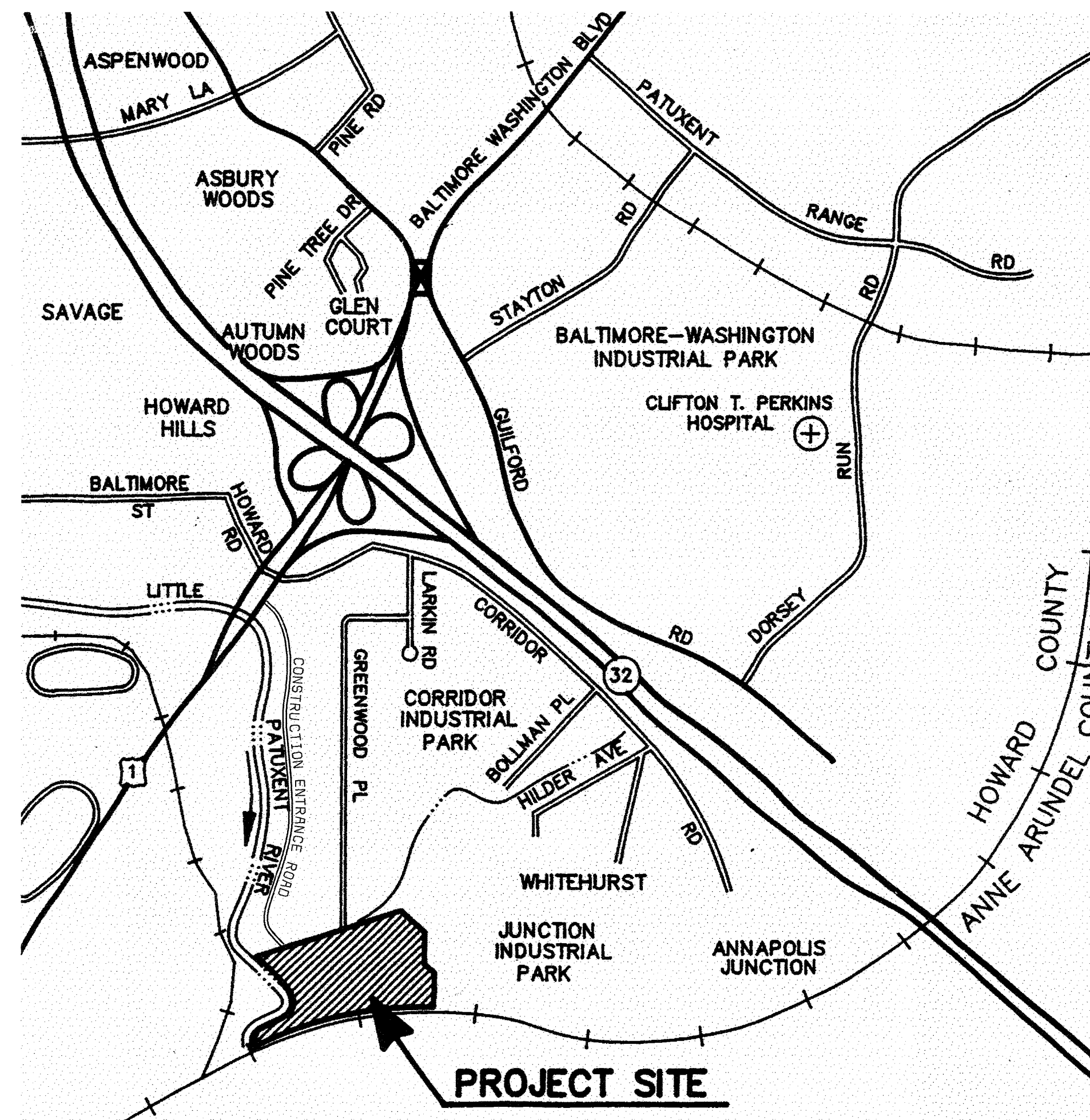


# HOWARD COUNTY, MARYLAND

## LITTLE PATUXENT WATER RECLAMATION PLANT



### ADDITION NO. 6

### BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT NO. S-6205

CONTRACT NO. 20-3839

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

_____ DIRECTOR OF PUBLIC WORKS	_____ DATE	_____ CHIEF, BUREAU OF ENGINEERING	_____ DATE
_____ CHIEF, BUREAU OF UTILITIES	_____ DATE	_____ CHIEF, WATER & SEWER DIVISION	_____ DATE

THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. RECTANUS, JR.,  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927



**BLACK & VEATCH** LLP  
Gaithersburg, Maryland

#### ASSOCIATE DESIGN FIRMS

**STANTEC CONSULTING, LTD.**  
Surrey, British Columbia

**BRYANT, BRYANT, & WILLIAMS**  
Washington, D. C.

**A. MORTON THOMAS & ASSO., INC.**  
Rockville, Maryland

**LACH ELECTRIC CORPORATION**  
Baltimore, Maryland


**CONFORMED TO CONSTRUCTION RECORDS 05/26/05**

SHEET  
1 OF 139

L1

**LIST OF DRAWINGS**

SHEET NO.	DRAWING NO.	DRAWING TITLE	SHEET NO.	DRAWING NO.	DRAWING TITLE	SHEET NO.	DRAWING NO.	DRAWING TITLE
<b>LAYOUT/OVERVIEW</b>			<b>MECHANICAL</b>			<b>ELECTRICAL</b>		
1	L1	COVER SHEET/LOCATION MAP	51	M1	EAST/WEST PROCESS REACTORS - EXISTING EQUIPMENT & PIPING	<b>GENERAL</b>		
2	L2R	LIST OF DRAWINGS	52	M2	NOT USED	103	E1	ELECTRICAL LEGEND AND ABBREVIATIONS
3	L3	LEGEND AND DESIGNATIONS	53	M3	NOT USED	104	E2R	SITE PLAN
4	L4	ABBREVIATIONS	54	M4	NOT USED	105	E3R	EXISTING MCC20 FRONT DEMOLITION ONE-LINES
5	L5	OVERALL SITE PLAN	55	M5	NOT USED	106	E4	NOT USED
6	L6R	PROCESS DESIGN CRITERIA	56	M6	NOT USED	107	E5R	MISCELLANEOUS ONE-LINE DIAGRAMS
7	L7	PROCESS MASS BALANCE	57	M7R	WEST GALLERY - DEMOLITION PLAN	108	E6R	MCC20 FRONT MODIFIED ONE-LINES
8	L8R	LIQUID SCHEMATIC	58	M8	NOT USED	109	E7R	MCC20 FRONT MODIFIED ONE-LINES CONTINUATION
9	L9R	HYDRAULIC PROFILE	59	M9	NOT USED	110	E8R	MCC20 REAR MODIFIED ONE-LINES
<b>CIVIL/SITEWORK</b>			60	M10	NOT USED	111	E9R	CONTROL AND MISC ONE-LINES
10	C1	EROSION AND SEDIMENT CONTROL PLAN - SHEET 1 OF 2	61	M11	NOT USED	112	E10R	EAST-WEST PROCESS REACTOR - SCHEMATICS
11	C2	EROSION AND SEDIMENT CONTROL PLAN - SHEET 2 OF 2	62	M12R	EAST/WEST REACTOR & GALLERIES - GENERAL ARRANGEMENT PLAN	113	E11	NOT USED
12	C3	EROSION AND SEDIMENT CONTROL - NOTES & DETAILS	63	M13R	EAST/WEST PROCESS REACTORS - PROCESS REACTORS	114	E12	NOT USED
<b>YARDWORK</b>			64	M14R	WEST GALLERY - PLAN	115	E13	NOT USED
13	Y1R	YARD PIPING PLAN - SHEET 1	65	M15R	EAST/WEST PROCESS REACTORS - ENLARGED PLAN AND SECTIONS	116	E14	NOT USED
14	Y2	YARD PIPING PLAN - SHEET 2	66	M16	NOT USED	117	E15	NOT USED
15	Y3R	YARD PIPING PROFILES	67	M17	NOT USED	118	E16R	POWER PLAN PROCESS REACTOR NO. 1 AND PART NO. 2
16	Y4	NOT USED	68	M18	NOT USED	119	E17	NOT USED
17	Y5R	MISCELLANEOUS YARDWORK DETAILS	69	M19	NOT USED	120	E18	NOT USED
<b>STRUCTURAL</b>			70	M20	NOT USED	121	E19	POWER PLAN FINAL CLARIFIER 7 & 8
18	S1R	EAST/WEST PROCESS REACTORS - DEMOLITION PLAN	71	M21	NOT USED	122	E20	POWER PLAN FINAL CLARIFIER 6 & 9
19	S2	NOT USED	72	M22	NOT USED	123	E21R	POWER PLAN EAST GALLERY
20	S3R	EAST/WEST PROCESS REACTORS - DEMOLITION PLAN AND SECTIONS	73	M23	NOT USED	124	E22R	POWER PLAN WEST GALLERY
21	S4	NOT USED	74	M24	NOT USED	125	E23R	SCHEDULES AND DETAILS
22	S5	NOT USED	75	M25	NOT USED	126	E24	EFFLUENT PUMPING STATION - EXISTING MCC-11 ONE-LINE DIAGRAM
23	S6	NOT USED	76	M26R	EAST/WEST PROCESS REACTORS - PLAN & SECTIONS SPRAY HOOD	127	E25	EFFLUENT PUMPING STATION - PUMP ROOM - PLAN AND SCHEMATIC
24	S7	NOT USED	77	M27R	WEST GALLERY - PLAN AND SECTIONS	<b>INSTRUMENTATION AND CONTROLS</b>		
25	S8	NOT USED	78	M28R	WEST GALLERY - ENLARGED PLANS AND SECTIONS	128	I1	P&ID - LEGEND AND ABBREVIATIONS
26	S9	NOT USED	79	M29	NOT USED	129	I2R	P&ID - PROCESS REACTOR 1
27	S10R	EAST/WEST PROCESS REACTORS - GENERAL ARRANGEMENT PLAN	80	M30R	EAST GALLERY - PLAN AND SECTIONS	130	I3R	P&ID - PROCESS REACTOR 2
28	S11	NOT USED	81	M31R	ALUM STORAGE BUILDING - ALUM BUILDING AND ALUM FEED SYSTEM	131	I4	NOT USED
29	S12	NOT USED	82	M32	EAST FINAL CLARIFIERS - DEMOLITION PLAN	132	I5	NOT USED
30	S13R	EAST/WEST PROCESS REACTORS - PLANS AND SECTIONS	83	M33	EAST FINAL CLARIFIERS - DEMOLITION PLAN	133	I6R	P&ID - FINAL CLARIFIERS 2 & 3 & WEST GALLERY
31	S14	NOT USED	84	M34	EAST FINAL CLARIFIERS - DEMOLITION PLAN	134	I7	P&ID - FINAL CLARIFIERS 4 & 5 & WEST GALLERY
32	S15	NOT USED	85	M35R	FC 6 & 9 - PLAN	135	I8	NOT USED
33	S16	NOT USED	86	M36	FC 7 & 8 - PLAN	136	I9	NOT USED
34	S17	NOT USED	87	M37	FC NO. 8 - SECTIONS	137	I10R	P&ID - RAS CHLORINATION SYSTEM
35	S18R	EAST/WEST PROCESS REACTORS - PLANS, SECTIONS, AND DETAILS	88	M38	FC NO. 9 - SECTIONAL PLAN & SECTION	138	I11	P&ID - CONTROL BLOCK DIAGRAM
36	S19	NOT USED	89	M39	NOT USED	139	I12	P&ID - INSTALLATION DETAILS
37	S20	NOT USED	90	M40	NOT USED	<b>HVAC/PLUMBING</b>		
38	S21	NOT USED	91	M41	FILTER EFFLUENT PUMP STATION - PLAN	99	H1	NOT USED
39	S22	NOT USED	92	M42	FILTER EFFLUENT PUMP STATION - SECTIONS	100	H2	NOT USED
40	S23R	EAST/WEST PROCESS REACTORS - SPRAY HOOD PLAN, SECTIONS, & DETAIL	93	M43	36" FE VAULT - PLANS AND SECTION	101	H3	NOT USED
41	S24	NOT USED	94	M44	GENERAL - MISCELLANEOUS DETAILS	102	P1	NOT USED
42	S25	EAST FINAL CLARIFIERS - PLAN, SECTION, AND DETAILS	95	M45	GENERAL - MISCELLANEOUS DETAILS			
43	S26R	EAST FINAL CLARIFIERS FLOW DISTRIBUTION CHAMBER - DEMO AND MODIFIED PLANS & SECTIONS	96	M46	GENERAL - MISCELLANEOUS DETAILS			
44	S27	NOT USED	97	M47	GENERAL - MISCELLANEOUS DETAILS			
45	S28	NOT USED	98	M48	GENERAL - MISCELLANEOUS DETAILS			
46	S29	NOT USED						
47	S30	GENERAL - STRUCTURAL NOTES						
48	S31	GENERAL - STANDARD CONCRETE DETAILS						
49	S32	GENERAL - STANDARD MASONRY DETAILS						
50	S33	GENERAL - LADDER DETAILS						

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND  CHIEF, BUREAU OF UTILITIES DATE	 <b>BLACK &amp; VEATCH</b> Gaithersburg, Maryland  REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. RECTANUS, JR. A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927	DES: FKA								LAYOUT/OVERVIEW CIVIL  LIST OF DRAWINGS	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839  HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: RLC	CHK: RJR	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS	RJR	RJR	6/11/03			PR VALUE ENGINEERING PROPOSAL
			DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			L2R	

### GENERAL LEGEND

	SURFACED STREET, ROAD OR DRIVE		BUILDINGS, STRUCTURES
	SURFACED STREET, ROAD OR DRIVE WITH CURBS		STRUCTURES UNDERGROUND
	NON-SURFACED STREET, ROAD OR DRIVE		FUTURE BUILDINGS, STRUCTURES
	CONCRETE WALK		FENCE
	CATCH BASIN		FENCE, WOOD
	MANHOLE		RAILROAD, EACH TRACK
	DRAINAGE COURSE OR FLOW LINE		CENTERLINE
	EXISTING GROUND CONTOUR		HEDGE, BRUSH, SHRUBS, WOODS
	FINISH GRADE CONTOUR		SWAMP
	BANK OR SLOPE LINES		FIRE HYDRANT
	TEST HOLE AND NUMBER		YARD HYDRANT
	SURVEY LINE WITH PI, PT, OR PDT		STREET LIGHT POLE
	CONCRETE ENCASEMENT-PLAN		TRAFFIC SIGN
	CONCRETE REACTION BLOCKING AT BEND, PLUG OR TEE		STOP SIGN
	DRAINS OR CULVERTS		WATER OR GAS VALVE
	TUNNEL CASING - PLAN		WATER OR GAS METER
	TELEPHONE OR POWER POLE WITH GUY ANCHOR		SECTION NUMBER OR DETAIL LETTER DRAWING NUMBER ON WHICH SECTION OR DETAIL APPEARS, OR WHERE SECTION IS CUT OR DETAIL IS NOTED
	WALL ELEVATION		AREA DESIGNATION DOOR, WINDOW AND LOUVER SCHEDULE REFERENCE
	ROOM NUMBER		EQUIPMENT REPRESENTATION WITH CALLOUT
	AREA DESIGNATION		EXISTING FACILITY TO BE DEMOLISHED OR REMOVED
	POINT OF CONNECTION NEW WORK TO EXISTING		

### MATERIALS LEGEND

	EARTH OR GRADE		WOOD, SHEATHING, PANELING, DECKING, ETC.
	GRANULAR FILL (CRUSHED ROCK OR GRAVEL)		WOOD, STUDS, BEAMS, JOISTS, ETC.
	ROCK		RIPRAP
	NEW CONCRETE		CHECKERED PLATE
	EXISTING CONCRETE, PRECAST OR PRESTRESSED CONCRETE		STEEL (FOR 1" SCALE & LARGER)
	BRICK, FACE		STEEL OR ALUMINUM (FOR 3/4" SCALE & SMALLER)
	BRICK, COMMON		BAR GRATING (LINES IN DIRECTION OF SPAN)
	CONCRETE MASONRY UNITS (CMU)		ALUMINUM
	CUT STONE OR SAND FILL, GROUT, MORTAR, AND PLASTER		INSULATION (BATT)
	CAST STONE		INSULATION (RIGID)

### PIPING SYSTEMS

	NEW PIPING		FIRE PROTECTION WATER SYSTEM
	UNDERGROUND PIPING		FILTER BASIN INFLUENT
	EXISTING PIPING		FINAL CLARIFIER INFLUENT
	FUTURE PIPING		FILTER EFFLUENT
	ALUM - ALUMINUM SULFATE - (ALUM)		FLOW EQUALIZATION INFLUENT
	CRW - CHEMICAL RESISTANT ACID WASTE		FLOW EQUALIZATION EFFLUENT
	CRV - CHEMICAL RESISTANT ACID WASTE VENT		FERMENTER SUPERNATANT
	CL(S) - CHLORINE SOLUTION		GAS, NATURAL
	CDWR - CONDENSER WATER RETURN		GRIT BASIN INFLUENT
	CDWS - CONDENSER WATER SUPPLY		HEATING SYSTEM WATER RETURN
	D - DRAIN		HEATING SYSTEM WATER SUPPLY
	DW - DISTILLED WATER		HOT WATER CIRCULATING
			INSTRUMENT AIR
			INTERNAL RECYCLE
			LIME
			SODIUM HYDROXIDE
			SODIUM HYPOCHLORITE
			WATER, NON-POTABLE HOT
			WATER, NON-POTABLE (NOTE 2)

### VALVE LEGEND

	PINCH VALVE		BACKWATER VALVE
	PLUG VALVE, ECCENTRIC		INLINE PRESSURE RELIEF VALVE
	PLUG VALVE, NON-ECCENTRIC		PRESSURE REGULATING VALVE
	BUTTERFLY VALVE		PRESSURE SUSTAINING OR MAINTAINING VALVE
	GATE VALVE		VACUUM BREAKER
	BALL VALVE		THERMAL SHUTOFF VALVE
	GLOBE VALVE		EXPLOSION RELIEF VALVE
	CHECK VALVE		HOSE FAUCET
	3 WAY VALVE		HOSE FAUCET W/VACUUM BREAKER
	4 WAY VALVE		HOSE VALVE W/HOSE NIPPLE
	ANGLE VALVE		BACKFLOW PREVENTER
	CHLORINE INSTITUTE VALVE		SAFETY RELIEF VALVE
	DIAPHRAGM VALVE		VACUUM RELIEF CHECK VALVE
	THROTTLING VALVE		KNIFE GATE VALVE

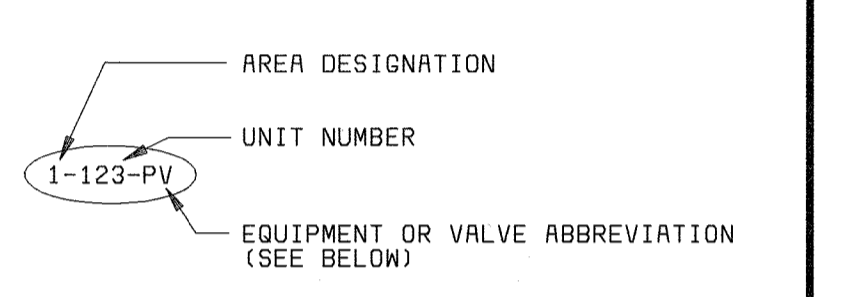
### PIPING ACCESSORIES LEGEND

	AUTOMATIC DRAIN TRAP		FLUME
	BLIND FLANGE		GAGE GLASS
	CALIBRATING COLUMN		HOSE CONNECTION
	CAP OR PLUG		HOSE REEL
	CENTRIFUGE		INJECTOR, EDUCATOR, BLENDER
	CLEANOUT		INLINE FILTER
	COMPRESSOR OR BLOWER		INSULATING NIPPLE
	CROSS		LEVEL SWITCH
	DIAPHRAGM SEAL		MIXER
	DIFFERENTIAL PRESSURE INDICATOR		OIL SEPARATOR
	DIFFERENTIAL PRESSURE SWITCH		ORIFICE PLATE
	DIFFUSER, CHANNEL		PIPE ANCHOR
	DIFFUSER, PIPE		PIPE GUIDE
	DRAIN OR BELL-UP		PITOT TUBE
	DRIP TRAP		PRESSURE GAUGE WITH SNUBBER
	DUPLEX STRAINER		PRESSURE SWITCH
	ELBOW		PRESSURE TRANSMITTER
	ELBOW TURNING DOWN		PUMP
	ELBOW TURNING UP		QUICK COUPLING
	EXPANSION COMPENSATOR		REDUCER
	EXPANSION TANK		ROTAMETER
	FLAME ARRESTER OR CHECK		RUPTURE DISK
	FLEXIBLE CONNECTOR		SAMPLE TAP
	FLEXIBLE HOSE OR TUBING		SCREEN
	FLOWMETER ELECTROMAGNETIC/ULTRASONIC		SEDIMENT TRAP/CONDENSATE ACCUMULATOR
	FLOW SWITCH		SET STOP METER
	FLOW TUBE		SIGHT GLASS

### ACTUATOR LEGEND

	AIR, PNEUMATIC
	AIR/OIL TANDEM
	DIAPHRAGM
	ELECTRIC, MOTORIZED
	FLOAT
	HYDRAULIC
	SOLENOID

### EQUIPMENT DESIGNATION



AREA DESIGNATION	
#	LOCATION
1	HEADWORKS
2	GRIT BASIN & FEB BASIN
3	WEST GALLERY
4	EAST/WEST BASIN COMPLEX
5	NORTH BASIN COMPLEX
6	EAST GALLERY
7	FILTRATION
8	SOLIDS PROCESSING
9	ADMINISTRATION/MAINTENANCE

EQUIPMENT/VALVE ABBREVIATION	
BV	BUTTERFLY VALVE
FV	PINCH VALVE
KV	KNIFE GATE VALVE
L	WATER LEVEL
M	METERS
ME	MECHANICAL EQUIPMENT
MX	MIXERS
P	PUMPS
PV	PLUG VALVE
SG	SLUICE GATE
SL	SLIDE GATE
RW	ROTATING WEIR GATE
WG	WEIR GATE

NOTE:  
 1. SYMBOLS ON THIS SHEET WHICH ARE TO BE SHOWN AS EXISTING SHALL BE DELINEATED AS SCREENED. THOSE SYMBOLS WHICH ARE TO BE SHOWN AS NEW SHALL BE DELINEATED AS SOLID (HEAVY).  
 2. NON-POTABLE WATER, UPSTREAM OF A BACKFLOW PREVENTER.

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
 Gaithersburg, Maryland  
 REG. PROF. ENGR. DATE

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DES: SLF					
DRN: SLF					
CHK: RJR					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
		REVISIONS AND RECORD OF ISSUE			


LAYOUT/OVERVIEW  
 CIVIL  
 LEGEND AND DESIGNATIONS

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

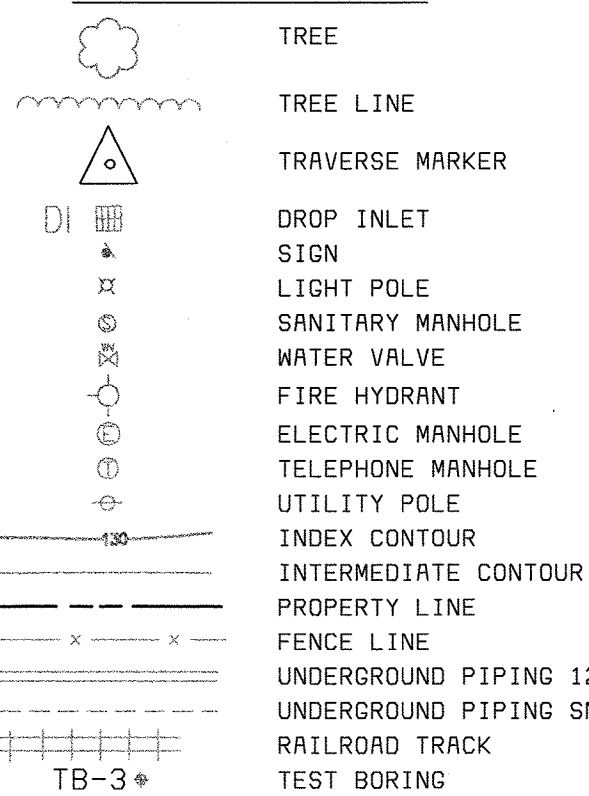
SCALE AS SHOWN  
 SHEET 3 OF 139  
 L3

ABBREVIATIONS

A	ACID, AMBER INDICATING LIGHT, AMPERE	CTR(S)	CENTER(S)	GM	GAS METER	SKL	SKYLIGHT
AB	ANCHOR BOLT	CU	CUBIC	GPM	GALLONS PER MINUTE	SLG	SLIDE GATE
ABS	ACID BATH SINK	CU YD	CUBIC YARD	GR	GRADE	SM	SHEET METAL
AC	ALTERNATING CURRENT	CV	COLD VALVE	GV	GATE VALVE	SP	SUMP PUMP
A/C	AIR CONDITIONER, (ING)	CW	COLD WATER	GWB	GYPNUM WALLBOARD	SPA	SPACING, SPACES
ACP	ASBESTOS CEMENT PIPE	CWR	COLD WATER RETURN	GYP	GYPNUM	SPEC(S)	SPECIFICATION(S)
ACST	ACOUSTIC, (AL)	CWS	COLD WATER SUPPLY			SPLY	SUPPLY
AD	ACCESS DOOR, AREA DRAIN, AIR DAMPER, ANODE	D	DOOR, DRAIN	H	HIGH, HOUR, HYDROGEN	SQ	SQUARE
ADA	AMERICAN DISABILITY ACT	DBL	DOUBLE	HB	HOSE BIBB	SR	SUPPLY REGISTER
ADD	ADDITIONAL	DC	DIRECT CURRENT	HV	HOLLOW CORE	SS	STAINLESS STEEL
ADH	ADHESIVE	DEG	DEGREE	HDR	HEADER	SS	SANITARY SEWER
ADJ	ADJUSTABLE, ADJACENT	DEPT	DEPARTMENT	HDWR	HARDWARE	SSK	SERVICE SINK
ADMIN	ADMINISTRATION	DET	DETRAIL	HE	HEAT EXCHANGER	ST	SELF TAPPING
AF	AIR FLOW	DF	DRINKING FOUNTAIN	HEX	HEXAGONAL	ST SWR	STORM SEWER
AFF	ABOVE FINISH FLOOR	DH	DOOR HEIGHT	HF	HOSE FAUCET	STA	STATION
AH	AHEAD	DI	DROP INLET, DUCTILE IRON	HGT	HEIGHT	STD	STANDARD
AHU	AIR HANDLING UNIT	DIA	DIAMETER	HH	HANDHOLE	STL	STEEL
AL	ACTIVE LEAF	DIFF	DIFFUSER	HLS	HIGH LEVEL SWITCH	STOR	STORAGE
ALT	ALTERNATE, (IVE)	DIM	DIMENSION	HMC	HARNESSED MECHANICAL COUPLING	STR	STRUCTURAL
ALUM	ALUMINUM	DIP	DUCTILE IRON PIPE	HMD	HOLLOW METAL DOOR	SUP	SUPPLY
AM	AMMETER	DISCH	DISCHARGE	HMJ	HARNESSED MECHANICAL JOINT	SUSP	SUSPENDED
AMP	AMPERE	DISP	DISPENSER	HORIZ	HORIZONTAL	SV	SHUTOFF VALVE
AN	ANAEROBIC	DIST	DISTRIBUTION	HP	HIGH POINT, HORSEPOWER	SW	SWITCH
ANOD	ANODIZED	DIV	DIVISION	HR	HOUR, HANDRAIL	SWBD	SWITCHBOARD
AP	ACCESS PANEL	DM	DEAD LOAD	HS	HIGH STRENGTH	SWGR	SWITCHGEAR
APPR	APPROACH	DM	DAMPEN MOTOR	HV	HOSE VALVE	SWS	SEAL WATER SOLENOID
APPROX	APPROXIMATE, (LY)	DMJ	DOUBLE MECHANICAL JOINT	HVAC	HEATING, VENTILATING AND AIR CONDITIONING	SYM	SYMMETRICAL
AR	ALARM RELAY	DN	DOWN	HW	HOT WATER	SYS	SYSTEM
ARCH	ARCHITECTURAL	DO	DOOR OPENING, DISSOLVED OXYGEN	HWY	HIGHWAY	T	THERMOSTAT, TREAD, TOTALIZER
AS	AMMETER SWITCH	DPDT	DOUBLE POLE DOUBLE THROW	HYDRO	HYDRO-PNEUMATIC	T	TRANSFORMER, TELEPHONE, TOP
ASSY	ASSEMBLY	DR	DRAIN	I	INDICATOR	TAN	TANGENT
AUTO	AUTOMATIC	DS	DOWNSPOUT	ID	INSIDE DIAMETER	TB	TERMINAL BOX
AUX	AUXILIARY	DT	DISTRIBUTION TRANSFORMER	IF	INSIDE FACE	T&B	TOP AND BOTTOM
AVS	AUTOMATIC VALVE STATION	DV	DRAIN VALVE	I/I	CURRENT TO CURRENT BOOSTER	TBE	THREAD BOTH ENDS
AWG	AMERICAN WIRE GAGE	DWG(S)	DRAWING(S)	IN	INCHES	TBM	TEMPORARY BENCHMARK
AX	ANOXIC	DWL(S)	DOWEL(S)	INCL	INCORPORATED	TC	TOWEL CABINET, TOP OF CURB
B	BEAM	E	EAST, ELECTRICAL	INCL	INCLUDING	TC	TERMINAL CABINET
B TO B	BACK TO BACK	EA	EACH	INCR	INCREASE	TEL	TELESCOPING
BA	BEARING AREA	EAT	ENTERING AIR TEMPERATURE	INST	INSTRUMENT, (ATION)	TEMP	TEMPERATURE, TEMPORARY
BAL	BALANCE	EC	END CURVE	INSUL	INSULATE, (ED), (ING)	TERM	TERMINAL
BAT	BATTERY	ECC	ECCENTRIC	INT	INTERIOR, INTERNAL	T&G	TONGUE & GROOVE
BC	BEGIN CURVE	ECC RED	ECCENTRIC REDUCER	INV	INVERT	TH	TEST HOLE
BD	BOARD	EEW	EMERGENCY EYEWASH	IPS	IRON PIPE SIZE	THK	THICK, THICKNESS
BEJ	BRICK EXPANSION JOINT	EF	EACH FACE	IR	INTERNAL RECYCLE	THR	THRESHOLD
BF	BLIND FLANGE	EFF	EFFLUENT	JAN	JANITOR	TI	TOTALIZING INDICATOR, TEMPERATURE INDICATOR
BFV	BUTTERFLY VALVE	EJ	EXPANSION JOINT	JB	JUNCTION BOX	TIR	TOTALIZING INDICATING RECORDER
BHP	BRAKE HORSEPOWER	EL	ELEVATION	JF	JOINT FILLER	TOF	TOP OF FOOTING
BITUM	BITUMINOUS	ELB	ELBOW	JT	JOINT	TOM	TOP OF MASONRY
BKR	BREAKER	ELEC	ELECTRIC, (AL)	K	KIPS	TOS	TOP OF STEEL
BLDG	BUILDING	ELEV	ELEVATOR	KIT	KITCHEN	TP	TWISTED PAIR COUPLE, TOWEL PIN
BLK	BLOCK	EMER	EMERGENCY	KO	KNOCK OUT	TPD	TONS PER DAY
BM	BENCHMARK	ENC	ENCASEMENT	KS	KITCHEN SINK	TRANS	TRANSFORMER, TRANSMITTER, TRANSFER
BOF	BOTTOM OF FOOTING	ENCL	ENCLOSURE	KV	KILOVOLT	TS	TEMPERATURE SWITCH
BOT	BOTTOM	ENT	ENTRANCE	KVA	KILOVOLT AMPERE	TV	TELEVISION
BP	BACK PRESSURE	EOL	END OF LINE	KW	KILOWATT	TYP	TYPICAL
BPMK NO	BASEPLATE MARK NUMBER	EPV	ECCENTRIC PLUG VALVE	KWH	KILOWATT HOUR	TW	TILTING WEIR
BRC	BEARING	EQ	EQUAL	L	LOUVER, ANGLE	UDM	ULTRASONIC DENSITY METER
BRK	BRICK	EQUIP	EQUIPMENT	LAB	LABORATORY	UGND	UNDERGROUND
BS	BOTH SIDES	EW	EACH WAY	LAM	LAMINATE (D)	UH	UNIT HEATER
B&S	BELL AND SPIGOT	EMW	EMERGENCY EYEWASH	LAT	LEAVING AIR TEMPERATURE	UNIF	UNIFORM
BSMT	BASEMENT	EXCH	EXCHANGER	LAV	LAVATORY	UNO	UNLESS NOTED OTHERWISE
BTU	BRITISH THERMAL UNIT	EXH	EXHAUST	LAV	LAVATORY	UR	URINAL
BTUH	BRITISH THERMAL UNIT-HOUR	EX, EXIST	EXISTING	LB(S)	POUNDS	USGS	UNITED STATES GEOLOGICAL SURVEY
BU	BELL-UP	EXP	EXPANSION, EXPOSED	LG	LENGTH, LONG	V	VALVE, VOLT, VENT
BUR	BUILT UP ROOFING	EXP JT	EXPANSION JOINT	LH	LEFT HAND	VAC	VACUUM
BV	BALL VALVE	EXT	EXTENSION, EXTERIOR, EXTERNAL	LL	LINEAL, LINEAR	VAT	VINYL ASBESTOS TILE
BVC	BEGIN VERTICAL CURVE	F	FAN, FIBERGLASS	LLH	LONG LEG HORIZONTAL	VB	VACUUM BREAKER
C	COUNTER	F TO F	FACE TO FACE	LLV	LONG LEG VERTICAL	VC	VERTICAL CURVE, VICTAULIC COUPLING
C TO C	CENTER TO CENTER	FB	FACE BRICK, FILTER BASIN	LV	LOUVER OPENING	VCD	VERTICAL CONTROL DAMPER
CBU	CEMENTITIOUS BACKER UNIT	FC	FLEXIBLE CONNECTION, FLOW CONTROL, FINAL CLARIFIER	LS	LABORATORY SINK, LEVEL SWITCH, LIMIT SWITCH	VCP	VITRIFIED CLAY PIPE
CD	CEILING DIFFUSER	FCA	FLANGED COUPLING ADAPTER	LT	LEFT, LAB TABLE	VCT	VINYL COMPOSITION TILE
C/EJ	CONTRACTION/EXPANSION JOINT	FD	FLOOR DRAIN	MA	MILLIAMPERE	VERT	VERTICAL
CFM	CUBIC FEET PER MINUTE	FDN	FOUNDATION	MACH	MACHINE	VIB	VIBRATION
CFS	CUBIC FEET PER SECOND	FDPR	FIRE DAMPER	MAINT	MAINTENANCE	VM	VOLT METER
C&G	CURB AND GUTTER	FE	FIRE EXTINGUISHER, FLOW ELEMENT	MAN	MANUAL	VNR	VENEER
CHKD	CHECKERED	FEC	FIRE EXTINGUISHER CABINET	MAS	MASONRY	VTR	VENT TO ROOF
CI	CAST IRON	FF	FACTORY FINISH	MATL	MATERIAL	VV	VENT VALVE
CIMH	CAST IRON MANHOLE	FH	FLAT HEAD, FIRE HYDRANT	MAX	MAXIMUM	W	WEST, WIDE, WIDTH, WINDOW, WATT, POTABLE WATER
CIMHS	CAST IRON MANHOLE STEPS	FHMS	FLAT HEAD MACHINE SCREW	MB	MACHINE BOLT	W/	WITH
CIP	CAST IRON PIPE	FIG	FIGURE	MC	MECHANICAL COUPLING	WAS	WASTE ACTIVATED SLUDGE
CISP	CAST IRON SOIL PIPE	FIN	FINISH	MCC	MOTOR CONTROL CENTER	WB	WALLBOARD
CJT	CONTROL JOINT	FIN GR	FINISH GRADE	MECH	MECHANICAL	WC	WATER CLOSET
CKT	CIRCUIT	FL	FLOOR, FLOW LINE	MED	MEDIUM	WD	WOOD, WIDTH
CL	CLASS, CENTERLINE	FLEX	FLEXIBLE	MEZ	MEZZANINE	WF	WALL FITTING, WALL FABRIC
CLG	CEILING	FLG	FLANGE, FLASHING	MFM	MAGNETIC FLOWMETER	WH	WALL HYDRANT
CLO	CLOSET	FM	FORCE MAIN	MFR(S)	MANUFACTURER(S)	WL	WATER LEVEL
CLR	CLEAR, (ANCE)	FO	FUEL OIL	MCD	MILLION GALLONS	WM	WATER METER, WATTMETER
CMP	CORRUGATED METAL PIPE	FOB	FLAT ON BOTTOM	MG	MILLION GALLONS PER DAY	WO	WINDOW OPENING
CMU	CONCRETE MASONRY UNIT	FOM	FACE OF MASONRY	MCD	MILLION GALLONS PER DAY	W/O	WITHOUT
CO	CLEAN OUT, COMPANY	FOS	FACE OF STUDS	MG/L	MILLIGRAMS PER LITER	WOM	WOMEN
COD	CHEMICAL OXYGEN DEMAND	FOT	FLAT ON TOP	MH	MANHOLE	WP	WATERPROOF, WORKING POINT
COL	COLUMN	FRP	FEET PER MINUTE	MIN	MINIMUM, MINUTE	WR	WASTE RECEPTACLE
COMB	COMBINATION	FRP	FIBERGLASS REINFORCED PLASTIC	MISC	MISCELLANEOUS	WS	WATERSTOP
COMB SWR	COMBINED SEWER	FS	FAR SIDE, FLOOR SLEEVE, FLOAT SWITCH, FLOOR SEALER	MJ	MECHANICAL JOINT	WT	WEIGHT, CERAMIC WALL TILE
COMP	COMPRESSOR, (ED)	FT	FOOT	MJR	MECHANICAL JOINT RETAINER GLAND	WV	WETWELL
CONC	CONCRETE	FTG	FOOTING	MJTR	MECHANICAL JOINT WITH TIE ROD	WWF	WELDED WIRE FABRIC
CONN	CONNECTION	FURN	FURNISH, FURNISHED	MO	MASONRY OPENING, MOTOR OPERATED		
CONST	CONSTRUCTION	FV	FLAP VALVE	MOD	MODIFIED	X	BY, TIMES
CONT	CONTINUOUS, CONTINUATION, CONTROL	FWD	FORWARD	MP	METERING PUMP	YH	YARD HYDRANT
CONTR	CONTRACTOR	G	GAS	MRD	METAL ROOF DECK	&	AND
COR	CORNER	GA	GAUGE	MS	MACHINE SCREW	@	AT
CORR	CORRIDOR, CORRUGATED	GALV	GALLON	MSL	MEAN SEA LEVEL	<	CENTERLINE
CP	CONTROL PANEL, CARPET	GB	GRIT BASIN	MT	MOUNTED	>	DEFLECTION ANGLE
CPLG	COUPLING	GC/MS	GAS CHROMATOGRAPH/MASS SPECTROMETER	MTL	METAL	=	NUMBER
CPT	CONTROL POWER TRANSFORMER	GEN	GENERAL, GENERATOR	MTR	MOTOR	%	PERCENT
CRS	COURSES, (ING)	GLV	GLOBE VALVE	MV	MUD VALVE		
CS	CONTROL SWITCH, CONTROL STATION, CUP SINK						
CSK	COUNTERSUNK, (INK)						
CT	CERAMIC TILE, CARPET TILE, CYCLE TIMER, CURRENT TRANSFORMER						

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND  CHIEF, BUREAU OF UTILITIES DATE	 <b>BLACK &amp; VEATCH</b> Gaithersburg, Maryland	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. REICHAUS, JR. A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927	DES: SLF						LAYOUT/OVERVIEW  CIVIL  ABBREVIATIONS	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839  HOWARD COUNTY, MARYLAND	SCALE AS SHOWN	
			DRN: SLF									SHEET 4 OF 139
			CHK: RJR									
			DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK			APP	L4

EXISTING LEGEND



ABBREVIATIONS

F	FERMENTER
FC	FINAL CLARIFIER
FEB	FLOW EQUALIZATION BASIN
PC	PRIMARY CLARIFIER
PR	PROCESS REACTOR
PS	PRIMARY SUBSTATION

GENERAL NOTES:

- ALL CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE LATEST STANDARDS AND SPECIFICATIONS OF HOWARD COUNTY PLUS MSHA STANDARDS AND SPECIFICATIONS IF APPLICABLE.
- THE CONTRACTOR SHALL NOTIFY THE DEPARTMENT OF PUBLIC WORKS/BUREAU OF ENGINEERING/CONSTRUCTION INSPECTION DIVISION AT (410) 313-1880 AT LEAST FIVE (5) WORKING DAYS PRIOR TO THE START OF WORK.
- THE CONTRACTOR SHALL NOTIFY "MISS UTILITY" AT 1-800-257-7777 AT LEAST 48 HOURS PRIOR TO ANY EXCAVATION WORK BEING DONE.
- ALL PLAN DIMENSIONS ARE TO FACE OF CURB UNLESS OTHERWISE NOTED.
- THE EXISTING TOPOGRAPHY IS TAKEN FROM AERIAL SURVEY WITH MAXIMUM ONE FOOT CONTOUR INTERVALS PREPARED FOR RMT AND ASSOCIATES BY AIR SURVEY CORP., INC., DATED JUNE 1989.
- THE COORDINATES SHOWN HEREON ARE BASED UPON THE HOWARD COUNTY GEODETIC CONTROL WHICH IS BASED UPON THE MARYLAND STATE PLANE COORDINATE SYSTEM, HOWARD COUNTY MONUMENT NOS. 47111 AND 47112N WERE USED FOR THIS PROJECT.
- WATER IS PUBLIC (HO. CO. LITTLE PATUXENT WATER RECLAMATION PLANT).
- SEWER IS PUBLIC (HO. CO. LITTLE PATUXENT WATER RECLAMATION PLANT).
- EXISTING UTILITIES ARE BASED ON LITTLE PATUXENT WATER RECLAMATION PLANT AND MUST BE VERIFIED BY THE CONTRACTOR PRIOR TO START OF ANY DEMOLITION AND CONSTRUCTION.
- FLOODPLAIN LIMITS FOR THIS PROJECT WERE TAKEN FROM HOWARD COUNTY STUDY DATED 1986.
- THE ENTIRE LITTLE PATUXENT WASTEWATER TREATMENT PLANT SITE IS LOCATED IN THE 100 YEAR FLOODPLAIN, ELEV. 143.0.
- OFFSITE DISPOSAL OF EXCESS MATERIAL WILL BE TO AN APPROVED SITE.
- THE CONTRACTOR SHALL LOCATE AND PROTECT ALL EXISTING FACILITIES, STRUCTURES AND UTILITIES FROM DAMAGE UNLESS OTHERWISE SHOWN.
- OMISSIONS/ADDITIONS OF UTILITIES FOUND DURING CONSTRUCTION ARE THE SOLE RESPONSIBILITY OF ANY CONTRACTOR ENGAGED IN CONSTRUCTION AT THIS SITE. THE ENGINEER SHALL BE NOTIFIED IMMEDIATELY OF ANY AND ALL UTILITY OMISSIONS/ADDITIONS.
- IT SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR TO REMOVE AND LEGALLY DISPOSE OF ANY AND ALL DEMOLISHED/DELETERIOUS MATERIALS.
- EXISTING PAVEMENT SHALL BE SAWCUT PRIOR TO REMOVAL. ALL SAWCUT SHALL BE STRAIGHT, EVEN EDGES. JAGGED EDGES SHALL NOT BE PERMITTED. SAWCUT DEPTH SHALL EXTEND AT LEAST 2/3 TIMES THE THICKNESS OF THE EXISTING PAVEMENT THAT REMAINS IN PLACE.
- POSITIVE DRAINAGE SHALL BE MAINTAINED AT ALL TIMES. PONDING OF WATER SHALL NOT BE PERMITTED. ALL PONDING WATER SHALL BE FILTERED THROUGH A PORTABLE SEDIMENT TANK PRIOR TO DISCHARGE INTO THE PUBLIC STORM/SEWER SYSTEM.
- SURFACED STREET AND PARKING AREAS SHALL BE MAINTAINED IN A CLEAN CONDITION, MUD AND DUST FREE AT ALL TIMES. ADEQUATE MEANS SHALL BE PROVIDED TO CLEAN TRUCKS AND EQUIPMENT.
- CONTRACTOR SHALL HAND DIG TEST PITS AT ALL UTILITY CROSSINGS TO DETERMINE THEIR EXACT LOCATION, WELL IN ADVANCE OF ANY DEMOLITION/CONSTRUCTION.
- ALL TIES TO EXISTING PAVEMENT/STRUCTURES AND CURB SHALL BE SMOOTH TRANSITIONS WITH NO ABRUPT CHANGES.
- CONTRACTOR SHALL ADJUST ALL UTILITY FRAME AND COVERS TO MATCH NEW FINISHED GRADE.
- FOR DEMOLITION/RELOCATION OF YARD PIPING SANITARY SEWER, WATER LINE ETC. SEE YARD PIPING DEMOLITION PLANS.
- THE VERTICAL SURVEY IS BASED ON THE CURRENT HOWARD COUNTY GEODETIC CONTROL (NAVD 88). PREVIOUS CONSTRUCTION PROJECTS AND RECORD DRAWINGS AT THE SITE WERE BASED ON AN EARLIER VERTICAL DATUM. ELEVATIONS OF EXISTING FACILITIES SHOWN ON THESE DRAWINGS HAVE BEEN ADJUSTED TO APPROXIMATE THE ELEVATIONS IN THE CURRENT HOWARD COUNTY GEODETIC CONTROL. THE CONTRACTOR SHALL CONFIRM THE ELEVATION OF ALL EXISTING STRUCTURES WHICH ARE CRITICAL TO THIS CONTRACT.
- THE SITE PLAN AND EROSION CONTROL PLAN ARE BASED ON THE SITE DEVELOPMENT PLAN (SDP) AMENDMENT DATED APRIL 10, 2000 AND SUBMITTED TO HOWARD COUNTY. THE SDP AMENDMENT IS INCLUDED IN THE CONTRACT BY REFERENCE. THE CONTRACTOR SHALL COMPLY WITH ALL REQUIREMENTS OF THE SDP AMENDMENT.
- CONTRACTOR OF CONTRACT NO 20-3751 SHALL CONSTRUCT THE CONTRACTOR PARKING AREA AND BE RESPONSIBLE FOR ITS INITIAL MAINTENANCE.
- CONTRACTOR OF CONTRACT NO 20-3751 SHALL INSTALL AND MAINTAIN SIGNS AS SHOWN IN THE CONSTRUCTION SIGNAGE TABLE ON THIS DRAWING.
- CONTRACTOR OF CONTRACT NO 20-3751 SHALL PREPARE CONSTRUCTION TRAILER AREA AS SHOWN, AND MAINTAIN THE SITE THROUGHOUT THE DURATION OF THE CONTRACT.
- AT THE TIME OF NOTICE TO PROCEED FOR CONTRACT 20-3839, THE CONTRACTOR SHALL TAKE OVER RESPONSIBILITY FOR THE MAINTENANCE OF CONTRACTOR PARKING, CONSTRUCTION ENTRANCE, CONSTRUCTION SIGNAGE, AND THE CONSTRUCTION TRAILER AREA. AT THE END OF 20-3839 CONSTRUCTION, THE 20-3839 CONTRACTOR SHALL REMOVE THE PARKING LOT, CONSTRUCTION ENTRANCE, CONSTRUCTION SIGNAGE AND CONSTRUCTION TRAILER AREA. GRADE THE AREAS TO ORIGINAL CONTOURS, AND SEED IN ACCORDANCE WITH THESE PLANS AND SPECIFICATIONS, PAVEMENT IN THE AREA OF THE CONSTRUCTION ENTRANCE SHALL BE REMOVED AND/OR REPLACED AS NECESSARY TO RETURN THE AREA TO ITS PRE-CONSTRUCTION CONDITION.

TRAVERSE STATIONS

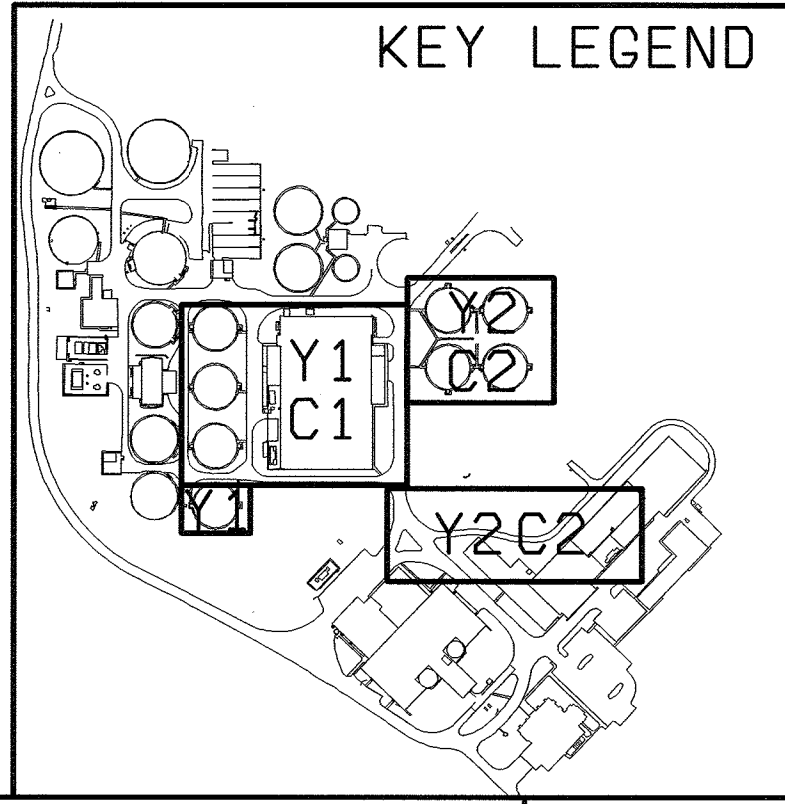
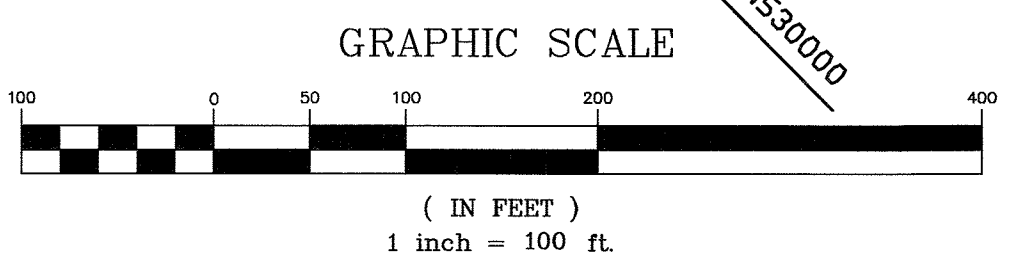
NUMBER	NORTHING	EASTING	ELEVATION	DESCRIPTION
TRAV #22	530410.03	1365394.67		
TRAV #1	530891.94	1365737.20	141.44	PK NAIL SET
TRAV #2	531189.86	1365490.86	140.70	PK NAIL SET
TRAV #3	530714.05	1365488.81	140.83	PK NAIL SET
TRAV #4	530635.03	1365378.47	140.71	PK NAIL SET
TRAV #5	530580.57	1365274.49	140.81	PK NAIL SET
TRAV #6	530593.79	1365236.95	141.20	PK NAIL SET
TRAV #7	530825.66	1365020.78	140.81	PK NAIL SET
TRAV #8	530911.71	1365131.75	140.07	PK NAIL SET
TRAV #9	531019.78	1365271.36	141.27	PK NAIL SET
TRAV #10	531214.69	1365947.63	139.91	PK NAIL SET
TRAV #11	530853.02	1366121.33	142.28	60D NAIL SET

BENCHMARK

HORIZONTAL AND VERTICAL BASED UPON HOWARD COUNTY GPS CONTROL MONUMENTS (THIRD CLASS SURVEY CONTROL) NAD 83/91, NAVD 88.

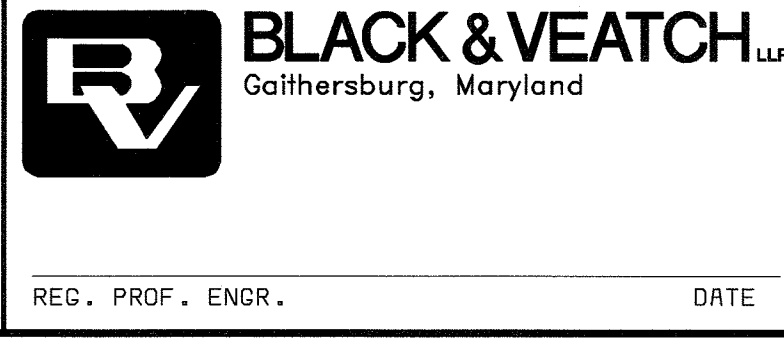
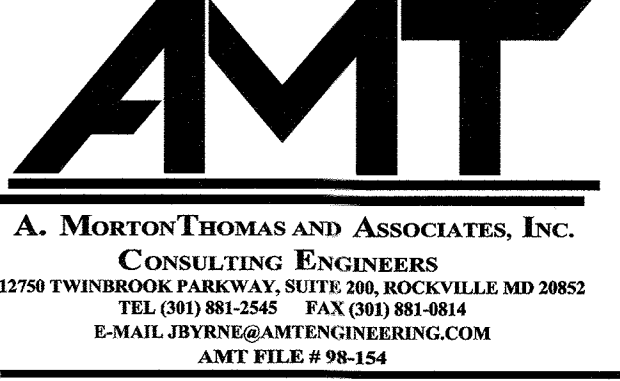
NAME	NORTHING	EASTING	ELEVATION
47111	530819.908	1366225.547	143.274
47112	531440.211	1365496.525	147.001

NUMBER	LOCATION	SIZE	DESCRIPTION
1	ON HIGHWAY U.S. 1 SOUTH OF CONSTRUCTION ENTRANCE	36X24 - BLACK LETTERS ON WHITE BACKGROUND	CAUTION -CONSTRUCTION ENTRANCE
2	ON HIGHWAY U.S. 1 SOUTH OF CONSTRUCTION ENTRANCE	36X24 - BLACK LETTERS ON WHITE BACKGROUND	TRUCKS ENTERING HIGHWAY
3	AT INTERSECTION OF PERIMETER ROAD & HIGHWAY U.S. 1	48X96 - BLACK LETTERS ON WHITE BACKGROUND	CONSTRUCTION ENTRANCE AUTHORIZED PERSONNEL ONLY ALL OTHERS USE MAIN PLANT ENTRANCE
4	AT INTERSECTION OF PERIMETER ROAD & HIGHWAY U.S. 1	AS REQUIRED BY MDE	"MDE" SIGN
5	AT INTERVALS NOT GREATER THAN 500 FEET FROM HIGHWAY U.S. 1 TO PLANT PERIMETER FENCE	12X18 RED LETTERS ON WHITE BACKGROUND	1. SPEED LIMIT 25 MPH 2. TWO-WAY TRAFFIC 3. ABSOLUTELY NO PARKING ALONG PERIMETER ROAD
6	AT PLANT PERIMETER FENCE	30X30 RED LETTERS ON WHITE BACKGROUND	NO PERSONAL VEHICLES BEYOND THIS POINT



OWNER/DEVELOPER  
HOWARD COUNTY GOVERNMENT  
DEPT. OF PUBLIC WORKS  
3430 COURTHOUSE DRIVE  
ELLCOTT CITY, MARYLAND 21043

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. REYNOLDS, JR., A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927

DES: A. REYES					
DRN: R. ANCHORS					
CHK: A. REYES					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

CIVIL  
**OVERALL SITE PLAN**

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 5 OF 139  
**L5**

58427-113-GEN-C-T00000-025  
58472-113-GEN-C-T00000-022  
58472-113-GEN-C-T00000-011  
58472-113-GEN-C-T00000-010  
58472-113-GEN-C-T00000-009  
58472-113-GEN-C-T00000-008  
58472-113-GEN-C-T00000-007  
58472-113-GEN-C-T00000-006  
58472-113-GEN-C-T00000-005  
58472-113-GEN-C-T00000-004  
58472-113-GEN-C-T00000-003  
58472-113-GEN-C-T00000-002  
58472-113-GEN-C-T00000-001  
58472-113-GEN-C-T00000-000

DESIGN WASTEWATER CHARACTERISTICS

Table with columns: AVERAGE, MAX. MO., MAX DAY. Rows include RAW WASTEWATER (BOD5, TSS, TKN, TP), INTERNAL RECYCLE LOADS, TOTAL PLANT LOADS, PRIMARY EFFLUENT CHARACTERISTICS, and EFFLUENT DISCHARGE LIMITATIONS.

RAW WASTEWATER SCREENING

Table with columns: NO. OF SCREENS, SCREEN WIDTH, TYPE OF SCREENS, NOMINAL BAR SPACING, CLEAN SCREEN CAPACITY.

RAW WASTEWATER PUMPING

Table with columns: HEADWORKS PUMPS, NO. OF EXISTING PUMPS, RATED CAPACITY, NO. OF NEW PUMPS, RATED CAPACITY, AUXILIARY PUMP STATION, NO. OF PUMPS, RATED CAPACITY, COMBINED PUMPING CAPACITY, TOTAL CAPACITY, FIRM CAPACITY.

GRIT REMOVAL BASINS

Table with columns: NO. OF BASINS, TYPE OF BASINS, DIMENSIONS, RATED CAPACITY, 90% REMOVAL 100 MESH, 90% REMOVAL 65 MESH.

FLOW EQUALIZATION

Table with columns: NO. OF BASINS, TOTAL VOLUME.

PRIMARY CLARIFIERS

Table with columns: DIAMETER EXISTING BASINS, PC NO., PC NOS., DIAMETER PC NO. 5, SIDE WATER DEPTH, TOTAL SURFACE AREA, TOTAL WEIR LENGTH, SURFACE OVERFLOW RATES, AVERAGE, MAX MONTH, MAX DAY, WEIR OVERFLOW RATE, AVERAGE, MAX MONTH, MAX DAY.

PRIMARY SLUDGE PUMPING

Table with columns: SOUTH PUMP STATION, SLUDGE PUMPS, SCUM PUMPS, NORTH PUMP STATION, SLUDGE PUMPS, SCUM PUMPS.

BIOLOGICAL PROCESS REACTORS

Table with columns: NORTH PROCESS REACTORS, NO. OF REACTOR BASINS, NO. OF REACTOR CELL PER BASIN, REACTOR CELL VOLUMES, CELL 1 (ANOXIC), CELL 2 (ANAEROBIC), CELL 3 (ANAEROBIC/ANOXIC), CELLS 4 & 5 (ANOXIC), CELLS 6 & 7 (ANOXIC/OXIC), CELLS 8, 9 & 10 (OXIC), REACTOR ZONE VOLUMES, 1ST ANOXIC, ANAEROBIC, 2ND ANOXIC, SWITCH ZONE, OXIC, TOTAL.

Table with columns: PROCESS LOADING, FLOW, BOD5, TSS, TKN, TP, TEMP, RETENTION TIME BY ZONE, 1ST ANOXIC, ANAEROBIC, 2ND ANOXIC, OXIC, TOTAL, SRT, MLSS, WASTE ACTIVATED SLUDGE, RETURN ACTIVATED SLUDGE, RAS FLOW, SOLIDS CONCENTRATION, INTERNAL RECYCLE FLOW, OXYGEN TRANSFER REQ., AIR REQUIRED.

Table with columns: EXISTING PROCESS REACTORS, NO. OF REACTOR BASINS, NO. OF REACTOR CELL PR 1-6, NO. OF REACTOR CELL PR 7-8, REACTOR ZONE VOLUMES, 1ST ANOXIC, ANAEROBIC, 2ND ANOXIC, SWITCH ZONE, OXIC, 3RD ANOXIC, TOTAL.

Table with columns: PROCESS LOADING, FLOW, BOD5, TSS, TKN, TP, TEMP, RETENTION TIME BY ZONE, 1ST ANOXIC, ANAEROBIC, 2ND ANOXIC, SWITCH ZONE, OXIC, 3RD ANOXIC, TOTAL, SRT, MLSS, WASTE ACTIVATED SLUDGE, RETURN ACTIVATED SLUDGE, RAS FLOW, SOLIDS CONCENTRATION, INTERNAL RECYCLE FLOW, OXYGEN TRANSFER REQ., AIR REQUIRED.

ANAEROBIC FERMENTER

Table with columns: NO. FERMENTER BASINS, BASIN DIAMETER, BASIN SIDE WATER DEPTH, BASIN VOLUME, PRIMARY SLUDGE FLOW, SOLIDS FEED, ELUTRIATION WATER, HYDRAULIC RETENTION TIME, SOLIDS RETENTION TIME, FERMENTATE PRODUCTION FLOW, BOD5 LOAD, TSS LOAD, TKN LOAD, TP LOAD.

FINAL CLARIFIERS

Table with columns: NORTH FINAL CLARIFIERS, NO. OF CLARIFIERS, DIAMETER, SIDE WATER DEPTH, SURFACE AREA, WEIR LENGTH, SURFACE OVERFLOW RATES, AVERAGE, MAX MONTH, MAX DAY, WEIR OVERFLOW RATES, AVERAGE, MAX MONTH, MAX DAY, SOLIDS LOADING RATES, AVERAGE, MAX MONTH (WINTER), MAX DAY (WINTER), EAST & WEST FINAL CLARIFIERS, NO. OF CLARIFIERS, DIAMETER, SIDE WATER DEPTH, SURFACE AREA, WEIR LENGTH, SURFACE OVERFLOW RATES, AVERAGE, MAX MONTH, MAX DAY, WEIR OVERFLOW RATES, AVERAGE, MAX MONTH (WINTER), MAX DAY (WINTER).

EFFLUENT FILTERS

Table with columns: NO. OF FILTER BASINS, FILTER AREA, TOTAL FILTER AREA, HYDRAULIC LOADING, AVERAGE, MAX MONTH, MAX DAY.

FILTER EFFLUENT PUMP STATION

Table with columns: NO. OF PUMPS, RATED CAPACITY, TOTAL CAPACITY, FIRM CAPACITY.

CHLORINATION/DECHLORINATION/REAERATION

Table with columns: FLOCCULATION/1ST STAGE CHLORINE CONTACT BASINS, BASIN VOLUME, CONTACT TIME @ MAX FLOW, POST CHLORINATION BASIN, BASIN VOLUME, CONTACT TIME @ MAX FLOW, DECHLORINATION BASIN, BASIN VOLUME, CONTACT TIME @ MAX FLOW, REAERATION BASIN, BASIN VOLUME, CONTACT TIME @ MAX FLOW.

A

B

C

D

E

F

A

B

C

D

E

F

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE

BLACK & VEATCH LLP Gaithersburg, Maryland REG. PROF. ENGR. DATE

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Table with columns: DES: RJR, DRN: SLF, CHK: RJR, DATE: 05/10/02, 05/26/05 CONFORMED TO CONSTRUCTION RECORDS, 6/11/03 PR VALUE ENGINEERING PROPOSAL, PJS/RJR/RJR, PJS/RJR/RJR, REVISIONS AND RECORD OF ISSUE, NO. BY CK APP

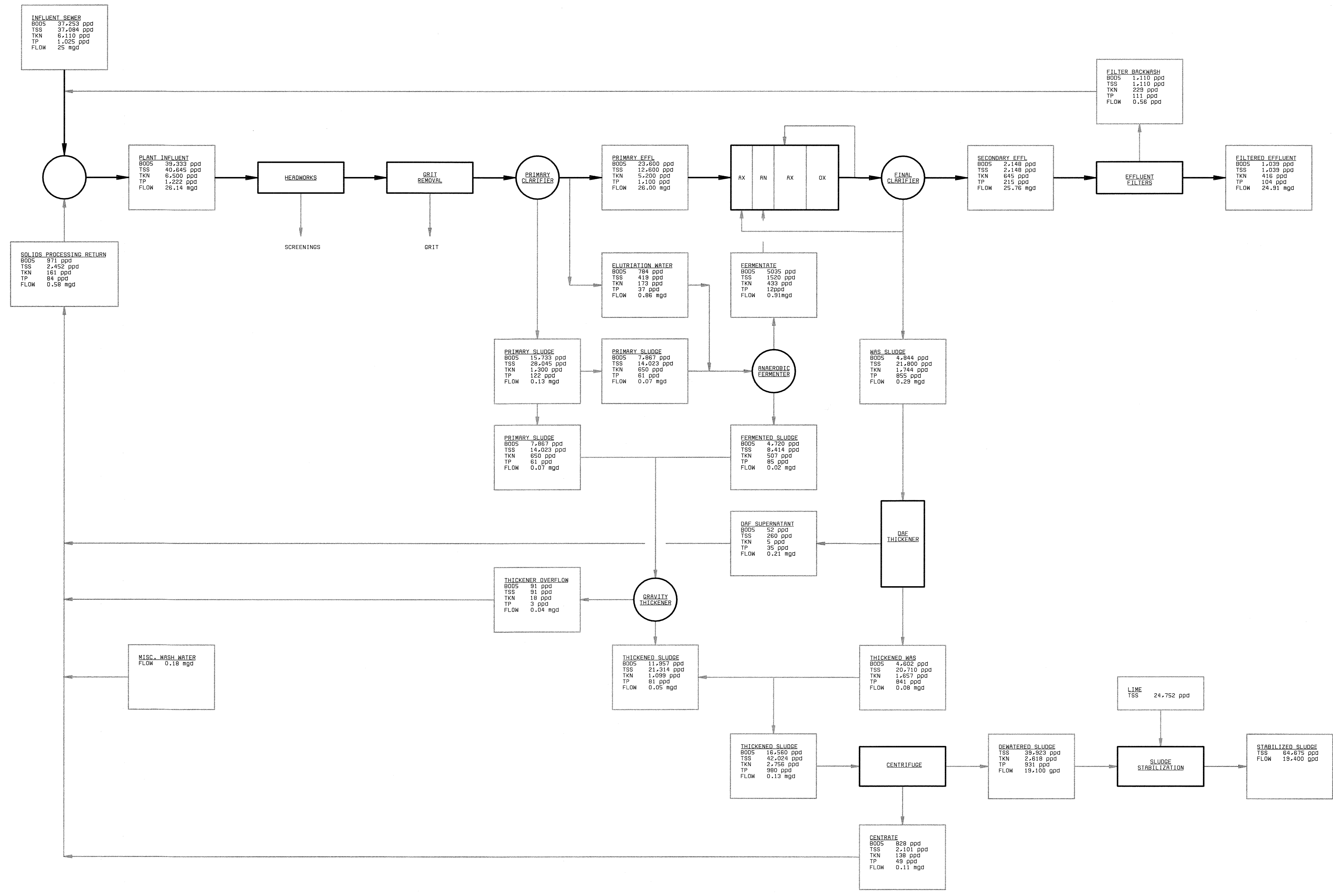
LAYOUT/OVERVIEW CIVIL PROCESS DESIGN CRITERIA

LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN SHEET 6 OF 139 L6R

A  
B  
C  
D  
E

A  
B  
C  
D  
E



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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AND SEALED BY  
ROBERT J. RECTANUS, JR.  
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PROFESSIONAL ENGINEER  
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STATE OF MARYLAND,  
NO. 22927

DES: RJR					
DRN: SLF					
CHK: RJR					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS RJR RJR	
	DATE	REVISIONS AND RECORD OF ISSUE		NO. BY CK APP	

LAYOUT/OVERVIEW  
CIVIL

PROCESS MASS BALANCE DIAGRAM

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

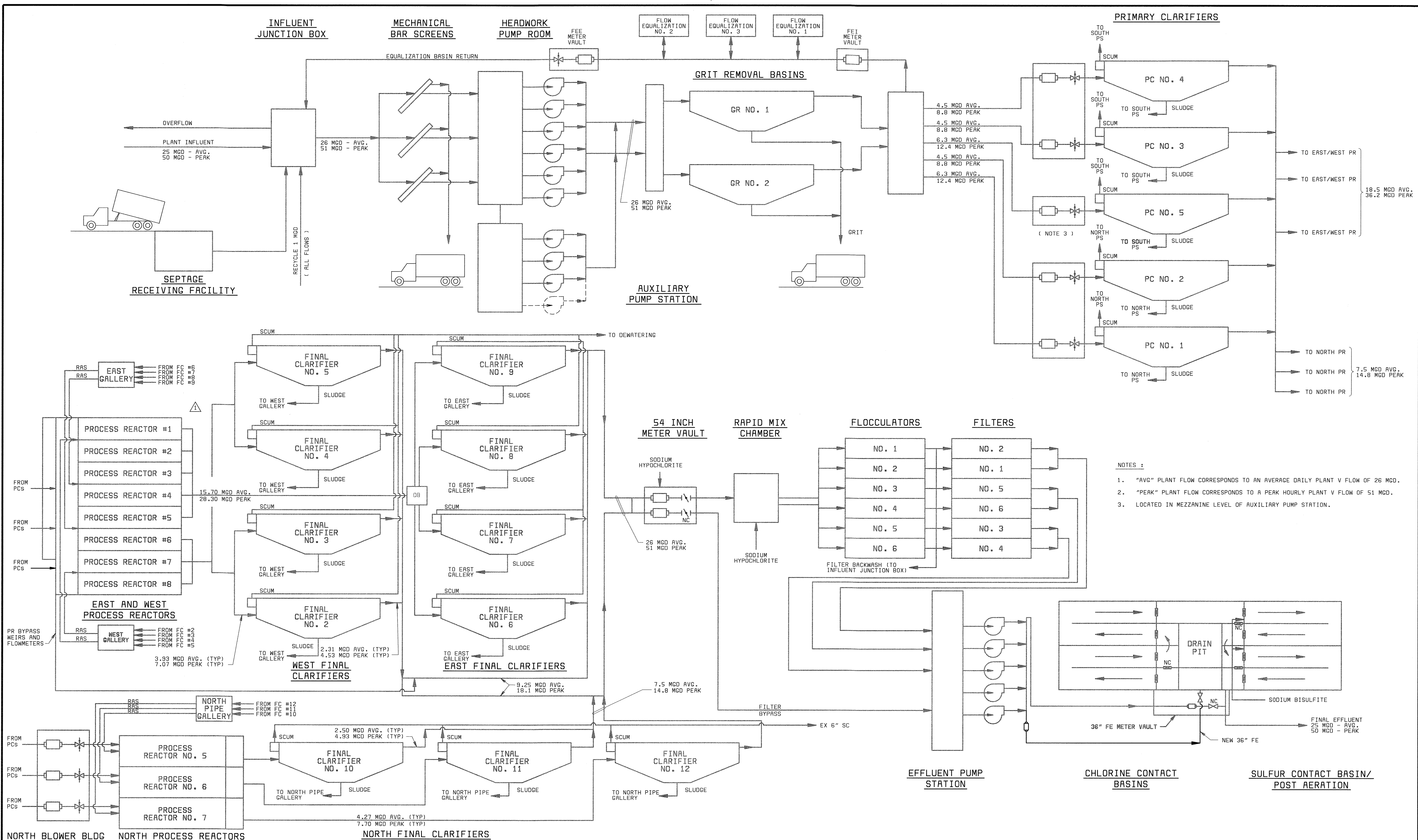
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

SHEET  
7 OF 139

L7



DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
 Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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DES: FKA					
DRN: SLF					
CHK: RJR	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		PJS/RJR/RJR	
		REVISIONS AND RECORD OF ISSUE		NO. BY CK APP	

LAYOUT/OVERVIEW  
 CIVIL

LIQUID SCHEMATIC

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839

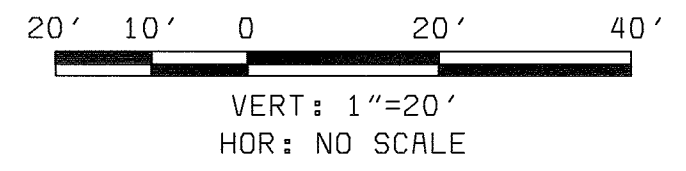
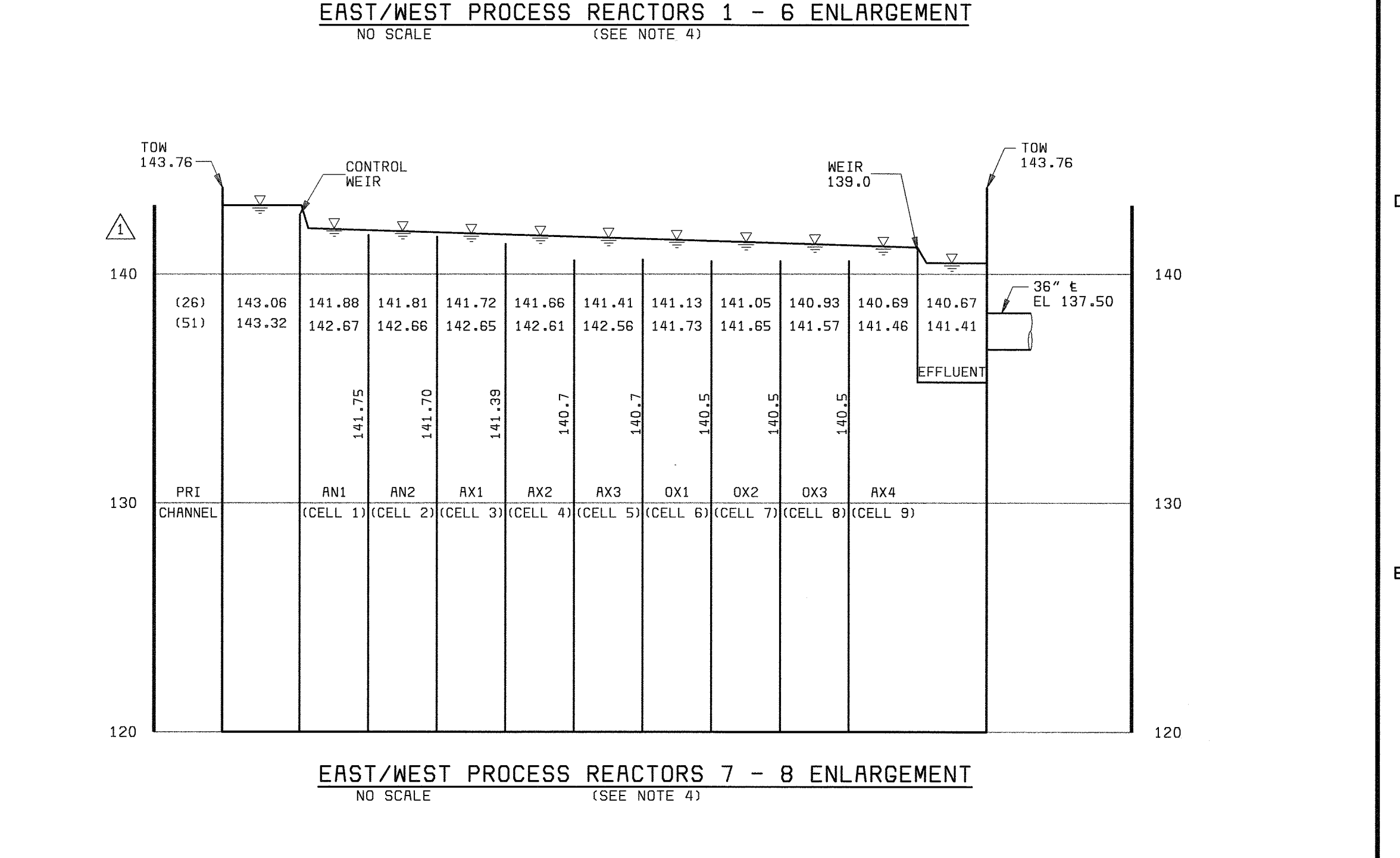
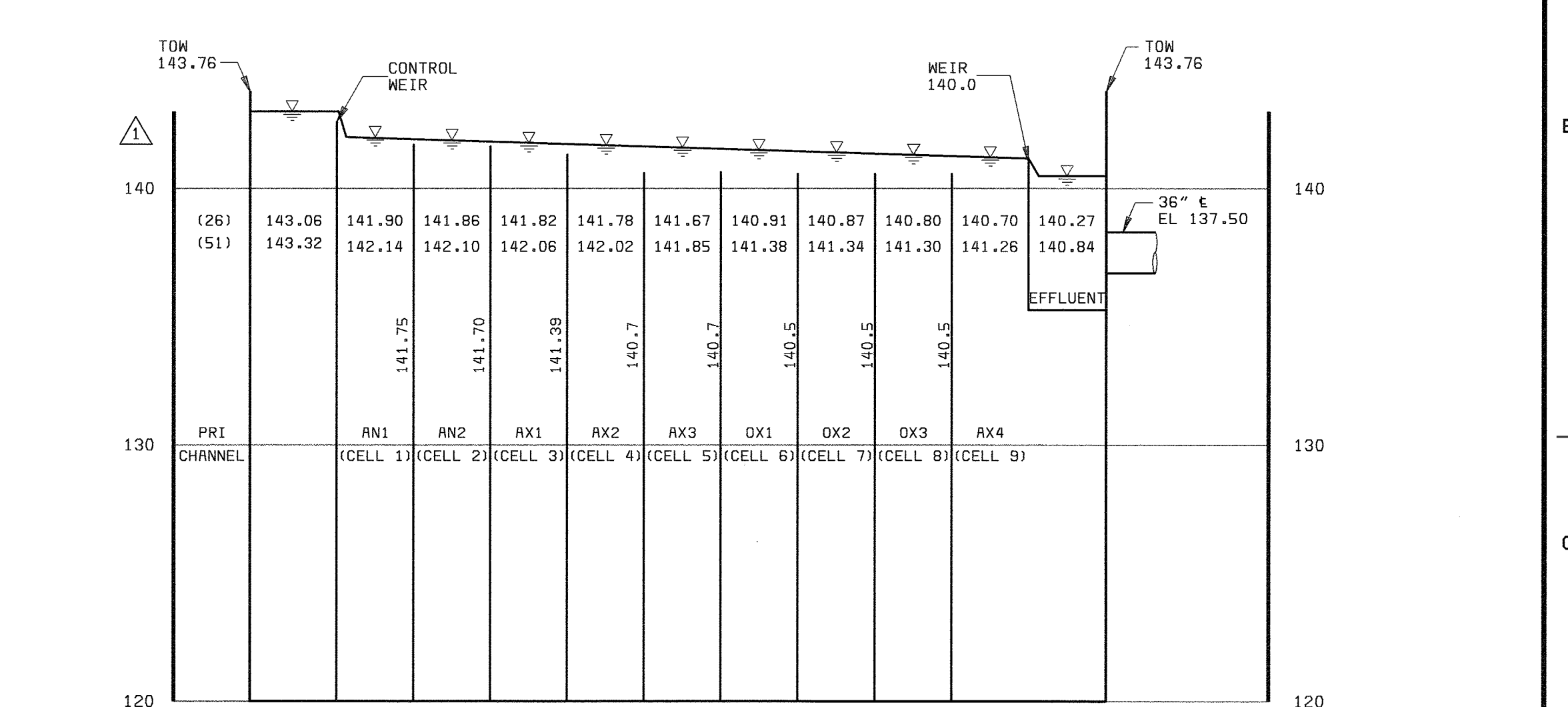
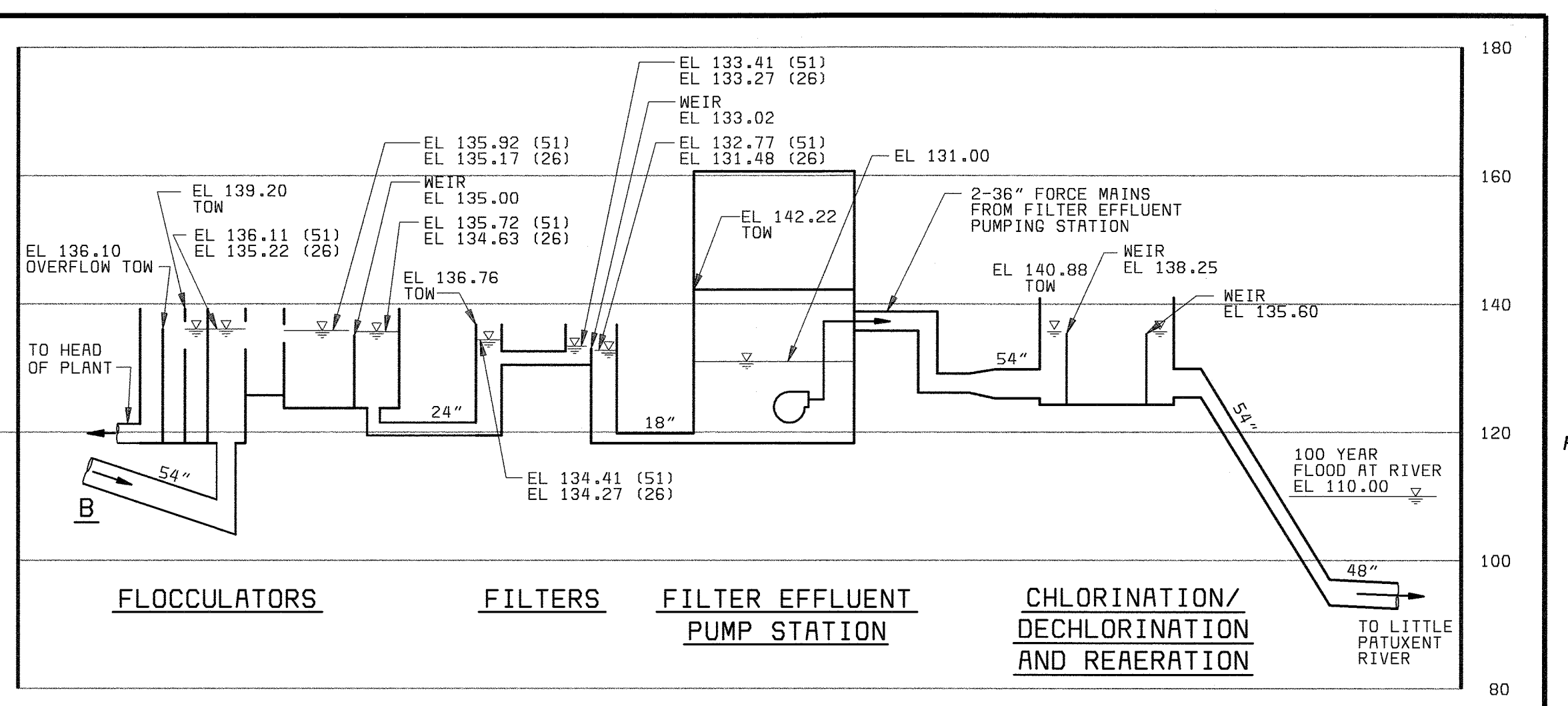
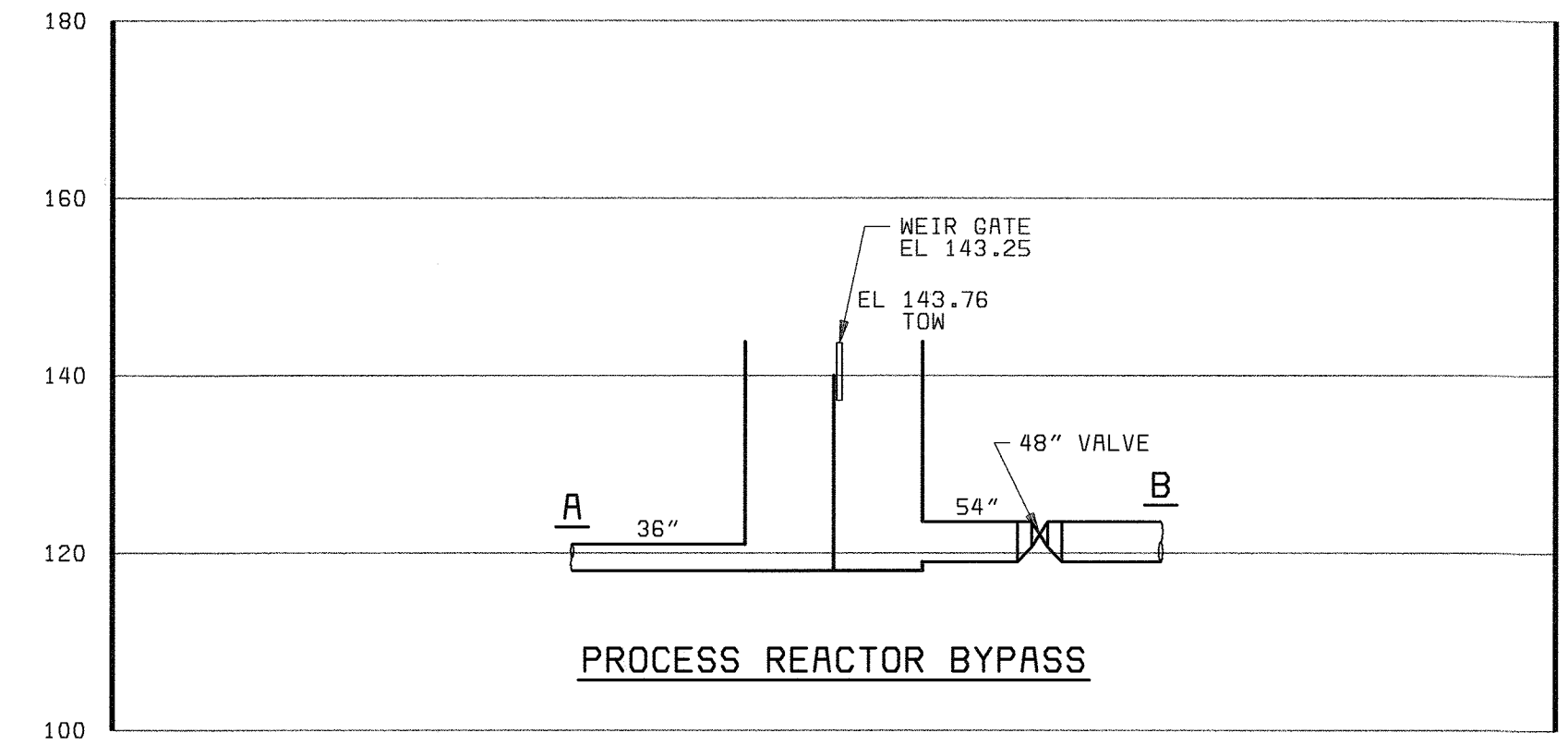
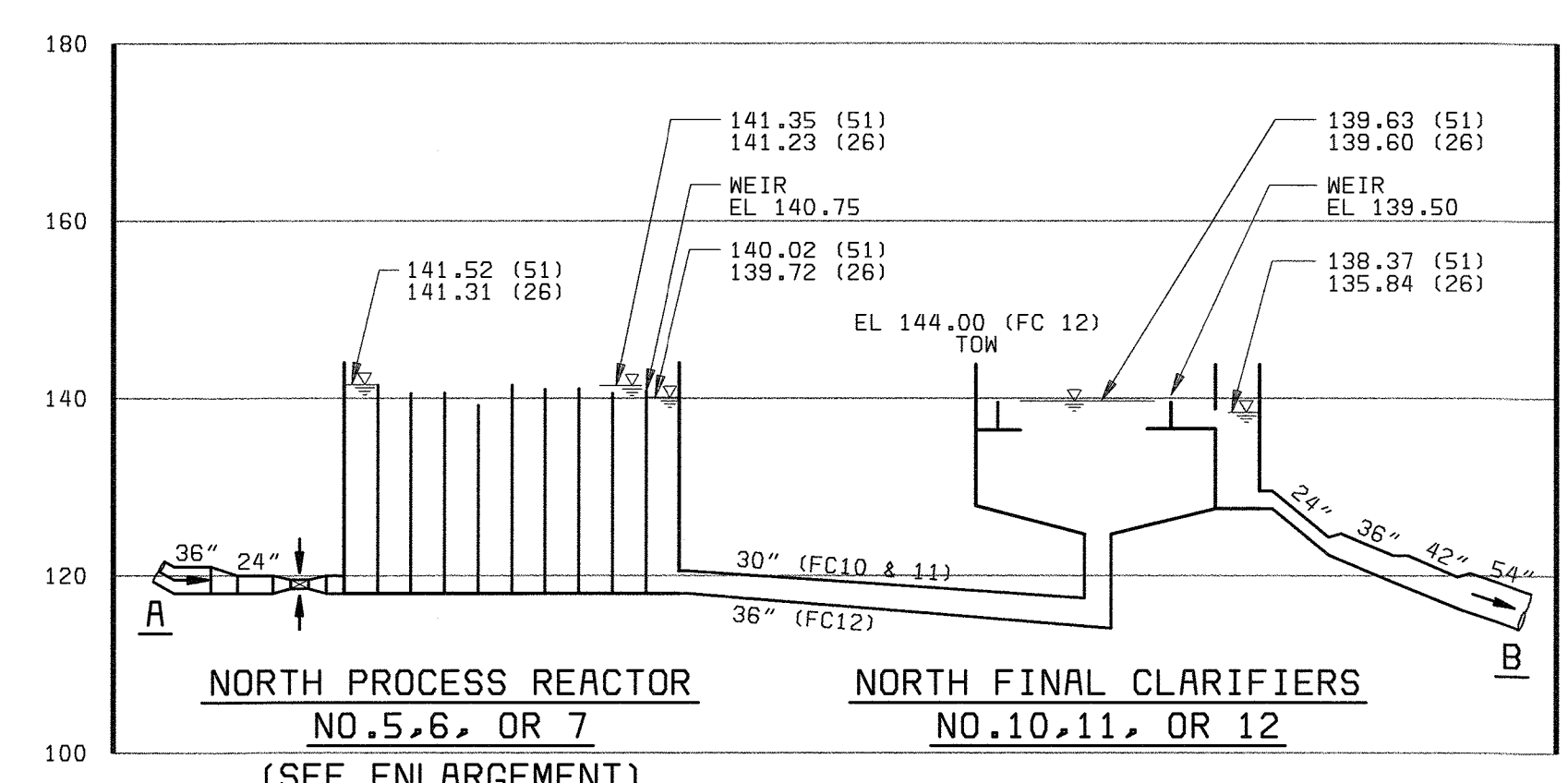
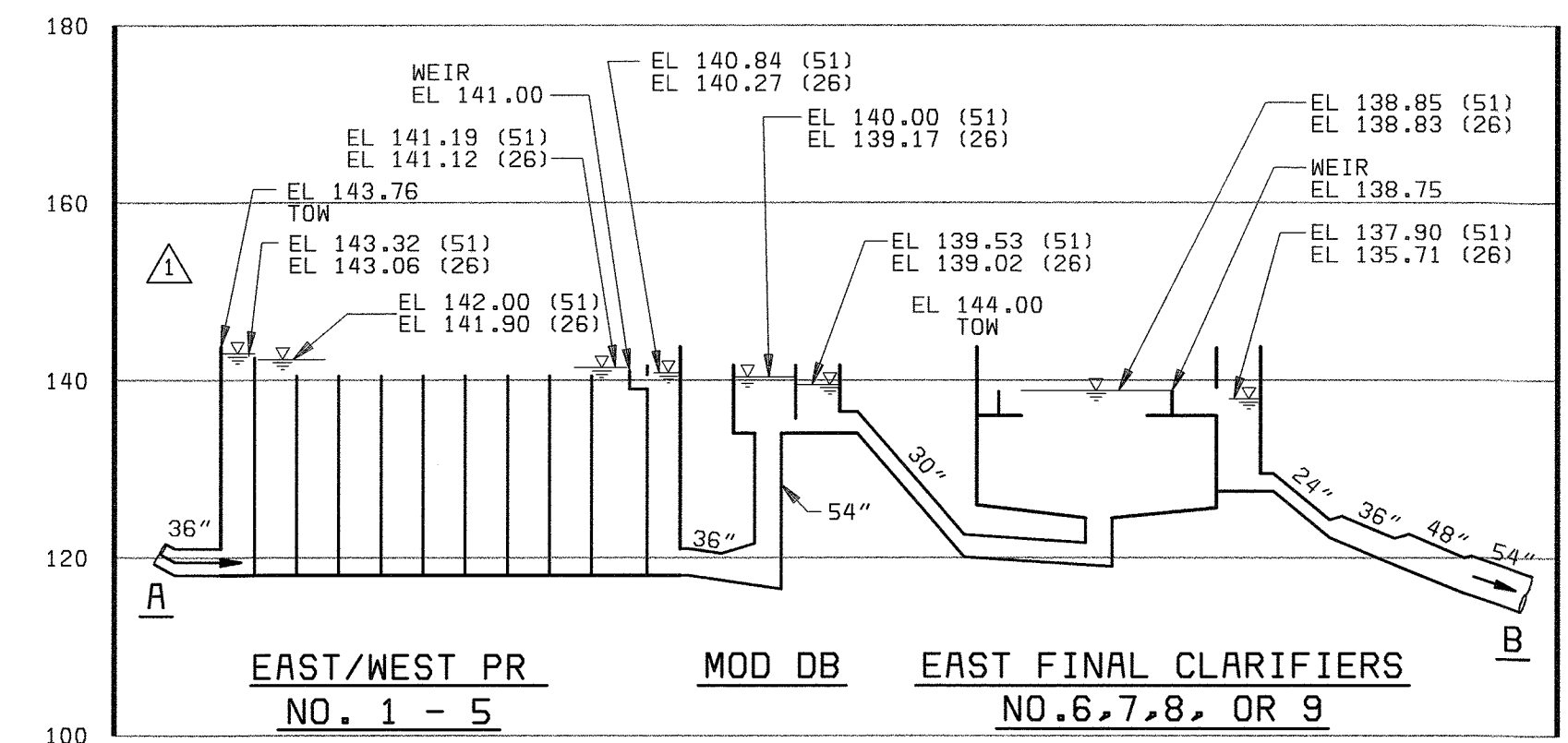
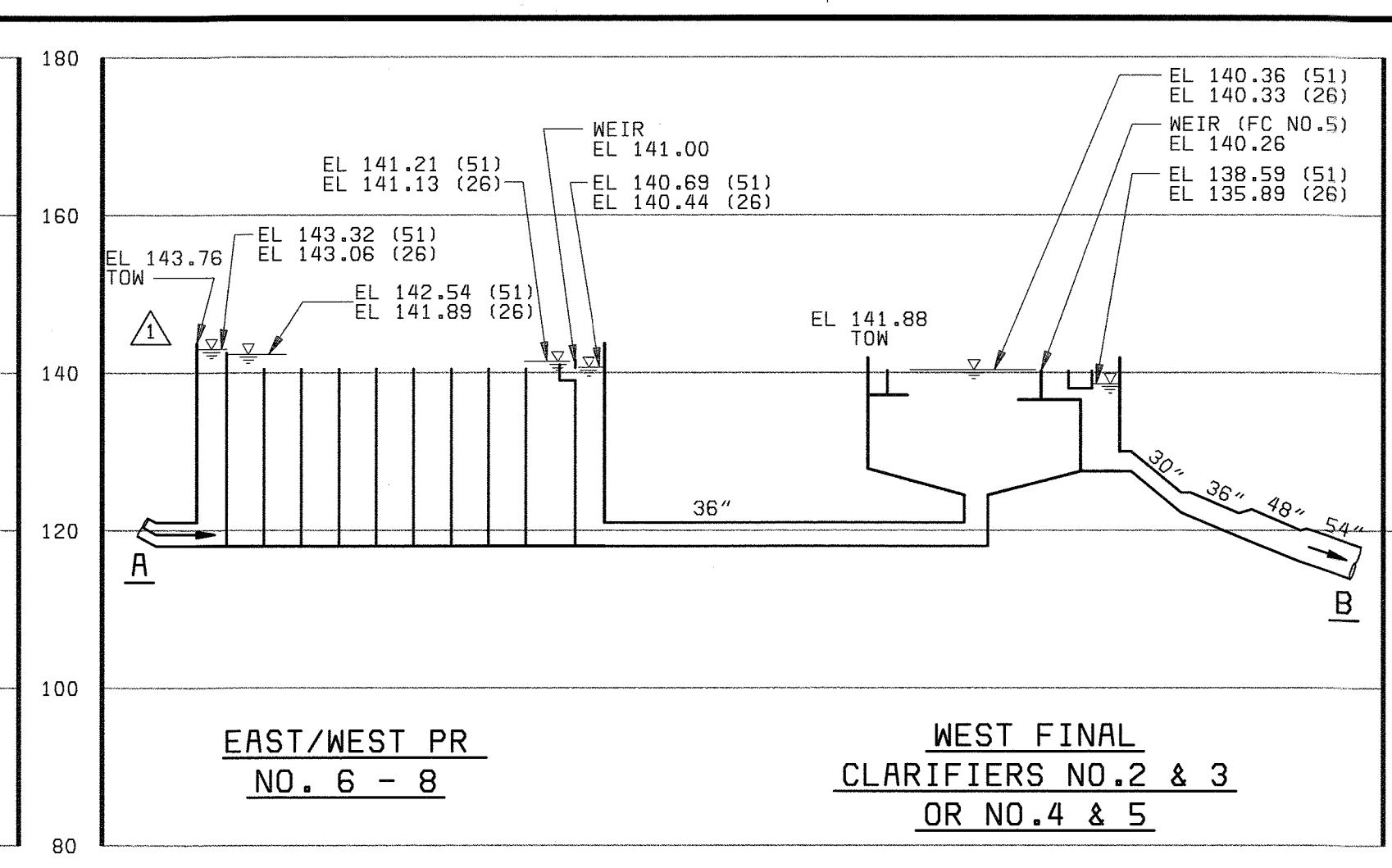
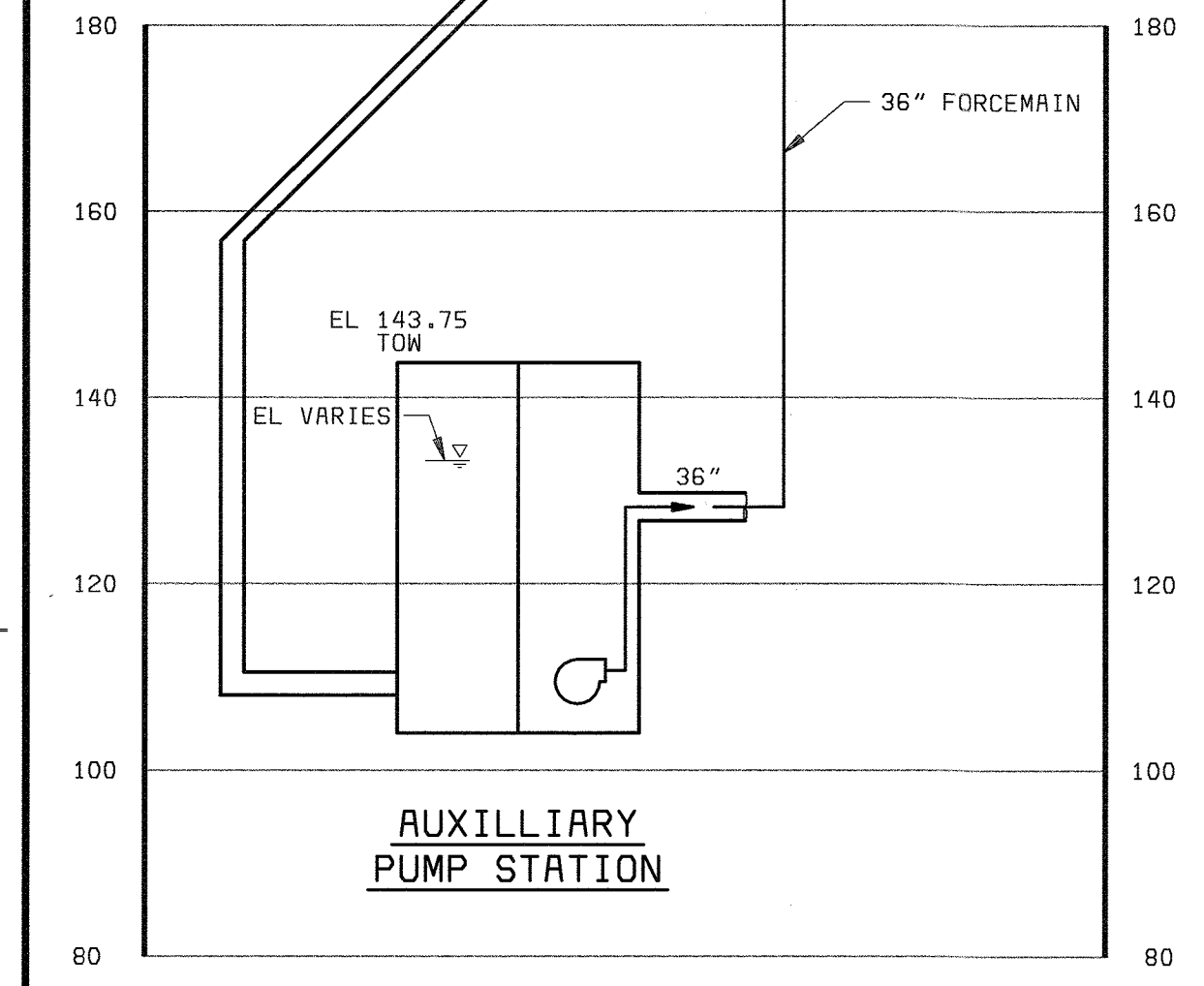
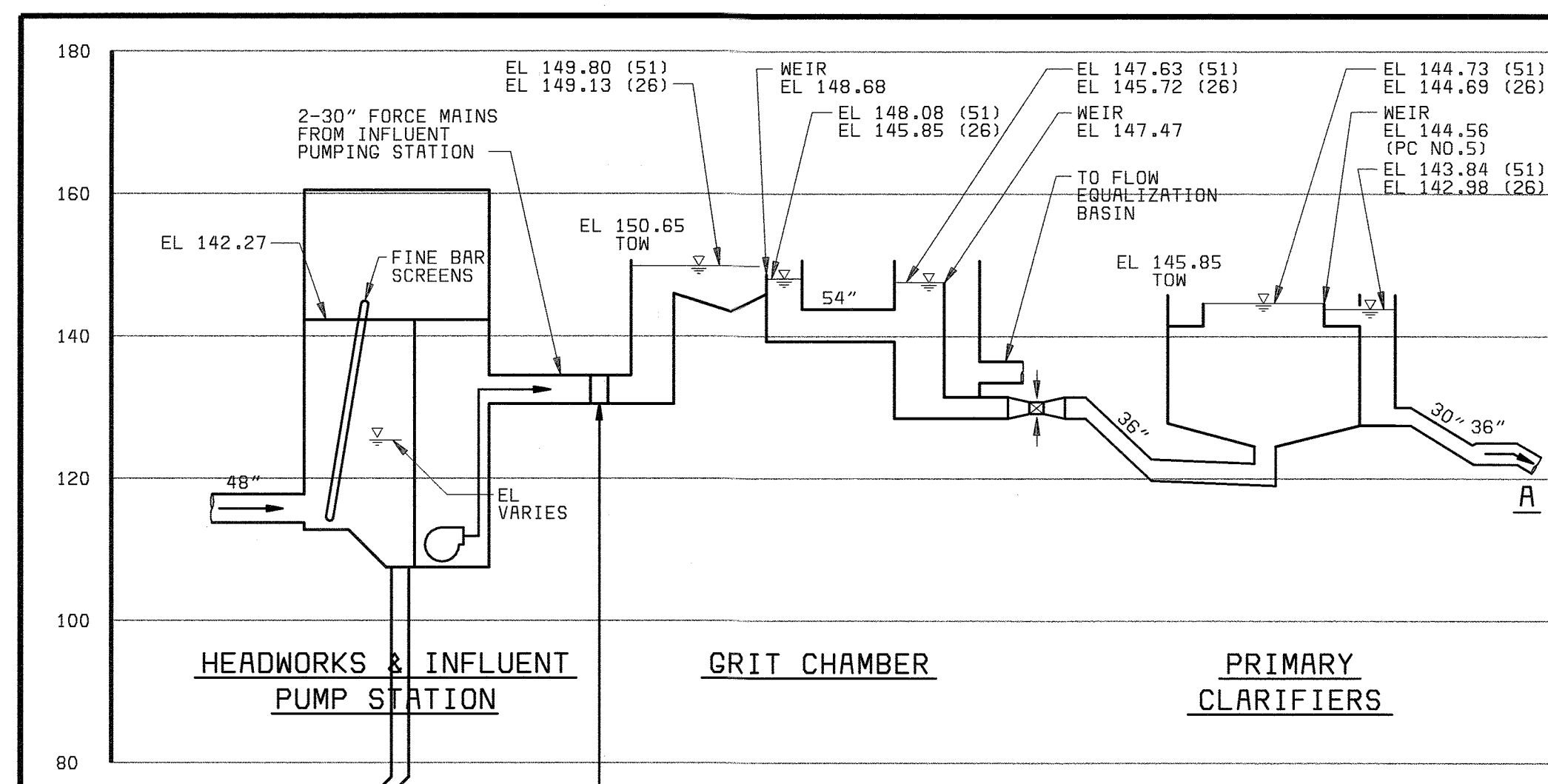
HOWARD COUNTY, MARYLAND

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- NOTES:**
- WEIR EL GIVEN IS TO THE INVERT OF V-NOTCH
  - (26) REFERS TO AVERAGE DAILY PLANT FLOW OF 25 MGD AND REGULAR PLANT FLOW OF 1 MGD.
  - (51) REFERS TO PEAK HOURLY PLANT FLOW OF 50 MGD AND REGULAR PLANT FLOW OF 1 MGD.
  - THEORETICAL VALUES VARY SLIGHTLY BETWEEN PROCESS REACTORS.

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
 Gaithersburg, Maryland  
 REG. PROF. ENGR. DATE

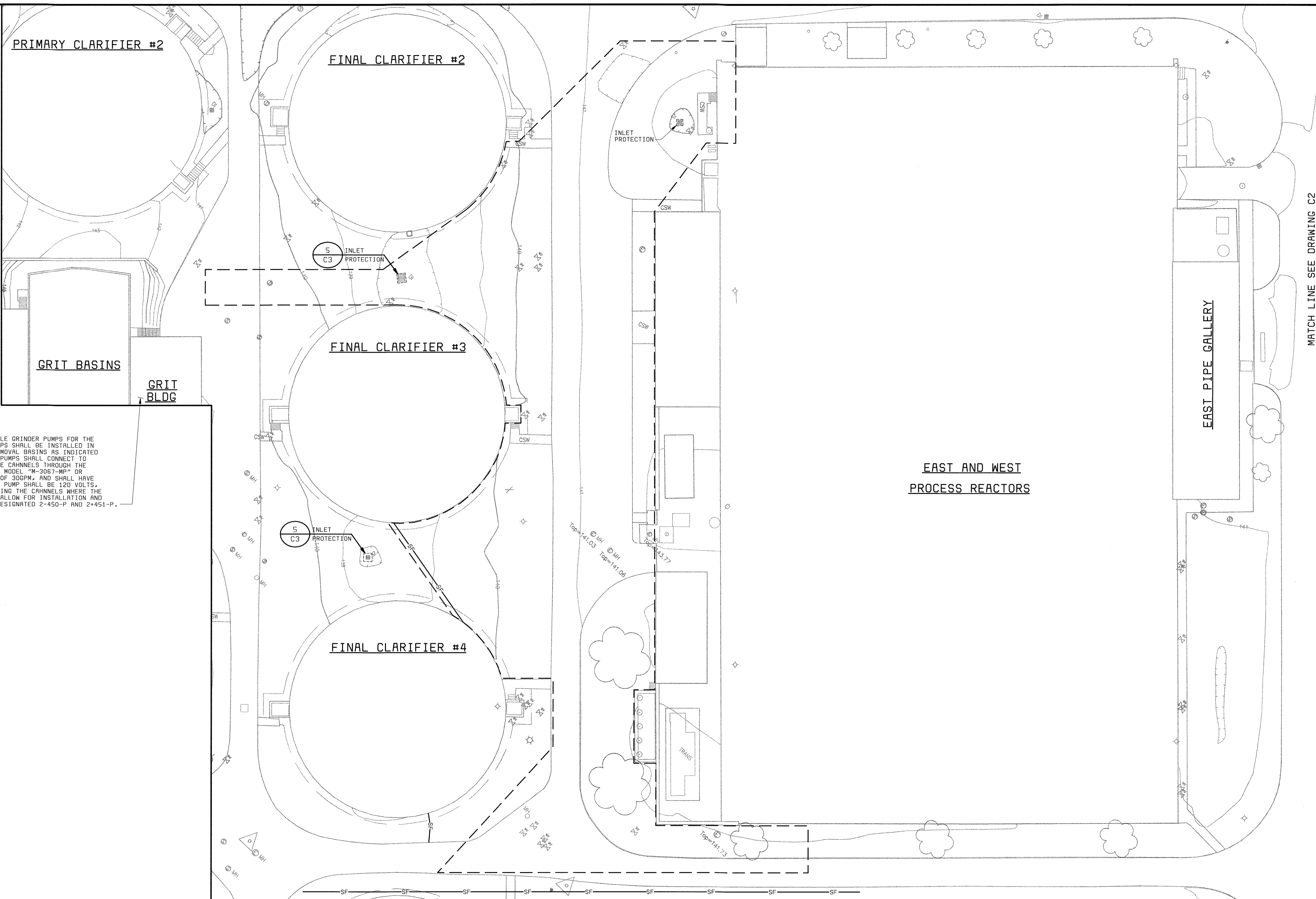
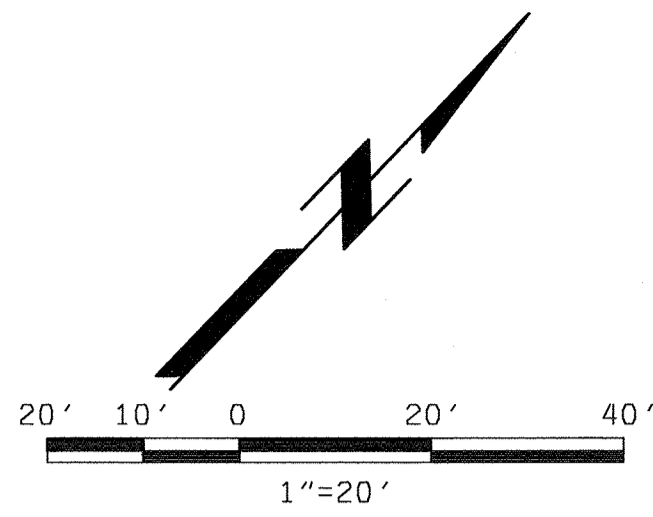
THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. RECTANUS, JR., A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927

DES: FKA					
DRN: GRH					
CHK: RJR	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY

LAYOUT/OVERVIEW  
 CIVIL  
 HYDRAULIC PROFILE

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
 SHEET 9 OF 139  
 L9R




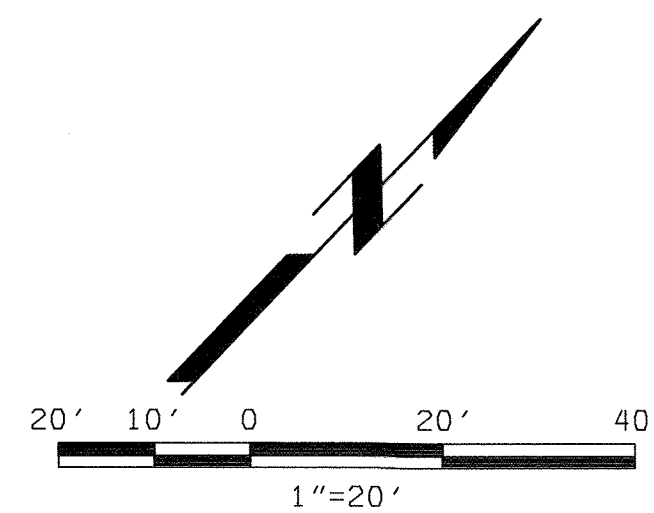
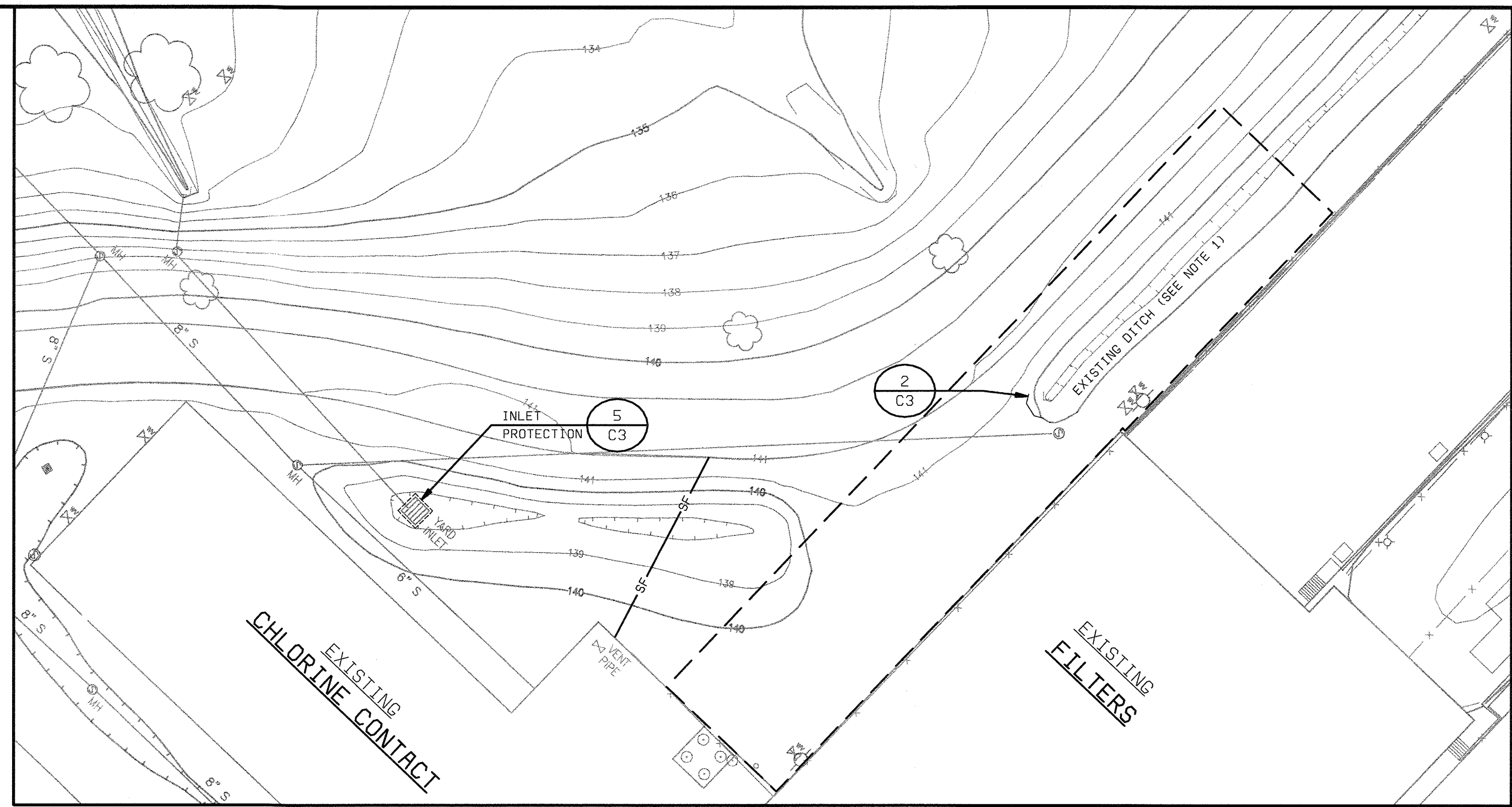
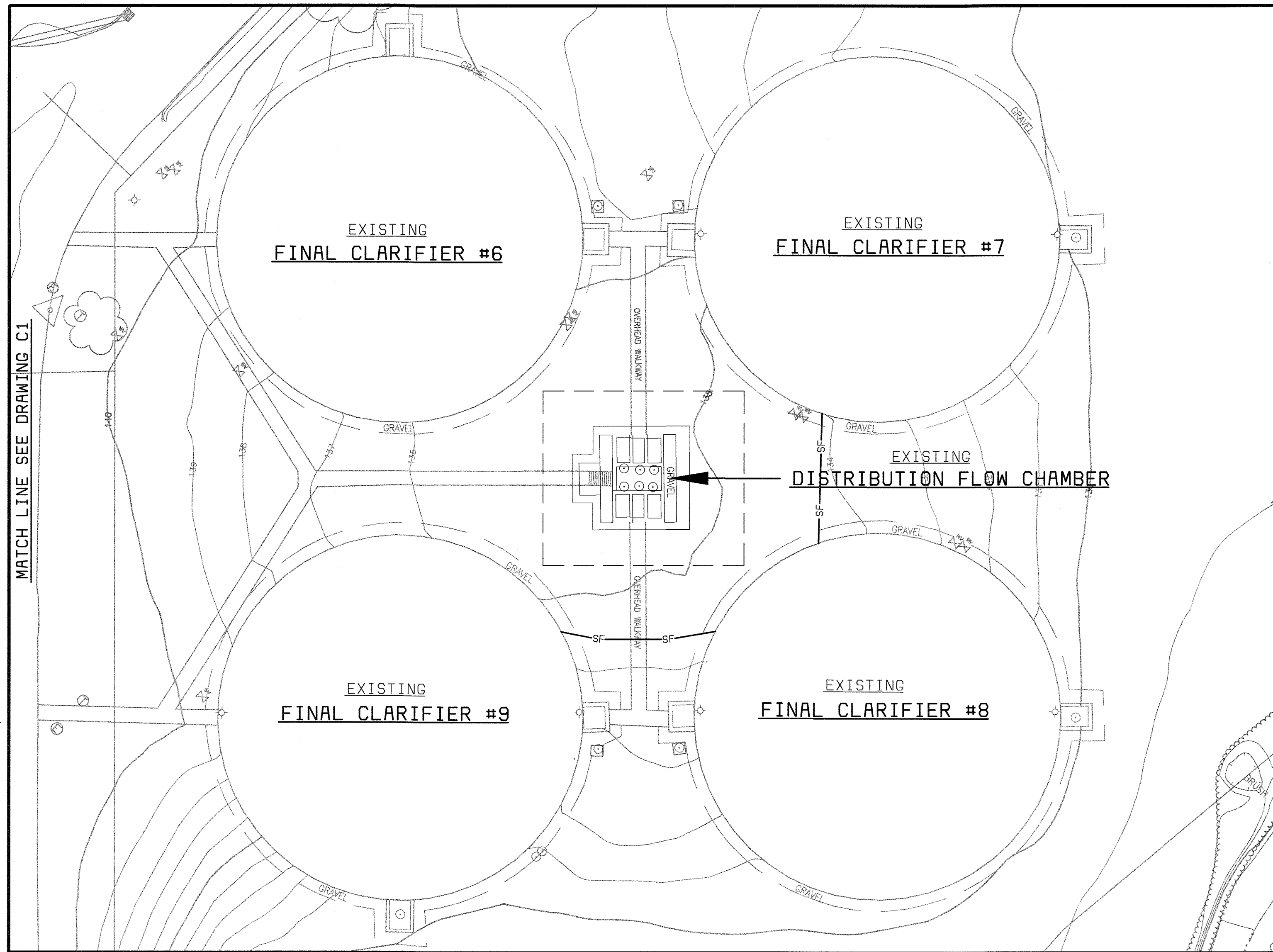
2-4.04. SUBMERSIBLE GRINDER PUMPS.

