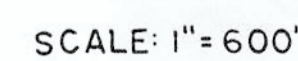


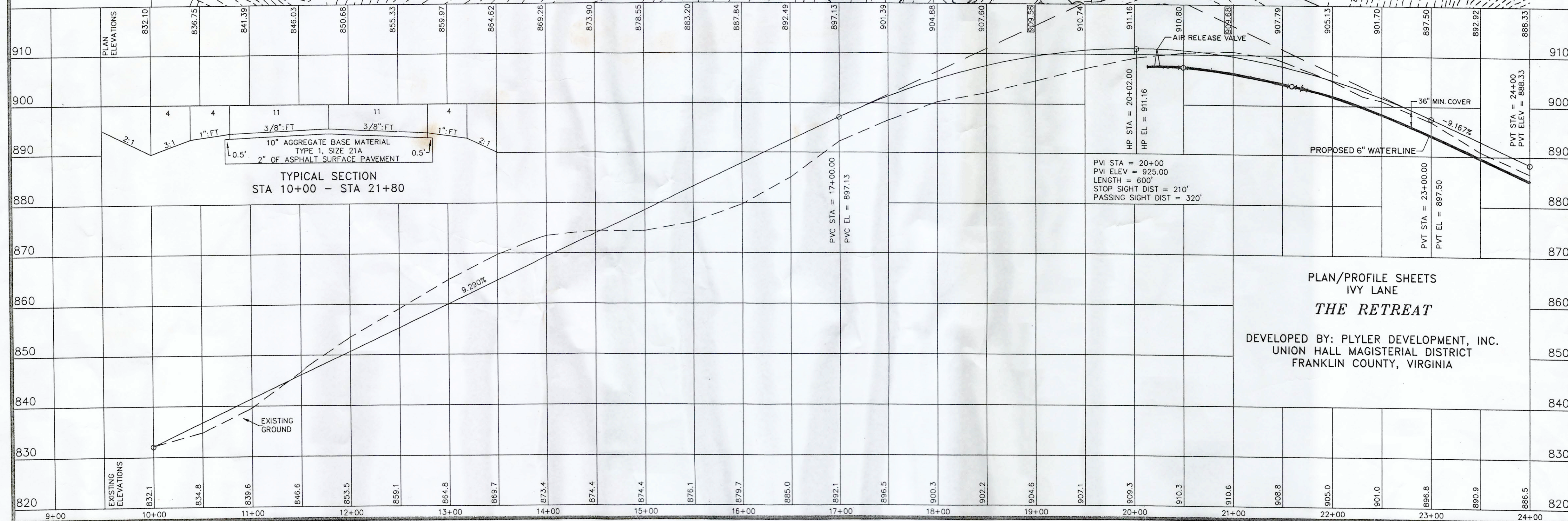
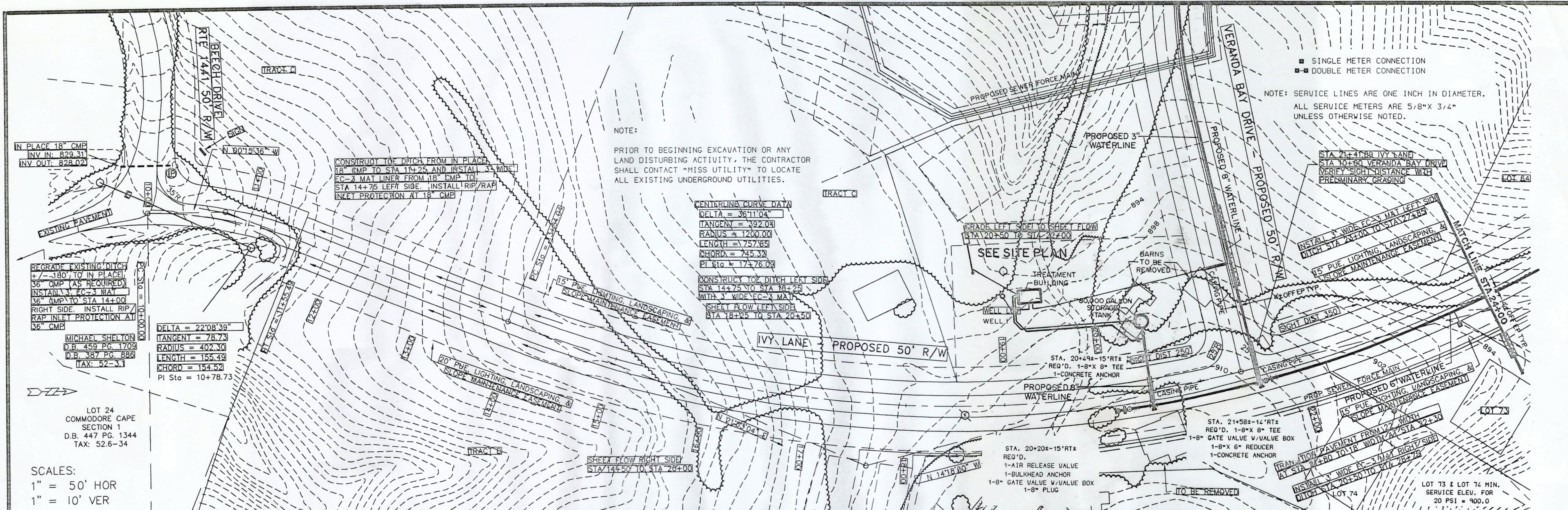
FRANKLIN COUNTY, VIRGINIA



SHEETS 2 THROUGH 10 ARE BASED ON TOPOGRAPHIC INFORMATION
AND PLAN AND PROFILE DRAWINGS PROVIDED BY: PHILIP W. NESTER,
INC., P. O. BOX 827, ROCKY MOUNT, VIRGINIA 24151.

UNION HALL DISTRICT FRANKLIN CO., VA.

BERKLEY HOWELL & ASSOC., P.C.
ENGINEERS • SURVEYORS • PLANNERS
306 ENTERPRISE DRIVE, SUITE C
FOREST, VIRGINIA 24551
PH: (434) 385-7548 FAX: (434) 385-6



PLAN/PROFILE SHEETS
 IVY LANE
THE RETREAT
 DEVELOPED BY: PLYLER DEVELOPMENT, INC.
 UNION HALL MAGISTERIAL DISTRICT
 FRANKLIN COUNTY, VIRGINIA

BERKLEY HOWELL & ASSOC., P.C.
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 306 ENTERPRISE DRIVE, SUITE C
 FOREST, VIRGINIA 24551
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THE RETREAT
 WATER SYSTEM

UNION HALL DISTRICT
 FRANKLIN CO., VA.

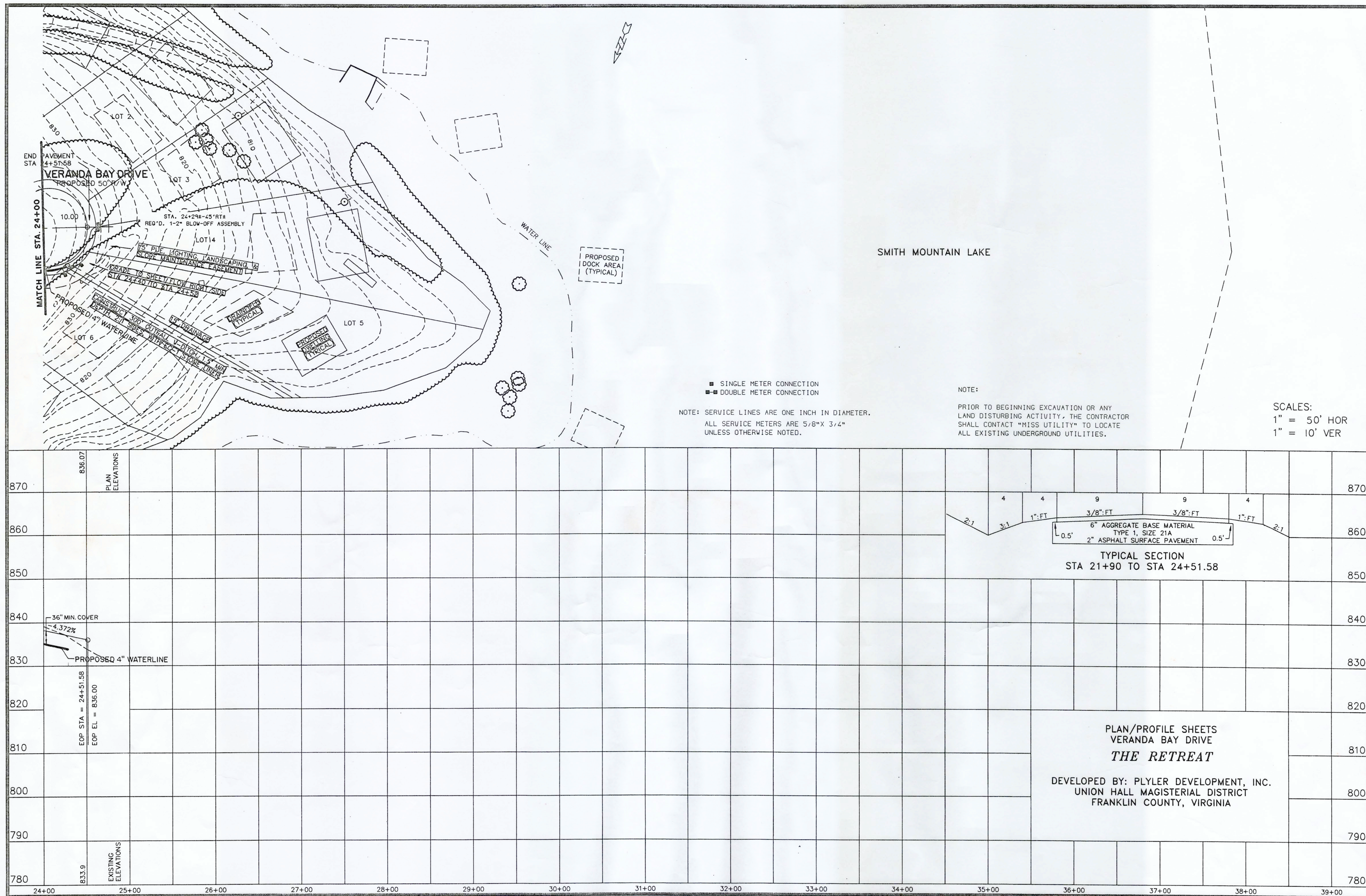
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PROJ. NO. 020097 **DIV.**
SHEET NO. 2 OF 16
DRAWING NO.



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COMMONWEALTH OF VIRGINIA
 WM C. BERKLEY, JR.
 No. 10759
 PROFESSIONAL SEAL

THE RETREAT
WATER SYSTEM

UNION HALL DISTRICT FRANKLIN CO., VA.

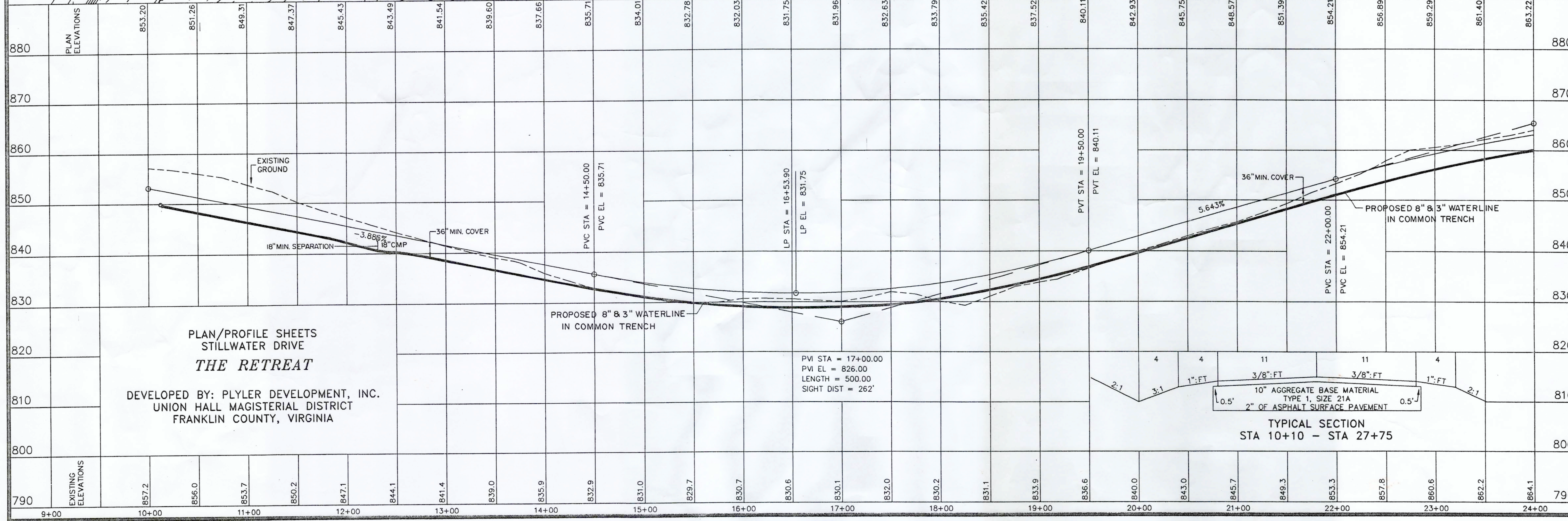
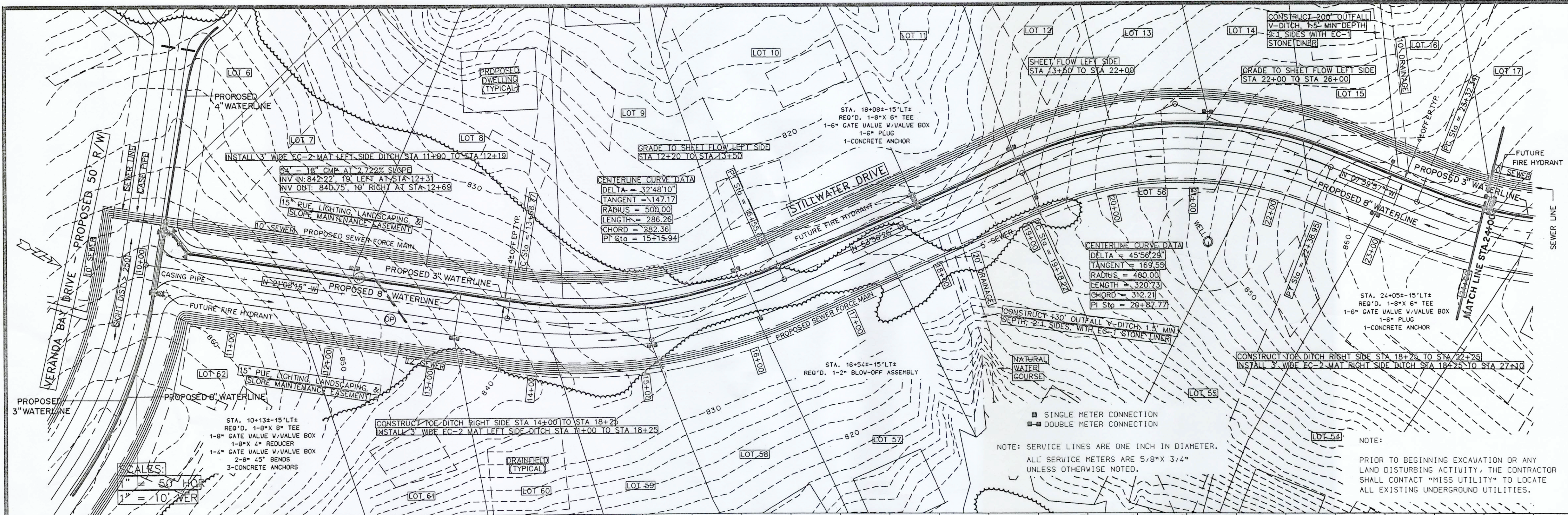
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 SHEET NO. 5 OF 16
 DRAWING NO.



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FOREST, VIRGINIA 24551
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COMMONWEALTH OF VIRGINIA
W.M. O. BERKLEY, JR.
No. 10759
PROFESSIONAL

**THE RETREAT
WATER SYSTEM**

DATE: 10-1-02
TECHNICIAN:
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REVISIONS

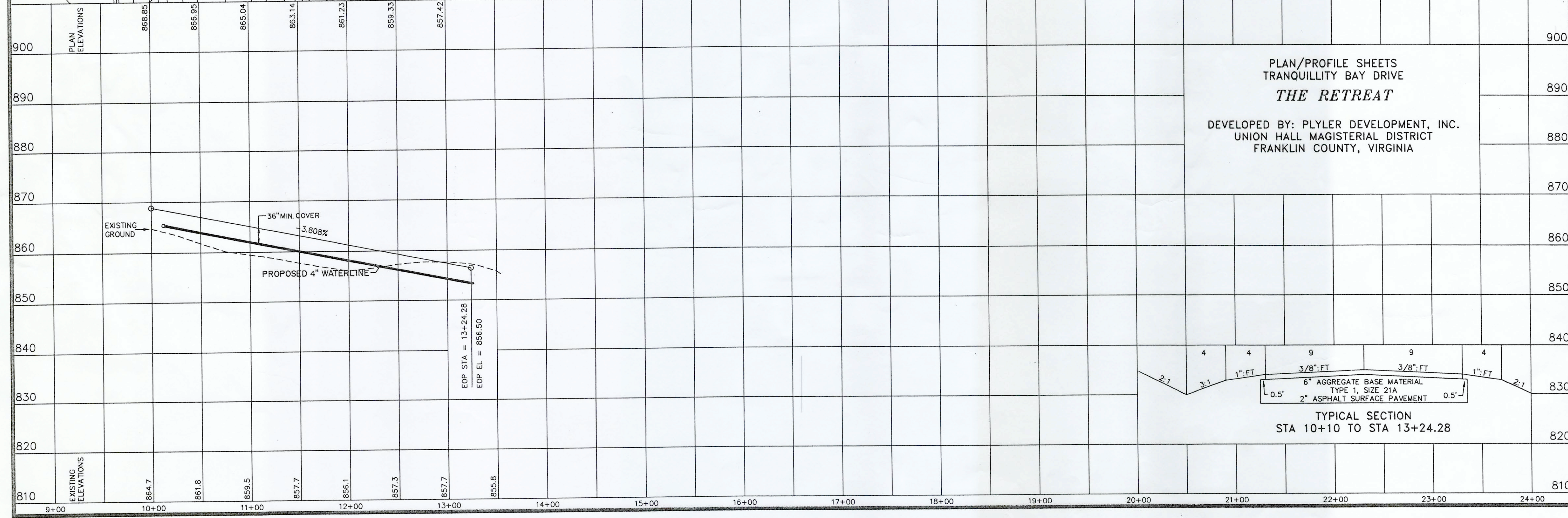
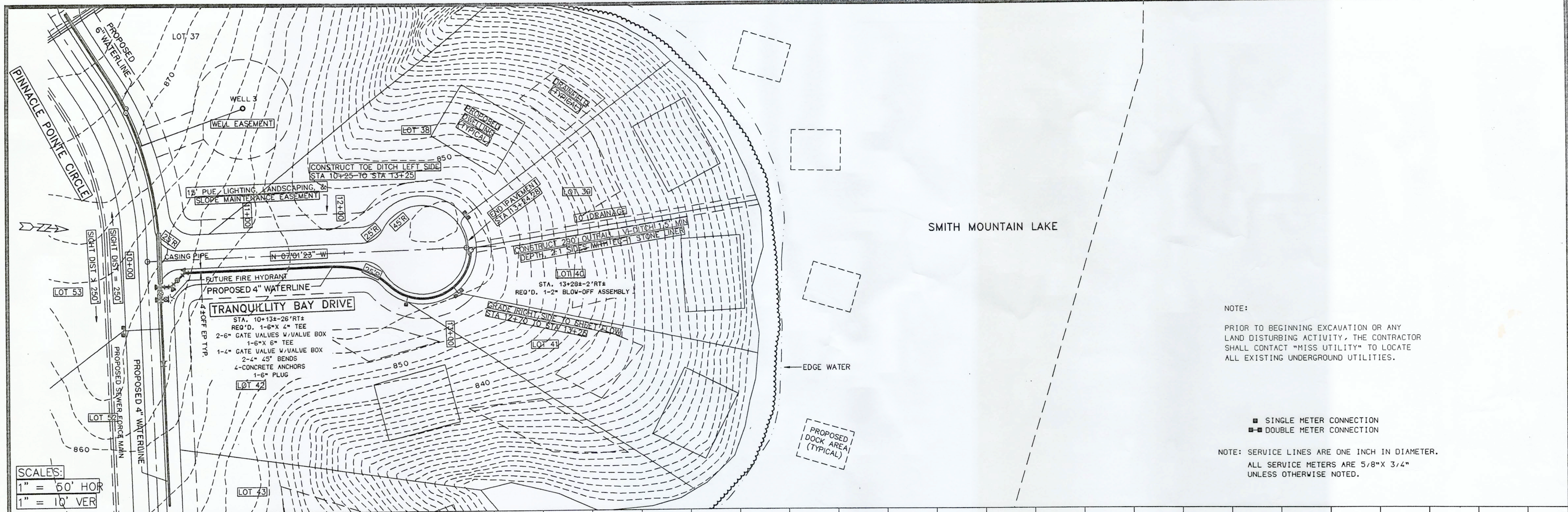
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6 OF 16

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ENGINEERS • SURVEYORS • PLANNERS

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FOREST, VIRGINIA 24551

PH: (434) 385-7548 FAX: (434) 385-6178

COMMONWEALTH OF VIRGINIA

WM. O. BERKLEY, JR.

