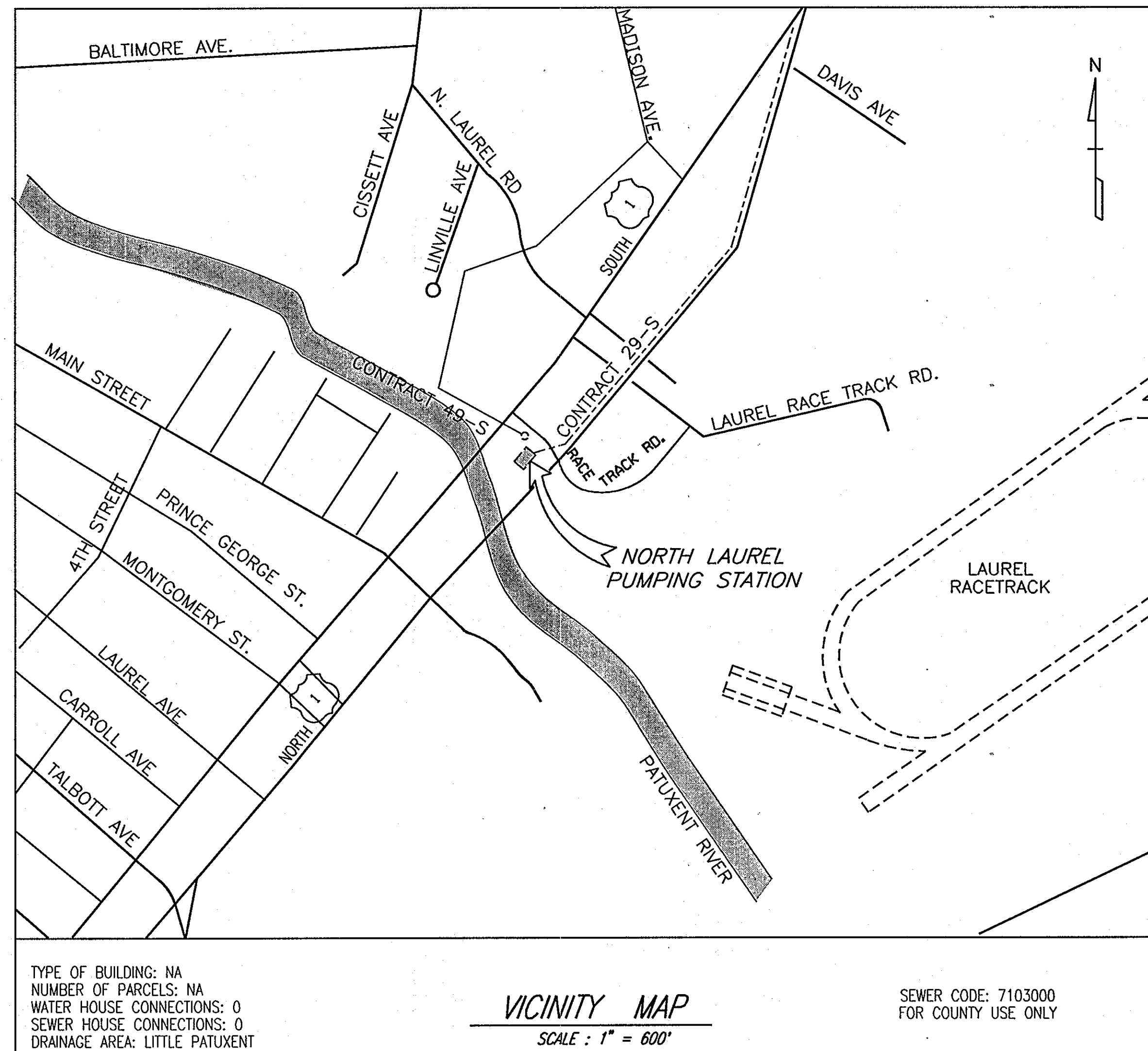


NORTH LAUREL WASTEWATER PUMPING STATION MAINTENANCE IMPROVEMENTS

CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

INDEX OF DRAWINGS

SHEET NO.	DRAWING NO.	DESCRIPTION
1	G-1	TITLE SHEET - VICINITY MAP, INDEX OF DRAWINGS, AND GENERAL NOTES
2	C-1	SITE PLAN - SEQUENCE OF CONSTRUCTION
3	D-1	MECHANICAL PLANS - DEMOLITION
4	D-2	ELECTRICAL PLAN - DEMOLITION
5	D-3	ELECTRICAL SINGLE LINE & MCC SCHEDULE - DEMOLITION
6	M-1	MECHANICAL INSTALLATION PLANS
7	M-2	MECHANICAL INSTALLATION SECTION AND DETAILS
8	M-3	MECHANICAL INSTALLATION DETAILS
9	E-1	ELECTRICAL PLAN, LEGEND AND ABBREVIATIONS - NEW WORK
10	E-2	ELECTRICAL SINGLE LINE & MCC SCHEDULE - NEW WORK
11	I-1	PROCESS AND INSTRUMENTATION LEGEND AND ABBREVIATIONS
12	I-2	PROCESS AND INSTRUMENTATION DIAGRAM
13	I-3	CONTROL DIAGRAMS, LEGEND AND SYMBOLS
14	I-4	VFD-1 AND STATION PLC CONTROL DIAGRAMS
15	I-5	VFD-2 AND 3 PUMP CONTROL DIAGRAMS
16	I-6	STATION PLC/TELEMETRY MODIFICATION DETAILS
17	I-7	INSTRUMENT RISER DIAGRAMS



DIRECTIONS: TAKE ROUTE 32 EAST FROM I-95, AND TRAVEL SOUTH ON ROUTE 1 TO RACE TRACK ROAD

GENERAL NOTES

- APPROXIMATE LOCATION OF EXISTING MAINS ARE SHOWN. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING MAINS AND SERVICES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE INCURRED SHALL BE REPAIRED IMMEDIATELY TO THE SATISFACTION OF THE ENGINEER AT THE CONTRACTOR'S EXPENSE.
- ALL HORIZONTAL CONTROLS ARE BASED ON MARYLAND STATE COORDINATES, NAD 83/91.
- ALL VERTICAL CONTROLS ARE BASED ON NAVD 88.
- ALL PIPE ELEVATIONS SHOWN ARE INVERT ELEVATIONS UNLESS OTHERWISE NOTED ON PLANS.
- CLEAR ALL UTILITIES BY A MINIMUM OF 12". CLEAR ALL POLES BY 5'-0" MINIMUM, OR TUNNEL AS REQUIRED UNLESS OTHERWISE NOTED. THE OWNER HAS CONTACTED UTILITY COMPANIES AND HAS MADE ARRANGEMENTS FOR BRACING OF THE POLES AS SHOWN ON DRAWINGS. IN THE EVENT THE CONTRACTOR'S WORK REQUIRES THE BRACING OF ADDITIONAL POLES OR DAMAGES SHALL BE DEDUCTED FROM MONIES OWED THE CONTRACTOR. THE CONTRACTOR SHALL COORDINATE WITH THE UTILITY COMPANIES TO SCHEDULE THE BRACING OF THE POLES.
- FOR DETAILS NOT SHOWN ON THE DRAWINGS, AND FOR MATERIALS AND CONSTRUCTION METHODS, USE HOWARD COUNTY DESIGN MANUAL, VOLUME IV, STANDARD SPECIFICATIONS AND DETAILS FOR CONSTRUCTION (LATEST EDITION). THE CONTRACTOR SHALL HAVE A COPY OF VOLUME IV ON THE JOB.
- WHERE TEST PITS HAVE BEEN MADE ON EXISTING UTILITIES, THEY ARE NOTED BY THE SYMBOL AT THE LOCATIONS OF THE PITS. A NOTE OR NOTES CONTAINING THE RESULTS OF THE TEST PIT OR PITS IS INCLUDED ON THE DRAWINGS. EXISTING UTILITIES IN THE VICINITY OF THE PROPOSED WORK FOR WHICH TEST PITS HAVE NOT BEEN DUG SHALL BE LOCATED BY CONTRACTOR TWO WEEKS IN ADVANCE OF CONSTRUCTION OPERATIONS AT HIS OWN EXPENSE.
- CONTRACTOR SHALL NOTIFY THE FOLLOWING UTILITIES OR AGENCIES AT LEAST FIVE WORKING DAYS BEFORE STARTING WORK SHOWN ON THESE PLANS

AT&T	1-800-252-1133
BGE (CONTRACTOR SERVICES)	410-850-4620
BGE (UNDERGROUND DAMAGE CONTROL)	410-787-9068
BUREAU OF UTILITIES	410-313-4900
COLONIAL PIPELINE CO.	410-795-1390
MISS UTILITY	1-800-257-7777
STATE HIGHWAY ADMINISTRATION	410-531-5533
VERIZON	1-800-743-0033/410-224-9210
- TREES AND SHRUBS ARE TO BE PROTECTED FROM DAMAGE TO THE MAXIMUM EXTENT. TREES AND SHRUBS LOCATED WITHIN THE CONSTRUCTION STRIP ARE NOT TO BE REMOVED OR DAMAGED BY THE CONTRACTOR.

AS-BUILT

DECEMBER 2005

G-1

SCALE AS SHOWN

SHEET

1 OF 17

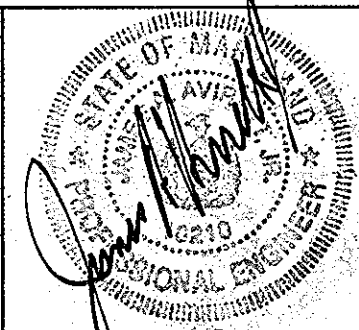
DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

[Signature] 2/10/04
DIRECTOR OF PUBLIC WORKS
DATE

[Signature] 2/9/04
CHIEF, BUREAU OF ENGINEERING
DATE

PREPARED BY:

WR&A
Whitman, Reardon and Associates, LLP.
801 S. Caroline St.
Baltimore, Md. 21231
410-235-3450



DES: LAP					
DRN: LAP					
CHK: SEA					
DATE: 9/30/03	BY	NO.	REVISION	DATE	

TITLE SHEET- VICINITY MAP,
INDEX OF DRAWINGS, AND
GENERAL NOTES

600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

100% JANUARY, 2004

REMOVAL NOTES:

- ① SEE REMOVALS ON DRAWING D-2 NOTE 8. FOR RELOCATION OF EXISTING UNIT HEATER.
- ② DEWATER WET WELL AND REMOVE EXISTING WET WELL FLOATS.
- ③ REMOVE ALL EXISTING BUBBLER SYSTEM PIPING AND SUPPORTS.
- ④ REMOVE EXISTING PUMP NO. 2 PNEUMATIC CONE VALVE WITH ALL ASSOCIATED AIR PIPING AND ELECTRICAL SERVICE. RETURN CONE VALVE TO THE BUREAU OF UTILITIES.
- ⑤ REMOVE EXISTING PUMP MOTORS NO. 2 AND NO. 3. MODIFY SUPPORT PADS AND SHAFT COUPLINGS AS DESCRIBED ON DETAIL B, ON DRAWING M-2.
- ⑥ REMOVE EXISTING COMPRESSED AIR SYSTEM IN ITS ENTIRETY. SEE REMOVAL NOTES ON DRAWING D-2 FOR ADDITIONAL DETAILS.

- ⑦ REMOVE EXISTING OUTSIDE VENTILATION STACKS INCLUDING WALL BOXES AND ALL SUPPORTS.
- ⑧ REMOVE EXISTING WALL MOUNTED PRESSURE TRANSMITTER INCLUDING ALL SENSING PIPING AND ELECTRICAL SERVICE. RETURN PRESSURE TRANSMITTER TO THE BUREAU OF UTILITIES.
- ⑨ REMOVE EXISTING ROOF MOUNTED EXHAUST FAN. MODIFY VENTILATION SYSTEM AS DESCRIBED ON DRAWINGS M-1 AND M-2.
- ⑩ REMOVE EXISTING WET WELL SUPPLY FAN INCLUDING INTERIOR DUCT AND WALL CONNECTIONS. FILL AND CAP 14" CEMENT ASBESTOS DUCT. MODIFY VENTILATION SYSTEM AS DESCRIBED ON DRAWINGS M-1 AND M-2.
- ⑪ REMOVE EXISTING PUMP ROOM EXHAUST FAN INCLUDING SUPPLY DUCT, WALL AND FLOOR CONNECTIONS. MODIFY VENTILATION SYSTEM AS DESCRIBED ON DRAWINGS M-1, M-2 AND M-3.

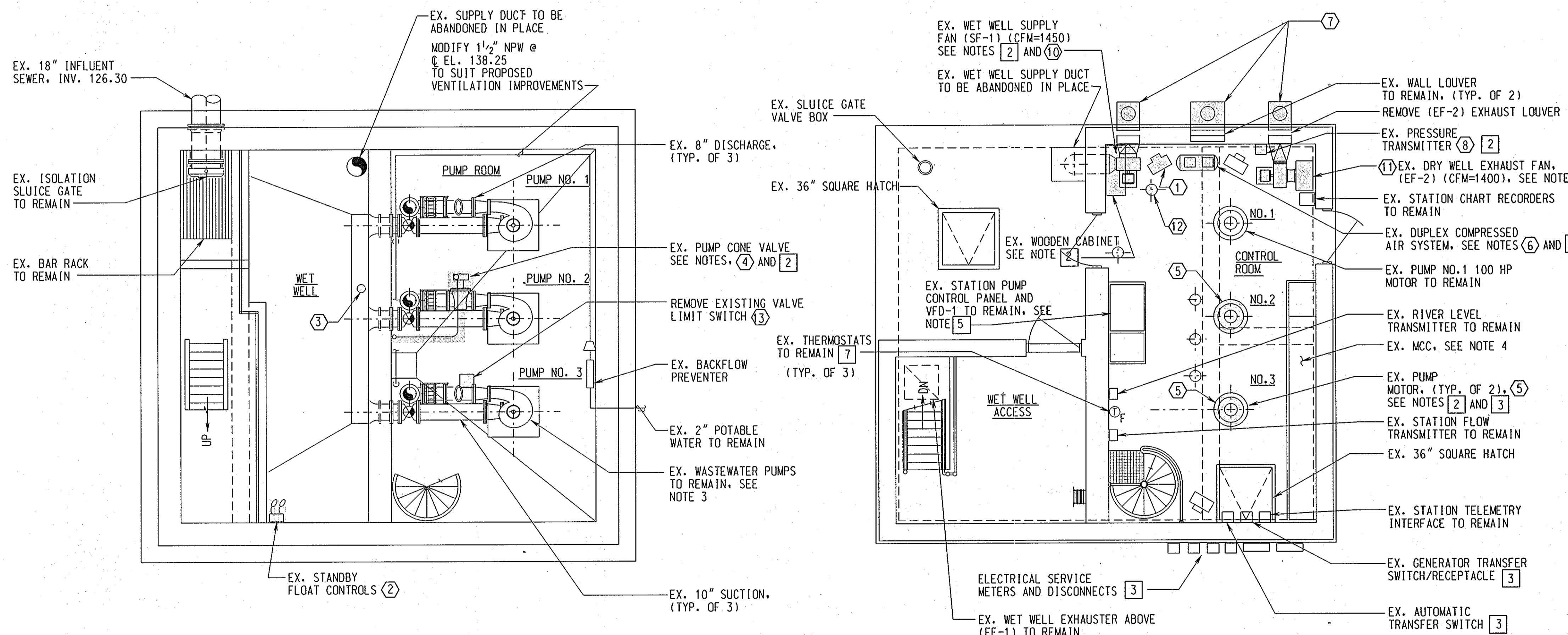
- ⑫ RELOCATE VALVE BOX SHOWN FOR PUMP NO. 1 DISCHARGE ISOLATION VALVE. FILL FLOOR OPENING WITH NON SHRINK-GROUT AND RELOCATE AS DESCRIBED ON DRAWING M-1, NOTE 17.
- ⑬ REMOVE EXISTING VALVE LIMIT SWITCH. CONTRACTOR TO INVESTIGATE EXISTING VALVE LIMIT SWITCH CONFIGURATION AND CONTACTS.

CONSTRUCTION NOTES:

- ① CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS AND CONDITIONS PRIOR TO THE START OF CONSTRUCTION.
- ② CONTRACTOR TO TURN-OVER MECHANICAL AND ELECTRICAL GEAR AS DIRECTED BY OWNER.
- ③ EXISTING PUMPS TO REMAIN, CAPACITIES 1000 GPM @ 170 FT. TDH. SEE ELECTRICAL DEMOLITION SHEETS FOR DETAILED ELECTRICAL REMOVALS.
- ⑤ SEE INSTRUMENTATION DRAWINGS FOR DETAILED MODIFICATIONS ASSOCIATED WITH STATION CONTROL AND TELEMTRY.
- ⑥ SEE DRAWINGS M-1 AND M-2 FOR DETAILED MODIFICATIONS AND INSTALLATION NOTES.
- ⑦ EXISTING THERMOSTATS:
 - VENTILATION
 - FREEZESTAT
 - HEATING

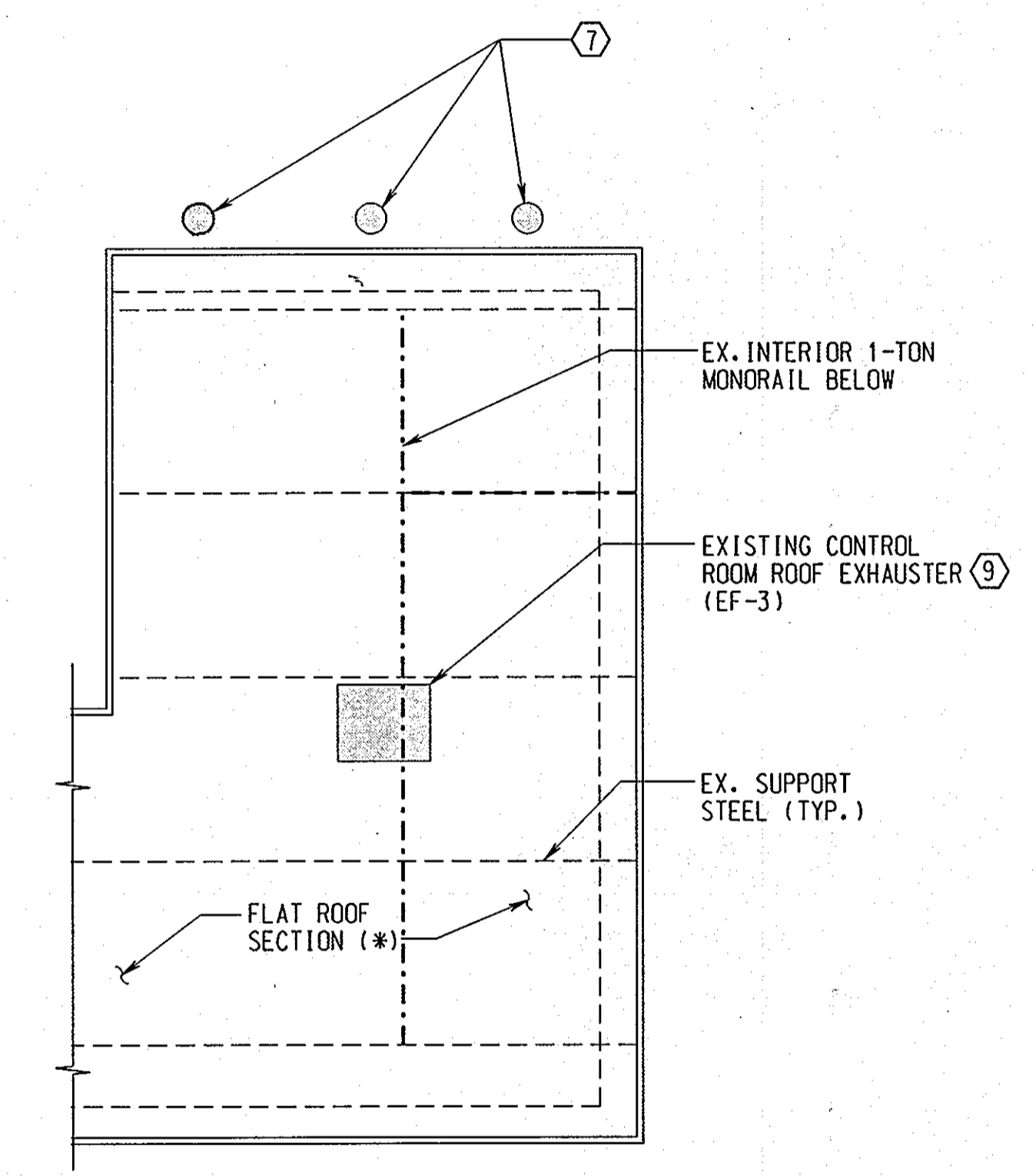
LEGEND:

- EXISTING FEATURES
- REMOVALS



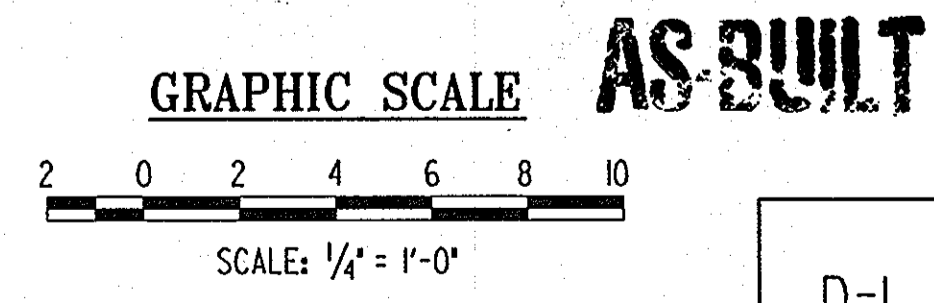
LOWER LEVEL PLAN ①
SCALE: 1/4" = 1'-0"

GRADE LEVEL PLAN ①
SCALE: 1/4" = 1'-0"

