



THIS DRAWING PREPARED AT THE  
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REVISION DESCRIPTION  
 ROLESVILLE ROAD TAPER SHIFT AND STORM NETWORK UPDATE  
 GRADING AND STORM NETWORK ADJUSTMENTS

YOUR VISION ACHIEVED THROUGH OURS.

DATE  
 06-15-2023  
 10-24-2023

DATE  
 07/21/22

DRAWN BY  
 BPW

DESIGNED BY  
 BPW

CHECKED BY  
 BPW

SCALE  
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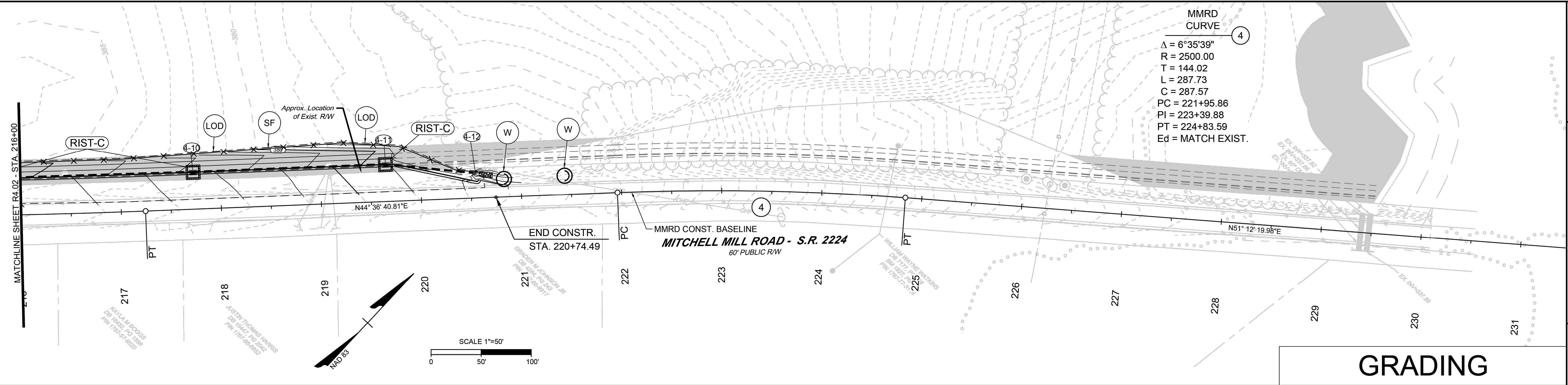
JOB NO.  
 43398

SHEET NO.  
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# TIMMONS GROUP

## WHEELER TRACT - OFFSITE IMPROVEMENTS ROLESVILLE - WAKE COUNTY - NORTH CAROLINA EROSION CONTROL PLAN



### GRADING

## EROSION CONTROL NOTES & DETAILS

### PROJECT DESCRIPTION

THE PURPOSE OF THIS PROJECT IS TO WIDEN ROLESVILLE ROAD AND MITCHELL MILL ROAD TO THE ONE-HALF THE ULTIMATE CROSS SECTION PER THE TOWN'S COMPREHENSIVE TRANSPORTATION PLAN. THESE IMPROVEMENTS SPAN FOR THE ENTIRE FRONTAGE SITE DEVELOPMENT PER TOWN UDO REQUIREMENTS. ADDITIONAL IMPROVEMENTS INCLUDE STRIPING AND DITCHES.

### EROSION AND SEDIMENT CONTROL MEASURES:

UNLESS OTHERWISE INDICATED, ALL VEGETATIVE AND STRUCTURAL EROSION AND SEDIMENT CONTROL PRACTICES SHALL BE CONSTRUCTED AND MAINTAINED ACCORDING TO THE MINIMUM STANDARDS AND SPECIFICATIONS OF THE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION EROSION AND SEDIMENT CONTROL DESIGN AND CONSTRUCTION MANUAL. THE MINIMUM STANDARDS SET FORTH BY THIS MANUAL SHALL BE ADHERED TO UNLESS OTHERWISE WAIVED OR APPROVED BY A VARIANCE.