AT THE GRIT BUILDING, PROVIDE TWO SUBMERSIBLE GRINDER PUMPS FOR THE PRIMARY CLARIFIER INFLUENT SAMPLER. THE PUMPS SHALL BE INSTALLED IN THE INFLUENT CHANNELS THAT FEED THE GRIT REMOVAL BASINS AS INDICATED ON THE DRAWINGS. DISCHARGE PIPING FROM THE PUMPS SHALL CONNECT TO EXISTING 2" PVC SAMPLE LINES WHICH ENTER THE CHANNELS THROUGH THE GRIT BUILDING ALL. THE PUMPS SHALL BE FLYGT MODEL "M-3067-MP" OR EQUAL. THE PUMPS SHALL BE RATED FOR A FLOW OF 30GPM, AND SHALL HAVE A HORSEPOWER OF 1.6 HP. POWER SUPPLY TO THE PUMP SHALL BE 120 VOLTS, 60 HZ, SINGLE PHASE. EXISTING GRATING COVERING THE CHANNELS WHERE THE PUMPS ARE TO BE INSTALLED, SHALL BE CUT TO ALLOW FOR INSTALLATION AND FUTURE RETRIEVAL OF PUMPS. PUMPS SHALL BE DESIGNATED 2-450-P AND 2+451-P.

**LEGEND:**  
 - - - - - LIMITS OF DISTURBANCE  
 —SF— SILT FENCE

58472-101-YARD-C-Z0000001R  
 58472-101-YARD-C-Z0000001R  
 05/26/05  
 10:56:21

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND  CHIEF, BUREAU OF UTILITIES DATE	 <b>BLACK &amp; VEATCH</b> Gaithersburg, Maryland  REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. RECTANUS, JR. A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927	DES: FKA							SITE WORK CIVIL  EROSION AND SEDIMENT CONTROL PLAN 1 OF 2	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839  HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: RLC	CHK: RJR	DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	REVISIONS AND RECORD OF ISSUE	NO.			BY



**NOTES:**

- 1. DIRECT SURFACE DRAINAGE AS NECESSARY TO PROTECT OPEN TRENCH.

**LEGEND:**

- LIMITS OF DISTURBANCE
- SF- SILT FENCE

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DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
  
CHIEF, BUREAU OF UTILITIES DATE



**BLACK & VEATCH**  
Galithersburg, Maryland

REG. PROF. ENGR. \_\_\_\_\_ DATE \_\_\_\_\_

THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. RECTANUS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: FKA  
DRN: RLC  
CHK: RJR  
DATE: 05/10/02

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR

**SITE WORK  
CIVIL**

**EROSION AND SEDIMENT  
CONTROL PLAN  
2 OF 2**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

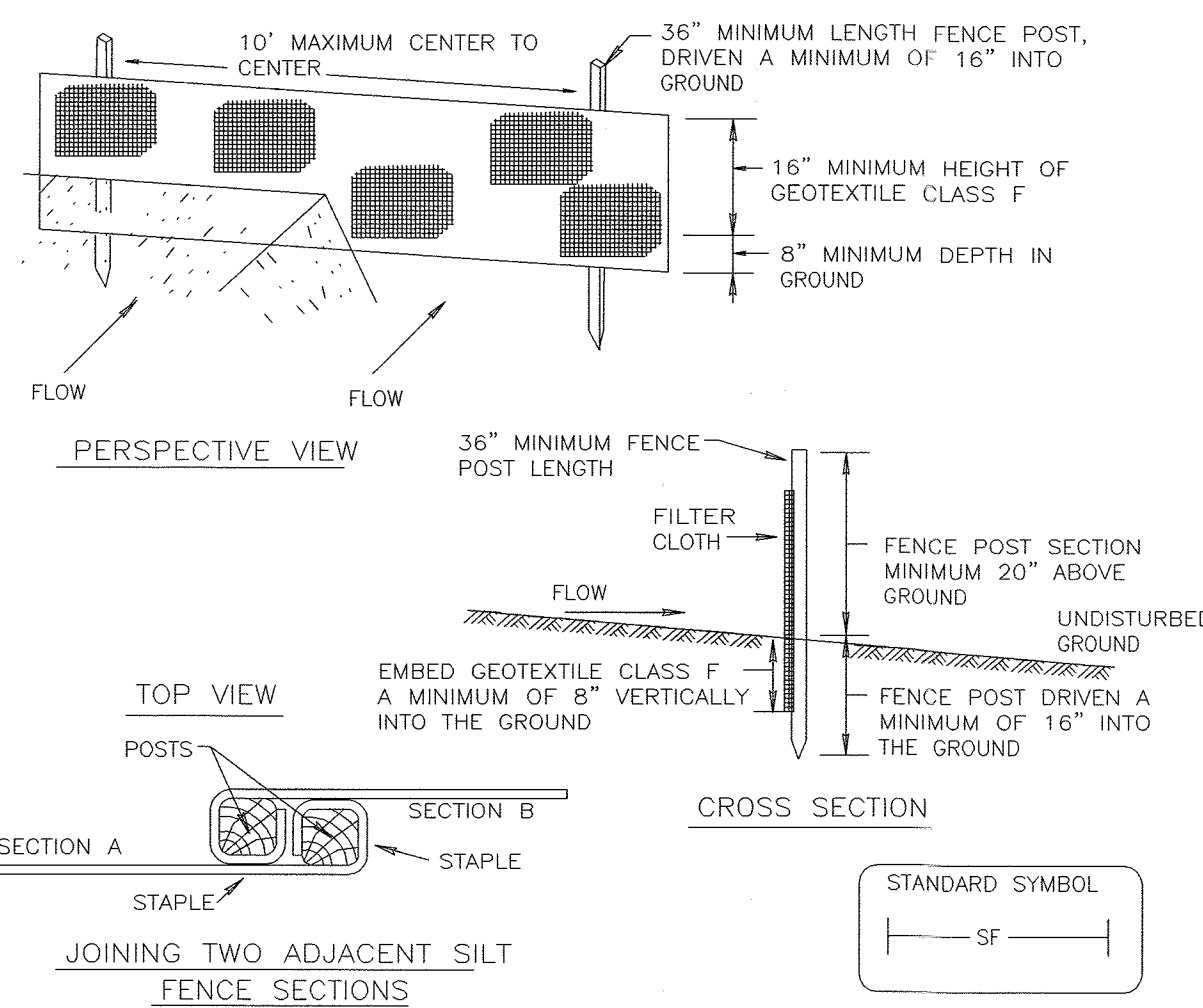
HOWARD COUNTY, MARYLAND

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DETAIL 22 - SILT FENCE



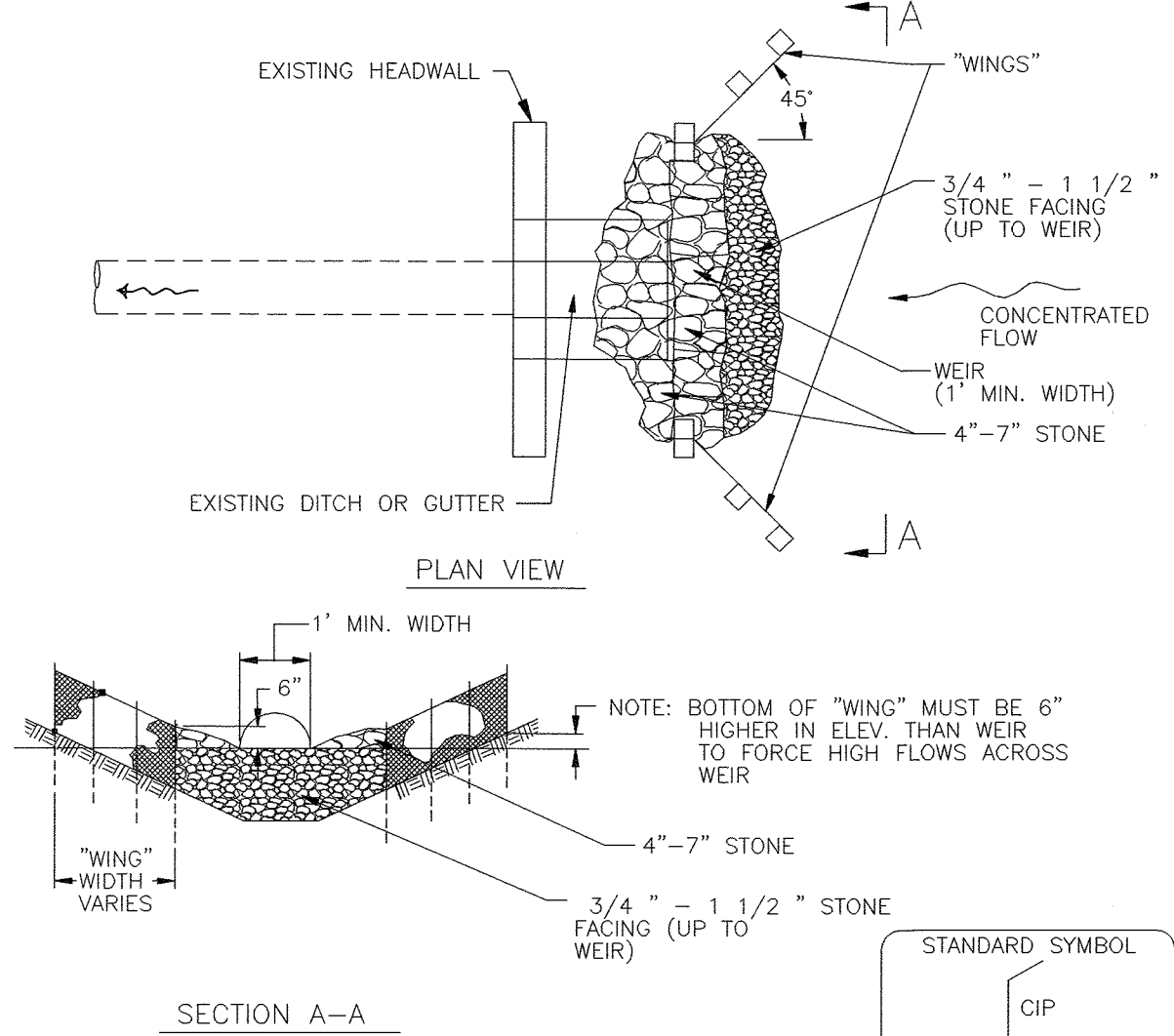
- CONSTRUCTION SPECIFICATIONS**
- FENCE POSTS SHALL BE A MINIMUM OF 36" LONG DRIVEN 16" MINIMUM INTO THE GROUND. WOOD POSTS SHALL BE 1 1/2" x 1 1/2" SQUARE (MINIMUM) CUT OR 1 3/4" DIAMETER (MINIMUM) ROUND AND SHALL BE OF SOUND QUALITY HARDWOOD. STEEL POSTS WILL BE STANDARD "T" OR "U" SECTION WEIGHING NOT LESS THAN 1.00 POUND PER LINEAR FOOT.
  - GEOTEXTILE SHALL BE FASTENED SECURELY TO EACH FENCE POST WITH WIRE TIES OR STAPLES AT TOP AND MID-SECTION AND SHALL MEET THE FOLLOWING REQUIREMENTS FOR GEOTEXTILE CLASS F:
 

TENSILE STRENGTH	50 LBS/IN (MIN.)	TEST: MSMT 509
TENSILE MODULUS	20 LBS/IN (MIN.)	TEST: MSMT 509
FLOW RATE	0.3 GAL. FT./MINUTE (MAX.)	TEST: MSMT 322
FILTERING EFFICIENCY	75% (MIN.)	TEST: MSMT 322
  - WHERE ENDS OF GEOTEXTILE FABRIC COME TOGETHER, THEY SHALL BE OVERLAPPED, FOLDED AND STAPLED TO PREVENT SEDIMENT BYPASS.
  - SILT FENCE SHALL BE INSPECTED AFTER EACH RAINFALL EVENT AND MAINTAINED WHEN BULGES OCCUR OR WHEN SEDIMENT ACCUMULATION REACHED 50% OF THE FABRIC HEIGHT.

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE E-15-3 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

CULVERT INLET PROTECTION

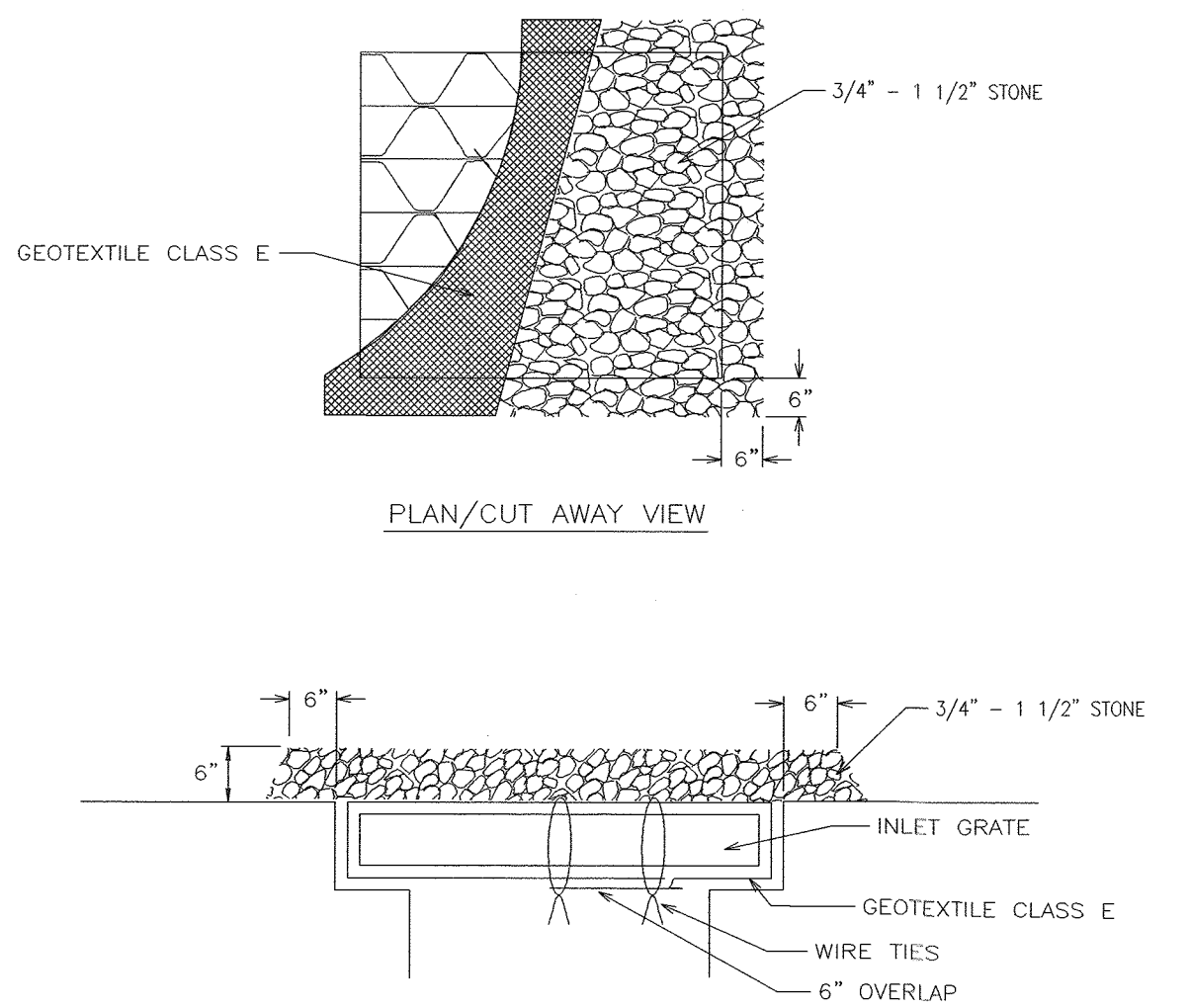


- CONSTRUCTION SPECIFICATIONS**
- Fence posts shall be 36" (min.) long, driven 16" into the ground and spaced 5' (max.) apart. Wood posts shall be 1 1/2" x 1 1/2" (min.) square cut or 1 3/4" (min.) diameter round and shall be of sound quality hardwood. Steel posts shall be standard T or U section weighing not less than 1.0 #/linear foot.
  - Geotextile Class F shall be fastened securely to each post with wire ties or staples at top and mid-section.
  - Where ends of geotextile fabric come together they shall be overlapped, folded and stapled.
  - Median Inlet Protection shall be inspected after each rain and maintained when bulges occur in the fabric or when the stone gets clogged.
  - Stone used to construct the weir shall be 4" - 7" with a 1" thick layer of 3/4" - 1 1/2" stone on the upstream face.

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE E-16-5C MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 23B - AT GRADE INLET PROTECTION

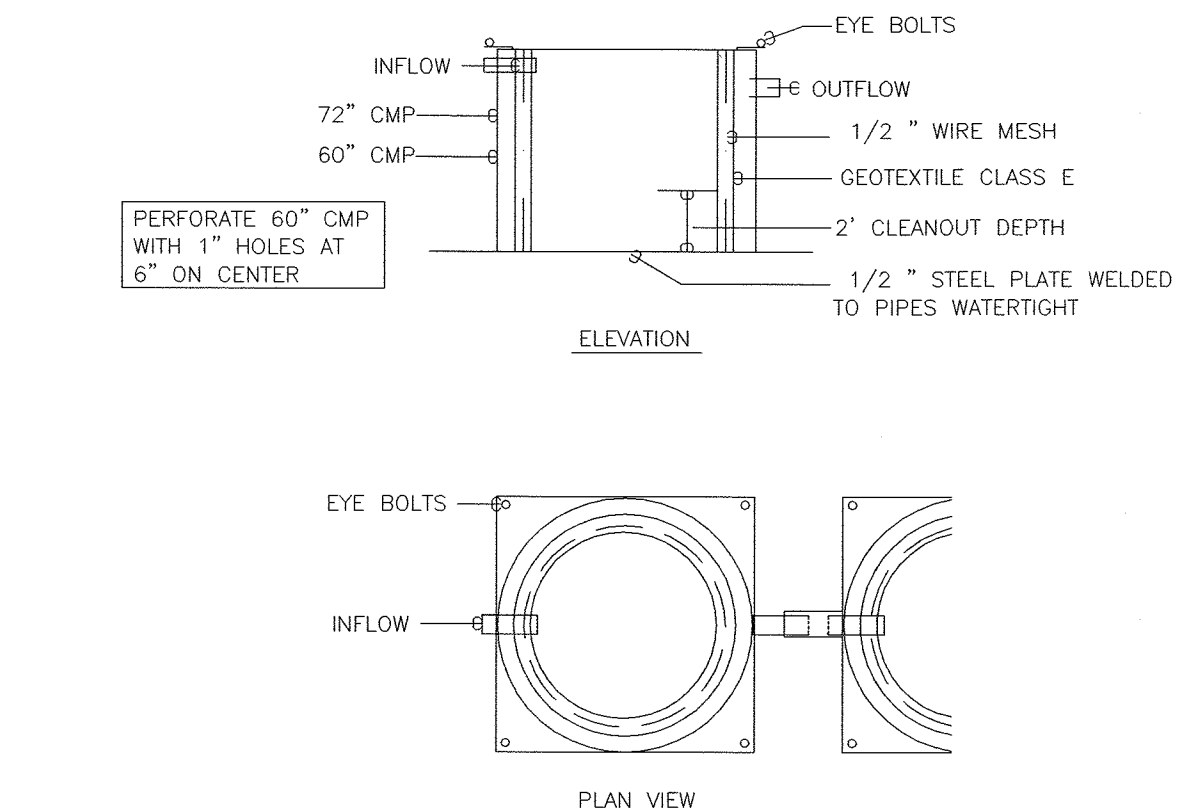


- CONSTRUCTION SPECIFICATIONS**
- LIFT GRATE AND WRAP WITH GEOTEXTILE CLASS E TO COMPLETELY COVER ALL OPENINGS THEN SET GRATE BACK IN PLACE.
  - PLACE 3/4" TO 1 1/2" STONE, 4"-6" THICK ON THE GRATE TO SECURE THE FABRIC AND PROVIDE ADDITIONAL FILTRATION.

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE E-16-5A MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

PORTABLE SEDIMENT TANK

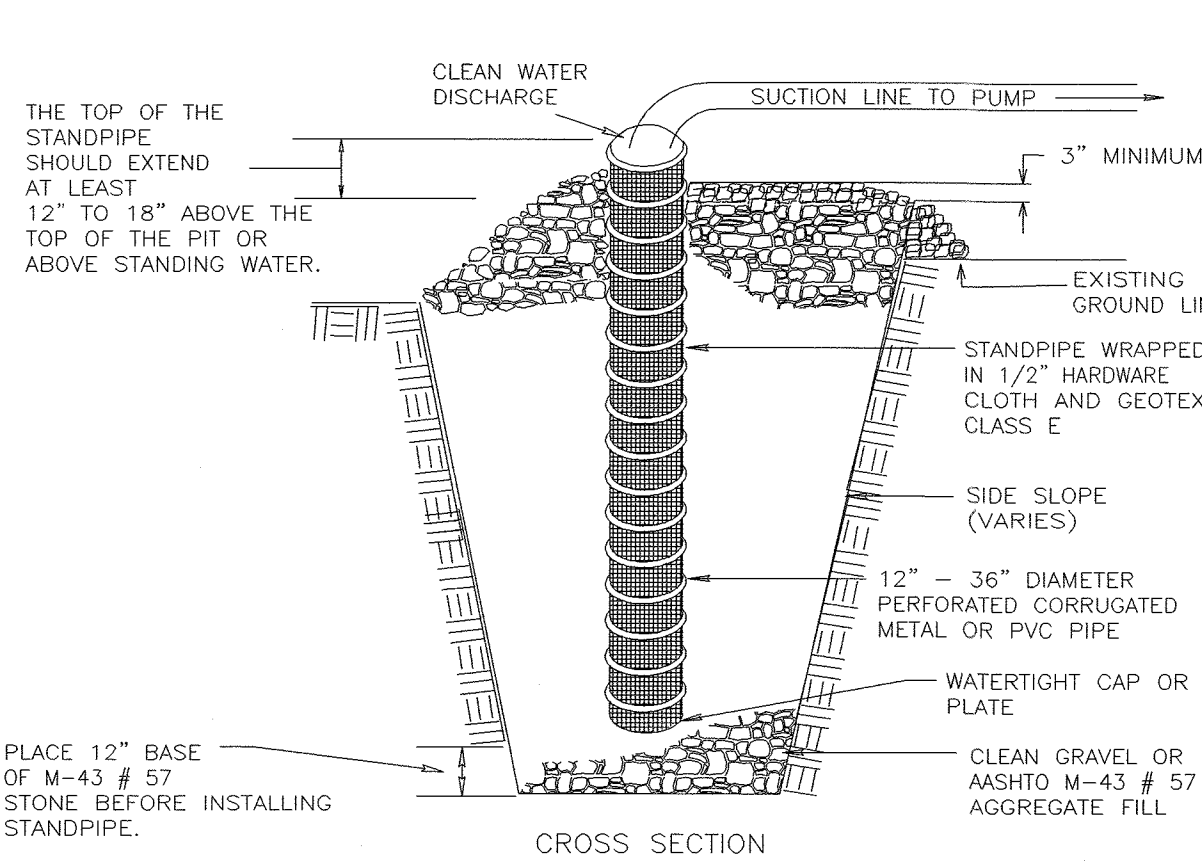


- CONSTRUCTION SPECIFICATIONS**
- THE FOLLOWING FORMULA SHOULD BE USED IN DETERMINING THE STORAGE VOLUME OF THE SEDIMENT TANK: 1 CUBIC FOOT OF STORAGE FOR EACH GALLON PER MINUTE OF PUMP DISCHARGE CAPACITY.
  - AN EXAMPLE OF A TYPICAL SEDIMENT TANK IS SHOWN ABOVE. OTHER CONTAINER DESIGNS CAN BE USED IF THE STORAGE VOLUME IS ADEQUATE AND APPROVAL IS OBTAINED FROM THE LOCAL APPROVING AGENCY.
  - TANKS MAY BE CONNECTED IN SERIES.

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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE E-16-5B MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

DETAIL 20B - SUMP PIT



- CONSTRUCTION SPECIFICATIONS**
- Pit dimensions are variable, with the minimum diameter being 2 times the standpipe diameter.
  - The standpipe should be constructed by perforating a 12" to 24" diameter corrugated or PVC pipe. Then wrapping with 1/2" hardware cloth and Geotextile Class E. The perforations shall be 1/2" x 6" slits or 1" diameter holes.
  - A base of filter material consisting of clean gravel or #57 stone should be placed in the pit to a depth of 12". After installing the standpipe, the pit surrounding the standpipe should then be backfilled with the same filter material.
  - The standpipe should extend 12" to 18" above the lip of the pit or the riser crest elevation (basin dewatering only) and the filter material should extend 3" minimum above the anticipated standing water elevation.

7  
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U.S. DEPARTMENT OF AGRICULTURE SOIL CONSERVATION SERVICE PAGE D-31-2 MARYLAND DEPARTMENT OF ENVIRONMENT WATER MANAGEMENT ADMINISTRATION

HOWARD SOIL CONSERVATION DISTRICT PERMANENT SEEDING NOTES

- APPLY TO GRADED OR CLEARED AREAS NOT SUBJECT TO IMMEDIATE FURTHER DISTURBANCE WHERE A PERMANENT LONG-LIVED VEGETATIVE COVER IS NEEDED.
- SEEDBED PREPARATION:** LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENEED.
- SOIL AMENDMENTS:** IN LIEU OF SOIL TEST RECOMMENDATIONS, USE ONE OF THE FOLLOWING SCHEDULES:
- PREFERRED** -- APPLY 2 TONS/ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ. FT.) AND 600 LBS/ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ. FT.) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL. AT TIME OF SEEDING, APPLY 400 LBS/ACRE 30-0-0 UREAFORM FERTILIZER (9 LBS/1000 SQ. FT.)
  - ACCEPTABLE** -- APPLY 2 TONS/ACRE DOLOMITIC LIMESTONE (92 LBS/1000 SQ. FT.) AND 1000 LBS/ACRE 10-10-10 FERTILIZER (23 LBS/1000 SQ. FT.) BEFORE SEEDING. HARROW OR DISK INTO UPPER THREE INCHES OF SOIL.
- SEEDING** -- FOR THE PERIODS MARCH 1 -- APRIL 30, AND AUGUST 1 -- OCTOBER 15, SEED WITH 60 LBS/ACRE (1.4 LBS/1000 SQ. FT.) OF KENTUCKY 31 TALL FESCUE. FOR THE PERIOD MAY 1 -- JULY 31, SEED WITH 60 LBS KENTUCKY 31 TALL FESCUE PER ACRE AND 2 LBS/ACRE (.05 LBS/1000 SQ. FT.) OF WEEPING LOVEGRASS. DURING THE PERIOD OF OCTOBER 16 -- FEBRUARY 28, PROTECT SITE BY:
- OPTION 1** -- TWO TONS PER ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING.  
**OPTION 2** -- USE SOD.  
**OPTION 3** -- SEED WITH 60 LBS/ACRE KENTUCKY 30 TALL FESCUE AND MULCH WITH 2 TONS/ACRE WELL ANCHORED STRAW.
- MULCHING** -- APPLY 1-1/2 TO 2 TONS PER ACRE (70 TO 90 LBS/1000 SQ. FT.) OF UNROTTED SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GALLONS PER ACRE (5 GAL/1000 SQ. FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPE 8 FEET OR HIGHER, USE 348 GALLONS PER ACRE (8 GAL/1000 SQ. FT.) FOR ANCHORING.
- MAINTENANCE** -- INSPECT ALL SEEDING AREAS AND MAKE NEEDED REPAIRS, REPLACEMENTS AND RESEEDINGS.

TEMPORARY SEEDING NOTES

- APPLY TO GRADED OR CLEARED AREAS LIKELY TO BE RE-DISTURBED WHERE A SHORT-TERM VEGETATIVE COVER IS NEEDED.
- SEEDBED PREPARATION:** -- LOOSEN UPPER THREE INCHES OF SOIL BY RAKING, DISKING OR OTHER ACCEPTABLE MEANS BEFORE SEEDING, IF NOT PREVIOUSLY LOOSENEED.
- SOIL AMENDMENTS:** -- APPLY 600 LBS/ACRE 10-10-10 FERTILIZER (14 LBS/1000 SQ. FT.).
- SEEDING:** -- FOR PERIODS MARCH 1 -- APRIL 30 AND FROM AUGUST 15 -- OCTOBER 15, SEED WITH 2-1/2 BUSHEL PER ACRE OF ANNUAL RYE (3.2 LBS/1000 SQ. FT.). FOR THE PERIOD MAY 1 -- AUGUST 14, SEED WITH 3 LBS/ACRE OF WEEPING LOVEGRASS (.07 LBS/1000 SQ. FT.). FOR THE PERIOD NOVEMBER 16 -- FEBRUARY 28, PROTECT SITE BY APPLYING 2 TONS/ACRE OF WELL ANCHORED STRAW MULCH AND SEED AS SOON AS POSSIBLE IN THE SPRING, OR USE SOD.
- MULCHING** -- APPLY 1-1/2 TO 2 TONS/ACRE (70 TO 90 LBS/1000 SQ. FT.) OF UNROTTED WEED-FREE, SMALL GRAIN STRAW IMMEDIATELY AFTER SEEDING. ANCHOR MULCH IMMEDIATELY AFTER APPLICATION USING MULCH ANCHORING TOOL OR 218 GAL. PER ACRE (5 GAL/1000 SQ. FT.) OF EMULSIFIED ASPHALT ON FLAT AREAS. ON SLOPE 8 FT. OR HIGHER, USE 348 GAL. PER ACRE (8 GAL/1000 SQ. FT.) FOR ANCHORING.
- REFER TO THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR ADDITIONAL RATES AND METHODS NOT COVERED.

HOWARD SOIL CONSERVATION DISTRICT STANDARD SEDIMENT CONTROL NOTES

- A MINIMUM OF 48 HOURS NOTICE MUST BE GIVEN TO THE HOWARD COUNTY DEPARTMENT OF INSPECTIONS, LICENSES AND PERMITS, SEDIMENT CONTROL DIVISION PRIOR TO THE START OF ANY CONSTRUCTION (313-1855).
- ALL VEGETATIVE AND STRUCTURAL PRACTICES ARE TO BE INSTALLED ACCORDING TO THE PROVISIONS OF THIS PLAN AND ARE TO BE IN CONFORMANCE WITH THE MOST CURRENT MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL AND REVISIONS THERETO.
- FOLLOWING INITIAL SOIL DISTURBANCE OR RE-DISTURBANCE, PERMANENT OR TEMPORARY STABILIZATION SHALL BE COMPLETED WITHIN:
  - 7 CALENDAR DAYS FOR ALL PERIMETER SEDIMENT CONTROL STRUCTURES, DIKES, PERIMETER SLOPES AND ALL SLOPES GREATER THAN 3:1.
  - 14 DAYS AS TO ALL OTHER DISTURBED OR GRADED AREAS ON THE PROJECT SITE.
- ALL SEDIMENT TRAPS/BASINS SHOWN MUST BE FENCED AND WARNING SIGNS POSTED AROUND THEIR PERIMETER IN ACCORDANCE WITH VOL. 1, CHAPTER 12 OF THE HOWARD COUNTY DESIGN MANUAL, STORM DRAINAGE.
- ALL DISTURBED AREAS MUST BE STABILIZED WITHIN THE TIME PERIOD SPECIFIED ABOVE IN ACCORDANCE WITH THE 1994 MARYLAND STANDARDS AND SPECIFICATIONS FOR SOIL EROSION AND SEDIMENT CONTROL FOR PERMANENT SEEDING (SEC. 51), SOD (SEC. 54), TEMPORARY SEEDING (SEC. 50) AND MULCHING (SEC. 52). TEMPORARY STABILIZATION WITH MULCH ALONE CAN ONLY BE DONE WHEN RECOMMENDED SEEDING DATES DO NOT ALLOW FOR PROPER GERMINATION AND ESTABLISHMENT OF GRASSES.
- ALL SEDIMENT CONTROL STRUCTURES ARE TO REMAIN IN PLACE AND ARE TO BE MAINTAINED IN OPERATIVE CONDITION UNTIL PERMISSION FOR THEIR REMOVAL HAS BEEN OBTAINED FROM THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- SITE ANALYSIS:
 

TOTAL AREA OF SITE	38.01 ACRES	
AREA DISTURBED	0.75 ACRES	
AREA TO BE ROOFED OR PAVED	0.33 ACRES	
AREA TO BE VEGETATIVELY STABILIZED	0.42 ACRES	
TOTAL CUT	3000 CU. YDS.	**
TOTAL FILL	2000 CU. YDS.	**
OFFSITE WASTE/BORROW AREA LOCATION	2500 CU. YDS.	**

\*\* THIS INFORMATION IS NOT TO BE USED BY THE CONTRACTOR
- ANY SEDIMENT CONTROL PRACTICE WHICH IS DISTURBED BY GRADING ACTIVITY FOR PLACEMENT OF UTILITIES MUST BE REPAIRED ON THE SAME DAY OF DISTURBANCE.
- ADDITIONAL SEDIMENT CONTROL MUST BE PROVIDED, IF DEEMED NECESSARY BY THE HOWARD COUNTY SEDIMENT CONTROL INSPECTOR.
- ON ALL SITES WITH DISTURBED AREAS IN EXCESS OF 2 ACRES, APPROVAL OF THE INSPECTION AGENCY SHALL BE REQUESTED UPON COMPLETION OF INSTALLATION OF PERIMETER EROSION AND SEDIMENT CONTROLS, BUT BEFORE PROCEEDING WITH ANY OTHER EARTH DISTURBANCE OR GRADING. OTHER BUILDING OR GRADING INSPECTION APPROVALS MAY NOT BE AUTHORIZED UNTIL THIS INITIAL APPROVAL BY THE INSPECTION AGENCY IS MADE.
- TRENCHES FOR THE CONSTRUCTION OF UTILITIES IS LIMITED TO THREE PIPE LENGTHS OR THAT WHICH SHALL BE BACK-FILLED AND STABILIZED BY THE END OF EACH WORK DAY, WHICHEVER IS SHORTER.

SEQUENCE OF CONSTRUCTION ACTIVITIES

- OBTAIN GRADING PERMIT.
- INSTALL NECESSARY SEDIMENT CONTROL MEASURES AND DEVICES.
- EXCAVATE AND BUILD DISTRIBUTION FLOW CHAMBER AND EFFLUENT METER VAULT.
- INSTALL PROCESS PIPING.
- INSTALL CURB AND GUTTER, PAVING, WALK, ETC.
- STABILIZE AREAS TO BE VEGETATED WITH PERMANENT SEED AND MULCH.
- REMOVE ALL SEDIMENT CONTROL MEASURES AND DEVICES. RESTABILIZE DISTURBED AREAS WITH SEED AND MULCH.
- FINAL STABILIZATION OF SITE.

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



REG. PROF. ENGR. DATE

THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. RECTANUS, JR., A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927

DES: KMH  
DRN: RLC  
CHK: RJR  
DATE: 05/10/02

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR

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EROSION AND SEDIMENT CONTROL NOTES AND DETAILS

LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT

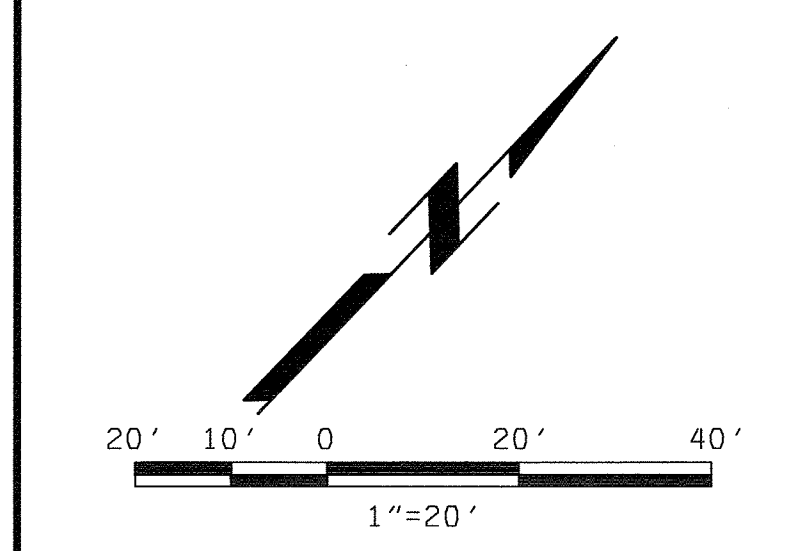
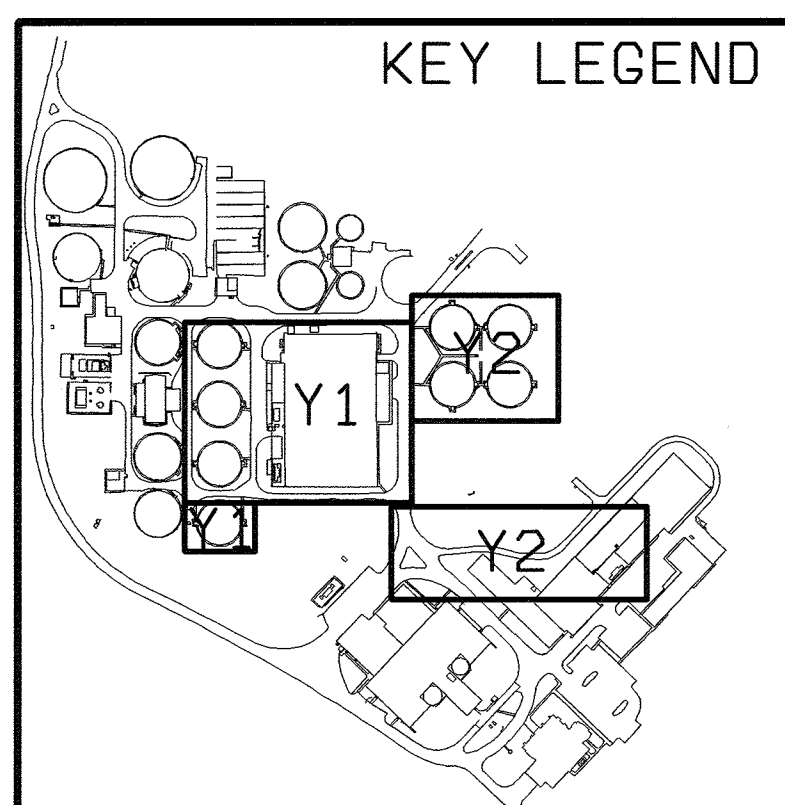
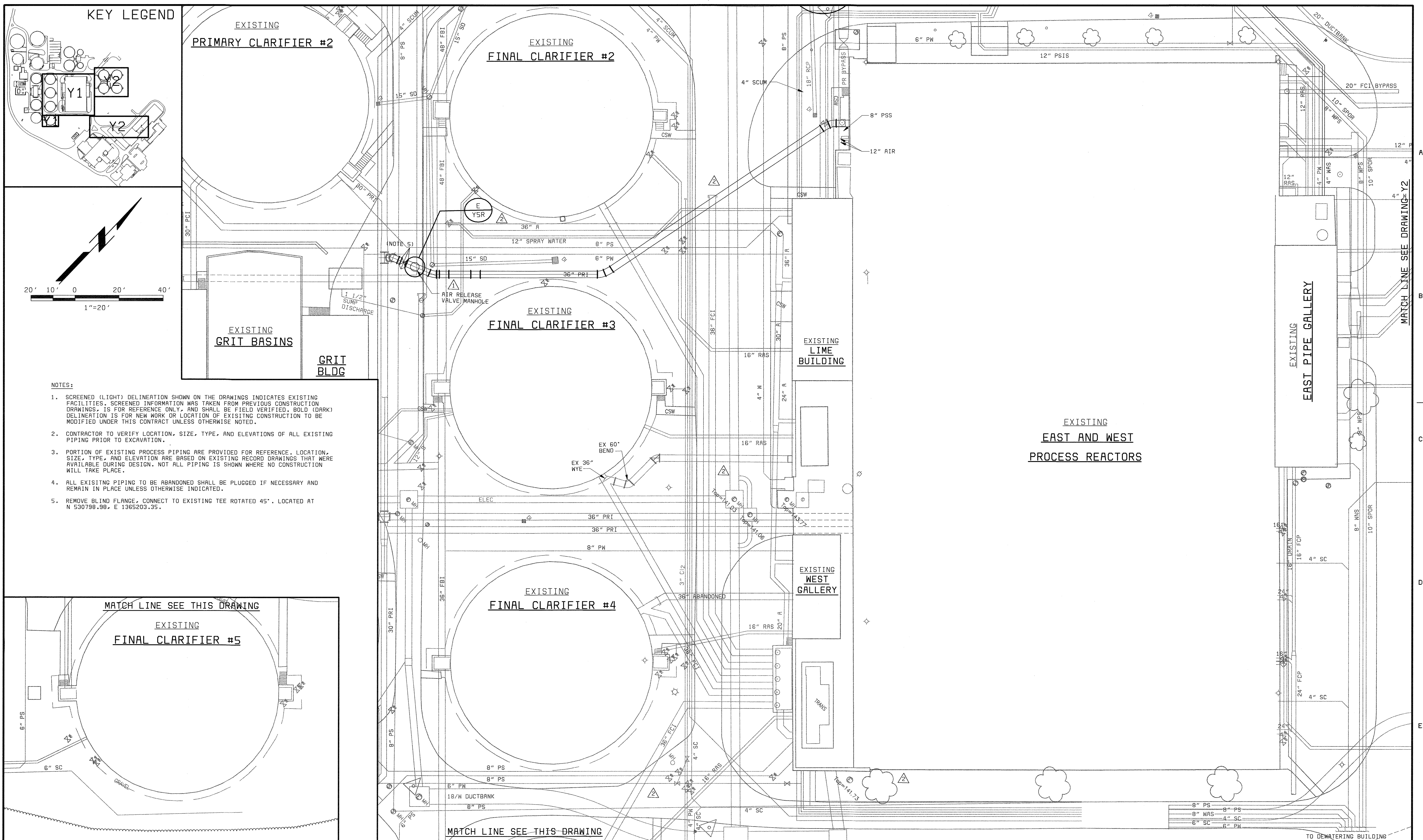
CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

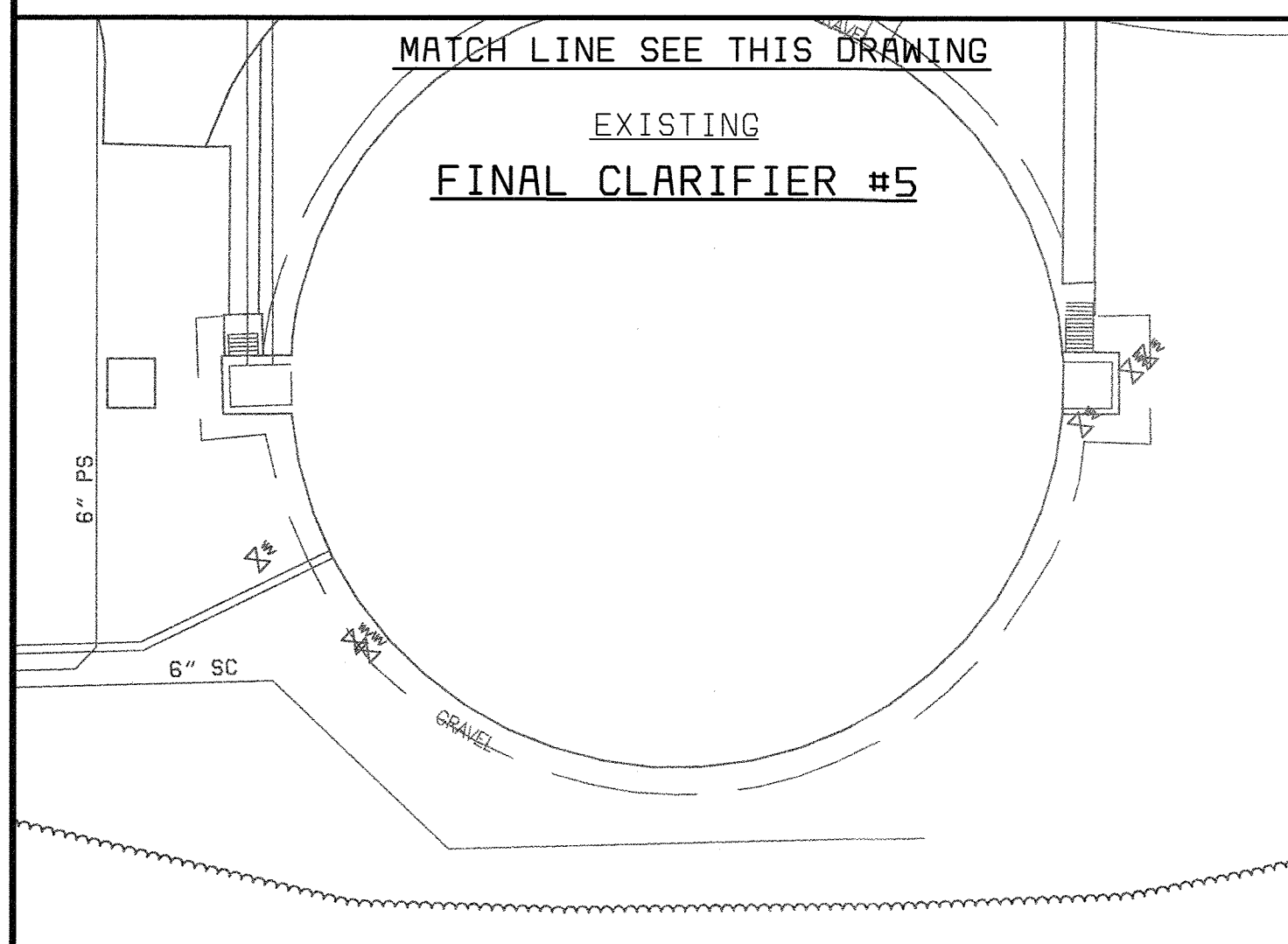
SCALE AS SHOWN

SHEET 12 OF 139

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- NOTES:**
1. SCREENED (LIGHT) DELINEATION SHOWN ON THE DRAWINGS INDICATES EXISTING FACILITIES, SCREENED INFORMATION WAS TAKEN FROM PREVIOUS CONSTRUCTION DRAWINGS, IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED. BOLD (DARK) DELINEATION IS FOR NEW WORK OR LOCATION OF EXISTING CONSTRUCTION TO BE MODIFIED UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
  2. CONTRACTOR TO VERIFY LOCATION, SIZE, TYPE, AND ELEVATIONS OF ALL EXISTING PIPING PRIOR TO EXCAVATION.
  3. PORTION OF EXISTING PROCESS PIPING ARE PROVIDED FOR REFERENCE. LOCATION, SIZE, TYPE, AND ELEVATION ARE BASED ON EXISTING RECORD DRAWINGS THAT WERE AVAILABLE DURING DESIGN. NOT ALL PIPING IS SHOWN WHERE NO CONSTRUCTION WILL TAKE PLACE.
  4. ALL EXISTING PIPING TO BE ABANDONED SHALL BE PLUGGED IF NECESSARY AND REMAIN IN PLACE UNLESS OTHERWISE INDICATED.
  5. REMOVE BLIND FLANGE, CONNECT TO EXISTING TEE ROTATED 45°. LOCATED AT N 530798.98, E 1365203.35.



58472-101-YARD-C-7000000TB  
 58472-101-YARD-C-7000000TR  
 058472-4  
 058472R

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE


**BLACK & VEATCH**  
 Gaithersburg, Maryland  
 REG. PROF. ENGR. \_\_\_\_\_ DATE \_\_\_\_\_

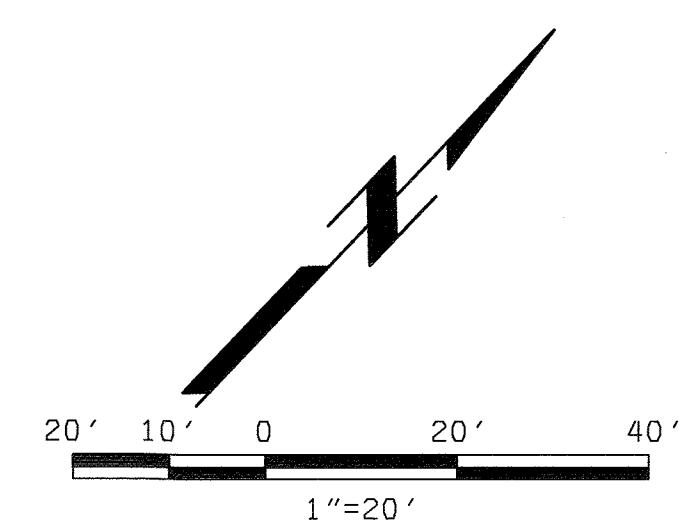
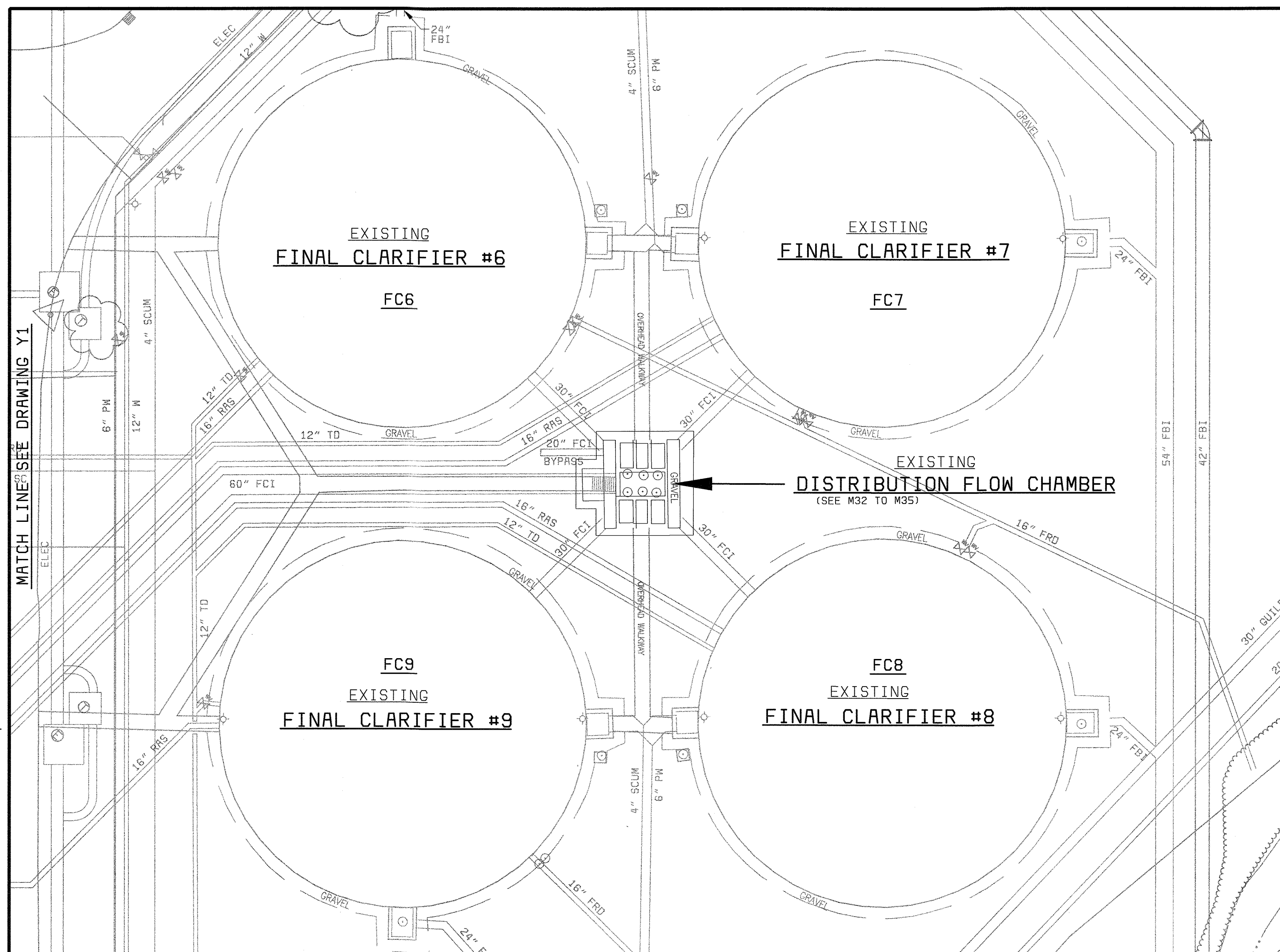
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 ROBERT J. RECTANUS, JR.,  
 A REGISTERED  
 PROFESSIONAL ENGINEER  
 IN THE  
 STATE OF MARYLAND,  
 NO. 22927

DES: FKA					
DRN: RLC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR/RJR
CHK: RJR	6/11/03	PR VALUE ENGINEERING PROPOSAL		2	PJS
DATE: 05/10/02	6/3/02	PER ADDENDUM NO. 1		1	FKA
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY
				CK	APP

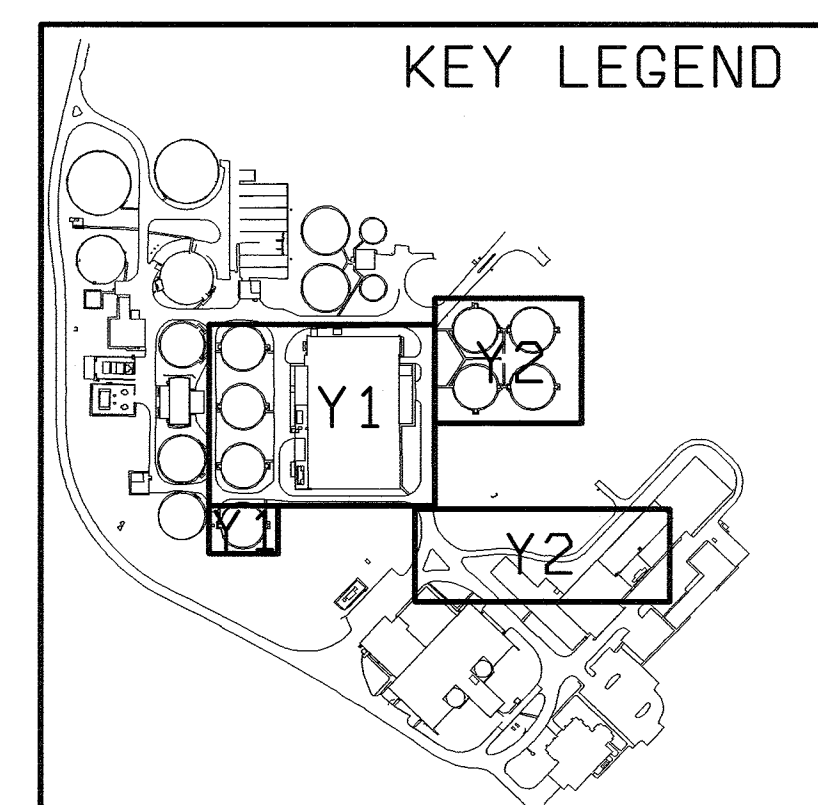
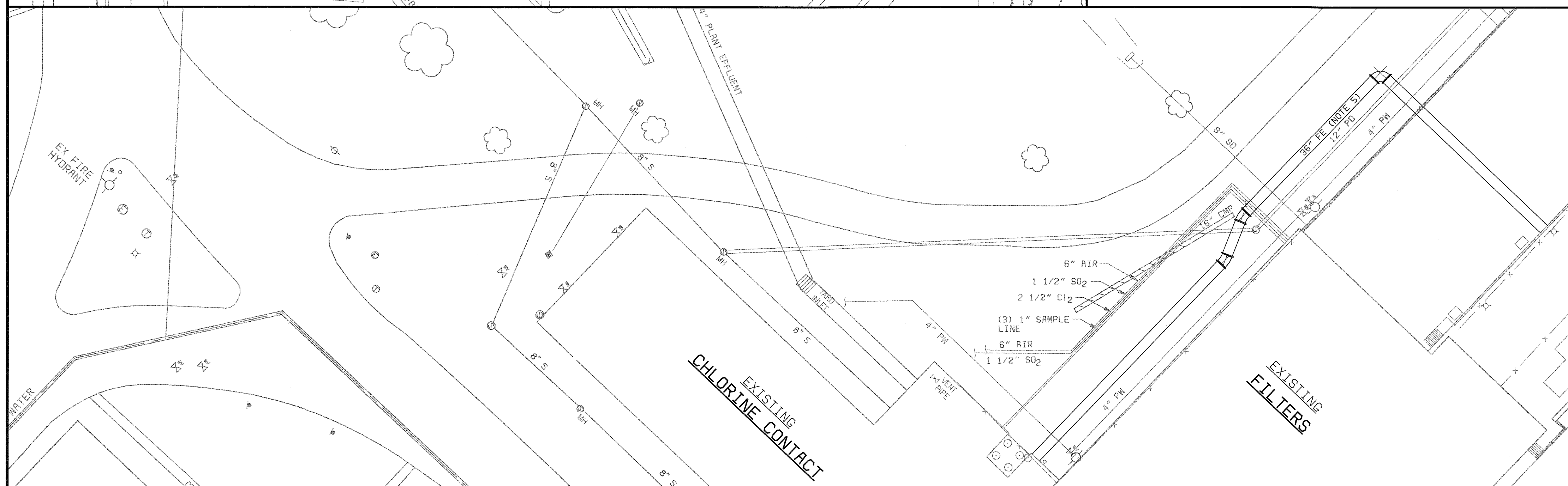
**YARDWORK**  
**YARD PIPING**  
**1 OF 2**

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

SCALE  
 AS  
 SHOWN  
 SHEET  
 13 OF 139  
**Y1**




- NOTES:**
1. SCREENED (LIGHT) DELINEATION SHOWN ON THE DRAWINGS INDICATES EXISTING FACILITIES. SCREENED INFORMATION WAS TAKEN FROM PREVIOUS CONSTRUCTION DRAWINGS, IS FOR REFERENCE ONLY, AND SHALL BE FIELD VERIFIED. BOLD (DARK) DELINEATION IS FOR NEW WORK OR LOCATION OF EXISTING CONSTRUCTION TO BE MODIFIED UNDER THIS CONTRACT UNLESS OTHERWISE NOTED.
  2. CONTRACTOR TO VERIFY LOCATION, SIZE, TYPE, AND ELEVATIONS OF ALL EXISTING PIPING PRIOR TO EXCAVATION.
  3. PORTION OF EXISTING PROCESS PIPING ARE PROVIDED FOR REFERENCE. LOCATION, SIZE, TYPE, AND ELEVATION ARE BASED ON EXISTING RECORD DRAWINGS THAT WERE AVAILABLE DURING DESIGN. NOT ALL PIPING IS SHOWN WHERE NO CONSTRUCTION WILL TAKE PLACE.
  4. ALL EXISTING PIPING TO BE ABANDONED SHALL BE PLUGGED IF NECESSARY AND REMAIN IN PLACE UNLESS OTHERWISE INDICATED.
  5. ALL JOINTS ON 36\"/>



58472-101-YARD-C-Z0000001B  
 58472-101-YARD-C-Z0000001A  
 058472-4  
 F058472A

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE


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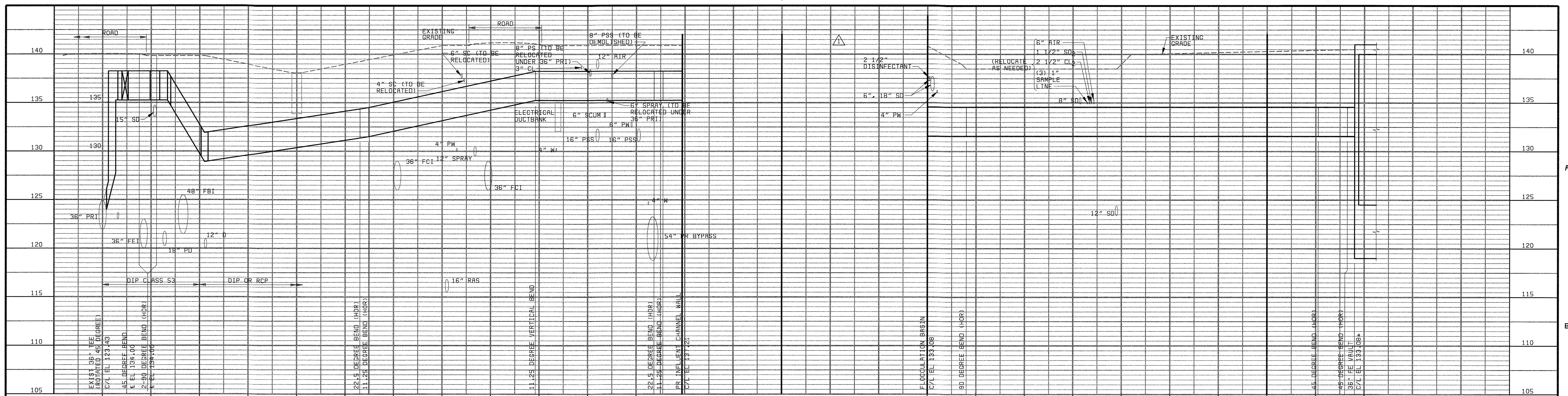
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 NO. 22927

DES: FKA					
DRN: RLC					
CHK: RJR					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

**YARDWORK**  
**YARD PIPING**  
**2 OF 2**

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

SCALE  
 AS  
 SHOWN  
 SHEET  
 14 OF 139  
**Y2**



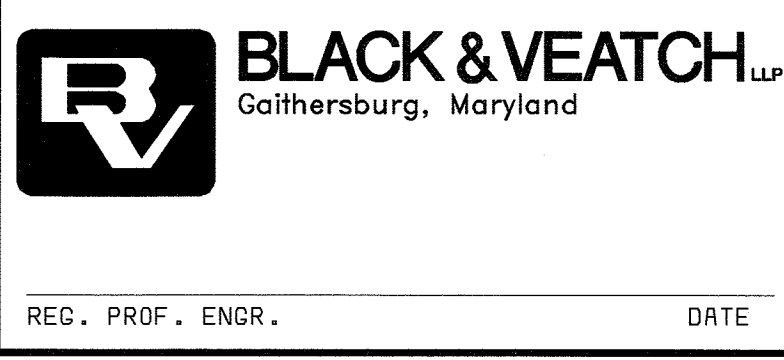
**36" PRI**  
 (FROM EXIST 36" TEE TO PR INFLUENT CHANNEL)

**36" FE**  
 (FROM FLOCCULATION BASIN TO 36" FE VAULT)  
 (SEE NOTE)

NOTE:  
 36" TO BE RESTRAINED JOINTS.

HOR : 1" = 20'-0"  
 VERT : 1" = 5'-0"

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
  
 CHIEF, BUREAU OF UTILITIES DATE



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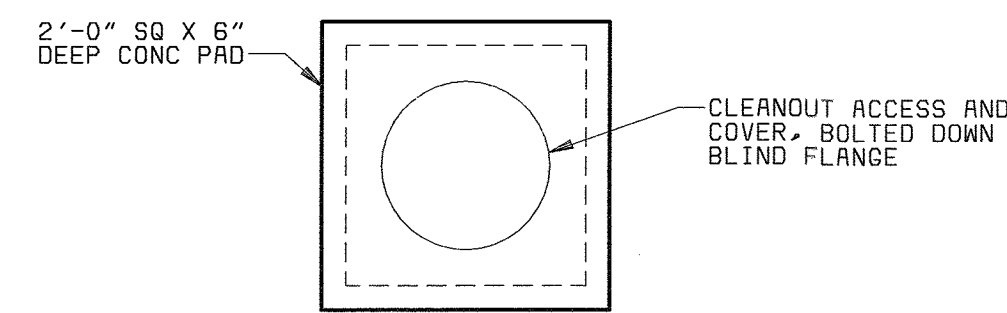
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 DRN: SLF  
 CHK: RJR  
 DATE: 05/10/02

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
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6/11/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR	RJR

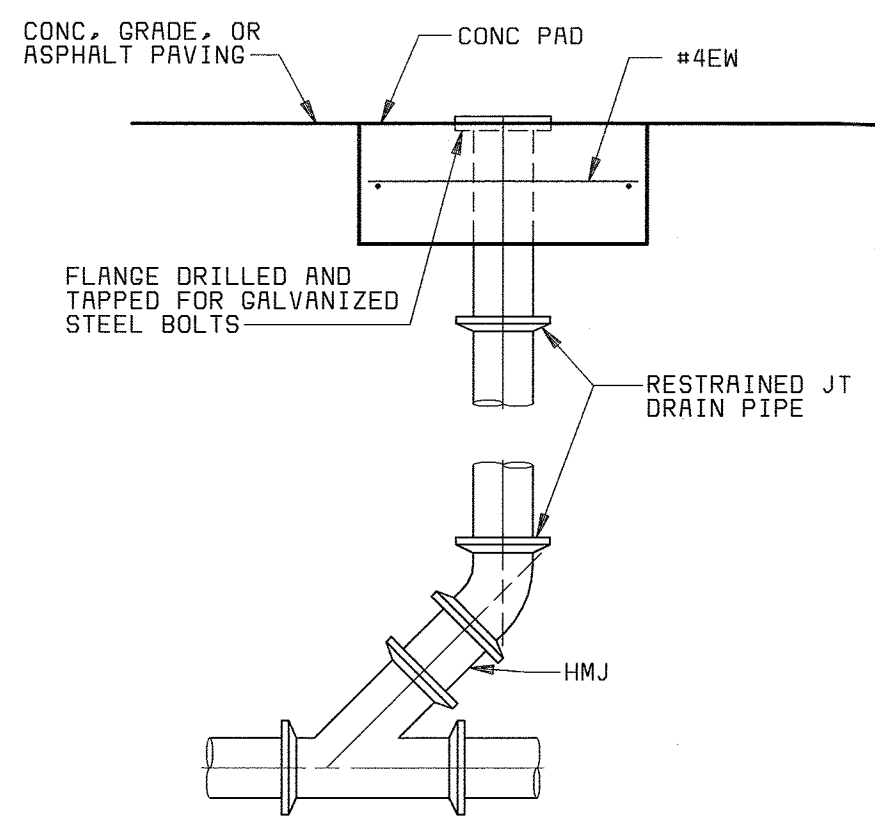
**YARDWORK**  
**CIVIL**  
  
**YARD PIPING PROFILES**

LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

SCALE  
 AS  
 SHOWN  
 SHEET  
 15 OF 139  
**Y3R**

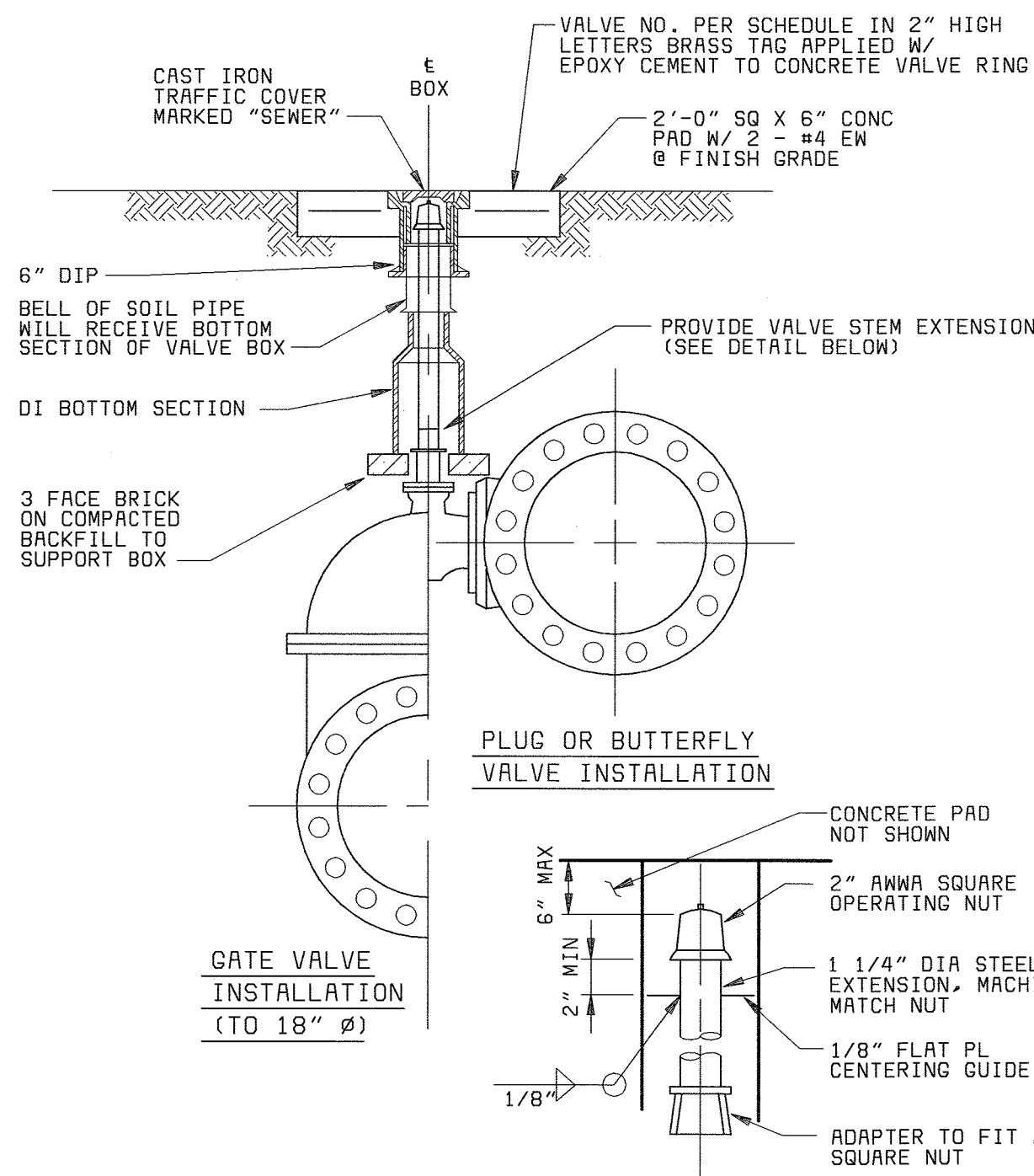


**PLAN**



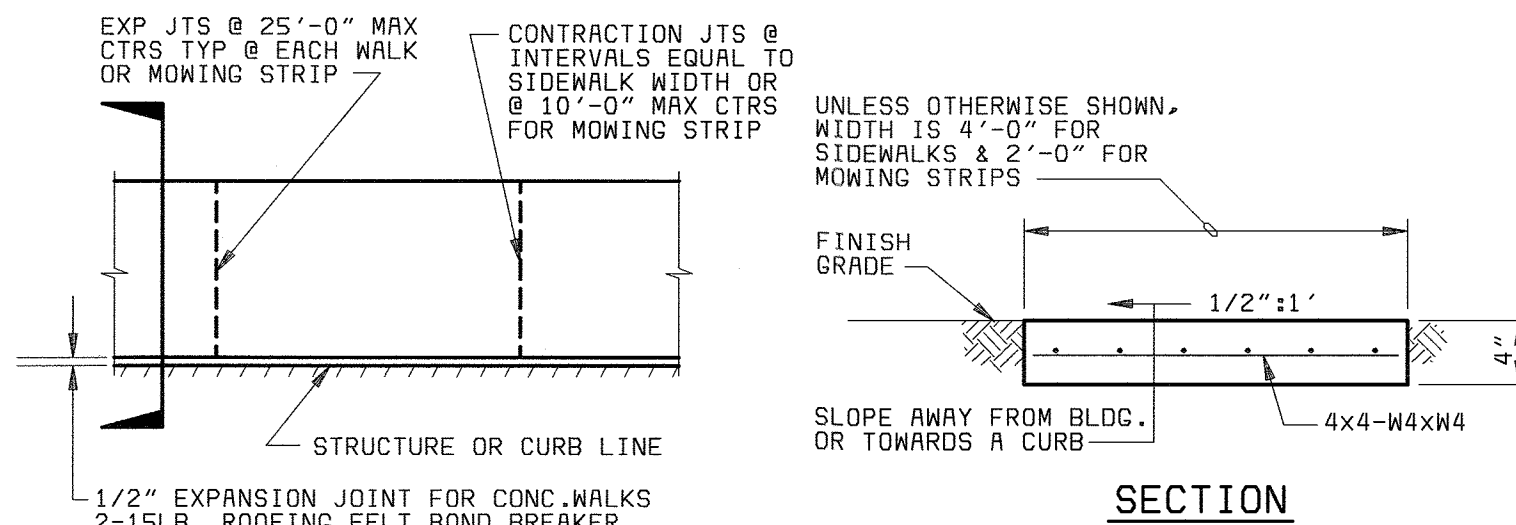
**SECTION**

**CLEANOUT UP TO GRADE DETAIL (A)**  
NO SCALE



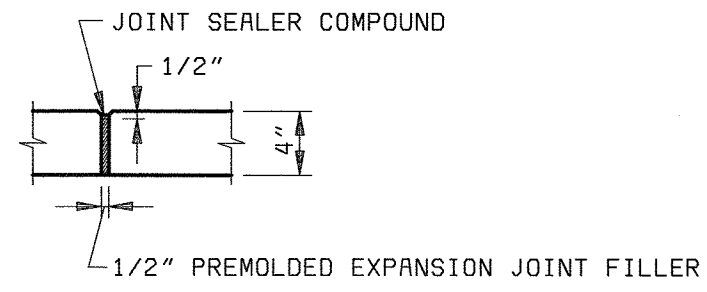
**VALVE STEM EXTENSION DETAIL**

**BURIED VALVE INSTALLATION (B)**  
NO SCALE

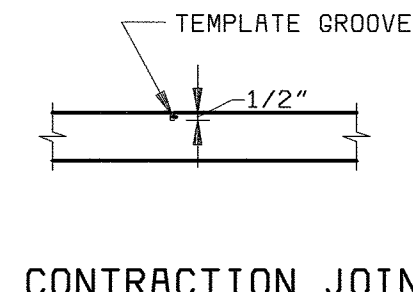


**PLAN**

**SECTION**

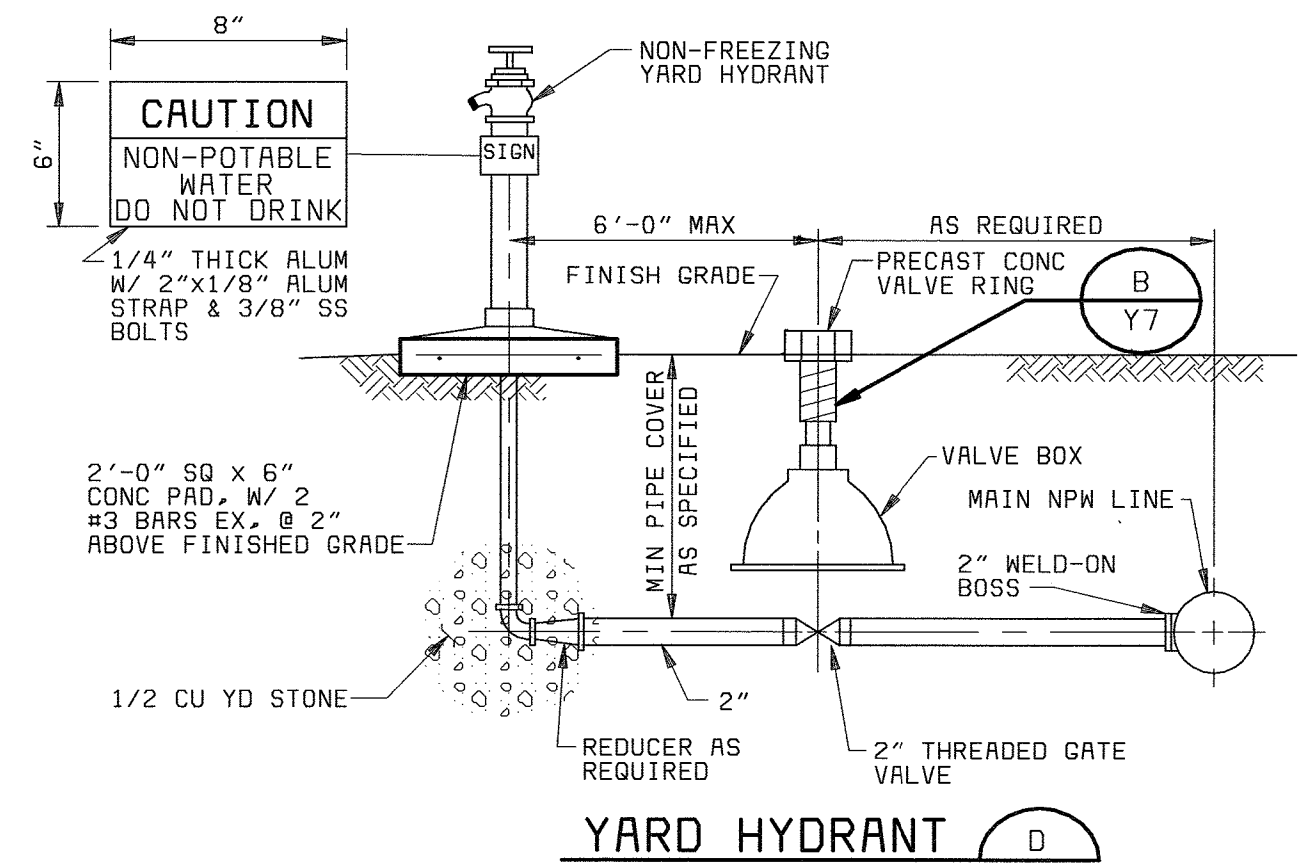


**EXPANSION JOINT**

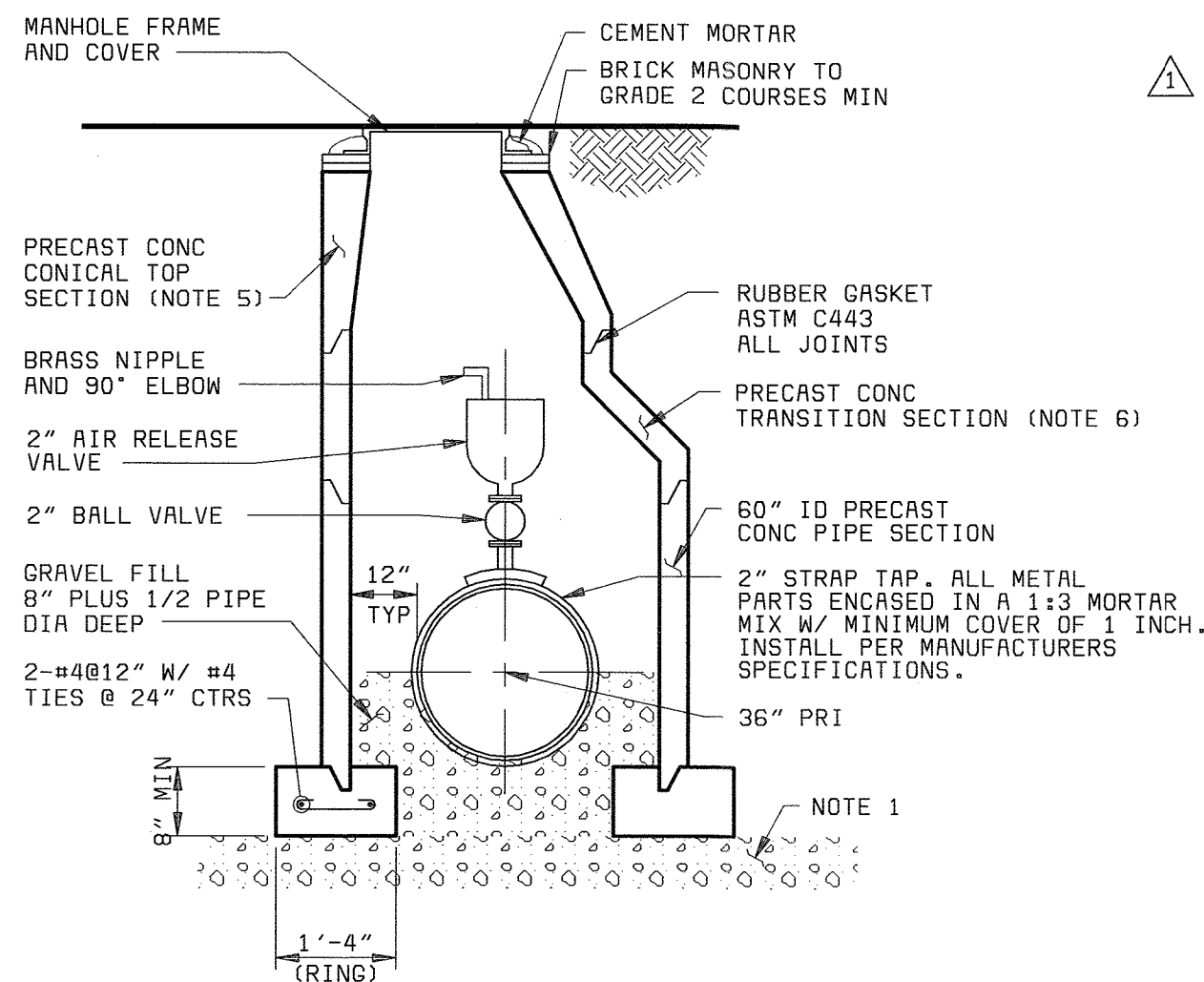


**CONTRACTION JOINT**

**MOWING STRIP AND CONCRETE WALK DETAILS (C)**  
NO SCALE



**YARD HYDRANT (D)**



**AIR RELEASE VALVE (E)**  
NO SCALE

**NOTES**

1. MANHOLE BASE SHALL BE BEDDED ON 6-INCH GRANULAR MATERIAL ON FIRM SUBGRADE.
2. CONNECTION BETWEEN MANHOLE WALL AND PIPE SHALL BE NON-SHRINK GROUT OR RUBBER GASKET (COMPRESSION TYPE) JOINT.
3. MANHOLE COVER SHALL BE AS SPECIFIED ON DETAIL G5.S1, HOWARD CO. DEPT OF PUBLIC WORKS STANDARD.
4. MANHOLE SHALL BE IN ACCORDANCE WITH ASTM C478 EXCEPT AS NOTED.
5. MINIMUM CIRCUMFERENTIAL REINFORCING:  
 'A' < 20', As=0.17 Sq In/ft  
 'A' > 20', As=0.22 Sq In/ft  
 MINIMUM LONGITUDINAL REINFORCING (FOR ALL SECTIONS):  
 As=0.02 Sq In/ft
6. MINIMUM CIRCUMFERENTIAL REINFORCING:  
 'A' < 20', As=0.23 Sq In/ft  
 'A' > 20', As=0.28 Sq In/ft

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



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NO. 22927

DES: FKA  
DRN: RLC  
CHK: RJR  
DATE: 05/10/02

NO.	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
05/26/05	CONFORMED TO CONSTRUCTION RECORDS			PJS	RJR	RJR
6/11/03	PR VALUE ENGINEERING PROPOSAL			PJS	RJR	RJR
6/3/02	PER ADDENDUM NO. 1			FKA	RJR	RJR

**YARDWORK**

**MISCELLANEOUS YARDWORK DETAILS**

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

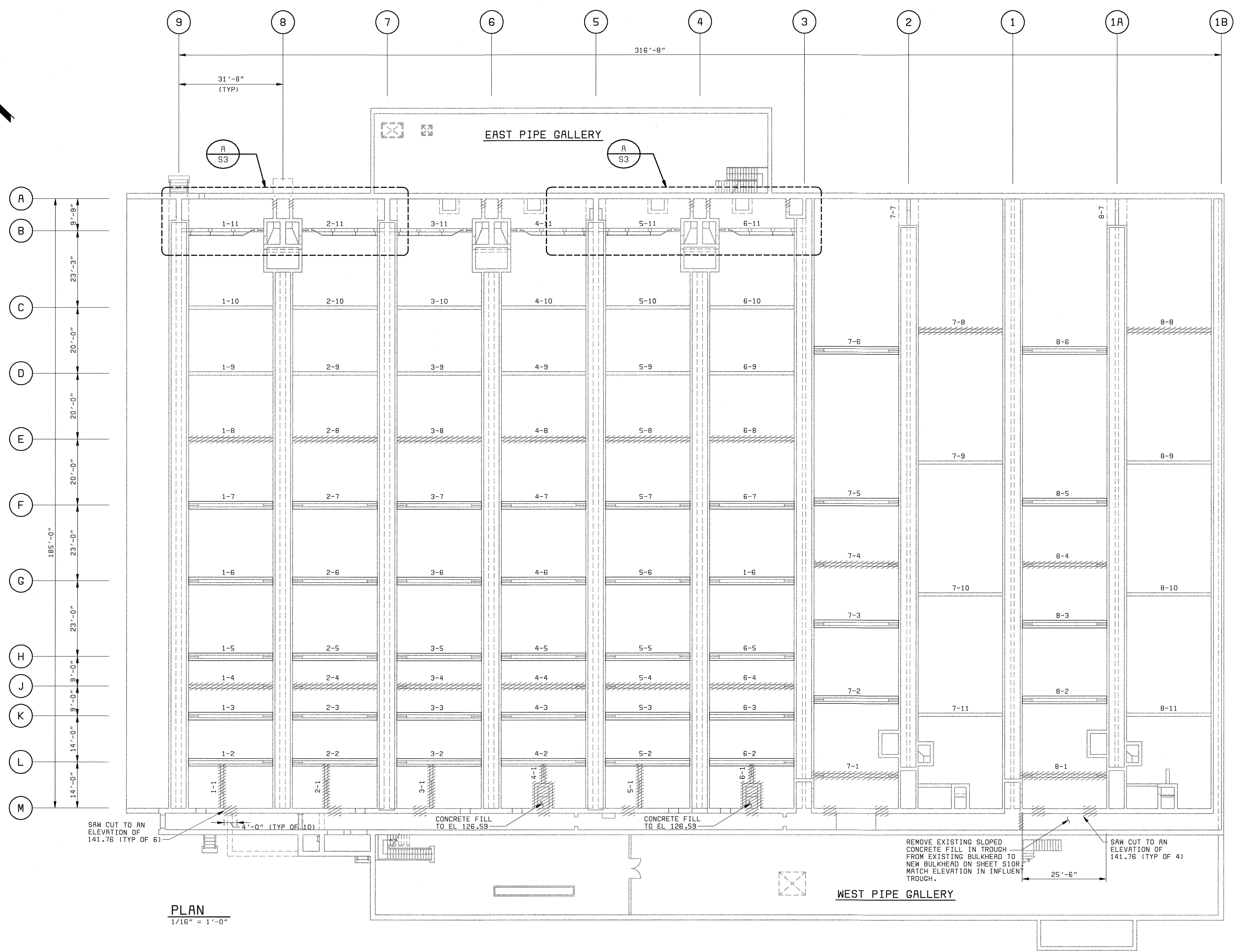
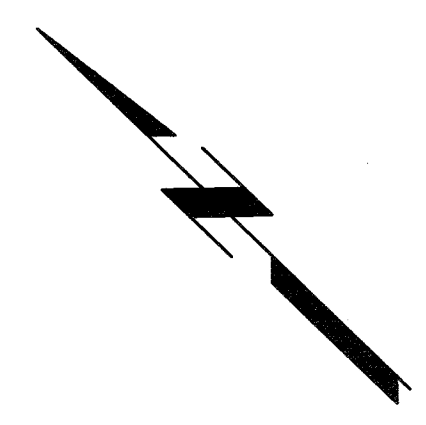
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

SHEET  
17 OF 139

**Y5R**





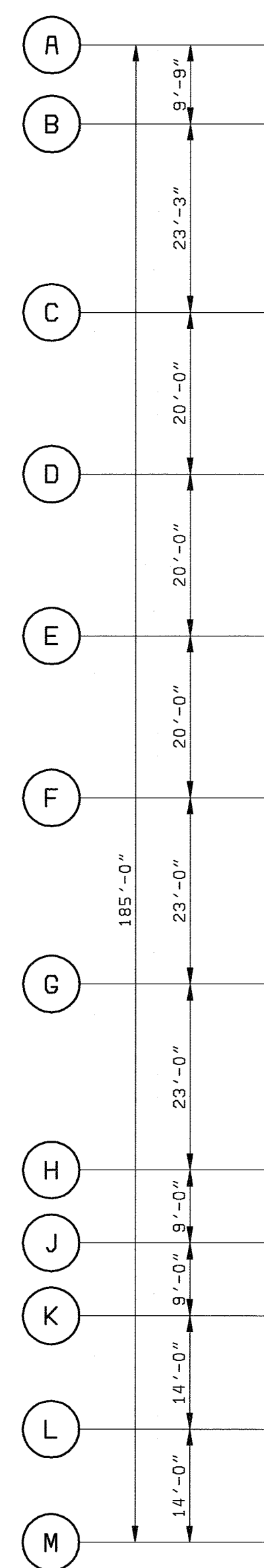
**LEGEND:**

- WALLS TO BE DEMOLISHED
- WALLS TO BE PARTIALLY DEMOLISHED TO ELEVATIONS LISTED IN THE FOLLOWING TABLE

PARTIAL DEMOLITION OF INTERNAL BAFFLE WALLS	
1-2, 2-2, 3-2, 4-2, 5-2, 6-2	141.75
1-3, 2-3, 3-3, 4-3, 5-3, 6-3	141.70
1-5, 2-5, 3-5, 4-5, 5-5, 6-5	141.39
1-6, 2-6, 3-6, 4-6, 5-6, 6-6	140.26
1-7, 2-7, 3-7, 4-7, 5-7, 6-7	140.26
7-2, 8-2	141.63
7-3, 8-3	141.58
7-5, 8-5	141.01
7-6, 8-6	139.72
7-7, 8-7	137.75

**GENERAL NOTES :**

1. WHERE CONCRETE IS REMOVED, REMOVE EXISTING REBAR MINIMUM 2" BELOW FINAL CONCRETE SURFACE AND FILL HOLES WITH NON-SHRINK GROUT.
2. PIPE SUPPORT ON PIPES BEING REMOVED OR DEMOLISHED SHALL ALSO BE REMOVED.



SAW CUT TO AN ELEVATION OF 141.76 (TYP OF 6)

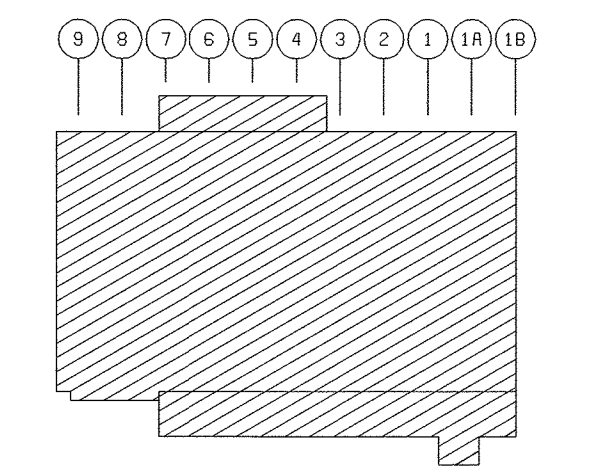
**PLAN**  
1/16" = 1'-0"

CONCRETE FILL TO EL. 126.59

**WEST PIPE GALLERY**

REMOVE EXISTING SLOPED CONCRETE FILL IN TROUGH FROM EXISTING BULKHEAD TO NEW BULKHEAD ON SHEET S10R. MATCH ELEVATION IN INFLUENT TROUGH.

SAW CUT TO AN ELEVATION OF 141.76 (TYP OF 4)



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



Stantec Consulting Ltd.  
Suite 1007, 7445-132  
Surrey, BC  
V3W 1J8  
Ph. (604) 597-0422  
Fax (604) 591-1856  
Email: surrey@stantec.com



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Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

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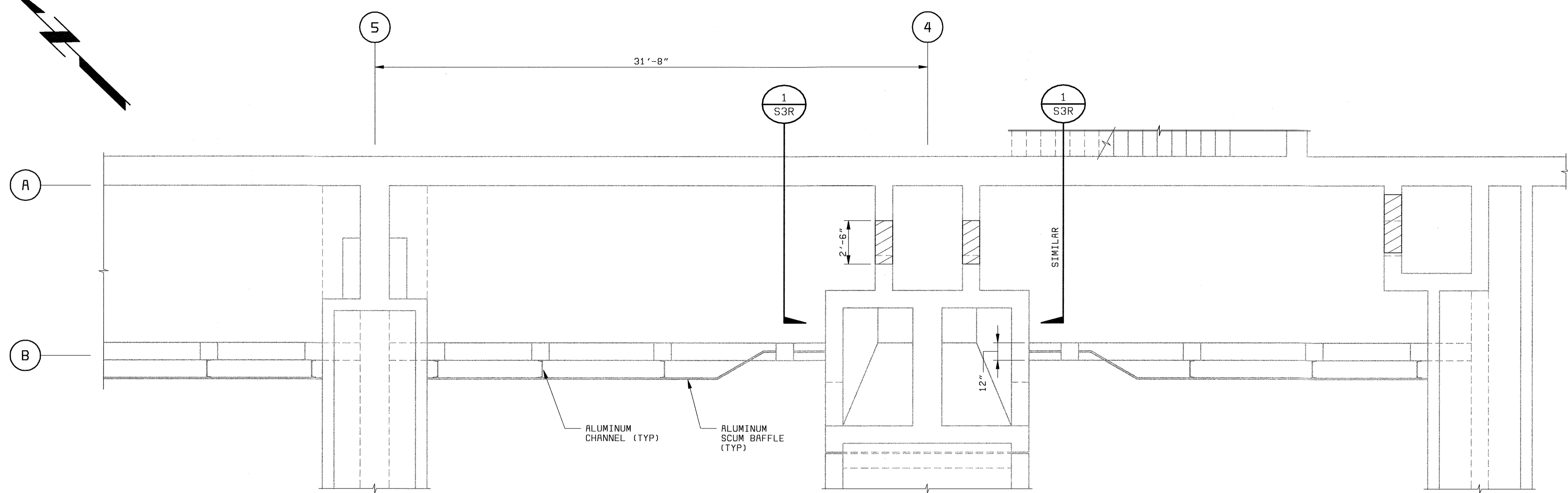
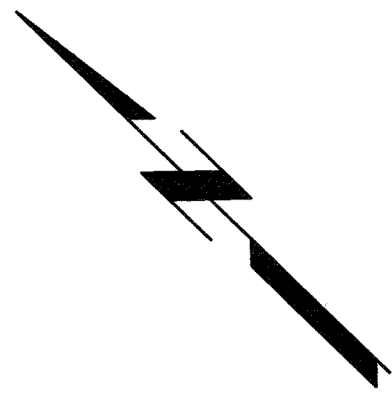
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DRN: RCF					
CHK: TRB	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR/RJR
DATE: 5/10/02	5/9/03	PR VALUE ENGINEERING PROPOSAL		IFH	RJR/RJR
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

**EAST - WEST PROCESS REACTORS**  
STRUCTURAL  
**DEMOLITION PLAN**

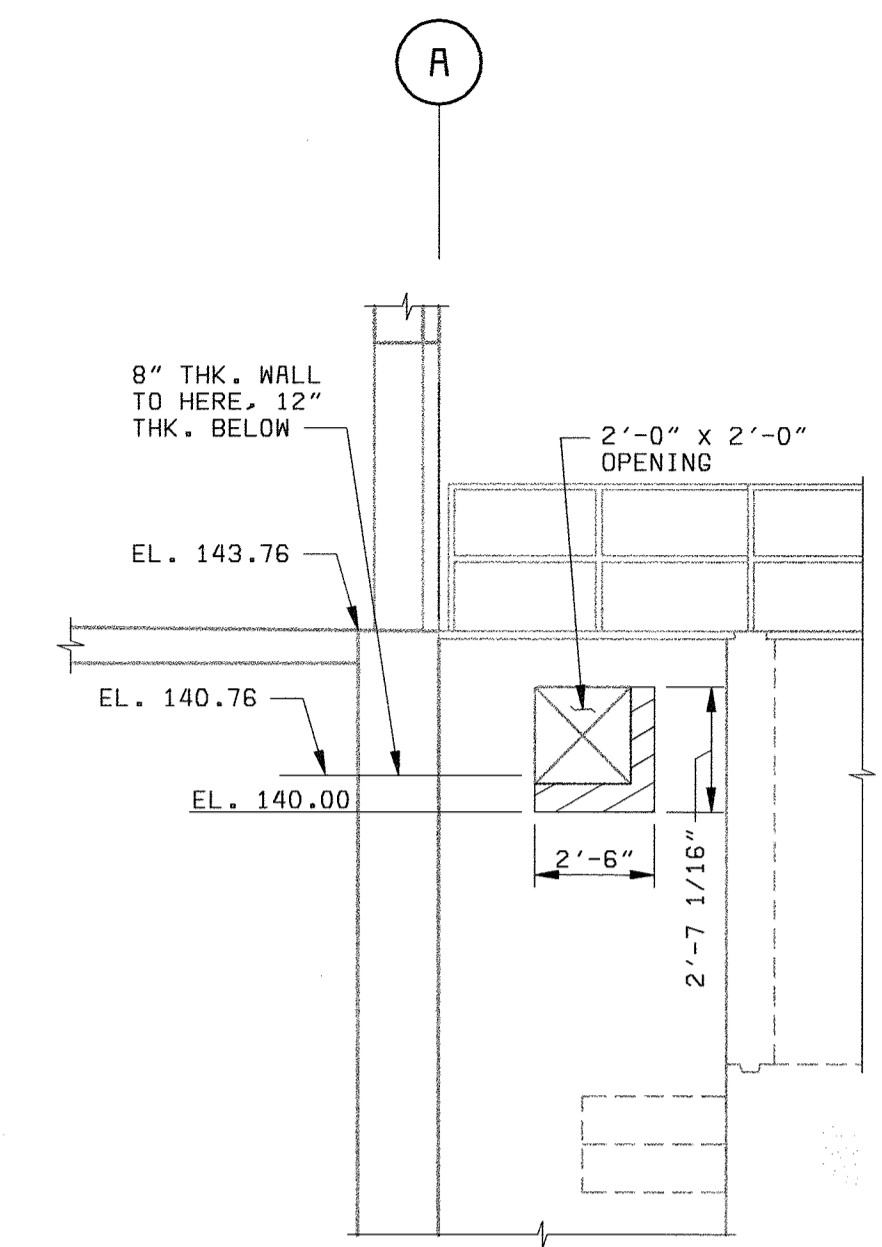
**LITTLE PATUXENT WATER RECLAMATION PLANT**  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 18 OF 139  
**S1R**

058472-4  
FD58472A



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



**SECTION 1 S3R**  
1/4" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



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Surrey, BC  
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NO. 22927

REG. PROF. ENGR. DATE

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DRN: RCF									
CHK: TRB	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR			
DATE: 5/10/02	4/4/03	PR VALUE ENGINEERING PROPOSAL		IFH	RJR	RJR			
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY	CK	APP		

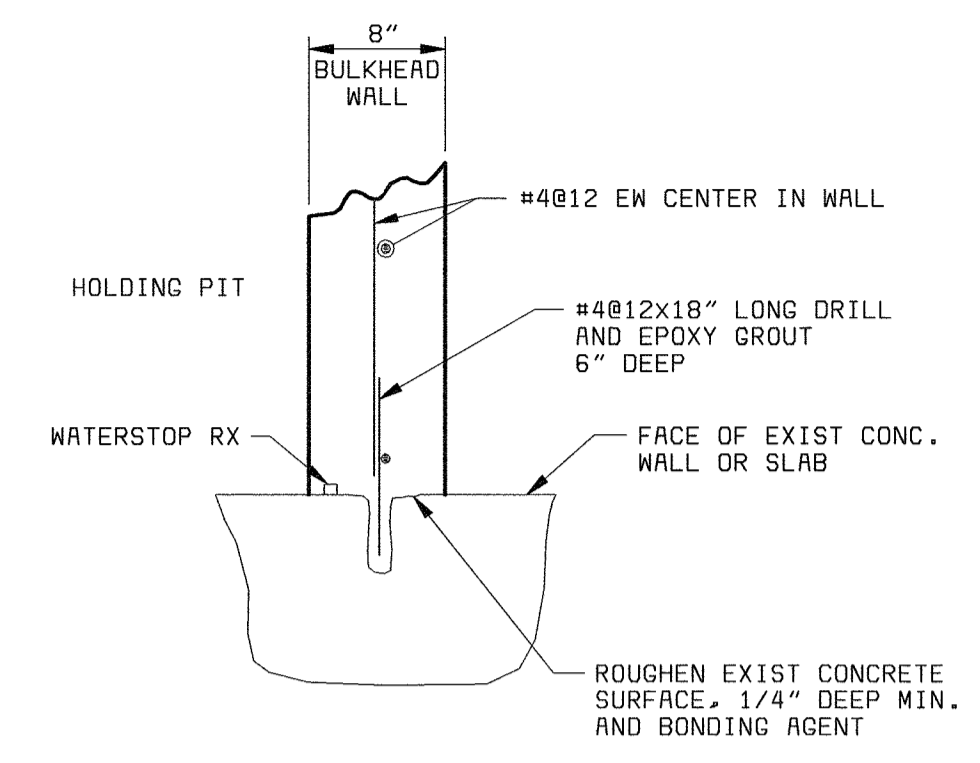
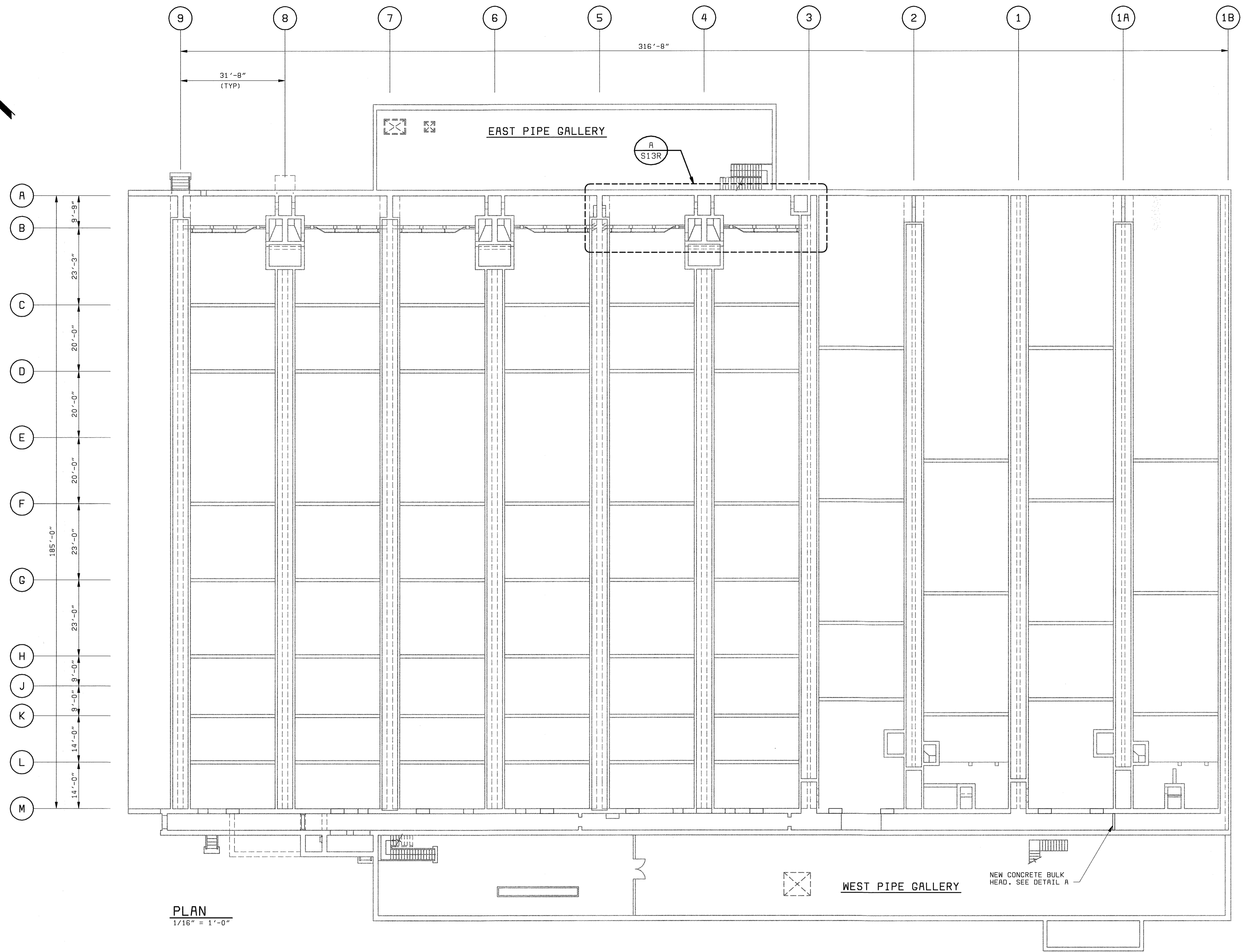
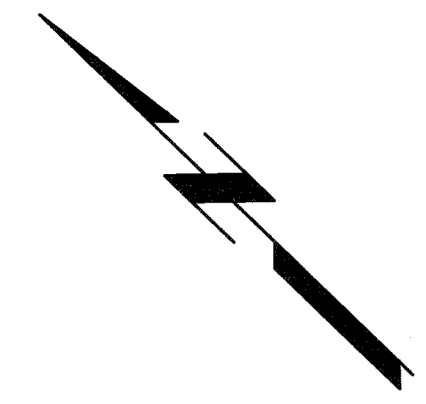
**EAST-WEST PROCESS REACTORS**  
**STRUCTURAL**  
**DEMOLITION**  
**PLAN & SECTIONS**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

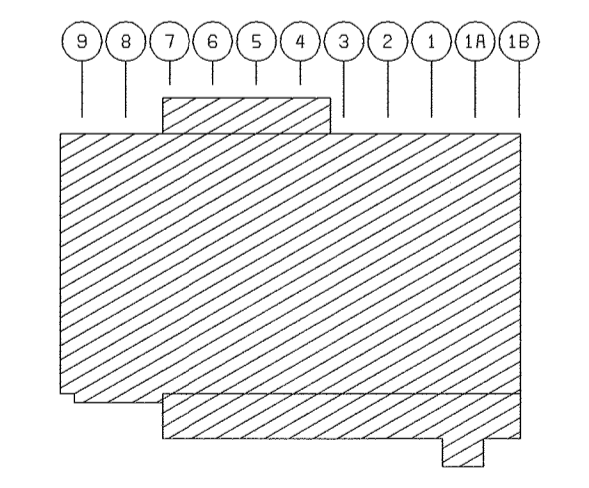
SCALE  
AS  
SHOWN  
  
SHEET  
20 OF 139  
  
**S3R**

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F058472A

1 2 3 4 5 6 7 8 9 10



DETAIL A  
NO SCALE S10R



KEY PLAN  
NO SCALE

PLAN  
1/16" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
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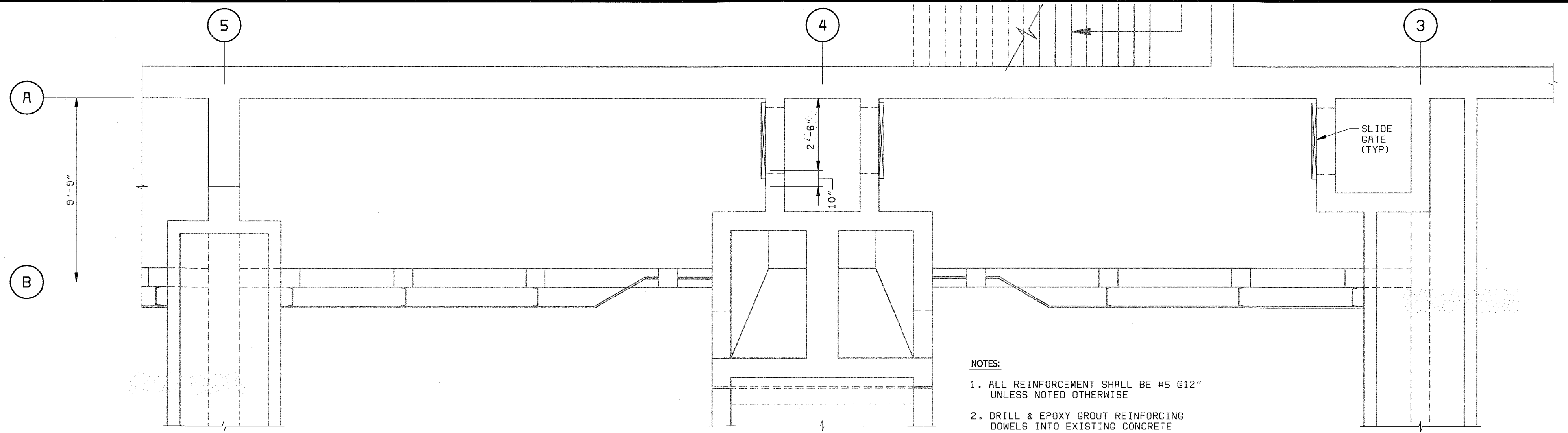
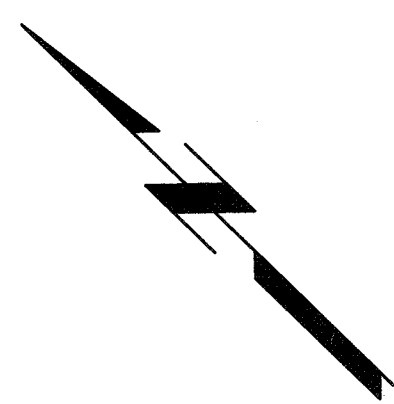
EAST - WEST PROCESS REACTORS  
STRUCTURAL  
GENERAL ARRANGEMENT PLAN

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
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HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
SHEET  
27 of 139  
S10R

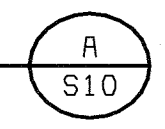
058472-4  
FD56472A

1 2 3 4 5 6 7 8 9 10



- NOTES:**
1. ALL REINFORCEMENT SHALL BE #5 @12" UNLESS NOTED OTHERWISE
  2. DRILL & EPOXY GROUT REINFORCING DOWELS INTO EXISTING CONCRETE STRUCTURE WITH MINIMUM EMBEDMENT OF 15 TIMES BAR DIAMETER. ALL DOWELS SHALL BE #5 X 3'-0" LONG U.N.D.

