

# WWTP SECONDARY EFFLUENT PUMPS REPLACEMENT

## CITY OF ANN ARBOR PUBLIC SERVICES

### WASHTENAW COUNTY, MICHIGAN

DECEMBER 5, 2014  
ISSUED FOR BIDS  
ITB No. 4351

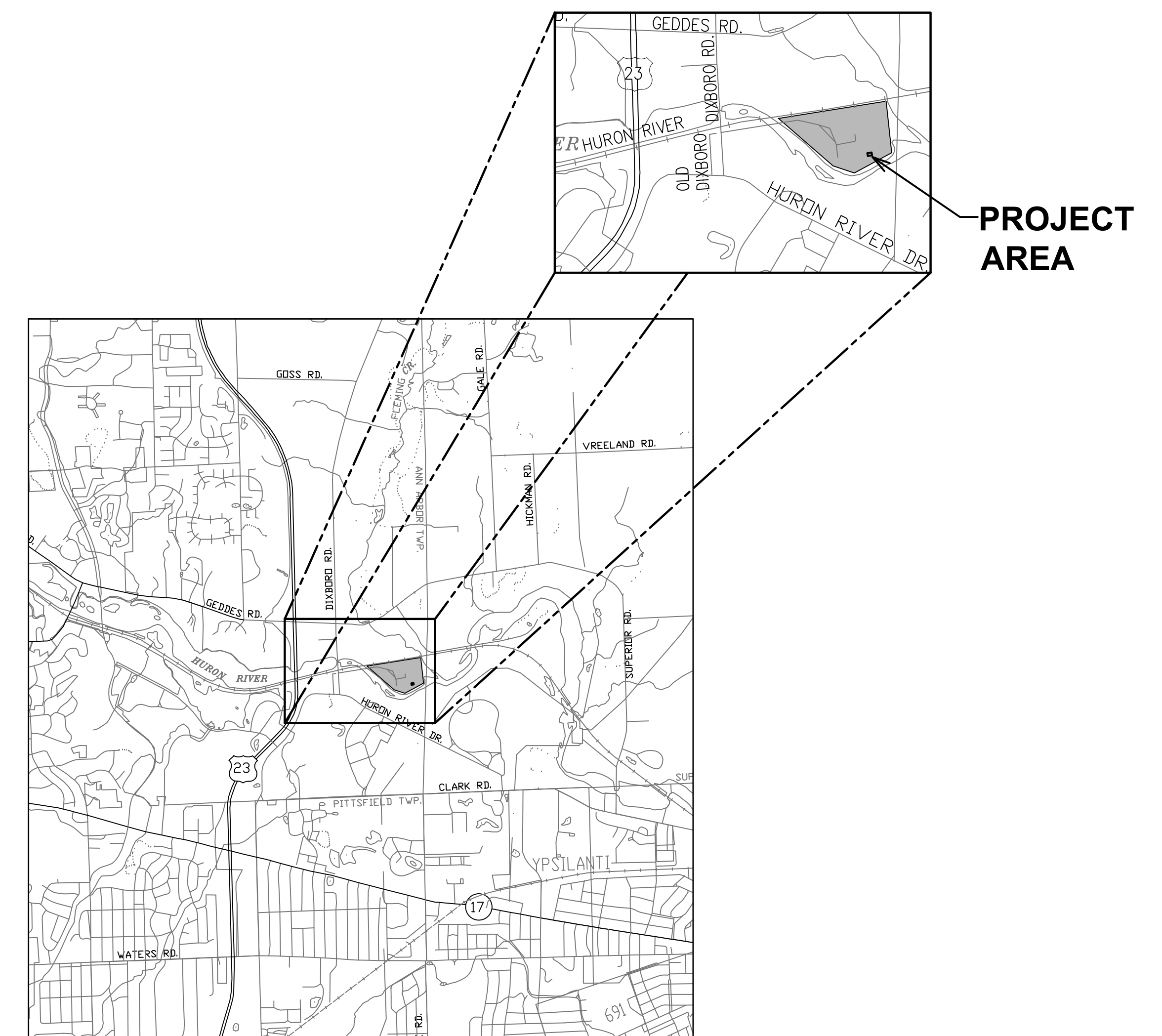


#### SHEET INDEX

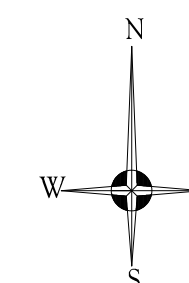
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E-2	WIRING DIAGRAMS
REF-A	REFERENCE ONLY
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REF-C	REFERENCE ONLY
REF-D	REFERENCE ONLY
REF-E	REFERENCE ONLY



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LOCATION MAP  
NOT TO SCALE

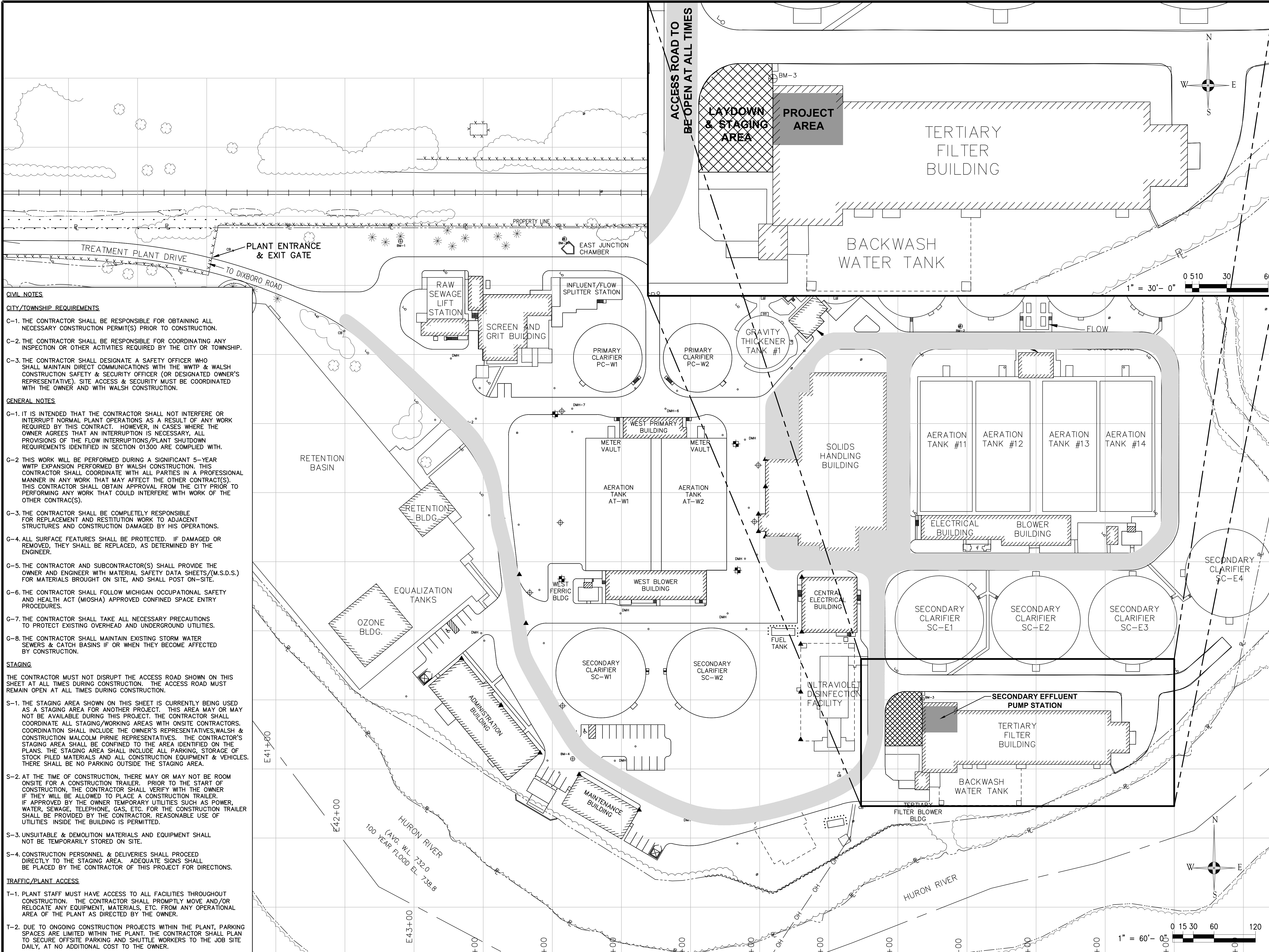




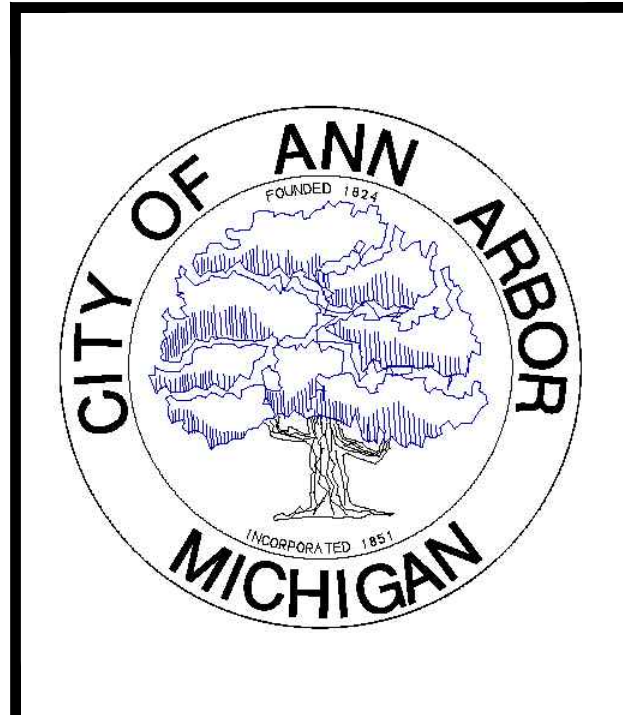
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- CIVIL NOTES**
- CITY/TOWNSHIP REQUIREMENTS**
- C-1. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING ALL NECESSARY CONSTRUCTION PERMIT(S) PRIOR TO CONSTRUCTION.
  - C-2. THE CONTRACTOR SHALL BE RESPONSIBLE FOR COORDINATING ANY INSPECTION OR OTHER ACTIVITIES REQUIRED BY THE CITY OR TOWNSHIP.
  - C-3. THE CONTRACTOR SHALL DESIGNATE A SAFETY OFFICER WHO SHALL MAINTAIN DIRECT COMMUNICATIONS WITH THE WWTP & WALSH CONSTRUCTION SAFETY & SECURITY OFFICER (OR DESIGNATED OWNER'S REPRESENTATIVE). SITE ACCESS & SECURITY MUST BE COORDINATED WITH THE OWNER AND WITH WALSH CONSTRUCTION.
- GENERAL NOTES**
- G-1. IT IS INTENDED THAT THE CONTRACTOR SHALL NOT INTERFERE OR INTERRUPT NORMAL PLANT OPERATIONS AS A RESULT OF ANY WORK REQUIRED BY THIS CONTRACT. HOWEVER, IN CASES WHERE THE OWNER AGREES THAT AN INTERRUPTION IS NECESSARY, ALL PROVISIONS OF THE FLOW INTERRUPTIONS/PLANT SHUTDOWN REQUIREMENTS IDENTIFIED IN SECTION 01300 ARE COMPLIED WITH.
  - G-2. THIS WORK WILL BE PERFORMED DURING A SIGNIFICANT 5-YEAR WWTP EXPANSION PERFORMED BY WALSH CONSTRUCTION. THIS CONTRACTOR SHALL COORDINATE WITH ALL PARTIES IN A PROFESSIONAL MANNER IN ANY WORK THAT MAY AFFECT THE OTHER CONTRACT(S). THIS CONTRACTOR SHALL OBTAIN APPROVAL FROM THE CITY PRIOR TO PERFORMING ANY WORK THAT COULD INTERFERE WITH WORK OF THE OTHER CONTRACT(S).
  - G-3. THE CONTRACTOR SHALL BE COMPLETELY RESPONSIBLE FOR REPLACEMENT AND RESTITUTION WORK TO ADJACENT STRUCTURES AND CONSTRUCTION DAMAGED BY HIS OPERATIONS.
  - G-4. ALL SURFACE FEATURES SHALL BE PROTECTED. IF DAMAGED OR REMOVED, THEY SHALL BE REPLACED, AS DETERMINED BY THE ENGINEER.
  - G-5. THE CONTRACTOR AND SUBCONTRACTOR(S) SHALL PROVIDE THE OWNER AND ENGINEER WITH MATERIAL SAFETY DATA SHEETS (M.S.D.S.) FOR MATERIALS BROUGHT ON SITE, AND SHALL POST ON-SITE.
  - G-6. THE CONTRACTOR SHALL FOLLOW MICHIGAN OCCUPATIONAL SAFETY AND HEALTH ACT (MIOSHA) APPROVED CONFINED SPACE ENTRY PROCEDURES.
  - G-7. THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT EXISTING OVERHEAD AND UNDERGROUND UTILITIES.
  - G-8. THE CONTRACTOR SHALL MAINTAIN EXISTING STORM WATER SEWERS & CATCH BASINS IF OR WHEN THEY BECOME AFFECTED BY CONSTRUCTION.
- STAGING**
- THE CONTRACTOR MUST NOT DISRUPT THE ACCESS ROAD SHOWN ON THIS SHEET AT ALL TIMES DURING CONSTRUCTION. THE ACCESS ROAD MUST REMAIN OPEN AT ALL TIMES DURING CONSTRUCTION.
- S-1. THE STAGING AREA SHOWN ON THIS SHEET IS CURRENTLY BEING USED AS A STAGING AREA FOR ANOTHER PROJECT. THIS AREA MAY OR MAY NOT BE AVAILABLE DURING THIS PROJECT. THE CONTRACTOR SHALL COORDINATE ALL STAGING/WORKING AREAS WITH ON-SITE CONTRACTORS. COORDINATION SHALL INCLUDE THE OWNER'S REPRESENTATIVES, WALSH & CONSTRUCTION MALCOLM PIRNIE REPRESENTATIVES. THE CONTRACTOR'S STAGING AREA SHALL BE CONFINED TO THE AREA IDENTIFIED ON THE PLANS. THE STAGING AREA SHALL INCLUDE ALL PARKING, STORAGE OF STOCK PILED MATERIALS AND ALL CONSTRUCTION EQUIPMENT & VEHICLES. THERE SHALL BE NO PARKING OUTSIDE THE STAGING AREA.
  - S-2. AT THE TIME OF CONSTRUCTION, THERE MAY OR MAY NOT BE ROOM ON-SITE FOR A CONSTRUCTION TRAILER. PRIOR TO THE START OF CONSTRUCTION, THE CONTRACTOR SHALL VERIFY WITH THE OWNER IF THEY WILL BE ALLOWED TO PLACE A CONSTRUCTION TRAILER. IF APPROVED BY THE OWNER TEMPORARY UTILITIES SUCH AS POWER, WATER, SEWAGE, TELEPHONE, GAS, ETC. FOR THE CONSTRUCTION TRAILER SHALL BE PROVIDED BY THE CONTRACTOR. REASONABLE USE OF UTILITIES INSIDE THE BUILDING IS PERMITTED.
  - S-3. UNSUITABLE & DEMOLITION MATERIALS AND EQUIPMENT SHALL NOT BE TEMPORARILY STORED ON SITE.
  - S-4. CONSTRUCTION PERSONNEL & DELIVERIES SHALL PROCEED DIRECTLY TO THE STAGING AREA. ADEQUATE SIGNS SHALL BE PLACED BY THE CONTRACTOR OF THIS PROJECT FOR DIRECTIONS.
- TRAFFIC/PLANT ACCESS**
- T-1. PLANT STAFF MUST HAVE ACCESS TO ALL FACILITIES THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL PROMPTLY MOVE AND/OR RELOCATE ANY EQUIPMENT, MATERIALS, ETC. FROM ANY OPERATIONAL AREA OF THE PLANT AS DIRECTED BY THE OWNER.
  - T-2. DUE TO ONGOING CONSTRUCTION PROJECTS WITHIN THE PLANT, PARKING SPACES ARE LIMITED WITHIN THE PLANT. THE CONTRACTOR SHALL PLAN TO SECURE OFFSITE PARKING AND SHUTTLE WORKERS TO THE JOB SITE DAILY, AT NO ADDITIONAL COST TO THE OWNER.



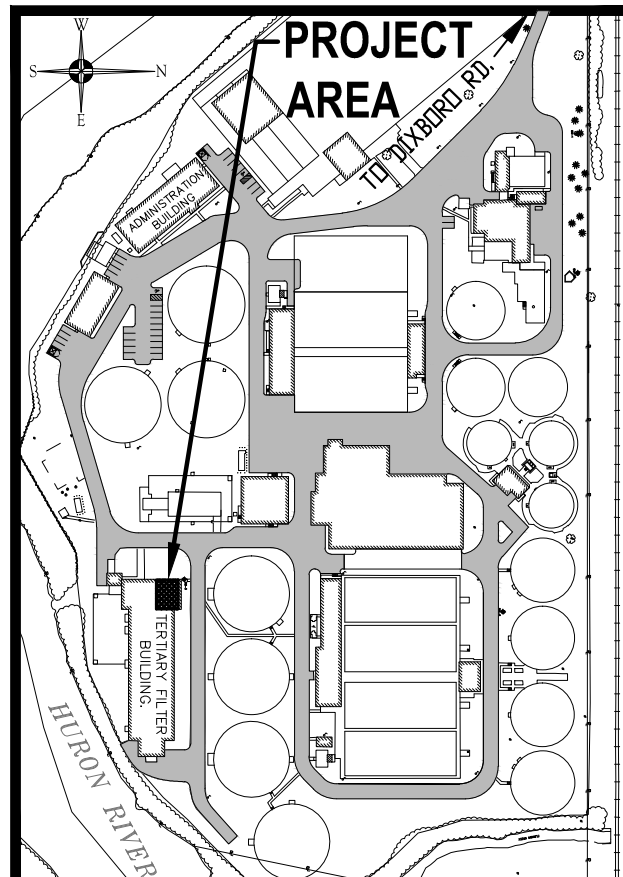
**HRC**  
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 Consulting Engineers

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DATE	ADDITIONS AND/OR REVISIONS
12-05-14	ISSUED FOR BIDS
06-13-14	FINAL BID PKG. SUBMITTAL
03-14-14	DRAFT BID PKG. SUBMITTAL
11-08-13	REVISED PER CITY COMMENTS
10-04-13	PRELIMINARY SUBMITTAL

DESIGNED	T.H.S.
DRAWN	E.J.P.
CHECKED	T.H.S.
APPROVED	R.N.A.
OBSERVER	



CITY OF ANN ARBOR  
 WASTEWATER TREATMENT PLANT

**SECONDARY EFFLUENT PUMPS REPLACEMENT**

WASHTENAW COUNTY MICHIGAN

GENERAL SITE PLAN

HRC JOB NO. 20120802	SCALE AS NOTED
DATE OCTOBER, 2013	SHEET NO. <b>C-1</b> OF 1

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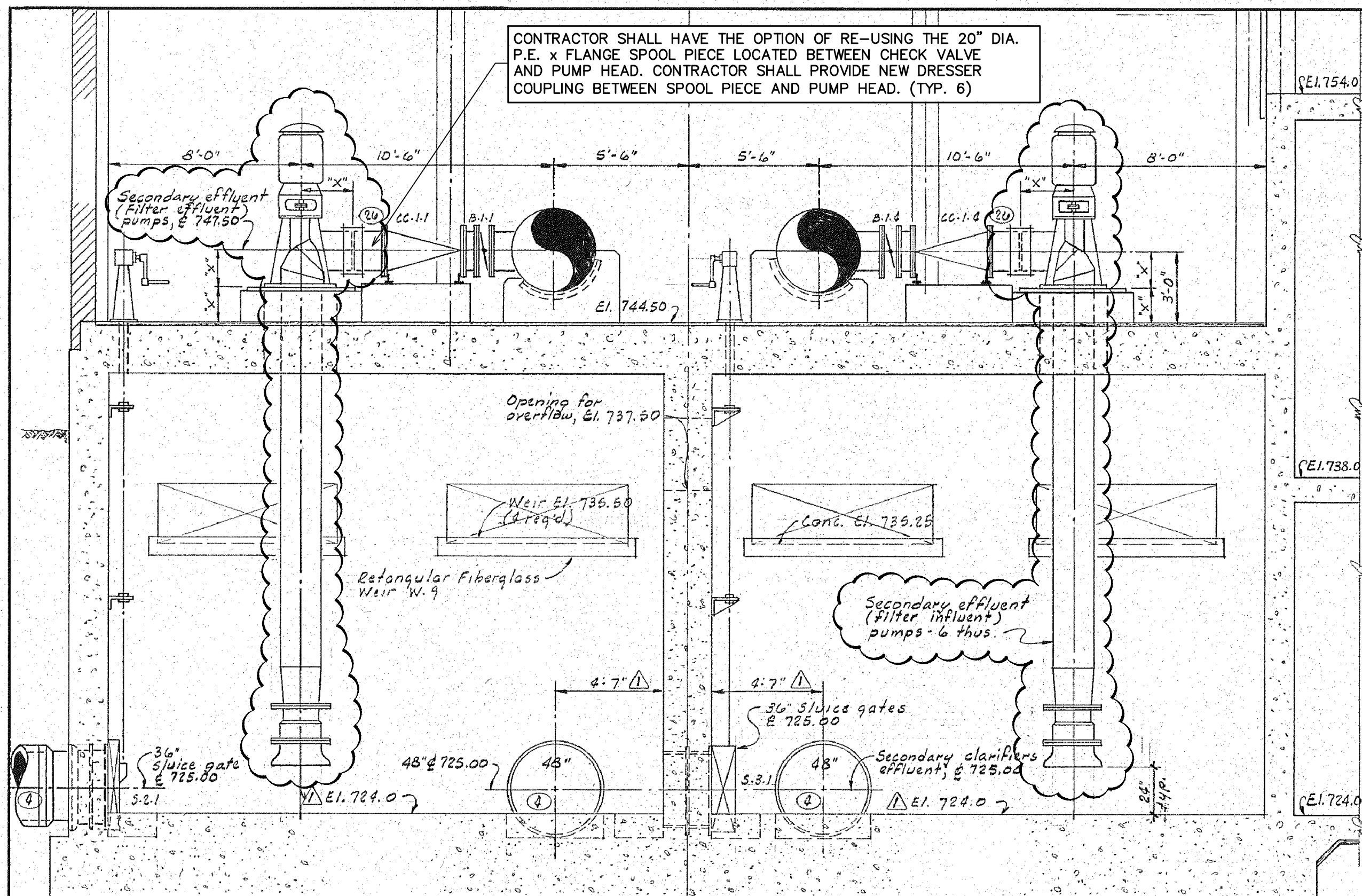
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**DEMOLITION NOTES**

