

GENERAL NOTES

- CLASS 1, DIVISION 1 OR 2 (AS NOTED), GROUP D, ALL CONDUITS AND FITTINGS PVC COATED, SEAL OFF FITTINGS REQUIRED ON ALL CONDUITS AND DEVICES PER NEC ARTICLE 501.15.
- ALL LIGHTING AND RECEPTACLE WIRING TO BE #12 XHHW WITH EQUIPMENT GROUND IN 3/4" C UNLESS OTHERWISE NOTED.
- DO NOT MOUNT ANY LIGHT FIXTURE DIRECTLY OVER PIPING OR EQUIPMENT THAT WILL INTERFERE WITH NORMAL LIGHTING DISTRIBUTION.
- SIZE #8 'S' AS REQUIRED PER NEC. PROVIDE BARRIER TYPE TERMINAL STRIPS, AND ALL WIRING TO BE IN CONDUIT.
- SIZE PULL BOXES AS REQUIRED PER NEC.
- PROVIDE SEPARATE PB 'S' FOR CONTROL AND POWER.
- MOTOR OVERLOAD SETTING SHALL BE FIELD SELECTED PER MOTOR NAME PLATE CURRENT AND INSTALLED ACCORDINGLY.
- WATERTIGHT CONNECTIONS – HEAT SHRINK INSULATION RAYGHEM, THOMAS BETTS, OR EQUAL.
- LOCAL CONTROLS AT EQUIPMENT SHALL BE MOUNTED 60" ABOVE FINISHED FLOOR. MOUNT CONTROLS ON WALL NEAREST EQUIPMENT WHERE POSSIBLE. (MAX. DISTANCE FROM WALL TO EQUIPMENT –10 FEET).

LIGHTING SWITCHES & RECEPTACLES

MARK *	ITEM	AMPS	VOLTS	PHASE	DESCRIPTION
	RECEPTACLE	20	125	1	3 WIRE GROUNDING DUPLEX TYPE
	RECEPTACLE- GROUND FAULT	20	125	1	3 WIRE GROUNDING, DUPLEX TYPE, NEMA REF: RECEPT 5-20R PLUG 5-20P
	RECEPTACLE- GROUND FAULT W/ LOCATION	20	125	1	3 WIRE GROUNDING, DUPLEX TYPE, COMPLETE W/COVER & RECEPTACLE
	TELEPHONE JACK				MODULAR PHONE JACK TYPE, COMPLETE W/COVER
	RECEPTACLE- EXPLOSION PROOF	20	125	1	3 WIRE GROUNDING SINGLE GANG W/ PLUG NEMA 7
	RECEPTACLE- 200V 5PH 5W	30	208	3	4 POLE 5 WIRE GROUNDING, TYPE, COMPLETE W/COVER & RECEPTACLE
	WALL SWITCH	20	120	1	SINGLE POLE PRESS SWITCH & PLATE
	WALL SWITCH	20	277	1	THREE WAY PRESS SWITCH & PLATE
	WALL SWITCH	20	277	1	FOUR WAY PRESS SWITCH & PLATE
	WALL SWITCH	20	277	1	W/ PILOT LIGHT

- * PROVIDE ENCLOSURE W/ NEMA RATING AS REQD.
 NEMA 1 – OFFICE & LAB AREAS
 NEMA 4X – OUTSIDE/CORROSIVE AREAS
 NEMA 7 – HAZARDOUS AREAS
 NEMA 12 – INSIDE

ELECTRICAL ABBREVIATIONS

ABBREVIATION	DESCRIPTION	ABBREVIATION	DESCRIPTION
AMS	ALUMINUM	PS	PRESSURE SWITCH
AL	ALUMINUM	PT	POTENTIAL TRANSFORMER
AM	AMMETER	R	REINFORCED CONCRETE PIPE
AO	ANALOG OUTPUT (PLC)	RL	ROUND LIGHT
AP	ALARM PANEL	SCP	SECONDARY
AWG	AMERICAN WIRE GAUGE	SEC	SECONDARY
C	CONDUIT	SF	SUPPLY FAN
CB	CAPACITOR	SHLD	SHIELDED
CB	CIRCUIT BREAKER	SP	SPEAKER PIN SWITCH
CB	CONTROL JUNCTION BOX	SPK	SPEAKER
CP	CONTROL PANEL	SS	SELECTOR SWITCH OR STAINLESS STEEL
CP	CONTROL POWER TRANSFORMER	SSR	SOLID STATE OVERLOAD RELAY
CR	CORROSION RESISTANT	SSPB	SOLID STATE STARTER
CS	CONTROL STATION	SSS	SOLID STATE STARTER
CT	CURRENT TRANSFORMER	STD	STANDARD
CU	COPPER	STR	STARTER
CU	DUCT BANK	SV	SCHEMATIC VALVE
DI	DIGITAL INPUT (PLC)	SW	SWITCH
DO	DIGITAL OUTPUT (PLC)	TC	TEMPERATURE
EAG	ELECTRICALLY ACTIVATED GATE	TE	TELEPHONE
EAV	ELECTRICALLY ACTIVATED VALVE	TEB	TELEPHONE EQUIPMENT BACKBOARD
EF	EXHAUST FAN	TEMP	TEMPERATURE
ESPB	EMERGENCY STOP PUSHRUTTON (MAINTAINED)	TR	TRIP
ETT	ELAPSED TIME TOTALIZER	TR	TRIP
EWD	ELEMENTARY WIRING DIAGRAM	TR	TRIP
FDS	FUSED DISCONNECT SWITCH	TR	TRIP
FLA	FULL LOAD AMPERES	TRANS	TRANSFORMER
FS	FLOW SWITCH	TS/AT	THERMOSTAT
FVC	FULL VOLTAGE CONTACTOR	TVSS	TRANSIENT VOLTAGE SUPPRESSOR
FWR-1	FULL VOLTAGE NON-REVERSING STARTER SIZE 1	UH	UNIT HEATER
GF1	GROUND FAULT INTERRUPTER	UPS	UNINTERUPTABLE POWER SUPPLY
GND	GROUND	V	VOLTS
GR	GROUND FAULT RELAY	VC	VOLUME CONTROL
HOA	HORSEPOWER	PH	PHASE
HT	HIGH TORQUE SWITCH	PLC	PROGRAMMABLE LOGIC CONTROLLER
HTR	HEATER	PB	POWER JUNCTION BOX
HZ	HERTZ	PP	POWER PANEL
		PHI	PRIMARY

ISA IDENTIFICATION LETTERS

FIRST-LETTER	MODIFIER	READOUT OR PASSIVE FUNCTION	OUTPUT FUNCTION	MODIFIER
A	ANALYSIS	ALARM	USER'S CHOICE	USER'S CHOICE
B	BURNER, COMBUSTION	USER'S CHOICE	CONTROL	USER'S CHOICE
C	USER'S CHOICE	DIFFERENTIAL		
D	USER'S CHOICE	SENSOR (PRIMARY ELEMENT)		
E	VOLTAGE	RATIO		
F	FLOW RATE			
G	USER'S CHOICE	GLASS VIEWING DEVICE		
H	HAND			
I	CURRENT (ELECTRICAL)	INDICATE		
J	POWER	SCAN		
K	TIME SCHEDULE	TIME RATE OR CHANGE	CONTROL STATION	
L	LEVEL			
M	USER'S CHOICE	MOMENTARY		
N	USER'S CHOICE			
O	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE	USER'S CHOICE
P	PRESSURE, VACUUM	ORING, RESTRICTION	POINT (TEST) CONNECTION	
Q	QUANTITY	INTEGRATE, TOTALIZE		
R	RADIATION	RECORD		
S	SPEED, FREQUENCY	SAFETY	SWITCH	
T	TEMPERATURE		TRANSMIT	
U	MULTIVARIABLE	MULTIFUNCTION	MULTIFUNCTION	MULTIFUNCTION
V	VIBRATION		VALVE, DAMPER, LOUVER	
W	WEIGHT, FORCE			
X	EVENT, STATE OR PRESENCE	WELL	UNCLASSIFIED RELAY, COMPUTE, CONVERT	UNCLASSIFIED
Y	POSITION, DIMENSION	Z AXIS	UNCLASSIFIED FINAL CONTROL ELEMENT	

LEGEND OF ELECTRICAL SYMBOLS

PLAN SYMBOLS ONLY

MOTOR	PRESSURE SWITCH	CEILING MOUNTED FIXTURE
DISCONNECT SWITCH	FLOW SWITCH	WALL MOUNTED FIXTURE
MOTOR CONTROLLER	LEVEL SWITCH	FLUORESCENT FIXTURE
CAPACITOR	LIMIT SWITCH	WALLPACK
LOCAL CONTROL STATION	TIME CLOCK	UNIT HEATER
SURGE SUPPRESSOR	THERMOSTAT	SOLENOID VALVE
LIGHTING	HIGHLY CORROSIVE ATMOSPHERE	MOTOR OPERATED VALVE

SINGLE LINE, ELEMENTARY, & INTERCONNECTION DIAGRAMS – SYMBOLS ONLY

DISCONNECT SWITCH	FLOW SWITCH	CONTACT – NORMALLY CLOSED
FUSE	N.O. LEVEL SWITCH	SOLENOID COIL
CIRCUIT BREAKER	N.O. PRESSURE SWITCH	PILOT LIGHT – PUSH TO TEST
AMMETER	N.O. TEMPERATURE SWITCH	GROUND
VOLT METER	N.O. TIME DELAY AFTER ENERGIZATION	CAPACITOR
POWER FACTOR METER	N.C. TIME DELAY AFTER ENERGIZATION	2 POSITION SELECTOR SWITCH
GROUND FAULT RELAY	N.C. TIME DELAY AFTER DE-ENERGIZATION	3 POSITION SELECTOR SWITCH
TRANSFORMER	N.O. TIME DELAY AFTER DE-ENERGIZATION	EQUIPMENT FIELD TERMINAL
RELAY COIL	N.O. SWITCH (GREEN)	MCC OR STARTER TERMINAL
TIMING RELAY COIL	N.O. TIME DELAY AFTER ENERGIZATION	P.C. TERMINAL
MOTOR STARTER COIL	N.C. TIME DELAY AFTER ENERGIZATION	SPECIAL TERMINAL AS NOTED
ELAPSED TIME TOTALIZER	CONTACT – NORMALLY OPEN	PROCESS RECORDER TERMINAL
N.O. LIMIT SWITCH		

PROTECTIVE DEVICES

UNDERVOLTAGE RELAY	27
PHASE BALANCE RELAY	46
OVERCURRENT RELAY	51
FREQUENCY RELAY	81

DESIGNED BY: FBA	DATE:	REVISIONS:	
DRAWN BY: JAS		REMARKS:	
CHECKED BY:			
APPROVED BY:			
DATE: JAN 13, 2006			
DWG NO:224-01 MACK-IND-NORTHSTAR-E1-2			

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SCALE: NONE	NORTHSTAR DEVELOPMENT WASTEWATER TREATMENT PLANT	SHEET NO. 30
WASTEWATER TREATMENT PLANT ELECTRICAL NOTES/LEGENDS/ABBREVIATIONS		E1 OF 18

NOTES — MOTOR DATA AND FEEDERS

- A. FULL LOAD CURRENTS ARE BASED ON TABLE 430-250, 2005 NEC.
- B. STARTER SIZES ARE MINIMUM PER NEMA STANDARDS AND FB SPECIFICATIONS.
- C. SIZES LISTED ARE FOR COMBINATION STARTERS. PROVIDE PROTECTIVE DEVICES AS INDICATED ON SINGLE LINE DIAGRAMS, OR AS NOTED.
- D. SIZES PROVIDE BACKUP MOTOR OVERLOAD PROTECTION.
- D5: SIZES ARE BASED ON 2009 NEC, TABLE 310.16, AND ARTICLE 110.14, 60" AND 75" SIZES ARE APPLICABLE ONLY FOR THE WIRE AND CONDUIT BETWEEN THE MOTOR AND STARTER. ONE WIRE PER PHASE AND GROUND UNLESS NOTED OTHERWISE.
- E. DISTANCE SHOWN IS THE MAXIMUM DISTANCE ALLOWABLE FOR A 2% VOLTAGE DROP. VOLTAGE IS BASED ON 3 SINGLE CONDUCTORS/STEEL CONDUIT, 0.8 POWER FACTOR, DISTANCES MAY CHANGE FOR NON-MAGNETIC CONDUIT, CAPACITORS AT MOTOR, ETC.
- F. PROVIDE GROUND WIRE FOR EACH SET OF POWER CONDUCTORS.
- G. OVERCURRENT PROTECTION FOR CONTROL TRANSFORMERS SHALL BE AS FOLLOWS:

PRIMARY FUSE SIZE	120 VOLT SECONDARY
480 V	240 V
0.5 A	1.5 A
1-1/4 A	2.5 A
1.8 A	3.0 A
3.5 A	4.5 A
	4 A
- H. SIZES ARE BASED ON 2009 NEC, TABLE 310.16, AND ARTICLE 110.14. SEPARATE "ON-OFF" SWITCH IS REQUIRED.
- I. POWER FACTOR CORRECTION CAPACITORS SHALL BE PROVIDED AND SIZED ACCORDING TO MOTOR KW AND POWER FACTOR DATA SHOWN ON APPROVED SHOP DRAWINGS. CAPACITORS SHALL BE SIZED SUCH THAT FINAL MOTOR OPERATING POWER FACTOR SHALL BE BETWEEN 0.90 AND 0.95 LAGGING.

SINGLE PHASE TRANSFORMERS

PRIMARY & SECONDARY PROTECTION		480 VOLT PRIMARY		240/120 V SECONDARY	
SIZE	MAX FUSE (250%)	SIZE	MAX FUSE (250%)	SIZE	MAX FUSE (250%)
5	25	10.4	25	20.8	41.7
10	50	20.8	50	41.7	83.4
15	75	31.3	75	62.5	125.1
25	125	52.1	125	104	208.4
37.5	200	78.1	200	156	312.6
50	250	104	250	208	417
75	350	156	350	313	625.5
100	500	208	500	417	834

THREE PHASE TRANSFORMERS

PRIMARY & SECONDARY PROTECTION		480 VOLT PRIMARY		208/120 V SECONDARY	
SIZE	MAX FUSE (250%)	SIZE	MAX FUSE (250%)	SIZE	MAX FUSE (250%)
6	20	7.2	25	16.7	33.4
9	30	10.8	35	25.0	50.0
15	45	16.1	60	41.7	83.4
30	90	36.1	110	83.4	166.8
45	135	54.2	175	125.1	250.2
75	225	90.3	300	208.4	417
125.5	350	135.5	400	312.6	625.5
150	450	180.0	500	417	834

POWER CABLE & CONDUIT SCHEDULE

NO.	CIRCUIT COND.	GND. COND.	CONDUIT SIZE	NO.	CIRCUIT COND.	GND. COND.	CONDUIT SIZE	NO.	CIRCUIT COND.	GND. COND.	CONDUIT SIZE
I	NOT USED			VII	8-#12	1-#12	1"	XXIII	3-#1	1-#6	1 1/2"
II	NOT USED			VIII	10-#12	1-#12	1"	XXIV	3-#1/0	1-#6	2"
III	2-#12	1-#12	3/4"	IX	2-#10	1-#10	3/4"	XXV	3-#2/0	1-#6	2"
IV	3-#12	1-#12	3/4"	X	3-#10	1-#10	3/4"	XXVI	3-#3/0	1-#6	2"
V	5-#12	1-#12	3/4"	XI	6-#10	1-#10	1"	XXVII	3-#4/0	1-#4	2 1/2"
VI	6-#12	1-#12	3/4"	XII	2-#8	1-#10	1"	XXVIII	3-#50	1-#4	2 1/2"
				XIII	3-#8	1-#10	1"	XXIX	3-#50	1-#4	2 1/2"
				XIV	6-#8	1-#10	1 1/4"	XXX	3-#500	1-#2	3"
								XXXI	3-#12	1-#12	3/4" MIN
								XXXII	29502 OR EQUAL		
								XXXIII	29507 OR EQUAL		

FEEDER CHART

BRANCH CIRCUIT DEVICE	WIRE SIZE (NOTE H)	GROUNDING	CONDUIT		
			480 V	240 V	120 V
15	#12	3/4"	160	282	140
20	#12	3/4"	245	120	210
25	#10	3/4"	300	150	260
30	#10	3/4"	250	125	220
35	#8	1"	345	170	150
40	#8	1"	300	150	130
50	#6	1"	240	120	105
60	#4	1"	310	155	135
70	#4	1.5"	400	200	170
80	#2	1.5"	350	175	150
90	#2	1.5"	600	300	260
100	#1	1.5"	540	270	180
110	#1	1.5"	500	250	165
125	#1	2"	620	310	225
150	#1/0	2"	425	210	180
175	#2/0	2"	430	210	190
200	#3/0	2.5"	520	265	225
225	#4/0	2.5"	460	230	200
250	#50	2.5"	450	230	200
300	#350	2"	425	215	185
350	#300	2"	445	220	190
400	2-(#3/0)	2.5"	520	265	225
450	2-(#4/0)	2.5"	460	230	200
500	2-(#250)	2.5"	450	230	200
600	2-(#350)	3"	425	215	185
800	2-(750)	3"	445	225	190
1000	3-(#500)	3"	445	225	190
1200	3-(#750)	4"	485	240	210

FEEDER CHART

HP	FLA (NOTE A)	STARTER SIZE (b)	FUSE SIZE (c)			MCP SIZE (c)	CB SIZE (c)	WIRE (NOTE D)	GND (NOTE F)	COND (NOTE D)	DIST (NOTE E)	OPT SIZE (NOTE G)
			1/2"	3/4"	1"							
1/2	1.1	1	1.8	3	3	15	#12	#12	3/4"	3200"	150 VA	
3/4	1.6	1	2.8	3	3	15	#12	#12	3/4"	2300"	150 VA	
1	2.1	1	3.5	3	3	15	#12	#12	3/4"	1800"	150 VA	
1.5	3.0	1	5	7	7	15	#12	#12	3/4"	1350"	150 VA	
2	3.4	1	6	7	7	15	#12	#12	3/4"	950"	150 VA	
3	4.8	1	8	7	7	15	#12	#12	3/4"	700"	150 VA	
5	7.6	1	12	15	15	15	#12	#12	3/4"	420"	150 VA	
7.5	11	1	17.5	15	15	20	#12	#12	3/4"	300"	150 VA	
10	14	1	25	30	25	20	#12	#12	3/4"	375"	150 VA	
15	21	2	35	30	40	40	#10	#10	1"	390"	150 VA	
20	27	2	45	50	60	60	#8	#10	1"	460"	150 VA	
25	34	2	60	50	70	80	#6	#8	1.5"	370"	150 VA	
30	40	3	70	70	70	80	#5	#8	1.5"	475"	150 VA	
40	52	3	90	100	90	90	#4	#8	1.5"	530"	150 VA	
50	65	3	110	100	100	100	#4	#8	1.5"	530"	150 VA	
60	77	4	125	150	110	110	#1	#5	2"	507"	200 VA	
75	96	4	150	150	125	125	#1	#5	2"	420"	200 VA	
100	124	4	200	250	200	200	#1/0	#4	2.5"	510"	200 VA	
125	156	5	250	250	225	225	#3/0	#4	2.5"	400"	350 VA	
150	180	5	300	250	250	250	#4/0	#2	2.5"	400"	350 VA	
200	240	5	400	400	350	350	#50	#2	3"	400"	350 VA	