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



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
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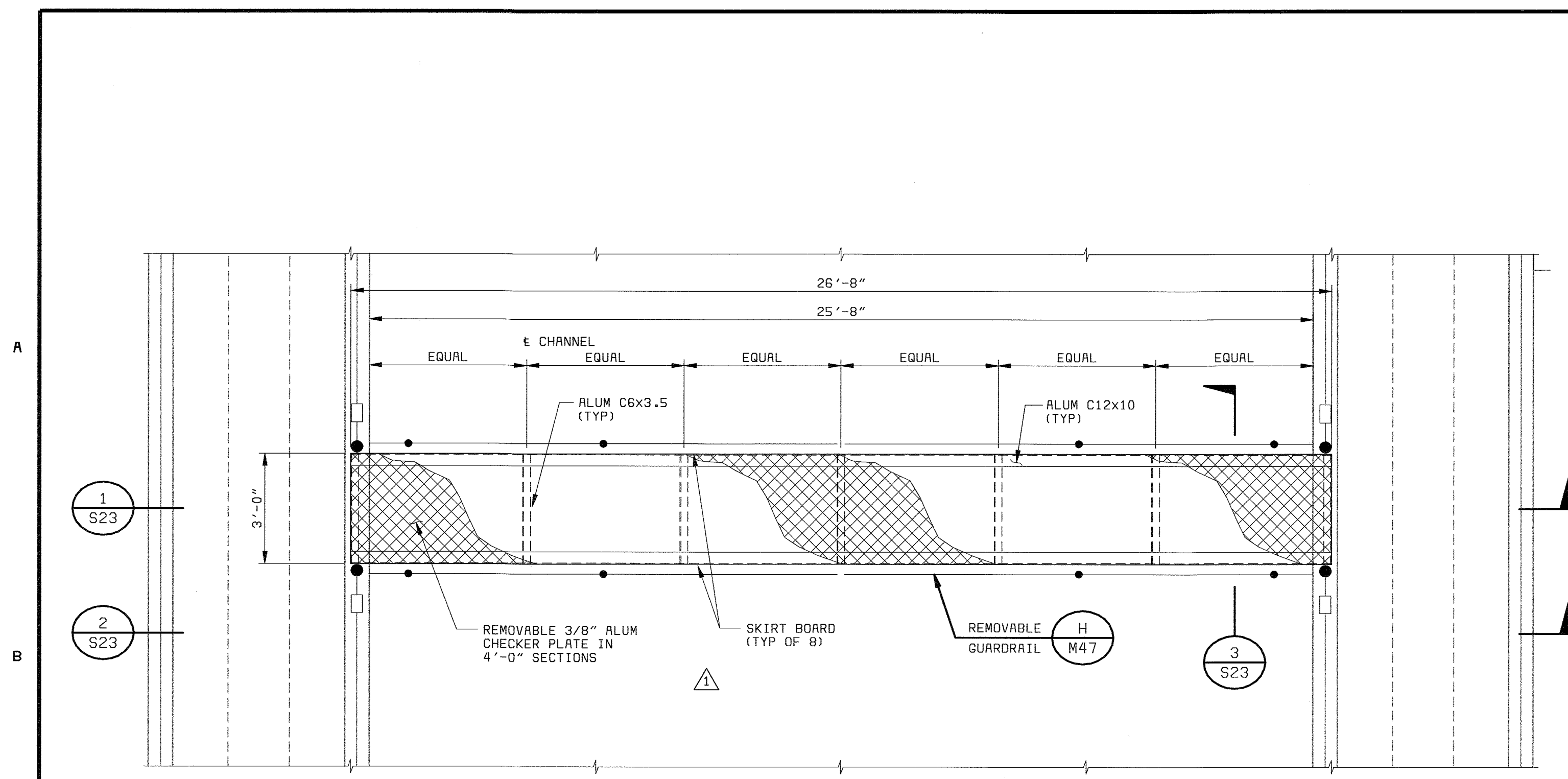
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CHK: TRB	05/26/05	CONFORMED TO CONSTRUCTION RECORDS				PJS	RJR	RJR	
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	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

**EAST-WEST PROCESS REACTORS**  
**STRUCTURAL**  
**PLAN & SECTIONS**

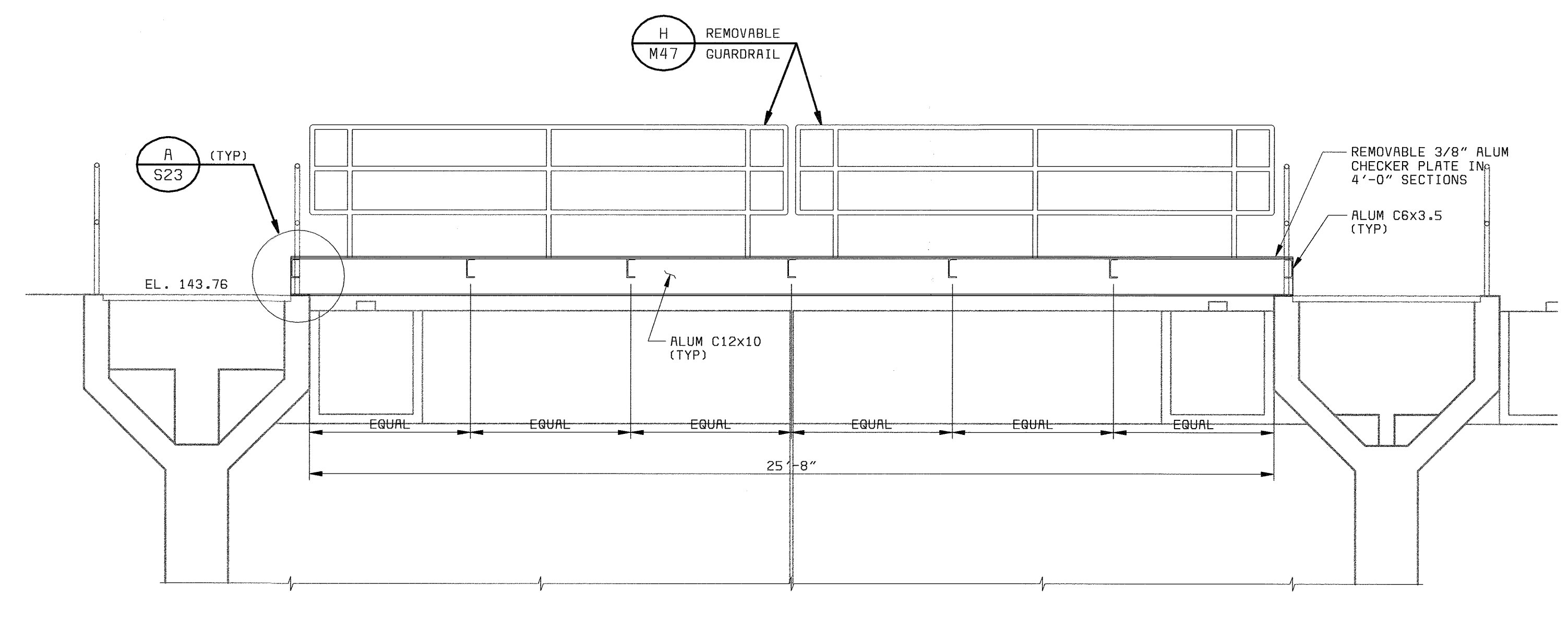
**LITTLE PATUXENT WATER RECLAMATION PLANT**  
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CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
SHEET  
30 of 139  
**S13R**

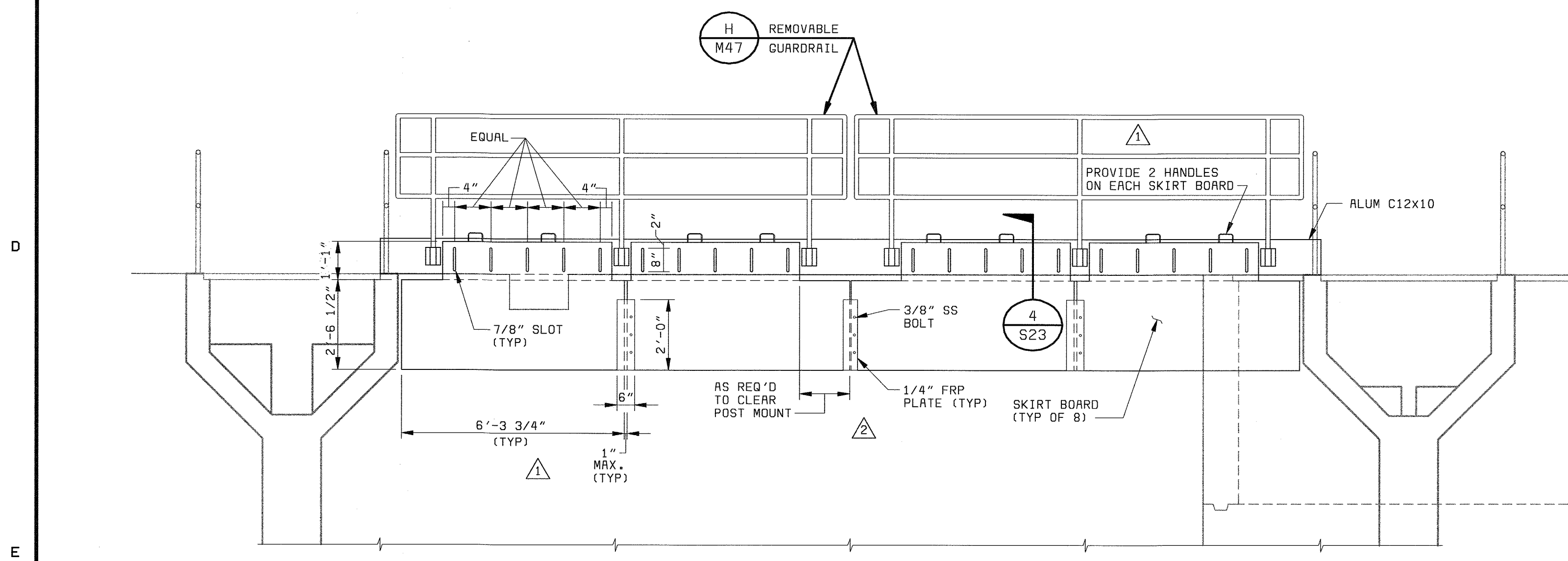
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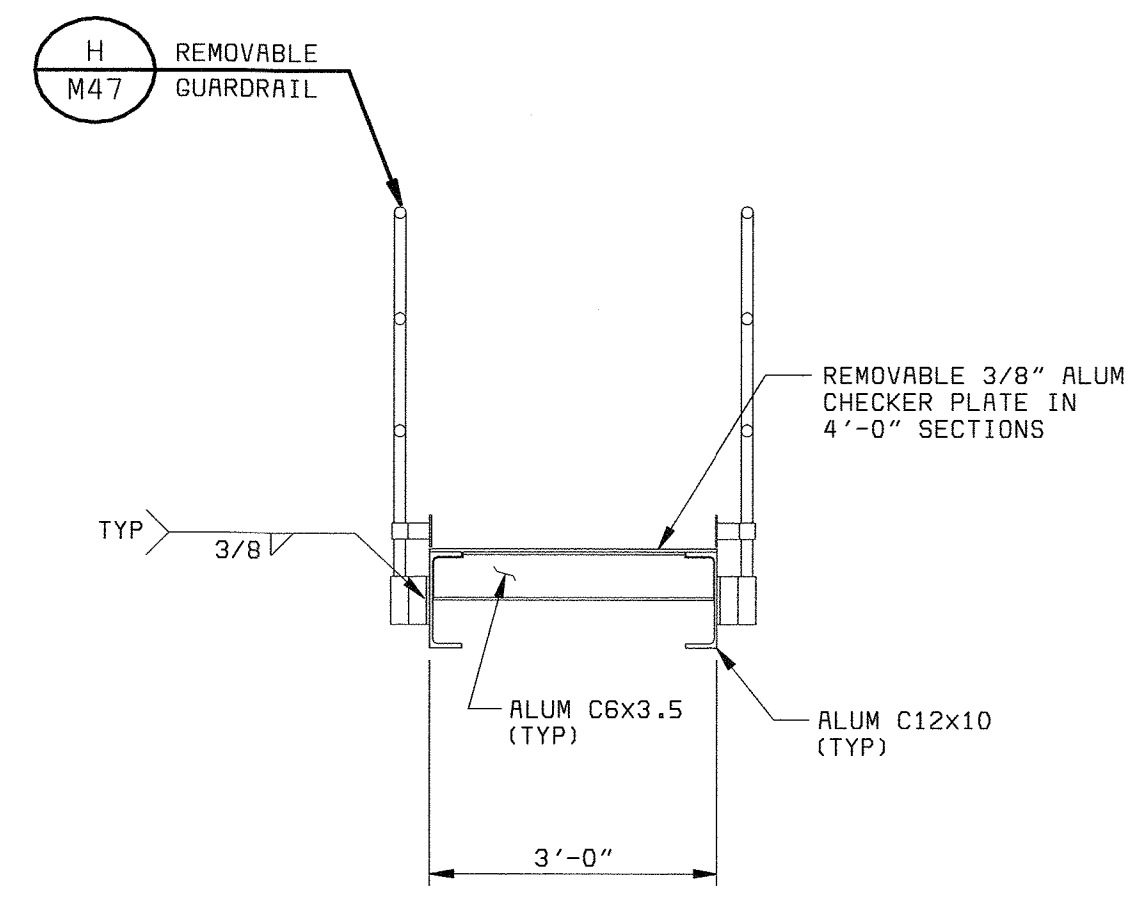
**SPRAY HOOD - PLAN**  
3/8" = 1'-0"



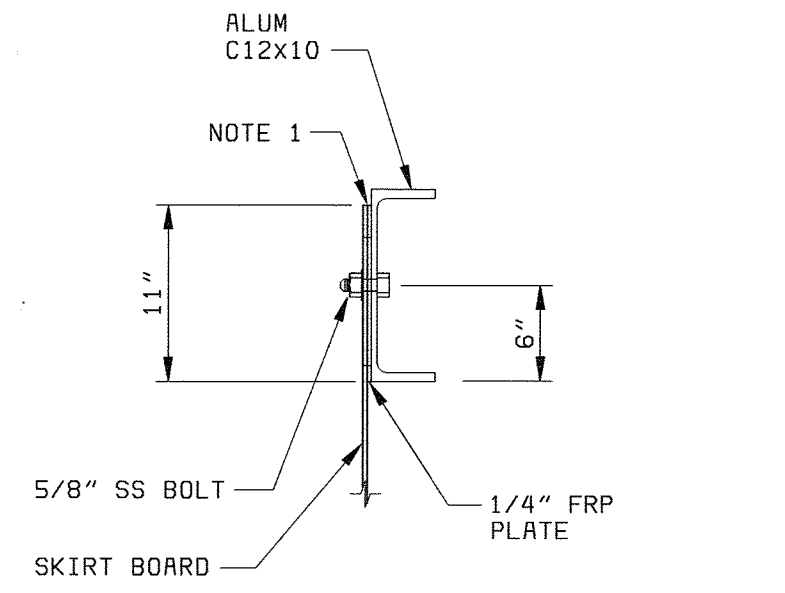
**SECTION 1**  
3/8" = 1'-0"



**(SKIRT BOARD) SECTION 2**  
3/8" = 1'-0"

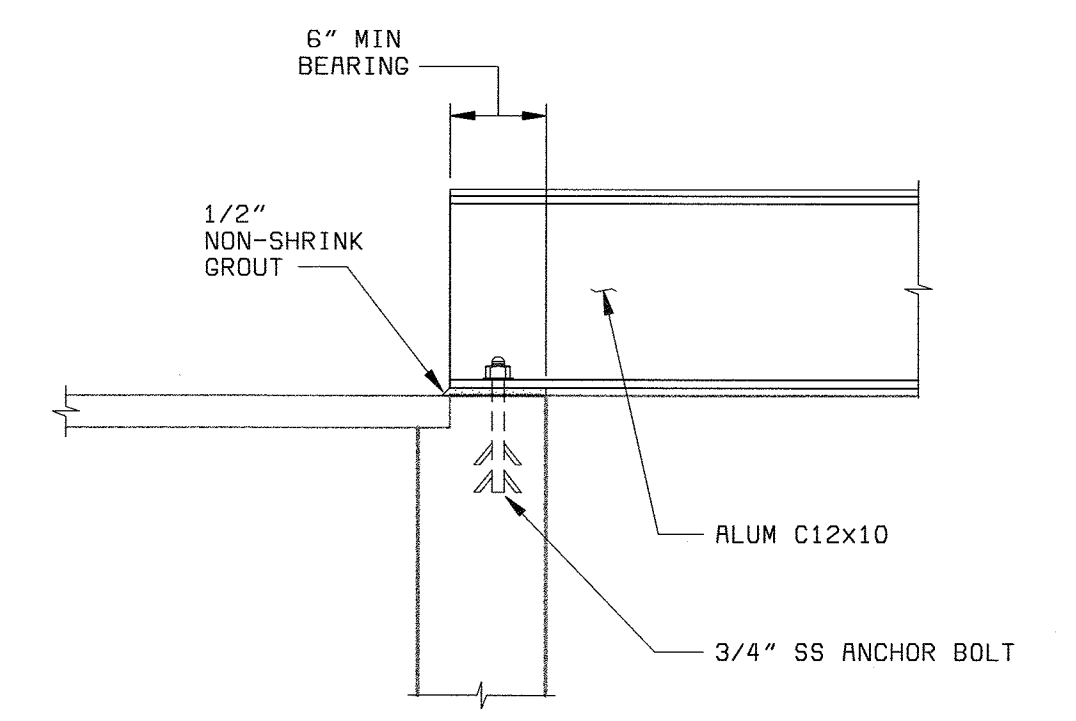


**SECTION 3**  
1/2" = 1'-0"



**NOTE:**  
1. BOND AND BOLT 1/4" FRP PLATES AS NECESSARY TO PREVENT SEPARATION.

**SECTION 4**  
1" = 1'-0"



**DETAIL A**  
1" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

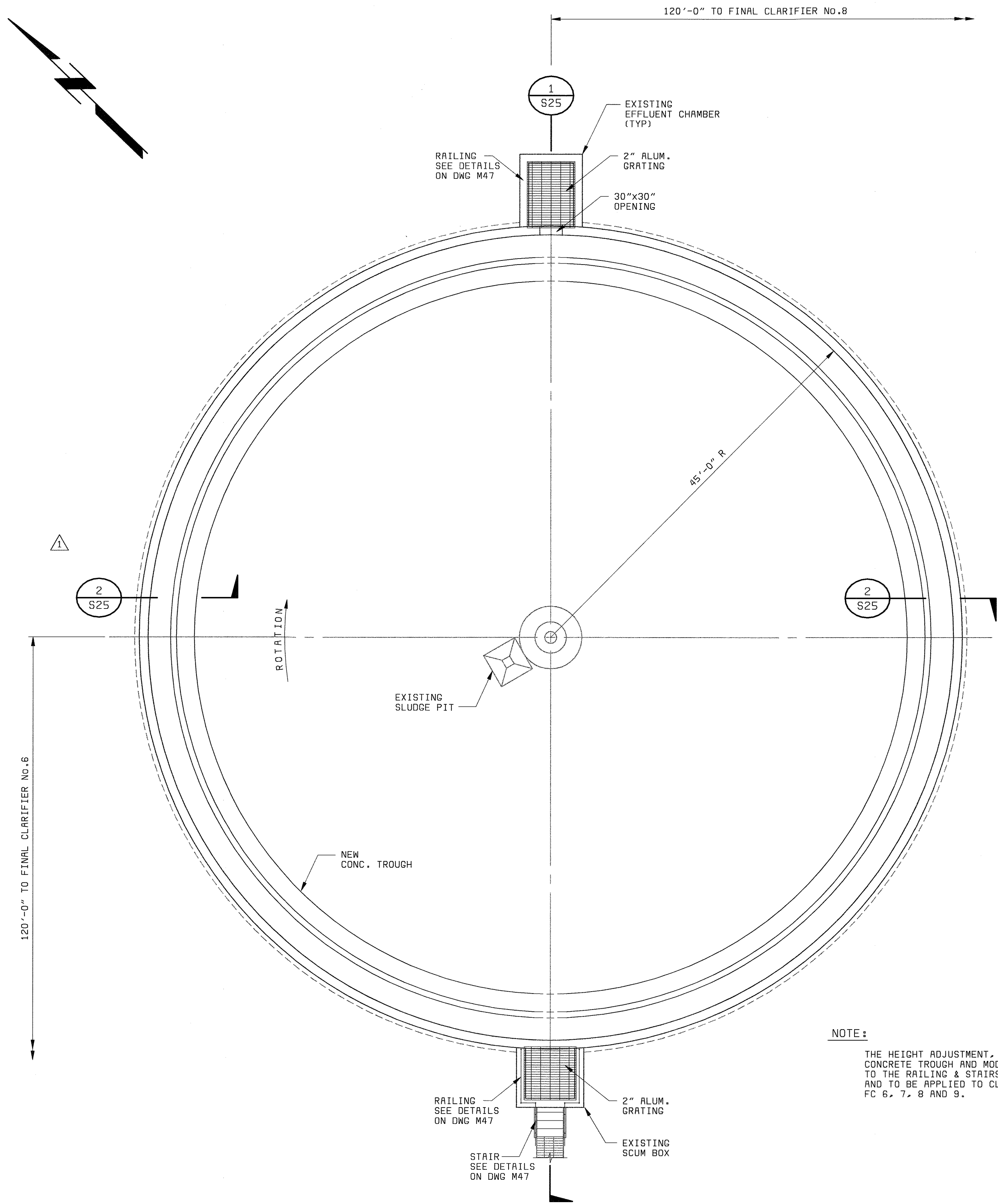
THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
TERRENCE R. TOBEY  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25007

DES: RC							
DRN: RCF	05/26/05	CONFORMED TO CONSTRUCTION RECORDS				PJS/RJR/RJR	
CHK: TRB	6/11/03	PR VALUE ENGINEERING PROPOSAL				PJS/RJR/RJR	
DATE: 5/10/02	6/12/02	PER ADDENDUM NO. 2				FKA/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	

**EAST-WEST PROCESS REACTOR  
STRUCTURAL**  
**SPRAY HOOD  
PLAN, SECTIONS & DETAIL**

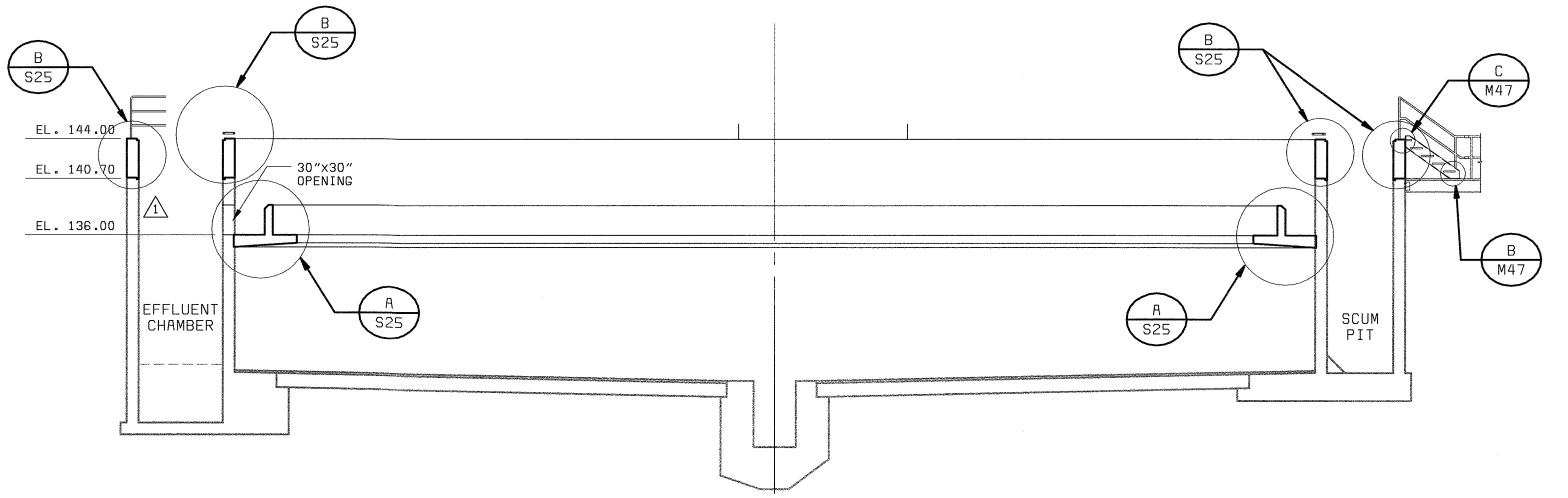
**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
SHEET  
40 OF 139  
**S23R**

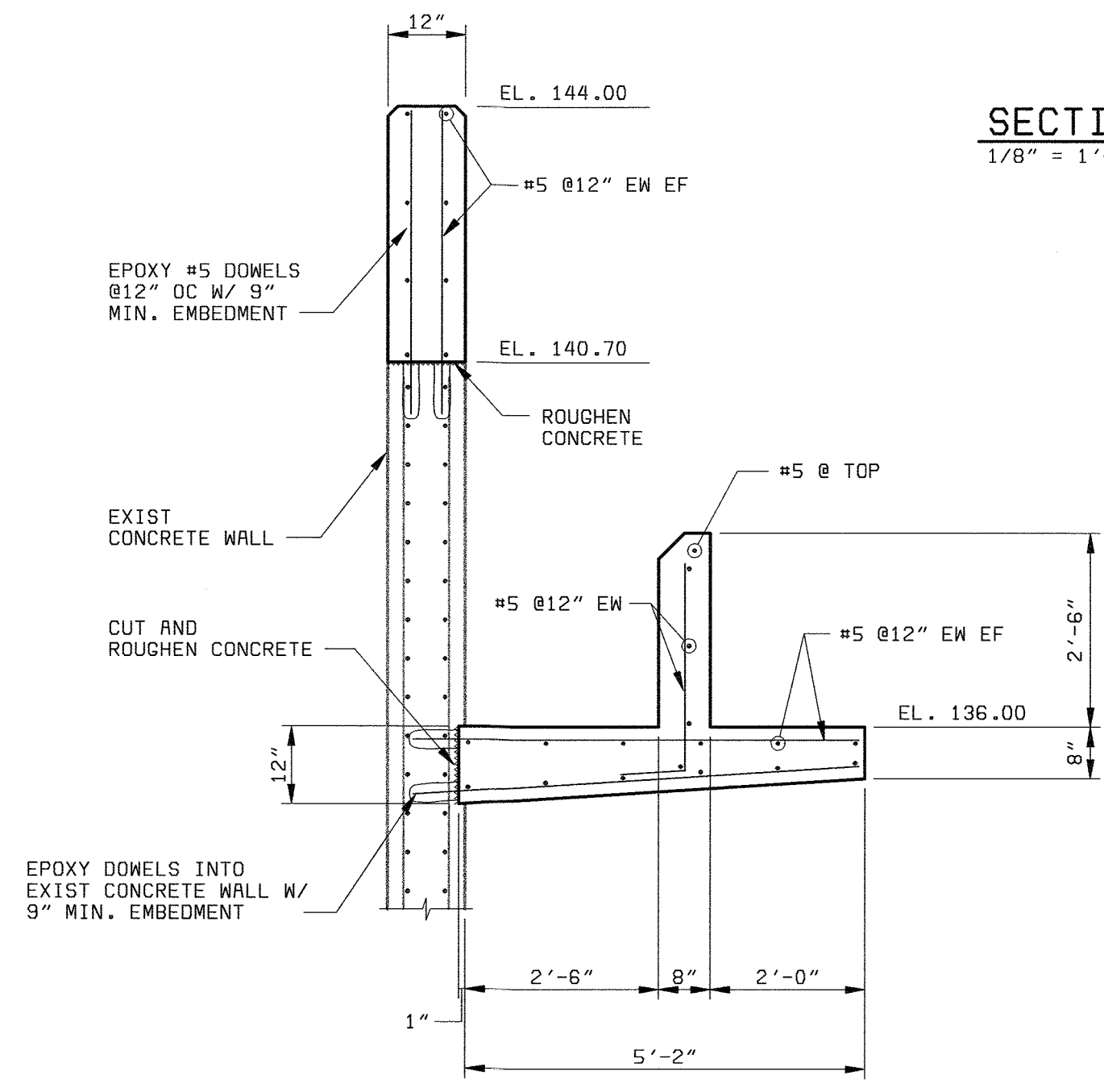


**PLAN**  
1/8" = 1'-0"

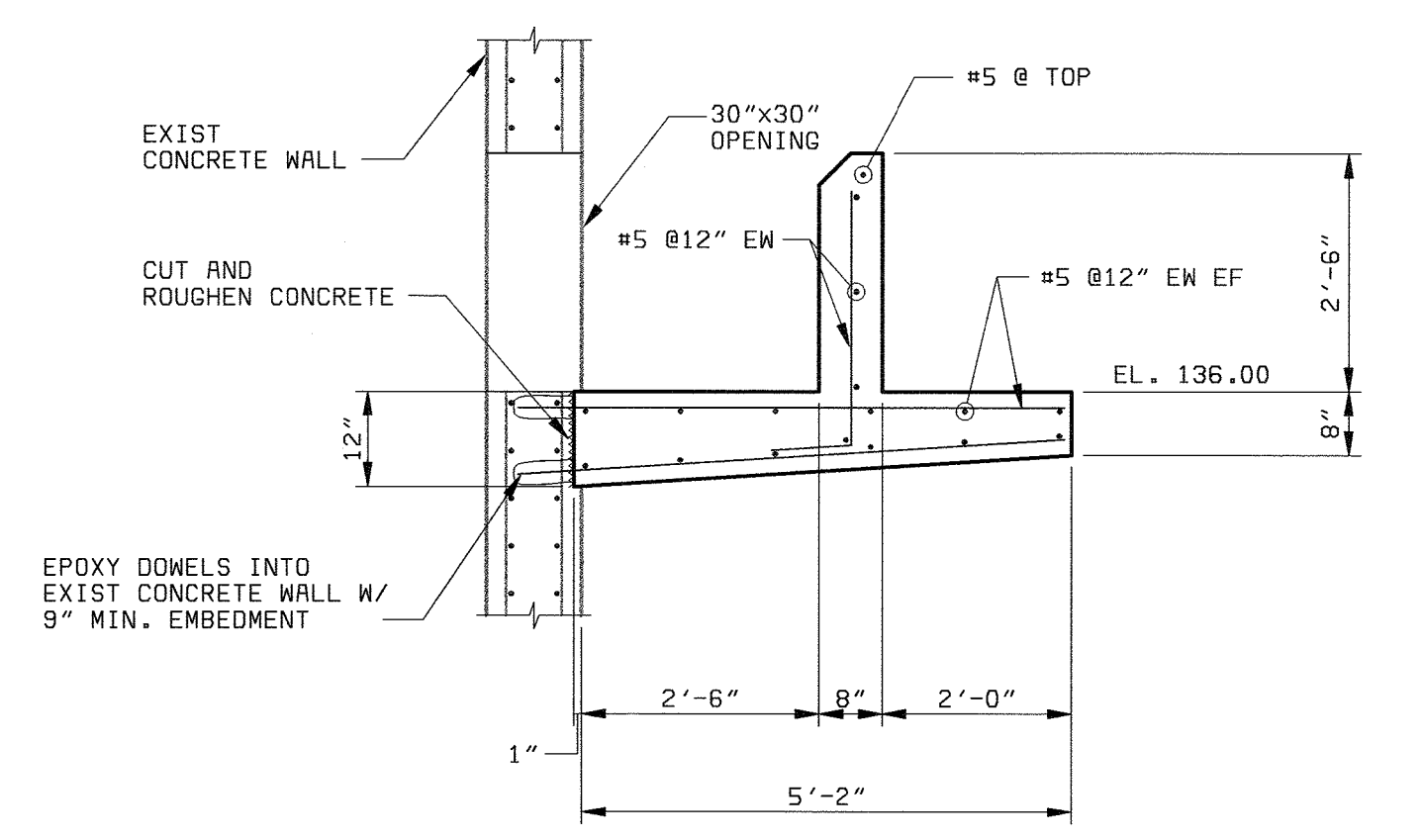
**NOTE:**  
THE HEIGHT ADJUSTMENT, ADDITION OF CONCRETE TROUGH AND MODIFICATION TO THE RAILING & STAIRS ARE TYPICAL AND TO BE APPLIED TO CLARIFIERS FC 6, 7, 8 AND 9.



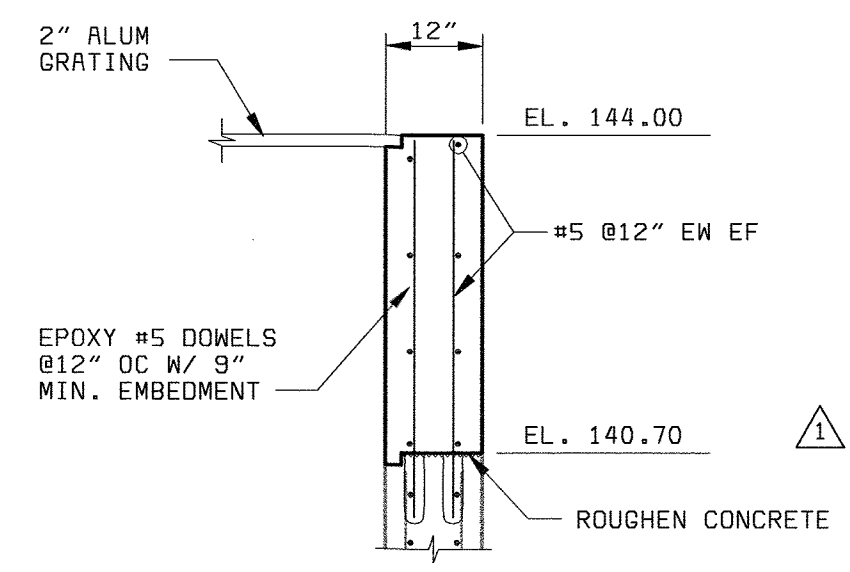
**SECTION 1**  
1/8" = 1'-0" S25



**SECTION 2**  
1/2" = 1'-0" S25

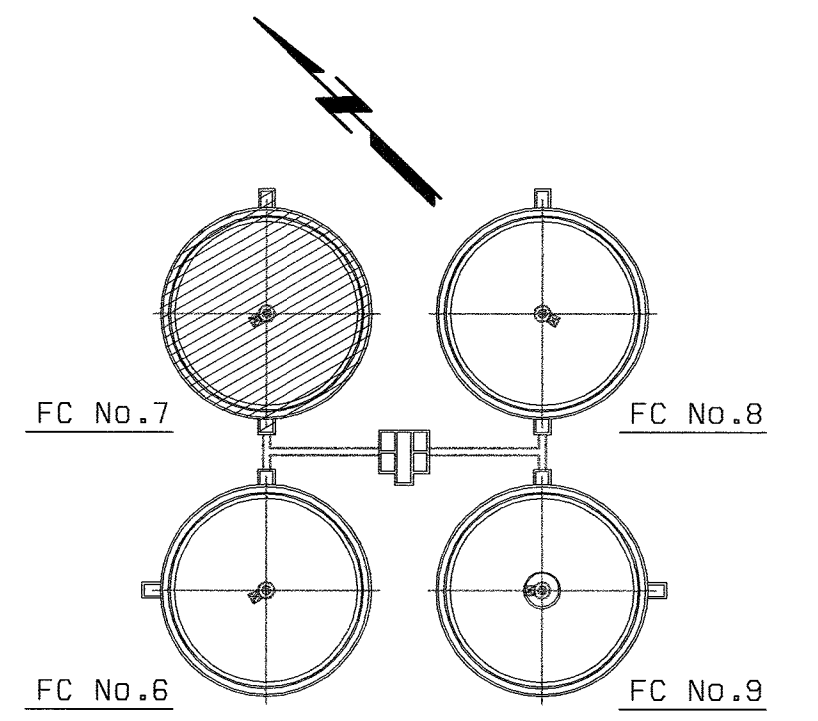


**DETAIL A**  
1/2" = 1'-0" S25



**DETAIL B**  
1/2" = 1'-0" S25

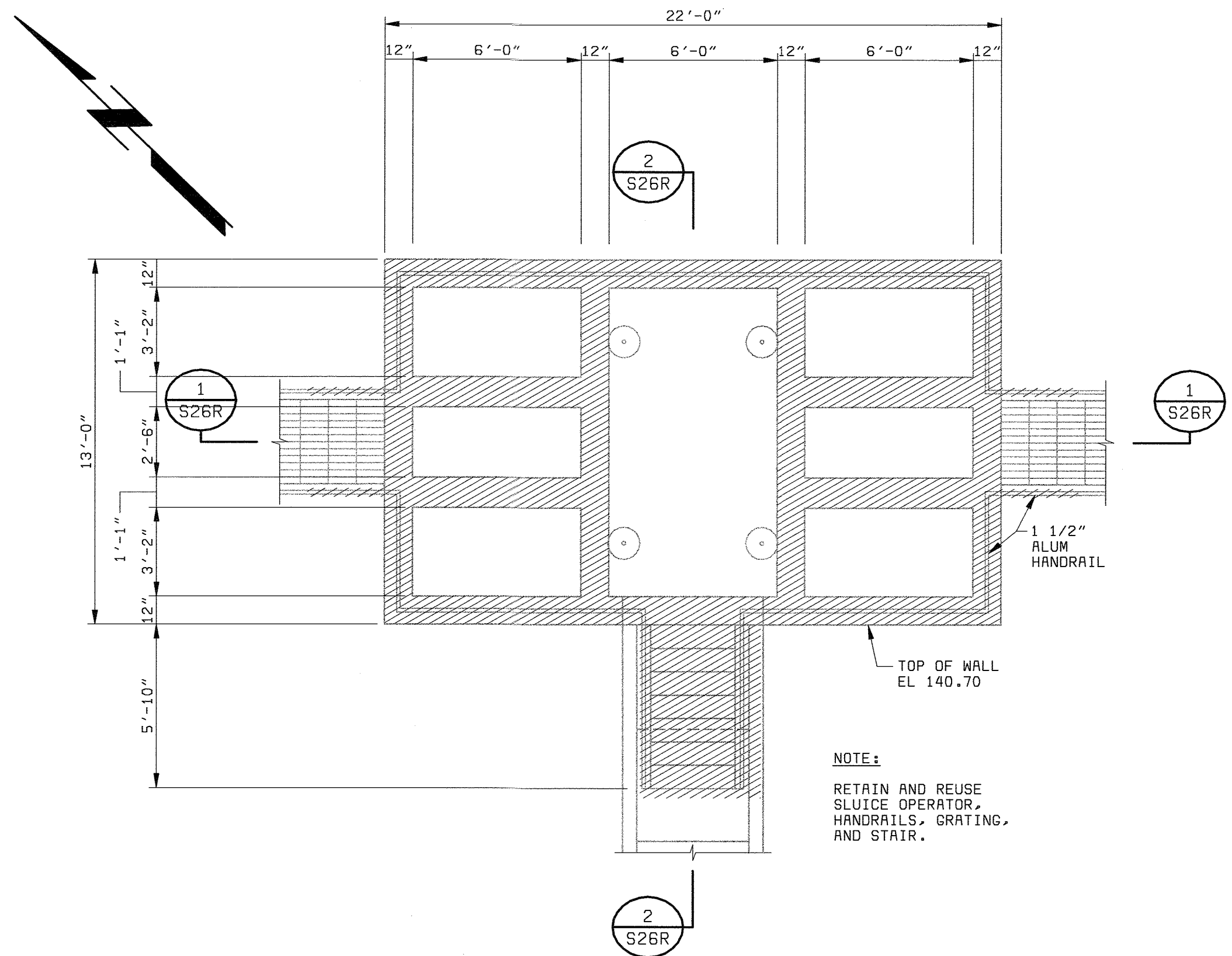
- NOTES:**
1. ALL REINFORCEMENT SHALL BE #5 @12" UNLESS NOTED OTHERWISE
  2. DRILL & EPOXY GROUT REINFORCING DOWELS INTO EXISTING CONCRETE STRUCTURE WITH MINIMUM EMBEDMENT OF 15 TIMES BAR DIAMETER. ALL DOWELS SHALL BE #5 X 3'-0" LONG U.N.D.
  3. FC No.7 SHOWN - TYPICAL. ALL CLARIFIERS TO BE MODIFIED SIMILARLY.



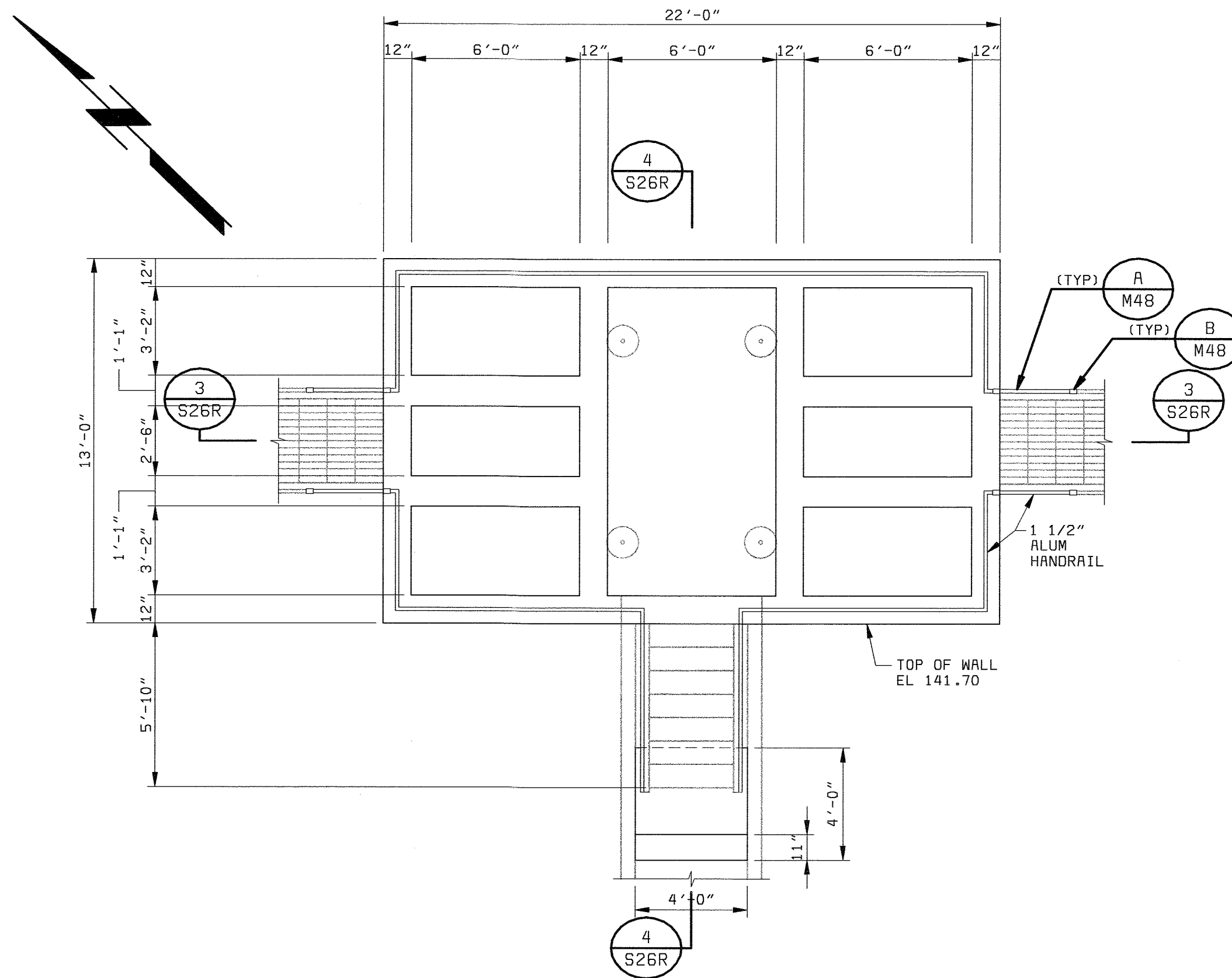
**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND  CHIEF, BUREAU OF UTILITIES DATE	 <b>BLACK &amp; VEATCH</b> Gaithersburg, Maryland  REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY TERRENCE R. TOBEY A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 25007	DES: RC	EAST FINAL CLARIFIERS STRUCTURAL	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839  HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: RCF			PJS/RJR/RJR FKA/RJR/RJR
			CHK: TRB	05/26/05 CONFORMED TO CONSTRUCTION RECORDS 6/12/02 PER ADDENDUM NO. 2	<b>PLAN, SECTION &amp; DETAILS</b>	<b>S25</b>
			DATE: 5/10/02	DATE REVISIONS AND RECORD OF ISSUE NO. BY CK APP		

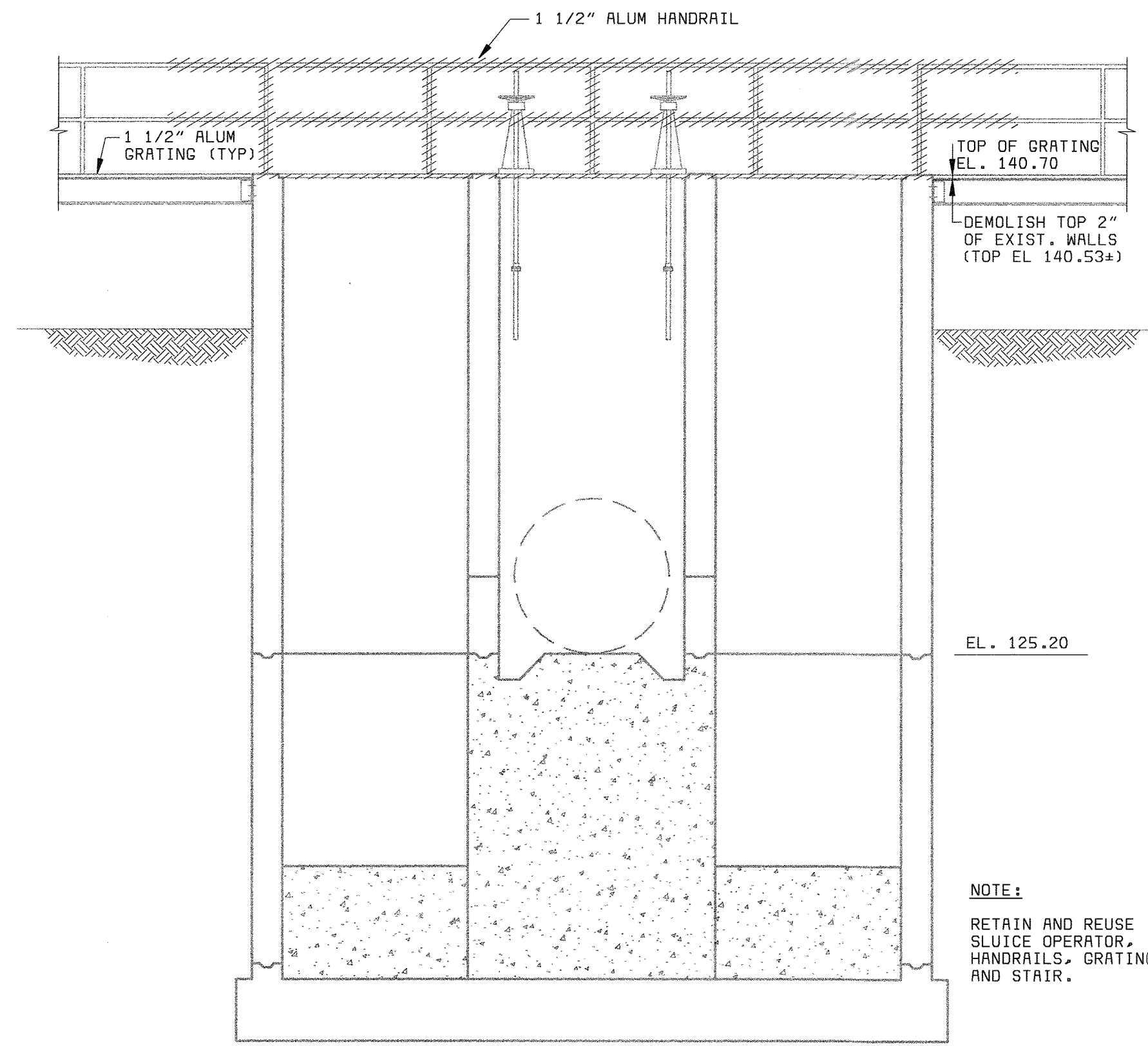
058472-4  
FD58472A



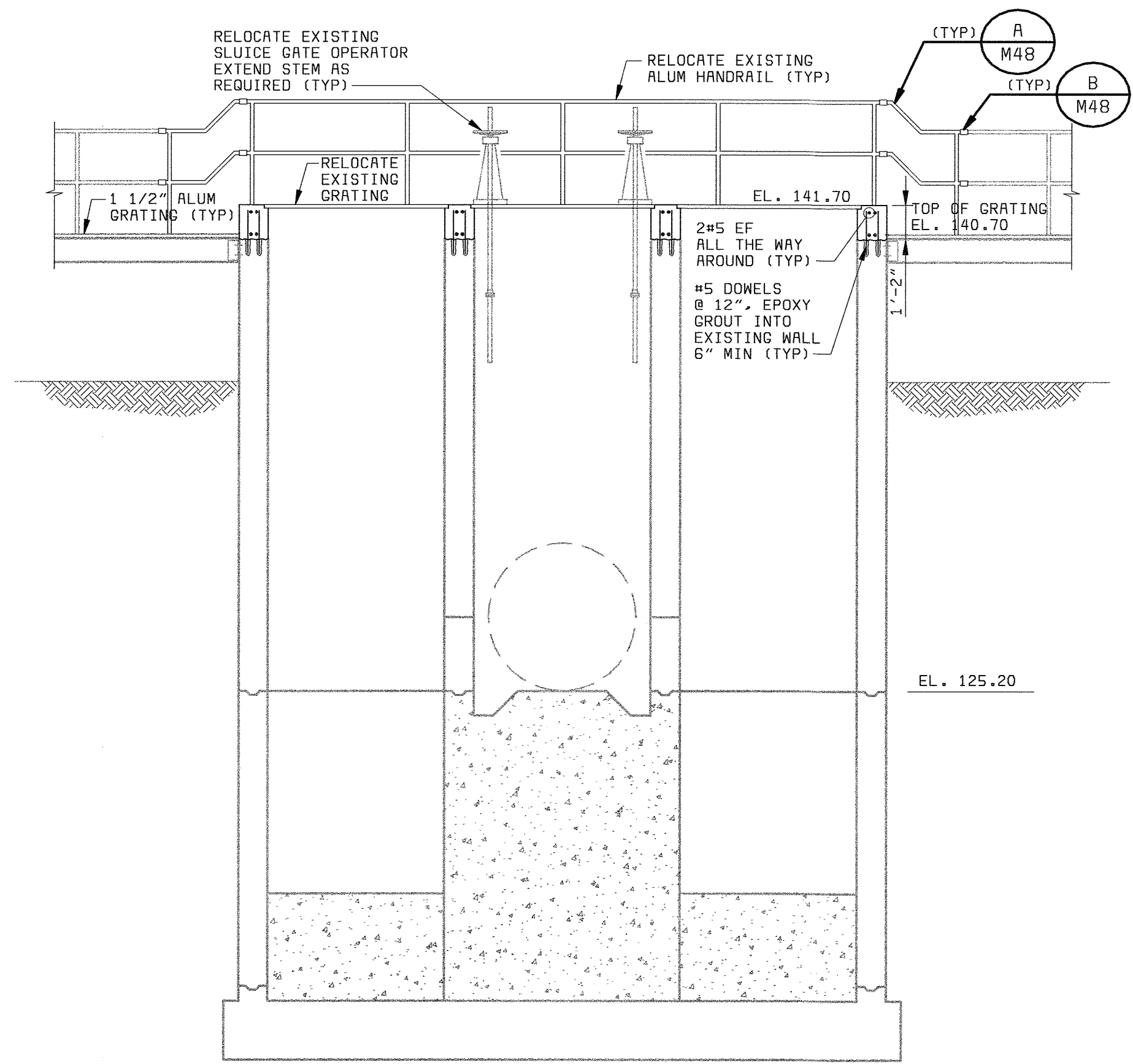
**DEMOLITION PLAN**  
1/4" = 1'-0"



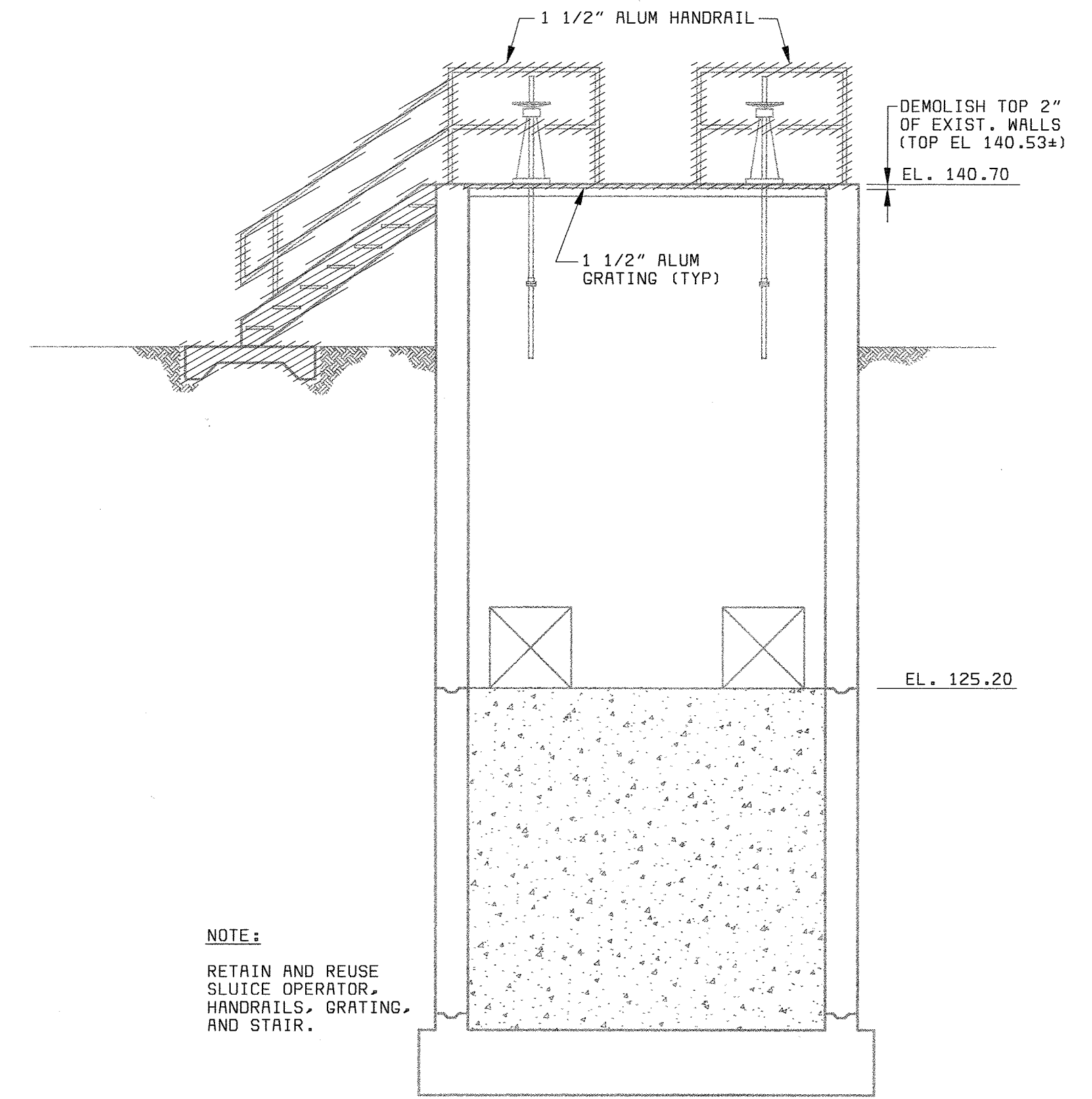
**MODIFIED PLAN**  
1/4" = 1'-0"



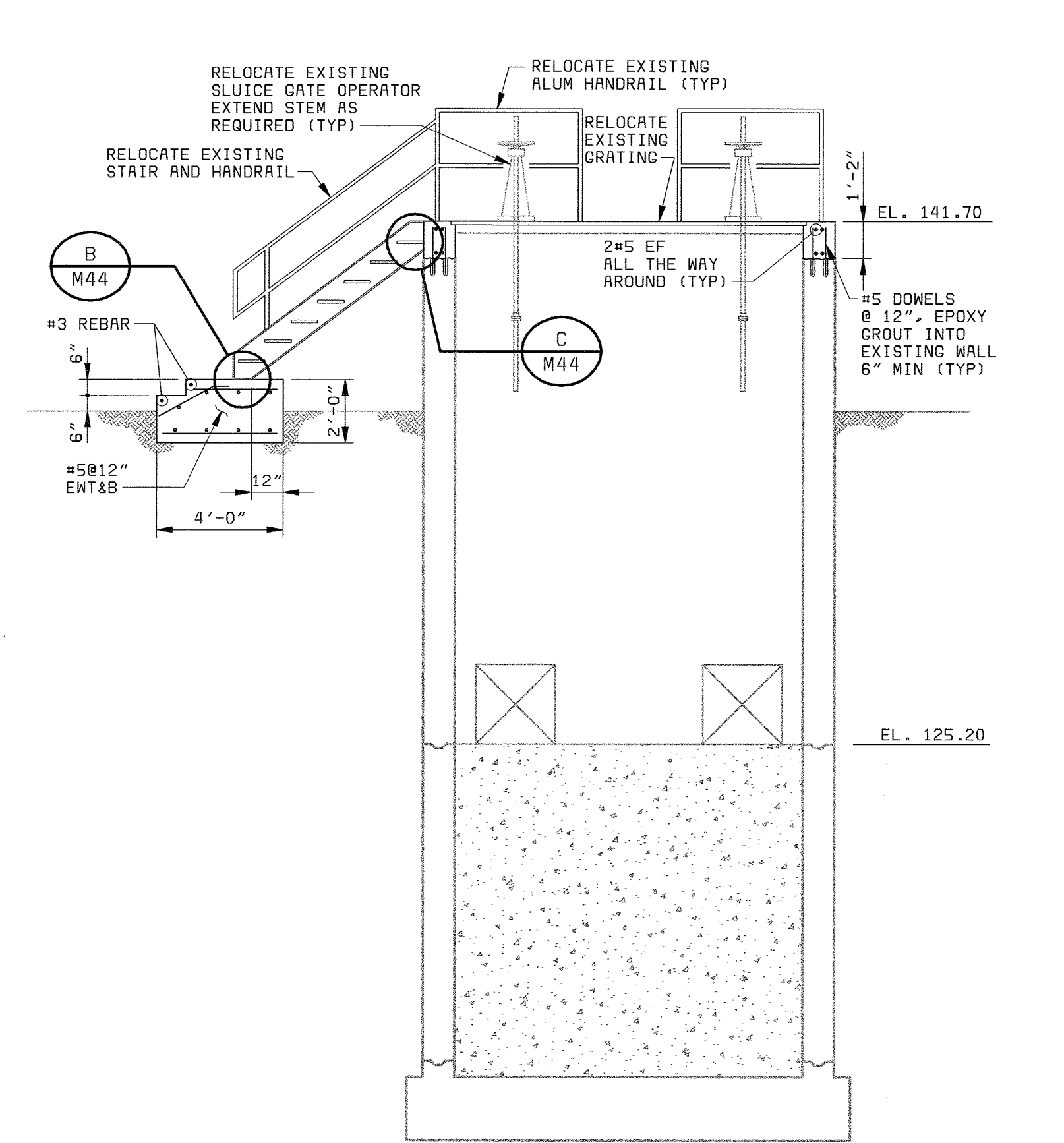
**SECTION 1**  
1/4" = 1'-0"



**SECTION 3**  
1/4" = 1'-0"



**SECTION 2**  
1/4" = 1'-0"



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

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



Stantec Consulting Ltd.  
Suite 1007, 7445-132 St.  
Surrey, BC  
V3W 1J8  
Ph. (604) 597-0422  
Fax (604) 591-1856  
Email: [surrey@stantec.com](mailto:surrey@stantec.com)



**BLACK & VEATCH** LP  
Gaithersburg, Maryland

THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. RECTINUS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: RC					
DRN: RLC					
CHK: TRB	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
DATE: 5/10/02	6/5/03	PR VALUE ENGINEERING PROPOSAL		IFH/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

**EAST FINAL CLARIFIERS  
FLOW DISTRIBUTION CHAMBER**

**DEMOLITION AND MODIFIED  
PLANS & SECTIONS**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

SHEET  
43 OF 139

**S26R**

058472.4  
FD58472A

**STRUCTURAL NOTES**

**GENERAL**

- FOR LOCATIONS AND DIMENSIONS OF SLEEVES, CURB, OPENINGS AND DEPRESSIONS NOT SHOWN ON THE STRUCTURAL DRAWINGS, REFER TO ARCHITECTURAL, CIVIL/MECHANICAL, YARDWORK, PLUMBING, HVAC AND ELECTRICAL DRAWINGS. CONTRACTOR SHALL VERIFY AND COORDINATE REQUIREMENT FOR AND LOCATION OF ABOVE ITEMS WHETHER SHOWN ON THE STRUCTURAL DRAWING OR NOT.
- EMBEDDED ITEMS, SUCH AS PIPE SLEEVES, CONDUITS AND INSERTS SHALL BE IN PLACE BEFORE CONCRETE IS POURED. REFER TO ARCHITECTURAL, CIVIL/MECHANICAL, YARDWORK, PLUMBING, HVAC AND ELECTRICAL DRAWINGS FOR ITEMS REQUIRING SLEEVES AND EMBEDMENTS IN CONCRETE WHICH ARE NOT SHOWN IN THE STRUCTURAL DRAWINGS.

**CONCRETE**

- ALL CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH (f'c) OF 4000 PSI, UNLESS OTHERWISE SPECIFIED. CEMENT SHALL BE ASTM C150, TYPE II LOW ALKALI FOR ALL STRUCTURES.
- ALL CONCRETE CONSTRUCTION SHALL CONFORM TO THE ACI 318 "BUILDING CODE REQUIREMENTS FOR REINFORCED CONCRETE" INCLUDING BAR BENDS AND HOOKS, UNLESS DETAILED OTHERWISE.
- THE LOCATION OF ALL CONSTRUCTION JOINTS AND OTHER TYPES OF JOINTS, OTHER THAN SPECIFIED OR SHOWN ON THE PLANS, SHALL BE APPROVED BY THE ENGINEER PRIOR TO PLACING CONCRETE.
- ALL OPENINGS, PIPE SLEEVES, CONDUITS, INSERTS AND OTHER EMBEDDED ITEMS SHALL BE IN PLACE BEFORE CONCRETE IS PLACED. IT IS THE CONTRACTOR'S RESPONSIBILITY TO COORDINATE ARCHITECTURAL, CIVIL/MECHANICAL, PLUMBING, HVAC, ELECTRICAL PLANS FOR ITEMS REQUIRING SLEEVES AND EMBEDMENTS IN CONCRETE WHICH ARE NOT INDICATED IN SECTIONS OR FLOOR PLANS. NO PIPES OR SLEEVES SHALL PASS THROUGH STRUCTURAL MEMBERS, UNLESS SHOWN ON STRUCTURAL DRAWINGS OR APPROVED BY THE ENGINEER.
- ALL EXPOSED EDGES AND CORNERS SHALL BE CHAMFERED 3/4" EXCEPT THE TOP EDGES OF WALLS AND SLABS WHICH ARE TO BE TOOLED.
- ALL CONSTRUCTION JOINTS SHALL BE ROUGHENED TO 1/4" AMPLITUDE MINIMUM.

**REINFORCING STEEL**

- ALL REINFORCING BAR SHALL BE GRADE 60.
- WELDED WIRE FABRIC SHALL CONFORM TO ASTM A185 OR ASTM A497.
- DIMENSIONS TO REINFORCING BARS ARE TO BAR CENTERLINES, UNLESS NOTED OTHERWISE. BAR COVER IS CLEAR DISTANCE BETWEEN BAR AND THE CONCRETE SURFACE. BAR COVERS AS SHOWN ON THE "STANDARD CONCRETE DETAILS" SHEET SHALL BE PROVIDED UNLESS NOTED OTHERWISE.
- SPLICING OF REINFORCEMENT FOR WALLS, FOOTINGS AND SLABS SHALL BE AS SHOWN ON THE "STANDARD CONCRETE DETAILS" SHEET, UNLESS NOTED OTHERWISE. WHEN BARS OF DIFFERENT SIZE LAP TO EACH OTHER, SPLICE LENGTH FOR THE SMALLER BAR MAY BE USED.
- UNLESS INDICATED OTHERWISE, ALL DOWELS SHALL HAVE THE SAME SIZE AND SPACING AS THAT OF THE REINFORCING STEEL TO WHICH THEY ARE SPLICED.
- NO WELDING OF REINFORCING BARS SHALL BE PERMITTED, UNLESS NOTED OTHERWISE.

**STRUCTURAL STEEL**

- UNLESS NOTED OTHERWISE, STRUCTURAL STEEL SHALL CONFORM TO ASTM A36, STRUCTURAL PIPES TO ASTM A53, TYPE E, GRADE B OR ASTM A500, GRADES B, C OR D, OR ASTM A501, STRUCTURAL TUBING TO ASTM A500, GRADE B OR C. ALL STRUCTURAL STEEL SHALL BE FABRICATED AND ERECTED IN CONFORMANCE WITH THE LATEST AISC SPECIFICATIONS PARTS 1 THRU 4 AND THE "SPECIFICATION FOR STRUCTURAL STEEL BUILDINGS."
- WELDING SHALL BE PERFORMED BY A CERTIFIED WELDER IN ACCORDANCE WITH AWS AND AISC WELDING PROCEDURES AND CODES AS OUTLINED IN THE SPECIFICATIONS.
- ALL STRUCTURAL STEEL WELDING SHALL BE PERFORMED WITH FILLER METAL HAVING A MINIMUM TENSILE STRENGTH OF 70 KSI.

**STAINLESS STEEL**

- STAINLESS STEEL BOLTS SHALL CONFORM TO ASTM F593. ALLOY GROUP 1 OR 2, UNLESS NOTED OTHERWISE.
- STAINLESS STEEL PLATES, BARS AND RODS SHALL CONFORM TO ASTM A240, TYPE 304L.
- STAINLESS STEEL STRUCTURES SHAPES AND STUDS SHALL CONFORM TO ASTM A276, TYPE 304.

**ALUMINUM**

- UNLESS NOTED OTHERWISE, ALUMINUM ALLOY IN ALL ALUMINUM STRUCTURAL MATERIALS SHALL BE 6061-T6.
- ALL ALUMINUM SURFACES IN CONTACT WITH CONCRETE OR DISSIMILAR METALS SHALL BE COATED OR COVERED WITH A HEAVY COAT OF EPOXY ENAMEL TO PREVENT ALUMINUM-CONCRETE REACTION OR ELECTROLYTIC ACTION.
- ALL ALUMINUM WELDING SHALL CONFORM TO THE PROVISIONS OF THE LATEST STRUCTURAL WELDING CODE (AWS D1.2).
- A CERTIFIED FABRICATOR IS REQUIRED FOR ALL ALUMINUM PANELS AND FRAMES.

**MASONRY**

- CONCRETE MASONRY UNITS SHALL CONFORM TO ASTM C90. THE TOTAL MASONRY ASSEMBLAGE SHALL HAVE A COMPRESSIVE STRENGTH EQUAL TO 1500 PSI AT 28 DAYS.
- MASONRY MORTAR SHALL CONFORM TO ASTM C270, TYPE S.
- ANY MASONRY IN CONTACT WITH EARTH SHALL BE GROUTED FULL AND BACK PARGED AS REQUIRED.
- ALL BOND BEAMS AND ANY BLOCK CELLS CONTAINING EMBEDMENTS, REINFORCING STEEL, ANCHORS, ETC., SHALL BE FILLED MINIMUM 2,000 PSI CONCRETE FILL. PROVIDE BOND BEAMS W/ MIN 2-#5 HORIZONTAL AT OPENING SILL (EXTENDED 2'-0" MIN BEYOND OPENING AT EACH END), WHERE INDICATED ON ARCH DRAWINGS AND TOP OF WALL UNLESS DETAILED OTHERWISE. BOND BEAM REINF TO BE CONTINUOUS AT CORNERS AND INTERSECTIONS.
- ALL CONCRETE MASONRY OPERATIONS SHALL BE DONE IN ACCORDANCE WITH THE PROVISIONS OF THE BOCA NATIONAL BUILDING CODE / 1996.
- REFER TO ARCHITECTURAL, ELECTRICAL AND MECHANICAL DRAWINGS FOR EMBEDDED ITEMS NOT SHOWN HEREIN AND TO VERIFY SIZE AND LOCATION OF ALL OPENINGS. BEFORE EXECUTING ANYTHING HEREIN SHOWN, THE CONTRACTOR SHALL EXAMINE ACTUAL JOB CONDITIONS AND REPORT TO THE ENGINEER ANY ERROR OMISSION OR DISCREPANCY AFFECTING THE WORK.
- ALL REINFORCING TO BE CONTINUOUS WITH LAP SPLICES EQUAL TO 48 BAR DIAMETERS MINIMUM.

**SOIL AND FOUNDATIONS**

- ALL EARTHWORK AND FOUNDATION CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND THE RECOMMENDATIONS OF THE PROJECT GEOTECHNICAL REPORT. IN CASE OF A CONFLICT THE REQUIREMENTS OF THE SPECIFICATIONS SHALL COVER.
- TO FACILITATE SCHEDULING, AT LEAST 48 HOURS ADVANCE NOTICE SHOULD BE GIVEN TO THE INSPECTION ENGINEER PRIOR TO THE REQUIRED INSPECTIONS.
- UNLESS NOTED OTHERWISE, BACKFILL SHALL NOT BE PLACED AGAINST THE WALLS UNTIL THE TOP SLAB HAS BEEN PLACED IN ITS ENTIRETY AND ALL CONCRETE HAS REACHED ITS DESIGN STRENGTH.

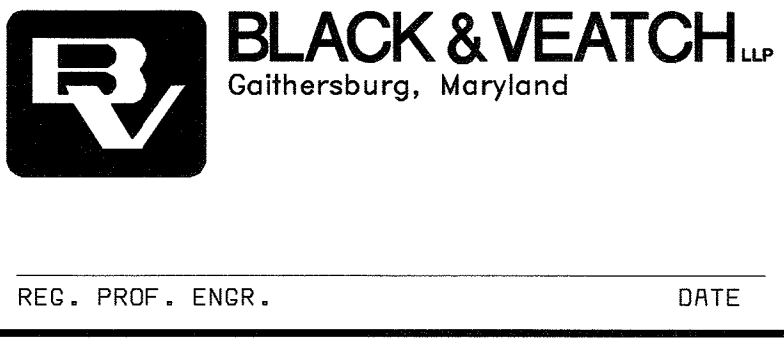
**LOADING CRITERIA**

- DEAD LOAD .....CALCULATED
- LIVE LOADS: (NO LIVE LOAD REDUCTION IS CONSIDERED IN THE DESIGN)
  - OPERATION AND PROCESS FLOORS..... 150 PSF
  - EQUIPMENT..... ACTUAL
  - STAIRS/SERVICE PLATFORMS..... 100 PSF
  - GRATING AREAS..... 100 PSF
  - ALL FLOORS NOT INDICATED..... 100 PSF
  - ROOF..... 30 PSF
  - CLEARWELL ROOF..... 100 PSF
  - GROUND SNOW LOAD..... 30 PSF
  - IMPORTANCE FACTOR..... 1.0
  - SNOW EXPOSURE FACTOR..... 0.7
- LATERAL EARTH PRESSURE ..... 3,000 PSF AND 8,000 PSF  
FROST DEPTH 24 INCHES MINIMUM
- LATERAL SURCHARGE ..... EQUIVALENT OF 2 FT OF SOIL WHERE  
ADJACENT TO ROADWAY
- HYDROSTATIC FLUID PRESSURE ..... 63 PSF/FT
- WIND LOAD:
  - BASIC WIND SPEED..... 80 MPH
  - EXPOSURE..... C
  - IMPORTANCE FACTOR..... 1.0
  - INTERNAL PRESSURE COEFFICIENTS (INCLUDING COMPONENTS AND CLADDING)
    - Kz..... 0.93
    - Gz..... 1.27
    - Cp..... 0.80
    - Kh..... 0.93
    - Gcpl..... +0.75
    - ..... -0.25
- SEISMIC LOAD:
  - AV..... .05
  - Aa..... .05
  - HAZARD EXPOSURE GROUP..... 1
  - PERFORMANCE CATEGORY..... B
  - SEISMIC SITE COEFFICIENT (S)..... 1.0
  - RESPONSE MODIFICATION FACTOR..... 1.0
  - BASIC SEISMIC-FORCE-RESISTING SYSTEM.... BUILDING FRAME SYSTEM
  - DESIGN BASE SHEAR..... 5 KIPS

A  
B  
C  
D  
E  
F

A  
B  
C  
D  
E  
F

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
  
CHIEF, BUREAU OF UTILITIES DATE



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ROBERT J. RECTANUS, JR.,  
A REGISTERED  
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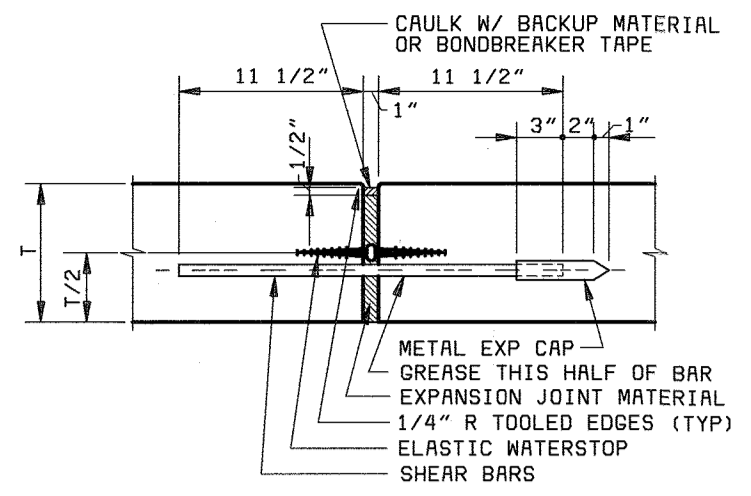
DES: JD									
DRN: ET									
CHK: RJR									
DATE: 05/10/02	DATE	05/26/05	CONFORMED TO CONSTRUCTION RECORDS			PJS	RJR	RJR	
			REVISIONS AND RECORD OF ISSUE			NO.	BY	CK	APP

GENERAL  
STRUCTURAL  
  
STRUCTURAL NOTES

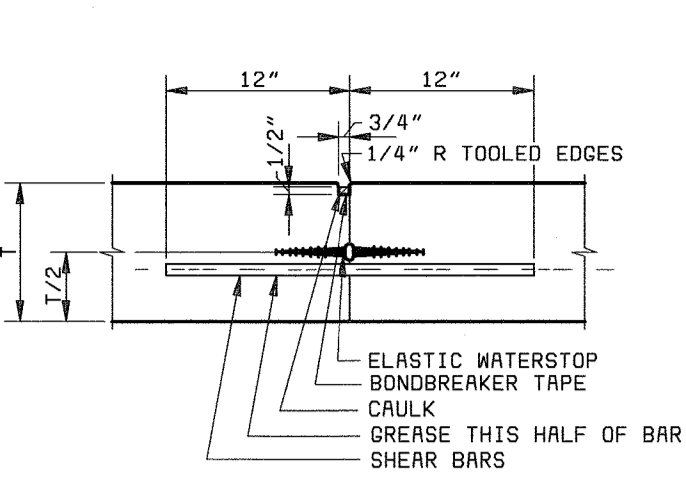
LITTLE PATUXENT WATER RECLAMATION PLANT  
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HOWARD COUNTY, MARYLAND

SCALE  
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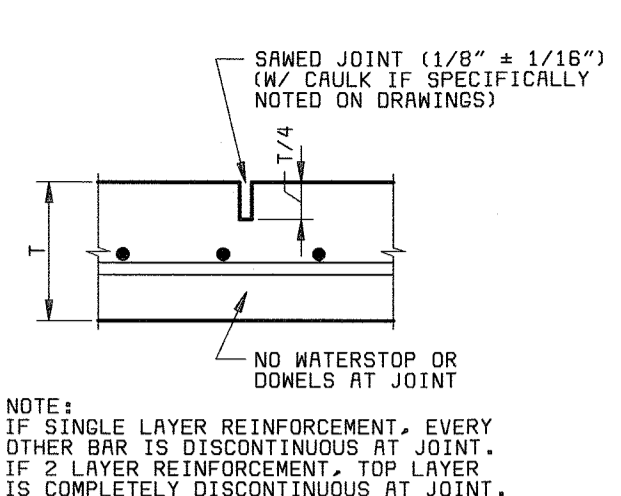




SLABS

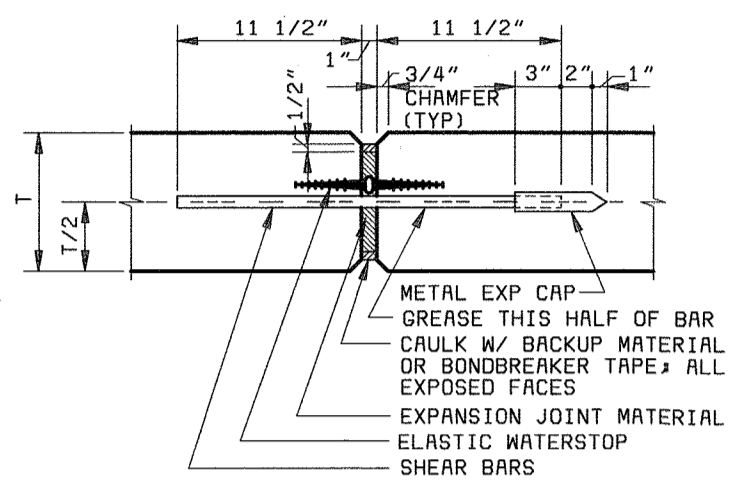


SLABS



SAWED CONTRACTION JOINT  
SLAB-ON-GRADE

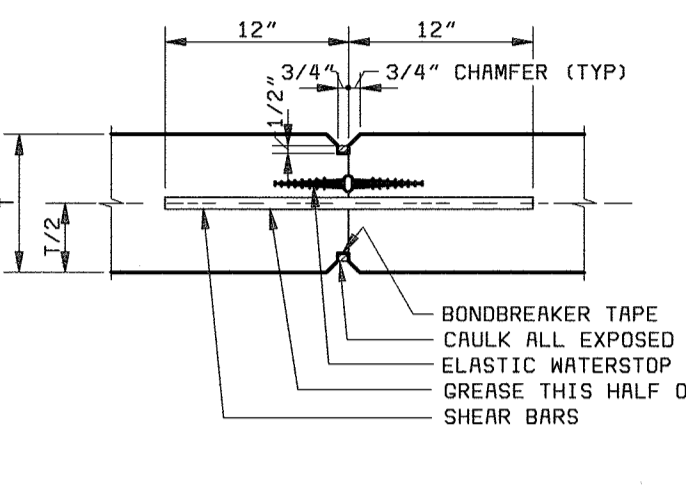
NOTE:  
IF SINGLE LAYER REINFORCEMENT, EVERY OTHER BAR IS DISCONTINUOUS AT JOINT. IF 2 LAYER REINFORCEMENT, TOP LAYER IS COMPLETELY DISCONTINUOUS AT JOINT.



WALLS

EXPANSION JOINTS

NOTE:  
"EJ W/WS" - WITH ELASTIC WATERSTOP  
"EJ" - WITHOUT ELASTIC WATERSTOP



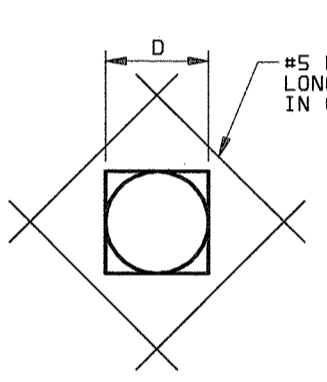
WALLS

CONTRACTION JOINTS

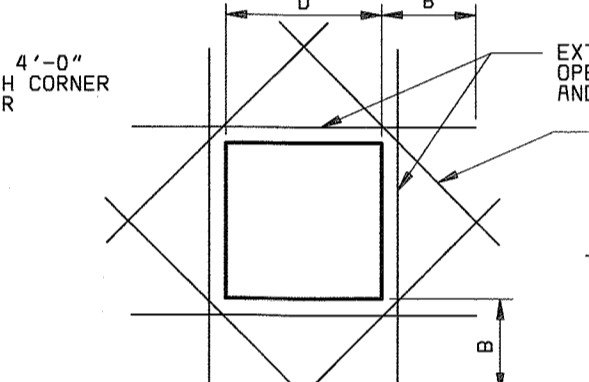
NOTE:  
"CJ W/WS" - WITH ELASTIC WATERSTOP  
"CJ" - WITHOUT ELASTIC WATERSTOP

TYPICAL CONTROL JOINTS

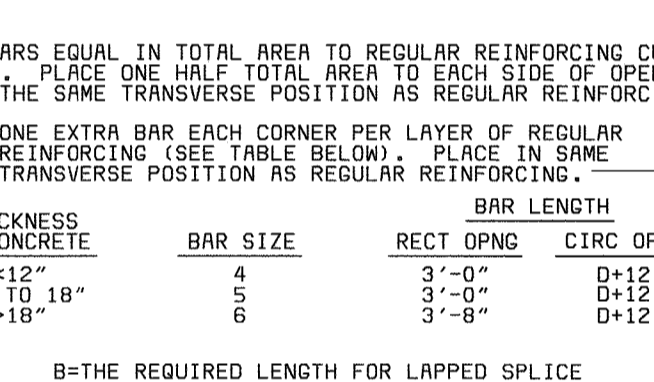
NOTES:  
1. PROVIDE 3/4" SHEAR BARS @ 1'-6" CTRS ACROSS JOINT UNLESS NOTED OTHERWISE  
2. REINFORCING STEEL SHALL NOT BE EXTENDED ACROSS JOINT UNLESS NOTED OTHERWISE  
3. SHEAR BARS SHALL BE SMOOTH, FREE FROM RUST OR SCALE, AND GREASED TO PREVENT BOND (ONE HALF OF BAR ONLY)



FOR OPENINGS  
12" ≤ D ≤ 21"



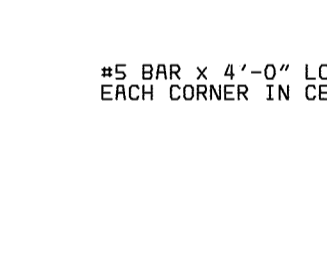
FOR RECTANGULAR OPENINGS  
21" < D ≤ 54"



FOR CIRCULAR OPENINGS  
21" < D ≤ 54"

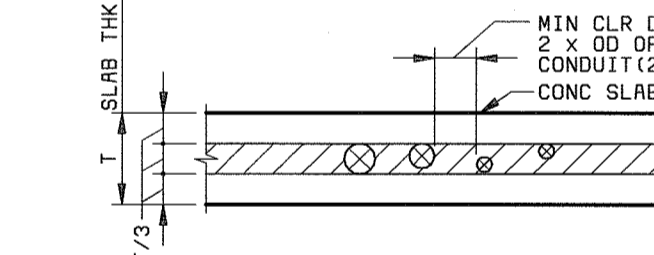
TYPICAL EXTRA REINFORCING AT OPENINGS 12" TO ≤ 54"

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



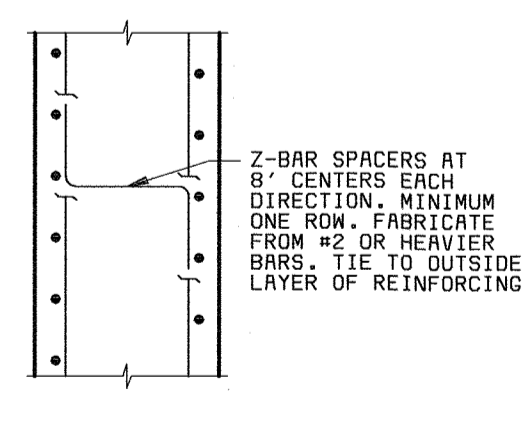
TYPICAL EXTRA REINFORCING AT ISOLATED RE-ENTRANT CORNERS

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

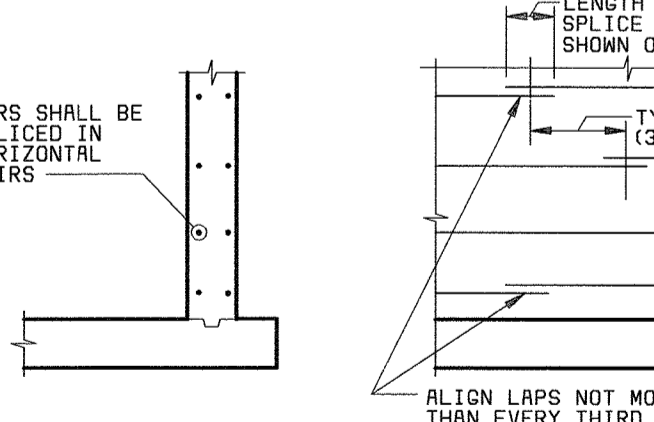


CONDUIT PLACING DETAIL

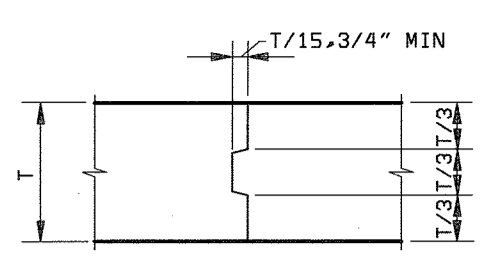
NOTES:  
1. PLACE CONDUIT ONLY IN SHADED AREA  
2. FOR CONDUIT REQUIREMENTS SEE THE ELECTRICAL DRAWINGS AND SPECIFICATIONS.



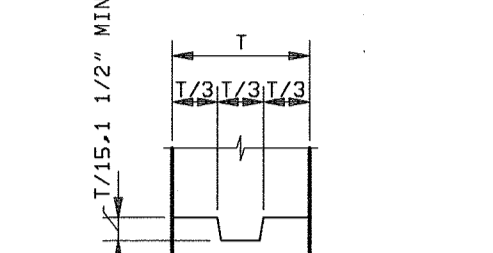
SPACERS FOR WALL REINFORCEMENT



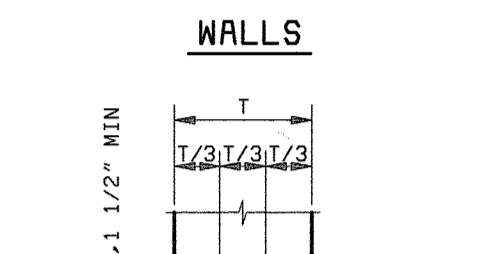
TYPICAL RING WALL REINFORCING SPLICE DETAIL



SLABS

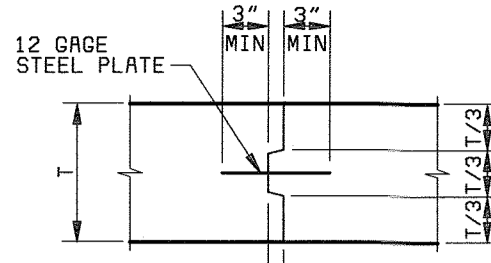


WALLS

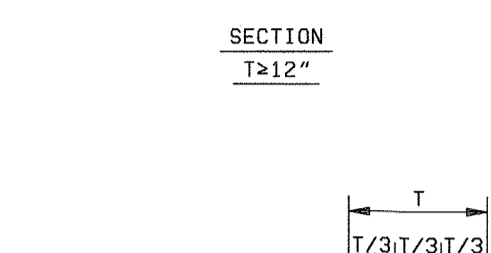


BASE OF WALLS

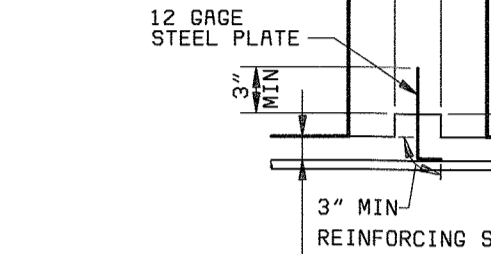
JOINTS WITHOUT WATERSTOPS



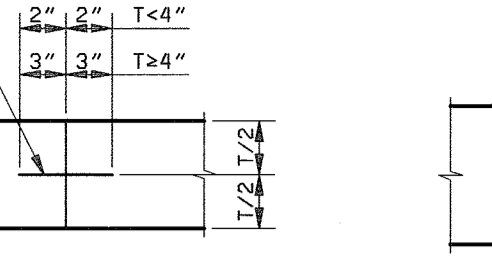
SLABS



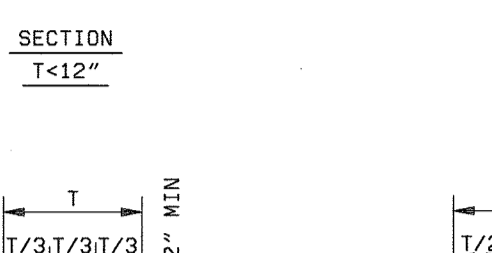
WALLS



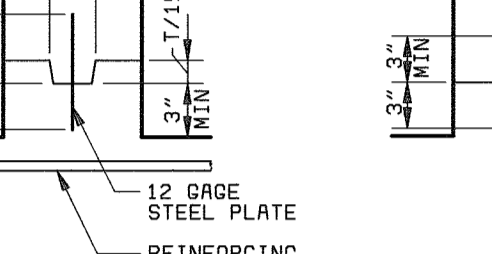
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SLABS

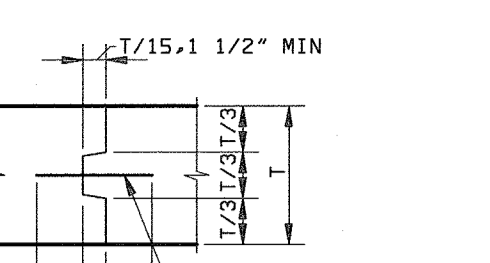


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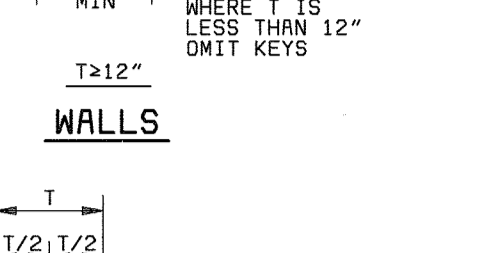


BASE OF WALLS

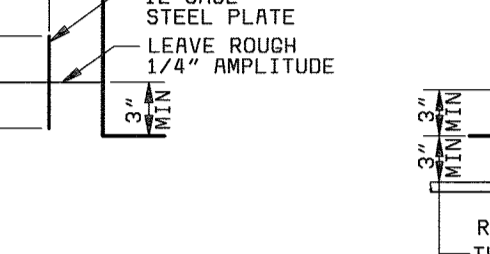
JOINTS WITH WATERSTOPS



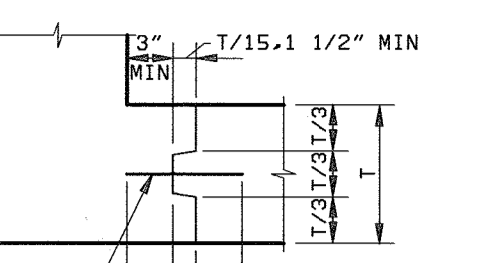
SLABS



WALLS



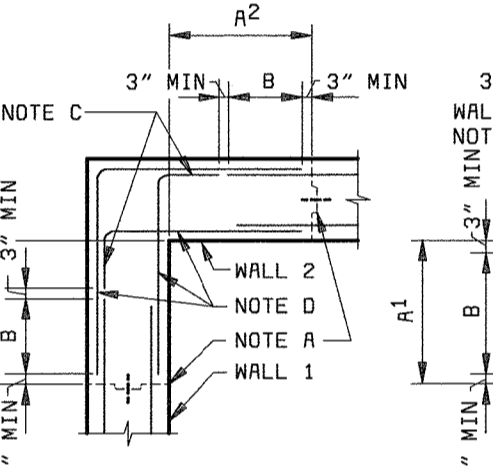
BASE OF WALLS



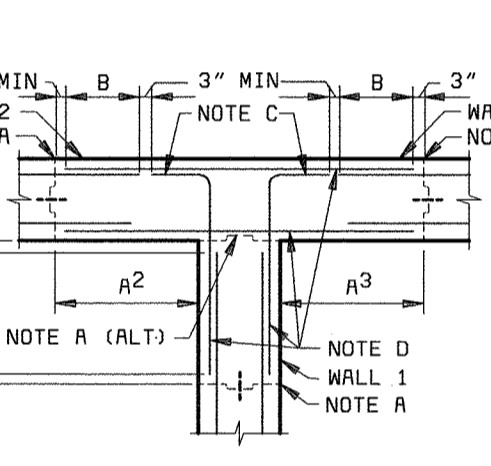
CORNERS

TYPICAL CONSTRUCTION JOINTS

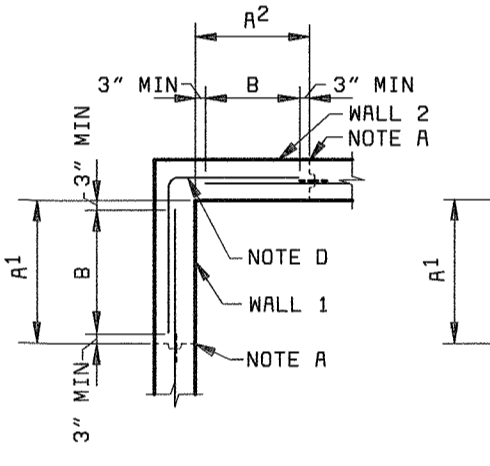
NOTE:  
1. REINFORCING STEEL IS CONTINUOUS THROUGH ALL CONSTRUCTION JOINTS  
2. "CSJ W/WS" - WITH WATERSTOP  
3. "CSJ" - WITHOUT WATERSTOP



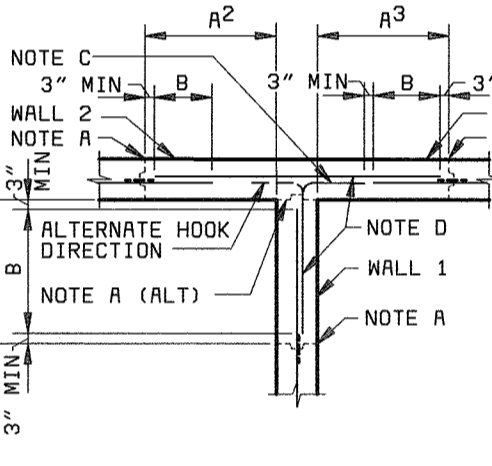
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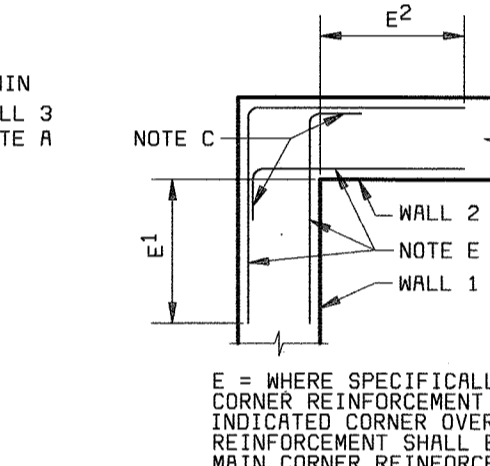
WALLS



WALLS



WALLS



WALLS

E = WHERE SPECIFICALLY NOTED ON THE DRAWINGS, ADDITIONAL CORNER REINFORCEMENT SHALL BE PLACED IN BOTH FACES OF THE INDICATED CORNER OVER THE FULL HEIGHT. ADDITIONAL CORNER REINFORCEMENT SHALL BE OF THE SAME SIZE AND SPACING AS THE MAIN CORNER REINFORCEMENT. PLACE ADDITIONAL REINFORCEMENT ALTERNATELY WITH, AND EQUAL DISTANCE BETWEEN, MAIN CORNER REINFORCEMENT.

EX = DISTANCE FROM INSIDE CORNER FACE TO TERMINATION OF ADDITIONAL CORNER REINFORCEMENT IN SIMILARLY NUMBERED WALL. EX SHALL NOT BE LESS THAN 0.20 THE CLEAR SPAN DISTANCE MEASURED HORIZONTALLY BETWEEN THIS CORNER AND THE NEXT OR 0.40 THE CLEAR SPAN DISTANCE OR CANTILEVERED DISTANCE MEASURED VERTICALLY, WHICHEVER IS SMALLER, BUT NOT LESS THAN 0'-0".

CONTRACTOR OPTION:  
E BAR TAILS MAY BE SPLICED USING LAPPED SPLICE LENGTHS FOR TOP BARS. SPLICES SHALL NOT BE LOCATED IN THE CORNER AREA COMMON TO BOTH WALLS AND SHALL CLEAR HOOK ENDS BY 3" MIN.

MAIN REINFORCEMENT FOR ALL STRUCTURES

TYPICAL HORIZONTAL CORNER REINFORCING DETAILS

NOTES:  
1. VERTICAL REINFORCING NOT SHOWN  
2. THESE DETAILS SHALL BE APPLICABLE TO ALL WALL CORNERS UNLESS NOTED OTHERWISE ON THE DRAWINGS.

		SPLICE & DEVELOPMENT LENGTHS (UNLESS NOTED OTHERWISE ON THE DRAWINGS)										CONCRETE COVER FOR REINFORCEMENT		
		BEAMS AND COLUMNS					WALLS, SLABS AND FOOTINGS					LOCATION		MINIMUM COVER
BAR SIZE	LENGTH OF LAPPED SPLICES FOR REINF (INCHES)	LENGTH OF END ANCHORAGE FOR DEVELOPMENT OF REINFORCEMENT (INCHES)		HOOKED BARS	LENGTH OF LAPPED SPLICES FOR REINF (INCHES)		LENGTH OF END ANCHORAGE FOR DEVELOPMENT OF REINFORCEMENT (INCHES)		HOOKED BARS	BAR SIZE				
		*TOP BARS	OTHERS		*TOP BARS	OTHERS	*TOP BARS	OTHERS			*TOP BARS	OTHERS		
3	19	16	14	12	6	19	16	14	12	6	3	UNFORMED SURFACES ADJACENT TO EXCAVATION		3"
4	24	19	15	7	24	19	15	7	4	4	FORMED OR TOP SURFACES EXPOSED TO WEATHER OR SATURATED AIR, SUBMERGED OR IN CONTACT WITH EARTH, INCLUDING STIRRUPS, TIES OR SPIRALS		2"	
5	31	24	18	9	31	24	18	9	5	5	OTHER LOCATIONS			
6	40	31	22	10	36	28	22	10	6	6	BARS IN BEAMS OR GIRDERS, INCLUDING STIRRUPS AND COLUMN SPIRALS OR TIES		1 1/2"	
7	54	42	25	12	54	42	32	12	7	7	SLABS, WALLS AND JOISTS #6 AND LARGER		1 1/2"	
8	71	55	30	14	102	78	55	14	8	8	#5 AND SMALLER		3/4"	
9	90	70	38	15	129	99	69	15	9	9				
10	115	88	49	17	163	126	88	17	10	10				
11	141	108	63	19	201	154	119	19	11	11				
14	---	---	105	33	---	---	210	33	14	14				
18	---	---	155	43	---	---	309	43	18	18				

\* TOP BARS ARE HORIZONTAL BARS SO PLACED THAT MORE THAN 12" OF CONCRETE IS CAST IN THE MEMBER BELOW THE BAR.  
HORIZONTAL BARS IN WALLS ARE TO BE PROVIDED WITH LAP LENGTHS AS REQUIRED FOR TOP BARS.  
VERTICAL BARS MAY BE CONSIDERED AS OTHER BARS.  
IN WALLS, SLABS AND FOOTINGS: LAPPED SPLICE LENGTH FOR BARS SIZE 8 THROUGH 11 AND STRAIGHT (NON-HOOKED) END ANCHORAGE DEVELOPMENT LENGTH FOR BAR SIZE 11 (IN TABLE ABOVE) PLACED WITH MORE THAN 2 BAR DIAMETER CLEAR SPACING MAY BE MULTIPLIED BY A FACTOR OF 0.7.  
IN BEAMS, COLUMNS, WALLS, SLABS AND FOOTINGS: LAPPED SPLICE LENGTH AND STRAIGHT (NON-HOOKED) END ANCHORAGE DEVELOPMENT LENGTH FOR BARS SIZE 7 THROUGH 11 (IN THE TABLE ABOVE) PLACED WITH MORE THAN 5 BAR DIAMETER CLEAR SPACING MAY BE MULTIPLIED BY A FACTOR OF 0.8. THE MULTIPLICATION FACTORS OF 0.7 AND 0.8 MAY BE COMBINED ONLY FOR BARS COMMON TO THIS NOTE AND THE NOTE ABOVE.  
LAPPED SPLICES SHALL NOT BE MADE AT POINTS OF MAXIMUM STRESS UNLESS OTHERWISE INDICATED ON THE DRAWINGS OR AS DETERMINED BY THE ENGINEER.

GENERAL NOTE:  
DETAILS ON THIS SHEET APPLY TO ALL DRAWINGS UNLESS OTHERWISE NOTED

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH** LLP  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

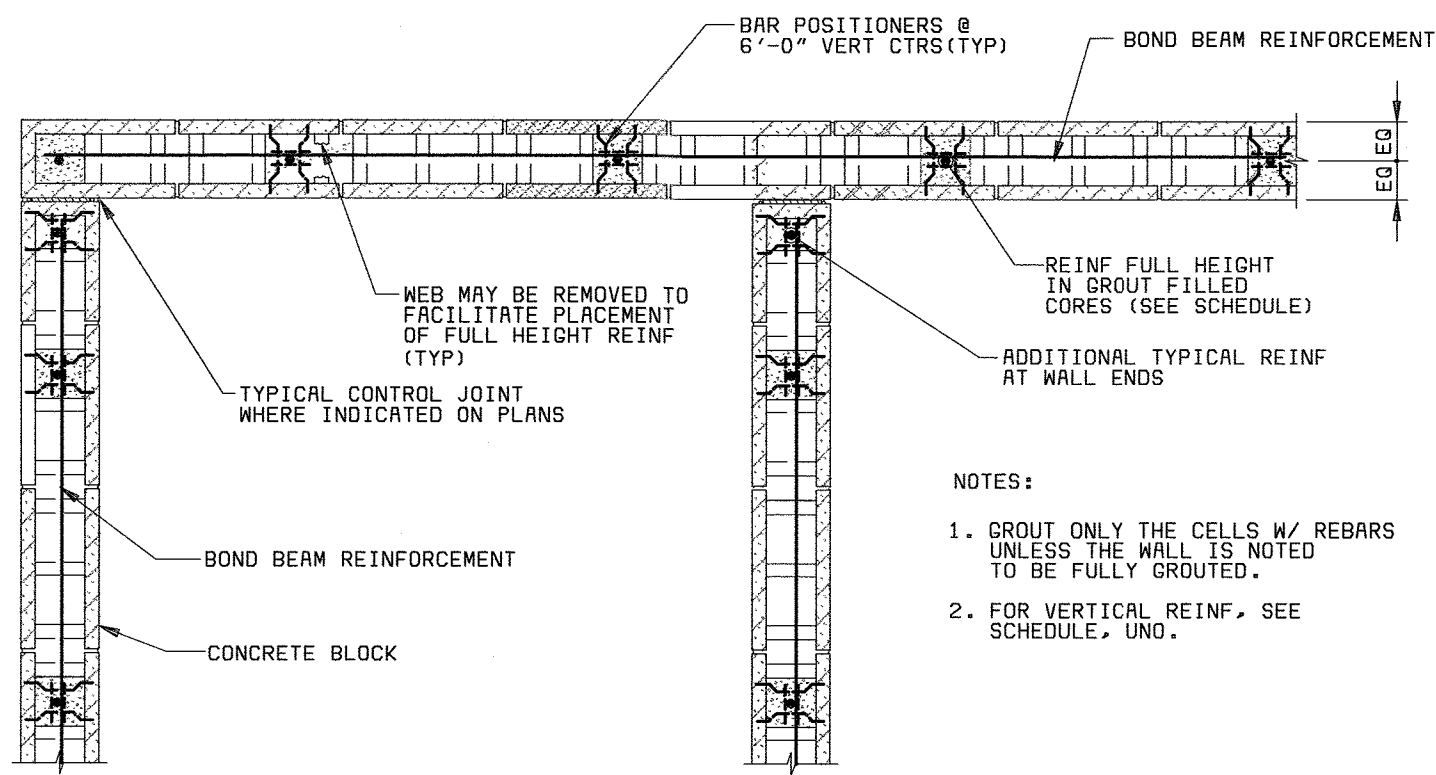
THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. REICHTMUS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: STD					
DRN: RLC					
CHK: RJR					
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

GENERAL  
STRUCTURAL  
STANDARD CONCRETE DETAILS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

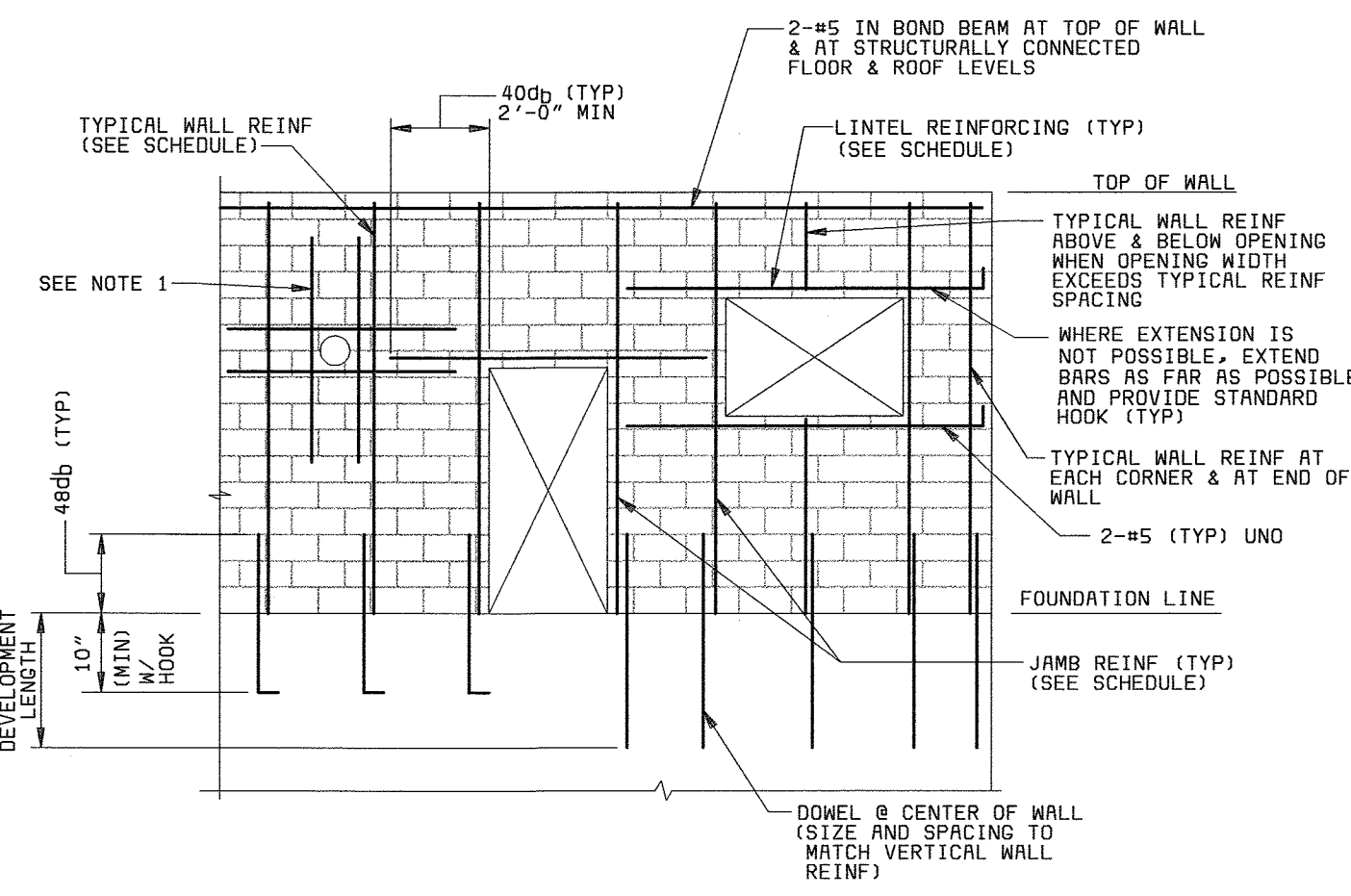
SCALE AS SHOWN  
SHEET 48 OF 139  
S31



**TYPICAL REINFORCING WITH CORNER CONTROL JOINTS**

SINGLE CURTAIN REINFORCEMENT SHOWN. DOUBLE CURTAIN SIMILAR WITH 1/2" CLEAR FROM EACH WALL FACE.

- NOTES:
1. GROUT ONLY THE CELLS W/ REBARS UNLESS THE WALL IS NOTED TO BE FULLY GROUTED.
  2. FOR VERTICAL REINF, SEE SCHEDULE, UNO.



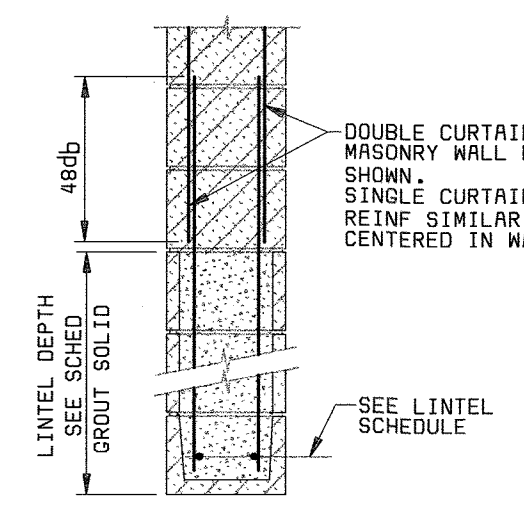
- NOTE:
1. EXTEND JAMB BARS FLOOR TO ROOF WHERE OPENING WIDTH EXCEEDS 1'-4", OTHERWISE, EXTEND 40 BAR DIAMETERS OR 2'-0" MIN PAST OPENINGS.

**TYPICAL MASONRY REINFORCING ELEVATION**

NO SCALE

LINTEL SCHEDULE			
WALL SIZE	OPENING WIDTH	LINTEL DEPTH	LONGITUDINAL REINFORCEMENT
12"	≤4'-0"	0'-8"	2-#5
	≤8'-0"	1'-4"	2-#5
	≤12'-0"	2'-0"	2-#5
	≤16'-0"	2'-0"	2-#6
	≤20'-0"	2'-8"	2-#7
8"	≤4'-0"	0'-8"	2-#5
	≤8'-0"	1'-4"	2-#5
	≤15'-0"	2'-0"	2-#5

- NOTES:
1. BEAR ALL LINTELS A MINIMUM 2'-0" AT EACH END.
  2. REINFORCE LINTELS AS INDICATED ABOVE UNLESS NOTED OTHERWISE ON THE DRAWINGS.

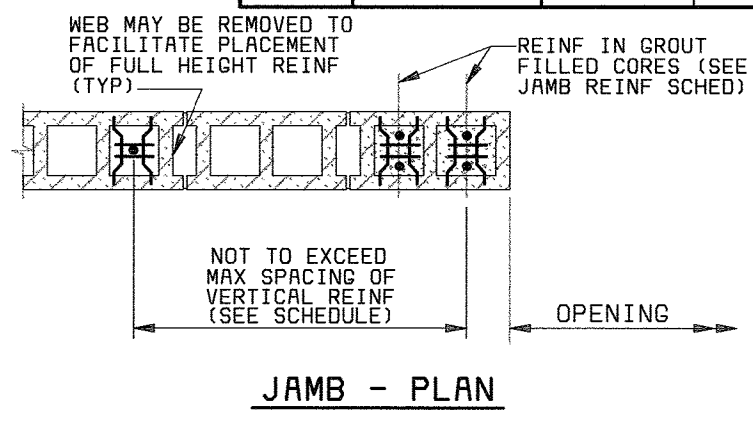


**TYPICAL MASONRY LINTEL SECTION AND SCHEDULE**

NO SCALE

JAMB REINFORCING SCHEDULE				
WALL SIZE	WALL HEIGHT	OPENING WIDTH	EXTERIOR WALL REINFORCEMENT	INTERIOR WALL REINFORCEMENT
12"	≤16'-0"	≤7'-0"	1-#5 EF	1-#5 EF
		≤12'-0"	2-#5 EF	1-#5 EF
	≤20'-0"	≤4'-0"	1-#6 EF	1-#5 EF
		≤7'-0"	1-#6 EF	1-#5 EF
		≤12'-0"	3-#6 EF	1-#5 EF
		≤4'-0"	1-#6 EF	1-#5 EF
8"	≤13'-0"	≤7'-0"	1-#6 EF	1-#5 EF
		≤12'-0"	3-#6 EF	1-#5 EF
	≤16'-0"	≤4'-0"	1-#6 EF	1-#5 EF
		≤7'-0"	2-#7 EF	1-#5 EF
≤18'-0"	≤4'-0"	2-#5 EF	1-#5 EF	

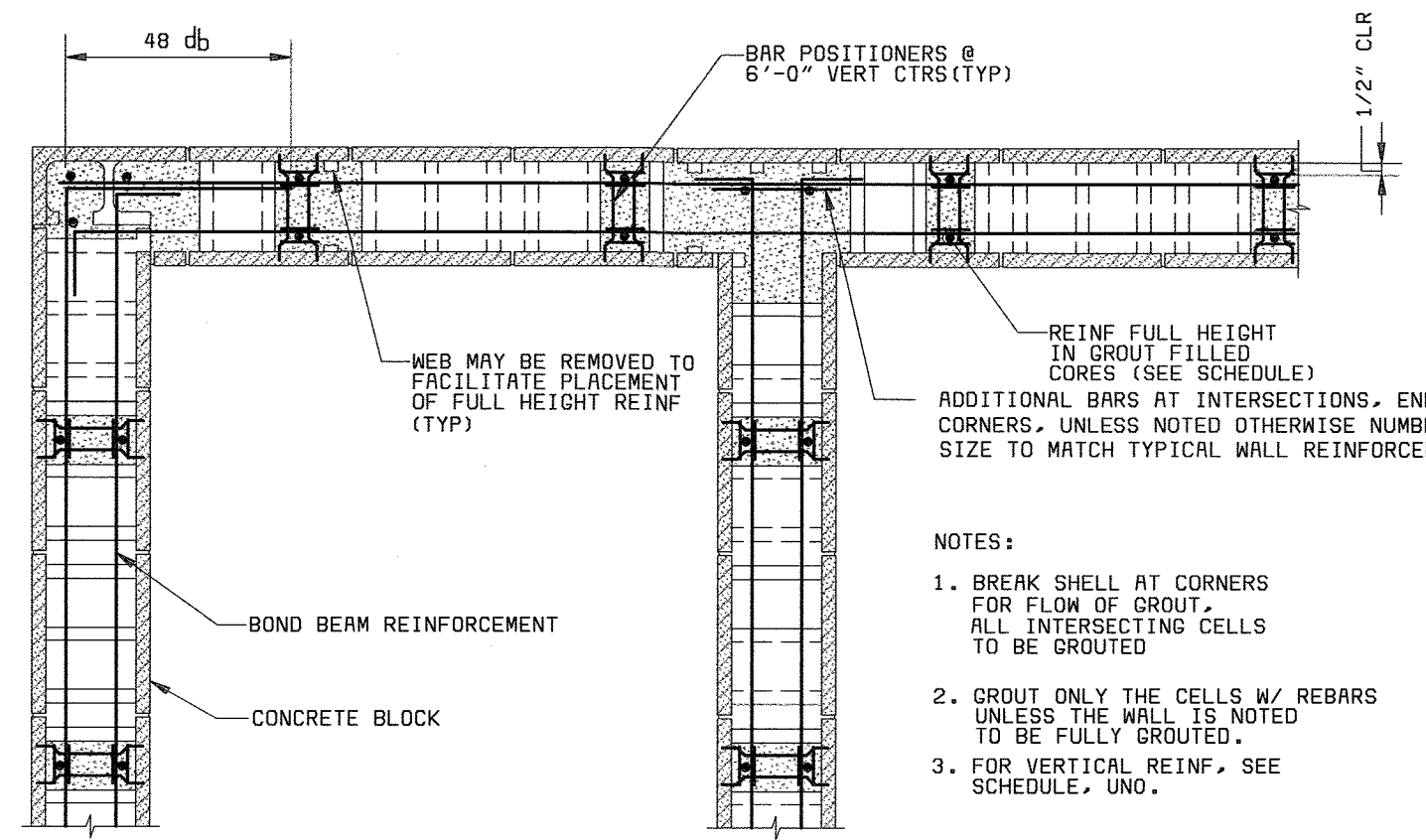
- NOTES:
1. WALL HEIGHT IS DISTANCE FROM BOTTOM OF MASONRY WALL TO THE LOCATION OF TOP LATERAL SUPPORT.
  2. THE SCHEDULED REINFORCING SHALL BE PLACED WITH ONE BAR AT EACH FACE OF THE WALL. ONLY ONE PAIR OF BARS SHALL BE PLACED IN EACH CELL.
  3. AN INTERIOR WALL IS A WALL IN WHICH NO PORTION OF THE WALL IS EXPOSED TO THE EXTERIOR.
  4. AT LOCATIONS WHERE WALLS CANTILEVER ABOVE THE TOP LATERAL SUPPORT, THE WALL HEIGHT FOR ABOVE SCHEDULE SHALL BE THE GREATER OF THE HEIGHT IN NOTE 1 OR DOUBLE THE DISTANCE FROM LATERAL SUPPORT TO THE TOP OF THE WALL.
  5. REINFORCE JAMBS AS INDICATED UNLESS NOTED OTHERWISE ON THE DRAWINGS.