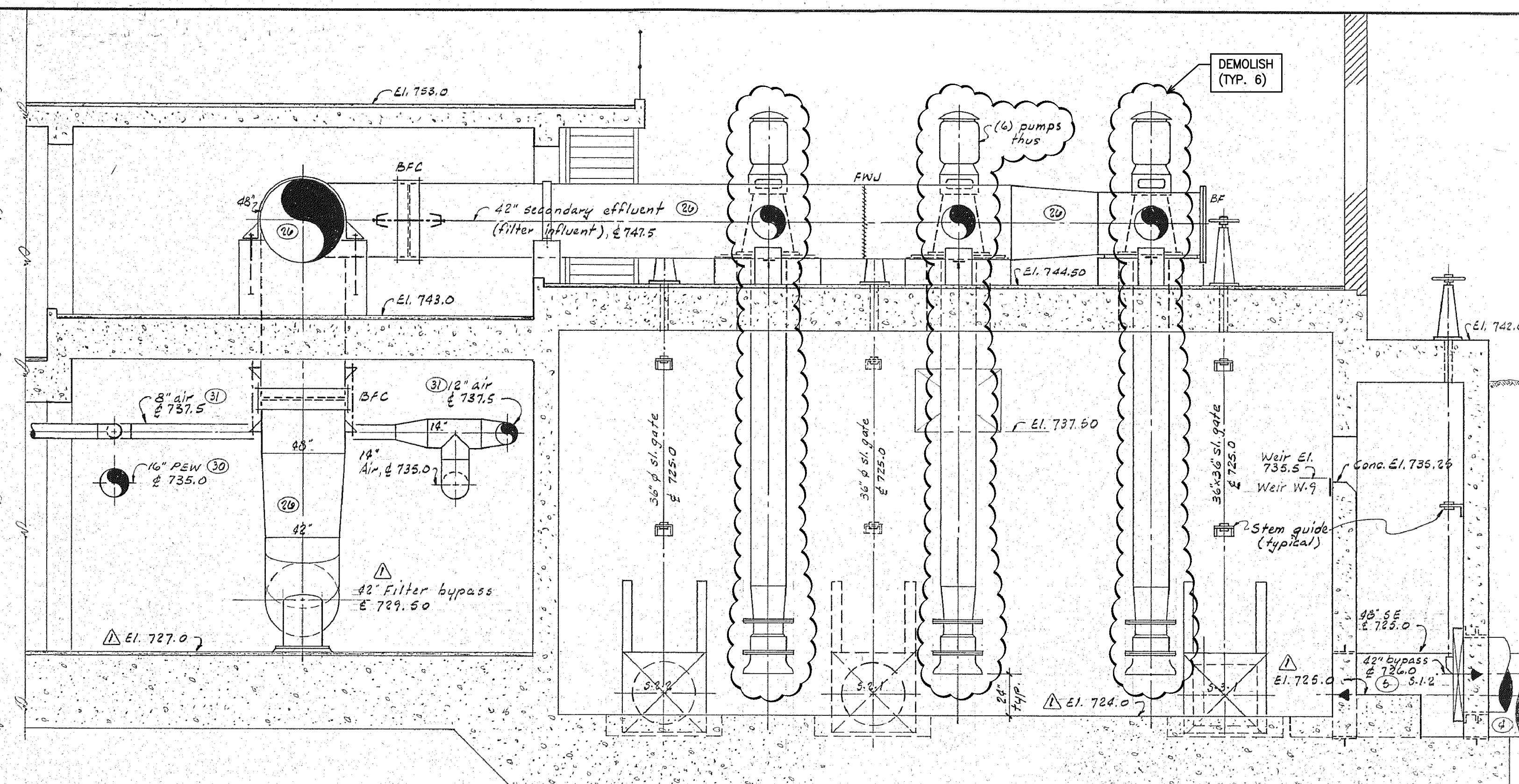
**GENERAL**

- D - 1. THE PLANS, SECTIONS, DETAILS & NOTATIONS SHOWN ON THE DEMOLITION SHEETS ARE REPRODUCED FROM THE 1977 CONSTRUCTION DRAWINGS AS IDENTIFIED IN THE ORIGINAL TITLE BLOCK. THESE DRAWINGS ARE NOT TO SCALE & MAY NOT NECESSARILY REFLECT THE EXISTING CONDITIONS. THE CONTRACTOR SHALL VISIT THE SITE TO OBSERVE ACTUAL CONDITIONS PRIOR TO THE BID. ANY COSTS ASSOCIATED WITH DISCREPANCIES BETWEEN INFORMATION SHOWN ON THE DEMOLITION DRAWINGS AND ACTUAL FIELD CONDITIONS SHALL BE INCLUDED IN THE BID AND SHALL BE THE RESPONSIBILITY OF THE CONTRACTOR. NO ADDITIONAL COSTS SHALL BE PAID DUE TO DISCREPANCIES.
- D - 2. DEMOLISH SECONDARY EFFLUENT PUMPS (SEP) SEP-2 THROUGH SEP-6. PUMP SEP-1 HAS BEEN DEMOLISHED PREVIOUSLY.
- D - 3. THE REFERENCE DRAWINGS ARE PROVIDED FOR INFORMATIONAL PURPOSES TO ASSIST THE CONTRACTOR AND MANUFACTURERS WITH DEMOLITION SHOP DRAWINGS PREPARATION, AND INSTALLATION. THESE DRAWINGS HAVE ALSO BEEN REDUCED AND ARE NOT TO SCALE. CRITICAL DIMENSIONS SHALL BE FIELD VERIFIED.
- D - 4. DO NOT REMOVE PROCESS, MECHANICAL AND/OR ELECTRIC EQUIPMENT UNTIL READY TO REPLACE WITH NEW EQUIPMENT. COORDINATE DEMOLITION WITH OWNER AND THE REQUIREMENTS OF SECTIONS 01950 - SEQUENCE OF CONSTRUCTION.

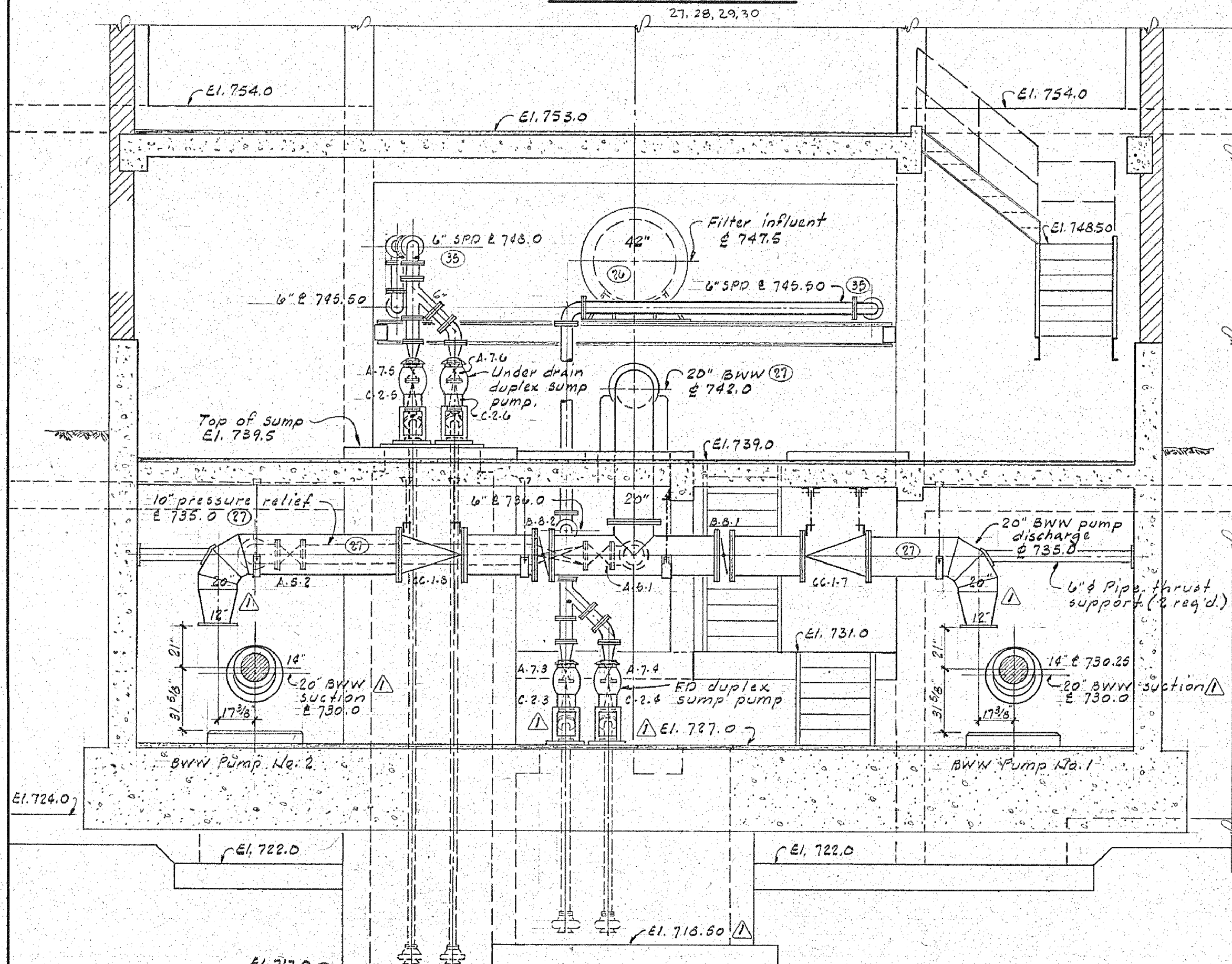
- D - 5. THE CONTRACTOR SHALL REMOVE AND PROMPTLY DISPOSE OF ALL MATERIAL AND EQUIPMENT IN A LEGAL MANNER. MATERIALS AND EQUIPMENT MAY BE SALVAGED AT THE CONTRACTOR'S DISCRETION.
- D - 6. THE CONTRACTOR SHALL PROTECT THE FACILITIES THROUGHOUT THE WORK. DAMAGE TO THE FACILITY SHALL BE REPLACED AT THE CONTRACTOR'S EXPENSE.
- D - 7. PROVIDE TEMPORARY BLIND FLANGES OR CAP ON THE ENDS OF THE WALL PENETRATION AND ALL PIPES. TEMPORARY FLANGES AND CAPS MUST BE INSTALLED AT THE END OF THE DAY ON ANY LIVE PIPES.
- D - 8. LUBRICATING, COOLING AND/OR HYDRAULIC FLUIDS AND/OR GREASE SHALL BE DRAINED AND DISPOSED AT A RECYCLING CENTER OR IN AN APPROPRIATE AND LEGAL MANNER AT CONTRACTOR'S EXPENSE. CHAIN OF CUSTODY PAPERS MUST BE FILED.
- D - 9. CAP INDUSTRIAL WATER, HYDRAULIC, COPPER AND ANY OTHER LINES AT WALL AND FILL SLEEVES OR WALL PENETRATIONS WITH NON-SHRINK GROUT.
- D - 10. REMOVE ALL FASTENERS, PLATES, SHIMS, ETC., AND PATCH FLOOR PENETRATIONS WITH NON-SHRINK GROUT. TORCH ANCHORS AND/OR REBAR BELOW THE CONCRETE SURFACE, AND PATCH WITH NON-SHRINK GROUT.



**SECTION D-D**  
21, 28, 29, 30



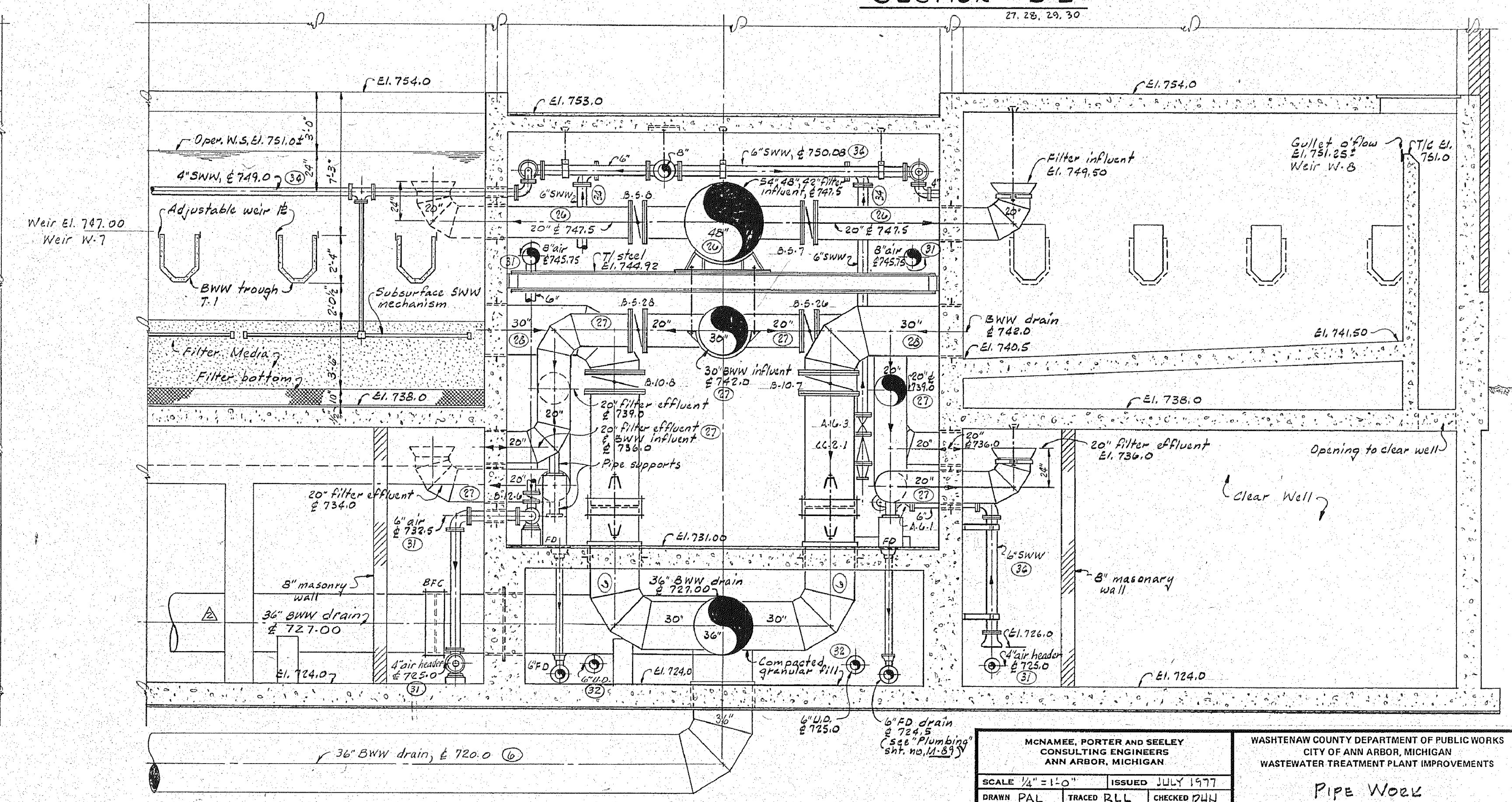
**SECTION E-E**  
21, 28, 29, 30



**SECTION G-G**  
21, 28, 29, 30

**NOTE:**

THIS DRAWING INCLUDES INFORMATION THAT HAS BEEN COPIED FROM A PREVIOUS CONSTRUCTION PROJECT AND IS PROVIDED FOR INFORMATION ONLY. THIS DRAWING HAS BEEN REDUCED AND IS THEREFORE NOT TO SCALE. NO GUARANTEE IS MADE, OR SHOULD BE ASSUMED, AS TO THE COMPLETENESS OR ACCURACY OF THE INFORMATION SHOWN ON THIS DRAWING. PARTIES UTILIZING THIS INFORMATION SHALL FIELD VERIFY THE ACCURACY AND COMPLETENESS PRIOR TO CONSTRUCTION ACTIVITIES.



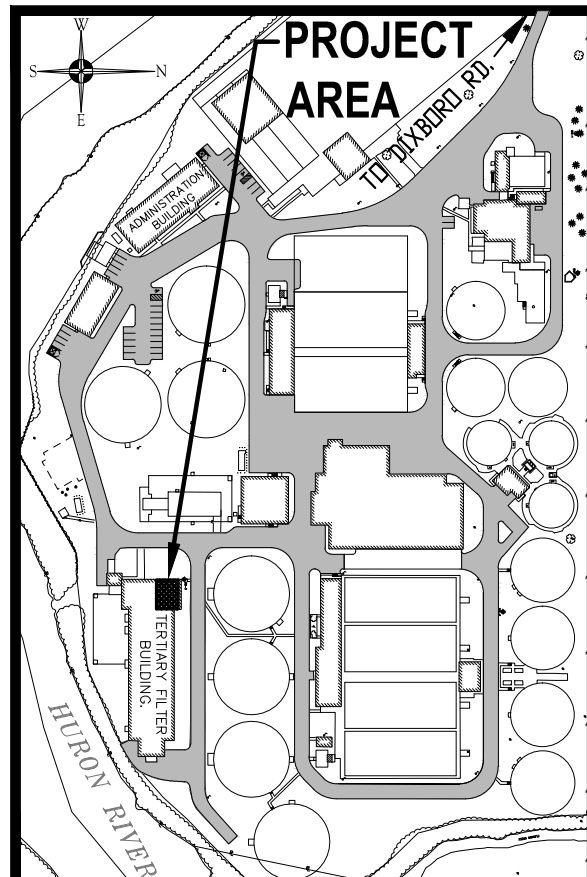
**SECTION F-F**  
21, 28, 29, 30

MNAMEE, PORTER AND SEELEY CONSULTING ENGINEERS ANN ARBOR, MICHIGAN		WASHTENAW COUNTY DEPARTMENT OF PUBLIC WORKS CITY OF ANN ARBOR, MICHIGAN WASTEWATER TREATMENT PLANT IMPROVEMENTS	
SCALE 1/4" = 1'-0"	ISSUED JULY 1977		
DRAWN P.A.L.	TRACED R.L.L.	CHECKED D.J.H.	
ISSUE	NATURE OF REVISION	DATE	
Δ	Revised and reissued as a part of Bulletin No. 14	6-5-79	
CONFORMING TO CONSTRUCTION RECORDS		CONTRACT 77-5-7	SHEET C26 2539 05 M.35 2014



