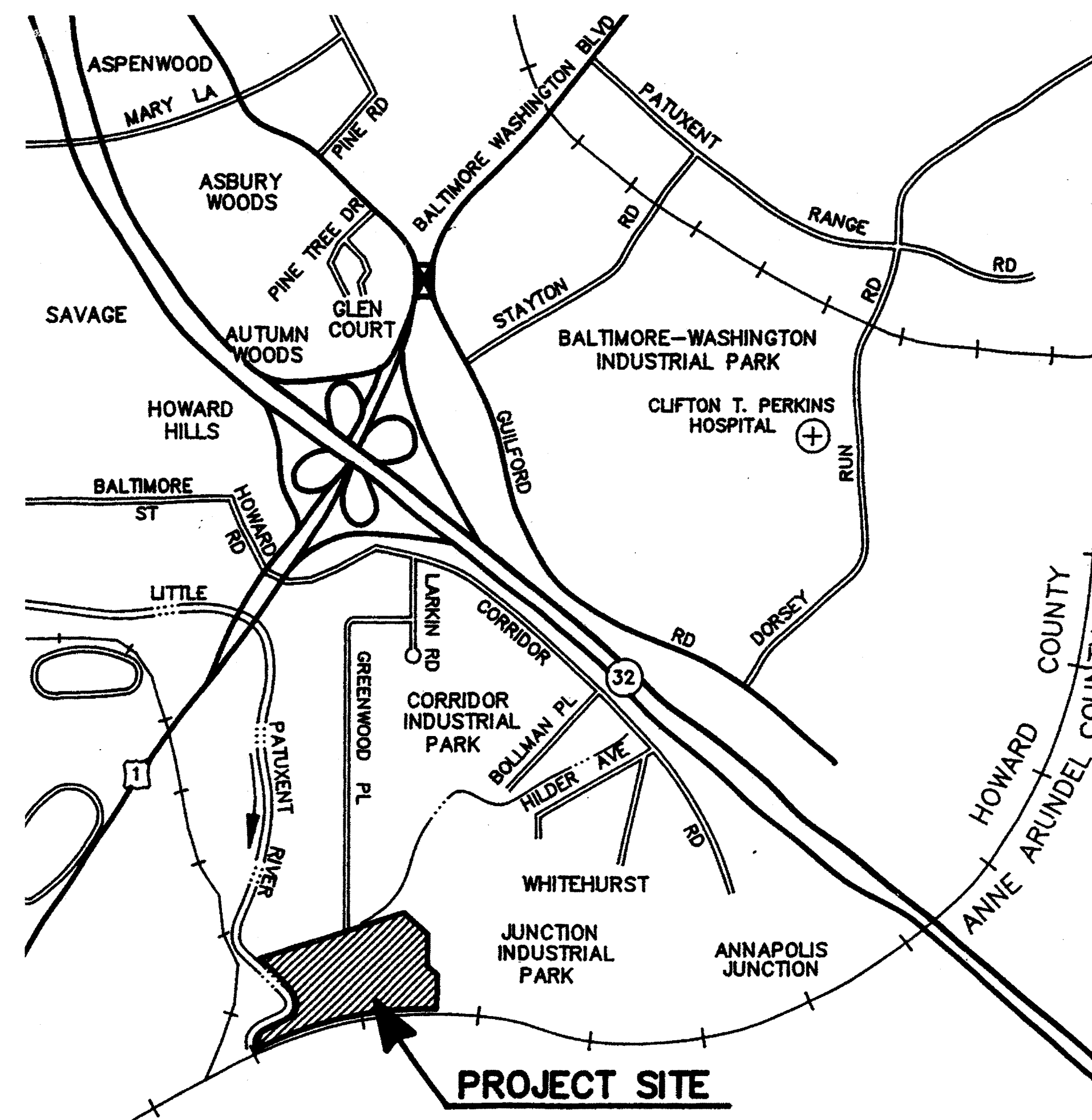


HOWARD COUNTY, MARYLAND

LITTLE PATUXENT WATER RECLAMATION PLANT



ADDITION NO. 6 CONTROL SYSTEM EXPANSION

CAPITAL PROJECT NO. S-6205

CONTRACT NO. 20-3842

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

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CONFORMED TO CONSTRUCTION RECORDS 07/22/05

SHEET 1 OF 39
L1

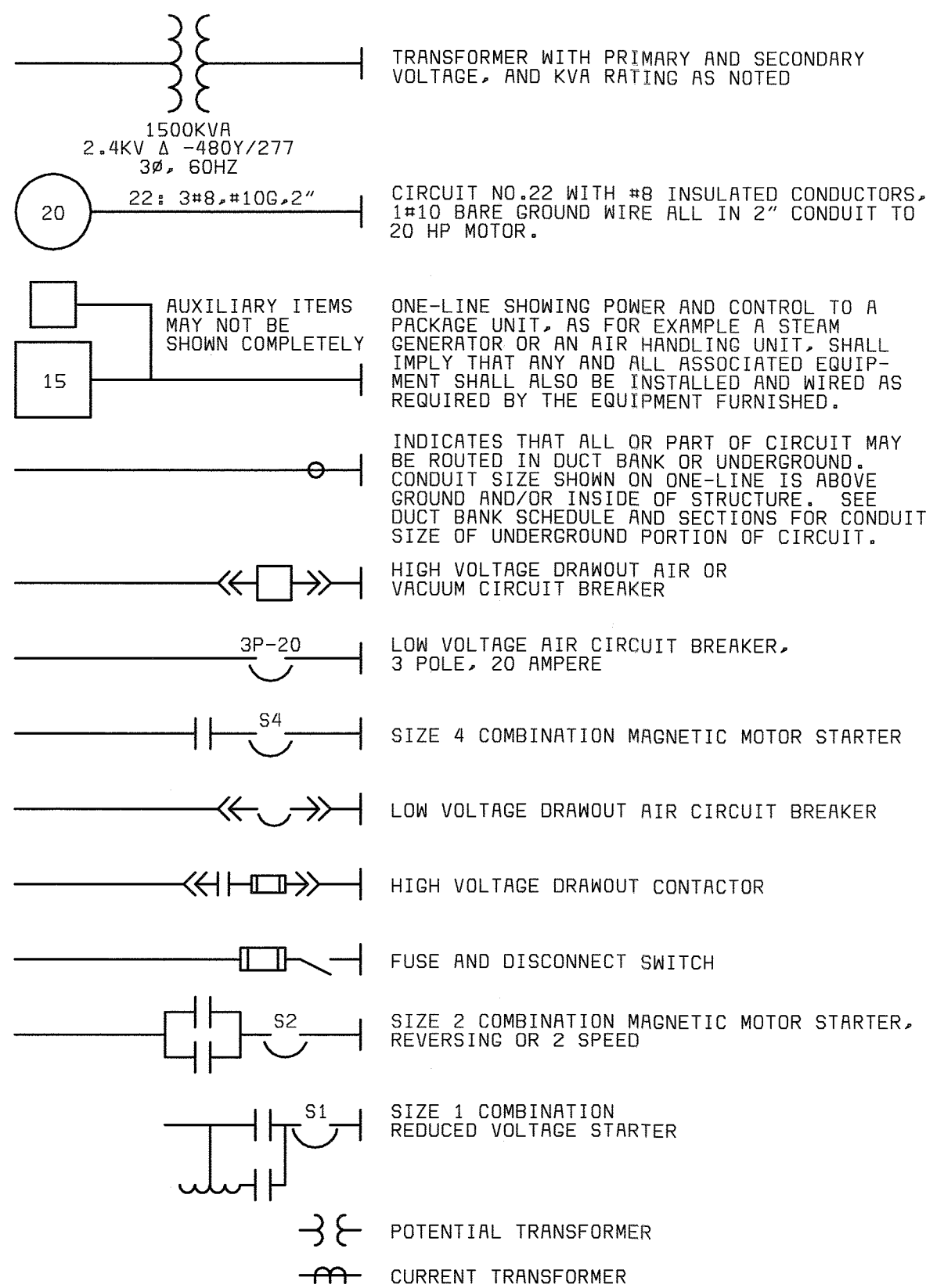
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<u>SHEET NO.</u>	<u>DRAWING NO.</u>	<u>DRAWING TITLE</u>
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37	I32	NOT USED
38	I33	CONTROL SYSTEM SCHEMATIC ONE-LINE DIAGRAM, CTP-06/PIU-4
39	I34	CONTROL BLOCK DIAGRAM

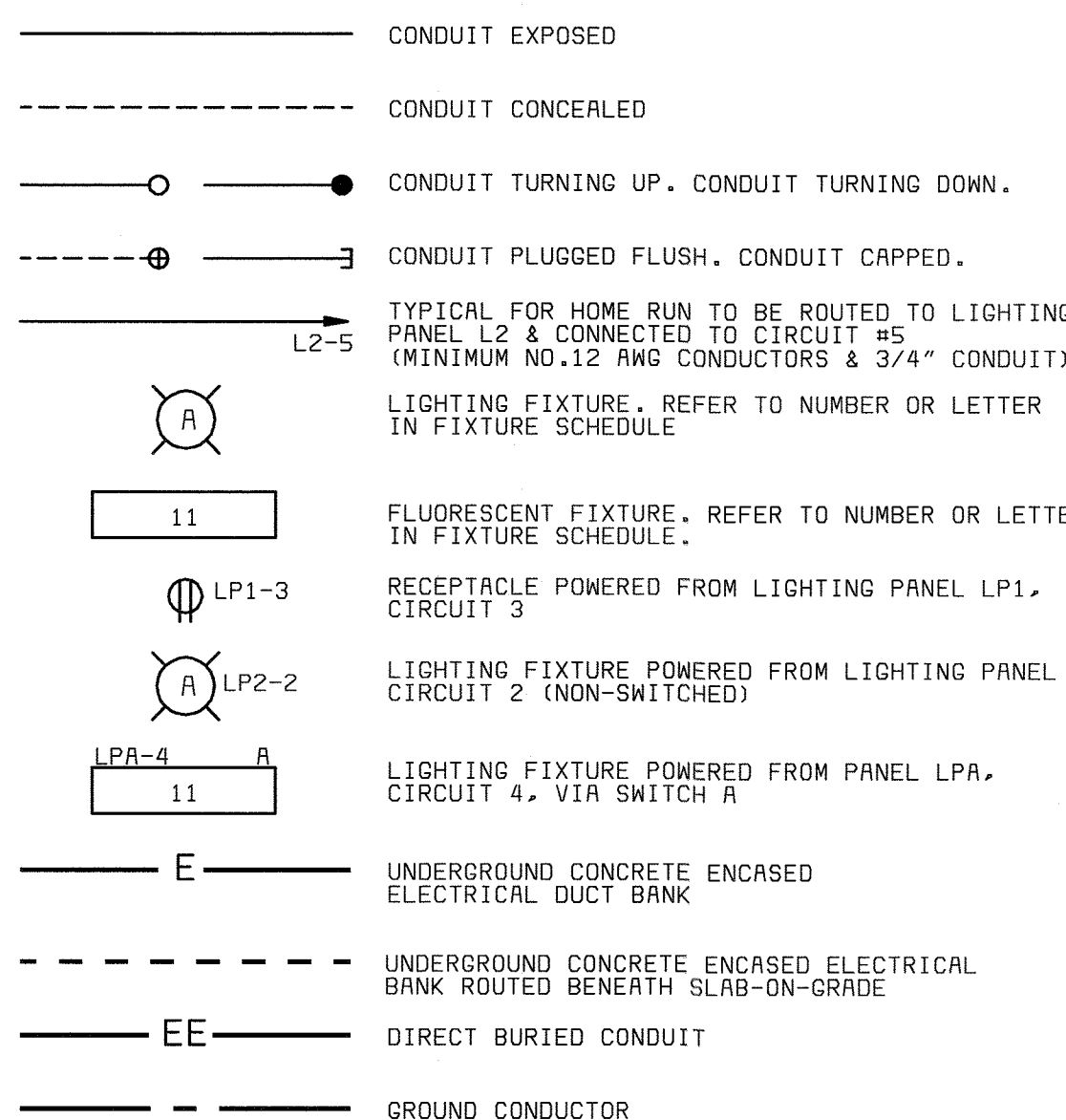
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DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE	 BLACK & VEATCH Gaithersburg, Maryland REG. PROF. ENGR. _____ DATE _____	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY ROBERT J. RECTANUS, JR. A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 22927	DES: FKA DRN: RLC CHK: WLK DATE: 2/19/01	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>7/22/05</td> <td>CONFORMED TO CONSTRUCTION RECORDS</td> <td>△</td> <td>RHH</td> <td>RJR</td> <td>RJR</td> </tr> <tr> <td>DATE</td> <td>REVISIONS AND RECORD OF ISSUE</td> <td>NO.</td> <td>BY</td> <td>CK</td> <td>APP</td> </tr> </table>	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	△	RHH	RJR	RJR	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	LAYOUT/OVERVIEW CIVIL LIST OF DRAWINGS	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN SHEET 2 OF 39 L2
7/22/05	CONFORMED TO CONSTRUCTION RECORDS	△	RHH	RJR	RJR														
DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP														

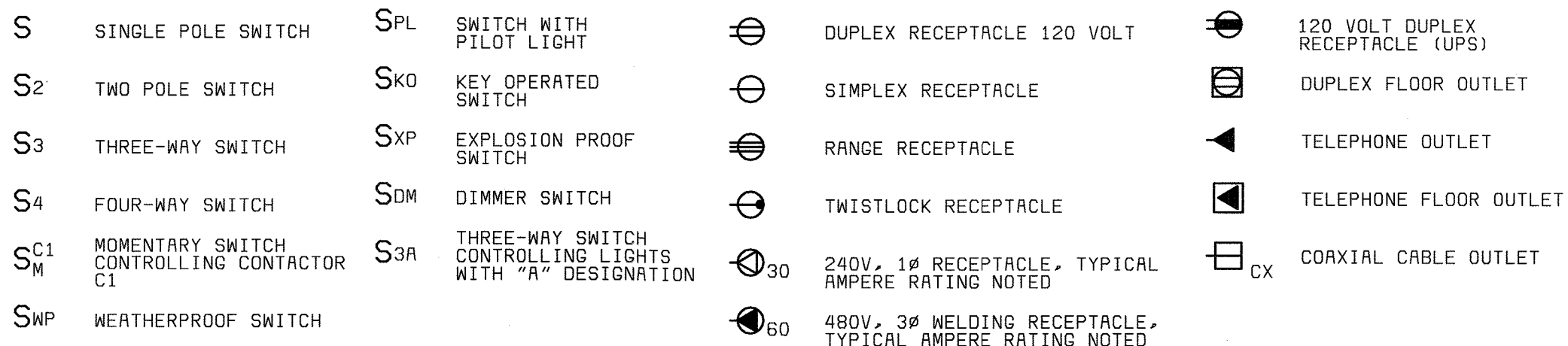
ONE-LINE DIAGRAM LEGEND



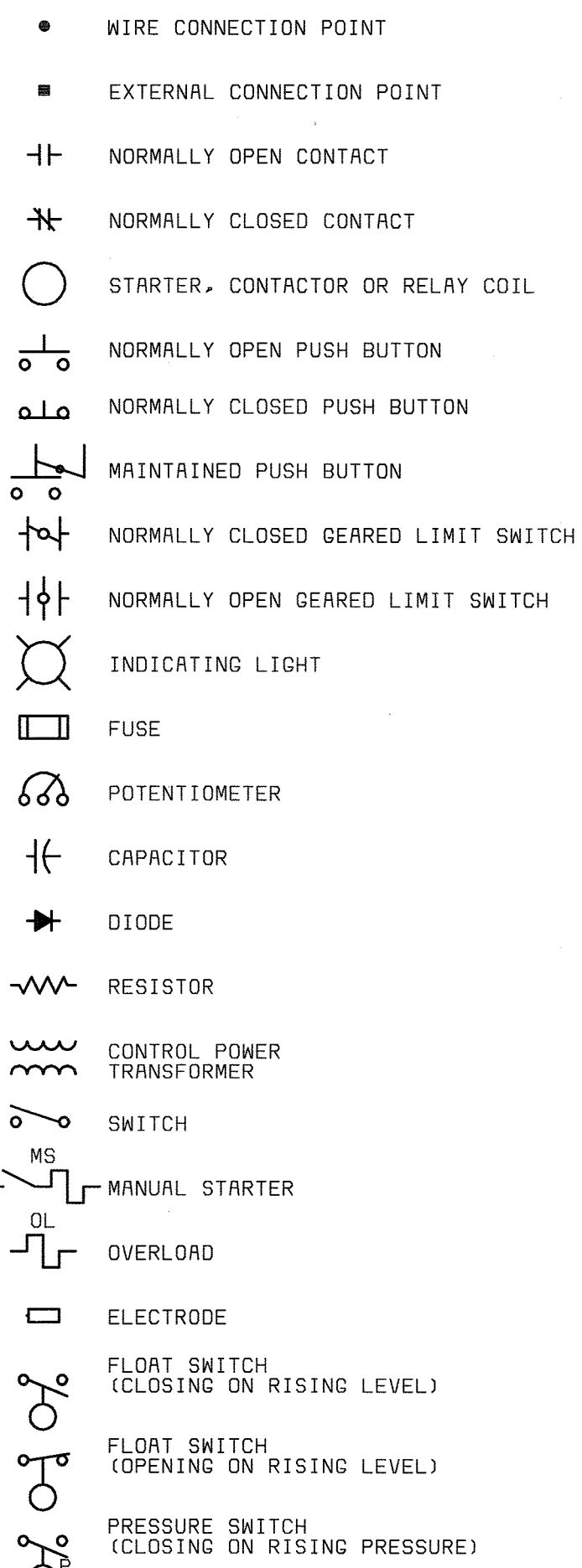
CONDUIT & WIRING INSTALLATION LEGEND



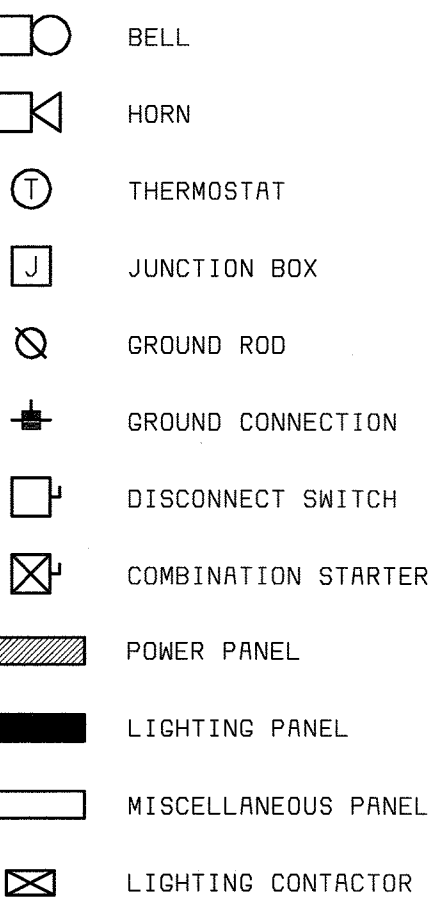
SWITCH & OUTLET SYMBOLS



SCHEMATIC SYMBOLS



MISCELLANEOUS SYMBOLS



ABBREVIATIONS

A	AMBER, AMPERE, ALARM	M	MAGNETIC MOTOR STARTER
AC	ALTERNATING CURRENT	MA	MILLIAMPERE
ACB	AIR CIRCUIT BREAKER	MCB	MAIN CIRCUIT BREAKER
AF	AMPERE FRAME	MCC	MOTOR CONTROL CENTER
AFD	ADJUSTABLE FREQUENCY DRIVE	MCLU	MOTOR CONTROL LINEUP
AM	AMMETER	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
CB	CAPACITOR	NC	NORMALLY CLOSED
CB"R"	CIRCUIT BREAKER	NO	NORMALLY OPEN, NUMBER
CB"R"	CIRCUIT BREAKER AUXILIARY CONTACT (OPEN WHEN BREAKER IS OPEN OR TRIPPED)	O	OPEN
CB"B"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS CLOSED)	OCB	OIL CIRCUIT BREAKER
CB"R"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN OR TRIPPED)	OL	OVERLOAD
CB"R"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN OR TRIPPED)	OOA	ON-OFF-AUTO
CB"R"	CIRCUIT BREAKER AUXILIARY CONTACT (CLOSED WHEN BREAKER IS OPEN OR TRIPPED)	OOR	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	PR	PROTECTIVE RELAYING
CS	CONTROL STATION	PR#	PROCESS REACTOR #5,6 OR 7
CT	CYCLE TIMER OR CURRENT TRANSFORMER	PRS	PROXIMITY SWITCH
CTC	CYCLE TIMER CLUTCH	PS	PRESSURE SWITCH
CTM	CYCLE TIMER MOTOR	PT	POTENTIAL TRANSFORMER, PROGRAM TIMER
CTP	CONTROLS TERMINATION PANEL	2P	2 POLE
2/C	2 CONDUCTOR	R	RED, RAISE, RELAY OR REVERSE
4"C	4" CONDUIT	RECP	RECEPTACLE
DC	DIRECT CURRENT	RES	RESISTOR
DI	DOOR INTERLOCK	RT	REPEATING TIMER
DM	DAMPER MOTOR OR DEMAND METER	RTD	RESISTANCE TYPE TEMP DETECTOR
DPDT	DOUBLE POLE DOUBLE THROW	RTU	REMOTE TERMINAL UNIT
DPST	DOUBLE POLE SINGLE THROW	RVSS	REDUCED VOLTAGE SOLID STATE STARTER
DPR	DIFFERENTIAL PRESSURE REGULATOR		
DPS	DIFFERENTIAL PRESSURE SWITCH	S2	SIZE 2 STARTER
DS	DISCONNECT SWITCH	S2	SUPERVISORY CONTROL AND DATA ACQUISITION
DVLS	DISCHARGE VALVE LIMIT SWITCH	SH	SPACE HEATER
E	ELECTRIC OPERATOR FOR CONTROL DAMPER OR VALVE	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	SSM	SOLID STATE METERING
EX	EXISTING	SSS	SOLID STATE STARTER
F	FORWARD	SUPV	SUPERVISORY CONTROL
FOT	FIBER OPTIC TERMINATIONS	SV	SOLENOID VALVE
FS	FLOW SWITCH	SWB	SWITCHBOARD
G	GREEN OR GROUND	SWCR	SWITCHGEAR
GD	GROUND DETECTOR	T	THERMOSTAT, TIMER, OR TOTALIZER
GEN	GENERATOR	TACH	TACHOMETER
GFI	GROUND FAULT INTERRUPTER	TB	TERMINAL BLOCK
GLS	GEARED LIMIT SWITCH	TC	TIMER CLUTCH
#GC	#8 GROUND WIRE	TD	TIME DELAY RELAY
H	HIGH OR HUMIDISTAT	TEMP	TEMPERATURE
HC	HOT CIRCUIT	TM	TIMER MOTOR
HH	HANDHOLE	TQ	TORQUE
HMT	HIGH MOTOR TEMPERATURE	TS	TEMPERATURE SWITCH
HOR	HAND-OFF-REMOTE	TTB	TELEPHONE TERMINAL BOX
HOR	HORSEPOWER	UC	UNDERGROUND
HWC0	HIGH WATER CUTOFF	UV	UNDER VOLTAGE
HZ	HERTZ (CYCLE)	UPS	UNINTERRUPTIBLE POWER SUPPLY
I/O	INPUT/OUTPUT	V	VOLTS
INST	INSTANTANEOUS	VA	VOLT AMPERE
J	JUNCTION BOX	VAR	VARMETER
JB	JUNCTION BOX	VLS	VALVE LIMIT SWITCH
K	KEY INTERLOCK	VM	VOLTMETER
KV	KILOVOLT	VPI	VALVE POSITION INDICATOR
KVA	KILOVOLT AMPERE	VS	VOLTMETER SWITCH
KVAR	KILOVAR	W	WHITE OR WATTS
KW	KILOWATT	WH	WATTHOUR METER
KWH	KILOWATT HOUR	WM	WATT METER
L	LOW, LEVEL	WP	WEATHERPROOF
LA	LIGHTNING ARRESTER	X	AUXILIARY RELAY
LAN	LOCAL AREA NETWORK	XFMR	TRANSFORMER
LC	LIGHTING CONTACTOR	XP	EXPLOSION PROOF
LDA	LOCAL-ON-OFF	Y	YELLOW
LOR	LOCAL-OFF-REMOTE	Z	AUXILIARY RELAY
LP	LIGHTING PANEL	ZS	POSITION SWITCH
LS	LIMIT OR LEVEL SWITCH	ZSS	ZERO SPEED SWITCH
LWCO	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		