No. 10759

PROFESSIONAL

THE RETREAT

WATER SYSTEM

UNION HALL DISTRICT

FRANKLIN CO., VA.

DATE: 10-1-02

TECHNICIAN:

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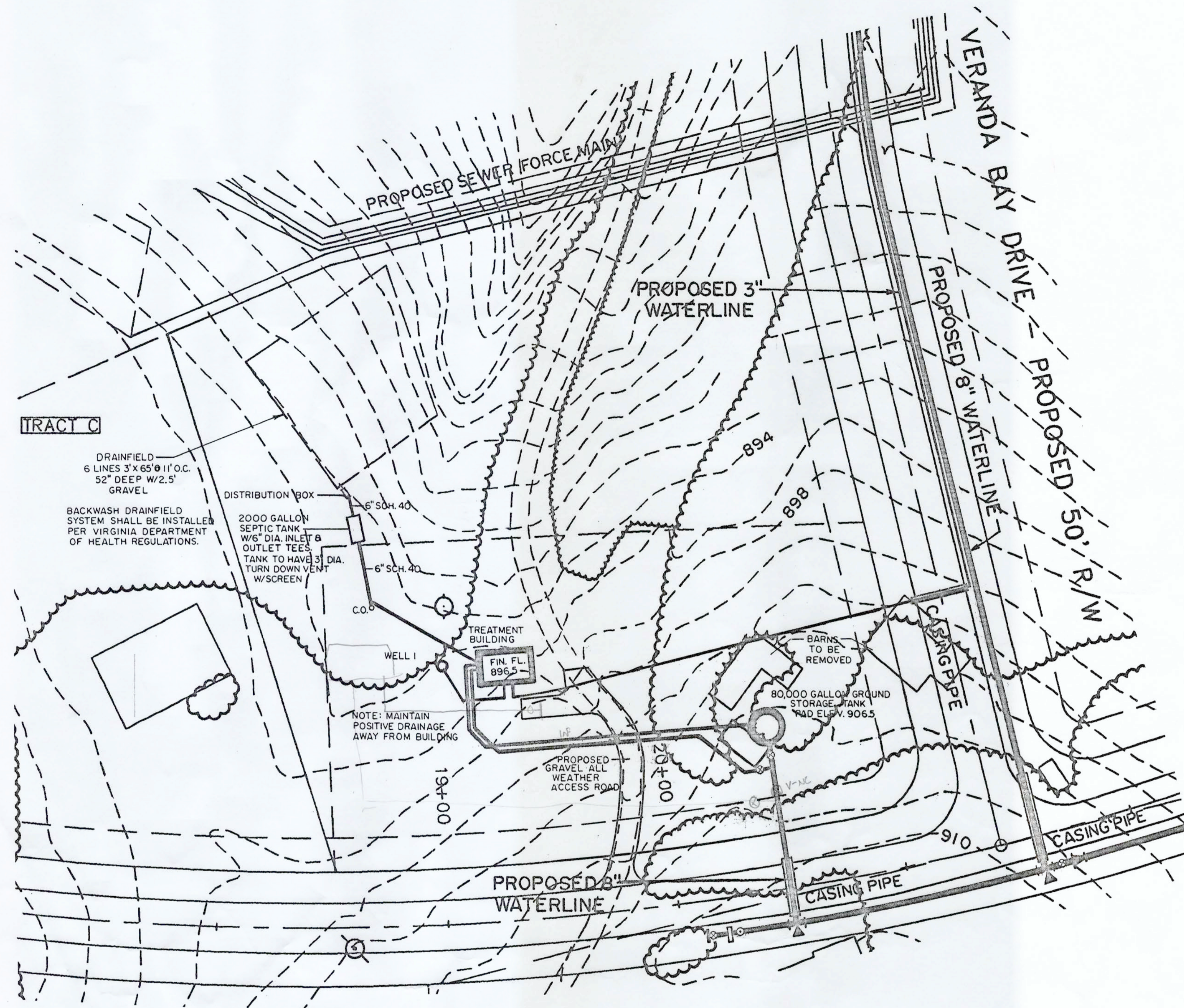
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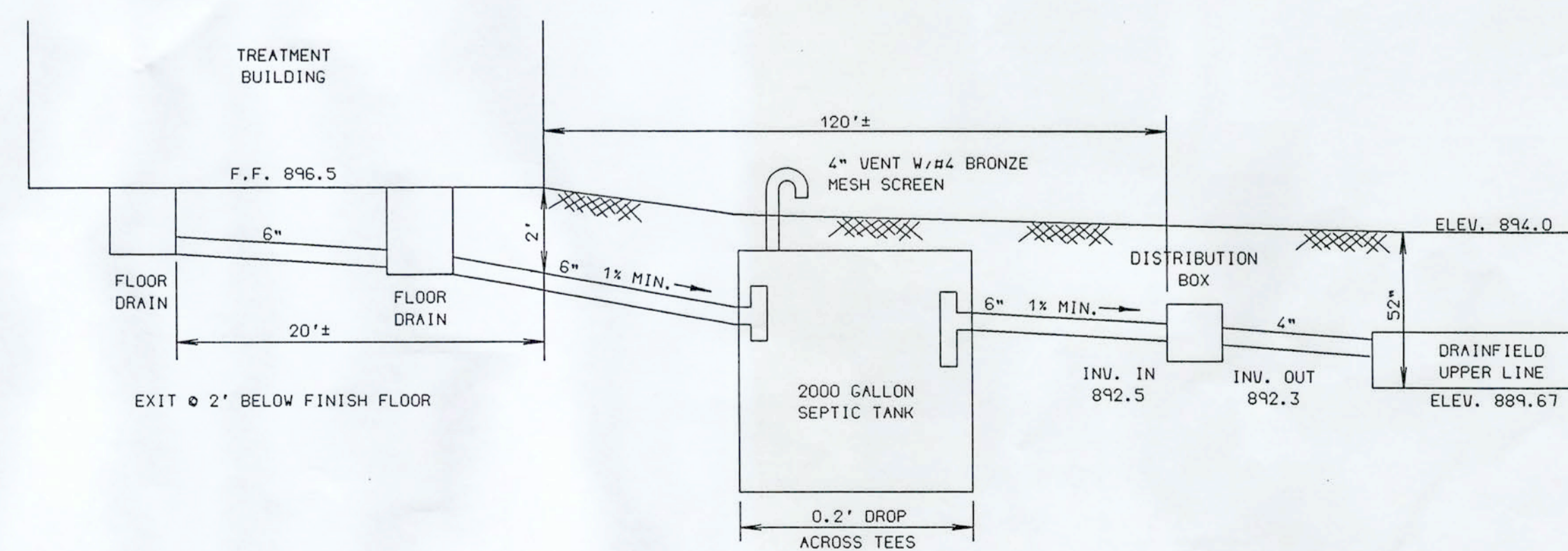
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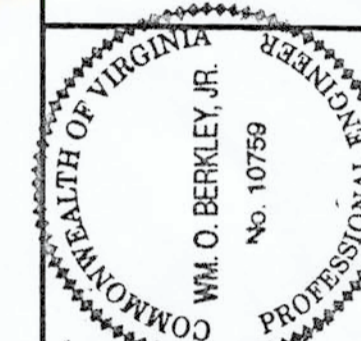


SITE PLAN
SCALE: 1" = 30'



BACKWASH DISPOSAL SYSTEM
N.T.S.

BERKLEY HOWELL & ASSOC., P.C.
ENGINEERS • SURVEYORS • PLANNERS
306 ENTERPRISE DRIVE, SUITE C
FOREST, VIRGINIA 24551
PH: (434) 385-7548 FAX: (434) 385-6111



THE RETREAT
WATER SYSTEM

SITE PLAN

DATE: 10-1-02

TECHNICIAN:

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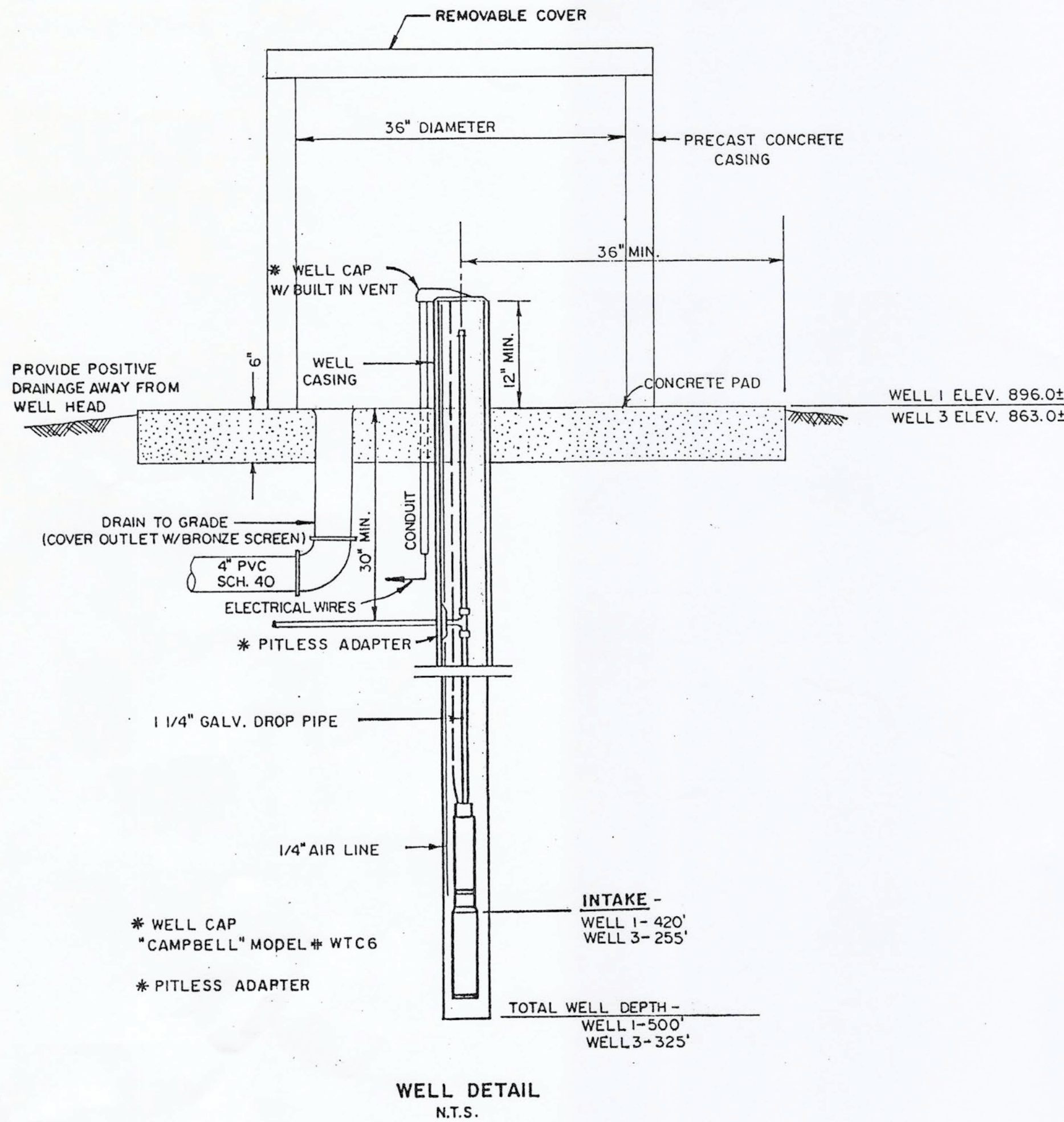
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SURVEY DATUM USED:

FIELDBOOK IDENTIFICATION:

VIEWS TO CREATE THIS DRAWING:

MANUSCRIPT DRAWING NUMBER:



GENERAL NOTES:

- CONTRACTOR SHALL LOCATE ALL EXISTING UTILITIES WITHIN THE CONSTRUCTION LIMITS OF THE PROJECT PRIOR TO COMMENCEMENT OF CONSTRUCTION.
- CONTRACTOR SHALL FIELD VERIFY EXISTING WATER LINES AND SANITARY SEWER LOCATION AND DEPTH PRIOR TO CONSTRUCTION AND MAKE ADJUSTMENTS AS NECESSARY FOR CONNECTION OF THE WATER LINES AND SANITARY SEWER LINES.
- SEPARATION OF WATER LINES AND SANITARY AND/OR COMBINED SEWERS OR SEWER FORCE MAINS. AS USED BELOW, THE WORK "SEWER" IS INTENDED TO ALSO INCLUDE SEWER FORCE MAINS.
 - FOLLOW STATE HEALTH DEPARTMENT STANDARDS FOR SEPARATION OF WATER MAINS AND SEWER LINES.
- PARALLEL INSTALLATION
 - NORMAL CONDITIONS - WATER LINES SHALL BE CONSTRUCTED AT LEAST 10 FEET HORIZONTALLY FROM A SEWER OR SEWER MANHOLE WHENEVER POSSIBLE. THE DISTANCE SHALL BE MEASURED EDGE-TO-EDGE.
 - UNUSUAL CONDITIONS - WHEN LOCAL CONDITIONS PREVENT A HORIZONTAL SEPARATION OF AT LEAST 10 FEET, THE WATER LINE MAY BE LAID CLOSER TO A SEWER OR SEWER MANHOLE PROVIDED THAT:
 - THE BOTTOM OF THE WATER LINE IS AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER.
 - WHERE THIS VERTICAL SEPARATION CANNOT BE OBTAINED, THE SEWER SHALL BE CONSTRUCTED OF AWWA APPROVED WATER PIPE PRESSURE-TESTED IN PLACE TO 50 PSI WITHOUT LEAKAGE PRIOR TO BACKFILLING. THE SEWER MANHOLE SHALL BE OF WATERTIGHT CONSTRUCTION AND TESTED IN PLACE.
- CROSSING
 - NORMAL CONDITIONS - WATER LINES CROSSING OVER SEWERS SHALL BE LAID TO PROVIDE A SEPARATION OF AT LEAST 18 INCHES BETWEEN THE BOTTOM OF THE WATER LINE AND THE TOP OF THE SEWER WHENEVER POSSIBLE.
 - UNUSUAL CONDITIONS - WHEN LOCAL CONDITIONS PREVENT A VERTICAL SEPARATION DESCRIBED IN CROSSING, NORMAL CONDITIONS, PARAGRAPH ABOVE, THE FOLLOWING CONSTRUCTION SHALL BE USED:
 - SEWERS PASSING OVER OR UNDER WATER LINES SHALL BE CONSTRUCTED OF THE MATERIALS DESCRIBED IN PARALLEL INSTALLATION. UNUSUAL CONDITIONS - PARAGRAPH 2 ABOVE.
 - WATER LINES PASSING UNDER SEWERS SHALL, IN ADDITION, BE PROTECTED BY PROVIDING:
 - VERTICAL SEPARATION OF AT LEAST 18 INCHES BETWEEN THE BOTTOM OF THE SEWER AND THE TOP OF THE WATER LINE.
 - ADEQUATE STRUCTURAL SUPPORT FOR THE SEWERS TO PREVENT EXCESSIVE DEFLECTION OF THE JOINTS AND SETTLING ON AND BREAKING WATER LINE.
 - THAT THE LENGTH OF THE WATER LINE BE CENTERED AT THE POINT OF THE CROSSING SO THAT JOINTS SHALL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE SEWER.
 - C. SANITARY AND/OR COMBINED SEWERS OR SEWER MANHOLES - NO WATER PIPES SHALL PASS THROUGH OR COME IN CONTACT WITH ANY PART OF A SEWER OR SEWER MANHOLE.
- SEPARATION OF WATERLINES AND SEPTIC SYSTEMS
WATERLINES (RAW AND FINISHED) SHALL BE CONSTRUCTED A MINIMUM OF 30 FEET FROM SEPTIC TANKS AND DRAINFIELDS.
- CONTRACTOR SHALL INSTALL DETECTABLE TAPE ACCORDING TO MANUFACTURER'S RECOMMENDATION IN TRENCH ABOVE ALL NONMETALLIC PIPE. THE TAPE SHALL BE A METALLIC CORE PROTECTED BY A PLASTIC JACKET AND SHALL BE CONTINUOUSLY MARKED INDICATING THAT A WATER MAIN IS BURIED BENEATH THE TAPE.
- CONCRETE FOR REACTION ANCHORS SHALL HAVE 3500 PSI STRENGTH AT 28 DAYS AND SHALL MEET REQUIREMENTS OF ASTM C 94. CONCRETE REACTION ANCHORS SHALL BEAR AGAINST

UNDISTURBED EARTH. ANCHORS SHALL BE OF THE SIZE AND SHAPE INDICATED ON THE DRAWINGS. CONTRACTOR SHALL PROVIDE REACTION ANCHORS AT ALL CHANGES IN DIRECTION AND AT ALL DEAD ENDS OF PRESSURE PIPELINES AND AS SHOWN ON THE DRAWINGS.