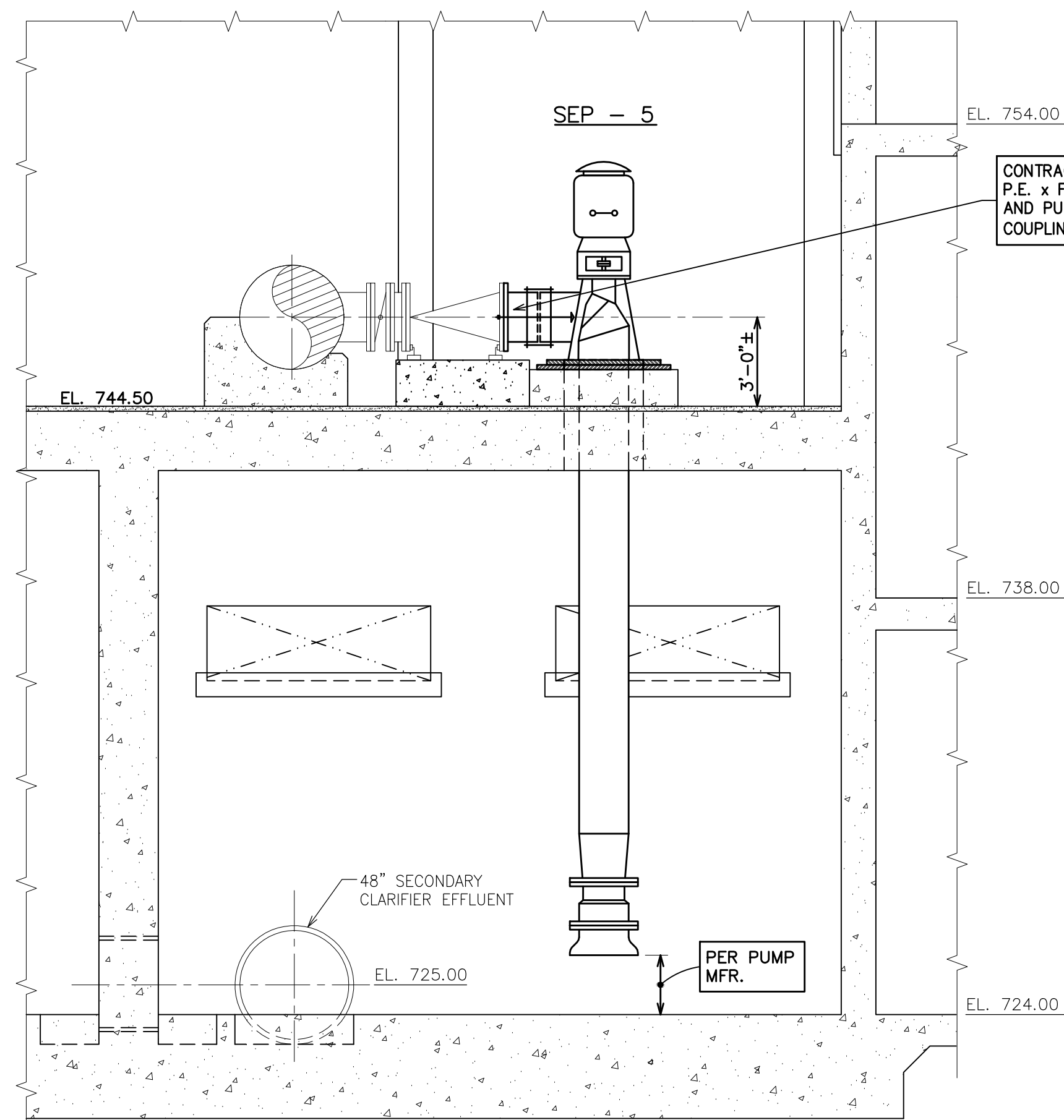
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OBSERVER	



CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT  
**SECONDARY EFFLUENT PUMPS REPLACEMENT**  
WASHTENAW COUNTY MICHIGAN  
MECHANICAL DEMOLITION  
HRC JOB NO. 20120802  
SCALE NOT TO SCALE  
DATE OCTOBER, 2013  
SHEET NO. **D-1** OF





**SECTION 1**  
SCALE: 1/4" = 1'-0"  
P-1

**PROCESS NOTES**

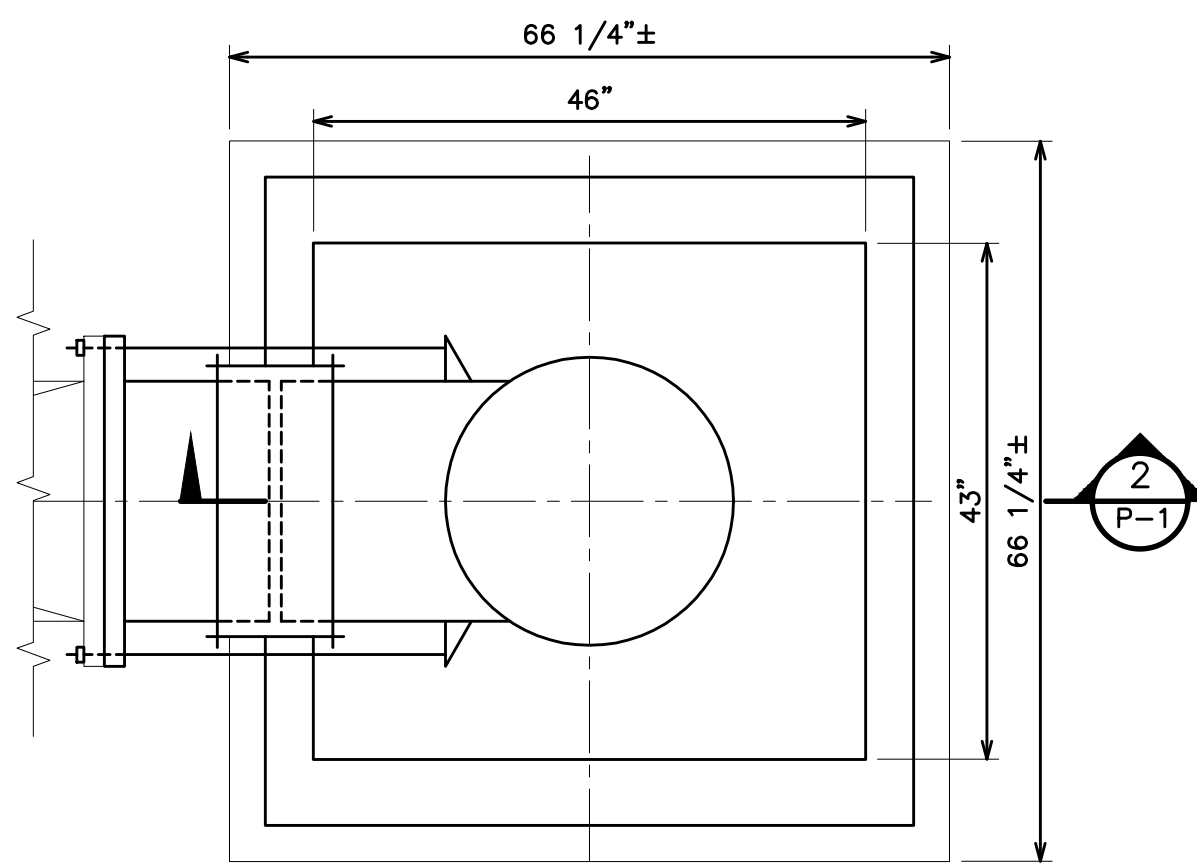
- P-1. THESE DRAWINGS GENERALLY REPRESENT THE INSTALLATION OF THE PUMP MODELS SPECIFIED. THEREFORE, INSTALLATION OF THE PUMPS MAY BE DIFFERENT THAN THAT SHOWN. THE COST FOR ANY MODIFICATIONS, TO THE INSTALLATION OF THAT SHOWN DUE TO THE DIFFERING DIMENSIONS OF THE SPECIFIED PUMPS, SHALL BE BORNE BY THE CONTRACTOR.
- P-2. THE CONCRETE PUMP PADS SHOWN ARE REPRESENTATIVE OF THE EXISTING INSTALLATION, BUT ARE NOT NECESSARY PRECISE OR THE SAME FOR EACH PUMP. THE CONTRACTOR IS RESPONSIBLE FOR ALL FIELD MEASUREMENTS, PRIOR TO DEVELOPING SHOP DRAWINGS.
- P-3. ALL HARDWARE, ANCHORS, FASTENERS, SHIMS, NUTS, BOLTS AND WASHERS, ETC. SHALL BE 316 STAINLESS STEEL.
- P-4. THE CONTRACTOR SHALL PROVIDE AND INSTALL ONE DISCHARGE PRESSURE GAGE FOR EACH OF THE SIX NEW PUMPS. GAGE SHALL BE MOUNTED ON MITER DISCHARGE ELBOWS.

**PUMP PEDESTAL & BASE PLATE NOTES**

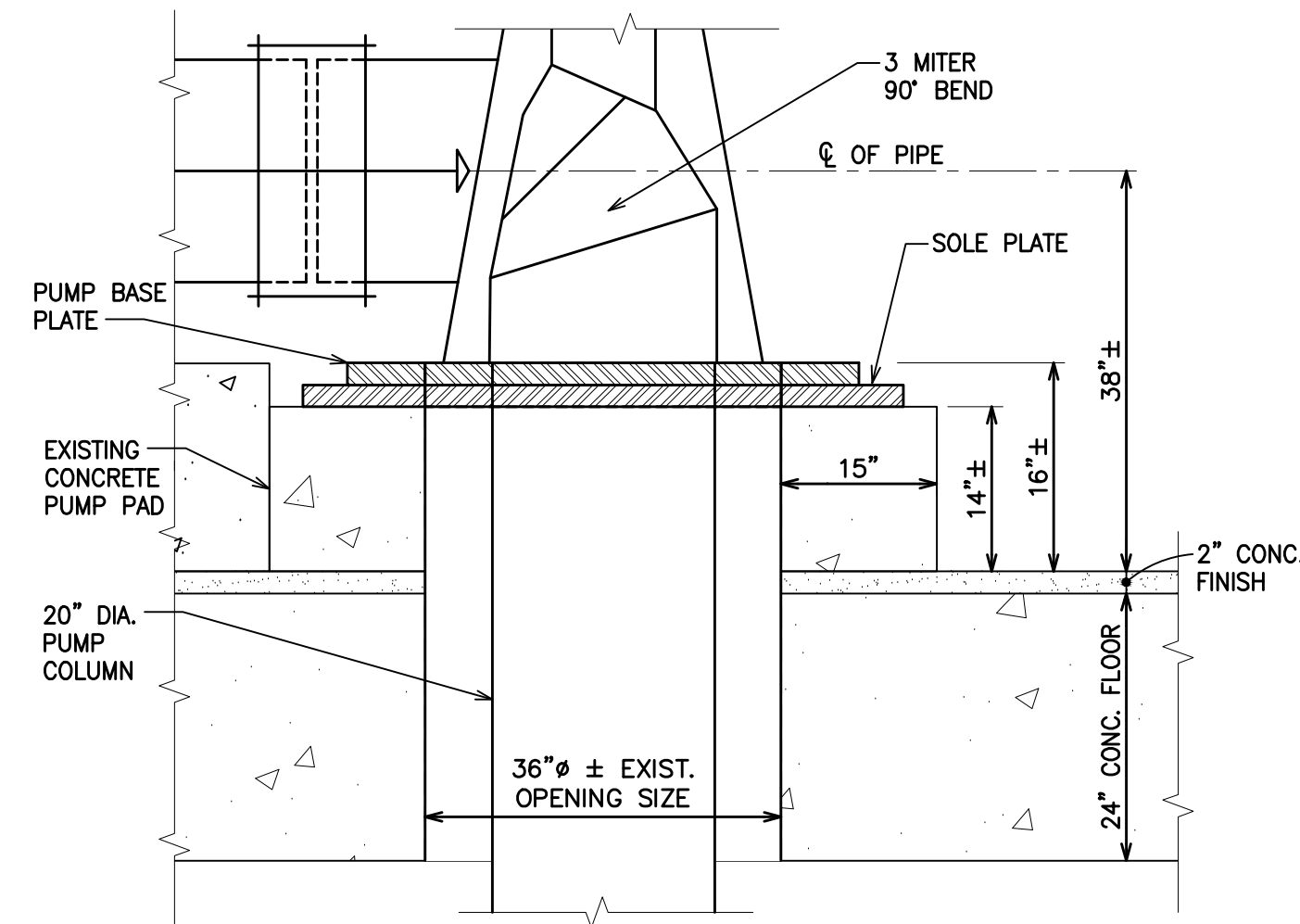
- 1. THE PUMP WILL BE INSTALLED THROUGH THE EXISTING ROOF OPENINGS, WALL LOUVER OPENINGS, OR OTHER OWNER APPROVED METHOD. CONTRACTOR SHALL VISIT THE SITE TO DETERMINE MAXIMUM OPENING SIZES.
- 2. THE PUMP BASE PLATE WILL BE 46" X 43" SECURED TO A NEW SOLE PLATE MOUNTED ON THE EXISTING CONCRETE PUMP PAD. THE PUMP PAD HEIGHT, PUMP BASE PLATE, SOLE PLATE AND GROUT PAD DIMENSIONS MUST BE COORDINATED SUCH THAT THE PUMP DISCHARGE MATCHES THE HORIZONTAL AND VERTICAL CENTERLINE OF EACH RESPECTIVE PUMP'S EXISTING DISCHARGE PIPING.
- 3. GROUT PAD SHALL BE A MINIMUM OF 3/4" INCH AND A MAXIMUM OF 1 1/2" INCHES, UNLESS RECOMMENDED OTHERWISE BY THE MFR. BASE PLATE SHALL BE A-36 STEEL PLATE.
- 4. ANCHOR BOLTS SHALL BE PROVIDED BY THE MFR. PER THE SPECIFICATION. ANCHORS SHALL EXCEED MINIMUM DISTANCES FROM EDGE OF CONCRETE PER CSI STANDARDS. (STANDARDS DEPENDENT UPON BOLT HOLE DIAMETER, PULL OUT CONE, PROXIMITY TO ADJACENT CONES, ETC.) & SHALL BE COORDINATED WITH ENGINEER DURING SUBMITTAL.

**OWNER FURNISHED VERTICAL WASTEWATER PUMPS**

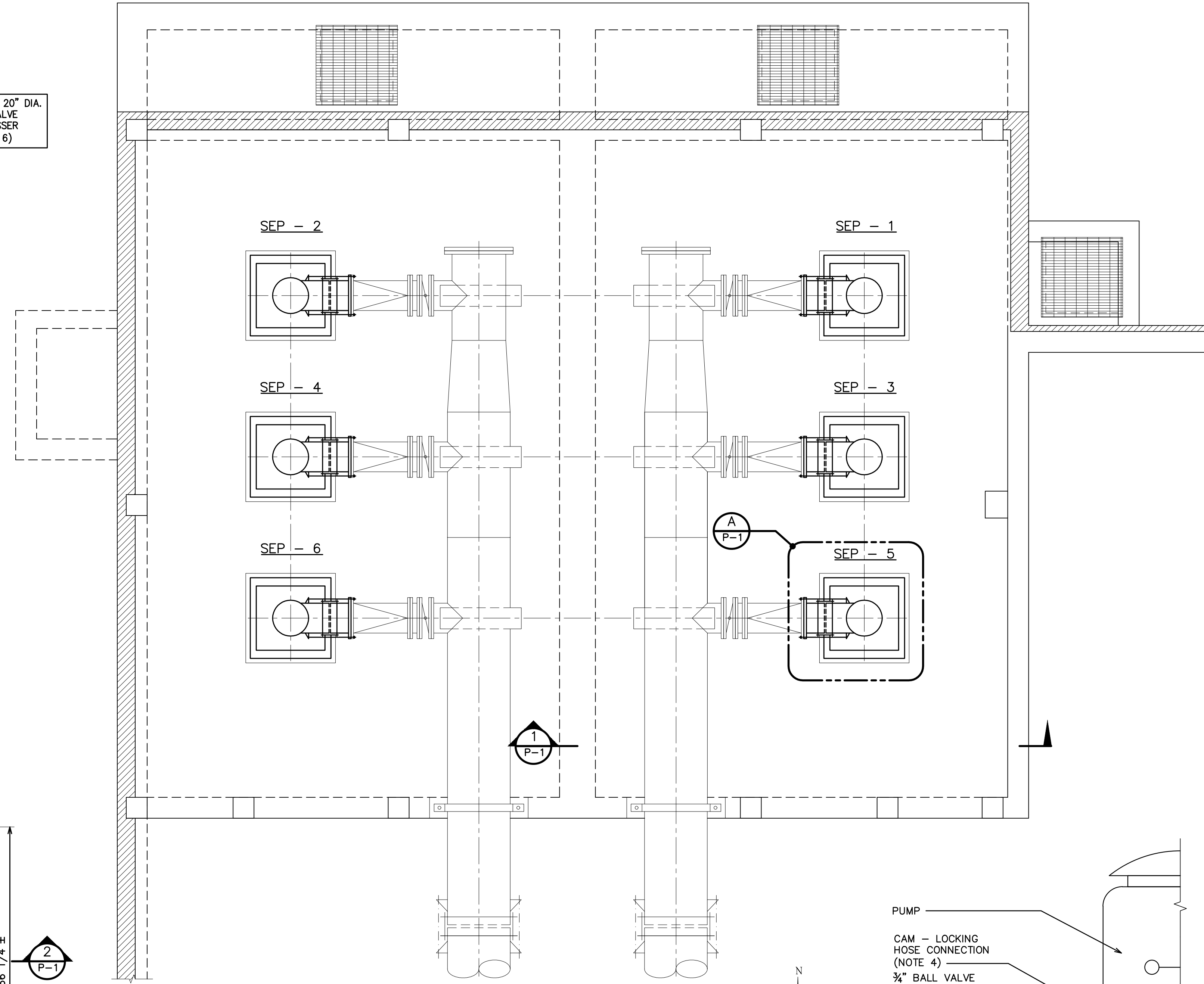
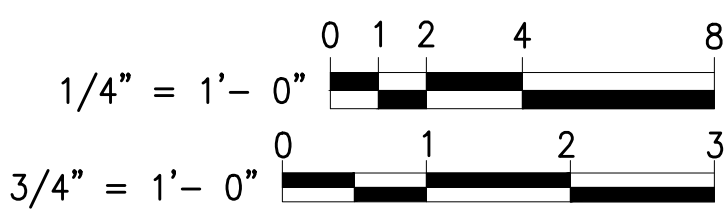
- 1. THE PUMPS WILL BE FURNISHED BY THE OWNER FOR TEMPORARY STORAGE AND INSTALLATION BY THE CONTRACTOR. THE CONTRACTOR SHALL RECEIVE, INSPECT, TEMPORARILY STORE, MOVE, RIG, UNPACK, AND OTHERWISE HANDLE THE OWNER FURNISHED PUMPS AT TIME OF DELIVERY TO THE TEMPORARY STORAGE SITE PROVIDED BY THE CONTRACTOR. HE SHALL THEREAFTER PROVIDE PROTECTION AGAINST WEATHER, PILFERAGE, AND OTHER HAZARDS, BEING FULLY RESPONSIBLE UNTIL COMPLETION OF HIS CONTRACT.
- 2. AT THE TIME OF ASSEMBLY AND INSTALLATION, THE CONTRACTOR SHALL PROVIDE THE SERVICES OF A COMPETENT RIGGER FOR MOVING THE VERTICAL TURBINE PUMP ASSEMBLIES FROM THE TEMPORARY STORAGE FACILITY TO THE FILTER BUILDING, RIGGING, HANDLING AND INSTALLATION OF THE ASSEMBLIES INCLUDING MOTORS AND ALL APPURTENANCES.
- 3. AT THE TIME OF RECEIPT OF OWNER FURNISHED EQUIPMENT AND ACCESSORIES, THE CONTRACTOR SHALL VISUALLY INSPECT THE EQUIPMENT AND REPORT ANY DAMAGE TO THE OWNER'S REPRESENTATIVE.
- 4. THE CONTRACTOR SHALL ASSEMBLE AND INSTALL THE VERTICAL TURBINE PUMP ASSEMBLIES IN ACCORDANCE WITH THE MANUFACTURER'S INSTRUCTIONS.
- 5. AFTER SETTING THE EQUIPMENT IN PLACE AND MAKING ALL CONNECTIONS, THE CONTRACTOR SHALL COORDINATE START-UP, TESTING AND TRAINING TO BE PERFORMED BY THE PUMP MANUFACTURER AND SHALL PERFORM ANY ASSISTANCE AS NECESSARY TO COMPLETE THE WORK.



