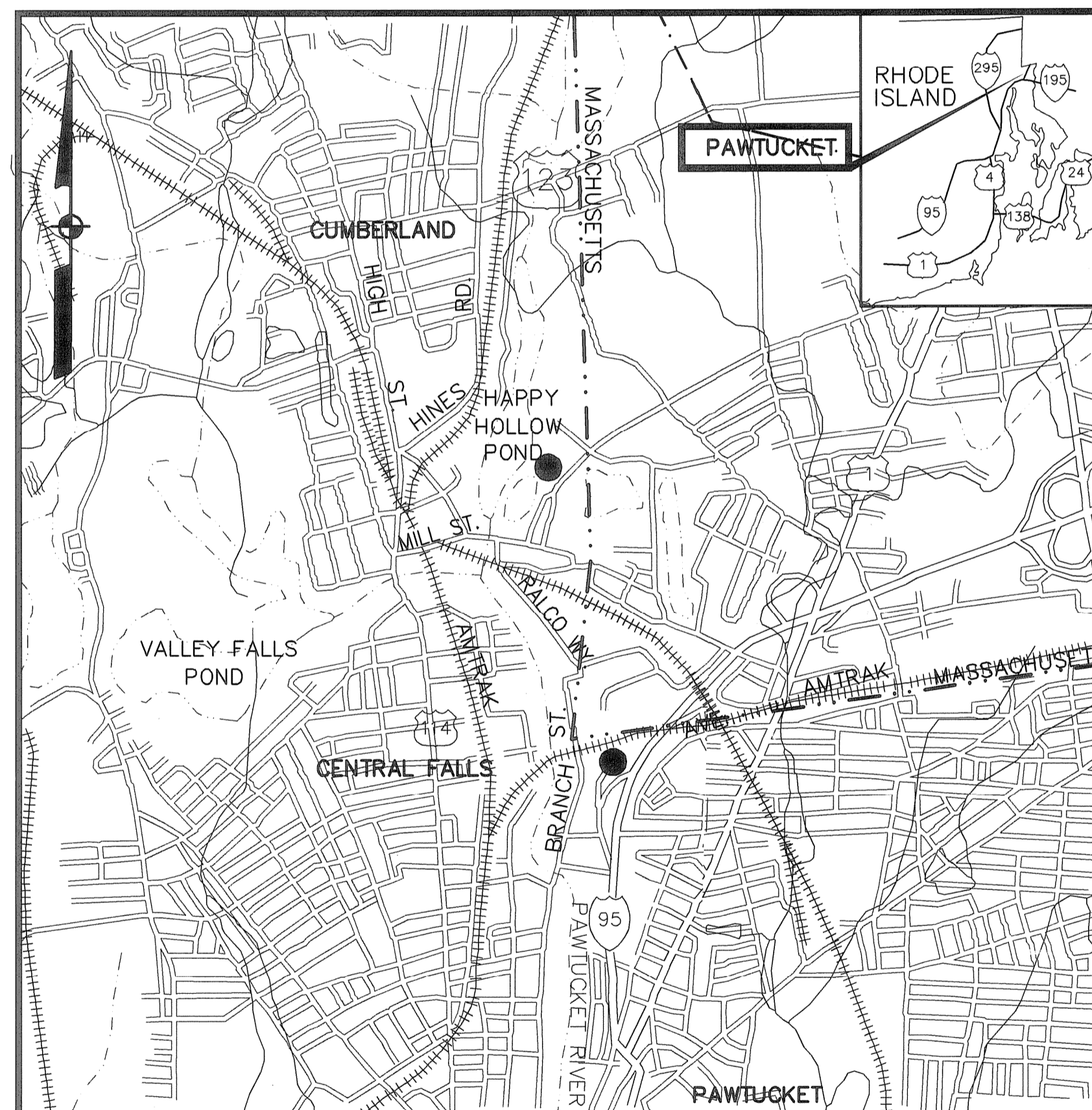


# CONTRACT DRAWINGS - FOR - Pawtucket Regional Water Treatment Facility Pkg. 6 - Mechanical Process

Pawtucket, Rhode Island

OCTOBER 31, 2006

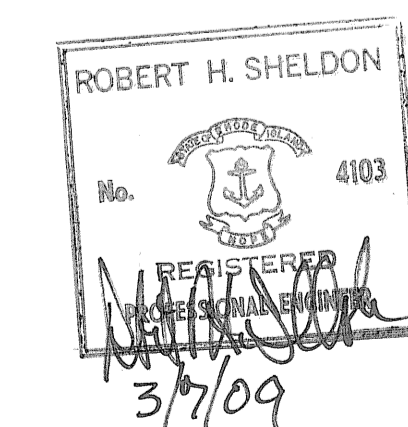
INDEX



LOCUS  
NOT TO SCALE

 **EarthTech**  
A Tyco International Ltd. Company

300 Baker Avenue Suite 290 Concord, Mass.



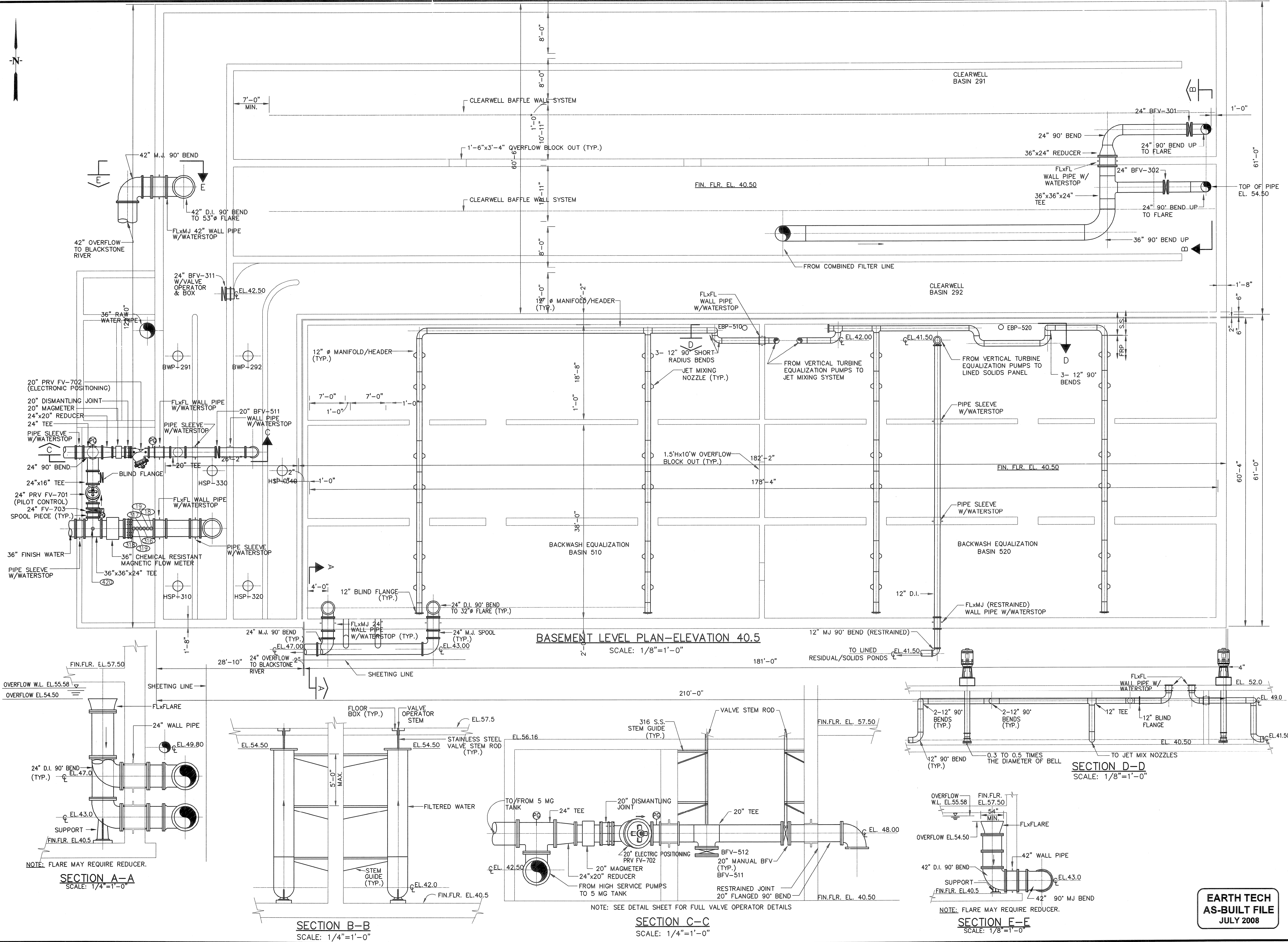
<u>DWG.</u>	<u>TITLE</u>
	COVER
	<u>GENERAL</u>
G-1	ABBREVIATIONS AND SYMBOLS
G-2	PROCESS SCHEMATIC
G-3	HYDRAULIC PROFILES
	<u>MECHANICAL PROCESS</u>
M-1	PLAN AT ELEVATION 40.5 (BASEMENT)
M-2	PLAN AT ELEVATION 57.5 (LOWER LEVEL)
M-3	PLAN AT ELEVATION 73.5 (UPPER LEVEL), SECTIONS AND FILTER GALLERY
M-4	PIPE GALLERY- PLANS AT ELEVATION 52.0 AND 57.5
M-5	PIPE GALLERY- PLANS AT ELEVATION 52.0 AND 57.5
M-6	SECTIONS AND DETAILS
M-7	SECTIONS - PIPE GALLERY
M-8	SECTIONS - PIPE GALLERY
M-9	CLARIFIER/FILTER PLAN AND SECTIONS
M-10	SCHEMATICS - CHEMICAL FEED AREA
M-11	SCHEMATICS - CHEMICAL FEED AREA
M-12	CHEMICAL FEED DETAILS
M-13	PROCESS ANALYZERS
M-14	CHEMICAL FEED PIPING - PLAN AND SECTIONS
M-15	DETAILS

**GENERAL NOTES**

LOCATIONS OF ALL UTILITIES AND SUB-SURFACE STRUCTURES ARE FROM SURVEY AND RECORDS OF TOWN, CORPORATIONS, ETC., AND ARE CONSIDERED APPROXIMATE BOTH AS TO SIZE AND LOCATION AND ARE INDICATED ON THESE DRAWINGS TO GIVE BIDDERS A GENERAL IDEA OF EXISTING CONDITIONS TO BE INVESTIGATED BY THE BIDDER. IT IS UNDERSTOOD AND AGREED THAT EACH BIDDER WILL NOT RELY UPON THESE DRAWINGS FOR SUCH INFORMATION, BUT THAT EACH BIDDER SHALL MAKE EXAMINATIONS IN THE FIELD BY VARIOUS AVAILABLE METHODS AND SHALL OBTAIN INFORMATION FROM UTILITY CORPORATIONS AND INDIVIDUALS AS TO THE LOCATION OF ALL SUB-SURFACE STRUCTURES.

ALL ELEVATIONS REFER TO NATIONAL GEODETIC VERTICAL DATUM OF 1929.

Filename: L:\WORK\69993\CAD\AS-BUILT\6) WTP\MECH\69993.M1 - 8.DWG  
 Plot File Date Created: Sep/22/2008 10:57 AM



**BASEMENT LEVEL PLAN-ELEVATION 40.5**

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

**SECTION A-A**

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

**SECTION B-B**

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

**SECTION C-C**

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

**SECTION D-D**

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

**SECTION E-E**

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

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2	10/31/04	ISSUED FOR RFI POSTED SET	
1	5/20/05	ISSUED FOR CONSTRUCTION	
0	4/9/05	ISSUED FOR CONSTRUCTION	

ROBERT H. SHELDON  
 No. 4103  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF MASSACHUSETTS  
 10/15/09

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
 PLAN AT ELEVATION 40.5 (BASEMENT)

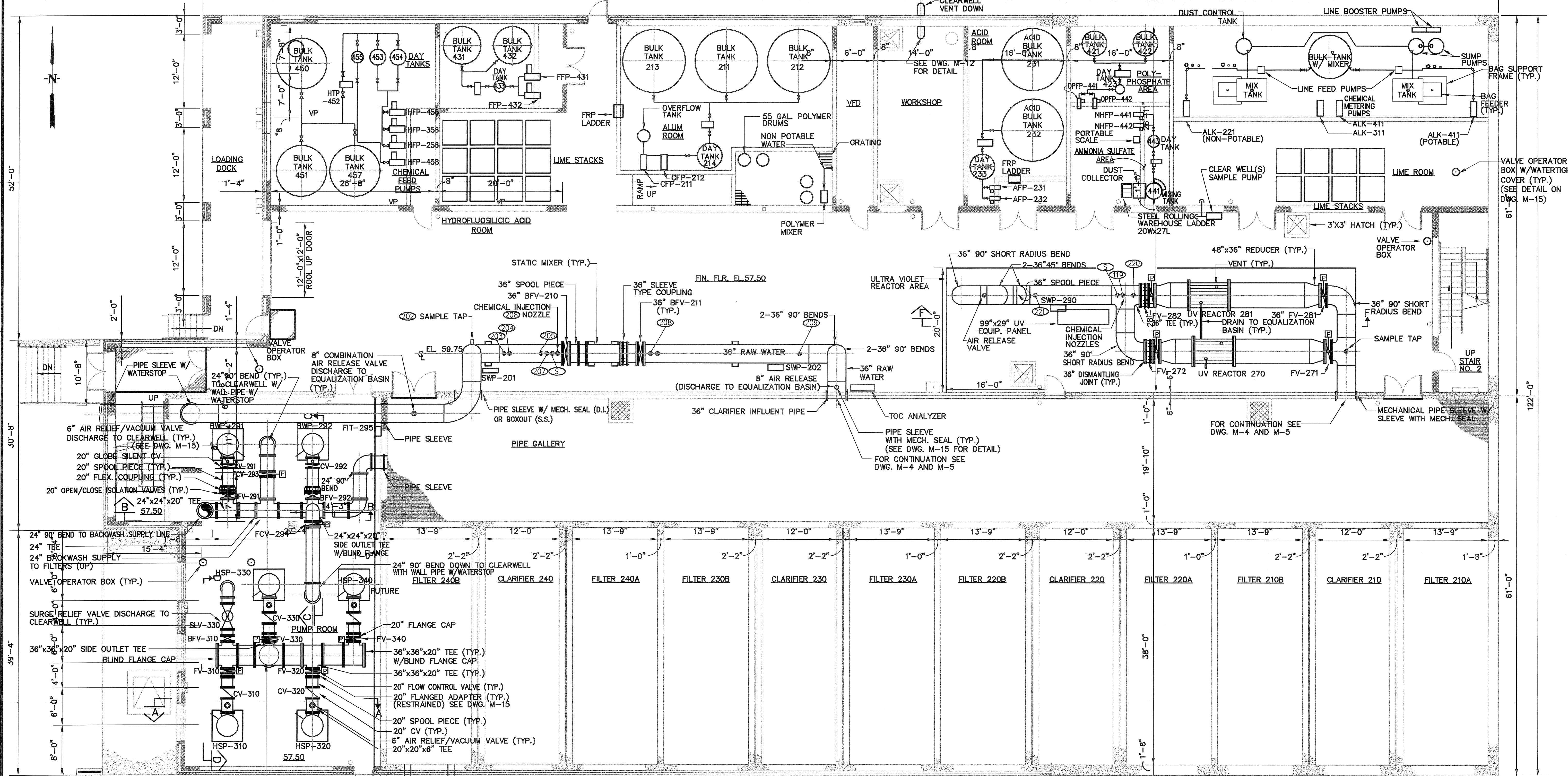
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DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
	DATE

**EARTH TECH**  
**AS-BUILT FILE**  
 JULY 2008

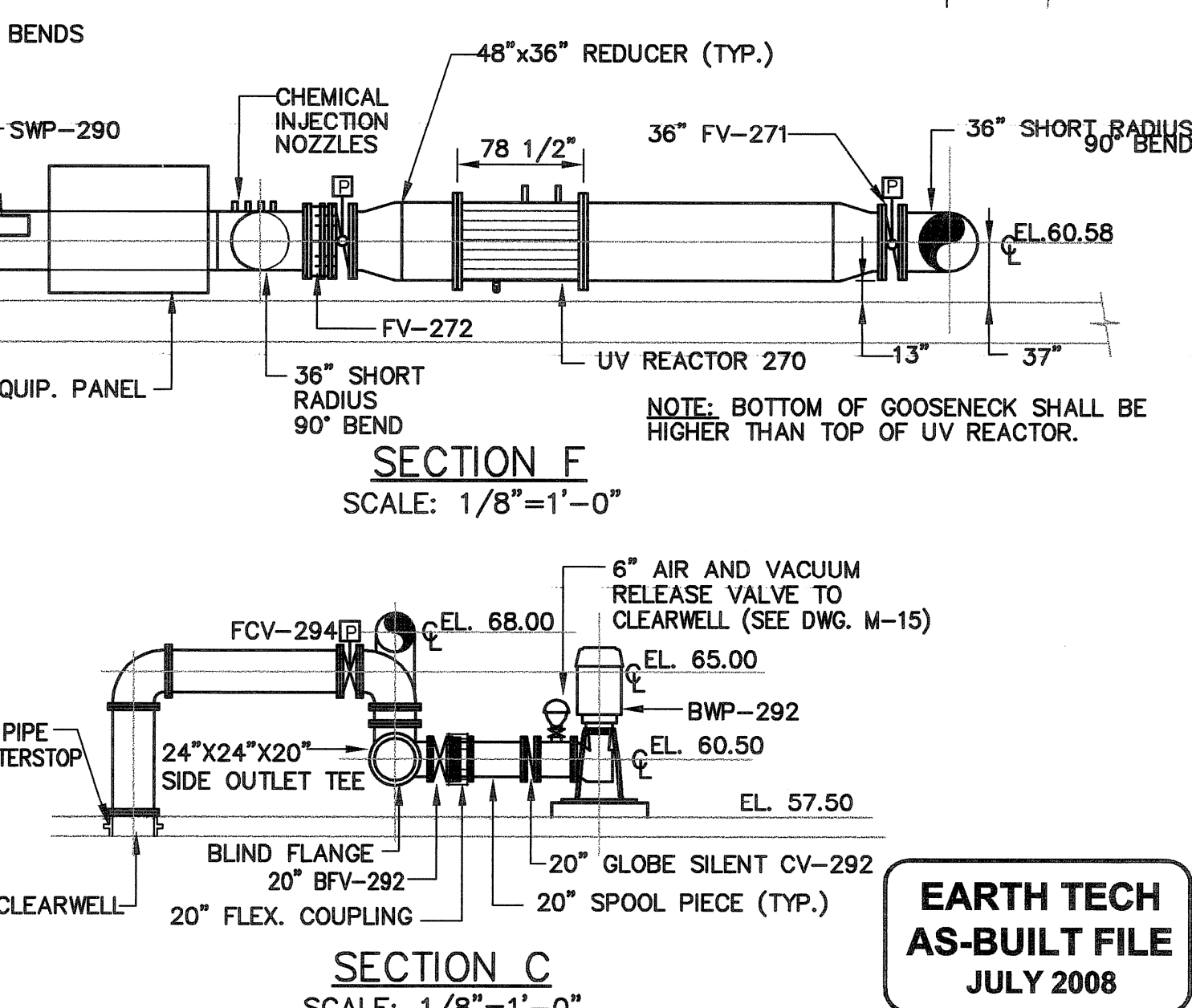
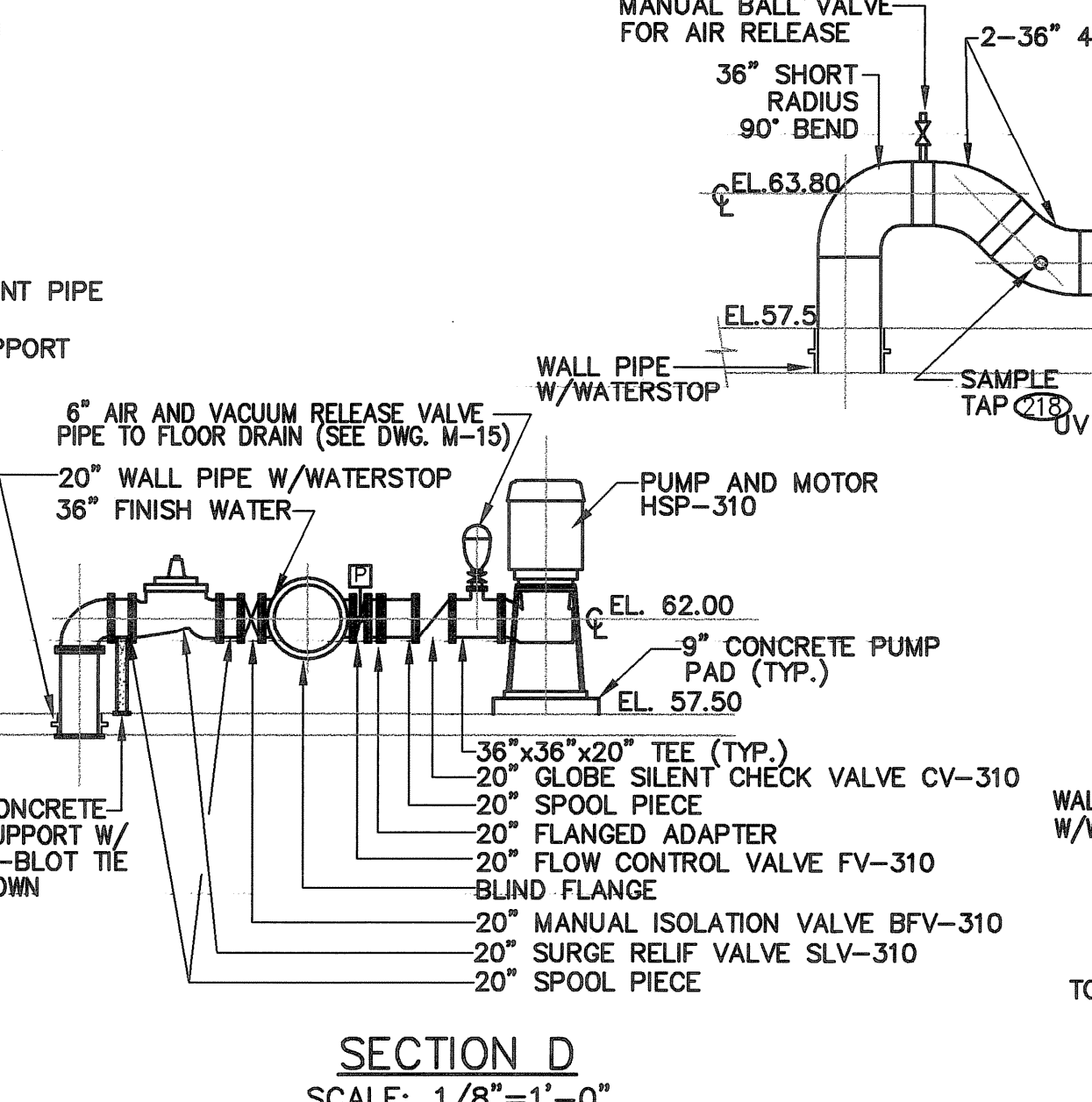
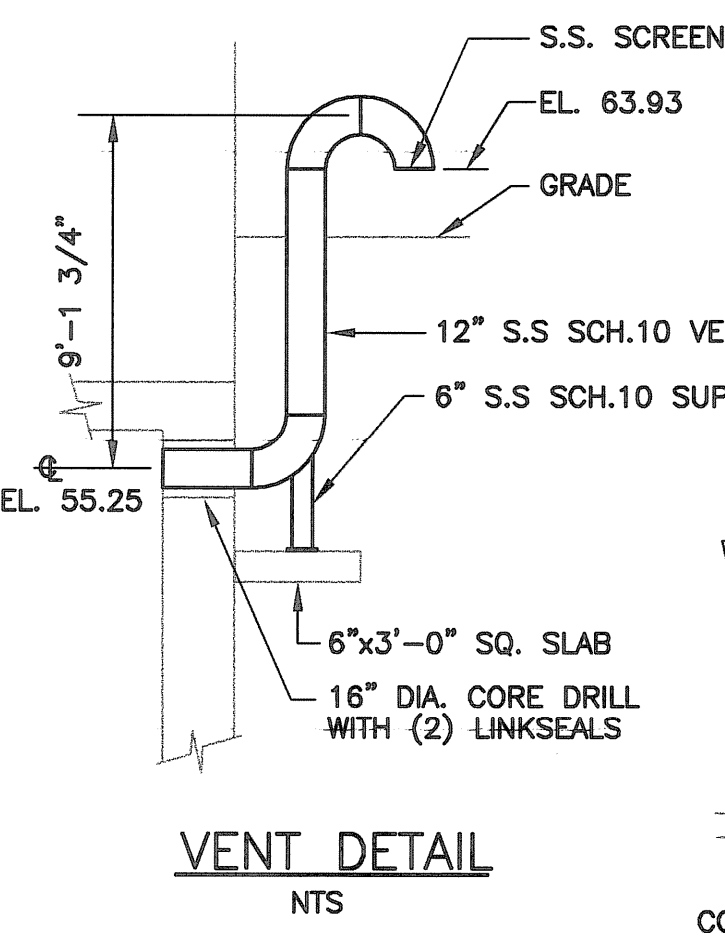
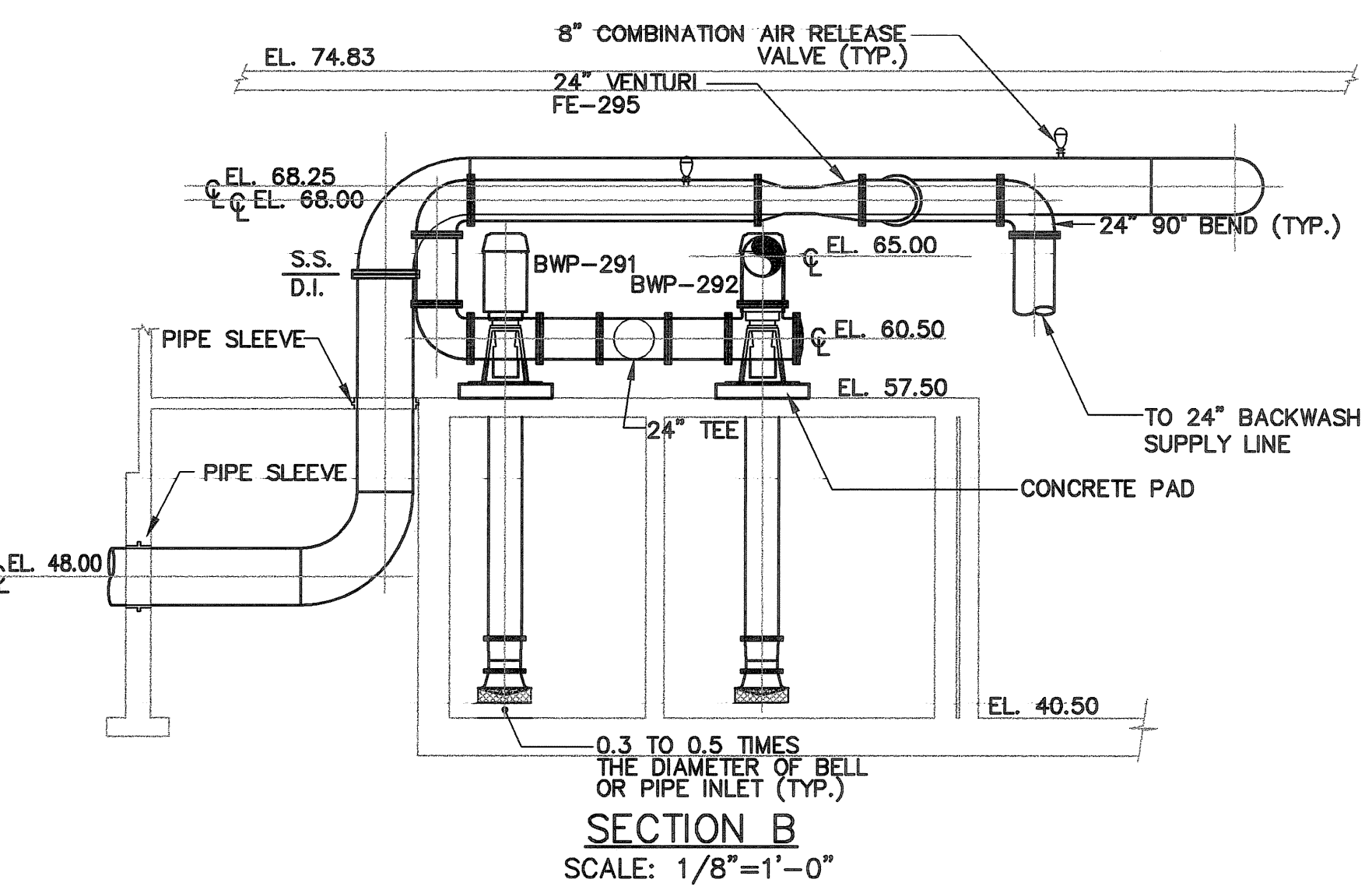
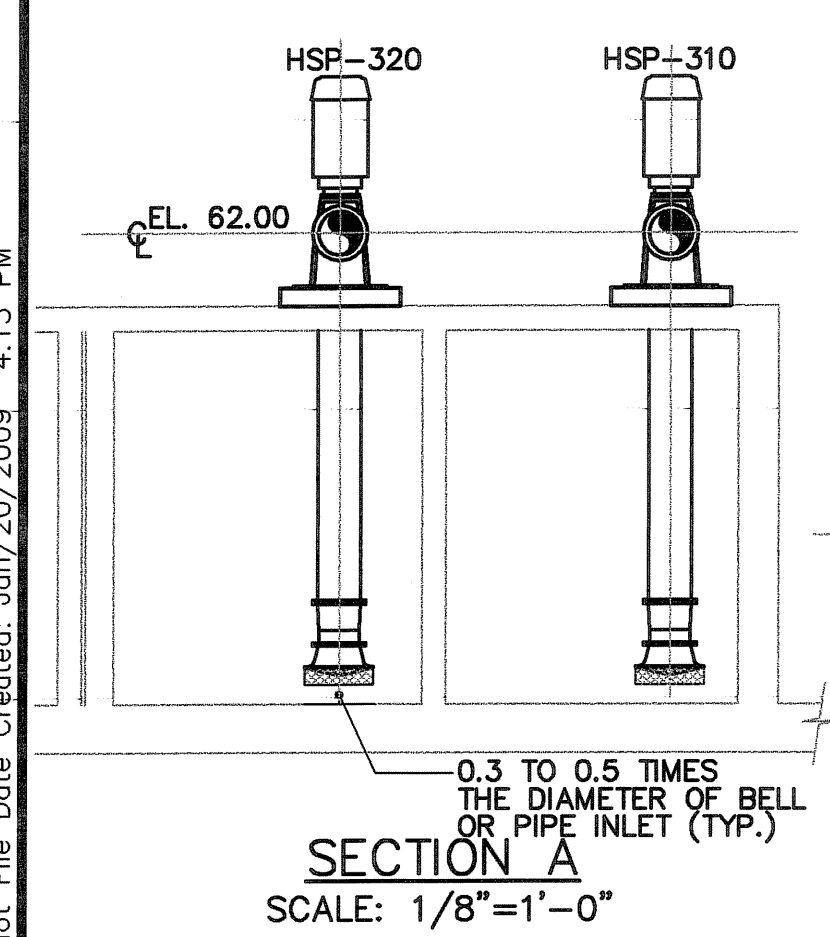
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Filename: L:\WORK\69993\CAD\AS-BUILT\G\WTP\MECH\69993M1--8.DWG  
 Plot File Date Created: Jan/20/2009 4:15 PM



LOWER LEVEL PLAN-ELEVATION 57.5  
 SCALE: 1/8"=1'-0"



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 300 BAKER AVENUE SUITE 250 CONCORD MA 01742 (978) 371-0000

DATE	BY	REVISIONS
2/15/05	BR	ISSUED FOR CONSTRUCTION
4/9/05	AM	ISSUED FOR CONSTRUCTION
5/20/05	AM	ISSUED FOR POSTED SET
10/27/05	AM	AS-BUILT DRAWING FILE
AUG 2008	AM	AS-BUILT DRAWING FILE

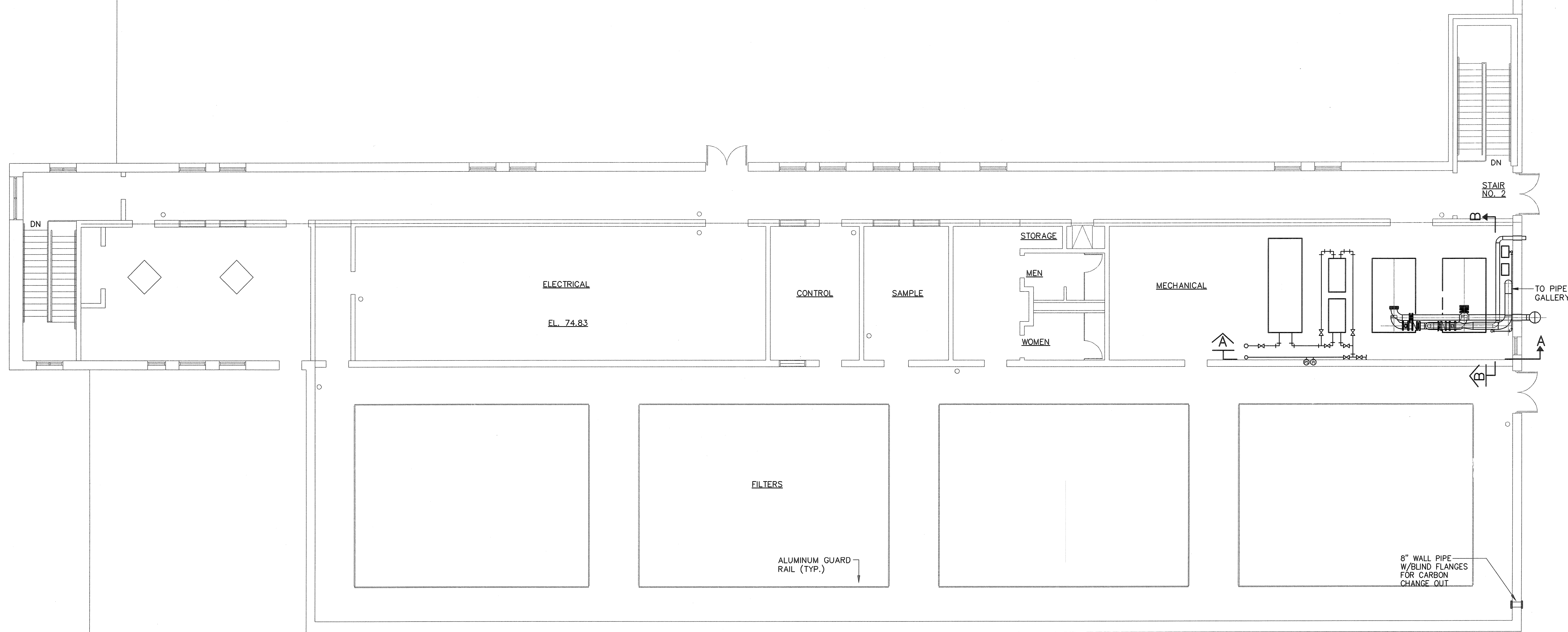
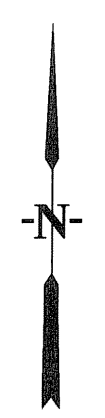
ROBERT H. SHELDON  
 No. 4103  
 3/1/09

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL  
 WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
 PLAN AT ELEVATION 57.5 (LOWER LEVEL)