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

AREA DESIGNATIONS

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

AREA TYPE 1A	CORROSIVE CHEMICAL FEED AND STORAGE ROOMS. CONDUIT SYSTEM SHALL BE EXPOSED 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 CONDUIT 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

THIS DRAWING WAS
ORIGINALLY APPROVED
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AND SEALED BY
DONALD R. STEVENS
A REGISTERED
PROFESSIONAL ENGINEER
IN THE
STATE OF MARYLAND,
NO. 21876

DES: GNS

DRN: BAL

CHK: GNS

DATE: 04/22/02

DATE	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH/RJR/RJR
REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

ELECTRICAL

LEGEND AND ABBREVIATIONS

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION

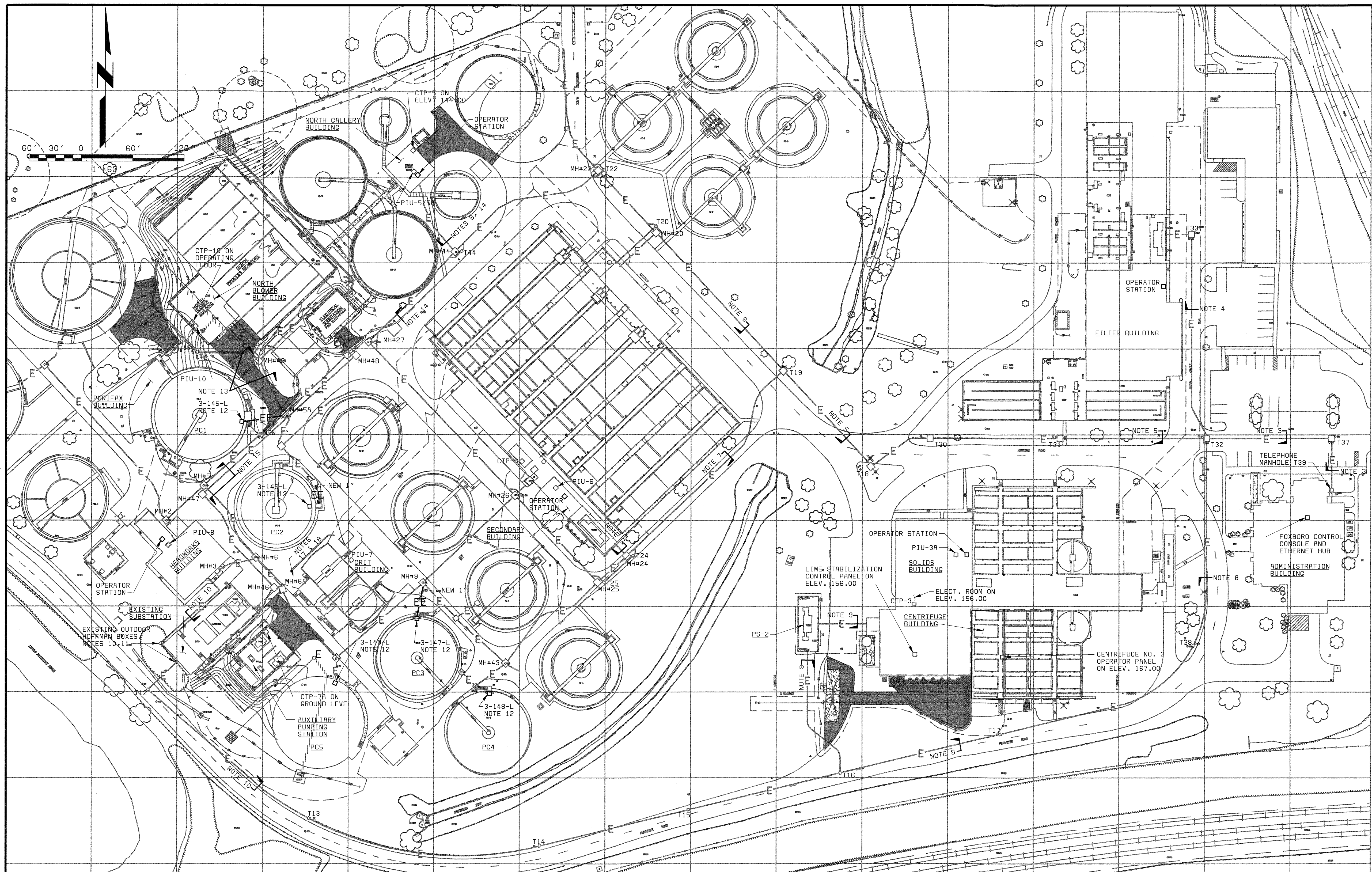
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
3 OF 39

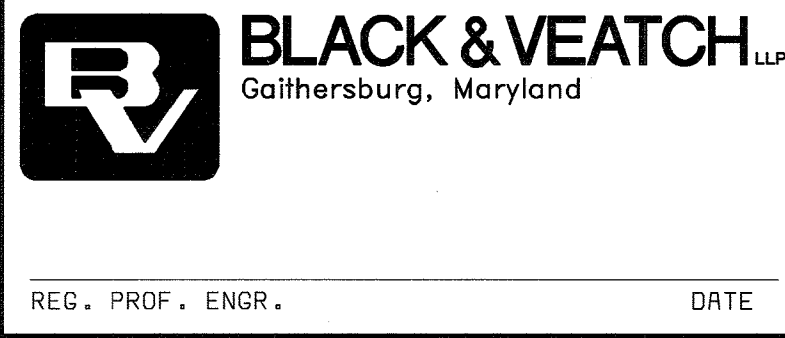
E1



- NOTES:**
- FOR ELECTRICAL LEGEND AND ABBREVIATIONS SEE DWG E1.
 - SCALE IS FOR SITE PLAN BACKGROUND ONLY. OTHER ELECTRICAL EQUIPMENT ADDED TO THIS DRAWING IS NOT TO SCALE. EXACT LOCATIONS OF EXISTING EQUIPMENT SHALL BE FIELD VERIFIED, WITH OWNER'S ASSISTANCE. ALL DUCT BANKS SHOWN ON THIS DRAWING ARE EXISTING.
 - ROUTE THE 5 NEW FIBER OPTIC CABLES FROM THE ADMIN BLDG TO MANHOLE T32 IN EXISTING 5-INCH CONDUIT CONTAINING EXISTING ETHERNET AND PHONE CABLES.
 - ROUTE 1 NEW FIBER OPTIC CABLE (CKT NO. FO-4) FROM T32 TO T33 AND THEN TO THE FILTER BLDG IN EXISTING CONDUIT CONTAINING EXISTING ETHERNET CABLE.
 - ROUTE 2 NEW FIBER OPTIC CABLES (CKT NO. FO-2, FO-3) FROM T32 TO T31, T30, T18, T19 USING SPARE 4-INCH CONDUIT.
 - CONTINUE 1 FIBER OPTIC CABLE (CKT NO. FO-2) TO T20, T22, T44, AND INTO NORTH GALLERY BUILDING USING EXISTING CONDUIT (SEE NOTE 14).
 - CONTINUE 1 FIBER OPTIC CABLE (CKT NO. FO-3) TO T24 AND INTO THE SECONDARY BUILDING USING SPARE CONDUIT.
 - ROUTE 2 NEW FIBER OPTIC CABLES (CKT NO. FO-1, FO-5, FO-8, FO-9) FROM T32 TO T38, T17, T16 IN SPARE CONDUIT.
 - ROUTE 1 NEW FIBER OPTIC CABLE (CKT NO. FO-1, FO-8, FO-9) FROM T16 TO THE PS-2 VAULT IN SPARE 5 INCH CONDUIT. CONTINUE FROM THE VAULT TO THE SOLIDS BUILDING IN EXISTING 4 INCH CONDUIT TO THE TELEPHONE CABINET IN BASEMENT. CONTINUE IN EXISTING 2 INCH CONDUIT UP TO ELECTRICAL ROOM, THEN SPLIT OUT TO CONTROL PANELS AND OPERATORS STATION, AS REQUIRED.
 - CONTINUE 1 NEW FIBER OPTIC CABLE (CKT NO. FO-5) FROM T16 TO T15, T14, T13 AND T12 IN EXISTING CONDUITS. FROM T12 RUN IN EXISTING CONDUIT TO EXISTING OUTDOOR HOFFMAN BOX ON WEST WALL, THEN IN EXISTING CONDUIT ON WALL TO SECOND EXISTING HOFFMAN BOX LOCATED ON THE NORTH WEST CORNER OF EXISTING SUBSTATION WALL. FROM THIS BOX, ROUTE CABLE IN EXISTING UNDERGROUND 2 INCH DIRECT BURIED CONDUIT CONTAINING 50-PAIR PHONE CABLE TO EXISTING INDOOR BOX LOCATED IN THE HEADWORKS BUILDING.
 - REPLACE OUTDOOR TELEPHONE HOFFMAN BOX ON WEST GROUND OF NORTH WALL WITH NEW NEW 3R STAINLESS STEEL HOFFMAN BOX WITH A 24"x36" BACK PLATE. FOR THE EXISTING BOX ON WEST WALL, CLEAN/BLAST BOX AND RE-PAINT.
 - PROVIDE/INSTALL CIRCUITS FROM 3-145-L & 3-146-L USING NEW DIRECT BURIED CONDUIT TO EXISTING DUCT BANK SYSTEM. TO PIU-10. PROVIDE/INSTALL CIRCUITS FROM 3-147-L & 3-148-L USING NEW DIRECT BURIED CONDUIT TO EXISTING DUCT BANK SYSTEM, TO PIU-6 IN SECONDARY BUILDING. PROVIDE/INSTALL CIRCUIT FROM 3-149-L IN EXISTING DUCT BANK SYSTEM TO CTP-7A IN AUXILIARY PUMPING STATION.
 - ROUTE 1 NEW FIBER OPTIC CABLE (CKT NO. FO-6) FROM THE NORTH BLOWER BUILDING TO MH#49 AND MH#5A IN EXISTING SPARE 4 INCH CONDUIT.
 - CONTINUE 1 FIBER OPTIC CABLE (CKT NO. FO-6) TO MH#48, MH#27, T44, AND INTO NORTH BLOWER BUILDING USING EXISTING CONDUIT. NOTE THAT THIS CABLE IS TO BE COMBINED WITH CABLE CKT FO-2 FROM T44 INTO BUILDING (SEE NOTE 6).
 - NOT USED
 - SPARE FIBER OPTIC CABLE FIBERS SHALL BE TERMINATED WITHIN A FIBER OPTIC PATCH PANEL FOR FUTURE USE. PATCH PANELS SHALL BE LOCATED WITHIN OR IN CLOSE PROXIMITY OF THE FINAL DESTINATION EQUIPMENT LOCATIONS.
 - (1) FO CABLE (FO-7) PIU-8 HEADWORKS TO PIU-7 GRIT BUILDING.
 - (1) FO CABLE (FO-8) PIU-7, GRIT BUILDING TO PIU-7A AUX PS.

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



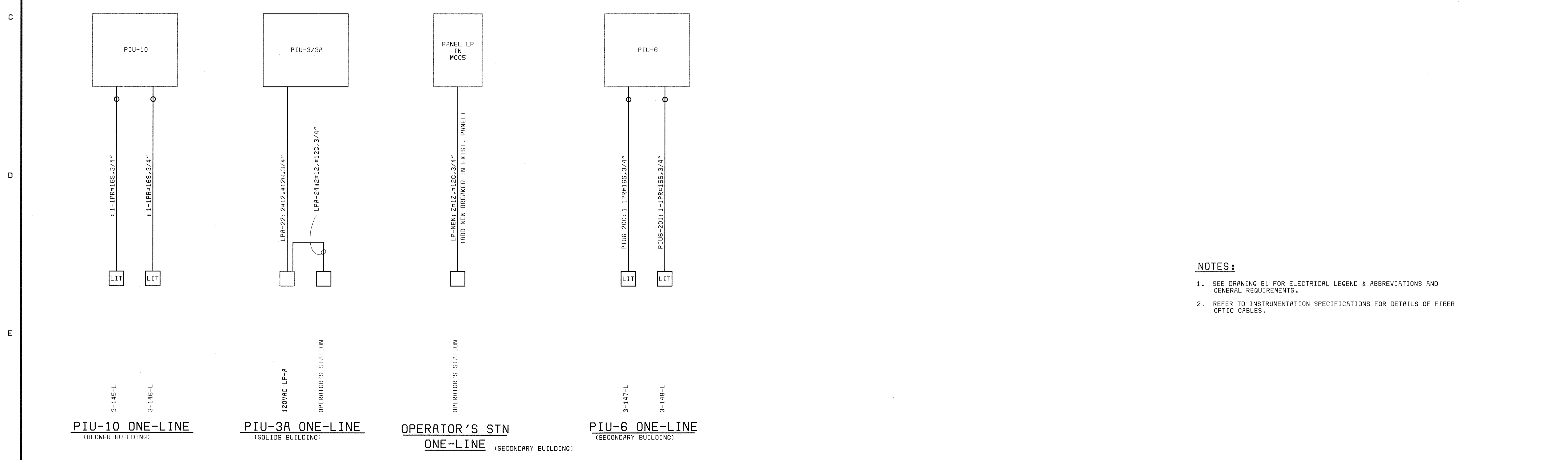
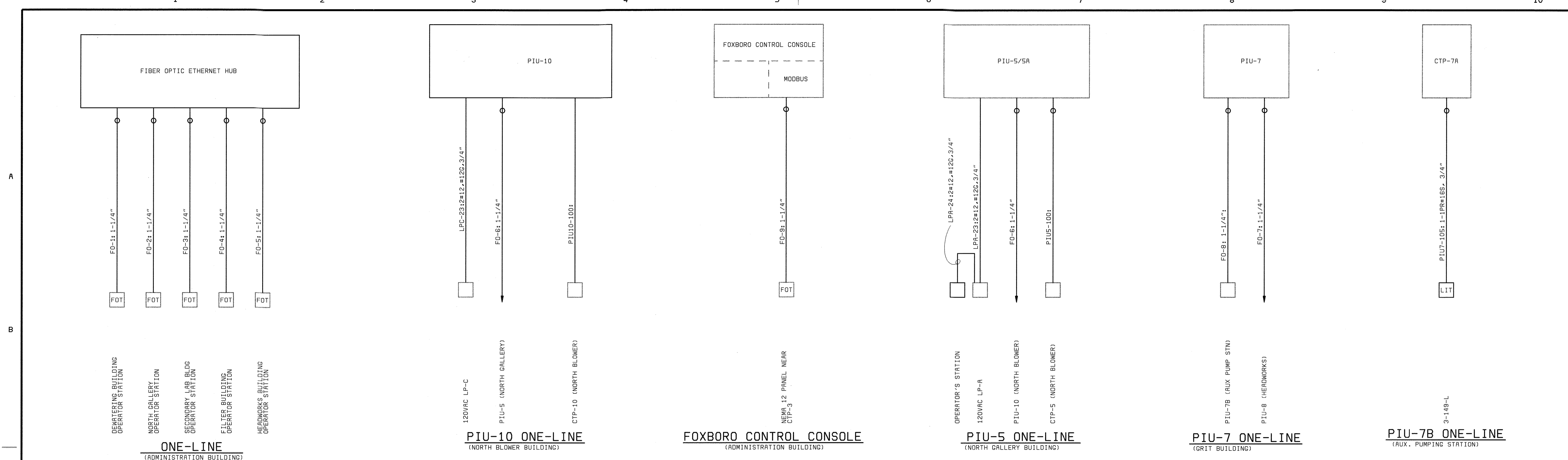
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ELECTRICAL
 SITE PLAN

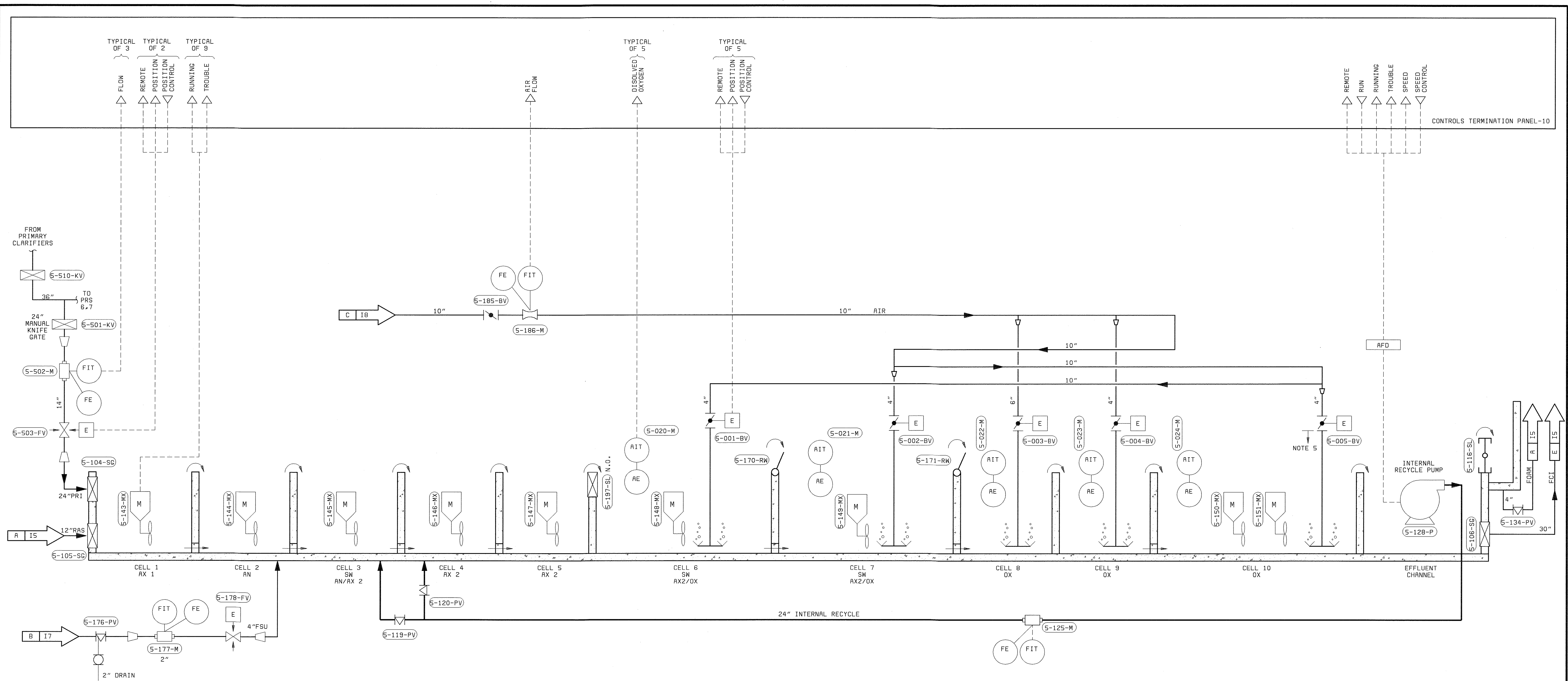
LITTLE PATUXENT WATER RECLAMATION PLANT
 ADDITION NO. 6
 CONTROL SYSTEM EXPANSION
 CAPITAL PROJECT S-6205
 CONTRACT NO. 20-3842
 HOWARD COUNTY, MARYLAND

SCALE
 AS
 SHOWN
 SHEET
 4 OF 39
E2




- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
 - REFER TO INSTRUMENTATION SPECIFICATIONS FOR DETAILS OF FIBER OPTIC CABLES.

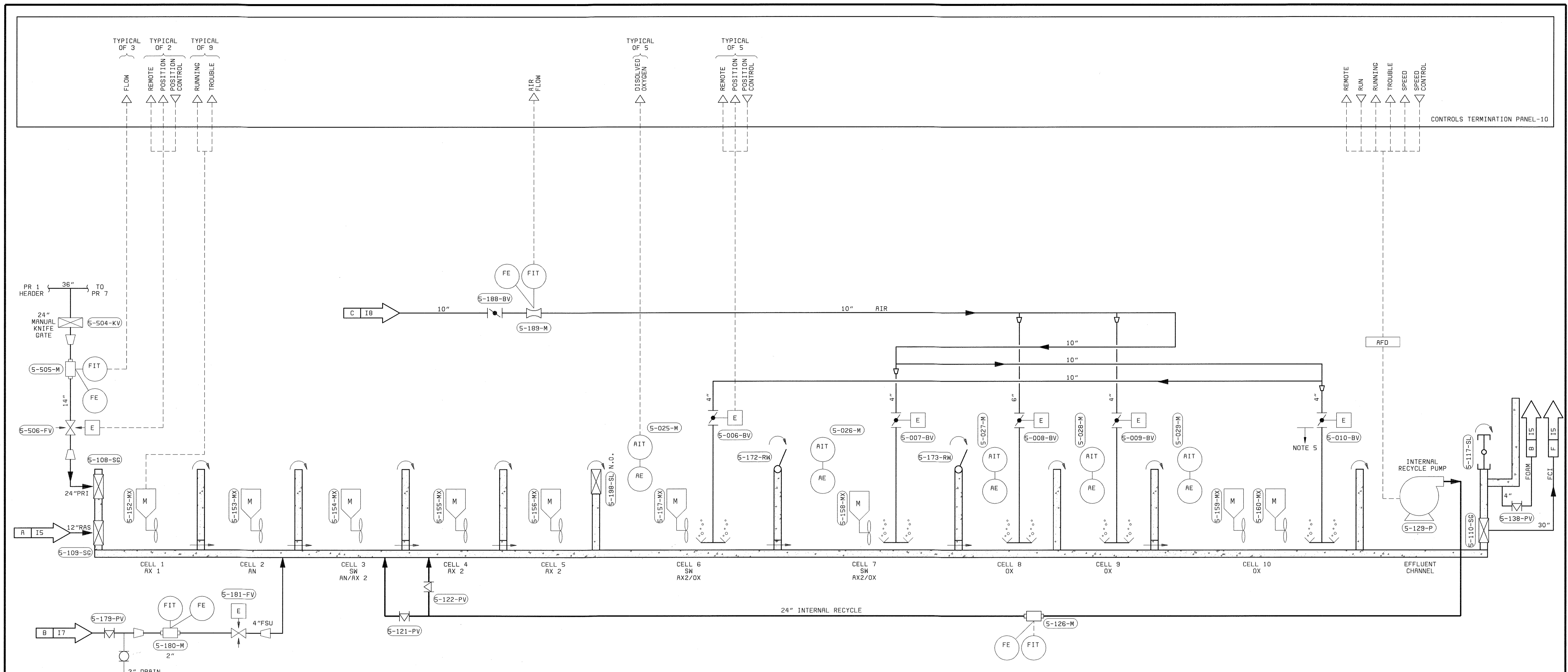
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			DRN: BAL						7/22/05
			CHK: GNS						
			DATE: 04/22/02						E3



PROCESS REACTOR #5
5-101-PR

- NOTES:**
- SEE P&ID LEGEND ON DRAWING I-1.
 - LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCCS OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
 - ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
 - REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.
 - PIPING BY DIFFUSER SUPPLIER (TYP.)