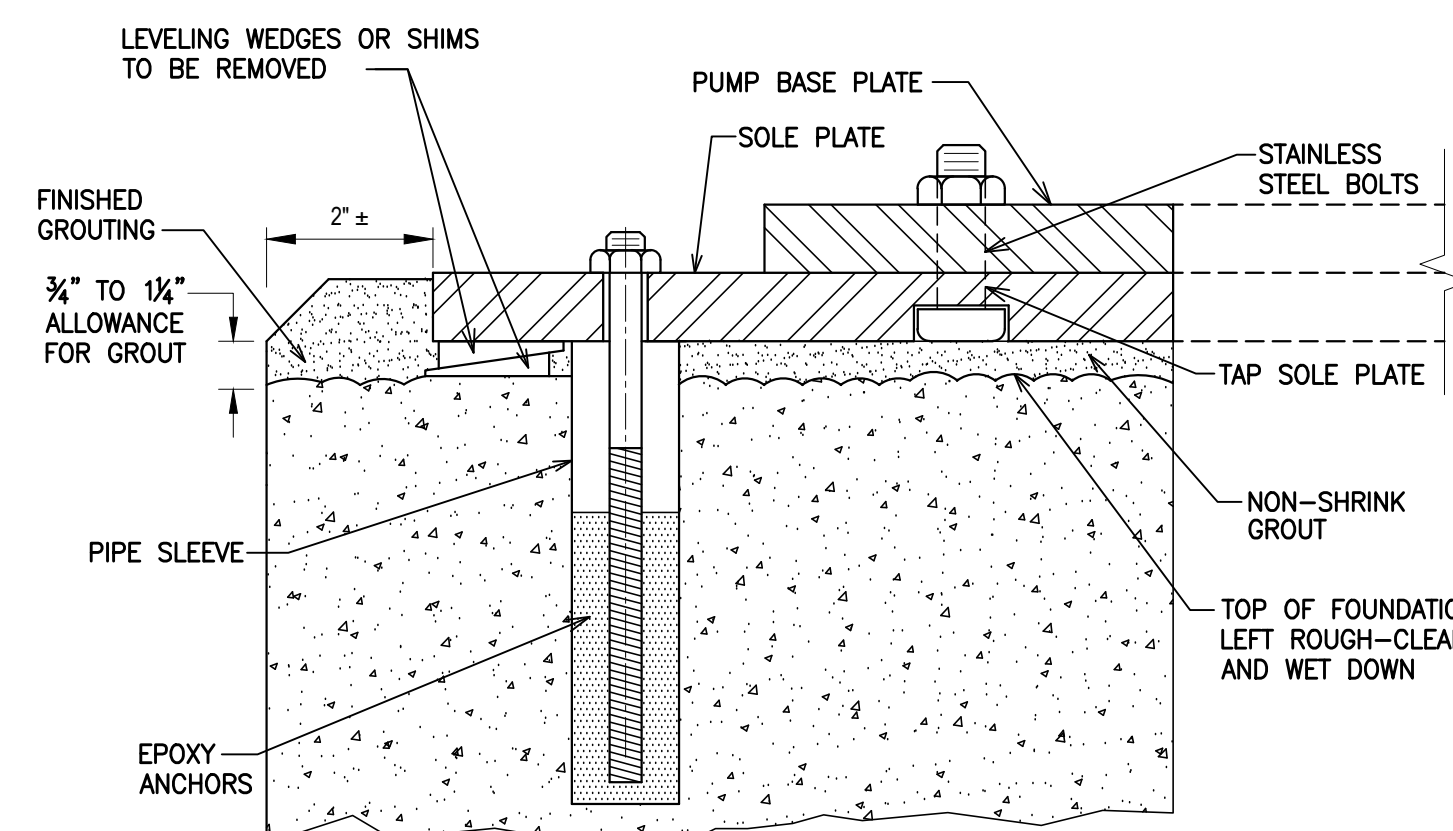
**DETAIL A**  
SCALE: 3/4" = 1'-0"  
P-1



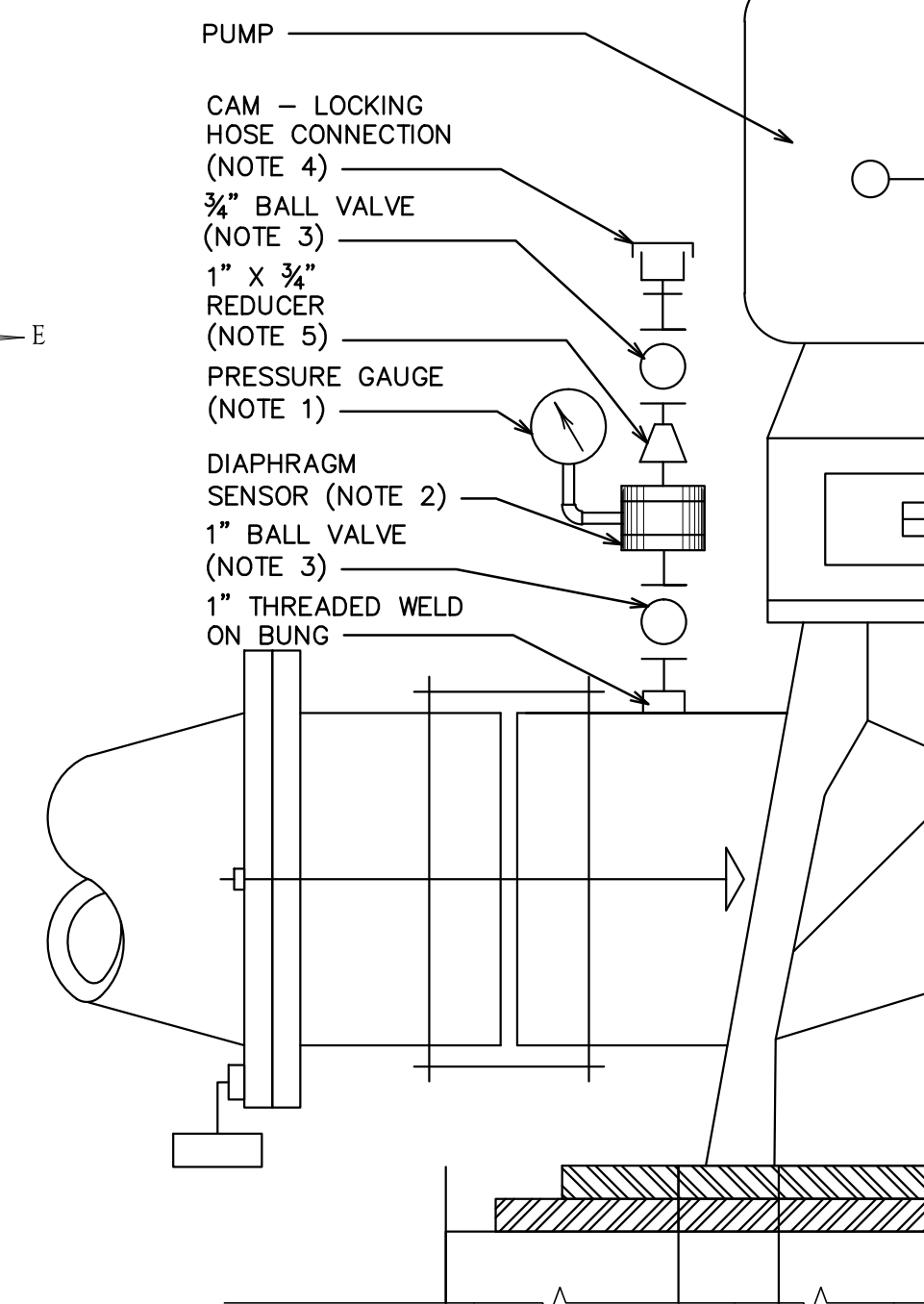
**SECTION 2**  
SCALE: 3/4" = 1'-0"  
P-1



**FILTER BUILDING PLAN @ EL. 744.5**  
SCALE: 1/4" = 1'-0"



**PUMP ANCHOR DETAIL**  
NO SCALE



**NOTES:**

- 1. PRESSURE GAUGES SHALL BE 4-1/2" DIA. DIAL SIZE, LIQUID FILLED (GLYCERINE & WATER), 316 S.S. CASE, STEM MOUNTED, ACCURATE TO 2% OF SCALE AT MID-SCALE, S.S. MOVEMENT, ADJUSTABLE MICROMETER POINTER, STAINLESS STEEL BOURDON TUBE AND SOCKET, DIAL RANGE SHALL BE 0 TO 50 PSI, WITH 1 PSI INCREMENTS, MODEL 450LFSS AS MANUFACTURED BY H.O. TRERICE CO., ASHCROFT, OR OWNER APPROVED.
- 2. DIAPHRAGM SEALS (AND GAUGES) SHALL BE 1" SIZE, CARBON STEEL BODY AND BUNA-N SLEEVE, SERIES 742 AS MANUFACTURED BY RED VALVE OR EQUAL.
- 3. ISOLATION AND FLUSHING VALVES SHALL BE BALL VALVES, JAMESBURY STYLE 21-22 WITH CARBON STEEL BODY AND BALL, STAINLESS STEEL STEM AND TFE SEALS AND SEAT.
- 4. DPW CAMLOCK MALE END/FEMALE CAP FLUSHING (CAM-LOCKING) HOSE CONNECTION SHALL BE MODEL 633-F (MALE) BY DPW WITH FEMALE COVER.
- 5. PIPE REDUCER HOSE CONNECTION & CAP SHALL BE 304 S.S.

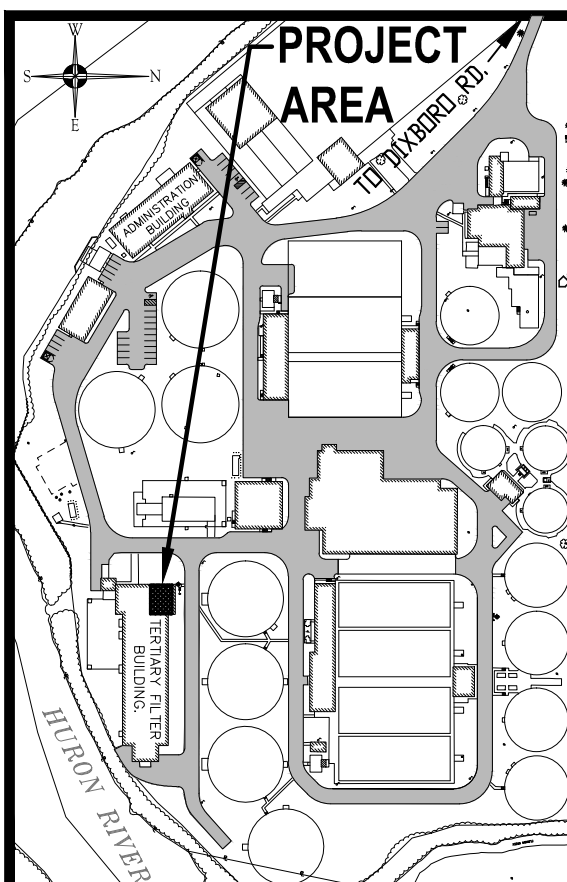
**TYPICAL PROCESS PRESSURE GAUGE**  
NO SCALE



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CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT

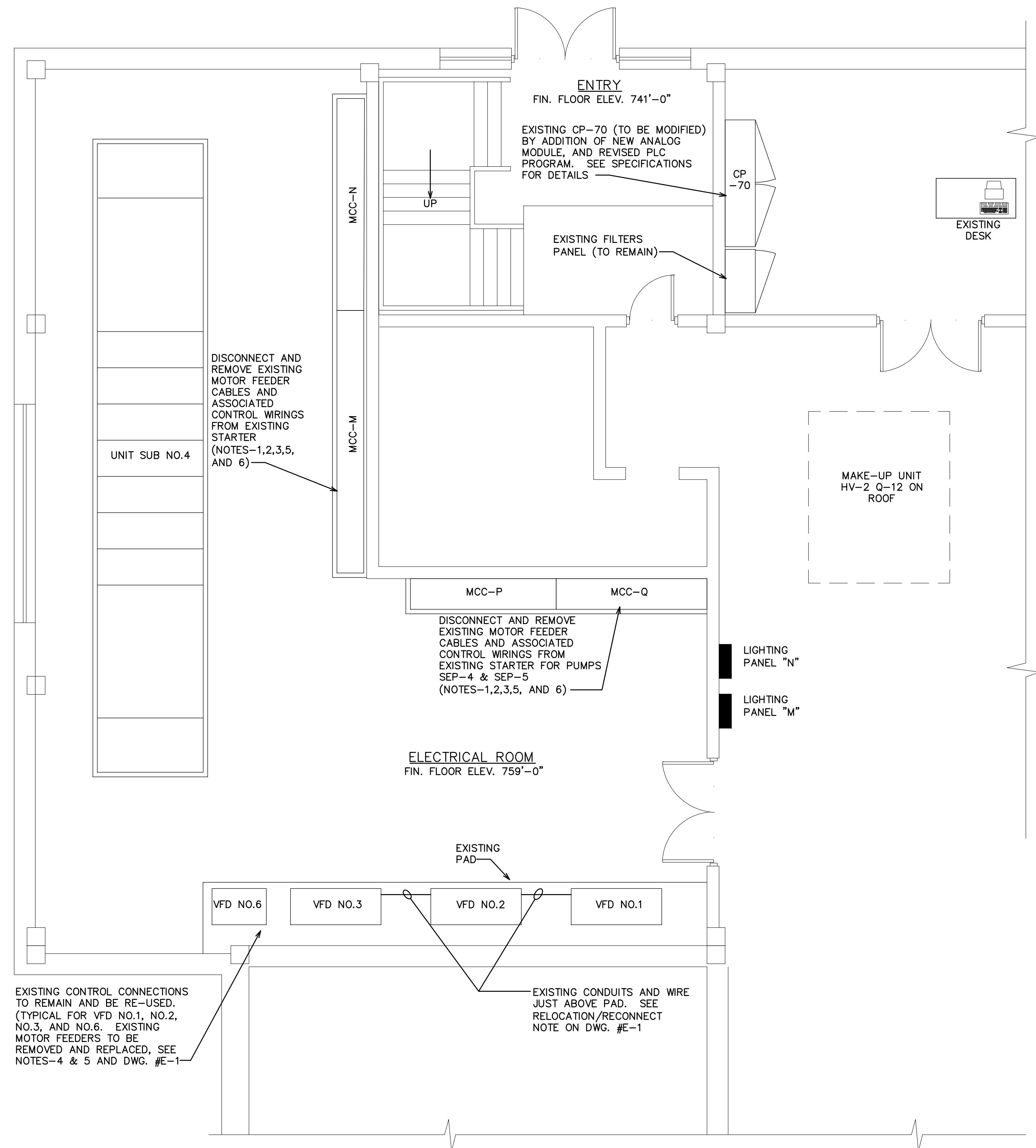
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WASHTENAW COUNTY MICHIGAN

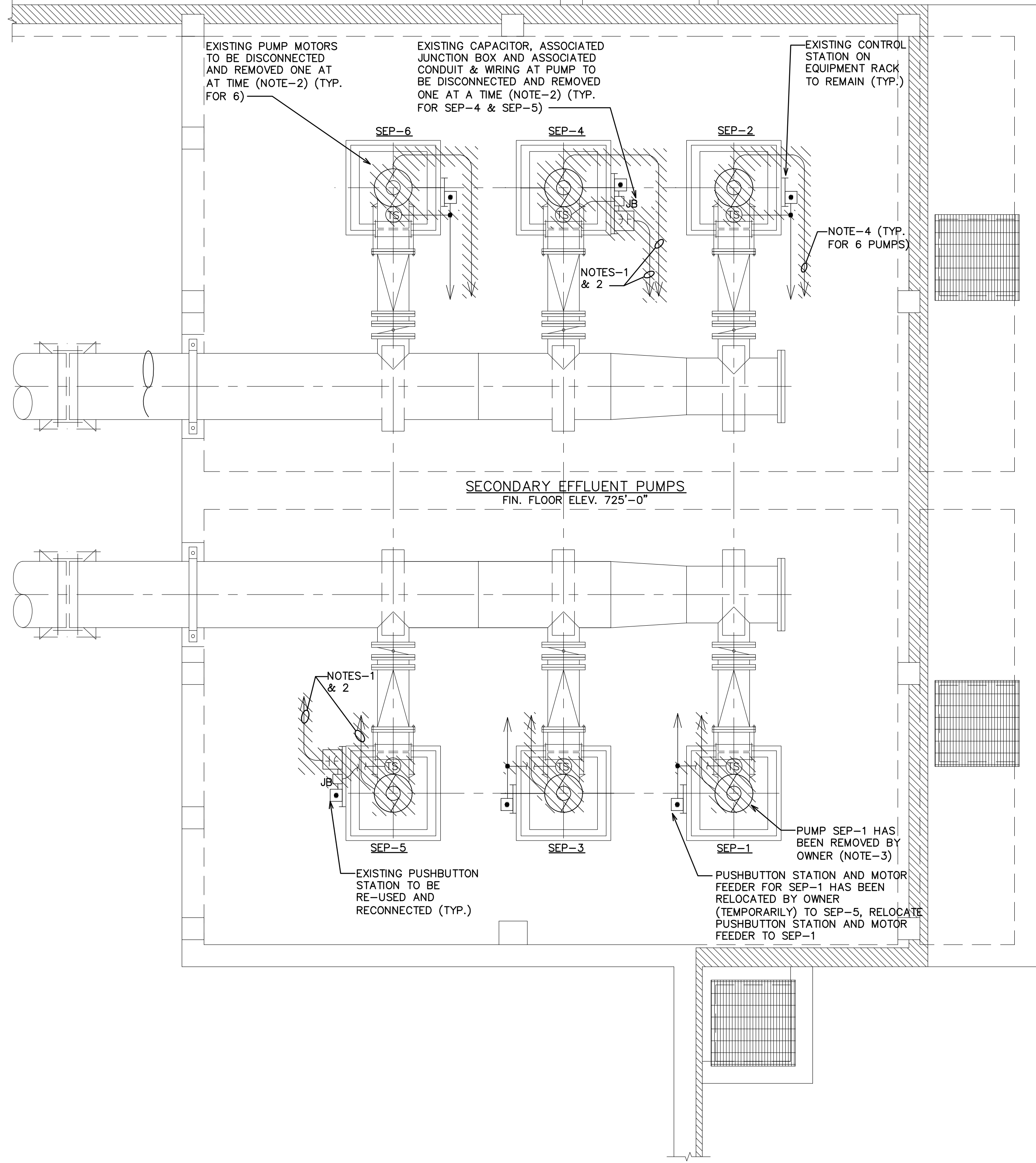
PLAN, SECTIONS AND DETAILS

HRC JOB NO. 20120802	SCALE AS SHOWN
DATE OCTOBER, 2013	SHEET NO. <b>P-1</b>





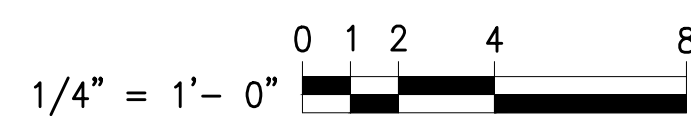
**DEMOLITION PLAN EL. 759'-0"**  
SCALE: 1/4" = 1'-0"



**DEMOLITION PLAN EL. 725'-0"**  
SCALE: 1/4" = 1'-0"

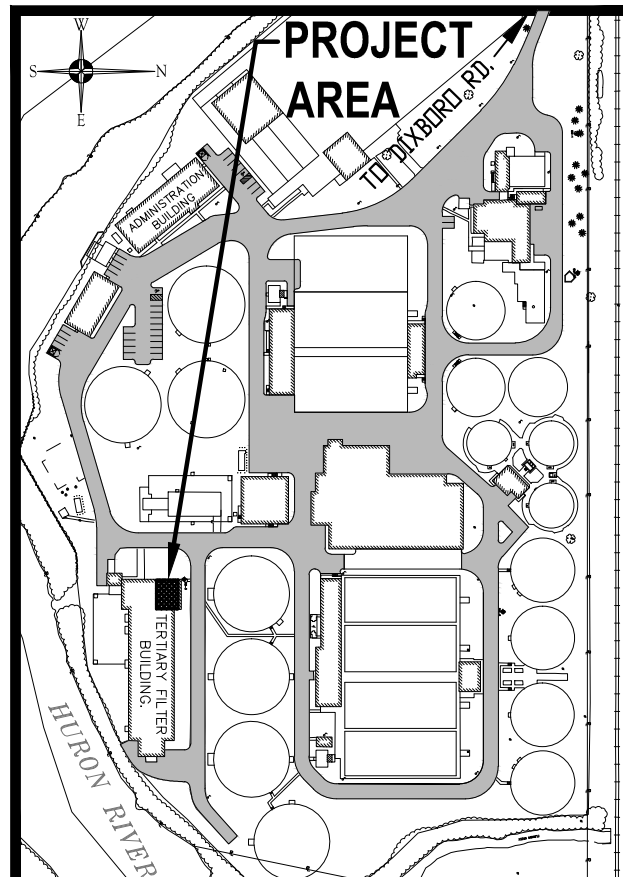
**DEMOLITION NOTES:**

1. DISCONNECT AND REMOVE WIRING FOR PUMPS SEP-4 & SEP-5 BACK TO MCC AND ASSOCIATED EXPOSED CONDUIT THAT IS NOT RE-USED.
2. ONLY ONE PUMP PER WET WELL SHALL BE DISCONNECTED AT A TIME. WORK ON NEXT PUMP SHALL BEGIN AFTER RE-BUILT PUMP IS OPERABLE. REFER TO SEQUENCE OF CONSTRUCTION.
3. PUMP SEP-5 HAS TEMPORARILY BEEN CONNECTED TO PUMP SEP-1 VFD. REMOVE THIS TEMPORARY CONDUIT AND WIRING AT THE TIME WHEN PUMP SEP-1 IS MADE OPERABLE AND RE-INSTALL WIRING AND CONTROL DEVICES FOR PUMP SEP-1 PROVIDING NEW RIGID CONDUIT AS REQUIRED TO PUMP SEP-1 LOCATION FOR RE-USE.
4. DISCONNECT AND REMOVE WIRING BACK TO VFD, CONDUIT TO REMAIN.
5. BEFORE DISCONNECTING PUMPS COORDINATE ALL SERVICE AND EQUIPMENT OUTAGES IN ADVANCE WITH THE PLANT/OWNER, PER SPECIFICATIONS.
6. EXISTING MOTOR STARTER "BUCKETS" FOR PUMPS SEP-4 & SEP-5 SHALL BE DISCONNECTED FROM PUMPS AND MODIFIED AS DESCRIBED ON DWG. #E-1.



