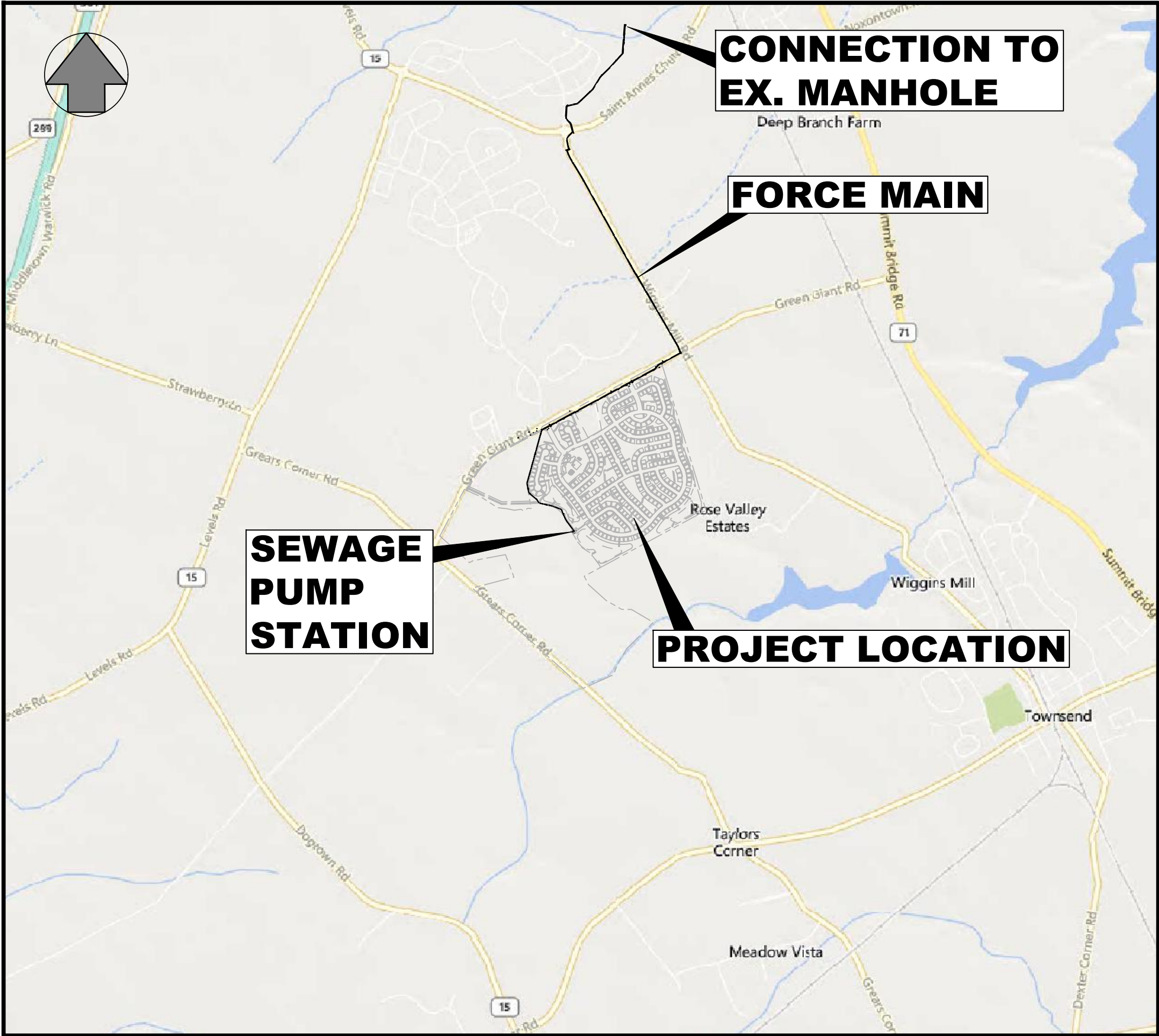


GENERAL NOTES

- THE CONTRACTOR SHALL PROVIDE SEDIMENT CONTROL MEASURES TO PROTECT STOCKPILE AREAS AND STORAGE AREAS. ALL AREAS USED BY THE CONTRACTOR FOR STAGING OPERATIONS SHALL BE FULLY RESTORED BY THE CONTRACTOR UPON COMPLETION OF THE PROJECT. IF THE STAGING AREA IS PAVED, IT SHALL BE RESTORED TO ITS ORIGINAL CONDITION. IF THE STAGING AREA IS UNPAVED, IT SHALL BE RE-GRADED, TOPSOILED, SEEDDED AND MULCHED TO THE SATISFACTION OF THE ENGINEER. ALL COSTS ASSOCIATED WITH RESTORATION OF THE STAGING AREA SHALL BE AT THE CONTRACTOR'S EXPENSE. IF THE ENGINEER DETERMINES THAT A SATISFACTORY STAND OF GRASS DOES NOT EXIST AT THE TIME OF FINAL INSPECTION, ALL COSTS ASSOCIATED WITH RE-ESTABLISHING A SATISFACTORY STAND OF GRASS SHALL BE AT THE CONTRACTOR'S EXPENSE.
- EQUIPMENT AND/OR STOCKPILE MATERIAL SHALL NOT BE STORED IN THE DRIPLINE AREA OF ANY TREE.
- THE CONTRACTOR SHALL CONTACT TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT AT LEAST 14 DAYS IN ADVANCE OF STARTING CONSTRUCTION.
- THE CONTRACTOR SHALL CONTACT MISS UTILITY OF DELMARVA AT 1-800-282-8855 FOR UTILITY LOCATIONS WITHIN AND SURROUNDING CONSTRUCTION AREAS NOT LESS THAN 3 DAYS BEFORE PERFORMING ANY EXCAVATION.
- THE CONTRACTOR SHALL ESTABLISH BENCHMARK ELEVATION DATUM IN ACCORDANCE WITH TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT.
- THE CONTRACTOR SHALL PROVIDE TEMPORARY SEED AND MULCH FOR ALL AREAS WHERE SOIL IS EXPOSED AND SILT FENCE IS NOT SPECIFIED, BY THE CLOSE OF EACH BUSINESS DAY.
- THE CONTRACTOR SHALL MAINTAIN PUBLIC ROADS AND STREETS IN A BROOM SWEPT CONDITION AT ALL TIMES.
- PIPE JOINTS TO BE RESTRAINED ARE SHOWN ON THE DRAWINGS.
- THE CONTRACTOR SHALL USE ONLY NEW MATERIALS, PARTS, AND PRODUCTS, ALL MATERIALS SHALL BE STORED SO AS TO ASSURE THE PRESERVATION OF THEIR QUALITY AND FITNESS FOR THE INTENDED WORK.
- MAINTENANCE OF TRAFFIC - ALL WORK SHALL BE PERFORMED IN A MANNER THAT WILL ENSURE THE LEAST PRACTICABLE OBSTRUCTION TO TRAFFIC CONSISTENT WITH SAFETY AND SHALL COMPLY WITH THE DEPARTMENT MANUAL ENTITLED "TRAFFIC CONTROLS FOR STREETS AND HIGHWAY CONSTRUCTION, MAINTENANCE, UTILITY AND EMERGENCY OPERATIONS". THE MOST CURRENT VERSION OF THIS MANUAL IN EFFECT AT THE TIME OF CONSTRUCTION SHALL BE USED. HEREINAFTER, THIS MANUAL SHALL BE REFERRED TO AS THE "TRAFFIC CONTROL MANUAL". THE CONTRACTOR SHALL SUBMIT A TRAFFIC CONTROL PLAN FOR APPROVAL BY THE ENGINEER BEFORE THE START OF THE PROJECT.
- ALL UTILITIES PLOTTED ON THE DRAWINGS ARE FROM THE BEST AVAILABLE INFORMATION. THE CONTRACTOR, PRIOR TO LAYING A RUN OF PIPE OR OTHER INVOLVED CONSTRUCTION, SHALL EXCAVATE WITHIN THE ALIGNMENT AT POINTS OF POSSIBLE CONFLICT TO DETERMINE IF A CONFLICT EXISTS. ANY CONFLICTS SHALL BE COORDINATED BY THE CONTRACTOR WITH THE ENGINEER AND THE UTILITY INVOLVED. THE ENGINEER SHALL DETERMINE THE SOLUTION. EXCAVATING BACKFILLING AND RESTORATION OF THE TEST HOLES AS REQUIRED FOR UTILITY INVESTIGATIONS SHALL BE CONSIDERED INCIDENTAL TO THE INSTALLATION OF THE UTILITIES AS SHOWN ON THE PLANS.
- CONTRACTOR SHALL OBTAIN ALL THE NECESSARY PERMITS FOR THE EXECUTION OF THIS CONTRACT.
- ALL CONSTRUCTION SHALL BE PERFORMED TO THE SATISFACTION OF THE ENGINEER. TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT OF DELAWARE DEPARTMENT OF TRANSPORTATION (DELDOT) AND ALL RESPECTIVE UTILITY OWNERS IN ACCORDANCE WITH ALL APPLICABLE CONTRACT DRAWINGS AND SPECIFICATIONS.
- THE CONTRACTOR SHALL COMPLY WITH ALL APPLICABLE LAWS, ORDINANCES, RULES, REGULATIONS AND ORDERS OF ANY PUBLIC BODY HAVING JURISDICTION. THE CONTRACTOR SHALL ERECT AND MAINTAIN AS REQUIRED BY THE CONDITIONS AND PROGRESS OF THE WORK, ALL NECESSARY SAFEGUARDS FOR SAFETY AND PROTECTION.
- CONTRACTOR TO DEFLECT WATER MAINS WITH VERTICAL BENDS OR VERTICAL DEFLECTION AS NEEDED TO ACHIEVE APPROPRIATE SEPARATION FROM OTHER UTILITIES AS PER WATER CROSSING CHARTS.
- WATER SUPPLY BY TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT. ALL WORK AND MATERIALS SHALL BE IN ACCORDANCE WITH TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT STANDARDS AND SPECIFICATIONS. ALL WATER MAINS SHALL BE LOCATED AT LEAST 10 FEET HORIZONTAL FROM SANITARY SEWER AND SHALL HAVE A MINIMUM VERTICAL SEPARATION OF 18 INCHES.
- THE ENTIRE WATER DISTRIBUTION SYSTEM MUST BE IN COMPLIANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE DELAWARE STATE DEPARTMENT OF NATURAL RESOURCES AND ENVIRONMENTAL CONTROL AND THE DELAWARE STATE DIVISION OF PUBLIC HEALTH.
- FIXTURE LOCATIONS SHALL BE IN ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT.
- EXISTING UTILITIES ARE SHOWN IN ACCORDANCE WITH THE BEST AVAILABLE INFORMATION. IT SHALL BE THE CONTRACTOR'S RESPONSIBILITY TO VERIFY AND ALLOW FOR UTILITY LOCATION.
- THE CONTRACTOR SHALL TAKE ALL NECESSARY PRECAUTIONS TO PROTECT ALL EXISTING UTILITIES AND MAINTAIN UNINTERRUPTED SERVICE. ANY DAMAGE DONE TO EXISTING UTILITIES DUE TO HIS/HER NEGLIGENCE SHALL BE IMMEDIATELY REPAIRED AT HIS/HER EXPENSE.
- PLAN LOCATIONS AND DIMENSIONS SHALL BE STRICTLY ADHERED TO UNLESS OTHERWISE SPECIFIED BY THE ENGINEER. THE CONTRACTOR SHALL ADJUST WATERLINE LOCATIONS AS REQUIRED TO AVOID CONFLICTS WITH OTHER UTILITIES.
- THE CONTRACTOR SHALL BE RESPONSIBLE FOR REPLACEMENT OF DAMAGED OR DESTROYED LANDSCAPE.
- THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE PERFORMED IN COMPLIANCE WITH THE OCCUPATION SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THEREO APPURTENANT.
- DISINFECTION REQUIREMENTS SHALL MEET THE STANDARDS AND SPECIFICATIONS OF THE STATE ENVIRONMENTAL PROTECTION AGENCY OR EQUIVALENT TO THE AMERICAN WATER WORKS ASSOCIATION STANDARD C60-08.
- ALL WATER PIPES SHALL HAVE A MINIMUM COVER OF 3.5 FEET.
- THE CONTRACTOR SHALL PROVIDE PRESSURE REDUCING VALVES IN UNITS, IF NECESSARY.
- THE CONTRACTOR SHALL PROVIDE BUTTRESSES FOR ALL HORIZONTAL AND VERTICAL BENDS AS REQUIRED PER STANDARDS AND SPECIFICATIONS OF THE TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT.
- EROSION CONTROL FOR WORK RELATED TO THE INSTALLATION OF WATERLINE IS THE RESPONSIBILITY OF THE CONTRACTOR AND SHALL BE PERFORMED IN ACCORDANCE WITH THE DELAWARE EROSION AND SEDIMENT CONTROL HANDBOOK OF 1994.
- THE CONTRACTOR SHALL INSTALL AIR RELEASE VALVES AS SPECIFIED IN FIELD.
- THE CONTRACTOR SHALL SUBMIT SHOP DRAWINGS FOR ALL MATERIALS FOR APPROVAL TO THE OWNER PRIOR TO COMMENCEMENT OF CONSTRUCTION. ALL MATERIALS ORDERED AND INSTALLED PRIOR TO THE OWNER'S REVIEW AND ACCEPTANCE WILL BE AT THE CONTRACTOR'S RISK.
- THE CONTRACTOR SHALL OPEN ONLY THAT SECTION OF TRENCH OR ACCESS PITS WHICH CAN BE BACKFILLED AND STABILIZED AT THE END OF EACH WORKING DAY. STEEL PLATES SHALL BE USED ON ANY TRENCH OR ACCESS PITS WHICH MUST REMAIN OPEN OVERNIGHT. THIS REQUIREMENT DOES NOT APPLY TO AREAS COMPLETELY CLOSED AND SECURE FROM VEHICULAR OR PEDESTRIAN TRAFFIC.
- ALL PVC SANITARY SEWER SHALL BE MARKED WITH LOCATOR TAPE, LABELED "SANITARY SEWER", INSTALLED 12" BELOW FINISH GRADE.
- FINAL APPROVED SET OF PLANS AND SPECIFICATIONS SHALL BE MAINTAINED ON THE JOB SITE. FAILURE TO COMPLY WITH THIS PROVISION SHALL BE CONSIDERED CAUSE TO STOP THE WORK.
- THE CONTRACTOR SHALL MAINTAIN ONE COMPLETE SET OF CONTRACT DRAWINGS ON WHICH HE SHALL NOTE IN RED THE ALIGNMENTS AND INVERTS OF ALL UNDERGROUND UTILITIES INSTALLED OR ENCOUNTERED DURING THE PROSECUTION OF THE WORK. ALL DISCREPANCIES BETWEEN THE PLAN LOCATIONS AND ELEVATIONS OF BOTH THE EXISTING AND PROPOSED UTILITIES SHALL BE SHOWN ON THE AS-BUILT DRAWINGS TO BE MAINTAINED BY THE CONTRACTOR IN THE FIELD.
- ALL SANITARY SEWERS AND MANHOLES SHALL BE TESTED IN ACCORDANCE WITH THE CONTRACT SPECIFICATIONS. IN ADDITION ALL MANHOLES SHALL BE VACUUM TESTED IN ACCORDANCE WITH THE ACCEPTANCE TESTING IN MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS OF ROADS, OPEN SPACES AND UTILITIES".
- CONTRACTOR SHALL PROVIDE ALL MATERIAL AND EQUIPMENT NECESSARY FOR TESTING. IF TESTING FAILS, CONTRACTOR SHALL SEAL ALL LEAKS AND RE-TEST UNTIL ACCEPTABLE. THAT THIS TESTING SHALL BE PERFORMED BEFORE BACKFILLING SO THAT ANY LEAKS CAN BE FOUND AND FIXED EXTERNALLY. THE MANHOLE FRAME AND ADJUSTING RINGS SHALL BE IN PLACE WHEN TESTING.
- ROUTINE PERIODIC INSPECTIONS DURING CONSTRUCTION WILL BE PROVIDED BY THE OWNER. THESE INSPECTIONS DO NOT RELIEVE THE CONTRACTOR FROM HIS OBLIGATION AND RESPONSIBILITY FOR CONSTRUCTING A SANITARY SEWER SYSTEM IN STRICT ACCORDANCE WITH THE STANDARDS AND SPECIFICATIONS OF THE OWNER.
- AFTER TESTING IS COMPLETE AND ALL COMPONENTS OF THE SANITARY SEWER SYSTEM ARE DEEMED ACCEPTABLE TO TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT, THE CONTRACTOR SHALL SUBMIT THE AS-BUILT DRAWINGS TO TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT. ANY DISCREPANCIES NOTED DURING THE FINAL INSPECTION SHALL BE CORRECTED BY THE CONTRACTOR WITHIN 30 DAYS.
- THE PROPERTY AND RIGHT OF WAY LINES SHOWN ON THESE DRAWINGS ARE APPROXIMATE, AND ARE NOT BASED ON METES AND BOUNDS FIELD RUN SURVEYS OR PROPERTY RECORDS.
- THE CONTRACTOR SHALL TAKE PRECAUTIONS TO LOCATE PROPERTY LINES AND RIGHT OF WAY LINES PRIOR TO CONSTRUCTION AND AVOID CONSTRUCTION ACTIVITIES ON PRIVATE PROPERTY. ANY/OTHER RIGHTS OF WAY/OTHER SAID CONSTRUCTION IS PROHIBITED. THE CONTRACTOR MAY CONDUCT CONSTRUCTION ACTIVITIES ON PRIVATE PROPERTY PROVIDED HE HAS OBTAINED PRIOR WRITTEN PERMISSION FROM THE PROPERTY OWNER AND HAS SUBMITTED A COPY OF SAID WRITTEN PERMISSION TO TOWN OF MIDDLETOWN WATER/MASTEWATER DEPARTMENT.
- ANY REQUIRED EASEMENTS, PERMITS AND APPROVALS SHALL BE ACQUIRED BY THE CONTRACTOR PRIOR TO COMMENCEMENT OF SANITARY SEWER CONSTRUCTION.
- PIPE MATERIAL, GRAVITY SEWER MAIN LESS THAN OR EQUAL TO 15 FEET DEEP SHALL BE PVC SDR 26 OR DIP, GREATER THAN 15 FEET SHALL TO BE DIP (CONCRETE LINED WITH CERAMIC COATING). A MINIMUM "C" FACTOR OF 150 SHALL BE USED FOR THE DESIGN OF SANITARY SEWER.

- ALL GRAVITY SEWER MAINS SHALL HAVE MINIMUM COVER OF 48 INCHES.
- MANHOLES SHALL BE OF THE PRECAST CONCRETE OR POURED-IN-PLACE CONCRETE TYPE. MANHOLES SHALL BE WATERPROOFED ON THE EXTERIOR WITH A BITUMINOUS COATING. JOINTS BETWEEN MANHOLE SECTIONS TO BE WRAPPED WITH EZ-WRAP PAK BUTYL JOINT WRAP. INLET AND OUTLET PIPES SHALL BE JOINED TO THE MANHOLE WITH A GASKETTED FLEXIBLE WATER-TIGHT CONNECTION OR ANY WATER-TIGHT CONNECTION ARRANGEMENT THAT ALLOWS DIFFERENTIAL SETTLEMENT OF THE PIPE AND MANHOLE WALL TO TAKE PLACE. CONNECTIONS TO EXISTING MANHOLES SHALL BE MADE UTILIZING A HOLE SAW AND A TYCITE ADAPTER WITH A-LOK GASKETS OR LINK SEALS. THE INTERIOR JOINT SHALL BE SEALED WITH NON-SHRINK HYDRAULIC GROUT.
- CLEARANCES BETWEEN SEWERS AND OTHER UTILITIES, BOTH EXISTING AND PROPOSED, SHOULD BE DESIGNED AS FOLLOWS:  
  
SEWERS CROSSING WATER MAINS, SEWERS SHALL HAVE A MINIMUM VERTICAL CLEARANCE OF 18 INCHES MEASURED FROM THE OUTSIDE OF THE WATER MAIN TO THE OUTSIDE OF THE SEWER. THIS SHALL BE THE CASE WHETHER THE WATER MAIN IS ABOVE OR BELOW THE SEWER. WHERE POSSIBLE, THE SEWER SHALL BE BENEATH THE WATER MAIN. THE CROSSING SHALL BE ARRANGED SO THAT THE SEWER JOINTS SHALL BE EQUIDISTANT AND AS FAR AS POSSIBLE FROM THE WATER MAIN JOINTS, WHERE A WATER MAIN CROSSES UNDER A SEWER, ADEQUATE STRUCTURAL SUPPORT SHALL BE PROVIDED.  
  
SEWER PARALLEL TO WATER MAIN, SEWERS SHALL BE KEPT AT LEAST 10 FEET HORIZONTALLY FROM ANY WATER MAIN AS MEASURED FROM THE OUTSIDE OF THE WATER MAIN TO THE OUTSIDE OF THE SEWER.  
  
IF SEWER AND WATER MAIN CANNOT BE BUILT TO SPECIFIED CLEARANCES, STEEL ENCASEMENT SHALL BE USED. AT A JOINT THERE SHOULD BE 5 FEET OF ENCASING ON EITHER SIDE OF THE JOINT AND AT A CROSSING THERE SHALL BE 10 FEET ON EITHER SIDE OF THE CROSSING.  
  
CROSSING OTHER UTILITIES, SEWERS SHALL HAVE A MINIMUM OF 18-INCH CLEARANCE FROM ELECTRIC LINES, GAS MAINS, ETC.  
  
WHERE STORM WATER CROSSES OVER THE GRAVITY SEWER SYSTEM AND THERE IS MORE THAN 3-FEET OF SEPARATION NO SPECIAL CONSTRUCTION IS REQUIRED.  
  
WHERE STORM WATER CROSSES OVER THE GRAVITY SEWER SYSTEM AND THERE IS BETWEEN 6-INCHES AND 3-FEET OF SEPARATION THE GRAVITY SEWER PIPE MUST EITHER: BE CONSTRUCTED OF DUCTILE IRON PIPE BE CONSTRUCTED OF 30K-26 PVC AND STEEL ENCAGED (10 FOOT MINIMUM ON EACH SIDE OF THE CROSSING). ALL CASINGS SHALL BE SEALED TO PREVENT ENTRY OF SOIL OR OTHER FOREIGN MATERIAL.
- BENCHMARKS:  
BM#1: 512474.910 NORTH 567562.5440 EAST ELEV. 61.61 REBAR 4 CAP  
BM#2: 51435.7100 NORTH 51070575100 EAST ELEV. 59.12 REBAR 4 CAP  
HORIZONTAL DATUM: DELAWARE COORDINATE SYSTEM 83  
VERTICAL DATUM: N.A.V.D. 88



LOCATION MAP

SCALE: 1" = 2,000'

NOTE

ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS".

- INTERRUPTION OF EXISTING UTILITIES SHALL BE IN ACCORDANCE WITH THE SPECIFICATIONS AND/OR AT THE DIRECTION OF THE UTILITY OWNERS.

DRAWING INDEX

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SHEET 16-18	SPS STANDARD DETAILS
SHEET 19	SPS SITE PLAN & DESIGN CRITERIA
SHEET 20	SPS BUILDING & WET WELL PLAN
SHEET 21	SPS BUILDING & WET WELL SECTION VIEWS
SHEET 22-27	SPS STRUCTURAL PLANS & DETAILS
SHEET 28-32	SPS ELECTRICAL PLAN & DETAILS



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WORKING DAYS NOTICE  
THIS DRAWING DOES NOT INCLUDE NECESSARY COMPONENTS FOR CONSTRUCTION SAFETY. ALL CONSTRUCTION MUST BE DONE IN COMPLIANCE WITH THE OCCUPATION SAFETY AND HEALTH ACT OF 1970 AND ALL RULES AND REGULATIONS THEREO APPURTENANT.

Consultant:

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PHILLIP L. TOLLIVER, P.E.

DATE

**MRA**

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DEVELOPER  
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(610) 664-6800

**ABBEY CREEK**

NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

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NO.	REVISION	DATE
2	UPDATES PER TOWN OF MIDDLETOWN	04/01/25
1	UPDATES PER TOWN OF MIDDLETOWN	11/01/24
NO.	REVISION	DATE
21647	DRAWN BY GC	CHECKED SP
		ISSUED 04/29/25

SHEET TITLE

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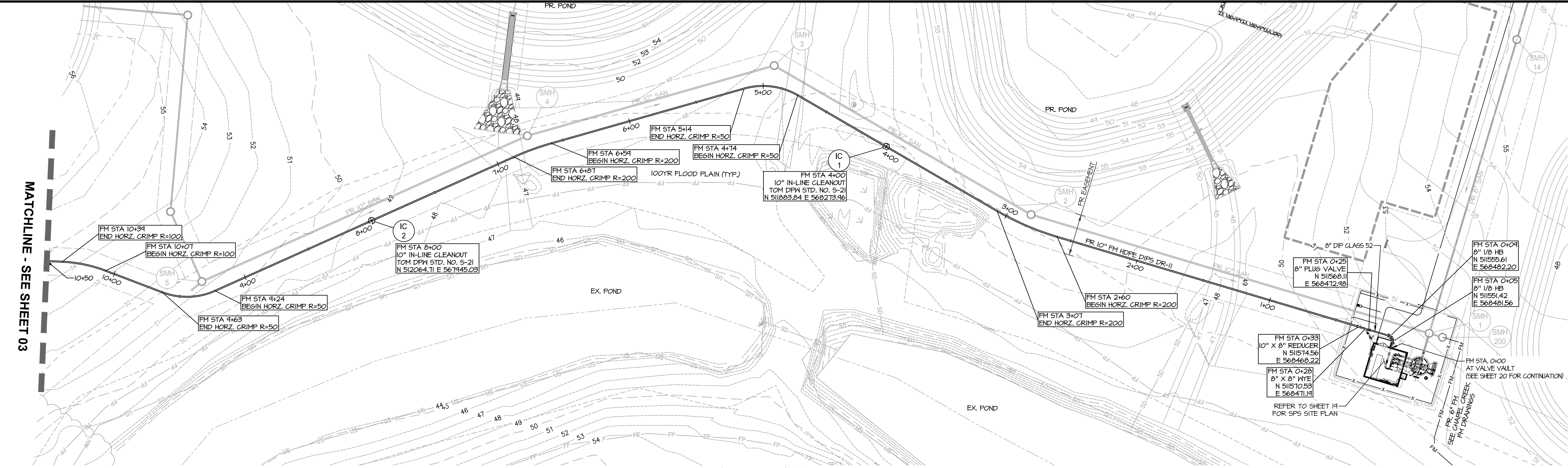
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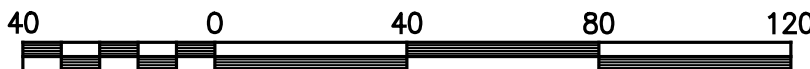


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MATCHLINE - SEE SHEET 03



### FORCE MAIN PLAN

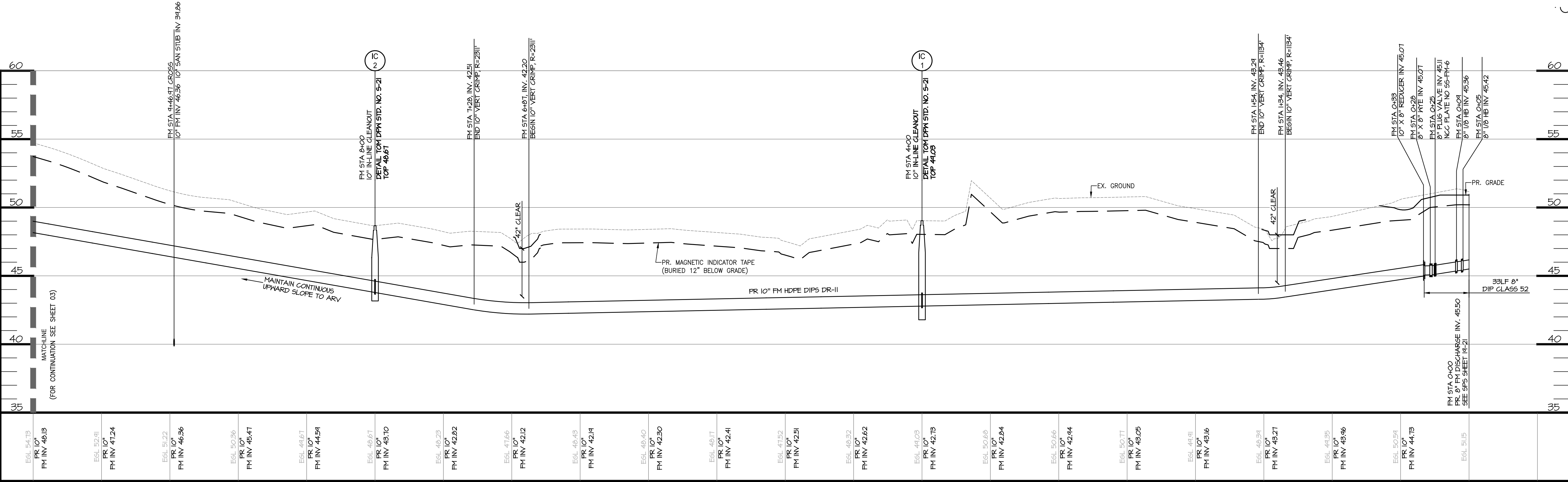


Scale 1" = 40'

### NOTES

- ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS".
- MANHOLE SMH 1 AND SMH 200 ARE TO BE COATED AS FOLLOWS:
  - EXTERIOR PROTECTIVE COATING: PLANT-APPLIED, 55PS-FRINT 16, COAL-TAR, EPOXY-POLYAMIDE PAINT; 16-MIL MINIMUM THICKNESS.
  - INTERIOR PROTECTIVE COATING: 2 COATS - 746/948/949 RLY-TILE EPOXY TAR COATING; 16-MIL MINIMUM THICKNESS.

LEGEND	
	EX. PROPERTY LINE
	EX. RIGHT-OF-WAY
	EX. ADJACENT PROPERTY LINE
	EX. EASEMENT
	EX. FLOODPLAIN
	EX. WATERS-OF-THE-US
	EX. 1' CONTOUR
	EX. 10' CONTOUR
	EX. WETLAND
	PR. RIGHT OF WAY
	PR. LOT LINE/PARCEL LINE
	PR. EASEMENT
	PR. BUILDING
	PR. CURB & GUTTER
	PR. ROAD CENTER LINE
	PR. CONC SIDEWALK
	PR. LOT NUMBER
	PR. CURB RADIUS
	PR. SANITARY LINE
	PR. STORM DRAIN
	PR. WATER LINE
	PR. FIRE HYDRANT
	PR. SANITARY FORCE MAIN
	PR. 1' CONTOUR
	PR. 10' CONTOUR
	PR. FENCE
	PR. INLINE CLEANOUT
	PR. TERMINAL CLEANOUT
	PR. AIR RELEASE VALVE
	PR. SANITARY MANHOLE
	PR. TREELINE



### FORCE MAIN 1 PROFILE

SCALE: H: 1"=40'  
V: 1"=4'

# MRA

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## ABBEY CREEK

NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

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SHEET TITLE

FORCE MAIN PLAN & PROFILE

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02 OF 32



ENGINEERS, PLANNERS,  
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**ABBAY CREEK**  
NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

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## FORCE MAIN PLAN & PROFILE

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1. ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS"

Scale 1" = 40'



- |                   |                            |
|-------------------|----------------------------|
| _____             | EX. PROPERTY LINE          |
| _____             | EX. RIGHT-OF-WAY           |
| _____             | EX. ADJACENT PROPERTY LINE |
| _____             | EX. EASEMENT               |
| _____ FP _____ FP | EX. FLOODPLAIN             |
| _____ US _____ US | EX. WATERS-OF-THE-US       |
| _____ 203 _____   | EX. 1' CONTOUR             |
| _____ 200 _____   | EX. 10' CONTOUR            |
| NW _____ NW       | EX. WETLAND                |
| _____             | PR. RIGHT OF WAY           |
| _____             | PR. LOT LINE/PARCEL LINE   |
| _____             | PR. EASEMENT               |
| _____             | PR. BUILDING               |
| _____             | PR. CURB & GUTTER          |
| _____             | PR. ROAD CENTER LINE       |
| _____             | PR. CONC SIDEWALK          |
| _____             | PR. LOT NUMBER             |
| XXXX              | PR. CURB RADIUS            |
| RIS' 5            | PR. SANITARY LINE          |
| PR. 6" SAN        | PR. STORM DRAIN            |
| PR. 18" SD        | PR. WATER LINE             |
| PR. 6" W          | PR. FIRE HYDRANT           |
| sbs               | PR. SANITARY FORCE MAIN    |
| PR. 6" FM         | PR. 1' CONTOUR             |
| 202               | PR. 10' CONTOUR            |
| 200               | PR. FENCE                  |
| x x               | PR. INLINE CLEANOUT        |
| IC<br>2           | PR. TERMINAL CLEANOUT      |
| TC<br>2           | PR. AIR RELEASE VALVE      |
| AV<br>2           | PR. SANITARY MANHOLE       |
| SMH<br>228        | PR. TREE LINE              |

SCALE: H: 1"=40'  
V: 1"=4'

**ABBHEY CREEK**  
NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

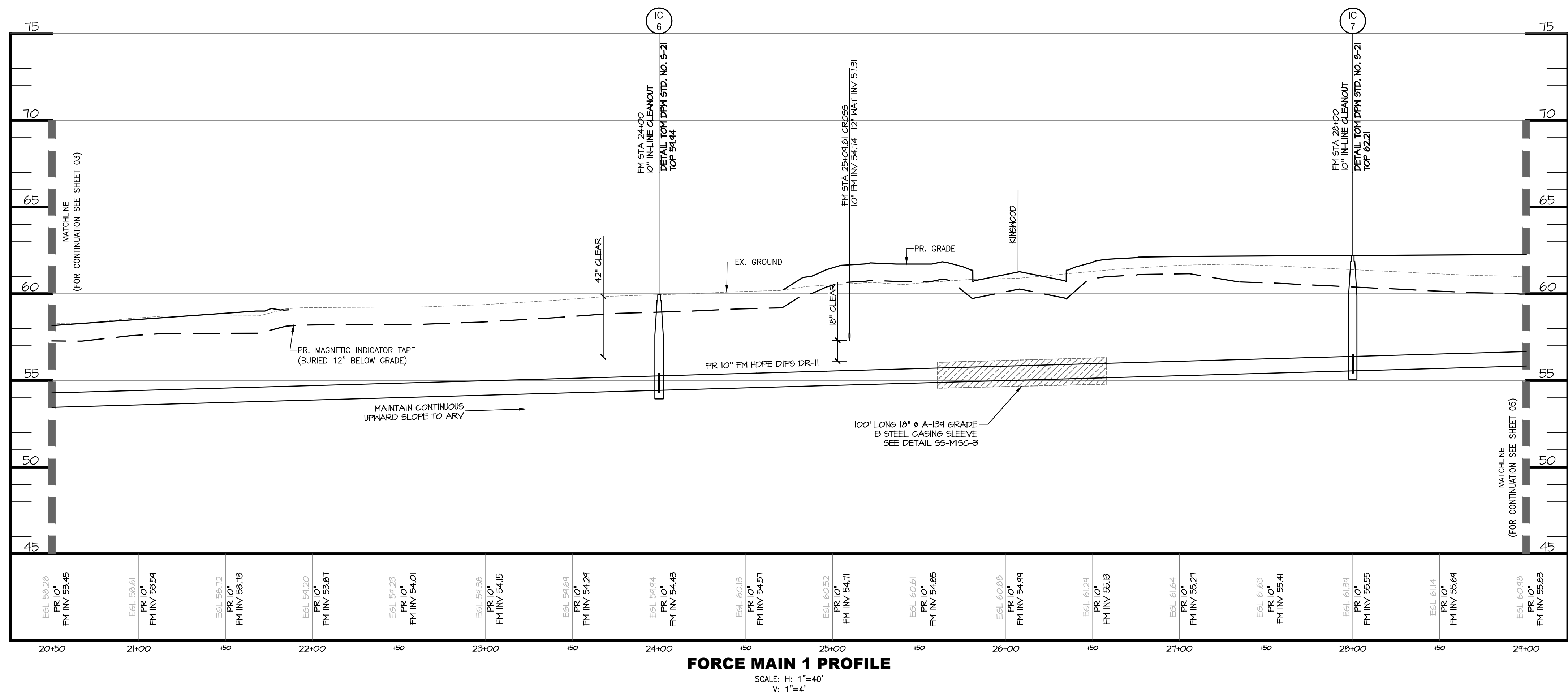
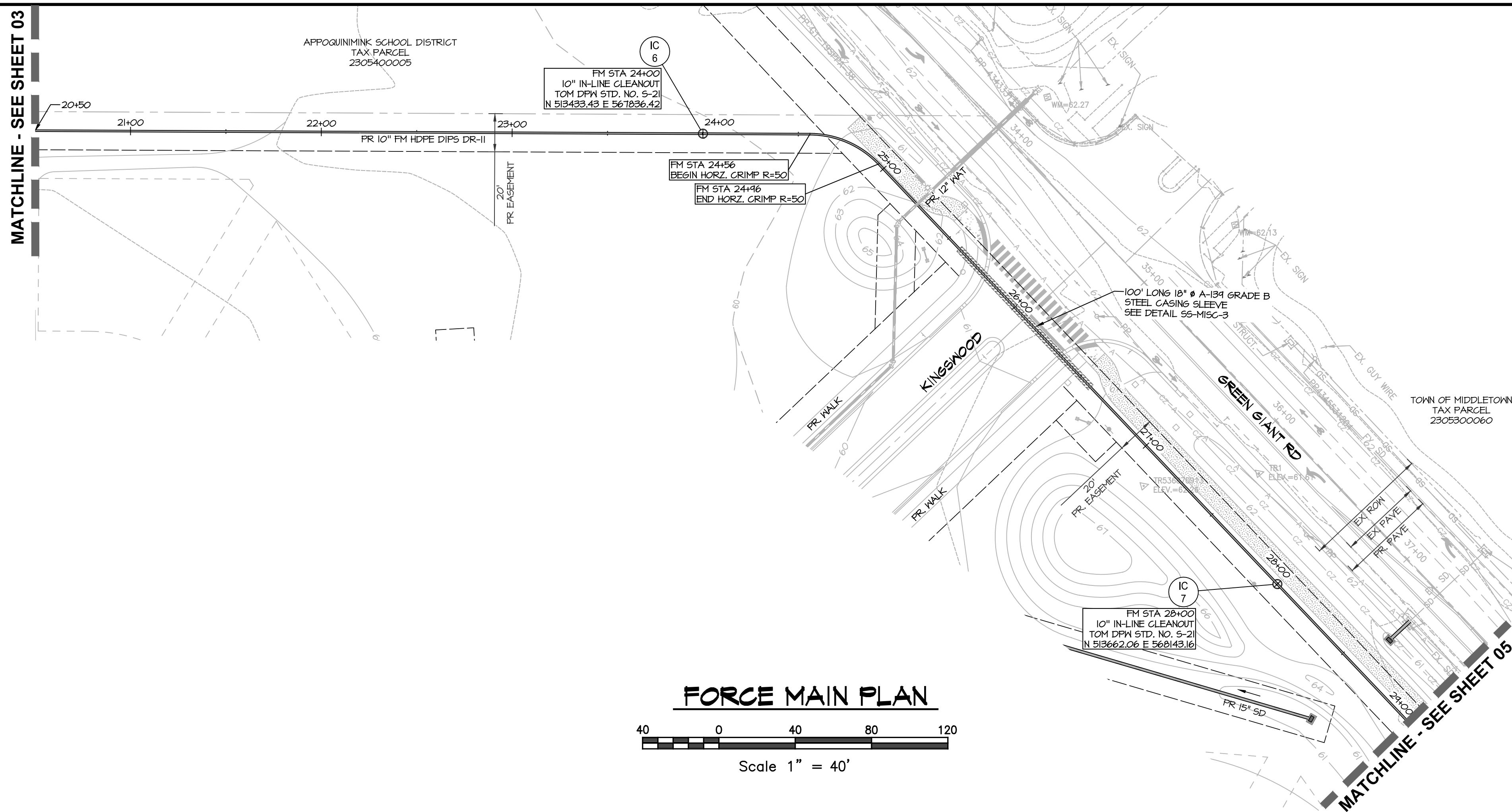
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SHEET TITLE			

MEET TITLE

## FORCE MAIN PLAN & PROFILE

SHEET NUMBER

04 OF 32



## NOTES

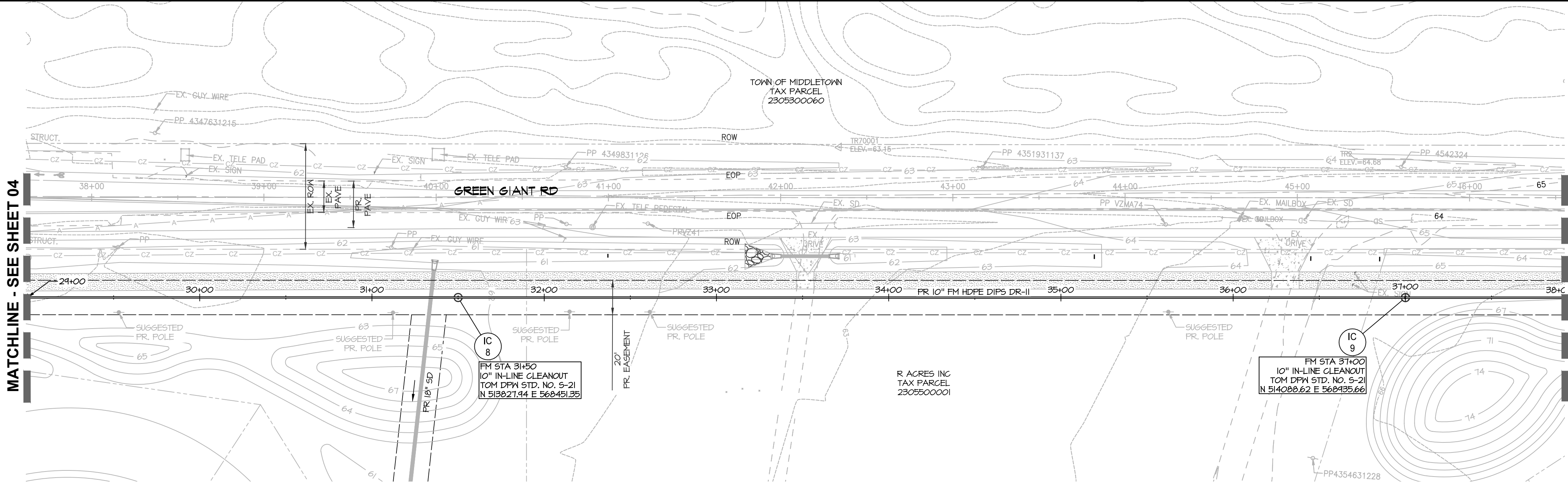
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### LEGEND

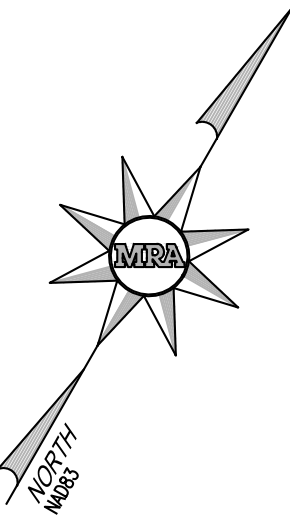
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|                       | EX. PROPERTY LINE          |
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|                       | EX. ADJACENT PROPERTY LINE |
|                       | EX. EASEMENT               |
| FP-----FP             | EX. FLOODPLAIN             |
| US-----US             | EX. WATERS-OF-THE-US       |
| -----203              | EX. 1' CONTOUR             |
| -----200              | EX. 10' CONTOUR            |
| NW-----NW             | EX. WETLAND                |
|                       | PR. RIGHT OF WAY           |
|                       | PR. LOT LINE/PARCEL LINE   |
|                       | PR. EASEMENT               |
|                       | PR. BUILDING               |
|                       | PR. CURB & GUTTER          |
|                       | PR. ROAD CENTER LINE       |
|                       | PR. CONC SIDEWALK          |
|                       | PR. LOT NUMBER             |
|                       | PR. CURB RADIUS            |
| (XXX)<br>RIS'         | PR. SANITARY LINE          |
| FR B' SAN<br>FR B' SD | PR. STORM DRAIN            |
| FR B' N               | PR. WATER LINE             |
| FS                    | PR. FIRE HYDRANT           |
| FR 6' FM              | PR. SANITARY FORCE MAIN    |
| 202                   | PR. 1' CONTOUR             |
| 200                   | PR. 10' CONTOUR            |
| X-----X               | PR. FENCE                  |
| (IC<br>2)             | PR. INLINE CLEANOUT        |
| (TC<br>2)             | PR. TERMINAL CLEANOUT      |
| (AV<br>2)             | PR. AIR RELEASE VALVE      |
| (SMH<br>28)           | PR. SANITARY MANHOLE       |
| . . . A A A A A . . . | PR. TREELINE               |