### EROSION CONTROL SEQUENCE OF CONSTRUCTION

A SINGLE-PHASED EROSION CONTROL APPROACH IS PROVIDED BELOW TO DESCRIBE GENERAL MEASURES REQUIRED TO MAINTAIN THE SITE THROUGHOUT CONSTRUCTION. THE CONTRACTOR SHALL APPLY PHASE I AS DESCRIBED HEREIN TO THE VARIOUS WORK AREAS ASSOCIATED WITH THIS PROJECT. DUE TO THE NATURE OF WORK AREAS, THE CONTRACTOR SHALL ENSURE EROSION CONTROL MEASURES ARE PROVIDED AS DESCRIBED THROUGH PROJECT COMPLETION AND ACCEPTANCE.

### PHASE I:

- PROVIDE MINIMAL CLEARING TO INSTALL SILT FENCE AS SHOWN ON THE PLANS. INSTALL CULVERT PROTECTION AS REQUIRED FOR EXISTING PIPES. TAKE SPECIAL CARE TO KEEP SOIL BUILD-UP FROM ENTERING THE EXISTING ROAD PAVEMENT.
- THE CONTRACTOR WILL NOTIFY THE INSPECTOR OF THE PERMITTED LOCATION EXCESS SOIL MATERIAL IS HAULED TO OR BORROW MATERIAL IS BROUGHT IN FROM. CLEAR AND GRUB AS INDICATED IN THE PLANS. MAINTAIN ACCESS ALONG EXISTING ROADS AND TO EXISTING DRIVEWAYS AT ALL TIMES.
- TEMPORARY GRADING AND SEEDING IS REQUIRED FOR ALL AREAS WHEN DIRECTED:
  - WHEN IT IS IMPOSSIBLE OR IMPRACTICAL TO BRING AN AREA TO THE FINAL LINE, GRADE AND FINISH SO THAT PERMANENT SEEDING AND MULCHING OPERATIONS CAN BE PERFORMED WITHOUT SUBSEQUENT SERIOUS DISTURBANCE BY ADDITIONAL GRADING.
  - WHEN EROSION OCCURS OR IS CONSIDERED TO BE POTENTIALLY SUBSTANTIAL ON AREAS OF GRADED ROADBED WHERE CONSTRUCTION OPERATIONS ARE TEMPORARILY SUSPENDED OR WHEN THE GRADING OF THE ROADBED HAS BEEN COMPLETED SUBSTANTIALLY IN ADVANCE OF THE PAVING CONSTRUCTION DURING SEASONS OF THE YEAR WHEN PERMANENT SEEDING AND MULCHING IS PROHIBITED BY THE CONTRACT.
  - WHEN AN IMMEDIATE COVER WOULD BE DESIRABLE TO MINIMIZE EROSION, SILTATION OR POLLUTION ON ANY AREA.
  - 7/14-DAY SOIL STABILIZATION REQUIREMENTS APPLY TO ANY SECTION OF THE PROJECT WHERE LAND-DISTURBING ACTIVITIES HAVE TEMPORARILY OR PERMANENTLY CEASED AND SHALL SUPERSEDE ANY LESS STRINGENT STABILIZATION REQUIREMENTS ON THE PLANS. [G.S. 143-215.1]
- CONTRACTOR SHALL REMOVE AND REPLACE ANY DAMAGED EROSION CONTROL MEASURES UNTIL FINAL APPROVAL OF CONSTRUCTION.
- THE SITE SHALL BE PERMANENTLY STABILIZED AFTER ALL GRADING HAS BEEN COMPLETED BY SEEDING ALL DISTURBED AREAS.
- UPON CONSTRUCTION COMPLETION, THE CONTRACTOR MUST CONTACT THE INSPECTOR FOR EROSION CONTROL INSPECTION OF SLOPE STABILITY. EROSION CONTROL MEASURES MAY NOT BE REMOVED WITHOUT AUTHORIZATION BY THE ASSIGNED INSPECTOR.
- UPON APPROVAL CONTRACTOR SHALL REMOVE ALL TEMPORARY EROSION CONTROL DEVICES.