- PROVIDE A COMBINATION AIR RELEASE VALVE AT LOCATIONS SHOWN ON DRAWINGS AND AT ALL HIGH POINTS ON THE MAINS. INSTALL GATE VALVE BETWEEN WATER MAIN AND RELIEF VALVE. CONSTRUCT MANHOLE/VALVE BOXES FOR VALVES BELOW GRADE. VALVES SHALL BE FOR WORKING PRESSURES INDICATED ON DRAWINGS. MANUFACTURERS SHALL BE VALVE & PRIMER CORP., AMERICAN DARTING VALVE AND MANUFACTURING, VAL-MATIC VALVE & MANUFACTURING COMPANY, OR GLOW CORP.
- WATER LINE PIPE: PVC PIPE 4-12 INCHES IN DIAMETER SHALL MEET REQUIREMENTS OF AWWA C900. PIPE CONNECTION SHALL BE FLAN END PIPE WITH A RUBBER GASKETED COUPLING OR FLAN END AND RUBBER GASKETED BELL END. PIPE SHALL BE PRESSURE CLASS SHOWN ON THE DRAWINGS. THE PIPE SHALL CONFORM TO THE OUTSIDE DIMENSION OF DUCTILE IRON PIPE. FOR POTABLE WATER SHALL BE APPROVED BY NATIONAL SANITATION FOUNDATION. USE AWWA C900-D18, 150 PSI PIPE.

POLYVINYL CHLORIDE (PVC) PLASTIC PIPE LESS THAN 4-INCH DIAMETER: PVC PIPE 4\"/>

PROVISIONS FOR EXPANSION AND CONTRACTIONS AT EACH JOINT SHALL BE MADE WITH AN ELASTOMERIC RING. THE BELL SHALL CONSIST OF AN INTEGRAL WALL SECTION WITH AN ELASTOMERIC RING MEETING THE REQUIREMENTS OF ASTM F477. THE WALL THICKNESS OF THE BELL SECTION SHALL CONFORM TO ASTM D3139.

ALL FITTINGS SHALL BE CLASS 250 GRAY CAST IRON CONFORMING TO ANSI A21.10-82 OR AWWA C110-82 OR CLASS 350 DUCTILE IRON. DUCTILE IRON SHALL CONFORM TO ASTM A536-72, MINIMUM GRADE. NOMINAL THICKNESS OF ALL FITTINGS SHALL BE EQUAL TO OR EXCEED CLASS 3 DUCTILE IRON PIPE THICKNESSES. RADII OF CURVATURES SHALL CONFORM TO ANSI A21.10-82 OR AWWA C110-82.

CERTIFICATION OF THE PVC PIPE AND CAST IRON FITTING WILL BE REQUIRED AND THE CONTRACTOR SHALL INDICATE THIS REQUIREMENT ON HIS PURCHASE ORDER.

PIPE STIFFNESS USING Fy FOR PVC MUNICIPAL WATER PIPE SHALL BE 375.

MATERIALS USED IN THE MANUFACTURE OF PVC PIPE SHALL CONFORM TO ASTM SPECIFICATIONS D1784.

EACH LENGTH OF PVC PIPE SHALL BE MARKED WITH THE MANUFACTURER'S IDENTIFICATION, SIZE, MATERIAL, TYPE AND GRADE OF COMPOUND, PRESSURE RATING AND THE LETTERS NSF DENOTING NATIONAL SANITATION FOUNDATION APPROVAL FOR USE TO TRANSPORT POTABLE WATER.

- PIPE LAYING - EXERCISE CARE TO KEEP FOREIGN MATERIAL AND DIRT FROM ENTERING PIPE DURING STORAGE, HANDLING, AND PLACING IN TRENCH. CLOSE ENDS OF IN-PLACE PIPE AT THE END OF ANY WORK PERIOD TO PRECLUDE ENTRY OF ANIMALS AND FOREIGN MATERIAL. DO NOT LAY PIPE WHEN TRENCH BOTTOM IS MUDDY OR FROZEN, OR HAS STANDING WATER. REFER TO WATERLINE TRENCH DETAIL.
- PIPE CASING
WATERLINE AND INDIVIDUAL SERVICE LINES SHALL BE CASED BENEATH ROADWAY. REFER TO DETAIL.

ACCEPTANCE TESTS

- THE OWNER OR CONTRACTOR SHALL NOTIFY THE COUNTY AND ENGINEER AT LEAST TWENTY-FOUR (24) HOURS PRIOR TO THE COMMENCEMENT OF TESTING. TESTS SHALL BE MADE ON ALL SECTIONS OF PIPE THROUGHOUT THE ENTIRE PROJECT AND SHALL BE CONDUCTED ONLY IN THE PRESENCE OF THE COUNTY AND ENGINEER OR ITS AUTHORIZED AGENT. TESTS SHALL BE MADE AFTER THE CORPORATION STOPS HAVE BEEN INSTALLED, AND SHALL BE MADE BETWEEN ADJACENT VALVES. CARE SHALL BE TAKEN TO ENSURE THAT THE ENTIRE TEST RUN OF PIPE IS SECURELY BRACED AND BLOKED AGAINST THRUST WHEN PRESSURE IS APPLIED. ALL THRUST BLOCKS MUST BE COMPLETELY SET, AND ALL PIPE MUST BE FIRMLY SUPPORTED AND WEIGHTED DOWN BY PARTIAL BACKFILL SOIL ON TOP.
- ALL PIPE, JOINTS, VALVES AND FITTINGS IN THE TEST SECTION SHALL BE EXAMINED. DEFECTIVE MATERIAL DISCLOSED AS A CONSEQUENCE OF THE TESTS SHALL BE REMOVED AND REPLACED BY SOUND MATERIAL AT THE OWNER/CONTRACTOR'S EXPENSE. ANY JOINT SHOWING VISIBLE LEAKAGE SHALL BE MADE AIRTIGHT. THE TEST AS SHOWN BELOW SHALL BE REPEATED UNTIL ITS RESULTS ARE SATISFACTORY TO THE COUNTY AND ENGINEER.

- AFTER THE LINE HAS BEEN BACKFILLED AND AT LEAST 7 DAYS AFTER THE LAST CONCRETE REACTION ANCHOR HAS BEEN POURED, SUBJECT THE LINE OR ANY VALVED SECTION OF THE LINE TO A HYDROSTATIC PRESSURE TEST. FILL THE SYSTEM WITH WATER AT A VELOCITY OF APPROXIMATELY 1-FOOT PER SECOND. WHEN NECESSARY MEASURES ARE TAKEN TO ELIMINATE ALL AIR. AFTER THE SYSTEM HAS BEEN FILLED, RAISE THE PRESSURE BY PUMP TO 1.5 TIMES THE WORKING PRESSURE. MEASURE PRESSURE AT THE LOW POINT ON THE SYSTEM COMPENSATING FOR GAGE ELEVATION. MAINTAIN THIS PRESSURE FOR 2 HOURS. IF PRESSURE CANNOT BE MAINTAINED, DETERMINE CAUSE, REPAIR, AND REPEAT THE TEST UNTIL SUCCESSFUL.
- A LEAKAGE TEST SHALL BE CONDUCTED CONCURRENTLY WITH THE PRESSURE TEST. LEAKAGE SHALL BE DETERMINED WITH A CALIBRATED TEST METER FURNISHED BY THE CONTRACTOR. LEAKAGE WILL BE DEFINED AS THE QUANTITY OF WATER REQUIRED TO MAINTAIN A PRESSURE WITHIN 5 PSI OF THE SPECIFIED TEST PRESSURE, AFTER AIR HAS BEEN EXPELLED, AND THE PIPE FILLED WITH WATER. LEAKAGE, IN GALLONS PER HOUR, SHALL NOT EXCEED THAT QUANTITY DETERMINED BY $L = S \times \text{SQUARE FOOT OF P} \times 133200$ (P-AVG. TEST PRESSURE IN PSI). IF LEAKAGE EXCEEDS THAT AMOUNT, FIND AND REPAIR THE LEAKS AND REPEAT THE TEST UNTIL SUCCESSFUL. ALL VISIBLE LEAKS SHALL BE REPAIRED REGARDLESS OF THE AMOUNT OF LEAKAGE.

- DISINFECT AND TEST WATER MAINS AND ACCESSORIES IN ACCORDANCE WITH THE PROCEDURES LISTED BELOW AND MEET REQUIREMENTS OF VDH AND IN ACCORDANCE WITH AWWA C651.
 - PRELIMINARY FLUSHING: THE MAIN SHALL BE FLUSHED PRIOR TO DISINFECTION, EXCEPT WHEN THE TABLET METHOD IS USED. FLUSHING SHALL BE AT A VELOCITY OF NOT LESS THAN 2.5 FEET PER SECOND. ADEQUATE PROVISIONS SHALL BE MADE FOR DRAINAGE OF FLUSHING WATER.
 - FORM OF CHLORINE FOR DISINFECTION
 - CALCIUM HYPOCHLORITE CONTAINS 70 PERCENT AVAILABLE CHLORINE BY WEIGHT. IT SHALL BE EITHER GRANULAR OR TABULAR IN FORM. THE TABLETS, SIX TO EIGHT TO THE CUP, ARE DESIGNED TO DISSOLVE SLOWLY IN WATER. A CHLORINE-WATER SOLUTION SHALL BE PREPARED BY DISSOLVING THE GRANULES OR TABLETS IN WATER IN THE PROPORTION REQUISITE FOR THE DESIRED CONCENTRATION.
 - SODIUM HYPOCHLORITE IS SUPPLIED IN STRENGTHS FROM 5.25 TO 16 PERCENT AVAILABLE CHLORINE. THE CHLORINE-WATER SOLUTION SHALL BE PREPARED BY ADDING HYPOCHLORITE TO WATER. PRODUCT DETERIORATION SHALL BE RECKONED WITH IN COMPUTING THE QUANTITY OF SODIUM HYPOCHLORITE REQUIRED FOR THE DESIRED CONCENTRATION.
 - APPLICATION: THE HYPOCHLORITE SOLUTIONS SHALL BE APPLIED TO THE WATER MAIN WITH A GASOLINE OR ELECTRICALLY-POWERED CHEMICAL FEED PUMP DESIGNED FOR FEEDING CHLORINE SOLUTIONS. FOR SMALL APPLICATIONS, THE SOLUTIONS MAY BE FED WITH A HAND PUMP. FOR EXAMPLE, A HYDRAULIC TEST PUMP. FEED LINES SHALL BE OF SUCH MATERIAL AND STRENGTH AS TO WITHSTAND SAFELY THE MAXIMUM PRESSURES THAT MAY BE CREATED BY THE PUMPS. ALL CONNECTIONS SHALL BE CHECKED FOR TIGHTNESS BEFORE THE HYPOCHLORITE SOLUTION IS APPLIED TO THE MAIN.

C. METHODS OF CHLORINE APPLICATION

- CONTINUOUS FEED METHOD: WATER FROM THE EXISTING DISTRIBUTION SYSTEM OR OTHER APPROVED SOURCES OF SUPPLY SHALL BE MADE TO FLOW AT A CONSTANT, MEASURED RATE INTO THE NEWLY-LAID PIPELINE. THE WATER SHALL RECEIVE A DOSE OF CHLORINE, ALSO FED AT A CONSTANT, MEASURED RATE. THE TWO RATES SHALL BE PROPORTIONED SO THAT THE CHLORINE CONCENTRATION IN THE WATER IN THE PIPE IS MAINTAINED AT A MINIMUM OF 50 MG/L AVAILABLE CHLORINE. TO ASSURE THAT THIS CONCENTRATION IS MAINTAINED, THE CHLORINE SHALL BE MEASURED AT INTERVALS NOT EXCEEDING 2,000 FEET IN ACCORDANCE WITH THE PROCEDURES DESCRIBED IN THE CURRENT EDITION OF "STANDARD METHODS" AND AWWA M12 - "SIMPLIFIED PROCEDURES FOR WATER EXAMINATION". IN THE ABSENCE OF A METER, THE RATE MAY BE DETERMINED EITHER BY PLACING A PITOT GAGE AT THE DISCHARGE OR BY MEASURING THE TIME TO FILL A CONTAINER OF KNOWN VOLUME. TABLE 1 GIVES THE AMOUNT OF CHLORINE REQUIRED FOR EACH 100 FEET OF PIPE OF VARIOUS DIAMETERS. SOLUTIONS OF 1 PERCENT CHLORINE MAY BE PREPARED WITH SODIUM HYPOCHLORITE OR CALCIUM HYPOCHLORITE. THE LATTER SOLUTION REQUIRES APPROXIMATELY 1 POUND OF CALCIUM HYPOCHLORITE IN 8.5 GALLONS OF WATER.

TABLE 1
CHLORINE REQ'D TO PRODUCE 50 MG/L CONC. IN 100 FT OF PIPE - BY DIAMETER

PIPE SIZE INCHES	100% CHLORINE POUNDS	1% CHLORINE SOLNS GALLONS
4 AND SMALLER	0.027	0.33
6	0.061	0.73
8	0.108	1.30

DURING THE APPLICATION OF THE CHLORINE, VALVES SHALL BE MANIPULATED TO PREVENT THE TREATMENT DOSAGE FROM FLOWING BACK INTO THE LINE SUPPLYING THE WATER. CHLORINE APPLICATION SHALL NOT CEASE UNTIL THE ENTIRE MAIN IS FILLED WITH THE CHLORINE SOLUTION. THE CHLORINATED WATER SHALL BE RETAINED IN THE MAIN FOR AT LEAST 24 HOURS, DURING WHICH TIME ALL VALVES IN THE SECTION TREATED SHALL BE OPERATED IN ORDER TO DISINFECT THE APPURTENANCES. AT THE END OF THIS 24-HOUR PERIOD, THE TREATED WATER SHALL CONTAIN NO LESS THAN 25 MG/L CHLORINE THROUGHOUT THE LENGTH OF THE MAIN.

- TABLET METHOD: USE ONLY WHEN SCrupULOUS CLEANLINESS HAS BEEN EXERCISED BECAUSE PRELIMINARY FLUSHING CANNOT BE USED. DO NOT USE THIS METHOD IF TRENCH WATER OR FOREIGN MATERIAL HAS ENTERED THE MAIN OR IF THE WATER IS BELOW 41 DEGREES F (5 DEGREES C). THIS METHOD MAY BE USED FOR MAINS UP TO 12 INCHES IN DIAMETER AND WHERE THE TOTAL LENGTH OF THE MAIN IS LESS THAN 2,500 FEET.

PLACE TABLETS IN EACH SECTION OF PIPE AND OTHER APPURTENANCES. ENOUGH TABLETS SHALL BE USED TO ENSURE THAT A CHLORINE CONCENTRATION OF 25 MG/L IS PROVIDED IN THE WATER. ATTACH TABLETS USING PERMATEX NO. 1 ADHESIVE OR APPROVED EQUAL, EXCEPT FOR THE TABLETS PLACED IN HYDRANTS AND IN THE JOINTS BETWEEN THE PIPE SECTIONS. TABLETS SHALL BE FREE OF ADHESIVE EXCEPT ON THE ONE BROAD SIDE TO BE ATTACHED. PLACE ALL TABLETS AT THE TOP OF THE MAIN. IF THE TABLETS ARE ATTACHED BEFORE THE PIPE SECTION IS PLACED IN THE TRENCH, MARK THE POSITION OF THE TABLET IN THE PIPE AND ASSURE THAT THE PIPE IS PLACED WITH THE TABLET AT THE TOP. THE FOLLOWING TABLE SHOWS THE NUMBER OF 5-GRAIN HTH TABLETS NECESSARY PER JOINT OF PIPE TO OBTAIN 50 PPM CHLORINE.

PIPE SIZE INCHES	TABLETS PER JOINT
4 AND SMALLER	1
4-INCH	2
6-INCH	3
8-INCH	3

WHEN INSTALLATION IS COMPLETED, FILL THE MAIN WITH WATER AT A VELOCITY OF LESS THAN 1-FOOT PER SECOND. THE WATER SHALL REMAIN IN THE PIPE FOR AT LEAST 24 HOURS. OPERATE VALVES SO THAT THE STRONG CHLORINE SOLUTION WILL NOT FLOW BACK INTO THE LINE SUPPLYING THE WATER.

- FINAL FLUSHING: AFTER THE APPLICABLE RETENTION PERIOD, THE HEAVILY CHLORINATED WATER SHALL BE FLUSHED FROM THE MAIN UNTIL THE CHLORINE CONCENTRATION IN THE WATER LEAVING THE MAIN IS NO HIGHER THAN THAT GENERALLY PREVAILING IN THE SYSTEM, OR LESS THAN 1 MG/L CHLORINE RESIDUAL DETERMINATION SHALL BE MADE TO ASCERTAIN THAT THE HEAVILY CHLORINATED WATER HAS BEEN REMOVED FROM THE PIPELINE.

