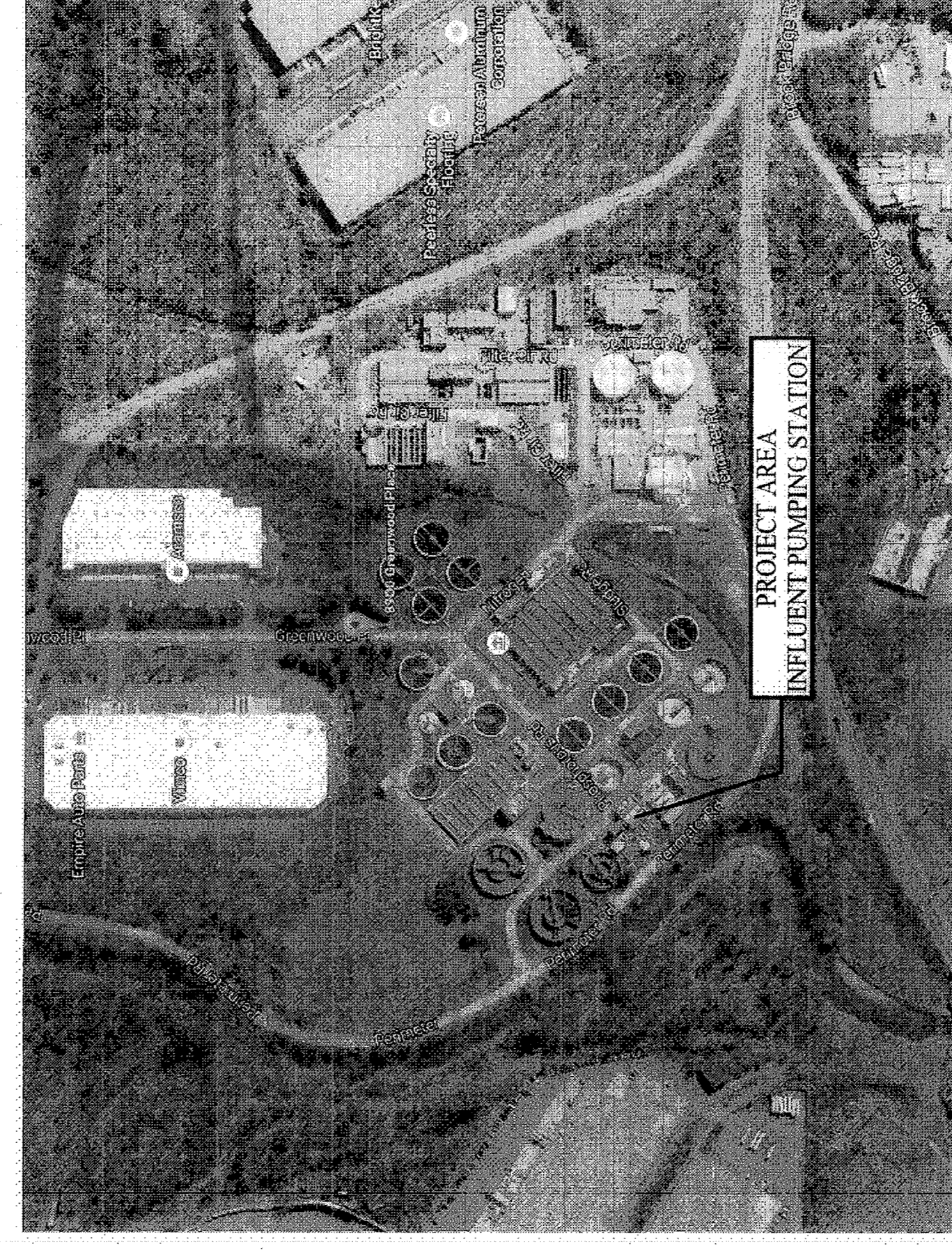


LITTLE PATUXENT WATER RECLAMATION PLANT INFLUENT PUMPING STATION PUMP REPLACEMENT HOWARD COUNTY, MARYLAND

DEPARTMENT OF PUBLIC WORKS
CAPITAL PROJECT NO. S-6264
CONTRACT NO. 20-4991



VICINITY MAP

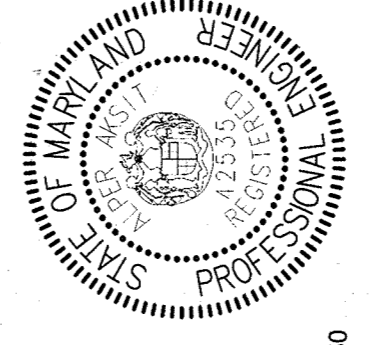


LOCATION MAP

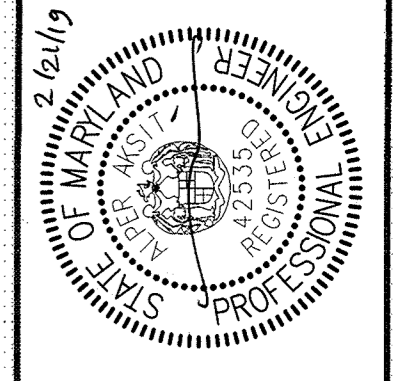
SHEET NO.	DRAWING NO.	INDEX OF DRAWINGS
GENERAL		
1	C1	COVER
2	C2	EXPLANATIONS, LEGEND AND CODE DATA
3	C3	SITE STAKING AREAS
4	C4	SYSTEM SCHEMATIC
5	C5	PUMP, CURVES & DESIGN CRITERIA
MECHANICAL		
6	M1	BOTTOM PLAN AND SECTIONS - DEMOLITION
7	M2	BOTTOM PLAN AND SECTIONS
DETAILS		
8	D1	MISCELLANEOUS STANDARD DETAILS
STRUCTURAL		
9	S1	GENERAL STRUCTURAL NOTE SHEET 1
10	S2	GENERAL STRUCTURAL NOTE SHEET 2
11	S3	DEMOLITION INTERMEDIATE PLAN AND DETAILS
12	S4	PROPOSED INTERMEDIATE PLAN, SECTIONS & DETAILS
HVAC		
13	H1	GENERAL NOTES, ABBREVIATIONS, AND DETAILS
14	H2	SCHEDULES AND DETAILS
15	H3	DEMOLITION PLANS
16	H4	PROPOSED PLANS
ELECTRICAL		
17	E1	LEGEND AND SYMBOLS
18	E2	ONE-LINE DIAGRAM MCC-02-MAIN
19	E3	ONE-LINE DIAGRAM MCC-02-01
20	E4	PANEL SCHEDULES
21	E5	MOTOR CONTROL SCHEMATIC
22	E6	WIRING DIAGRAMS AND SCHEDULES
23	E7	UPPER LEVEL PLAN
24	E8	UPPER LEVEL SECTION
25	E9	LOWER LEVEL PLAN
INSTRUMENTATION		
26	I1	LEGEND AND SYMBOLS
27	I2	PROCESS & INSTRUMENTATION DIAGRAM

RECORD DRAWING STATEMENT:
THESE RECORD DRAWINGS REFLECT DEVIATIONS FROM THE ORIGINAL CONTRACT DRAWINGS BASED ON "AS-BUILT" RED-LINE MARK-UPS PROVIDED BY OTHERS, AND SUPPLEMENTED BY VISUAL OBSERVATIONS OF PROJECT FEATURES AT OR ABOVE GRADE AT COMPLETION OF THE PROJECT.

SIGNATURE: _____
DESIGN PROFESSIONAL SIGNATURE
DATE: 2/21/19 MD P.E. LICENSE 42515
ALPER AKSIT, P.E.
HAZEN & SAWYER
1 SOUTH STREET, SUITE 1150
BALTIMORE, MD 21202



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND
DIRECTOR OF PUBLIC WORKS: Thomas E. Keller, 2-28-19
DATE: 3/1/19
DATE: 2-22-19
DATE: 2/22/19



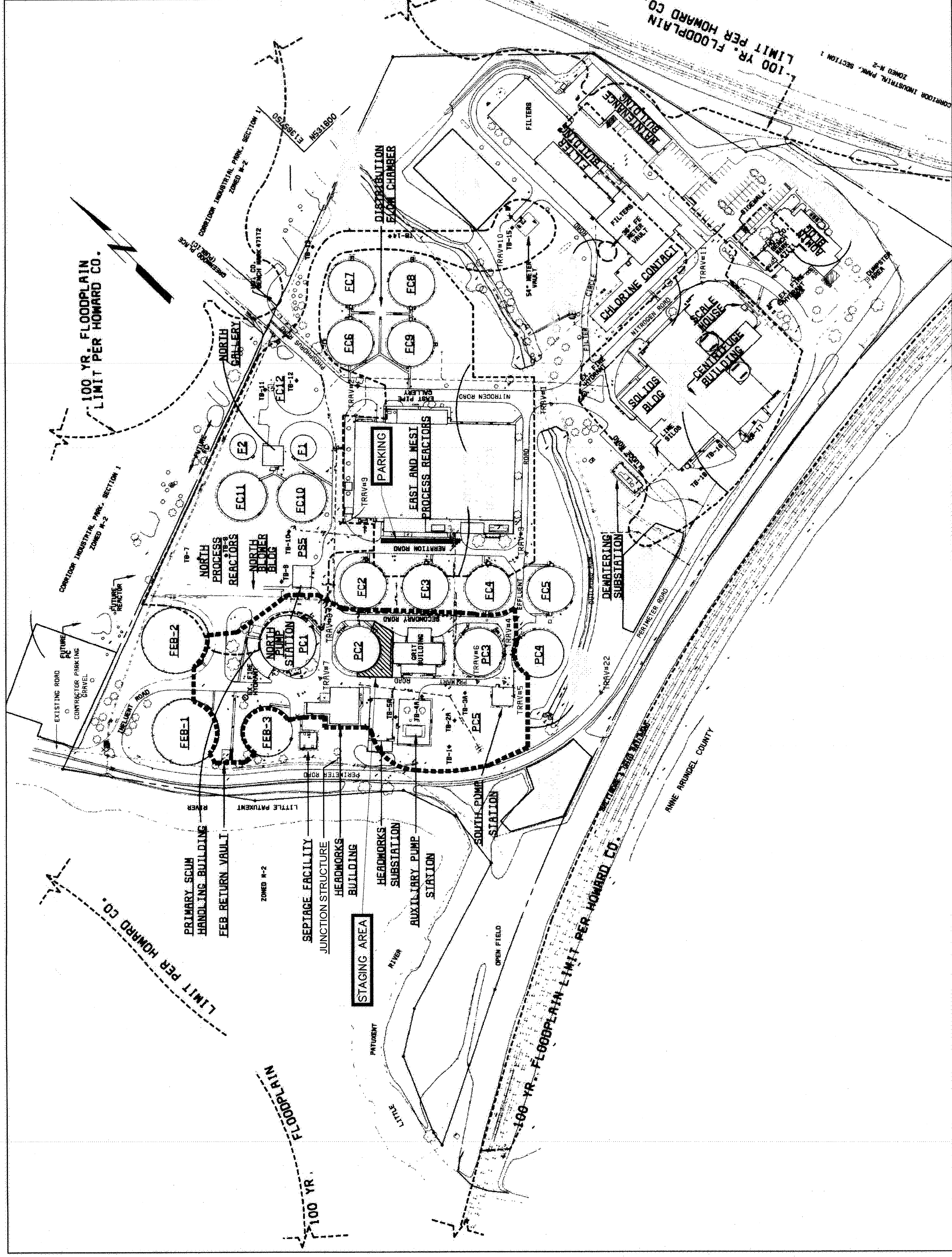
PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR CHECKED BY A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF MARYLAND.
LICENSE NO. 42515
EXPIRATION DATE 01/26/2018
SIGNED: _____

DESIGNED	AA
DRAWN	BRC
CHECKED	JCS
PROJ. ENGR.	AA
APPROVED	AA

AS-BUILT ADDENDUM	1	1/9/19	AA
ADDENDUM	2	5/9/17	AA
ISSUED FOR	3	5/9/17	AA
INC.	1	DATE	BY

COVER

AS-BUILT REPLACEMENT SHEET 1/2019
INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND
DATE: JAN 2017
DRAWING NUMBER: G1
SCALE: AS SHOWN
SHEET 1 OF 27



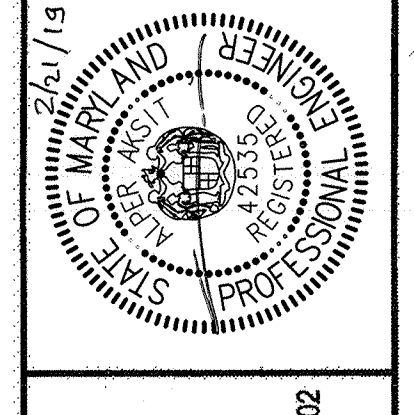
AS-BUILT REPLACEMENT SHEET 1/2019

INFLUENT PUMPING STATION
 PUMP REPLACEMENT CONTRACT
 LITTLE PATUXENT WATER RECLAMATION PLANT
 CAPITAL PROJECT NUMBER S-6264
 CONTRACT NUMBER 20-4991
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

SITE STAGING AREA

DESIGNED	AA	NO.	1	ISSUED FOR	AA	BY
DRAWN	BRC				AA	
CHECKED	JCS				AA	
PH.OL. ENGR.	AA	3	1/9/19	AS-BUILT	AA	
APPROVED		2	5/9/17	ADDENDUM	AA	
		1	5/9/17	ADDENDUM	AA	

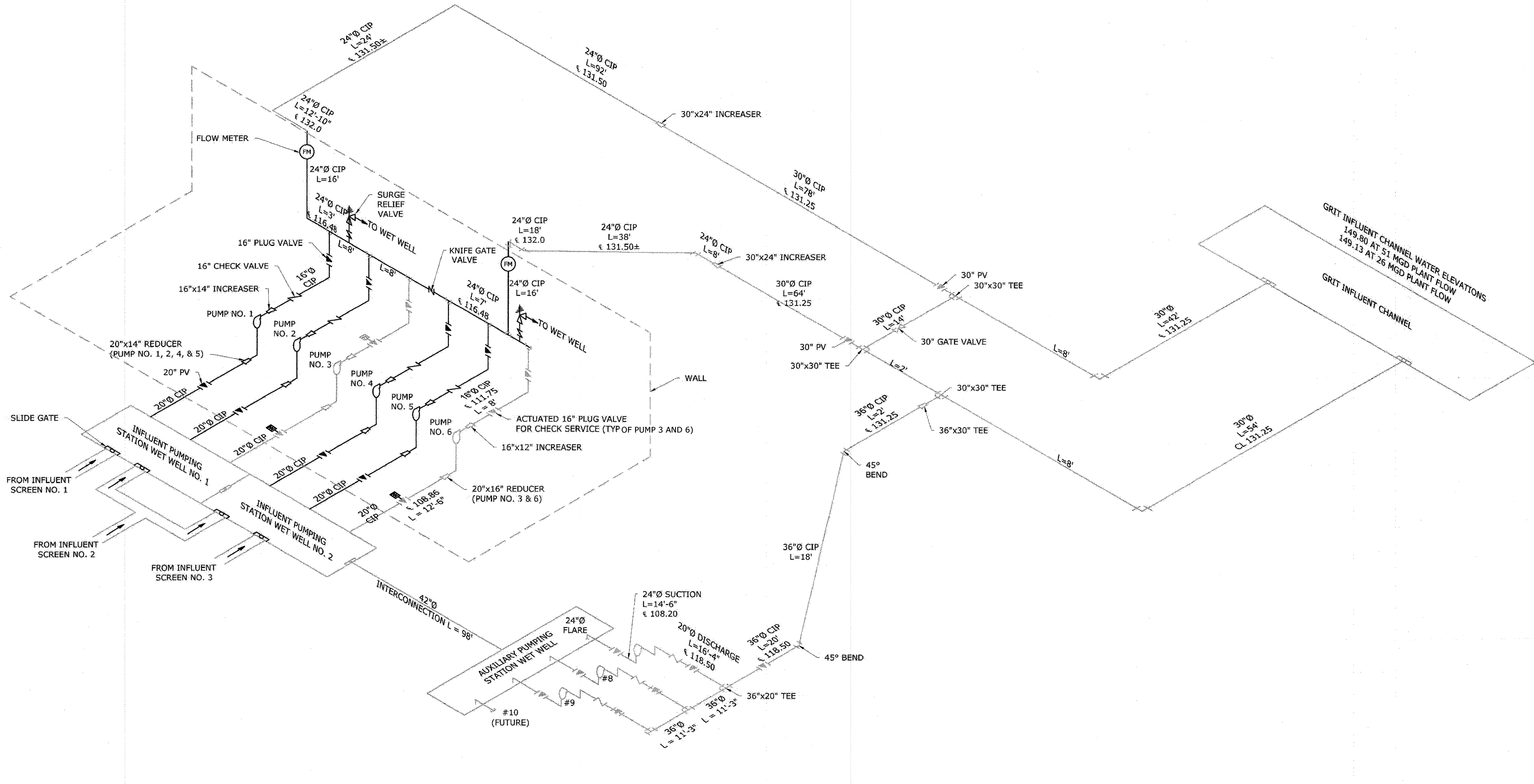
PROFESSIONAL CERTIFICATION
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. EXPIRATION DATE 07/29/2018.
 SIGNED: _____



Hazen
 HAZEN AND SAWYER
 1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
 410-538-7681

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND
Thomas E. Butler 2-20-19
 CHIEF BUREAU OF ENGINEERING
 DATE 3/7/19

Charles J. Sawyer 1-26-19
 CHIEF UTILITY DESIGN DIVISION
 DATE 1-26-19



PROPOSED INFLUENT AND AUXILIARY PUMP STATION SYSTEM ISOMETRIC DIAGRAM
NTS

NOTE: THIS SCHEMATIC IS FOR INFORMATION PURPOSES ONLY.

LEGEND

	PUMP		SLIDE GATE
	GATE VALVE		PLUG VALVE
	CHECK VALVE		MOTOR OPERATED PLUG VALVE
	BUTTERFLY VALVE		
	KNIFE GATE VALVE		

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* 3/1/19
Chief Bureau of Engineering: *[Signature]* 2-20-19
Chief Utility Design Division: *[Signature]* 2/26/19

Hazen
HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150; BALTIMORE, MD 21202
410-539-7881

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. 42535, EXPIRATION DATE 5/26/2018.

SIGNED: _____

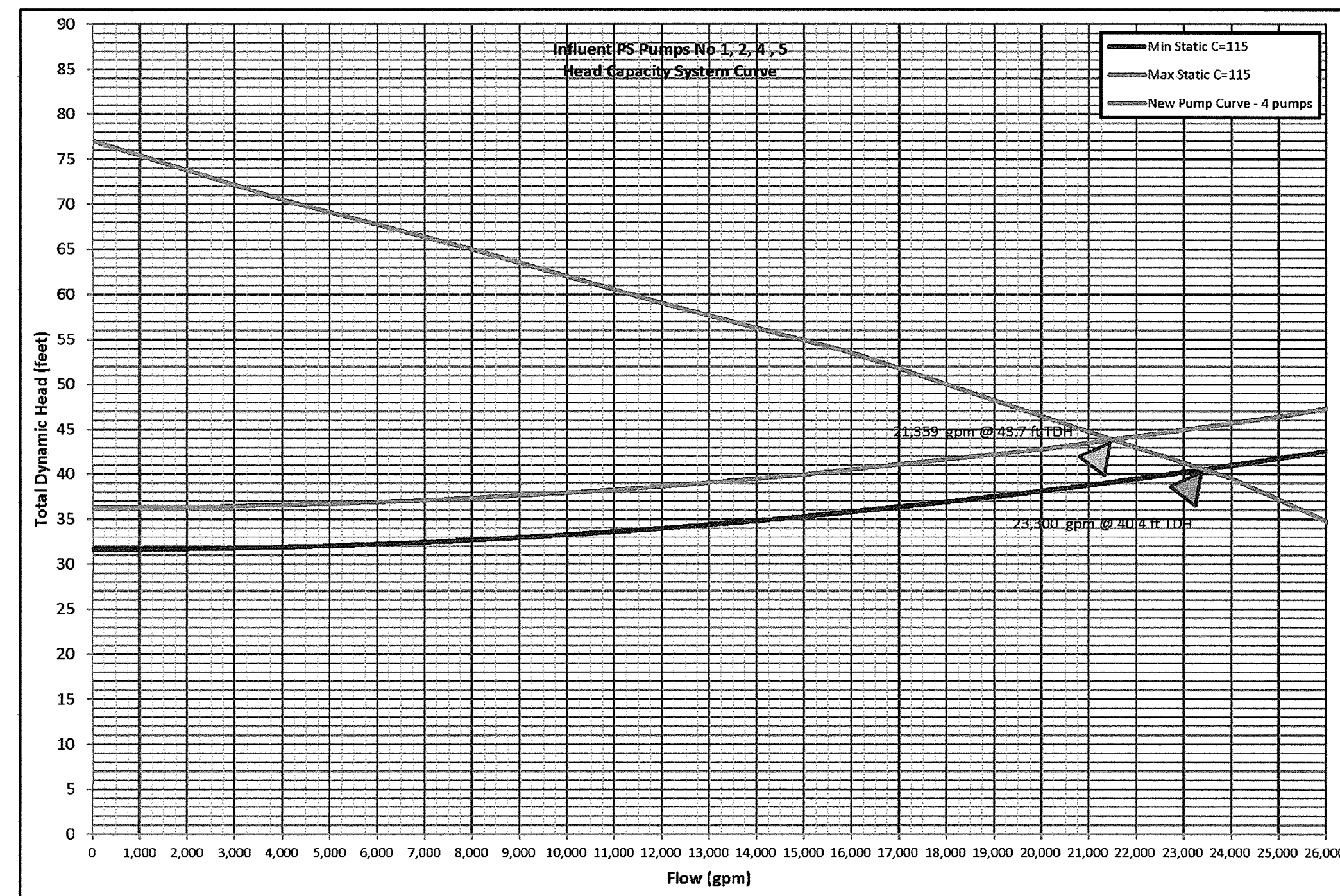
DESIGNED	AA				
DRAWN	BRC				
CHECKED	JCS				
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED	NO.		ISSUED FOR		

SYSTEM SCHEMATIC

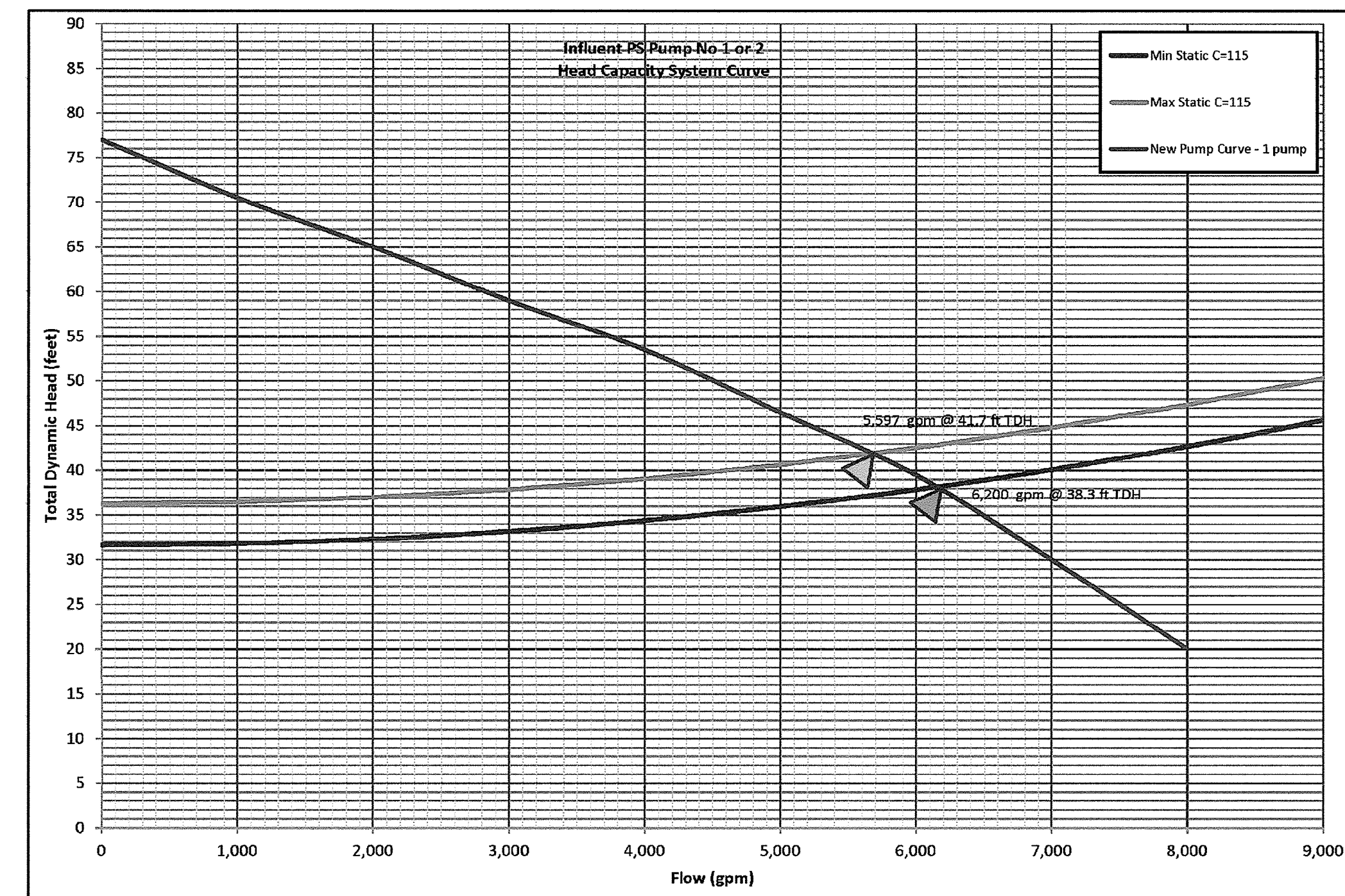
INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE: JAN 2017
DRAWING NUMBER: G4
SCALE: AS SHOWN
SHEET 4 OF 27

20170126 1:00P 0:\32232-BAL\32232-005\Drawings\General\6-4.dwg LastSaveBy:EPROSSEP



HEAD CAPACITY SYSTEM CURVE FOR FOUR REPLACEMENT PUMP OPERATION



HEAD CAPACITY SYSTEM CURVE FOR ONE PUMP OPERATION

DESIGN CRITERIA

NUMBER OF PUMPS	4
PUMP ID	NO. 1, 2, 4, 5
DUTY POINT 1	4,788 GPM AT 47.2 FT TDH
DUTY POINT 2	5,597 GPM AT 41.7 FT TDH
DUTY POINT 3	6,200 GPM AT 37.0 FT TDH
MINIMUM SHUT OFF HEAD	77 FT
MINIMUM EFFICIENCY AT PRIMARY DESIGN POINT	82%
MAXIMUM PUMP SPEED	1160 RPM
MAXIMUM MOTOR HP	75 HP
MAXIMUM NET POSITIVE SUCTION HEAD REQUIRED (NPSHR) AT DUTY POINT 2	21 FT
MAXIMUM NPSHR AT DUTY POINT 3	25 FT
MAXIMUM NET POSITIVE SUCTION HEAVE AVAILABLE (NPSHA) AT DUTY POINT 2	32 FT
MAXIMUM NPSHA AT DUTY POINT 3	35 FT

AS - BUILT

IMAGE: No. 1 Curve, No. 1-2-4-5, XREFs: 32232-TB

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

[Signature] 2/13/17
DIRECTOR OF PUBLIC WORKS DATE

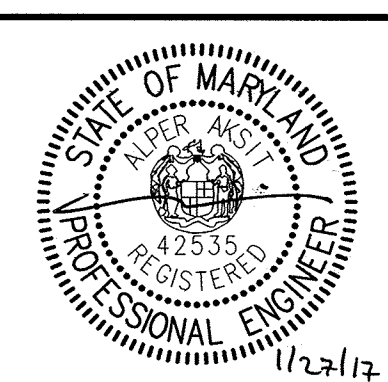
[Signature] 2/13/17
CHIEF BUREAU OF ENGINEERING DATE

[Signature] 2/16/17
CHIEF BUREAU OF UTILITIES DATE

[Signature] 2/16/17
CHIEF UTILITY DESIGN DIVISION DATE

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7881



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. 42535, EXPIRATION DATE 07/25/2018.

SIGNED: _____

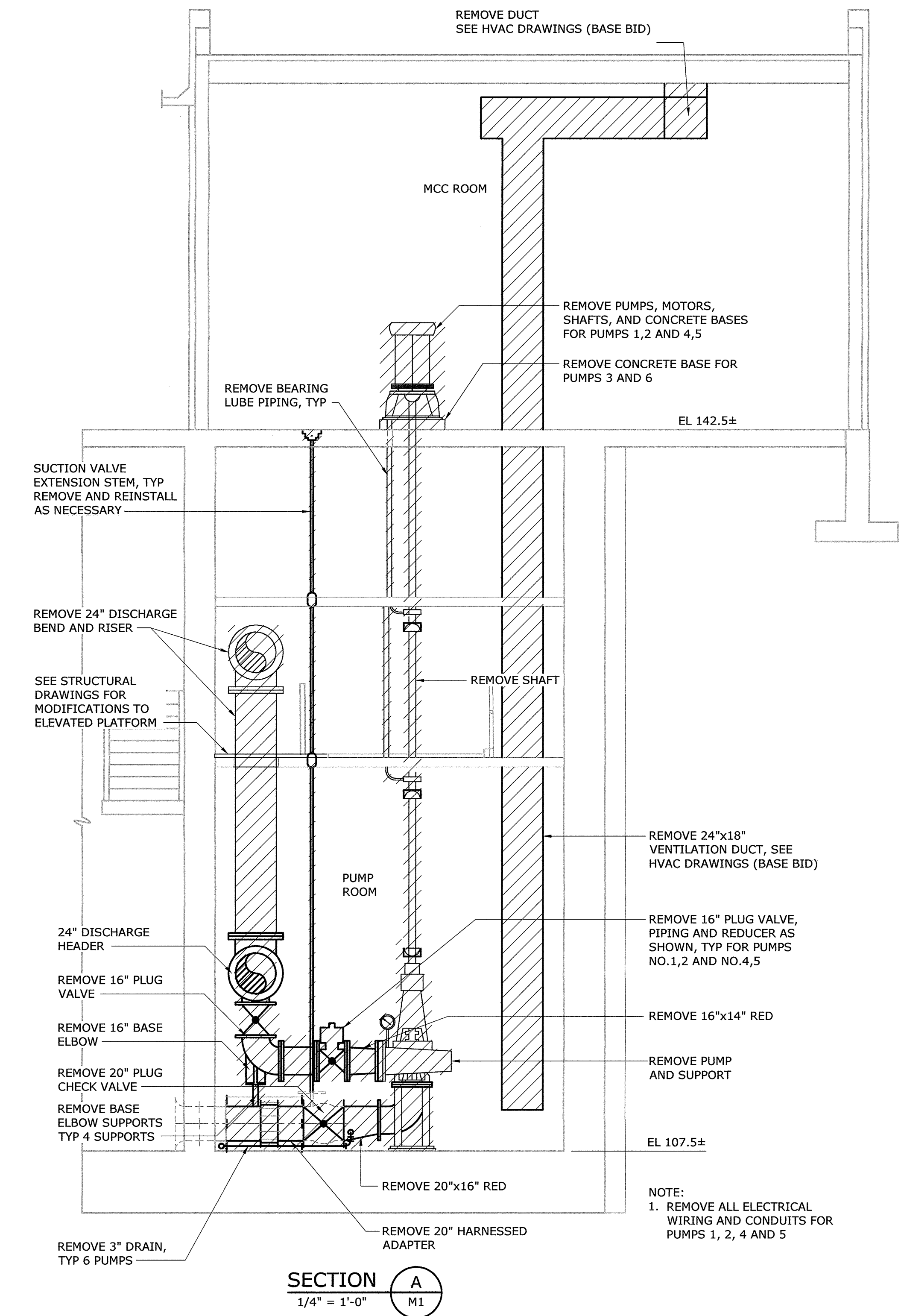
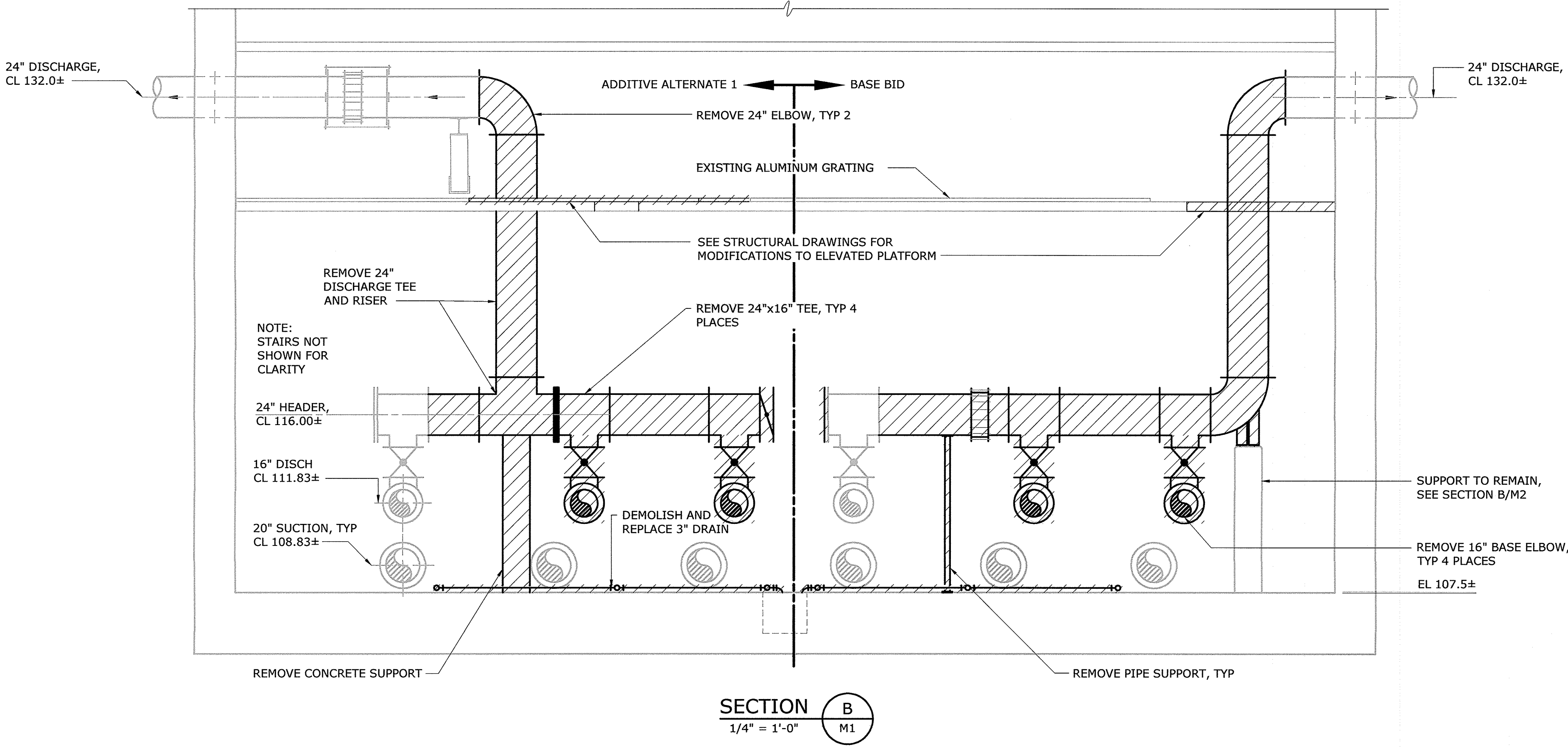
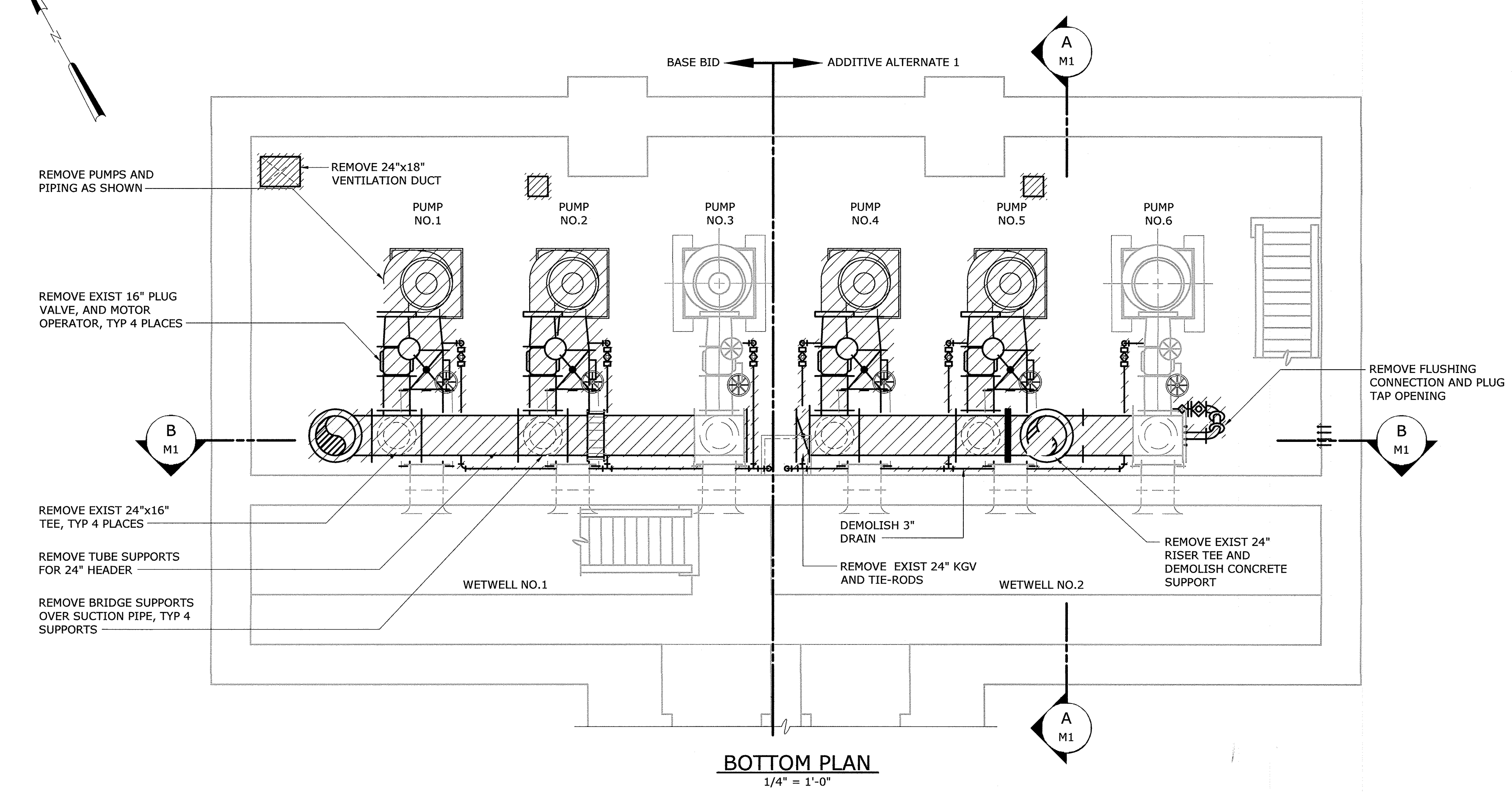
DESIGNED	AA				
DRAWN	BRC				
CHECKED	JCS				
PROJ. ENGR.	AA				
APPROVED	NO.	ISSUED FOR	DATE	BY	

PUMP CURVES & DESIGN CRITERIA

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	G5
SCALE	AS SHOWN
SHEET	5 OF 27

NOTES:
 1. REFER TO SPECIFICATIONS SECTION 01520 FOR MAINTENANCE OF PLANT OPERATIONS DURING CONSTRUCTION.