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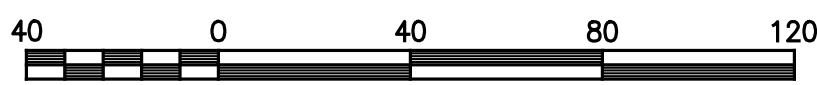
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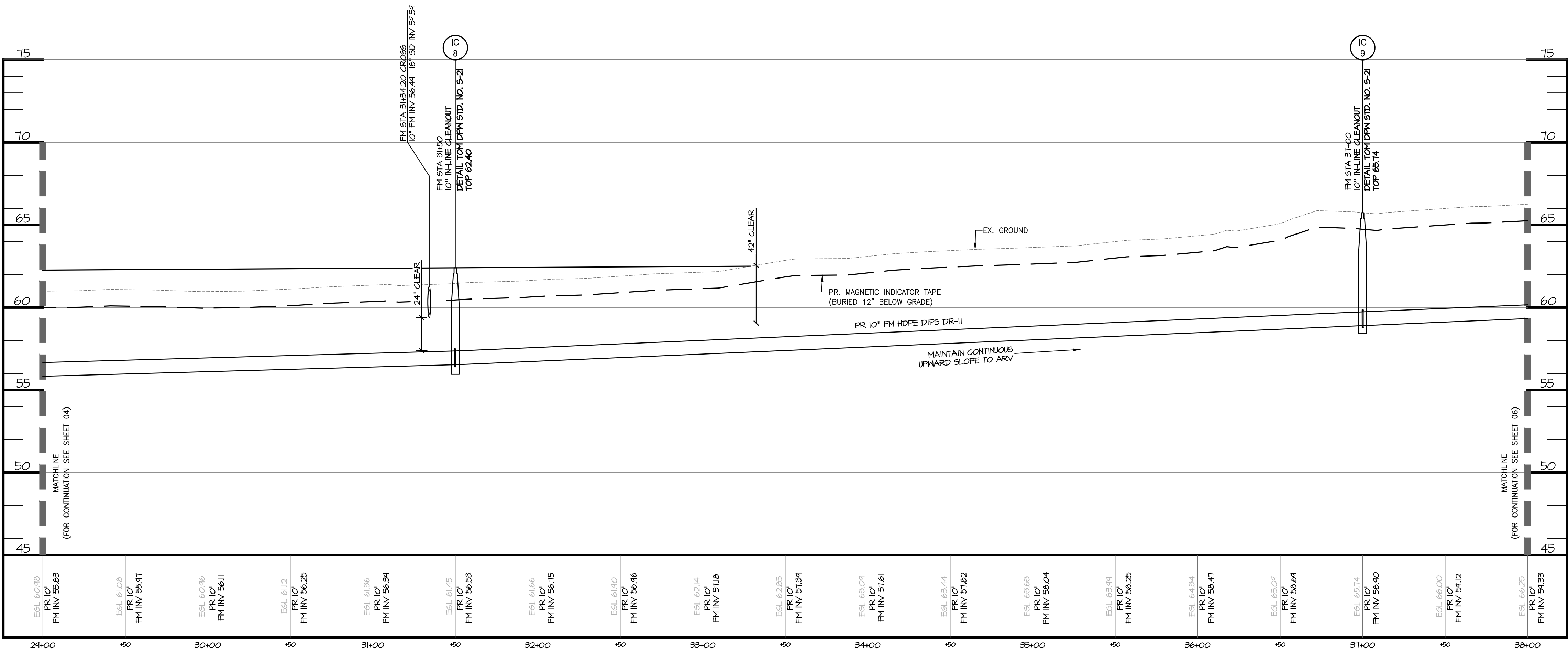
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- I. ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS"

FORCE MAIN PLAN



Scale 1" = 40'



FORCE MAIN 1 PROFILE

SCALE: H: 1"=40'  
V: 1"=4'

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT PROPERTY LINE
- EX. EASEMENT
- EX. FLOODPLAIN
- EX. WATERS-OF-THE-US
- EX. 1' CONTOUR
- EX. 10' CONTOUR
- EX. WETLAND
- PR. RIGHT OF WAY
- PR. LOT LINE/PARCEL LINE
- PR. EASEMENT
- PR. BUILDING
- PR. CURB & GUTTER
- PR. ROAD CENTER LINE
- PR. CONC SIDEWALK
- PR. LOT NUMBER
- PR. CURB RADIUS
- PR. SANITARY LINE
- PR. STORM DRAIN
- PR. WATER LINE
- PR. FIRE HYDRANT
- PR. SANITARY FORCE MAIN
- PR. 1' CONTOUR
- PR. 10' CONTOUR
- PR. FENCE
- PR. IN-LINE CLEANOUT
- PR. TERMINAL CLEANOUT
- PR. AIR RELEASE VALVE
- PR. SANITARY MANHOLE
- PR. TREELINE



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ABBEY CREEK

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1	UPDATES PER TOWN OF MIDDLETOWN	11/01/24
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JOB NO.	DRAWN BY	CHECKED BY
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		ISSUED
		04/29/25

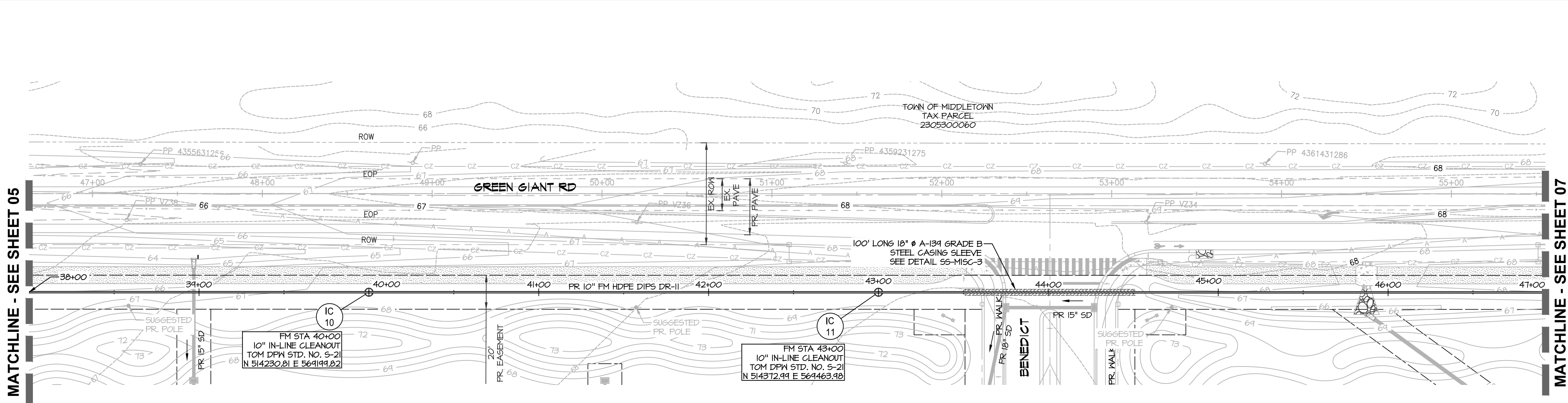
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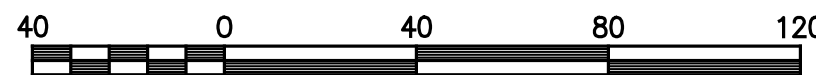
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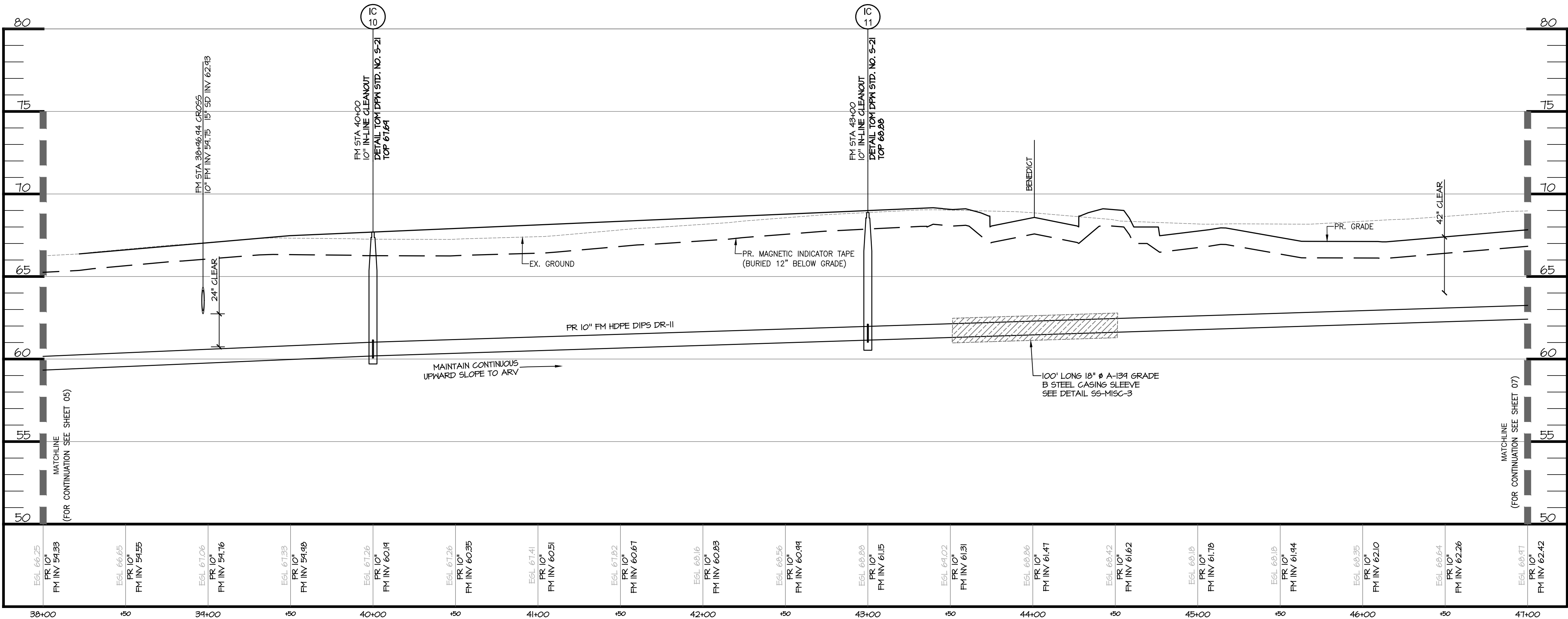
FORCE MAIN PLAN



Scale 1" = 40'

NOTES

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FORCE MAIN 1 PROFILE

SCALE: H: 1"=40'  
V: 1"=4'

LEGEND

- EX. PROPERTY LINE
- EX. RIGHT-OF-WAY
- EX. ADJACENT PROPERTY LINE
- EX. EASEMENT
- EX. FLOODPLAIN
- EX. WATERS-OF-THE-US
- EX. 1' CONTOUR
- EX. 10' CONTOUR
- EX. WETLAND
- PR. RIGHT OF WAY
- PR. LOT LINE/PARCEL LINE
- PR. EASEMENT
- PR. BUILDING
- PR. CURB & GUTTER
- PR. ROAD CENTER LINE
- PR. CONC. SIDEWALK
- PR. LOT NUMBER
- PR. CURB RADIUS
- PR. SANITARY LINE
- PR. STORM DRAIN
- PR. WATER LINE
- PR. FIRE HYDRANT
- PR. SANITARY FORCE MAIN
- PR. 1' CONTOUR
- PR. 10' CONTOUR
- PR. FENCE
- PR. INLINE CLEANOUT
- PR. TERMINAL CLEANOUT
- PR. AIR RELEASE VALVE
- PR. SANITARY MANHOLE
- PR. TREELINE

MRA

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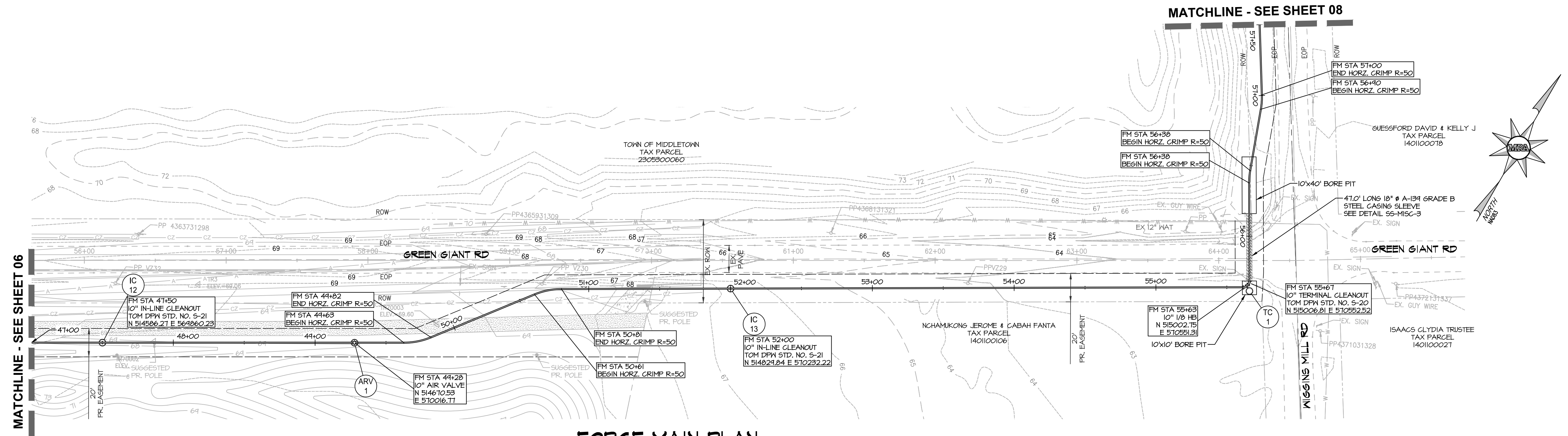
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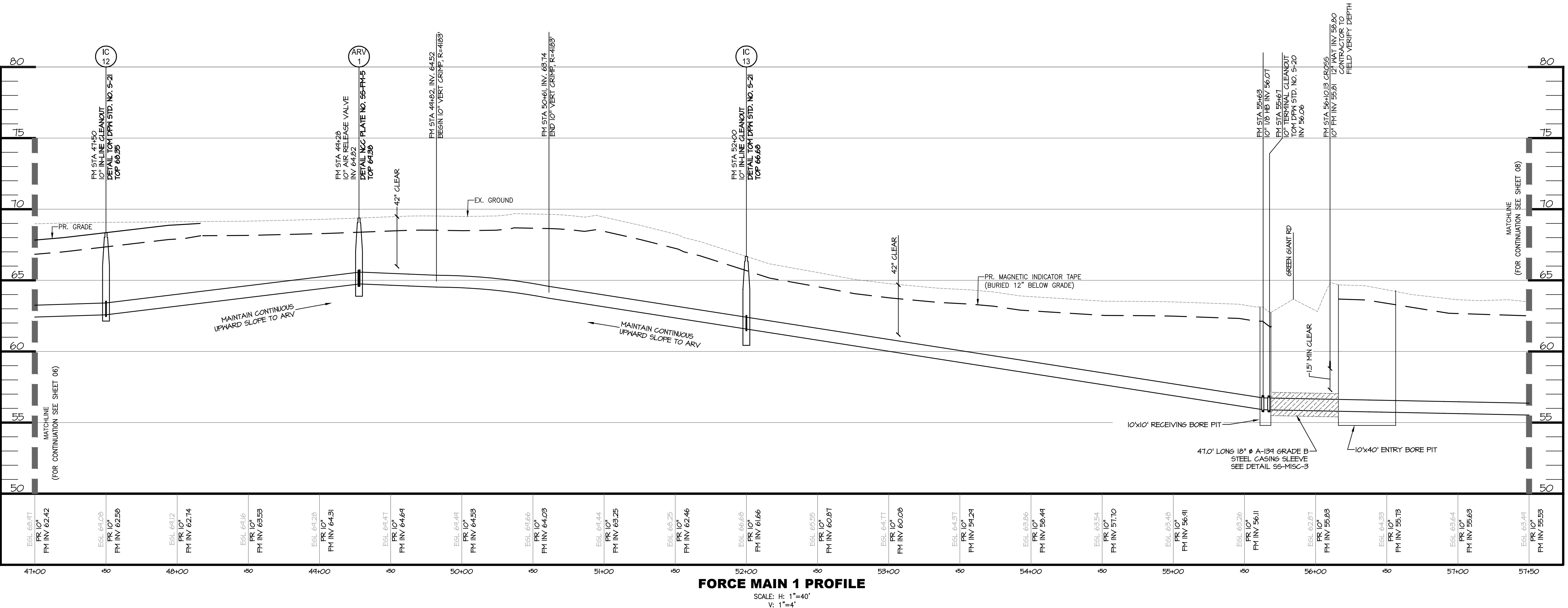
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## NOTES

ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETOWN'S CHAPTER 46 "MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS"



### LEGEND

- EX. RIGHT-OF-WAY  
 EX. ADJACENT PROPERTY LINE  
 EX. EASEMENT  
 EX. FLOODPLAIN  
 EX. WATERS-OF-THE-USE  
 EX. 1' CONTOUR  
 EX. 10' CONTOUR  
 EX. WETLAND  
 PR. RIGHT OF WAY  
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 PR. SANITARY MANHOLE  
 PR. TREELINE

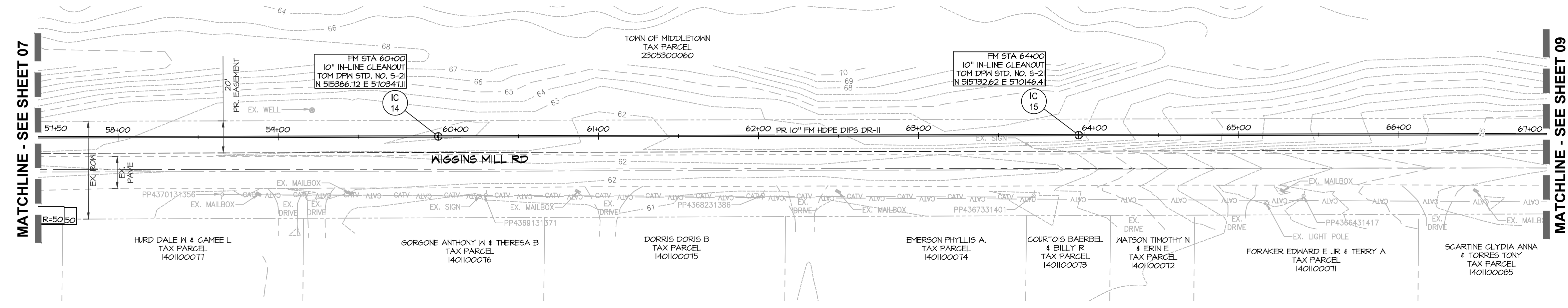
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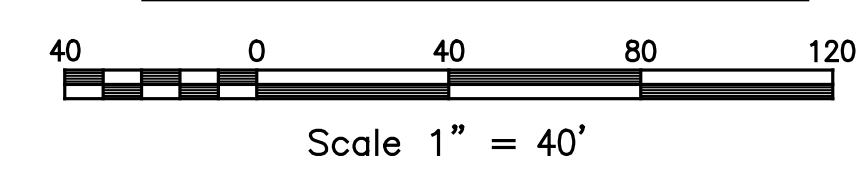
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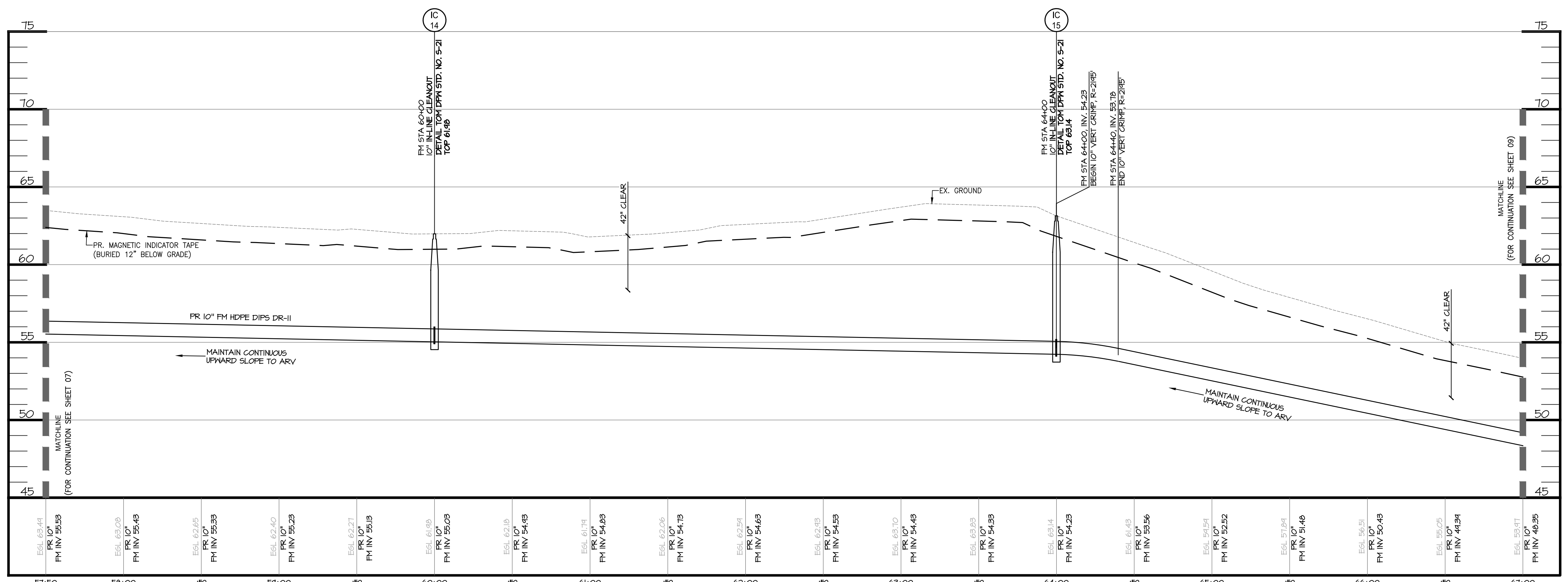
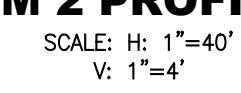


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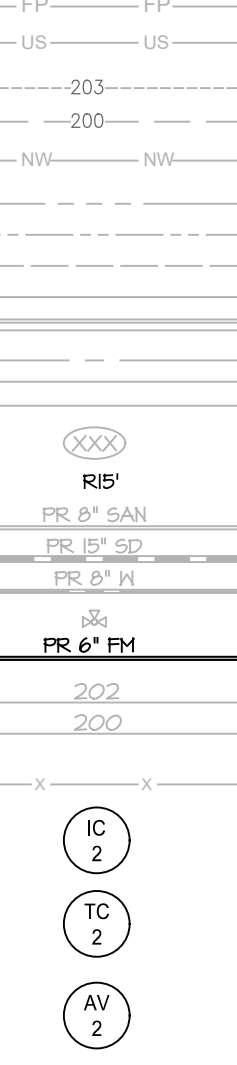


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**FM 2 PROFILE**

LEGEND

- 
- EX. PROPERTY LINE  
 EX. RIGHT-OF-WAY  
 EX. ADJACENT PROPERTY LINE  
 EX. EASEMENT  
 EX. FLOODPLAIN  
 EX. WATERS-OF-THE-US  
 EX. 1' CONTOUR  
 EX. 10' CONTOUR  
 EX. WETLAND  
 PR. RIGHT OF WAY  
 PR. LOT LINE/PARCEL LINE  
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 PR. TERMINAL CLEANOUT  
 PR. AIR RELEASE VALVE  
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 PR. TREELINE

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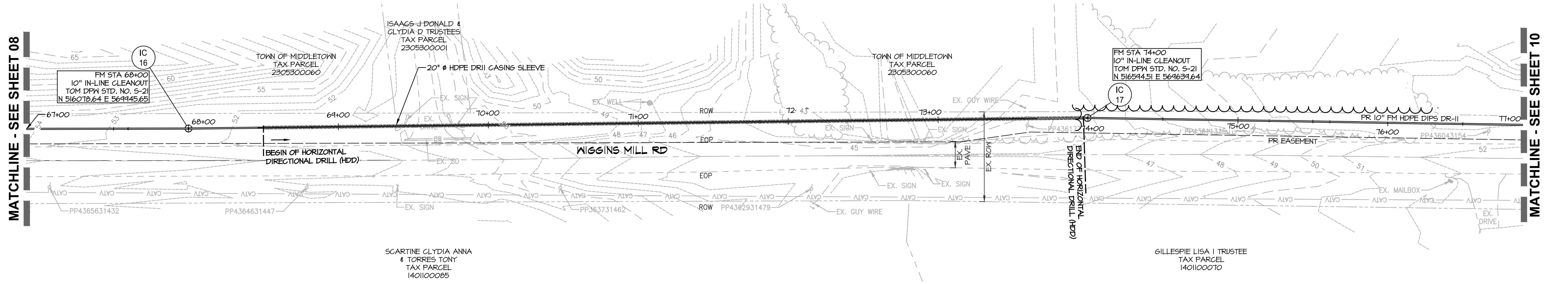
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SHEET NUMBER



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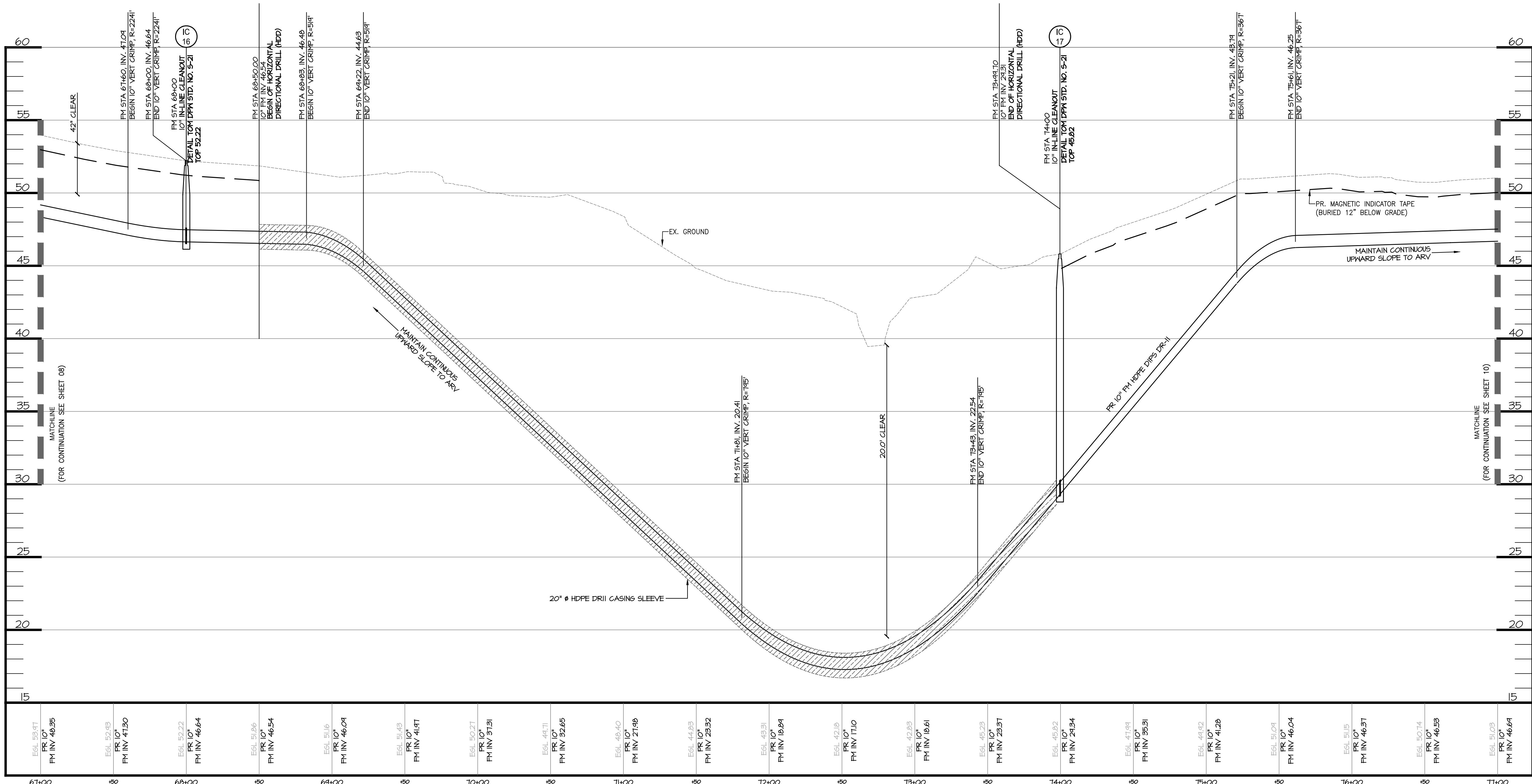
FORCE MAIN PLAN



Scale 1" = 40'

NOTES

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- WHERE TREES ARE REMOVED A REPLACEMENT TREE SHALL BE PLANTED ON THE ABBEY CREEK SITE WITHIN THE OPEN AREA.



FM 2 PROFILE

SCALE: H: 1"=40'  
V: 1"=4'

LEGEND	
---	EX. PROPERTY LINE
---	EX. RIGHT-OF-WAY
---	EX. ADJACENT PROPERTY LINE
---	EX. EASEMENT
---	EX. FLOODPLAIN
---	EX. WATERS-OF-THE-US
---	EX. 1' CONTOUR
---	EX. 10' CONTOUR
---	EX. WETLAND
---	PR. RIGHT OF WAY
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---	PR. AIR RELEASE VALVE
---	PR. SANITARY MANHOLE
---	PR. TREELINE

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		04/29/25

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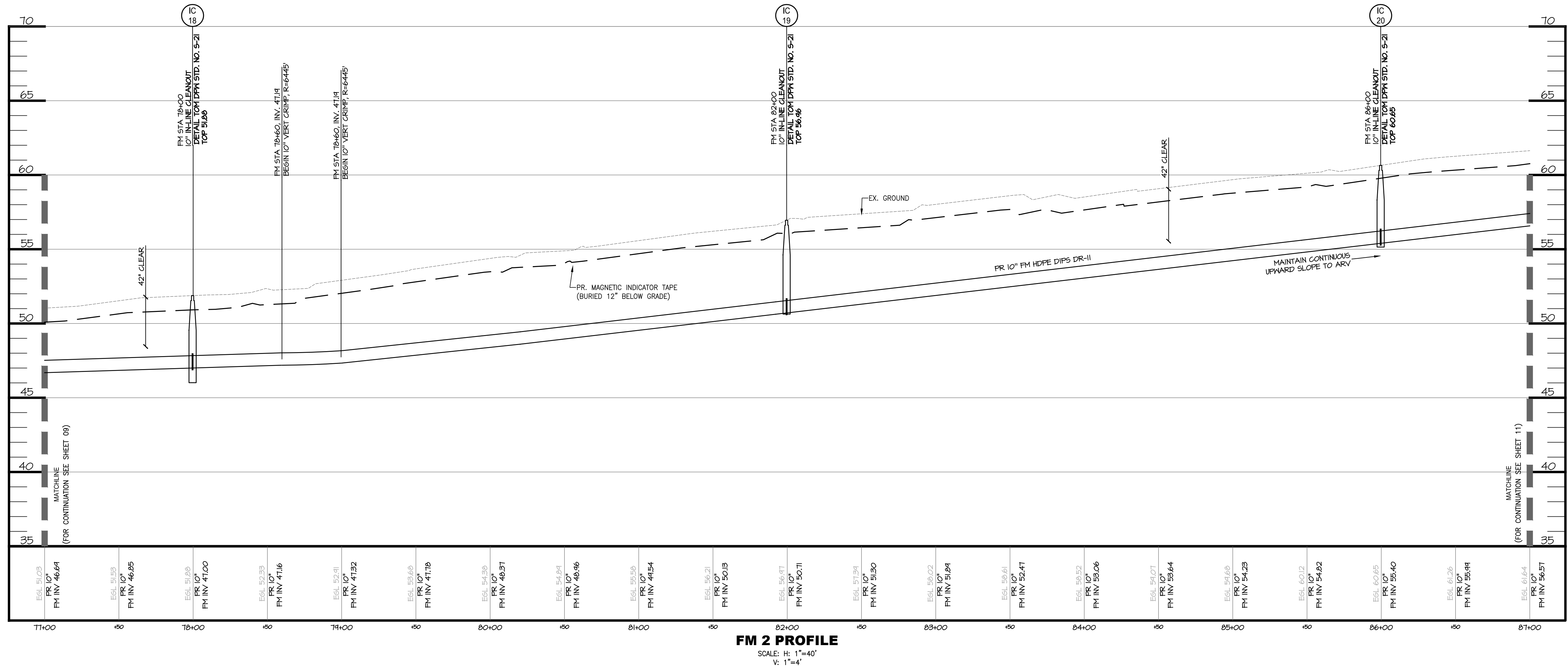
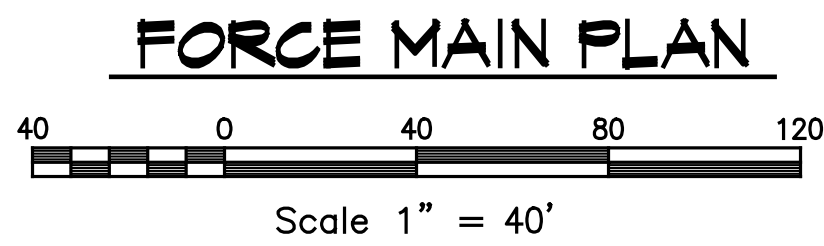
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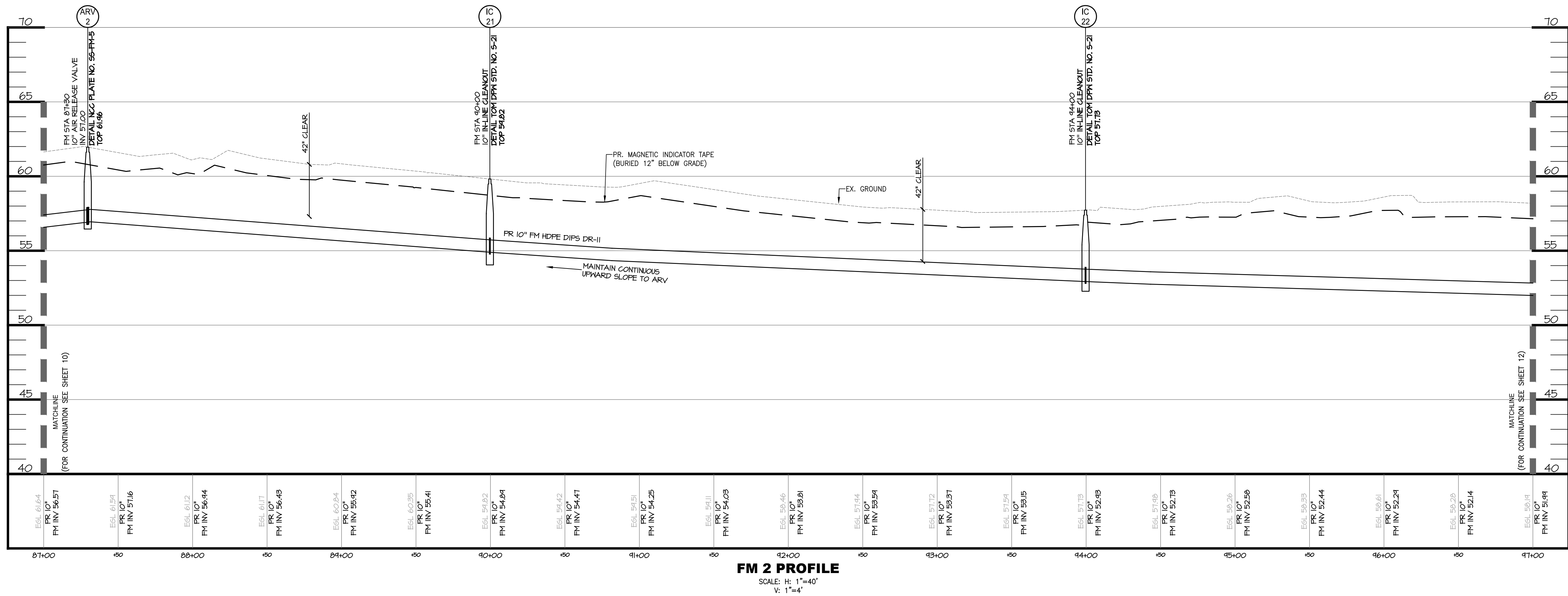
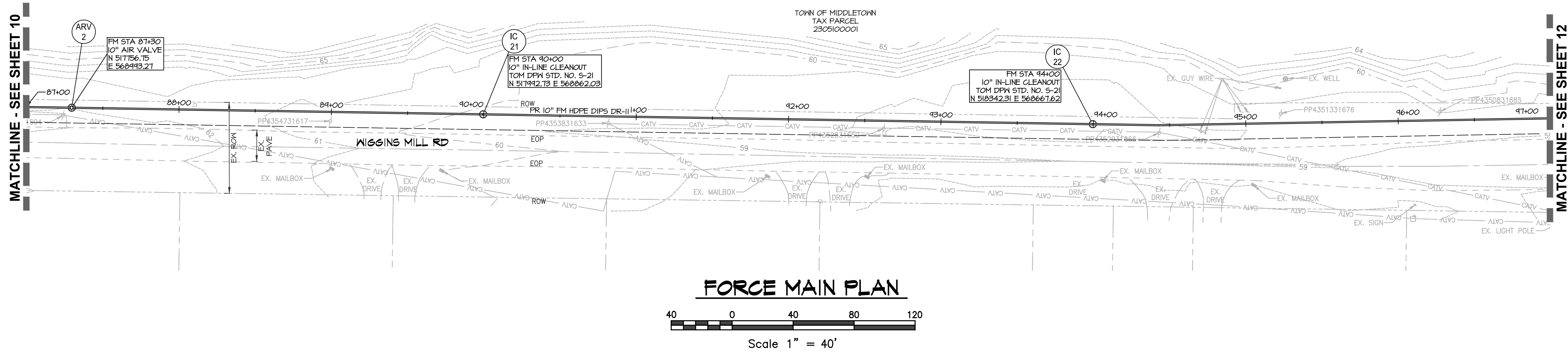


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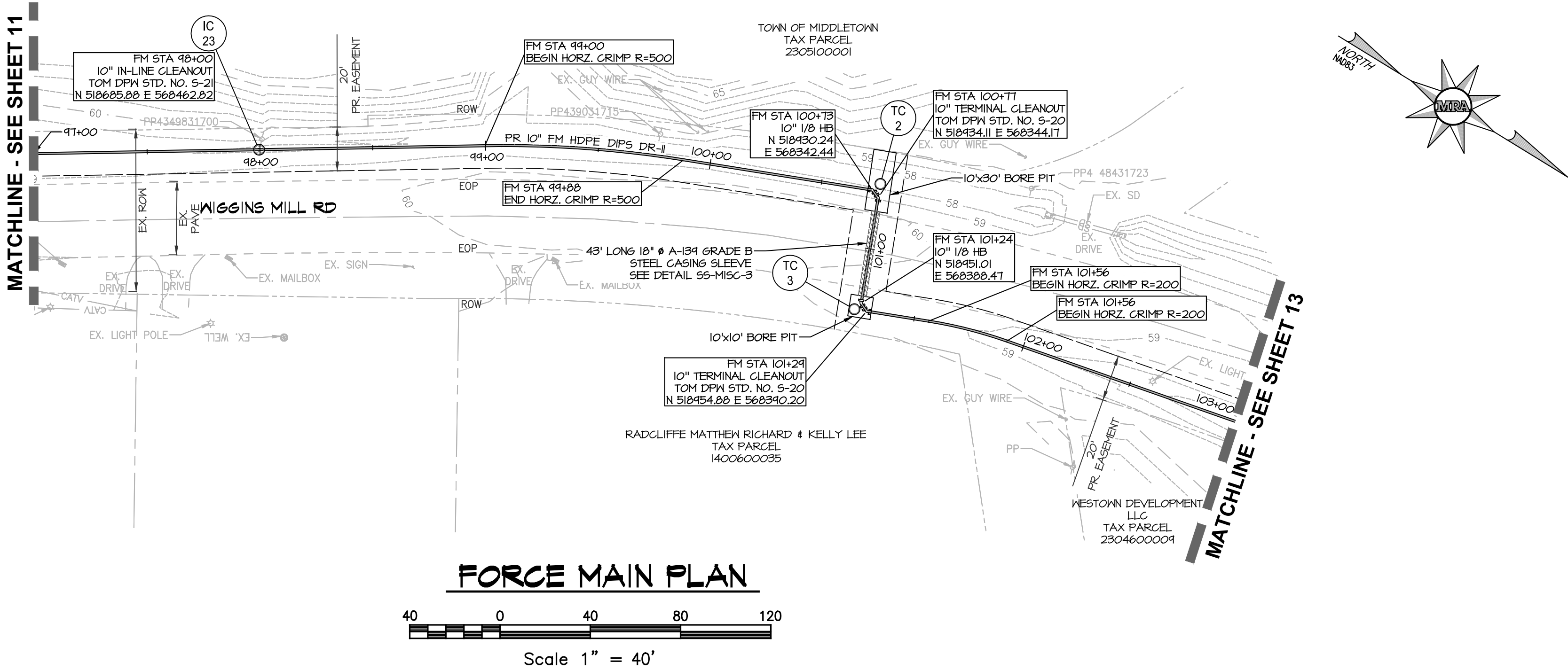
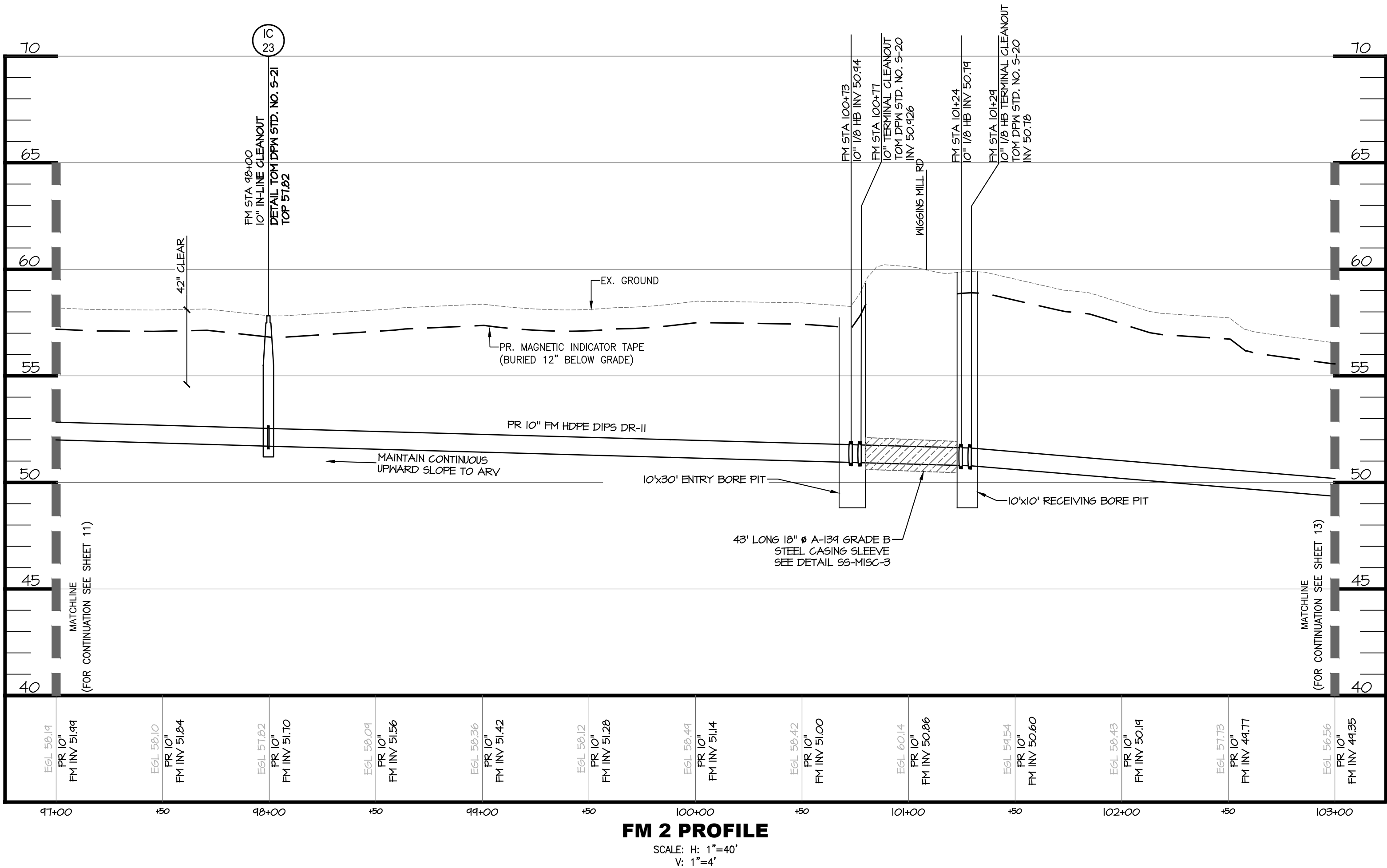
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- EX. 10' CONTOUR
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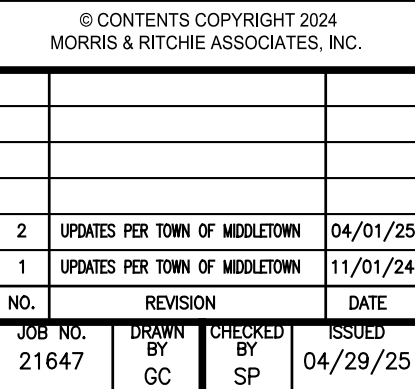
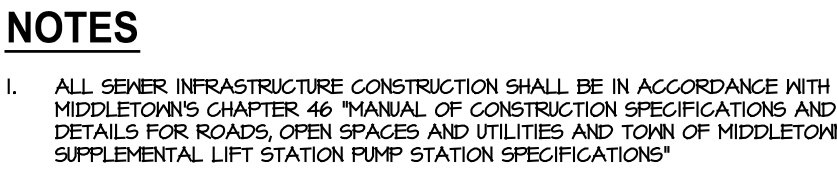
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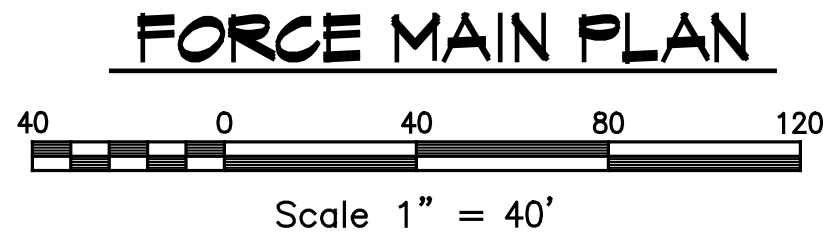
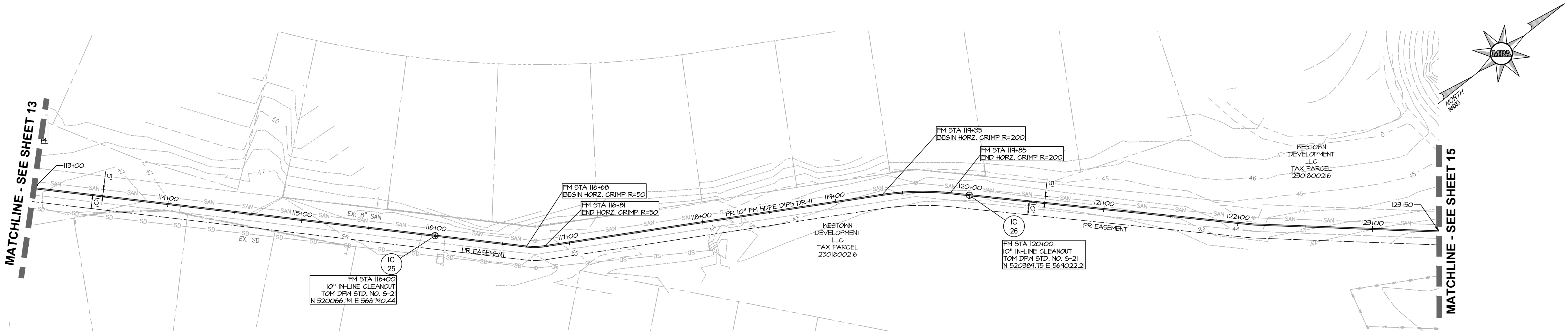
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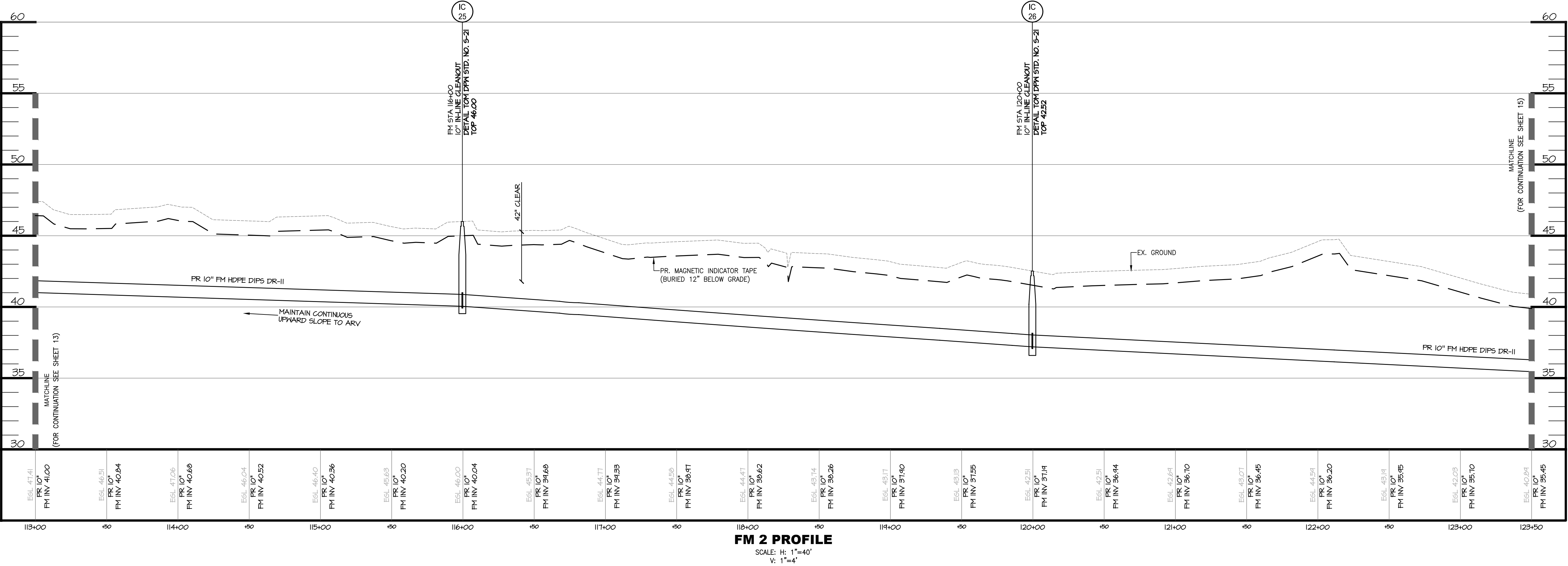