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DATE	ADDITIONS AND/OR REVISIONS
12-05-14	ISSUED FOR BIDS
06-13-14	FINAL BID PKG. SUBMITTAL
03-14-14	DRAFT BID PKG. SUBMITTAL
11-08-13	REVISED PER CITY COMMENTS
10-04-13	PRELIMINARY SUBMITTAL
DESIGNED	M.A.O.
DRAWN	B.T.E.
CHECKED	M.A.O.
APPROVED	R.N.A.
OBSERVER	



CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT

**SECONDARY EFFLUENT PUMPS REPLACEMENT**

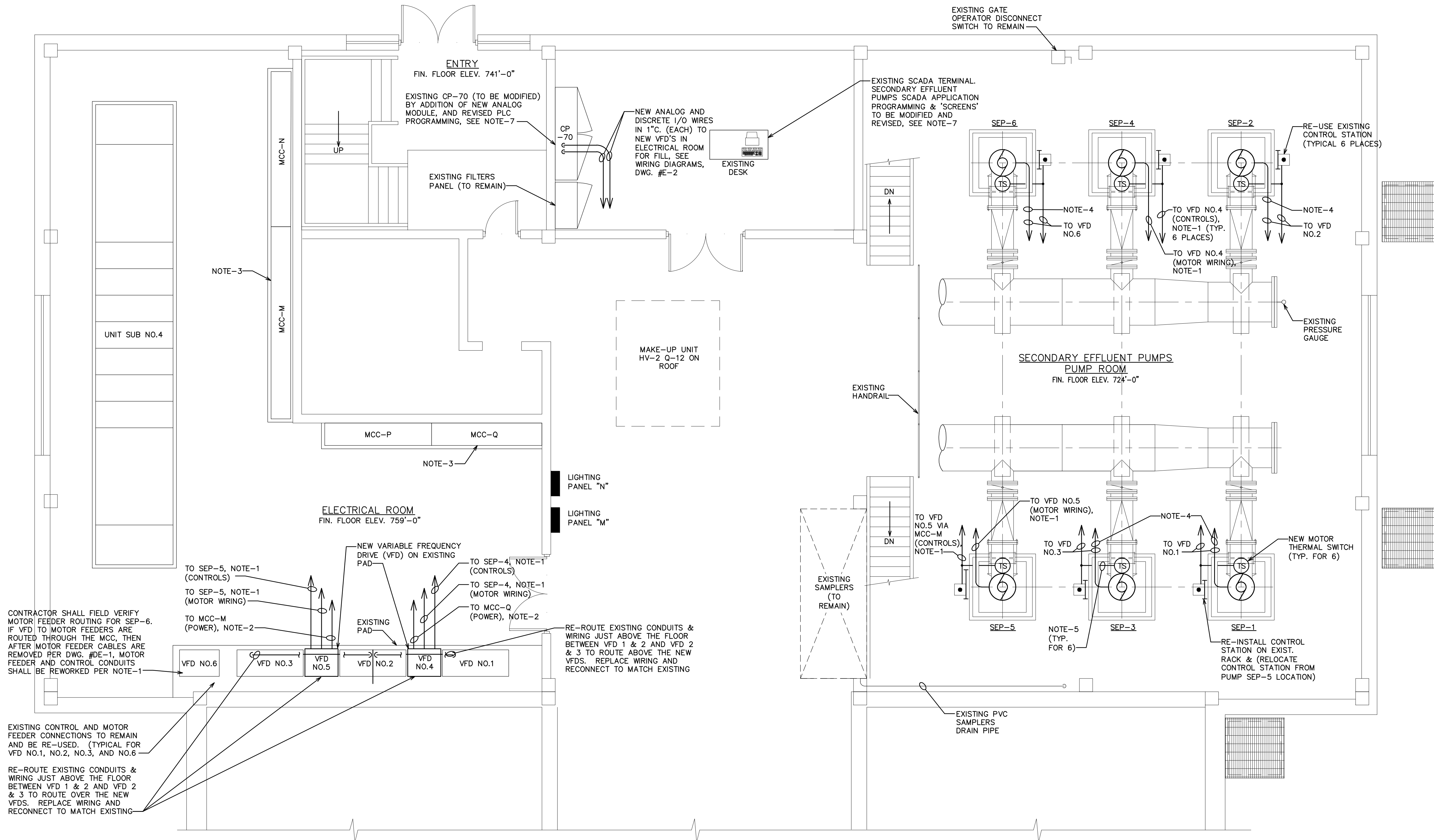
WASHTENAW COUNTY MICHIGAN

FILTER BUILDING ELECTRICAL DEMOLITION PLANS

HRC JOB NO. 20120802	SCALE AS NOTED
DATE OCTOBER, 2013	SHEET NO. <b>DE-1</b> OF

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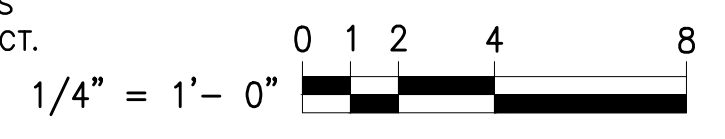
**FILTER BUILDING PARTIAL PLAN**  
SCALE: 1/4" = 1'-0"

**CAUTION**  
ALL WORK REQUIRING EQUIPMENT OR POWER OUTAGE(S) SHALL BE COORDINATED WITH AND APPROVED BY THE PLANT/OWNER IN ADVANCE PER THE SPECIFICATIONS.

ELECTRICAL LEGEND	
-----	CONDUIT RUN CONCEALED ABOVE CEILING OR IN WALL
—————	CONDUIT RUN EXPOSED
□	CONTROL STATION (EMERGENCY STOP P.B.)
T	MOTOR THERMAL SWITCH (PART OF MOTOR)
⊞	DISCONNECT SWITCH
⊙	MOTOR 3 PHASE

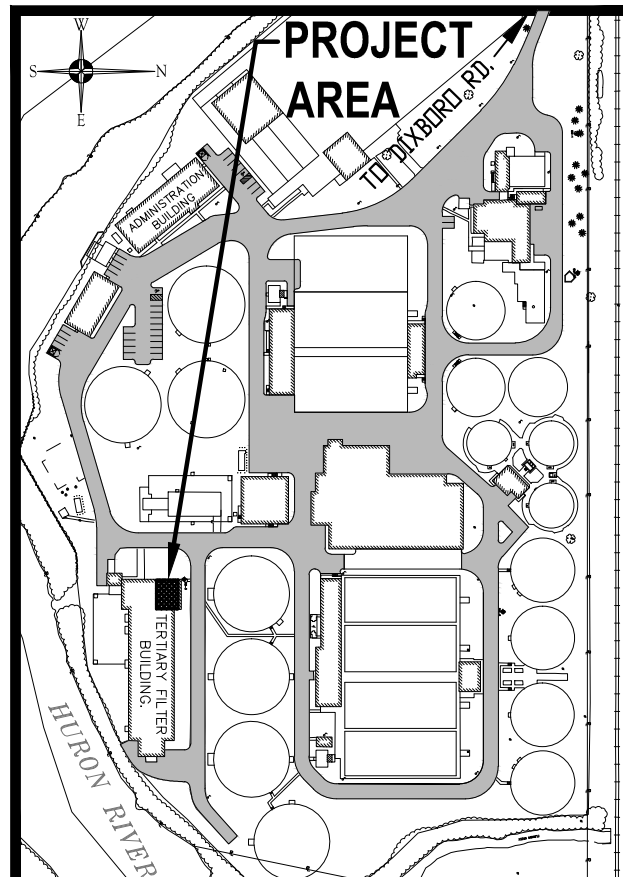
**NOTES:**

- DISCONNECT EXISTING CONDUITS AND WIRE PER DWG. #DE-1. EXTEND EXISTING CONDUITS TO NEW VFD. INSTALL NEW 3-#4/0 + 1-#3 GRD. (VFD RATED WIRE) IN NEW & EXIST. 2 1/2" C. & 6-#14 IN NEW & EXIST, 3/4" C. (CONTROLS) TO NEW VFD.
- PROVIDE NEW 3-#4/0 + 1-#3 GRD., 2 1/2" C. TO EXISTING MCC BUCKET FOR VFD POWER FEED. ROUTE BELOW FLOOR.
- MODIFY EXISTING COMBINATION STARTERS FOR SECONDARY EFFLUENT PUMPS NO.4 & NO.5 TO BECOME FUSED FEEDER SWITCHES FOR NEW REMOTE MOUNTED VFD. RE-USE EXISTING 300 AMP FUSES AND REMOVE EXISTING STARTER AND DOOR MOUNTED DEVICES. PLUG HOLES IN DOOR.
- REMOVE EXISTING 3-#4/0 + 1-#3 GRD. FROM EXISTING 2 1/2" CONDUITS AND REPLACE WITH NEW 3-#4/0 + 1-#3 GRD. (VFD RATED WIRE) TO EXISTING VFD. EXTEND CONDUIT AS REQUIRED FOR CONNECTION TO NEW PUMP MOTOR.
- REMOVE AND EXTEND EXISTING CONTROL WIRING THROUGH EXISTING AND NEW CONDUITS AS REQUIRED FOR CONNECTION TO NEW MOTOR THERMAL SWITCH.
- THE PLC AND SCADA PROGRAMMING FOR PUMPS NO.4 & NO.5 SHALL BE REVISED TO ESSENTIALLY MATCH THAT FOR THE EXISTING VFD OPERATED PUMPS, SEE SPECIFICATIONS 13010, 13020, 13305, 13530, & 13600 FOR WORK REQUIRED AS A PART OF THIS PROJECT.



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CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT

**SECONDARY EFFLUENT PUMPS REPLACEMENT**

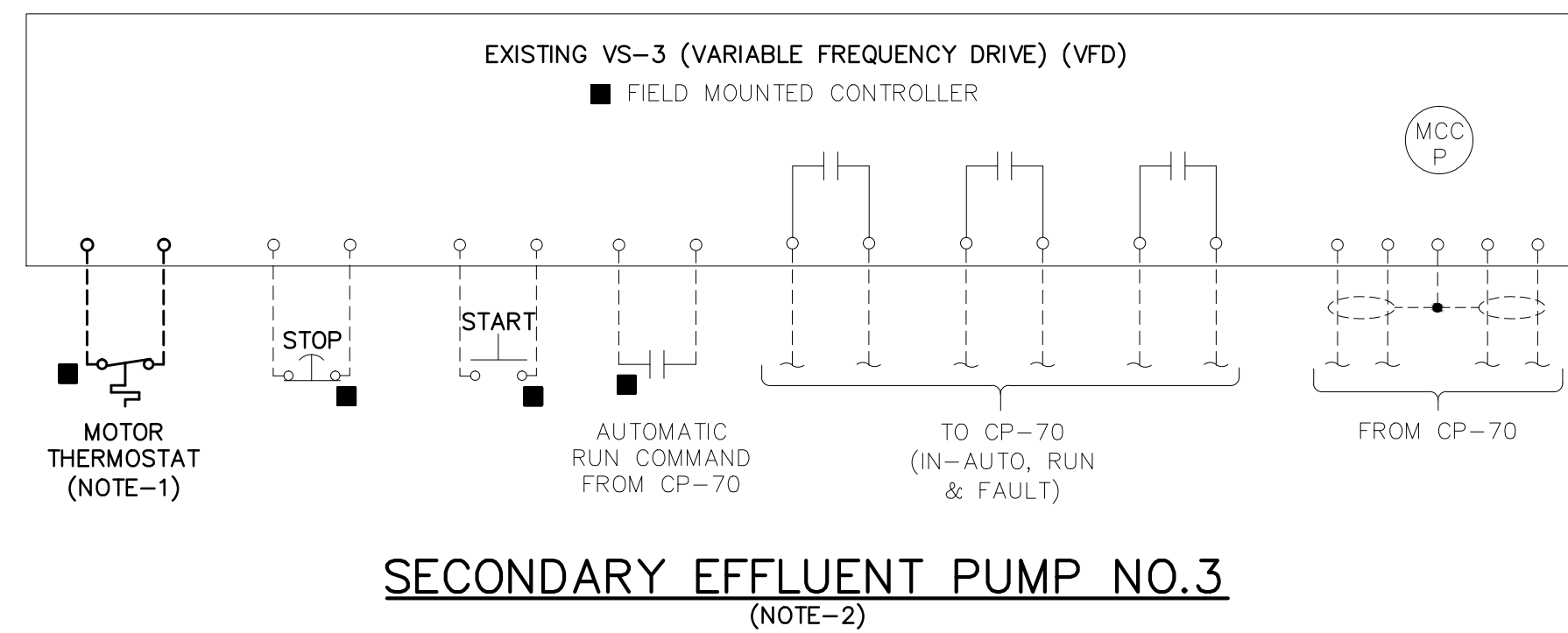
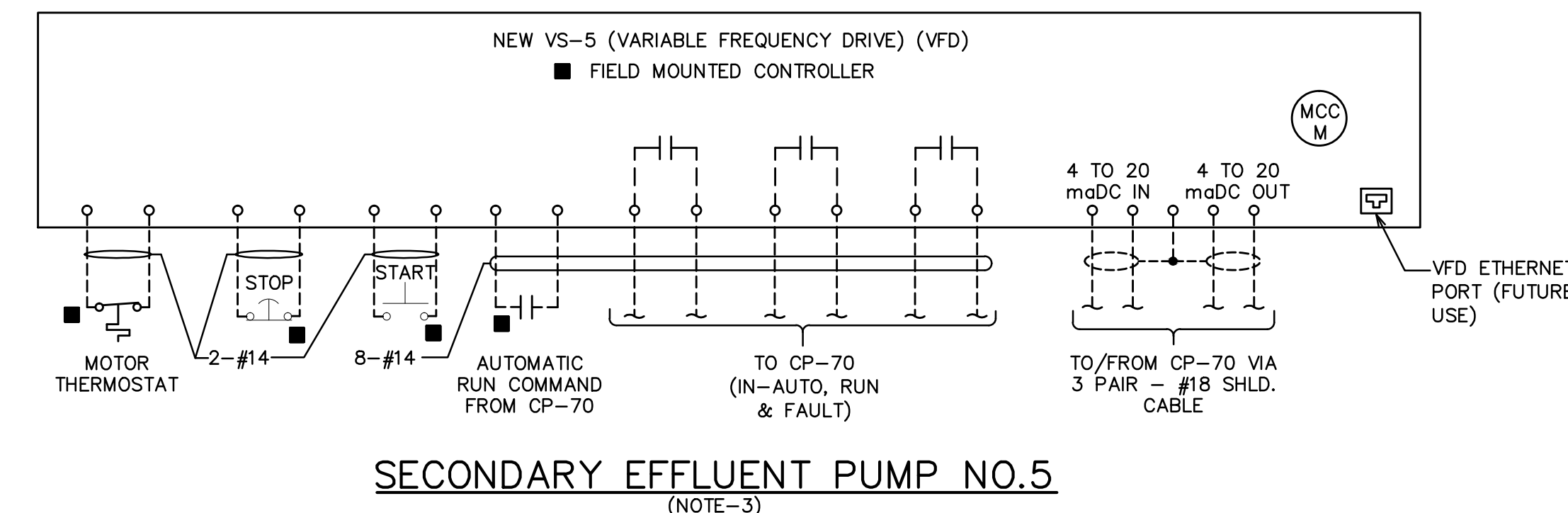
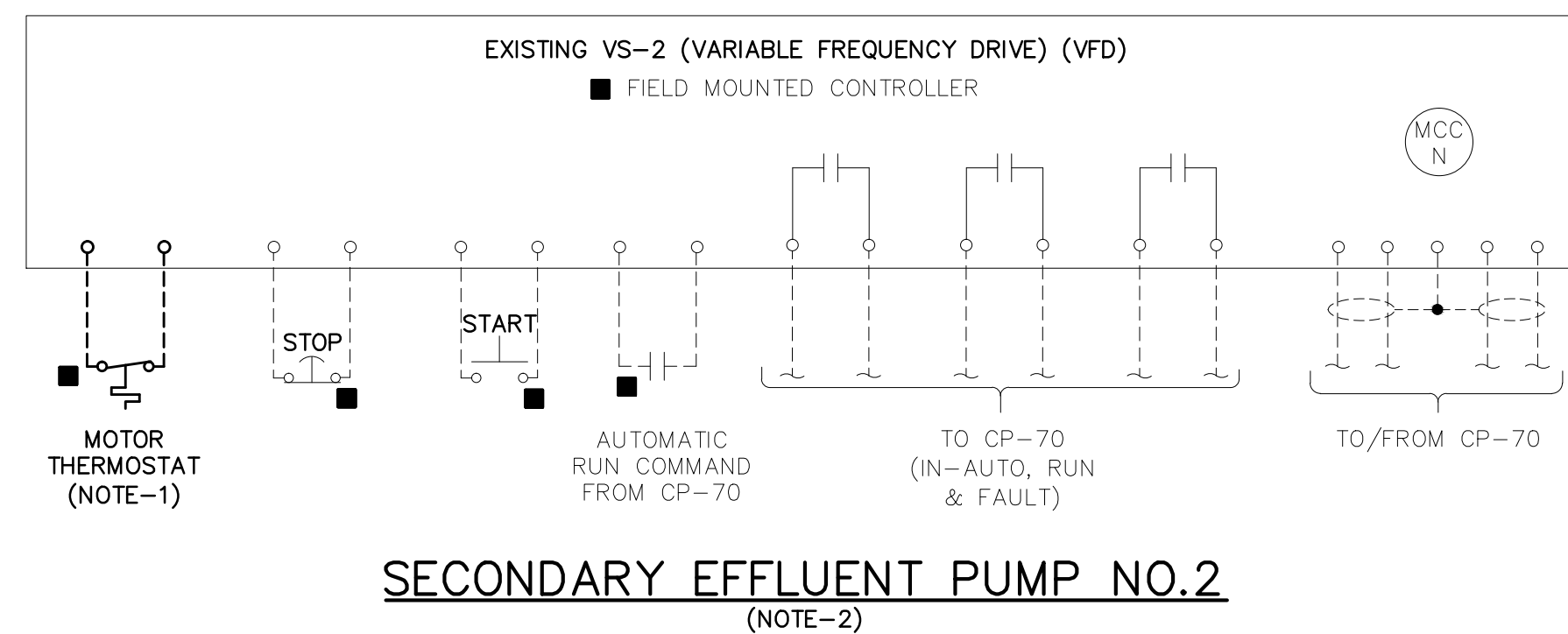
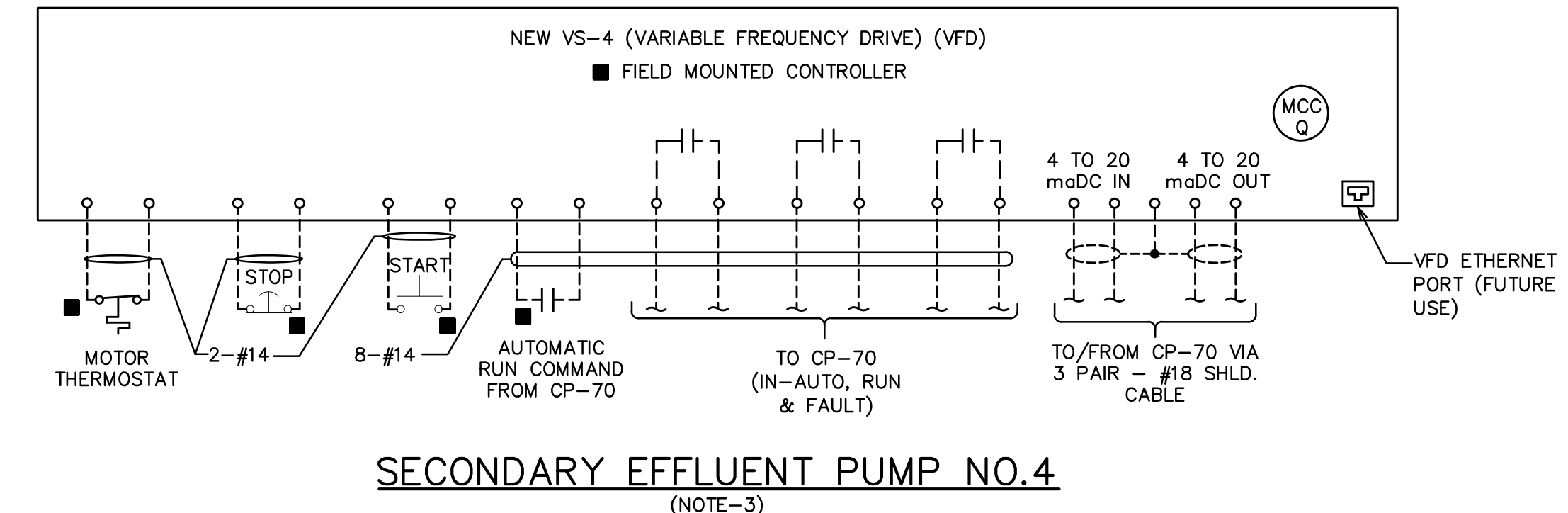
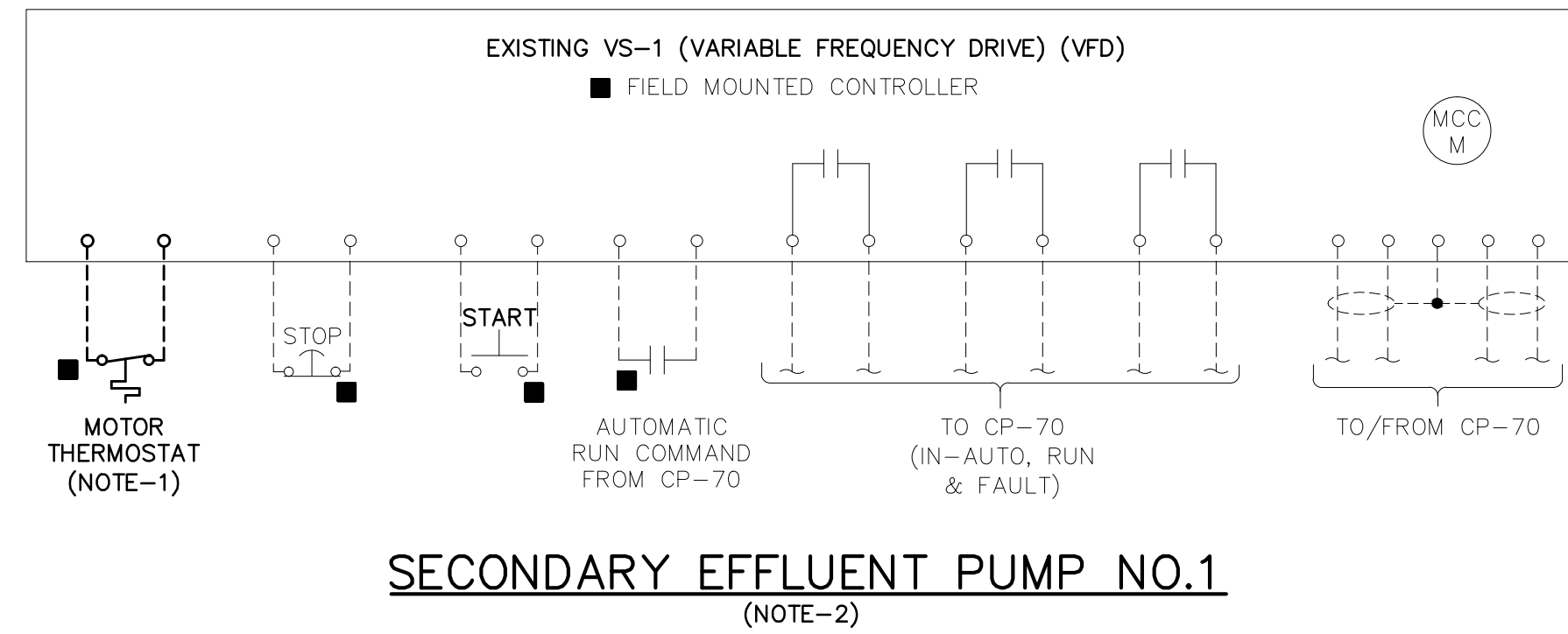
WASHTENAW COUNTY MICHIGAN

