


GENERAL NOTES

- APPROXIMATE LOCATIONS OF EXISTING MAINS ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- TOPOGRAPHIC FIELD SURVEYS WERE PERFORMED ON MARCH 2007 BY KCI TECHNOLOGIES INC.
- HORIZONTAL AND VERTICAL SURVEY CONTROLS:
THE HORIZONTAL DATUM IS ASSUMED, AND THE MERIDIAN SHOWN IS BASED ON RECORD PLATS. THE VERTICAL DATUM IS BASED ON THE PUMP STATION FINISHED FLOOR ELEVATION AS A BENCH-MARK.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON THE PLANS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12 INCHES. CLEAR ALL POLES BY 5'-0" MINIMUM OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. THE OWNER HAS CONTACTED THE UTILITY COMPANIES AND HAS MADE ARRANGEMENTS FOR BRACING OF POLES AS SHOWN ON THE DRAWINGS. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF ADDITIONAL POLES, ANY COST INCURRED BY THE OWNER FOR THE BRACING OF ADDITIONAL POLES OR DAMAGES SHALL BE DEDUCTED FROM MONIES OWED THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SCHEDULE THE BRACING OF THE POLES.
- FOR DETAILS NOT SHOWN ON THE DRAWING, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL  AT THE LOCATIONS OF THE TEST PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PIT OR PITS IS INCLUDED ON THE DRAWINGS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY THE CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
- THE CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITY COMPANIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS:

AT&T	1-800-252-1133
BGE (CONSTRUCTION SERVICES)	410-637-8713
BGE (EMERGENCY)	410-685-0123
BUREAU OF UTILITIES	410-313-4900
COLONIAL PIPELINE CO	410-795-1390
MISS UTILITY	1-800-257-7777
STATE HIGHWAY ADMINISTRATION	410-531-5533
VERIZON	1-800-743-0033
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS LOCATED WITHIN THE CONSTRUCTION STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.
- THE CONTRACTOR SHALL REMOVE TREES, STUMPS AND ROOTS ALONG THE LINE OF EXCAVATION. PAYMENT FOR SUCH REMOVAL SHALL BE INCLUDED IN THE UNIT PRICE BID FOR CONSTRUCTION OF THE MAIN.
- THE CONTRACTOR SHALL NOTIFY THE BUREAU OF HIGHWAYS, HOWARD COUNTY, AT (410)-313-7450 AT LEAST FIVE WORKING DAYS BEFORE OPEN CUTTING OR BORING/JACKING OF ANY COUNTY ROAD FOR LAYING WATER/SEWER MAINS OR HOUSE CONNECTIONS. THE APPROVAL OF THESE DRAWINGS WILL CONSTITUTE COMPLIANCE WITH DPW REQUIREMENTS PER SECTION 18.114(A) OF THE HOWARD COUNTY CODE.
- CONTRACTOR SHALL COORDINATE WITH THE COUNTY FOR OPERATIONS OF ALL PUMPS AND VALVES, AND TAKE ALL PRECAUTIONS TO PROTECT EQUIPMENT, WATER MAINS AND MAINTAIN SCHEDULED SERVICE AND OPERATIONS.

SEQUENCE OF CONSTRUCTION

SUMMARY: THE STATION SHALL BE MAINTAINED FOR NORMAL OPERATIONS THROUGHOUT THE ENTIRE CONSTRUCTION PHASE. DURING THIS PERIOD THE 2400 VAC PUMPS CAN BE RUN IN FULL OPERATION, ONLY TO BE SHUTDOWN FOR SHORT PERIODS OF TIME AS REQUIRED. STATION SHUTDOWNS SHALL BE COORDINATED WITH THE COUNTY. MOBILIZATION SHALL INCLUDE SEDIMENT AND EROSION CONTROL MEASURES, SITE SECURITY AND CONSTRUCTION STAGING. CONSTRUCTION SHALL BEGIN WITH REMOVAL OF THE EX. VFD EQUIPMENT, FOLLOWED BY A SEQUENTIAL INSTALLATION OF THE POWER DISTRIBUTION AND POWER TRANSFER EQUIPMENT. THE GENERATOR AND VFD EQUIPMENT SHALL BE INSTALLED FOLLOWED BY CONTROLS AND CONTROL SYSTEM MODIFICATIONS. MECHANICAL IMPROVEMENTS SHALL BE MADE TO SUPPORT ELECTRICAL AND CONTROL SYSTEMS. FINALIZED SITE WORK AND LANDSCAPING SHALL INCLUDE NORMAL AND STANDBY POWER OPERATIONS OF THE 480VAC WATER BOOSTER PUMPS.

SEQUENCE: THE FOLLOWING GENERAL SEQUENCE SHALL BE PREFORMED.

- SITE SEDIMENT AND EROSION CONTROL.
- SITE EXCAVATION AND CLEARING FOR GENERATOR INSTALLATION.
- NEW STANDBY POWER DISTRIBUTION CONDUITS, DUCTBANK AND PULL BOXES.
- NEW VFD/ATS POWER DISTRIBUTION CONDUITS.
- NEW VFD's WITH BYPASS STARTERS AND HARMONIC FILTERS.
- NEW GENERATOR WITH ENCLOSURE AND PLATFORMS.
- NEW INTERIOR PLATFORMS.
- NEW ATS.

ELKRIDGE PUMP STATION

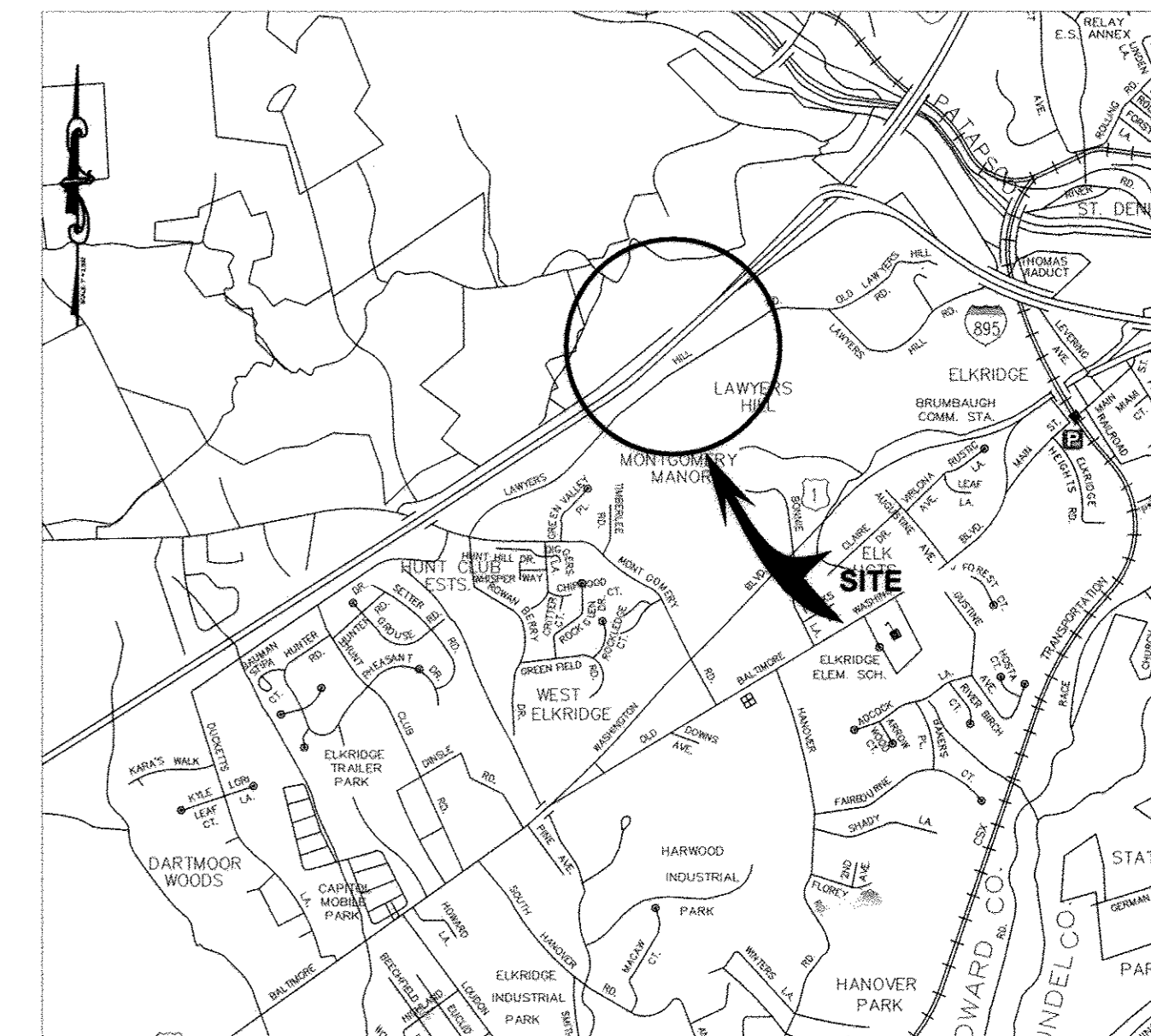
IMPROVEMENTS

DEPARTMENT OF PUBLIC WORKS

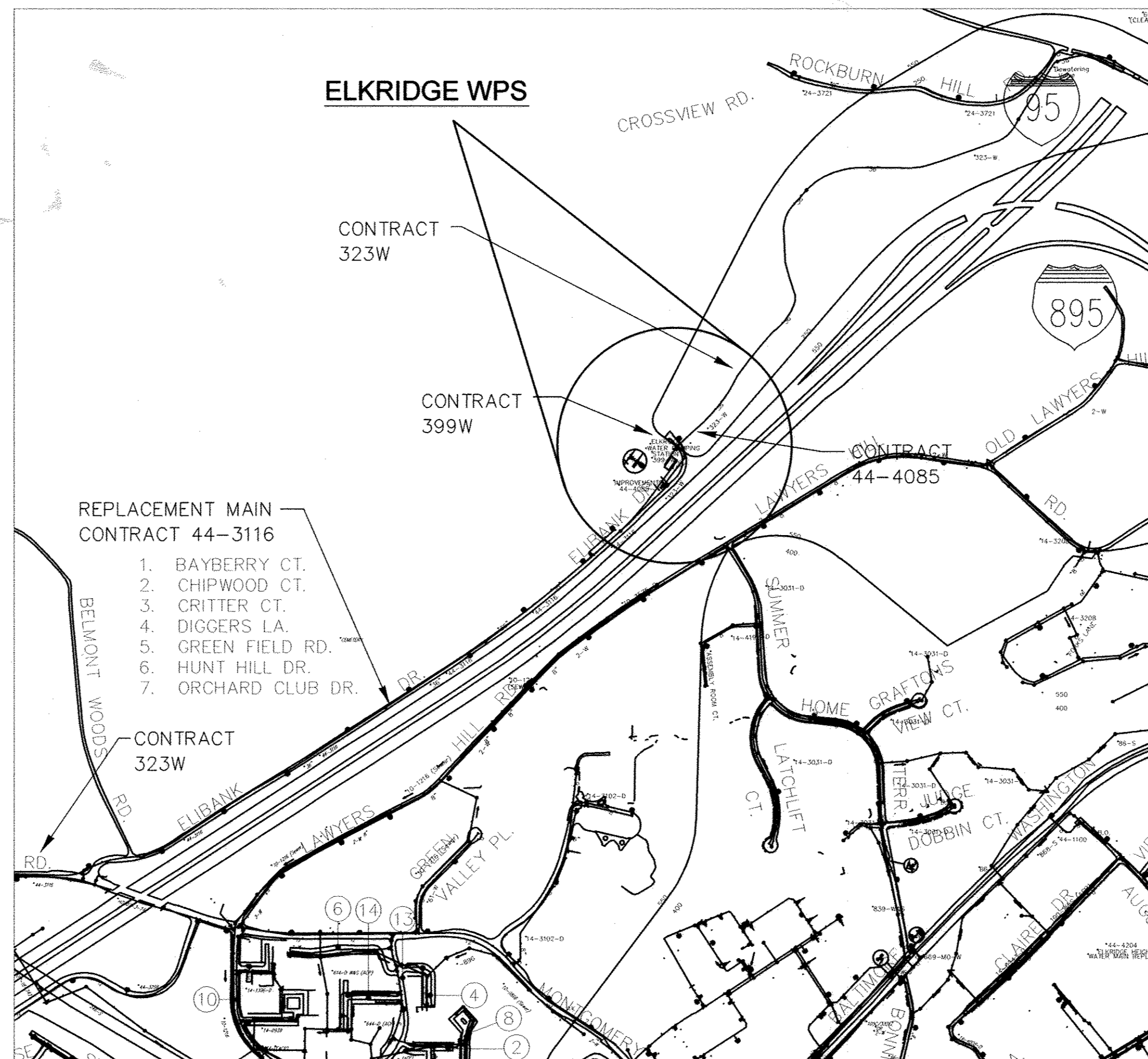
HOWARD COUNTY, MARYLAND

CONTRACT NO. 44-4793

CAPITAL IMPROVEMENT PROJECT NO. W-8317



VICINITY MAP
SCALE: 1" = 2000'



LOCATION MAP
SCALE: 1" = 600'

- NEW MTS WITH LOAD BANKS.
- NEW TRANSFORMER FOR MCC-CC2.
- EXPAND EXISTING LC2000 CONTROLLER FOR STANDBY POWER OPERATIONS AND I/O. PROVIDE CONTROL PROGRAMMING.
- INTERFACE STANDBY POWER CONTROLS WITH STATION CONTROLLER AND GENERATOR INCLUDING ATS INTERLOCKS AND SEQUENCE.
- MODIFIED CONTROL SYSTEM PROGRAMMING AT THE MC9710 CONTROLLER.
- NEW VENTILATION FANS WITH DUCTWORK, MOTORIZED DAMPERS AND CONTROL PANEL.
- NEW WATER SYSTEM MONITOR.
- STARTUP AND TESTING.
- EXPAND ASPHALT DRIVEWAY FOR GENERATOR ACCESS.
- LANDSCAPING FOR GENERATOR.
- PROJECT CLOSEOUT.

INDEX OF SHEETS	
SHEET NO.	DESCRIPTION
G-1	GENERAL - TITLE SHEET
C-1	CIVIL - SITE PLAN, LEGEND AND DETAILS
C-2	CIVIL - LANDSCAPING, PLAN AND DETAILS
SC-1	CIVIL - EROSION AND SEDIMENT CONTROL NOTES AND DETAILS
S-1	STRUCTURAL - PLATFORM PLAN, DETAILS, SECTIONS AND NOTES
M-1	MECHANICAL LEGEND, ABBREVIATIONS, AND GENERAL NOTES
M-2	MECHANICAL PLANS
M-3	GENERATOR PLAN, SECTION AND DESIGN CRITERIA
ED-1	ELECTRICAL - PLAN PUMP STATION DEMOLITION
E-1	ELECTRICAL - PLAN PUMP STATION
E-2	ELECTRICAL - PLAN GENERATOR
E-3	ELECTRICAL - SINGLE LINE DIAGRAM
E-4	ELECTRICAL - PANELBOARD SCHEDULE
I-1	INSTRUMENTATION - GENERAL NOTES, LEGEND AND KEY PLAN
I-2	INSTRUMENTATION - CONTROL DIAGRAM SYMBOLS
I-3	INSTRUMENTATION - PUMPING SYSTEM P&ID
I-4	INSTRUMENTATION - STANDBY POWER SYSTEMS P&ID
I-5	INSTRUMENTATION - PUMP CONTROLS (ECD)
I-6	INSTRUMENTATION - PUMP CONTROLS (ECD)
I-7	INSTRUMENTATION - PANEL ELEVATIONS AND DETAILS
I-8	INSTRUMENTATION - VENTILATION CONTROLS


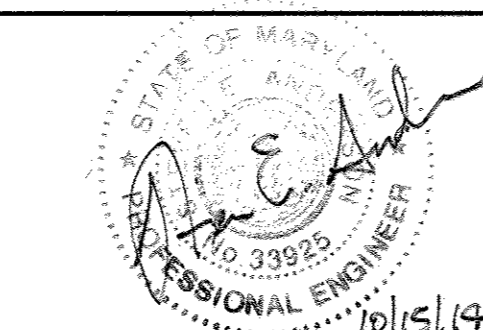
GRAPHIC SCALE

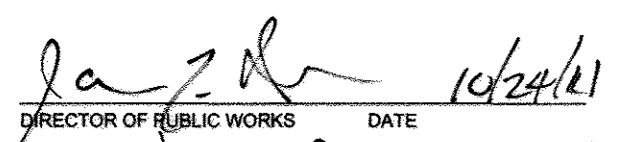





KCI TECHNOLOGIES PROJECT No.: 13-12267718

Oct 15, 2014 4:15pm User: Jordan Wolfe M:\2013\12267718\Drawings\G-1 TITLE SHEET.dwg

PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/15

 <p>KCI TECHNOLOGIES</p>	<p>ENGINEERS PLANNERS SCIENTISTS CONSTRUCTION MANAGERS</p> <p>936 RIDGEBROOK ROAD SPARKS, MD 21152 PHONE: (410) 316-7800 FAX: (410) 316-7817 WWW.KCI.COM</p>	
	<p>DES: SEA JFW AS - BUILT 12-22-17</p> <p>DRN: JFW</p> <p>CHK: SEA</p> <p>DATE: 10/20/14 BY NO. REVISION DATE</p>	

<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND</p>	
<p> DIRECTOR OF PUBLIC WORKS DATE 10/24/14</p>	<p> CHIEF, BUREAU OF ENGINEERING DATE 10/22/14</p>
<p> CHIEF, BUREAU OF UTILITIES DATE 10/22/14</p>	<p> CHIEF, UTILITY DESIGN DIVISION DATE 10/22/14</p>

<p>TITLE SHEET</p>	
<p>ELKRIDGE PUMP STATION IMPROVEMENTS</p> <p>HOWARD COUNTY, MARYLAND CONTRACT NO. 44-4793 ELECTION DISTRICT 1</p>	
<p>SCALE AS SHOWN SHEET 1 OF 21</p>	<p>SCALE 1"=600' 1"=2000'</p>

AS BUILT

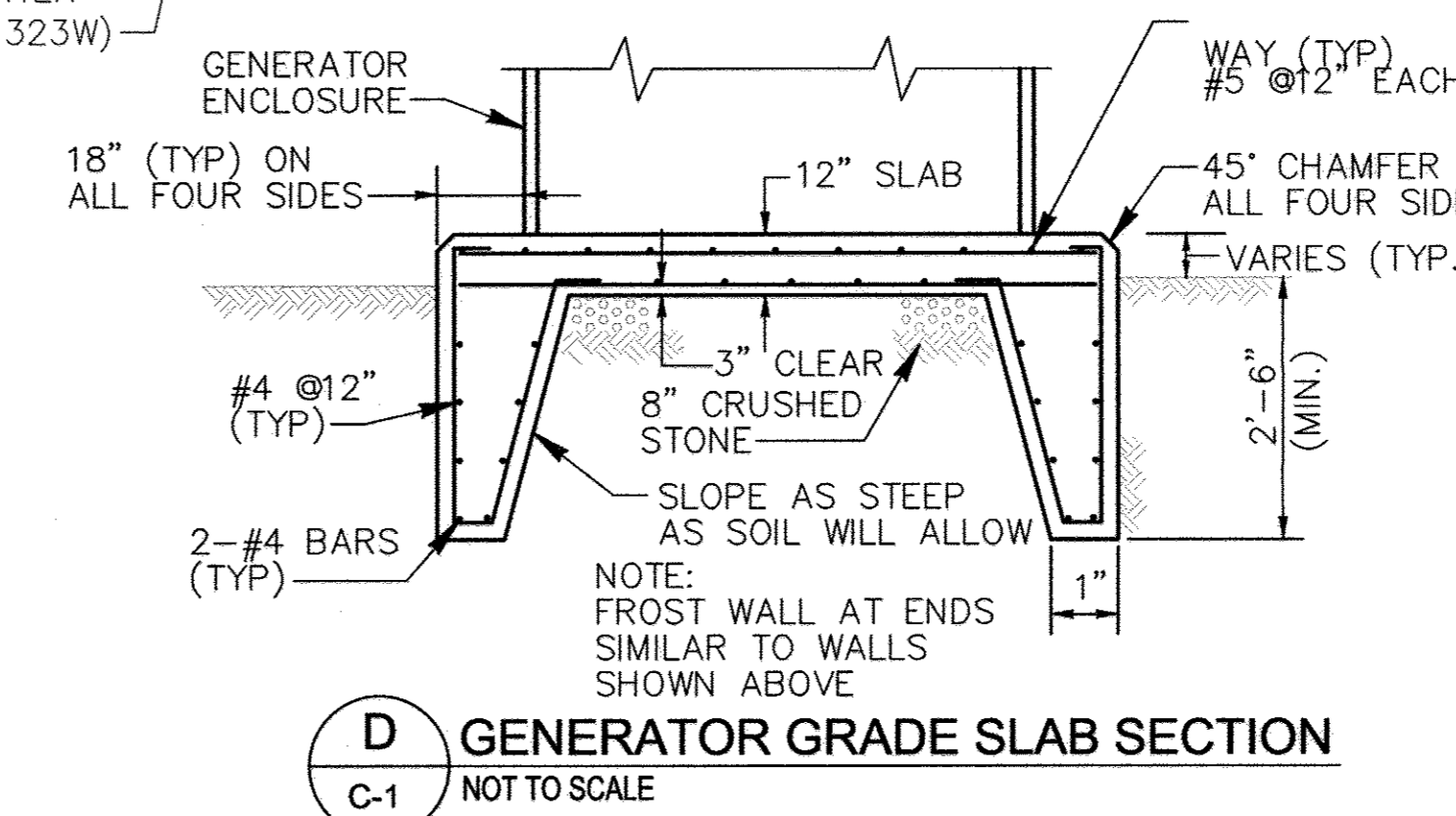
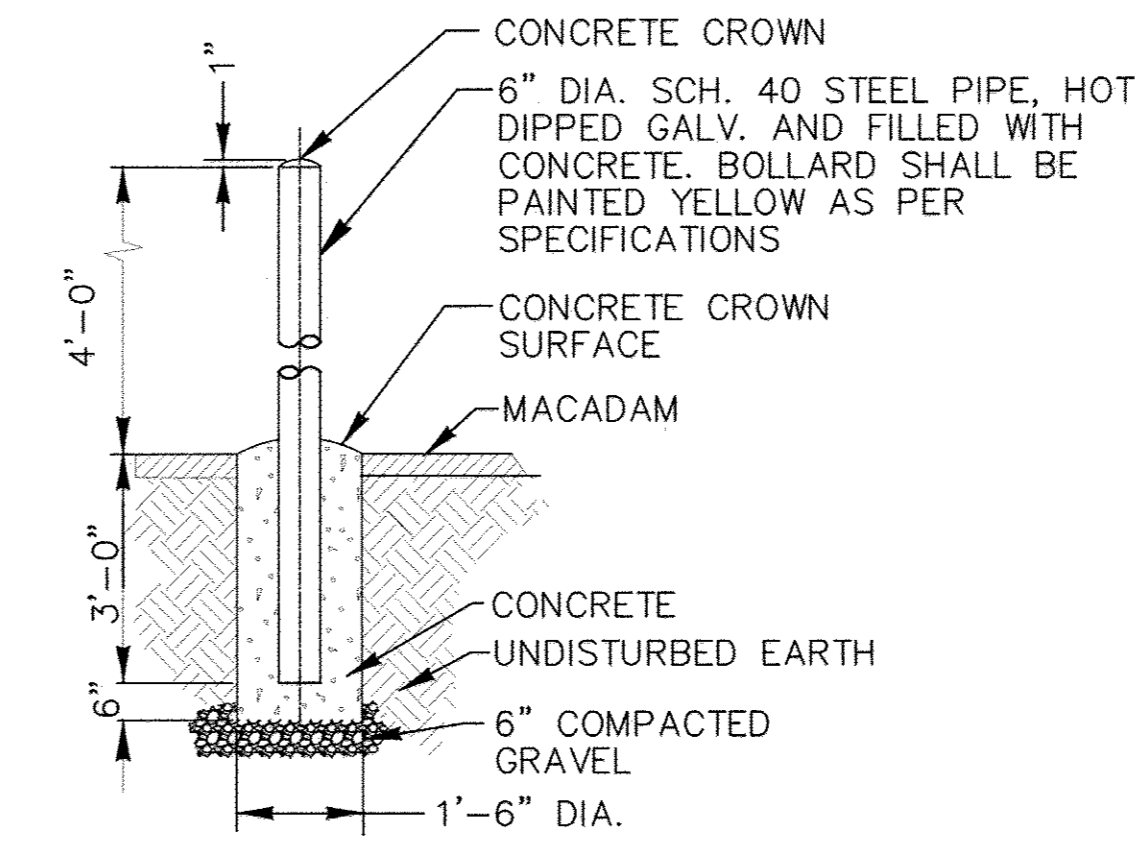
P.O.B.

TABLE 1:

STRUCTURAL FILL COMPACTION GUIDELINES			
AREAS OF FILL PLACEMENT	PROCTOR COMPACTION METHODS		MOISTURE CONTENT (PERCENT OF OPTIMUM)
	ASTM D 698 STANDARD	ASTM 1557 MODIFIED	
BENEATH LANDSCAPED/GRASS AREAS	92%	90%	AS NECESSARY TO OBTAIN DENSITY

NOTES:

- CONTRACTOR TO VERIFY EXISTING FIELD CONDITIONS PRIOR TO PERFORMING SITE IMPROVEMENTS. CONTRACTOR SHALL VERIFY SITE UTILITY LOCATIONS AND SITE SPECIFIC DIMENSIONS.
- ELEVATIONS SHOWN ARE BASED UPON FIRST FLOOR ELEVATION OF EXISTING ELK RIDGE WATER PUMPING STATION 213.00'.
- TRAVERSE POINT NO.2 SHOWN FOR SURVEY REFERENCE. SEE TRAVERSE POINT COORDINATES BELOW FOR POINTS NO.1, NO.2, AND NO.3.
- M.S.R.C. PLAT NO.31902 AND 34003. LIBER 669, FOLIO 489.
- PROVIDE TEMPORARY FENCING TO SECURE AND SAFEGUARD THE SITE IN ACCORDANCE WITH LIMITS OF DISTURBANCE AND STAGED CONSTRUCTION ACTIVITIES.
- IF SOILS ARE DEEMED UNSUITABLE BY GEOTECH. ENGINEERING FOR ALLOWABLE BEARING PRESSURE OF 1000 P.S.F. PERFORM SUBGRADE PREP TILL SUITABLE SOIL IS OBTAINED AND APPROVED BY GEOTECH ENGINEER.
- PLACE SLAB-ON-GRADE CONSTRUCTION FOR GENERATOR/PAD ON NO. 57 STONE AGGREGATE AND / OR COMPACTED STRUCTURAL FILL OVERLAYING FIRM INORGANIC NATURAL SOILS. USE A NET ALLOWABLE BEARING PRESSURE OF 1,000 PSF.
- SUBGRADE PREPARATION: PRIOR TO PLACING NEW FILL, EXCAVATE THE TOP THREE FEET OF SOILS TO REMOVE TOPSOIL, ORGANICS, DISTURBED AND UNSUITABLE MATERIALS. PROOF-ROLL COMPACTION OF EXPOSED SUBGRADES SHALL BE PERFORMED TO DENSIFY SOILS IN -SITU AND/OR TO DETECT DISTURBED GROUND AREAS AS EVIDENCED BY PUMPING OR SHIFTING BEHAVIOR. ANY DISTURBED AND LOOSE/SOFT SOILS ENCOUNTERED DURING EXCAVATION AND AT FOOTING SUBGRADE SHALL BE REMOVED AND REPLACED WITH COMPACTED FILL AND/OR NO. 57 STONE AGGREGATE AS DIRECTED BY THE OWNER.
- STRUCTURAL FILL MATERIALS SHALL HAVE A UNIFIED SOILS CLASSIFICATION OF GW, GP, GM, GC, SW, SP, SM WITH NOT MORE THAN 20 PERCENT FINES CONTENT, AND HAVING PLASTIC INDICES OF LESS THAN 10 PERCENT. USE NO. 57 STONE AGGREGATE WHEN WATER IS ENCOUNTERED. FILL USED WITHIN THE BUILDING AREAS OR FOR REPLACEMENT IN ANY UNDERCUT AREAS SHALL BE COMPACTED IN THIN LIFTS OF 6 TO 12 INCHES BASED ON COMPACTION EQUIPMENT. STRUCTURAL FILL COMPACTION REQUIREMENTS ARE INDICATED ON TABLE 1.
- FOR GRADE SLAB DETAILS SEE DRAWING E-2. GENERATOR PAD AT EL. 212.83.
- INSTALL NEW MACADAM WITH APPROVED SUBGRADE AND COURSE CONSTRUCTION IN ACCORDANCE WITH COUNTY DETAIL R-2.01, PAVING SECTION P-3.



CIVIL SYMBOLS AND ABBREVIATIONS:

- PROPERTY MARKER
- STORM DRAIN MANHOLE
- ⊠ TELEPHONE BOX
- △ TRAVERSE POINT
- EX. WATER VALVE
- w — EX. WATER MAIN
- DIA. DIAMETER
- EL. ELEVATION
- EX. EXISTING
- FF FINISHED FLOOR
- FT. FEET
- NO. NUMBER
- P.O.B. POINT OF BEGINNING
- S.S. STAINLESS STEEL
- TYP. TYPICAL
- — — — — EXISTING FEATURES
- — — — — EXISTING BERM CURB
- — — — — PROPERTY LINE
- 214 — PROPOSED GRADE
- — — — — NEW FEATURES
- SF — SILT FENCE
- LOD — LIMITS OF DISTURBANCE
- ⊠ EARTH

TRAVERSE POINTS

- N=996.562 } NOT SHOWN
E=1026.511 }
EL.=234.826 }
- N=1110.261 } ROADWAY LOCATION SHOWN
E=1207.524 }
EL.=209.036 }
- N=863.015 } NOT SHOWN
E.=1116.191 }
EL.214.378? }

SITE EXCAVATION

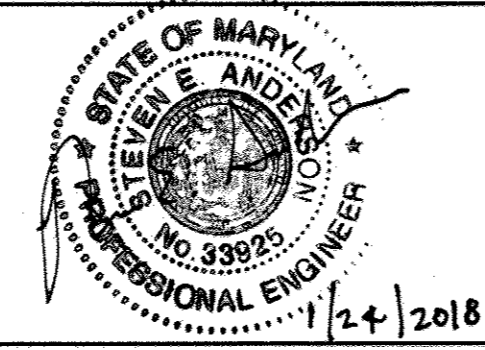
TOTAL LIMITS OF DISTURBANCE 4811 SQ. FT.
CUT QUANTITY 96 CUBIC YDS.
FILL QUANTITY 44 CUBIC YDS.
MASS BALANCE REMOVE 52 CUBIC YDS.
MACADAM WORK 113 SQ. FT.

CONSTRUCTION NOTES

① A SUMMATION OF CHANGES IN SITE DRAINAGE TO EVALUATE THE NEED FOR SWM MEASURES. NO SWM REQUIRED, BMP EMPLOYED, SEE DRAWING SC-1.

PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State Of Maryland, License No. 33925, Expiration Date 1/15/19

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DES: SEA	JFW	AS-BUILTS	12/22/2017
DRN: JFW			
CHK: SEA			
DATE: 10/2014	BY: NO.	REVISION	DATE

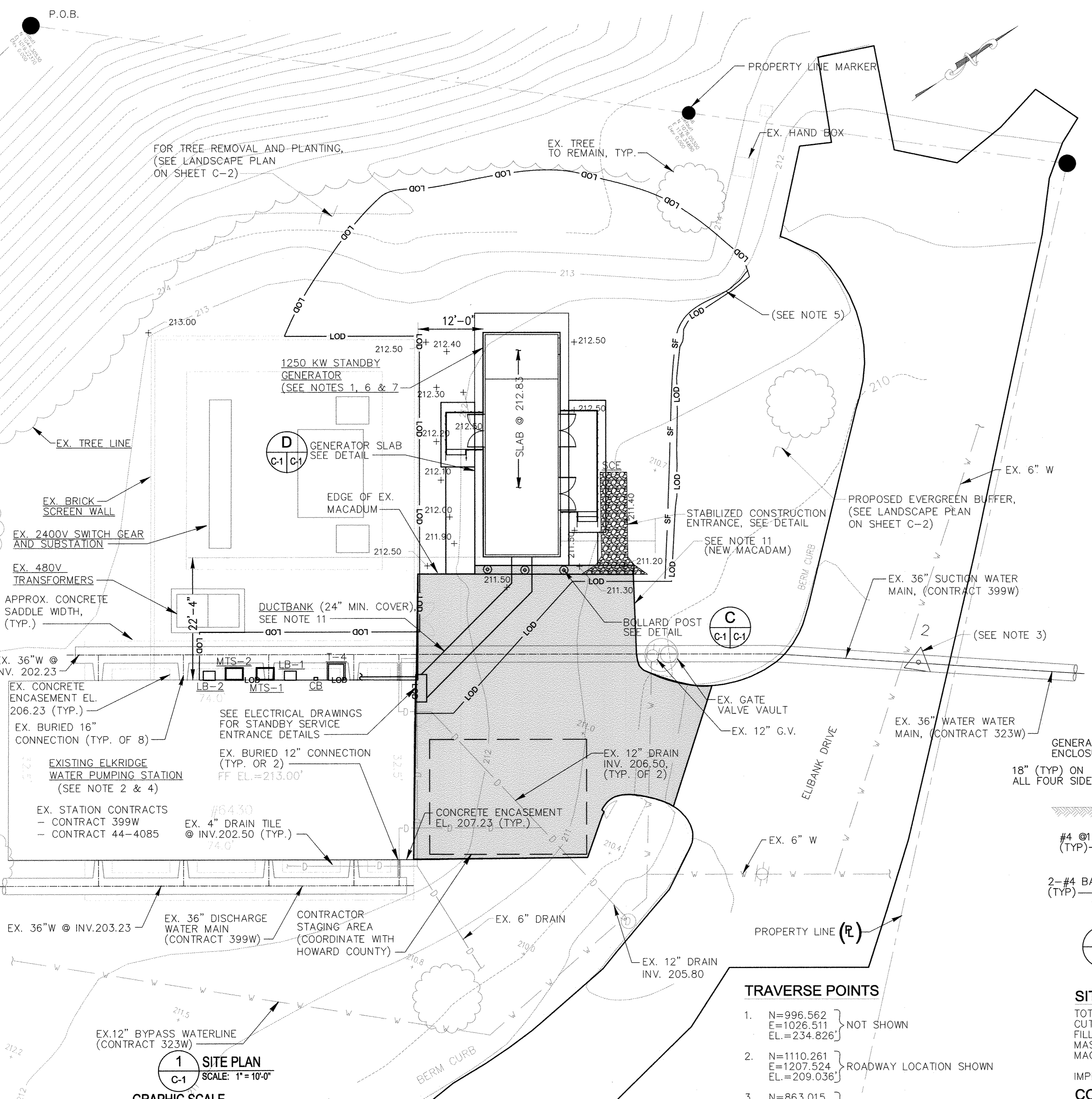
CIVIL - SITE PLAN LEGEND AND DETAILS	
1000 SCALE MAP NO. 32	BLOCK NO.20

ELK RIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

SCALE AS SHOWN
SHEET 2 OF 21

KCI TECHNOLOGIES PROJECT No.: 13-12267718

Jan 24, 2018, 10:28am User: jfww@kci.com W:\2017\1312267718\Drawings\As-Built\Drawings\Final As-Built\Contract 44-4793\C-1 - SITE PLAN.rvt.dwg

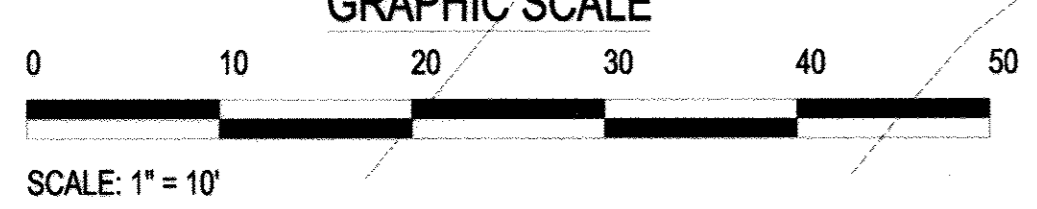


FOR TREE REMOVAL AND PLANTING, (SEE LANDSCAPE PLAN ON SHEET C-2)

D GENERATOR SLAB SEE DETAIL C-1

C TYPICAL BOLLARD DETAIL C-1

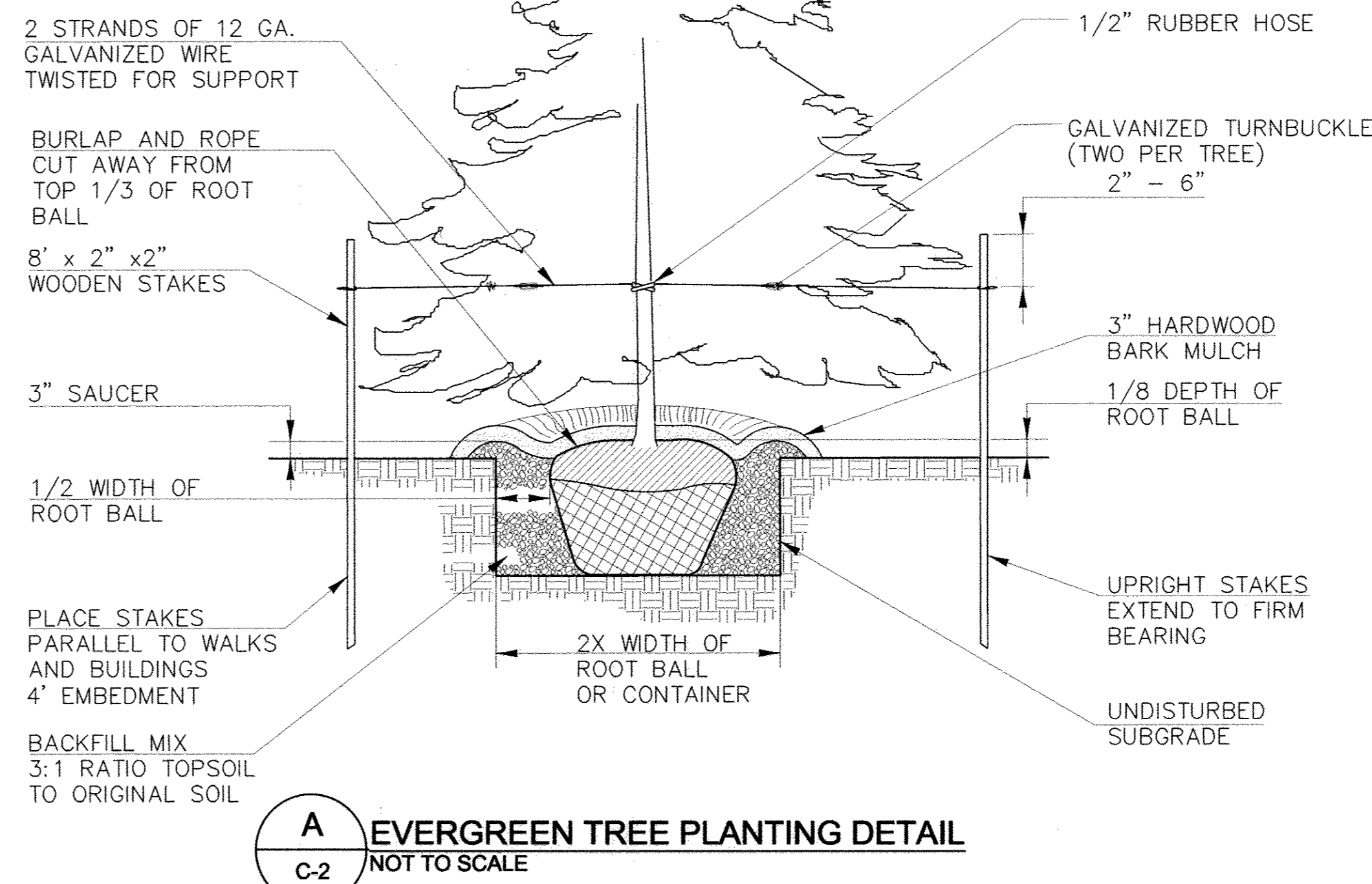
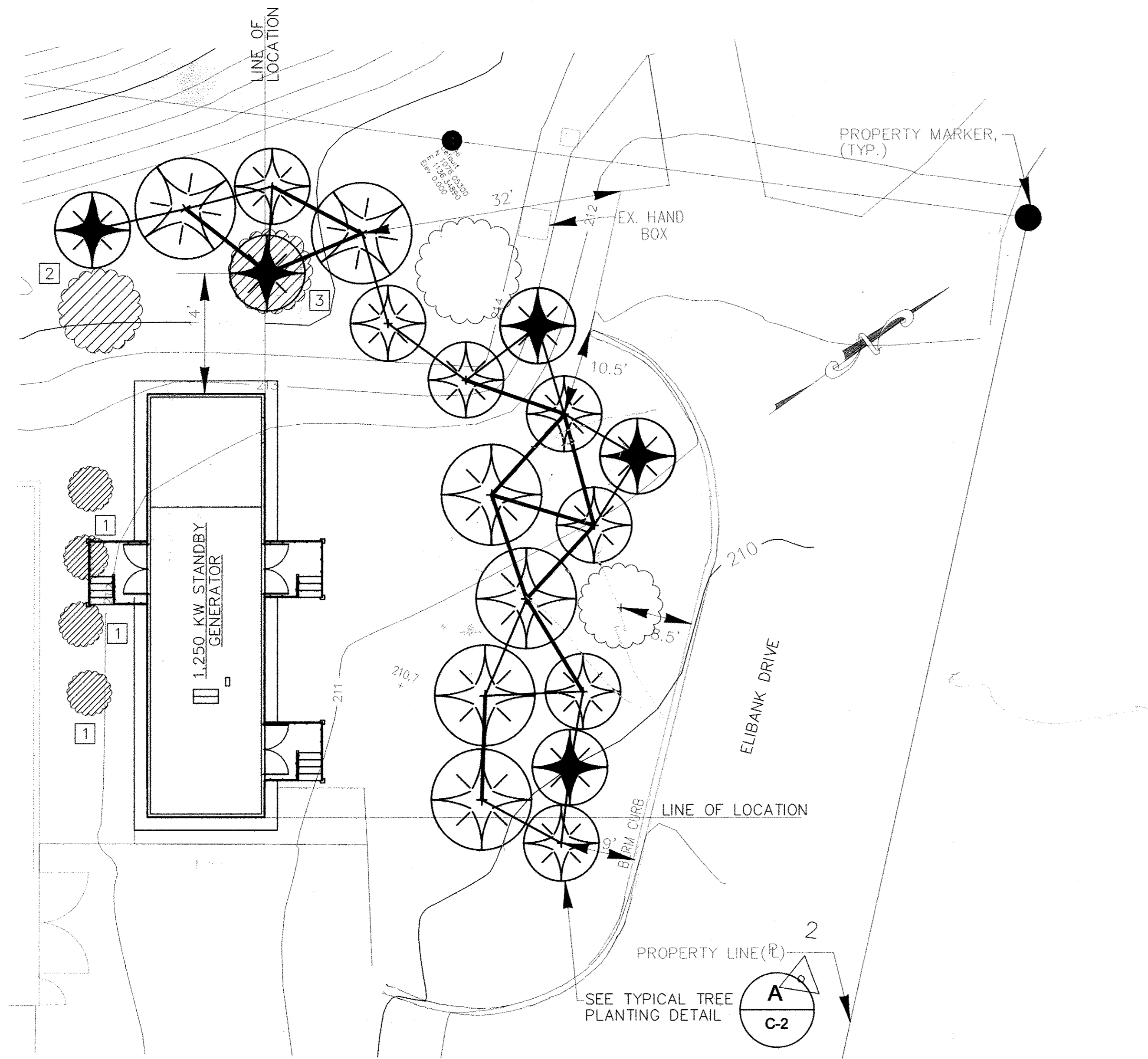
1 SITE PLAN C-1 SCALE: 1"=10'-0"



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

John G. Kelle 1-20-18
CHIEF, BUREAU OF UTILITY
DATE

Mona E. Butler 1/31/18
CHIEF, BUREAU OF ENGINEERING
DATE



- NOTES**
- SEE CIVIL-SITE PLAN, C-1, FOR DETAILS AND GRADING.
 - SEE SC-1 FOR EROSION AND SEDIMENT CONTROL NOTES AND DETAILS.
 - ALL TREES ARE DEER RESISTANT.

- SYMBOLS**
- DISTANCE = 13'-0"
 - DISTANCE = 11'-0"
 - EASTERN WHITE PINE (PINUS STROBUS) 7'-9" TALL
 - EASTERN REDCEDAR (JUNIPERUS VIRGINIANA) 6'-8" TALL
 - SAN JOSE HOLLY (ILEX AQUIPERNYI) 6'-8" TALL

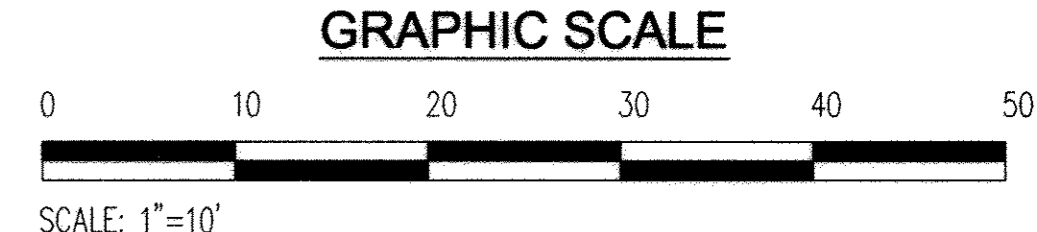
- REMOVAL NOTES**
- REMOVE EXISTING BUSH/SHRUBS
 - REMOVE EXISTING 6" WHITE PINE TREE
 - REMOVE TWO (2) EXISTING 18" WHITE PINE TREES

GENERAL LANDSCAPE NOTES

- THE LANDSCAPE CONTRACTOR SHALL VERIFY ALL EXISTING CONDITIONS AND UTILITY LOCATIONS SHOWN WITHIN THE PROJECT LIMITS AND SHALL INFORM THE ENGINEER OF ANY DISCREPANCIES OR POTENTIAL PROBLEMS PRIOR TO COMMENCING WORK.
- ALL PLANTING AND MULCHING SHALL BE DONE IN ACCORDANCE WITH THE MDSA BOOK OF STANDARDS, HIGHWAY AND INCIDENTAL STRUCTURES, CATEGORY 7 - LANDSCAPING.
- DO NOT PLANT TREES OR SHRUBS WITHIN 5'-0" OF THE CENTERLINE OF UNDERGROUND UTILITIES LINES. DO NOT PLANT TREES WITHIN 10'-0" OF THE CENTERLINE OF OVERHEAD UTILITY LINES. THE CONTRACTOR IS RESPONSIBLE FOR CONTACTING 'MISS UTILITY' AT 1-800-257-7777 A MINIMUM OF 72 HOURS PRIOR TO PROCEEDING WITH ANY EXCAVATION FOR PLANT MATERIAL INSTALLATION.
- ALL TREES GREATER THAN OR EQUAL TO 6'-0" IN HEIGHT SHALL BE STAKED PER THE PLANTING DETAILS.
- TREES, SHRUBS AND/OR ANY TYPE OF WOODY VEGETATION ARE NOT TO BE PLANTED ON ANY EMBANKMENT COMPRISED OF FILL MATERIALS.
- TREES AND SHRUBS ARE NOT TO BE PLANTED WITHIN 10 FEET OF THE TOE OF SLOPE OR WITHIN 25 FEET OF ANY DRAINAGE STRUCTURES OR PIPES.

CARE OF PLANTS AFTER CONSTRUCTION

- IF SOILS ARE NOT WET, THE AREA WILL BE WATERED IMMEDIATELY AFTER PLANTING. THE SOIL SUBSTRATE MUST BE KEPT SATURATED DURING PLANTING AND CONTINUED ACCORDING TO CLIMATIC CONDITIONS AND UNTIL PLANTINGS BECOME FULLY ESTABLISHED AS DETERMINED BY THE PROFESSIONAL LANDSCAPER.
- 3-WEEKS AFTER PLANTING, THE TREES SHALL BE TREATED WITH (BT) BACTERIA OR EQUAL PREVENTIVE MEASURE TO PROTECT THE TREES FROM BAGWORMS. THE TREES SHALL REQUIRE TREATMENT BETWEEN MAY AND AUGUST PLANTING SEASON. FALL PLANTING SHALL NOT REQUIRE TREATMENT.



PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/15

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

[Signature] 10/22/14
DIRECTOR OF PUBLIC WORKS DATE

[Signature] 10/22/14
CHIEF, BUREAU OF UTILITIES DATE

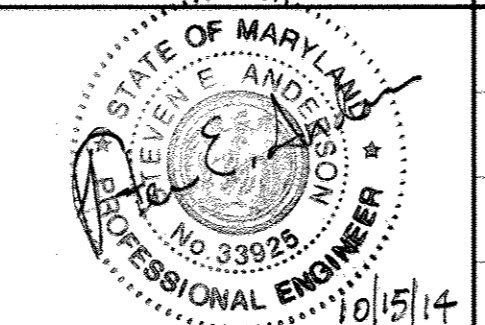
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DATE: 10/2014	BY: NO.	REVISION	DATE

CIVIL - LANDSCAPE PLAN AND DETAILS

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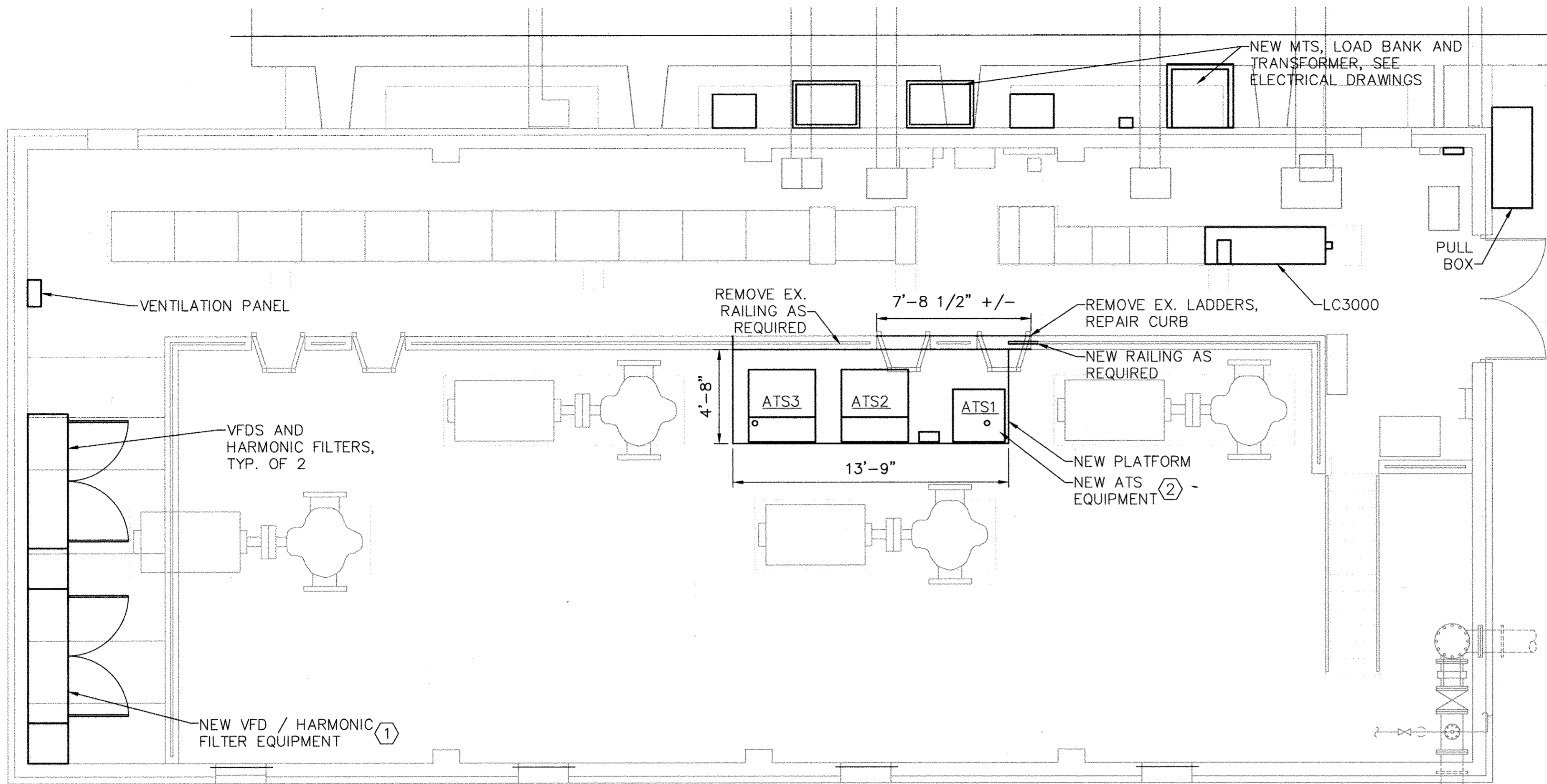
ELKRIDGE PUMP STATION IMPROVEMENTS

HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

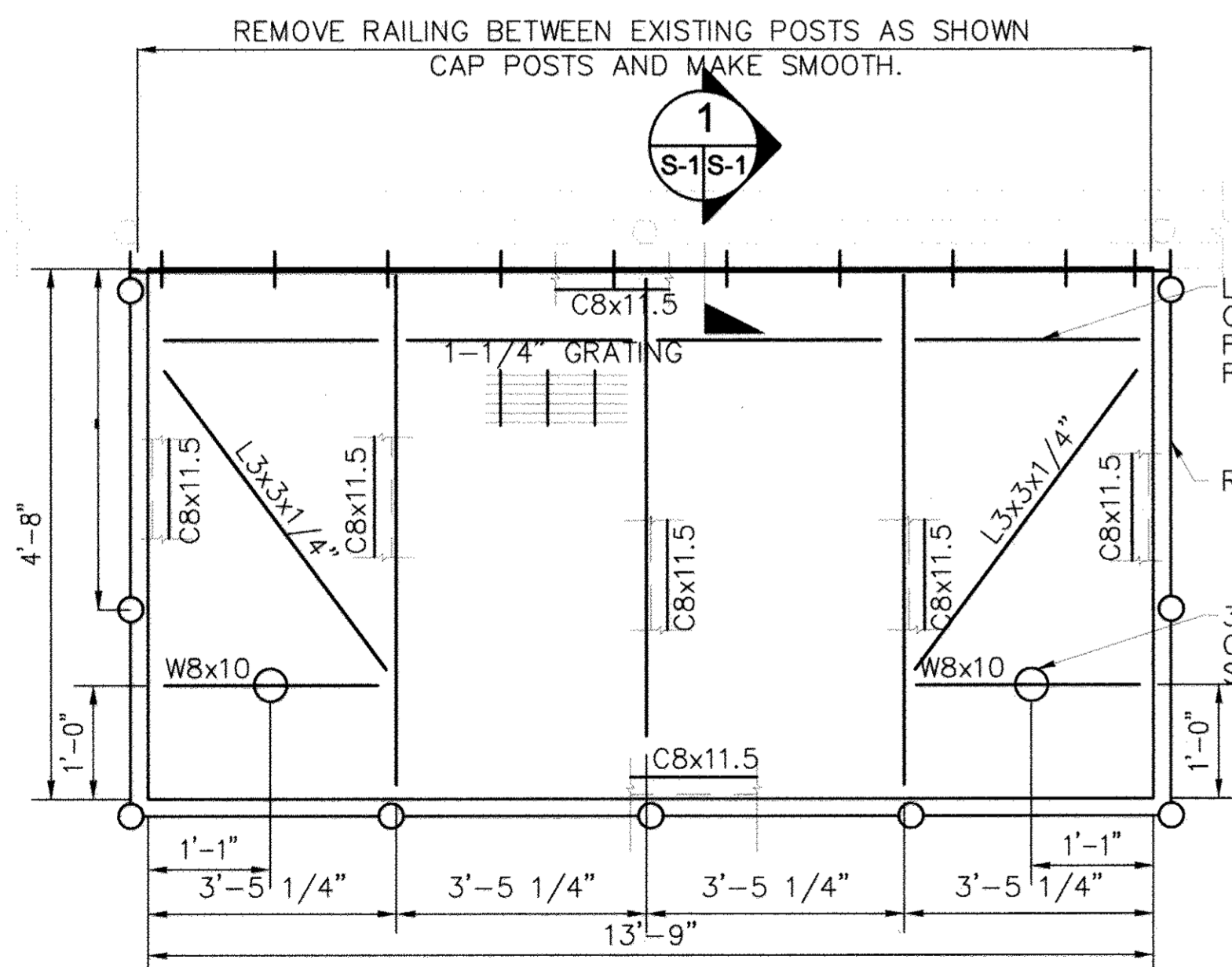
C-2
SCALE AS SHOWN
SHEET 3 OF 21

AS BUILT

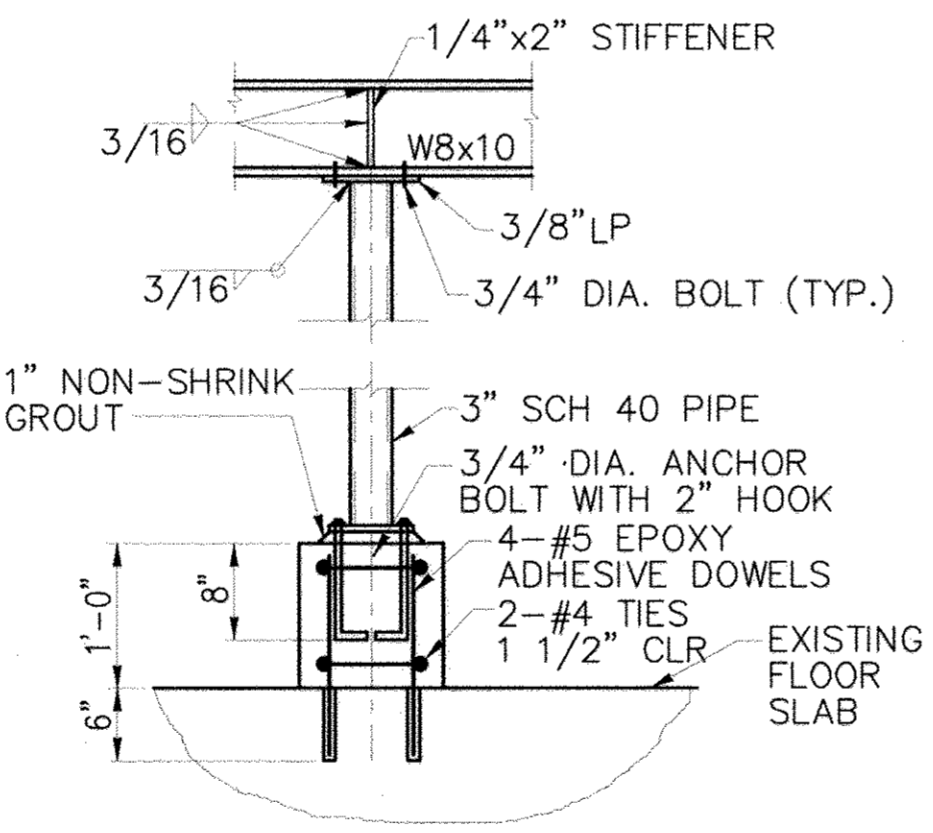
KCI TECHNOLOGIES PROJECT No.: 13-12267718



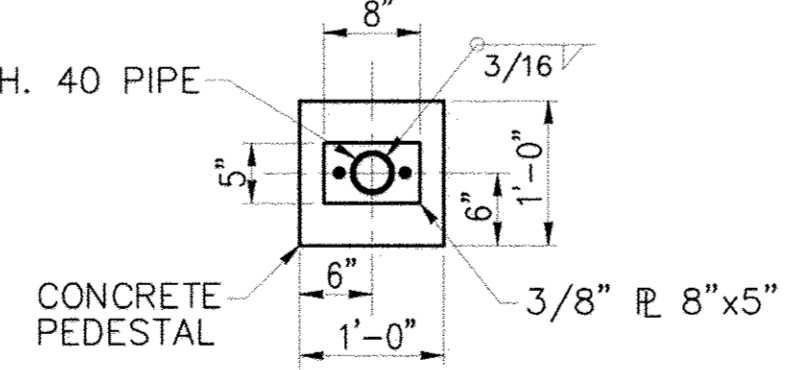
1 PLATFORM PLACEMENT PLAN
S-1 SCALE: 1/4" = 1'-0"



2 PLATFORM FRAMING PLAN
S-1 SCALE: NOT TO SCALE

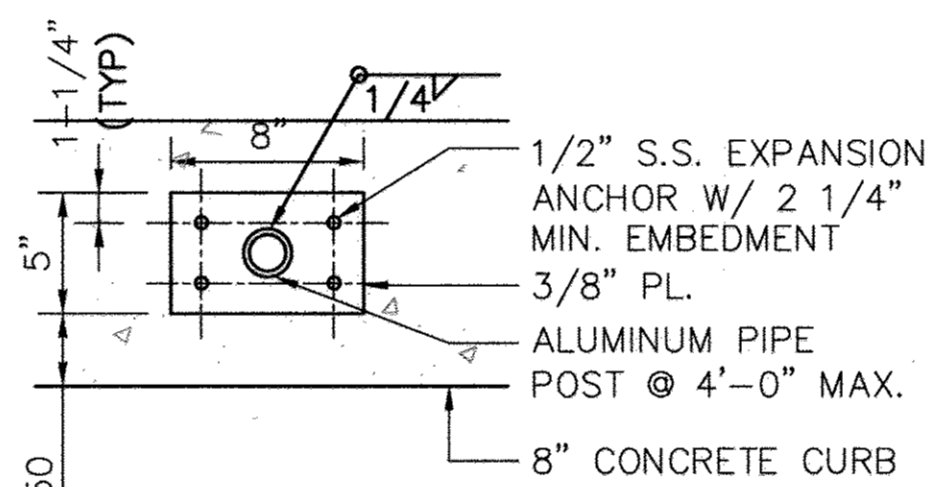


SECTION VIEW
SCALE: 3/4" = 1'-0"

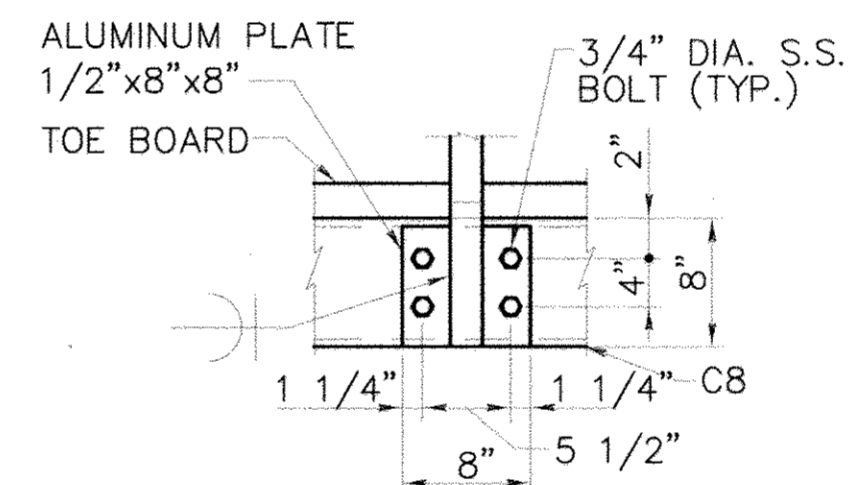


PLAN VIEW
SCALE: 3/4" = 1'-0"

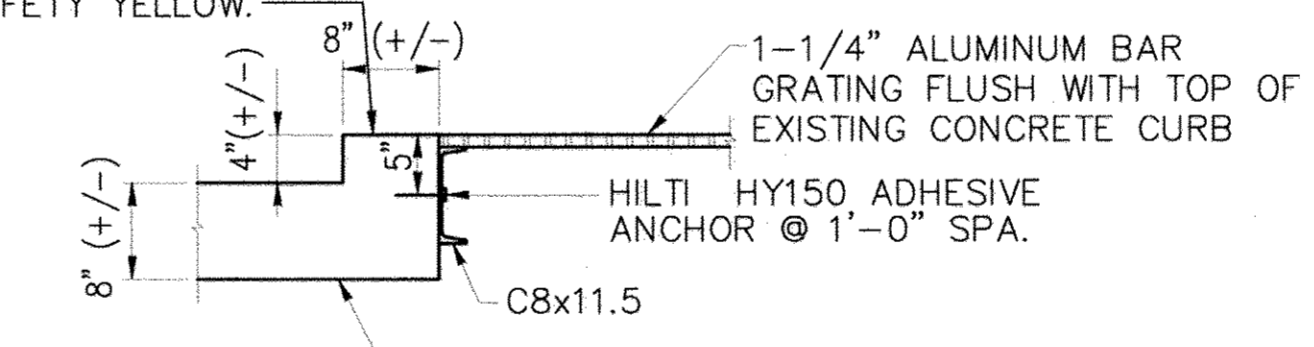
A TYPICAL PIPE COLUMN DETAIL
S-1 SCALE: AS NOTED



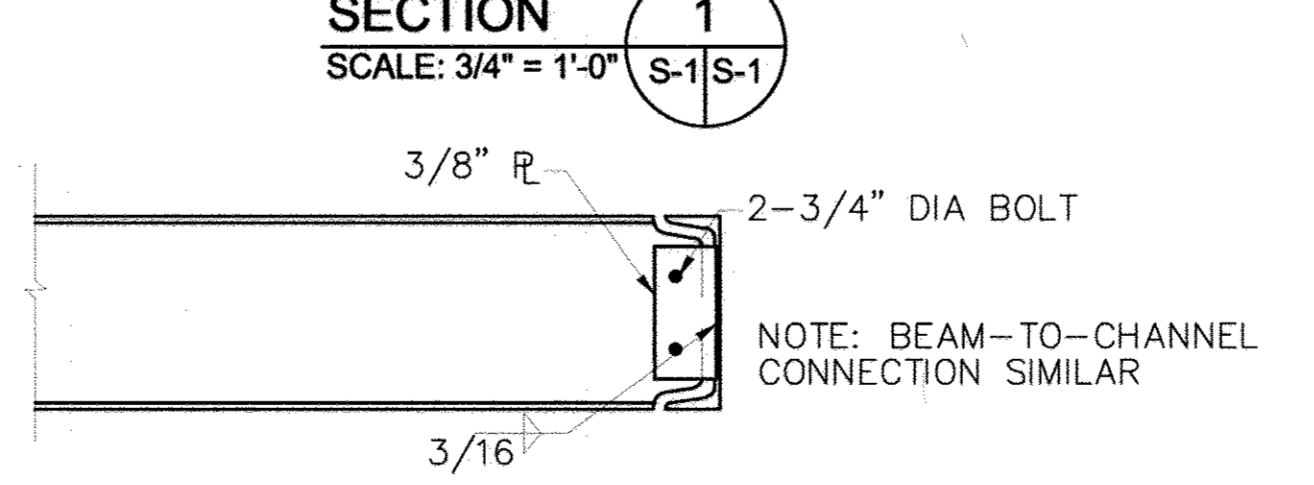
RAILING CONNECTION TO CONCRETE DETAIL
NOT TO SCALE



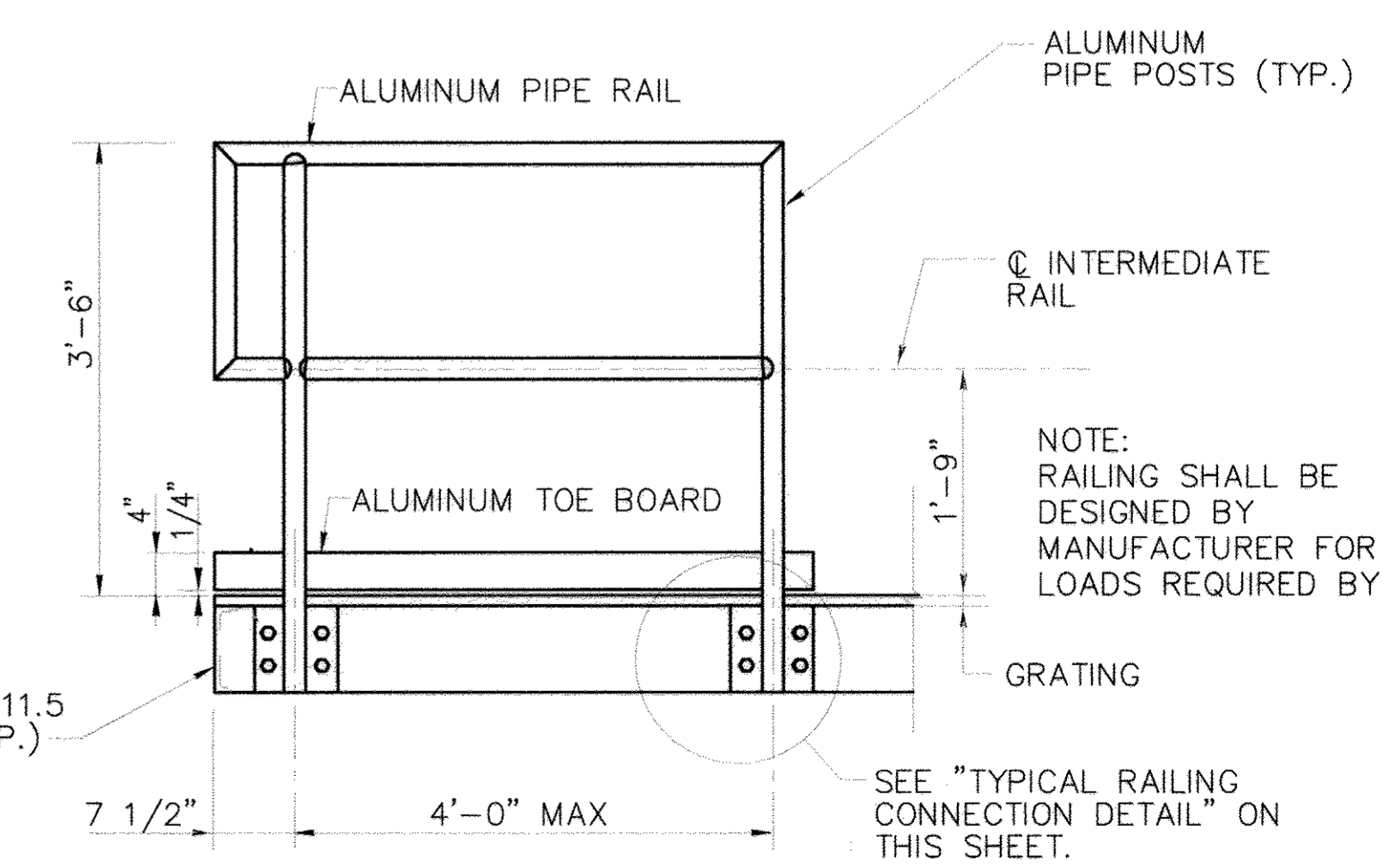
RAILING CONNECTION DETAIL
NOT TO SCALE



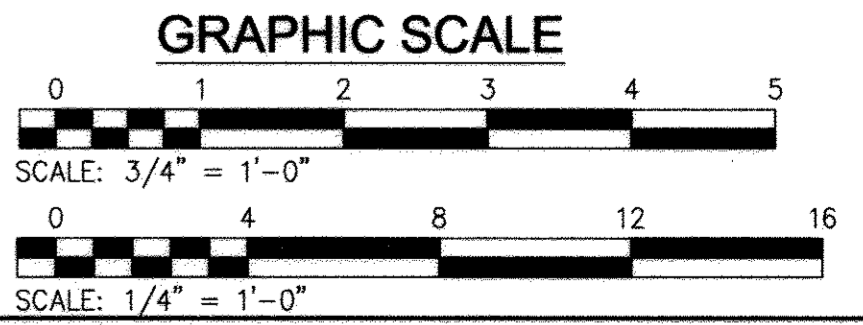
SECTION
SCALE: 3/4" = 1'-0"



TYP. CHANNEL-TO-CHANNEL CONNECTION DETAIL
NOT TO SCALE



TYP. RAILING DIMENSION
SCALE: 3/4" = 1'-0"



S-1

CONSTRUCTION NOTES

- COORDINATE MODIFICATIONS TO EXISTING SUPPORT STEEL TO SUIT NEW VFDS AND HARMONIC FILTERS.
- COORDINATE PLATFORM POST LOCATIONS TO MAINTAIN A MINIMUM OF 3- FEET CLEARANCE AROUND EQUIPMENT.