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  - PR. FIRE HYDRANT
  - PR. SANITARY FORCE MAIN
  - PR. 1' CONTOUR
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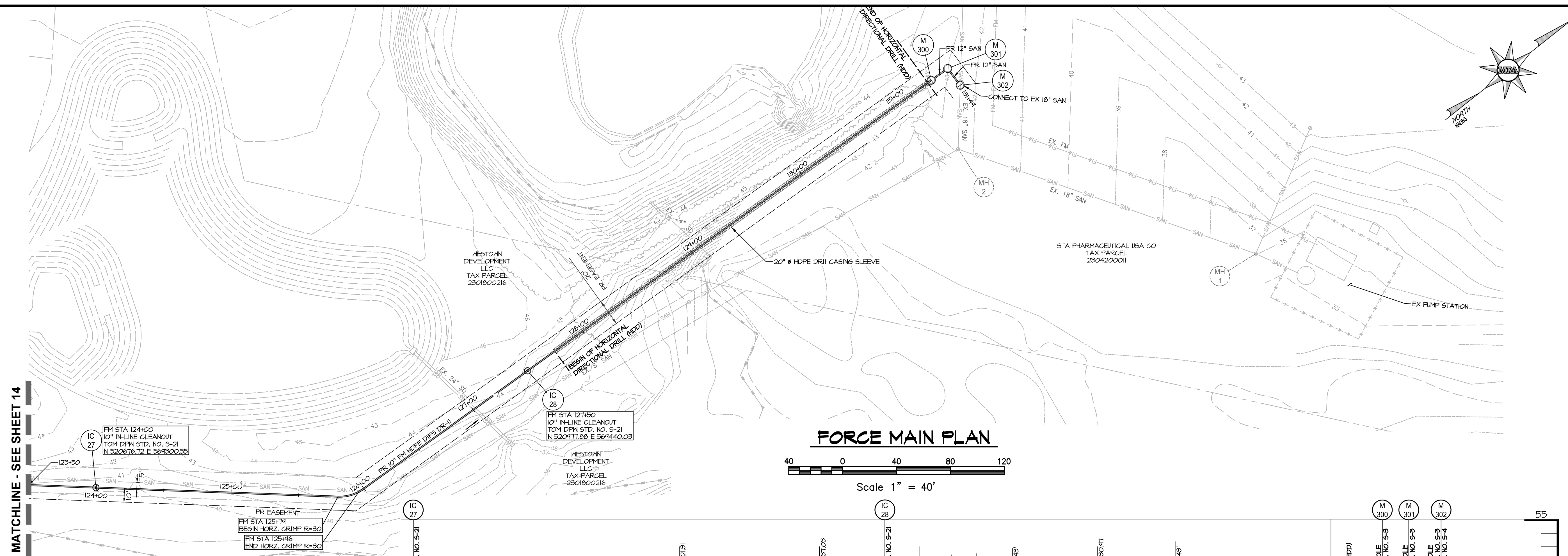
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SHEET NUMBER  
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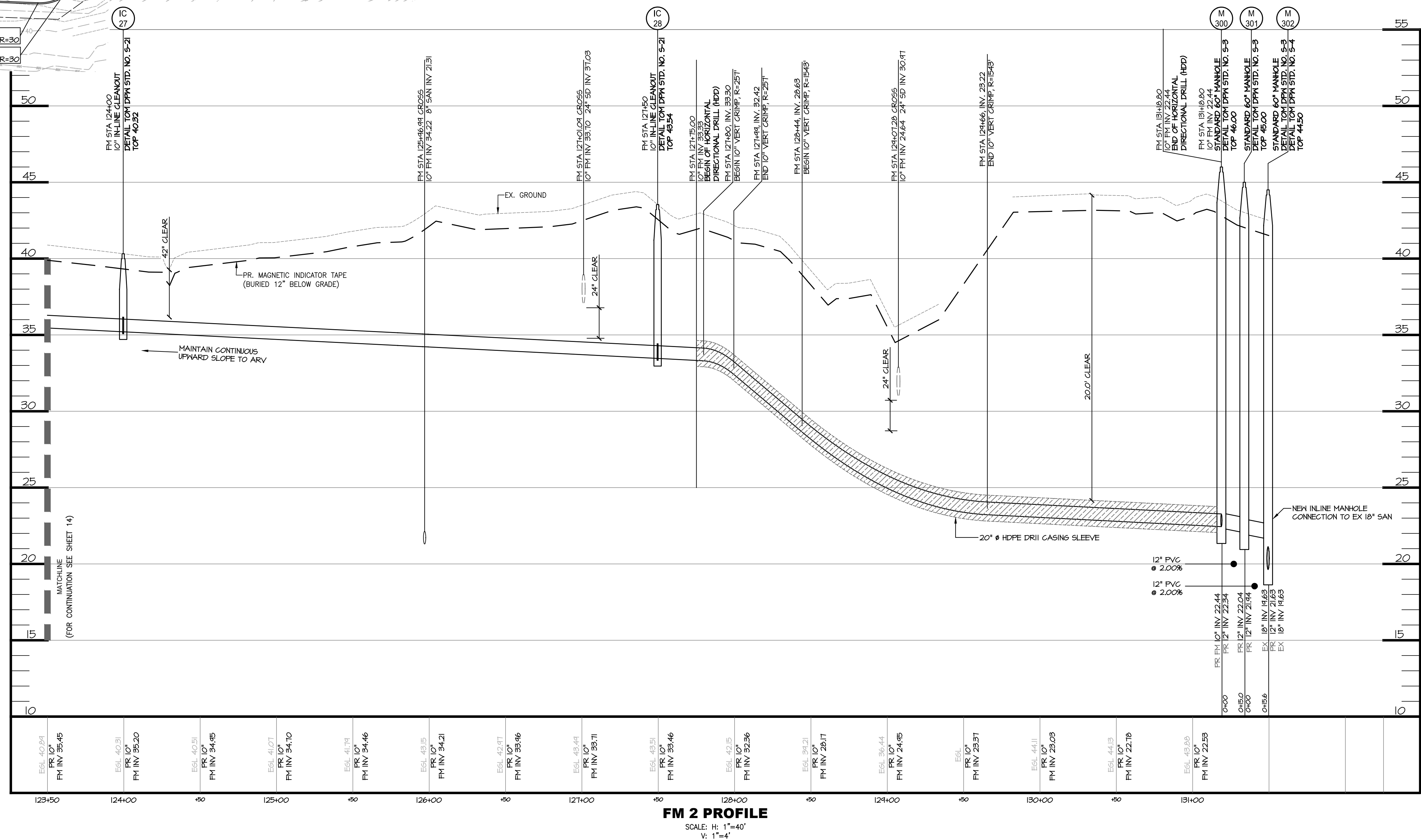


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1. ALL SEWER INFRASTRUCTURE CONSTRUCTION SHALL BE IN ACCORDANCE WITH MIDDLETON'S CHAPTER 46 MANUAL OF CONSTRUCTION SPECIFICATIONS AND DETAILS FOR ROADS, OPEN SPACES AND UTILITIES AND TOWN OF MIDDLETON SUPPLEMENTAL LIFT STATION PUMP STATION SPECIFICATIONS
2. MANHOLE M 300, M501 AND M 302 ARE TO BE COATED AS FOLLOWS:
  - a. EXTERIOR PROTECTIVE COATING, PLANT-APPLIED, 55FC-PAINT 16, COAL-TAR, EPOXY-POLYAMIDE PAINT, 16-MIL MINIMUM THICKNESS
  - b. INTERIOR PROTECTIVE COATING, 2 COATS = 796/980/999 PLY-TILE EPOXY TAR COATING, 16-MIL MINIMUM THICKNESS.
3. MANHOLE EX M41 AND EX M42 ARE TO BE COATED AS FOLLOWS:
  - INTERIOR PROTECTIVE COATING, 2 COATS = 796/980/999 PLY-TILE EPOXY TAR COATING, 16-MIL MINIMUM THICKNESS.

LEGEND

	EX. PROPERTY LINE
	EX. RIGHT-OF-WAY
	EX. ADJACENT PROPERTY LINE
	EX. EASEMENT
	EX. FLOODPLAIN
	EX. WATERS-OF-THE-UNIT
FP — FP	EX. 1' CONTOUR
US — US	EX. 10' CONTOUR
-----203-----	EX. WETLAND
NW-----NW	PR. RIGHT OF WAY
-----200-----	PR. LOT LINE/PARCEL LINE
-----	PR. EASEMENT
-----	PR. BUILDING
=====	PR. CURB & GUTTER
=====	PR. ROAD CENTER LINE
=====	PR. CONC SIDEWALK
=====	PR. LOT NUMBER
XXXX	PR. CURB RADIUS
RIU'S	PR. SANITARY LINE
PR. 8" SAN	PR. STORM DRAIN
PR. 18" SD	PR. WATER LINE
PR. 8" W	PR. FIRE HYDRANT
36"	PR. SANITARY FORCE MAIN
PR. 6" FM	PR. 1' CONTOUR
202	PR. 10' CONTOUR
200	PR. FENCE
x-----x	PR. INLINE CLEANOUT
(10 2)	PR. TERMINAL CLEANOUT
(TC 2)	PR. AIR RELEASE VALVE
(AV 2)	PR. SANITARY MANHOLE
(SMH 25)	PR. TREELINE



**MORRIS & RITCHIE  
ASSOCIATES, INC.**

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**ABBEEY CREEK**  
NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

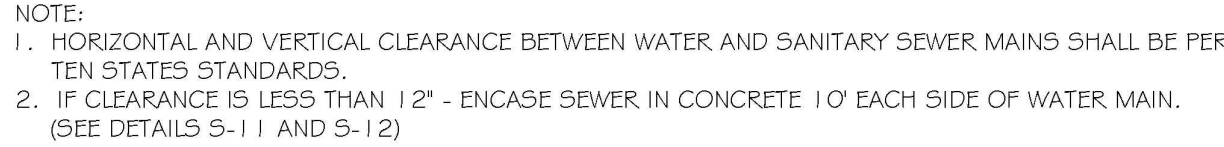
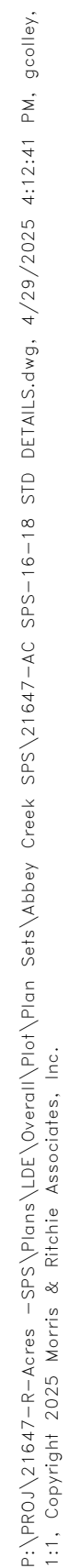
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2	UPDATES PER TOWN OF MIDDLETOWN	04/01/25	
1	UPDATES PER TOWN OF MIDDLETOWN	11/01/24	
NO.	REVISION	DATE	
JOB NO. 21647	DRAWN BY GC	CHECKED BY SP	ISSUED  04/29/25
SHEET TITLE			

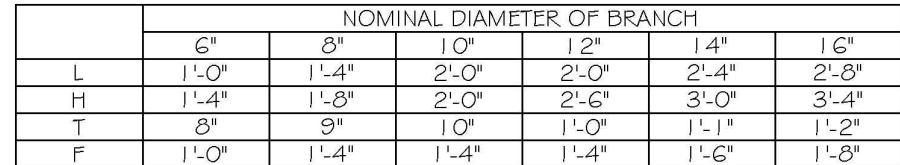
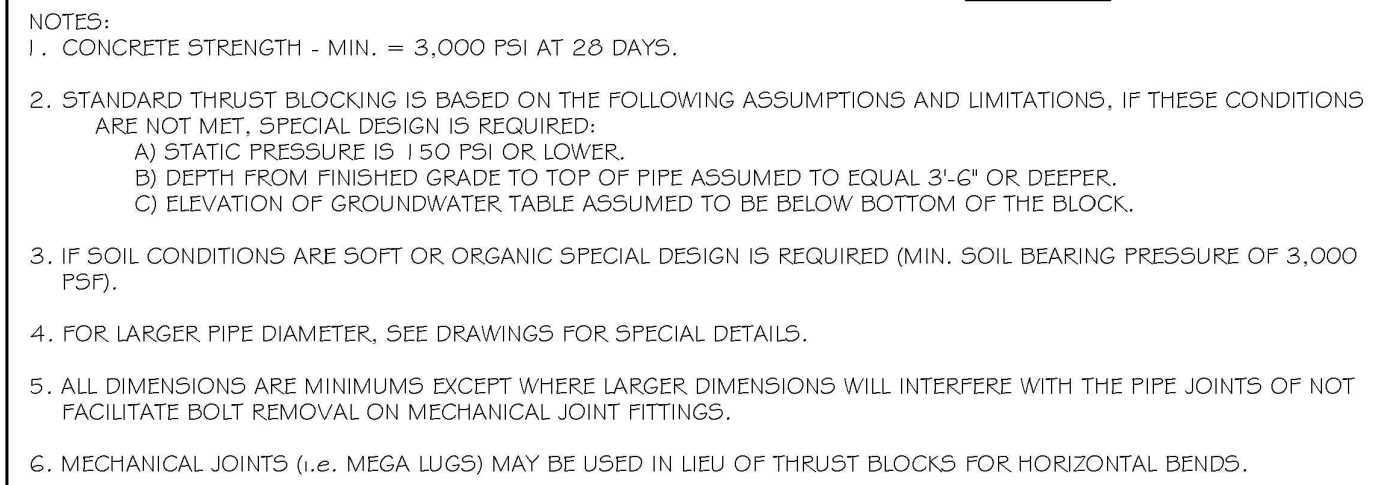
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SHEET NUMBER



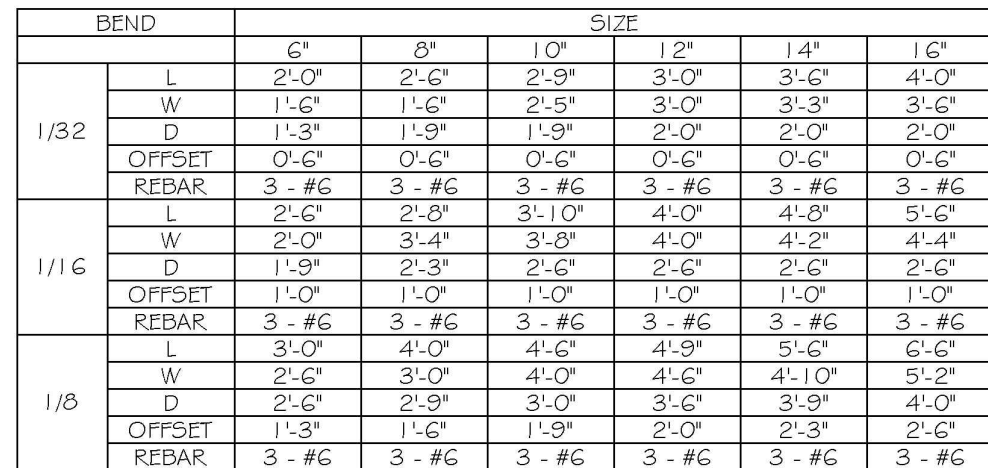




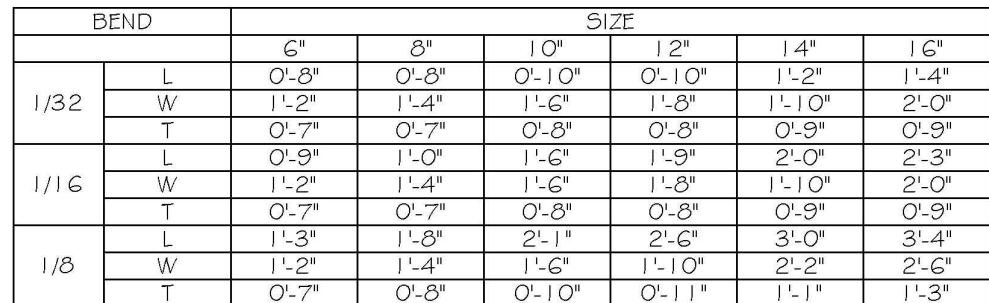


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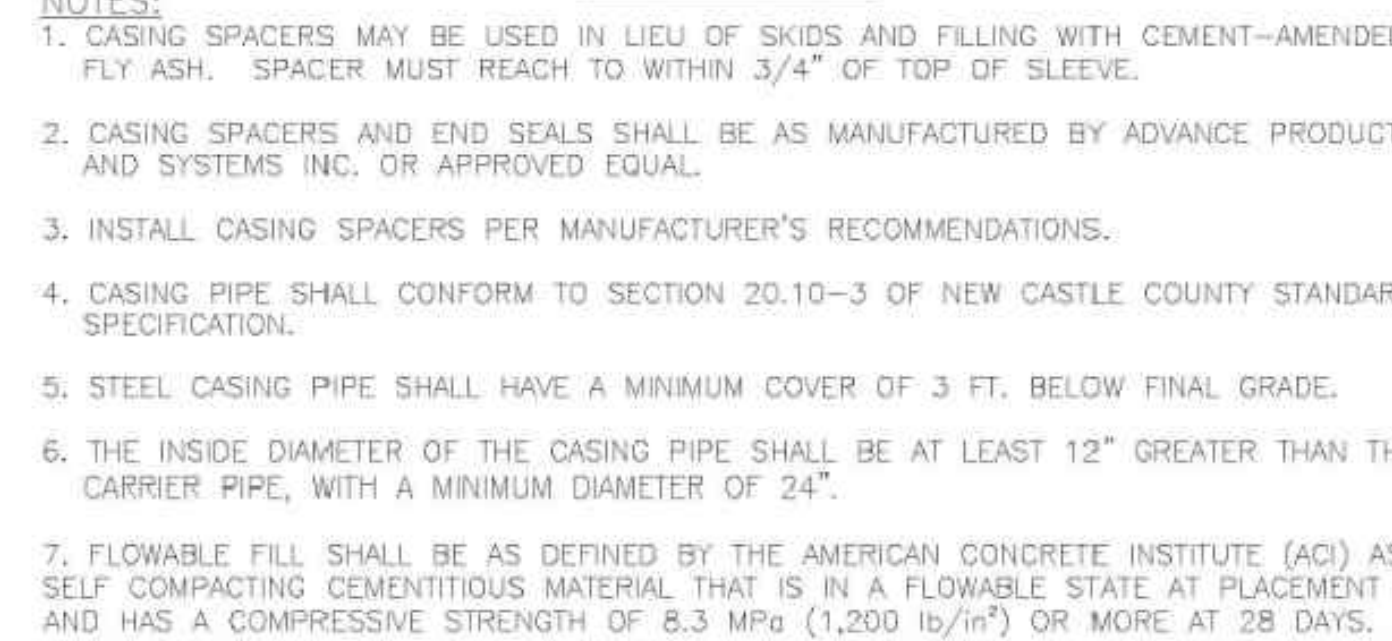
1. SEE BLOCKING DESIGN REQUIREMENT NOTES, STANDARD DETAIL W-5.
2. MECHANICAL JOINTS (i.e. MEGA LUGS) MAY BE USED IN LIEU OF THRUST BLOCKS FOR HORIZONTAL BENDS.



NOTES:  
1. SEE BLOCKING DESIGN REQUIREMENT NOTES, STANDARD DETAIL W-5.

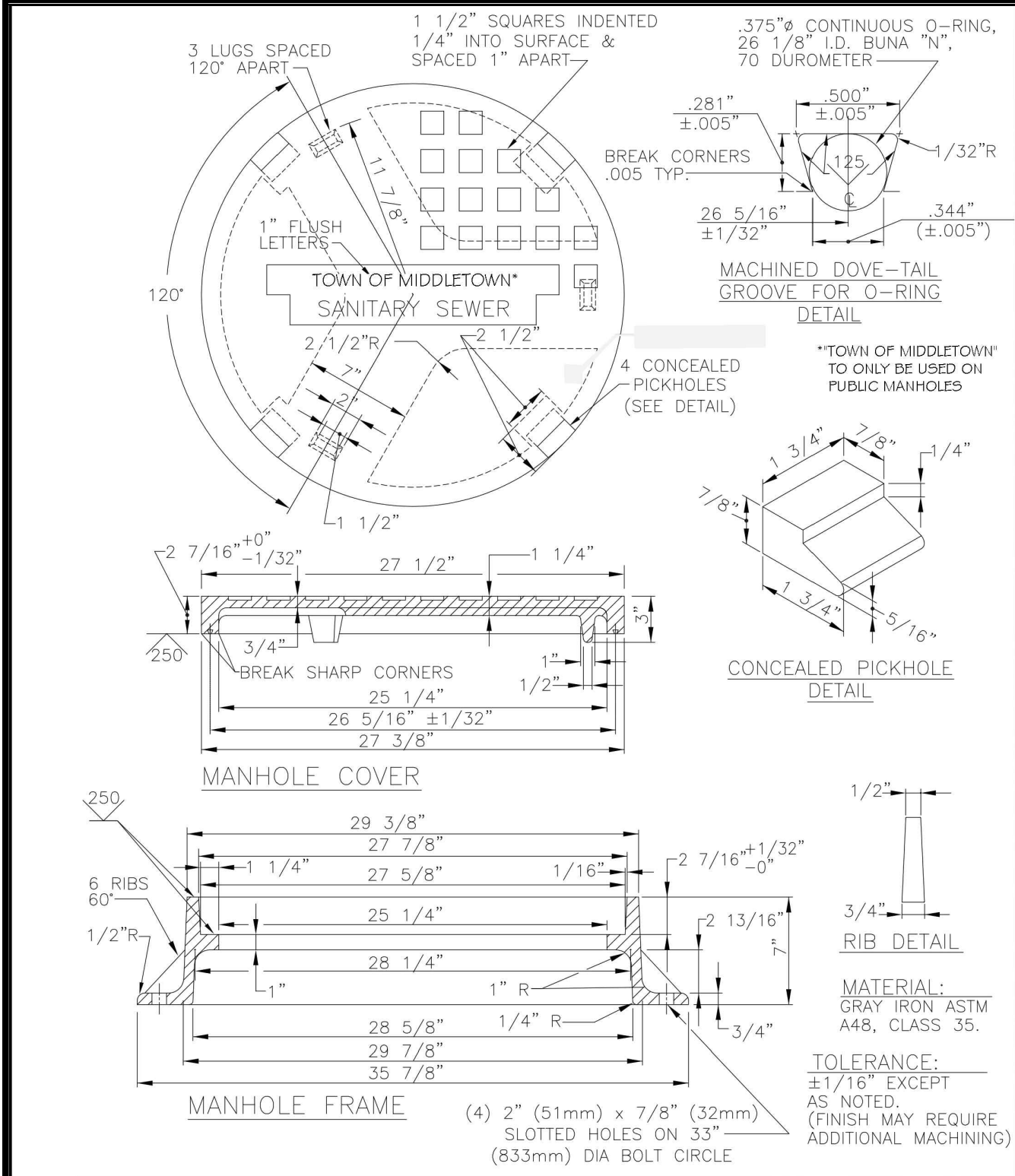


NOTES:  
1. SEE BLOCKING DESIGN REQUIREMENT NOTES, STANDARD DETAIL W-5.

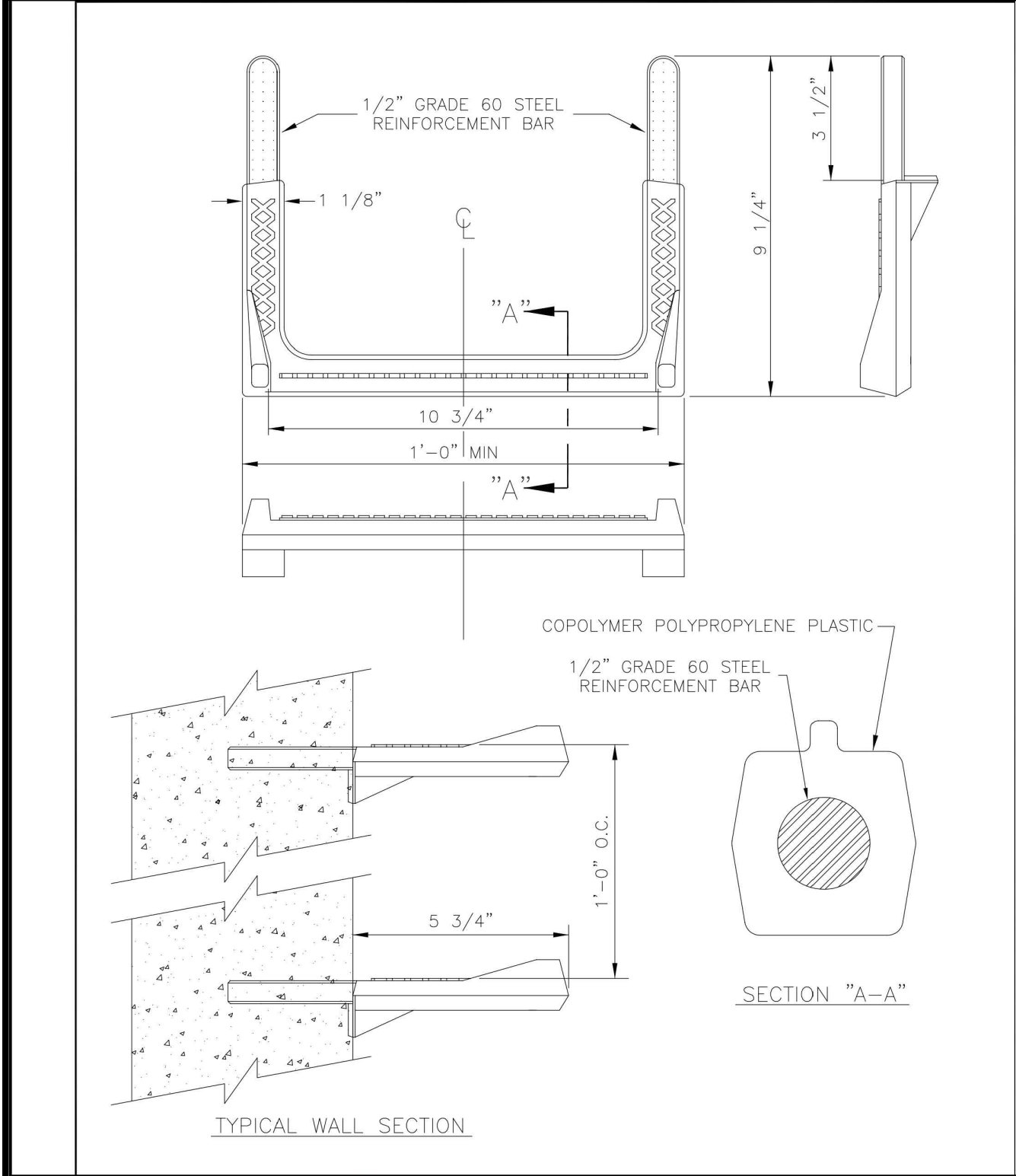




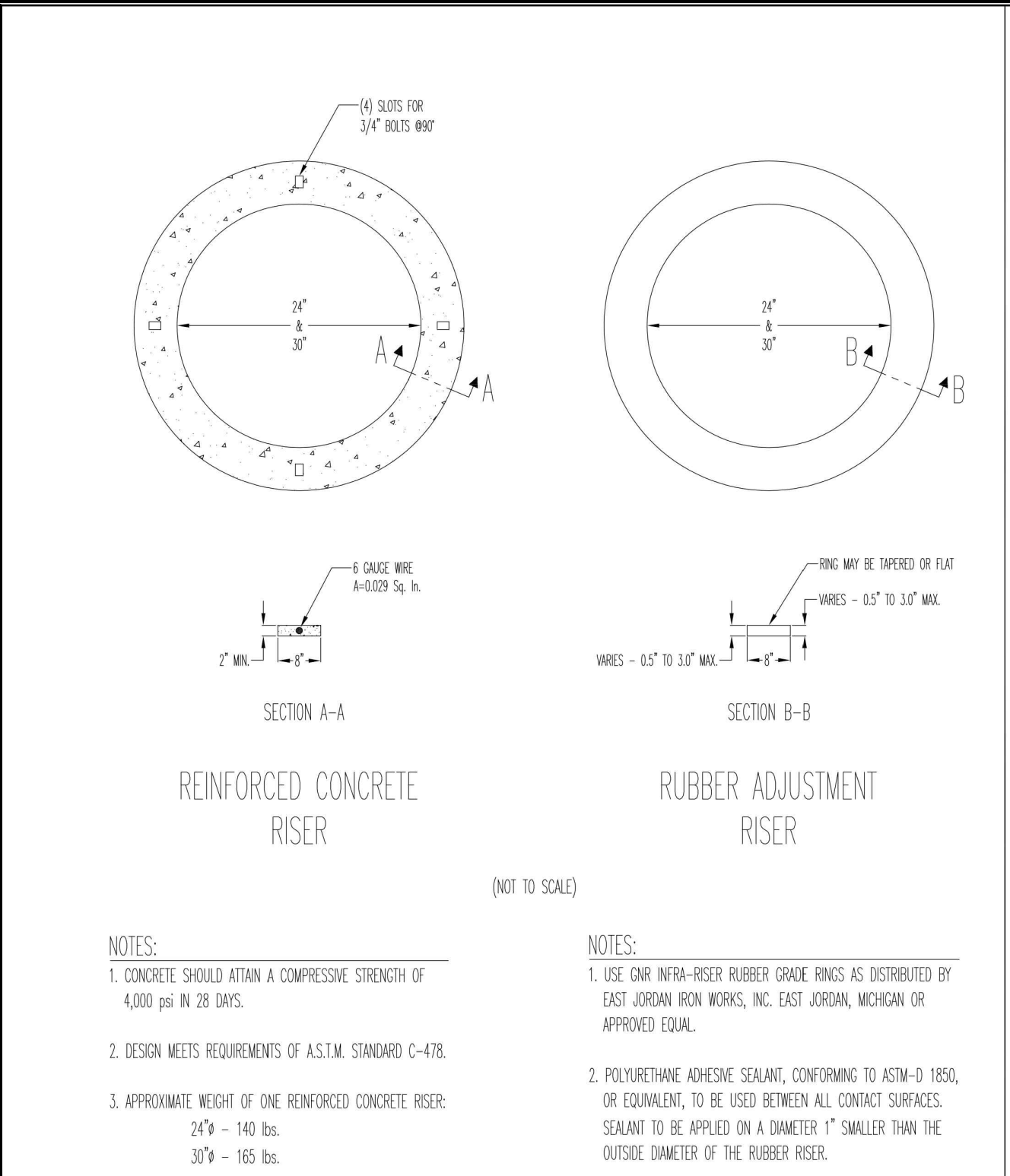
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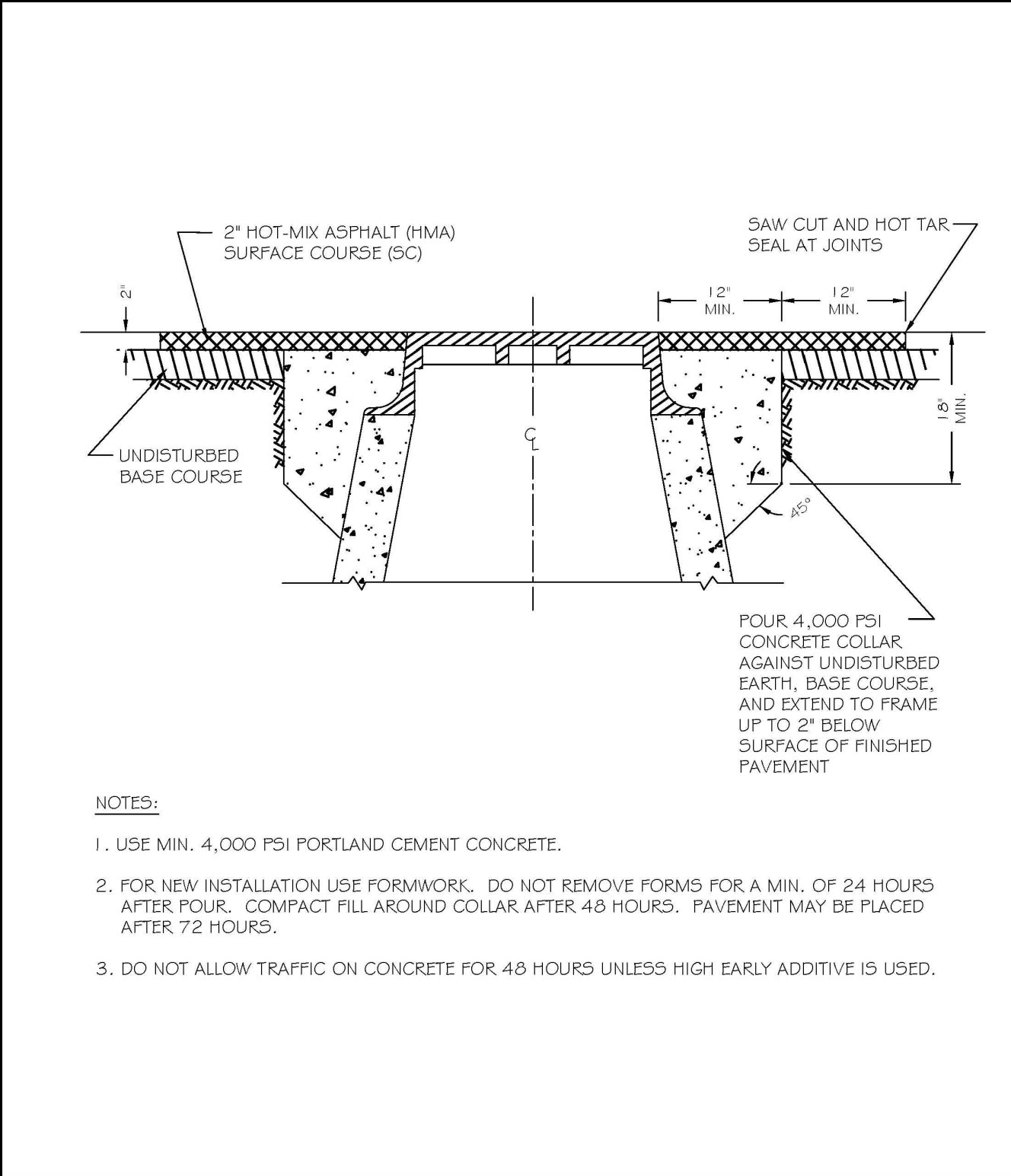
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REVISED	2021		
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



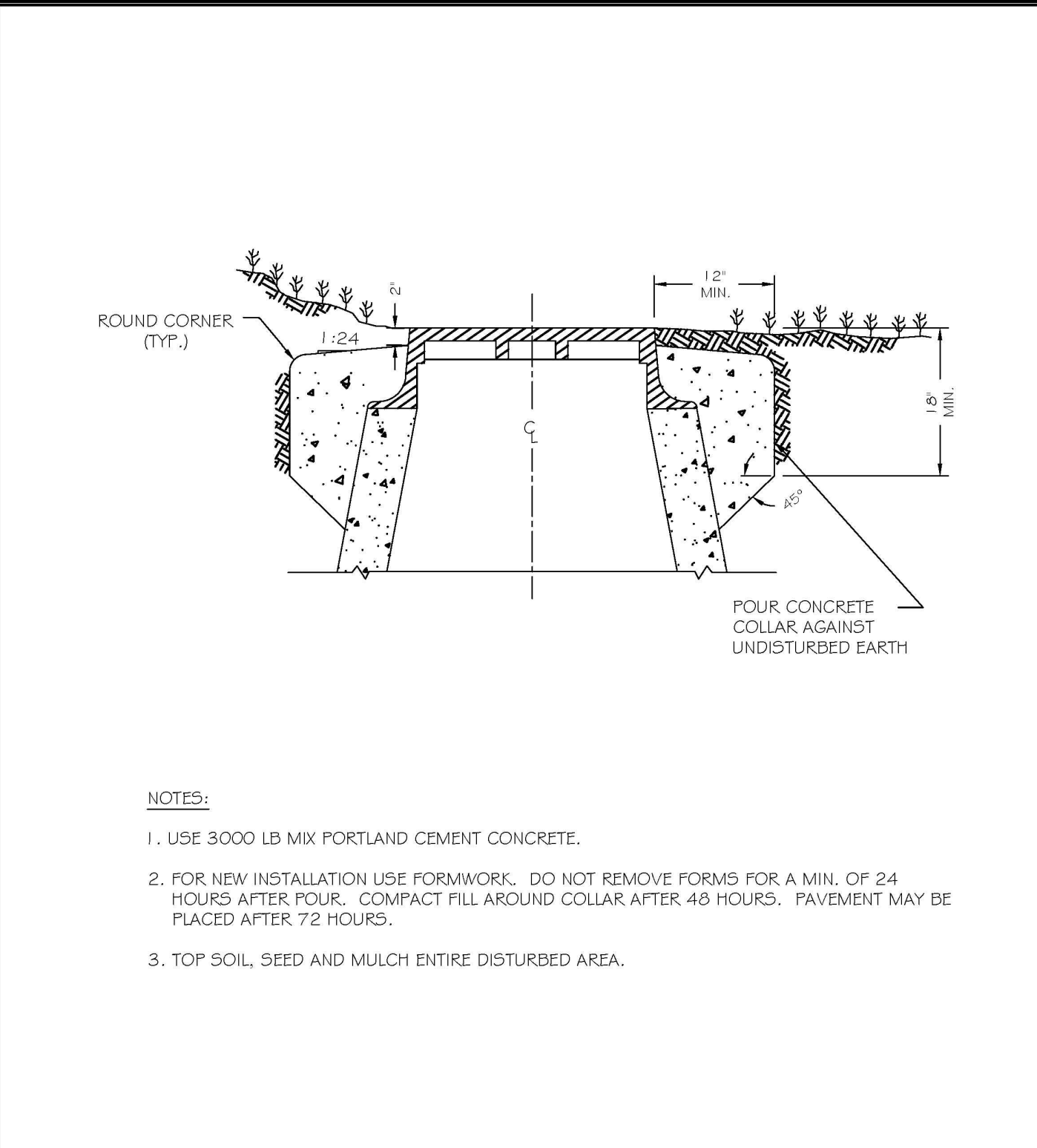
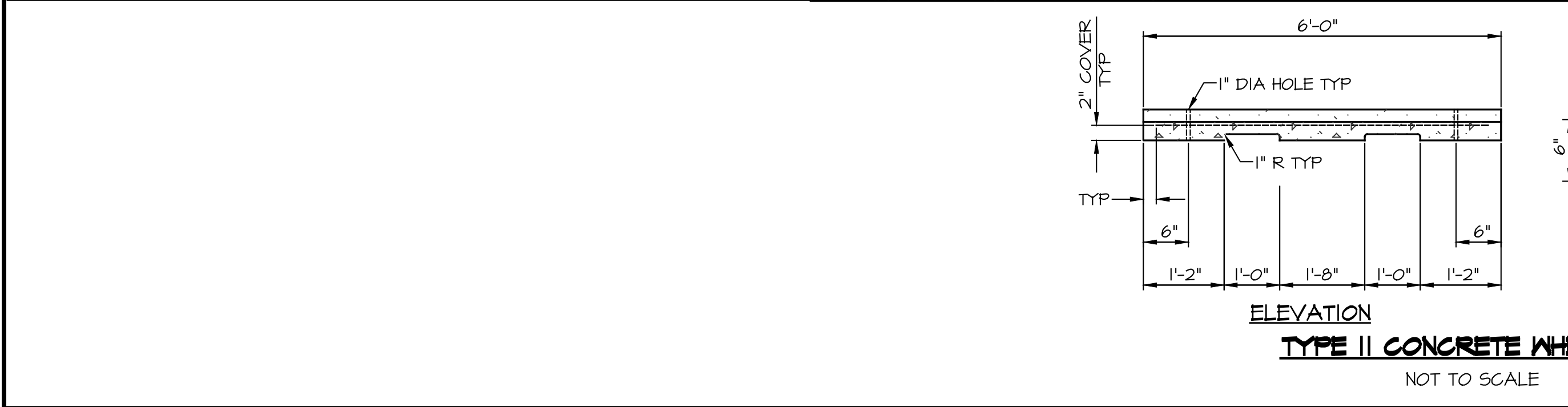
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REVISED	2021		
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