FEEDER CHART

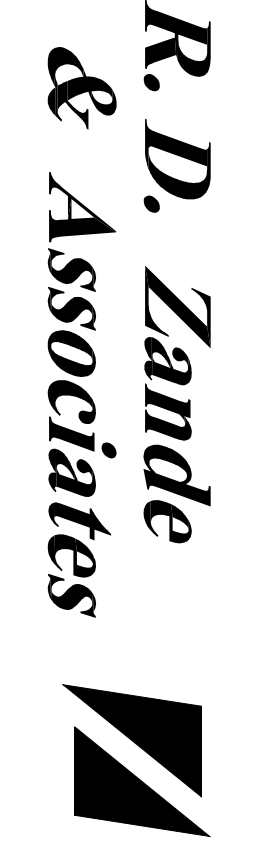
CONTROL (C)		METERING (M)	
CIRCUIT COND.	CONDUIT SIZE	CIRCUIT COND.	CONDUIT SIZE
CA	2-#14	1-#14	3/4"
CB	3-#14	1-#14	3/4"
CC	4-#14	1-#14	3/4"
CD	5-#14	1-#14	1 1/2"
CE	6-#14	1-#14	3/4"
CF	8-#14	1-#14	3/4"
CG	10-#14	1-#14	1 1/2"
CH	12-#14	1-#14	1"
MA	1-PR #18 SHIELDED DRAIN WIRE	1-#14	1 1/2"
MB	2-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MC	3-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MD	4-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
ME	IND. SHIELD & OVERALL DRAIN WIRE	1-#14	1 1/2"
MF	3C #18 SHIELDED DRAIN WIRE	1-#14	3/4"
MG	2-3C #18 OVERALL SHIELDED DRAIN WIRE	1-#14	3/4"
MJ	TYPE "J" THERMO-COUPLE WIRE-#20		3/4"

FEEDER CHART

CONTROL (C)		METERING (M)	
CIRCUIT COND.	CONDUIT SIZE	CIRCUIT COND.	CONDUIT SIZE
CA	2-#14	1-#14	3/4"
CB	3-#14	1-#14	3/4"
CC	4-#14	1-#14	3/4"
CD	5-#14	1-#14	1 1/2"
CE	6-#14	1-#14	3/4"
CF	8-#14	1-#14	3/4"
CG	10-#14	1-#14	1 1/2"
CH	12-#14	1-#14	1"
MA	1-PR #18 SHIELDED DRAIN WIRE	1-#14	1 1/2"
MB	2-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MC	3-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MD	4-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
ME	IND. SHIELD & OVERALL DRAIN WIRE	1-#14	1 1/2"
MF	3C #18 SHIELDED DRAIN WIRE	1-#14	3/4"
MG	2-3C #18 OVERALL SHIELDED DRAIN WIRE	1-#14	3/4"
MJ	TYPE "J" THERMO-COUPLE WIRE-#20		3/4"

FEEDER CHART

CONTROL (C)		METERING (M)	
CIRCUIT COND.	CONDUIT SIZE	CIRCUIT COND.	CONDUIT SIZE
CA	2-#14	1-#14	3/4"
CB	3-#14	1-#14	3/4"
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CD	5-#14	1-#14	1 1/2"
CE	6-#14	1-#14	3/4"
CF	8-#14	1-#14	3/4"
CG	10-#14	1-#14	1 1/2"
CH	12-#14	1-#14	1"
MA	1-PR #18 SHIELDED DRAIN WIRE	1-#14	1 1/2"
MB	2-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MC	3-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
MD	4-PR #18 OVERALL DRAIN WIRE	1-#14	1 1/2"
ME	IND. SHIELD & OVERALL DRAIN WIRE	1-#14	1 1/2"
MF	3C #18 SHIELDED DRAIN WIRE	1-#14	3/4"
MG	2-3C #18 OVERALL SHIELDED DRAIN WIRE	1-#14	3/4"
MJ	TYPE "J" THERMO-COUPLE WIRE-#20		3/4"



DESIGNED BY: FBA
 DRAWN BY: JAS
 CHECKED BY:
 APPROVED BY:
 DATE: JAN. 13, 2006



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NORTHSTAR DEVELOPMENT
 WASTEWATER TREATMENT PLANT

SCALE: NONE

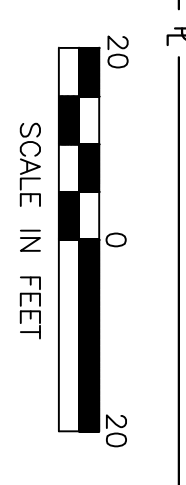
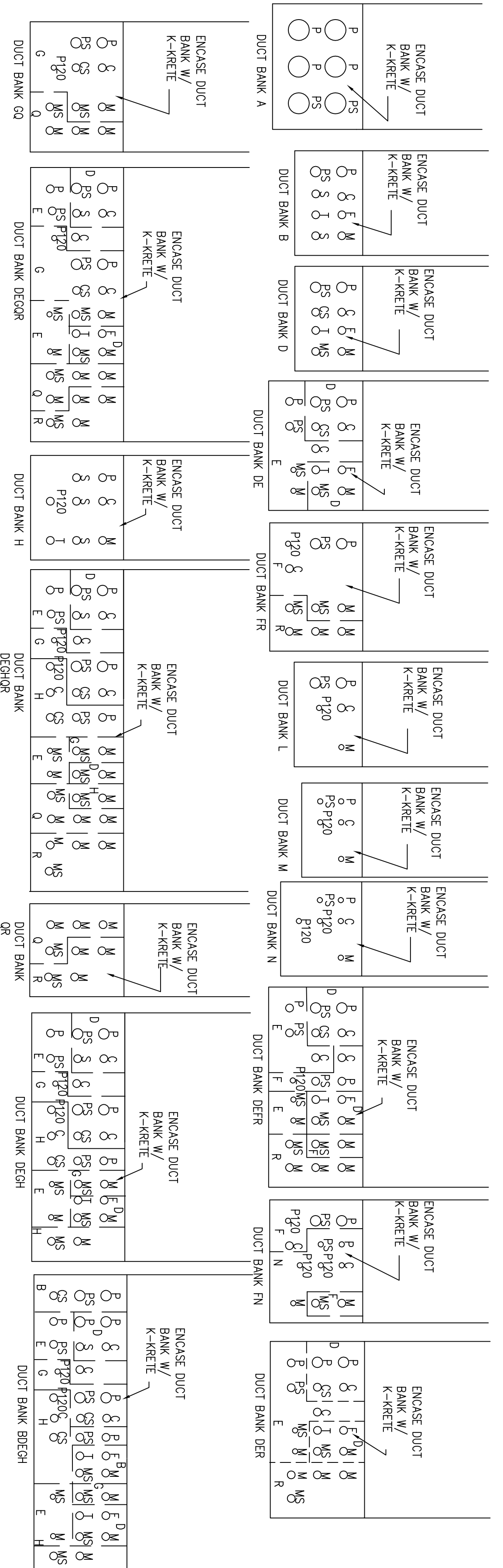
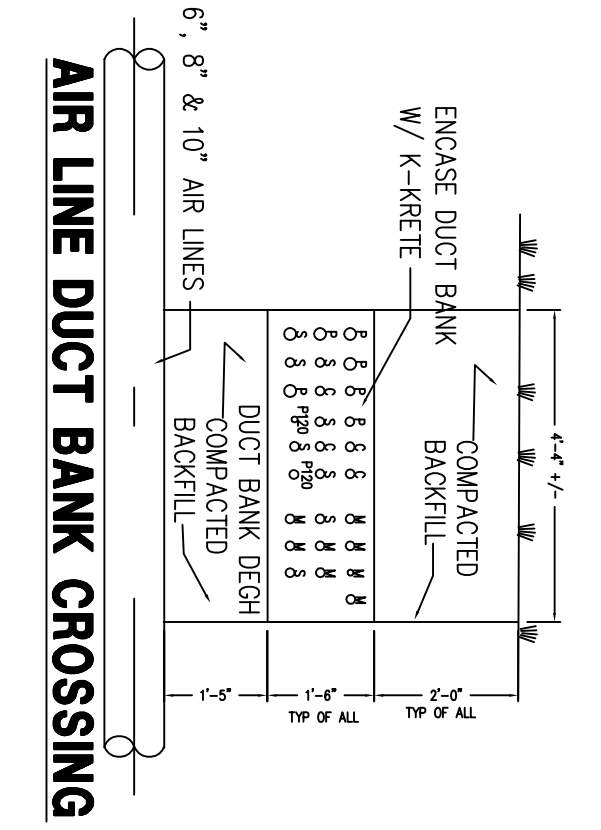
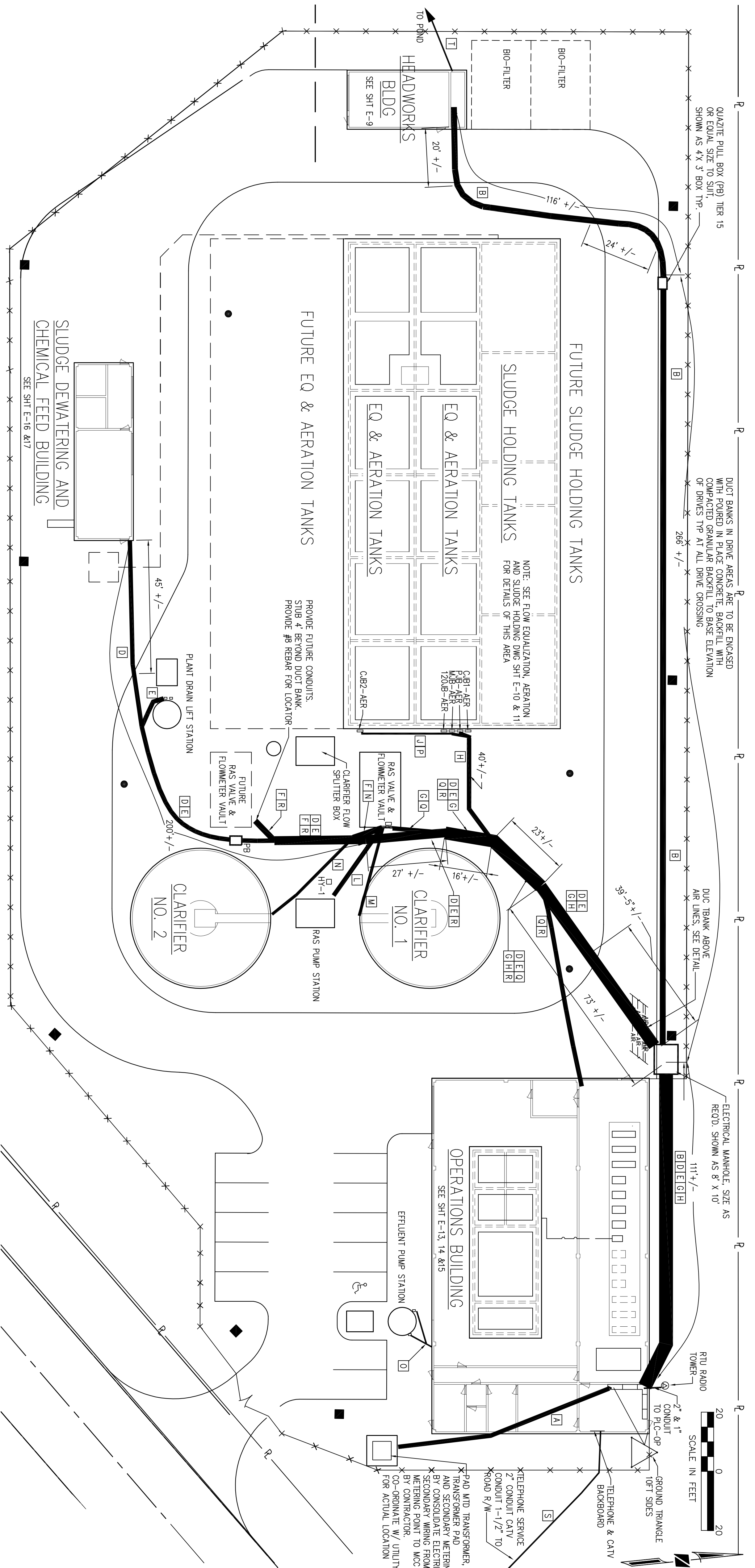
WASTEWATER TREATMENT PLANT
 ELECTRICAL SCHEDULES

SHEET NO. 31
 E2 OF 18

P	POWER	480
P.S	POWER/SPARE	120
P120	POWER	240
P240	POWER	240
C	CONTROL	240
C.S	CONTROL SPARE	
M	METERING SPARE	
M.S	METERING SPARE	
F	FIBER OPTIC CABLE	
S	SPARE	
T	TELEPHONE	

NOTE: SPARE CONDUITS ARE TO BE TERMINATED WITH THE USED CONDUITS IN SAME RUN. SPARE CONDUITS ARE TO BE TERMINATED MIN. OF 8' ABOVE FLOOR OR SLAB AND CAPPED. SPARE CONDUITS ARE TO HAVE SS TAGS ATTACHED TO STUDS IDENTIFYING WHAT SPARE IS AND WHERE SPARE CONDUIT IS ENDED

DUCT	FROM	TO	NO. OF CONDUITS	SIZE OF CONDUIT	USE	WIRE CODE
A	TRUNK	REC-OP	4	4"	P	1-750(MV) W/ 40-020
B	TRUNK	REC-OP SPARE	2	4"	P	SPARE
C	TRUNK	REC-OP	1	2"	P	SPARE
D	TRUNK	REC-OP	1	1.5"	T	SPARE
E	TRUNK	REC-OP	1	1.5"	T	SPARE
F	TRUNK	REC-OP	1	1.5"	T	SPARE
G	TRUNK	REC-OP	1	1.5"	T	SPARE
H	TRUNK	REC-OP	1	1.5"	T	SPARE
I	TRUNK	REC-OP	1	1.5"	T	SPARE
J	TRUNK	REC-OP	1	1.5"	T	SPARE
K	TRUNK	REC-OP	1	1.5"	T	SPARE
L	TRUNK	REC-OP	1	1.5"	T	SPARE
M	TRUNK	REC-OP	1	1.5"	T	SPARE
N	TRUNK	REC-OP	1	1.5"	T	SPARE
O	TRUNK	REC-OP	1	1.5"	T	SPARE
P	TRUNK	REC-OP	1	1.5"	T	SPARE
Q	TRUNK	REC-OP	1	1.5"	T	SPARE
R	TRUNK	REC-OP	1	1.5"	T	SPARE
S	TRUNK	REC-OP	1	1.5"	T	SPARE
T	TRUNK	REC-OP	1	1.5"	T	SPARE



SCALE IN FEET

DESIGNED BY: FBA

DRAWN BY: JAS

CHECKED BY:

APPROVED BY:

DATE: JAN. 6, 2006

DWG. NO.: 5724-01-MCK-IND-NORTHSTAR.E3

REVISIONS:

NO.	DATE	REMARKS

FLLOYD BROWNE ASSOCIATES

Dayton, Ohio 937.431.1004
 Delaware, Ohio 740.383.6792
 * Marion, Ohio 740.383.2187

NORTHSTAR DEVELOPMENT

WASTEWATER TREATMENT PLANT

SCALE:

WASTEWATER TREATMENT PLANT

ELECTRICAL

YARD DUCT BANKS AND WIRING

SHEET NO. 32

E3 OF 18



P-1

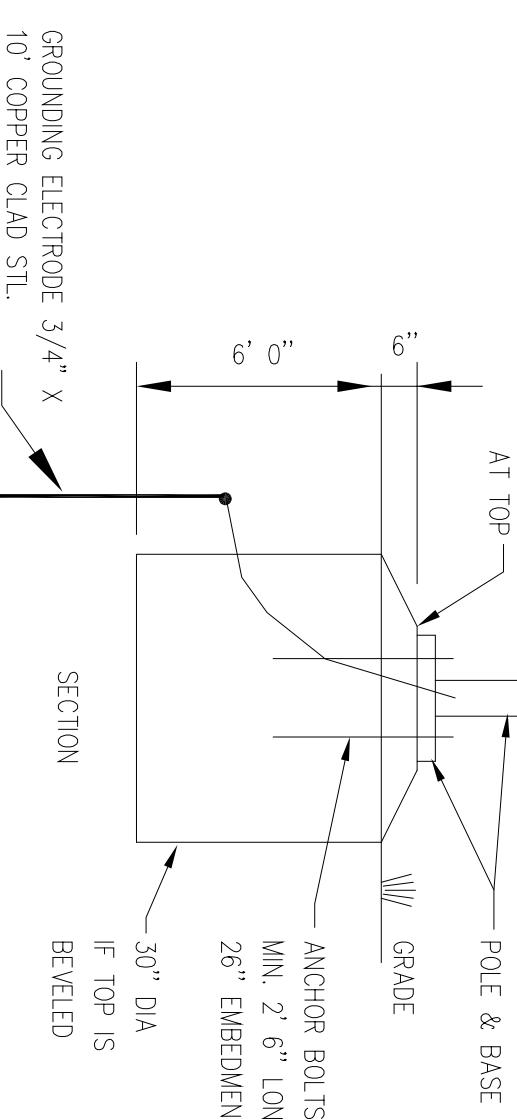
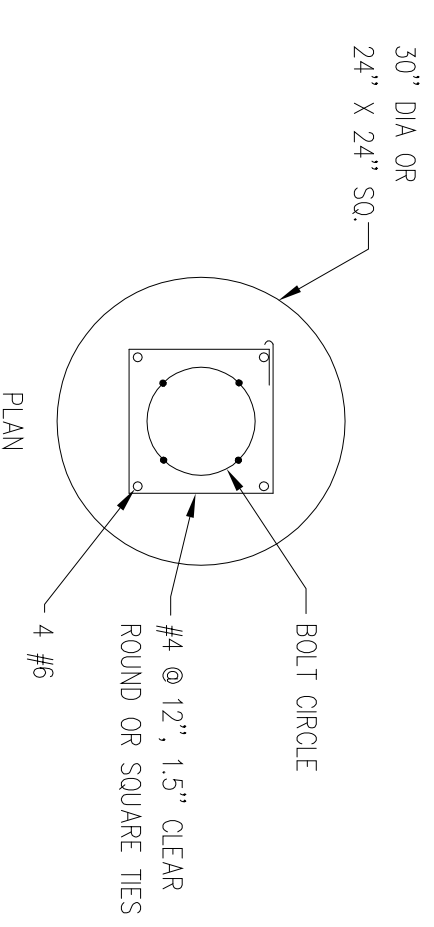
YARD LIGHT POLE - 30FT HINGED STEEL POLE.
 PROVIDE ONE LOWERING HAND CRANK WINCH. DESIGN
 FOR 100MPH WIND. PAINT TO MATCH FIXTURE. PROVIDE
 ONE GET RECEIPT W/ WEATHER PROOF IN-USE COVER
 AT BASE. INC. CONC. BASE & MTC BOLTS