GENERAL NOTES

- DESIGN LOADS: GRATING LIVE LOAD = 125 PSF EQUIPMENT LOAD = 1560 LBS. EACH
- ALL STEEL SHALL BE DETAILED, FABRICATED AND ERECTED IN ACCORDANCE WITH AISC MANUAL OF STEEL CONSTRUCTION (ALLOWABLE STRESS DESIGN), 9th EDITION. MATERIALS SHALL BE AS FOLLOWS: SHAPES AND PLATES: ASTM A 36 PIPE: ASTM A 53, GRADE B ASTM A 325 UNLESS SPECIFIED OTHERWISE BOLTS:
- ALL WELDING SHALL BE IN ACCORDANCE WITH THE APPLICABLE PROVISIONS OF AWS D1.1, STRUCTURAL WELDING CODE - STEEL, USING E70XX ELECTRODES. ALL WELDERS SHALL BE CERTIFIED IN ACCORDANCE WITH AWS REQUIREMENTS.
- ALL ALUMINUM GRATING SHALL HAVE 1-1/4"x1/8" BEARING BARS, IN ACCORDANCE WITH NAAMM METAL BAR GRATING MANUAL. EACH PANEL SHALL BE ANCHORED TO THE SUPPORT STRUCTURE WITH A MINIMUM OF 4 SADDLE CLIPS WITH 1/4" DIAMETER BOLTS OR SELF-DRILLING SCREWS.
- ALL STRUCTURAL STEEL, INCLUDING ALL BOLTS AND ACCESSORIES, SHALL BE GALVANIZED AFTER FABRICATION IN ACCORDANCE WITH ASTM A 123 AND A 153. ALL AREAS OF FIELD WELDING AND BOLTING AND ANY OTHER AREAS WITH DAMAGED COATING SHALL BE FIELD REPAIRED WITH SSPC PAINT 20 GALVANIZING REPAIR PAINT APPLIED IN ACCORDANCE WITH MANUFACTURER'S INSTRUCTIONS.
- ALL NEW HANDRAILING SHALL BE OF MODULAR ALUMINUM. SEE SPECIFICATIONS FOR PIPE SIZES AND LOADING QUALIFICATIONS.
- ALL DIMENSIONS AFFECTED BY THE GEOMETRICS AND/OR LOCATION OF THE EXISTING STRUCTURE ARE TO BE CHECKED IN THE FIELD BY THE CONTRACTOR BEFORE ANY CONSTRUCTION IS DONE AND BEFORE ANY MATERIAL IS ORDERED OR FABRICATED. NOTIFY THE ENGINEER WHERE OBSTRUCTIONS TO NEW CONSTRUCTION OCCUR BEFORE ANY CONSTRUCTION IS DONE AND BEFORE ANY MATERIAL IS ORDERED OR FABRICATED.
- SUBMIT SHOP DRAWINGS FOR ALL STEEL AND CONCRETE WORK TO OWNER PRIOR TO FABRICATION FOR APPROVAL.
- CONTRACTOR SHALL VERIFY THE LOCATION OF BUILDING STRUCTURAL ELEMENTS TO ASSURE THE CONSTRUCTABILITY OF THE PROPOSED STRUCTURE.
- CONTRACTOR IS RESPONSIBLE FOR CARRYING OUT THE PROJECT IN A SAFE MANNER SO THAT THE EXISTING STRUCTURE IS NOT DAMAGED IN ANY WAY. CONTRACTOR SHALL PERFORM ANY NECESSARY TESTING AND ENGAGE A QUALIFIED PROFESSIONAL TO PROVIDE CONSTRUCTION GUIDANCE. ANY DAMAGE TO THE EXISTING STRUCTURE CAUSED BY CONTRACTOR'S OPERATIONS SHALL BE REPAIRED TO THE OWNER'S SATISFACTION AT THE CONTRACTOR'S SOLE EXPENSE.
- ALL DETAILS ARE TYPICAL EXCEPT AS NOTED.
- CONCRETE:
 - ALL CONCRETE WORK SHALL CONFORM TO ALL PROVISIONS OF "SPECIFICATION FOR STRUCTURAL CONCRETE FOR BUILDINGS" (ACI 301) AND TO THE "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" (ACI 318).
 - ALL STRUCTURAL CONCRETE, UNLESS NOTED OTHERWISE, SHALL HAVE A MINIMUM COMPRESSIVE STRENGTH OF 3,500 P.S.I. AT 28 DAYS.
 - ALL REINFORCING BARS SHALL CONFORM TO ASTM A-615, GRADE 60.
 - HOOKS ON BARS SHALL HAVE STANDARD ACI LENGTHS AND BEND RADII UNLESS INDICATED OTHERWISE.
 - COVER FOR REINFORCEMENT SHALL BE IN ACCORDANCE WITH ACI 318 UNLESS INDICATED OTHERWISE.

Dec 21, 2017, 12:23pm User: jpkd, web: W:\2017\1312267718\Drawings\As-Built\Digital\Final As-Built.dwg Plot: 44-4793S - 0.dwg

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

[Signature] 2/6/18
DATE 1-30-18
CHIEF, BUREAU OF UTILITIES

[Signature] 1/31/18
DATE 1/31/18
CHIEF, UTILITY DESIGN DIVISION

PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/19

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STATE OF MARYLAND
REGISTERED PROFESSIONAL ENGINEER
NO. 33925
EXPIRES 1/15/19

DES: LH	JFW	AS-BUILTS	12/22/2017
DRN: PDB			
CHK: LH			
DATE: 10/2014	BY	NO.	REVISION
			DATE

PLATFORM PLAN, DETAILS, SECTIONS, AND NOTES

1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

SCALE AS SHOWN SHEET 5 OF 21

AS BUILT REPLACEMENT SHEET

GENERAL ABBREVIATIONS

Table with 2 columns: SYMBOL, DESCRIPTION. Lists abbreviations for materials, equipment, and units.

Table with 2 columns: SYMBOL, DESCRIPTION. Lists abbreviations for materials, equipment, and units.

FLOWSTREAM ABBREVIATIONS

Table with 2 columns: SYMBOL, DESCRIPTION. Lists abbreviations for flow streams and equipment.

HVAC ABBREVIATIONS

Table with 2 columns: SYMBOL, DESCRIPTION. Lists abbreviations for HVAC equipment and ductwork.

PLUMBING ABBREVIATIONS

Table with 2 columns: SYMBOL, DESCRIPTION. Lists abbreviations for plumbing fixtures and equipment.

MECHANICAL GENERAL NOTES:

- 1. COORDINATE ALL SHUTDOWNS AND SEQUENCING WITH THE OWNER.
2. OWNER WILL MAINTAIN AND OPERATE EXISTING EQUIPMENT. CONTRACTOR SHALL NOT OPERATE EXISTING VALVES OR EQUIPMENT.
...
25. ALL DUCTS, AIR HANDLERS, FANS AND FILTER BOXES SHALL BE SEALED IN ACCORDANCE WITH SECTION 603.9 OF THE IMC.

PROCESS PIPING SYMBOLS:

Table showing symbols for process piping: DOUBLE LINE, SINGLE LINE, and various pipe types like welded, flanged, threaded.

VALVE SYMBOLS

Table showing symbols for various valves: BACKFLOW PREVENTOR, GATE VALVE, CHECK VALVE, BALL VALVE, BUTTERFLY VALVE, SOLENOID VALVE, etc.

EQUIPMENT SYMBOLS

Table showing symbols for equipment: SLIDE GATE, SPRAY NOZZLE, JET NOZZLE, AIR DIFFUSERS, DOUBLE DISK DIAPHRAGM PUMP, CENTRIFUGAL PUMP, etc.

HVAC SYMBOLS

Table showing symbols for HVAC: DUCT SIZE - RECTANGULAR, DUCT TRANSITION - FLAT ON BOTTOM, FLEXIBLE CONNECTION AT FAN-INLET AND OUTLET, etc.

FIELD INSTRUMENT SYMBOLS

Table showing symbols for field instruments: MAGNETIC FLOW METER, PRESSURE SENSOR W/ PRESSURE DEVICES, PRESSURE SWITCH, etc.

ANNOTATION SYMBOLS

Table showing symbols for annotations: WATER SURFACE ELEVATION, ONE WAY FLOW DIRECTION, BOTH WAYS FLOW DIRECTION.

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Oct 15, 2014 - 11:00am User: Jordan Walsh MCD261320877:0 Drawings\M-M-1 LEGEND & ABBREVIATIONS.dwg

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND. Includes signatures of Director of Public Works and Chief, Bureau of Utilities.

KCI TECHNOLOGIES logo and contact information: 936 RIDGEBROOK ROAD SPARKS, MD 21152

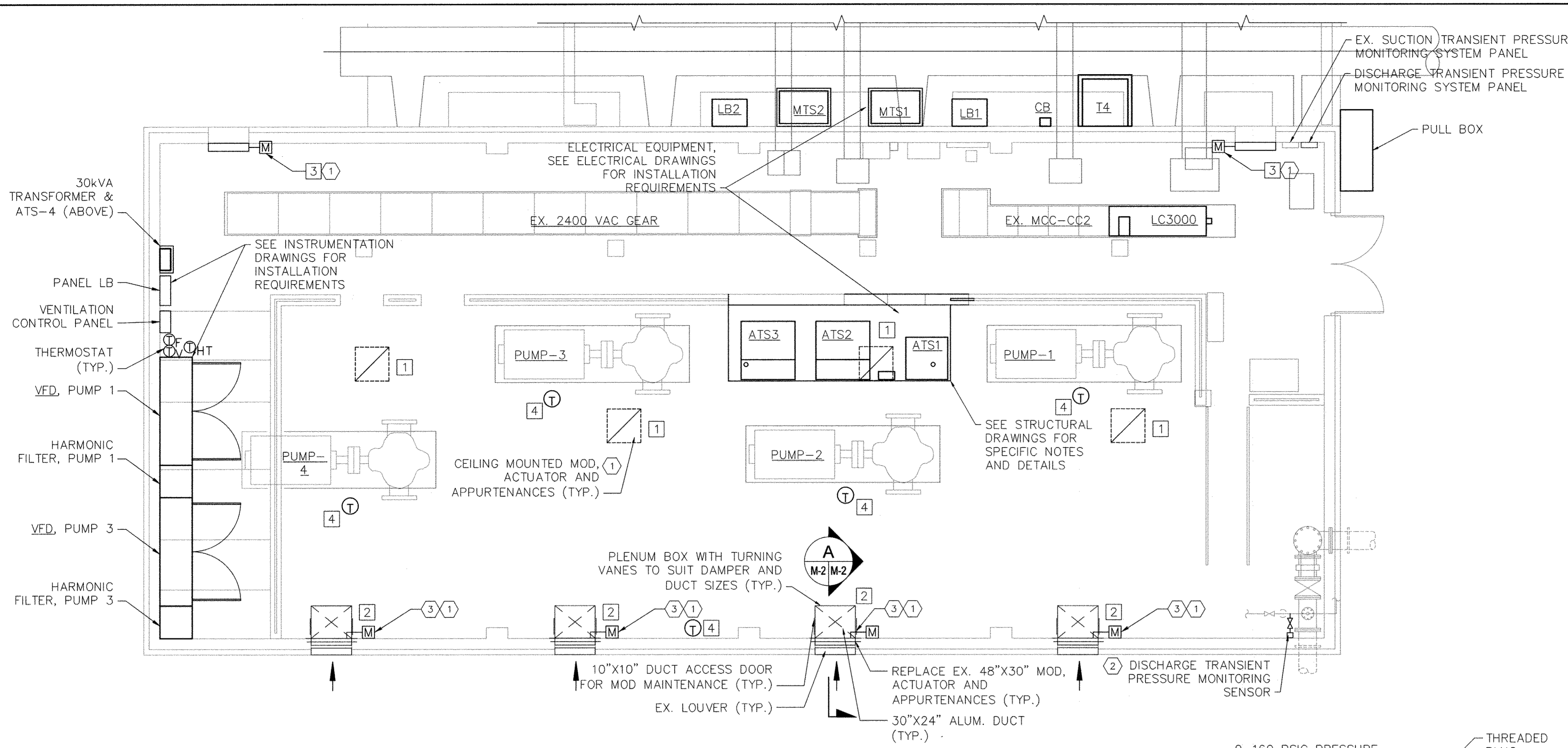
Professional Engineer Seal for Jordan Walsh, License No. 33925, State of Maryland.

Table with columns: DES: JFW, DRN: JFW, CHK: LP, DATE: 10/2014, BY: NO., REVISION, DATE: 12-22-17.

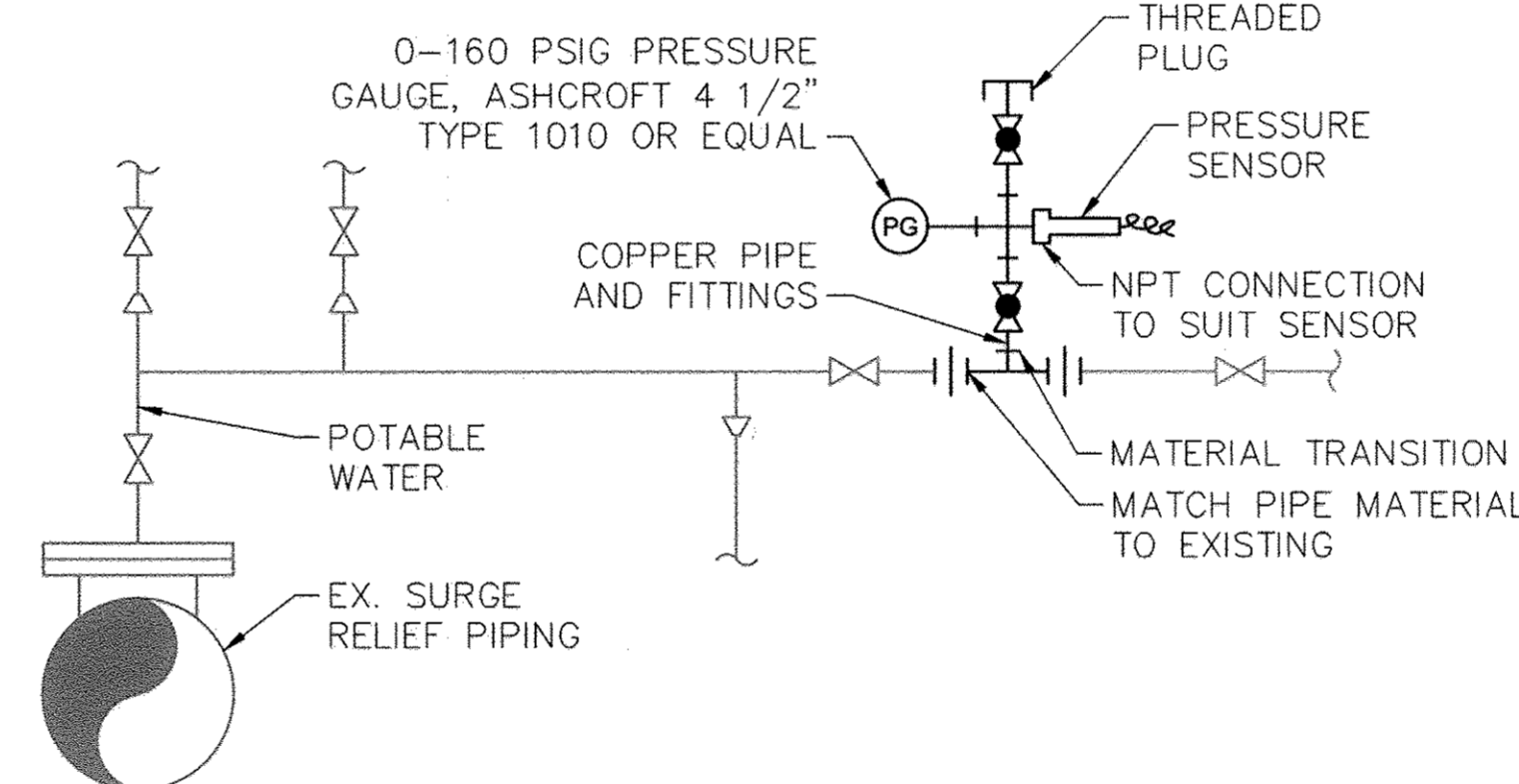
MECHANICAL LEGEND, ABBREVIATIONS AND GENERAL NOTES. 1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS HOWARD COUNTY, MARYLAND CONTRACT NO. 44-4793 ELECTION DISTRICT 1. SCALE AS SHOWN SHEET 6 OF 21

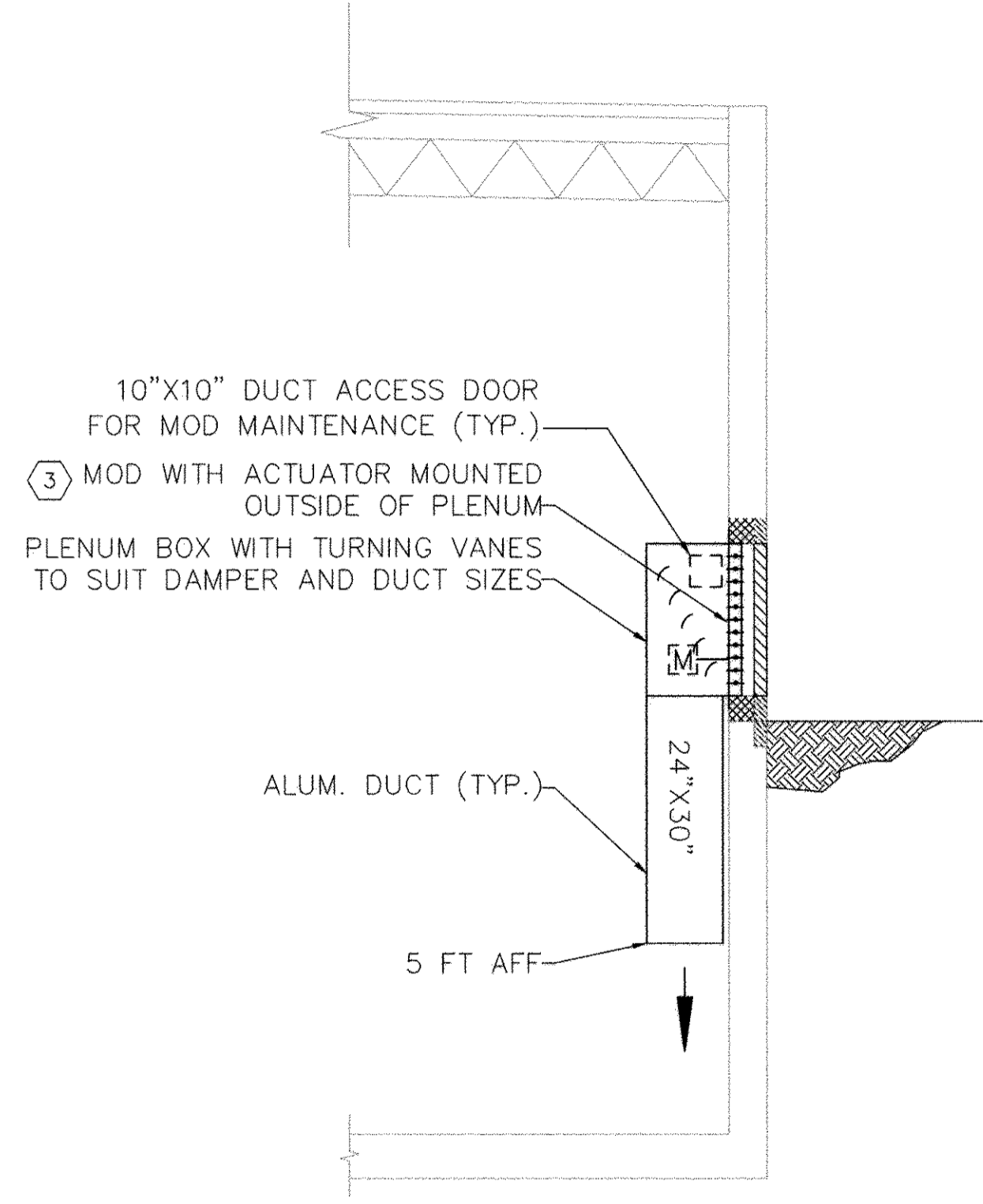
AS BUILT



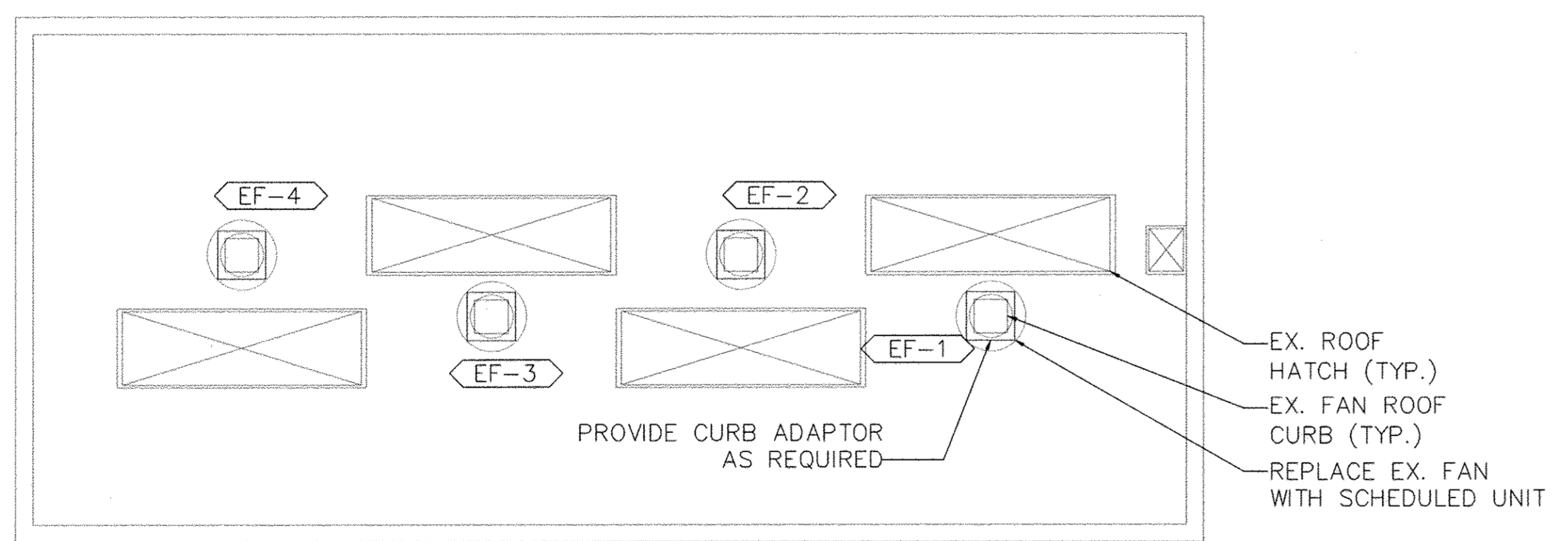
1 PUMP ROOM PLAN
 SCALE: 1/4" = 1'-0"



3 SENSOR DETAIL
 SCALE: NONE



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

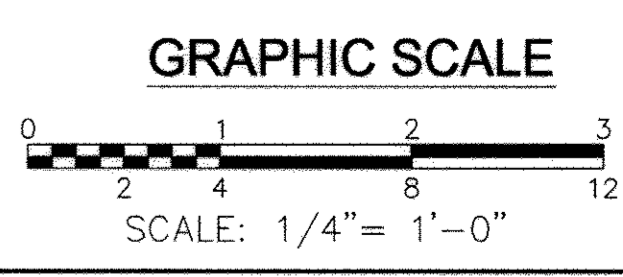


2 ROOF PLAN
 SCALE: NONE

FAN SCHEDULE

ID	LOCATION	UNIT TYPE	TOTAL AIR (CFM)	ESP (IN WG)	MOTOR (HP)	RPM	DRIVE	VOLTS/PH/Hz	DAMPER	BASIS OF DESIGN	REMARKS
EF-1	ROOF	C,ROOF	8,375	0.5"	3	585	B	480/3/60	MOD	COOK 300 ACEB	Notes: 1
EF-2	ROOF	C,ROOF	8,375	0.5"	3	585	B	480/3/60	MOD	COOK 300 ACEB	Notes: 1
EF-3	ROOF	C,ROOF	8,375	0.5"	3	585	B	480/3/60	MOD	COOK 300 ACEB	Notes: 1
EF-4	ROOF	C,ROOF	8,375	0.5"	3	585	B	480/3/60	MOD	COOK 300 ACEB	Notes: 1

NOTES:
 1. PROVIDE ROOF CURB ADAPTOR AS REQUIRED.



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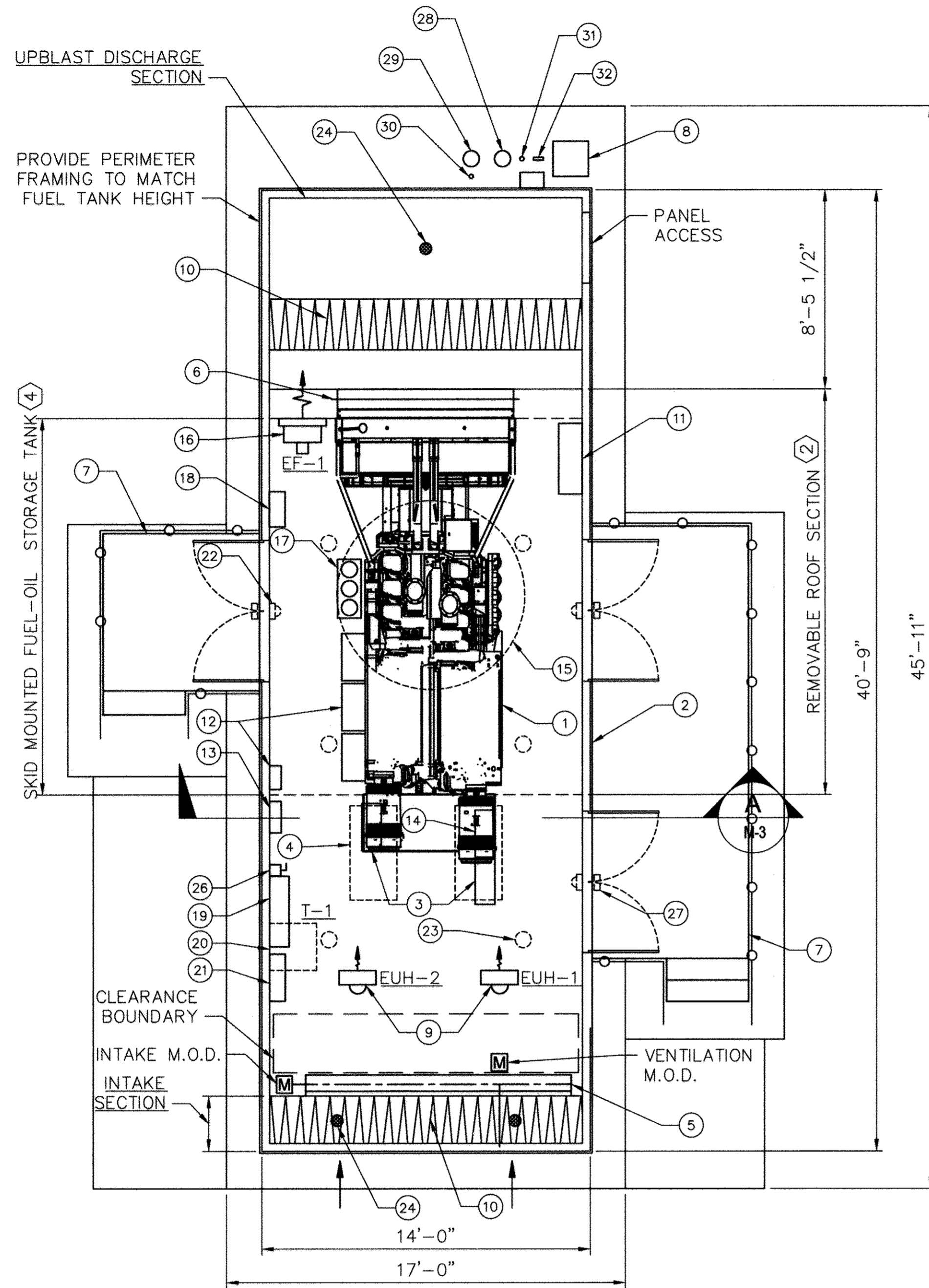
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DES: MH	JFW	AS-BUILT	12/22/2017
DRN: JFW			
CHK: LAP			
DATE: 10/2014	BY: NO.	REVISION	DATE

MECHANICAL PLANS AND SCHEDULES
 1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
 ELECTION DISTRICT 1

SCALE AS SHOWN
 SHEET 7 of 21



1 GENERATOR ENCLOSURE LAYOUT
M-3 SCALE: 1/4" = 1'-0"

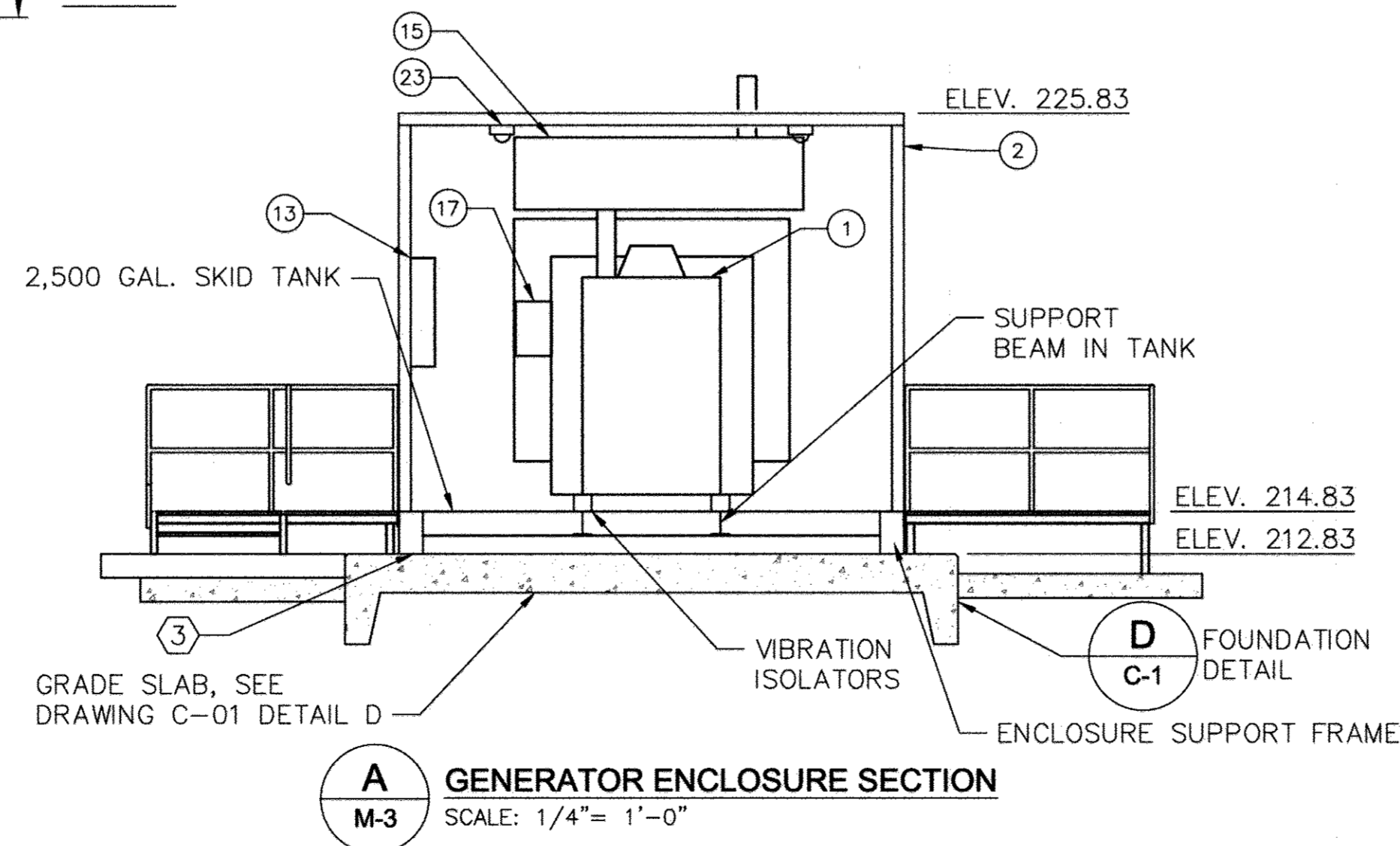
PLATFORM CRITERIA

MATL.	ALUMINUM
GRATING	ALUMINUM
HARDWARE	STAINLESS STEEL
HANDRAIL	ALUMINUM
LOADING	250 LBS/SF

NOTE:
PLATFORMS TO BE FURNISHED BY GENERATOR ENCLOSURE MANUFACTURER. PLATFORMS SHALL BE 8'x8' STRUCTURES INCLUDING STAIRWAY AND HANDRAIL. CONTRACTOR SHALL COORDINATE HEIGHT TO SUIT FINAL SETTING ELEVATION.

CODED NOTES

- 1 1250 kW GENERATOR
- 2 ACOUSTICAL GRADE LEVEL-2 ENCLOSURE W/ ROOF ACCESS HATCHES FOR EQUIPMENT REMOVAL
- 3 BREAKERS 800A, 800A, 400A
- 4 GENERATOR POWER / CONTROLS STUB-UP, (TYP. OF 2)
- 5 MOTORIZED INTAKE LOUVERS
- 6 RADIATOR DISCHARGE BACKDRAFT DAMPER OR M.O.D.
- 7 ENTRANCE PLATFORM (WITH REMOVABLE HANDRAILS)
- 8 FUEL-OIL DELIVERY POINT (OUTSIDE DOOR ACCESS)
- 9 5 kW ELECTRIC UNIT HEATER (EUH)
- 10 SOUND Baffles
- 11 FUEL-OIL POLISHING SYSTEM
- 12 BATTERY'S AND CHARGER
- 13 FUEL-OIL MONITORING SYSTEM
- 14 GENERATOR CONTROLER
- 15 CRITICAL GRADE SILENCER
- 16 EXHAUST FAN (PROPELLER BELT DRIVEN TYPE)
- 17 INJECTOR FUEL-PUMP FILTERING
- 18 VENTILATION CONTROL PANEL (VCP-1)
- 19 480 VAC POWER DISTRIBUTION PANEL
- 20 480 VAC - 208/120 VAC 75 KVA TRANSFORMER (MINIMUM)
- 21 208 / 120 VAC AUXILIARY SERVICE PANEL
- 22 EMERGENCY WALL PACK LIGHT (TYP. OF 3, BATTERY)
- 23 CEILING LIGHT FIXTURES (TYP. OF 6)
- 24 GENERAL PLENUM DRAINS
- 25 I&C TERMINATION ENCLOSURE
- 26 TRANSFORMER DISCONNECT
- 27 EXTERIOR LIGHTS, (TYP. OF 3)
- 28 8" EMERGENCY TANK VENT
- 29 8" EMERGENCY BASIN VENT
- 30 2" NORMAL TANK VENT
- 31 2" TANK SPARE PORT
- 32 FUEL LEVEL GAUGE



A GENERATOR ENCLOSURE SECTION
M-3 SCALE: 1/4" = 1'-0"

GENERATOR DESIGN CRITERIA

CAPACITY	1,250 kW
STANDARD kVA RATING	1,563 kVA
VOLTAGE	480 / 277 VAC, 3φ, 4W
EPA CLASSIFICATION	EMERGENCY, TIER 2 (65 DBA @ PROPERTY LINE COMPLIANCE) STANDBY
DUTY	ACoustical LEVEL-2 (WALK-IN)
ENCLOSURE	CRITICAL GRADE
EXHAUST SILENCER	V-16 CYLINDER
ENGINE SIZE	TURBOCHARGED
ASPIRATION	3,067 CUBIC INCHES
DISPLACEMENT	2,220 BHP
BRAKE HORSEPOWER	ENHANCED HIGH AMBIENT TYPE
COOLANT SYSTEM	92.5 GPH AT 100% LOAD
FUEL-OIL USE (MAX.)	2,500 GALLON (MIN. FOR 24 HOUR STORAGE)
SUB-BASE TANK	2-STAGE FILTERS, AFTER COOLER, AND POLISHING SYSTEM
FUEL AUXILIARIES	62,983 SCFM MIN. / 73,937 SCFM MAX.
SYSTEM AIR FLOW	80°C TEMPERATURE RISE
ALTERNATOR (MAX. FRAME)	5,743 SkVA
MAXIMUM SURGE kVA	90% MIN. DURING STARTING
SUSTAINED VOLTAGE	

GENERATOR AIR FLOW DESIGN CRITERIA

AIR FLOW	
COMBUSTION AIR	4,460 SCFM
ALTERNATOR AIR	6,494 SCFM
RADIATOR COOLING	62,983 SCFM
	73,937 SCFM (MAX.)