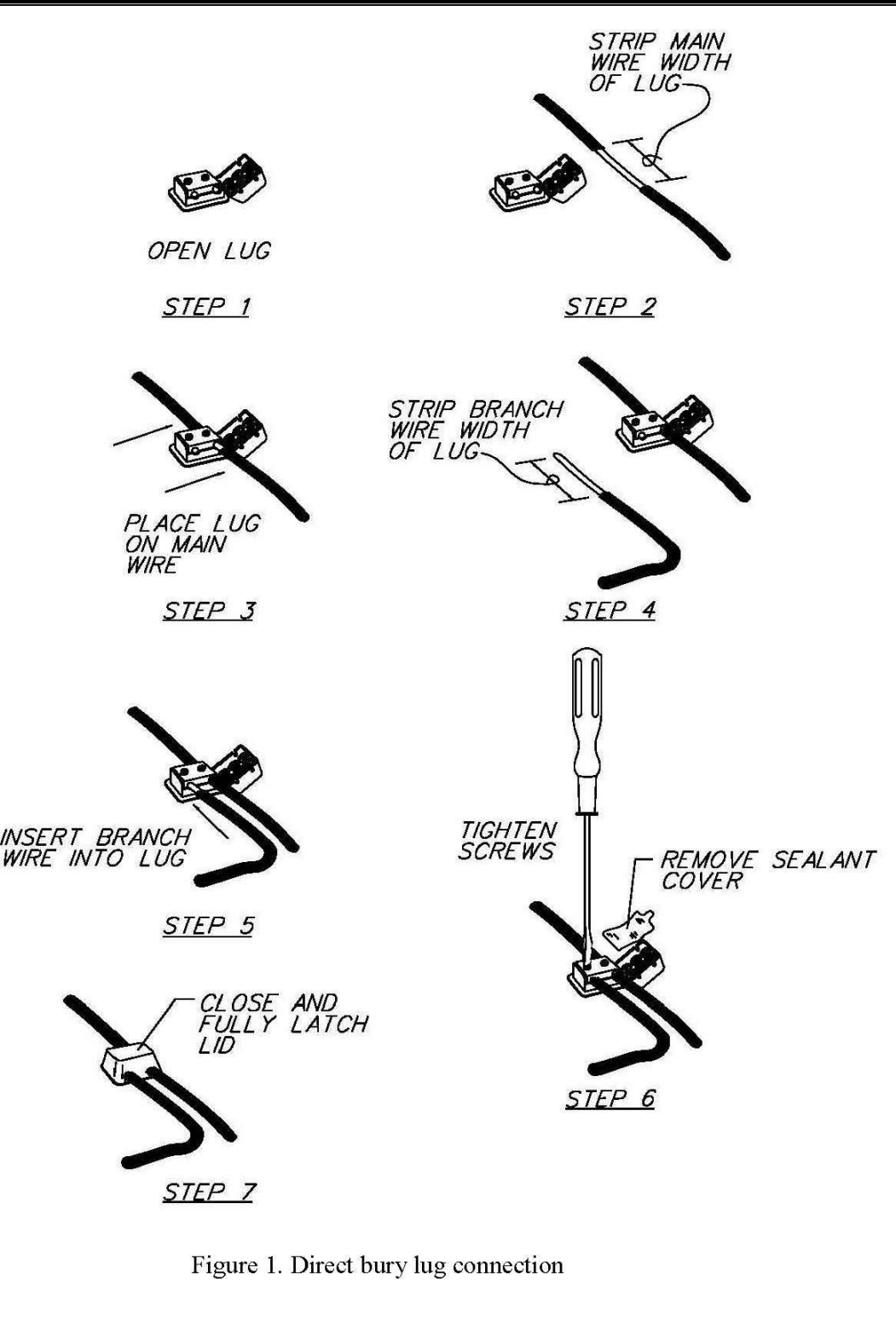
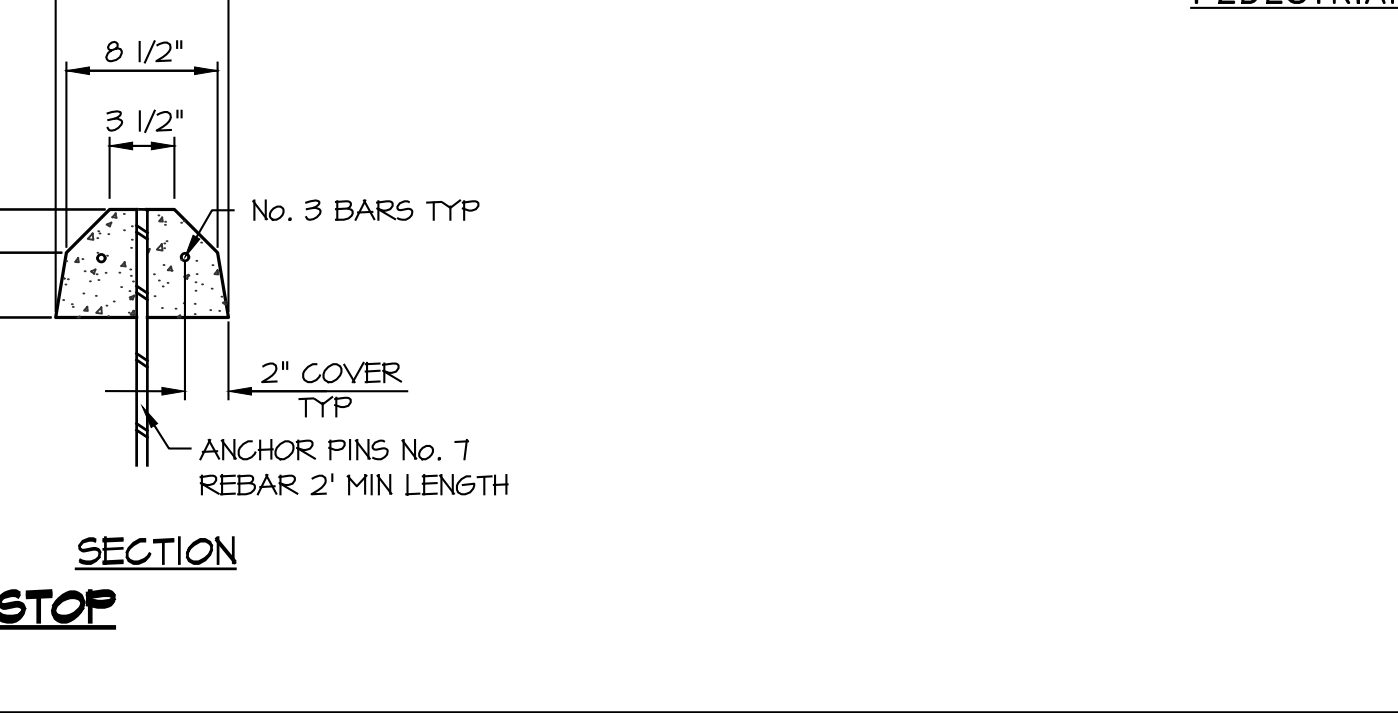
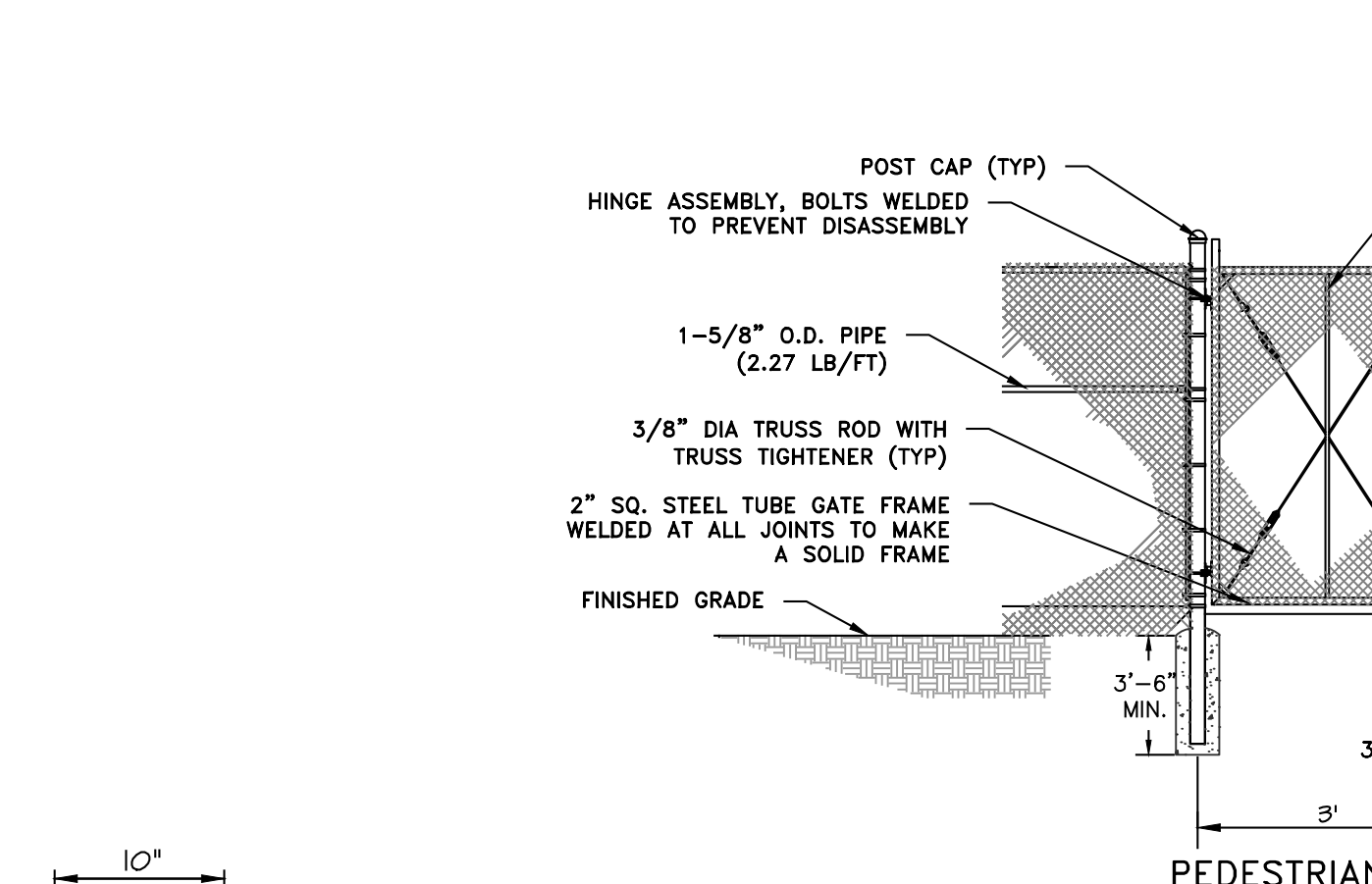
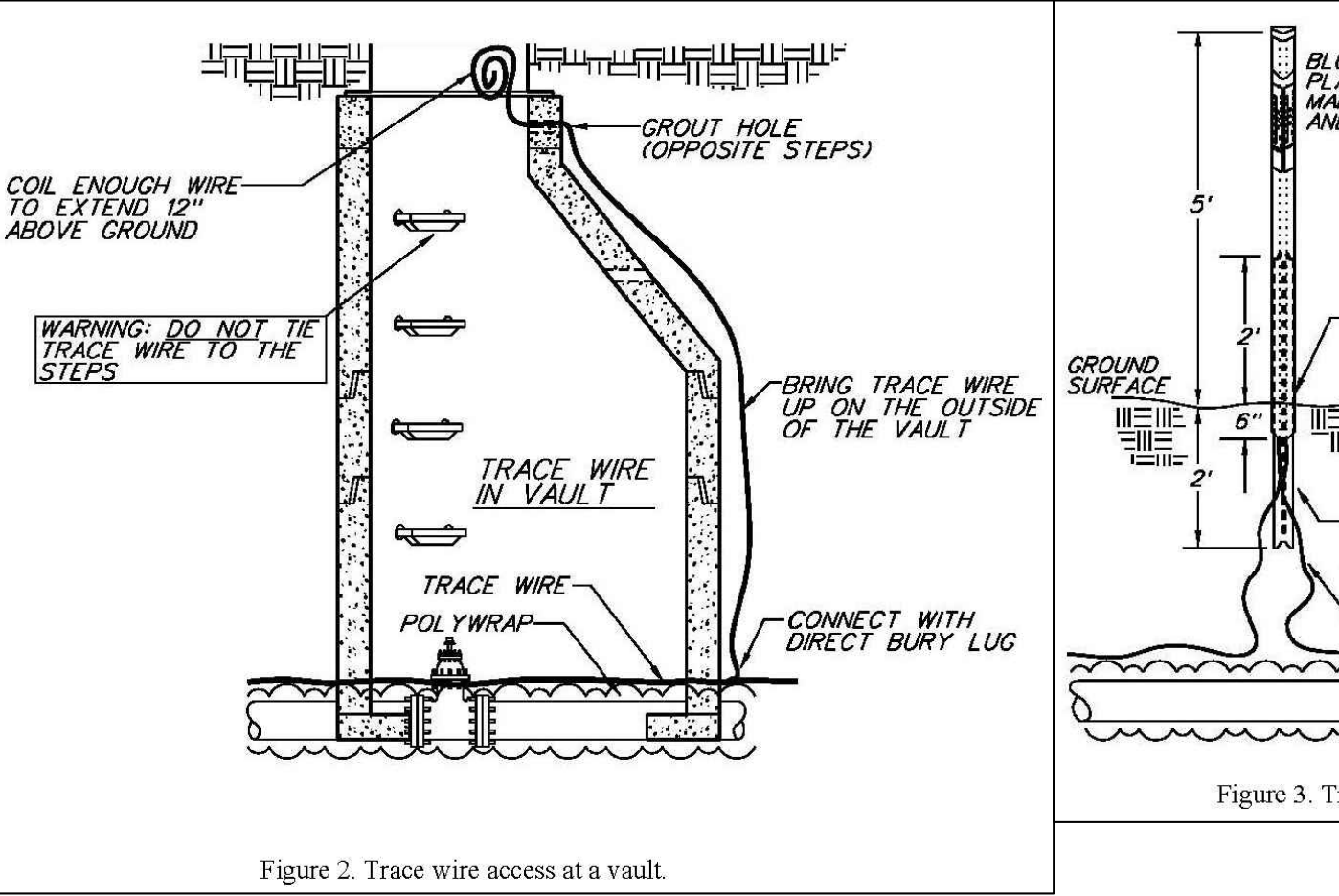
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REVISED			
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



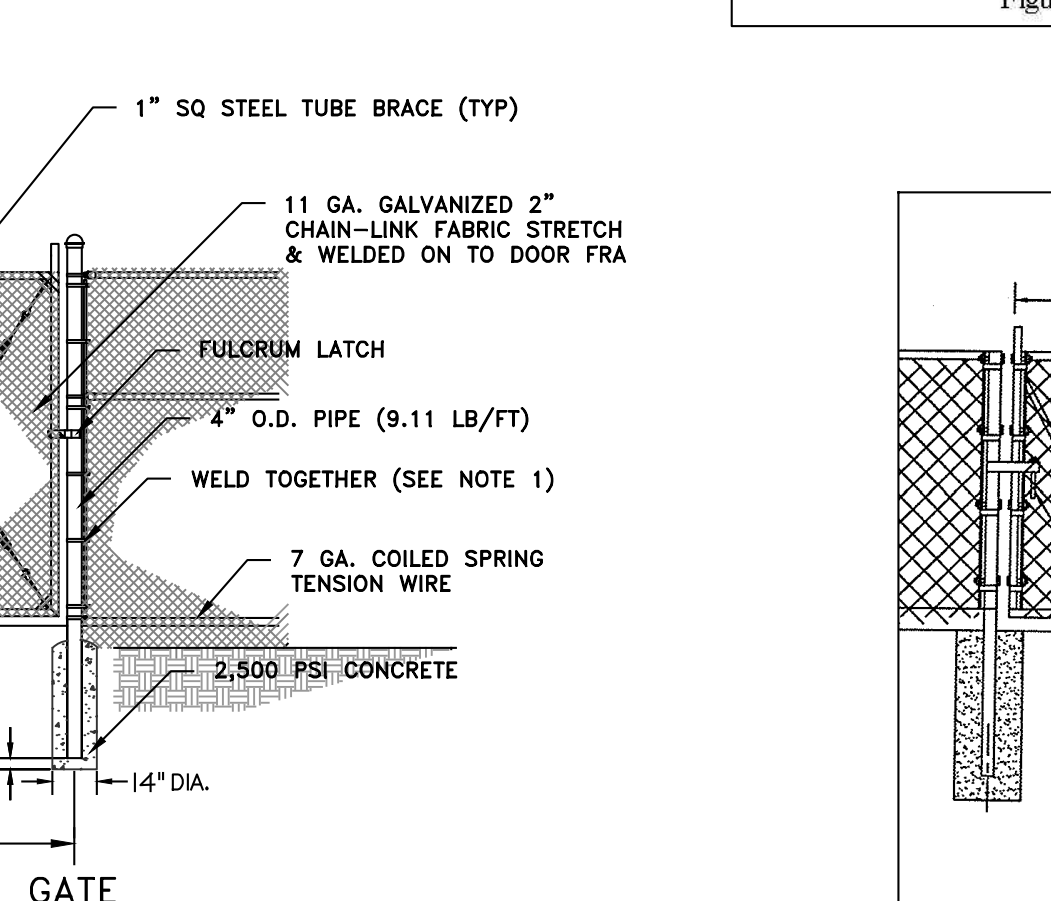
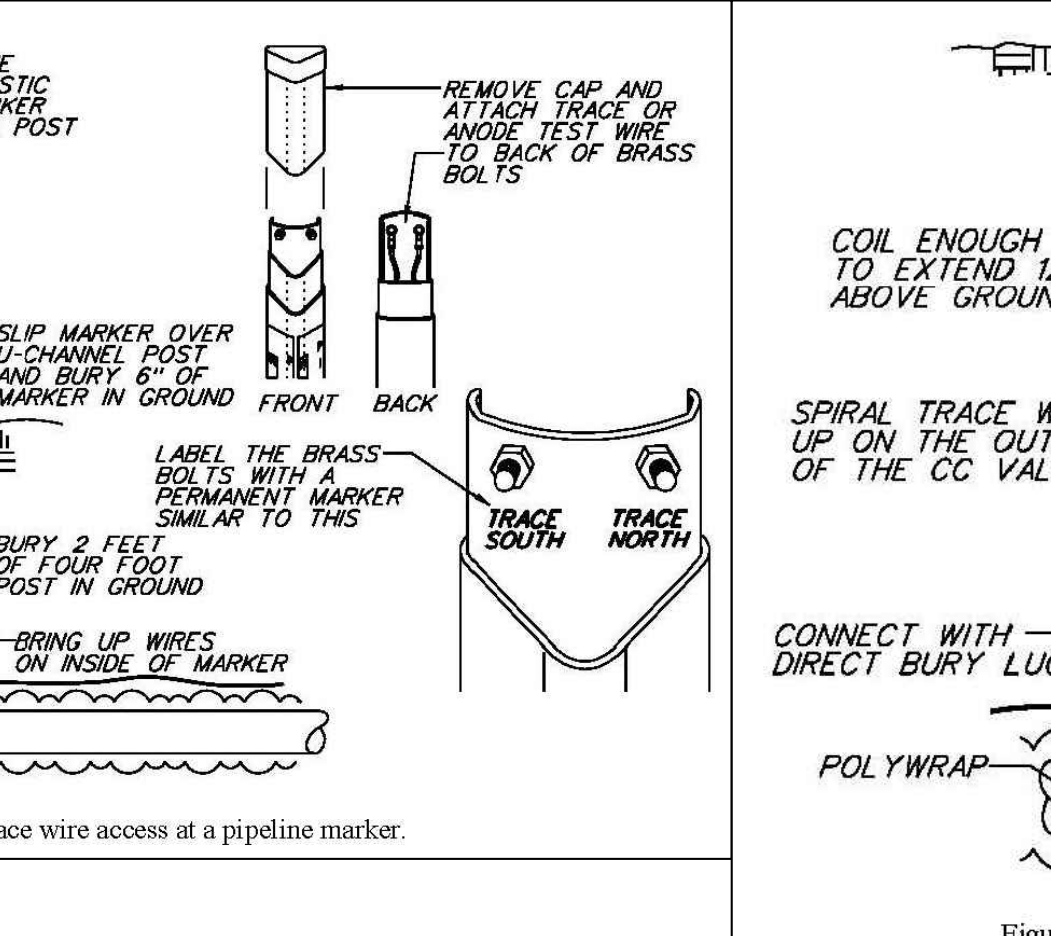
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REVISED	2021		
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



ISSUED	2010		CONCRETE MANHOLE COLLAR (NON-PAVED AREAS)
REVISED			
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	

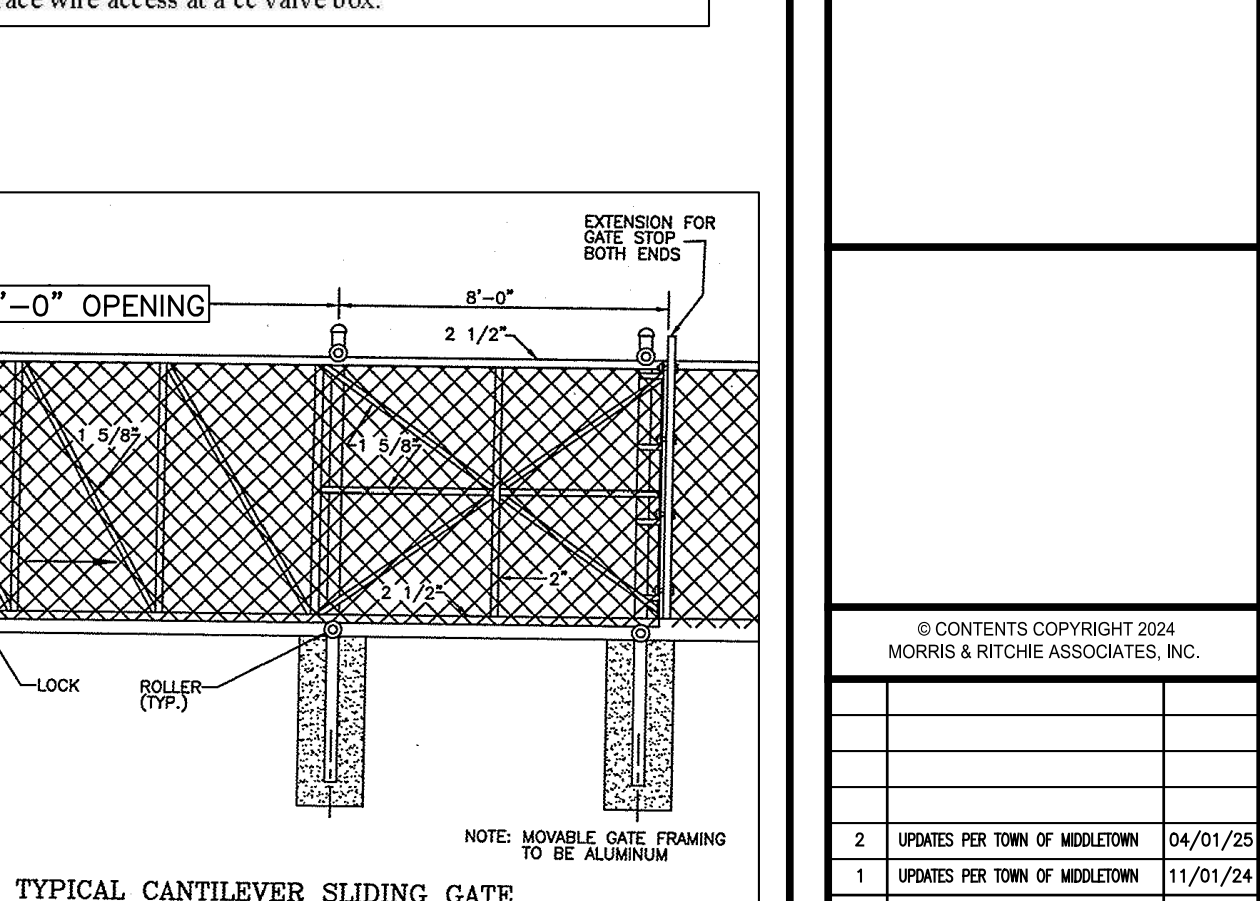
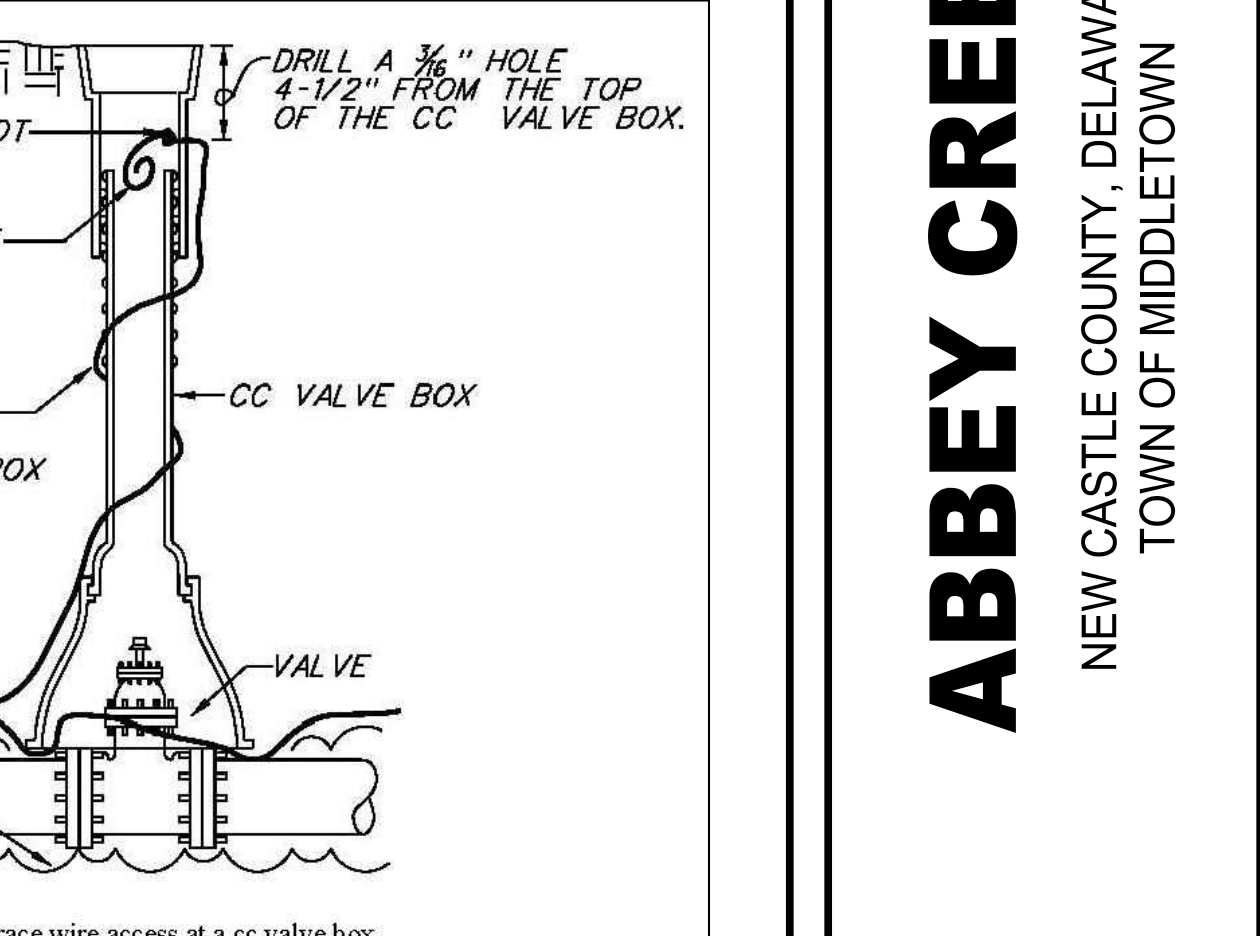


ISSUED	2010		CONCRETE MANHOLE COLLAR (NON-PAVED AREAS)
REVISED			
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



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ISSUED	2010		CONCRETE MANHOLE COLLAR (NON-PAVED AREAS)
REVISED			
SOURCE	NEW CASTLE COUNTY		
		DEPARTMENT OF PUBLIC WORKS	



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**ABBEE CREEK**  
NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

2	UPDATES PER TOWN OF MIDDLETOWN	04/01/25
1	UPDATES PER TOWN OF MIDDLETOWN	11/01/24
NO.	REVISION	DATE
JOB NO.	DRAWN BY	CHECKED BY
21647	GC	SP
SHEET TITLE		
SEWAGE PUMPING STATION STANDARD DETAILS		
SHEET NUMBER		

18 OF 32



DESIGN FLOW CALCULATION

Projected Wastewater Flow Calculations

Establishment	Unit Value (Gal/Day/Unit)	Unit Type	# of Units	Discharge, GPD
Abbey Creek	140	Detached Single-family Twin (semi- detached)	254	35,560.00
(55+ / Active Adult)	140		150	21,000.00
Chapel Creek	250	Detached Single-family Townhome	216	54,000.00
	225		190	42,750.00
Freestone Village	250	Single Family	193	48,250.00
	225	Townhome	288	64,800.00
Ford Farm				10,925.00
Average Daily Flow (GPD)				277,285
Average Daily Flow (GPM)				193

Design Pumping Flow Rate

Peaking Factor Calculation	
Design Peak Factor =	4.0
Peak Flow (GPD) =	1,109,140
Minimum Pumping Rate Required (GPM) =	770
Design Pumping Rate (GPM) =	800.00

Cycle Time & Wet Well Geometry

Target Cycles Per Hour =	6.00
Check Cycles Per Hour:	OK
Check Cycles Per Hour:	OK
Time (Min) =	10
Required Volume =	1462
Pick Wet Well Diameter (FT) =	12.00
Pick Wet Well Cycle (Vert. FT) =	2.00
Volume in Cycle (GAL) =	1,692

Wet Well Invert & Float Elevations

Wet well Dia. (FT) =	12
Top Elev=	51.00
Gnd Elev=	51.00
Wet Well Discharge Elevation (ft) =	45.50
Influent Sewer Invert Elev=	35.81
Alarm =	34.75
Standby Pump On =	34.25
Lag On =	33.75
Lead On =	33.25
Pumps Off =	31.25
Bottom Invert Elev* =	29.75
*As required for complete submergence	
Alarm Depth below Invert Check = 6ft min. between Influent Sewer Invert and Bottom Invert =	OK
Depth of Wet Well (ft) =	OK
	21.25

Force Main Sizing & Velocity Check

Design Pump Rate (gpm) =	800
Select Force Main Pipe =	10" HDPE DIPS DR 11
Select Force Main Outside Diameter (in) =	11.10
Select Force Main Inside Diameter (in) =	8.96
Velocity (fps) =	4.07
Meets Minimum Velocity Requirement?	OK
Meets Maximum Velocity Requirement?	OK
Line Length (ft) =	13,229.00

Minor Losses Calculation

Fitting, Description	Number of Fittings	L/D Ratio	Equivalent Length
45 bend	11	16	131
90 bend	0	30	0
22.5 bend	3	9	20
Branch Tee Flow	36	20	538
Gate valve	56	8	335
Plug Valve	1	18	13
Magnetic Flow Meter	0	5	0
Equivalent Fitting Length (ft) =			1037
Total Equiv Length (ft) =			14,266

PS Piping and Valve Vault Sizing & Velocity Check

Design Pump Rate (gpm) =	800
Select Force Main Pipe =	8" CL CLASS 52 DIP
Select Force Main Outside Diameter (in) =	9.05
Select Force Main Inside Diameter (in) =	8.27
Velocity (fps) =	4.78
Meets Minimum Velocity Requirement?	OK
Meets Maximum Velocity Requirement?	OK

Minor Losses Calculation

Fitting, Description	Number of Fittings	L/D Ratio	Equivalent Length
45 bend	0	16	0
90 bend	8	30	165
22.5 bend	0	9	0
Branch Tee Flow	3	20	41
Check valve	1	100	69
Plug Valve	1	18	12
Magnetic Flow Meter	1	5	3
Reducer 6" x 8"	1	2.5	2
Equivalent Fitting Length (ft) =			293
Wet Well & Valve Vault Piping Length (ft) =			50.00
Total Equivalent Pump Station Pipe Length (ft) =			343

Static Head from Wet Well to Discharge Manhole

Discharge Point Ground Elevation (ft) =	51.00
Depth of Discharge Below Grade (ft) =	5.50
Discharge Point Invert Elevation (ft) =	45.50
Forcemain High Elevation (ft) =	64.82
"Pump Off" Elevation (ft) =	31.25
Static Head (ft) =	33.57

Total Dynamic Head Calculation

Pipe losses	where:
H <sub>f</sub> = head loss due to friction (ft)	
L = length of pipe (ft)	
Q = flow rate (gpm)	
C = Hazen-Williams coefficient	
I.D. = inside diameter (in)	

	Forcemain	PS & Valve Vault
Initial Service C =	150	120

Flow (gpm)	Static Head (ft)	Forcemain Pipe Losses (ft)	PS & Valve Vault Pipe Losses (ft)	TDH (ft)
0	33.6	0.0	0.0	34
230	33.6	7.6	0.3	41
470	33.6	28.6	1.0	63
800	33.6	76.6	2.7	113
1000	33.6	115.8	4.0	153
1200	33.6	162.2	5.6	201

	Forcemain	PS & Valve Vault
End-of-Service C =	140	100

Flow (gpm)	Static Head (ft)	Forcemain Pipe Losses (ft)	PS & Valve Vault Pipe Losses (ft)	TDH (ft)
0	33.6	0.0	0.0	34
230	33.6	8.7	0.4	43
470	33.6	32.5	1.4	67
800	33.6	87.0	3.7	124
1000	33.6	131.5	5.6	171
1200	33.6	184.3	7.9	226

PUMP SELECTION:  
FLYGT MODEL N 3301 HT 3~468, 85 HP, 3PH OPERATING @ 41.4 Hz, DUTY POINT: 486 gpm @ 67 ft TDH  
FLYGT MODEL N 3301 HT 3~468, 85 HP, 3PH OPERATING @ 58.7 Hz, DUTY POINT: 884 gpm @ 124 ft TDH

PUMP OPERATION CHECK

Proposed Operational Point No.1	
Flow =	470 GPM
TDH =	67 ft

Check Wet well Cycle Times

Wet well Diameter (feet)	Wet well Area (gal / VF)	Wet well Cycle (ft)	Wet well Volume (gal)
12.0	846	2.0	1691

Fill =	Wet well Volume	=	16.0 minutes
Run =	Wet well Volume	=	4.6 minutes
	Pump Rate - ADF		

Total =	20.6 minutes
Cycle Time =	2.9 Cycles / Hour
Meets Minimum Cycle Time?	OK
Meets Maximum Cycle Time?	OK

Proposed Operational Point No.2	
Flow =	800 GPM
TDH =	124 ft

Check Wet well Cycle Times

Wet well Diameter (feet)	Wet well Area (gal / VF)	Wet well Cycle (ft)	Wet well Volume (gal)
12.0	846	2.0	1691

Fill =	Wet well Volume	=	8.8 minutes
Run =	Wet well Volume	=	2.8 minutes
	Pump Rate - ADF		

Total =	11.6 minutes
Cycle Time =	5.2 Cycles / Hour
Meets Minimum Cycle Time?	OK
Meets Maximum Cycle Time?	OK

FORCEMAIN DETENTION TIME

Pipe =	10" HDPE DIPS DR 11
Inside Diameter (in) =	8.961
Pipe Length (ft)	13229.0
Pipe Cross Sectional Area (ft <sup>2</sup> )	0.438
Pipe Volume (ft <sup>3</sup> )	5,794
Pipe Volume (G)	43,341

Average Daily Flow (gallons per day)	277,285
--------------------------------------	---------

Average Detention Time (hr)	3.75
-----------------------------	------

ANTILOTATION CALCULATIONS

Wet well Structure Details	
Wet well Outside Dimensions	14.00 Feet
Wet well Inside Dimensions	12.00 Feet
Wet well Top Slab Elevation	51.00 Feet
Wet well Invert Elevation	29.75 Feet
Extended Base Slab Diameter	19.00 Feet
Extended Base Slab Thickness	1.50 Feet
Top Slab Thickness	1.00 Feet

Calculate Total Volume of Wet well Structure	
Volume of Wet well Riser Sections=	3270 cf
Volume of Wet well Extended Base=	425 cf
Total Volume of Wet well Structure=	3695 cf

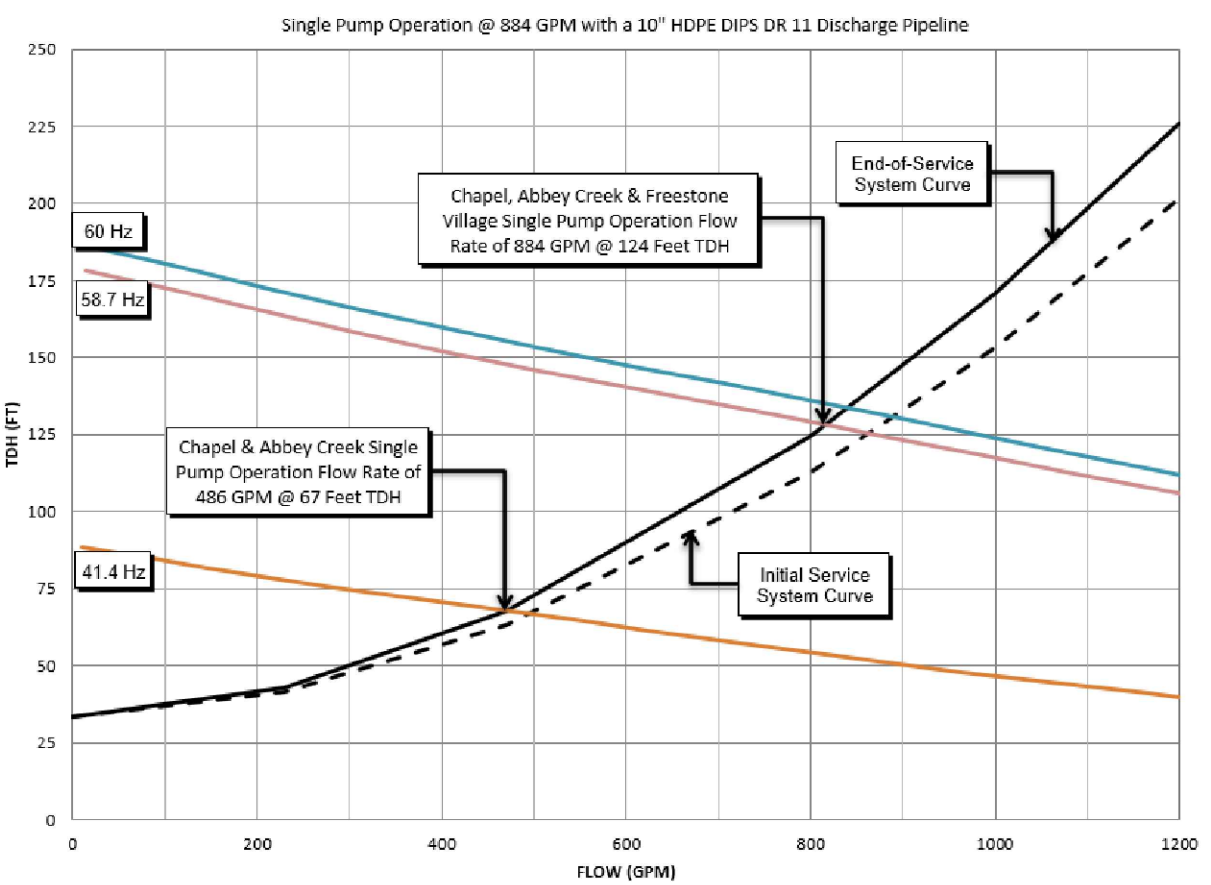
Calculate Total Volume of Water Displaced	
H <sub>2</sub> O Displaced = (Volume of Wet well Structure) * (62.4 lbs/cf)	
H <sub>2</sub> O Displaced=	230543 lbs

Calculate Weight of Wet well Components		
Section	Total Ht	Weight
Top Slab Thickness (ft.)	1.00	23091
Riser - Total Vertical Ft.	21.25	130180
Base Slab Thickness (ft.)	1.50	63794
Totals=	23.75	217064
Total Weight of Concrete in Wet well=		217064 lbs.

Calculate Submerged Weight of Soil Above Extended Base/Footing	
Total Area of Extended Base	284 sf
Total Area of Wet well Riser	154 sf
Area of Extended Base less Wet well	130 sf
Height of Soil Above Extended Base	21 ft
Volume of Soil Above Extended Base	2754 cf
Wt. of Soil Above Extended Base (estimated)	50 lbs/cf
Total Weight of Soil Above Extended Base	137690 lbs/cf

Flotation Protection Required?	
Weight of Concrete and Weight of Soil Above Extended Base:	354754 lbs
Weight of Water Displaced By Wet Well:	230543 lbs
Flotation Protection Required?	NO

PUMP CURVES

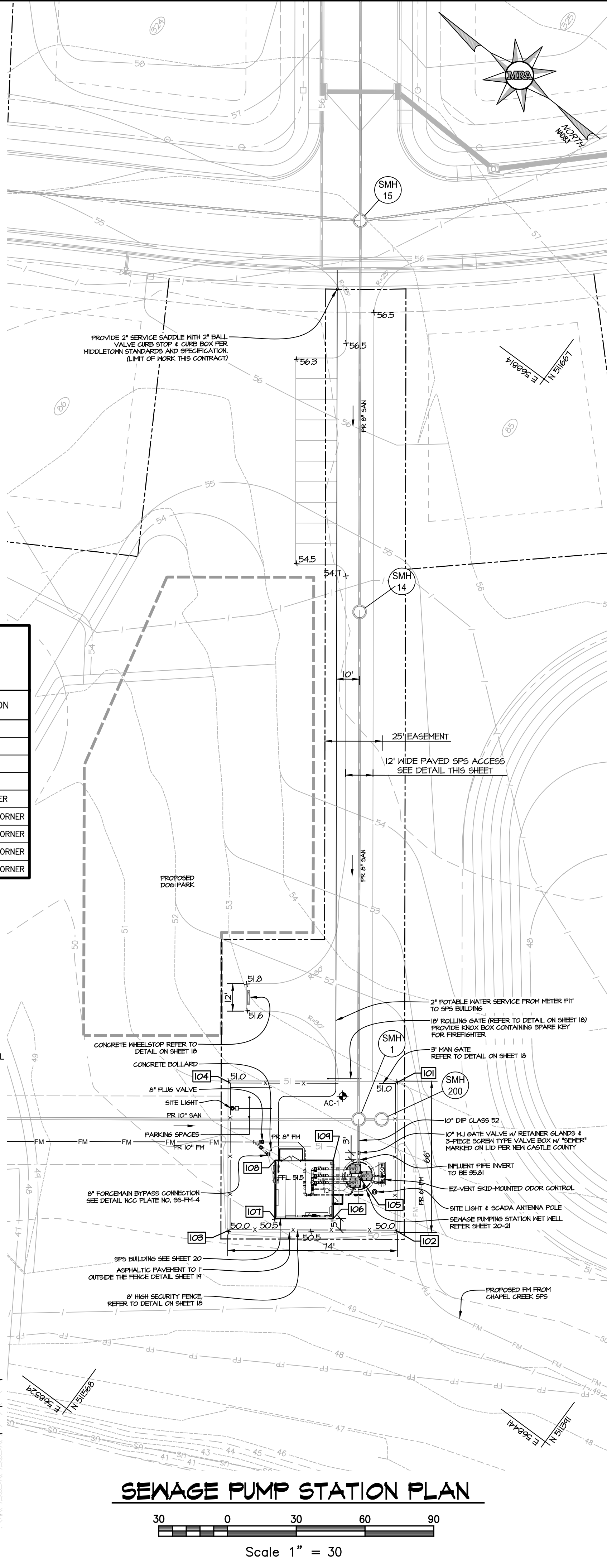
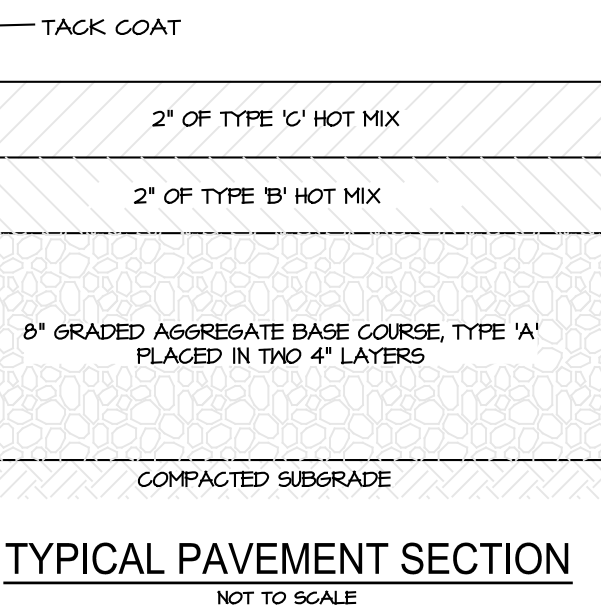


LOG OF BORING NO. AC-1									
PROJECT: Abbey Creek					WATER LEVEL (ft): 13.0 Dry BOC				
PROJECT NO.: 232293					DATE: 1/8/24 1/8/24				
PROJECT LOCATION: Town of Middletown, Delaware					CAVED IN: In August 8.8				
DATE STARTED: 1/8/24					WATER ENCOUNTERED DURING DRILLING (ft): 13.0				
DATE COMPLETED: 1/8/24					GROUND SURFACE ELEVATION: 64.0				
DRILLING CONTRACTOR: Geo-Technology Associates, Inc.					DATUM: Topo				
DRILLER: D. Hans, Jr.					EQUIPMENT: Diedrich D60				
DRILLING METHOD: Hollow Stem Auger					LOGGED BY: D. Baker				
SAMPLING METHOD: Split Spoon					CHECKED BY: M. McDonough				
SAMPLE NUMBER	SAMPLE DEPTH (ft)	SAMPLE RECOVERY (%)	SAMPLE BLOWER TURNS	N (Number)	ELEVATION (ft)	USCS	GRAPHIC SYMBOL	DESCRIPTION	REMARKS
S-1	0.0	17	1-1-2-3	3	54.0	CL		Topsoil +/- 10 Inches	
					53.8			Brown, moist, soft, Lean CLAY	
S-2	2.0	15	3-4-3-4	7				Brown, moist, medium stiff, Lean CLAY with sand	
S-3	4.0	17	4-5-4-5	9	50.0	SC		Brown and orange, moist, loose, Clayey SAND	
S-4	6.0	20	4-7-9-9	16				Orange and brown, moist, medium dense, Clayey SAND, contains gravel	
S-5	8.0	18	2-4-3-4	7				Brown and orange, moist, very loose, Silty SAND	
S-6	13.0	21	2-4-4-3	8	41.0	SP-SM		Orange, wet, loose, Poorly-graded SAND with Silt	
S-7	18.0	18	3-5-5-7	10	36.0	SM		Orange and brown, moist, medium stiff, Lean CLAY	
S-8	28.0	20	4-6-7-9	13				Same	
NOTES: Elevation and location should be considered approximate.									
GEO-TECHNOLOGY ASSOCIATES, INC.					LOG OF BORING NO. AC-1				
18 Boulden Circle, Suite 38 New Castle, DE 19720					Sheet 1 of 2				

STAKEOUT POINT TABLE			
POINT NUMBER	NORTHING	EASTING	DISCRPTION
101	511,536.67	568,528.05	FENCE CORNER
102	511,498.69	568,476.54	FENCE CORNER
103	511,556.64	568,433.81	FENCE CORNER
104	511,594.62	568,485.33	FENCE CORNER
105	511,525.61	568,486.09	WET WELL CENTER
106	511,523.39	568,464.54	SPS BUILDING CORNER
107	511,543.78	568,449.51	SPS BUILDING CORNER
108	511,558.81	568,469.90	SPS BUILDING CORNER
109	511,538.42	568,484.93	SPS BUILDING CORNER

LEGEND

---	EX. PROPERTY LINE
---	EX. RIGHT-OF-WAY
---	EX. ADJACENT PROPERTY LINE
---	EX. EASEMENT
---	EX. FLOODPLAIN
---	EX. WATERS--OF--THE--US
---	EX. 1' CONTOUR
---	EX. 10' CONTOUR
---	EX. SOILS DELINEATION
---	EX. SOILS CLASSIFICATION LABEL
---	PR. RIGHT OF WAY
---	PR. LOT LINE/PARCEL LINE
---	PR. EASEMENT
---	PR. BUILDING
---	PR. CURB & GUTTER
---	PR. ROAD CENTER LINE
---	PR. CONC SIDEWALK
---	PR. HANDICAP RAMP
---	PR. LOT NUMBER
---	PR. CURB RADIUS
---	PR. SANITARY LINE
---	PR. STORM DRAIN
---	PR. WATER LINE
---	PR. FIRE HYDRANT
---	PR. SANITARY FORCE MAIN
---	PR. 1' CONTOUR
---	PR. 10' CONTOUR
---	BORING LOCATION









FITTING, VALVE &  
EQUIPMENT SCHEDULE

ID	DESCRIPTION
A	SUBMERSIBLE SEWAGE PUMPS - FLYGT MODEL NP-3301 HT 3~460, 85HP
B	8" FLG, 90° BEND
C	DUCKBILL CHECK VALVE - CLA-VAL SERIES RF-DBF
D	8" RESTRAINED MJ SLEEVE
E	8" RESTRAINED FLANGE COUPLING ADAPTER - ROMAC RFCA
F	8" FLG. AIR-CUSHIONED SWING CHECK VALVE - 6A INDUSTRIES FIGURE 250-D
G	8" FLG. ECCENTRIC FLUG VALVE (FULL PORT) DEZURIK PEF w/ HANDWHEEL ACTUATOR
H	8" FLG, 90° BASE BEND
I	8"x8"x4" FLG. TEE
J	8" FLG. TEE
K	8" ONYX PSR PRESSURE GLAND w/ ASHCROFT PRESSURE TRANSMITTER RATED FOR 0-100 PSI
L	8" FLG. TEE w/ BLIND FLANGE, 2" THD. TAP, 2" NRS RESILIENT WEDGE GATE VALVE AND APCO COMBO RELEASE VALVE w/ 2" INLET
M	4" FLG, 90° BEND
N	10" MJ RESILIENT SEAT GATE VALVE - MUELLER A-2361 w/ RETAINER GLANDS
O	6"x8" FLG. INCREASER
P	SUBMERSIBLE LEVEL TRANSDUCER - E+H WATERPILOT
Q	8" FLG. ELECTROMAGNETIC FLOW METER - SIEMENS SITRANS MAGFLO 5100 w/ MAG6000 TRANSMITTER
R	4" DEZURIK APCO SURGE RELIEF ANGLE VALVE
S	4" MJ, 45° BEND
T	4" MJ, 22.5° BEND
U	4" MJ, 90° BEND
V	8" MJ, 90° BEND
W	4" GATE VALVE

## PUMP STATION GENERAL NOTES

- ALL METALS & FASTENERS INCLUDING FLANGED ACCESSORIES IN THE WET WELL & VALVE VAULT SHALL BE STAINLESS STEEL.
- WASTEWATER PIPING INSIDE WET WELL, VALVE VAULT & UPSTREAM OF TRANSITION TO PVC AT 8"x10" MJ INCREASER SHALL BE CLASS 52, FLANGED DUCTILE IRON PIPE WITH EXTERIOR ASPHALTIC COATING & INTERIOR DOUBLE CEMENT MORTAR LINING (DCL).
- ALL PIPE PENETRATIONS SHALL HAVE PVC SLEEVE w/ INTEGRAL WATERSTOP & MODULAR ELASTOMER SEAL (LINK-SEAL).
- ALL INTERIOR WET WELL CONCRETE SURFACES SHALL RECEIVE 2 COATS OF 746/498/499 PLY-TILE EPOXY TAR (24 MIL MIN. DFT).
- ALL ISOLATION VALVES SHALL OPEN LEFT (COUNTER-CLOCKWISE).

