

Drawings
For

Part 1:

**Thornton Water Treatment Plant
Clearwell and Pumping
Improvements**

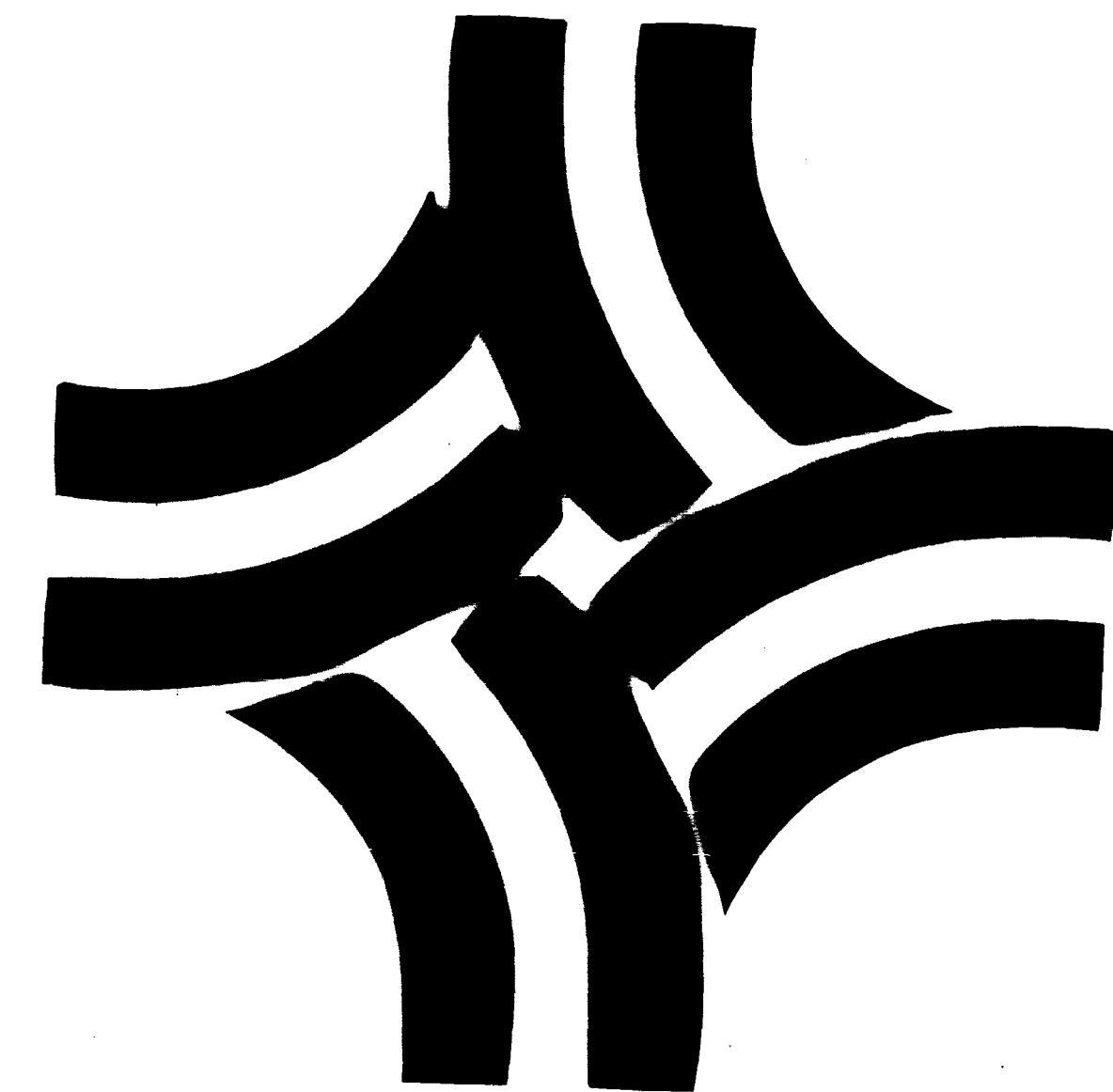
Part 2: (NOT INCLUDED IN THIS SET)

**Thornton Parkway
24" Water Main**

1987

Job No's. 148-42-50 / 148-43-50

HDR Infrastructure, Inc.
A Centerra Company



"AS RECORDED"
FROM INFORMATION
PROVIDED BY THE
CONTRACTORS
DATE: OCT-14-88



Thornton Water Treatment Plant
Part 1

DRAWING INDEX

1. COVER SHEET
2. VICINITY MAP/DRAWING INDEX

PART 1- THORNTON W.T.P. CLEARWELL & PUMPING IMPROVEMENTS

3. THORNTON W.T.P. - OVERALL SITE PLAN
4. 3.0 MG CLEARWELL - SITE PLAN
5. 3.0 MG CLEARWELL - PLAN, ELEVATIONS & DETAILS
6. 3.0 MG CLEARWELL - DETAILS
7. YARD PIPING - PROFILES
8. YARD PIPING - PROFILES & SECTIONS
9. YARD PIPING ALLEY - PROFILES
10. YARD PIPING - MISCELLANEOUS DETAILS
11. YARD PIPING - MISCELLANEOUS DETAILS
12. ZONE 4/3 PUMP STATION - PROCESS PLANS & SECTIONS
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14. ZONE 4/3 PUMP STATION - INSTRUMENTATION
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17. ZONE 4/3 PUMP STATION - ELECTRICAL ONE-LINE DIAGRAM
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19. ZONE 4/3 PUMP STATION - ELECTRICAL DETAILS
20. ZONE 4/3 PUMP STATION - ELECTRICAL DETAILS
21. THORNTON W.T.P. - ELECTRICAL SITE PLAN

PART 2 - THORNTON PARKWAY 24" WATER MAIN

22. PLAN & PROFILE - STA. 0+00 TO STA. 13+25
23. PLAN & PROFILE - STA. 13+25 TO STA. 27+84
24. PLAN & PROFILE - STA. 27+84 TO STA. 42+00
25. PLAN & PROFILE - STA. 42+00 TO STA. 56+15
26. PLAN & PROFILE - STA. 56+15 TO STA. 66+37
27. MISCELLANEOUS DETAILS
28. MISCELLANEOUS DETAILS
- 6A. RAW WATER LINE & VALVE VAULT

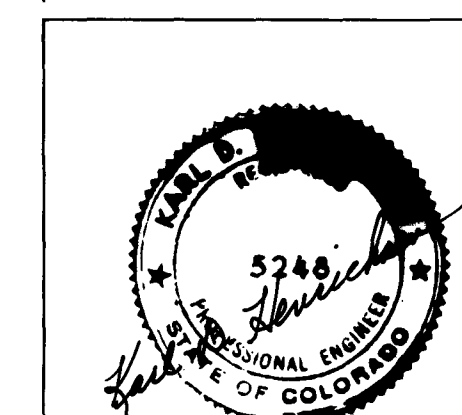
Thornton WTP
Clearwell &
Pumping
Improvements

Thornton
Parkway 24"
Water Main

Vicinity Map /
Drawing Index

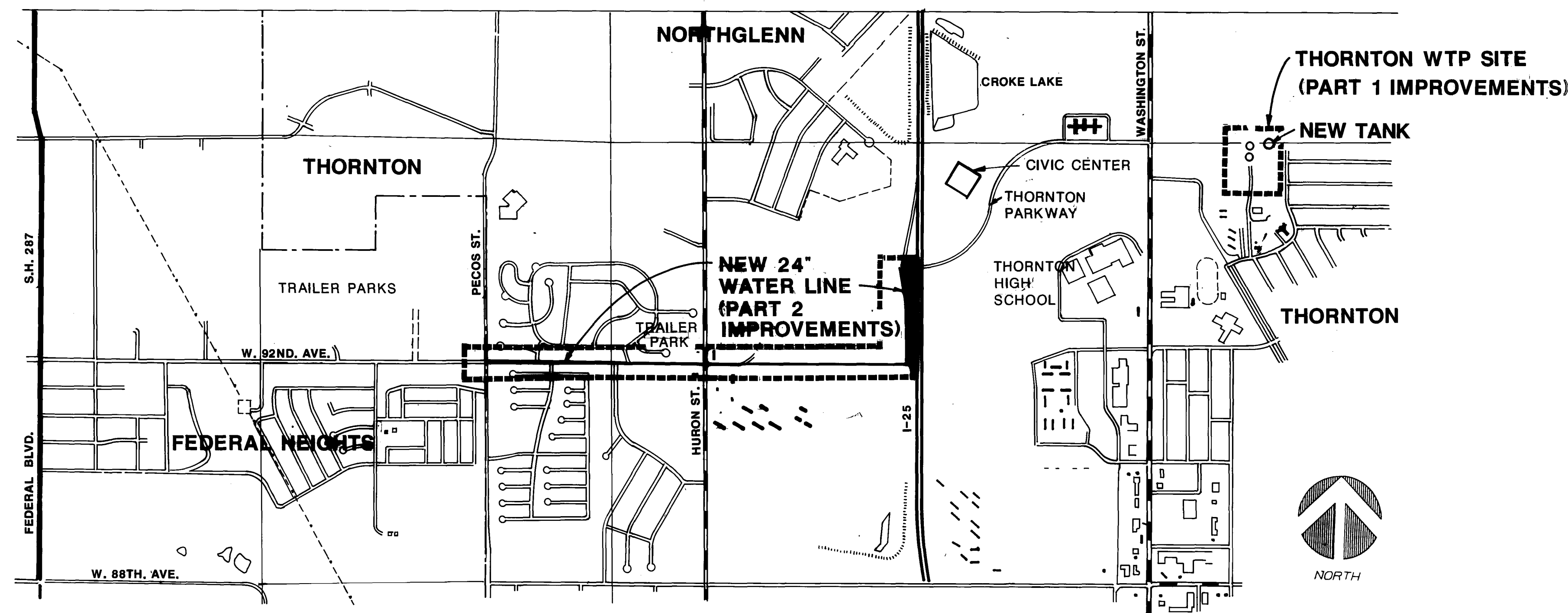
Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder

Revisions
10/14/88 AS BUILT
REVISION



Sheet Number

2



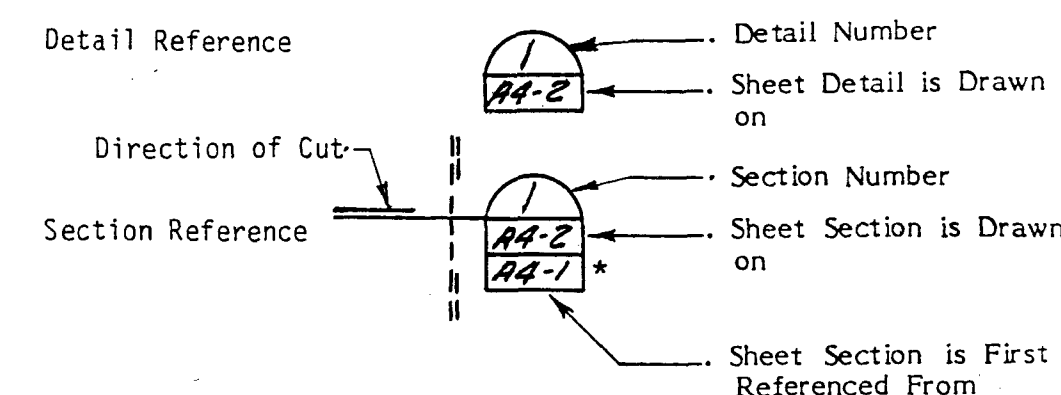
VICINITY MAP

SCALE: 1"=1000'

GENERAL NOTES:

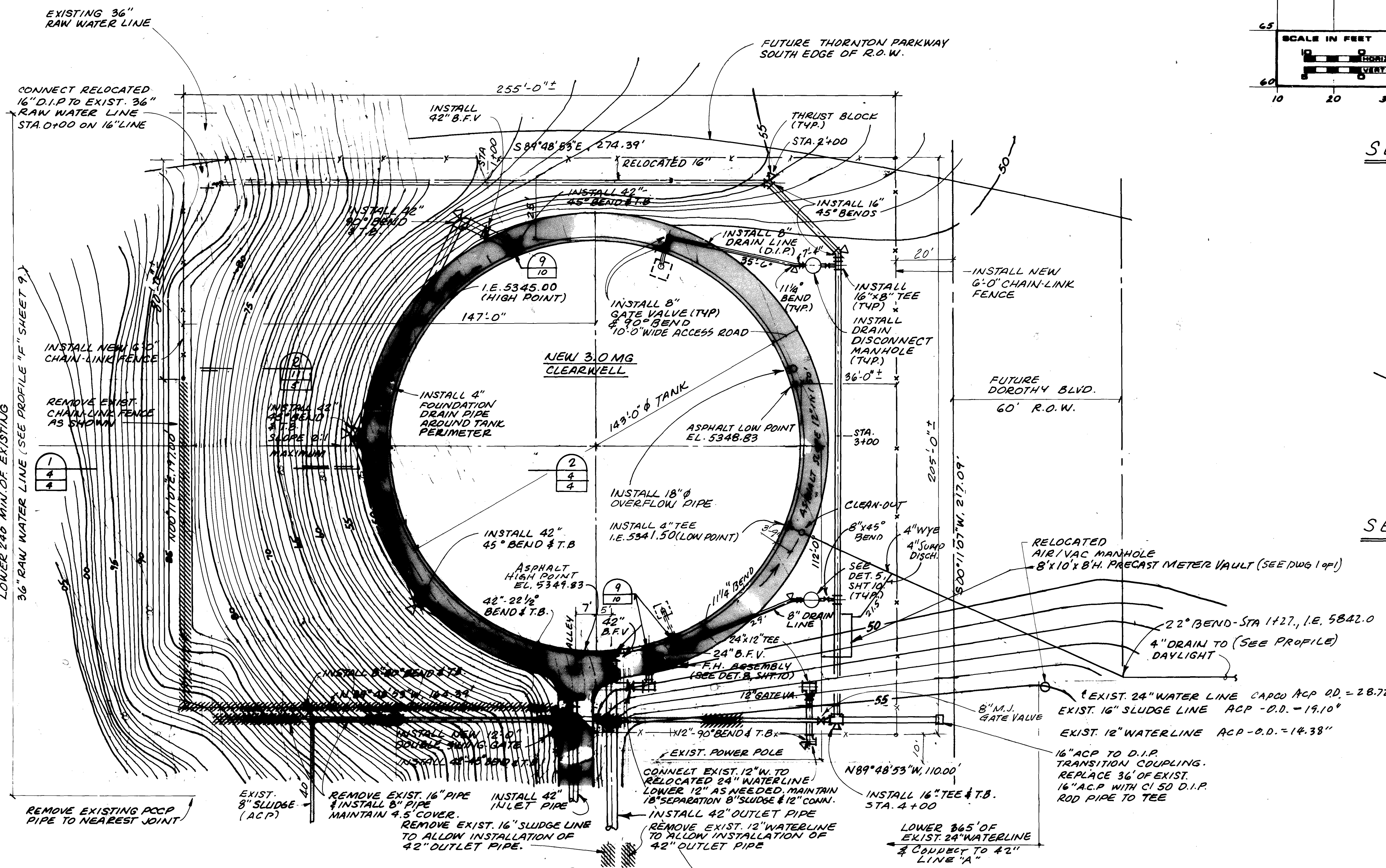
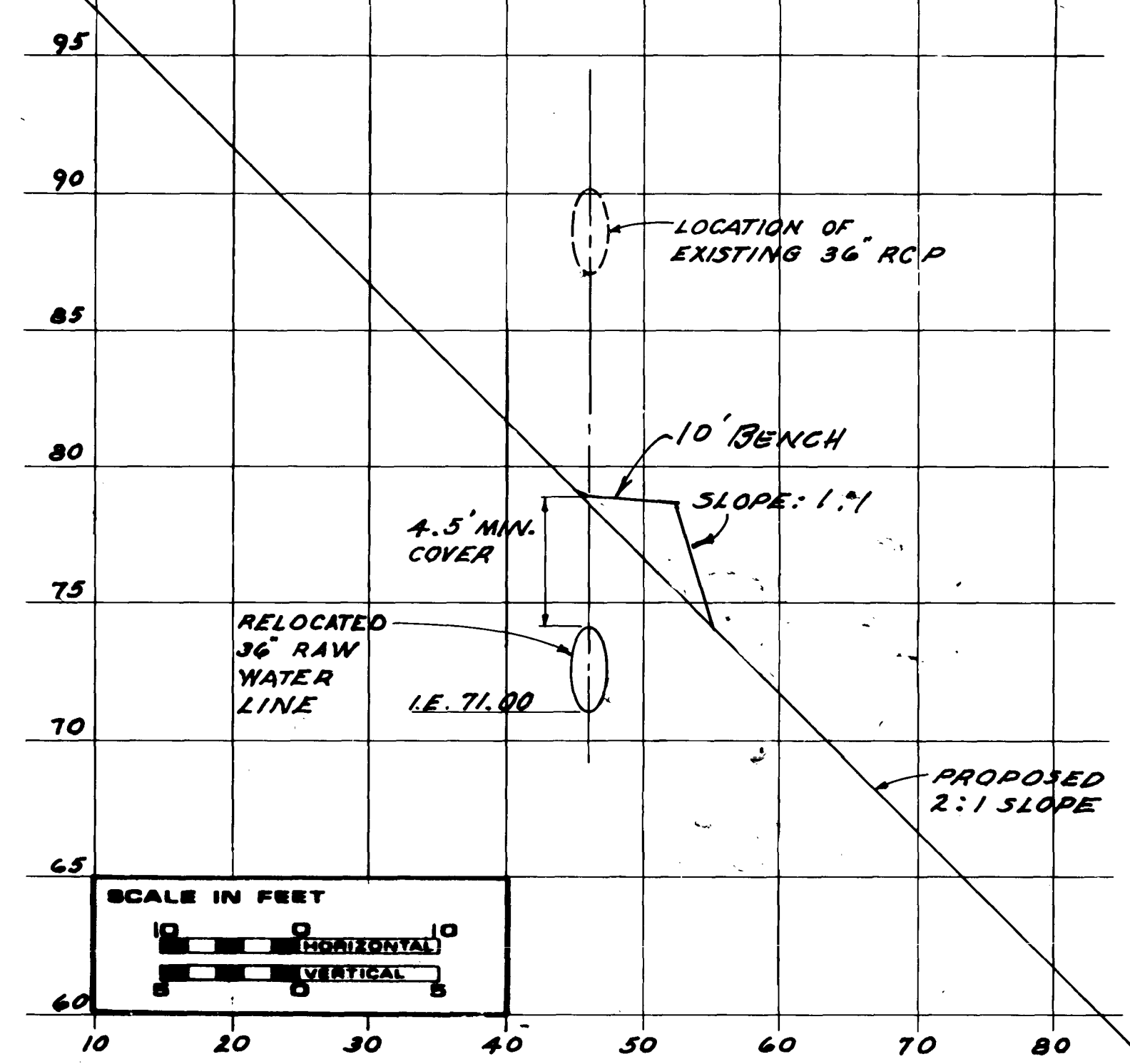
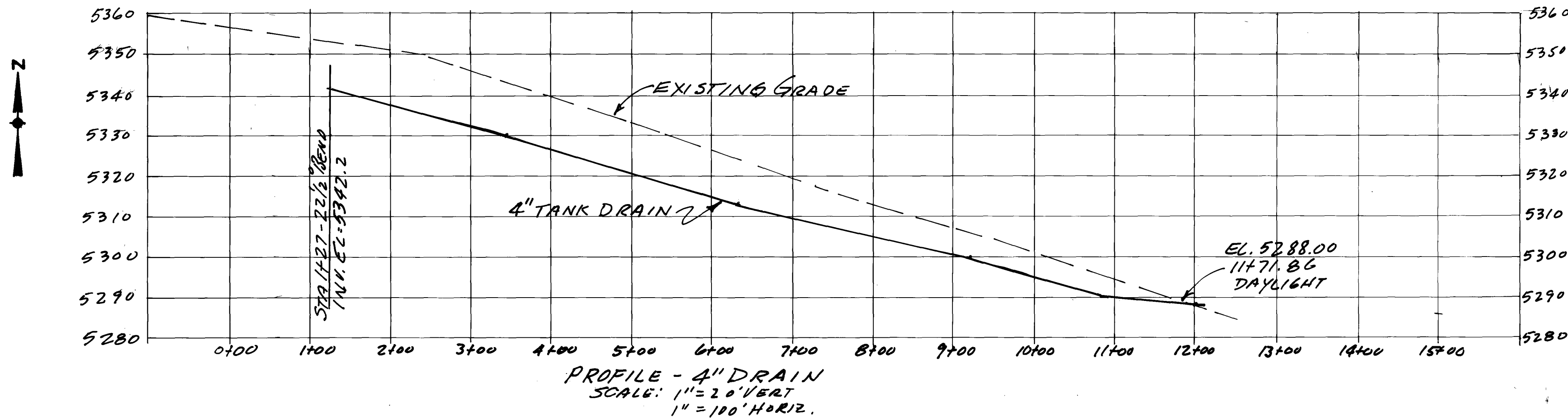
1. CONTRACTOR SHALL FIELD VERIFY BY EXCAVATION ALL UTILITIES AND EXISTING PIPING AT LOCATIONS WHERE NEW PIPE CROSSES THE EXISTING UTILITY OR EXISTING PIPING. THE FIELD VERIFIED LOCATIONS AND ELEVATIONS SHALL BE REPORTED TO THE CITY AND THE ENGINEER.
2. ALL DUCTILE IRON PIPE JOINTS SHALL BE ELECTRICALLY CONNECTED USING #2 HMWPE TYPE VH CADWELD CONNECTION OR PROVIDE DIP CAPABLE OF ACCEPTING BOLTED LUG CONNECTIONS. ALL CONNECTIONS OF DISSIMILAR MATERIALS SHALL BE INSTALLED WITH INSULATION GASKETS.
3. CONTRACTOR SHALL CONFINE ALL CONSTRUCTION ACTIVITIES TO THE AREAS DELINEATED ON THE DRAWINGS. CONTRACTOR SHALL COORDINATE ACCESS AT WTP SITE WITH OTHER CONTRACTOR.
4. ABANDON EXISTING 16" and 12" PIPING IN ALLEYWAY AT WTP AS NECESSARY TO INSTALL THE NEW 42" PIPE. ABANDONED PIPE NOT REMOVED FROM GROUND SHALL BE PLUGGED WITH CONCRETE. THE 12" LINE SHALL BE RECONNECTED TO THE RELOCATED 24" LINE AS SHOWN ON PLANS.
5. BURIED DUCTILE IRON PIPE SHALL BE RESTRAINED AS SHOWN ON DRAWING USING RESTRAINED JOINT PIPE. BURIED STEEL PIPE SHALL HAVE HARNESS COUPLINGS EVERY 40 FEET MAXIMUM.
6. DUCTILE IRON PIPE SHALL BE CLASS 51 IN AREAS UNDER PAVEMENT AND CLASS 52 IN AREAS OF OPEN FIELD AS SHOWN ON THE PLANS. ALL DUCTILE IRON PIPE SHALL BE WRAPPED WITH 8 MIL POLYETHYLENE ENCASEMENT AS PER AWWA C105.
7. CONTRACTOR SHALL REMOVE AND REPLACE EXISTING ASPHALT TO THE EXTENT SHOWN ON THE PLANS. ASPHALT SHALL BE HOT MIX USING TYPE E AGGREGATE GRADATION. THE AGGREGATE BASE SHALL BE CLASS 6. BOTH THE HOT BITUMINOUS PAVEMENT AND THE AGGREGATE BASE COURSE SHALL CONFORM TO COLORADO DEPARTMENT OF HIGHWAY SPECIFICATIONS.
8. ALL DISTURBED AREAS SHALL BE REGRADED AND SEEDED TO REESTABLISH VEGETATIVE COVER.

(NOT INCLUDED IN THIS SET)



* Orientation Should be as Shown

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FROM INFORMATION
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DATE: 05-14-88

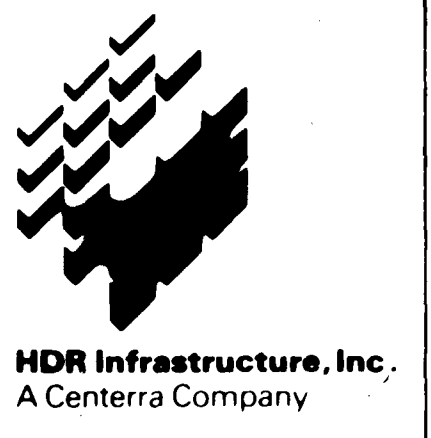


SECTION 1

SECTION 2

PLAN SCALE: 1" = 20'

"AS RECORDED" FROM INFORMATION PROVIDED BY THE CONTRACTORS DATE: OCT-14-88



Part 1:
Thornton
Water
Treatment
Plant
Clearwell &
Pumping
Improvements

Clearwell
Site Plan

Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder
Revisions	10/14/88 AS BUILT REVISIONS



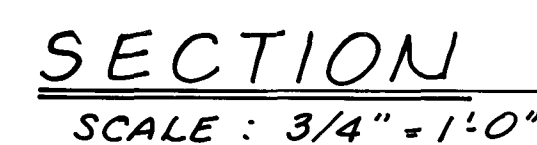
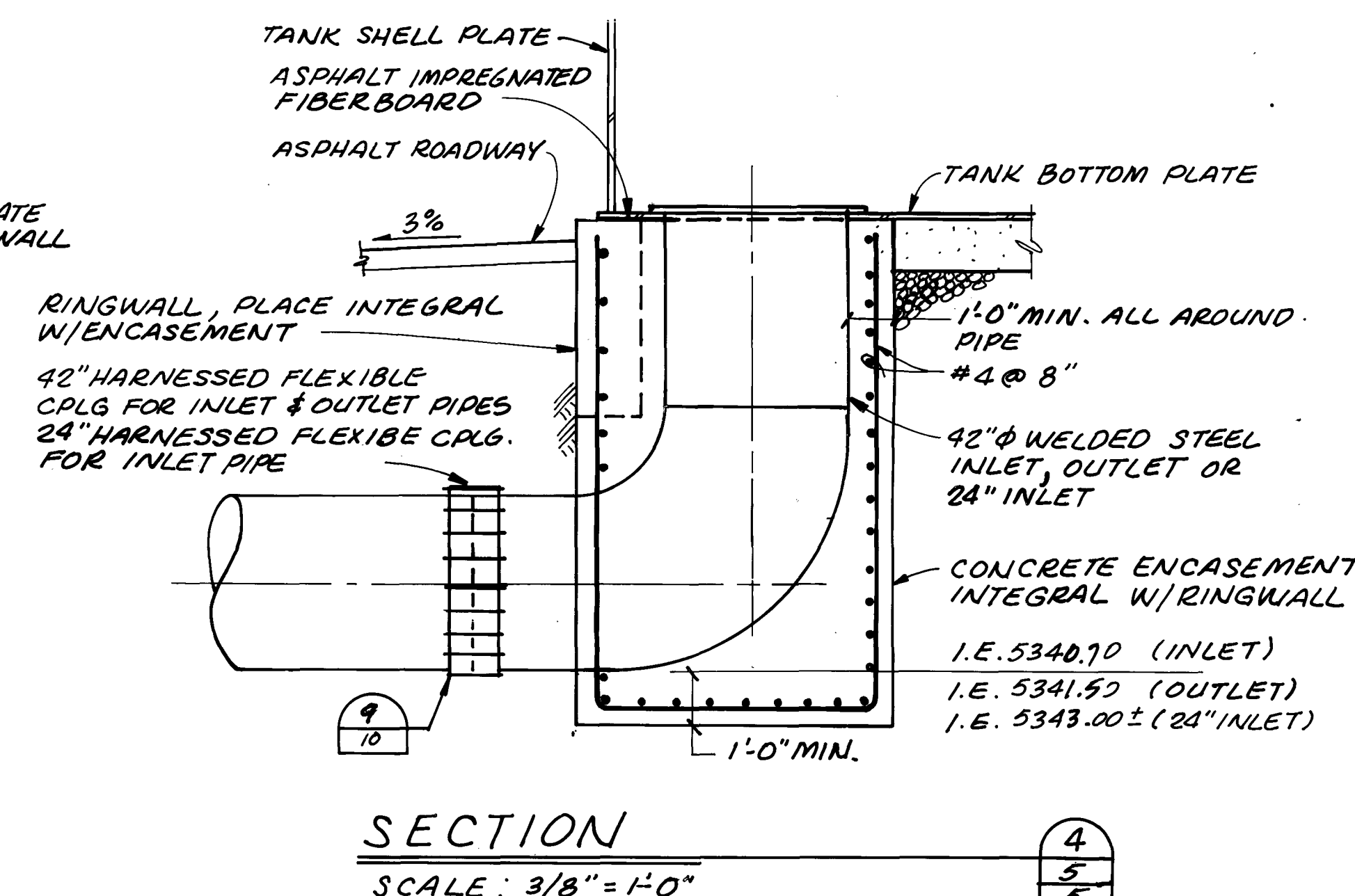
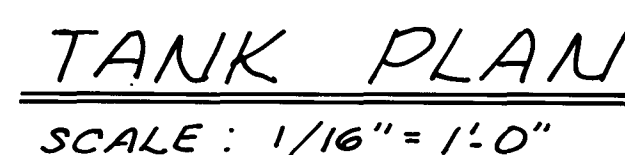
AUDIT	007	007
OVERLAY	006	006
	005	005
	004	004



3.0 MG
Clearwell

A circular professional engineer seal for KAM B. KANDUCHEN, No. 5248, State of California. The seal features the text "KAM B. KANDUCHEN", "REGISTERED", "5248", "PROFESSIONAL ENGINEER", and "STATE OF CALIFORNIA". There are two stars on either side of the number. A handwritten signature is written across the seal.

5



- "AS RECORDED"**
FROM INFORMATION
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DATE: OCT-14-88

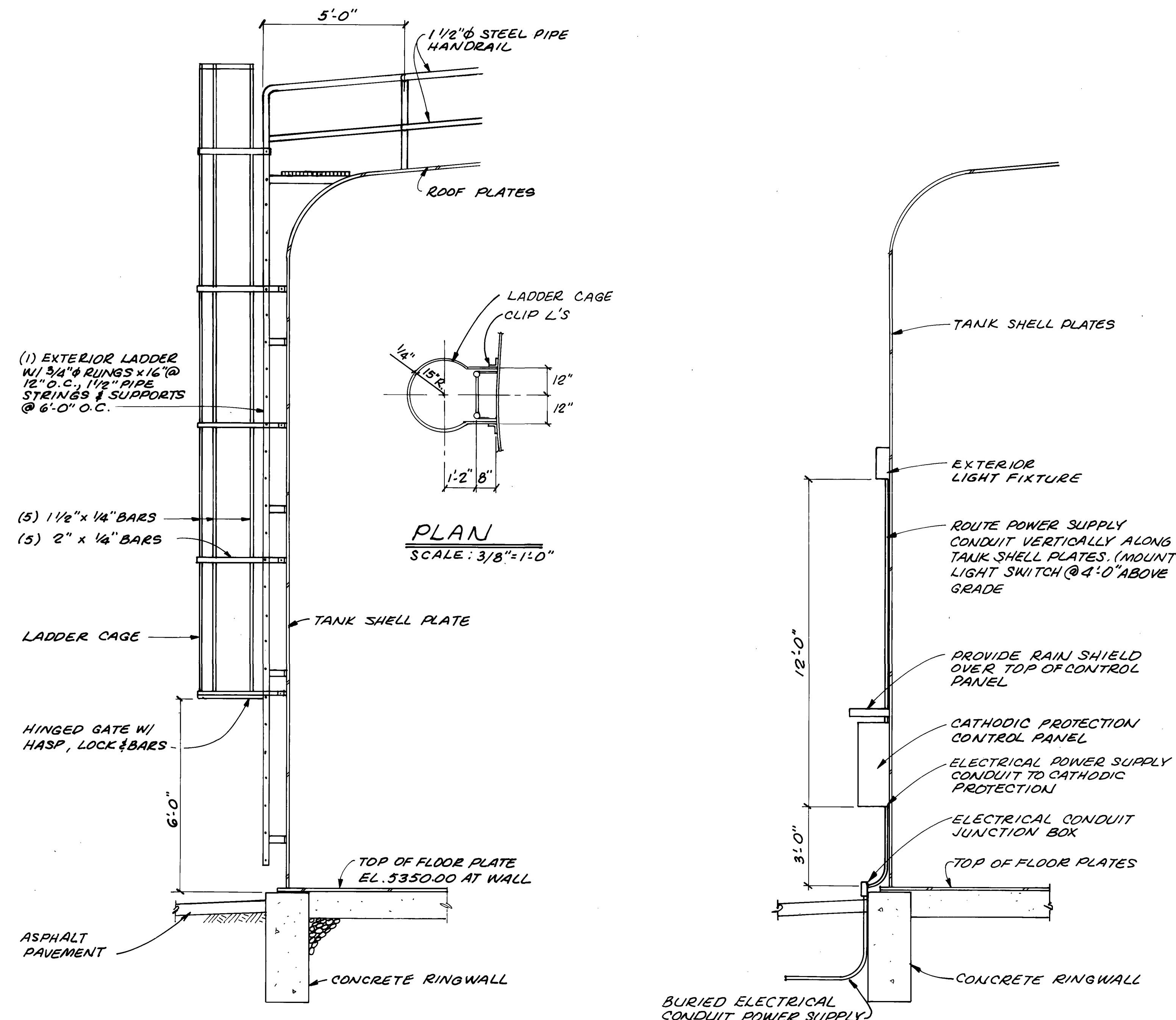
Part 1:
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Improvements

3.0 MG
Clearwell

Project Number	148-42-50
Date	November, 1986
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Drawn By	R. Bredsnajder
Revisions	10/14/88 As Built REVISIONS