HY-1 - 400 WATT CLEAR MH HOLOPHANE CRESTWOOD
 FIXTURE CW34400MH12BZNN W/P-1 POLE

HY-1 - HOLOPHANE MODEL
 WJ2K-070MH-12-XX-LAMP, OR EQUAL

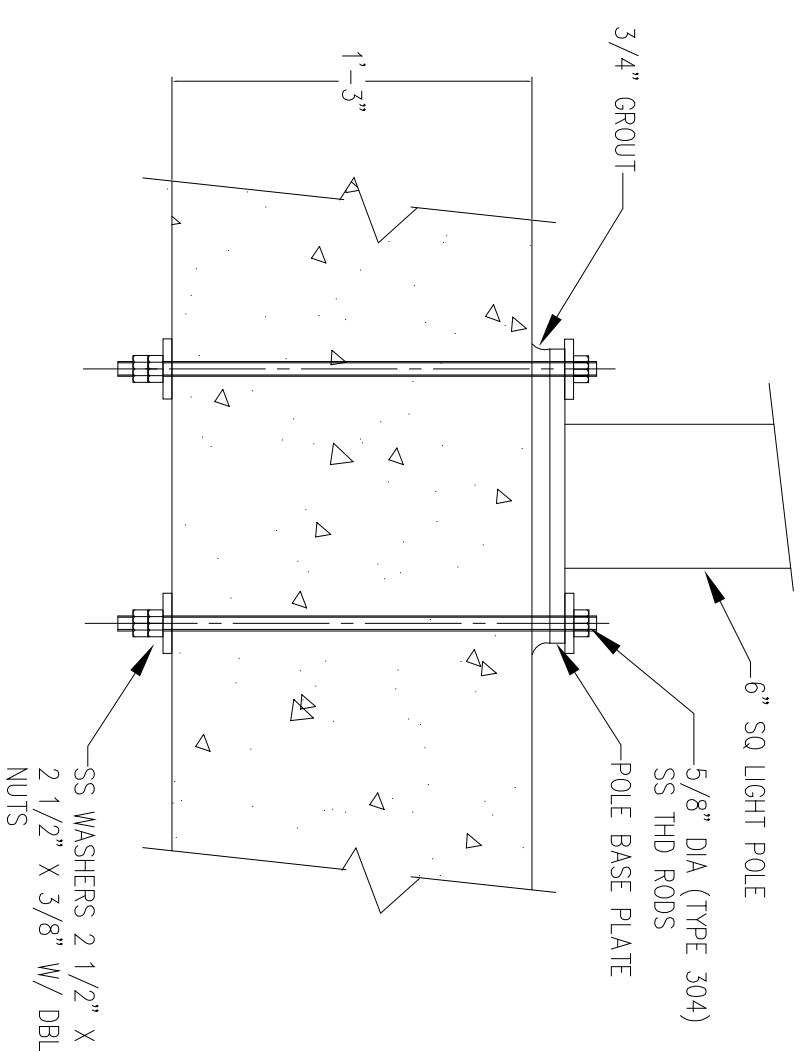
HY-2 - 150 WATT QUARTZ FLOOD LIGHT TO BE
 SIMILAR TO CLARIFIER LIGHT DETAIL ON SHIT. E72

LOCAL YARD LIGHT

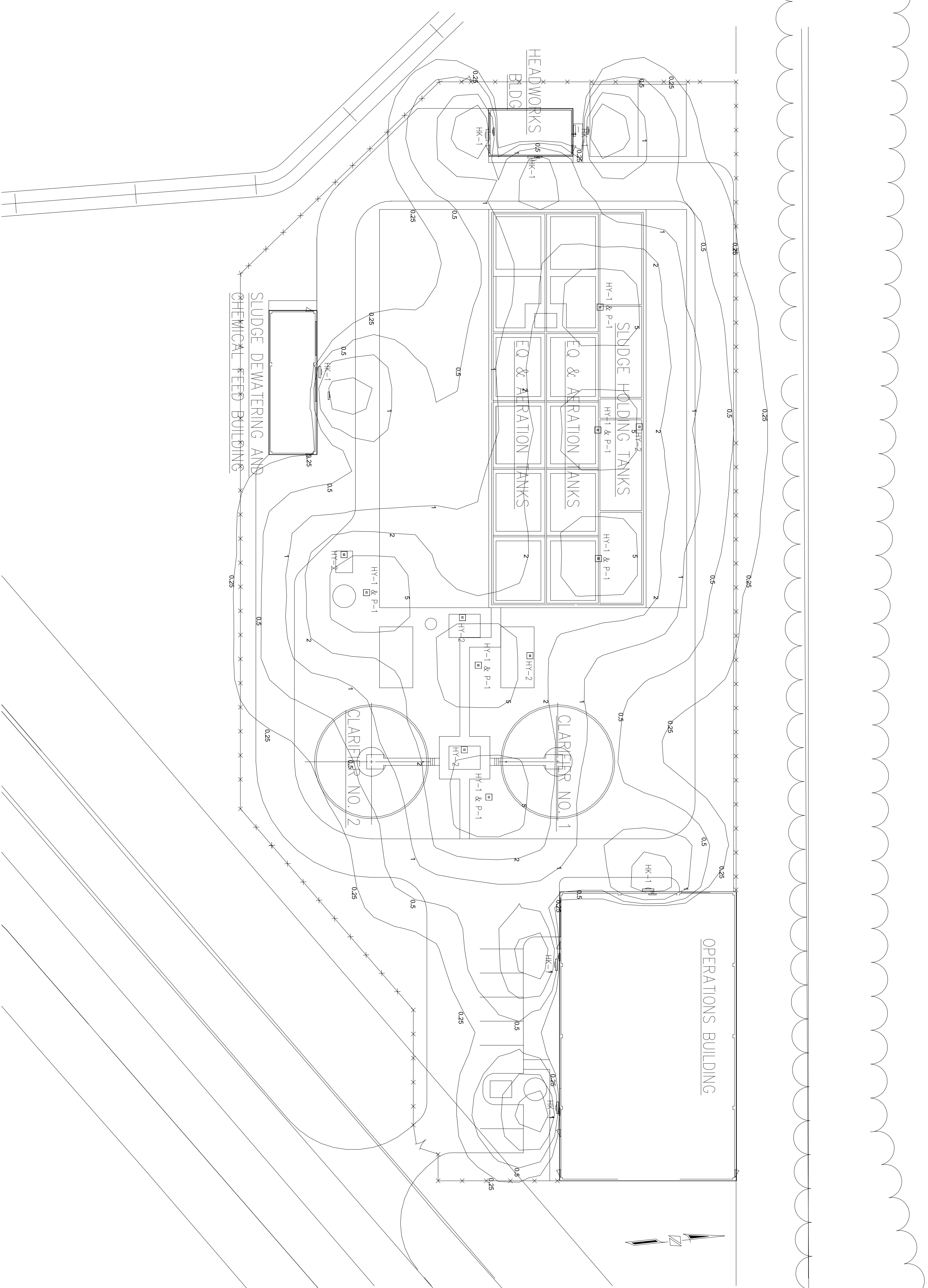


CONCRETE LIGHT POLE
 FOUNDATION DETAIL - TYPICAL

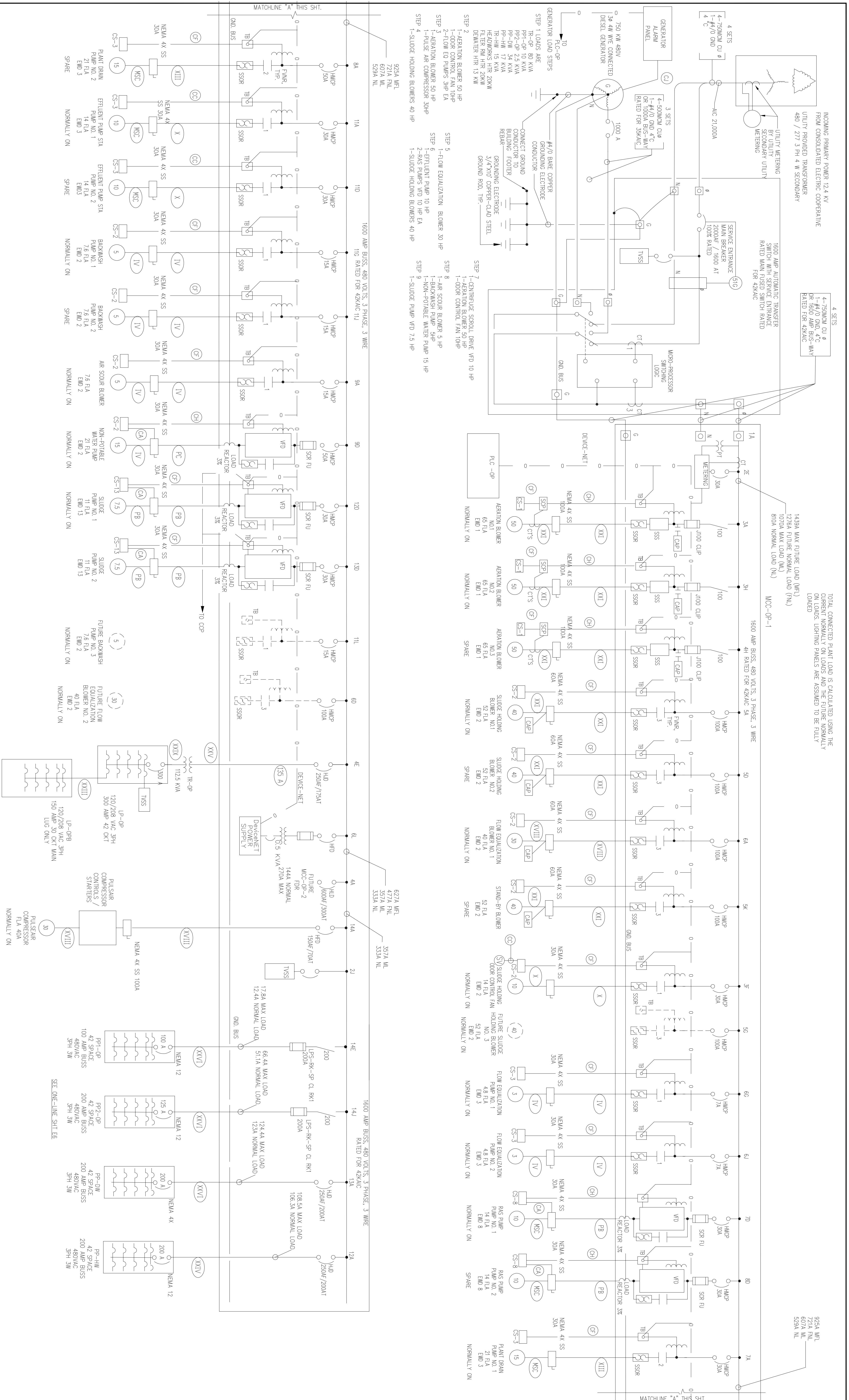
NOTES:
 A. REST FOUNDATION ON UNDISTURBED SOIL
 OR FOUNDATION CUSHION.
 B. DIMENSIONS MAY VARY DUE TO SOIL CONDITIONS,
 WIND CONDITIONS, OR OTHER FACTORS.



LIGHT POLE MOUNTING DETAIL AT
 SLUDGE STORAGE TANKS



DESIGNED BY: FBA	REVISIONS	FLOYD BROWNE ASSOCIATES, INC. Dayton, Ohio 937.491.0014 Delaware, Ohio 740.363.6792 * Marion, Ohio 740.383.2187	NORTHSTAR DEVELOPMENT WASTEWATER TREATMENT PLANT	SCALE: NO SCALE	WASTEWATER TREATMENT PLANT ELECTRICAL SITE LIGHTING PLAN	SHEET NO. 33 E4 OF 17
DRAWN BY: JAS	DATE: 5-18-06					
CHECKED BY:	REVISED PER DELWARE CO. COMMENTS					
APPROVED BY:						
DATE: JAN 13, 2006						
DWG. NO. 5724-01-MACK-ND-NBP8787A/E4						



INCOMING PRIMARY POWER 12.4 KV
FROM CONSOLIDATED ELECTRIC COOPERATIVE
UTILITY PROVIDED TRANSFORMER
480 / 277.3 PH. 4 W SECONDARY

4 SETS
4-750KVA CU @
1-#4/0 END, 4°C
OR 1600 AMP BUS-MAN
RATED FOR 42KVAIC

TOTAL CONNECTED PLANT LOAD IS CALCULATED USING THE
CURRENT NORMALLY ON LOADS AND THE FUTURE NORMALLY
ON LOADS. LIGHTING PANELS ARE ASSUMED TO BE FULLY
LOADED

1439A MAX FUTURE LOAD (MFL)
1276A FUTURE NORMAL LOAD (FNL)
810A NORMAL LOAD (NL)