SEWER PUMP STATION STANDARDS SPECIFICATIONS  
(TOWN OF MIDDLETOWN)

- ALL WORK SHALL CONFORM TO THE TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION / PUMP STATION SPECIFICATIONS (2024 EDITION), TOWN STANDARD DETAILS, AND APPLICABLE FEDERAL, STATE, AND LOCAL CODES INCLUDING NFPA, NEC, ANNA, ASTM, DNREC, AND NEW CASTLE COUNTY.
- PUMP STATION DESIGN: PUMP STATION SHALL USE A WET WELL SUBMERSIBLE SYSTEM WITH TRIPLEX PUMP CONFIGURATION (ONE DUTY, TWO STANDBY). PUMPS SHALL BE FLYGT OR TOWN-APPROVED EQUAL, NON-CLOS. CENTRIFUGAL, CAPABLE OF PASSING A MINIMUM 3-INCH SOLID. INSTALL MIX-FLUSH VALVES WHERE REQUIRED.
- SITE REQUIREMENTS: PROVIDE PAVED ACCESS DRIVE AND PARKING AREA, DESIGNED FOR JET/VAC TRUCK ACCESS (34-FT MINIMUM VEHICLE LENGTH CLEARANCE). INSTALL 8' HIGH VINYL-SLATTED CHAIN LINK FENCING WITH KNOX-BOX ENTRY, AND LED SITE LIGHTING WITH DUSK-TO-DAWN PHOTOCELLS AND MANUAL OVERRIDE SWITCHES. PROVIDE SITE GRADING FOR POSITIVE DRAINAGE AWAY FROM THE STATION.
- STRUCTURAL COMPONENTS: WET WELL AND VALVE VAULTS TO BE PRECAST CONCRETE WITH MINIMUM 4,000 PSI STRENGTH, DESIGNED WITH 15 FACTOR OF SAFETY AGAINST BUOYANCY. APPLY 16-MIL COAL TAR EPOXY COATING ON EXTERIORS AND 16-MIL PLY-TILE EPOXY COATINGS INSIDE. PROVIDE H-20 RATED ALUMINUM ACCESS HATCHES WITH INTEGRAL SAFETY GRATES.
- ELECTRICAL SYSTEM: ALL EQUIPMENT SHALL BE NEMA 4X STAINLESS STEEL, RATED FOR OUTDOOR SERVICE. ELECTRICAL SERVICE SHALL BE 3-PHASE, 4-WIRE AT 480V, 240V, OR 208V BASED ON UTILITY AVAILABILITY. PROVIDE GROUND FAULT PROTECTION, LIGHTNING SURGE PROTECTION, AND GROUNDING SYSTEMS IN ACCORDANCE WITH NEC. USE COLOR-CODED WIRING AND LABELED TERMINATIONS.
- INSTRUMENTATION AND CONTROLS: PRIMARY WET WELL LEVEL CONTROL SHALL BE PROVIDED USING A MULTITRODE SENSING SYSTEM. BACKUP LEVEL CONTROL SHALL BE BY MECHANICAL FLOAT SWITCHES. USE FLYGT MULTISHIFT PUMP STATION MANAGER OR APPROVED EQUAL FOR MONITORING AND CONTROL, WITH SCADA INTERFACE TO TOWN'S SYSTEM. PROVIDE UPS-BACKED POWER TO ALARM SYSTEMS COORDINATED WITH B SAFE SECURITY.
- ALARM REQUIREMENTS: SCADA SYSTEM SHALL MONITOR AND REPORT ALARMS INCLUDING UTILITY POWER FAILURE, GENERATOR OPERATION, HIGH WET WELL LEVEL, AND LOW WET WELL LEVEL. COORDINATE INSTALLATION WITH TOWN'S DESIGNATED SCADA INTEGRATOR AND ALARM CONTRACTOR.
- PIPING AND VALVES: USE DUCTILE IRON PIPE CLASS 52, PROTECTO 401 LINED AND EPOXY-COATED FOR PRESSURE PIPING. USE SCHEDULE 80 PVC FOR DRAIN AND VENT LINES. INSTALL DEZURIK FLUG VALVES, MUELLER RESILIENT WEDGE GATE VALVES, AND GOLDEN-ANDERSON LEVER-WEIGHTED CHECK VALVES. PROVIDE A BAUER QUICK-CONNECT BYPASS CONNECTION WITH ISOLATION VALVE.
- FORCE MAIN REQUIREMENTS: INSTALL COMBINATION AIR RELEASE VALVES AT ALL HIGH POINTS, CLEANOUTS EVERY 400 LINEAR FEET, AND TERMINAL CLEANOUTS AT CHANGES IN DIRECTION OVER 30 DEGREES. DISCHARGE MANHOLES AND FIRST TWO DOWNSTREAM MANHOLES MUST BE EPOXY COATED.
- GENERATOR AND ATS: PROVIDE DIESEL-POWERED GENERATOR BY CUMMINS/ONAN SIZED FOR FULL STATION ELECTRICAL LOAD, WITH 500-GALLON MINIMUM DOUBLE-WALL FUEL TANK. INSTALL LEVEL 2 AUTOMATIC TRANSFER SWITCH (ATS) WITH ADJUSTABLE START DELAY AND RETRANSFER SETTINGS. PROVIDE WEEKLY AUTO-EXERCISE AND MANUAL LOAD BANK CONNECTION IF STATION LOAD IS CONSISTENTLY BELOW 30% OF GENERATOR CAPACITY.
- HYAC AND ODOR CONTROL: WET WELL VENTILATION SHALL BE CONTINUOUS, 12 AIR CHANGES PER HOUR (ACH) MINIMUM, USING EXPLOSION-PROOF FANS. BUILDING VENTILATION SHALL BE INTERMITTENT, 6 ACH MINIMUM, THERMOSTATICALLY CONTROLLED. PROVIDE CARBON FILTRATION ODOR CONTROL SYSTEM IF DETENTION TIMES EXCEED LIMITS SET BY TOWN SPECIFICATIONS.
- TESTING AND START-UP: CONTRACTOR SHALL PERFORM ALL REQUIRED FIELD TESTING INCLUDING PUMP DRAIN-DOWN TESTS (MINIMUM THREE CYCLES PER PUMP), FORCE MAIN PRESSURE TESTING, SCADA/ALARM VERIFICATION, AND GENERATOR/ATS TESTING. PROVIDE COMPLETE START-UP SERVICES BY CERTIFIED FACTORY TECHNICIANS. CORRECT ALL DEFICIENCIES PRIOR TO FINAL ACCEPTANCE.
- OPERATION AND MAINTENANCE MANUALS: SUBMIT COMPLETE AS-BUILT DRAWINGS, CERTIFIED PUMP CURVES, SPARE PARTS LIST, MAINTENANCE PROCEDURES, MANUFACTURER WARRANTIES, AND OPERATIONS MANUALS. POST LAMINATED AS-BUILT DRAWINGS INSIDE CONTROL PANEL ENCLOSURE FOR REFERENCE.
- WARRANTY: PROVIDE A MINIMUM 1-YEAR WARRANTY ON COMPLETE INSTALLATION, AND A 5-YEAR MANUFACTURER'S WARRANTY ON SUBMERSIBLE PUMPS, CONTROL PANELS, AND MAJOR ELECTRICAL COMPONENTS.
- FOR COMPLETE DETAILED REQUIREMENTS, REFER TO THE TOWN OF MIDDLETOWN SUPPLEMENTAL LIFT STATION / PUMP STATION SPECIFICATIONS (2024 EDITION). NO DEVIATIONS PERMITTED WITHOUT PRIOR WRITTEN TOWN APPROVAL.

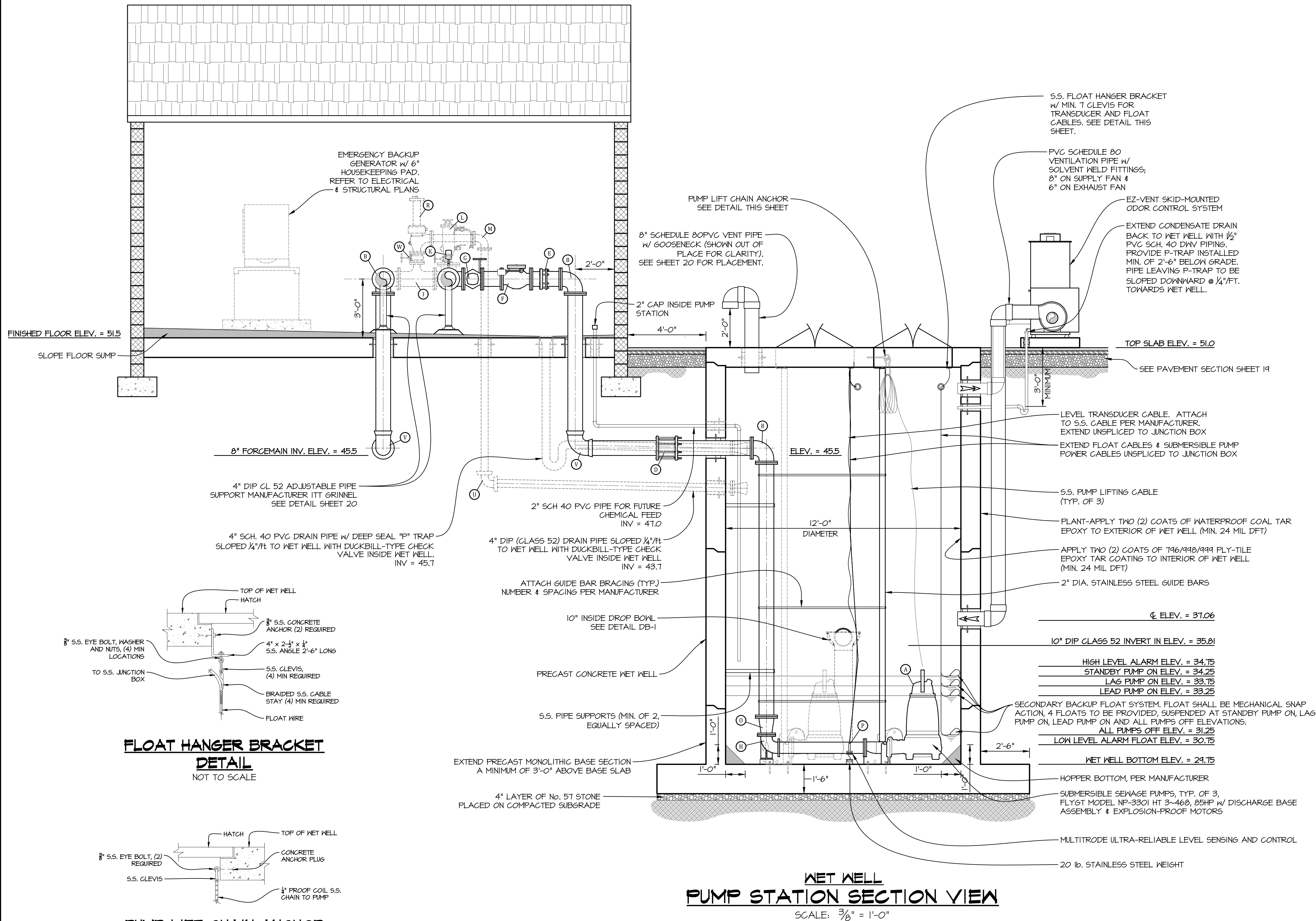
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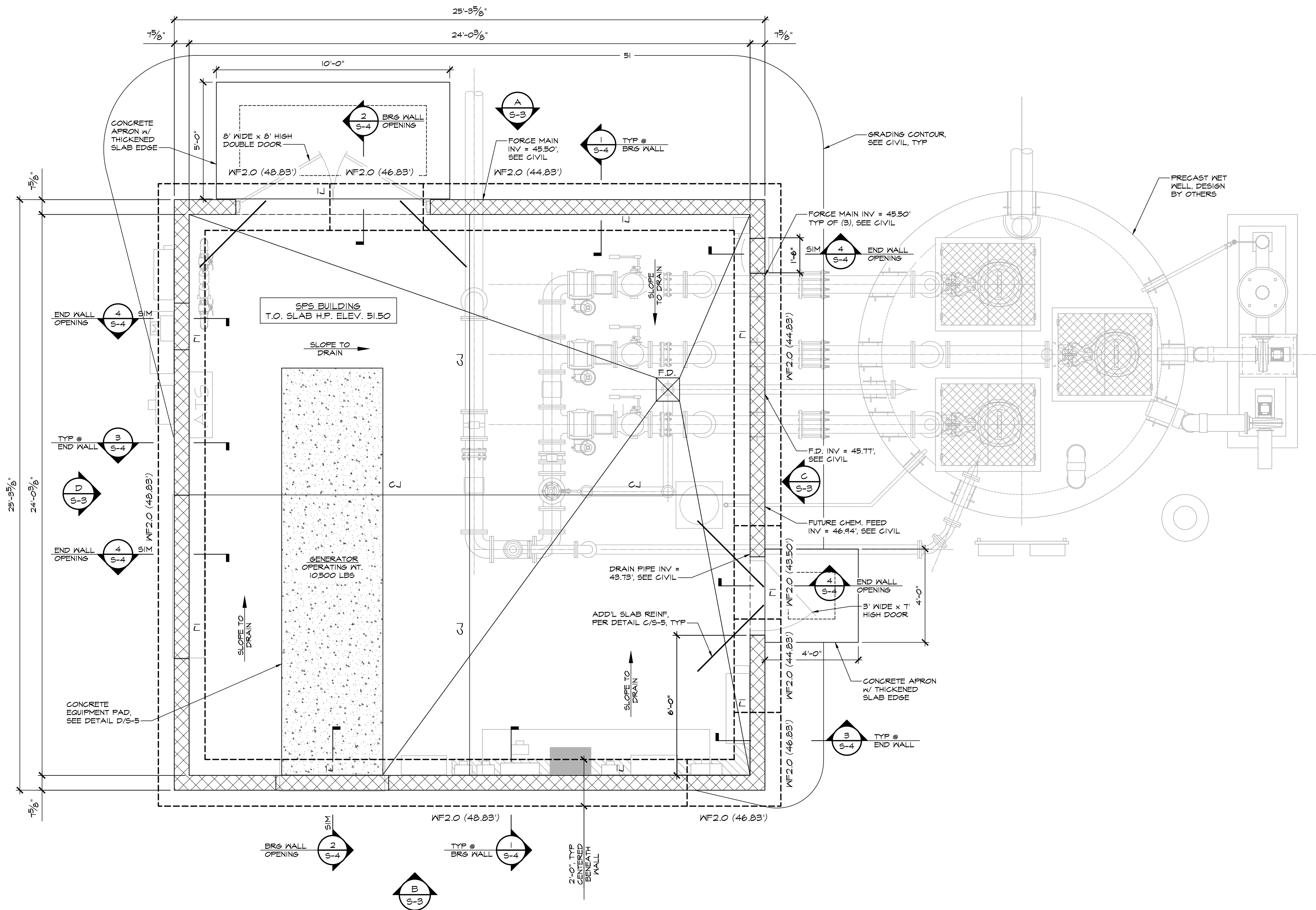
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NO.	REVISION	DATE
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		ISSUED 04/29/25

SHEET TITLE

SEWAGE PUMPING STATION  
BUILDING AND WET WELL  
SECTION VIEW

SHEET NUMBER





**FOUNDATION PLAN**

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

**FOUNDATION AND SLAB ON GRADE NOTES**

- CONCRETE SLAB ON GRADE SHALL CONSIST OF 6" NORMAL WEIGHT CONCRETE REINFORCED WITH (2) LAYERS 6"x6"-W2.5XW2.5 WELDED WIRE FABRIC (WWF) AND PLACED OVER A 4" THICK COMPACTED GRANULAR BASE AND 10 MIL VAPOR RETARDER. REFER TO TYPICAL SLAB ON GRADE DETAILS FOR ADDITIONAL INFORMATION.
- TOP OF SLAB ON GRADE HIGH POINT ELEVATION = 51.50 = DATUM ELEVATION = +0'-0".
- SLAB ON GRADE CONTROL JOINTS ARE SHOWN ON PLAN THUS: C-J
- SLAB ON GRADE ISOLATION JOINTS ARE SHOWN ON PLAN THUS: I-J
- TOP OF FOOTING ELEVATIONS ARE SHOWN ON PLAN THUS: (XXXXX)
- WF2.0 IN PLAN INDICATES: 2'-0" WIDE X 1'-0" THICK CONCRETE WALL FOOTINGS, SEE SECTIONS ON S-4 FOR ADD'L. INFORMATION.

	UPDATES PER TOWN OF MIDDLETOWN		04/01/2
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	REVISION		DATE
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1647	SDT	JGB	04/29/2

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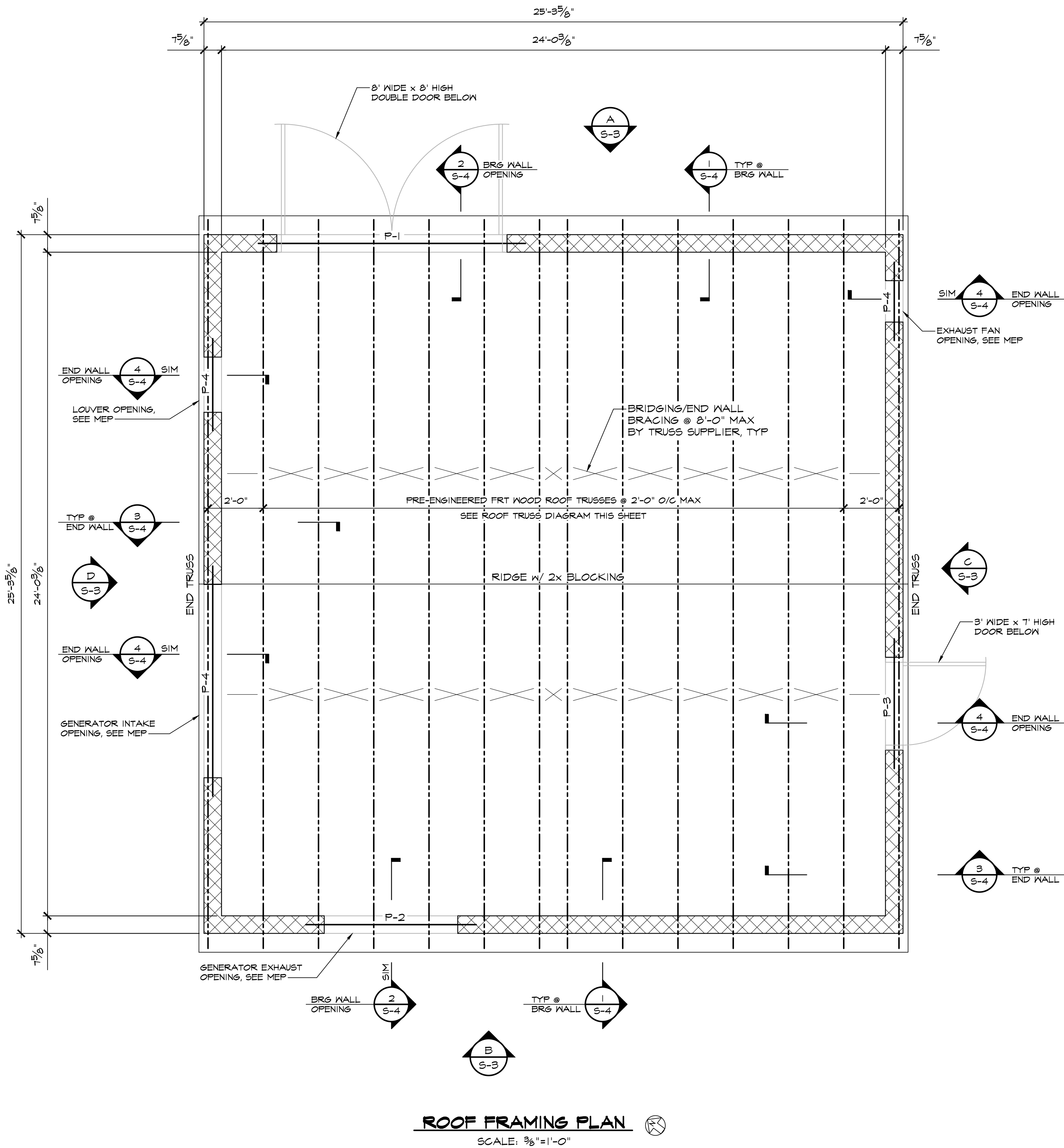
**FOUNDATION  
PLAN**

SHEET NUMBER

**S-1**  
22 OF 32



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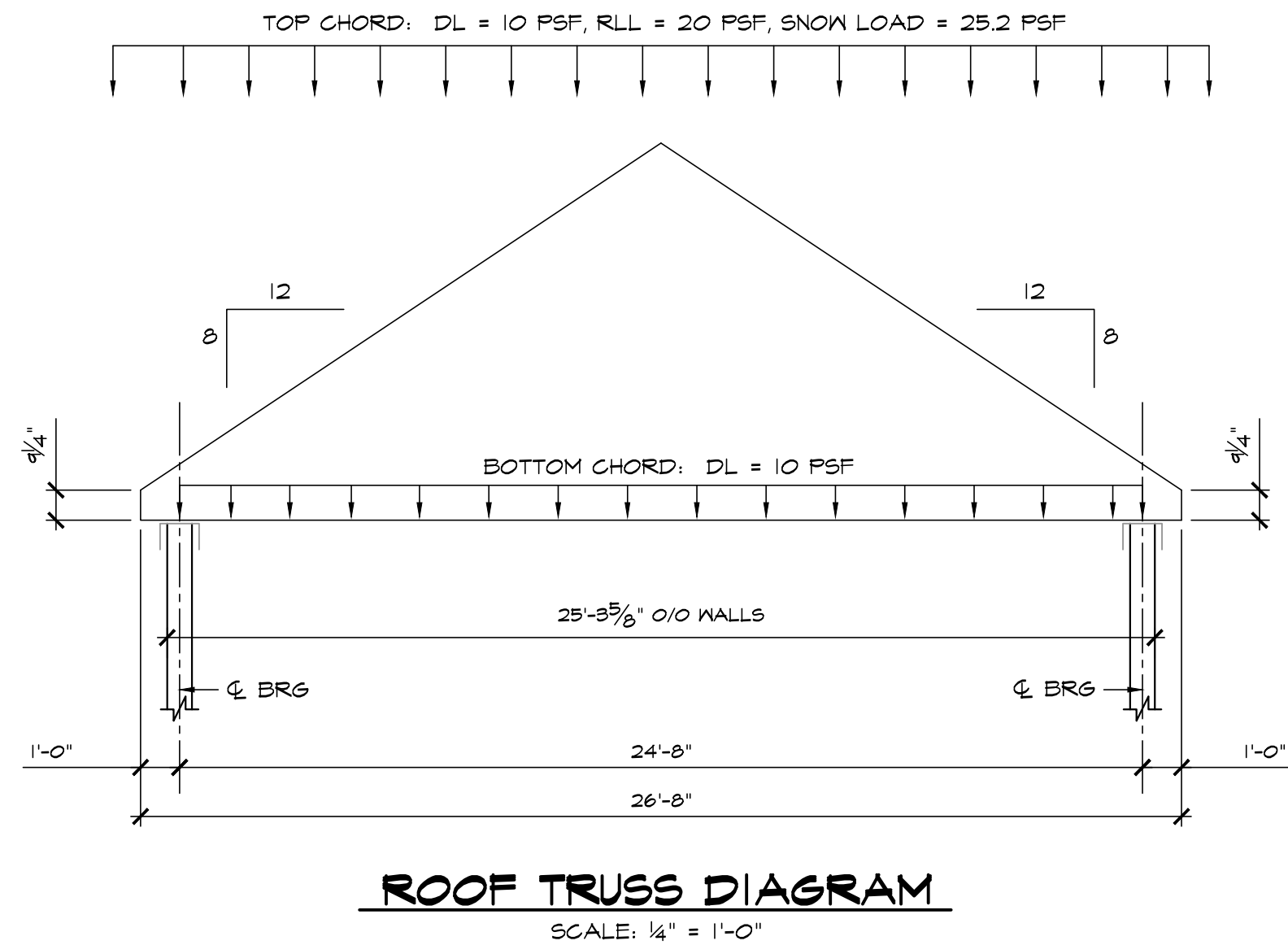


**ROOF FRAMING PLAN**   
SCALE: 3/8"=1'-0"

**ROOF FRAMING NOTES**

- ALL ROOF FRAMING SHEATHED WITH WOOD FRT STRUCTURAL PANELS SHALL FORM A DIAPHRAGM. THE WOOD STRUCTURAL PANELS SHALL BE GLUED & NAILLED TO THE FRAMING MEMBERS USING 10d NAILS SPACED AT 6" OC ALONG ALL SUPPORTED PANEL EDGES AND AT 12" OC AT INTERMEDIATE SUPPORTS.
- ROOF SHEATHING SHALL CONSIST OF 1 1/2" WOOD STRUCTURAL PANELS WITH THE FOLLOWING DESIGN PROPERTIES:

GRADE	SHEATHING
SPAN RATING:	48/24
EXPOSURE RATING:	EXPOSURE 1
VENEER GRADE:	GRADE C
- ALL WOOD ROOF FRAMING SHALL BE FIRE RETARDANT TREATED WOOD (FRT)
- SEE ARCHITECTURAL AND MECHANICAL DRAWINGS FOR SIZE AND LOCATION OF ALL ROOF TOP EQUIPMENT AND ROOF OPENINGS. COORDINATE OPENINGS AND ADDITIONAL FRAMING WITH TYPICAL DETAILS.
- T.O. MASONRY WALL ELEVATION = 62.83 ± 11'-4" ABOVE SLAB HIGH POINT.



**MRA**

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MCKEE BUILDERS, LLC.  
940 WEST SPROUL ROAD, SUITE 301  
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**ABBEY CREEK**  
NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

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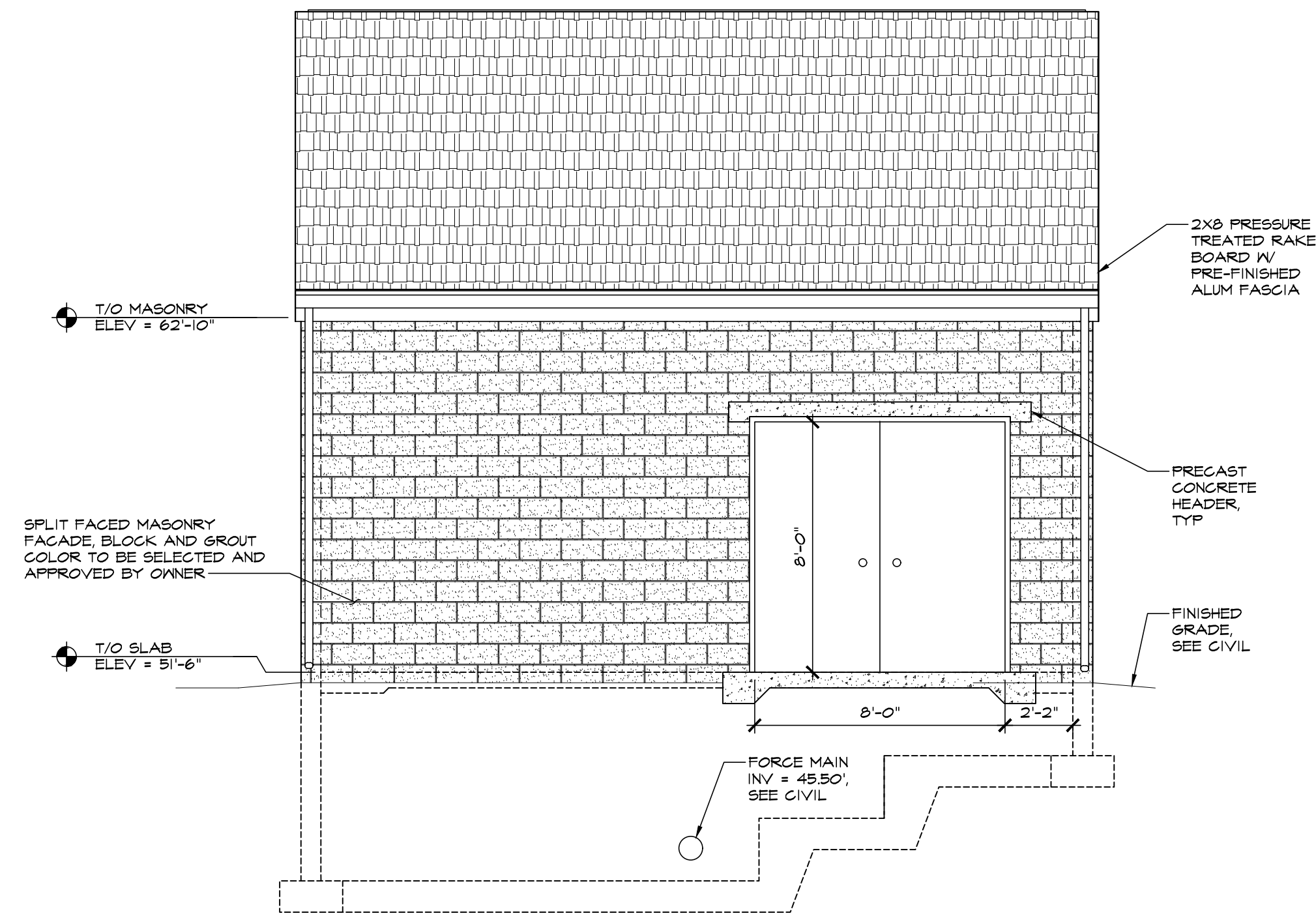
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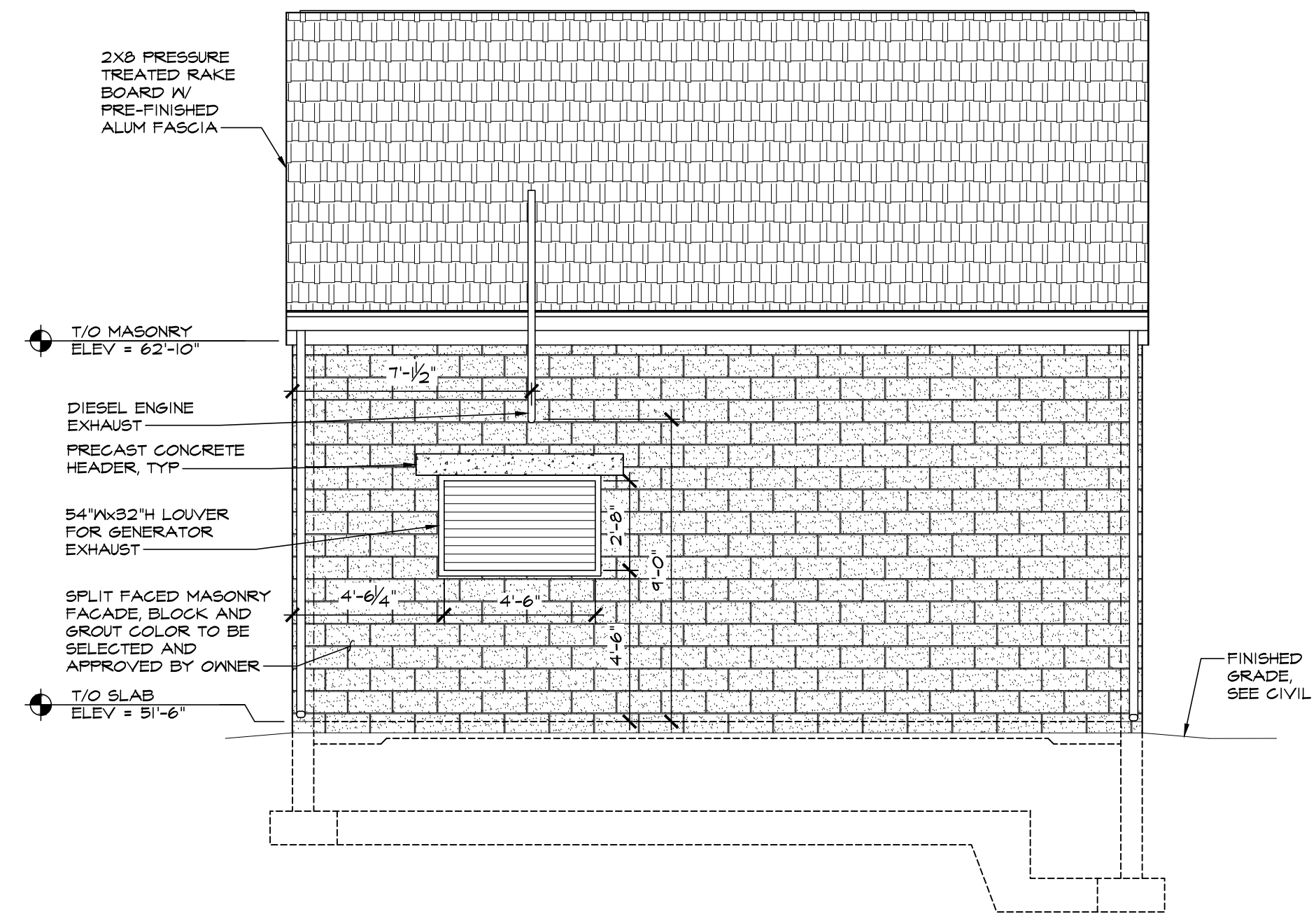
**ROOF  
PLAN**

SHEET NUMBER  
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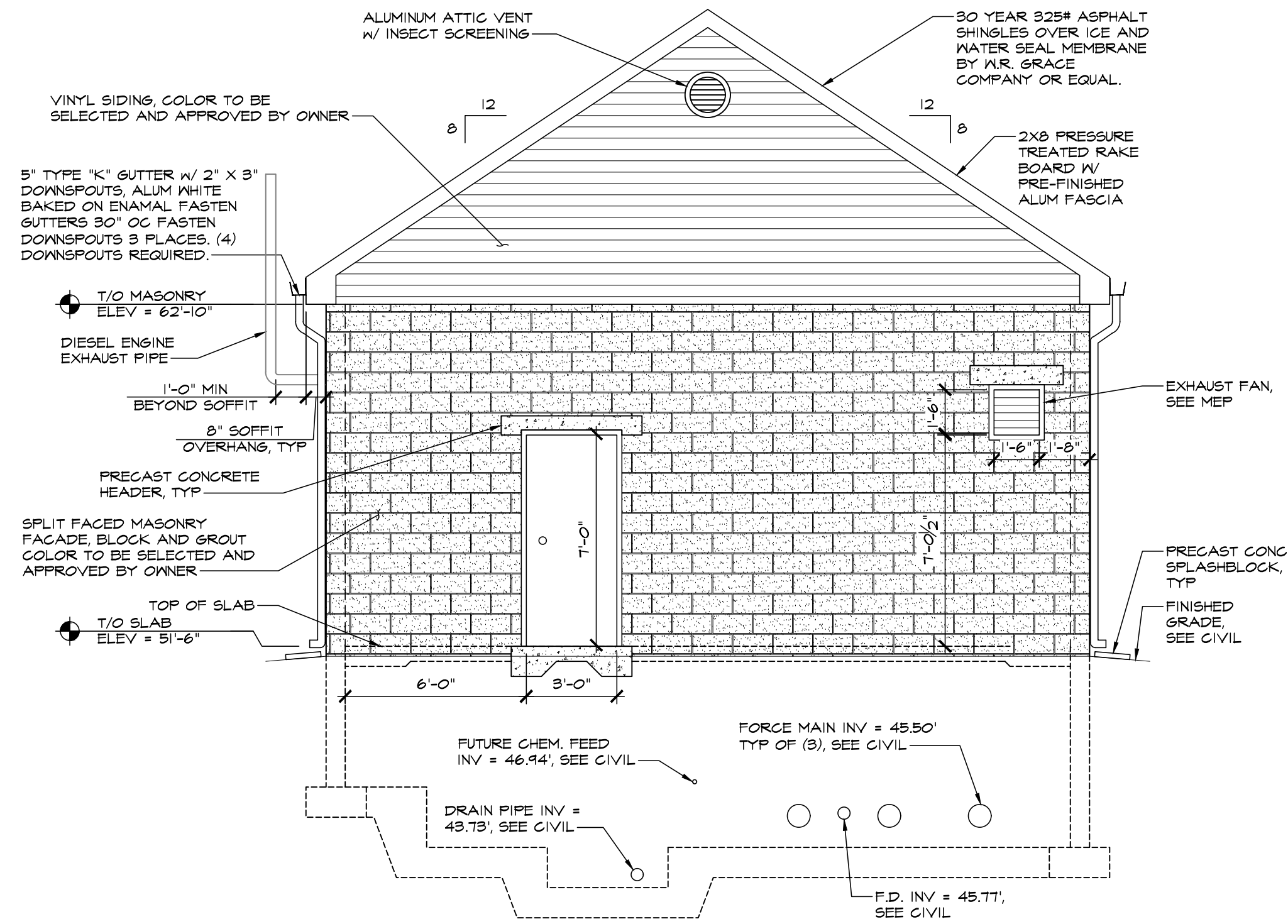
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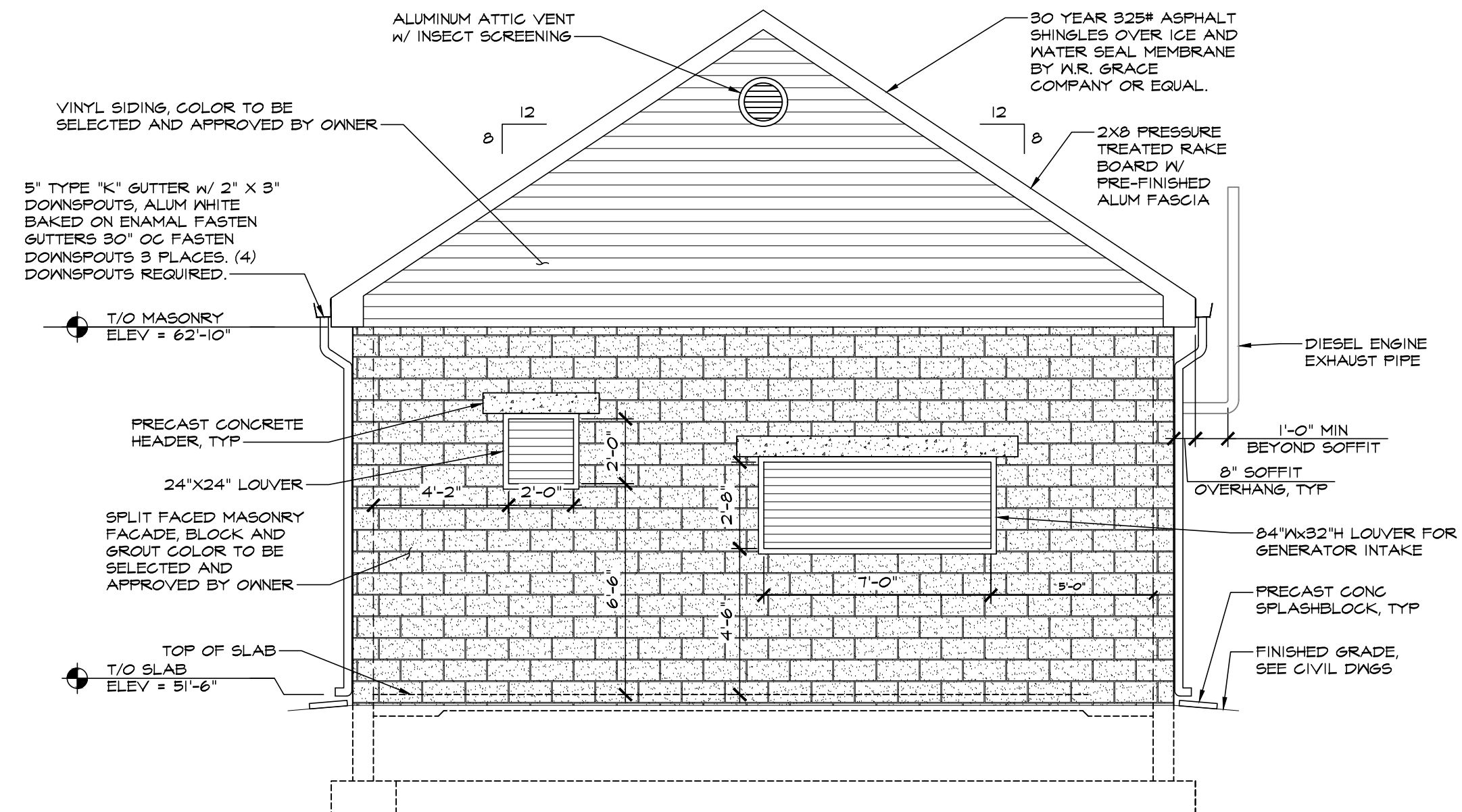
**A** NORTH ELEVATION  
SCALE: 1/4" = 1'-0"



