICKENING
TW	TREATED WATER
TF	TRICKLING FILTER
UV	ULTRAVIOLET
VAC	VACUUM
WW	WASH WATER
WAS	WASTE ACTIVATED SLUDGE
WWW	WASTE WASH WATER
CDW	WATER - CONDENSATE
COLW	WATER - COOLING
DW	WATER - DISTILLED WATER
FW	WATER - FIRE
IRW	WATER - IRRIGATION
OZW	WATER - OZONATED
SWT	WATER - SEAL
HW	WATER - WATER HEATING
DEIW	WATER DEIONIZED
NPW	WATER NON-POTABLE
PEW	WATER PLANT EFFLUENT
PW	WATER POTABLE
RW	WATER RAW
WWT	WET WEATHER TREATMENT
ZOP	ZINC ORTHOPHOSPHATE

PROCESS CODE ABBREVIATIONS

ACE_X	ACETIC ACID
ACT_X	ACETYLENE
GAC_X	ACTIVATED CARBON - GRANULAR
AIR_X	AERATION AIR/PROCESS AIR
AER_X	AERATION SYSTEM
ARW_X	AIR WASH
ALS_X	ALUMINUM SULFATE
NSO4_X	AMMONIUM SULFATE
NH3_X	ANHYDROUS AMMONIA
AS_X	ANTI-SEALANT
NHOH_X	AQUA AMMONIA
ARG_X	ARGON
ASH_X	ASH
BWH_X	BACKWASH - MEMBRANE/FILTER
BAL_X	BALLASTED FLOCCULATION
BNR_X	BIOSOLIDS
BIO_X	BIOTOWER
BIT_X	BLENDED SLUDGE
BLS_X	BNR
BRN_X	BRINE
CACL_X	CALCIUM HYPOCHLORITE
CATS_X	CALCIUM THIOSULFATE
CO2_X	CARBON DIOXIDE
CAS_X	CARBON SLURRY
HCO3_X	CARBONIC ACID
CEN_X	CENTRATE
CEB_X	CHEMICAL ENHANCED BACKWASH - MEMBRANE
CL2_X	CHLORINE
CLO2_X	CHLORINE DIOXIDE
CA_X	CITRIC ACID
CIP_X	CLEAN IN PLACE
COA_X	COAGULATION
CAI_X	COMPRESSED AIR - INSTRUMENT
CMS_X	COMPRESSED AIR - SERVICE
CUS_X	COPPER SULFATE
CI_X	CORROSION INHIBITOR
DCL_X	DECHLORINATION
DET_X	DETERGENT
DWT_X	DEWATERING
FUE_X	DIESEL FUEL
DGG_X	DIGESTER GAS
DGM_X	DIGESTER GAS MIXING
DGS_X	DIGESTER SLUDGE
DGA_X	DIGESTION - AEROBIC
DIG_X	DIGESTION - ANAEROBIC
DCB_X	DISINFECTION CONTACT BASIN
DAF_X	DISSOLVED AIR FLOTATION
DRN_X	DRAINAGE
EFP_X	EFFLUENT PUMPING
EXH_X	ENGINE EXHAUST
EQB_X	EQUALIZATION BASIN
FEC_X	FERRIC CHLORIDE
FES_X	FERRIC SULFATE
FRC_X	FERROUS CHLORIDE
FRS_X	FERROUS SULFATE
FLT_X	FILTRATION
FLC_X	FLOCCULATION
GOX_X	GASEOUS OXYGEN
GSL_X	GASOLINE
GRS_X	GREASE
GRT_X	GRIT
HEL_X	HELIUM
HFL_X	HYDRAULIC FLUID
HCL_X	HYDROCHLORIC ACID
HFS_X	HYDROFLUOSILIC ACID (FLUORIDE)
HYD_X	HYDROGEN
PER_X	HYDROGEN PEROXIDE
INC_X	INCINERATION
INFP_X	INFLUENT PUMPING