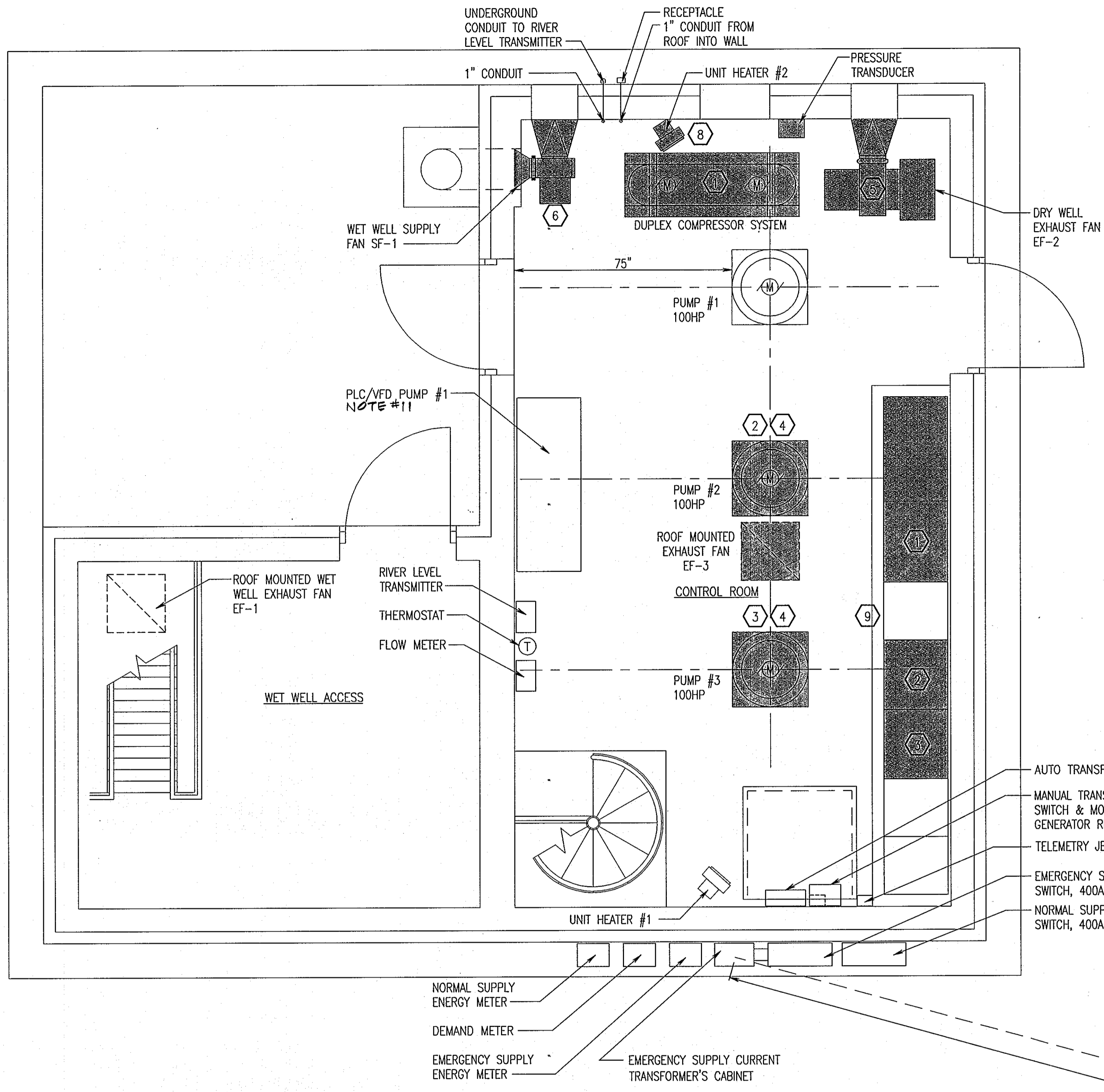


(*) EXISTING ROOF IS CONSTRUCTED OF PRECAST PLANKS AND BUILT UP ROOFING WITH STONE TOPPING

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



DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND. Director of Public Works: <i>Jan P. Sh...</i> 2/10/04 Chief, Bureau of Engineering: <i>Robert J. ...</i> 2/19/04 Chief, Bureau of Utilities: <i>...</i> 2-10-04 Chief, Utility Design Division: <i>...</i> 2-9-04		PREPARED BY: WR&A Whitman, Requardt and Associates, LLP. 801 S. Caroline St. Baltimore, Md. 21231 410-235-3450		DES: LAP/BKM DRN: MMM CHK: SEA DATE: 9/30/03 BY: [Signature] NO. [Signature] REVISION [Signature] DATE [Signature]		MECHANICAL PLANS - DEMOLITION 600' SCALE MAP NO. 50 BLOCK NO. 10		NORTH LAUREL WASTEWATER PUMPING STATION MAINTENANCE IMPROVEMENTS CONTRACT NO. 44-4165 CAPITAL PROJECT NO. S-6189 HOWARD COUNTY, MARYLAND		D-1 SCALE AS SHOWN SHEET 3 OF 17
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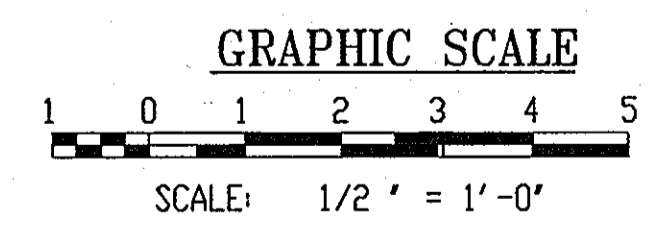
DEMOLITION LEGEND:
(DWG. D-2 & D-3)

- [S] STARTER OR BY-PASS STARTER
- [C] CONTACTOR
- [VFD] VARIABLE FREQUENCY DRIVE
- [M] MOTOR HP AS NOTED
- [T] THERMOSTAT
- [V] VOLTMETER
- [A] AMMETER
- [AS] AMMETER SELECTOR SWITCH
- [VS] VOLTAGE SELECTOR SWITCH
- [X] DEMOLITION NOTE
- [A] EXISTING ELECTRICAL EQUIPMENT TO BE DEMOLISHED
- [A] ALTERNATOR
- [PS] PRESSURE SWITCH
- [] CIRCUIT BREAKER

DEMOLITION NOTES:
(DWG. D-2 & D-3)

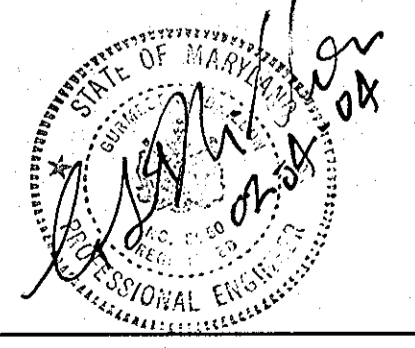
1. DISCONNECT POWER WIRING BETWEEN CELLS CC-2&3 AND COMPRESSORS. REMOVE EXISTING COMPRESSOR ALTERNATOR AND RELAY CONTROLS FROM MCC COMPARTMENT CC-4.
2. DISCONNECT LOAD CABLES. REMOVE MOTOR STARTER, CABLES & CONDUIT BETWEEN MCC CC #9 AND PUMP #2.
3. DISCONNECT LOAD CABLES. REMOVE MOTOR, STARTER AND CABLES & CONDUIT BETWEEN MCC CC #14 AND PUMP #3.
4. DISCONNECT CABLES FROM ROTOR MOTOR TO REACTO DRIVE FOR MOTOR #2 & #3.
5. DISCONNECT WIRING FROM DRY WELL EXHAUSTER TO MCC CC-16 AND REMOVE WIRES AND CONDUITS.
6. DISCONNECT WIRING FROM WET WELL BLOWER AND REMOVE WIRES AND CONDUITS FROM CC-17 TO WET WELL BLOWER.
7. REMOVE REACTO DRIVE EQUIPMENT, COORDINATE SALVAGE WITH DPW, HOWARD COUNTY.
8. RELOCATE UNIT HEATER #2 TO CLEAR PROPOSED VFD EQUIPMENT.
9. FOR LOCATION OF MCC COMPARTMENTS SEE EX. MCC ELEVATION ON SHEET D-3.
10. EXISTING 75KVA TRANSFORMER TO BE REPLACED BY BGE WITH NEW 300KVA TRANSFORMER PER DWG. E-1. CONTRACTOR SHALL COORDINATE THIS ACTIVITY WITH BGE AS PART OF THIS WORK SCHEDULE.
11. EXISTING PLC REMOVED FROM SERVICE

EXIST PUMPING STATION PLAN
SCALE: 1/2" = 1'-0"



AS-BUILT

DHILLON ENGINEERING, INC.
10902 REISTERSTOWN ROAD, SUITE 204
OWINGS MILLS, MD 21117
410-356-1095



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

PREPARED BY:
WR&A
Whitman, Requardt and Associates, LLP.
801 South Caroline Street
Baltimore, Md. 21231
410-235-3450

Director of Public Works: *John A. ...* DATE: 2-10-04
Chief, Bureau of Utilities: *...* DATE: 2-9-04
Chief, Bureau of Engineering: *...* DATE: 2-9-04
Chief, Utility Design Division: *...* DATE: 2-9-04

DES: SS			
DRN: AS			
CHK: AKM			
DATE: 07-02-03			
BY: ND	AS-BUILT	REVISION	DATE

ELECTRICAL PLAN - DEMOLITION
600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. 5-6189
HOWARD COUNTY, MARYLAND

D-2
SCALE AS SHOWN
SHEET 4 OF 17

ABBREVIATIONS:

BDD BACK DRAFT DAMPER
 CFM CUBIC FEET PER MINUTE
 DIA. DIAMETER
 EF EXHAUST FAN
 EL. ELEVATION
 EX. EXISTING
 GA GAUGE
 H HEIGHT
 HP HORSEPOWER
 HZ HERTZ
 INV. INVERT
 L LENGTH
 LAH LEVEL ALARM HIGH
 LAL LEVEL ALARM LOW
 MCC MOTOR CONTROL CENTER
 MOD MOTOR OPERATED DAMPER
 NO. NUMBER
 NPT NATIONAL PIPE THREAD
 NPW NON-POTABLE WATER
 PH PHASE
 PW POTABLE WATER
 SI STACK 1 (SEQUENTIAL)
 SF SUPPLY FAN
 S.P. STATIC PRESSURE
 S.S. STAINLESS STEEL
 RPM REVOLUTIONS PER MINUTE
 VFD VARIABLE FREQUENCY DRIVE
 W WIDTH
 W.C. WATER COLUMN (INCHES H₂O)

MECHANICAL SYMBOLS:

GATE VALVE
 MOD
 PIPE ELBOW-TURNED DOWN
 PIPE ELBOW-TURNED UP
 PLUG VALVE

CONSTRUCTION NOTES:

- 1 INSTALL 3 HP CENTRIFUGAL ROOF EXHAUST FAN RATED FOR 8,000 CFM @ 0.75" S.P. AT EXISTING FAN LOCATION, SEE DETAIL-D ON SHEET M-2. SEE ECD DETAIL-A ON DRAWING I-3.
- 2 INSTALL NEW INTAKE STACKS WITH PLENUM BOXES AS PER DETAIL-D ON SHEET M-3.
- 3 INSTALL CENTRIFUGAL UTILITY VENT SET. SEE DETAIL-C AND FAN SCHEDULE ON SHEET M-2.
- 4 ~~INSTALL NEW 8" DIA Y-BODY HYDRAULIC PUMP CHECK SERVICE VALVE AND ALL NECESSARY PIPING AND FITTINGS TO ALLOW VALVE OPERATION USING EX. STATION WATER SUPPLY. VALVE TO MATCH EXISTING VALVES ON PUMPS 1 AND 3.~~
- 5 INSTALL NEW 100 HP SQUIRREL CAGE MOTORS AS SHOWN ON SHEET M-2 AND ELECTRICAL DRAWINGS.
- 6 INSTALL WET WELL ULTRASONIC LEVEL TRANSMITTER IN ACCORDANCE WITH INSTRUMENTATION DRAWINGS.
- 7 INSTALL VFD EQUIPMENT IN ACCORDANCE WITH ELECTRICAL AND INSTRUMENTATION DRAWINGS.
- 8 FLOOR SHALL BE CORE DRILLED FOR INSTALLATION OF ULTRASONIC LEVEL SENSOR AS SHOWN IN DETAIL-E ON M-3
- 9 INSTALL AND SUPPORT 30" DIA INTAKE STACK SIMILAR TO STACK S1. BURIED PORTION OF STACK SHALL BE SUITABLY SUPPORTED TO CONCRETE WALL. STACK AND BOX SHALL BE STEEL. PLENUM BOX SHALL BE BURIED, ATTACHED TO EXTERIOR OF PUMP ROOM WALL, AND SHALL BE CONSTRUCTED AS SHOWN ON DETAIL-D ON SHEET M-2.
- 10 CORE DRILL 30" DIA HOLE IN PUMP ROOM WALL. INSTALL 30"x30" MOTOR OPERATED DAMPER WITH PLENUM TO PUMP ROOM WALL. DAMPER INSTALLATION SHALL COMPLETELY COVER 30" DIA HOLE. CONTRACTOR SHALL USE 1/4" NEOPRENE GASKETS AS NECESSARY TO SEAL GAPS BETWEEN DAMPER PLENUM, M.O.D. FRAME AND CONCRETE WALL.
- 11 INSTALL BACKUP FLOAT CONTROLS IN ACCORDANCE WITH INSTRUMENTATION DRAWINGS.
- 12 INSTALL STEEL PLATE TO SEAL OFF FLOOR OPENING.

- 13 INSTALL MOTOR SHIELDS FACING EXISTING MCC EQUIPMENT, SEE DETAILS ON DRAWING M-3.
- 14 PLATE AND SEAL ABANDONED WALL OPENING.
- 15 PROVIDE WELDED STEEL FRAMING MEMBER TO ADJUST OPENING SIZE TO MATCH FAN CURB THROAT DIMENSIONS. ANTICIPATED MODIFICATIONS INCLUDE FRAMING A 30"x25" CEILING OPENING TO SUIT A 28"x28" FAN CURB.
- 16 FRAME WOODEN SHELVING TO UTILIZE EMPTY CUBICLE FOR STORAGE
- 17 FILL EXCITING VALVE BOX OPENING AND MODIFY EXTENDED OPERATOR SHAFTING TO SUIT NEW OPENING.
- 18 ~~DELETE THIS NOTE. OWNER REQUESTED THAT NEW CHECK VALVES BE SUPPLIED WITHOUT LIMIT SWITCHES.~~
- 19 PROVIDE DISCHARGE GAUGES COMPLETE WITH CALIBRATED DIAPHRAGM SEALS AS SPECIFIED FOR EACH EXISTING PUMP.

20 REMOVE EXISTING CHECK VALVE ON P1 AND P3. REPLACE CHECK VALVES WITH VALMATIC MODEL #508 CHECK VALVES. SUPPLY STAINLESS SUPPORTS BENEATH CHECK VALVES.

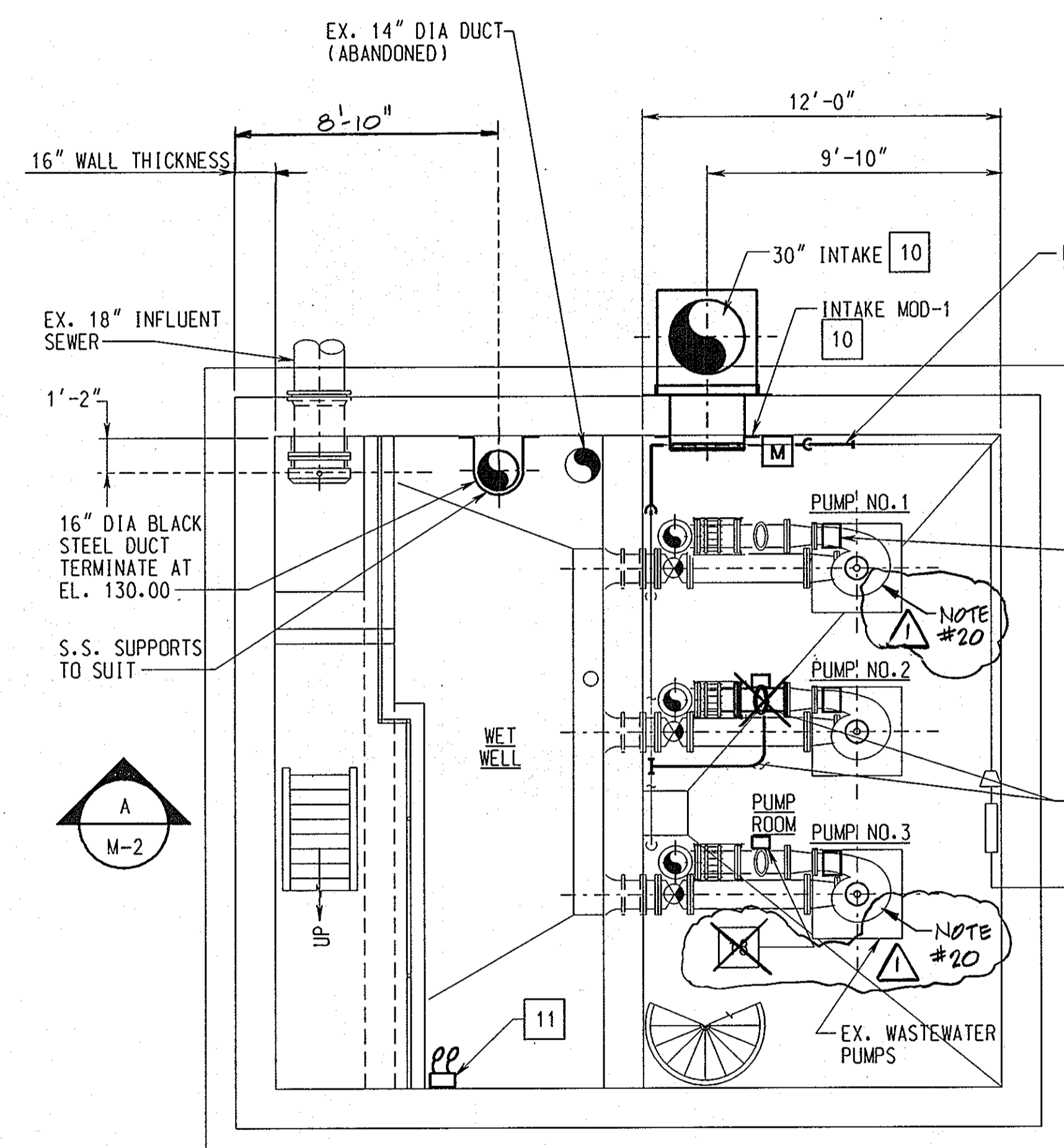
21 FAN AND SUPPORT ROTATED 90° TO ALLOW ACCESS FOR HOWARD COUNTY OPERATIONS. CONCRETE SLAB DRILLED AND DOWELED INTO EXISTING CONCRETE WALL. NEW CONCRETE SLAB MEASURES 3' WIDE X 1'-6" DEEP X 1'-6" HIGH. SUPPORTS AS DETAILED ARE ATTACHED TO RELOCATED PAD.

GENERAL NOTES:

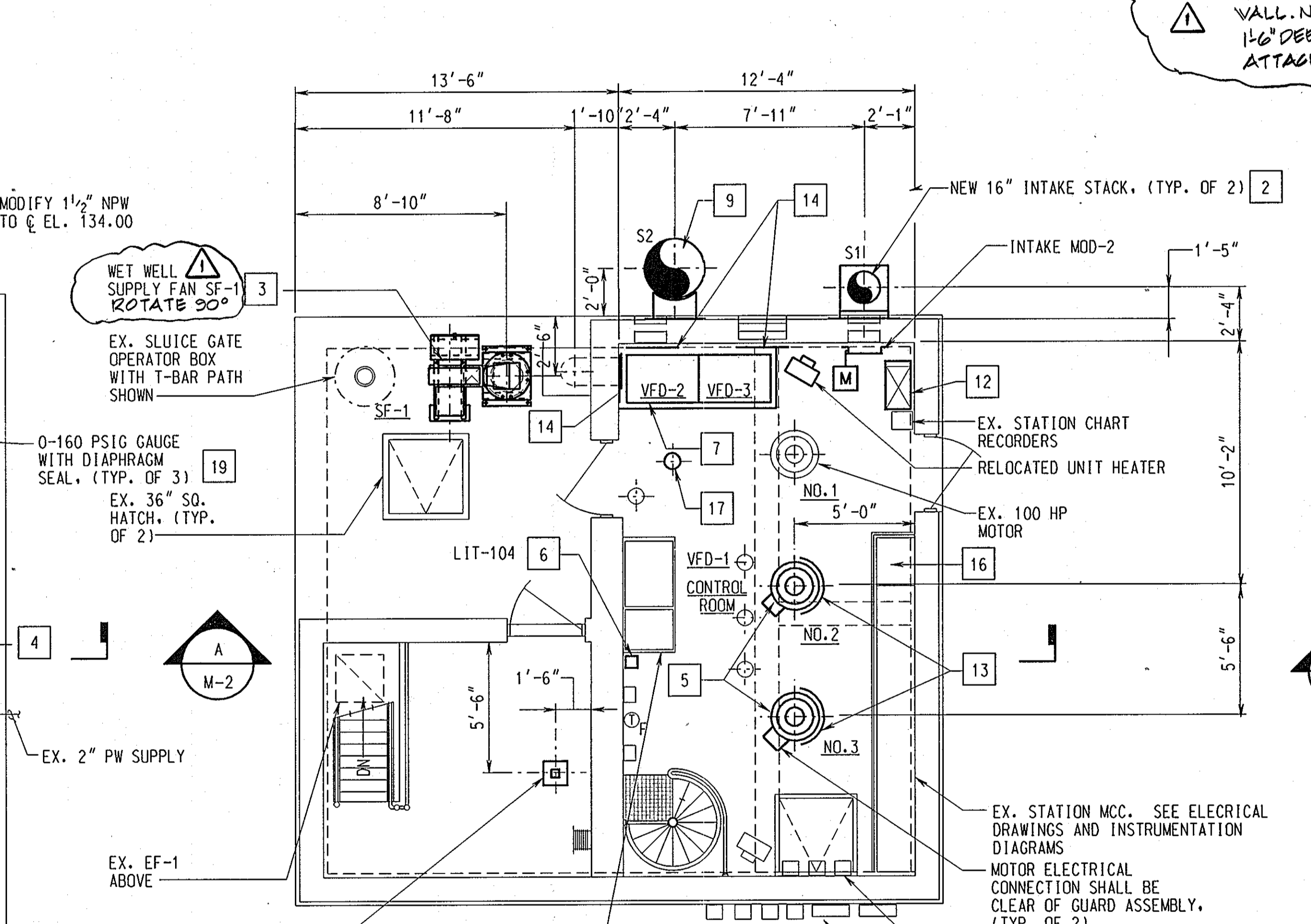
1. PIPE ROUTING FOR LINES 3" AND SMALLER HAVE NOT BEEN SHOWN ON RESPECTIVE FACILITY PLAN DRAWINGS. PIPE CONNECTIONS HAVE BEEN SHOWN FOR TERMINATIONS. THE CONTRACTOR SHALL BE RESPONSIBLE FOR DETAILED PIPE ROUTING INCLUDING ALL APPURTENANCES.
2. CONTRACTOR SHALL FIELD VERIFY ALL DIMENSIONS SHOWN.
3. CONTRACTOR SHALL COORDINATE ALL EQUIPMENT INSTALLATION REQUIREMENTS WITH OTHER PORTIONS OF CONTRACT DOCUMENTS, INCLUDING BUT NOT LIMITED TO ELECTRICAL AND INSTRUMENTATION DRAWINGS AND SPECIFICATIONS.
4. SEE INSTRUMENTATION DRAWINGS FOR CONTROL INTERFACE.
5. SEE ELECTRICAL DRAWINGS FOR ELECTRICAL POWER INTERFACE.