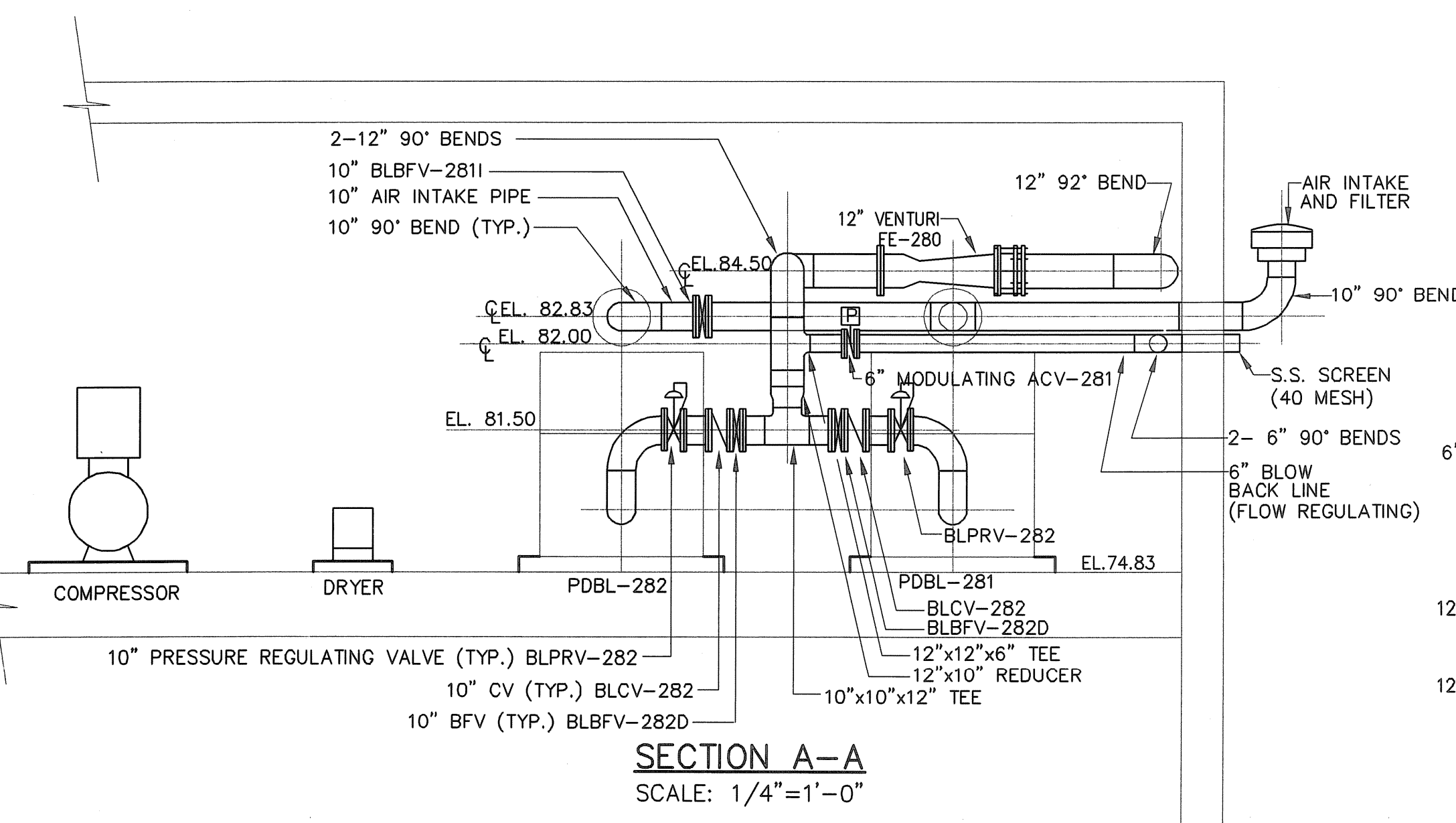
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DRAWN BY	CONTRACT NO.
CHECKED BY	DATE

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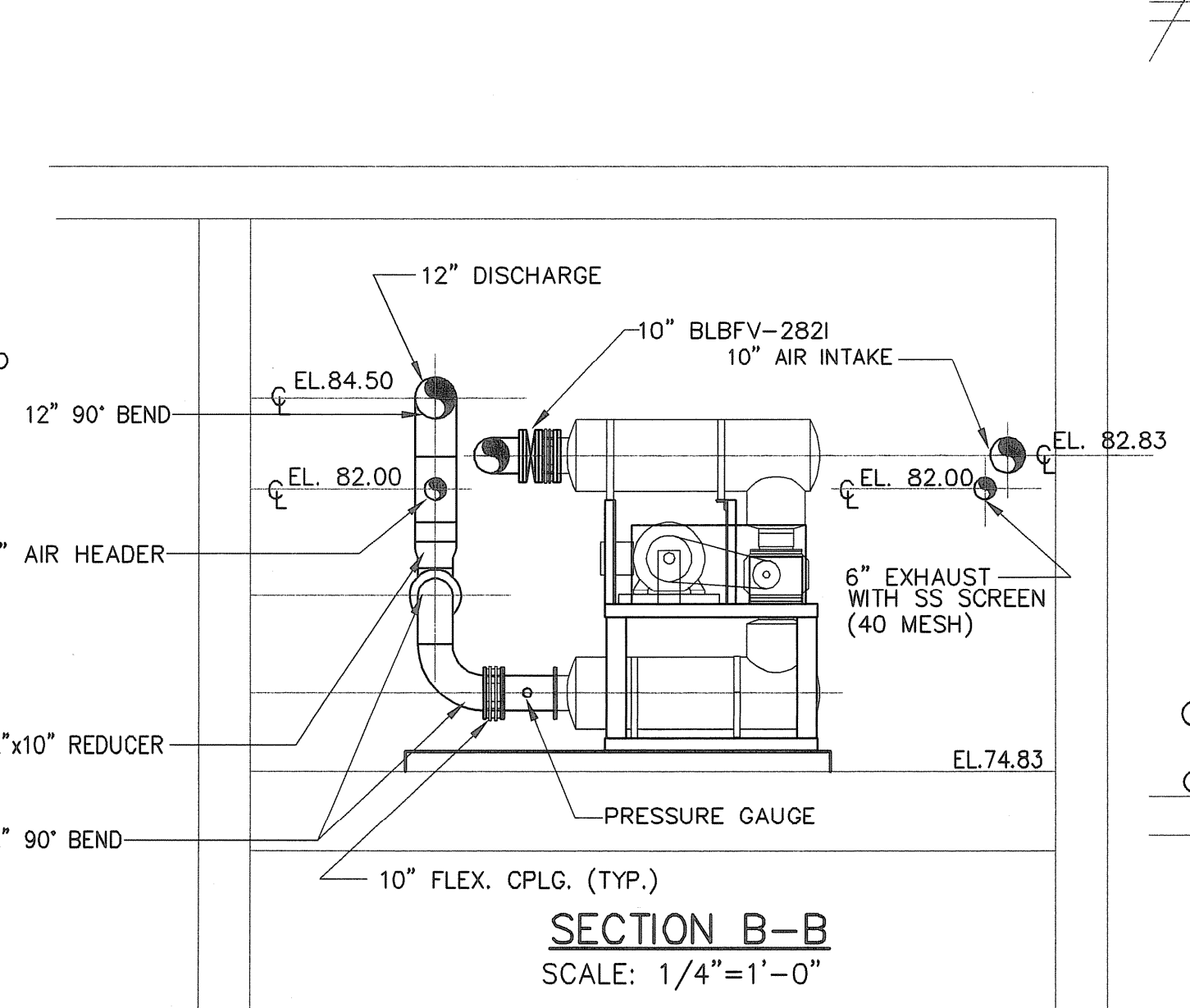
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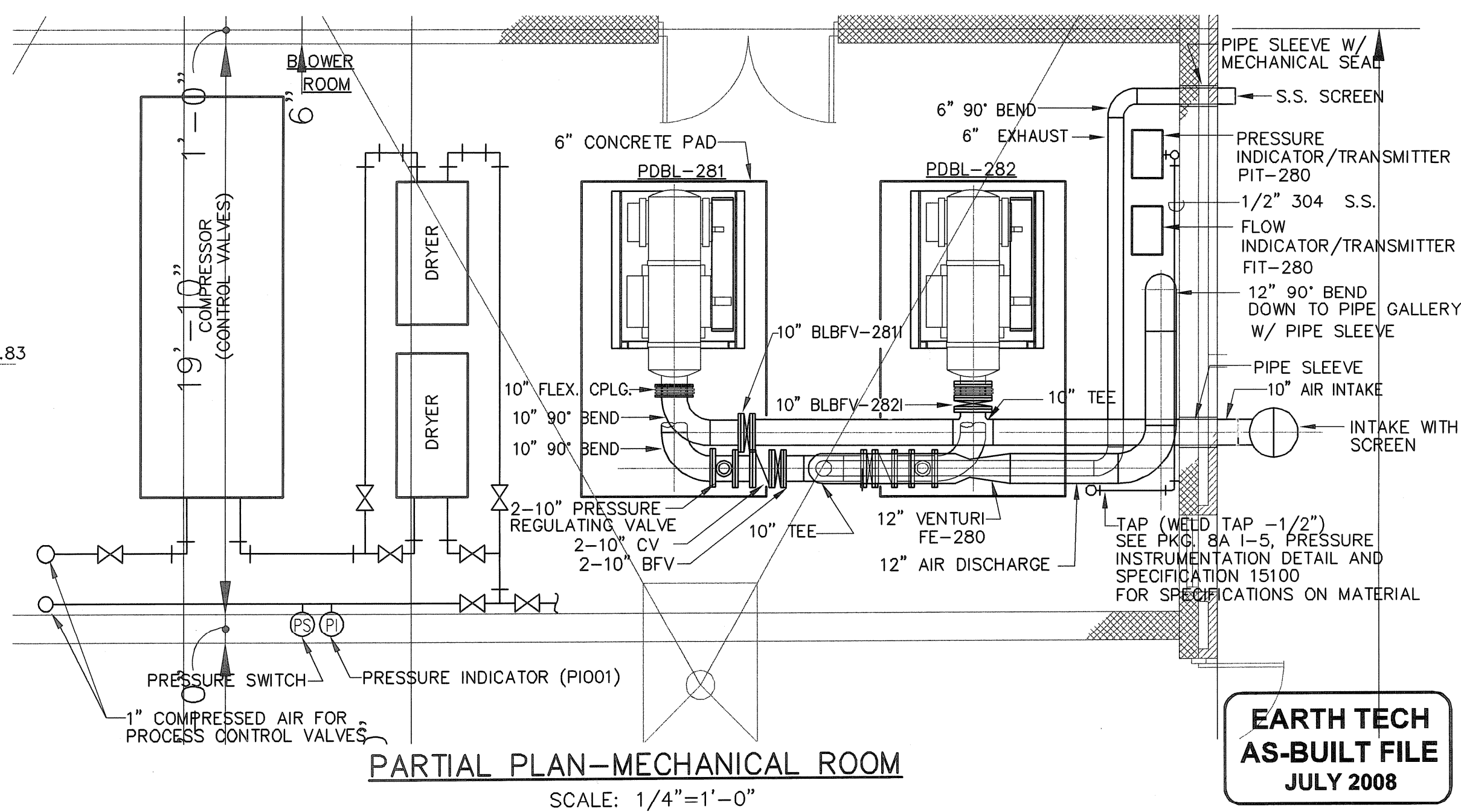
UPPER LEVEL PLAN-ELEVATION 73.5  
SCALE: 1/8"=1'-0"



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



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



PARTIAL PLAN-MECHANICAL ROOM  
SCALE: 1/4"=1'-0"

FULL SIZE DRAWING = 4"

NO.	DATE	BY	REVISIONS
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2	10/31/06	AMH	ISSUED FOR RFI POSTED SET
1	5/20/05	AMH	ISSUED FOR CONSTRUCTION
0	4/8/05	AMH	ISSUED FOR CONSTRUCTION
	2/15/05	DRB	RD SET

ROBERT H. SHELDON  
No. 4103  
Professional Engineer  
State of Massachusetts  
3/1/05

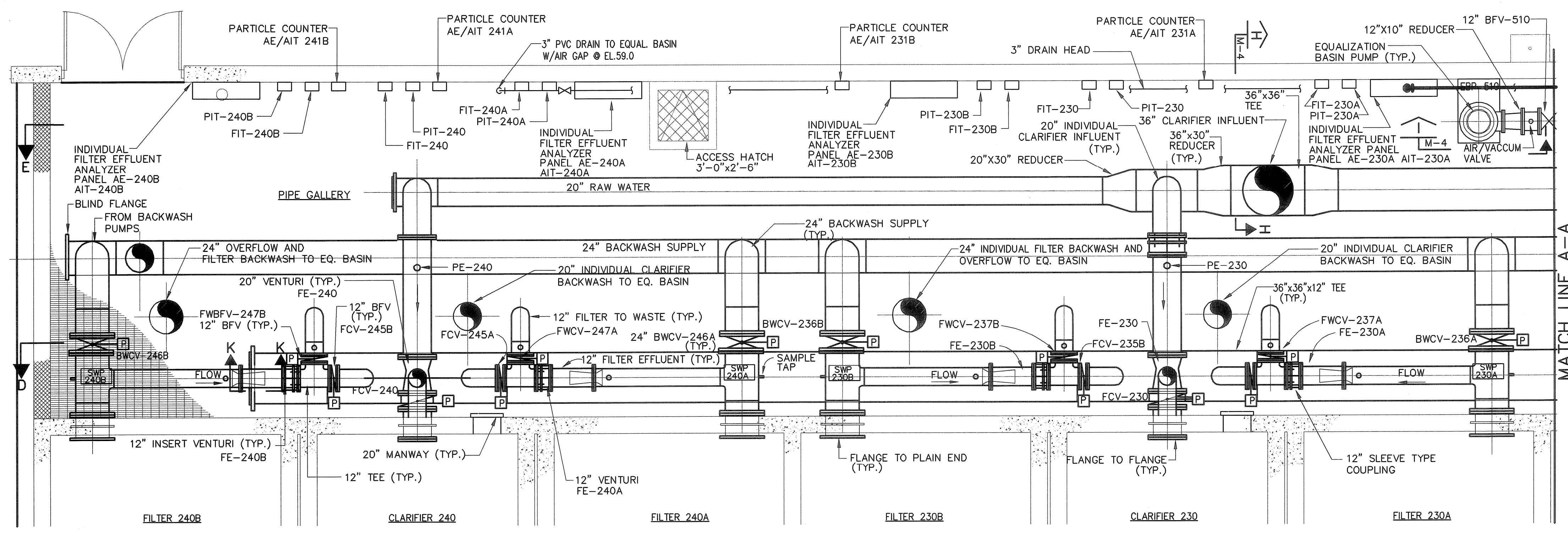
PAWTUCKET, RHODE ISLAND  
PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY  
PKG. 6 - MECHANICAL PROCESS  
PLAN AT ELEVATION 74.83 (UPPER LEVEL)  
SECTIONS AND FILTER GALLERY

DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
	DATE
	OCTOBER 31, 2008

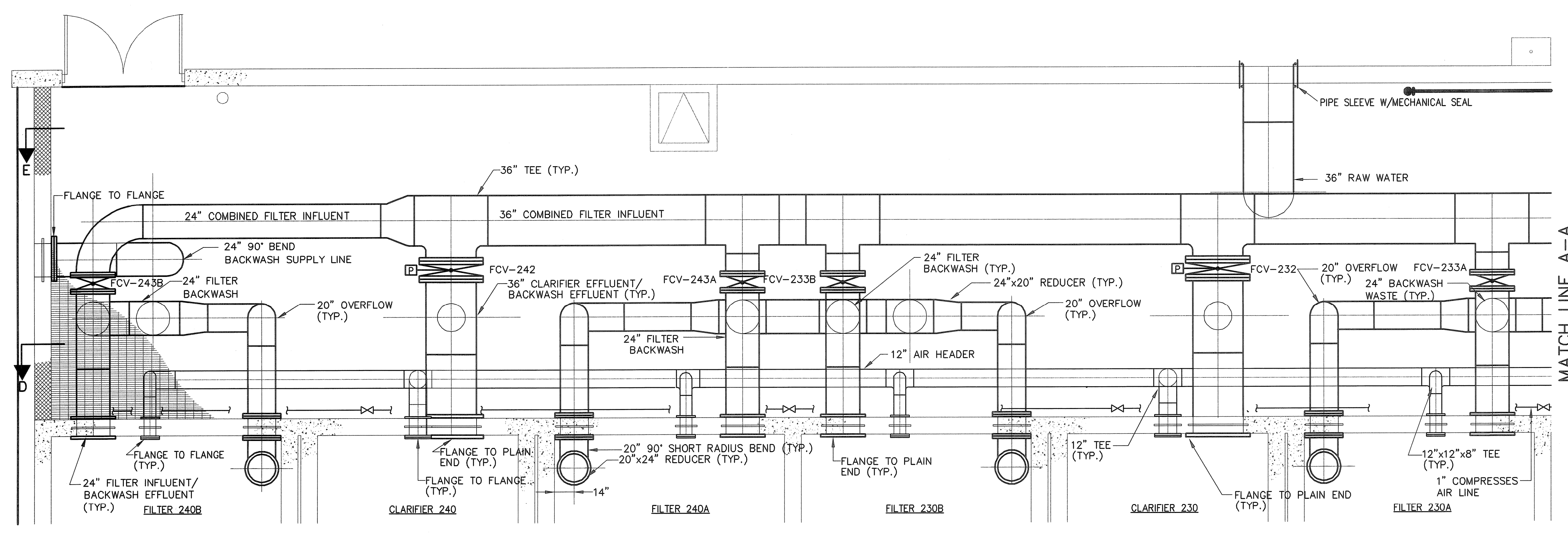
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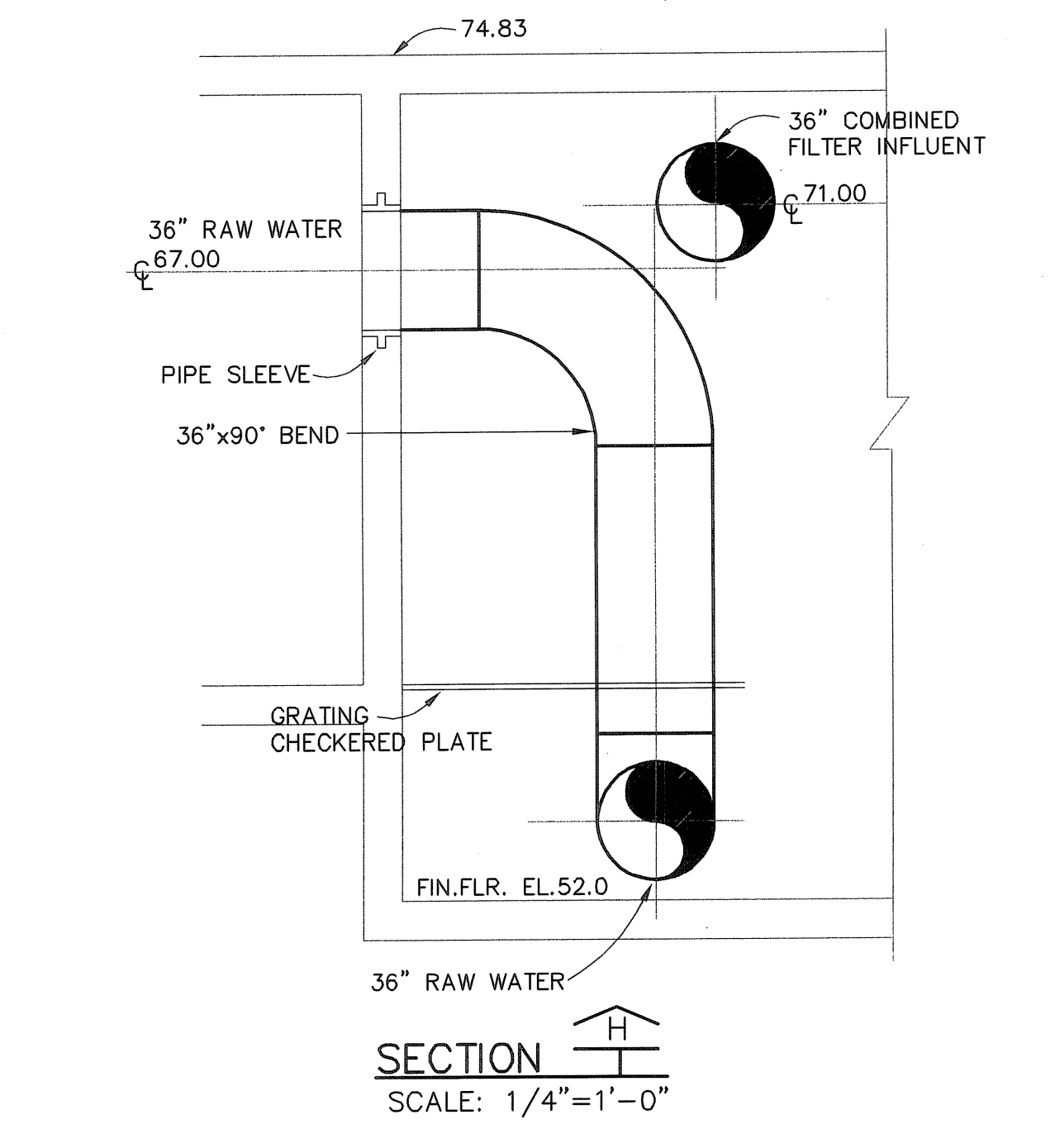
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1. EFFLUENT PARTICLE COUNTER ON ANALYZER PANEL SHALL BE ABLE TO OBTAIN CONTINUOUS SAMPLES FROM ANY FILTER.



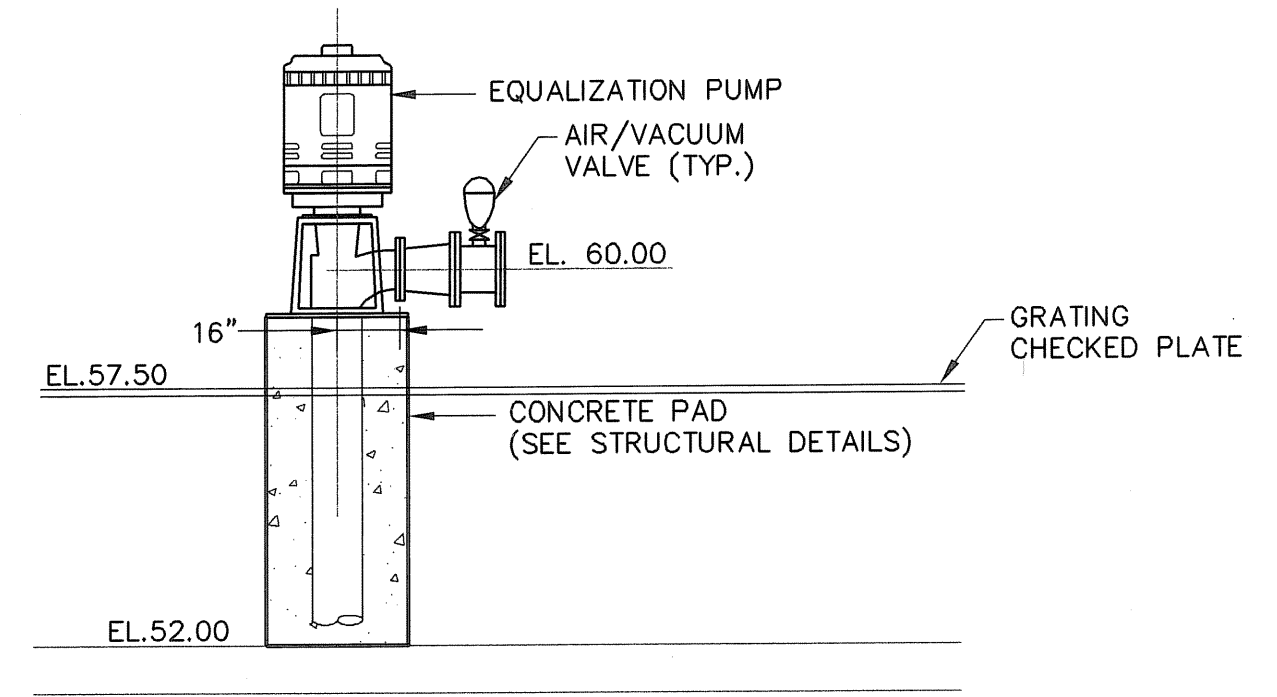
PIPE GALLERY  
LOW PIPE LEVEL PLAN-FLOOR ELEVATION 52.0  
SCALE: 1/4"=1'-0"



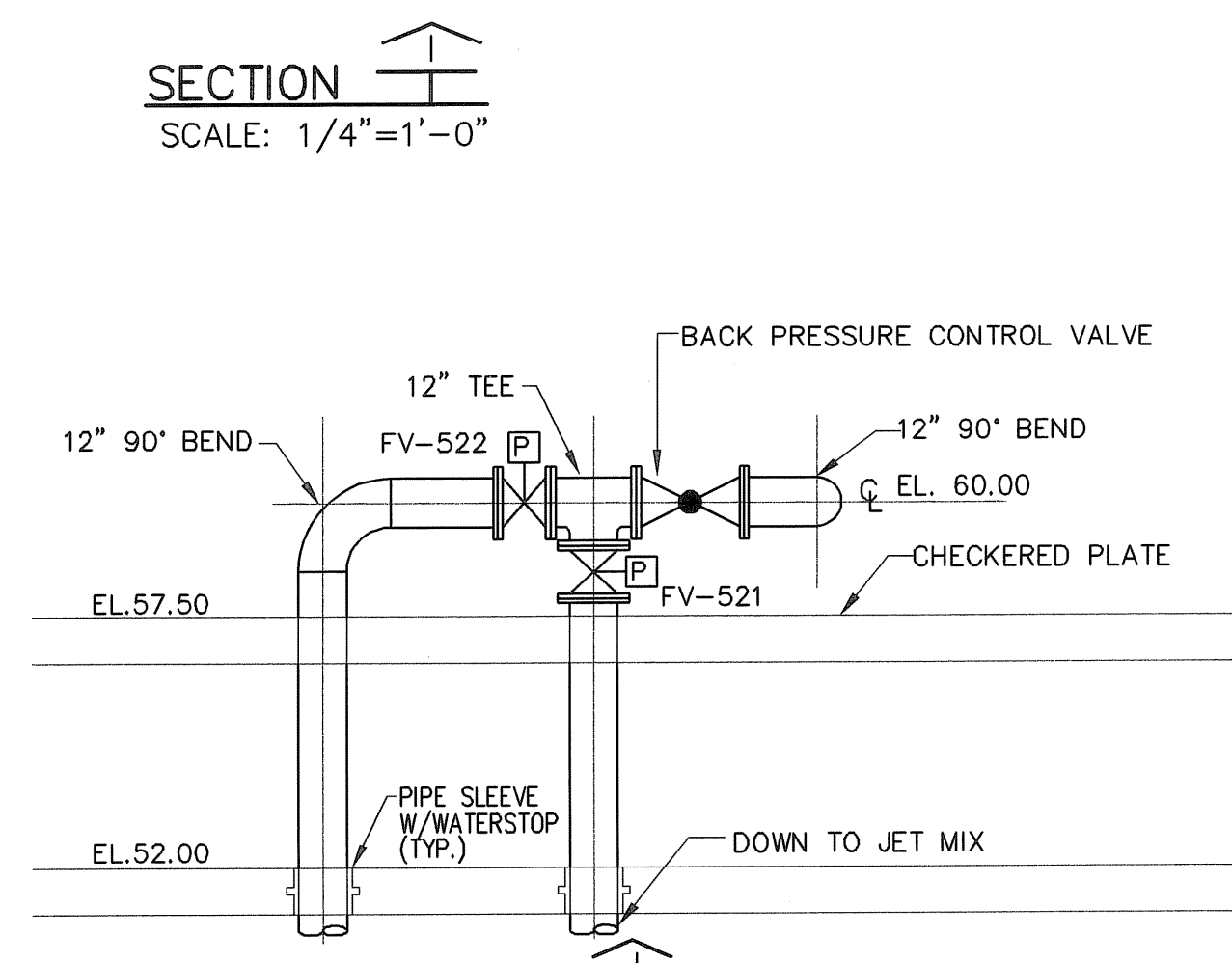
PIPE GALLERY  
HIGH PIPE LEVEL PLAN-FLOOR ELEVATION 57.5  
SCALE: 1/4"=1'-0"



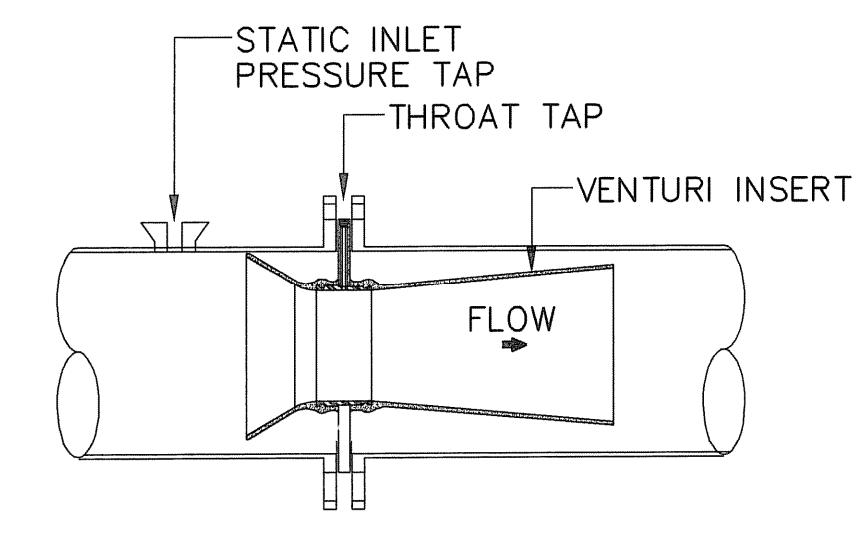
SECTION H  
SCALE: 1/4"=1'-0"



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



SECTION M-5  
SCALE: 1/4"=1'-0"



SECTION M-4  
SCALE: 1"=1'-0"

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1	5/20/05	ISSUED FOR CONSTRUCTION	
0	4/9/05	ISSUED FOR CONSTRUCTION	
	2/15/05	BID SET	

ROBERT H. SHELDON  
No. 4003  
Professional Engineer  
State of Massachusetts  
3/1/09

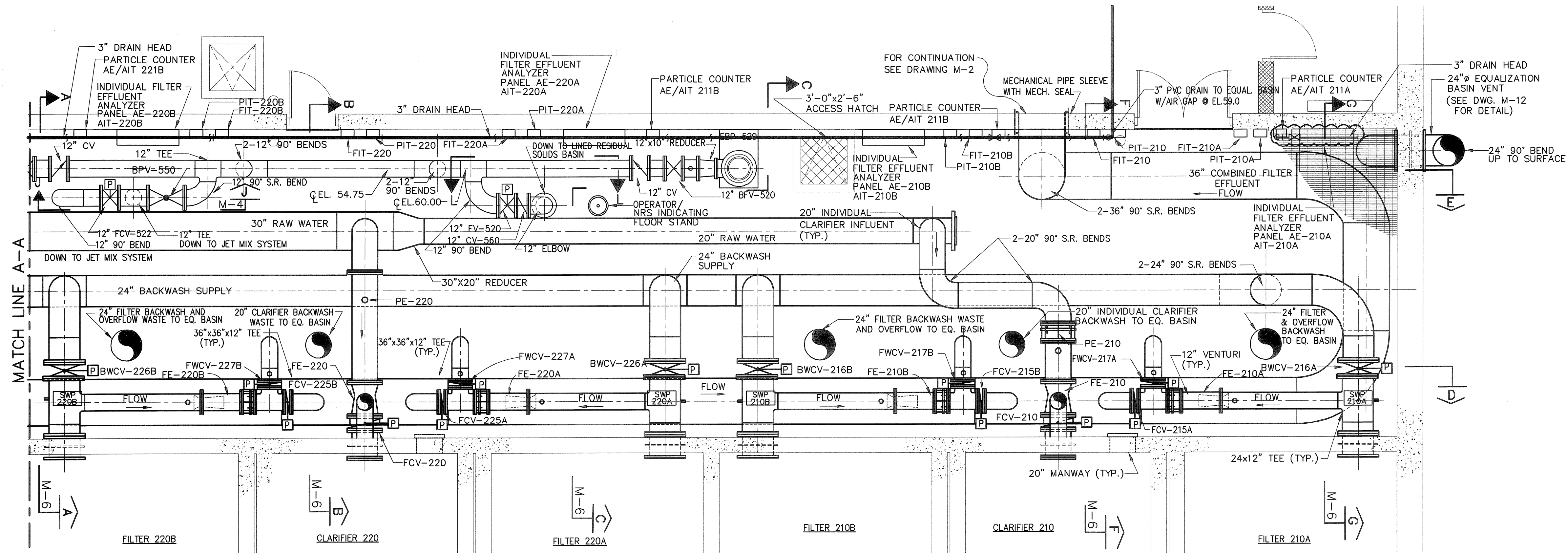
PAWTUCKET, RHODE ISLAND  
PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY  
**PKG. 6 - MECHANICAL PROCESS**  
PIPE GALLERY-PLANS  
AT ELEVATION 52.00 AND 57.50

DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
	DATE
	OCTOBER 31, 2008

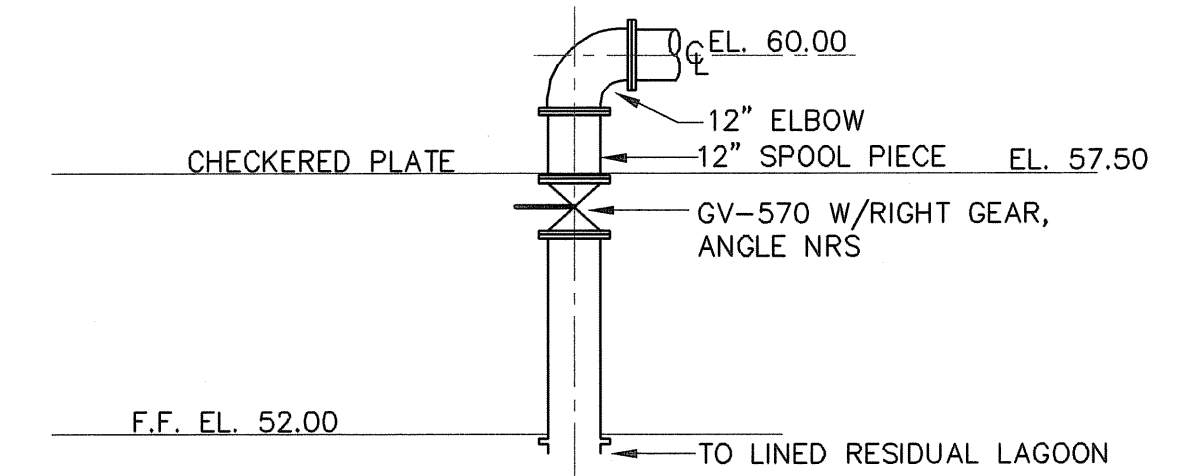
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AS-BUILT FILE  
JULY 2008

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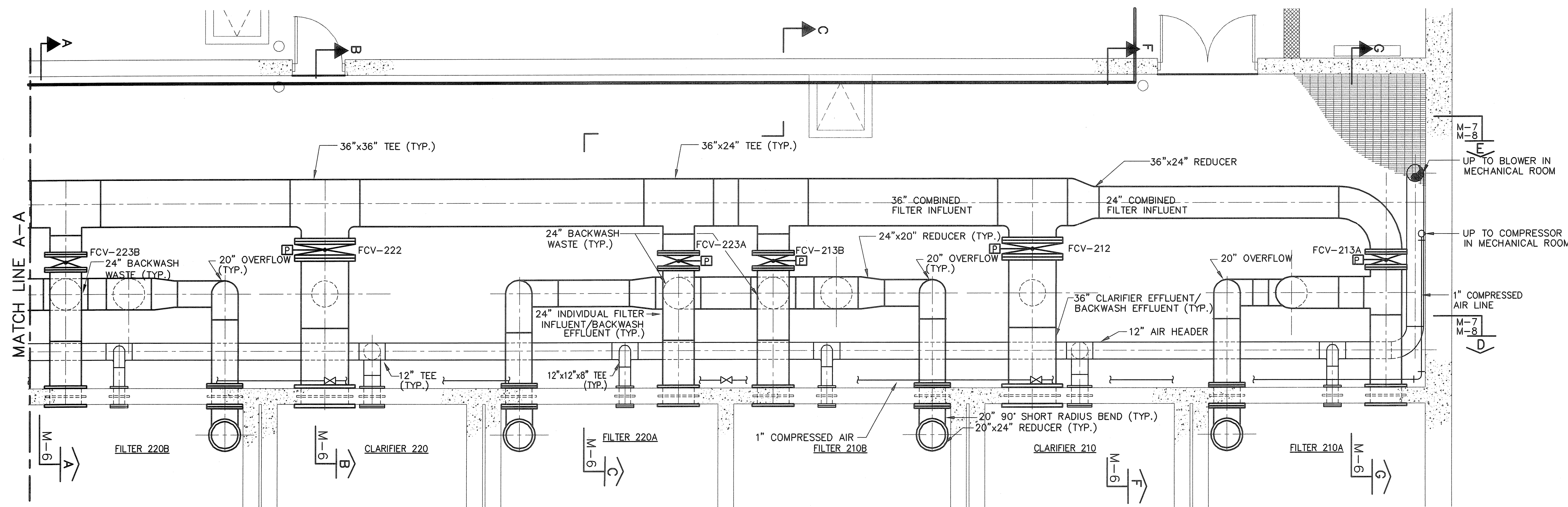
NOTES:  
 1. EFFLUENT PARTICLE COUNTER SHALL BE ABLE TO OBTAIN CONTINUOUS SAMPLES FROM ANY FILTER.