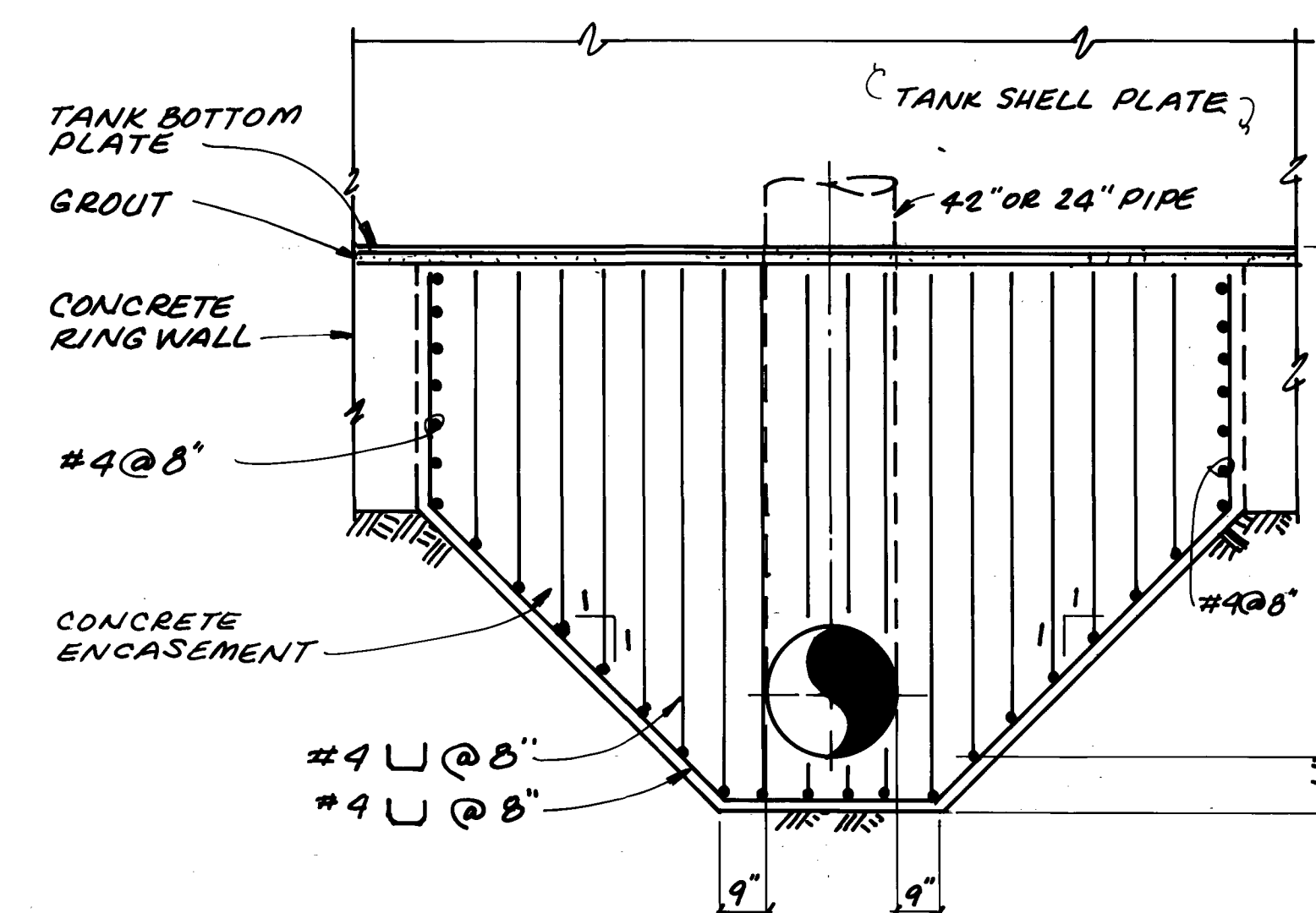
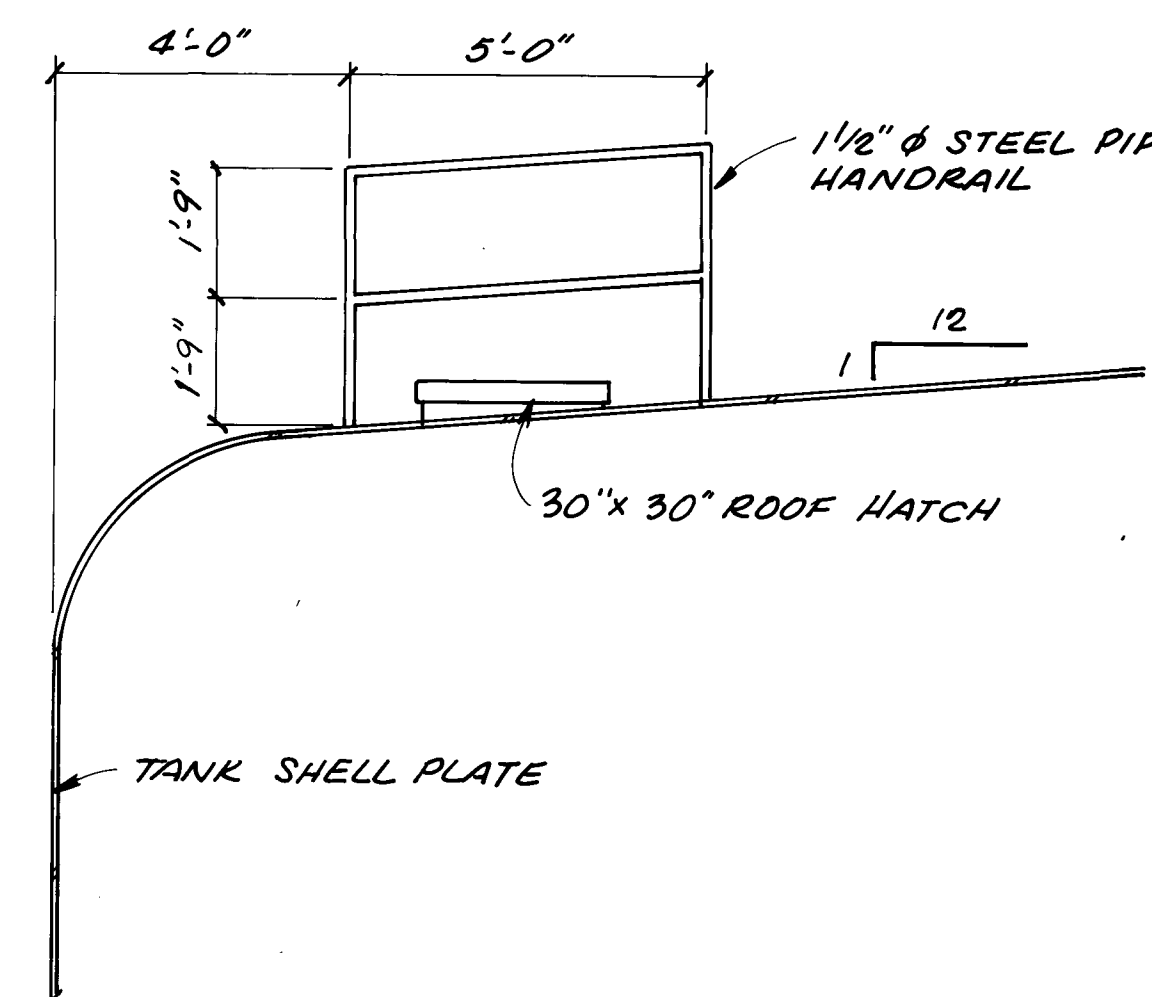
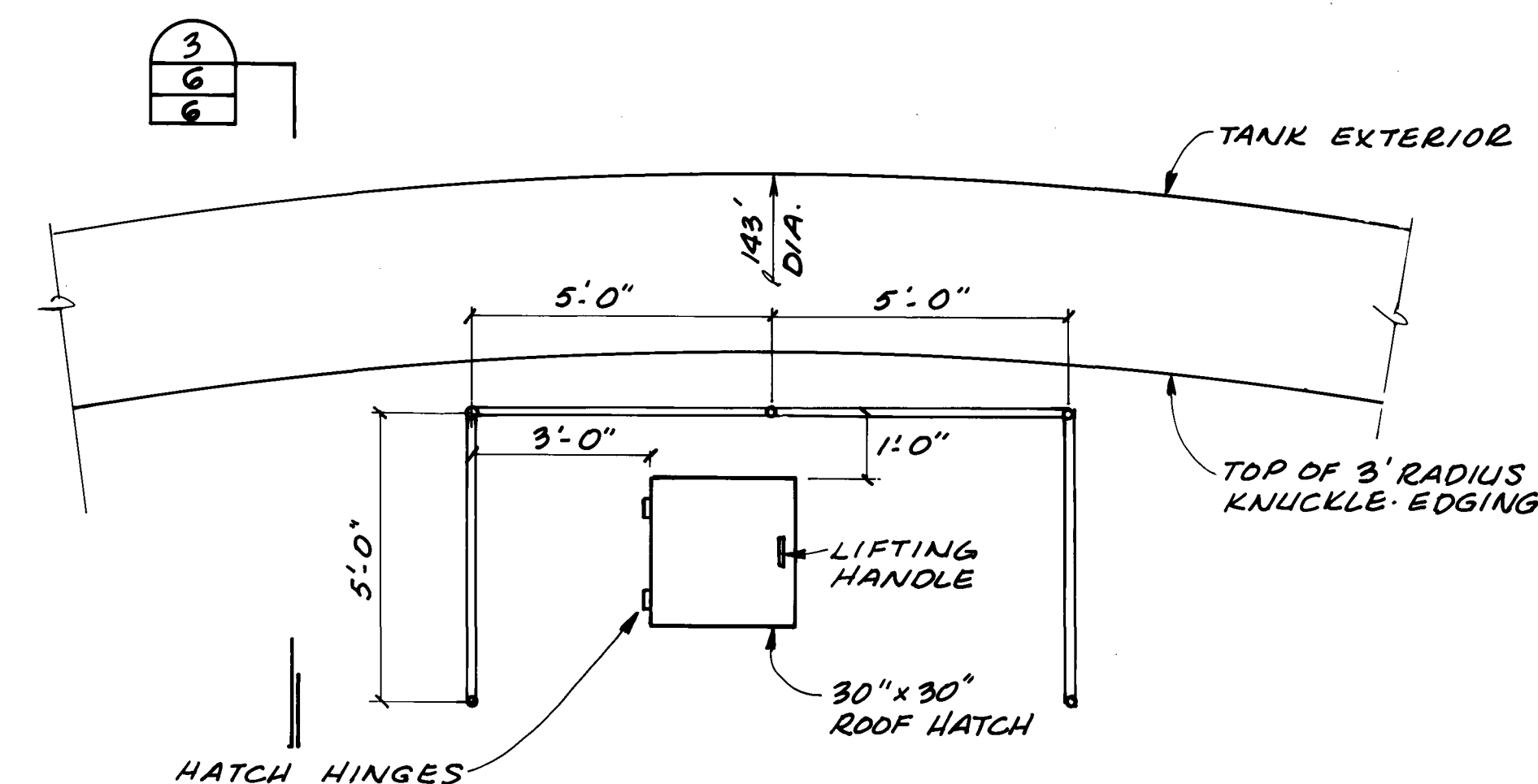
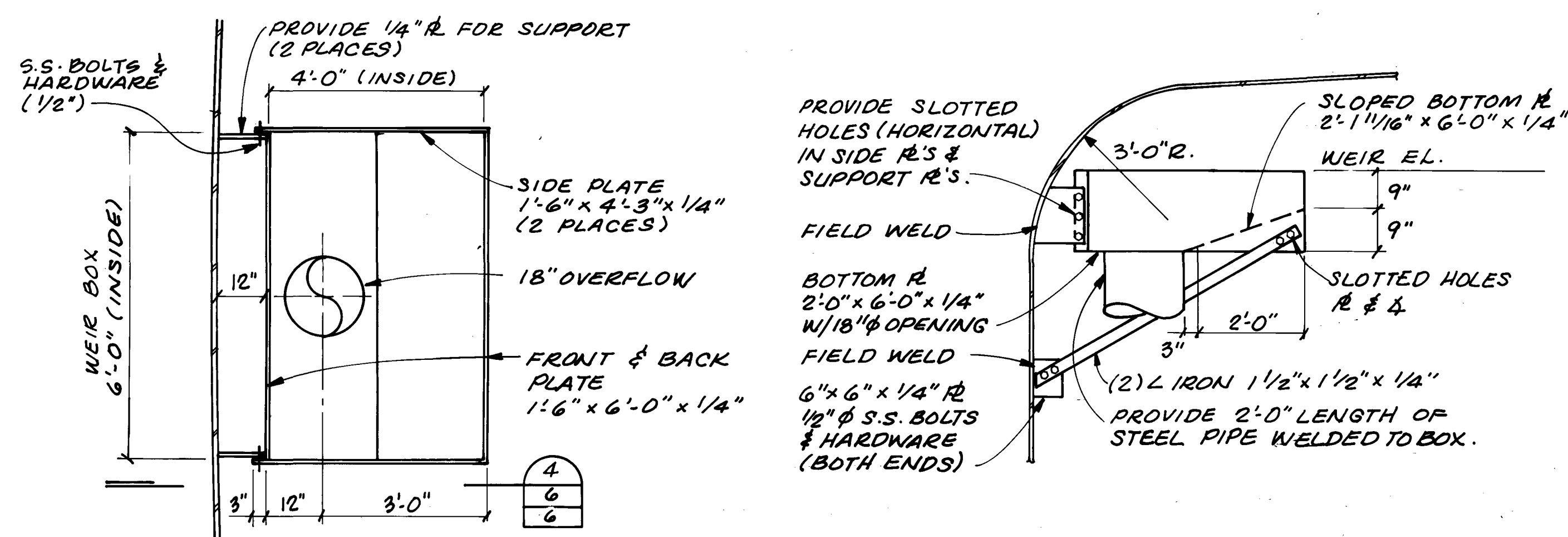


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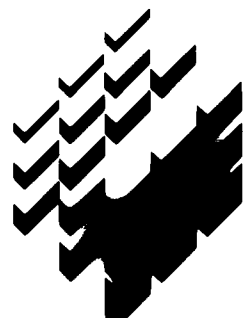


SECTION
SCALE: 3/8" = 1'-0"

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



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FROM INFORMATION
PROVIDED BY THE
CONTRACTORS
DATE: OCT-14-88



HDR Infrastructure, Inc.
A Centerra Company

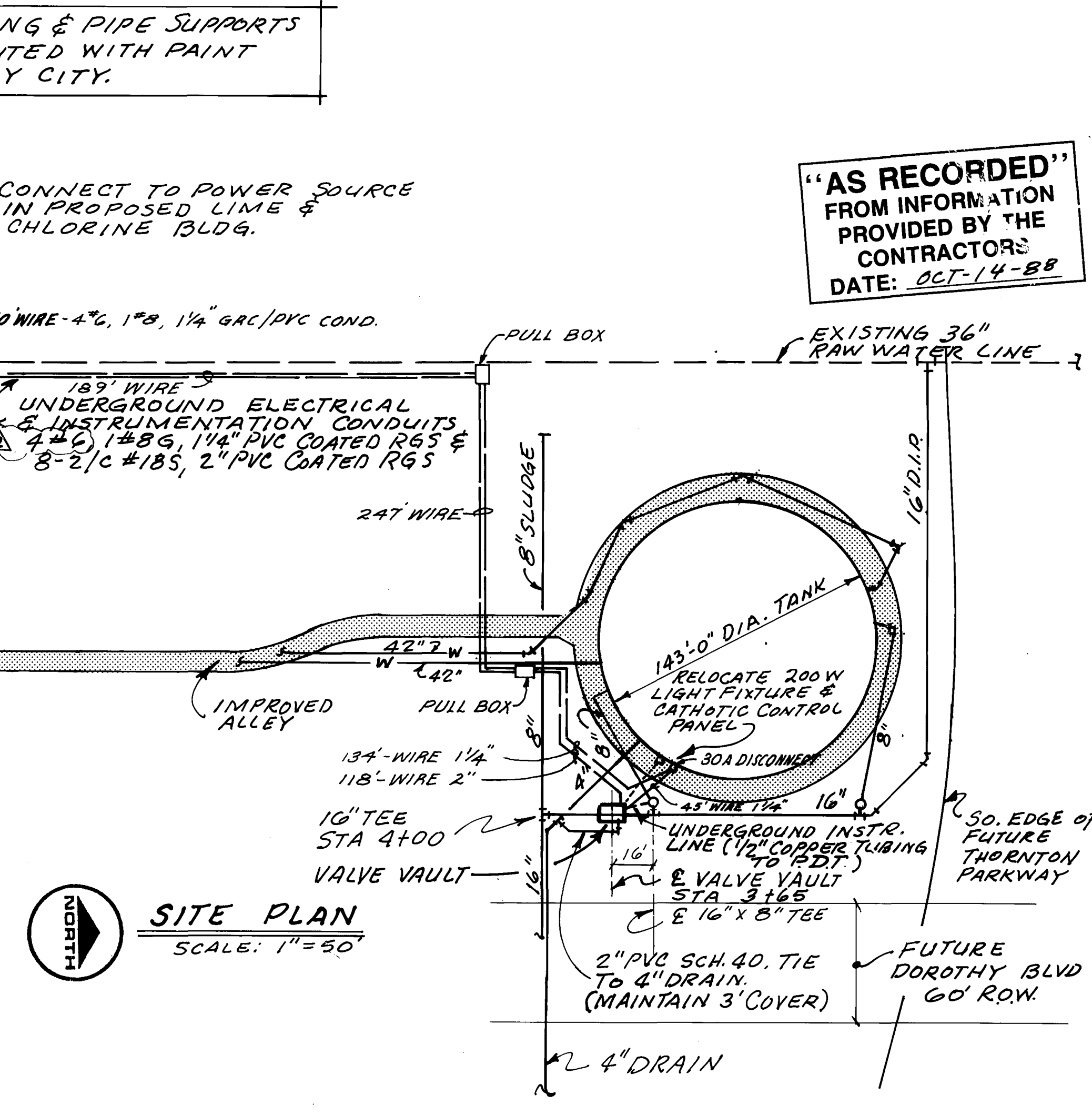
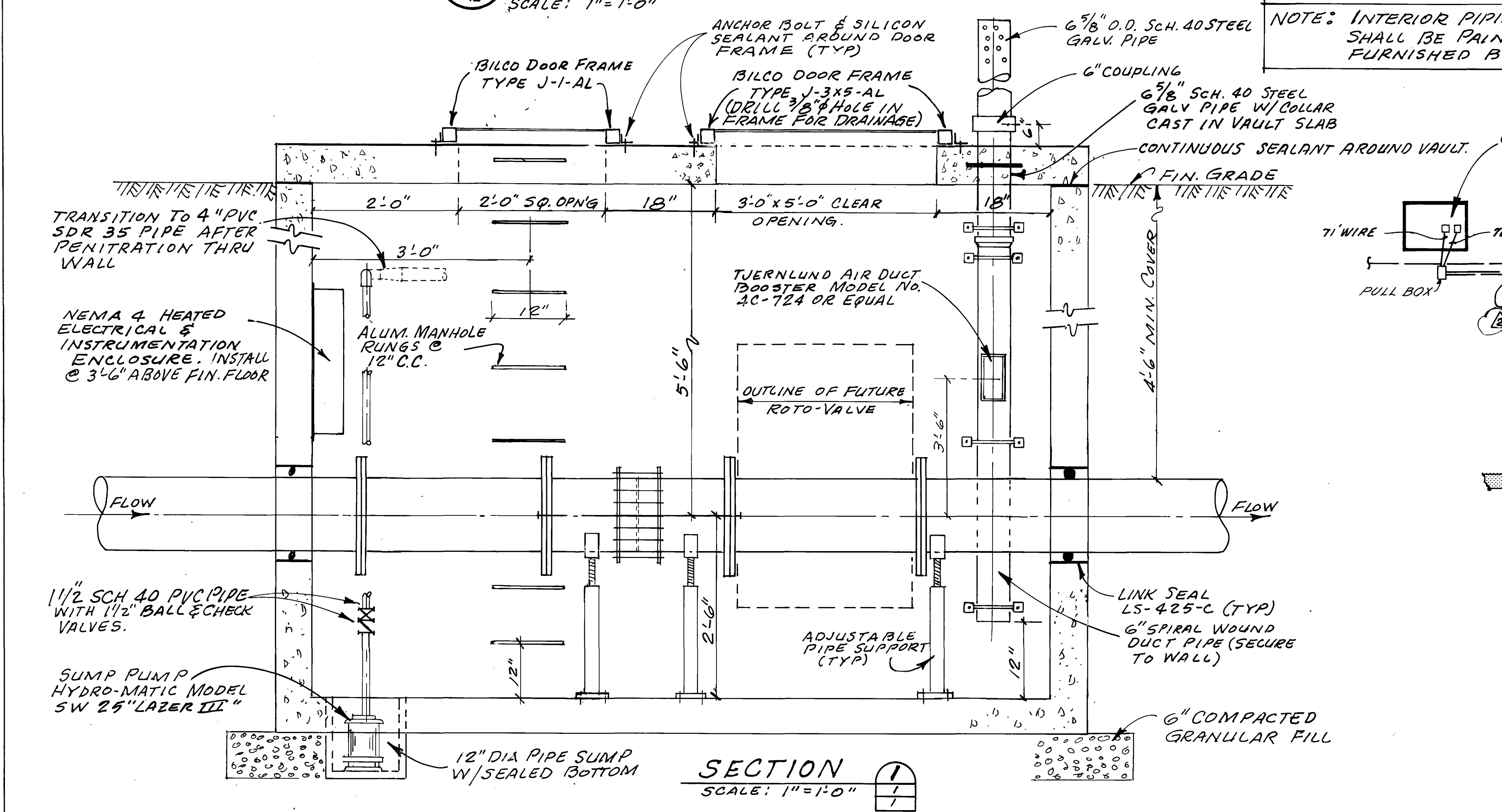
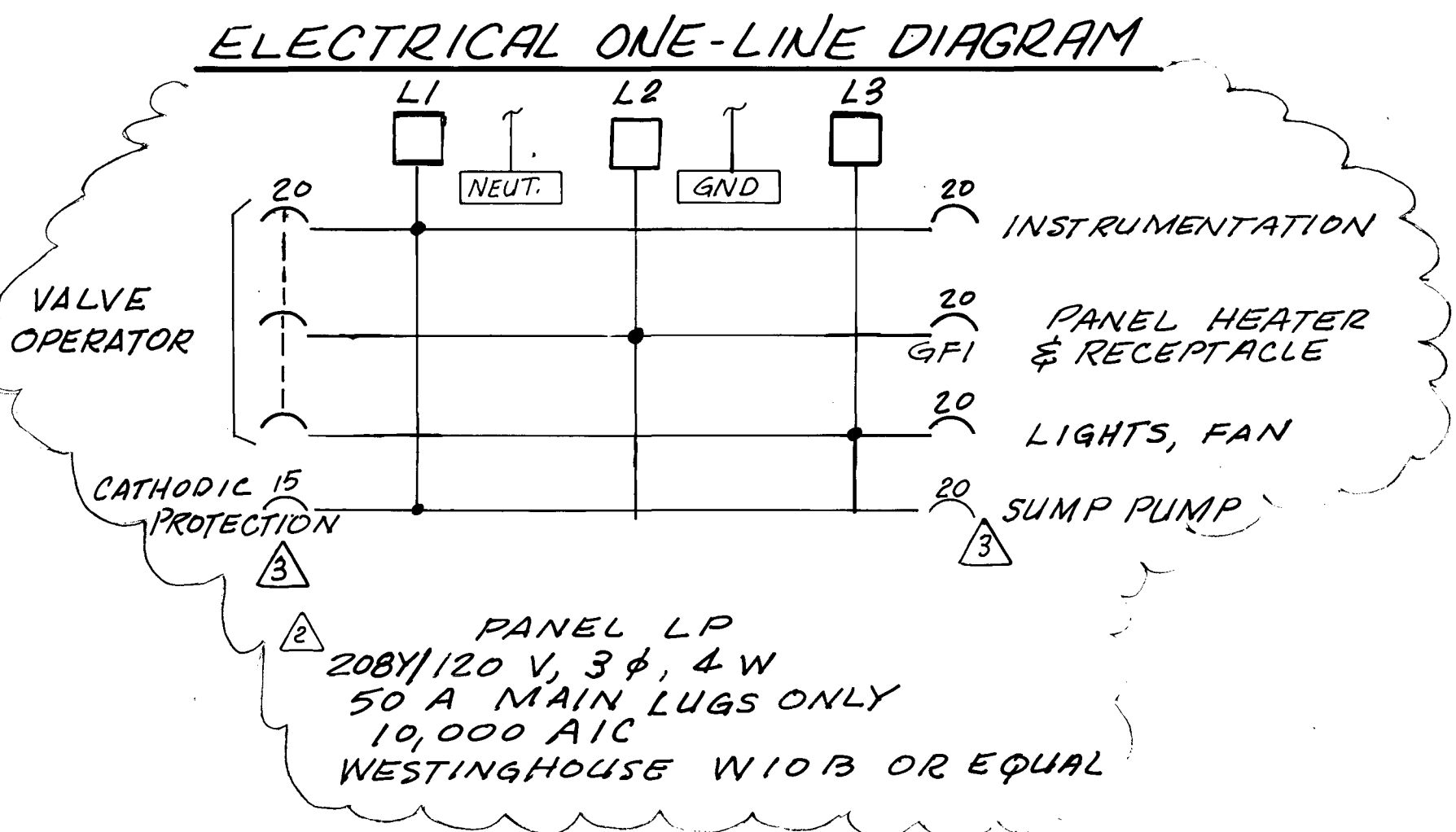
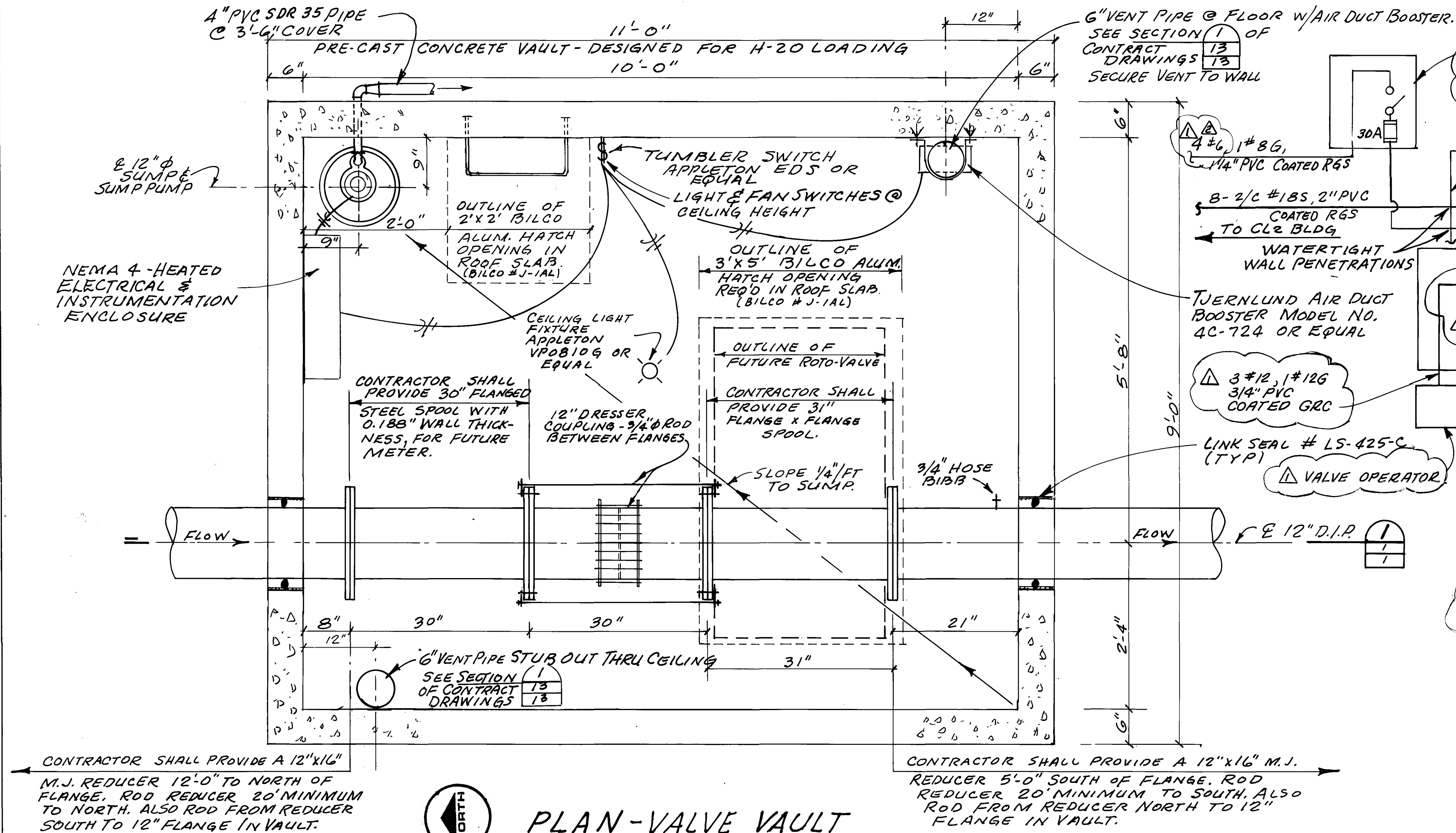
Part 1:
Thornton
Water
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Clearwell &
Pumping
Improvements

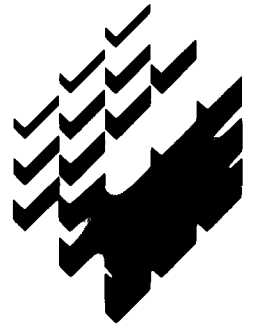
RAW WATER
LINE
VALVE VAULT

Project Number	148-42-50
Date	April, 1987
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	R. SASAKURA
Drawn By	A. Tacito

Revisions
4-21-87-REVISED
PER CITY COMMENTS.
7-30-87 REVISED
PER CITY REQUEST
8-10-87 REVISED
PER CITY REQUEST.
8-31-87 ADDED SUMP
PUMP & CATHODIC PROT.
TO ONE-LINE DIAGRAM.
10/14/88 AS BUILT
REVISIONS.

Sheet Number
6A





HDR Infrastructure, Inc.
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Part 1:
Thornton
Water
Treatment
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Clearwell &
Pumping
Improvements

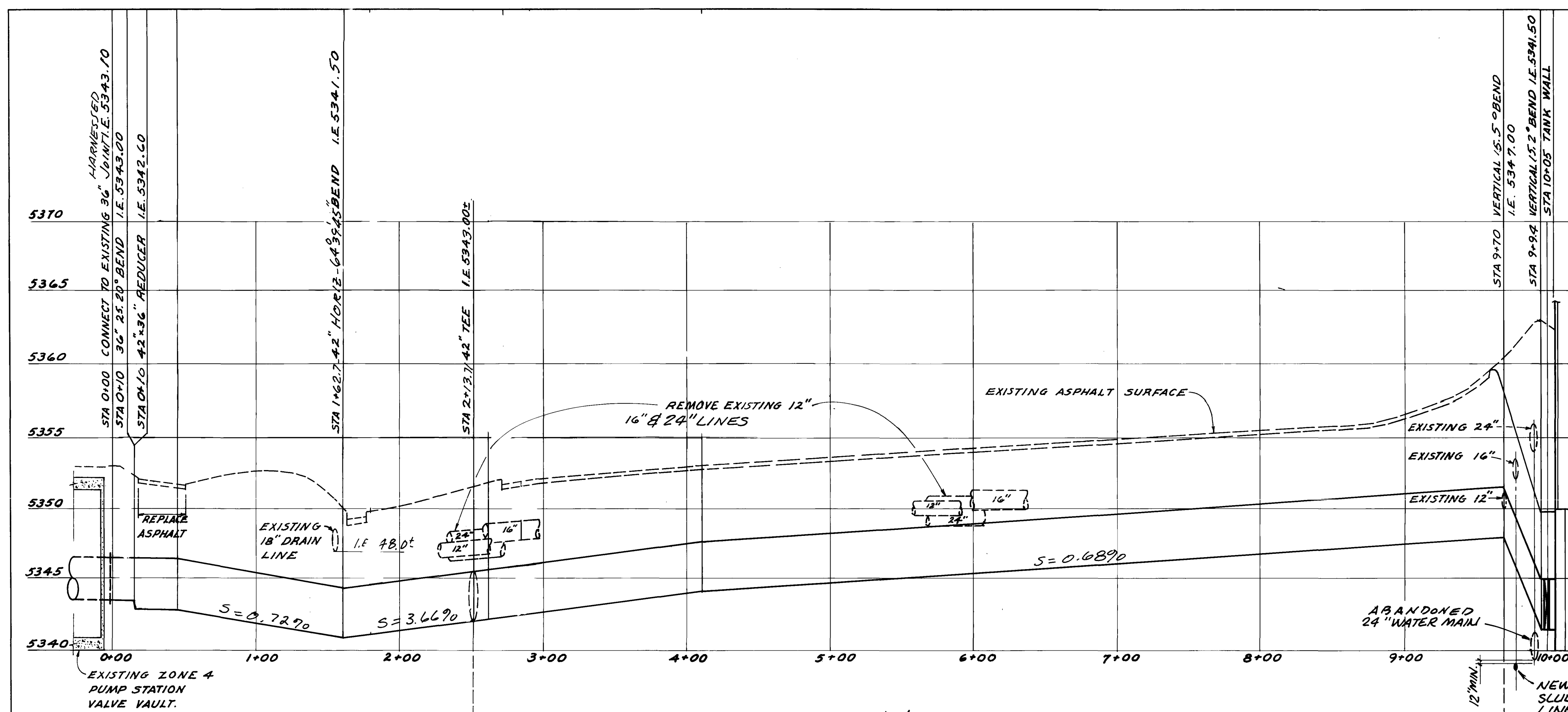
Yard
Piping

Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder
Revisions	10/14/88 As Built REVISIONS



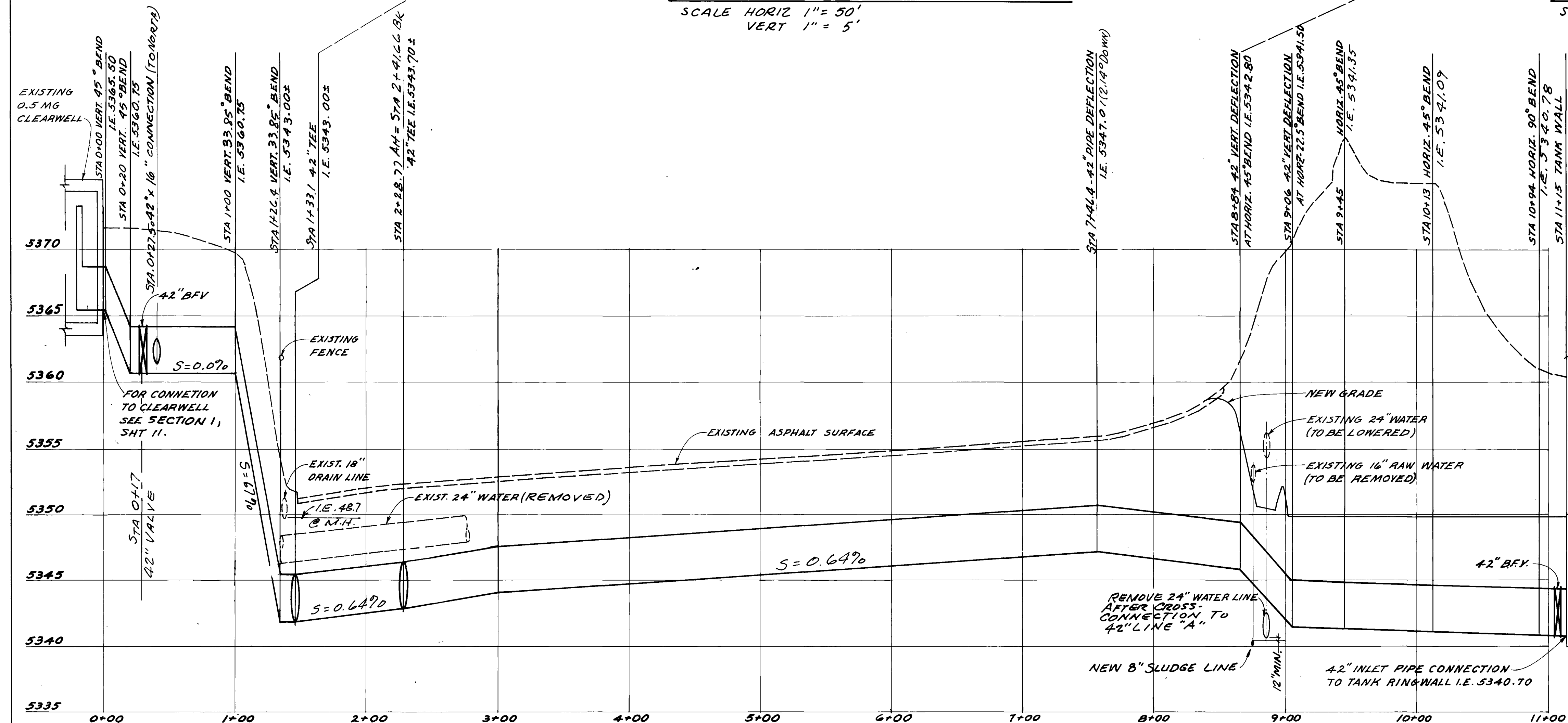
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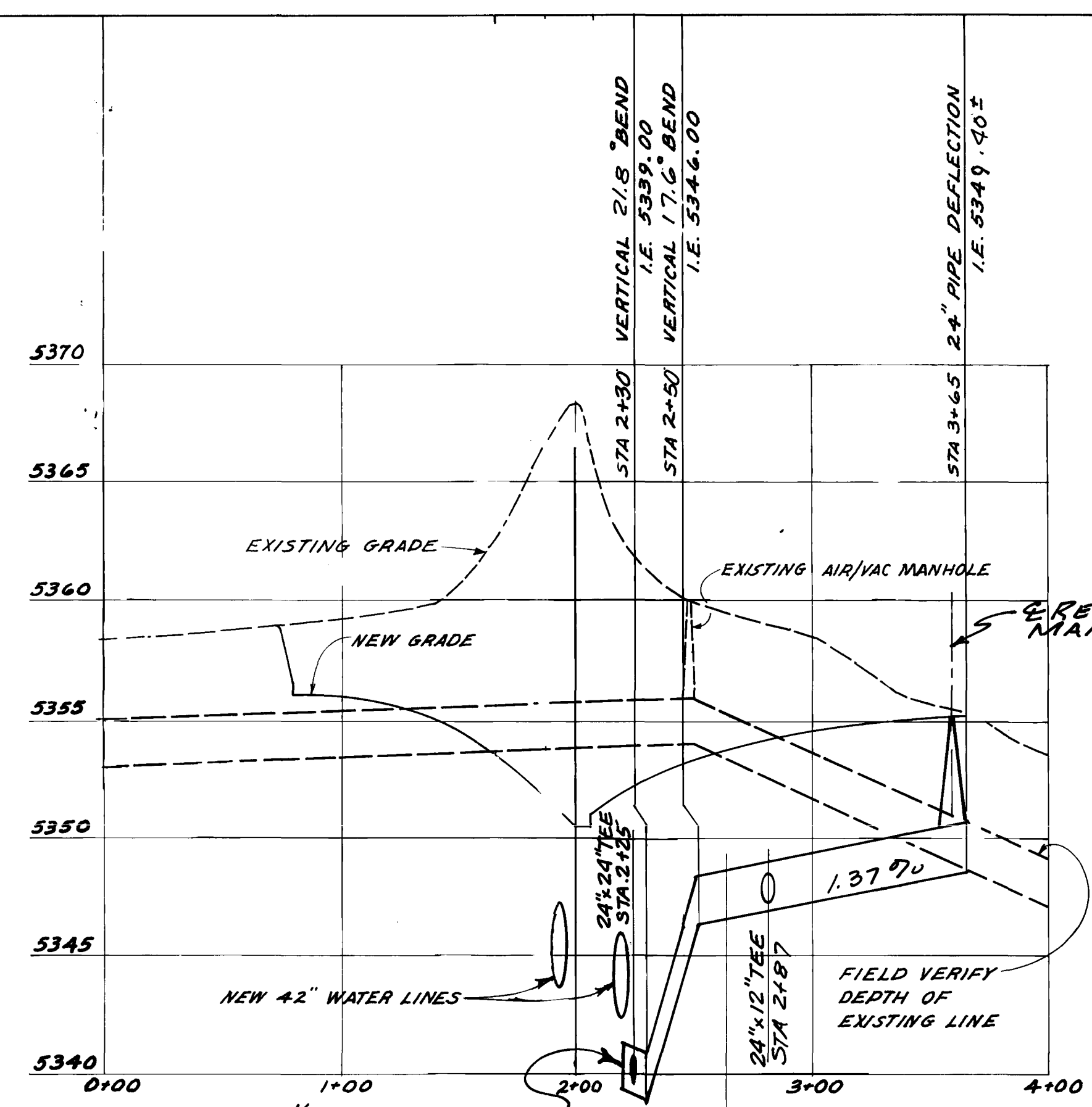
PROFILE 'A' - 42" OUTLET PIPE