INTAKE AIR

MAX. CORE VELOCITY	1,500 FPM
LOUVER	MOTORIZED
INTAKE SECTION	13' LONG (MAX.)
ACOUSTICS	BAFFLE WALL
FLOOR STYLE	DRAINABLE

EXHAUST AIR

ALTERNATOR AIR	6,494 SCFM
RADIATOR COOLING	62,983 SCFM
	69,477 SCFM (MAX.)

MAX. CORE VELOCITY	600 FPM
DAMPER	GRAVITY TYPE (SIZED TO SUIT RADIATOR)
DISCHARGE SECTION	12'-0" LONG (MAX.)
DISCHARGE PLENUM	11'-8"x13'-4" SCREENED
FLOOR STYLE	PLENUM DRAIN

GENERATOR AIR FLOW STATICS

MAXIMUM TOTAL STATICS 0.50-INCHES OF WATER (*)

(*) NOTE ACOUSTICAL ENCLOSURE DESIGN SHALL COMPLY WITH MANUFACTURERS "STATIC" REQUIREMENTS.

ENCLOSURE HEATING AND VENTILATION CRITERIA

VENTILATION

SERVICE AIR CHANGES	HEAT REMOVAL 15 AC.
FAN CAPACITY DEVICES	2,500 CFM
	MOTORIZED INTAKE LOUVER / INTEGRATED BACK-DRAFT DAMPER
FAN TYPE	PROPELLER
FAN RATINGS	2,500 CFM AT 0.375-INCHES OF WATER, BELT DRIVEN, 0.50 HP AT 961 RPM, 480 VAC, 3φ (EF-1)

HEATING

CAPACITY 5 kW, 480 VAC, 6 AMPS, 3φ (EUH-1)

VENTILATION CONTROL NARRATIVE

THE FAN SHALL BE THERMOSTATICALLY CONTROLLED WITH AN INTERLOCKED INTAKE LOUVER MOTOR ACTUATOR. THE FAN SHALL BE CONTROLLED FROM A VENTILATION CONTROL PANEL (VCP). THE PANEL SHALL INCLUDE A HAND-OFF-AUTOMATIC (HOA) SWITCH, RUN TIME METER, AND RUN/STOP INDICATIONS. THE PANEL SHALL BE COMPLETE WITH CONTROL POWER TRANSFORMER (CPT) SIZED FOR FAN CONTROLS AND MOTORIZED LOUVER LOADS.

1. **AUTOMATIC MODE:** WHEN THE HOA SELECTOR IS IN THE AUTOMATIC POSITION, THE FAN SHALL START AND STOP IN ACCORDANCE WITH THE ENCLOSURE THERMOSTAT SET-POINT. WHEN THE FAN IS CALLED TO RUN, THE MOTORIZED LOUVER SHALL BE INTERLOCKED TO OPEN. THE FAN SHALL NOT OPERATE IN AN OVERLOAD STATE, THE STARTER SHALL REQUIRE MANUAL RESET OF THE OVERLOAD CONDITION.
2. **HAND MODE:** WHEN THE HOA SELECTOR IS IN THE HAND POSITION, THE FAN SHALL RUN CONTINUOUSLY AS DESIRED. WHEN THE FAN IS CALLED TO RUN, THE MOTORIZED LOUVER SHALL BE INTERLOCKED TO OPEN. ALL ALARMS SHALL BE INDICATED LOCALLY AT THE VCP.

CONSTRUCTION NOTES:

- 1 MANUFACTURER COORDINATE LOCATIONS OF ALL EQUIPMENT DESCRIBED AND SPECIFIED TO SUIT CODE CLEARANCES AND MAINTENANCE OPERATIONS.
- 2 PROVIDE REMOVABLE ROOF SECTIONS TO FACILITATE OVER-HEAD CRANE WORK ON THE ENGINE AND RADIATOR SECTIONS OF THE GENERATOR.
- 3 CONTRACTOR SHALL ANCHOR THE ENCLOSURE IN ACCORDANCE WITH MANUFACTURE'S RECOMMENDATIONS.
- 4 THE ENCLOSURE SHALL BE COMPLETELY SUPPORTED ALONG THE PERIMETER FRAME TO THE GRADE SLAB. NO CANTILEVERED SECTIONS SHALL BE ACCEPTABLE.

ELECTRICAL POWER DISTRIBUTION SCHEDULE

480 VAC 3-PHASE, 4W (1)(3)

1. BLOCK HEATER-1
2. BLOCK HEATER-2
3. 5.0 KW UNIT HEATER
4. 1/2 HP. EXHAUST FAN
5. 208/120 VAC XFMR

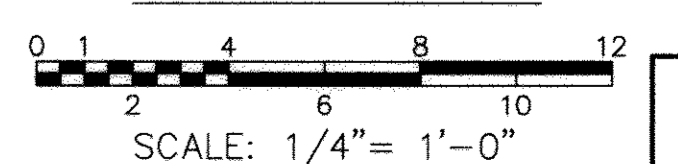
208/120 VAC (1)(3)

1. FUEL OIL POLISHING SYSTEM
2. BATTERY CHARGER
3. FUEL MEASUREMENT SYSTEM
4. INSIDE LIGHTING
5. EXTERIOR LIGHTING
6. RECEPTACLES

NOTES

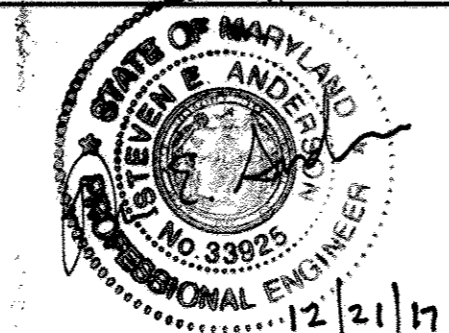
- (1) NOTE: GENERATOR MANUFACTURER COORDINATE ALL LOADS, AND POWER DISTRIBUTION WITHIN THE ENCLOSURE FOR A COMPLETE INTEGRATED PACKAGE.
- (2) ROOF HATCHES SHALL BE PROVIDED BY THE GENERATOR MANUFACTURER LOCATED OVER GENERATOR ENGINE ASSEMBLY AND ALTERNATOR.
- (3) SINGLE-PHASE AND THREE-PHASE CIRCUITS SHALL BE COORDINATED WITH SPECIFIC EQUIPMENT APPROVALS.

GRAPHIC SCALE



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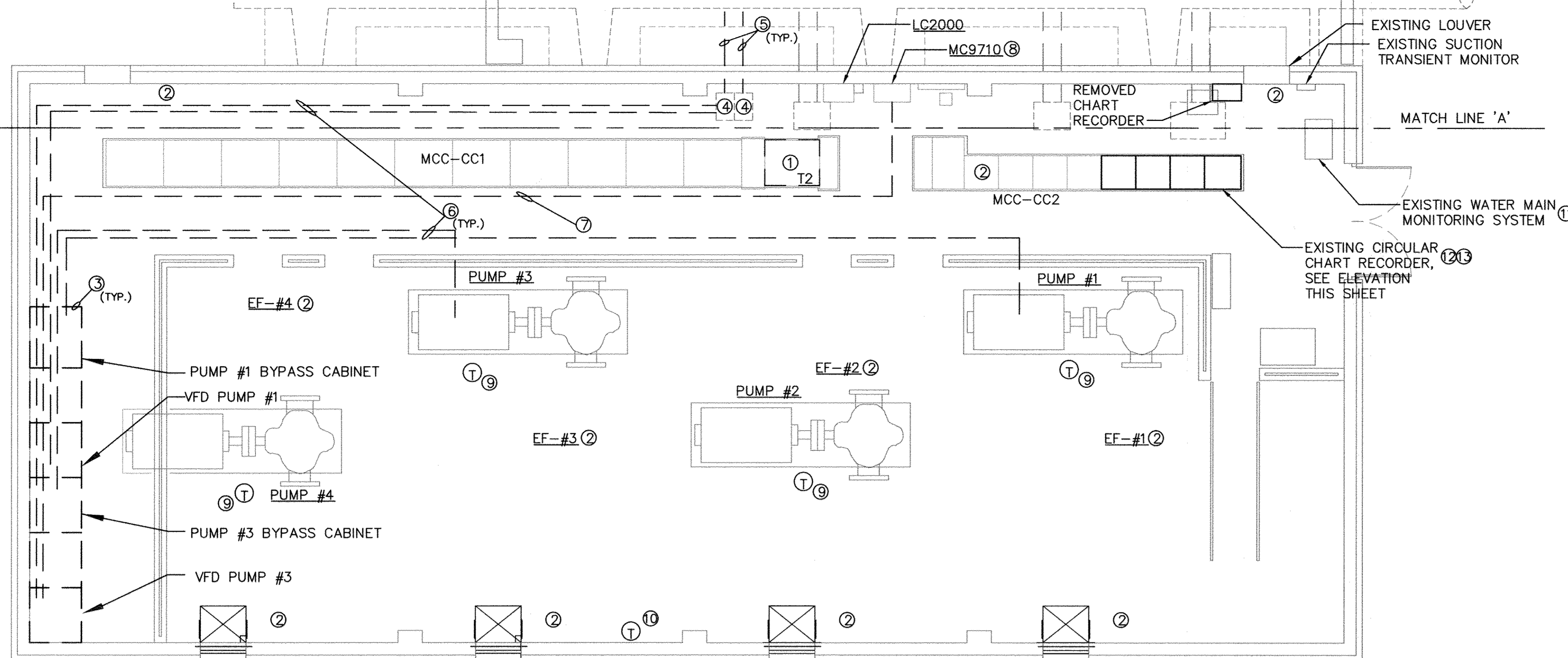
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GENERATOR ENCLOSURE LAYOUT	
1000 SCALE MAP NO. 32	BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

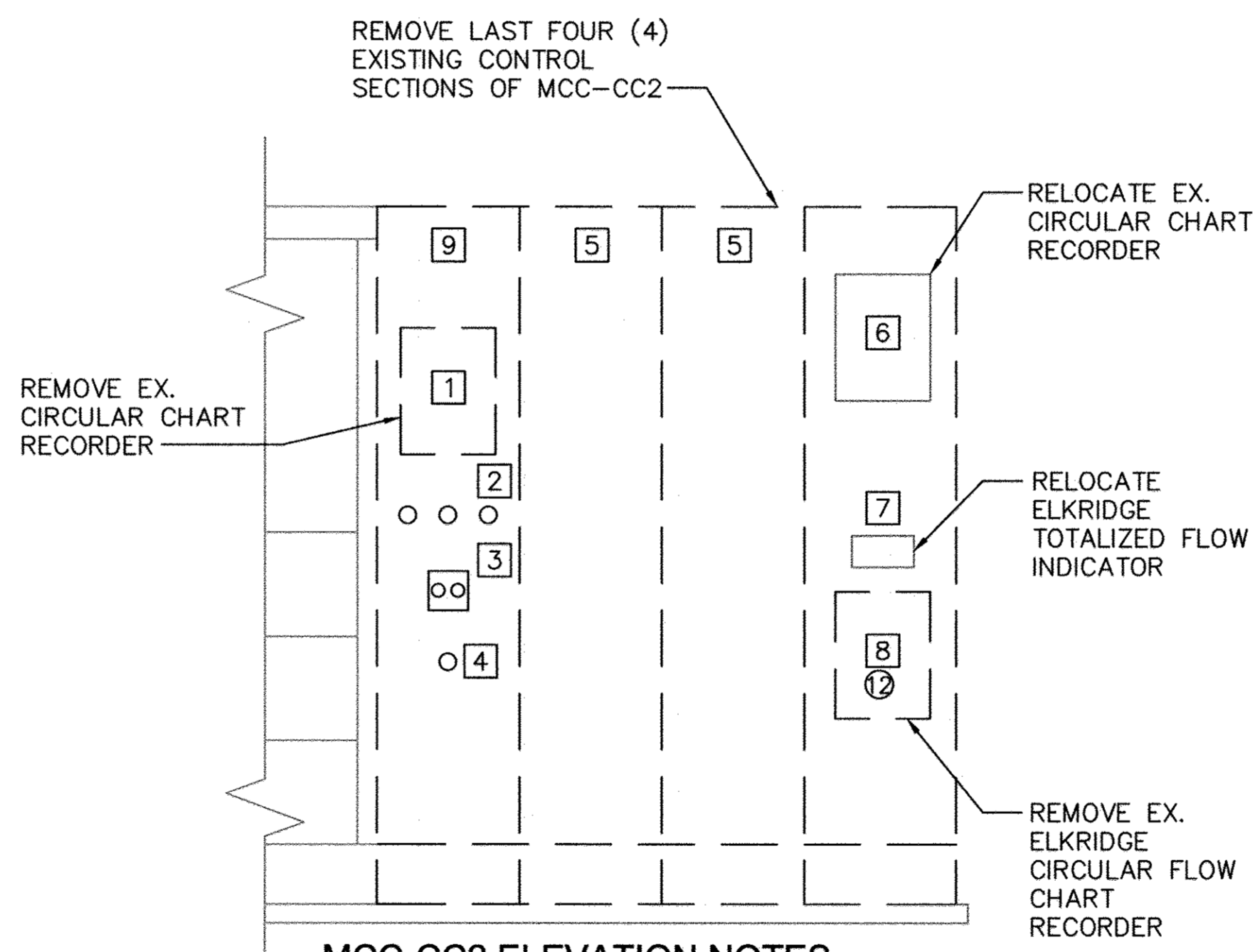
KCI TECHNOLOGIES PROJECT No.: 13-12267718

13-12267718-ED-1 - Pump Station Plan - .dwg



1 ELKRIDGE WATER PUMP STATION
ED-1 SCALE: 1/4" = 1'-0"

DEMOLITION TRANSFORMER SCHEDULE								
DESIGNATOR	PRIMARY VOLTAGE	PRIMARY CONFIGURATION	SECONDARY VOLTAGE	SECONDARY CONFIGURATION	RATING	MOUNTING STYLE	NEMA	BASIS OF DESIGN
T2	2.4KV	DELTA	480/277	WYE	150KVA	FLOOR	NEMA 1	

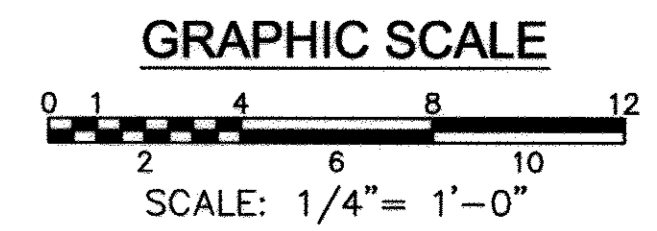


- MCC-CC2 ELEVATION NOTES**
- 1 REMOVE SNOWDEN TANK CIRCULAR CHART RECORDER.
 - 2 REMOVE LEAD/LAG SELECTOR SWITCHES.
 - 3 REMOVE FAILURE/RESET ALARM.
 - 4 REMOVE LEAD/LAG TROUBLE INDICATOR.
 - 5 REMOVE ABANDONED CONTROL SECTION.
 - 6 G.B. FOOD MARKET EWT LEVEL RECORDERS.
 - 7 ELKRIDGE TOTALIZED FLOW INDICATOR.
 - 8 ELKRIDGE FLOW CIRCULAR CHART RECORDER.
 - 9 REMOVE EXISTING CONTROL SECTION.

A PARTIAL ELEVATION: MCC-CC2
ED-1 SCALE: NONE

- GENERAL NOTES**
1. ARRANGE CONDUIT, WIRING, EQUIPMENT AND OTHER WORK GENERALLY AS SHOWN, PROVIDING PROPER CLEARANCE AND ACCESS. CAREFULLY EXAMINE ALL CONTRACT DRAWINGS AND COORDINATE THE WORK WITH ALL TRADES. WHERE DEPARTURES ARE PROPOSED BECAUSE OF FIELD CONDITIONS OR OTHER CAUSES, PREPARE AND SUBMIT DETAILED DRAWING FOR ACCEPTANCE.
 2. THE CONTRACT DOCUMENTS ARE DIAGRAMMATIC, ALL OFFSETS, BENDS, FITTINGS AND ACCESSORIES ARE NOT NECESSARILY SHOWN. PROVIDE ALL SUCH ITEMS AS REQUIRED FOR COMPLETE OPERATIONAL SYSTEM.
 3. CONTRACTOR SHALL ACCOMPANY THE OWNER FOR INSPECTION AND APPROVAL AT PROJECT COMPLETION.
 4. CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION OVER THIS WORK.
 5. CONTRACTOR TO CONTACT MISS UTILITY (1-800-257-7777) 48-HOURS PRIOR, EXCLUDING WEEKENDS AND HOLIDAYS, TO STARTING EARLY WORK. IT'S THE CONTRACTORS RESPONSIBILITY TO PROTECT EXISTING UNDERGROUND UTILITIES DURING CONSTRUCTION. REPAIRS TO DAMAGED UTILITIES SHALL BE MADE AT NO EXPENSE TO THE OWNER.
 6. GROUND ELECTRIC SYSTEM IN ACCORDANCE WITH NEC SECTION 250.
 7. 3/4" CONDUIT SHALL BE THE MINIMUM SIZE CONDUIT INSTALLED. ALL CONDUIT SHALL BE ALUMINUM, EXCEPT DUCT BANK WHICH IS PVC.
 8. ALL NEW MATERIAL REQUIRED SHALL CONFORM WITH THE STANDARDS OF UNDERWRITERS LABORATORIES (UL).
 9. ELECTRICAL CONTRACTOR SHALL PROVIDE TEMPORARY POWER TO SCADA SYSTEM FOR THE DURATION OF ALL PLANNED POWER OUTAGES.

- REMOVAL NOTES**
- 1 REMOVE EXISTING 150KVA TRANSFORMER, WIRING AND CONDUIT.
 - 2 EF-1,EF-2,EF-3 AND EF-4: DISCONNECT POWER AND CONDUIT FROM EXISTING FANS AND MOD'S, REMOVE OVERLOADS. REUSE EXISTING CONDUIT TO THE EXTENT POSSIBLE. COORDINATE WITH MECHANICAL CONTRACTOR AND SYSTEM INTEGRATOR.
 - 3 DISCONNECT AND REMOVE EXISTING VFDs, SSRVS AND POWER FACTOR FILTERS FOR PUMP #1 AND PUMP #3. REUSE CONDUIT TO THE EXTENT POSSIBLE.
 - 4 REMOVE EXISTING JUNCTION BOXES (23" x 16" x 32" AND 23" x 22" x 32")BELOW MEZZANINE.
 - 5 REMOVE CONDUCTORS FROM 2.4KV-480V STEP DOWN TRANSFORMERS AND EXISTING VFDs. REUSE CONDUIT TO THE EXTENT POSSIBLE.
 - 6 REMOVE CONDUCTORS BETWEEN 2.4KV-480V TRANSFORMERS AND EXISTING VFDs. REMOVE CONDUCTORS BETWEEN EXISTING PUMPS #1 AND #3 AND VFDs. REUSE CONDUIT TO THE EXTENT POSSIBLE.
 - 7 REMOVE INSTRUMENTATION CONDUCTORS BETWEEN VFDs AND MC9710. SEE INSTRUMENTATION DRAWINGS FOR DETAILED INTEGRATION REQUIREMENTS.
 - 8 RETROFIT PANEL FOR TERMINAL BOARD INSTALL.
 - 9 REMOVE EXISTING THERMOSTAT WIRING FROM DEVICE TO MCC-CC2.
 - 10 REMOVE EXISTING THERMOSTAT WIRING FROM DEVICE TO PANEL-LA, CIRCUIT LA-10.
 - 11 REMOVE POWER CIRCUITS TO EXISTING WATER MAIN MONITOR AND HYDRAULIC SUCTION TRANSIENT MONITOR.
 - 12 REMOVE EXISTING ELKRIDGE STATION CIRCULAR FLOW CHART RECORDER IN MCC-CC2.
 - 13 REMOVE THE LAST FOUR (4) EX. MCC SECTIONS FROM MCC-CC2, TWO (2) EMPTY 20" CABINETS, ONE (1) 20" CABINET WITH EX. CONTROLS AND ONE (1) 24" CABINET.



PROFESSIONAL CERTIFICATION
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State Of Maryland, License No. 33925, Expiration Date 1/15/19

KCI TECHNOLOGIES
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STATE OF MARYLAND
LEWIS E. ANDERSON, III
PROFESSIONAL ENGINEER
1/16/2018

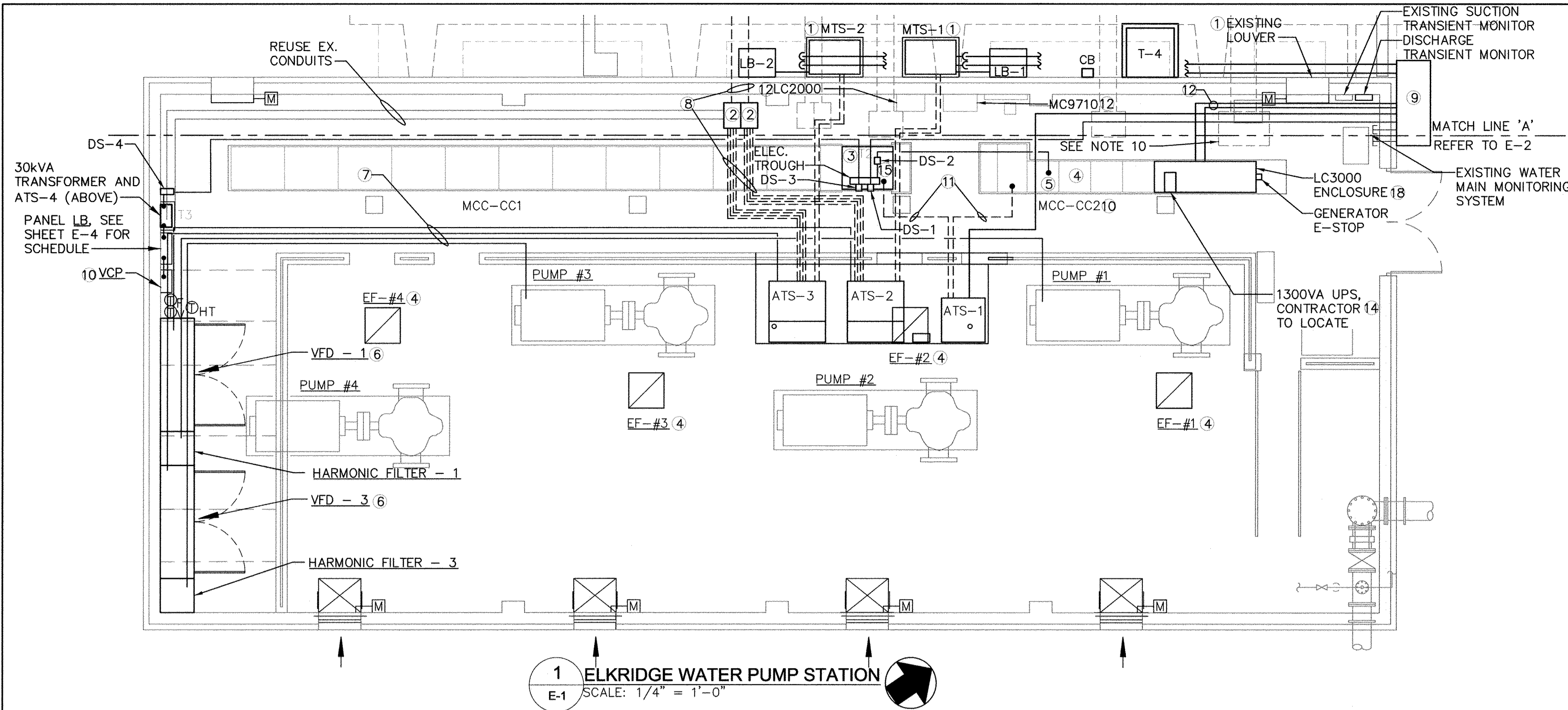
DES: SEB	JFW	AS-BUILT	12/22/2017
DRN: SEB			
CHK: RDS			
DATE: 10/2014	BY NO.	REVISION	DATE

ELECTRICAL - DEMOLITION PLAN	
PUMP STATION	
1000 SCALE MAP NO. 32	BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

SCALE AS SHOWN
SHEET 9 OF 21

KCI TECHNOLOGIES PROJECT No.: 13-12267718



1 ELKRIDGE WATER PUMP STATION
E-1 SCALE: 1/4" = 1'-0"

GENERAL NOTES

- ARRANGE CONDUIT, WIRING, EQUIPMENT AND OTHER WORK GENERALLY AS SHOWN, PROVIDING PROPER CLEARANCE AND ACCESS. CAREFULLY EXAMINE ALL CONTRACT DRAWINGS AND COORDINATE THE WORK WITH ALL TRADES. WHERE DEPARTURES ARE PROPOSED BECAUSE OF FIELD CONDITIONS OR OTHER CAUSES, PREPARE AND SUBMIT DETAILED DRAWING FOR ACCEPTANCE.
- THE CONTRACT DOCUMENTS ARE DIAGRAMMATIC, ALL OFFSETS, BENDS, FITTINGS AND ACCESSORIES ARE NOT NECESSARILY SHOWN. PROVIDE ALL SUCH ITEMS AS REQUIRED FOR COMPLETE OPERATIONAL SYSTEM.
- CONTRACTOR SHALL ACCOMPANY THE OWNER FOR INSPECTION AND APPROVAL AT PROJECT COMPLETION.
- CONTRACTOR SHALL OBTAIN AND PAY FOR ALL PERMITS AND CERTIFICATES OF INSPECTION AS REQUIRED BY THE AUTHORITIES HAVING JURISDICTION OVER THIS WORK.
- CONTRACTOR TO CONTACT MISS UTILITY (1-800-257-7777) 48-HOURS PRIOR, EXCLUDING WEEKENDS AND HOLIDAYS, TO STARTING EARLY WORK. IT'S THE CONTRACTORS RESPONSIBILITY TO PROTECT EXISTING UNDERGROUND UTILITIES DURING CONSTRUCTION. REPAIRS TO DAMAGED UTILITIES SHALL BE MADE AT NO EXPENSE TO THE OWNER.
- GROUND ELECTRIC SYSTEM IN ACCORDANCE WITH NEC SECTION 250.
- 3/4" CONDUIT SHALL BE THE MINIMUM SIZE CONDUIT INSTALLED. ALL CONDUIT SHALL BE RIGID STEEL CONDUIT, EXCEPT DUCT BANK WHICH IS PVC.
- ALL NEW MATERIAL REQUIRED SHALL CONFORM WITH THE STANDARDS OF UNDERWRITERS LABORATORIES (UL).
- CONTRACTOR SHALL PROVIDE TEMPORARY POWER TO SCADA SYSTEM FOR THE DURATION OF ALL PLANNED POWER OUTAGES.
- ALL PULL / JUNCTION BOXES AND CONDUITS SHOWN RUN BELOW THE CONCRETE CONTROL LEVEL DECK. CONTRACTOR SHALL SUPPORT CONDUITS IN ACCORDANCE WITH THE SPECIFICATIONS. CONTRACTOR SHALL BE RESPONSIBLE FOR CONDUIT ROUTING AND TERMINATIONS IN ACCORDANCE WITH ELECTRICAL AND INSTRUMENTATION SCHEDULES.

PLAN NOTES

- ROUTE CONDUIT ALONG OUTSIDE WALL FROM PULL BOX TO MTS. AVOID BLOCKING EXISTING LOUVER WITH CONDUITS.
- PROVIDE (2) JUNCTION BOXES (23" x 16" x 32" AND 23" x 22" x 32") BELOW MEZZANINE.
- PROVIDE 2.4KV-480V, 300KVA, 3 PHASE STEP DOWN TRANSFORMER. REPLACE EXISTING 65 AMP FEEDER FUSE WITH 100 AMP.
- EF-1, EF-2, EF-3 AND EF-4: REMOVE EXISTING OVERLOADS FROM EXISTING STARTERS AND REPLACE WITH NEW OVERLOADS. COORDINATE OVERLOAD SIZE WITH MECHANICAL CONTRACTOR. CONNECT NEW FANS TO EXISTING CONDUIT AND CONDUCTORS. COORDINATE ALL WORK WITH MECHANICAL CONTRACTOR.
- BUS TAP EXISTING MCC-CC2 AND CONNECT TO NEW DISCONNECT DS-1 AND DS-3. REFER TO ONE-LINE FOR ADDITIONAL INFORMATION. CONFORM TO NFPA 70 ARTICLE 240.
- PROVIDE NEW VFDs, HARMONIC FILTERS AND SSRV STARTERS FOR EXISTING PUMPS #1 AND #3. RETROFIT EXISTING CONDUIT WHERE FEASIBLE. PROVIDE ALL NEW FEEDERS. REFER TO INSTRUMENTATION DRAWINGS FOR ADDITIONAL SIGNAL CONDUIT INFORMATION AND TERMINATIONS.
- POWER CONDUCTORS FOR PUMPS #1 AND #3: PROVIDE CONDUCTORS BETWEEN RESPECTIVE ATS AND VFD, VFD AND RESPECTIVE PUMP(S). EACH PUMP'S CONDUCTORS SHALL BE KEPT SEPARATE FROM THE OTHER PUMP'S CONDUCTORS AT ALL TIMES INCLUDING JUNCTION BOXES.
- PROVIDE CONDUCTORS BETWEEN 2.4KV-480V STEP DOWN TRANSFORMERS AND NEW ATS(S). REUSE CONDUIT TO THE EXTENT POSSIBLE.
- PROVIDE SEPARATE JUNCTION BOXES FOR POWER AND COMMUNICATIONS.
- COORDINATE FAN CONTROL INTERFACE WITH THE MCC-CC2 IN ACCORDANCE WITH INSTRUMENTATION DRAWINGS.
- RELOCATE LIGHTING AT LOWER LEVEL AS REQUIRED TO ACCOMMODATE CONDUIT ROUTING.
- MODIFY MC9710 TO ACT AS A JUNCTION BOX WITH USE OF TERMINAL BOARDS FOR EXISTING COMMUNICATIONS. EXISTING TERMINAL NUMBERING SHALL BE REPLICATED ON NEW TERMINAL BOARDS. COMM. LINK LC2000 TO LC3000. SEE INSTRUMENTATION DRAWINGS FOR MORE INFORMATION.
- THE CONTRACTOR SHALL PROVIDE NEW CONDUIT AND SIGNAL WIRE, SIZED TO SUIT INSTALLATION, FROM EXISTING MC9710 JUNCTION BOX TO NEW LC3000.
- PROVIDE 2#12 AND 1#12 GROUND-3/4"C TO UPS RECEPTACLE, FIELD LOCATE TO SUIT EQUIPMENT LOCATION. CONNECT TO PANEL LB-1. CONTRACTOR SHALL COORDINATE LOCATION OF UPS.
- RECONNECT ELKRIDGE STATION CIRCULAR CHART RECORDER SIGNALS TO NEW STRIP CHART RECORDER EQUIPMENT AT NEW LOCATION IN LC3000 ENCLOSURE. SEE INSTRUMENTATION DRAWINGS FOR SIGNAL CONNECTIONS.
- ELECTRICAL WIRE TROUGH, DISCONNECTS 1, 2 AND 3 (DS-1, DS-2, DS-3) MOUNTED ABOVE TRANSFORMER 2 (T-2) VIA UNI-STRUTS.
- RELOCATE EX. G.B. FOOD-TANK CIRCULAR FLOW CHART RECORDER INTO NEW LC3000 CABINET, CONTRACTOR TO COORDINATE.
- PROVIDE 72" WIDE ENCLOSURE FOR LC3000 INSTALLATION. CONTRACTOR TO COORDINATE ALIGNMENT WITH EX. MCC-CC2 GEAR.
- PROVIDE NEW LEAD/LAG SELECTOR SWITCHES, FAILURE RESET ALARM, AND LEAD/LAG TROUBLE INDICATOR. REWIRE NEW EQUIPMENT TO EXISTING CONDITIONS.