PIPE GALLERY  
 LOW PIPE LEVEL PLAN-FLOOR ELEVATION 52.0  
 SCALE: 1/4"=1'-0"



SECTION M-5  
 SCALE: 1/4"=1'-0"



PIPE GALLERY  
 HIGH PIPE LEVEL PLAN-FLOOR ELEVATION 57.50  
 SCALE: 1/4"=1'-0"

NO.	DATE	REVISIONS
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1	5/20/05	ISSUED FOR CONSTRUCTION
0	4/8/05	ISSUED FOR CONSTRUCTION
	04/06/05	BID SET
	2/15/05	REVISIONS
		BY

ROBERT H. SHELDON  
 No. 4103  
 REGISTERED PROFESSIONAL ENGINEER  
 STATE OF MASSACHUSETTS  
 5/11/05

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL  
 WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
**PIPE GALLERY-PLANS**  
 AT ELEVATION 52.00 AND 57.50

DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
	DATE
	OCTOBER 31, 2008

**EARTH TECH**  
 AS-BUILT FILE  
 JULY 2008

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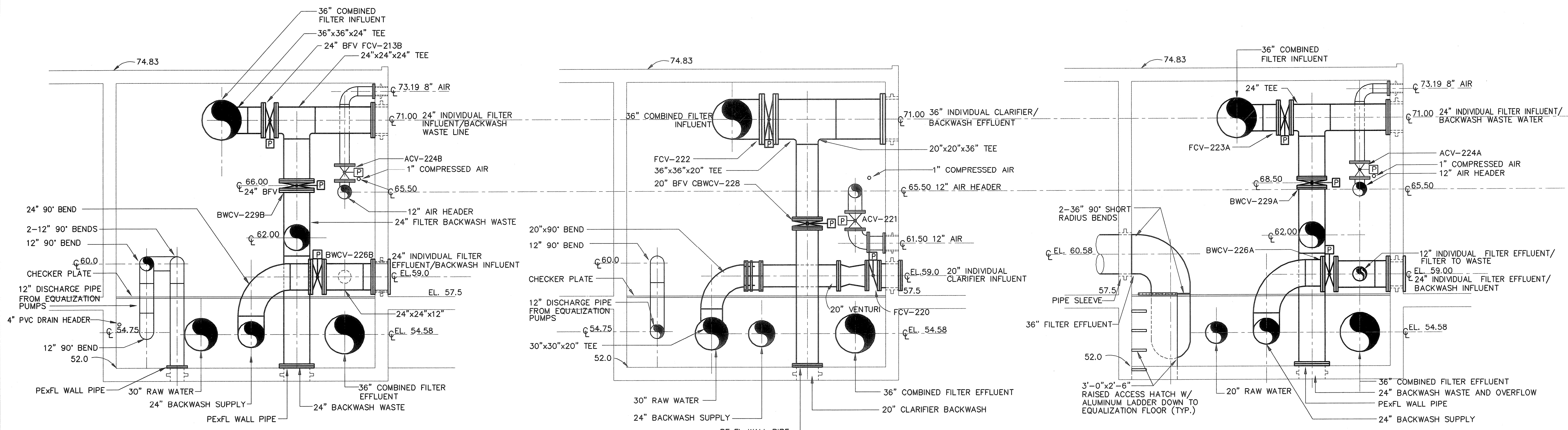
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BY: ML  
REVISIONS: ISSUED FOR CONSTRUCTION, ISSUED FOR RFI POSTED SET, AS-BUILT DRAWING FILE

ROBERT H. SHELDON  
No. 4103  
Professional Engineer  
State of Massachusetts  
No. 51719

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
SECTIONS AND DETAILS

DESIGNED BY	DWG SCALE AS NOTED
DRAWN BY GLF	CONTRACT NO.
CHECKED BY	DATE OCTOBER 31, 2008

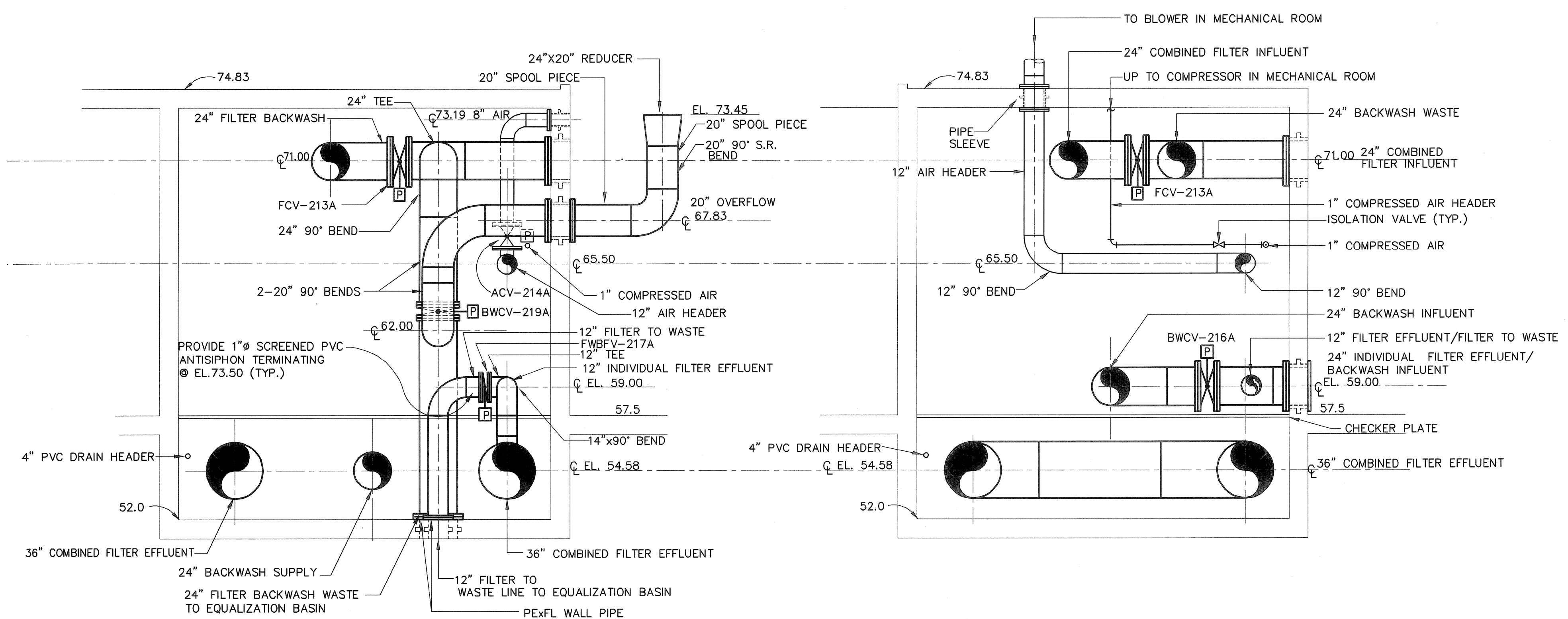
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SECTION A  
M-5  
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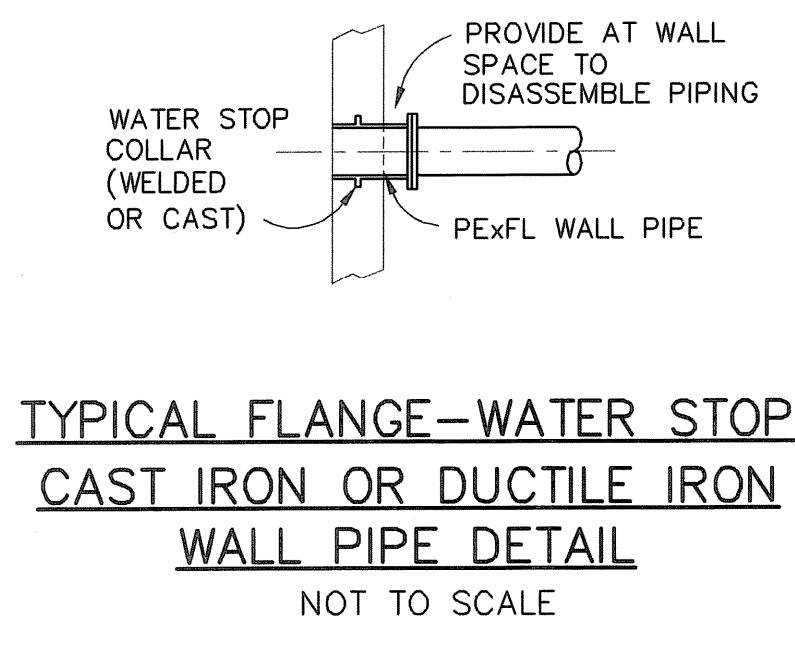
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SECTION C  
M-5  
SCALE: 1/4"=1'-0"



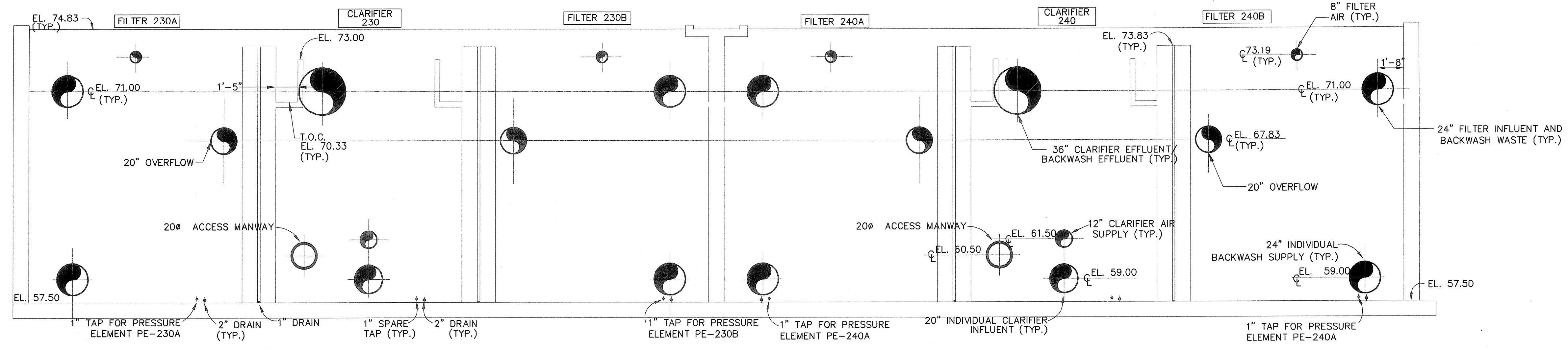
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SECTION E  
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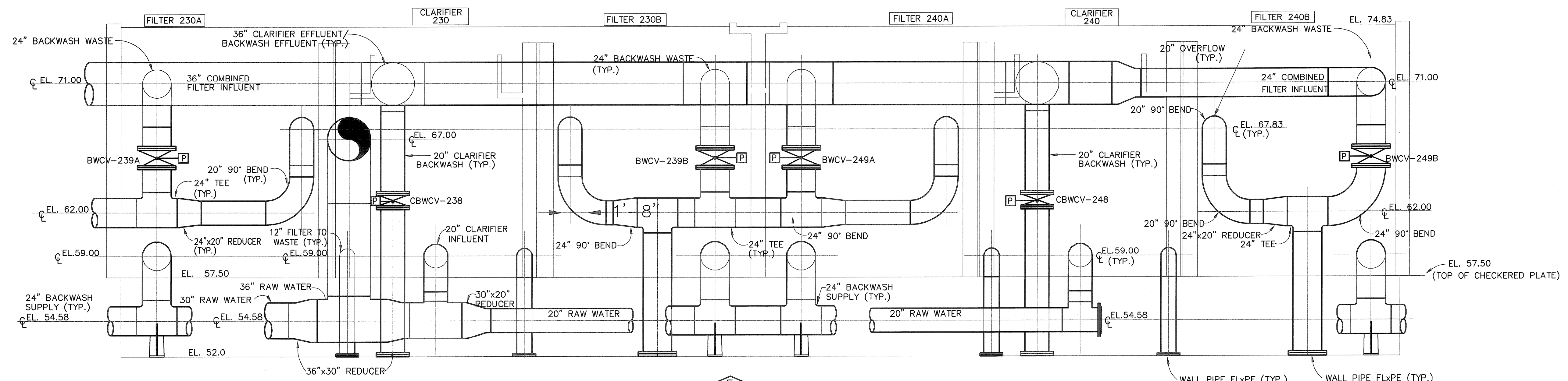


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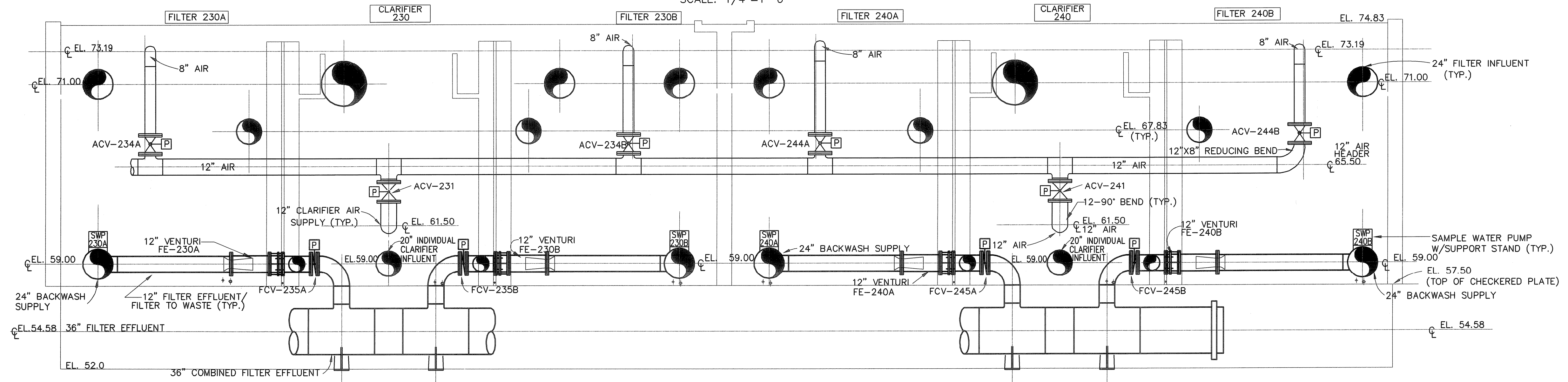
**EARTH TECH**  
AS-BUILT FILE  
JULY 2008



**CLARIFIER (NON-BUOYANT MEDIA) / FILTER WALL CONNECTION LAYOUT**  
SCALE: 1/4"=1'-0"



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



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

NOTE: 36" RAW WATER NOT SHOWN FOR CLARITY

FULL SIZE DRAWING = 4"

NO.	DATE	BY	REVISIONS
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1	5/20/05	AMA	ISSUED FOR CONSTRUCTION
0	4/9/05	AMA	ISSUED FOR CONSTRUCTION
	2/15/05	AMA	800 SET

ROBERT H. SHELDON  
No. 4103  
*[Signature]*

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
SECTIONS - PIPE GALLERY

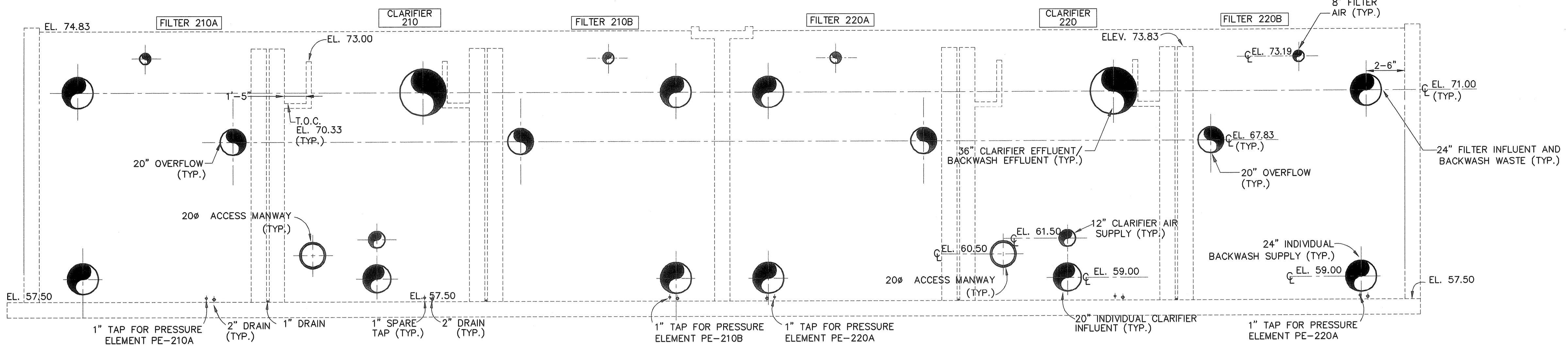
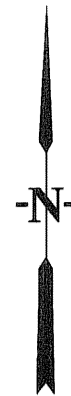
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CHECKED BY	CONTRACT NO.
	DATE

**EARTH TECH**  
AS-BUILT FILE  
JULY 2008

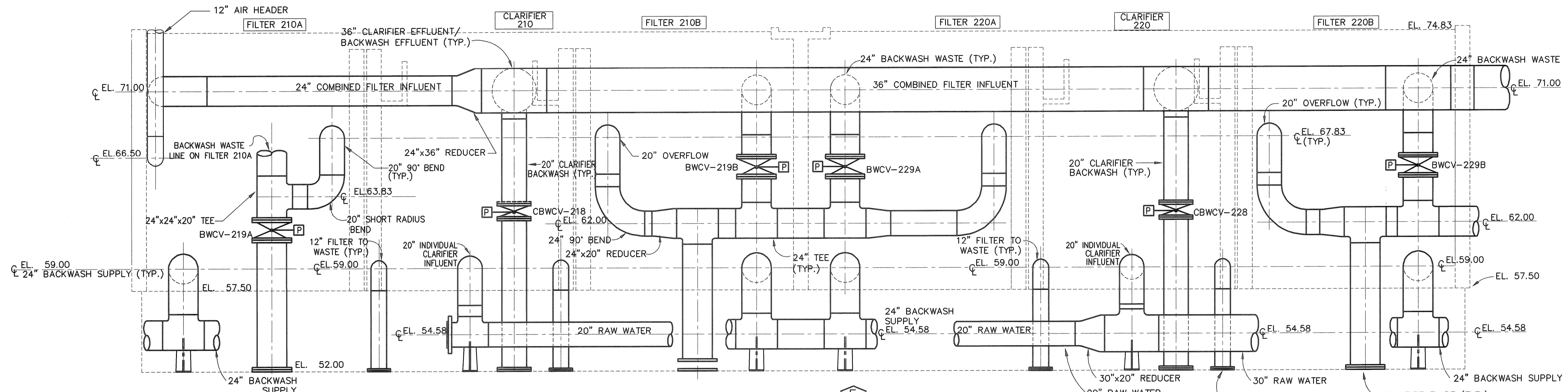
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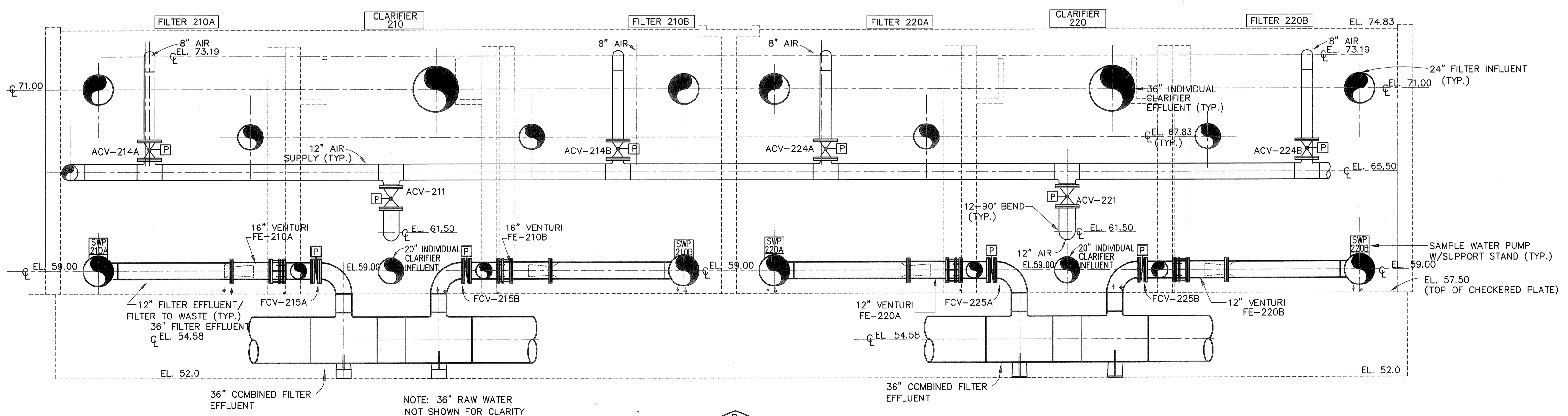




CLARIFIER (NON-BUOYANT MEDIA) / FILTER WALL CONNECTION LAYOUT  
SCALE: 1/4"=1'-0"



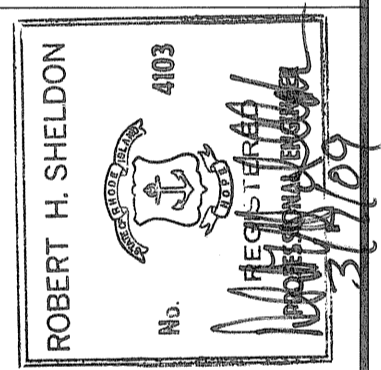
SECTION M-2  
SCALE: 1/4"=1'-0"



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

FULL SIZE DRAWING = 4"

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PAWTUCKET, RHODE ISLAND  
 PAWTUCKET REGIONAL  
 WATER TREATMENT FACILITY  
 PKG. 6 - MECHANICAL PROCESS  
 SECTIONS - PIPE GALLERY

DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
	DATE
	OCTOBER 31, 2008

**EARTH TECH**  
AS-BUILT FILE  
JULY 2008

M-8  
SHEET OF

NO.	BY	DATE	REVISIONS
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1	AMB	5/20/05	ISSUED FOR CONSTRUCTION
0	AMB	4/8/05	ISSUED FOR CONSTRUCTION
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			REVISIONS

ROBERT H. SHELDON  
No. 4103  
MECHANICAL ENGINEER  
3/17/09

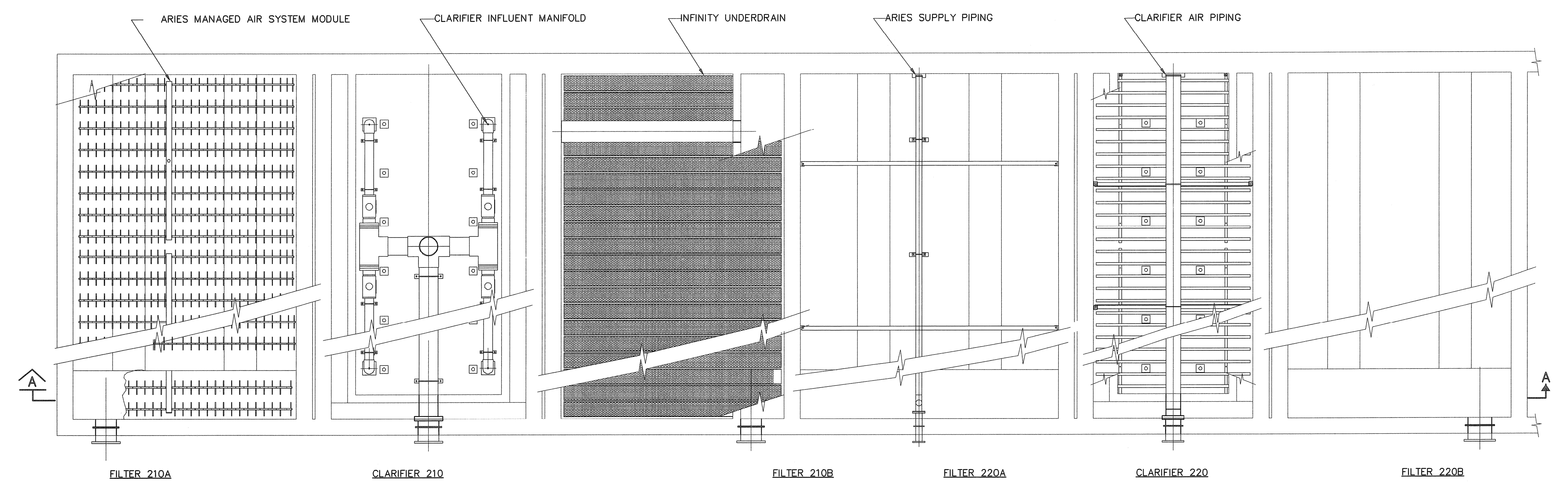
PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
CLARIFIER/FILTER PLAN AND SECTIONS

DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO.
CHECK	DATE
	OCTOBER 31, 2008

**EARTH TECH**  
AS-BUILT FILE  
JULY 2008

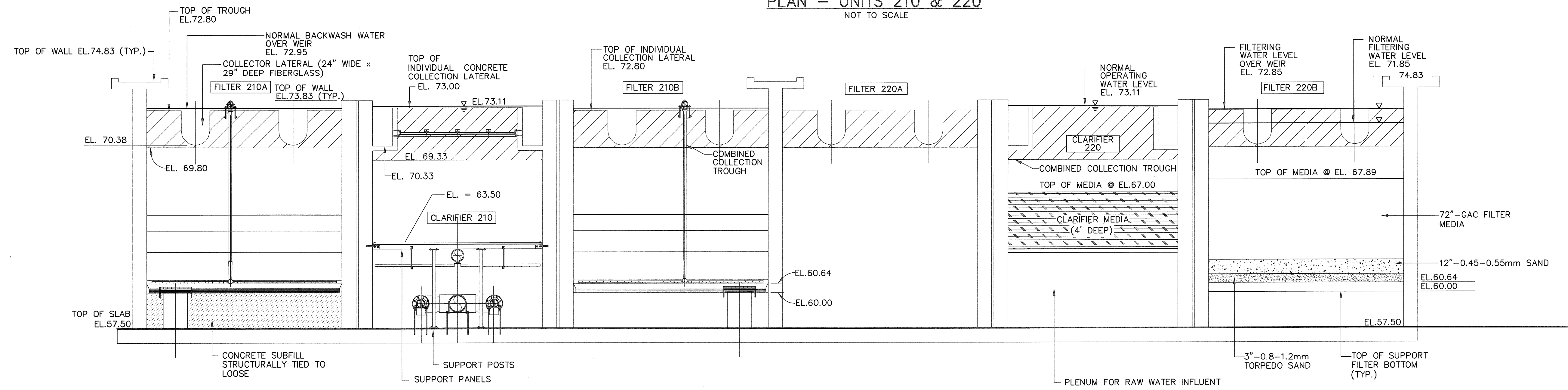
M-9

SHEET OF



NOTES: 1. ARRANGEMENT TYPICAL FOR UNITS 230 AND 240

**PLAN - UNITS 210 & 220**  
NOT TO SCALE



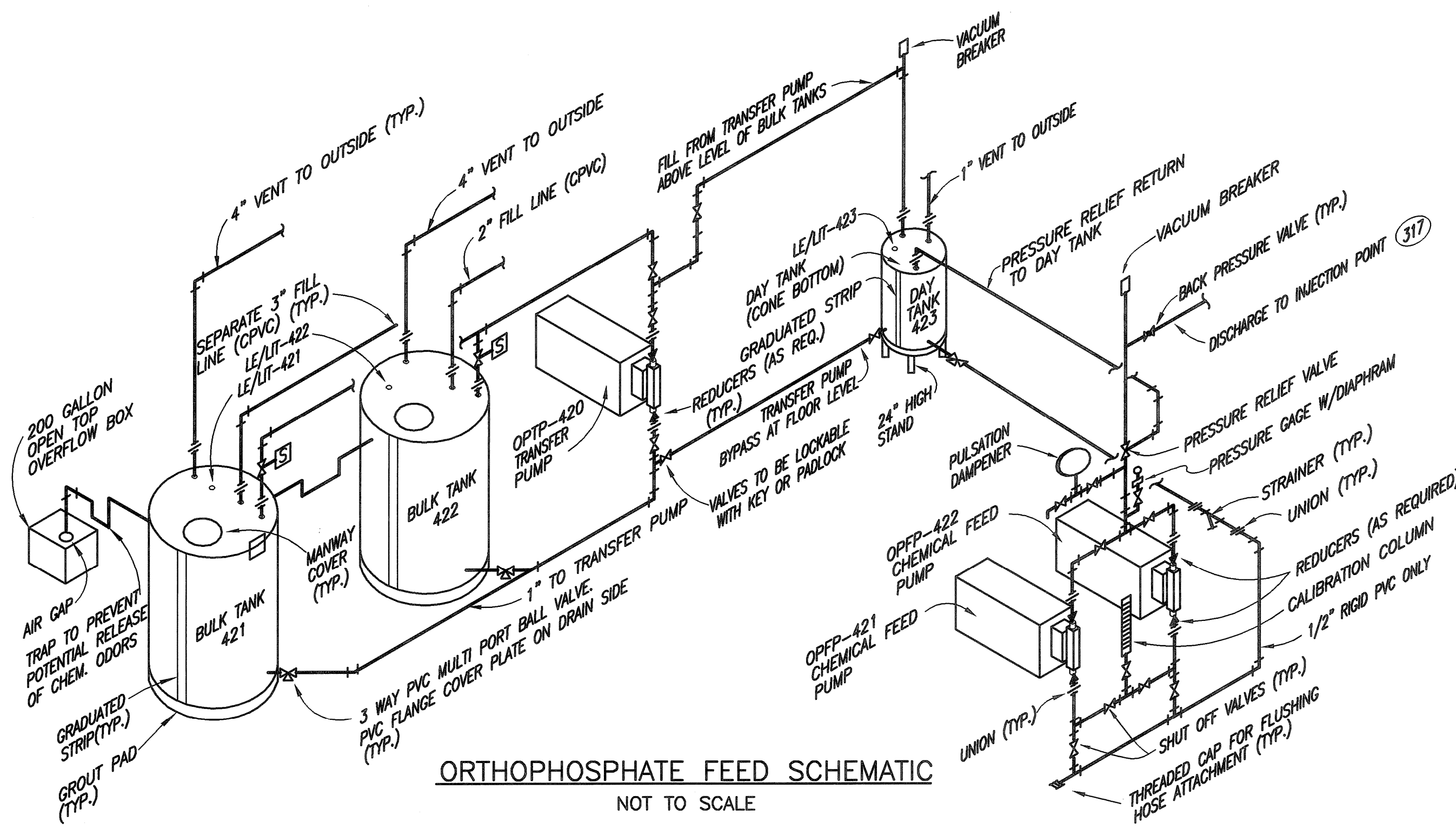
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**CLARIFIER (NON-BUOYANT MEDIA) /FILTER SECTION**  
SCALE: 1/4"=1'-0"