SCALE: HORIZ. 1" = 50'
VERT. 1" = 5'



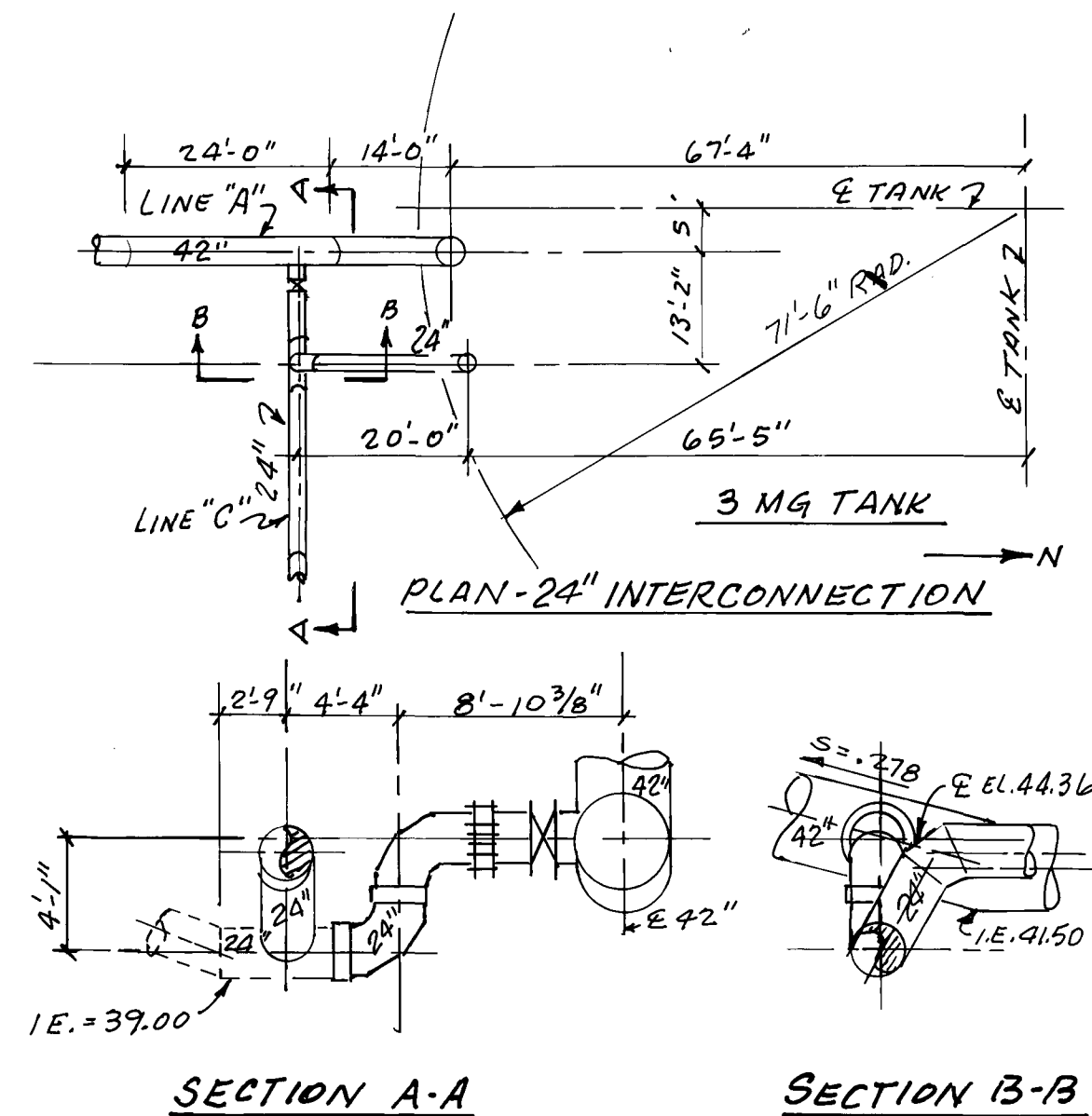
PROFILE 'B' - 42" INLET PIPE

SCALE: HORIZ. 1" = 50'
VERT. 1" = 5'



PROFILE 'C' - RELOCATED 24" WATER LINE

SCALE: HORIZ. 1" = 50'
VERT. 1" = 5'



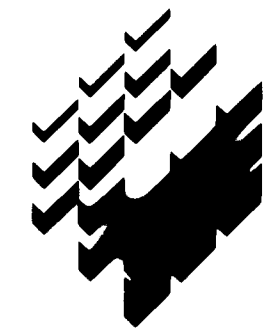
SECTION A-A

SECTION B-B

DETAIL A
NO SCALE

NOTE: THE ABOVE DETAIL "A" WAS TAKEN
FROM THOMPSON PIPE & STEEL CO.
SHOP DRAWING NO. 71, FILE NO. 3-B375,
DATED 8-31-87.

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Part 1:
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Pumping
Improvements

Yard
Piping

Project Number
148-42-50

Date
November, 1986

Project Manager
G. Fuller

Design
J. Chwirka

Architectural

Structural
C. Nyman

Mechanical
P. O'Brien

Electrical
M. Elzway

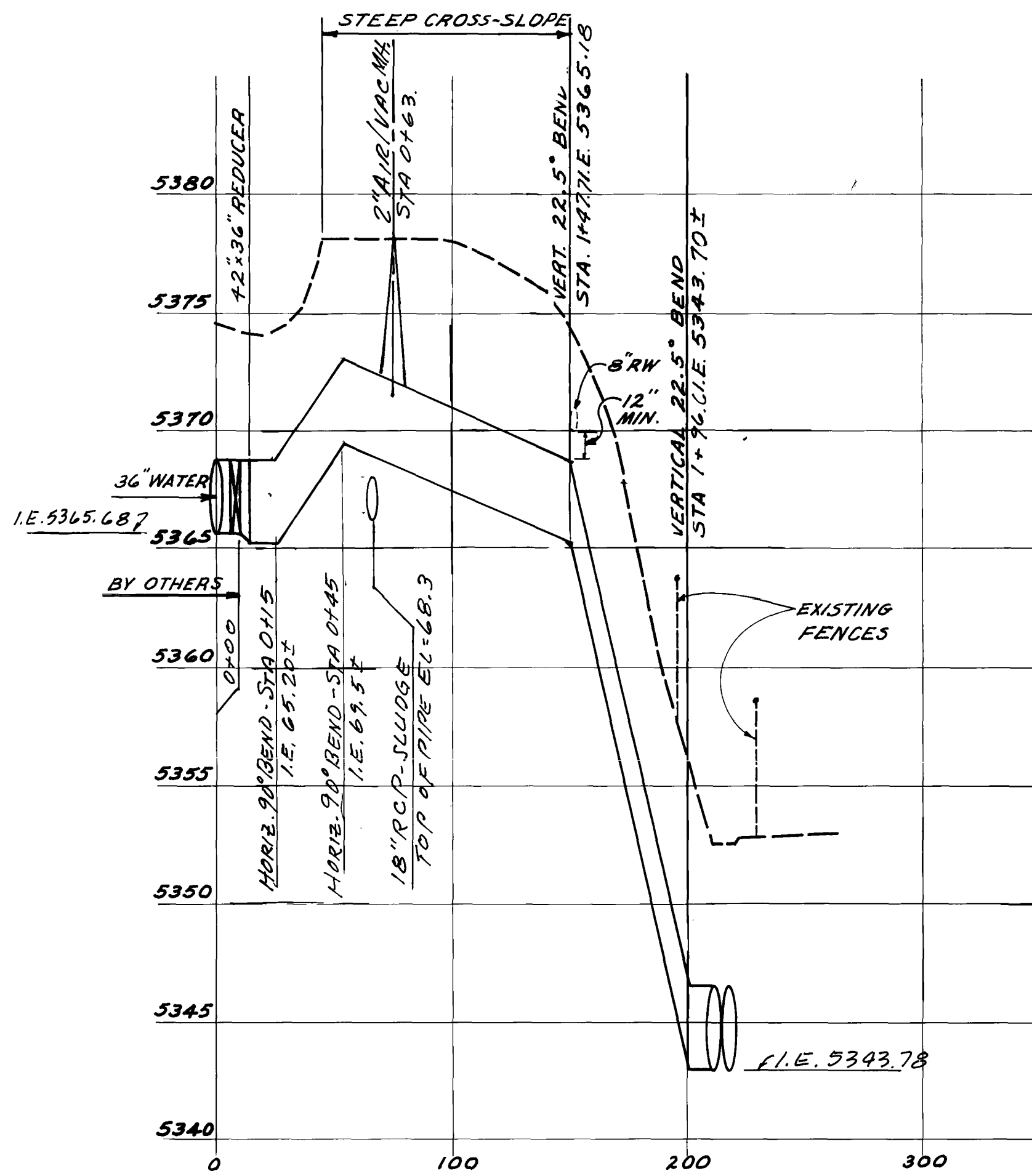
Drawn By
R. Bredsnajder

Revisions
10/14/88 As Built
REVISIONS



Sheet Number

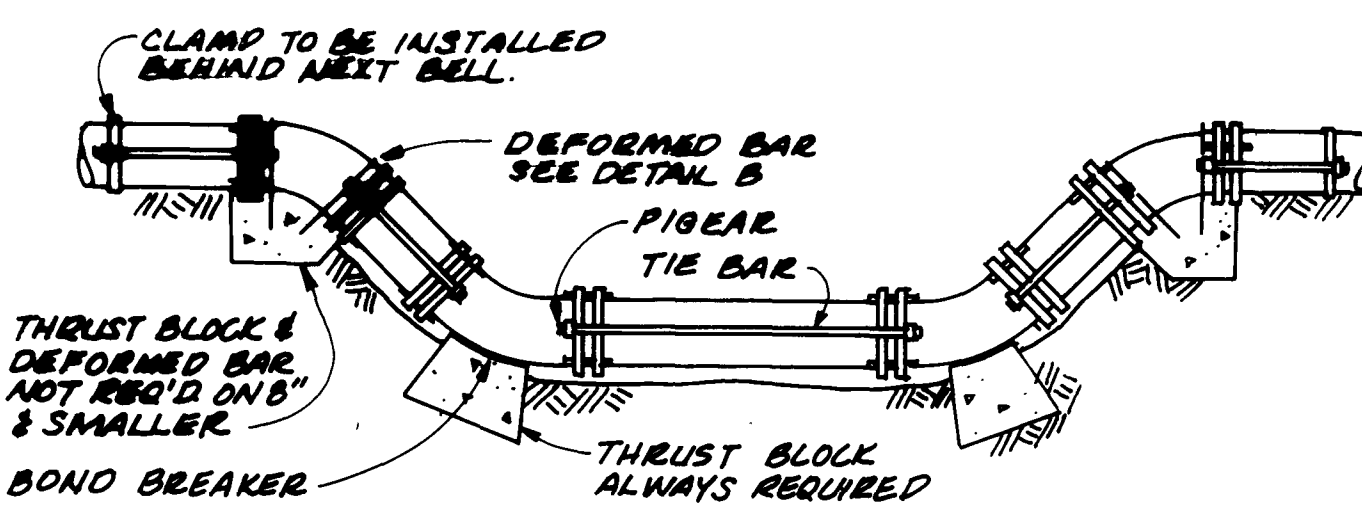
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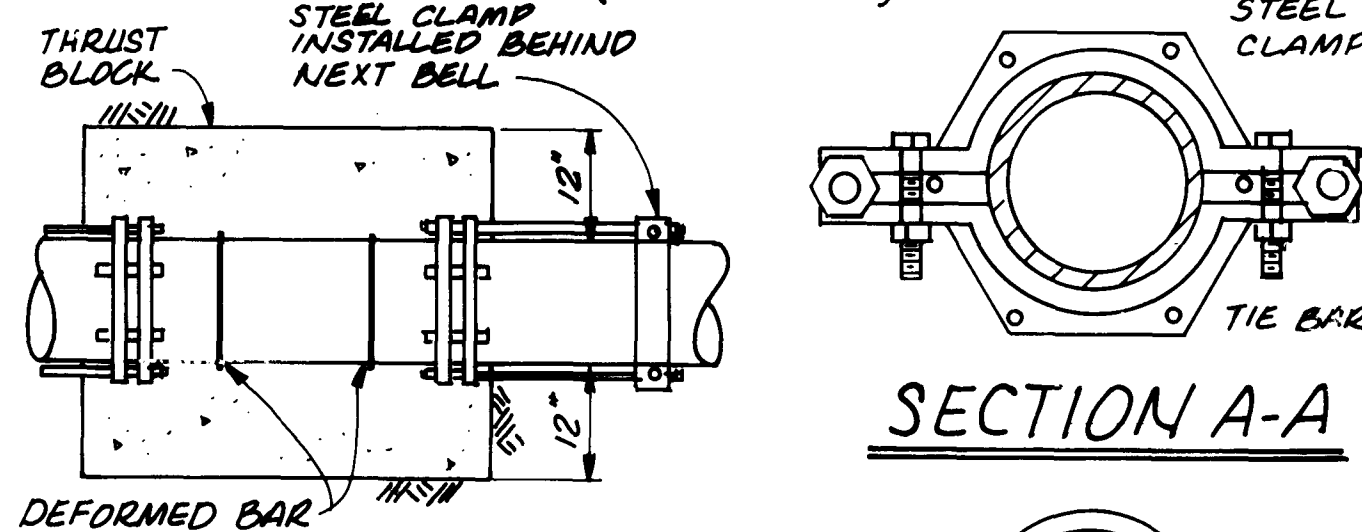
REFER TO THOMPSON PIPE CO. DWG #7-1114-5
REV-1.

PROFILE "D" - 42" PIPE

SCALE: HORIZ 1"=50'
VERT 1"=5'



WATERLINE LOWERING DETAIL
(NOT USED)



PLAN VIEW

NOTES:

1. ALL PIPE USED IN LOWERING SHALL BE DUCTILE IRON PIPE WITH 3 MIL. POLYWRAP.
2. ALL FITTINGS, PIPES & TIE BARS TO BE WRAPPED SEPARATELY IN POLYETHYLENE.
3. 45° FITTINGS SHALL BE USED.
4. FITTINGS SHALL BE RODDED TO THE NEXT BELL & NO JOINTS ARE ALLOWED BETWEEN FITTINGS.
5. PIGEARS SHALL BE USED ON RODDING FOR FITTINGS.

DETAIL

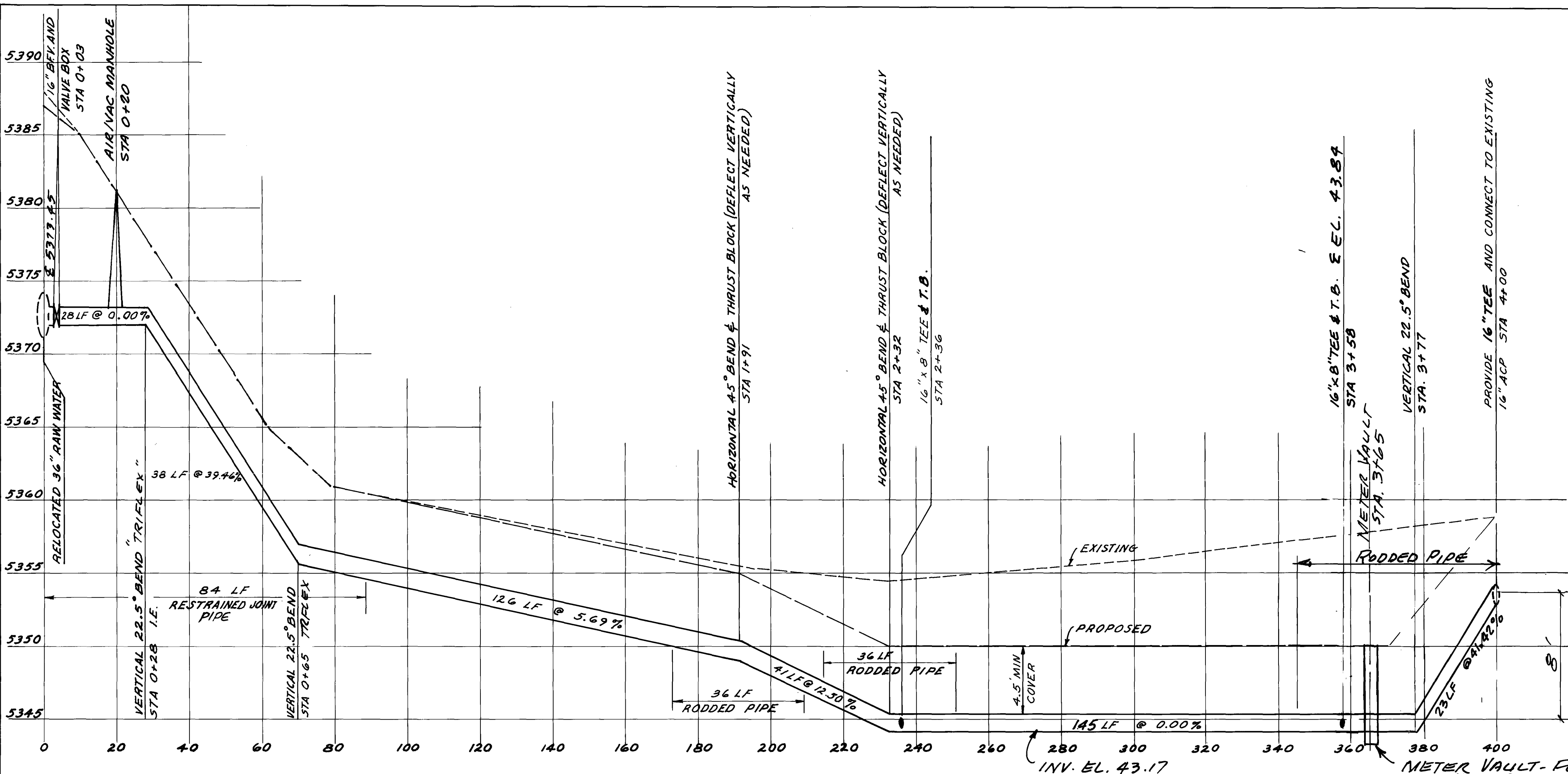
DETAIL B

LINE SIZE	DEFORMED BAR DIAM.	"X" DIAM.	TIE BAR DIAM.	AMOUNT
8"	-	-	.375	2
12"	.500	18"	.500	2
16"	.750	20"	.750	2
24"	1.000	24"	1.000	2

SECTION 2

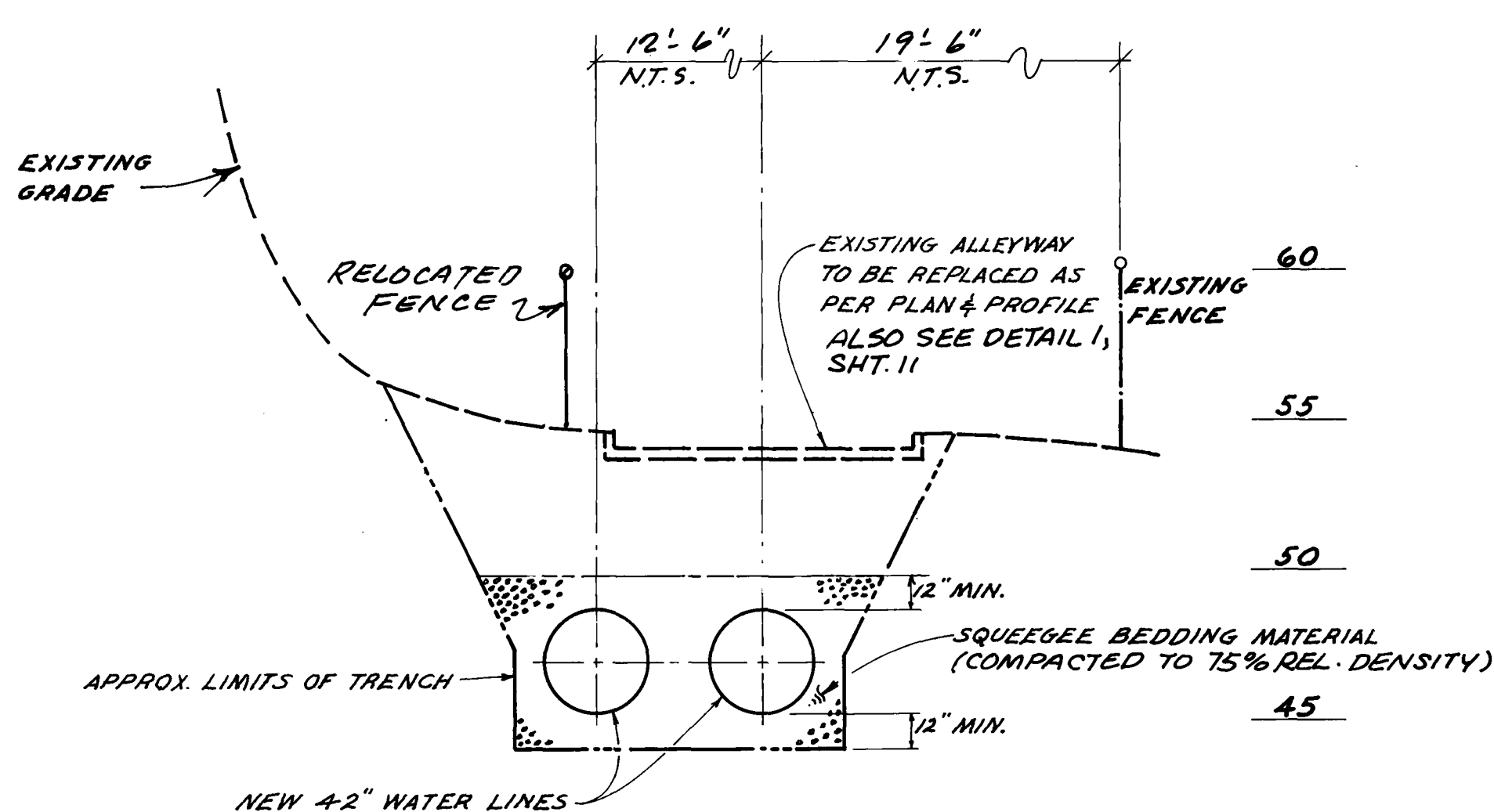
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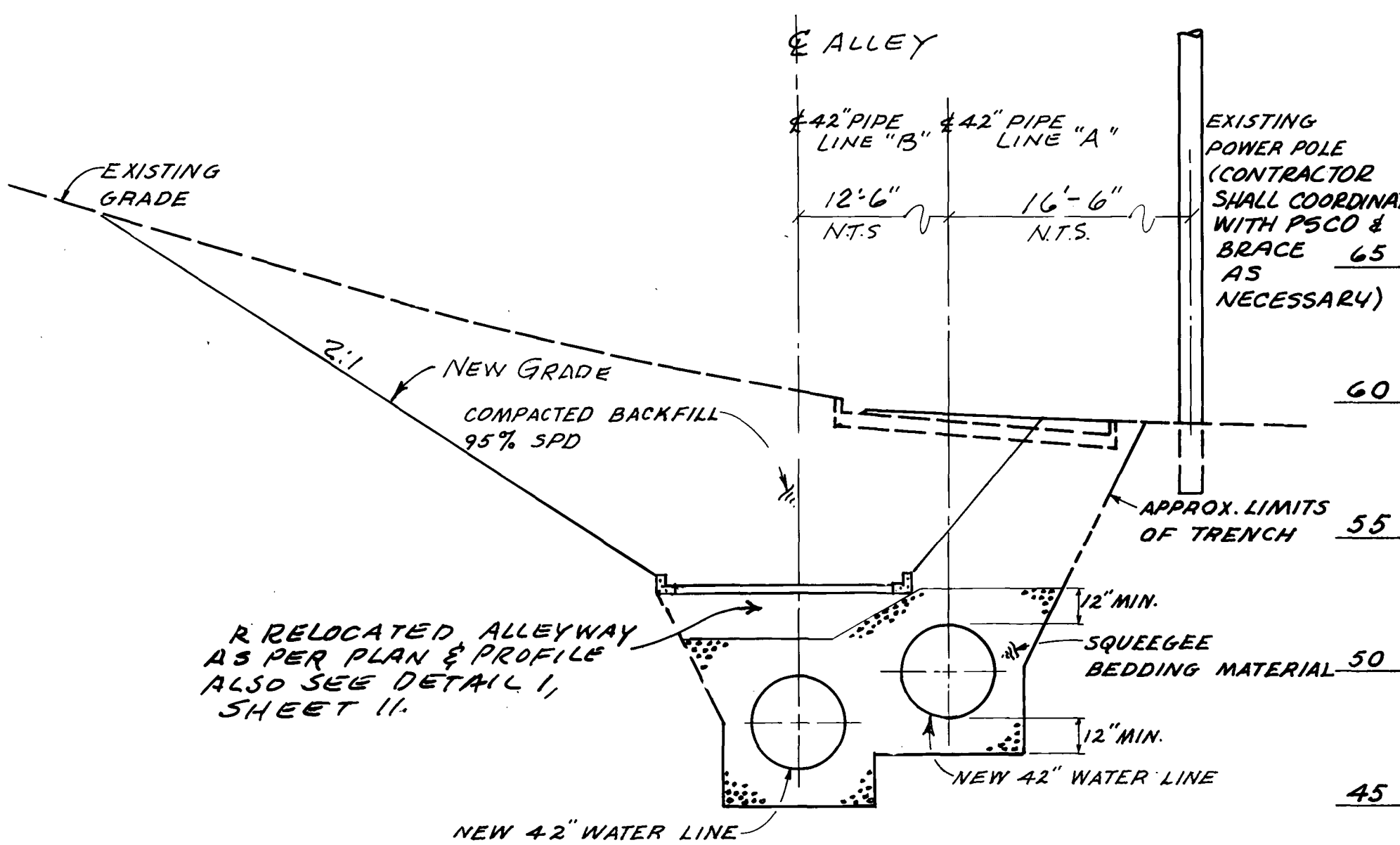
PROFILE "E" - RELOCATED 16" RAW WATER LINE

SCALE: HORIZ 1"=20'
VERT 1"=5'



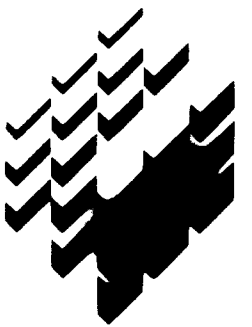
SECTION 1

SCALE: 1"=5'-0"



SECTION 2

SCALE: 1"=5'-0"

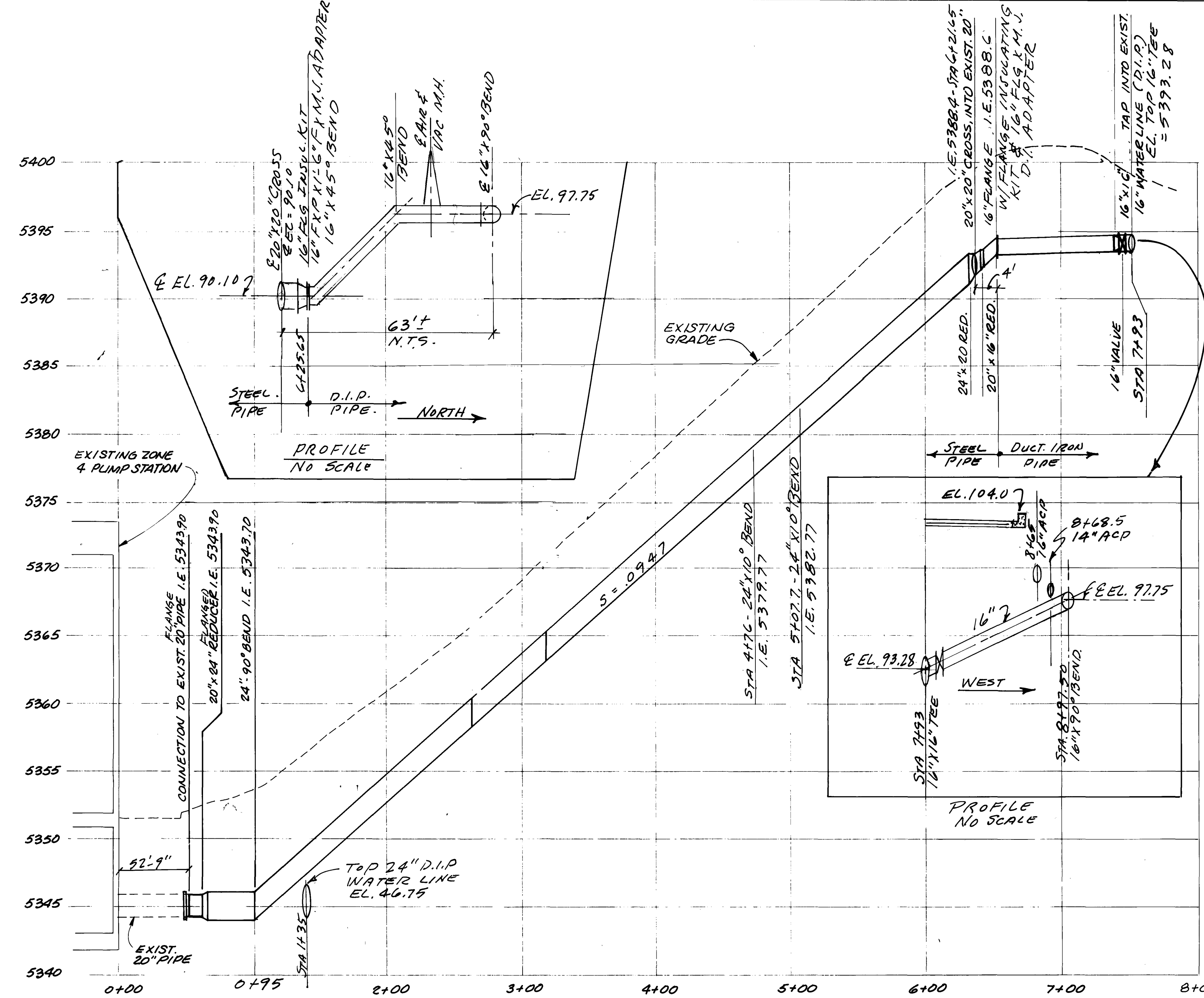


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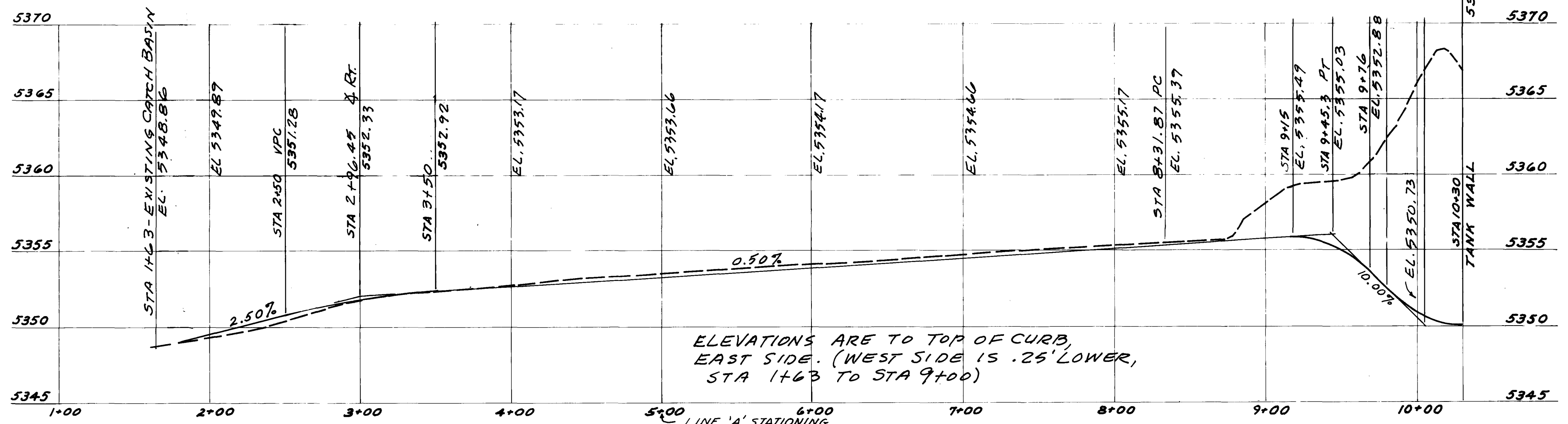
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Yard
Piping

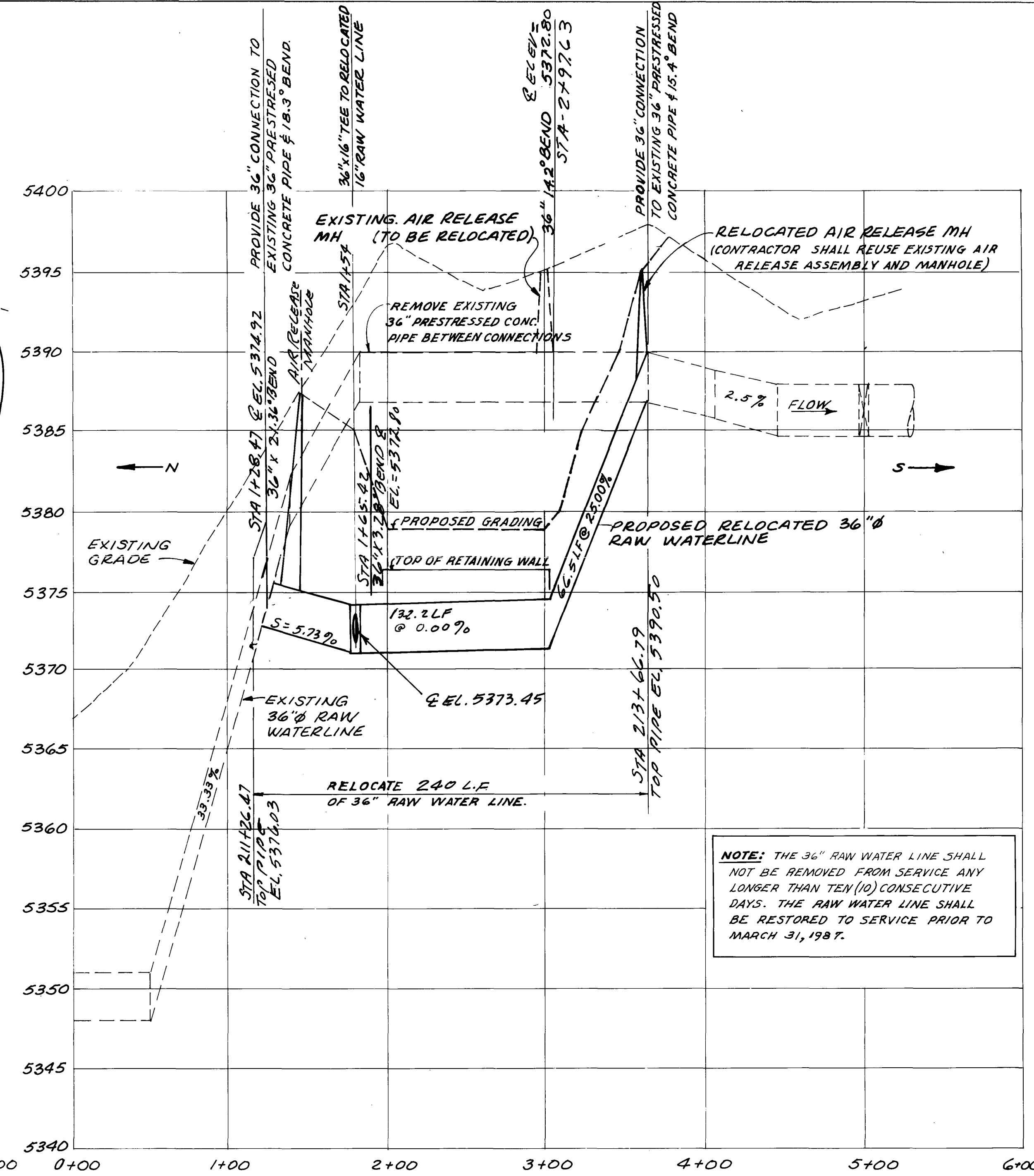
Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
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Drawn By	R. Bredsnajder
Revisions	10/14/88 As Built REVISIONS