925A WFL
721A FNL
607A ML
529A NL

R. D. Zande & Associates

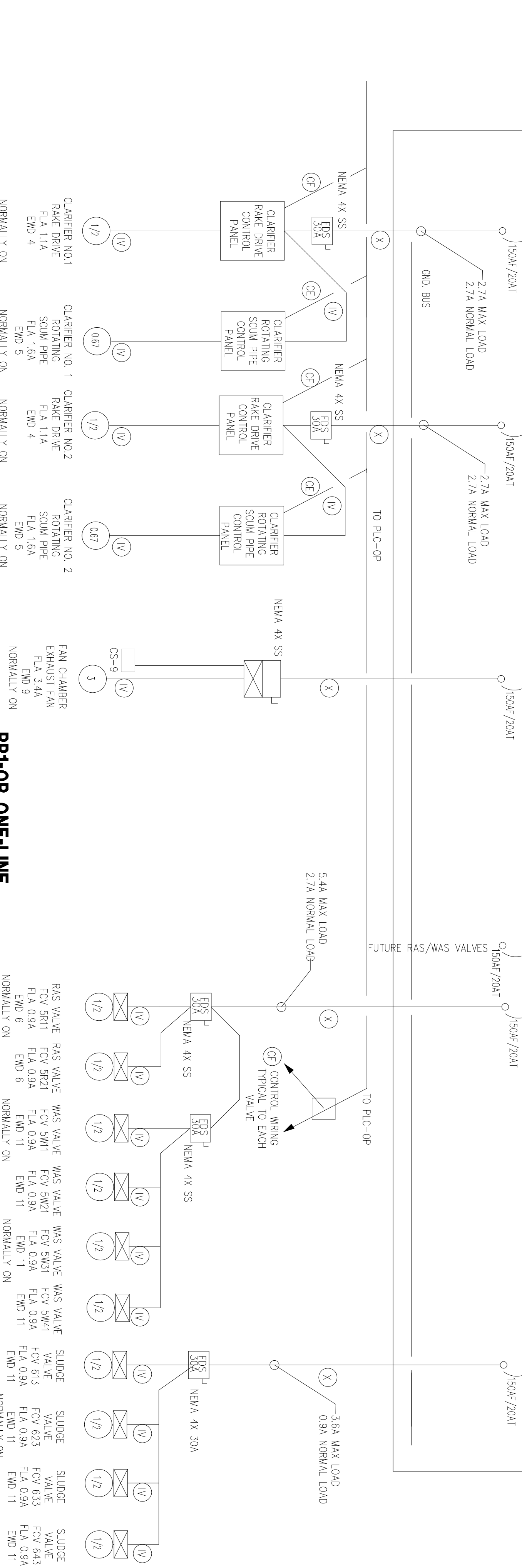
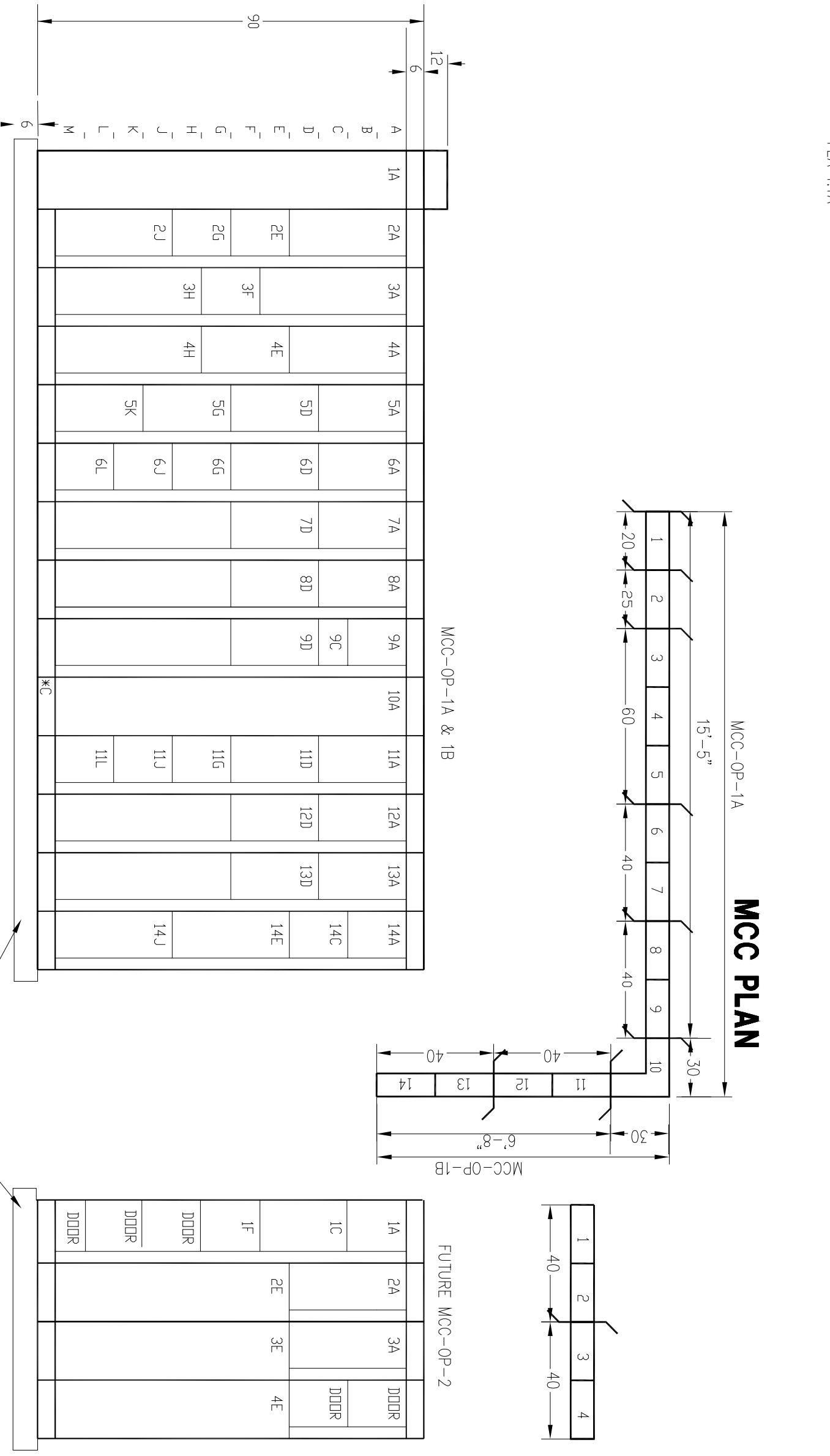
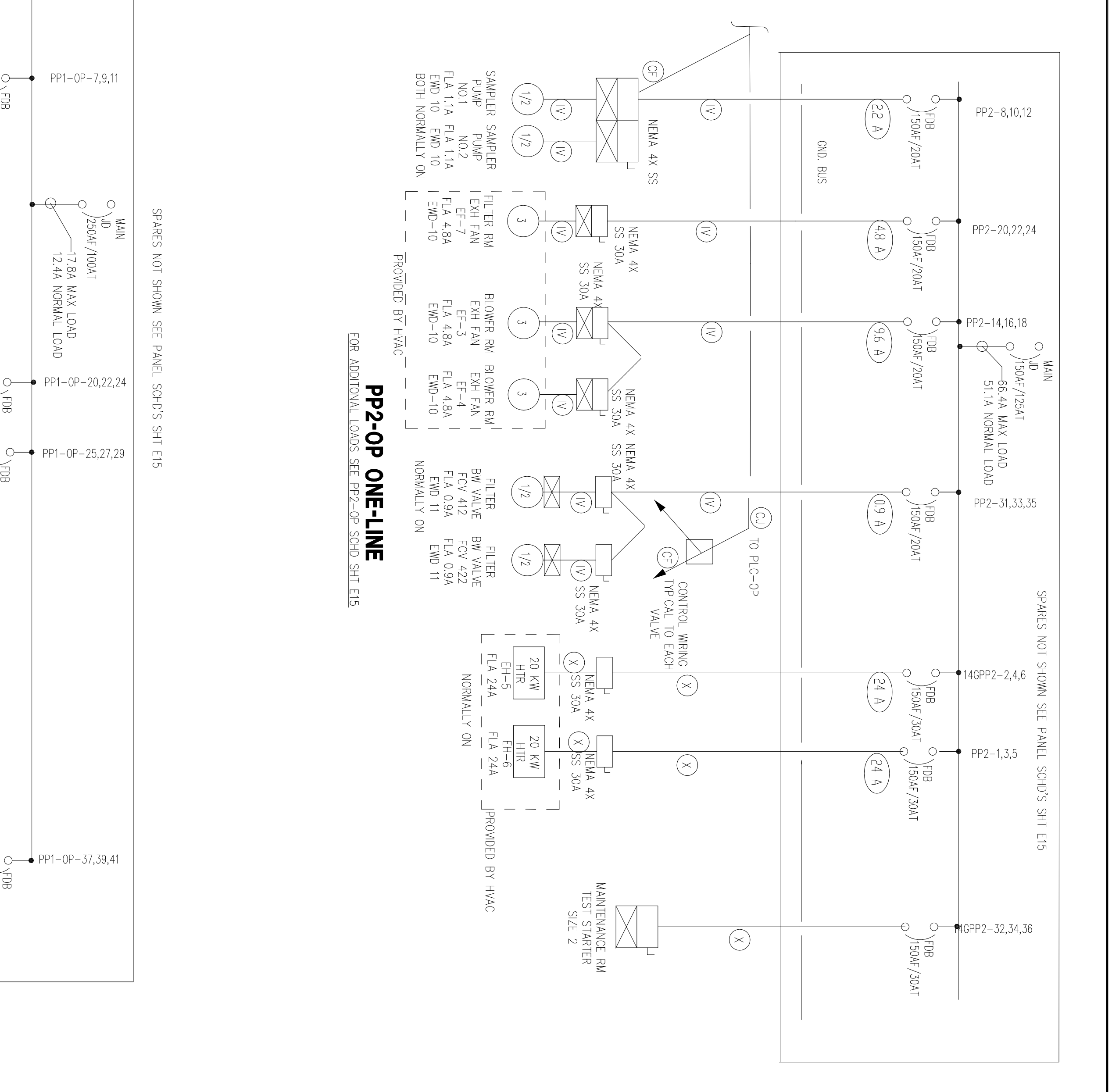
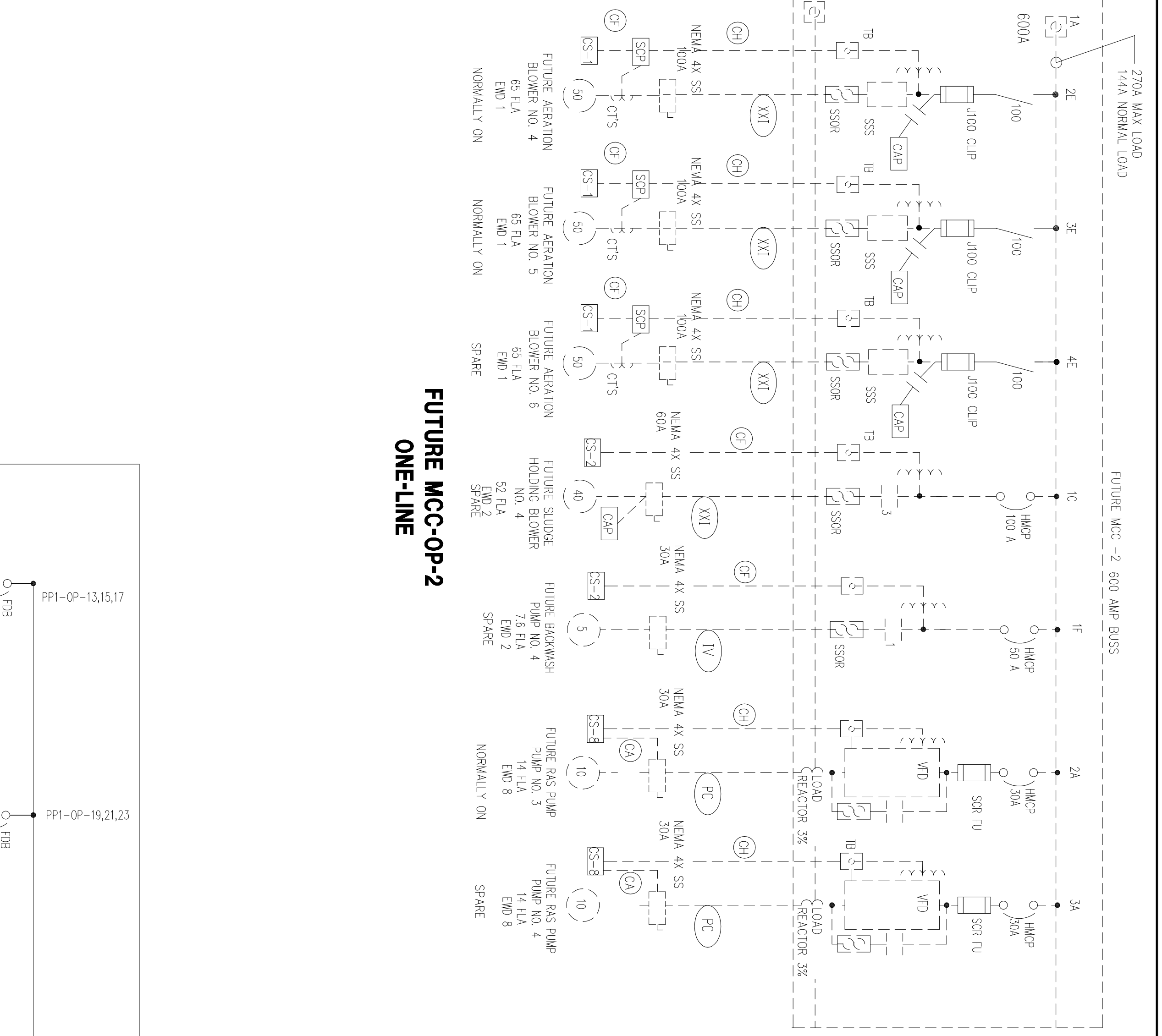
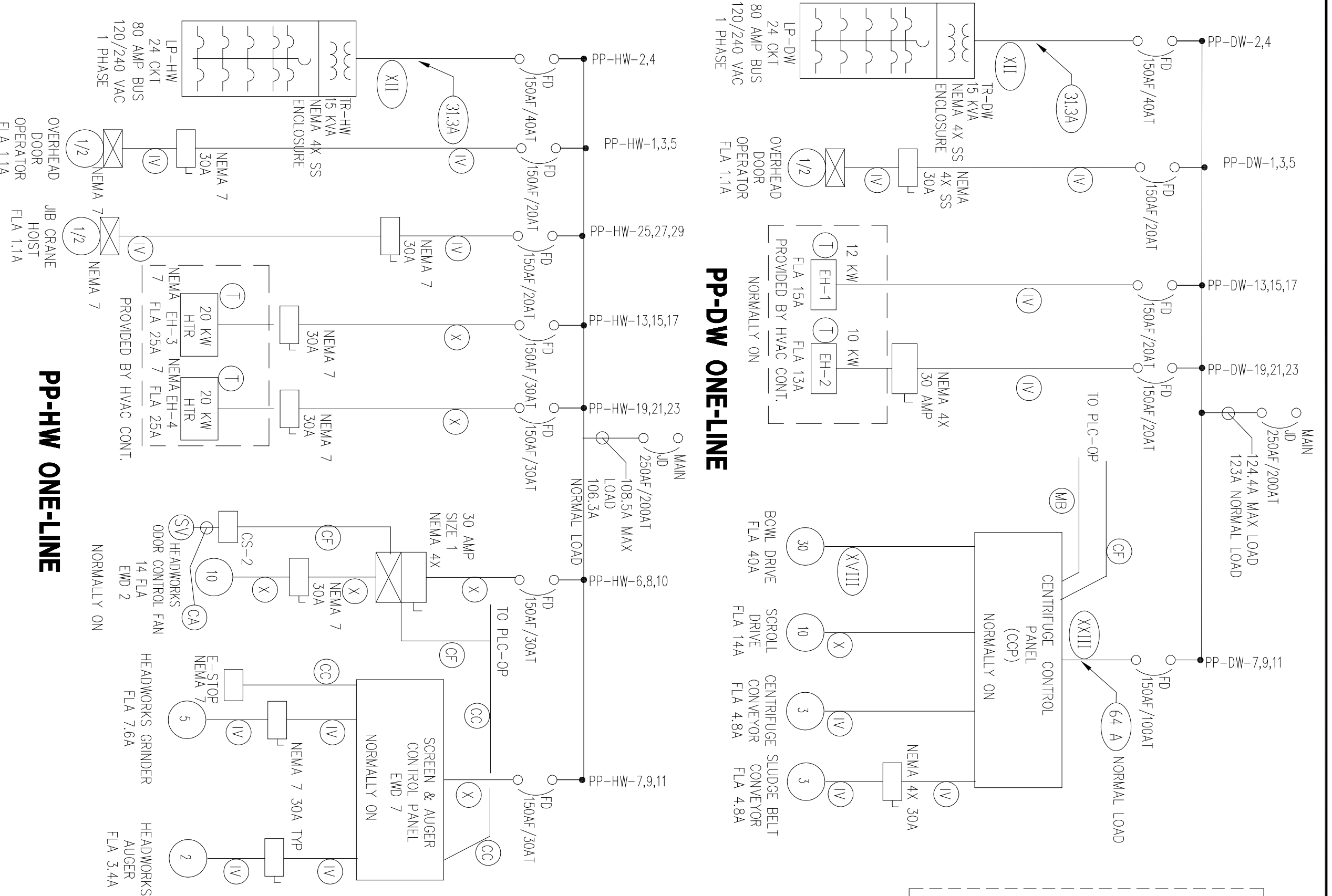
DESIGNED BY:	REVISIONS
FBA	
DRAWN BY:	REMARKS
JAS	
CHECKED BY:	
5-2-06	REVISED PER DELAWARE CO. COMMENTS
APPROVED BY:	
DATE:	
JAN.13 2006	