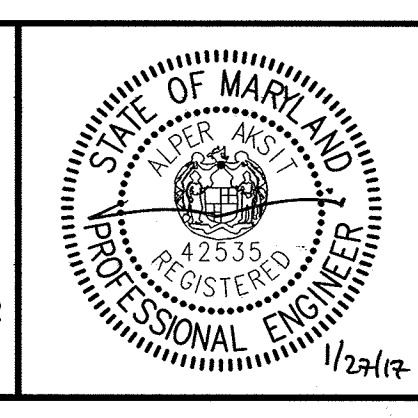
AS - BUILT

IMAGES: 32232-TB, Influent PS -PS-PB, Influent PS -PS-S01, Influent PS -PS-S02, Influent PS -PS-PB-H
 XREFS: 32232-TB, Influent PS -PS-PB, Influent PS -PS-S01, Influent PS -PS-S02, Influent PS -PS-PB-H

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
Director of Public Works <i>[Signature]</i> DATE: 2/3/17	Chief Bureau of Engineering <i>[Signature]</i> DATE: 2/16/17
Chief Bureau of Utilities <i>[Signature]</i> DATE: 2/16/17	Chief Utility Design Division <i>[Signature]</i> DATE: 2/16/17

Hazen

HAZEN AND SAWYER
 1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
 410-539-7881



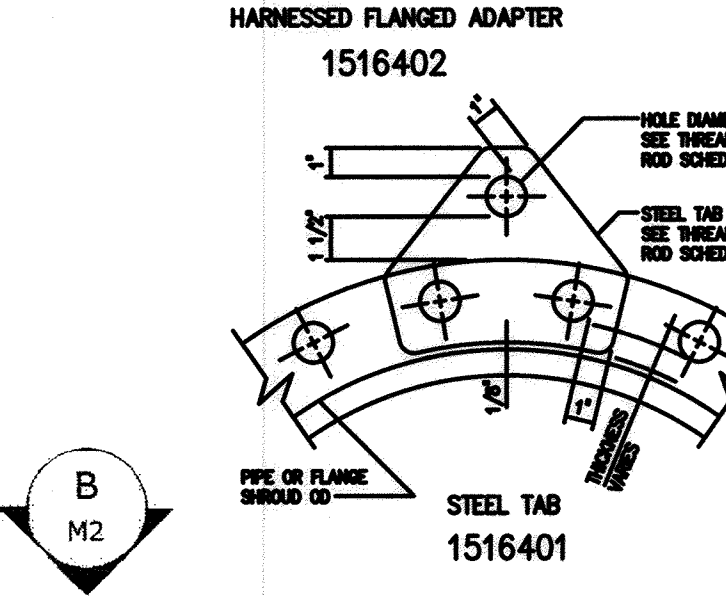
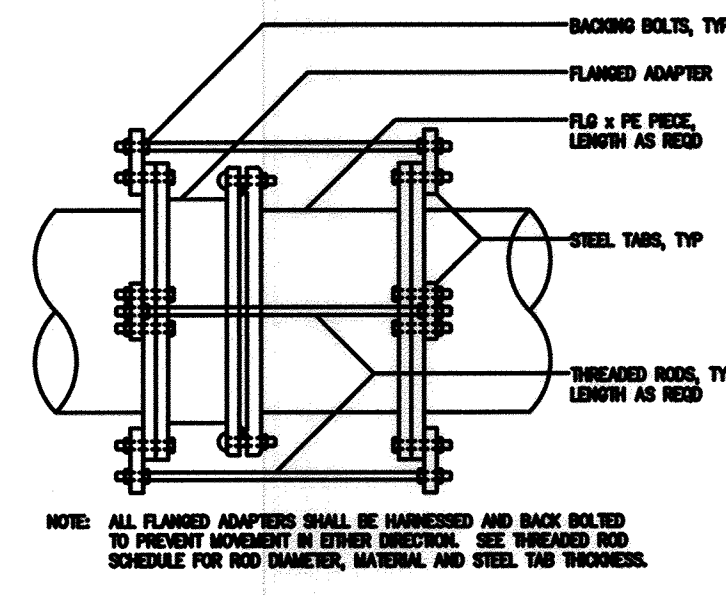
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DESIGNED	AA				
DRAWN	BRC				
CHECKED	JCS				
PROJ. ENGR.	AA				
APPROVED	NO.	ISSUED FOR	DATE	BY	

**INFLUENT PUMPING STATION
 MECHANICAL
 BOTTOM PLAN AND SECTIONS-
 DEMOLITION**

**INFLUENT PUMPING STATION
 PUMP REPLACEMENT CONTRACT
 LITTLE PATUXENT WATER RECLAMATION PLANT
 CAPITAL PROJECT NUMBER S-6264
 CONTRACT NUMBER 20-4991
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND**

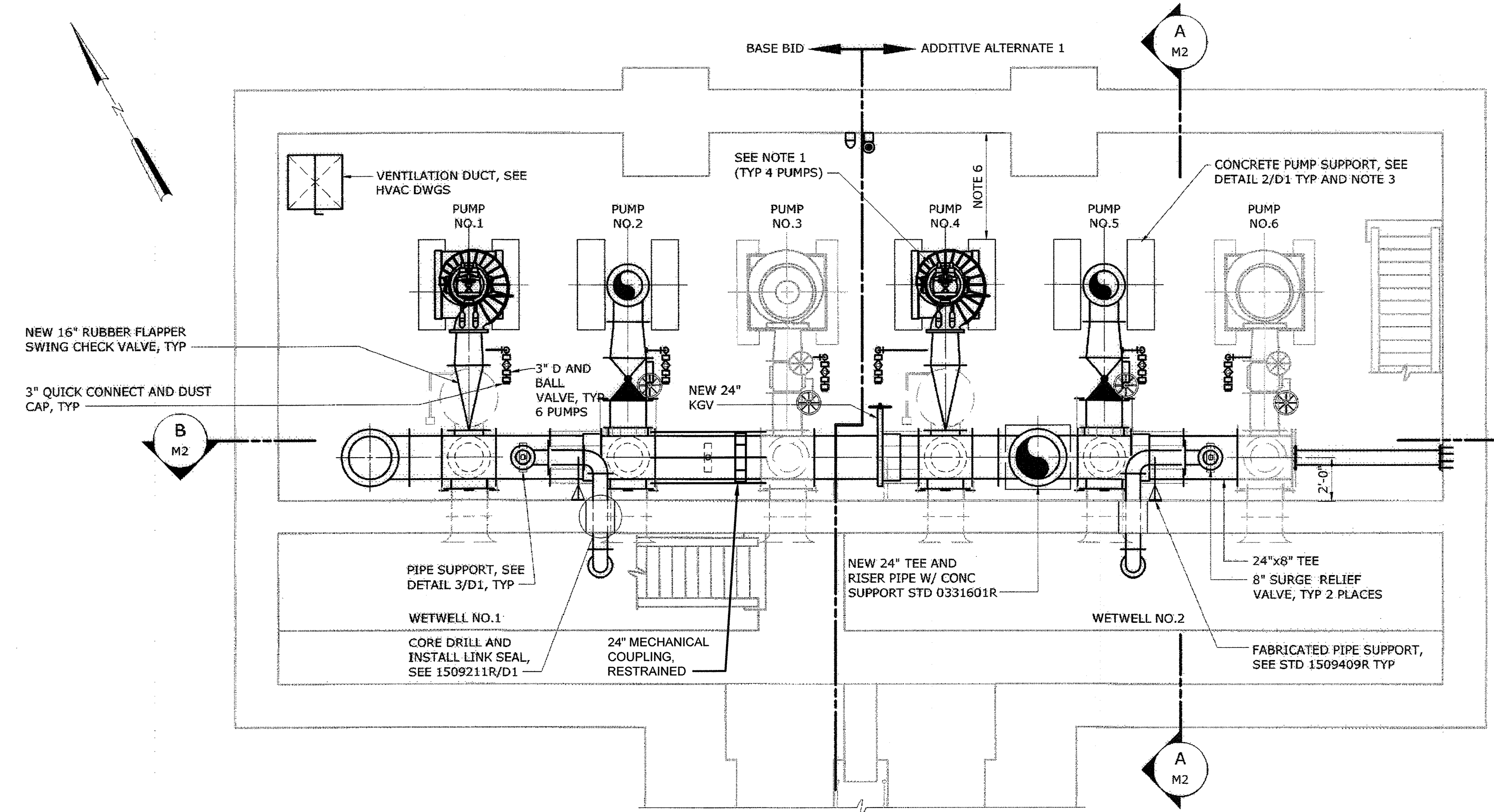
DATE	JAN 2017
DRAWING NUMBER	M1
SCALE	AS SHOWN
SHEET	6 OF 27



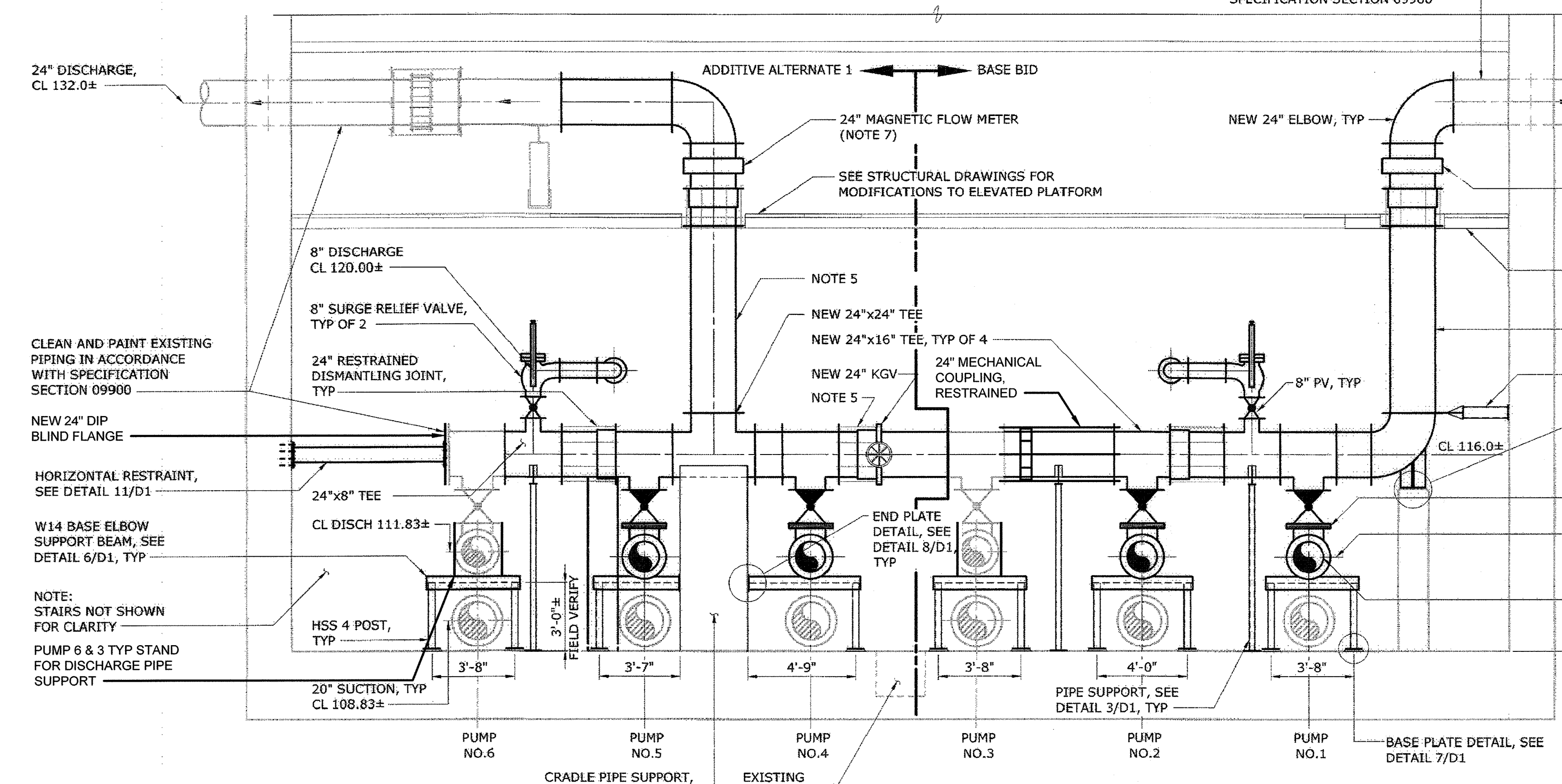
THREADED ROD SCHEDULE	
NO.	DESCRIPTION
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2	3/4" X 12" X 1/2" UNF X 11.625
3	1" X 12" X 1/2" UNF X 11.625
4	1 1/4" X 12" X 1/2" UNF X 11.625
5	1 1/2" X 12" X 1/2" UNF X 11.625
6	1 3/4" X 12" X 1/2" UNF X 11.625
7	2" X 12" X 1/2" UNF X 11.625
8	2 1/4" X 12" X 1/2" UNF X 11.625
9	2 1/2" X 12" X 1/2" UNF X 11.625
10	2 3/4" X 12" X 1/2" UNF X 11.625
11	3" X 12" X 1/2" UNF X 11.625
12	3 1/4" X 12" X 1/2" UNF X 11.625
13	3 1/2" X 12" X 1/2" UNF X 11.625
14	3 3/4" X 12" X 1/2" UNF X 11.625
15	4" X 12" X 1/2" UNF X 11.625
16	4 1/4" X 12" X 1/2" UNF X 11.625
17	4 1/2" X 12" X 1/2" UNF X 11.625
18	4 3/4" X 12" X 1/2" UNF X 11.625
19	5" X 12" X 1/2" UNF X 11.625
20	5 1/4" X 12" X 1/2" UNF X 11.625
21	5 1/2" X 12" X 1/2" UNF X 11.625
22	5 3/4" X 12" X 1/2" UNF X 11.625
23	6" X 12" X 1/2" UNF X 11.625
24	6 1/4" X 12" X 1/2" UNF X 11.625
25	6 1/2" X 12" X 1/2" UNF X 11.625
26	6 3/4" X 12" X 1/2" UNF X 11.625
27	7" X 12" X 1/2" UNF X 11.625
28	7 1/4" X 12" X 1/2" UNF X 11.625
29	7 1/2" X 12" X 1/2" UNF X 11.625
30	7 3/4" X 12" X 1/2" UNF X 11.625
31	8" X 12" X 1/2" UNF X 11.625
32	8 1/4" X 12" X 1/2" UNF X 11.625
33	8 1/2" X 12" X 1/2" UNF X 11.625
34	8 3/4" X 12" X 1/2" UNF X 11.625
35	9" X 12" X 1/2" UNF X 11.625
36	9 1/4" X 12" X 1/2" UNF X 11.625
37	9 1/2" X 12" X 1/2" UNF X 11.625
38	9 3/4" X 12" X 1/2" UNF X 11.625
39	10" X 12" X 1/2" UNF X 11.625
40	10 1/4" X 12" X 1/2" UNF X 11.625
41	10 1/2" X 12" X 1/2" UNF X 11.625
42	10 3/4" X 12" X 1/2" UNF X 11.625
43	11" X 12" X 1/2" UNF X 11.625
44	11 1/4" X 12" X 1/2" UNF X 11.625
45	11 1/2" X 12" X 1/2" UNF X 11.625
46	11 3/4" X 12" X 1/2" UNF X 11.625
47	12" X 12" X 1/2" UNF X 11.625
48	12 1/4" X 12" X 1/2" UNF X 11.625
49	12 1/2" X 12" X 1/2" UNF X 11.625
50	12 3/4" X 12" X 1/2" UNF X 11.625
51	13" X 12" X 1/2" UNF X 11.625
52	13 1/4" X 12" X 1/2" UNF X 11.625
53	13 1/2" X 12" X 1/2" UNF X 11.625
54	13 3/4" X 12" X 1/2" UNF X 11.625
55	14" X 12" X 1/2" UNF X 11.625
56	14 1/4" X 12" X 1/2" UNF X 11.625
57	14 1/2" X 12" X 1/2" UNF X 11.625
58	14 3/4" X 12" X 1/2" UNF X 11.625
59	15" X 12" X 1/2" UNF X 11.625
60	15 1/4" X 12" X 1/2" UNF X 11.625
61	15 1/2" X 12" X 1/2" UNF X 11.625
62	15 3/4" X 12" X 1/2" UNF X 11.625
63	16" X 12" X 1/2" UNF X 11.625
64	16 1/4" X 12" X 1/2" UNF X 11.625
65	16 1/2" X 12" X 1/2" UNF X 11.625
66	16 3/4" X 12" X 1/2" UNF X 11.625
67	17" X 12" X 1/2" UNF X 11.625
68	17 1/4" X 12" X 1/2" UNF X 11.625
69	17 1/2" X 12" X 1/2" UNF X 11.625
70	17 3/4" X 12" X 1/2" UNF X 11.625
71	18" X 12" X 1/2" UNF X 11.625
72	18 1/4" X 12" X 1/2" UNF X 11.625
73	18 1/2" X 12" X 1/2" UNF X 11.625
74	18 3/4" X 12" X 1/2" UNF X 11.625
75	19" X 12" X 1/2" UNF X 11.625
76	19 1/4" X 12" X 1/2" UNF X 11.625
77	19 1/2" X 12" X 1/2" UNF X 11.625
78	19 3/4" X 12" X 1/2" UNF X 11.625
79	20" X 12" X 1/2" UNF X 11.625
80	20 1/4" X 12" X 1/2" UNF X 11.625
81	20 1/2" X 12" X 1/2" UNF X 11.625
82	20 3/4" X 12" X 1/2" UNF X 11.625
83	21" X 12" X 1/2" UNF X 11.625
84	21 1/4" X 12" X 1/2" UNF X 11.625
85	21 1/2" X 12" X 1/2" UNF X 11.625
86	21 3/4" X 12" X 1/2" UNF X 11.625
87	22" X 12" X 1/2" UNF X 11.625
88	22 1/4" X 12" X 1/2" UNF X 11.625
89	22 1/2" X 12" X 1/2" UNF X 11.625
90	22 3/4" X 12" X 1/2" UNF X 11.625
91	23" X 12" X 1/2" UNF X 11.625
92	23 1/4" X 12" X 1/2" UNF X 11.625
93	23 1/2" X 12" X 1/2" UNF X 11.625
94	23 3/4" X 12" X 1/2" UNF X 11.625
95	24" X 12" X 1/2" UNF X 11.625
96	24 1/4" X 12" X 1/2" UNF X 11.625
97	24 1/2" X 12" X 1/2" UNF X 11.625
98	24 3/4" X 12" X 1/2" UNF X 11.625
99	25" X 12" X 1/2" UNF X 11.625
100	25 1/4" X 12" X 1/2" UNF X 11.625

NOTES:

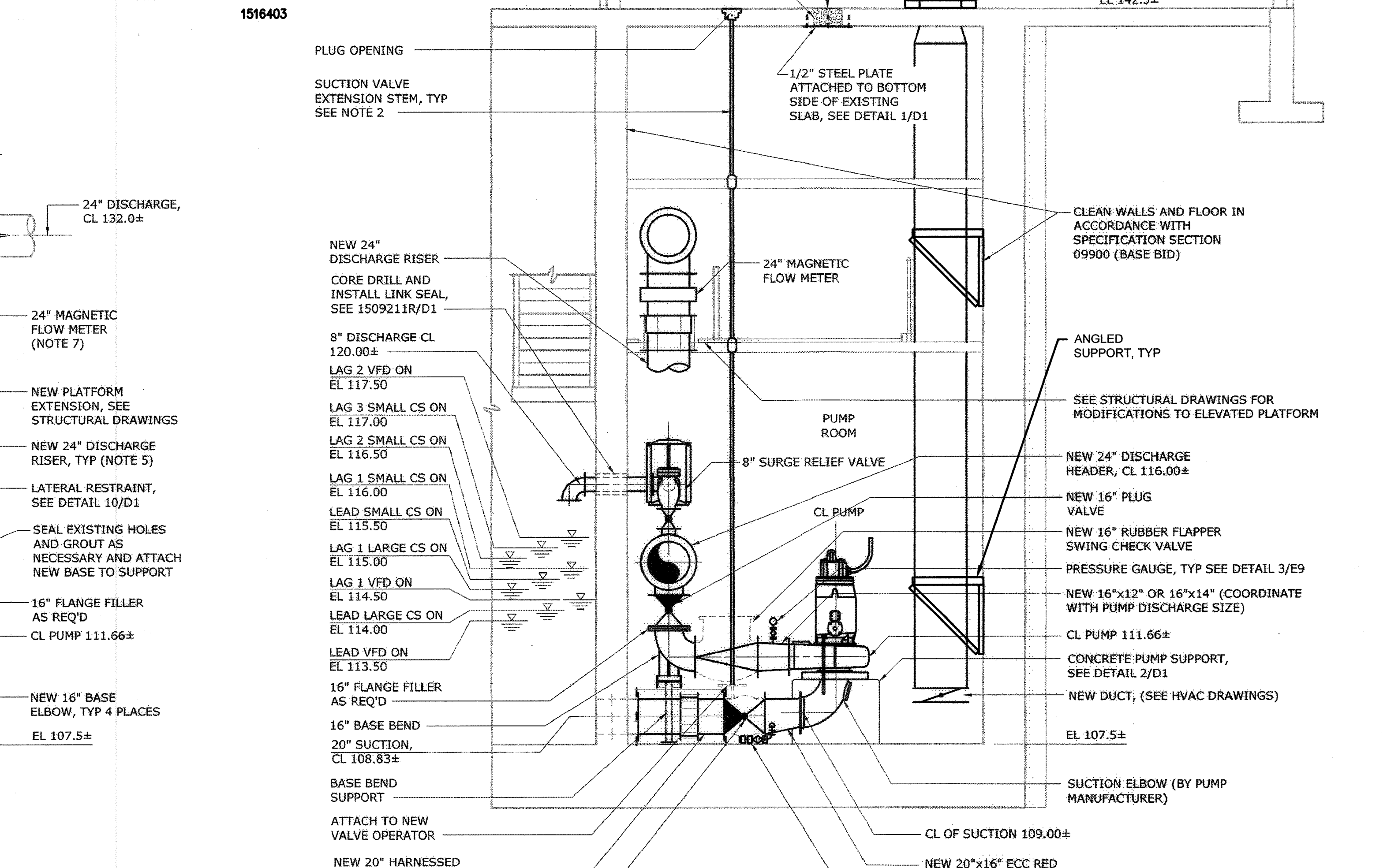
1. PROVIDE PORT FOR ANTIFREEZE FILL AND DRAIN PER MANUFACTURERS RECOMMENDATIONS AND PROVIDE VALVE AS NECESSARY.
2. REALIGN STEM TO MATCH NEW VALVE OPERATOR POSITION. PROVIDE NEW PENETRATIONS AND SEAL OPENINGS IF NECESSARY.
3. GEOMETRY AND REINFORCEMENT OF PUMP SUPPORTS ARE SHOWN FOR BID PURPOSES ONLY WITH FINAL GEOMETRY AND REINFORCING DETAILS TO BE BASED ON MANUFACTURER'S REQUIREMENTS FOR ACTUAL EQUIPMENT INSTALLED. SUBMIT TO ENGINEER MANUFACTURERS INFORMATION INDICATING BASEPLATE GEOMETRY, ANCHOR BOLT PATTERN AND WORST CASE VERTICAL AND LATERAL LOADS TO THE ANCHORS FOR ENGINEER'S REVIEW PRIOR TO CONSTRUCTION OF THE PUMP SUPPORTS.
4. CONTRACTOR SHALL FIELD VERIFY SIZE OF FLOOR PENETRATION TO BE FILLED. SIZE OF PLATE SHOWN IS SUCH TO ACCOMMODATE A 16" OPENING WHILE MAINTAINING A 4" EDGE DISTANCE BETWEEN THE EDGE OF OPENING AND THE CENTERLINE OF ADHESIVE ANCHORS. IF SIZE OF OPENINGS IS DIFFERENT THAN THAT SHOWN COORDINATE WITH ENGINEER PRIOR TO FABRICATION OF PLATE.
5. REINSTALL TIE-RODS IF ADDITIVE ALTERNATE 1 IS NOT IMPLEMENTED. INCLUDE COST IN ADDITIVE ALTERNATE 1.
6. SHALL NOT BE LESS THAN 58 INCHES. COORDINATE CONCRETE PUMP SUPPORT DIMENSIONS WITH MANUFACTURER. LAYOUT IS SHOWN FOR SPECIFIED PUMP MANUFACTURED BY FLYGT. IF SPECIFIED BY KSB IS PROVIDED, PROVIDE A 16-INCH RESTRAINED FLANGED COUPLING ADAPTER BETWEEN CHECK VALVE AND ELBOW INCLUDING A 16-INCH FLXPE PIPE WITH APPROPRIATE LENGTH PROVIDED THAT THE DIMENSION BETWEEN PUMP SUPPORT AND WALL IS NOT LESS THAN 58 INCHES.
7. PROVIDE A 24-INCH SPOOL PIECE EQUAL TO LAY LENGTH OF EACH MAGNETIC FLOWMETER. HAND OVER TO OWNER FOR STORAGE.
8. 3 INCH DRAIN PIPING SHALL BE ASTM A312, TYPE 304, SCHEDULE 40 SEAMLESS STAINLESS STEEL. ALL JOINTS AND FITTINGS SHALL HAVE NPT THREADED CONNECTIONS. DRAIN PIPE SHALL BE CONNECTED TO THE DI SUCTION PIPING VIA A BOSS AND THREADED TAP. BALL VALVE SHALL BE FULL PORT, STAINLESS STEEL WITH TEFLON SEAT AND PACKING AND QUARTER TURN HANDLE, MANUFACTURED BY FLOW-TEK, APOLLO, OR EQUAL. QUICK CONNECT COUPLINGS SHALL BE STAINLESS STEEL CAM AND GROOVE STYLE COUPLINGS (MALE END), MANUFACTURED BY EVER-TITE, OR EQUAL.



BOTTOM PLAN
1/4" = 1'-0"



SECTION B
1/4" = 1'-0"



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

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

3/7/19
3/26/19

DATE
DATE

3/28/19
2/28/19

DATE
DATE

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681

PROFESSIONAL CERTIFICATION

STATE OF MARYLAND
REGISTERED PROFESSIONAL ENGINEER

DESIGNED: AA
DRAWN: BRC
CHECKED: JCS
PROJ. ENGR.: AA

NO. 3
2
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INFLUENT PUMPING STATION
MECHANICAL
BOTTOM PLAN AND SECTIONS

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE: JAN 2017
DRAWING NUMBER: M2
SCALE: AS SHOWN
SHEET 7 OF 27

IMAGES: 32232-TB, Influent PS -PS-S01, Influent PS -PS-S02, Influent PS -PS-PB, Influent PS -PS-S01, Influent PS -PS-S02, 20170126 1:01P 0:\32232-BAL\32232-005\Drawings\Mechanical\M2.dwg LastSaveBy: CPROSSER

GENERAL STRUCTURAL NOTES

- G-1 THESE NOTES ARE GENERAL AND SUPPLEMENT THE SPECIFICATIONS. THESE NOTES APPLY TO THE ENTIRE PROJECT UNLESS MODIFIED OR NOTED OTHERWISE IN THE CONTRACT DOCUMENTS.
- G-2 STANDARD DETAILS SHALL BE USED WHEN REFERRED TO OR WHEN NO MORE RESTRICTIVE OR DIFFERENT DETAILS ARE SHOWN ON THE DRAWINGS.
- G-3 DESIGN IS IN ACCORDANCE WITH AND CONSTRUCTION SHALL COMPLY WITH THE PROVISIONS OF THE MARYLAND BUILDING PERFORMANCE STANDARDS. THE DESIGN LOADS AND OTHER DESIGN VALUES GIVEN IN THE NOTES BELOW WERE USED FOR DESIGN OF STRUCTURAL COMPONENTS UNLESS NOTED OTHERWISE ON THE DRAWINGS.
- G-4 LIVE LOADS: SEE SHEET S4 FOR ALLOWABLE LIVE LOADS ON PLATFORM AREAS. EQUIPMENT AND PIPING SUPPORTS ARE DESIGNED FOR THE WEIGHT OF EQUIPMENT SUPPORTED.
- G-5 SEISMIC LOAD:
OCCUPANCY CATEGORY = III
SEISMIC IMPORTANCE FACTOR (I_e) = 1.25
SITE CLASS = D
MAPPED SPECTRAL RESPONSE ACCELERATIONS (S_s/S₁) = 0.159/0.050
SPECTRAL RESPONSE ACCELERATIONS (S_{MS}/S_{M1}) = 0.254/0.120
SPECTRAL RESPONSE COEFFICIENTS (SDS/SD1) = 0.170/0.080
SEISMIC DESIGN CATEGORY = B
- G-6 ALL DIMENSIONS INDICATED (*) SHALL BE VERIFIED EITHER BY FIELD MEASUREMENTS FOR EXISTING STRUCTURES OR BY SHOP DRAWINGS FOR EQUIPMENT FURNISHED. STRUCTURAL DIMENSIONS NOT SHOWN BUT CONTROLLED BY OR RELATED TO EQUIPMENT SHALL BE VERIFIED BY THE CONTRACTOR WITH THE MANUFACTURER PRIOR TO CONSTRUCTION.
- G-7 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING INFORMATION IN THE FIELD AS REQUIRED FOR NEW WORK.
- G-8 IF A CONFLICT IS FOUND BETWEEN DIFFERENT PORTIONS OF THE CONTRACT DOCUMENTS, THE CONTRACTOR SHALL NOTIFY THE ENGINEER IMMEDIATELY. CONTINUED CONSTRUCTION OF THE AREA IN CONFLICT SHALL BE AT THE CONTRACTOR'S OWN RISK UNTIL THE CONFLICT IS RESOLVED.
- G-9 EQUIPMENT ANCHOR BOLT SIZES, TYPES, EMBEDMENT AND PATTERNS SHALL BE VERIFIED WITH THE MANUFACTURER. ALL BOLT PATTERNS SHALL BE TEMPLATED TO INSURE ACCURACY OF PLACEMENT.
- G-10 STRUCTURAL DRAWINGS SHALL BE USED IN COORDINATION WITH THE DRAWINGS OF ALL OTHER DISCIPLINES AND MANUFACTURER'S SHOP DRAWINGS.
- G-11 STRUCTURES HAVE BEEN DESIGNED FOR OPERATIONAL LOADS ON THE COMPLETED STRUCTURE. DURING CONSTRUCTION, THE STRUCTURES SHALL BE PROTECTED BY BRACING AND TEMPORARY SUPPORTS WHEREVER EXCESSIVE CONSTRUCTION LOADS MAY OCCUR. OVERSTRESSING OF ANY STRUCTURAL ELEMENT IS PROHIBITED.
- G-12 IF CONTRACTOR DESIRES TO TEMPORARILY PLACE OR MOVE LOADS ON OR ADJACENT TO EXISTING STRUCTURES OR UTILITIES DURING CONSTRUCTION PROCESS, CONTRACTOR IS EXCLUSIVELY RESPONSIBLE FOR MAINTAINING STRUCTURAL INTEGRITY AND AVOIDING OVERSTRESSING AND DAMAGING EXISTING STRUCTURES AND UTILITIES. CONTRACTOR SHALL SUBMIT STRUCTURAL CALCULATIONS AND DRAWINGS VERIFYING PROPOSED CONSTRUCTION INCLUDING APPLICATION OF TEMPORARY CONSTRUCTION LOADS WILL NOT OVERSTRESS OR DAMAGE EXISTING STRUCTURES AND UTILITIES. DRAWINGS AND CALCULATIONS SHALL BE SEALED BY A PROFESSIONAL ENGINEER CURRENTLY REGISTERED IN THE STATE OF MARYLAND.

STRUCTURAL METALS

- M-1 DETAIL, FABRICATE, AND ERECT STRUCTURAL STEEL IN ACCORDANCE WITH AISC SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS, ALLOWABLE STRESS DESIGN AND PLASTIC DESIGN, LATEST EDITION.
- M-2 STEEL MATERIAL:
A) STRUCTURAL HSS: ASTM A500, GRADE C (46/50 KSI) OR A1085 (50 KSI)
B) STRUCTURAL PIPE: ASTM A53, GRADE B (35 KSI)
C) PLATES, BARS AND ANGLES: ASTM A36 UNO (36 KSI)
D) STRUCTURAL W SHAPES: ASTM A992 (50 KSI)
E) STRUCTURAL S, M, C & MC SHAPES: ASTM A36 (36 KSI)
F) STRUCTURAL HP: ASTM A572 GRADE 50 (50 KSI)
G) RODS: ASTM F1554 GRADE 36 (36 KSI)
- M-3 PROVIDE MINIMUM 3/4" DIAMETER ASTM A325 HIGH STRENGTH BOLTS WITH SNUG TIGHTENED TYPE N CONNECTIONS FOR STRUCTURAL STEEL UNLESS NOTED OTHERWISE. HOLES FOR BOLTS SHALL BE STANDARD SIZE UNLESS NOTED OTHERWISE.
- M-4 PROVIDE TYPICAL STEEL BEAM CONNECTIONS FOR A CAPACITY OF NOT LESS THAN THE TOTAL UNIFORM LOAD CAPACITY TABULATED IN THE AISC TABLES FOR ALLOWABLE LOADS OF BEAMS UNLESS NOTED OTHERWISE.
- M-5 DO NOT PAINT STEEL SURFACES WHICH ARE TO BE WELDED OR ARE TO BE ENCASED IN CONCRETE.
- M-6 ALL STAINLESS STEEL FABRICATIONS EXPOSED TO UNDERWATER SERVICE SHALL BE TYPE 316. ALL OTHER STAINLESS STEEL FABRICATIONS SHALL BE TYPE 304 UNLESS NOTED OTHERWISE.
- M-7 ALUMINUM SHALL BE ALLOY 6061-T6 UNLESS NOTED OTHERWISE.
- M-8 ALL BOLTS, ANCHOR BOLTS, AND CONCRETE ANCHORS CONNECTING ALUMINUM SHALL BE STAINLESS STEEL TYPE 316 FOR UNDERWATER APPLICATIONS AND TYPE 304 FOR ALL OTHER APPLICATIONS.
- M-9 DETAIL, FABRICATE, AND ERECT ALUMINUM IN ACCORDANCE WITH THE LATEST EDITION OF THE ALUMINUM ASSOCIATION ALUMINUM DESIGN MANUAL.
- M-10 ALUMINUM SHALL BE ISOLATED FROM CONTACT WITH CONCRETE AND DISSIMILAR METALS.
- M-11 ALL GROOVE AND BUTT WELDS SHALL BE FULL PENETRATION.
- M-12 FILLET WELD SIZES SHALL NOT BE LESS THAN THE MINIMUM SIZE REQUIRED BY AISC CODE FOR PLATE SIZES TO BE CONNECTED AND SHALL BE APPLIED TO THE ENTIRE JOINT CONTACT LENGTH, AND NOT LESS THAN 3/16".
- M-13 BOTTOM SURFACES OF BASE PLATES SHALL BE GROUTED TO ENSURE FULL BEARING CONTACT WITH CONCRETE SLAB.
- M-14 WHENEVER ONE MEMBER IS FASTENED TO ANOTHER WITH FASTENINGS (BOLTS, WELDS, ETC.) SET AT A UNIFORM SPACING, THERE SHALL BE A MINIMUM OF TWO FASTENINGS PER PIECE CONNECTED AND THE FIRST AND LAST FASTENINGS SHALL BE LOCATED NOT TO EXCEED 0.25 OF FASTENER SPACING FROM EACH END.
- M-15 BOLTED CONNECTIONS FOR STRUCTURAL STEEL SHALL BE ASSEMBLED AND INSPECTED IN ACCORDANCE WITH RCSC (SPECIFICATIONS FOR STRUCTURAL JOINTS USING ASTM A325 OR ASTM A490 BOLTS).
- M-16 STRUCTURAL WELDED JOINTS SHALL CONFORM TO THE PROVISIONS OF AWS D1.1, STRUCTURAL WELDING CODE BY AMERICAN WELDING SOCIETY. PROOF OF WELDER CERTIFICATION SHALL BE AVAILABLE AT THE JOB SITE DURING TIMES OF INSPECTION.
- M-17 BEARING PADS - BEARING PADS SHALL BE ONE PIECE NON-LAMINATED PADS WITH THE ELASTOMER PORTION OF THE PAD MADE FROM NEOPRENE COMPOUND. PADS SHALL BE CAST UNDER HEAT AND PRESSURE AND MAY BE INDIVIDUALLY MOLDED OR CUT FROM PRESSURE-CAST STOCK. TOLERANCES, DIMENSIONS, FINISH AND APPEARANCE, FLASH, AND RUBBER-TO-METAL BONDING SHALL CONFORM TO THE REQUIREMENTS OF A 4-F3-T-063-B2, GRADE 2, METHOD B, IN ACCORDANCE WITH THE RMA RUBBER HANDBOOK. PADS SHALL HAVE A HARDNESS OF 70 POINTS #5 (ASTM D624) AND A MINIMUM TENSILE STRENGTH OF 2500 PSI IN BOTH THE LONGITUDINAL AND TRANSVERSE DIRECTION (ASTM D412). ADHESIVE USED FOR ATTACHMENT TO CONCRETE SHALL BE 20-F CONTACT CEMENT BY MIRACLE ADHESIVES CORPORATION, NEOPRENE ADHESIVE 77-198 BY IGI ADHESIVES, SIKODUR 31, HI-MOD GEL BY SIKA CORPORATION, OR DP-605 NS URETHANE ADHESIVE BY 3M ADHESIVE SYSTEMS.