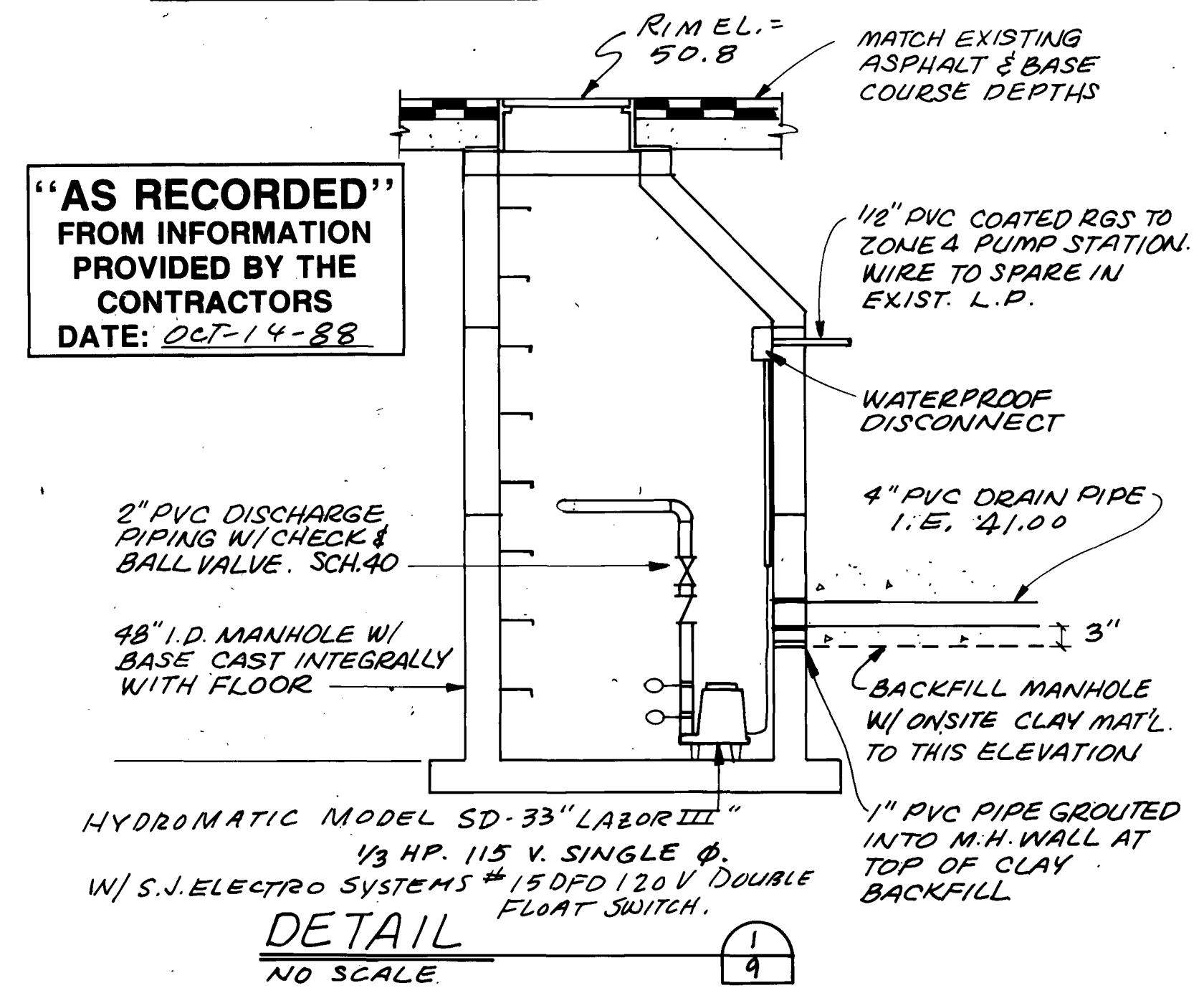
REFER TO THOMPSON PIPE CO. DWG # 7-1114-4, REV. 2.
PROFILE "G" - 24" DISCHARGE LINE

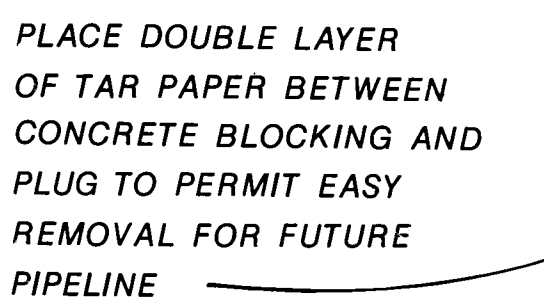
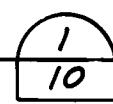
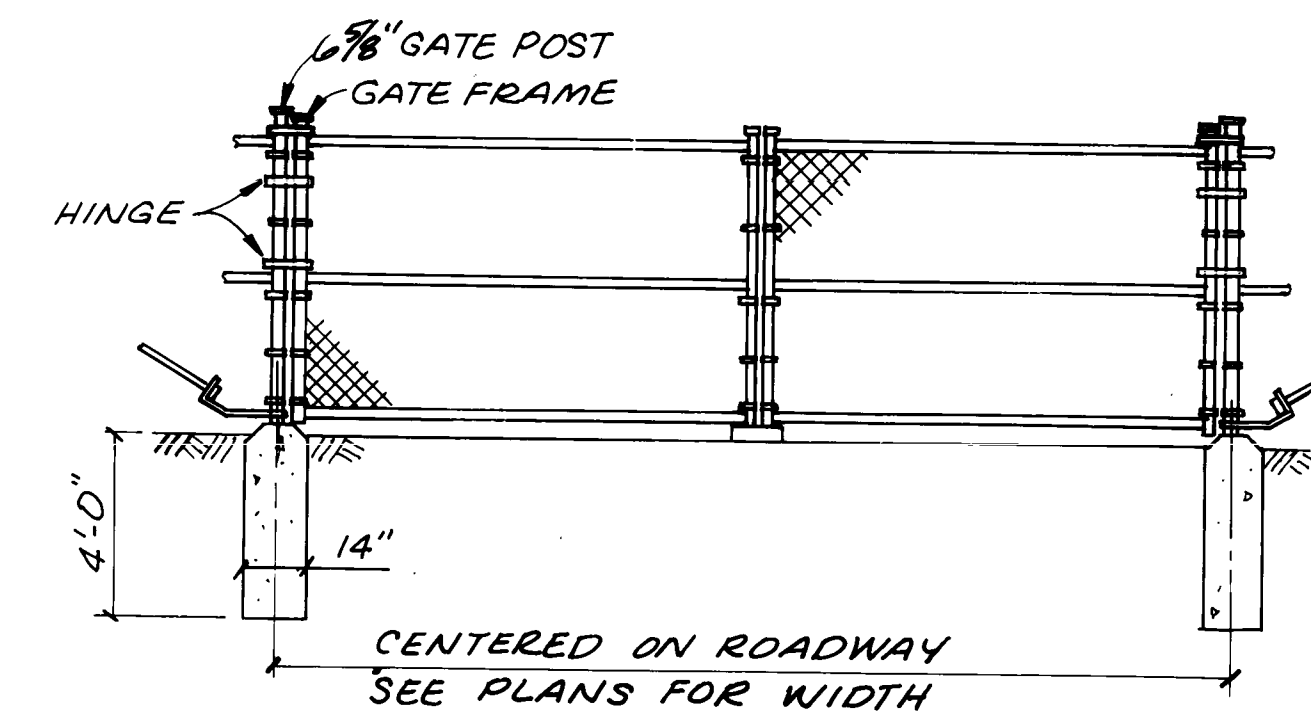
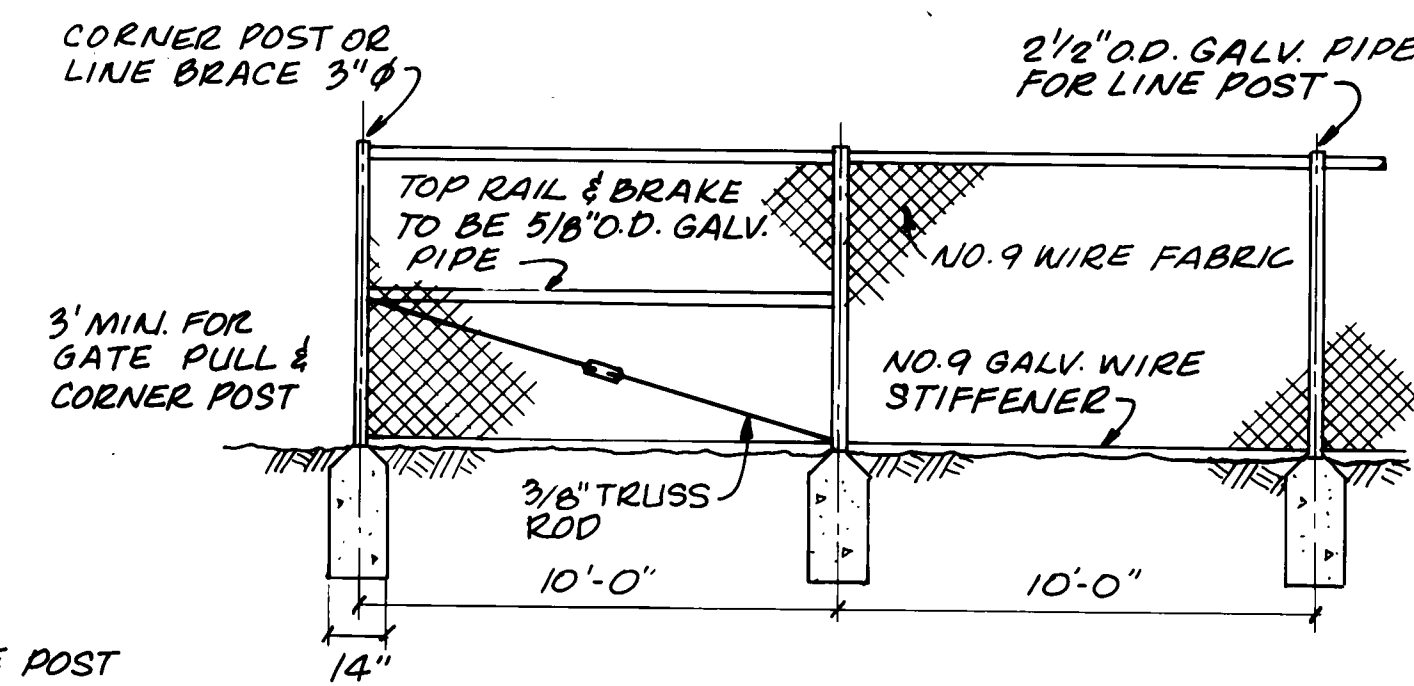
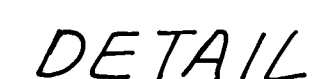
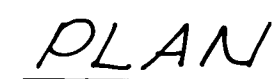
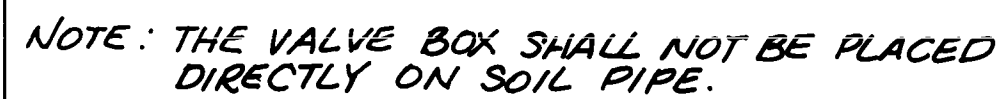


ALLEYWAY PROFILE

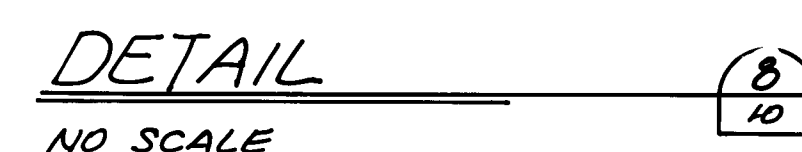
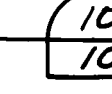
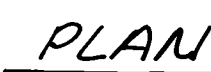
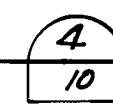


REFER TO THOMPSON PIPE CO. DWG # 7-1114-1, REV. 1.
PROFILE "F" - 36" RAW WATER LINE RELOCATION





TYPICAL BLOCK DETAIL



1a



Yard
Piping

Revisions
10/14/88 As BUILT
REVISIONS

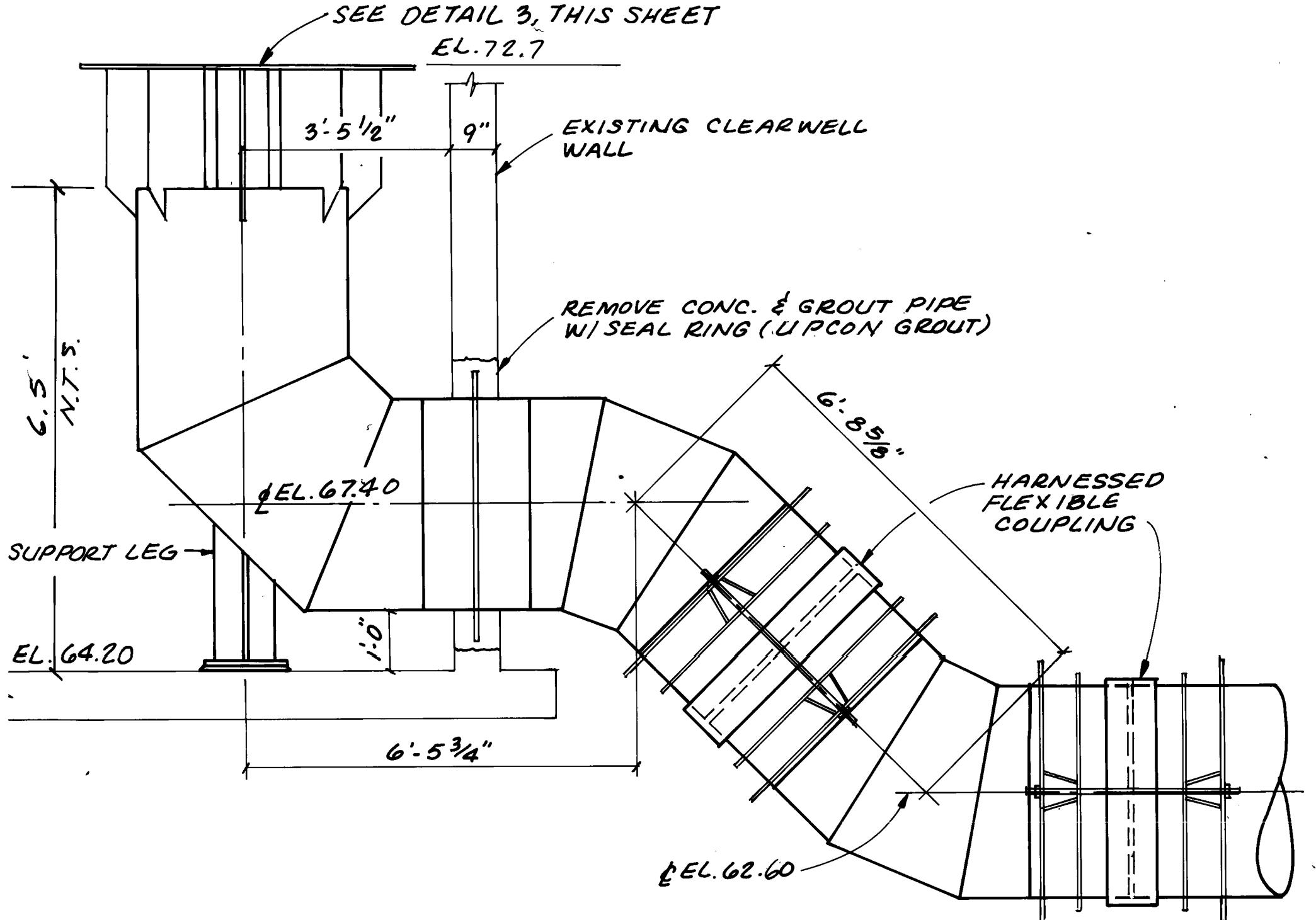




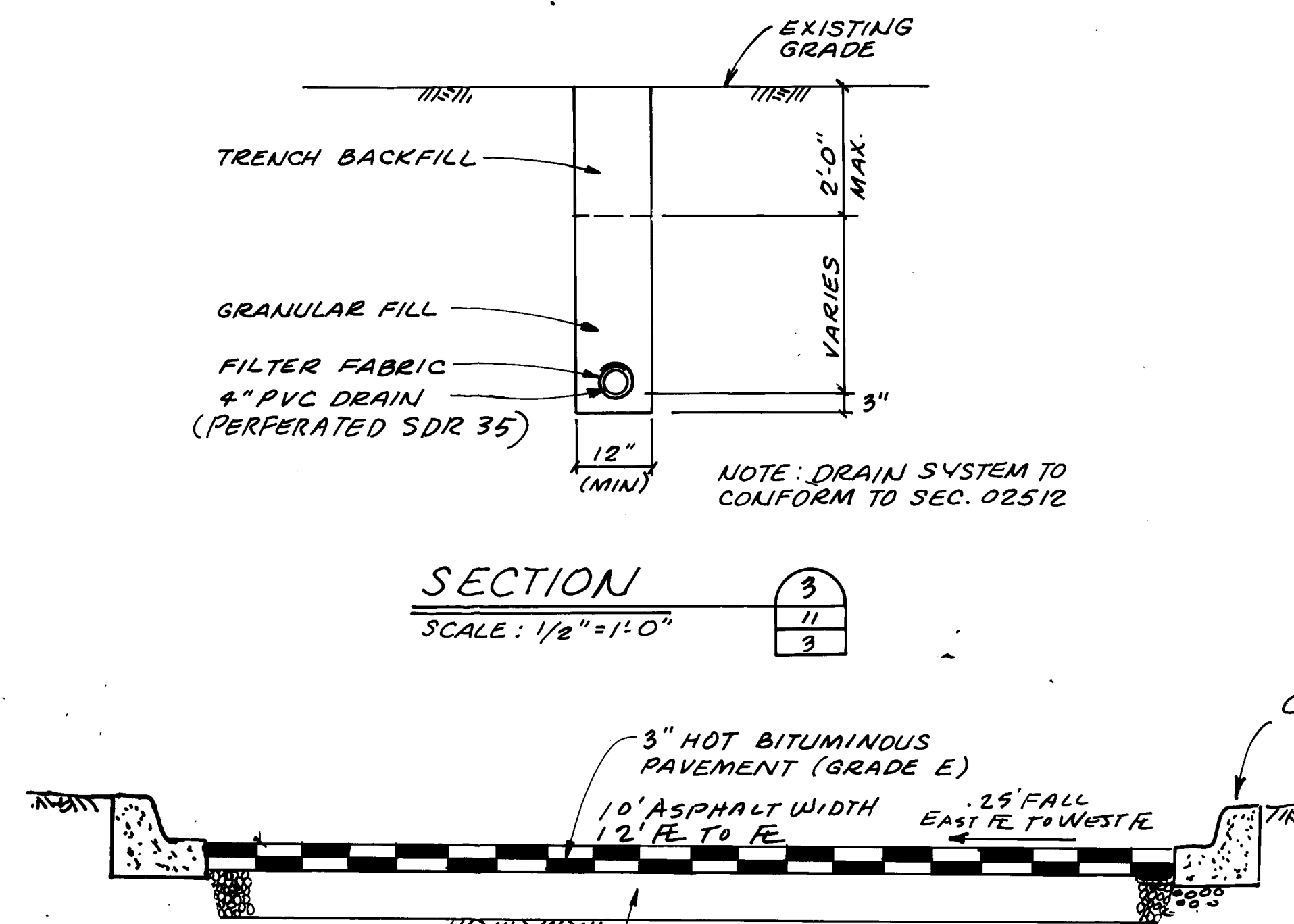
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SECTION
SCALE: 1/2"=1'-0"
1
11
3



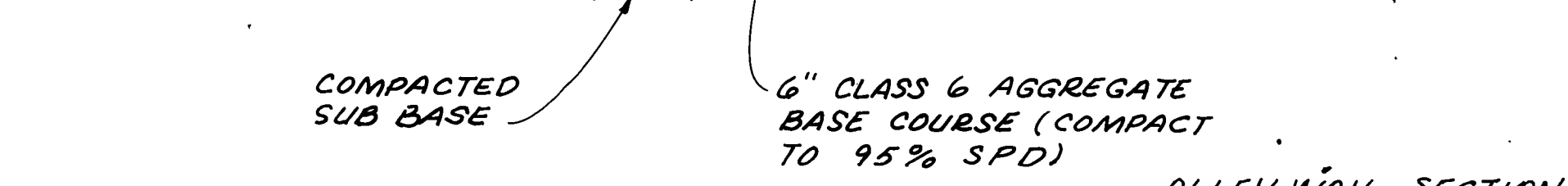
SECTION
SCALE: 1/2"=1'-0"
3
11
3

REQ'D. 90° STD. HOOK LENGTH		MIN. SPLICE LAP LENGTH	
#3	4000 PSI	#3	4000 PSI
4	6"	4	1'-8"
5	8"	5	1'-8"
6	10"	6	2'-2"
7	1'-0"	7	2'-7"
8	1'-2"	8	3'-3"
9	1'-4"	9	4'-3"
10	1'-6"	10	5'-5"
11	1'-8"	11	7'-0"

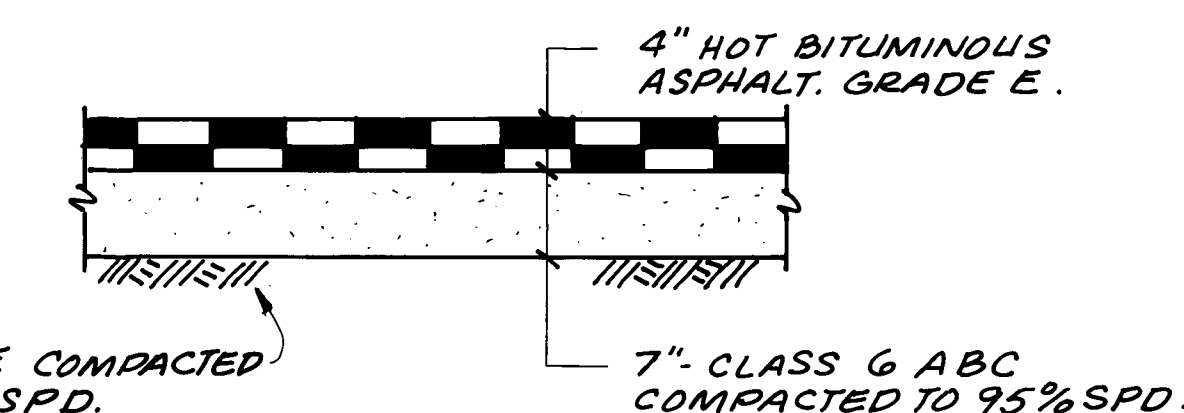
#3	4000 PSI	#3	4000 PSI
4	6"	4	1'-8"
5	8"	5	1'-8"
6	10"	6	2'-2"
7	1'-0"	7	2'-7"
8	1'-2"	8	3'-3"
9	1'-4"	9	4'-3"
10	1'-6"	10	5'-5"
11	1'-8"	11	7'-0"

REBAR NOTES:
*1. ALL REBAR SPLICE LAP LENGTHS SHALL BE PROVIDED AS SHOWN UNDER HEADING MARKED "OTHER" UNLESS SPLICED BARS ARE VERTICAL BARS.
2. COLUMN BAR SPLICE LAP LENGTHS SHALL BE PROVIDED AS SHOWN UNDER HEADING MARKED "VERTICAL" UNLESS NOTED OTHERWISE ON DRAWINGS.
3. ALL SPLICES SHALL BE CONTACT SPLICES & WIRED TOGETHER.

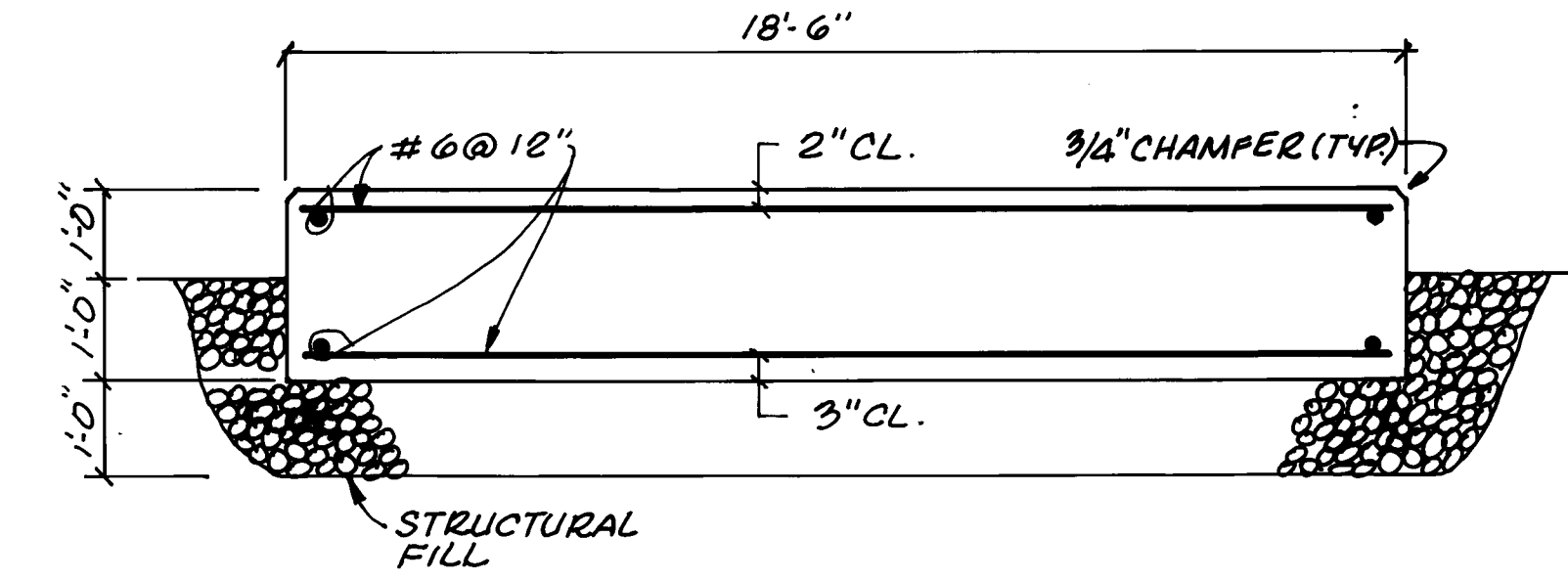
DETAIL
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4
11



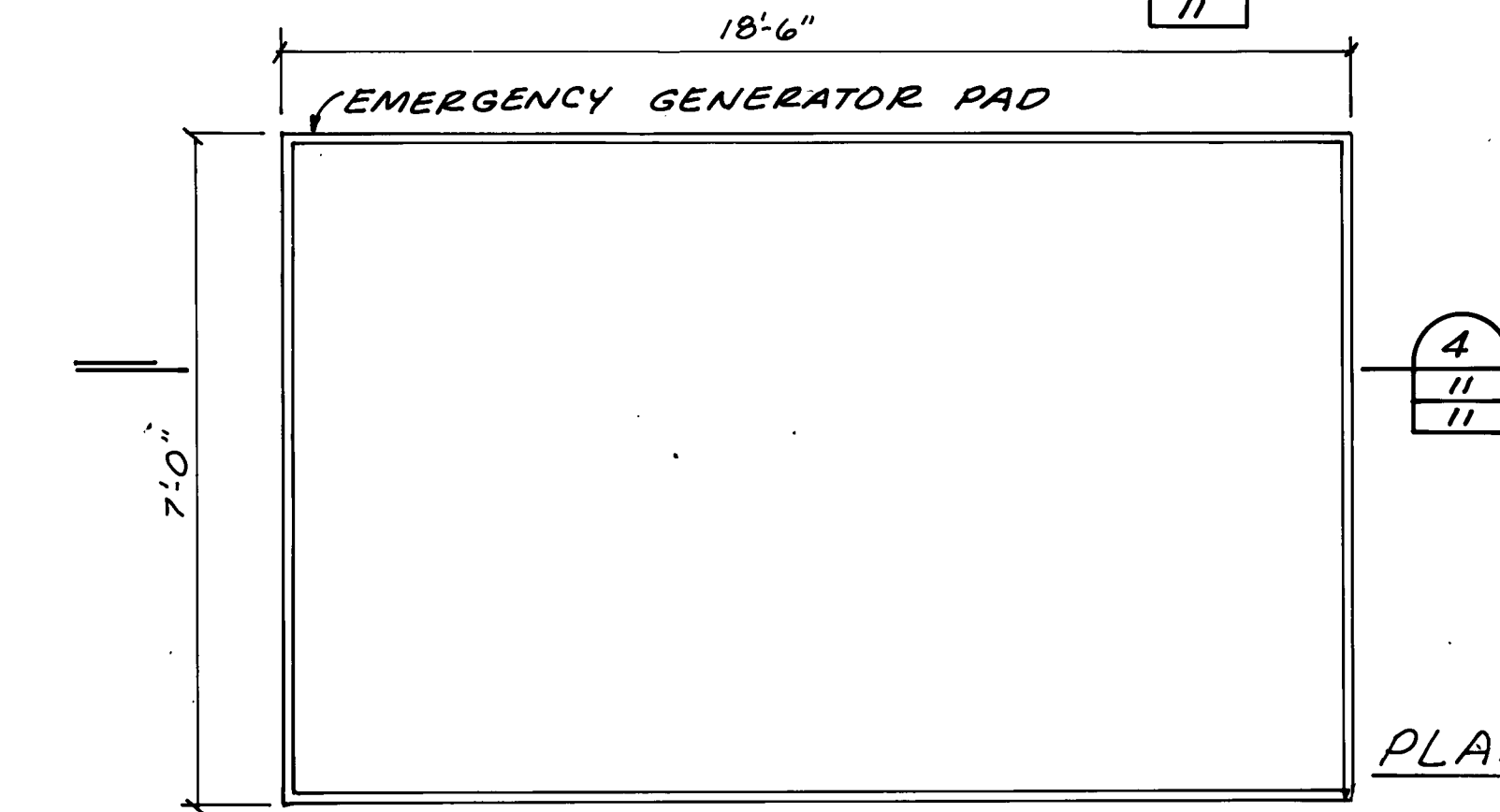
DETAIL
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1
11



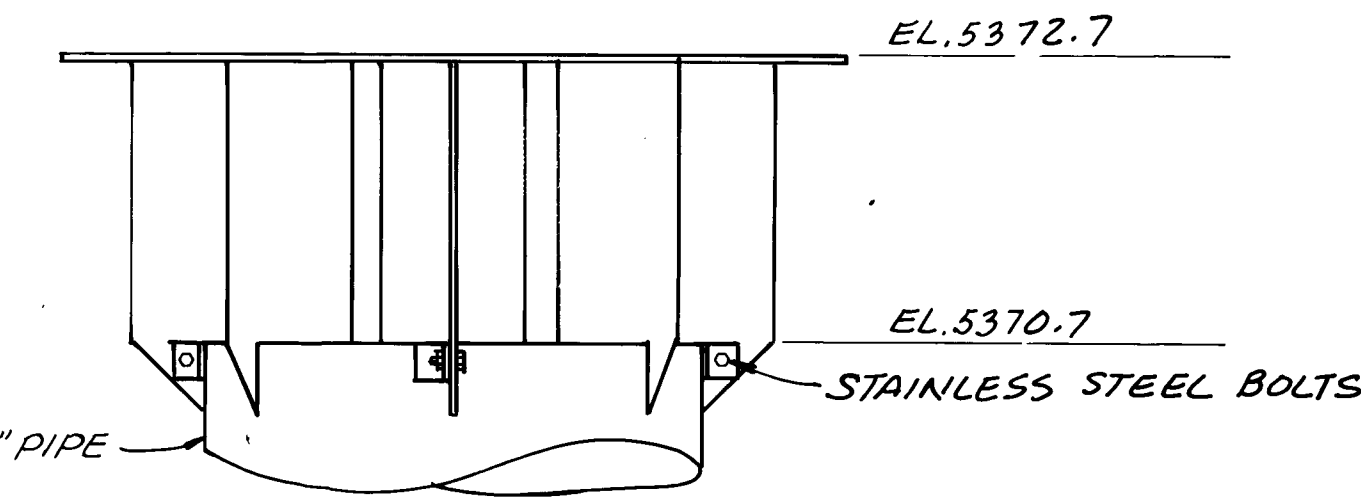
DETAIL
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2
11