LEGEND:

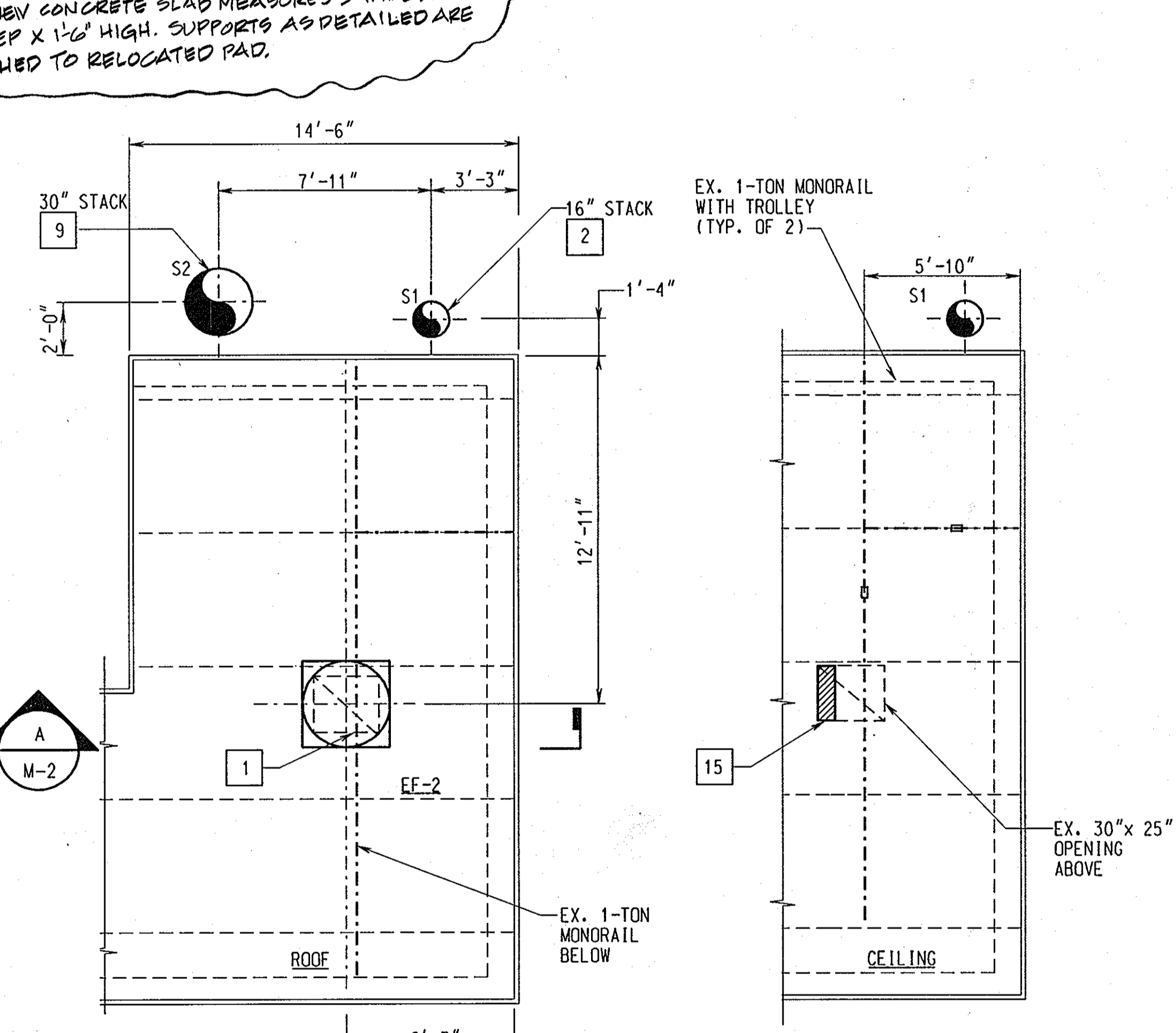
— NEW WORK
 — EXISTING FEATURES



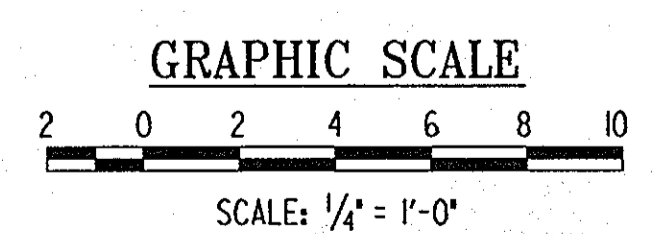
LOWER LEVEL PLAN
 SCALE: 1/4" = 1'-0"



GRADE LEVEL PLAN
 SCALE: 1/4" = 1'-0"



PARTIAL ROOF PLANS
 SCALE: 1/4" = 1'-0"



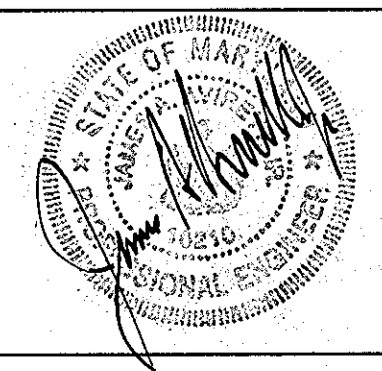
AS-BUILT M-1

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND.

[Signature] 2/10/04
 DIRECTOR OF PUBLIC WORKS DATE

[Signature] 2-9-04
 CHIEF, BUREAU OF UTILITIES DATE

PREPARED BY:
WR&A
 Whitman, Reardon and Associates, LLP.
 801 S. Caroline St.
 Baltimore, Md. 21231
 410-235-3450



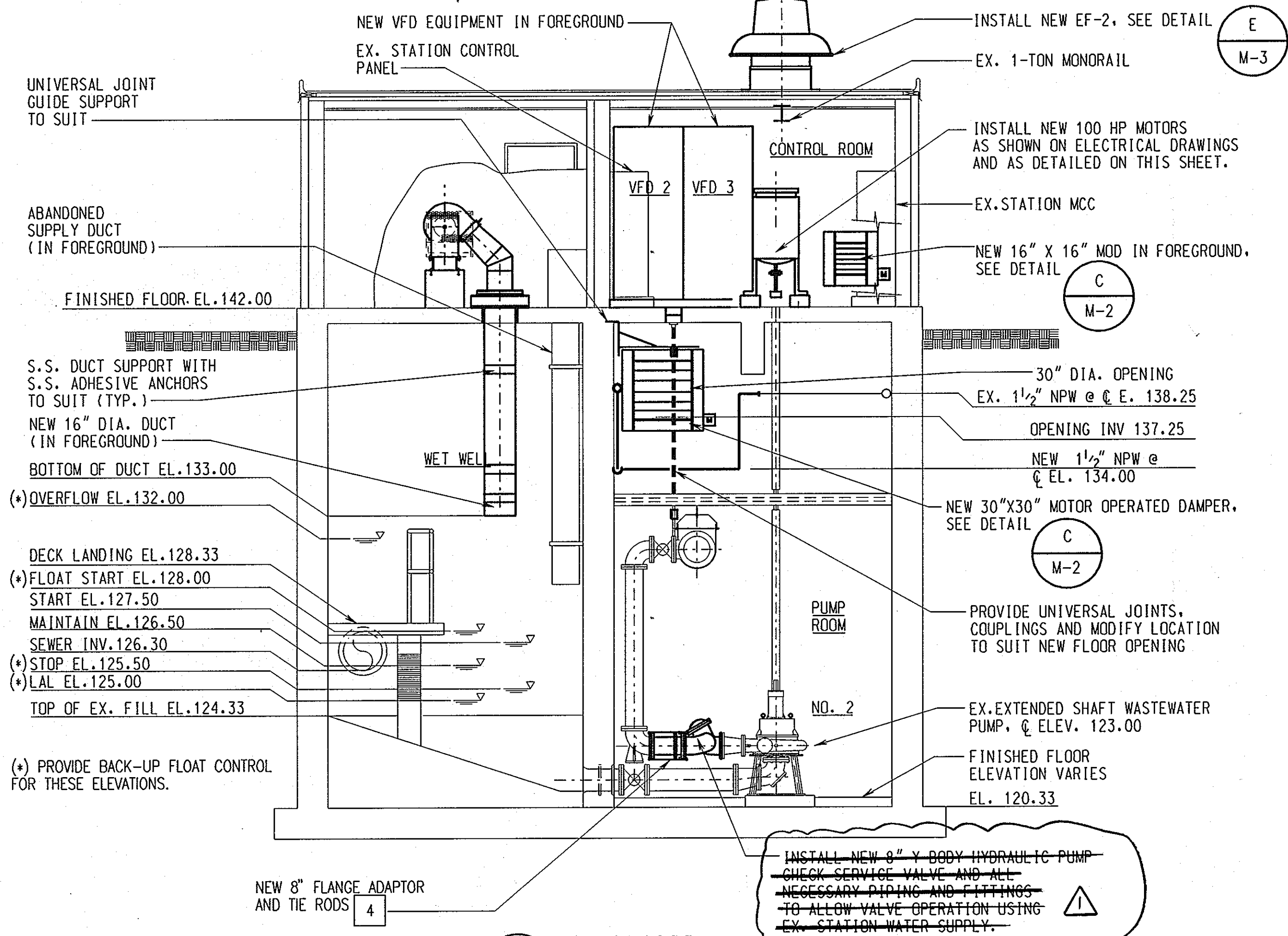
DES:	LAP/BKM	
DRN:	LAP	
CHK:	SEA	
DATE:	9/30/03	
BY:		
NO.:		
REVISION:		
DATE:		

MECHANICAL INSTALLATION PLANS

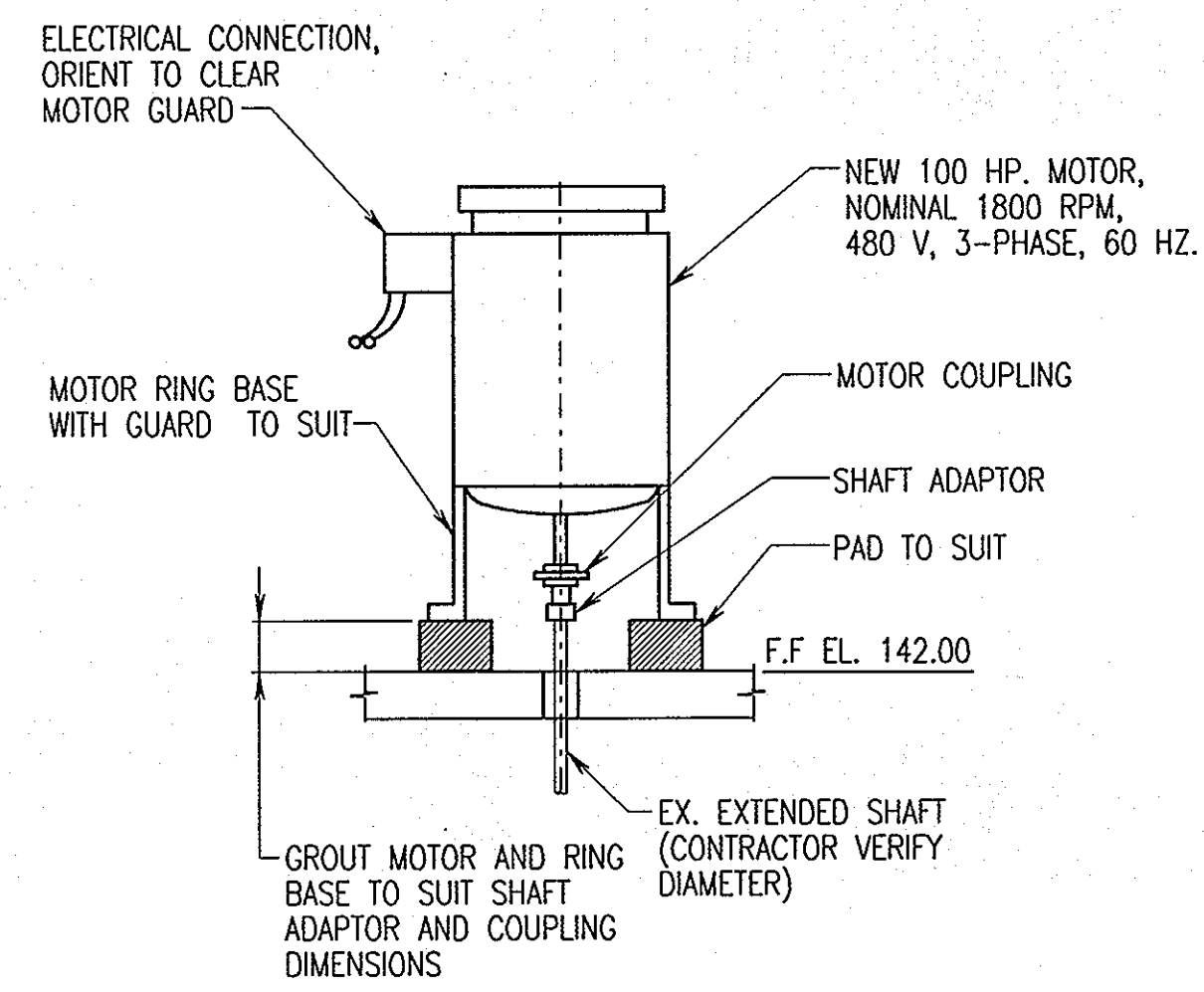
600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
 PUMPING STATION MAINTENANCE IMPROVEMENTS
 CONTRACT NO. 44-4165
 CAPITAL PROJECT NO. S-6189
 HOWARD COUNTY, MARYLAND

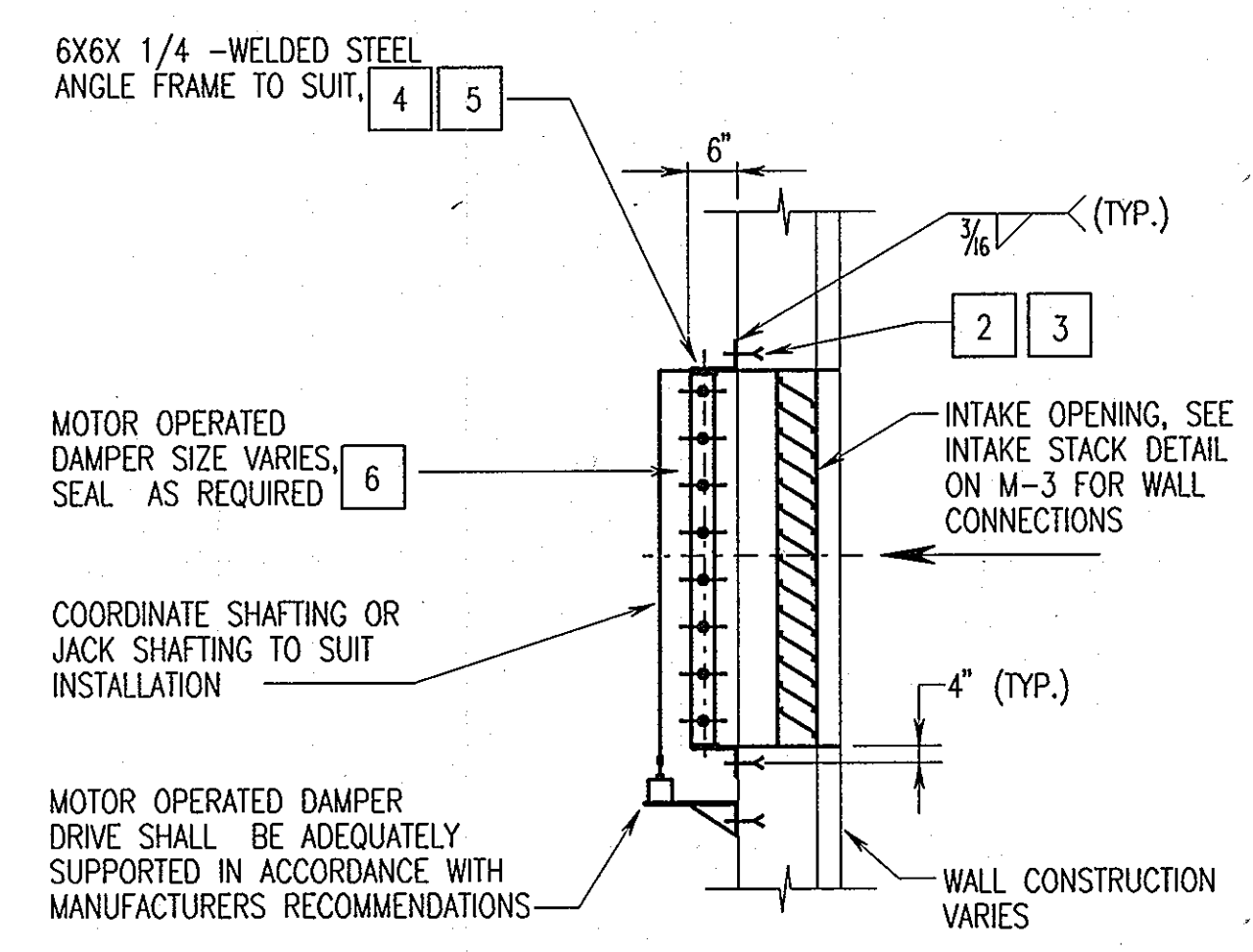
SCALE AS SHOWN
 SHEET 6 OF 17



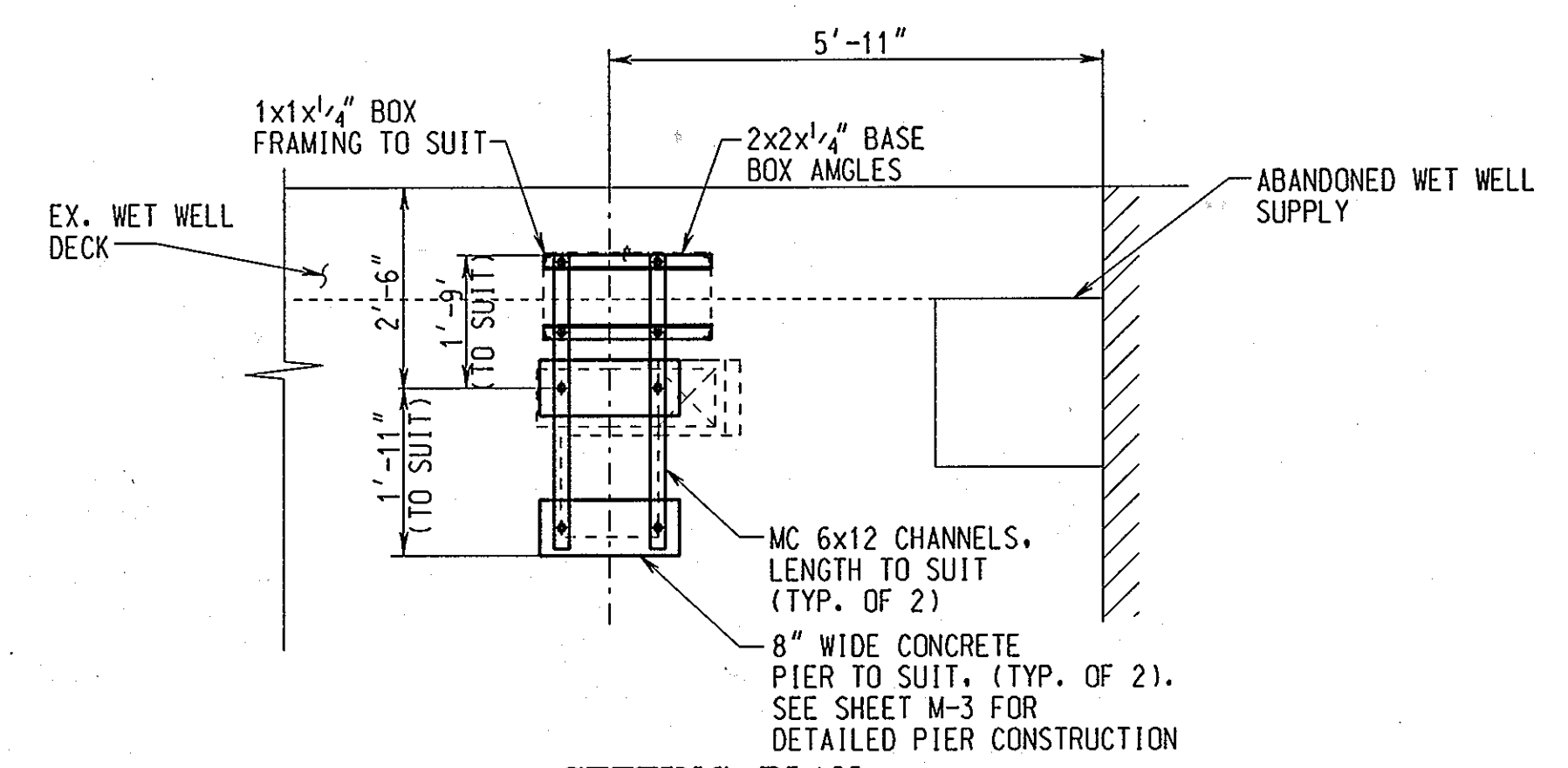
SECTION A
M-1 SCALE: 1/4" = 1'-0"