**FILTER BUILDING ELECTRICAL PLAN**

HRC JOB NO. 20120802	SCALE 1/4" = 1'-0"
DATE OCTOBER, 2013	SHEET NO. <b>E-1</b>

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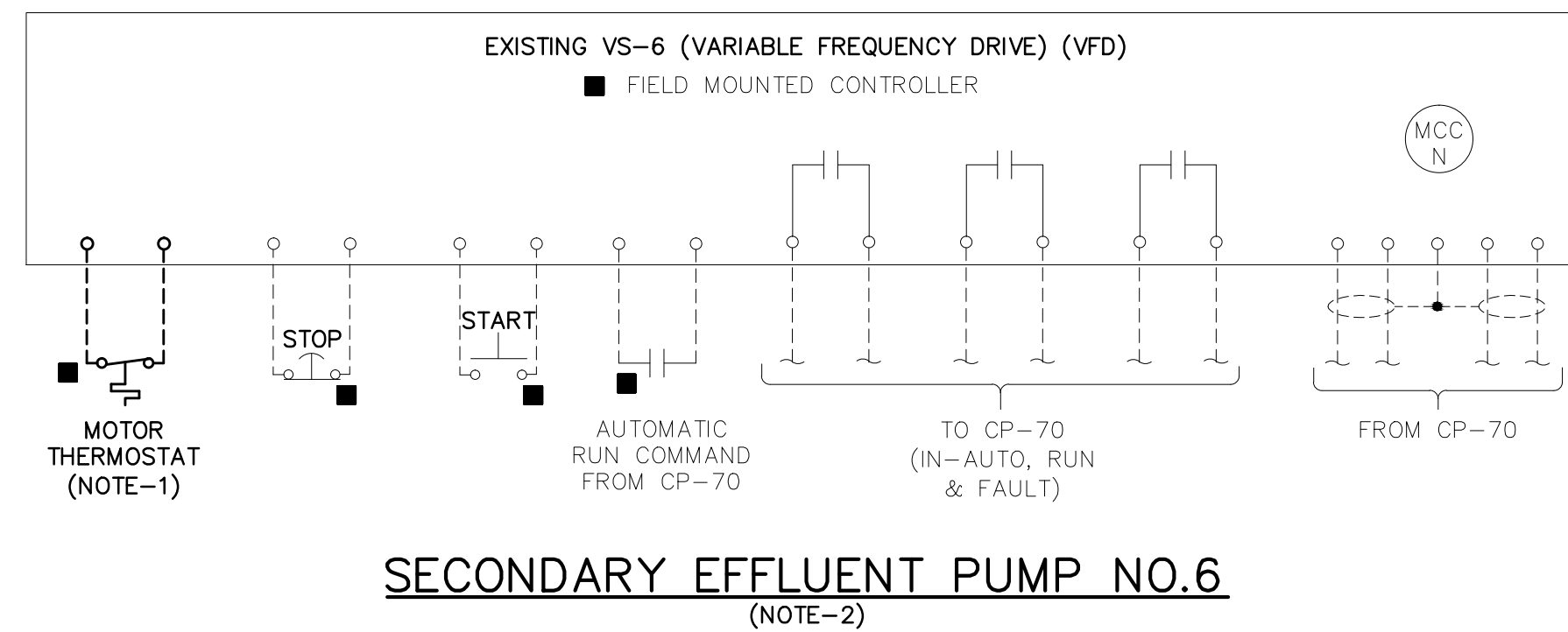




- CONNECTION NOTES:**
1. NEW MOTOR THERMOSTAT (KLIXON) SWITCHES SHALL BE RECONNECTED TO EXISTING VFD'S. EXISTING CONTROL WIRE AND CONDUIT SHALL BE SPLICED AND EXTENDED AS REQUIRED.
  2. EXISTING CONTROL WIRING AND DEVICES FOR PUMPS SEP-1, 2, 3, AND 6 MAY REMAIN AND BE RE-USED, EXCEPT AS NOTED OTHERWISE. MOTOR POWER WIRE SHALL BE REPLACED AS NOTED ELSEWHERE, AND CONDUIT MAY BE SPLICED AND EXTENDED AS REQUIRED.
  3. ALL CONTROL AND MOTOR POWER CONNECTIONS FOR PUMPS SEP-4, AND SEP-5 BETWEEN NEW VFD, NEW PUMP MOTOR, AND EXISTING CP-70 ARE TO BE MADE USING NEW WIRE AND CONDUIT. PORTIONS OF EXISTING CONDUIT RUNS MAY BE RE-USED IF PRACTICAL.

**LEGEND:**

■ = LOCATED REMOTE FROM MCC & VFD

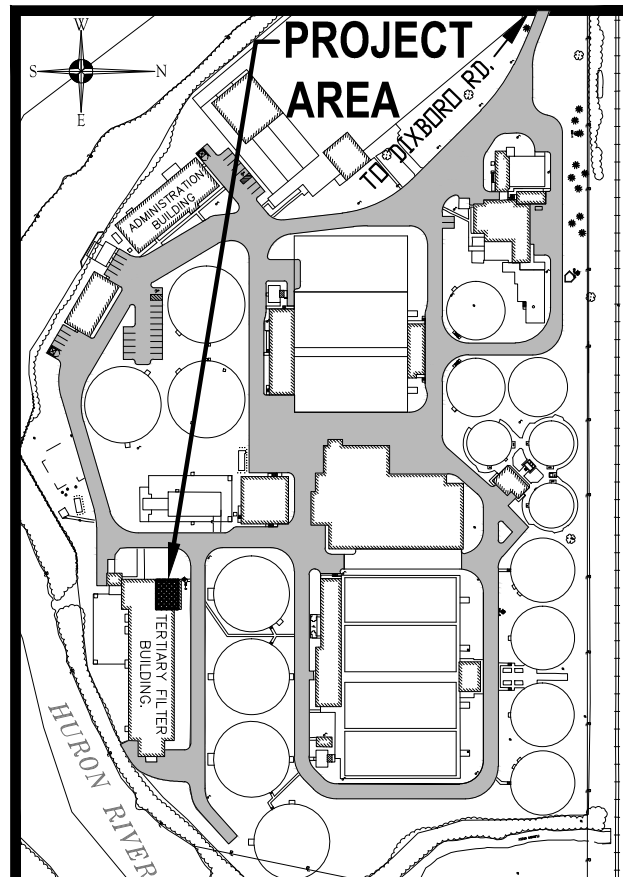


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CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT

**SECONDARY EFFLUENT PUMPS REPLACEMENT**

WASHTENAW COUNTY MICHIGAN

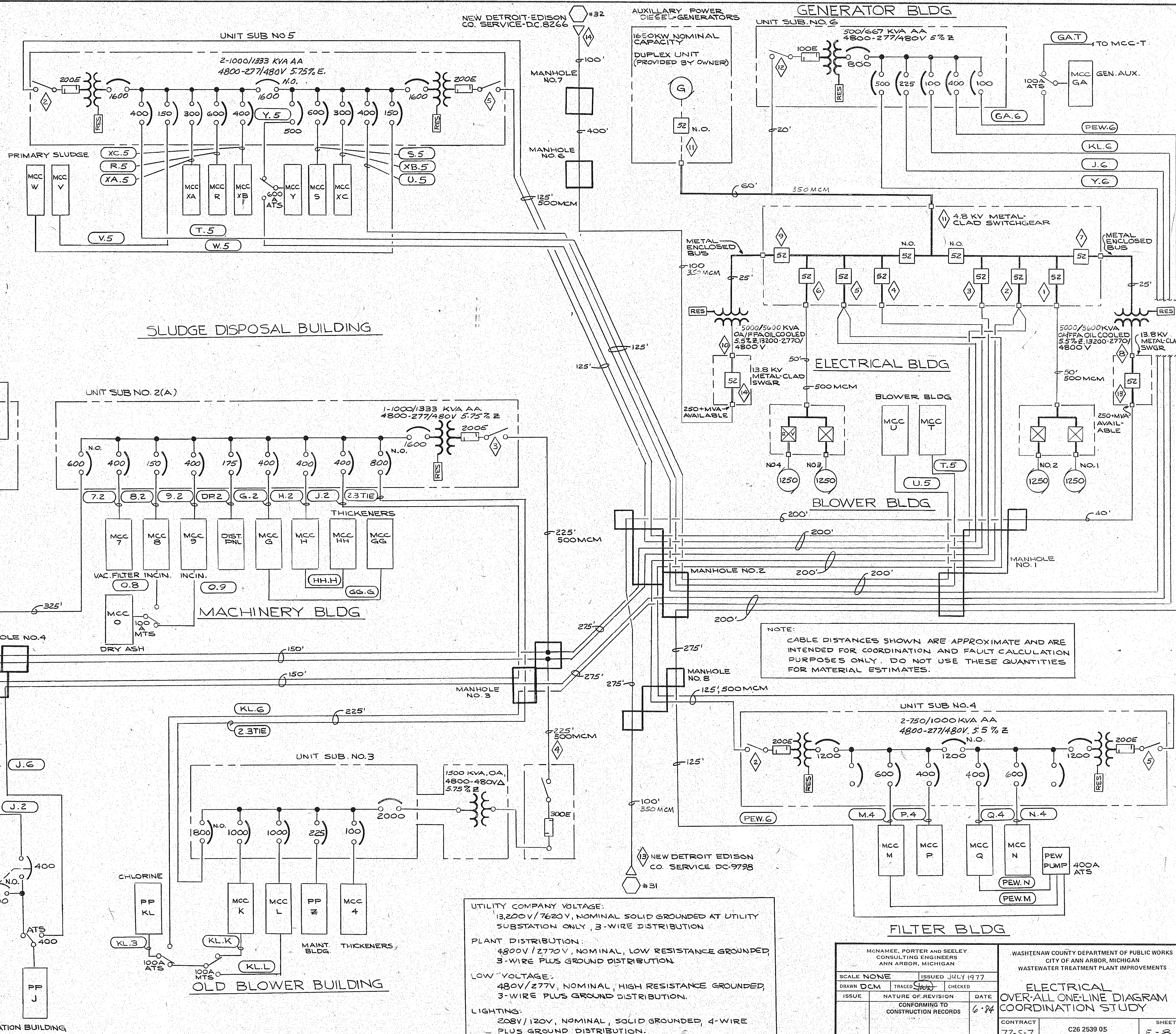
WIRING DIAGRAMS

HRC JOB NO. 20120802	SCALE NONE
DATE OCTOBER, 2013	SHEET NO. E-2 OF



### LEGEND

SYMBOL	DESCRIPTION
---	CIRCUIT CONNECTION
---	FUTURE CIRCUIT CONNECTION
[Symbol]	HIGH VOLTAGE LOAD BREAK SWITCH
[Symbol]	HIGH VOLTAGE CURRENT LIMITING FUSE
[Symbol]	HIGH VOLTAGE METAL-CLAD POWER CIRCUIT BREAKER
[Symbol]	POLE FOR OVERHEAD LINE
[Symbol]	TRANSFORMER L.V. CKT. I.D.
[Symbol]	H.V. CKT. I.D.
[Symbol]	GROUNDING RESISTOR
[Symbol]	LOW VOLTAGE POWER CIRCUIT BREAKER, METAL ENCLOSED SWITCHGEAR
[Symbol]	MOTOR CONTROL CENTER "X"
[Symbol]	POWER DISTRIBUTION PANEL "K"
[Symbol]	SHADED COMPONENTS ARE EXISTING, OR ARE TO BE EXISTING AT TIME IN CONSTRUCTION PROCESS REPRESENTED.
[Symbol]	THAT WITH CROSSMATCHING ARE TO BE REMOVED, REFER TO SEQUENCE DESCRIPTION.



**UTILITY COMPANY VOLTAGE:**  
13,200V / 7620V, NOMINAL SOLID GROUNDING AT UTILITY  
SUBSTATION ONLY, 3-WIRE DISTRIBUTION

**PLANT DISTRIBUTION:**  
480V / 277V, NOMINAL, LOW RESISTANCE GROUNDING  
3-WIRE PLUS GROUND DISTRIBUTION

**LOW VOLTAGE:**  
480V / 277V, NOMINAL, HIGH RESISTANCE GROUNDING,  
3-WIRE PLUS GROUND DISTRIBUTION.

**LIGHTING:**  
208V / 120V, NOMINAL, SOLID GROUNDING, 4-WIRE  
PLUS GROUND DISTRIBUTION.

**NOTE:**  
CABLE DISTANCES SHOWN ARE APPROXIMATE AND ARE  
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SCALE NONE	ISSUED JULY 1977	ELECTRICAL OVER-ALL ONE-LINE DIAGRAM COORDINATION STUDY	
DRAWN DCM	TRACED SCS	CHECKED	
ISSUE	NATURE OF REVISION	DATE	
	CONFORMING TO	CONSTRUCTION RECORDS	6.8.84
CONTRACT 77-5-7		C26 2539 05	
		SHEET E-8 OF 87	

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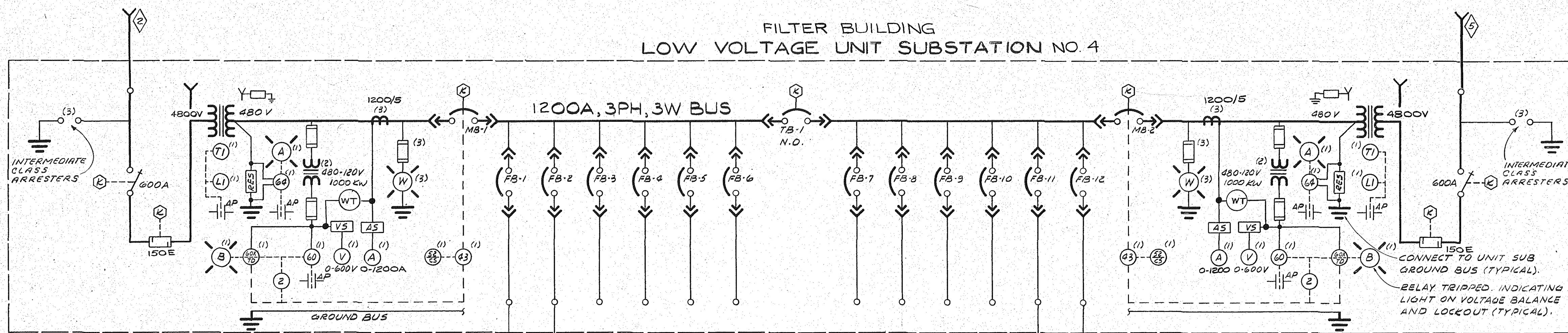
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DRAWN	B.T.E.
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APPROVED	R.N.A.
OBSERVER	

CITY OF ANN ARBOR WASTEWATER TREATMENT PLANT	
<b>SECONDARY EFFLUENT PUMPS REPLACEMENT</b>	
WASHTENAW COUNTY	MICHIGAN
REFERENCE DRAWING	
HRC JOB NO. 20120802	SCALE NONE
DATE OCTOBER, 2013	SHEET NO. REF-A OF

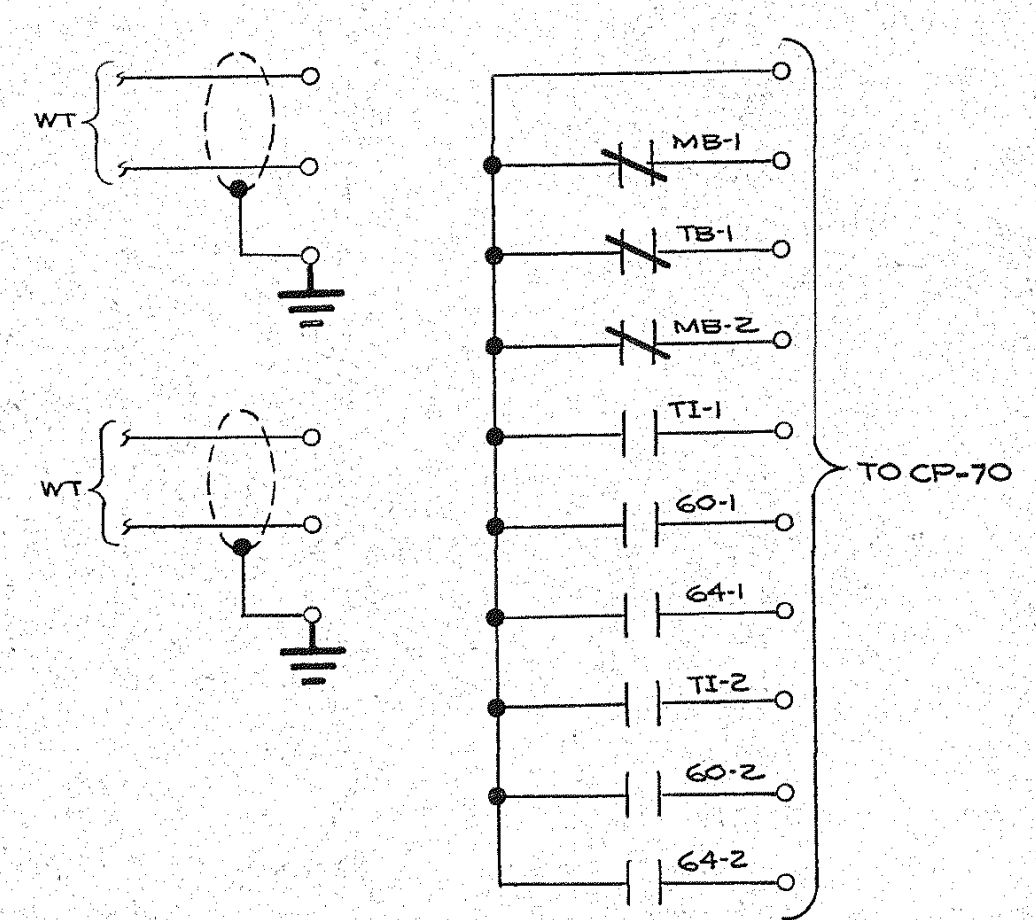


BRUNING 74254

### FILTER BUILDING LOW VOLTAGE UNIT SUBSTATION NO. 4



- NOTES:**
- IN THE POWER CIRCUIT BREAKER SCHEDULE THE FOLLOWING REMARKS APPLY.  
 (A) BLANK: INDICATES AN EMPTY COMPARTMENT WITH NO PROVISIONS FOR A FUTURE BREAKER.  
 (B) SPACE: INDICATES AN EMPTY COMPARTMENT COMPLETE WITH ALL PROVISIONS FOR BACKING IN A FUTURE BREAKER.  
 (C) SPARE: INDICATES A COMPARTMENT COMPLETE WITH SPARE BREAKER AND ALL RELAYING AND AUXILIARIES NOTED.  
 (D) STARTER: INDICATES A CIRCUIT BREAKER USED AS A STARTER COMPLETE WITH POTENTIAL TRANSFORMERS OFF MAIN BUS FOR POWER. CONTROL CIRCUIT TO BE MANUFACTURER'S STANDARD DESIGN CAPABLE OF ACCEPTING MOMENTARY OR MAINTAINED REMOTE STOP-START CONTACT INPUTS.
  - BREAKER RELAY CIRCUIT DESCRIPTION:  
 (A) IN THE AUTOMATIC POSITION, THE MAIN BREAKER IS TRIPPED ON SINGLE PHASING BY VOLTAGE BALANCE RELAY (60) IN CONJUNCTION WITH GOX/TD AUX. DEVICE AND RECLOSED THRU (62) WHEN (60) RETURNS TO NORMAL. IN THE MANUAL POSITION THE MAIN BREAKER IS CLOSED VIA 52/CS (IF (60) HAS RETURNED TO NORMAL) AND TRIPPED VIA 52/CS. OVERCURRENT TRIP OF MAIN SHALL LOCKOUT THAT MAIN AND PREVENT THE TIE FROM CLOSING. OVERCURRENT TRIP OF THE TIE BREAKER SHALL LOCKOUT THE TIE BREAKER.
  - GROUND FAULT:  
 WHEN GROUND FAULT OCCURS THE AMBER LIGHT SHALL FLASH UNTIL THE FAULT IS CLEARED.
  - HIGH VOLTAGE FUSE SIZES ARE ESTIMATED FINAL FUSES SHALL BE DETERMINED BY THE COORDINATION STUDY.