**B** SOUTH ELEVATION  
SCALE: 1/4" = 1'-0"



**C** EAST ELEVATION  
SCALE: 1/4" = 1'-0"



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

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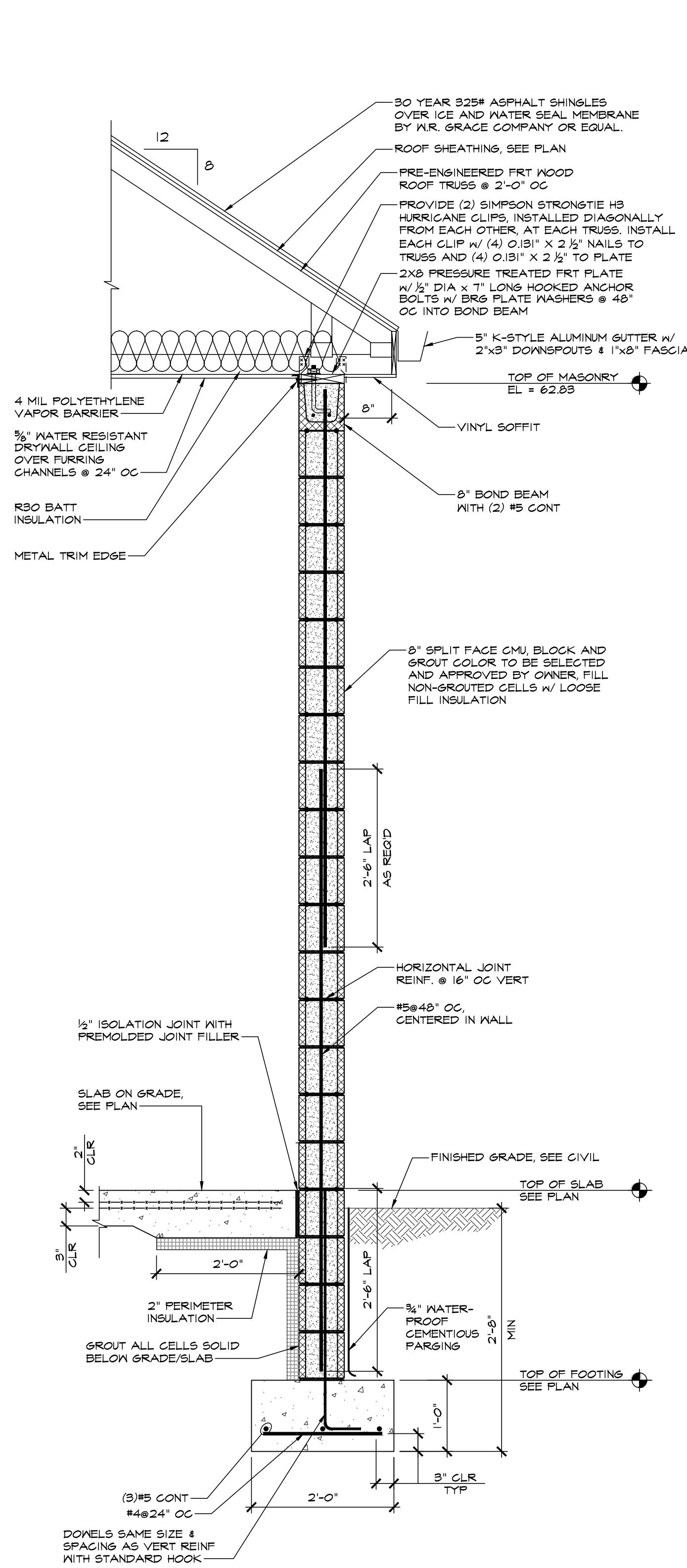
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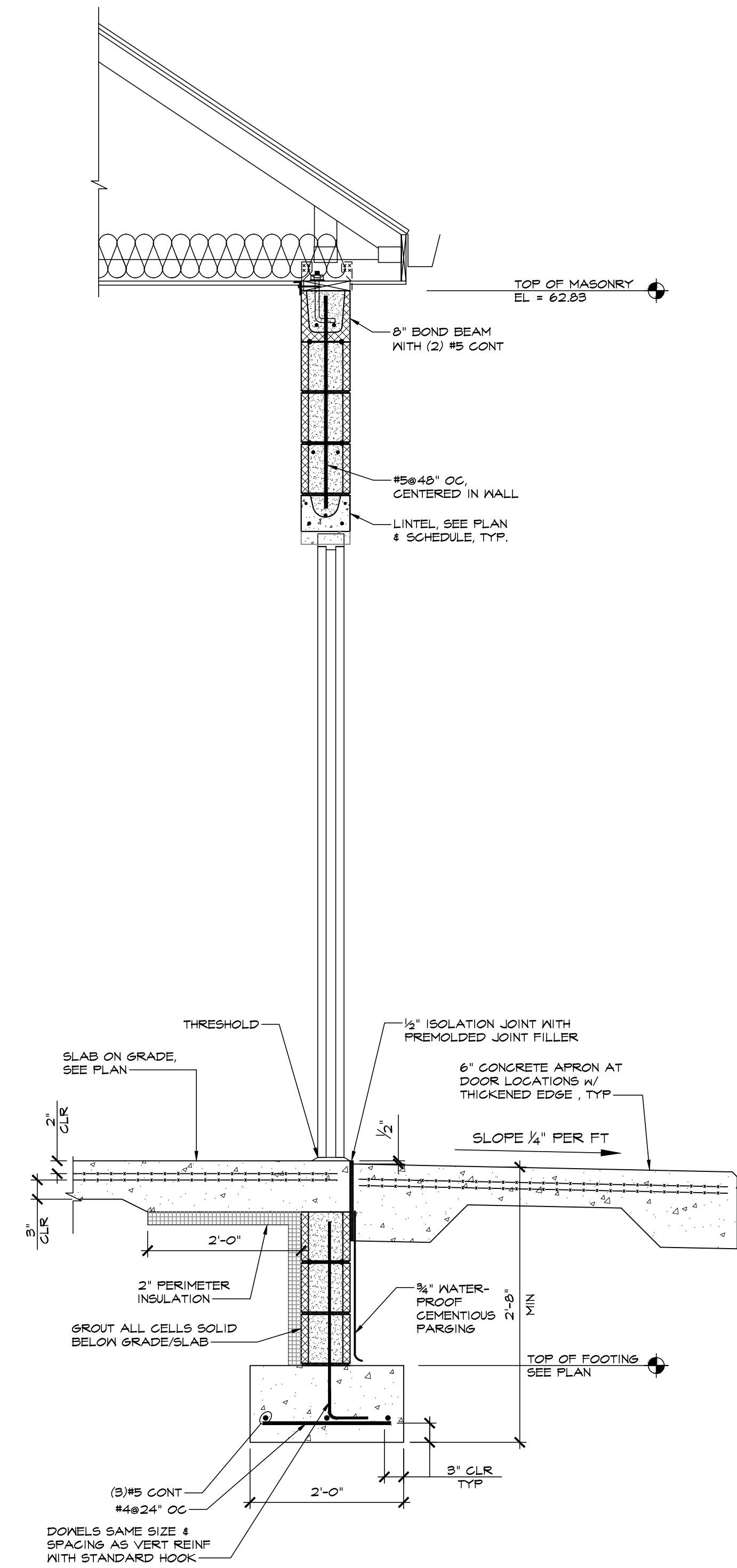
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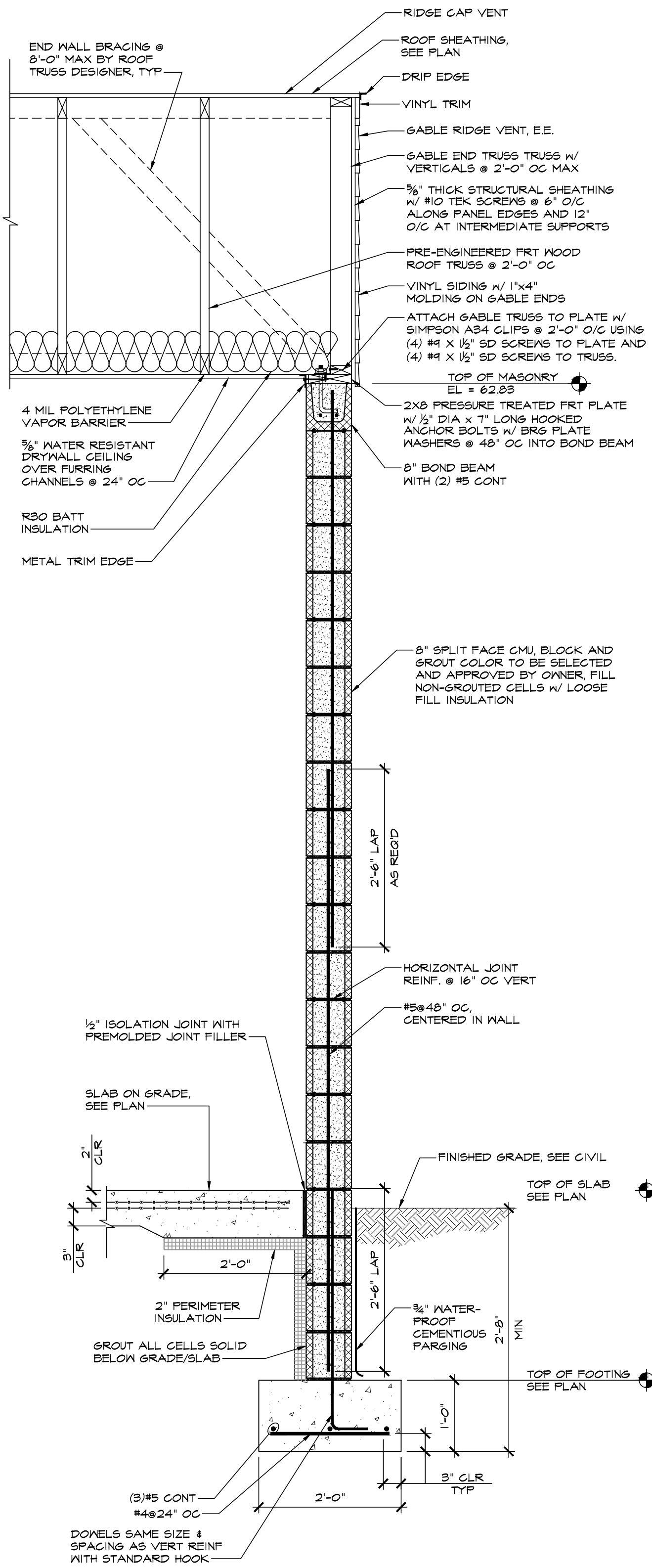
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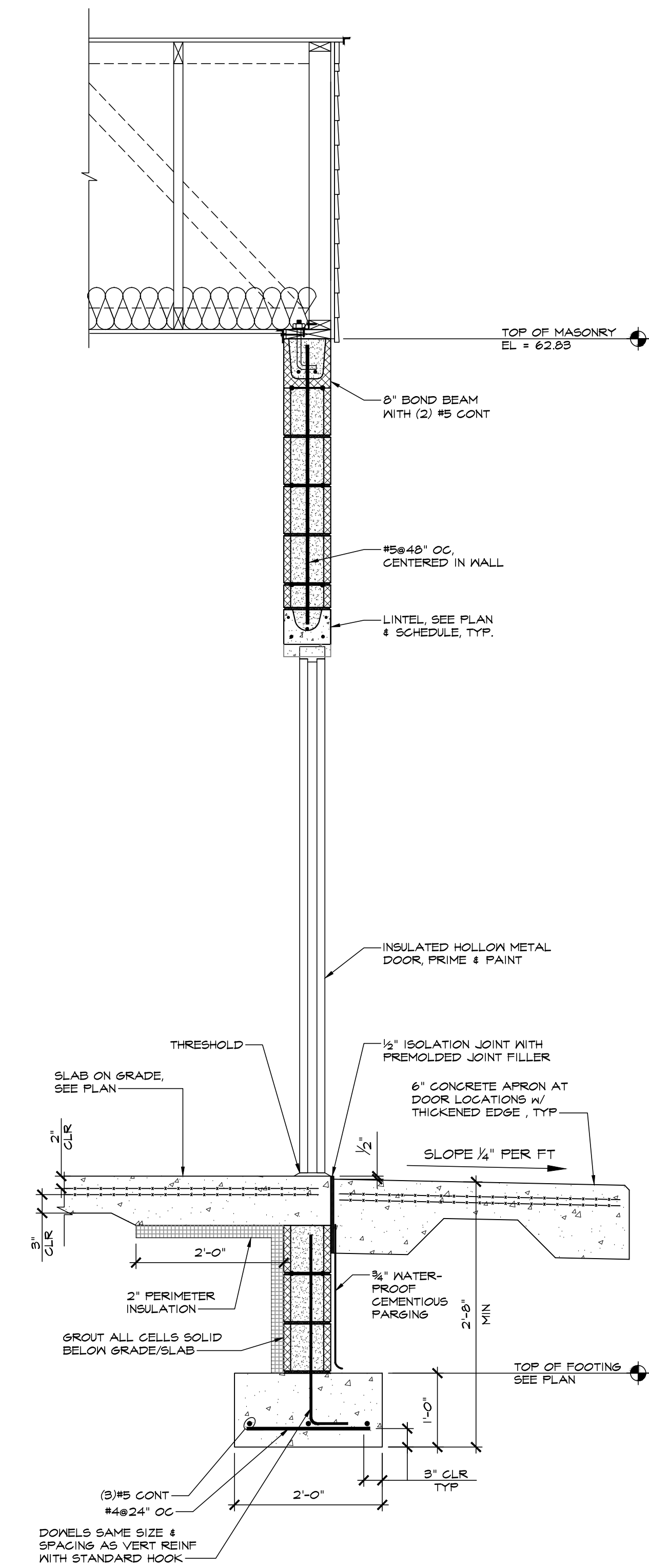
1 BEARING WALL SECTION  
S-1 SCALE: 3/4" = 1'-0"



2 BEARING WALL SECTION @ OPENING  
S-1 SCALE: 3/4" = 1'-0"



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



4 END WALL SECTION @ OPENING  
S-1 SCALE: 3/4" = 1'-0"

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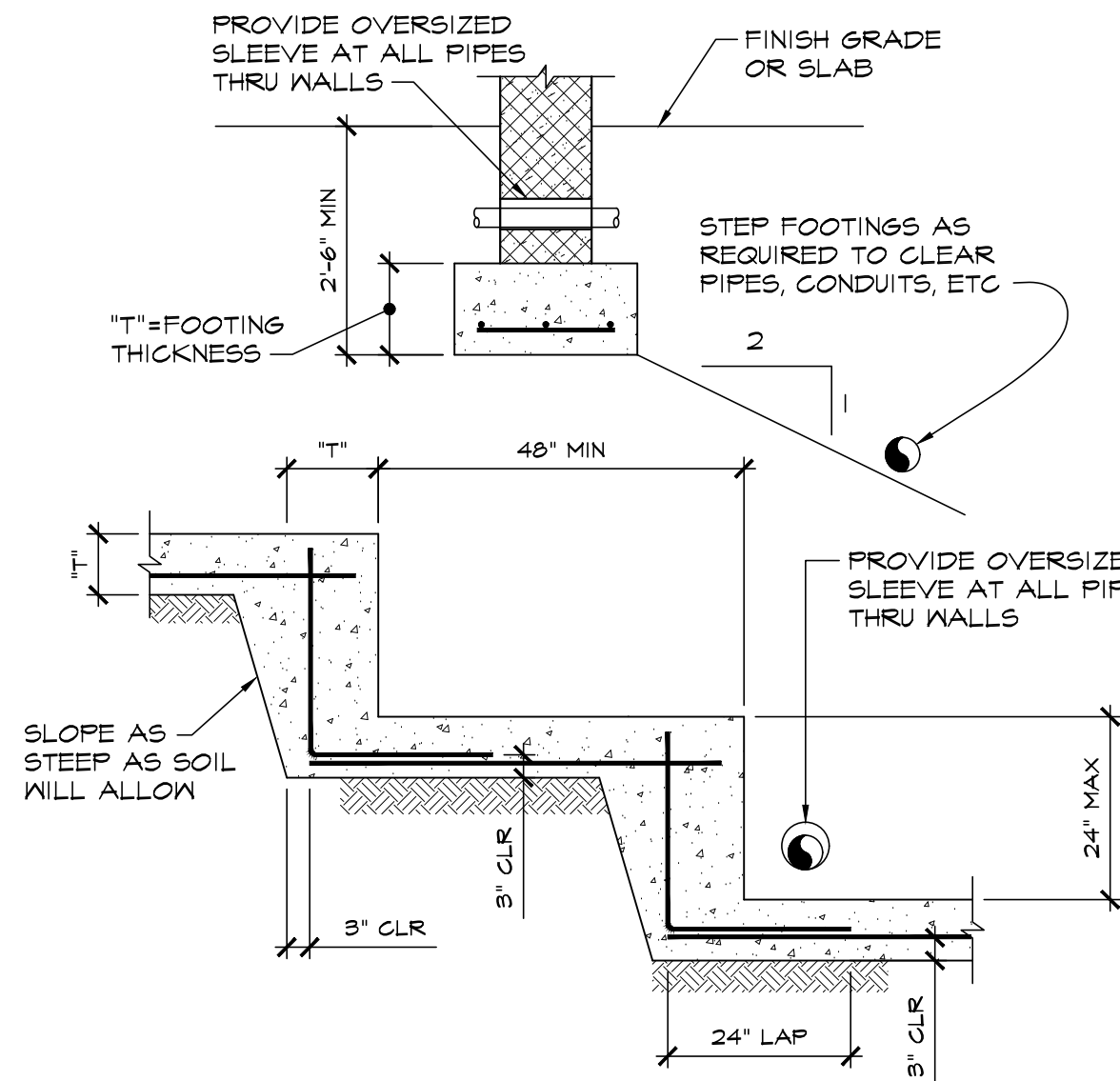
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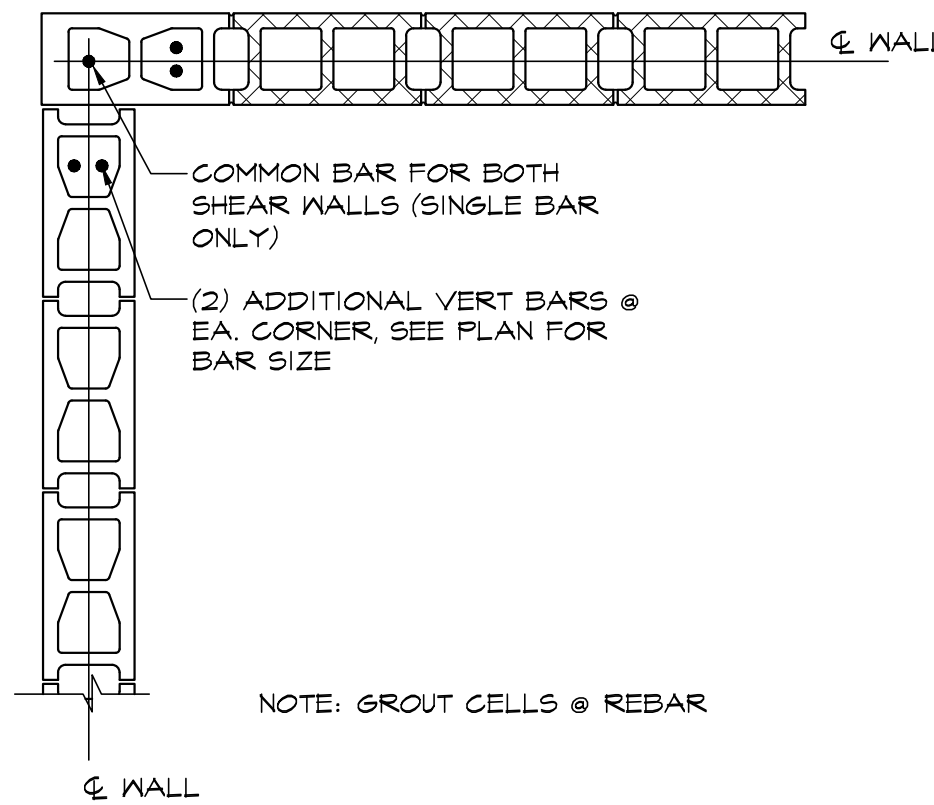
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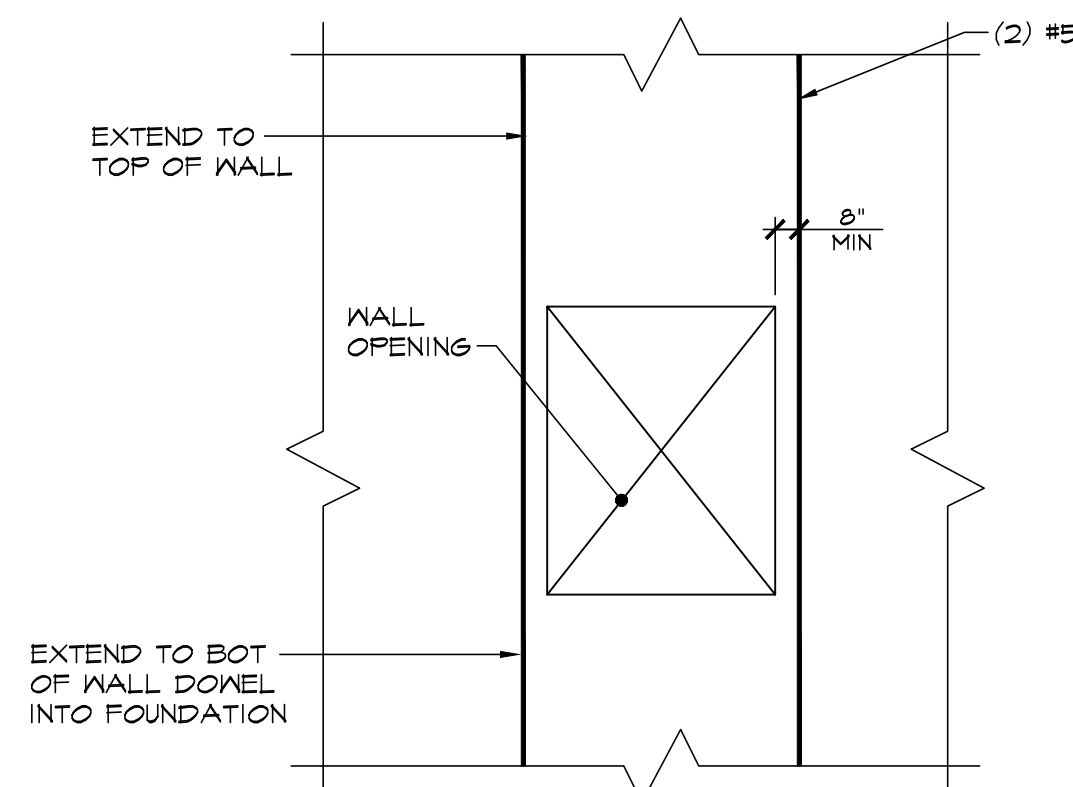
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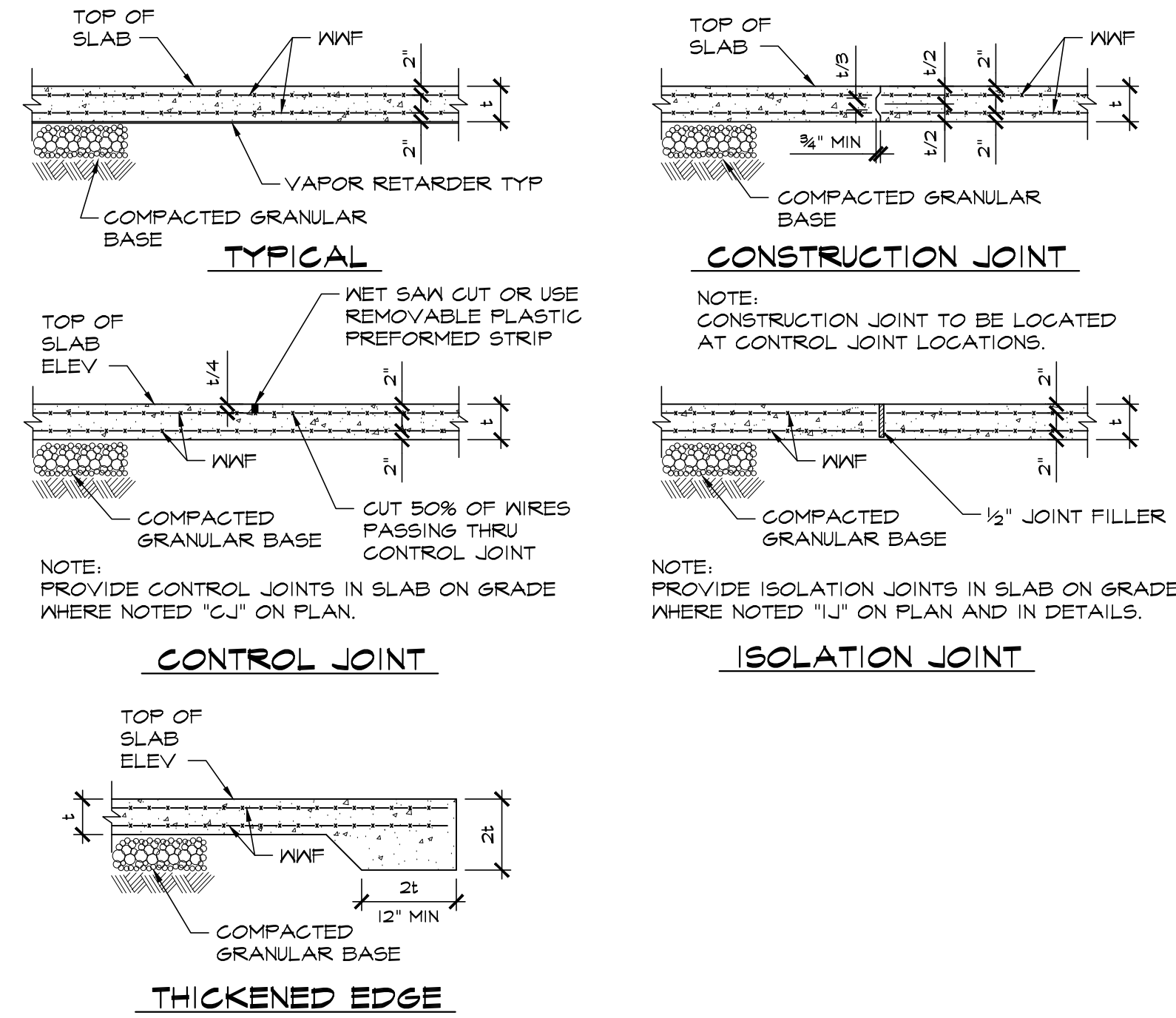
STEPPED WALL FOOTING  
**DETAIL A**  
NOT TO SCALE



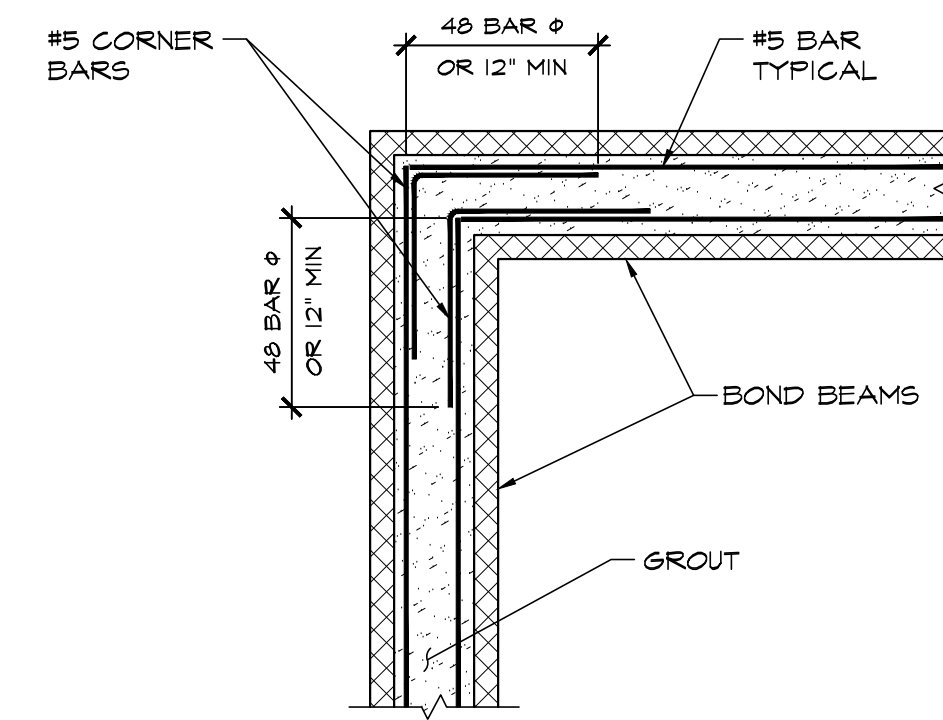
CMU WALL CORNER REINFORCING  
**DETAIL F**  
NOT TO SCALE



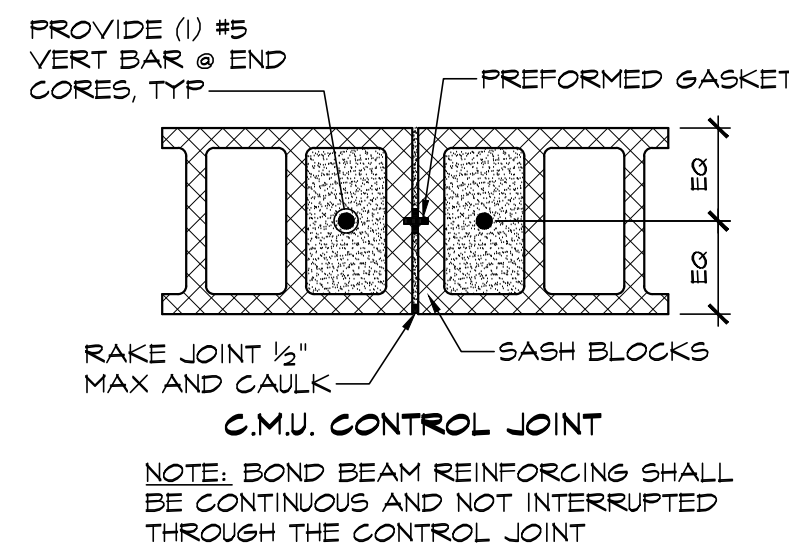
ELEVATION VIEW  
JAMB DETAIL  
ADDITIONAL REINFORCING AT OPENINGS IN REINFORCED CMU WALLS  
**DETAIL J**  
NOT TO SCALE



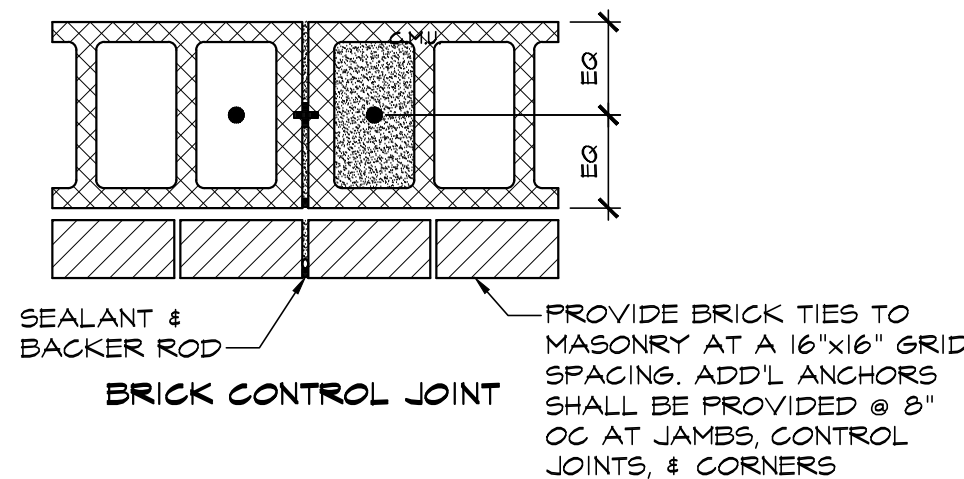
TYPICAL SLAB-ON-GRADE DETAILS  
**DETAIL B**  
NOT TO SCALE



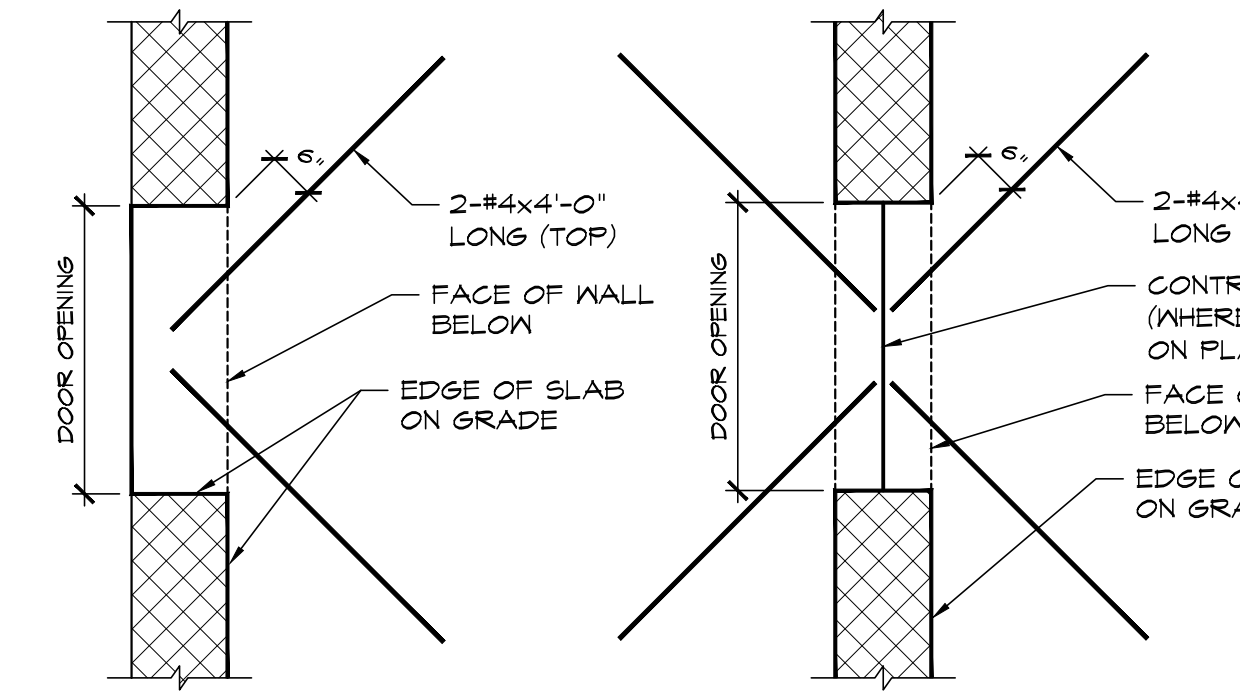
BOND BEAM CORNER  
**DETAIL G**  
SCALE: NTS



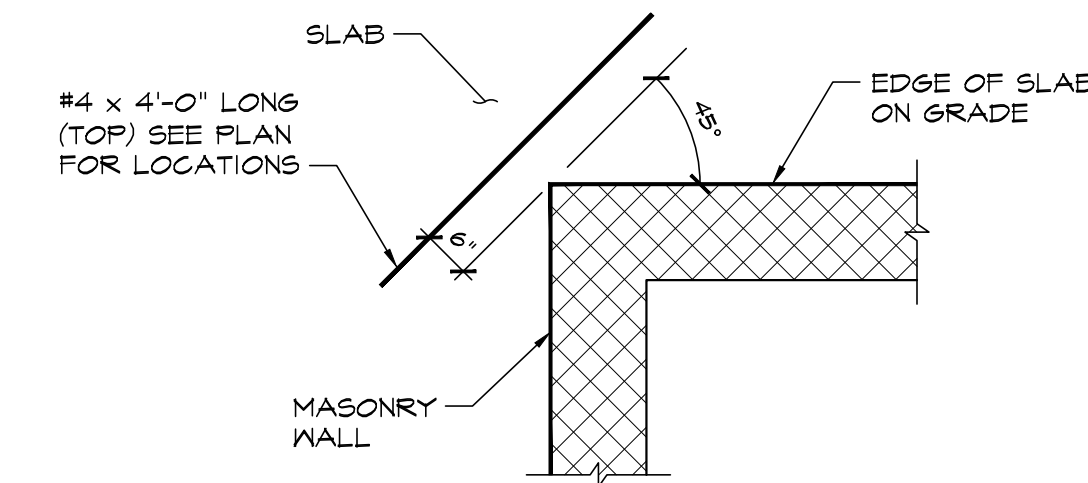
MASONRY CONTROL JOINT DETAIL  
**DETAIL K**  
NOT TO SCALE



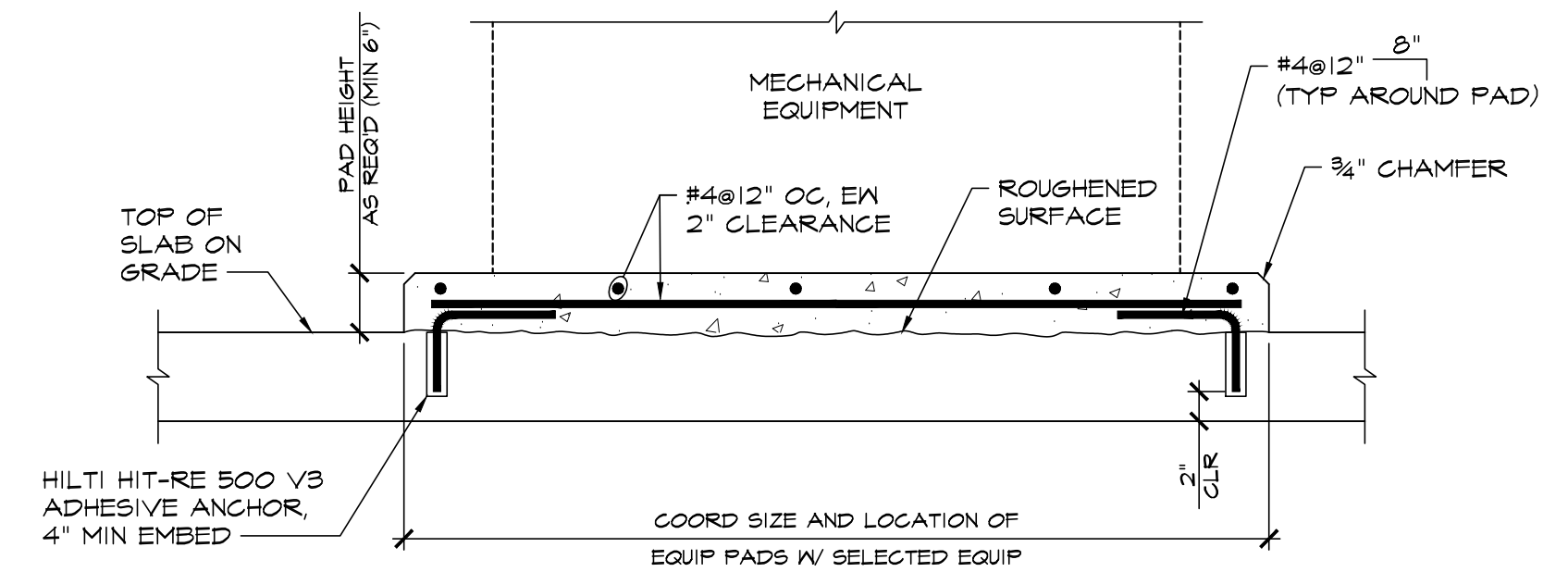
**DETAIL L**  
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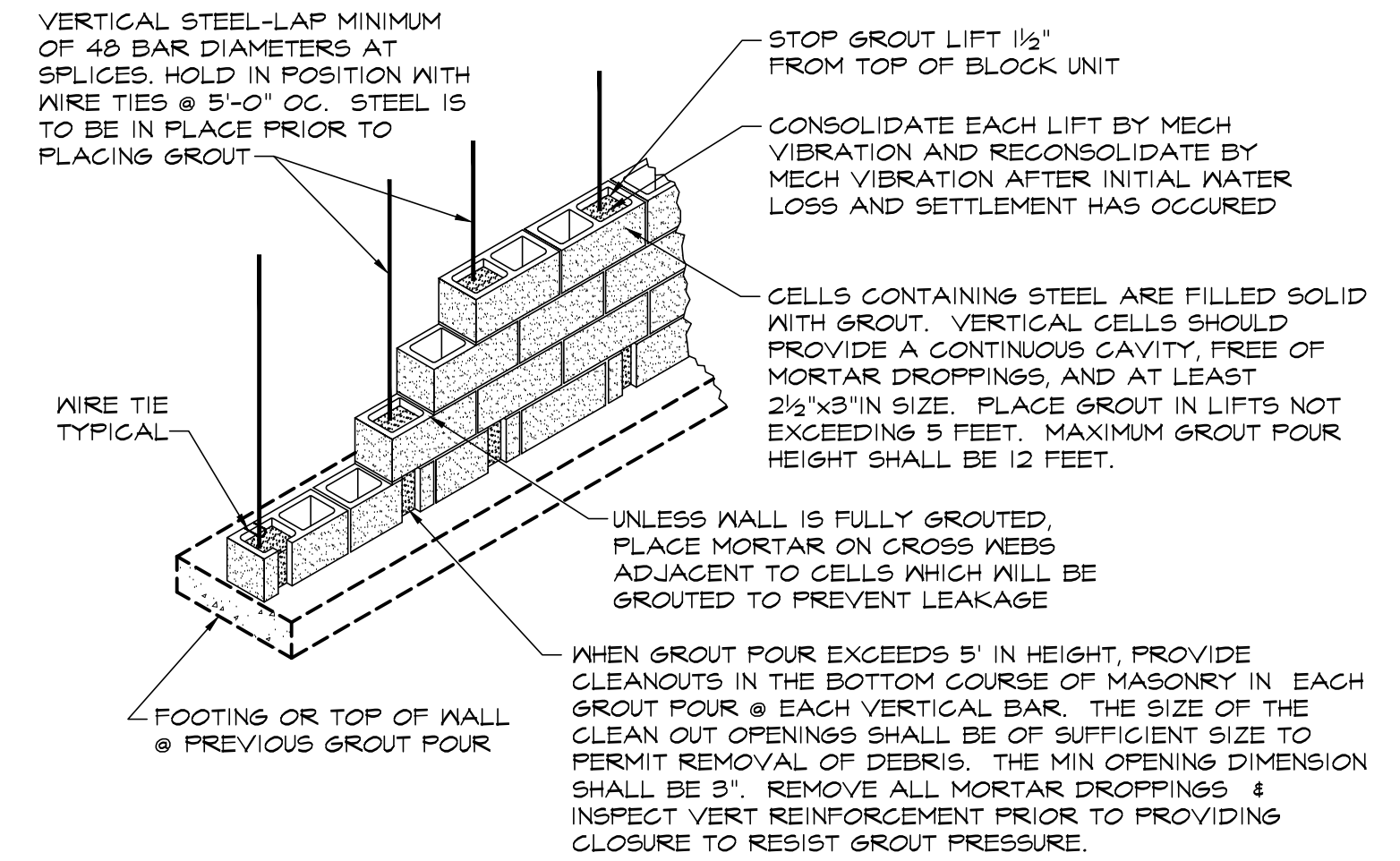
ADDITIONAL SLAB ON GRADE REINFORCING  
**DETAIL C**  
NOT TO SCALE



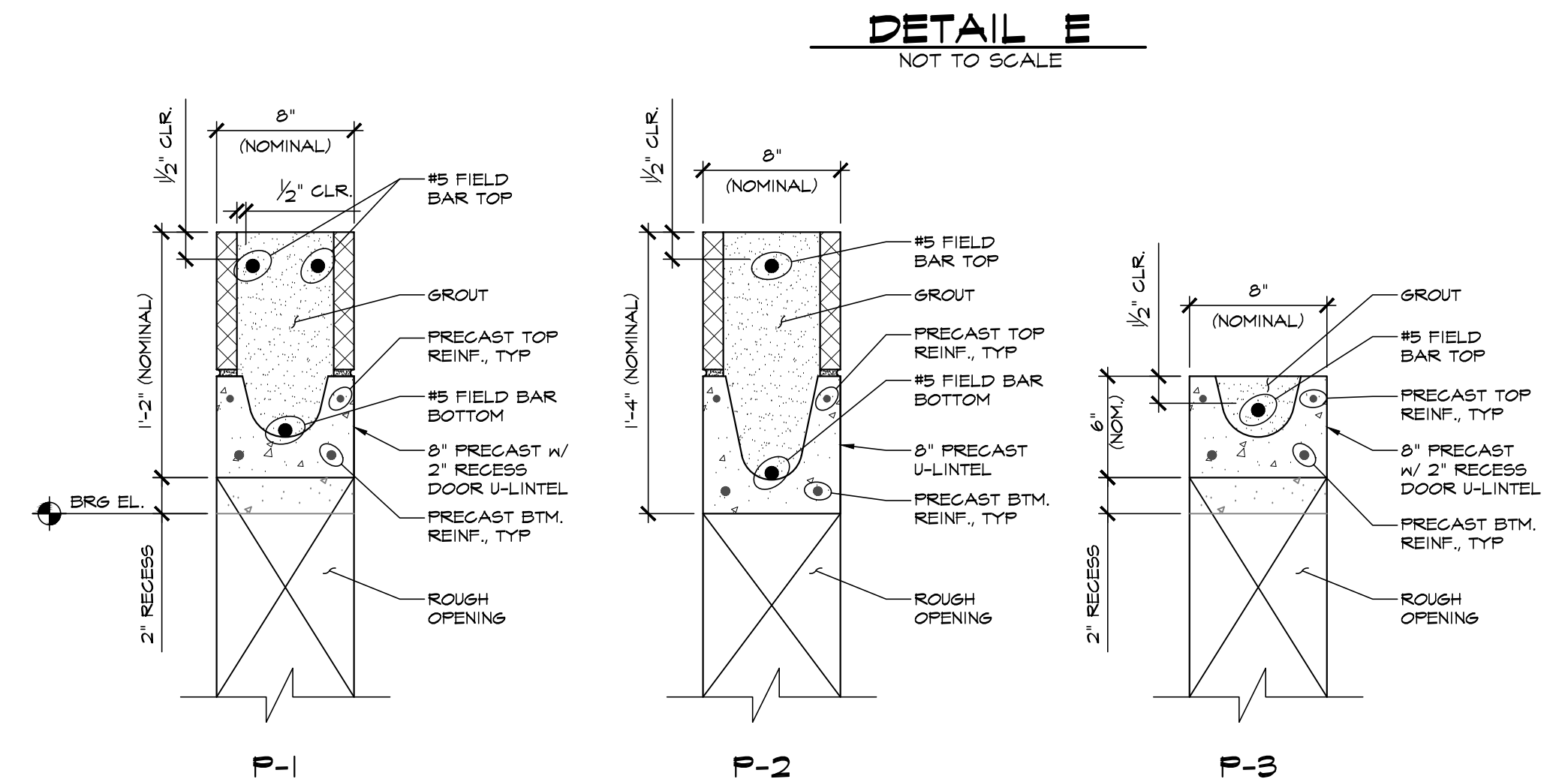
@ INTERIOR WALL CORNER



EQUIPMENT PAD  
**DETAIL D**  
NOT TO SCALE



REINFORCED CMU CONSTRUCTION



MARK	SIZE / REINF.	SPAN	MAKE / MODEL
P-1	8"-WIDE x 14"-DEEP PRECAST CONCRETE LINTEL w/ (1) #5 FIELD BAR BTM & (2) TOP	UP TO 8'-4" CLEAR	CAST-CRETE 8RF14-1B/2T
P-2	8"-WIDE x 16"-DEEP PRECAST CONCRETE LINTEL w/ (1) #5 FIELD BAR T&B	UP TO 4'-10" CLEAR	CAST-CRETE 8P16-1B/1T
P-3	8"-WIDE x 6"-DEEP PRECAST CONCRETE LINTEL w/ (1) #5 FIELD BAR TOP	UP TO 3'-4" CLEAR	CAST-CRETE 8RF6-0B/1T
P-4	8"-WIDE x 8"-DEEP PRECAST CONCRETE LINTEL w/ (1) #5 FIELD BAR TOP	UP TO 7'-0" CLEAR	CAST-CRETE 8P8-0B/1T

NOTES:

- ALL LINTELS SHALL HAVE 8" MINIMUM BEARINGS AT EACH END. PROVIDE 16" LONG x 16" MIN. DEEP SOLID BEARING AT LINTEL ENDS. SOLID LINTEL BEARING SHALL CONSIST OF HOLLOW BLOCK FILLED SOLID w/GROUT, TYPICAL.
- PROVIDE LINTELS OVER ALL OPENINGS PER ABOVE, INCLUDING DOORS, WINDOWS, DUCTS, LOUVERS, RECESSES, AND OTHER OPENINGS, UNLESS SHOWN OR NOTED OTHERWISE ON STRUCTURAL OR ARCHITECTURAL DRAWINGS.
- FOR DIMENSIONS AND LOCATION OF OPENINGS, SEE ARCHITECTURAL, MECHANICAL, AND ELECTRICAL DRAWINGS.
- EXTEND FIELD BARS 2'-6" INTO ADJACENT MASONRY WALL, E.E.