CONCRETE (CAST-IN-PLACE)




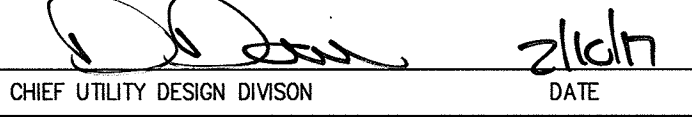
- C-1 DESIGN OF CONCRETE ELEMENTS IS IN ACCORDANCE WITH ACI 318 (CODE REQUIREMENTS FOR STRUCTURAL CONCRETE).
- C-2 ALL CONCRETE SHALL BE MACHINE MIXED, HAND MIXING OF CONCRETE WILL NOT BE PERMITTED. EACH BATCH OF CONCRETE SHALL BE MIXED IN A TRUCK MIXER FOR NOT LESS THAN 100 REVOLUTIONS OF THE DRUM OR BLADES AT THE RATE OF ROTATION DESIGNATED BY THE MANUFACTURER OF EQUIPMENT AND EVERY CONCRETE DELIVERY SHALL BE ACCOMPANIED BY A DELIVERY TICKET.
- C-3 SUBMIT A CONCRETE MIX DESIGN INCLUDING THE FOLLOWING IN ACCORDANCE WITH SECTION 01300, SUBMITTALS.
A. SOURCES OF ALL MATERIALS AND CERTIFICATIONS OF COMPLIANCE WITH SPECIFICATIONS FOR ALL MATERIALS.
B. CERTIFIED CURRENT (LESS THAN 1 YEAR OLD) CHEMICAL ANALYSIS OF THE PORTLAND CEMENT OR BLENDED CEMENT TO BE USED.
C. CERTIFIED CURRENT (LESS THAN 1 YEAR OLD) CHEMICAL ANALYSIS OF FLY ASH OR SLAG CEMENT TO BE USED.
D. AGGREGATE TEST RESULTS SHOWING COMPLIANCE WITH REQUIRED STANDARDS, I.E., SIEVE ANALYSIS, AGGREGATE SOUNDNESS TESTS, PETROGRAPHIC ANALYSIS, MORTAR BAR EXPANSION TESTING, ETC.
E. MANUFACTURER'S DATA ON ALL ADMIXTURES STATING COMPLIANCE WITH REQUIRED STANDARDS.
F. CONCRETE MIX DESIGN FOR EACH CLASS OF CONCRETE SPECIFIED HEREIN.
G. FIELD EXPERIENCE RECORDS AND/OR TRIAL MIX DATA FOR THE PROPOSED CONCRETE MIXES FOR EACH CLASS OF CONCRETE SPECIFIED HEREIN.
- C-4 STRUCTURAL CONCRETE SHALL CONFORM TO THE FOLLOWING REQUIREMENTS. CEMENTITIOUS MATERIALS REFER TO THE TOTAL COMBINED WEIGHT OF ALL CEMENT, FLY ASH, AND SLAG CEMENT CONTAINED IN THE MIX:
A. COMPRESSIVE STRENGTH: 4000 PSI (MINIMUM)
B. WATER/ CEMENTITIOUS MATERIALS RATIO BY WEIGHT: 0.39 (MIN) TO 0.45 (MAX)
C. SLUMP RANGE: 4 INCH NOMINAL (WITHOUT HIGH RANGE WATER REDUCER), 8 INCH MAX (WITH HIGH RANGE WATER REDUCER)
D. AIR CONTENT: 6% +/- 1.5%
- C-5 CONCRETE MATERIALS
A. PORTLAND CEMENT SHALL BE TYPE I/II OR II CONFORMING TO ASTM C 150. FOR CONCRETE MIXED WITH ONLY PORTLAND CEMENT, THE TOTAL ALKALIS IN THE CEMENT (CALCULATED AS THE PERCENTAGE OF NA2O PLUS 0.658 TIMES THE PERCENTAGE OF K2O) SHALL NOT EXCEED 0.40%. FOR CONCRETE MIXED WITH PORTLAND CEMENT AND AN APPROPRIATE AMOUNT OF FLY ASH OR SLAG CEMENT THE TOTAL ALKALIS IN THE PORTLAND CEMENT SHALL NOT EXCEED 0.85%. THE PROPOSED PORTLAND CEMENT SHALL NOT CONTAIN MORE THAN 8% TRICALCIUM ALUMINATE AND MORE THAN 12% TETRACALCIUM ALUMINOFERRITE.
B. FLY ASH SHALL MEET THE REQUIREMENTS OF ASTM C 618 FOR CLASS F, EXCEPT THAT THE LOSS ON IGNITION SHALL NOT EXCEED 4%. FLY ASH SHALL ALSO MEET THE OPTIONAL PHYSICAL REQUIREMENTS FOR UNIFORMITY AS SHOWN IN TABLE 3 OF ASTM C 618. WHERE THE TOTAL ALKALIS IN THE PORTLAND CEMENT EXCEED 0.40% THE FLY ASH CONSTITUENT SHALL BE BETWEEN 15% AND 25% OF THE TOTAL WEIGHT OF THE COMBINED PORTLAND CEMENT AND FLY ASH.
C. SLAG CEMENT SHALL MEET THE REQUIREMENTS OF ASTM C 989 INCLUDING TESTS FOR EFFECTIVENESS OF SLAG IN PREVENTING EXCESSIVE EXPANSION DUE TO ALKALI-AGGREGATE REACTIVITY AS DESCRIBED IN APPENDIX X-3 OF ASTM C 989. WHERE THE TOTAL ALKALIS IN THE PORTLAND CEMENT EXCEED 0.40% THE SLAG CEMENT CONSTITUENT SHALL BE BETWEEN 35% AND 40% OF THE TOTAL WEIGHT OF THE COMBINED PORTLAND CEMENT AND SLAG.
D. WATER USED FOR MIXING CONCRETE SHALL BE CLEAR, POTABLE AND FREE FROM DELETERIOUS SUBSTANCES SUCH AS OBJECTIONABLE QUANTITIES OF SILTY ORGANIC MATTER, ALKALI, SALTS AND OTHER IMPURITIES.
E. COARSE AGGREGATES SHALL CONSIST OF HARD, CLEAN, DURABLE GRAVEL, CRUSHED GRAVEL OR CRUSHED ROCK. COARSE AGGREGATE SHALL BE SIZE #57 OR #67 AS GRADED WITHIN THE LIMITS GIVEN IN ASTM C 33 UNLESS OTHERWISE SPECIFIED. FINE AGGREGATE (SAND) IN THE VARIOUS CONCRETE MIXES SHALL CONSIST OF NATURAL OR MANUFACTURED SILICEOUS SAND, CLEAN AND FREE FROM DELETERIOUS SUBSTANCES, AND GRADED WITHIN THE LIMITS OF ASTM C 33. AGGREGATE SHALL MEET THE REQUIREMENTS FOR SOUNDNESS AS DEFINED BY ASTM C88 AND THE LOSS AFTER 5 CYCLES SHALL NOT EXCEED 10%.
- C-6 CONCRETE ADMIXTURES
A. AIR ENTRAINING AGENT SHALL BE ADDED TO ALL CONCRETE UNLESS NOTED OTHERWISE. THE AGENT SHALL CONSIST OF A NEUTRALIZED VINYL RESIN SOLUTION OR A PURIFIED HYDROCARBON WITH A CEMENT CATALYST WHICH WILL PROVIDE ENTRAINED AIR IN THE CONCRETE IN ACCORDANCE WITH ASTM C 260.
B. WATER REDUCING ADMIXTURE SHALL CONFORM TO ASTM C 494, TYPE A AND SHALL CONTAIN NO MORE THAN 0.05% CHLORIDE IONS. ACCEPTABLE PRODUCTS ARE "EUCON SERIES" BY THE EUCLID CHEMICAL COMPANY, "MASTER POZZOLITH SERIES" BY BASF, AND "PLASTOCRETE SERIES" BY SIKA CORPORATION.
C. HIGH RANGE WATER REDUCER SHALL BE SULFONATED POLYMER CONFORMING TO ASTM C 494, TYPE F OR G. THE HIGH RANGE WATER REDUCER SHALL BE ADDED TO THE CONCRETE AT EITHER THE BATCH PLANT OR AT THE JOB SITE AND MAY BE USED IN CONJUNCTION WITH A WATER REDUCING ADMIXTURE. ACCEPTABLE PRODUCTS ARE "EUCON 37" OR "PLASTOL 5000" BY THE EUCLID CHEMICAL COMPANY, "MASTER RHEOBUILD 1000" OR "MASTER GLENIUM SERIES" BY BASF, AND "DARACEM 100" OR "ADVAFLOW SERIES" BY W.R. GRACE.
D. SUBMIT MANUFACTURER'S DATA INCLUDING THE CHLORIDE ION CONTENT OF EACH ADMIXTURE AND CERTIFICATION FROM THE ADMIXTURE MANUFACTURER THAT ALL ADMIXTURES UTILIZED IN THE DESIGN MIX ARE COMPATIBLE WITH ONE ANOTHER AND PROPERLY PROPORTIONED PRIOR TO MIX DESIGN REVIEW.
- C-7 REINFORCING STEEL
A. ALL BAR REINFORCING SHALL CONFORM TO ASTM A615, GRADE 60. WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185.
B. PROVIDE ALL NECESSARY CHAIRS, SLAB BOLSTERS, CONCRETE BLOCKS, TIE WIRES, DIPS, SUPPORTS, SPACERS AND OTHER DEVICES TO POSITION REINFORCING DURING CONCRETE PLACEMENT. SLAB BOLSTERS SHALL HAVE GRAY PLASTIC-COATED LEGS.
C. WHERE ADHESIVE DOWELS ARE CALLED FOR ON THE DRAWINGS THE DOWEL ADHESIVE SYSTEM SHALL MEET THE REQUIREMENTS OF SPECIFICATION 05050 FOR STRUCTURAL ADHESIVE ANCHORS. INSTALLERS OF ADHESIVE DOWELS SHALL BE CERTIFIED AS AN ADHESIVE ANCHOR INSTALLER AND SHALL INSTALL DOWELS AS REQUIRED BY SPECIFICATION 05050.
D. WHERE INDICATED ON THE DRAWINGS ADHESIVE DOWELS SHALL BE LOAD TESTED AS PER THE CONCRETE ANCHOR TESTING REQUIREMENTS OF SPECIFICATION 05050.
E. REINFORCING BARS AND ACCESSORIES SHALL NOT BE IN CONTACT WITH ANY METAL PIPE, PIPE FLANGE, METAL CONDUIT, OR OTHER METAL PARTS EMBEDDED IN CONCRETE. A MINIMUM CLEARANCE OF 2" SHALL BE PROVIDED.
F. DRILLED ADHESIVE DOWELS (WHERE DOWELS ARE SHOWN TO BE PLACED INTO HARDENED CONCRETE):
a. THE HOLE DIAMETER SHALL BE NO LARGER THAN 1/8" GREATER THAN THE DIAMETER OF THE REINFORCING BAR AT THE DEFORMATIONS.
b. THE DEPTH OF EMBEDMENT SHALL BE 12 BAR DIAMETERS, UNLESS NOTED OTHERWISE.
c. ADJUST THE DOWEL LOCATIONS AS NEEDED TO AVOID DRILLING THROUGH ANY REINFORCING BARS. IF THE LOCATION NEEDS TO BE MODIFIED, CONTACT THE ENGINEER. CONTRACTOR SHALL USE NON-DESTRUCTIVE MEANS TO FIELD LOCATE REINFORCEMENT PRIOR TO DRILLING HOLES FOR DOWELS.

CONCRETE (CONT.)

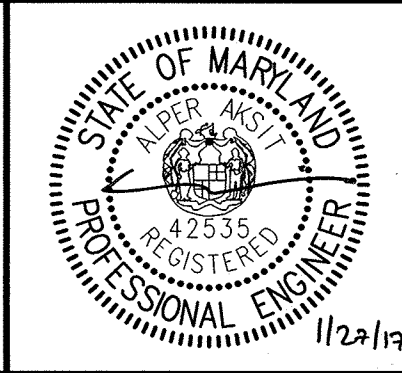
- C-8 CONCRETE FORMWORK
A. CONCRETE FORMWORK SHALL BE IN ACCORDANCE WITH ACI 301, ACI 318, AND ACI 347. TOLERANCES SHALL BE IN ACCORDANCE WITH ACI 117. DESIGN AND ENGINEERING OF FORMWORK AND SAFETY CONSIDERATIONS DURING CONSTRUCTION SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR.
B. WOOD MATERIALS FOR CONCRETE FORMS AND FALSEWORK SHALL BE HIGH DENSITY OVERLAD (HDO) PLYWOOD MANUFACTURED ESPECIALLY FOR CONCRETE FORMWORK AND SHALL CONFORM TO THE REQUIREMENTS OF PS1 FOR CONCRETE FORMS, CLASS I, AND SHALL BE EDGE SEALED. OTHER FORM MATERIALS SUCH AS METAL, FIBERGLASS, OR OTHER ACCEPTABLE MATERIAL THAT WILL NOT ADVERSELY AFFECT THE CONCRETE AND WILL FACILITATE PLACEMENT OF CONCRETE TO THE SHAPE, FORM, LINE AND GRADE INDICATED MAY BE SUBMITTED TO THE ENGINEER FOR APPROVAL, BUT ONLY MATERIALS THAT WILL PRODUCE A SMOOTH FORM FINISH EQUAL OR BETTER THAN THE WOOD MATERIALS SPECIFIED WILL BE CONSIDERED.
C. FORM TIES SHALL BE PROVIDED WITH A PLASTIC CONE OR OTHER SUITABLE MEANS FOR FORMING A CONICAL HOLE TO INSURE THAT THE FORM TIE MAY BE BROKEN OFF A MINIMUM OF 1 INCH BACK OF THE FACE OF THE CONCRETE. HOLES LEFT BY REMOVAL OF PLASTIC CONE SHALL BE PATCHED WITH CEMENTITIOUS GROUT.
D. FORM RELEASE AGENT SHALL BE A BLEND OF NATURAL AND SYNTHETIC CHEMICALS THAT EMPLOYS A CHEMICAL REACTION TO PROVIDE QUICK, EASY AND CLEAN RELEASE OF CONCRETE FROM FORMS. IT SHALL NOT STAIN THE CONCRETE AND SHALL LEAVE THE CONCRETE WITH A PAINTABLE SURFACE. SUBMIT MANUFACTURERS DATA ON PROPOSED FORM RELEASE AGENT.
- C-9 CONCRETE FINISHES
A. TOPS OF ALL EQUIPMENT PADS SHALL BE PROVIDED WITH A BROOM FINISH
B. VERTICAL SURFACES OF ALL EXPOSED CONCRETE SHALL BE PROVIDED WITH A SMOOTH RUBBED FINISH. FINISH SHALL CONSIST OF:
a. REMOVE ALL FINS, BURRS, OFFSETS, MARKS AND ALL OTHER PROJECTIONS LEFT BY THE FORMS AND FILL ALL HOLES SOLIDLY WITH CEMENTITIOUS GROUT. ANY HONEYCOMBS SHALL BE CHIPPED BACK TO SOLID CONCRETE AND REPAIRED AS DIRECTED BY THE ENGINEER.
b. PREDAMPEN CONCRETE AND SPREAD OVER THE SURFACE WITH BURLAP PADS OR SPONGE RUBBER FLOATS A SLURRY CONSISTING OF ONE PART CEMENT TO 1-1/2 PARTS SAND PASSING THE NO. 16 SIEVE.
c. ONCE CONCRETE HAS THOROUGHLY HARDENED AND MORTAR USED FOR PATCHING HAS FIRMLY SET WET THE SURFACE OF THE CONCRETE AND RUB WITH A CARBORUNDUM STONE. SURFACE SHALL BE RUBBED UNTIL A SMOOTH, UNIFORM SURFACE HAS BEEN OBTAINED.
- C-10 CONCRETE CURING
A. AS SOON AS THE CONCRETE HAS BEEN PLACED AND HORIZONTAL TOP SURFACES HAVE RECEIVED THEIR REQUIRED FINISH, PROVISION SHALL BE MADE FOR MAINTAINING THE CONCRETE IN A MOIST CONDITION FOR AT LEAST A 5-DAY PERIOD THEREAFTER. HORIZONTAL SURFACES SHALL BE KEPT COVERED, AND INTERMITTENT, LOCALIZED DRYING WILL NOT BE PERMITTED.
B. TO ENSURE THAT THE CONCRETE REMAINS MOIST THE CONTRACTOR SHALL EITHER UTILIZE MATS OR FABRIC KEPT CONTINUOUSLY WET, UTILIZE SHEETING MATERIALS CONFORMING TO ASTM C171 OR IF APPROVED BY THE ENGINEER APPLY A CURING COMPOUND. CURING COMPOUND SHALL BE A CLEAR STYRENE ACRYLATE TYPE COMPLYING WITH ASTM C 1315, TYPE 1, CLASS A WITH A MINIMUM SOLIDS CONTENT OF 30%. MOISTURE LOSS SHALL NOT BE GREATER THAN 0.40 KG/M2 WHEN APPLIED AT 300 SQ.FT./GAL. MANUFACTURER'S CERTIFICATION IS REQUIRED. ACCEPTABLE PRODUCTS ARE SUPER DIAMOND CLEAR VOX BY THE EUCLID CHEMICAL COMPANY, MASTEKURE CC 300 SB BY BASF MASTER BUILDER SOLUTIONS, AND CURE & SEAL 30 PLUS BY SYMONS CORPORATION.
- C-11 FIELD QUALITY CONTROL TESTING
A. THE CONTRACTOR SHALL PROVIDE APPROVED CURING BOXES FOR STORAGE OF CYLINDERS ON SITE. THE INSULATED CURING BOX SHALL BE OF SUFFICIENT SIZE AND STRENGTH TO CONTAIN ALL THE SPECIMENS MADE IN ANY FOUR CONSECUTIVE WORKING DAYS AND TO PROTECT THE SPECIMENS FROM FALLING OVER, BEING JARRED OR OTHERWISE DISTURBED DURING THE PERIOD OF INITIAL CURING. THE BOX SHALL BE ERECTED, FURNISHED AND MAINTAINED BY THE CONTRACTOR. SUCH BOX SHALL BE EQUIPPED TO PROVIDE THE MOISTURE AND TO REGULATE THE TEMPERATURE NECESSARY TO MAINTAIN THE PROPER CURING CONDITIONS REQUIRED BY ASTM C 31. SUCH BOX SHALL BE LOCATED IN AN AREA FREE FROM VIBRATION SUCH AS PILE DRIVING AND TRAFFIC OF ALL KINDS AND SUCH THAT ALL SPECIMEN ARE SHIELDED FROM DIRECT SUNLIGHT AND/OR RADIANT HEATING SOURCES. NO CONCRETE REQUIRING INSPECTION SHALL BE DELIVERED TO THE SITE UNTIL SUCH STORAGE CURING BOX HAS BEEN PROVIDED. SPECIMENS SHALL REMAIN UNDISTURBED IN THE CURING BOX UNTIL READY FOR DELIVERY TO THE TESTING LABORATORY BUT NOT LESS THAN SIXTEEN HOURS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR MAINTAINING THE TEMPERATURES OF THE CURING BOX DURING THE INITIAL CURING OF TEST SPECIMENS WITH THE TEMPERATURE PRESERVED BETWEEN 60°F AND 80°F AS MEASURED BY A MAXIMUM-MINIMUM THERMOMETER. THE CONTRACTOR SHALL MAINTAIN A WRITTEN RECORD OF CURING BOX TEMPERATURES FOR EACH DAY CURING BOX CONTAINS TEST SPECIMENS. TEMPERATURE SHALL BE RECORDED A MINIMUM OF THREE TIMES A DAY WITH ONE RECORDING AT THE START OF THE WORK DAY AND ONE RECORDING AT THE END OF THE WORK DAY.
B. FIELD QUALITY CONTROL TESTS WILL BE PERFORMED BY A THIRD PARTY MATERIALS TESTING CONSULTANT APPROVED BY THE ENGINEER, PAID BY THE CONTRACTOR. HOWEVER, THE CONTRACTOR SHALL BE CHARGED FOR THE COST OF ANY ADDITIONAL TESTS AND INVESTIGATION ON WORK PERFORMED WHICH DOES NOT MEET THE SPECIFICATIONS. ANY INDIVIDUAL WHO SAMPLES AND TESTS CONCRETE TO DETERMINE IF THE CONCRETE IS BEING PRODUCED IN ACCORDANCE WITH THIS SPECIFICATION SHALL BE CERTIFIED AS A CONCRETE FIELD TESTING TECHNICIAN, GRADE I, IN ACCORDANCE WITH ACI CP-2. TESTING LABORATORY SHALL CONFORM TO REQUIREMENTS OF ASTM C-1077.
C. SLUMP TESTS SHALL BE MADE BY THE MATERIALS TESTING CONSULTANT IN ACCORDANCE WITH ASTM C 143.
D. SAMPLES OF FRESHLY MIXED CONCRETE SHALL BE TESTED FOR UNIT WEIGHT BY THE MATERIALS TESTING CONSULTANT IN ACCORDANCE WITH ASTM C 138.
E. SAMPLES OF FRESHLY MIXED CONCRETE WILL BE TESTED FOR ENTRAINED AIR CONTENT BY THE MATERIALS TESTING CONSULTANT IN ACCORDANCE WITH ASTM C 231.
F. SAMPLES OF FRESHLY MIXED CONCRETE WILL BE TAKEN BY THE MATERIALS TESTING CONSULTANT AND TESTED FOR COMPRESSIVE STRENGTH IN ACCORDANCE WITH ASTM C 172, C 31 AND C 39. IN GENERAL, ONE SAMPLING SHALL BE TAKEN FOR EACH PLACEMENT IN EXCESS OF FIVE (5) CUBIC YARDS, WITH A MINIMUM OF ONE (1) SAMPLING FOR EACH DAY OF CONCRETE PLACEMENT OPERATIONS. EACH SAMPLING SHALL CONSIST OF AT LEAST FIVE (5) 6X12 CYLINDERS OR (8) 4X8 CYLINDERS WITH EACH CYLINDER IDENTIFIED BY A TAG, WHICH SHALL BE HOOKED OR WIRED TO THE SIDE OF THE CONTAINER.
G. COMPRESSION TESTS SHALL BE PERFORMED IN ACCORDANCE WITH ASTM C 39. FOR 6X12 CYLINDERS, TWO TEST CYLINDERS WILL BE TESTED AT SEVEN DAYS AND TWO AT 28 DAYS. FOR 4X8 CYLINDERS, THREE TEST CYLINDERS WILL BE TESTED AT SEVEN DAYS, THREE AT 28 DAYS. THE REMAINING CYLINDERS WILL BE HELD TO VERIFY TEST RESULTS, IF NEEDED. THE STRENGTH LEVEL OF CONCRETE SHALL BE CONSIDERED SATISFACTORY IF THE TESTING REQUIREMENTS OF ACI 318, CHAPTER 5.6.3 ARE MET.
- C-12 CONCRETE COVER FOR REINFORCING (UNLESS NOTED OTHERWISE ON THE DRAWINGS):
A. CONCRETE DEPOSITED DIRECTLY AGAINST SOIL: 3"
B. CONCRETE EXPOSED TO WEATHER (#5 OR SMALLER): 1 1/2"
CONCRETE EXPOSED TO WEATHER (#6 OR LARGER): 2"
C. SLABS: 1 1/2"
AT SURFACES CONTACTING FLUID: 2"
D. BEAMS AND COLUMNS (TO MAIN REINFORCEMENT): 2"
BEAMS AND COLUMNS (TO COLUMN TIES OR STIRRUPS): 1 1/2"
E. WALLS 12" OR MORE: 2"
WALLS LESS THAN 12" (#5 OR SMALLER): 1 1/2"
WALLS LESS THAN 12" (#6 OR LARGER): 2"
F. FOR SURFACES EXPOSED TO FLUID IN BEAMS, COLUMNS AND WALLS: ADD 1/2" TO ABOVE VALUES

AS - BUILT

IMAGE= XREF= 32232-B

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
 DIRECTOR OF PUBLIC WORKS	 CHIEF BUREAU OF ENGINEERING
 CHIEF BUREAU OF UTILITIES	 CHIEF UTILITY DESIGN DIVISION

Hazen
HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-538-7881



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. 42535, EXPIRATION DATE 07/25/2018.

DESIGNED	AGM						
DRAWN	SBS						
CHECKED	JCS						
PROJ. ENGR.	AA						
APPROVED		NO.	ISSUED FOR	SIGNED	DATE	BY	

STRUCTURAL
GENERAL STRUCTURAL NOTE
SHEET 1

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	S1
SCALE AS SHOWN	
SHEET	9 OF 27

CONCRETE (CONT.)

- C-13 SPLICES SHALL BE CLASS "B" CONFORMING TO THE PROVISIONS OF ACI 318 UNLESS NOTED OTHERWISE. SPLICE LENGTH FOR TWO DIFFERENT SIZED BARS TO BE LAP SPliced TOGETHER SHALL BE THE LENGTH OF THE LARGER BAR UNLESS NOTED OTHERWISE.
- C-14 CONSTRUCTION JOINTS SHALL BE LOCATED AS SHOWN ON THE DRAWINGS. CONSTRUCTION JOINTS NOT SHOWN SHALL BE SUBMITTED BY THE CONTRACTOR FOR THE APPROVAL OF THE ENGINEER PRIOR TO SUBMITTING REBAR SHOP DRAWINGS.
- C-15 ALL EXPOSED CORNERS SHALL HAVE A 3/4" CHAMFER OR A 1/2" RADIUS TOOLED CORNER.
- C-16 EQUIPMENT SUPPORTS, ANCHORAGES, OPENINGS, RECESSES AND REVEALS NOT SHOWN ON THE STRUCTURAL DRAWINGS BUT REQUIRED BY OTHER CONTRACT DOCUMENTS, SHALL BE PROVIDED FOR PRIOR TO PLACING CONCRETE.
- C-17 DOWELS, ANCHOR BOLTS, PIPES, WATERSTOPS AND OTHER EMBEDDED ITEMS SHALL BE HELD SECURELY IN POSITION WHILE CONCRETE IS BEING PLACED.
- C-18 CONDUITS AND OTHER SIMILAR ITEMS EMBEDDED IN OR PENETRATING THROUGH CONCRETE SHALL BE SPACED ON CENTER NOT LESS THAN 3 TIMES THEIR OUTSIDE DIMENSION, BUT NOT LESS THAN 2 1/2" CLEAR. WHEN SUCH ITEMS ARE EMBEDDED IN WALLS OR SLABS, THEY SHALL NOT OCCUPY MORE THAN 1/3 OF THE MEMBER THICKNESS.
- C-19 AT ALL TYPICAL CURBS, EQUIPMENT PADS, AND PIPE SUPPORT PIERS, REINFORCING DOWELS SHOWN MAY BE REPLACED WITH MATCHING DOWELS SET IN EPOXY IN DRILLED HOLES AS SPECIFIED. DOWELS LOCATED CLOSER THAN 3" FROM ANY EDGE OF CONCRETE SHALL NOT BE REPLACED WITH DRILLED DOWELS.
- C-20 CLEAR DISTANCE FROM ANCHOR BOLTS TO ANY CONCRETE EDGE SHALL BE 4" MINIMUM UNLESS NOTED OTHERWISE.
- C-21 CONCRETE COMPRESSIVE STRENGTH TESTS SHALL BE AVAILABLE ON THE JOB SITE FOR REVIEW BY THE ENGINEER.
- C-22 WHERE FRESH CONCRETE IS TO BE PLACED AGAINST HARDENED CONCRETE AN EPOXY BONDING AGENT SHALL BE USED. EPOXY BONDING AGENT SHALL CONFORM TO ASTM C881 AND SHALL BE SIKADUR 32 HI-MOD, SIKA CORPORATION, LYNDHURST, NJ; EUCO #452 EPOXY SYSTEM, EUCLID CHEMICAL COMPANY, CLEVELAND, OH; MASTERUNJECT 1500 BY BASF MASTER BUILDER SOLUTIONS (BASF)

DEMOLITION

- D-1 FOR DEMOLITION REQUIREMENTS, REFER TO SPECIFICATION 01540 - DEMOLITION.
- D-2 CONCRETE DEMOLITION WITHIN STRUCTURES BEING MODIFIED SHALL BE SELECTIVE DEMOLITION BY CORE DRILLING OR SAWCUTTING AND CAREFUL REMOVAL OF CONCRETE SHOWN TO BE REMOVED. NO OVER CUTTING OF AREAS TO BE DEMOLISHED SHALL BE PERMITTED. CONTRACTOR SHALL CORE DRILL CORNERS OF OPENING PRIOR TO SAWCUTTING. EXPLOSIVES AND VIBRATORY HAMMERS SHALL NOT BE USED FOR DEMOLITION WORK.
- D-3 UNLESS ANCHORING DEVICES AND/OR REINFORCEMENT IS NOTED TO REMAIN FOLLOWING DEMOLITION, REMOVE AND/OR BURN BACK ANCHORS AND REINFORCEMENT STEEL 1/2" MIN BELOW SURFACE AND VOIDS CREATED SHALL BE FILLED WITH EPOXY RESIN BINDER. SUCH AS "SIKADUR 52" BY SIKA CORPORATION, "DURALCRETE LV" BY EUCLID CHEMICAL COMPANY, OR EQUAL.
- D-4 EMBEDDED CONDUIT ENCOUNTERED DURING DEMOLITION WORK LIMITS SHALL BE PERMANENTLY REROUTED AS NECESSARY. CONTRACTOR SHALL SUBMIT PROPOSED MEANS OF REROUTING ANY INTERFERING CONDUIT.
- D-5 WHERE DRAWINGS INDICATE A CONCRETE EQUIPMENT PAD TO BE DEMOLISHED, THE FLOOR SLAB SURFACE SHALL BE REPAIRED AS APPROVED BY ENGINEER. FOLLOWING SELECT DEMOLITION AND REMOVAL OF THE EQUIPMENT PAD REMOVAL THE REPAIR SHALL BE:
 A. SAWCUT THE FLOOR AROUND THE EQUIPMENT PAD PERIMETER TO A DEPTH OF 1/4".
 B. SCARIFY AND REMOVE SLAB CONCRETE WITHIN THE PERIMETER TO A NOMINAL 1/4" DEPTH CLEAN AND REMOVE ALL CONCRETE LIFTANCE.
 C. RESURFACE THE AREA BY APPLYING A POLYMER MODIFIED OR SILICA FUME ENHANCED CEMENTITIOUS REPAIR MORTAR, APPROVED BY THE ENGINEER, FOLLOWING THE MANUFACTURER'S SURFACE PREPARATION AND APPLICATION RECOMMENDATIONS. LEVEL AND FINISH THE SURFACE TO MATCH THE FLOOR SLAB SURROUNDING AREA.
- D-6 PRIOR TO DEMOLITION OF SMALL OPENINGS (LESS THAN 6 INCHES IN SIZE) FOR PENETRATIONS, ETC., CONTRACTOR SHALL USE NON-DESTRUCTIVE MEANS TO FIELD LOCATE REINFORCEMENT. OPENINGS SHALL BE LOCATED TO AVOID CUTTING THROUGH EXISTING REINFORCEMENT, IF POSSIBLE. EXISTING REINFORCEMENT SHALL NOT BE CUT WITHOUT APPROVAL OF ENGINEER.
- D-7 CONCRETE SURFACES LEFT EXPOSED FOLLOWING DEMOLITION SHALL BE SEALED WITH EPOXY RESIN COATING SUCH AS "SIKAGARD" BY SIKA CORPORATION, "DURACOTE 240" BY TAMMS INDUSTRIES, OR APPROVED EQUAL.
- D-8 DETAILED CONSTRUCTION AND DEMOLITION PLAN SHALL BE SUBMITTED TO THE ENGINEER AND APPROVED BY THE ENGINEER AND OWNER PRIOR TO BEGINNING CONSTRUCTION. ANY SHUTDOWNS SHALL BE SUBMITTED TO, COORDINATED WITH, AND APPROVED BY THE OWNER. ONCE APPROVED, CONTRACTOR SHALL PROVIDE A MINIMUM OF THREE (3) WEEKS NOTICE TO OWNER PRIOR TO SHUTDOWN.

NONSTRUCTURAL COMPONENT ANCHORAGE




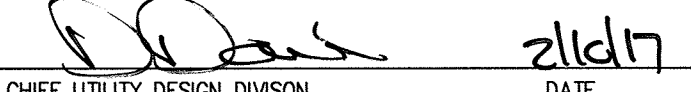
- A-1 ALL ARCHITECTURAL, MECHANICAL, AND ELECTRICAL COMPONENTS SHALL BE DESIGNED AND INSTALLED TO RESIST THE CONTROLLING CONDITION OF OPERATIONAL FORCES OR SEISMIC FORCES IN ACCORDANCE WITH THE GOVERNING BUILDING CODE. SEISMIC FORCES SHALL ALSO BE AS PER ASCE 7. COMPONENT SEISMIC ATTACHMENTS SHALL BE BOLTED, WELDED, OR OTHERWISE POSITIVELY FASTENED WITHOUT CONSIDERATION OF FRICTIONAL RESISTANCE PRODUCED BY THE EFFECTS OF GRAVITY. A CONTINUOUS LOAD PATH OF SUFFICIENT STRENGTH AND STIFFNESS BETWEEN THE COMPONENT AND THE SUPPORTING STRUCTURE SHALL BE PROVIDED. CONNECTIONS FOR BOTH ORTHOGONAL DIRECTIONS (TRANSVERSE AND LONGITUDINAL) SHALL BE DESIGNED BY THE CONTRACTOR'S ENGINEER CURRENTLY REGISTERED IN THE STATE OF MARYLAND.
- A-2 COMPONENT REACTION FORCES AT THE POINT OF ATTACHMENT TO THE STRUCTURE SHALL BE SUBMITTED TO AND COORDINATED WITH THE ENGINEER FOR CONFIRMATION SUPPORTING STRUCTURE CAN WITHSTAND REACTION FORCES.
- A-3 CONTRACTOR SHALL PROVIDE SPECIAL SEISMIC CERTIFICATION (SSC) FROM MANUFACTURER OF EQUIPMENT FOR ALL SYSTEMS DEEMED NECESSARY BY SPECIFICATIONS. SPECIAL SEISMIC CERTIFICATION SHALL BE IN COMPLIANCE WITH ASCE 7.

EXISTING INFORMATION

- X-1 ALL EXISTING INFORMATION SHOWN ON THESE DRAWINGS INCLUDING LOCATION, DIMENSIONS, ELEVATIONS, AND CONFIGURATIONS IS DERIVED FROM THE SAVAGE SEWAGE TREATMENT PLANT ADDITION NO. 2 CONTRACT DRAWINGS BY WHITMAN, REQUARDT AND ASSOCIATES DATED JUNE 5, 1972. CONTRACTOR IS TO BE AWARE THAT ADDITIONAL MODIFICATIONS HAVE BEEN MADE TO THE PLATFORM AREA THAT ARE NOT REFLECTED IN THESE EXISTING DRAWINGS. THESE CONTRACT DOCUMENTS REPRESENT THE PLATFORM AREA TO THE EXTENTS POSSIBLE BUT ARE NOT GUARANTEED TO BE COMPLETE OR CORRECT.
- X-2 THE CONTRACTOR IS RESPONSIBLE FOR VERIFYING ALL EXISTING INFORMATION IN THE FIELD AS REQUIRED FOR DEMOLITION AND MODIFICATIONS.