INT_X	INTAKE
LAG_X	LAGOON STORAGE
LAP_X	LAND APPLICATION
CAH_X	LIME - HYDRATED
CAO_X	LIME - QUICKLIME
LIM_X	LIME STABILIZATION
LOX_X	LIQUID OXYGEN
LPG_X	LP GAS OR PROPANE GAS
MGOH_X	MAGNESIUM HYDROXIDE
MEM_X	MEMBRANE
MEG_X	METHANE GAS
MTH_X	METHANOL
MXL_X	MIXED LIQUOR
NG_X	NATURAL GAS
NIT_X	NITROGEN
NIO_X	NITROUS OXIDE
ODC_X	ODOR CONTROL
FO_X	OIL
OIL_X	OIL - FUEL
OZN_X	OZONE
OZD_X	OZONE DESTRUCT
PPP_X	PHOSPHATE
PO4_X	PHOSPHORIC ACID
PCL_X	POLYALUMINUM CHLORIDE
POLF_X	POLYMER
KMN_X	POTASSIUM PERMANGANATE
PAC_X	POWDERED ACTIVATE CARBON
PAR_X	PRE-AERATION
PSD_X	PRESEDIMENTATION
PRC_X	PRIMARY CLARIFICATION
PSC_X	PRIMARY SCUM
PRS_X	PRIMARY SLUDGE
WWP_X	RAW WASTEWATER PUMPING
RWP_X	RAW WATER PUMPING
RWS_X	RAW WATER STORAGE
RCS_X	RECIRCULATED SLUDGE
RCW_X	RECLAIMED WATER
REF_X	REFRIGERANT
RES_X	RESIDUALS
RAS_X	RETURN ACTIVATED SLUDGE
ROS_X	REVERSE OSMOSIS
SCR_X	SCREENINGS
SCL_X	SECONDARY CLARIFICATION
SSC_X	SECONDARY SCUM
SEP_X	SEPTAGE
SET_X	SETTLED WATER
SEW_X	SEWAGE
NAC_X	SODA ASH
NAL_X	SODIUM ALUMINATE
NAM_X	SODIUM ALUMINATE
NBC_X	SODIUM BICARBONATE
NHS_X	SODIUM BISULFITE
NCL_X	SODIUM CHLORIDE
NCL2_X	SODIUM CHLORITE
NAF_X	SODIUM FLUORIDE
NAX_X	SODIUM HEXAMETAPHOSPHATE
NAOH_X	SODIUM HYDROXIDE
NOCL_X	SODIUM HYPOCHLORITE
NASF_X	SODIUM SILICOFLUORIDE
STM_X	STEAM
STS_X	STORM SEWER
STW_X	STORM WATER
SO2_X	SULFUR DIOXIDE
HSO4_X	SULFURIC ACID
SW_X	SURFACE WASH
TERT_X	TERTIARY TREATMENT
TPRS_X	THICKENED PRIMARY SLUDGE
TWAS_X	THICKENED WASTE ACTIVATED SLUDGE
THCK_X	THICKENING
TW_X	TREATED WATER
TF_X	TRICKLING FILTER
UV_X	ULTRAVIOLET
VAC_X	VACUUM
WW_X	WASH WATER
WAS_X	WASTE ACTIVATED SLUDGE
WWW_X	WASTE WASH WATER
CDW_X	WATER - CONDENSATE
COLW_X	WATER - COOLING
DW_X	WATER - DISTILLED WATER
FW_X	WATER - FIRE
IRW_X	WATER - IRRIGATION
OZW_X	WATER - OZONATED
SWT_X	WATER - SEAL
HW_X	WATER - WATER HEATING
DEIW_X	WATER DEIONIZED
NPW_X	WATER NON-POTABLE
PEW_X	WATER PLANT EFFLUENT
PW_X	WATER POTABLE
RW_X	WATER RAW
WWT_X	WET WEATHER TREATMENT
ZOP_X	ZINC ORTHOPHOSPHATE