FLOYD BROTHERS ASSOCIATES INC.
DAYTON, OHIO
897-431,1004
DELAWARE, OHIO
740-363-6792
* Dayton, Ohio
740-363-5187

**NORTHSTAR DEVELOPMENT
WASTEWATER TREATMENT PLANT**

SCALE: AS NOTED
WASTEWATER TREATMENT PLANT
ELECTRICAL
ONE-LINE DISTRIBUTION

SHEET NO. 34
E5 OF 18



MCC ELEVATION

MCC PLAN

MCC-OP-2

PP1-OP ONE-LINE

PP2-OP ONE-LINE

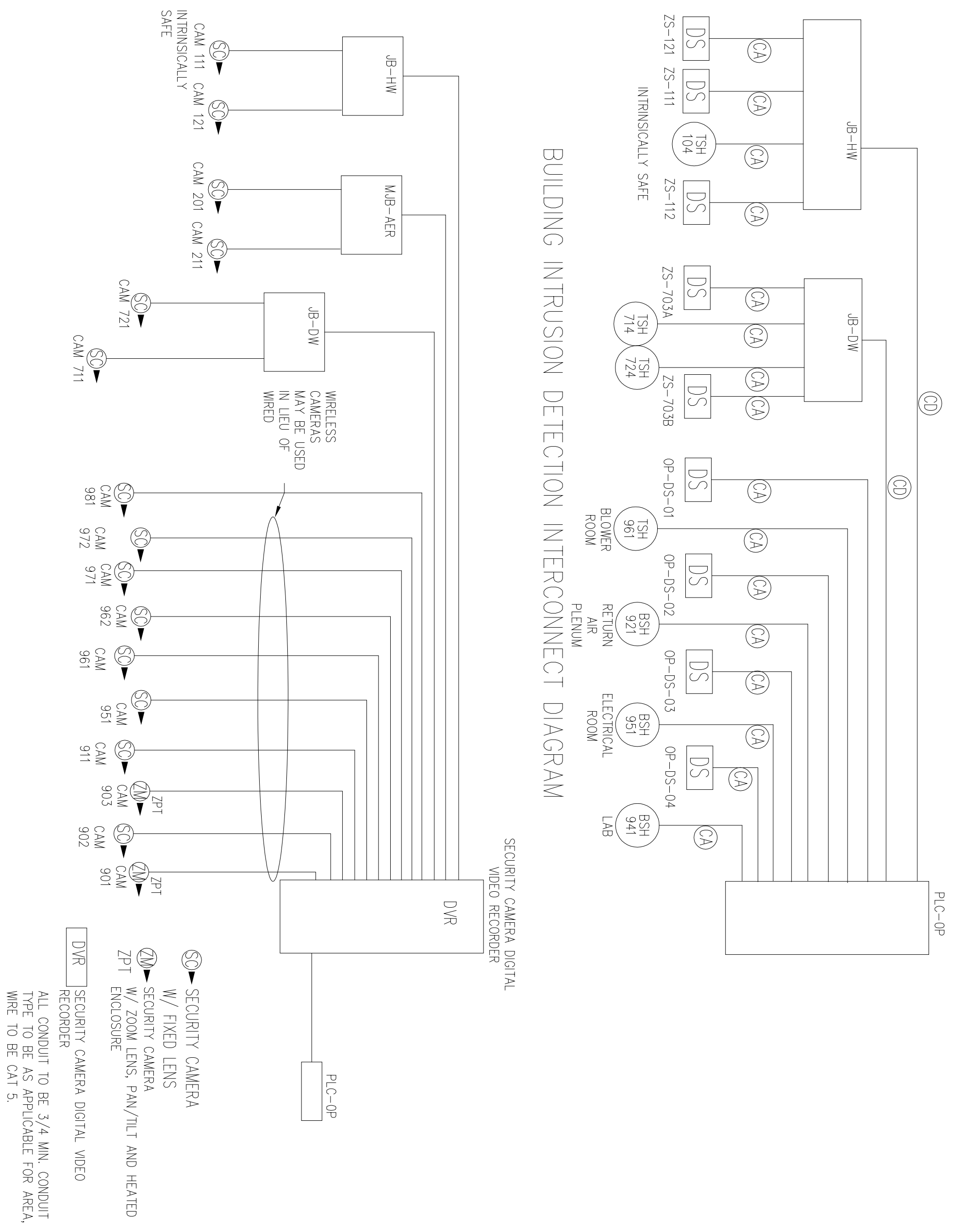
WASTEWATER TREATMENT PLANT

DESIGNED BY: FBA
 DRAWN BY: JAS
 CHECKED BY: JAS
 APPROVED BY: JAS
 DATE: JAN 13, 2006

REVISIONS
 DATE
 REMARKS

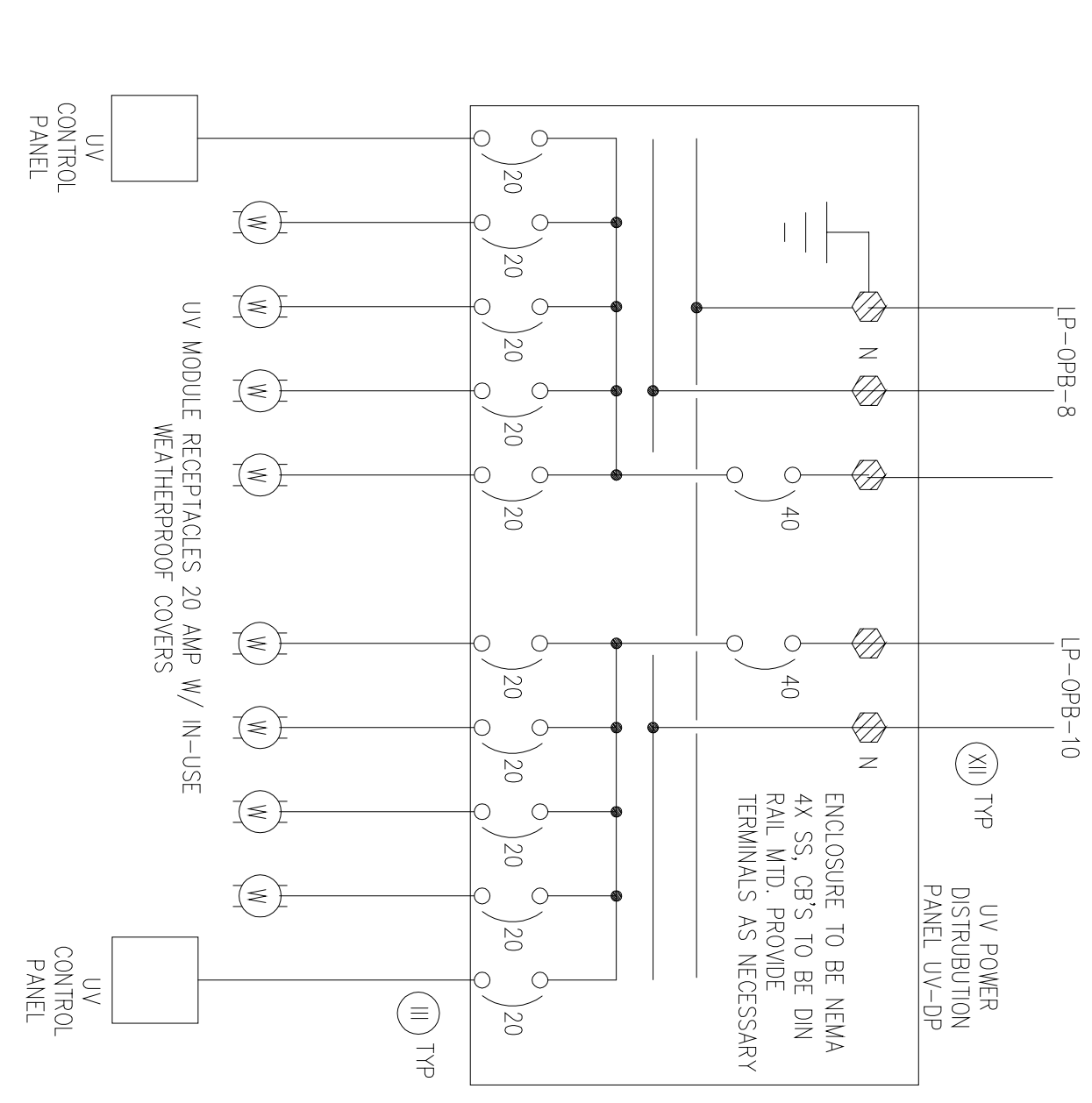
SCALE:
 AS NOTED

SHEET NO. 35

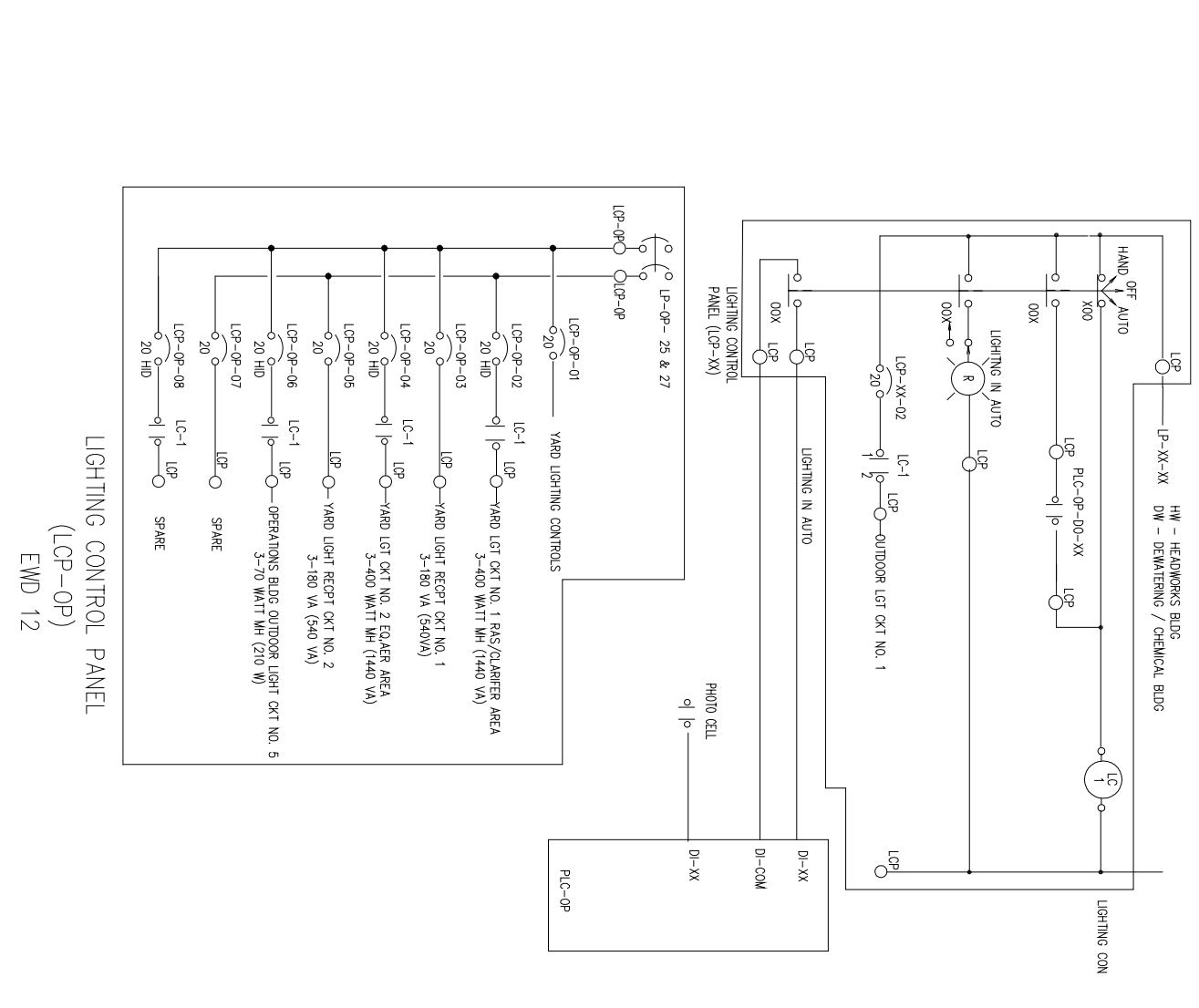


BUILDING SECURITY CAMERA INTERCONNECT DIAGRAM

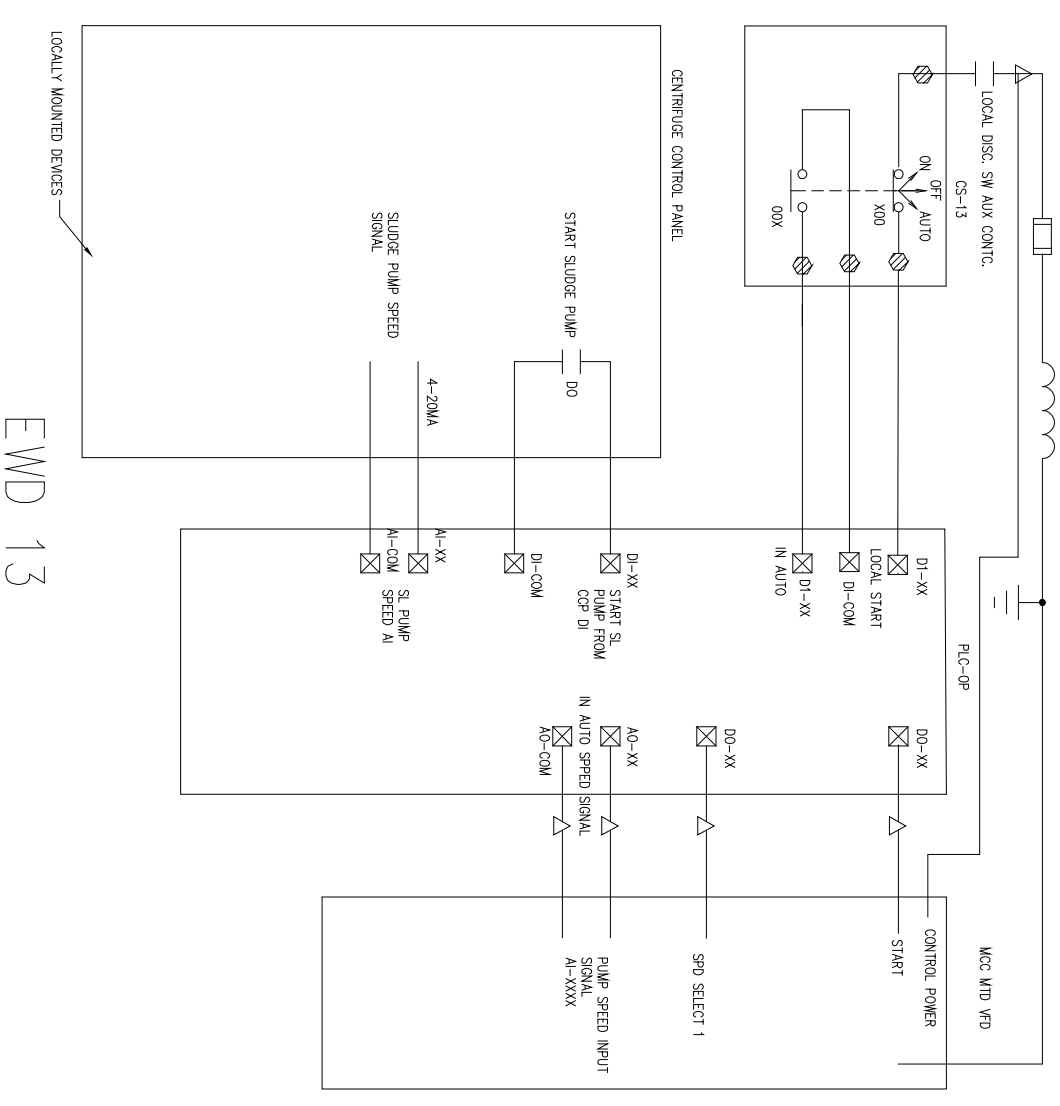
BUILDING INTRUSION DETECTION INTERCONNECT DIAGRAM



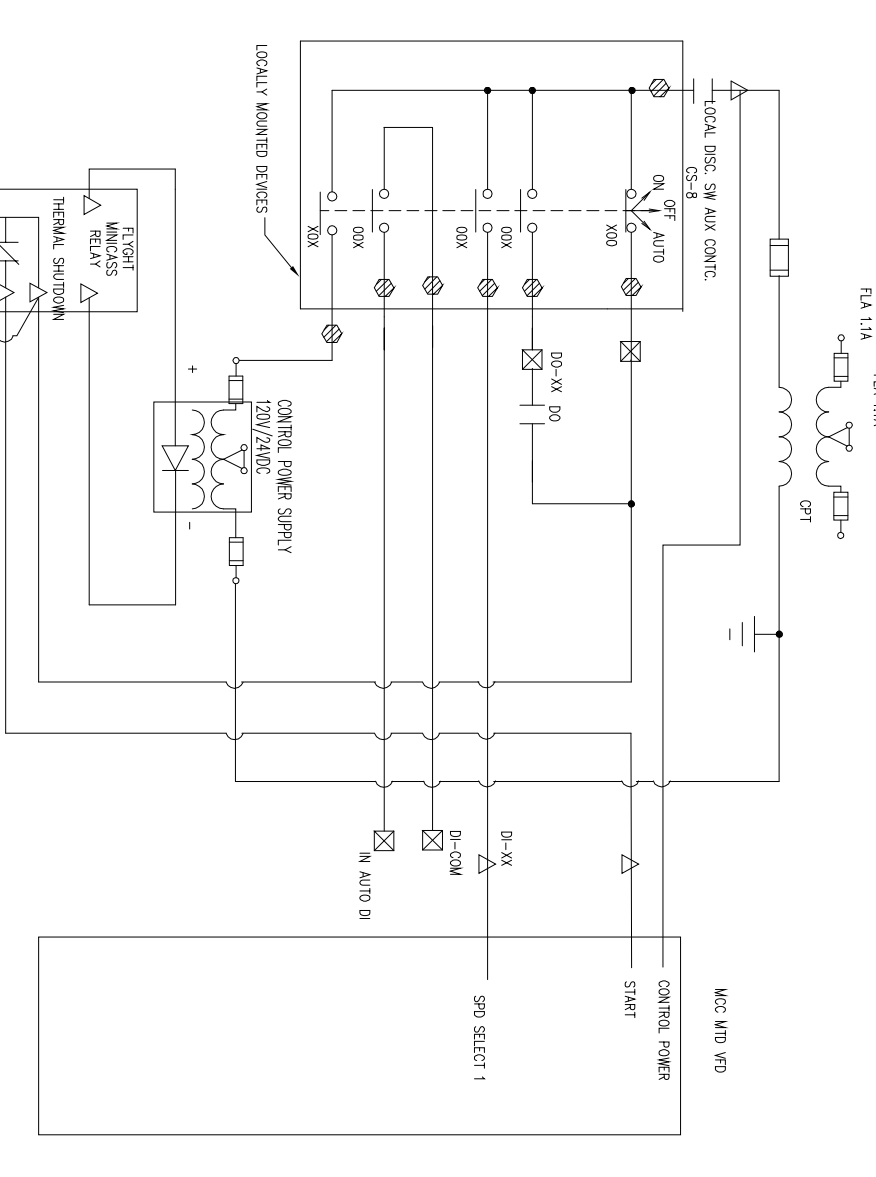
UV SYSTEM DISTRIBUTION DETAIL



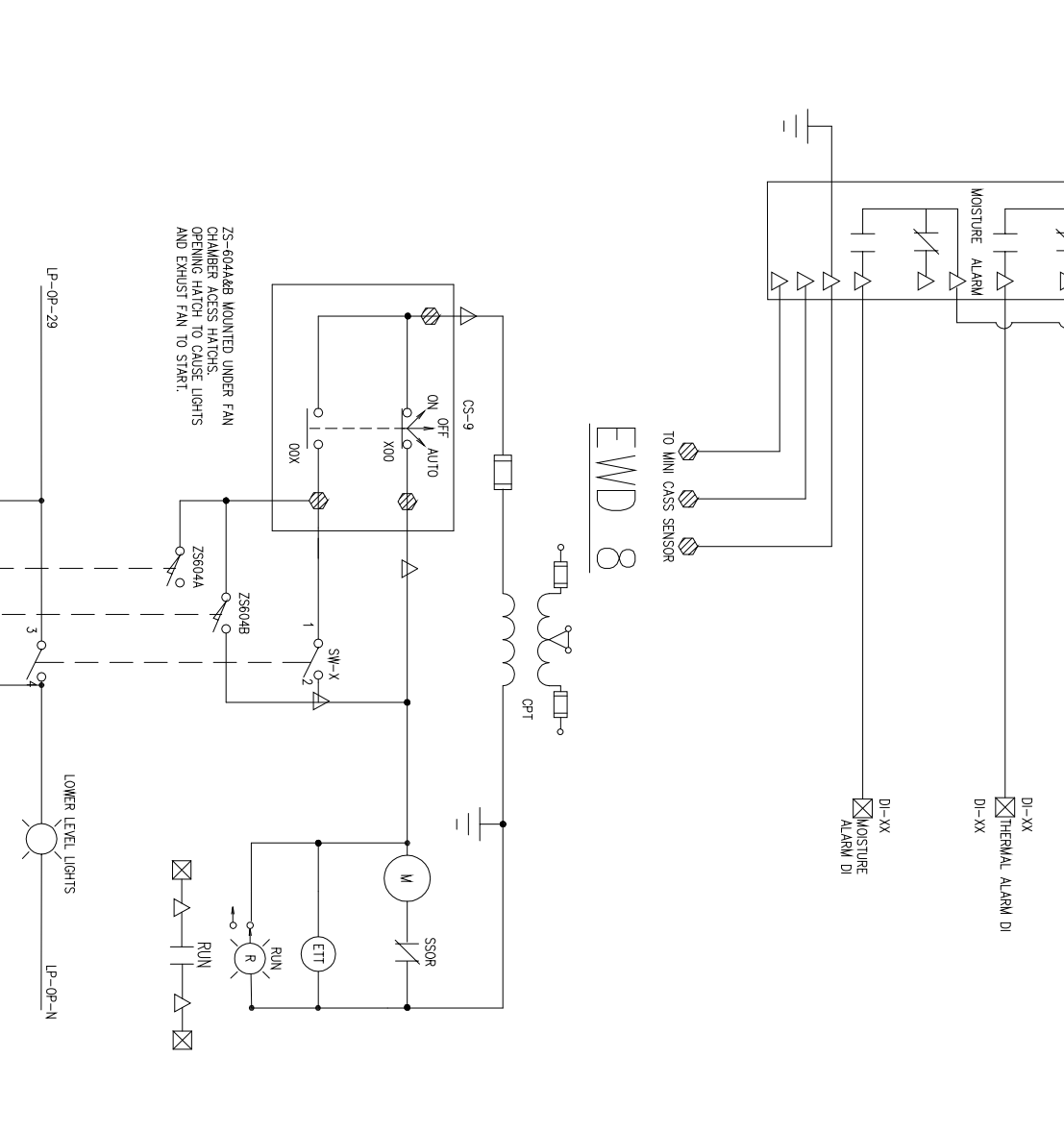
LIGHTING CONTROL PANEL (LCP-OP)