MANUAL/AUTOMATIC TRANSFER SWITCH SCHEDULE

DESIGNATOR	VOLTAGE (VAC)	PHASE	QUANTITY PHASE POLES	TRANSITION TYPE	NEUTRAL	SWITCH RATING (AMPS)	TRANSFER TIME DELAY (SEC)	ENCLOSURE NEMA RATING	NUMBER SETS	NUMBER WIRES	WIRE SIZE (KCMIL)	GRD WIRE (AWG)	SHORT CIRCUIT RATING (INCHES)	BASIS OF DESIGN
ATS-1	480	3	4	OPEN	SWITCHED	400	0	12	1	4	500	3	22,000 ACIS	ASCO 4ATS B400N5L NEMA 12 FREESTANDING ENCLOSURE
ATS-2	480	3	3	OPEN	UNSWITCHED	800	0	12	2	3	500	2/0	22,000 ACIS	ASCO 4ATS 3800N5L NEMA 12 FREESTANDING ENCLOSURE
ATS-3	480	3	3	OPEN	UNSWITCHED	800	10	12	2	3	500	2/0	22,000 ACIS	ASCO 4ATS 3800N5L NEMA 12 FREESTANDING ENCLOSURE
ATS-4	480	3	4	OPEN	SWITCHED	100	0	12	1	4	1	8	22,000 ACIS	GE ZENITH NEMA 12 ENCLOSURE
MTS-1	480	3	3	MANUAL	UNSWITCHED	800	-	4X	2	3	500	2/0	22,000 ACIS	EATON 800 AMP HNB
MTS-1	480	3	3	MANUAL	UNSWITCHED	800	-	4X	2	3	500	2/0	22,000 ACIS	EATON 800 AMP HNB

DISCONNECT SCHEDULE

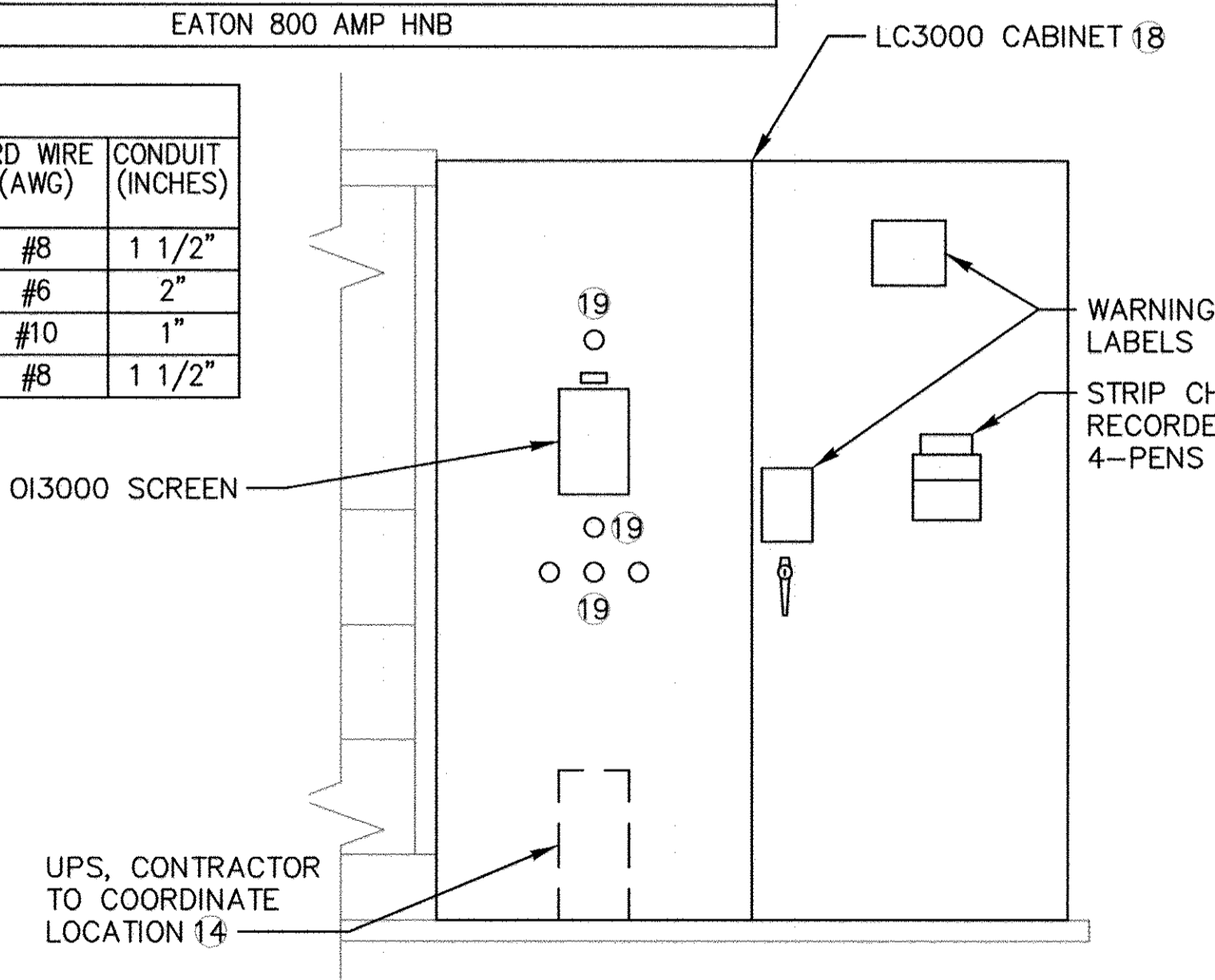
DESIGNATOR	VOLTAGE (VAC)	PHASE	QUANTITY BLADE(S)	QUANTITY FUSEHOLDERS	NEUTRAL BLADE	SWITCH RATING (AMPS)	FUSE RATING (AMPS)	NON FUSED DISCONNECT (AMPS)	NEMA RATING	HEAVY DUTY	NUMBER SETS	NUMBER WIRES	WIRE SIZE (KCMIL)	GRD WIRE (AWG)	CONDUIT (INCHES)
DS-1	600	3	4	3	1	100	100 (CLASS RK1)	-	NEMA 12	YES	1	3	#1	#8	1 1/2"
DS-2	600	3	4	3	1	200	200 (CLASS RK1)	-	NEMA 12	YES	1	3	#3/0	#6	2"
DS-3	600	3	3	1	-	100	50 (CLASS RK1)	-	NEMA 12	YES	1	3	#6	#10	1"
DS-4	600	3	3	0	-	100	-	-	NEMA 12	YES	1	3	#1	#8	1 1/2"

TRANSFORMER SCHEDULE

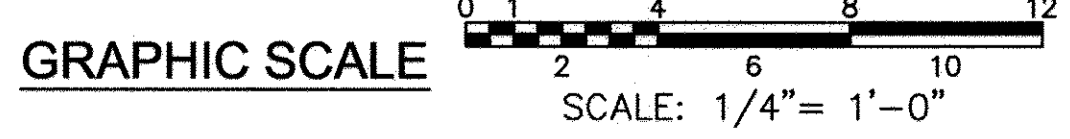
DESIGNATOR	PRIMARY VOLTAGE	PRIMARY CONFIGURATION	SECONDARY VOLTAGE	SECONDARY CONFIGURATION	RATING	MOUNTING STYLE	NEMA	BASIS OF DESIGN
T1	480V	DELTA	120/208	WYE	75KVA	FLOOR	NEMA 1	EATON-MV48M28F75CU
T2	2.4KV	DELTA	480/277	WYE	300KVA	FLOOR	NEMA 1	EATON-V42D47T33CUE3R
T3	480V	DELTA	120/208	WYE	30KVA	FLOOR	NEMA 2	EATON-V48M28T45EE
T4	2.4KV	DELTA	480/277	WYE	30KVA	FLOOR	NEMA 3R	-TEMGO-T38491-

LOAD BANK CONNECTION BOX

DESIGNATOR	VOLTAGE	CONNECTION TYPE	PHASE	NEUTRAL	RATING	MOUNTING STYLE	NEMA	BASIS OF DESIGN
LB-1	480V	MECHANICAL LUGS	3	N/A	800 AMP	FLOOR	4X	EATON-GTB08MAMA
LB-2	480V	MECHANICAL LUGS	3	N/A	800 AMP	FLOOR	4X	EATON-GTB08MAMA



A MCC-CC2 / LC3000 ENCLOSURE ELEVATION
E-1 SCALE: NONE



PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/19

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

James P. Butler 1/31/18
CHIEF, UTILITY DESIGN DIVISION

James P. Butler 1/31/18
CHIEF, BUREAU OF ENGINEERING

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STATE OF MARYLAND
PROFESSIONAL ENGINEER
NO. 33925
1/9/2018

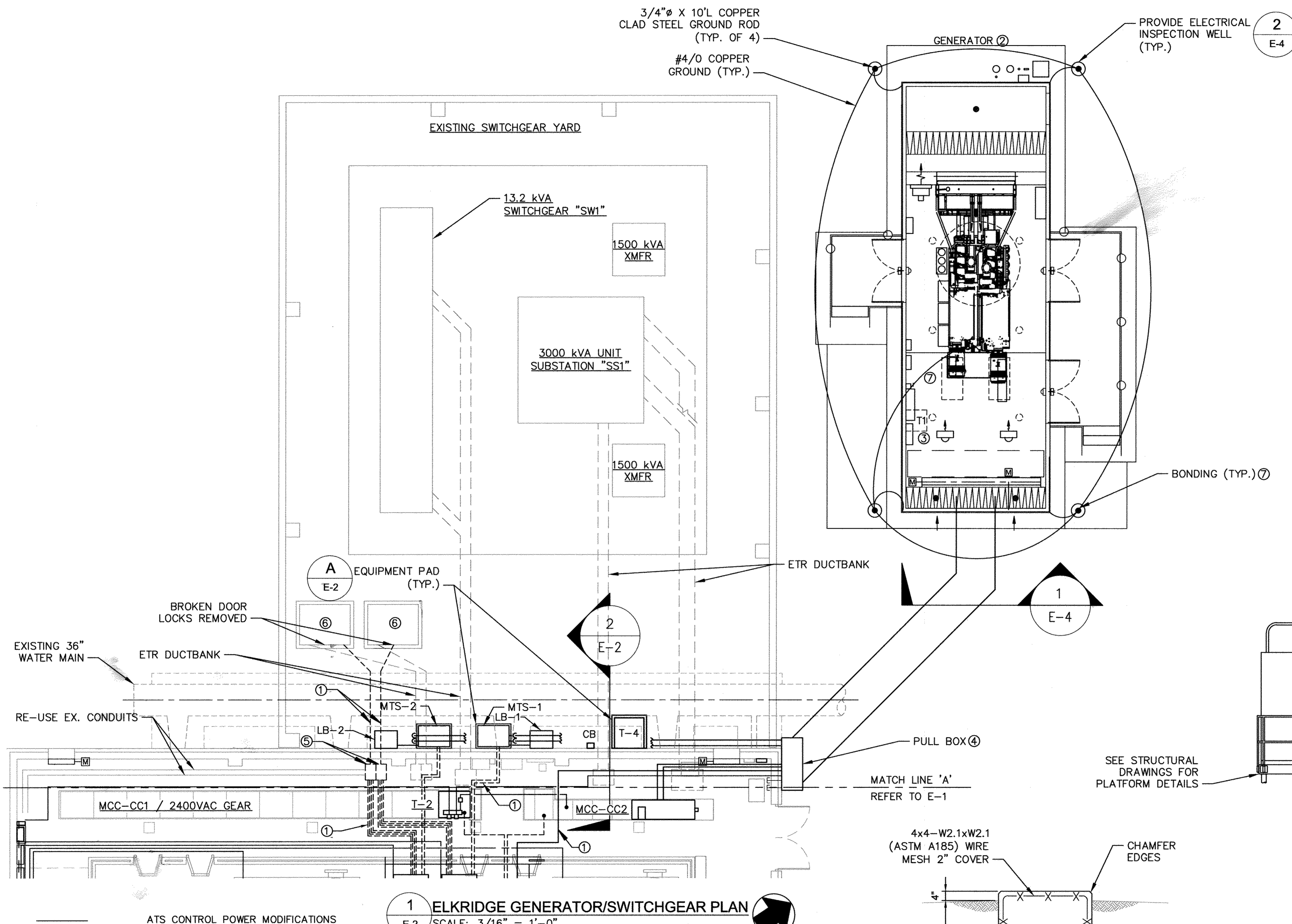
DES: SEB	JFW	AS-BUILT	12/22/2017
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CHK: RDS			
DATE: 10/2014	BY: NO.	REVISION	DATE

ELECTRICAL - PLAN PUMP STATION

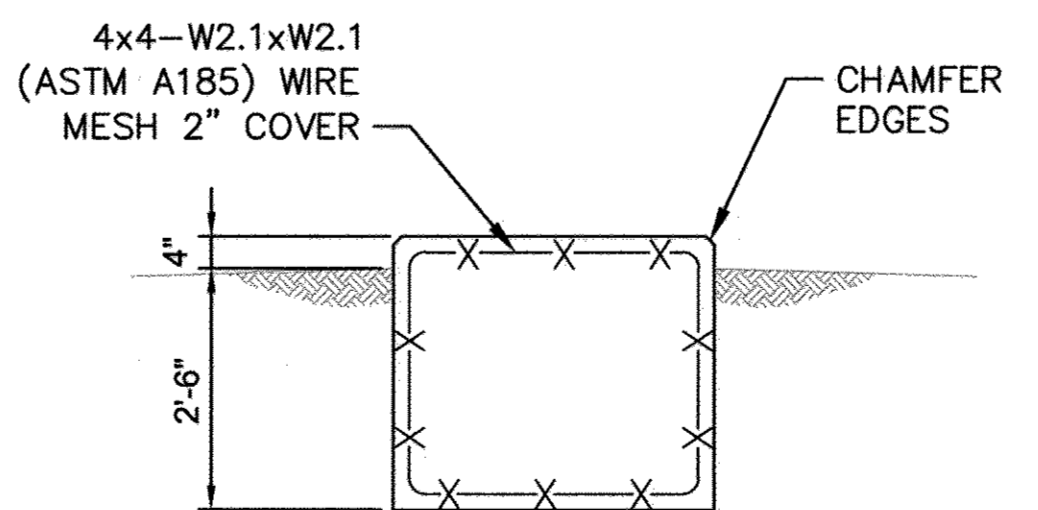
1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

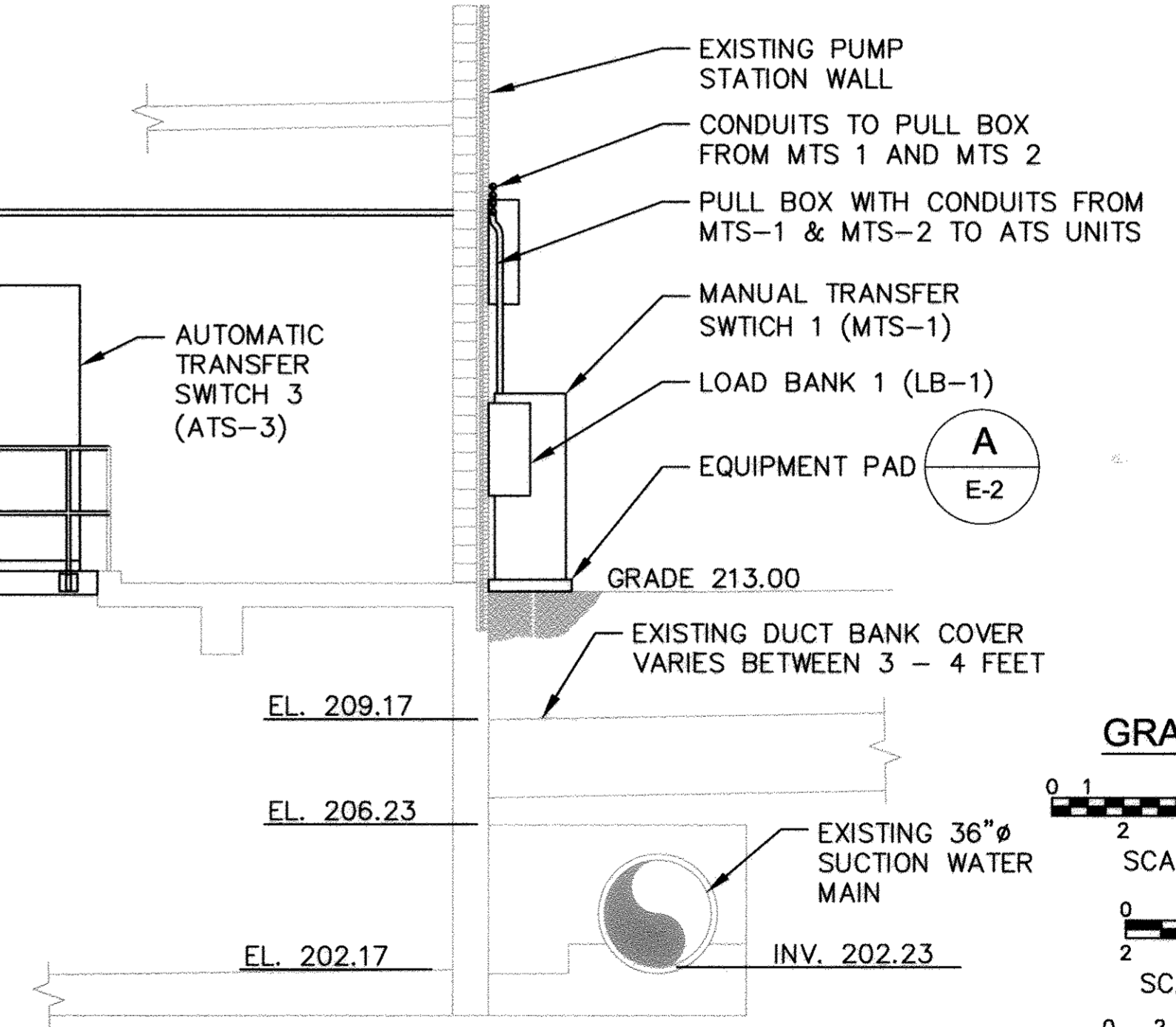
SCALE AS SHOWN
SHEET 10 OF 21



1 ELKRIDGE GENERATOR/SWITCHGEAR PLAN
E-2 SCALE: 3/16" = 1'-0"



A TYPICAL EQUIPMENT PAD DETAIL
E-2 SCALE: 1/2" = 1'-0"



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

NOTES:
1. NOT ALL EXISTING AND NEW INTERIOR EQUIPMENT / SYSTEMS ARE SHOWN.
2. ALL CONDUIT PENETRATIONS SHALL BE BOTTOM ENTRY.

- GENERAL NOTES**
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 - GROUND ELECTRIC SYSTEM IN ACCORDANCE WITH NEC ARTICLE 250.
 - 3/4" CONDUIT SHALL BE THE MINIMUM SIZE CONDUIT INSTALLED. ALC CONDUIT SHALL BE RIGID ALUMINUM CONDUIT, EXCEPT DIRECT BURIAL WHICH IS PVC. WORK.
 - ALL NEW MATERIAL REQUIRED SHALL CONFORM WITH THE STANDARDS OF UNDERWRITERS LABORATORIES (UL).
 - FINAL CONNECTIONS TO GENERATOR SHALL BE MADE WITH FLEXIBLE METAL CONDUIT.

- PLAN NOTES**
- SEE FEEDER SCHEDULE ON E-3 FOR NEW CONDUCTORS (TYP.).
 - REFER TO M-03 FOR GENERATOR LAYOUT. COORDINATE CONDUIT STUB-UP LOCATIONS WITH GENERATOR MANUFACTURER'S RECOMMENDATIONS.
 - COORDINATE TRANSFORMER LOCATION WITH GENERATOR MANUFACTURER.
 - PROVIDE SEPARATE JUNCTION BOXES FOR COMMUNICATIONS AND POWER. COORDINATE WITH INSTRUMENTATION DRAWINGS.
 - EXISTING JUNCTION BOXES (TO BE REPLACED, REFER TO SHEET E-1).
 - EXISTING 2.4KV-480VOLT, 750KVA TRANSFORMER. EXISTING 2.4KV CONDUIT AND CONDUCTORS TO REMAIN.
 - BOND GENERATOR HOUSING AND GENERATOR'S ALTERNATOR PER MANUFACTURER'S AND NFPA RECOMMENDATIONS.

PROFESSIONAL CERTIFICATION.
I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/19

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ELECTRICAL - PLAN GENERATOR
1000 SCALE MAP NO. 32
BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

E-2
SCALE AS SHOWN
SHEET
11 OF 21

KCI TECHNOLOGIES PROJECT No.: 13-12267718

UNDERGROUND SERVICE FDR1
BY POWER CO.

TRANSFORMER #1,
1500/1725KVA, OA/FA 65°C
13.2KV-2400Y/1385V, 3φ,
60HZ, 5.39% IMPEDANCE

UNDERGROUND SERVICE FDR2
BY POWER CO.

TRANSFORMER #2,
1500/1725KVA, OA/FA 65°C
13.2KV-2400Y/1385V, 3φ,
60HZ, 5.39% IMPEDANCE

13.2KV SWITCHGEAR AND KEY INTERLOCKS, SYSTEM NORMALLY OPERATES IN TWO INDEPENDENT HALVES.

2.4KV SWITCHGEAR AND KEY INTERLOCKS, SYSTEM NORMALLY OPERATES IN TWO INDEPENDENT HALVES.

GENERAL NOTES

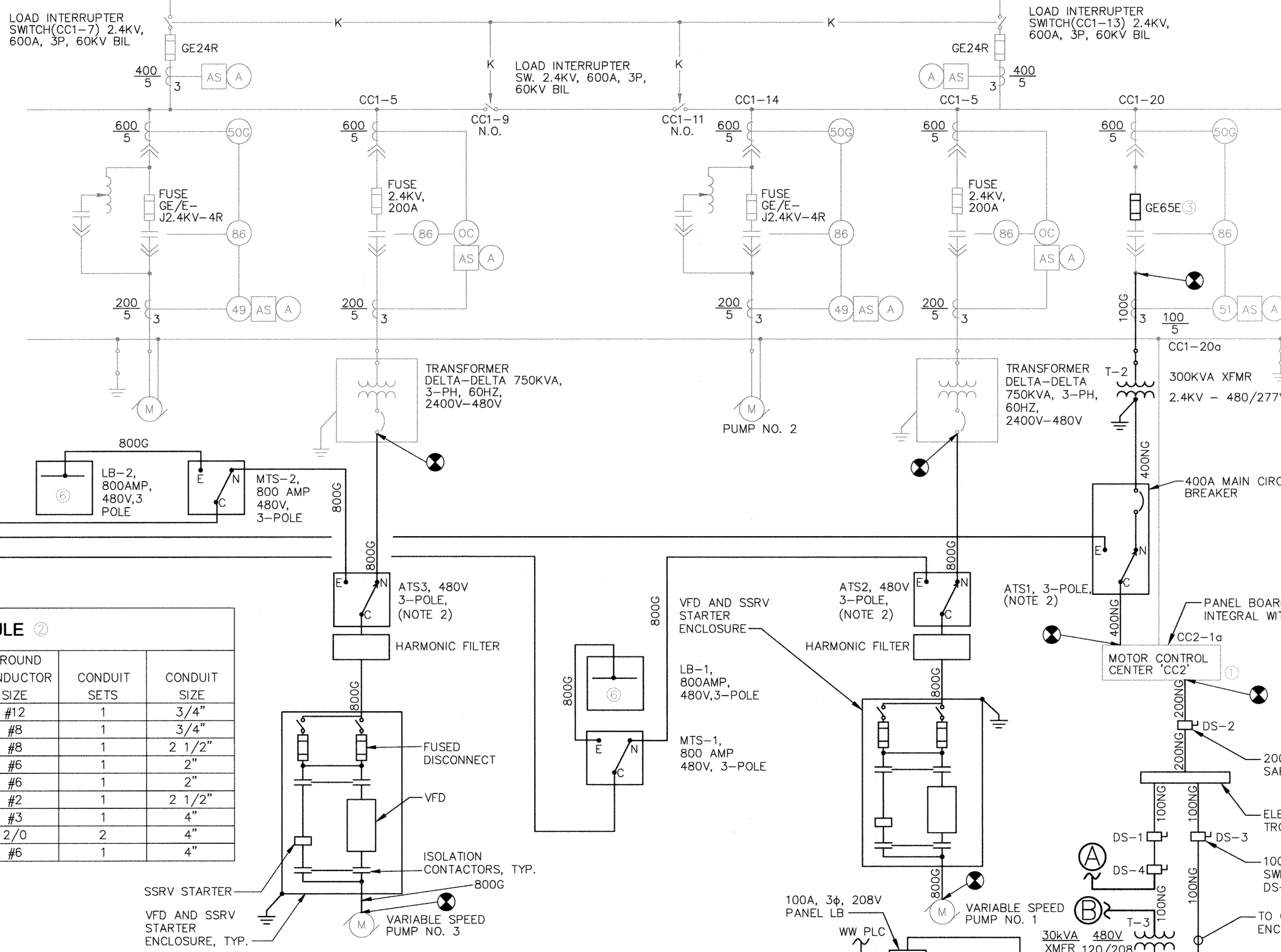
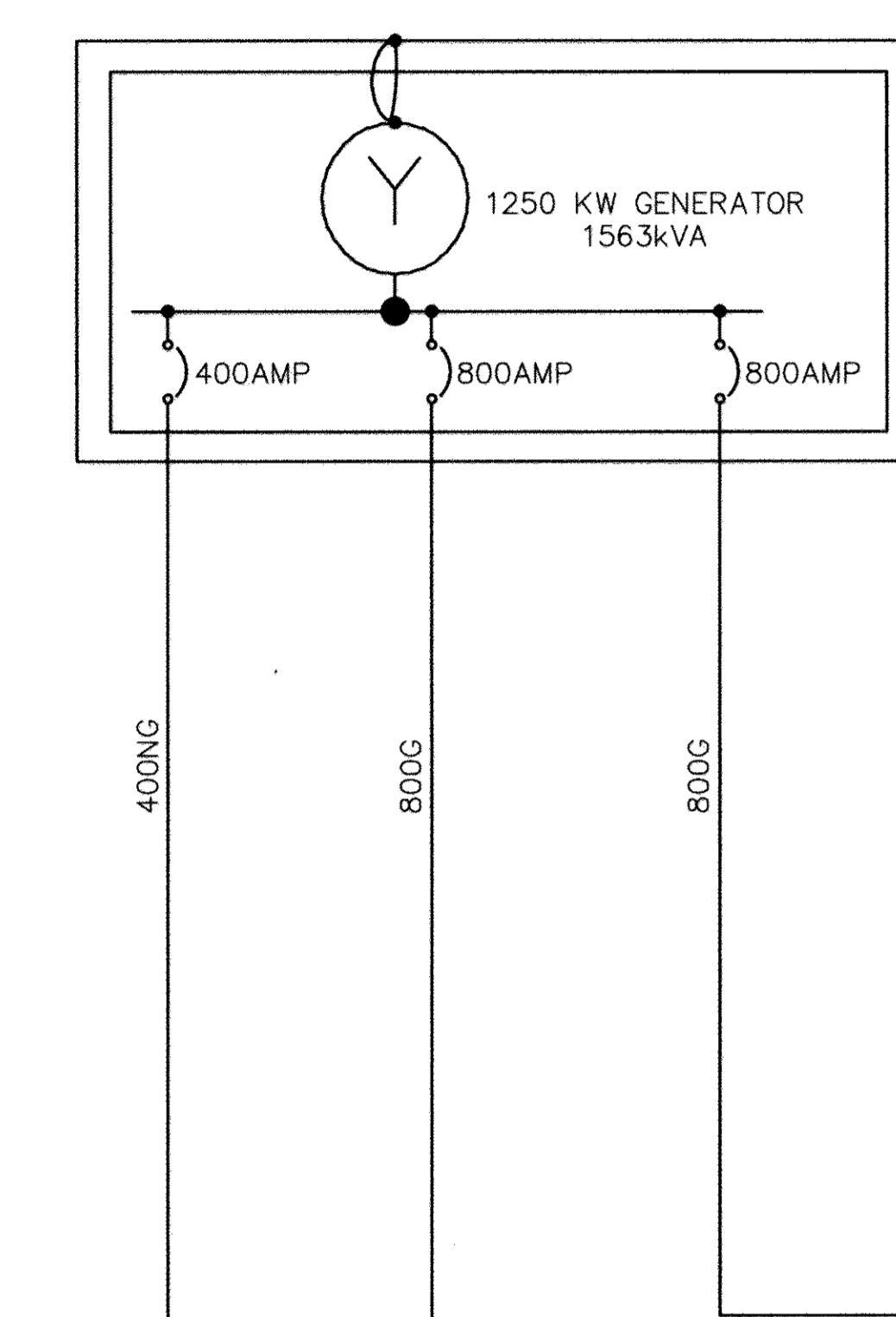
- SEE PLAN SHEET E1 FOR DISCONNECT SWITCH (DS) SCHEDULE.
- SEE PLAN SHEET E1 FOR AUTOMATIC TRANSFER SWITCH (ATS) SCHEDULE.
- CONTRACTOR SHALL DISCONNECT AND REMOVE EXISTING CONDUCTORS BETWEEN THE 750 KVA, 2400V-480V TRANSFORMERS (TYP. OF 2) AND THE VFD'S.
- CONTRACTOR SHALL DISCONNECT AND REMOVE CONDUIT AND CONDUCTORS BETWEEN THE 150 KVA, 3-POLE, 2400-480/277V TRANSFORMER AND MOTOR CONTROL CENTER 'CC2'.
- SEE PLAN SHEET E-1 FOR TRANSFORMER (T) SCHEDULE.

PLAN NOTES

- BUS TAP THE EXISTING MCC AND FEED DISCONNECT SWITCHES. CONFORM TO NFPA 70 ARTICLE 240.
- ALL CONDUITS SHALL BE 4" FOR POWER AND 3" FOR CONTROL IN DUCT BANK AND TO 12" AFG. TRANSITION TO RGS PRIOR TO EXITING DUCT BANK CONCRETE ENVELOPE.
- REMOVE AND REPLACE EXISTING FUSE WITH GE100E FUSE, OR EQUIVALENT.
- REMOVE AND REPLACE EXISTING 150KVA TRANSFORMER WITH 300KVA, 3 PHASE, 2.4KV-480/277V TRANSFORMER.
- REMOVE AND REPLACE EXISTING 2.4KV CONDUCTOR WITH: (3) #2, 2.4KV, #6GND, 4"C.
- PROVIDE #500KCMIL TWO BOLT MECHANICAL LUG(S) FOR CONNECTION TO LOAD BANK(S).

SYMBOLS

- (49) / OL THERMAL OVERLOAD RELAY
- (50G) INSTANTANEOUS GND. OVERCURRENT RELAY
- (51) TIME DELAY OVERCURRENT RELAY
- (86) / LOR LOCKOUT TRIPPING RELAY, HAND RESET
- (A) AMMETER
- (AS) AMMETER SWITCH
- (V) VOLTMETER
- (VS) VOLTMETER SWITCH
- (OC) TIME INVERSE, INSTANTANEOUS OVERCURRENT AND GROUND FAULT RELAY GE MULTILIN 735
- (Circuit Breaker Symbol) CIRCUIT BREAKER
- (Current Transformer Symbol) CURRENT TRANSFORMER
- (Power Transformer Symbol) POWER TRANSFORMER
- (Ground/Ground Rod Symbol) GROUND/GROUND ROD
- (Fuse Symbol) FUSE
- (Normally Open Contact Symbol) NORMALLY OPEN CONTACT
- (Drawout Device Contact Symbol) DRAWOUT DEVICE CONTACT
- (Switch Symbol) SWITCH
- (Connect to Existing Symbol) CONNECT TO EXISTING
- (Generator Symbol) GENERATOR
- (ATS Symbol) AUTOMATIC TRANSFER SWITCH (ATS)



FEEDER SCHEDULE

FEEDER DESIGNATION	CONDUCTOR SETS	PHASE CONDUCTORS SIZE	NEUTRAL CONDUCTOR SIZE	GROUND CONDUCTOR SIZE	CONDUIT SETS	CONDUIT SIZE
15NG,20NG	1	#12	#12	#12	1	3/4"
40G	1	#8	-	#8	1	3/4"
100NG	1	#1	#1	#8	1	2 1/2"
125G	1	#1	-	#6	1	2"
200NG	1	3/0	3/0	#6	1	2"
225NG	1	4/0	4/0	#2	1	2 1/2"
400NG	1	500	500	#3	1	4"
800G	2	500	-	2/0	2	4"
100G	1	#2-2.4KV	-	#6	1	4"

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I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State of Maryland, License No. 33925, Expiration Date 1/15/19

1 SINGLE LINE POWER DIAGRAM
SCALE: NOT TO SCALE

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

[Signatures and Dates]
DIRECTOR OF PUBLIC WORKS DATE 1/30/18
CHIEF, BUREAU OF UTILITIES DATE 1/31/18
CHIEF, UTILITY DESIGN DIVISION DATE 1/31/18

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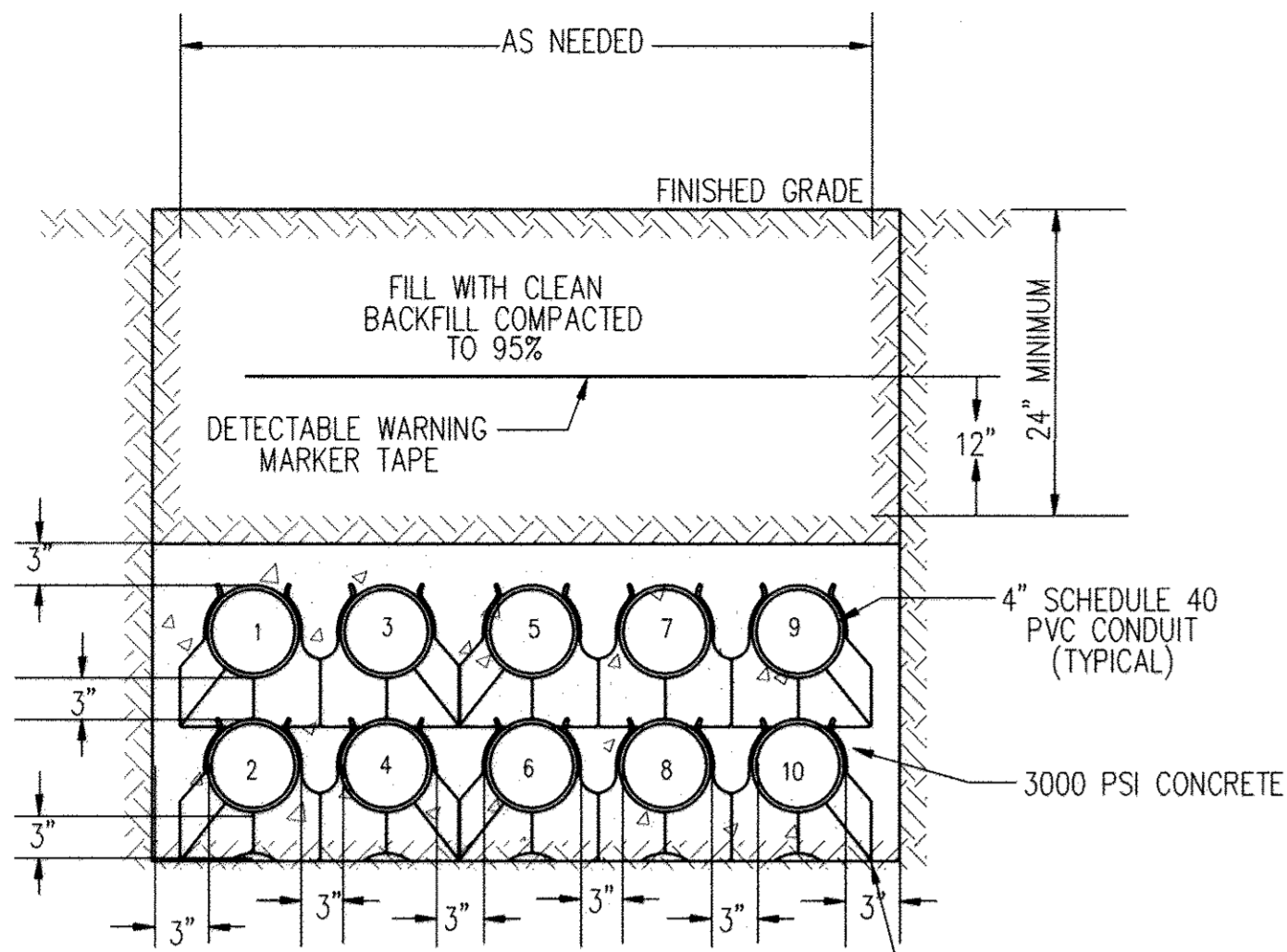
ELECTRICAL - SINGLE LINE DIAGRAM

1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

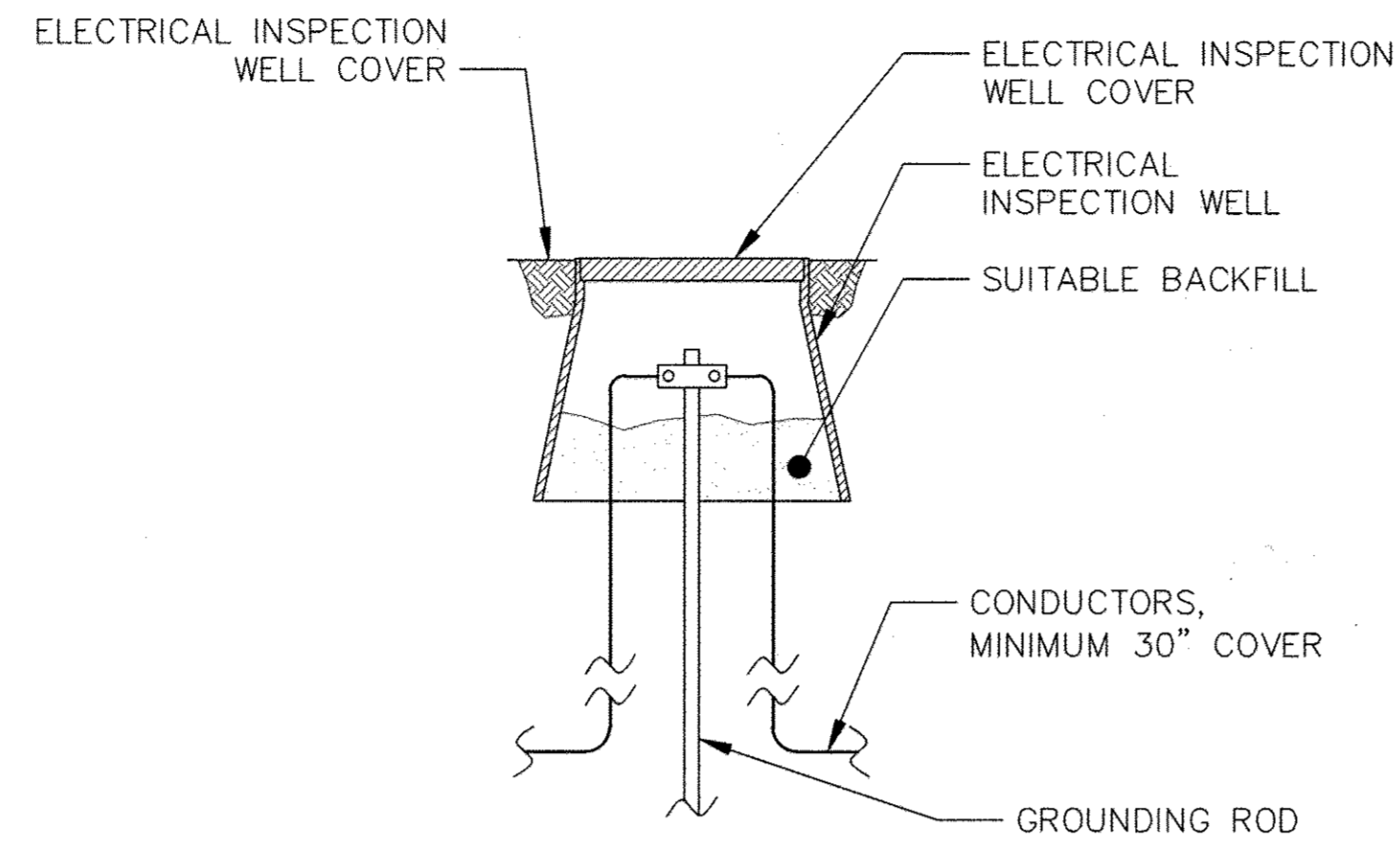
E-3
SCALE AS SHOWN
SHEET 12 OF 21

AS BUILT REPLACEMENT SHEET



- CONDUIT DESIGNATIONS:**
1. GENERATOR TO ATS-1: 4°C
 2. GENERATOR TO ATS-2: 4°C
 3. GENERATOR TO ATS-2: 4°C
 4. GENERATOR TO ATS-3: 4°C
 5. GENERATOR TO ATS-3: 4°C
 6. GENERATOR TRANSFORMER TO MCC, 4°C
 7. SPARE: COMMUNICATIONS
 8. SPARE: POWER
 9. CONTROL: SIGNAL, 3°C
 10. CONTROL: DISCRETE, 3°C
- DUCT SPACER LOCATED EVERY 5' ALONG DUCT BANK - UNDERGROUND DEVICES INC., WUNREECE DUCT SPACER OR EQUAL.