X = PROCESS CODE SUFFIX USED TO FURTHER SPECIFY A PROCESS STREAM (I.E. CL2_G FOR CHLORINE GAS OR CL2_S FOR CHLORINE SOLUTION)

FUNCTION CODE ABBREVIATIONS

ACMB	ACTIVATION CHAMBER
AFD	ADJUSTABLE FREQUENCY DRIVE
ACD	AERATOR, COARSE BUBBLE DIFFUSED
AEFD	AERATOR, FINE PORE DIFFUSED
AFS	AERATOR, FLOATING SURFACE
AES	AERATOR, SURFACE
AFC	AFTERCOOLER
AD	AIR DRYER
AF	AIR FILTER
AR	AIR RECEIVER OR REGULATOR
AS	AIR SEPARATOR
AST	AIR STRIPPER
BFP	BACKFLOW PREVENTER
BSNA	BASIN, AERATION
BSNX	BASIN, ANOXIC/OXIC
BNR	BASIN, BNR
BSNC	BASIN, CHLORINE CONTACT
BSNO	BASIN, OXIC
RBSN	BASIN, RECTANGULAR SEDIMENTATION
BFPS	BELT FILTER PRESS
B	BIN (STORAGE - ALL TYPES)
BA	BIN ACTIVATOR
BLC	BLOWER, CENTRIFUGAL
BL	BLOWER, POSITIVE DISPLACEMENT
BLR	BOILER
BDZ	BULLDOZER
CCLM	CALIBRATION COLUMN
CFG	CENTRIFUGE
CHF	CHEMICAL FEEDER
CGS	CHLORINE GAS SCRUBBER
PCLR	CLARIFIER, PRIMARY
SCLR	CLARIFIER, SECONDARY
CGR	CLASSIFIER, GRIT
CW	CLEARWELL
CMP	COMPRESSOR
CMB	COMPRESSOR, LIQUID RING
CMR	COMPRESSOR, ROTARY SCREW
CMPS	COMPRESSOR, STEAM
CTR	CONTAINER, PROCESS
COB	CONVEYOR, BELT
COS	CONVEYOR, SCREW
CFA	COVER, ALUMINUM DOME BASIN
CFD	COVER, FIXED DIGESTER
CFL	COVER, FLOATING DIGESTER
DCG	COVER, GAS HOLDER
DCM	COVER, MEMBRANE
CRN	CRANE
CRG	CRANE, GANTRY
CRJ	CRANE, JIB
CRP	CRANE, PORTABLE GANTRY
CRT	CRANE, TRAVELLING BRIDGE
CYL	CYLINDER, CHLORINE
CYG	CYLINDER, GAS
DWS	DEWATERING SCREW
DPS	DIAPHRAGM SEAL
DIF	DIFFUSER, CHANNEL
DFB	DIFFUSER BANK
DIP	DIFFUSER, PIPELINE
DIR	DIFFUSER, TANK
DGE	DIGESTER, AEROBIC
DGAP	DIGESTER, ANAEROBIC PRIMARY
DGAS	DIGESTER, ANAEROBIC SECONDARY
DSUV	DISINFECTION UNIT, UV
DAF	DISSOLVED AIR FLOTATION THICKENER
DUC	DUST COLLECTOR
EDC	EDUCTOR
EQPE	ELECTRICAL EQUIPMENT, GENERAL
EWSH	EMERGENCY EYE WASH FOUNTAIN
ESHR	EMERGENCY SHOWER
EMEW	EMERGENCY SHOWER & EYEWASH
EQPB	EQUIPMENT, BUILDING SERVICES
EQPT	EQUIPMENT, GENERAL OR UNSPECIFIED
EV	EVAPORATOR
EXC	EXPANSION CHAMBER
FAX	FAN, AXIAL FLOW
FAN	FAN, CENTRIFUGAL
FST	FENCE STIRRER
FTSP	FILTER GAS PARTICULATE
FLC	FILTER, CARTRIDGE TYPE
FLT	FILTER, UNDERDRAINS OR PRESSURE
FSW	FILTER. SURFACE WASH EQUIPMENT