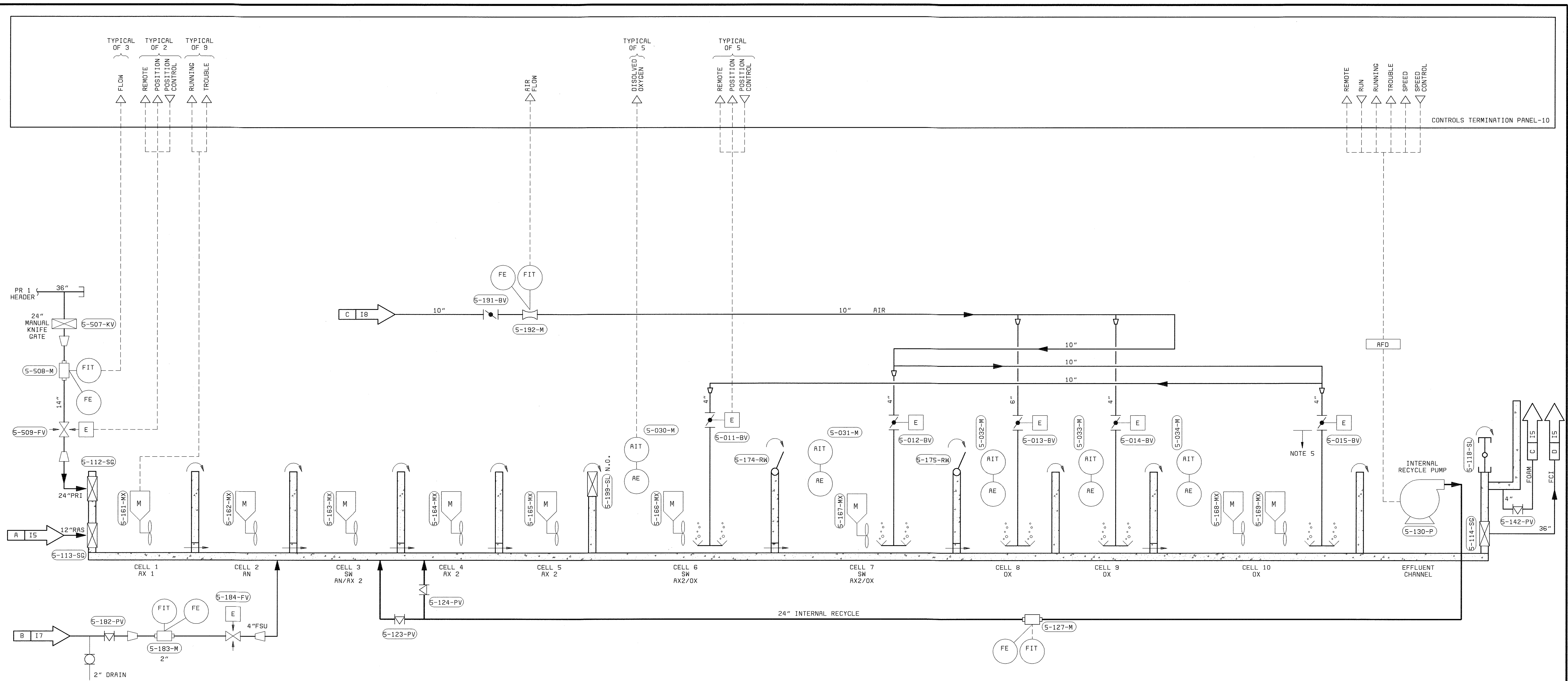
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE	 BLACK & VEATCH Gaithersburg, Maryland REG. PROF. ENGR. _____ DATE _____	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RSF DRN: MDR CHK: PWM DATE: 04/22/02 7/22/05 CONFORMED TO CONSTRUCTION RECORDS REVISIONS AND RECORD OF ISSUE	INSTRUMENTATION P & ID PROCESS REACTOR NO.5	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN SHEET 7 OF 39 12
--	---	---	--	--	---	---



PROCESS REACTOR #6
5-102-PR

- NOTES:**
- SEE P&ID LEGEND ON DRAWING I-1.
 - LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCCS OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
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 - PIPING BY DIFFUSER SUPPLIER (TYP.)

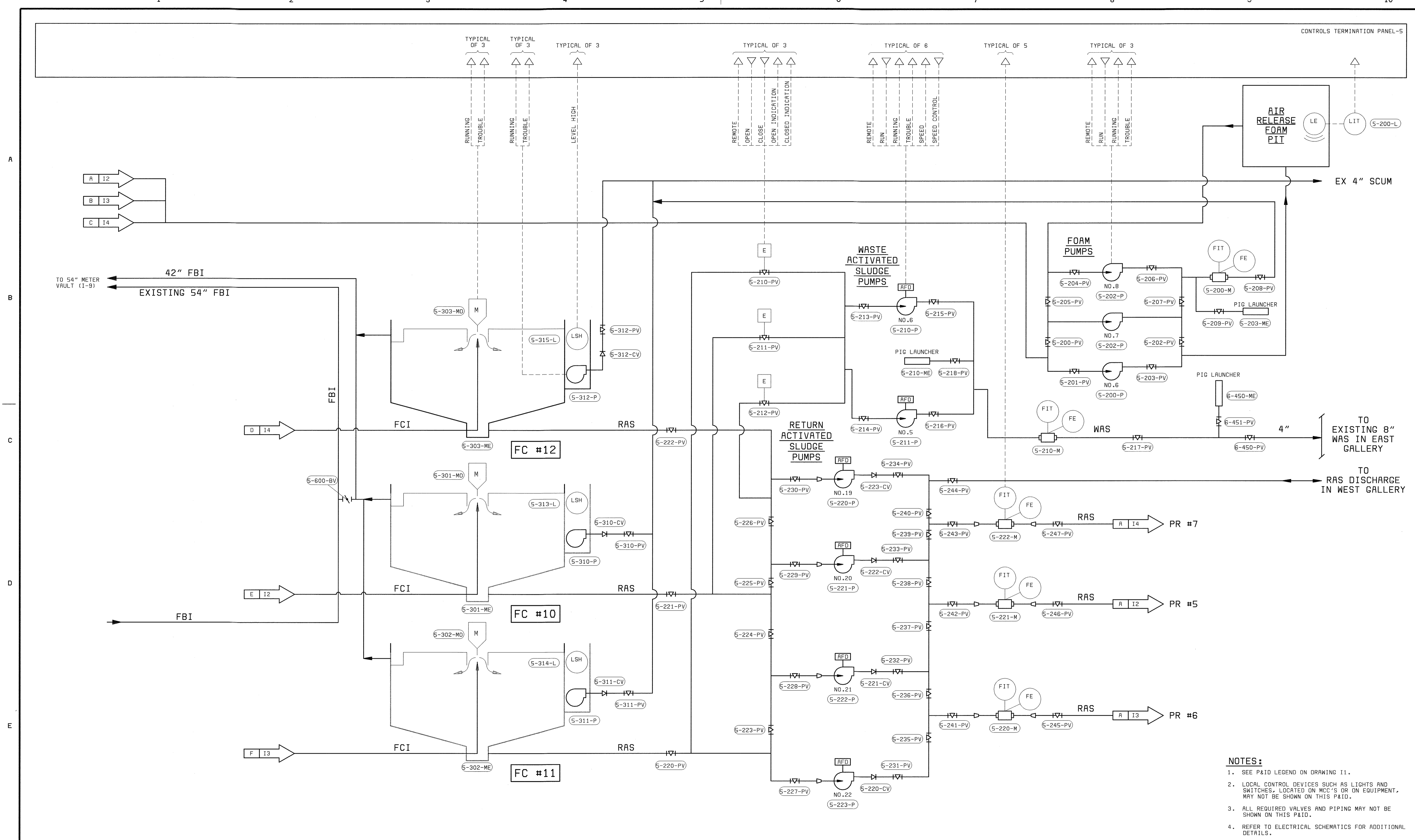
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE	BLACK & VEATCH Gaithersburg, Maryland REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RSF					INSTRUMENTATION P & ID PROCESS REACTOR NO.6	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: DAH	CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH/RJR/RJR			
			DATE: 04/22/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	13



PROCESS REACTOR #7
5-103-PR

- NOTES:**
- SEE P&ID LEGEND ON DRAWING I-1.
 - LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCCS OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
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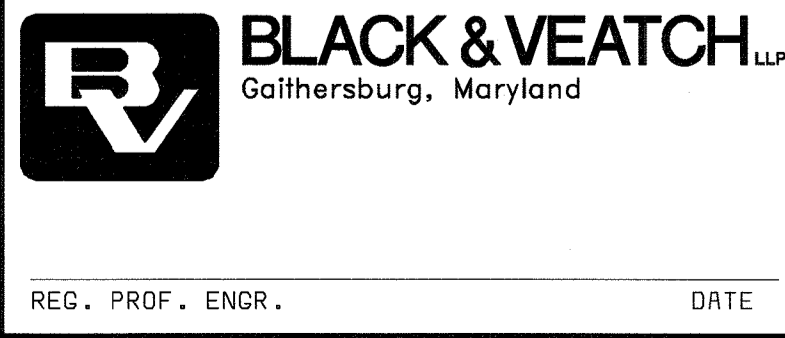
DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE	BLACK & VEATCH Gaithersburg, Maryland REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RSF					INSTRUMENTATION P & ID PROCESS REACTOR NO.7	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: MDR	CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH			RJR
			DATE: 04/22/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	I 4



- NOTES:**
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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



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DONALD R. STEVENS
A REGISTERED
PROFESSIONAL ENGINEER
IN THE
STATE OF MARYLAND,
NO. 21876

DES: RSF					
DRN: RLC					
CHK: PWM					
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH/RJR/RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	APP

INSTRUMENTATION

P & ID
FINAL CLARIFIERS
NO. 10, 11 AND 12

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION

CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

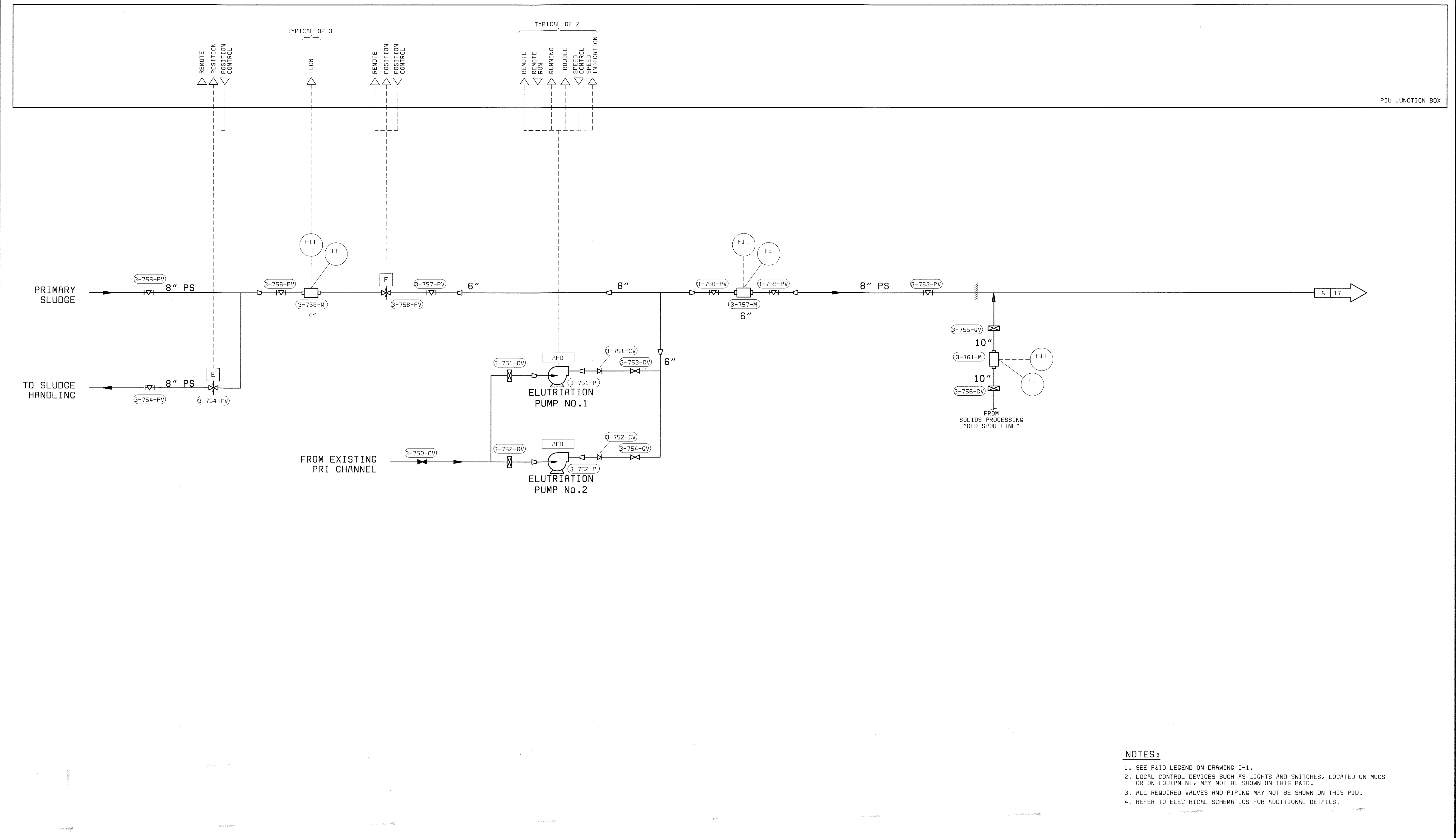
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
10 OF 39


15

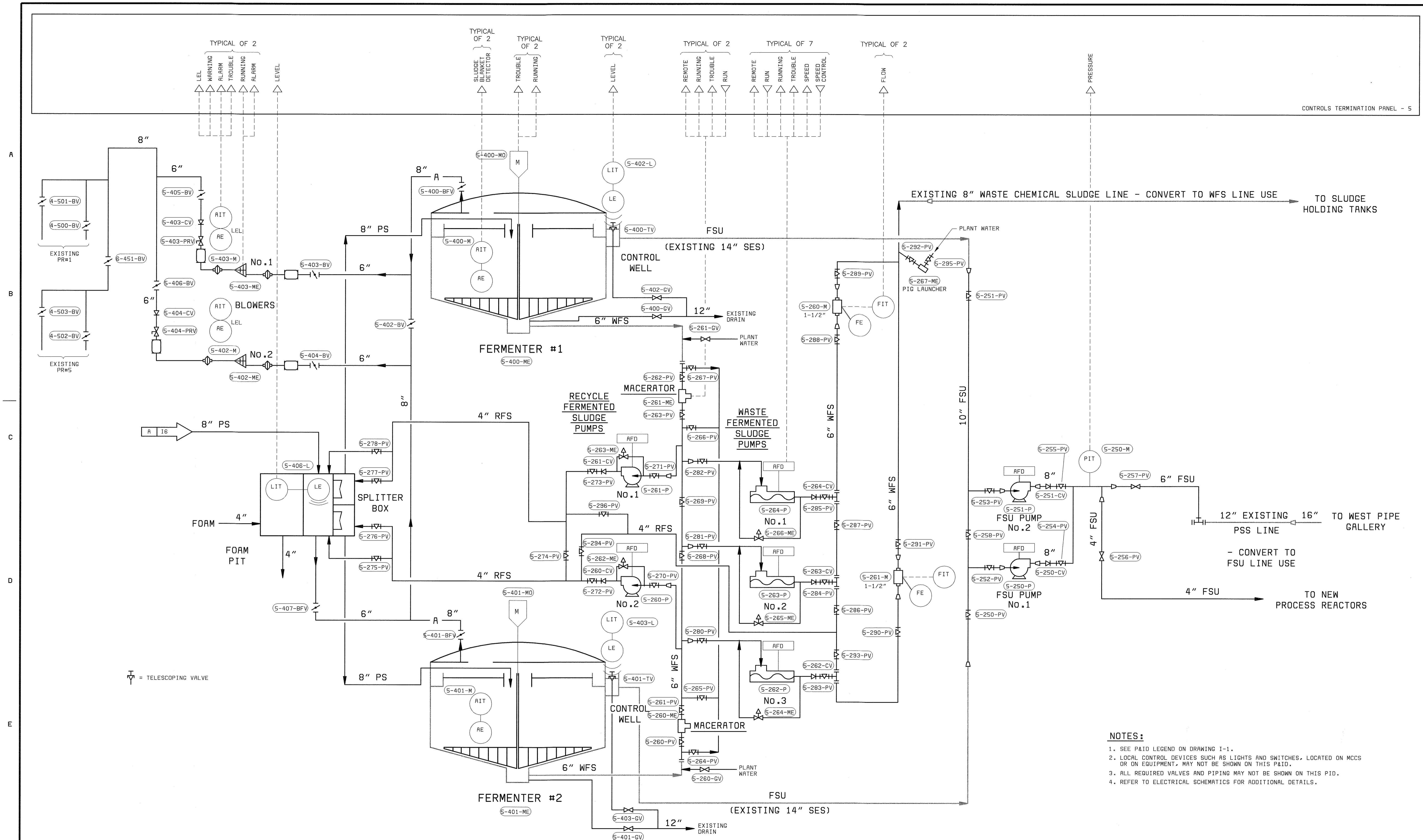
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F



PIU JUNCTION BOX

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			DRN: JGT, DAH	CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH, RJR, RJJ			
			DATE: 04/22/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	I6



CONTROLS TERMINATION PANEL - 5

TV = TELESCOPING VALVE

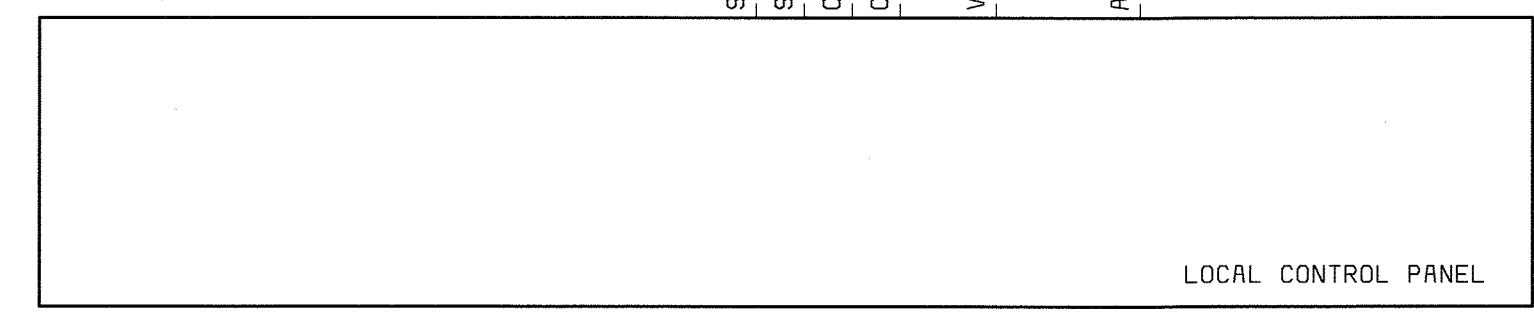
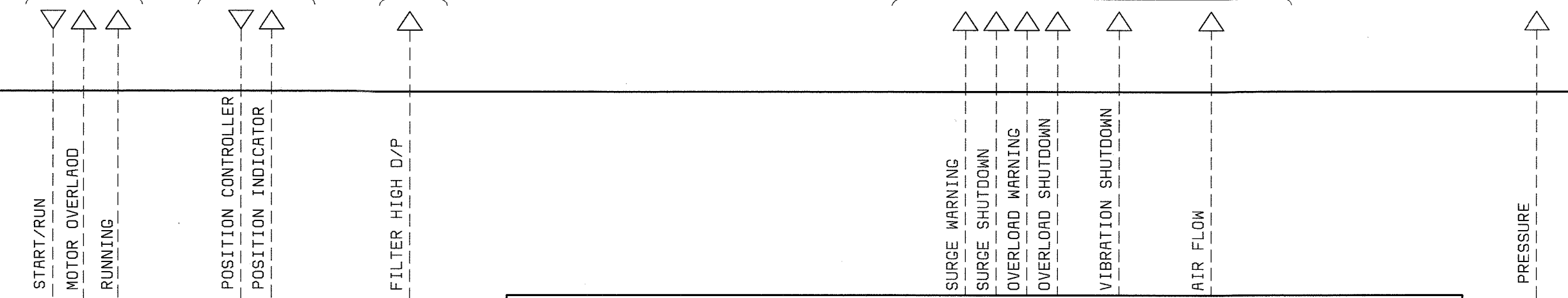
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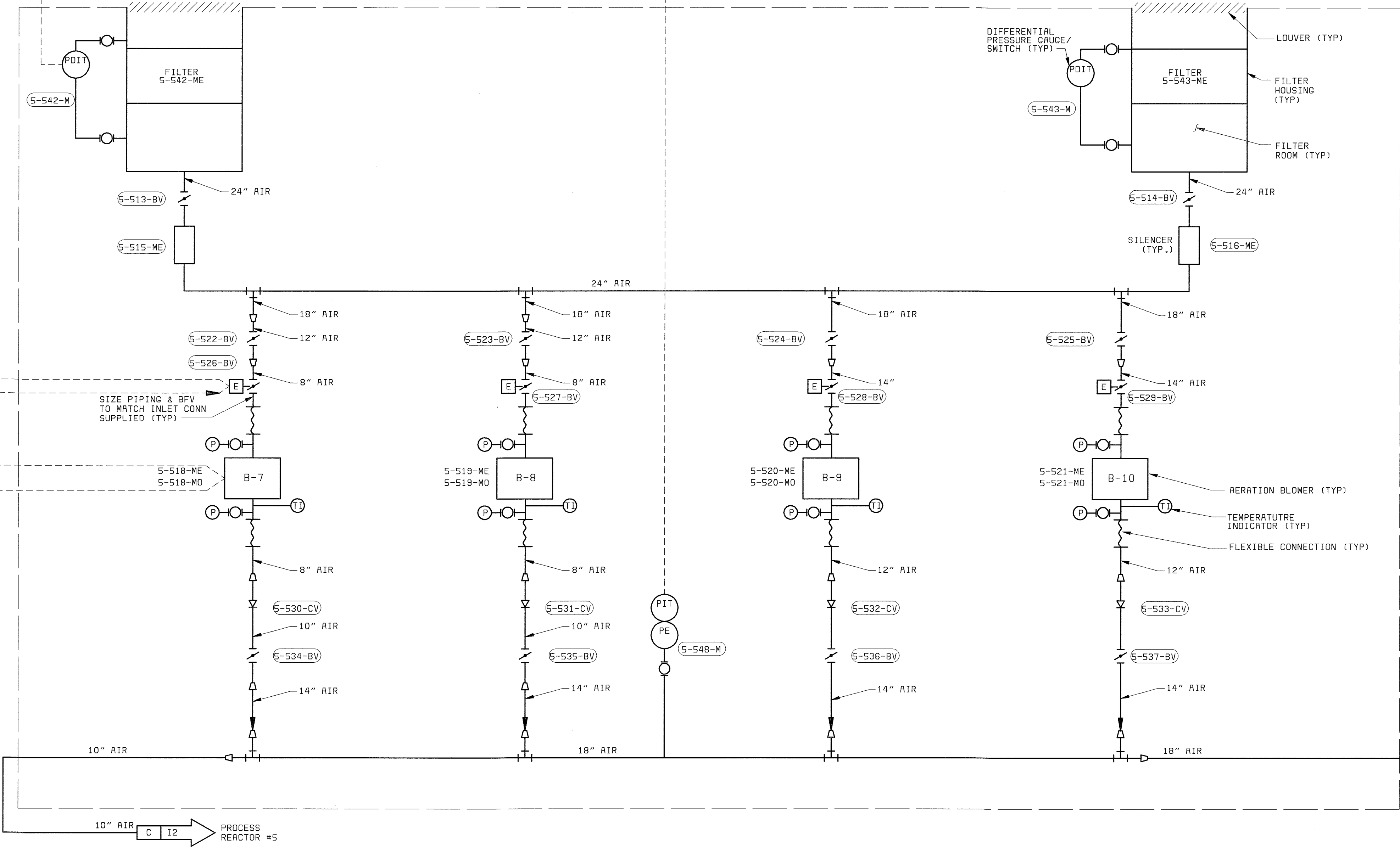
TYPICAL OF 4 TYPICAL OF 4 TYPICAL OF 2

TYPICAL OF 4

CONTROLS TERMINATION PANEL - 10



OUTPUT
INPUT



NOTES:

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

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

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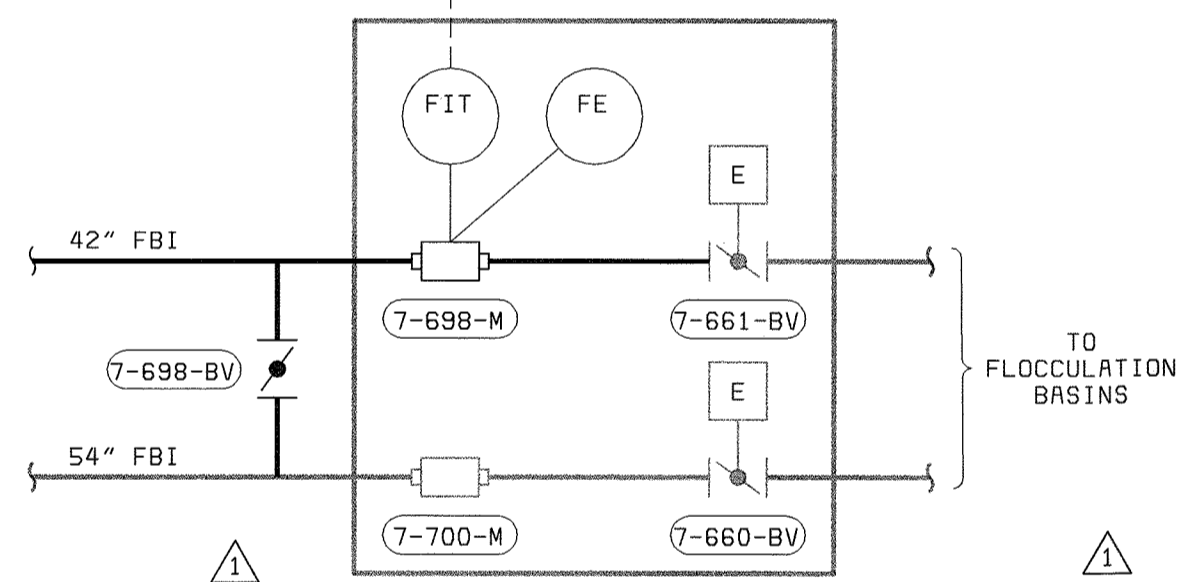
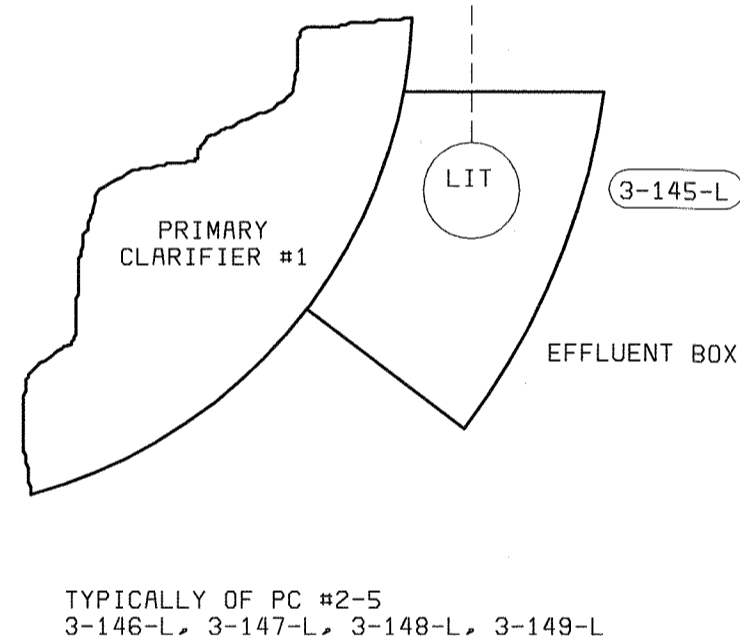
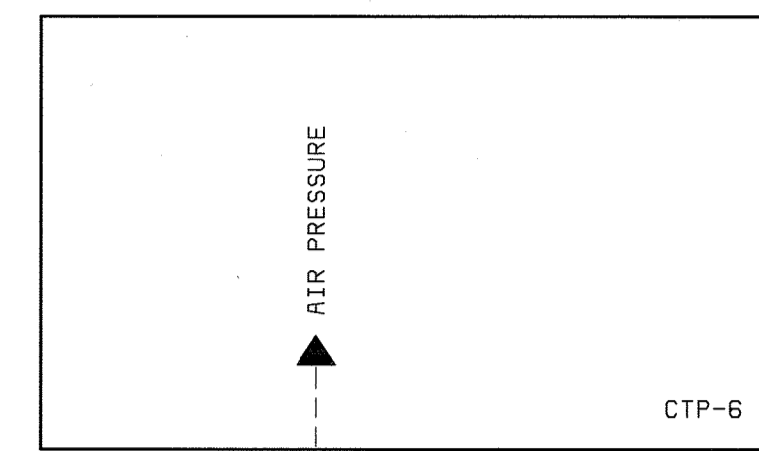
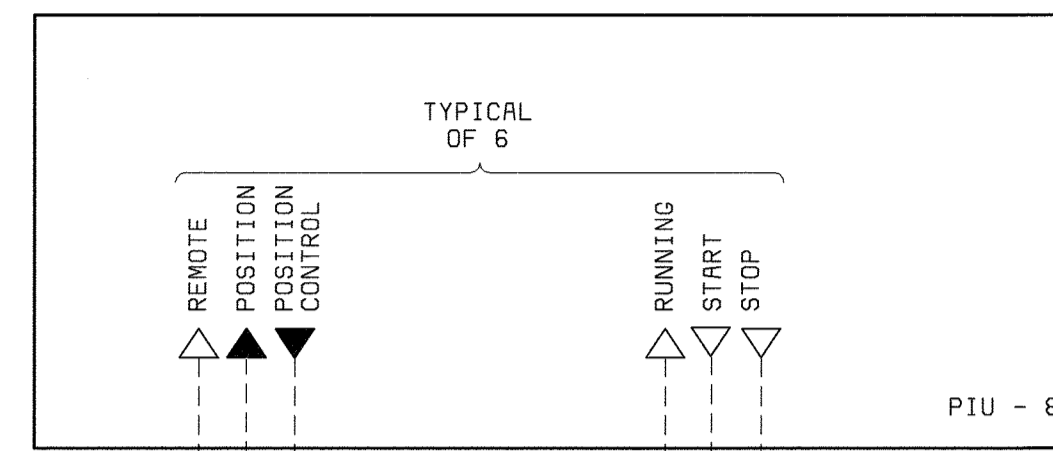
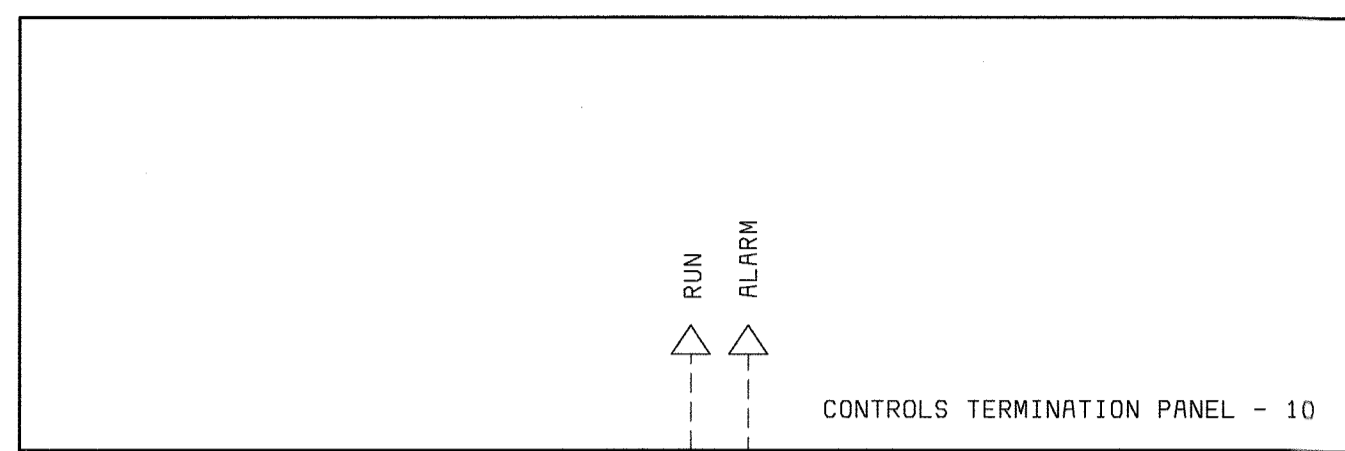
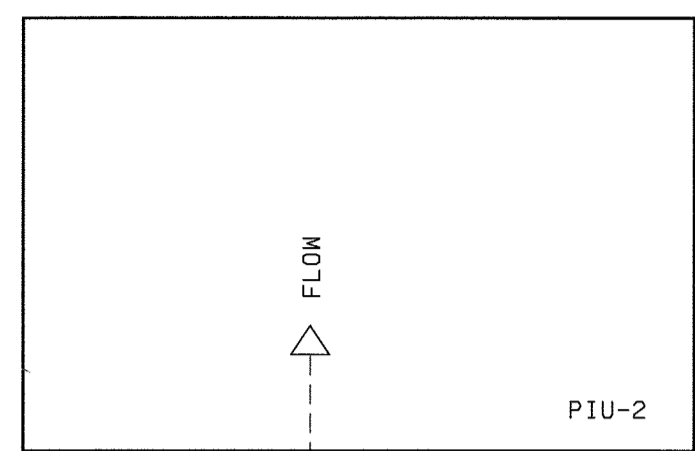
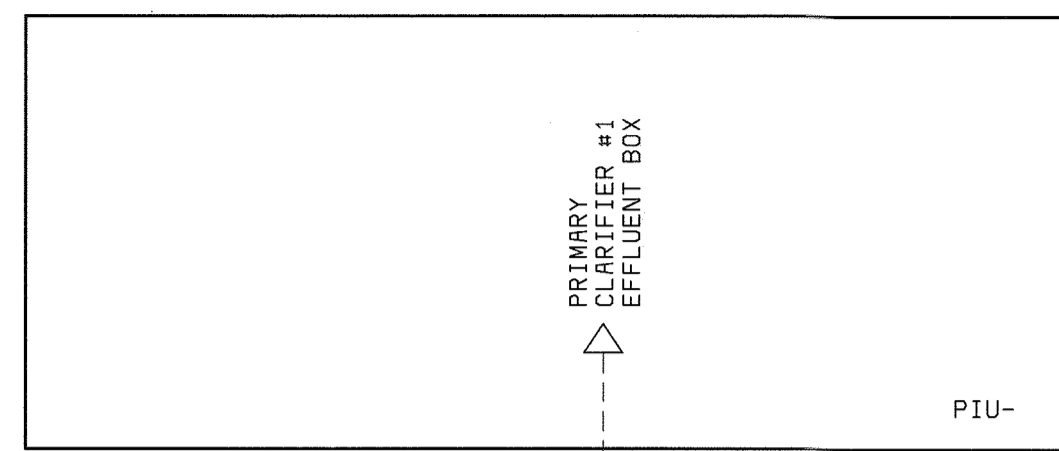
DES: RSF					
DRN: JGT					
CHK: PWM					
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH	RJR	RJR
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

INSTRUMENTATION
P & ID
NORTH
BLOWERS

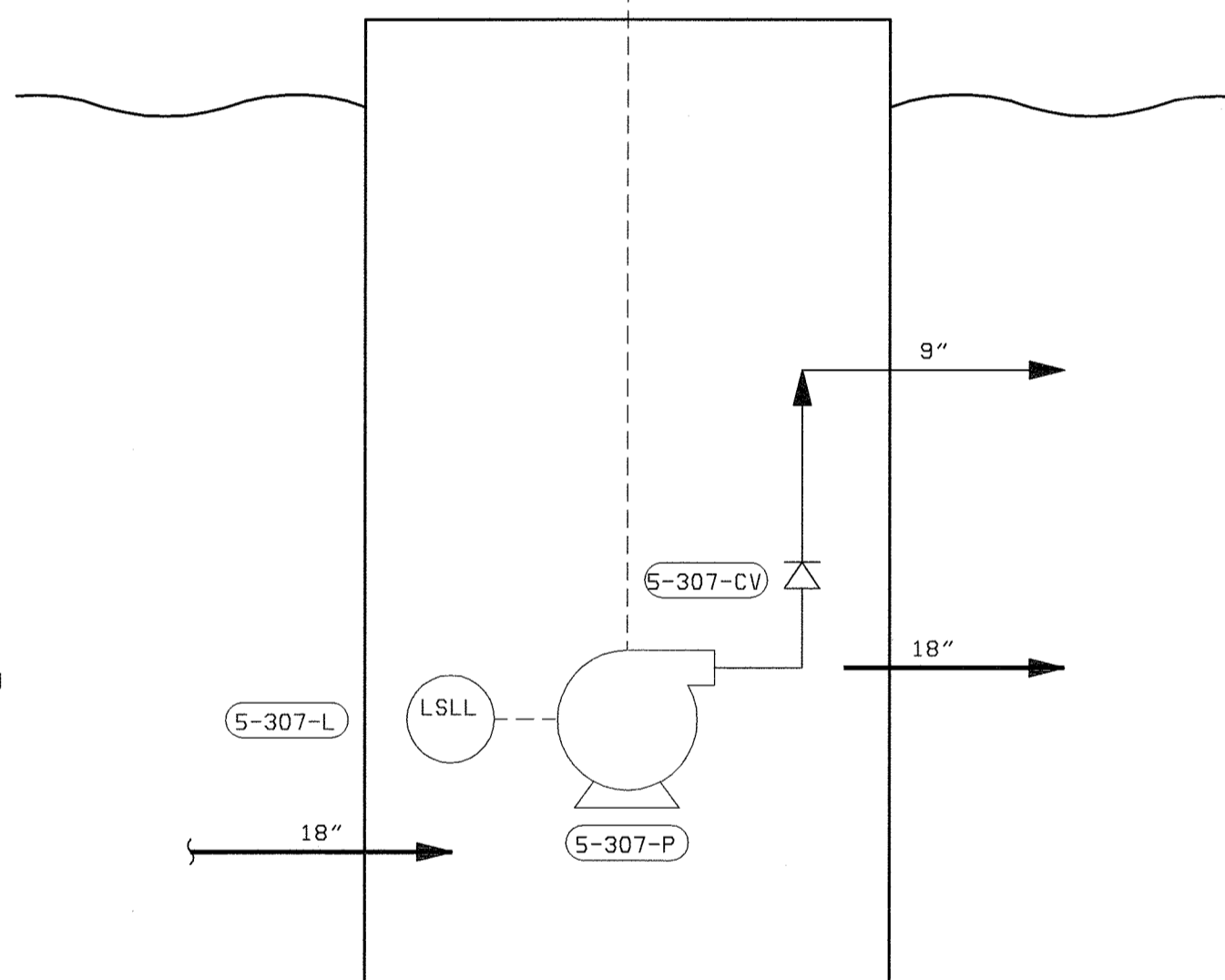
LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN
SHEET
13 OF 39
18

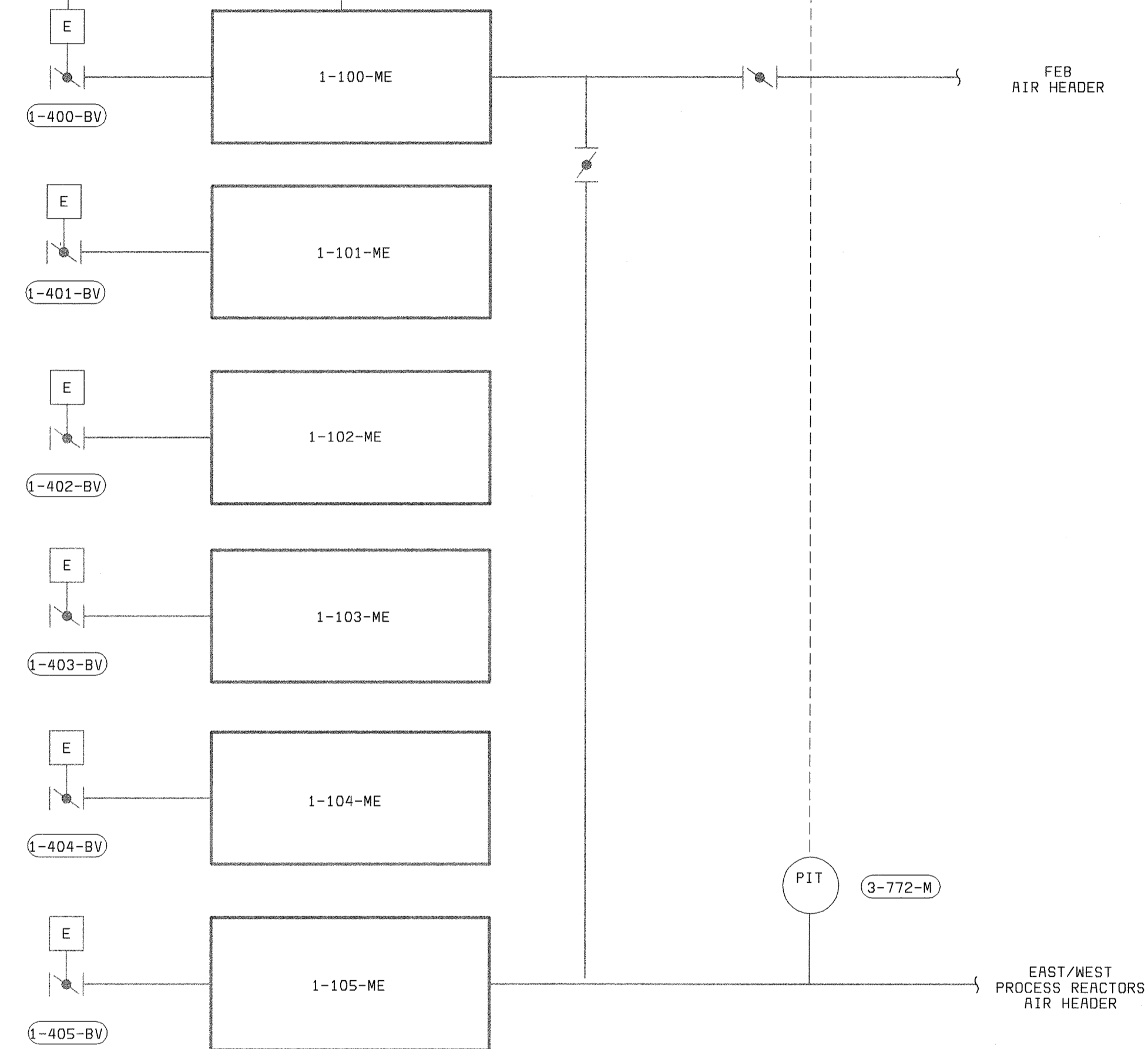
DB6725.6
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54" METER VAULT



PLANT DRAIN MANHOLE PUMP STATION



BLOWERS IN HEADWORKS

NOTES:

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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



BLACK & VEATCH
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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IN THE
STATE OF MARYLAND,
NO. 21876

DES: RSF
DRN: DAH
CHK: PWM
DATE: 04/22/02

DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP
7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR
04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM	

INSTRUMENTATION & CONTROLS

P & ID
MISCELLANEOUS

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION

CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

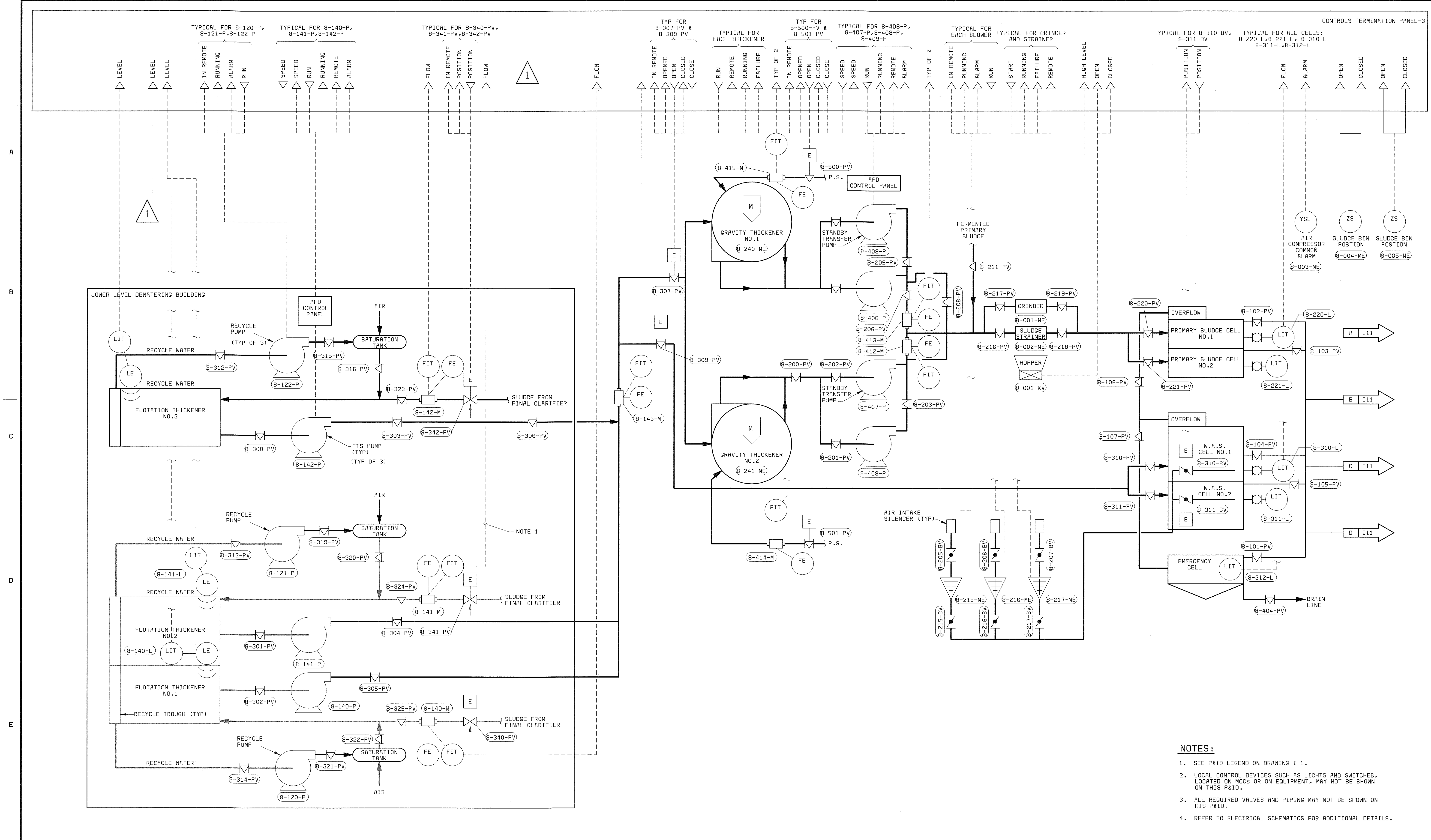
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
14 OF 39