**JAMB - PLAN**

**TYPICAL MASONRY JAMB PLAN AND SCHEDULE**

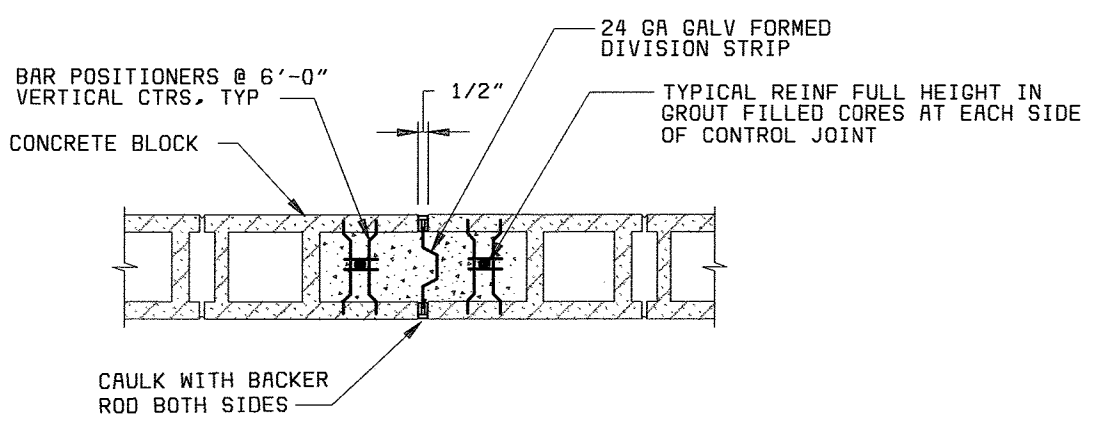
NO SCALE



**TYPICAL REINFORCING WITHOUT CORNER CONTROL JOINTS**

DOUBLE CURTAIN REINFORCEMENT SHOWN. SINGLE CURTAIN SIMILAR EXCEPT CENTERED IN WALL.

- NOTES:
1. BREAK SHELL AT CORNERS FOR FLOW OF GROUT. ALL INTERSECTING CELLS TO BE GROUTED.
  2. GROUT ONLY THE CELLS W/ REBARS UNLESS THE WALL IS NOTED TO BE FULLY GROUTED.
  3. FOR VERTICAL REINF, SEE SCHEDULE, UNO.



- NOTES:
1. LADDER TYPE REINFORCEMENT IS DISCONTINUOUS AT JOINT. ALL OF BOND BEAM REINFORCEMENT IS CONTINUOUS THROUGH JOINT.
  2. CONTROL JOINT IS CONTINUOUS FULL WALL HEIGHT.
  3. PLACE CONCRETE MASONRY CONTROL JOINTS AT ABOUT 35'-0" CENTERS AND WITHIN 16'-0" OF CORNERS UNLESS OTHERWISE NOTED. PLACE CONTROL JOINTS AT LEAST ONE HALF THE OPENING WIDTH AWAY FROM OPENINGS.
  4. SEE ARCHITECTURAL DRAWINGS FOR LOCATION OF VENEER CONTROL JOINTS.

**TYPICAL CONCRETE MASONRY CONTROL JOINT**

NO SCALE

**TYPICAL MASONRY REINFORCING PLANS**

3/4" = 1'-0"

MINIMUM CMU WALL REINFORCING SCHEDULE (NOTE 5)					
(SPECIAL INSPECTION REQUIRED)					
WALL SIZE	WALL HEIGHT	VERTICAL REINFORCEMENT		HORIZONTAL REINFORCEMENT	
		EXTERIOR WALL	INTERIOR WALL	EXTERIOR WALL	INTERIOR WALL
12"	≤16'-0"	#5@48	#5@48	CONTINUOUS BOND BEAMS @ 48" CTRS W/ 2-#6 HORIZONTAL	CONTINUOUS BOND BEAMS @ 48" CTRS W/ 2-#6 HORIZONTAL
	≤20'-0"	#6@48	#5@48		
	≤22'-0"	#5@48 EF	#5@48		
	≤24'-0"	#5@32 EF	#5@48		
8"	≤13'-0"	#5@48	#5@48	CONTINUOUS BOND BEAMS @ 48" CTRS W/ 2-#5 HORIZONTAL	CONTINUOUS BOND BEAMS @ 48" CTRS W/ 2-#5 HORIZONTAL
	≤16'-0"	#5@32	#5@48		
	≤18'-0"	#5@32 EF	#5@48		
	≤22'-0"	#6@32 EF	#5@48		

- NOTES:
1. WALL HEIGHT IS DISTANCE FROM BOTTOM OF MASONRY WALL TO THE LOCATION OF TOP LATERAL SUPPORT.
  2. WHERE BARS ARE CALLED OUT EACH FACE (EF), BARS SHALL BE PLACED, IN A DOUBLE CURTAIN WITH ONE BAR TOWARD EACH FACE OF THE WALL. OTHERWISE BARS SHALL BE CENTERED IN THE WALL.
  3. AN INTERIOR WALL IS A WALL IN WHICH NO PORTION OF THE WALL IS EXPOSED TO THE EXTERIOR.
  4. AT LOCATIONS WHERE WALLS CANTILEVER ABOVE THE TOP LATERAL SUPPORT, THE WALL HEIGHT FOR THE ABOVE SCHEDULE SHALL BE THE GREATER OF THE HEIGHT IN NOTE 1 OR DOUBLE THE DISTANCE FROM LATERAL SUPPORT TO THE TOP OF THE WALL.
  5. IN ADDITION TO THE SCHEDULED REINFORCEMENT, WALLS SHALL HAVE A CONTINUOUS BOND BEAM WITH AT LEAST 2-#5 BARS AT OR NEAR THE TOP COURSE, SCHEDULED REINFORCEMENT AT OPENINGS, AND ALL OTHER HORIZONTAL AND VERTICAL REINFORCEMENT AS INDICATED ON THE STRUCTURAL AND ARCHITECTURAL DRAWINGS.
  6. SEE THE STRUCTURAL DRAWINGS FOR SPECIAL REINFORCEMENT AND BOUNDARY ELEMENTS IN HIGH STRESS SHEAR WALLS. ALL WALLS SHALL BE REINFORCED WITH THE MINIMUMS ABOVE.

**MINIMUM CMU WALL REINFORCING SCHEDULE**

NO SCALE

- GENERAL NOTES:
1. THE DETAILS ON THIS SHEET ARE APPLICABLE TO ALL CONCRETE MASONRY CONSTRUCTION. SPECIAL NOTES, SECTIONS AND DETAILS SPECIFICALLY NOTED ON THE DESIGN DRAWINGS SHALL BE APPLICABLE IN LIEU OF THESE TYPICAL DETAILS, EXCEPT THAT REINFORCEMENT SHALL NOT BE LESS THAN THE TYPICAL REINFORCEMENT REQUIRED.
  2. FOR MISCELLANEOUS APPURTENANCES INCLUDING EMBEDMENTS, BRACING, STEEL OR PRECAST LINTELS, VENEER, FLASHING, WEEPS, INSULATION, SEALING, CAULKING AND EMBEDDED PIPE AND ELECTRICAL CONDUIT, SEE THE DESIGN DRAWINGS.
  3. MASONRY SHALL BE CONSTRUCTED WITH SLEEVES AS REQUIRED TO ACCOMMODATE PASSAGE OF PENETRATING PIPING, CONDUIT AND DUCT BANKS INDICATED ON THE CIVIL, MECHANICAL AND ELECTRICAL DRAWINGS.
  4. db DENOTES REINFORCING BAR DIAMETER. UNO DENOTES "UNLESS NOTED OTHERWISE".
  5. SPECIAL INSPECTION IS REQUIRED FOR ALL MASONRY.

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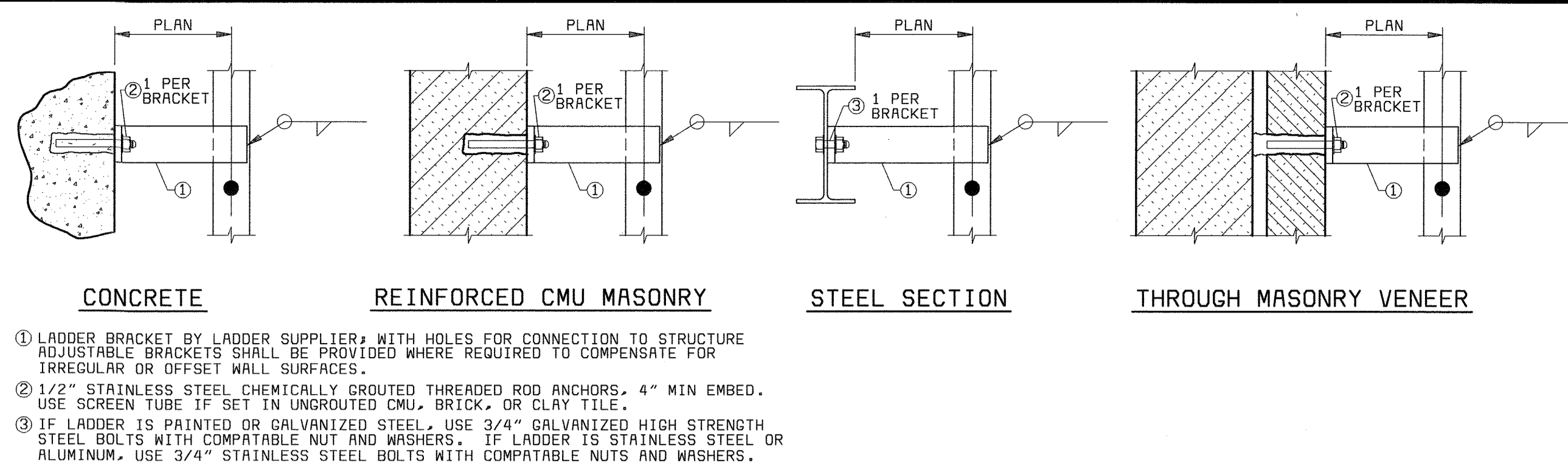
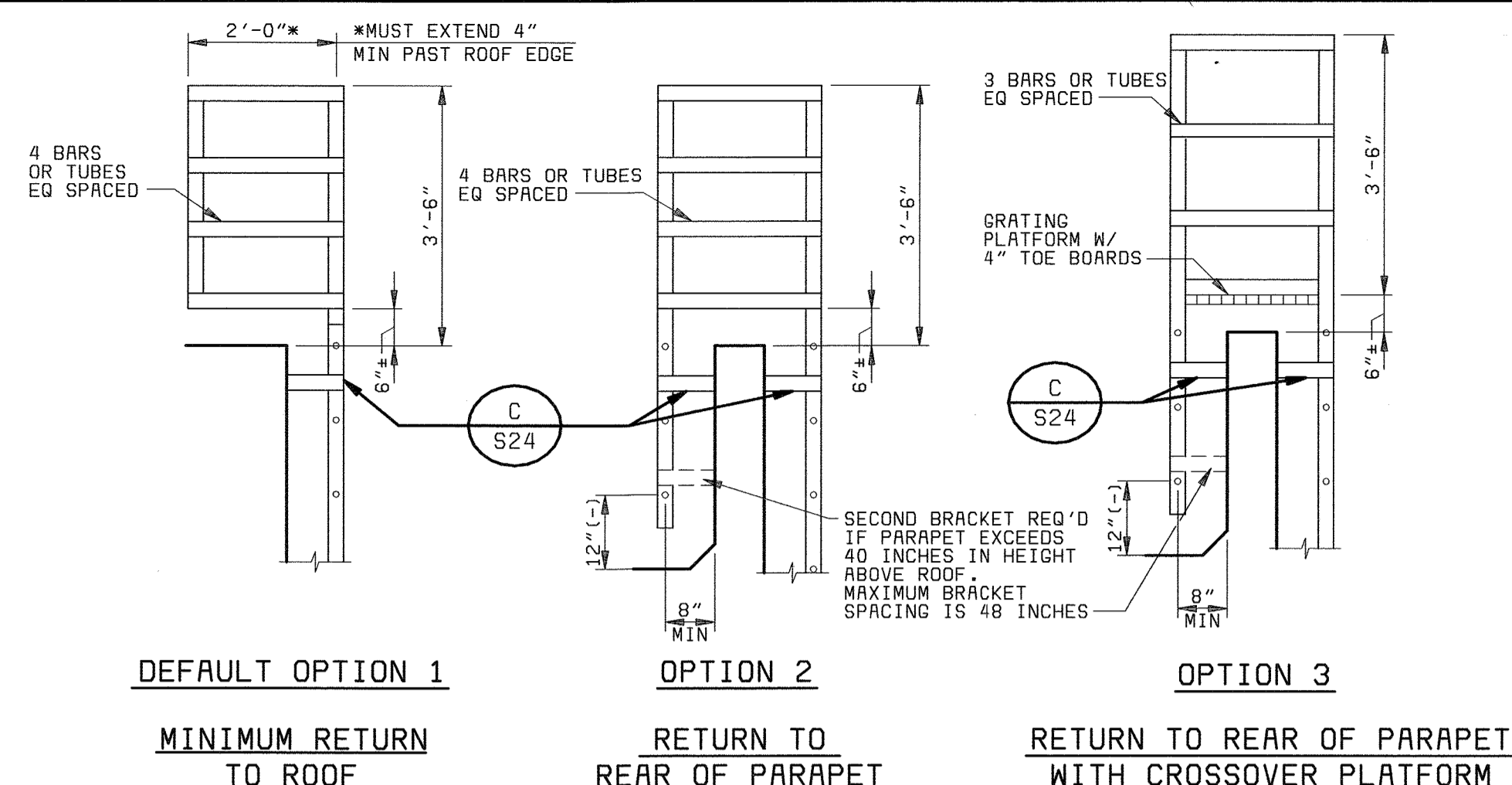
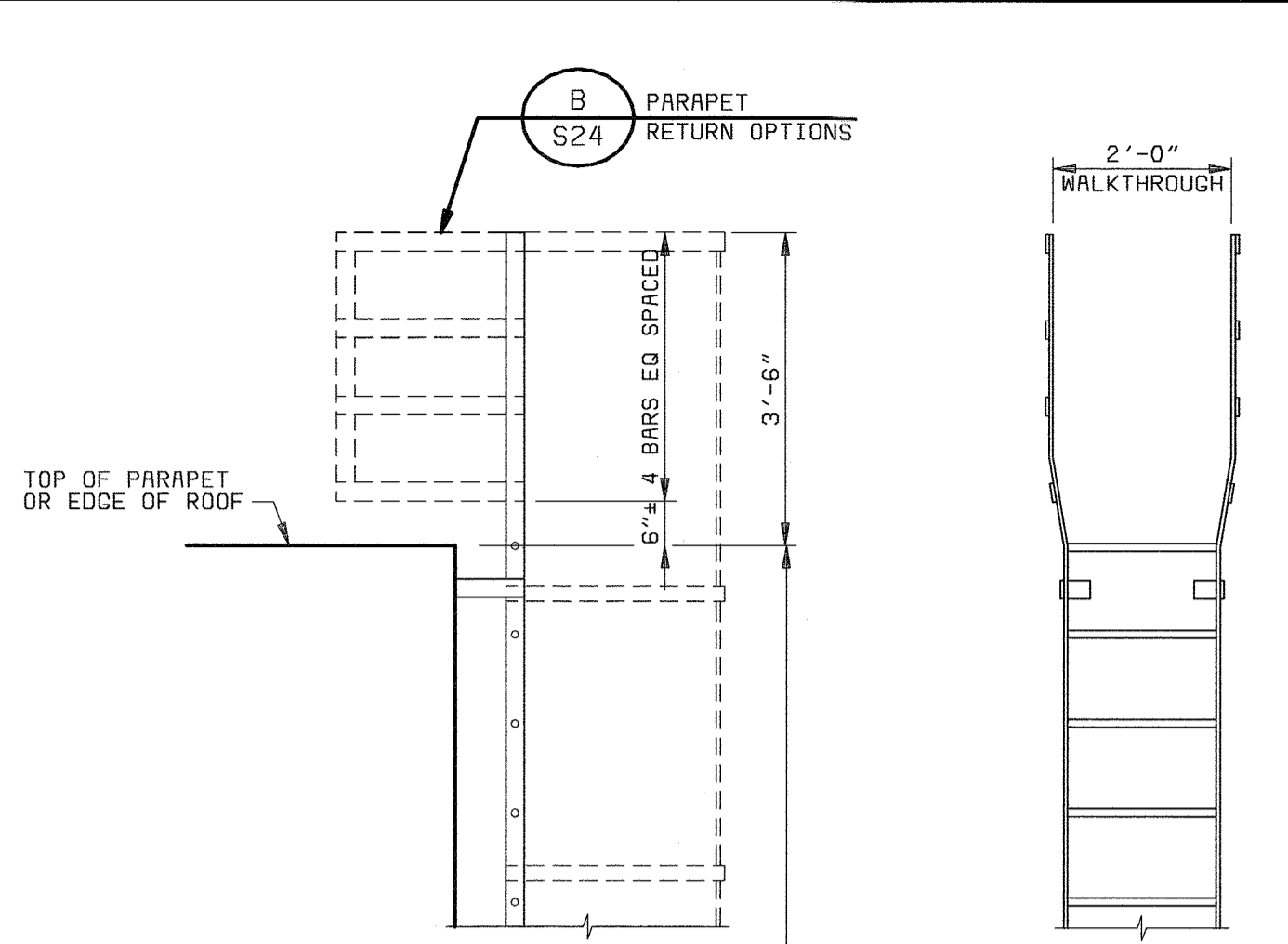
THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. RECTANUS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: STD					
DRN: B&V					
CHK: RJR					
DATE: 05/10/02	DATE	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS/RJR/RJR	
			REVISIONS AND RECORD OF ISSUE	NO.	BY CK APP

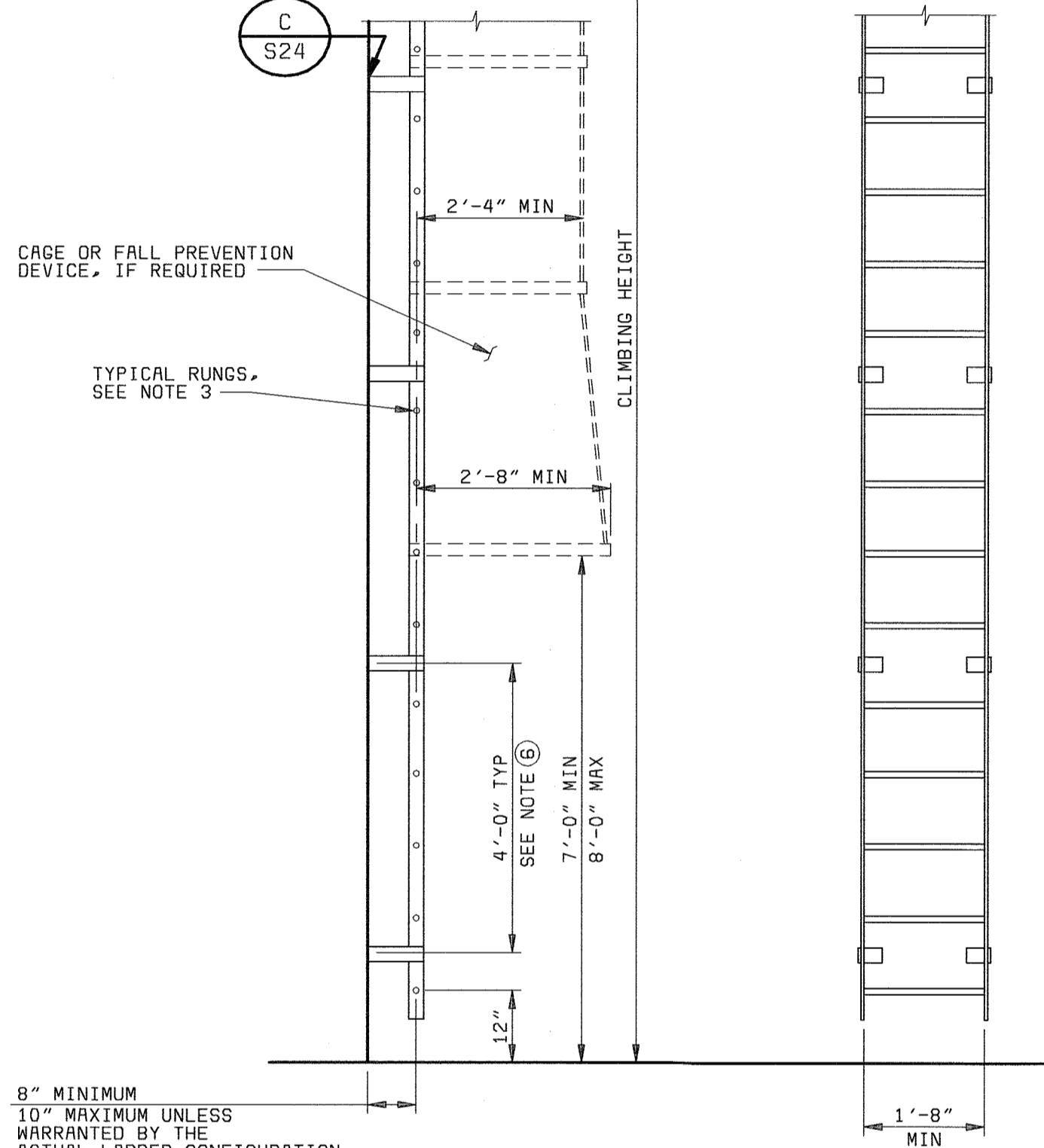
GENERAL  
STRUCTURAL  
STANDARD MASONRY DETAILS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

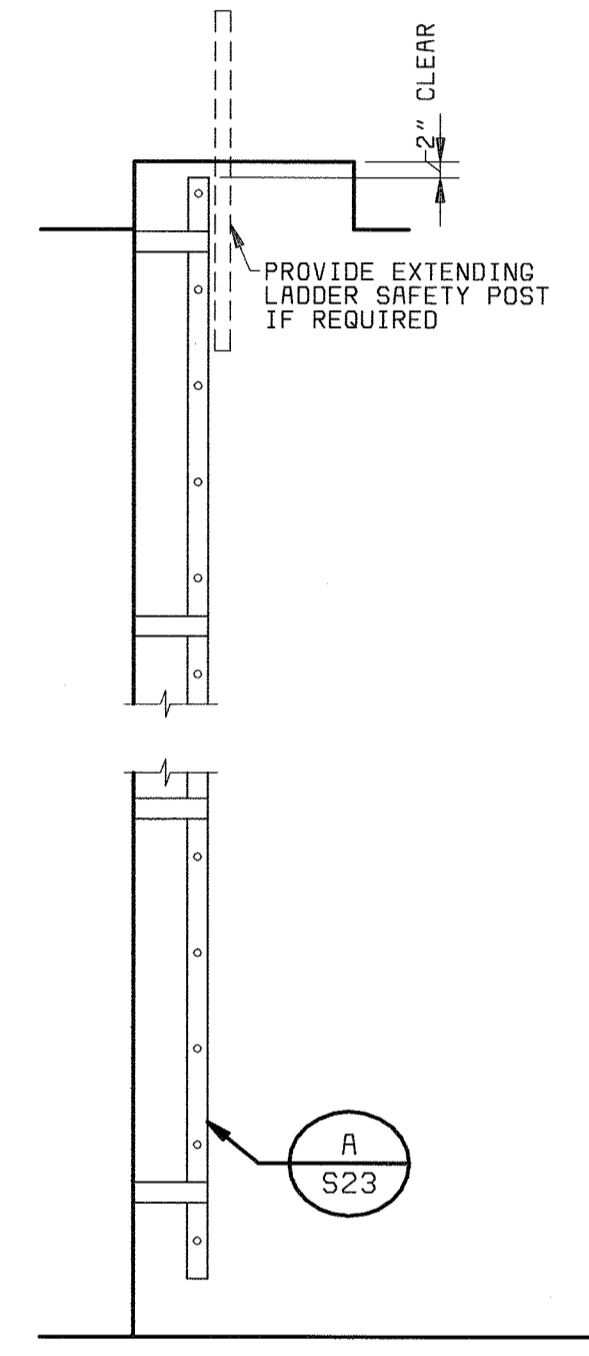
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S32



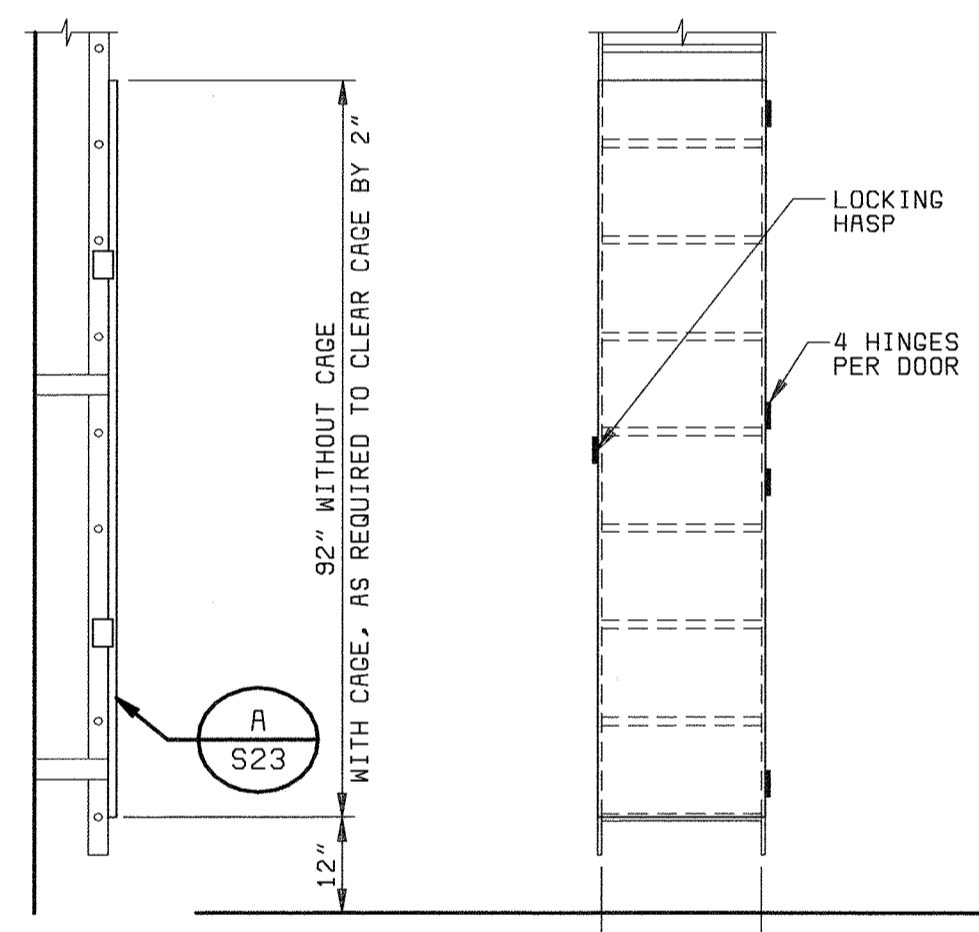
**TYPICAL LADDER BRACKET CONNECTIONS**  
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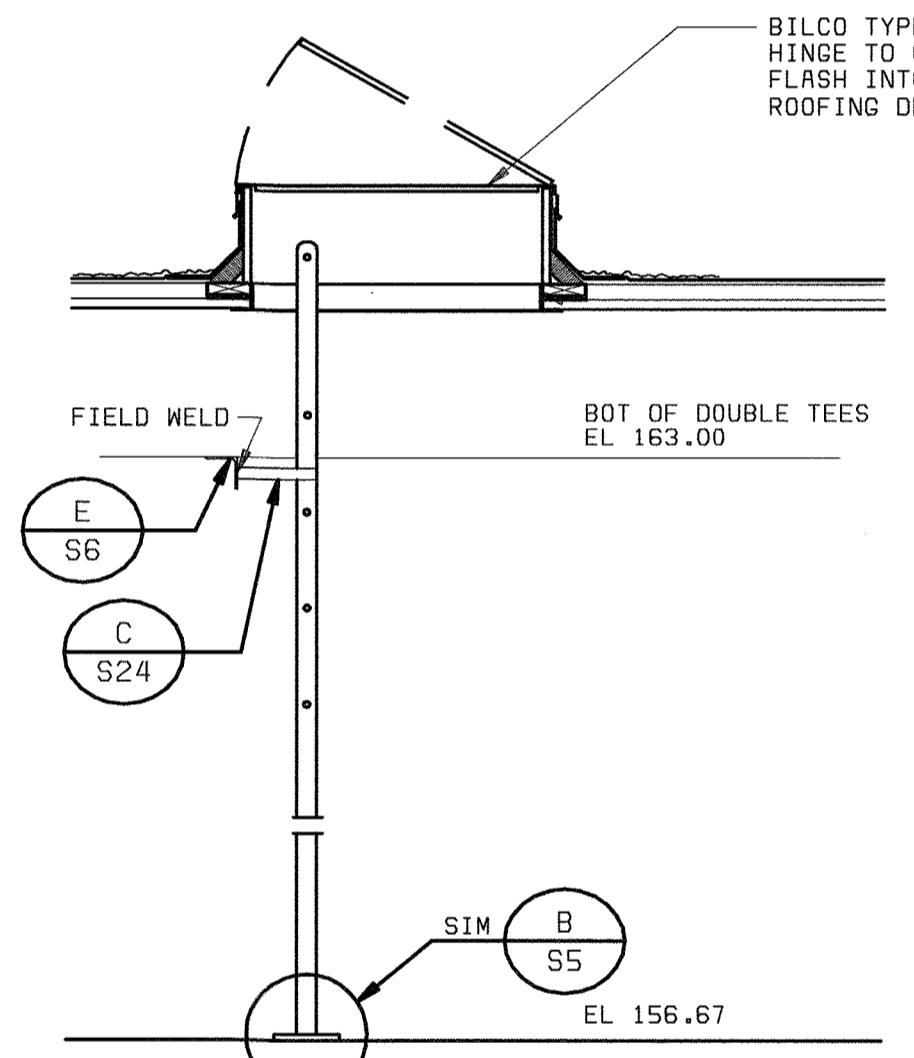
**TYPICAL LADDER**  
1/2" = 1'-0"



**UNDER HATCH**  
1/2" = 1'-0"



**SECURITY DOOR**  
1/2" = 1'-0"



**ROOF HATCH**  
1/2" = 1'-0"

NOTE: A CAGE OR FALL PREVENTION DEVICE, AS REQUIRED, SHALL BE FURNISHED FOR ALL CLIMBING HEIGHTS GREATER THAN 20'-0". FOR CLIMBING HEIGHTS GREATER THAN 30'-0", REST PLATFORMS SHALL BE FURNISHED AS REQUIRED TO LIMIT STRAIGHT CLIMBS TO 30'-0".

- NOTES:**
- ALL LADDERS, CAGES AND REST PLATFORMS, COMPLETE WITH GUARDRAILING AND GRATING AS REQUIRED, SHALL BE DESIGNED AND FABRICATED BY THE LADDER SUPPLIER IN CONFORMANCE WITH THE LATEST ISSUE OF OSHA/ANSI A14.3, APPLICABLE BUILDING CODE STANDARDS FOR FIXED WALL LADDERS, AND THE REQUIREMENTS OF THE CONTRACT DRAWINGS AND SPECIFICATIONS. GENERAL CONFIGURATION AND DETAILS SHALL CONFORM WITH THIS DRAWING. ALL REST PLATFORMS SHALL BE GUARDED WITH STANDARD 3-RAIL RAILING WITH STANDARD TOE BOARD.
  - LADDER AND ALL APPURTENANCES TO BE MATERIAL AS NOTED ON DRAWINGS. COORDINATE MATERIALS AND FABRICATION WITH THE SPECIFICATIONS FOR MISCELLANEOUS METALS, GUARDRAILING, GRATING AND FIBERGLASS, IF APPLICABLE.
    - STEEL (PAINTED) - ASTM A36, SHOP PRIME PAINTED
    - STEEL (GALVANIZED) - ASTM A36, ZINC COATED IN ACCORDANCE WITH ASTM A123.
    - ALUMINUM - ALUMINUM ASTM A6061-T6 ALLOY WITH MILL FINISH UNLESS NOTED OTHERWISE.
    - STAINLESS STEEL - ASTM TYPE 316L
    - FIBERGLASS - FIBERGLASS REINFORCED PULTRUDED TUBE, UV PROTECTED.
    - GRATING - 1" THICK MIN; PAINTED, GALVANIZED OR STAINLESS STEEL, ALUMINUM OR FIBERGLASS TO MATCH LADDER MATERIAL.
    - HANDRAIL - 1 1/2" OR 1 3/4" ROUND OR SQUARE, 3 HORIZONTAL RAILS WITH MINIMUM 4" KICK PLATE.
  - LADDER RUNGS TO BE 1" DIA BARS OR PREFABRICATED FLAT TOP LADDER TREADS W/ MINIMUM 1" WIDE SLIP RESISTANT SURFACES. SPACE RUNGS AT 12". LADDER SIDE RAILS TO BE PIPE, TUBE OR FLAT STOCK.
  - FURNISH LADDERS IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
  - IF REQUIRED BY THE ENGINEER, CALCULATIONS OR TEST REPORTS VERIFYING THE LADDERS COMPLIANCE WITH APPLICABLE STANDARDS SHALL BE SUBMITTED. THESE SUBMITTALS SHALL BE SEALED BY A PROFESSIONAL ENGINEER REGISTERED IN THE STATE OF THE PROJECT.
  - IF A LADDER CONFIGURATION INDICATED ON THE DRAWINGS REQUIRES THAT THE LADDER SPAN A GREATER DISTANCE BETWEEN SUPPORTS THAN INDICATED ON THE TYPICAL DETAILS, THE LADDER SUPPLIER SHALL DESIGN THE LADDER, THE LADDER BRACKET, AND THE LADDER BRACKET CONNECTIONS FOR THE INDICATED SPAN IN ACCORDANCE WITH NOTE 1 ABOVE. THE BRACKET CONNECTIONS SHALL BE AT LEAST EQUAL TO THE TYPICAL CONNECTIONS INDICATED.

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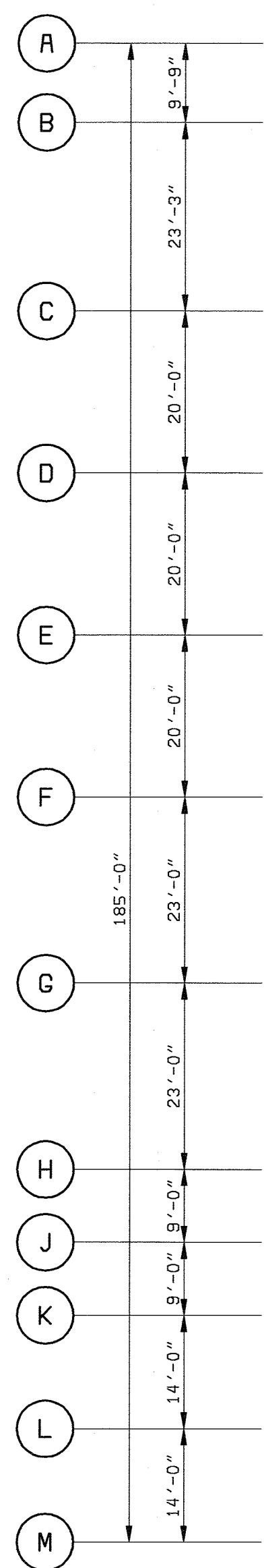
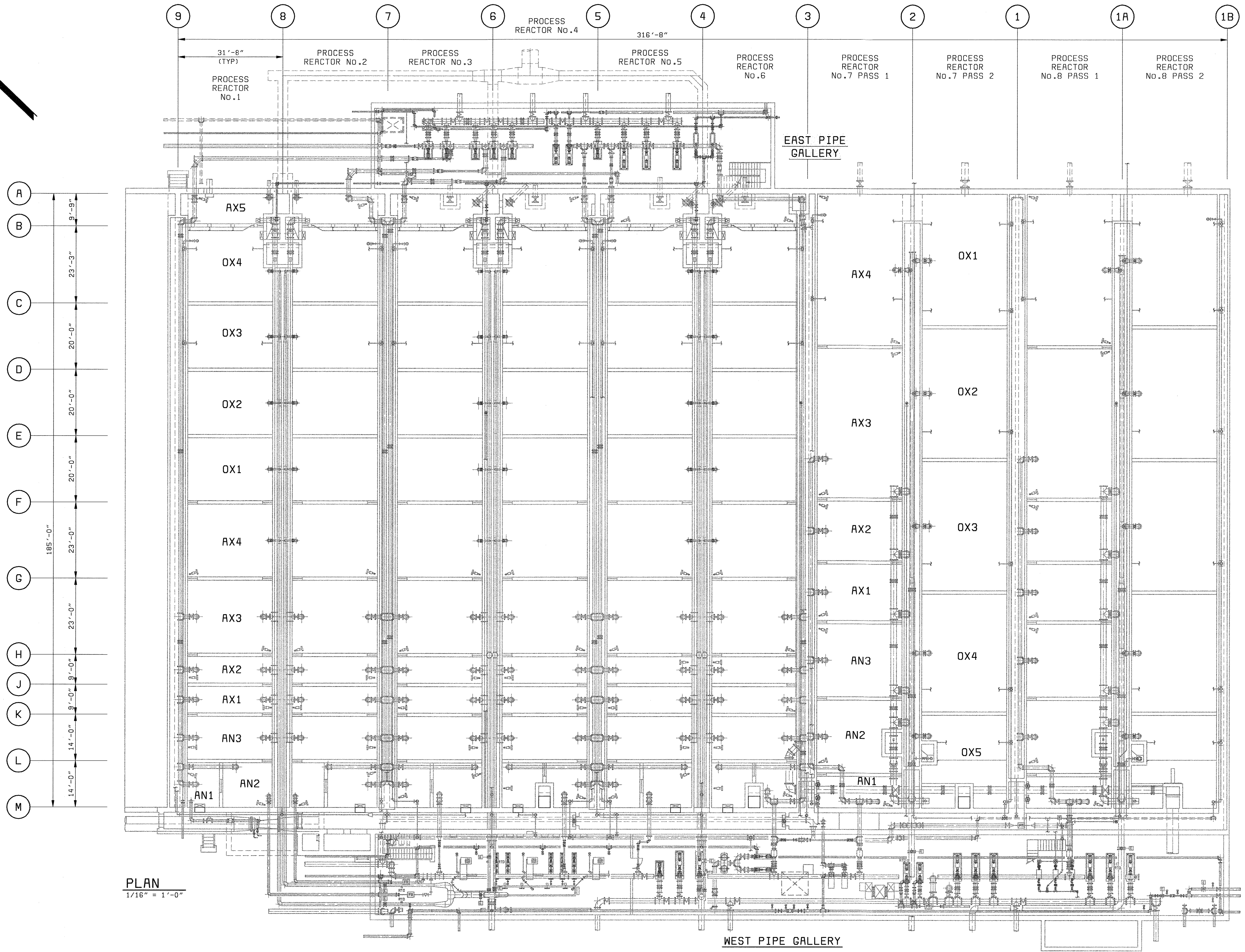
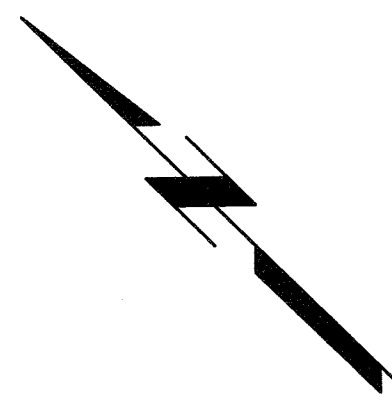
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FOR CONSTRUCTION  
AND SEALED BY  
RICHARD H. FOSTER  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 12053

DES: STD					
DRN: RLC					
CHK: RJR					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

**GENERAL STRUCTURAL**  
**LADDER DETAILS**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
ADDITION NO. 6  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

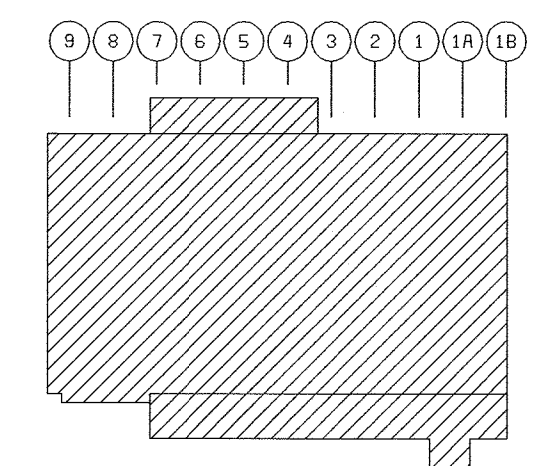
SCALE AS SHOWN  
SHEET 50 OF 139  
**S33**



**PLAN**  
1/16" = 1'-0"

**NOTES:**

1. CELL NUMBERS SHOWN IN PR No.1 ARE TYPICAL FOR CELLS 1 TO 6.
2. CELL NUMBERS SHOWN IN PR No.7 ARE TYPICAL FOR CELLS 7 & 8.



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



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Surrey, BC  
V3W 1J8  
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Fax (604) 591-1856  
Email: surrey@stantec.com



**BLACK & VEATCH**  
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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JAN SZENOZIELORZ  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25097

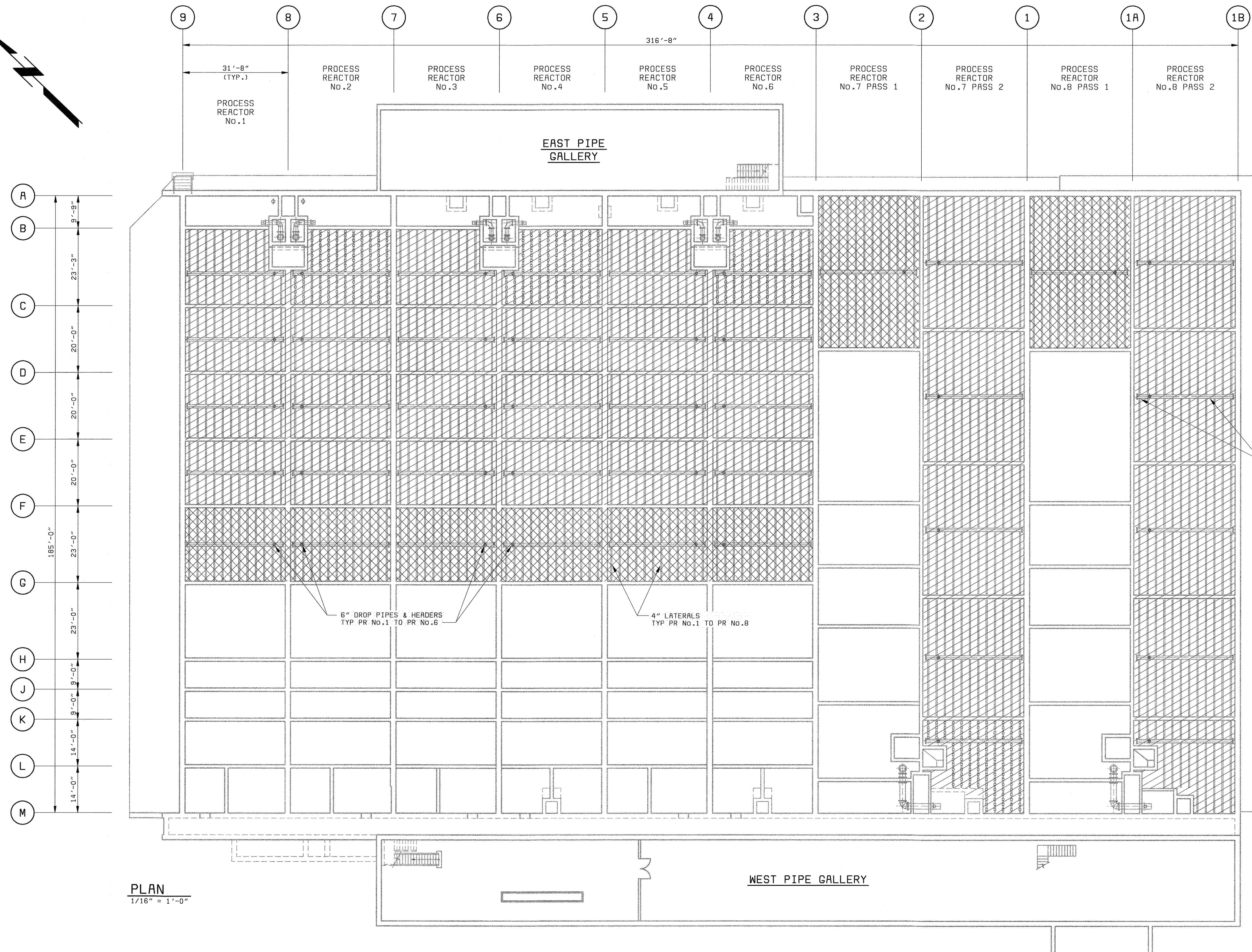
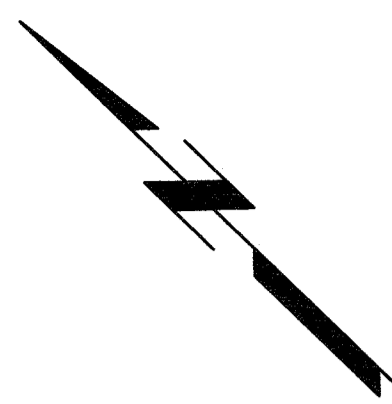
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DRN: RCF					
CHK: JS					
DATE: 5/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS/RJR/RJR		
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	APP

**EAST-WEST PROCESS REACTORS**  
**MECHANICAL**  
**EXISTING EQUIPMENT AND PIPING**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
  
SHEET  
51 OF 139  
  
**M1**

D58472-4  
P558472A



**LEGEND:**

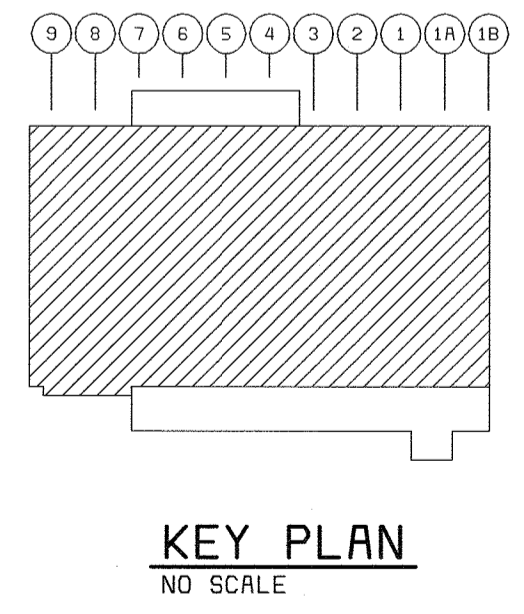
- CERAMIC DISK DIFFUSER & PIPING GRID
- MEMBRANE DISK DIFFUSER & PIPING GRID
- EXISTING DIFFUSERS, DROP PIPES, MANIFOLDS & PIPING GRIDS TO BE REMOVED.
- SALVAGE CERAMIC DISKS.

12" DROP PIPES & HEADERS  
TYP PR NO.7 & PR NO.8

6" DROP PIPES & HEADERS  
TYP PR NO.1 TO PR NO.6

4" LATERALS  
TYP PR NO.1 TO PR NO.8

**PLAN**  
1/16" = 1'-0"



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



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DRN: RCF							
CHK: JS							
DATE: 5/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS			PJS/RJR/RJR		
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	

**EAST-WEST PROCESS REACTORS**  
**MECHANICAL**

**DEMOLITION PLAN**  
**LOWER LEVEL**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

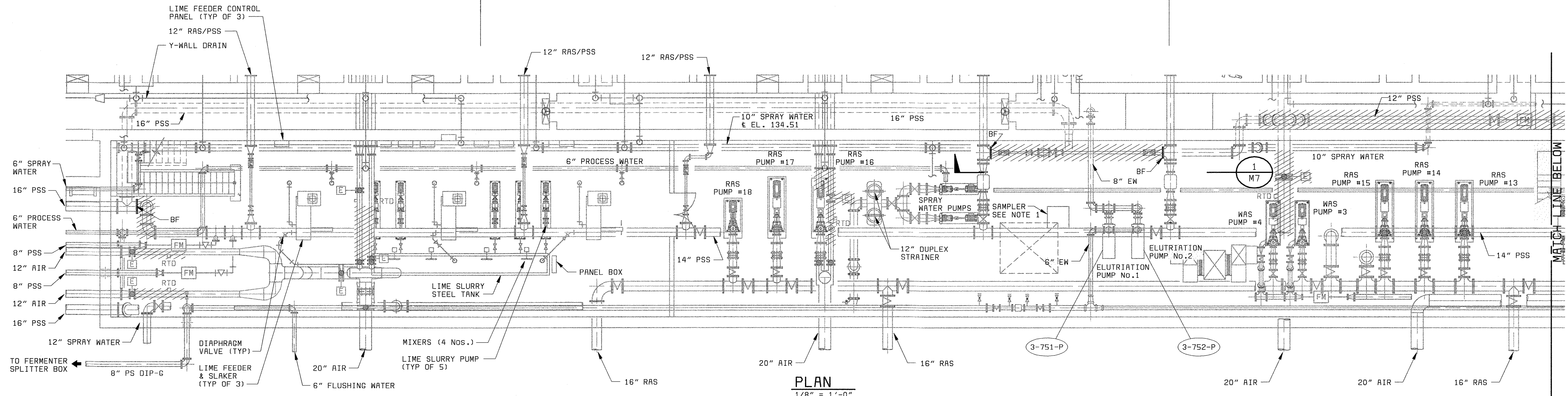
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AS  
SHOWN

SHEET  
55 OF 139

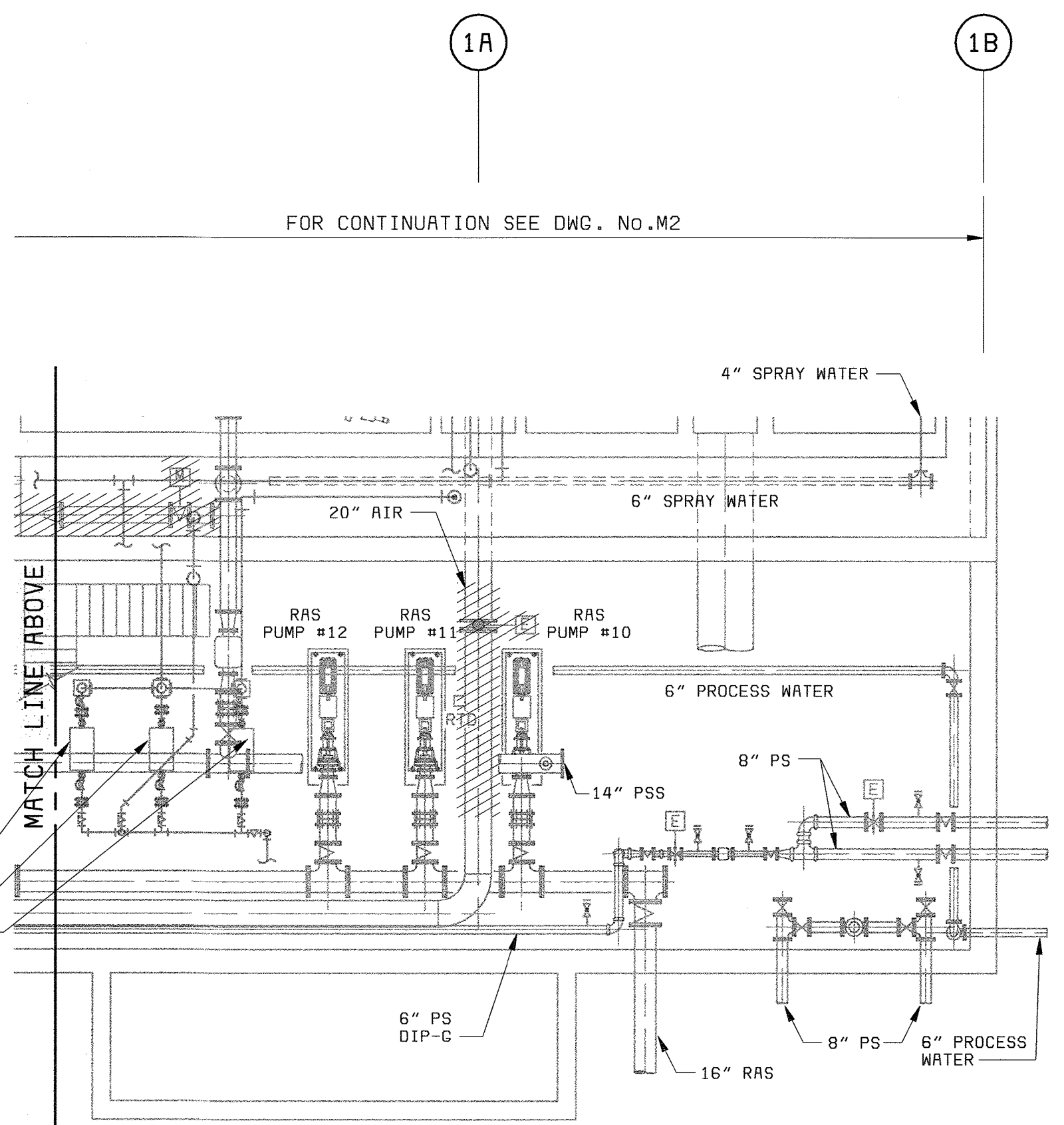
**M5**

058472-4  
F058472A

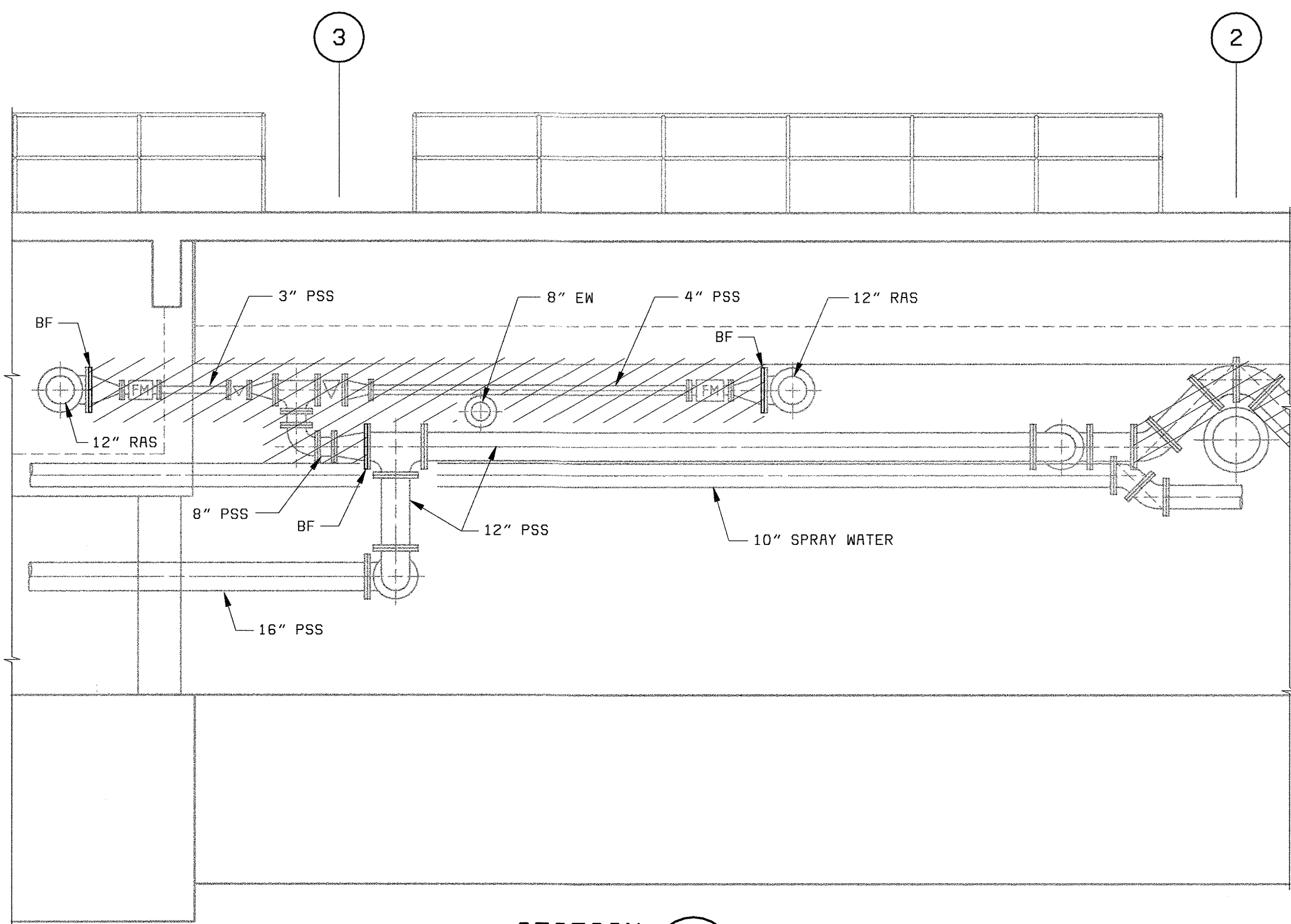
FOR CONTINUATION SEE DWG. No.M4      FOR CONTINUATION SEE DWG. No.M3      FOR CONTINUATION SEE DWG. No.M2



**PLAN**  
1/8" = 1'-0"

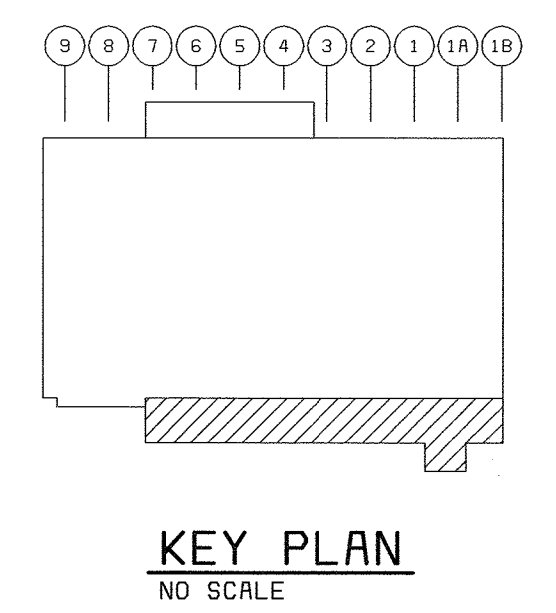


**PLAN**  
1/8" = 1'-0"



**SECTION 1**  
1/4" = 1'-0" M7

**NOTES:**  
1. RECONNECT TO EXISTING PIPING PERM27R.



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



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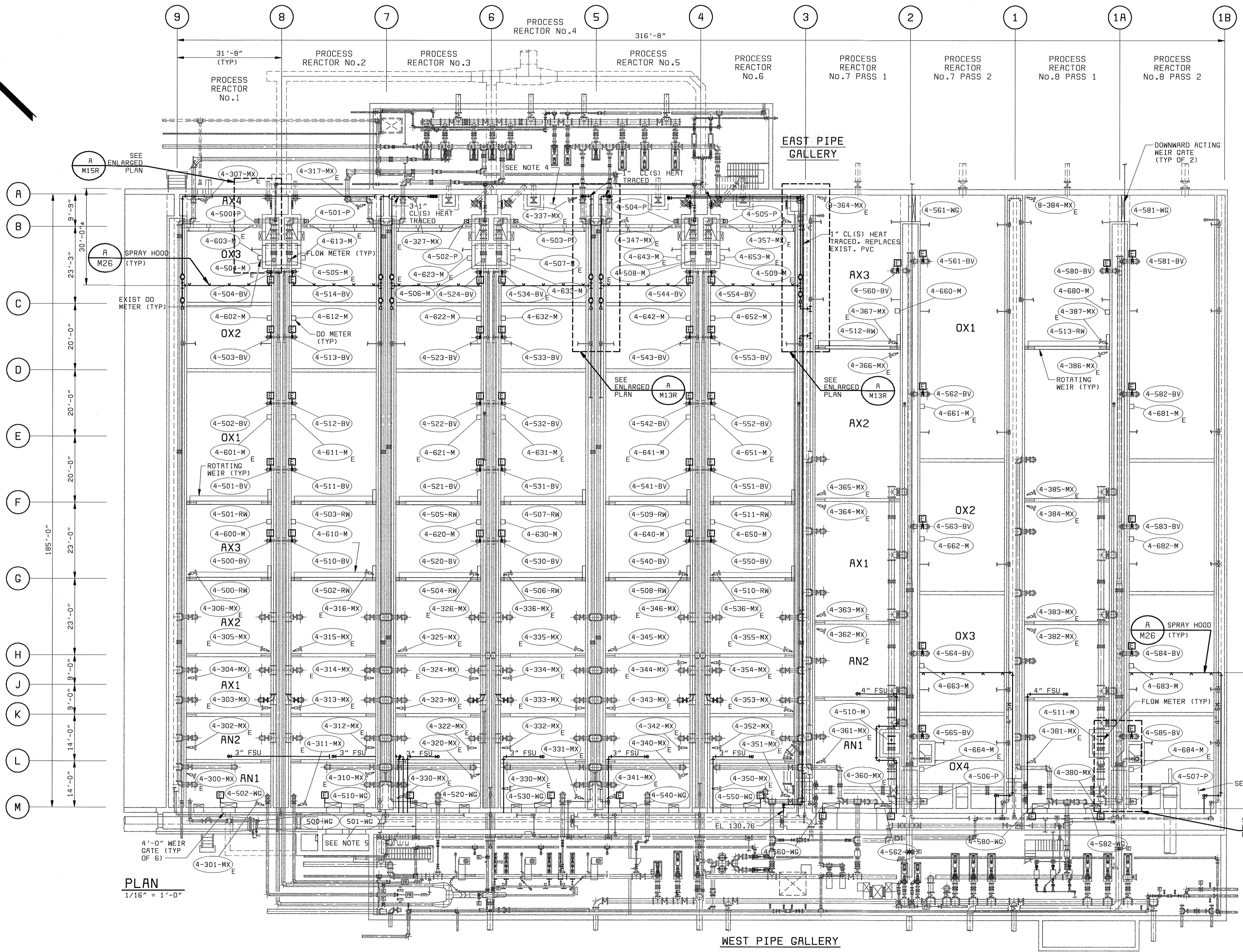
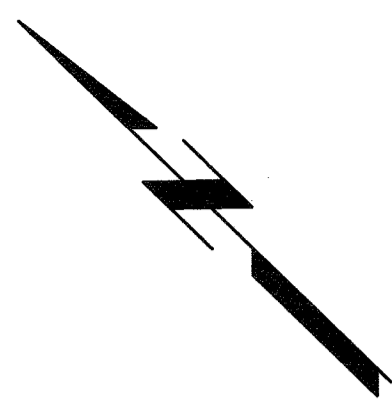
DES: RVJ					
DRN: RCF					
CHK: JS	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
DATE: 5/10/02	4/21/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY

**WEST GALLERY  
MECHANICAL**  
  
**DEMOLITION PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

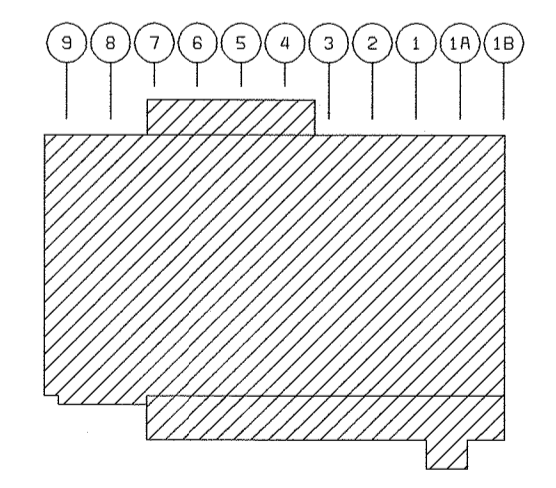
SCALE  
AS  
SHOWN  
  
SHEET  
57 OF 139  
  
**M7R**

DB8472-4  
FD58472A



**PLAN**  
1/16" = 1'-0"

- NOTES:**
- CELL NUMBERS SHOWN IN PR NO. 1 ARE TYPICAL FOR CELLS 1 TO 6.
  - CELL NUMBERS SHOWN IN PR NO. 7 ARE TYPICAL FOR CELLS 7 & 8.
  - SUBSCRIPT "E" ON TAG NUMBERS INDICATES THAT EQUIPMENT IS EXISTING WITH NEW TAG NUMBERS.
  - EFFLUENT TROUGH NOT SHOWN FOR CLARITY, SEE DRAWING 510R.
  - MODIFY SPRAY PIPING IN INFLUENT CHANNEL AS NECESSARY TO ACCOMMODATE WEIR GATE.



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DES: RVJ					
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DATE: 5/10/02	4/21/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR/RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

**EAST-WEST PROCESS REACTORS  
MECHANICAL**

**GENERAL ARRANGEMENT PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

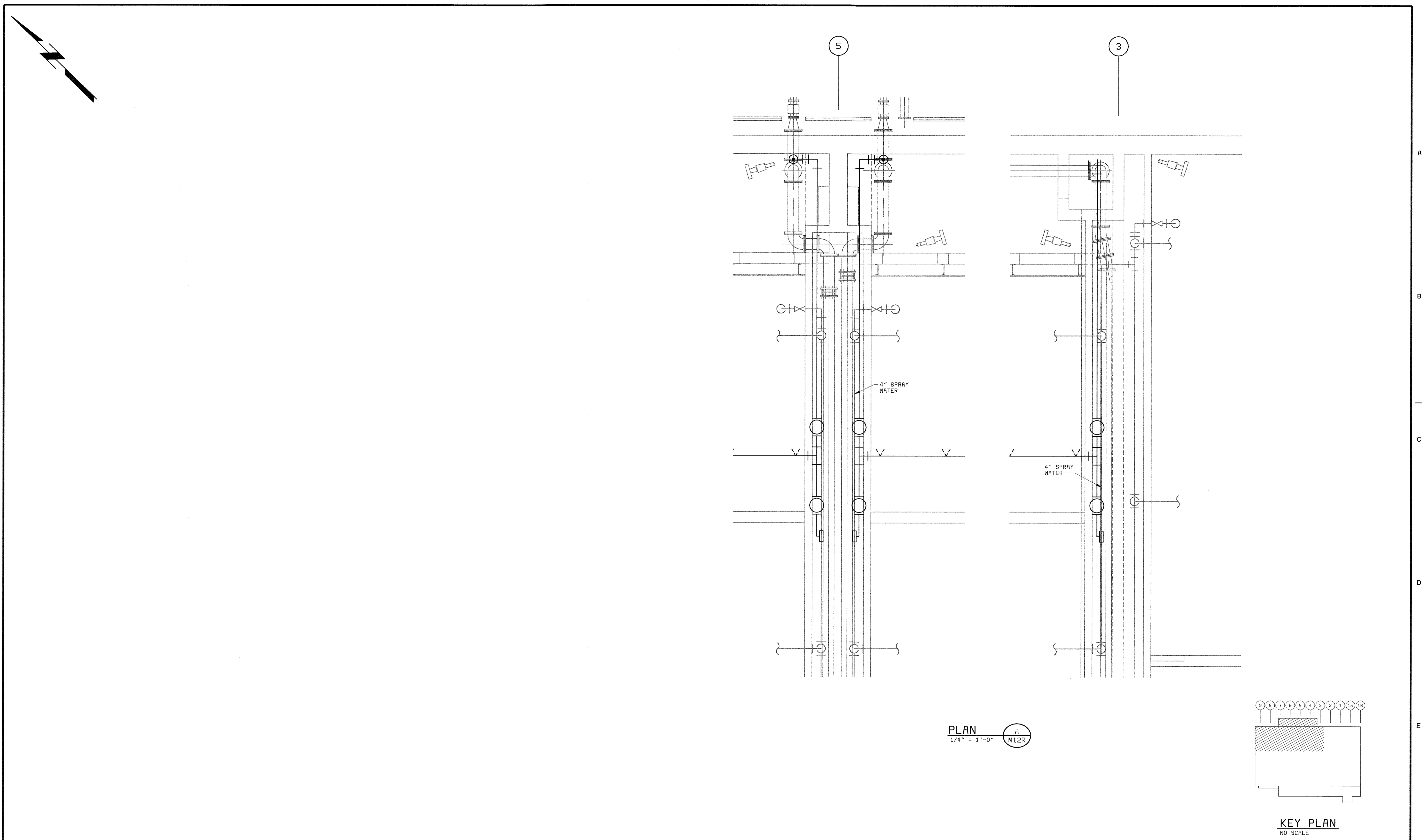
SCALE  
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SHOWN

SHEET  
62 OF 139

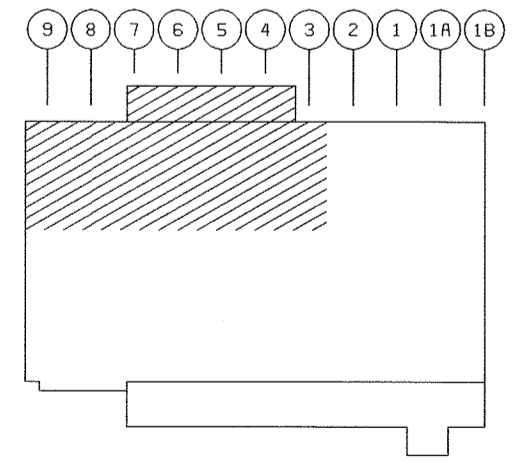
**M12R**

05/26/05

A  
B  
C  
D  
E  
F



PLAN  
1/4" = 1'-0"  
A  
M12R



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HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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NO. 22927

DES:					
DRN:					
CHK:	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS	RJR	RJR
	4/21/03	PR VALUE ENGINEERING PROPOSAL	PJS	RJR	RJR
DATE:	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

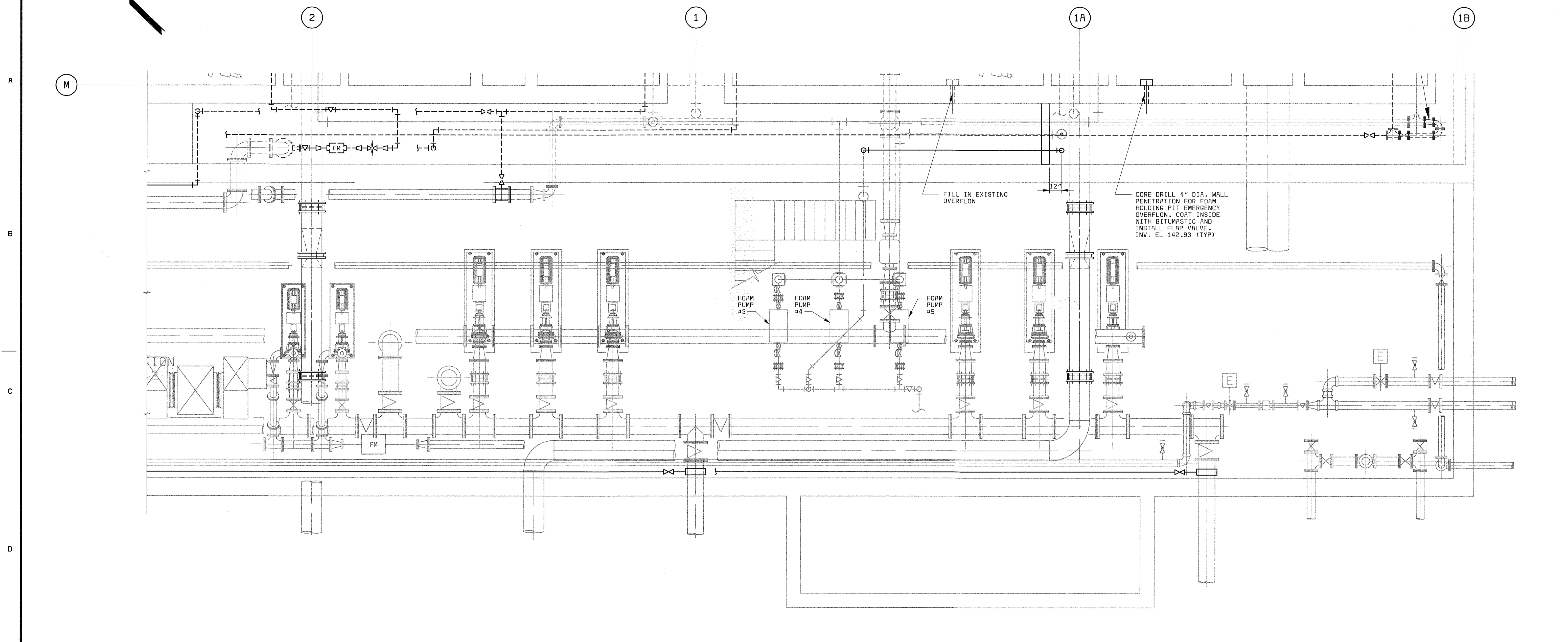
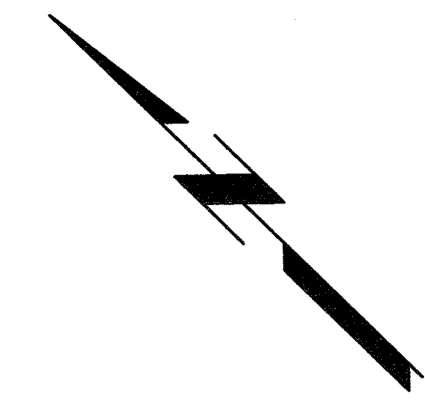
EAST-WEST PROCESS REACTORS  
MECHANICAL  
PROCESS REACTORS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

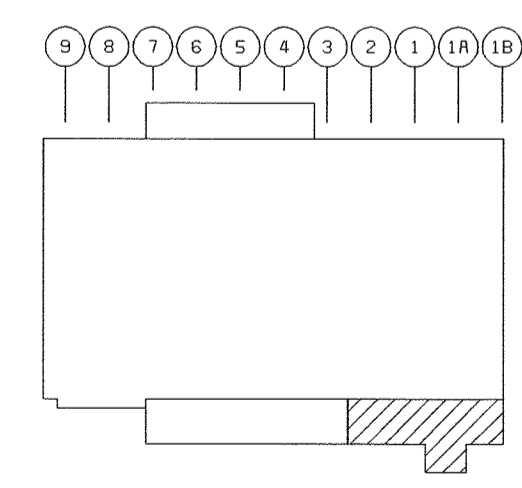
SCALE AS SHOWN  
SHEET 63 OF 139  
M13R

XSPRM2 XSPRM1 C1-CYONET-CRICHE-EG472-M12R





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



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
  
CHIEF, BUREAU OF UTILITIES DATE

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REG. PROF. ENGR. DATE

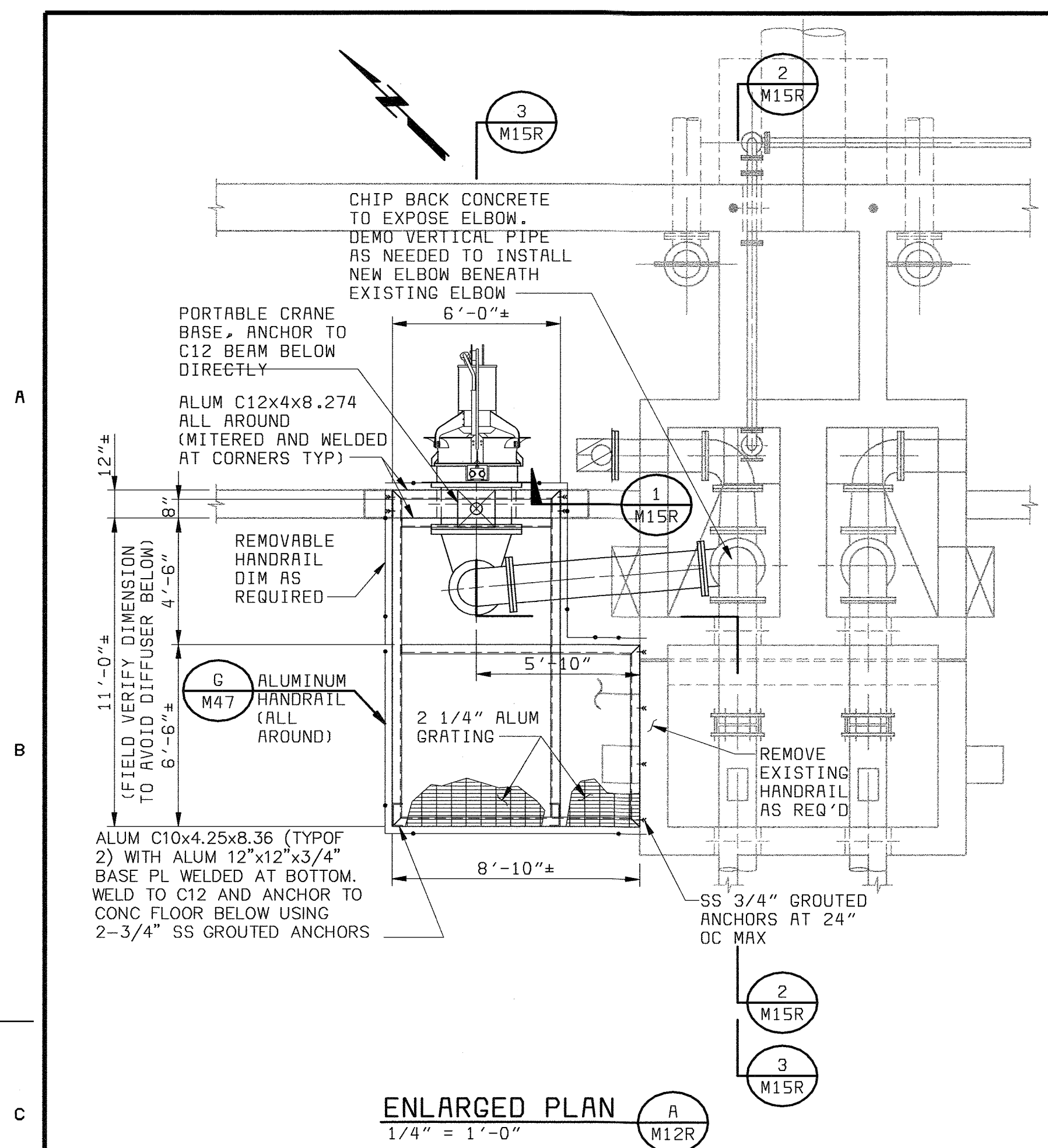
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STATE OF MARYLAND,  
NO. 22827

DES: RVJ							
DRN: RCF							
CHK: JS	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR	
DATE: 5/10/02	5/9/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY	CK	APP

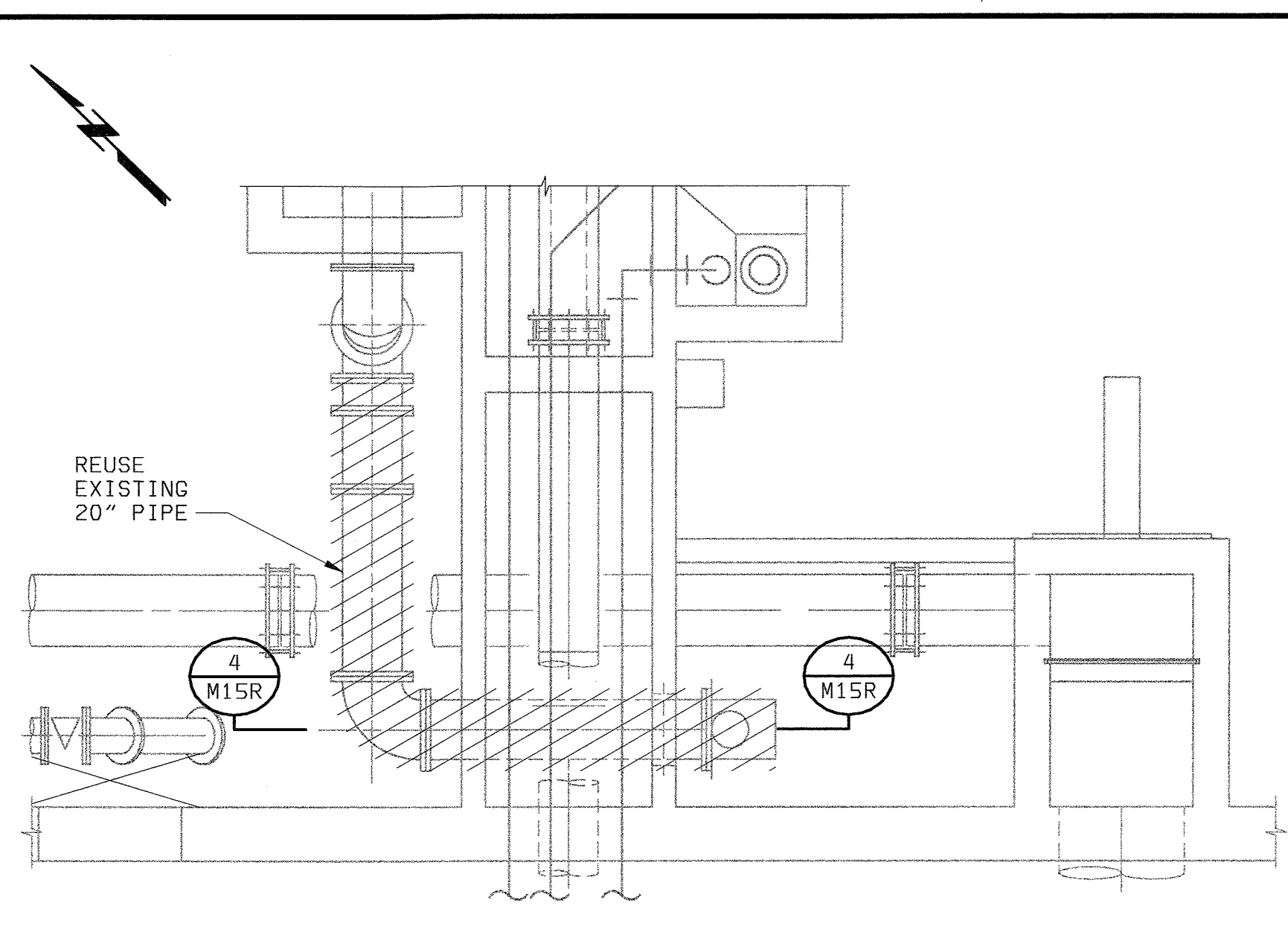
**WEST GALLERY  
MECHANICAL**  
  
**PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

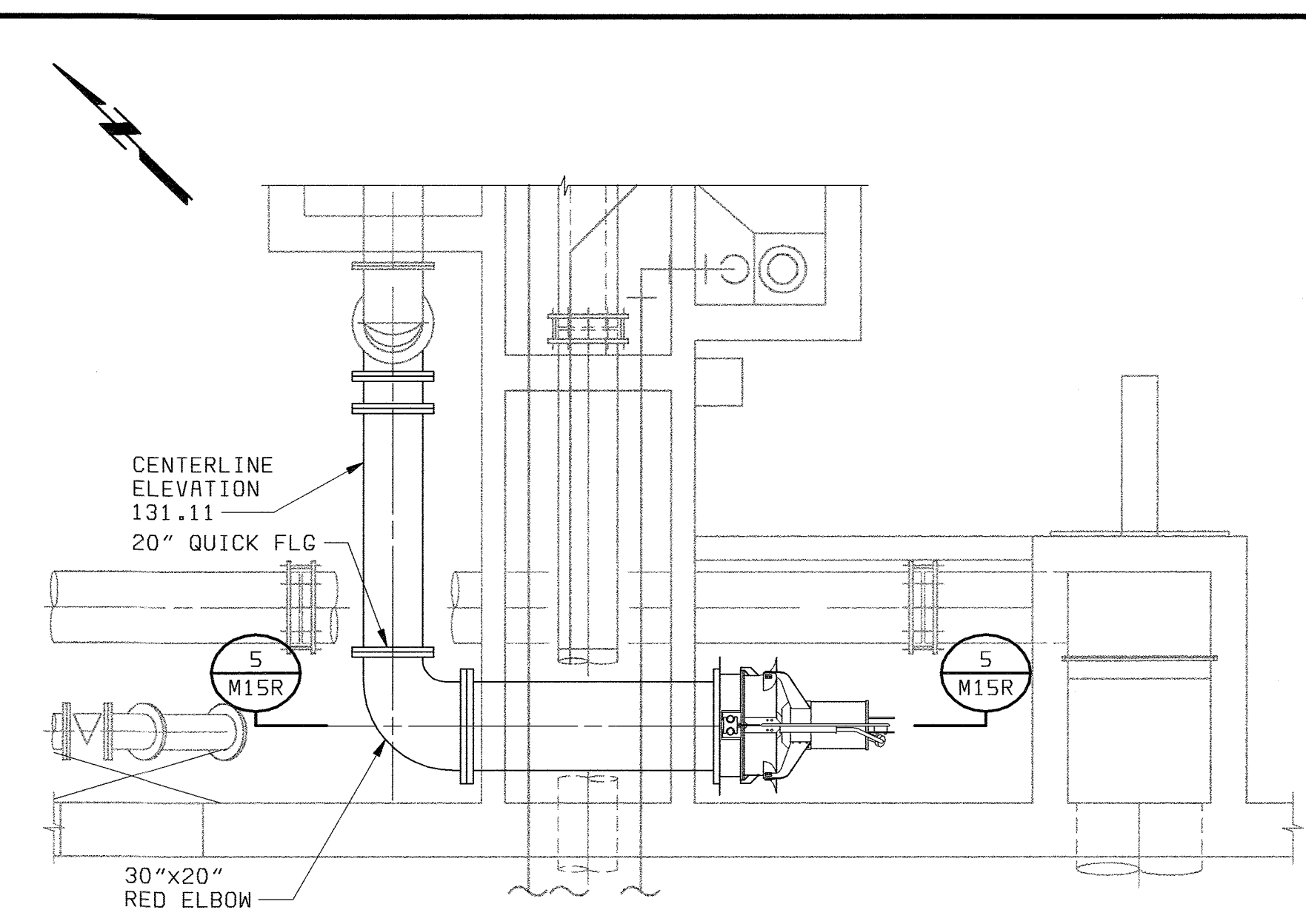
SCALE  
AS  
SHOWN  
  
SHEET  
64 OF 139  
  
**M14R**



ENLARGED PLAN A  
1/4" = 1'-0"

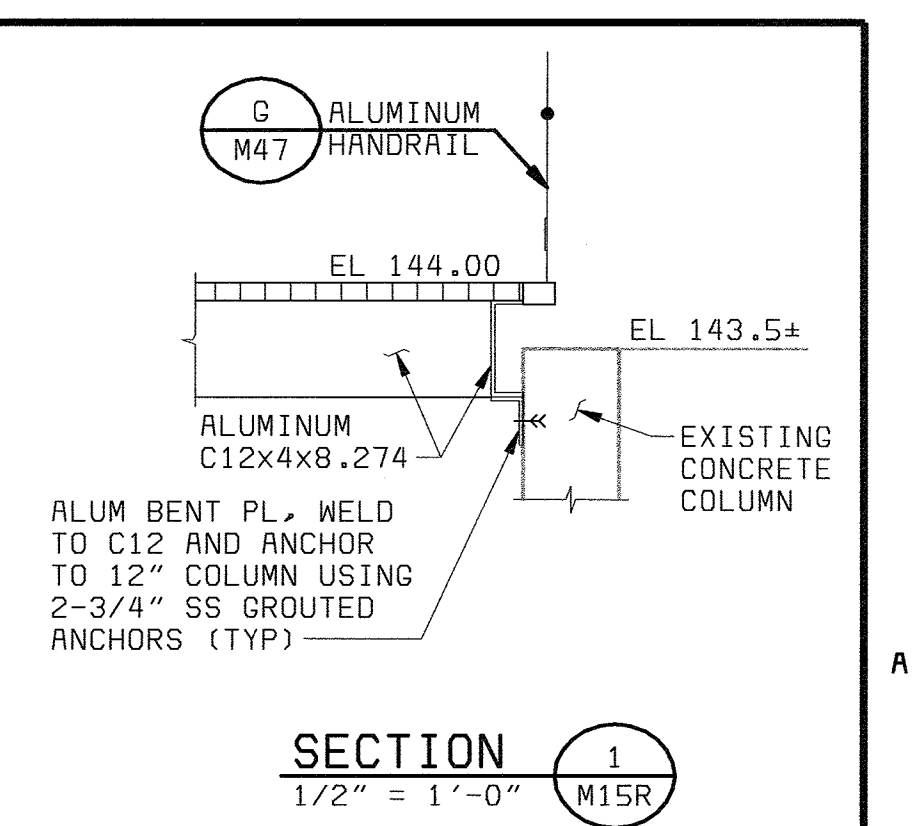


DEMOLITION PLAN

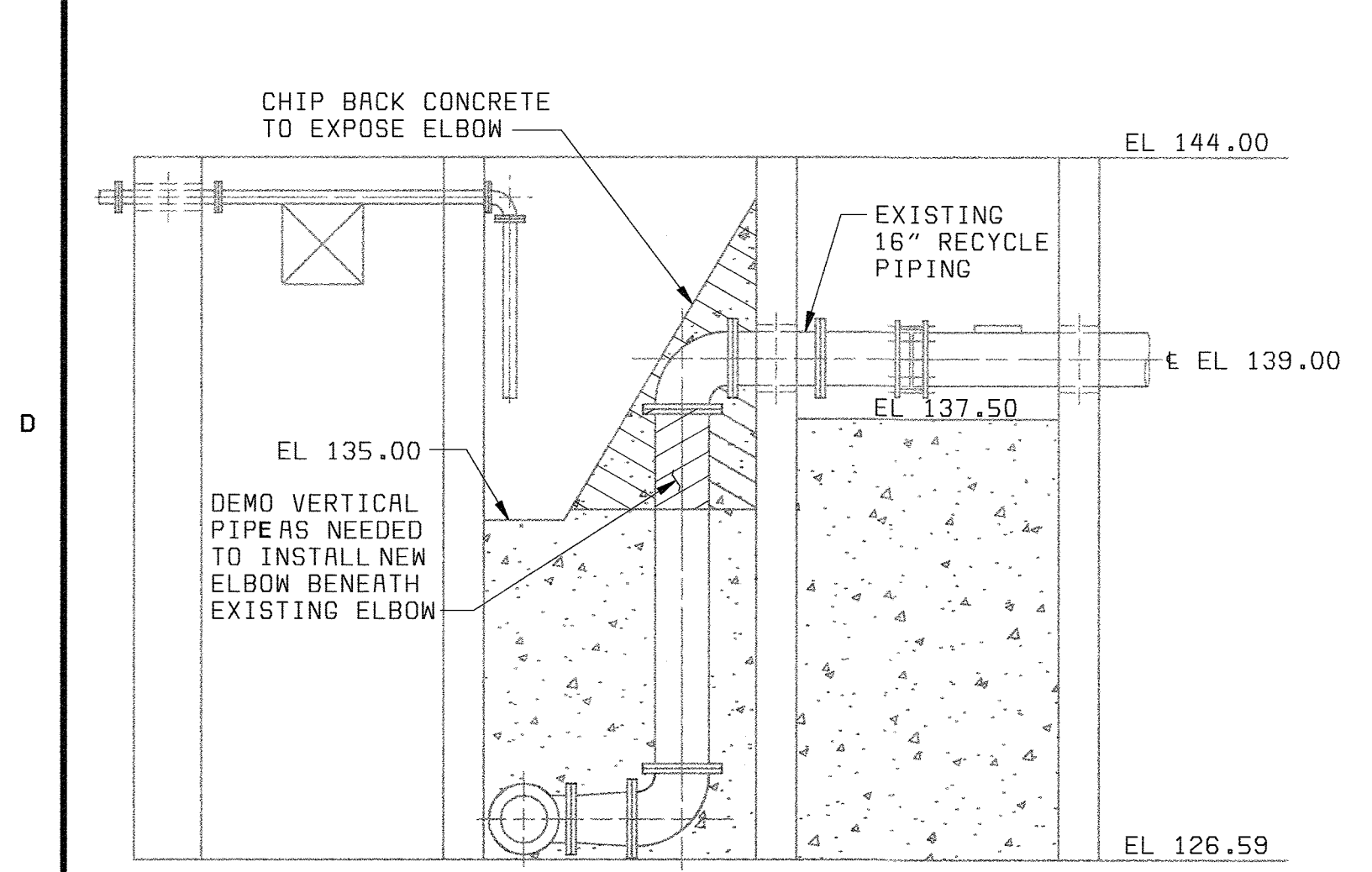


MODIFIED PLAN

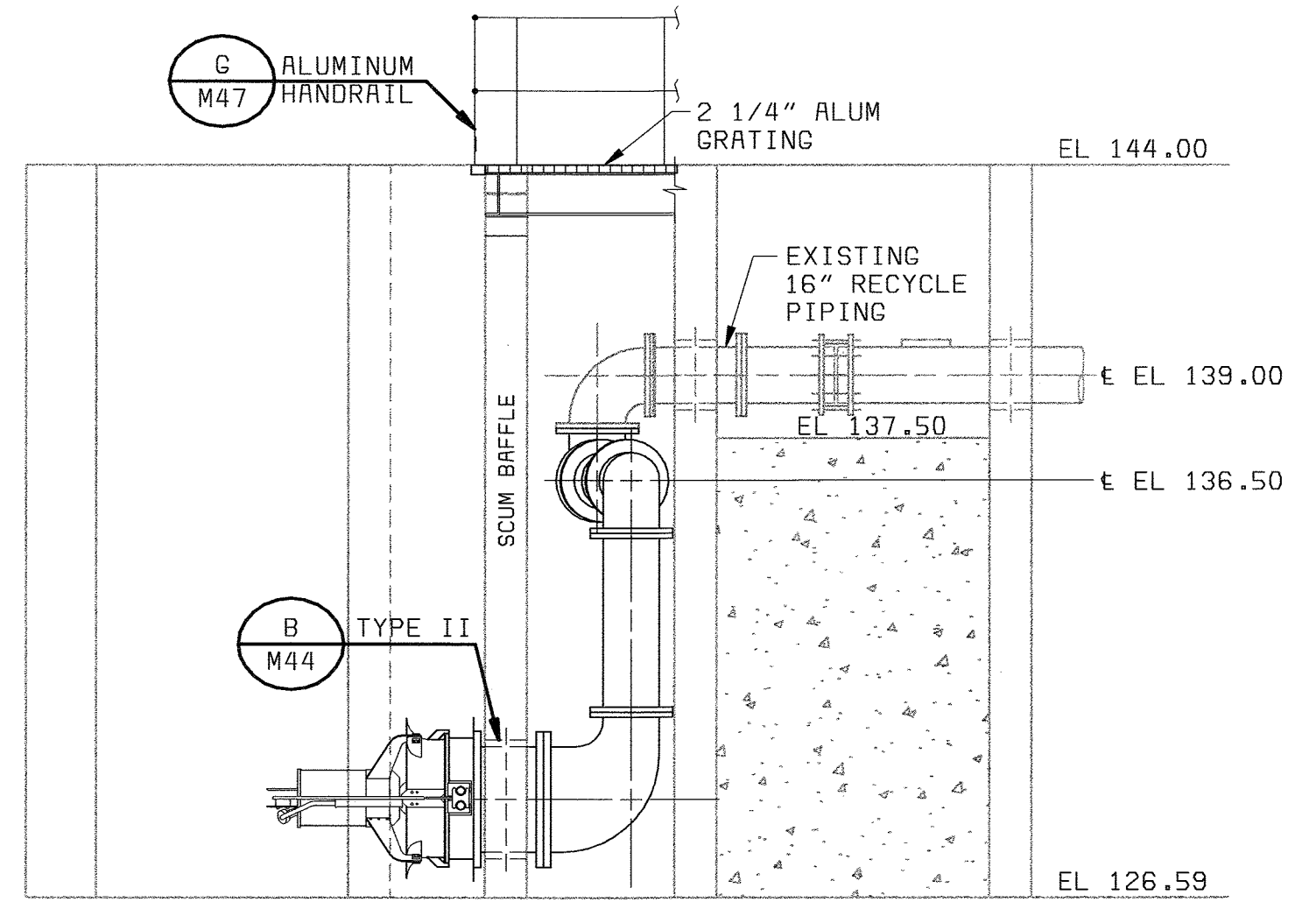
ENLARGED PLAN B  
1/4" = 1'-0"



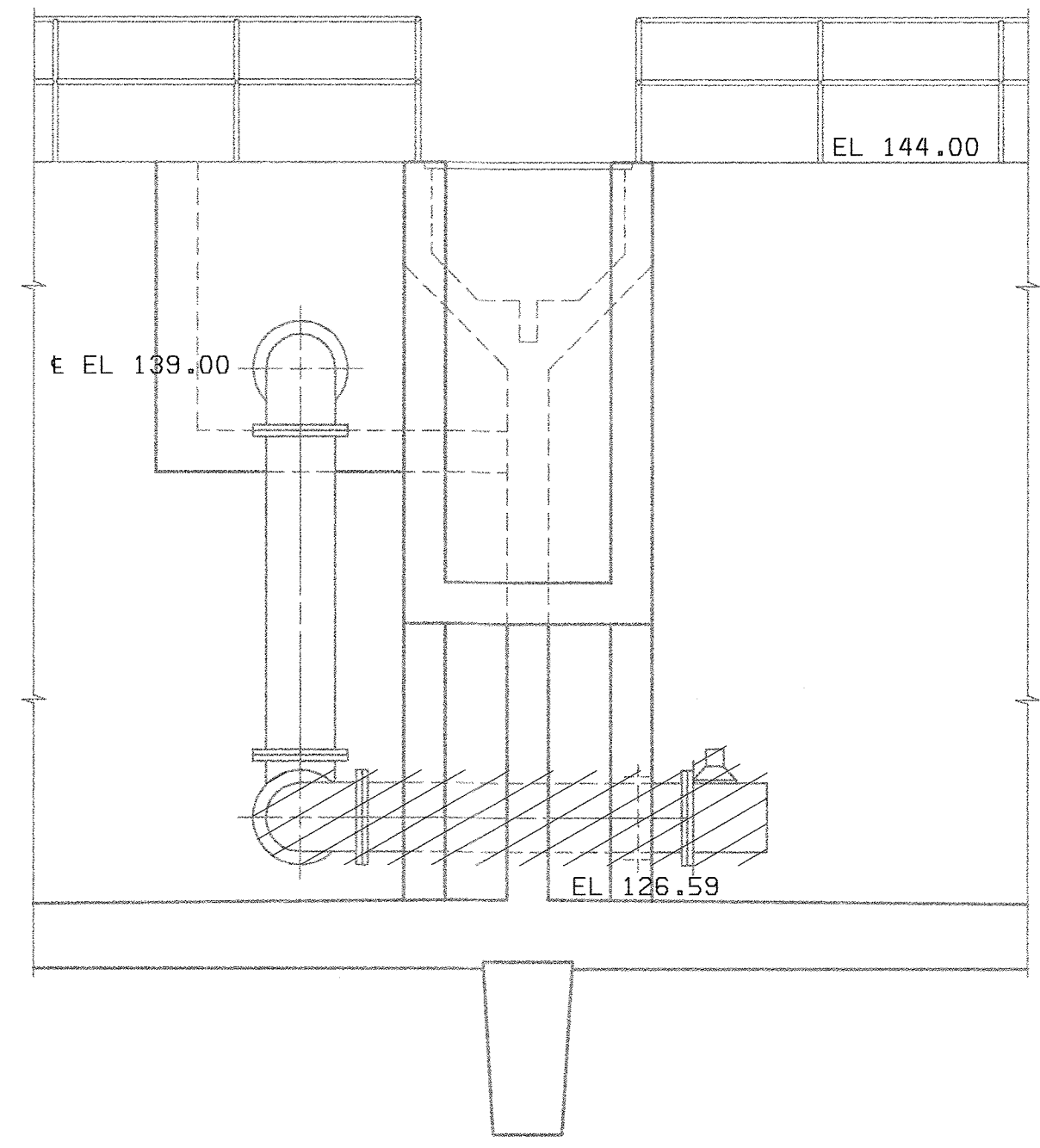
SECTION 1  
1/2" = 1'-0"



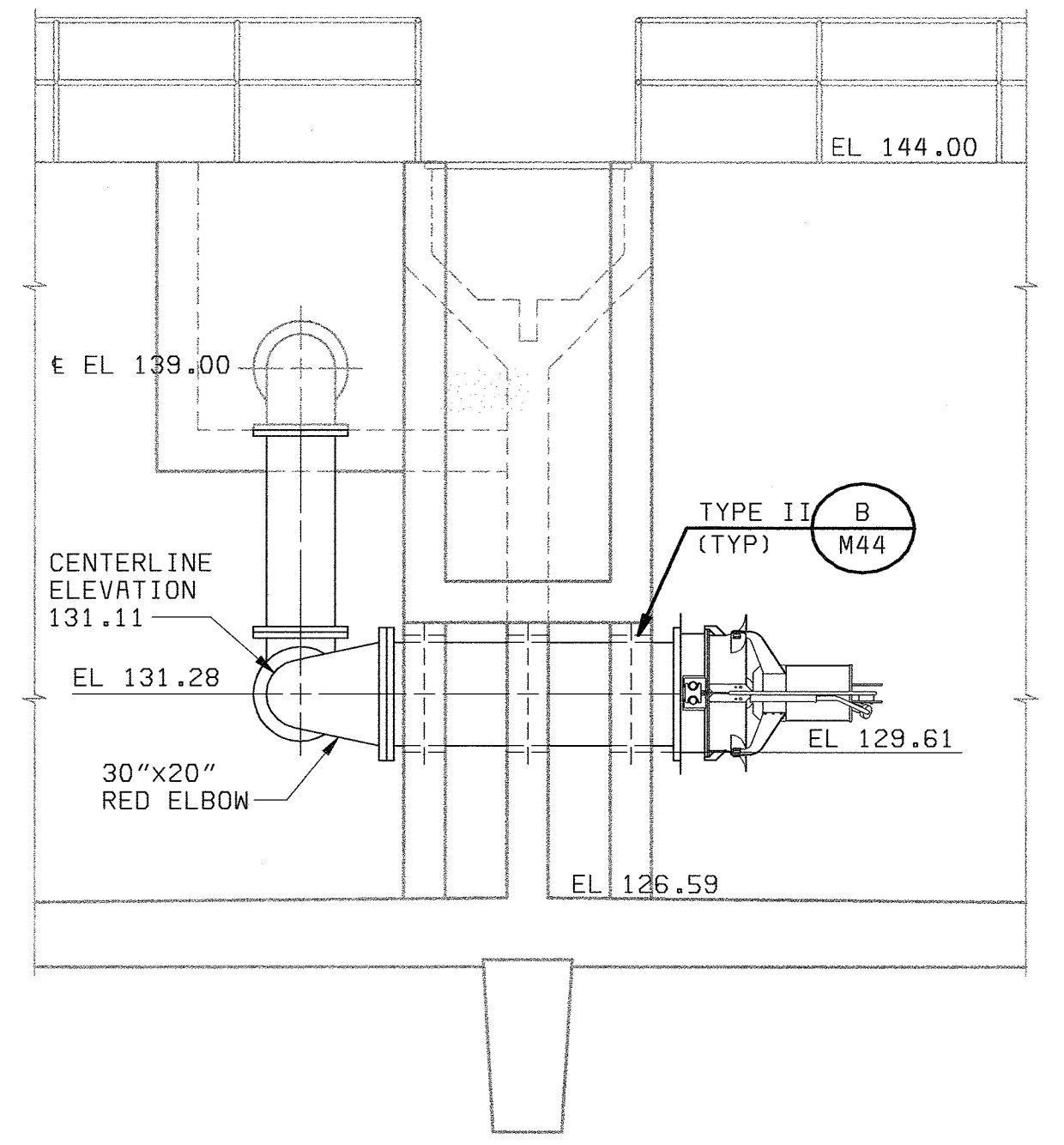
SECTION 2  
1/4" = 1'-0"



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



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



SECTION 5  
1/4" = 1'-0"

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EAST-WEST PROCESS REACTORS  
MECHANICAL

ENLARGED PLAN AND SECTIONS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

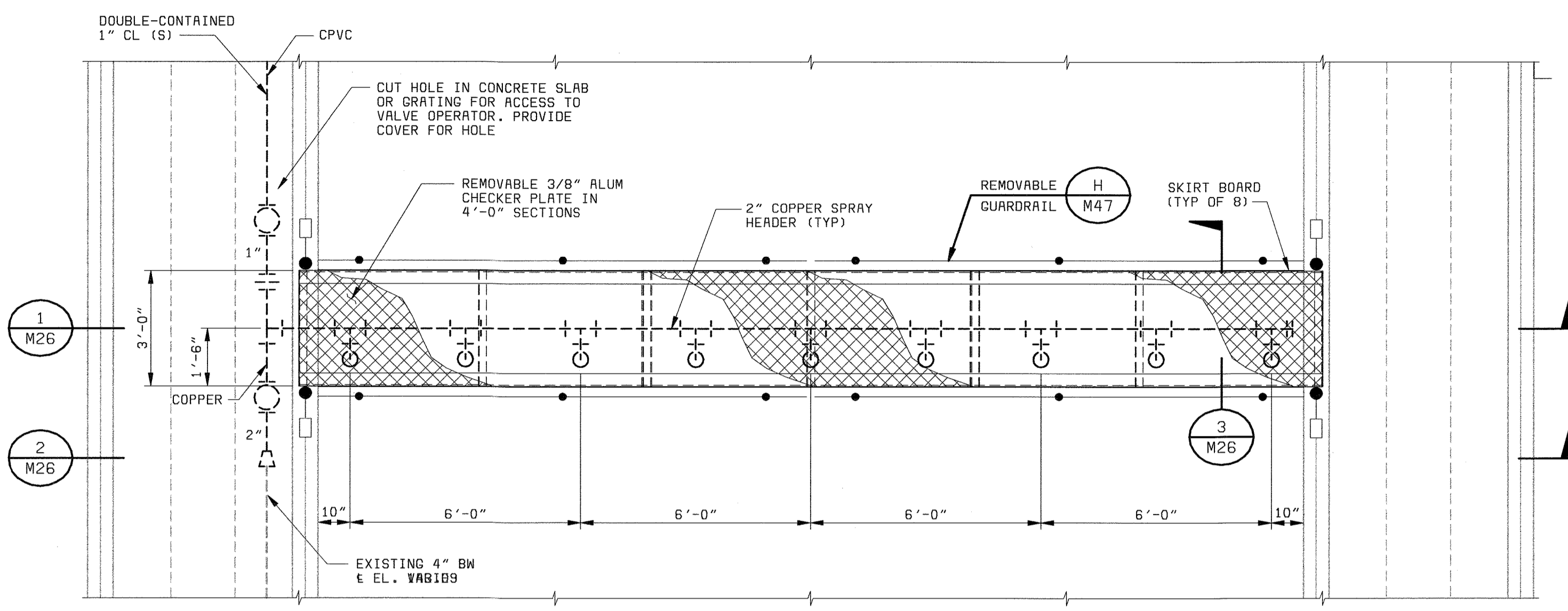
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

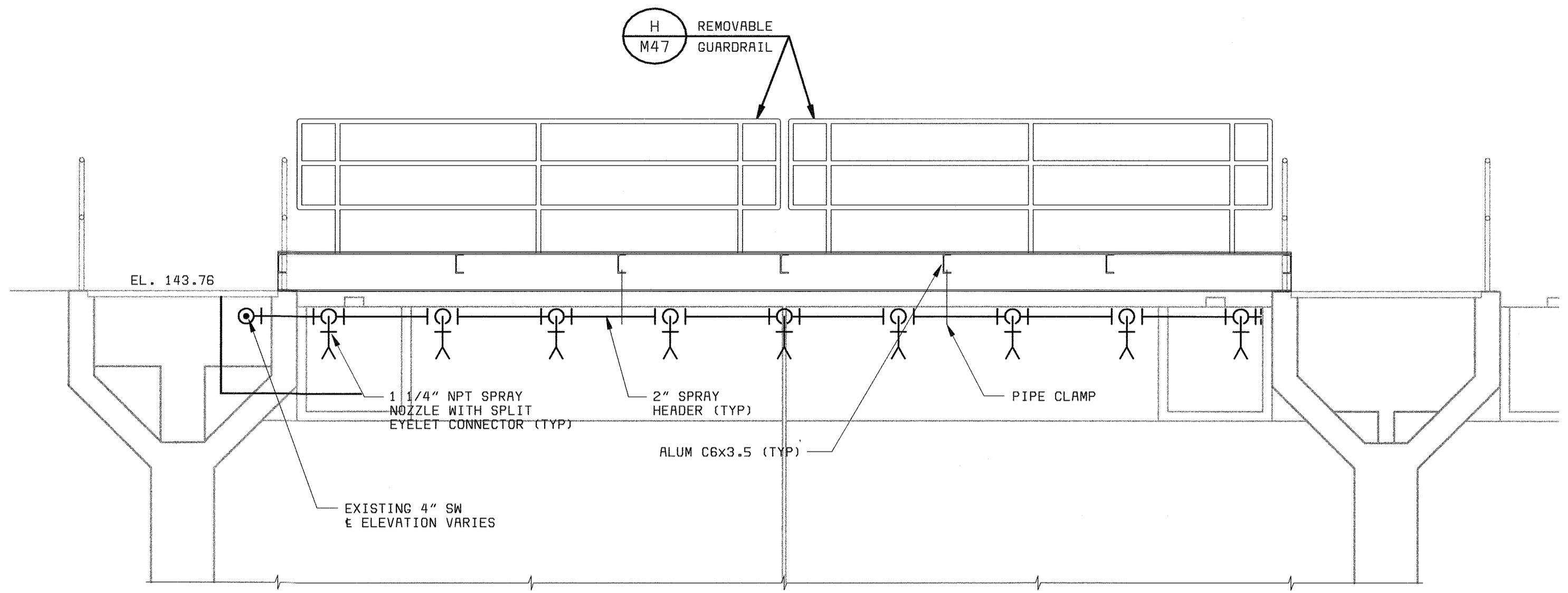
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65 SHEET  
OF 139

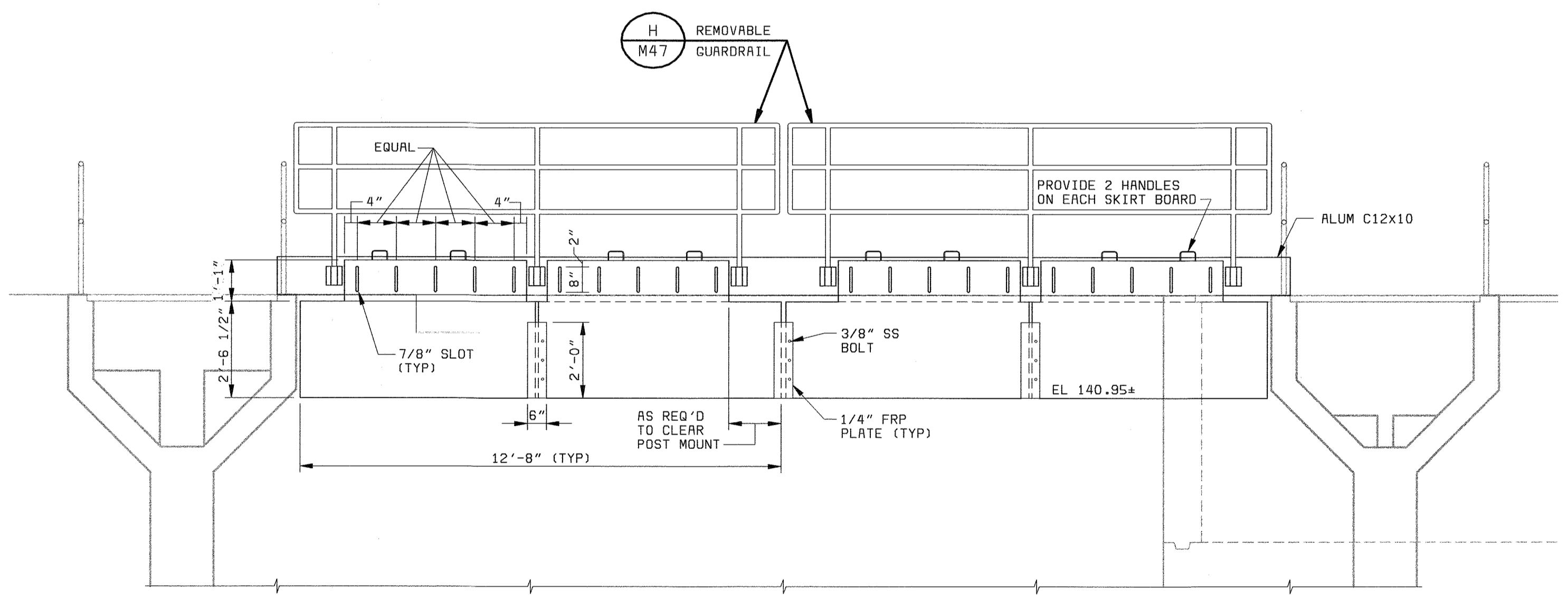
M15R



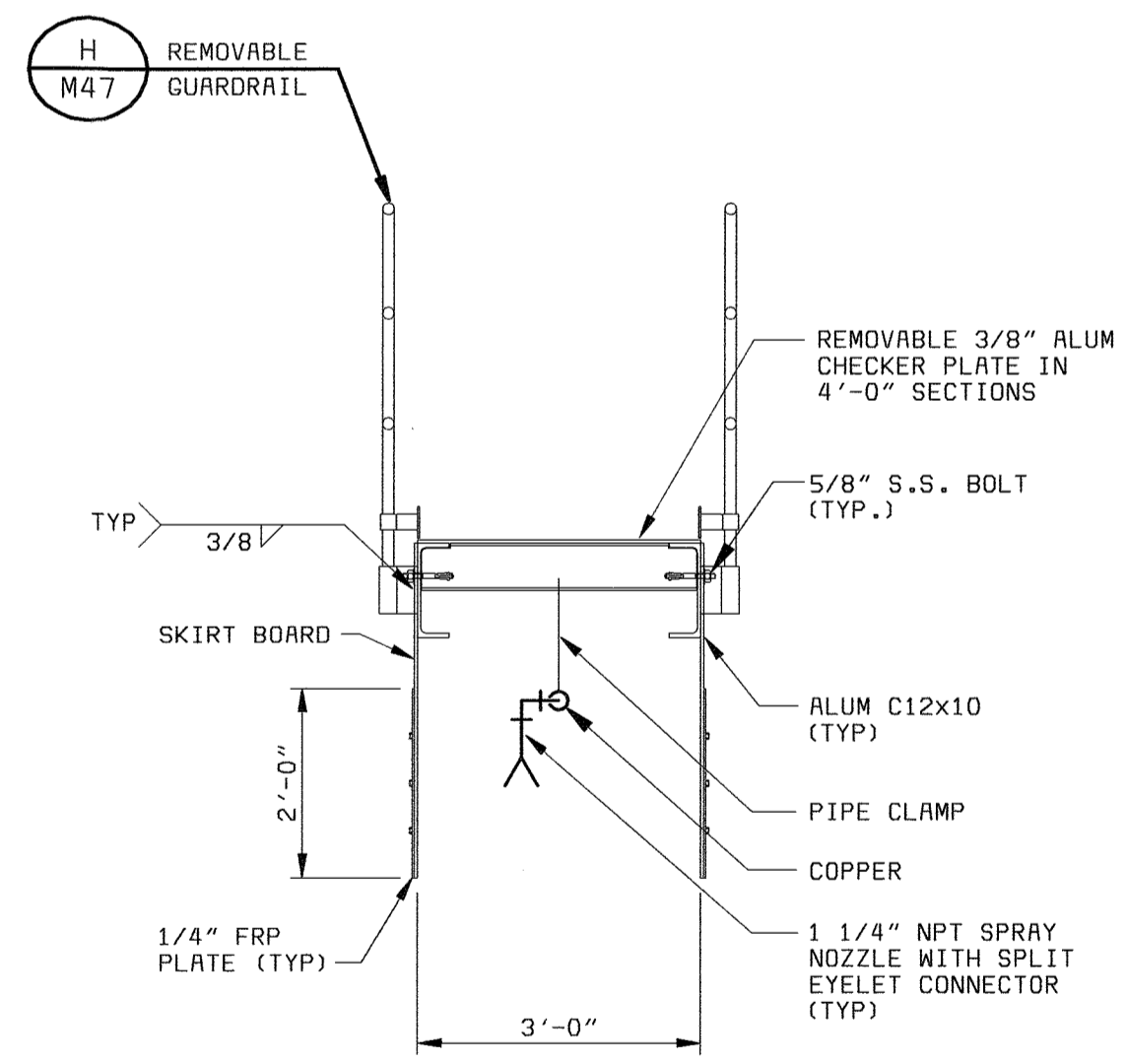
SPRAY HOOD - PLAN  
3/8" = 1'-0"