FTTNG	FITTING, MISCELLANEOUS
FAR	FLAME ARRESTER
FC	FLAME CHECK
FLCH	FLOCCULATOR, HORIZONTAL
FLCV	FLOCCULATOR, VERTICAL
FD	FLOOR DRAIN
FS	FLOW SPLITTER
FE	FLUME, PARSHALL
FMSP	FOAM SEPARATOR
FL	FORKLIFT
CHF	GAS FEEDER
GF	GAS FLARE
GWH	GAS WATER HEATER
GFL	GATE, FLAP
GSD	GATE, SLIDE
GSC	GATE, SLUICE
G	GATE, WEIR
GEN	GENERATOR, ENGINE (BACKUP POWER)
GBT	GRAVITY BELT THICKENER
GVT	GRAVITY THICKENER
GRD	GRINDER PULVERIZER
GRB	GRIT BASIN, VORTEX TYPE
GRV	GRIT SCREW CONCENTRATOR
HEX	HEAT EXCHANGER
HST	HOIST
HSC	HOIST, CHAIN
HSE	HOIST, WIRE ROPE
HYDF	HYDRANT, FIRE
HYDW	HYDRANT, WALL
HYC	HYDROCYCLONE
INJ	INJECTOR, CHEMICAL
LS	LIME SLAKER
MFM	MEMBRANE
MBMF	MEMBRANE, MICROFILTRATION
MBNF	MEMBRANE, NANOFILTRATION
MBRO	MEMBRANE, REVERSE OSMOSIS
MBUF	MEMBRANE, ULTRAFILTRATION
MXC	MIXER, CARBON
FLM	MIXER, FLOCCULATION
M	MOTOR
MXI	MIXER, IN-LINE
MXPG	MIXER, PUGMILL
MXR	MIXER, RAPID
MXS	MIXER, STATIC
MXP	MIXER, SUBMERSIBLE, PROP OR BLENDER
MM	MUFFIN MONSTER
ORD	OVERFLOW ROOF DRAIN
ODU	OZONE DESTRUCT UNIT
OGEN	OZONE GENERATOR
PSU	OZONE POWER SUPPLY UNIT
PP	PACKAGED PLANT
PCN	PARTICLE COUNTER
PLT	PELLETIZER
PS	PENSTOCK
PIPE	PIPE
PSE	PLATE SETTLER
INJ	POLYMER INJECTOR RING
PBC	PRESSURE BUILDING COIL
PD	PULSATION DAMPNER
PAD	PUMP, AIR DIAPHRAGM
PCL	PUMP, CENTRIFUGAL
PDM	PUMP, DIAPHRAGM METERING
PHW	PUMP, HEATING WATER
PHE	PUMP, HORIZONTAL END SUCTION
PSC	PUMP, HORIZONTAL SPLIT CASE
PPS	PUMP, PERISTALTIC
PPL	PUMP, PLUNGER
PPC	PUMP, PROGRESSING CAVITY
PSE	PUMP, SCREW ENCLOSED
PSE	PUMP, SCREW OPEN
PCL	PUMP, SUBMERSIBLE
PCH	PUMP, SUBMERSIBLE CHOPPER
PSS	PUMP, SUBMERSIBLE SUMP
PSP	PUMP, SUMP
P	PUMP, POSITIVE DISPLACEMENT, ROTARY, DRUM OR BELL MOUNTED
PVD	PUMP, VERTICAL DIFFUSION VANE
PVE	PUMP, VERTICAL END SUCTION
PVW	PUMP, VERTICAL WET PIT
RSV	RESERVOIR
RCO	RESIDUAL COLLECTOR
RM	ROTAMETER
RD	RUPTURE DISK
SAMP	SAMPLER
SCL	SCALE
SC	SCALE, WEIGHT
SCRHT	SCREEN, HORIZONTAL
SCRI	SCREEN, INLINE SLUDGE
SCRA	SCREEN, MANUAL OR MECH CLEANED BAR
SCRS	SCREEN, STEP
SCT	SCREEN, TRAVELLING WATER
SCR	SCREEN, VIBRATORY
SCU	SCRUBBER
SMC	SCUM COLLECTOR
SCW	SCUM WEIR - ROTATING
SEP	SEPARATOR, MOISTURE OR CYCLONE