### NOTE:

- CONTRACTOR MUST KEEP THE EXISTING ROAD FREE FROM BUILDUP OF SOIL.

EROSION & SEDIMENT CONTROL LEGEND	
	LIMITS OF DISTURBANCE
	TEMPORARY SILT FENCE (NCDOT STD. 1605.01)
	WATTLE WITH FLOCCULANT
	ROCK INLET SEDIMENT TRAP - TYPE C (NCDOT STD. 1632.03)
	ROCK PIPE SEDIMENT TRAP - TYPE B (NCDOT STD. 1635.02)

### STABILIZATION REQUIREMENTS:

Stabilization for this project shall comply with the time frame guidelines as specified by the NCG-010000 general construction permit effective April 1, 2019 issued by the North Carolina Department of Environmental Quality Division of Water Resources. Temporary or permanent ground cover stabilization shall occur within 7 calendar days from the last land-disturbing activity, with the following exceptions in which temporary or permanent ground cover shall be provided in 14 calendar days from the last land-disturbing activity:

- Slopes between 2:1 and 3:1, with a slope length of 10 ft. or less
- Slopes 2:1 or flatter, with a slope length of 50 ft. or less
- Slopes 4:1 or flatter

The stabilization timeframe for High Quality Water (HQW) Zones shall be 7 calendar days with no exceptions for slope grades or lengths. High Quality Water Zones (HQW) Zones are defined by North Carolina Administrative Code 15A NCAC 04A.0105 (2). Temporary and permanent ground cover stabilization shall be achieved in accordance with the provisions in this contract and as directed.

### SEEDING AND MULCHING:

(East)

The kinds of seed and fertilizer, and the rates of application of seed, fertilizer, and limestone, shall be as stated below. During periods of overlapping dates, the kind of seed to be used shall be determined. All rates are in pounds per acre.

All Roadway Areas	
March 1 - August 31	September 1 - February 28
35# Tall Fescue	35# Tall Fescue
10# Centipede	10# Centipede
25# Bermudagrass (unfilled)	35# Bermudagrass (subfilled)
500# Fertilizer	500# Fertilizer
4000# Limestone	4000# Limestone

Waste and Borrow Locations

March 1 - August 31		September 1 - February 28	
75# Tall Fescue	75# Tall Fescue	75# Tall Fescue	75# Tall Fescue
25# Bermudagrass (unfilled)	35# Bermudagrass (subfilled)	25# Bermudagrass (unfilled)	35# Bermudagrass (subfilled)
500# Fertilizer	500# Fertilizer	500# Fertilizer	500# Fertilizer
4000# Limestone	4000# Limestone	4000# Limestone	4000# Limestone

Note: 50# of Bahiagrass may be substituted for either Centipede or Bermudagrass only upon Engineer's request.