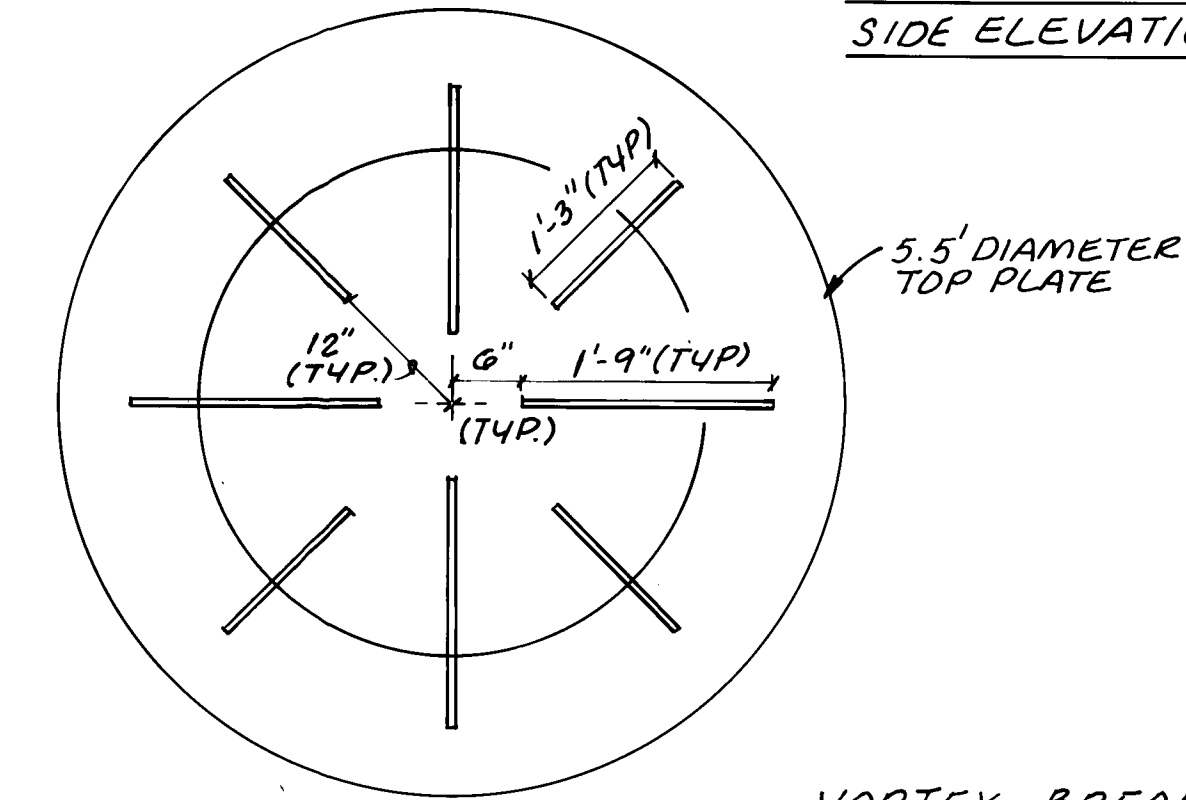
SECTION
4
11
11



DETAIL
NO SCALE
5
11

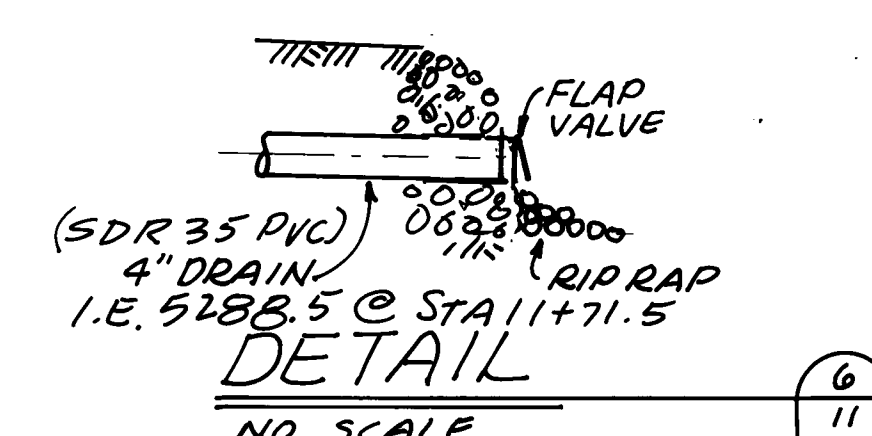


VORTEX BREAKER
SIDE ELEVATION

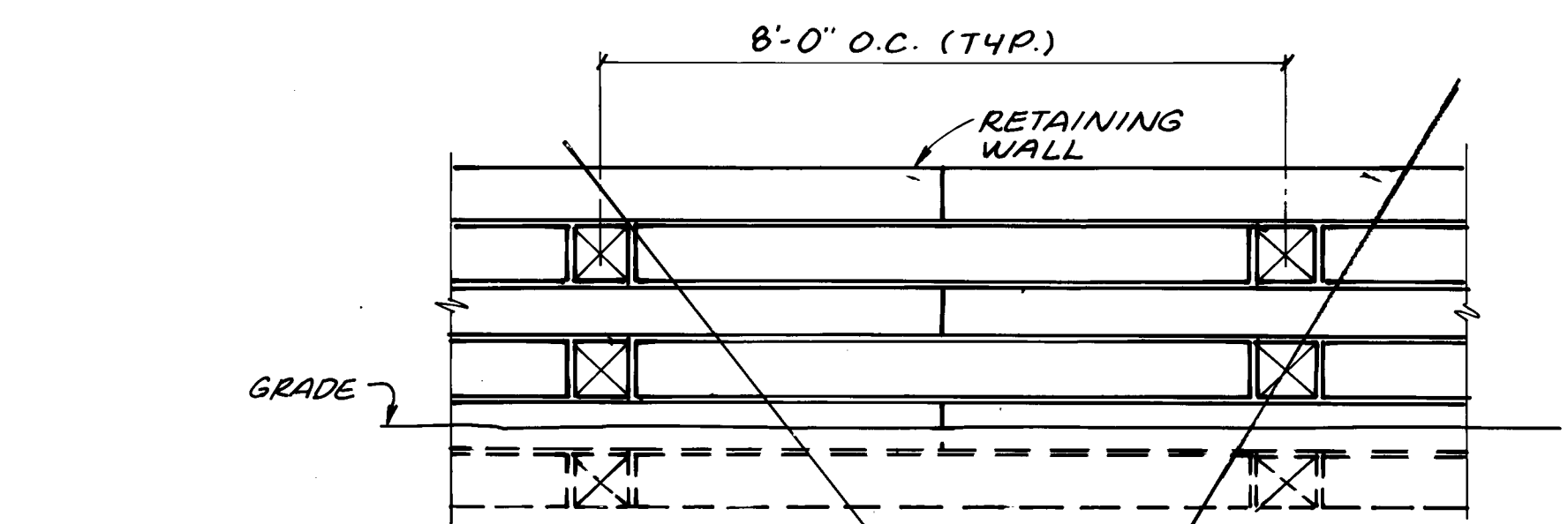


VORTEX BREAKER
PLAN VIEW

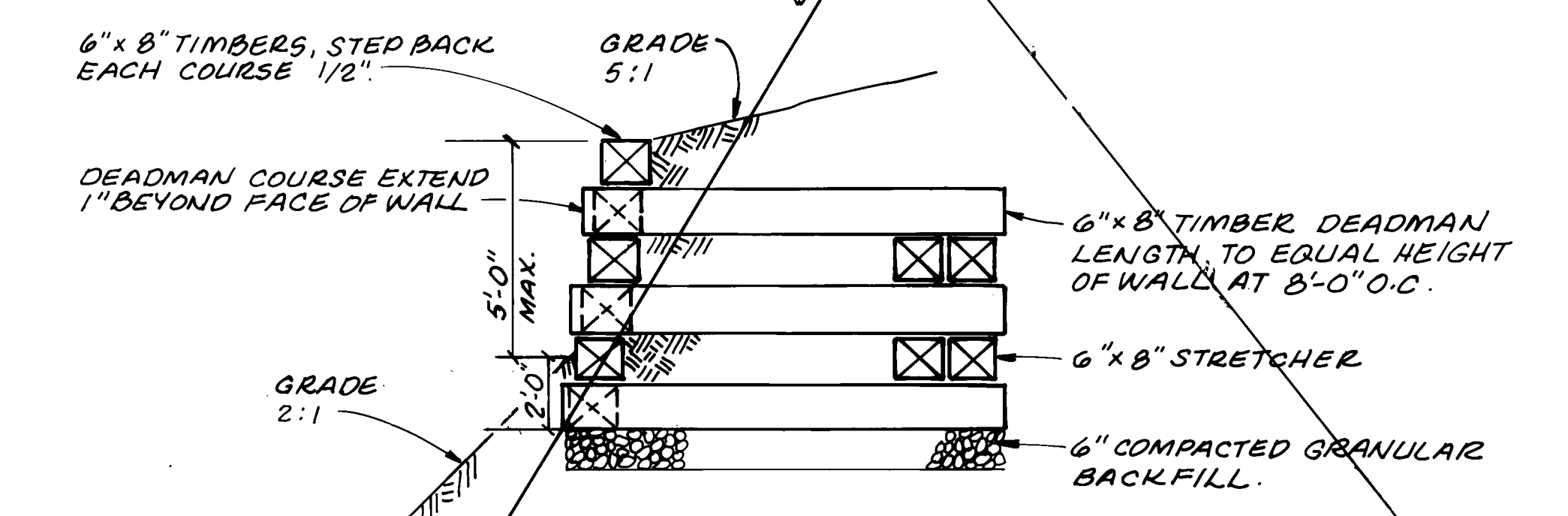
DETAIL
NO SCALE
3
11



DETAIL
NO SCALE
6
11



DETAIL
NO SCALE
4
11



SECTION
NO SCALE
2
11
4

- NOTES:
1. SEE SHEET 4 FOR WALL ELEVATIONS.
2. USE TIMBERS PRESSURE TREATED TO A.W.P.A. STANDARDS FOR GROUND CONTACT.
3. USE SPIRAL LOG SPIKES.
4. USE 2 SPIKES PER DEADMAN.
5. INTERLOCK ALL CORNERS.
6. STAGGER ALL SEAMS BY AT LEAST 24".
7. COMPACT SOIL IN 1 FOOT LIFTS BEHIND RETAINING WALL.
8. SHOP DRAWINGS CONCERNING THE CONSTRUCTION OF THE TIMBER RETAINING WALLS MUST BE SUBMITTED IN CONFORMANCE WITH THE CONTRACT SPECIFICATIONS.



HDR Infrastructure, Inc.
A Centerra Company

Part 1:
Thornton
Water
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Clearwell &
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Improvements

Zone 4/3
Pump Station

Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder

Revisions
12/14/88 As Built
REVISIONS



Sheet Number
12

INSTALL 1 NEW 10" PUMP CONTROL VALVE

REMOVE EXIST. 10" PIPE UP TO B.F.V. FLANGE & CONNECT TO PUMP DISCHARGE PIPE

RELOCATE EXIST. FLEXIBLE CPLGS. TO INLET SIDE OF CONTROL VALVE (TYP. BOTH PUMPS)

REMOVE EXIST. 16"x6" ECC. RED. & REPLACE W/ 16"x12" ECC. RED. CONN. TO EXIST. 16" FLGD PIPE

REMOVE 2 EXIST. JOCKEY PUMPS & ASSOCIATED 3" PIPING & VALVES

REMOVE EXIST. 10" B.F.V. & INSTALL BLIND FLANGE

RELOCATE EXIST. 10" PUMP CONTROL VALVE (TO PUMP 4-2)

PUMP NO. 4-3 (EXISTING)

PUMP NO. 3-1 (NEW)

EXIST. 16"x12" ECC. REDUCER

RELOCATE EXIST. PUMP IN THIS LOCATION TO PUMP NO. 4-2 LOCATION

NOTE: FOR NEW PIPING, REFER TO SHOP DWGS SUBMITTAL # 46A, MID AMERICA PIPE DWG # 275-1, R-1.

REMOVE EXIST. 6" 90° BEND & INSTALL 6" CROSS W/ 6" BL. FLG. DRILLED & TAPPED FOR 3" I.P.S.; FOR COOLING WATER RETURN PIPING. 6" SURGE ANTICIPATOR VALVE

NOTE 1: CUT & REPAIR STEEL HANDRAIL AS NEEDED.

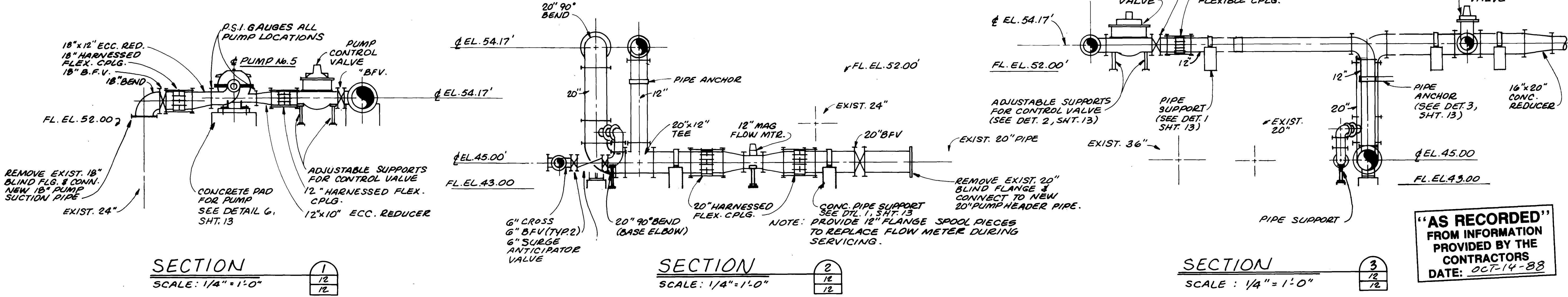
3" Ø WELD-O-LET FOR COOLING WATER SUPPLY 16"x20" CONC. REDUCER 16" BLIND FLANGE 12" B.F.V. (TYP.) 12" PUMP CONTROL VALVE (TYP.) 12" HARNESSSED FLEXIBLE CPLG. (TYP.) 12"x10" ECC. RED. (TYP.)

18"x12" ECC. RED. (TYP.) 18" HARNESSSED FLEXIBLE CPLG. (TYP.) 18" B.F.V. (TYP.)

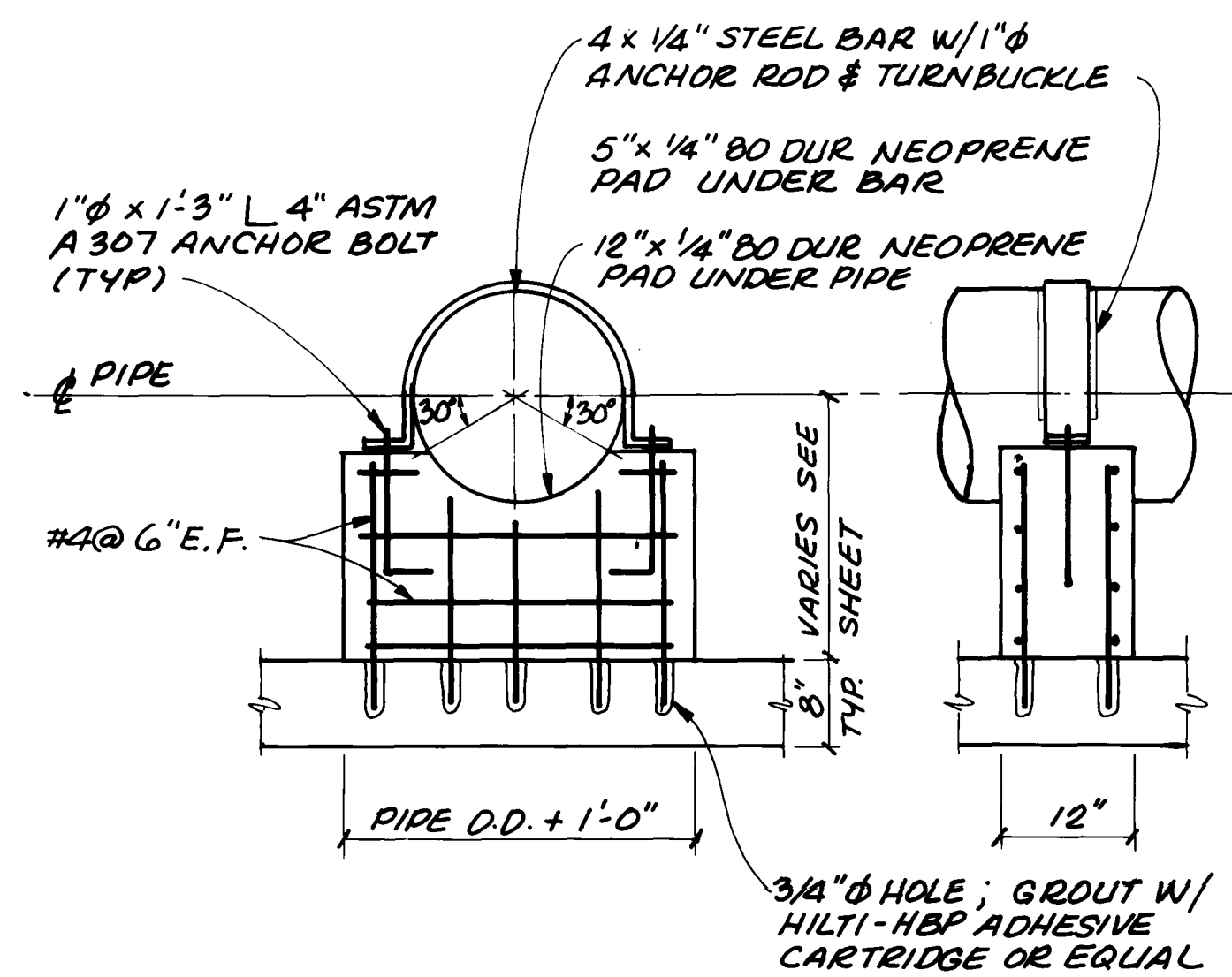
18" 90° BEND REMOVE EXIST. 18" BLIND FLANGES & CONNECT NEW 18" PUMP SUCTION PIPING

REMOVE EXIST. 20" BLIND FLG. & CONN. TO NEW 20" PUMP HEADER PIPE

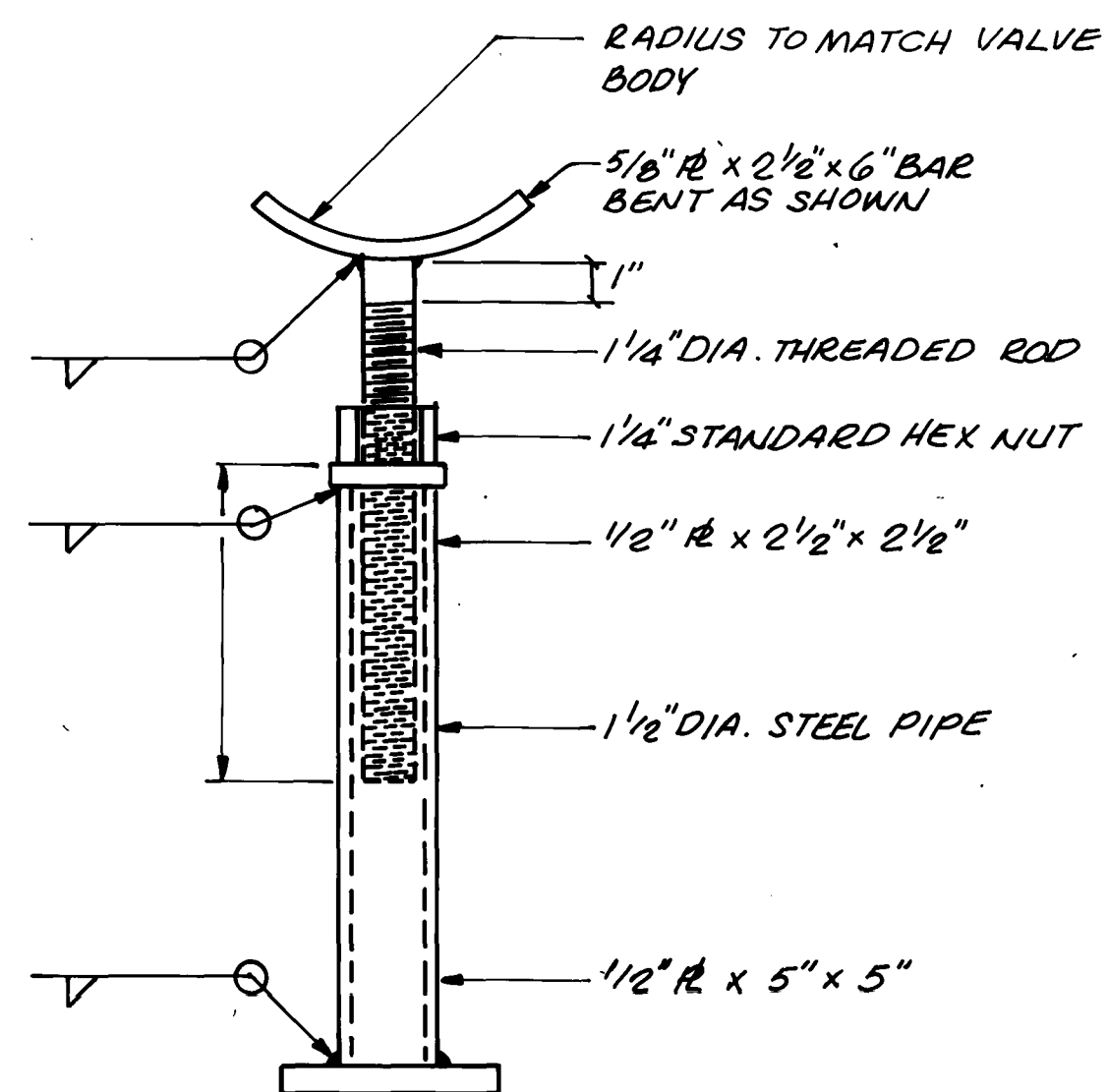
GROUND FLOOR PLAN
SCALE: 1/4" = 1'-0"



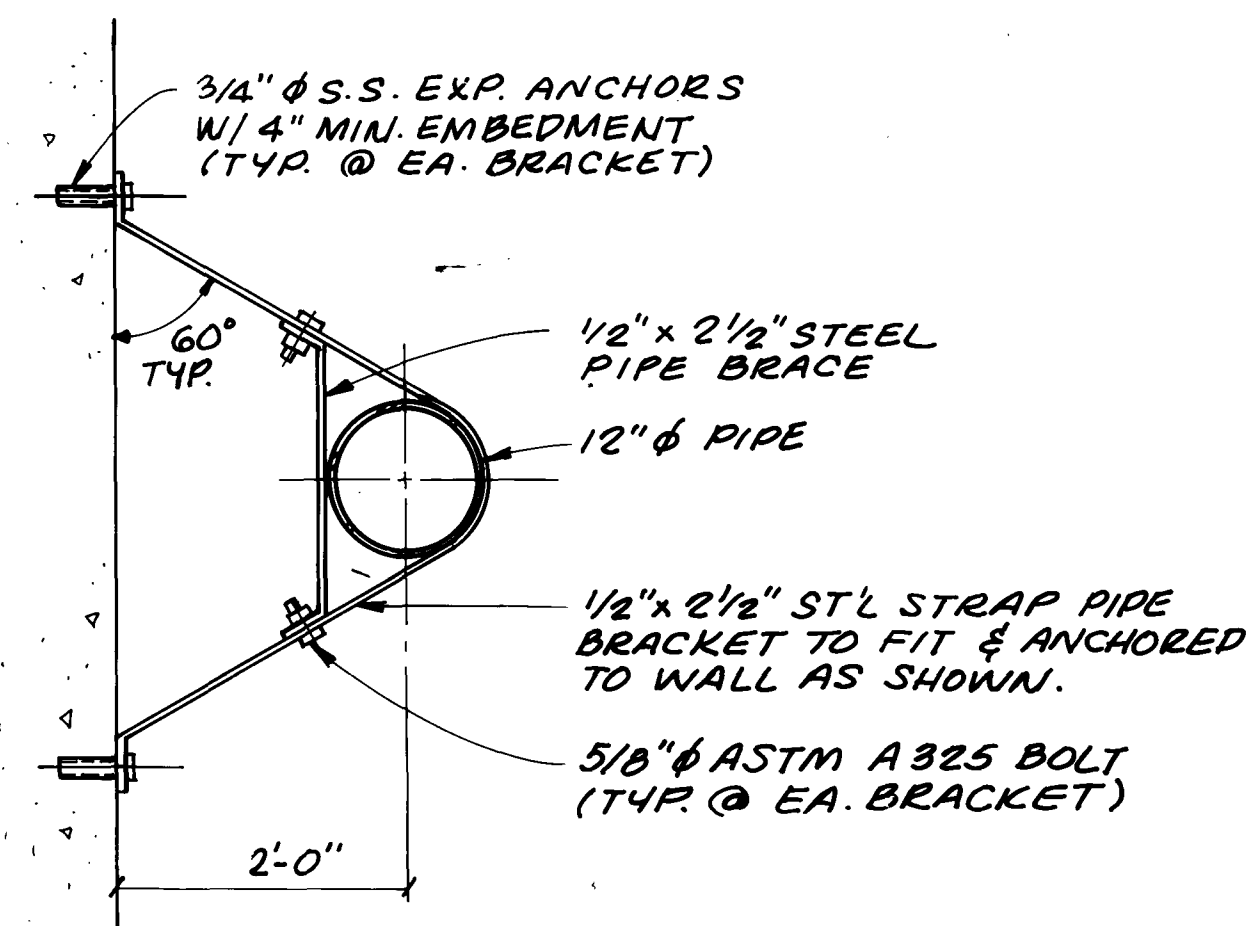
"AS RECORDED"
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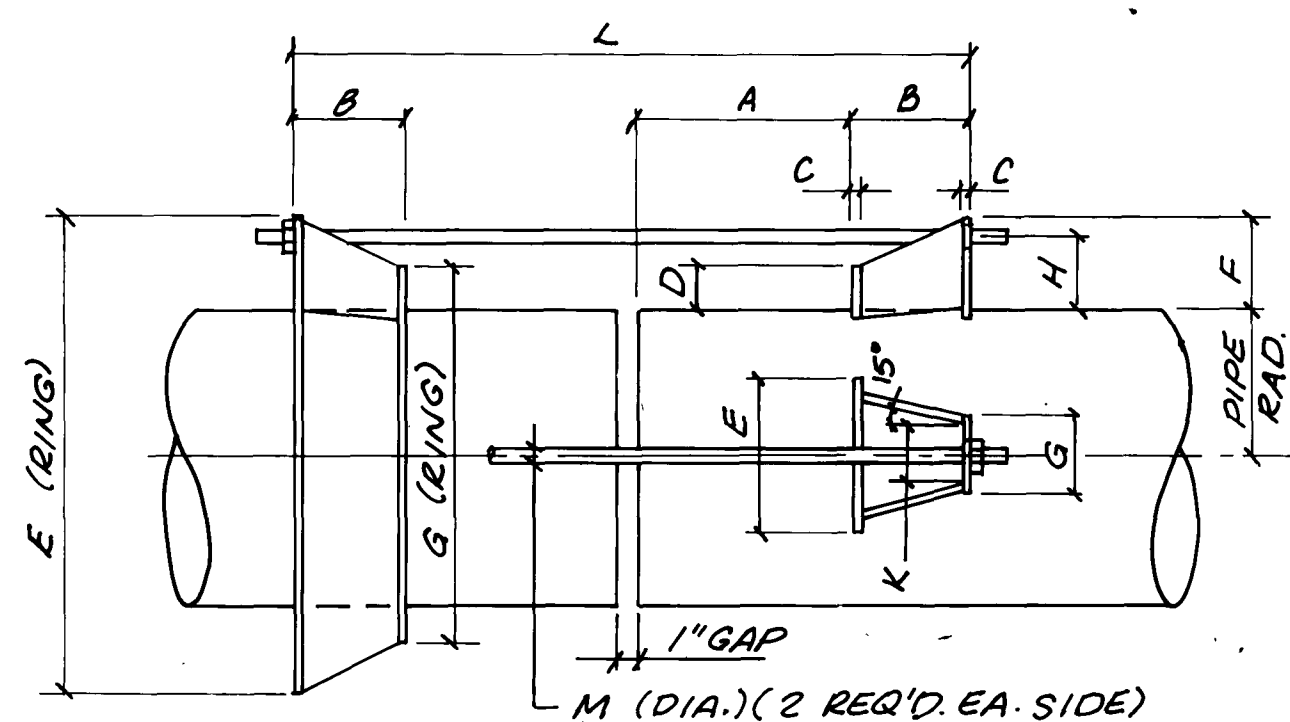
DETAIL 1
NO SCALE



DETAIL 2
NO SCALE



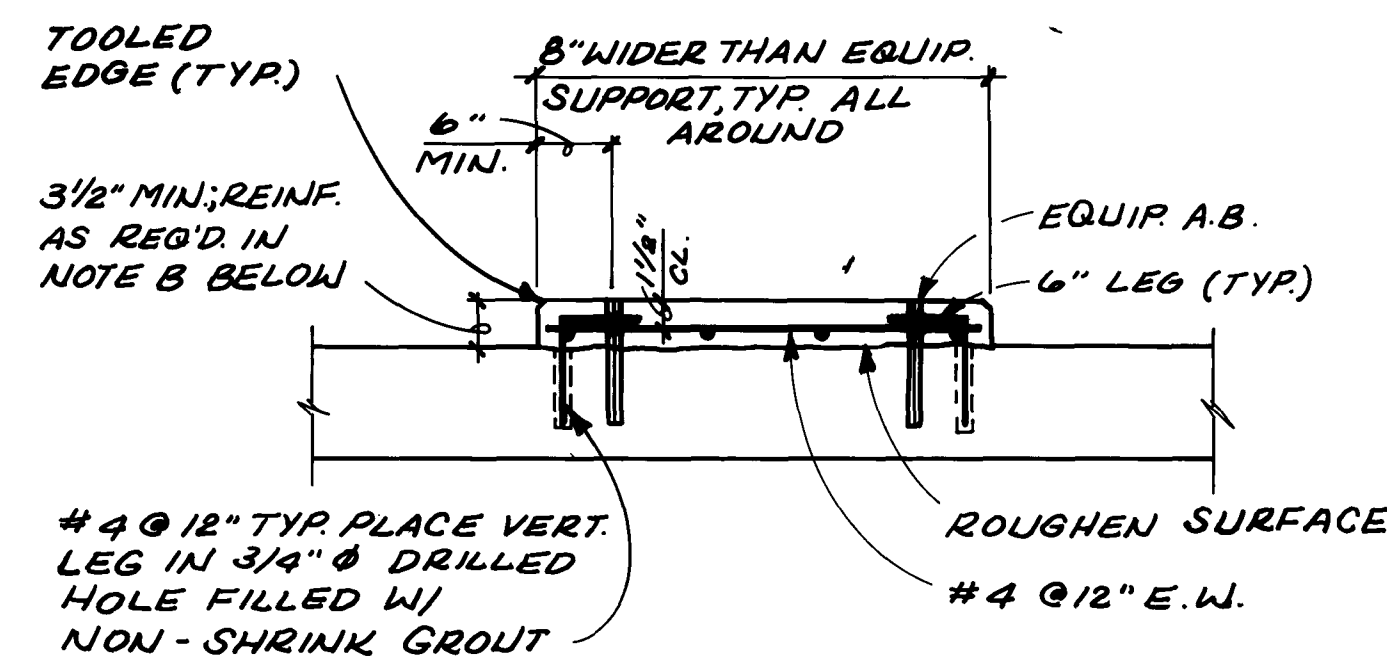
DETAIL 3
NO SCALE



PIPE DIA.	A	B	C	D	E	F	G	H	K	M	L	MAXIMUM PRESSURE, PSI
10"	10	3 3/8	3/8	2	5	3 3/8	5	3	1 1/4	5/8	22	150
18"	10	3 3/8	3/8	2	5	3 3/8	5	3	1 3/4	5/8	29 1/2	150
20"	10	3 3/8	3/8	2	5	3 3/8	5	3	2	5/8	30 1/2	150
42"	10	7 1/2	5/8	2 1/2	7 1/2	5	7 1/2	3 3/4	2 3/4	1 1/4	48	50

NOTES:
1. HARNESS LUGS TO BE SPACED EQUALLY AROUND THE PIPE MATERIAL TO CONFORM TO ASTM A-283 GRADE 'D' OR ASTM A-36.
2. STUD BOLTS TO HAVE UNC THREADS 1" DIA. & LARGER TO HAVE 8 UN THREADS PER INCH BOLTS TO CONFORM TO ASTM A-193 GRADE B-7. NUTS TO CONFORM TO ASTM A-194 GRADE 2H.

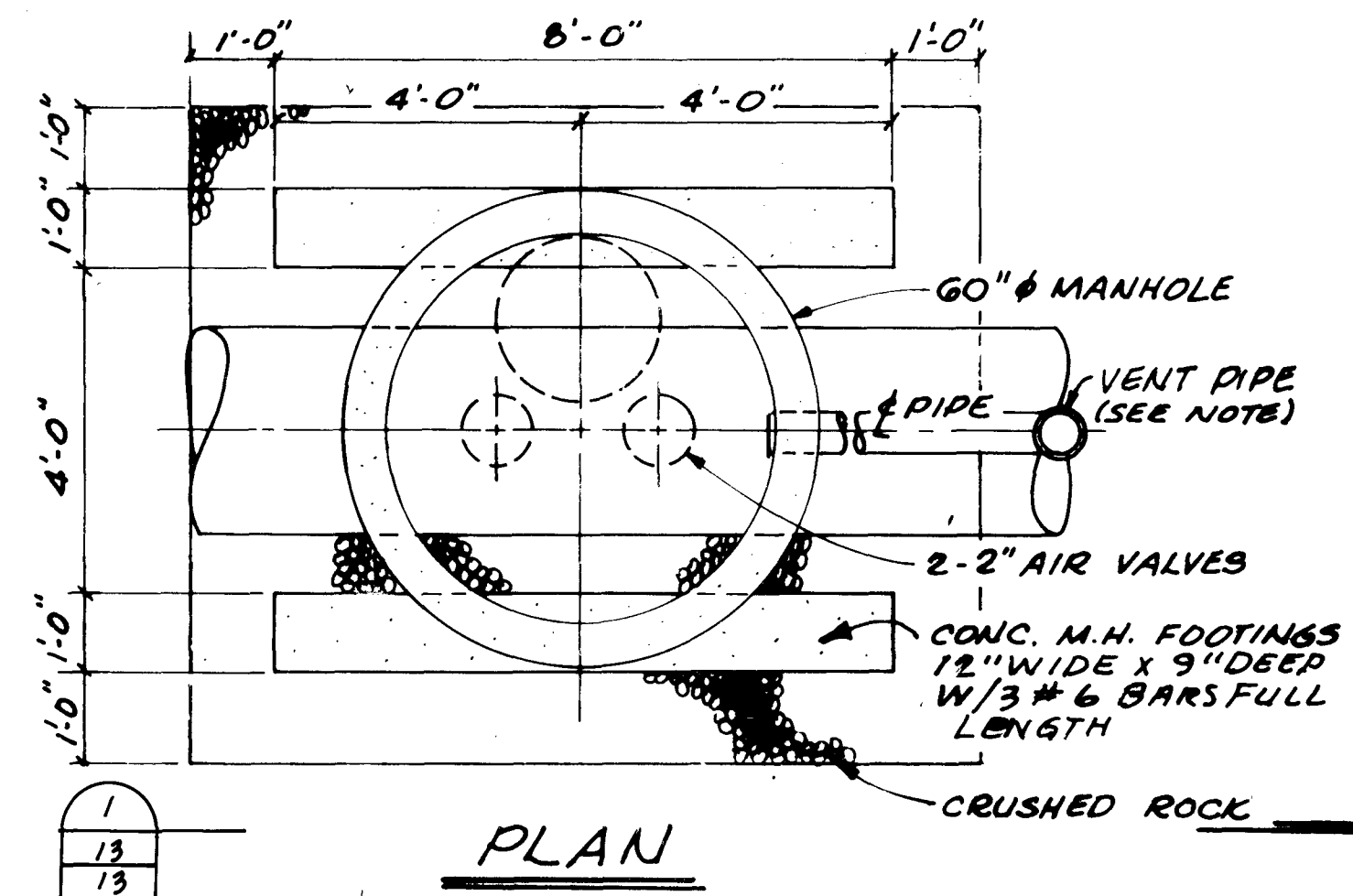
DETAIL 4
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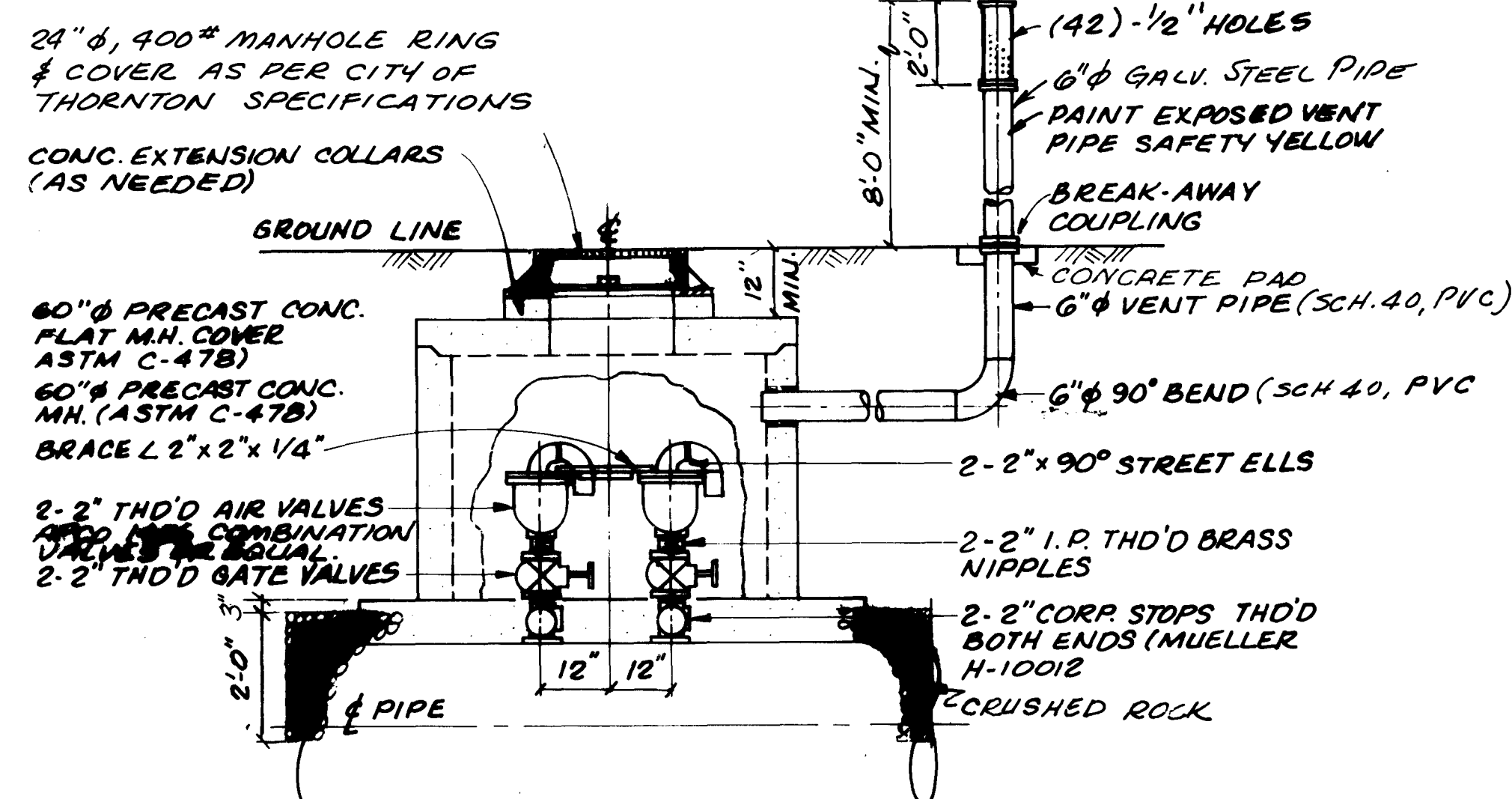
NOTES:

- PROVIDE ABOVE PAD UNDER EQUIP. SUPPORTED ON STRUCTURAL OR ELEVATED SLABS. ALSO FOR ELECTRICAL & MECHANICAL EQUIP. WEIGHING LESS THAN 5000 LBS. WHICH ARE SUPPORTED ON GRADE, OR WHERE SPECIFICALLY NOTED ON PLANS.
- PROVIDE AN ADDITIONAL LAYER OF #4 @ 12" E.W. W/ 1 1/2" CL. T&B IF PAD THICKNESS EXCEEDS 8".