SGT	SIGHT GLASS - TALL
SG	SIGHT GAUGE
SIL	SILENCER
SLC	SLUDGE COLLECTOR, CIRCULAR
GCLR	SLUDGE COLLECTOR, CROSS
SFC	SLUDGE COLLECTOR, FLOC-CLARIFYING
SCS	SLUDGE COLLECTOR, SEC CLARIFIERS
SSC	SLUDGE COLLECTOR, SOLIDS CONTACT
SLCS	SLUDGE COLLECTOR, STRAIGHT LINE
GRD	SLUDGE GRINDER, INLINE OR CHANNEL
SBL	SOLIDS BLENDER-INLINE
STR	STRAINER
STRB	STRAINER BASKET TYPE
STRY	STRAINER Y TYPE
SRCH	SURGE CHAMBER
TSA	TANK, ABOVE GROUND STORAGE
TCN	TANK, AMMONIA STORAGE
TCR	TANK, CRYOGENIC STORAGE
DWT	TANK, DOUBLE WALL
TSE	TANK, ELEVATED STORAGE
TX	TANK, EXPANSION
TNK	TANK, FRP CHEMICAL STORAGE
TNK	TANK, GENERAL OR UNSPECIFIED
TCP	TANK, METHANOL
SMPT	TANK, SAMPLER
TCS	TANK, CHLORINE CONTACTOR
TSW	TANK, FLAT TOP STEEL WATER
TRP	TRAP, DRIP
TRPS	TRAP, SEDIMENT
TRK	TRUCK
TB	TURBINE
TBC	TURBINE COMPRESSOR
TBG	TURBINE ENGINE
UPS	UNINTERRUPTABLE POWER SUPPLY
UVE	UV REACTOR
UVL	UV REACTOR, HORIZONTAL OR VERTICAL
VB	VACUUM BREAK
VRG	VACUUM REGULATOR
AVR	VALVE, AIR RELEASE
AVRV	VALVE, AIR-VACUUM
VAG	VALVE, ANGLE
VBM	VALVE, AWWA BALL
VBF	VALVE, AWWA BUTTERFLY
VBFP	VALVE, BACKFLOW PREVENTER
VBM	VALVE, BALL MISCELLANEOUS
VCK	VALVE, CHECK
VCN	VALVE, CONE
VDG	VALVE, DIAPHRAGM OPERATED
VGD	VALVE, DOUBLE DISC GATE
VPE	VALVE, ECCENTRIC PLUG
VER	VALVE, EXPLOSION RELIEF
VFW	VALVE, FOUR WAY
VG	VALVE, GATE
V	VALVE, GENERAL OR UNSPECIFIED
VGL	VALVE, GLOBE
VBI	VALVE, INDUSTRIAL BUTTERFLY
VKG	VALVE, KNIFE GATE
VMR	VALVE, MATERIAL HANDLING ROTARY
VMD	VALVE, MUD
VND	VALVE, NEEDLE
PTV	VALVE, PILOT
VPN	VALVE, PINCH
VPO	VALVE, PISTON OPERATED
VPL	VALVE, NON-ECCENTRIC PLUG
VPC	VALVE, PRESSURE REDUCING
VPC	VALVE, PRESSURE SUSTAINING
VSP	VALVE, PRESSURE RELIEF
VSPV	VALVE, PRESSURE/VACUUM RELIEF
VP	VALVE, PROCESS
VGR	VALVE, RESILIENT SEATED GATE
VS	VALVE, SAFETY
VSLV	VALVE, SLEEVE
VSL	VALVE, SOLENOID
VTV	VALVE, TELESCOPING
VTS	VALVE, THERMAL SHUTOFF
VTW	VALVE, THREE WAY
VVB	VALVE, VACUUM BREAKER
VSV	VALVE, VACUUM RELIEF
VVP	VALVE, V-PORT BALL
VAP	VAPORIZER
VSLB	VESSEL, BOOT
WC	WEIR, CIPOLETTI
WR	WEIR, RECTANGULAR
WV	WEIR, V-NOTCH
WLHC	WELL, HORIZONTAL COLLECTOR
WLV	WELL, VERTICAL