SECTION 1  
3/8" = 1'-0"



(SKIRT BOARD) SECTION 2  
3/8" = 1'-0"



SECTION 3  
1/2" = 1'-0"

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	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY

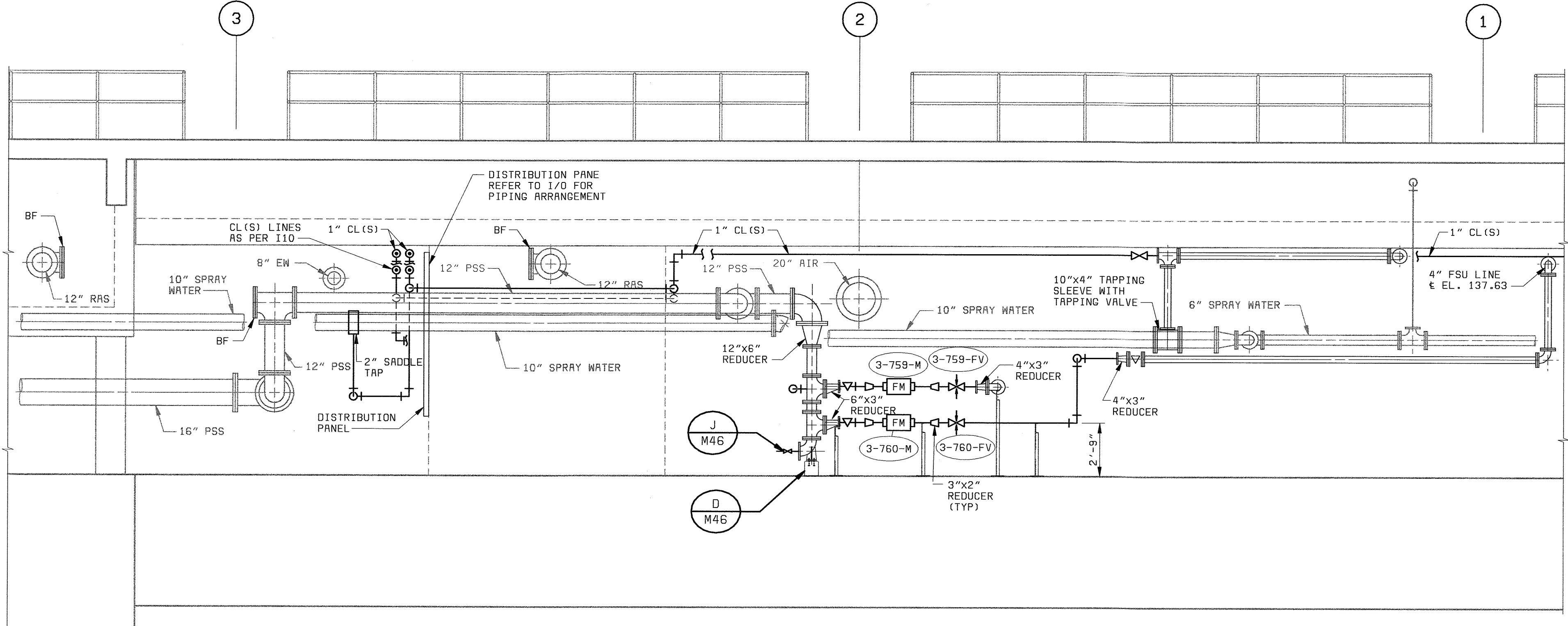
EAST-WEST PROCESS REACTORS  
MECHANICAL  
SPRAY HOOD  
PLAN & SECTIONS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

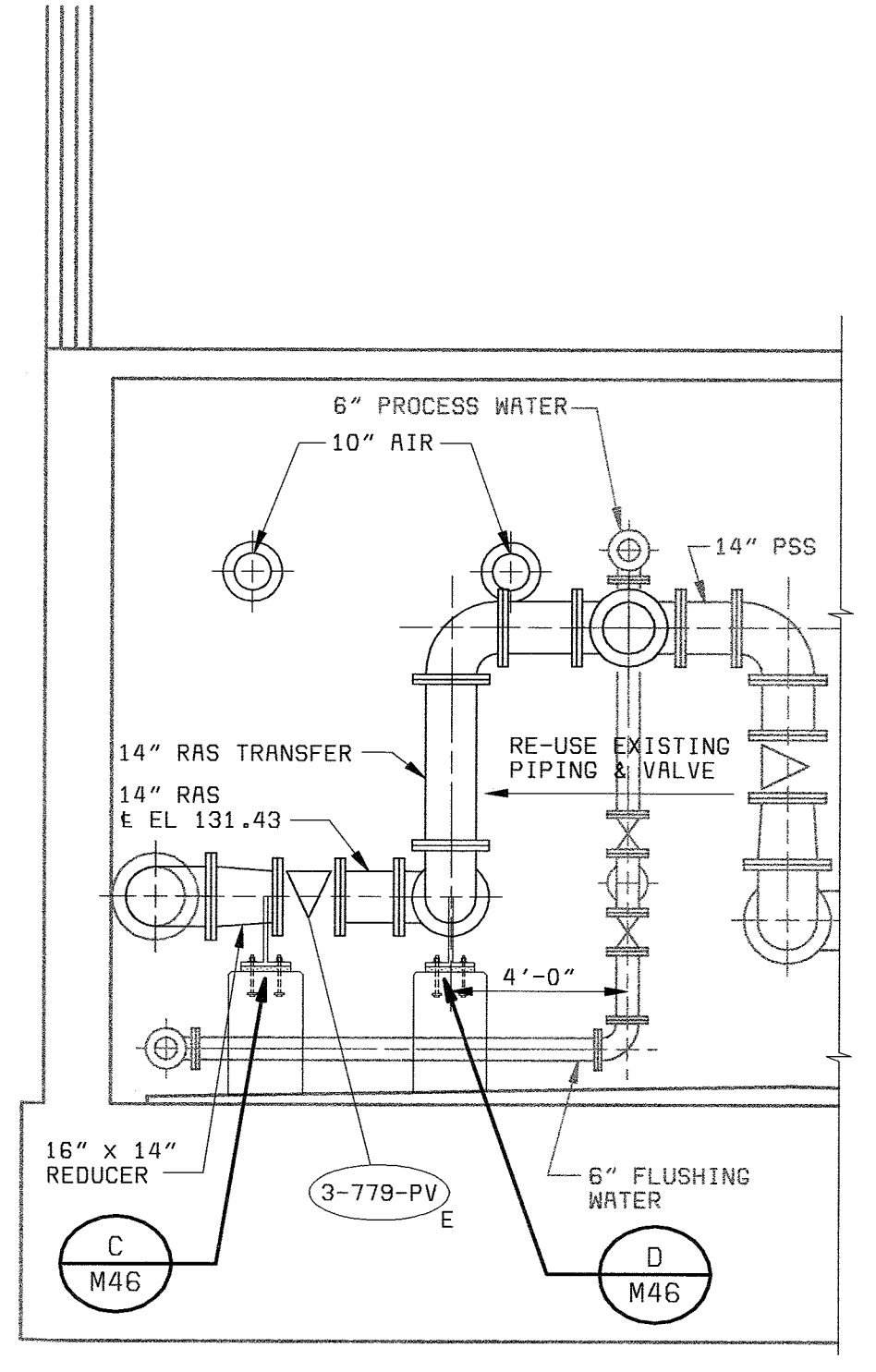
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AS  
SHOWN  
SHEET  
76 OF 139  
M26R

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0564724

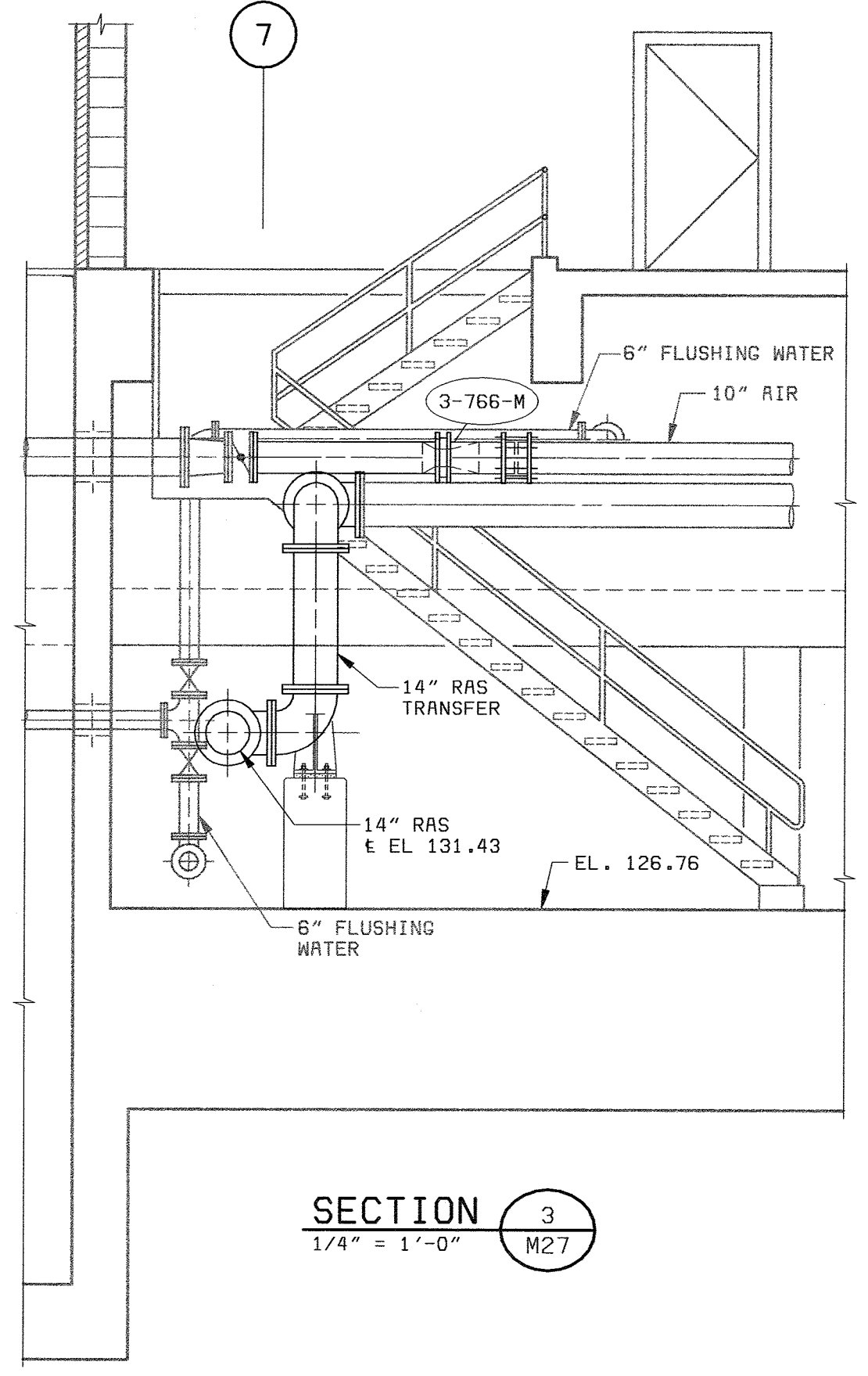




SECTION 1  
1/4" = 1'-0"



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



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

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

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WEST GALLERY  
MECHANICAL

SECTION

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

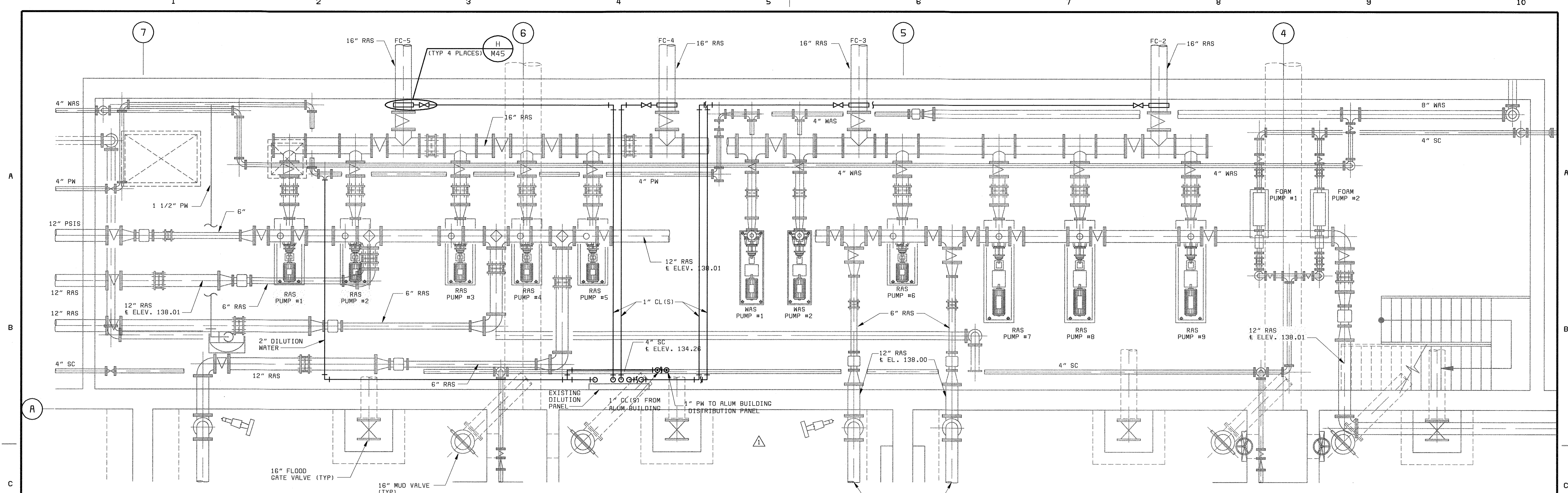
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

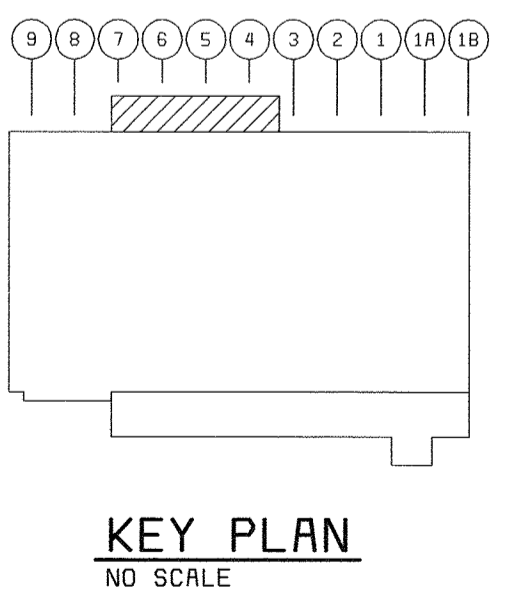
SHEET  
78 OF 139

**M28R**

D58472-4  
F058472A



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



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

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DATE: 5/10/02	4/21/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY

**EAST GALLERY  
MECHANICAL**

**PIPING DEMOLITION  
PLAN & SECTIONS**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

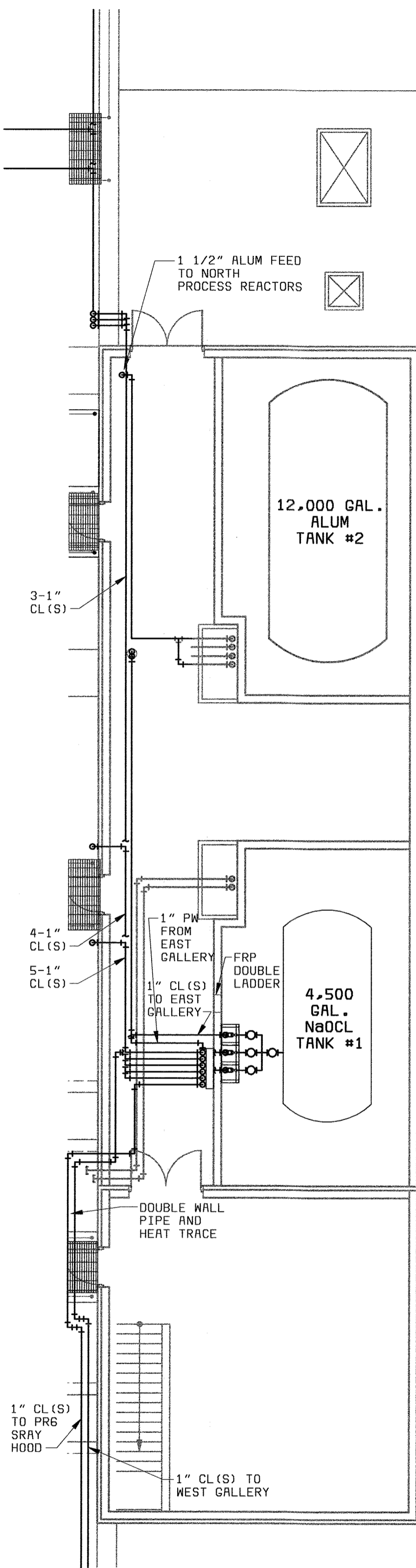
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

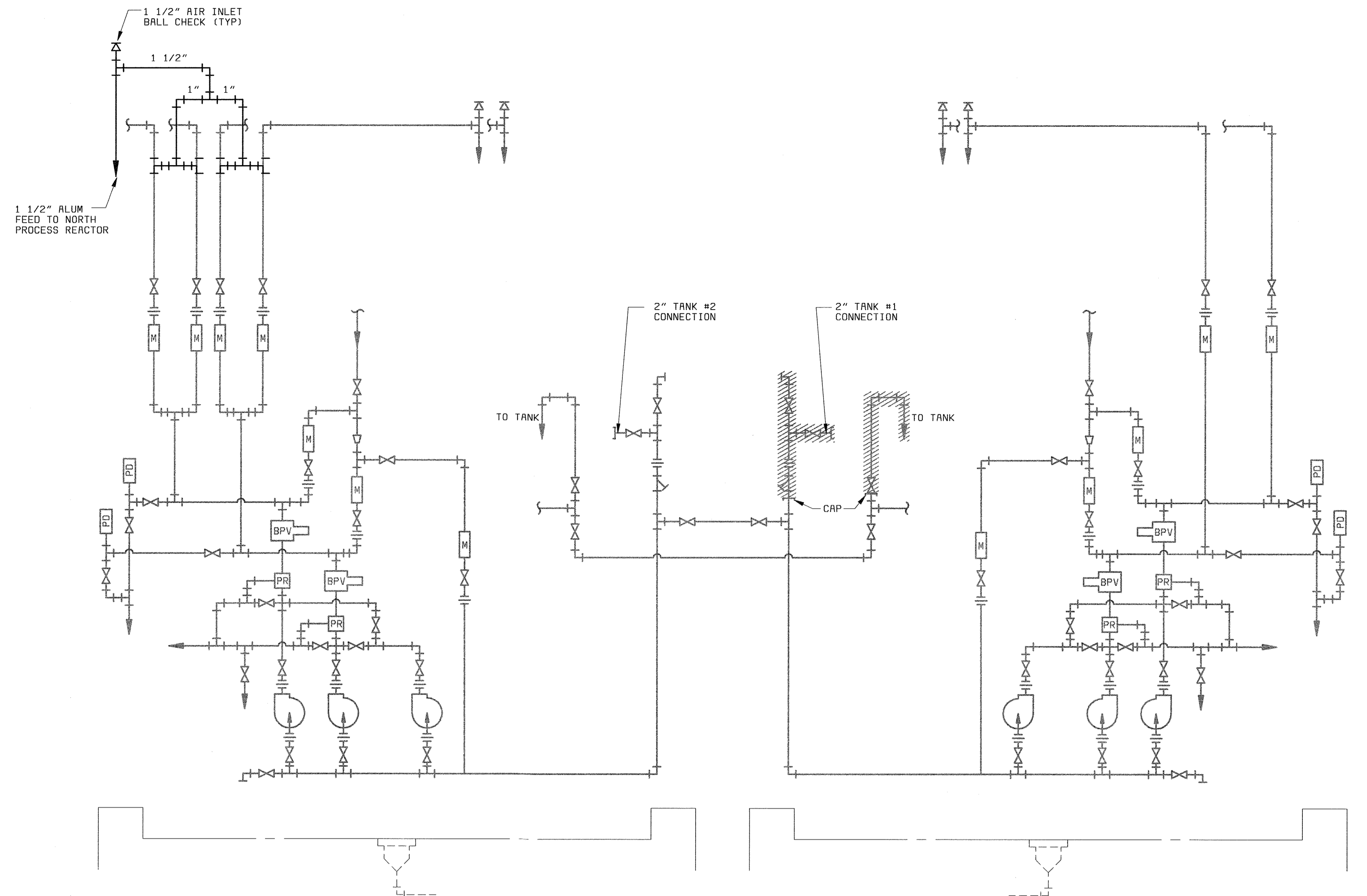
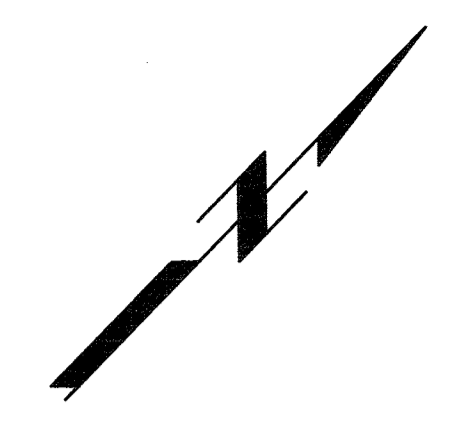
SHEET  
80 OF 139

**M30R**

A  
B  
C  
D  
E

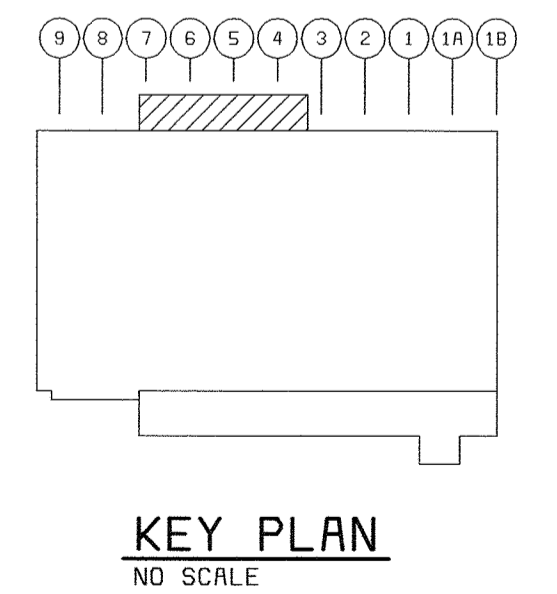


ALUM BUILDING  
PLAN  
1/8" = 1'-0"



ALUM FEED SYSTEM

NOTE:  
1. CAP OFF 2" TANK CONNECTION PLUS 1" RETURN LINE TANK #1



KEY PLAN  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



Stantec Consulting Ltd.  
Suite 1007, 7445-132  
Surrey, BC  
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**BLACK & VEATCH** LP  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

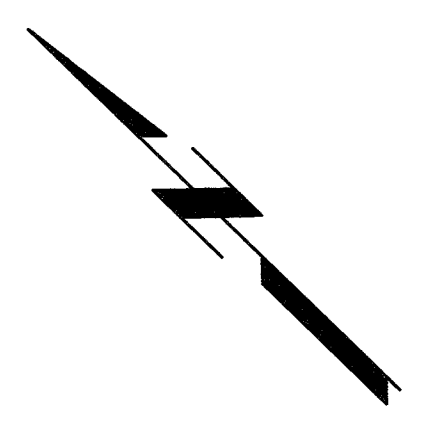
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ROBERT J. RECTANUS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES:					
DRN:					
CHK:	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
	4/21/03	PR VALUE ENGINEERING PROPOSAL		PJS	RJR
DATE: 5/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

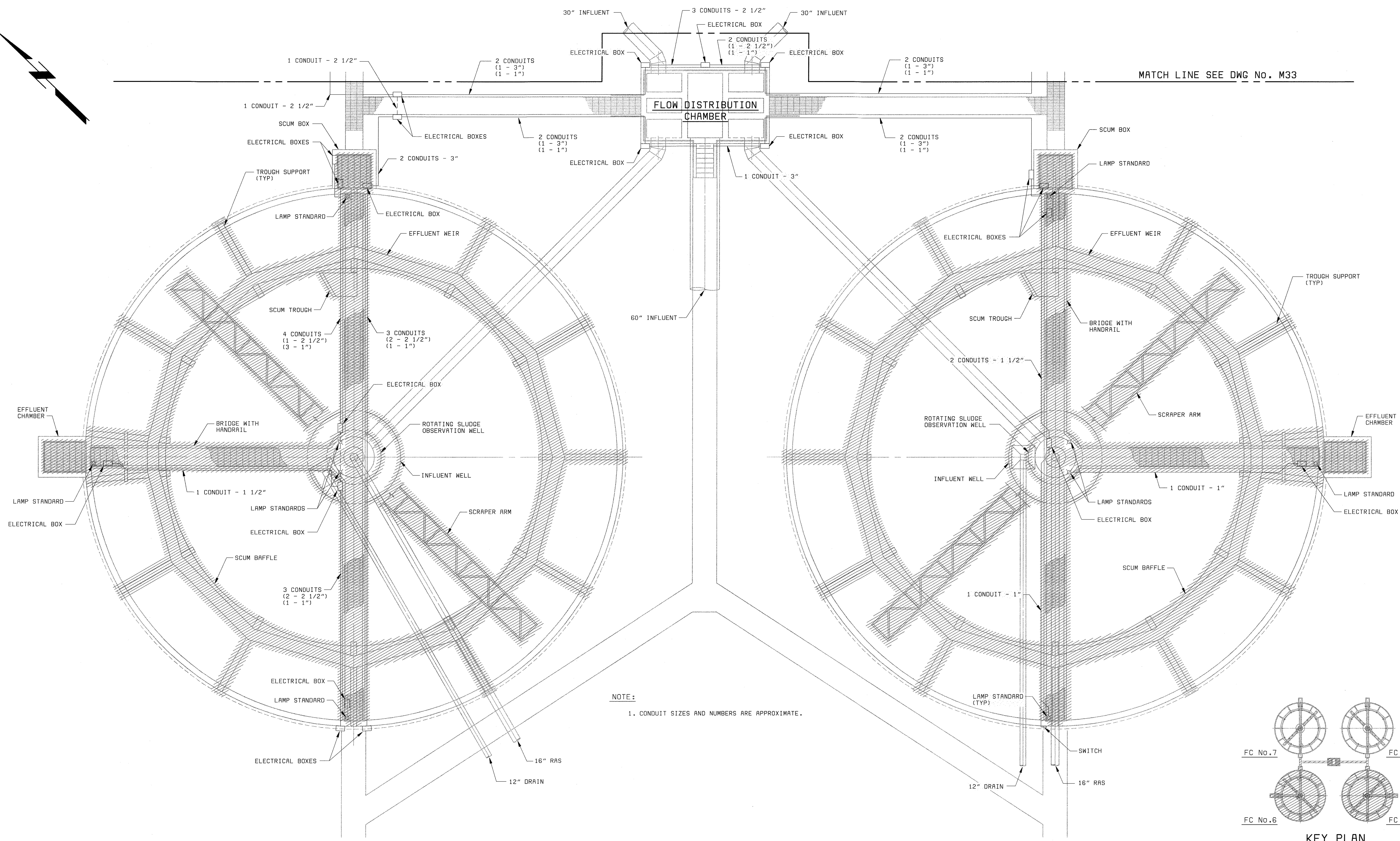
ALUM STORAGE BULDING  
MECHANICAL  
ALUM BUILDING

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

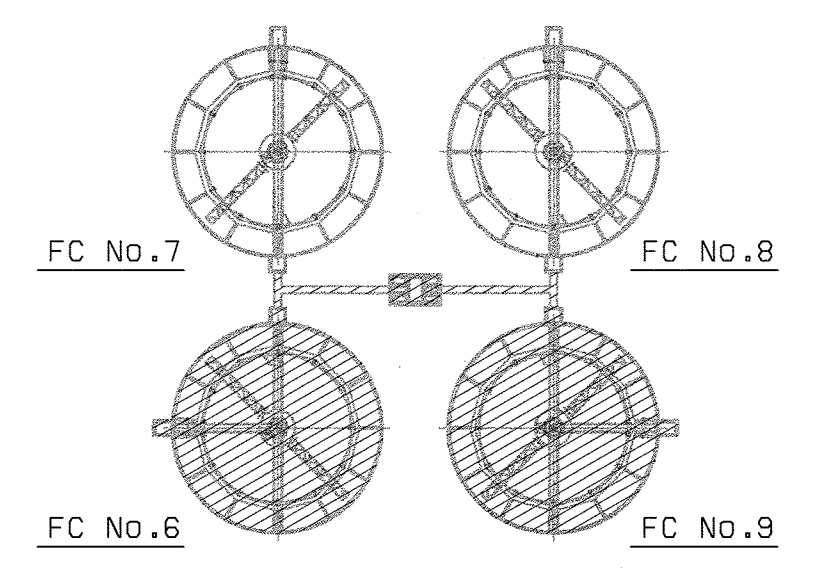
SCALE AS SHOWN  
SHEET 81 OF 139  
M31R



MATCH LINE SEE DWG No. M33



NOTE:  
1. CONDUIT SIZES AND NUMBERS ARE APPROXIMATE.



**FINAL CLARIFIER No. 6**  
1/8" = 1'-0"

**FINAL CLARIFIER No. 9**  
1/8" = 1'-0"

**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
  
CHIEF, BUREAU OF UTILITIES DATE

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REG. PROF. ENGR. DATE

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PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25097

DES: RVJ									
DRN: RCF									
CHK: RVJ									
DATE: 10/16/00	05/26/05	CONFORMED TO CONSTRUCTION RECORDS				PJS	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

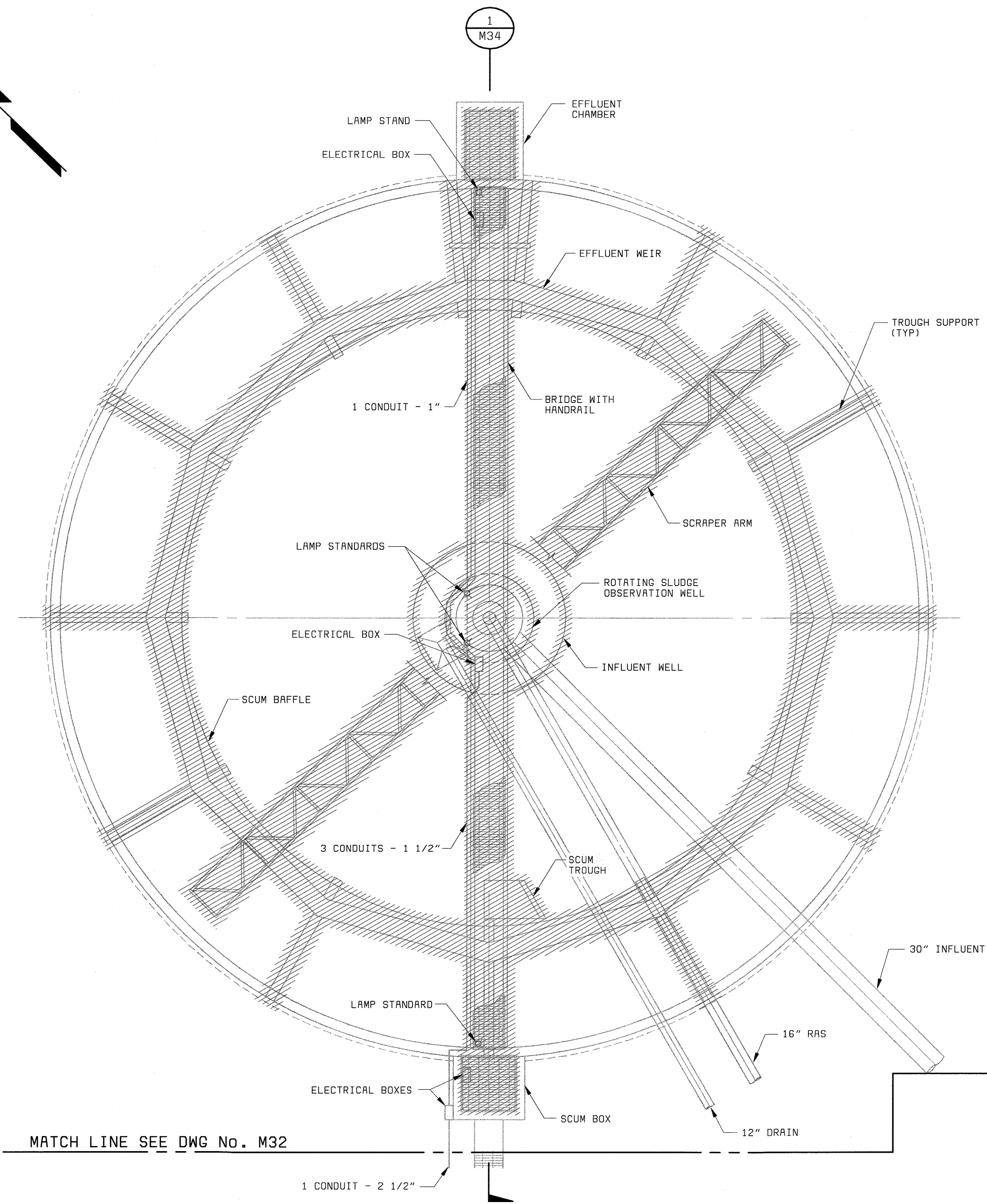
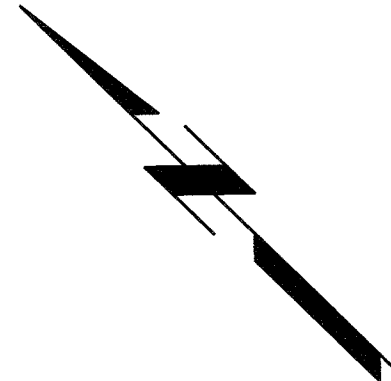
**EAST FINAL CLARIFIERS**  
**MECHANICAL**  
  
**DEMOLITION PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

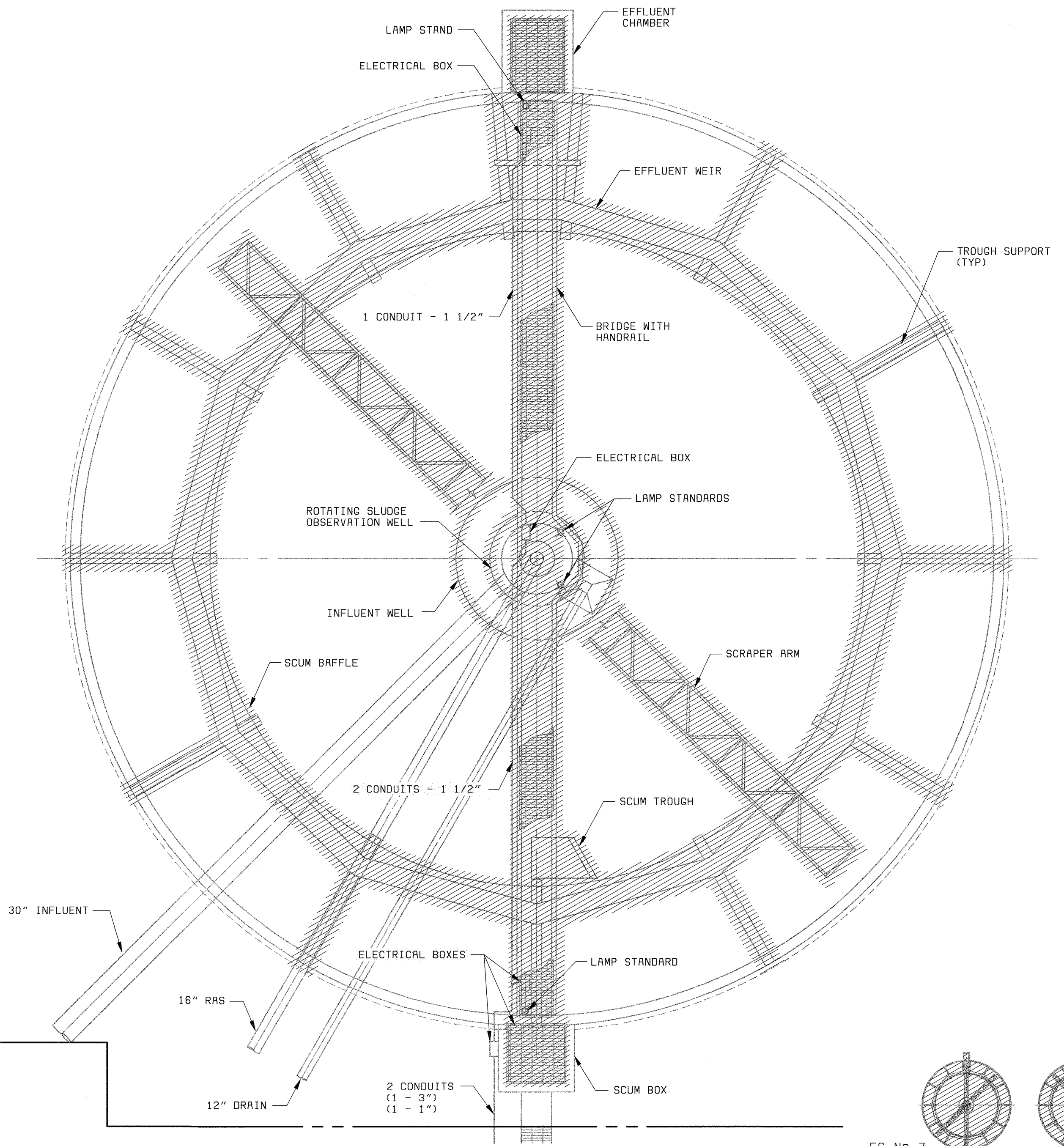
SCALE  
AS  
SHOWN  
  
SHEET  
82 OF 139  
  
**M32**

058475-4  
F058472A

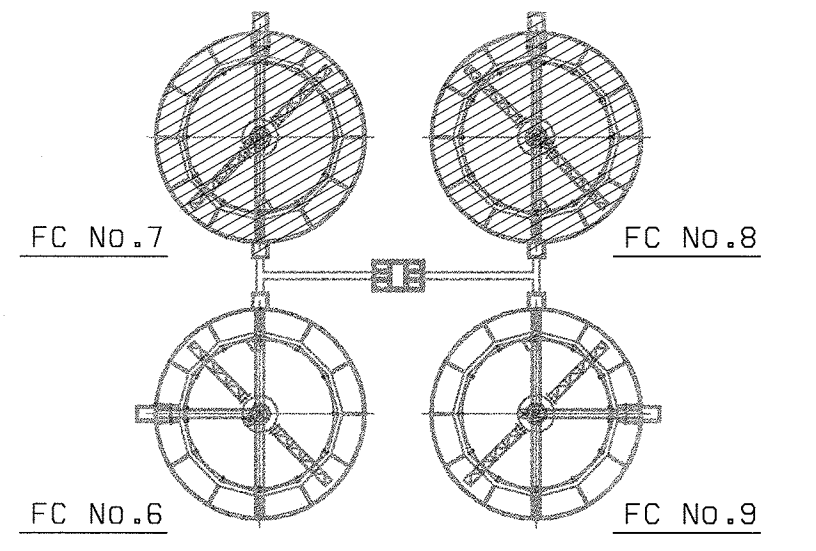




**FINAL CLARIFIER No.7**  
1/8" = 1'-0"



**FINAL CLARIFIER No.8**  
1/8" = 1'-0"



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

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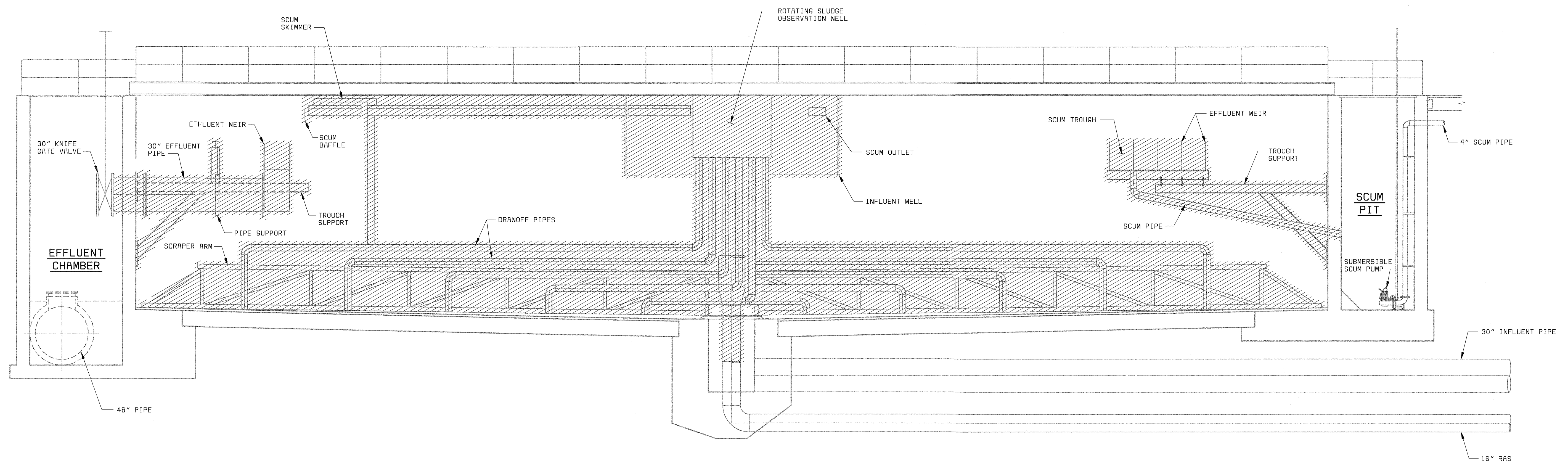
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DRN: RCF					
CHK: RVJ					
DATE: 10/16/00	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
		REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

**EAST FINAL CLARIFIERS  
MECHANICAL  
DEMOLITION PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN  
SHEET  
83 OF 139  
**M33**

058472-4  
FD58472A



SECTION  
 (TYPICAL FOR CLARIFIERS 6 TO 9) 1  
 1/4" = 1'-0" M33

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE

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 REG. PROF. ENGR. DATE

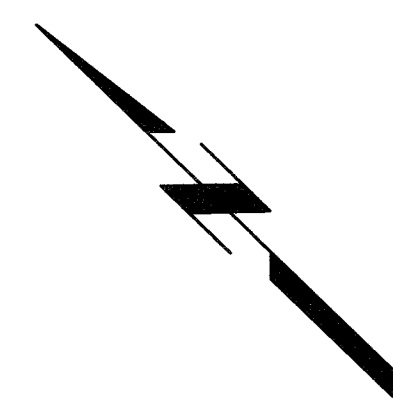
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DES: RVJ									
DRN: RCF									
CHK: RVJ									
DATE: 10/16/00	05/26/05	CONFORMED TO CONSTRUCTION RECORDS				PJS	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

EAST FINAL CLARIFIER  
 MECHANICAL  
 SECTION - DEMOLITION

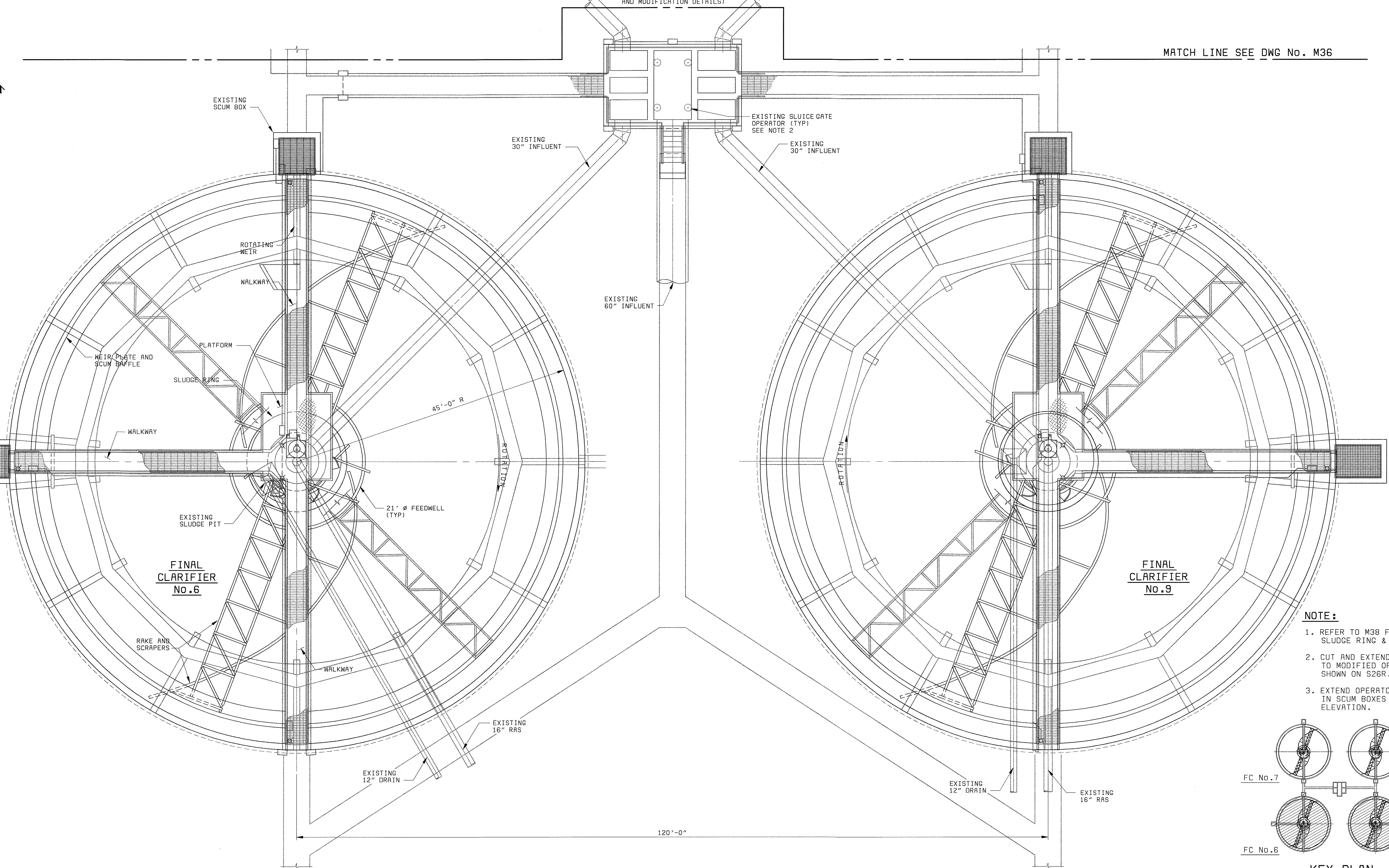
LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

SCALE  
 AS  
 SHOWN  
 SHEET  
 84 OF 139  
 M34

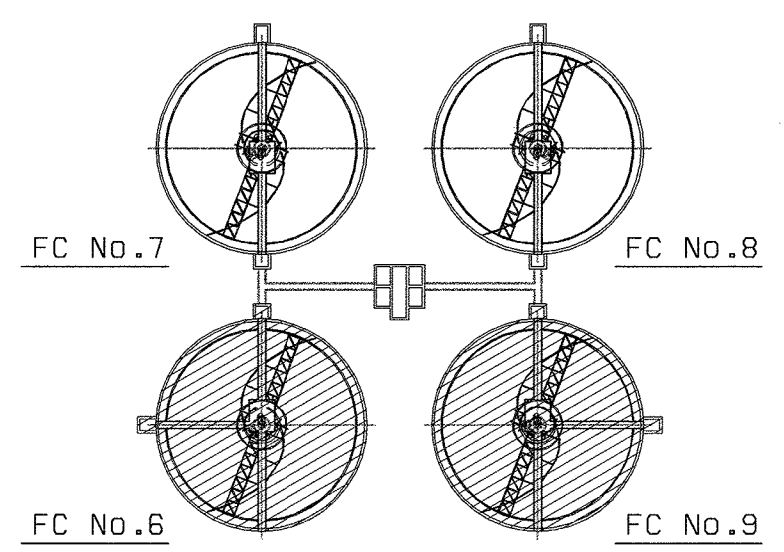


**EAST FINAL CLARIFIER  
FLOW DISTRIBUTION CHAMBER**  
(SEE S26R FOR DEMOLITION  
AND MODIFICATION DETAILS)

MATCH LINE SEE DWG No. M36



- NOTE:**
1. REFER TO M36 FOR DETAILS AT SLUDGE RING & CENTER COLUMN.
  2. CUT AND EXTEND STEM ACCORDING TO MODIFIED OPERATOR PLATFORM SHOWN ON S26R.
  3. EXTEND OPERATOR ON EQUIPMENT IN SCUM BOXES TO NEW GRATING ELEVATION.



**PLAN**  
1/8" = 1'-0"

**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



Stantec Consulting Ltd.  
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A REGISTERED  
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IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: RVJ  
DRN: RCF  
CHK: JS  
DATE: 5/10/02

05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS/RJR/RJR
6/5/03	PR VALUE ENGINEERING PROPOSAL	IFH/RJR/RJR
REVISIONS AND RECORD OF ISSUE		NO. BY CK APP

**FC 6 & 9  
MECHANICAL  
PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

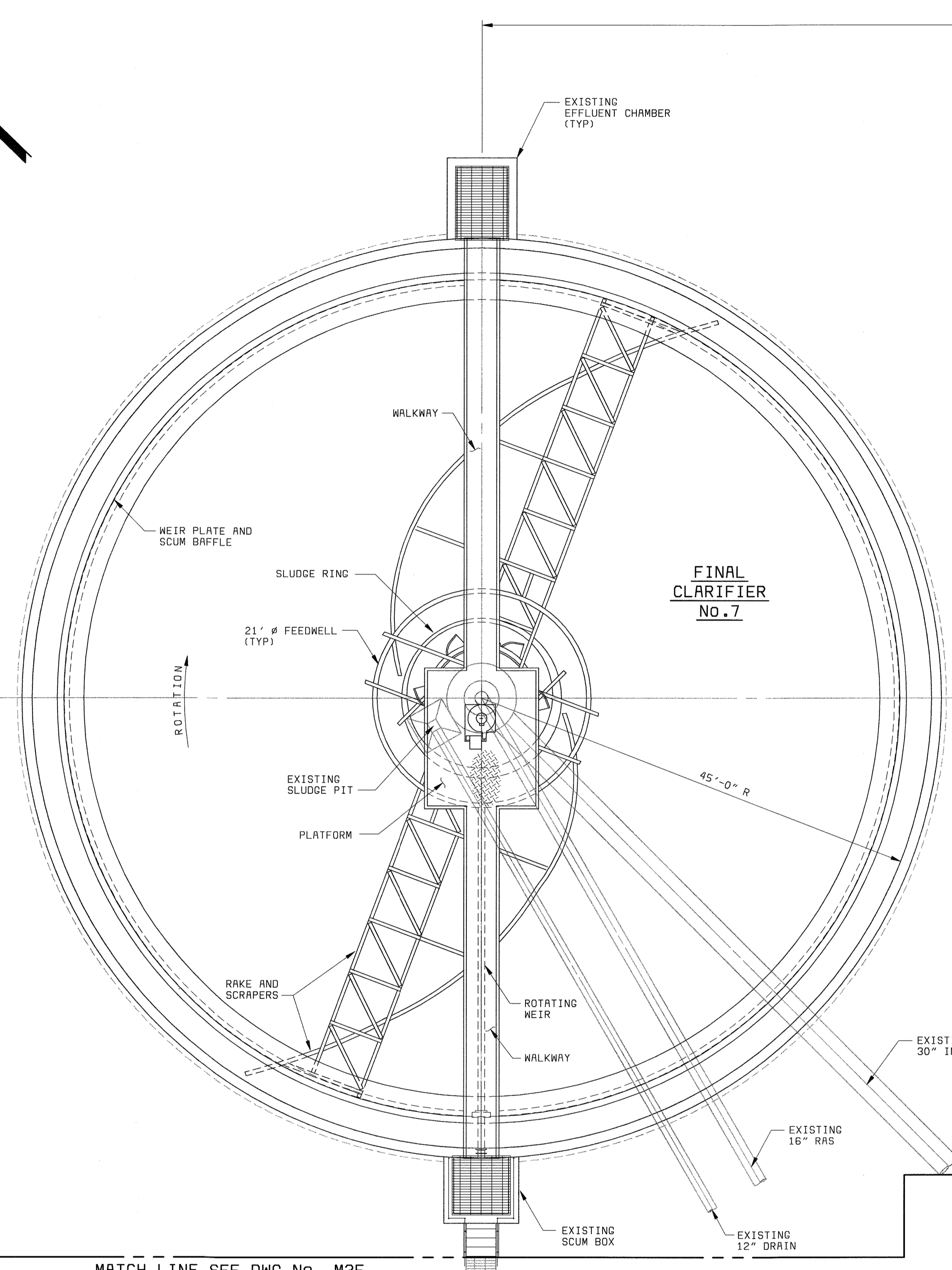
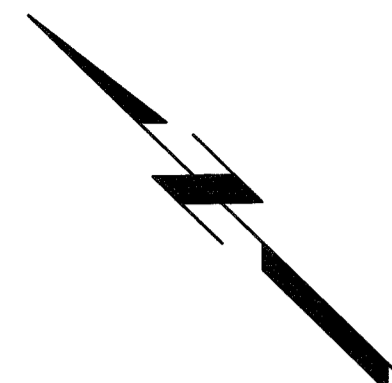
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

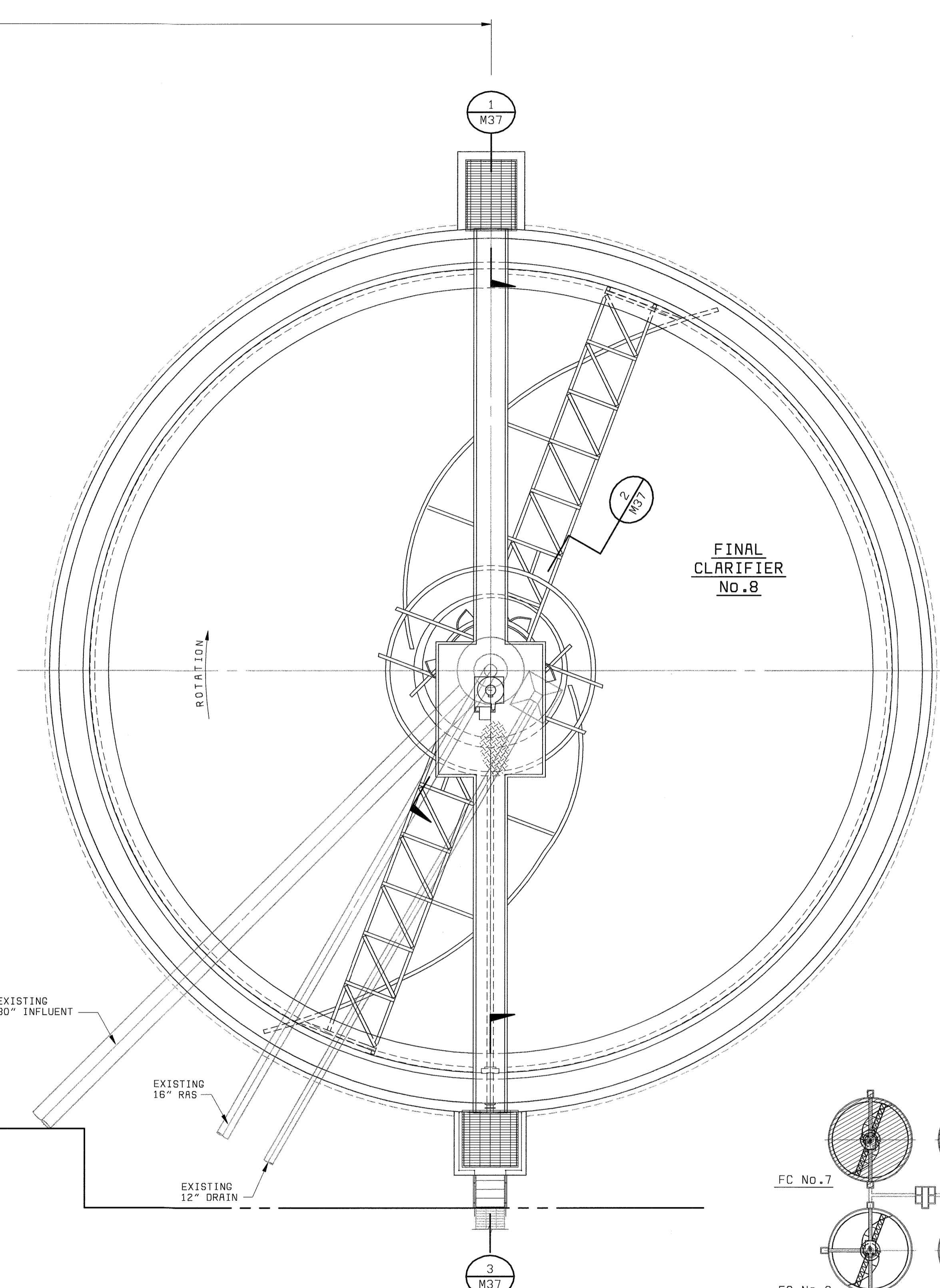
SHEET  
85 of 139

**M35R**

D58472-4  
FD58472R

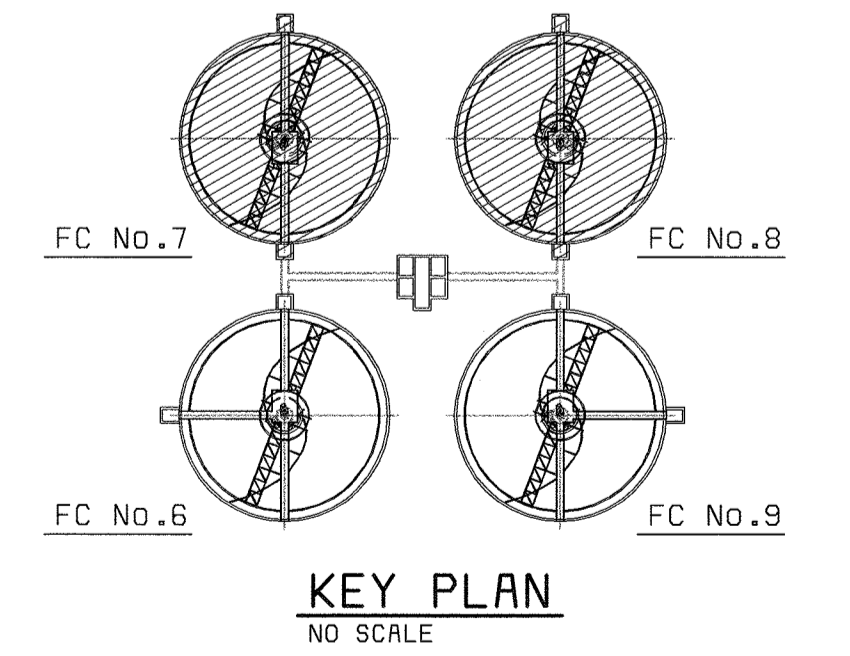


**FINAL  
CLARIFIER  
No. 7**



**FINAL  
CLARIFIER  
No. 8**

**PLAN**  
1/8" = 1'-0"



120'-0" TO FINAL CLARIFIER NO. 6

MATCH LINE SEE DWG No. M35

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25097

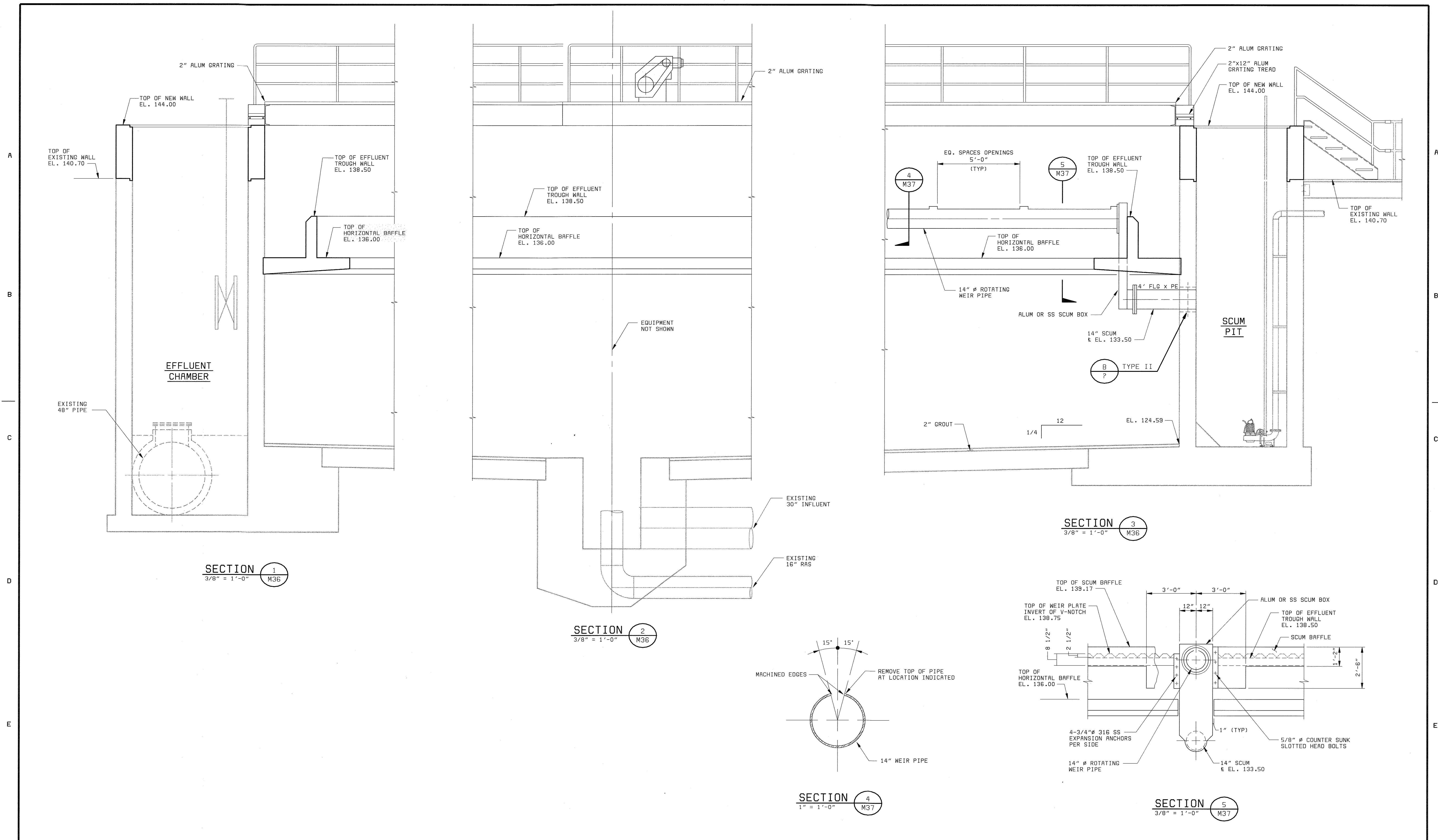
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CHK: RVJ							
DATE: 10/16/00	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	

**FC 7 & 8  
MECHANICAL**  
  
**PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
**HOWARD COUNTY, MARYLAND**

SCALE  
AS  
SHOWN  
SHEET  
86 OF 139  
**M36**

DB68754  
FD58472A



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

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A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25097

DES: RVJ					
DRN: RCF					
CHK: RVJ					
DATE: 10/16/00	05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS	RJR	RJR
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	APP

FC No.8  
MECHANICAL

SECTIONS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

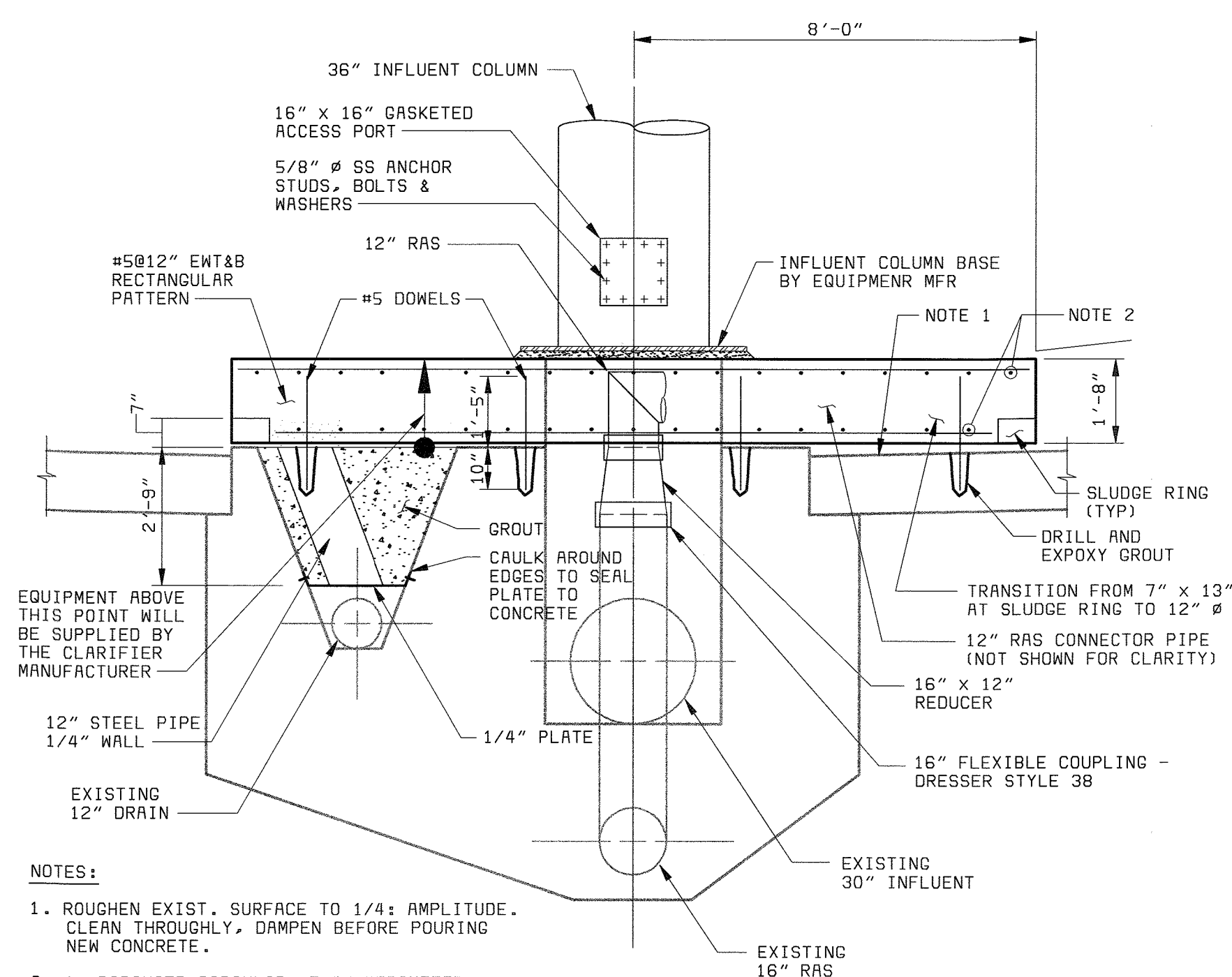
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

SHEET  
87 OF 139

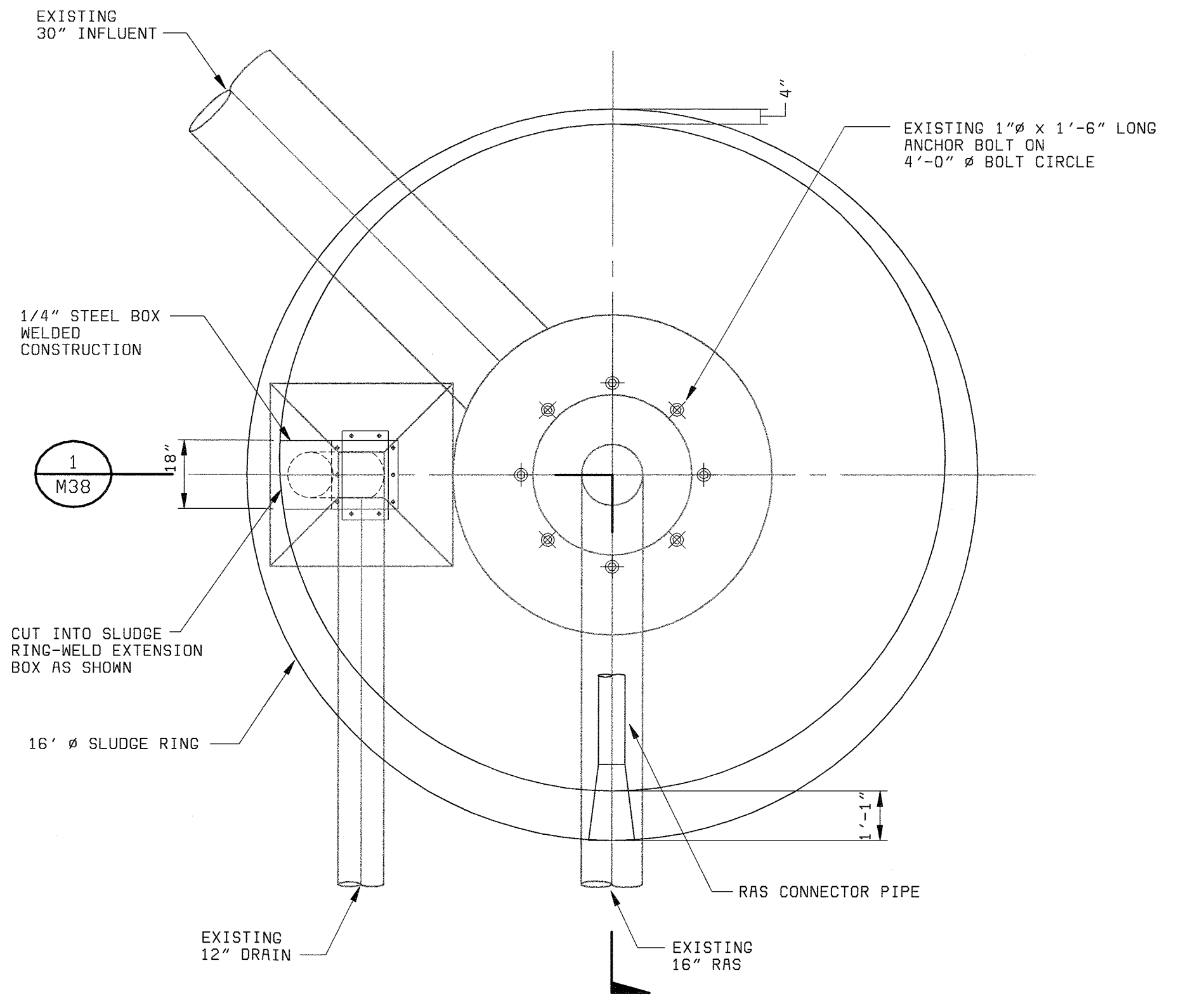
M37

A  
B  
C  
D  
E  
F



- NOTES:
1. ROUGHEN EXIST. SURFACE TO 1/4" AMPLITUDE. CLEAN THOROUGHLY, DAMPEN BEFORE POURING NEW CONCRETE.
  2. 1- RADIUSED CIRCULAR #5 AT PERIMETER, T&B, LAP 2'-6".
  3. NEW CONCRETE IS TO BE 4,000 PSI MIX.

SECTION 1  
3/8" = 1'-0"



SECTIONAL PLAN  
3/8" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



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REG. PROF. ENGR. \_\_\_\_\_ DATE \_\_\_\_\_

DES: RVJ									
DRN: RCF									
CHK: JS									
DATE: 5/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

FC No. 9  
MECHANICAL

SECTIONAL PLAN & SECTION

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

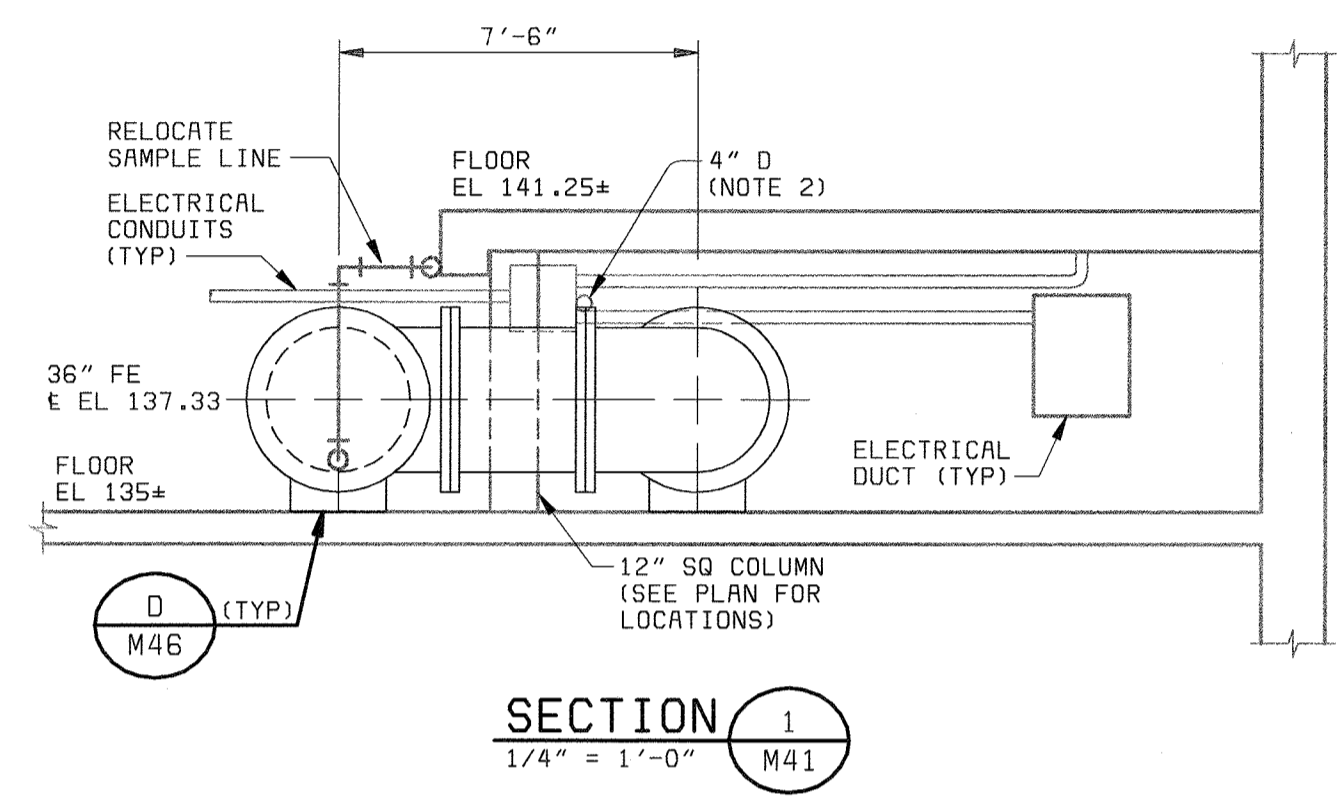
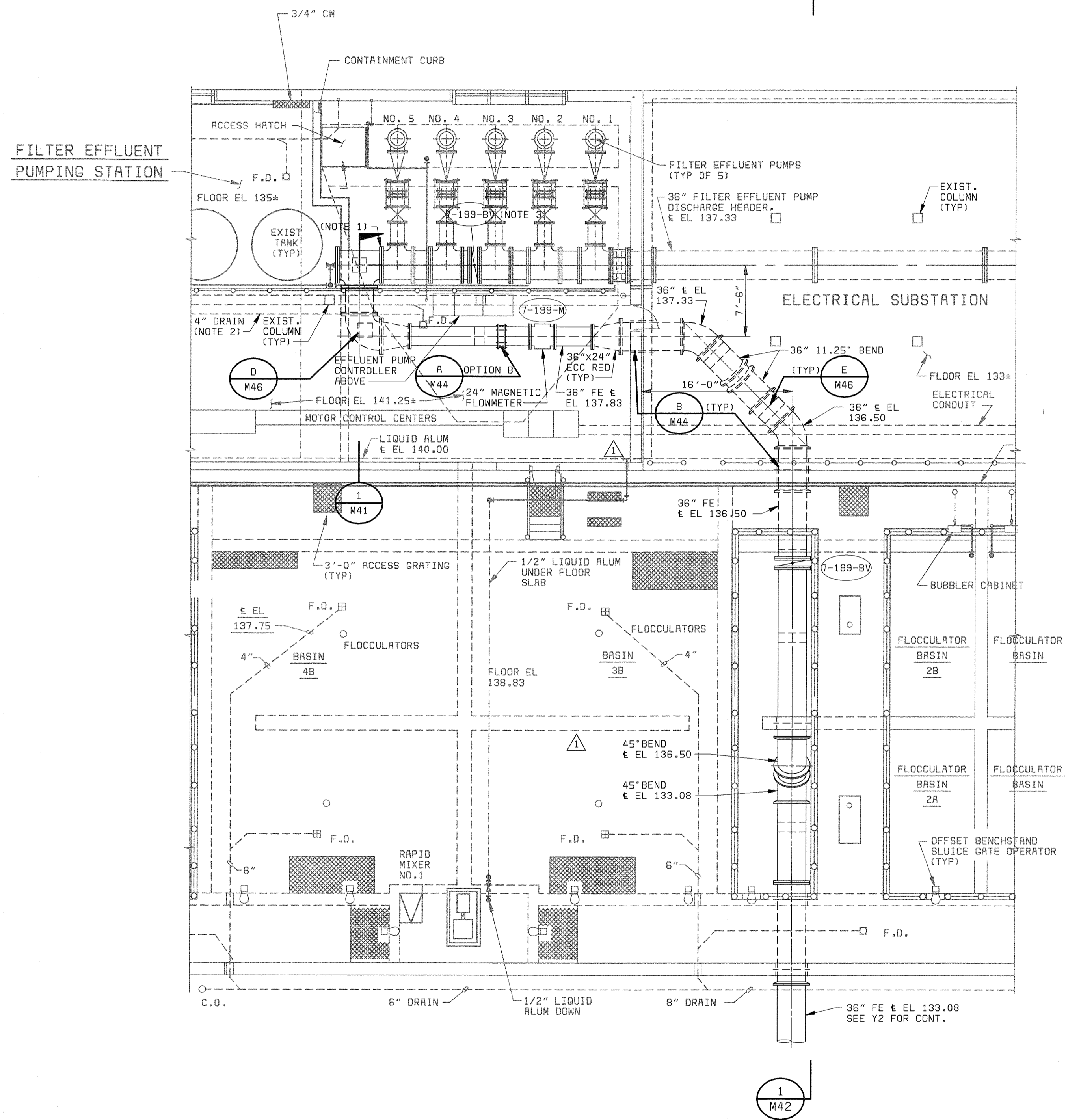
SHEET  
88 OF 139

M38

058472-4  
F058472A



1  
M42



- NOTES:**
1. RELOCATE EXIST BLIND FLANGE, VALVE, & SAMPLE LINE TO END OF NEW 36" TEE.
  2. RELOCATE EXIST DRAIN LINE AS NECESSARY, SUCH THAT IT DOES NOT INTERFERE WITH NEW 36" FE OR ELECTRICAL CONDUITS.
  3. REMOVE 36" FLANGE BY FLANGE (APPROXIMATE LENGTH IS 22") AND REPLACE WITH NEW 36" BUTTERFLY AND FLANGE SPOOL PIECE AS NECESSARY. PROVIDE NEW FLANGE GASKET.
  4. 36" FILTER EFFLUENT SHALL BE RESTRAINED JOINT PIPE OR FLANGED JOINT PIPE AS INDICATED ON THE DRAWINGS.

**PLAN**  
1/8" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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REG. PROF. ENGR. DATE

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IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: FKA					
DRN: GRH					
CHK: RJR	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
DATE: 05/10/02	6/3/02	PER ADDENDUM NO. 1		FKA/RJR/RJR	
		REVISIONS AND RECORD OF ISSUE			

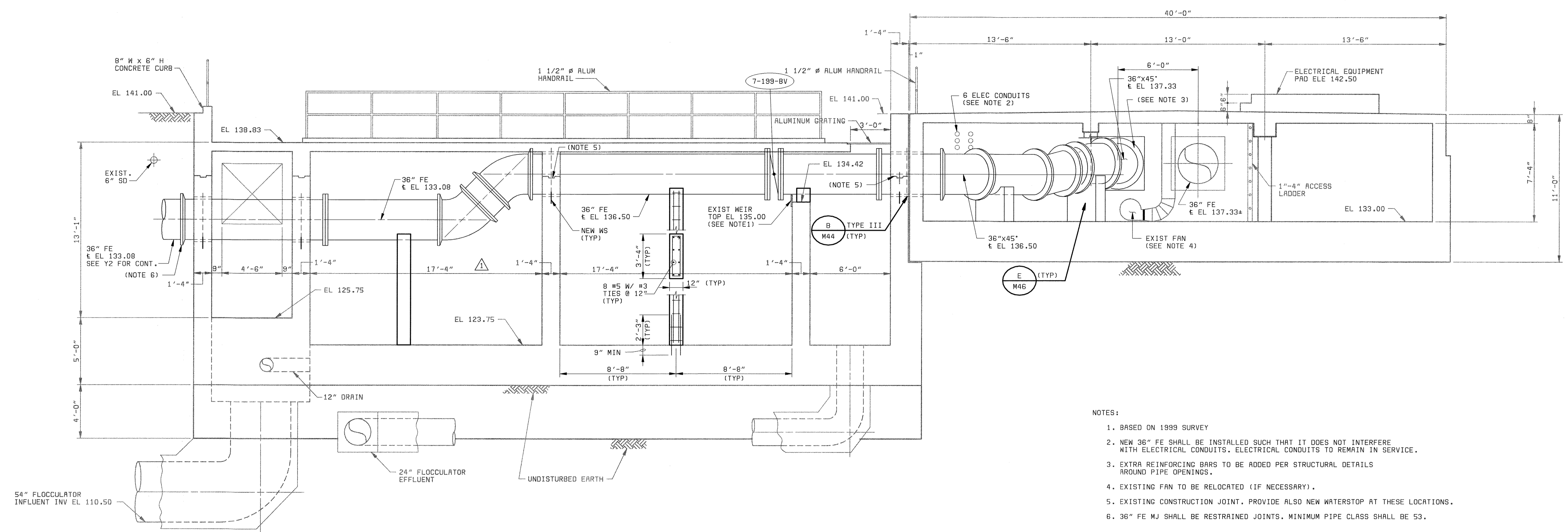
**FILTER EFFLUENT PUMP STATION**  
**MECHANICAL**  
**PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 91 OF 139  
**M41**

058472-4  
FD58472A

A  
B  
C  
D  
E  
F



- NOTES:
1. BASED ON 1999 SURVEY
  2. NEW 36" FE SHALL BE INSTALLED SUCH THAT IT DOES NOT INTERFERE WITH ELECTRICAL CONDUITS. ELECTRICAL CONDUITS TO REMAIN IN SERVICE.
  3. EXTRA REINFORCING BARS TO BE ADDED PER STRUCTURAL DETAILS AROUND PIPE OPENINGS.
  4. EXISTING FAN TO BE RELOCATED (IF NECESSARY).
  5. EXISTING CONSTRUCTION JOINT. PROVIDE ALSO NEW WATERSTOP AT THESE LOCATIONS.
  6. 36" FE MJ SHALL BE RESTRAINED JOINTS. MINIMUM PIPE CLASS SHALL BE 53.

SECTION 1  
1/4" = 1'-0" M41

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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REG. PROF. ENGR. DATE

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DES: FKA									
DRN: GRH									
CHK: RJR	05/26/05	CONFORMED TO CONSTRUCTION RECORDS				PJS	RJR	RJR	
DATE: 05/10/02	6/03/02	PER ADDENDUM NO. 1				FKR	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

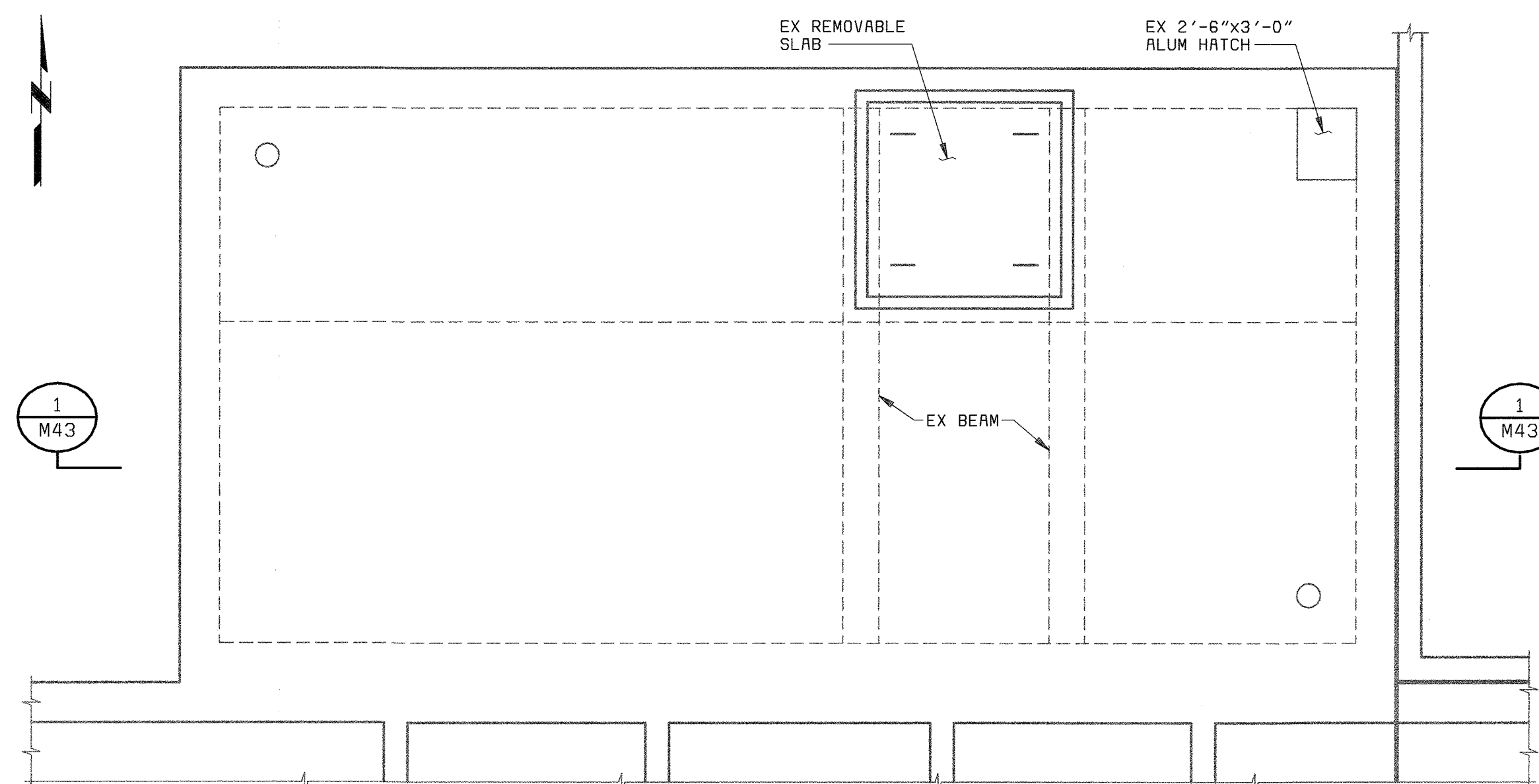
FILTER EFFLUENT PUMP STATION  
MECHANICAL  
SECTION

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

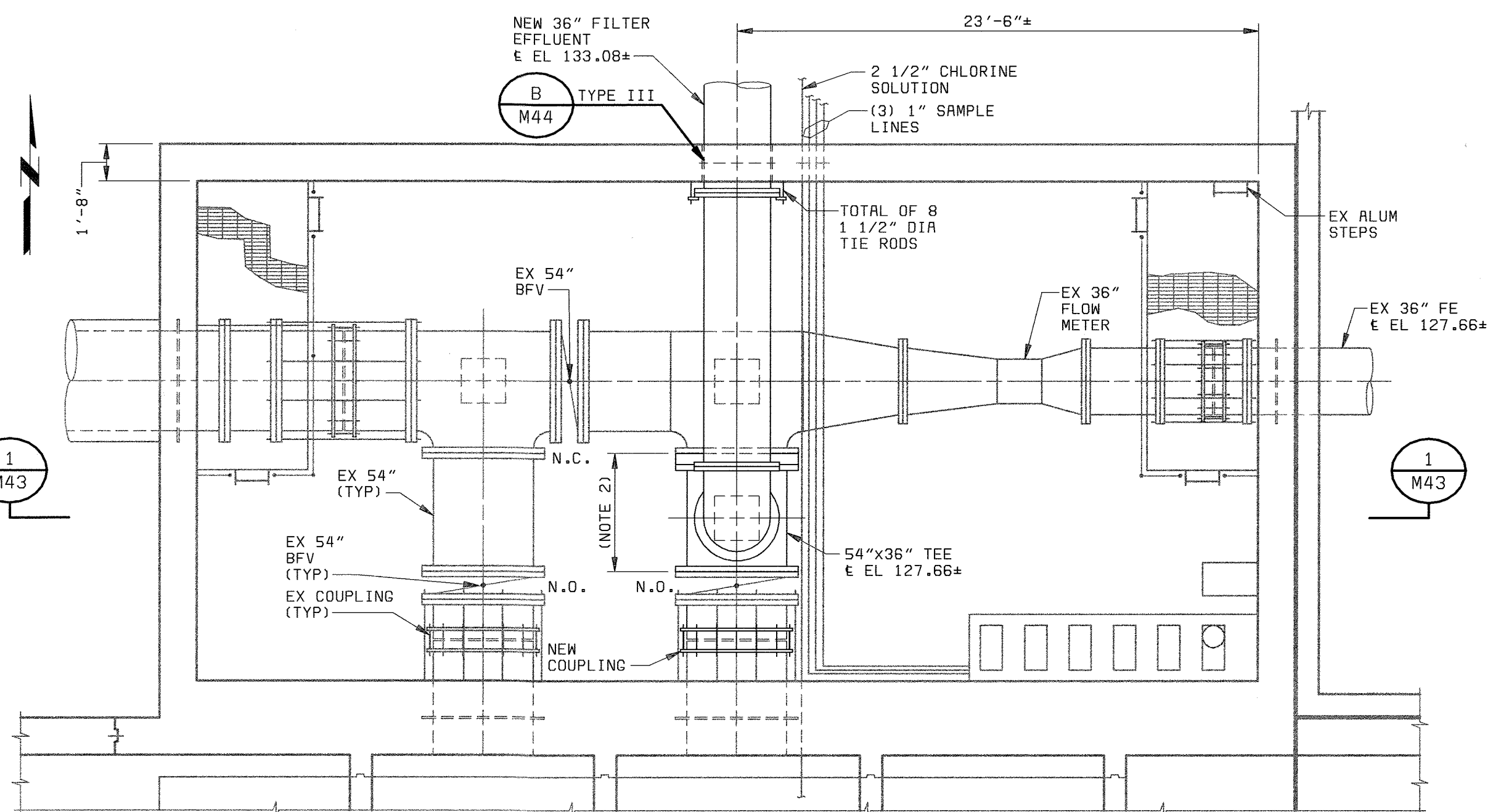
SCALE AS SHOWN  
SHEET 92 OF 139  
M42

DS6472-A  
FD58472A

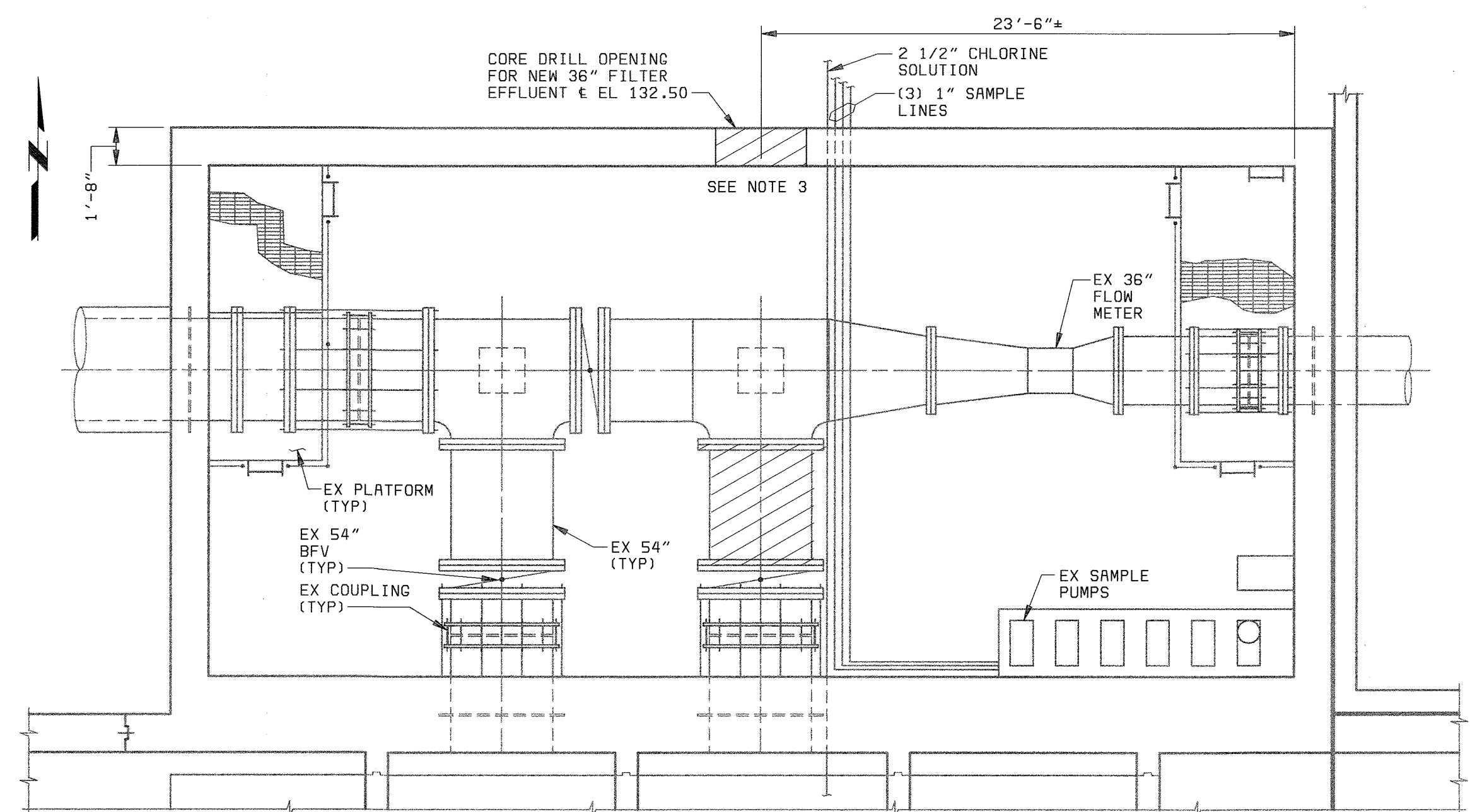




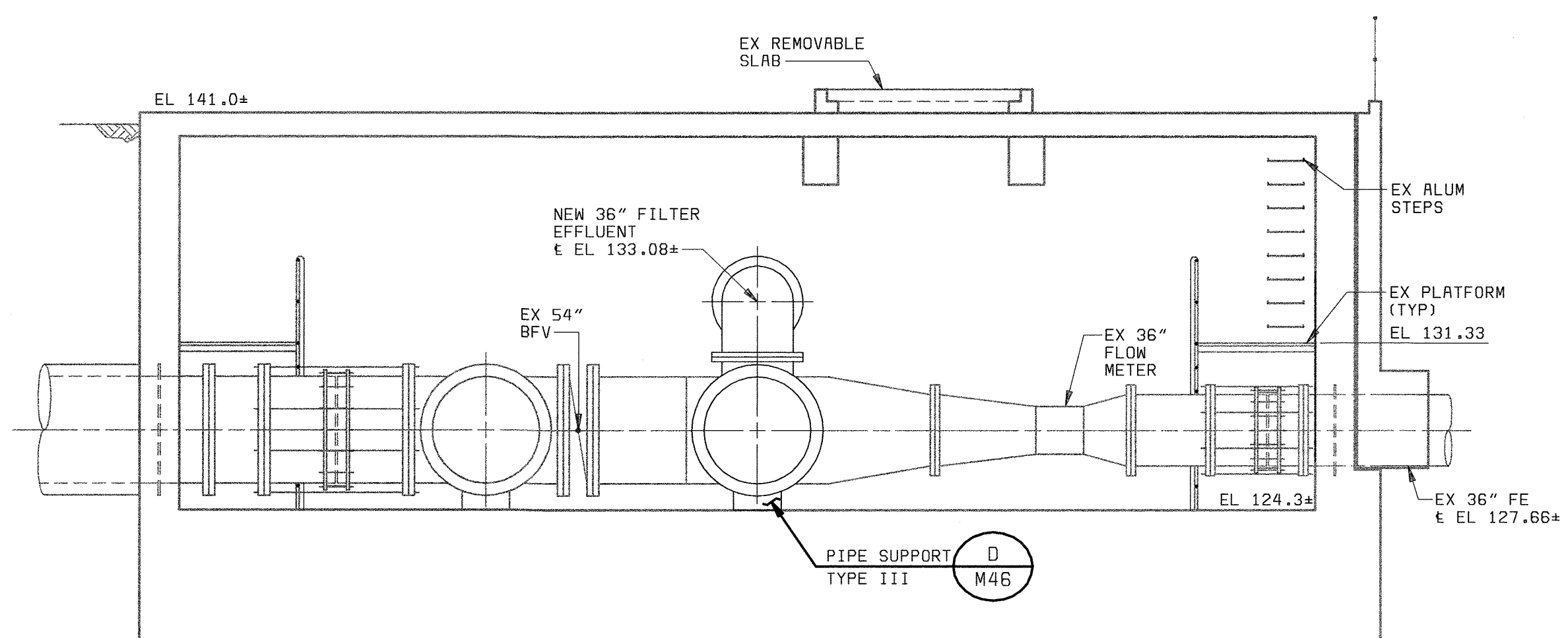
**TOP PLAN**  
3/16" = 1'-0"



**SECTIONAL PLAN**  
3/16" = 1'-0"



**DEMOLITION PLAN**  
3/16" = 1'-0"



**SECTION 1**  
3/16" = 1'-0"

**NOTES:**

1. ELEVATIONS AND DIMENSIONS ARE BASED ON EXISTING DRAWINGS. CONTRACTOR TO VERIFY PRIOR TO ORDERING PIPES AND FITTINGS.
2. CONTRACTOR TO VERIFY LENGTH AND PROVIDE FILLER FLANGE AS NECESSARY.
3. ELECTRICAL CONDUITS TO BE RELOCATED AS NECESSARY.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



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NO. 22927

DES: FKA  
DRN: RLC  
CHK: RJR  
DATE: 05/10/02

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR

36" FE VAULT  
MECHANICAL

PLANS AND SECTION

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

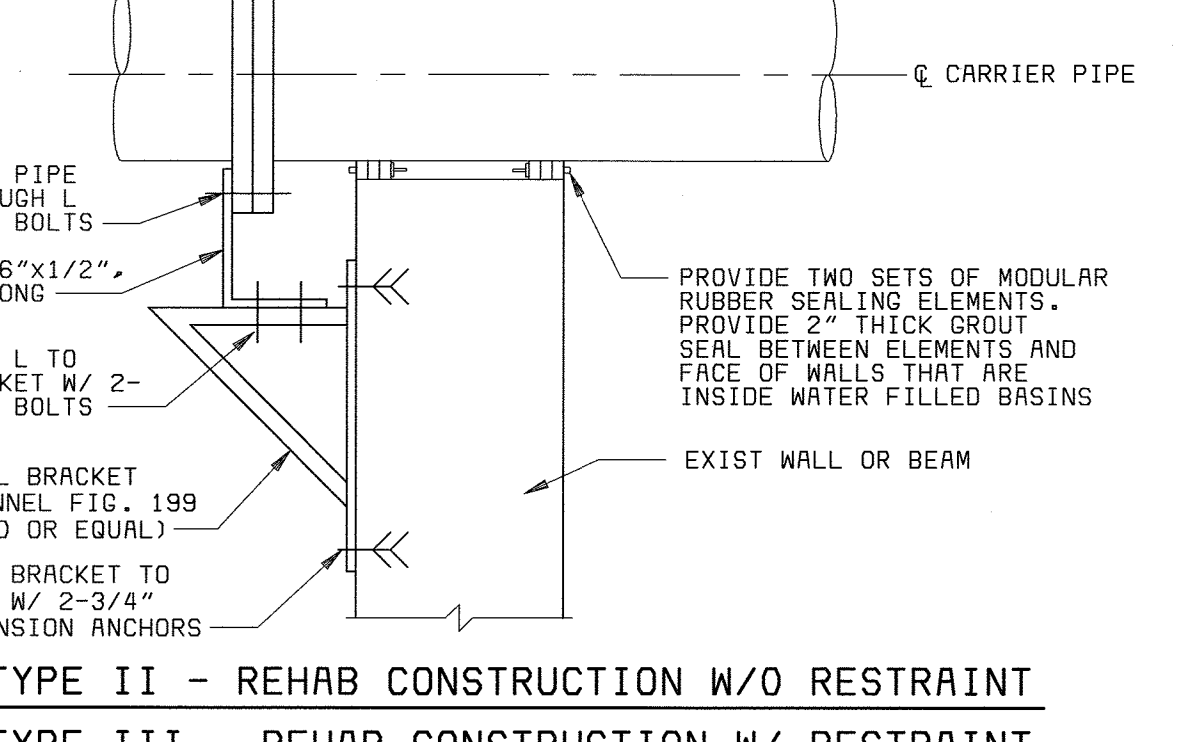
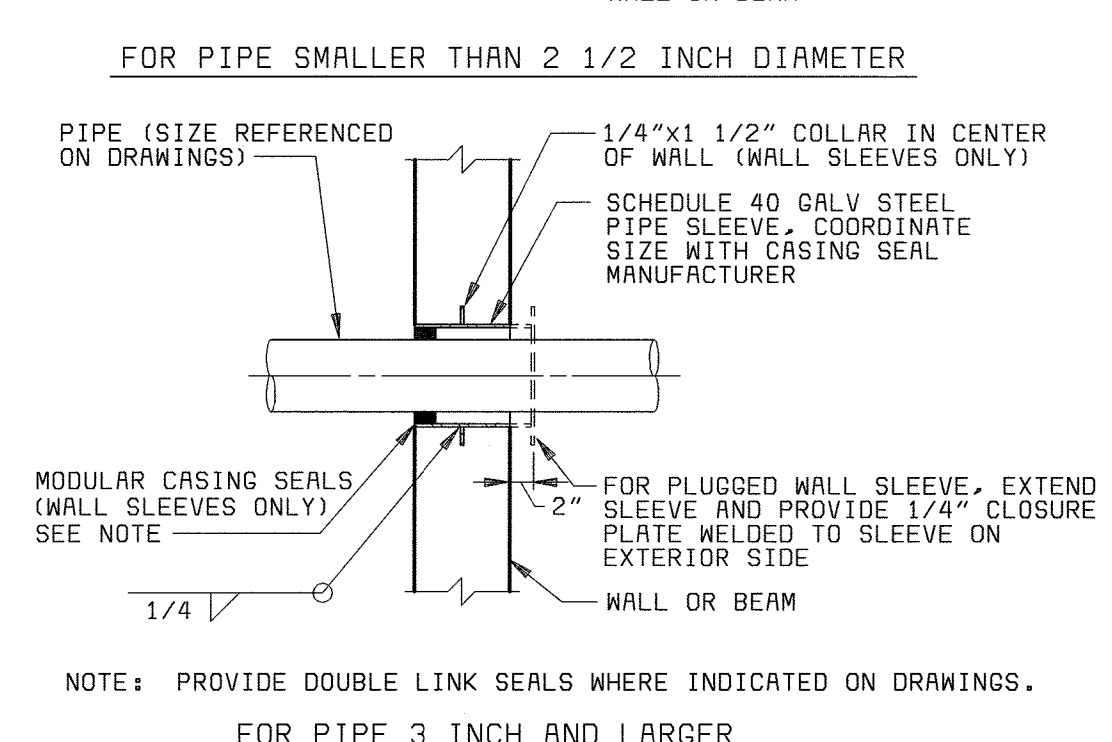
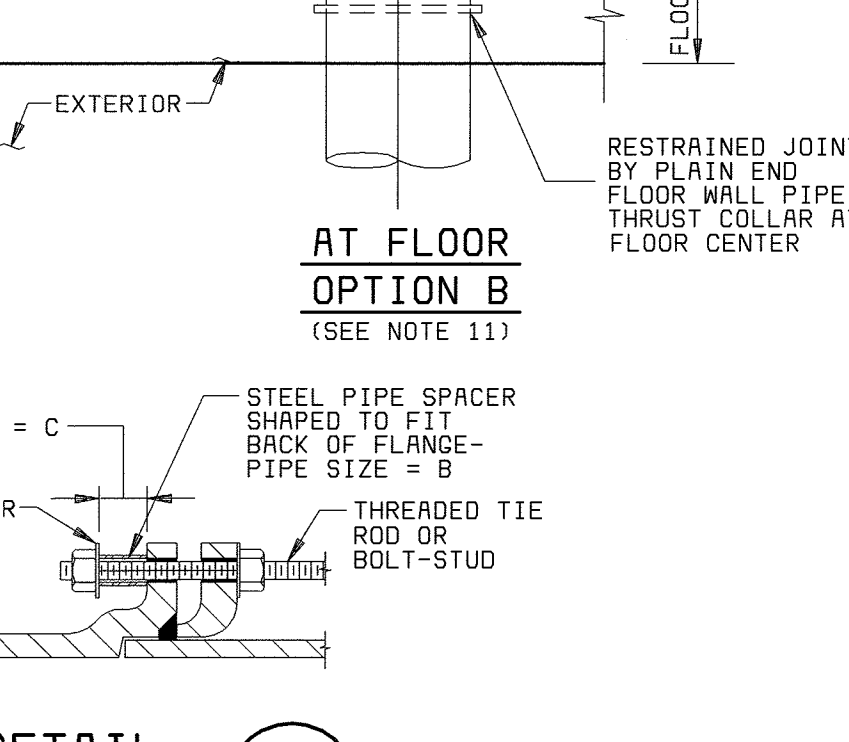
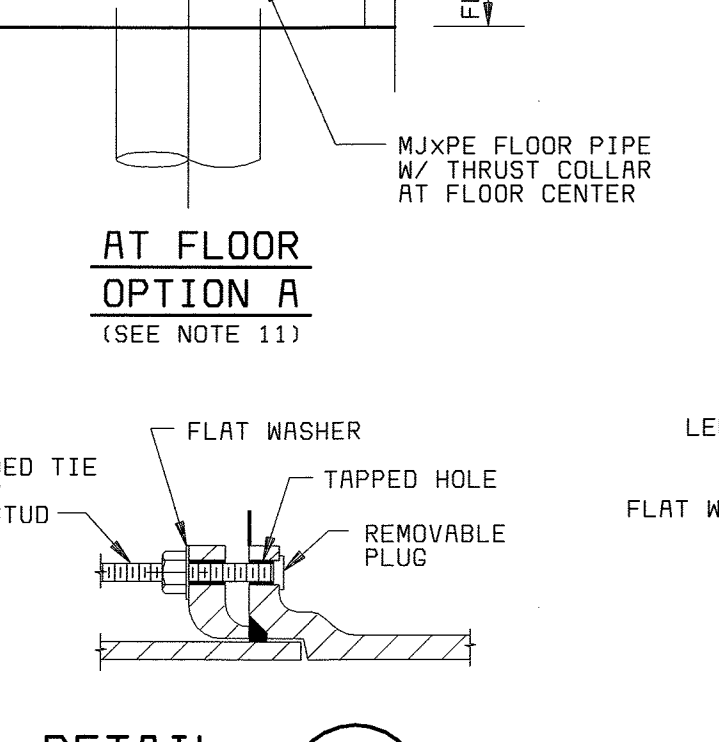
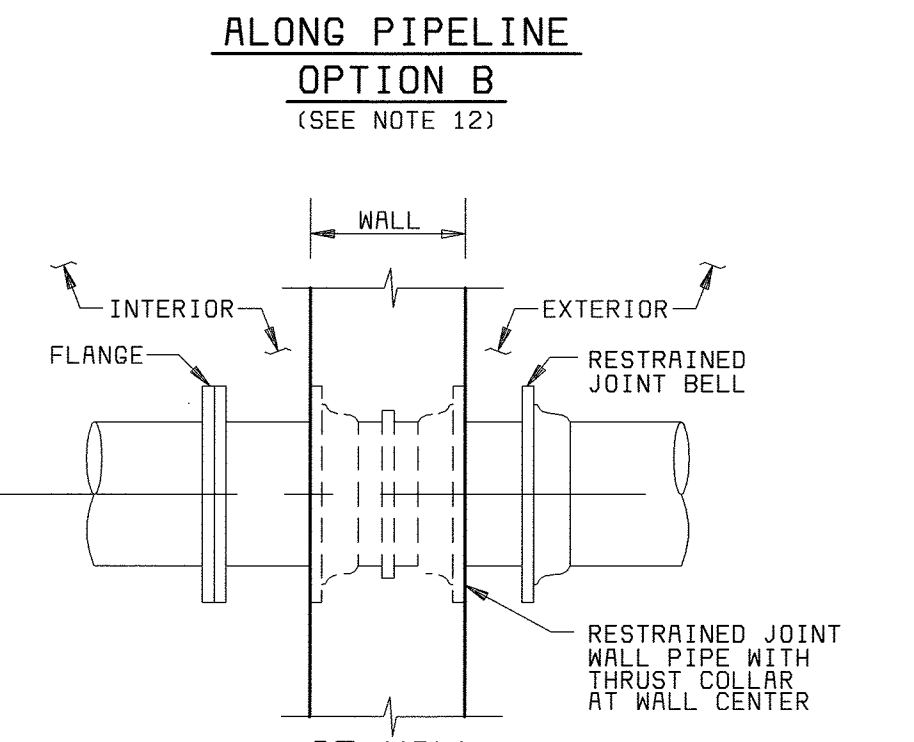
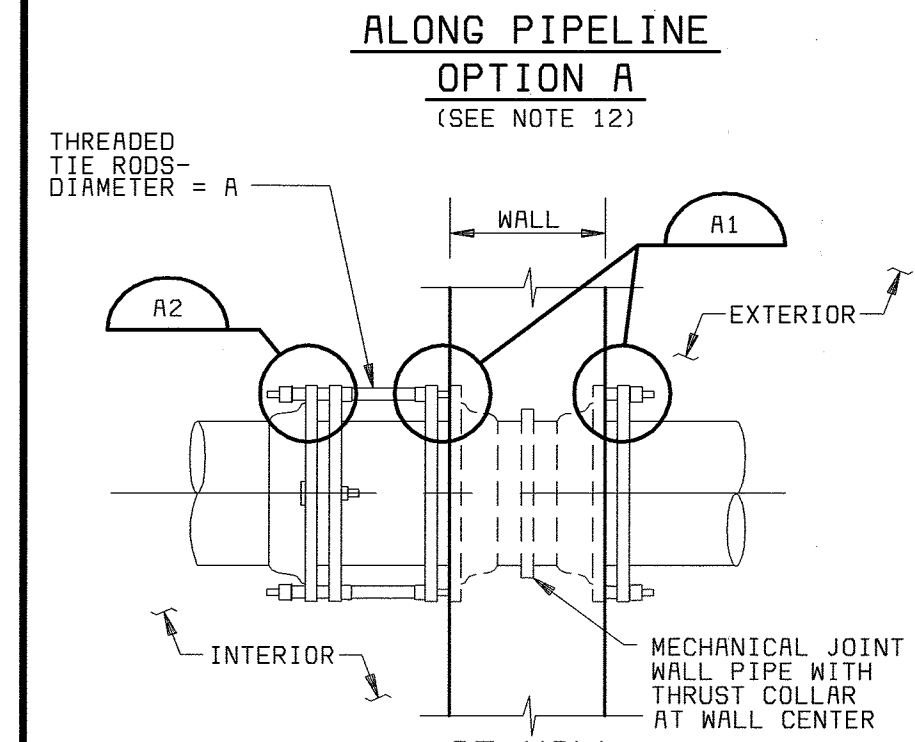
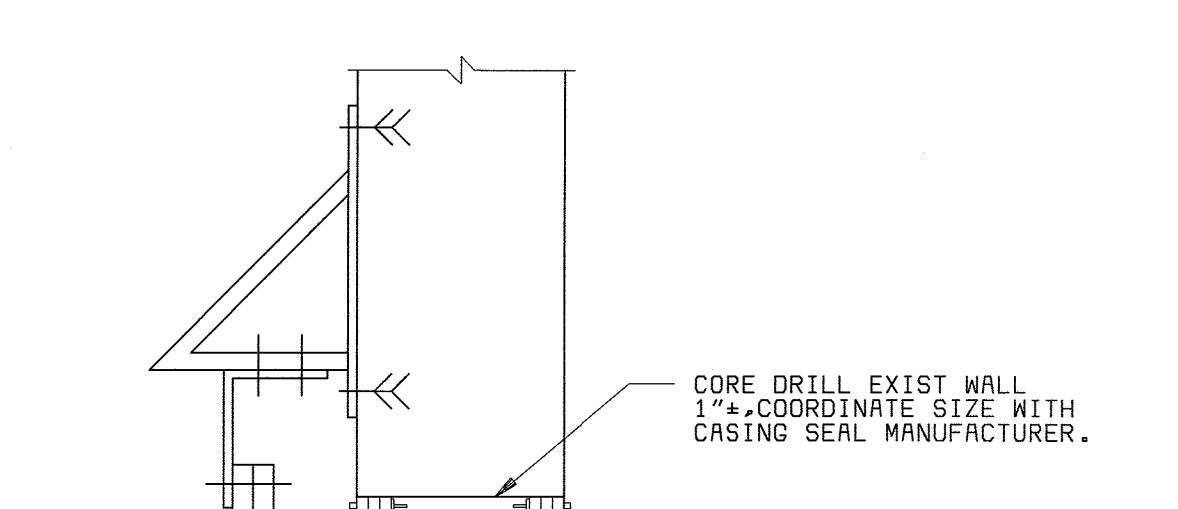
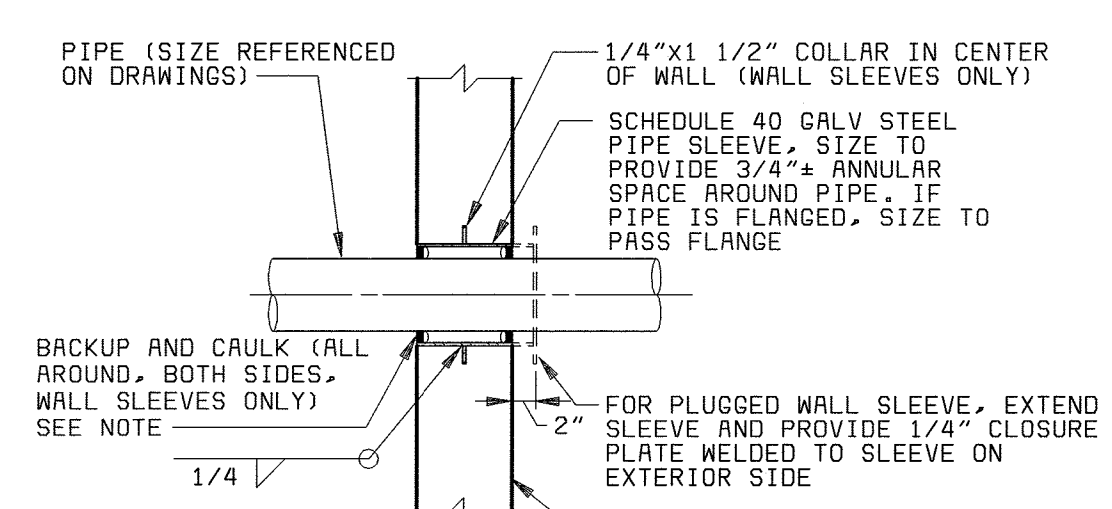
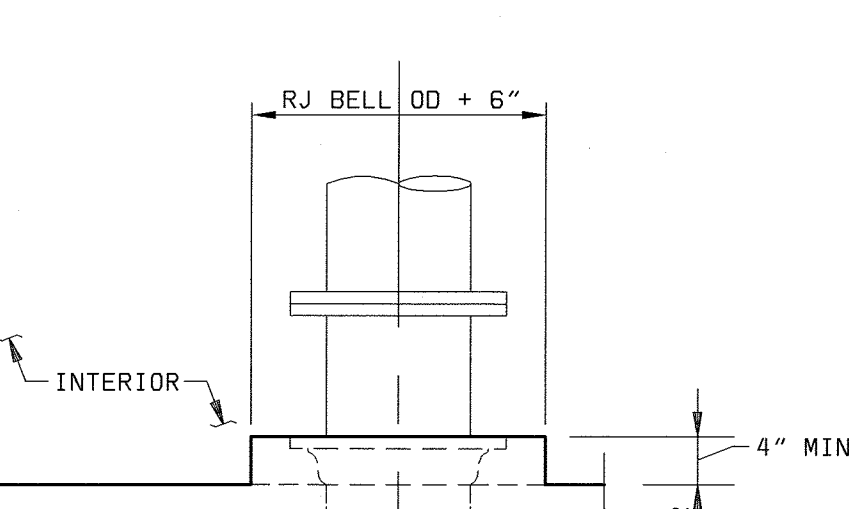
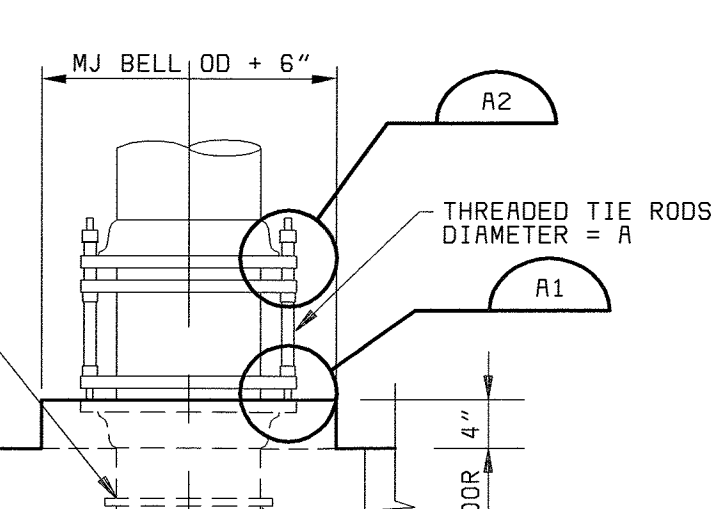
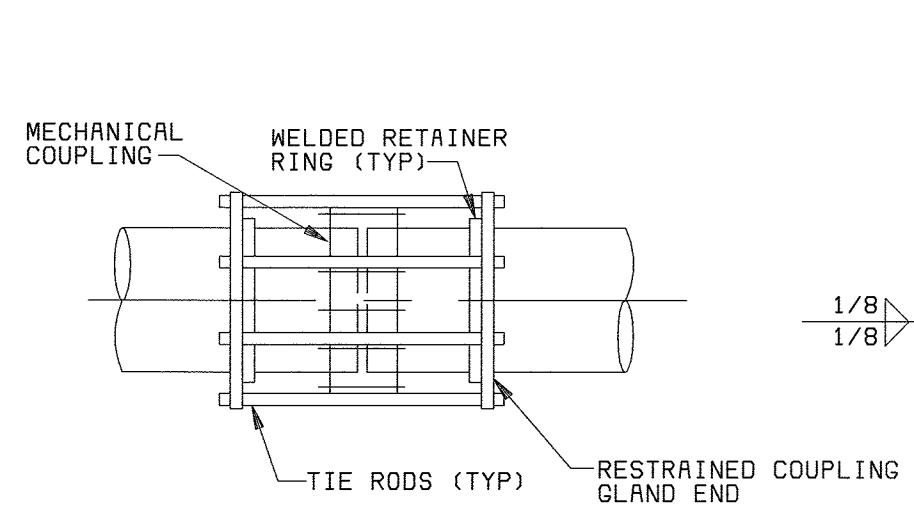
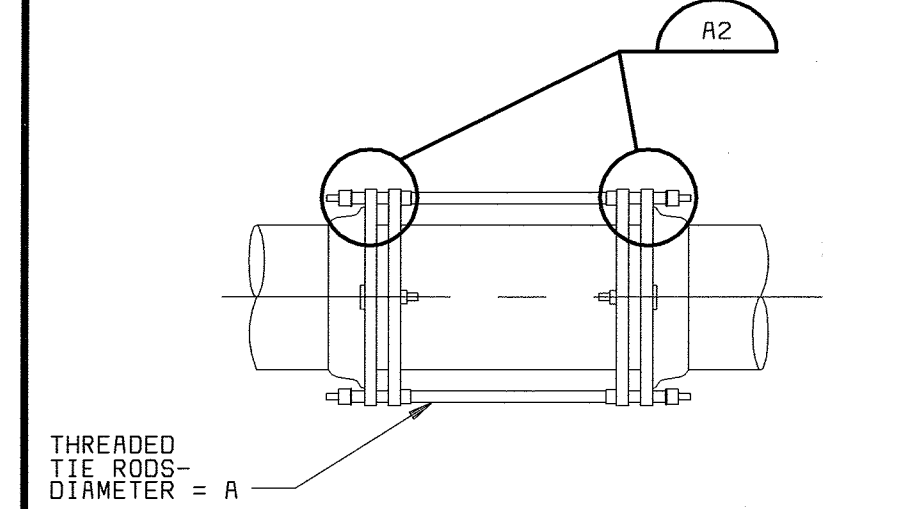
HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