AS - BUILT

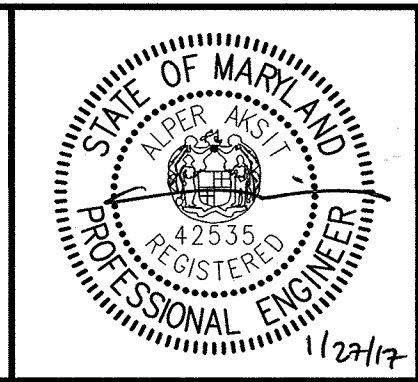
IMAGE# = 37232-TB
XREF# =

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND			
 DIRECTOR OF PUBLIC WORKS DATE: 2/3/17	 CHIEF BUREAU OF ENGINEERING DATE: 2/1/17	 CHIEF BUREAU OF UTILITIES DATE: 2/1/17	 CHIEF UTILITY DESIGN DIVISION DATE: 2/1/17



Hazen

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1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681



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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. 42535, EXPIRATION DATE 07/25/2018.
SIGNED: _____

DESIGNED	AGM				
DRAWN	SBS				
CHECKED	JCS				
PROJ. ENGR.	AA				
APPROVED		NO.	ISSUED FOR	DATE	BY

STRUCTURAL

GENERAL STRUCTURAL NOTE

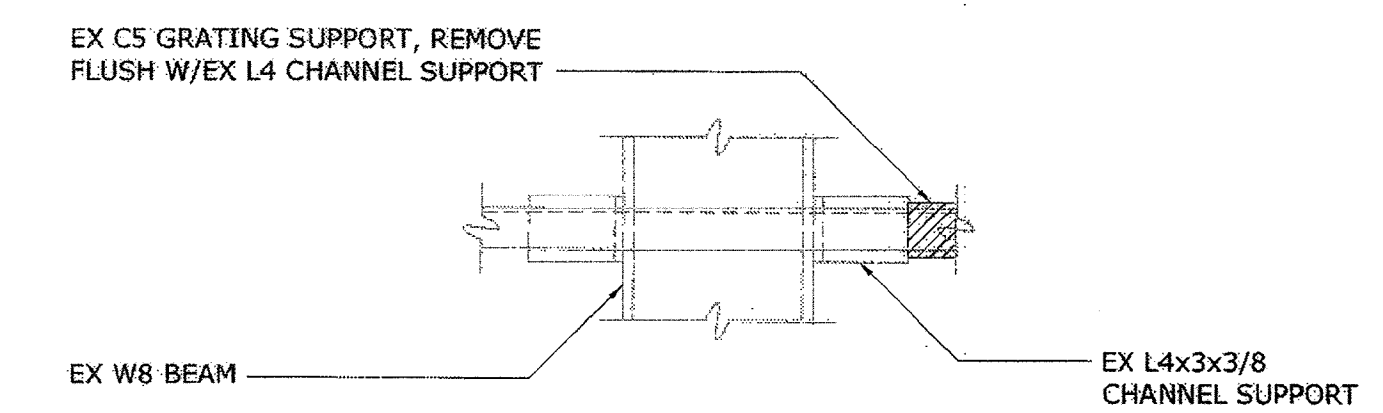
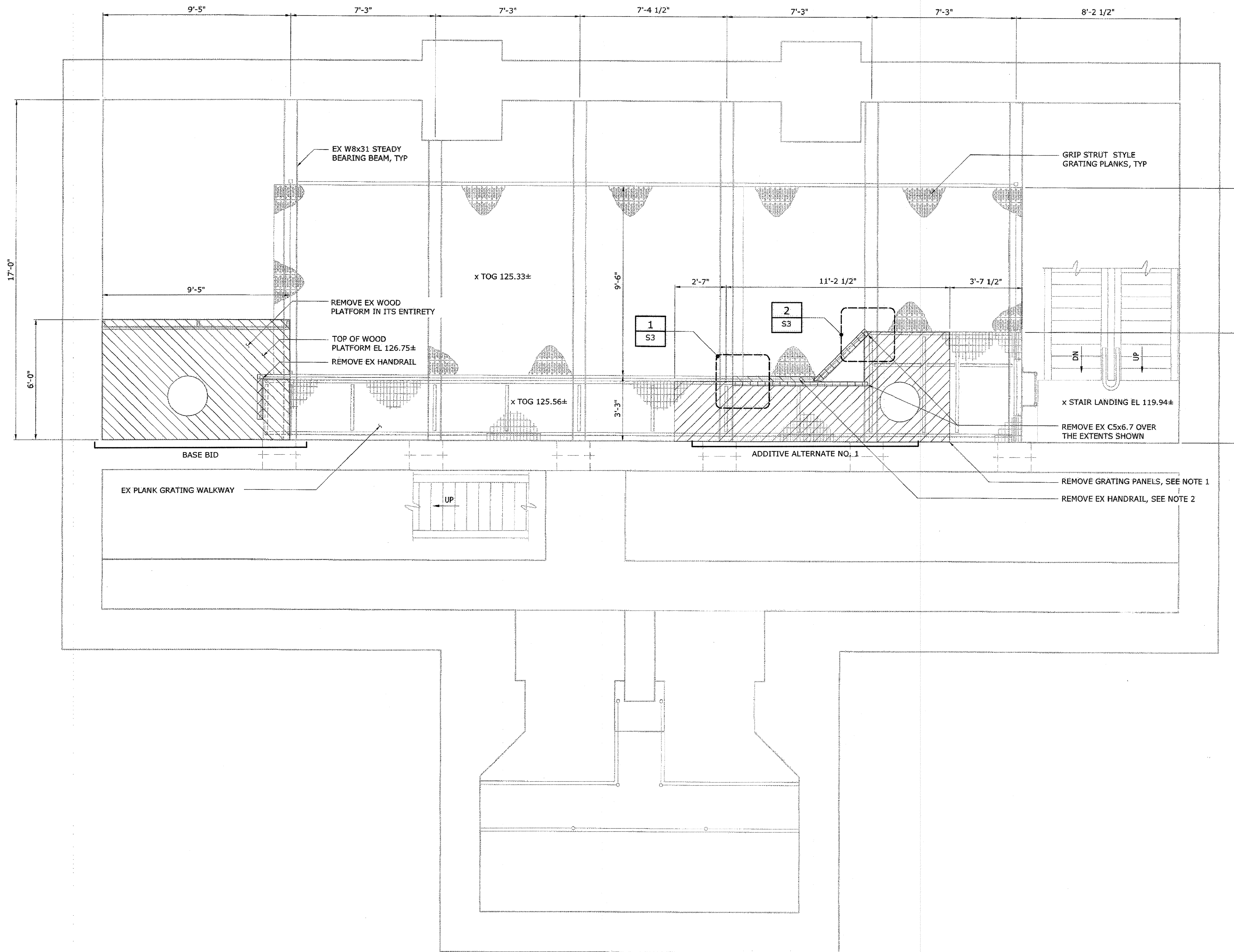
SHEET 2

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

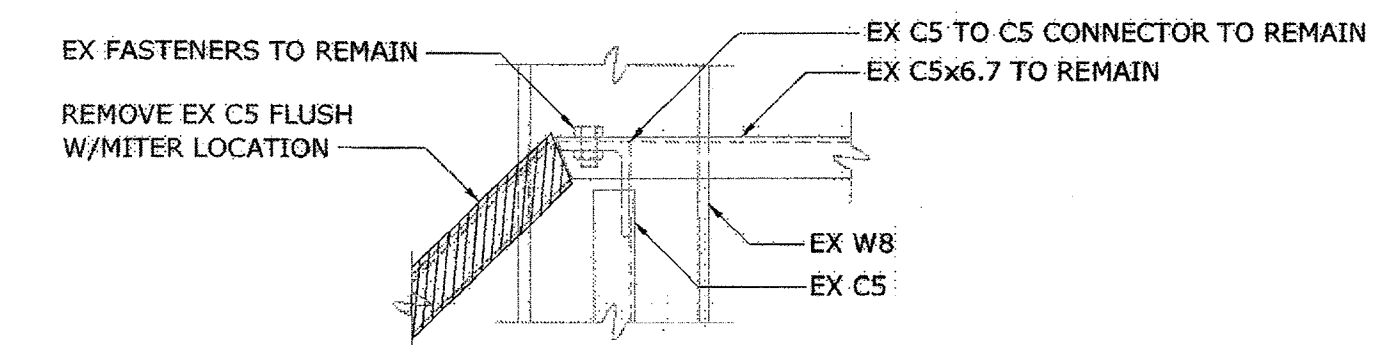
DATE	JAN 2017
DRAWING NUMBER	S2
SCALE AS SHOWN	
SHEET	10 OF 27

NOTES:

- EXTENTS OF GRATING TO BE REMOVED IS BASED ON THE LOCATIONS OF GRATING PANELS SEAMS IN THE AREA TO BE MODIFIED. CONTRACTOR TO VERIFY THE DIMENSIONS SHOWN. FOR THE PURPOSE OF DEMOLITION THE ENTIRE GRATING PANEL SHALL BE REMOVED AND THE DIMENSIONS SHOWN MODIFIED IF NECESSARY. EXISTING PANELS SHALL NOT BE FIELD CUT TO OBTAIN THE DIMENSIONS SHOWN.
- FINAL EXTENTS OF EXISTING HANDRAIL TO BE REMOVED SHALL BE VERIFIED IN THE FIELD TO ACCOMMODATE FINAL LAYOUT OF REVISED PLATFORM AREA.



DETAIL 1
1 1/2" = 1'-0"
S3



DETAIL 2
1 1/2" = 1'-0"
S3

INTERMEDIATE PLAN - DEMOLITION
3/8" = 1'-0"

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

3/7/19
DATE
3/7/19
DATE

2-26-19
DATE
2/26/19
DATE

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150; BALTIMORE, MD 21202
410-539-7681

PROFESSIONAL CERTIFICATION
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 42535, EXPIRATION DATE 5/7/2018.

DESIGNED	AGM				
DRAWN	SBS				
CHECKED	JCS				
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED		NO.	ISSUED FOR	DATE	BY

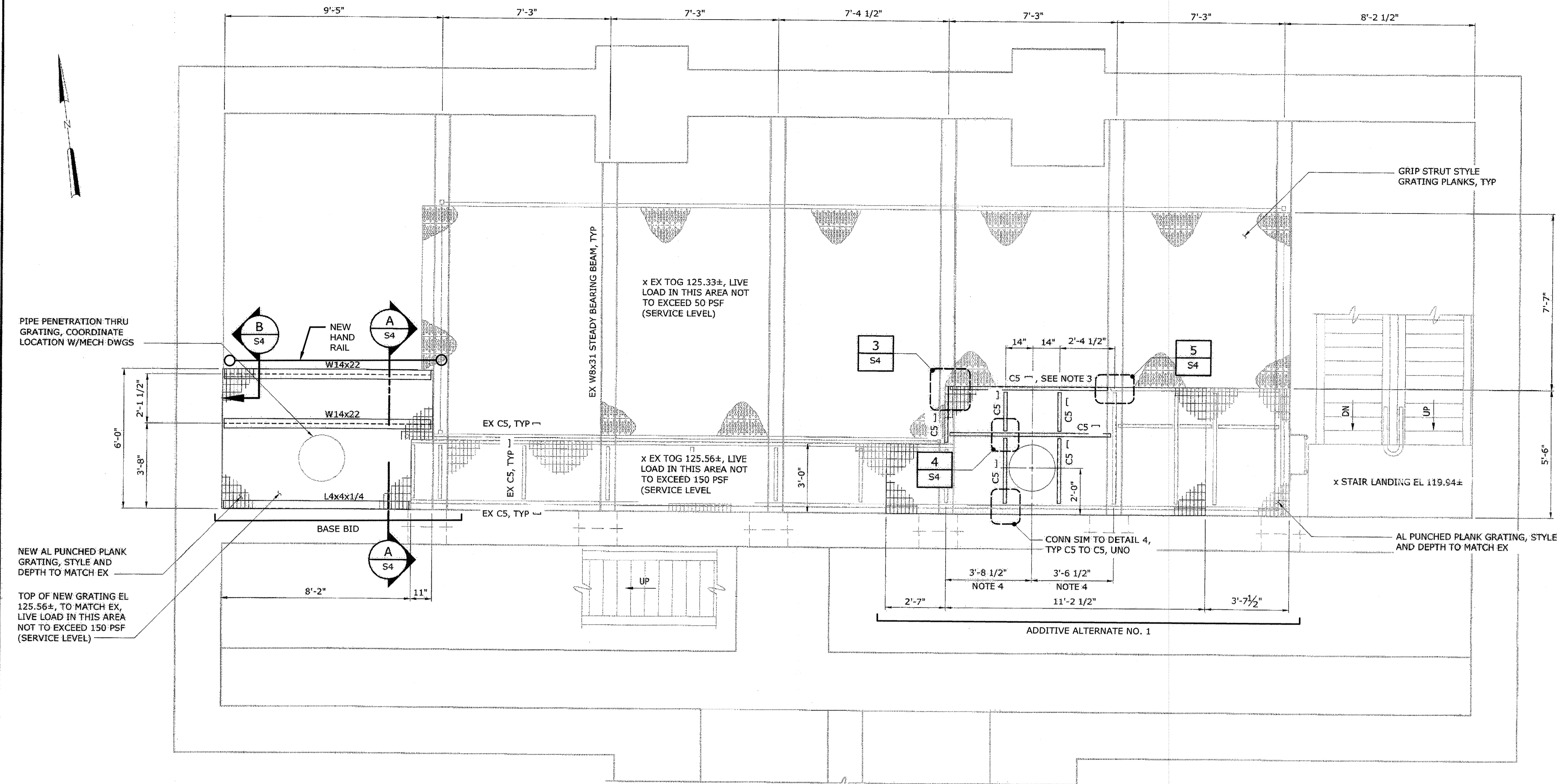
STRUCTURAL
DEMOLITION INTERMEDIATE
PLAN AND DETAILS

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

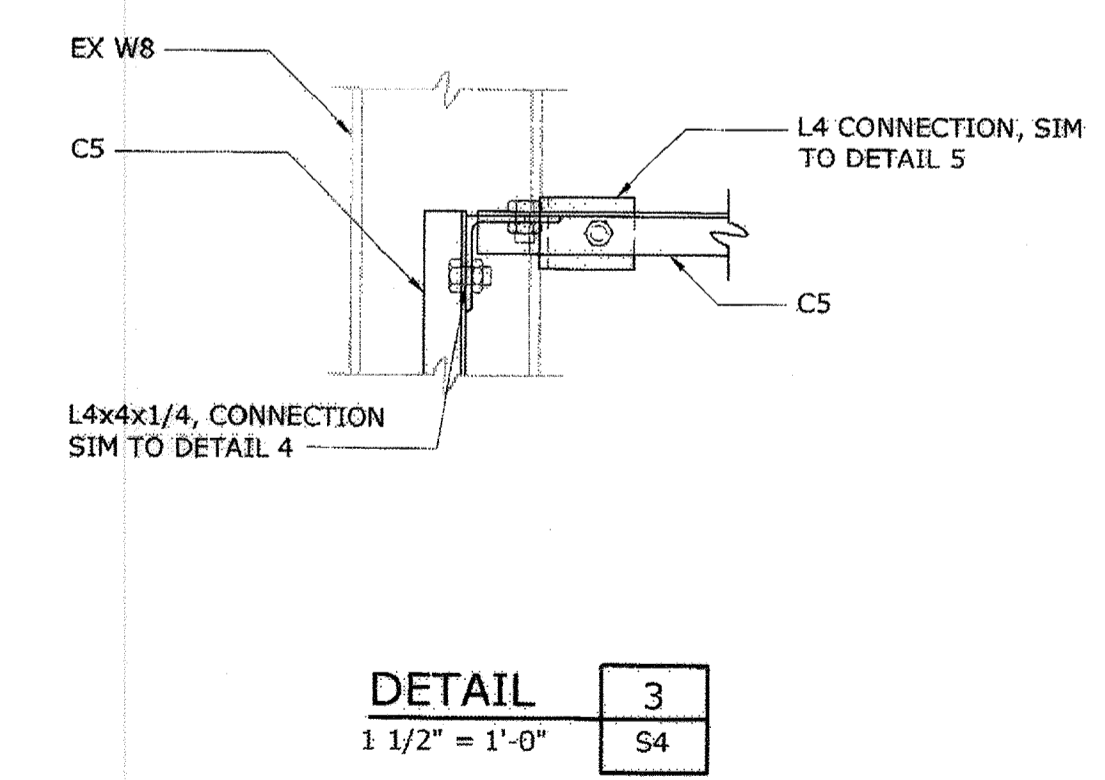
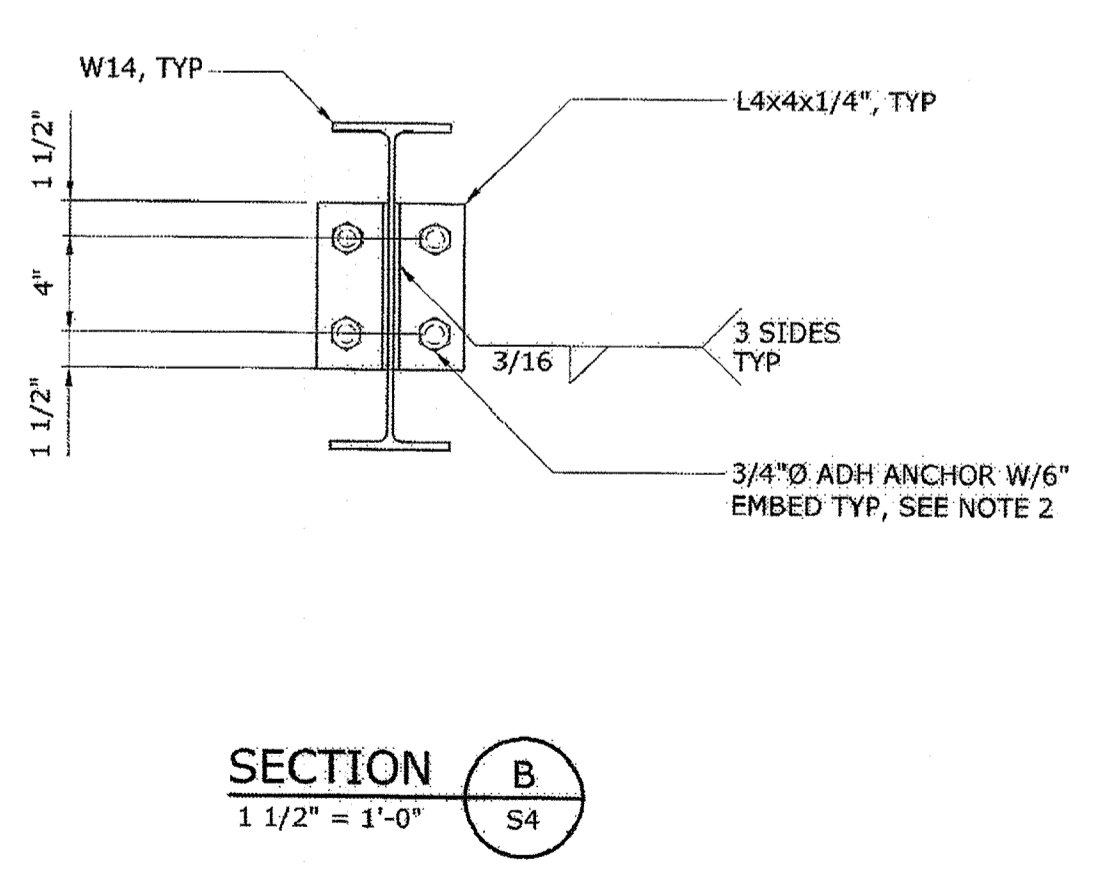
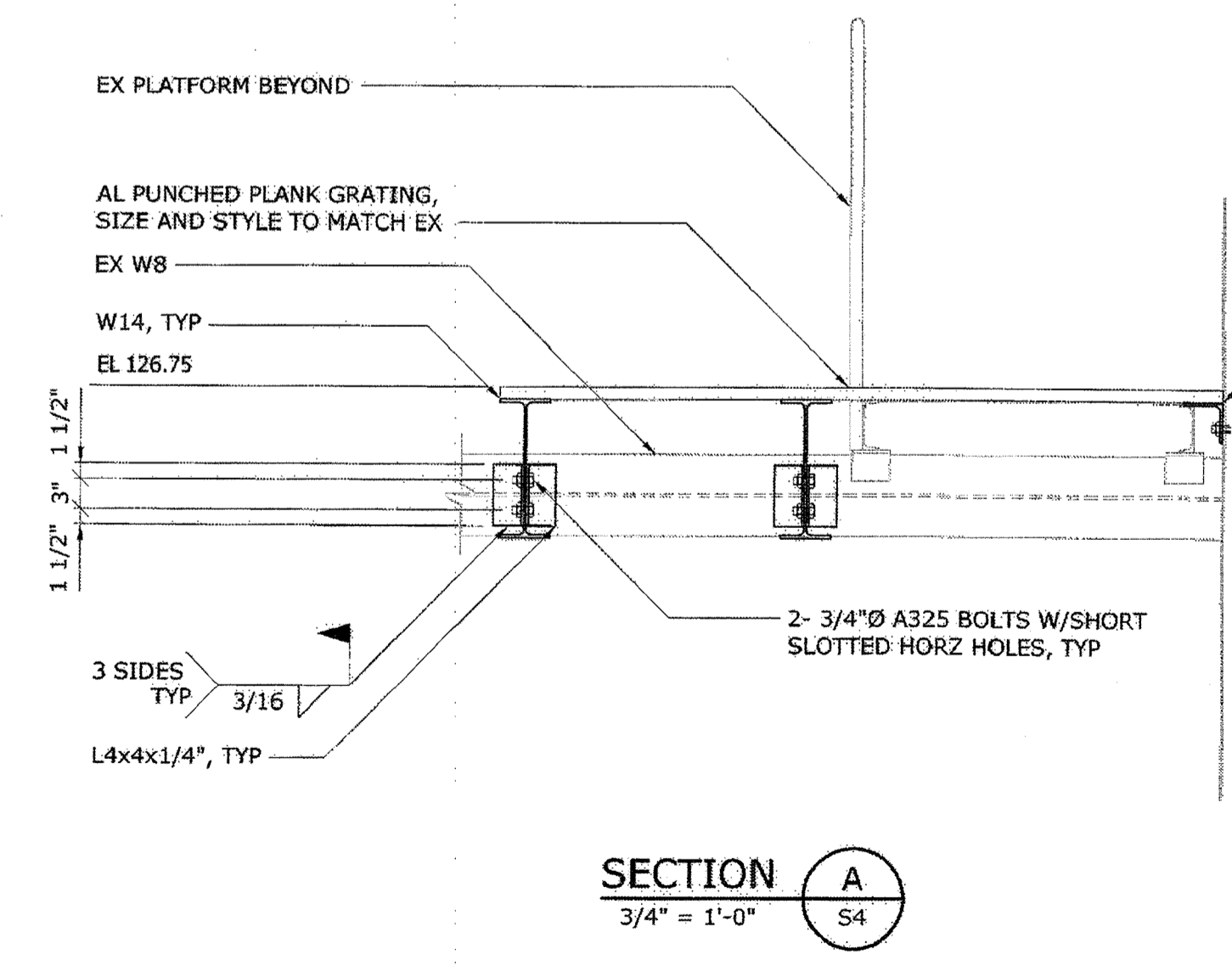
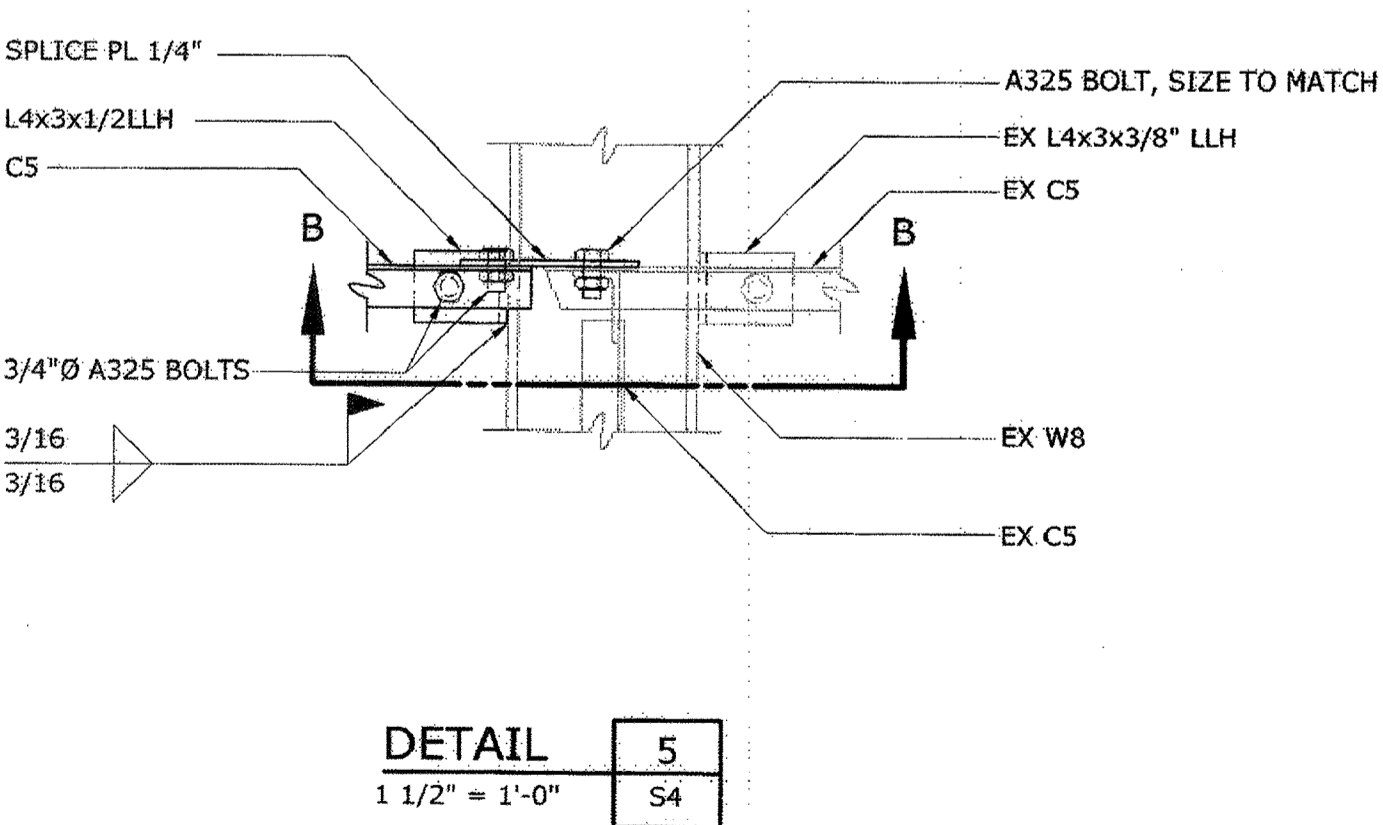
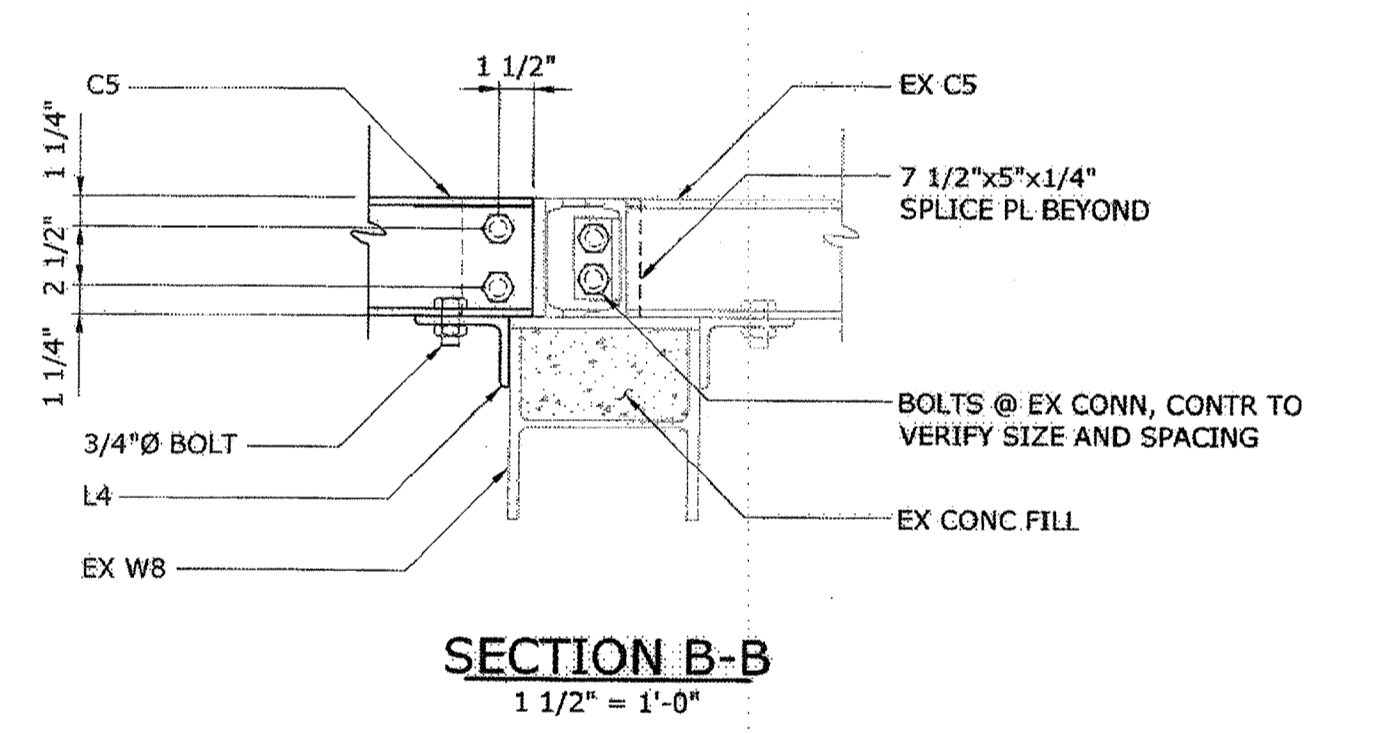
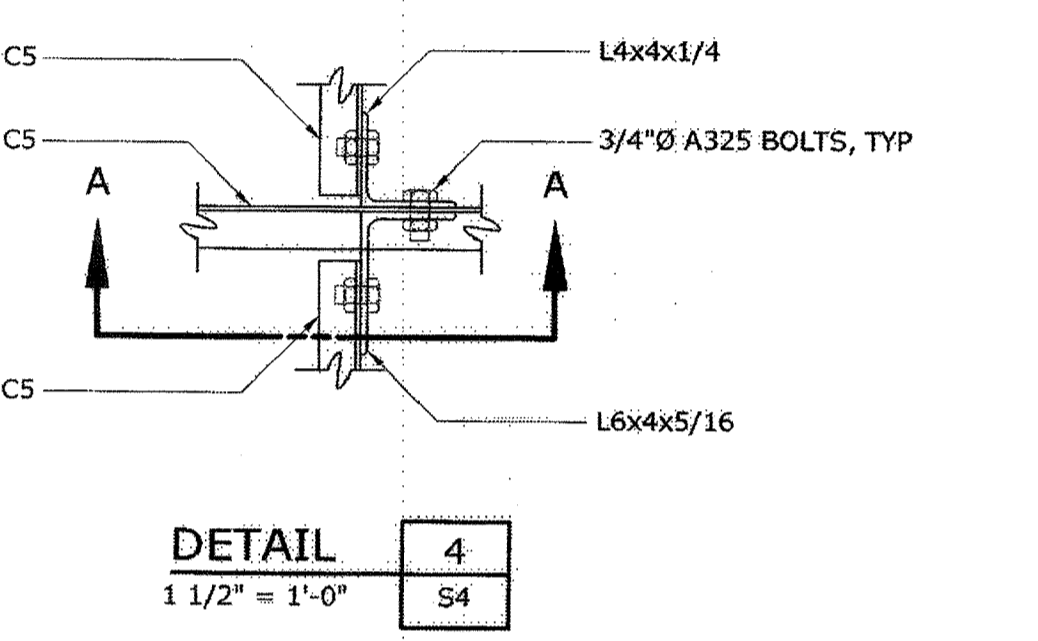
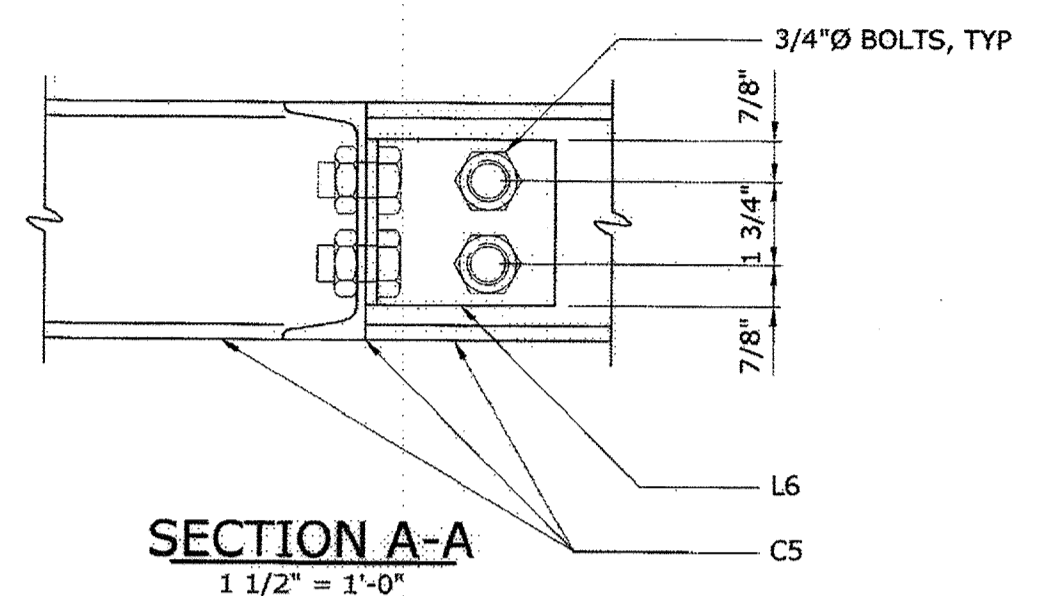
DATE JAN 2017
DRAWING NUMBER
S3
SCALE AS SHOWN
SHEET 11 OF 27

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 LastSaveBy: EPROSSER

- NOTES:**
- CONTRACTOR SHALL LOAD TEST AT LEAST 2 ANCHORS IN TENSION TO A LOAD OF 1500 LBS. ENGINEER TO DETERMINE ANCHORS TO BE TESTED ONCE ALL ANCHORS HAVE BEEN INSTALLED.
 - CONTRACTOR SHALL LOAD TEST AT LEAST 1 ANCHORS PER ANCHOR GROUP IN TENSION TO A LOAD OF 1500 LBS. ENGINEER TO DETERMINE ANCHORS TO BE TESTED ONCE ALL ANCHORS HAVE BEEN INSTALLED.
 - C5 DENOTES C5x6.7
 - COORDINATE DIMENSIONS WITH ACTUAL LOCATION OF RELOCATED RISER.



INTERMEDIATE PLAN - PROPOSED
3/8" = 1'-0"



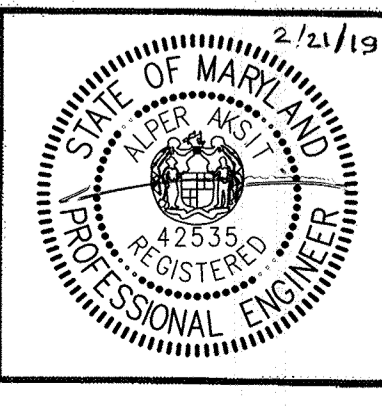
AS-BUILT REPLACEMENT SHEET 1/2019

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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

DIRECTOR OF PUBLIC WORKS: [Signature] DATE: 2/20/19
 CHIEF BUREAU OF ENGINEERING: [Signature] DATE: 2/20/19
 CHIEF BUREAU OF UTILITIES: [Signature] DATE: 2/20/19
 CHIEF UTILITY DESIGN DIVISION: [Signature] DATE: 2/20/19

Hazen
HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150; BALTIMORE, MD 21202
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PROFESSIONAL CERTIFICATION:
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SIGNED: [Signature]








DESIGNED	AGM				
DRAWN	SBS				
CHECKED	JCS				
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED		NO.	ISSUED FOR	DATE	BY

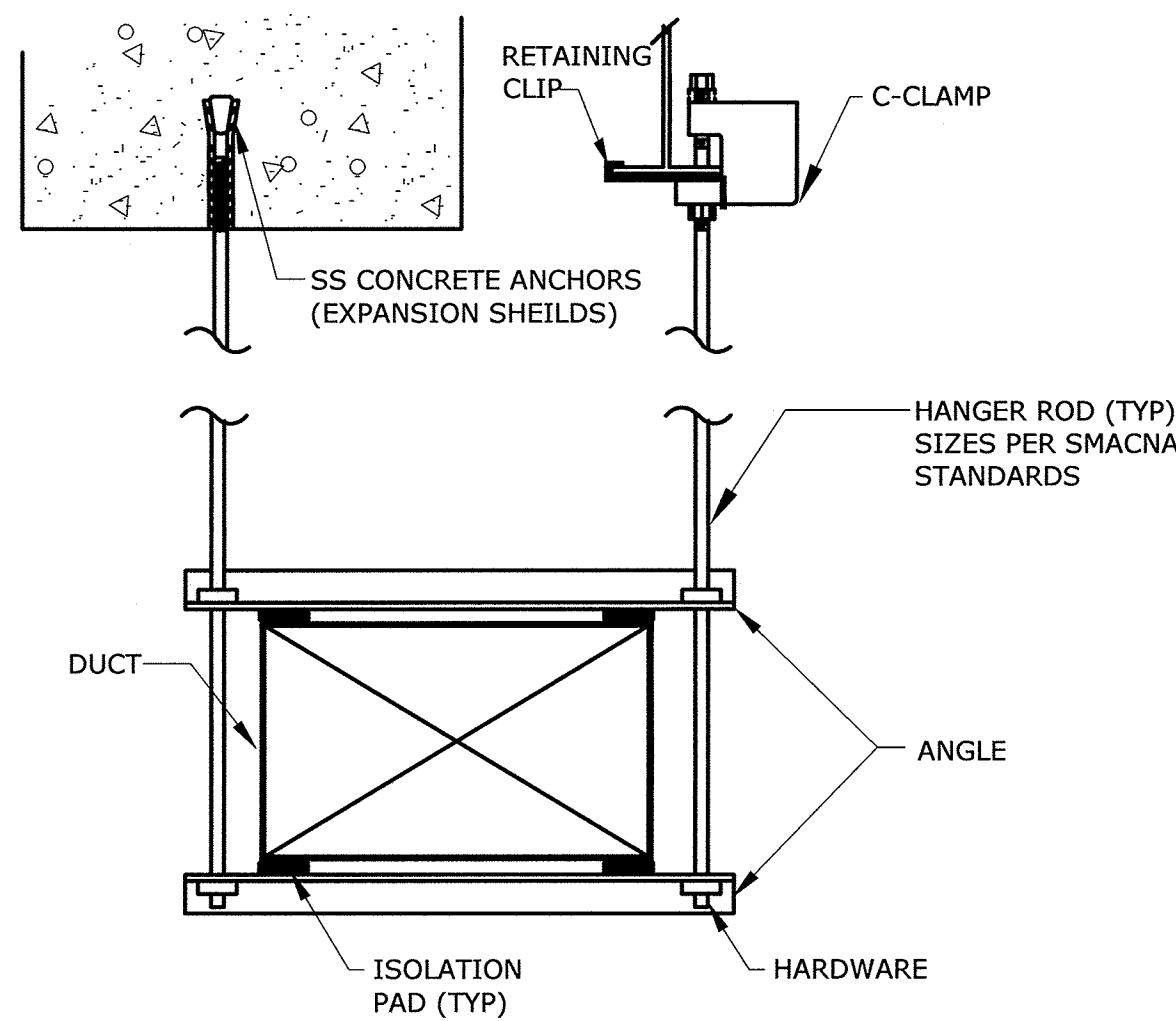
STRUCTURAL
PROPOSED INTERMEDIATE PLAN, SECTIONS & DETAILS

INFLUENT PUMPING STATION PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	S4
SCALE AS SHOWN	
SHEET	12 OF 27

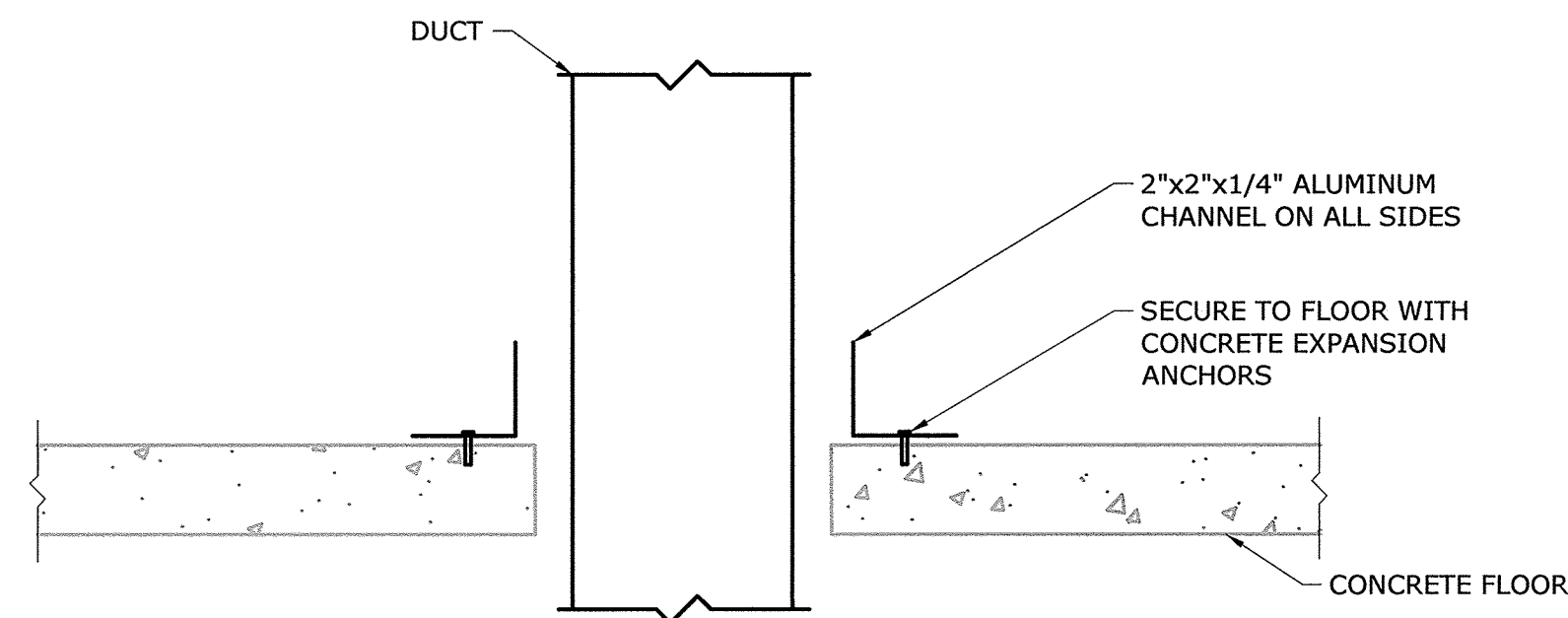
DUCT SYMBOLS

-  SUPPLY AIR DUCT SECTION-UP
-  SUPPLY AIR DUCT SECTION-DOWN
-  RETURN AIR DUCT SECTION-UP
-  RETURN AIR DUCT SECTION-DOWN
-  EXHAUST AIR DUCT SECTION-UP
-  EXHAUST AIR DUCT SECTION-DOWN
-  MITERED ELBOW WITH TURNING VANES

















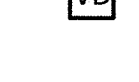





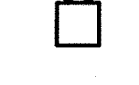


THREADED ROD, ANGLE, AND HARDWARE MATERIAL SHALL MATCH DUCT MATERIAL.