DETAIL 5
NO SCALE



DETAIL 6
NO SCALE



SECTION
NO SCALE

Part 1:
Thornton
Water
Treatment
Plant
Clearwell &
Pumping
Improvements

Zone 4/3
Pump Station

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Date	November, 1986
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Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder
Revisions	10/14/88 AS BUILT REVISIONS



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G. Fuller

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P. O'Brien

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M. Elzway

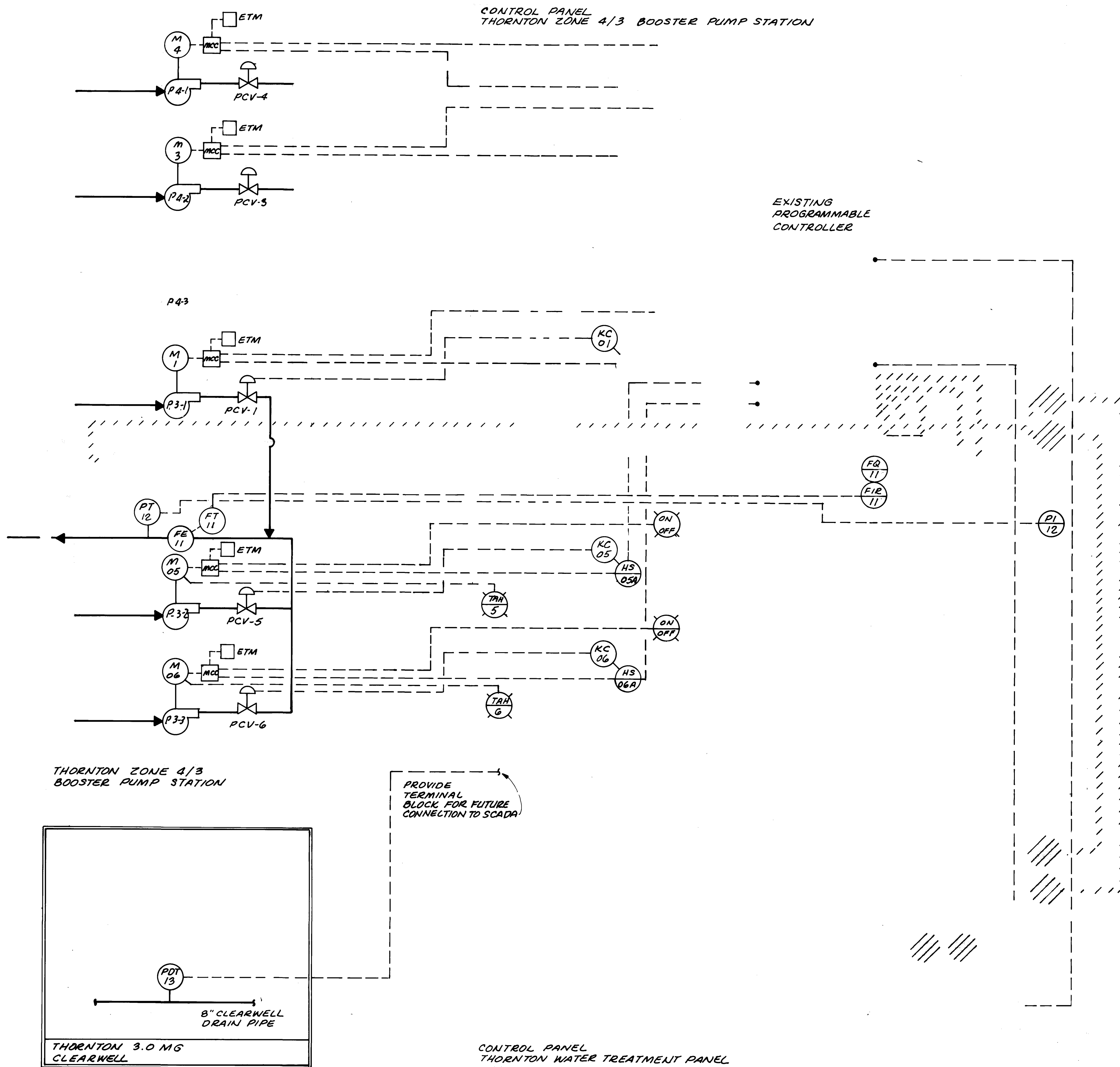
Drawn By
R. Bredsnajder

Revisions
10/14/88 AS BUILT
REVISIONS



Sheet Number

14



PUMP STATION CONTROL PANEL
NO SCALE

PUMP STATION CONTROL PANEL LEGEND					
				R - REMOVE & REPLACE	
				X - REMOVE & DISCONNECT	
				M - MODIFY CONNECTION	
				N - NEW	
NO.	ACTION	TAG	DESCRIPTION	NAME PLATE	SCALE/RANGE
1	R	HS05A	ON/OFF/AUTO/REMOTE SWITCH FOR PUMP #5	PUMP NO. 3-2	
2	R	HS10A	ON/OFF/AUTO/REMOTE SWITCH FOR PUMP #6	PUMP NO. 3-3	
3	R	----	----	PUMP NO. 4-1	
4	R	----	----	PUMP NO. 4-2	
5	R	----	----	PUMP NO. 4-3	
6	R	----	----	PUMP NO. 3-1	
7	X	FAH-02A	HIGH DISCHARGE FLOW ALARM	BLANK	
8	X	FAL-02A	LOW DISCHARGE FLOW ALARM	BLANK	
9	X	PAL-08	LOW DISCHARGE PRESSURE ALARM	BLANK	
10	X	PAH-08	HIGH DISCHARGE PRESSURE ALARM	BLANK	
11	N	FQ-11	FLOW TOTALIZER	ZONE 3 TOTAL (GALS. X 1000)	GALLONS X 100
12	N	PI-12	DISCHARGE PRESSURE INDICATOR	ZONE 3 DISCHARGE PRESSURE (PSI)	0-200 PSI
13	R	----	----	ZONE 4 TOTAL (GALS. X 1000)	
14	R	----	----	ZONE 4 DISCHARGE PRESSURE (PSI)	
15	M	FIR-11A	PROVIDE SECOND PEN FIR-02A	ZONE 3 (BLACK) ZONE 4 (RED) PUMP STATION FLOW (GPM)	0-7000 GPM

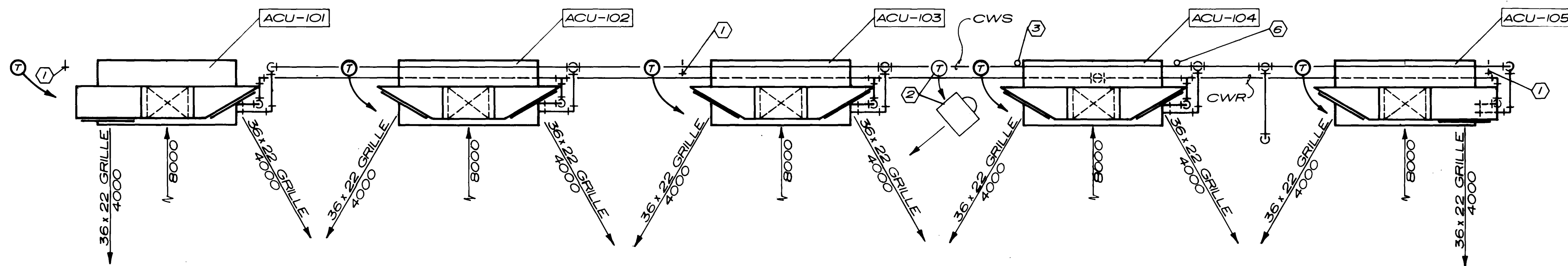
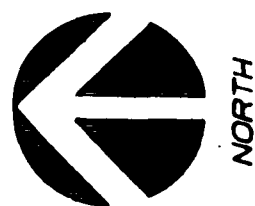
LEGEND

—	EXISTING	—	PROCESS LINE
- - -	PROPOSED	- - -	INSTRUMENTATION SIGNAL
□	STRUCTURE OR CONTROL PANEL		TO BE REMOVED
○	LOCALLY MOUNTED	HS	HANDSWITCH OR PUSHBUTTON
○	BOARD OR PANEL MOUNTED	KC	TIME DELAY
○	INDICATING LIGHT	FAL	FLOW ALARM LOW
○		FAH	FLOW ALARM HIGH
○		FQ	FLOW TOTALIZER
○		FIR	FLOW INDICATING RECORDER
○		FI	FLOW INDICATOR
○		ET	FLOW TRANSMITTER
○		LIR	LEVEL INDICATING RECORDER
○		LT	LEVEL TRANSMITTER
○		PI	PRESSURE INDICATOR
○		PS	PRESSURE SWITCH
○		PT	PRESSURE TRANSMITTER
○		PAL	PRESSURE ALARM LOW
○		TAH	TEMPERATURE ALARM HIGH
○		MCC	MOTOR CONTROL CENTER
○		FE	FLOW ELEMENT (MAG METER)
○		PCV	PUMP CONTROL VALVE

NOTE SEE UCEC O & M MANUAL FOR UP-DATED REVISIONS.

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AUDIT	000	000	000
OVERLAY	000	000	000



GROUND FLOOR PLAN
SCALE: 1/4" = 1'-0"

Notes:

- 1 Relocate hose bibbs as necessary.
- 2 Relocate existing unit heater and thermostat so as not to interfere with ACU-104. Reconnect flue through existing opening in roof. Power vent if necessary. Install so as not to interfere with bridge crane operation.
- 3 Reroute plumbing vent around ACU-104.
- 4 Relocate thermostat to suspend one foot below unit heater at unit heater.
- 5 Rotate unit heater such that it will not direct air towards the electrical panels. Reconnect electrical flue and natural gas as necessary.
- 6 Reroute water supply line to hose bibbs around ACU-104.

(a) SCOPE OF WORK. The work to be performed in accordance with the requirements of this Section consists of furnishing everything required and of performing all operations required in connection with the construction and installation of all heating, cooling, and ventilating systems.

(b) MATERIALS AND EQUIPMENT.

1. Air Conditioning Units No. ACU-101 thru ACU-105. Furnish and install McQuay Trane, Carrier, Airtherm, or equal, air conditioning units complete with fan section, cooling coil section, flat filter section motor, V-belt drive, belt guard, sound absorbing base, and vibration dampeners. The performance of the units shown in the Performance Data is based on 5,900 feet Elevation.

The cooling coils shall be constructed with copper tubes and aluminum fins. The coils shall be arranged for counterflow with supply water into the bottom tapping.

The fan shall be constructed with forward curved or airfoil blades. Fan and motor bearings shall be on the ball-bearing type. The V-belt drive shall be of the adjustable pitch type, having a horsepower rating of not less than 150% of the motor rating. Extend piping from fan bearings as necessary for easy lubrication.

The unit casing shall be constructed with welded reinforcing. The entire fan section and casing from cooling coil location to the fan section shall be internally insulated with 1" thick coated blanket insulation.

Each unit shall be provided with a corrosion-resistant insulated drip pan. The discharge from the drip pan shall be piped to equipment drain with copper piping of appropriate size.

Furnish and install under the units, Vibration Mountings, Inc. or equal, insulators properly sized and located to keep the transmission of noise to the building structure to a minimum.

Filter section shall be arranged for 2" thick standard sized filters, and shall be equipped with sponge rubber sealing pieces. Filter section shall have 1" internal insulation.

The motors shall be of the general purpose, ball-bearing, drip-proof fully guarded type.

2. Temperature Controls. The Temperature Control System shall be electric components to comprise the complete system. The system shall be furnished and installed by the Johnson Service Company, Honeywell or Powers. The system shall be complete in all respects, put in operation, and calibrated under operating conditions as hereinafter specified.

The system shall include all valves, thermostats, controllers and other control devices shown on drawings or as specified. All control devices shall be connected complete to perform the functions indicated, so as to operate in the required sequence.

a. Air Conditioning Units ACU-101, thru ACU-105 shall operate in response to a thermostat on normal operation and shall be off during emergency power operation.

On a rise above 86 degrees F. adjustable, the thermostat shall start the motor for its respective air conditioning unit and modulate the cooling valve to maintain the setting. On a drop below 84 degrees F. adjustable, the unit shall shut off.

b. Equipment. Control components and all interconnecting piping, fitting, conduit, wire, etc., shall meet the following outlined requirements.

1. Control Valves. Cooling water valves shall be sized for not more than 2 psi drop.

2. Valve Operators. Provide electric operators with fully immersed in oil gear train, in tightly closed cast aluminum housing. Operators shall fully modulate from proportional electric controllers, with integral spring return to make control fail-safe in closed position. Provide end switches permitting interlocking with other equipment. Provide valve linkage Honeywell M-945 operator with Q618 linkage or approved equal.

3. Proportional Temperature Controller. Provide three wire low voltage controller for valve motors. Bellows element shall adjust the potentiometer slider to regulate motor operation. Provide with removable setting knob. Provide range and scale from 66 to 95 degrees F. with 4 degrees F. throttling range. Provide thermometer range from 60 to 100 degrees F. Honeywell T92A or approved equal.

c. Electrical Wiring. All wiring shall comply with the requirements of the Section "Electrical and Instrumentation".

3. Tests, Leaks and Adjustments. The entire installation of cooling piping shall be tested according to Section 15060.

After testing, the cooling systems shall be operated for 3 days, then drained, flushed out and all strainers cleaned. Refill and vent the systems and leave in proper working order.

After the systems have been in operation for one month, they shall be drained, flushed out and all strainers cleaned.

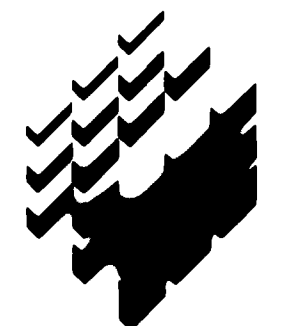
(c) SHOP DRAWINGS. Provide shop drawings in compliance with General Section 01340. Submit shop drawings on the following items. Submit shop drawings on all substitution items.

- a. ACU Units
- b. Temperature control components
- c. Temperature control system schematic diagrams

Submit (3) three sets of "as built" control diagrams and one reproducible for use in the operating instructions at the conclusion of the job.

Provide Operation and Maintenance (O&M) Manuals in compliance with Detailed Sections 01340.

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Paul F. O'Brien
Sheet Number
15

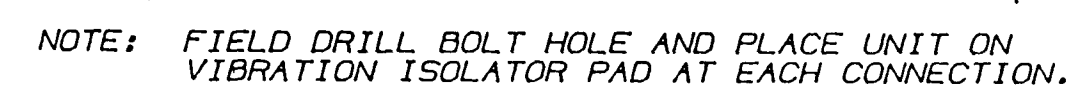


NOTES:

1. CWR & CWS PIPING - COPPER
2. FOR COMPLETE PIPING & CONTROL WIRING DRAWINGS, REFER TO EVANS-REDMOND DRAWING IN O & N MANUALS.



NO SCALE



NO SCALE

NOTE: REFER TO SHOP DRAWING
SUBMITTAL # 64 FOR SUPPORT
DETAILS- PASTERKAMP H & AC
DWG # F1 & F2



NO SCALE



NO SCALE



NO SCALE

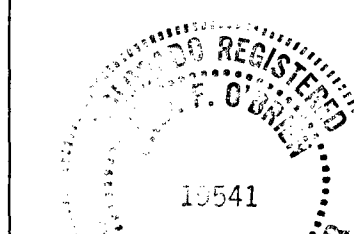
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Paul F O'Brien

FUTURE ENGINE GENERATOR #2
480V, 3Ø, 910KW, 80% P.F.

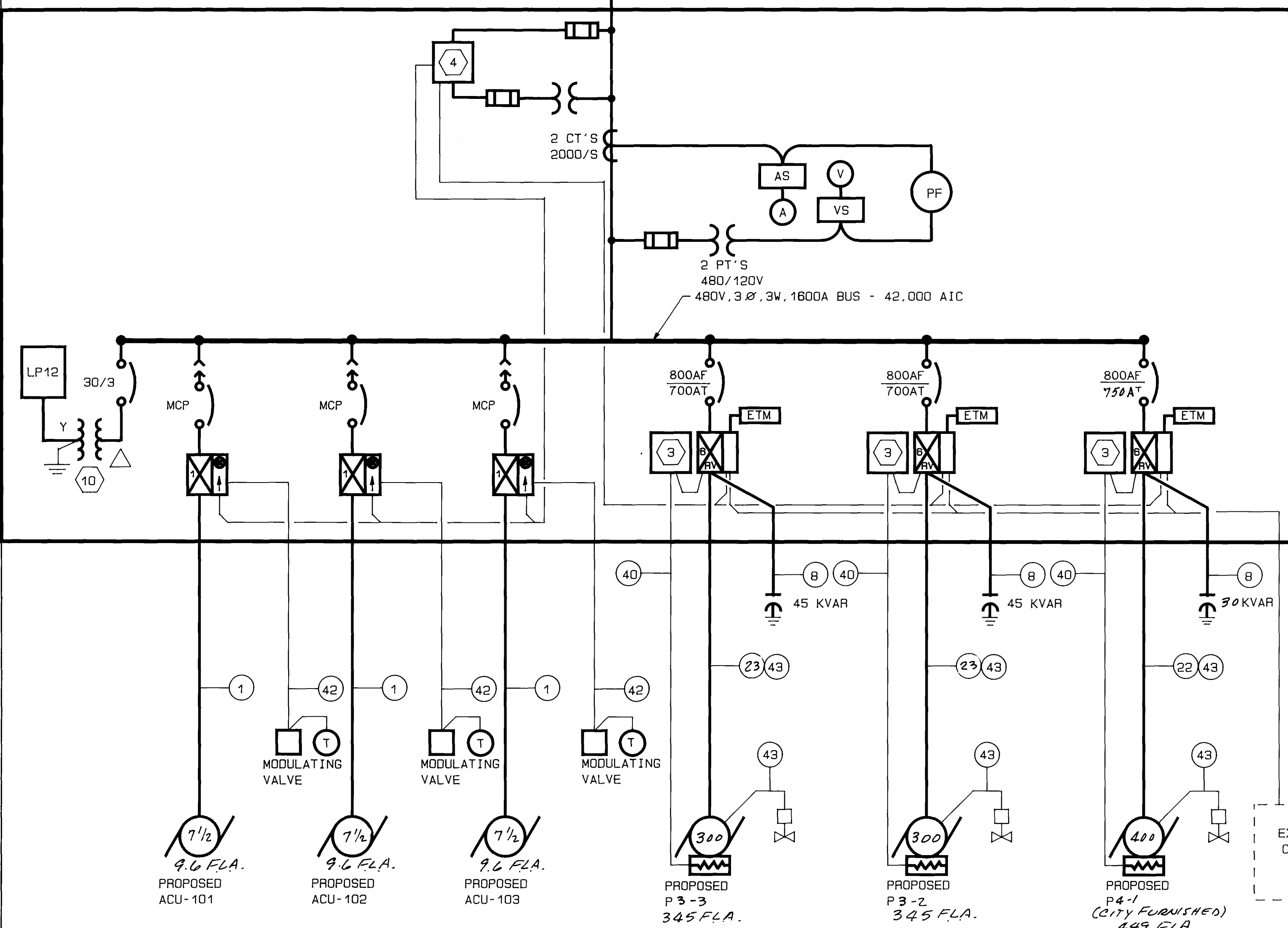
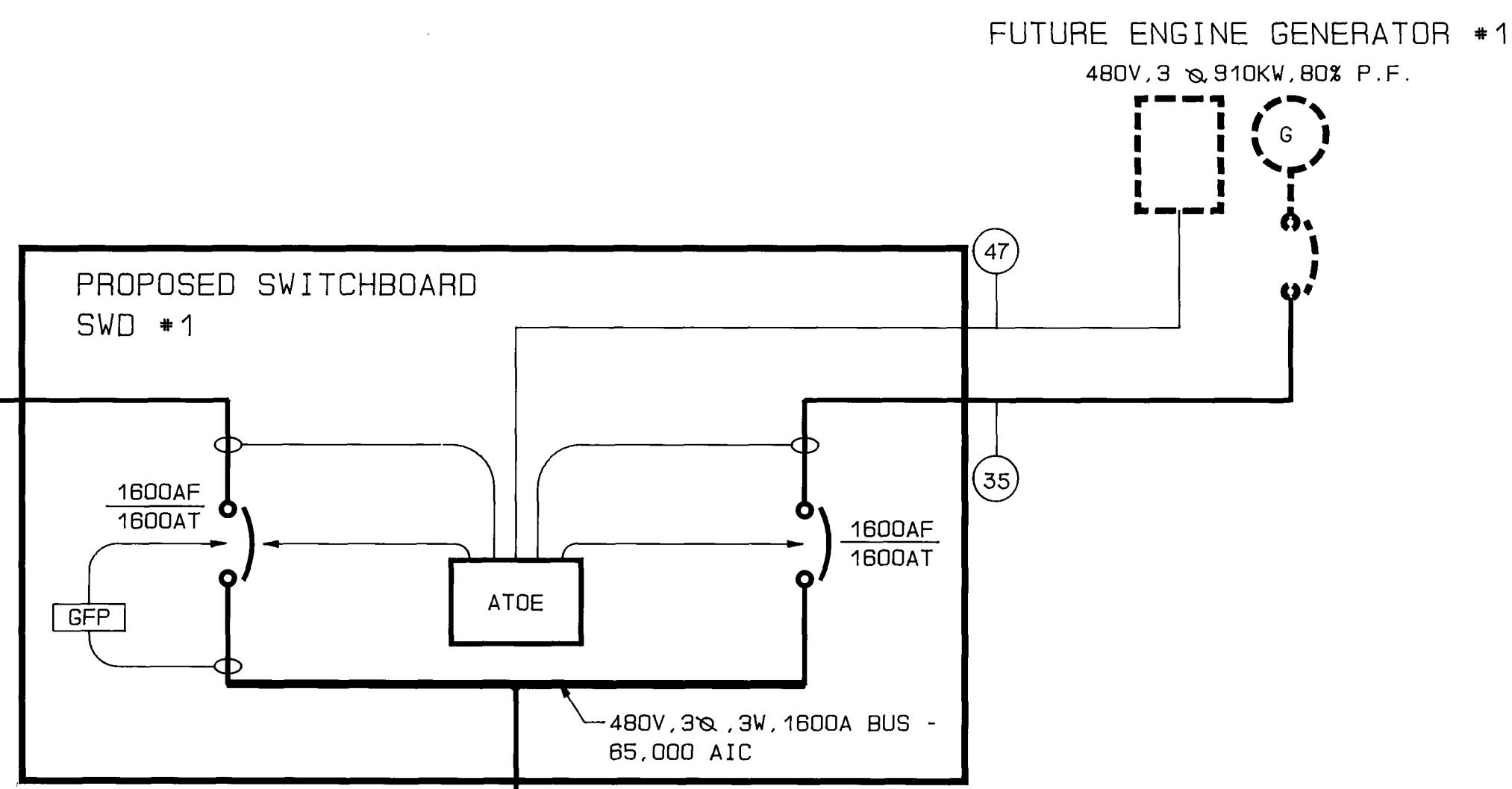
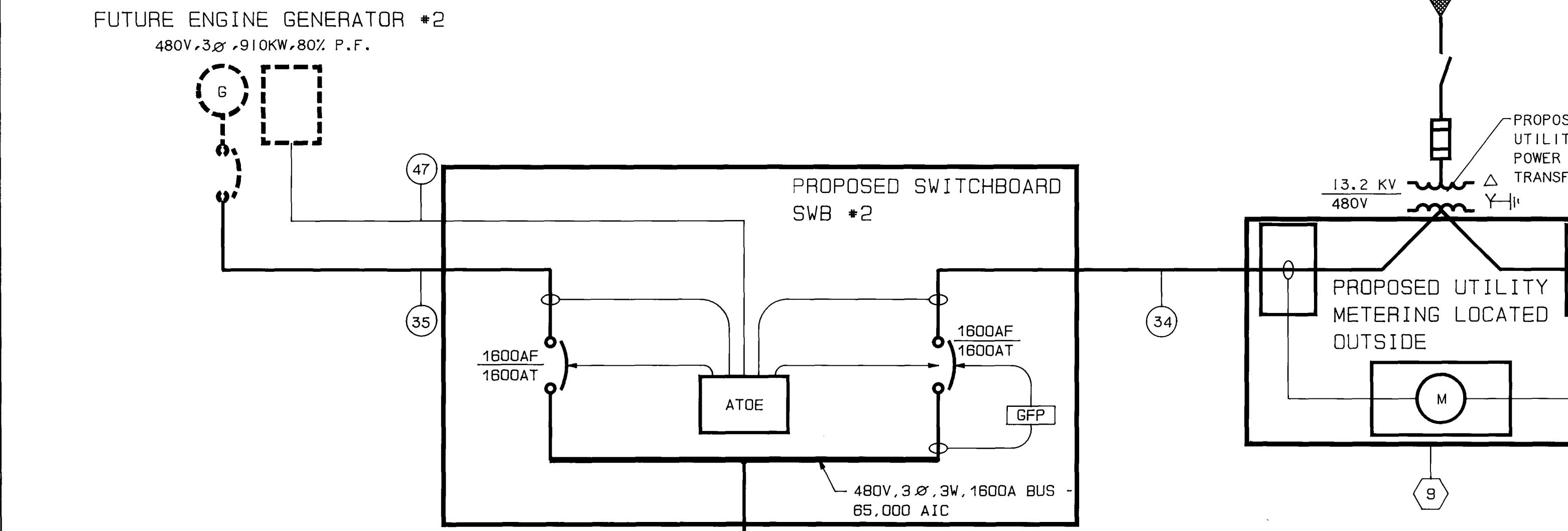
FUTURE ENGINE GENERATOR #1
480V, 3Ø, 910KW, 80% P.F.



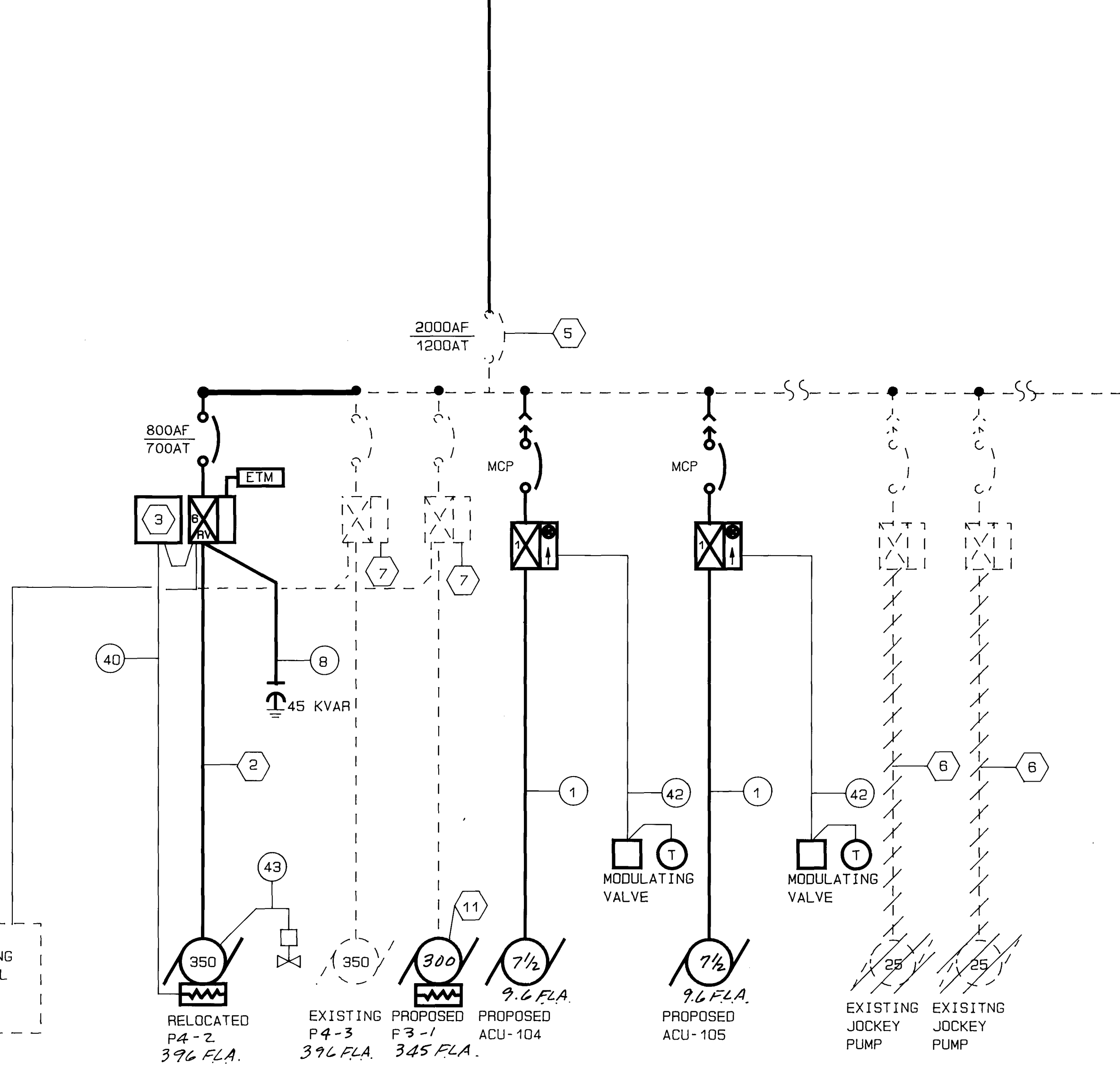
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PROPOSED MOTOR CONTROL CENTER "MCC #2" ONE LINE DIAGRAM
NO SCALE



EXISTING MOTOR CONTROL CENTER "MCC #1" ONE LINE DIAGRAM MODIFICATIONS
NO SCALE

NOTES:

- RE-ROUTE EXISTING FEEDER CONDUCTORS THROUGH EXISTING MANHOLE AND CONNECT TO NEW SWITCHBOARD "SWB-1". UTILIZE EXISTING 4" SPARE CONDUIT FROM EXISTING MANHOLE TO EXISTING MCC-1 AND ADD ANOTHER SET OF 3#500 MCM, 1#250 MCM GROUND. THE ADDITIONAL SET OF CONDUCTORS SHALL MATCH EXISTING CONDUCTORS (XLP/USE) IN PHYSICAL AND ELECTRICAL CHARACTERISTIC AND SHALL BE SUPPLIED BY THE SAME MANUFACTURER (HI-TECH CABLE CORPORATION - FORMERLY PHELPS DODGE WIRE AND CABLE CO.). FINAL INSTALLATION SHALL BE AS FOLLOWS:
5#500 MCM PER PHASE, AND 5#250 MCM GROUND (ONE IN EACH CONDUIT). PROVIDE LUGS AS REQUIRED FOR CONDUCTOR TERMINATIONS.
- UTILIZE EXISTING 4" CONDUIT AND INSTALL 6#500 MCM, 1# 1/0 GROUND FOR CONNECTION OF 350 HP MOTOR TO NEW STARTER. ADDED TO EXISTING MOTOR CONTROL CENTER "MCC-1". REMOVE EXISTING JUNCTION BOX LOCATED ON CONCRETE PAD JUST NORTH OF EXISTING MCC-1. ALSO INSTALL 6 #4 CONDUCTORS FOR SOLENOID VALVES.
- TEMPERATURE MONITORING RELAY
- PHASE FAILURE RELAY (3Ø).
- CHANGE TRIP-SETTING TO 1600A
- DISCONNECT AND REMOVE FEEDER CONDUCTORS. LEAVE CONDUIT IN PLACE. ALSO DISCONNECT AND REMOVE MOTOR AND HAND OVER TO OWNER.
- ADD TIME DELAY RELAY IN THE CONTROL CIRCUIT AS PER SCHMATICS SHEET 20.

- MODIFY EXISTING CONTROL PANEL TO ACCOMODATE THE PROPOSED EXPANSION AS PER SCHEMATIC SHEETS 20, 21 AND P&ID SHEET.
- THE CONTRACTOR SHALL COORDINATE WITH PUBLIC SERVICE COMPANY OF COLORADO AND PROVIDE CT'S CABENITS AS PER PSSC SPECIFICATIONS AND STANDARDS.
- TRANSFORMER "T2", 15KVA, 3Ø, 480V-120/208V DRY TYPE. MOUNT IN MCC.
- EXISTING PUMP/MOTOR WILL BE RELOCATED AND RENAMED AS P3-1 (SEE POWER PLAN FOR LOCATION). NEW PUMP/MOTOR WILL BE INSTALLED AS SHOWN. DISCONNECT WIRING TO EXISTING MOTOR AND RECONNECT TO NEW MOTOR INCLUDING WIRING FOR THERMISTORS.
- RELOCATED PUMP/MOTOR. CONNECT AS SHOWN ON ONE LINE DIAGRAM.

"AS RECORDED"
FROM INFORMATION
PROVIDED BY THE
CONTRACTORS
DATE: 02/14/88

- LEGEND
- EXISTING
 - /-/-/- DEMOLITION
 - PROPOSED
 - FUTURE





UNDERGROUND TO
MANHOLE NO. 2

10-4" COND.
1-3/4" COND.
1-2" COND.