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M43

058472-4  
FD58472A



TYPE I - NEW CONSTRUCTION

CONCRETE WALL OR BEAM SLEEVE

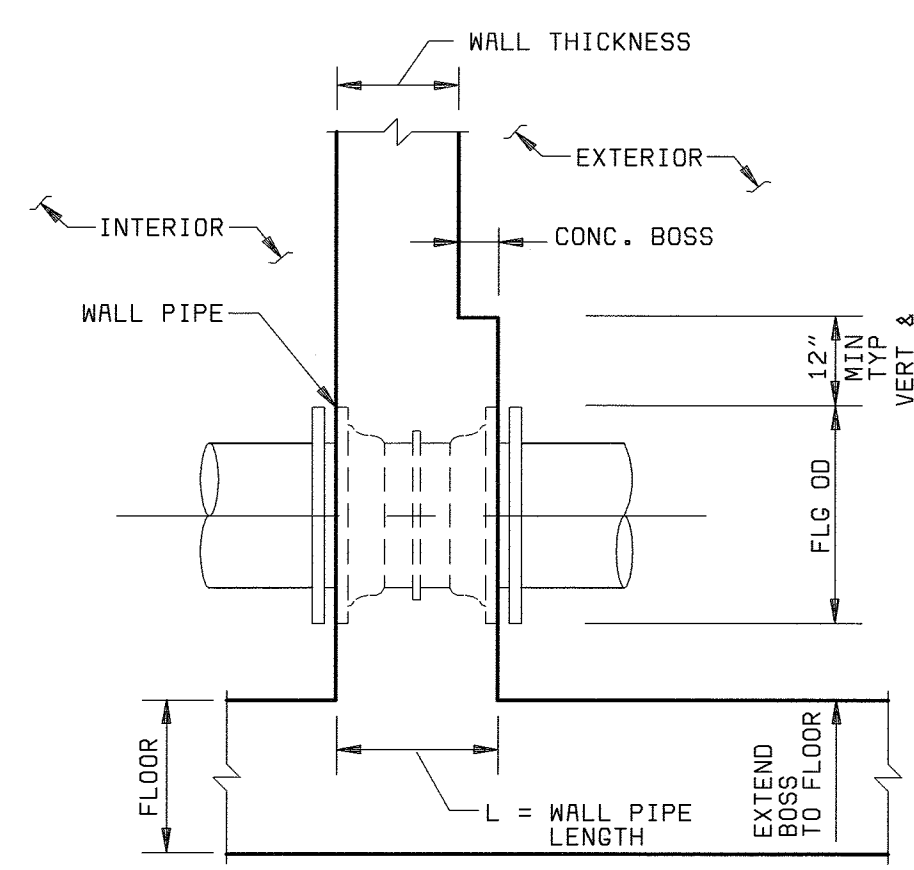
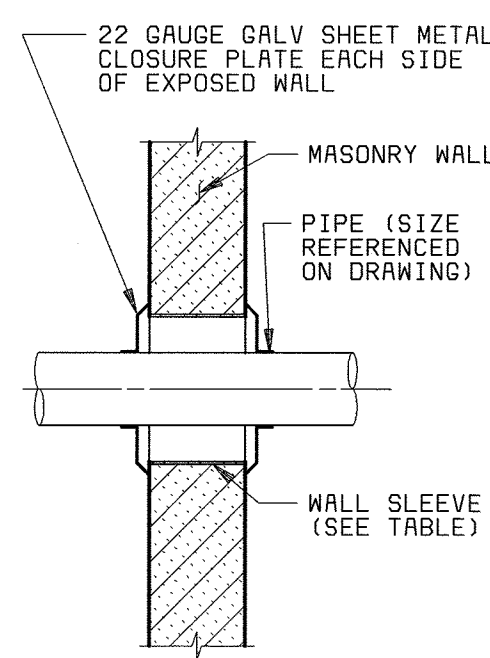
PIPE SIZE	A TIE ROD DIAMETER	B SPACER NOM. DIA	C SPACER LENGTH	NO. RODS
3" - 8"	3/4"	3/4"	2 1/2"	2
10" - 12"	3/4"	1"	2 1/2"	2
14"	3/4"	1"	3 1/2"	2
16" - 20"	3/4"	1"	3 1/2"	4
24"	3/4"	1"	3 1/2"	6
30"	1"	1 1/4"	4"	8
36"	1"	1 1/4"	4"	8
42"	1 1/4"	1 1/2"	4"	8
48"	1 1/4"	1 1/2"	4"	12

- NOTES:
- EXCEPT WHERE TIE RODS ARE REQUIRED, BOLTS FOR FOLLOWER RINGS SHALL BE BOLT-STUDS ON ALL WALL PIPES AND TEE HEAD BOLTS IN OTHER LOCATIONS.
  - WALL PIPE FITTINGS SHALL BE DUCTILE IRON AND SHALL HAVE A PRESSURE RATING NOT LESS THAN 250 PSI.
  - TIE RODS SHALL BE INSTALLED IN PAIRS, DIAMETRICALLY OPPOSITE EACH OTHER, IN THE BOLT CIRCLE OF THE PIPE.
  - ALL BOLT HOLES IN THE WALL OR FLOOR CASTINGS SHALL BE DRILLED AND TAPPED AND SIZED IN ACCORDANCE WITH COLUMN A. PLASTIC PROTECTIVE CAPS OR THREADED INSERTS SHALL BE PLACED IN THE TAPPED BOLT HOLES TO PROTECT THE BOLT HOLES FROM FILLING WITH CONCRETE DURING THE PLACEMENT OF CONCRETE. EXTENSIONS OF THE CAP OR THREADED INSERT SHALL HAVE SUFFICIENT LENGTH TO PLACE BOLT IN FINAL POSITION.
  - BOLT HOLES IN ALL WALL CASTINGS, EXCEPT IN 6, 8, AND 14 INCH PIPE SIZES, SHALL BE ORIENTED WITH THE BOLT HOLES STRADDLING THE VERTICAL CENTERLINE OF HORIZONTAL PIPE.
  - BOLT HOLES IN WALL CASTINGS FOR 6, 8, 14, AND 20 INCH PIPE SIZES SHALL BE ORIENTED ON THE HORIZONTAL CENTERLINE OF HORIZONTAL PIPE.
  - BOLT HOLES FOR FLOOR CASTINGS SHALL BE PLACED SIMILAR TO WALL CASTINGS.
  - TIE ROD MATERIALS SHALL BE ASTM A307 OR EQUAL FOR ALL DUCTILE IRON WALL AND FLOOR CASTINGS. HIGH STRENGTH BOLT MATERIALS SHALL NOT BE USED IN HARNESSING PIPE JOINTS TO DUCTILE IRON PIPE OR WALL PIPE CASTINGS.
  - ALL WALL AND FLOOR CASTINGS SHALL BE NOTCHED OR PERMANENTLY MARKED AT THE TWO PIPE CENTERLINES.
  - TIE ROD INSTALLATION AT MECHANICAL JOINT WALL OR FLOOR SLEEVES SHALL BE THE SAME AS USED FOR MECHANICAL JOINT WALL OR FLOOR PIPES.
  - AT CONTRACTOR'S OPTION, RESTRAINED JOINT WALL PIPES MAY BE USED IN PLACE OF MECHANICAL JOINT WALL OR FLOOR PIPES SHOWN ON THE DRAWINGS WHERE APPROPRIATE LENGTHS ARE AVAILABLE AND SPACE FOR TRANSITION PIECES ARE AVAILABLE. FLANGE WALL PIPES WILL NOT BE ACCEPTABLE UNLESS OTHERWISE INDICATED.
  - AT CONTRACTOR'S OPTION, RESTRAINED COUPLING GLAND END (AS MANUFACTURED BY AMERICAN CAST IRON PIPE COMPANY) WITH MECHANICAL COUPLING MAY BE USED IN PLACE OF HARNESSING MECHANICAL JOINTS AS SHOWN ON THE DRAWINGS WHERE SPACE IS AVAILABLE.

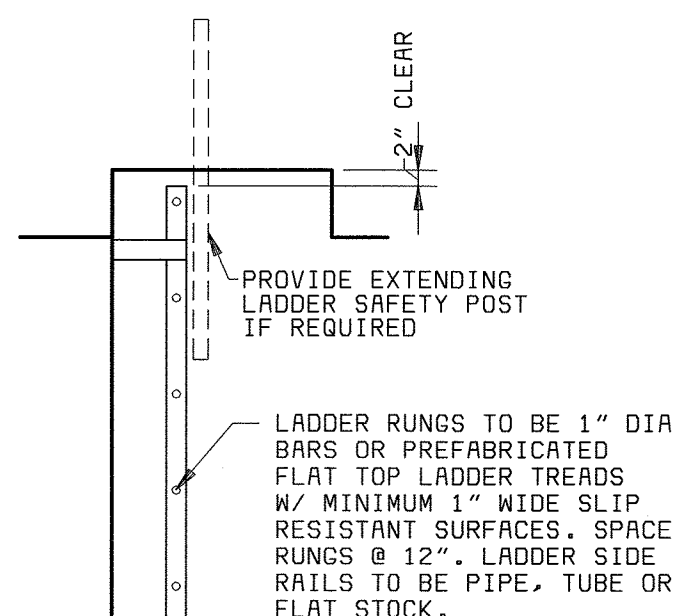
WALL SLEEVE TABLE

PIPE SIZE	SLEEVE SIZE (UNLESS OTHERWISE INDICATED)
1" & SMALLER	3" (1)
1 1/4" & 1 1/2"	3 1/2" (1)
2"	4" (1)
3"	6" (2) (4)
4"	6" (2) (4)
6"	8" (3) (4)
8" & LARGER	PIPE OD+2" (3) (4)

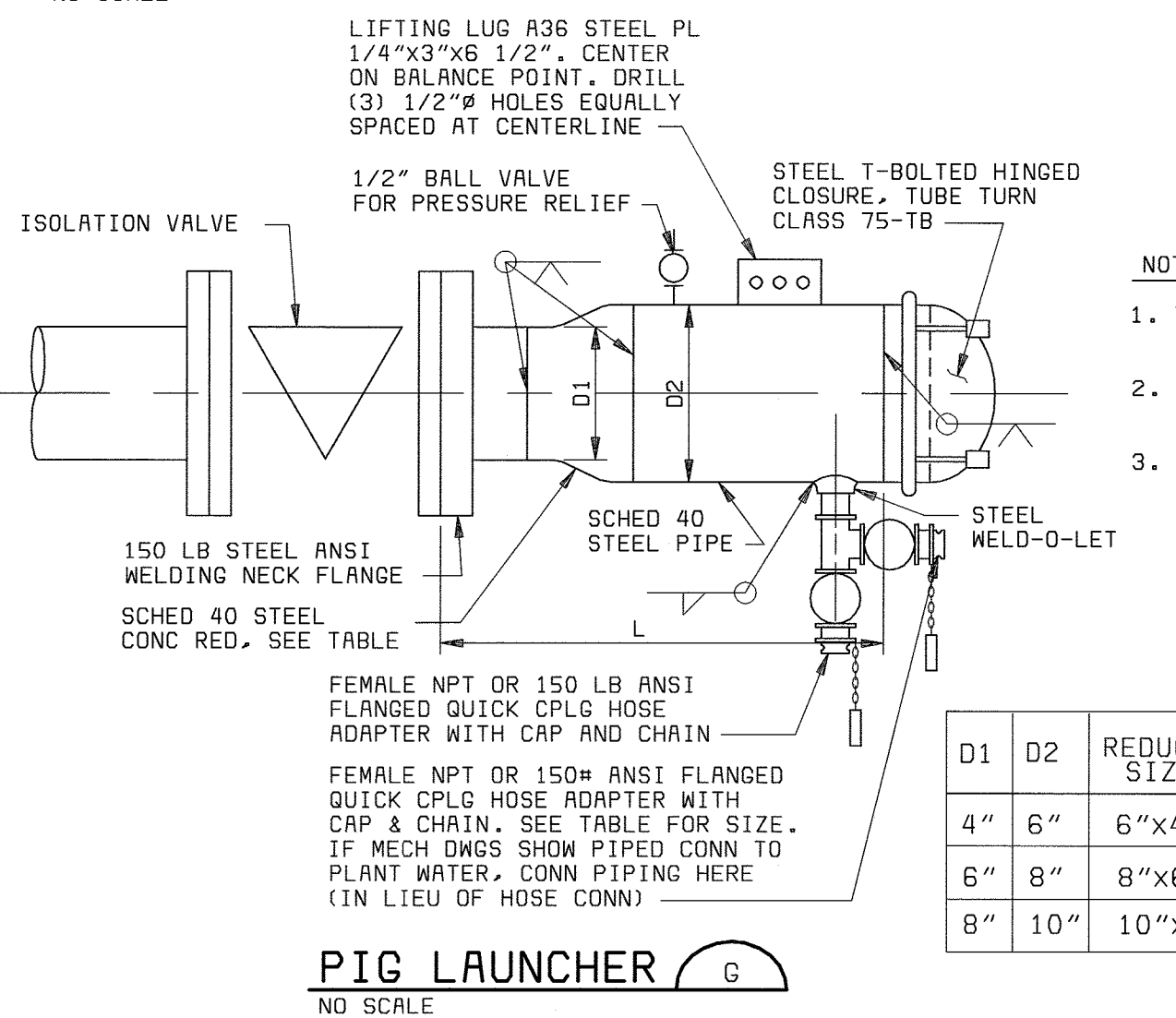
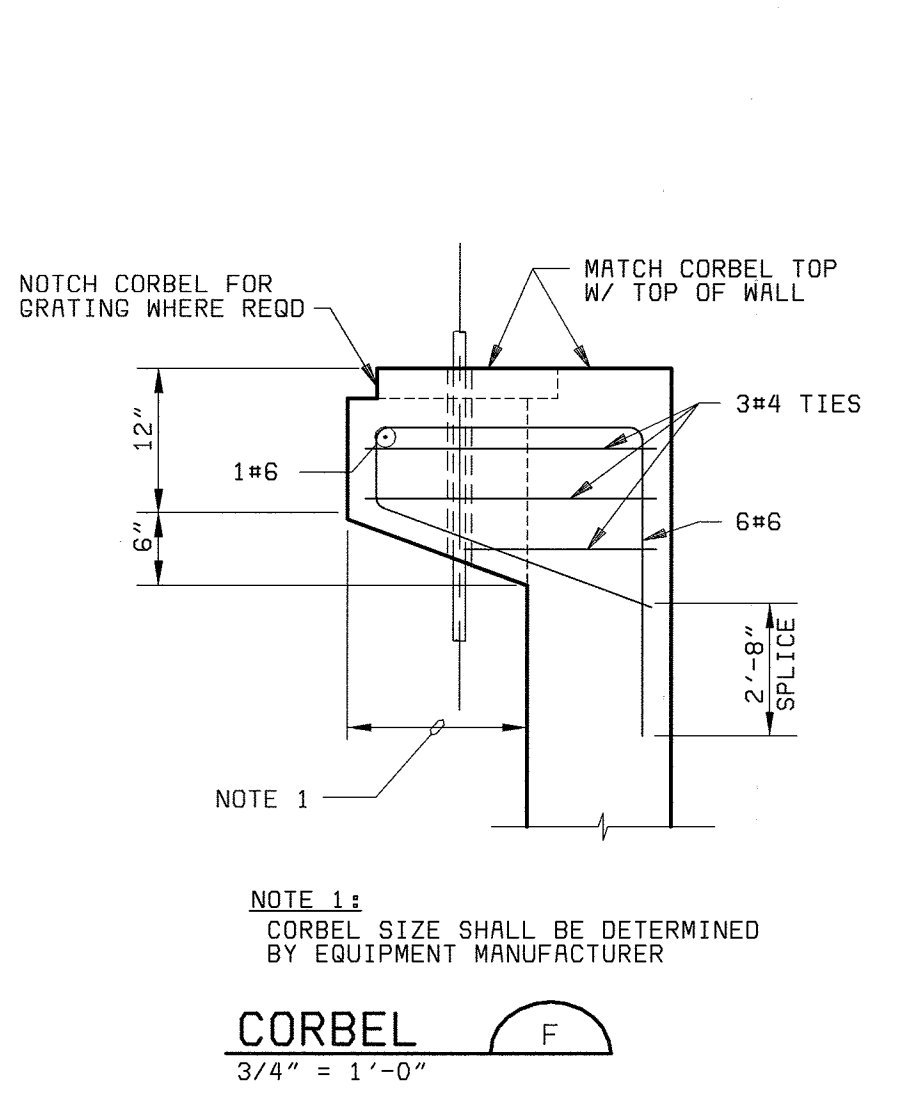
- SCHEDULE 40 GALV STEEL PIPE
- SCHEDULE 20 GALV STEEL PIPE, MINIMUM 1/4" MINIMUM WALL THICKNESS
- IF PIPE IS FLANGED, USE SLEEVE LARGE ENOUGH FOR FLANGE TO PASS THROUGH



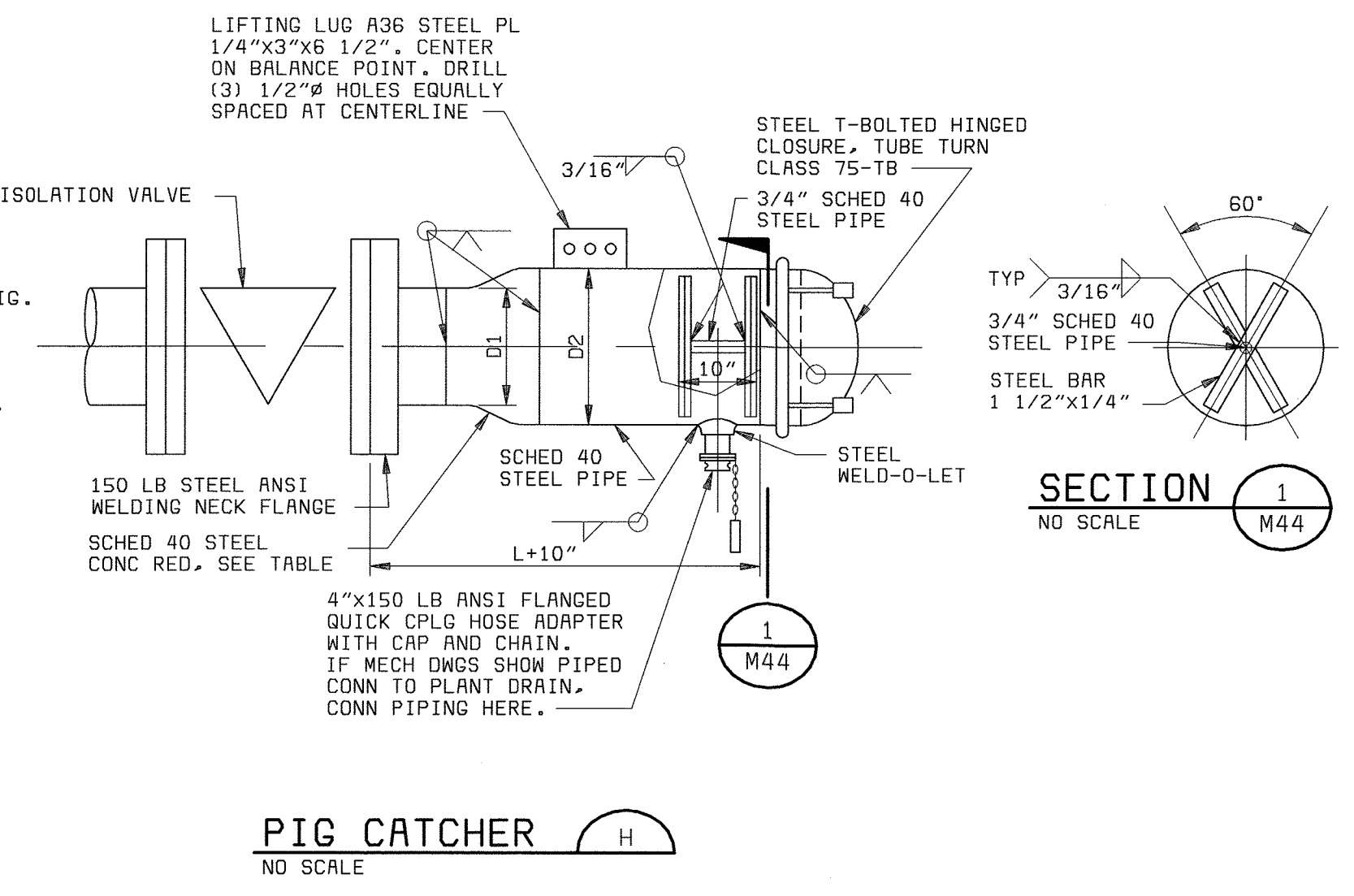
- NOTE:
- WHERE MINIMUM OVERALL LENGTH OF WALL PIPE IS GREATER THAN THE WALL THICKNESS PROVIDE CONCRETE BOSS OTHERWISE PROVIDE WALL PIPE WITH LENGTH EQUAL TO WALL THICKNESS.



DIP MECHANICAL JOINTS WITH TIE RODS



D1	D2	REDUCER SIZE	L	HOSE COUPLING AND VALVE
4"	6"	6"x4"	14"	2" SCD
6"	8"	8"x6"	20"	3" FLGD
8"	10"	10"x8"	24"	4" FLGD



TYPICAL LADDER BRACKET CONN

LADDER

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

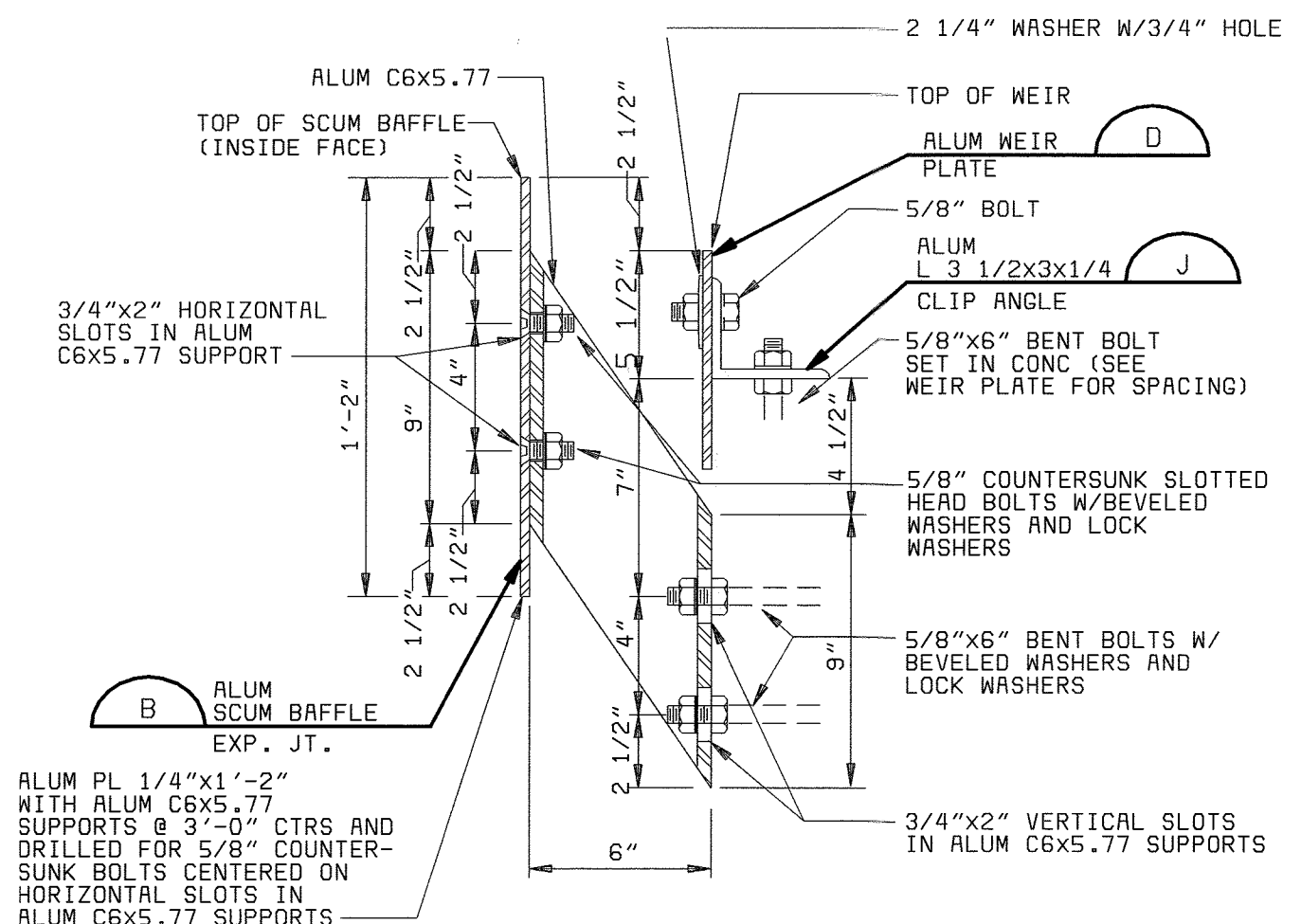
THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. REICHTMUS, JR., A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927

DES: DMP					
DRN: WHS,VVR					
CHK: RJR					
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

GENERAL MECHANICAL  
MISCELLANEOUS DETAILS

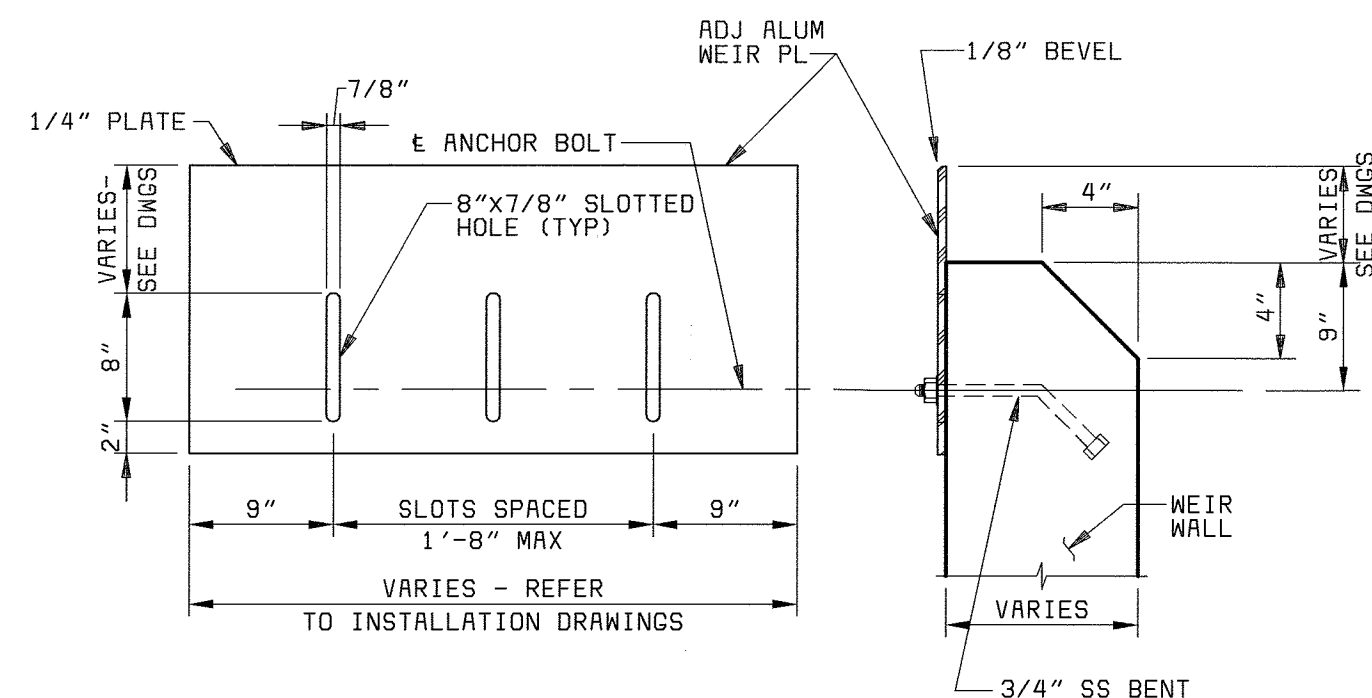
LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
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M44

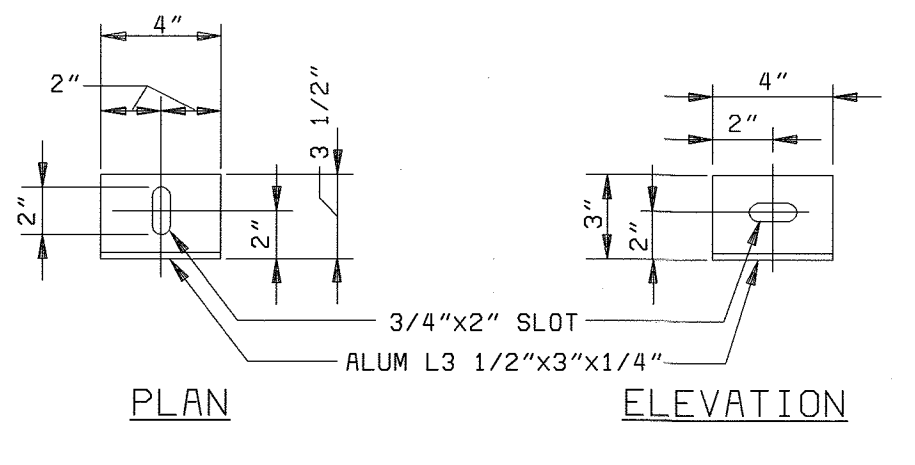


- NOTES:
1. SURFACE OF CONCRETE AND ADJACENT SIDE OF WEIR PLATE TO BE COATED WITH A HEAVY LAYER OF SEALANT PRIOR TO PLACING WEIR PLATE
  2. ALL BOLTS, NUTS, AND WASHERS TO BE STAINLESS STEEL
  3. 5/8" EPOXY GROUTED THREADED ROD MAY BE USED IN LIEU OF ANCHOR BOLTS AT CONTRACTORS OPTION
  4. ALL SURFACES OF ALUMINUM IN CONTACT WITH CONCRETE SHALL BE COATED WITH COAL TAR PAINT
  5. SEE SPECIFICATION SECTION 05990, STRUCTURAL AND MISCELLANEOUS METALS FOR ADDITIONAL REQUIREMENTS.
  6. SEE SPECIFICATION SECTIONS 11410 AND 11435, CIRCULAR CLARIFYING EQUIPMENT AND SECONDARY WASTE WATER TREATMENT CLARIFYING EQUIPMENT, FOR MODIFICATIONS TO WEIR AND SCUM BAFFLE IN VICINITY OF SCUM BOXES.

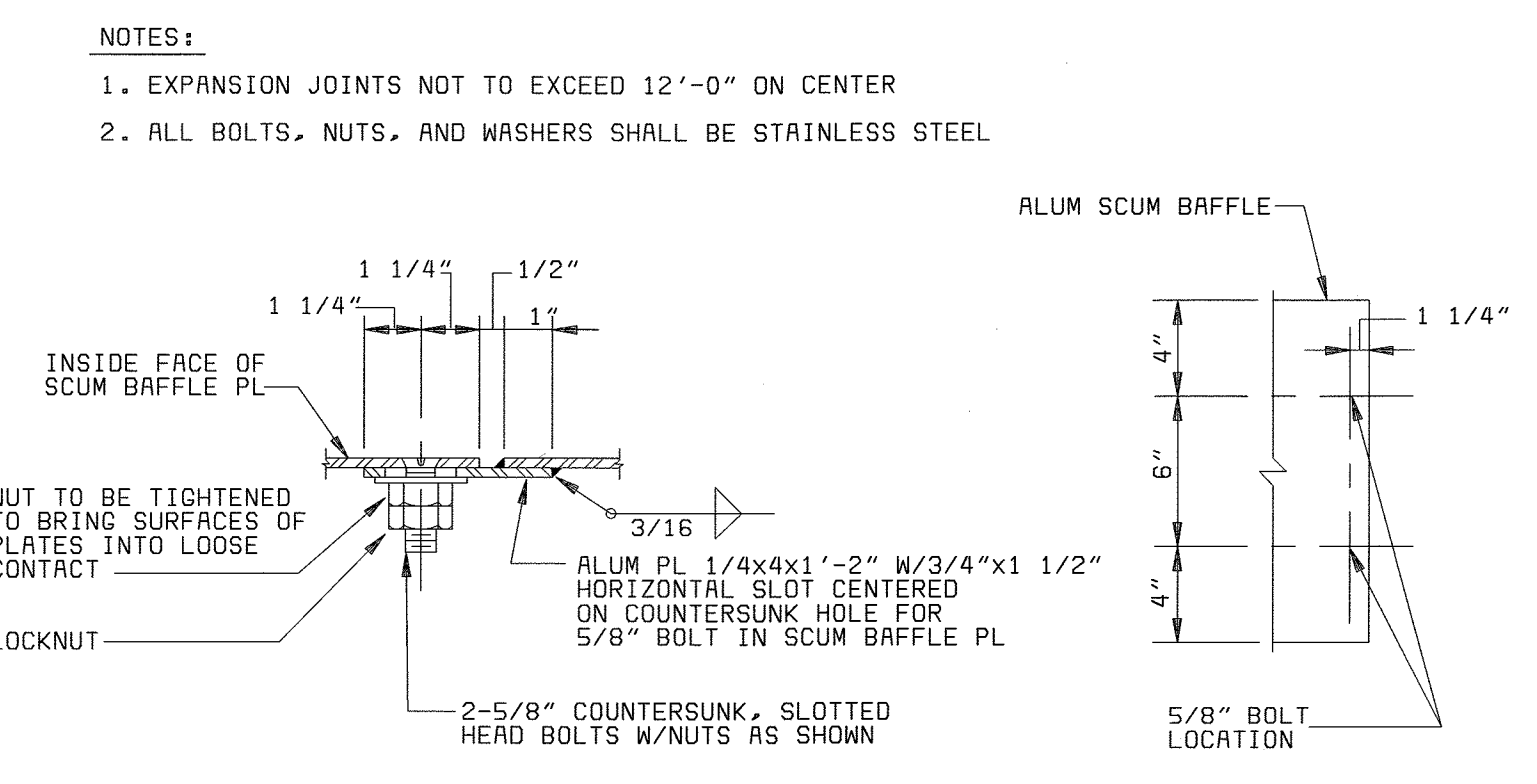
**SCUM BAFFLE & WEIR SUPPORT (A)**  
NO SCALE



**WEIR CLIP ANGLE (J)**  
NO SCALE

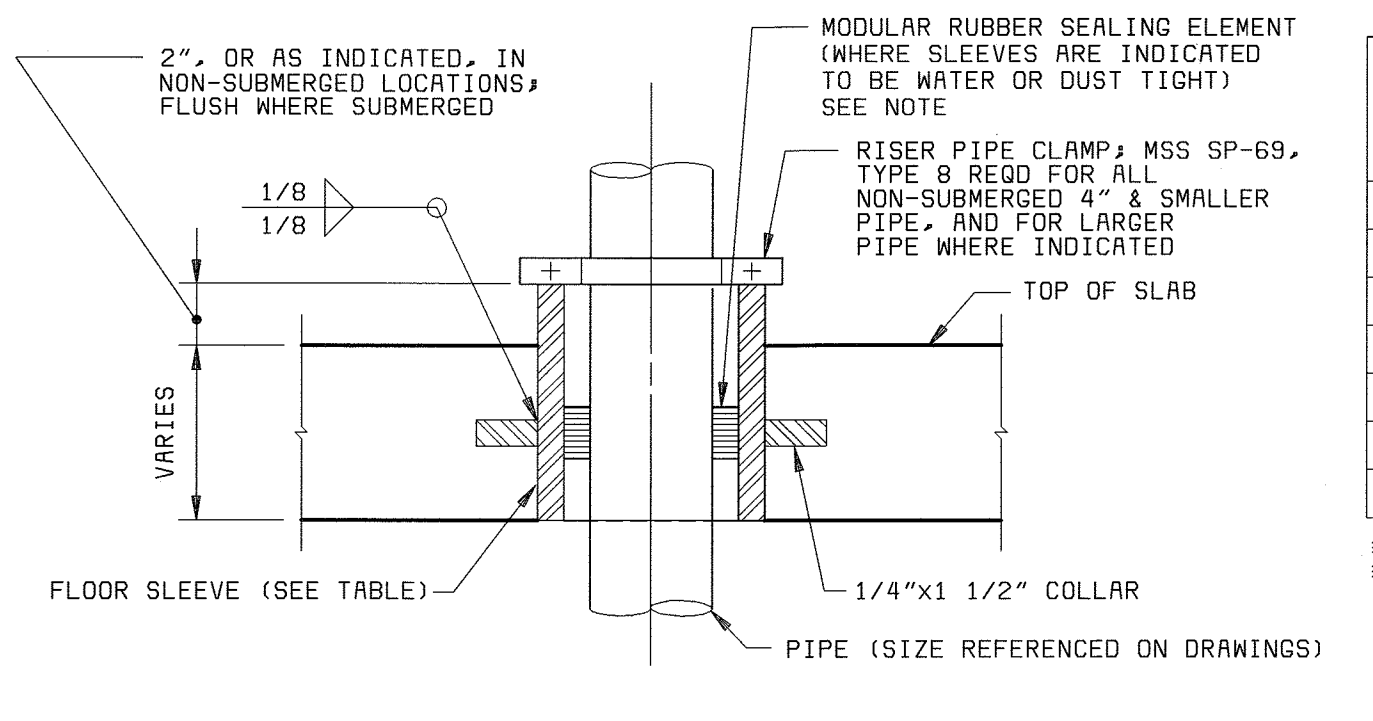


**WEIR CLIP ANGLE (J)**  
NO SCALE



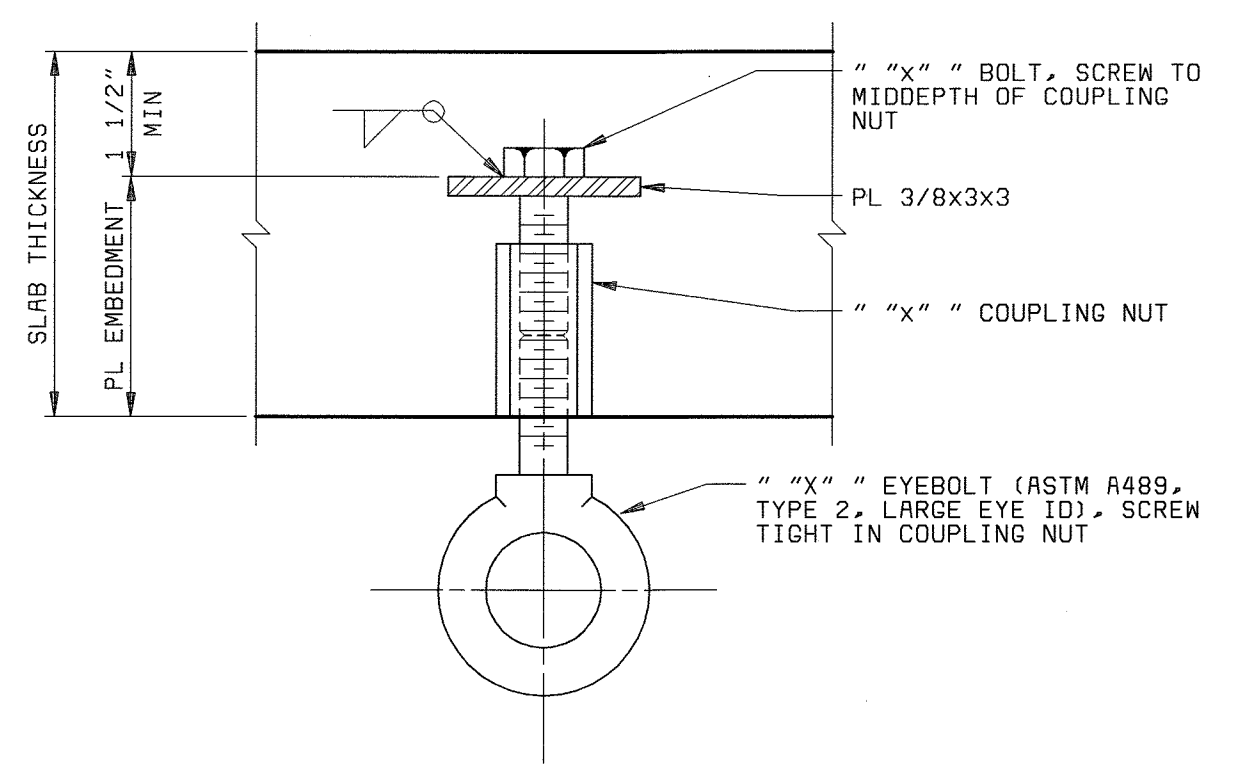
**SECTIONAL PLAN**      **ELEVATION**

**SCUM BAFFLE EXPANSION JOINT (B)**  
1" = 1'-0"



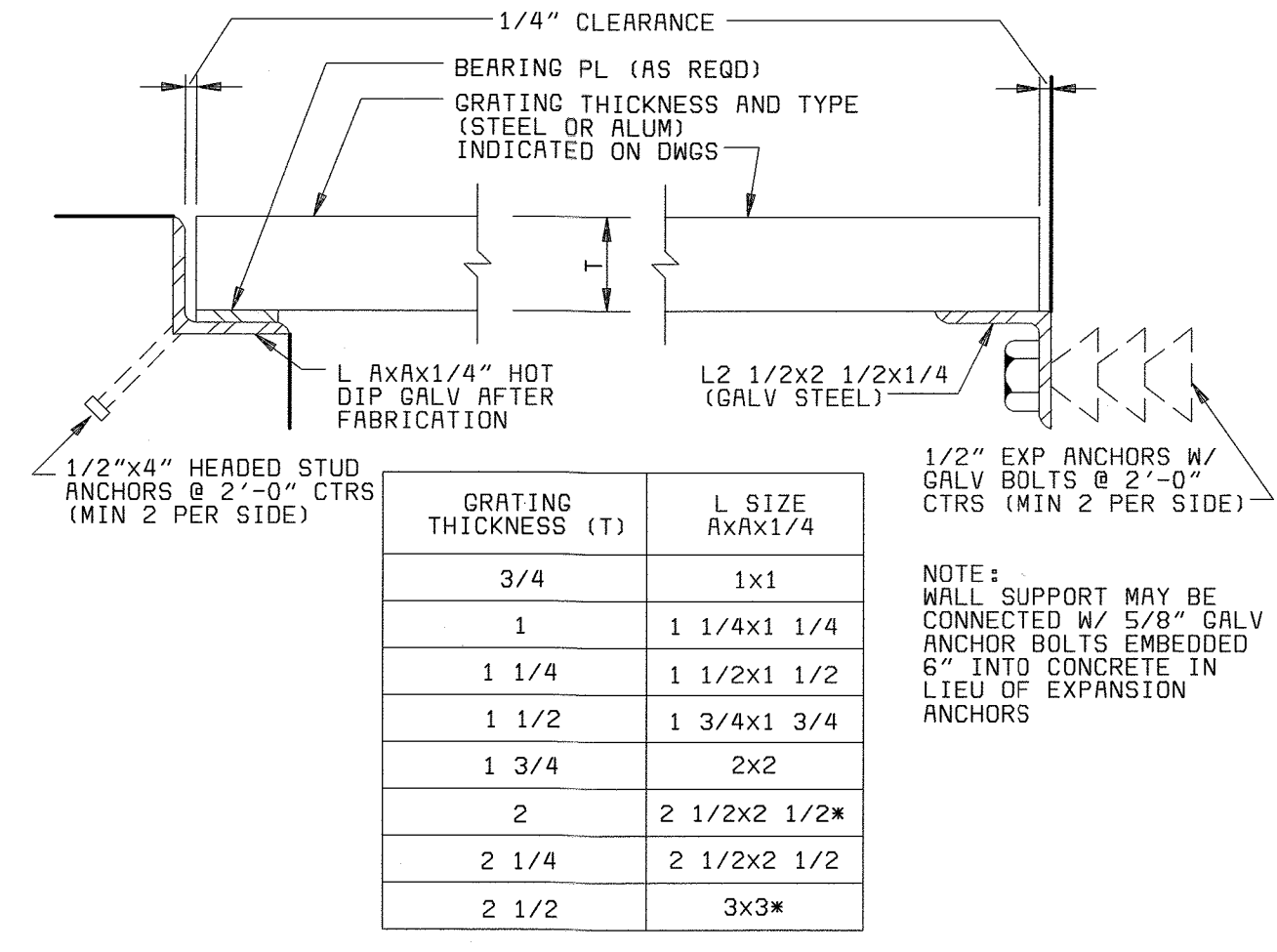
NOTE: PROVIDE DOUBLE SEALS WHERE INDICATED ON DRAWINGS.

**FLOOR SLEEVE NEW CONSTRUCTION (F)**  
NO SCALE

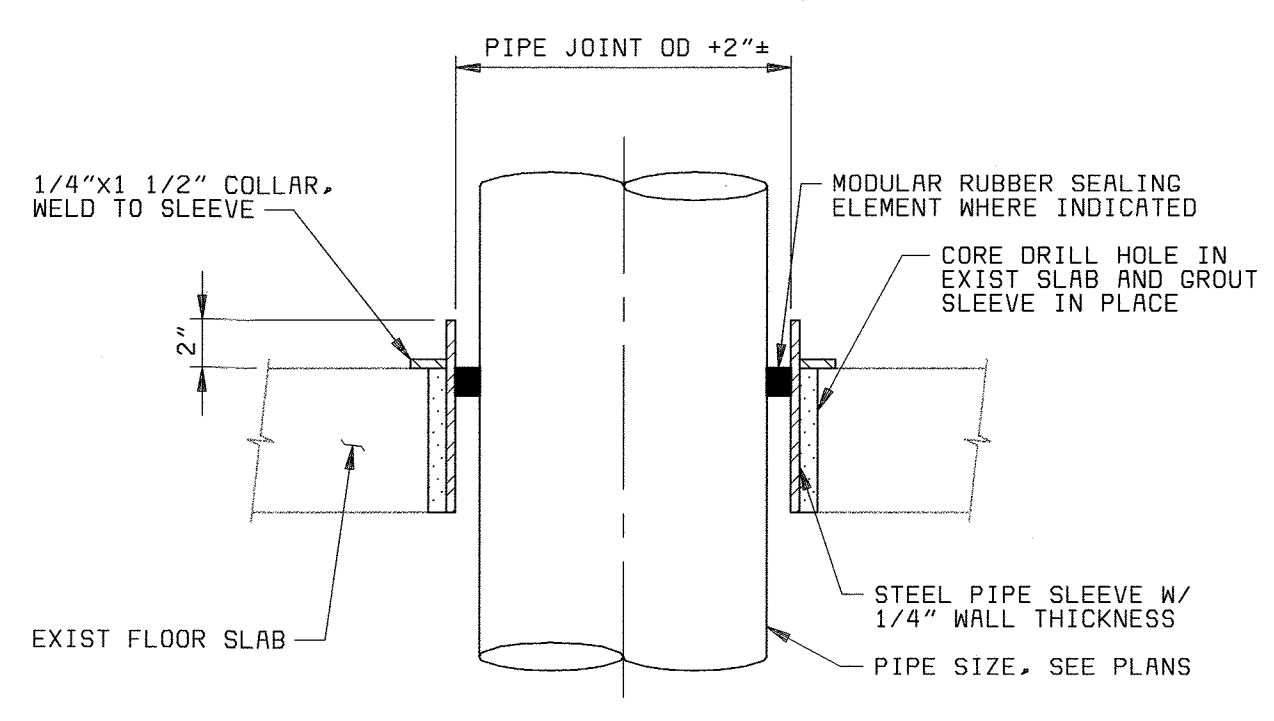


SAFE WORKING LOAD-POUNDS	BOLT SIZE DIA X LENGTH (IN)	SLAB THICKNESS IN (MINIMUM)	PL EMBED DEPTH IN (MINIMUM)	COUPLING NUT SIZE DIA X LENGTH IN	EYEBOLT SIZE IN
4000	3/4 x 3 1/4	6	4	3/4 x 2 1/4	3/4
6000	3/4 x 5 1/4	8	6	3/4 x 2 1/4	3/4
8000	1 x 5	8	6	1 x 3	1

**TYPICAL EYEBOLT (K)**  
NO SCALE

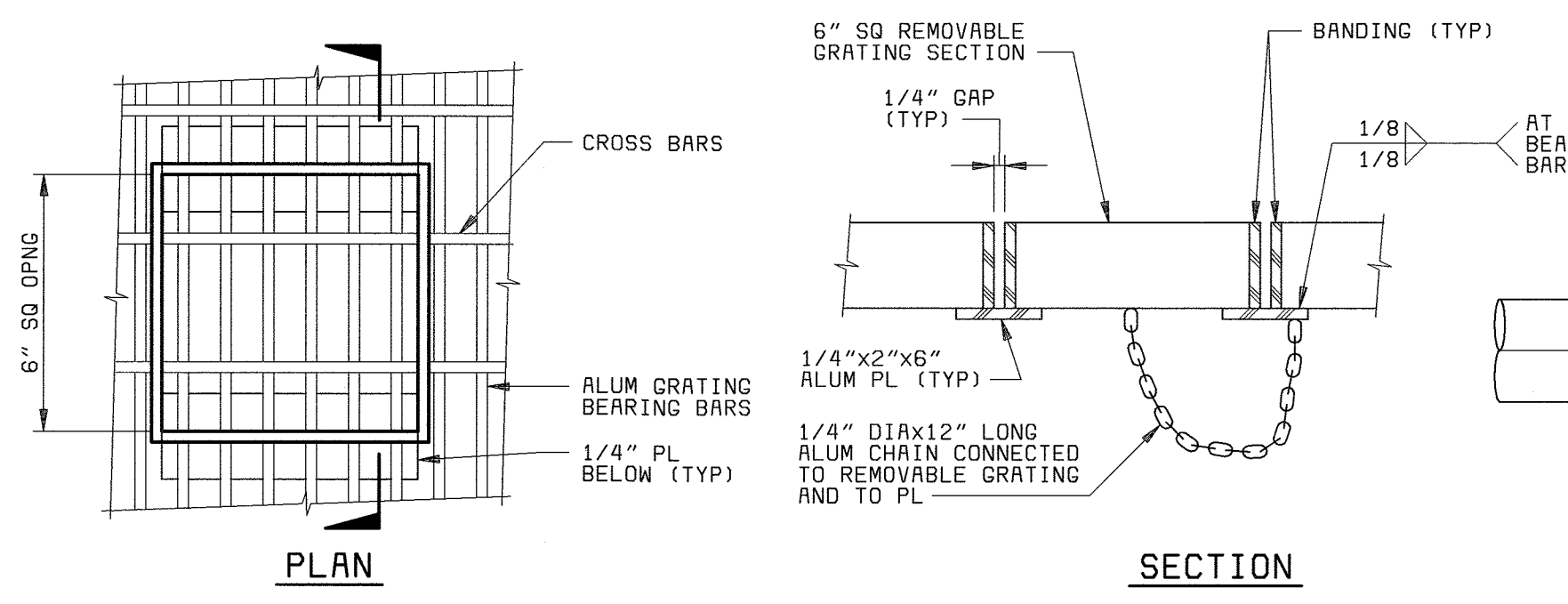


**GRATING SUPPORT (C)**  
NO SCALE

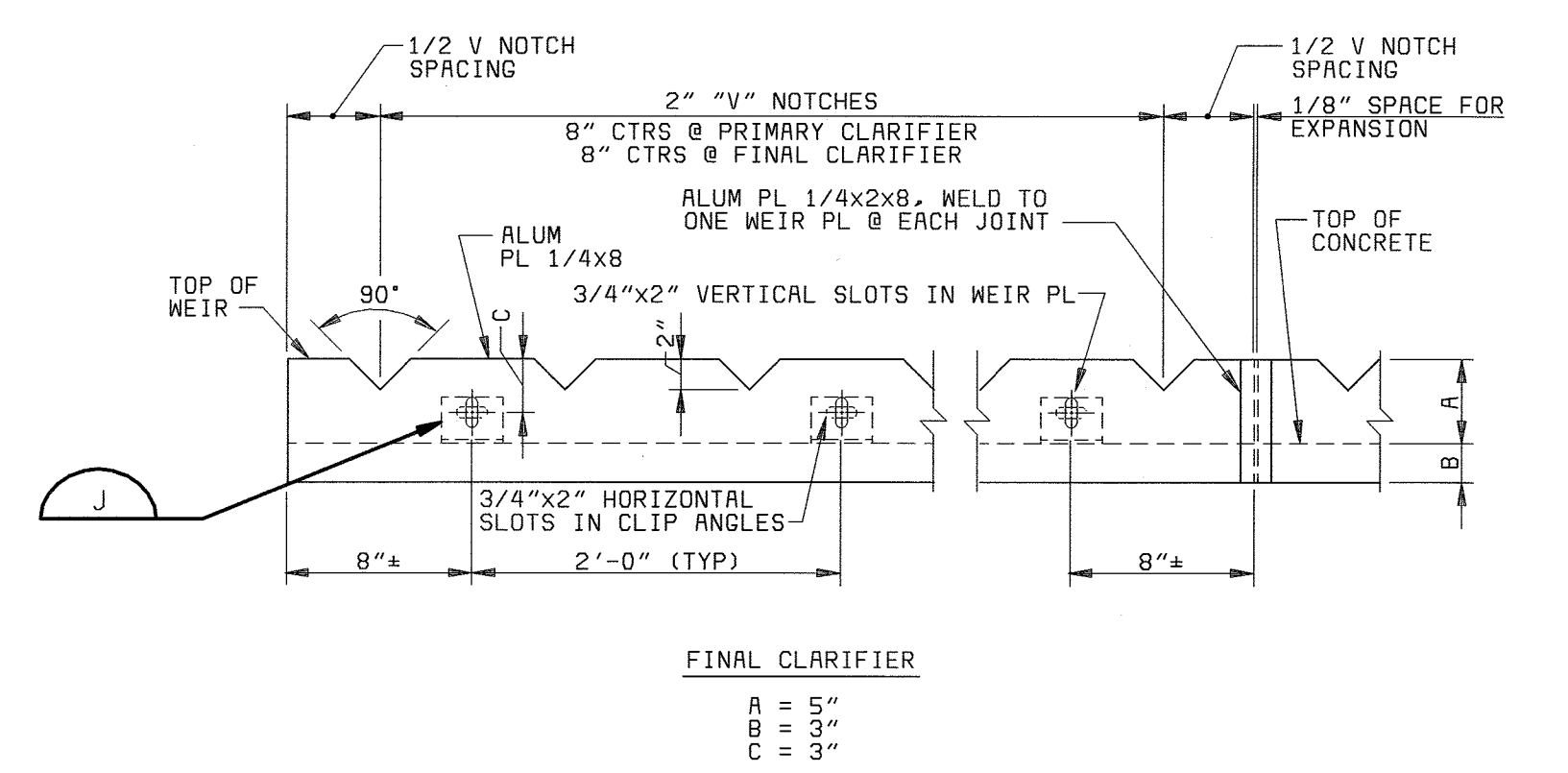


NOTE: FOR PREINSULATED PIPE (CSC PIPING) OD SHALL BE OD OF INSULATION

**FLOOR SLEEVE REHAB CONSTRUCTION (G)**  
NO SCALE

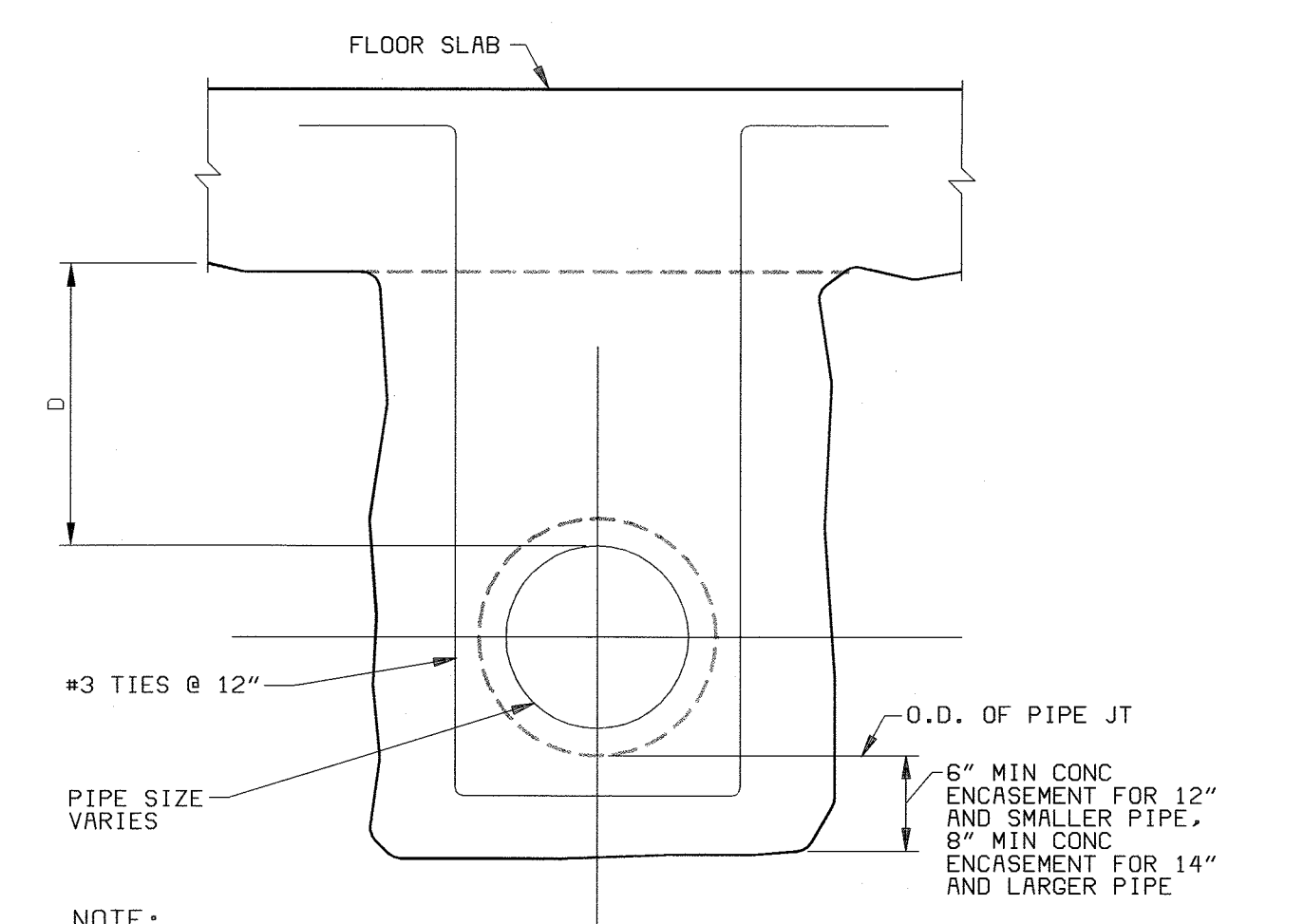


**REMOVABLE GRATING DETAIL (L)**  
NO SCALE



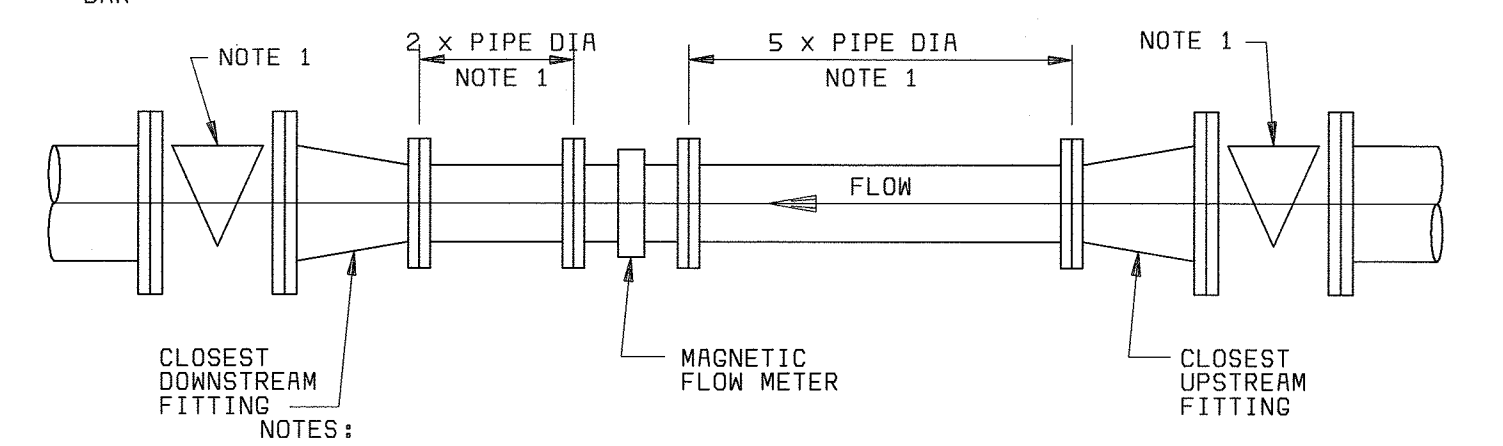
- NOTES:
1. TOP EDGE OF WEIR PL. & "V" NOTCHES TO BE MACHINED TO A TRUE EDGE. SURFACE OF CONC. & ADJACENT SIDE OF WEIR PL. TO BE COATED W/ HEAVY LAYER OF SEALANT PRIOR TO INSTALLATION. WEIR PL.'S FOR CIRCULAR TANKS TO BE BENT TO RADIUS. MAXIMUM WEIR PLATE LENGTH 11'-4"
  2. ALL SURFACES OF ALUMINUM IN CONTACT WITH CONCRETE SHALL BE COATED WITH EPOXY ENAMEL PAINT

**V-NOTCH WEIR PLATE (D)**  
NO SCALE



- NOTE:
1. IF D IS LESS THAN 1'-6", PROVIDE ENCASEMENT CONTINUOUS TO SLAB. IF D IS GREATER THAN 1'-6", ENCASEMENT MAY BE SEPARATED FROM SLAB UNLESS OTHERWISE INDICATED ON DRAWINGS. FILL VOID BETWEEN TOP OF ENCASEMENT AND BOTTOM OF SLAB WITH COMPACTED GRANULAR MATERIAL.
  2. PROVIDE A BELL AT THE END OF CONCRETE ENCASEMENT WHERE PIPELINE CHANGES FROM AN ENCASED PIPELINE TO A BURIED PIPELINE.

**CONCRETE ENCASEMENT (H)**  
NO SCALE



- NOTES:
1. MINIMUM UPSTREAM AND DOWNSTREAM STRAIGHT PIPE LENGTHS SHALL BE MAINTAINED FOR ALL MAGNETIC FLOW METER INSTALLATIONS.
  2. SHUTOFF VALVES AS SHOWN ON THE DRAWINGS.

**MAGNETIC FLOW METER INSTALLATION (M)**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gathersburg, Maryland  
REC. PROF. ENGR. DATE

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DES:	DRN:	CHK:	DATE:	DATE:	DATE:	NO.:	BY:	CK:	APP:
DMP	WHS,VVR	RJR	05/10/02	05/26/05					
				CONFORMED TO CONSTRUCTION RECORDS			PJS,RJR,RJR		
				REVISIONS AND RECORD OF ISSUE					

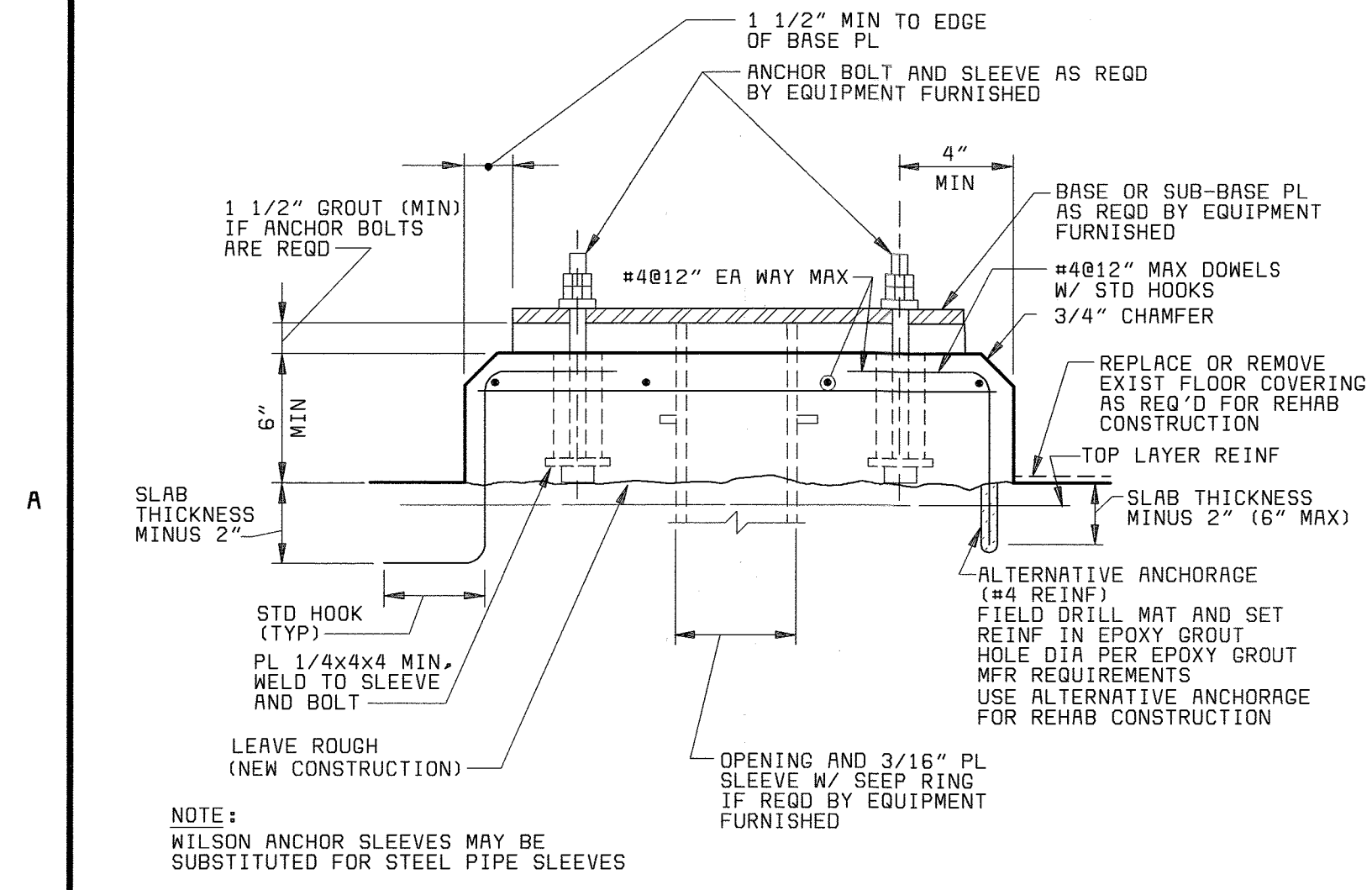
GENERAL MECHANICAL  
MISCELLANEOUS DETAILS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

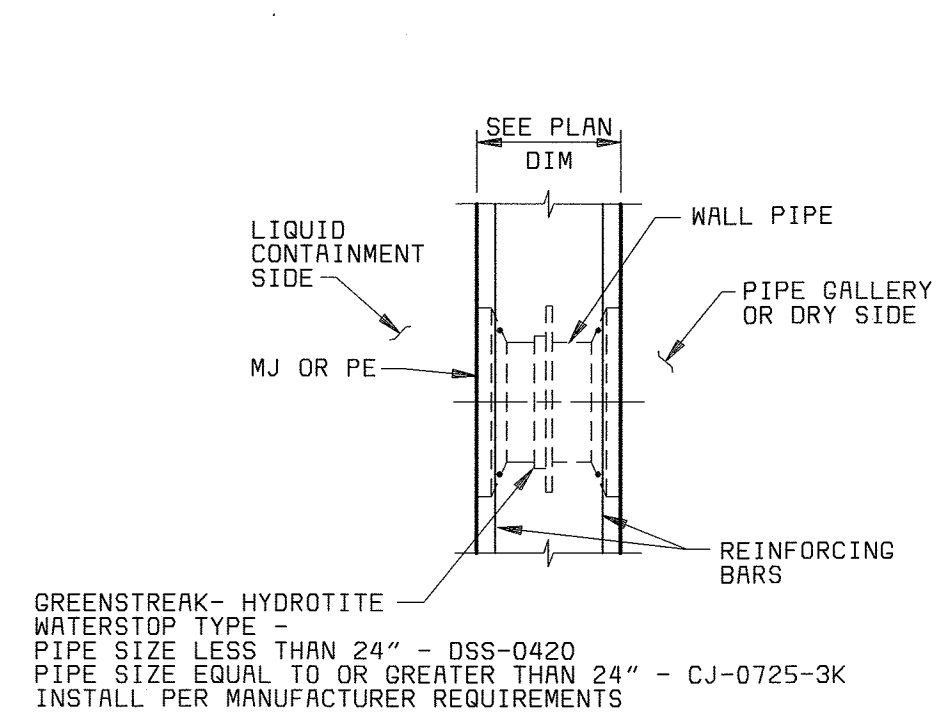
SCALE AS SHOWN  
SHEET 95 OF 139  
M45

058472-4  
F058472A

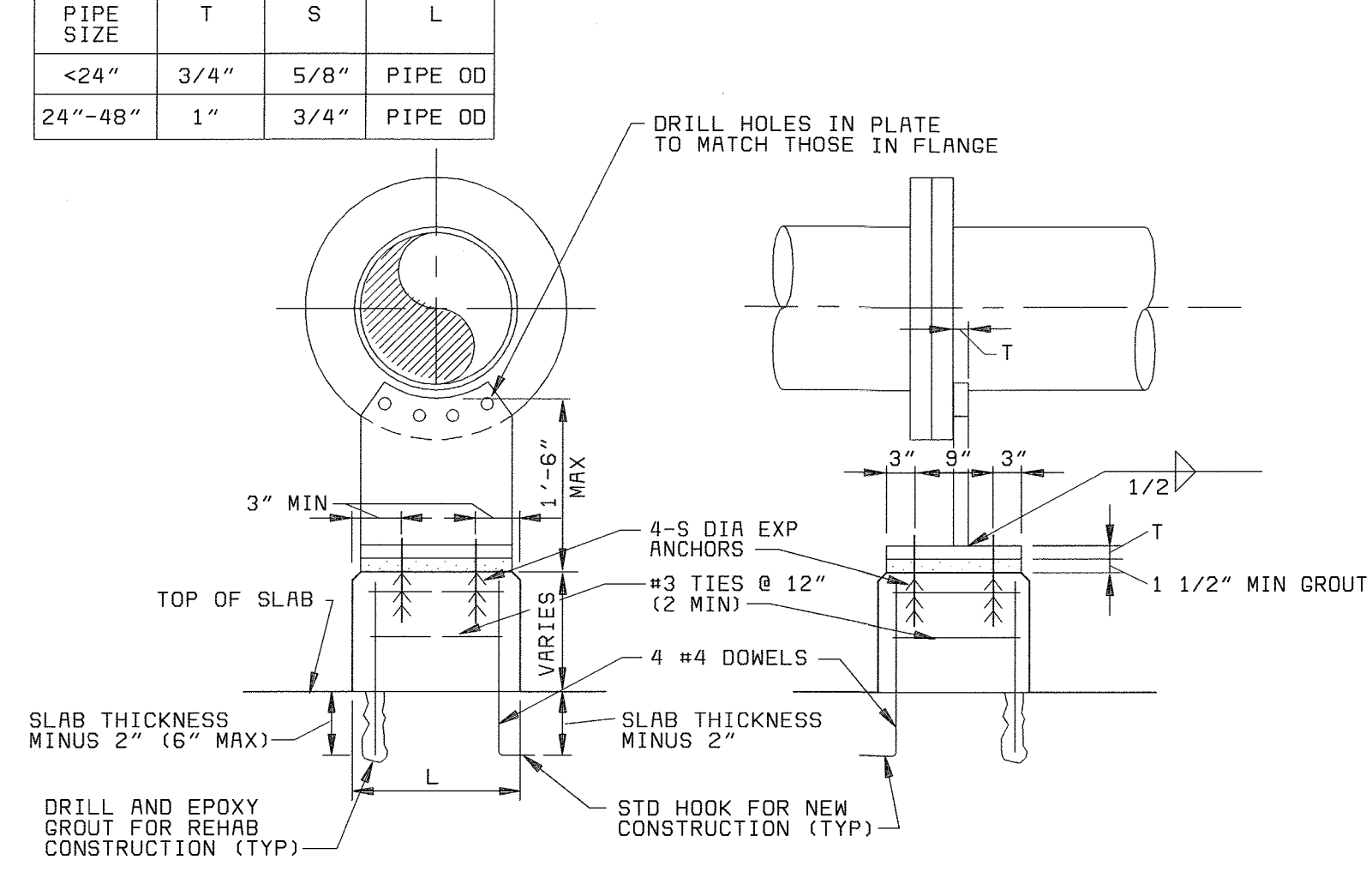
PIPE SIZE	T	S	L
<24"	3/4"	5/8"	PIPE OD
24"-48"	1"	3/4"	PIPE OD



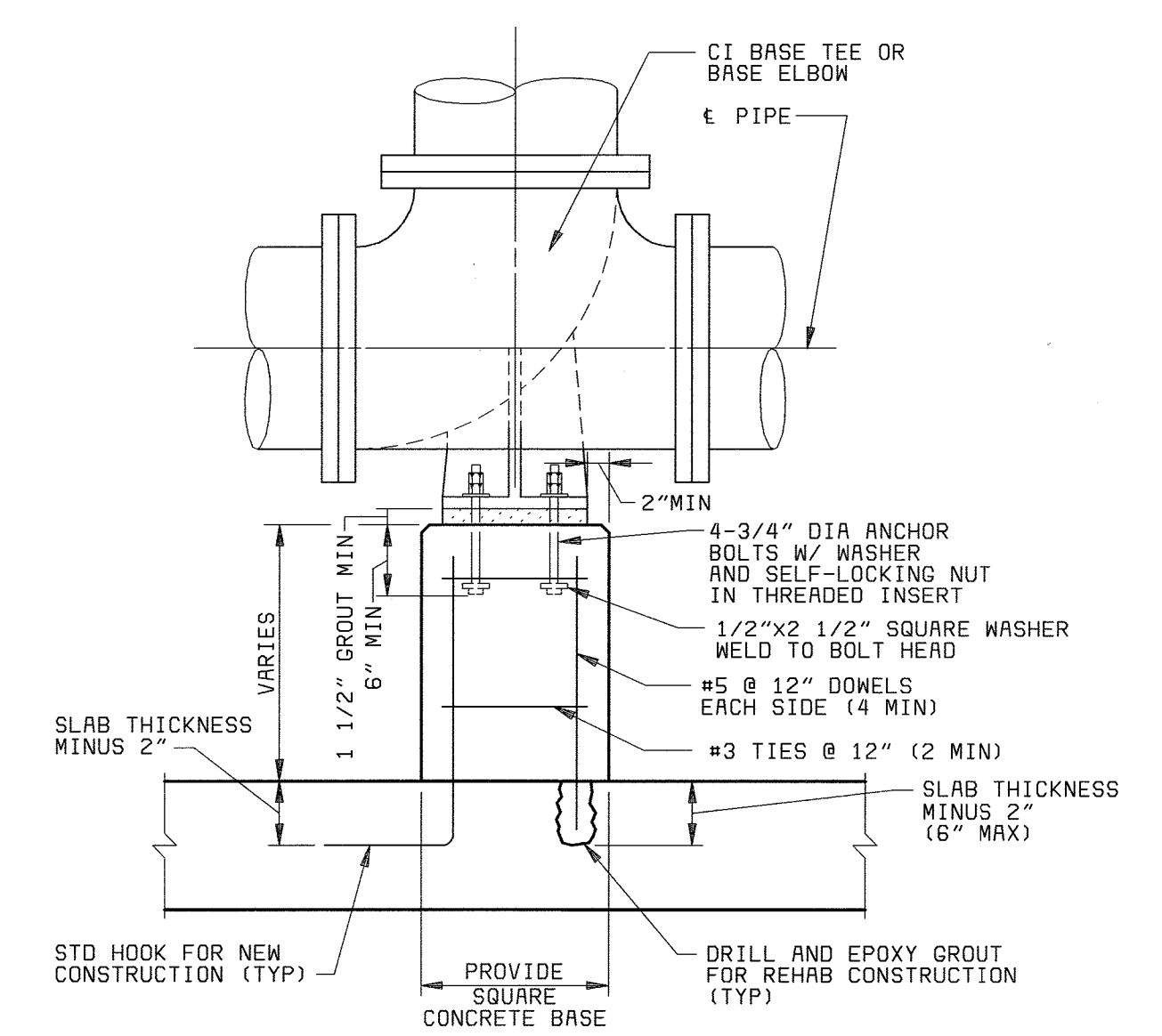
**EQUIPMENT BASE A**  
NO SCALE



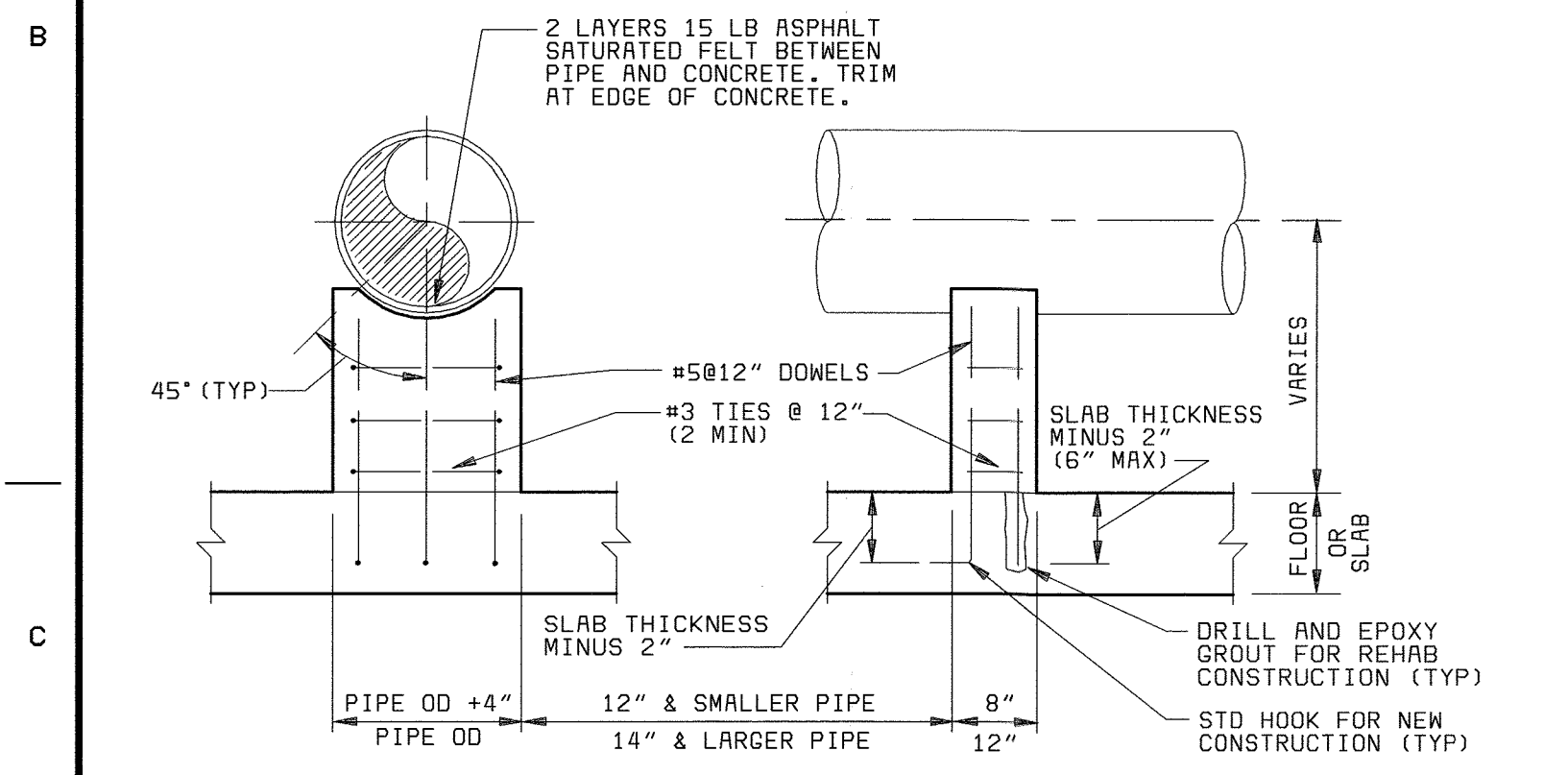
**EXPANDABLE WATERSTOP B**  
3/4" = 1'-0"



**FLANGE PIPE SUPPORT C**  
NO SCALE



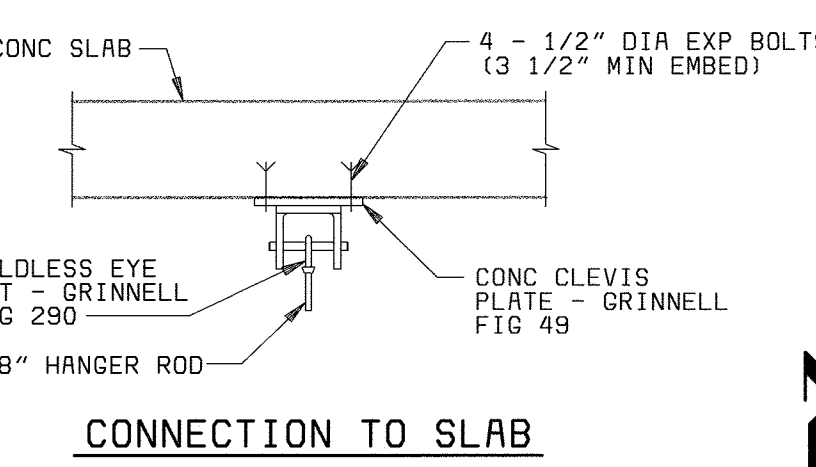
**DUCTILE IRON BASE TEE OR ELBOW D**  
NO SCALE



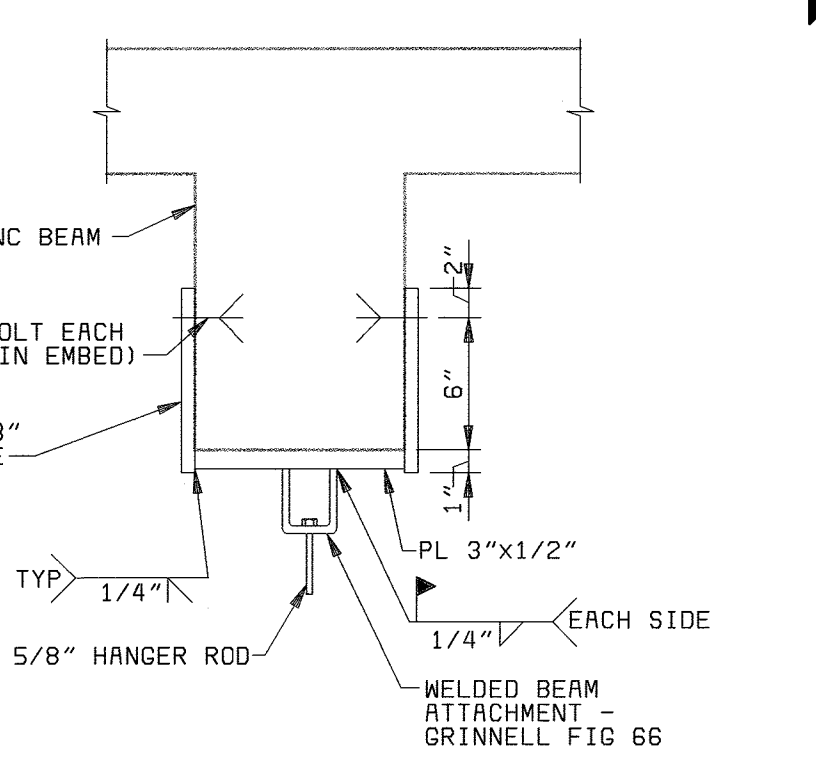
**CONCRETE PIPE SUPPORT E**  
NO SCALE



**HANGER ROD SUPPORT F**  
NO SCALE

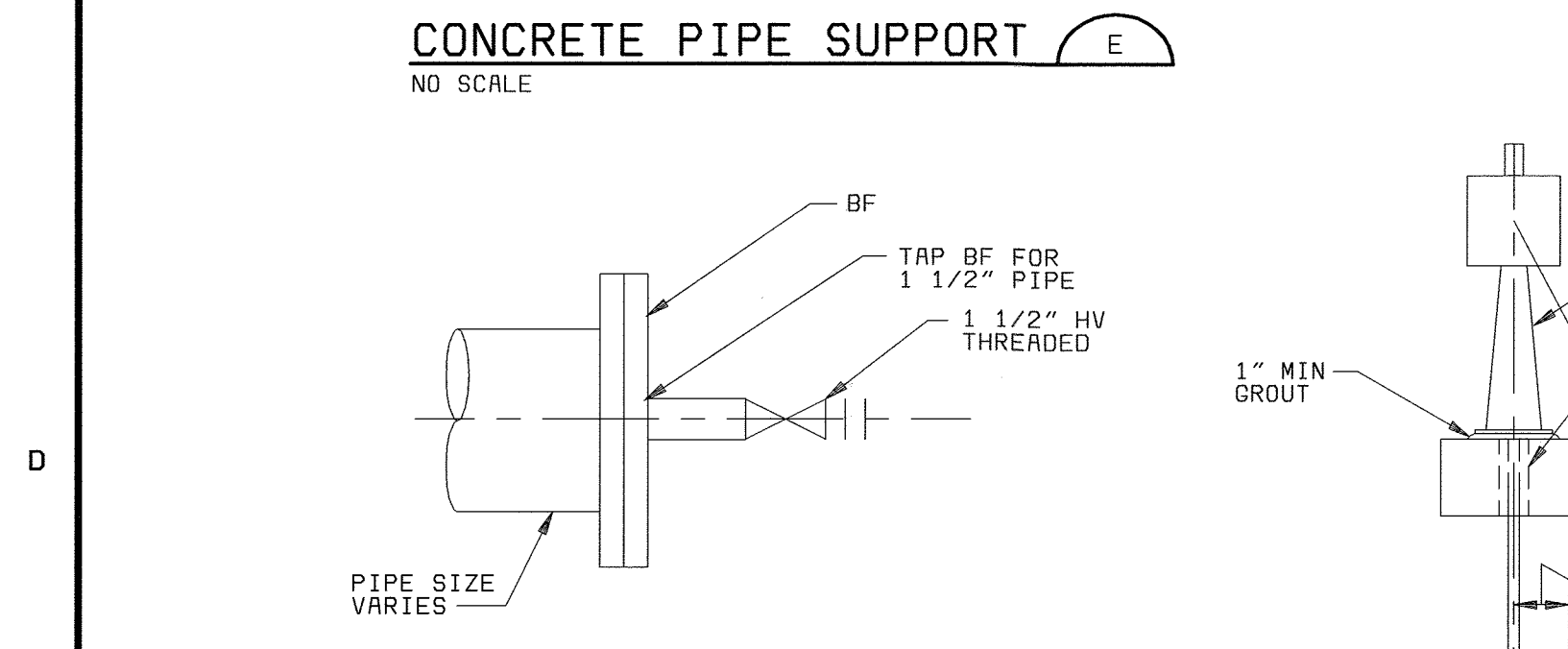


**CONNECTION TO SLAB**

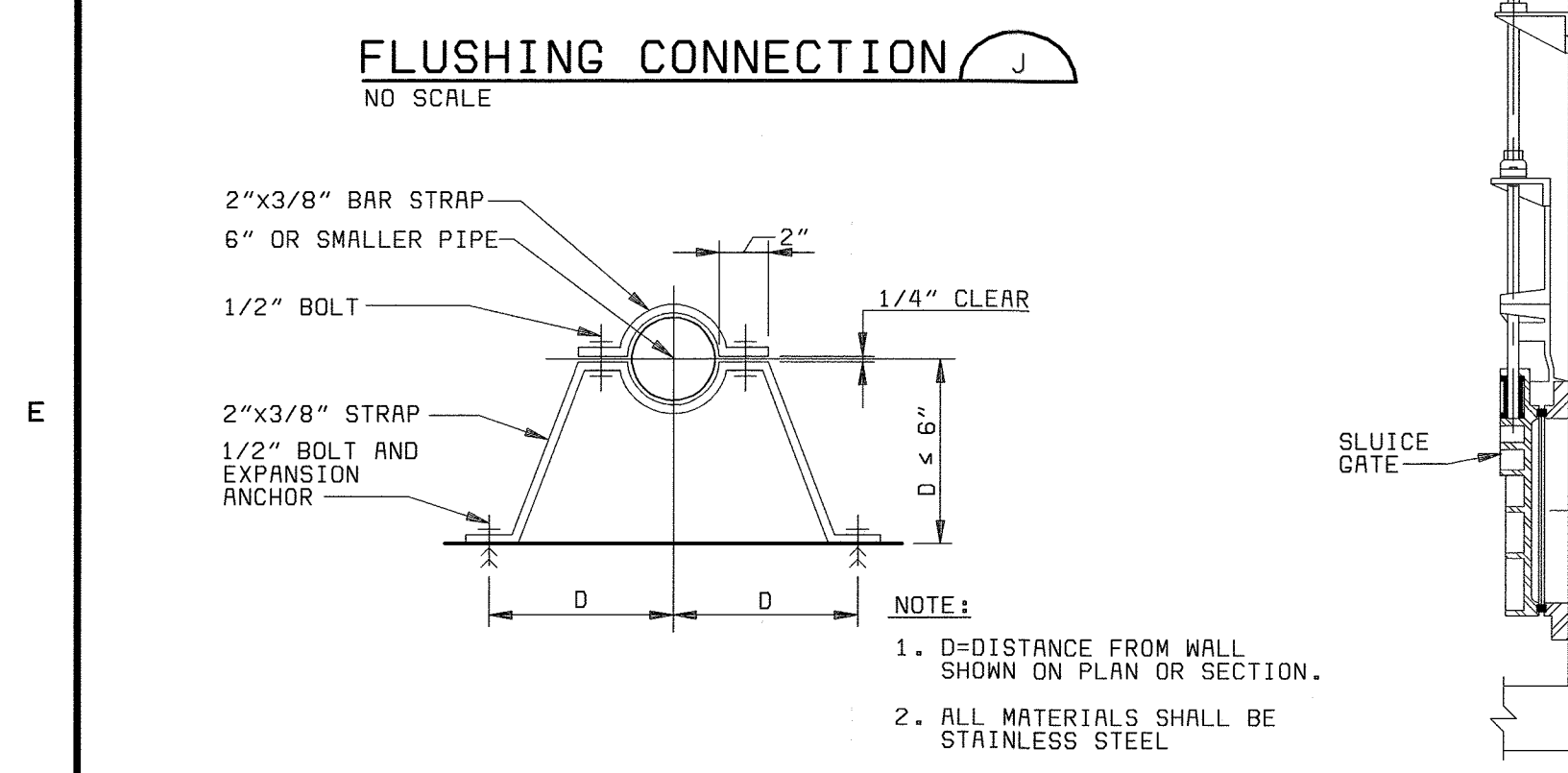


**CONNECTION TO BEAM**

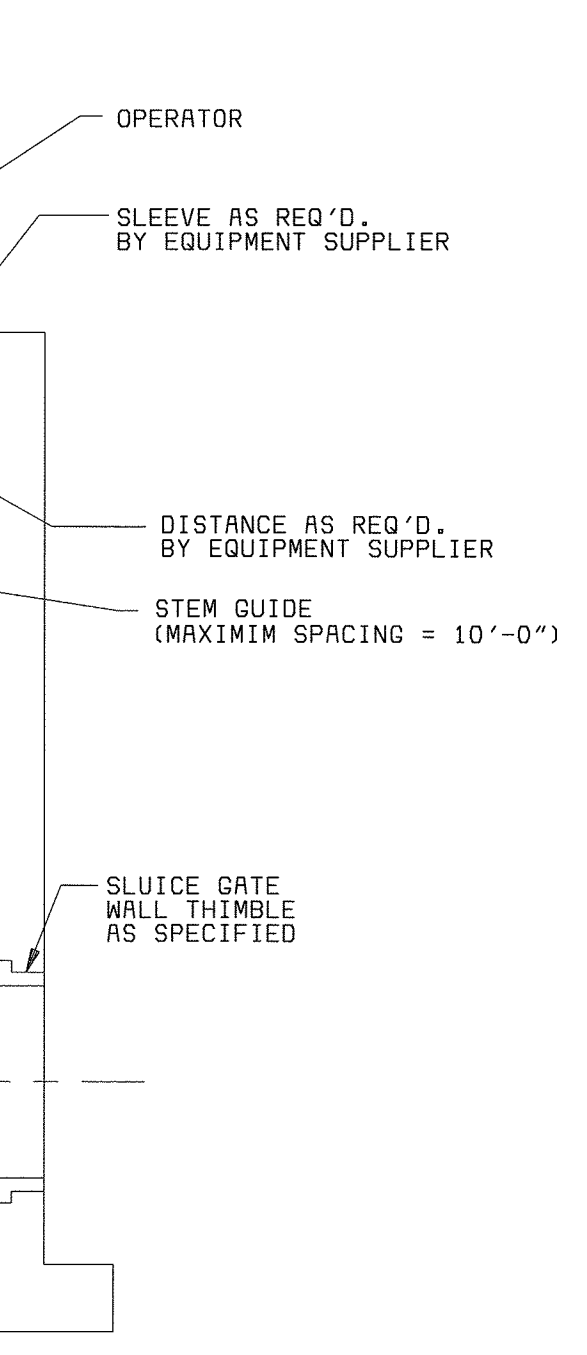
**PIPE HANGER ROD SUPPORT G**  
NO SCALE (EXISTING CONSTRUCTION)



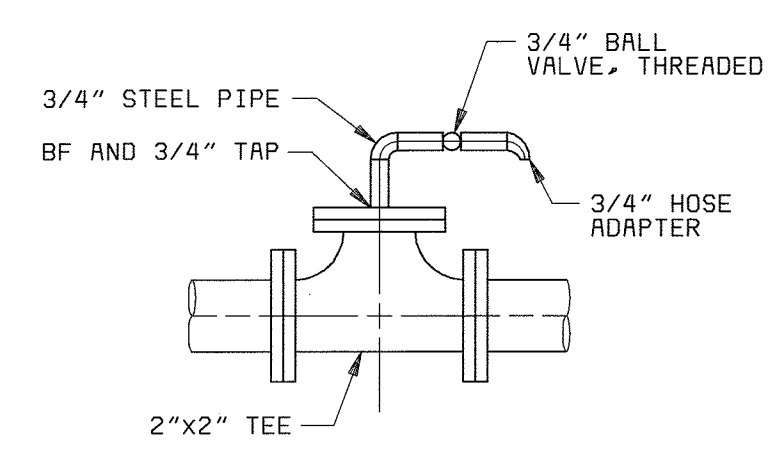
**FLUSHING CONNECTION J**  
NO SCALE



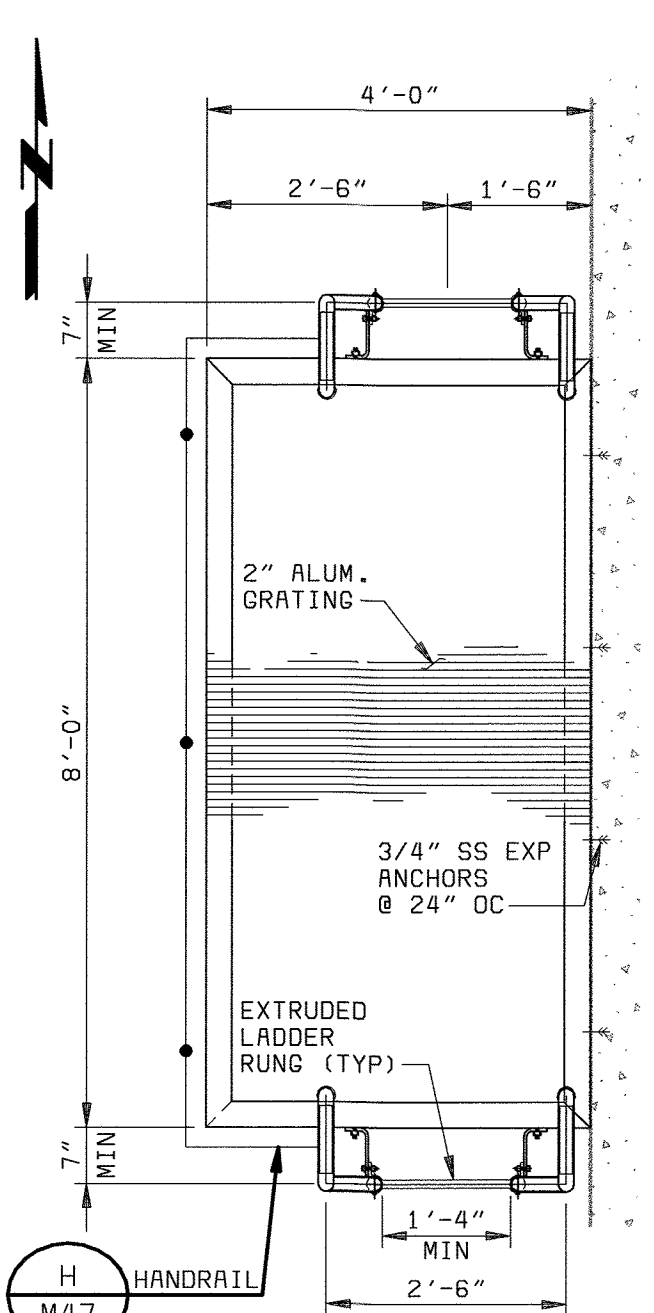
**VERTICAL PIPE SUPPORT K**  
NO SCALE



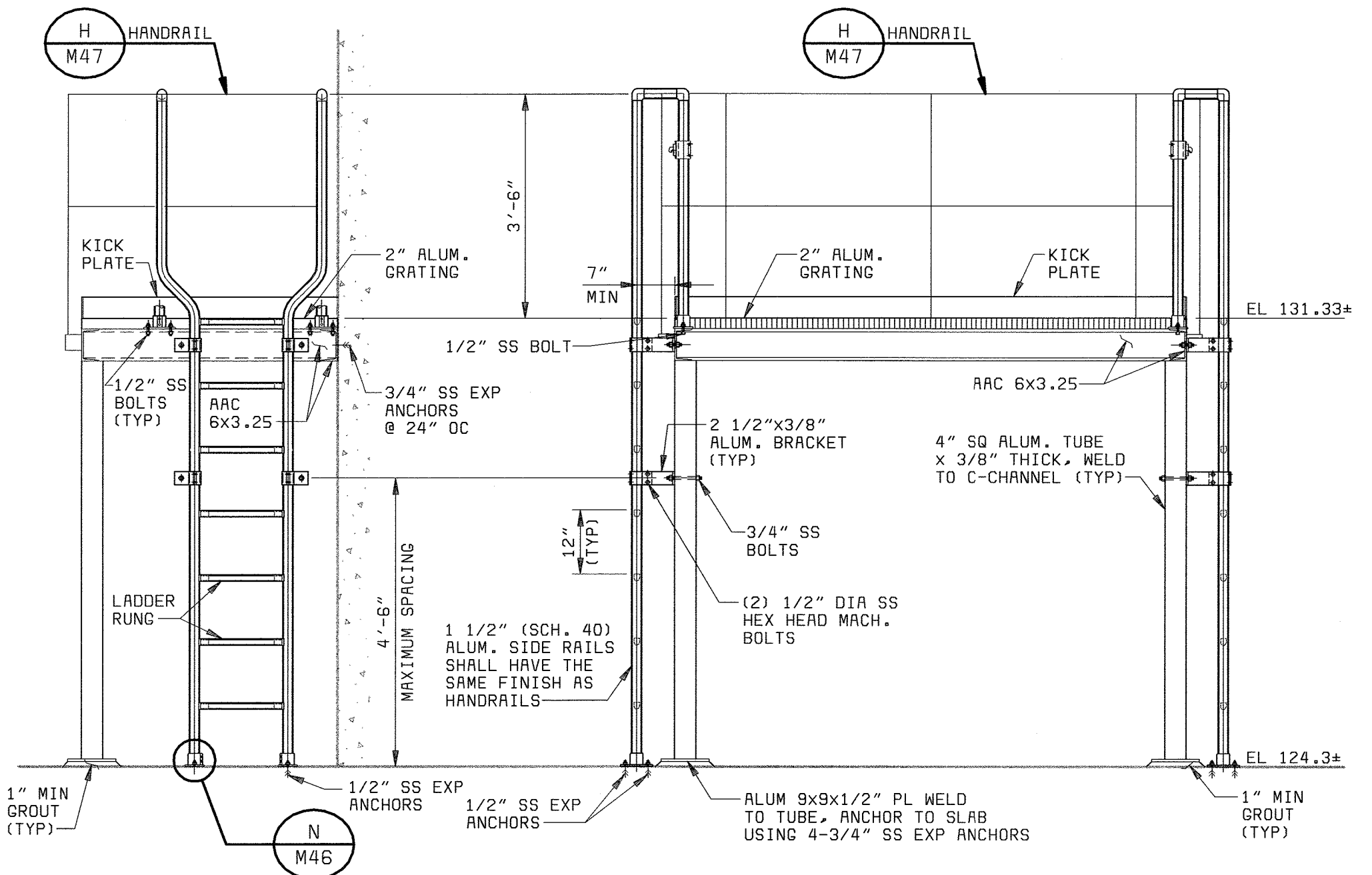
**SLUICE GATE L**  
NO SCALE



**AIR RELEASE VALVE DETAIL M**  
NO SCALE



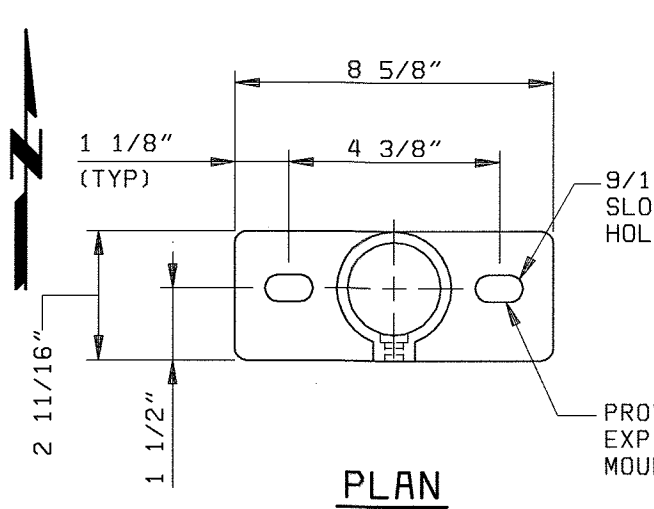
**PLAN**



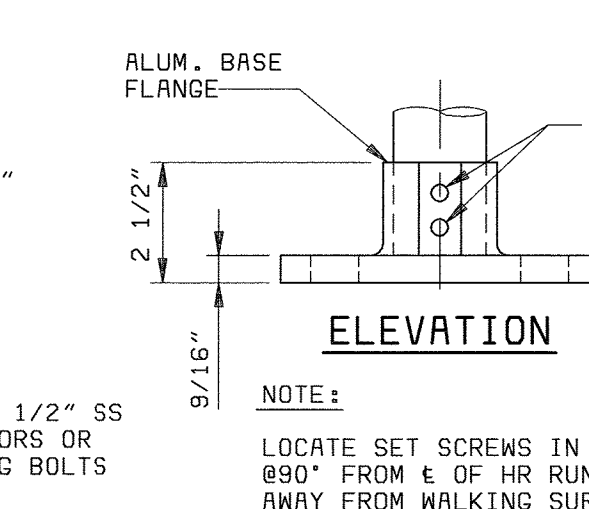
**ELEVATION**

**SECTION**

**PLATFORM DETAIL H**  
1/2" = 1'-0"

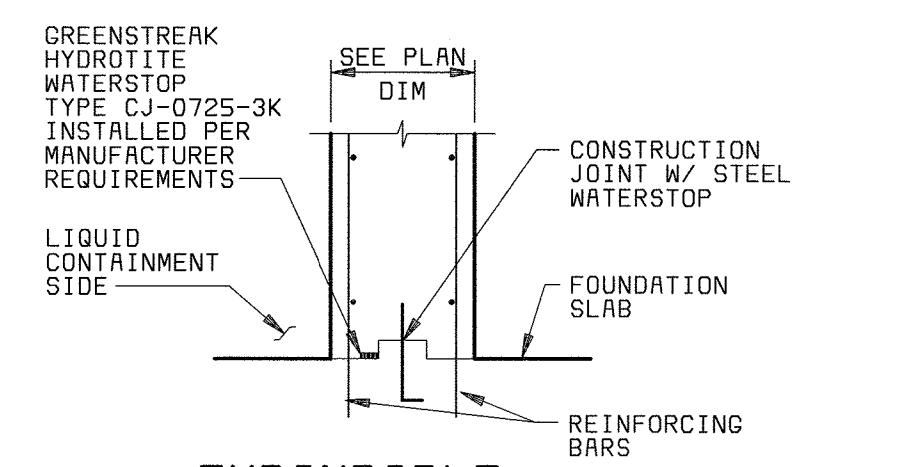


**PLAN**



**ELEVATION**

**DETAIL N**  
3" = 1'-0"



**EXPANDABLE WATERSTOP P**  
3/4" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

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Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