MASONRY WALL LINTEL SCHEDULE  
**DETAIL L**  
NOT TO SCALE

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SHEET TITLE

TYPICAL  
DETAILS

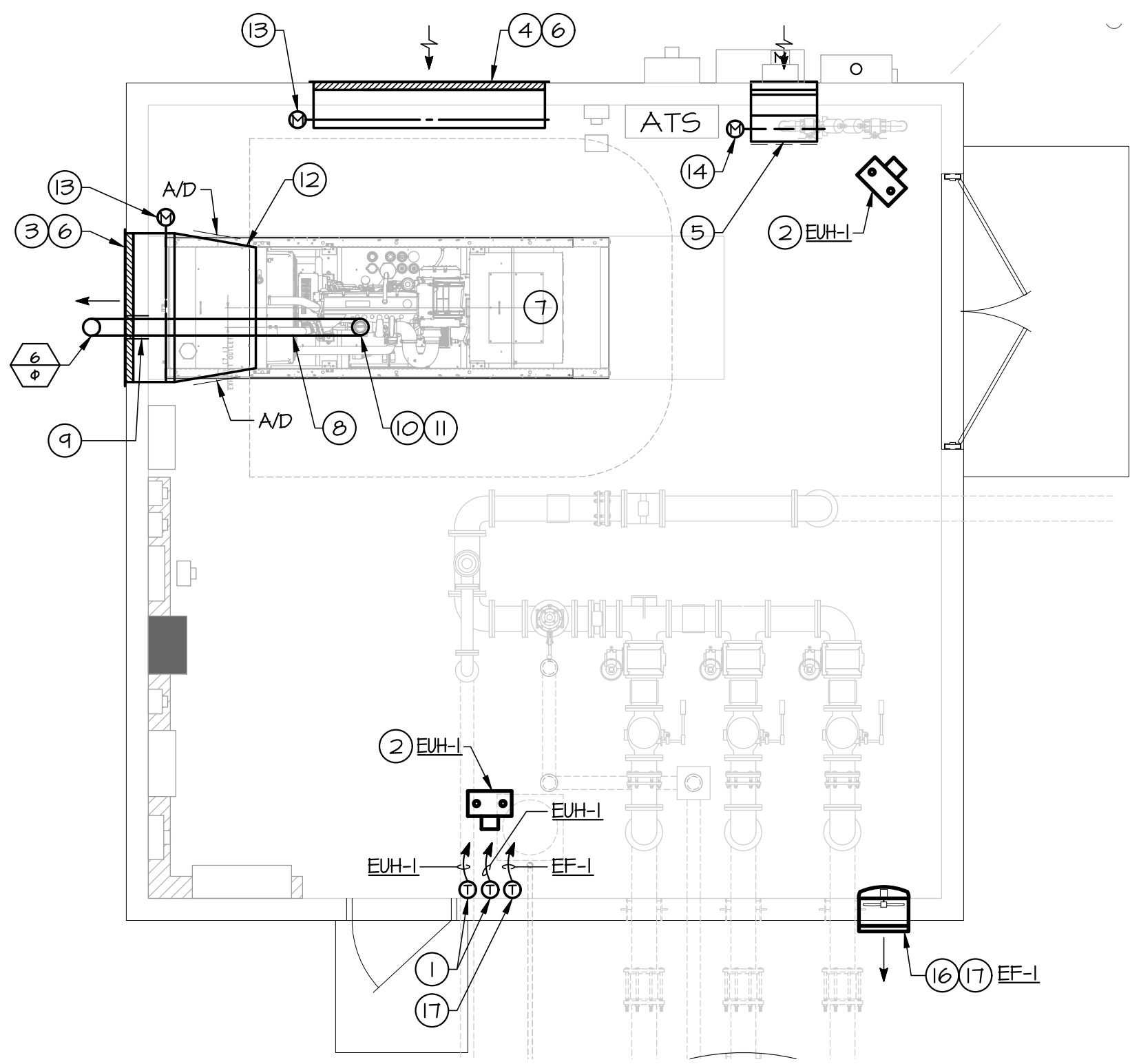
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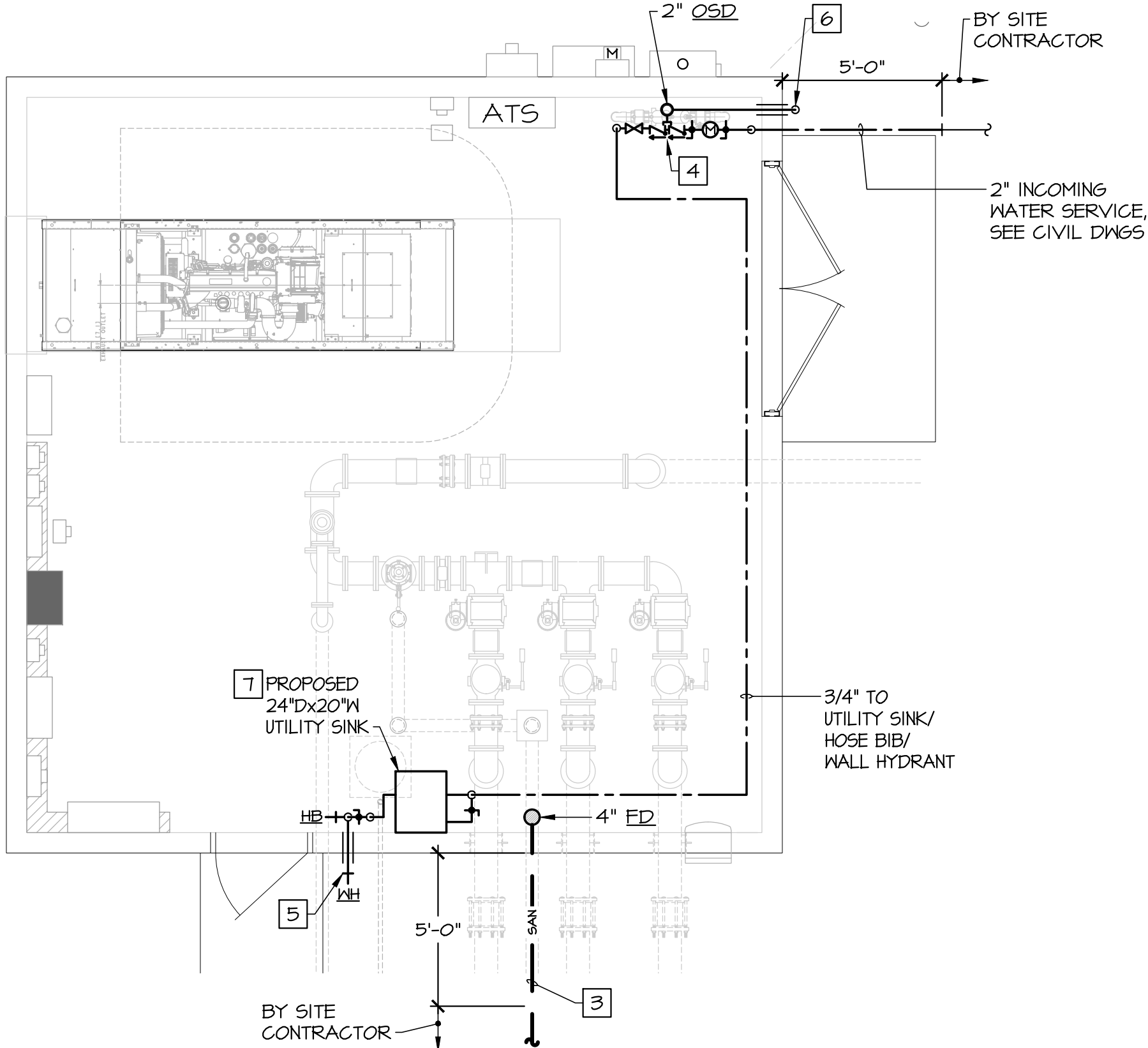




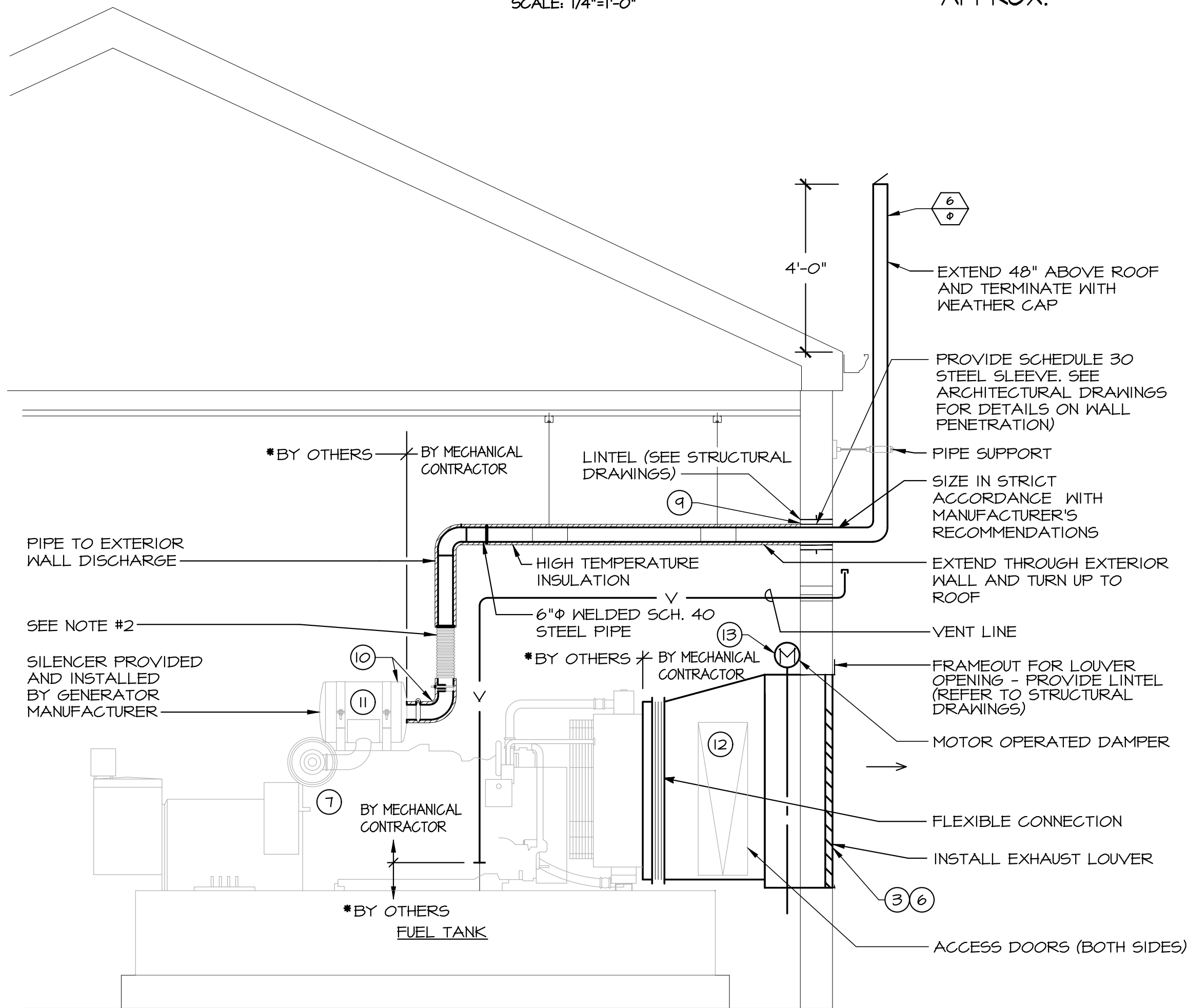




15 PUMP STATION BUILDING  
HVAC PLAN  
SCALE: 1/4"=1'-0" APPROX.



12 PUMP STATION BUILDING  
PLUMBING PLAN  
SCALE: 1/4"=1'-0" APPROX.



DETAIL - DIESEL GENERATOR INSTALLATION  
NO SCALE

- NOTES:
1. WORK SHOWN WITH DARK LINE WEIGHT SHALL BE BY MECHANICAL CONTRACTOR. ALL OTHER WORK SHALL BE BY ELECTRICAL CONTRACTOR AND IS SHOWN FOR REFERENCE ONLY.
  2. MECHANICAL CONTRACTOR SHALL PROVIDE RISER OF APPROPRIATE SIZE WITH LENGTH AS DETERMINED IN THE FIELD. RISER SHALL CONNECT FLEX CONNECTOR (BY OTHERS) TO MUFFLER (BY OTHERS)
  - "BY OTHERS" REFERENCES FURNISHED BY GENERATOR MANUFACTURER.

DRAWING NOTES - PLUMBING

- 1 CONTRACTOR SHALL REVIEW ARCHITECTURAL DRAWINGS FOR EXACT LOCATIONS OF ALL NEW PLUMBING FIXTURES TO BE INSTALLED AND SHALL MAKE ALL NECESSARY ALLOWANCES AND MODIFICATIONS TO SANITARY, VENT, AND DOMESTIC WATER PIPING FOR THE INSTALLATION OF ALL NEW PLUMBING FIXTURES.
- 2 EXTENT OF PLUMBING CONTRACTOR'S WORK. ALL WORK BEYOND 5'-0" FROM BUILDING SHALL BE BY SITE UTILITIES CONTRACTOR. REFER TO CIVIL DRAWINGS FOR ADDITIONAL INFORMATION. PROVIDE PIPE SLEEVE AT PENETRATION OF FOUNDATION WALL WHERE APPLICABLE. COORDINATE ALL FINAL INVERTS WITH SITE UTILITIES CONTRACTOR.
- 3 PROVIDE SANITARY PIPING BELOW FLOOR SLAB AND EXTEND TO WET WELL/SEWER MANHOLE WITH 1/4" PER LINEAR FOOT SLOPE TOWARDS WET WELL/MANHOLE. REFER TO CIVIL DRAWINGS FOR CONNECTION AND ADDITIONAL INFORMATION.
- 4 2" LEAD FREE, REDUCED PRESSURE BACKFLOW PREVENTER WITH INTEGRAL UNION BALL VALVES, SAE THREADED TEST COCKS AND LOCKING LEVER HANGLES, 2" APOLLO MODEL RPLF4A. REFER TO DETAIL, SHEET M-2 FOR ADDITIONAL INFORMATION.
- 5 PROVIDE ENGAGED AUTOMATIC DRAINING, NON-FREEZE WALL HYDRANT WITH REMOVABLE KEY, INTEGRAL BACKFLOW PREVENTER. FINISH TO BE SELECTED BY ARCHITECT. IN ADDITION, PROVIDE 2" CAMLOCK FOR FUTURE USE. INSTALL AT 18" ABOVE GRADE. CONTRACTOR SHALL EXTEND INSULATED VERTICAL PIPING ON WARM SIDE OF INSULATION FOR FREEZE PREVENTION.
- 6 ROUTE OVERFLOW PIPING TO SPLASH BLOCK ON GRADE. TERMINATE OVERFLOW PIPING SHALL BE AT LEAST 12" ABOVE GRADE. PROVIDE TAMPER PROOF WIRE MESH INSECT SCREEN. REFER TO DETAIL, SHEET M-2 FOR ADDITIONAL INFORMATION.
- 7 DRAIN FROM UTILITY SINK SHALL BE ROUTED TO ADJACENT 4" FLOOR DRAIN AND DISCHARGE WITH A MINIMUM 2" AIR GAP.

DRAWING NOTES - HVAC

- 1 PROVIDE THERMOSTAT WITH WALL GUARD MOUNTED APPROXIMATELY 48 INCHES ABOVE FINISHED FLOOR FOR UNIT HEATER.
- 2 PROVIDE CEILING SUSPENDED ELECTRIC UNIT HEATER WITH INTEGRAL DISCONNECT. REFER TO ELECTRIC UNIT HEATER SCHEDULE, SHEET M-2, FOR ADDITIONAL INFORMATION.
- 3 PROVIDE 54"x54" AIR LOUVER BY RUSKIN MODEL ELF375DXH; 11.67 SQ FT FREE AREA, WITH INSECT SCREEN. INSTALL LOUVER HIGH ON WALL AS SHOWN AND FIELD COORDINATE EXACT LOCATION WITH STRUCTURE. SEAL WALL PENETRATION WEATHER TIGHT. FINISH SHALL BE SELECTED BY ARCHITECT.
- 4 PROVIDE 84"x60" AIR LOUVER BY RUSKIN MODEL ELF375DXH; 19.2 SQ FT FREE AREA, WITH INSECT SCREEN. INSTALL LOUVER HIGH ON WALL AS SHOWN AND FIELD COORDINATE EXACT LOCATION WITH STRUCTURE. SEAL WALL PENETRATION WEATHER TIGHT. FINISH SHALL BE SELECTED BY ARCHITECT.
- 5 PROVIDE 24"x24" AIR LOUVER BY RUSKIN MODEL ELF375DXH; 1.78 SQ FT FREE AREA, WITH INSECT SCREEN. INSTALL LOUVER HIGH ON WALL AS SHOWN AND FIELD COORDINATE EXACT LOCATION WITH STRUCTURE. SEAL WALL PENETRATION WEATHER TIGHT. FINISH SHALL BE SELECTED BY ARCHITECT.
- 6 PROVIDE ACTUATORS FOR EACH SECTION, FAIL OPEN, ALL INTERLOCKED WITH GENERATOR START CIRCUIT SUCH THAT ON SIGNAL TO START GENERATOR, DAMPERS SHALL GO FULLY OPEN AND WHEN GENERATOR IS DE-ENERGIZED DAMPERS SHALL CLOSE.
- 7 PROPOSED EMERGENCY GENERATOR SHOWN FOR INFORMATION AND COORDINATION ONLY.
- 8 PROVIDE 6"x8" SCHEDULE 40 BLACK STEEL EXHAUST PIPE FROM DISCHARGE OF SILENCER, THROUGH EXTERIOR WALL AND TERMINATE 4'-0" ABOVE ROOF WITH FLAPPER.
- 9 SEE STRUCTURAL DRAWINGS FOR PIPE THRU-WALL PENETRATION DETAILS.
- 10 PROVIDE RIGID, HIGH TEMPERATURE CALCIUM SILICATE INSULATION ON MUFFLER AND ENTIRE INTERIOR LENGTH OF EXHAUST PIPING. INSULATION SHALL BE OF THICKNESS AND FINISH AS RECOMMENDED BY MANUFACTURER. INSULATION TEMPERATURE RATING SHALL BE VERIFIED TO BE COMPATIBLE WITH GENERATOR MANUFACTURER SPECIFIED EXHAUST TEMPERATURES. ALL FASTENERS, SEALANTS, COATINGS, COVERINGS, ETC. SHALL HAVE A TEMPERATURE RATING EQUAL TO OR GREATER THAN THE REQUIRED INSULATION. PROVIDE 12" LONG SHEET METAL SHIELDS AT ALL HANGERS TO PROTECT INSULATION FROM CRUSHING. HANGERS SHALL BE OVERSIZED TO ACCOMMODATE INSULATION.
- 11 PROVIDE SILENCER MOUNTED DIRECTLY ON GENERATOR. SEE ELECTRICAL DRAWINGS FOR GENERATOR DETAILS.
- 12 DUCT TRANSITION FROM GENERATOR RADIATOR TO EXHAUST LOUVER. PROVIDE HINGED ACCESS DOORS ON BOTH SIDES. DOORS SHALL BE SIZED FOR 80% OF THE WIDTH OF THE TRANSITION & 80% OF THE HEIGHT. PROVIDE FLEXIBLE CONNECTION AT RADIATOR DISCHARGE.
- 13 PROVIDE 2 POSITION, NORMALLY CLOSED, LOW-LEAKAGE MOTOR OPERATED DAMPER BY RUSKIN MODEL CD60. INTERLOCK WITH GENERATOR START CIRCUIT. REFER TO ATC SEQUENCE, SHEET M-2, FOR ADDITIONAL INFORMATION.
- 14 PROVIDE 2 POSITION, NORMALLY CLOSED, LOW-LEAKAGE MOTOR OPERATED DAMPER BY RUSKIN MODEL CD60. INTERLOCK WITH ASSOCIATED EXHAUST FAN EF-1. REFER TO ATC SEQUENCE, SHEET M-2, FOR ADDITIONAL INFORMATION.
- 15 COORDINATE WALL OPENINGS, WALL PENETRATIONS, AND LINTEL INSTALLATIONS WITH GENERAL CONTRACTOR.
- 16 PROVIDE CORROSION RESISTANT EXHAUST SHUTTER FAN, DAYTON MODEL #BLB3, 1/4HP, 1490 CFM AT 1/4" SP, 120 VOLT, SIDEWALL MOUNTED EXHAUST FAN WITH BIRD SCREEN AND BACK DRAFT DAMPER. MOUNT AT 8'-0" AFF TO BOTTOM OF WALL OPENING.
- 17 EXHAUST FAN SHALL BE CONTROLLED BY HOA CONTROLS ON STARTER AND AUTOMATICALLY VIA THERMOSTAT. FAN SHALL BE INTERLOCKED WITH LOUVER MOD OPERATION TO OPEN WHEN ENERGIZED AND CLOSE WHEN DE-ENERGIZED. FAN SHALL BE ENERGIZED BY A RISE IN TEMPERATURE TO 80°F (ADJ.).

MRA

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NEW CASTLE COUNTY, DELAWARE  
TOWN OF MIDDLETOWN

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NO.	REVISION	DATE
JOB NO. 25014	DRAWN BY EC	CHECKED BY TS
ISSUED 4/29/25		

SHEET TITLE

MECHANICAL PLANS

SHEET NUMBER

28 OF 32

M-1

TEI

TELECENT ENGINEERING INC.  
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Forest Hill, MD 21050  
410-692-5816  
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## AUTOMATIC TEMPERATURE CONTROL SEQUENCES

### BUILDING VENTILATION SYSTEM - EF-1:

- EXHAUST FAN (EF-1), SHALL BE CONTROLLED BY H-O-A CONTROLS ON STARTER AND AUTOMATICALLY VIA THE WALL MOUNTED THERMOSTAT. FAN SHALL BE INTERLOCKED WITH LOUVER MOD OPERATION TO OPEN WHEN ENERGIZED AND CLOSE WHEN DE-ENERGIZED. FAN SHALL BE ENERGIZED BY A RISE IN TEMPERATURE TO 80°F (ADJUSTABLE).

### ELECTRIC UNIT HEATER:

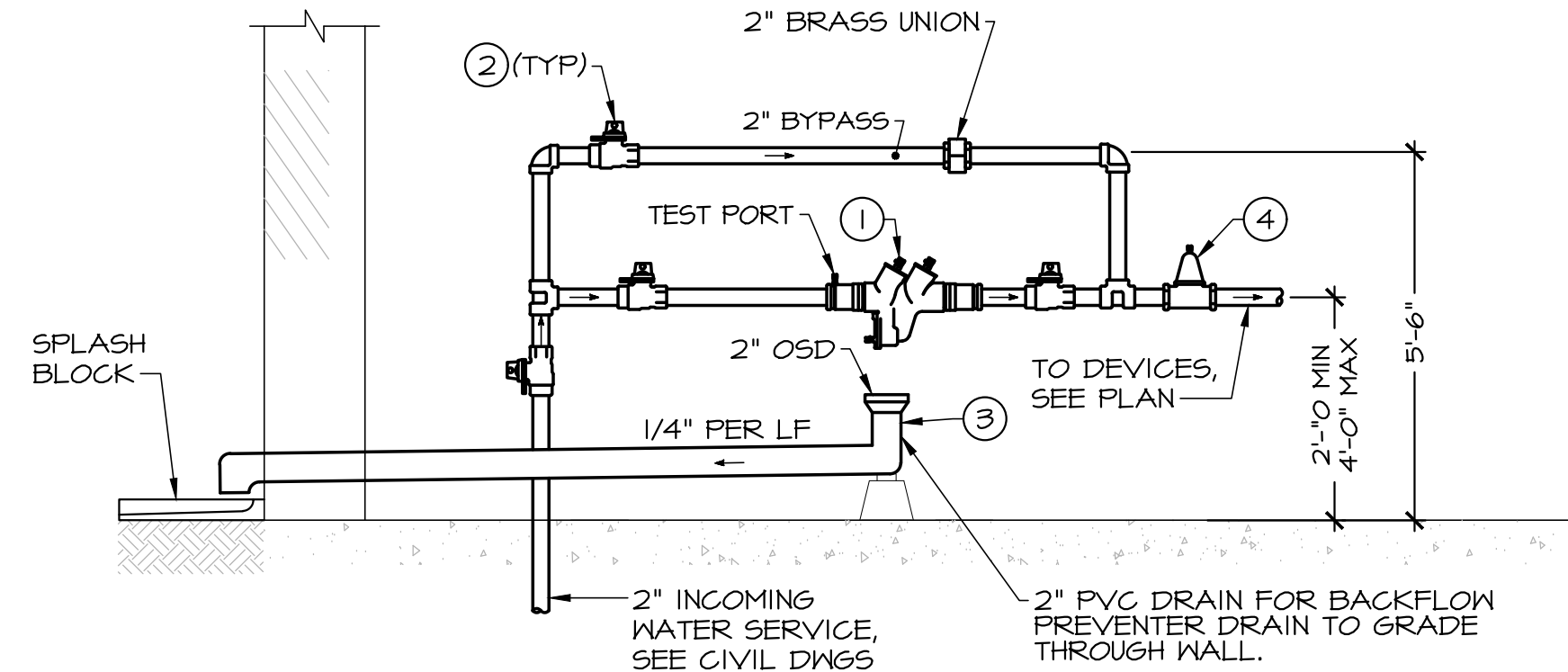
- ELECTRIC UNIT HEATERS (EUH-1), SHALL OPERATE UNDER CONTROL OF THEIR WALL MOUNTED THERMOSTAT TO MAINTAIN THERMOSTAT HEATING SET POINT OF 45°F (ADJUSTABLE).

### GENERATOR VENTILATION:

- THE ATC CONTRACTOR SHALL PROVIDE CONTROL PANEL TO CONTROL ASSOCIATED INTAKE AIR AND EXHAUST AIR MOTOR OPERATED DAMPERS. CONTRACTOR SHALL FURNISH AND INSTALL MOTOR OPERATED DAMPERS AND ASSOCIATED ACTUATORS AS NECESSARY FOR ALL DAMPERS AS PER THE DAMPER'S MANUFACTURER RECOMMENDATIONS FOR PROPER OPERATION WITH END SWITCH AND NUMBER OF ACTUATORS AS NEEDED. COORDINATE INSTALLATION OF DAMPERS WITH MECHANICAL CONTRACTOR THESE DAMPERS SHALL BE INTERLOCKED TO THE GENERATOR CONTROL CIRCUIT.
- WHEN THE SIGNAL FOR THE GENERATOR TO START, FROM LOSS OF POWER, THE INLET DAMPER (D-1) AND EXHAUST DAMPER (D-2) SHALL BE OPENED BY SPRING AND THEN GENERATOR SHALL START. THE DAMPERS SHALL BE PROVEN OPEN BY THE END SWITCH.
- WHEN POWER IS RESTORED AND AFTER GENERATOR HAS GONE THROUGH ITS COOL DOWN CYCLE, THE DAMPERS SHALL BE CLOSED BY MOTOR OPERATION.
- GENERATOR MANUFACTURER SHALL PROVIDE CONTACTS FOR THE FOLLOWING ALARM CONDITIONS:
  - GENERATOR OPERATING
  - LOW OIL PRESSURE
  - HIGH COOLANT TEMPERATURES
  - LOW FUEL LEVEL

## DETAIL NOTES:

- 2" LEAD FREE, REDUCED PRESSURE BACKFLOW PREVENTER WITH INTEGRAL UNION BALL VALVES, SAE THREADED TEST COCKS AND LOCKING LEVER HANGLES, 2" APOLLO MODEL RPLF4A.
- BALL VALVE (LOCK WING) FORD MODEL B-II-666-W
- ROUTE OVERFLOW PIPING TO SPLASH BLOCK ON GRADE. TERMINATE OVERFLOW PIPING SHALL BE AT LEAST 12" ABOVE GRADE. PROVIDE TAMPER PROOF WIRE MESH INSECT SCREEN.
- PROVIDE GOLDEN-ANDERSON 43-D PRESSURE REGULATOR.

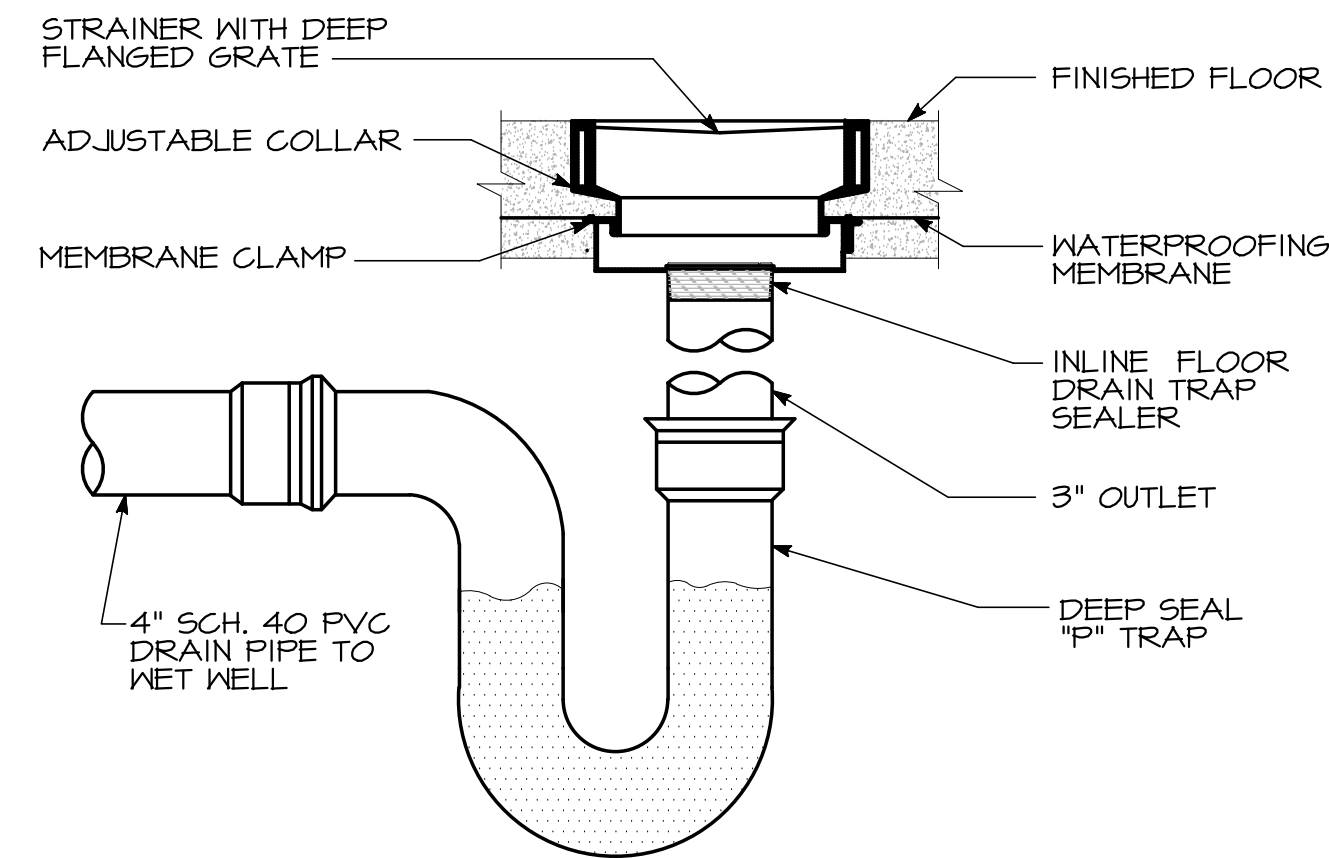


## DETAIL - INCOMING WATER SERVICE VALVING

NO SCALE

### GENERAL NOTES:

- PRIOR TO ORDERING THE METER SETTING AND BACKFLOW PREVENTER, THE CONTRACTOR SHALL SCHEDULE AND HOLD A MEETING WITH THE DIVISION OF WATER AND SEWER MAINTENANCE CHIEF TO DISCUSS THE INSTALLATION REQUIREMENTS.
- INSTALL CORROSIVE RESISTANT WELDED GANTILEVERED WALL BRACKETS AS REQUIRED TO SUPPORT THE EQUIPMENT AND PIPING.
- TYPE 'K' COPPER TUBING SHALL BE CONTINUOUS TO THE BALL VALVE.
- BYPASS PIPING SHALL BE THREADED BRASS.
- ALL FITTINGS AND NIPPLES SHALL BE BRASS WITH APPROPRIATE ADAPTERS.
- ALL COMPONENTS SHALL BE LEAD FREE.



## DETAIL - FLOOR DRAIN

NO SCALE

## SYMBOLS LIST & ABBREVIATIONS

	VOLUME DAMPER	A/D	ACCESS DOOR
	FLEXIBLE CONNECTION	AFF	ABOVE FINISHED FLOOR
	MOTOR OPERATED DAMPER	APD	AIR PRESSURE DROP
	DUCT MOUNTED THERMOSTAT	BDD	BACK DRAFT DAMPER
	AIR FLOW SWITCH	BTUH	BRITISH THERMAL UNITS/HOUR
	TURNING VANES	CAP.	CAPACITY
	DIRECTION OF AIR FLOW (POSITIVE)	CFM	CUBIC FEET PER MINUTE
	DIRECTION OF AIR FLOW (NEGATIVE)	CONN.	CONNECTION
	AIR FLOW SWITCH W/ PILOT LIGHT	DIA	DIAMETER
	THERMOSTAT W/ GUARD	DWH	DOMESTIC WATER HEATER
	CUBIC FEET PER MINUTE	EDH	ELECTRIC DUCT HEATER
	DIAMETER	EF	EXHAUST FAN
	DRAWING NOTE- NEW WORK	EUH	ELECTRIC UNIT HEATER
	DUCTWORK SIZE (10'x10')	GPM	GALLONS PER MINUTE
	DUCT SIZE (8"φ)	HB	HOSE BIBB
	DIFFUSER/GRILLE TAG	HP	HORSE POWER
	SANITARY PIPE (SAN)	I.N.	INCH
	VENT PIPE (V)	KW	KILOWATT
	COLD WATER PIPE (C.W.)	O.A.	OUTSIDE AIR
	HOT WATER PIPE (H.W.)	OAI	OUTSIDE AIR INTAKE
	PIPE DOWN	PSIG	POUNDS PER SQUARE INCH GAUGE
	PIPE UP	RPM	REVOLUTIONS PER MINUTE
	CLEANOUT (FLOOR & WALL)	SF	SUPPLY FAN
	BALL VALVE	TWH	TANKLESS WATER HEATER
	GATE VALVE	TYP	TYPICAL
	CHECK VALVE	VTR	VENT THRU ROOF
	UNION	WH	WALL HYDRANT
	WATER METER	WPD	WATER PRESSURE DROP
	HOSE BIB	1φ	SINGLE PHASE

## ELECTRIC UNIT HEATER (EUH) SCHEDULE

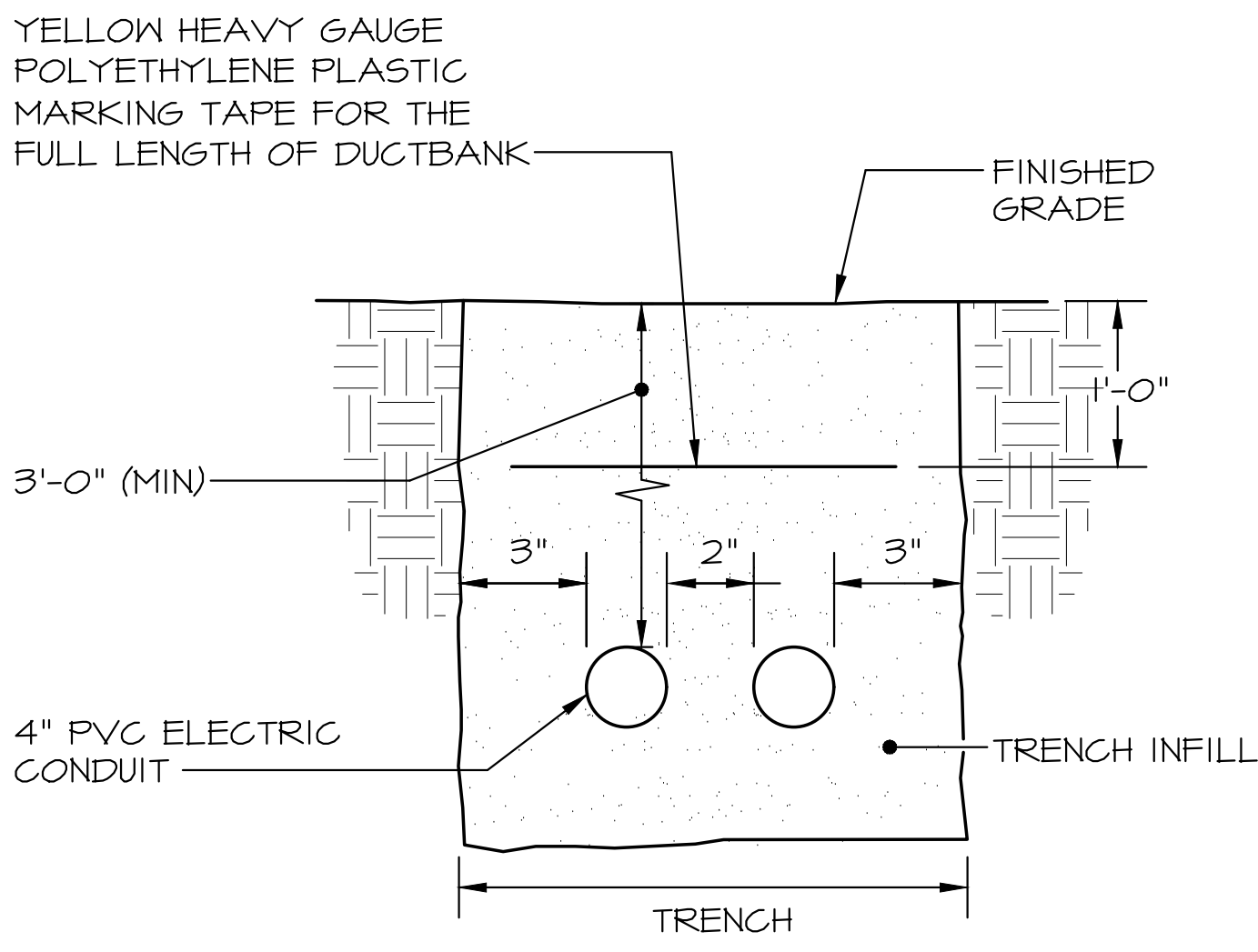
UNIT TAG	LOCATION	HEATING OUTPUT (KW)	FAN MOTOR				MANUFACTURER/ MODEL #
			V	PH	HZ	RPM	
EUH-1	SEWAGE PUMPING STATION BUILDING	5.0	480	3	60	1600	QMARK MUH05-41

### NOTE:

- PROVIDE REMOTE THERMOSTAT CONTROL.
- MOUNT AT 8'-0" AFF TO BOTTOM OF UNIT.
- PROVIDE WALL MOUNTING BRACKET.

ELECTRICAL LEGEND

SYMBOL	DESCRIPTION	SYMBOL	DESCRIPTION
	LIGHTING FIXTURE - STRIP - TYPE AS SPECIFIED		TIME CLOCK
	LIGHTING FIXTURE - WALL MOUNTED - TYPE AS SPECIFIED		PANELBOARD - 277/480V
	LIGHTING FIXTURE - EXTERIOR WALL PACK - TYPE AS SPECIFIED		MINI-POWER ZONE UNIT (SQUARE D SERIES OR APPROVED EQUAL) INTEGRAL PANELBOARD "P" (120/240V)
	BATTERY POWERED EMERGENCY LIGHTING UNIT WITH INTEGRAL CHARGER		SPECIFIC DEVICE AS NOTED
	SWITCH - SINGLE POLE, THREE WAY, SUBSCRIPT DENOTES FIXTURE CONTROLLED, DIMMER, OCCUPANCY SENSOR, VACANCY SENSOR - M.H. +48"		CONTROL PANEL (AS SPECIFIED)
	SWITCH - KEY OPERATED, WITH PILOT LIGHT, WEATHER PROOF - MOUNTING HEIGHT 48"		CONDUIT - IN OR ON CEILING OR WALLS
	SWITCH - EXPLOSION PROOF - MOUNTING HEIGHT 48"		CONDUIT - IN OR UNDER FLOOR
	DUPLEX RECEPTACLE - 20A., 2P, 3W GROUNDING, 125V. - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE		HOMERUN TO PANEL - NUMBER OF ARROWS INDICATE NUMBER OF CIRCUITS AND NUMBER OF CROSSLINES INDICATES NUMBER OF #12 CONDUCTORS - WHERE NO CROSSLINES APPEAR 3#12 CONDUCTORS ARE IMPLIED
	6FI RECEPTACLE - 20A., 2P, 3W GROUNDING, 125V. - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE		CONDUIT TERMINATED IN BUSHING OR CAPPED AS NOTED
	QUADRUPLEX RECEPTACLE - 20A., 2P, 3W GROUNDING, 125V. - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE		DISCONNECT SWITCH - FUSED, NON-FUSED - TYPE AND RATING AS INDICATED
	SPECIAL PURPOSE RECEPTACLE - WALL MOUNTED - TYPE AS INDICATED OR SCHEDULED		MAGNETIC STARTER, COMBINATION TYPE STARTER - TYPE AND RATING AS INDICATED
	TELEPHONE OUTLET BOX - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE (OUTLETS BY OTHERS), EXTEND 3/4"C FROM BOX TO ABOVE CEILING, TURNOUT AND PROVIDE END BUSHING		VARIABLE FREQUENCY DRIVE (VFD)
	DATA OUTLET BOX - WALL MOUNTED - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE (OUTLETS BY OTHERS), EXTEND 3/4"C FROM BOX TO ABOVE CEILING, TURNOUT AND PROVIDE END BUSHING		MANUAL MOTOR STARTER, H.P. RATED SWITCH
	SINGLE GANG DATA/TELE OUTLET BOX - WALL MOUNTED - MOUNTING HEIGHT 18" UNLESS NOTED OTHERWISE (OUTLETS BY OTHERS), EXTEND 3/4"C FROM BOX TO ABOVE CEILING, TURNOUT AND PROVIDE END BUSHING		CONTACTOR, RELAY
	JUNCTION BOX - WALL, CEILING		ELECTRIC HEATING ELEMENT
	ENCLOSED CIRCUIT BREAKER		MOTOR - 1 PHASE
	SURGE PROTECTIVE DEVICE		MOTOR - 3 PHASE
	AUTOMATIC TRANSFER SWITCH		MOTOR - HORSEPOWER AS NOTED
			TRANSFORMER
			PHOTOCELL
			EMERGENCY GENERATOR STOP PUSH BUTTON
			SMOKE, HEAT DETECTOR
			PHASE MONITOR

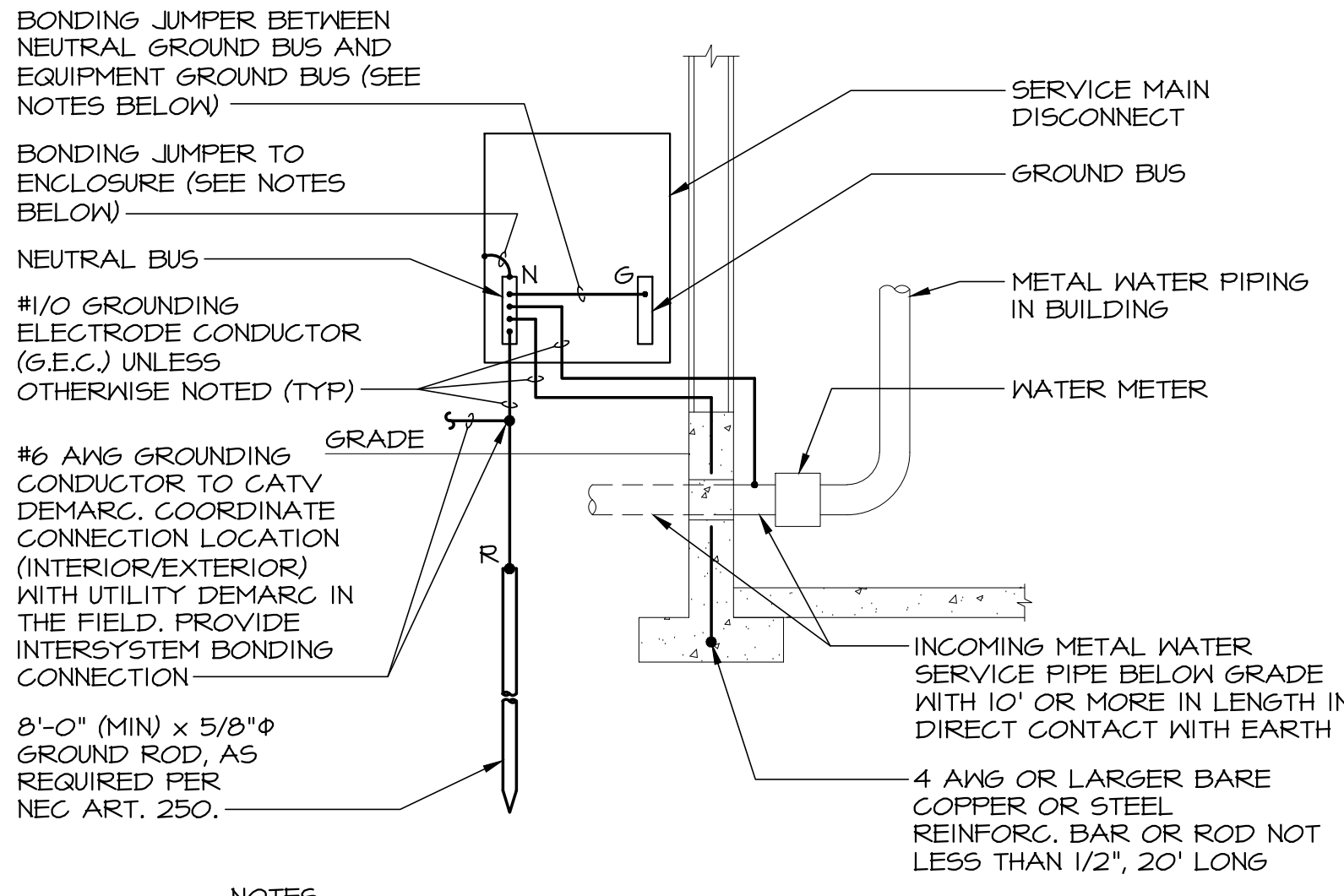
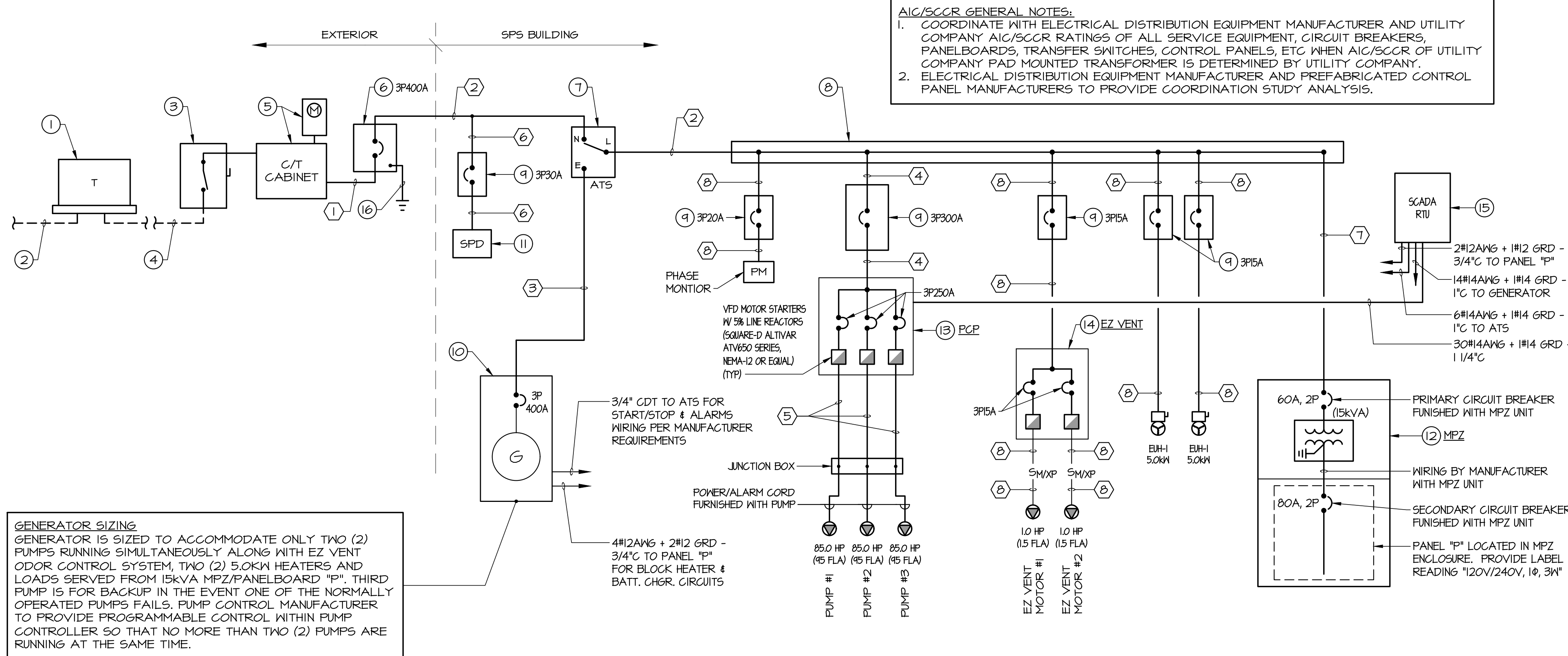


\* COORDINATE FINAL QUANTITY WITH UTILITY COMPANY DESIGN DRAWINGS PRIOR TO START OF WORK.