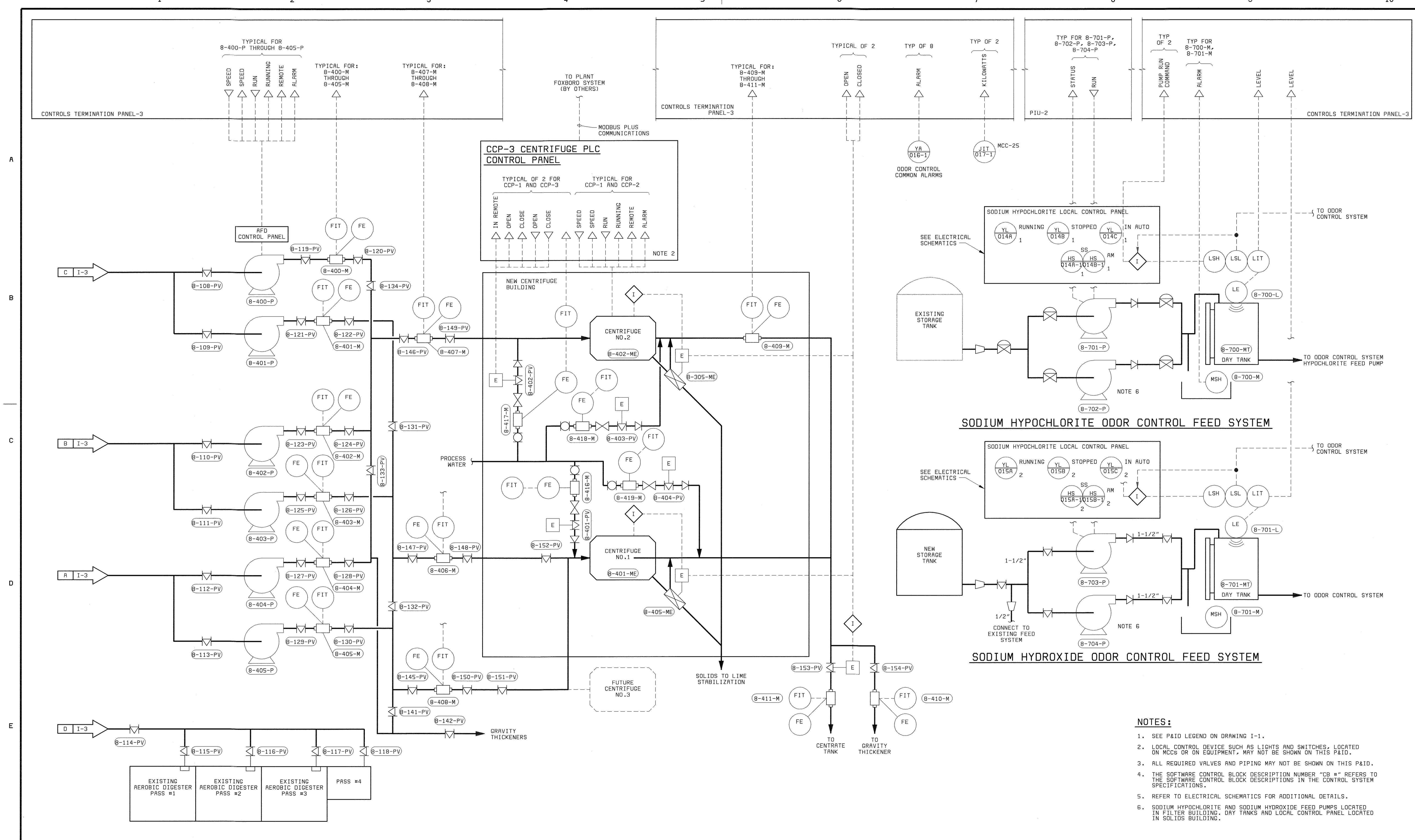
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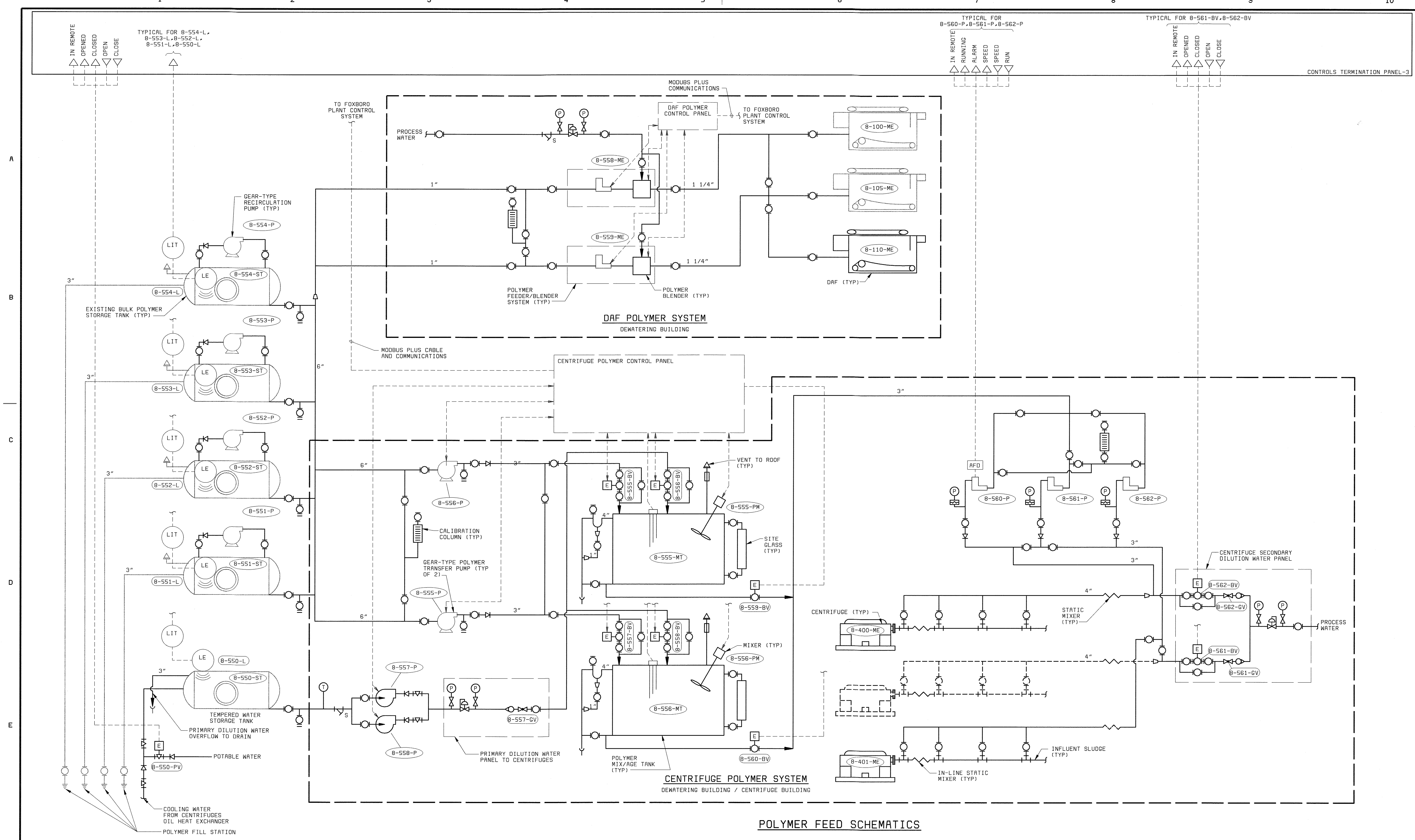
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DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP																				
7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR																				
04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM																					



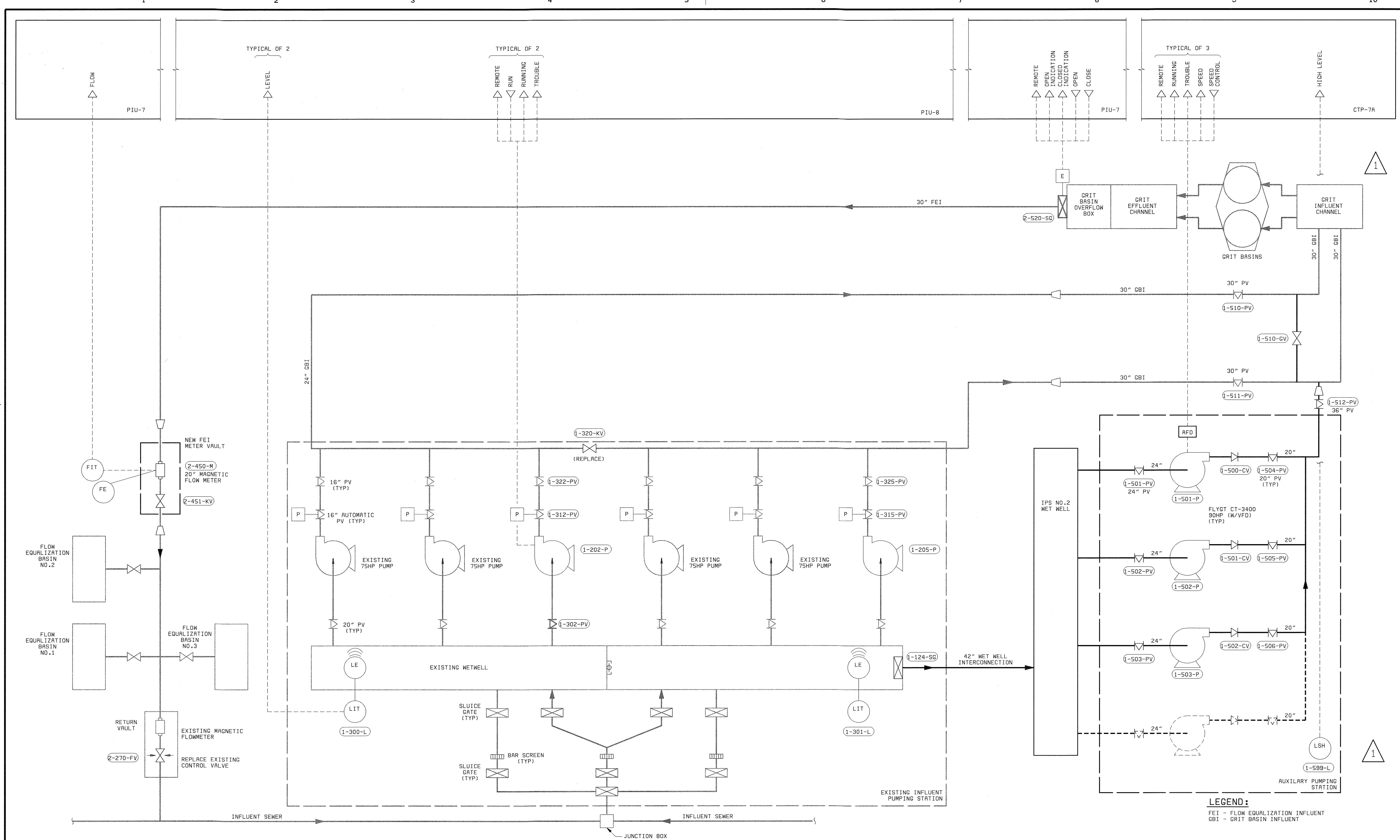
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 - ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
 - THE SOFTWARE CONTROL BLOCK DESCRIPTION NUMBER "CB #" REFERS TO THE SOFTWARE CONTROL BLOCK DESCRIPTIONS IN THE CONTROL SYSTEM SPECIFICATIONS.
 - REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.
 - SODIUM HYPOCHLORITE AND SODIUM HYDROXIDE FEED PUMPS LOCATED IN FILTER BUILDING. DAY TANKS AND LOCAL CONTROL PANEL LOCATED IN SOLIDS BUILDING.

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 DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RLS DRN: DAH CHK: PWM DATE: 04/22/02	7/22/05 CONFORMED TO CONSTRUCTION RECORDS REVISIONS AND RECORD OF ISSUE	RHH RJR RJR NO. BY CK APP	INSTRUMENTATION SOLIDS PROCESSING P&ID	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN SHEET 16 OF 39 I 11
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POLYMER FEED SCHEMATICS

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 DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RLS					INSTRUMENTATION POLYMER FEED SCHEMATIC	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: DAH	CHK: PWM	DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS			RHH/RJR/RJR



LEGEND:
 FEI - FLOW EQUALIZATION INFLUENT
 GBI - GRIT BASIN INFLUENT

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



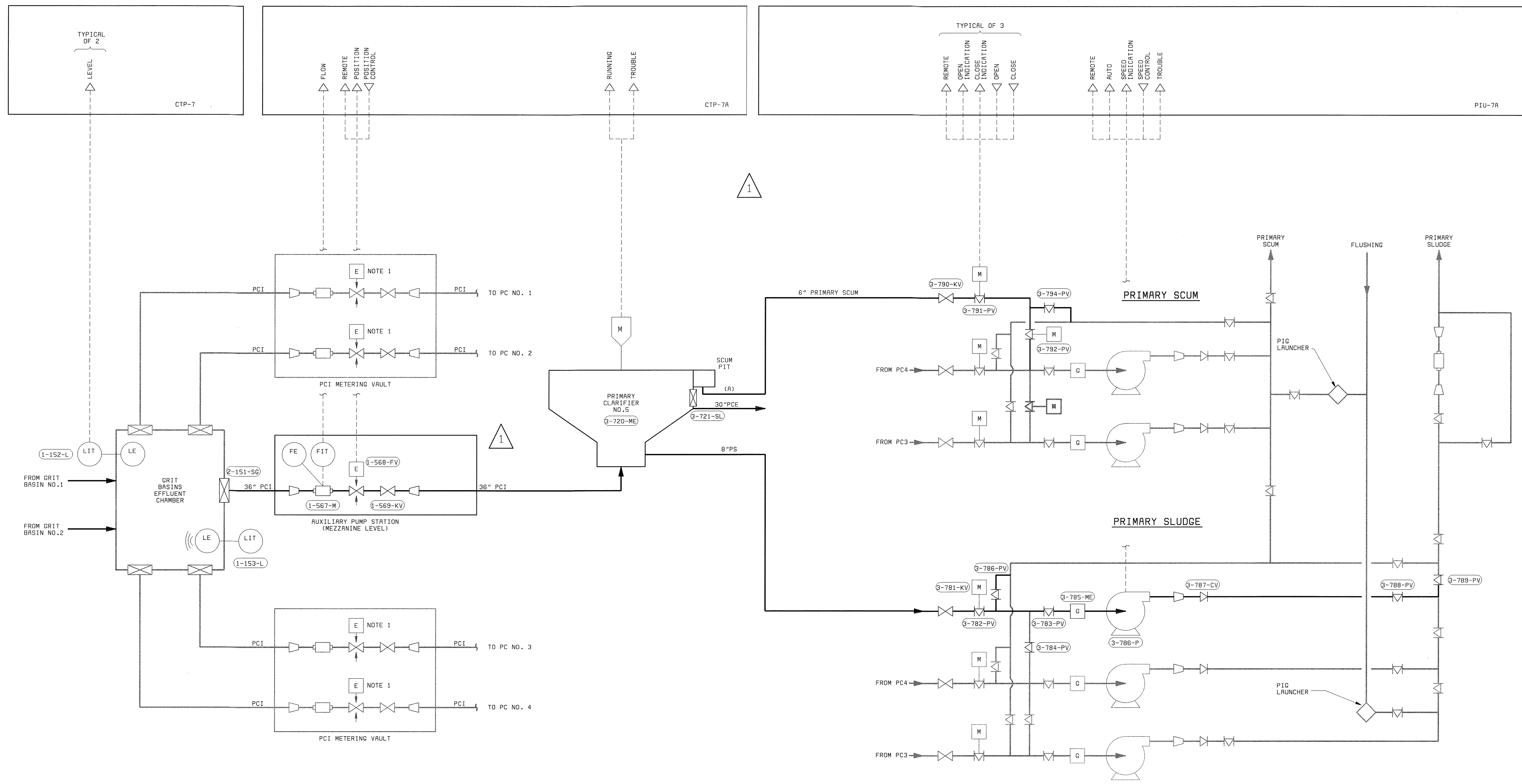
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DES: RSF							
DRN: DAH							
CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR	
DATE: 04/22/02	04/22/02	CONFORMED TO NEGOTIATED CHANGES		1	RSF	PWM	
		REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	

INSTRUMENTATION
HEADWORKS & INFLUENT PUMPING P & ID

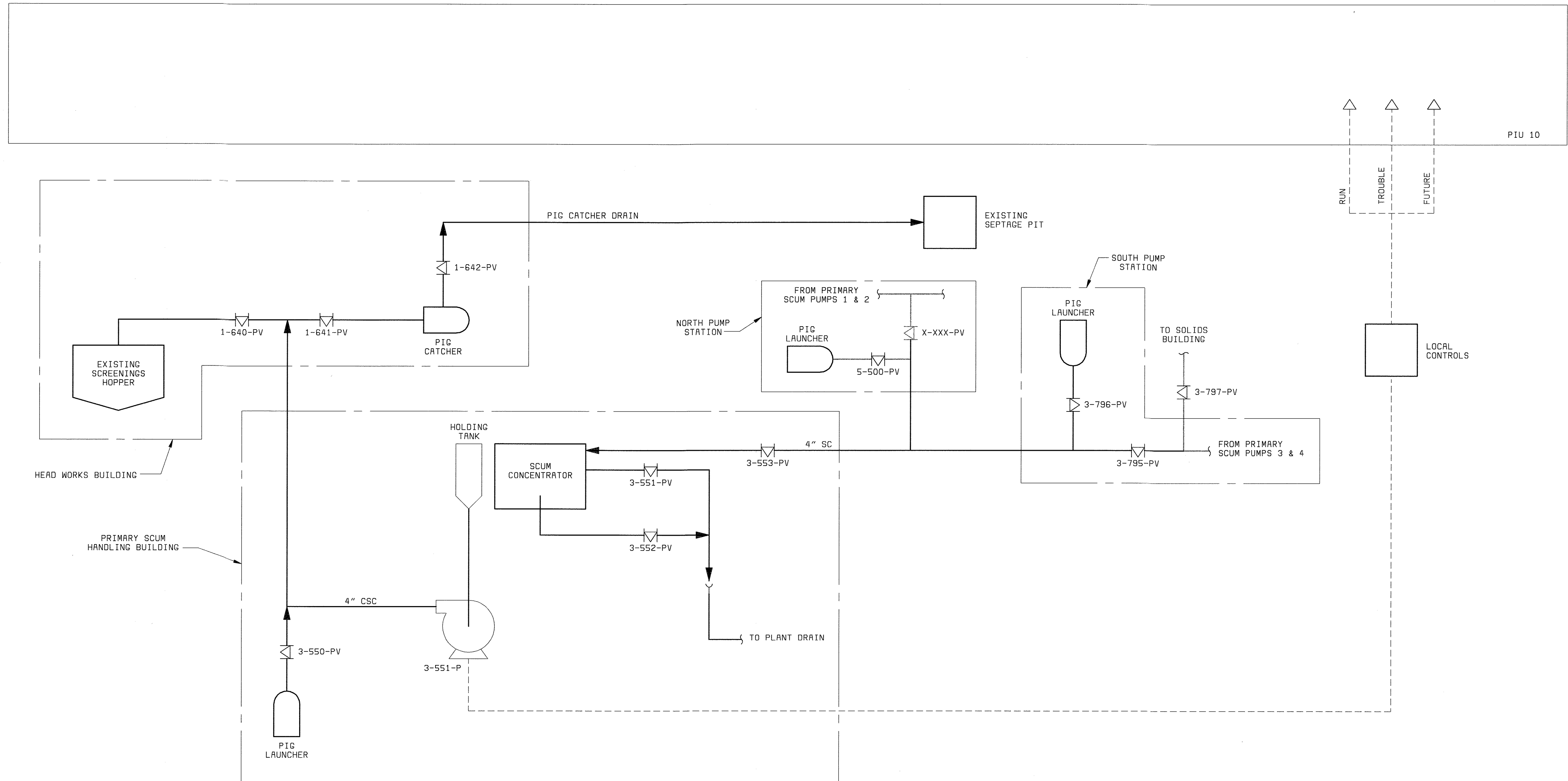
**LITTLE PATUXENT WATER RECLAMATION PLANT
 ADDITION NO. 6
 CONTROL SYSTEM EXPANSION**
 CAPITAL PROJECT S-6205
 CONTRACT NO. 20-3842
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
 SHEET 18 OF 39
113



- NOTE:**
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DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP																				
7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR																				
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DEPARTMENT OF PUBLIC WORKS
HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



BLACK & VEATCH LP
Gaithersburg, Maryland

REG. PROF. ENGR. DATE

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NO. 21876

DES: RSF									
DRN: TDR									
CHK: PWM									
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS				RHH	RJR	RJR	
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

INSTRUMENTATION

**P & ID
SCUM CONCENTRATOR**

**LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION**

CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

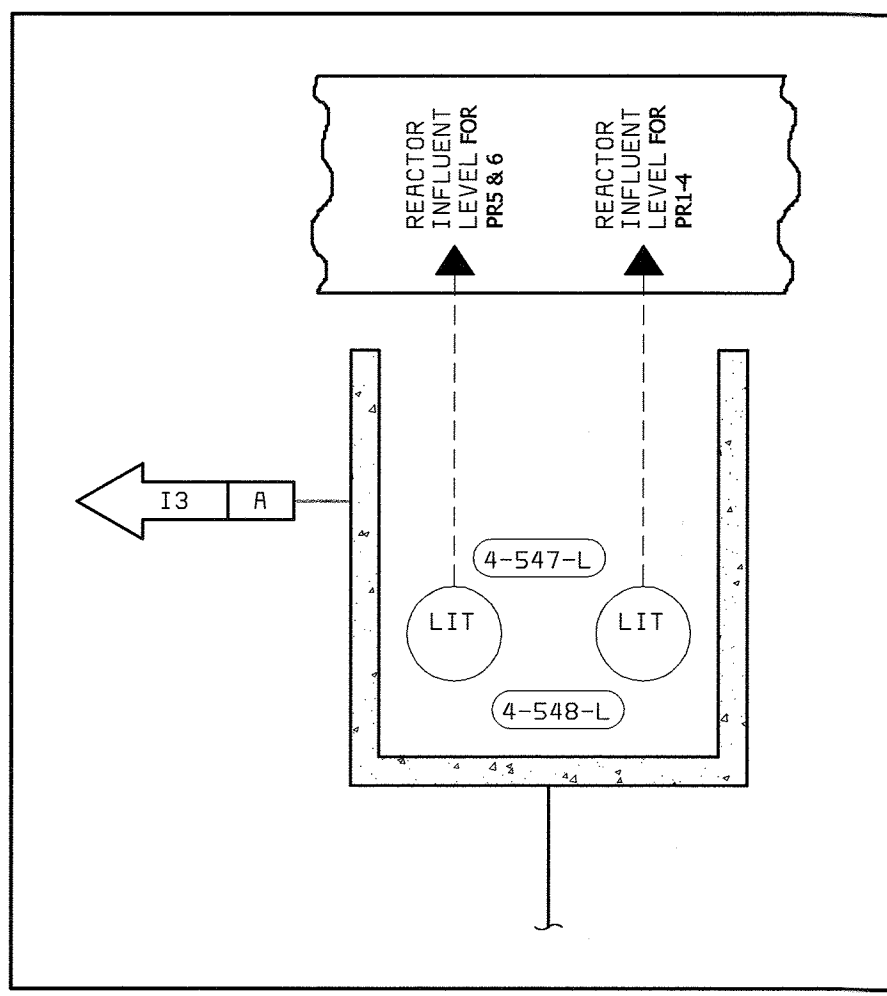
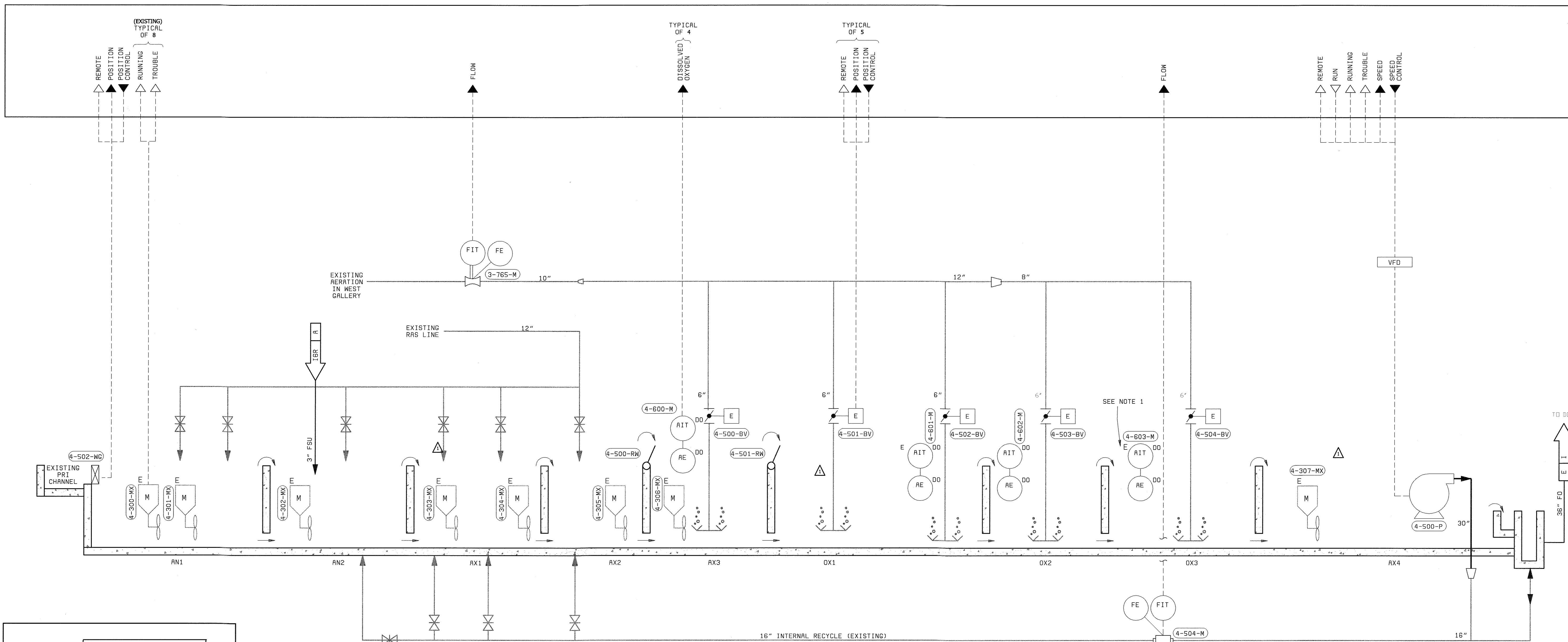
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
20 of 39

I 15

DES: RJS
FD: SRT



	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 1	4-300-MX	4-302-MX	4-303-MX	4-305-MX	4-306-MX				4-307-MX
PROCESS REACTOR 2	4-301-MX	4-310-MX	4-313-MX	4-315-MX	4-316-MX				4-317-MX
PROCESS REACTOR 3	4-320-MX	4-322-MX	4-323-MX	4-325-MX	4-326-MX				4-327-MX
PROCESS REACTOR 4	4-321-MX	4-332-MX	4-334-MX	4-335-MX	4-336-MX				4-337-MX
PROCESS REACTOR 5	4-340-MX	4-342-MX	4-343-MX	4-345-MX	4-346-MX				4-347-MX
PROCESS REACTOR 6	4-350-MX	4-352-MX	4-353-MX	4-355-MX	4-356-MX				4-357-MX

	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 1					4-500-BV	4-501-BV	4-503-BV	4-504-BV	
PROCESS REACTOR 2					4-510-BV	4-511-BV	4-513-BV	4-514-BV	
PROCESS REACTOR 3					4-520-BV	4-521-BV	4-523-BV	4-524-BV	
PROCESS REACTOR 4					4-530-BV	4-531-BV	4-533-BV	4-534-BV	
PROCESS REACTOR 5					4-540-BV	4-541-BV	4-543-BV	4-544-BV	
PROCESS REACTOR 6					4-550-BV	4-551-BV	4-553-BV	4-554-BV	

	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 1					4-600-M	4-601-M	4-602-M		4-603-M
PROCESS REACTOR 2					4-610-M	4-611-M	4-612-M		4-613-M
PROCESS REACTOR 3					4-620-M	4-621-M	4-622-M		4-623-M
PROCESS REACTOR 4					4-630-M	4-631-M	4-632-M		4-633-M
PROCESS REACTOR 5					4-640-M	4-641-M	4-642-M		4-643-M
PROCESS REACTOR 6					4-650-M	4-651-M	4-652-M		4-653-M

	INFLUENT WEIR GATE	INTERNAL RECYCLE PUMP	INTERNAL RECYCLE FLOW	AERATION FLOW
PROCESS REACTOR 1	4-502-WG	4-500-P	4-504-M	3-765-M
PROCESS REACTOR 2	4-510-WG	4-501-P	4-505-M	3-766-M
PROCESS REACTOR 3	4-520-WG	4-502-P	4-506-M	3-772-M
PROCESS REACTOR 4	4-530-WG	4-503-P	4-507-M	3-767-M
PROCESS REACTOR 5	4-540-WG	4-504-P	4-508-M	3-768-M
PROCESS REACTOR 6	4-550-WG	4-505-P	4-509-M	3-769-M

- NOTES:**
- "E" DENOTES EXISTING MIXER TO BE RELOCATED AS SHOWN.
 - "M" DENOTES 3.2 HP MOTOR, ALL OTHER 1.5 HP.
 - SEE P&ID LEGEND ON DRAWING I-1.
 - LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCCS OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
 - ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
 - REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.