DUCT HANGING DETAIL
NOT TO SCALE



DUCT PENETRATION THROUGH FLOOR
NOT TO SCALE

CONTROL SYMBOLS

-  SMOKE DETECTOR
-  THERMOSTAT
-  TEMPERATURE SENSOR
-  SURFACE TEMPERATURE SENSOR
-  TEMPERATURE AND HUMIDITY SENSOR
-  HAND-OFF-AUTO
-  FLOW SENSOR
-  KEY SWITCH
-  LIGHT SWITCH
-  PUSH BUTTON
-  AIRFLOW TEMPERATURE SENSOR
-  LOUVER/DAMPER
-  MOTOR OPERATED DAMPER
-  BACKDRAFT DAMPER
-  VOLUME DAMPER
-  PANEL LAMP
-  COUNTDOWN TIMER
-  STROBE
-  HORN
-  INSTRUMENT TAP
-  DIAL
-  LIGHT SWITCH
-  FAN

ABBREVIATIONS

- AFF ABOVE FLOOR FINISH
- AI ANALOG INPUT
- AL ALUMINUM
- AO ANALOG OUTPUT
- BD BACKDRAFT DAMPER
- CFM CUBIC FEET PER MINUTE
- CRAC CONTROL ROOM AIR CONDITIONING
- DB DRY BULB
- DI DISCRETE INPUT
- DN DOWN
- DO DISCRETE OUTPUT
- DWG DRAWING
- EF EXHAUST FAN
- EL ELEVATION
- EQPT EQUIPMENT
- EX EXISTING
- FA FREE AREA
- FACP FIRE ALARM CONTROL PANEL
- FRP FIBERGLASS REINFORCED PLASTIC
- FS FLOW SENSOR
- GALV GALVANIZED
- H HEIGHT
- HMI HUMAN MACHINE INTERFACE
- HP HORSEPOWER
- KW KILOWATT
- L LENGTH
- LBS POUNDS
- LS LIGHT SWITCH
- M MOTOR
- MBH THOUSAND BTU PER HOUR
- MD MOTORIZED DAMPER
- MECH MECHANICAL
- MTD MOUNTED
- OPD OVERCURRENT PROTECTION DEVICE
- PD PRESSURE DIFFERENTIAL
- RF RECIRCULATION FAN
- SD SMOKE DAMPER
- SF SUPPLY FAN
- S.P. STATIC PRESSURE
- TH THERMOSTAT
- TYP TYPICAL
- UH UNIT HEATER
- VEL VELOCITY
- WSA WIRE SIZE AMPS

GENERAL NOTES

1. THE SYMBOLS AND ABBREVIATIONS LIST ON THIS SHEET IS A COMPREHENSIVE STANDARD GUIDE INTENDED FOR GENERAL USE ON ALL PROJECTS. THEREFORE NOT ALL THE SYMBOLS AND ABBREVIATIONS CONTAINED IN THIS LIST ARE NECESSARILY USED ON THIS PARTICULAR PROJECT AND SHOULD BE USED FOR CLARIFICATION ONLY.
2. ALL DUCT DIMENSIONS ARE CLEAR DIMENSIONS TO INSIDE OF DUCT. DIMENSIONS TO DUCTS FROM FLOOR OR WALL SHALL BE TO THE OUTSIDE OF DUCT/INSULATION. WHERE INTERNAL INSULATION IS REQUIRED THE DUCT SIZE SHALL BE INCREASED TO GIVE CLEAR INSIDE DIMENSIONS AS NOTED ON THE DRAWINGS.
3. EQUIPMENT SIZES AND LOCATIONS ARE APPROXIMATE. ACTUAL DIMENSIONS TO BE DETERMINED BY EQUIPMENT FURNISHED. COORDINATE HVAC WORK WITH THE WORK OF ALL OTHER TRADES.
4. FINAL OPENING DIMENSIONS, CONCRETE PAD SIZES, AND LOCATIONS MUST BE COORDINATED DURING CONSTRUCTION WITH APPROVED EQUIPMENT.
5. FINAL SIZES OF FLOOR OPENINGS, DUCT PLENUMS, TRANSITIONS AND PIPING CONNECTIONS TO ALL EQUIPMENT SHALL BE DETERMINED BY EQUIPMENT FURNISHED.
6. THE DRAWINGS ARE SCHEMATIC IN NATURE AND SHOW INTENDED GENERAL LOCATION OF HVAC EQUIPMENT AND SYSTEMS. NOT ALL OFFSETS AND REQUIRED FITTINGS FOR ACTUAL FIELD INSTALLATION ARE INTENDED TO BE SHOWN FOR INSTALLATION OF SYSTEMS IN THE SPACE AVAILABLE IN CONSIDERATION OF WORK OF OTHER TRADES AND FIELD CONDITIONS. CONTRACTOR SHALL PROVIDE ADDITIONAL OFFSETS IN DUCTWORK AND PIPING AS REQUIRED TO AVOID SUCH INTERFERENCES OR FIELD CONDITIONS AT NO ADDITIONAL COST TO THE ORIGINAL CONTRACT AMOUNT.
7. FIRST FIGURE OF DUCT SIZE INDICATES DIMENSION OF FACE SHOWN OR INDICATED OR WIDTH OF DUCT IN PLAN VIEW.
8. COORDINATE THE REQUIREMENTS FOR HVAC OPENINGS AND SLEEVES IN BUILDING ELEMENTS WITH THE GC.
9. REFER TO ELECTRICAL DRAWINGS OR SPECIFICATIONS FOR INTERLOCKING WIRING REQUIREMENTS.
10. CONTRACTOR SHALL COORDINATE DUCTWORK INSTALLATION WITH OTHER TRADES SO THAT THE DUCTWORK IS INSTALLED BEFORE THE PIPING, LIGHTING AND ELECTRICAL CONDUIT.
11. PROVIDE ADEQUATE SUPPORT, PER THE MANUFACTURER'S RECOMMENDATIONS, FOR ALL HVAC EQUIPMENT.
12. CONTRACTOR SHALL BE RESPONSIBLE FOR CHECKING ELECTRICAL RATINGS FROM CERTIFIED DRAWINGS OF EQUIPMENT AND SHALL MAKE ANY BRANCH CIRCUIT DISTRIBUTION MODIFICATION REQUIREMENTS WITHOUT ANY ADDITIONAL COST TO OWNER. THE CONTRACTOR SHALL SUBMIT A SCHEDULE OF SUCH CHANGES FOR APPROVAL BY ENGINEER.
13. WHEREVER THE REQUIREMENTS AND REGULATIONS OF STATE, FEDERAL AND LOCAL AUTHORITIES HAVING JURISDICTION DIFFER FROM THE DRAWINGS OR SPECIFICATIONS, THEY SHALL TAKE PRECEDENCE AND SHALL BE MADE PART OF THE CONTRACT (EXCEPT WHERE THE DRAWINGS OR SPECIFICATIONS ARE MORE STRINGENT).
14. DUCTWORK AND PLENUM TO LOUVERS SHALL BE CONNECTED TO FRAMED OPENINGS AND, SEALED AIRTIGHT AND WEATHER RESISTANT.
15. THERMOSTATS, SENSORS, AND/OR CONTROL PANEL LOCATIONS SHOWN ARE APPROXIMATE AND SHALL BE COORDINATED TO SUIT FIELD CONDITIONS.
16. INSTALL WALL MTD SENSORS, CONTROLS AND THERMOSTATS 4'-0" AFF UNLESS OTHERWISE NOTED. ALIGN WITH OTHER NEARBY ITEMS SUCH AS LIGHT SWITCHES. DO NOT INSTALL CLOSER THAN 6-INCHES FROM EDGE OF DOOR FRAME OR CORNER OF WALL AS SHOWN ON ARCH PLANS. WHERE CONFLICTS MAY OCCUR WITH ITEMS SUCH AS LIGHT SWITCHES, MOUNT THE SENSOR OR CONTROL DEVICE 4'-6" AFF CENTERED ABOVE THE LIGHT SWITCH.
17. PROVIDE ADEQUATE MEANS OF ACCESS CLEARANCE FOR ALL HVAC/MECHANICAL EQUIPMENT AND SYSTEMS THAT REQUIRE ACCESS FOR PROPER OPERATION, MAINTENANCE AND REPAIR PER RECOMMENDED MANUFACTURER CLEARANCES. PROVIDE ACCESS DOORS WHERE NECESSARY IN FINISHED WALLS OR DRYWALL CEILINGS FOR ACCESS TO VALVES, DAMPERS, OR CONTROL DEVICES.
18. COORDINATE THE REQUIREMENTS OF HVAC HANGERS AND SUPPORTS W/ OTHER PRIME CONTRACTORS PROVIDING STRUCTURAL AND/OR ARCHITECTURAL BUILDING ELEMENTS WHICH HVAC SUPPORTS SHALL INTERFACE.
19. HVAC CONTRACTOR SHALL PROVIDE ALL FIRESTOPPING AND PIPE SLEEVES FOR ALL PIPE AND DUCT PENETRATIONS THRU FIRE RATED BUILDING ASSEMBLIES.
20. CONTRACTOR SHALL OBTAIN AND PAY ALL FEES RELATED TO PERMITTING, AND INSPECTIONS.
21. FOR ADDITIONAL REQUIREMENTS REFER TO SPECIFICATIONS.

AS - BUILT

20170126 1:04P 0:\32232-BAL\32232-005\Drawings\HVAC\H1.dwg LastSaveBy:EPROSSER

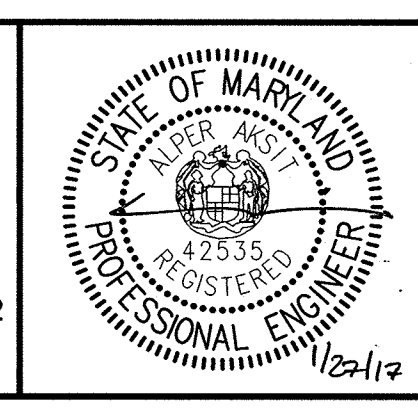
DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Jan. de 2/3/17 *Momas & Keller* 2/10/17
DIRECTOR OF PUBLIC WORKS DATE CHIEF BUREAU OF ENGINEERING DATE

Steve C... 2/10/17 *D...* 2/10/17
CHIEF BUREAU OF UTILITIES DATE CHIEF UTILITY DESIGN DIVISION DATE

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7881



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. 42535, EXPIRATION DATE 07/25/2018.

SIGNED: _____

DESIGNED	AJC				
DRAWN	MJB				
CHECKED	NB				
PROJ. ENGR.	AA				
APPROVED	NO.	ISSUED FOR	DATE	BY	

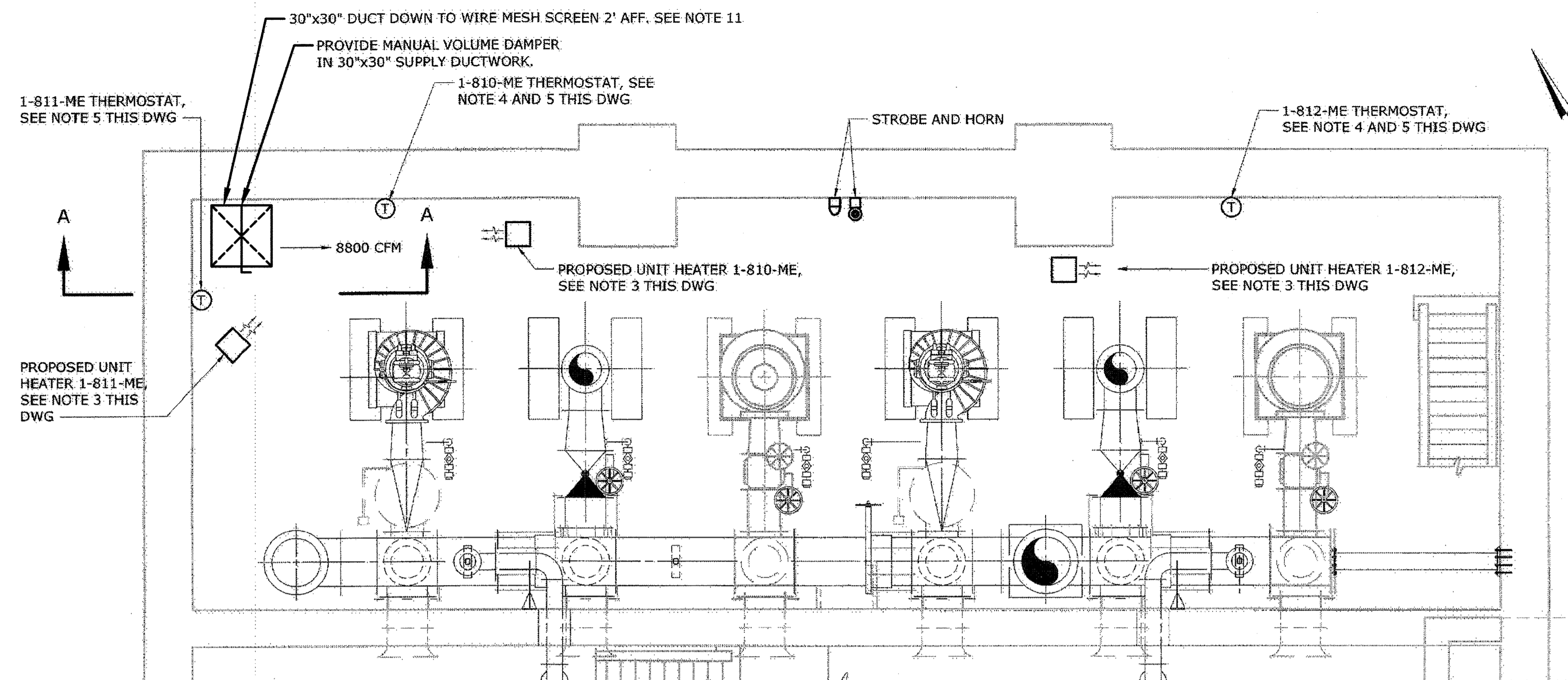
HVAC

GENERAL NOTES,
ABBREVIATIONS, AND DETAILS

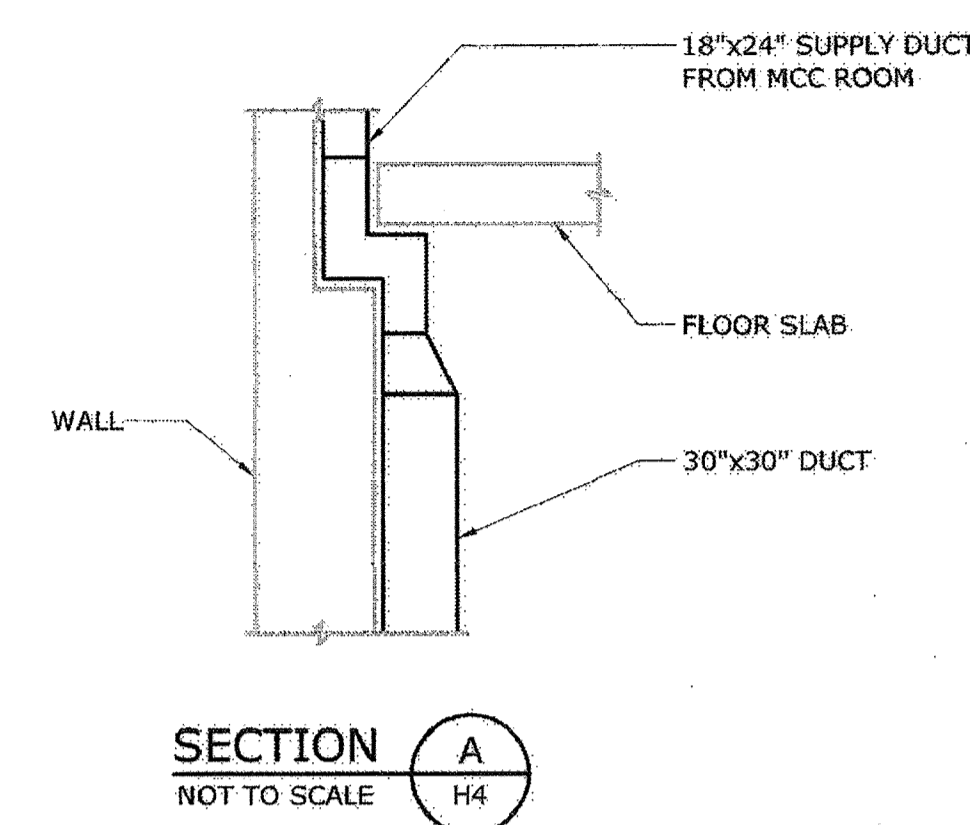
INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991

6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	H1
SCALE	AS SHOWN
SHEET	13 OF 27

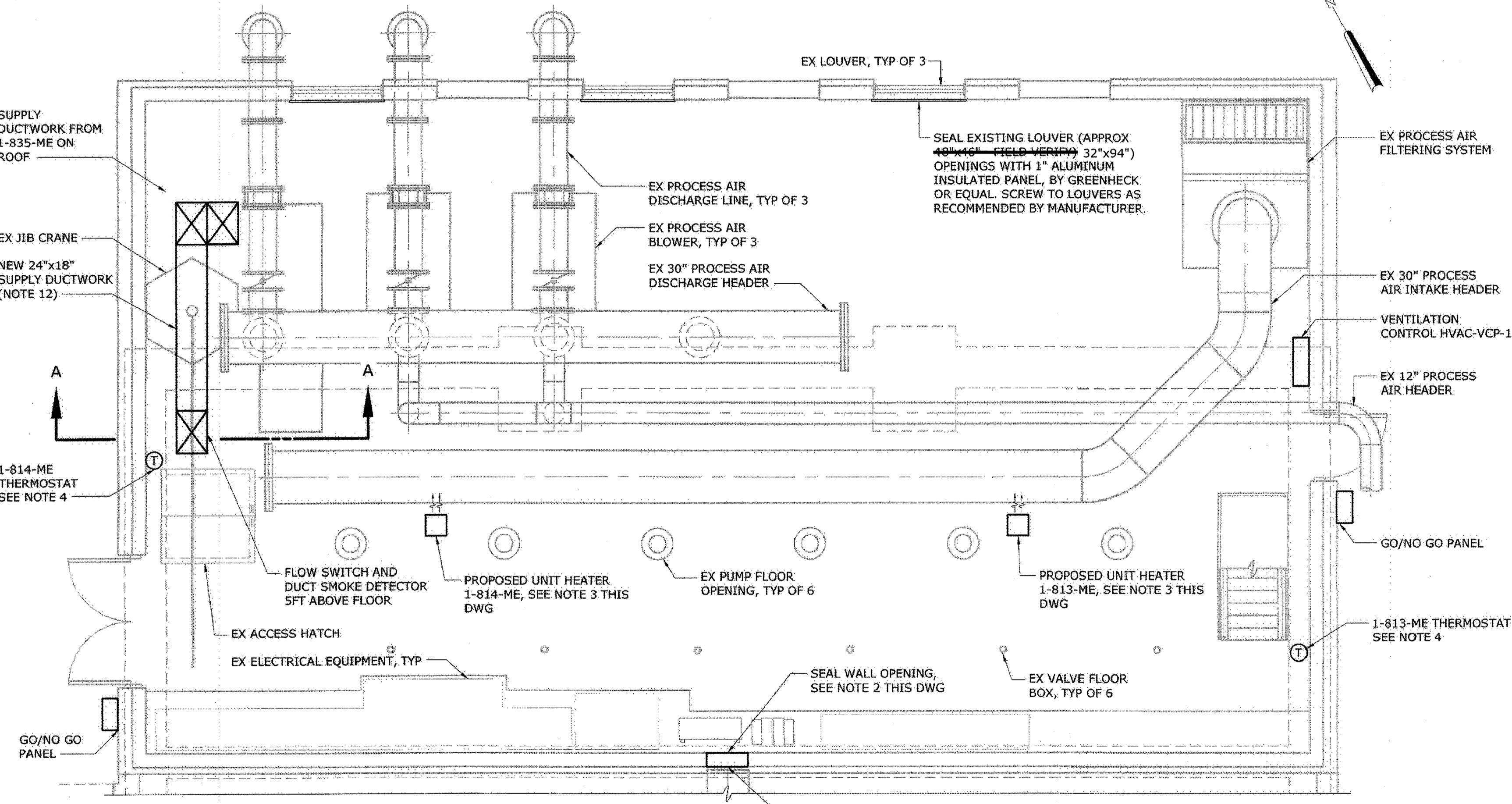


PUMP ROOM PROPOSED PLAN
1/4" = 1'-0"

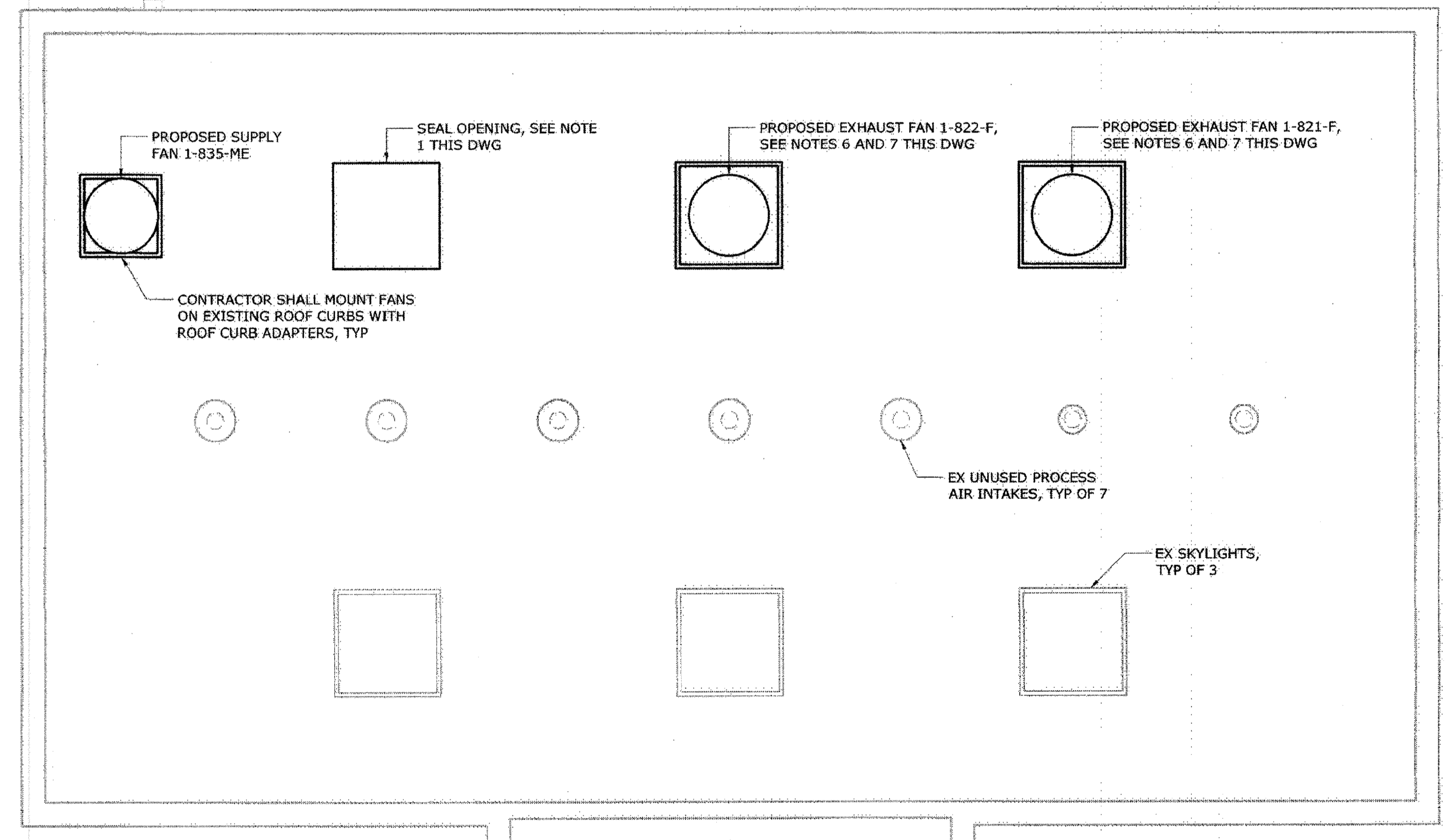


SECTION A
NOT TO SCALE

- NOTES:**
1. PROVIDE INSULATED CURB COVER, APPROXIMATELY 55"x55", FIELD VERIFY. CURB COVER SHALL SUPPORT 50 PSI MINIMUM EXPOSED METALS SHALL BE 18GA STEEL MINIMUM WITH PLYWOOD SUBSTRATE, MINIMUM 3/4". INSTALL IN ACCORDANCE WITH MANUFACTURER'S REQUIREMENTS. PROVIDE COVER BY PATE ROOF PRODUCTS INC, ROOF CURB SYSTEMS OR EQUAL.
 2. FILL 12" CMU WALL OPENING (APPROXIMATELY 24"x24") WITH MATERIAL TO MATCH EXISTING. MATCH WIDTH AND ALIGN MORTAR JOINTS. USE TYPE N MORTAR.
 3. UNIT HEATERS IN THE LOWER LEVEL (1-810-ME, 1-811-ME, 1-812-ME) SHALL BE MOUNTED 10 FEET AFF. UNIT HEATERS IN THE UPPER LEVEL (1-813-ME, 1-814-ME) SHALL BE MOUNTED 8 FEET AFF.
 4. THERMOSTATS SHALL BE MOUNTED 4 FEET AFF.
 5. THERMOSTATS FOR 1-810-ME AND 1-811-ME SHALL BE LOCATED WITHIN 4 FEET HORIZONTALLY OF THEIR RESPECTIVE UNIT HEATERS.
 6. PROVIDE FLOW SWITCHES AT EXHAUST FAN DUCTS. ATTACH 4 FT OF INTAKE DUCT TO FAN WITH VOLUME DAMPER.
 7. PROVIDE SMOKE DETECTORS AT EXHAUST FAN DUCTS.
 8. REFER TO DWG H2 FOR VENTILATION, INSTRUMENTATION, AND CONTROL PANEL DETAILS.
 9. MCC AND PUMP ROOM WILL BE UNCLASSIFIED PER NFPA 820 WITH CONTINUOUS VENTILATION AT 6 AIR CHANGES PER HOUR.
 10. ALL VENTILATION WORK TO BE INCLUDED IN BASE BID.
 11. TRANSITION EXISTING 24"x18" DUCT TO NEW 30"x30" DUCT BELOW CEILING OR PUMP ROOM.
 12. NEW 24"x18" SUPPLY DUCTWORK IN MCC ROOM SHALL REPLACE EXISTING 24"x18" DUCTWORK. NEW DUCT ALIGNMENT SHALL MATCH EXISTING DUCTWORK. CONTRACTOR SHALL COORDINATE NEW DUCTWORK INSTALLATION TO AVOID INTERFERENCE WITH EXISTING CRANE OPERATION.



MCC ROOM PROPOSED PLAN
1/4" = 1'-0"



ROOF LEVEL PROPOSED PLAN
1/4" = 1'-0"

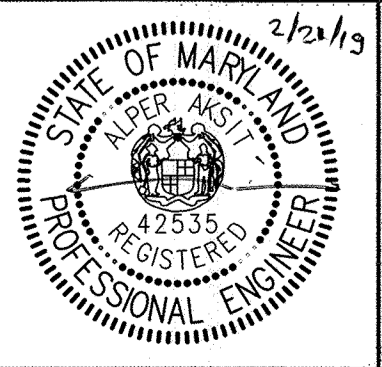
AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *George J. ...* 3/6/19
 Chief Bureau of Engineering: *Thomas E. ...* 2-20-19
 Chief Utility Design Division: *...* 2/20/19

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-639-7881



PROFESSIONAL CERTIFICATION:
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DESIGNED	AJC				
DRAWN	MJB				
CHECKED	NB				
PROF. ENGR	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED		NO.	ISSUED FOR	DATE	BY

INFLUENT PUMPING STATION HVAC

PROPOSED PLANS

INFLUENT PUMPING STATION PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	H4
SCALE	AS SHOWN
SHEET	16 OF 27

LIGHTING:

- X DENOTES FIXTURE TYPE (TYP.)
SEE SPECIFICATION 16500 FOR FIXTURE SCHEDULE
DENOTES CIRCUIT NUMBER (TYP.)
- RECTANGULAR FIXTURE
- CEILING-MOUNTED FIXTURE
- WALL-MOUNTED FIXTURE
- EMERGENCY WALL-MOUNTED FIXTURE:
LEFT: STANDARD/RIGHT: REMOTE-HEAD
- CEILING-MOUNTED EXIT SIGN:
SHADED PORTION DENOTES SIGN FACE
- WALL-MOUNTED EXIT SIGN:
SHADED PORTION DENOTES SIGN FACE
- POLE-MOUNTED FIXTURE
- PHOTOCELL
- CEILING MOUNTED OCCUPANCY SENSOR:
NUMBER DENOTES TYPE
- WALL MOUNTED OCCUPANCY SENSOR:
NUMBER DENOTES TYPE

RECEPTACLES:

- X DENOTES RECEPTACLE TYPE (TYP.):
GFCI DENOTES GROUND FAULT CIRCUIT INTERRUPT
UPS DENOTES UNINTERRUPTIBLE POWER SUPPLY
WPCR DENOTES WEATHERPROOF CORROSION RESISTANT
DENOTES CIRCUIT NUMBER (TYP.)
- DUPLEX RECEPTACLE
- SIMPLEX RECEPTACLE
- QUADRUPLEX RECEPTACLE
- MULTI-OUTLET RECEPTACLE SIMPLEX
- MULTI-OUTLET RECEPTACLE DUPLEX
- 240 VOLT RECEPTACLE
- SPECIAL PURPOSE OUTLET

PANELS AND BOXES

- JUNCTION BOX
- PULL BOX
- CONTROL PANEL

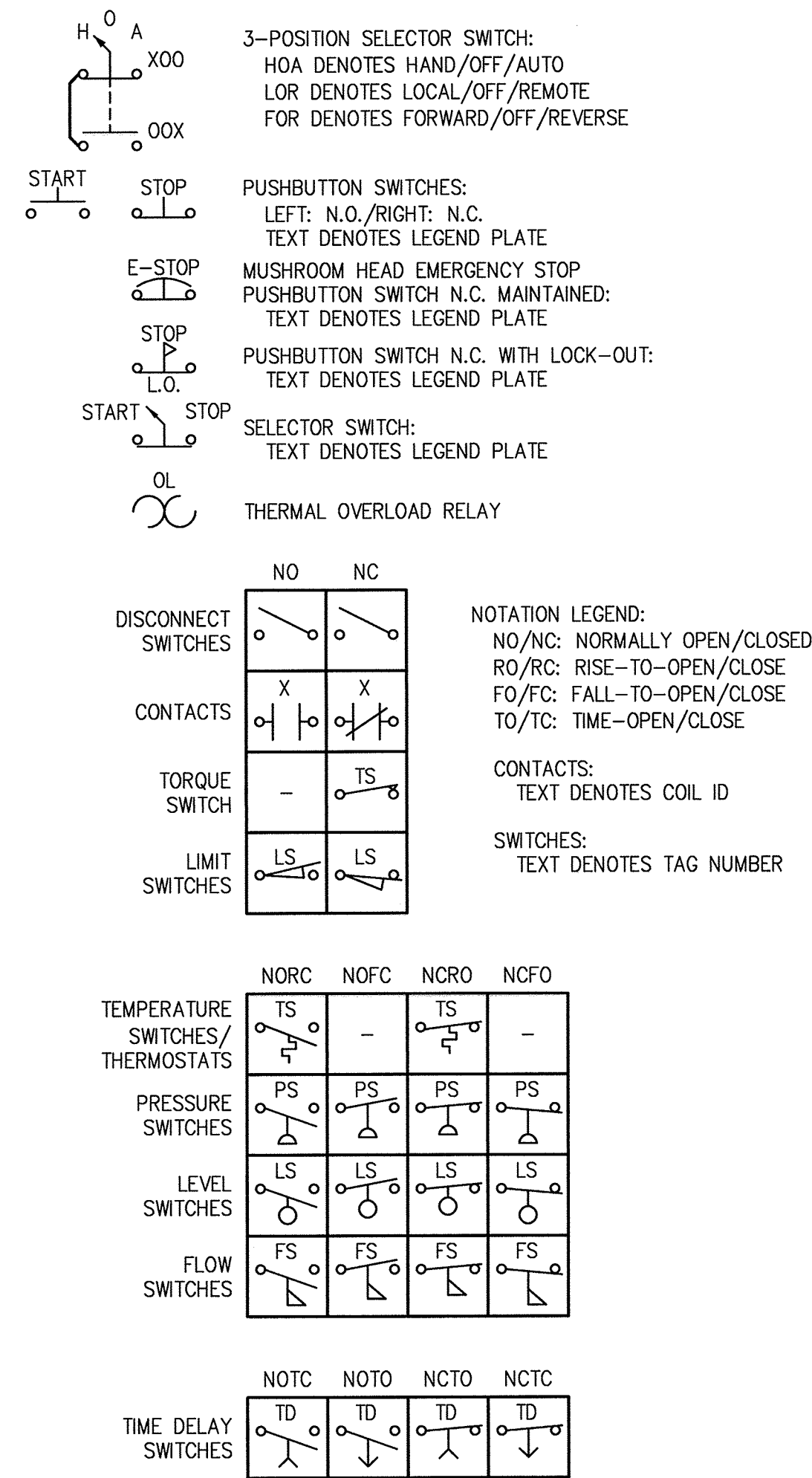
HVAC AND FIRE ALARM

- FIRE ALARM CONTROL PANEL
- FIRE ALARM ANNUNCIATOR PANEL
- FIRE ALARM PULL STATION
- FIRE ALARM INDICATOR:
X DENOTES ALERT TYPE (TYP.):
A DENOTES AUDIBLE
V DENOTES VISIBLE (# DENOTES STROBE INTENSITY)
- FIRE ALARM INDICATOR MOUNTED
ABOVE A FIRE ALARM PULL STATION
- DUCT DETECTOR
- SMOKE DETECTOR:
X DENOTES TYPE:
Z DENOTES IONIZATION
P DENOTES PHOTOELECTRIC
T DENOTES THERMAL
- HEAT DETECTOR
- THERMOSTAT
- AMBIENT TEMPERATURE TRANSMITTER

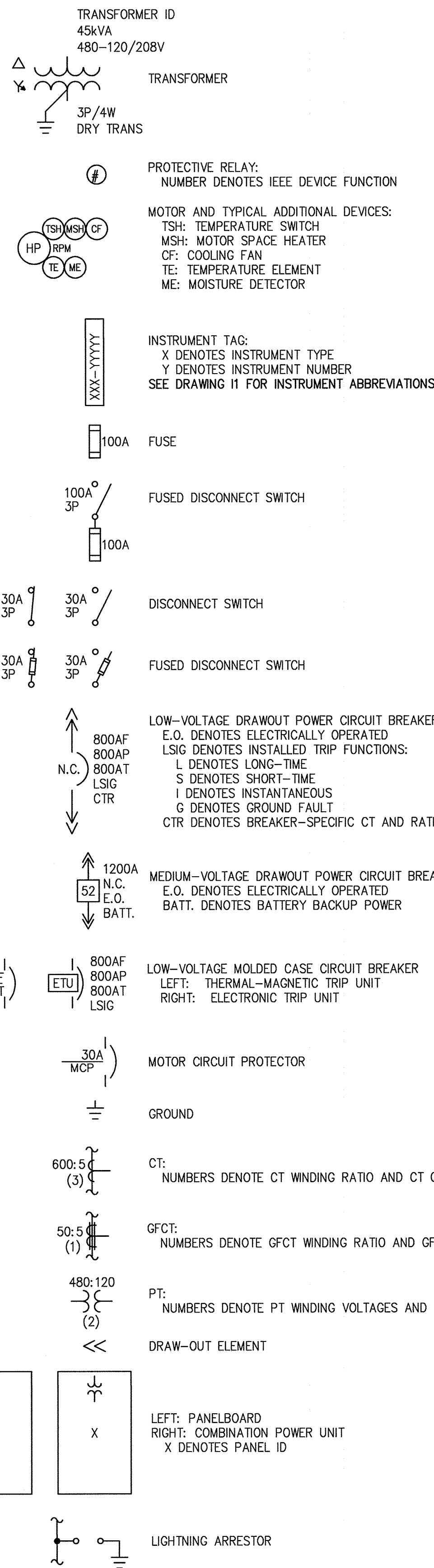
EQUIPMENT/DEVICE LOCATION SYMBOLS

- LOCATED IN MCC
- LOCATED IN STAND-ALONE MOTOR STARTER/CONTROLLER
- LOCATED IN FIELD
- LOCATED AT PANEL:
X DENOTES PANEL ID:
L DENOTES LOCAL CONTROL STATION