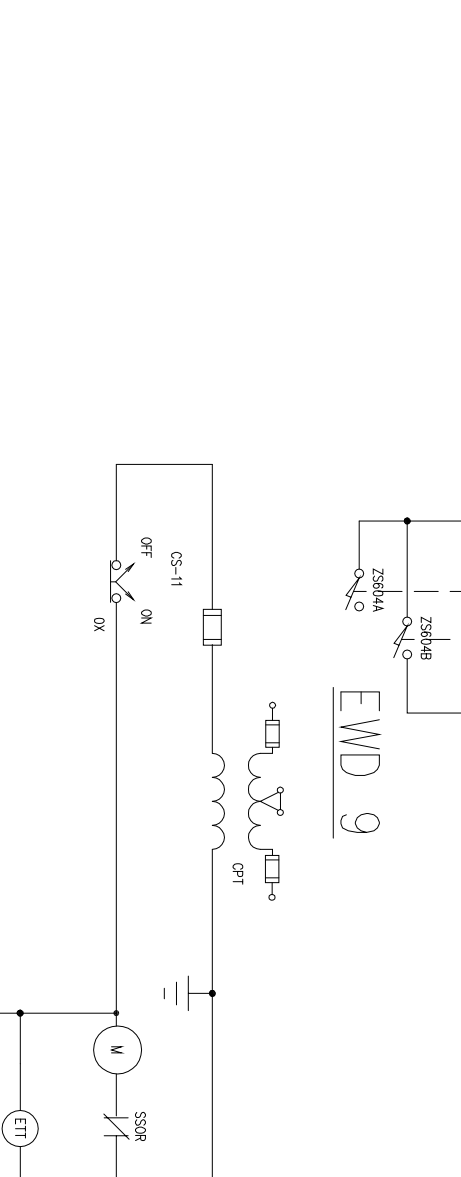
EWD 13



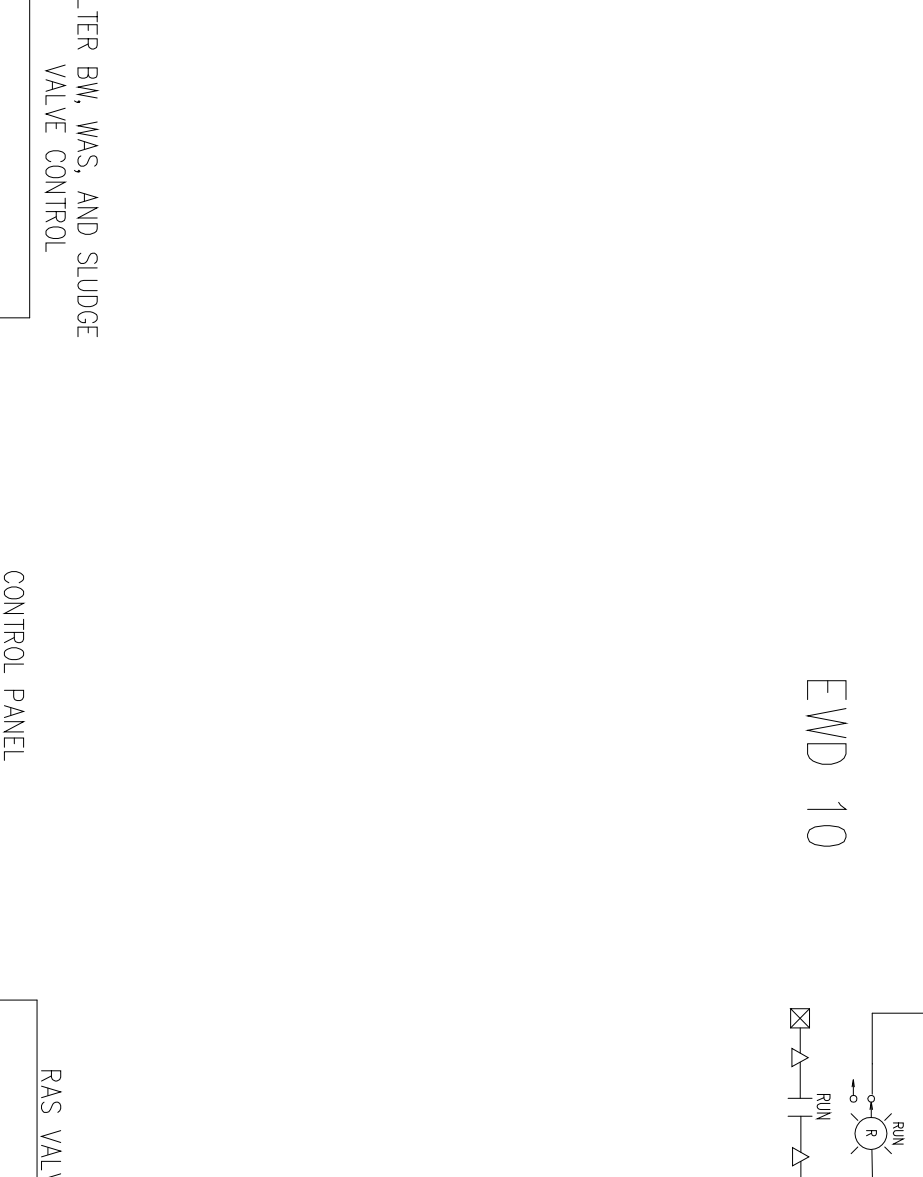
EWD 8



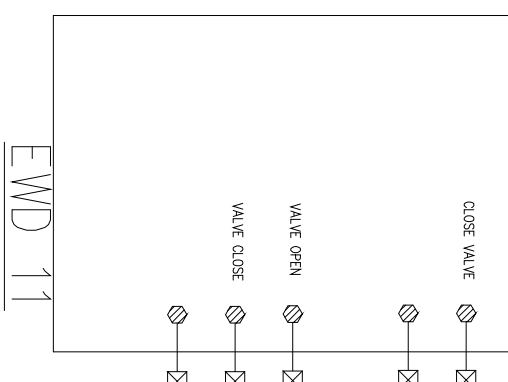
EWD 9



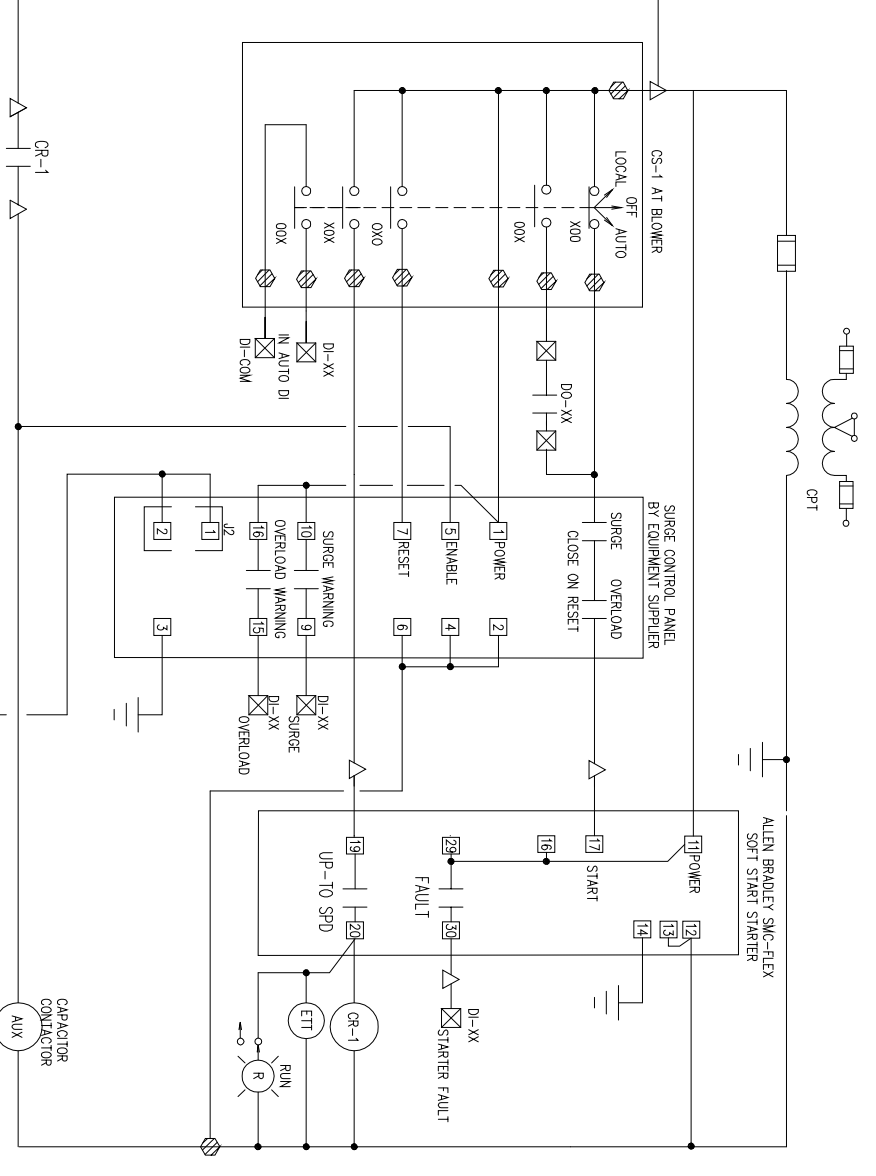
EWD 10



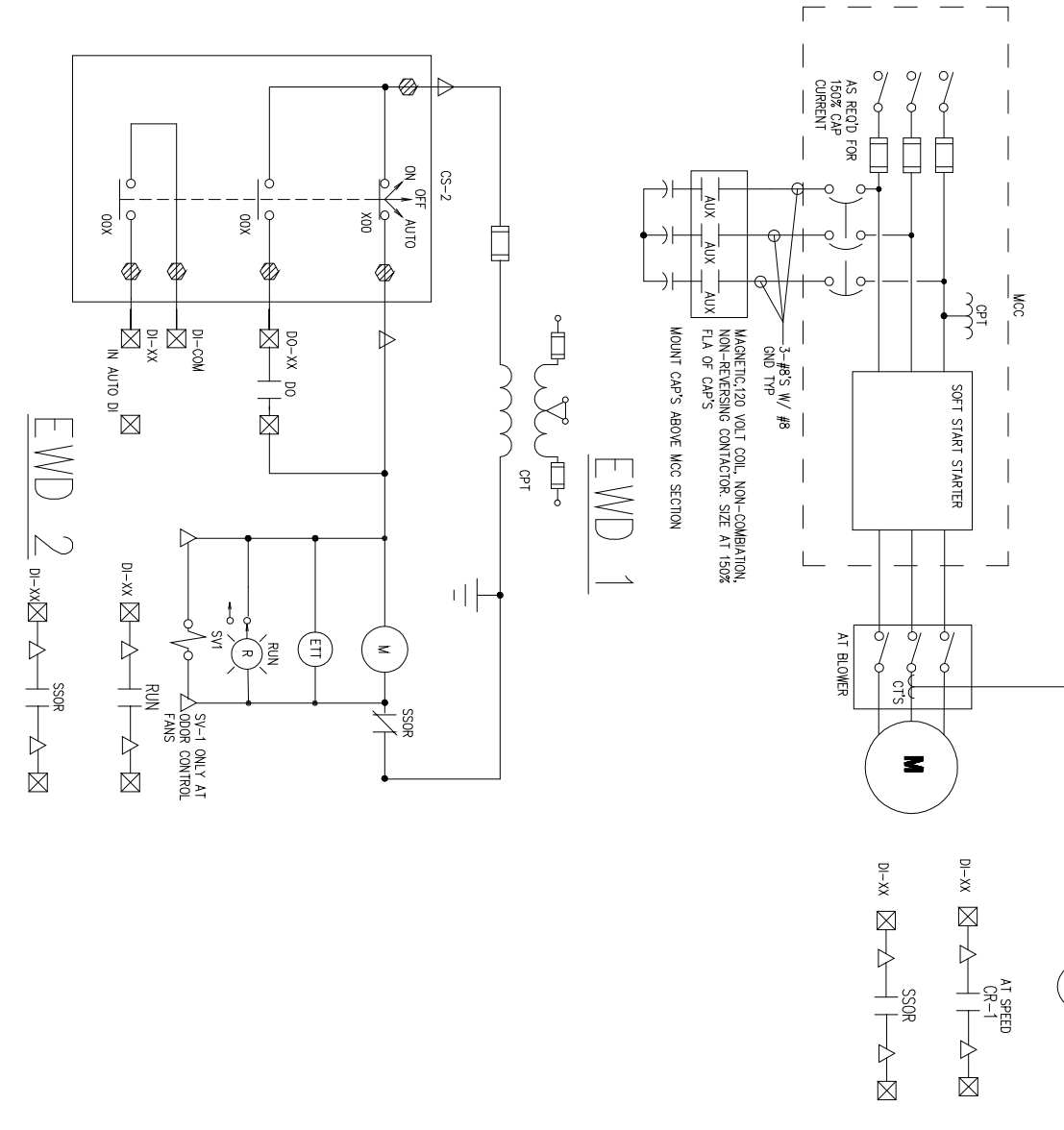
FILTER BW, WAS, AND SLUDGE VALVE CONTROL