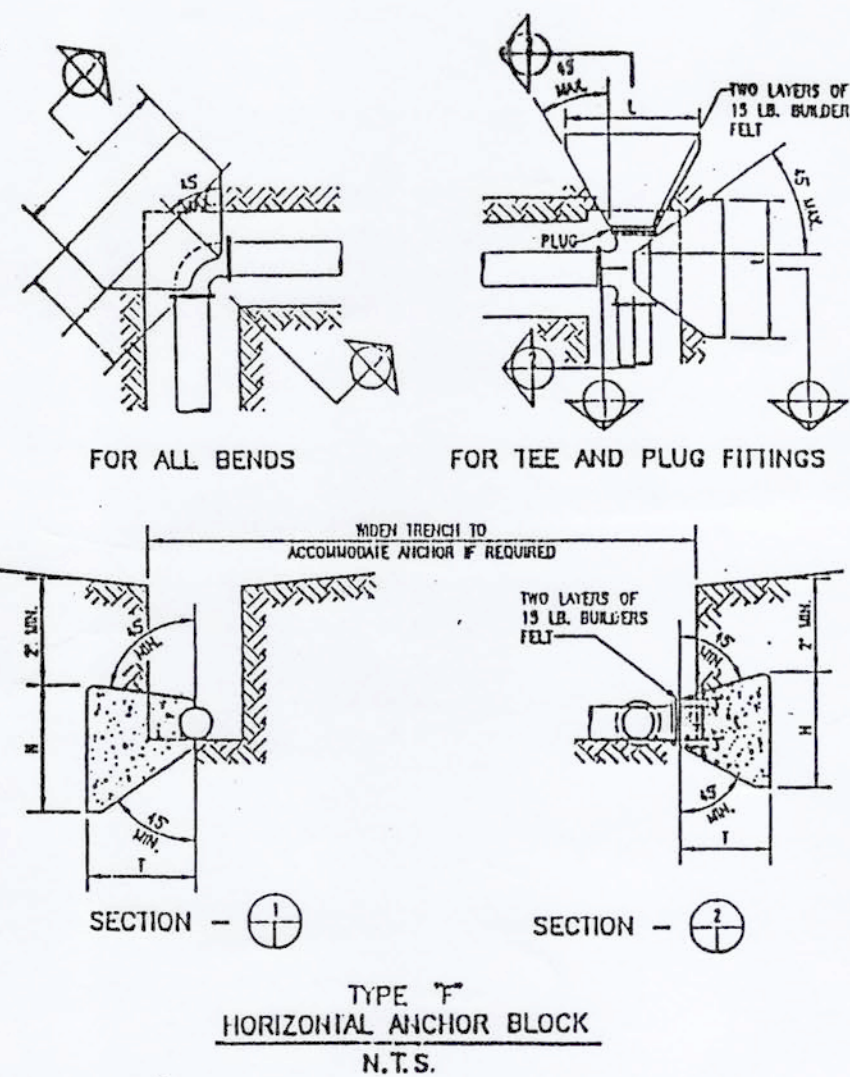
- BACTERIOLOGIC TESTS
 - AFTER FINAL FLUSHING AND BEFORE THE WATER MAIN IS PLACED IN SERVICE, SAMPLES SHALL BE COLLECTED AND TESTED FOR BACTERIOLOGIC QUALITY AND SHALL SHOW THE ABSENCE OF COLIFORM ORGANISMS. AT LEAST TWO SAMPLES SHALL BE COLLECTED AT LEAST 24 HOURS APART AT INTERVALS NOT EXCEEDING 2,000 FEET, AND TESTED BY A STATE HEALTH DEPARTMENT APPROVED LABORATORY AND RESULTS SUBMITTED TO BERKLEY-HOWELL.
 - SAMPLES FOR BACTERIOLOGICAL ANALYSIS SHALL BE COLLECTED IN STERILE BOTTLES TREATED WITH SODIUM THIOSULFATE. IF LABORATORY RESULTS INDICATE THE PRESENCE OF COLIFORM BACTERIA, THE SAMPLES ARE UNSATISFACTORY AND DISINFECTION SHALL BE REPEATED UNTIL THE SAMPLES ARE SATISFACTORY.
- A SAMPLING TAP CONSISTING OF A CORPORATION COCK WITH METAL PIPE SHALL BE INSTALLED WITHIN 2 FEET OF VALVES. THE CORPORATION STOP INLET SHALL BE MALE, 1 INCH IN SIZE, AND THE OUTLET SHALL HAVE 1 INCH I.P. THREADS AND A CAP.

- CLEANING, DISINFECTION, AND TESTING WILL BE THE RESPONSIBILITY OF THE CONTRACTOR FOR THESE OPERATIONS WILL BE FURNISHED BY THE OWNER, BUT THE CONTRACTOR SHALL INCLUDE IN HIS BID THE COST OF LOADING, HAULING, AND DISCHARGING THE WATER.
- TESTING AND DISINFECTION OF THE COMPLETED SECTIONS SHALL NOT RELIEVE THE CONTRACTOR OF HIS RESPONSIBILITY TO REPAIR OR REPLACE ANY CRACKED OR DEFECTIVE PIPE. ALL WORK NECESSARY TO SECURE A TIGHT LINE SHALL BE DONE AT THE CONTRACTOR'S EXPENSE.

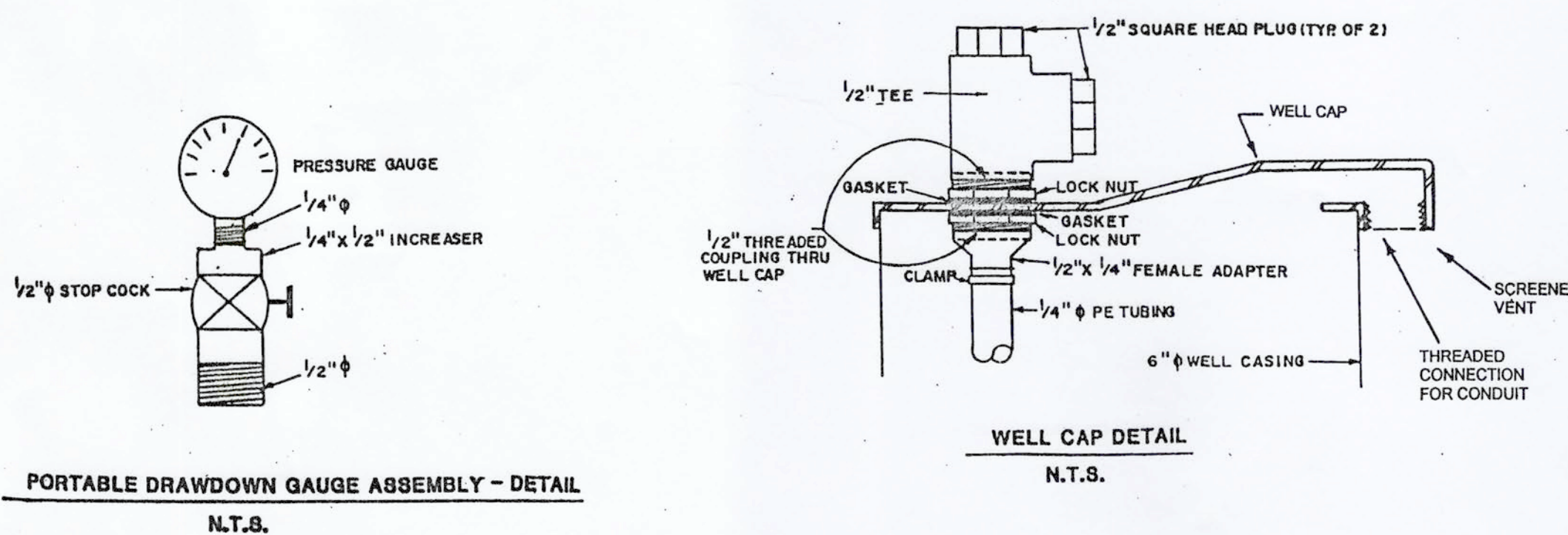
- DISINFECTION - PIPING, TREATMENT UNITS, AND ACCESSORIES WITHIN TREATMENT BUILDING. PIPING, TREATMENT UNITS AND ACCESSORIES WITHIN THE TREATMENT BUILDING SHALL BE DISINFECTED SIMILARLY IN ACCORDANCE WITH SECTION 11 ABOVE. BACTERIOLOGICAL SAMPLE TESTS SHALL BE COLLECTED AND TESTED AT EACH RAW WATER TAP AND FILTER TAP SIMILARLY IN ACCORDANCE WITH SECTION 6 ABOVE.

Well Head and Water Distribution Specifications

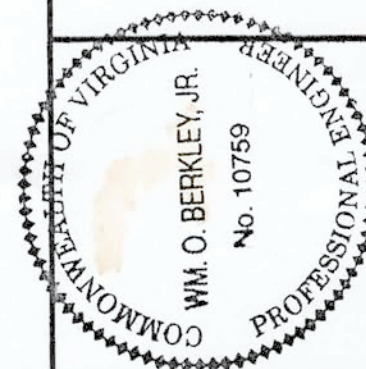
ITEM	DESCRIPTION
Well Pump	
Well #1	Goulds Model 7GS15, 1.5 hp, 1 ph, 230 V, Operating Design - 8 GPM @ 446 FC TDH
Well #3	Goulds Model 33GS50, 5 hp, 1 ph, 230 V, Operating Design - 38 gpm @ 370 FC TDH
Pump Motors Shall Be Equipped With an HIO Switch	
Watertight Well Cap	Campbell Model # WTC 6M Well Cap Shall be a unit certified for this use and approved by the Virginia Department of Health.
Pitless Adapter	Campbell Model # B-20 Pitless Adapter shall be certified by PAS-1 and approved by the Virginia Department of Health.
Check Valves	Mueller, Watts, or Equal
Gate Valves	Mueller, Watts or Equal
Air Release Valve	Hoffman Model 79 or Equal
Pump Controls	Motor Minder Model 201B by Integra
Piping	See General Notes for Specifications



TYPE "T" HORIZONTAL ANCHOR BLOCK DATA		TYPE "T" HORIZONTAL ANCHOR BLOCK DATA	
PIPE SIZE, INCH	TEST PRESSURE, PSI	PIPE SIZE, INCH	TEST PRESSURE, PSI
11 1/2"	150	11 1/2"	150
12 1/2"	150	12 1/2"	150
14"	150	14"	150
16"	150	16"	150
18"	150	18"	150
20"	150	20"	150
22"	150	22"	150
24"	150	24"	150
26"	150	26"	150
28"	150	28"	150
30"	150	30"	150
32"	150	32"	150
34"	150	34"	150
36"	150	36"	150
38"	150	38"	150
40"	150	40"	150
42"	150	42"	150
44"	150	44"	150
46"	150	46"	150
48"	150	48"	150
50"	150	50"	150
52"	150	52"	150
54"	150	54"	150
56"	150	56"	150
58"	150	58"	150
60"	150	60"	150
62"	150	62"	150
64"	150	64"	150
66"	150	66"	150
68"	150	68"	150
70"	150	70"	150
72"	150	72"	150
74"	150	74"	150
76"	150	76"	150
78"	150	78"	150
80"	150	80"	150
82"	150	82"	150
84"	150	84"	150
86"	150	86"	150
88"	150	88"	150
90"	150	90"	150
92"	150	92"	150
94"	150	94"	150
96"	150	96"	150
98"	150	98"	150
100"	150	100"	150



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THE RETREAT WATER SYSTEM

UNION HALL DISTRICT FRANKLIN CO., VA.

MISC. DETAILS

DATE: 10-1-02

TECHNICIAN:

CHECKED BY:

REVISIONS

NO.	DATE
1	2-26-03

SCALES
AS SHOWN

PROJ. NO.
020097

SHEET NO.
12 OF 16

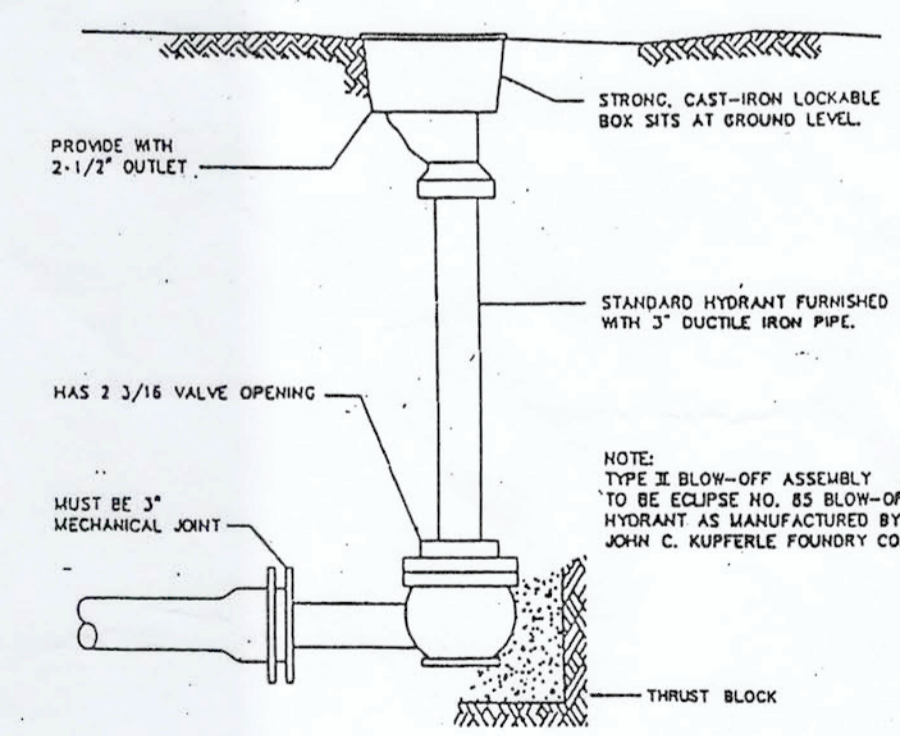
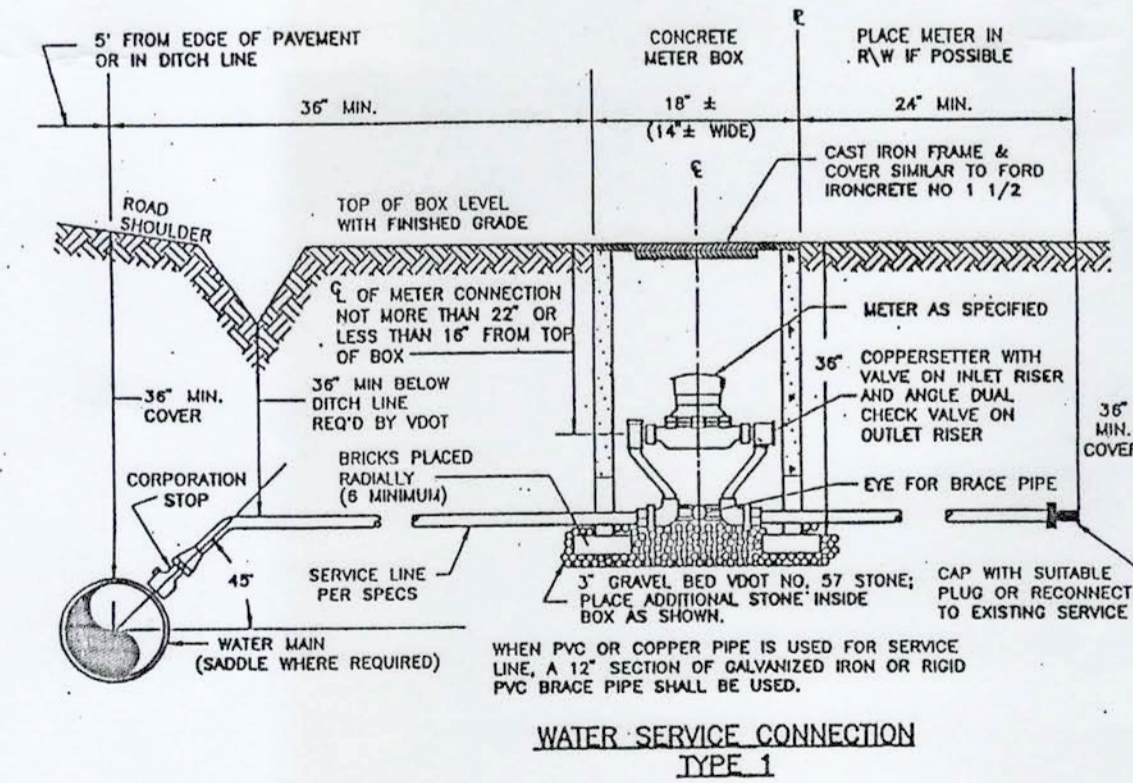
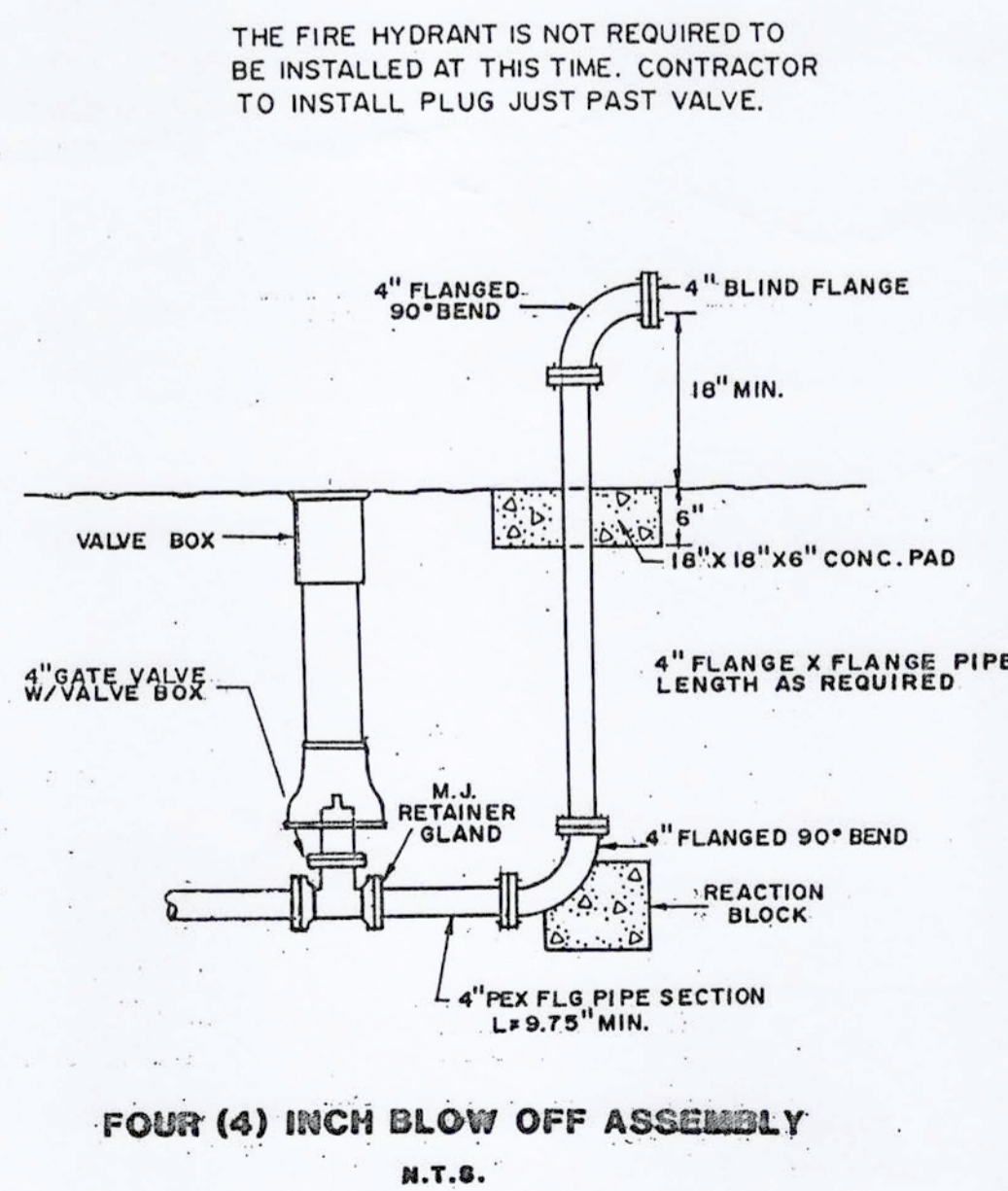
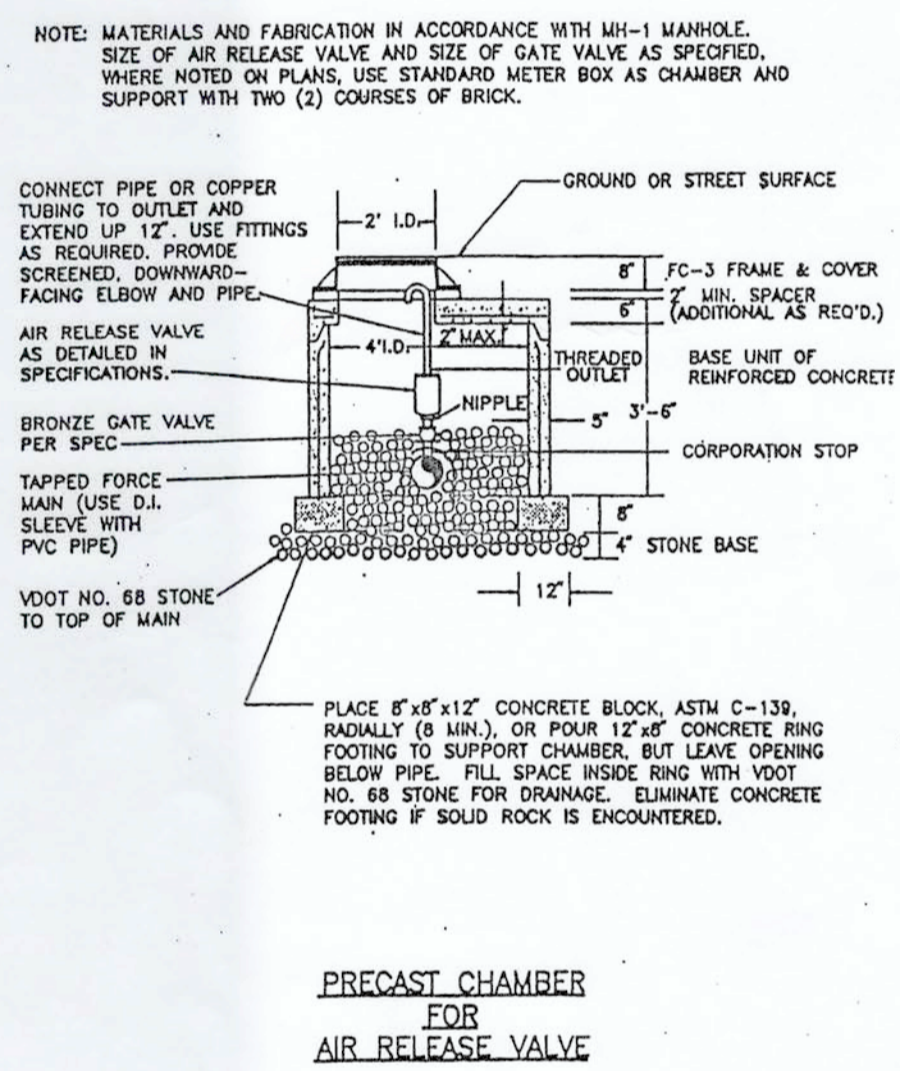
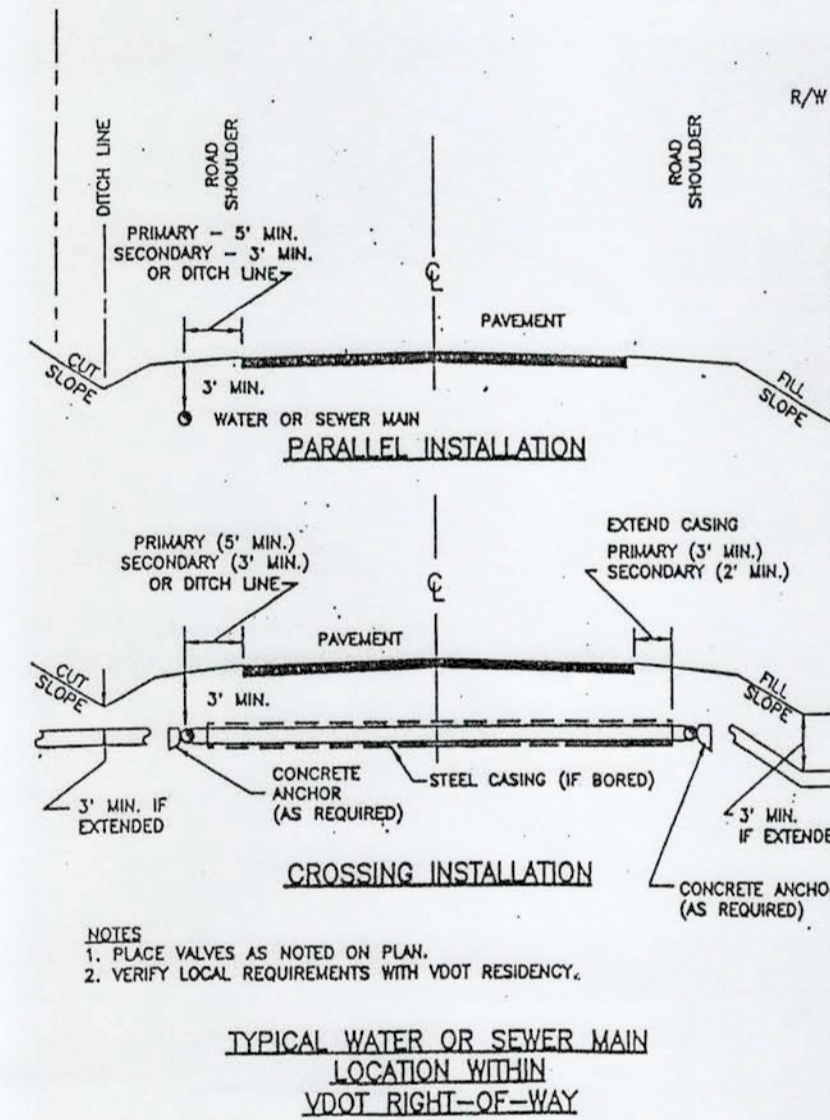
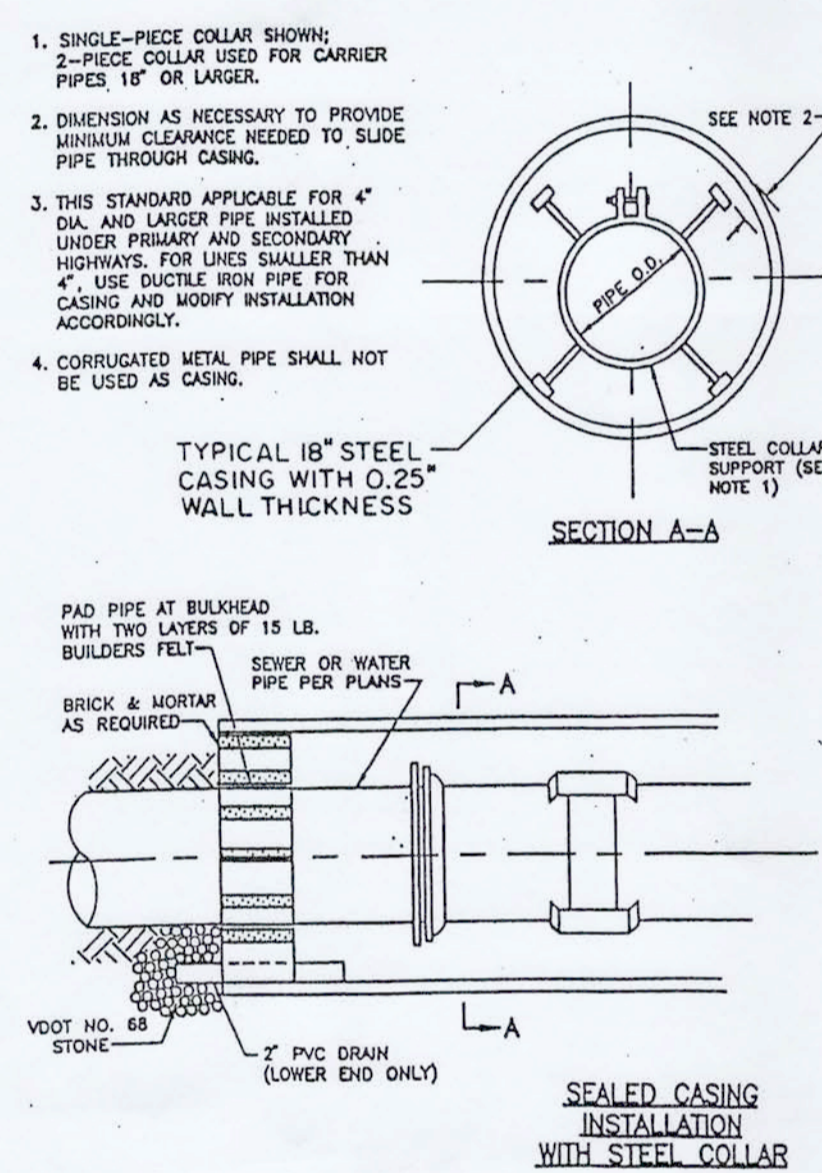
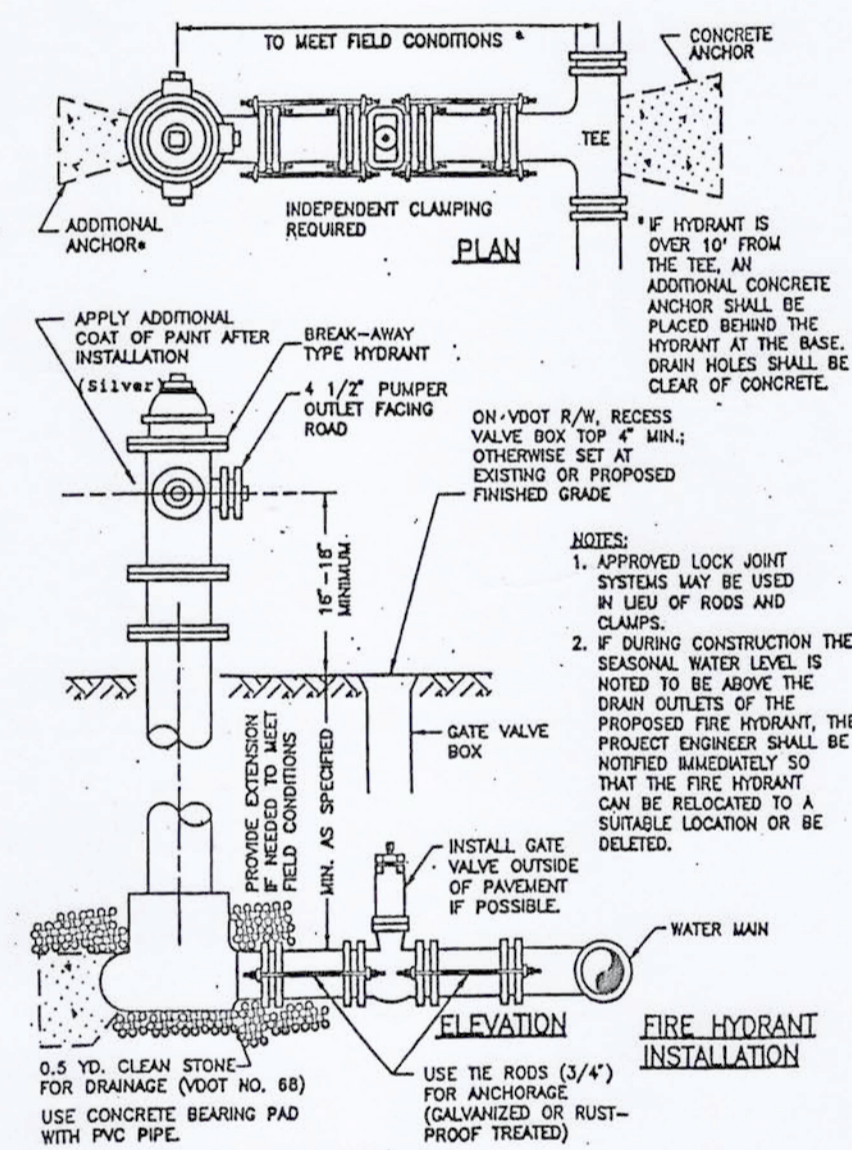
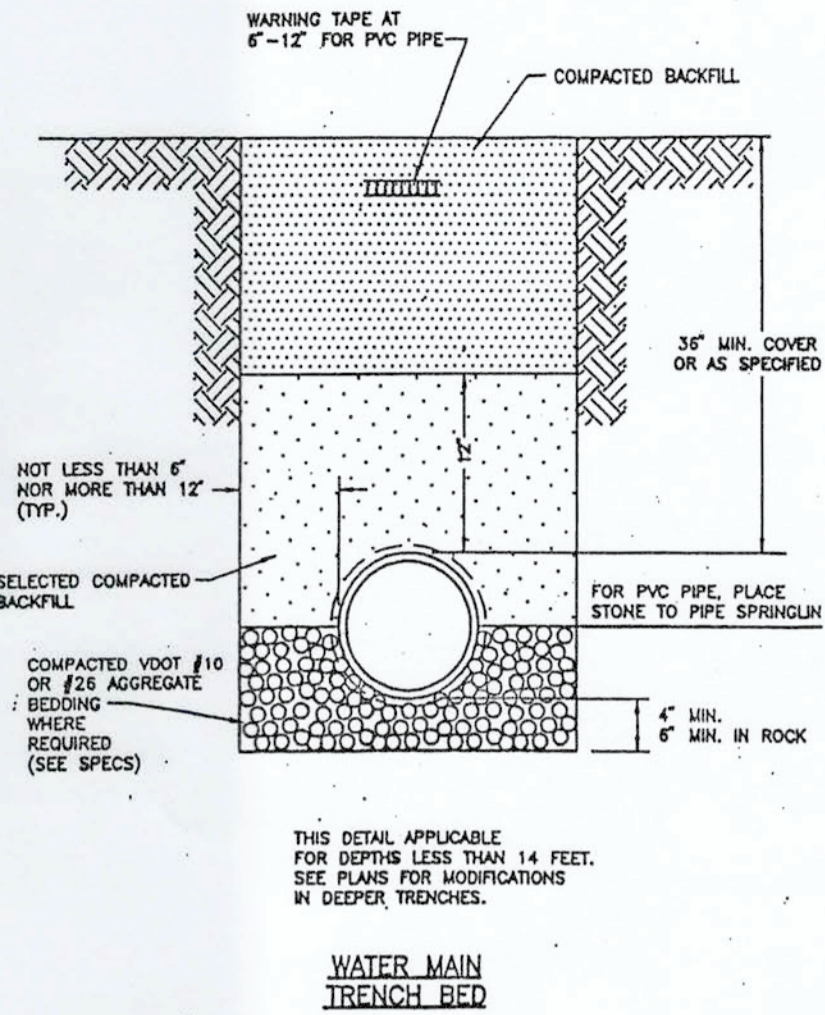
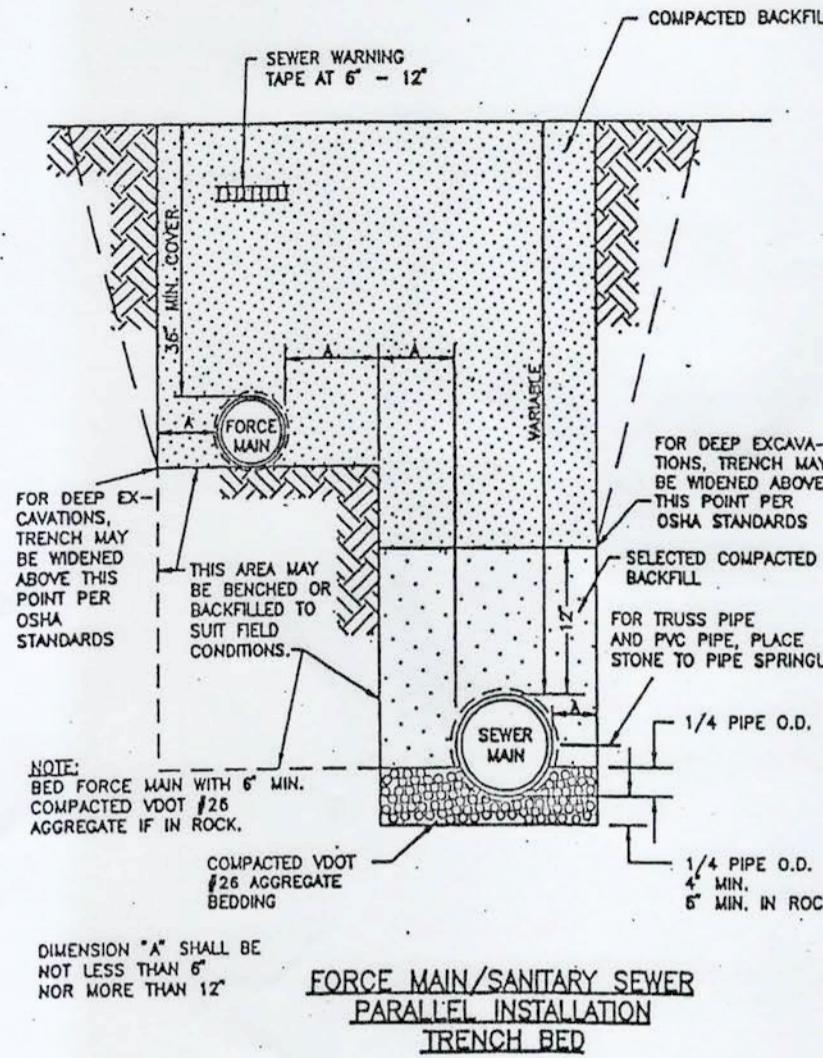
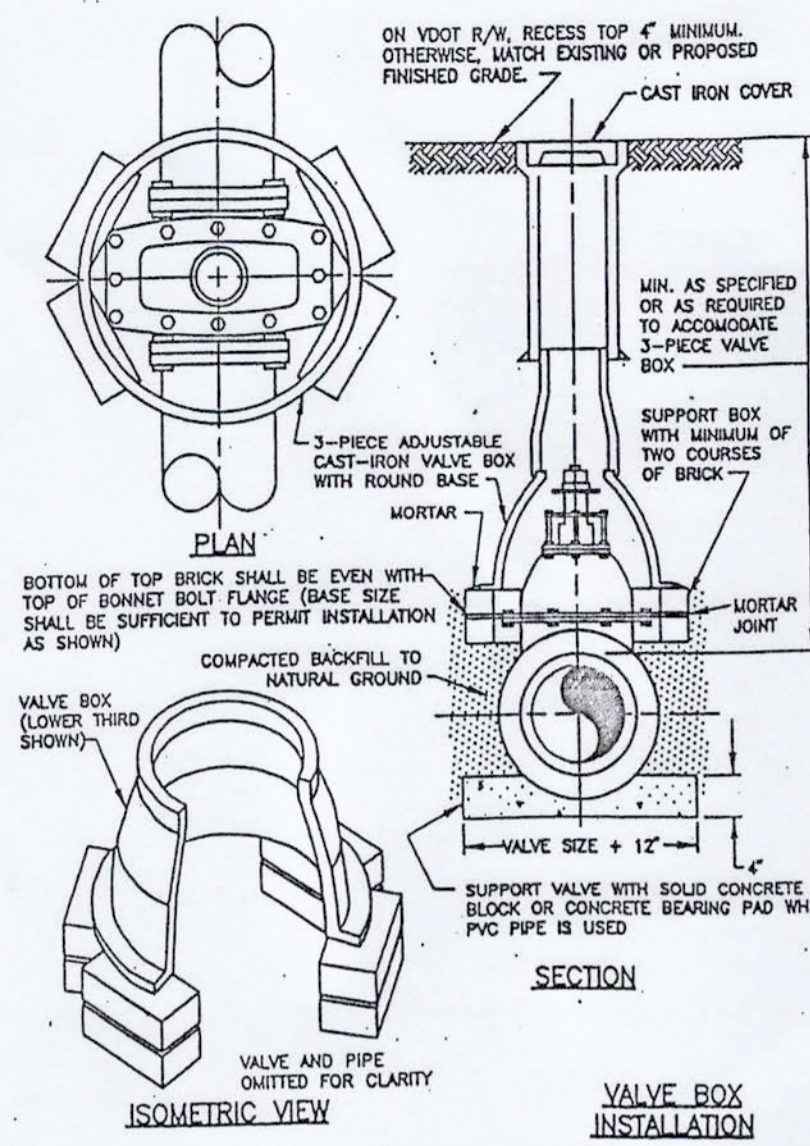
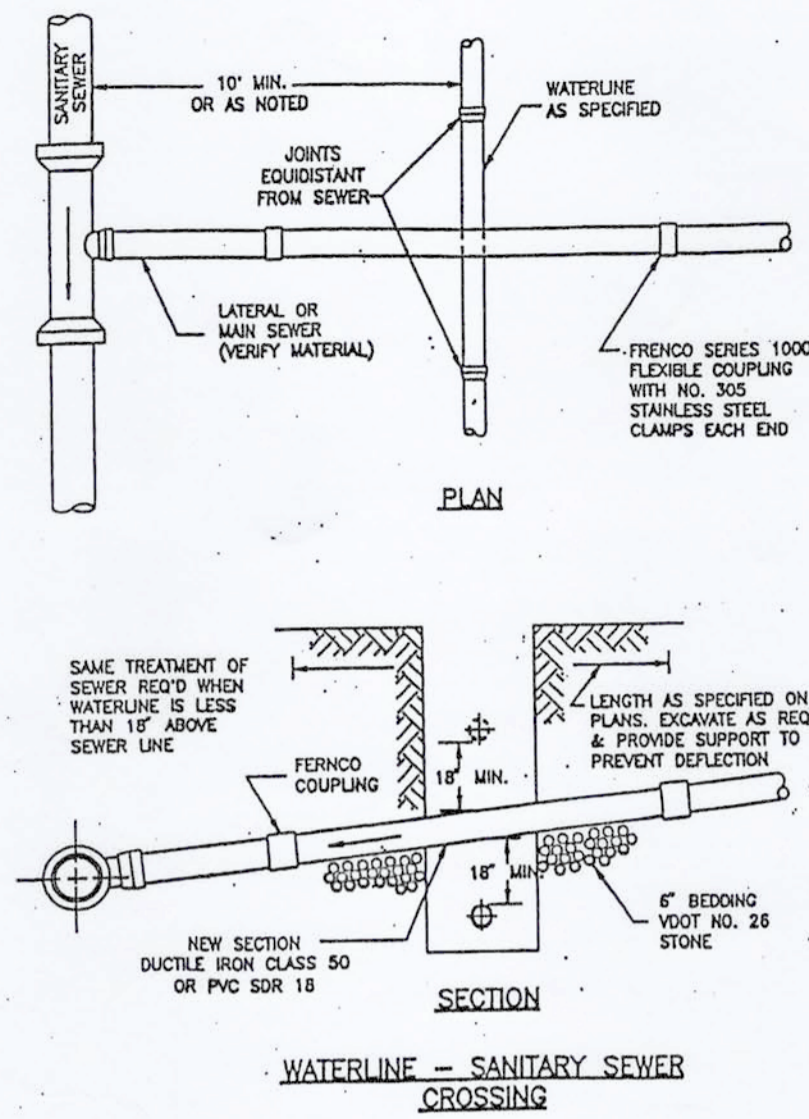
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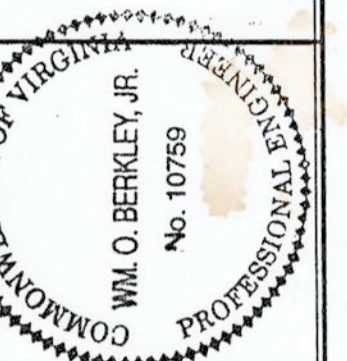
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VIEW TO CREATE THIS DRAWING:

MANUSCRIPT DRAWING NUMBER:



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THE RETREAT
WATER SYSTEM
UNION HALL DISTRICT FRANKLIN CO., VA.

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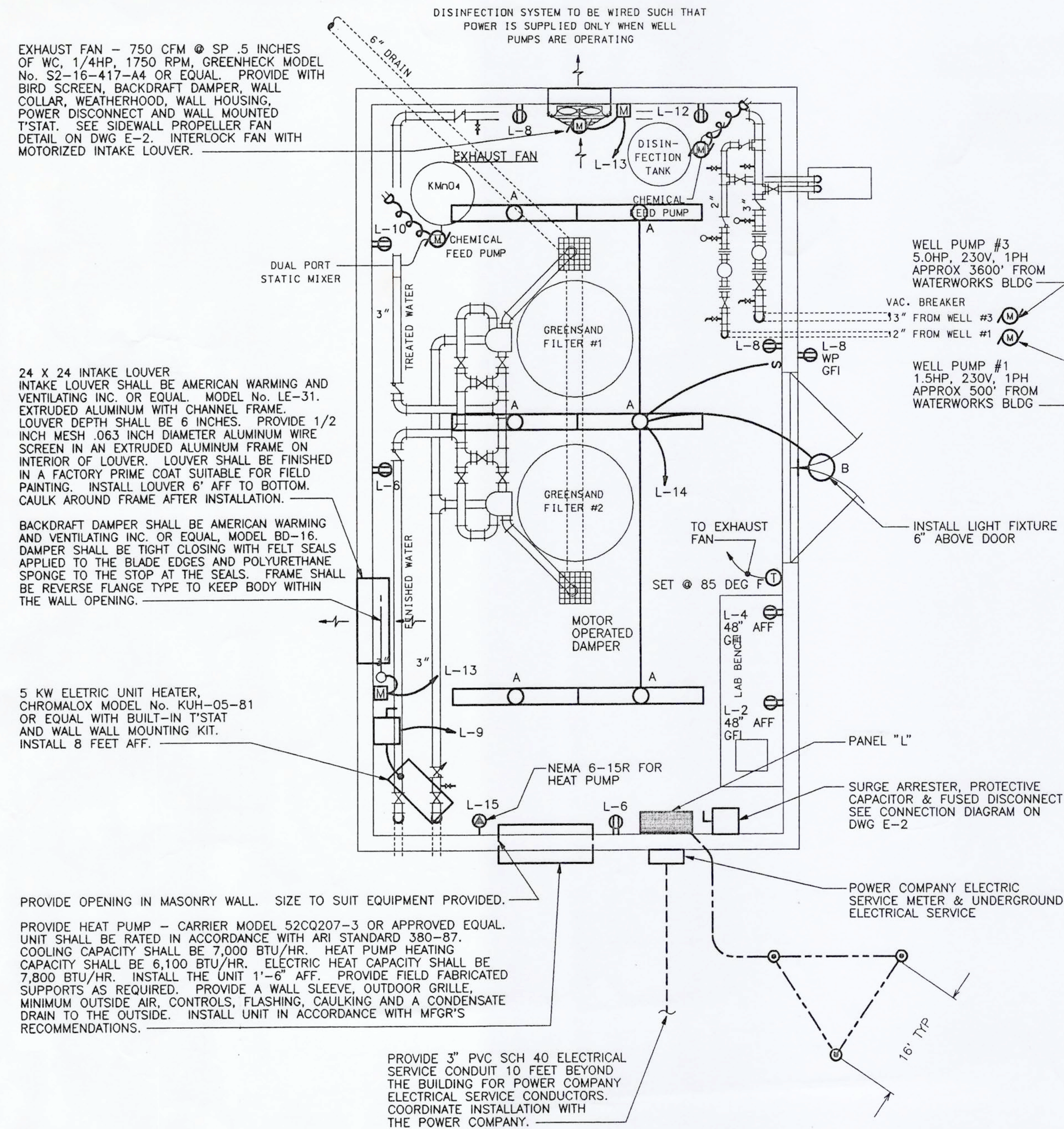
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020097
DIV.
SHEET NO.
14 OF 16
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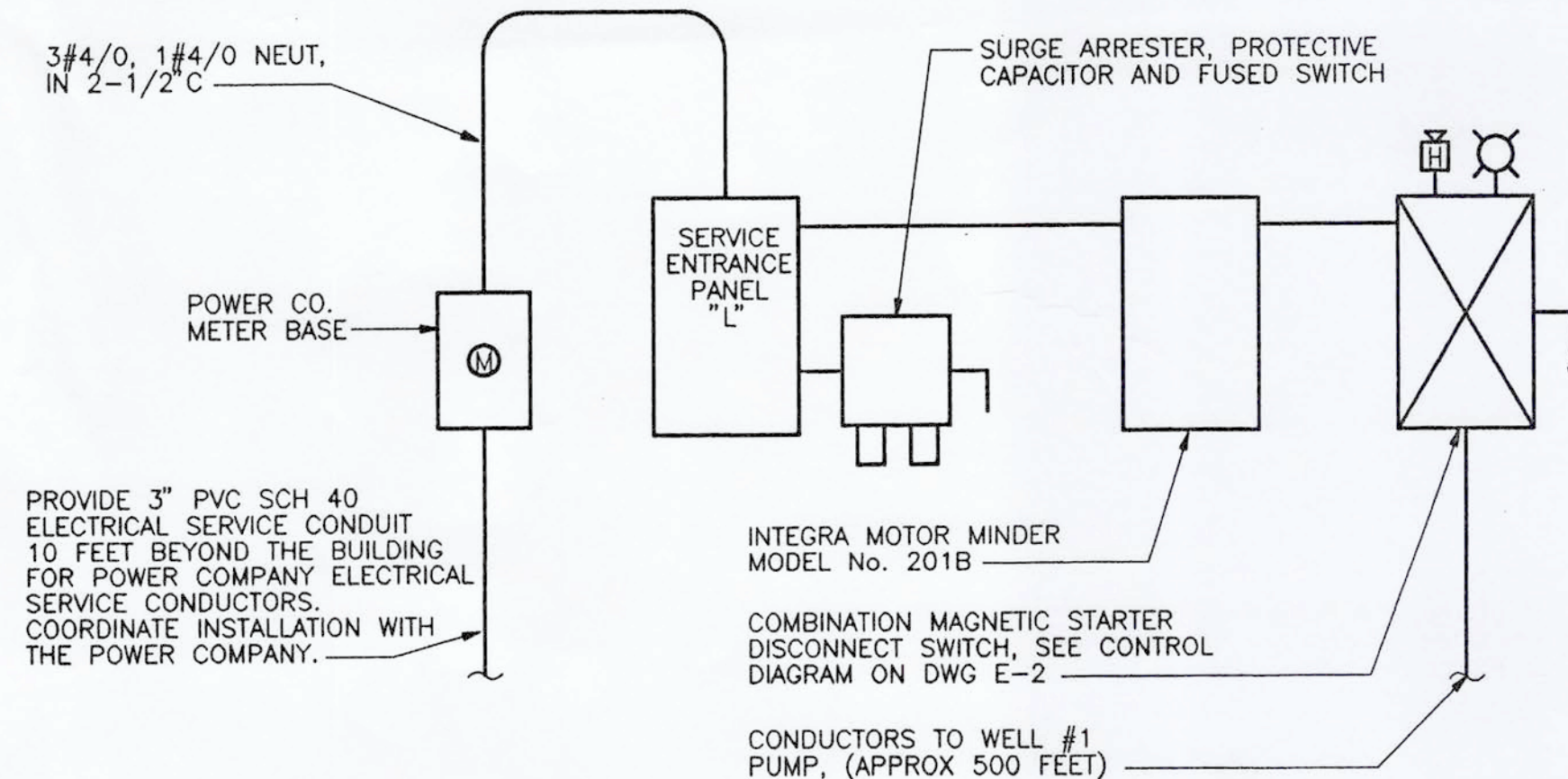
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POWER & LIGHTING PLAN - WATERWORKS BUILDING
3/8" = 1' - 0"



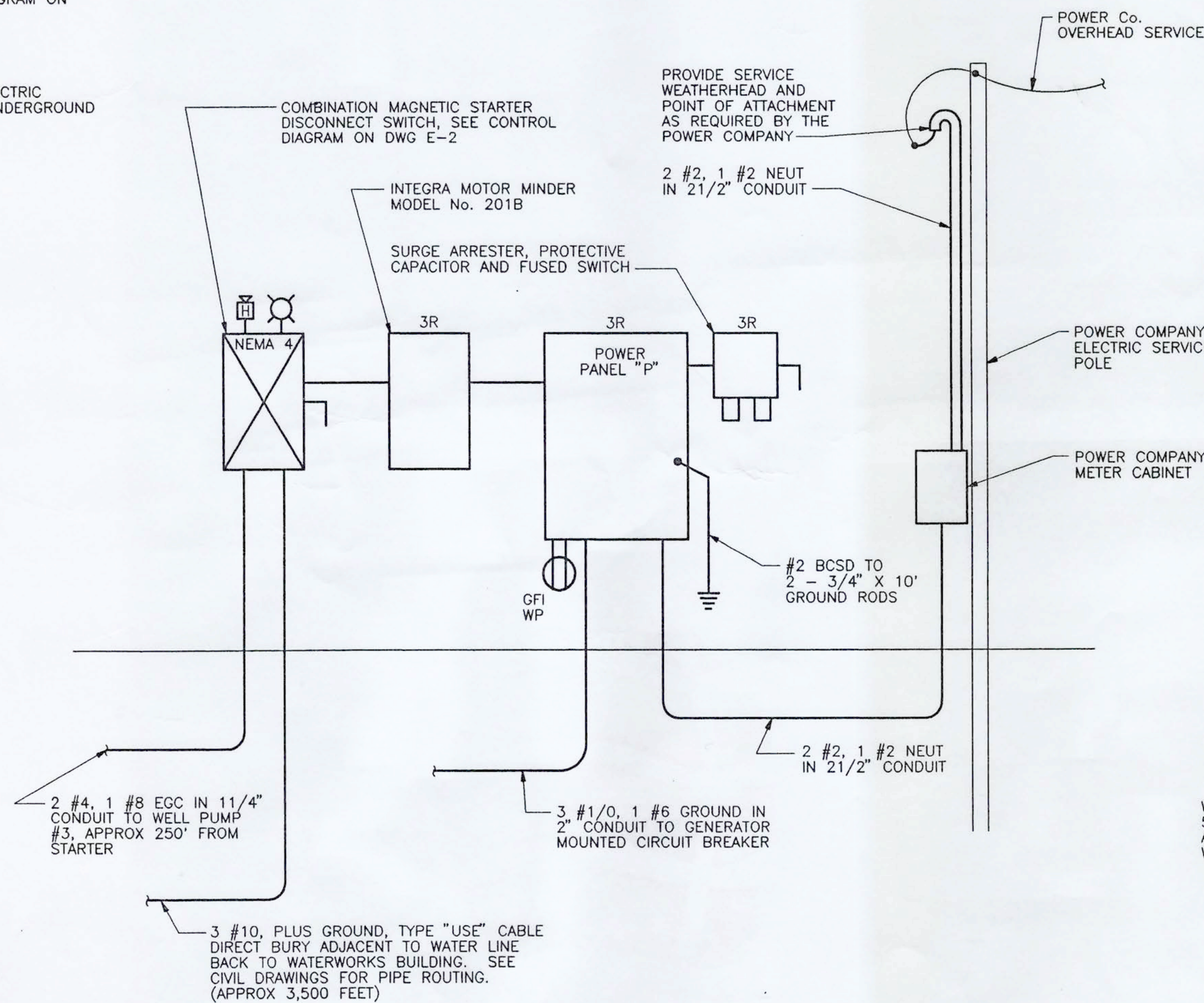
HEADWORKS BUILDING ELECTRIC SERVICE DIAGRAM
NOT TO SCALE

ABBREVIATIONS

A,AMP	AMPERE(S)
AF	AMPERE FRAME
AFF	ABOVE FINISHED FLOOR
AIC	AMPS INTERRUPTING CAPACITY
ARR	ARRESTER
AT	AMPERE TRIP
BCSD	BARE COPPER SOFT DRAWN
BFG	BELOW FINISHED GRADE
C	CONDUIT
CH	COUNTER HEIGHT
CT	CONTROL POWER TRANSFORMER
CT	CURRENT TRANSFORMER
DISC	DISCONNECT
EA	EACH
EGC	EQUIPMENT GROUNDING CONDUCTOR
EQPT	EQUIPMENT
EXIST	EXISTING
FLA	FULL LOAD AMPS
FRAC	FRACTIONAL
FVNR	FULL VOLTAGE, NON-REVERSING
GFI	GROUND FAULT INTERRUPTER
GND	GROUND
HP	HORSEPOWER
KVA	KILOVOLT-AMPERE
KW	KILOWATTS
LED	LIGHT EMITTING DIODE
MCCB	MOLDED CASE CIRCUIT BREAKER
MIN	MINIMUM
NEC	NATIONAL ELECTRICAL CODE
NEUT	NEUTRAL
OL'S	OVERLOADS
PH	PHASE
PVC	POLY VINYLE CHLORIDE
SCH	SCHEDULE
TYP	TYPICAL
V	VOLT(S)
W	WATT(S), WIRE, WIDE

LEGEND

—	CONDUIT RUN CONCEALED IN WALLS AND EXPOSED ELSEWHERE
----	CONDUIT RUN CONCEALED IN OR BELOW FLOOR OR BELOW GRADE AS APPLICABLE
—○—	CONDUIT TURNING UP
—○—	CONDUIT TURNING DOWN
—	TICK MARKS: INDICATE NUMBER OF CONDUCTORS IN A CONDUIT IN ADDITION TO EGC. NO TICK MARKS INDICATE TWO CONDUCTORS IN ADDITION TO EGC
→	HOMERUN TO PANELBOARD
□	FLUORESCENT LIGHTING FIXTURE
□	WALL MOUNTED LIGHTING FIXTURE
S	SINGLE POLE SWITCH
WP, GFI	NEMA 5-20R DUPLEX RECEPTACLE, "WP", WHERE USED, INDICATES WEATHERPROOF, "GFI", WHERE USED, INDICATES GROUND FAULT INTERRUPTER.
□	120/240 VOLT PANELBOARD
□	COMBINATION MAGNETIC STARTER
□	JUNCTION BOX
□	DISCONNECT SWITCH
□	CONTACTOR
□	CIRCUIT BREAKER
□	CONTACT, NORMALLY OPEN
□	PILOT LIGHT
□	GROUND ROD
□	GROUND GRID
□	CONNECTION TO GROUND
□	THERMOSTAT