Zone 4/3
Pump Station

Revisions
10/14/88 AS BUILT
REVISIONS

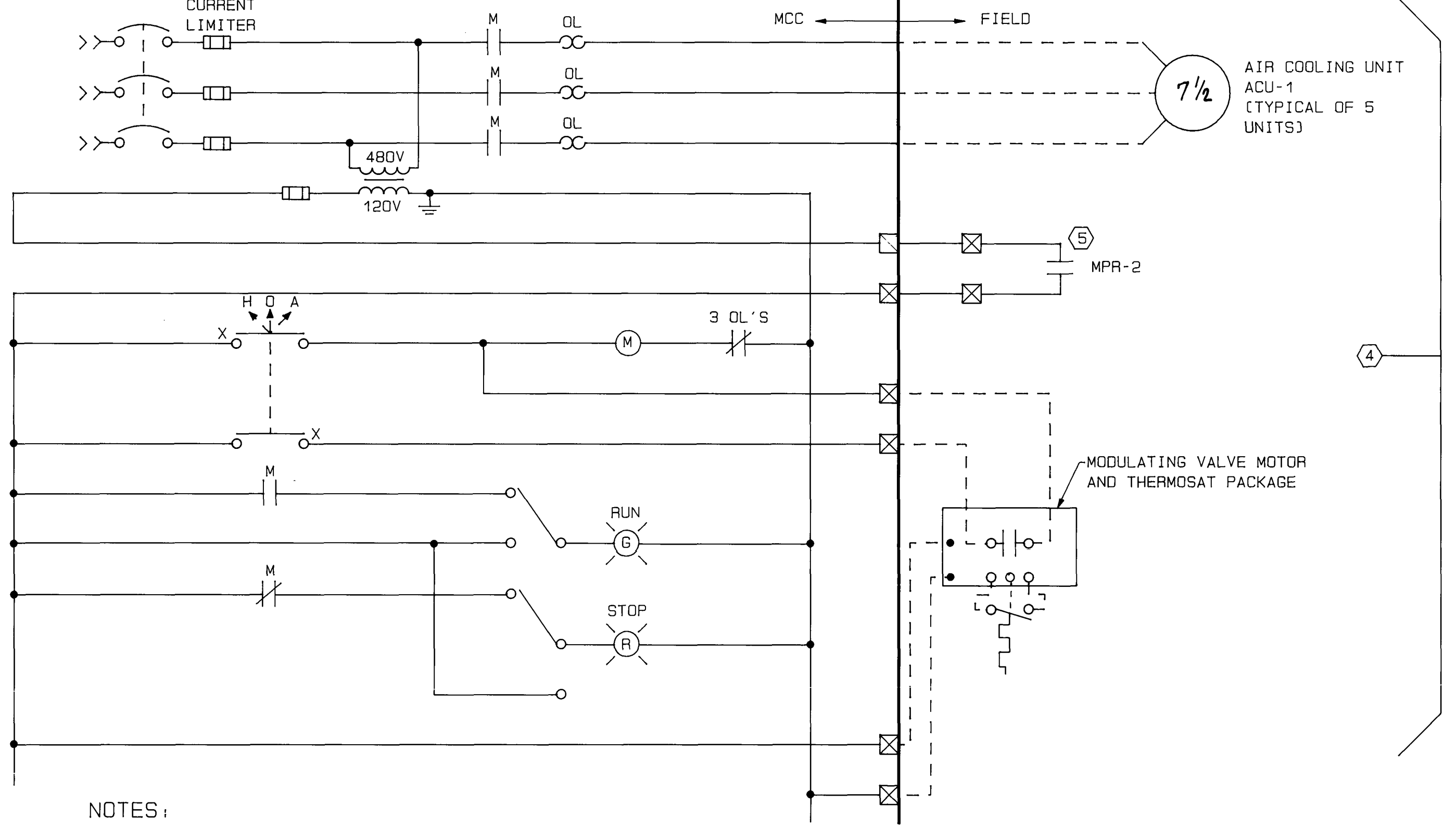
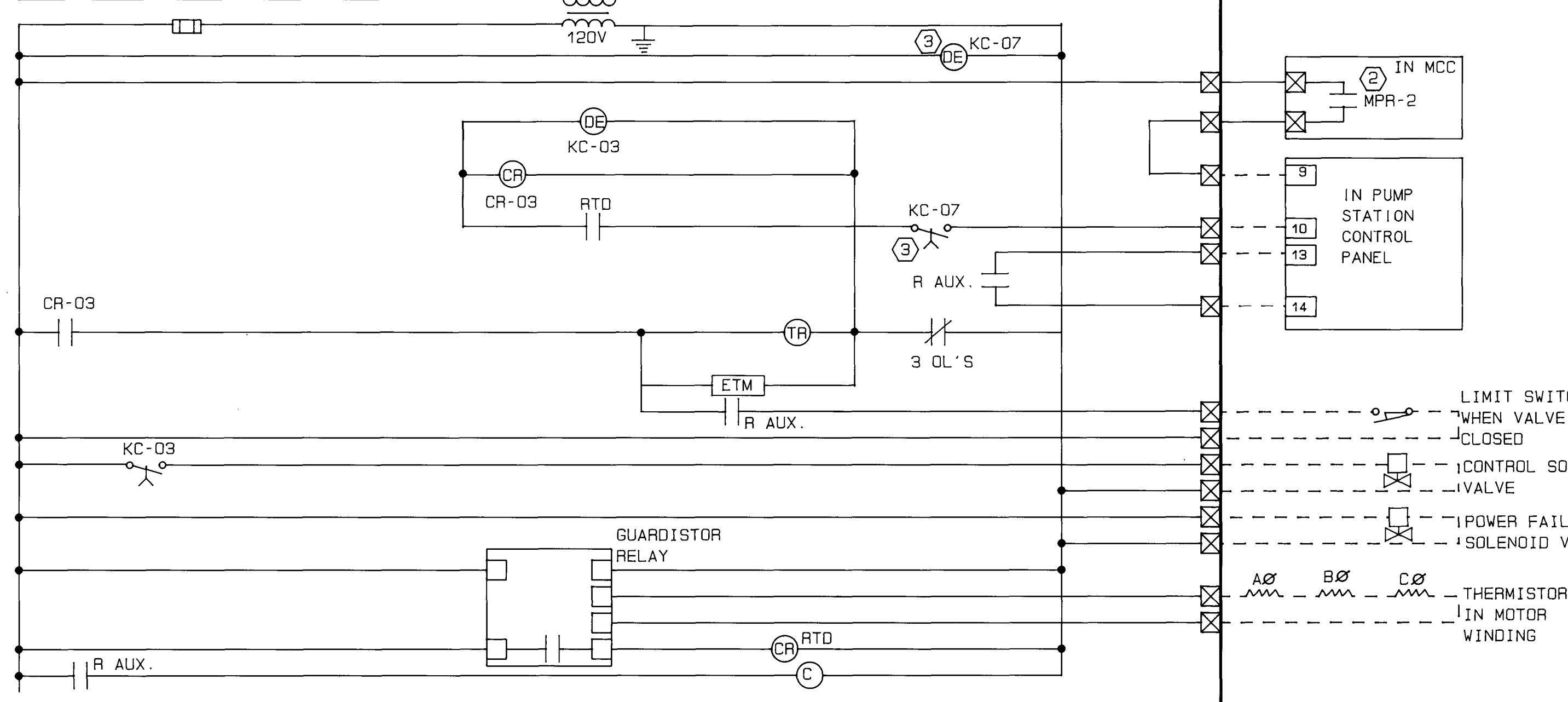
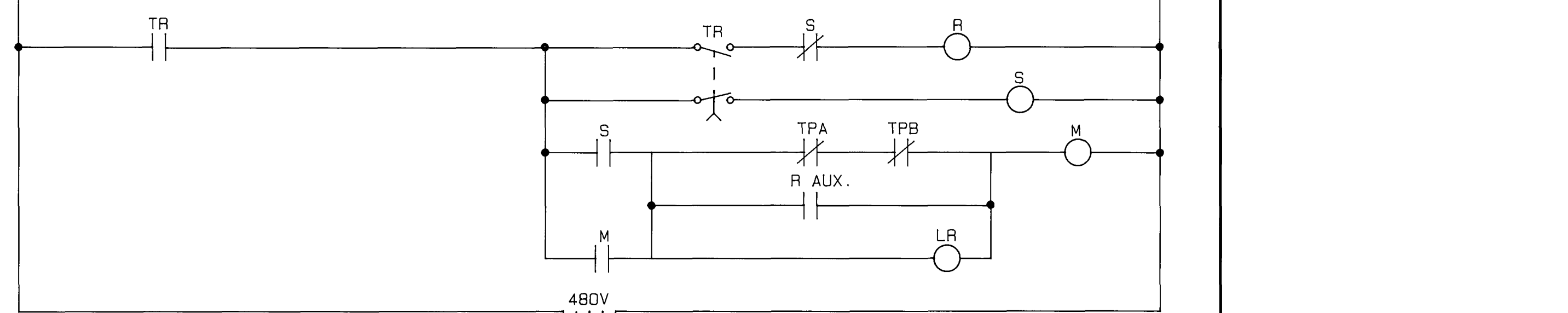
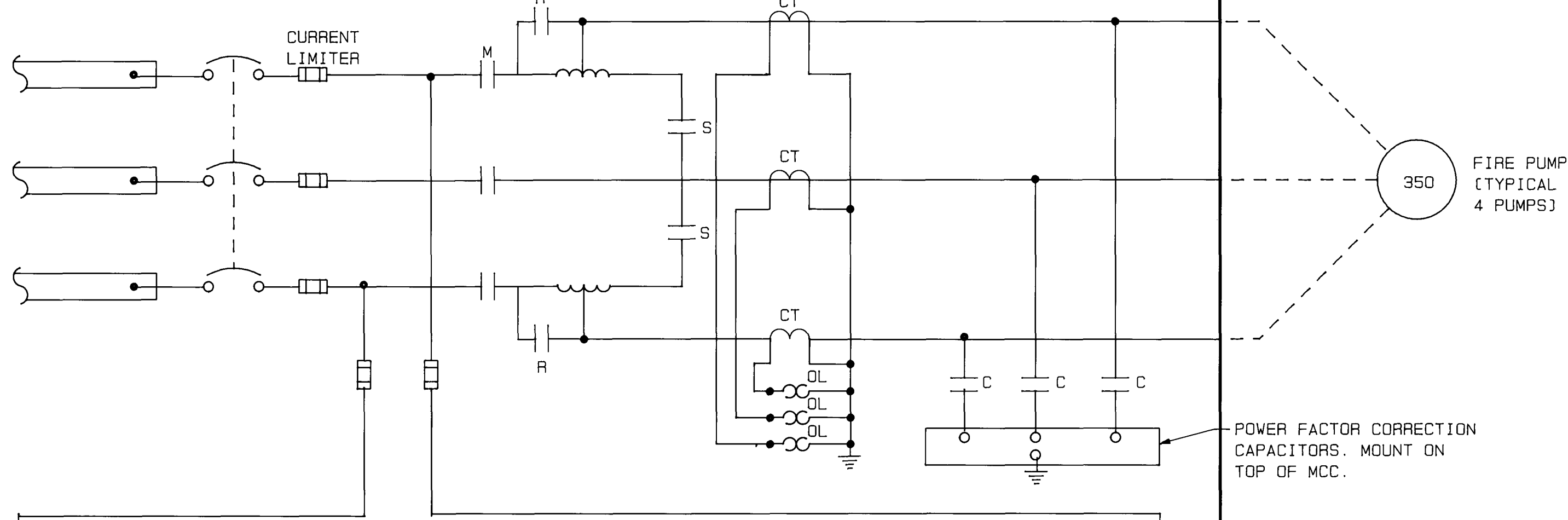
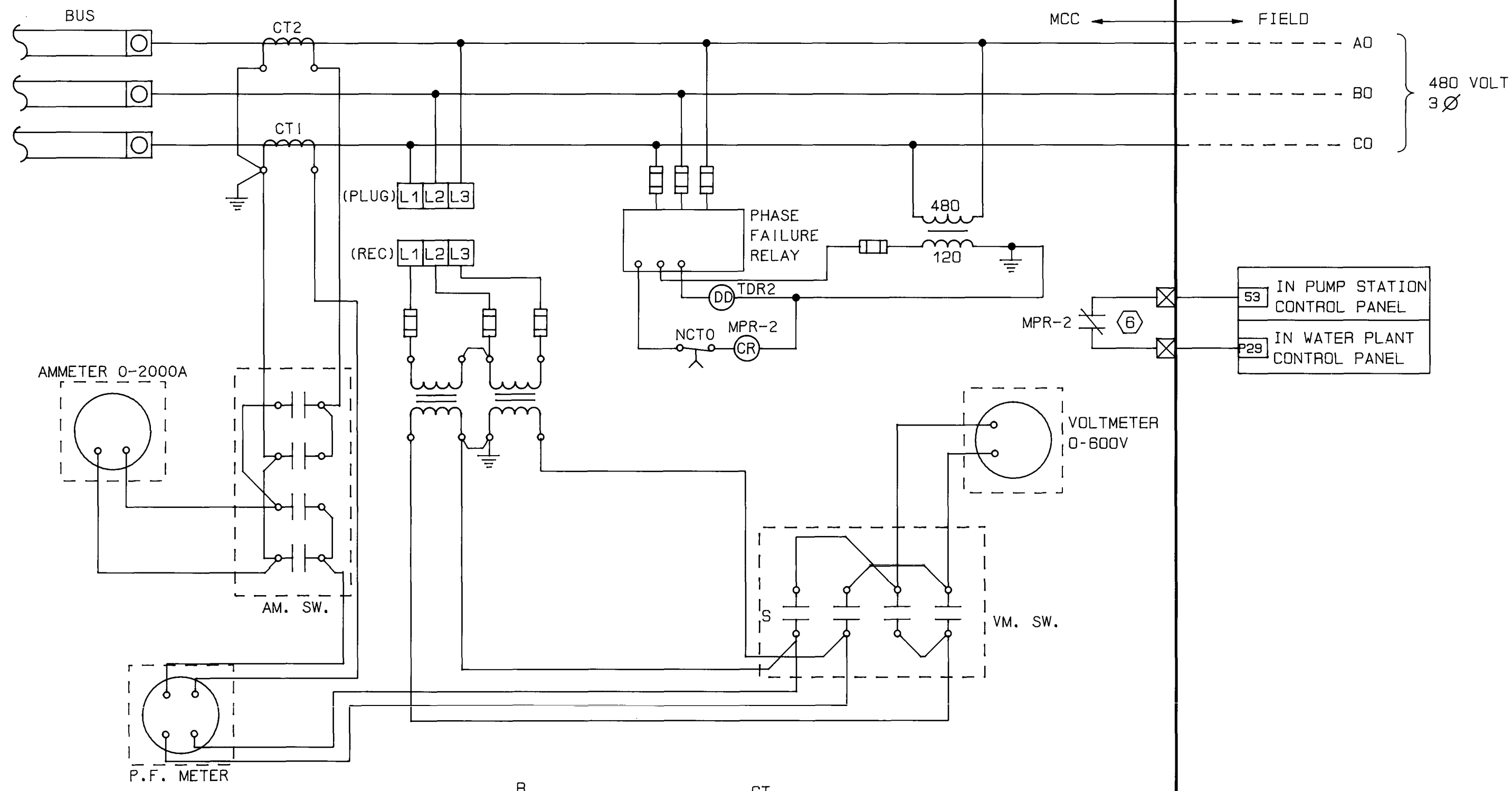


PANEL: LP-12				MOUNTING: IN MCC #2				
SERVICE: 200/208 VOLTS, 3 PHASE, 4 WIRE, 100% NEUTRAL				SERVICE ENTRANCE LABEL: NO				
MAIN DEVICE: 50 AMP CIRCUIT BREAKER, 3 POLE, 10 KAIC INTERRUPTING RATING								
FEEDER SOURCE: T-2 (15 KVA)			FEEDER SIZE: RESPONSIBILITY OF MCC SUPPLIER					
CKT. NO.	CIRCUIT IDENTIFICATION	C. B. AMPS	WATTS PER PHASE			C. B. AMPS	CIRCUIT IDENTIFICATION	CKT. NO.
			A	B	C			
1	SPARE	15/1	500/			15/1	PHASE FAILURE RELAY - NOC 2.	2
3	SPARE	20/1				20/1	SPARE	4
5	SPARE	20/1				20/1	SPARE	6
7	SPACE						SPACE	8
9								10
11								12
13								14
15								16
17								18
19								20

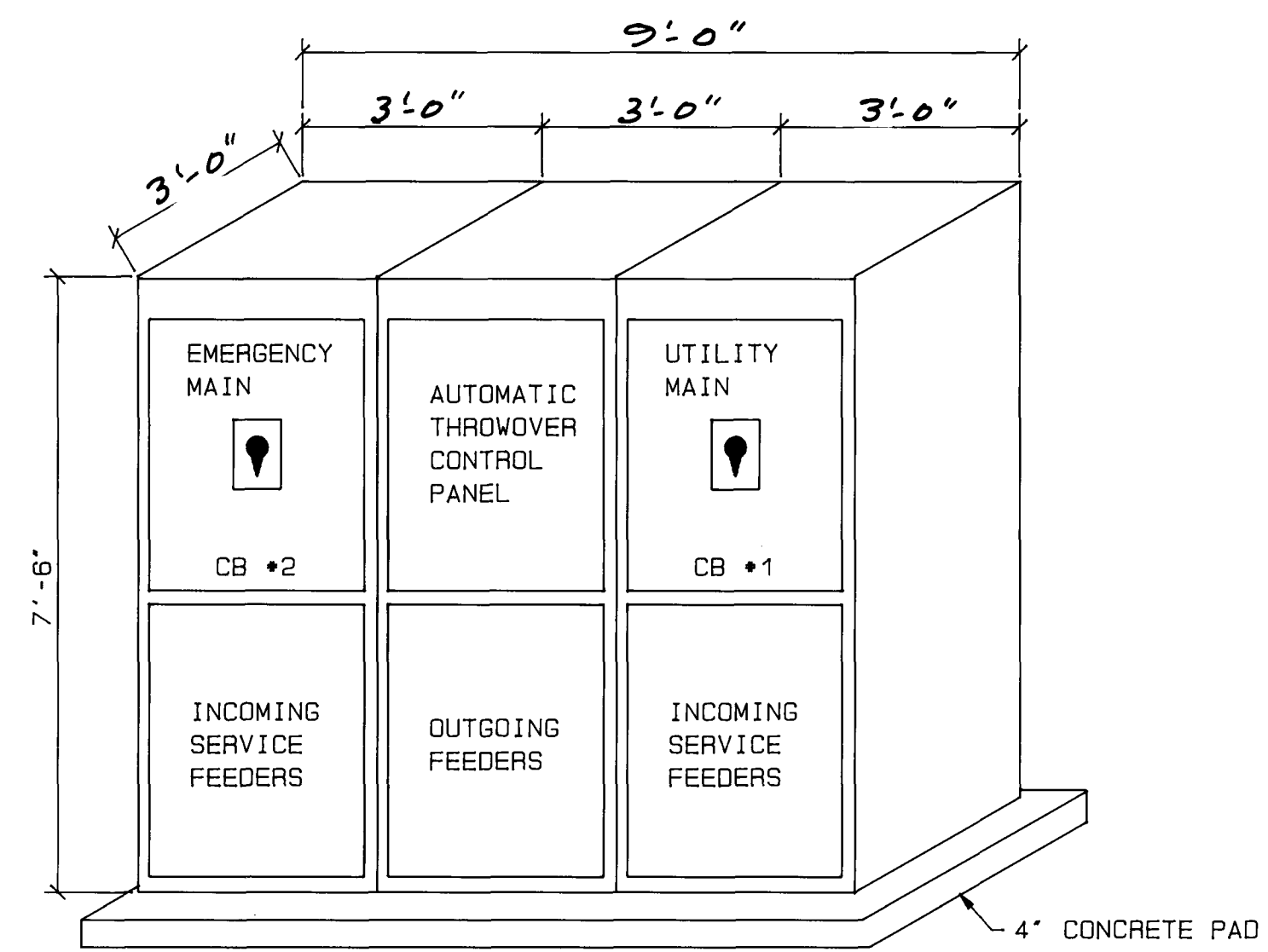
"AS RECORDED"
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DATE: OCT-14-88



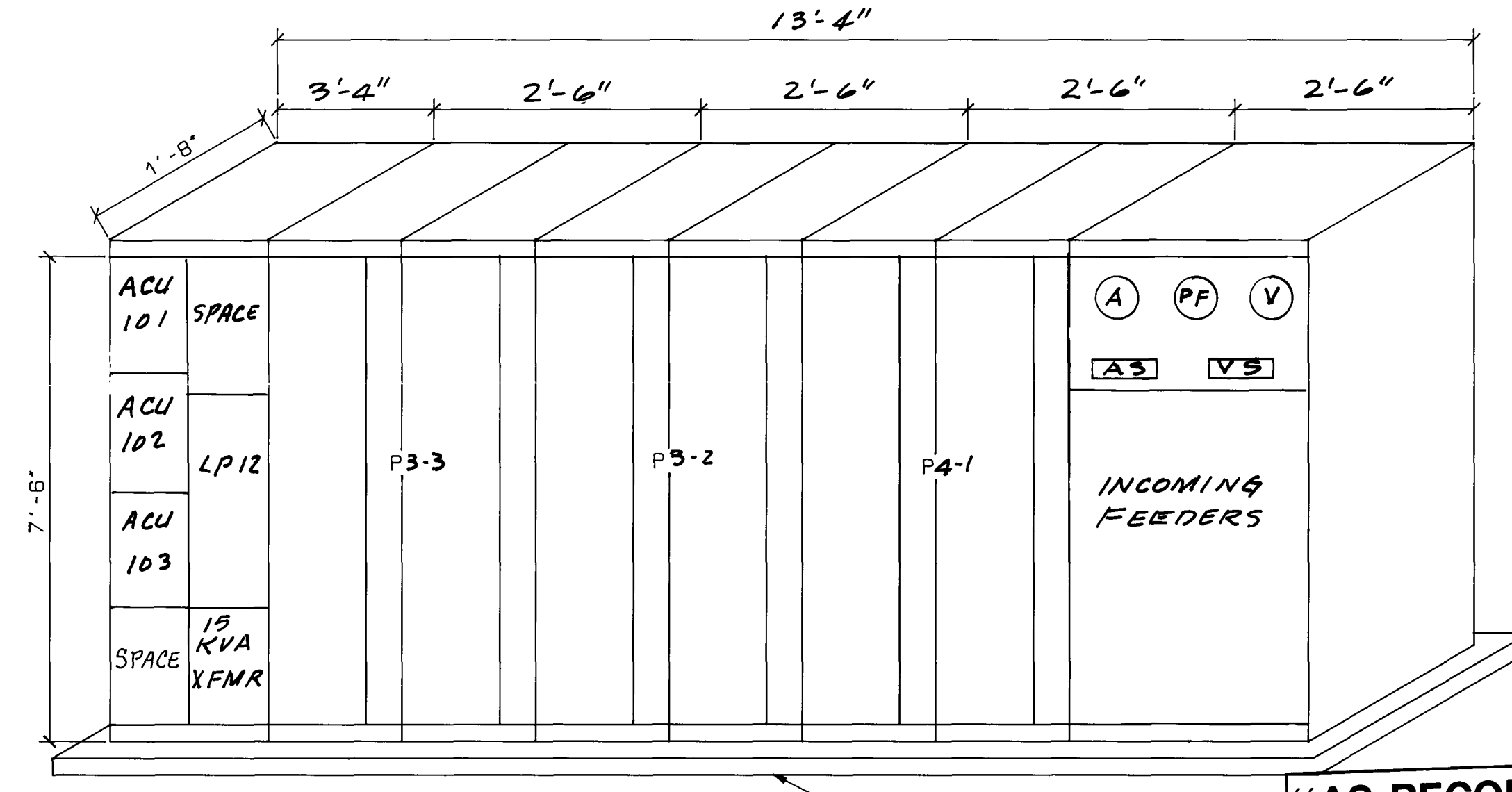
18



- NOTES:
- ① TYPICAL FOR P4-1, P4-2 P3-2 AND P3-3
 - ② P4-2 STARTER WILL BE LOCATED IN EXISTING MCC #1. USE CONTACT CLOSURE FRO EXISTING PHASE FAILURE RELAY MPR-1.
 - ③ ALSO ADD THIS RELAY TO THE CONTROL CIRCUIT FOR EXISTING PUMPS P4-3 AND P3-1 IN EXISTING STARTERS.
 - ④ TYPICAL FOR ACU-1, ACU-2, ACU-3, ACU-4 AND ACU-5.
 - ⑤ STARTERS FOR ACU-1 & ACU-2 WILL BE LOCATED IN EXISTING MCC #1. USE CONTACT CLOSURE FOR EXISTING PHASE FAILURE RELAY MPR-1.
 - ⑥ CONNECT IN SERIES WITH EXISTING PHASE FAILURE ALARM CIRCUIT.



SWITCHBOARD "SWB #2" ELEVATION
NO SCALE (TYPICAL FOR "SWB #1")



MCC #2 ELEVATION
NO SCALE

• PROVIDE 20" DEEP SECTION FOR INCOMING FEEDERS.

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DATE: OCT-14-88

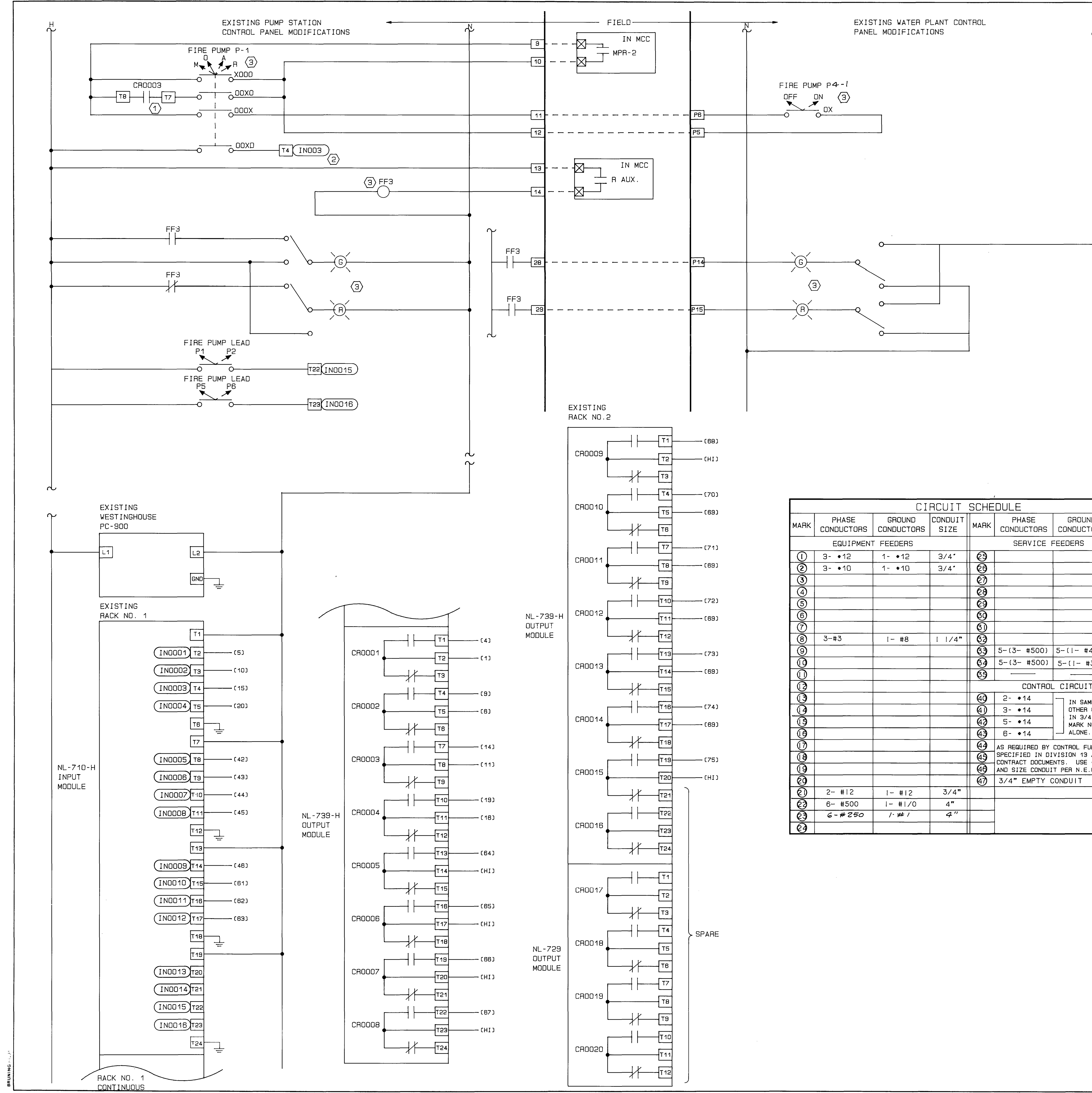


Part 1:
Thornton
Water
Treatment
Plant
Clearwell &
Pumping
Improvements

Zone 4/3
Pump Station

Project Number	148-42-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Eizway
Drawn By	R. Bredsnajder
Revisions	10/14/88 As BUILT REVISIONS





- NOTES:
- ① USE CONTROL POINT IN EXISTING PROCESS CONTROLLER OUTPUT MODULES, AS FOLLOWS:
A. CR0003 FOR P-1
B. CR0004 FOR P-2
C. CR0017 FOR P-5
D. CR0018 FOR P-6
 - ② USE DIGITAL INPUT POINT IN EXISTING PROCESS CONTROLLER INPUT MODULE AS FOLLOWS:
A. IN0003 FOR P-1
B. IN0004 FOR P-2
C. IN0013 FOR P-5
D. IN0014 FOR P-6
 - ③ TYPICAL FOR P4-1, P4-2, P3-2, AND P3-3
 - ④ GENERAL NOTE:
PRESSURE ELEMENTS, PRESSURE SWITCHES, PRESSURE TRANSMITTER AND FLOW METER/TRANSMITTERS ARE NOT SHOWN ON SCHEMATIC DIAGRAMS. CONNECT THESE DEVICES TO EXISTING CONTROL PANEL AS PER P&ID DRAWING SHEET 14 AND CONTROL LOOP DESCRIPTION.
SEE UCEC OEM MANUAL FOR COMPLETE WIRING DIAGRAMS.

CIRCUIT SCHEDULE							
MARK	PHASE CONDUCTORS	GROUND CONDUCTORS	CONDUIT SIZE	MARK	PHASE CONDUCTORS	GROUND CONDUCTORS	CONDUIT SIZE
EQUIPMENT FEEDERS				SERVICE FEEDERS			
①	3- #12	1- #12	3/4"	23			
2	3- #10	1- #10	3/4"	24			
3				25			
4				26			
5				27			
6				28			
7				29			
8	3-#3	1- #8	1 1/4"	30			
9				31			
10				32			
11				33	5-(3- #500)	5-(1- #4/0)	5- 4"
12				34	5-(3- #500)	5-(1- #350)	5- 4"
13				35			5- 4"
				CONTROL CIRCUIT			
14				40	2- #14	IN SAME CONDUIT WITH OTHER CONDUCTORS. IN 3/4" CONDUIT IF MARK NO. APPEARS ALONE.	
15				41	3- #14		
16				42	5- #14		
17				43	6- #14		
18				44	AS REQUIRED BY CONTROL FUNCTION		
19				45	SPECIFIED IN DIVISION 13 AND 15 OF		
20				46	CONTRACT DOCUMENTS. USE #14 WIRE		
21				47	AND SIZE CONDUIT PER N.E.C.		
22	2- #12	1- #12	3/4"	48	3/4" EMPTY CONDUIT		
23	6- #500	1- #1/0	4"				
24	6-#250	1- #1	4"				
25							

NOTES:
A. ANY CIRCUIT NOT IDENTIFIED WITH MARK NUMBER OR DESCRIPTIVE NOTE IS A BRANCH CIRCUIT REQUIRING 2-#12,1-#12, GND., 3/4"C. 480V CIRCUITS IDENTIFIED ONLY ON ONE-LINE DIAGRAMS.
B. THIS SCHEDULE IS BASED ON THE USE OF THWN FOR CONDUCTOR SIZE NO.8 AND SMALLER AND XHHW FOR SIZE NO.6 AND LARGER. INCREASE CONDUIT SIZE PER N.E.C. IF OTHER INSULATION TYPE IS REQUIRED BY SPECIFICATION SECTION 16120.
C. THIS IS A STANDARD SCHEDULE. SOME MARK NUMBERS MAY NOT BE USED ON THIS PROJECT.

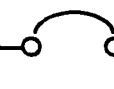
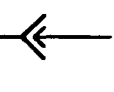
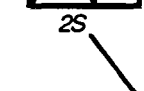
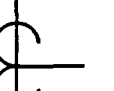
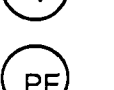
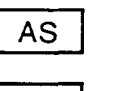
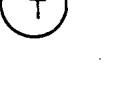
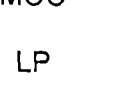
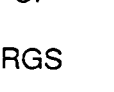
Part 1:
Thornton
Water
Treatment
Plant
Clearwell &
Pumping
Improvements

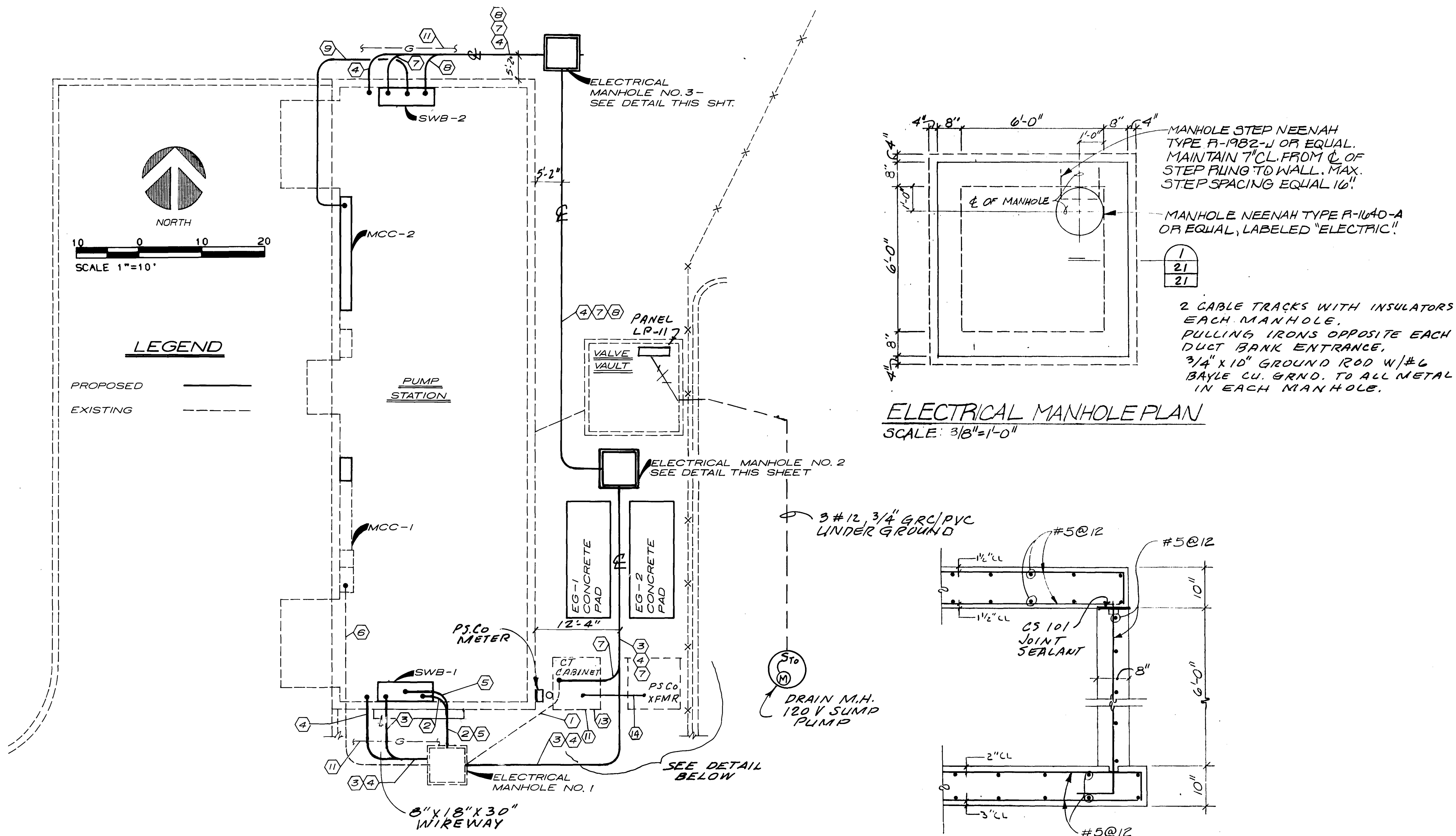
Electrical
Site Plan

Project Number	148-42-50
Date	November, 1988
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	C. Nyman
Mechanical	P. O'Brien
Electrical	M. Elzway
Drawn By	R. Bredsnajder
Revisions	10/14/88 AS BUILT REVISIONS