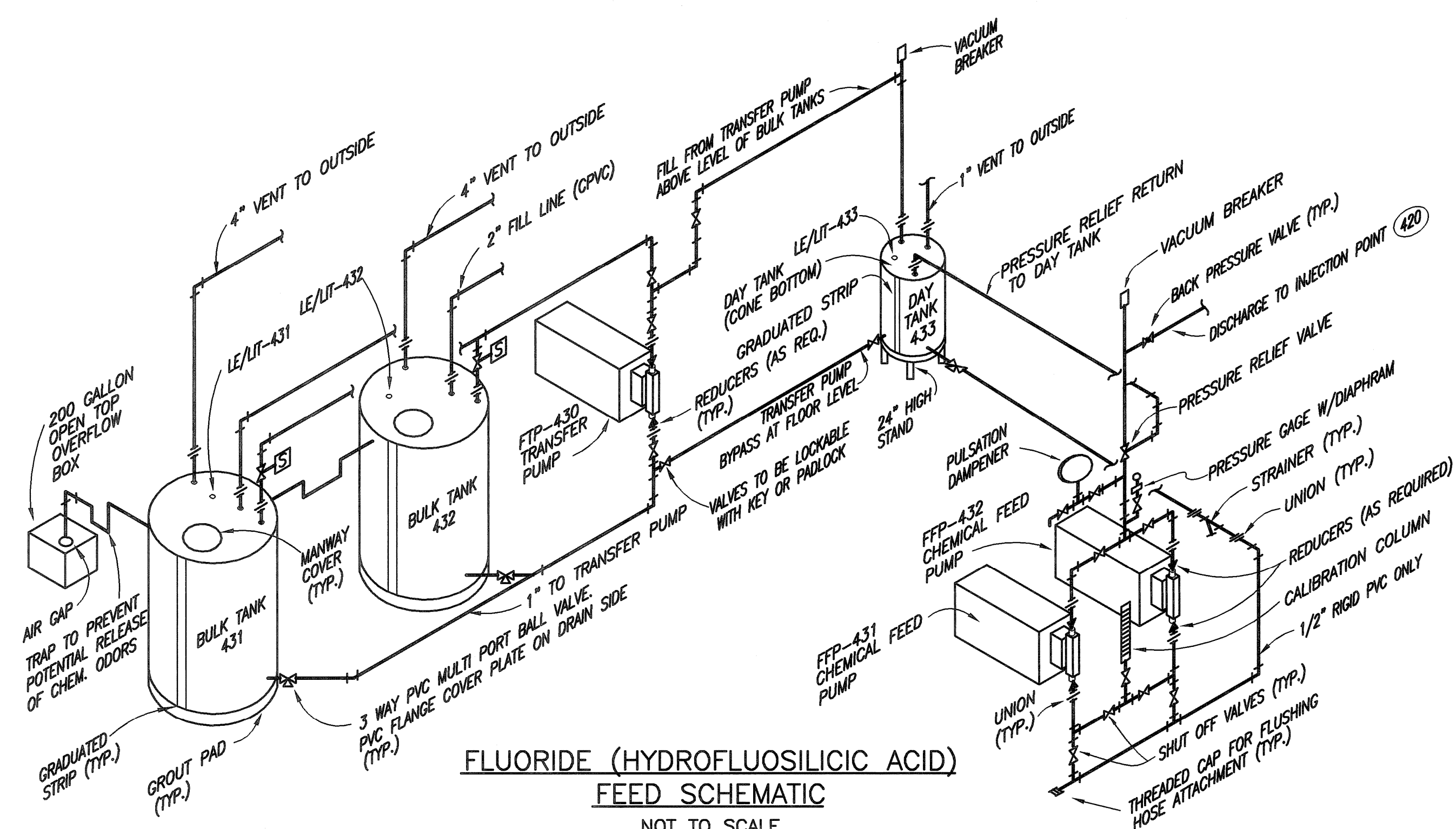
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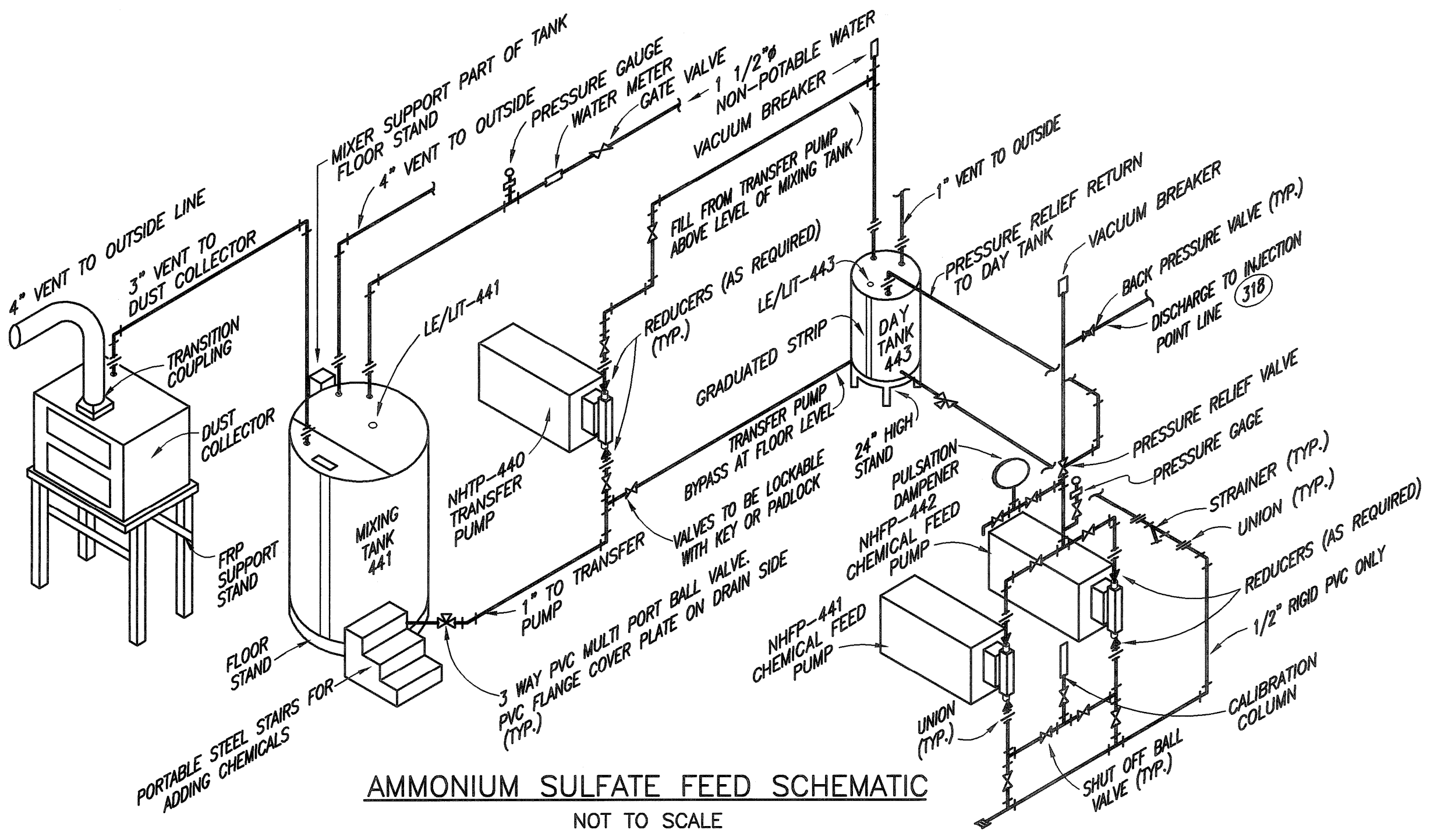
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	REVISED	DATE
	BY	DATE



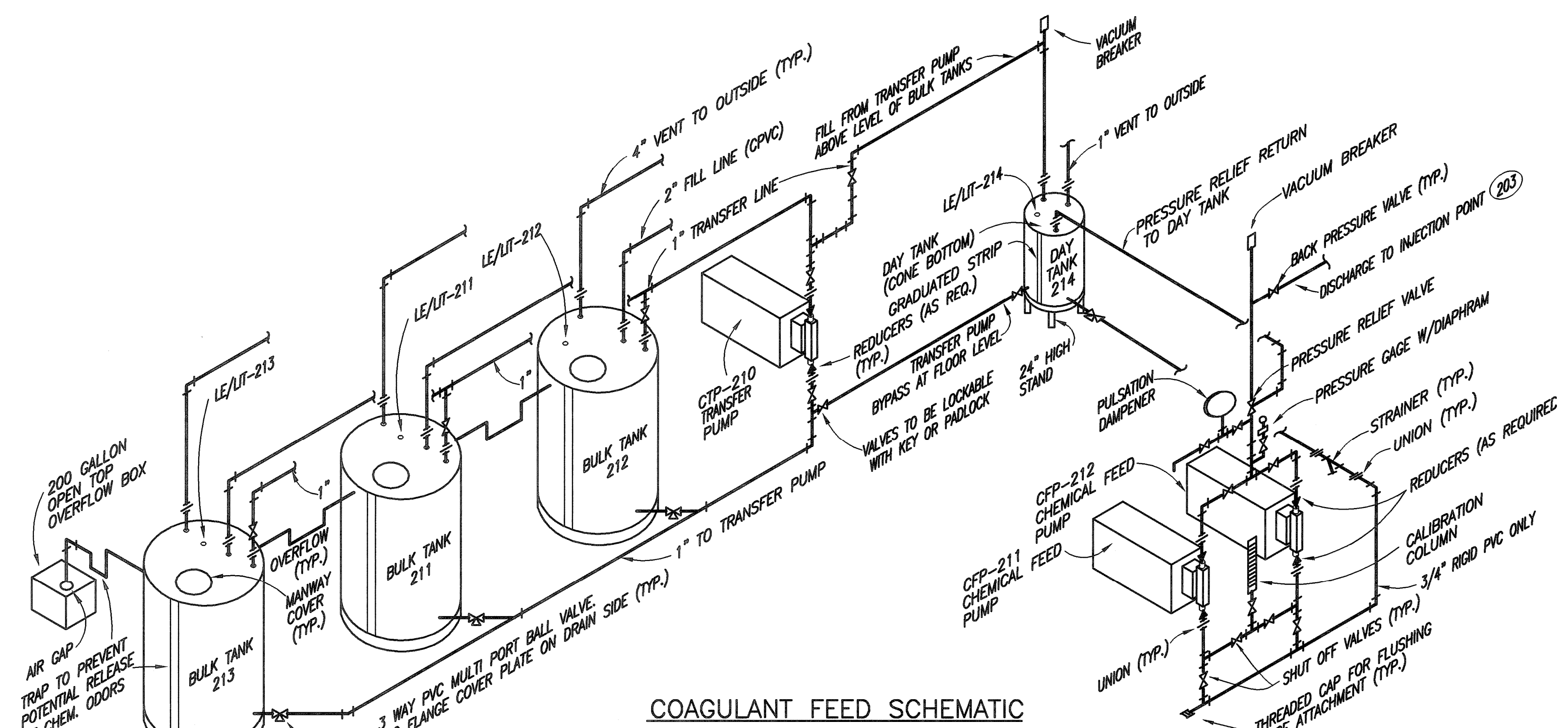
**ORTHOPHOSPHATE FEED SCHEMATIC**  
NOT TO SCALE



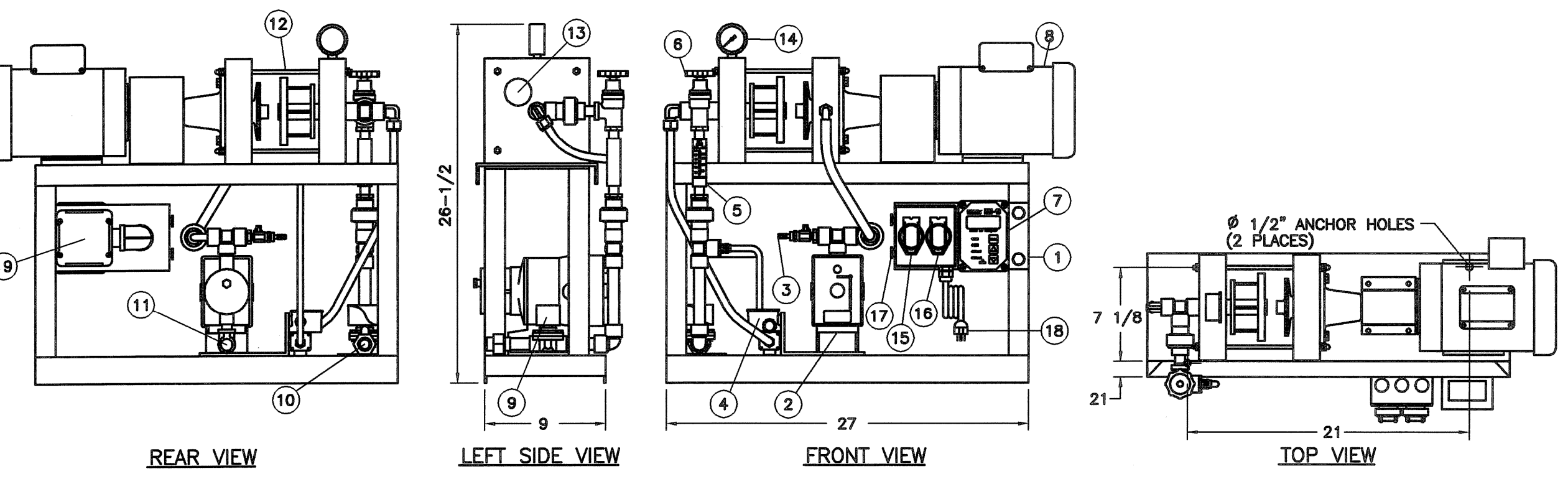
**FLUORIDE (HYDROFLUOSILICIC ACID) FEED SCHEMATIC**  
NOT TO SCALE



**AMMONIUM SULFATE FEED SCHEMATIC**  
NOT TO SCALE

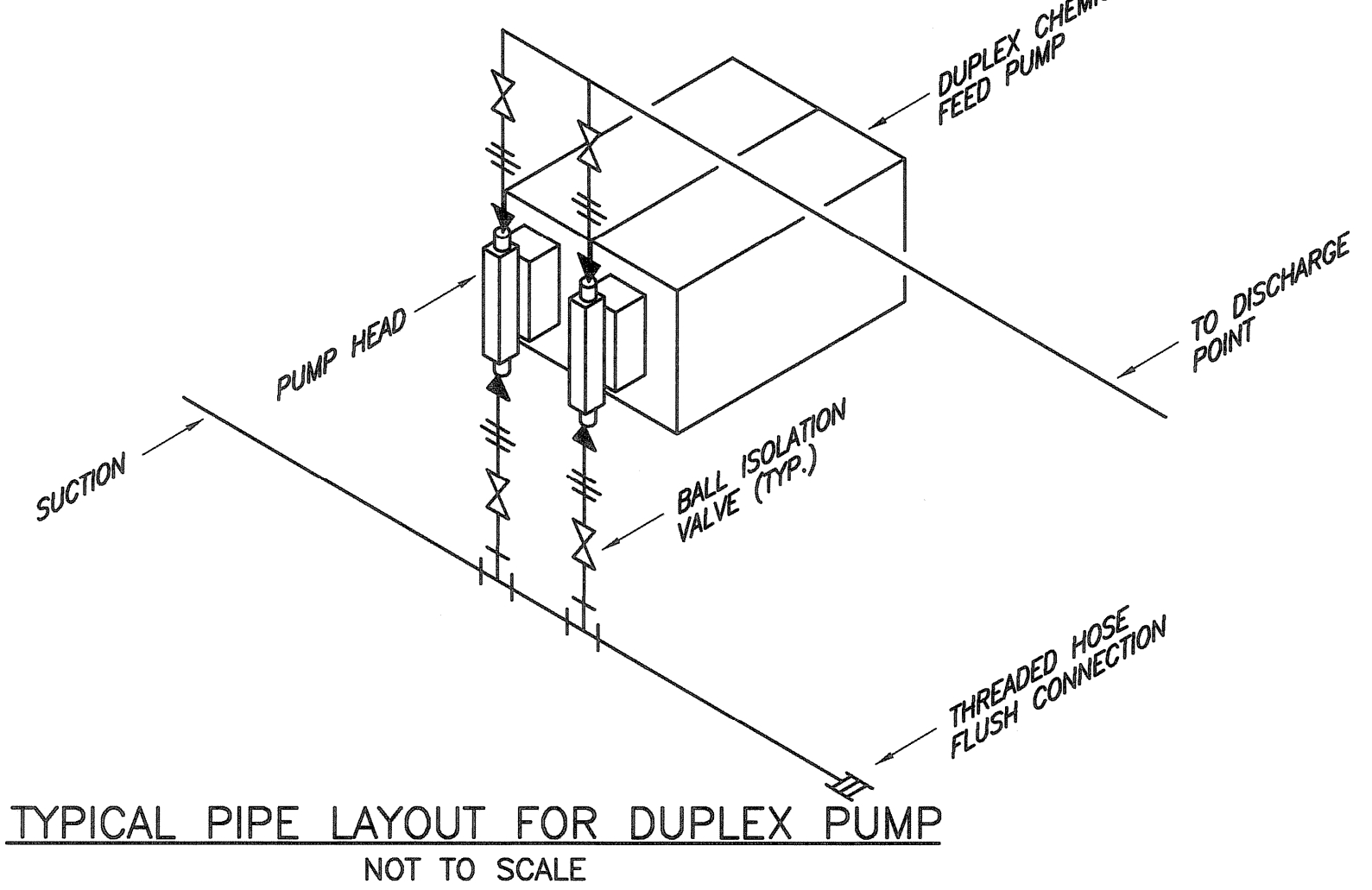


**COAGULANT FEED SCHEMATIC**  
NOT TO SCALE



**POLYMER FEED SCHEMATIC**  
NOT TO SCALE

KEY	DESCRIPTION	KEY	DESCRIPTION
1	BASE ASSEMBLY	10	WATER INLET
2	PUMP	11	POLYMER INLET
3	PRIMING PORT, (PUMP)	12	MIX CHAMBER ASSEMBLY
4	DIFFERENTIAL PRESSURE SWITCH	13	SOLUTION DISCHARGE
5	FLOWMETER	14	PRESSURE GAUGE
6	FLOW CONTROL VALVE	15	ON/OFF MAIN POWER, SWITCH
7	DIGITAL DISPLAY PUMP CONTROLLER, (REM-1D)	16	MIXER MOTOR, SWITCH
8	MOTOR	17	FUSE, (QTY 2)
9	SOLENOID VALVE	18	POWER CORD
		19	DP SWITCH RELAY BOX



**TYPICAL PIPE LAYOUT FOR DUPLEX PUMP**  
NOT TO SCALE

**GENERAL NOTES:**

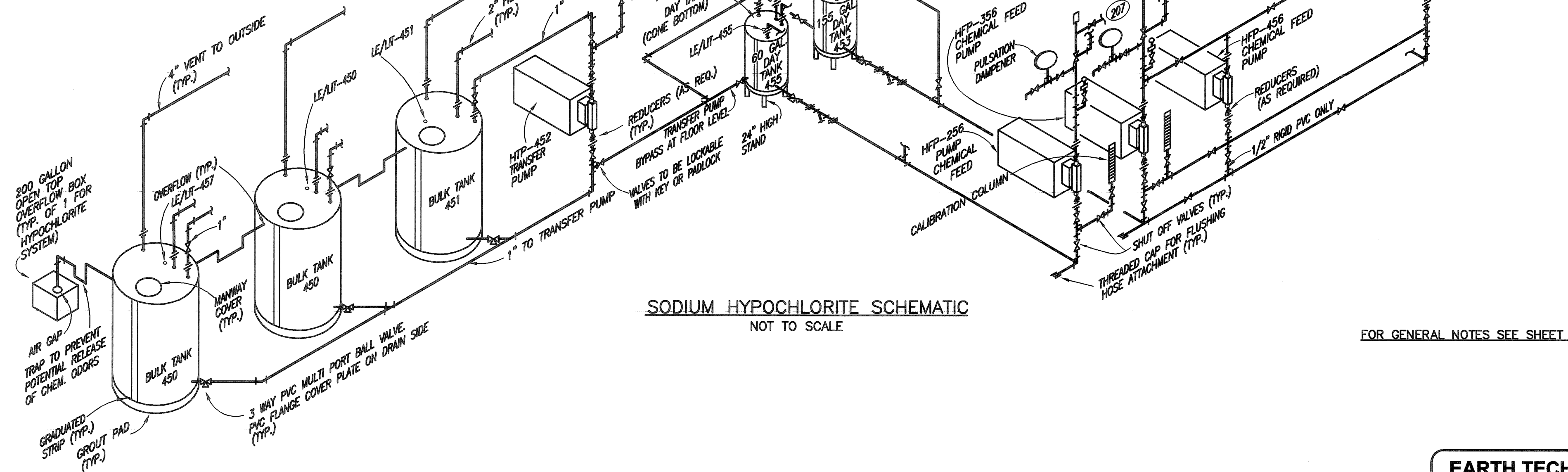
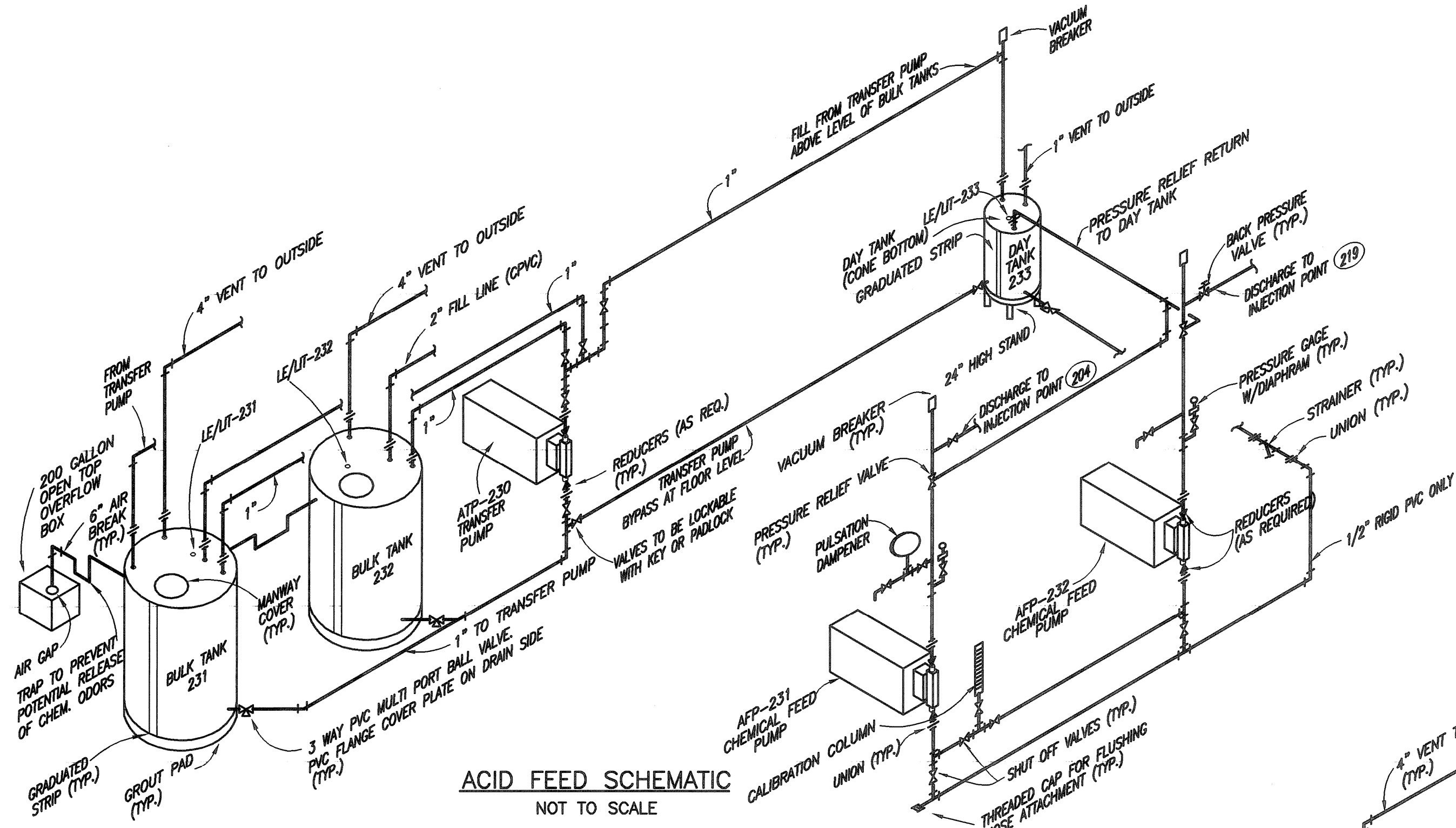
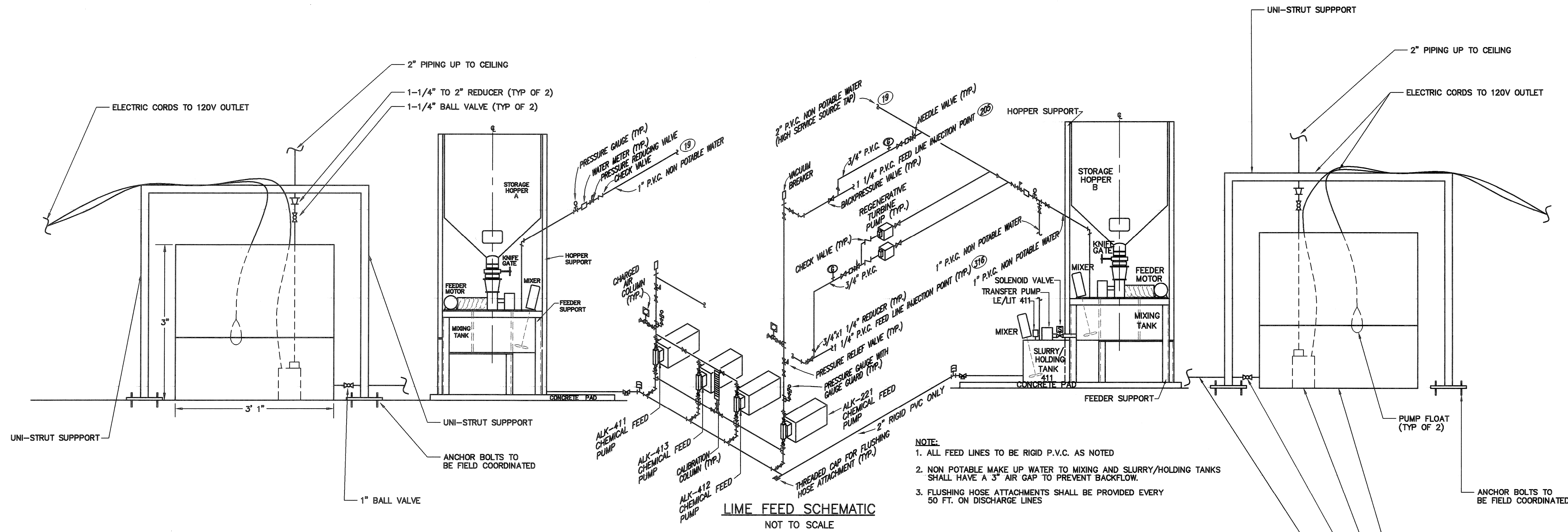
1. ALL CHEMICAL PIPING TO BE 1/2" SCH. 80 RIGID PVC UNLESS OTHERWISE NOTED.
2. ALL VALVES TO BE 1/2" PVC BALL VALVES UNLESS OTHERWISE NOTED.
3. CONTRACTOR TO PROVIDE ALL ADAPTERS NEEDED FOR TANK, PUMP, AND OTHER APPURTENANCES.
4. REFER TO CHEMICAL METERING PUMP PAD DETAIL ON STRUCTURAL DETAILS.
5. REFER TO DWG. G-2 FOR LEGEND OF CHEMICAL INJECTION LINE NUMBER DESIGNATIONS.
6. ALL CONE BOTTOM DAY TANKS SHALL BE INSTALLED WITH A TEE FITTING AT THE BOTTOM CONNECTION TO ALLOW FLOW FROM TRANSFER PUMP BYPASS AND INTO CHEMICAL FEED PUMP SUCTION.
7. ALL VENTS SHALL BE ROUTED ALONG THE CEILING AND SHALL EXIT THE BUILDING ON AN EXTERIOR WALL. VENTS FOR DIFFERENT CHEMICALS SHALL NOT BE COMBINED.
8. ALL MANUAL VALVES SHALL BE LOCATED NO HIGHER THAN 6 FEET ABOVE THE FINISH FLOOR.
9. BALL VALVES SHOWN ADJACENT TO TANKS SHALL BE INSTALLED DIRECTLY ON THE TANK CONNECTION.
10. FLUSHING CONNECTIONS SHALL BE FURNISHED AND INSTALLED AT EACH METERING PUMP, ON EITHER SIDE OF THE DISCHARGE HEAD, JUST INSIDE THE BALL VALVES SHOWN. EACH FLUSHING CONNECTION SHALL CONSIST OF A TEE FITTING WITH STANDARD HOSE THREAD ON THE BRANCH. A THREADED CAP SHALL BE FURNISHED AND INSTALLED AT EACH FLUSHING CONNECTION.
11. BACKPRESSURE VALVES TO BE INSTALLED AT POINT OF INJECTION FOR ALL FEED SYSTEMS.
12. ALL OVERFLOW LINES AND NON POTABLE WATER SERVICE LINES SHALL HAVE AN AIR BREAK AND BE INSTALLED WITH SCREENS AT END OF PIPE.
13. PROVIDE SCREEN ON END OF OVERFLOW PIPE FOR EACH BULK TANK.
14. PROVIDE AIR GAP FOR ALL NON-POTABLE WATER SERVICE LINES AT EACH MIXING TANK (AMMONIUM SULFATE AND LIME).

ROBERT H. SHELDON  
No. 4103  
Professional Engineer  
State of Massachusetts  
Registration No. 10109  
Date: 7/10/08

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
SCHEMATICS - CHEMICAL FEED AREA

DESIGNED BY	DWG SCALE AS NOTED
DRAWN BY	CONTRACT NO.
CHECKED BY	DATE

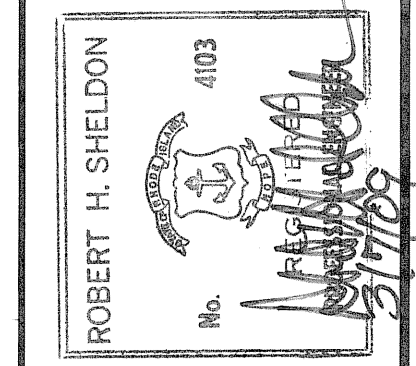
**EARTH TECH**  
AS-BUILT FILE  
JULY 2008



FOR GENERAL NOTES SEE SHEET 10

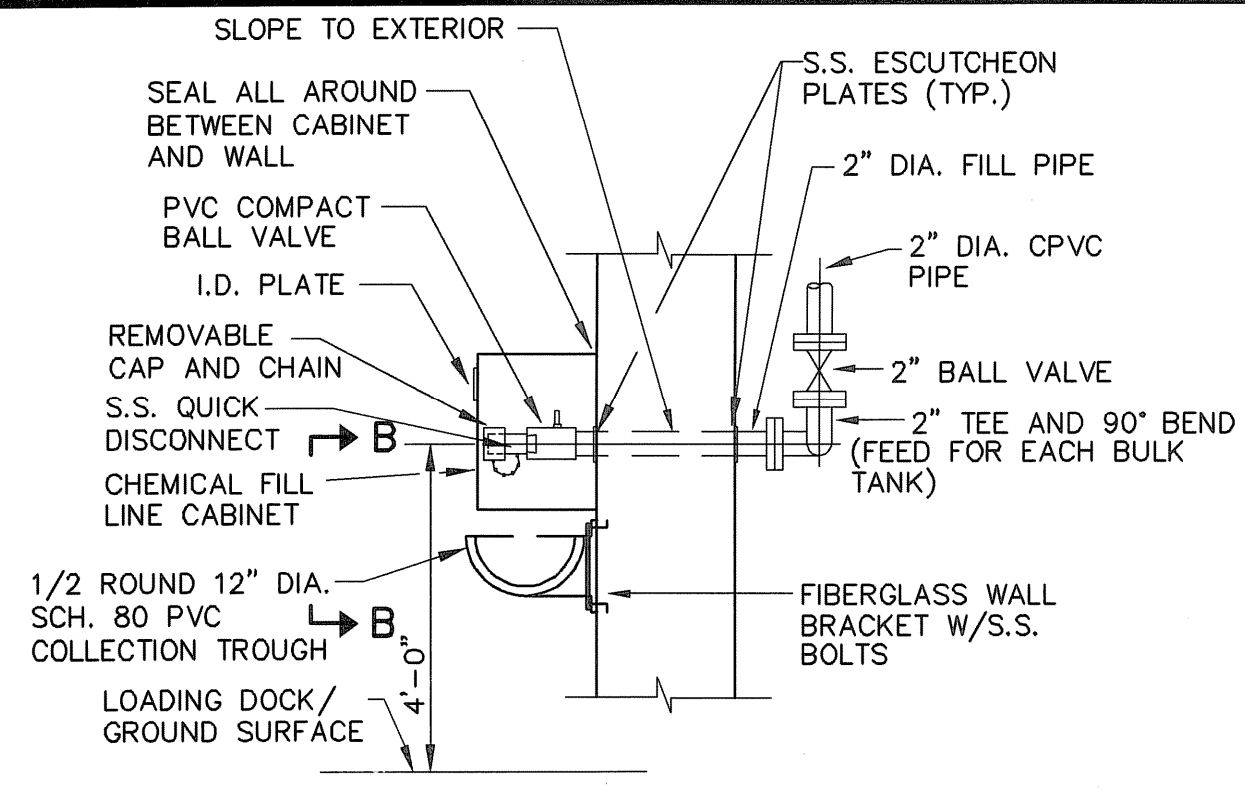
**EARTH TECH**  
AS-BUILT FILE  
JULY 2008

NO.	DATE	BY	REVISIONS
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2	10/21/08	AMM	ISSUED FOR RT POSTED SET
3	7/20/08	AMM	AS-BUILT DRAWING FILE

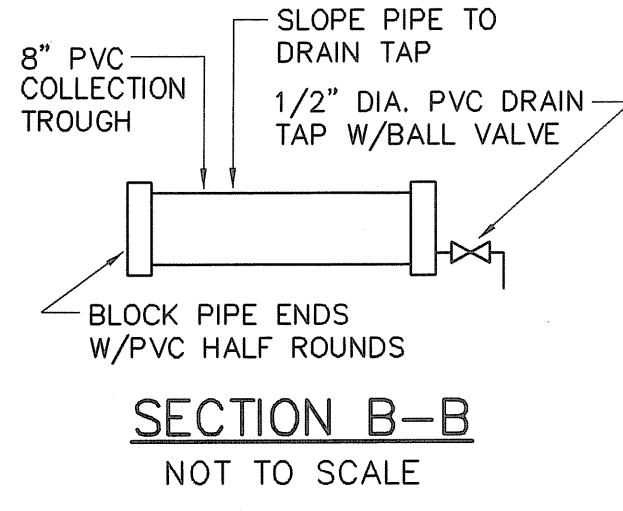


PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
 SCHEMATICS—CHEMICAL FEED AREA

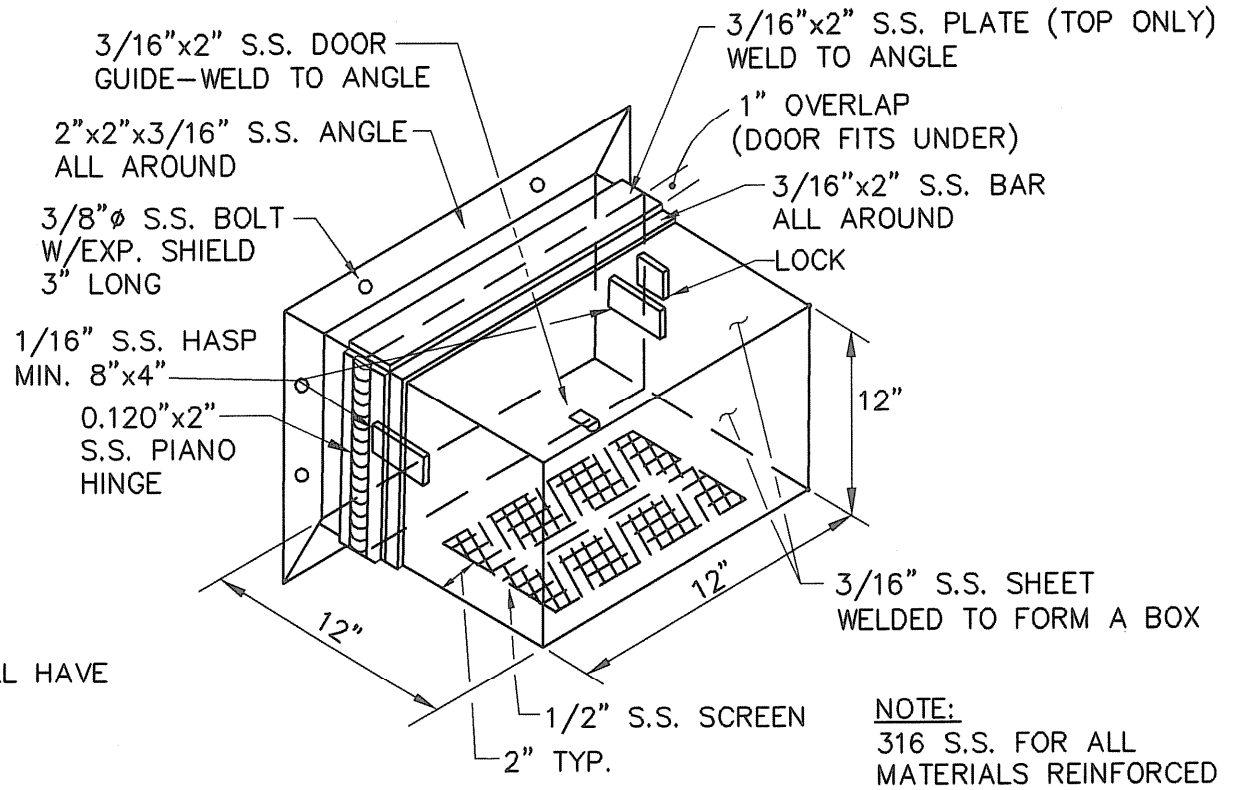
DESIGNED BY	DWG SCALE
DRAWN BY	AS NOTED
CHECKED BY	CONTRACT NO
	DATE
	OCTOBER 31, 2008