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Florida License No.: No. 57973

BLACK & VEATCH
Black & Veatch Corporation
2855 N. University Drive, Suite 210
Coral Springs, FL 33065 Certificate No. 8132

DESIGNED: LJB
DETAILED: LJB
CHECKED: BLB
APPROVED: LJB
DATE: DECEMBER 2019

0 1/2 1
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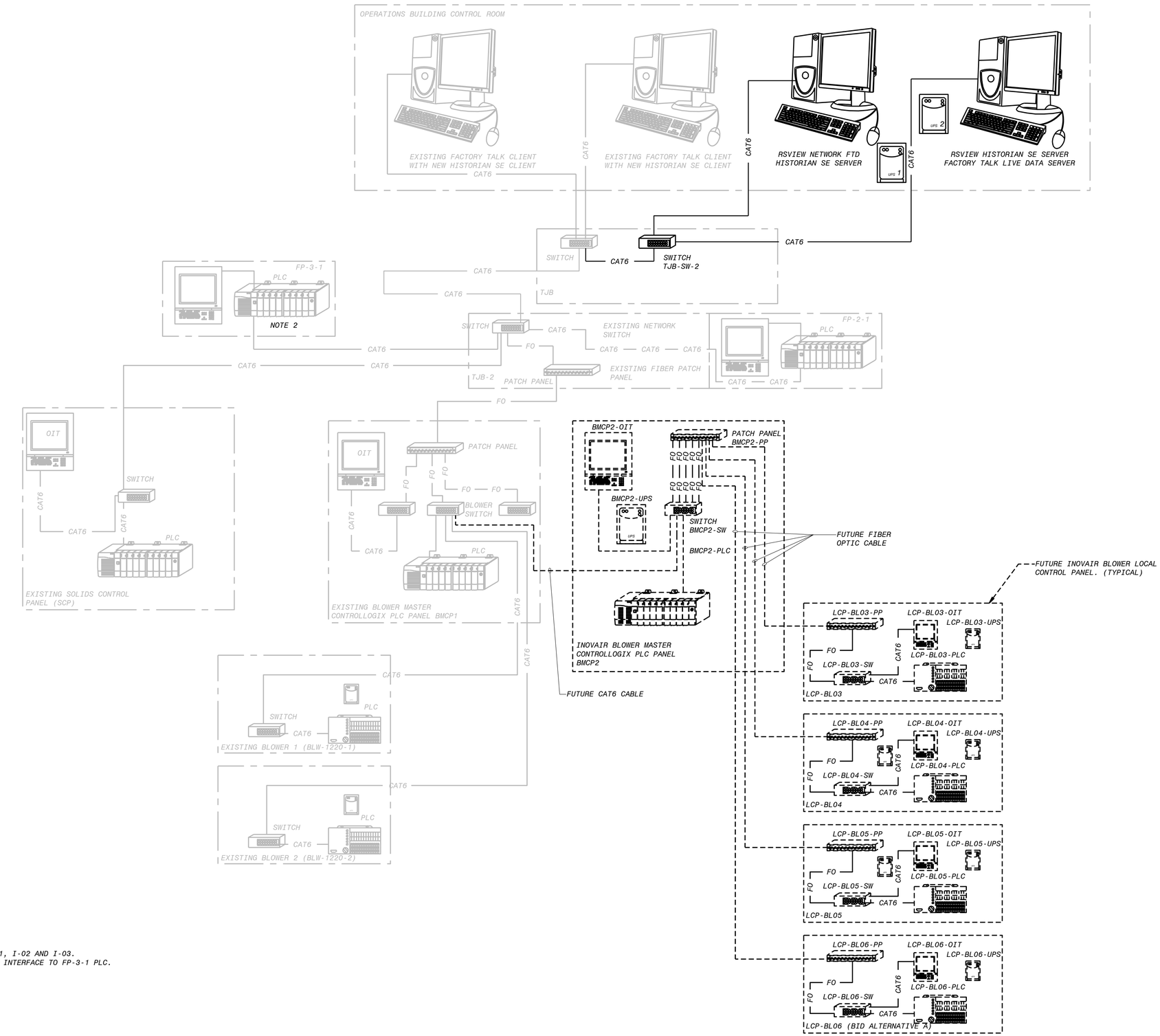
PROJECT NO.
199322