UNIT SUBSTATION NO. 4		
DESCRIPTION	BOTTOM	TOP
PRIMARY CABLE ENTRY LEFT END	X	
PRIMARY CABLE ENTRY RIGHT END	X	
SECONDARY CABLE EXIT	X	
POWER CO. METERING CUBICLE	NA	

TRANSFORMER RATINGS	
DESCRIPTION	RATING
INSULATION CLASS - LOW VOLTAGE	1.2 KV
INSULATION CLASS - HIGH VOLTAGE	5.0 KV
B.L.L. LOW VOLTAGE	30 KV
B.L.L. HIGH VOLTAGE	60 KV
TAPS - FCBN	2-2 1/2 %
TAPS - FLAN	2-2 1/2 %
COOLANT	AIR
TEMPERATURE RISE (BA)	80°C/150°C
IMPEDANCE	5 TO 6 %
COOLING FAN CONTROL CIRCUIT	NA
KVA RATING (BA)	750/1000KVA
KVA RATING (OA/FA)	NA KVA
PRIMARY WINDING CONNECTION	WYE
PRIMARY VOLTAGE	4.8 KV
SECONDARY WINDING CONNECTION	WYE
SECONDARY VOLTAGE	277/480V

POWER CIRCUIT BREAKER SCHEDULE					
DEVICE	FRAME SIZE	CONT. CURRENT RATING	INTERR. RMS AMP SYMM.	SOLID STATE TRIP DEVICES	REMARKS
MB-1	1600	1200	42000	L.S.	ELECTRICALLY OPERATED
MB-2	1600	1200	42000	L.S.	ELECTRICALLY OPERATED
TB-1	1600	1200	42000	L.S.	ELECTRICALLY OPERATED
FB-1	800	800	30,000	L.S.I.	} SPARE } BLANKS AS REQ'D } SPACE
FB-2	800	400		L.S.I.	
FB-3	800	400		L.S.I.	
FB-4	800	400		L.S.I.	
FB-5	800	400		L.S.I.	
FB-6	800	400		L.S.I.	
FB-7	800	400		L.S.I.	
FB-8	800	400		L.S.I.	
FB-9	800	400		L.S.I.	
FB-10	800	400		L.S.I.	
FB-11	800	400		L.S.I.	
FB-12	800	400		L.S.I.	

SYMBOL LEGEND	
RES	RESISTOR
PT	POTENTIAL TRANSFORMER
CT	CURRENT TRANSFORMER
A	AMMETER
V	VOLTMETER
AS	AMMETER SWITCH
VS	VOLTMETER SWITCH
PF	POWER FACTOR METER
W	WATTMETER
CS	CONTROL SWITCH
TI	TEMPERATURE INDICATOR
LI	LEVEL INDICATOR
AP	ALARM POINT
L.S.	LONG TIME - SHORT TIME
L.S.I	LONG TIME - SHORT TIME INSTANTANEOUS
K	KEY INTERLOCK
WT	WATT TRANSMITTER

RELAY LEGEND		
DEVICE NO	G.E. CAT. NO. (OR EQUAL)	DESCRIPTION
2	EAGLE SIGNAL AGASTAT OR EQUAL	D-C OPERATED TIME DELAY OR SYNC. TIMER WITH 0-120SEC RANGE
27	IAY-54	CU-2 SHORT TIME UNDERVOLTAGE
43	SB-1	W SELECTOR SWITCH
47	ICR-53B	CP PHASE SEQUENCE UNDERVOLTAGE
52/CS	SB-1	W CONTROL SWITCH
60	NBY	CVQ VOLTAGE BALANCE
60X/TD	178AT343	AUX. D-C POWER SUPPLY (TIMER)
62	EAGLE SIGNAL AGASTAT OR EQUAL	D-C OPERATED TIME DELAY
64	IAY-510	CV-B SHORT TIME LOW PICK UP OVERVOLTAGE
69	SB-1	W LOCKABLE CONTROL SWITCH
83	HFA	M6 MULTI-CONTACT AUXILIARY
86/HR	HEA	WL MULTI-CONTACT AUX. HAND RESET

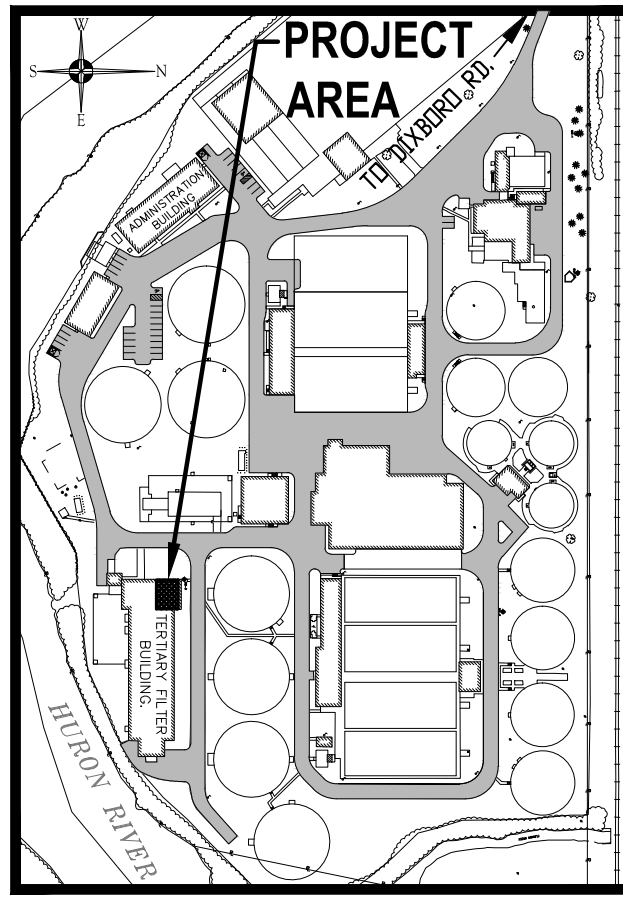
KEY INTERLOCK SCHEDULE	
FUSE COMPARTMENT	PRIMARY SWITCH AND ITS MAIN SECONDARY BREAKER
MAIN	MUST BE LOCKED OPEN TO GAIN ACCESS. MAY NOT BE CLOSED ON SINGLE PHASING (60) OR WHEN THE TIE AND OTHER SECONDARY MAIN IS CLOSED.
SECONDARY BREAKER	MAY NOT BE CLOSED WITH BOTH MAIN BREAKERS CLOSED.
TIE BREAKER	

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SCALE NONE	ISSUED 3 JULY 1977	Low Voltage - Double Ended UNIT SUBSTATION NO. 4	
DRAWN DCM	TRACED JCS	CHECKED	DATE 6-88
ISSUE	NATURE OF REVISION	CONSTRUCTION RECORDS	6-88
CONTRACT 77-S-7		C26 2539 05	SHEET E-16 of 27



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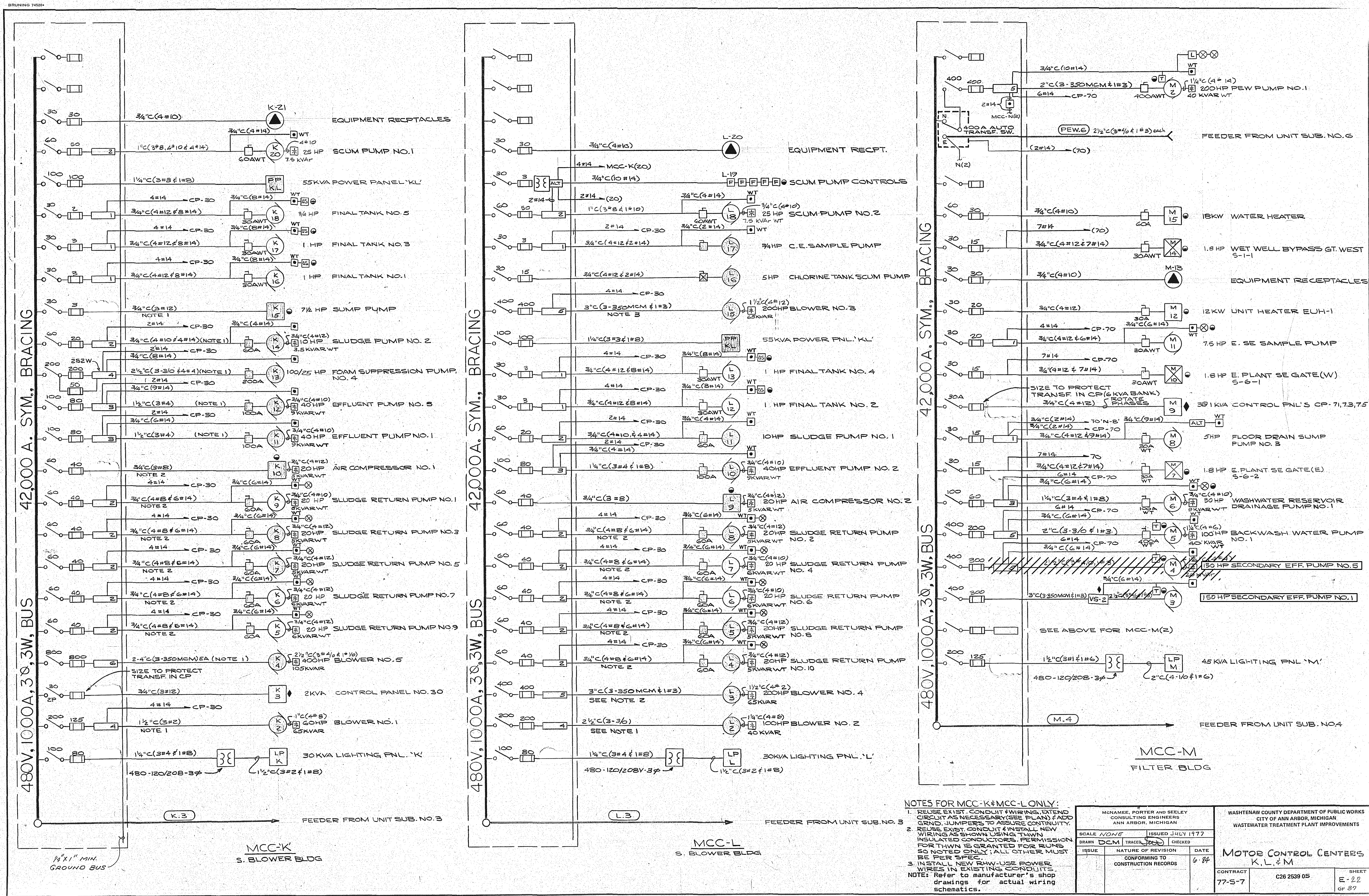


CITY OF ANN ARBOR  
 WASTEWATER TREATMENT PLANT  
**SECONDARY EFFLUENT PUMPS REPLACEMENT**

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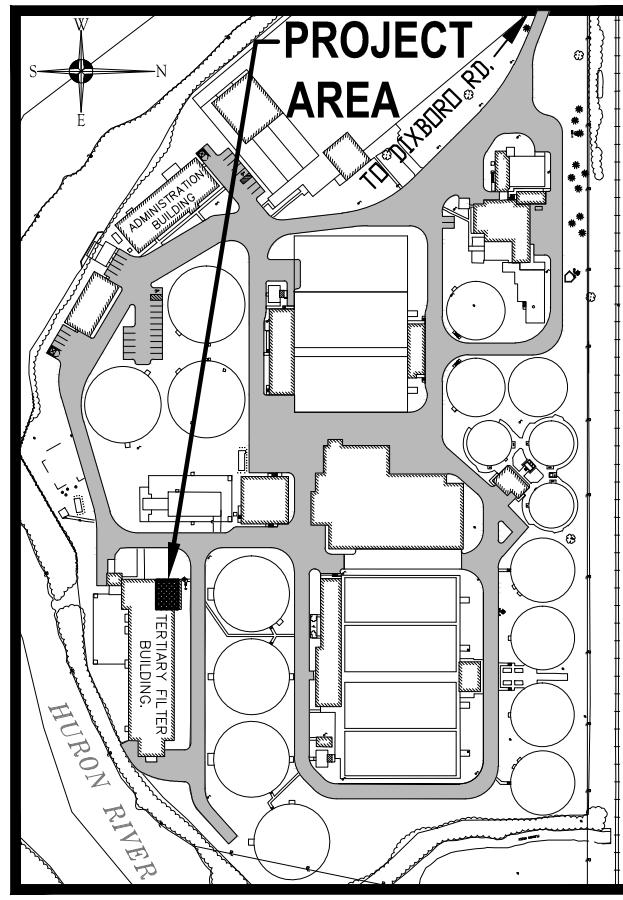
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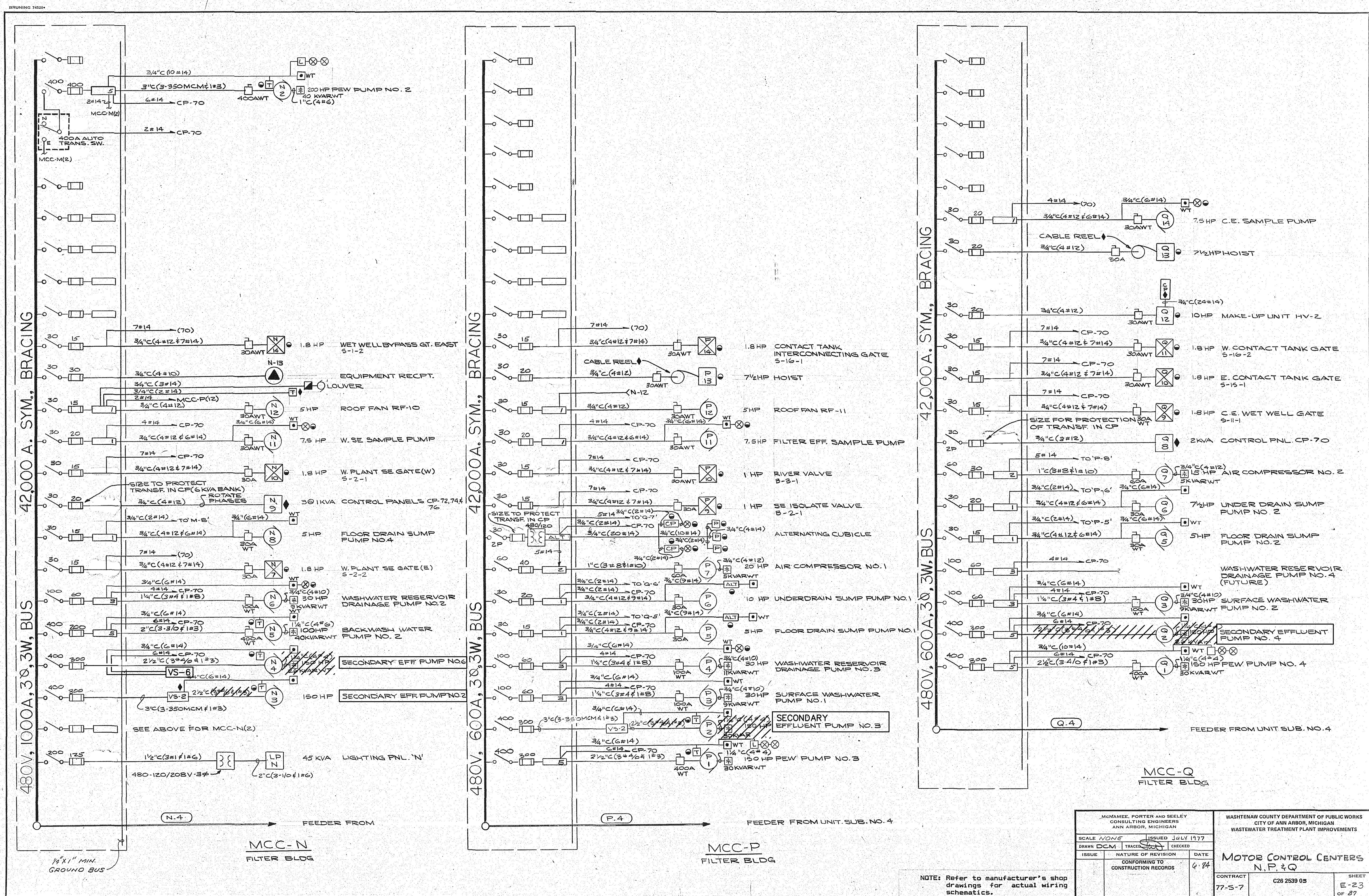


CITY OF ANN ARBOR  
 WASTEWATER TREATMENT PLANT  
**SECONDARY EFFLUENT PUMPS REPLACEMENT**  
 WASHENAW COUNTY DEPARTMENT OF PUBLIC WORKS  
 CITY OF ANN ARBOR, MICHIGAN  
 WASTEWATER TREATMENT PLANT IMPROVEMENTS  
**MOTOR CONTROL CENTERS K, L, & M**  
 CONTRACT 77-S-7 C26 2539 05 SHEET E-22 OF 27

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DATE	SHEET NO.	REF-C OF
OCTOBER, 2013	E-22	27

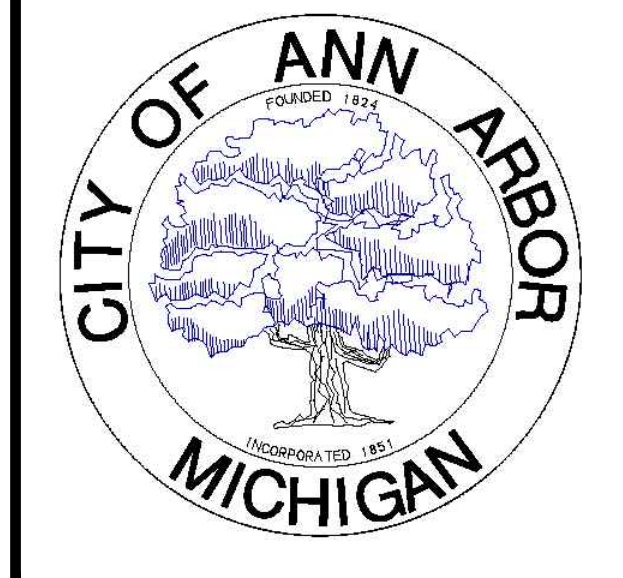




NOTE: Refer to manufacturer's shop drawings for actual wiring schematics.