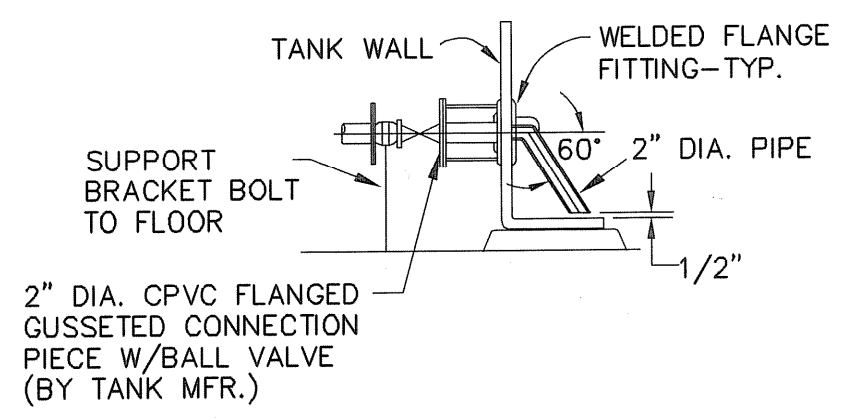
**CHEMICAL FILL LINE DETAIL**  
NOT TO SCALE



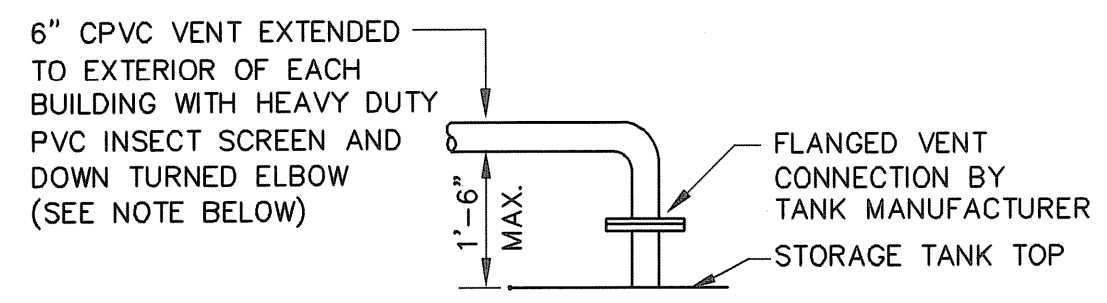
**CHEMICAL FILL LINES PLAN VIEW**  
NOT TO SCALE



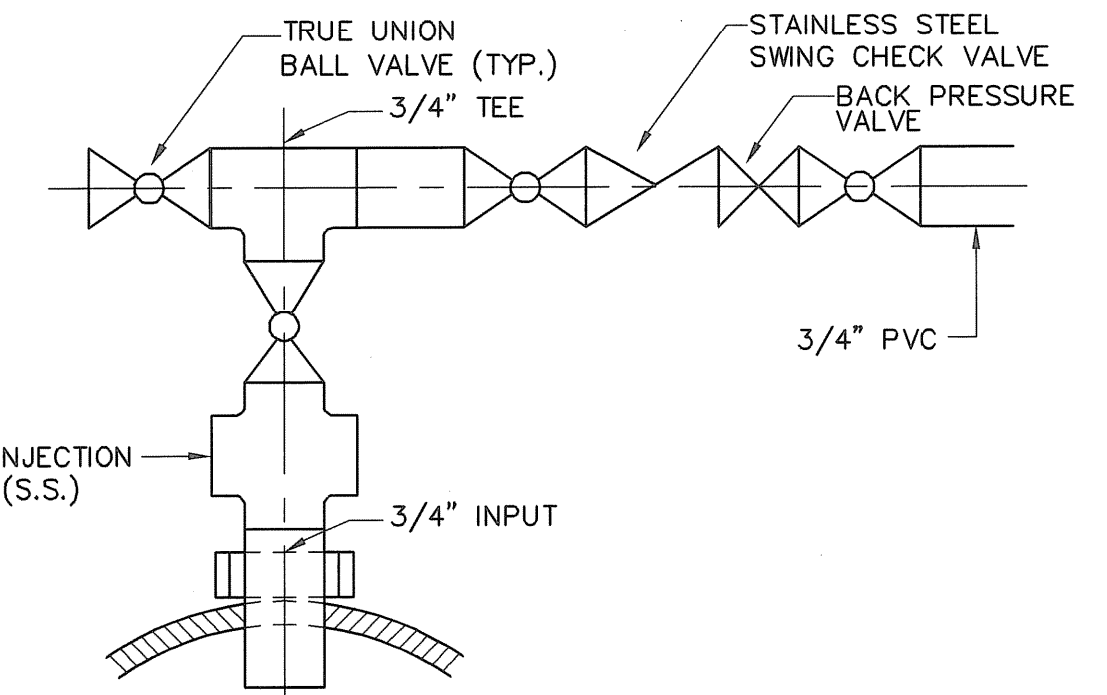
**CHEMICAL FILL LINE CABINET**  
NOT TO SCALE



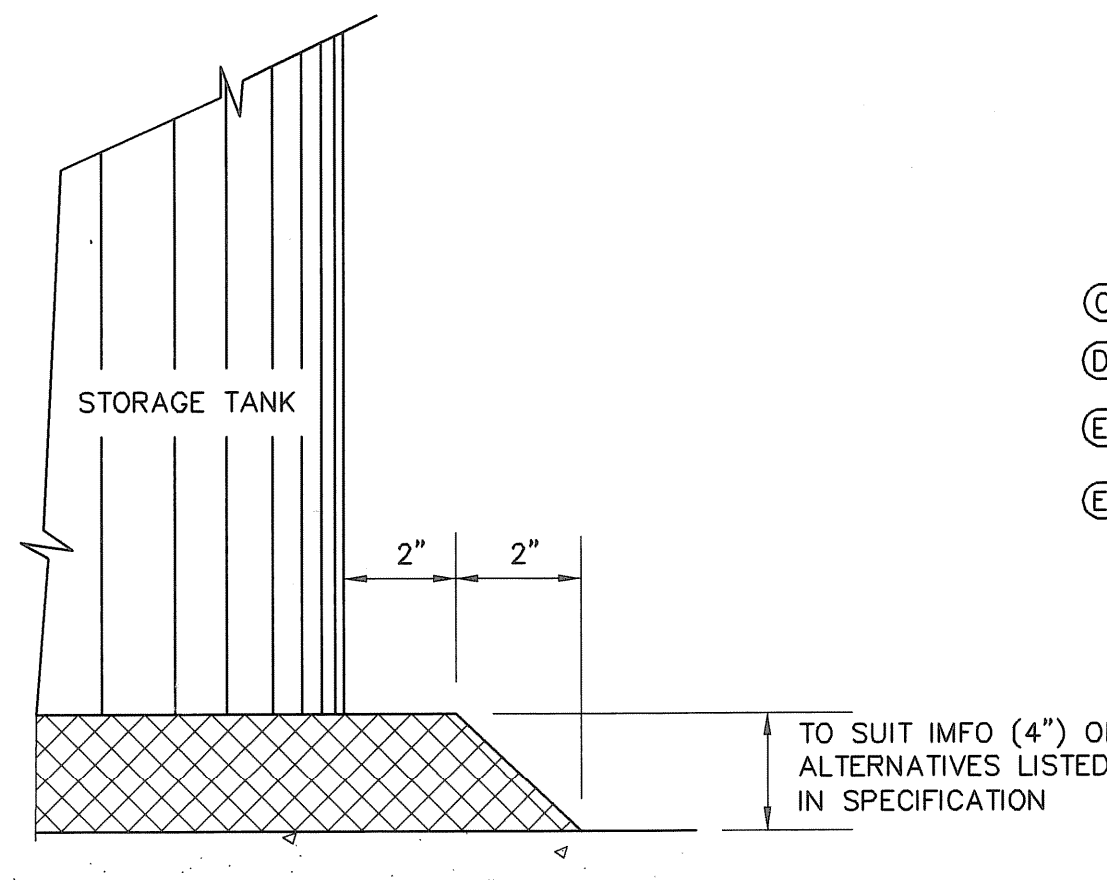
**CHEMICAL STORAGE TANK DISCHARGE DETAIL**  
NOT TO SCALE



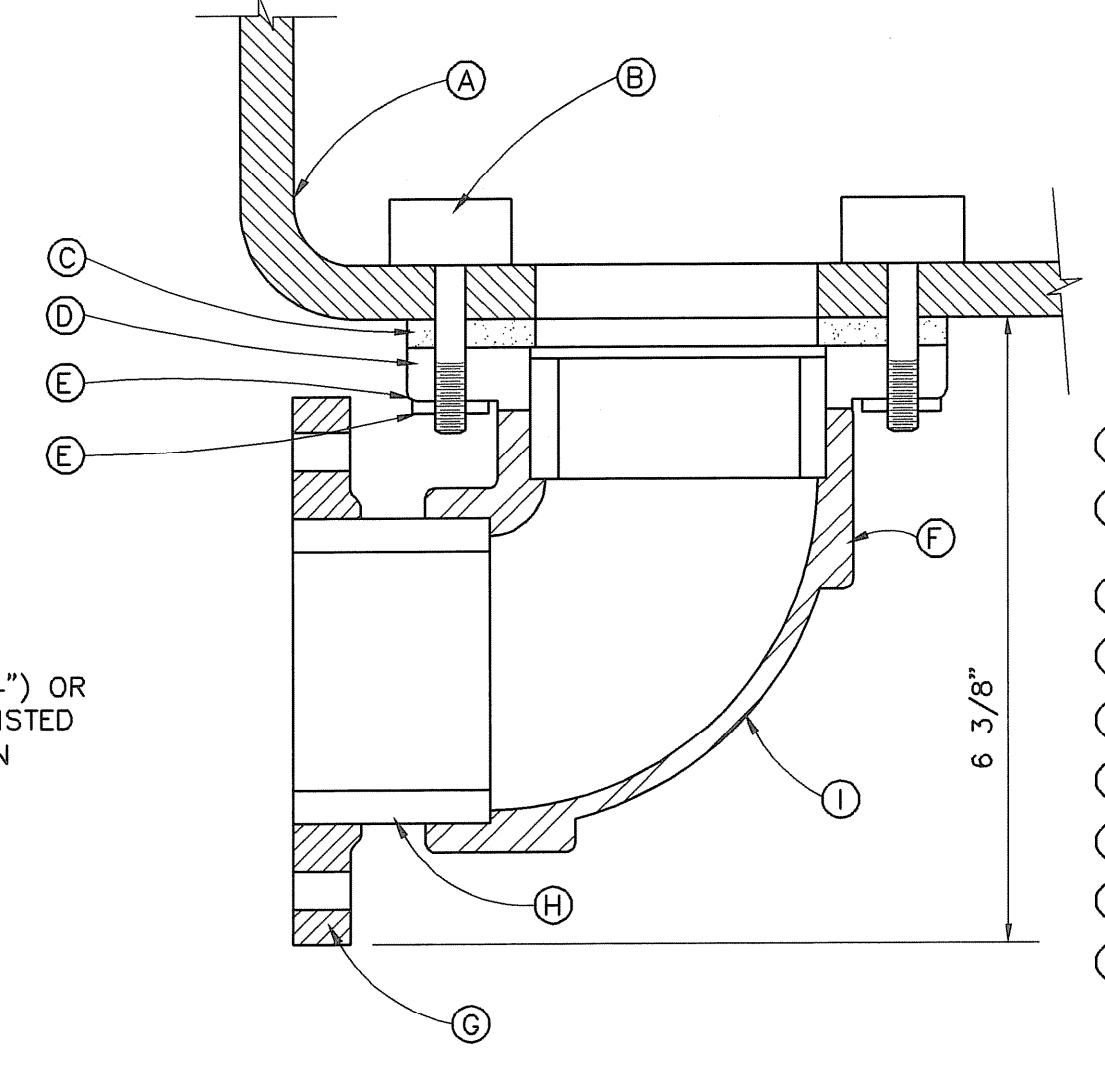
**CHEMICAL TANK VENT DETAIL**  
NOT TO SCALE



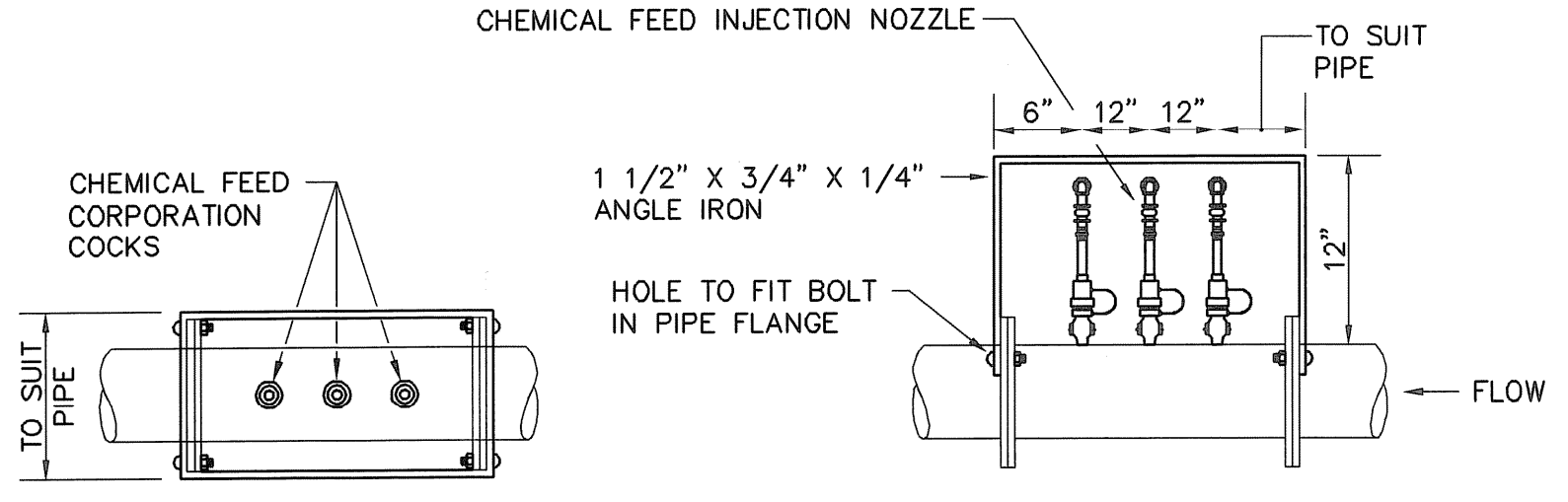
**INJECTION QUILL FOR LIME FEED SYSTEM**  
NOT TO SCALE



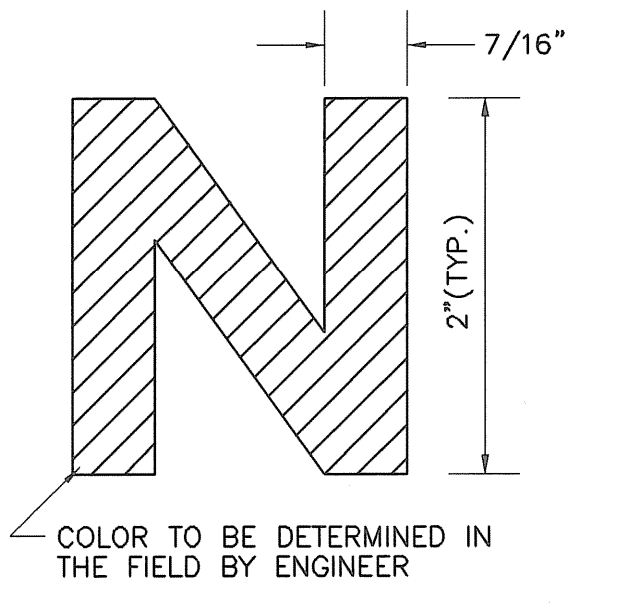
**CHEMICAL TANK BEARING DETAIL**  
NOT TO SCALE



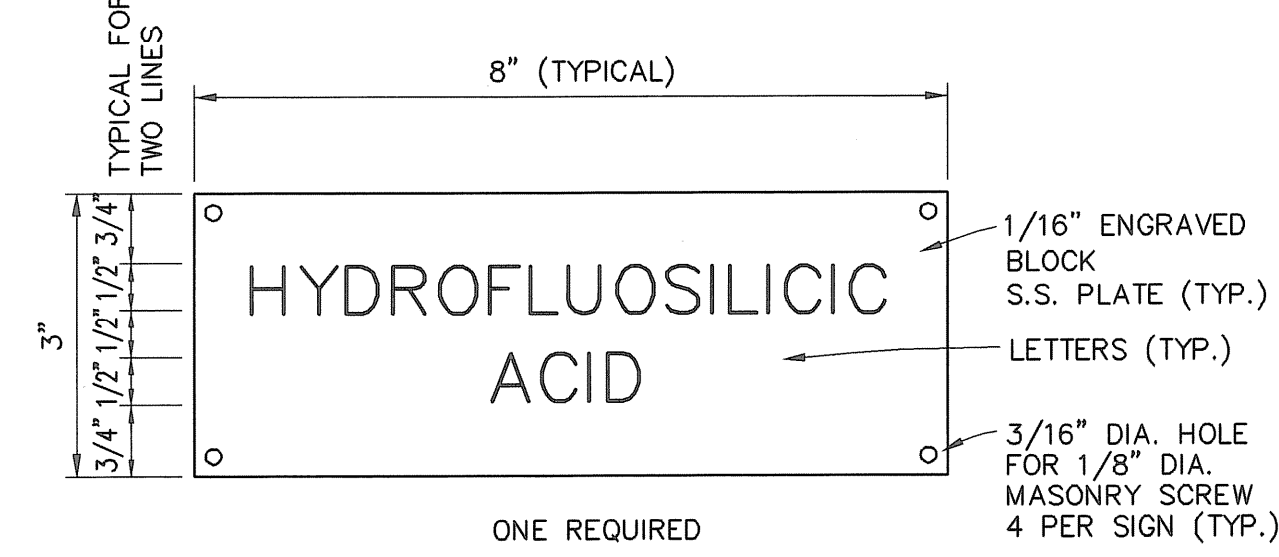
**DONKER BOLT FLANGE DETAIL**  
NOT TO SCALE



**CHEMICAL FEED/SAMPLE TAP CORPORATION GUARD**  
NOT TO SCALE

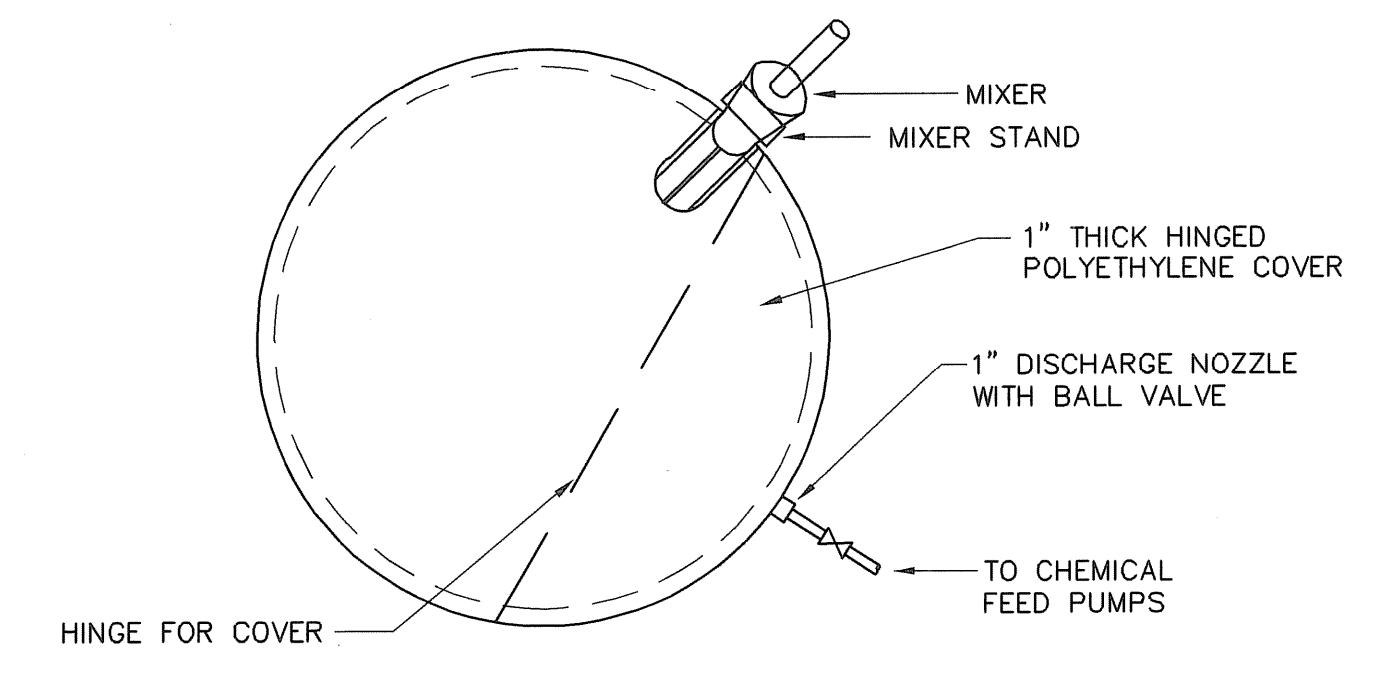


**DETAIL CHEMICAL TANK I.D. LETTERING**  
NOT TO SCALE

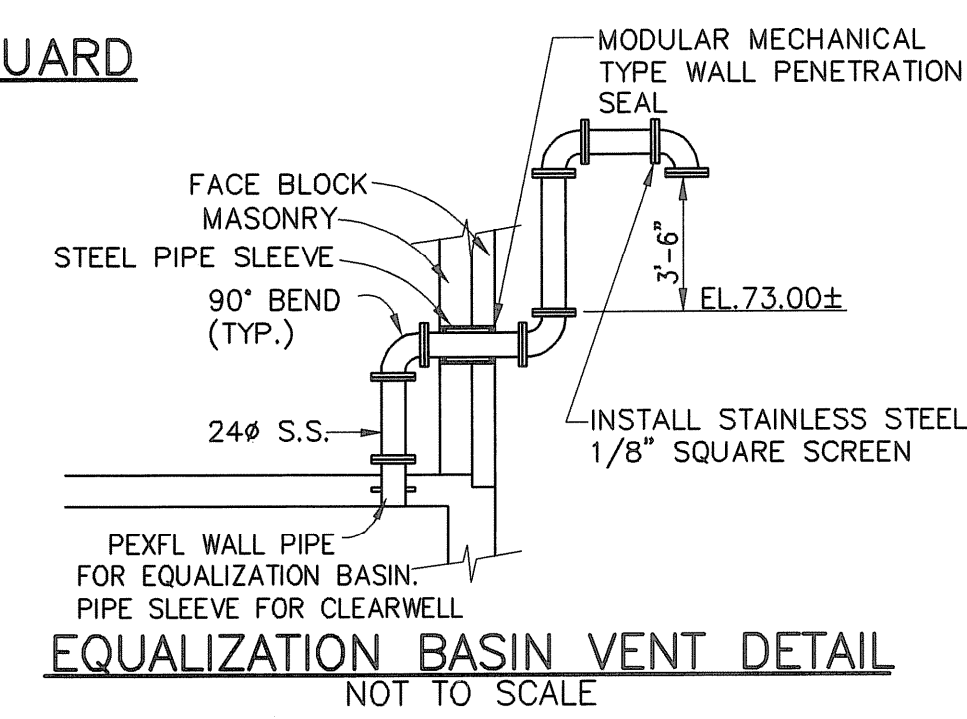


**FILL PIPE EXTERIOR I.D. LABELS- WATER TREATMENT FACILITY**  
NOT TO SCALE

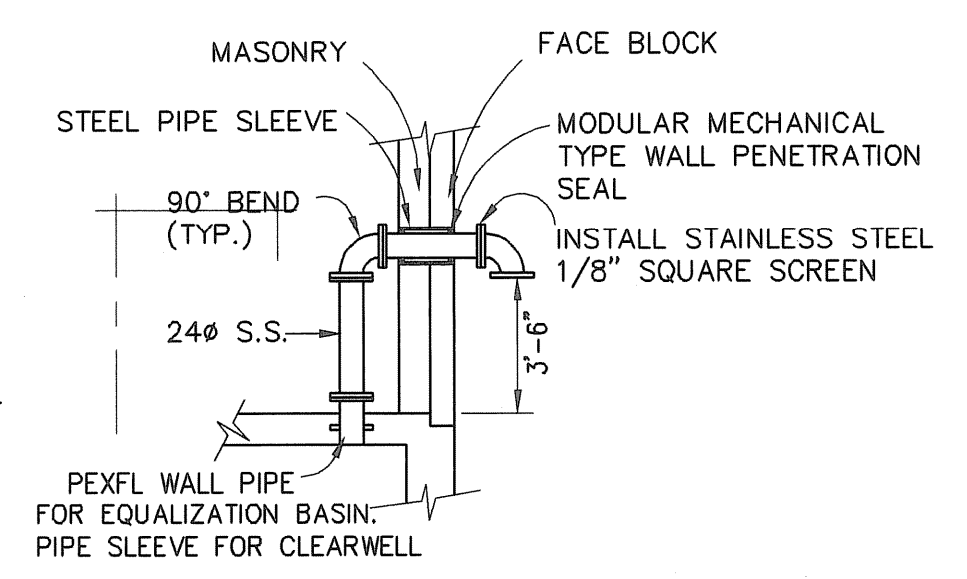
LEGEND	QUANTITY
HYDROFLUOSILICIC ACID	1
PHOSPHATE	1
COAGULANT	1
ACID	1
SODIUM HYPOCHLORITE	1



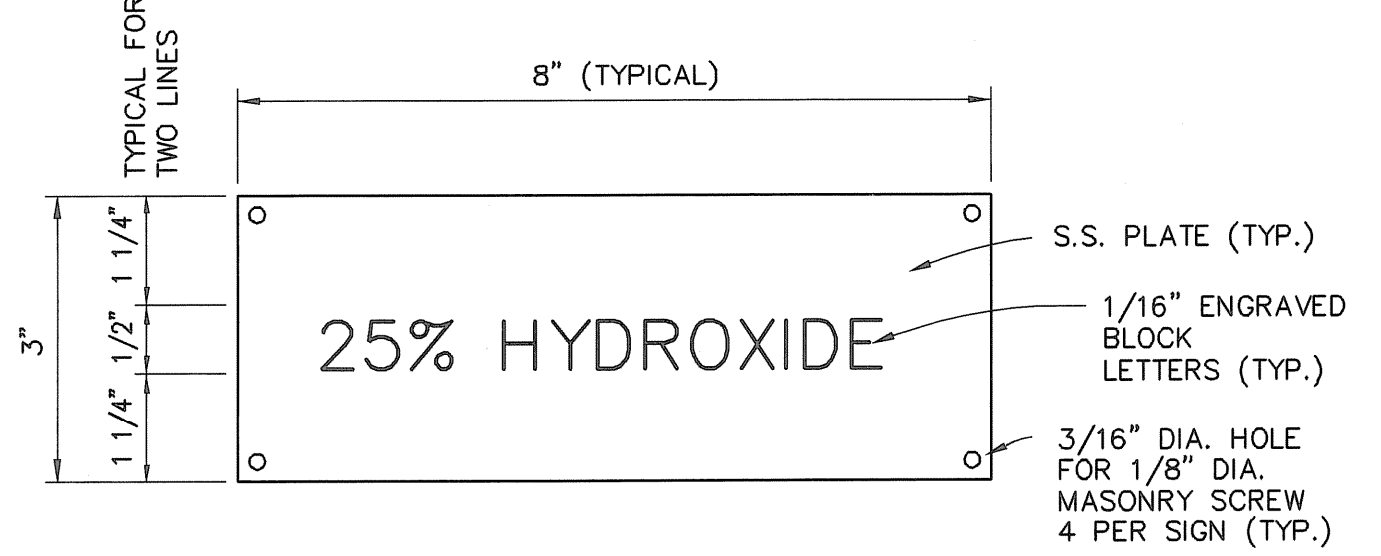
**CHEMICAL MIXING TANK POTASSIUM PERMANGANATE AND AMMONIUM SULFATE**  
NOT TO SCALE



**EQUALIZATION BASIN VENT DETAIL**  
NOT TO SCALE

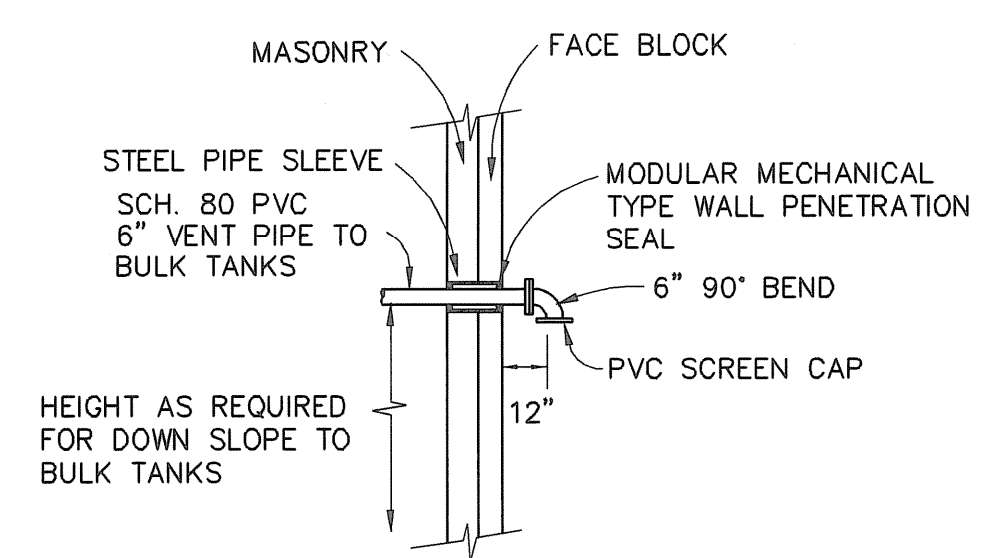


**CLEAR WELL VENT DETAIL**  
NOT TO SCALE

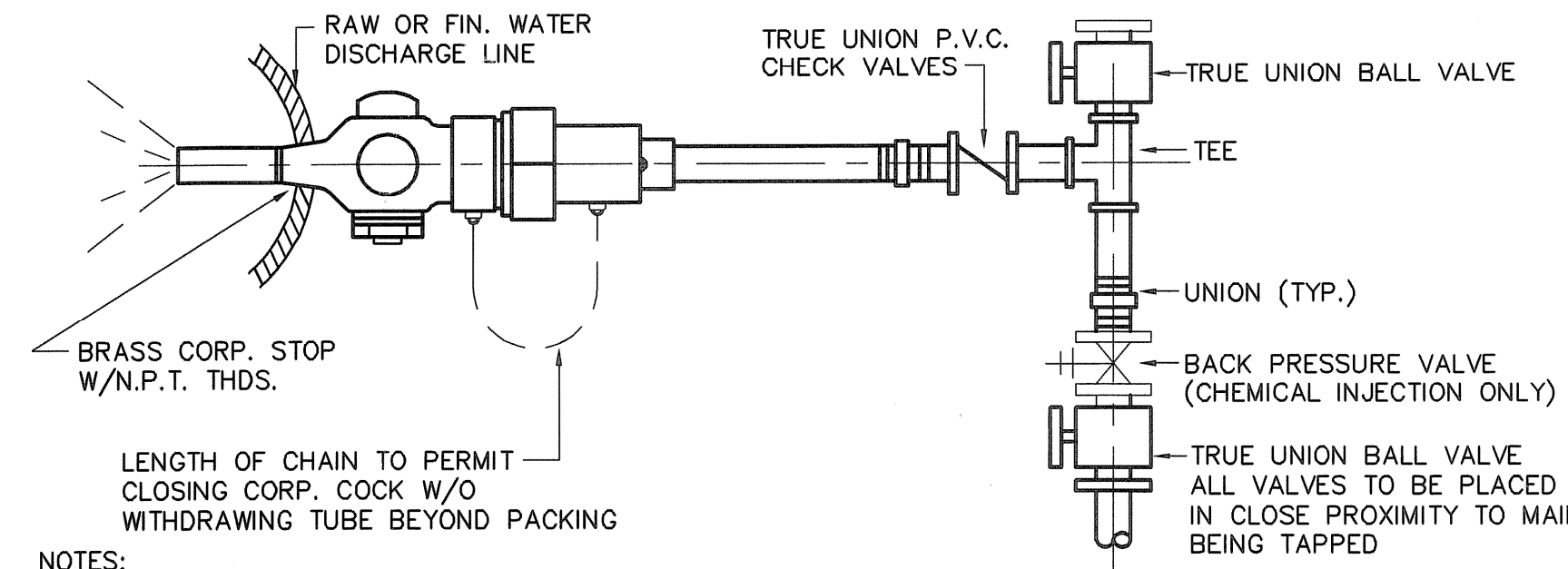


LEGEND	QUANTITY
25% HYDROXIDE	1

**FILL PIPE EXTERIOR I.D. LABELS- PUMP STATION**  
NOT TO SCALE



**TYPICAL BULK TANK VENT WALL PENETRATION DETAIL**  
NOT TO SCALE



**CORPORATION STOP DETAIL (ALL EXCEPT LIME FEED)**  
NOT TO SCALE

- NOTES:**
1. DETAIL TYPICAL FOR CHEMICAL INJECTION AND SAMPLE WATER TAPS AT PIPES OR MAINS.
  2. TYPE "K" COPPER TO BE USED FOR RAW WATER SAMPLE LINE.
  3. SCH. 80 CPVC TO BE USED FOR CHEMICAL INJECTION LINES.