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

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

THIS DRAWING WAS
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A REGISTERED
PROFESSIONAL ENGINEER
IN THE
STATE OF MARYLAND,
NO. 21876

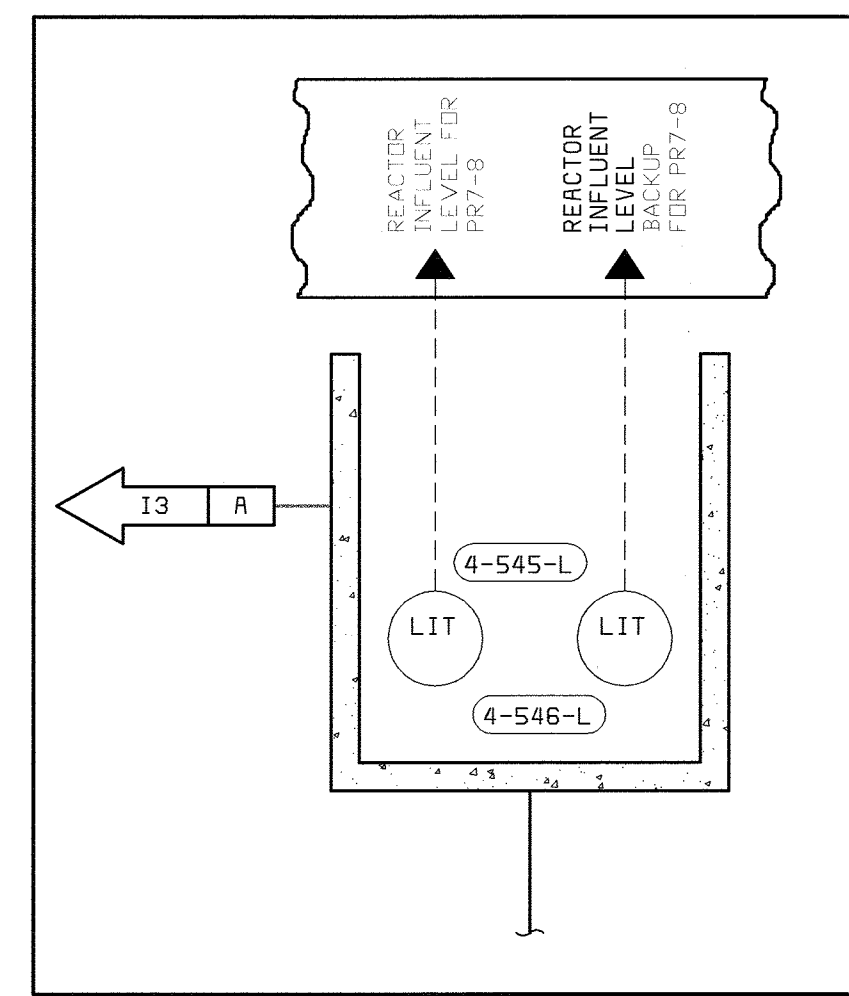
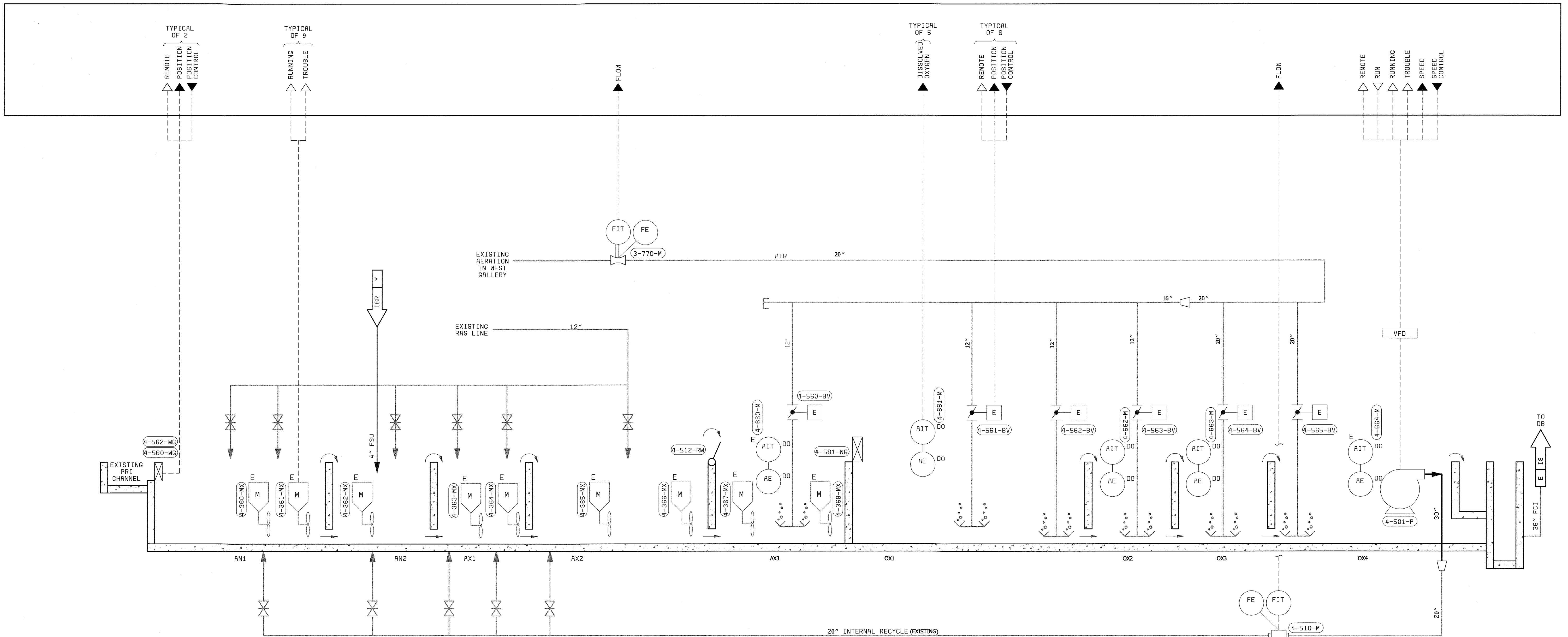
DES: RSF									
DRN: DAH									
CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR			
DATE: 04/22/02	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM				
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

INSTRUMENTATION
PROCESS REACTOR NO. 1 P & ID
(TYPICAL OF PR'S 1 - 6)

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
SHEET 21 OF 39
I16

058472.6
FD58472R



DETAIL A
NO SCALE

	MIXER								
	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 7	4-360-MX	4-362-MX	4-363-MX	4-365-MX	4-367-MX				
PROCESS REACTOR 8	4-361-MX	4-364-MX	4-364-MX	4-366-MX	4-368-MX				
	4-380-MX	4-382-MX	4-383-MX	4-385-MX	4-387-MX				
	4-381-MX	4-384-MX	4-384-MX	4-386-MX	4-388-MX				

	ELECTRIC BUTTERFLY VALVE								
	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 7					4-560-BV	4-563-BV	4-564-BV	4-565-BV	
PROCESS REACTOR 8					4-580-BV	4-583-BV	4-584-BV	4-585-BV	

	DO PROBE								
	AN1	AN2	AX1	AX2	AX3	OX1	OX2	OX3	AX4
PROCESS REACTOR 7					4-660-M	4-661-M	4-662-M	4-663-M	4-664-M
PROCESS REACTOR 8					4-680-M	4-681-M	4-682-M	4-683-M	4-684-M

	INFLUENT WEIR GATE	INTERNAL RECYCLE PUMP	INTERNAL RECYCLE FLOW	AERATION FLOW
	PROCESS REACTOR 7	4-560-WG	4-506-P	4-510-M
PROCESS REACTOR 8	4-562-WG	4-508-P	4-511-M	3-771-M
	4-580-WG			
	4-582-WG			

- NOTES:**
- "E" DENOTES EXISTING MIXER TO BE RELOCATED AS SHOWN.
 - "*" DENOTES 3.2 HP MOTOR, ALL OTHER 1.5 HP.
 - SEE P&ID LEGEND ON DRAWING I-1.
 - LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCCs OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
 - ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
 - REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.

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. 21876

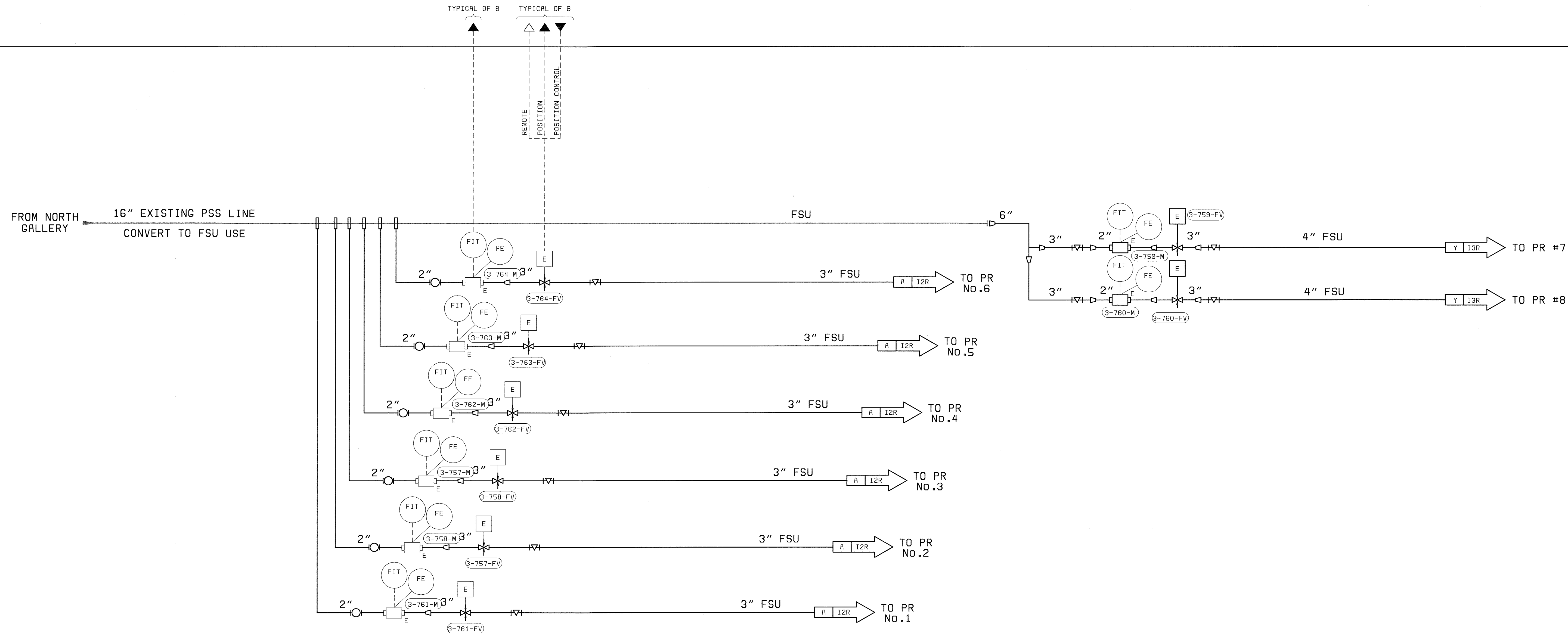
DES: RSF									
DRN: DAH									
CHK: PWM									
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR	RJR			
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

INSTRUMENTATION
PROCESS REACTOR NO. 7 P & ID
(TYPICAL OF PR'S 7 & 8)

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
SHEET 22 OF 39
I 17

CTP-6



NOTES:

1. SEE P&ID LEGEND ON DRAWING I-1.
2. LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCC'S OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
3. ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
4. REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.

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HOWARD COUNTY, MARYLAND

CHIEF, BUREAU OF UTILITIES DATE



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NO. 21876

DES: RVJ/RSF									
DRN: RCF									
CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS			RHH	RJR	RJR		
DATE: 04/22/02	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1		RSF	PWM			
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			

INSTRUMENTATION

P & ID
FSU LINES
WEST GALLERY

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION

CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

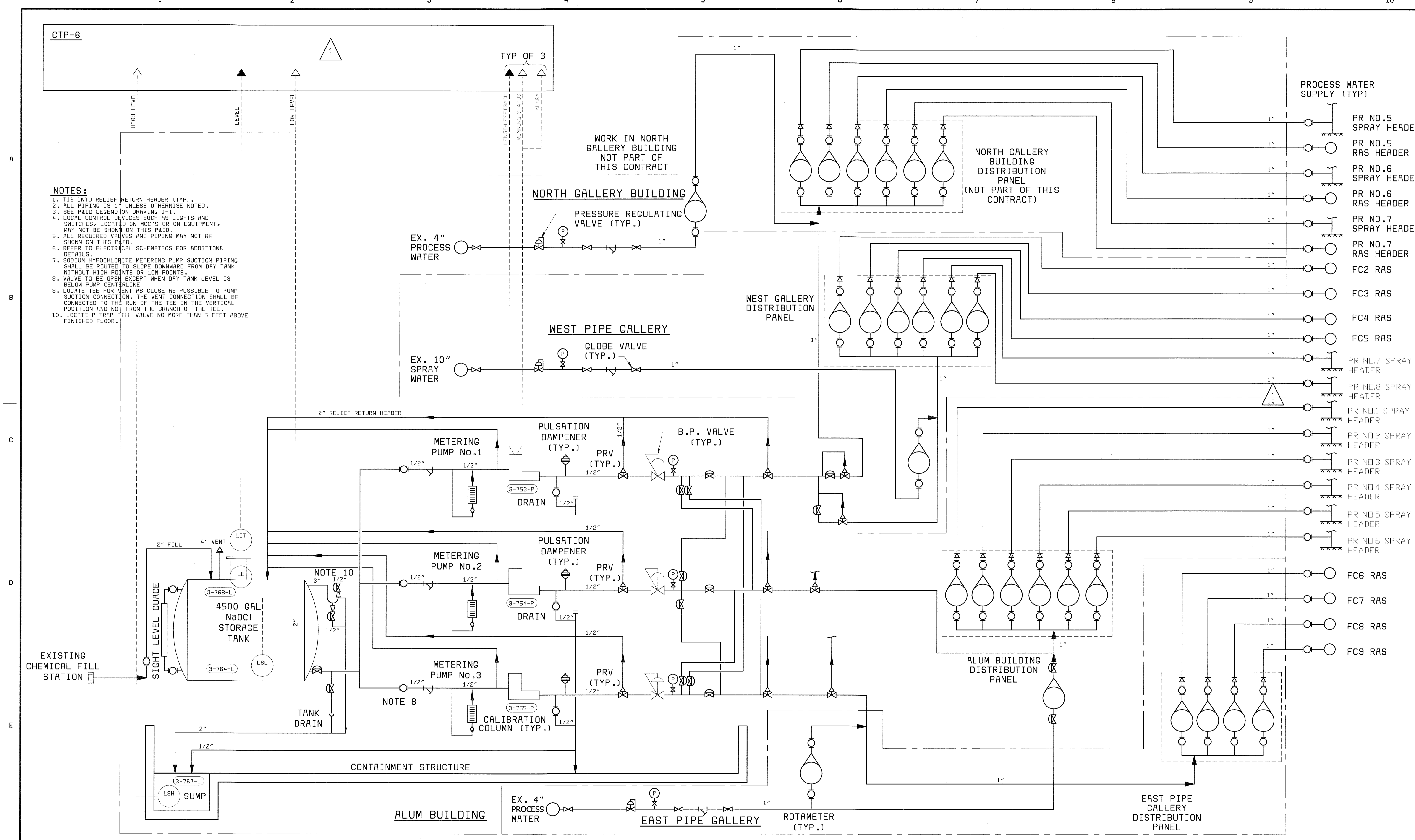
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
25 OF 39

I20

058472-6
FD56472A



CTP-6

- NOTES:**
1. TIE INTO RELIEF RETURN HEADER (TYP).
 2. ALL PIPING IS 1" UNLESS OTHERWISE NOTED.
 3. SEE P&ID LEGEND ON DRAWING 1-1.
 4. LOCAL CONTROL DEVICES SUCH AS LIGHTS AND SWITCHES, LOCATED ON MCC'S OR ON EQUIPMENT, MAY NOT BE SHOWN ON THIS P&ID.
 5. ALL REQUIRED VALVES AND PIPING MAY NOT BE SHOWN ON THIS P&ID.
 6. REFER TO ELECTRICAL SCHEMATICS FOR ADDITIONAL DETAILS.
 7. SODIUM HYPOCHLORITE METERING PUMP SUCTION PIPING SHALL BE ROUTED TO SLOPE DOWNWARD FROM DAY TANK WITHOUT HIGH POINTS OR LOW POINTS.
 8. VALVE TO BE OPEN EXCEPT WHEN DAY TANK LEVEL IS BELOW PUMP CENTERLINE.
 9. LOCATE TEE FOR VENT AS CLOSE AS POSSIBLE TO PUMP SUCTION CONNECTION. THE VENT CONNECTION SHALL BE CONNECTED TO THE RUN OF THE TEE IN THE VERTICAL POSITION AND NOT FROM THE BRANCH OF THE TEE.
 10. LOCATE P-TRAP FILL VALVE NO MORE THAN 5 FEET ABOVE FINISHED FLOOR.

- PROCESS WATER SUPPLY (TYP)
- PR NO.5 SPRAY HEADER
 - PR NO.5 RAS HEADER
 - PR NO.6 SPRAY HEADER
 - PR NO.6 RAS HEADER
 - PR NO.7 SPRAY HEADER
 - PR NO.7 RAS HEADER
 - FC2 RAS
 - FC3 RAS
 - FC4 RAS
 - FC5 RAS
 - PR NO.7 SPRAY HEADER
 - PR NO.8 SPRAY HEADER
 - PR NO.1 SPRAY HEADER
 - PR NO.2 SPRAY HEADER
 - PR NO.3 SPRAY HEADER
 - PR NO.4 SPRAY HEADER
 - PR NO.5 SPRAY HEADER
 - PR NO.6 SPRAY HEADER
 - FC6 RAS
 - FC7 RAS
 - FC8 RAS
 - FC9 RAS

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

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Gaithersburg, Maryland
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IN THE
STATE OF MARYLAND,
NO. 21876

DES: RSF					
DRN:					
CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR
DATE: 04/22/02	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

INSTRUMENTATION
P & ID
RAS CHLORINATION
SYSTEM

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842
HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN
SHEET
29 OF 39
124

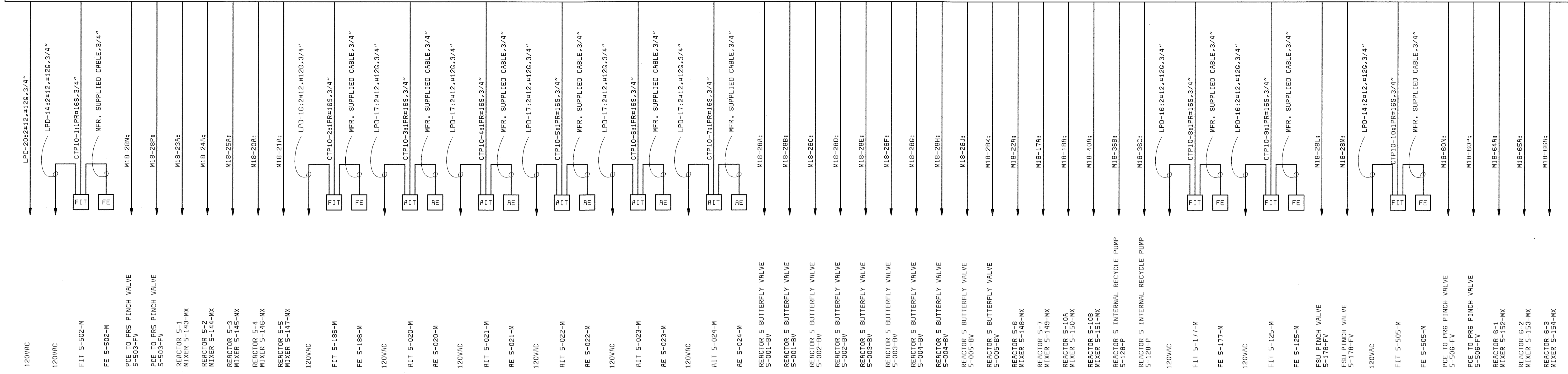
CTP-10

CONTINUED BELOW

A B C

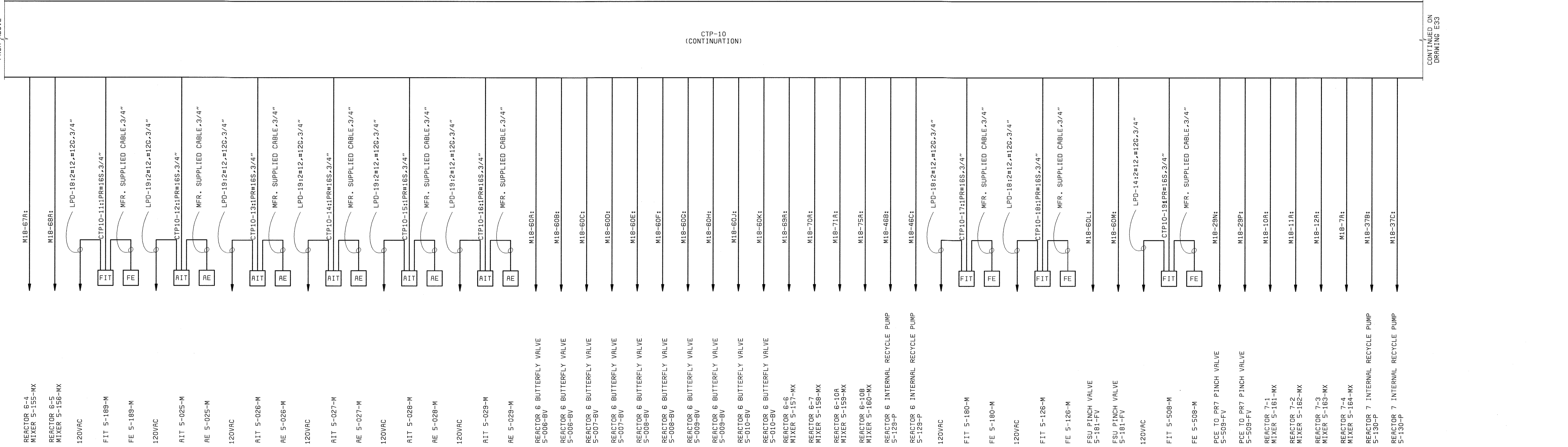
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F



CTP-10 ONE-LINE DIAGRAM (NBB)