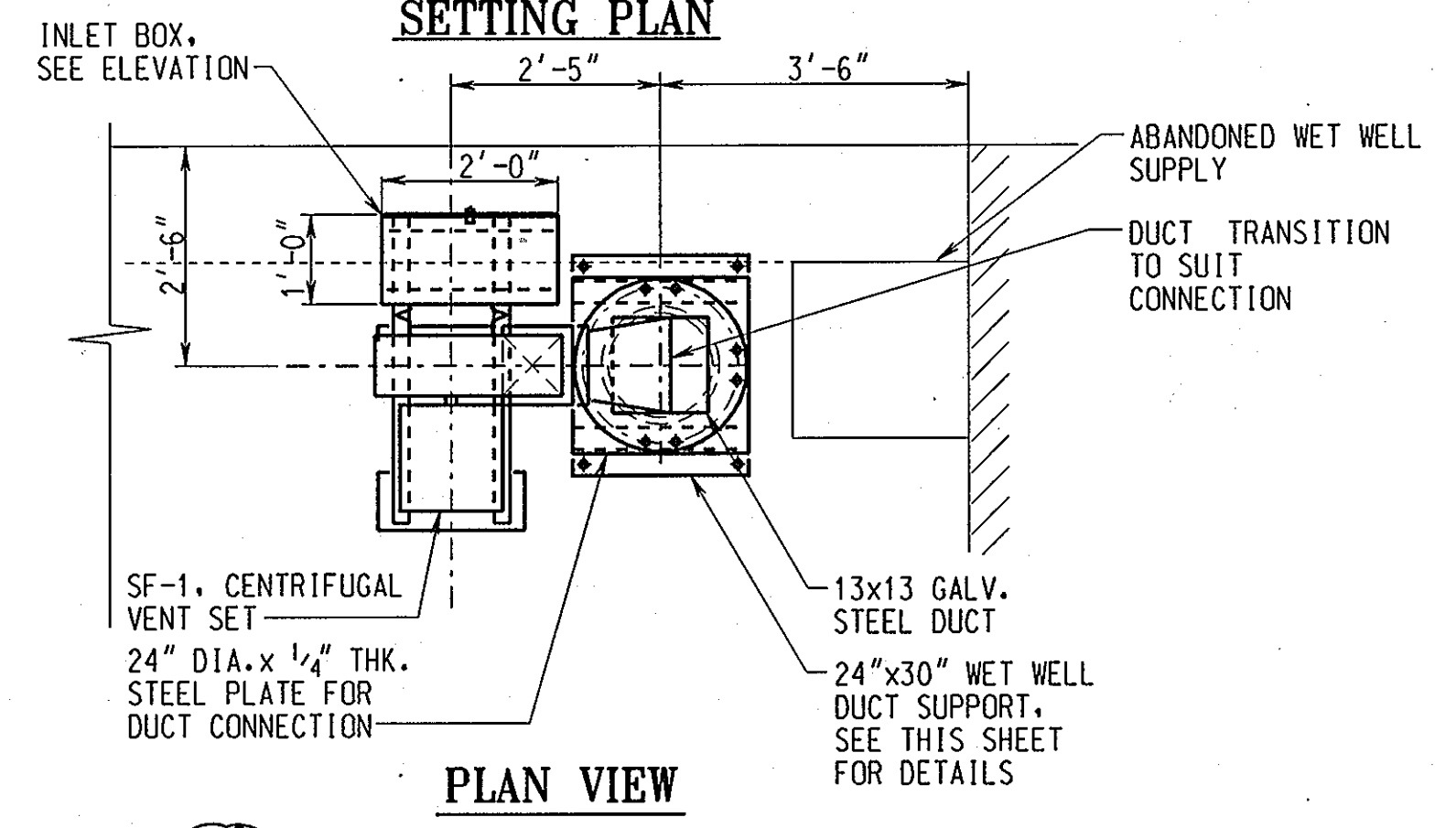
MOTOR DETAIL B
M-1,2 NO SCALE



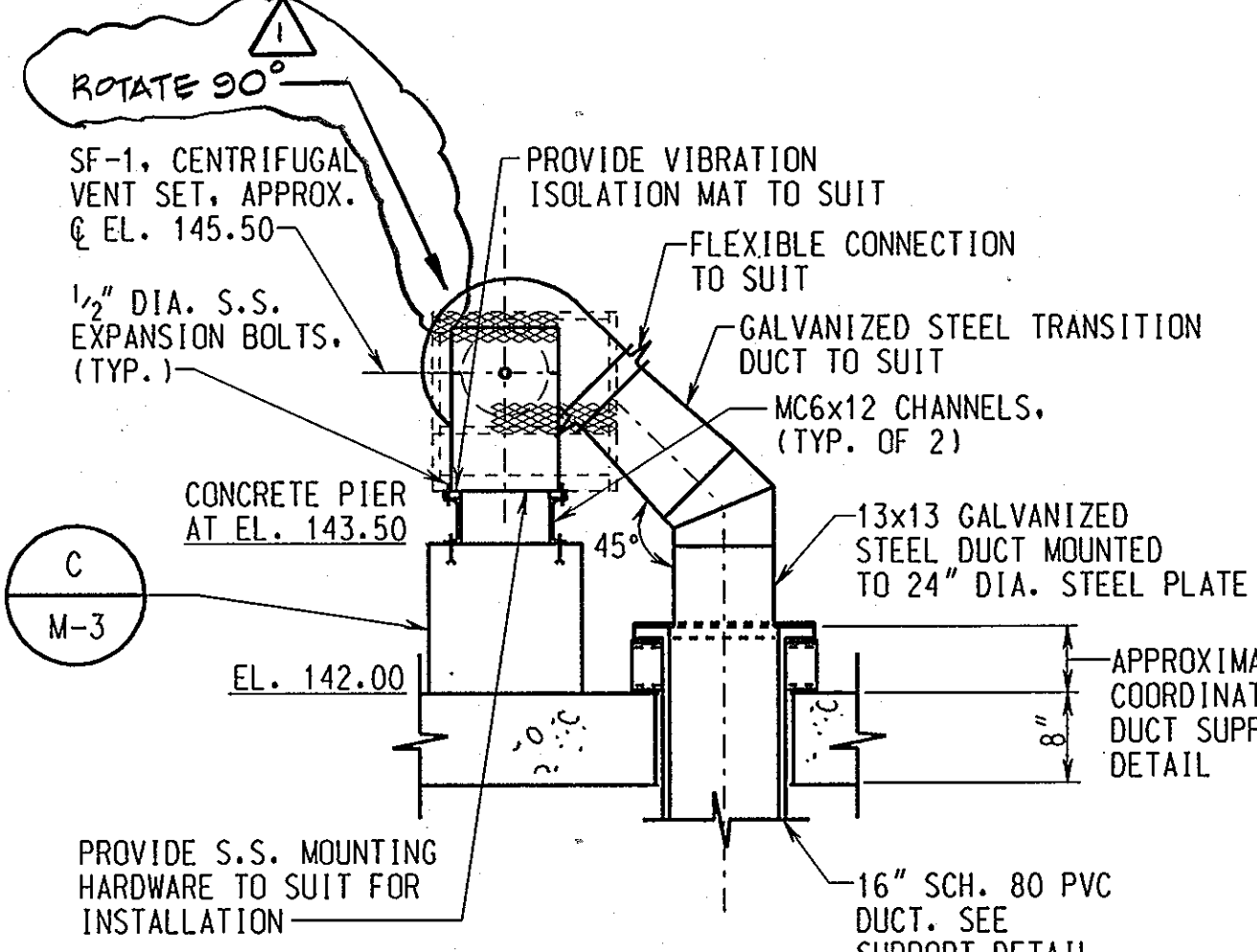
INTAKE MOD DETAIL C
M-1,2 NO SCALE



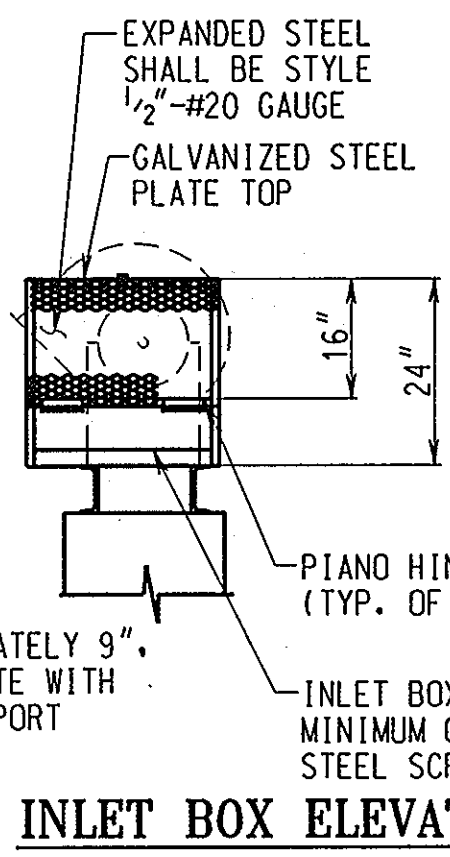
SETTING PLAN



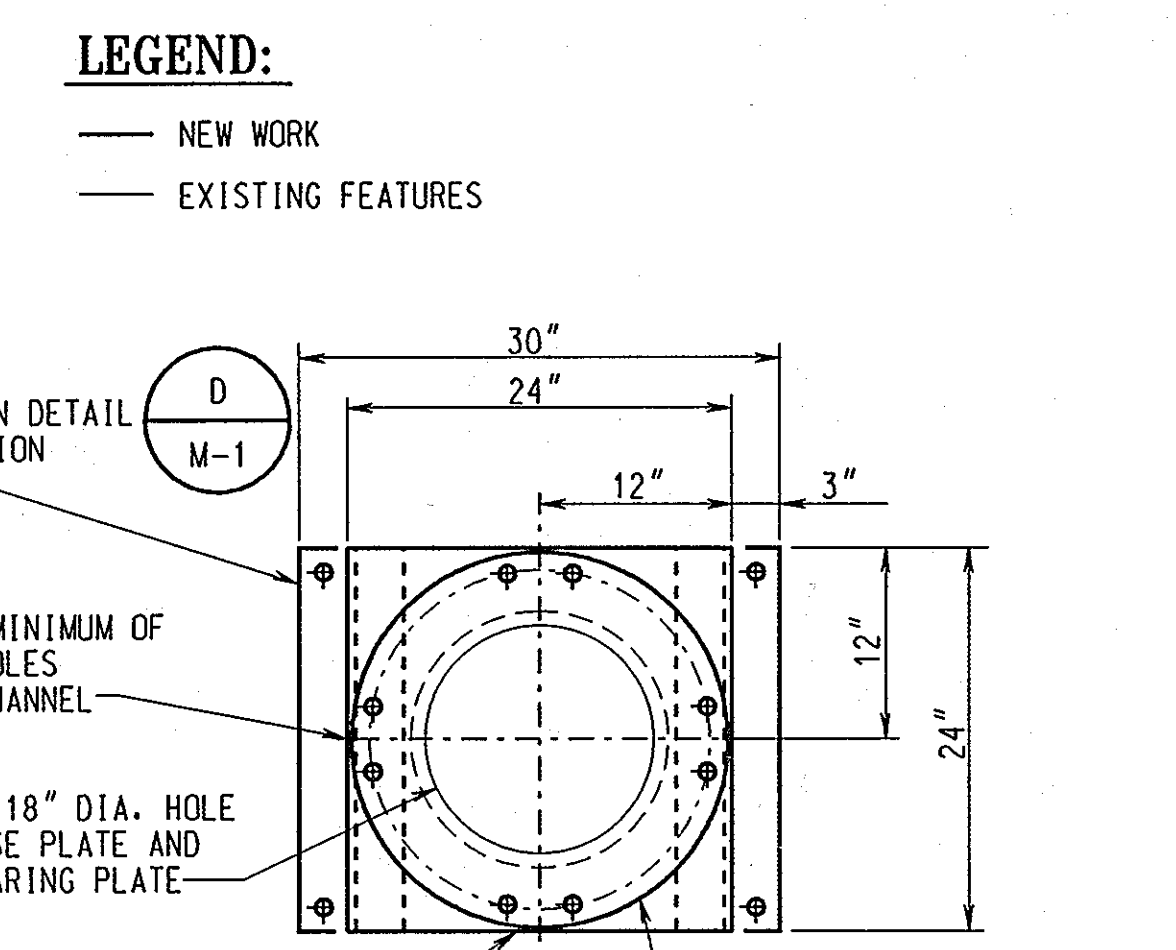
PLAN VIEW



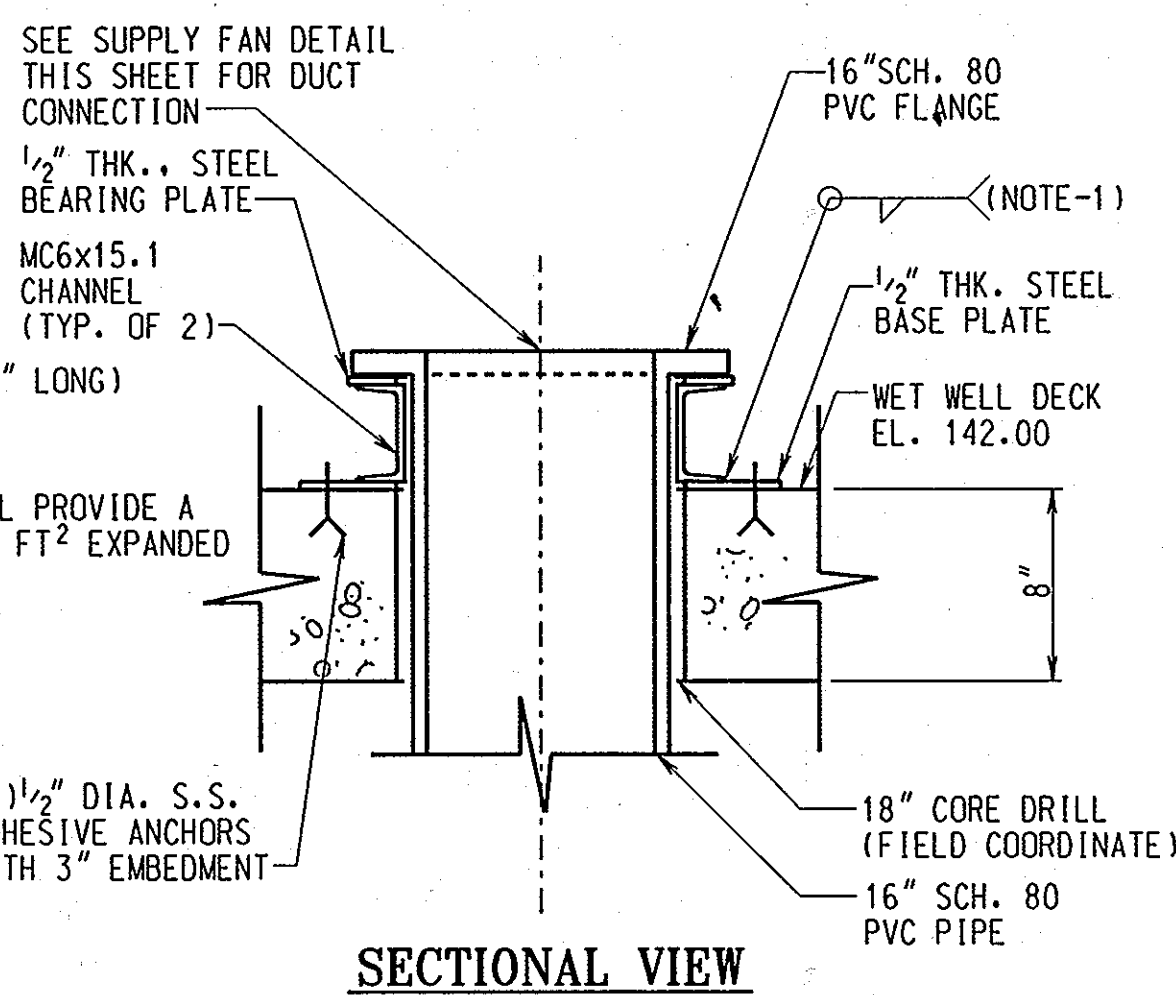
SECTIONAL VIEW



INLET BOX ELEVATION



PLAN VIEW



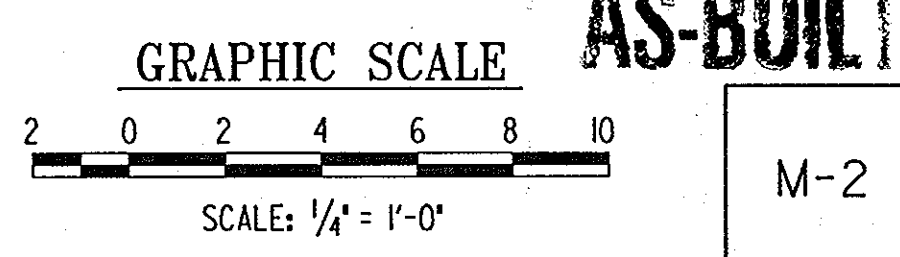
SECTIONAL VIEW

NOTE: 1. WELDING TYPICAL AT BASE PLATE AND FLANGE BEARING PLATE

SUPPLY FAN DETAIL D
M-1 NO SCALE

DUCT SUPPORT DETAIL E
M-1,2 NO SCALE

FAN SCHEDULE									
UNIT I.D.	TYPE	SERVICE	DRIVE	CFM	S.P. IN W.C.	FAN RPM	MOTOR HP	ELECTRICAL VOLT/PH/HZ	NOTES
SF-1	CENTRIFUGAL/UTILITY SET	WET WELL SUPPLY	BELT	1400	0.500	2156	1	480/3/60	BIRD SCREEN AND (EF-1 INTERLOCK)
EF-2	CENTRIFUGAL ROOF EXHAUSTER	PUMP ROOM/CONTROL ROOM EXHAUST	BELT	8000	1.0	710	3	480/3/60	BIRD SCREEN AND M.O.D.



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

PREPARED BY:
WR&A
Whitman, Reardon and Associates, LLP.
801 S. Caroline St.
Baltimore, Md. 21231
410-235-3450



DES: LAP/BKM
DRN: LAP
CHK: SEA
DATE: 9/30/03
BY: [Signature] NO. [] REVISION [] DATE []

MECHANICAL INSTALLATION
SECTION AND DETAILS

NORTH LAUREL WASTEWATER
STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

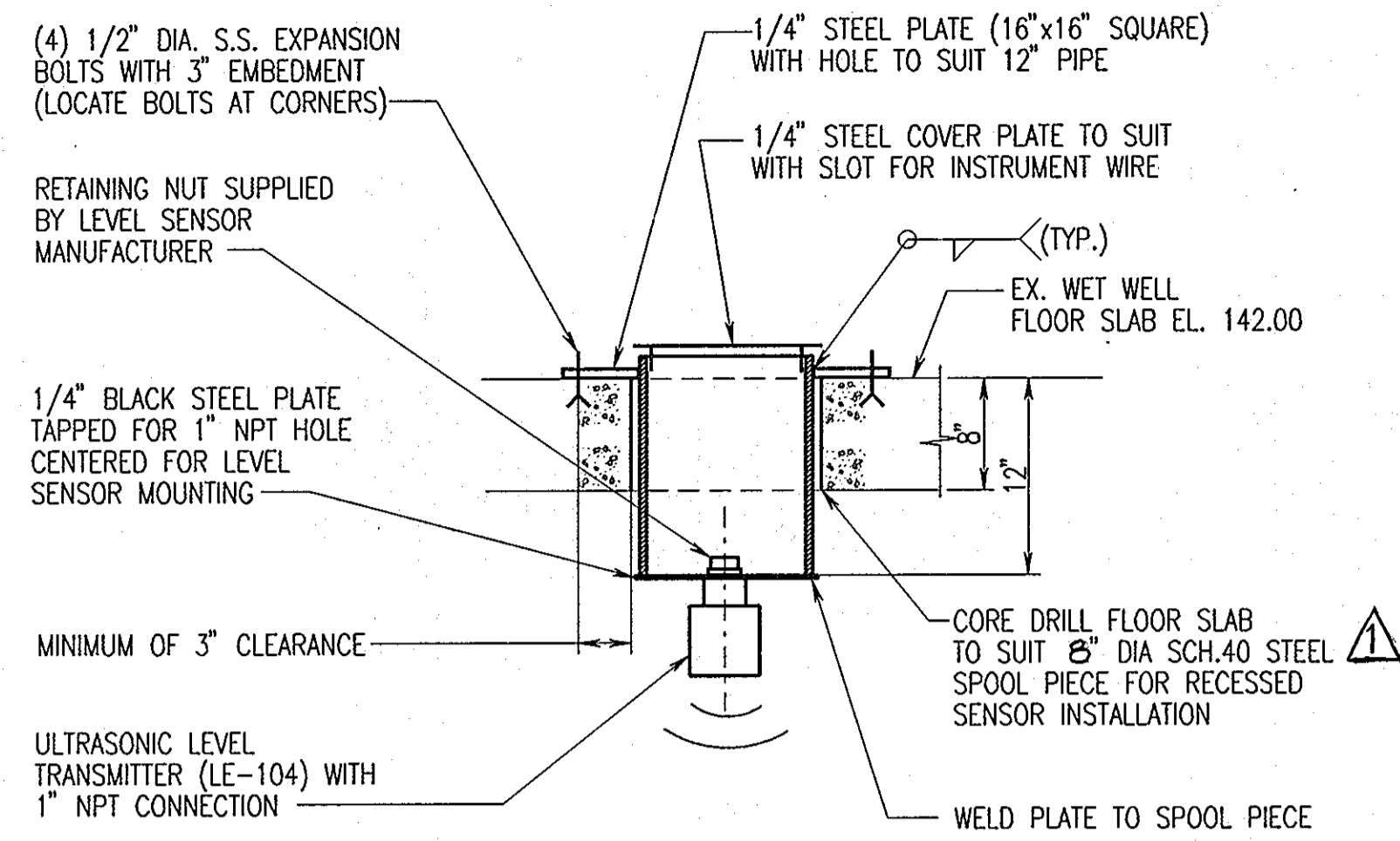
SCALE AS SHOWN
SHEET 7 OF 17

CONSTRUCTION NOTES:

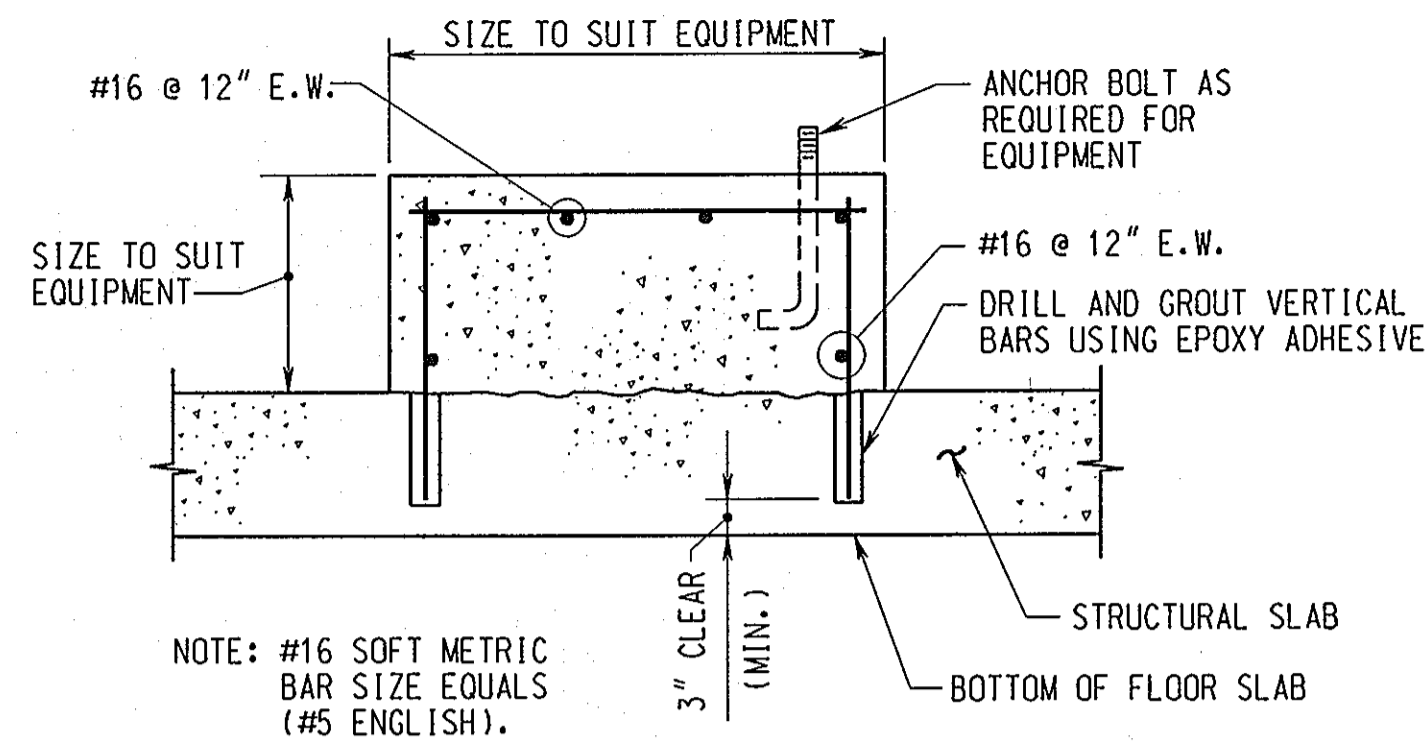
1 SEE MECHANICAL INSTALLATION PLANS ON SHEET M-1 FOR LOCATIONS OF EQUIPMENT

LEGEND:

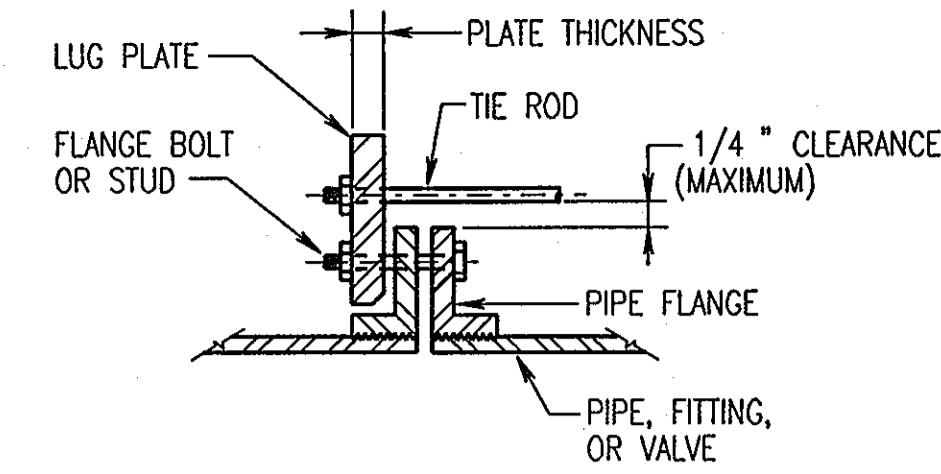
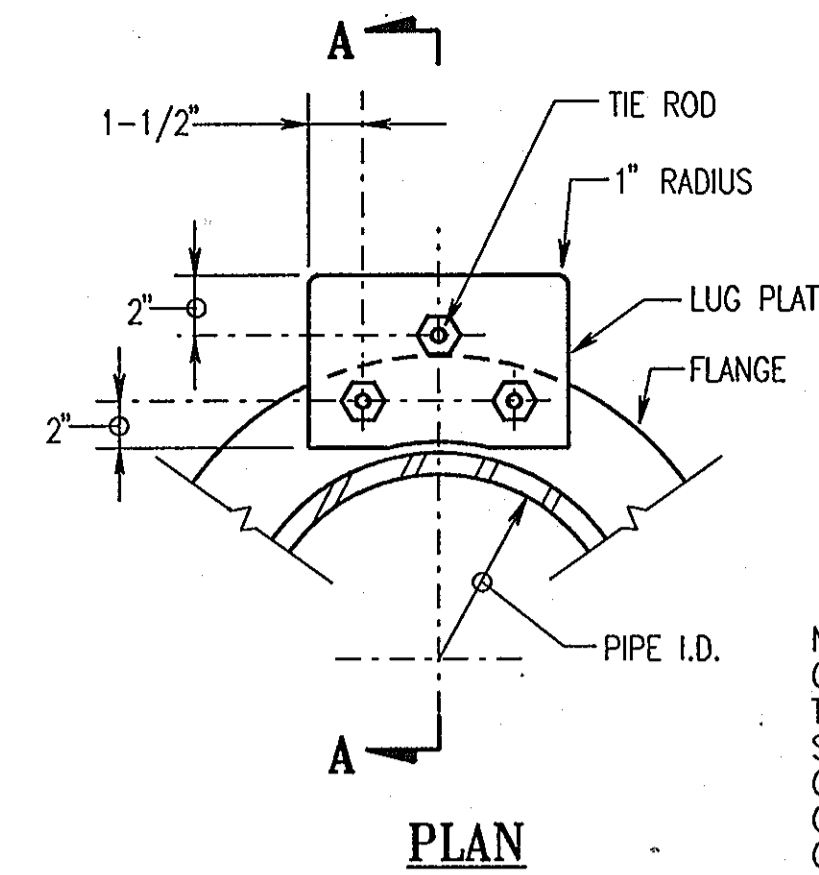
— NEW WORK
 - - - EXISTING FEATURES



A INSTRUMENT DETAIL
 M-1 NO SCALE



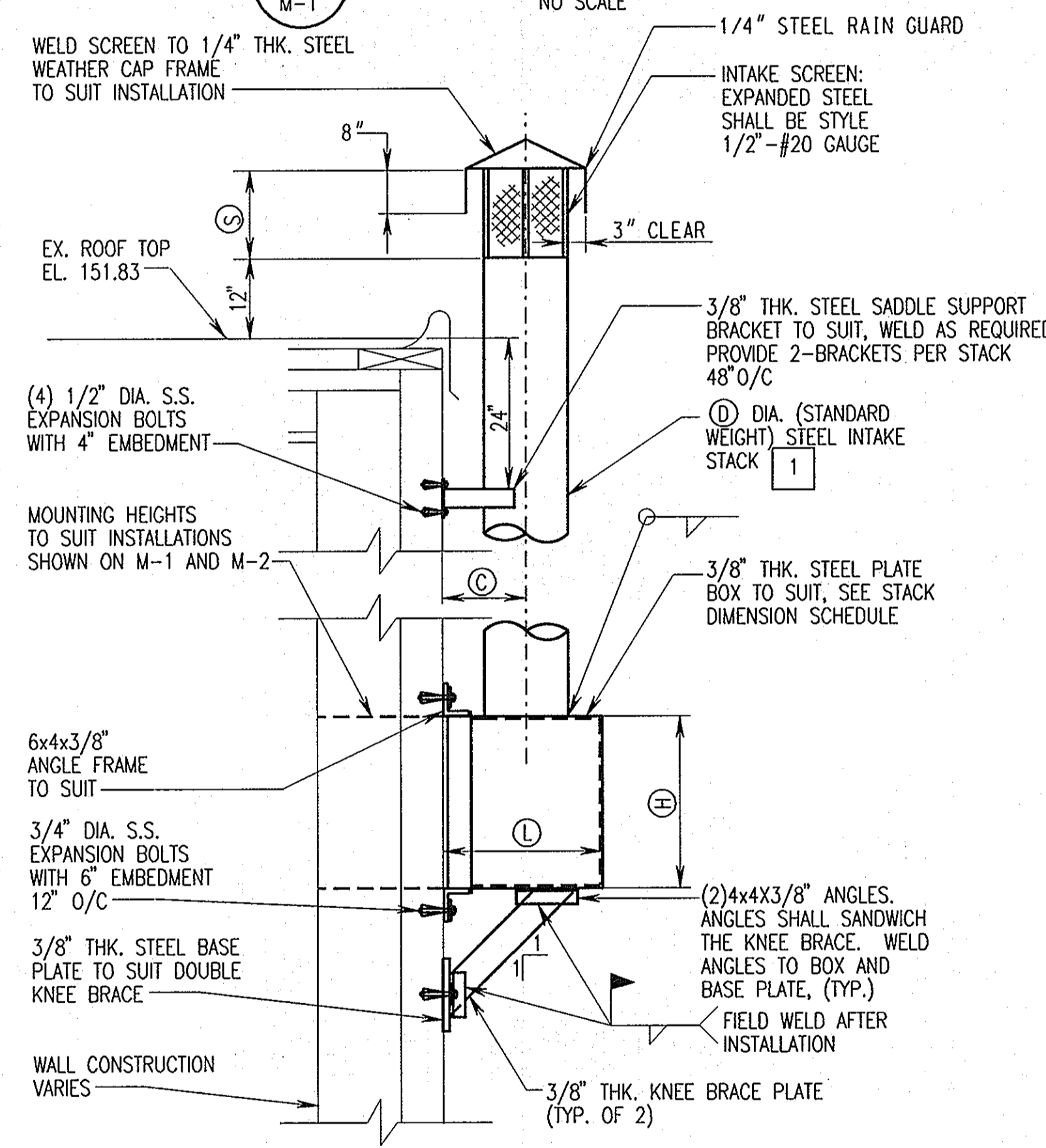
B TYPICAL EQUIPMENT SUPPORT
 M-2 SCALE: NONE



NOTE: IF PLATE IS REQUIRED TO BE MOUNTED ON REVERSE SIDE OF FLANGE, PROVIDE A PIPE SLEEVE AND WASHER ON THE END OF THE TIE ROD SO THAT THE MAXIMUM CLEARANCE BETWEEN THE SLEEVE AND THE FLANGE CAN BE MAINTAINED. FLANGE SURFACE IN CONTACT WITH LUG PLATE SHALL BE GROUND SMOOTH TO CLEAR THE CASTING IRREGULARITY AND EMBOSSED LETTERING. CONTACT SURFACE OF LUG PLATE SHALL BE MACHINED TO A ONE DEGREE TAPER FOR PIPE DIAMETERS 12-INCH AND LARGER.
 ROD MATERIAL - ASTM A588
 PLATE MATERIAL - ASTM A36
 SLEEVE MATERIAL - SCHEDULE 40 STEEL PIPE

PIPE SIZE	NUMBER OF RODS	DIAMETER OF RODS	PLATE THICKNESS	PIPE SLEEVE (IF REQUIRED)	DESIGN PRESSURE PSI
8"	2	3/4"	1"	7/8"	150

C TIE-ROD INSTALLATION REQUIREMENTS
 M-2 NO SCALE



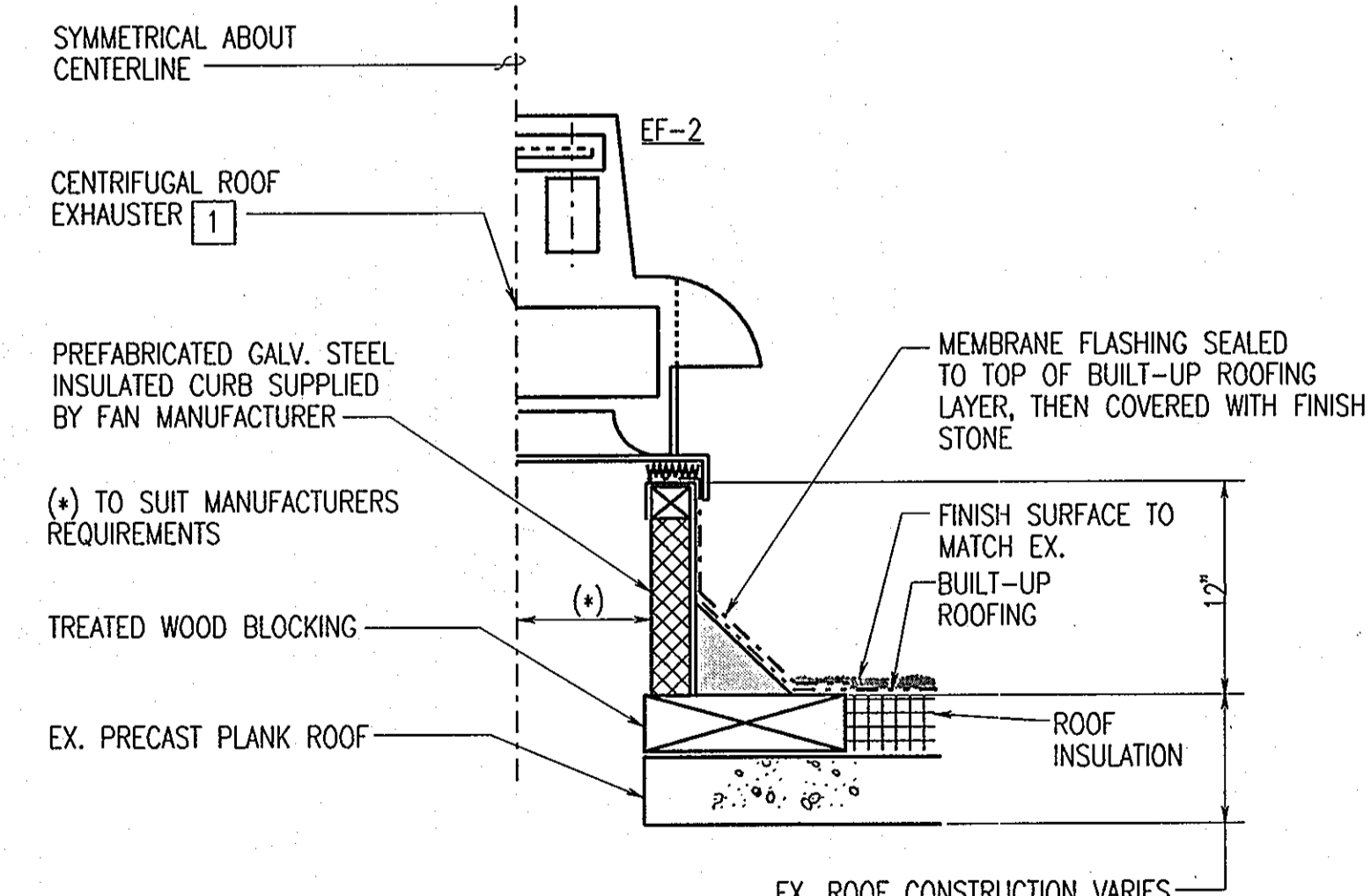
STACK DIMENSIONS SCHEDULE

STACK	SERVICE	DIA.	L	W	H	C	S
S1	CONTROL LEVEL INTAKE	16"	27"	24"	18"	16"	16"
S2	PUMP ROOM INTAKE	30"	43"	40"	32"	26"	24"

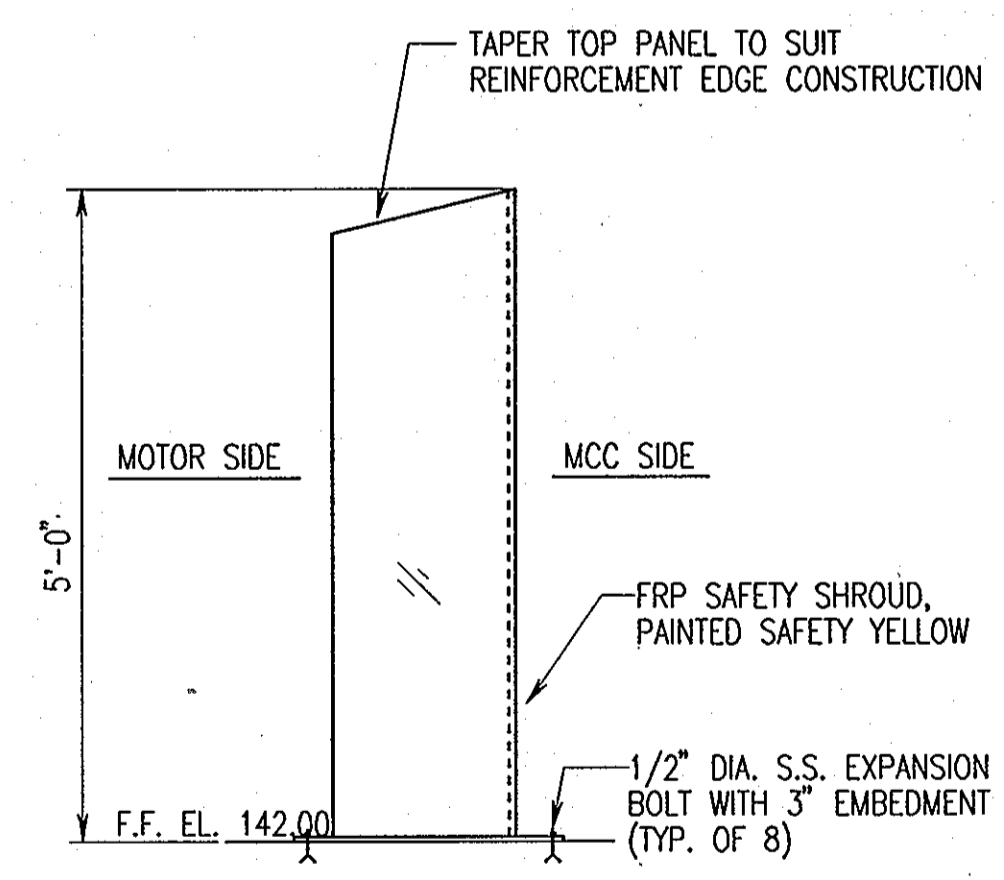
L-LENGTH OF BOX
 W-WIDTH OF BOX
 H-HEIGHT OF BOX
 C-CLEARANCE
 S-SCREEN HEIGHT

NOTE: S2 INTAKE IS BURIED. BACKFILL WITH NO.57 STONE TO MATCH EXISTING GRADE.

D INTAKE STACK DETAIL
 M-1 NO SCALE

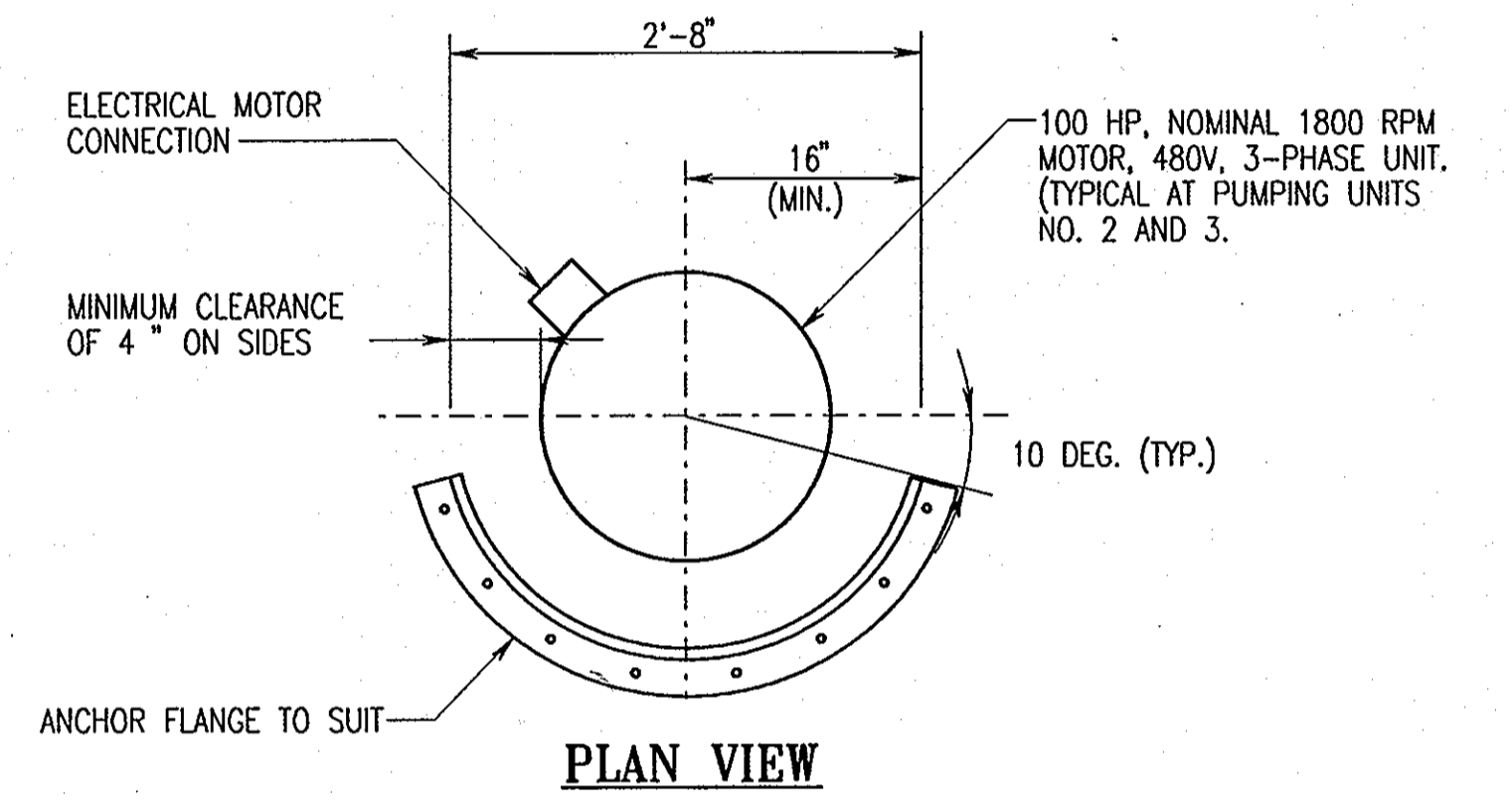


E ROOF EXHAUST FAN DETAIL
 M-1,2 NO SCALE



TYPICAL SIDE PANEL VIEW

F MOTOR GUARD DETAIL
 M-1,2 SCALE: 3/4" = 1'-0"



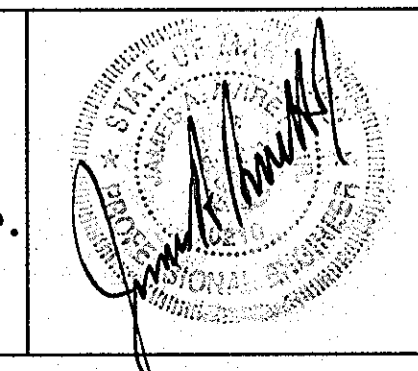
PRODUCT DESIGN REQUIREMENTS

MATERIAL OF CONSTRUCTION SHALL BE FIBERGLASS REINFORCED FFC-15 RESIN SYSTEM IN ACCORDANCE WITH SPECIFICATION ASTM C-582-87 FOR CONTACT MOLDED THERMOSETTING PLASTIC (RTP) LAMINATES. PRODUCTION SHALL COMPLY WITH ASTM D2563-70 STANDARD PRACTICE FOR CLASSIFYING VISUAL DEFECTS IN GLASS REINFORCED PLASTIC PARTS, AND NBS PS 15-69.
 LAMINATE: RESIN SYSTEM TO BE FFC-15 REINFORCING MATERIAL-TO BE COMMERCIAL GRADE TYPE-E GLASS INTERIOR AND EXTERIOR SURFACES TO BE 10MIL GLASS VEIL LAMINATE TO BE UV STABILIZED COLOR TO BE SAFETY YELLOW
 PHYSICAL PROPERTIES: ULTIMATE TENSILE STRENGTH (12,000 PSI) FLEXIBLE STRENGTH (19,000 PSI) FLEXIBLE MODULUS OF ELASTICITY (800,000 PSI)
 MANUFACTURED: KAR-DEL PLASTICS INC. WINCHESTER, VA. 22604 KAR-DEL MODEL 6016D-KD-FFC-15, OR EQUAL ELECTRICAL INSULATING MOTOR SAFETY SHROUD 160DEG X 16R X 60 OAH CORROSION RESISTANT NON CONDUCTIVE WT PER SHROUD IS 48#

AS-BUILT

DEPARTMENT OF PUBLIC WORKS
 HOWARD COUNTY, MARYLAND.
 Director of Public Works: [Signature] 2/16/04
 Chief, Bureau of Utilities: [Signature] 2-10-04
 Chief, Bureau of Engineering: [Signature] 2/9/04
 Chief, Utility Design Division: [Signature] 2-9-04