NOTES:
1. SEE LEGEND ON DRAWINGS I-01, I-02 AND I-03.
2. NEW DEEP INJECTION PUMP TO INTERFACE TO FP-3-1 PLC.

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Florida License No.: No. 57973

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2855 N. University Drive, Suite 210
Coral Springs, FL 33065 Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

INSTRUMENTATION
PARTIAL CONTROL BLOCK DIAGRAM

DESIGNED:	LJB
DETAILED:	LJB
CHECKED:	BLB
APPROVED:	LJB
DATE:	DECEMBER 2019

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I-04
SHEET
24 OF 26

SCADA HMI

FP-3-1 PLC

LEVEL LI 6-2-1 | LEVEL LI 6-2-2

VALVE IN-RMT YIR 6-2-3 | VALVE OPEN ZIO 6-2-3 | VALVE CLOSED ZIC 6-2-3 | FAULT YA 6-2-3A | VFD IN-RMT YI 6-2-3 | RUNNING YIR 6-2-3 | TEMP HIGH TAH 6-2-3 | MOISTURE DETECT YA 6-2-3B | RUN CMD UCR 6-2-3 | SPEED SETPOINT SC 6-2-3 | SPEED FEEDBACK SI 6-2-3

VALVE IN-RMT YIR 6-2-1 | VALVE OPEN ZIO 6-2-1 | VALVE CLOSED ZIC 6-2-1 | FAULT YA 6-2-1 | VFD IN-RMT YI 6-2-1 | RUNNING YIR 6-2-1 | TEMP HIGH TAH 6-2-1 | SEAL WTR FAIL YA 6-2-1 | RUN CMD UCR 6-2-1 | SPEED SETPOINT SC 6-2-1 | SPEED FEEDBACK SI 6-2-1

VALVE IN-RMT YIR 6-2-2 | VALVE OPEN ZIO 6-2-2 | VALVE CLOSED ZIC 6-2-2 | FAULT YA 6-2-2 | VFD IN-RMT YI 6-2-2 | RUNNING YIR 6-2-2 | TEMP HIGH TAH 6-2-2 | SEAL WTR FAIL YA 6-2-2 | RUN CMD UCR 6-2-2 | SPEED SETPOINT SC 6-2-2 | SPEED FEEDBACK SI 6-2-2