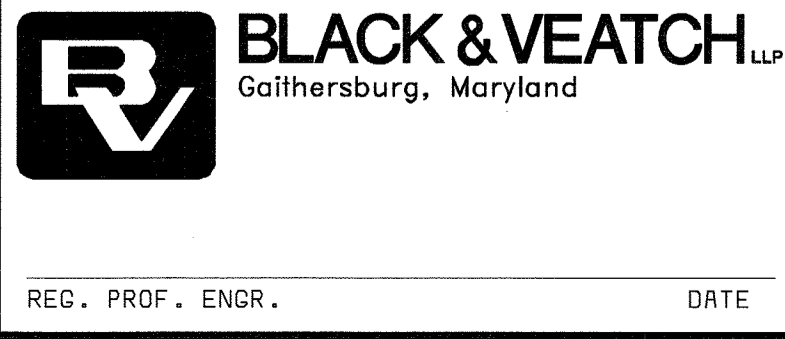
CTP-10 (CONTINUATION)



CTP-10 ONE-LINE DIAGRAM (NBB) (CONTINUED)

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

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



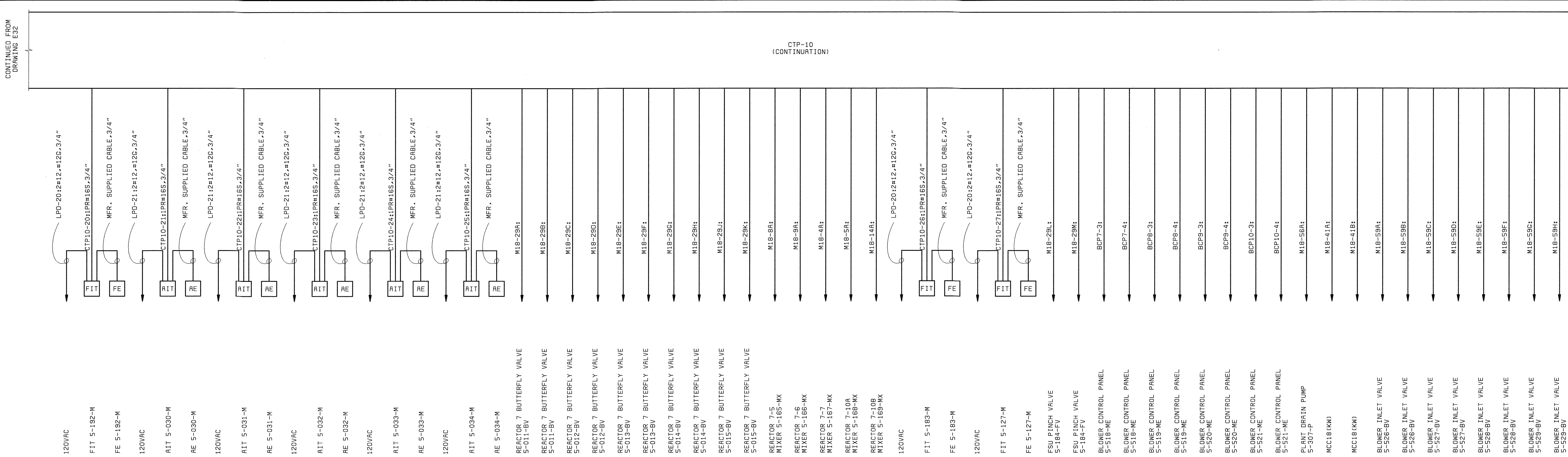
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IN THE
STATE OF MARYLAND,
NO. 21876

DES: RSF					
DRN: TDR					
CHK: PWM					
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH	RJR	RJR
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	APP

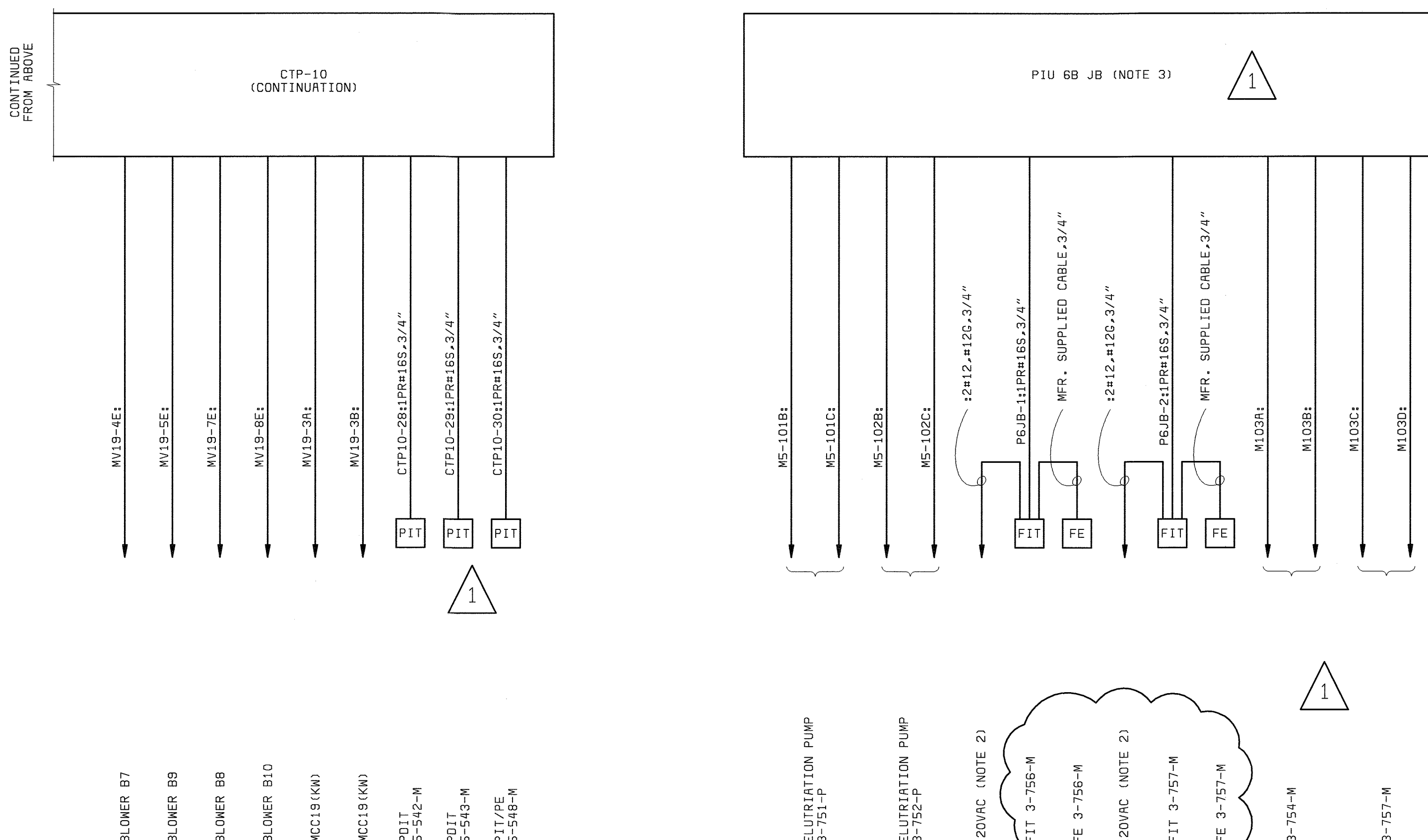
NORTH BLOWER BUILDING
INSTRUMENTATION
CONTROL SYSTEM SCHEMATIC
ONE-LINE DIAGRAM
CTP-10

LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842
HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
SHEET 30 OF 39
125



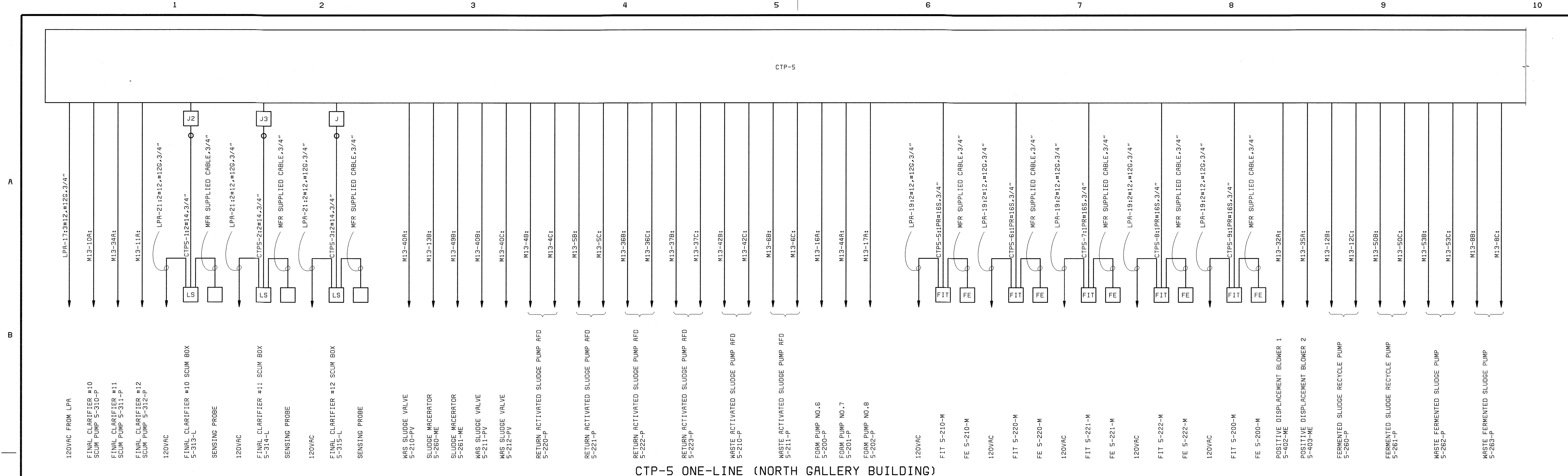
CTP-10 ONE-LINE DIAGRAM (NBB) (CONTINUED)



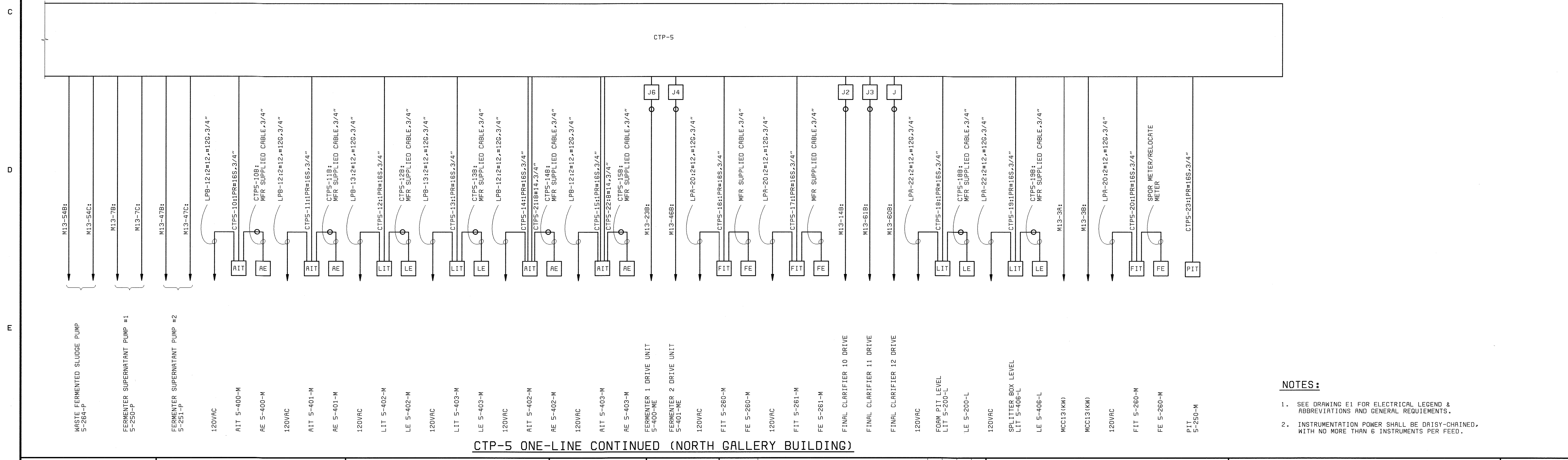
PIU 6B JUNCTION BOX ONE-LINE DIAGRAM (WEST GALLERY)

- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
 - DAISY CHAIN INSTRUMENTS TO EXISTING LIGHTING PANEL CIRCUIT.
 - COIL ENOUGH WIRE INTO JB TO EXTEND TO PIU IN FUTURE CONTRACT.


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 DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RSF						NORTH BLOWER BUILDING & WEST PIPE GALLERY FIELD LAB INSTRUMENTATION CONTROL SYSTEM ONE-LINE DIAGRAM CTP-10 CONTINUATION AND WEST GALLERY	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN	
			DRN: RSF	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH	RJR	RJR				
			CHK: PWM	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM				
			DATE: 04/22/02		REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP			126



CTP-5 ONE-LINE (NORTH GALLERY BUILDING)

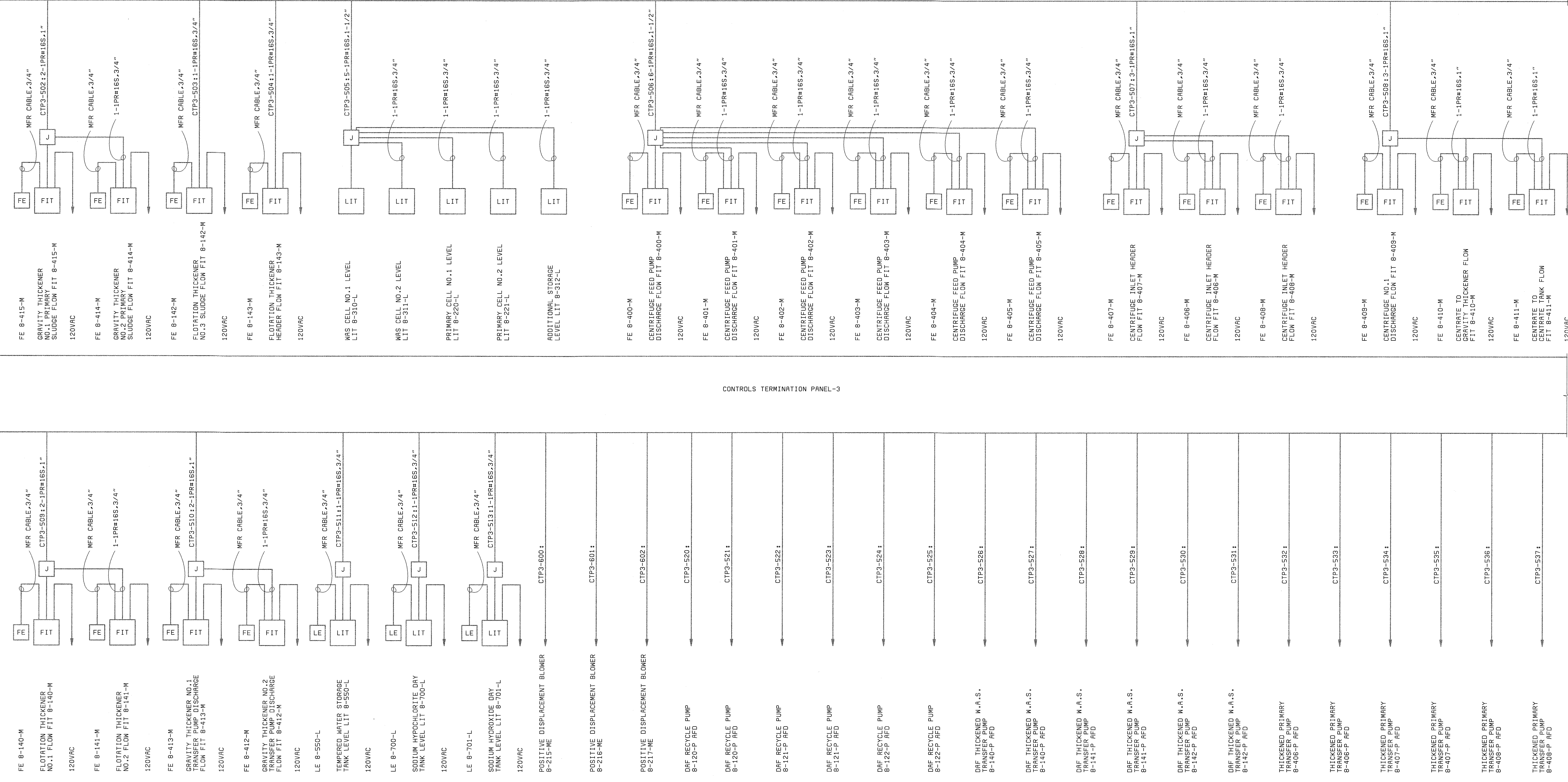


- NOTES:**
- SEE DRAWING E1 FOR ELECTRICAL LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
 - INSTRUMENTATION POWER SHALL BE DAISY-CHAINED, WITH NO MORE THAN 6 INSTRUMENTS PER FEED.

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 DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: GNS, RSF DRN: MDR CHK: PWM DATE: 04/22/02	7/22/05 CONFORMED TO CONSTRUCTION RECORDS REVISIONS AND RECORD OF ISSUE	NORTH GALLERY BUILDING INSTRUMENTATION CONTROL SYSTEM ONE-LINE DIAGRAM CTP-5	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN SHEET 32 OF 39 127
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CONTROLS TERMINATION PANEL-3

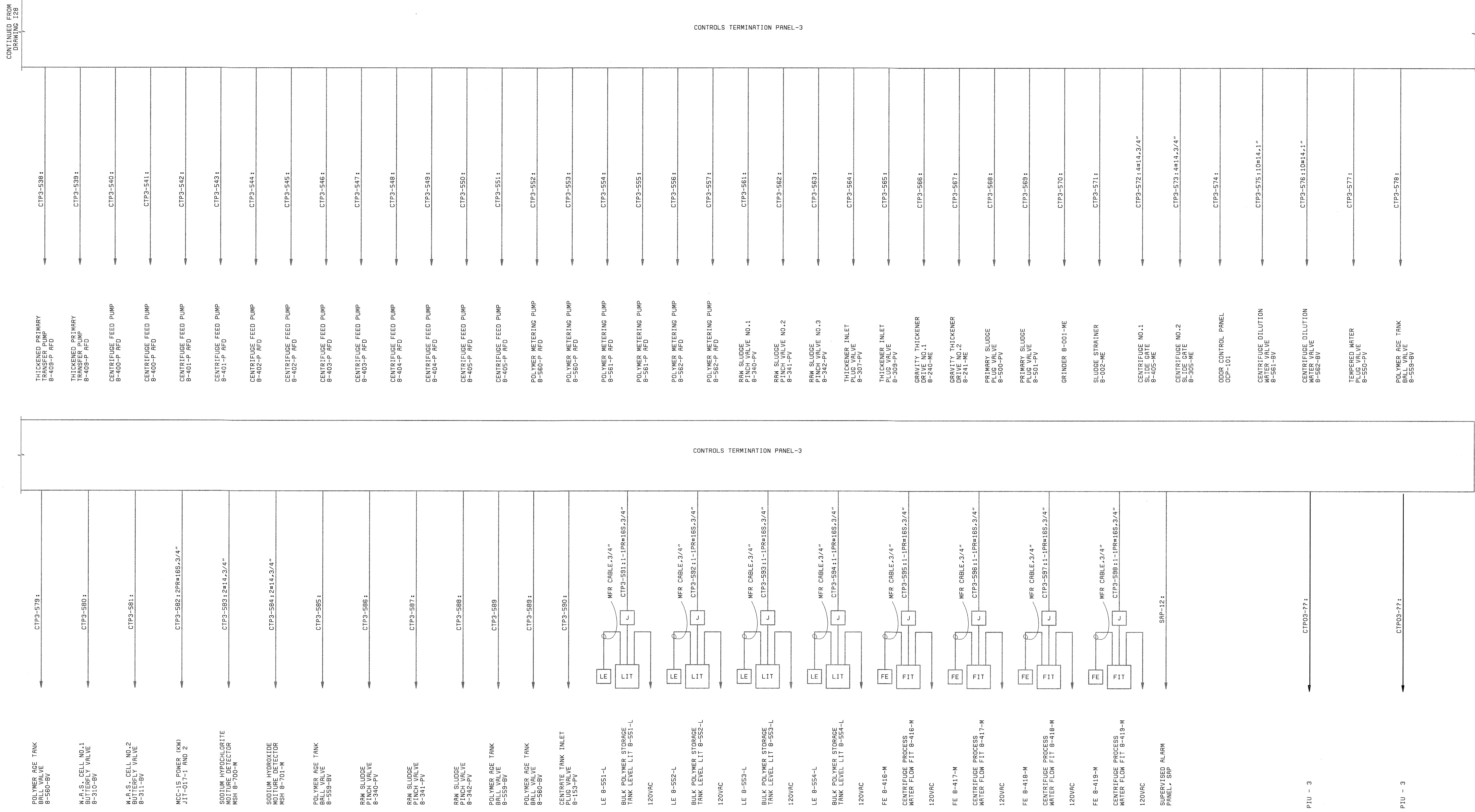
CONTROLS TERMINATION PANEL-3



- NOTES:**
- SEE DRAWING 11 FOR LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.
 - INSTRUMENTATION POWER SHALL BE FROM 120V POWER PANEL PP, AND SHALL BE DAISY-CHAINED AS REQUIRED. NO MORE THAN 6 INSTRUMENTS SHALL BE DAISY-CHAINED FROM ONE CIRCUIT BREAKER.