NO.	DATE	BY	REVISIONS
1	10/27/06	AM	AS-BUILT DRAWING FILE
2	5/20/08	AM	ISSUED FOR RFI POSTED SET
3	4/9/08	AM	ISSUED FOR CONSTRUCTION
4	2/15/08	AM	ISSUED FOR CONSTRUCTION

ROBERT H. SHELDON  
No. 403  
Professional Engineer  
State of Massachusetts  
3/7/08

DESIGNED BY	DWG SCALE
OLF	AS NOTED

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Plot File Date Created: Sep/22/2008 10:58 AM

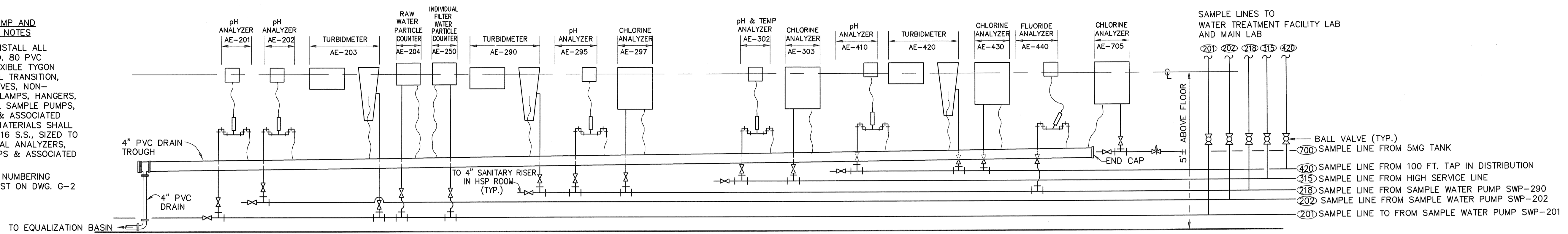
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04/05/05	MS	ISSUED FOR CONSTRUCTION
02/15/05	MS	BID SET

ROBERT H. SHELDON  
N. 403  
LICENSED PROFESSIONAL ENGINEER  
STATE OF MASSACHUSETTS  
2/11/08

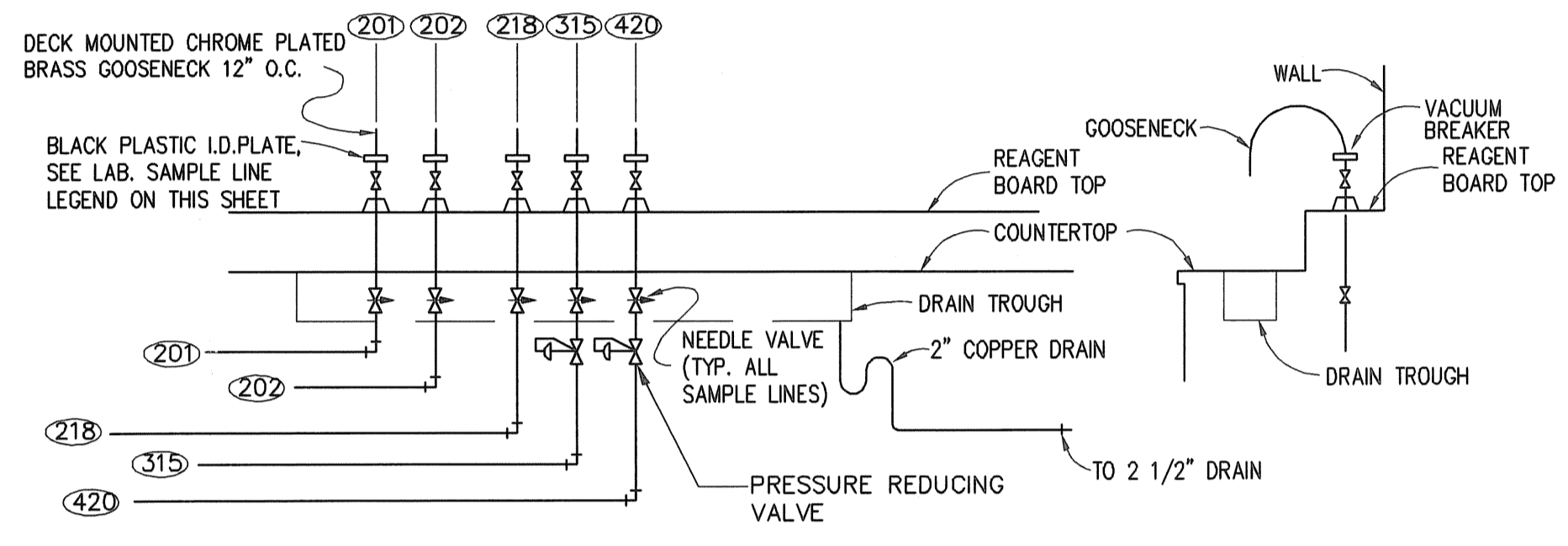
PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY  
**PKG. 6 - MECHANICAL PROCESS**  
PROCESS ANALYZERS

DESIGNED BY	DWG SCALE
MS	AS NOTED
DRAWN BY	CONTRACT NO.
GLF	
CHECKED BY	DATE
	OCTOBER 31, 2008

- SAMPLE PUMP AND ANALYZER NOTES**
- FURNISH & INSTALL ALL REQ'D. SCHED. 80 PVC PIPING & FLEXIBLE TYGON TUBING & ALL TRANSITION, FITTINGS, VALVES, NON-CORRODING CLAMPS, HANGERS, ETC. FOR ALL SAMPLE PUMPS, ANALYZERS, & ASSOCIATED PIPING. ALL MATERIALS SHALL BE PVC OR 316 S.S., SIZED TO SUIT INDIVIDUAL ANALYZERS, SAMPLE PUMPS & ASSOCIATED PIPING.
  - SAMPLE PIPE NUMBERING REFERS TO LIST ON DWG. G-2



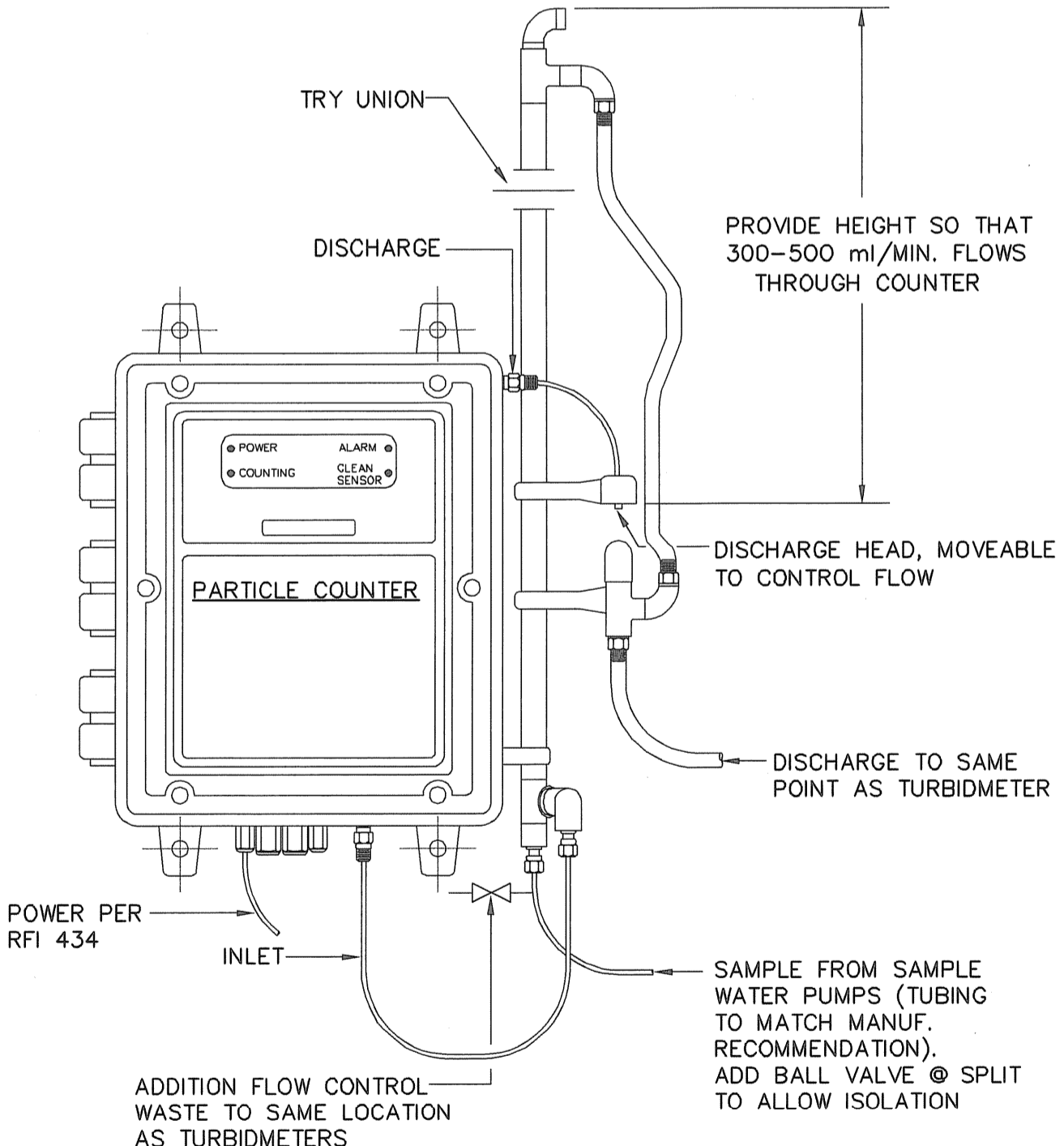
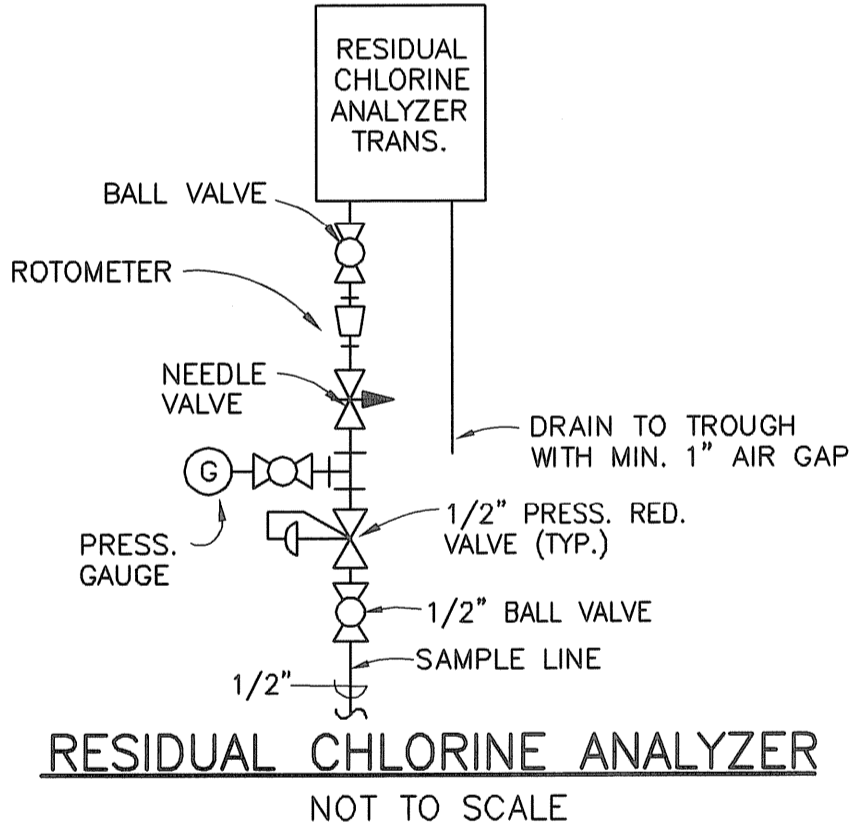
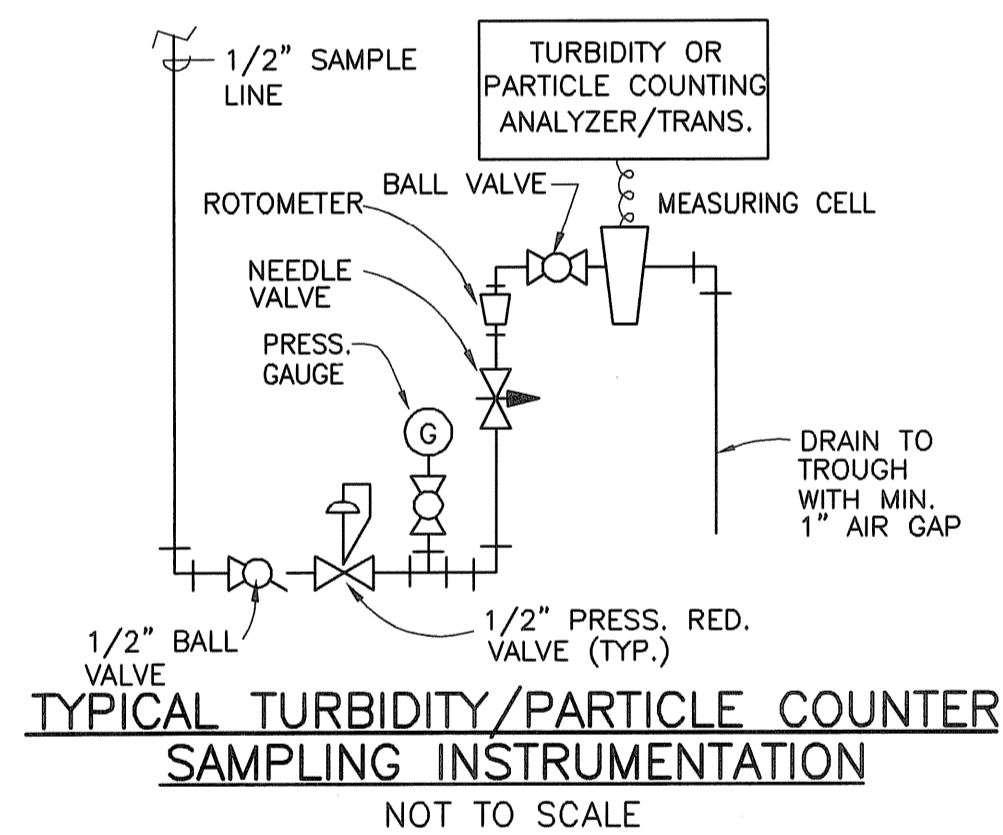
**ELEVATION OF WATER QUALITY ANALYZERS**  
NOT TO SCALE



**LABORATORY SAMPLE LINE LEGEND FOR WATER TREATMENT FACILITY AND MAIN LABORATORY**  
NOT TO SCALE

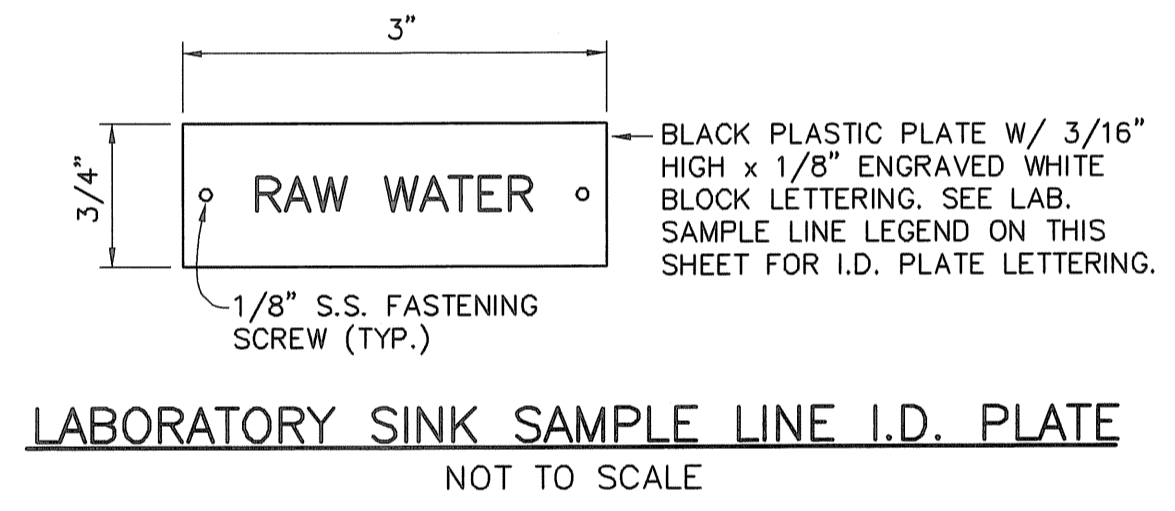
NO.	SAMPLE LINE	LAB. CONNECTION
201	RAW WATER	TO LAB. SINK
202	PRECOAGULATED WATER	TO LAB. SINK
218	COMBINED FILTER EFFLUENT	TO LAB. SINK
315	CLEARWELL EFFLUENT	TO LAB. SINK
420	DISTRIBUTION SYSTEM	TO LAB. SINK

NOTE:  
UNDERLINE DENOTES SAMPLE LINE LEGEND REQUIRED FOR I.D. PLATES.

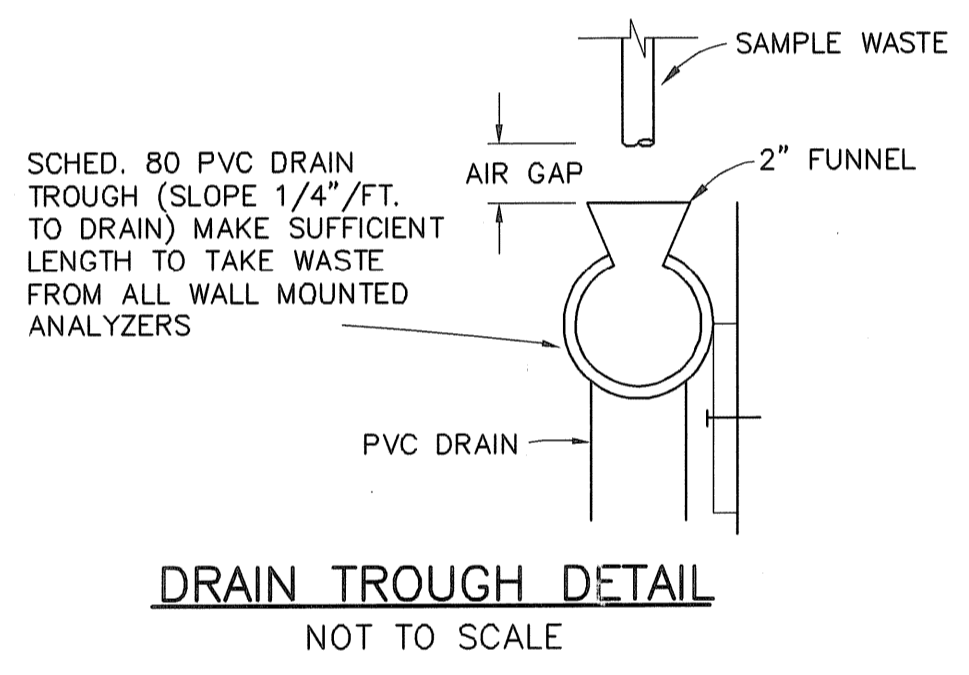


**DETAIL - PARTICLE COUNTER**  
NOT TO SCALE

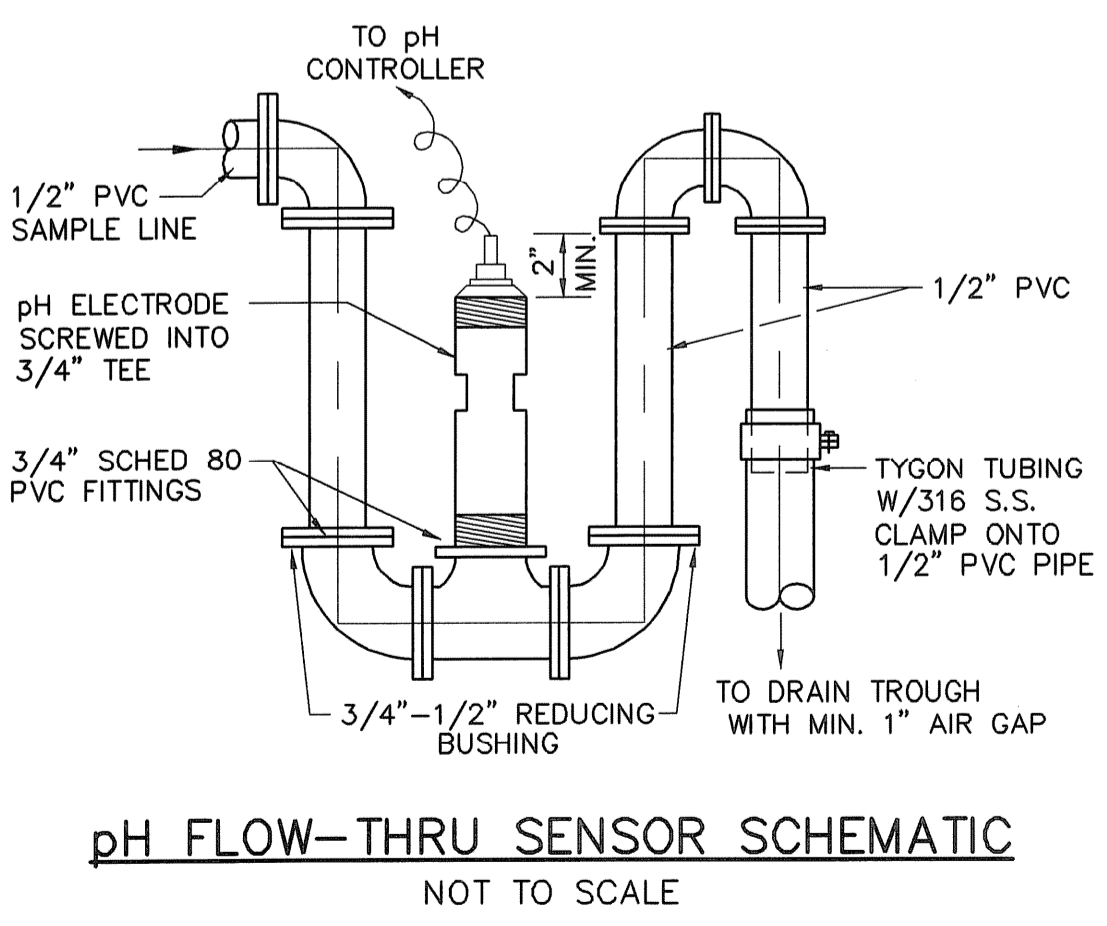
- NOTES:
- THE SAMPLE WATER SHALL GO UNDER THE STAINLESS STEEL FLOOR PLATE TO THE COUNTER AND NOT BE PIPED HIGH OVER THE CEILING.
  - MOUNT PARTICLE COUNTER NEXT TO TURBID IN PIPE GALLERY



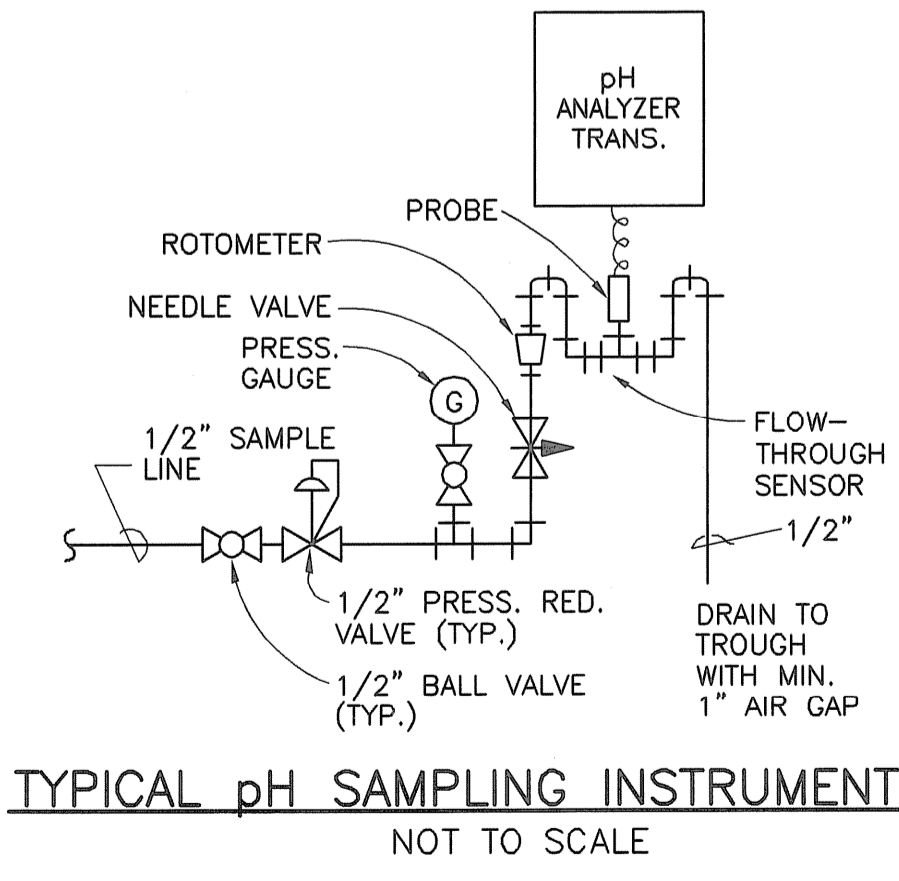
**LABORATORY SINK SAMPLE LINE I.D. PLATE**  
NOT TO SCALE



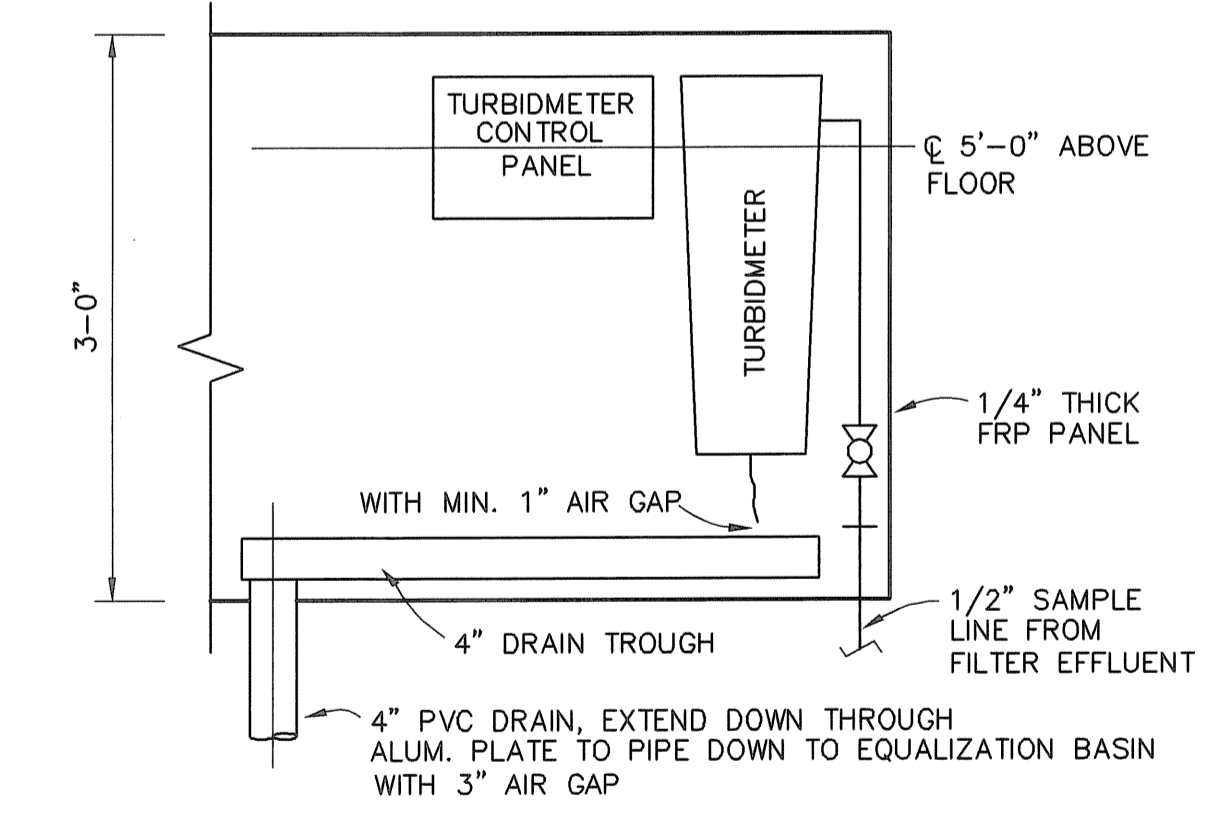
**DRAIN TROUGH DETAIL**  
NOT TO SCALE



**pH FLOW-THRU SENSOR SCHEMATIC**  
NOT TO SCALE

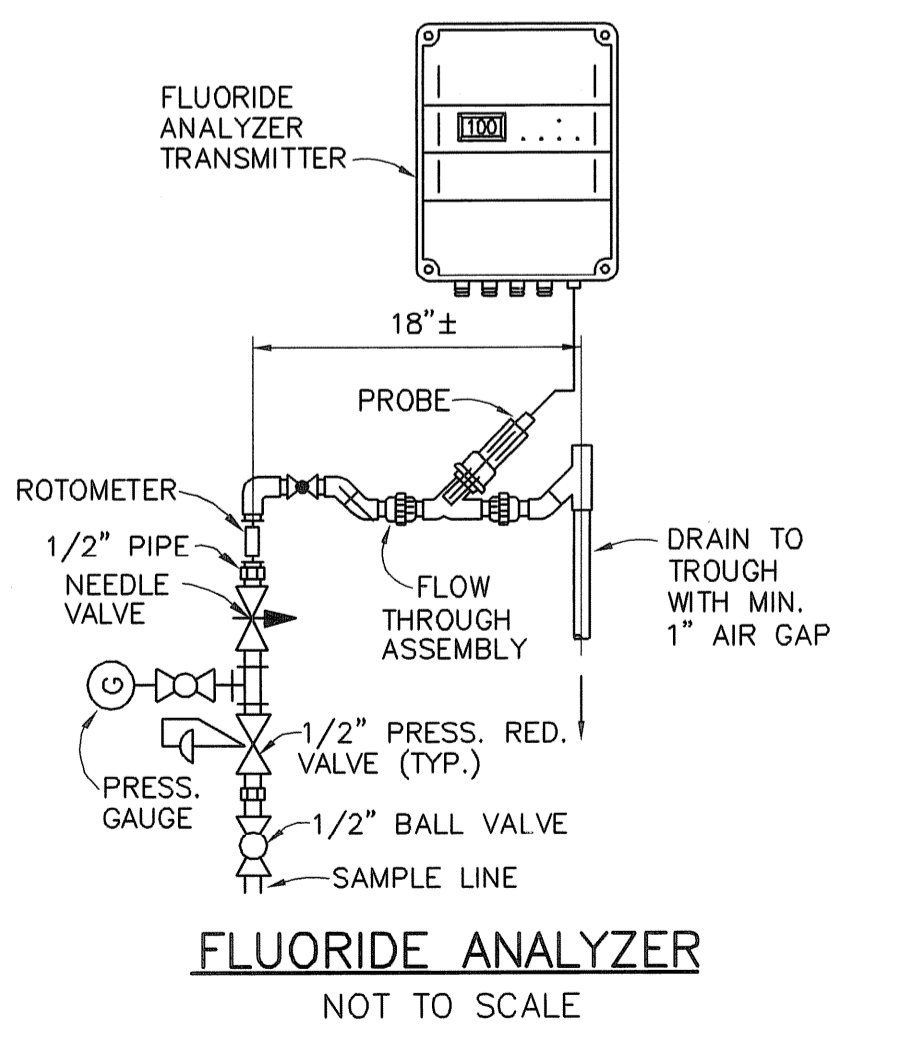


**TYPICAL pH SAMPLING INSTRUMENTATION**  
NOT TO SCALE



**DETAIL - FILTER EFFLUENT ANALYZER PANEL**  
NOT TO SCALE

- NOTES:
- FRP PANEL TO BE ATTACHED TO CLARIFIER EFFLUENT/FILTER INFLUENT HEADER PIPE USING U-BOLTS, BOLTS AND ALL ASSOCIATED HARDWARE (BACKUP NUT, WASHERS, AND LOCKDOWN NUT) TO BE 304 SS.
  - ANALYZERS TO BE ATTACHED TO PANEL USING 304 SS. HARDWARE.
  - MOUNTING HARDWARE, PIPING, ETC. FOR PARTICLE COUNTER TO BE INSTALLED AT ALL FILTER EFFLUENT LOCATIONS. ONLY ONE PARTICLE COUNTER TO BE PROVIDED BY CONTRACTOR, TO BE INSTALLED AT ONE OF THE FILTER EFFLUENT ANALYZER PANELS, AS DIRECTED BY THE ENGINEER.



**FLUORIDE ANALYZER**  
NOT TO SCALE

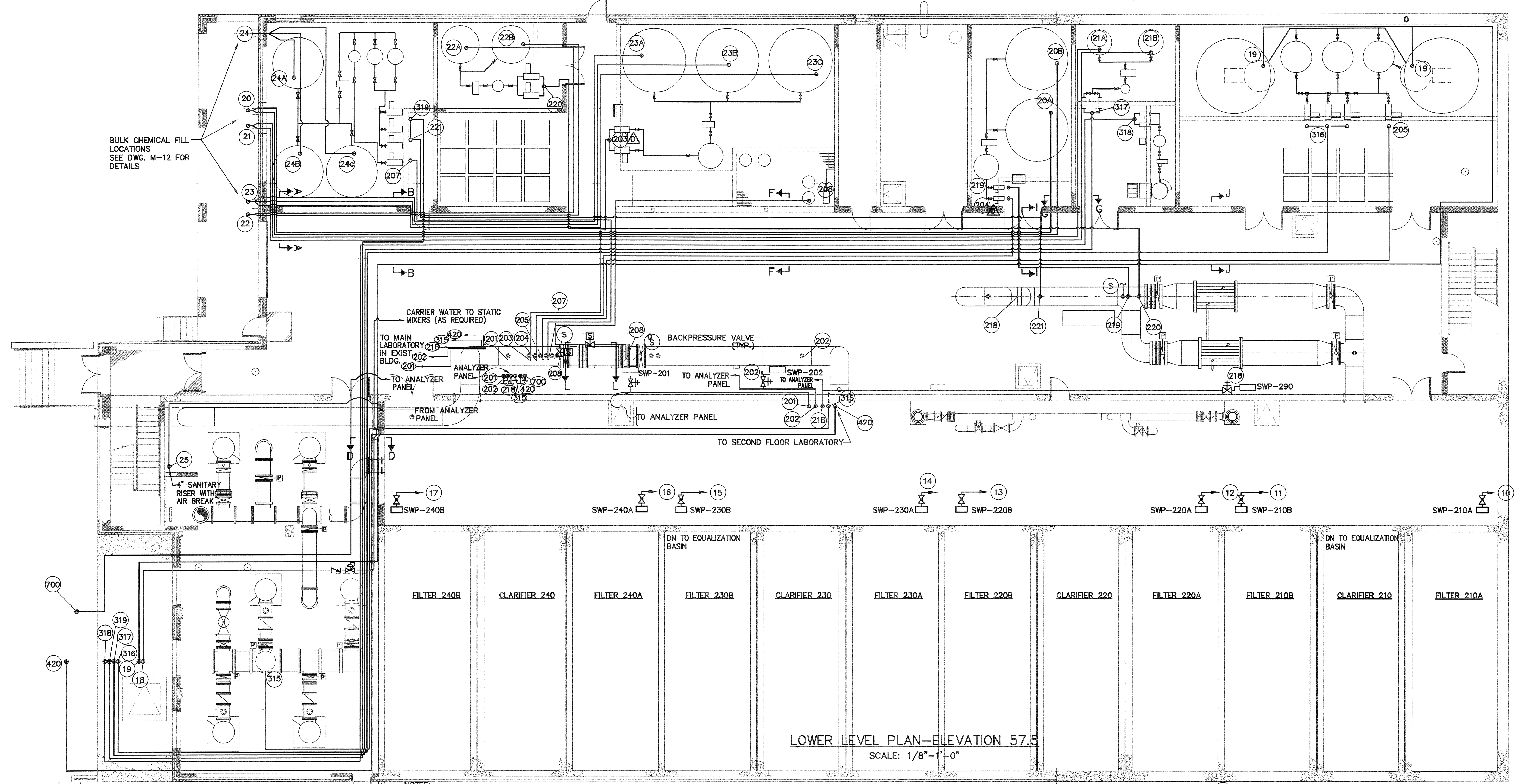
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NO.	DATE	BY	REVISIONS
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1	5/29/05	AAH	ISSUED FOR CONSTRUCTION
0	4/9/05	AAH	ISSUED FOR CONSTRUCTION
	2/15/05	AAH	ISSUED FOR CONSTRUCTION

ROBERT H. SHELDON  
No. 4103  
Professional Engineer  
State of Massachusetts  
No. 12169

PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
CHEMICAL FEED PIPING - PLAN AND SECTIONS

DESIGNED BY	DWG SCALE AS NOTED
DRAWN BY	CONTRACT NO. GLF
CHECKED BY	DATE OCTOBER 31, 2008

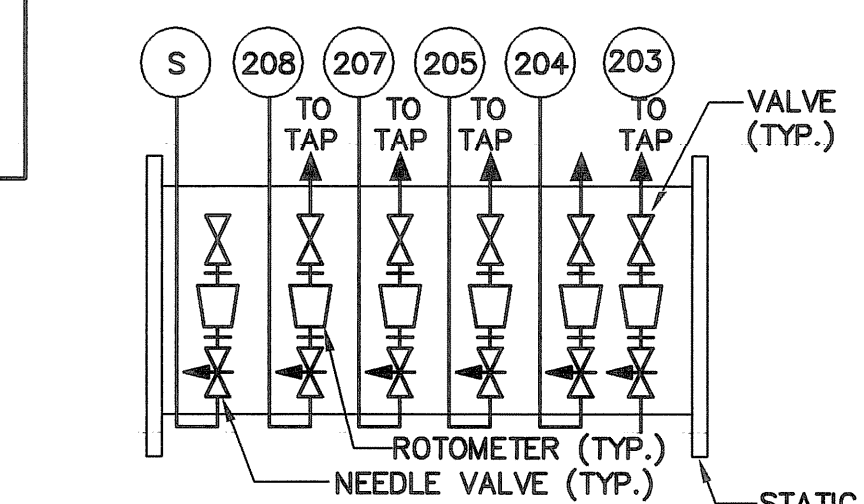


LOWER LEVEL PLAN-ELEVATION 57.5  
SCALE: 1/8"=1'-0"

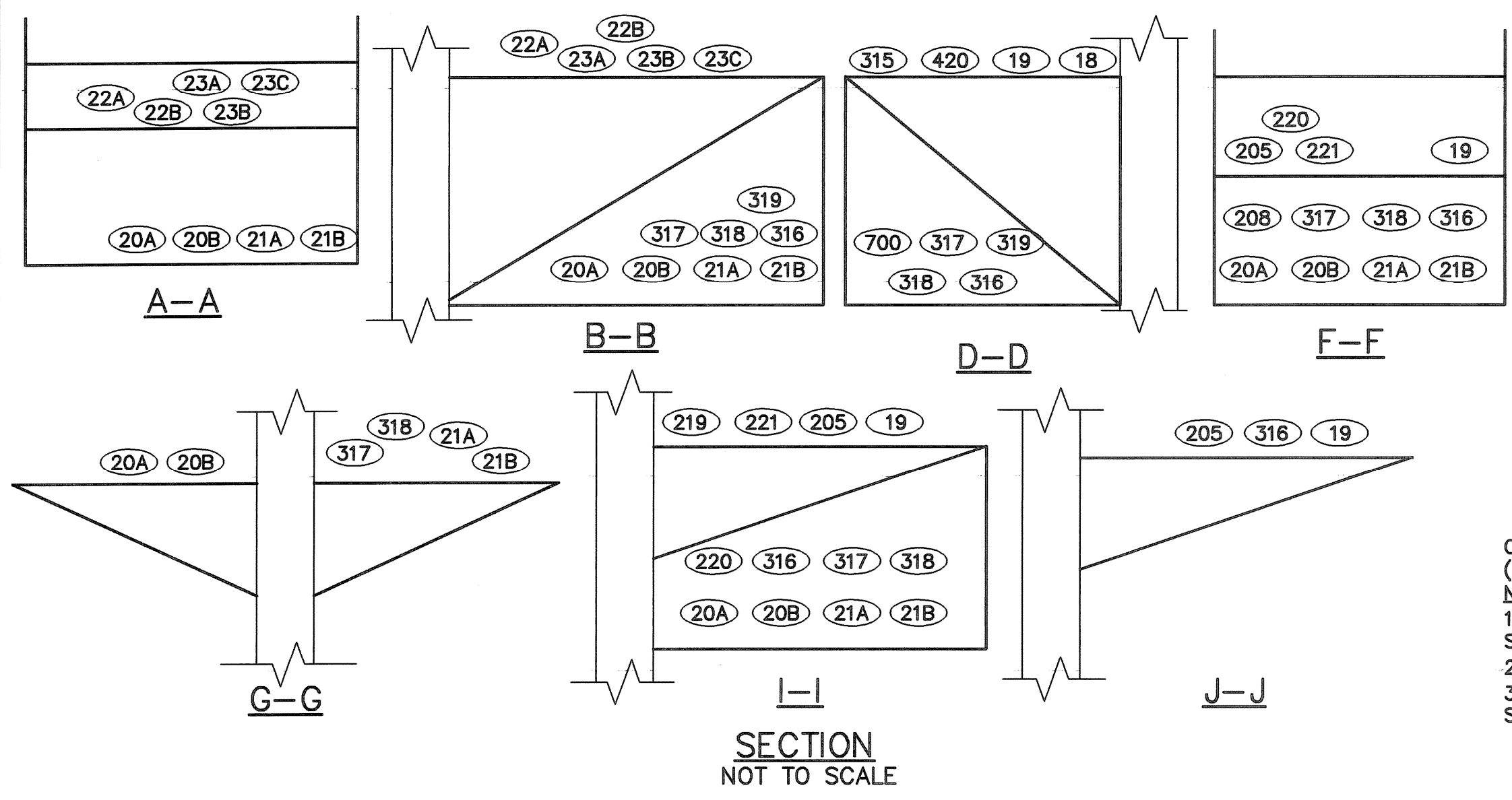
- NOTES:**
- BACKPRESSURE VALVE SHALL BE PLACED ON FAR DISCHARGE OF ALL SAMPLE WATER PUMPS.
  - USE METAL CONNECTORS THAT ARE CHEMICAL COMPATIBLE AT THE CHEMICAL FILL STATIONS. PLASTIC FILL CONNECTORS WILL NOT BE ALLOWED.