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ORIGINALLY APPROVED  
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ROBERT J. REICMAN, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

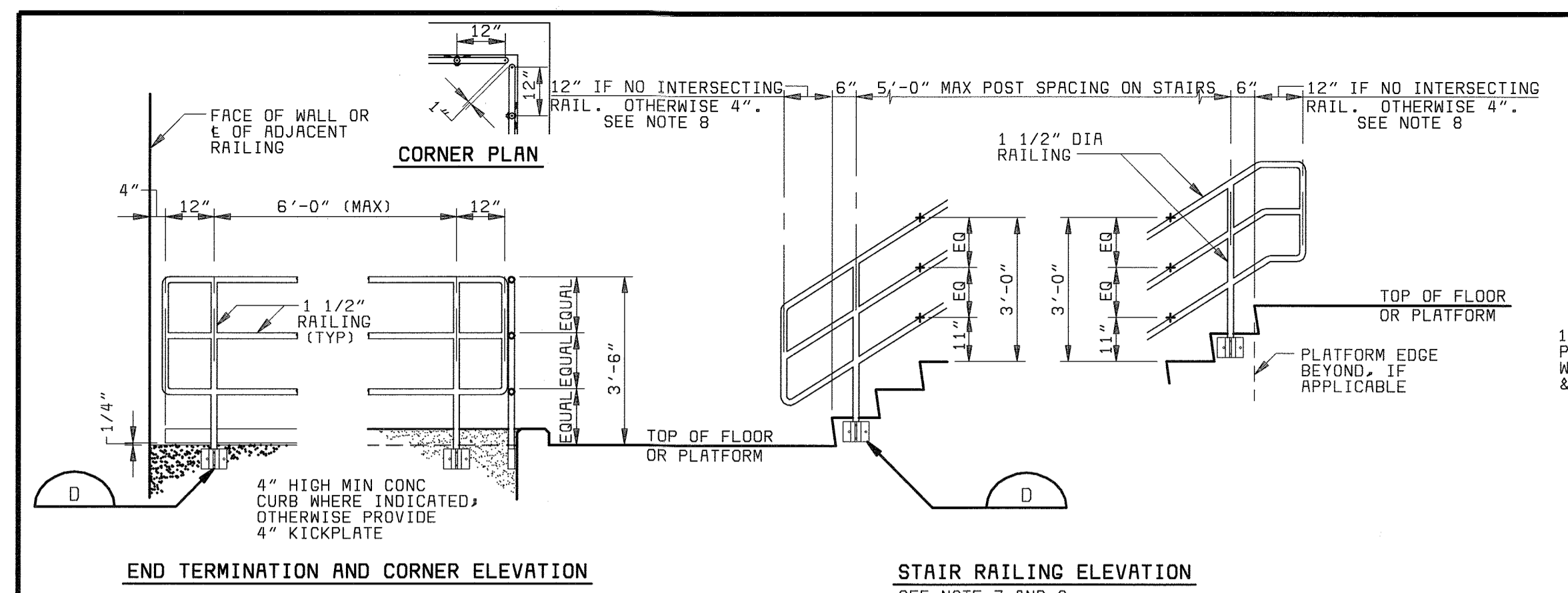
DES: DMP					
DRN: WHS,VVR					
CHK: RJR					
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

**GENERAL MECHANICAL**  
**MISCELLANEOUS DETAILS**

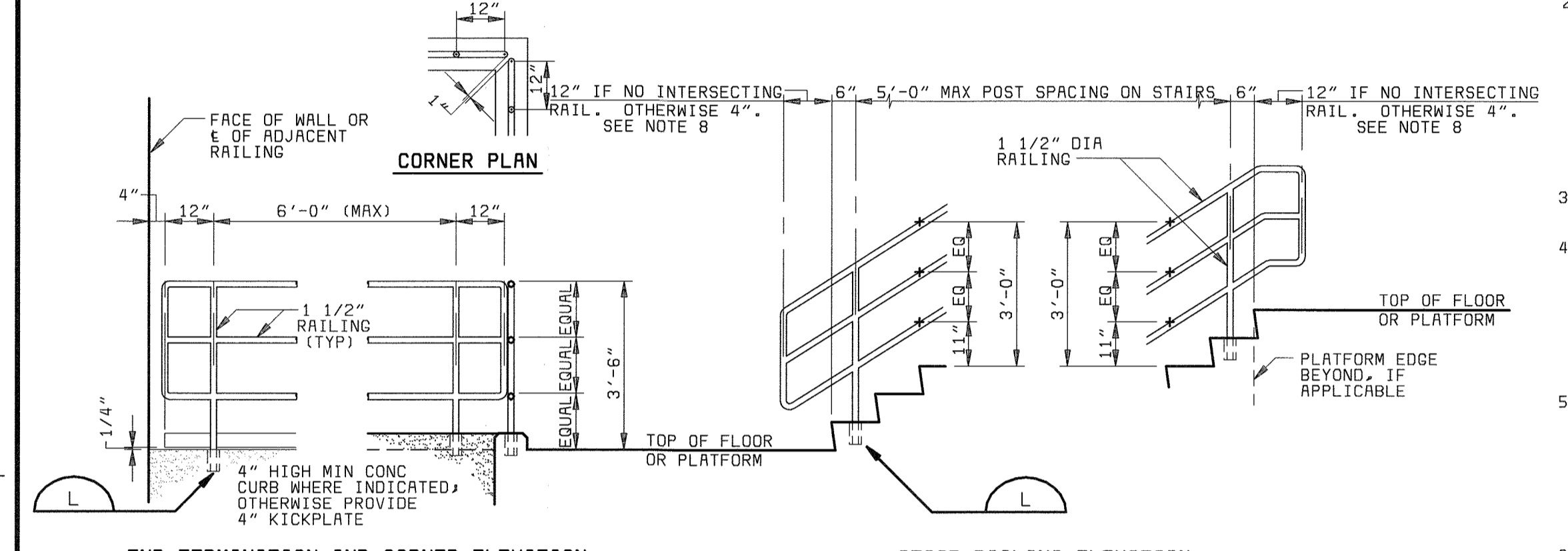
**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 96 OF 139  
**M46**

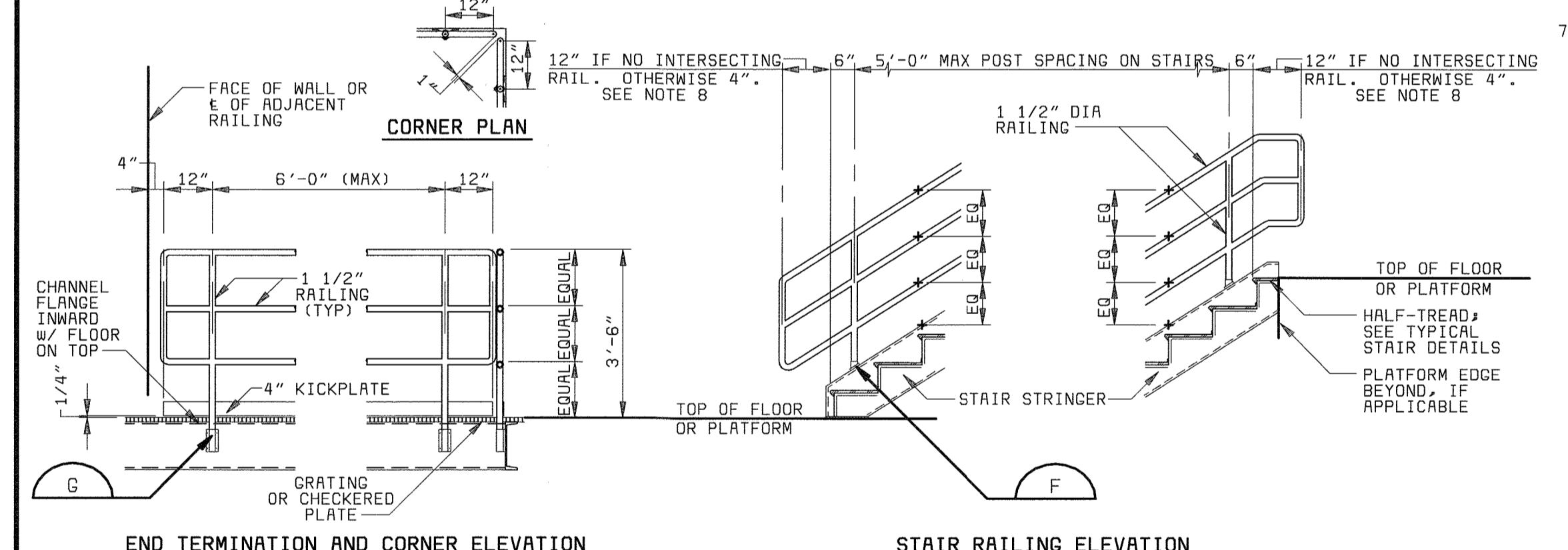
05/26/05 4:24 PM



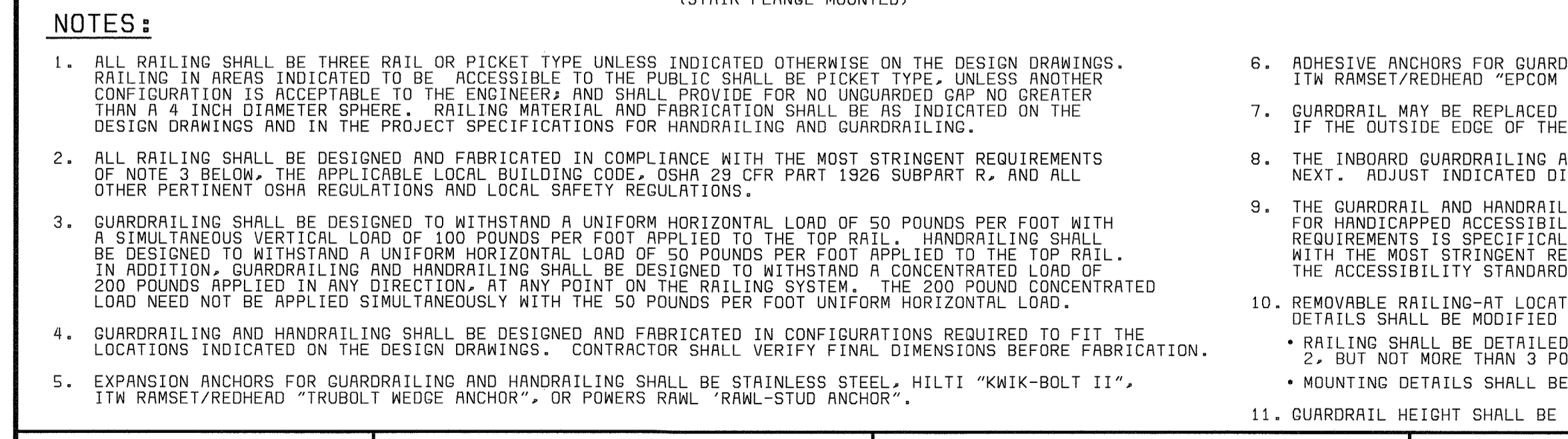
**THREE RAIL GUARDRAIL**  
3/8" = 1'-0"



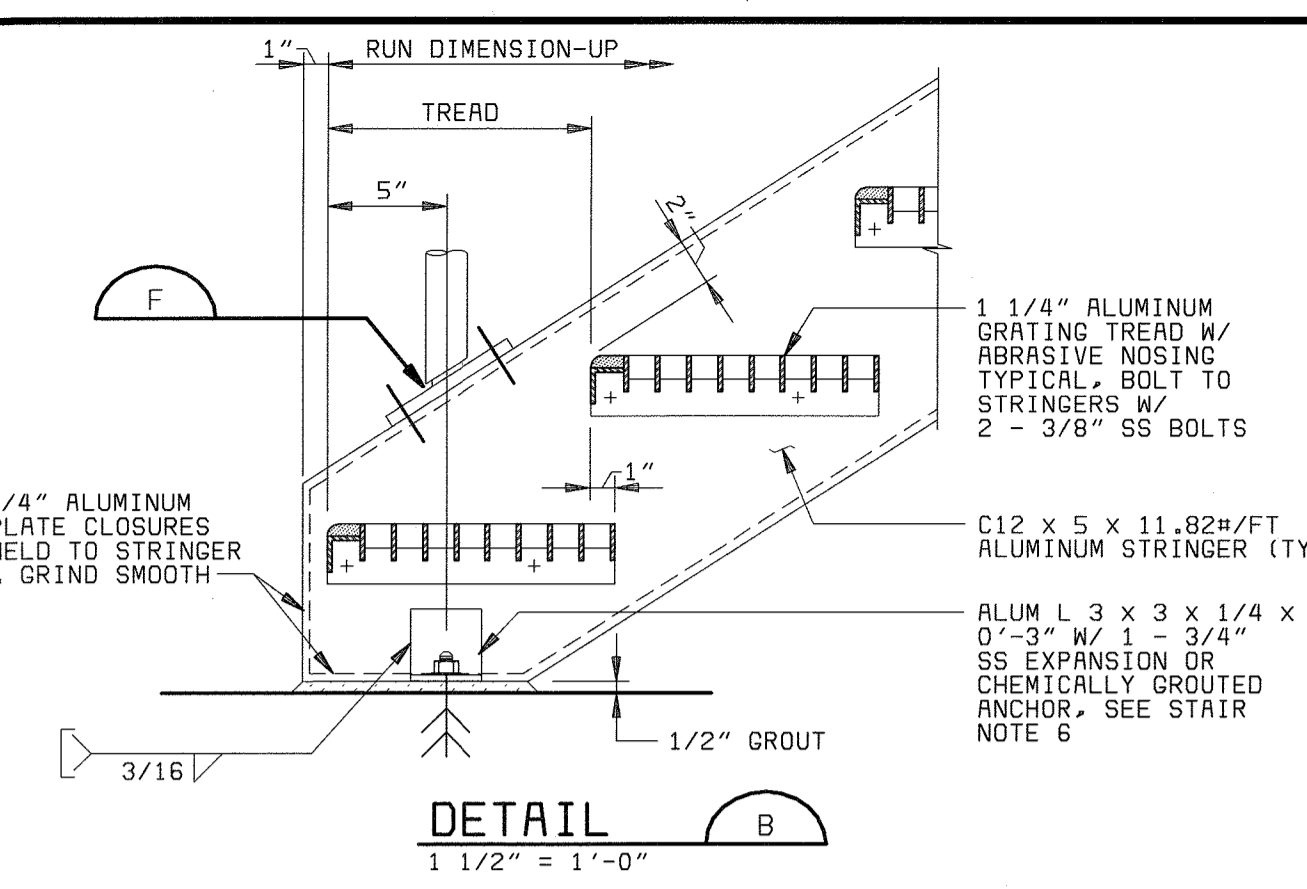
**THREE RAIL GUARDRAIL**  
3/8" = 1'-0"



**THREE RAIL GUARDRAIL**  
3/8" = 1'-0"

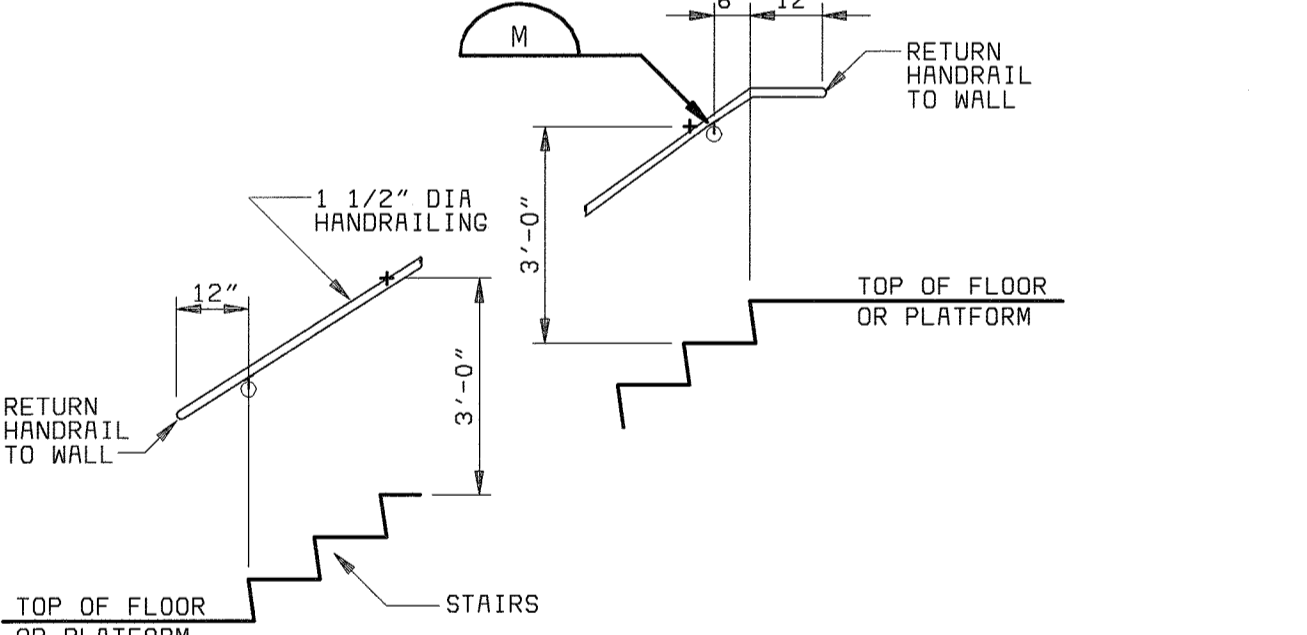


**THREE RAIL GUARDRAIL**  
3/8" = 1'-0"



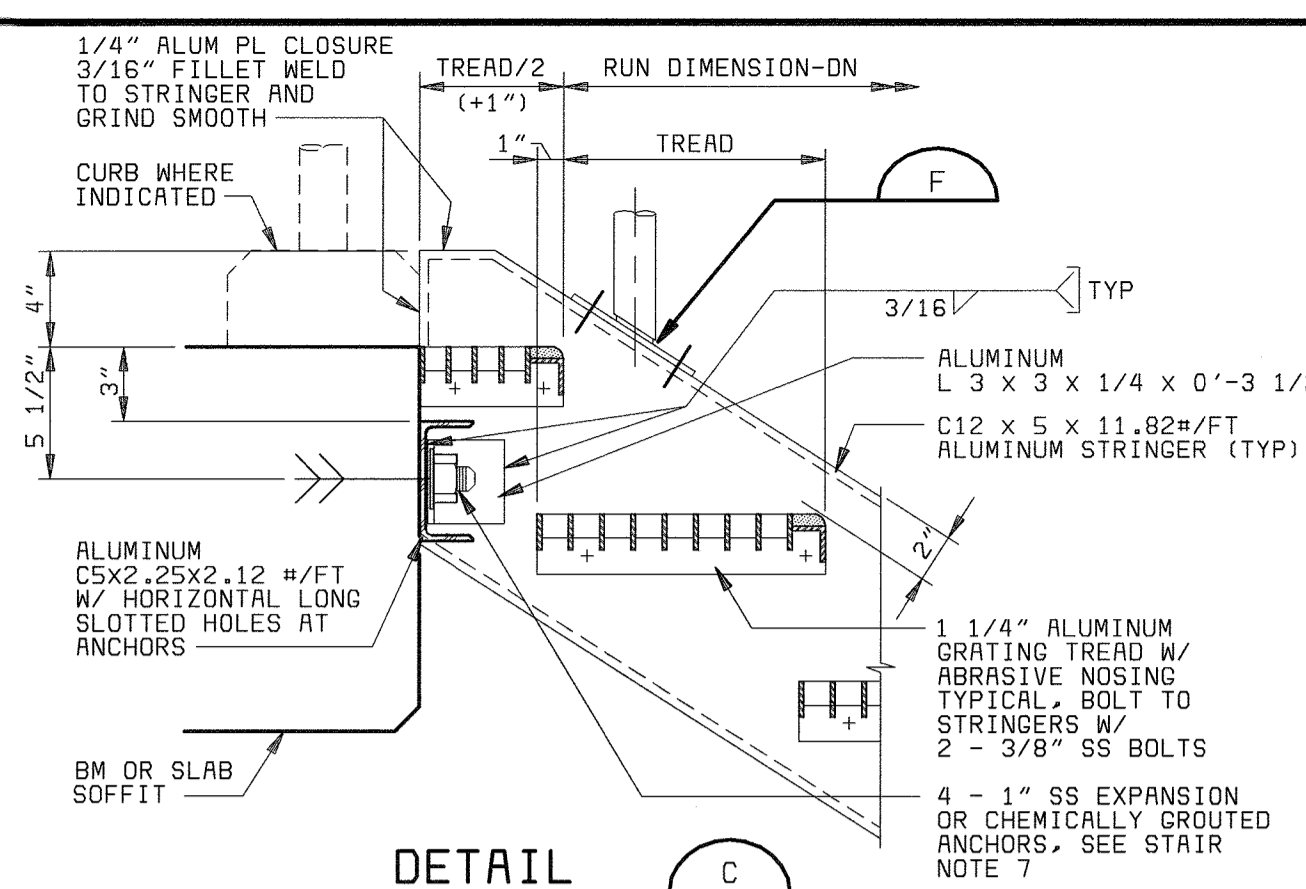
**ALUMINUM GRATING STAIR NOTES:**

- ALL MISCELLANEOUS ALUMINUM SHAPES ON THIS SHEET TO BE ROLLED TO ALUMINUM ASSOCIATION STANDARD STRUCTURAL SHAPES.
- DESIGNATION LEGEND FOR ALUMINUM SHAPES:  
CHANNEL DEPTH: C 12 x 5 x 11.82 #/FT  
FLANGE WIDTH MEMBER WEIGHT: L 5 x 5 x 3/8  
ANGLE: L 5 x 5 x 3/8
- WELDS NOT DIMENSIONED ON THE DRAWINGS SHALL BE SIZED TO DEVELOP THE FULL STRENGTH OF THE LEAST STRENGTH COMPONENT OF THE CONNECTION.
- ALTERNATIVE 3/8" ANCHORAGES INCLUDE:  
(1) HILTI 3/8" SS KWIK BOLT II, 4 1/4" MIN EMBEDMENT; ICBO REPORT #4627  
(2) 3/8" SS THREADED ROD, NUT AND BOLT; SET IN HILTI HIT C-100 ADHESIVE MIN 5 1/4" EMBEDMENT; ICBO REPORT #4016  
(3) RAMSET 3/8" SS TRUBOLT, 4 1/2" MIN EMBEDMENT; ICBO REPORT #1372  
(4) 3/8" SS THREADED ROD, NUT AND BOLT; SET IN RAMSET EPCON CERAMIC 6 EPOXY MINIMUM 4 1/2" EMBEDMENT; ICBO REPORT #4285  
(5) 3/8" ASTM A307 CAST-IN-PLACE ANCHOR BOLT, GRADE A OR C, WITH NUT AND WASHER. ALL GALVANIZED. 9" MINIMUM EMBEDMENT. 4" HOOK.
- ALTERNATIVE 1/2" ANCHORAGES INCLUDE:  
(1) HILTI 1/2" SS KWIK BOLT II, 3 1/2" MIN EMBEDMENT; ICBO REPORT #4627  
(2) 1/2" SS THREADED ROD, NUT AND BOLT; SET IN HILTI HIT C-100 ADHESIVE MIN 4 1/8" EMBEDMENT; ICBO REPORT #4016  
(3) RAMSET 1/2" SS TRUBOLT, 4 1/8" MIN EMBEDMENT; ICBO REPORT #1372  
(4) 1/2" SS THREADED ROD, NUT AND BOLT; SET IN RAMSET EPCON CERAMIC 6 EPOXY MINIMUM 4 1/8" EMBEDMENT; ICBO REPORT #4285  
(5) 1/2" ASTM A307 CAST-IN-PLACE ANCHOR BOLT, GRADE A OR C, WITH NUT AND WASHER. ALL GALVANIZED. 9" MINIMUM EMBEDMENT. 6" HOOK.
- ALTERNATIVE 3/4" ANCHORAGES INCLUDE:  
(1) HILTI 3/4" SS KWIK BOLT II, 4 3/4" MIN EMBEDMENT; ICBO REPORT #4627  
(2) 3/4" SS THREADED ROD, NUT AND BOLT; SET IN HILTI HIT C-100 ADHESIVE MIN 6 5/8" EMBEDMENT; ICBO REPORT #4016  
(3) RAMSET 3/4" SS TRUBOLT, 6 3/8" MIN EMBEDMENT; ICBO REPORT #1372  
(4) 3/4" SS THREADED ROD, NUT AND BOLT; SET IN RAMSET EPCON CERAMIC 6 EPOXY MINIMUM 6 3/4" EMBEDMENT; ICBO REPORT #4285  
(5) 3/4" ASTM A307 CAST-IN-PLACE ANCHOR BOLT, GRADE A OR C, WITH NUT AND WASHER. ALL GALVANIZED. 9" MINIMUM EMBEDMENT. 6" HOOK.
- ALTERNATIVE 1" ANCHORAGES INCLUDE:  
(1) HILTI 1" SS KWIK BOLT II, 6" MIN EMBEDMENT; ICBO REPORT #4627  
(2) 1" SS THREADED ROD, NUT AND BOLT; SET IN HILTI HIT C-100 ADHESIVE MIN 8 1/4" EMBEDMENT; ICBO REPORT #4016  
(3) RAMSET 1" SS TRUBOLT, 7 3/8" MIN EMBEDMENT; ICBO REPORT #1372  
(4) 1" SS THREADED ROD, NUT AND BOLT; SET IN RAMSET EPCON CERAMIC 6 EPOXY MINIMUM 9" EMBEDMENT; ICBO REPORT #4285  
(5) 1" ASTM A307 CAST-IN-PLACE ANCHOR BOLT, GRADE A OR C, WITH NUT AND WASHER. ALL GALVANIZED. 9" MINIMUM EMBEDMENT. 6" HOOK.

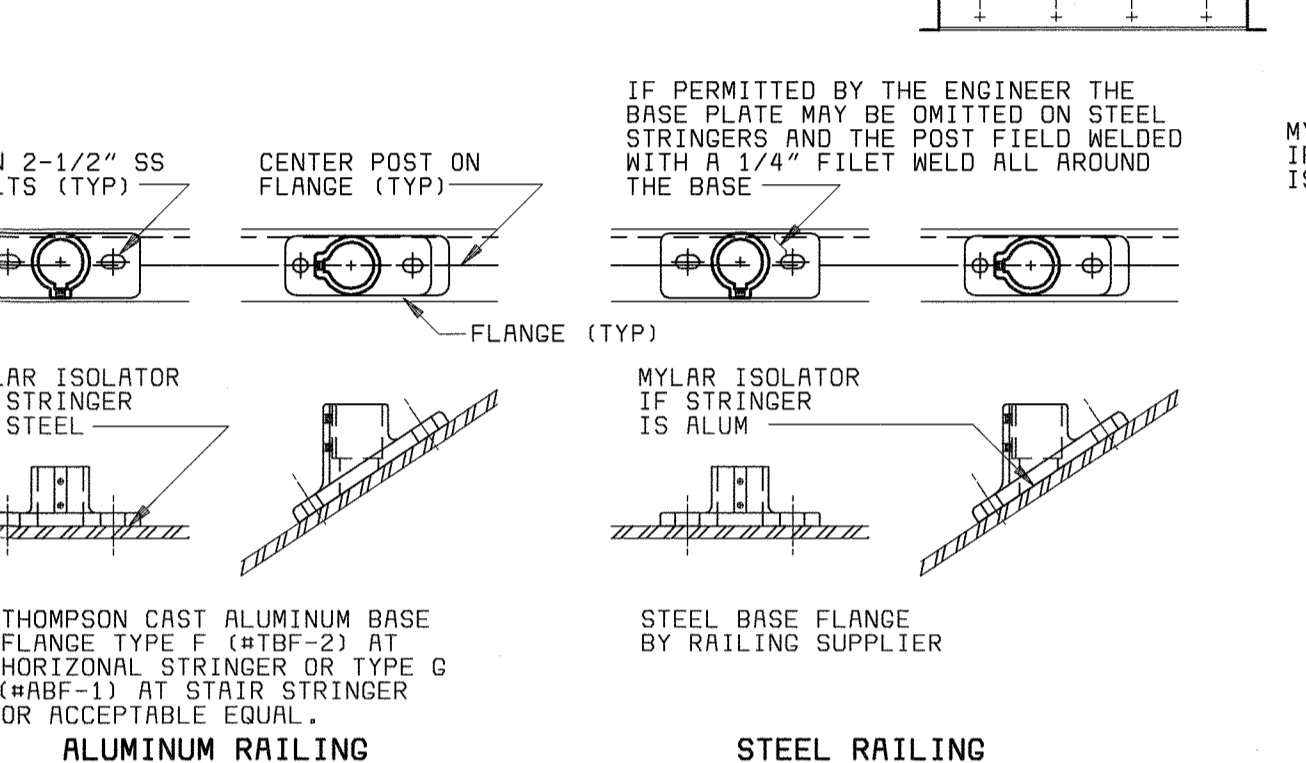


**WALL MOUNTED HANDRAIL ELEV**  
3/8" = 1'-0"

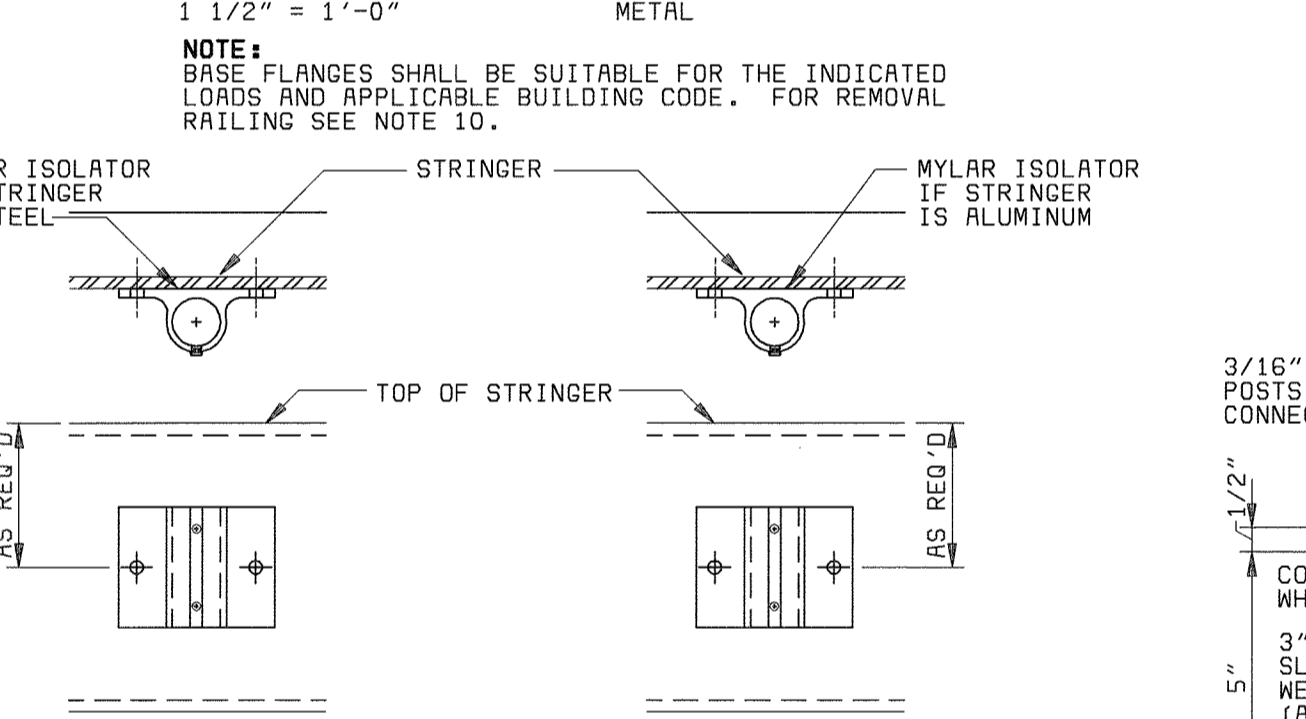
- ADHESIVE ANCHORS FOR GUARDRAILING AND HANDRAILING SHALL BE STAINLESS STEEL, HILTI "HIT HY 150 SYSTEM ITW RAMSET/REDHEAD "EPCON CERAMIC 6 SYSTEM", POWERS RAWL "POWER-FAST EPOXY INJECTION GEL SYSTEM".
- GUARDRAIL MAY BE REPLACED WITH WALL MOUNTED HANDRAIL AT STAIR EDGES AND STRINGERS LOCATED ADJACENT TO WALLS. IF THE OUTSIDE EDGE OF THE STAIR STRINGER IS MORE THAN 3" FROM THE WALL FACE, GUARDRAIL SHALL BE USED.
- THE INBOARD GUARDRAILING AT SWITCHBACK STAIR LANDINGS MUST BE CONTINUOUS FROM ONE STAIR RUN TO THE NEXT. ADJUST INDICATED DIMENSION AS REQUIRED TO ALIGN AND CONNECT RAILINGS OVER THE LANDING EDGE.
- THE GUARDRAIL AND HANDRAIL CONFIGURATIONS ON THIS SHEET WILL NOT COMPLETELY SATISFY ADA REQUIREMENTS FOR HANDICAPPED ACCESSIBILITY. AT LOCATIONS ON THE DESIGN DRAWINGS WHERE CONFORMANCE WITH ADA REQUIREMENTS IS SPECIFICALLY NOTED, THE RAILING SUPPLIER SHALL MODIFY THE CONFIGURATIONS TO COMPLY WITH THE MOST STRINGENT REQUIREMENTS OF ANS1 117.1 UNIFORM FEDERAL ACCESSIBILITY STANDARDS AND THE ACCESSIBILITY STANDARDS OF THE AMERICANS WITH DISABILITIES ACT (ADA).
- REMOVABLE RAILING-AT LOCATIONS SPECIFICALLY INDICATED AS REMOVABLE RAILING, GUARDRAILING AND MOUNTING DETAILS SHALL BE MODIFIED AS FOLLOWS:  
• RAILING SHALL BE DETAILED IN SHORT LENGTHS THAT CAN BE LIFTED BY ONE MAN. EACH PIECE SHALL INCLUDE AT LEAST 2, BUT NOT MORE THAN 3 POSTS. RAIL ENDS SHALL BE TERMINATED SIMILAR TO THE END TERMINATION DETAILS THIS SHEET.  
• MOUNTING DETAILS SHALL BE MODIFIED TO PERMIT RAILING PIECES TO BE REMOVED AND REINSTALLED WITHOUT USE OF TOOLS.
- GUARDRAIL HEIGHT SHALL BE 3'-6" UNLESS INDICATED OTHERWISE ON PLANS AND SECTIONS.



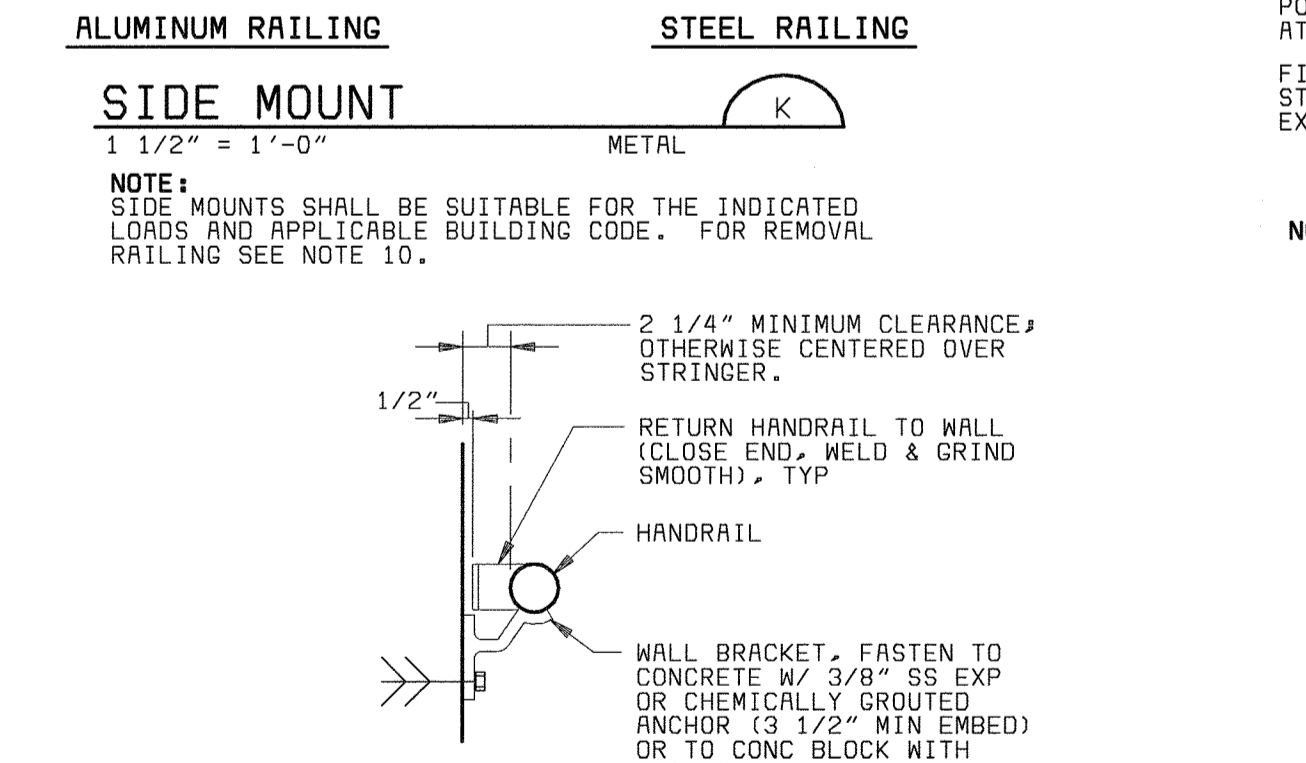
**ALUMINUM RAILING**  
1 1/2" = 1'-0"



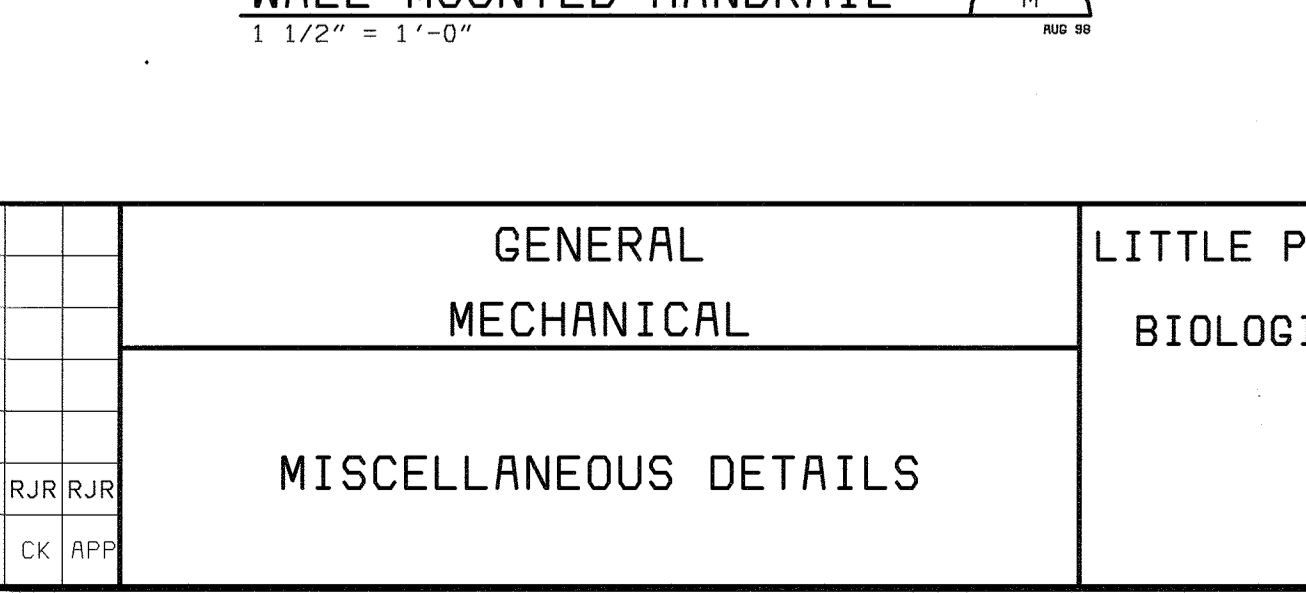
**STEEL RAILING**  
1 1/2" = 1'-0"



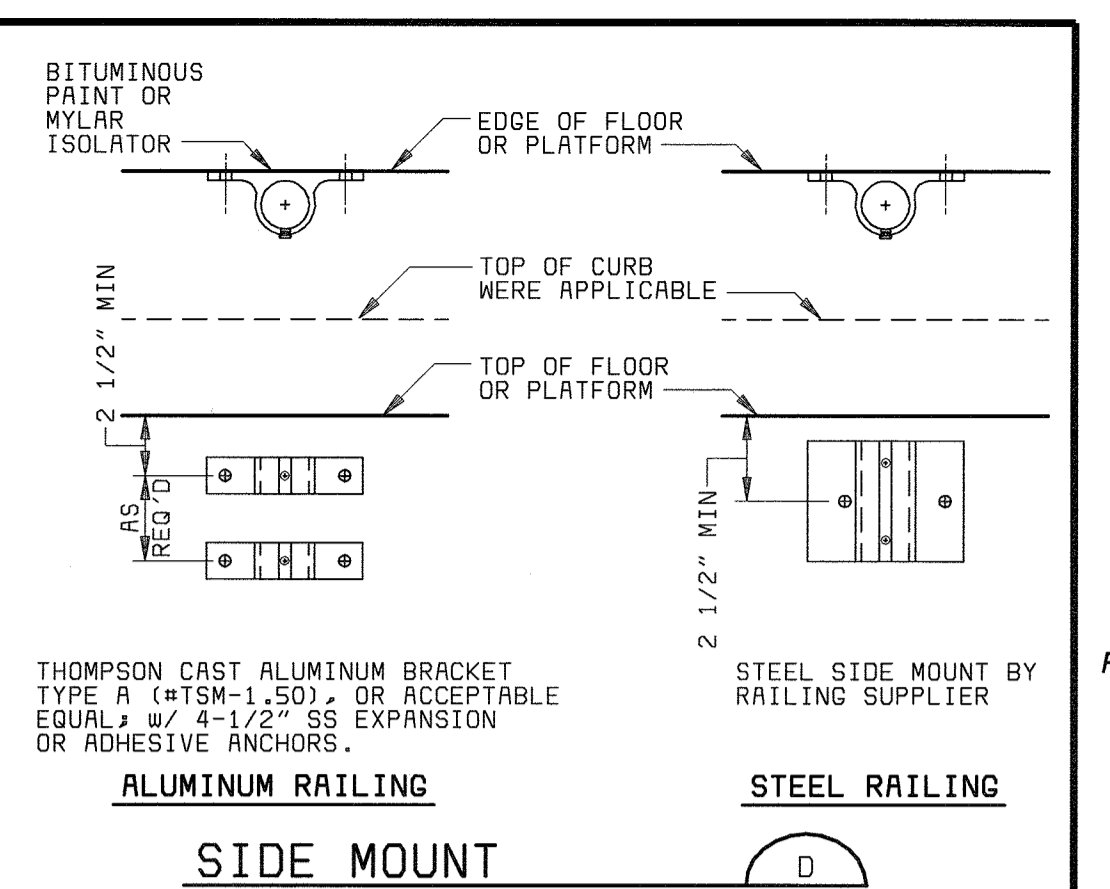
**ALUMINUM RAILING**  
1 1/2" = 1'-0"



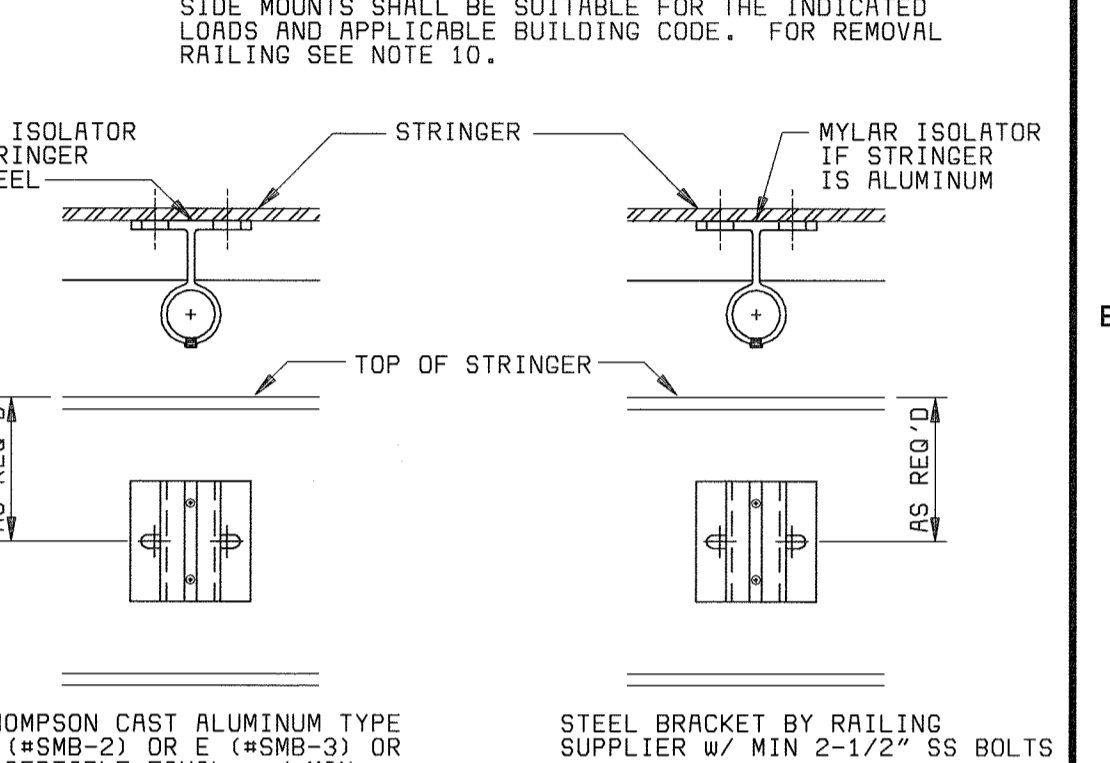
**STEEL RAILING**  
1 1/2" = 1'-0"



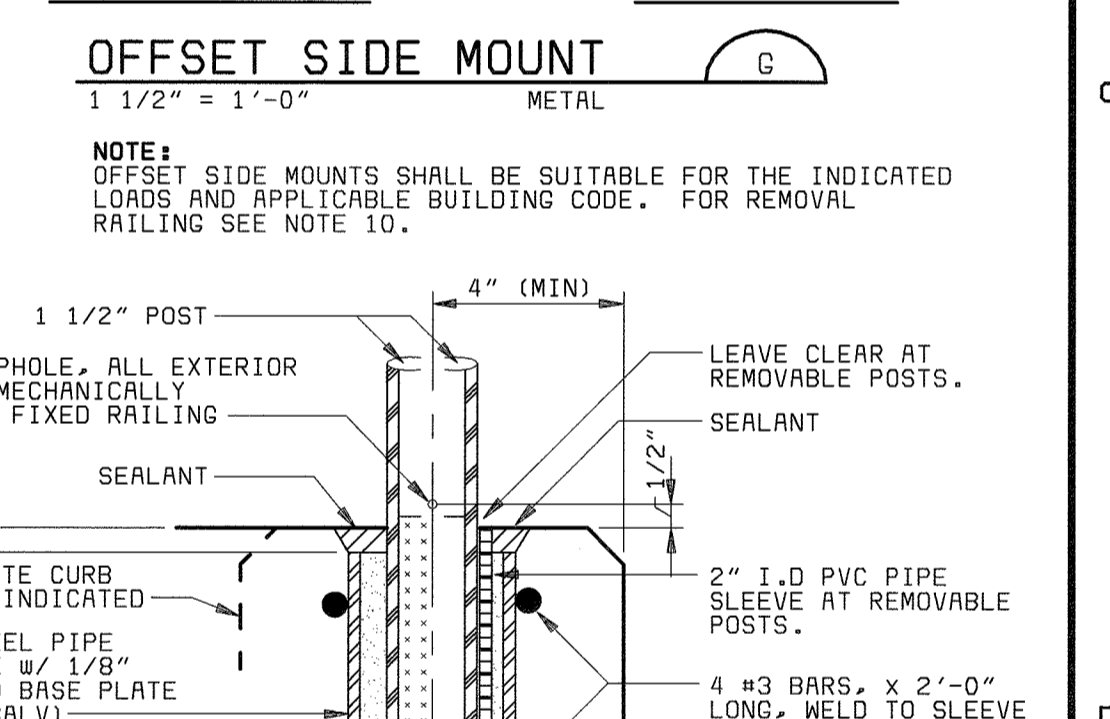
**WALL MOUNTED HANDRAIL**  
1 1/2" = 1'-0"



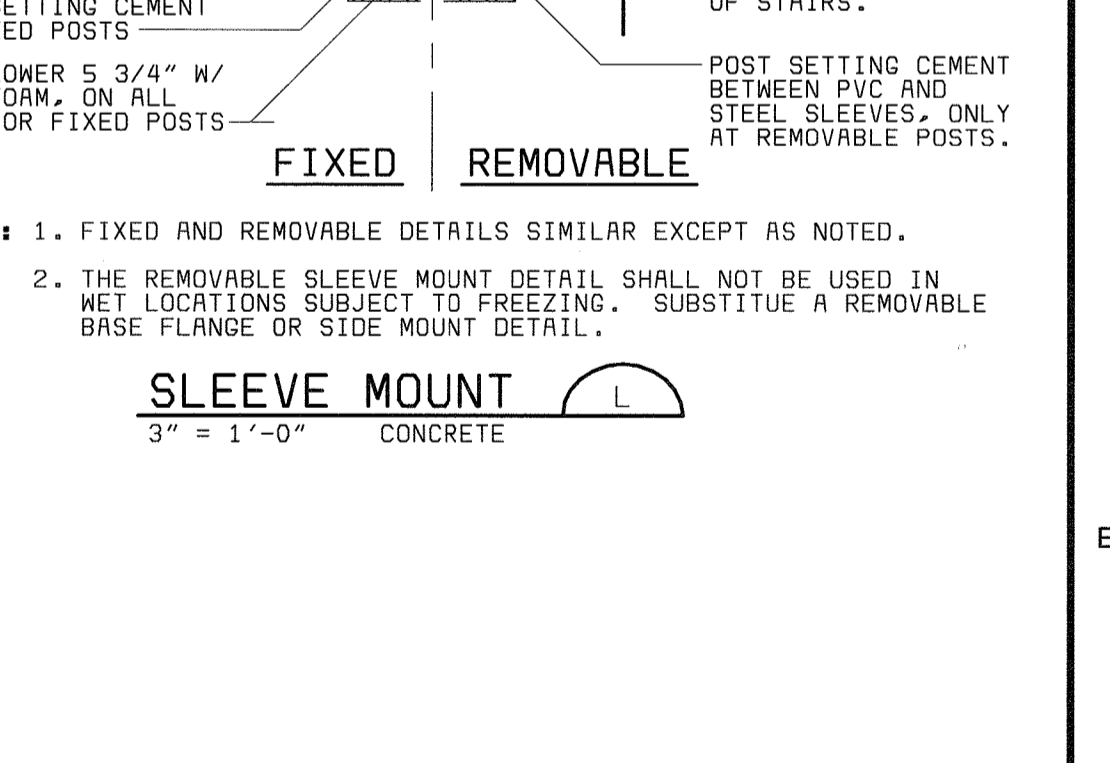
**ALUMINUM RAILING**  
1 1/2" = 1'-0"



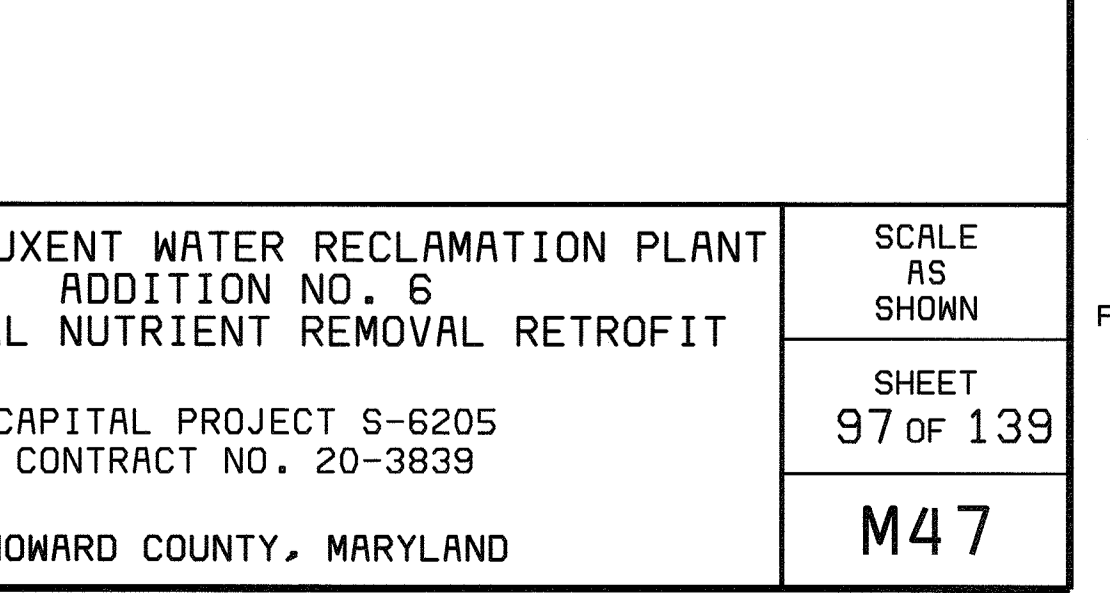
**STEEL RAILING**  
1 1/2" = 1'-0"



**ALUMINUM RAILING**  
1 1/2" = 1'-0"



**STEEL RAILING**  
1 1/2" = 1'-0"



**SLEEVE MOUNT**  
3" = 1'-0"

**NOTES:**

- ALL RAILING SHALL BE THREE RAIL OR PICKET TYPE UNLESS INDICATED OTHERWISE ON THE DESIGN DRAWINGS. RAILING IN AREAS INDICATED TO BE ACCESSIBLE TO THE PUBLIC SHALL BE PICKET TYPE, UNLESS ANOTHER CONFIGURATION IS ACCEPTABLE TO THE ENGINEER; AND SHALL PROVIDE FOR NO UNGUARDED GAP NO GREATER THAN A 4 INCH DIAMETER SPHERE. RAILING MATERIAL AND FABRICATION SHALL BE AS INDICATED ON THE DESIGN DRAWINGS AND IN THE PROJECT SPECIFICATIONS FOR HANDRAILING AND GUARDRAILING.
- ALL RAILING SHALL BE DESIGNED AND FABRICATED IN COMPLIANCE WITH THE MOST STRINGENT REQUIREMENTS OF NOTE 3 BELOW, THE APPLICABLE LOCAL BUILDING CODE, OSHA 29 CFR PART 1926 SUBPART R, AND ALL OTHER PERTINENT OSHA REGULATIONS AND LOCAL SAFETY REGULATIONS.
- GUARDRAILING SHALL BE DESIGNED TO WITHSTAND A UNIFORM HORIZONTAL LOAD OF 50 POUNDS PER FOOT WITH A SIMULTANEOUS VERTICAL LOAD OF 100 POUNDS PER FOOT APPLIED TO THE TOP RAIL. HANDRAILING SHALL BE DESIGNED TO WITHSTAND A UNIFORM HORIZONTAL LOAD OF 50 POUNDS PER FOOT APPLIED TO THE TOP RAIL. IN ADDITION, GUARDRAILING AND HANDRAILING SHALL BE DESIGNED TO WITHSTAND A CONCENTRATED LOAD OF 200 POUNDS APPLIED IN ANY DIRECTION, AT ANY POINT ON THE RAILING SYSTEM. THE 200 POUND CONCENTRATED LOAD NEED NOT BE APPLIED SIMULTANEOUSLY WITH THE 50 POUNDS PER FOOT UNIFORM HORIZONTAL LOAD.
- GUARDRAILING AND HANDRAILING SHALL BE DESIGNED AND FABRICATED IN CONFIGURATIONS REQUIRED TO FIT THE LOCATIONS INDICATED ON THE DESIGN DRAWINGS. CONTRACTOR SHALL VERIFY FINAL DIMENSIONS BEFORE FABRICATION.
- EXPANSION ANCHORS FOR GUARDRAILING AND HANDRAILING SHALL BE STAINLESS STEEL, HILTI "KWIK-BOLT II", ITW RAMSET/REDHEAD "TRUBOLT WEDGE ANCHOR", OR POWERS RAWL "RAWL-STUD ANCHOR".

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

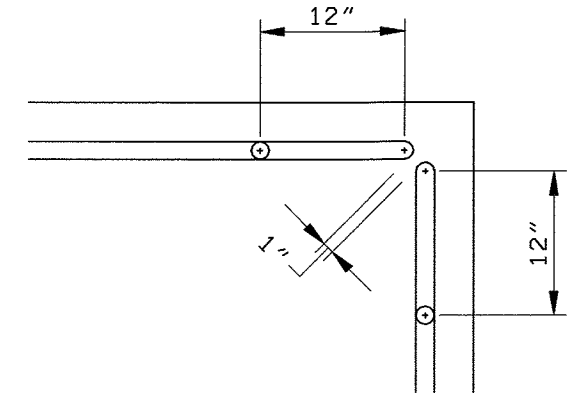
**BLACK & VEATCH**  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
ROBERT J. REYNOLDS, JR.  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 22927

DES: IFH					
DRN: RLC					
CHK: RJR					
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

GENERAL  
MECHANICAL  
MISCELLANEOUS DETAILS

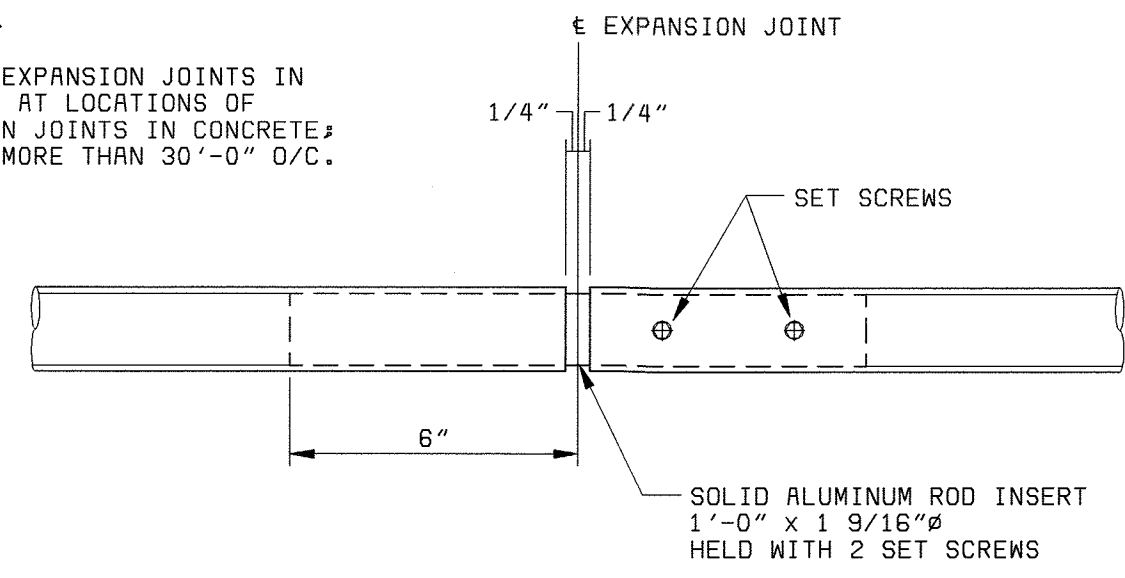
LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND  
SCALE AS SHOWN  
SHEET 97 OF 139  
M47



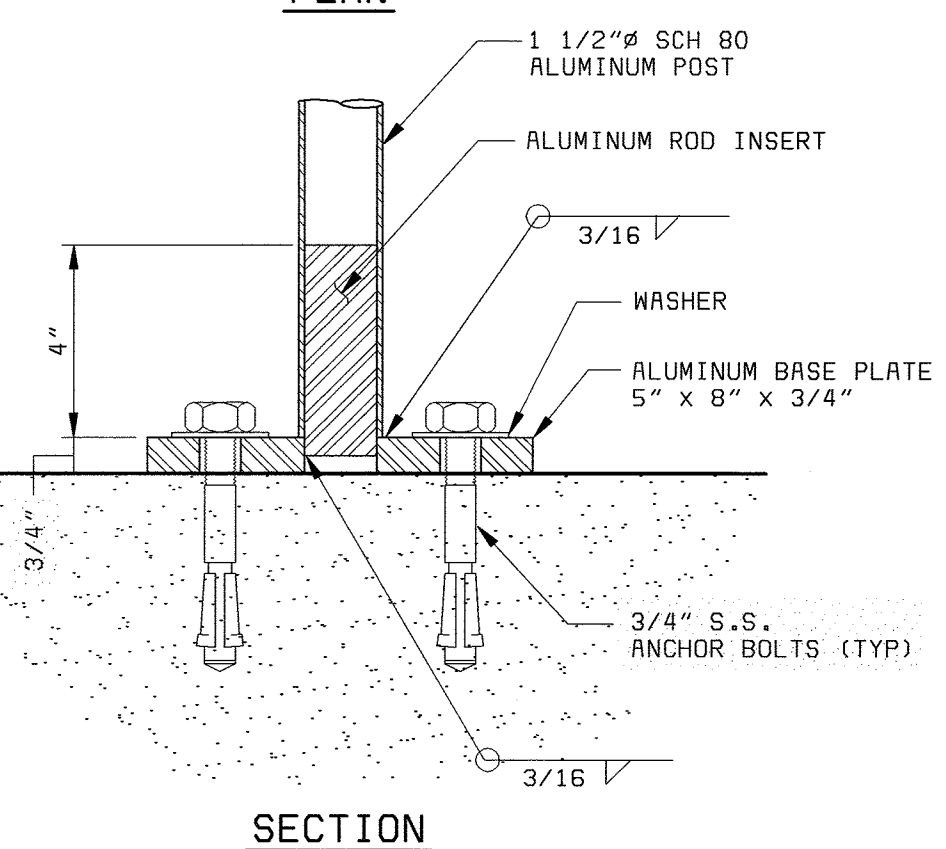
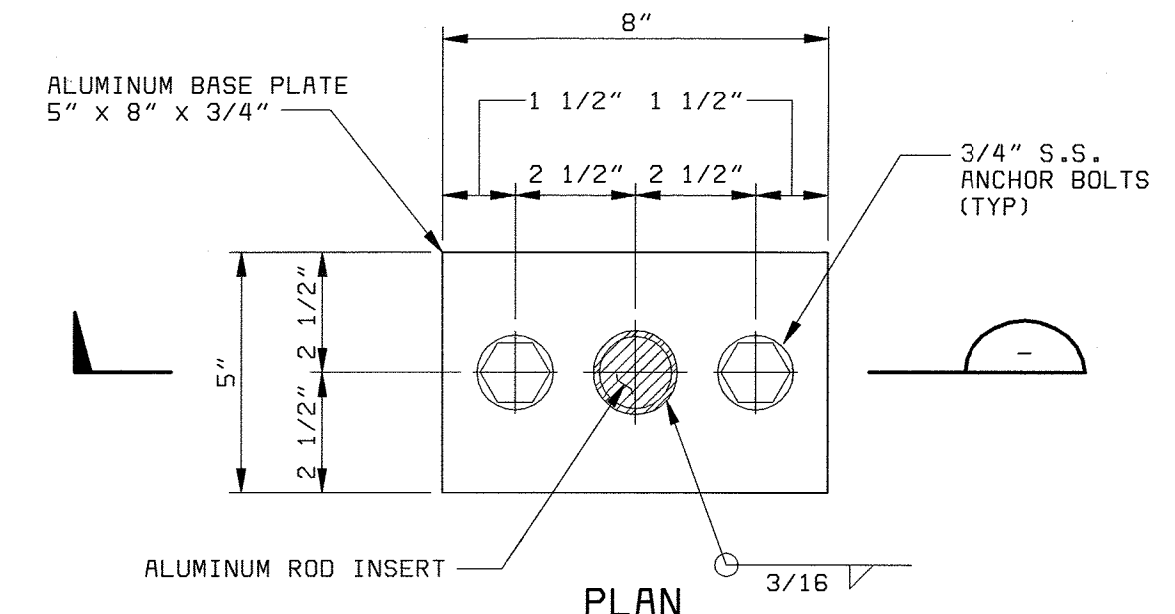
**CORNER PLAN**

**NOTE:**

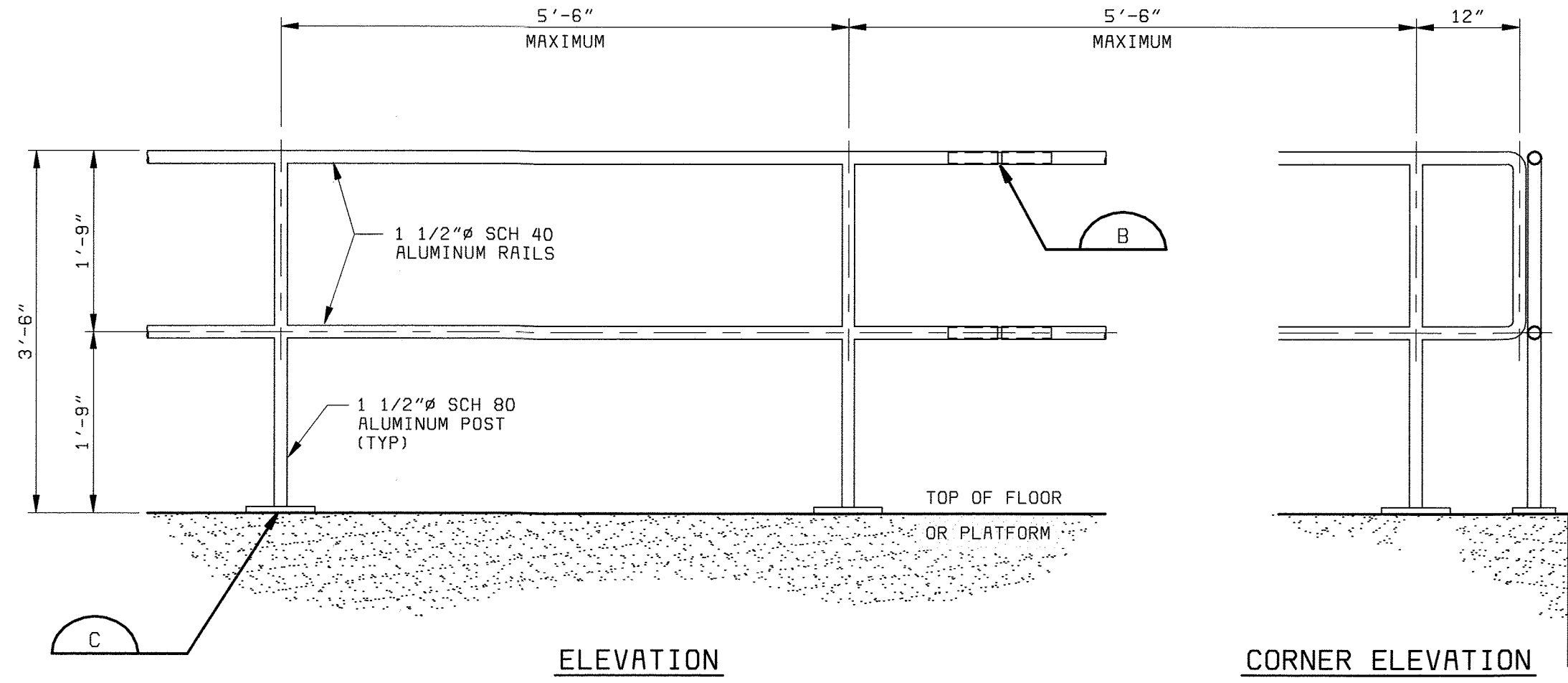
PROVIDE EXPANSION JOINTS IN HANDRAIL AT LOCATIONS OF EXPANSION JOINTS IN CONCRETE, BUT NOT MORE THAN 30'-0" O/C.



**CONNECTION TO EXISTING AND/OR FOR EXPANSION JOINT**  
3" = 1'-0"



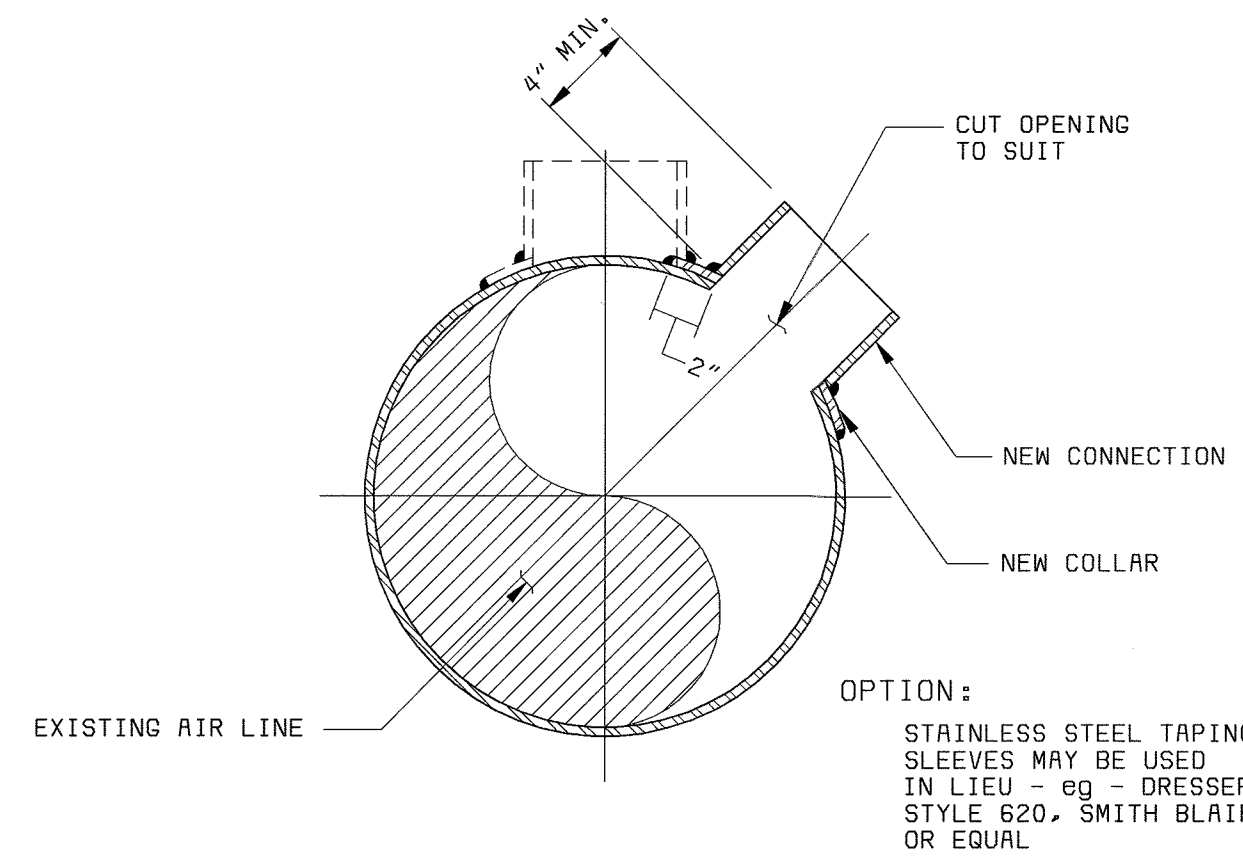
**ALUMINUM HANDRAIL FIXED BASE DETAIL**  
3" = 1'-0"



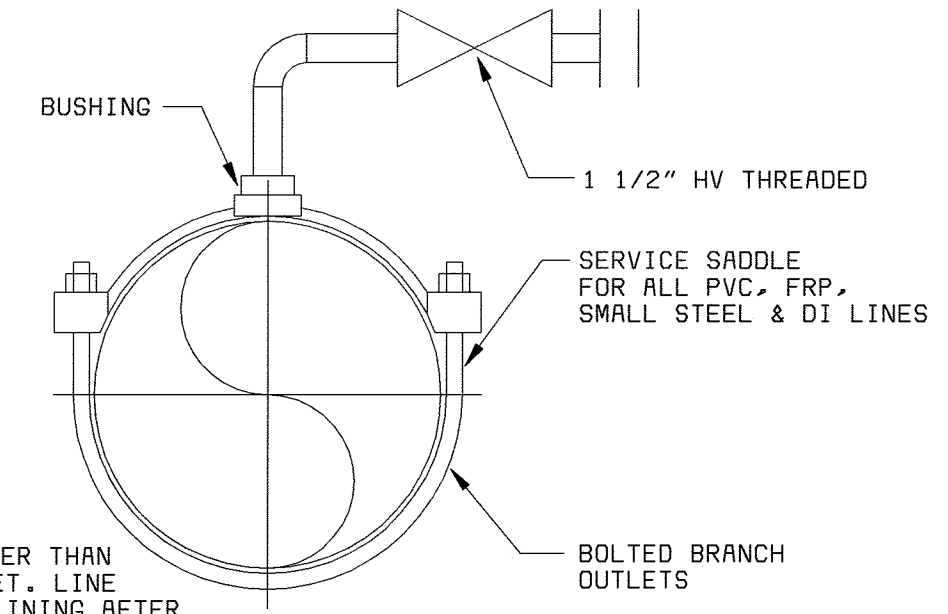
**ELEVATION**

**CORNER ELEVATION**

**TWO RAIL GUARDRAIL TO MATCH EXISTING GUARDRAIL**  
3/4" = 1'-0"



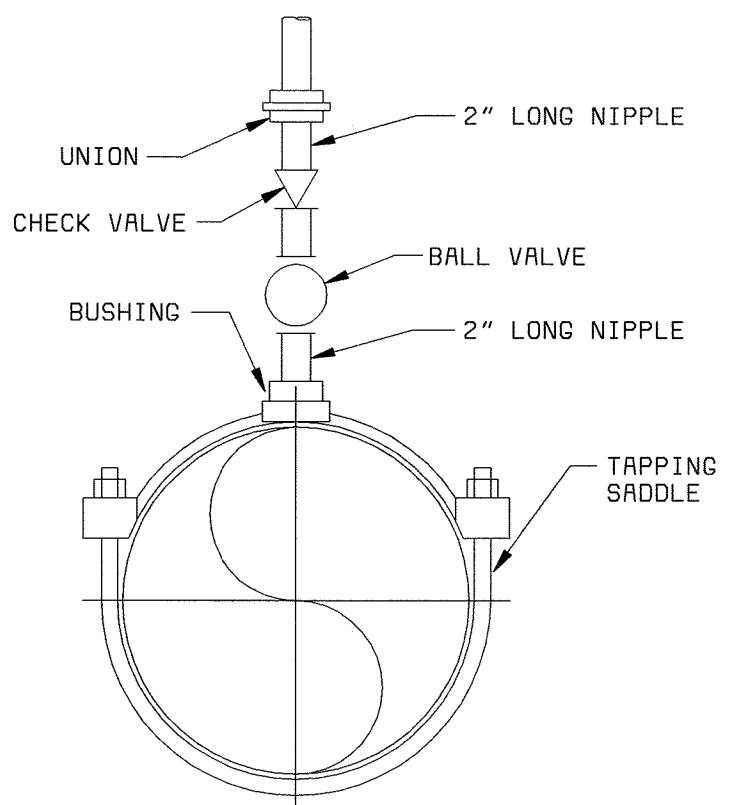
**AIR LINE CONNECTION**  
1 1/2" = 1'-0"



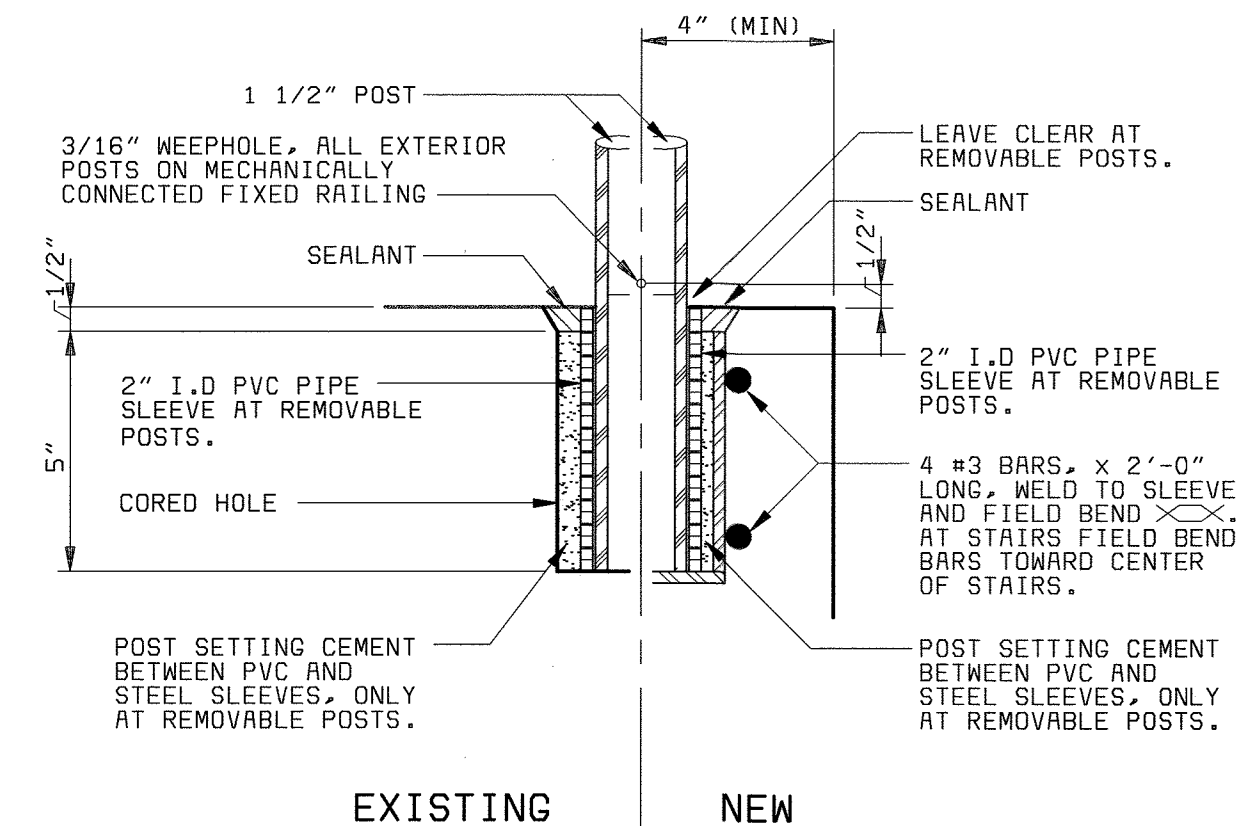
**NOTES:**

- FOR STEEL LINES GREATER THAN 200#, USE 50# SOCKET. LINE PIPE WITH SPECIFIED LINING AFTER INSTALLATION.
- FOR DUCTILE IRON LINES GREATER THAN 200#, THREAD PIPE FOR CONNECTION.

**FLUSHING CONNECTION**  
1 1/2" = 1'-0"



**TAPPINGS**  
1 1/2" = 1'-0"

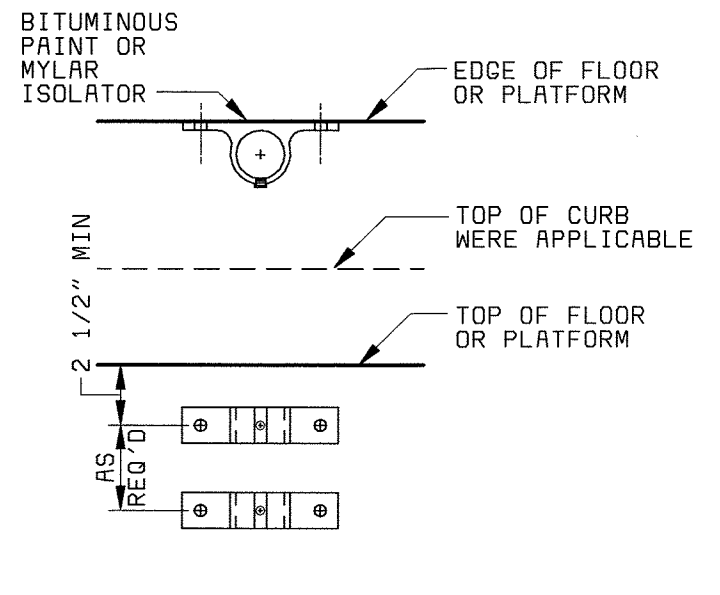


**EXISTING**

**NEW**

- NOTES:**
- FIXED AND REMOVABLE DETAILS SIMILAR EXCEPT AS NOTED.
  - THE REMOVABLE SLEEVE MOUNT DETAIL SHALL NOT BE USED IN WET LOCATIONS SUBJECT TO FREEZING. SUBSTITUTE A REMOVABLE BASE FLANGE OR SIDE MOUNT DETAIL.

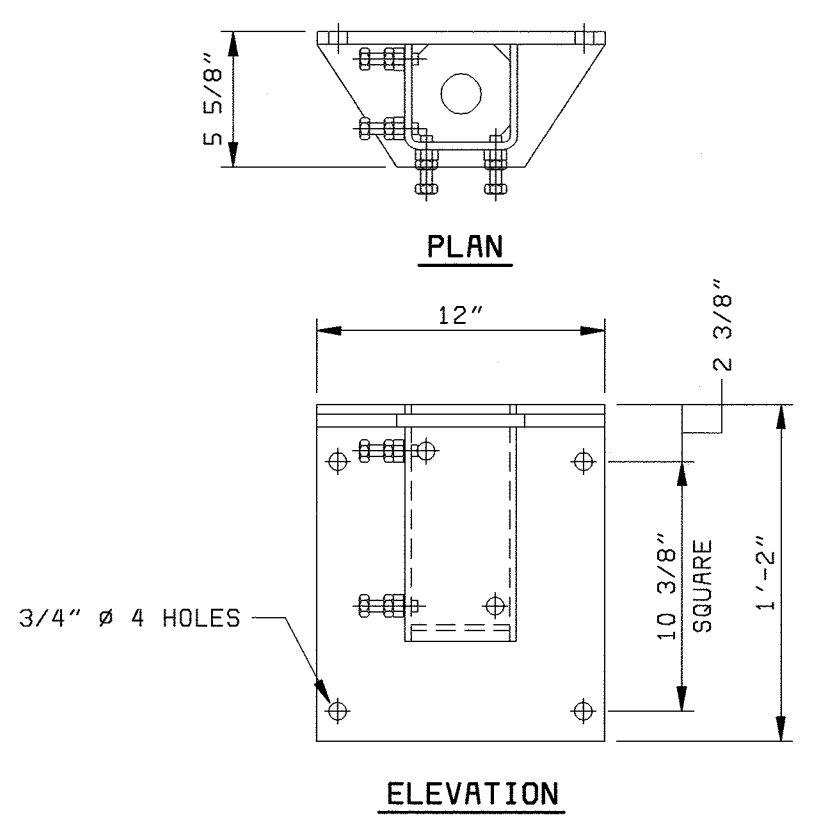
**REMOVABLE BASE DETAIL**  
3" = 1'-0"



**ALUMINUM RAILING**

**SIDE MOUNT**  
1 1/2" = 1'-0"

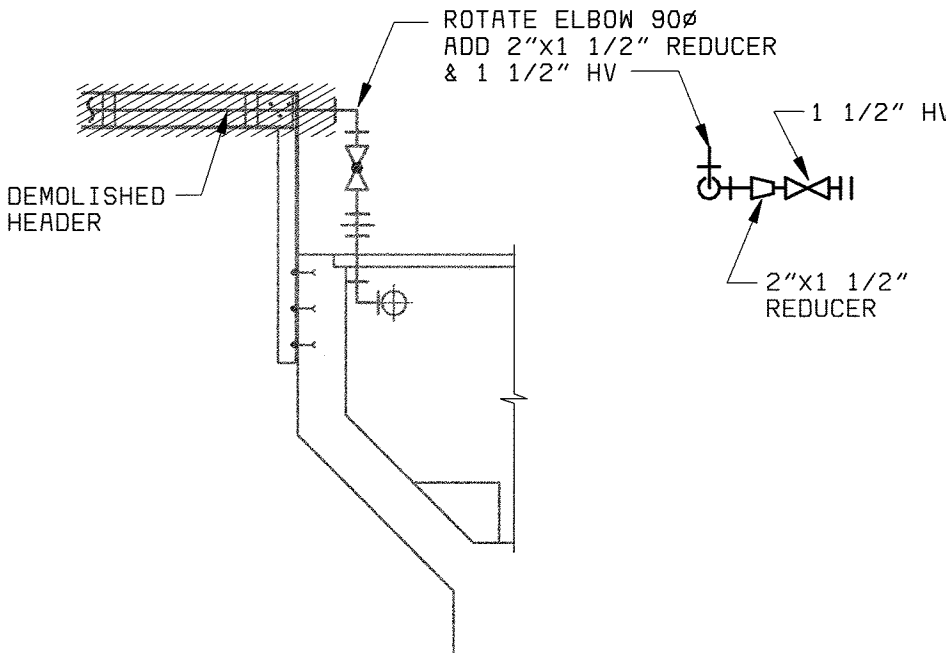
**NOTE:** SIDE MOUNTS SHALL BE SUITABLE FOR THE INDICATED LOADS AND APPLICABLE BUILDING CODE. FOR REMOVAL RAILING SEE NOTE 10.



**ELEVATION**

**GALVANIZED STEEL**

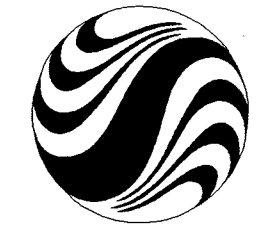
**WALL MOUNTING SOCKET**  
1 1/2" = 1'-0"



**SPRAY HEADER MODIFICATION**

3/8" = 1'-0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND



Stantec Consulting Ltd.  
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Surrey, BC  
V3W 1J8  
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Email: surrey@stantec.com



**BLACK & VEATCH**  
Gaithersburg, Maryland

THIS DRAWING WAS  
ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
JAN SZENDEJLORZ  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 25097

DES: RVJ					
DRN: RCF					
CHK: JS	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
	6/11/02	PER ADDENDUM NO. 2		FKA/RJR/RJR	
DATE: 5/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

**GENERAL MECHANICAL**

**MISCELLANEOUS DETAILS**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

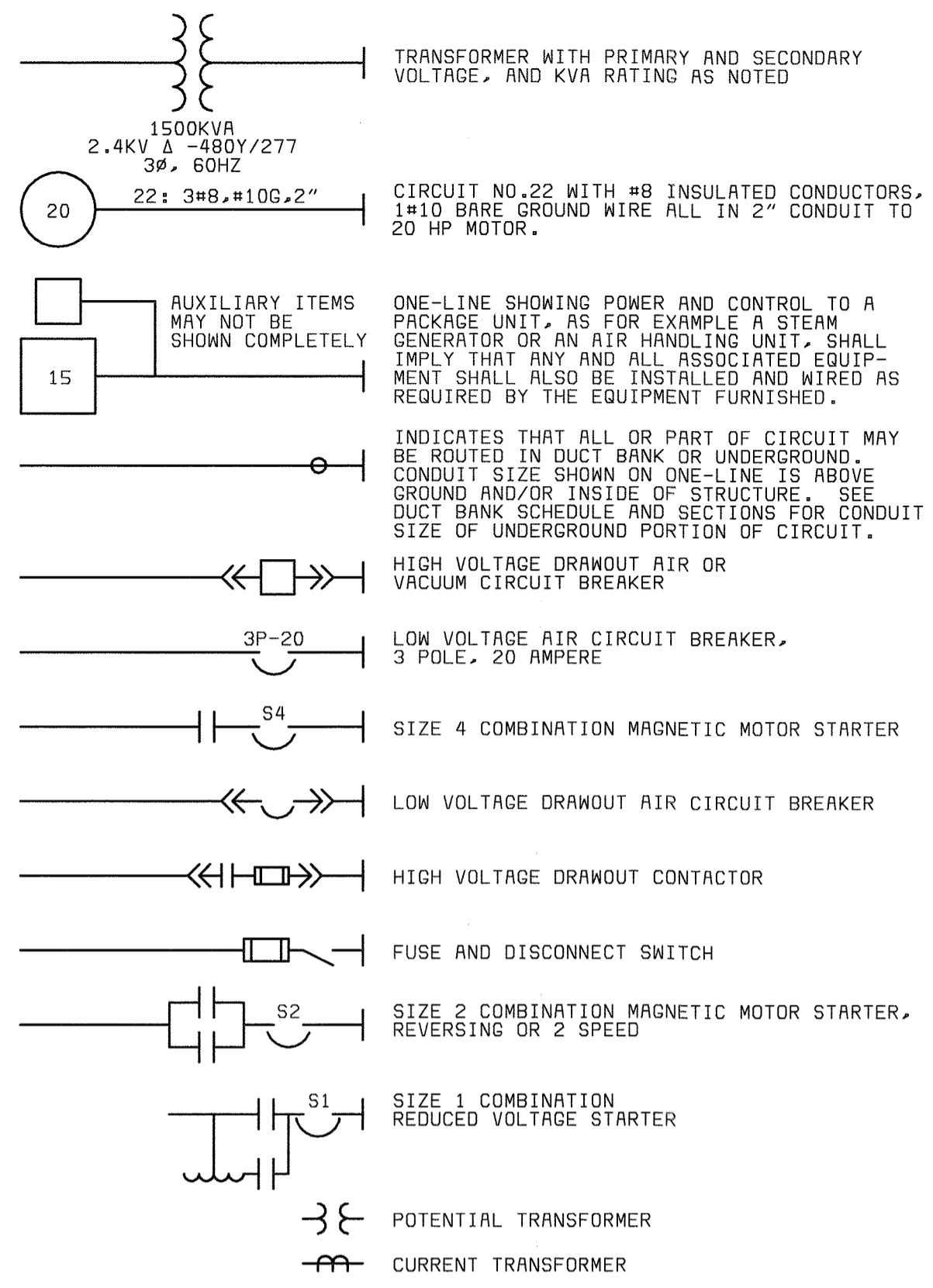
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

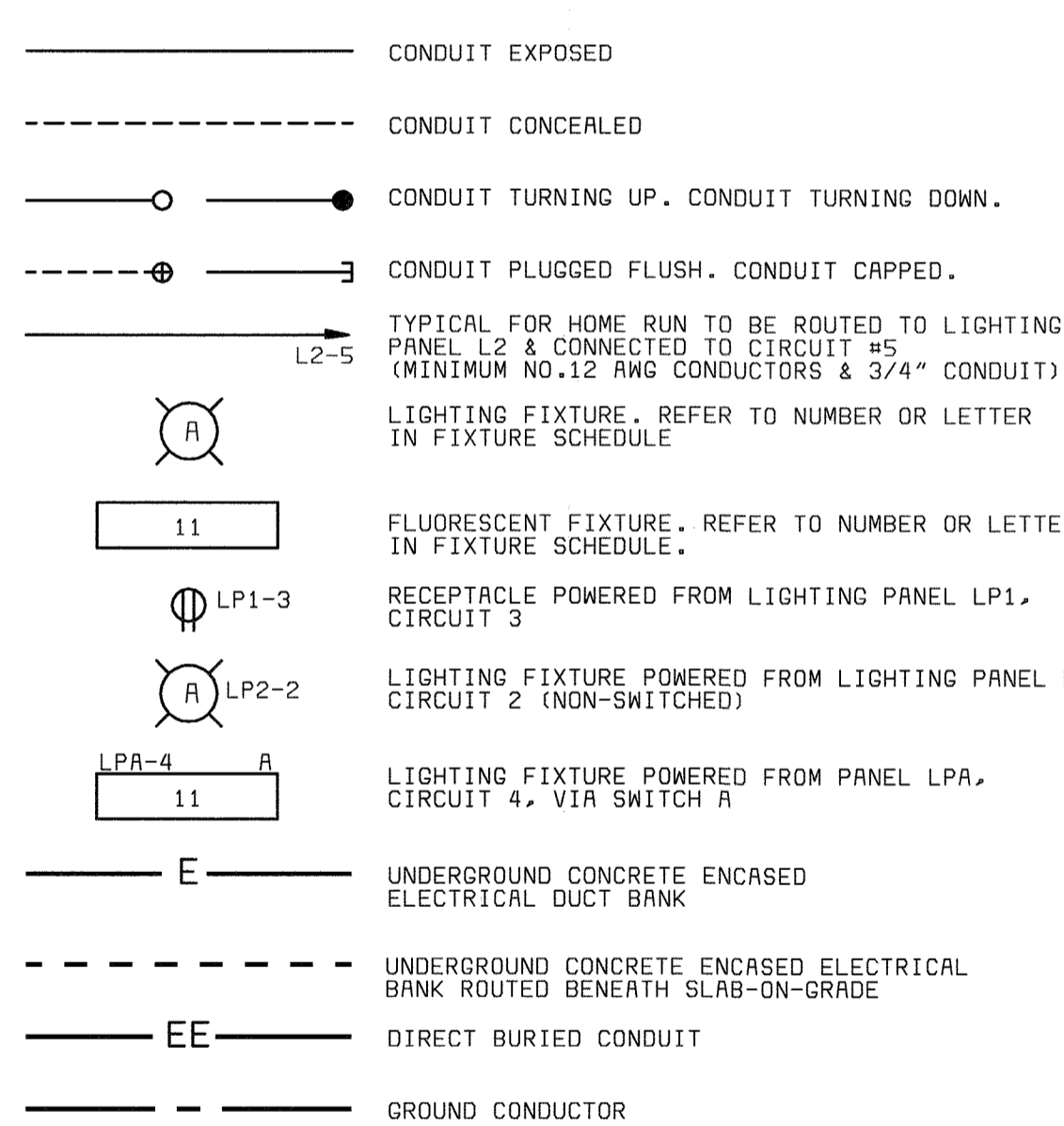
SHEET 98 OF 139

M48

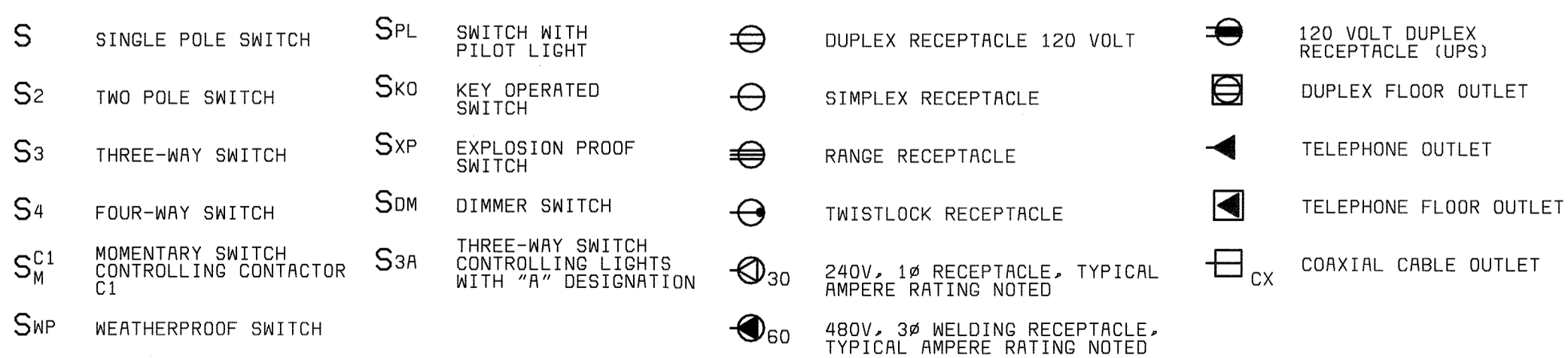
**ONE-LINE DIAGRAM LEGEND**



**CONDUIT & WIRING INSTALLATION LEGEND**



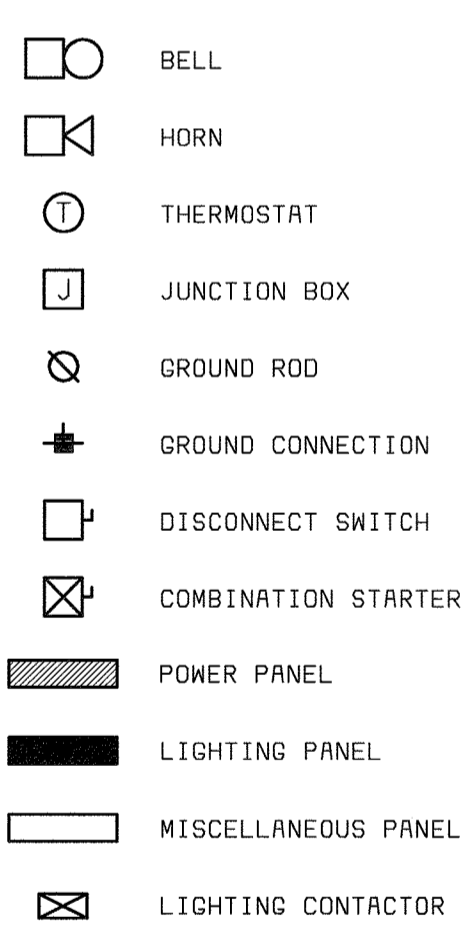
**SWITCH & OUTLET SYMBOLS**



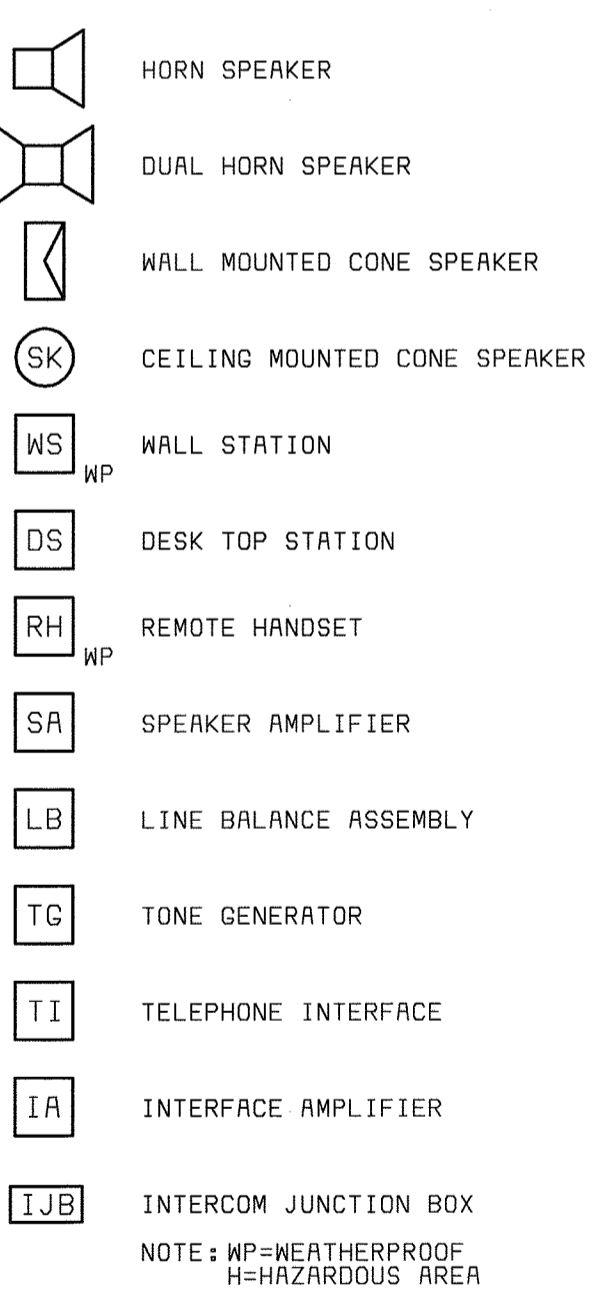
**SCHEMATIC SYMBOLS**



**MISCELLANEOUS SYMBOLS**



**COMMUNICATION SYMBOLS**



**ABBREVIATIONS**

A	AMBER, AMPERE, ALARM	M	MAGNETIC MOTOR STARTER
AC	ALTERNATING CURRENT	MA	MILLIAMPERE
ACB	AIR CIRCUIT BREAKER	MCC	MAIN CIRCUIT BREAKER
AF	AMPERE FRAME	MCCU	MOTOR CONTROL CENTER
AFD	ADJUSTABLE FREQUENCY DRIVE	MCM	MOTOR CONTROL LINEUP
AM	ANNUNCIATOR	MCM	THOUSAND CIRCULAR MIL
ANN	ANNUNCIATOR	MD	MOISTURE DETECTOR
AR	ALARM RELAY	MFM	MAGNETIC FLOW METER
AS	AMMETER SWITCH	MFR	MANUFACTURER
AT	AMPERE TRIP	MH	MANHOLE OR MOUNTING HEIGHT
AWG	AMERICAN WIRE GAGE	MOV	MOTOR OPERATED VALVE
BC	BATTERY CHARGER	MPR	MOTOR PROTECTION RELAY
BR	BRAKE	MS	MANUAL MOTOR STARTER
BT	BEARING TEMPERATURE	MSH	MOTOR SPACE HEATER
		MV	MILLIVOLT
		MVA	MEGA VOLT AMPERE
C	CLOSE, COUNTER OR CONTACTOR	N	NEUTRAL
CAP	CAPACITOR	NC	NORMALLY CLOSED
CB	CIRCUIT BREAKER	NO	NORMALLY OPEN, NUMBER
CB"A"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN OR TRIPPED)	O	OPEN
		OCB	OIL CIRCUIT BREAKER
		OL	OVERLOAD
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN OR TRIPPED)	ODR	ON-OFF-AUTO
		ORR	ON-OFF-REMOTE
CD	CONTROL DAMPER	P	PRIMARY
CI	CELL INTERLOCK	PCS	PLANT CONTROL SYSTEM
CKT	CIRCUIT	PB	PUSH BUTTON OR PULL BOX
CL2	CHLORINE	PF	POWER FACTOR METER
COS	CABLE OPERATED SWITCH	PH	PHASE, CHEMICAL TERM
CP	CONTROL PANEL	PLC	PROGRAMMABLE LOGIC CONTROLLER
CPT	CONTROL POWER TRANSFORMER	PP	POWER PANEL
CR	CURRENT OR CONTROL RELAY	PRS	PROXIMITY SWITCH
CS	CONTROL STATION	PS	PRESSURE SWITCH
CT	CYCLE TIMER OR CURRENT TRANSFORMER	PT	POTENTIAL TRANSFORMER, PROGRAM TIMER
CTC	CYCLE TIMER CLUTCH	2P	2 POLE
CTM	CYCLE TIMER MOTOR		
2/C	2 CONDUCTOR		
4"C	4" CONDUIT		
DC	DIRECT CURRENT	R	RED, RAISE, RELAY OR REVERSE
DI	DOOR INTERLOCK	RECP	RECEPTACLE
DM	DAMPER MOTOR OR DEMAND METER	RES	RESISTOR
DPDT	DOUBLE POLE DOUBLE THROW	RT	REPEATING TIMER
DPST	DOUBLE POLE SINGLE THROW	RTD	RESISTANCE TYPE TEMP DETECTOR
DPR	DIFFERENTIAL PRESSURE REGULATOR	RTU	REMOTE TERMINAL UNIT
DPS	DIFFERENTIAL PRESSURE SWITCH	RVSS	REDUCED VOLTAGE SOLID STATE STARTER
DS	DISCONNECT SWITCH	S2	SIZE 2 STARTER
DVLS	DISCHARGE VALVE LIMIT SWITCH	S2	SUPERVISORY CONTROL AND DATA ACQUISITION
E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE	SH	SPACE HEATER
		SN	SOLID NEUTRAL
EC	EMPTY CONDUIT	SO	SOLENOID OILER
EL	ELEVATION OR EMERGENCY LIGHT	SP	SINGLE POLE
EMH	ELECTRICAL MANHOLE	SPDT	SINGLE POLE DOUBLE THROW
ER	ELECTRODE RELAY	SPST	SINGLE POLE SINGLE THROW
ES	END SWITCH	SS	SELECTOR SWITCH
ETM	ELAPSED TIME METER	SBS	SOLID STATE STARTER
EX	EXISTING	SUPV	SUPERVISORY CONTROL
F	FORWARD	SV	SOLENOID VALVE
FS	FLOW SWITCH	SWB	SWITCHBOARD
		SWGR	SWITCHGEAR
G	GREEN OR GROUND	T	THERMOSTAT, TIMER, OR TOTALIZER
GD	GROUND DETECTOR	TACH	TACHOMETER
GEN	GENERATOR	TB	TERMINAL BLOCK
GFI	GROUND FAULT INTERRUPTER	TC	TIMER CLUTCH
QLS	GEARED LIMIT SWITCH	TD	TIME DELAY RELAY
#BG	#8 GROUND WIRE	TEMP	TEMPERATURE
H	HIGH OR HUMIDISTAT	TM	TIMER MOTOR
HC	HOT CIRCUIT	TQ	TORQUE
HH	HANDHOLE	TS	TEMPERATURE SWITCH
HMT	HIGH MOTOR TEMPERATURE	TTB	TELEPHONE TERMINAL BOX
HQA	HAND-OFF-AUTO	UC	UNDERGROUND
HOR	HAND-OFF-REMOTE	UV	UNDER VOLTAGE
HP	HORSEPOWER	UPS	UNINTERRUPTIBLE POWER SUPPLY
HWC0	HIGH WATER CUTOFF		
HZ	HERTZ (CYCLE)	V	VOLTS
I/O	INPUT/OUTPUT	VA	VOLT AMPERE
INST	INSTANTANEOUS	VAR	VARMETER
J	JUNCTION BOX	VLS	VALVE LIMIT SWITCH
JB	JUNCTION BOX	VM	VOLTMETER
K	KEY INTERLOCK	VPI	VALVE POSITION INDICATOR
KV	KILOVOLT	VS	VOLTMETER SWITCH
KVA	KILOVOLT AMPERE	W	WHITE OR WATTS
KVAR	KILOVAR	WH	WATTHOUR METER
KW	KILOWATT	WM	WATT METER
KWH	KILOWATT HOUR	WP	WEATHERPROOF
L	LOW, LEVEL	X	AUXILIARY RELAY
LA	LIGHTNING ARRESTER	XFMR	TRANSFORMER
LAN	LOCAL AREA NETWORK	XP	EXPLOSION PROOF
LC	LIGHTING CONTACTOR	Y	YELLOW
LOA	LOCAL-ON-OFF	Z	AUXILIARY RELAY
LOR	LOCAL-OFF-REMOTE	ZS	POSITION SWITCH
LP	LIGHTING PANEL	ZSS	ZERO SPEED SWITCH
LS	LIMIT OR LEVEL SWITCH		
LNCO	LOW WATER CUTOFF		

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

**AREA DESIGNATIONS**

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

**GENERAL REQUIREMENTS**

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

**GENERAL NOTES**

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

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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JOSEPH T. FORBES  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 27168

DES: GNS							
DRN: MAS2							
CHK: WTC							
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	

**EAST-WEST PROCESS REACTOR  
ELECTRICAL**

**LEGEND AND ABBREVIATIONS**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

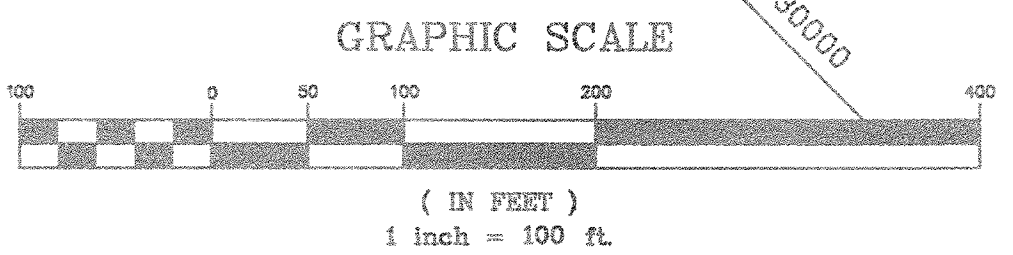
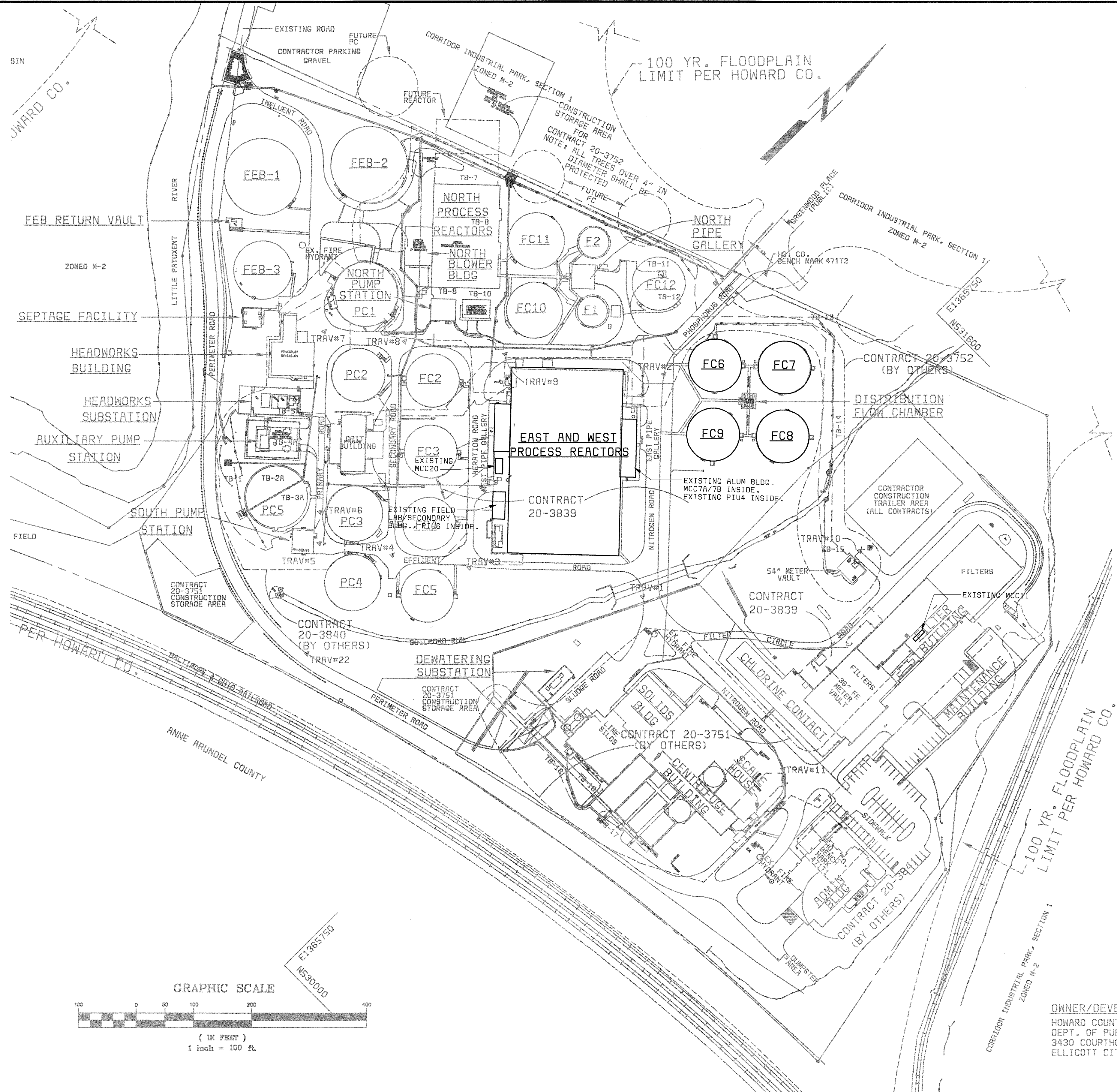
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

SCALE  
AS  
SHOWN

SHEET  
103 OF 139

**E1**



OWNER/DEVELOPER  
 HOWARD COUNTY GOVERNMENT  
 DEPT. OF PUBLIC WORKS  
 3430 COURTHOUSE DRIVE  
 ELLICOTT CITY, MARYLAND 21043

58472-113-LPO-C-T0000133Z  
 58472-113-GEN-C-T00000401.402.405  
 58472-113-GEN-C-T0000040N  
 058472.4  
 F058472A

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
 Gaithersburg, Maryland

REG. PROF. ENGR. \_\_\_\_\_ DATE \_\_\_\_\_

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 NO. 27168

DES: GNS					
DRN: MAS2					
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

**EAST-WEST PROCESS REACTOR  
 ELECTRICAL  
 SITE PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
 ADDITION NO. 6  
 BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839