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 DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: GNS, RSF					SOLIDS PROCESSING BUILDING INSTRUMENTATION ONE-LINE DIAGRAM CONTROLS TERMINATION PANEL - 3	LITTLE PATUXENT WATER RECLAMATION PLANT ADDITION NO. 6 CONTROL SYSTEM EXPANSION CAPITAL PROJECT S-6205 CONTRACT NO. 20-3842 HOWARD COUNTY, MARYLAND	SCALE AS SHOWN
			DRN: RSF	CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH/RJR/RJR			
			DATE: 04/22/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK	APP	128

069472-6
FD58472A



NOTES:
 1. SEE DRAWING I1 FOR LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

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

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

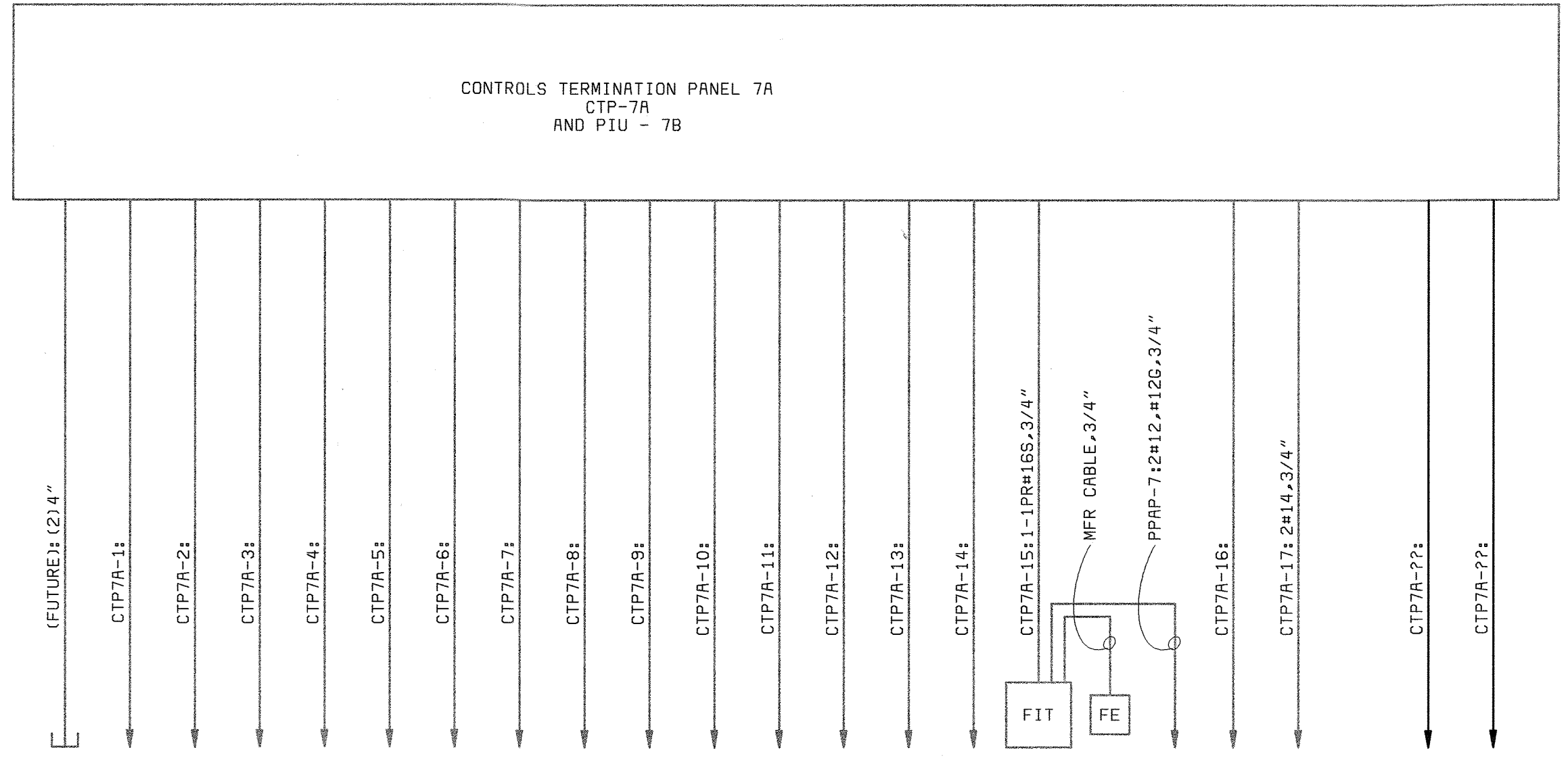
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 NO. 21876

DES: RSF					
DRN: RSF					
CHK: PWM					
DATE: 04/22/02	7/22/05	CONFORMED TO CONSTRUCTION RECORDS	RHH	RJR	RJR
	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

SOLIDS PROCESSING BUILDING
 INSTRUMENTATION
 ONE-LINE DIAGRAM
 CONTROLS TERMINATION PANEL - 3
 CONTINUED

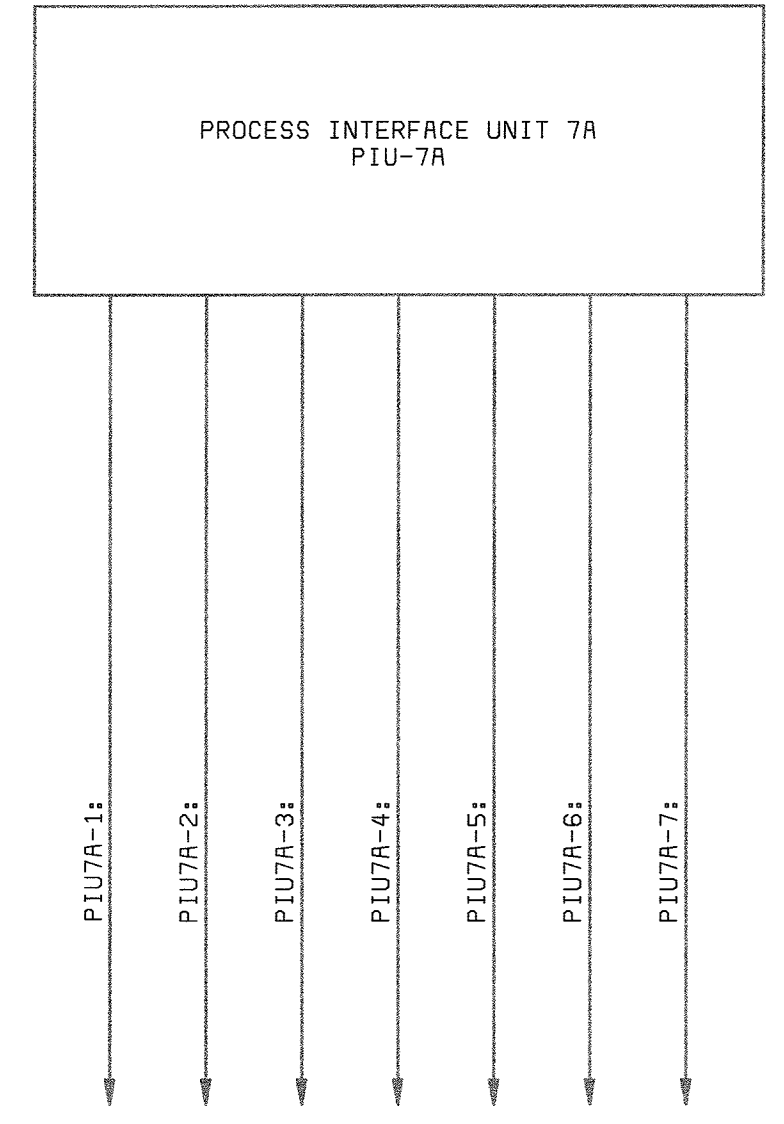
LITTLE PATUXENT WATER RECLAMATION PLANT
 ADDITION NO. 6
 CONTROL SYSTEM EXPANSION
 CAPITAL PROJECT S-6205
 CONTRACT NO. 20-3842
 HOWARD COUNTY, MARYLAND

SCALE AS SHOWN
 SHEET 34 OF 39
 129



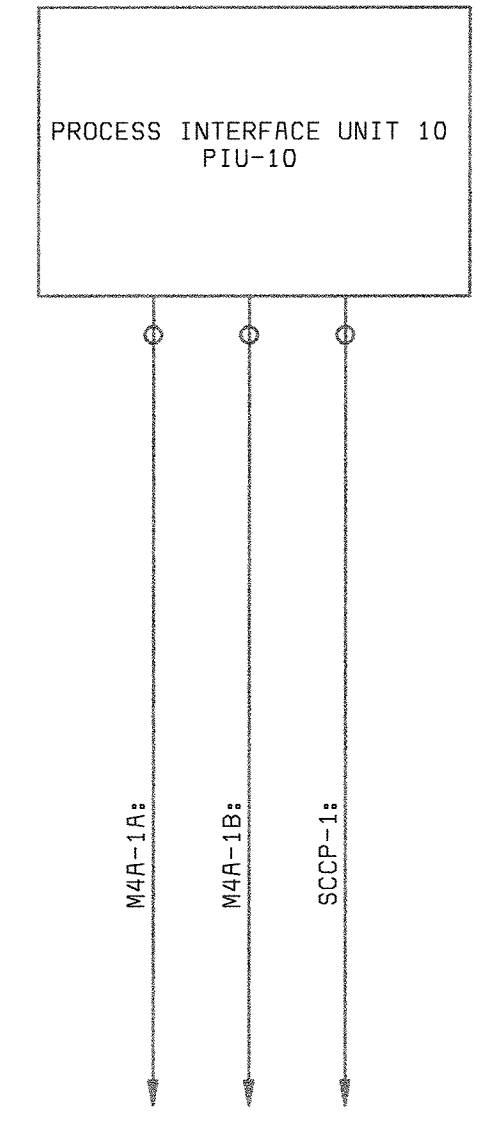
- TO GRIT BUILDING
- MAIN SEWAGE PUMP NO.7
1-501-P AFD
- MAIN SEWAGE PUMP NO.7
1-501-P AFD
- MAIN SEWAGE PUMP NO.9
1-503-P AFD
- MAIN SEWAGE PUMP NO.9
1-503-P AFD
- PCS CLARIFIER DRIVE
CONTROL PANEL
- INFLUENT PINCH VALVE
1-568-TV
- INFLUENT PINCH VALVE
1-568-TV
- MAIN SEWAGE PUMP NO.8
1-502-P AFD
- MAIN SEWAGE PUMP NO.8
1-502-P AFD
- 480V MCC16 MAIN, UNIT 1A
(KW SIGNAL)
- 480V MCC16 MAIN, UNIT 1A
(BREAKER STATUS)
- 480V MCC16 ITC UNIT 5A
(BREAKER STATUS)
- 480V MCC16 MAIN, UNIT 10A
(KW SIGNAL)
- 480V MCC16 MAIN, UNIT 10A
(BREAKER STATUS)
- PCS FLOW METER
1-567-M
- FLOW ELEMENT
- 120VAC POWER
- SUMP PUMP 1-589-P
CONTROL PANEL
- TEMPERATURE CONTROL PANEL
TCP-1
- PIU-7
- PIU-7

PROCESS INTERFACE UNIT 7 EXPANSION
(AUXILIARY PUMP STATION)



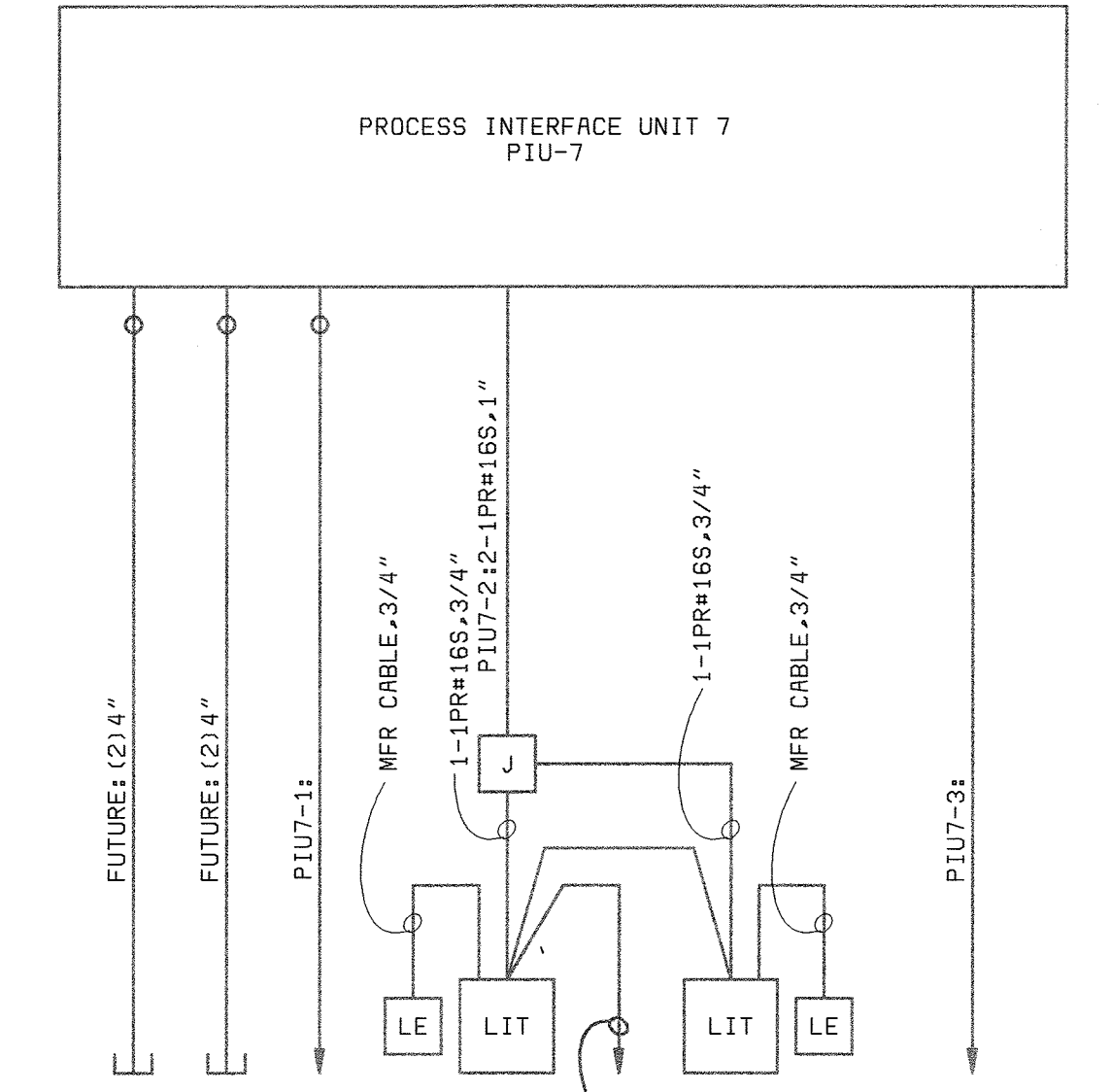
- SLUDGE GRINDER
CONTROL PANEL
- SLUDGE PUMP
3-117-P AFD
- SLUDGE PUMP
3-117-P AFD
- PLUG VALVE
3-782-P AFD
- PLUG VALVE
3-791-PV
- PLUG VALVE
3-792-PV
- PLUG VALVE
3-793-PV

PROCESS INTERFACE UNIT 7A
(SOUTH SLUDGE PUMPING STATION)



- 480V MCC4A UNIT 1B
(KW SIGNAL)
- 480V MCC4A UNIT 1C
(BREAKER STATUS)
- SOLUBLE CONCENTRATOR
CONTROL PANEL, SSCP

PROCESS INTERFACE UNIT 10
(NORTH BLOWER BUILDING)



- TO AUX PUMPING STATION
- TO HEADWORKS BUILDING
- FEL FLOW METER
2-450-M
- LEVEL ELEMENT
- GRIT BASIN LEVEL
1-152-L
- 120VAC POWER FROM EXISTING
GRIT BUILDING PANEL GBLP
(NOTE 2)
- GRIT BASIN LEVEL
1-153-L
- LEVEL ELEMENT
- SLUDGE GATE
2-520-SG

PROCESS INTERFACE UNIT 7
(GRIT BUILDING)

NOTES:

1. SEE DRAWING I1 FOR LEGEND & ABBREVIATIONS AND GENERAL REQUIREMENTS.

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
DONALD R. STEVENS
A REGISTERED
PROFESSIONAL ENGINEER
IN THE
STATE OF MARYLAND,
NO. 21876

DES: RSF					
DRN: RSF					
CHK: PWM	7/22/05	CONFORMED TO CONSTRUCTION RECORDS		RHH	RJR
	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM
DATE: 04/22/02	DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

INSTRUMENTATION

**INSTRUMENTATION ONE-LINE
DIAGRAMS**

**LITTLE PATUXENT WATER RECLAMATION PLANT
ADDITION NO. 6
CONTROL SYSTEM EXPANSION**

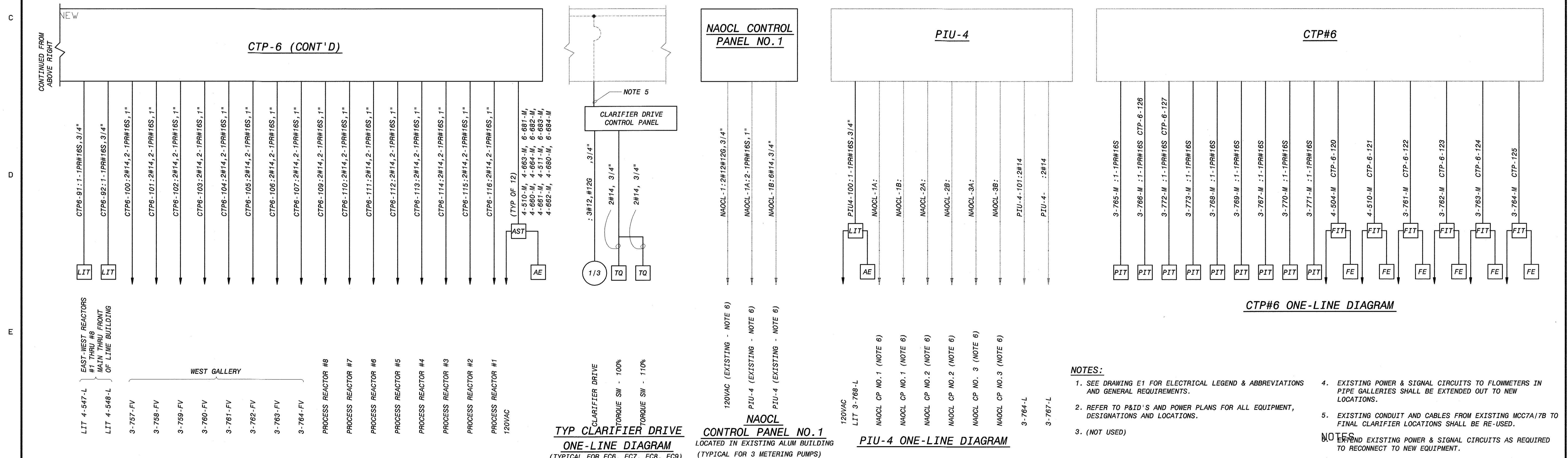
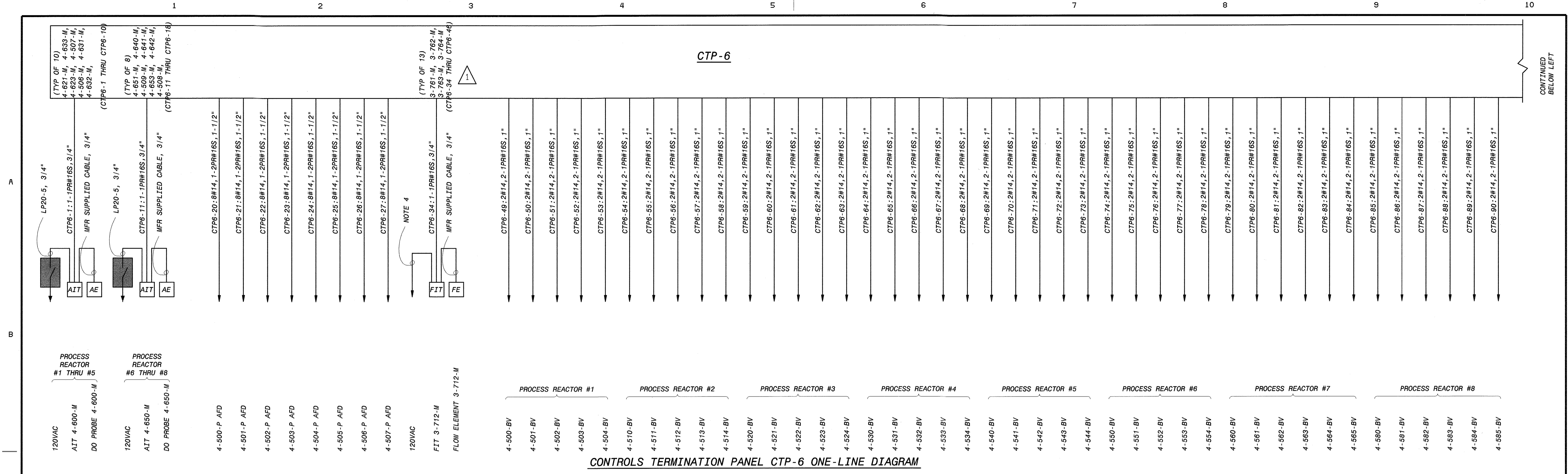
CAPITAL PROJECT S-6205
CONTRACT NO. 20-3842

HOWARD COUNTY, MARYLAND

SCALE
AS
SHOWN

SHEET
35 OF 39

I 30

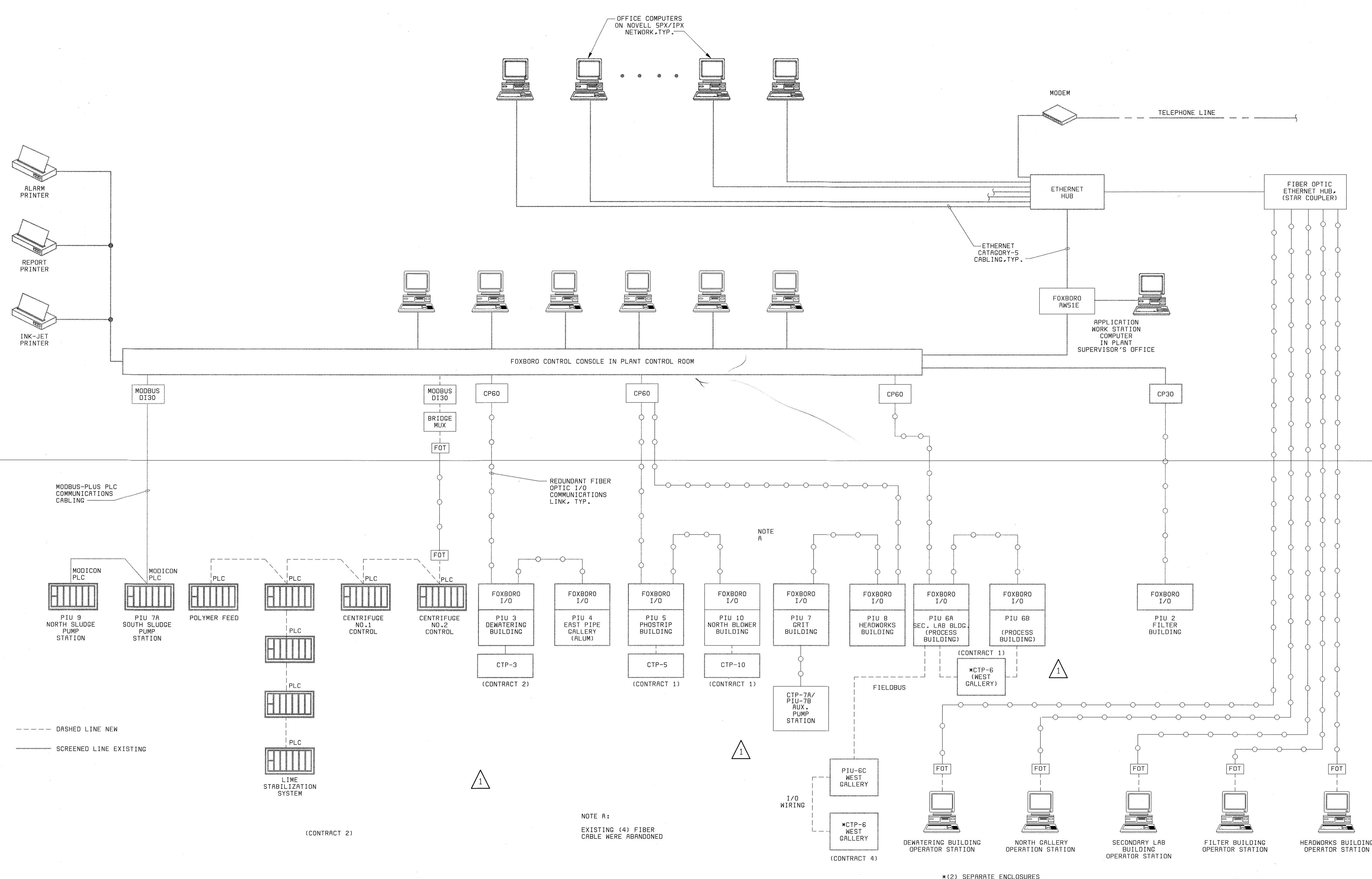


DEPARTMENT OF PUBLIC WORKS HOWARD COUNTY, MARYLAND CHIEF, BUREAU OF UTILITIES DATE	BLACK & VEATCH Gaithersburg, Maryland REG. PROF. ENGR. DATE	THIS DRAWING WAS ORIGINALLY APPROVED FOR CONSTRUCTION AND SEALED BY DONALD R. STEVENS A REGISTERED PROFESSIONAL ENGINEER IN THE STATE OF MARYLAND, NO. 21876	DES: RSF	WEST PIPE GALLERY FIELD LAB			LITTLE PATUXENT WATER RECLAMATION PLANT	SCALE AS SHOWN
			DRN: TDR	INSTRUMENTATION			ADDITION NO. 6	SHEET
			CHK: PWM	CONTROL SYSTEM SCHEMATIC			CAPITAL PROJECT S-6205	38 OF 39
			DATE: 04/22/02	ONE-LINE DIAGRAM CTP-6/PIU-4			CONTRACT NO. 20-3842	133
			DATE	REVISIONS AND RECORD OF ISSUE	NO.	BY	HOWARD COUNTY, MARYLAND	

A
B
C
D
E

ADMIN. BUILDING

OTHER PLANT AREAS



--- DASHED LINE NEW
 --- SCREENED LINE EXISTING

NOTE A:
 EXISTING (4) FIBER
 CABLE WERE ABANDONED

* (2) SEPARATE ENCLOSURES
 ARE LABELED "CTP-6"

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

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

DES: RSF					
DRN: RSF					
CHK: PWM					
DATE: 04/22/02	04/22/02	CONFORMED TO NEGOTIATED CHANGES	1	RSF	PWM
		REVISIONS AND RECORD OF ISSUE	NO.	BY	CK APP

INSTRUMENTATION
 CONTROL BLOCK DIAGRAM

LITTLE PATUXENT WATER RECLAMATION PLANT
 ADDITION NO. 6
 CONTROL SYSTEM EXPANSION
 CAPITAL PROJECT S-6205
 CONTRACT NO. 20-3842
 HOWARD COUNTY, MARYLAND

SCALE
 AS
 SHOWN
 SHEET
 39 OF 39
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