**KEY**

- |   |   |
|---|---|
| <ul style="list-style-type: none"> <li>10 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-210A FILTER TO GALLERY TURBIDIMETER</li> <li>11 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-210B FILTER TO GALLERY TURBIDIMETER</li> <li>12 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-220A FILTER TO GALLERY TURBIDIMETER</li> <li>13 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-220B FILTER TO GALLERY TURBIDIMETER</li> <li>14 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-230A FILTER TO GALLERY TURBIDIMETER</li> <li>15 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-230B FILTER TO GALLERY TURBIDIMETER</li> <li>16 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-240A FILTER TO GALLERY TURBIDIMETER</li> <li>17 PVC - SAMPLE LINE (INSULATED) FROM SAMPLE PUMP SWP-240B FILTER TO GALLERY TURBIDIMETER</li> <li>18 1" PVC - CARRIER WATER PRE STATIC MIXER (IF REQUIRED)</li> <li>19 2" PVC - CARRIER WATER FOR LIME SYSTEM</li> <li>20A CPVC - FILL LINE (ACID BULK TANK) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>20B CPVC - FILL LINE (ACID BULK TANK) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>21A CPVC - FILL LINE (POLYPHOSPHATE BULK TANK) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>21B CPVC - FILL LINE (POLYPHOSPHATE BULK TANK) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>22A CPVC - FILL LINE (HYDROFLUOSILICIC ACID)</li> <li>22B CPVC - FILL LINE (HYDROFLUOSILICIC ACID)</li> <li>23A CPVC - FILL LINE (COAGULANT) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>23B CPVC - FILL LINE (COAGULANT) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>23C CPVC - FILL LINE (COAGULANT) FILL LINE IN HYPOCHLORITE AREAS TO BE DOUBLE WALLED</li> <li>24A CPVC - FILL LINE (SODIUM HYPOCHLORITE)</li> <li>24B CPVC - FILL LINE (SODIUM HYPOCHLORITE)</li> </ul> | <ul style="list-style-type: none"> <li>24C CPVC - FILL LINE (SODIUM HYPOCHLORITE)</li> <li>25 1.5" SAMPLE BLEED LINE FROM ANALYZER PANEL</li> <li>201 PVC - SAMPLE LINE (INSULATED) PRE-STATIC MIXER TO SAMPLE LAB/ANALYZERS</li> <li>202 PVC - SAMPLE LINE (INSULATED) PRE-STATIC MIXER TO SAMPLE LAB/ANALYZERS</li> <li>203 PVC - COAGULANT TO STATIC MIXER</li> <li>204 PVC - ACID TO PRECOAGULATED WATER</li> <li>205 PVC - LIME TO PRECOAGULATED WATER</li> <li>207 PVC - PRE DISINFECTANT (CHLORINE) TO PRECOAGULATED WATER</li> <li>208 PVC - COAGULANT AID (POLYMER) TO PRE OR POST COAGULATED WATER</li> <li>218 PVC - SAMPLE LINE (INSULATED) COMBINED FILTER EFFLUENT TO SAMPLE LAB/ANALYZERS</li> <li>219 PVC - ACID TO POST UV TREATMENT</li> <li>220 PVC - FLUORIDE</li> <li>221 PVC - DISINFECTION (CHLORINE) TO CLEARWELL</li> <li>315 PVC - SAMPLE LINE POST CLEARWELL TO LAB/ANALYZERS</li> <li>316 PVC - DISTRIBUTION PH ADJUSTMENT (LIME)</li> <li>317 PVC - CORROSION CONTROL (PHOSPHATE)</li> <li>319 PVC - DISTRIBUTION RESIDUAL (CHLORINE)</li> <li>318 PVC - DISTRIBUTION RESIDUAL (AMMONIA)</li> <li>420 PVC - SAMPLE LINE (INSULATED) DISTRIBUTION TO SAMPLE LAB/ANALYZERS</li> <li>700 PVC - SAMPLE LINE FROM 5 MG STORAGE TANK TO ANALYZER PANEL</li> <li>S SPARE</li> </ul> |
|---|---|



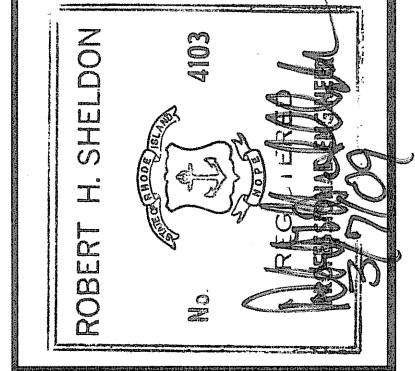
- NOTES:**
- ROTOMETER SHALL BE SUPPORTED ON GALVANIZED STRUCTURAL SYSTEM AT LEAST 4 FT. OFF FLOOR.
  - LINE 205 SHALL USE A SEPARATE CARRIER WATER LINE.
  - A SPOOL PIECE BETWEEN VALVES AND STATIC MIXER SHALL BE PROVIDED IF REQUIRED BY MANUFACTURE.
- (FOR CLARIFICATION SEE SKETCH DWG. M-15)



SECTION NOT TO SCALE

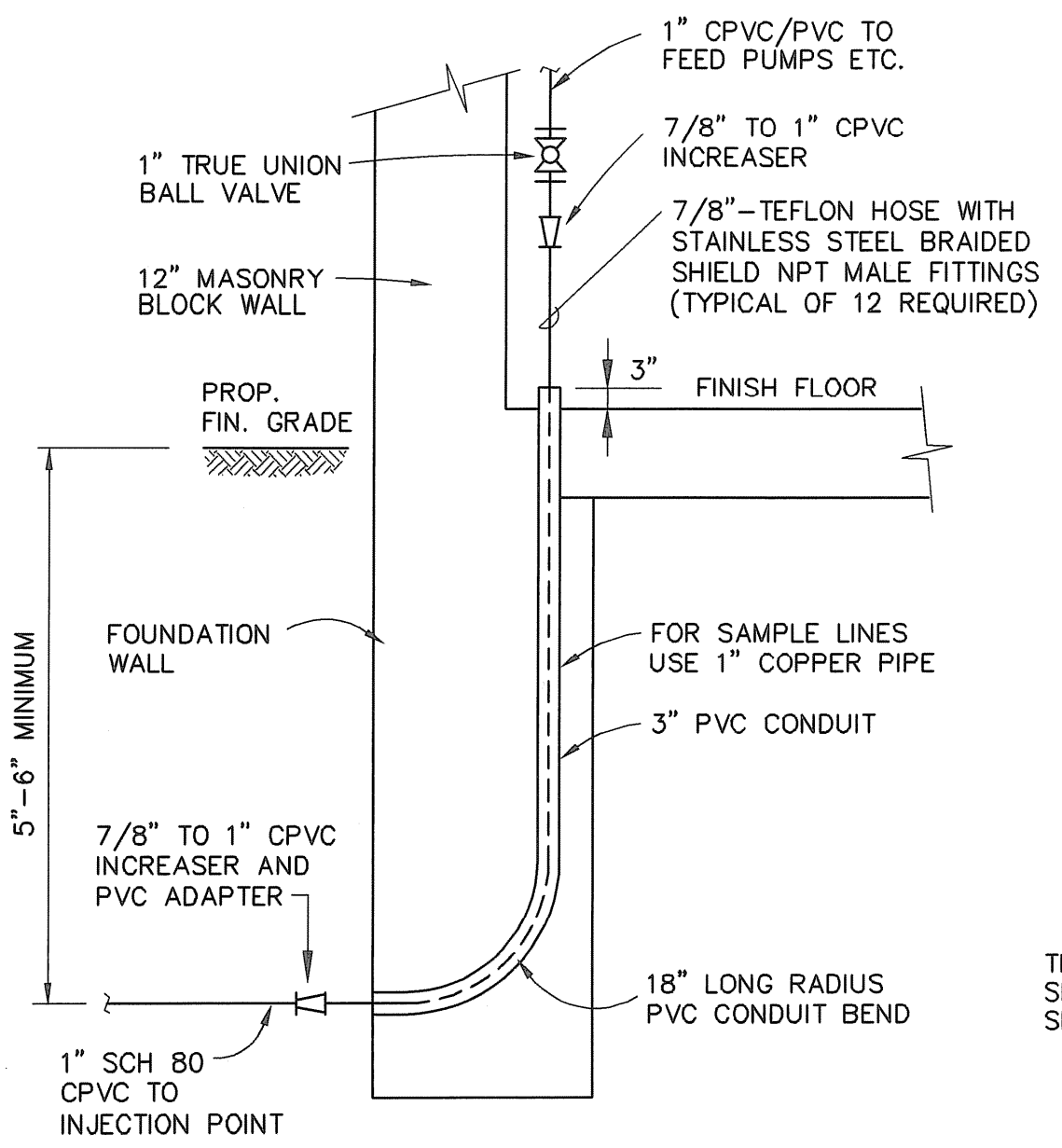
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DATE	BY	REVISIONS	NO.
JULY 2008			
AS-BUILT DRAWING FILE			
ISSUED FOR RFI POSTED SET	10/31/08		
ISSUED FOR CONSTRUCTION	5/20/05		
ISSUED FOR CONSTRUCTION	4/9/05		
80 SET	2/15/05		

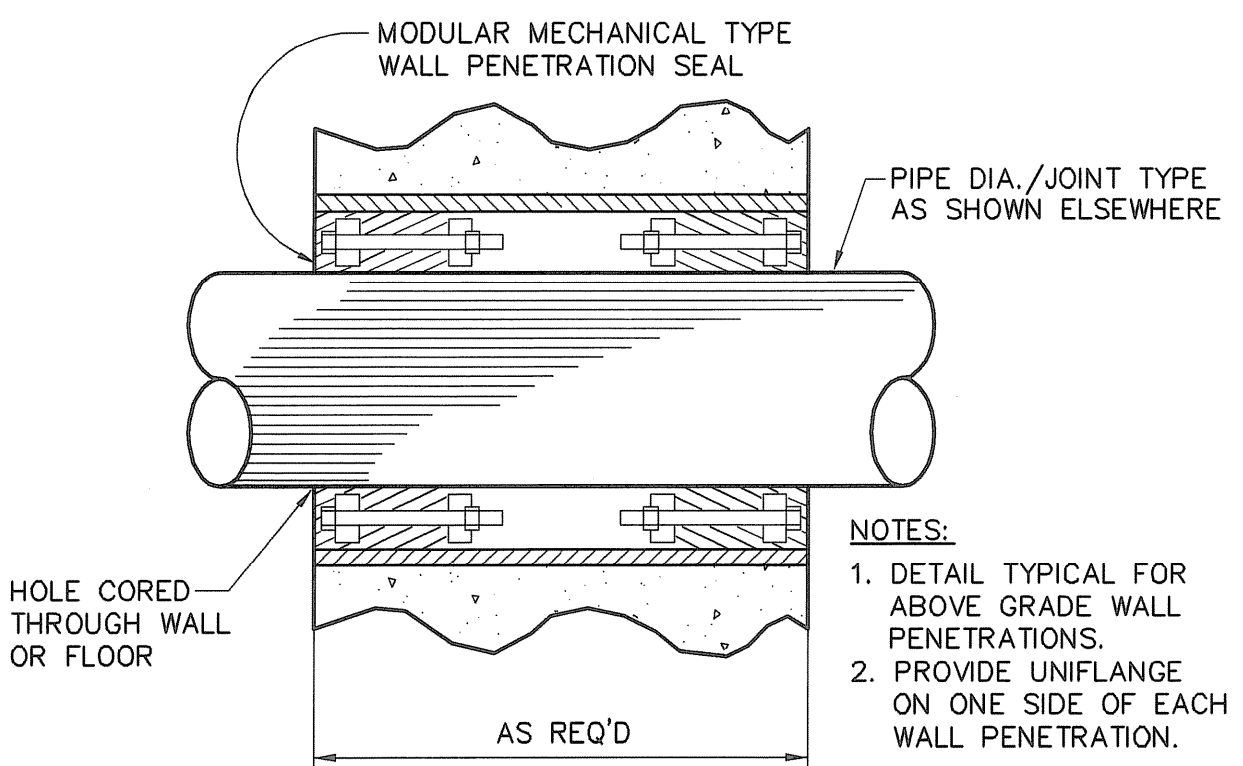


PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
DETAILS

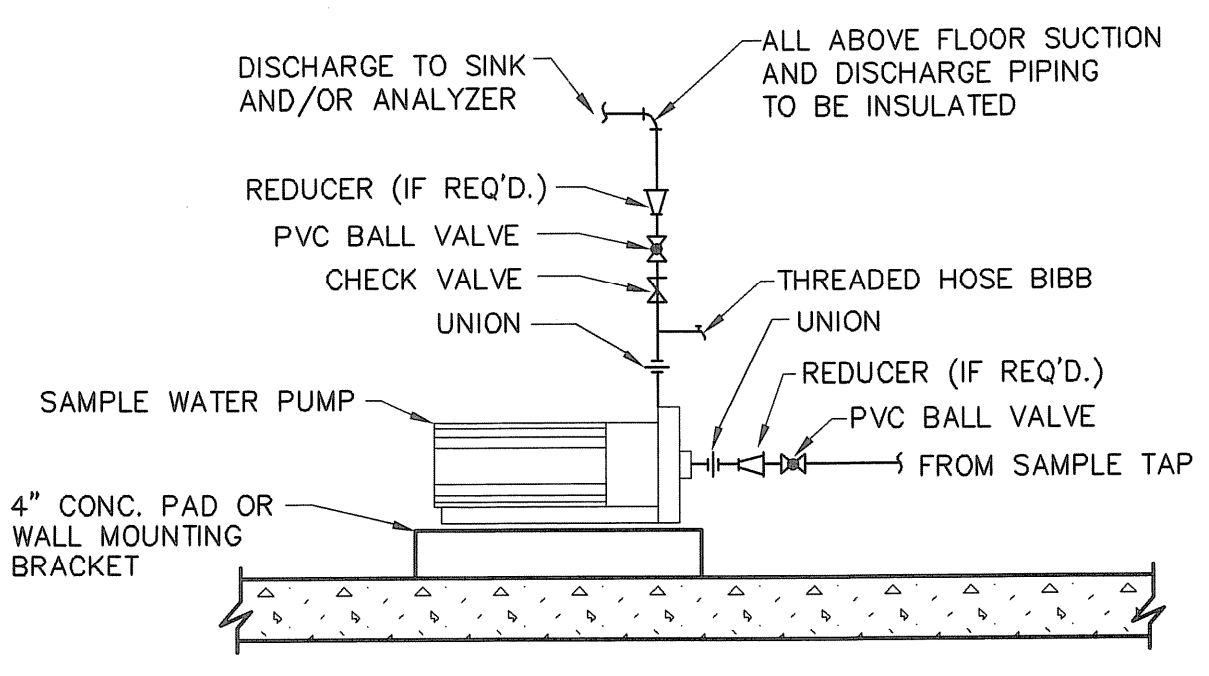
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DRAWN BY	CONTRACT NO.
CHECKED BY	DATE
	OCTOBER 31, 2008



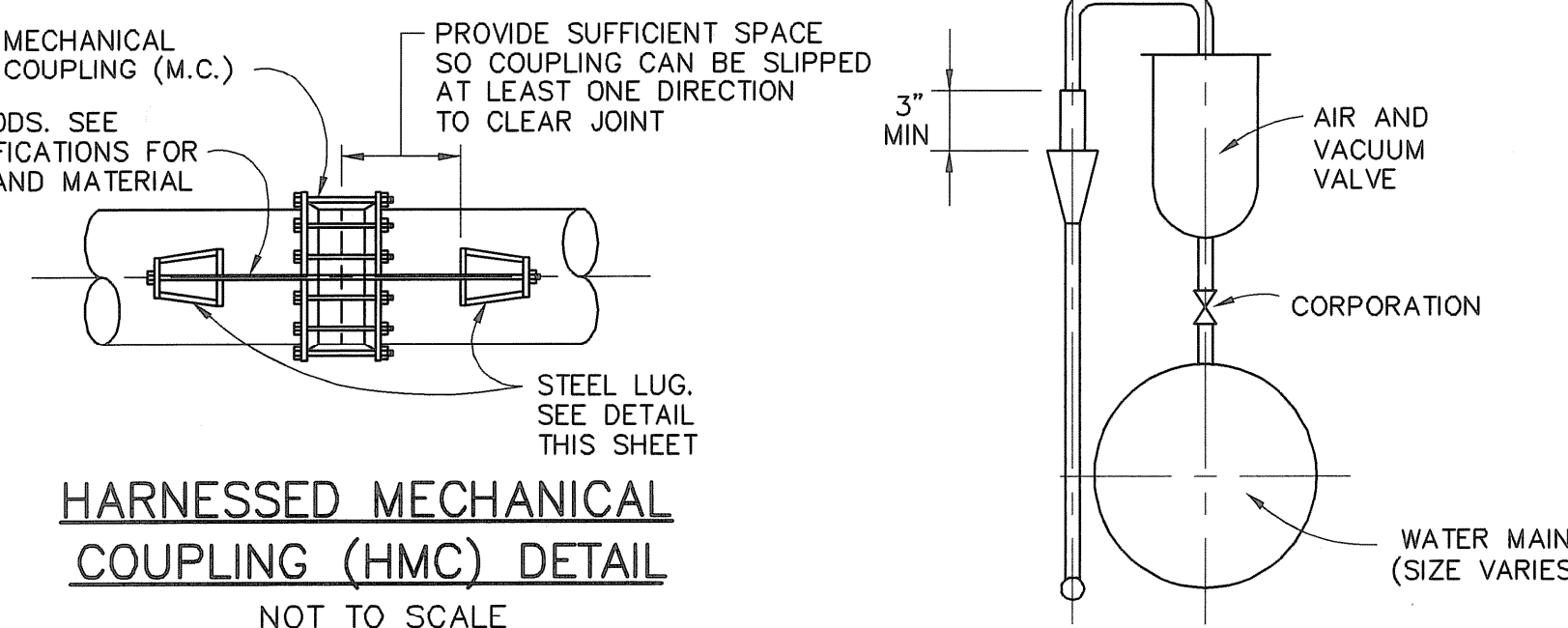
**TYPICAL SAMPLE WATER AND CHEMICAL PIPING DETAIL FOR SLAB PENETRATION IN CLEARWELL**  
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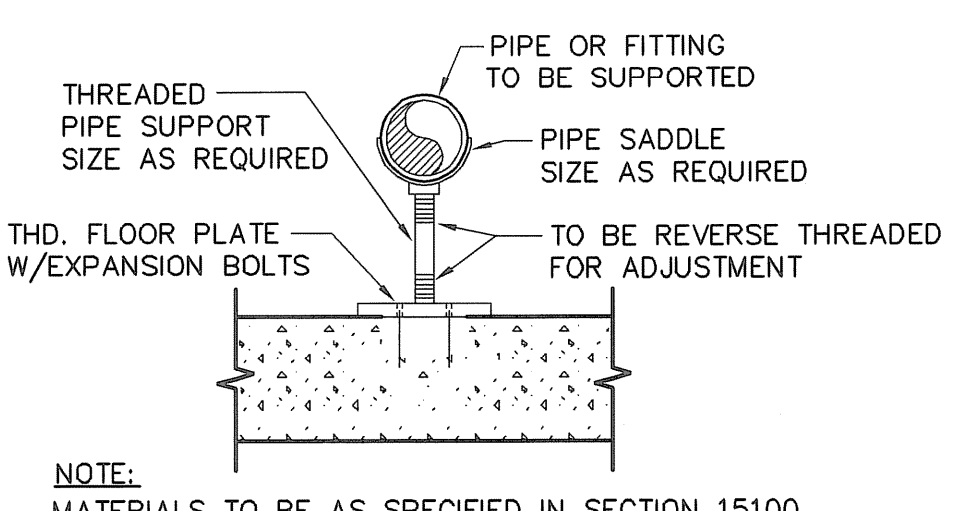
**PIPE SLEEVE DETAIL**  
NOT TO SCALE



**TYPICAL SAMPLE WATER PUMP PIPING DETAIL**  
NOT TO SCALE



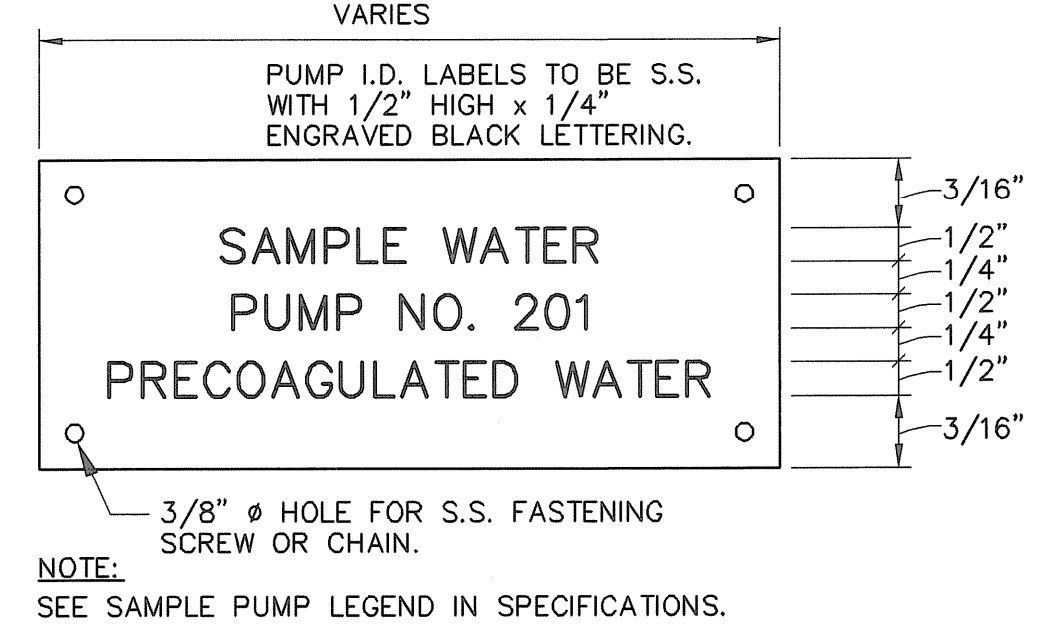
**HARNESSED MECHANICAL COUPLING (HMC) DETAIL**  
NOT TO SCALE



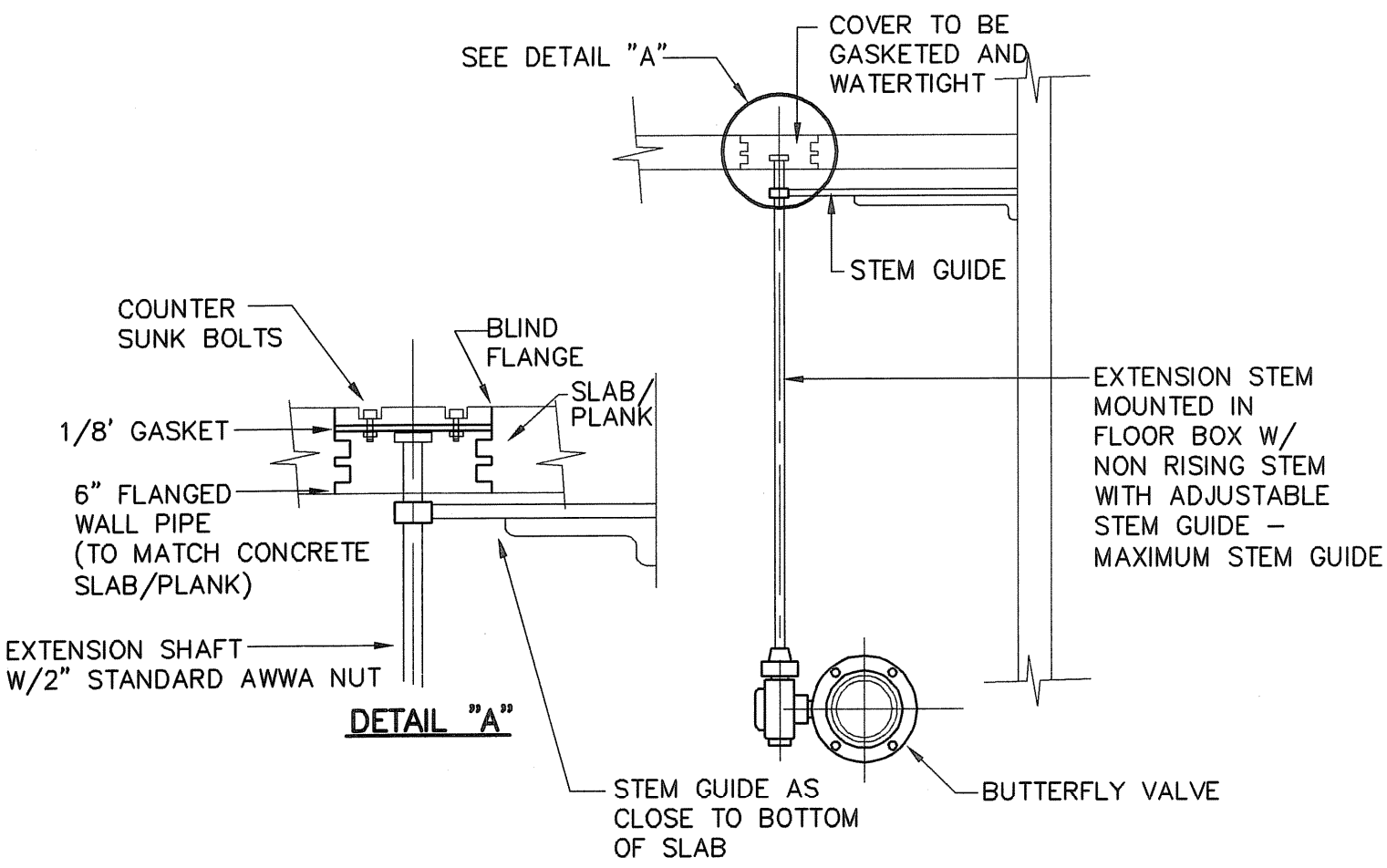
**PIPE SUPPORT DETAIL**  
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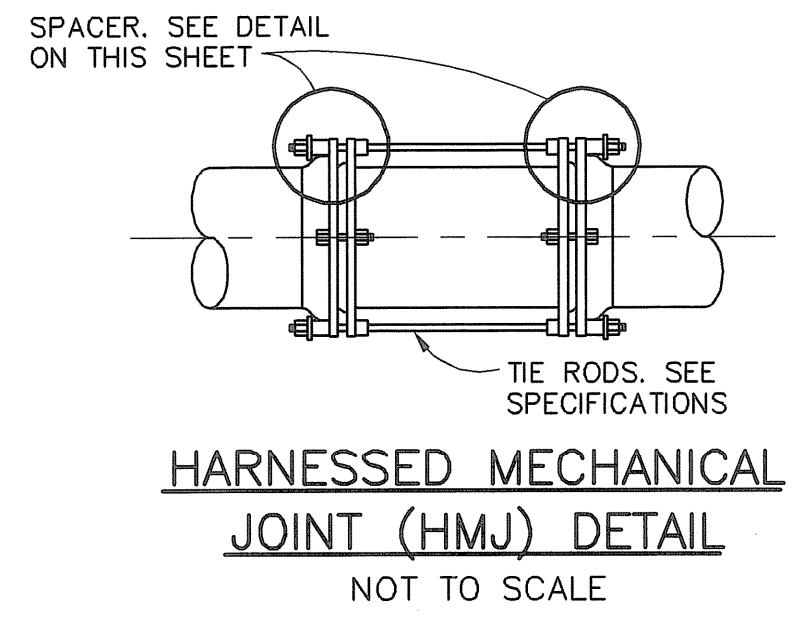
**DRAIN DETAIL FOR AIR AND VACUUM VALVES AND PUMP SEAL WATER**  
NOT TO SCALE