Approved Tall Fescue Cultivars

06 Dunt	Enchale	Justice	Sawseget
2nd Millennium	Evergreen 2	Kelly Hank 2000	Shady
3rd Millennium	Falcon IV	Legitimate	Sheridan
Apache III	Falcon NG	Legitimate	Sigma
Avenger	Falcon V	LSD	Silver Hawk
Baracas	Fuchs	Magnum	Silverstar
Batsons II	Far Cat	Millennium SRP	Shamrock Elite
Bar Pa	Festiva	Monor	Sidewinder
Barnes	Fidelity	Montag 4	Skyline
Barrington	Finelawn Elite	Ninja 2	Solara
Barroberto	Finelawn Xpress	Of Glory	Southern Choice II
Barrabato	Finelawn II	Olympic Gold	Speedway
Bilmore	Firebird	Palde	Spurlock LS
Bingo	Finelawn LS	Paragonia	Sunset Gold
Bilman	Finelawn LS	Pedigre	Tacone
Blackwatch	Five Point	Picasso	Tanzena
Black Runner II	Fortis	Piedmont	Tato
Bonast	Fortis	Platinum	Tato II
Braveheart	Genelle II	Prospect 5301	Talladega
Breno	Genelle II	Prospect	Tanzen
Boltway	Greenbrook	Quest	Titan Ind
Camavaro	Greenkeeper	Raptor II	Titanium LS
Candyst	Greenline	Rebel Elite	Tracer
Cayenne	Greenkeeper	Rebel Senry	Transverse SRP
Cosmos R2	Greystone	Rebel IV	Tribal Time
Chaper	Guardian 21	Rebel V	Turbo
Cochise IV	Guardian 41	Reignment II	Turbo RZ
Constitution	Hiway Hawk	Ragulator 2 SRP	Ultimate
Covent	Hiway Hawk	Renaissance	Ventura
Coyote	Hot Rod	Riverstone	Unshella
Coyote	Innovator	Riverside	Van Gogh
Dartiac	Innovator	Riverstone	Walbridge
Devine	Innovator	Riverstone	Wolfpack II
Domination	Innovator	Riverstone	Xmasgreen
Dynamic	Innovator	Riverstone	
Dynasty	Innovator	Riverstone	
Endeavor	Innovator	Riverstone	

On cut and fill slopes 2:1 or steeper Centipede shall be applied at the rate of 5 pounds per acre and add 20# of Sericea Lespedeza from January 1 - December 31.

Fertilizer shall be 10-20-20 analysis. A different analysis of fertilizer may be provided the 1-2-3 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as a 10-20-20 analysis and as directed.

### TEMPORARY SEEDING:

Fertilizer shall be the same analysis as specified for Seeding and Mulching and applied at the rate of 400 pounds and seeded at the rate of 50 pounds per acre. Sweet Sudan Grass, German Millet or Browning Millet shall be used in summer months and Ryegrass during the remainder of the year. The Engineer will determine the exact dates for using each kind of seed.

### FERTILIZER TOPDRESSING:

Fertilizer used for topdressing on all roadway areas except slopes 2:1 and steeper shall be 10-20-20 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-3 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 10-20-20 analysis and as directed.

Fertilizer used for topdressing on slopes 2:1 and steeper and waste and borrow areas shall be 16-8-8 grade and shall be applied at the rate of 500 pounds per acre. A different analysis of fertilizer may be used provided the 1-2-3 ratio is maintained and the rate of application adjusted to provide the same amount of plant food as 16-8-8 analysis and as directed.

### SUPPLEMENTAL SEEDING:

The kinds of seed and proportions shall be the same as specified for Seeding and Mulching, with the exception that no complete seed will be used in the seed mix for supplemental seeding. The rate of application for supplemental seeding may vary from 25# to 75# per acre. The actual rate per acre will be determined prior to the time of topdressing and the Contractor will be notified in writing of the rate per acre, total quantity needed, and areas on which to apply the supplemental seed. Minimum tillage equipment, consisting of a soil seeder shall be used for incorporating seed into the soil as to prevent disturbance of existing vegetation. A clothseeder (roll and chain) may be used where degree of slope prevents the use of a soil seeder.

### MOWING:

The minimum mowing height on this project shall be 4 inches.