1 10-WAY DUCTBANK DETAIL
E-4 SCALE: NOT TO SCALE



NOTE: SEE THE NFPA 70 FOR ELECTRICAL INSPECTION WELL AND GROUNDING GRID INSTALLATION REQUIREMENTS.

2 GROUNDING AND BONDING DETAIL
E-4 SCALE: NOT TO SCALE

PANELBOARD NAME: LB																			
VOLTAGE:		120/208V		BUS RATING:		100A		POLES:		30		MINIMUM A.I.C. RATING(A):		10K					
PHASE/WIRE:				3 PHASE, 4 WIRE +GROUND				MAIN:		100A MCB		MOUNTING:		SURFACE, NEMA 12		SERVICE:		DISTRIBUTION	
CKT NO.	LOAD TYPE	LOAD DESCRIPTION		BKR P	LOAD TRIP	PHASE LOAD (VA)			LOAD (VA)	BKR P	LOAD DESCRIPTION		LOAD TYPE	CKT NO.					
1	S	WATER MON. UPS		1	20	1000	1000				1	20	SPARE		2				
3	N	MC9710 - CP		1	20	240		240			1	20	SPARE		4				
5		SPACE						240	240		1	15	LC2000 - CP	N	6				
7		SPACE					960				3	15	VENTILATION PANEL	N	8				
9		SPACE						960					-	N	10				
11		SPACE							960				-	N	12				
13		SPARE		1	20	0					1	20	SPARE		14				
15		SPARE		1	20	0		0			1	20	SPARE		16				
17		SPARE		1	20	0		0			1	20	SPARE		18				
19		SPACE				0							SPACE		20				
21		SPACE						0					SPACE		22				
23		SPACE							0				SPACE		24				
25		SPACE				0							SPACE		26				
27		SPACE							0				SPACE		28				
29		SPACE											SPACE		30				
TOTAL CONNECTED LOAD (VA)						4360	1960	1200	1200				(VA/PHASE)						
TOTAL CONNECTED LOAD (A)						12.10	16.33	10.00	10.00				(AMPS/PHASE)						

PROFESSIONAL CERTIFICATION.
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CHK: RDS			
DATE: 10/2014	BY	NO.	REVISION

ELECTRICAL - PANELBOARD SCHEDULE AND DETAILS

1000 SCALE MAP NO. 32 BLOCK NO.20

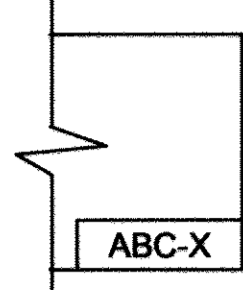
ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

KCI TECHNOLOGIES PROJECT No.: 13-12267718

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P & I LEGEND

ABC-X
↑
SEQUENTIAL NUMBER
IDENTIFICATION



PANEL LEGEND

AF = ACTIVE FILTER
J = JUNCTION BOX
L = LOCAL CONTROL PANEL
LC3000 = COMMUNICATIONS HUB
MCC-X = MOTOR CONTROL CENTER
MICROCAT = MAIN CONTROLLER
TB = TERMINAL BOARD
TEL-X = TELEPHONE
VCP-X = VENTILATION CONTROL PANEL
VFD-X = VARIABLE FREQUENCY DRIVE

LEGEND

— EX. SYSTEM
— NEW SYSTEM
- - - POWER
- · - · - SIGNAL
TEL PHONE LINE / COMMUNICATIONS
— ATS CONTROL POWER MODIFICATIONS

EQUIPMENT LEGEND

ABC-X
↑
SEQUENTIAL NUMBER
IDENTIFICATION

ATS = AUTOMATIC TRANSFER SWITCH
DP-X = DRAIN PUMP
EF-X = EXHAUST FAN
FM-X = FLOW METER
FOM = FUEL OIL MONITOR
FPS = FUEL POLISHING SYSTEM
HT-X = HEAT TRACE
LB-X = LOAD BANK
MTS = MANUAL TRANSFER SWITCH
MOV-X = MOTOR OPERATED VALVE
PM = POWER MONITOR
RASP-X = RETURN ACTIVATED SLUDGE PUMP
SOL-X = SOLENOID VALVE
SSRVS = SOLID STATE REDUCED VOLTAGE STARTER
T_H = THERMOSTAT HEAT
T_V = THERMOSTAT VENTILATION

GENERAL ABBREVIATIONS

AUTO = AUTOMATIC
ARV = AIR RELEASE VALVE
ATS = AUTOMATIC TRANSFER SWITCH
CB = CIRCUIT BREAKER
CP = CONTROL POWER
DPDT = DOUBLE POLE-DOUBLE THROW
ECD = ELECTRICAL CONTROL DIAGRAM
ETM = ELAPSED TIME METER
GND = GROUND
HMI = HUMAN MACHINE INTERFACE
I/O = INPUT/OUTPUT
JB = JUNCTION BOX
MB = MAIN BREAKER
OIT = OPERATOR INTERFACE TERMINAL
P&ID = PROCESS AND INSTRUMENTATION DIAGRAM
PM = PHASE MONITOR
TB = TERMINAL BOARD
TVSS = TRANSIENT VOLTAGE SURGE SUPPRESSION
VAC = VOLTS/ALTERNATING CURRENT
VFD = VARIABLE FREQUENCY DRIVE
XFMR = TRANSFORMER

INSTRUMENT, EXAMPLES

FIT = FLOW INDICATING TRANSMITTER
PIT = PRESSURE INDICATING TRANSMITTER
ZS = POSITION SWITCH

P & I D NUMBERING SEQUENCE

200 SERIES = EX. LC2000
300 SERIES = BOOSTER PUMP SYSTEMS, EX. MC9710
400 SERIES = GENERATOR SYSTEMS
500 SERIES = AUXILIARY SYSTEMS

PROCESS LEGEND

D = DRAIN
NPW = NON-POTABLE WATER
PW = POTABLE WATER
S = SANITARY
W = WATER

GENERAL NOTES

- 1. SEE MECHANICAL DRAWINGS FOR FIELD INSTRUMENT LOCATIONS.
- 2. FOR ECD SYMBOLS, SEE SHEET 1-2.
- 3. FOR POWER DISTRIBUTION AND DISCONNECT REQUIREMENTS, SEE ELECTRICAL DRAWINGS.

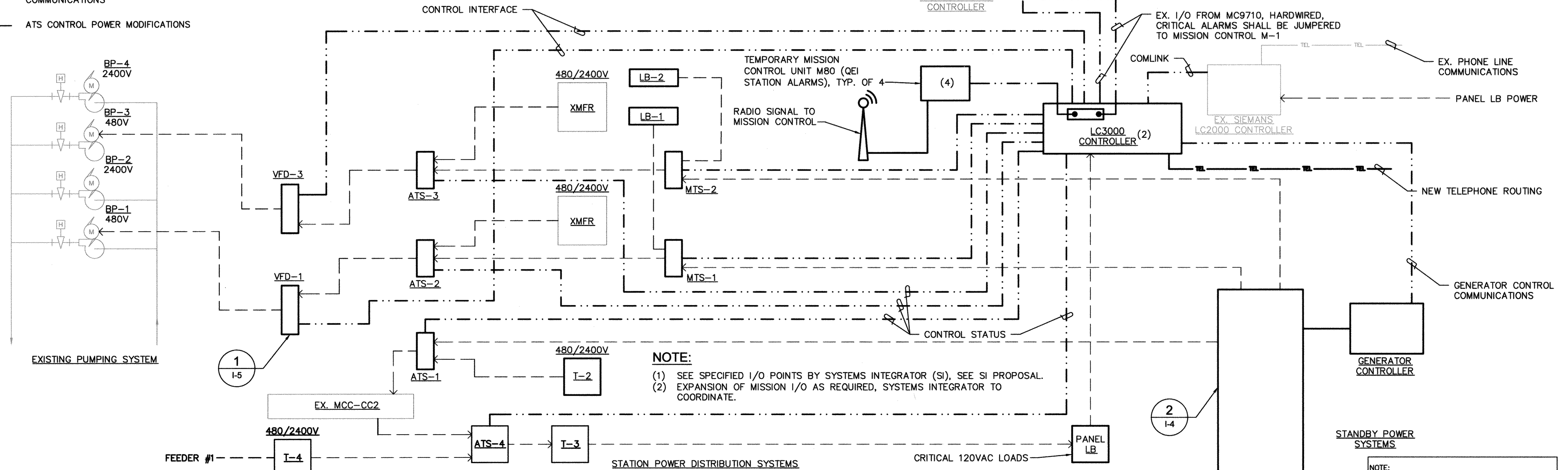
- (X) CODED NOTES
- (X) CONSTRUCTION NOTES
- (X) REMOVAL NOTES

(ISA) INSTRUMENT IDENTIFICATION SCHEDULE

FIRST LETTER	SUCCEEDING LETTER				
	VARIABLE	MODIFIER	PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		AUTOMATIC
B	BREAKER		USER'S CHOICE	CLOSE OR STOP	BYPASS/REVERSE
C	COMMUNICATIONS			CONTROL	
D	DENSITY	DIFFERENTIAL		OPEN OR START	
E	VOLTAGE (EMF)		PRIMARY ELEMENT	SENSOR	
F	FLOW RATE	RATIO	FAIL	FAIL	FAIL/INCOMPLETE
G	GAUGING		GLASS		LOCAL/MANUAL/HAND
H	HAND				HIGH OR OPEN
I	CURRENT		INDICATE		INTERMEDIATE
J	POWER	SCAN			
K	TIME	TIME RATE		CONTROL STATION	
L	LEVEL		LIGHT		LOW OR CLOSE
M	MOTOR	MOMENTARY		MOTOR	MIDDLE
N	STATUS		INPUT	FORWARD	ON OR OPERATE
O				OFF	OVERLOAD
P	PRESSURE	PNEUMATIC	POINT (TEST)	POSITION	
Q	QUALITY OR EVENT	TOTALIZE		EMERGENCY/ABNORMAL	
R	RADIOACTIVITY		RECORD OR PRINT	REMOTE	RUN/FORWARD
S	SPEED OR FREQUENCY	SUM	SWITCH	SWITCH	STOP
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VARIABLE OR VISCOSITY			VALVE OR DAMPER	VFD/VALVE
W	WEIGHT OR FORCE	TORQUE	WELL		UNCLASSIFIED
X	MOD. LIGHT OR VALVE		UNCLASSIFIED	UNCLASSIFIED	RESET
Y	INTERLOCK			RELAY OR COMPUTE	
Z	POSITION			DRIVE OR ACTUATOR	

PROGRAMMING NOTES

- 1. THE EXISTING MICROCAT CONTROLLER SHALL BE REUSED AS A JUNCTION BOX WITH NEW TERMINAL BOARDS. NEW TERMINAL BOARD NUMBERS SHALL BE REPLICATED FROM EXISTING TERMINAL BOARD.
- 2. ALL NEW I/O AND CONTROL FEATURES SHALL BE INCORPORATED INTO THE LC3000 COMMUNICATIONS HUB. SEE PUMP CONTROL AND GENERATOR I/O SPECIFIED IN CONTRACT DOCUMENTS FOR COMPLETE I/O LIST.
- 3. CONNECT ALL EX. I/O TO RETROFITTED TERMINAL BOARDS IN MC9710, HARDWIRE BACK TO LC3000.
- 4. PROVIDE ONE (1) TEMPORARY MISSION CONTROL M80 FOR EACH SPS NETWORKED THROUGH ELKRIDGE BPS.

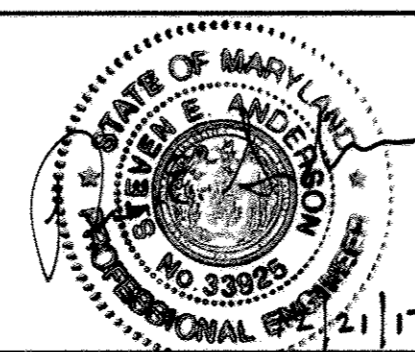


NOTE:

- (1) SEE SPECIFIED I/O POINTS BY SYSTEMS INTEGRATOR (SI), SEE SI PROPOSAL.
- (2) EXPANSION OF MISSION I/O AS REQUIRED, SYSTEMS INTEGRATOR TO COORDINATE.

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1000 SCALE MAP NO. 32
BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

SCALE AS SHOWN
SHEET 14 OF 21

PROCESS AND INSTRUMENTATION SYMBOLS

- EXISTING PROCESS FEATURES
- DIGITAL SIGNALS
- EQUIPMENT GROUPED AS A TYPICAL ARRANGEMENT OF MULTIPLES OF THE SAME PROCESS.
- ELECTRICAL SIGNAL
- REMOTE I/O
- SOFTWARE OR COMMUNICATIONS DATA SIGNAL
- ANALOG SIGNALS
- VENT
- PNEUMATIC SIGNAL (COMPRESSED AIR)
- ELECTRICAL SERVICE
- PROCESS FLOW
- ANALOG INPUT
- ANALOG OUTPUT
- DIGITAL INPUT
- DIGITAL OUTPUT
- X = A DESIGNATED CONTINUATION NUMBER WITH RESPECT TO A SPECIFIC SIGNAL. E.G.
 ① --->
 ② --->
- TS 112 FIELD-MOUNTED DEVICE
- AIT 110 PANEL-MOUNTED DEVICE
- ABC 123 X INDICATING LAMP - X INDICATES LENS COLOR:
 R = RED G = GREEN
 W = WHITE A = AMBER
- AH 110 PLC OR REMOTE INPUT/OUTPUT
- AH 123 PCS PLC INPUT/OUTPUT
- SB (X) SIGNAL BOOSTER/ISOLATOR (X) PANEL LOCATION
- LE XXX SUBMERSIBLE TRANSDUCER
- LE 106 ULTRASONIC LEVEL INDICATOR
- I (X) INTERPOSING RELAY (X) PANEL LOCATION
- SEE X-XX PROCESS CONTINUATION

PROCESS AND INSTRUMENTATION SYMBOLS

- PRESSURE SWITCH
- LIMIT SWITCH
- FLOW SWITCH
- FLOAT SWITCH
- RECEPTACLE
- EXTERIOR PLUG CONNECTION
- TB TERMINAL BOARD
- J TERMINAL ENCLOSURE OR J - JUNCTION
- ELECTRICAL DISCONNECT
- JUNCTION BOX, HAZARDOUS LOCATION
- JUNCTION BOX, NON-HAZARDOUS LOCATION
- EXPLOSION PROOF SEAL-OFF

HAND SWITCHES

- (XXX) SELECTOR SWITCH OR PUSH BUTTON (MAINTAINED CONTACTS)
- (XXX) HAND CONTROL STATION
- (XXX) MOMENTARY SELECTOR SWITCH

HAND SWITCH-NOTES (XXX)

- ACK = ACKNOWLEDGE PUSHBUTTON
- CL = CLOSE (PUSHBUTTON)
- ES = EMERGENCY STOP (PUSHBUTTON)
- HOA = HAND OFF AUTOMATIC (SELECTOR SWITCH)
- LO = LOCKOUT STOP (PUSHBUTTON)
- LR = LOCAL/REMOTE (SELECTOR SWITCH)
- MA = MANUAL/AUTOMATIC (SELECTOR SWITCH)
- OP = OPEN (PUSHBUTTON)
- POT = POTENTIOMETER (HAND CONTROL)
- RES = RESET (PUSHBUTTON)
- SEL = SELECTOR
- SP = STOP (PUSHBUTTON)
- ST = START (PUSHBUTTON)
- V-O-SSRV = VFD - OFF - SOLID STATE REDUCED VOLTAGE STARTER

ANALYZERS

- XXX-INDICATES:
 pH
 ORP OXYGEN REDUCTION POTENTIAL
 DO DISSOLVED OXYGEN
 NH₃ AMONIA

EQUIPMENT SYMBOLS

- AIR RELEASE VALVE
- BALL CHECK VALVE
- BALL VALVE
- BASKET STRAINER (HIGH FLOW)
- WYE STRAINER (LOW FLOW)
- BUTTERFLY VALVE
- CALIBRATION CYLINDER
- CENTRIFUGAL PUMP
- CHECK VALVE
- DOUBLE DOOR CHECK VALVE
- EXPANSION JOINT
- FLEXIBLE HOSE
- FLOAT
- FLOW METER (MAGNETIC)
- GATE VALVE
- GLOBE VALVE
- HOSE BIBB
- ISOLATION VALVE
- METERING PUMP
- MOTOR
- MOTOR ACTUATOR
- MOTORIZED BALLVALVE
- NEEDLE VALVE
- JB PANEL JUNCTION BOX
- PRESSURE REGULATING VALVE
- PRESSURE RELIEF VALVE
- SUBMERSIBLE MIXER
- P PUMP (AUXILIARY)
- REDUCER OR INCREASER
- ROTA-METER

EQUIPMENT SYMBOLS

- MOTORIZED BUTTERFLY VALVE
- CAPPED FLUSHING CONNECTION (F.C.)
- FLOW METER (THERMAL DISPERSION)
- MOTORIZED GATE VALVE
- MOTORIZED PINCH VALVE
- SLUICE GATE
- SOLENOID VALVE
- SOLENOID VALVE (3-WAY)
- STATIC MIXER
- TWO-WAY-THREE PORT VALVE, OR THREE WAY VALVE
- TRUCK QUICK CONNECTION
- UNION

ELECTRICAL CONTROL DIAGRAM SYMBOLS (ECD)

- < INCOMING LINE
> OUTGOING LINE
- CIRCUIT BREAKER
- CONTACTS - NORMALLY CLOSED
- CONTACTS - NORMALLY OPEN
- CONTROL POWER TRANSFORMER
- CONTROL RELAY (SEQUENTIAL)
- DISCONNECT SWITCH
- ETM ELAPSED TIME METER
- FLOAT SWITCH - NORMALLY OPEN, CLOSE ON LEVEL DROP
- FLOAT SWITCH - NORMALLY OPEN, CLOSE ON LEVEL RISE
- F FUSE
- GND GROUND (GND)
- HT-2 HEAT TRACE
- HOA HAND-OFF AUTOMATIC SWITCH
- X INDICATING LAMP INTEGRAL WITH HOA SELECTOR
- LIMIT SWITCH - NORMALLY OPEN
- MANUAL MOTOR STARTER, SINGLE-POLE
- OVERCURRENT ELEMENT THERMOSTAT
- PM PHASE MONITOR
- PLC OUTPUT (RTU OUTPUT)
- PRESSURE SWITCH - NORMALLY OPEN - CLOSURES ON PRESSURE DROP
- PRESSURE SWITCH - NORMALLY OPEN - CLOSURES ON PRESSURE RISE
- PUSH-BUTTON - MOMENTARY CONTACT
- PUSH-BUTTON - MOMENTARY CONTACT START/STOP
- PUSH-PULL BUTTON - MAINTAINED CONTACT
- PUSH TO TEST (TRANSFORMER TYPE) INDICATING LAMP - X INDICATES LENS COLOR:
 R = RED (RUN) B = BLUE (POSITION)
 G = GREEN (STOP) Y = YELLOW (POSITION)
 W = WHITE (POWER) A = AMBER (ALARM)
- RCT REPEAT CYCLE TIMER
- SOLENOID

ELECTRICAL CONTROL DIAGRAM SYMBOLS (ECD)

- M STARTER OR CONTACT COIL - DESIGNATION AS INDICATED
- START-STOP PUSHBUTTON - MAINTAINED CONTACT
- N.C. THERMOSTAT, NORMALLY CLOSED
- T1 TIMER
 NOTC NOT CLOSES ON HIGH TORQUE
 NCTO CLOSES ON HIGH TORQUE
- TORQUE SWITCH - N.O. - CLOSURES ON HIGH TORQUE

RISER DIAGRAM SYMBOLS

- ABC-123 ISA - P&ID NUMBERS
- DISCRETE SIGNAL/CONDUIT
- ANALOG SIGNAL/CONDUIT
- EXISTING WORK
- NEMA BOUNDARY

ABC - LETTERS INDICATE FUNCTION ACCORDING TO IDENTIFICATION ASSOCIATED WITH ISA SCHEDULE.
 123 - DIGITS INDICATE SEQUENTIAL EQUIPMENT

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 HOWARD COUNTY, MARYLAND

[Signature] 10/24/14
 DIRECTOR OF PUBLIC WORKS DATE

[Signature] 10/22/14
 CHIEF, BUREAU OF ENGINEERING DATE

[Signature] 10/22/14
 CHIEF, BUREAU OF UTILITIES DATE

[Signature] 10/22/14
 CHIEF, UTILITY DESIGN DIVISION DATE

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 NO. 33925
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DATE: 10/20/14	BY NO.	REVISION	DATE

INSTRUMENTATION AND CONTROL DIAGRAM SYMBOLS

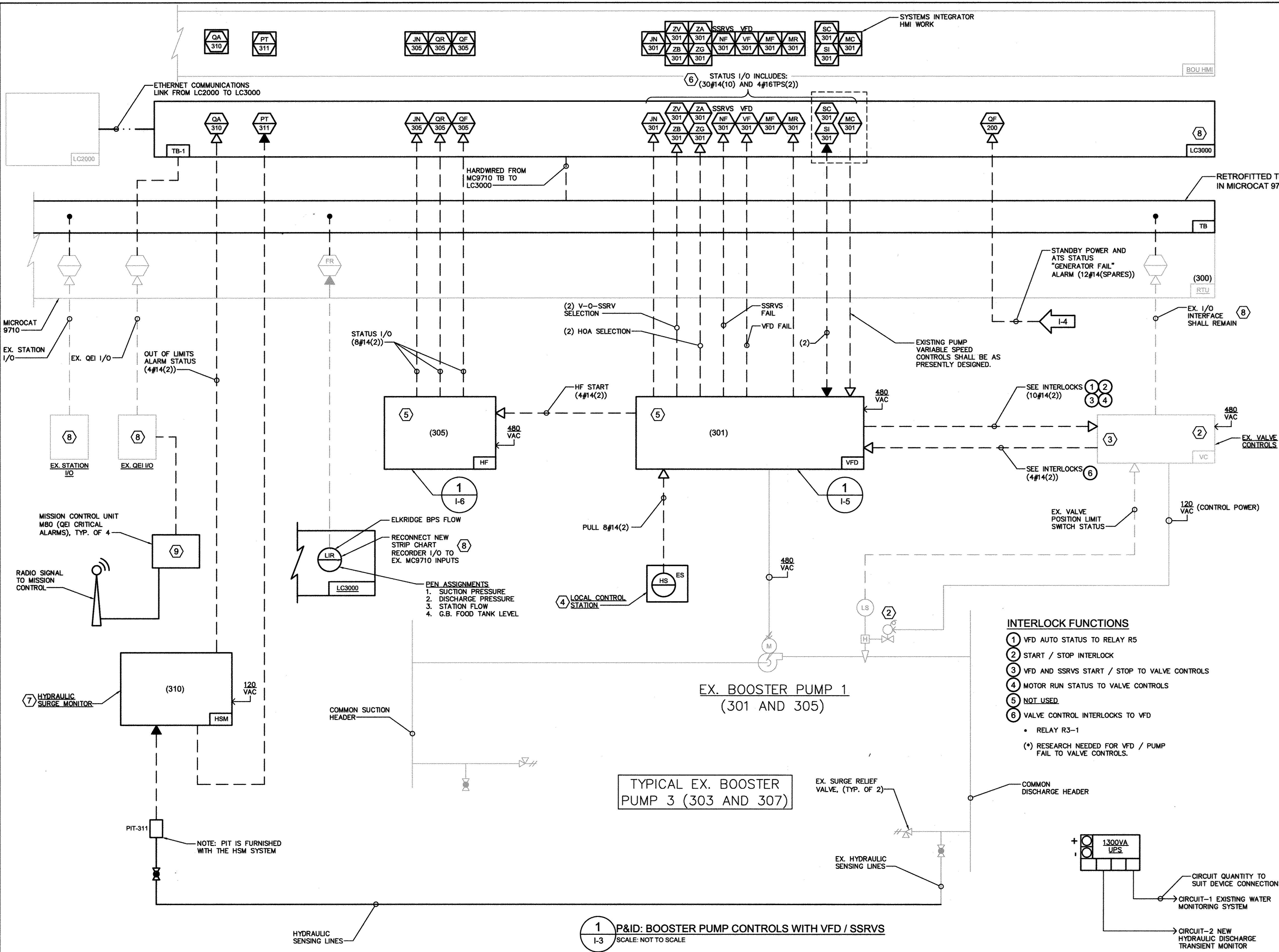
1000 SCALE MAP NO. 32 BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS

HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4783
 ELECTION DISTRICT 1

KCI TECHNOLOGIES PROJECT No.: 13-12267718

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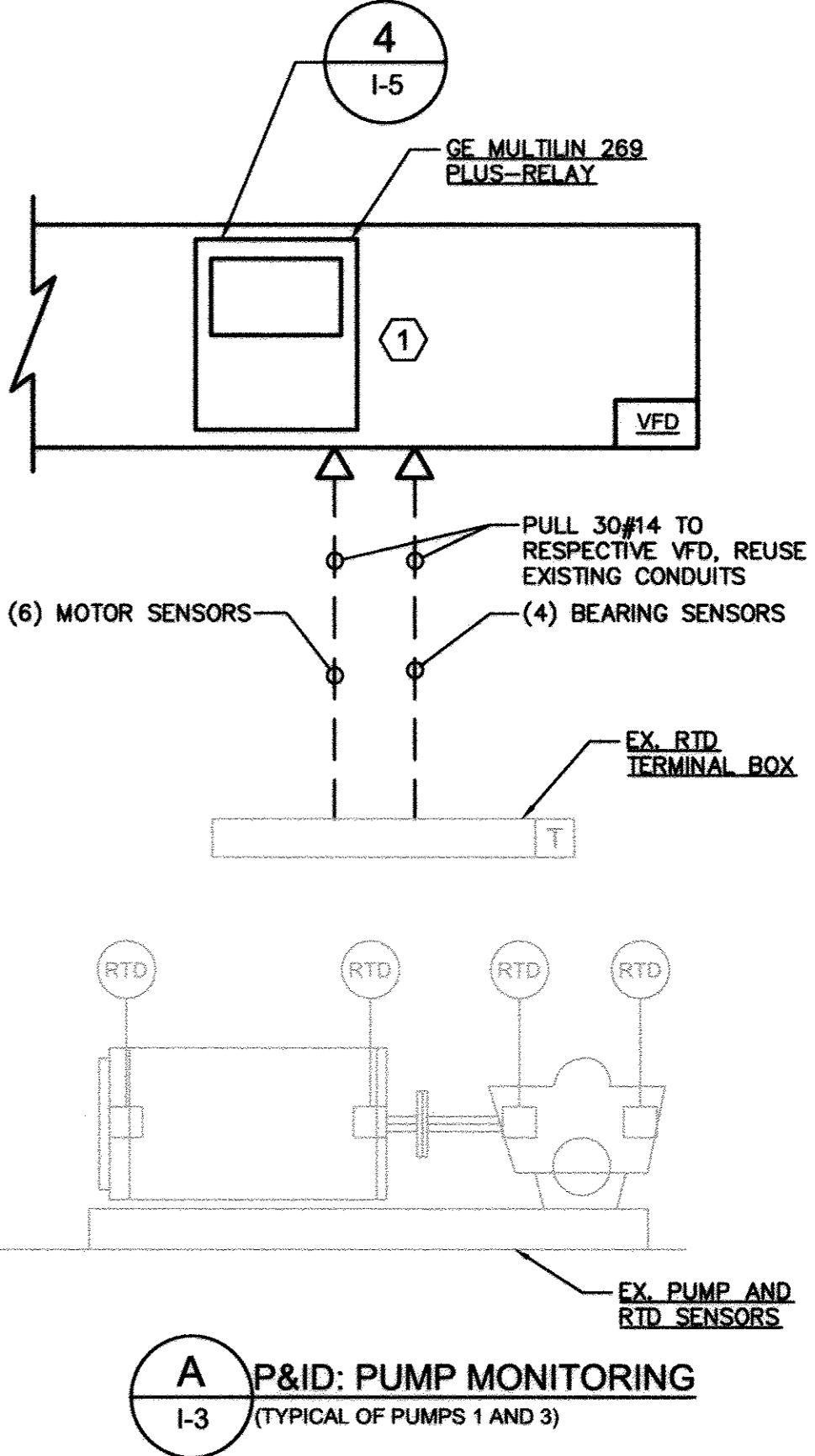
TYPICAL EX. BOOSTER PUMP 3 (303 AND 307)

1 P&ID: BOOSTER PUMP CONTROLS WITH VFD / SSRVS
 I-3 SCALE: NOT TO SCALE

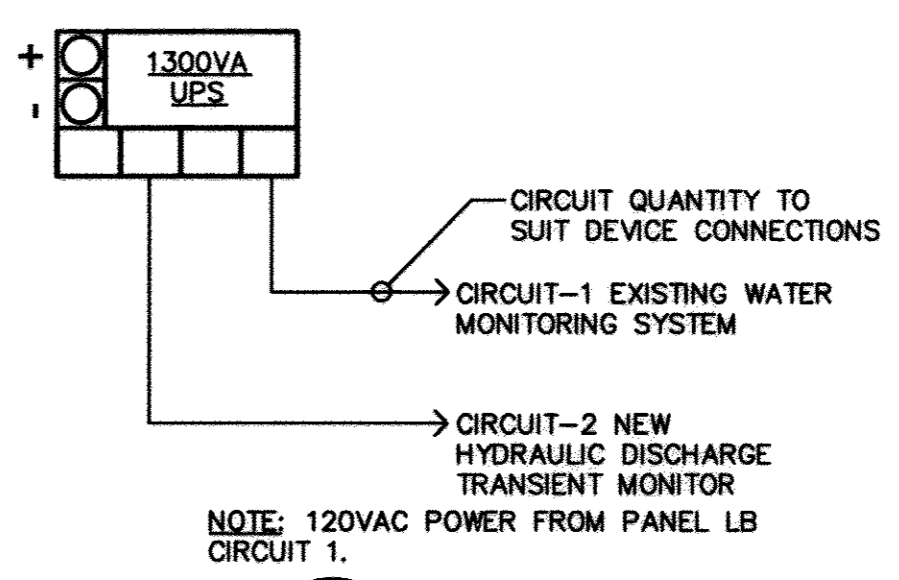
- INTERLOCK FUNCTIONS**
- 1 VFD AUTO STATUS TO RELAY R5
 - 2 START / STOP INTERLOCK
 - 3 VFD AND SSRVS START / STOP TO VALVE CONTROLS
 - 4 MOTOR RUN STATUS TO VALVE CONTROLS
 - 5 NOT USED
 - 6 VALVE CONTROL INTERLOCKS TO VFD
 - RELAY R3-1
 - (*) RESEARCH NEEDED FOR VFD / PUMP FAIL TO VALVE CONTROLS.

- CONSTRUCTION NOTES**
- 1 EACH MOTOR MONITOR SHALL BE PROGRAMMED FOR ONE COMMON FAILURE ALARM FOR ALL PUMP RTD'S.
 - 2 REUSE EXISTING BOOSTER PUMP VALVE CONTROLS.
 - 3 RECONNECT EXISTING VALVE LOCALS TO NEW VFD'S.
 - 4 REMOVE & REPLACE EXISTING LOCAL PUMP START/STOP CONTROL STATIONS WITH NEW E-STOP STATIONS & CONNECT TO VFD IN ACCORDANCE WITH ECD.
 - 5 CONTRACTOR PROVIDE NEW 2" CONDUIT BETWEEN VFD AND EX. RTU CABINETS.
 - 6 CONTRACTOR COORDINATE REUSE OF EXISTING VFD I/O POINTS AND HMI COMMUNICATIONS.
 - 7 POWER FOR THE EXISTING WATER MAIN MONITOR AND PROPOSED DISCHARGE PRESSURE TRANSIENT SURGE MONITOR SHALL BE VIA NEW 1300VA UPS.
 - 8 SYSTEMS INTEGRATOR (SI) SHALL COORDINATE REMOVAL OF MC9710 I/O POINTS FOR PUMP CONTROLS BASED ON NEW CONTRACT DOCUMENTS I/O LIST. SI SHALL MAINTAIN REMAINING EX. STATION I/O AND QEI COMMUNICATIONS WITHIN THE LC3000.
 - 9 PROVIDE ONE (1) MISSION CONTROL M80 FOR EACH SPS NETWORKED THROUGH ELKRIDGE BPS.
 - 10 ALL CONDUIT SHALL BE MINIMUM 3/4" UNLESS NOTED ON THE DRAWINGS.
 - 11 CONDUCTOR ID: A#14-B(C)
 - A - QUANTITY OF CONDUCTORS
 - B - SIZE OF CONDUIT LARGER THAN 3/4"
 - C - QUANTITY OF SPARE CONDUCTORS

LEGEND:
 — NEW WORK
 - - - EXISTING



A P&ID: PUMP MONITORING
 I-3 (TYPICAL OF PUMPS 1 AND 3)



B UPS DETAIL
 I-3 SCALE: NOT TO SCALE

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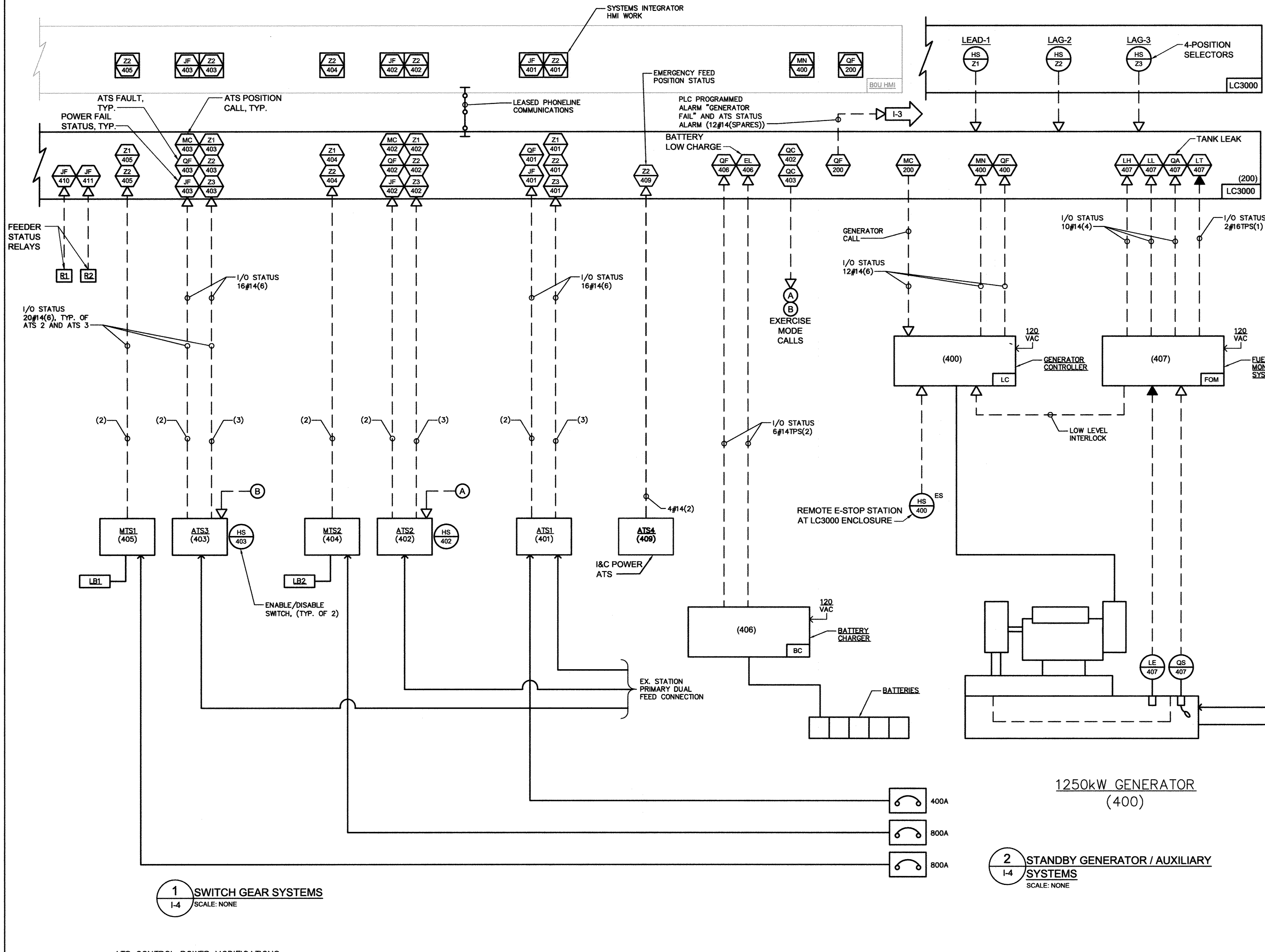
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PUMPING SYSTEMS PROCESS AND INSTRUMENTATION DIAGRAM
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ELKRIDGE PUMP STATION IMPROVEMENTS
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
 ELECTION DISTRICT 1

I-3
 SCALE AS SHOWN
 SHEET 16 OF 21

AS BUILT REPLACEMENT SHEET



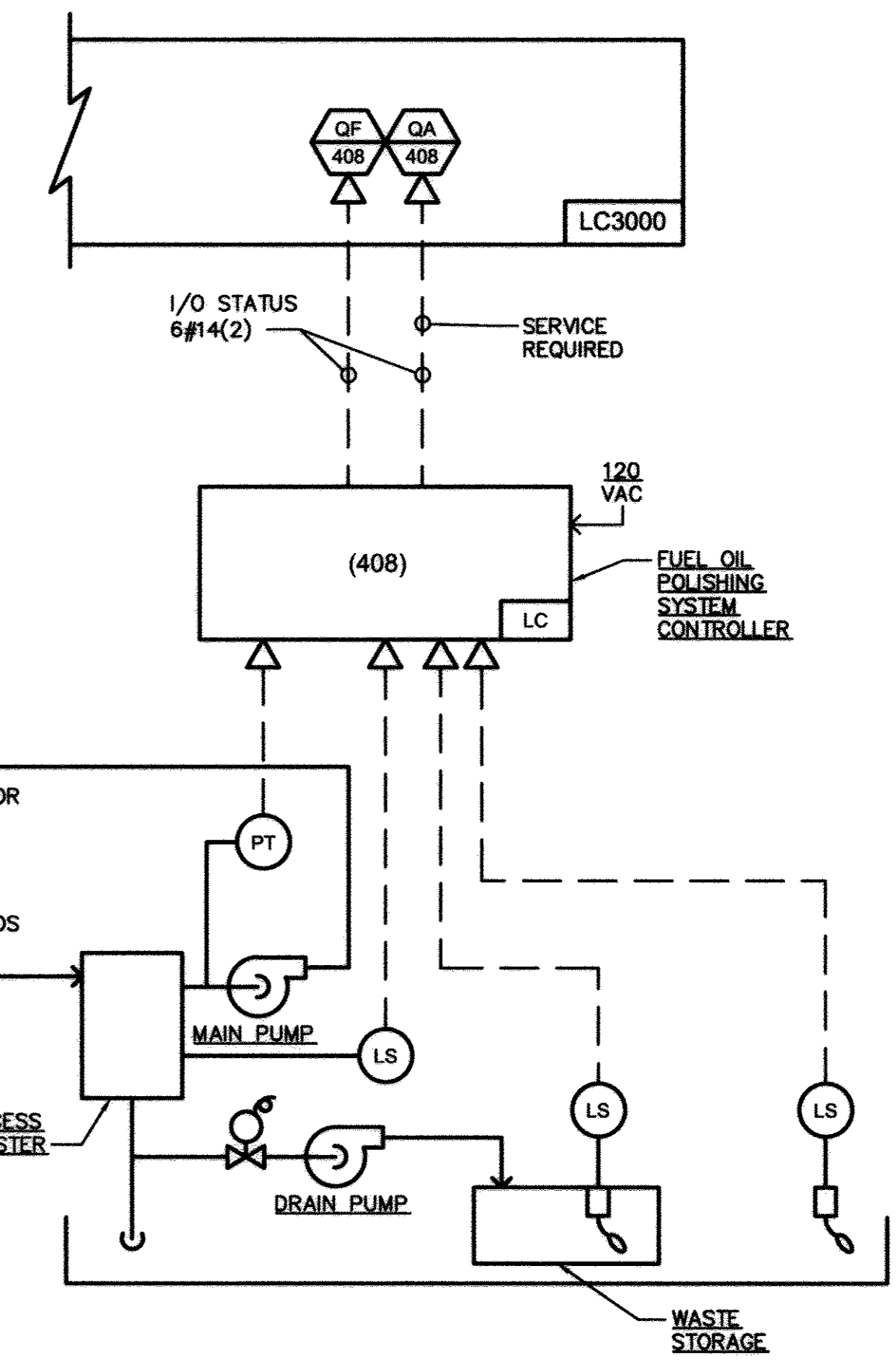
STANDBY POWER TRANSFER SEQUENCE

- ONLY ATS UNITS 1, 2, AND 3 STATUS POWER FAIL TO RTU.
- THE LC3000 CALLS THE GENERATOR TO START WHEN BOTH FEEDER STATUS RELAYS INDICATE NO POWER AVAILABLE.
- EACH ATS POSITIONS BASED ON POWER RECOVERY SEQUENCE.
- THE GENERATOR CONTROLLER SHALL SEQUENCE ATS1, ATS2, AND ATS3 TO STEP THE LOADS DURING GENERATOR OPERATIONS. THE LOADS SHALL BE STEPPED AS FOLLOWS:
 - LOAD=1 ATS1 SHALL BE CLOSED FIRST TO MAINTAIN ALL STATION CONTROLS AND AUXILIARY SYSTEMS. PROVIDE 1 MINUTE DELAY.
 - LOAD=2 ATS2 SHALL BE CLOSED SECOND TO SUIT THE RTU FIRST STEP PUMP POSITION STATUS. PROVIDE 3 MINUTE DELAY.
 - LOAD=3 ATS3 SHALL BE CLOSED THIRD TO SUIT THE RTU SECOND STEP PUMP POSITION STATUS.