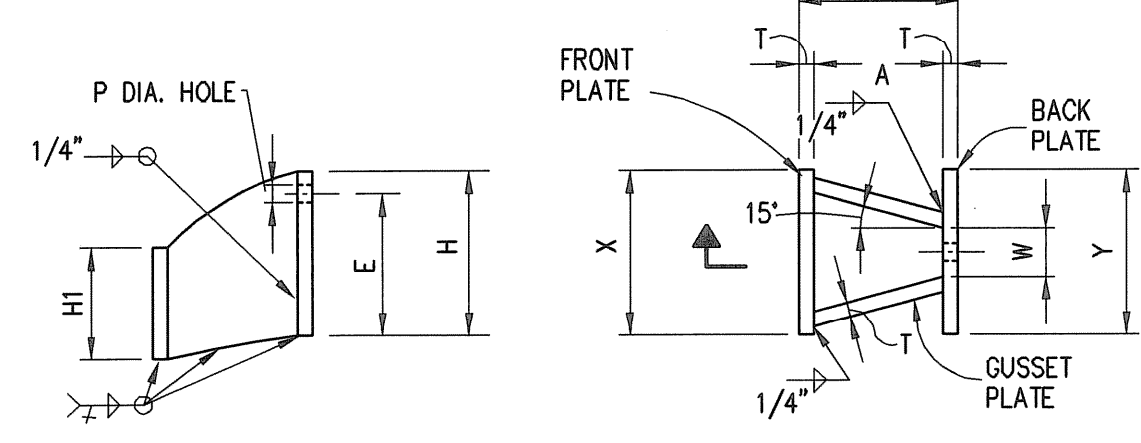
**TYPICAL SAMPLE PUMP I.D. LABEL AND CHEMICAL INJECTION TAG**  
NOT TO SCALE



**FLOOR VALVE BOX OPERATOR**  
NOT TO SCALE



**HARNESSED MECHANICAL JOINT (HMJ) DETAIL**  
NOT TO SCALE



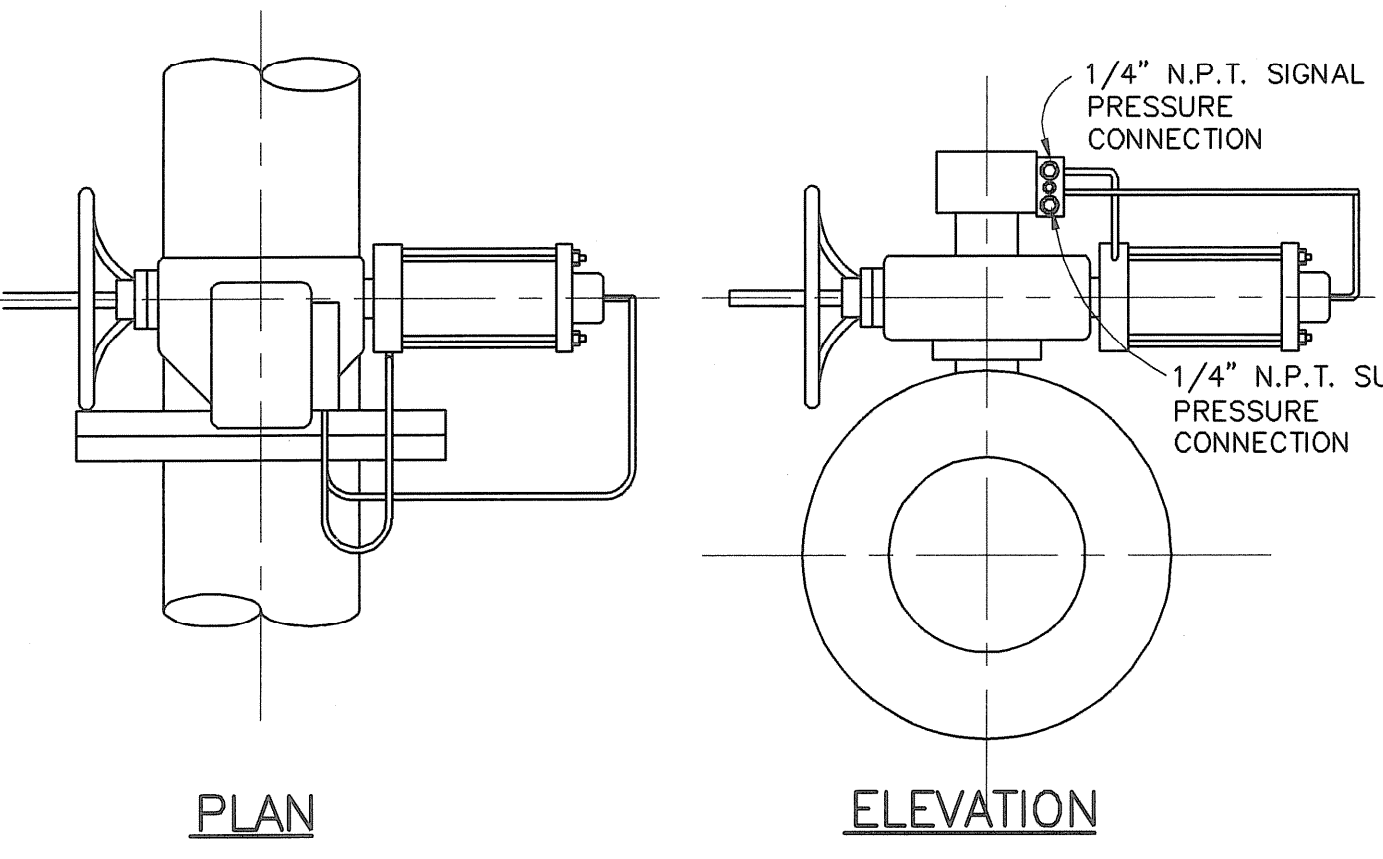
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**PLAN**  
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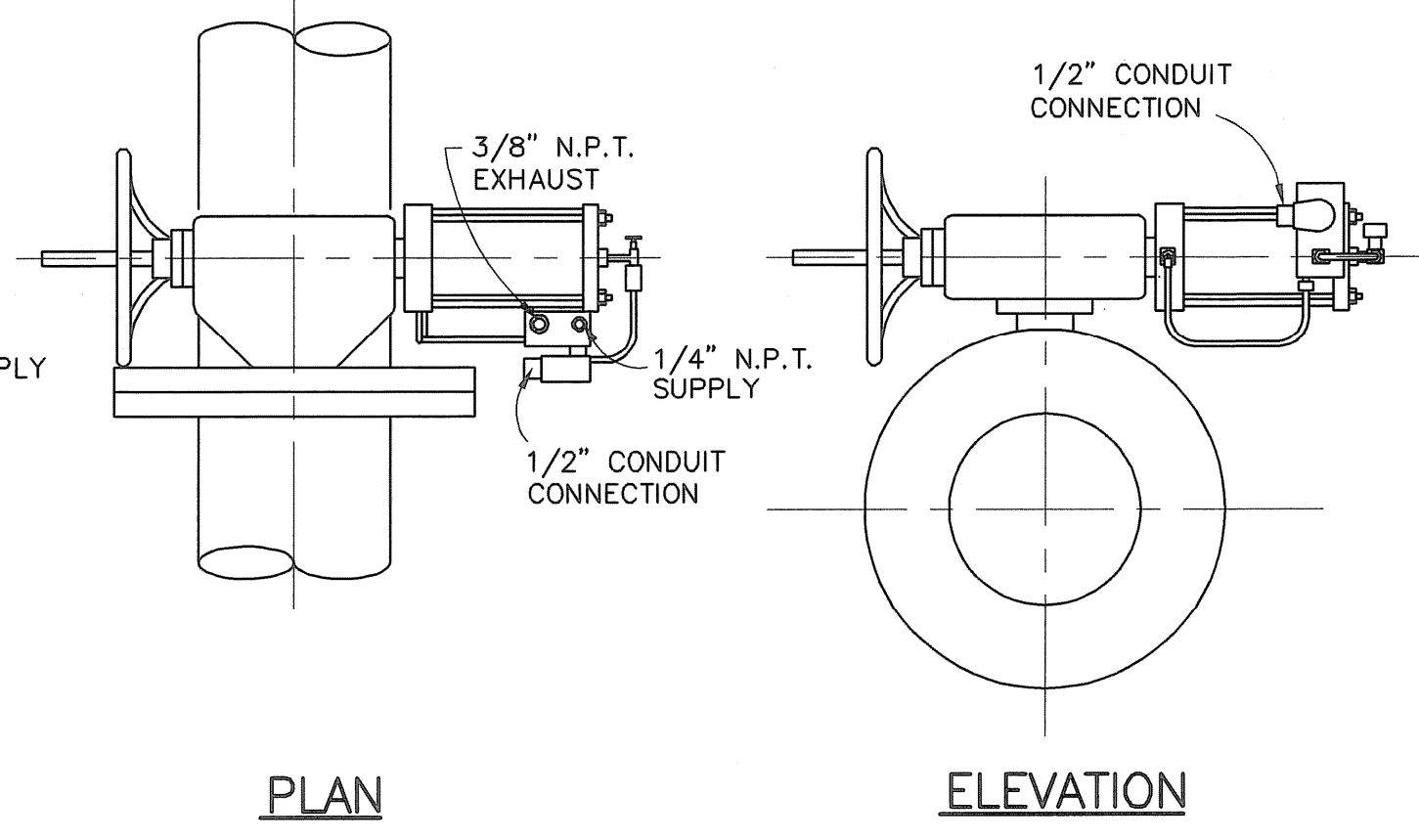
TIE ROD SIZE	A	W	X	T	H	E	HI	P	Y
5/8"	3 3/8"	1 3/8"	5"	3/8"	3 7/8"	3"	2"	3/4"	5"
3/4"	5"	1 1/2"	5"	3/8"	4 1/8"	3 1/8"	2"	7/8"	5"
7/8"	5 1/2"	1 5/8"	5"	1/2"	4 1/4"	3 1/8"	2"	1"	5"
1"	5 3/4"	1 3/4"	6"	1/2"	4 1/2"	3 1/4"	2"	1 1/8"	6"

- NOTES:
- WELD SIZE "T" IS EQUAL TO PIPE WALL THICKNESS.
  - PROVIDE 2, 4, OR 6 ROD INSERTS TO MATCH TIE RODS AS REQUIRED BY TIE ROD SPECIFICATIONS.
  - LOCATE 2 INSERTS ON HORIZONTAL  $\phi$  UNLESS OTHERWISE INDICATED.
  - LOCATE 4 INSERTS 45° OFF  $\phi$ .
  - LOCATE 6 INSERTS ON HORIZONTAL  $\phi$  8, 60° OFF HORIZONTAL  $\phi$ .

**STEEL LUG DETAIL FOR HARNESSED MECHANICAL COUPLING**  
NOT TO SCALE

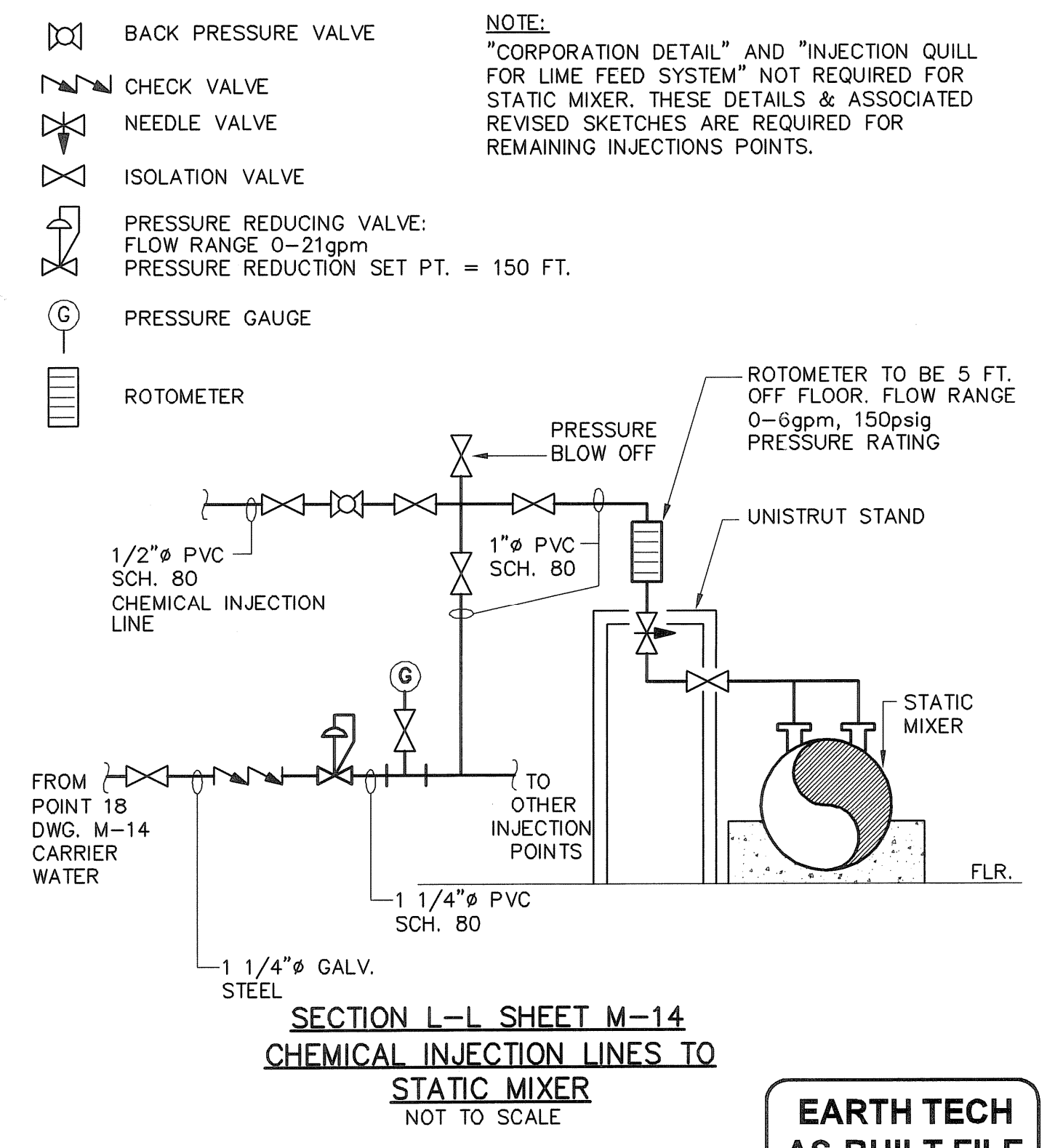


**MODULATING CONTROL VALVE**



**OPEN-CLOSE CONTROL VALVE**

**CONTROL VALVE DETAIL**  
NOT TO SCALE



**SECTION L-L SHEET M-14 CHEMICAL INJECTION LINES TO STATIC MIXER**  
NOT TO SCALE

**EARTH TECH AS-BUILT FILE**  
JULY 2008



ABBREVIATIONS AND SYMBOLS

ABBREVIATION	SYMBOLS		DESCRIPTION	ABBREVIATION	SYMBOLS		DESCRIPTION
	LESS THAN 4 INCHES	4 INCHES & GREATER			LESS THAN 4 INCHES	4 INCHES & GREATER	
ACV			AIR CONTROL VALVE	S.OPER.			SOLENOID OPERATED VALVE
B. EL.			BASE ELBOW	LAT.			STRAINER
BV			BALL VALVE	TEE			TEE
BCV			BALL CHECK VALVE	3-WAY PV			THREE WAY PLUG VALVE
BFV			BUTTERFLY VALVE (OPEN/CLOSE)	VB			VACUUM BREAKER
BF			BLIND FLANGE	VENTURI			VENTURI
CL			CENTER LINE	Y.HYD.			YARD HYDRANT
CV			CHECK VALVE				
DIS. MANT. JT.			DISMANTLING JOINT				
ECC.RED.			ECCENTRIC REDUCER				
F.D.			FLOOR DRAIN				
FV OR FCV			FLOW CONTROL VALVE				
FLG. & FL.			FLANGE AND FLARE				
GV			GATE VALVE ①				
H.B.			HOSE BIB				
HYD.			HYDRANT				
H.W.			HAND WHEEL				
KV			KNIFE VALVE				
M.H.			MANHOLE				
MFM			MAGNETIC FLOW METER				
MOV			MOTOR OPERATED VALVE				
NV			NEEDLE VALVE				
PRV			PRESSURE (REDUCING/REGULATING) VALVE				
BPV			BACK PRESSURE CONTROL VALVE				
SLV			SURGE RELIEF VALVE				
PCV			PNEUMATIC OPERATED MODULATING FLOW CONTROL VALVE				
RED.			REDUCER, REDUCING				
RM			ROTAMETER				

NOTE:  
 ① GATE VALVES SHALL NOT BE LARGER THAN 12" DIAMETER UNLESS OTHERWISE DIRECTED.

ABBREVIATIONS FOR PIPE TYPES

ABBREVIATION	DESCRIPTION
A.C.C.M.P.	ASPHALT COATED CORRUGATED METAL PIPE
C.I.	CAST IRON PIPE
CPVC	CHLORINATED POLYVINYL CHLORIDE
CU	COPPER PIPE
D.I.	DUCTILE IRON PIPE
FRP	FIBERGLASS REINFORCED PIPE
FPVC	FLEXIBLE POLYVINYL CHLORIDE
GALV.	GALVANIZED PIPE
P.C.C.P.	PRESTRESSED CONCRETE CYLINDER PIPE
POLY	POLYETHYLENE PIPE
P.V.C.	POLYVINYL CHLORIDE PIPE
R.C.	REINFORCED CONCRETE PIPE
S	STEEL PIPE
S.S.	STAINLESS STEEL PIPE
V	VINYL TUBING

ABBREVIATION	PIPE
P.V.C.	CHEMICAL - DOSING
C.P.V.C.	CHEMICALS - FILL
S.S. OR D.I.	INTERIOR RAW WATER
S.S. OR D.I.	INTERIOR TREATED WATER
S.S.	AIR
P.V.C.	ANALYZERS
STEEL	DRAIN
STEEL	FUEL
CU	HEATING WATER
D.I.	OVERFLOW, HIGH SERVICE PUMPS, BACKWASH PUMPS
CU	POTABLE WATER
DUCTILE IRON (4" OR GREATER) P.V.C. (1 1/2" - 3") CU (1 1/4" OR SMALLER)	PLANT WATER
D.I.	SANITARY DRAIN
P.V.C.	VENT
S.S. OR D.I.	RAW AND GALLERY PIPING

NOTES:  
 1. LAYOUTS SHOWN ON MECHANICAL DRAWINGS ARE BASED UPON STAINLESS STEEL PIPE EXCEPT FOR IN HIGH SERVICE PUMP ROOM.  
 2. THE WALL PIPE SHALL BE PROVIDED WITH SPACE BETWEEN THE WALL AND THE FLANGE TO ALLOW FOR REMOVAL OF BOLTS AS SHOWN IN DWG. M-6. TAPPING WILL NOT BE ACCEPTED.  
 3. UPON APPROVAL FROM ENGINEER, VITALLIC COUPLING CAN BE USED AS RESTRAINTS IN PLACE OF FLANGE CONNECTIONS.

ABBREVIATIONS

ABBREVIATION	DESCRIPTION
ACV	AIR CONTROL VALVE
AD	AIR DUCT
AE	ANALYZER ELEMENT
AFF	ABOVE FINISHED FLOOR
AI	AIR INTAKE
AL	ALUMINUM
ALK	ALKALINITY
BL	BLOWER
BWCV	BACKWASH CONTROL VALVE
CBWCV	CLARIFIER BACKWASH CONTROL VALVE
C.FLG.	COMPANION FLANGE
CHEM.	CHEMICAL
CPB	CHLORINE PULL BOX
CPLG.	COUPLING
CONC.	CONCRETE
C.O.	CLEAN OUT
CSK.	COUNTERSUNK
D	DISCHARGE
DIA.	DIAMETER
DISCH.	DISCHARGE
DN	DOWN
D & T	DRILL AND TAP
EBP	EQUALIZATION PUMP
EL.	ELEVATION
EQ.	EQUALIZATION
EQUIP.	EQUIPMENT
EXP.	EXPANSION
FCV	FLOW CONTROL VALVE
FE	FLOW ELEMENT
FIN. GR.	FINISHED GRADE
FLEX.	FLEXIBLE
FL. EL.	FLOOR ELEVATION
FIN. FLR. EL.	FINISHED FLOOR ELEVATION
FIT	FLOW INDICATOR TRANSMITTER
FLG.	FLANGE
FWCV	FILTER TO WASTE CONTROL VALVE
HGL	HYDRAULIC GRADE LINE
HORIZ.	HORIZONTAL
HSP	HIGH SERVICE PUMP
H.P.	HIGH POINT
H.W.L.	HIGH WATER LEVEL
I	INTAKE
INV.	INVERT
LE	LEVEL ELEMENT
LIT	LEVEL INDICATING ELEMENT
LG.	LONG
L.R.	LONG RADIUS
L.W.L.	LOW WATER LEVEL
MAX.	MAXIMUM
MTG.	MANUFACTURER
MJ	MECHANICAL JOINT
M.W.L.	MAXIMUM WATER LEVEL
MIN.	MINIMUM
MFCV	MANUAL FLOW CONTROL VALVE
MFM	MAGNETIC FLOW METER
N.C.	NORMALLY CLOSED
N.O.	NORMALLY OPEN
NTS	NOT TO SCALE
O.C.	ON CENTER
OPER.	OPERATOR
PDBL	POSITIVE DISPLACEMENT BLOWER
PE	PRESSURE ELEMENT
PIT	PRESSURE INDICATOR TRANSMITTER
PG	PRESSURE GAUGE
PL	PLATE
PS	PRESSURE SWITCH
PSI	POUNDS PER SQUARE INCH
RED.	REDUCER, REDUCING
RM	ROTAMETER
S	SPARE
S.G.	SLIDE GATE
SHT.	SHEET
S.O.	SIDE OUTLET
SQ.	SQUARE
S.R.	SHORT RADIUS
S.S.	STAINLESS STEEL
SUCT.	SUCTION
SWP	SAMPLE WATER PUMP
T.O.C.	TOP OF CONCRETE
TOS	TOP OF SLAB
TYP.	TYPICAL
UV	ULTRAVIOLET
VEN.	VENTURI
VERT.	VERTICAL
VG	VACUUM GAUGE
V.O.R.	VALVE ON RISER
W/	WITH
WEIR EL.	WEIR CREST ELEVATION
W.L. EL.	WATER LEVEL ELEVATION
W.P.	WALL PIPE
W.S.	WALL SLEEVE
WS	WATER SURFACE

FULL SIZE DRAWING = 4"

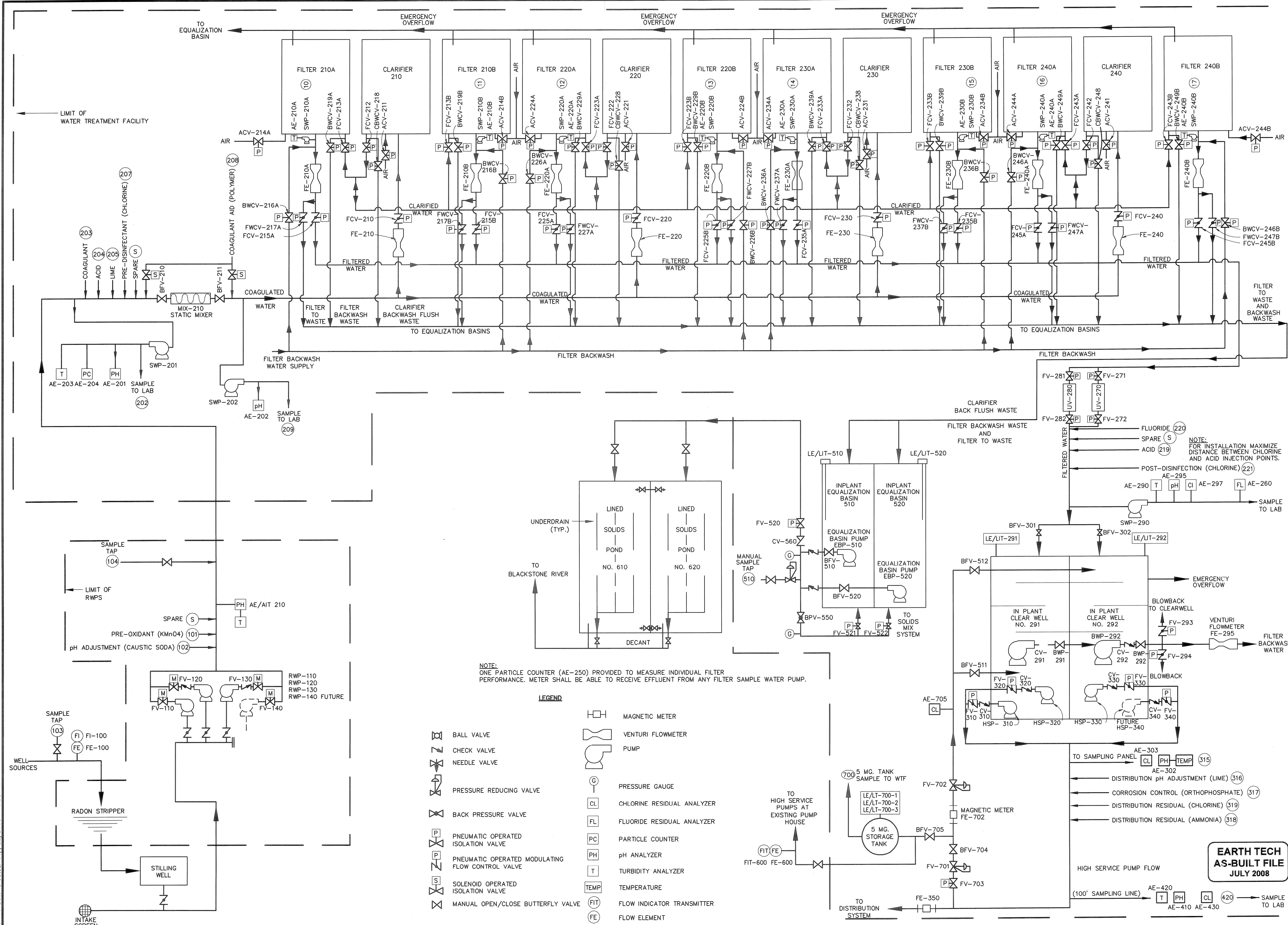
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2	10/17/06	ISSUED FOR RFI POSTED SET	
1	5/20/05	ISSUED FOR CONSTRUCTION	
0	4/9/05	ISSUED FOR CONSTRUCTION	

ROBERT H. SHELDON  
 N. 403  
 2/17/09

PAWTUCKET, RHODE ISLAND  
 PAWTUCKET REGIONAL  
 WATER TREATMENT FACILITY  
 PKG. 6 - MECHANICAL PROCESS  
 ABBREVIATIONS AND SYMBOLS

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EARTH TECH  
 AS-BUILT FILE  
 JULY 2008



FULL SIZE DRAWING = 4"

NO.	DATE	BY	REVISIONS
3	JULY 2008	AS-BUILT DRAWING FILE	
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1	5/20/05	ISSUED FOR CONSTRUCTION	
0	4/9/05	ISSUED FOR CONSTRUCTION	
	2/15/05	BID SET	

ROBERT H. SHELTON  
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PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
PROCESS SCHEMATIC

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**EARTH TECH AS-BUILT FILE JULY 2008**

TO SAMPLING PANEL AE-303 PH-TEMP 315  
AE-302  
DISTRIBUTION pH ADJUSTMENT (LIME) 316  
CORROSION CONTROL (ORTHOPHOSPHATE) 317  
DISTRIBUTION RESIDUAL (CHLORINE) 319  
DISTRIBUTION RESIDUAL (AMMONIA) 318

HIGH SERVICE PUMP FLOW  
AE-420  
(100' SAMPLING LINE) AE-410 AE-430  
SAMPLE TO LAB

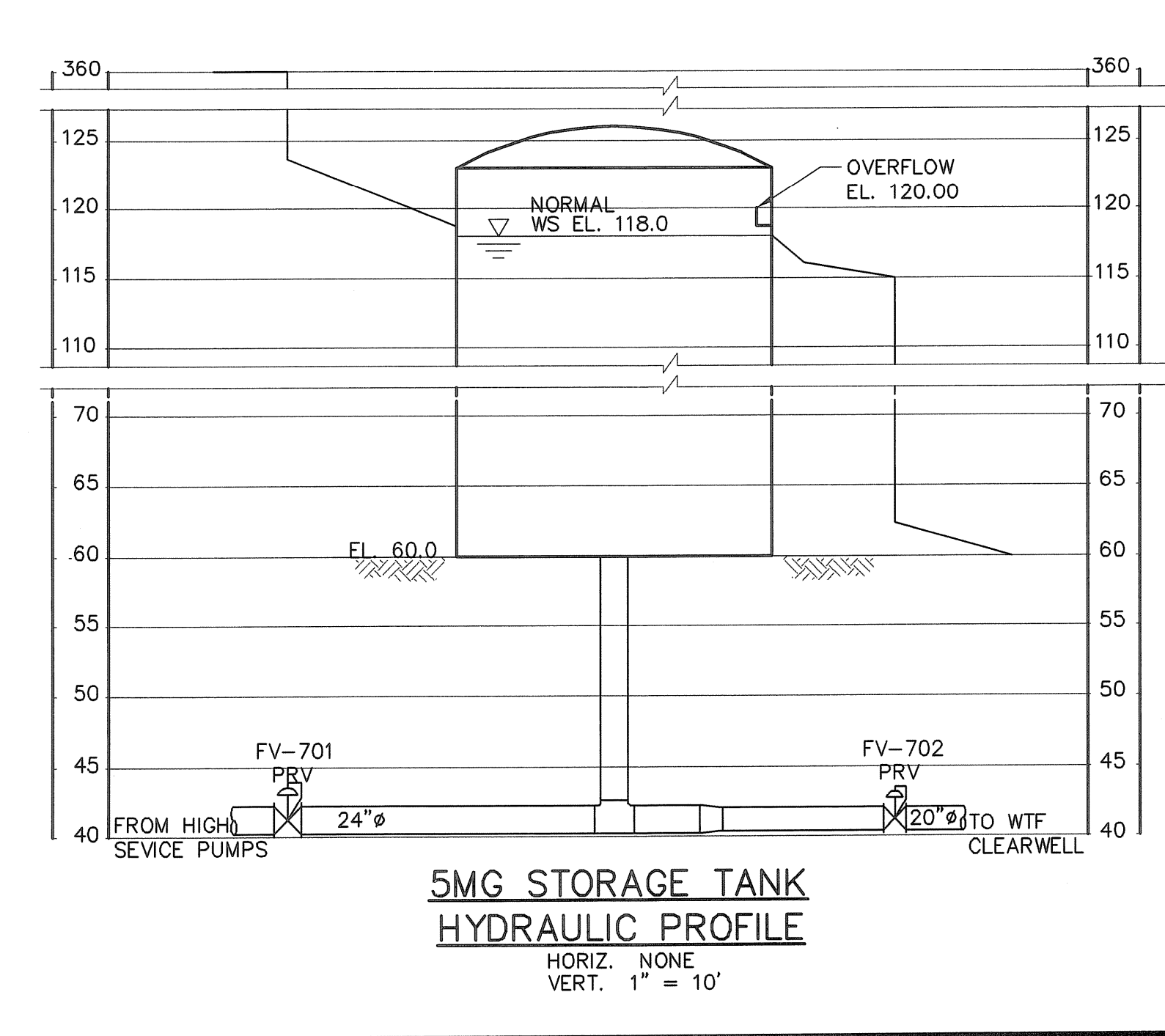
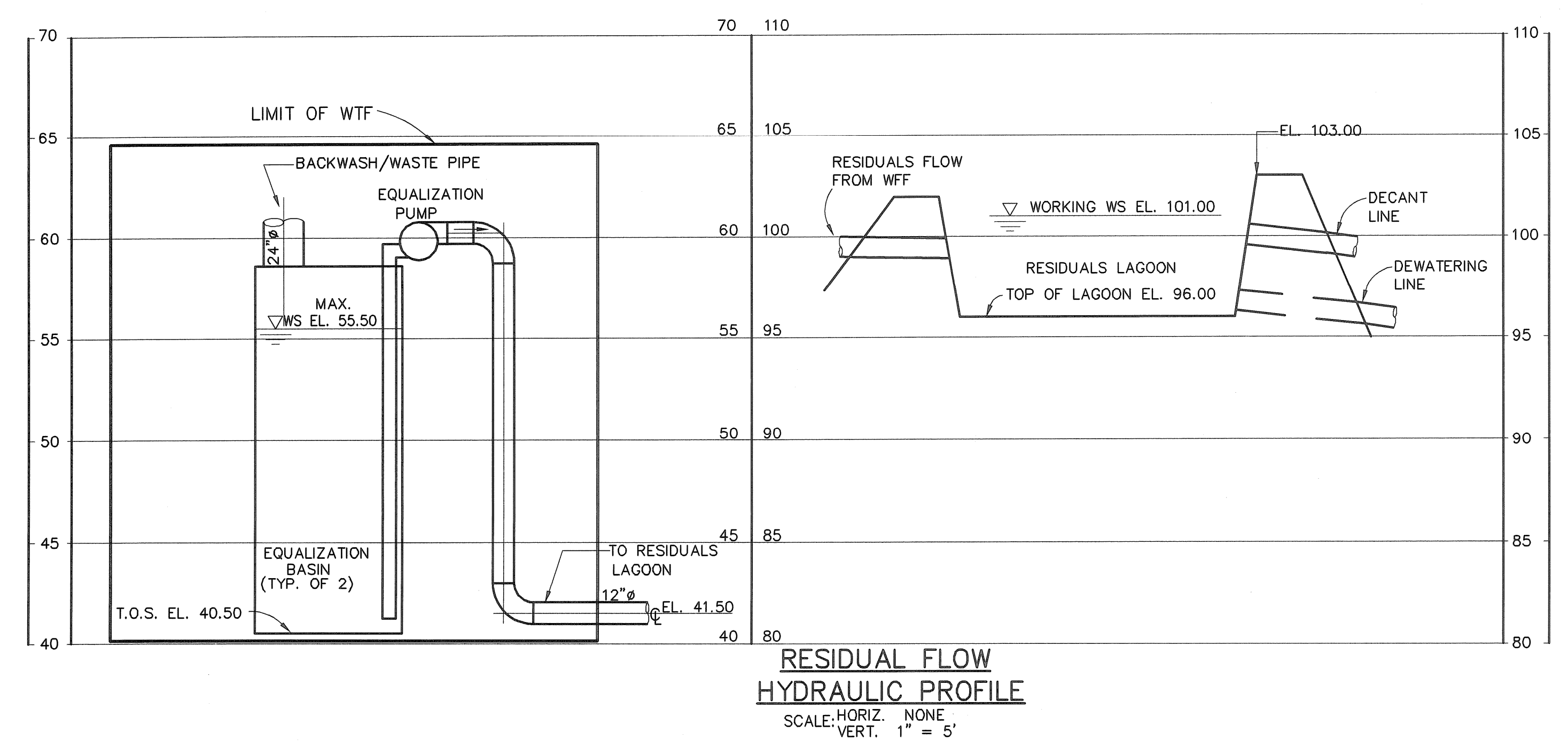
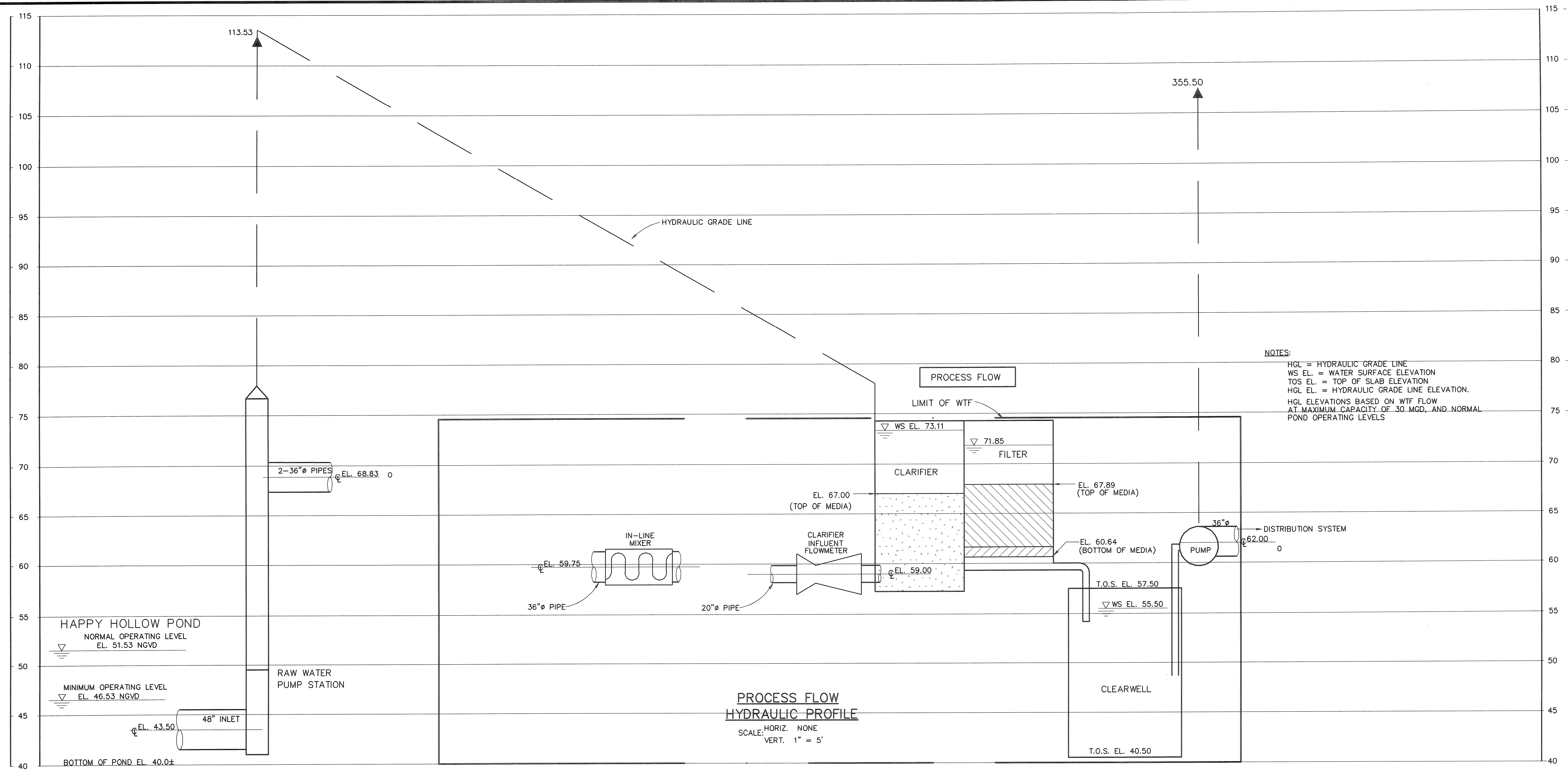
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0	4/9/05	ALM	ISSUED FOR CONSTRUCTION
	2/15/05	DMB	BD SET
			REVISIONS

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PAWTUCKET, RHODE ISLAND  
**PAWTUCKET REGIONAL  
WATER TREATMENT FACILITY**  
**PKG. 6 - MECHANICAL PROCESS**  
HYDRAULIC PROFILES

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**EARTH TECH**  
AS-BUILT FILE  
JULY 2008