Material	Rate Per Acre	Quality	Notes
Organic Mulches			
Straw	1-2 tons	Dry, unrotted, unweeded, avoid weeds.	Spread over bare soil or on top of mulch. Do not use on slopes. Must be applied in fine turf.
Wood chips	5-6 tons	Air dry	Apply with 12 Bar rotorgrinder. Apply with blower. Do not use in fine turf.
WOOD FIBER	0.5-1 ton		Apply with mulch blower or by hand. Do not use in fine turf.
Bank	30 cubic yards	Air dry, unrotted, or chips.	Apply with mulch blower, chip handler, or by hand. Do not use in fine turf.
COM POSTS	4-8 tons	Cut or shredded in 4-8 in. lengths.	Apply with mulch blower or by hand. Do not use in fine turf.
Grass	1-3 tons	Green or dry; avoid carbon content used.	Apply with mulch blower or by hand. Do not use in fine turf.
Wool Mat	Cover area	Heavy uniform; woven or single pile yarn.	Withstands weather. Best when used with organic mulch.
Geotextile mat	Cover area	Heavy uniform; woven or single pile yarn.	Withstands weather. Best when used with organic mulch.
Geotextile (WOOD FIBER)	Cover area	Heavy uniform; woven or single pile yarn.	Withstands weather.
Geotextile (WOOD FIBER)	0.5-1 ton	Continuous layer of straw, grass, or wood chips applied at a rate of 25-30 gal/1,000 sq. ft.	Apply with a compressed air seeder. Do not use in fine turf.
Geotextile Stabilizer	Follow manufacturer's specifications		Not beneficial to plant growth.

\*Use of backfill does not imply endorsement of product.

### NOTES

CHANGES MAY BE REQUIRED WHEN PHYSICAL DIMENSIONS IN THE DETAIL DRAWINGS, STANDARD DETAILS, AND ROADWAY DETAILS ARE NOT ATTAINABLE TO MEET FIELD CONDITIONS OR RESULT IN DUPLICATE OR UNDESIRABLE OVERLAPPING OF DEVICES. MODIFICATION MAY INCLUDE: MOVING, SUPPLEMENTING, COVERING, OR REMOVAL OF DEVICES AS DIRECTED BY THE ENGINEER.

THE FOLLOWING GENERAL NOTES APPLY AT ALL TIMES FOR THE DURATION OF THE CONSTRUCTION PROJECT EXCEPT WHEN OTHERWISE NOTED IN THE PLAN OR DIRECTED BY THE ENGINEER.

**TIME RESTRICTIONS**

A) DO NOT CLOSE OR NARROW TRAVEL LANES AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
Rolesville Road	7am-9am, 3pm-6pm
Mitchell Mill Road	7am-9am, 3pm-6pm

B) DO NOT CLOSE OR NARROW TRAVEL LANES DURING HOLIDAYS AND SPECIAL EVENTS AS FOLLOWS:

ROAD NAME	DAY AND TIME RESTRICTIONS
Rolesville Road	7am-9am, 3pm-6pm
Mitchell Mill Road	7am-9am, 3pm-6pm

**HOLIDAY**

- FOR ANY UNEXPECTED OCCURRENCE THAT CREATES UNUSUALLY HIGH TRAFFIC VOLUMES, AS DIRECTED BY THE ENGINEER.
- FOR NEW YEAR'S, BETWEEN THE HOURS OF 7:00 A.M. DECEMBER 31st TO 7:00 P.M. JANUARY 2ND. IF NEW YEAR'S DAY IS ON A FRIDAY, SATURDAY, SUNDAY, OR MONDAY THEN UNTIL 7:00 P.M. THE FOLLOWING TUESDAY.
- FOR EASTER, BETWEEN THE HOURS OF 7:00 A.M. THURSDAY AND 7:00 P.M. MONDAY.
- FOR MEMORIAL DAY, BETWEEN THE HOURS OF 7:00 A.M. FRIDAY TO 7:00 P.M. TUESDAY.
- FOR INDEPENDENCE DAY, BETWEEN THE HOURS OF 7:00 A.M. THE DAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE DAY AFTER INDEPENDENCE DAY.  
  
IF INDEPENDENCE DAY IS ON A FRIDAY, SATURDAY, SUNDAY OR MONDAY THEN BETWEEN THE HOURS OF 7:00 A.M. THE THURSDAY BEFORE INDEPENDENCE DAY AND 7:00 P.M. THE TUESDAY AFTER INDEPENDENCE DAY.
- FOR LABOR DAY, BETWEEN THE HOURS OF 7:00 A.M. FRIDAY AND 7:00 P.M. TUESDAY.
- FOR THANKSGIVING DAY, BETWEEN THE HOURS OF 7:00 A.M. TUESDAY TO 7:00 P.M. MONDAY.
- FOR CHRISTMAS, BETWEEN THE HOURS OF 7:00 A.M. THE FRIDAY BEFORE THE WEEK OF CHRISTMAS DAY AND 7:00 P.M. THE FOLLOWING TUESDAY AFTER THE WEEK OF CHRISTMAS.