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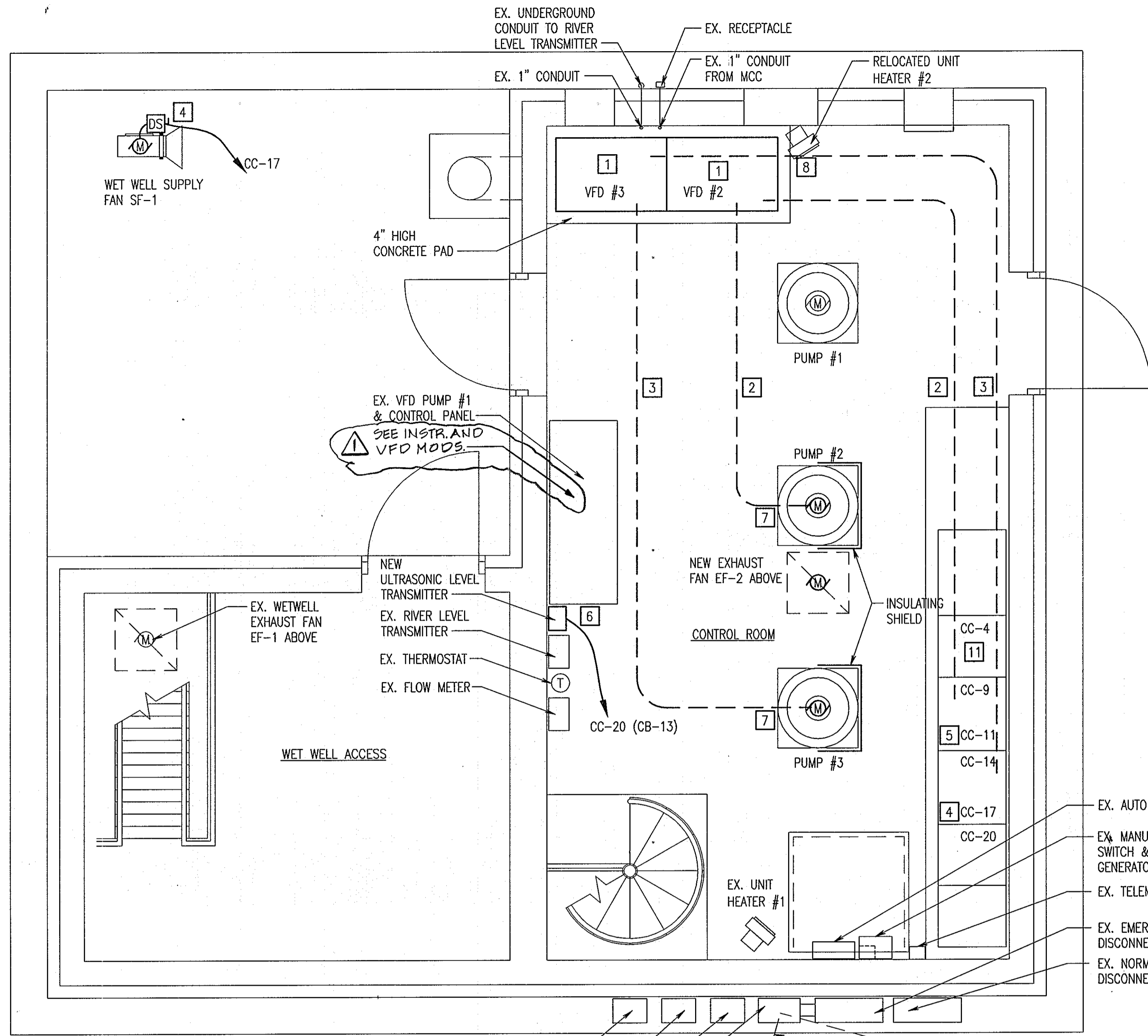


DES:	BKM			
DRN:	PLL			
CHK:	SEA			
DATE:	9/30/03			
BY:	NO.	AS-BUILT	REVISION	DATE

MECHANICAL INSTALLATION DETAILS
 600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
 PUMPING STATION MAINTENANCE IMPROVEMENTS
 CONTRACT NO. 44-4165
 CAPITAL PROJECT NO. S-6189
 HOWARD COUNTY, MARYLAND

M-3
 SCALE AS SHOWN
 SHEET 8 OF 17



LEGEND

EX.	NEW
[S]	[S] STARTER OR BY-PASS STARTER
[C]	[C] CONTACTOR
[VFD]	[VFD] VARIABLE FREQUENCY DRIVE
[DS]	[DS] MOTOR HP AS NOTED
[M]	[M] DISCONNECT SWITCH
[T]	[T] THERMOSTAT
[VS]	[VS] VOLTAGE SELECTOR SWITCH
[V]	[V] VOLTMETER
[AS]	[AS] AMMETER SELECTOR SWITCH
[A]	[A] AMMETER
[GND]	GROUND
[FUSE]	FUSE
[PT]	POTENTIAL TRANSFORMER
[CT]	CURRENT TRANSFORMER
[CSM]	CONDUIT SURFACE MOUNTED
[CUF]	CONDUIT UNDER FLOOR SLAB OR UNDERGROUND
[CHR]	CIRCUIT HOME RUN 2-#12 & 1-#12GND IN 3/4" CONDUIT TO MCC CC-17
[CB]	CIRCUIT BREAKER
[LW]	LINE WEIGHT

ELECTRICAL ABBREVIATIONS:

A	AMPERE
AC	ALTERNATING CURRENT
AFF	ABOVE FINISHED FLOOR
AUTO	AUTOMATIC
C	CONDUIT
CB	CIRCUIT BREAKER
CKT	CIRCUIT
CONN	CONNECTION OR CONNECT
DET	DETAIL
DWG	DRAWING
ELECT	ELECTRICAL
EX.	EXISTING
HZ	HERTZ
JB	JUNCTION BOX
KW	KILOWATT
KVA	KILOVOLT AMPERE
MAX	MAXIMUM
MCC	MOTOR CONTROL CENTER
MIN	MINIMUM
P	POLE
PB	PULL BOX
PL	PANEL
PH	PHASE
PWR	POWER
PVC	POLYVINYL CHLORIDE
REC/RECP	RECEPTACLE
RMC	RIGID METAL CONDUIT
SW	SWITCH
UNO	UNLESS NOTED OTHERWISE
V	VOLTS
VA	VOLT AMPERE
VFD	VARIABLE FREQUENCY DRIVE
W	WATTS

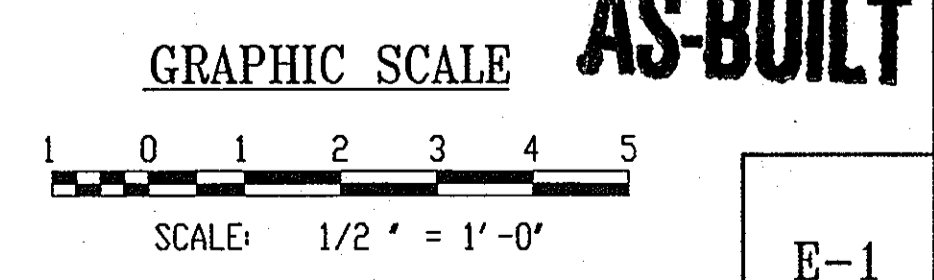
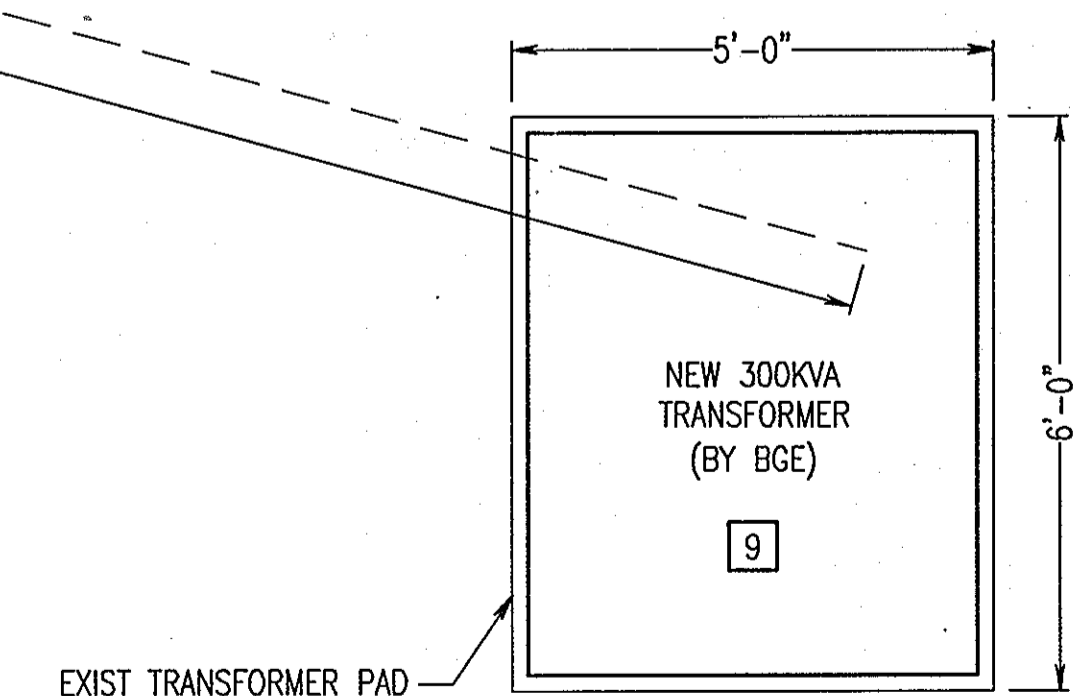
GENERAL NOTES:

1. ALL WORKS SHALL BE CARRIED OUT IN ACCORDANCE WITH THE LATEST EDITION OF NATIONAL ELECTRICAL CODE AND APPLICABLE CODES, RULES AND REGULATIONS.
2. ALL CONDUITS AND EQUIPMENT SHALL BE INSTALLED, WIRED AND GROUNDED IN ACCORDANCE WITH THE LATEST RULES AND REGULATIONS OF NATIONAL ELECTRICAL CODE (NEC).
3. CONDUIT RUNS ARE SHOWN DIAGRAMMATICALLY ONLY AND SHALL BE INSTALLED IN A MANNER TO PREVENT CONFLICTS WITH OTHER EQUIPMENTS. EXPOSED CONDUITS SHALL BE RUN ON THE WALLS HORIZONTALLY AND VERTICALLY.
4. CONDUITS SHALL BE TERMINATED SO AS TO PERMIT NEAT CONNECTION TO EQUIPMENT.
5. CONDUIT ENDS SHALL BE SUITABLY SEALED TO PREVENT TRANSGRESS OF MOISTURE THROUGH CONDUITS FROM ONE EQUIPMENT TO OTHER.
6. CONDUITS AND WIRES SHALL BE SIZED IN ACCORDANCE WITH NEC UNO.
7. CONDUITS INSTALLED EXPOSED ON EXTERIOR/INTERIOR OF BUILDING SHALL BE GALVANIZED RMC.
8. ALL WALL AND FLOOR PENETRATIONS FOR ELECTRICAL CONDUITS SHALL BE CORE DRILLED. PROVIDE SEGMENTED RUBBER COMPRESSION SEALS ON BOTH SIDES.
9. THIS IS A MODIFICATION JOB, CONTRACTOR SHALL VERIFY DIMENSIONS IN THE FIELD.
10. IF CONTRACTOR SHALL HAVE TO CUT EXISTING CONCRETE SLABS TO REMOVE/INSTALL ELECTRICAL CONDUITS, IN SUCH OCCURRENCES CONTRACTOR SHALL REPAIR EXISTING STRUCTURE TO MATCH THE ORIGINAL CONDITION.
11. ALL NEW ITEMS ARE SHOWN IN BOLD PRINT AND EXISTING ITEMS IN LIGHT PRINT.

CONSTRUCTION NOTES:

1. PROVIDE & INSTALL NEW VFD'S 460V, 100HP, 60HZ, 145A, 18 PULSE IN NEMA 1 ENCLOSURE, DAN Foss 454GT SERIES, PER PLAN FOR PUMP MOTORS #2 & #3. THE VFD SHALL BE LABELED BY A RECOGNIZED TESTING LABORATORY SUCH AS UL.
2. PROVIDE 3-#2/0AWG & 1-#4AWG GND COPPER CONDUCTORS IN 1 1/2" CONDUIT FROM COMPARTMENT CC-9 TO NEW VFD #2. PROVIDE 3-#2/0AWG & 1-#4 GND COPPER CONDUCTORS FROM NEW VFD #2 TO PUMP MOTOR #2.
3. PROVIDE 3-#2/0AWG & 1-#4AWG GND COPPER CONDUCTORS IN 1 1/2" CONDUIT FROM COMPARTMENT CC-14 TO NEW VFD #3. PROVIDE 3-#2/0AWG & 1-#4 GND COPPER CONDUCTORS FROM NEW VFD #3 TO PUMP MOTOR #3.
4. PROVIDE DISCONNECT SWITCH AT FAN, NEW O/L IN MCC AND 3-#12AWG & 1-#12AWG GND COPPER CONDUCTORS IN 3/4" CONDUIT FROM COMPARTMENT CC-17 TO NEW WET WELL SUPPLY FAN.
5. REPLACE O/L RELAY TO MATCH NEW MOTOR.
6. PROVIDE 120V CONTROL POWER SUPPLY FROM MCC CC-20, 120/208V PANEL 'L' CB-13.
7. PROVIDE NEW MOTORS #2 & #3. MOTORS SHALL BE CAPABLE OF OPERATION WITH VFD.
8. REROUTE CONDUIT AND WIRING TO NEW LOCATION OF UNIT HEATER.
9. CONTRACTOR SHALL COORDINATE WITH BGE, REMOVAL OF EXISTING 75KVA TRANSFORMER BY BGE AND MOUNTING, GROUNDING, AND CABLING OF A NEW 300KVA TRANSFORMER BY BGE ON EXISTING 6'X5' CONCRETE PAD.
10. BGE TRENCH AND INSTALL NEW CONDUITS BETWEEN NEW TRANSFORMER AND METER. RESTORE SITE IN LOCATION OF TRENCHING ACTIVITIES.
11. PROVIDE 120V CONTROL POWER SUPPLY FROM CC-20, 120/208V PANEL 'L', CB-14 TO STANDBY FLOAT LEVEL CONTROL SEE DWG. I-3.
12. CONTRACTOR INVESTIGATE EXISTING "PANEL L" CIRCUITS, SPARES, AND PROPOSED CONNECTIONS.

ELECTRICAL PLAN - NEW WORK
SCALE: 1/2" = 1'-0"



DHILLON ENGINEERING, INC.
10902 REISTERSTOWN ROAD, SUITE 204
OWINGS MILLS, MD 21117
410-356-1095

STATE OF MARYLAND
PROFESSIONAL ENGINEER
No. 6008
Date Rec'd 2-9-04

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DES: SS			
DRN: AS			
CHK: AKM			
DATE: 07-02-03			
BY: [Signature]	NO. 1	REVISION	DATE

ELECTRICAL PLAN, LEGEND AND ABBREVIATIONS - NEW WORK

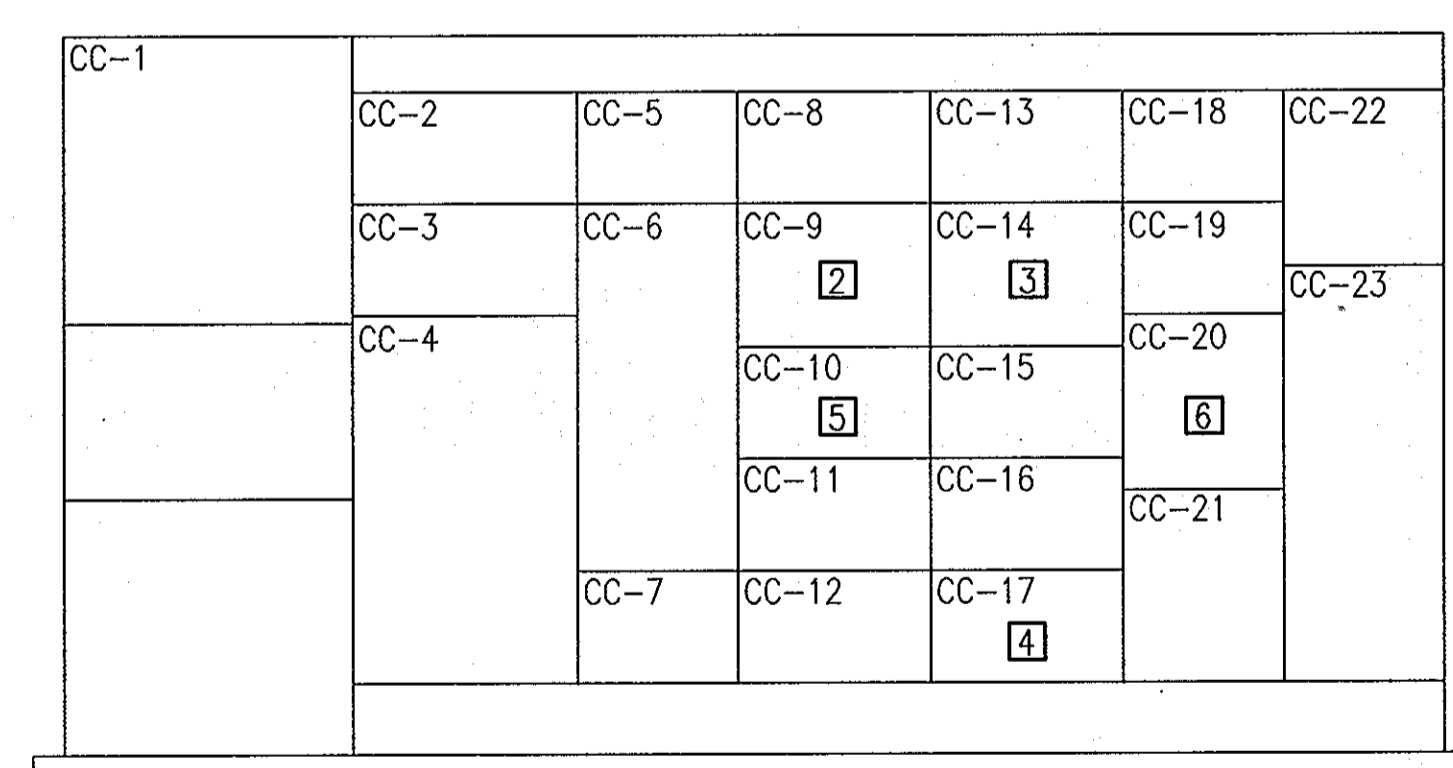
NORTH LAUREL WASTEWATER PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. 5-6189
HOWARD COUNTY, MARYLAND

E-1
SCALE AS SHOWN
SHEET 9 OF 17

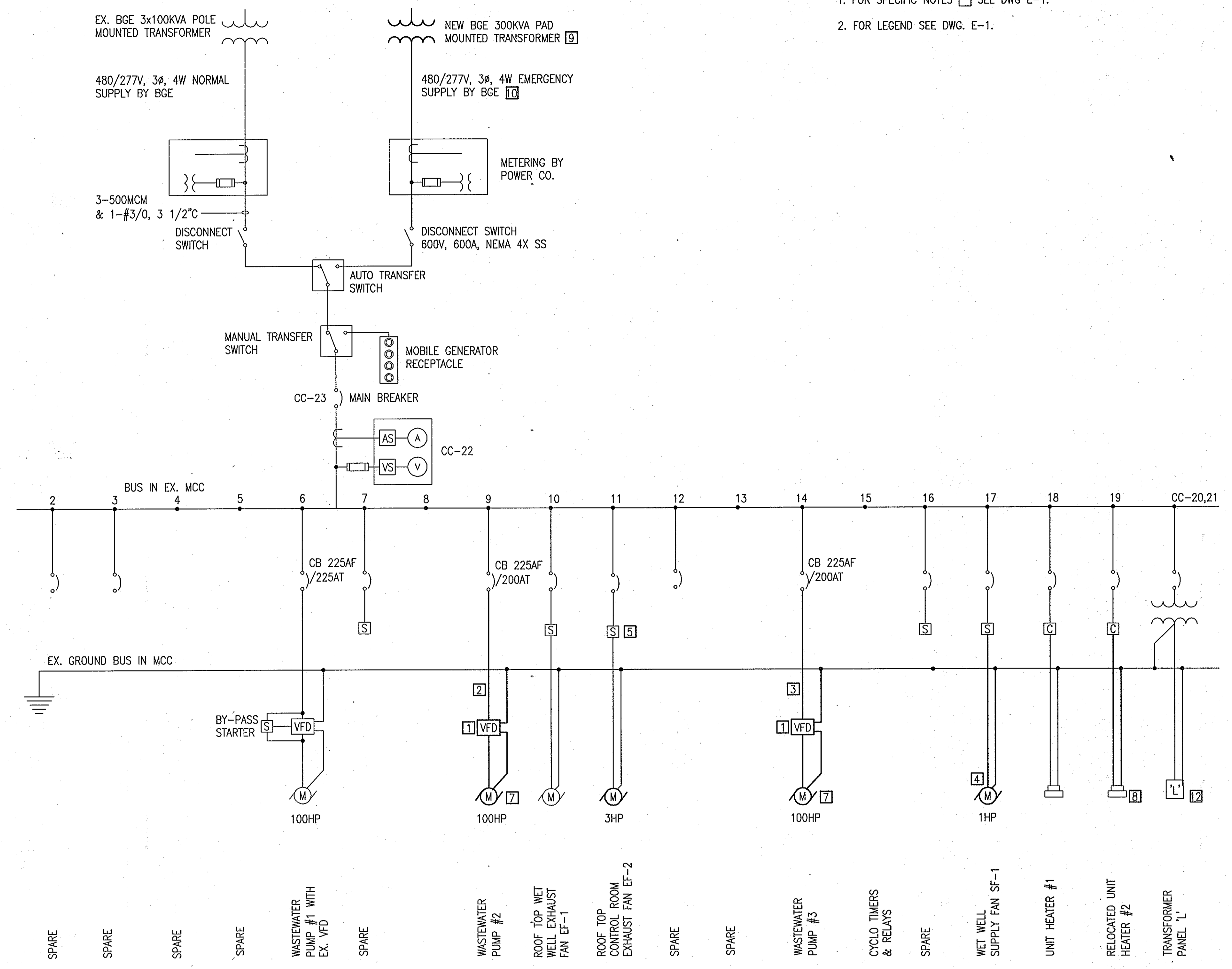
*****SPECS*****
*****SYSTEM*****

100% JANUARY, 2004

MOTOR CONTROL CENTER SCHEDULE (MODIFIED)							
BUCKET NUMBER	NAME PLATE DATA	DEVICE DESCRIPTION	BREAKER				REMARKS
			FRAME	POLE	CALIB.	K.A.I.C.	
CC-1	SPACE	-	-	-	-	-	
CC-2	SPARE	COMBINATION STARTER NEMA SIZE 1/FVNR	100	3	15	-	
CC-3	SPARE	COMBINATION STARTER NEMA SIZE 1/FVNR	100	3	15	-	
CC-4	STANDBY FLOAT CONTROLS FOR WASTE WATER PUMPS	-	-	-	-	-	
CC-5	SPARE	-	-	-	-	-	
CC-6	WASTEWATER PUMP #1	CIRCUIT BREAKER	225	3	225	5	EXISTING TO REMAIN
CC-7	SPARE	COMBINATION STARTER NEMA SIZE 1/FVNR	100	3	20	5	EXISTING TO REMAIN
CC-8	SPARE	-	-	-	-	-	
CC-9	WASTEWATER PUMP #2	CIRCUIT BREAKER	225	3	200	5	2
CC-10	WET WELL ROOF TOP FAN (EF-1)	COMBINATION STARTER NEMA SIZE 1/FVNR	100	3	20	-	EXISTING TO REMAIN
CC-11	CONTROL ROOM EXHAUST FAN (EF-2)	COMBINATION STARTER NEMA SIZE 1/FVNR	100	3	15	-	EXISTING TO BE REUSED REPLACE O/L RELAY 5
CC-12	SPARE	-	-	-	-	-	
CC-13	SPARE	-	-	-	-	-	
CC-14	WASTEWATER PUMP #3	CIRCUIT BREAKER	225	3	200	5	3
CC-15	CYCLE TIMERS & RELAYS	-	-	-	-	-	EXISTING TO REMAIN
CC-16	SPARE	-	-	-	-	-	
CC-17	WET WELL SUPPLY FAN (SF-1)	COMBINATION CONTACTOR NEMA SIZE 1	100	-	15	5	EXISTING TO BE REUSED REPLACE O/L RELAY 4
CC-18	UNIT HEATERS #1	COMBINATION CONTACTOR NEMA SIZE 1	100	3	20	4	EXISTING TO REMAIN
CC-19	UNIT HEATERS #2	COMBINATION CONTACTOR NEMA SIZE 1	100	3	20	4	EXISTING TO REMAIN 8
CC-20	LIGHTING & RECEPTACLE PANEL 'L'	CIRCUIT PANELBOARD	-	-	-	-	EXISTING TO REMAIN 6
CC-21	TRANSFORMER & PRIMARY CB	CIRCUIT BREAKER	100	3	30	4	EXISTING TO REMAIN
CC-22	METER PANEL	VOLTMETER, AMMETER & SELECTOR SWITCHES	-	-	-	-	EXISTING TO REMAIN
CC-23	MAIN BREAKER	CIRCUIT BREAKER	600	3	400	8	EXISTING TO REMAIN



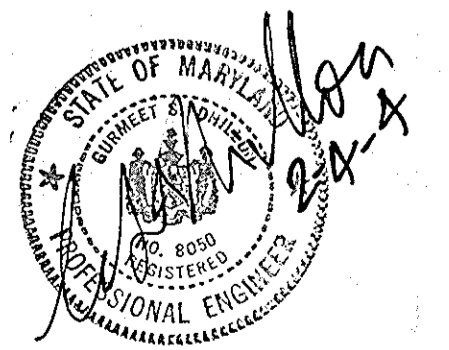
MOTOR CONTROL CENTER
SCALE: 1/2" = 1'-0"



SINGLE LINE WIRING DIAGRAM

NOTES:
1. FOR SPECIFIC NOTES SEE DWG E-1.
2. FOR LEGEND SEE DWG. E-1.