NOTE: DUCT BANK SHALL BE CONSIDERED TYPICAL. FINAL DUCT BANK SHALL BE INSTALLED IN FULL ACCORDANCE WITH APPLICABLE UTILITY(S) COMPANY LATEST EDITION SPECIFICATIONS.

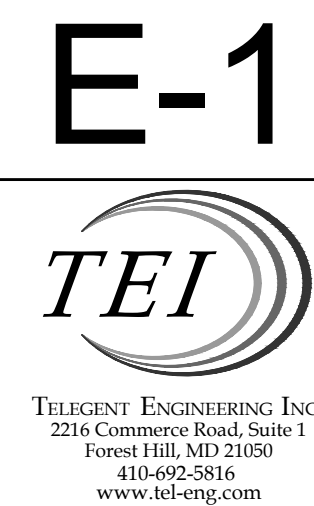
DETAIL - ELECTRIC CONDUIT SECTION  
NO SCALE

FEEDER SCHEDULE	
FEEDER NUMBER	FEEDER SIZE
1	2 SETS OF (4#3/0 AWG) - 4"C
2	2 SETS OF (4#3/0 AWG + 1#3 GRD) - 2"C
3	2 SETS OF (4#3/0 AWG + 1#3 GRD) - 2"C
4	4#4/0 AWG + 1#4 GRD - 2 1/2"C
5	3#1 AWG + #4 GRD - 1-1/2" C
6	4#1/0 AWG + 1#1/0 GRD - 1"C
7	2#6 AWG + 1#8 GRD - 1"C
8	3#12 AWG + 1#12 GRD - 1"C



DETAIL - ELECTRIC SERVICE GROUNDING ELECTRODE  
NO SCALE

ALL WORK SHALL BE PROVIDED IN ACCORDANCE WITH NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES SENIOR DESIGN POLICY "S67" INCLUDING PUMP STATION, EMERGENCY GENERATOR AND TELEMETRY SYSTEM.



REVIEW SET - NOT FOR CONSTRUCTION OR PERMIT

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JOB NO. 25014	DRAWN BY EC	CHECKED BY TS
ISSUED 4/29/25		

SHEET TITLE

**ELECTRICAL ONE LINE DIAGRAM**

SHEET NUMBER

**30 OF 32**



## DRAWING NOTES

- WIRING METHODS AND ELECTRICAL DEVICES IN WET WELL SHALL BE PER NEC ARTICLE 501 FOR CLASS I, DIVISION I LOCATIONS.
- PROVIDE AND INSTALL TWO (2) 4" PVC CONDUITS WITH PULLSTRINGS BELOW GRADE TO UTILITY COMPANY FURNISHED, GRADE MOUNTED TRANSFORMER PAD AS DETERMINED BY UTILITY COMPANY FOR EXTENSION OF SECONDARY SERVICE CABLES. COORDINATE EXACT LOCATION WITH UTILITY COMPANY IN THE FIELD. REFER TO ONE LINE DIAGRAM AND ELECTRICAL DUCTBANK DETAIL, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEMA-3R SERVICE MAIN NON-FUSIBLE UTILITY COMPANY LINE SIDE SAFETY DISCONNECT SWITCH FOR BUILDING ELECTRICAL SERVICE. COORDINATE ALL REQUIREMENTS WITH UTILITY COMPANY REPRESENTATIVE IN THE FIELD. REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEMA-3R UTILITY COMPANY APPROVED C/T CABINET FOR MAIN ELECTRICAL SERVICE. PROVIDE AND INSTALL METER FOR BUILDING ELECTRIC SERVICE METERING. METER FURNISHED AND INSTALLED BY UTILITY COMPANY. REFER TO ONE-LINE DIAGRAM SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW NEMA-3R, SERVICE ENTRANCE RATED, SERVICE MAIN ENCLOSED CIRCUIT BREAKER. REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW AUTOMATIC TRANSFER SWITCH (NEMA 3R RATED). REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW MINI-POWER ZONE (MPZ) WITH INTEGRAL PANELBOARD "P." REFER TO ONE LINE DIAGRAM, SHEET E-1 AND PANEL SCHEDULE, THIS SHEET FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW ENCLOSED CIRCUIT BREAKER TO SURGE PROTECTIVE DEVICE. REFER TO ONE LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW SURGE PROTECTIVE DEVICE. REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW ENCLOSED CIRCUIT BREAKER TO PUMP CONTROL PANEL SERVING SUBMERSIBLE PUMPS "P1," "P2" AND "P3." REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW ENCLOSED CIRCUIT BREAKER TO PHASE MONITOR PANEL. REFER TO ONE LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROPOSED LOCATION OF PHASE MONITOR PANEL. REFER TO ONE LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW ENCLOSED CIRCUIT BREAKER TO EUH-1. REFER TO ONE LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL NEW ENCLOSED CIRCUIT BREAKER TO EZ VENT ODOR CONTROL PANEL. REFER TO ONE LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- CONTROL PANEL AS NOTED. REFER TO COUNTY SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- PROVIDE AND INSTALL SEALABLE WIRE TROUGH (SIZED PER NEC).
- EXTEND 1 1/4" BELOW GRADE TO TELEMETRY ANTENNA POLE FOR COAXIAL CABLE.
- EXTEND 1" CONDUIT BETWEEN GENERATOR CONTROLLER AND ATS FOR START/STOP & ALARMS WIRING AS RECOMMENDED BY MANUFACTURER.
- EXTEND 1" CONDUIT WITH 6#14AWG (GENERATOR RUNNING, GENERATOR FAULT & SPARE) BETWEEN GENERATOR CONTROLLER AND TELEMETRY RTU PANEL FOR ALARMS WIRING.
- 1-1/2" GALVANIZED RIGID STEEL CONDUIT FOR SUBMERSIBLE PUMPS. REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- 1-1/4" GALVANIZED RIGID STEEL CONDUIT TO WET WELL FOR TRANSDUCER AND FLOAT CONTROL CABLES IN SEPARATE CONDUITS. PROVIDE SEALING HUBS (GROUSE-HINDS EYSR SERIES) PRIOR TO TERMINATION INTO J-BOX.
- REMOTE GENERATOR EMERGENCY STOP PUSH-BUTTON WITH DUAL ACTION (LIFT LID, PUSH BUTTON) OPERATION. EXTEND 2#12AWG TO GENERATOR CONTROL PANEL PER MANUFACTURER'S INSTRUCTIONS. PROVIDE PHENOLIC NAMEPLATE READING "GENERATOR EMERGENCY STOP."
- PROVIDE STANDBY GENERATOR MOUNTED ON CONCRETE HOUSEKEEPING PAD. REFER TO POWER ONE-LINE DIAGRAM, SHEET E-1 AND SPECIFICATIONS FOR ADDITIONAL INFORMATION.
- PROVIDE NON-REVERSING STARTER/DISCONNECT WITH H-O-A CONTROLS AND THERMAL OVERLOADS. SEE DIAGRAM, SHEET E-3 FOR ADDITIONAL INFORMATION.
- PROVIDE SPARE RIGID STEEL CONDUIT (SIZE AS INDICATED ON PLAN) FROM CONTROLLER TO JUNCTION BOX.
- RIGID STEEL CONDUIT BETWEEN JUNCTION BOXES AND WET WELL FOR PUMP POWER AND CONTROL CABLES PLUS TWO (2) SPARE.
- PROVIDE AND INSTALL NEW SAFETY DISCONNECT SWITCH SIZED PER MANUFACTURER'S RECOMMENDATIONS.
- EMERGENCY BATTER EGRESS LIGHT. CONNECT TO UNSWITCHED PORTION OF LIGHTING CIRCUIT. REFER TO LIGHT FIXTURE SCHEDULE, THIS SHEET FOR ADDITIONAL INFORMATION.

(WITHIN MPZ ENCLOSURE)

NEMA 3R (SURFACE)		* PANEL P				10 KW	
120 / 240 VOLTS		1 Ø		3 WIRE		80 AMP	
DESCRIPTION		KVA	CB	GCT	CB	KVA	DESCRIPTION
LTS - INTERIOR EMERGENCY	30	20	1	2	20	1.50	GEN. BLOCK HEATER
LTS - EXTERIOR	20	20	3	4	20	1.50	GEN. BATTERY CHARGER
RECEPTACLES	1.00	20	5	6	20	.20	RTU PANEL
GENERATOR LOUVERS	.60	20	7	8	20	.60	PUMP CONTROL PANEL
MOTORIZED DAMPER	.30	20	9	10	20	.15	SITE LIGHT
EF-1 CONTROLS	.70	20	11	12	-	-	SPACE
SPACE	-	-	13	14	-	-	SPACE
SPACE	-	-	15	16	-	-	SPACE
SPACE	-	-	17	18	-	-	SPACE
SPACE	-	-	19	20	-	-	SPACE
SPACE	-	-	21	22	-	-	SPACE
SPACE	-	-	23	24	-	-	SPACE
SPACE	-	-	25	26	-	-	SPACE
SPACE	-	-	27	28	-	-	SPACE
SPACE	-	-	29	30	-	-	SPACE
LIGHTING LOAD:		0.65 KVA x 125%		0.81 KVA		1.08 KVA	
RECEPTACLE LOAD:		1.00 KVA x 125%		1.25 KVA		1.50 KVA	
MISC. LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
MECHANICAL LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
LARGEST MOTOR LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
REMAINING MOTOR LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
WATER HEATER LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
ELECTRIC HEAT LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
SUB-PANEL LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
XFER. LOAD:		0.00 KVA x 125%		0.00 KVA		0.00 KVA	
TOTAL LOAD:		7.24 KVA x 125%		9.05 KVA		10.86 KVA	

\* PANELBOARD FEEDERS ARE SIZED FOR MAIN OVERCURRENT DEVICE PER N.E.C. ARTICLE 215.2

\*\* ALL LOADS ARE BASED UPON N.E.C. ARTICLE 220

## LIGHT FIXTURE SCHEDULE

TYPE	DESCRIPTION	MANUFACTURER OR EQUAL
A	4' GASKETED ENCLOSED STRIP FIXTURE WITH ACRYLIC LENS AND WHITE FINISH (120V, 31W, 4000°K, 4195 LM)	COLUMBIA LTG LXEM 4 40 LW RFA E U
B	WALL MOUNTED, ABOVE DOOR, SECURITY LIGHT WITH DARK BRONZE FINISH, INTEGRAL PHOTOCELL AND BATTER BACK UP (120V, 15W, 4000°K, 1868 LM)	HUBBELL: LNC2 48L-15 4K1 4W UNV DBT PC E
C	INDUSTRIAL EMERGENCY EGRESS LIGHTING UNIT W/2 HEADS AND MAINT. FREE BATTERY (120 VOLT)	DUAL LITE DYN SERIES

## EQUIPMENT SCHEDULE

ITEM	EQUIPMENT	VOLTAGE/Ø	LOAD (MCA UON)	MANUF. MOCF.	SUPPLY CIRCUIT			CONN.	NOTES
					CIRC #	WIRE	CDT		
(A)	EUH-1	480V/3Ø	5.0 KW	-	SEE NOTES	3#12AWG + #12GRD	3/4"	H.W.	1
(B)	MOTORIZED DAMPER	120V/1Ø	-	-	SEE PLAN	2#12AWG + #12GRD	3/4"	H.W.	2
(C)	EF-1	120V/1Ø	1/4 HP	-	P-II	2#12AWG + #12GRD	3/4"	H.W.	

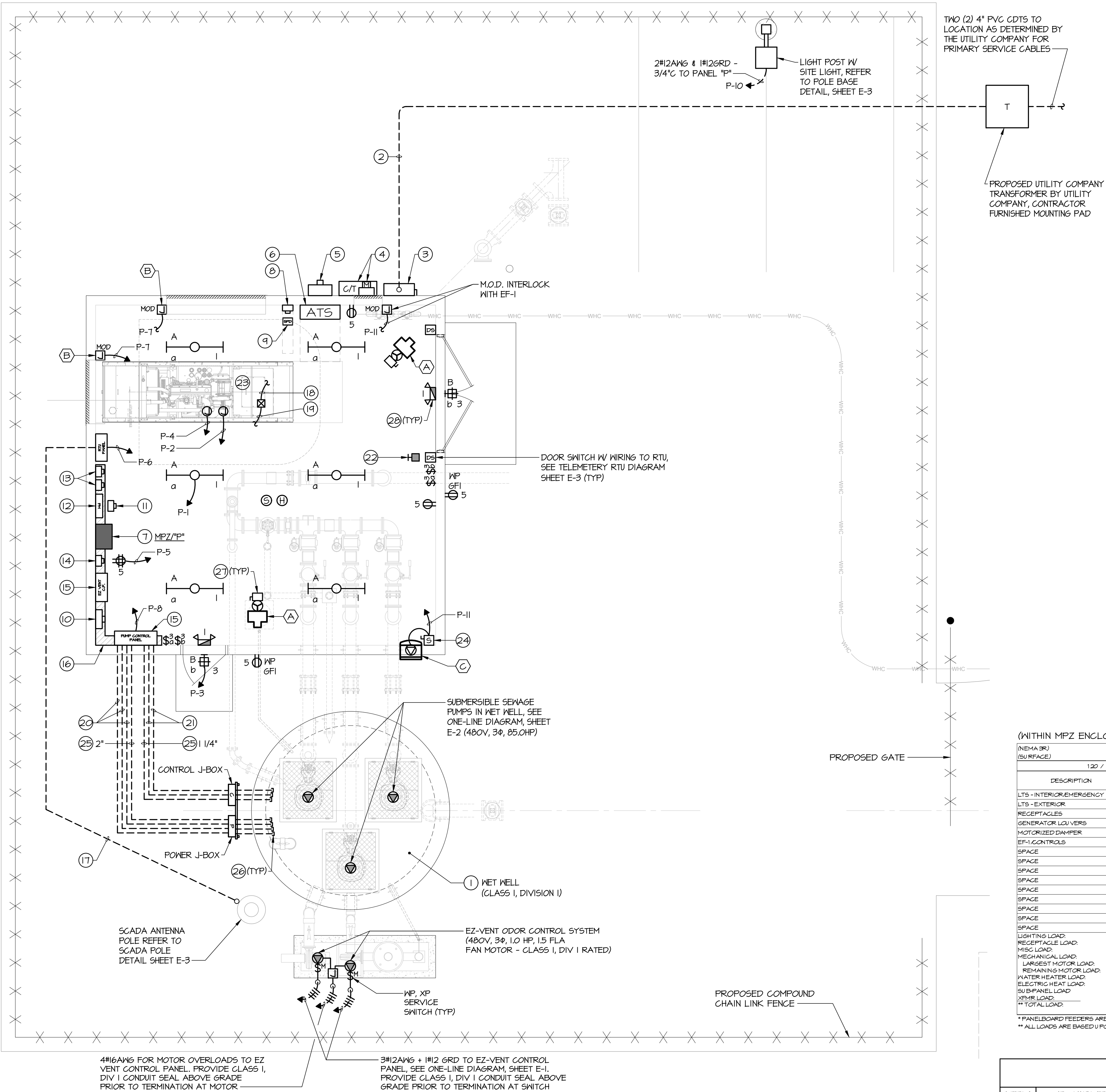
NOTES:

- REFER TO ONE-LINE DIAGRAM, SHEET E-1 FOR ADDITIONAL INFORMATION.
- PROVIDE 120V CONNECTION TO MOTOR OPERATED DAMPER FURNISHED AND INSTALLED BY MECHANICAL. REFER TO GENERATOR LOUVER CONTROL DIAGRAM, SHEET E-3.



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

TEI

TELECENT ENGINEERING INC.  
2216 Commerce Road, Suite 1  
Forest Hill, MD 21050  
410-692-5816  
www.tei-eng.com

## ELECTRICAL SITE PLAN

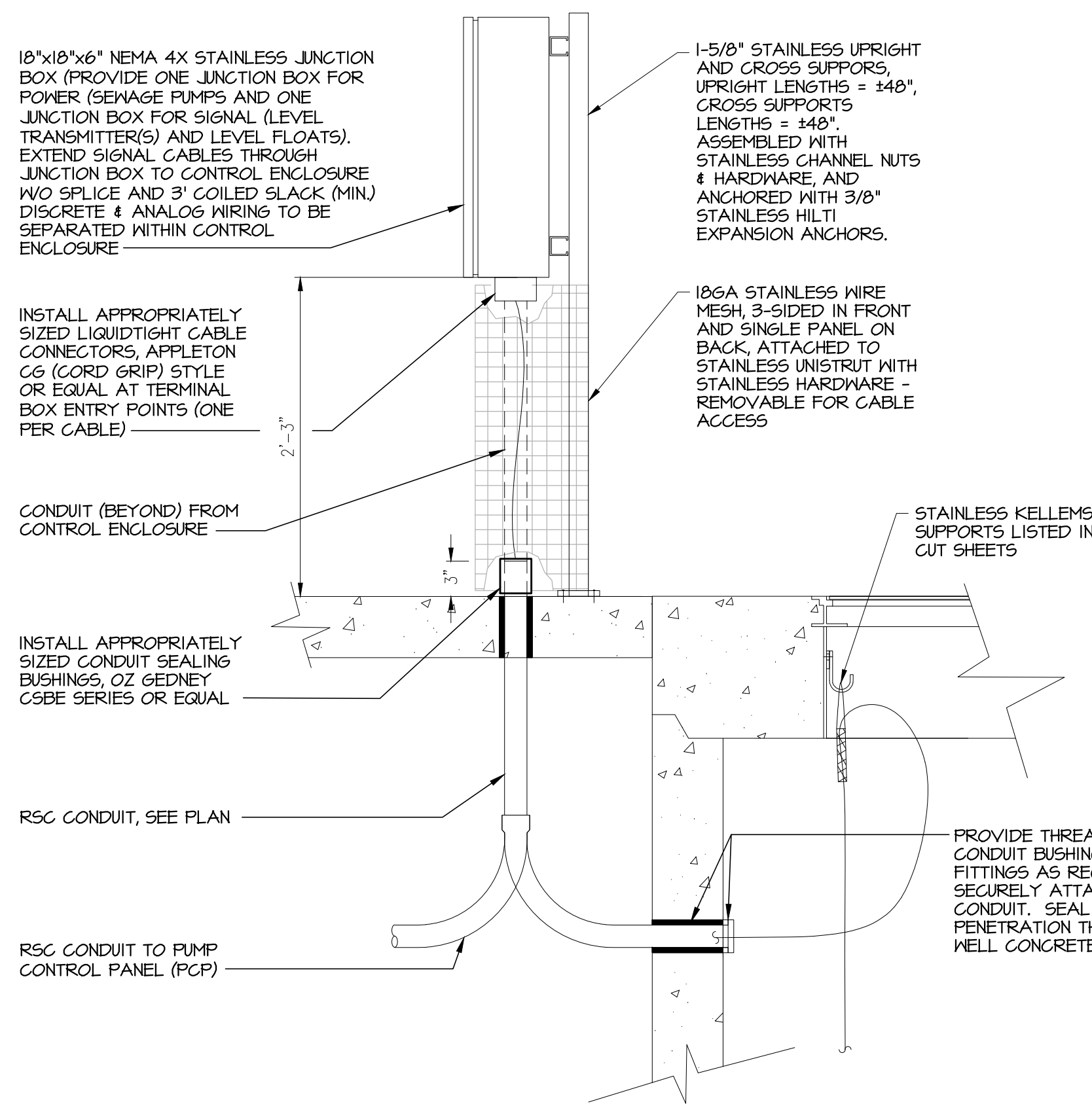
SCALE: 1/4" = 1'-0"



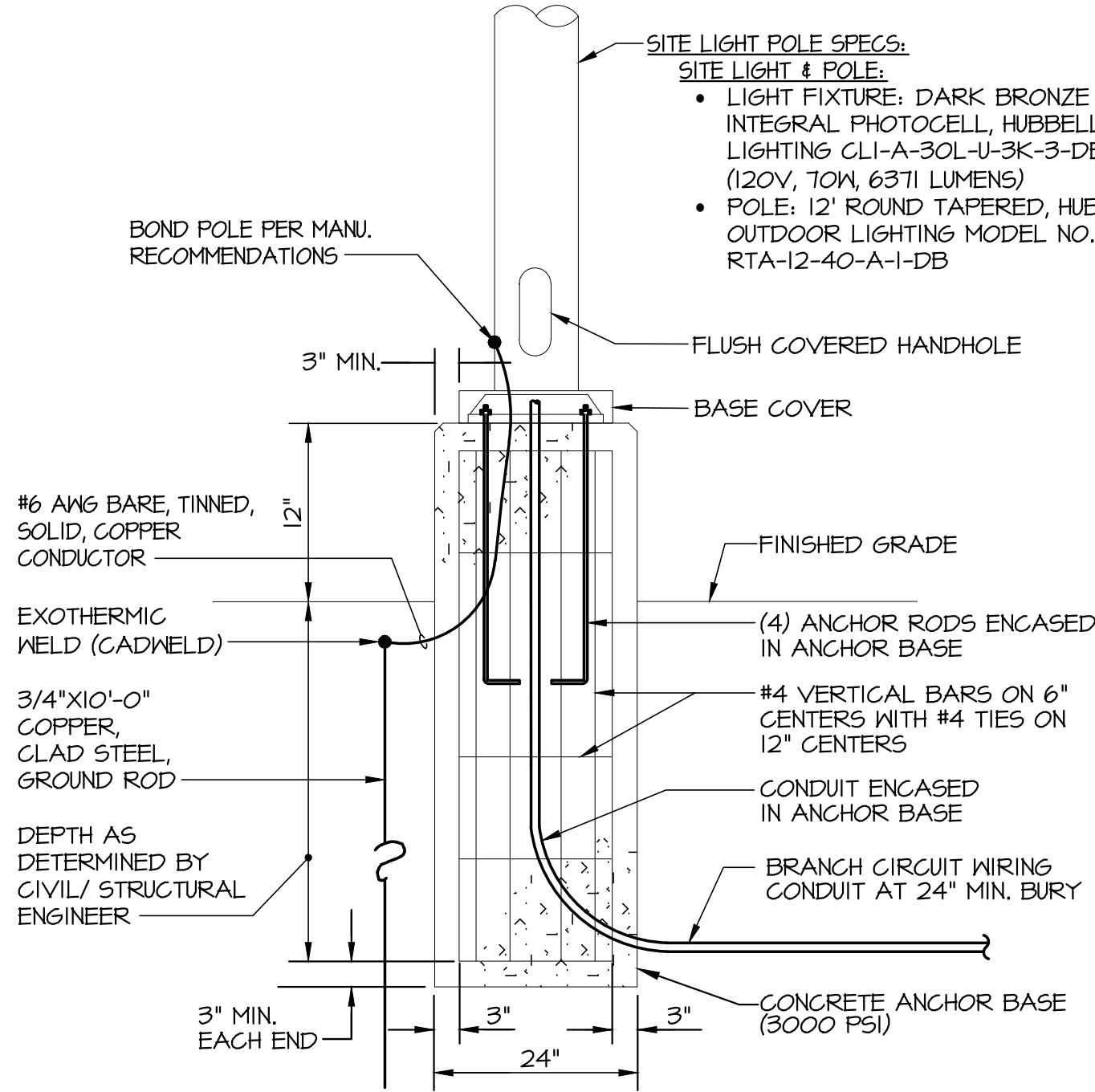
APPROX.

ALL WORK SHALL BE PROVIDED IN ACCORDANCE WITH NEW CASTLE COUNTY DEPARTMENT OF SPECIAL SERVICES SEWER DESIGN POLICY "SSD" INCLUDING PUMP STATION, EMERGENCY GENERATOR AND TELEMETRY SYSTEM.

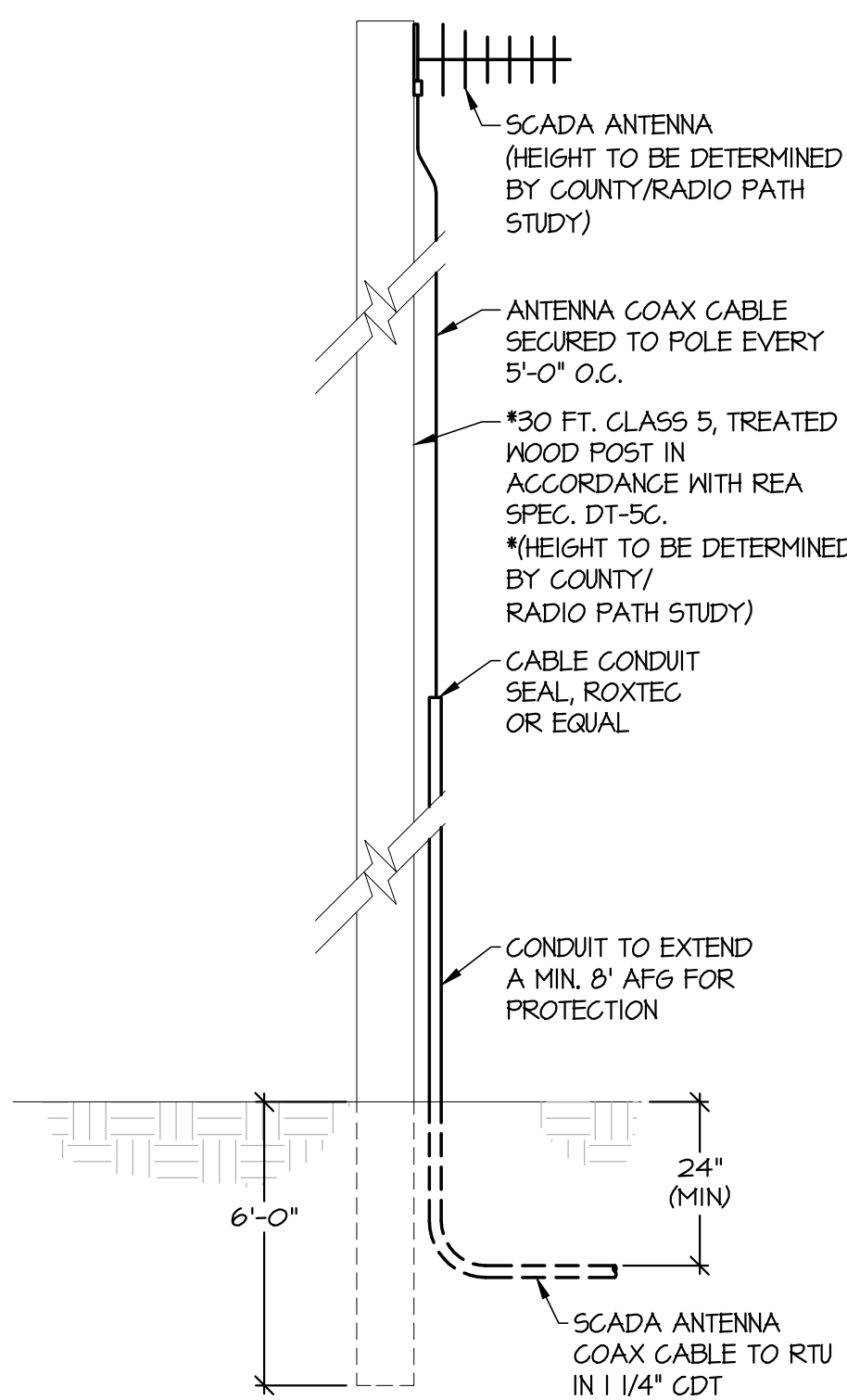




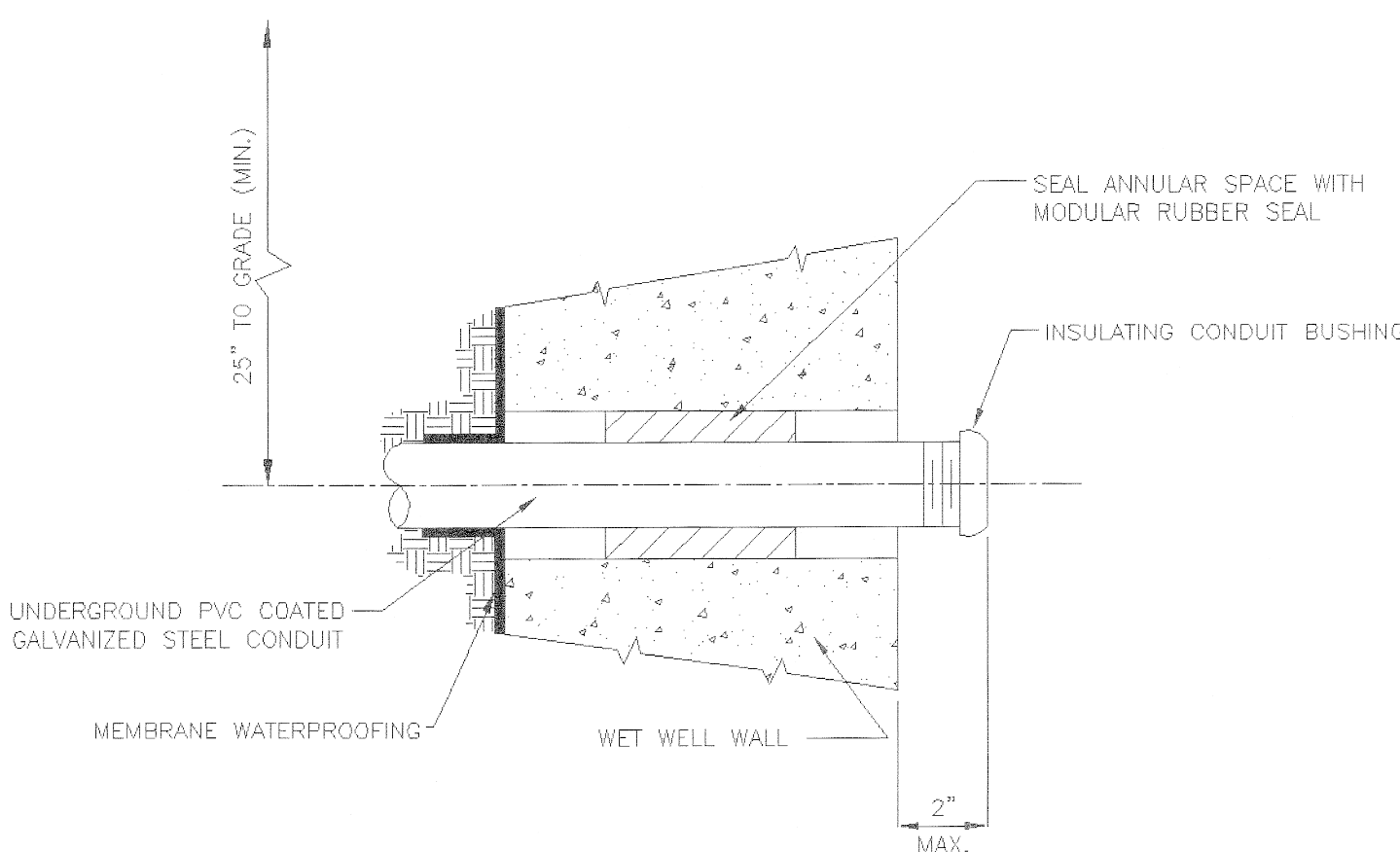
J-BOX SUPPORT & CABLE PROTECTION ASSEMBLY  
NO SCALE



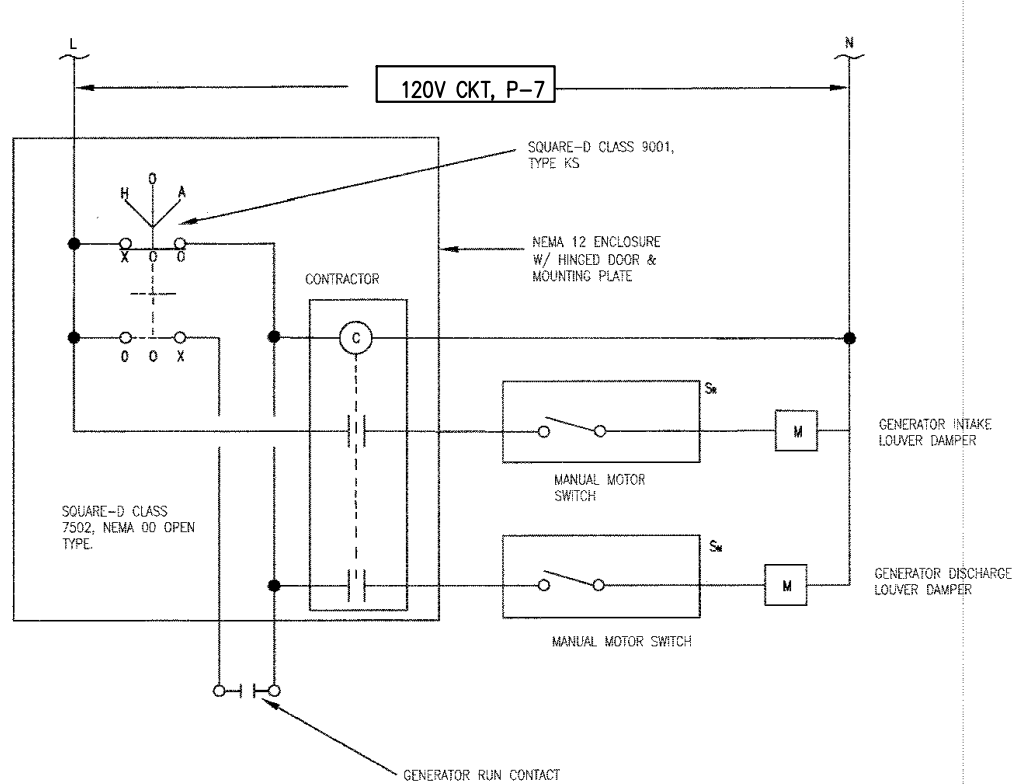
DETAIL - SITE LIGHT POLE FOUNDATION  
NO SCALE



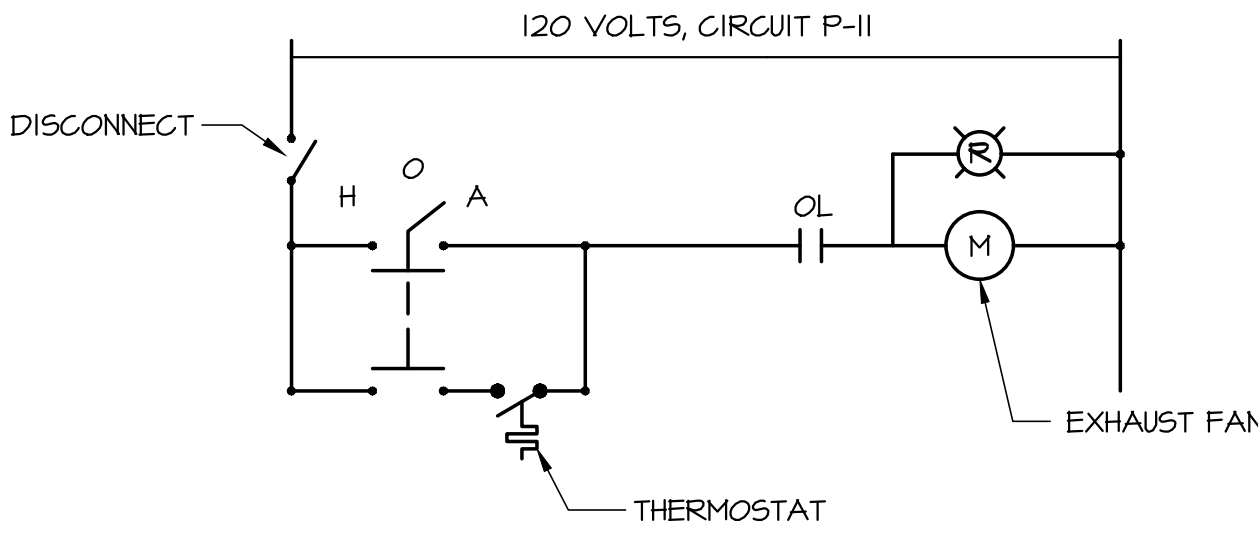
DETAIL - SCADA ANTENNA POLE  
NO SCALE



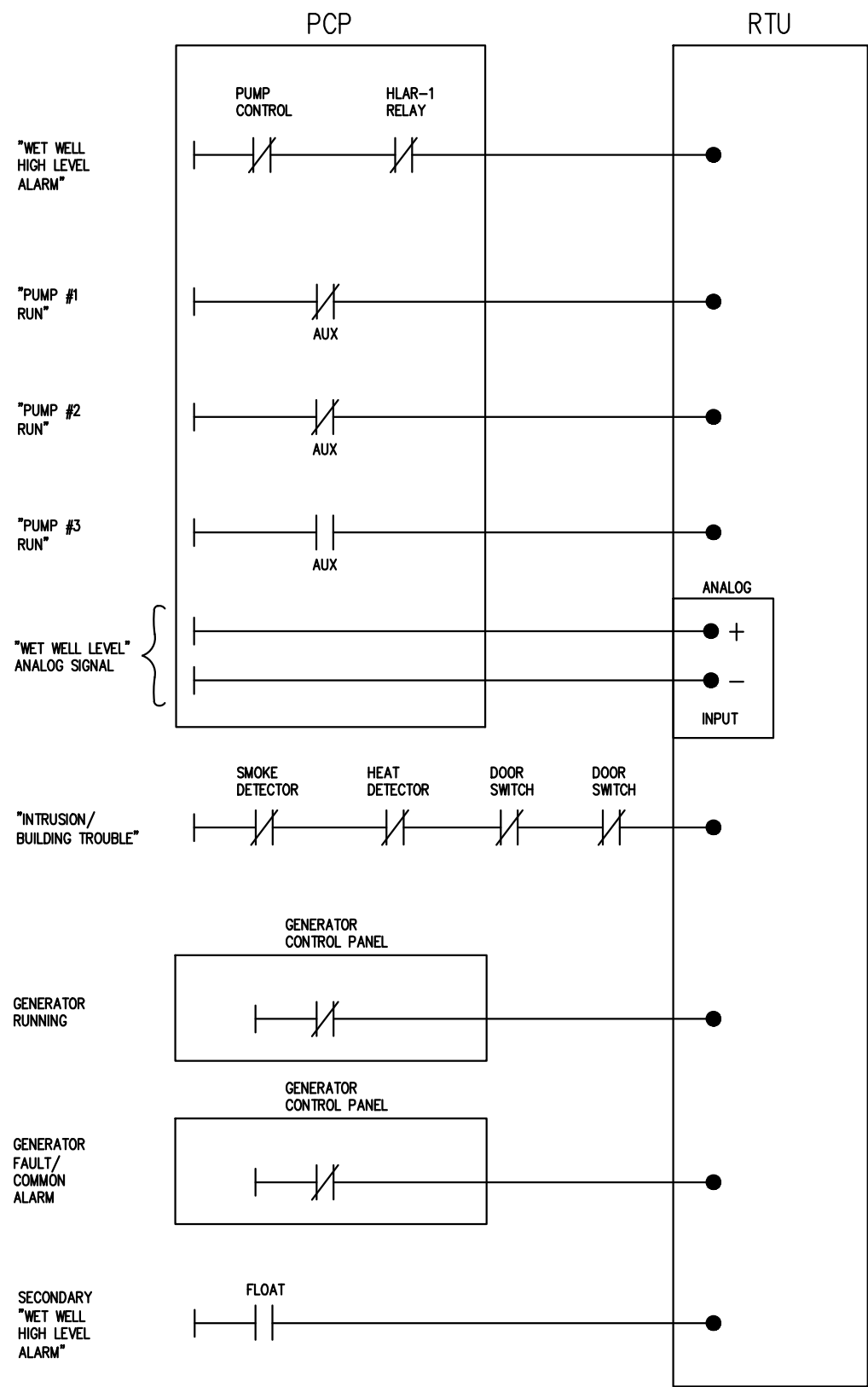
WET WELL ELECTRICAL CONDUIT DETAIL (TYPICAL)  
NO SCALE



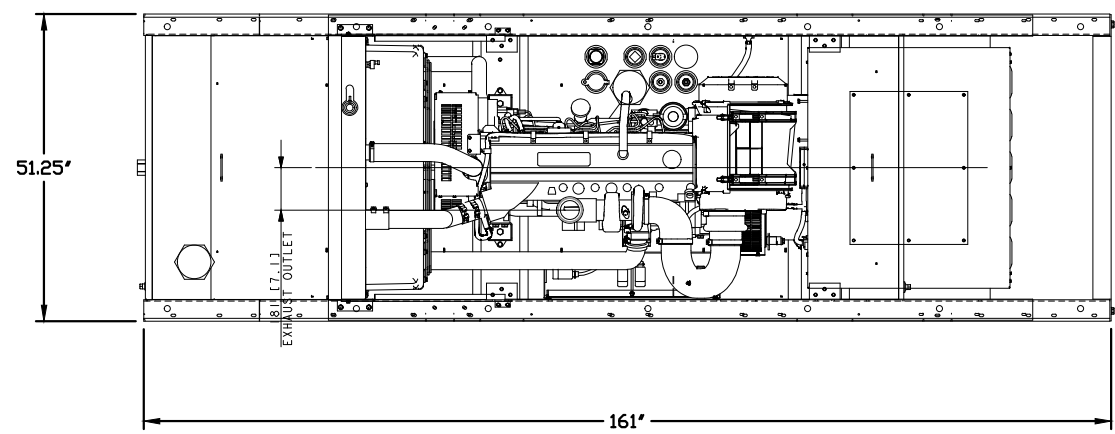
GENERATOR LOUVER CONTROL DIAGRAM  
NO SCALE



BLDG EF-1 CONTROL DIAGRAM  
NO SCALE



TELEMETRY INPUT WIRING DIAGRAM  
NO SCALE



DETAIL EMERGENCY GENERATOR  
NO SCALE