**LANE AND SHOULDER CLOSURE REQUIREMENTS**

- C) REMOVE LANE CLOSURE DEVICES FROM THE LANE WHEN WORK IS NOT BEING PERFORMED BEHIND THE LANE CLOSURE OR WHEN A LANE CLOSURE IS NO LONGER NEEDED OR AS DIRECTED BY THE ENGINEER.
- D) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING WITHIN 15 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN SHOULDER USING ROADWAY STANDARD DRAWING NO. 1101.04 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL OR A LANE CLOSURE IS INSTALLED.
- E) WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO AN UNDIVIDED FACILITY AND WITHIN 5 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

WHEN PERSONNEL AND/OR EQUIPMENT ARE WORKING ON THE SHOULDER ADJACENT TO A DIVIDED FACILITY AND WITHIN 10 FT OF AN OPEN TRAVEL LANE, CLOSE THE NEAREST OPEN TRAVEL LANE USING ROADWAY STANDARD DRAWING NO. 1101.02 UNLESS THE WORK AREA IS PROTECTED BY BARRIER OR GUARDRAIL.

F) DO NOT WORK SIMULTANEOUSLY WITHIN 15 FT ON BOTH SIDES OF AN OPEN TRAVELWAY, RAMP, OR LOOP WITHIN THE SAME LOCATION UNLESS PROTECTED WITH GUARDRAIL OR BARRIER.

**PAVEMENT EDGE DROP OFF REQUIREMENTS**

- G) BACKFILL AT A 6:1 SLOPE UP TO THE EDGE AND ELEVATION OF EXISTING PAVEMENT IN AREAS ADJACENT TO AN OPENED TRAVEL LANE THAT HAS AN EDGE OF PAVEMENT DROP-OFF AS FOLLOWS:
- BACKFILL DROP-OFFS THAT EXCEED 2 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS OF 45 MPH OR GREATER.
  - BACKFILL DROP-OFFS THAT EXCEED 3 INCHES ON ROADWAYS WITH POSTED SPEED LIMITS LESS THAN 45 MPH.
  - BACKFILL WITH SUITABLE COMPACTED MATERIAL, AS APPROVED BY THE ENGINEER, AT NO EXPENSE TO THE DEPARTMENT.
- H) DO NOT EXCEED A DIFFERENCE OF 2 INCHES IN ELEVATION BETWEEN OPEN LANES OF TRAFFIC FOR NOMINAL LIFTS OF 1.5 INCHES. INSTALL ADVANCE WARNING "UNEVEN LANES" SIGNS (W8-11) 500 IN ADVANCE AND A MINIMUM OF EVERY HALF MILE THROUGHOUT THE UNEVEN AREA.

**TRAFFIC PATTERN ALTERATIONS**

I) NOTIFY THE ENGINEER THIRTY (30) CALENDAR DAYS PRIOR TO ANY TRAFFIC PATTERN ALTERATION.

**SIGNING**

- J) INSTALL ADVANCE WORK ZONE WARNING SIGNS WHEN WORK IS WITHIN 40 FT FROM THE EDGE OF TRAVEL LANE AND NO MORE THAN THREE (3) DAYS PRIOR TO THE BEGINNING OF CONSTRUCTION.
- K) ENSURE ALL NECESSARY SIGNING IS IN PLACE PRIOR TO ALTERING ANY TRAFFIC PATTERN.
- L) INSTALL BLACK ON ORANGE "DIP" SIGNS (W8-2) AND/OR "BUMP" SIGNS (W8-1) 500 IN ADVANCE OF THE UNEVEN AREA, OR AS DIRECTED BY THE ENGINEER.