LEGEND:

- NEW WORK
- EXISTING

ATS POSITION STATUS		MTS POSITION STATUS	
Z1	LOAD POSITION	Z1	LOAD BANK POSITION
Z2	EMERGENCY POSITION	Z2	STATION POWER POSITION
Z3	BYPASS POSITION		



A FUEL OIL POLISHING SYSTEM PACKAGE
 1-4 SCALE: NONE

POLISHING SYSTEM ALARMS

- F MAIN PUMP FAIL
- F FLOOD ALERT
- F DRAIN PUMP FAIL
- SR CANISTER WATER HIGH
- SR FILTER CHANGE REQUIRED
- SR WASTE DRUM FULL
- GROUPED: F FAIL; SR SERVICE REQUIRED

1 SWITCH GEAR SYSTEMS
 1-4 SCALE: NONE

2 STANDBY GENERATOR / AUXILIARY SYSTEMS
 1-4 SCALE: NONE

ATS CONTROL POWER MODIFICATIONS

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**STANDBY POWER SYSTEMS
 PROCESS AND INSTRUMENTATION
 DIAGRAM**
 1000 SCALE MAP NO. 32 BLOCK NO.20

**ELKRIDGE PUMP STATION
 IMPROVEMENTS**
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
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ELECTRICAL CONTROL DIAGRAM LEGEND (ECD):

- AT EQUIPMENT
- LOCAL CONTROL PANEL
- △ VFD/SSRVS
- ▲ MCC
- ⊖ HARMONIC FILTER

ELECTRICAL CONTROL DIAGRAM TERMINALS (ECD):

- PANEL WIREWAY TERMINATIONS
- WIRING CONNECTIONS
- REMOTE TERMINATIONS
- PANEL CONNECTIONS
- - - REMOTE CONNECTIONS
- + POWER SUPPLY CONNECTION

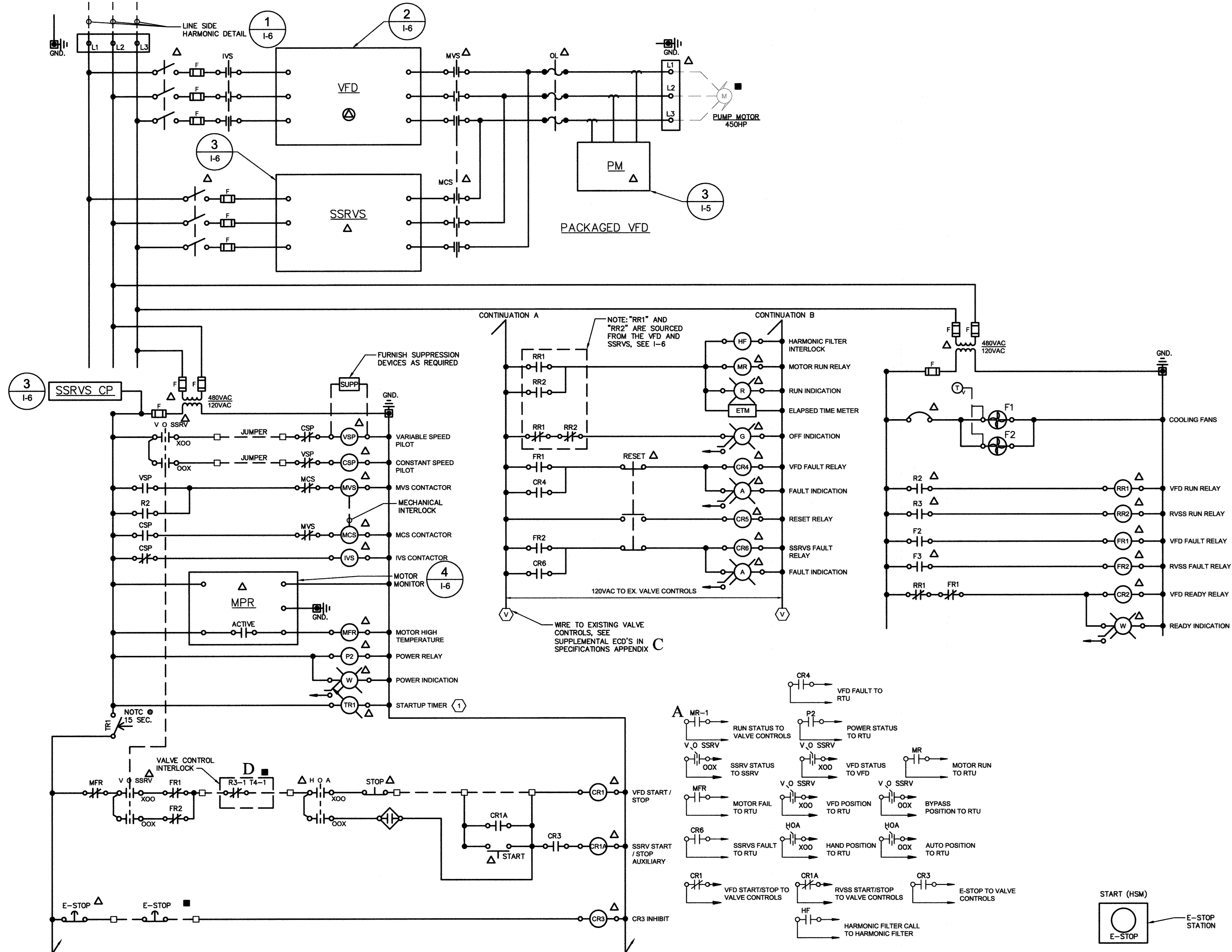
LEGEND:

- NEW WORK
- - - EXISTING
- X ECD CROSS-REFERENCE TO EXISTING VALVE CONTROLS, SEE SPECIFICATION APPENDIX-B

CONSTRUCTION NOTES:

- ① POWER START-UP TIMERS SHALL BE:
 - PUMP-1 - 15 SECONDS
 - PUMP-2 - 30 SECONDS

FOR APPROVED
DANFOSS VFD/SSRV
STARTER CONTROLS,
SEE O&M MANUAL



① ECD: PUMP CONTROLS
SCALE: NONE

② DETAIL: EX. LOCAL PUMP CONTROLS
SCALE: NONE

③ ECD: PHASE MONITOR
SCALE: NONE

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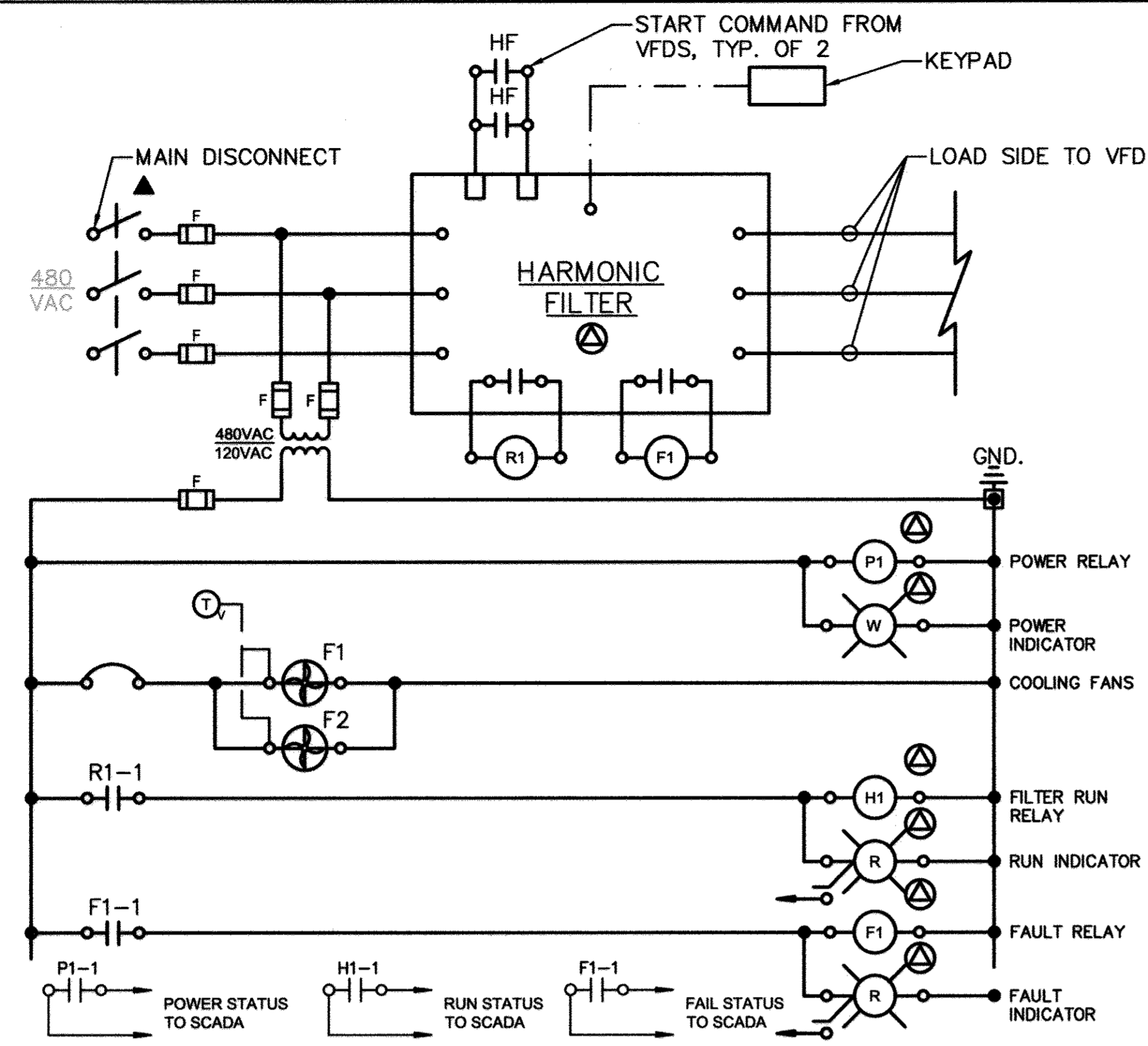
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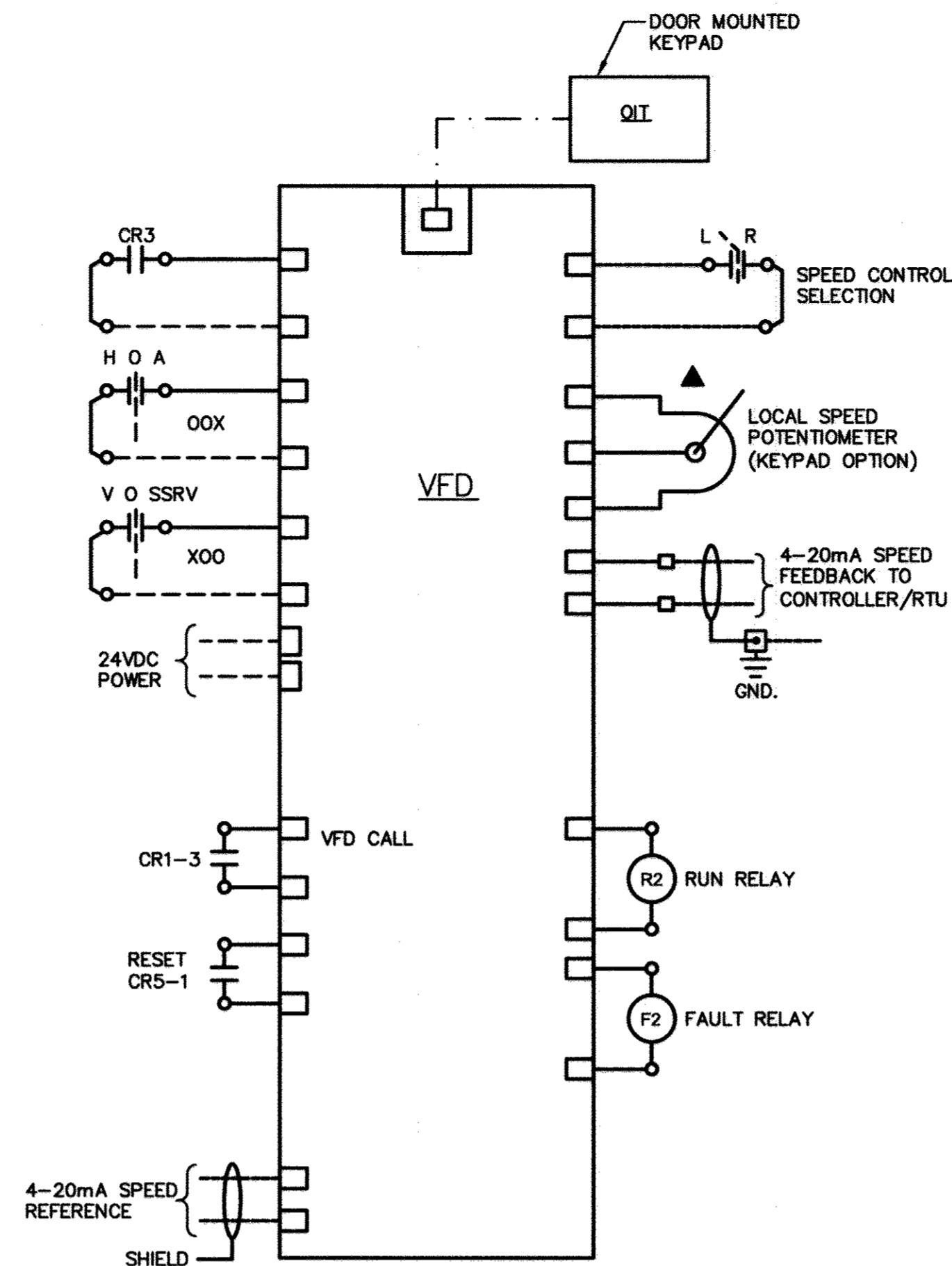
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 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
 ELECTION DISTRICT 1

I-5
 SCALE AS SHOWN
 SHEET
 18 OF 21

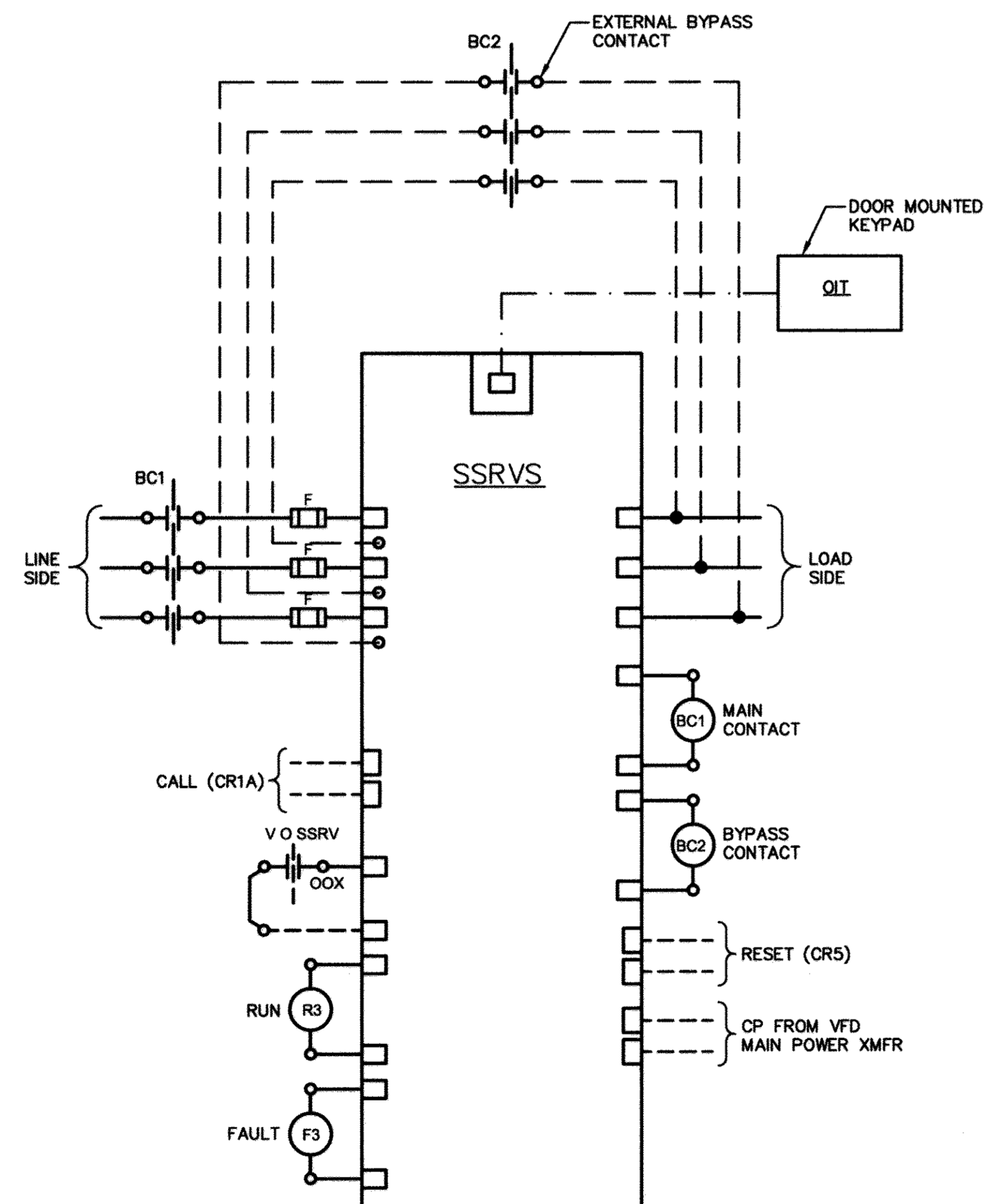
AS BUILT REPLACEMENT SHEET



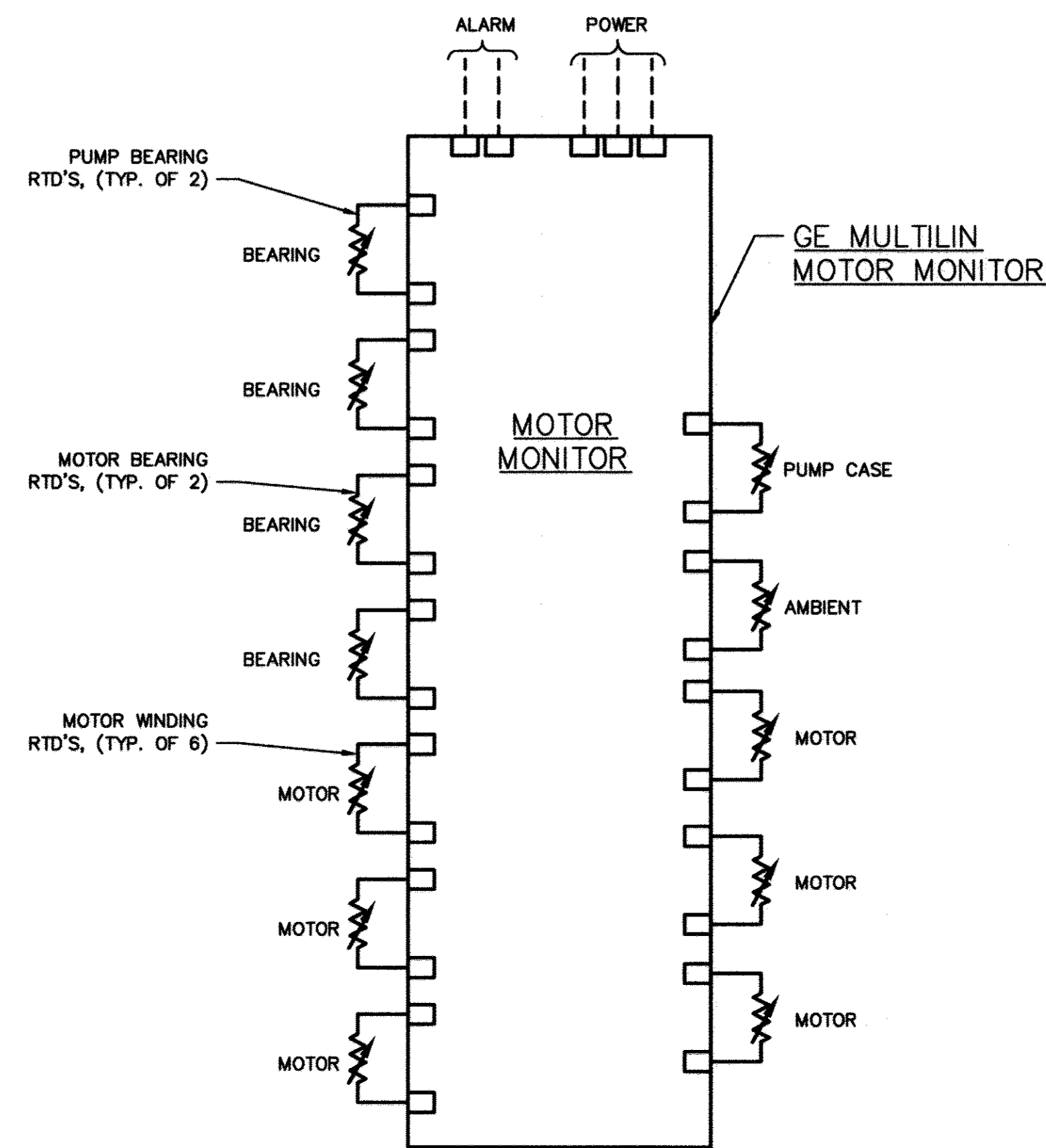
1 ECD: HARMONIC FILTER (HF)
 I-6 SCALE: NONE



2 ECD: VFD TERMINATIONS
 I-6 SCALE: NONE



3 ECD: SSRV STARTER TERMINATIONS
 I-6 SCALE: NONE



4 ECD: MOTOR MONITOR
 I-6 SCALE: NONE

- GENERAL NOTES:**
1. PROVIDE 24-INCHES SLACK WIRE AT EACH END OF ALL SPARE INSTRUMENTATION WIRES.
 2. SEE SYSTEM P&I DIAGRAMS AND ECD DETAILS FOR CONTROL WIRE IDENTIFICATIONS.
 3. CONDUIT CONTAINING #16 TPS (4-20mA) WIRE SHALL BE LOCATED 6-INCHES (MINIMUM) AWAY FROM CONDUIT CONTAINING POWER CONDUCTORS AND CONDUIT CONTAINING #14 OR #12 POWER AND DIGITAL SIGNAL WIRE.
 4. ALL CONDUIT SHALL BE 3/4-INCH IN SIZE UNLESS OTHERWISE NOTED ON INSTRUMENT RISER DIAGRAMS.
 5. SYSTEM INTEGRATOR SHALL VERIFY ALL APPROVED EQUIPMENT AND TERMINATIONS PRIOR TO INSTALLATION. THE SYSTEMS INTEGRATOR SHALL VERIFY ALL WIRE COUNTS AND INCLUDE SPARES AS SHOWN HERE IN AND ASSEMBLE INSTRUMENT RISERS FOR CONSTRUCTION. THE RISERS SHALL BE SUBMITTED FOR APPROVAL AS A SHOP DRAWING.
 6. SYSTEMS INTEGRATOR SHALL COORDINATE ANALOG SIGNAL CONDUIT QUANTITIES IN ACCORDANCE WITH MANUFACTURER'S RECOMMENDATIONS.

- CONSTRUCTION NOTES:**
- 1 ALL RELAYS SHALL HAVE L.E.D.S.
 - 2 ALL FUSES AND BREAKERS SHALL BE SIZED IN ACCORDANCE WITH THE ELECTRICAL DRAWINGS AND THE MCC MANUFACTURERS RECOMMENDATIONS.
 - 3 LIMIT SWITCH POSITION STATUS SIGNALS CAN BE COMBINED WITH THE MOD CONTROL POWER CONDUCTORS.
 - 4 CONTRACTOR TO COORDINATE APPROVED LOCATION WITH COUNTY FIRE MARSHAL.

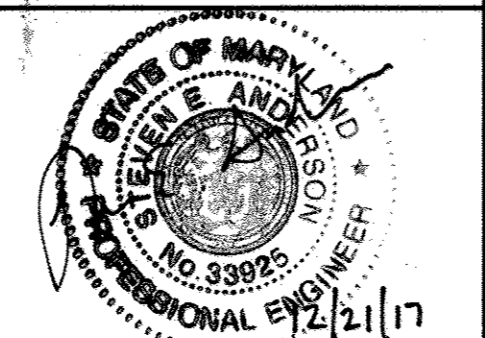
- ELECTRICAL CONTROL DIAGRAM LEGEND (ECD):**
- AT EQUIPMENT
 - LOCAL CONTROL PANEL
 - △ VFD/SSRVS
 - ▲ MCC
 - ⊙ HARMONIC FILTER

- ELECTRICAL CONTROL DIAGRAM TERMINALS (ECD):**
- PANEL WIREWAY TERMINATIONS
 - WIRING CONNECTIONS
 - REMOTE TERMINATIONS
 - PANEL CONNECTIONS
 - - - REMOTE CONNECTIONS
 - ⊕ POWER SUPPLY CONNECTION

FOR APPROVED
 DANFOSS VFD/SSRV
 STARTER CONTROLS,
 SEE O&M MANUAL

PROFESSIONAL CERTIFICATION.
 I hereby certify that these documents were prepared or approved by me, and that I am a duly licensed professional engineer under the laws of the State Of Maryland, License No. 33925, Expiration Date 1/15/19

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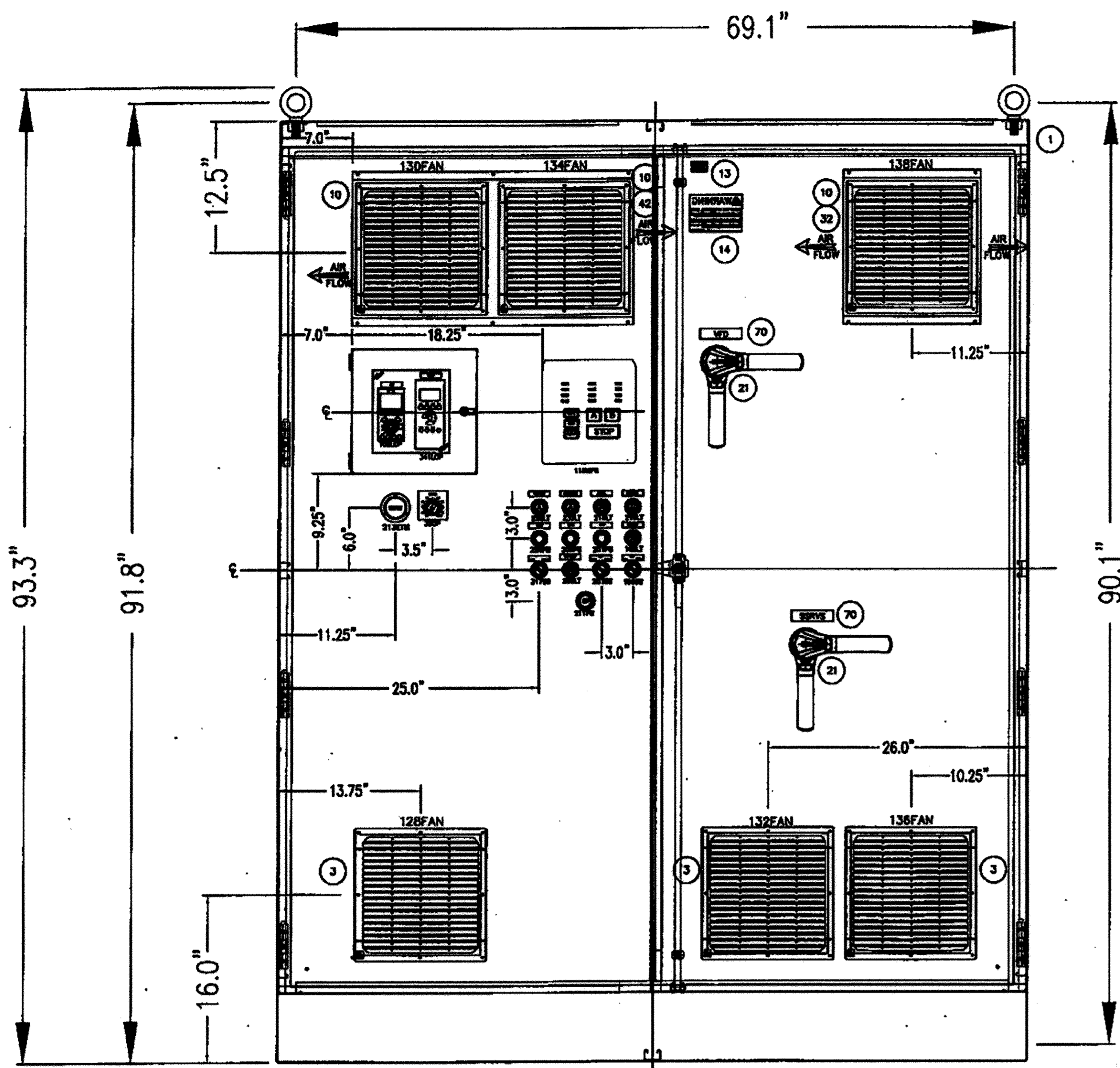


DES: SEA	JFW	AS-BUILT	12/22/2017
DRN: JFW			
CHK: SEA			
DATE: 10/2014	BY NO.	REVISION	DATE

1000 SCALE MAP NO. 32	BLOCK NO.20
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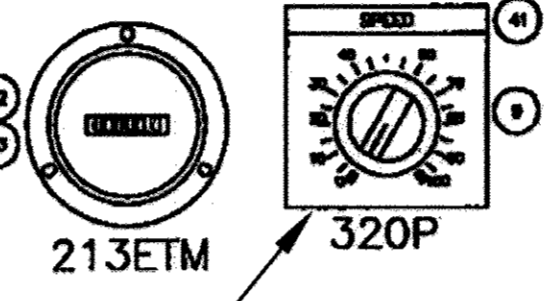
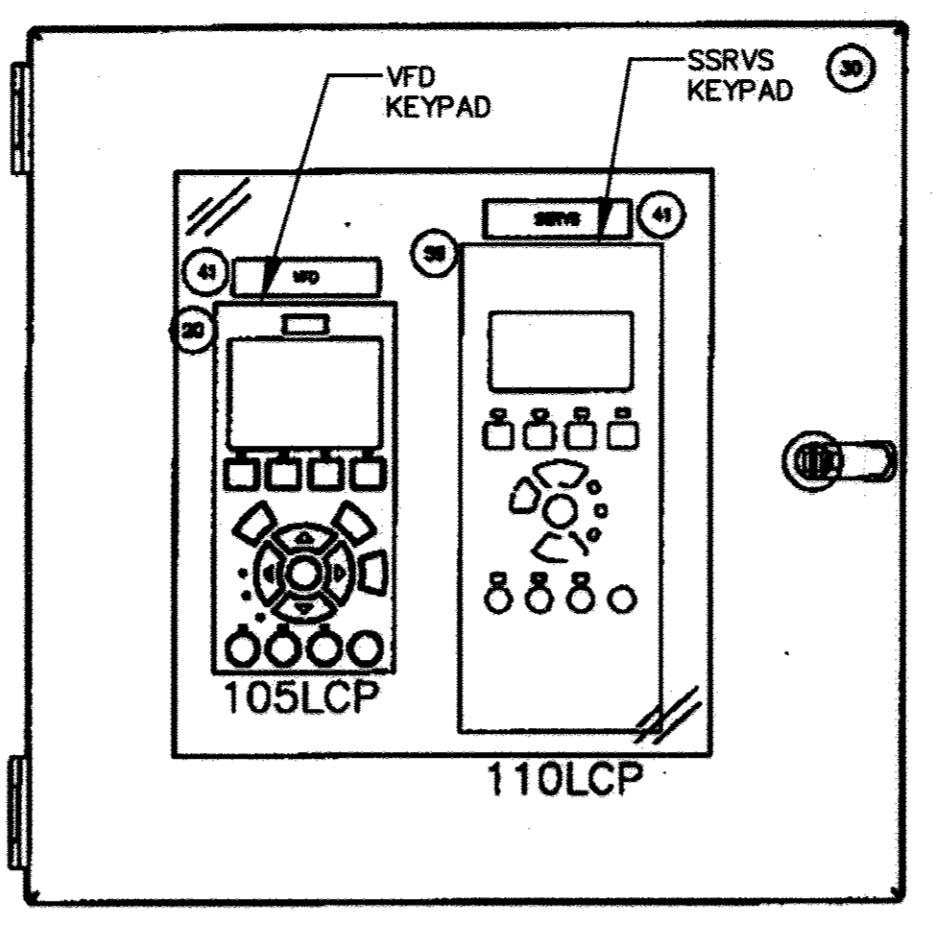
ELKRIDGE PUMP STATION IMPROVEMENTS
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
 ELECTION DISTRICT 1