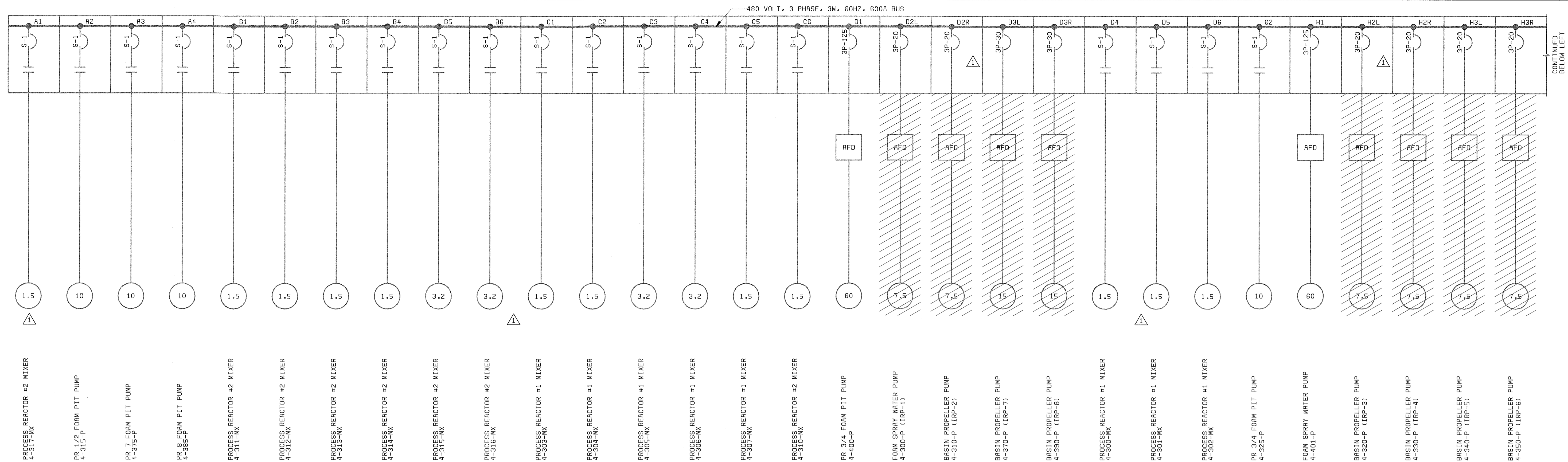
HOWARD COUNTY, MARYLAND

SCALE  
 AS  
 SHOWN

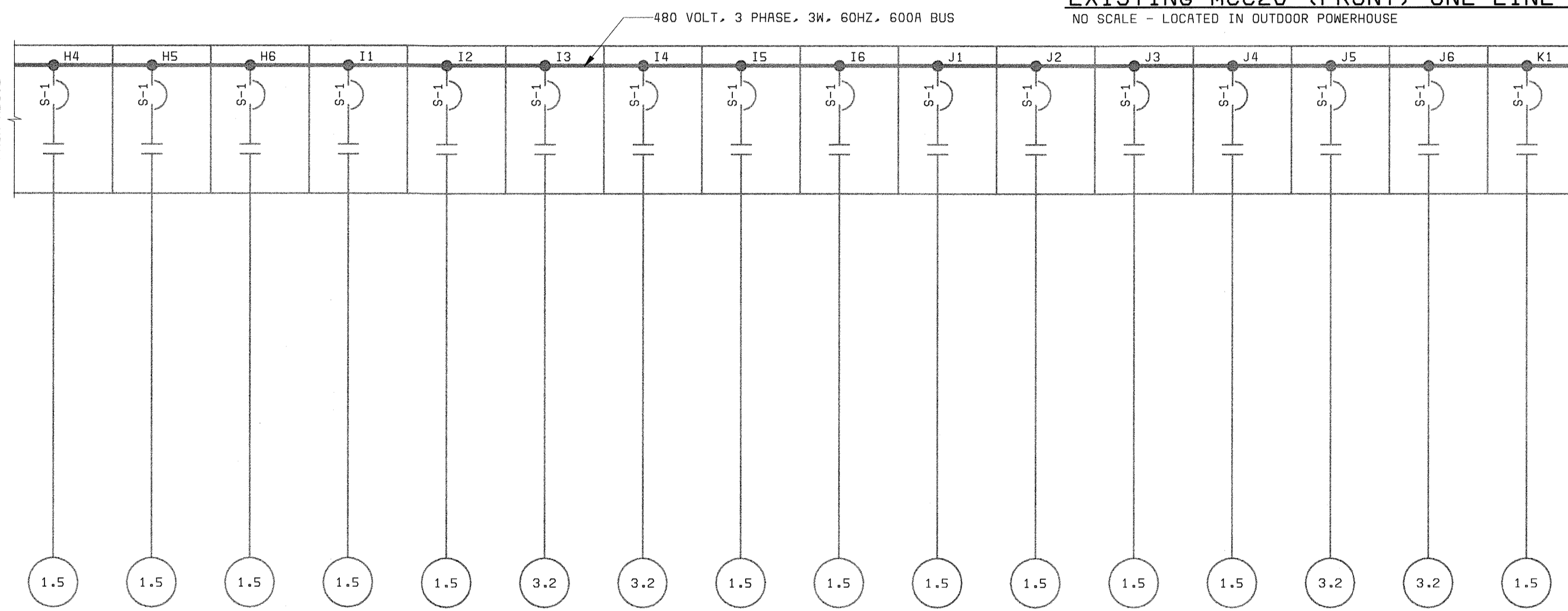
SHEET  
 104 OF 139

**E2R**





**EXISTING MCC20 (FRONT) ONE-LINE DIAGRAM**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE



**EXISTING MCC20 (FRONT) ONE-LINE DIAGRAM**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE

A1	B1	C1	D1	E1	F1	G1	H1	I1	J1	K1		
A2	B2	C2	D2L	D2R	E2	G2	H2L	H2R	I2	J2	K2L	K2R
A3	B3	C3	D3L	D3R	E3	G3	H3L	H3R	I3	J3	K3	
A4	B4	C4	D4		F3		H4		I4	J4		
A5	B5	C5	D5	E4	F4	G4	H5		I5	J5		
A6	B6	C6	D6				H6		I6	J6		

**EXISTING MCC20 FRONT ELEVATION**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE

**NOTES:**

- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
- REMOVE CONDUIT AND CABLE IN ADDITION TO MOTOR AND AFD'S, AS SHOWN. OUTDOOR CABLE AND CONDUIT FROM AFD'S TO MOTOR ARE 3#12, #12G, 4#14 IN 1" CONDUIT.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

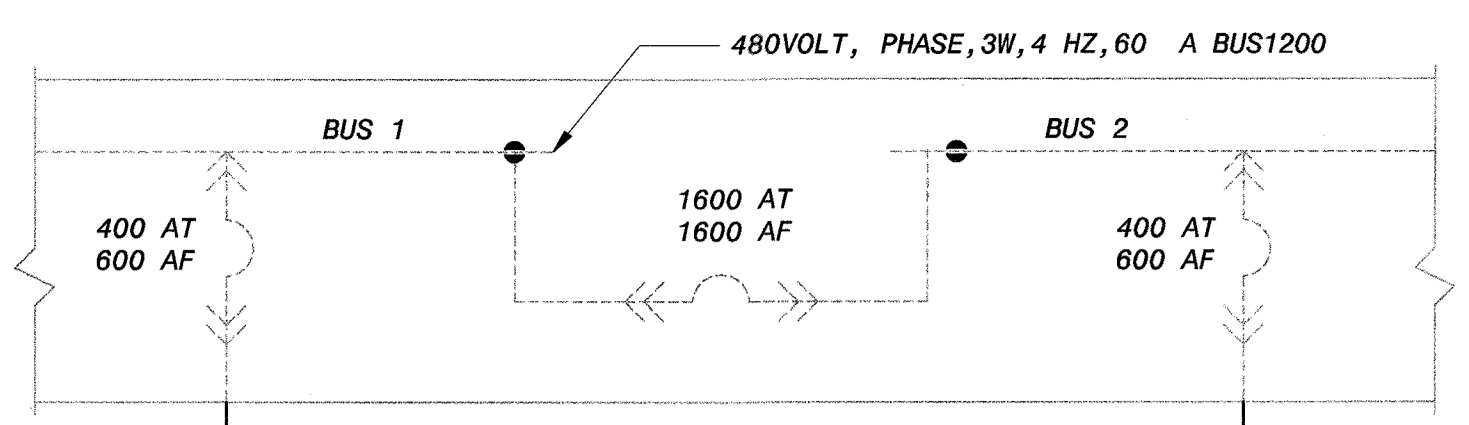
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JOSEPH T. FORBES  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 27168

DES: GNS					
DRN: MAS2					
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR
		REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

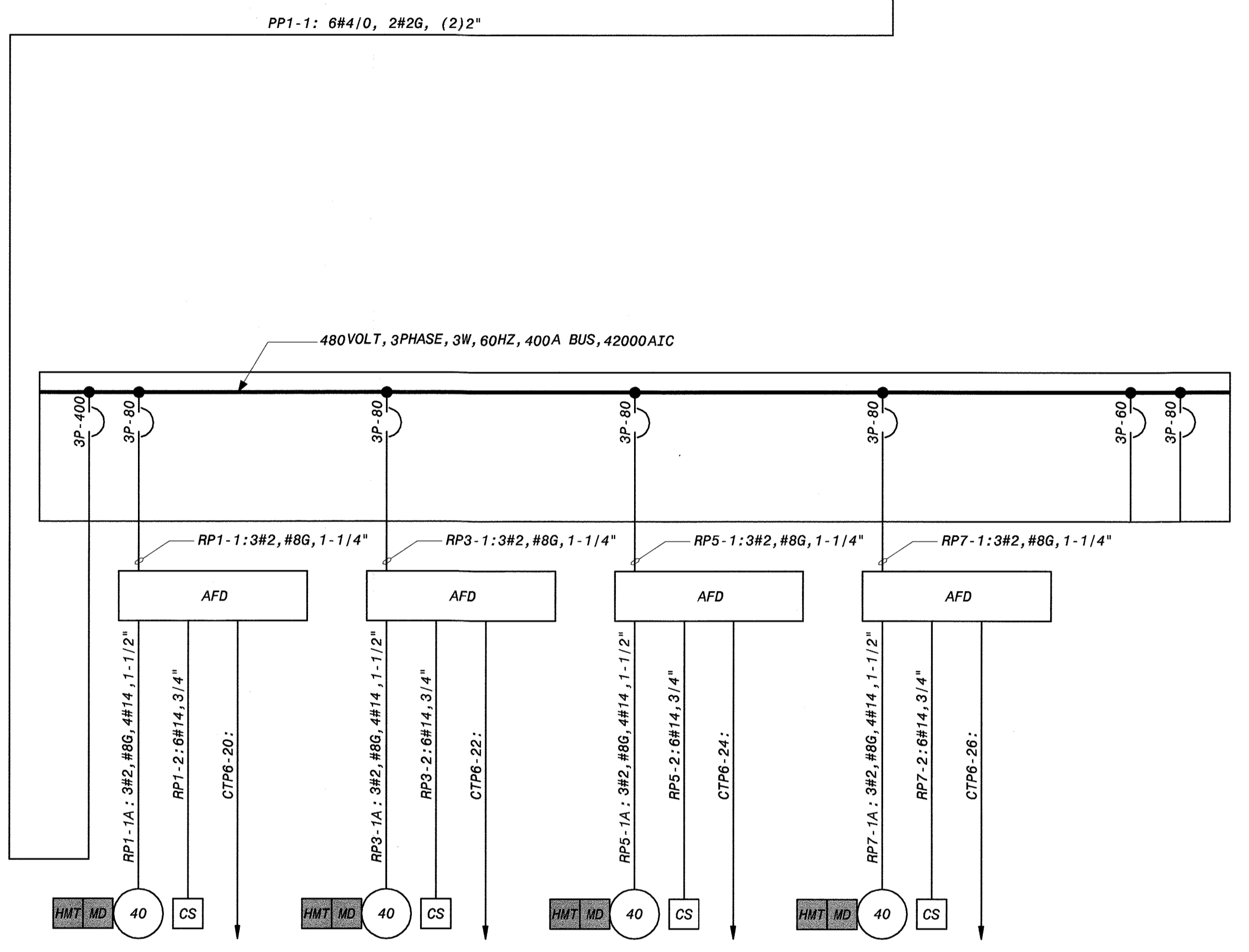
**ELECTRICAL**  
**EXISTING MCC20 FRONT  
DEMOLITION ONE-LINES**

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

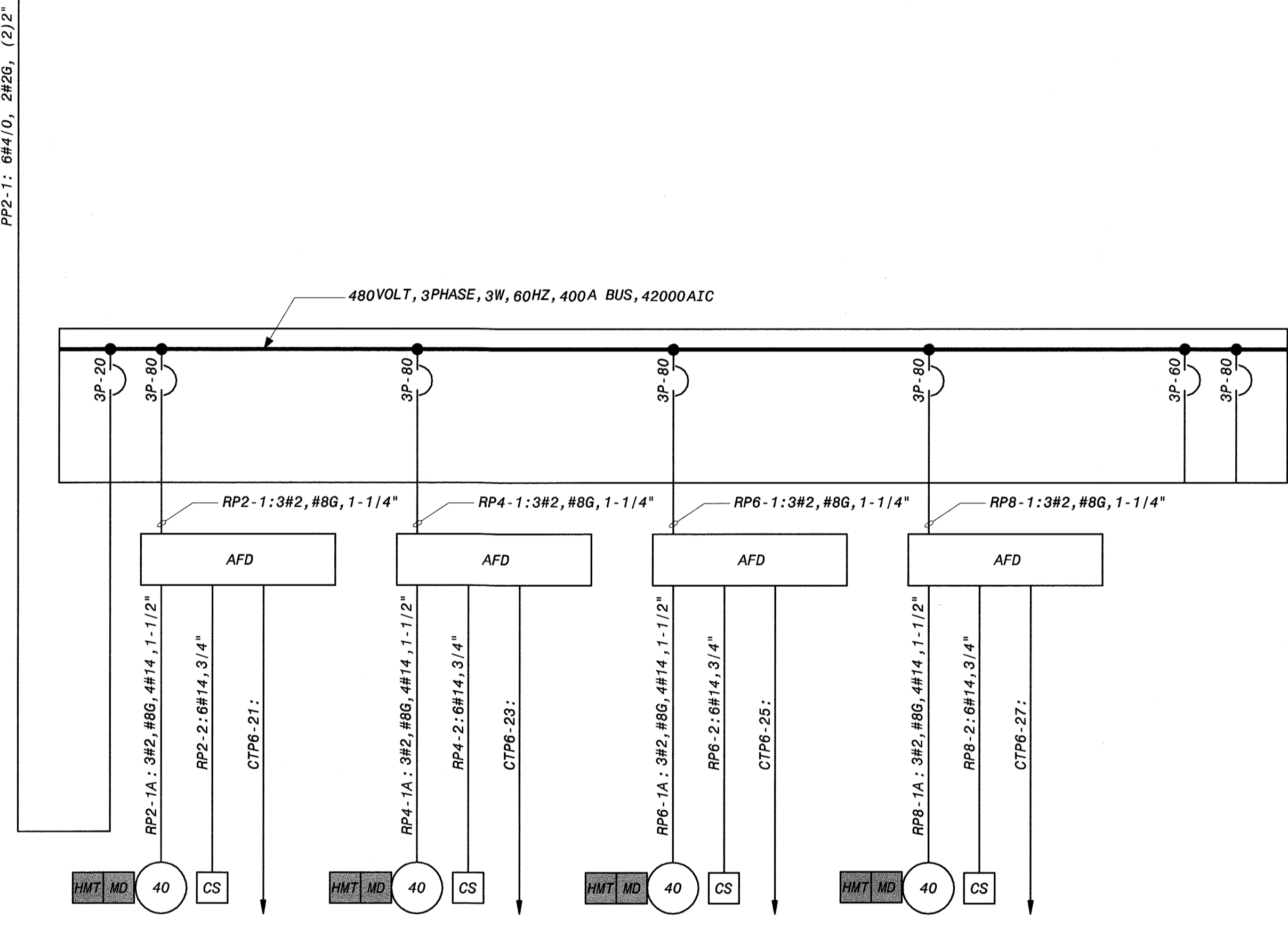
SCALE  
AS  
SHOWN  
SHEET  
105 OF 139  
**E3R**



**EXISTING SUBSTATION "PS3"**  
**PARTIAL ONE-LINE DIAGRAM**  
(LOCATED OUTDOORS - NOTE 2)



**480-VOLT POWER PANEL PP-1 ONE-LINE DIAGRAM**  
(LOCATED IN EXISTING LIME BUILDING)



**480-VOLT POWER PANEL PP-2 ONE-LINE DIAGRAM**  
(LOCATED IN EXISTING LIME BUILDING)

- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
  - CONTRACTOR SHALL CONFIRM TRIP RATINGS OF EXISTING SPARE BREAKERS IN SUBSTATION PS3.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
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REG. PROF. ENGR. DATE

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JOSEPH T. FORBES  
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NO. 27168

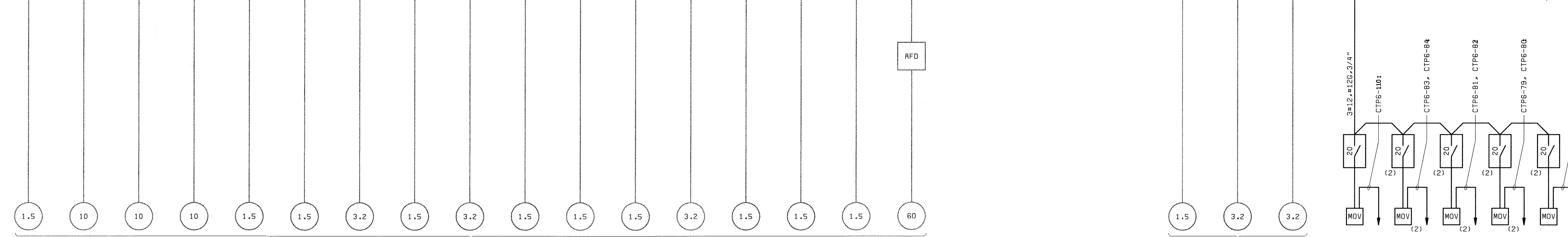
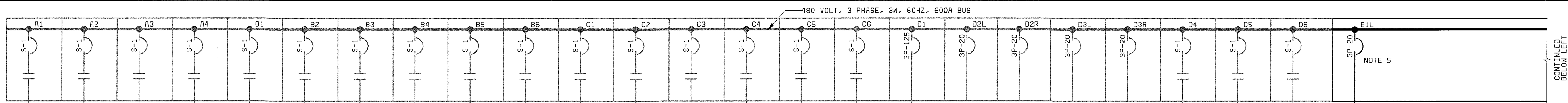
DES: GNS									
DRN: MAS2									
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR			
DATE: 06/10/03	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR	RJR			
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY	CK	APP		

**ELECTRICAL**  
**MISCELLANEOUS ONE-LINE DIAGRAMS**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 107 OF 139  
**ESR**

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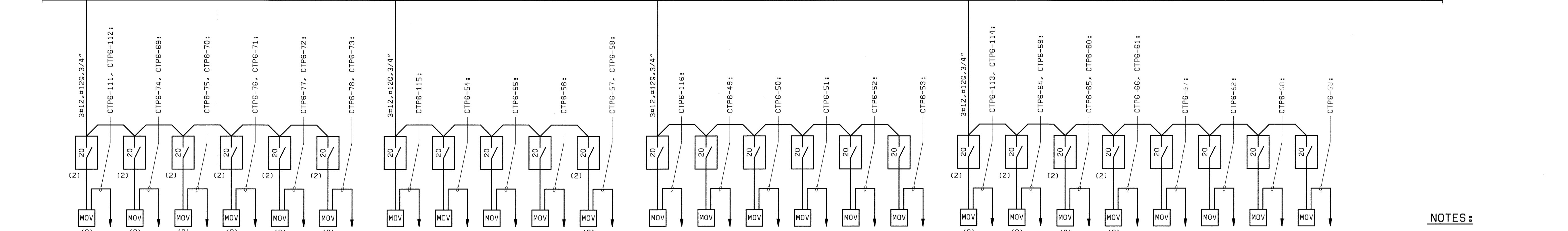
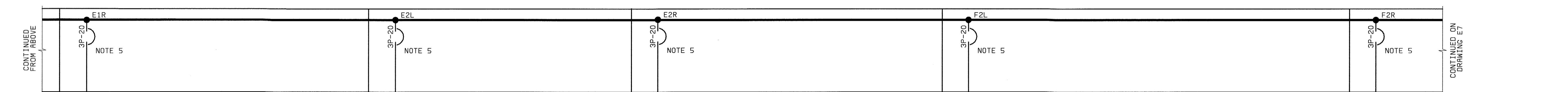


NO CHANGES TO EXISTING (NOTE 4)

NO CHANGES TO EXISTING (NOTE 4)

PROCESS REACTOR MIXER 4-340-MX  
 PR 1/2 FORM PIT PUMP 4-315-P  
 PR 7 FORM PIT PUMP 4-375-P  
 PR 8 FORM PIT PUMP 4-385-P  
 PROCESS REACTOR MIXER 4-386-MX  
 PROCESS REACTOR MIXER 4-351-MX  
 PROCESS REACTOR MIXER 4-363-MX  
 PROCESS REACTOR MIXER 4-358-MX  
 PROCESS REACTOR MIXER 4-365-MX  
 PROCESS REACTOR MIXER 4-332-MX  
 PROCESS REACTOR MIXER 4-385-MX (FROM PLANT INVENTORY)  
 PROCESS REACTOR MIXER 4-336-MX  
 PROCESS REACTOR MIXER 4-367-MX  
 PROCESS REACTOR MIXER 4-334-MX  
 PROCESS REACTOR MIXER 4-352-MX  
 PROCESS REACTOR MIXER 4-337-MX  
 PROCESS REACTOR MIXER 4-352-MX  
 PR 3/4 FORM PIT PUMP 4-400-P  
 SPARE  
 SPARE  
 SPARE  
 SPARE  
 PROCESS REACTOR MIXER (FROM PLANT INVENTORY)  
 PROCESS REACTOR MIXER 4-366-MX  
 PROCESS REACTOR MIXER 4-368-MX  
 PR 7 WEIR GATE 4-560-WG  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-564-BV, 4-565-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-562-BV, 4-563-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-560-BV, 4-561-BV  
 TO CTP-6  
 WEIR GATE 4-562-WG  
 TO CTP-6

**EXISTING MCC20 (FRONT) ONE-LINE DIAGRAM**  
 NO SCALE - LOCATED IN MCC20 POWERHOUSE

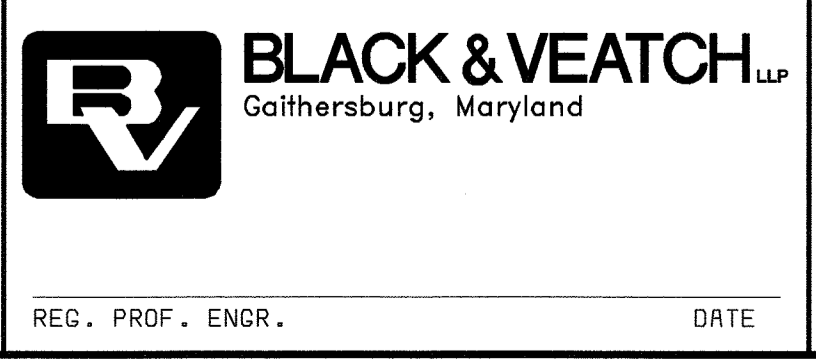


PRS, PRS WEIR GATES 4-550-WG, 4-540-WG  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-550-BV, 4-540-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-551-BV, 4-541-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-552-BV, 4-542-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-553-BV, 4-543-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-554-BV, 4-544-BV  
 TO CTP-6  
 PR2 WEIR GATE 4-510-WG  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-510-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-511-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-512-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-514-BV, 4-513-BV  
 TO CTP-6  
 PR1 WEIR GATE 4-500-WG  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-500-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-501-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-502-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-503-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-504-BV  
 TO CTP-6  
 PR4, PR3 WEIR GATES 4-530-WG, 4-520-WG  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-530-BV, 4-520-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-531-BV, 4-521-BV  
 TO CTP-6  
 MOTOR OPERATED VALVES 4-532-BV, 4-522-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-533-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-523-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-534-BV  
 TO CTP-6  
 MOTOR OPERATED VALVE 4-524-BV  
 TO CTP-6  
 SPARE

**EXISTING MCC20 (FRONT) ONE-LINE DIAGRAM**  
 NO SCALE - LOCATED IN MCC20 POWERHOUSE

- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
  - MODIFIED MCC LAYOUT IS SHOWN FOR BID PURPOSES ONLY. FINAL LAYOUT MAY BE ADJUSTED BY CONTRACTOR.
  - CONTRACTOR SHALL PROVIDE/RELOCATE ALL MCC EQUIPMENT NAME PLATES AS REQUIRED.
  - EXISTING MIXER LOCATIONS DO NOT CHANGE. RELATED DESIGNATIONS SHOWN TO BE IGNORED.
  - MCC 20 IS WESTINGHOUSE SERIES 2100, NO. A227362 IT.3A-FVC, DATED NOVEMBER 1992.

DEPARTMENT OF PUBLIC WORKS  
 HOWARD COUNTY, MARYLAND  
 CHIEF, BUREAU OF UTILITIES DATE



DES: GNS					
DRN: MAS2					
CHK: WTC					
DATE: 05/10/02	DATE	PR VALUE ENGINEERING PROPOSAL			
		REVISIONS AND RECORD OF ISSUE			

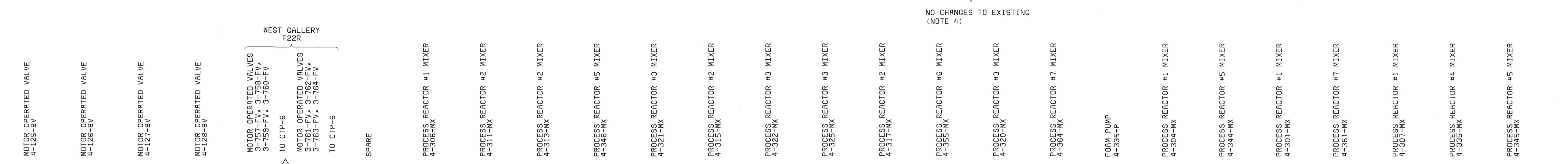
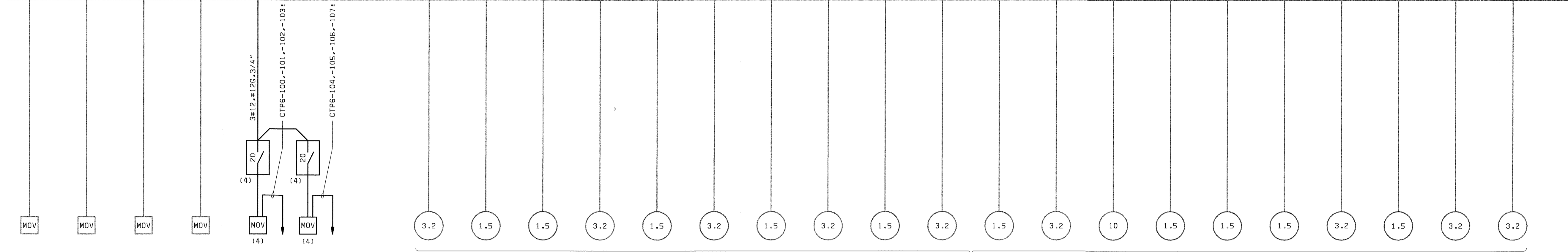
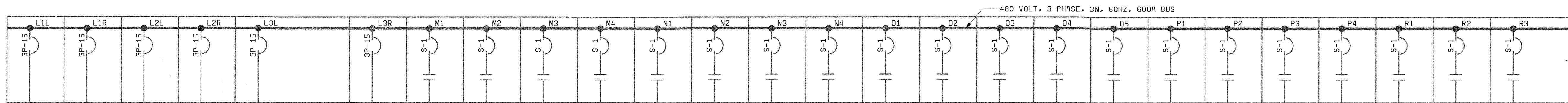
**ELECTRICAL**  
**MCC20 FRONT MODIFIED ONE-LINES**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
 CAPITAL PROJECT S-6205  
 CONTRACT NO. 20-3839  
 HOWARD COUNTY, MARYLAND

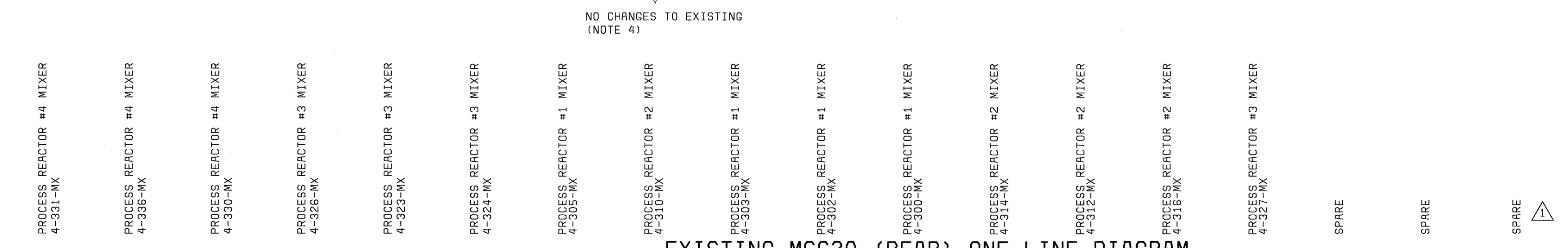
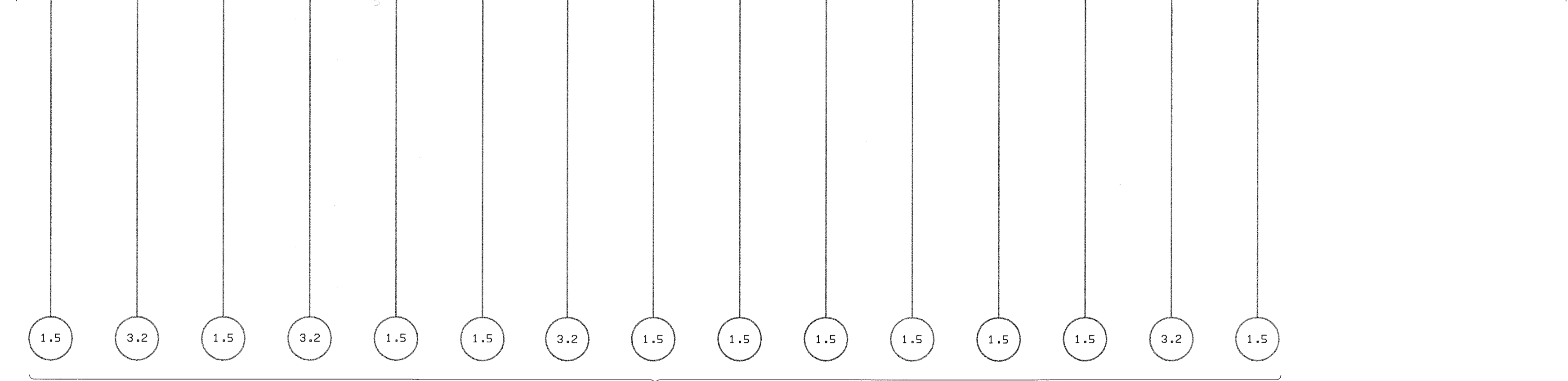
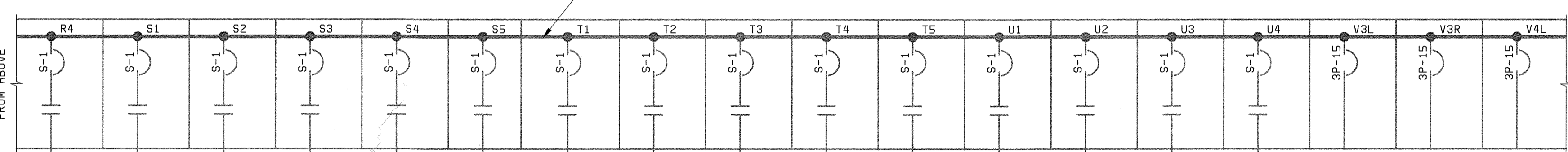
SCALE AS SHOWN  
 SHEET 108 of 139  
**E6R**

058472-4  
 F058472A





**EXISTING MCC20 (REAR) ONE-LINE DIAGRAM**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE



**EXISTING MCC20 (REAR) ONE-LINE DIAGRAM**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE

L1L	L1R	M1	N1	O1	P1	Q1	R1	S1	T1	U1	V1L	V1R			
L2L	L2R	M2	N2	O2	P2	Q2	R2	S2	T2	U2	V2L	V2R			
L3L	L3R	M3	N3	O3	P3		R3	S3	T3	U3	V3L	V3R			
L4L	L4R	M4	N4	O4	P4	Q3	R4	S4	T4	U4	V4L	V4R			
L5		MSL	MSR	N5	O5	P5		R5L	R5R	S5	T5	U5L	U5R	V5L	V5R

**EXISTING MCC20 REAR ELEVATION**  
NO SCALE - LOCATED IN OUTDOOR POWERHOUSE

- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
  - MODIFIED MCC LAYOUT IS FOR BID PURPOSES ONLY. ACTUAL LAYOUT SHALL BE FIELD DETERMINED BY CONTRACTOR.
  - CONTRACTOR SHALL PROVIDE ALL MCC EQUIPMENT NAME PLATES AS REQUIRED.
  - EXISTING MIXER LOCATIONS DO NOT CHANGE. RELATED DESIGNATIONS SHOWN TO BE IGNORED.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



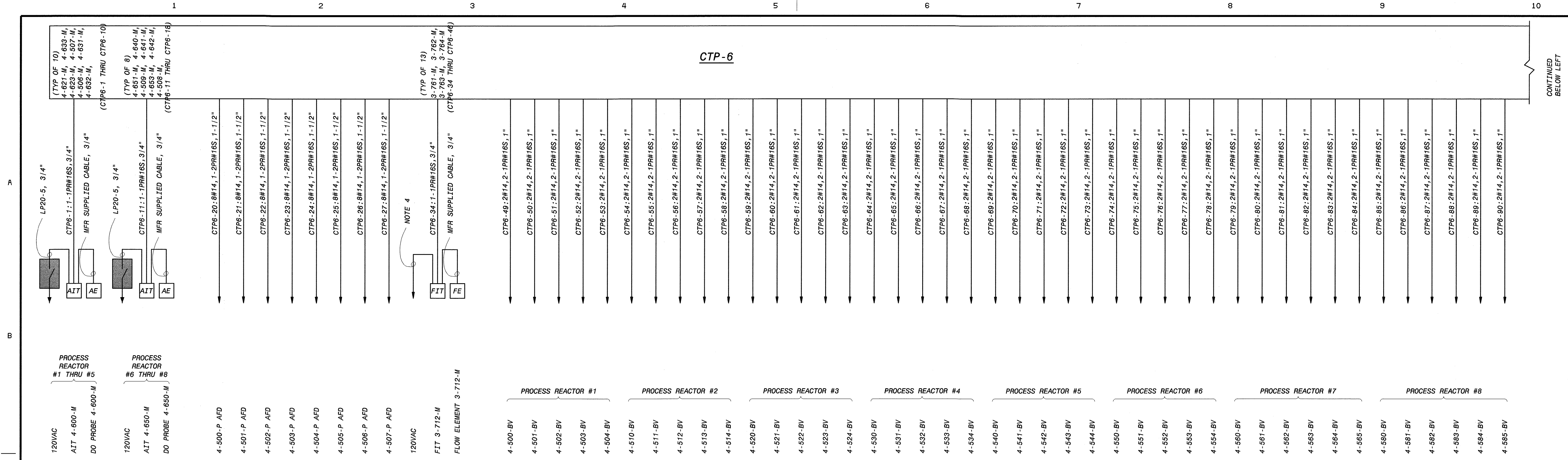
DES: GNS					
DRN: MAS2					
CHK: WTC					
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL			

**ELECTRICAL**  
MCC20 REAR MODIFIED ONE-LINES

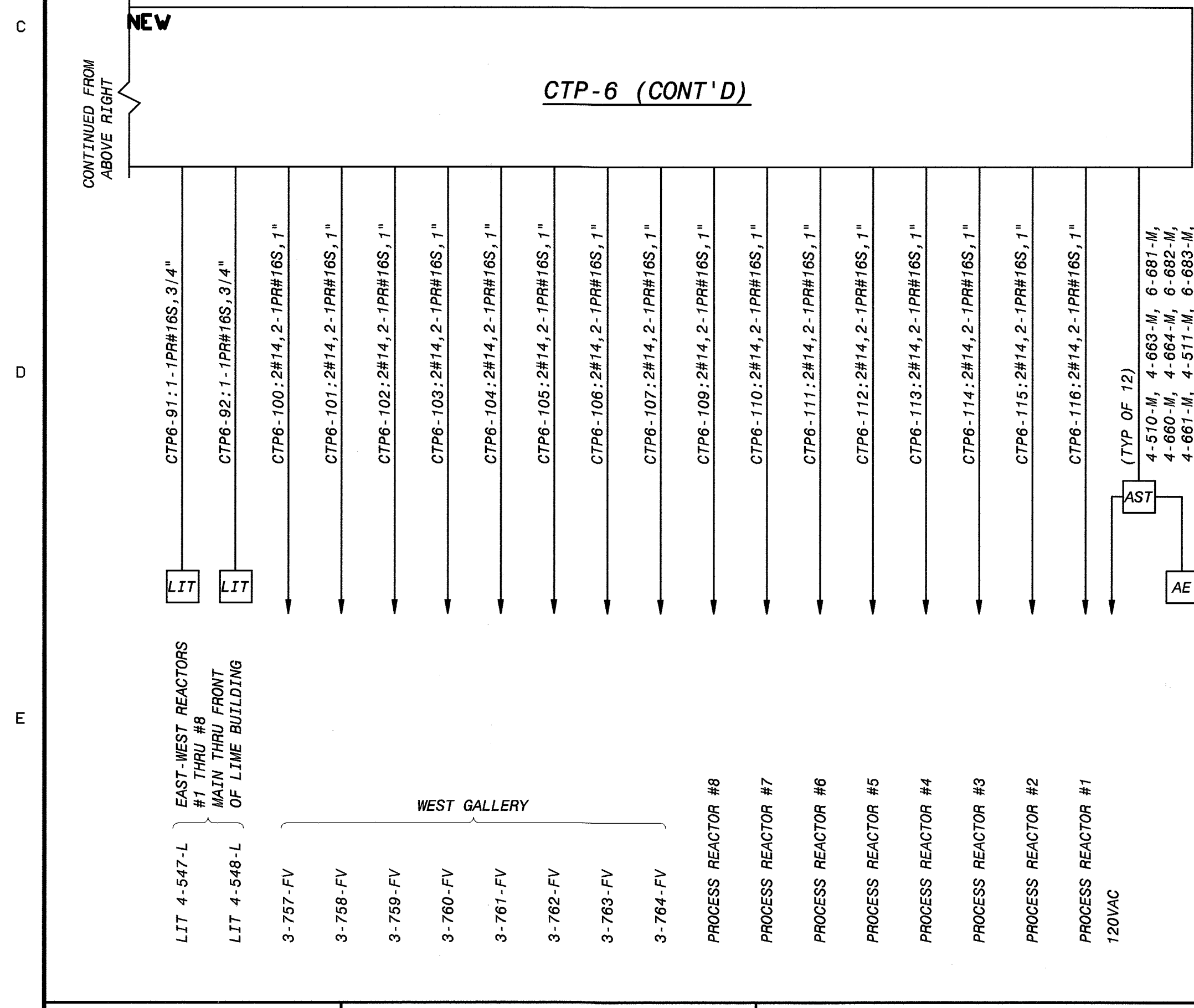
LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 110 OF 139  
E8R

058472-4  
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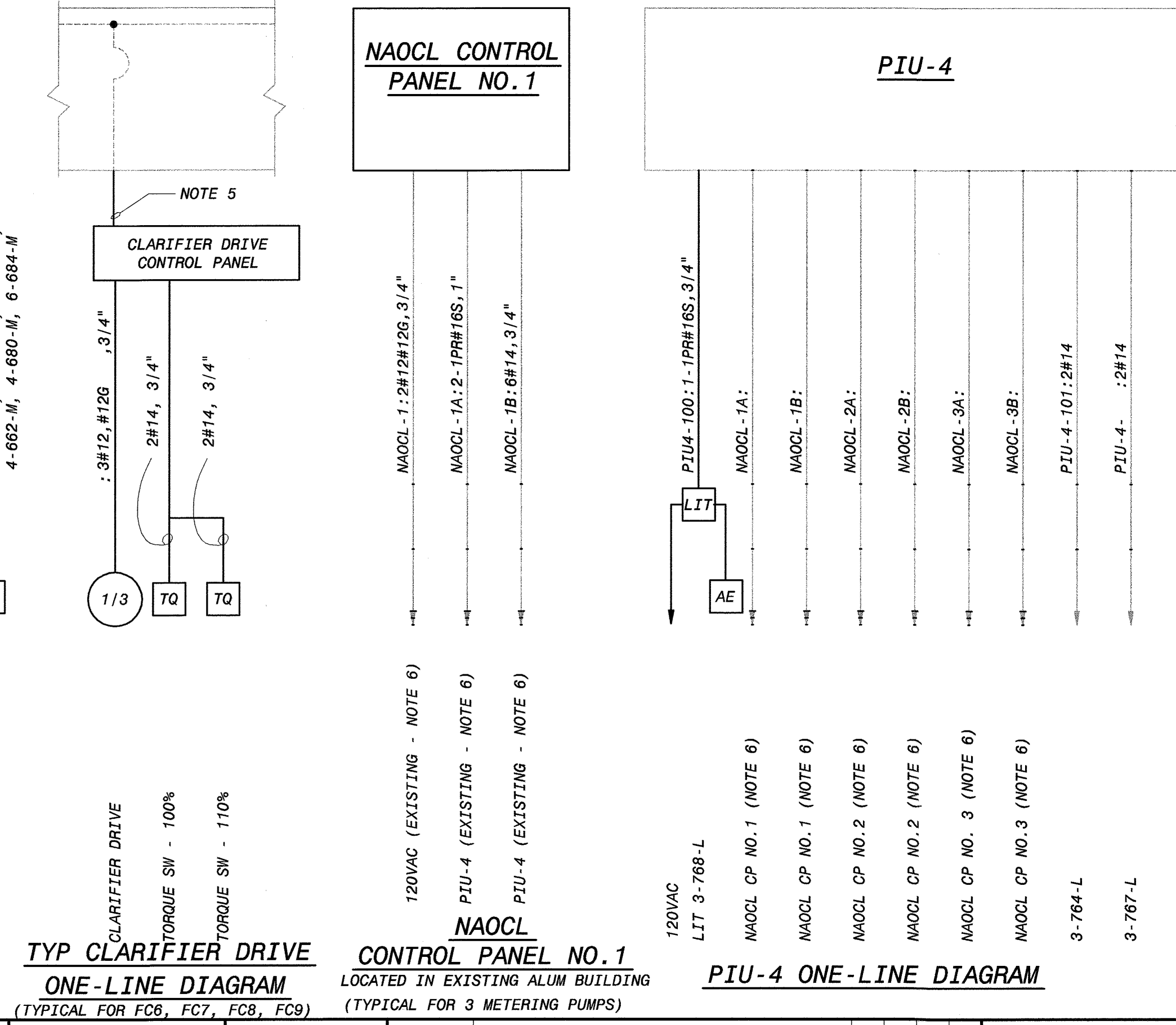
**CONTROLS TERMINATION PANEL CTP-6 ONE-LINE DIAGRAM**



CONTINUED FROM ABOVE RIGHT

NEW

CONTINUED BELOW LEFT



**CLARIFIER DRIVE ONE-LINE DIAGRAM**  
(TYPICAL FOR FC6, FC7, FC8, FC9)

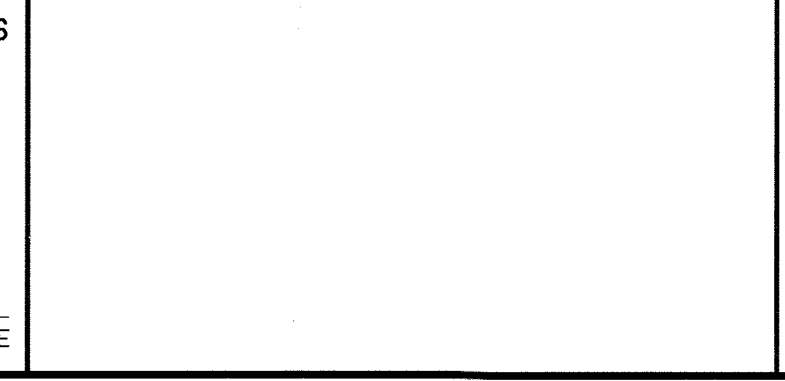
**NAOCL CONTROL PANEL NO. 1**  
LOCATED IN EXISTING ALUM BUILDING  
(TYPICAL FOR 3 METERING PUMPS)

**PIU-4 ONE-LINE DIAGRAM**

NOTES:  
1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.  
2. REFER TO P&ID'S AND POWER PLANS FOR ALL EQUIPMENT, DESIGNATIONS AND LOCATIONS.  
3. (NOT USED)  
4. EXISTING POWER & SIGNAL CIRCUITS TO FLOWMETERS IN PIPE GALLERIES SHALL BE EXTENDED OUT TO NEW LOCATIONS.  
5. EXISTING CONDUIT AND CABLES FROM EXISTING MCC7A/7B TO FINAL CLARIFIER LOCATIONS SHALL BE RE-USED.  
6. EXTEND EXISTING POWER & SIGNAL CIRCUITS AS REQUIRED TO RECONNECT TO NEW EQUIPMENT.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY JOSEPH T. FORBES A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND. NO. 27158

REG. PROF. ENGR. DATE

DES: GNS  
DRN: MAS2  
CHK: WTC  
DATE: 06/10/03

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR
6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR	RJR

**ELECTRICAL**

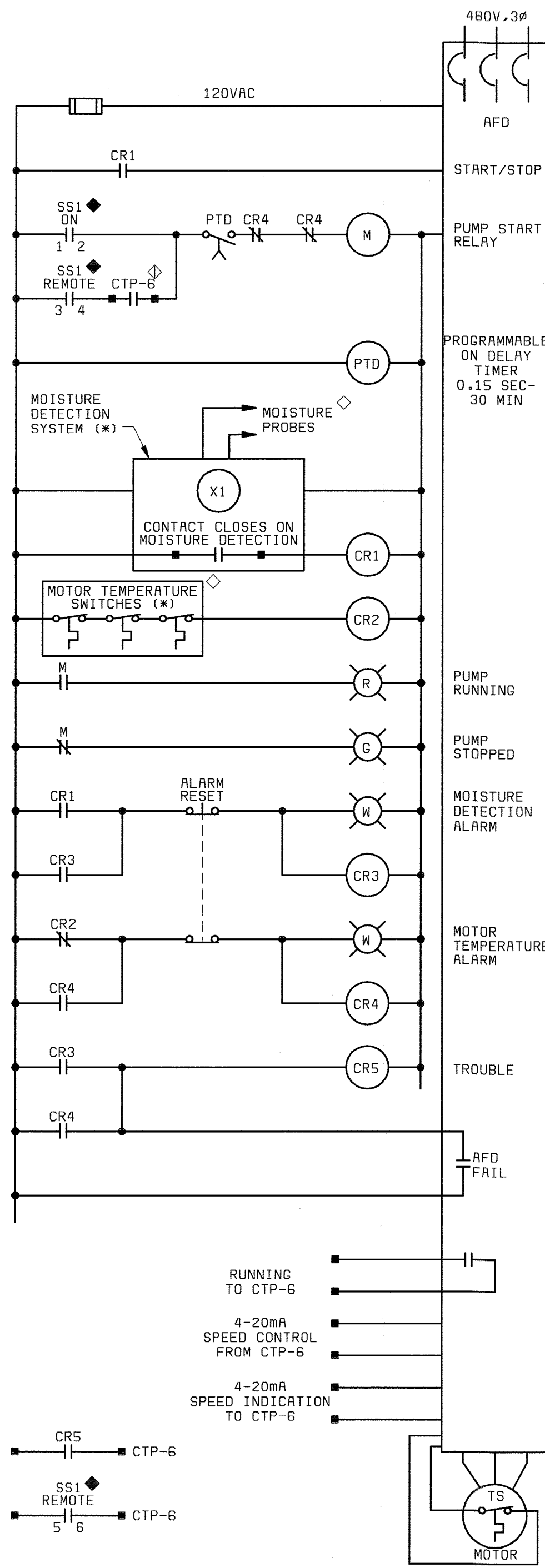
**CONTROL & MISC ONE-LINES**

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

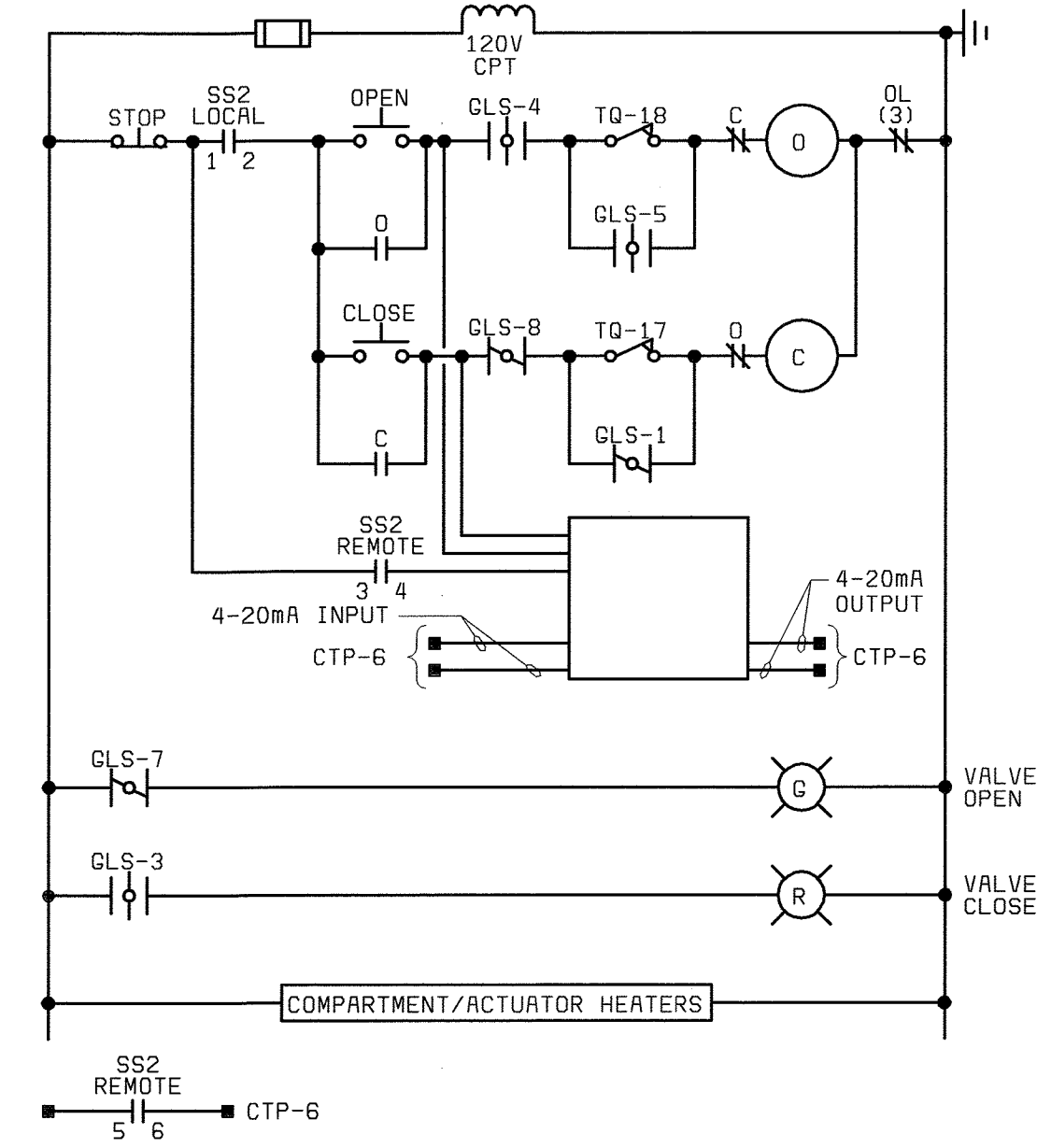
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 111 OF 139  
E9R



**INTERNAL RECYCLE PUMP IRP-1 THRU IRP-8  
(4-500-P THROUGH 4-508-P)**

(\*) PROVIDED UNDER SPECIFICATION 11155



**TYPICAL MODULATING VALVE  
ELECTRIC OPERATOR**

TYPICAL FOR: 4-500-FV THRU 4-503-FV  
4-505-BV THRU 4-528-BV  
3-757-FV THRU 3-760-FV

**GENERAL LIMIT SWITCH DEVELOPMENT:**

R O U T E	GLS CONTACT	ACTUATOR POSITION		
		FULL OPEN 0%	INTERMEDIATE POSITION (90%)	FULL CLOSED 100%
1	1			
1	2			
1	3			
1	4			
1	5			
2	6			
2	7			
2	8			
2	9			
3	10			
3	11			
3	12			
3	13			
3	14			
3	15			
3	16			

TQ/17 OPENS ON HIGH CLOSING TORQUE  
TQ/18 OPENS ON HIGH OPENING TORQUE  
=CONTACT CLOSED  
(VALVE SHOWN IN FULL OPEN POSITION)

**SWITCH DEVELOPMENTS:**

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

CONTACTS	POSITION		
	LOCAL	OFF	REMOTE
1-2	X		
3-4			X
5-6			X
7-8	X		

CONTACTS	POSITION		
	ON	OFF	AUTO
1-2	X		
3-4			X
5-6			X

**DEVICE LOCATION LEGEND:**

- ◇ AT DRIVEN EQUIPMENT
- ◆ REMOTE FROM STARTER AND DRIVEN EQUIPMENT
- ◊ CONTROLS TERMINATION PANEL CTP-6 (PIU-6)

**NOTES:**

1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. AFD SCHEMATICS SHOW FUNCTIONAL CONTROL AND INTERLOCKS. NOT ALL DEVICES ON THE DRIVE ARE SHOWN. SEE SPECIFICATION SECTION 16150 FOR ADDITIONAL REQUIREMENTS. ALL DEVICES ARE LOCATED AT THE DRIVES UNLESS OTHERWISE NOTED. SELECTOR SWITCHES AND PUSHBUTTONS AT AFD SHALL BE MOUNTED ON AFD ENCLOSURE FRONT.
3. SPARE CONTACTS SHALL BE PROVIDED FOR EACH STARTER AS DESCRIBED IN THE SPECIFICATIONS.
4. UNLESS OTHERWISE NOTED, DEVICES SHOWN ON THIS DRAWING SHALL BE SUPPLIED AS AN INTEGRAL PART OF THE STARTER. DEVICES LOCATED OUTSIDE OR REMOTE FROM THE STARTER SHALL BE IDENTIFIED BY A LOCATION SYMBOL AS DEFINED IN THE SCHEMATIC SYMBOL LEGEND.
5. RELAY AND TIMER DESIGNATIONS APPLY TO INDIVIDUAL SCHEMATIC ONLY.
6. CONTROL SETTINGS, ALARM LIMITS, AND SIMILAR ADJUSTABLE LIMITS ARE INTENDED TO BE FOR INITIAL STARTUP. ADJUSTABLE SETTINGS SHALL BE TESTED AND CHANGED BY THE CONTRACTOR, IF REQUIRED FOR PROPER SEQUENCING AND OPERATION.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE



THIS DRAWING WAS  
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JOSEPH T. FORBES  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 27168

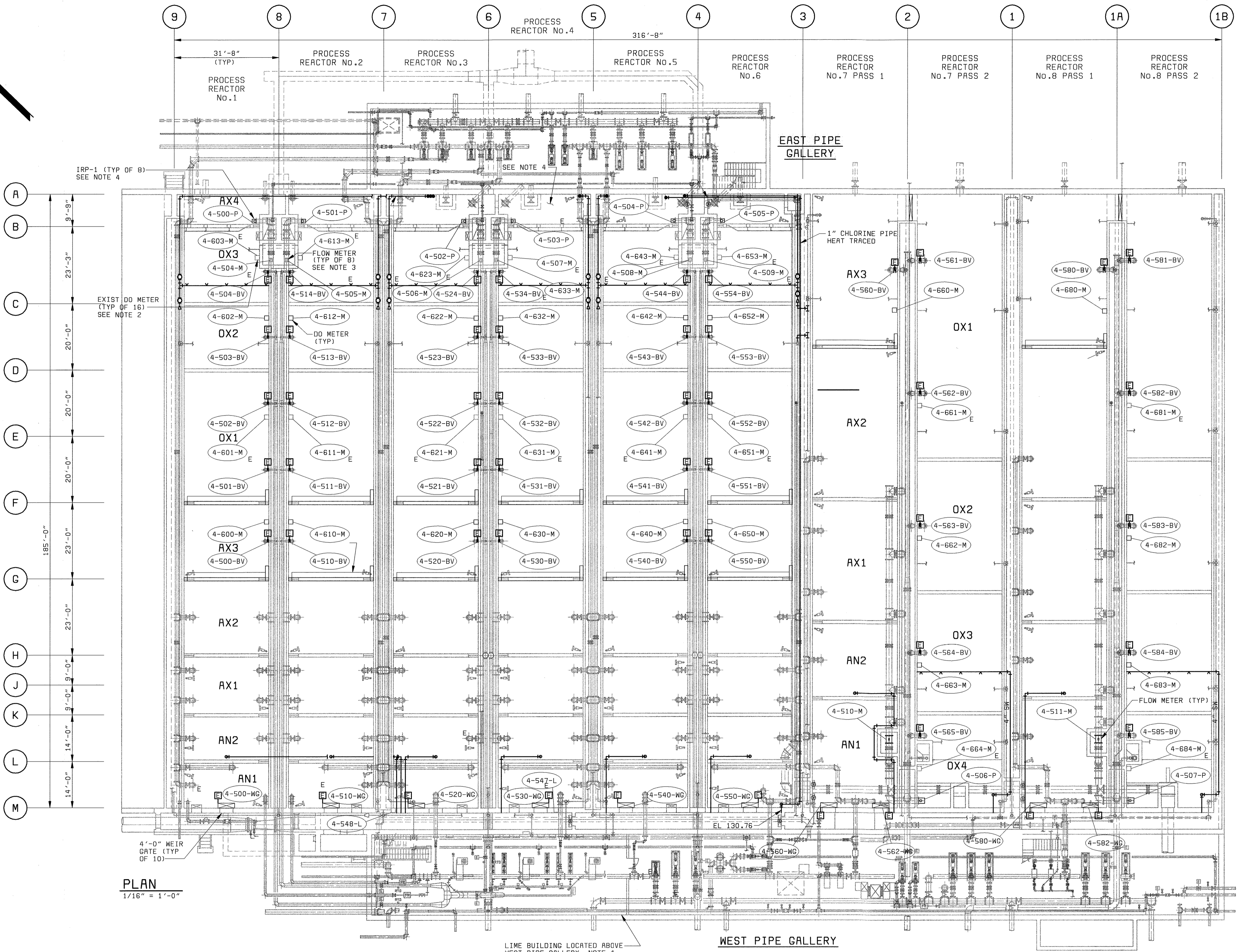
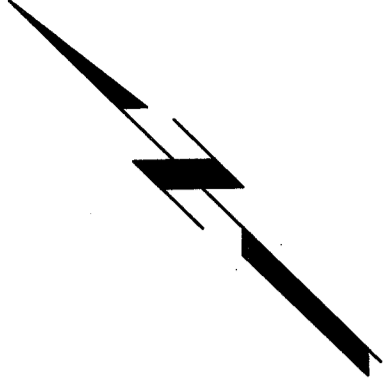
DES: GNS									
DRN: MAS2									
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR	RJR			
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR	RJR			
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY	CK	APP		

EAST - WEST PROCESS REACTOR  
ELECTRICAL  
SCHEMATICS

LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

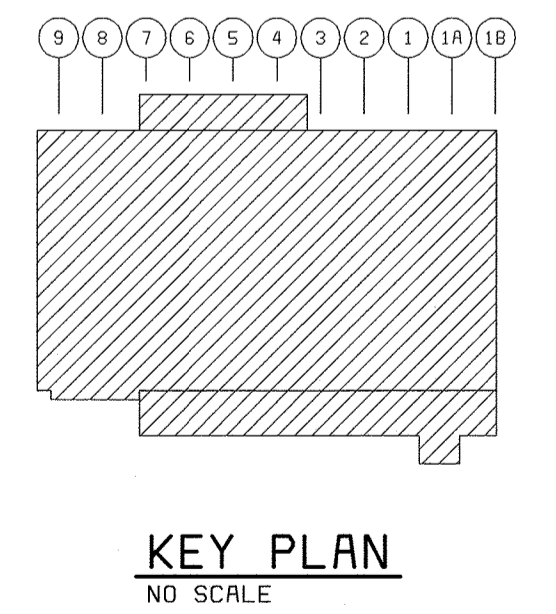
SCALE AS SHOWN  
SHEET 112 OF 139  
E10R

058472-4  
FD58472A



**PLAN**  
1/16" = 1'-0"

- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND AND ABBREVIATIONS AND GENERAL REQUIREMENTS.
  - SIXTEEN EXISTING D.O. METERS SHALL BE REPLACED. DISCONNECT EXISTING POWER AND SIGNAL CIRCUITS, AND RECONNECT TO NEW D.O. METERS.
  - EIGHT EXISTING FLOW METERS SHALL BE REPLACED. DISCONNECT EXISTING POWER AND SIGNAL CIRCUITS, AND RECONNECT TO NEW TRANSIT TIME FLOW METERS.
  - THE EIGHT INTERNAL RECYCLE PUMPS SHALL BE REPLACED IN ACCORDANCE WITH THE DRAWINGS. EACH PUMP'S CONTROL SYSTEM (CS) SHALL BE MOUNTED FROM THE EXISTING PROCESS REACTOR RAILS. THE NEW AFD'S SHALL BE MOUNTED ON A NEW AFD RACK, ASSEMBLED FROM UNISTRUT. IN THE EXISTING LIME BUILDING, POWER PANELS PP-1 AND PP-2 SHALL BE MOUNTED ON SOUTH WALL OF LIME BUILDING, NEAR DOOR. AFD'S MAY REQUIRE BACK-TO-BACK MOUNTING ON UNISTRUT TO MAINTAIN WORKING CLEARANCE.



LIME BUILDING LOCATED ABOVE WEST PIPE GALLERY. NOTE 4

WEST PIPE GALLERY

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gailthersburg, Maryland  
REG. PROF. ENGR. DATE

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DES: GNS					
DRN: MAS2					
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS/RJR/RJR	
	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS/RJR/RJR	
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE		NO. BY CK APP	

**EAST-WEST PROCESS REACTORS  
ELECTRICAL  
PROCESS REACTOR POWER PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

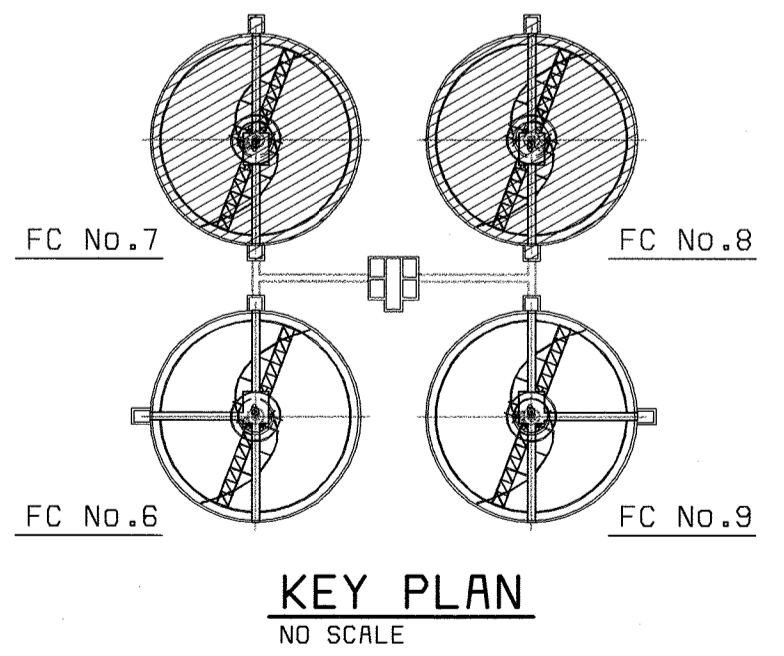
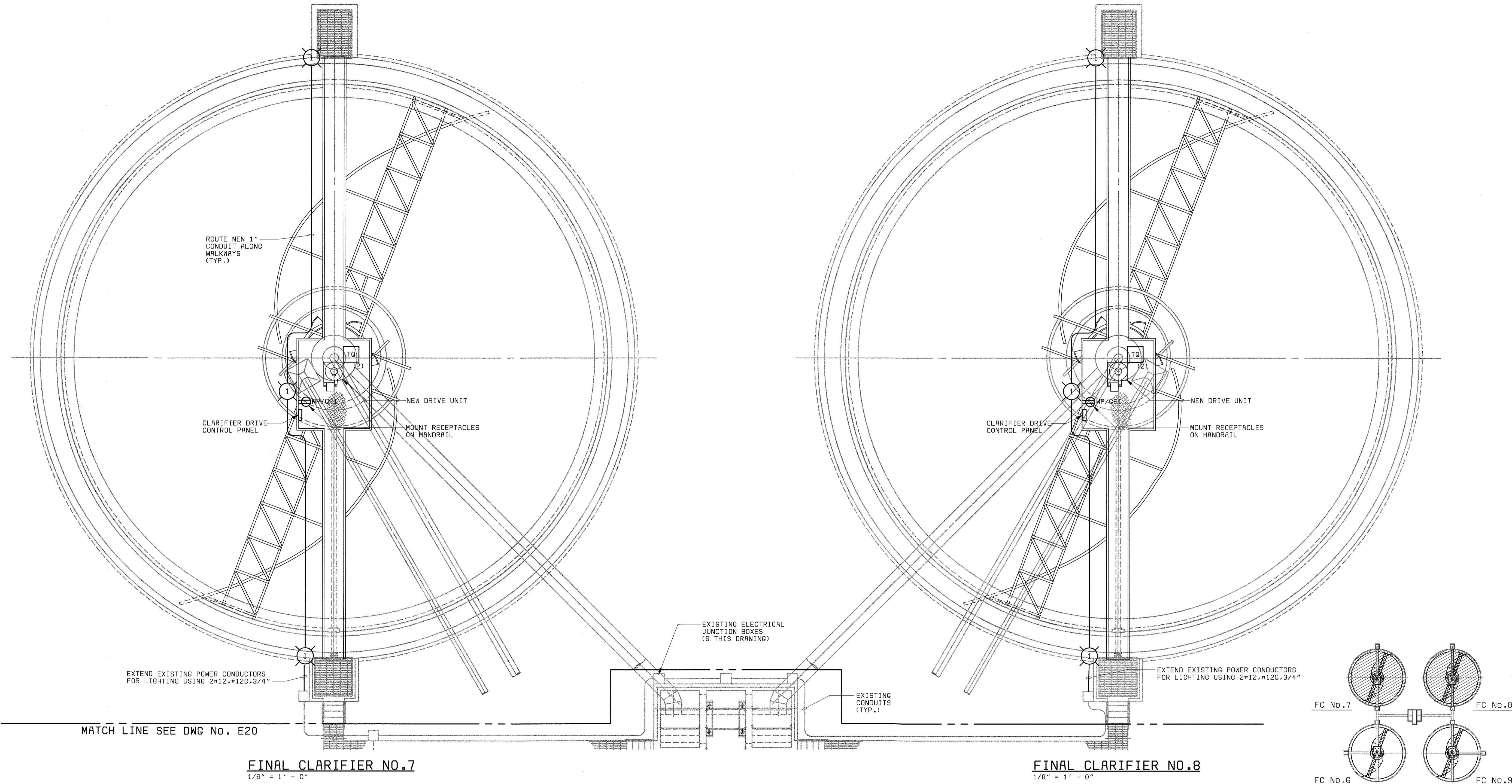
SCALE AS SHOWN  
SHEET 118 OF 139  
**E16R**

05/04/02  
FDS5472R



**NOTES:**

1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. REFER TO DEMOLITION DRAWINGS M32, M33. CONTRACTOR SHALL UTILIZE EXISTING FEEDERS, POWER SOURCES, UNDERGROUND, ETC. AND EXTEND AS REQUIRED TO PROVIDE POWER/CONTROL TO THE NEW DRIVE SYSTEMS. EXISTING POWER AND CONTROL COMES FROM MCC7A/7B LOCATED WITHIN THE ALUM BUILDING.



**FINAL CLARIFIER NO.7**  
1/8" = 1' - 0"

**FINAL CLARIFIER NO.8**  
1/8" = 1' - 0"

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland  
  
REG. PROF. ENGR. DATE

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JOSEPH T. FORBES  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 27168

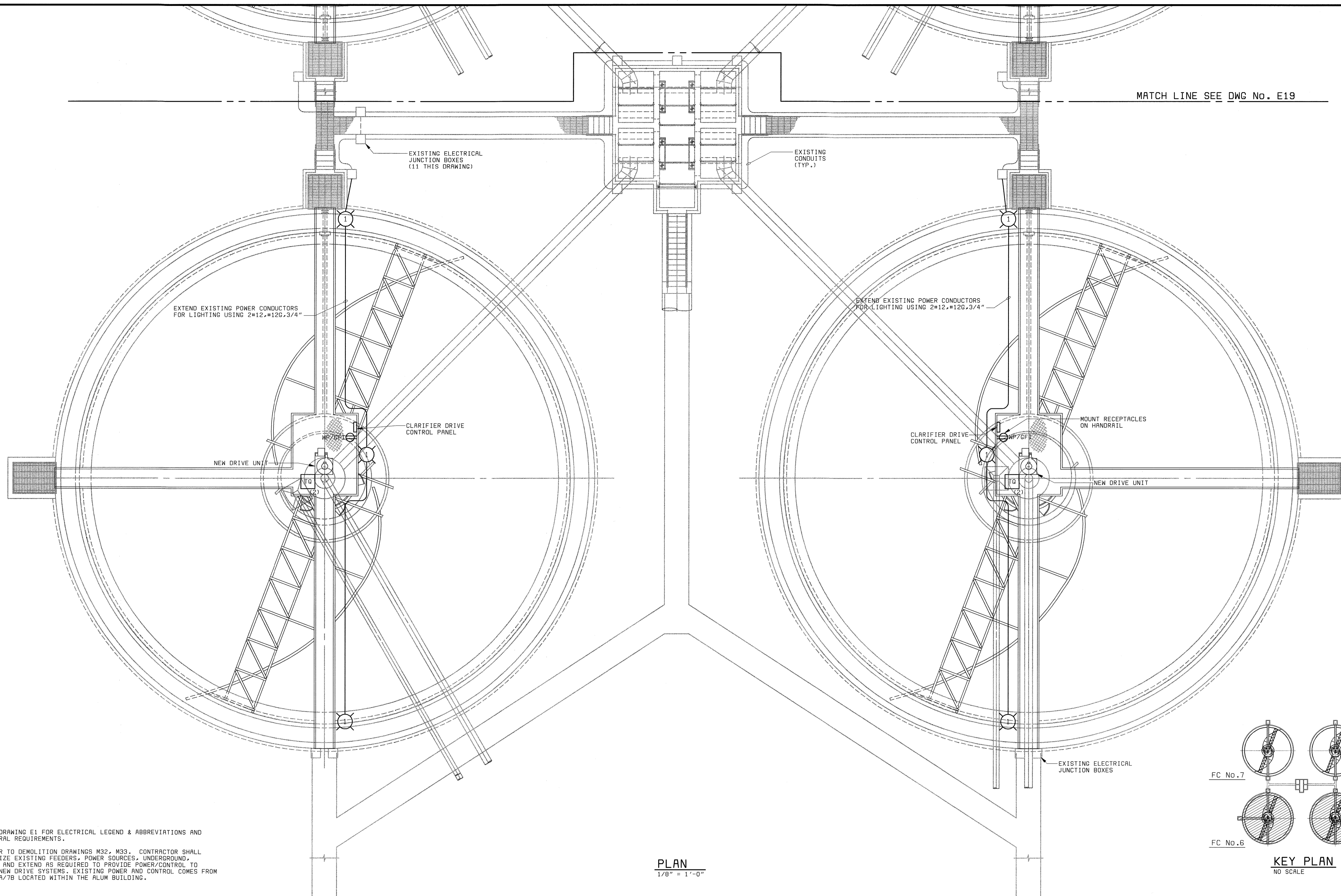
DES: GNS									
DRN: MAS2									
CHK: WTC									
DATE: 05/10/02	DATE	REVISIONS AND RECORD OF ISSUE							

**ELECTRICAL**  
  
**POWER PLAN**  
**FINAL CLARIFIER 7 & 8**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 121 OF 139  
**E19**

MATCH LINE SEE DWG No. E19

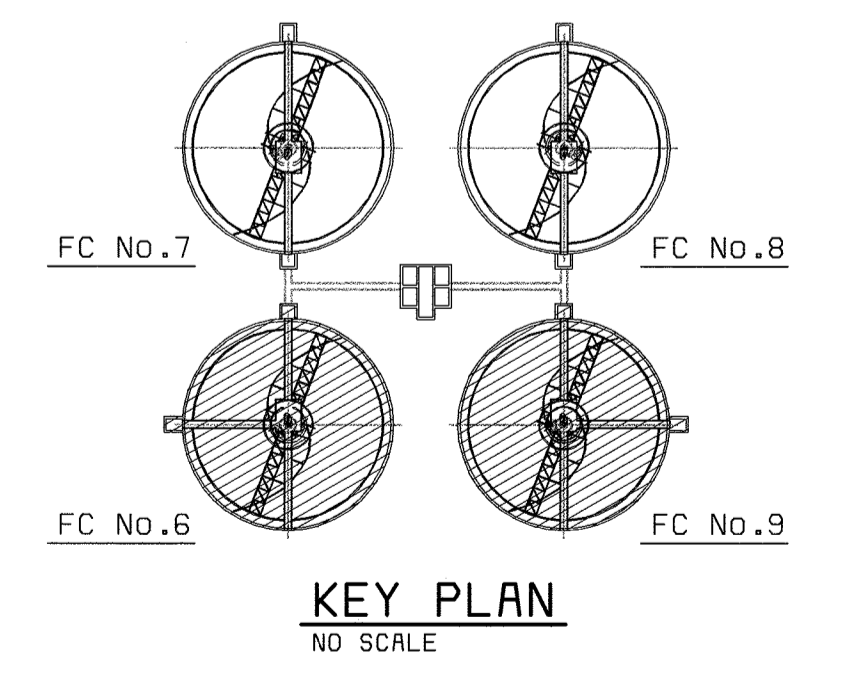


**NOTES:**

1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

REFER TO DEMOLITION DRAWINGS M32, M33. CONTRACTOR SHALL UTILIZE EXISTING FEEDERS, POWER SOURCES, UNDERGROUND, ETC. AND EXTEND AS REQUIRED TO PROVIDE POWER/CONTROL TO THE NEW DRIVE SYSTEMS. EXISTING POWER AND CONTROL COMES FROM MCC7A/7B LOCATED WITHIN THE ALUM BUILDING.

**PLAN**  
1/8" = 1'-0"



DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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DES: GNS					
DRN: MAS2					
CHK: WTC					
DATE: 05/10/02	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR
		REVISIONS AND RECORD OF ISSUE		NO.	BY
				CK	APP

**ELECTRICAL**

**POWER PLAN**  
**FINAL CLARIFIER 6 & 9**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

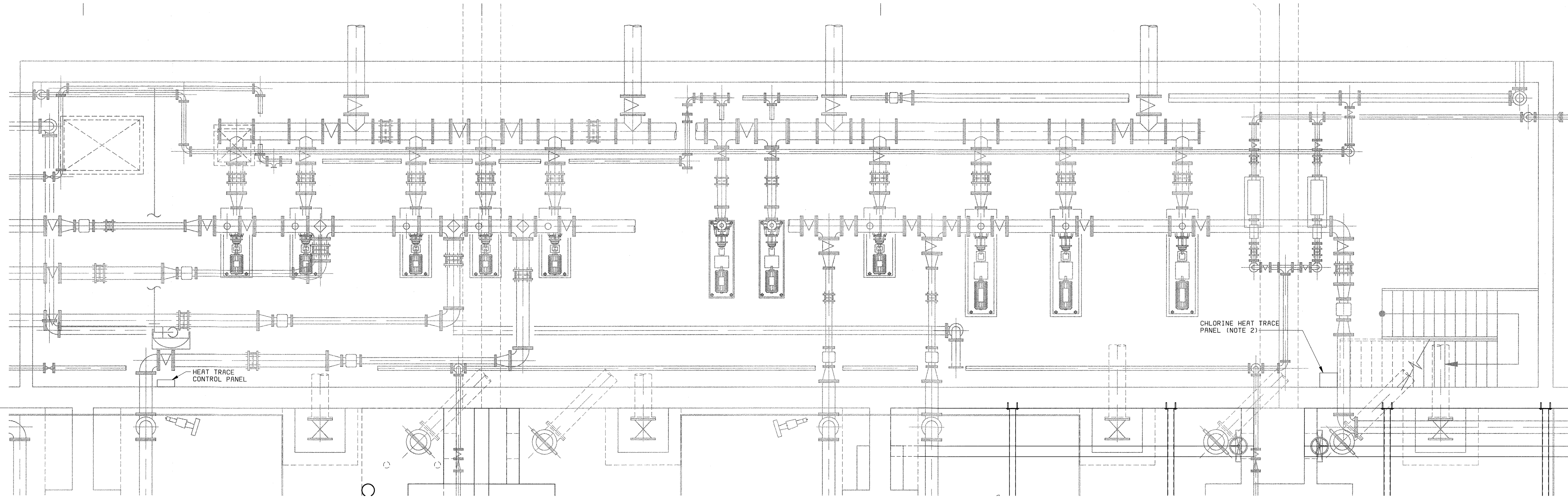
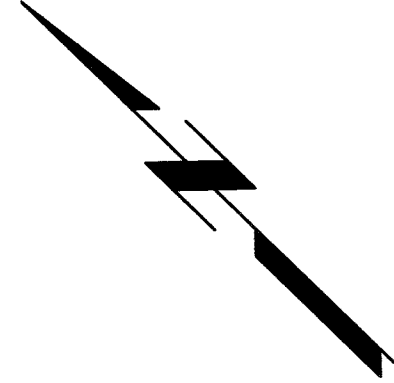
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN

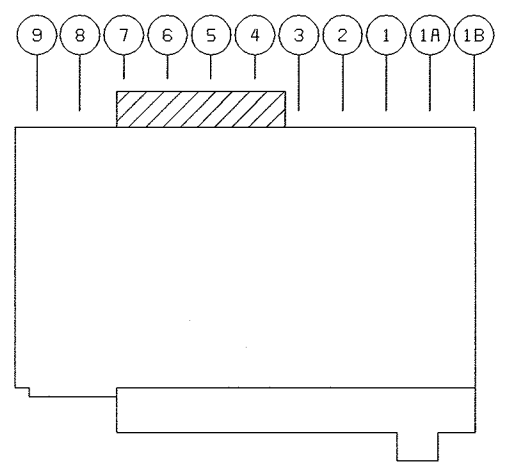
SHEET 122 OF 139

**E20**

058472-4  
FD58472A



**EAST GALLERY PLAN**  
1/4" = 1'-0"



**KEY PLAN**  
NO SCALE

**NOTES:**

1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
2. PROVIDE 120 VAX POWER TO PANEL USING SPARE 120V CIRCUIT BREAKER FROM EXISTING LIGHTING PANEL IN AMUM BUILDING (LOCATED DIRECTLY ABOVE). CONNECT USING 2#12, #12G, IN 3/4-INCH CONDUIT.

58472-111-EPR-W-T0000054J & T0000054L  
 58472-111-EPR-W-T0000054H & T0000054I  
 58472-111-WPG-W-T0000055P

058472-4  
 F058472A

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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ORIGINALLY APPROVED  
FOR CONSTRUCTION  
AND SEALED BY  
JOSEPH T. FORBES  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 27168

DES: GNS					
DRN: MAS2					
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR RJR
DATE: 05/10/02	6/11/03	PR VALUE ENGINEERING PROPOSAL		GNS	RJR RJR
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

**EAST GALLERY  
ELECTRICAL**

**POWER PLAN  
EAST GALLERY**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**

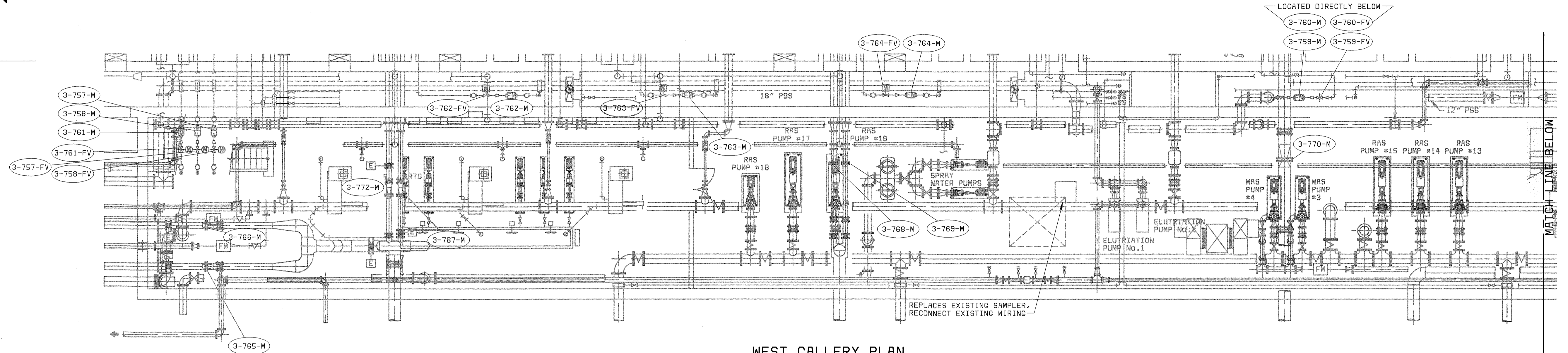
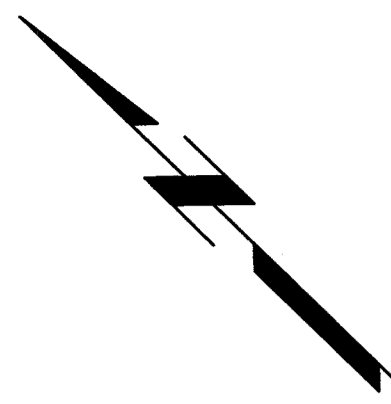
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839

HOWARD COUNTY, MARYLAND

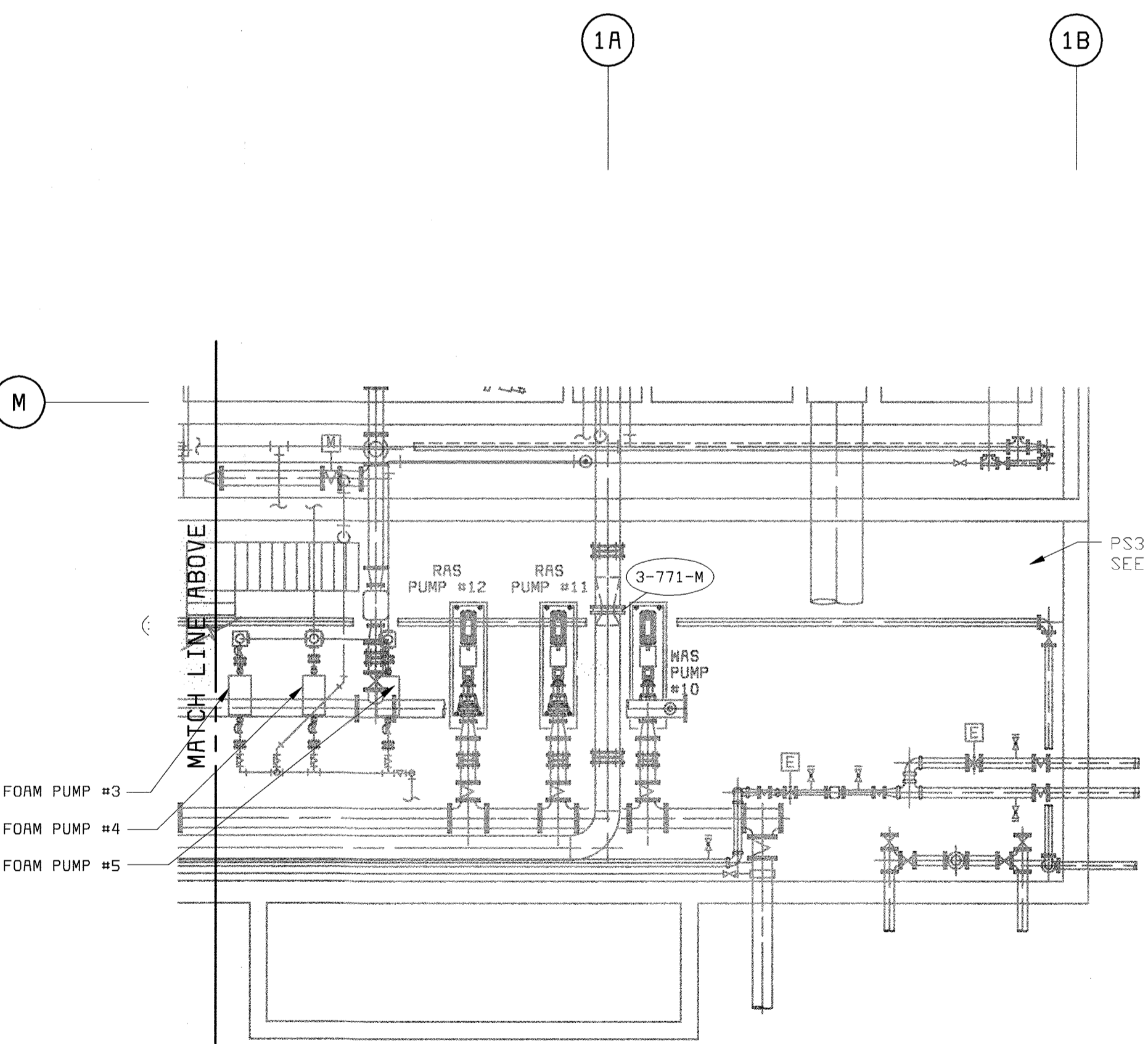
SCALE  
AS  
SHOWN

SHEET  
123 OF 139

**E21R**



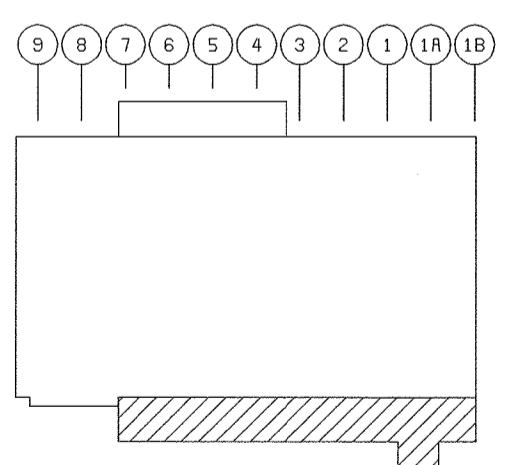
**WEST GALLERY PLAN**  
1/8" = 1'-0"



**WEST GALLERY PLAN**  
1/8" = 1'-0"

**NOTES:**

- SEE DRAWING E1 FOR ELECTRICAL LEGEND AND ABBREVIATIONS AND GENERAL REQUIREMENTS.
- EXTEND EXISTING INSTRUMENTATION POWER CIRCUITS TO NEW FLOW METERS.
- EXISTING SUBSTATION PS3 IS LOCATED OUTDOORS, ABOVE WEST PIPE GALLERY.



**KEY PLAN**  
NO SCALE

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**BLACK & VEATCH**  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. REICHTANUS, JR. A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927

DES: GNS					
DRN: KPO					
CHK: WTC	05/26/05	CONFORMED TO CONSTRUCTION RECORDS		PJS	RJR/RJR
DATE: 04/02/03	4/4/03	PR VALUE ENGINEERING PROPOSAL		CS	RJR/RJR
	DATE	REVISIONS AND RECORD OF ISSUE		NO.	BY CK APP

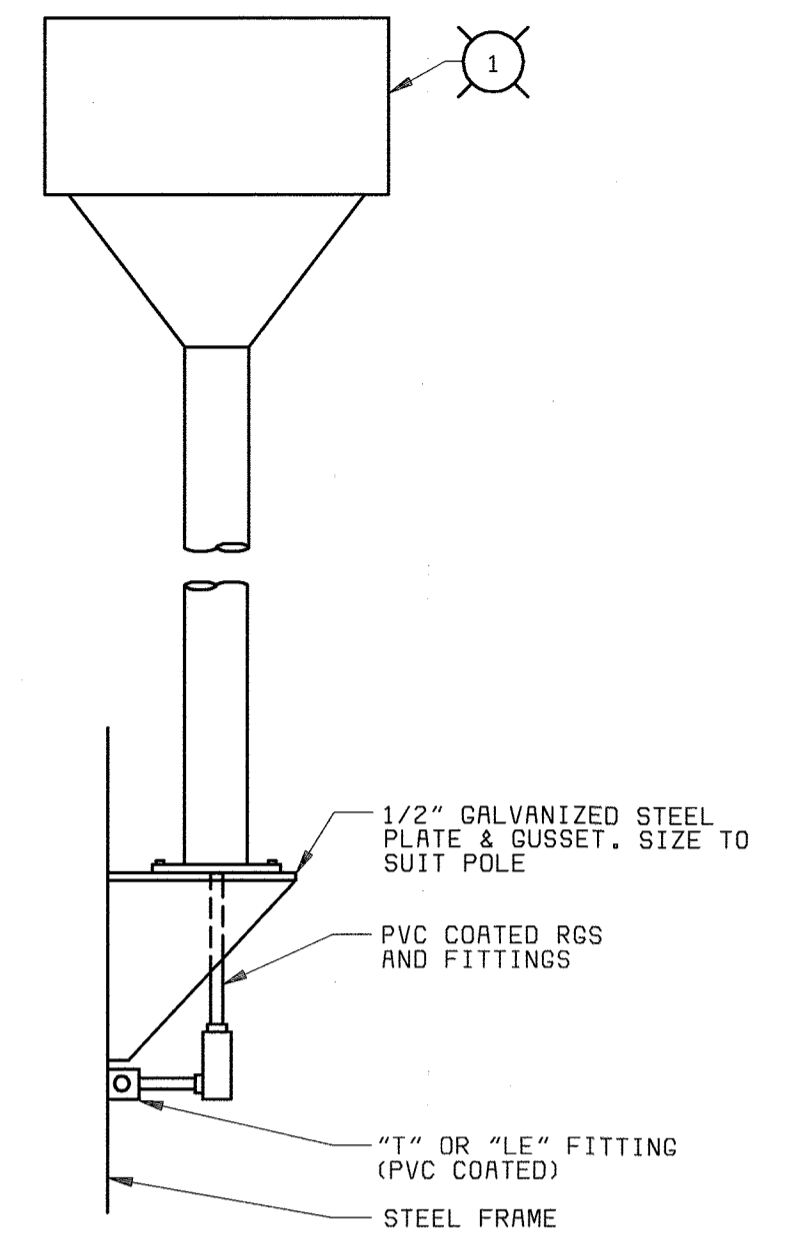
**WEST GALLERY  
ELECTRICAL  
POWER PLAN**

**LITTLE PATUXENT WATER RECLAMATION PLANT  
ADDITION NO. 6  
BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

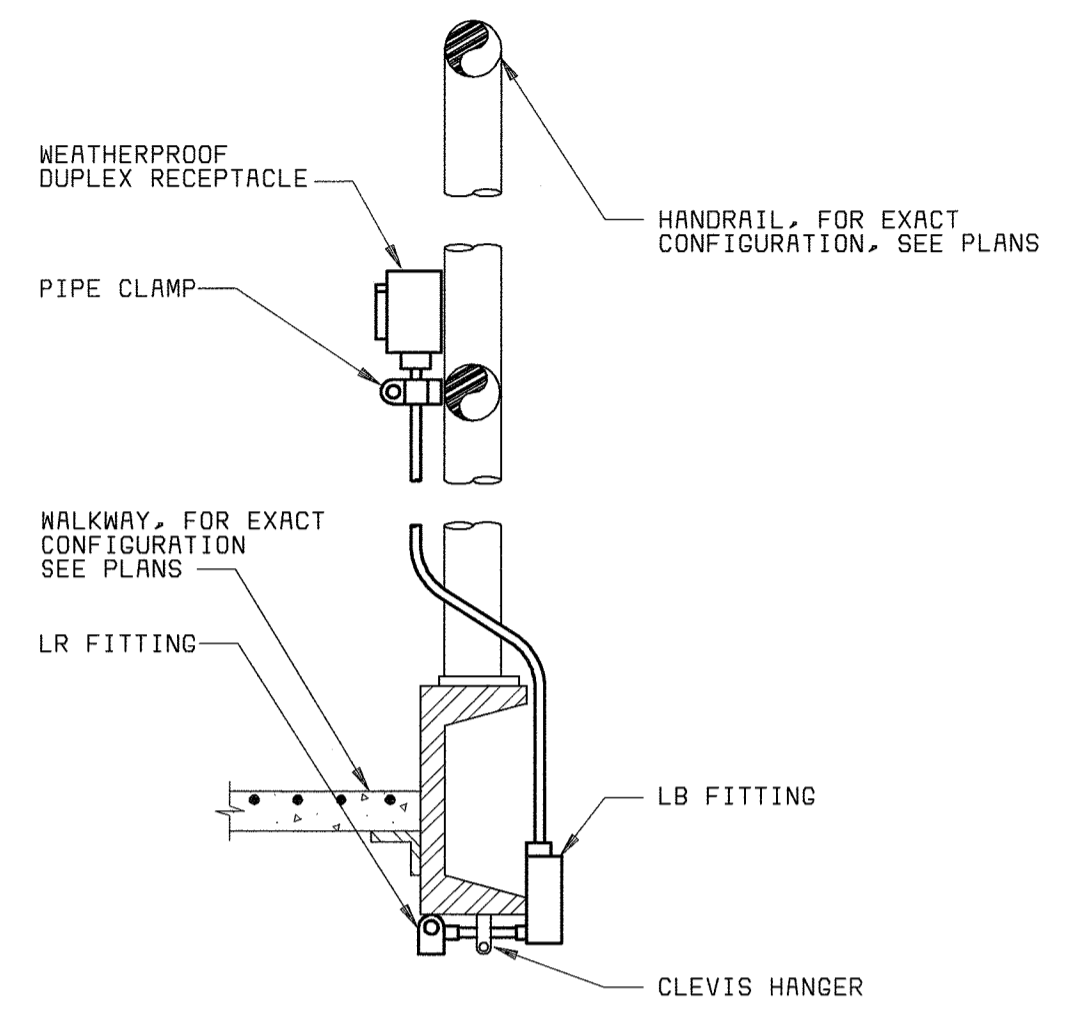
SCALE AS SHOWN  
SHEET 124 OF 139  
**E22R**

058472-4  
F058472A

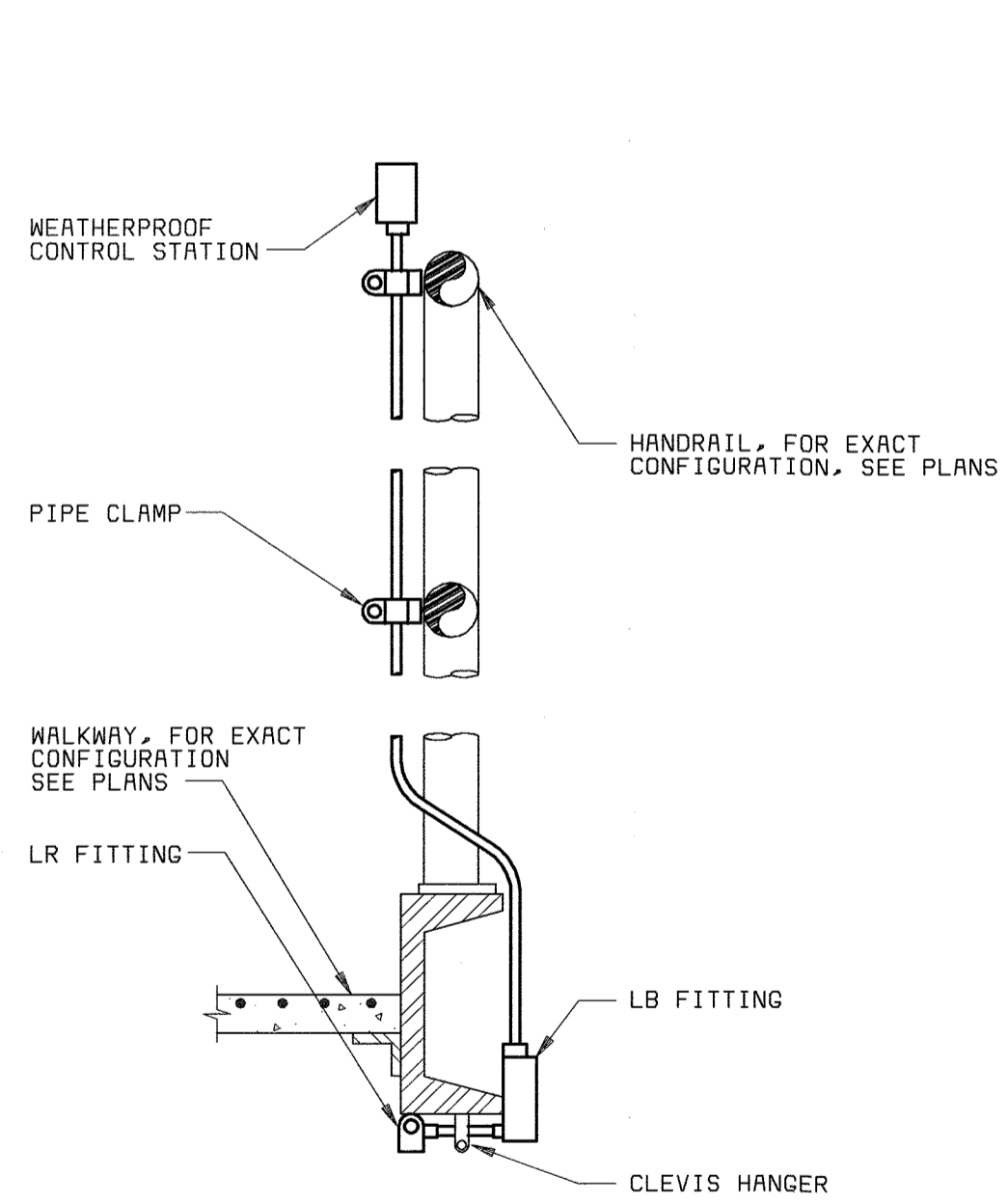
LIGHTING FIXTURE SCHEDULE				
SYMBOL	LAMP	MTG HGT	DESCRIPTION	MANUFACTURER
1	LU100 9500 LUMENS	10'-0" ALUMINUM ROUND TAPERED POLE	100 WATT POST-TOP HIGH PRESSURE SODIUM FIXTURE, TYPE 5 SQUARE DISTRIBUTION, GRAY FINISH, PHOTO-ELECTRIC CELL CONTROL. POLE FURNISHED WITH TRANSFORMER BASE, 120V.	GENERAL ELECTRIC #P17M10S1H2AMN5GRF WITH #ART10354.0- ASNT POLE



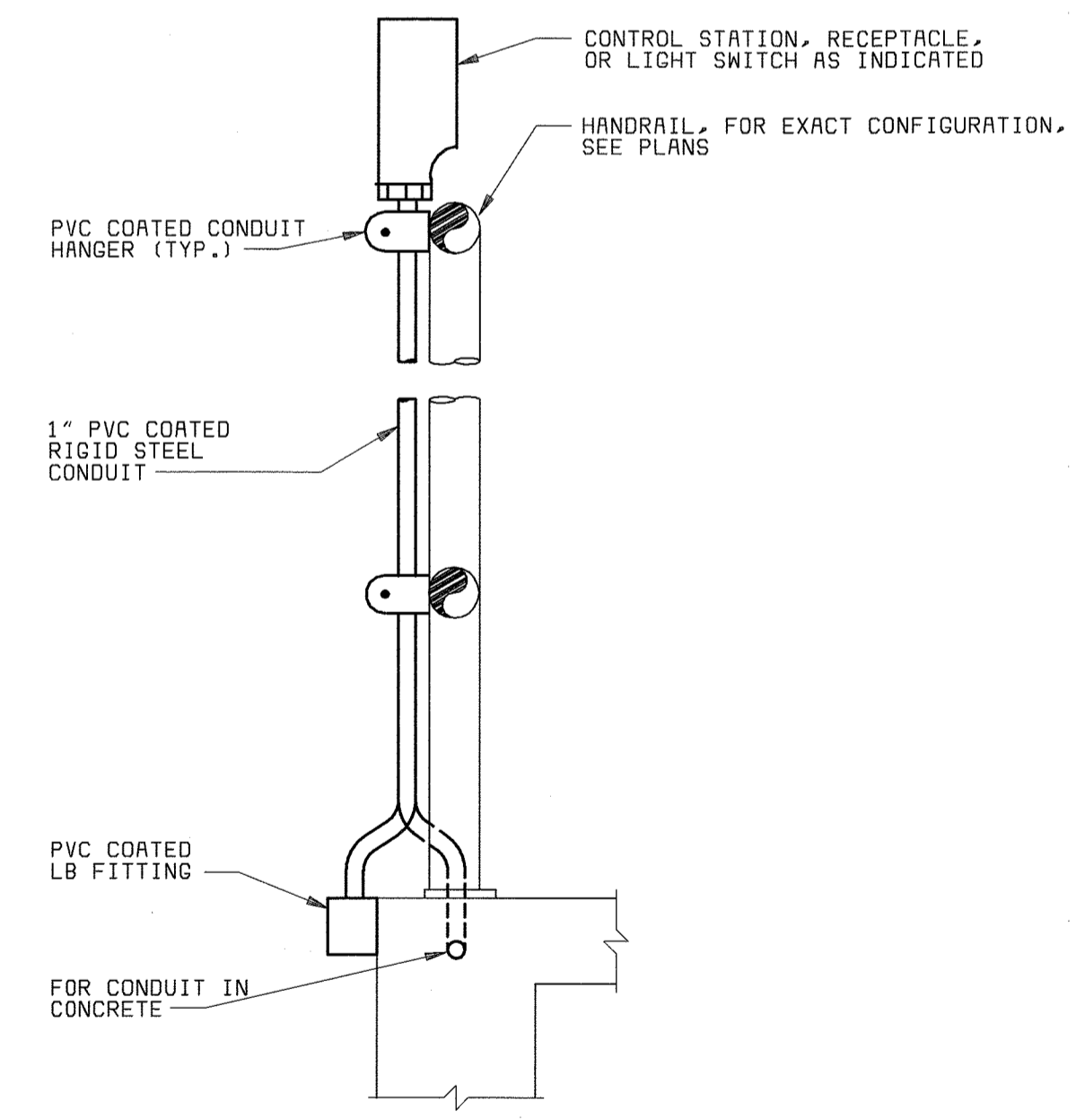
**STEEL WALKWAY POLE MOUNTING DETAIL**  
NO SCALE



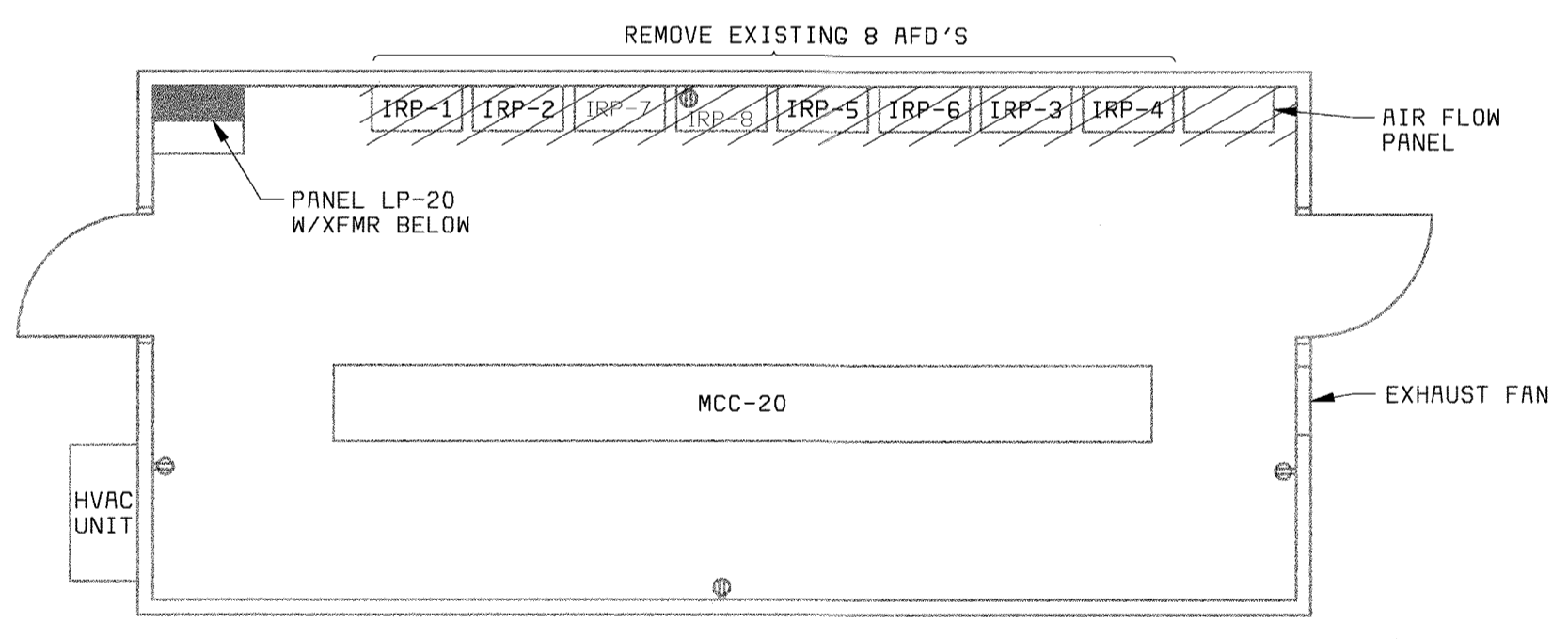
**TYPICAL RECEPTACLE MOUNTING AT METAL WALKWAY DETAIL**  
NO SCALE



**TYPICAL CONTROL STATION MOUNTING AT METAL WALKWAY DETAIL**  
NO SCALE



**TYPICAL HANDRAIL MOUNTING DETAIL**  
NO SCALE

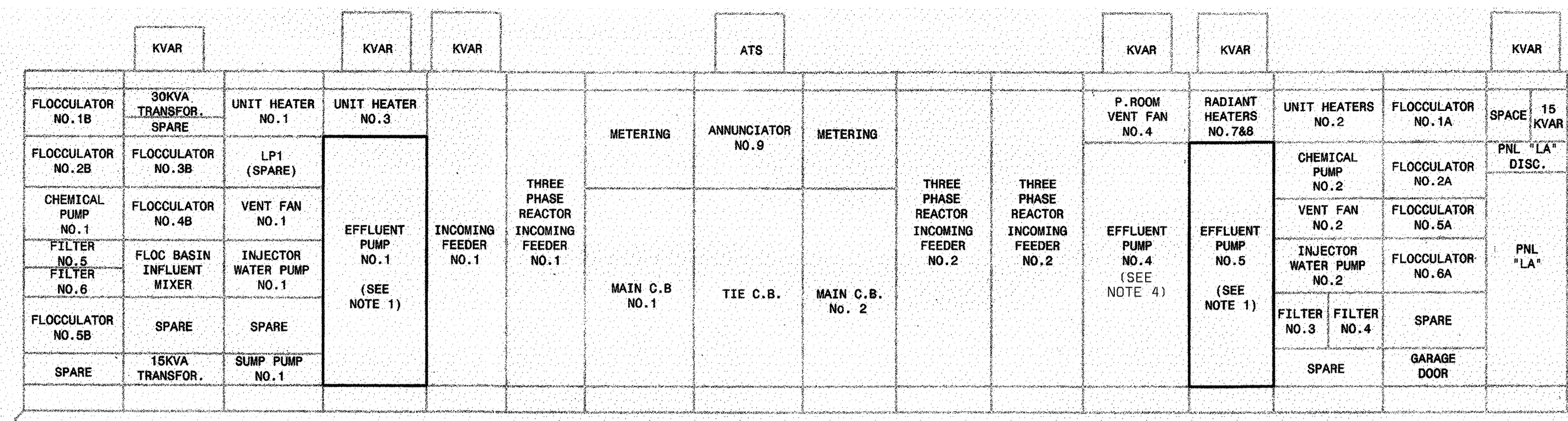


**MCC-20 BUILDING PLAN**  
(LOCATED ABOVE WEST GALLERY)  
1/4" = 1'-0"

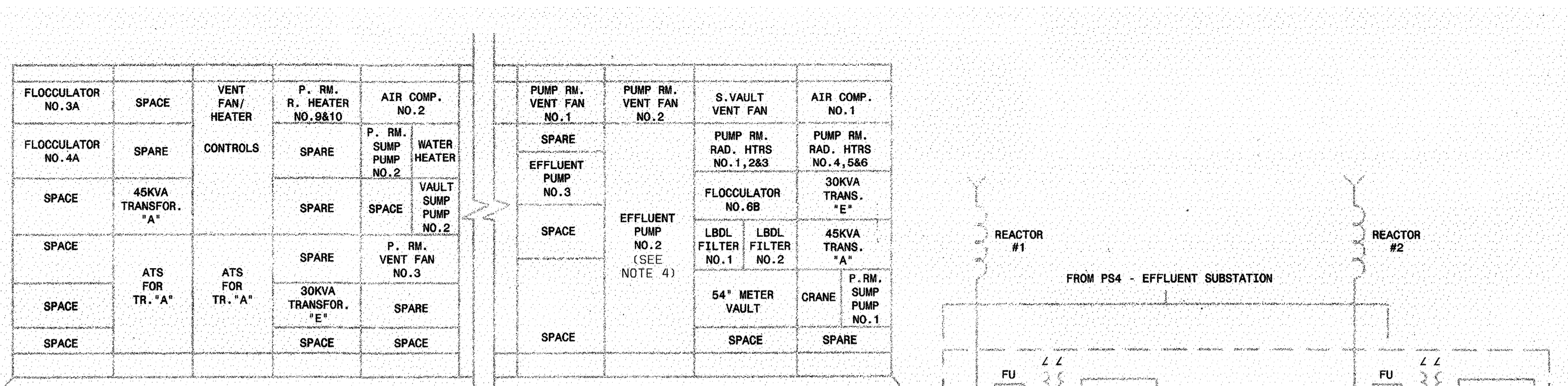
**NOTES:**  
1. SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

58472-111-EPR-W-T0000054J  
58472-111-EPR-W-T0000054H  
58472-4  
F058472A

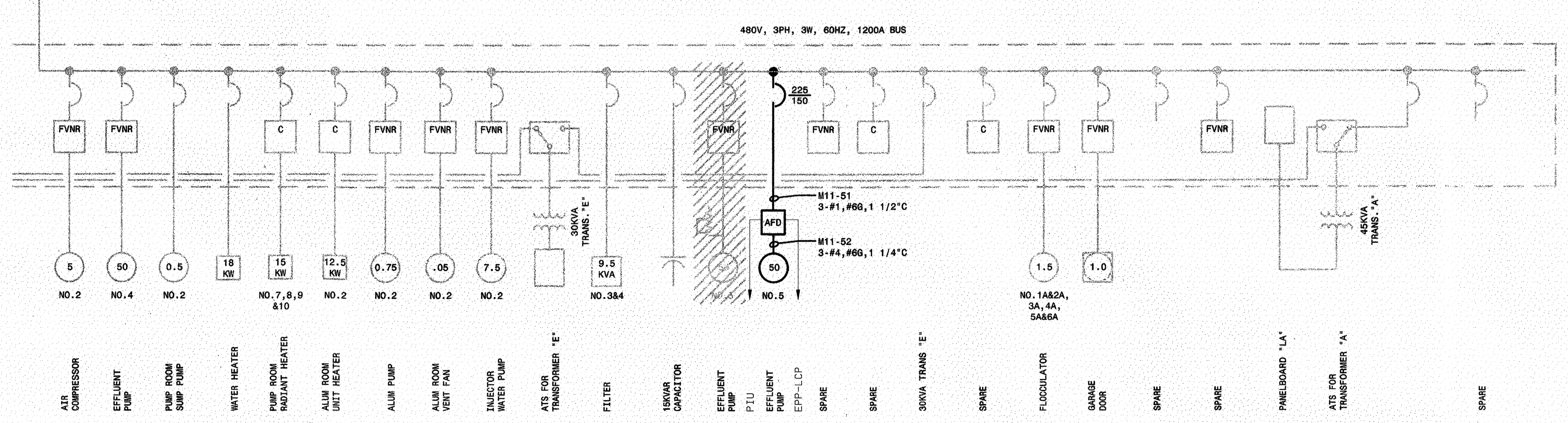
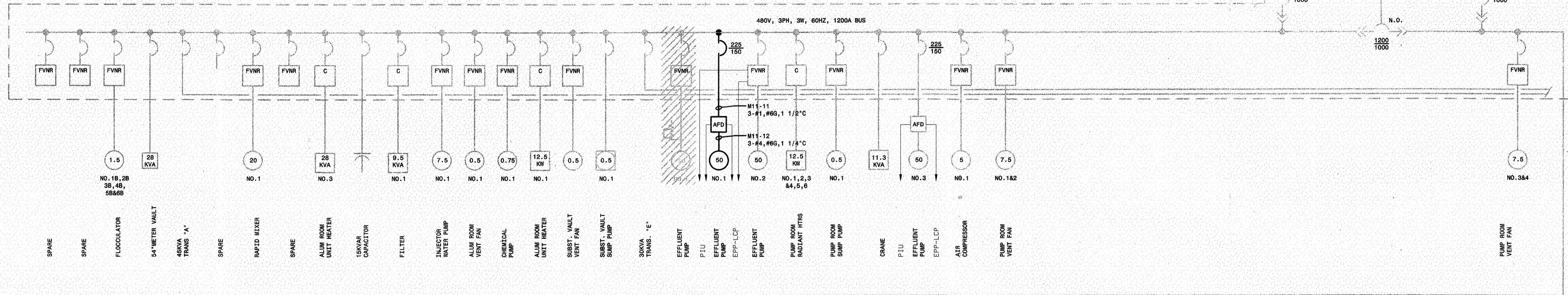
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND  CHIEF, BUREAU OF UTILITIES DATE	<b>BLACK &amp; VEATCH</b> Gaithersburg, Maryland  REG. PROF. ENGR. _____ DATE _____	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY JOSEPH T. FORBES A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 27168	DES: GNS					ELECTRICAL  SCHEDULES AND DETAILS	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 BIOLOGICAL NUTRIENT REMOVAL RETROFIT  CAPITAL PROJECT S-6205 CONTRACT NO. 20-3839  HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: MAS2	CHK: WTC	DATE: 05/10/02	05/26/05 CONFORMED TO CONSTRUCTION RECORDS	6/11/03 PR VALUE ENGINEERING PROPOSAL			



**MCC 11 - FRONT ELEVATION**  
SCALE: NONE



**MCC 11 - REAR ELEVATION**  
SCALE: NONE



**ONE LINE DIAGRAM**  
SCALE: NONE

- NOTES:
1. INSTALL NEW CIRCUIT BREAKER IN THE UPPER PORTION OF THE SPACE VACATED BY THE DEMOLISHED STARTER AND BLANK OFF HINGED DOORS FOR THE REMAINING SPACES.
  - 1.1 THE CIRCUIT BREAKER SHALL BE CAPABLE OF BEING LOCKED IN THE OPEN POSITION.
  2. REPLACE OR USE EXISTING RED AND GREEN INDICATING LIGHTS WITH CONTROL POWER FROM AFD (X1-X2) RUN IN SEPARATE CONDUIT TO MCC UNITS RESPECTIVELY.
  3. RUN POWER FOR MOTOR SPACE HEATERS IN A SEPARATE CONDUIT.
  4. EXTEND CONTROLS TO PTU AND NEW EEP-LCP.

DEPARTMENT OF PUBLIC WORKS  
HOWARD COUNTY, MARYLAND  
CHIEF, BUREAU OF UTILITIES DATE

**LACH**  
LACH ELECTRIC CORPORATION  
Baltimore, Maryland

**BLACK & VEATCH**  
Gaithersburg, Maryland  
REG. PROF. ENGR. DATE

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AND SEALED BY  
LACHMAN D. KUKREJA  
A REGISTERED  
PROFESSIONAL ENGINEER  
IN THE  
STATE OF MARYLAND,  
NO. 19889

DES: LK  
DRN: LJ  
CHK: WB  
DATE: 4/15/02

05/26/05	CONFORMED TO CONSTRUCTION RECORDS	PJS/RJR/RJR
REVISIONS AND RECORD OF ISSUE		NO. BY CK APP

**ELECTRICAL**  
**EFFLUENT PUMPING STATION**  
**EXISTING MCC-11 ONE-LINE DIAGRAM**

**LITTLE PATUXENT WATER RECLAMATION PLANT**  
**ADDITION NO. 6**  
**BIOLOGICAL NUTRIENT REMOVAL RETROFIT**  
CAPITAL PROJECT S-6205  
CONTRACT NO. 20-3839  
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN  
SHEET 126 OF 139  
**E24**