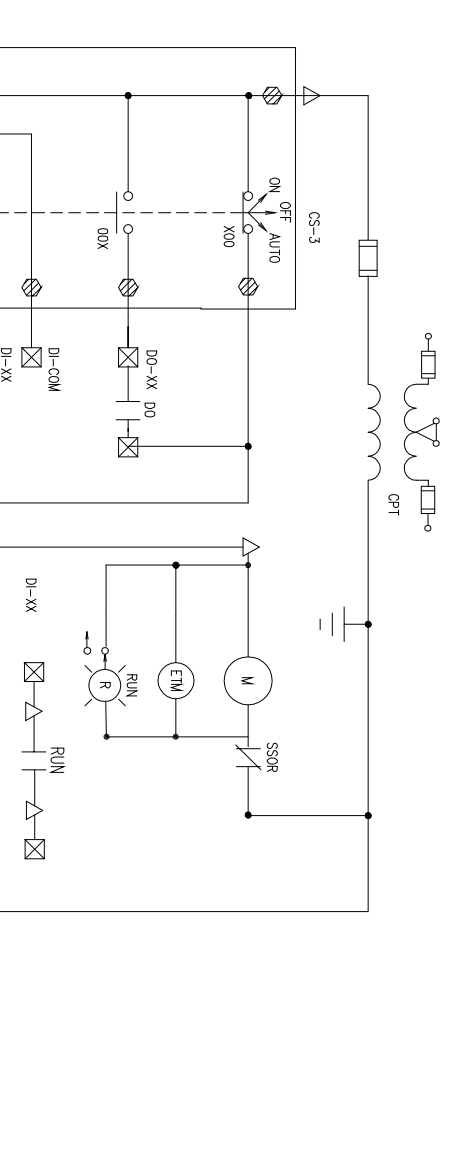
EWD 7



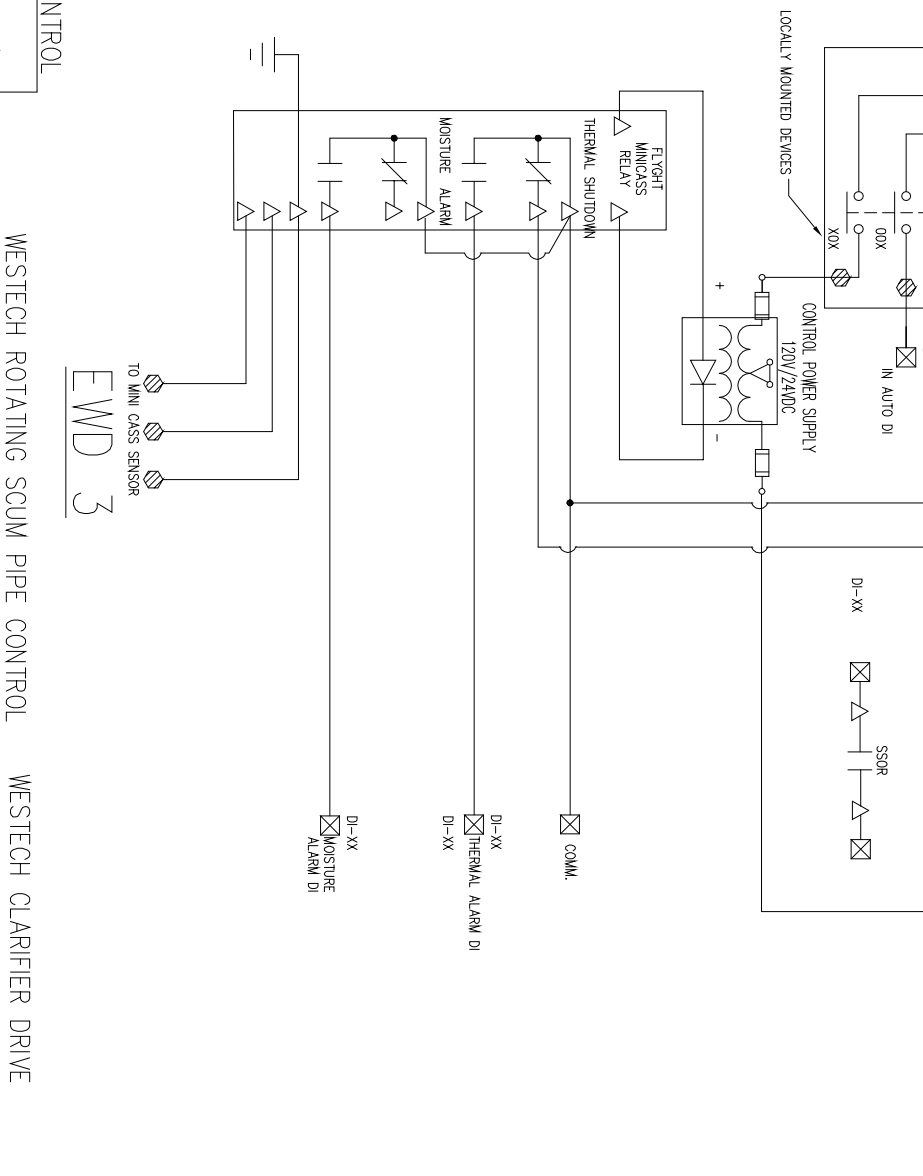
EWD 1



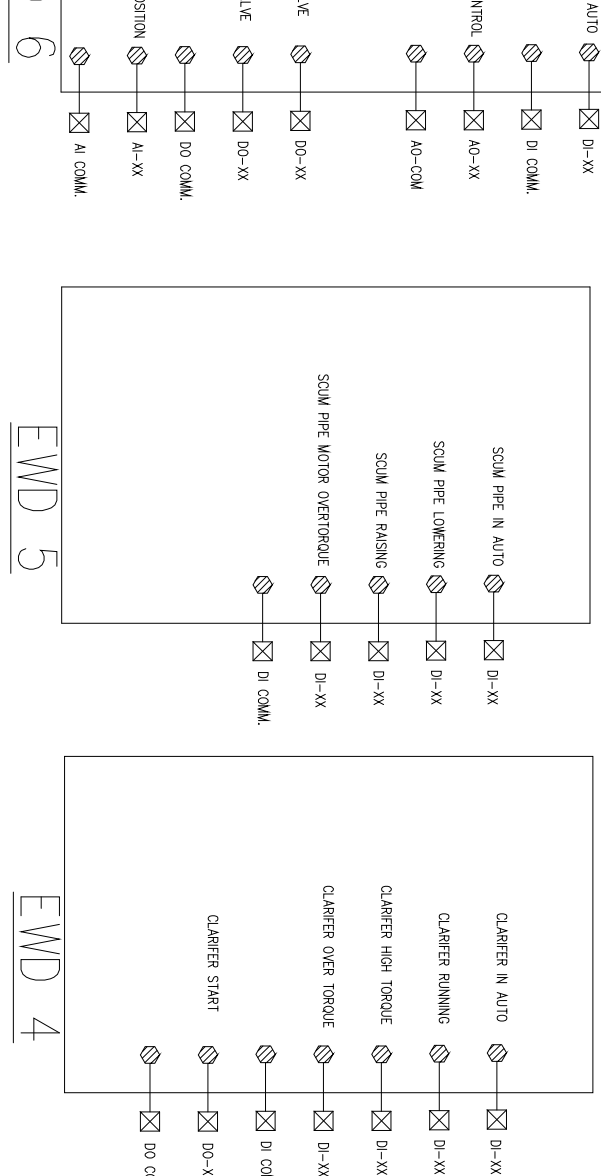
EWD 2



EWD 3



EWD 6



EWD 4

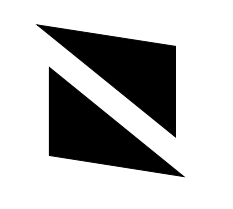
DESIGNED BY:	FBA	REVISIONS
DRAWN BY:	JAS	DATE
CHECKED BY:		REMARKS
APPROVED BY:		REMOVED PER DELAWARE CO. COMMENTS
DATE:	JAN 13, 2006	

DAYTON, OHIO	937.431.1004
DELAWARE, OHIO	740.363.6792
MARION, OHIO	740.383.2187

NORTHSTAR DEVELOPMENT	WASTEWATER TREATMENTPLANT
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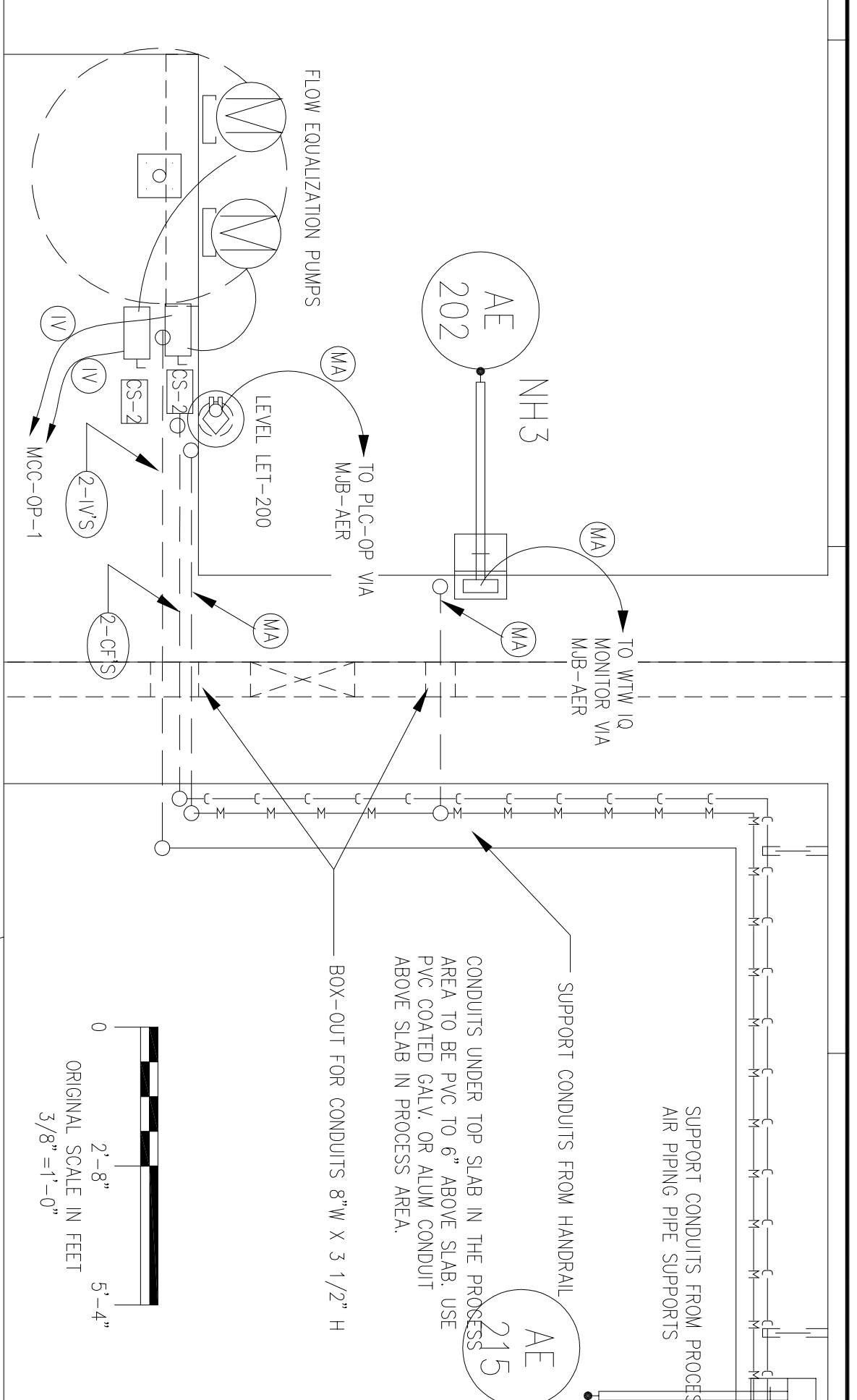
SCALE:	AS NOTED
WASTEWATER TREATMENT PLANT	ELECTRICAL
	ELEM. WIRING DIAGRAMS
	SHEET NO. 36
	E7 OF 18

R. D. Zande & Associates

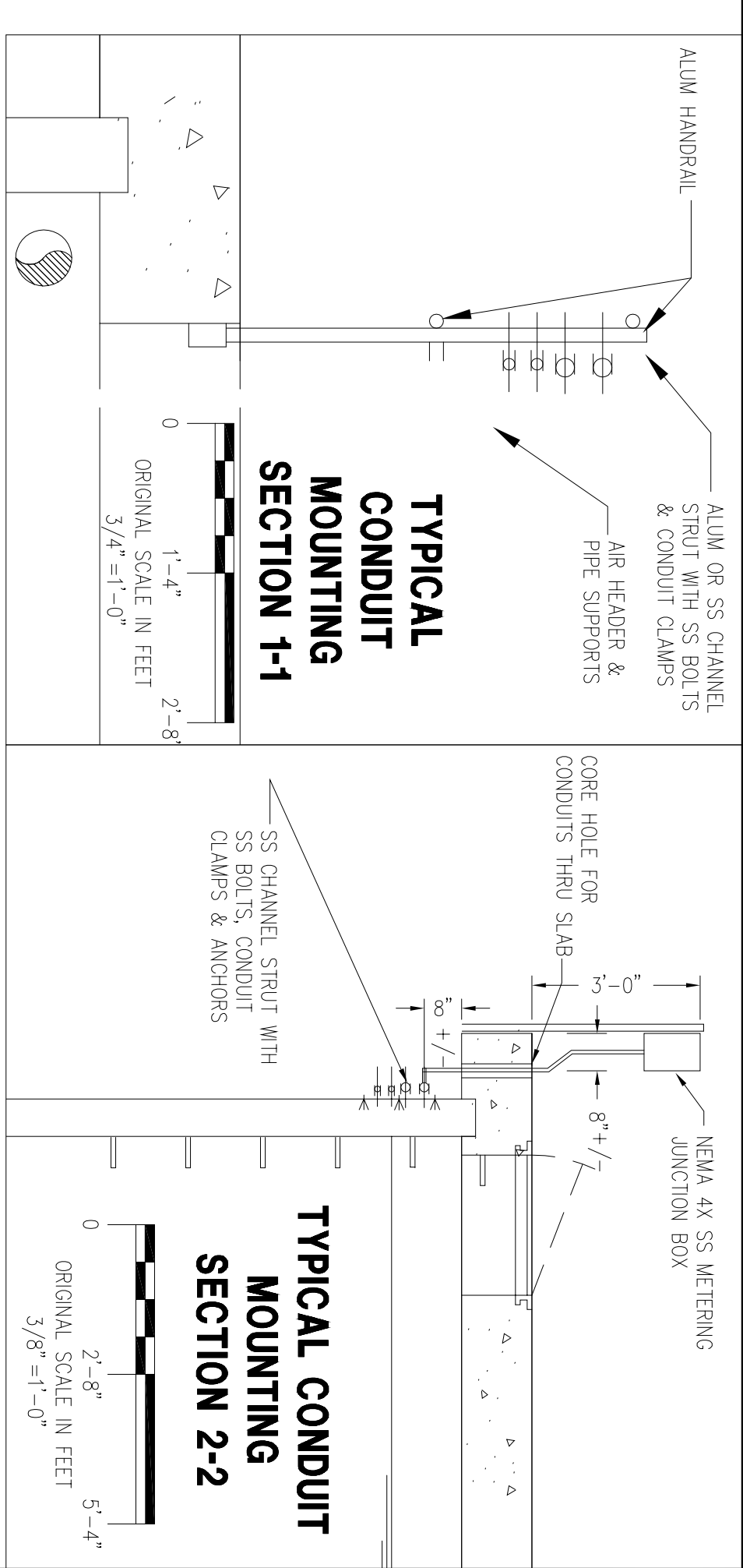
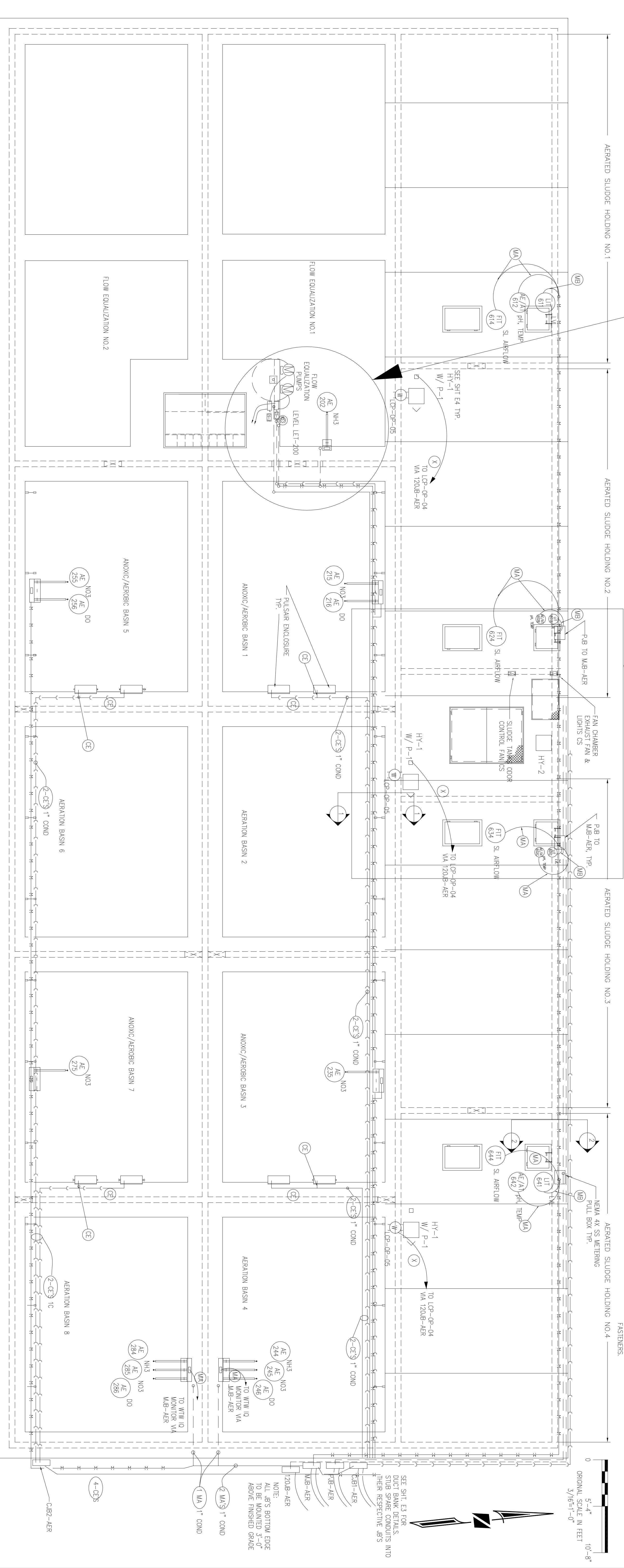


FLOYD BROWNE ASSOCIATES, FBA INC.

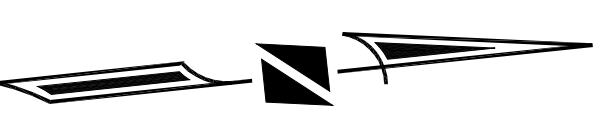
* Contact Office



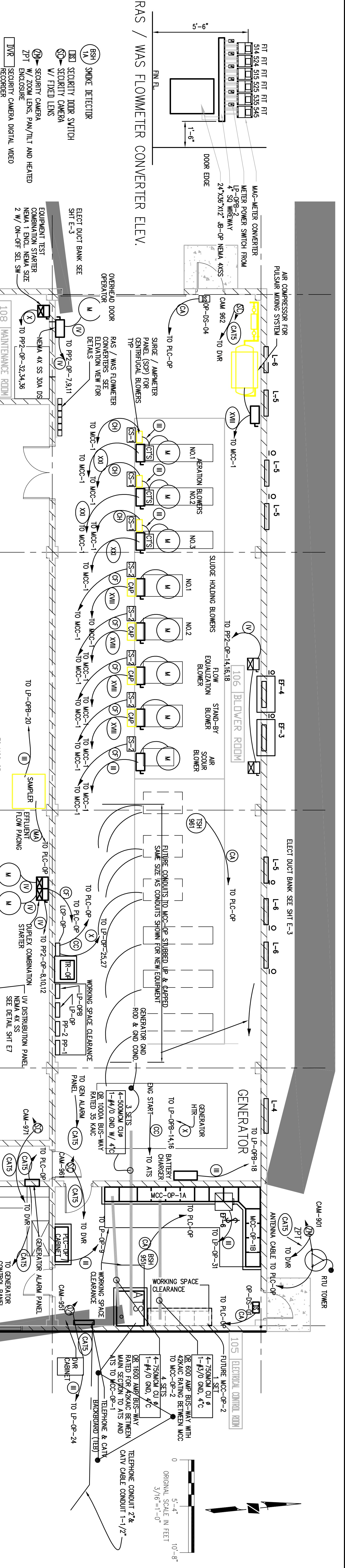
SEE FAN CHAMBER DETAILS ON SHT E11



ALL CONDUIT TO BE ALUMINUM AND ALUMINUM COPPER FREE CONDUIT CLAMPS & ANCHORS FASTENERS.