WELL #3 - ELECTRIC SERVICE DIAGRAM
NOT TO SCALE

ELECTRICAL SPECIFICATIONS:

1. PROVIDE NECESSARY ITEMS FOR A COMPLETE INSTALLATION OF ELECTRICALLY OPERATED EQUIPMENT SPECIFIED OR SHOWN ON THE CONTRACT DRAWING. ALL WORK SHALL BE IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE, 2002 EDITION.
2. PROVIDE LAMINATED PHENOLIC NAMEPLATES ON EACH STARTER, DISCONNECT AND THE LIKE INDICATING THE EQUIPMENT CONTROLLED AND WHERE FEED FROM. LETTERS SHALL BE 3/8" HIGH.
3. ALL EQUIPMENT SHALL BE UL LISTED AS REQUIRED BY THE NATIONAL ELECTRICAL CODE "NEC".
4. TEST ALL CONDUCTORS AND EQUIPMENT IN ACCORDANCE WITH MANUFACTURERS INSTRUCTIONS.
5. PROVIDE MOTORS THAT ARE DESIGNED FOR THE INTENDED USE. MOTORS SHALL BE ENERGY EFFICIENT TYPE.
6. CONDUCTORS SHALL BE STRANDED COPPER WITH TYPE "USE" INSULATION FOR DIRECT BURY INSTALLATION. CONDUCTORS FOR INTERIOR USE SHALL BE TYPE "THHN/THWN". ALL CONDUCTORS SHALL BE RATED FOR 600 VOLTS.
7. CONDUCTORS SHALL BE COLOR CODED AS REQUIRED BY THE NEC.
8. BURIED CONDUITS SHALL BE PVC SCH 40, SIZED AS INDICATED. EXPOSED EXTERIOR CONDUITS SHALL BE GALVANIZED RIGID STEEL. INTERIOR CONDUITS IN DRY AREAS SHALL BE ELECTRICAL METALIC TUBING "EMT" TYPE. EMT CONDUIT FITTINGS SHALL BE COMPRESSION TYPE. INSTALL RUNS OF CONDUIT PARALLEL OR PERPENDICULAR TO WALLS, STRUCTURAL MEMBERS, OR INTERSECTIONS OF VERTICAL PLANES.
9. PROVIDE PULL AND JUNCTION BOXES WHERE REQUIRED FOR CHANGES IN DIRECTION, AT JUNCTION POINTS, AND TO FACILITATE WIRE PULLING.
10. WIRING DEVICE AND JUNCTION BOXES SHALL BE METALLIC AND SIZED IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
11. WIRING DEVICES SHALL BE ROUGH SERVICE SPECIFICATIONS GRADE, 20 AMP RATED.
12. SEAL ALL WALL PENETRATIONS WITH SILICONE CAULKING DESIGNED FOR THE APPLICATION.
13. SAFETY SWITCHES OR DISCONNECTS SHALL BE HEAVY DUTY METAL ENCLOSED, WITH QUICK MAKE, QUICK-BREAK MECHANISM AND EXTERNAL PADLOCKABLE OPERATING HANDLE. ENCLOSURES SHALL BE NEMA 1 INDOORS AND NEMA 3R EXTERIOR.
14. STARTERS SHALL BE COMBINATION TYPE WITH FUSES, OVERLOADS, CONTROL POWER TRANSFORMER SIZED FOR THE LOAD INDICATED, PHASE LOSS PROTECTION AND WITH CONTROL AND INDICATING DEVICES AS INDICATED IN THE PUMP CONTROL DIAGRAMS. MANUFACTURER OF STARTERS SHALL BE SQUARE - D, CUTLER HAMMER OR GENERAL ELECTRIC. ENCLOSURES SHALL BE NEMA TYPE 12 FOR INTERIOR LOCATIONS AND NEMA TYPE 4 FOR EXTERIOR LOCATIONS. THE MINIMUM NEMA SIZE STARTER SHALL BE NEMA SIZE 1. PROVIDE SUBMITTALS FOR PUMP STARTERS AND PUMP CONTROLLERS. PROVIDE WEATHER PROOF HORN AND FLASHING RED ALARM LIGHT FOR EXTERIOR INSTALLATIONS.
15. PANELBOARDS SHALL BE ENCLOSED DEAD-FRONT WITH FEATURES AND RATINGS AS SCHEDULED. CIRCUIT BREAKERS SHALL BE BOLT-ON TYPE COMMERCIAL GRADE. PANELS KNOWN AS LOAD CENTERS WILL NOT BE ACCEPTED. BUS BARS SHALL BE COPPER. PROVIDE TYPED DIRECTORY CARDS.
16. PROVIDE GROUND CONDUCTORS IN ALL CONDUITS AND RACEWAYS. CONNECT TO ALL METAL ENCLOSURES IN ACCORDANCE WITH THE NATIONAL ELECTRICAL CODE.
17. PROVIDE CT CABINET, METERING CONDUIT, AND SERVICE ENTRANCE CONDUITS AS REQUIRED BY THE POWER COMPANY FOR THE ELECTRICAL SERVICES.

NOTES:

1. COORDINATE ELECTRICAL SERVICE WITH THE POWER COMPANY. SERVICE TO BUILDING SHALL BE RUN UNDERGROUND.
2. COORDINATE LOCATION OF ALL EXISTING AND PROPOSED UNDERGROUND UTILITIES BEFORE INSTALLING NEW UNDERGROUND ELECTRICAL WORK.
3. BRANCH CIRCUITRY FOR RECEPTACLES HAS NOT BEEN SHOWN. PROVIDE CIRCUIT CONDUCTORS AND CONDUIT AS INDICATED IN THE PANEL SCHEDULES. CONDUITS SHALL BE RUN EXPOSED OR UNDERGROUND AS INDICATED. ALL RECEPTACLES SHALL BE FLUSH MOUNTED.
4. ALL RECEPTACLES IN WATERWORKS BUILDING SHALL BE INSTALLED AT 48" AFF UNLESS OTHERWISE INDICATED.
5. NO CONDUIT OR JUNCTION BOXES SHALL BE INSTALLED EXPOSED ON THE EXTERIOR OF THE BUILDING.
6. ALL CONDUIT STRAPS SHALL BE NON-CORROSIVE, CAST METAL WITH STAINLESS STEEL HARDWARE.
7. POWER AND CONTROL/INSTRUMENTATION CABLES SHALL NOT BE INSTALLED WITHIN THE SAME CONDUIT.
8. PENN BREEZWAY FAN PACK, 3530 CFM AT .125" STATIC PRESSURE, 1/4 HP, 230 V, SINGLE PHASE. FAN PACK SHALL INCLUDE MODEL P18Q FAN, GALVANIZED STEEL WALL SLEEVE, REAR FAN GUARD AND COMBINATION LOUVER/SHUTTER, OR APPROVED EQUAL. INSTALL BOTTOM OF UNIT AT 8'-0" AFF.
9. UNIT HEATER SHALL BE Q-MARK MODEL MUH-05, 5.0 KW, 240 VOLT, SINGLE PHASE, 650 CFM, OR APPROVED EQUAL WITH BUILT-IN T-STAT AND WALL MOUNTING BRACKET. INSTALL BOTTOM OF UNIT AT 8'-0" AFF.
10. TIMERS SHALL BE 24 HOUR WITH 2 NORMALLY OPEN AND 2 NORMALLY CLOSED SETS OF CONTACTS. TIMERS SHALL BE POWERED FROM 120 VOLTS CIRCUITS INDICATED.

PARTIAL SITE PLAN - WELL #3
NOT TO SCALE

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THE RETREAT WATER SYSTEM

UNION HALL DISTRICT FRANKLIN CO., VA.

ELECTRICAL

WATERWORKS BLDG POWER & LIGHTING PLAN

ELECTRICAL SERVICE ONE LINE DIAGRAM

SPECIFICATIONS, NOTES, LEGEND & ABBREV

DATE: 3-11-03

TECHNICIAN: WAYNE

CHECKED BY: WOB

REVISIONS

NO.	DATE
1	2-26-03

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PROJ. NO. 020097 DIV.

SHEET NO. 15 OF 16

DRAWING NO. E-1

SURVEY DATUM USED:

FIELDBOOK IDENTIFICATION:

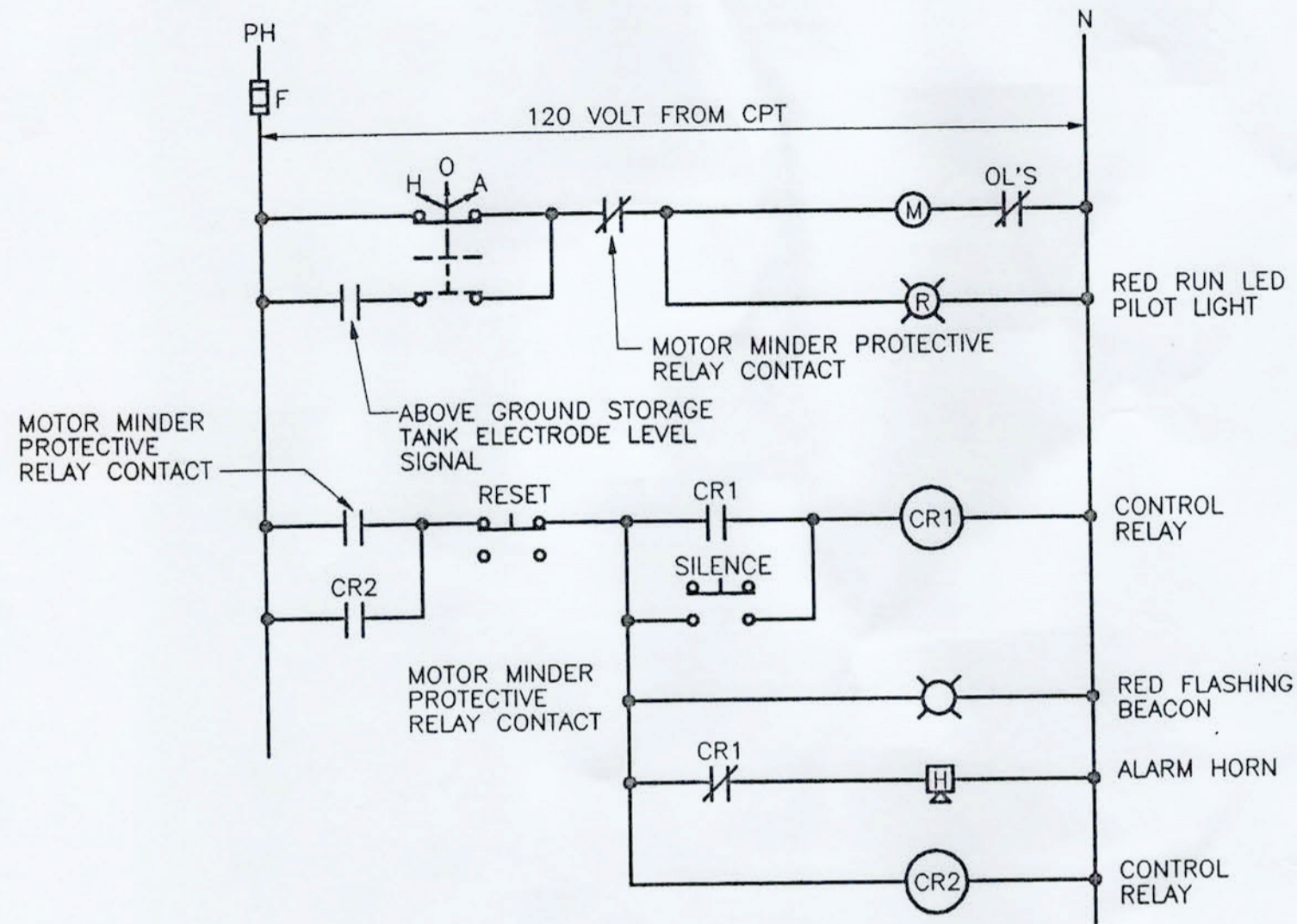
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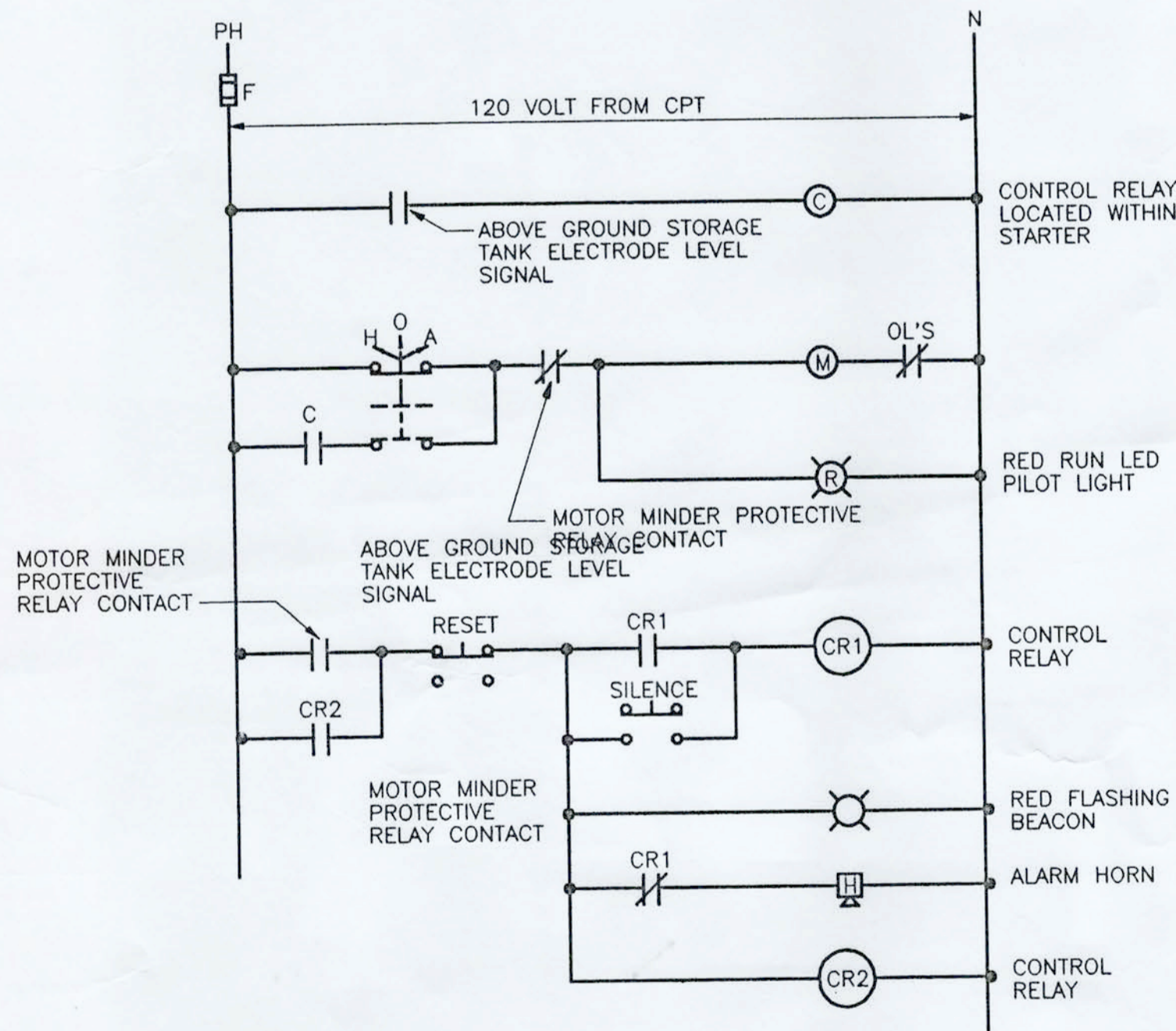
SERVICE ENTRANCE PANEL "L" SCHEDULE											
120/240 VOLTS, 1 PHASE, 3 WIRES, SOLID NEUTRAL, GROUND BAR; 150 AMP MAIN BREAKER, 200 AMP BUS PANELBOARD MINIMUM SHORT CIRCUIT RATING 10,000 SYM RMS AMPS											
CKT. NO.	POLE NO.	DESCRIPTION	CONN. KVA	CONN. AMPS		BREAKER			NUMBER & WIRE SIZE		
				A	B	P	AF	AT	PHASE	NEUT.	EGC
1	1	WELL PUMP #1 - 1.5HP	2.3	10.0	10.0	2	100	30	8	-	10
5	5	SPARE				2	100	30			
9	9	UNIT HEATER	5.0	20.8	20.8	2	100	30	10	-	10
13	13	EXHAUST FAN	0.7	5.8		1	100	20	12	12	12
15	15	PACKAGED HEAT PUMP AIR CONDITIONING UNIT	2.4	10.5		2	100	15	12	-	12
19	19	MOTOR MINDER CONTROL CKT				1	100	20	12	12	12
21	21	SPARE				2	100	20			
25	25	SPACE AND BUS				1	100				
27	27	SPACE AND BUS				1	100				
29	29	SPACE AND BUS				1	100				
31	31	SPACE AND BUS				1	100				
33	33	SPACE AND BUS				1	100				
35	35	SPACE AND BUS				1	100				
37	37	SPACE AND BUS				1	100				
39	39	SPACE AND BUS				1	100				
41	41	SPACE AND BUS				1	100				
2	2	LAB TABLE RECEPTACLE				1	100	20	12	12	12
4	4	LAB TABLE RECEPTACLE				1	100	20	12	12	12
6	6	RECEPTACLES				1	100	20	12	12	12
8	8	RECEPTACLES				1	100	20	12	12	12
10	10	RECEPTACLE, CHEMICAL FEED PUMPS				1	100	20	12	12	12
12	12	RECEPTACLE, CHEMICAL FEED PUMPS				1	100	20	12	12	12
14	14	LIGHTING				1	100	20			
16	16	SPARE				1	100	20			
18	18	SPARE				1	100	20			
20	20	SPARE				1	100	20			
22	22	SPARE				1	100	20			
24	24	SPARE				1	100	20			
26	26	SPARE				1	100	20			
28	28	SPACE AND BUS				1	100				
30	30	SPACE AND BUS				1	100				
32	32	SPACE AND BUS				1	100				
34	34	SPACE AND BUS				1	100				
36	36	SPACE AND BUS				1	100				
38	38	SPACE AND BUS				1	100				
40	40	SPACE AND BUS				1	100				
42	42	SPACE AND BUS				1	100				