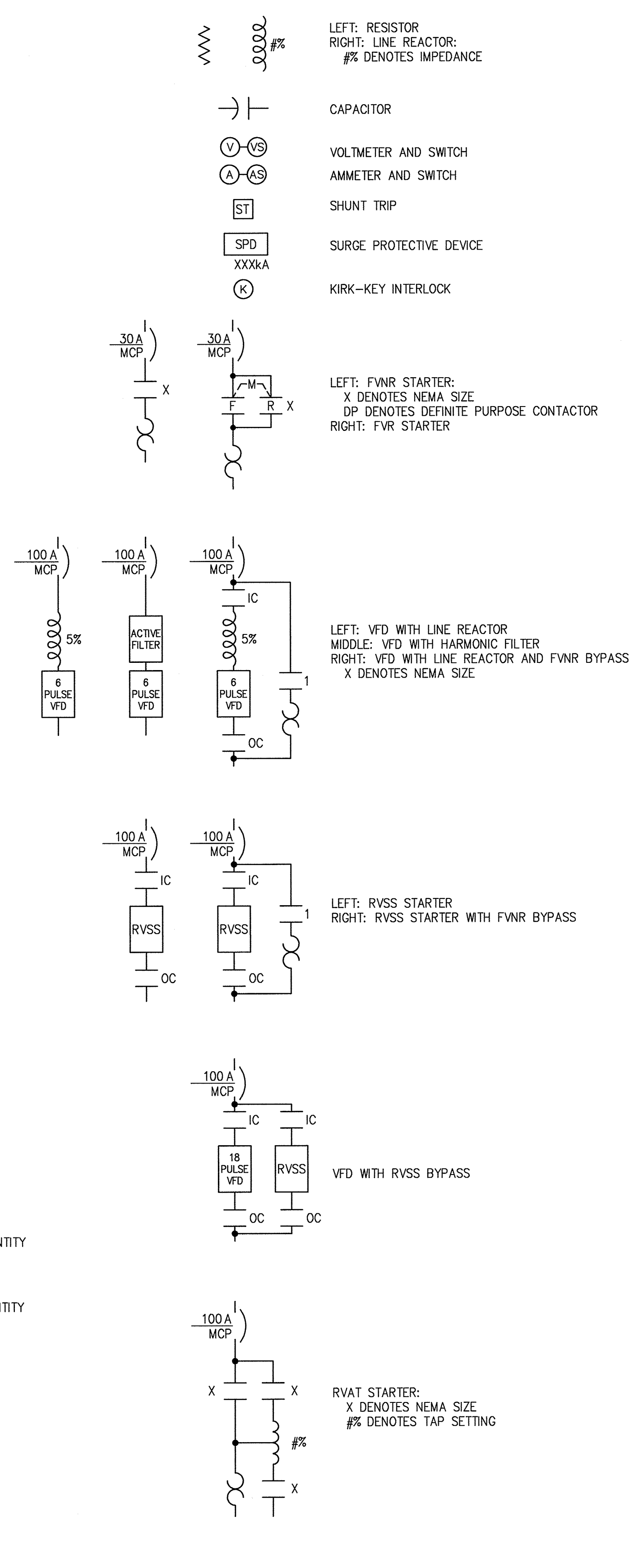
ELEMENTARY CONTROL SCHEMATICS



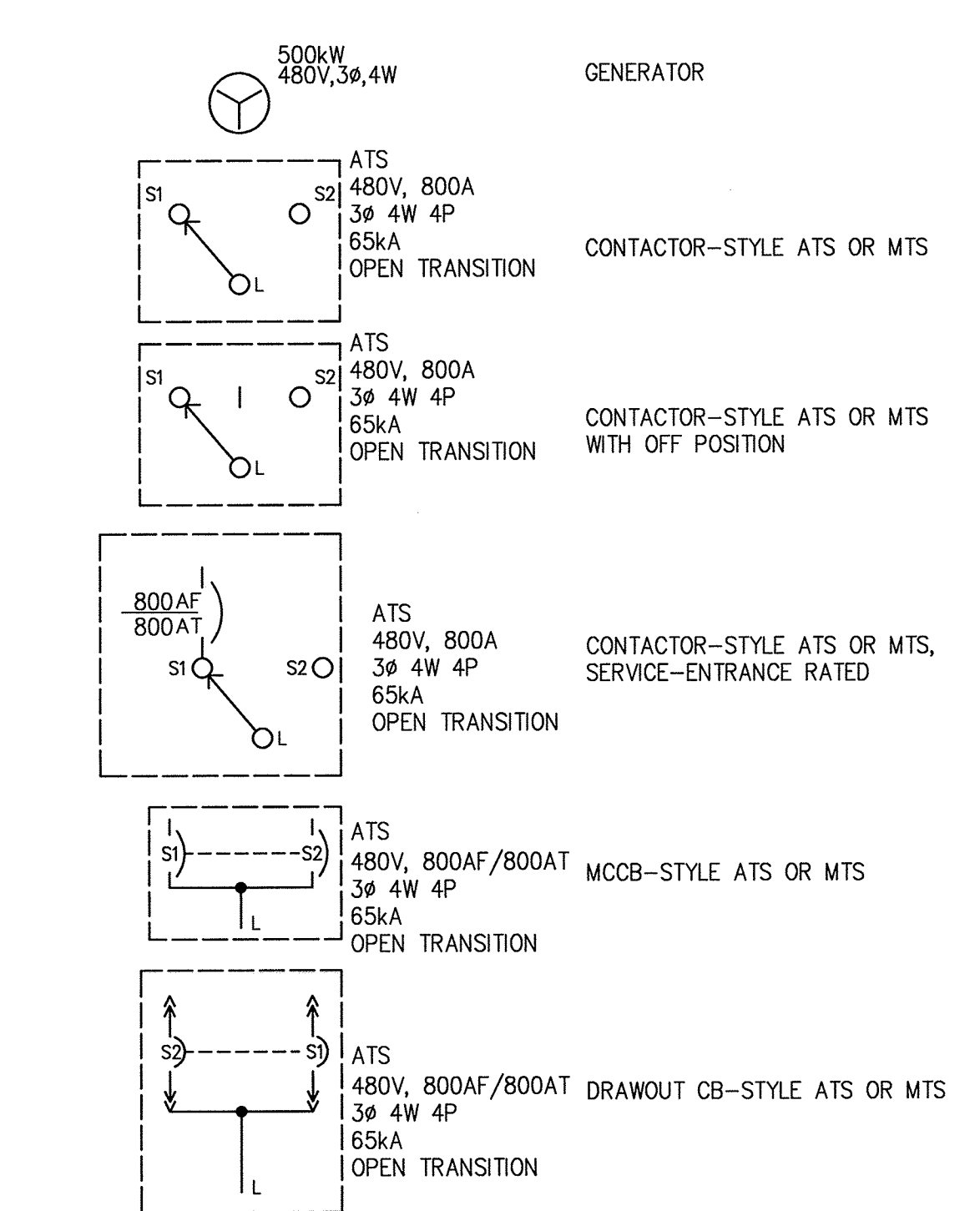
SINGLE-LINE DIAGRAMS



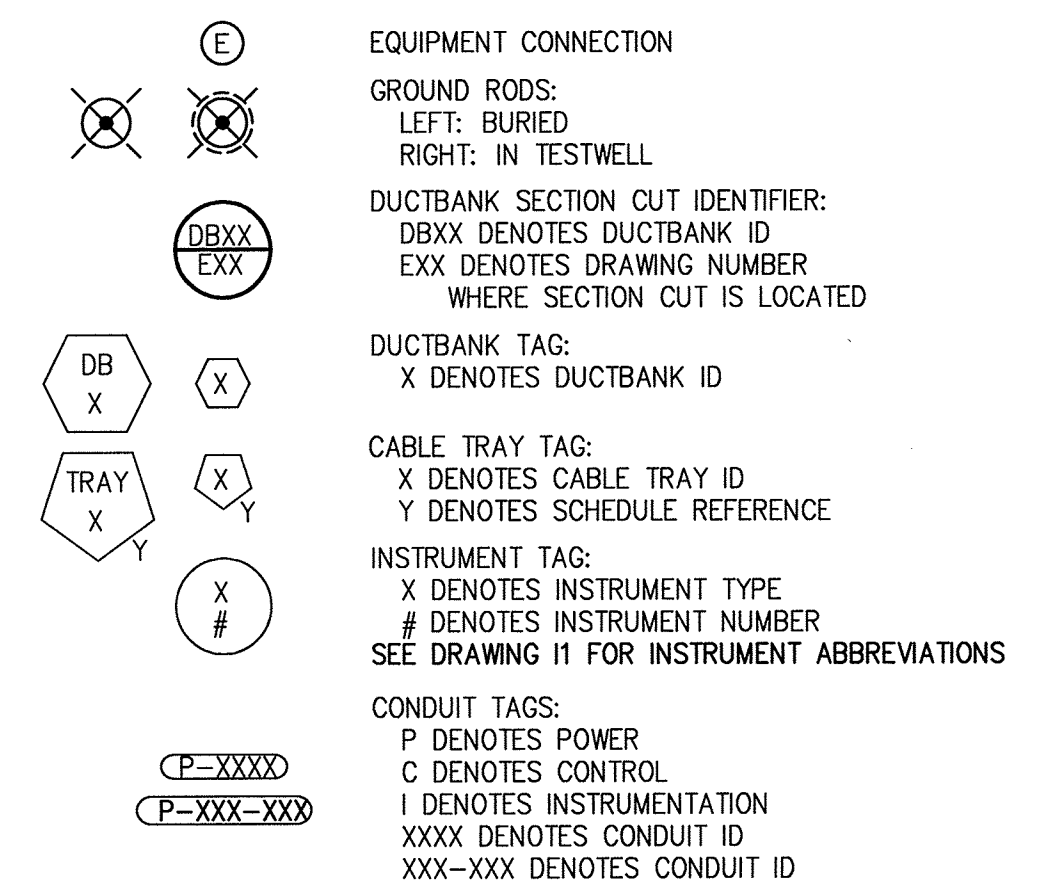
SINGLE-LINE DIAGRAMS, CONT'D.



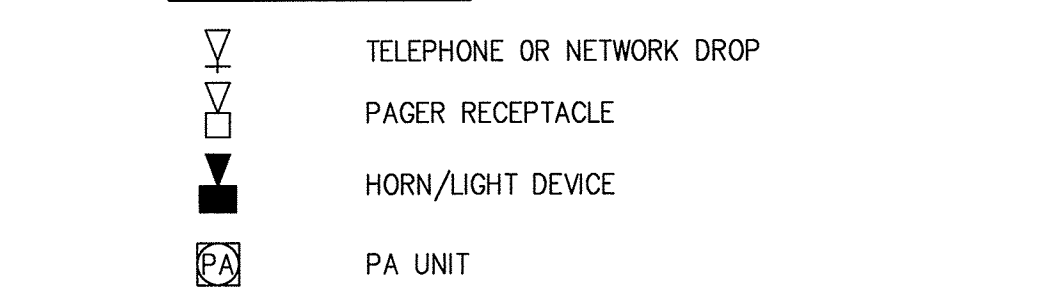
SINGLE-LINE DIAGRAMS, CONT'D.



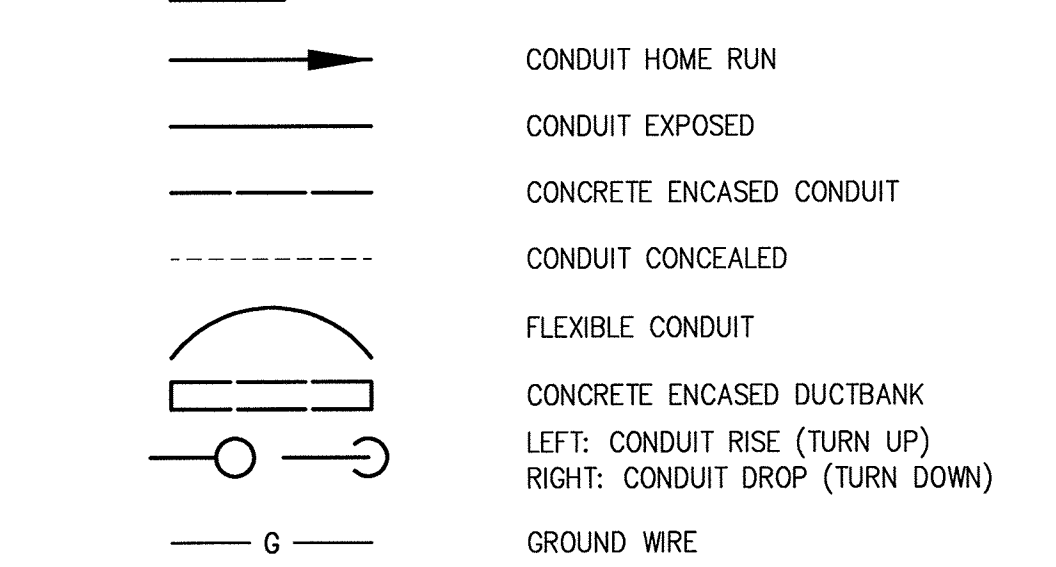
MISC PLAN VIEW SYMBOLS



COMMUNICATIONS



WIRING



AS - BUILT

MADE BY: 3/27/2017

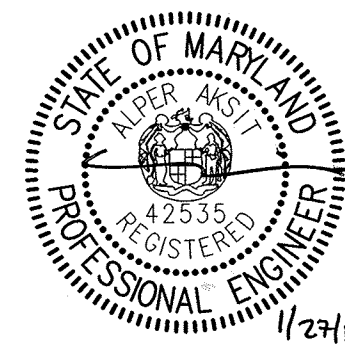
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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *John G. De...* 2/13/17
 Chief Bureau of Engineering: *Thomas E. Butler* 2/14/17
 Chief Bureau of Utilities: *...* 2/14/17
 Chief Utility Design Division: *...* 2/14/17

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681



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DESIGNED	DPW						
DRAWN	MRB						
CHECKED	JCS						
PRJ. ENGR.	AA						
APPROVED		NO.	ISSUED FOR	DATE	BY		

ELECTRICAL
LEGEND AND SYMBOLS

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

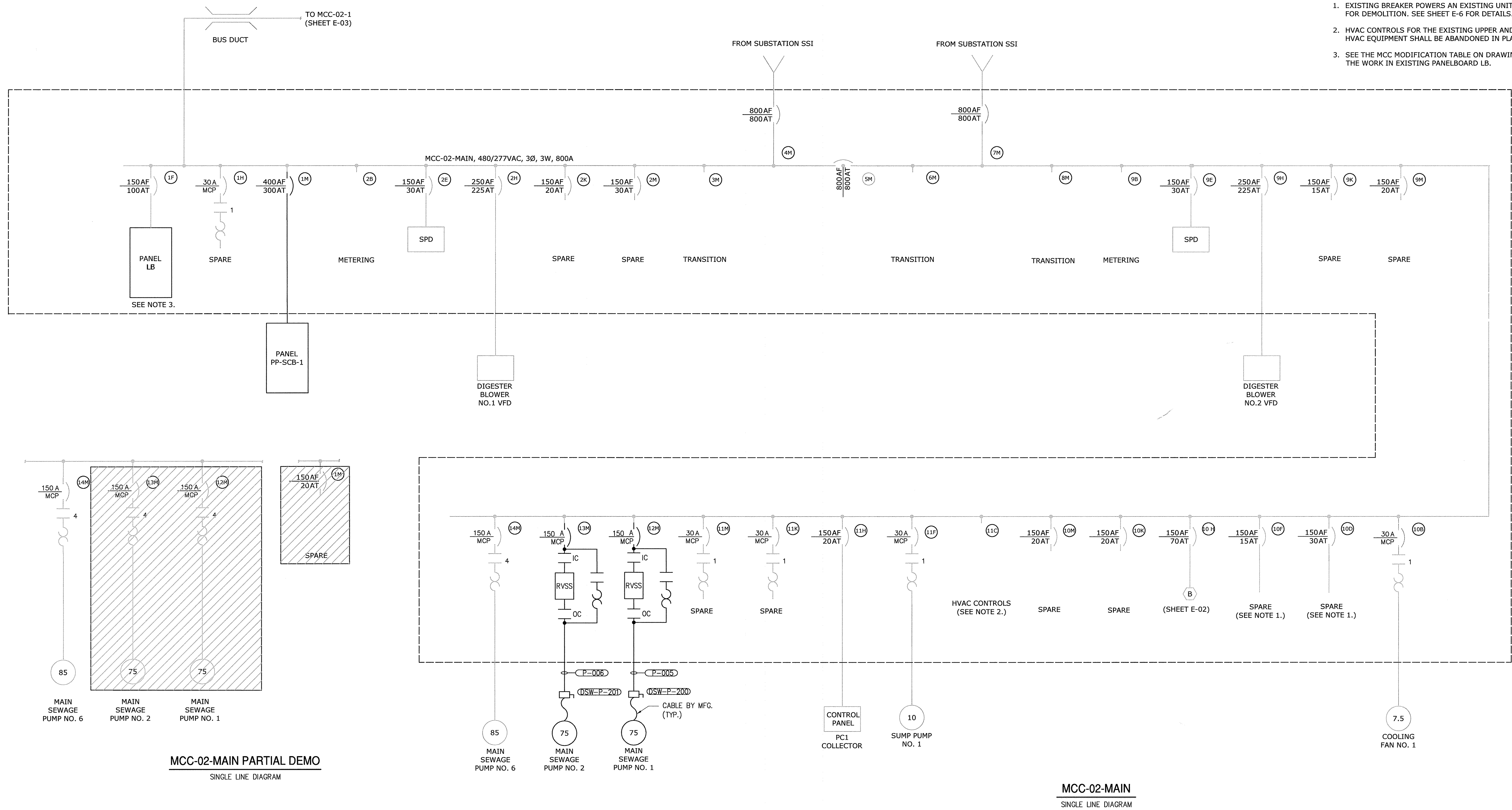
DATE: JAN 2017
DRAWING NUMBER: E1
SCALE: AS SHOWN
SHEET 17 OF 27

GENERAL ELECTRICAL NOTES:

1. ALL WORK SHALL BE INCLUDED IN BASE BID UNLESS INDICATED TO BE INCLUDED IN ADDITIVE ALTERNATIVE NO. 1.

NOTES:

1. EXISTING BREAKER POWERS AN EXISTING UNIT HEATER SCHEDULED FOR DEMOLITION. SEE SHEET E-6 FOR DETAILS.
2. HVAC CONTROLS FOR THE EXISTING UPPER AND LOWER PUMP ROOM HVAC EQUIPMENT SHALL BE ABANDONED IN PLACE.
3. SEE THE MCC MODIFICATION TABLE ON DRAWING E-6 FOR DETAILS ON THE WORK IN EXISTING PANELBOARD LB.



MCC-02-MAIN PARTIAL DEMO
SINGLE LINE DIAGRAM

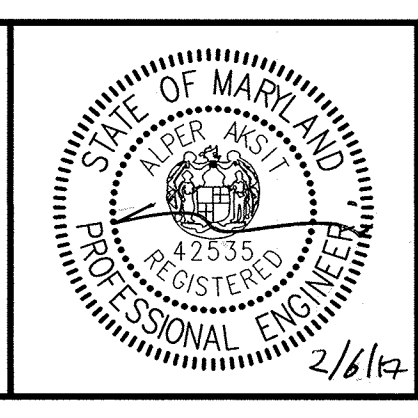
MCC-02-MAIN
SINGLE LINE DIAGRAM

AS - BUILT

IMAGE# 32232-TB

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
Director of Public Works <i>[Signature]</i> DATE: 2/14/17	Chief Bureau of Engineering <i>[Signature]</i> DATE: 2/14/17
Chief Bureau of Utilities <i>[Signature]</i> DATE: 2/14/17	Chief Utility Design Division <i>[Signature]</i> DATE: 2/14/17

Hazen
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 410-539-7681



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 SIGNED: *[Signature]* 2/14/17

DESIGNED	DPW
DRAWN	DPW
CHECKED	JCS
PROJ. ENGR.	AA
APPROVED	

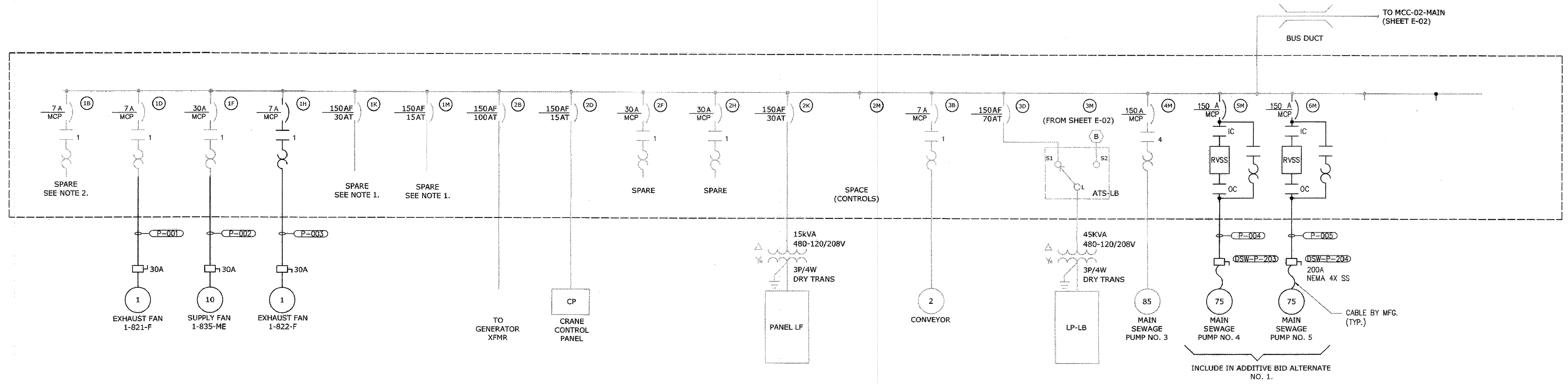
ELECTRICAL
ONE-LINE DIAGRAM
MCC-02-MAIN

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

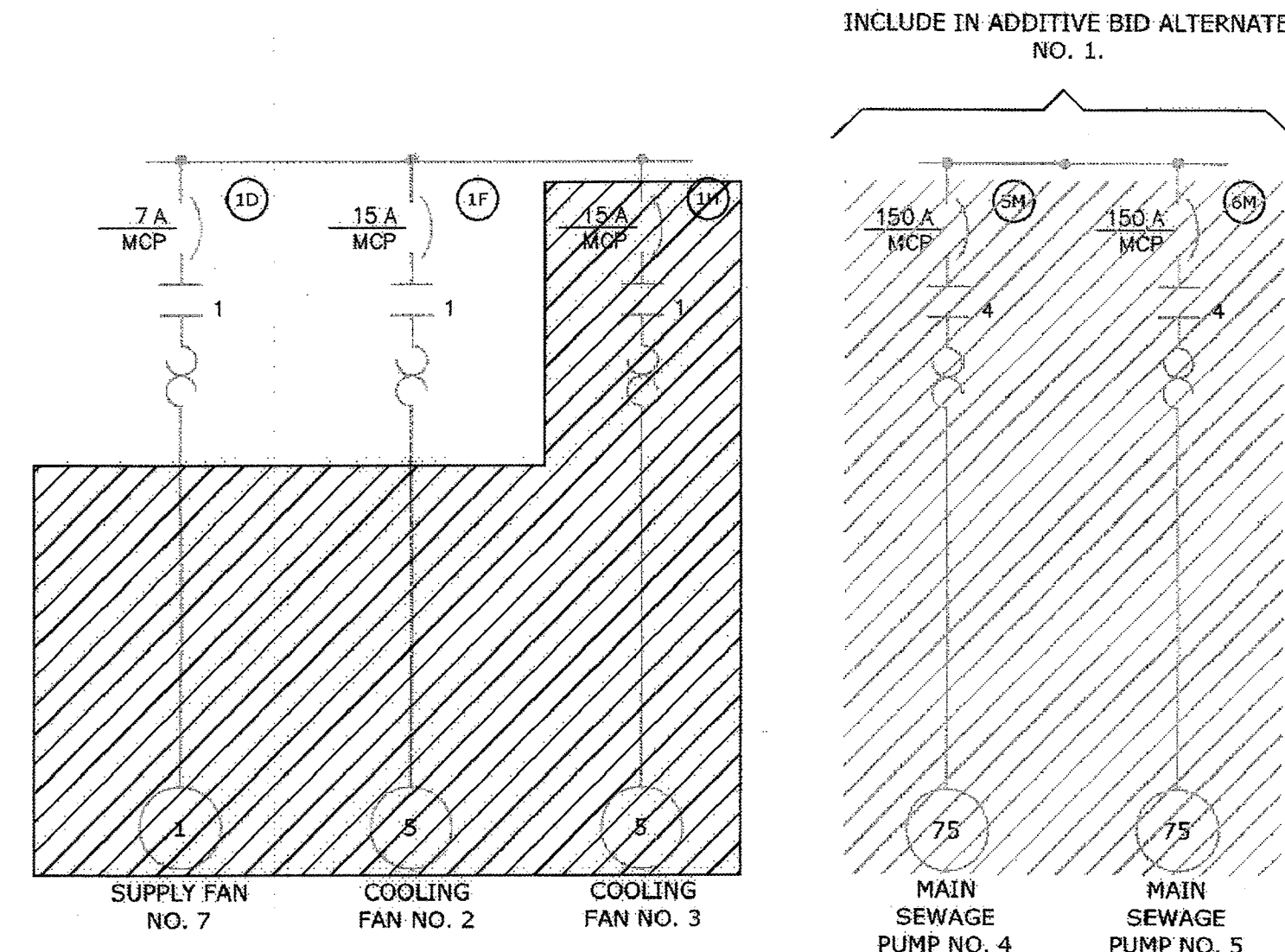
DATE	JAN 2017
DRAWING NUMBER	E2
SCALE	AS SHOWN
SHEET	18 OF 27

NOTES:

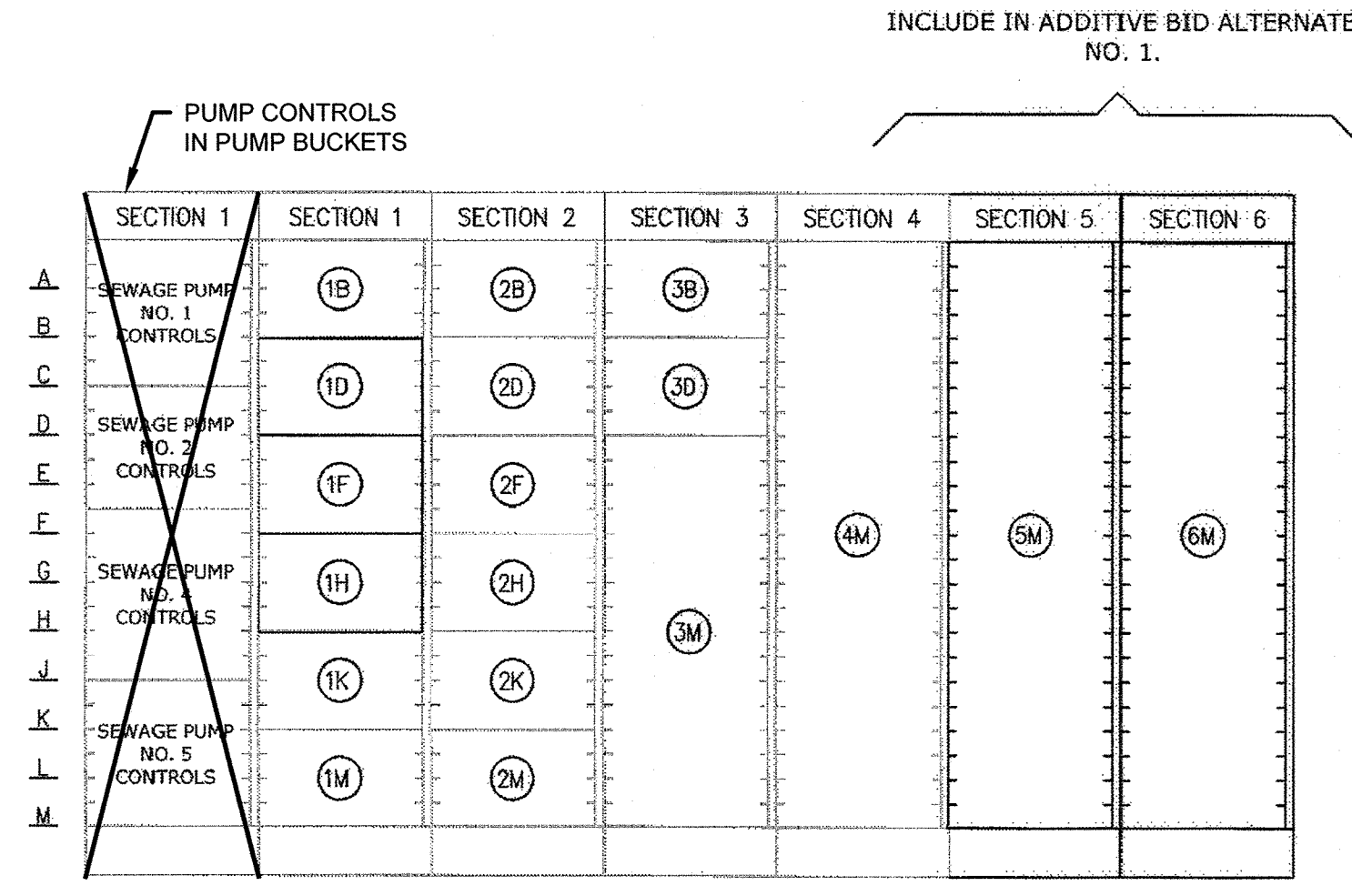
- EXISTING BREAKER POWERS AN EXISTING UNIT HEATER SCHEDULED FOR DEMOLITION. SEE SHEET E-6 FOR DETAILS.
- EXISTING BREAKER POWERS EXISTING EXHAUST FAN EF-3 SCHEDULED FOR DEMOLITION. SEE SHEET E-6 FOR DETAILS



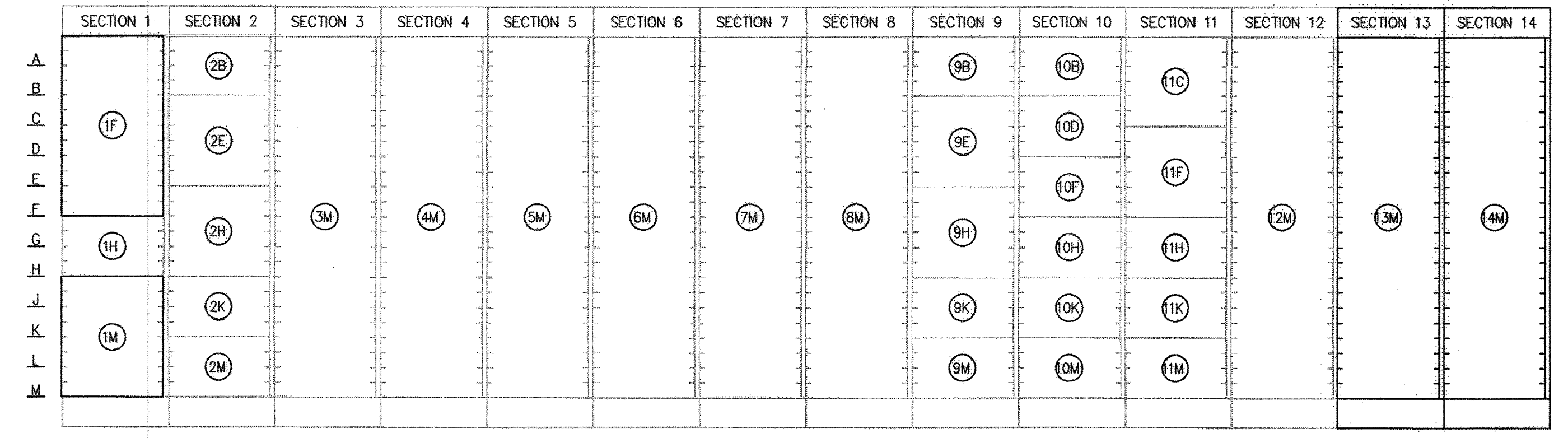
MCC-02-1
SINGLE LINE DIAGRAM



MCC-02-1 PARTIAL DEMOLITION
SINGLE LINE DIAGRAM



MCC-02-1 ELEVATION
NO SCALE



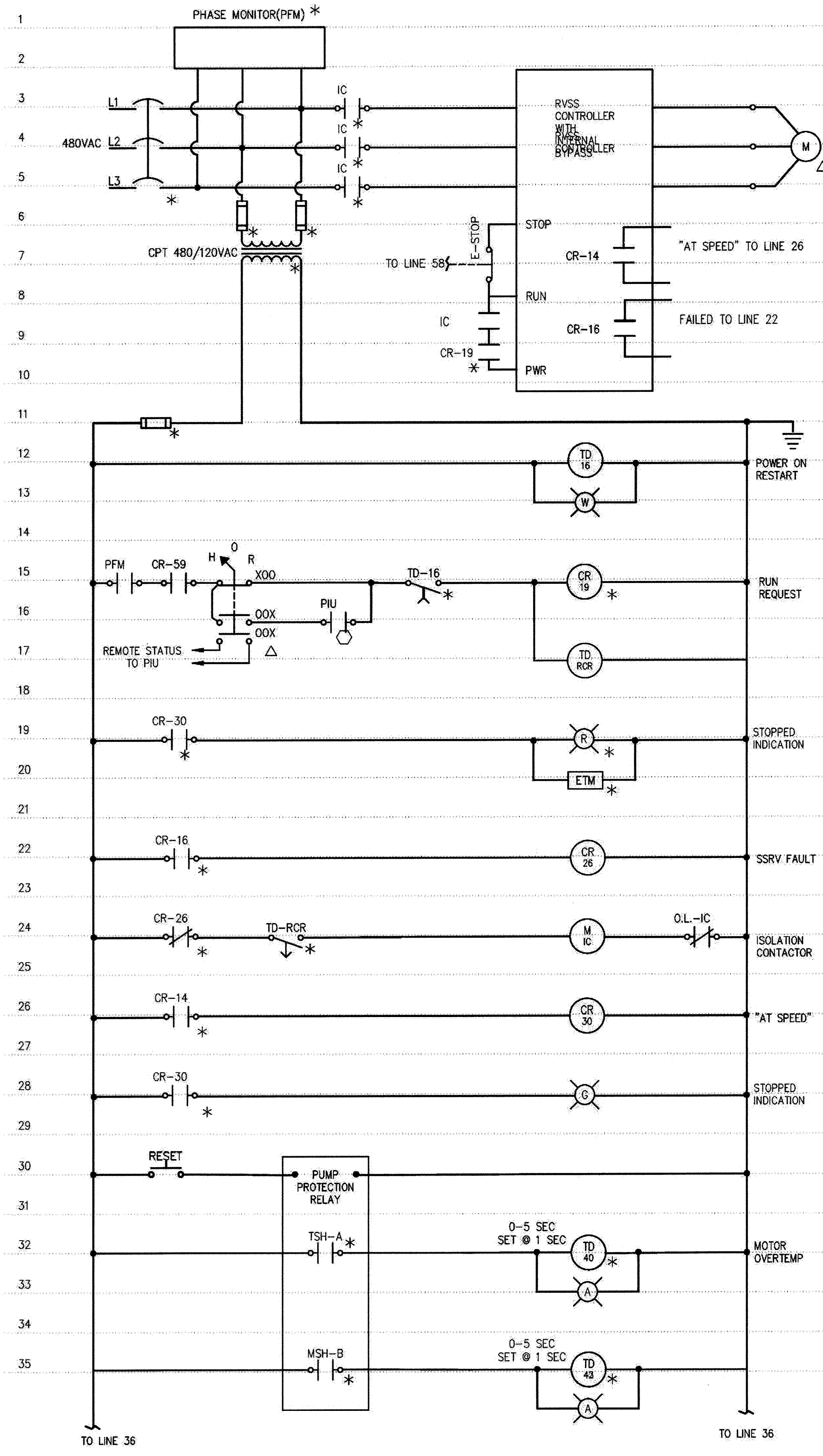
MCC-02-MAIN ELEVATION
NO SCALE

AS-BUILT REPLACEMENT SHEET 1/2019

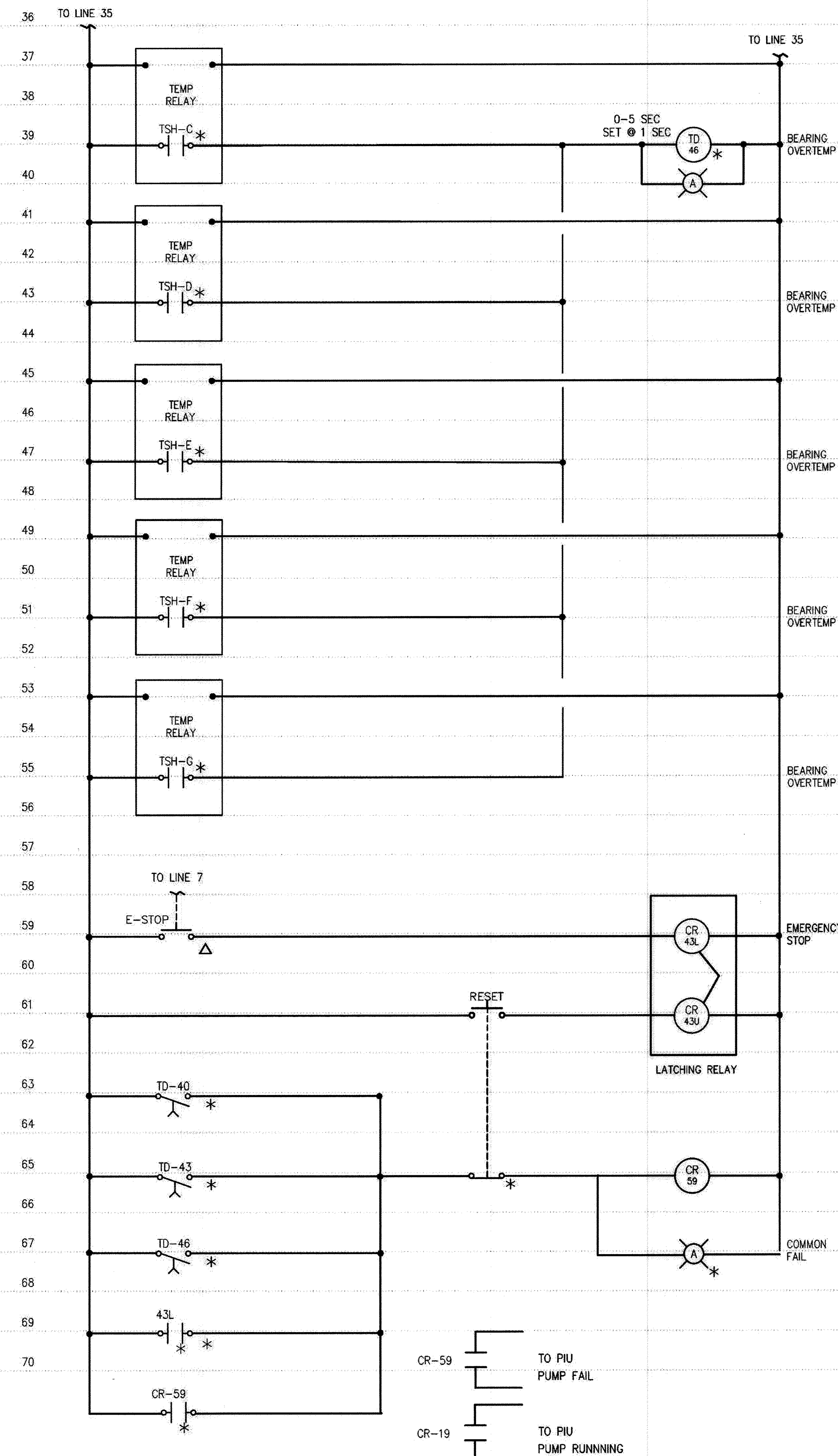
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND DATE: 3/7/19 DATE: 2-26-19		Hazen HAZEN AND SAWYER 1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202 410-539-7681		PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DULY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 42535, EXPIRATION DATE 07/25/2018. SIGNED:		DESIGNED: DPW DRAWN: DPW CHECKED: JCS PROJ. ENGR.: AA APPROVED:		ELECTRICIAN ONE-LINE DIAGRAM MCC-02-01		INFLUENT PUMPING STATION PUMP REPLACEMENT CONTRACT LITTLE PATUXENT WATER RECLAMATION PLANT CAPITAL PROJECT NUMBER S-6264 CONTRACT NUMBER 20-4991 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND		DATE: JAN 2017 DRAWING NUMBER: E3 SCALE AS SHOWN SHEET 19 OF 27	
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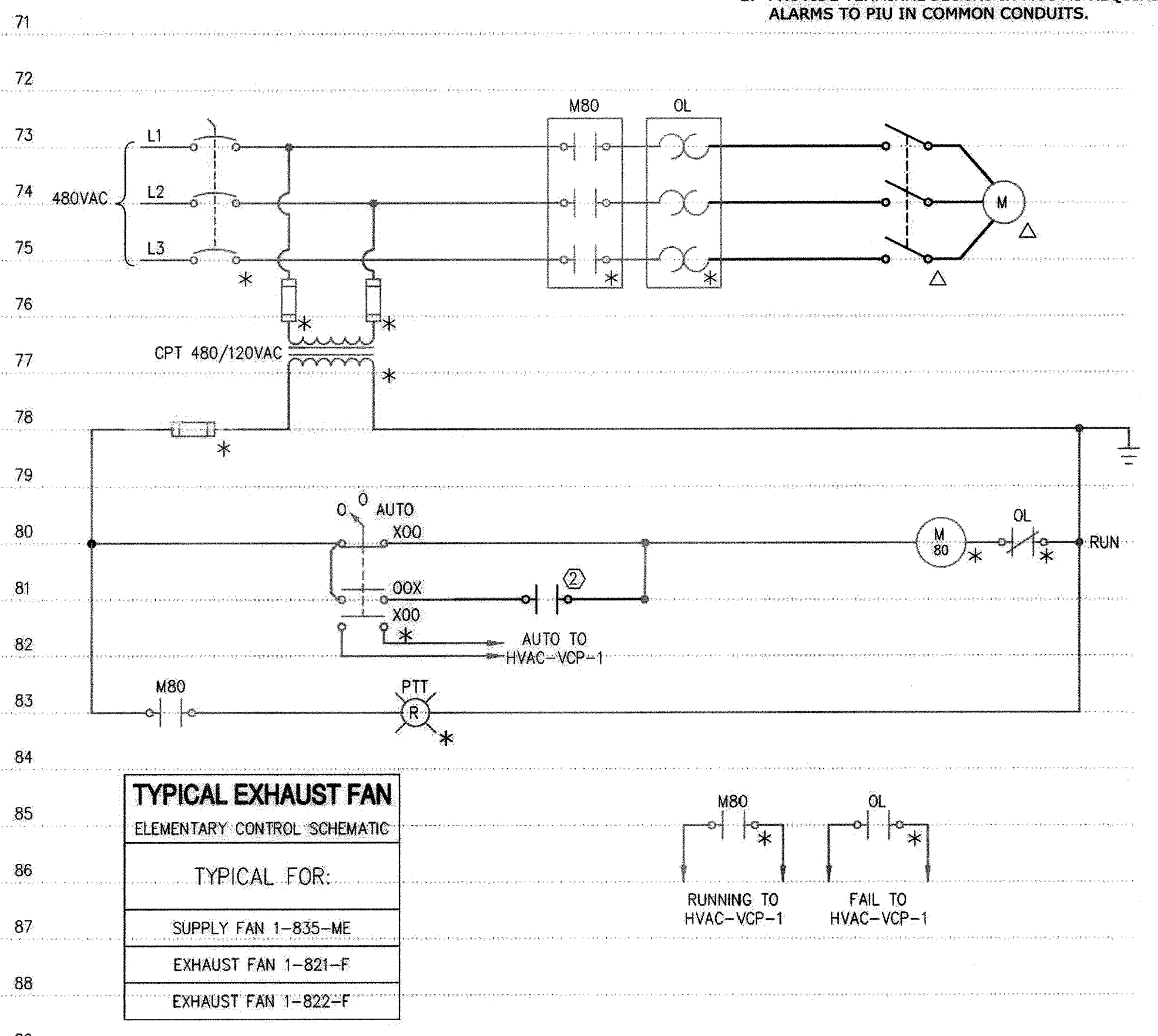
- NOTES:**
1. PROVIDE ADDITIONAL PUMP PROTECTION SENSOR, TIME DELAY RELAY AND PILOT LIGHT FOR BEARING HIGH TEMPERATURE ALARM AS SPECIFIED IF PROVIDED BY THE PUMP MANUFACTURER.
 2. PROVIDE TERMINAL BLOCKS IN MCC AS REQUIRED TO ROUTE FIELD ALARMS TO PIU IN COMMON CONDUITS.