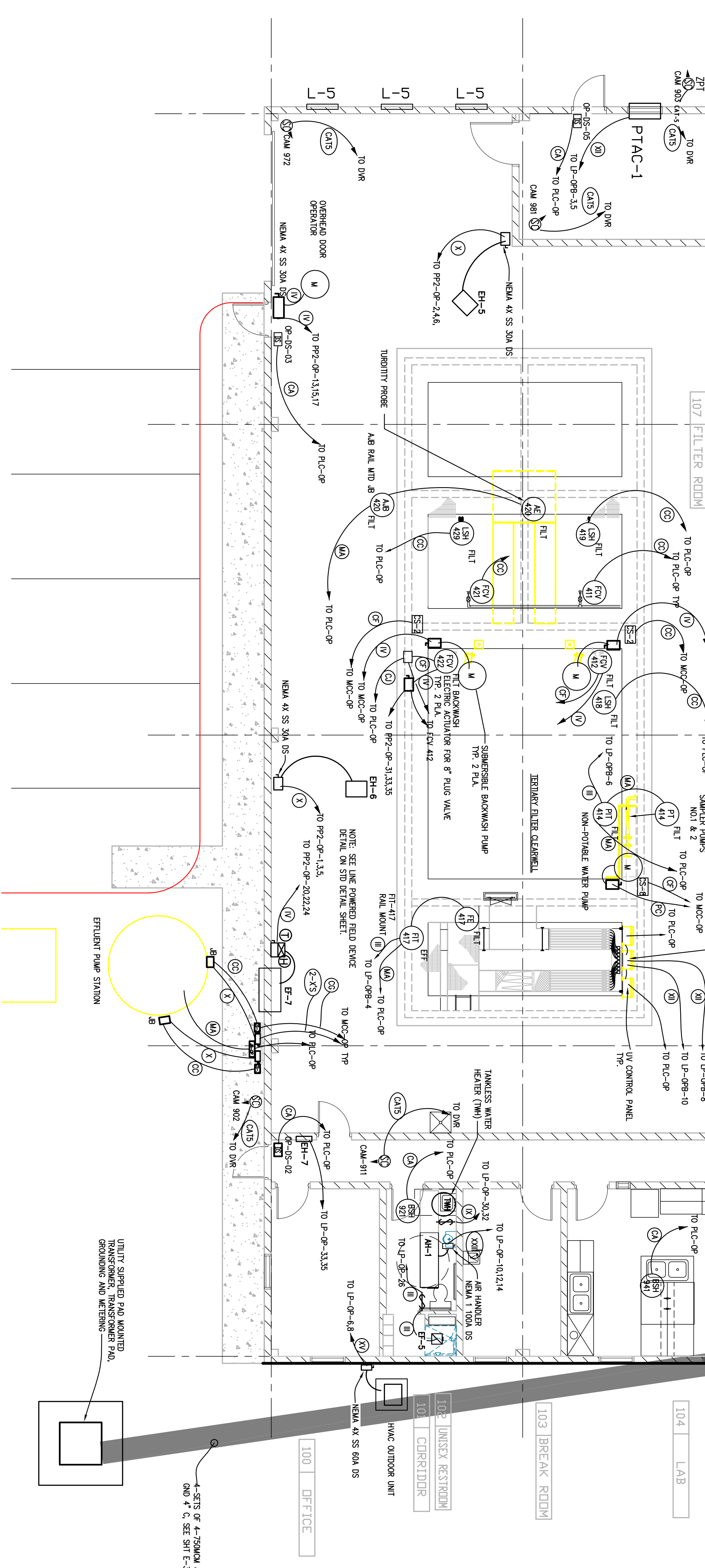
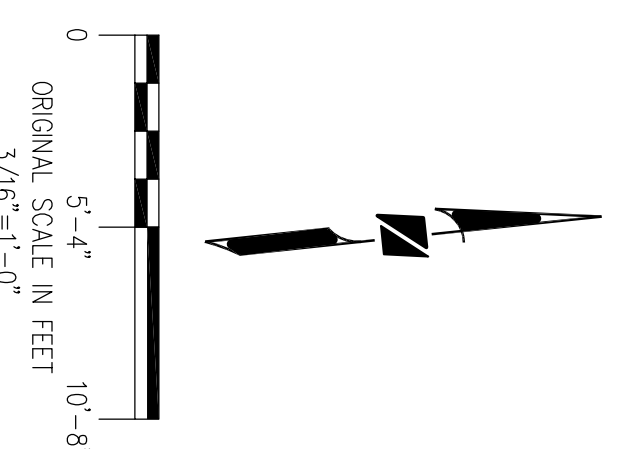


DESIGNED BY: FBA	REVISIONS:		<p>* Contact Office Dayton, Ohio 937.431.1004 Delaware, Ohio 740.383.6722 * Marion, Ohio 740.383.2187</p>	<p>NORTHSTAR DEVELOPMENT WASTEWATER TREATMENT PLANT</p>	<p>SCALE: WASTEWATER TREATMENT PLANT</p>	<p>ELECTRICAL & SLUDGE</p>	<p>SHEET NO. 39 E10 OF 18</p>
DRAWN BY: JAS	DATE: 5-18-06						
<p>REMARKS</p> <p>REMOVED PER DELAWARE CO. COMMENTS</p>							
<p>DWG NO. 5724-01 MACK-ND-NORTHSTAR E10-11</p>							



RAS / WAS FLOWMETER CONVERTER ELEV.

- BSH SPIKE DETECTOR
- SECURITY DOOR SWITCH
- SECURITY CAMERA
- W/ FIXED LENS
- SECURITY CAMERA
- ZPT W/ ZOOM LENS, PAN/TILT AND HEATED ZPT ENCLOSURE
- SECURITY CAMERA DIGITAL VIDEO RECORDER



UTILITY SUPPLIED PAD MOUNTED TRANSFORMER, TRANSFORMER PAD, GROUNDING AND METERS

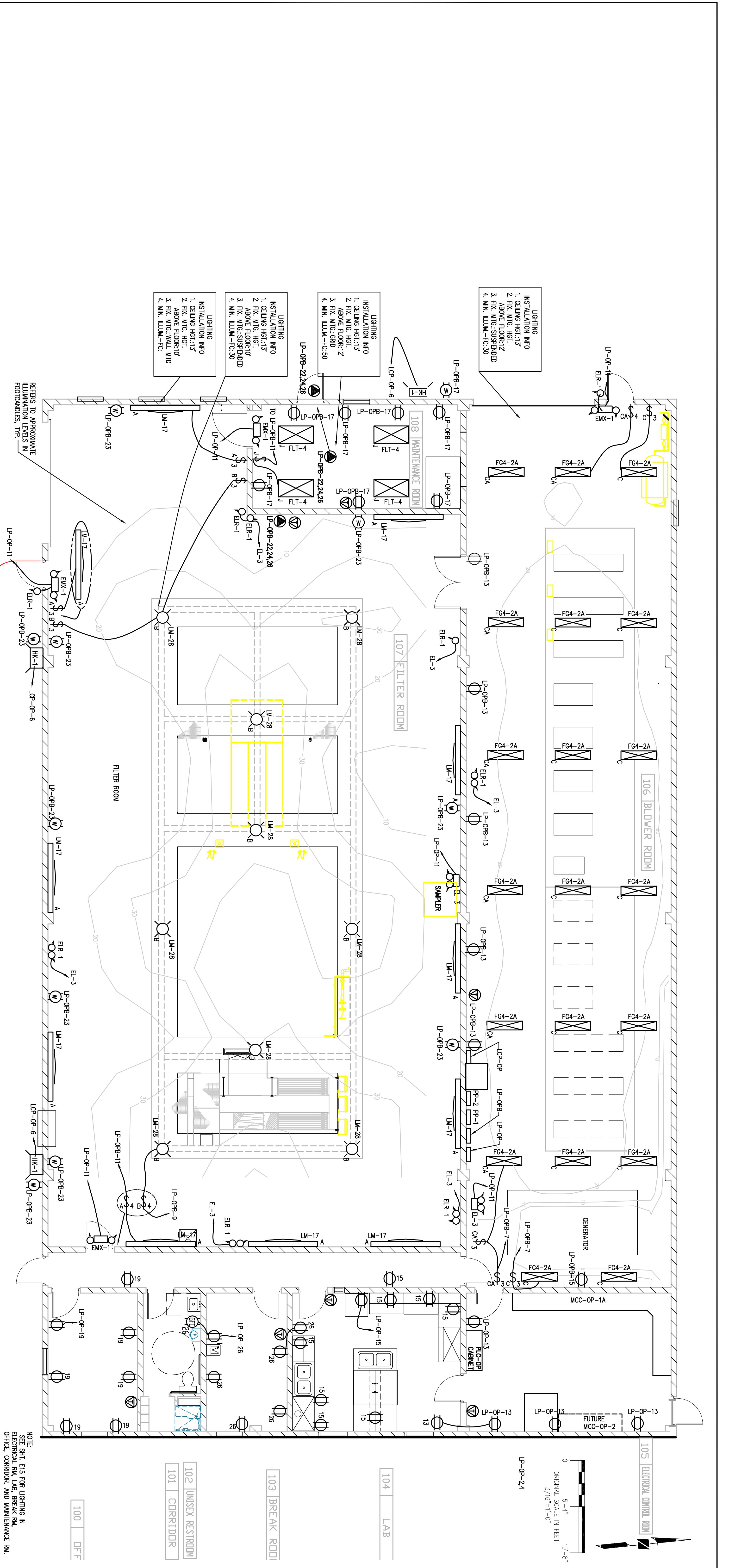
4 SETS OF 4-75MM² & 6ND 4 C, SEE SHIT E-3

DESIGNED BY:	FBA	REVISIONS:	
DRAWN BY:	JAS	DATE:	5-2-06
CHECKED BY:		REVISED PER:	DECLAWNE CO. COMMENTS
APPROVED BY:			
DATE:	JUN 13, 2006		
<p style="text-align: center;">NORTSTAR DEVELOPMENT WASTEWATER TREATMENT PLANT</p>			
SCALE:		AS NOTED	
WASTEWATER TREATMENT PLANT		ELECTRICAL OPERATIONS BLDG	
ELECTRICAL OPERATIONS BLDG		ELECTRICAL DISTRIBUTION PLAN	
SHEET NO. 42		E13 OF 18	

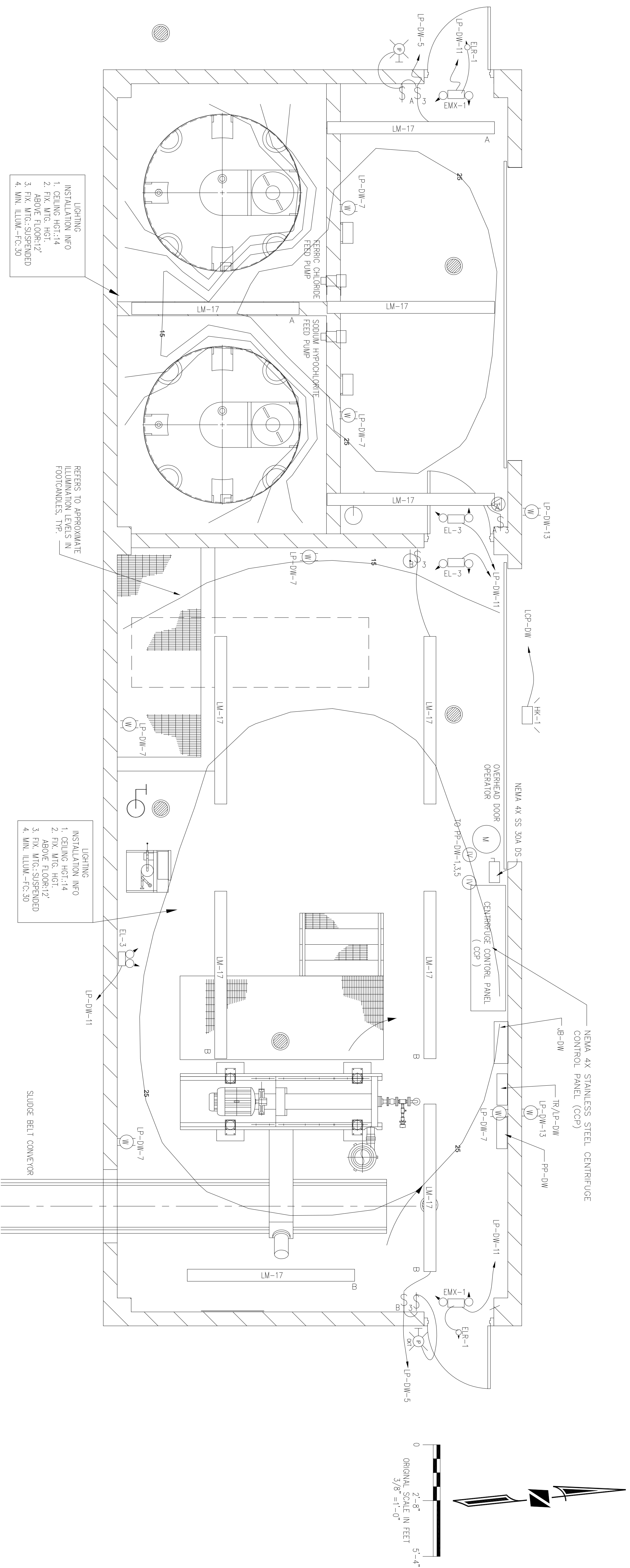
FLOYD BROWNE ASSOCIATES, INC.
 * Contact Office
 Dayton, Ohio
 937.431.1004
 Delaware, Ohio
 740.363.6792
 * Marion, Ohio
 740.383.2187

DESIGNED BY:	FBA	REVISIONS
DRAWN BY:	JAS	DATE
CHECKED BY:		REMARKS
APPROVED BY:		
DATE:	JAN 13, 2008	

NO.	DESCRIPTION
1	GENERAL FLUORESCENT FIXTURE 2 LAMP 48IN. APERTURE, 120VOLT T8 LAMPS COOPER METALUX DM232702EB81, GRANINGER # 50943 OR HOLOPHANE SMO5AKT10042P11
2	TROFFER MTD FLUORESCENT FIXTURE 4 LAMP 48IN, 120VOLT T8 LAMPS COOPER METALUX ZSR8432A120VBR2, GRANINGER # 44171 OR HOLOPHANE S52ZAKNS5044P21
3	70 WATT, 120V, METAL HALIDE ULL LISTED FOR WET LOCATION - UL1588 HOLOPHANE WALLEPACK II, W2K7QDHO00X, OR EQUAL, MOUNT 12 FT ABOVE FIN FL
4	175 WATT, 120V, METAL HALIDE PENDANT MOUNTED FIXTURE ULL LISTED FOR DAMP LOCATION, HOLOPHANE RETROFLU II, P1AT5W1P25C OR EQUAL
5	120V, 8' FLUORESCENT, WALL MOUNTED, ENCLOSED HOLOPHANE RETROFLU II, P1AT5W1P25C OR EQUAL
6	COMBINATION EXIT & EMERGENCY LIGHT OR KIT-# COOPER SURE LITES MODEL COZYTRIMHDH, LITHONIA QUANTUM LUMSW/6 or G120/277LH MOUNT 8 FT ABOVE FIN FL
7	REMOTE EMERGENCY LIGHT HEAD COOPER SURE LITES MODEL 6X-9-WCY, LITHONIA QUANTUM ELANK H008 GRANINGER # 46318 MOUNT 8 FT ABOVE FIN FL
8	EMERGENCY LIGHT 100 WATT HOLOPHANE DESOTO M60 SERIES DM6-C-100-S-WZ-2-TI OR EQUAL, MOUNT 8 FT ABOVE FIN FL
9	EMERGENCY LIGHT COOPER SURE LITES MODEL Q11B, OR LITHONIA QUANTUM ELW2 GRANINGER # 4PH01
10	EXIT LIGHT LED COOPER SURE LITES MODEL LPX206 or G1W, OR LITHONIA QUANTUM LUMSW/6 or G120/277ELN GRANINGER # 3X231
11	ENCLOSED & GASKETED, SURFACE MTD TWO LAMP 48IN, 120 VOLT T8 F32TRW LAMPS, ULL LISTED FOR WET LOCATIONS, CORROSION RESISTANT HIGH IMPACT PRISMATIC HOLOPHANE "CONTOURFLUORESCENT" SERIES ES504SBB85042P11, COOPER METALUX "VIZ" SERIES GRANINGER # 50964 OR EQUAL



NOTE:
SEE SH1, E15 FOR LIGHTING IN ELECTRICAL RM, LAB, BREAK RM, OFFICE, CORRIDOR, AND MAINTENANCE RM.



LIGHTING INSTALLATION INFO
 1. CEILING HGT: 14'
 2. FIX. MTS. HGT. ABOVE FLOOR: 12'
 3. FIX. MTS.: SUSPENDED
 4. MIN. ILLUM.: FC:30

LIGHTING INSTALLATION INFO
 1. CEILING HGT: 14'
 2. FIX. MTS. HGT. ABOVE FLOOR: 12'
 3. FIX. MTS.: SUSPENDED
 4. MIN. ILLUM.: FC:30

LM-17
 120V, 8' FLUORESCENT, SENSITIVE TO VIBRATION INDUSTRIAL FIXTURE, 2-75W T12 SIMULINE, 96" LINEAR FLUORESCENTS, ULL LISTED FOR DAMP LOCATION, LITHONIA DWM 2 96, OR EQUAL

IP
 GENERAL WALL FIXTURE, MAX WATTAGE 100W 120VOLT LUMINA PRO, GRANGER # 98R20 OR STONOCO WEATHERPROOF FIXTURE DECOROUS, LUMAFRO OR STONOCO DEC50 W/ 50W HPS LAMP MAY ALSO BE USED GRANGER # 5M60, MOUNT 7 FT ABOVE FIN FL

EL-3
 EMERGENCY LIGHT 100 WATT HOLLOWBANE DESOTO 660 SERIES DME-C-100-S-NZ-2-T1 OR EQUAL MOUNT 8 FT ABOVE FIN FL

EMX-1
 COMBINATION EXIT & EMERGENCY LIGHT COOPER SURE LITES MODEL CCG70RWH, GRANGER # 44L53 OR LITHONIA QUANTUM, LITHONIA DW 2 96, GRANGER # 44H(19 or 20) MOUNT 8 FT ABOVE FIN FL

HK-1
 70 WATT, 120V, METAL HALIDE OUTDOOR WALLPACK, ULL LISTED FOR WEI LOCATION - ULL 1598 HOLLOWBANE WALLPACK II, W/ 2K70DH-HOLLOW, OR EQUAL MOUNT 12 FT ABOVE FIN FL

EIR-1
 REMOTE EMERGENCY LIGHT HEAD COOPER SURE LITES MODEL 6X-9-WCY, GRANGER # 4PH9T OR LITHONIA QUANTUM ELANK H0806 GRANGER # 4PG78

Circuit No.	Circuit	LIGHT RECP	HVAC	MISC	VA			Circuit No.	Circuit
					L1 Load	L2 Load	LIGHT RECP		
1	80 MAIN				100	2	15	81R20	
3	80 INTERIOR LIGHTS	1570			1500	4	15	CHEM FEED PUMPS	
5	20 RECEPTACLES	1090			1500	6	20	ERT700	
7	20 RECEPTACLES CONTROL PANEL	400			225	8	20	EXIT FAN EF-1	
9	20 LCP-DW	340			1475	10	20	EXIT FAN EF-2	
11	20 EMERGENCY LIGHTS	380			1000	12	20	POLYMER SYSTEM	
13	20 SPARE				380	14	20	SPARE	
15	60-27 SPARE				0	16	20	SPARE	
17	20 SPARE				0	18	20	SPARE	
19	20 SPARE				0	20	20	SPARE	
21	20 SPARE				0	22	20	SPARE	
23	20 SPARE				0	24	20	SPARE	
25	20 SPARE				0	26	20	SPARE	
Motor Load					3645	4465			
TOTAL LOAD					2310	1440	0	0	4692

DESIGNED BY:	FBA	REVISIONS:
DRAWN BY:	JAS	DATE
CHECKED BY:		REMARKS
APPROVED BY:		
DATE:	DEC. 9, 2005	

FLOYD BROWNE ASSOCIATES, INC.
 Dayton, Ohio
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 * Marietta, Ohio
 740.585.5187

NORTHSTAR DEVELOPMENT
 WASTEWATER TREATMENT PLANT

SCALE:
 AS NOTED

WASTEWATER TREATMENT PLANT
 ELECTRICAL DEWATERING BLDG.
 LIGHTING PLAN & RECP