1-6
 SCALE AS SHOWN
 SHEET 19 OF 21

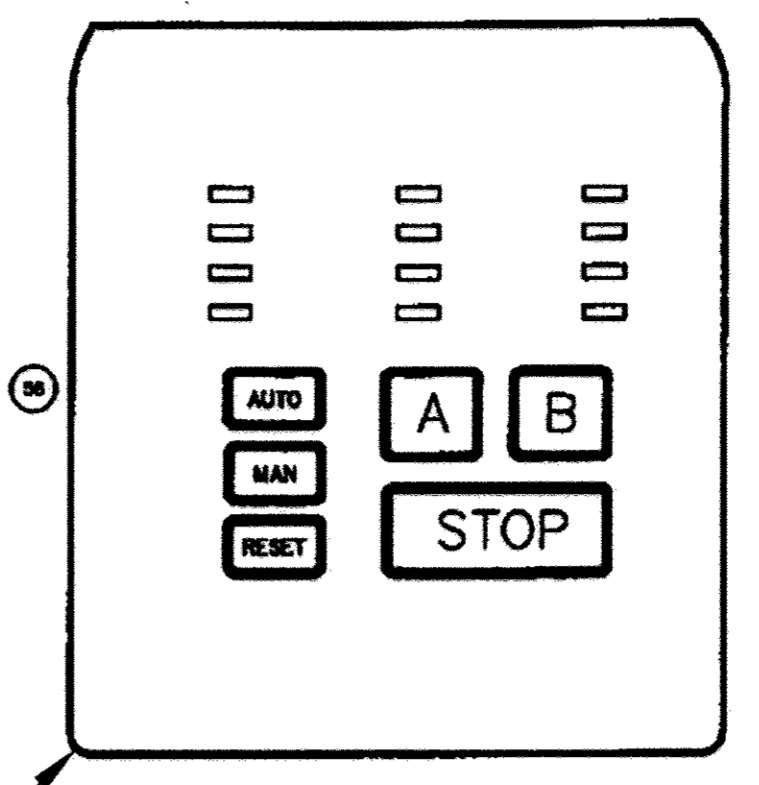


TYPE 12 ENCLOSURE 90X72X24 ANSI 61 GRAY

A DETAIL: TYPICAL VFD/SSRVS PANEL
1-7 SCALE: NONE

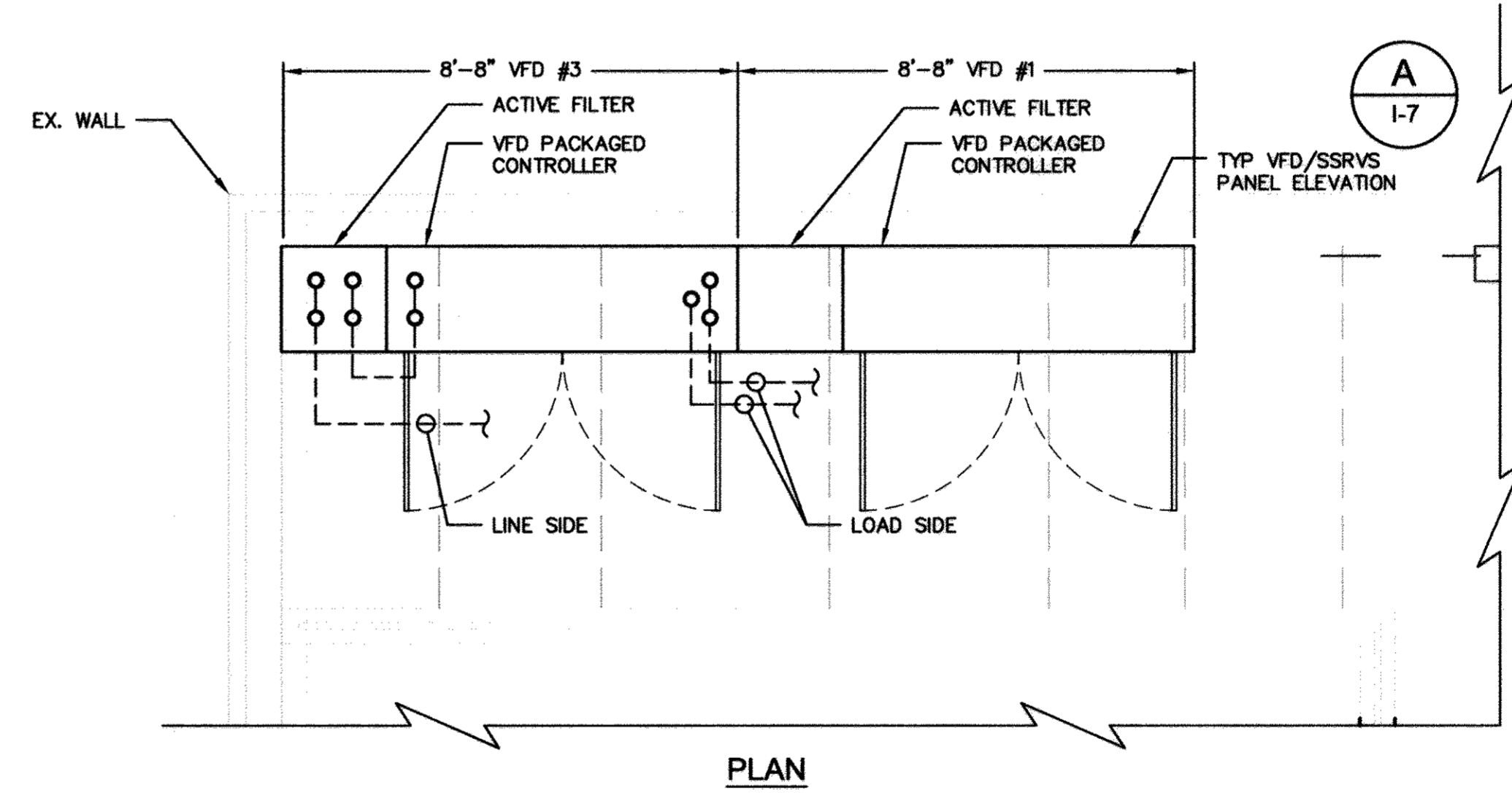
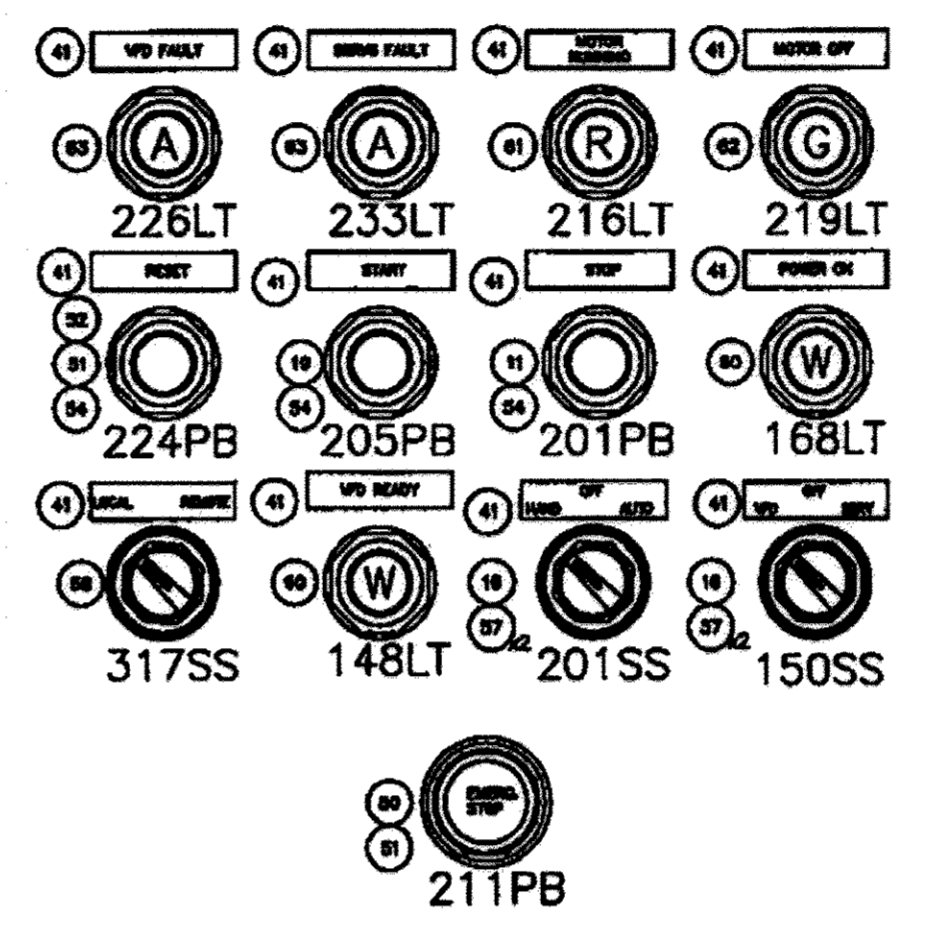


B ENLARGED DETAIL: TYPICAL VFD/SSRVS CONTROLS
1-7 SCALE: NONE

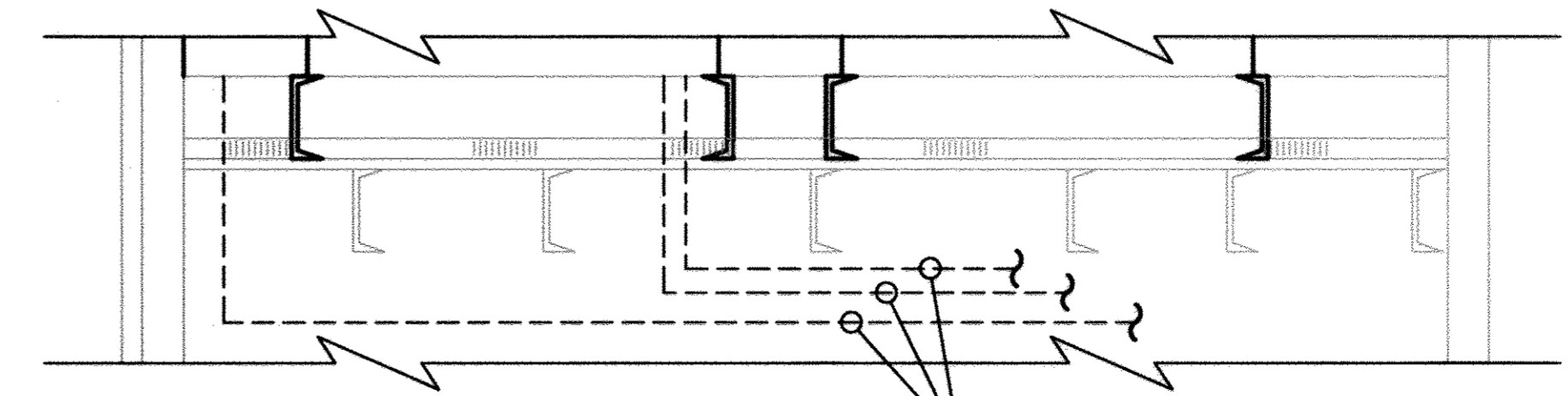


118MPR

MOTOR MONITOR



PLAN



SECTION

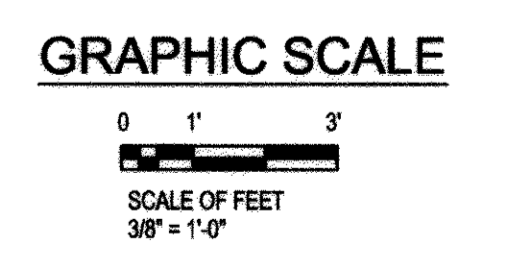
MODIFY CONDUIT SWEEPS AND BOTTOM ENTRY POINTS TO ALIGN WITH ELECTRICAL GEAR STUB-UPS.

1 DETAIL: VFD CABINET LAYOUT
1-7 SCALE: 3/8"=1'-0"

- GENERAL NOTES:**
1. PROVIDE 24-INCHES SLACK WIRE AT EACH END OF ALL SPARE INSTRUMENTATION WIRES.
 2. SEE SYSTEM P&I DIAGRAMS AND ECD DETAILS FOR CONTROL WIRE IDENTIFICATIONS.
- CONSTRUCTION NOTES:**
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 - 2 ALL FUSES AND BREAKERS SHALL BE SIZED IN ACCORDANCE WITH THE ELECTRICAL DRAWINGS AND THE MANUFACTURERS RECOMMENDATIONS.
- LEGEND:**
- NEW WORK
 - - - EXISTING

FOR APPROVED DANFOSS VFD/SSRV STARTER CONTROLS, SEE O&M MANUAL

NOTE: SEE O&M MANUAL FOR COMPONENT BILL OF MATERIAL AND ITEM BUBBLES



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Professional Engineer seal for the State of Maryland, License No. 33925, dated 12/21/17.

DES:	SEA	JFW	AS-BUILT	12/22/2017
DRN:	JFW			
CHK:	SEA			
DATE:	10/2014	BY	NO.	REVISION

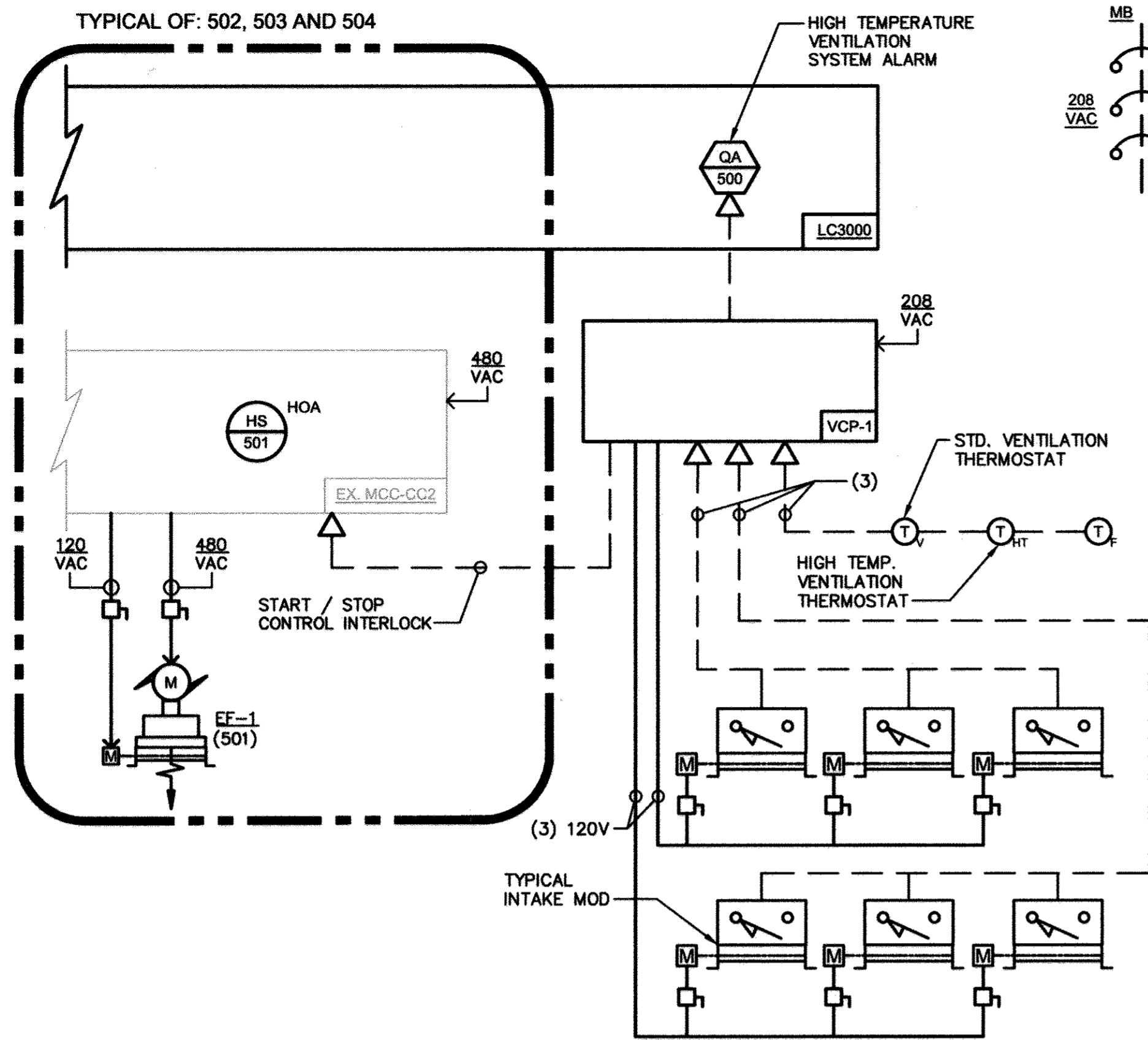
PANEL ELEVATIONS AND DETAILS	
1000 SCALE MAP NO. 32	BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
HOWARD COUNTY, MARYLAND
CONTRACT NO. 44-4793
ELECTION DISTRICT 1

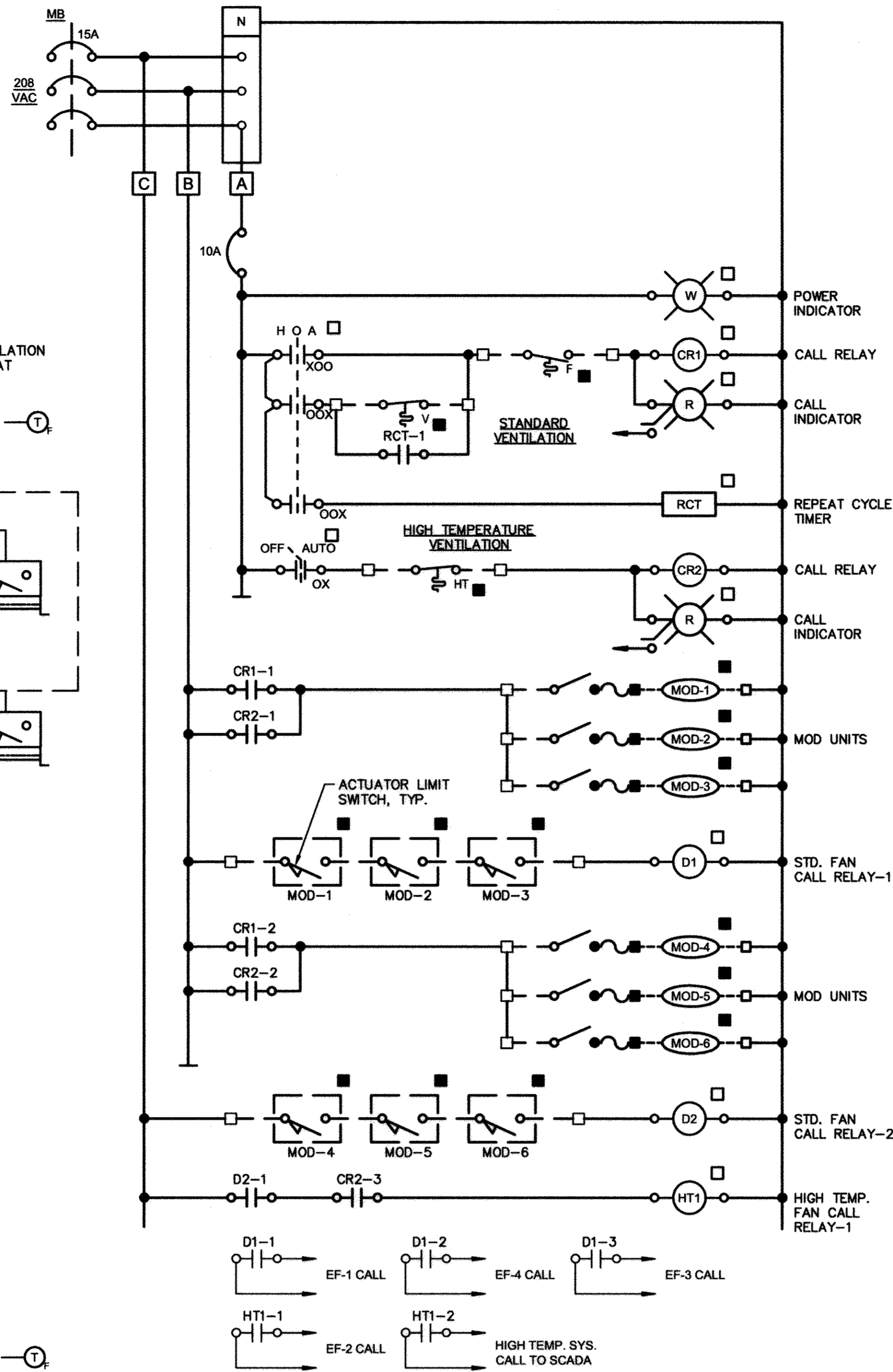
KCI TECHNOLOGIES PROJECT No.: 13-12267718

Doc 21, 2017 - 12/20/2016 User: jacob.wells
M:\3012\1312267718\Drawings\AS-Built\Drawings\Final As-Built\Controls\44-4793\8 VENTILATION CONTROLS AND DETAILS.dwg

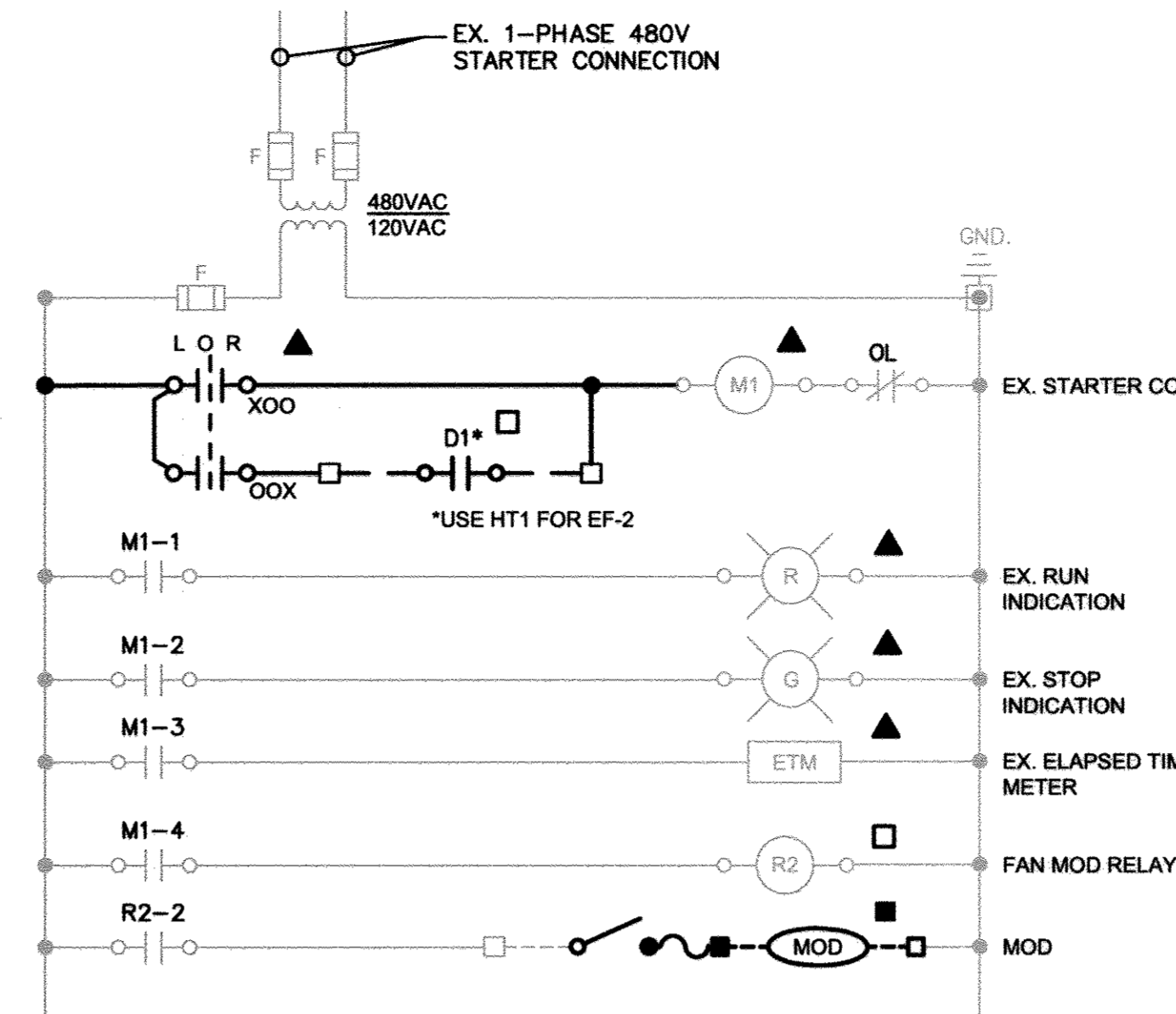
TYPICAL OF: 502, 503 AND 504



1 P&ID: VENTILATION SYSTEM
I-8 SCALE: NONE

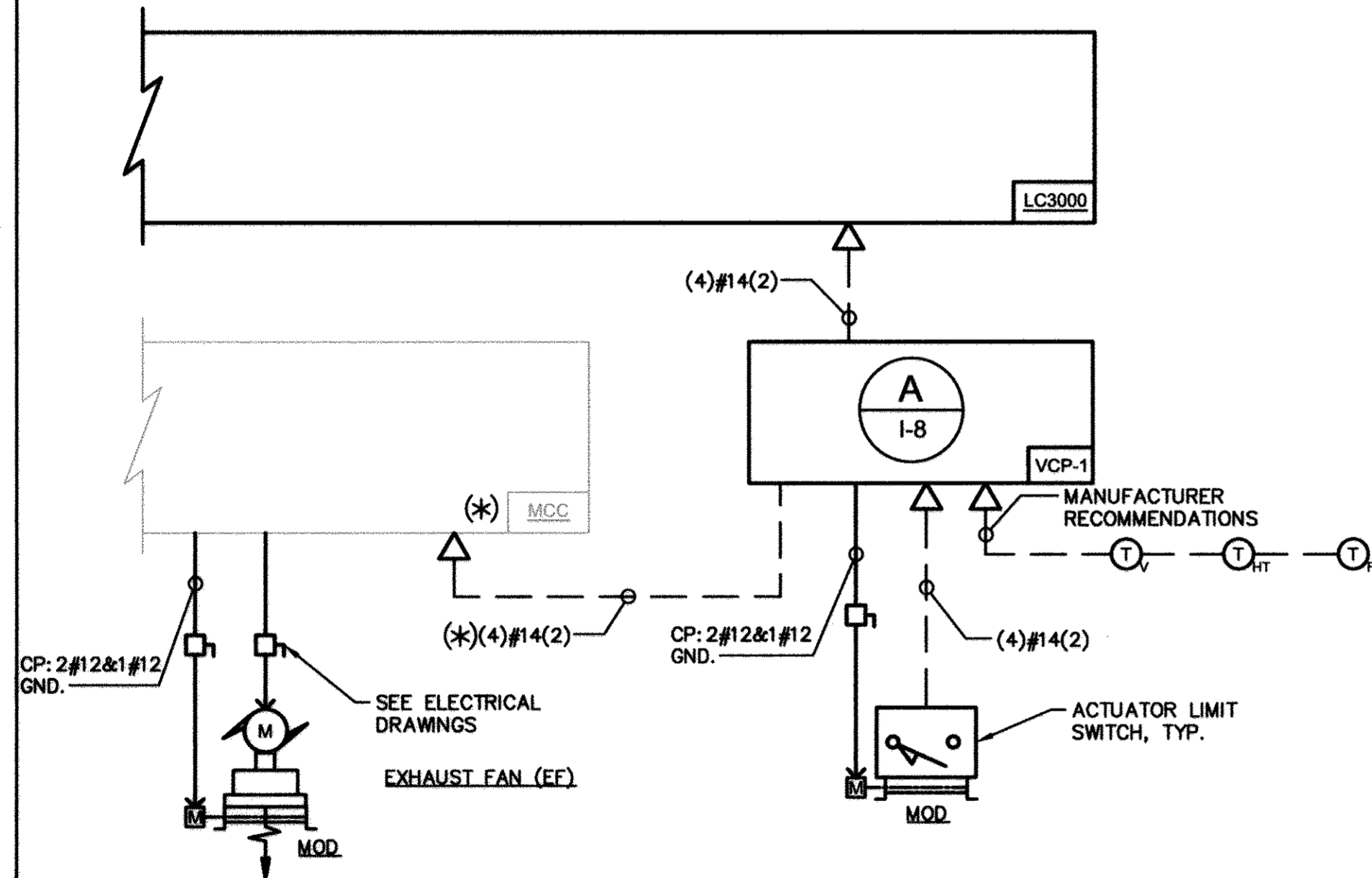


3 ECD: VENTILATION CONTROL PANEL
I-8 SCALE: NONE

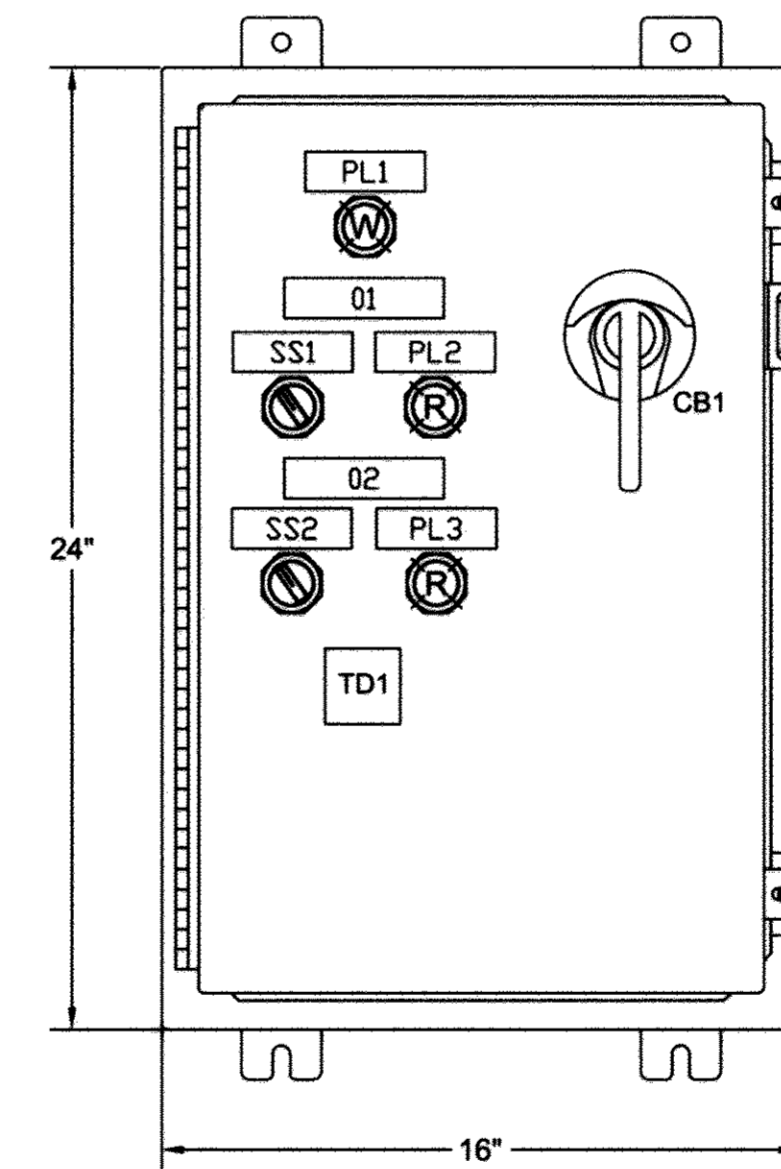


NOTES:
1. REMOVE H-O-A START / STOP PUSHBUTTONS, AUTOMATIC CONTACT CONNECTION, SECONDARY CALL RELAY AND POWER CONNECTIONS TO INTAKE MOTOR OPERATED DAMPERS.
2. BLANK-OFF UNUSED MCC-DOOR OPENINGS.

4 ECD: MCC-CC2 STARTER
I-8 VENTILATION MODIFICATIONS
SCALE: NONE



2 RISER DIAGRAM: TYPICAL EXHAUST FAN
I-8 SCALE: NONE



A ELEVATION: VCP-1
I-8 SCALE: NONE

NAMEPLATE SCHEDULE				
TAGNAME	DESC1	DESC2	DESC3	REMARKS
O1	STANDARD VENTILATION		1X4	
O2	HIGH TEMP VENTILATION		1X4	
PL1	POWER ON		1X3	
PL2	CALL		1X3	
PL3	CALL		1X3	
SS1	HAND OFF AUTO		1X3	
SS2	OFF AUTO		1X3	

NAMEPLATES ARE BLACK WITH WHITE LETTERS

NOTES:

- ENCLOSURE IS A NEMA TYPE 12 WALL-MOUNT HOFFMAN A241608LP, WITH INNER PANEL HOFFMAN A24P16.
- FINISH IS ANSI 61 GRAY.
- UL 508A

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- AT EQUIPMENT
- LOCAL CONTROL PANEL
- △ VFD/SSRVS
- ▲ MCC
- ⊕ HARMONIC FILTER

ELECTRICAL CONTROL DIAGRAM TERMINALS (ECD):

- PANEL WIREWAY TERMINATIONS
- WIRING CONNECTIONS
- REMOTE TERMINATIONS
- PANEL CONNECTIONS
- - - REMOTE CONNECTIONS
- ⊕ POWER SUPPLY CONNECTION

CONDUIT LEGEND:

- A#14-B C (C)
- A - QUANTITY OF CONDUCTORS
 - B - SIZE OF CONDUIT (LARGER THAN 3/4-INCH)
 - C - QUANTITY OF SPARE CONDUCTORS INCLUDED IN TOTAL COUNT (ITEM-A)

EQUIPMENT LEGEND:

- EF-X EXHAUST FAN
- MOD-X MOTORIZED OPERATED DAMPER
- VCP-X VENTILATION CONTROL PANEL
- EX. RTU LC3000 CONTROLLER
- EX. MCC CC2 MOTOR CONTROL CENTER
- EX. SCADA MICROCAT 9610 CONTROLLER
- T_v VENTILATION THERMOSTAT
- T_{HT} HIGH TEMPERATURE VENTILATION THERMOSTAT
- T_F VENTILATION FREEZESTAT

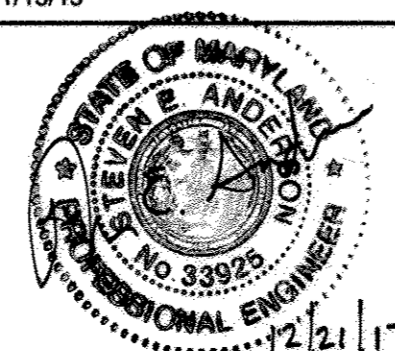
LEGEND:

- NEW WORK
- NEMA BOUNDARY
- - - SIGNAL CONDUIT

SEE WHEL-TECH O&M MANUAL FOR APPROVED CONTROLS AND AS-BUILT CONDITIONS

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1000 SCALE MAP NO. 32
BLOCK NO.20

ELKRIDGE PUMP STATION IMPROVEMENTS
 HOWARD COUNTY, MARYLAND
 CONTRACT NO. 44-4793
 ELECTION DISTRICT 1

SCALE AS SHOWN
SHEET 21 OF 21

AS BUILT REPLACEMENT SHEET