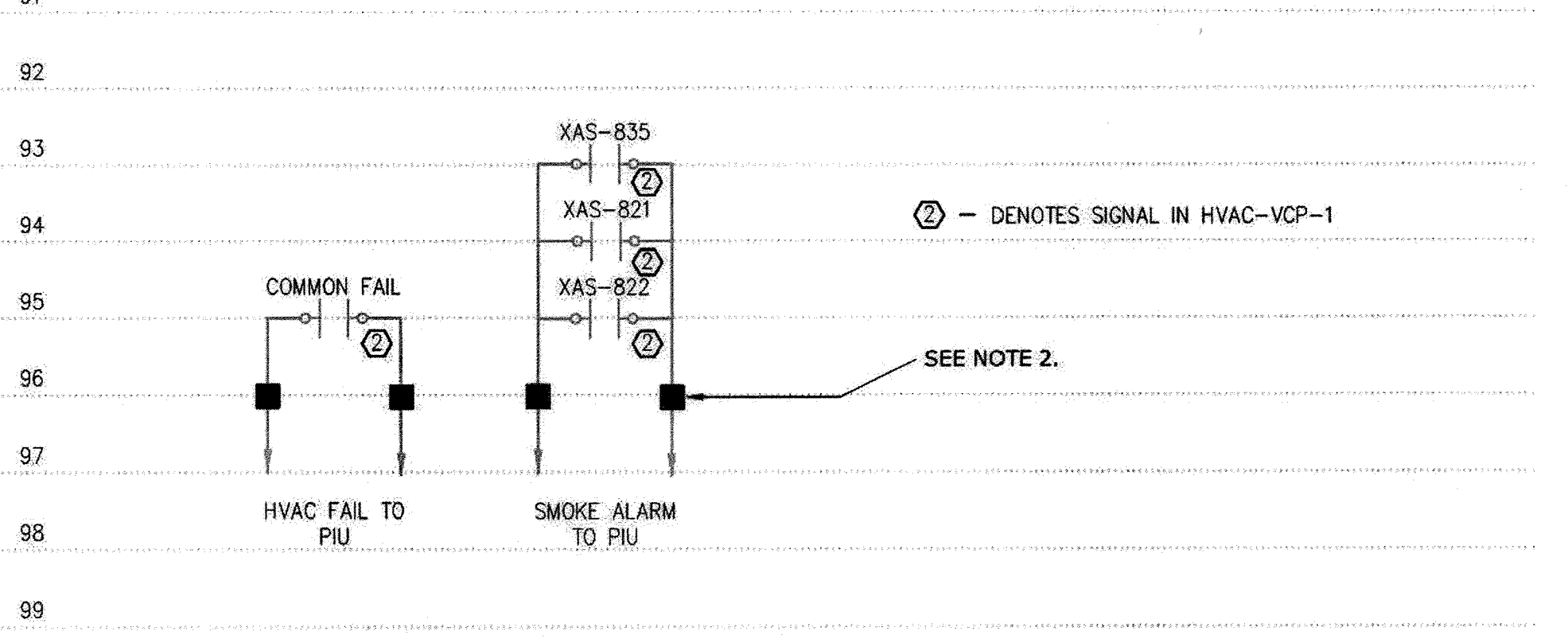
INFLUENT PUMPS 1, 2, 4 AND 5 MOTOR CONTROL SCHEMATIC
NO SCALE



INFLUENT PUMPS 1, 2, 4 AND 5 PROTECTION SCHEMATIC
NO SCALE



TYPICAL EXHAUST FAN ELEMENTARY CONTROL SCHEMATIC
NO SCALE



HVAC ALARMS
NO SCALE

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

3/6/19
DIRECTOR OF PUBLIC WORKS

2/28/19
CHIEF BUREAU OF ENGINEERING

2/26/19
CHIEF BUREAU OF UTILITIES

2/26/19
CHIEF UTILITY DESIGN DIVISION

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7881



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LICENSE NO. 42535
EXPIRATION DATE: 1/31/2021
SIGNED:

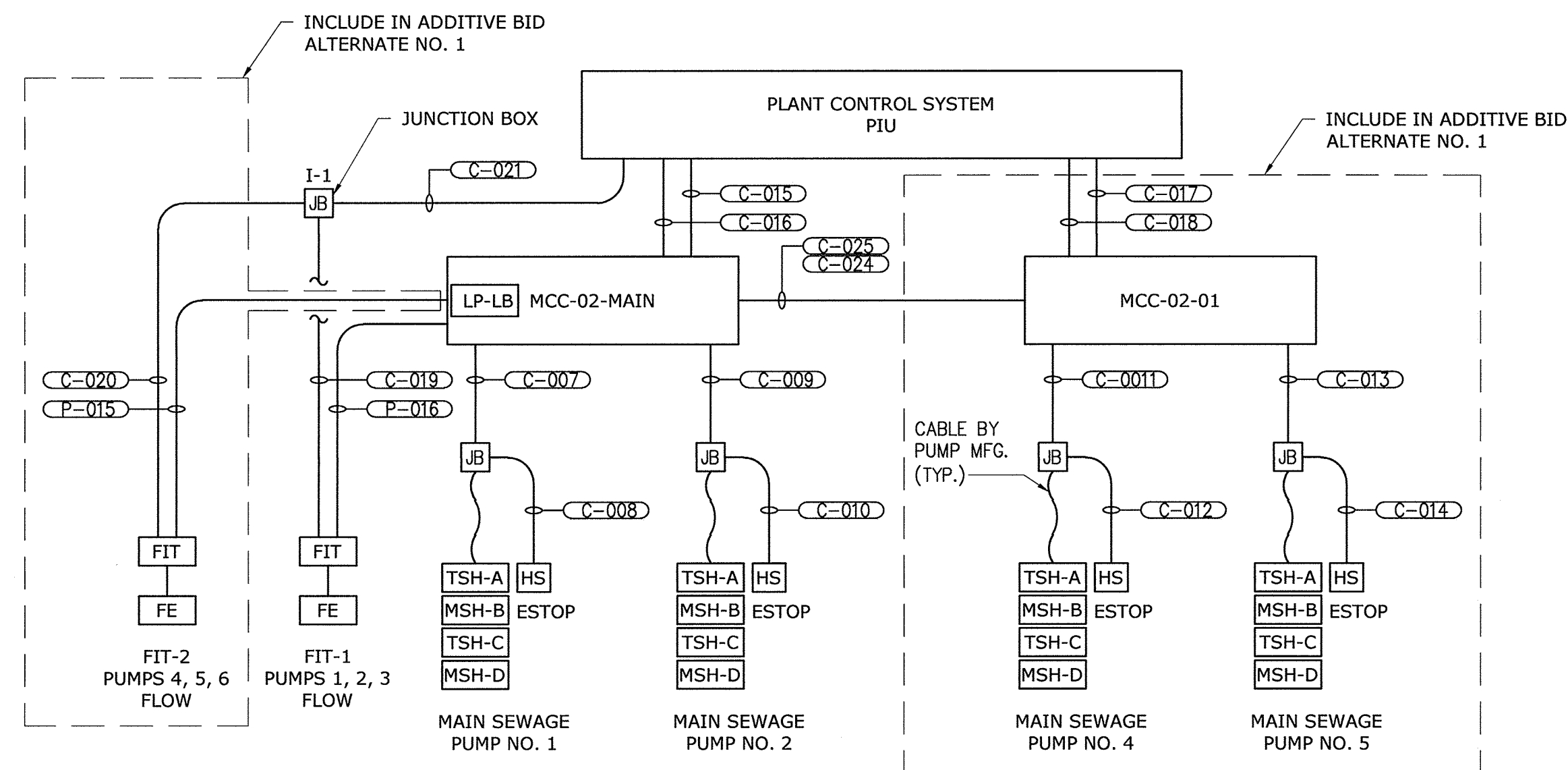
DESIGNED					
DRAWN					
CHECKED					
PROJ. ENGR.	3	AS-BUILT	1/9/19	AA	
	2	ADDENDUM	5/9/17	AA	
	1	ADDENDUM	5/9/17	AA	
APPROVED	NO.	ISSUED FOR	DATE	BY	

ELECTRICAL

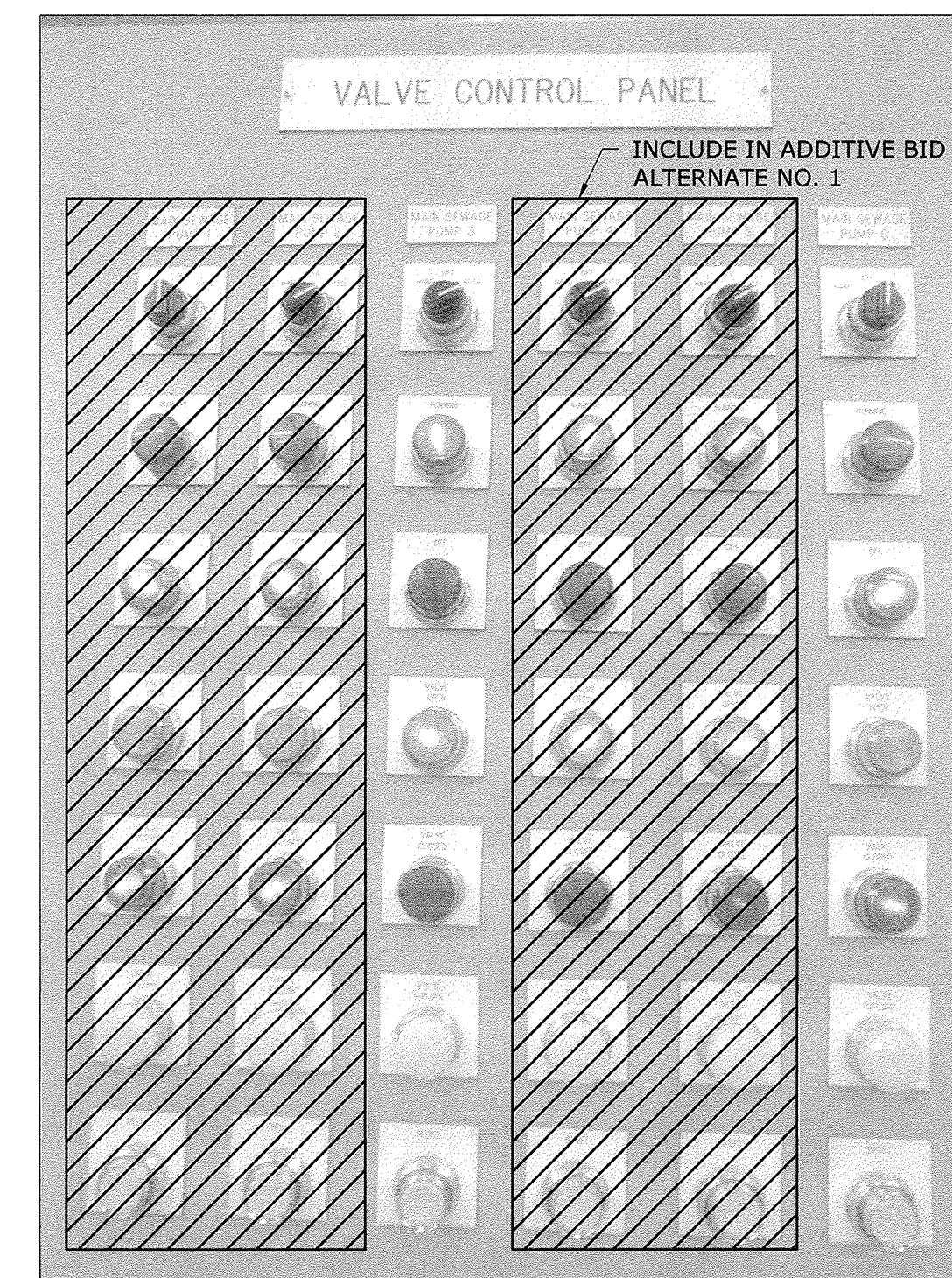
PUMP MOTOR CONTROL STARTER

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE JAN 2017
DRAWING NUMBER E-4
SCALE AS SHOWN
SHEET 20 OF 27



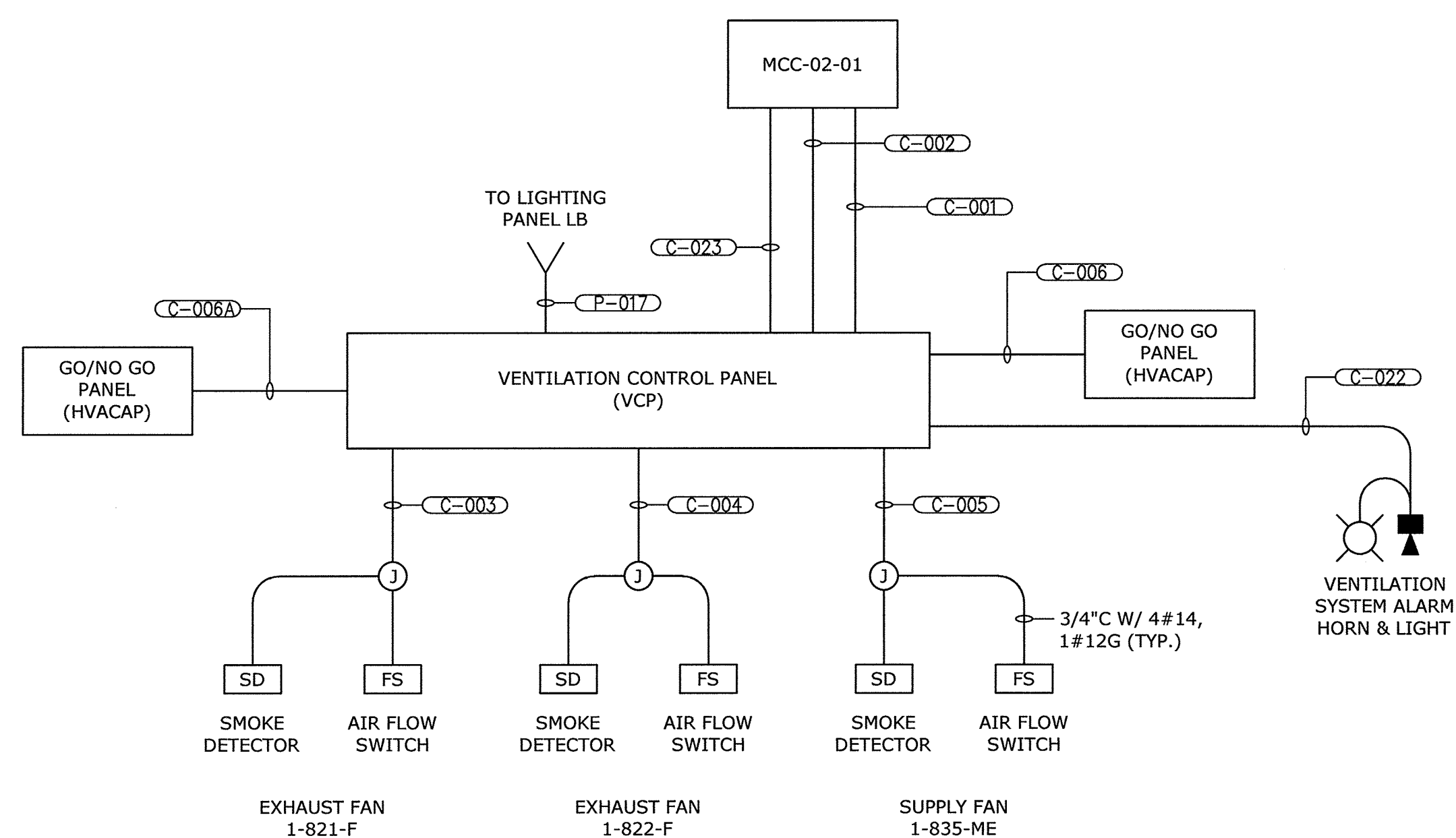
MAIN SEWAGE PUMP CONTROL RISER
NO SCALE



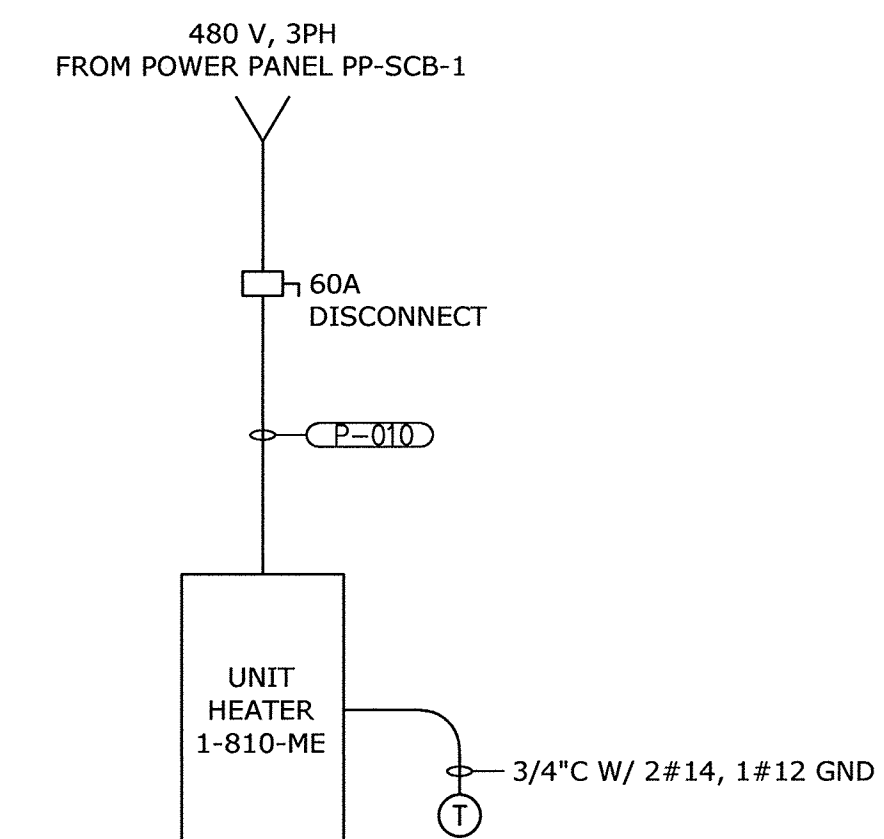
VALVE CONTROL PANEL - PARTIAL DEMOLITION
NO SCALE

VALVE CONTROL PANEL DEMOLITION NOTES:

1. SUBSEQUENT TO THE SUCCESSFUL DEMONSTRATION OF THE NEW PUMPS, THE EXISTING VALVE/PUMP CONTROLS FOR PUMPS 1, 2, 4 AND 5 SHALL BE DEMOLISHED. VALVE CONTROLS FOR PUMPS 1 AND PUMP 3 SHALL REMAIN IN SERVICE.
2. DISCONNECT WIRING FOR DEMOLISHED PUMPS IN THE VALVE CONTROL CABINET. ENSURE NO ABANDONED WIRING HAS VOLTAGE PRESENT.
3. REMOVE EXISTING PILOT LIGHTS AND DEVICES FROM THE PANEL DOOR.
4. REMOVE TAGS AND LABELS FOR DEMOLISHED PUMPS.
5. PLUG HOLES IN VALVE CONTROL PANEL WITH FITTED PLUGS.



VENTILATION SYSTEM RISER DIAGRAM
NO SCALE



UNIT HEATER 1-810-ME
NO SCALE
TYPICAL FOR 5 HEATERS

AS - BUILT

IMAGE= Valve Control Panel, XREFs= 32232-TB

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
Director of Public Works <i>[Signature]</i> DATE: 2/3/17	Chief Bureau of Utilities <i>[Signature]</i> DATE: 2/1/17
Chief Engineer <i>[Signature]</i> DATE: 2/1/17	Chief Utility Design Division <i>[Signature]</i> DATE: 2/1/17

Hazen
 HAZEN AND SAWYER
 1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
 410-539-7881

STATE OF MARYLAND
 REGISTERED PROFESSIONAL ENGINEER
 42535
 1/29/17

PROFESSIONAL CERTIFICATION.
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 SIGNED: _____

DESIGNED	DPW				
DRAWN	MRB				
CHECKED	JCS				
PROJ. ENGR.	AA				
APPROVED		NO.	ISSUED FOR	DATE	BY

ELECTRICAL
RISER DIAGRAMS AND SCHEDULES

INFLUENT PUMPING STATION PUMP REPLACEMENT CONTRACT
 LITTLE PATUXENT WATER RECLAMATION PLANT
 CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	E5
SCALE	AS SHOWN
SHEET	21 OF 27

CONDUIT NO.	SIZE	FROM	TO	CONDUCTORS	REMARKS
P-001	3/4"	MCC-02-01	EXHAUST FAN EF-1	3#12, 1-#12 GND	VIA DISCONNECT
P-002	3/4"	MCC-02-01	SUPPLY FAN SF-1	3#12, 1-#12 GND	VIA DISCONNECT
P-003	3/4"	MCC-02-01	EXHAUST FAN EF-2	3#12, 1-#12 GND	VIA DISCONNECT
P-004	1 1/2"	MCC-02-01	MAIN SEWAGE PUMP NO. 4	3-#1, 1#1 GND	VIA DISCONNECT
P-005	1 1/2"	MCC-02-01	MAIN SEWAGE PUMP NO. 5	3-#1, 1#1 GND	VIA DISCONNECT
P-006	1 1/2"	MCC-02-MAIN	MAIN SEWAGE PUMP NO. 1	3-#1, 1#1 GND	VIA DISCONNECT
P-007	1 1/2"	MCC-02-MAIN	MAIN SEWAGE PUMP NO. 2	3-#1, 1#1 GND	VIA DISCONNECT
P-008				NOT USED	
P-009	3"	MCC-02-MAIN	POWER PANEL PP-SCB-1	4-350 kcmil, #4 GND	
P-010	1"	POWER PANEL PP-SCB-1	UNIT HEATER UH-1	3#6, 1#6 GND	VIA DISCONNECT
P-011	1"	POWER PANEL PP-SCB-1	UNIT HEATER UH-2	3#6, 1#6 GND	VIA DISCONNECT
P-012	1"	POWER PANEL PP-SCB-1	UNIT HEATER UH-3	3#6, 1#6 GND	VIA DISCONNECT
P-013	3/4"	POWER PANEL PP-SCB-1	UNIT HEATER UH-4	3#10, 1#10 GND	VIA DISCONNECT
P-014	3/4"	POWER PANEL PP-SCB-1	UNIT HEATER UH-5	3#10, 1#10 GND	VIA DISCONNECT
P-015	3/4"	PANEL LB IN MCC-02-MAIN	FIT-1 (PUMPS 1-3)	2#12, 1-#12 GND	
P-016	3/4"	PANEL LB IN MCC-02-MAIN	FIT-2 (PUMPS 4-6)	2#12, 1-#12 GND	
P-017	3/4"	PANEL LB IN MCC-02-MAIN	CONTROL PANEL HVAC-VCP-1	2#12, 1-#12 GND	

CONDUIT NO.	SIZE	FROM	TO	CONDUCTORS	REMARKS
C-001	3/4"	MOTOR CONTROL CENTER MCC-02-01	CONTROL PANEL HVAC-VCP-1	8#14, 1#12 GND	
C-002	3/4"	MOTOR CONTROL CENTER MCC-02-01	CONTROL PANEL HVAC-VCP-1	16#14, 1#12 GND	
C-003	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	JB BY EXHAUST FAN 1-821-F	6#14, 1#12 GND; 1-TSP	
C-004	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	JB BY EXHAUST FAN 1-822-F	6#14, 1#12 GND; 1-TSP	
C-005	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	JB BY EXHAUST FAN 1-835-ME	6#14, 1#12 GND; 1-TSP	
C-006	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	GO/NO GO PANEL EAST ENTRANCE	8#14, 1#12 GND	INCLUDES 4 SPARE
C-006A	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	GO/NO GO PANEL WEST ENTRANCE	8#14, 1#12 GND	INCLUDES 4 SPARE
C-007	3/4"	MOTOR CONTROL CENTER MCC-02-MAIN	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	6-#16 TSP, 1#12 GND	INCLUDES 2 SPARE
C-008	3/4"	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	EMERGENCY STOP SWITCH (PUMP 1)	4#14, 1 #12 GND	
C-009	3/4"	MOTOR CONTROL CENTER MCC-02-MAIN	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	6-#16 TSP, 1#12 GND	INCLUDES 2 SPARE
C-010	3/4"	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	EMERGENCY STOP SWITCH (PUMP 2)	4#14, 1 #12 GND	
C-011	3/4"	MOTOR CONTROL CENTER MCC-02-01	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	6-#16 TSP, 1#12 GND	INCLUDES 2 SPARE
C-012	3/4"	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	EMERGENCY STOP SWITCH (PUMP 4)	4#14, 1 #12 GND	
C-013	3/4"	MOTOR CONTROL CENTER MCC-02-01	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	6-#16 TSP, 1#12 GND	INCLUDES 2 SPARE
C-014	3/4"	JUNCTION BOX ON PUMP ROOM PLATFORM LEVEL	EMERGENCY STOP SWITCH (PUMP 5)	4#14, 1 #12 GND	
C-015	1"	MOTOR CONTROL CENTER MCC-02-MAIN	PLANT CONTROL SYSTEM PIU	20#14, 1 #12 GND	
C-016	1"	MOTOR CONTROL CENTER MCC-02-MAIN	PLANT CONTROL SYSTEM PIU	SPARE	
C-017	1"	MOTOR CONTROL CENTER MCC-02-01	PLANT CONTROL SYSTEM PIU	20#14, 1 #12 GND	
C-018	1"	MOTOR CONTROL CENTER MCC-02-01	PLANT CONTROL SYSTEM PIU	SPARE	
C-019	3/4"	FIT (PUMPS 1-3)	JUNCTION BOX JB-II	1-#16 TSP, 1#12 GND	
C-020	3/4"	FIT (PUMPS 4-6)	JUNCTION BOX JB-II	1-#16 TSP, 1#12 GND	
C-021	1"	JUNCTION BOX JB-II	PLANT CONTROL SYSTEM PIU	2-#16 TSP, 2#12 GND	
C-022	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	LOWER PUMP ROOM ALARM HORN AND BEACON	8#14, 1#12 GND	
C-023	3/4"	HVAC CONTROL PANEL HVAC-VCP-1	MOTOR CONTROL CENTER MCC-02-01	8#14, 1#12 GND	SCADA SIGNALS-4 SPARE
C-024	3"	MOTOR CONTROL CENTER MCC-02-01	MOTOR CONTROL CENTER MCC-02-MAIN	DETERMINED BY MCC MFG	
C-025	3"	MOTOR CONTROL CENTER MCC-02-01	MOTOR CONTROL CENTER MCC-02-MAIN	DETERMINED BY MCC MFG	

CONDUIT AND CABLE SCHEDULE
NO SCALE

LOCATION	EXISTING LABEL	NEW LABEL	DESCRIPTION OF CHANGE
MCC-02-MAIN			
SECTION 1F	LIGHTING PANEL LB		ADD TWO 20 A CIRCUIT BREAKERS TO LIGHTING PANEL LB FOR THE NEW FLOW METER AND THE NEW HVAC CONTROL PANEL. (FLOWMETER BREAKER IS IN ADDITIVE BIS ALTERNATE NO.2)
SECTION 1K/1M	SPARE	POWER PANEL PP-81	REPLACE THE EXISTING 20 A, 3 POLE BREAKER AND THE SPARE STARTER WITH A 300 A, 3 POLE BREAKER.
SECTION 10B	COOLING FAN NO. 1	SPARE	DEMOLISH EXISTING WIRING. MARK STARTER AS SPARE.
SECTION 10D	UNIT HEATER NO. 3	SPARE	DEMOLISH EXISTING FIELD WIRING TO UNIT HEATER NO. 3. LABEL EXISTING BREAKER AS SPARE.
SECTION 10F	UNIT HEATER NO. 5	SPARE	DEMOLISH EXISTING FIELD WIRING TO UNIT HEATER NO. 5. LABEL EXISTING BREAKER AS SPARE.
SECTION 12M	MAIN SEWAGE PUMP NO. 1	MAIN SEWAGE PUMP NO. 1	REPLACE THE EXISTING STARTER WITH RVSS STARTER AS SHOWN ON THE ONE LINE DRAWINGS.
SECTION 13M	MAIN SEWAGE PUMP NO. 2	MAIN SEWAGE PUMP NO. 2	REPLACE THE EXISTING STARTER WITH RVSS STARTER AS SHOWN ON THE ONE LINE DRAWINGS.
MCC-02-01			
SECTION 1B	EXHAUST FAN NO. 3	SPARE	DEMOLISH EXISTING FIELD WIRING TO EXHAUST FAN NO. 3. LABEL EXISTING STARTER AS SPARE.
SECTION 1D	SUPPLY FAN NO. 7	EXHAUST FAN EF-1	DEMOLISH EXISTING FIELD WIRING. REUSE EXISTING STARTER FOR FAN EF-1. ADJUST OVERLOADS FOR NEW MOTOR FLA.
SECTION 1F	COOLING FAN NO. 2	SUPPLY FAN SF-1	DEMOLISH EXISTING FIELD WIRING. REUSE EXISTING STARTER FOR FAN EF-1. ADJUST OVERLOADS FOR NEW MOTOR FLA.
SECTION 1H	COOLING FAN NO. 3	EXHAUST FAN EF-2	REPLACE EXISTING STARTER WITH A NEW STARTER AS SHOWN ON THE ONE LINE DRAWINGS. DEMOLISH EXISTING WIRING AND PROVIDE NEW CONNECTIONS TO FAN EF-2.
SECTION 1K	UNIT HEATER NO.4	SPARE	DEMOLISH EXISTING FIELD WIRING TO UNIT HEATER NO. 4. LABEL EXISTING BREAKER AS SPARE.
SECTION 1M	UNIT HEATER NO.6	SPARE	DEMOLISH EXISTING FIELD WIRING TO UNIT HEATER NO. 6. LABEL EXISTING BREAKER AS SPARE.
SECTION 5M	MAIN SEWAGE PUMP NO. 4	MAIN SEWAGE PUMP NO. 4	REPLACE THE EXISTING STARTER WITH RVSS STARTER AS SHOWN ON THE ONE LINE DRAWINGS. INCLUDE AS PART OF ADDITIVE BID ALTERNATE NO. 1
SECTION 6M	MAIN SEWAGE PUMP NO. 5	MAIN SEWAGE PUMP NO. 5	REPLACE THE EXISTING STARTER WITH RVSS STARTER AS SHOWN ON THE ONE LINE DRAWINGS. INCLUDE AS PART OF ADDITIVE BID ALTERNATE NO. 1

MCC MODIFICATION SUMMARY
NO SCALE

480/277 VOLTS 3 PHASE, 4 WIRE		PANEL PP-81-B-1 MAIN BREAKER		TYPE: NEMA 12 MOUNT: SURFACE											
		300A 3P													
MODS	DESCRIPTION	WIRE	TRIP	POLE	No.	VOLT-AMPERES			No.	POLE	TRIP	WIRE	DESCRIPTION	MODS	
						A	B	C							
-	UNIT HEATER UH-1	P-010	60	3	1	16,000			2						
					3		16,000		4	3	60	P-011	UNIT HEATER UH-2	-	
					5			16,000	6						
-	UNIT HEATER UH-3	P-012	60	3	7	16,000			8						
					9		16,000		10	3	30	P-013	UNIT HEATER UH-4	-	
					11			16,000	12						
-	UNIT HEATER UH-5	P-014	30	3	13	5,000			14						
					15		5,000		16	3	20		SPARE	-	
					17			5,000	18						
-	SPARE		20	3	19				20						
					21				22	3	20		SPARE	-	
					23				24						
-	SPACE			3	25				26						
					27				28	3			SPACE	-	
					29				30						
-	SPACE			3	31				32						
					33				34	3			SPACE	-	
					35				36						
-	SPACE			3	37				38						
					39				40	3			SPACE	-	
					41				42						

TOTAL	37,000	37,000	37,000
PHASE TOTAL	58,000	58,000	58,000

21,000	21,000	21,000	TOTAL
TOTAL LOAD (VA)			
174,000			
TOTAL LOAD (A)			
209			

MODIFICATION (MODS) LEGEND:
 GFCI - GROUND FAULT CIRCUIT INTERRUPTER
 LOD - LOCK-ON DEVICE
 LFD - LOCK-OFF DEVICE

NOTES:
 65K AIC
 100KA SPD

POWER PANEL SCHEDULE
NO SCALE

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

John G. Van 3/5/19
DIRECTOR OF PUBLIC WORKS DATE

Thomas E. Butler 2/28/19
CHIEF BUREAU OF ENGINEERING DATE

Chris Stoff 2/26/19
CHIEF BUREAU OF UTILITIES DATE

[Signature] 2/26/19
CHIEF UTILITY DESIGN DIVISION DATE

Hazen
HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7881

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. 52535, EXPIRATION DATE 02/25/2018.