BY PUMP SUPPLIER

480V — YIL REM | YIL RUN | YAL FAULT | HS 6-2-3 LOR | SIC

AFD-6-2-3

480V — AFD-6-2-1

480V — AFD-6.2.2

120V — LIT 6-2-1 — LE 6-2-1

120V — LIT 6-2-2 — LE 6-2-2

PS 6-2-3 | PSH 6-2-3 | PI 6-2-3 | MSH 6-2-3 | TSH 6-2-3 | M

OC | HS 3-1-4B | ZSO 3-1-4 | LOR | HS 3-1-4A | ZSC 3-1-4

ACTUATOR — M — 480V

24" — NOTE 4

VCK-3-1-4

16"-SE-DIP — 24"-SE-DIP

12"-SE-DIP

DEEP WELL INJECTION PUMP 3 P-6-2-3

UU 3-1-2 | ZS 3-1-2 | OC — 480V — M

SE

FV 3-1-2 | PSH 6-3-1 | S | FO | SV 6-3-1

W2

DEEP WELL INJECTION PUMP 1 P-6-2-1

TO DEEP WELL INJECTION SYSTEM

UU 3-1-3 | ZS 3-1-3 | OC — 480V — M

SE

FV 3-1-3 | PSH 6-3-2 | S | FO | SV 6-3-2

W2

DEEP WELL INJECTION PUMP 2 P-6-2-2

EFFLUENT PUMPS

FROM PLANT WATER SYSTEM

W2

NOTES:
1. SEE LEGEND ON DRAWINGS I-01, I-02 AND I-03.
2. LOCAL CONTROL DEVICES SUCH AN INDICATING LIGHTS AND SWITCHES, LOCATED ON MCC'S OR AT DRIVEN EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
3. NOT ALL FUNCTIONS ARE SHOWN AT THE SCADA HMI LEVEL, REFER TO SOFTWARE CONTROL BLOCK DESCRIPTIONS IN SECTION 13550 FOR FURTHER DETAIL ON PLC, SCADA CONTROL AND MONITORING.
4. 24" X 16" REDUCING ELBOW TO BE PROVIDED BY THE PUMP SUPPLIER FOR INSTALLATION BY THE CONTRACTOR.

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2885 N. University Drive, Suite 210
Coral Springs, FL 33065
Certificate No. 8132

CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

INSTRUMENTATION
P&ID - DEEP WELL INJECTION PUMPS

DESIGNED: LJB
DETAILED: LJB
CHECKED: BLB
APPROVED: LJB
DATE: DECEMBER 2019

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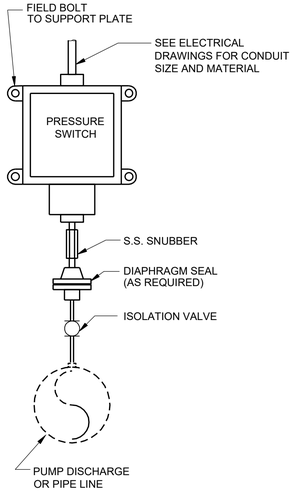
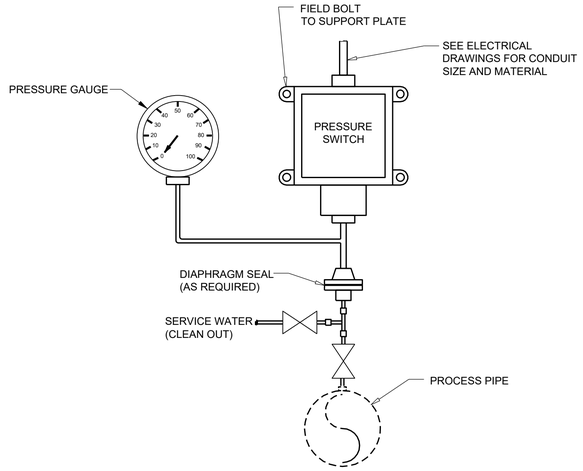
I-05
SHEET 25 OF 26



PRESSURE SWITCH (PIPE-MOUNT)
INSTALLATION DETAIL
NO SCALE
DETAIL APPLIES TO PSH-6-3-3



PRESSURE SWITCH, GAUGE & TRANSMITTER
INSTALLATION DETAIL
NO SCALE
DETAIL APPLIES TO PSH-6-2-3/PI-6-2-3

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CITY OF KEY WEST
RICHARD A. HEYMAN
ENVIRONMENTAL PROTECTION FACILITY
DEEP WELL INJECTION PUMP AND HVAC

INSTRUMENTATION
DETAILS

DESIGNED: LJB
DETAILED: LJB
CHECKED: BLB
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