DHILLON ENGINEERING, INC.
10902 REISTERSTOWN ROAD, SUITE 204
OWINGS MILLS, MD 21117
410-356-1095



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

Director of Public Works: *[Signature]* 2/10/04
Chief, Bureau of Utilities: *[Signature]* 2-10-04

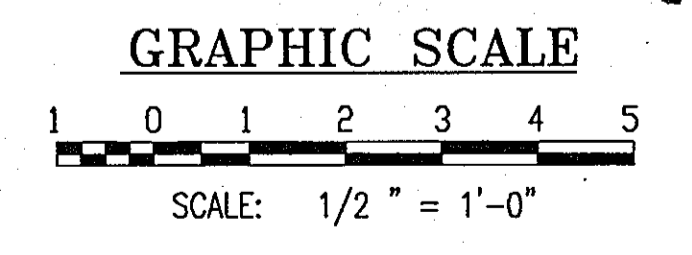
Chief, Bureau of Engineering: *[Signature]* 2/10/04
Chief, Utility Design Division: *[Signature]* 2-9-04

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DES: SS					
DRN: AS					
CHK: AKM					
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BY	NO.	REVISION	DATE	600' SCALE MAP NO.	50 BLOCK NO.

ELECTRICAL SINGLE LINE & MCC
SCHEDULE - NEW WORK

NORTH LAUREL WASTEWATER
PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. 5-6189
HOWARD COUNTY, MARYLAND



AS-BUILT

E-2
SCALE AS SHOWN
SHEET
10 OF 17

100% JANUARY, 2004

PROCESS AND INSTRUMENTATION SYMBOLS

- MOUNTED NEAR EQUIPMENT
- FACE OF PANEL MOUNTED
- (XXX) FACE OF PANEL MOUNTED INDICATION LAMP (XXX) DENOTES SECONDARY LIGHT FUNCTION
- ANALOG INPUT TO PLC
- ANALOG OUTPUT FROM PLC
- DIGITAL INPUT TO PLC
- DIGITAL OUTPUT FROM PLC
- TELEMETRY SIGNAL
- EX. PLC I/O
- ABC - LETTERS INDICATE FUNCTION ACCORDING TO ISA SCHEDULE: 123-DIGITS IDENTIFY ASSOCIATED EQUIPMENT
- SIGNAL BOOSTER
- ELECTRICAL SERVICE
- PROCESS FLOW
- ELECTRIC SIGNAL
- DATA HIGHWAY COMMUNICATIONS LINK
- MOTOR CONTROLLER INTERFACE FOR OVERLOADS AND FAULTS (x) DENOTES AUX. CONTACT
- ANALOG INPUT OR OUTPUT FOR INSTRUMENT / CONTROLLER
- DIGITAL INPUT OR OUTPUT FOR INSTRUMENT / CONTROLLER
- PROGRAMMING FUNCTION / INTERLOCK

EQUIPMENT SYMBOLS

- PUMP
- MOTOR / OPERATOR
- PUMP CHECK SERVICE
- SOLENOID VALVE (PORTS TO SUIT CONTROL)
- GATE VALVE
- PLUG VALVE
- FLOW METER
- JUNCTION BOX
- LEVEL SWITCH

NOTE: SEE SHEET M-1 AND E-1 LEGENDS AND NOTES FOR SYMBOLS NOT LISTED.

HAND SWITCHES

- SELECTOR SWITCH OR PUSH BUTTON (MAINTAINED CONTACTS)
- SPRING RETURN SWITCH OR PUSH BUTTON (MOMENTARY CONTACTS)
- HAND CONTROL STATION ADJUSTMENT (SPEED OR POSITION)

MODIFIER (XXX) DESCRIPTIONS:

- ACK = ACKNOWLEDGE (PUSH BUTTON)
- CL = CLOSE (PUSH BUTTON)
- ES = EMERGENCY STOP (PUSH BUTTON)
- HOA = HAND-OFF-AUTOMATIC (SELECTOR SWITCH)
- LR = LOCAL / REMOTE (SELECTOR SWITCH)
- MA = MANUAL / AUTO (SELECTOR SWITCH)
- OO = OFF / ON (SELECTOR SWITCH)
- OP = OPEN (PUSH BUTTON)
- POT = POTENTIOMETER (MANUAL ADJUSTMENT)
- RES = RESET (PUSH BUTTON)
- SEL = SELECT (SELECTOR SWITCH)
- SP = STOP (PUSH BUTTON)
- ST = START (PUSH BUTTON)
- VB = VFD-BYPASS (SELECTOR SWITCH)

INSTRUMENT IDENTIFICATION SCHEDULE

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

EXAMPLES

- AIT = ANALYSIS INDICATING TRANSMITTER
- FIT = FLOW INDICATING TRANSMITTER
- LIT = LEVEL INDICATING TRANSMITTER
- PAH = PRESSURE ALARM HIGH
- PAL = PRESSURE ALARM LOW
- ZSH = POSITION SWITCH OPEN
- ZSL = POSITION SWITCH CLOSED

NUMBERING SEQUENCE

- 100 SERIES - PUMPING PROCESS
- 200 SERIES - STANDBY FLOAT CONTROLS

P & I LEGEND

PANEL IDENTIFICATION:

- LC = LOCAL CONTROL PANEL
- MCC = MOTOR CONTROL CENTER
- P = EXISTING PLC
- O = OEI TELEMETRY
- VFD = VARIABLE SPEED DRIVE
- VFD/S = EXISTING VFD/SSRV STARTER

PANEL NAME PLATE LEGEND:

NOTE: ALL PANEL NAME PLATES SHALL INCLUDE COMPLETE SPELLING OF IDENTIFICATIONS.

(-x) SUFFIX IDENTIFIER: REPRESENTS SEQUENTIAL PANEL NUMBERING.

VFD-X = PUMP NO. 2 VFD AND NO.3 VFD

RELAY LOGIC INTERLOCKS

- (PANEL LOCATION OR CONTACT STATE)
- MOTOR STARTER COIL
- REPEAT CYCLE TIMER CIRCUIT
- ELAPSED TIME METER
- ALTERNATOR CIRCUIT

MODIFIER (XX) DESCRIPTIONS:

- (*) = RESPECTIVE PANEL IDENTIFICATION
- N/O = NORMALLY OPEN (DE-ENERGIZED)
- N/C = NORMALLY CLOSED (DE-ENERGIZED)

GENERAL NOTES:

- EQUIPMENT LIGHTS SHALL BE AS FOLLOWS:
 - * MOTOR RUN "RED"
 - * MOTOR STOP "GREEN"
 - * ALARM "AMBER" OR "RED"
 - * POWER INDICATION "WHITE"
 - * VALVE POSITION OPEN "AMBER"
 - * VALVE POSITION CLOSED "BLUE"
 - SEE TYPICAL ELECTRICAL CONTROL DIAGRAMS (ECD) FOR STANDARD RELAY LOGIC REQUIREMENTS.
- NOTES OR REFERENCE NOTES SPECIFIC TO A CONTRACT SHEET.

ABBREVIATIONS

- AFC = AUTOMATIC FREQUENCY CONTROLLER (SEE VFD)
- AUTO = AUTOMATIC
- FOM = FIBER OPTIC MODEM
- HMI = HUMAN, MACHINE INTERFACE
- I/O = INPUT/OUTPUT
- PLC = PROGRAMMABLE LOGIC CONTROLLER
- SCADA = SUPERVISORY CONTROL AND DATA ACQUISITION
- SSRV = SOLID STATE REDUCED VOLTAGE (STARTER/CONTROLLER)
- VAC = VOLTS/ALTERNATING CURRENT
- VDC = VOLTS/DIRECT CURRENT
- VFD = VARIABLE FREQUENCY DRIVE

AS-BUILT

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

Paul J. Brown 2/10/04
DIRECTOR OF PUBLIC WORKS DATE

Robert H. Brown 2-9-04
CHIEF, BUREAU OF UTILITIES DATE

PREPARED BY:

WR&A

Whitman, Reardon and Associates, LLP.
801 S. Caroline St.
Baltimore, Md. 21231
410-235-3450

DES: SEA

DRN: SEA

CHK: PG

DATE: 10/15/03

BY	NO.	REVISION	DATE

PROCESS AND INSTRUMENTATION
LEGEND AND ABBREVIATIONS

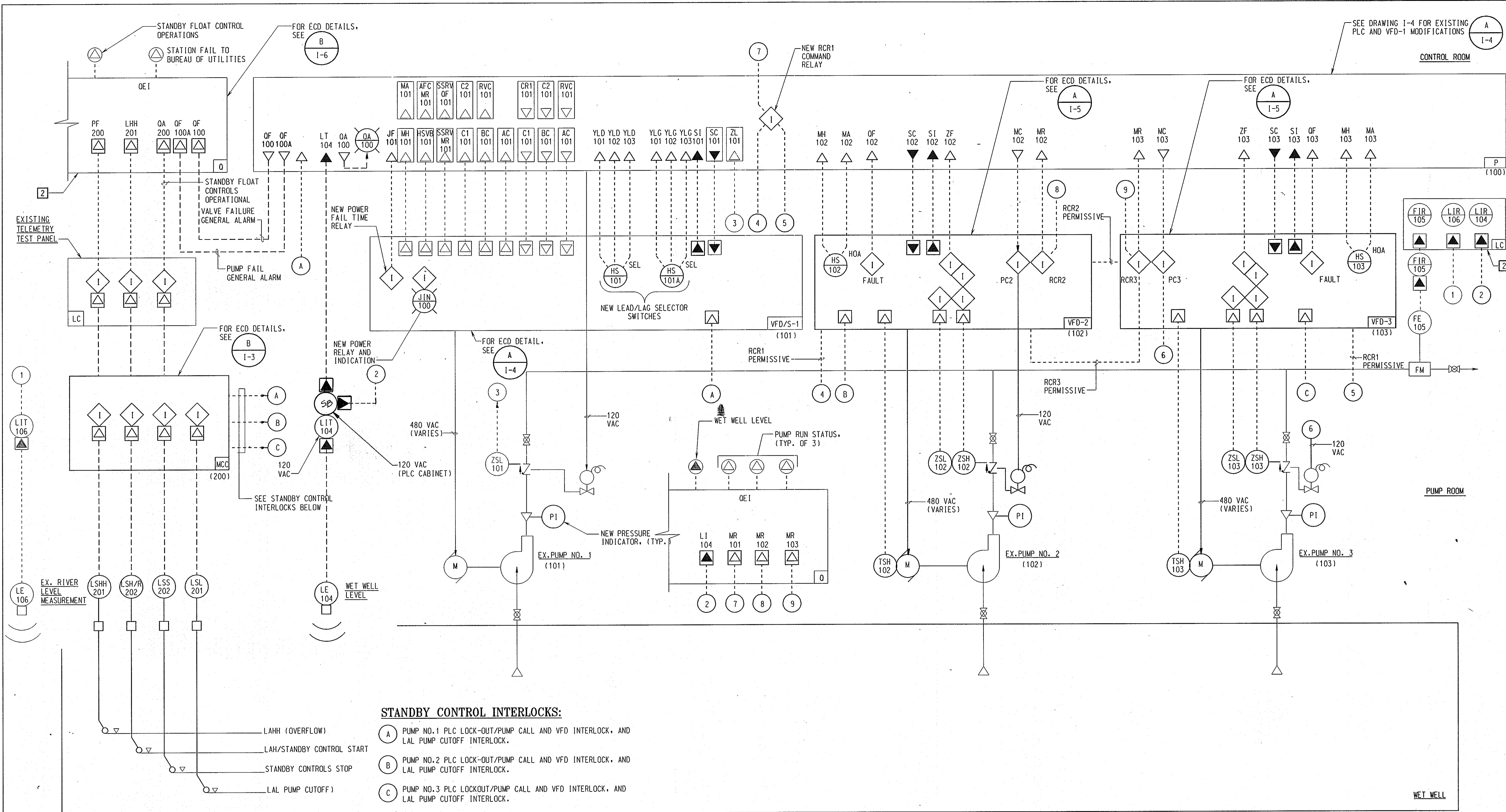
600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

I-1

SCALE AS SHOWN

SHEET 11 OF 17



WASTEWATER PROCESS

LEGEND

- YLD - POSITION LEAD
- YLG - POSITION LAG
- - EXISTING
- - NEW

NOTE:

- [1] FOR PANEL DEVICES, SEE ECD DETAIL REFERENCES.
- [2] LOCAL RECORDER PANEL IS INTEGRAL WITH OE1 PANEL.

AS-BUILT

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

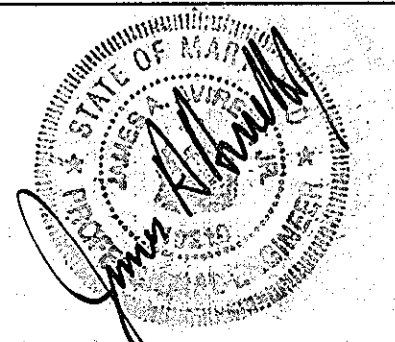
John J. Zolot 2/10/04
DIRECTOR OF PUBLIC WORKS
CHIEF, BUREAU OF UTILITIES

Paul J. Szymon 2/10/04
CHIEF, BUREAU OF ENGINEERING
CHIEF, UTILITY DESIGN DIVISION

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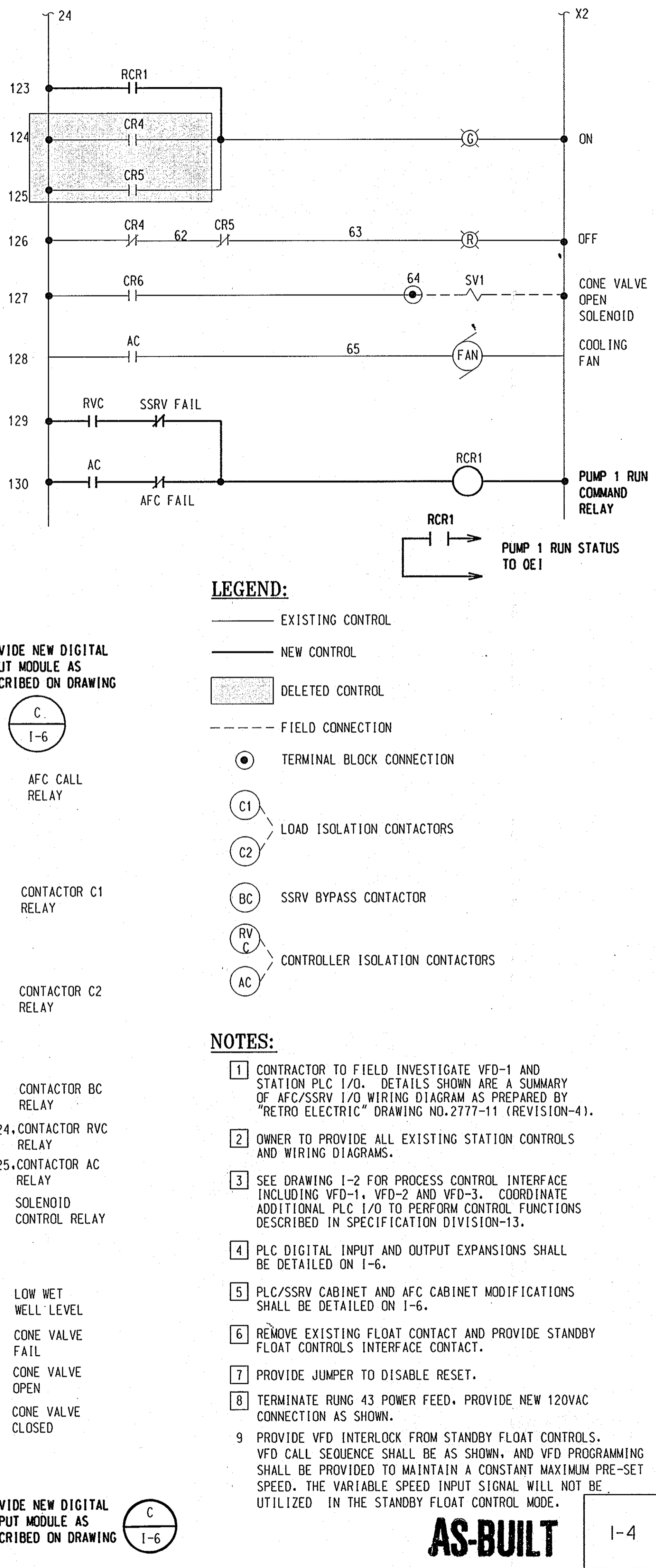
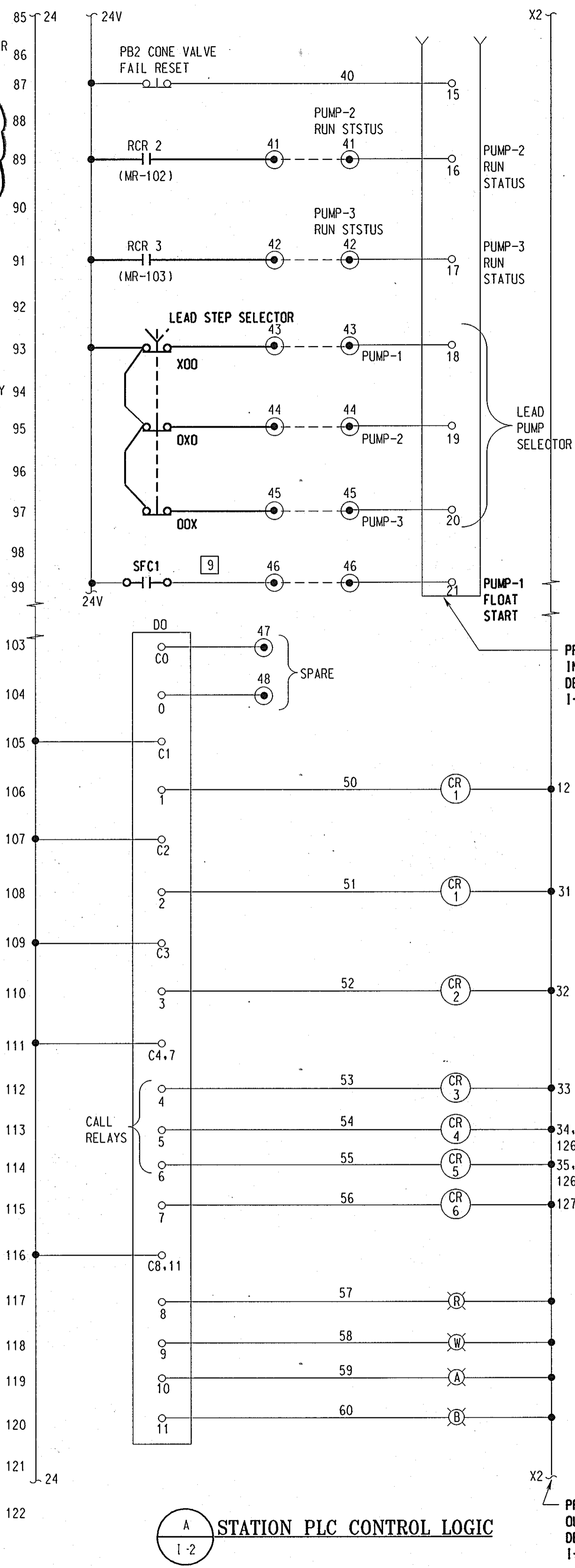
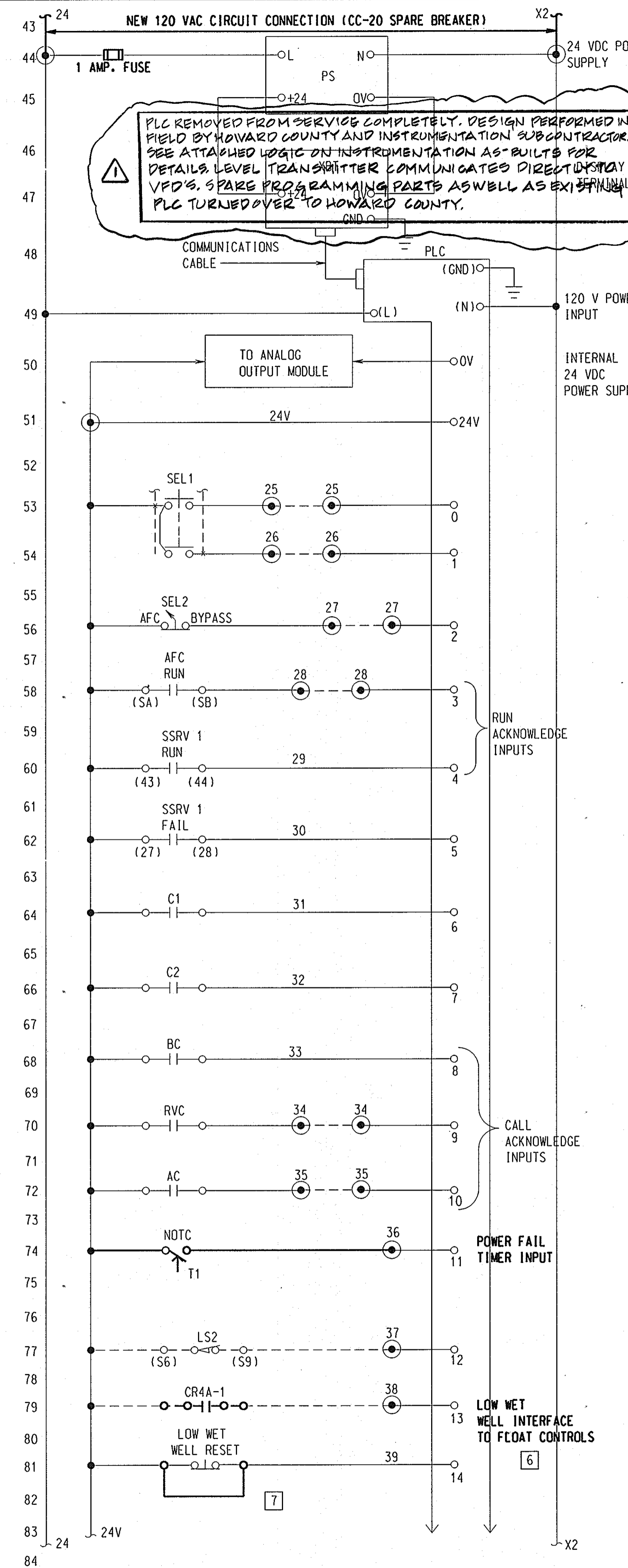
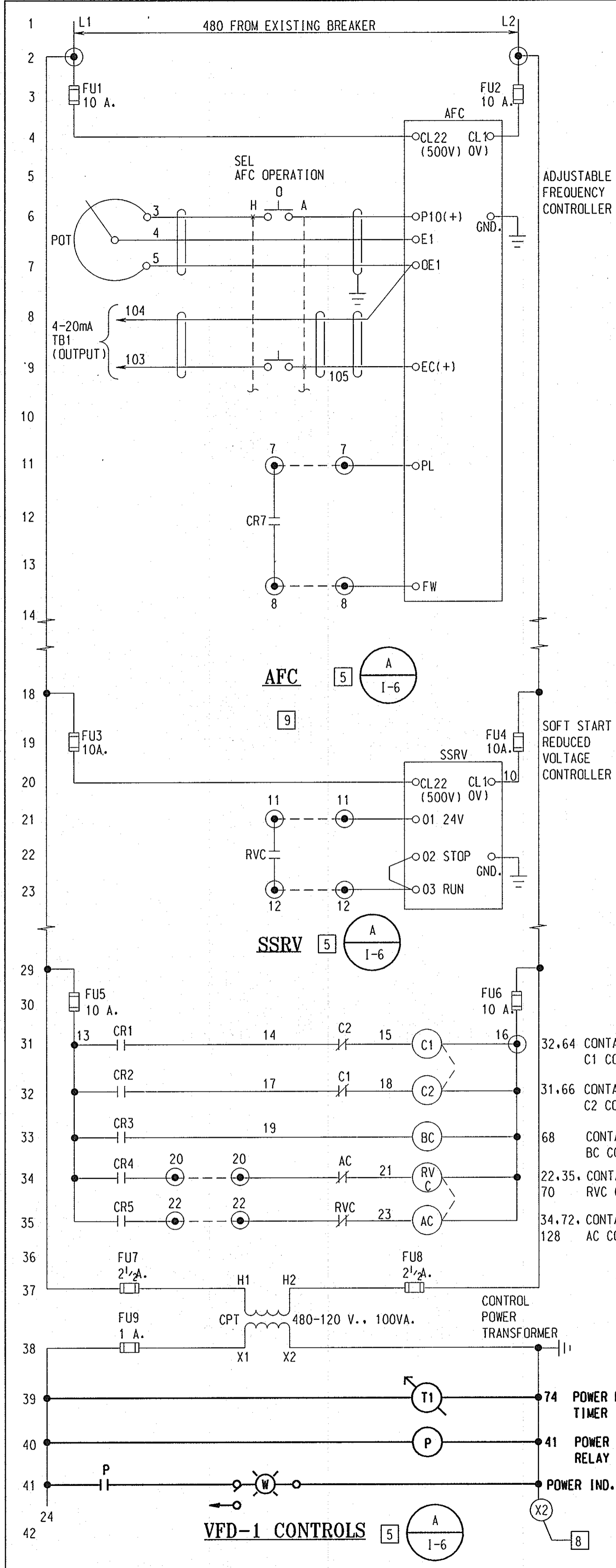
DES: SEA				
DRN: PLL				
CHK: PG				
DATE: 10/22/03	BY:	NO.:	REVISION:	DATE:

PROCESS AND INSTRUMENTATION DIAGRAM

600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER
PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

I-2
SCALE AS SHOWN
SHEET 12 OF 17



DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

John P. Chubb 2/10/04
DIRECTOR OF PUBLIC WORKS DATE

Robert J. Brown 2-9-04
CHIEF, BUREAU OF ENGINEERING DATE

John P. Chubb 2-10-04
CHIEF, BUREAU OF UTILITIES DATE

Robert J. Brown 2-9-04
CHIEF, UTILITY DESIGN DIVISION DATE

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John P. Chubb

DES:	SEA				
DRN:	PLL				
CHK:	PG				
DATE:	10/17/03				
BY:	NO.				
REVISION:					
DATE:					

AS-BUILT

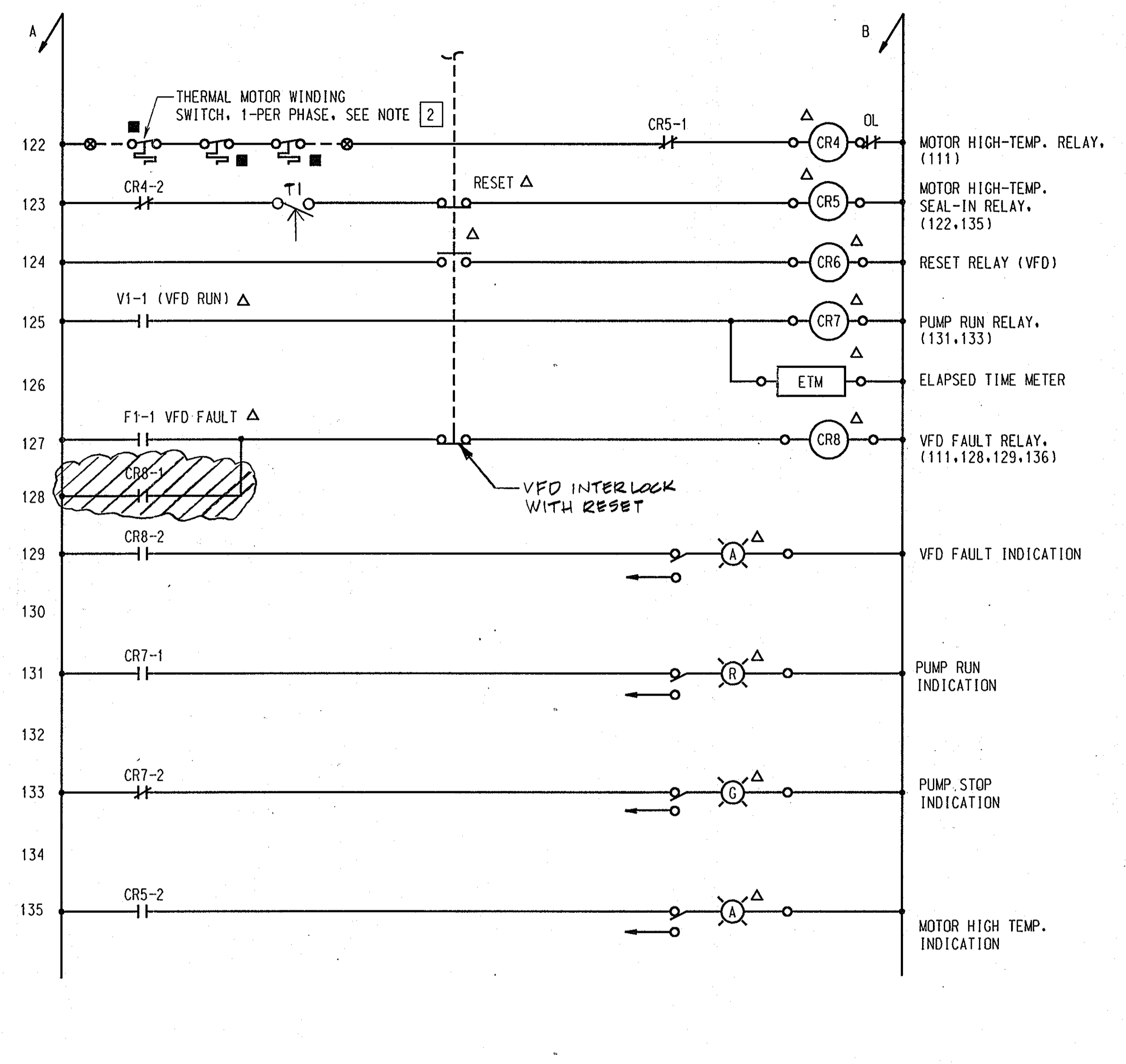
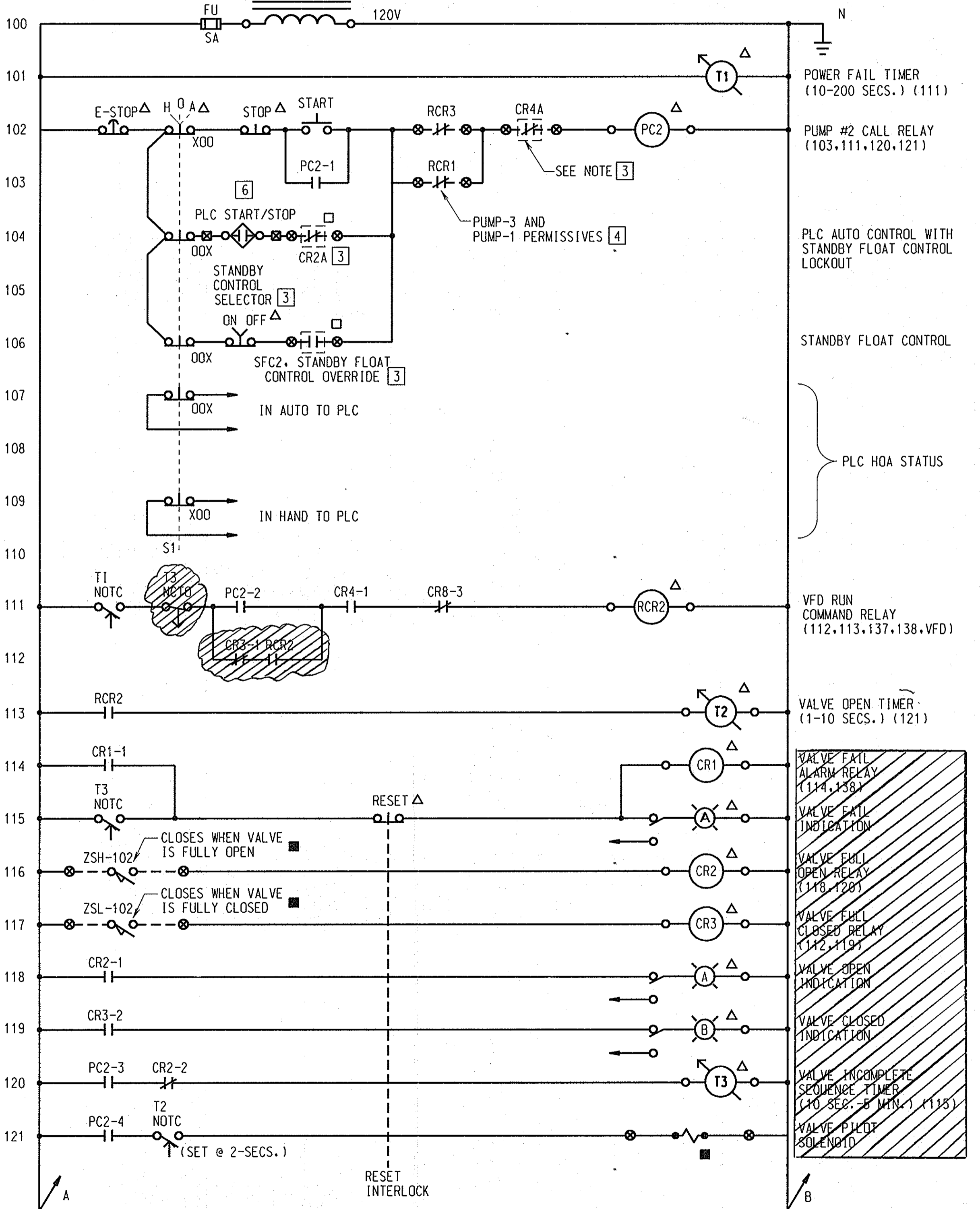
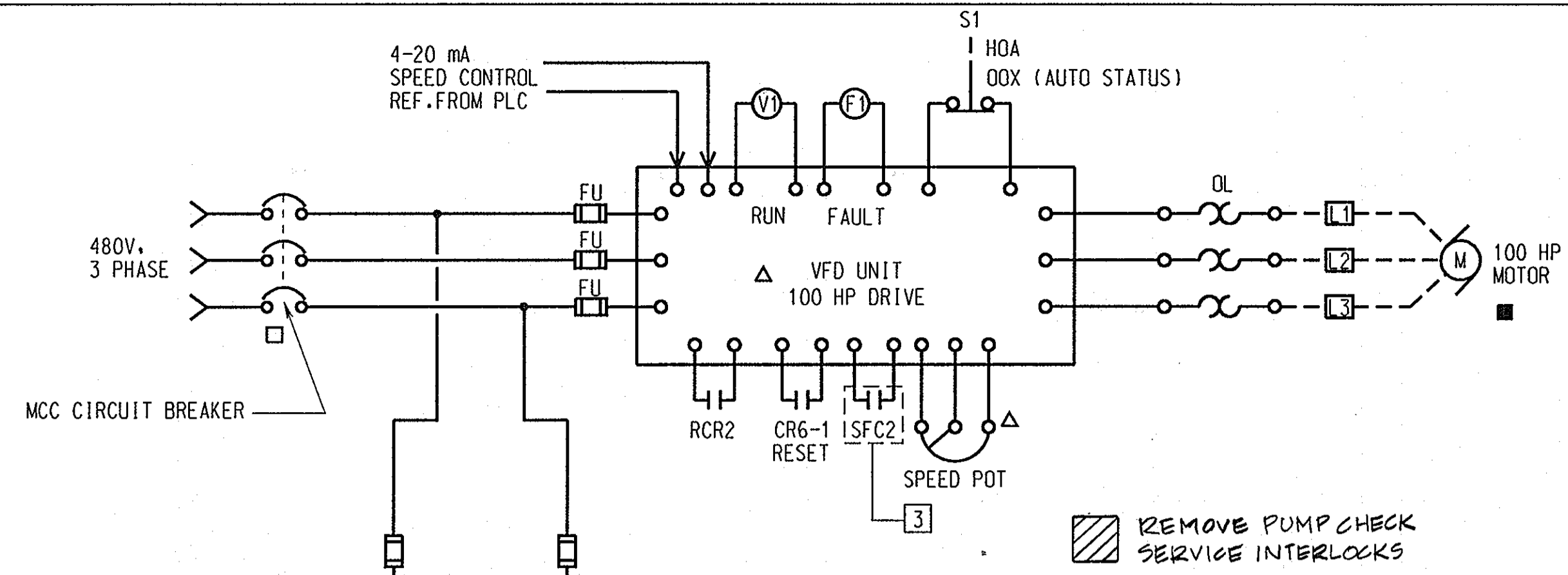
VFD-1 AND STATION PLC CONTROL DIAGRAMS

600' SCALE MAP NO. 50 BLOCK NO. 10

NORTH LAUREL WASTEWATER PUMPING STATION MAINTENANCE IMPROVEMENTS CONTRACT NO. 44-4165 CAPITAL PROJECT NO. S-6189 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

SHEET 14 OF 17

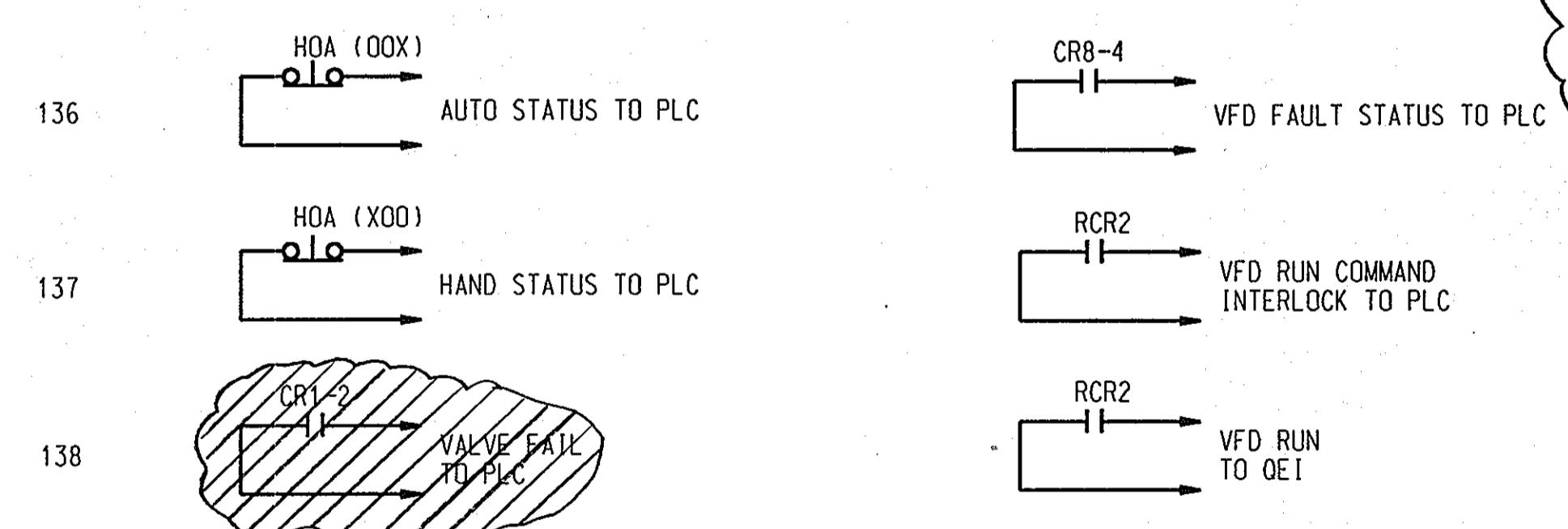


- GENERAL NOTES:**
- FOR ALL REMOTE I/O TO PLC, SEE DRAWING I-2.
 - PUMP MANUFACTURER TO COORDINATE SINGLE SERIES CONNECTION OF THERMAL SWITCHES AT MOTOR OR PROVIDE SEPARATE WIRING TO CONTROL CIRCUIT FOR EACH SWITCH (TSH-102).
 - SEE STANDBY FLOAT CONTROLS ECD ON DRAWING I-3. CONTACTS ARE PROVIDED FOR NORMAL PUMP CALL RELAY SEQUENCE, AND STATUS TO VFD TO RAMP PUMP TO PRESET FULL SPEED WITH LOCK-OUT OF VARIABLE CONTROL SIGNAL UNTIL RESET.
 - PUMP PERMISSIVES SHALL BE INTERLOCKED TO PERMIT ONLY TWO (2) PUMPS TO RUN AT ANY GIVEN TIME.
PUMP-1 INTERLOCK PUMP-2 AND 3
PUMP-2 INTERLOCK PUMP-1 AND 3
PUMP-3 INTERLOCK PUMP-1 AND 2
 - P&I DESIGNATIONS:
PUMP NO.2 (102)
PUMP NO.3 (103)
 - PLC START INTERPOSING RELAY FROM DRAWING I-6:

- LEGEND:**
- LOCATED AT EXISTING MCC
 - △ LOCATED AT VFD
 - ▲ LOCATED AT PLC PANEL
 - REMOTE MOUNTED
 - PANEL CONNECTIONS
 - - - REMOTE CONNECTIONS

- TERMINALS:**
- ⊗ TERMINALS AT PLC
 - ⊙ TERMINALS AT VFD
 - PANEL WIREWAY TERMINATIONS
 - MOTOR TERMINATIONS

PLC REMOVED FROM SERVICE COMPLETELY. DESIGN PERFORMED IN FIELD BY HOWARD COUNTY AND INSTRUMENTATION SUB CONTRACTOR. SEE ATTACHED LOGIC ON INSTRUMENTATION AS-BUILTS FOR DETAILS. LEVEL TRANSMITTER COMMUNICATES DIRECTLY TO VFD'S. SPARE PROGRAMMING PARTS AS WELL AS EXISTING PLC TURNED OVER TO HOWARD COUNTY.



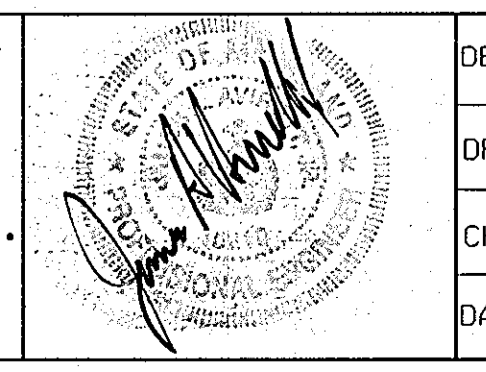
VARIABLE SPEED PUMP CONTROL DIAGRAM
(WASTEWATER PUMP NO. 2 SHOWN, TYPICAL FOR PUMP NO.3 OPERATIONS) [5]

AS-BUILT

DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND.

Director of Public Works: *R. J. Bump* 2/10/04
 Chief, Bureau of Engineering: *Paul J. Spon* 2/19/04
 Chief, Utility Design Division: *Edy D. ...* 2-9-04

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DES:	SEA			
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DATE:	10/17/03	BY:	NO.	REVISION
			AS-BUILT	

VFD-2 AND 3
PUMP CONTROL DIAGRAMS

NORTH LAUREL WASTEWATER
PUMPING STATION MAINTENANCE IMPROVEMENTS
CONTRACT NO. 44-4165
CAPITAL PROJECT NO. S-6189
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
SHEET 15 OF 17