**TRAFFIC CONTROL DEVICES**

M) WHEN LANE CLOSURES ARE NOT IN EFFECT SPACE CHANNELIZING DEVICES IN WORK AREAS NO GREATER IN FEET THAN TWICE THE POSTED SPEED LIMIT (MPH) EXCEPT, 10 FT ON-CENTER IN RADII AND 5 FT OFF THE EDGE OF AN OPEN TRAVELWAY. REFER TO STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES SECTIONS 1130 (DRUMS), 1135 (CONES) AND 1180 (SKINNY DRUMS) FOR ADDITIONAL REQUIREMENTS.

**PAVEMENT MARKINGS AND MARKERS**

N) TIE PROPOSED PAVEMENT MARKING LINES TO EXISTING PAVEMENT MARKING LINES.

O) REMOVE/REPLACE ANY CONFLICTING/DAMAGED PAVEMENT MARKINGS AND MARKERS BY THE END OF EACH DAY'S OPERATION.

**MISCELLANEOUS**

P) LAW ENFORCEMENT MAY BE USED TO MAINTAIN TRAFFIC THROUGH THE WORK AREA AND/OR INTERSECTIONS AS DIRECTED BY THE ENGINEER.

Q) ALL CURB RAMP LOCATIONS SHALL BE DERIVED FROM STATIONING SHOWN ON PAVEMENT MARKING PLANS OR AS DIRECTED BY THE ENGINEER IN COORDINATION WITH THE SIGNING AND DELINEATION UNIT.

REV. OCTOBER 2017

**ROADWAY STANDARD DRAWINGS**

THE FOLLOWING ROADWAY STANDARDS AS APPEAR IN "ROADWAY STANDARD DRAWINGS" - N.C. DEPARTMENT OF TRANSPORTATION - RALEIGH, N.C., DATED JANUARY 2018 ARE APPLICABLE TO THIS PROJECT AND BY REFERENCE HEREBY ARE CONSIDERED A PART OF THESE PLANS:

STD. NO.	TITLE
1101.01	WORK ZONE WARNING SIGNS
1101.02	TEMPORARY LANE CLOSURES
1101.04	TEMPORARY SHOULDER CLOSURES
1101.11	TRAFFIC CONTROL DESIGN TABLES
1110.02	PORTABLE WORK ZONE SIGNS
1130.01	DRUMS
1135.01	CONES
1150.01	FLAGGING DEVICES
1165.01	TRUCK MOUNTED ATTENUATOR
1180.01	SKINNY - DRUMS

THE FOLLOWING LISTED WORK ZONE STRATEGIES ARE RECOMMENDED FOR INCLUSION WITHIN THIS TRANSPORTATION MANAGEMENT PLAN (TMP).

**RECOMMENDED STRATEGIES:**

- TRAFFIC MANAGEMENT STRATEGIES:**
- SHOULDER CLOSURES
  - ONE-LANE, TWO WAY OPERATION (FLAGGING)
  - NIGHT WORK
  - WEEKEND WORK
  - WORK HOUR RESTRICTIONS FOR PEAK TRAVEL
- TRAFFIC / INCIDENT MANAGEMENT & SPEED ENFORCEMENT STRATEGIES:**
- COORDINATION WITH STATE TRAFFIC OPERATIONS CENTER (STOC)
  - COORDINATION WITH MEDIA

**SEQUENCE OF CONSTRUCTION**

THE FOLLOWING SEQUENCE OF CONSTRUCTION IS A RECOMMENDATION PROVIDED BY THE ENGINEER. THE CONTRACTOR SHALL BE RESPONSIBLE FOR OBTAINING APPROVAL FOR ANY CHANGES TO THIS TRANSPORTATION MANAGEMENT PLAN RESULTING FROM ADJUSTMENTS TO THE RECOMMENDED SEQUENCES. ALL PHASES OF CONSTRUCTION SHALL BE IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLANS PROVIDED.