NEMA 3R SERVICE ENTRANCE PANEL "P" SCHEDULE											
120/240 VOLTS, 1 PHASE, 3 WIRES, SOLID NEUTRAL, GROUND BAR; 100 AMP MAIN BREAKER, 100 AMP BUS PANELBOARD MINIMUM SHORT CIRCUIT RATING 10,000 SYM RMS AMPS											
CKT. NO.	POLE NO.	DESCRIPTION	CONN. KVA	CONN. AMPS		BREAKER			NUMBER & WIRE SIZE		
				A	B	P	AF	AT	PHASE	NEUT.	EGC
1	1	WELL PUMP #3	6.4	28.0	28.0	2	100	50	4	-	10
5	5	SPACE & BUS ONLY				1	100				
7	7	SPACE & BUS ONLY				1	100				
9	9	SPACE & BUS ONLY				1	100				
11	11	SPACE & BUS ONLY				1	100				
13	13	SPACE & BUS ONLY				1	100				
15	15	SPACE & BUS ONLY				1	100				
17	17	SPACE & BUS ONLY				1	100				
19	19	SPACE & BUS ONLY				1	100				
21	21										
2	2	RECEPTACLE				1	100	20	12	12	12
4	4	MOTOR MINDER CONTROL CKT				1	100	20	12	12	12
6	6	SPARE				1	100	20			
8	8	SPARE				1	100	20			
10	10	SPARE				1	100	20			
12	12	SPARE				1	100	20			
14	14	SPACE & BUS ONLY				1	100				
16	16	SPACE & BUS ONLY				1	100				
18	18	SPACE & BUS ONLY				1	100				
20	20	SPACE & BUS ONLY				1	100				

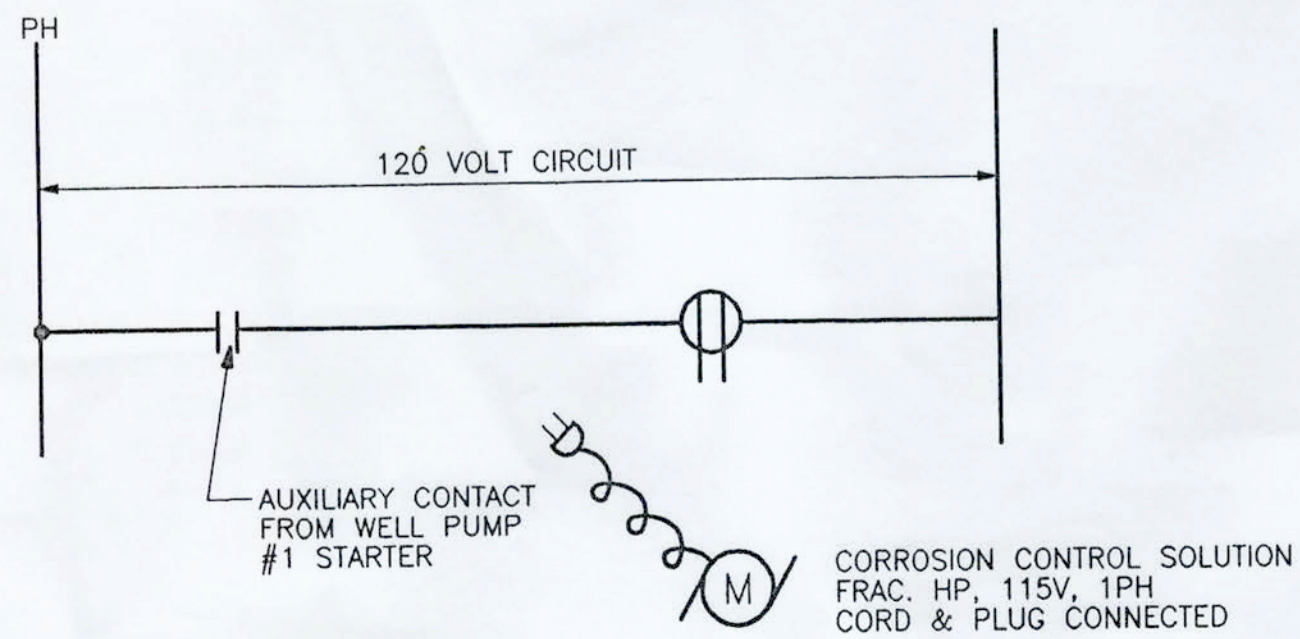
LIGHTING FIXTURE SCHEDULE						
TYPE	MANUFACTURER	CATALOG NUMBER	FIXTURE VOLTAGE	NUMBER	LAMPS TYPE	MOUNTING
A	LITHONIA	EJ-2-40-120-CW	120	2	40W-T12	SURFACE
B	LITHONIA	TWL-70S-120-DBL-PE	120	1	70W HPS	WALL



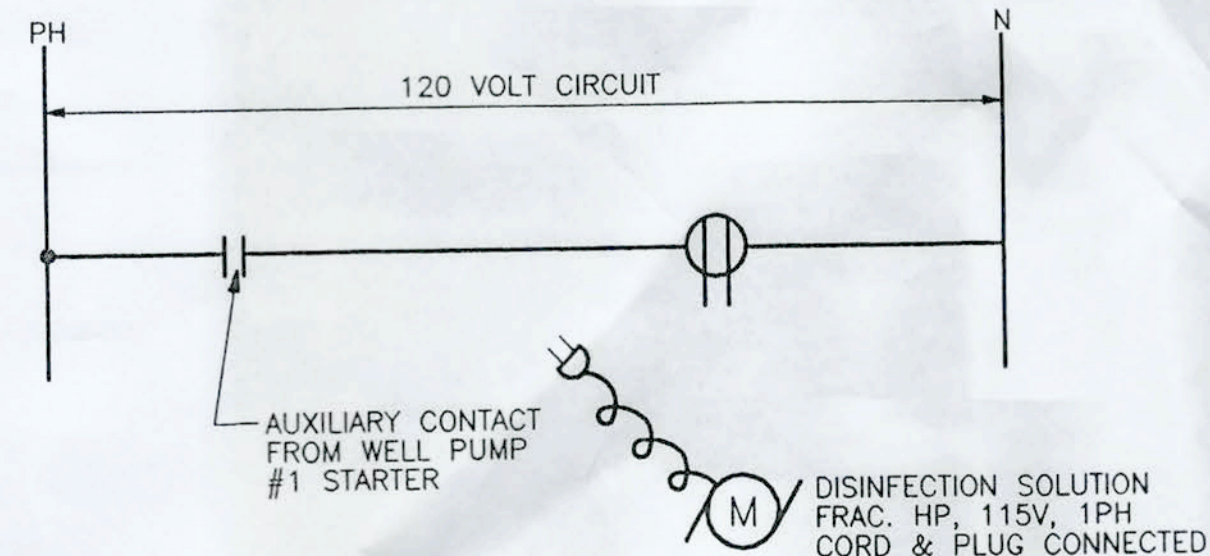
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NO SCALE



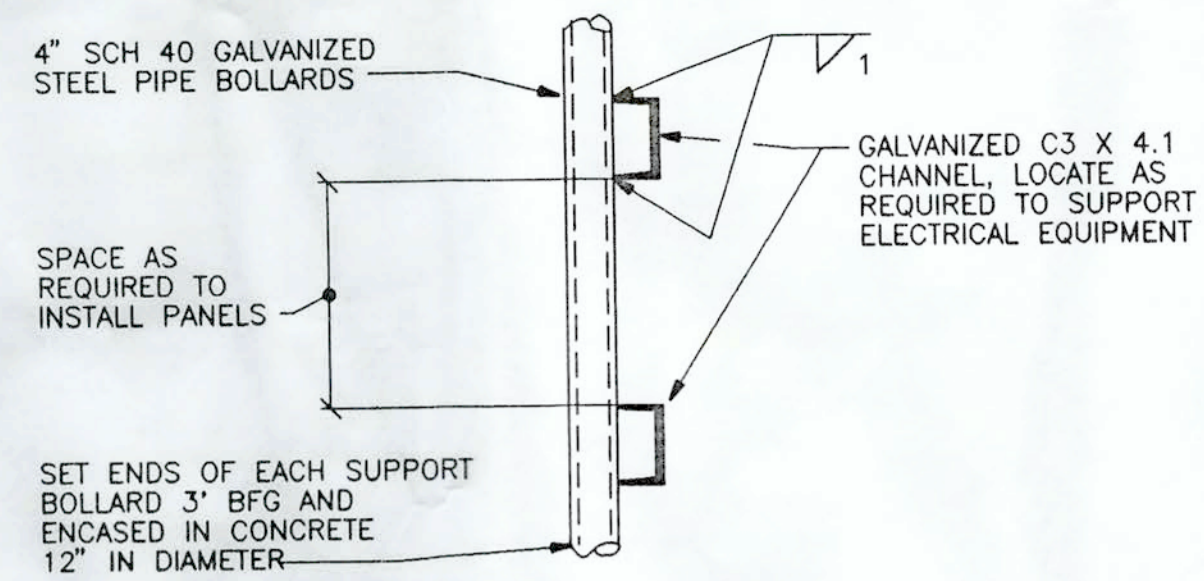
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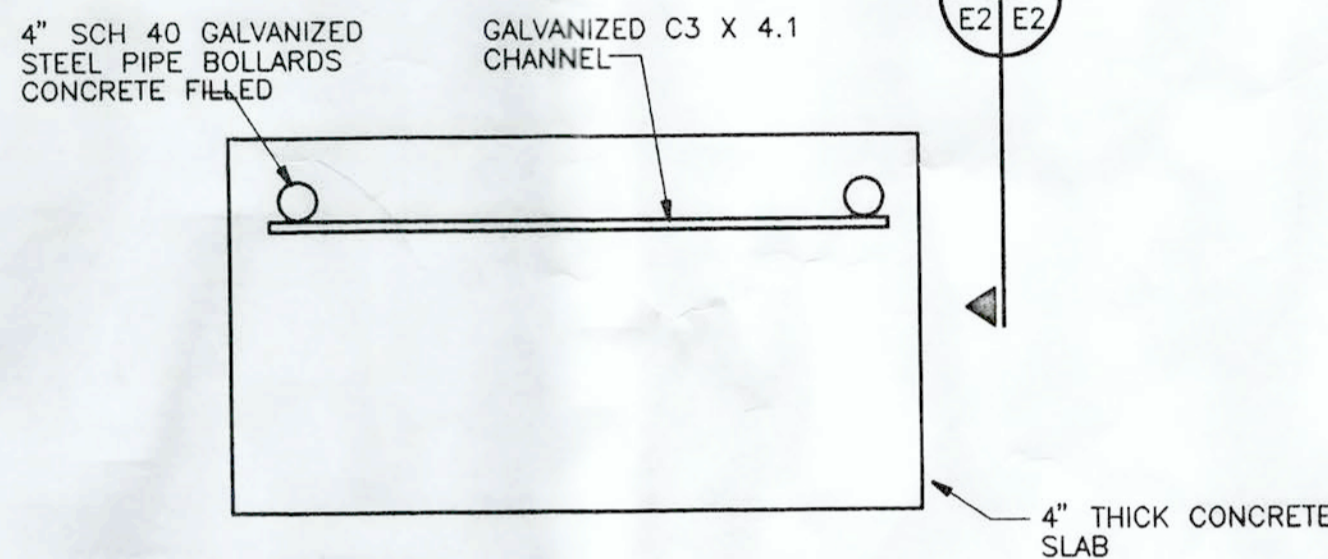
CHEMICAL FEED PUMP CONTROL DIAGRAM
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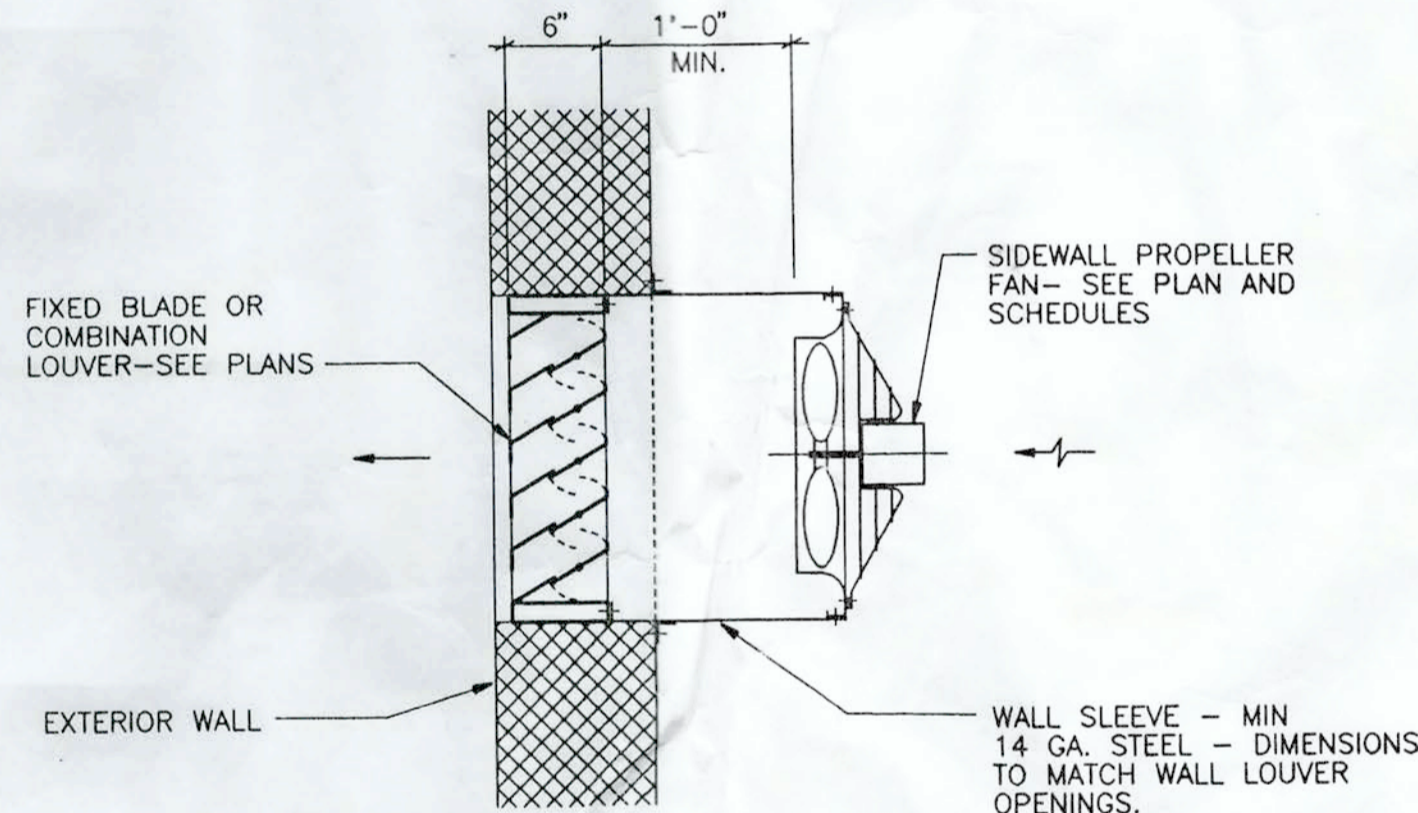
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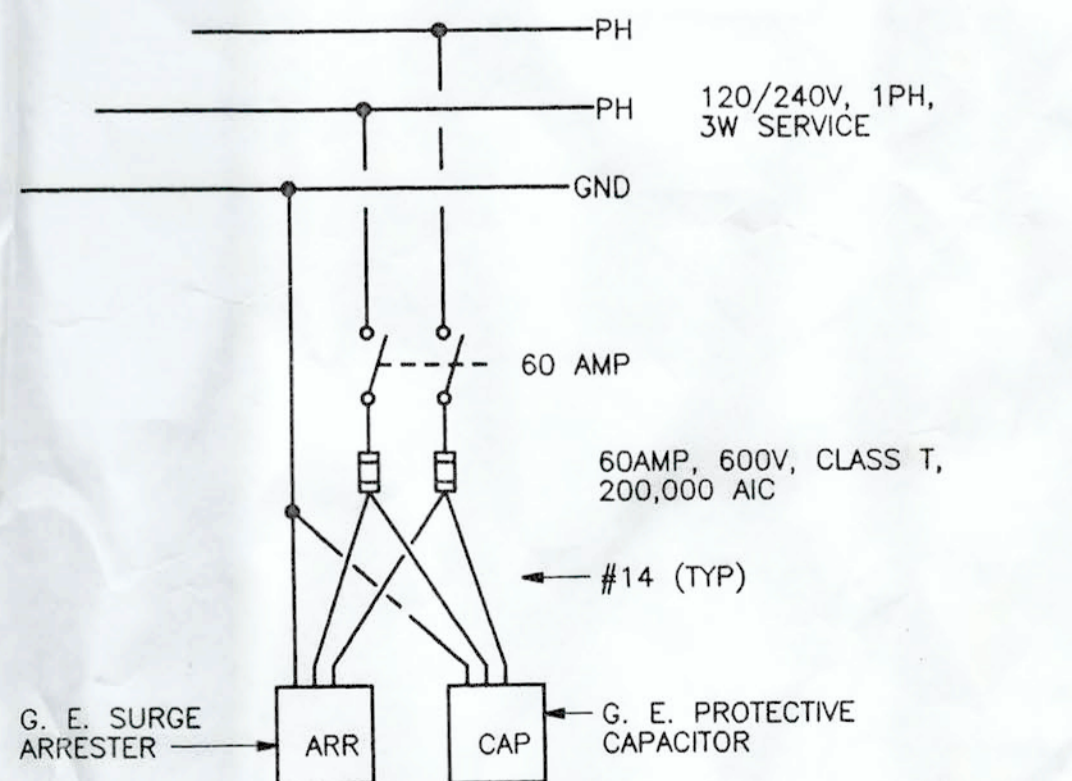
SECTION A-E2 E2
NOT TO SCALE



WELL #3 ELECTRICAL SERVICE RACK DETAIL
NOT TO SCALE

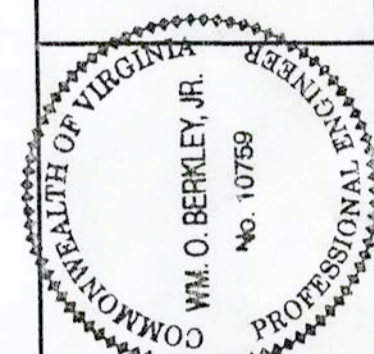


DETAIL - SIDEWALL PROPELLER FAN
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DETAIL SURGE ARRESTER & PROTECTIVE CAPACITOR CONNECTIONS
NO SCALE

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THE RETREAT
WATER SYSTEM
UNION HALL DISTRICT FRANKLIN CO., VA.

ELECTRICAL
LIGHTING FIXTURE & PANEL SCHEDULES
CONTROL DIAGRAMS & DETAILS

DATE: 3-11-03

TECHNICIAN: WAYNE

CHECKED BY: WOB

REVISIONS

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SHEET NO. 16 OF 16

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RETWATER02.DGN