SIGNED: *[Signature]* 2/21/19

DESIGNED	DPW				
DRAWN	DPW				
CHECKED	JCS				
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED		NO.	ISSUED FOR	DATE	BY

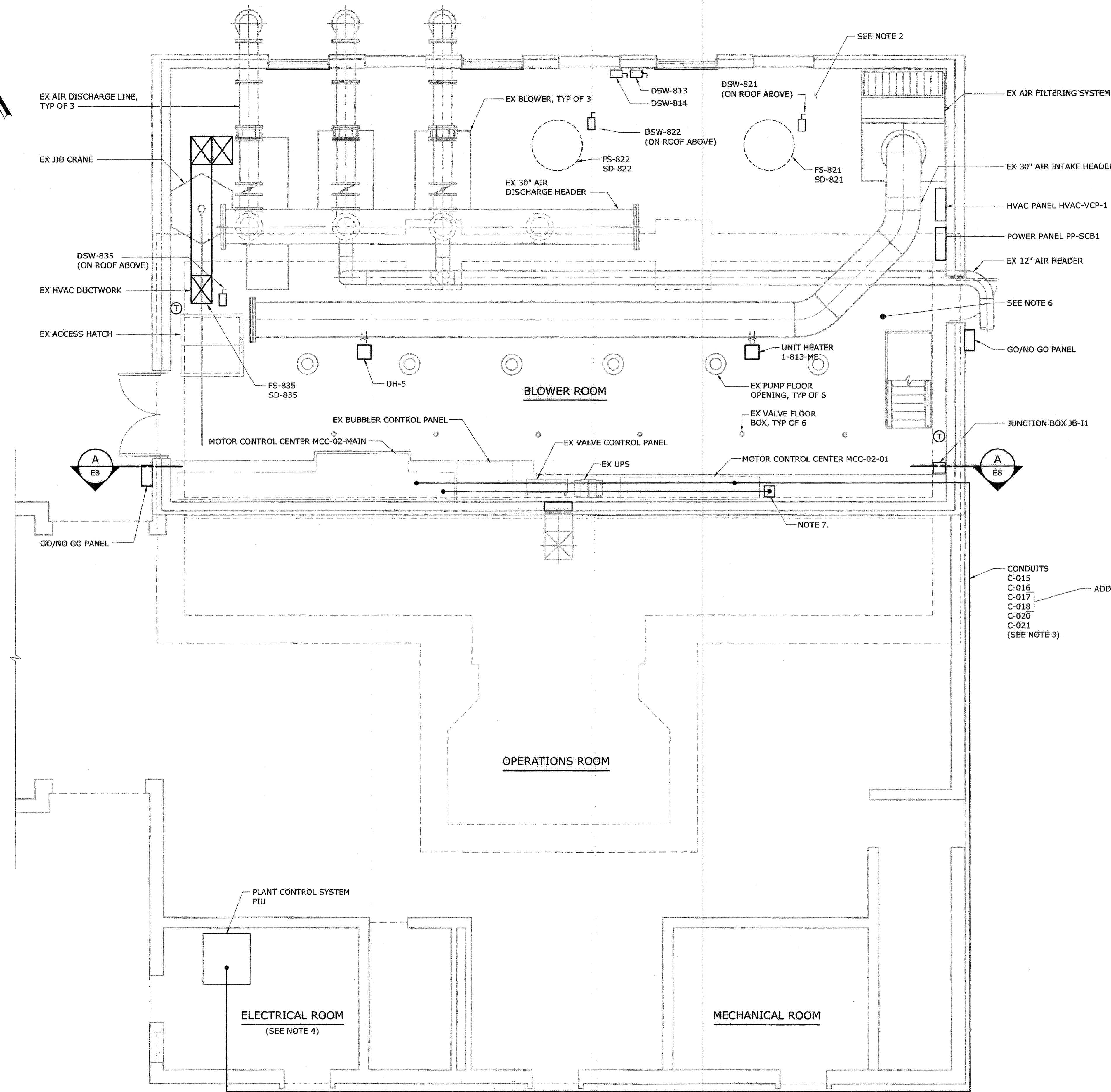
ELECTRICAL SCHEDULES

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE: JAN 2017
DRAWING NUMBER: E6
SCALE AS SHOWN
SHEET 22 OF 27

NOTES:

1. SEE ONE-LINE DIAGRAMS FOR MODIFICATIONS TO EXISTING MOTOR CONTROL CABINETS.
2. UPPER LEVEL PUMP ROOM IS A DRY UNCLASSIFIED SPACE. AREA HAS BEEN DE-RATED FROM CLASS 1, DIVISION II USING MONITORED AIR CHANGES.
3. ROUTE CONDUITS OUTSIDE OF OPERATIONS ROOM TO AVOID HAZARDOUS/CORROSIVE ENVIRONMENT.
4. ELECTRICAL ROOM IS AN UNCLASSIFIED, DRY ENVIRONMENT.
5. SEE HVAC PLANS FOR LOCATIONS OF HVAC CONTROLS.
6. BLOWER ROOM IS A DRY PROCESS AREA PER SPECIFICATION SECTION 16111. CONDUIT SHALL BE HEAVY WALL ALUMINUM.
7. SUPPLEMENTAL CABINET FOR NEW SEWAGE PUMP SOFT STARTER CONTROLS. SOFT STARTER CONTROLS SHALL BE SPLIT BETWEEN THE MAIN STARTER BUCKETS AND THE SUPPLEMENTAL CONTROL SPACE AS DETERMINED BY THE MCC VENDOR DURING CONSTRUCTION.



UPPER LEVEL ROOM PLAN
1/4" = 1'-0"

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

Director of Public Works: *[Signature]* 3/6/19
Date: 3/6/19

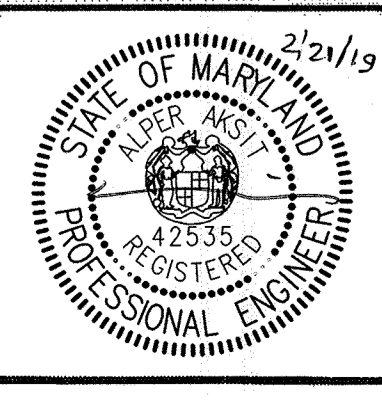
Chief Bureau of Engineering: *[Signature]* 2-28-19
Date: 2-28-19

Chief Bureau of Utilities: *[Signature]* 2-26-19
Date: 2-26-19

Chief Utility Design Division: *[Signature]* 2/26/19
Date: 2/26/19

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681



PROFESSIONAL CERTIFICATION:
I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 42535, EXPIRATION DATE 02/25/2018.

SIGNED: _____

DESIGNED	DPW				
DRAWN	MJB				
CHECKED	JCS				
PROJ. ENGR.	AA				
APPROVED					
	NO.	ISSUED FOR	DATE	BY	
	3	AS-BUILT	1/9/19	AA	
	2	ADDENDUM	5/9/17	AA	
	1	ADDENDUM	5/9/17	AA	

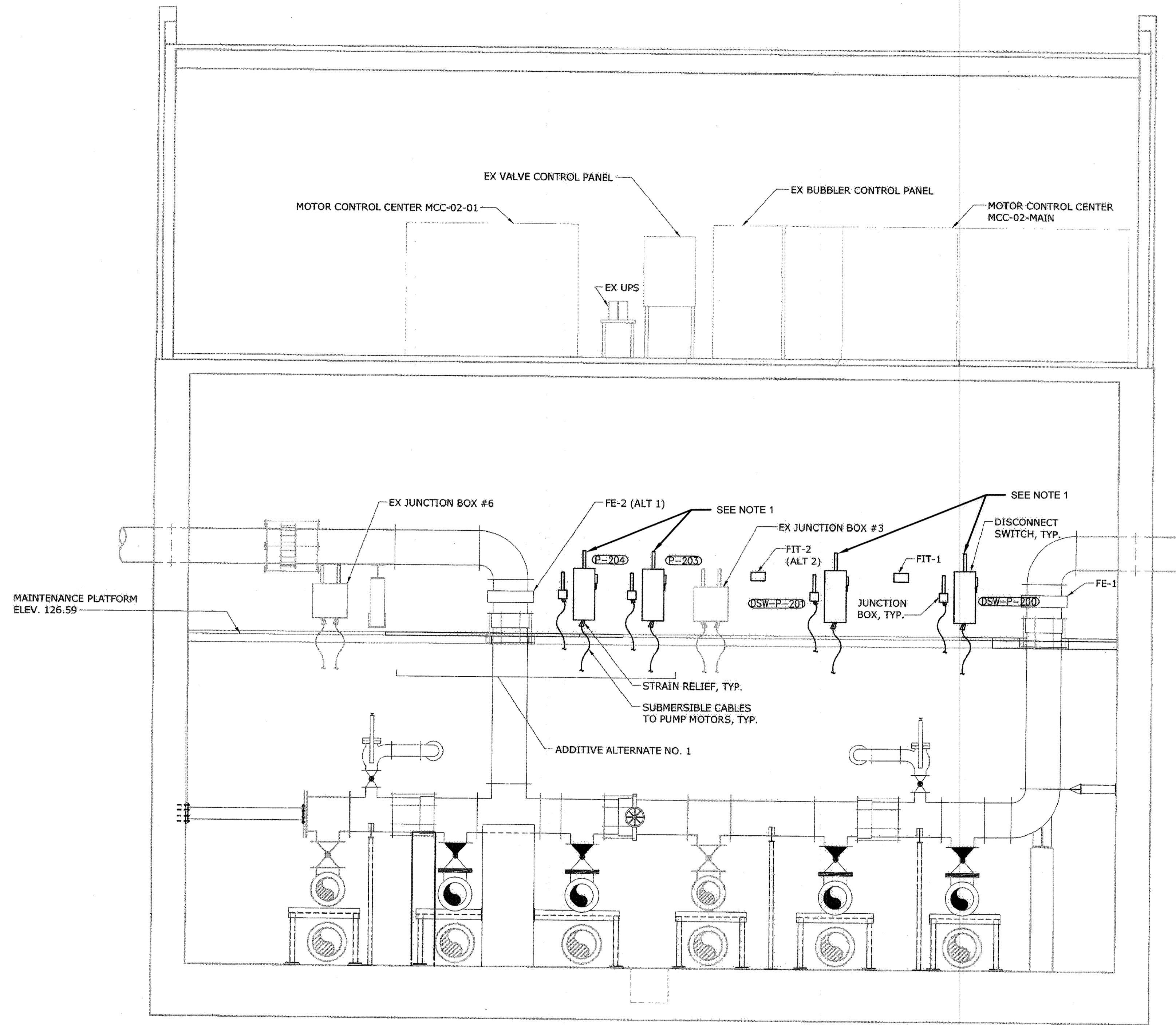
ELECTRICAL
UPPER LEVEL PLAN

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE: JAN 2017
DRAWING NUMBER: E7
SCALE: AS SHOWN
SHEET 23 OF 27

CODED NOTES:

1. PUMP DISCONNECTS INSTALLED ON EXISTING HANDRAIL



SECTION **A**
1/4" = 1'-0" **E7**

AS-BUILT REPLACEMENT SHEET 1/2019

I:\22232-BAL\32232-005\Drawings\Electrical\E8.dwg
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DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND	
DIRECTOR OF PUBLIC WORKS <i>[Signature]</i> DATE: 3/7/19	CHIEF BUREAU OF ENGINEERING <i>[Signature]</i> DATE: 2-28-19
CHIEF BUREAU OF UTILITIES <i>[Signature]</i> DATE: 2-26-19	CHIEF UTILITY DESIGN DIVISION <i>[Signature]</i> DATE: 2/26/19

Hazen
 HAZEN AND SAWYER
 1 SOUTH STREET, SUITE 1150; BALTIMORE, MD 21202
 410-539-7681

2/1/19
 STATE OF MARYLAND
 REGISTERED PROFESSIONAL ENGINEER
 42335

PROFESSIONAL CERTIFICATION:
 I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A FULLY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND, LICENSE NO. 42335, EXPIRATION DATE 07/25/2018.

SIGNED: _____

DESIGNED:	DPW				
DRAWN:	MJB				
CHECKED:	JCS				
PROJ. ENGR.:	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED:		NO.	ISSUED FOR	DATE	BY

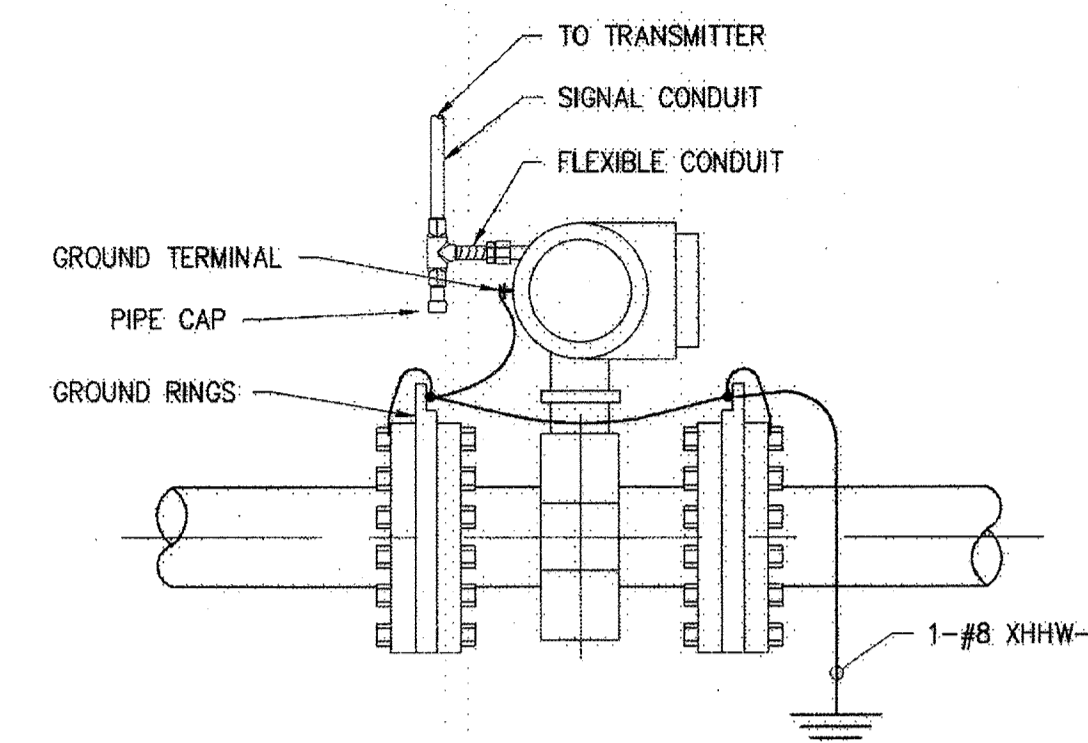
ELECTRICAL
 UPPER LEVEL SECTION

INFLUENT PUMPING STATION
 PUMP REPLACEMENT CONTRACT
 LITTLE PATUXENT WATER RECLAMATION PLANT
 CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE	JAN 2017
DRAWING NUMBER	E8
SCALE	AS SHOWN
SHEET	24 OF 27

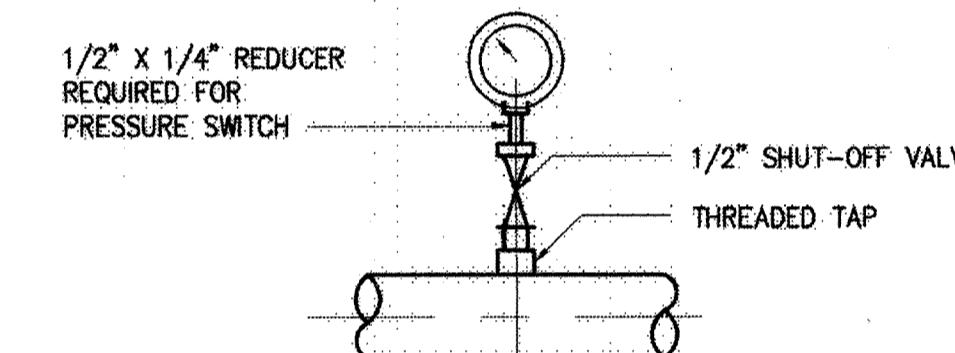
NOTES:

1. MOTOR PROTECTION EQUIPMENT INCLUDES TSH-A, MSH-B, TSH-C, AND MSH-D AS INDICATED ON SHEET E4. PROVIDE ELECTRICAL WORK TO CONNECT BEARING TEMPERATURE SWITCH TSH-E IF IT IS PROVIDED BY THE MANUFACTURER. TYPICAL OF ALL NEW MOTORS.
2. MOTOR TERMINAL HOUSING. TYPICAL FOR ALL NEW MOTORS.
3. THE LOWER PUMP ROOM SHALL BE CONSIDERED A WET ENVIRONMENT. CONDUIT SHALL BE PVC COATED HEAVY WALL CONDUIT PER SECTION 16111, PARAGRAPH 3.02F.



INTEGRAL MAGNETIC FLOW METER INSTALLATION

DETAIL	1
NO SCALE	E9

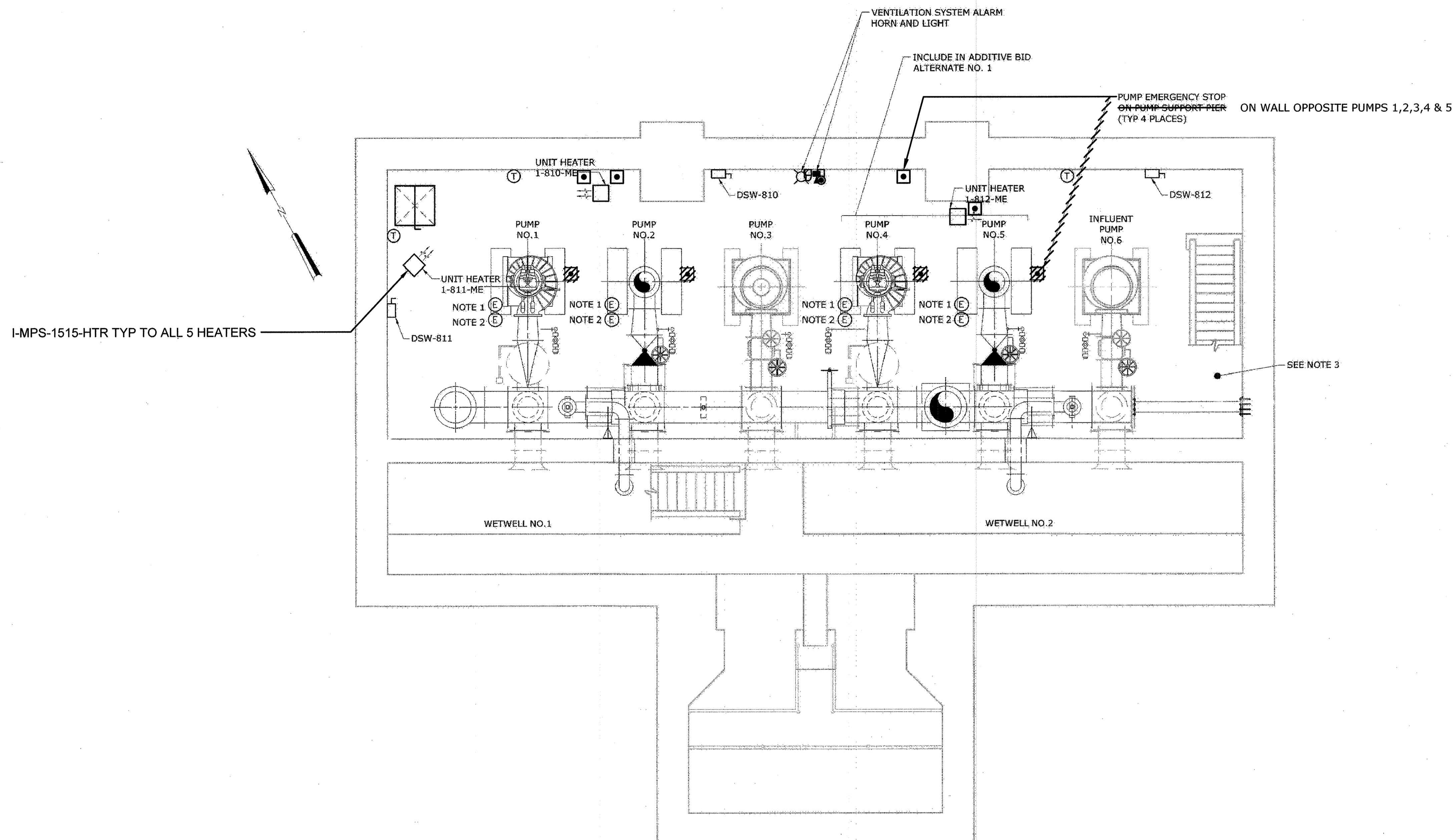


**PRESSURE GAUGE OR SWITCH
INSTALLATION WITH THREADED TAP
(SHOWN WITHOUT DIAPHRAGM SEAL)
USED FOR PIPES 2" AND LARGER**

DETAIL	3
NO SCALE	E9

NOTES:

1. PRESSURE GAUGE PIPING SHALL BE ASTM A312, TYPE 316, SCHEDULE 80 SEAMLESS STAINLESS STEEL. ALL JOINTS AND FITTINGS SHALL HAVE NPT THREADED CONNECTIONS. SHUT-OFF VALVE SHALL BE A FULL PORT, STAINLESS STEEL BALL VALVE WITH TEFLON SEAT AND PACKING AND QUARTER TURN HANDLE, MANUFACTURED BY FLOW-TEK, APOLLO, OR EQUAL.
2. SEE SPECIFICATION 17650 IN THE ADDENDUM FOR REQUIREMENTS



PUMP ROOM PLAN

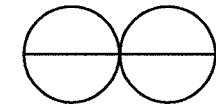
1/4" = 1'-0"

AS-BUILT REPLACEMENT SHEET 1/2019

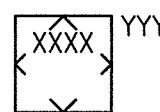
<p>DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND</p> <p><i>[Signature]</i> 3/7/19 DIRECTOR OF PUBLIC WORKS</p> <p><i>[Signature]</i> 2-20-19 CHIEF BUREAU OF ENGINEERING</p> <p><i>[Signature]</i> 2-26-19 CHIEF BUREAU OF UTILITIES</p>	<p>Hazen</p> <p>HAZEN AND SAWYER 1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202 410-539-7681</p>	<p>PROFESSIONAL CERTIFICATION: I HEREBY CERTIFY THAT THESE DOCUMENTS WERE PREPARED OR APPROVED BY ME, AND THAT I AM A DAILY LICENSED PROFESSIONAL ENGINEER UNDER THE LAWS OF THE STATE OF MARYLAND. LICENSE NO. 22535 EXPIRATION DATE 02/25/2018</p> <p>SIGNED: _____</p>	<table border="1" style="width:100%; border-collapse: collapse;"> <tr> <td>DESIGNED</td> <td>DPW</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>DRAWN</td> <td>MRB</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>CHECKED</td> <td>JCS</td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>PROJ. ENGR.</td> <td>AA</td> <td>3</td> <td>AS-BUILT</td> <td>1/9/19</td> <td>AA</td> </tr> <tr> <td></td> <td></td> <td>2</td> <td>ADDENDUM</td> <td>5/9/17</td> <td>AA</td> </tr> <tr> <td></td> <td></td> <td>1</td> <td>ADDENDUM</td> <td>5/9/17</td> <td>AA</td> </tr> <tr> <td>APPROVED</td> <td></td> <td>NO.</td> <td>ISSUED FOR</td> <td>DATE</td> <td>BY</td> </tr> </table>	DESIGNED	DPW					DRAWN	MRB					CHECKED	JCS					PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA			2	ADDENDUM	5/9/17	AA			1	ADDENDUM	5/9/17	AA	APPROVED		NO.	ISSUED FOR	DATE	BY	<p>ELECTRICAL</p> <p>LOWER LEVEL PLAN</p>	<p>INFLUENT PUMPING STATION PUMP REPLACEMENT CONTRACT LITTLE PATUXENT WATER RECLAMATION PLANT CAPITAL PROJECT NUMBER S-6264 CONTRACT NUMBER 20-4991 6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND</p>	<p>DATE JAN 2017 DRAWING NUMBER E9 SCALE AS SHOWN SHEET 25 OF 27</p>
DESIGNED	DPW																																															
DRAWN	MRB																																															
CHECKED	JCS																																															
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA																																											
		2	ADDENDUM	5/9/17	AA																																											
		1	ADDENDUM	5/9/17	AA																																											
APPROVED		NO.	ISSUED FOR	DATE	BY																																											

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INSTRUMENT AND FUNCTION SYMBOLS				
	PRIMARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	FIELD MOUNTED	AUXILIARY LOCATION NORMALLY ACCESSIBLE TO OPERATOR	NORMALLY INACCESSIBLE OR BEHIND THE PANEL DEVICES OR FUNCTIONS
FIELD/PANEL EQUIPMENT	XXX 000	XXX 000	XXX 000	XXX 000
SHARED DISPLAY, SHARED CONTROL (OIT)	XXX 000	XXX 000	XXX 000	XXX 000
PROGRAMMABLE LOGIC CONTROLLER	XXX 000	XXX 000	XXX 000	XXX 000
SUPERVISORY COMPUTER FUNCTION (HMI/SERVER)	ABC 12345	ABC 12345	ABC 12345	ABC 12345



SINGLE INSTRUMENT OR OTHER DEVICE HAVING MULTIPLE FUNCTIONS OR SHARING A COMMON HOUSING



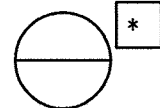
SOFTWARE LOGIC OR CONTROL MODULE XXXX AND SUB-MODULE YYY RESIDENT IN DISTRIBUTED CONTROL SYSTEM (DCS) OR PROGRAMMABLE LOGIC CONTROLLER (PLC) REFER TO CONTRACT DOCUMENTS FOR CONTROL AND MODULE DESCRIPTIONS.



DESIGNATIONS OF CONTROL FUNCTIONS (ZZZ) ASSOCIATED WITH INSTRUMENT OR OTHER DEVICES.

AHC - AUTO/HOLD/CLOSE
AM - AUTO/MANUAL
DEV - DEVIATION
HOA - HAND/OFF/AUTO
MOA - MANUAL/OFF/AUTO
HOR - HAND/OFF/REMOTE
LOS - LOCKOUT STOP
LR - LOCAL/REMOTE
LOR - LOCAL/OFF/REMOTE
OO - ON/OFF

OC - OPEN/CLOSE
OSC - OPEN/STOP/CLOSED
POT - POTENTIOMETER
RL - RAISE/LOWER
RSL - RAISE/STOP/LOWER
SD - SHUTDOWN
SEL - SELECT
SP - SET POINT
SR - START/RESET
SS - START/STOP



INSTRUMENT PANEL MOUNTED WITH COMPUTING OR CONVERTING FUNCTION



CONVERT

E - VOLTAGE
I - CURRENT
P - PNEUMATIC
A - ANALOG
B - BINARY

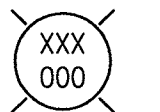
H - HYDRAULIC
O - ELECTROMAGNETIC, SONIC
R - RESISTANCE (ELECT.)
D - DIGITAL



COMPUTE

Σ SUMMING
Δ SUBTRACTOR
X MULTIPLYING
÷ DIVIDING
√ ROOT EXTRACTION
K PROPORTIONAL
d/dt DERIVATIVE

x^n EXPONENTIAL
P/n AVERAGING
: RATIO
> HIGH SELECTING
< LOW SELECTING
∫ INTEGRAL
PID PID



PANEL MOUNTED PILOT LIGHT



ANALYZER, XXXX = TYPE

XXXX ALK - ALKALINITY
CL₂ - CHLORINE CONCENTRATION
COMB - COMBUSTIBLE GAS
COND - CONDUCTIVITY
DO - DISSOLVED OXYGEN
H₂S - HYDROGEN SULFIDE
LEL - LOWER EXPLOSIVE LIMIT
O₂ - OXYGEN CONCENTRATION

O₃ - OZONE
ORP - OXIDATION/REDUCTION POTENTIAL
pH - HYDROGEN ION CONCENTRATION
TH - TOTAL HARDNESS
UV - ULTRAVIOLET

(*) ASTERISK IDENTIFIES FIELD INSTRUMENTS FURNISHED BY EQUIPMENT SUPPLIER

⊕ ASTERISK IDENTIFIES LOCAL CONTROL PANELS FURNISHED BY EQUIPMENT SUPPLIER



OPERATIONAL INTERLOCK



COMPLEX INTERLOCK



AND LOGIC



= 1, 2, 3, etc. INTERLOCK NUMBER DESCRIPTION ON SAME SHEET

OR LOGIC

VALVE AND ACTUATOR SYMBOLS

GENERIC VALVE	PLUG VALVE	GLOBE VALVE	BALL VALVE
BALL VALVE (3-WAY)	3-WAY VALVE (GENERAL)	PINCH VALVE	COMBINATION VACUUM AND PRESSURE RELIEF VALVE
BUTTERFLY VALVE	SWING CHECK VALVE	BALL CHECK VALVE	DIAPHRAGM VALVE
NEEDLE VALVE	ANGLE VALVE	ROTARY VALVE	THROUGH PLUG VALVE
PRESSURE RELIEF OR SAFETY VALVE	VACUUM RELIEF VALVE	PRESSURE-REDUCING REGULATOR	BACKPRESSURE REGULATOR
BACKFLOW PREVENTER	SLUICE GATE	STOP/SLIDE GATE	STRAINER
BACKFLOW PREVENTER	ELECTRIC ACTUATOR	SOLENOID ACTUATOR	PNEUMATIC ACTUATOR
ELECTROPNEUMATIC ACTUATOR	ELECTROHYDRAULIC ACTUATOR	HAND WHEEL	HYDRANT
CENTRIFUGAL PUMP			

INSTRUMENT SYMBOLS

MAGNETIC FLOW METER	VENTURI FLOW TUBE	TURBINE FLOW METER	ROTAMETER	ULTRASONIC FLOW METER	PADDLE WHEEL FLOW METER	VORTEX FLOW METER	POSITIVE DISPLACEMENT FLOW METER
PITOT TUBE	PARSHALL FLUME	WEIR	ORIFICE PLATES	STRAIGHTENING VANES	ULTRASONIC LEVEL SENSOR	SUBMERSIBLE LEVEL SENSOR	FLOAT TYPE LEVEL SWITCH
TAPPED RING SEAL	DIAPHRAGM SEAL	FULL LINE RING SEAL	VALVED TAP	RTD AND THERMOWELL	RADAR LEVEL SENSOR (UNGUIDED)	RADAR LEVEL SENSOR (GUIDED)	CAPACITANCE LEVEL SENSOR
SIGNAL BOOSTER	SEQUENTIAL EQUIPMENT	ANALOG INPUT	ANALOG OUTPUT	DIGITAL INPUT	DIGITAL OUTPUT		

INSTRUMENT/DEVICE IDENTIFICATION LETTERS

	FIRST-LETTER		SUCCEEDING-LETTERS		
	MEASURED OR INITIATING VARIABLE	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS		ALARM		
B	BURNER, COMBUSTION				
C				CONTROL	CLOSE, CLOSED
D		DIFFERENTIAL			
E	VOLTAGE		PRIMARY ELEMENT SENSOR		
F	FLOW RATE	FRACTION RATIO			
G	GAUGE		GLASS, VIEWING DEVICE		
H	HAND				HIGH
I	ELECTRICAL CURRENT		INDICATE		
J	POWER	SCALE			
K	TIME, TIME SCHEDULE	TIME RATE OF CHANGE			CONTROL STATION
L	LEVEL		LIGHT		LOW
M		MOMENTARY			MIDDLE, INTERMEDIATE
N	TORQUE				
O			ORIFICE, RESTRICTION		OPEN, OPENED
P	PRESSURE, VACUUM		TEXT POINT CONNECTION		
Q	QUANTITY	INTEGRATE, TOTALIZE			
R	RUN		RECORD & STORE	REPORT	
S	SPEED, FREQUENCY	SAFETY		SWITCH	
T	TEMPERATURE			TRANSMIT	
U	MULTIVARIABLE		MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION, VOLUME			VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE		WELL		
X	FAILURE OR TROUBLE	X AXIS			
Y	EVENT, STATE/PRESENCE	Y AXIS			COMPUTE, REVERT, RELAY
Z	POSITION, DIMENSION	Z AXIS			DRIVER, ACTUATOR, FINAL CONTROL ELEMENT

LINETYPE LEGEND

	MAJOR PROCESS PIPES OR CHANNELS
	SECONDARY PROCESS OR MECHANICAL CONNECTIONS
	CAPILLARY OR IMPULSE TUBING
	AIR SUPPLY OR SIGNAL
	HYDRAULIC SUPPLY OR SIGNAL
	ELECTRICAL SIGNAL
	DATA LINK OR INTERNAL SOFTWARE LINK
	PROCESS FLOW
	TYPICAL PUMP
	PUMPING STATION EQUIPMENT

AS - BUILT

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

2/14/17
DIRECTOR OF PUBLIC WORKS DATE

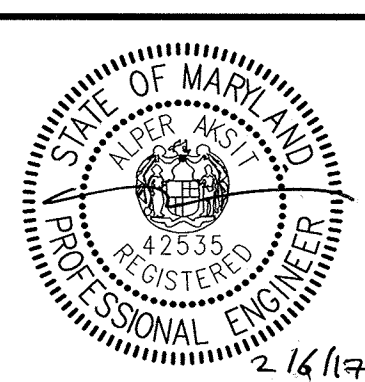
2/16/17
CHIEF BUREAU OF ENGINEERING DATE

2/14/17
CHIEF BUREAU OF UTILITIES DATE

2/16/17
CHIEF UTILITY DESIGN DIVISION DATE

Hazen

HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681



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. 42535, EXPIRATION DATE 07/25/2018.

SIGNED: _____

DESIGNED: AA

DRAWN: MRB

CHECKED: JCS

PROJ. ENGR.: AA

APPROVED: _____

NO. _____ ISSUED FOR _____ DATE _____ BY _____

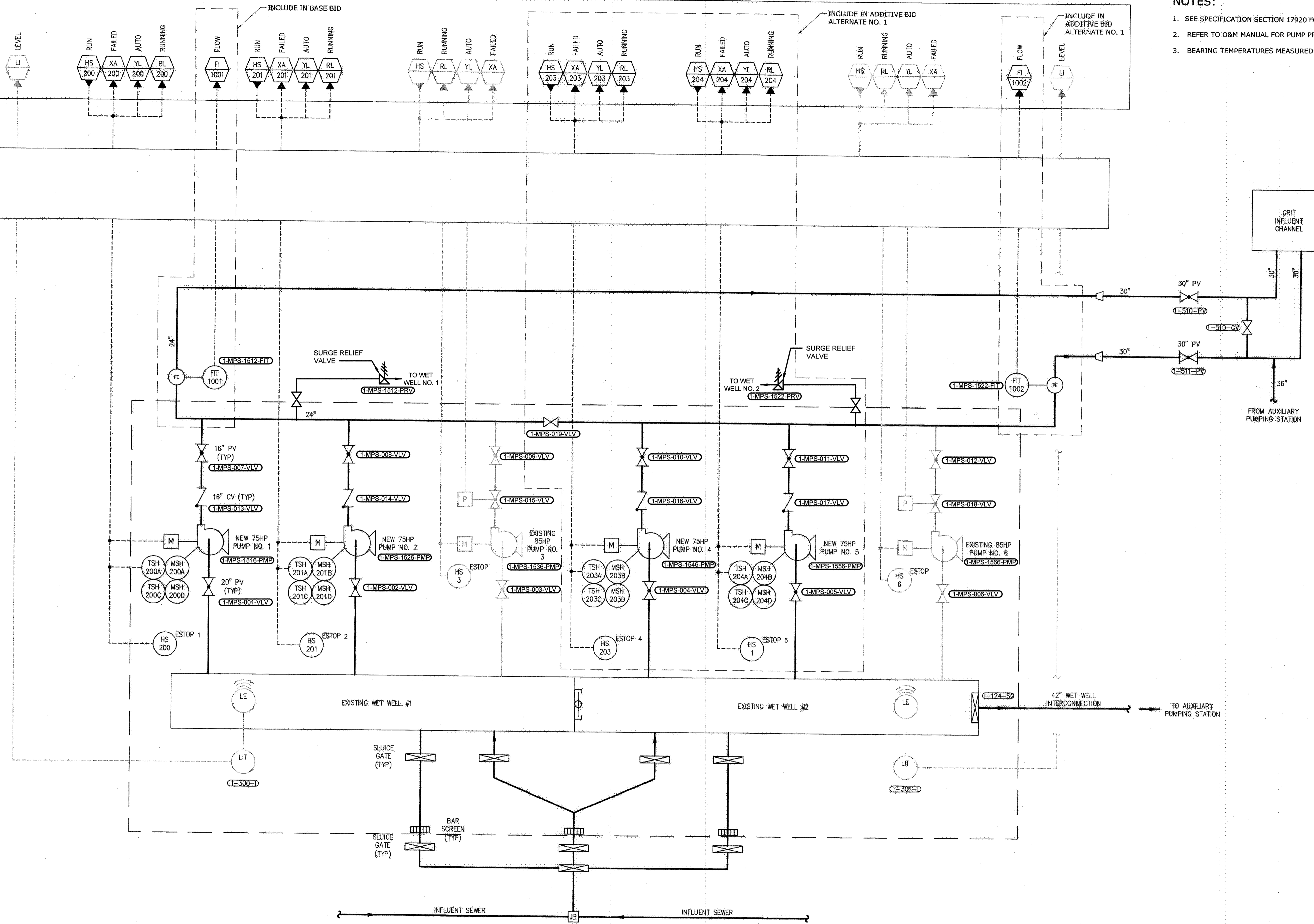
INSTRUMENTATION
LEGEND AND SYMBOLS

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE: JAN 2017
DRAWING NUMBER: I1
SCALE AS SHOWN
SHEET 26 OF 27

EXISTING PLANT SCADA PIU

MCC



- NOTES:**
1. SEE SPECIFICATION SECTION 17920 FOR ADDITIONAL SYSTEM I/O.
 2. REFER TO O&M MANUAL FOR PUMP PROTECTION DEVICES.
 3. BEARING TEMPERATURES MEASURED IN FIVE LOCATIONS.

AS-BUILT REPLACEMENT SHEET 1/2019

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

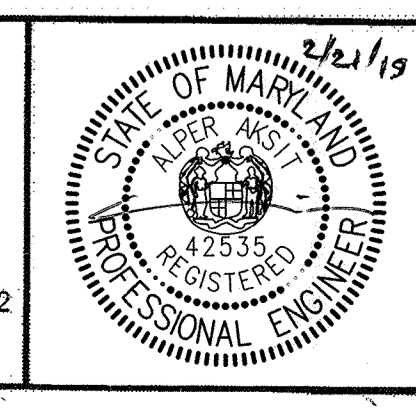
[Signature] 3/6/19
DIRECTOR OF PUBLIC WORKS DATE

[Signature] 2/28/19
CHIEF BUREAU OF ENGINEERING DATE

[Signature] 2/26/19
CHIEF BUREAU OF UTILITIES DATE

[Signature] 2/26/19
CHIEF UTILITY DESIGN DIVISION DATE

Hazen
HAZEN AND SAWYER
1 SOUTH STREET, SUITE 1150, BALTIMORE, MD 21202
410-539-7681



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SIGNED: _____

DESIGNED	AA				
DRAWN	MRB				
CHECKED	JCS				
PROJ. ENGR.	AA	3	AS-BUILT	1/9/19	AA
		2	ADDENDUM	5/9/17	AA
		1	ADDENDUM	5/9/17	AA
APPROVED		NO.	ISSUED FOR	DATE	BY

INSTRUMENTATION
PROCESS & INSTRUMENTATION
DIAGRAM

INFLUENT PUMPING STATION
PUMP REPLACEMENT CONTRACT
LITTLE PATUXENT WATER RECLAMATION PLANT
CAPITAL PROJECT NUMBER S-6264
CONTRACT NUMBER 20-4991
6TH ELECTION DISTRICT HOWARD COUNTY, MARYLAND

DATE JAN 2017
DRAWING NUMBER
I2
SCALE AS SHOWN
SHEET 27 OF 27

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