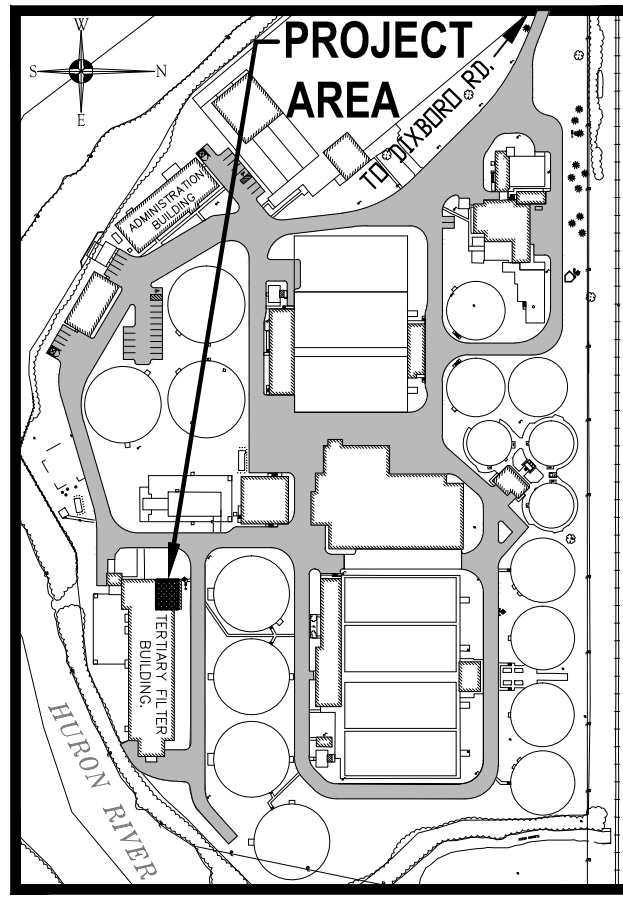
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SCALE NONE	ISSUED JULY 1977	MOTOR CONTROL CENTERS N, P, & Q	
DRAWN DCM	TRACED [initials]	CONTRACT	SHEET
ISSUE	NATURE OF REVISION	77-5-7	E-23
	DATE	C26 2539 05	OF 27
	CONFORMING TO CONSTRUCTION RECORDS		
	6/84		

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DATE	ADDITIONS AND/OR REVISIONS
12-05-14	ISSUED FOR BIDS
06-13-14	FINAL BID PKG. SUBMITTAL
03-14-14	DRAFT BID PKG. SUBMITTAL
11-08-13	REVISED PER CITY COMMENTS
10-04-13	PRELIMINARY SUBMITTAL
DESIGNED	M.A.O.
DRAWN	B.T.E.
CHECKED	M.A.O.
APPROVED	R.N.A.
OBSERVER	



CITY OF ANN ARBOR  
WASTEWATER TREATMENT PLANT

**SECONDARY EFFLUENT PUMPS REPLACEMENT**

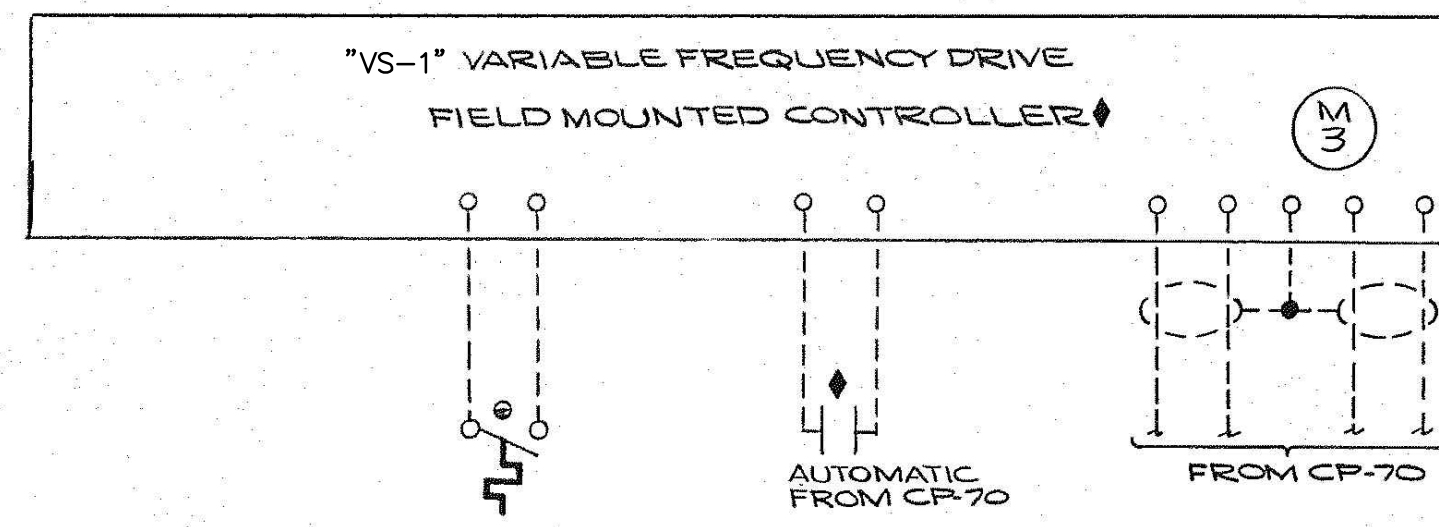
WASHTENAW COUNTY MICHIGAN

REFERENCE DRAWING

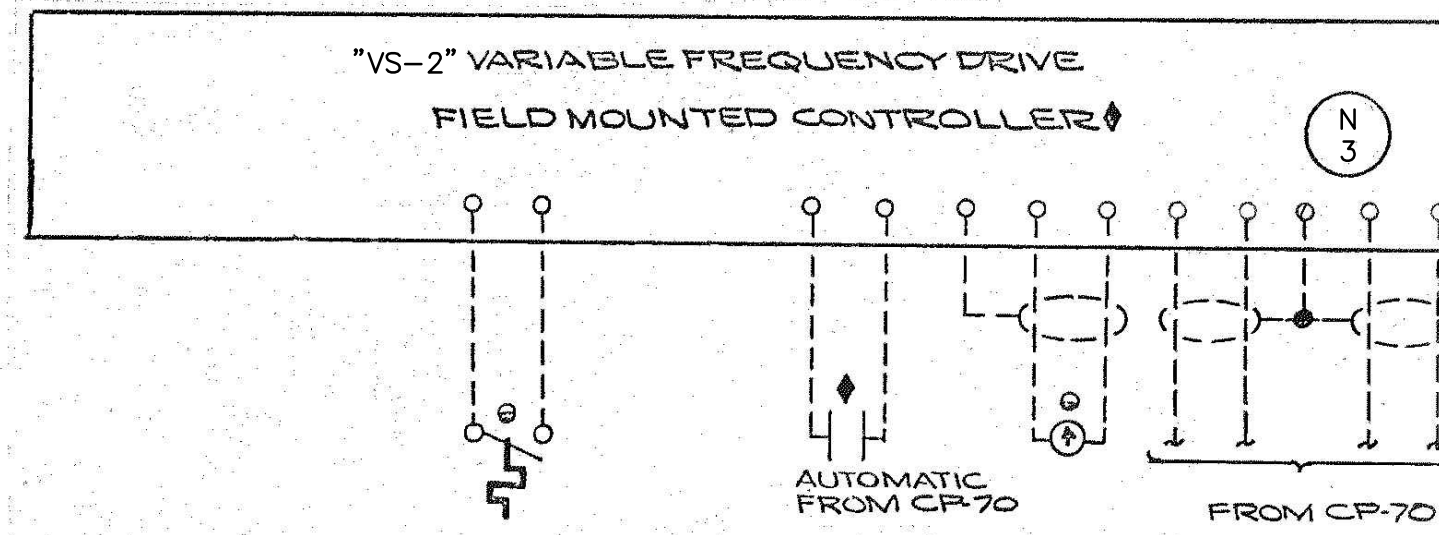
HRC JOB NO. 20120802	SCALE NONE
DATE OCTOBER, 2013	SHEET NO. REF-D

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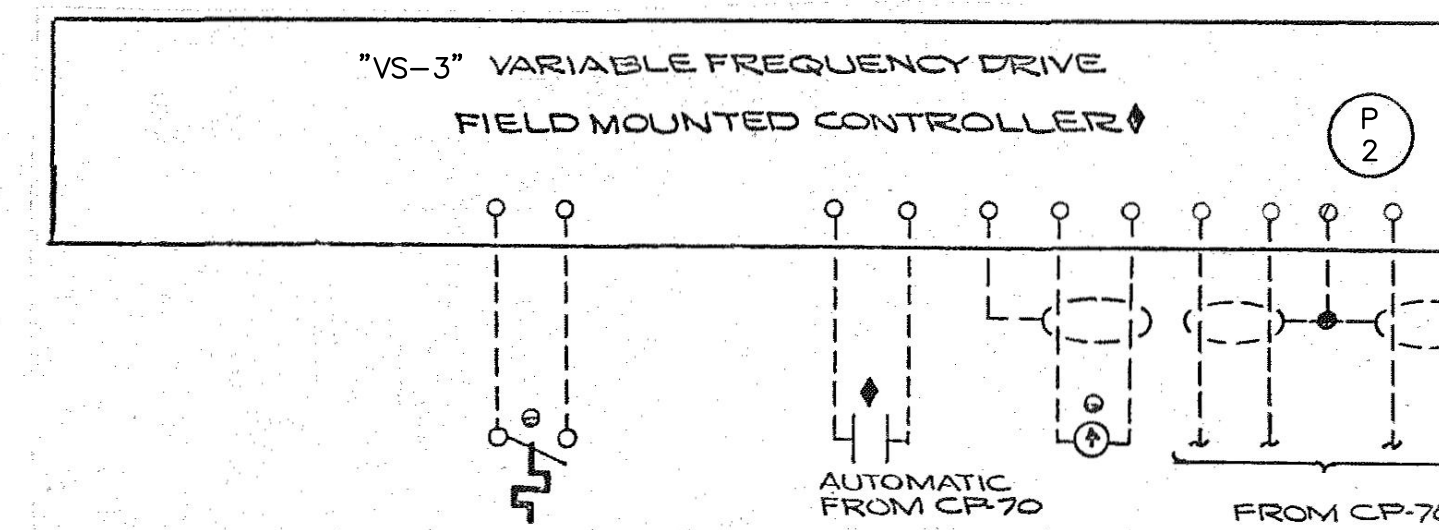




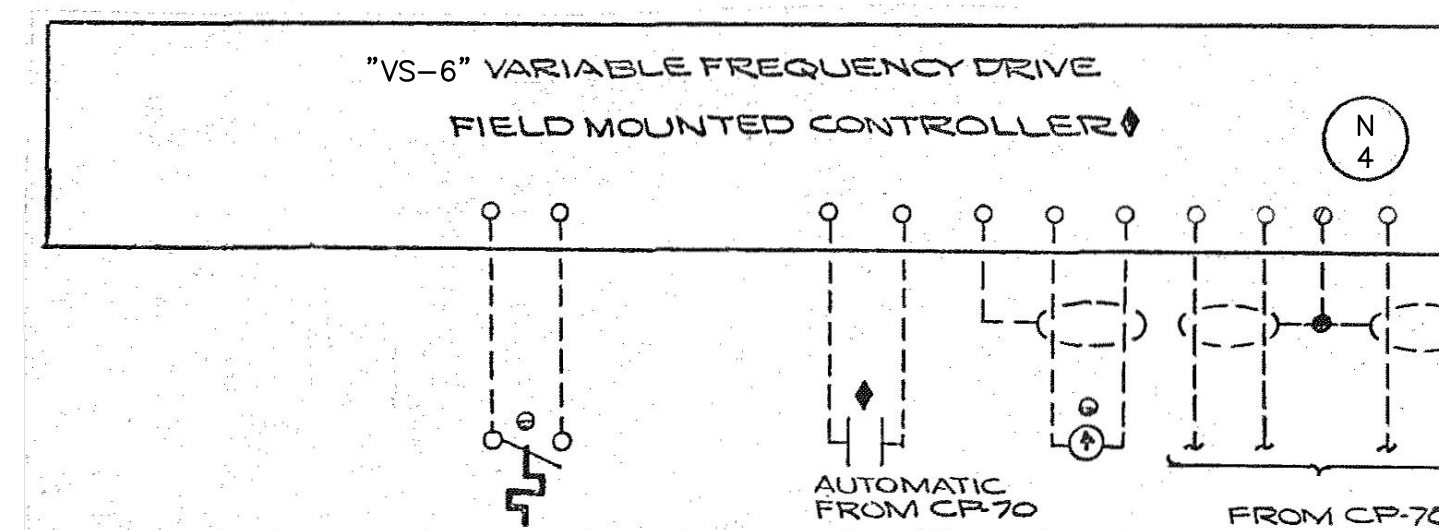
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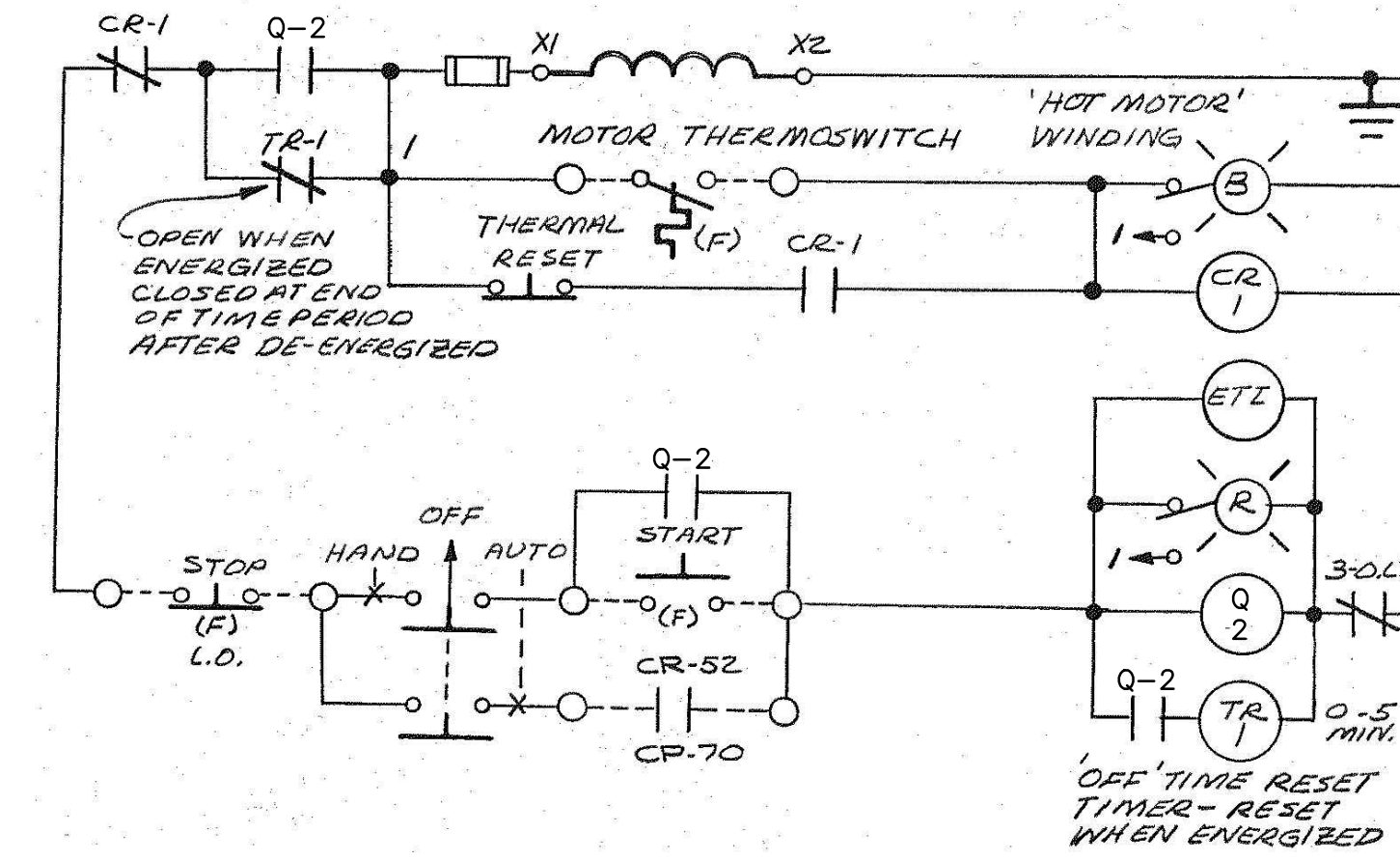
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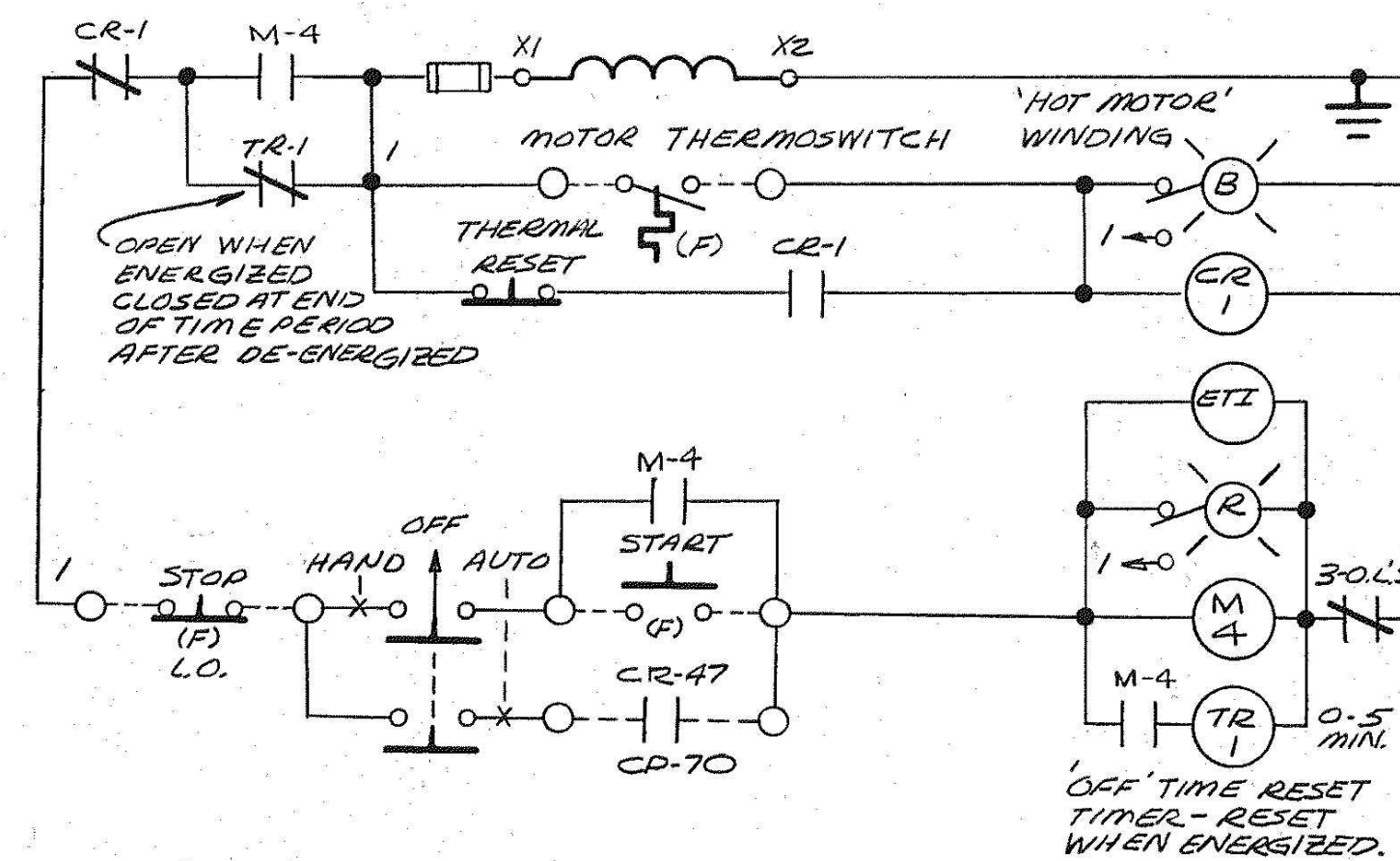
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EXISTING SECONDARY EFFLUENT PUMP NO.6



EXISTING SECONDARY EFFLUENT PUMP NO.4



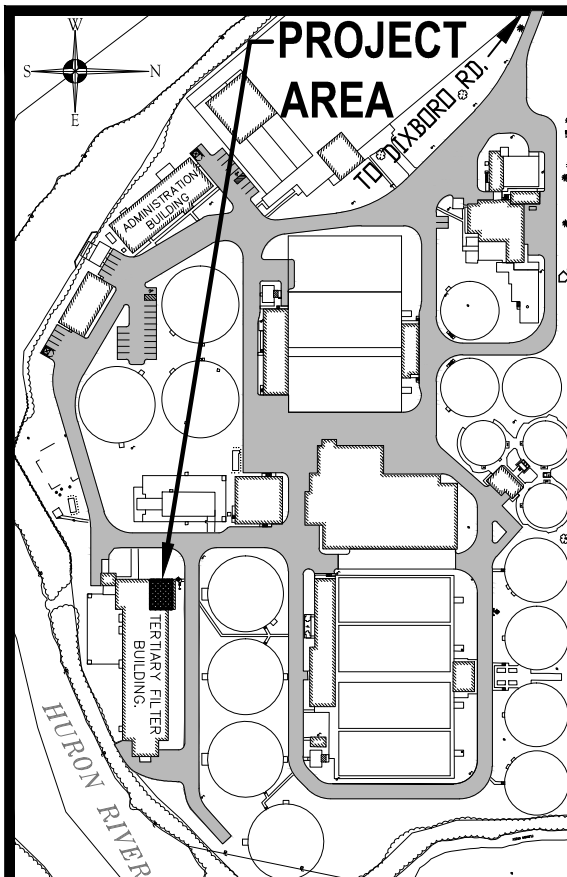
EXISTING SECONDARY EFFLUENT PUMP NO.5

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WASHTENAW COUNTY MICHIGAN

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HRC JOB NO. 20120802	SCALE NONE
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