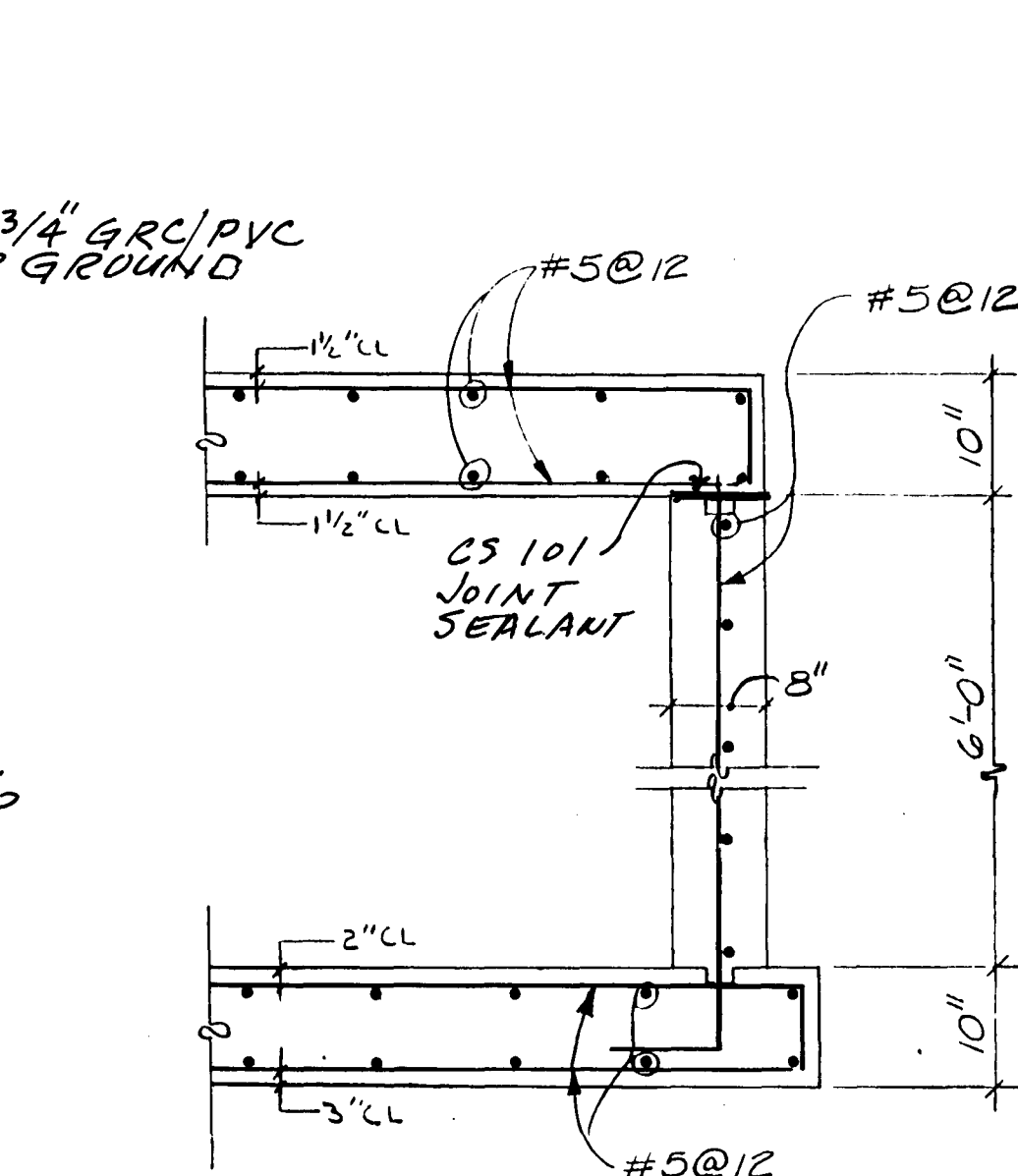


Electrical Symbol Legend

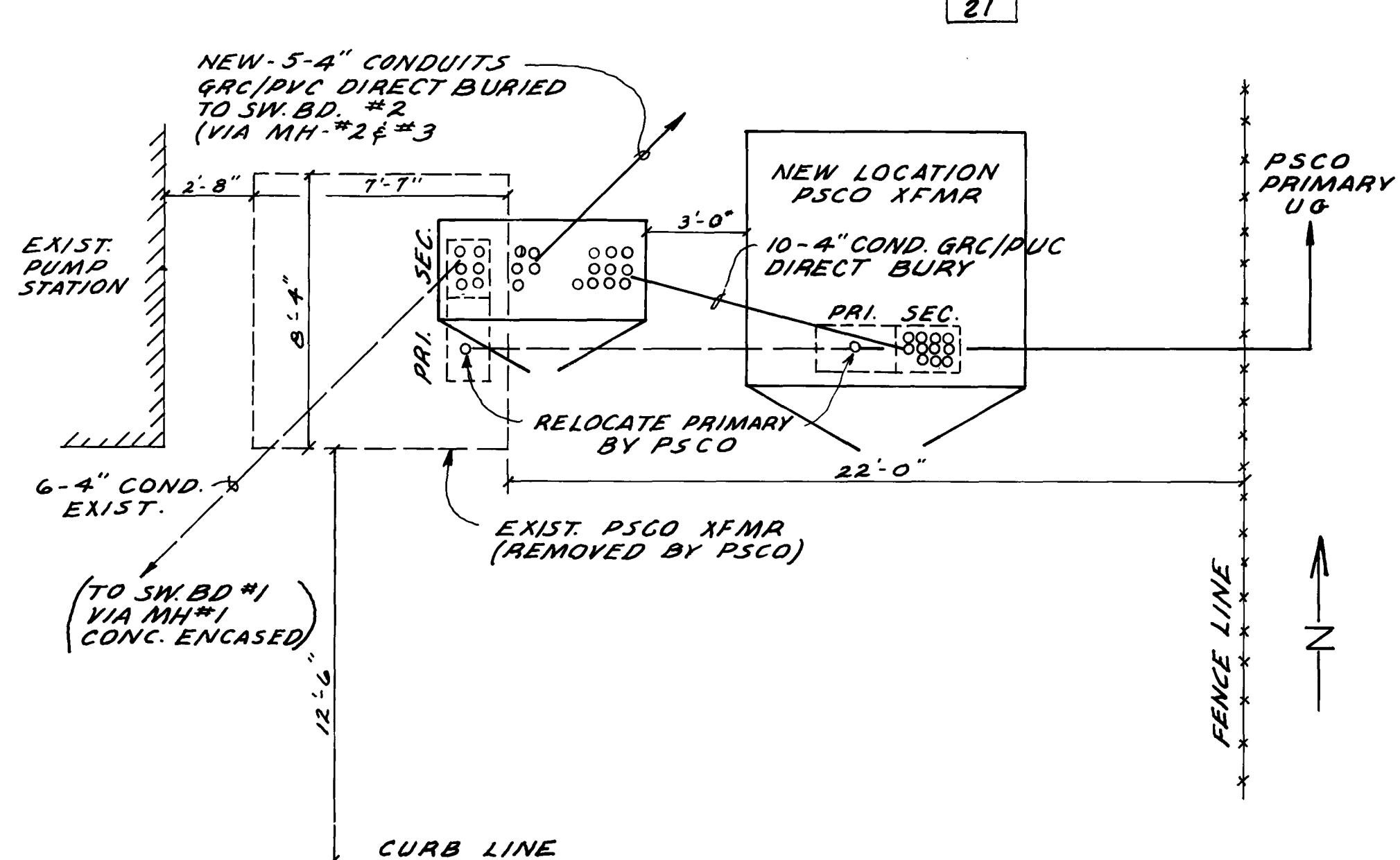
	Hand-off-auto selector switch (3 position)
	Molded case circuit breaker, rating and no. of poles indicated
	Fuse, size and quantity as required
	Disconnect device for drawout equipment
	Combination magnetic starter, ckt. bkr. type, part of MCC assembly. Nema size and ckt. bkr. size as indicated. 3 pole unless indicated
	Pilot light, RG Indicates one red and one green pilot light. Light colors: Red for running Green for stop Amber for standby
	Reversing Reduced voltage 2 Speed
	Motor, A-C induction type, encircled numeral indicates expected horsepower
	Solenoid valve
	Instrument, various types
	Current transformer
	Potential transformer
	Transformer, type and rating as noted
	Ammeter
	Voltmeter
	Power factor
	Ampmeter switch
	Voltmeter switch
	Elapsed time meter
	Device operated by components of temperature control system. See specifications division 15 and mechanical drawings.
MCC	Motor control center
LP	Lighting and small power panel
CP	Control panel by others
RGS	Rigid galvanized steel
	Motor winding, thermistors
	Ground fault protection. Integral part of main service entrance circuit breaker



ELECTRICAL MANHOLE PLAN
SCALE: 3/8"=1'-0"



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



"AS RECORDED"
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CONTRACTORS
DATE: OCT-14-88



Part 2 :
Thornton
Parkway
24"
Water Main

Plan & Profile

Project Number
148-43-50

Date
November, 1986

Project Manager
G. Fuller

Design
J. Chwirka

Architectura

Structural

Mechanical

Electrical

Drawn By
R. Bredsnajder

Revisions



Sheet Number

22

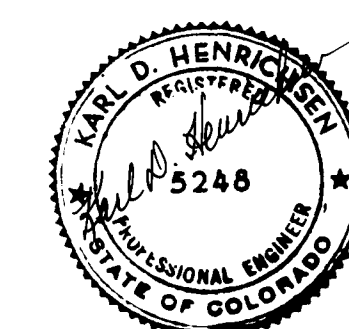


Part 2 :
Thornton
Parkway
24"
Water Main

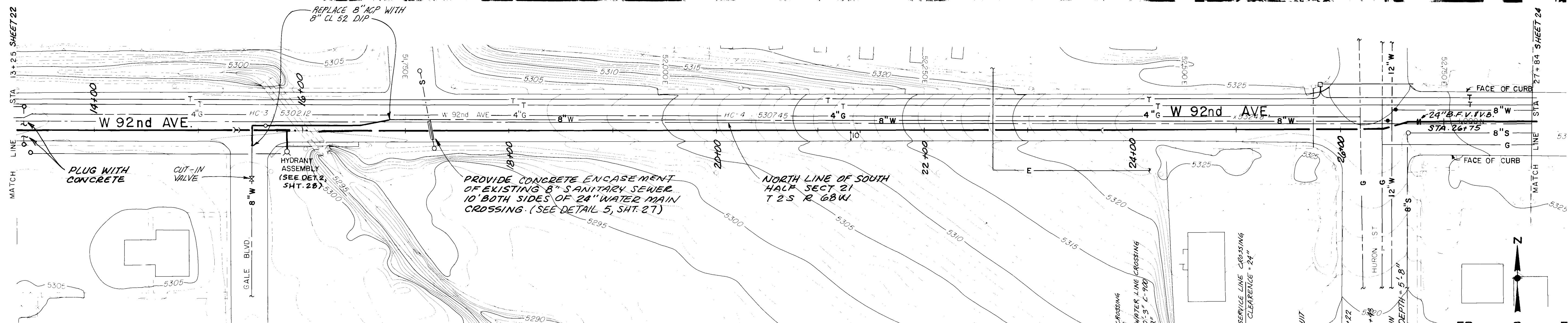
Plan & Profile

Project Number	148-43-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	
Mechanical	
Electrical	
Drawn By	R. Bredsnajder

Revisions



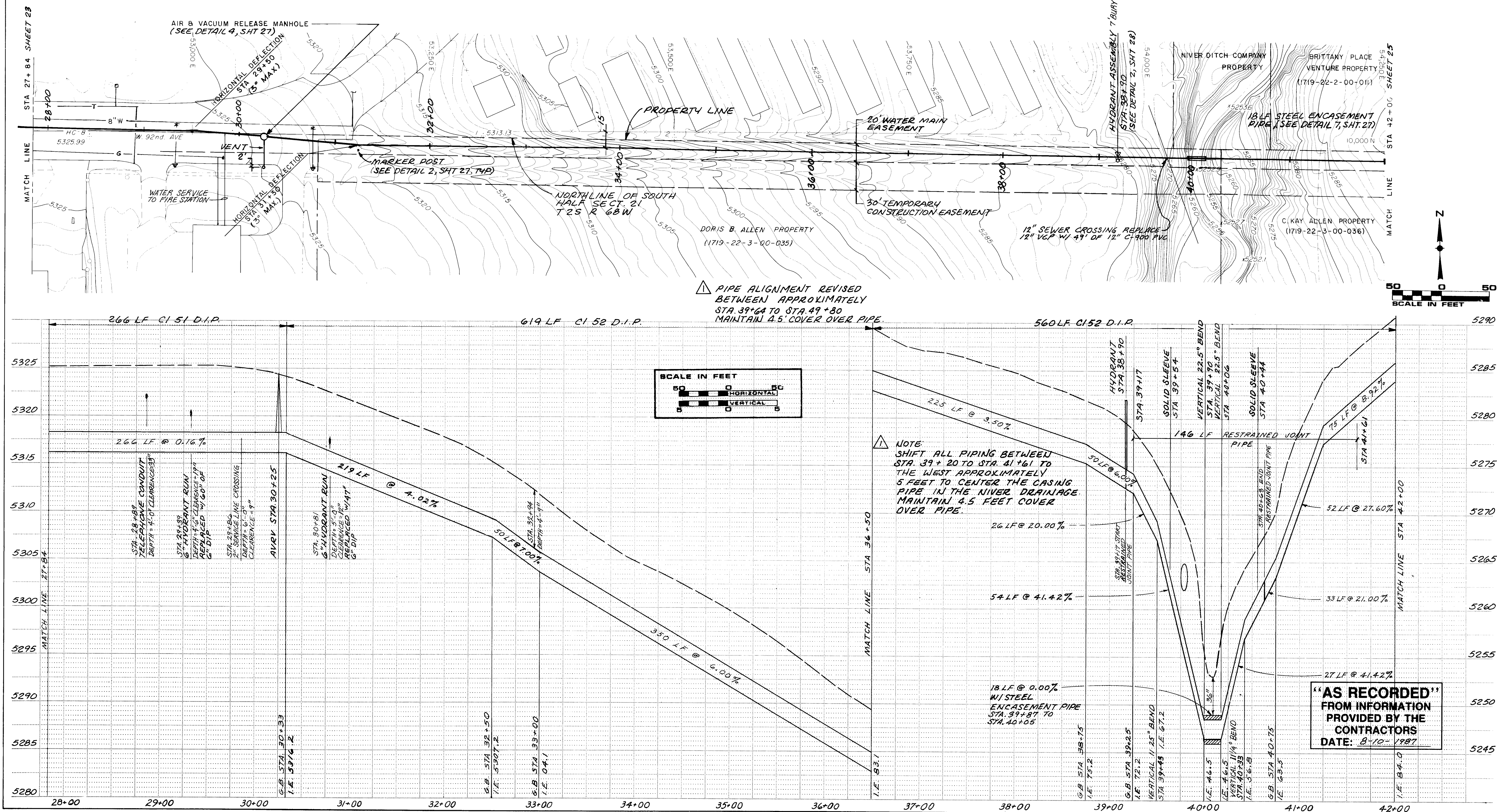
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Part 2 :
Thornton
Parkway
24"
Water Main

Plan & Profile

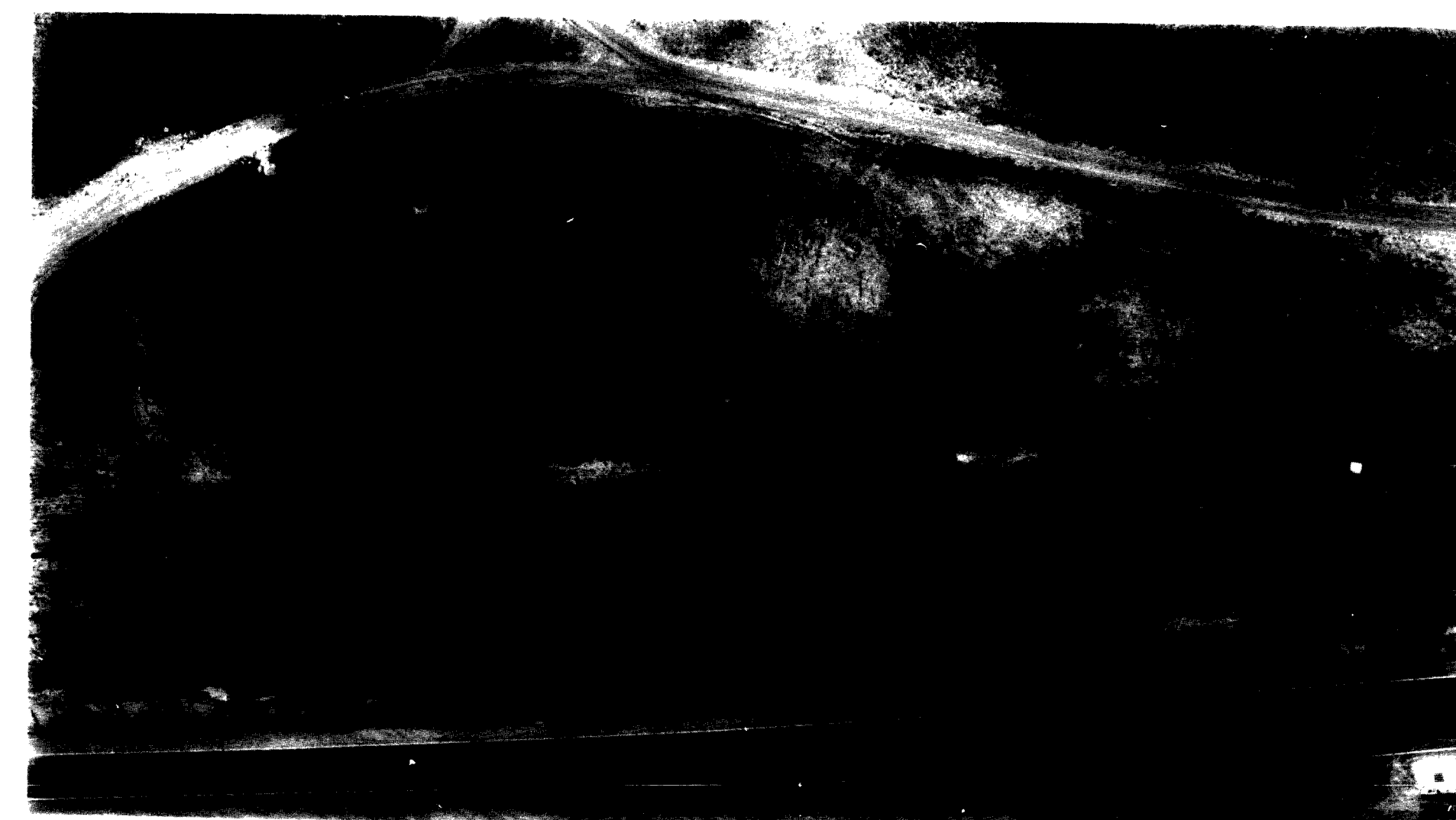


Project Number	148-43-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	
Mechanical	
Electrical	
Drawn By	R. Bredsnajder
Revisions	
	JULY 2, 1987



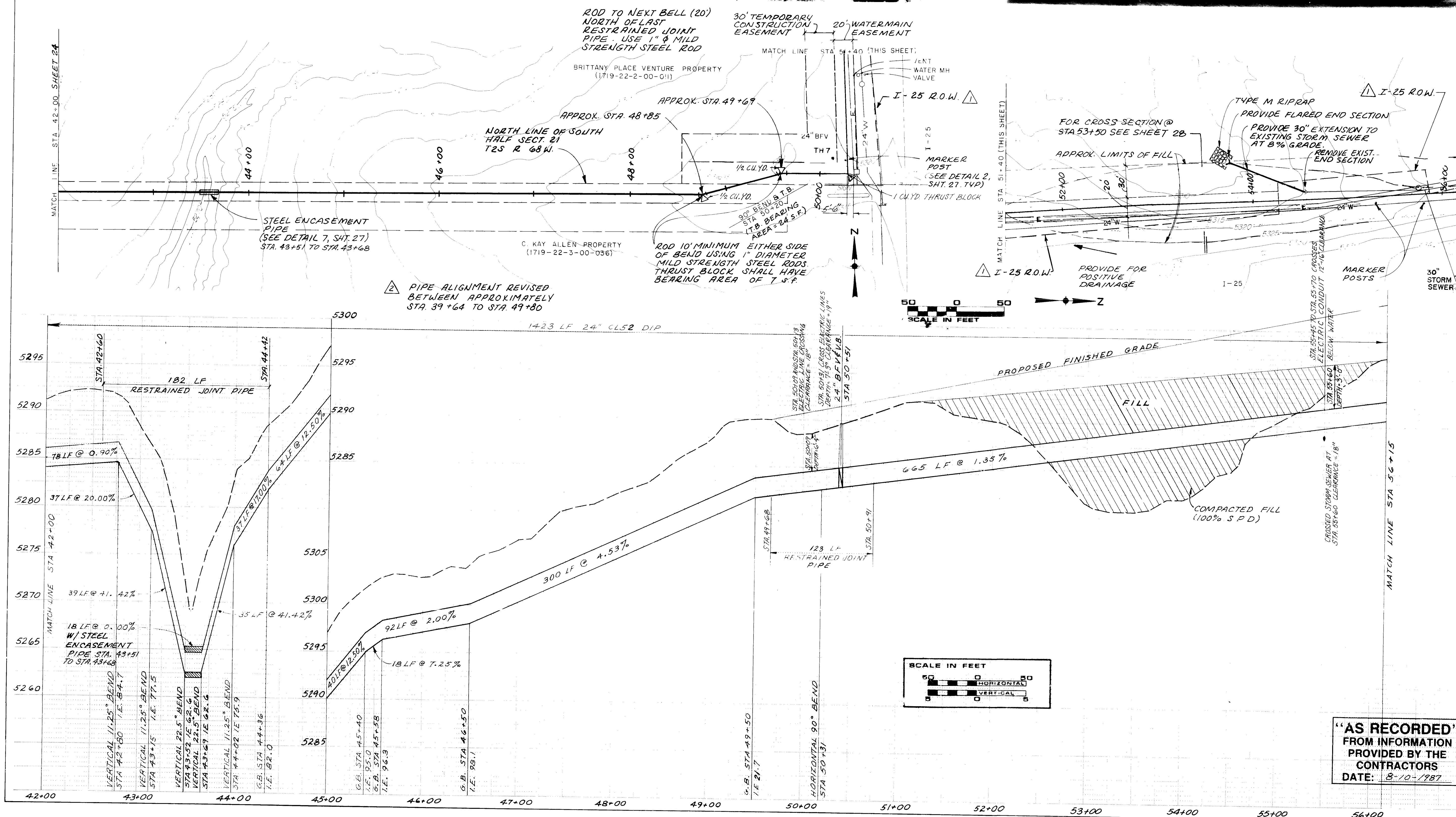
Sheet Number

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Plan & Profile

25

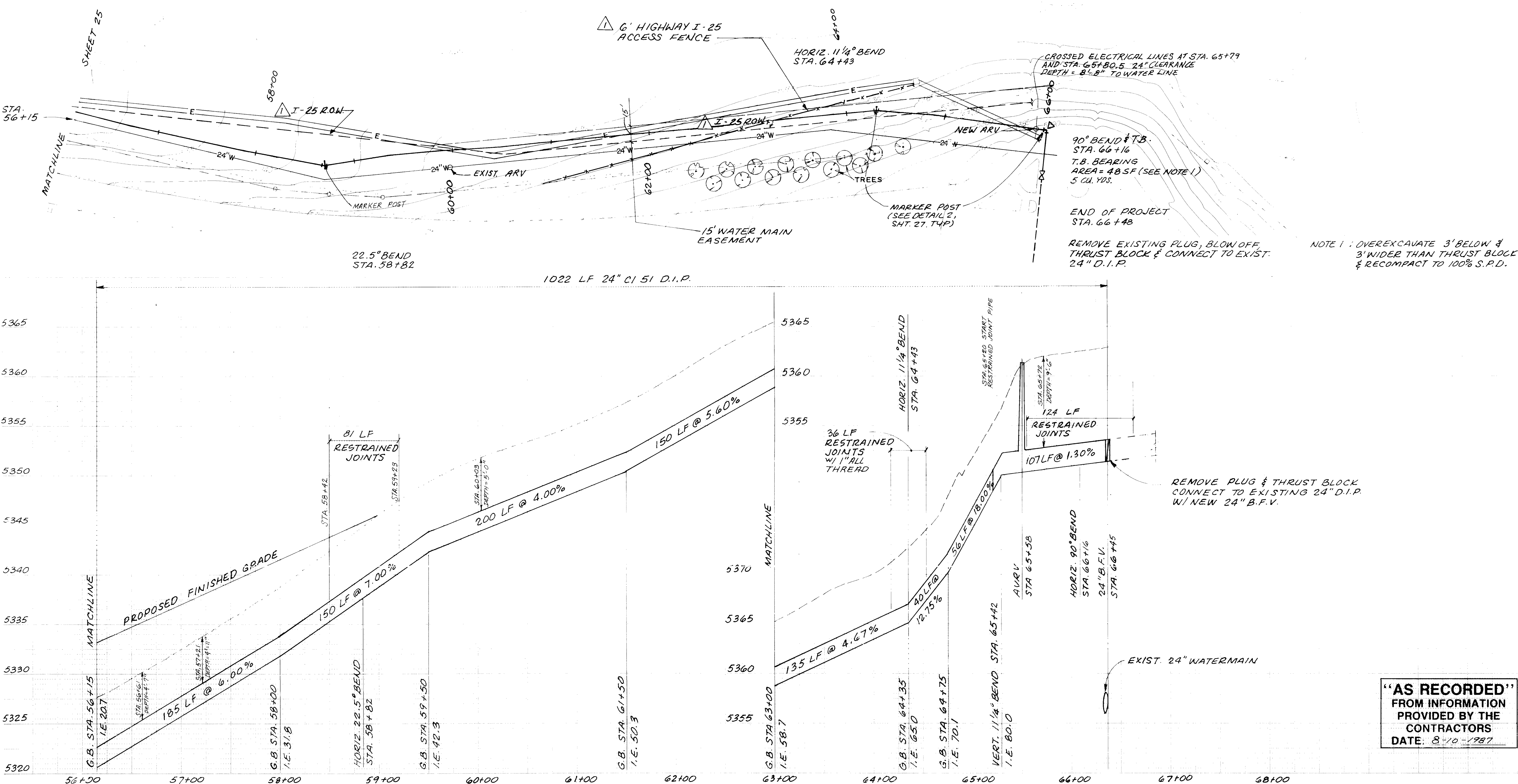
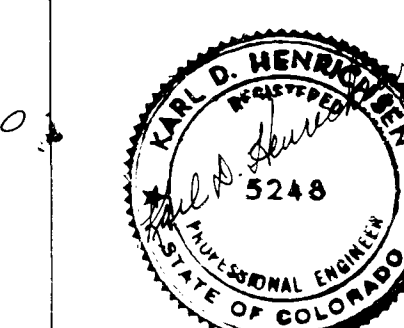




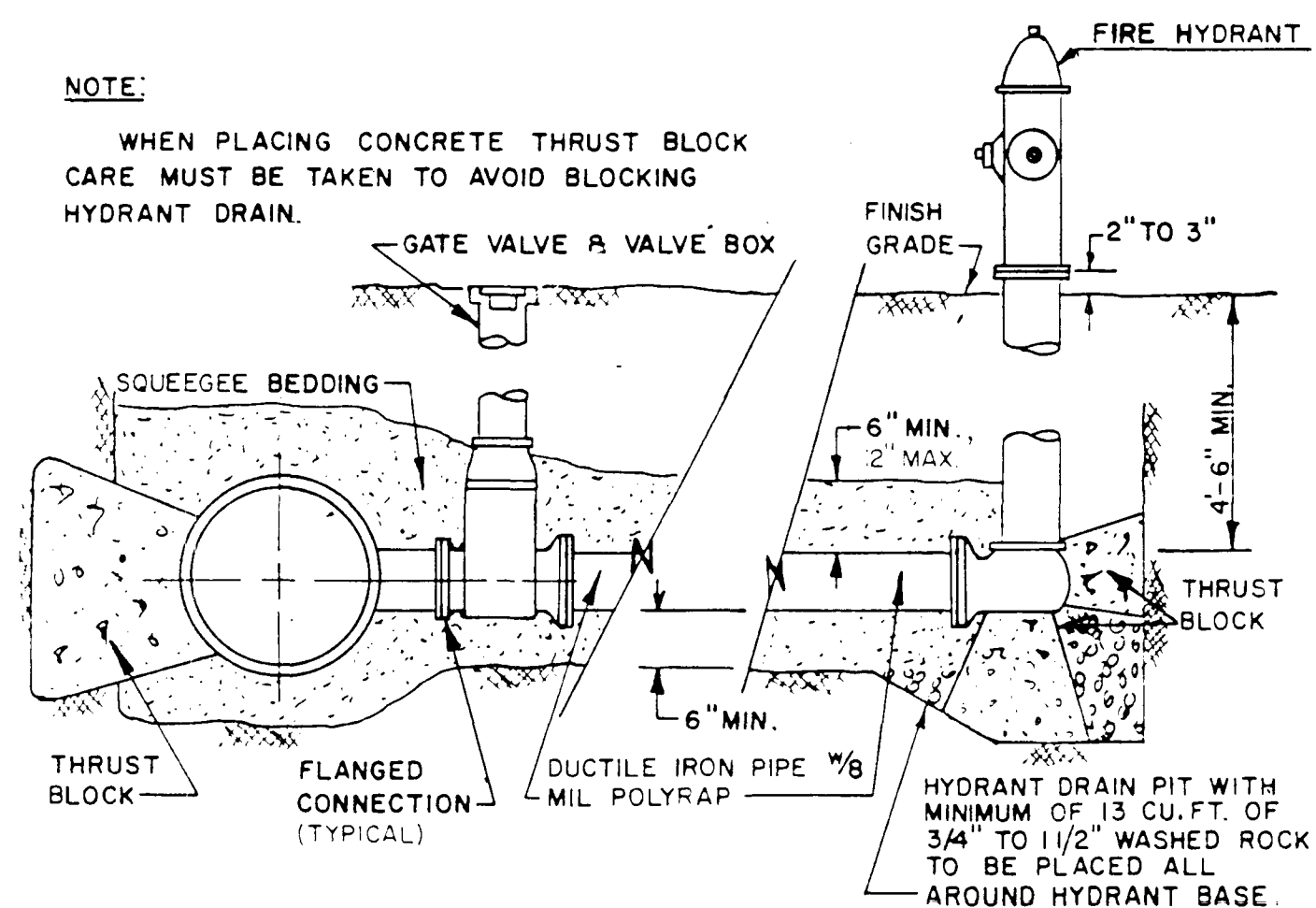
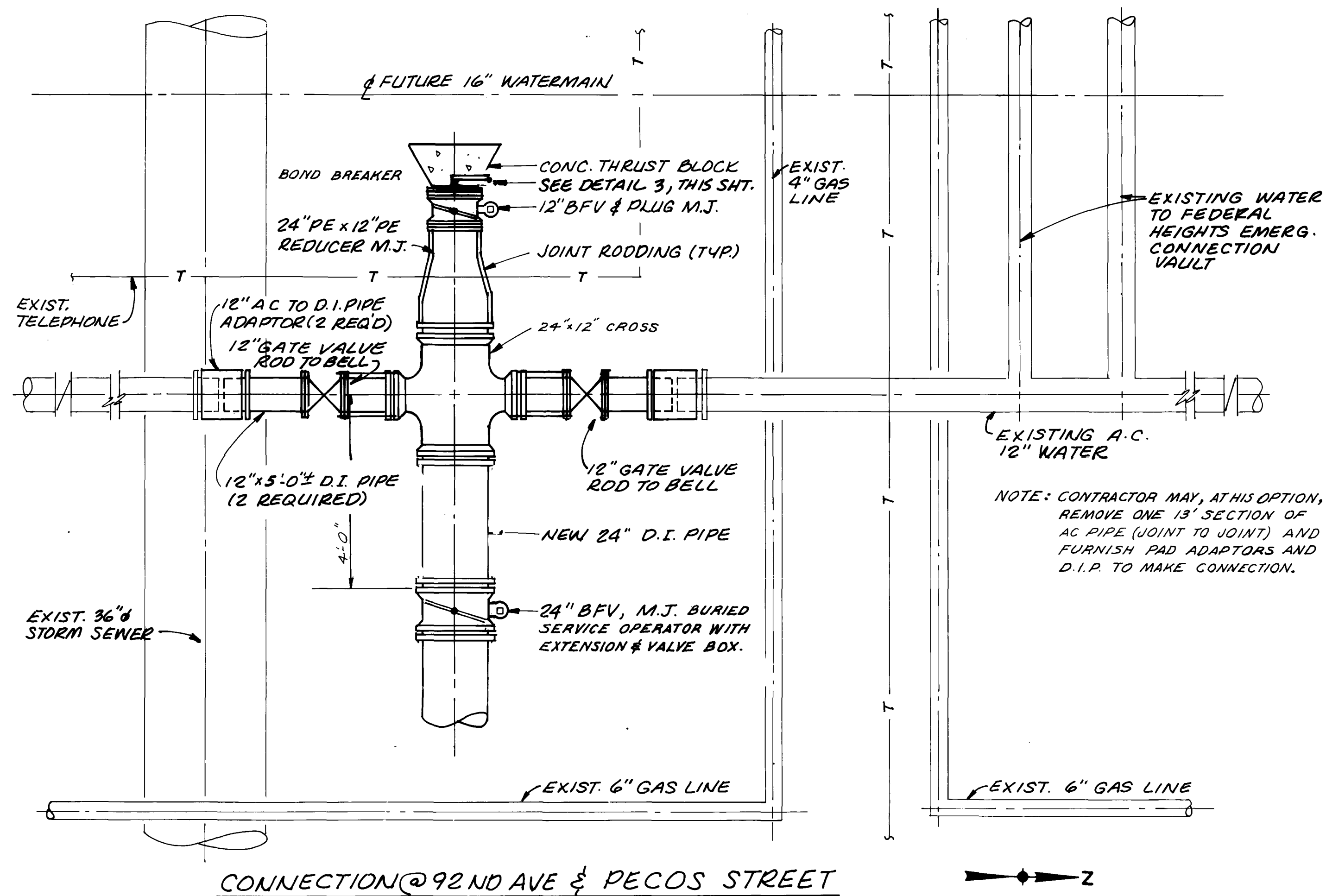
Part 2 :
Thornton
Parkway
24"
Water Main

Plan & Profile

Project Number	148-43-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	
Mechanical	
Electrical	
Drawn By	R. Bredsnajder
Revisions	
1	MARCH 12, 1987 R.O.W. / FENCE

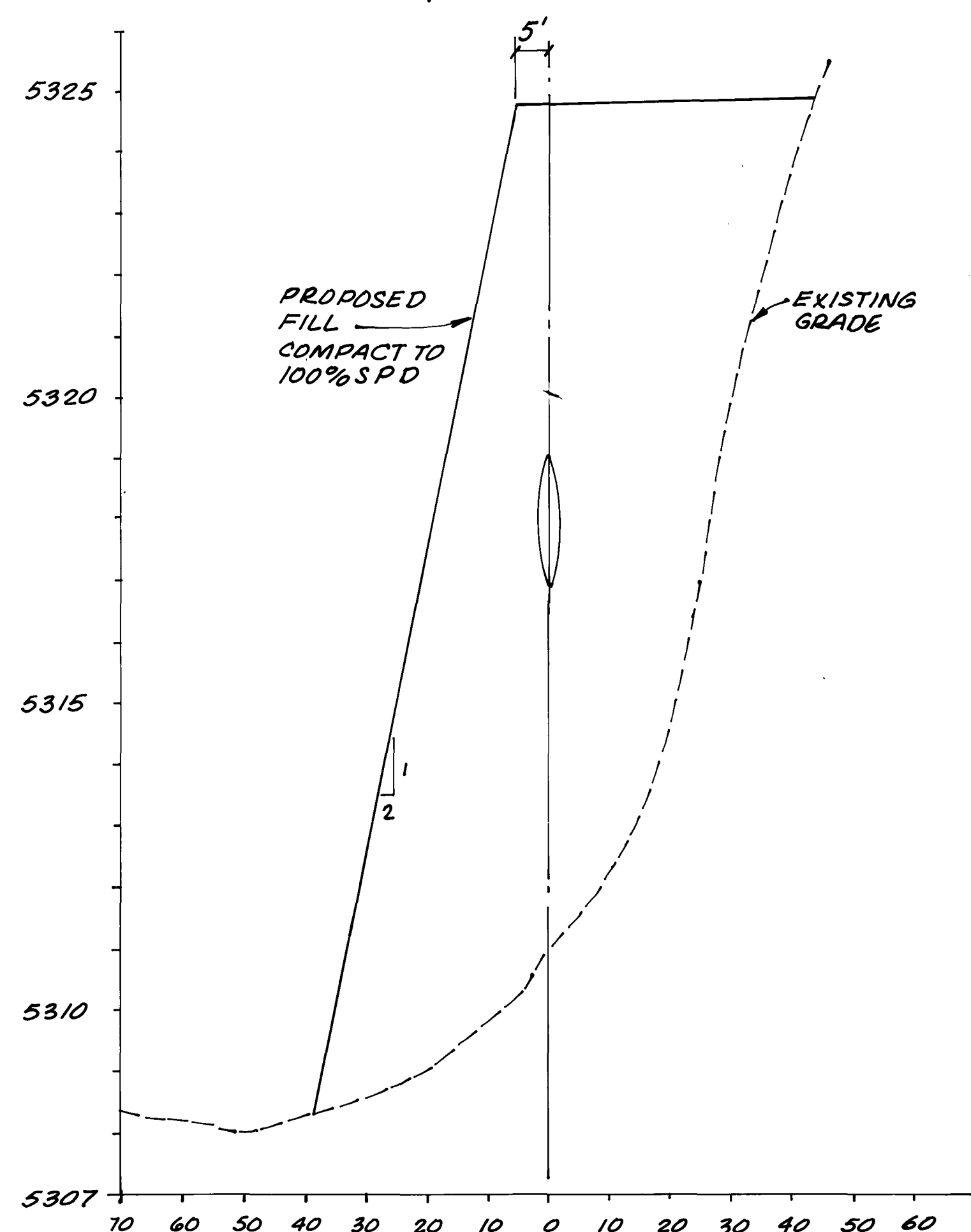


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DATE: 8-10-1987



DETAIL 28
NO SCALE

DETAIL 1
SCALE: 1/2" = 1' 0"



CROSS SECTION @ STA. 53+50



HDR Infrastructure, Inc.
A Centerra Company

Part 2 :
Thornton
Parkway
24"
Water Main

Miscellaneous
Details

Project Number	148-43-50
Date	November, 1986
Project Manager	G. Fuller
Design	J. Chwirka
Architectural	
Structural	
Mechanical	
Electrical	
Drawn By	R. Bredsnajder
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