CONSTRUCTION FOR EACH LOCATION WILL FOLLOW THE SEQUENCE PROVIDED BELOW. CONSTRUCTION DURING EACH PHASE CONSISTS OF ALL WORK NECESSARY TO COMPLETE THE PROJECT.

TRAFFIC SHALL BE MAINTAINED ACCORDING TO THE N.C. DEPARTMENT OF TRANSPORTATION DETAILS FOUND ON THIS SHEET. THE CONTRACTOR SHALL MINIMIZE LANE CLOSURES TO THE GREATEST EXTENT PRACTICAL.

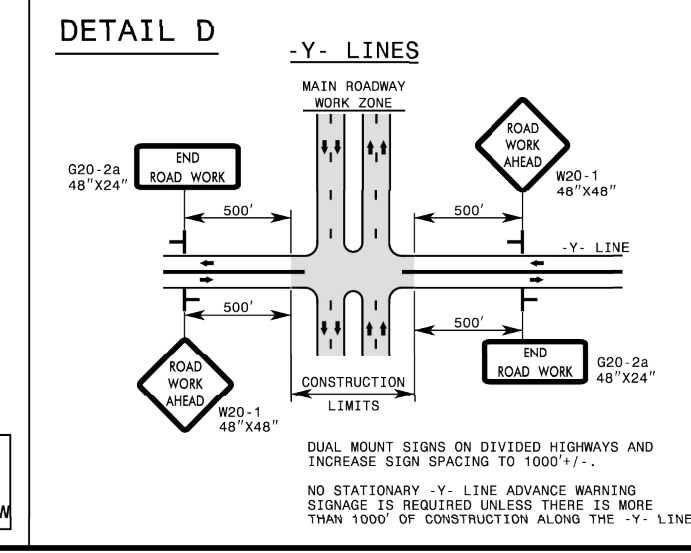
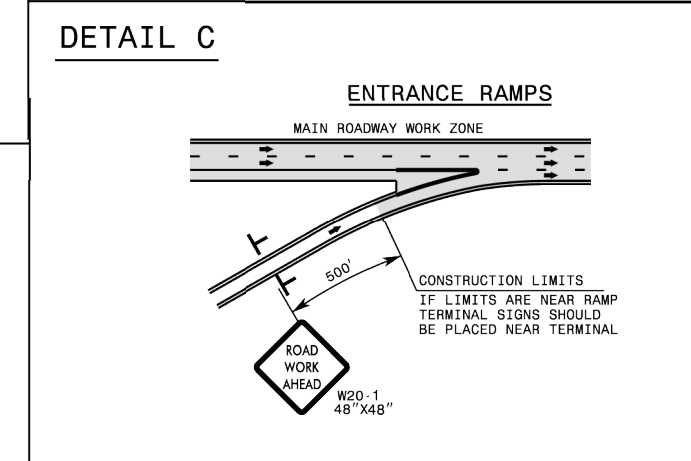
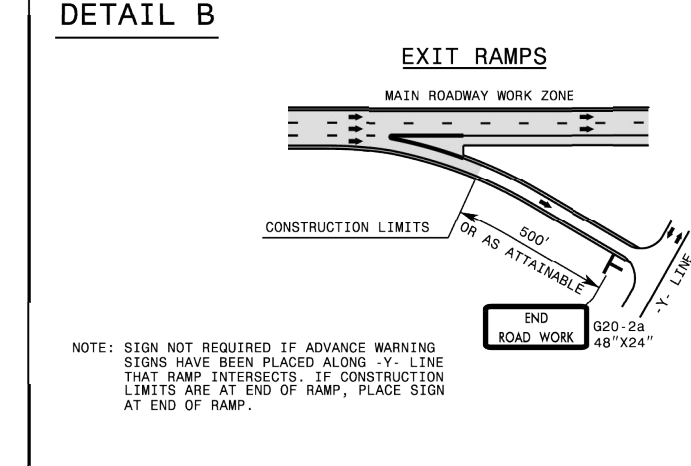
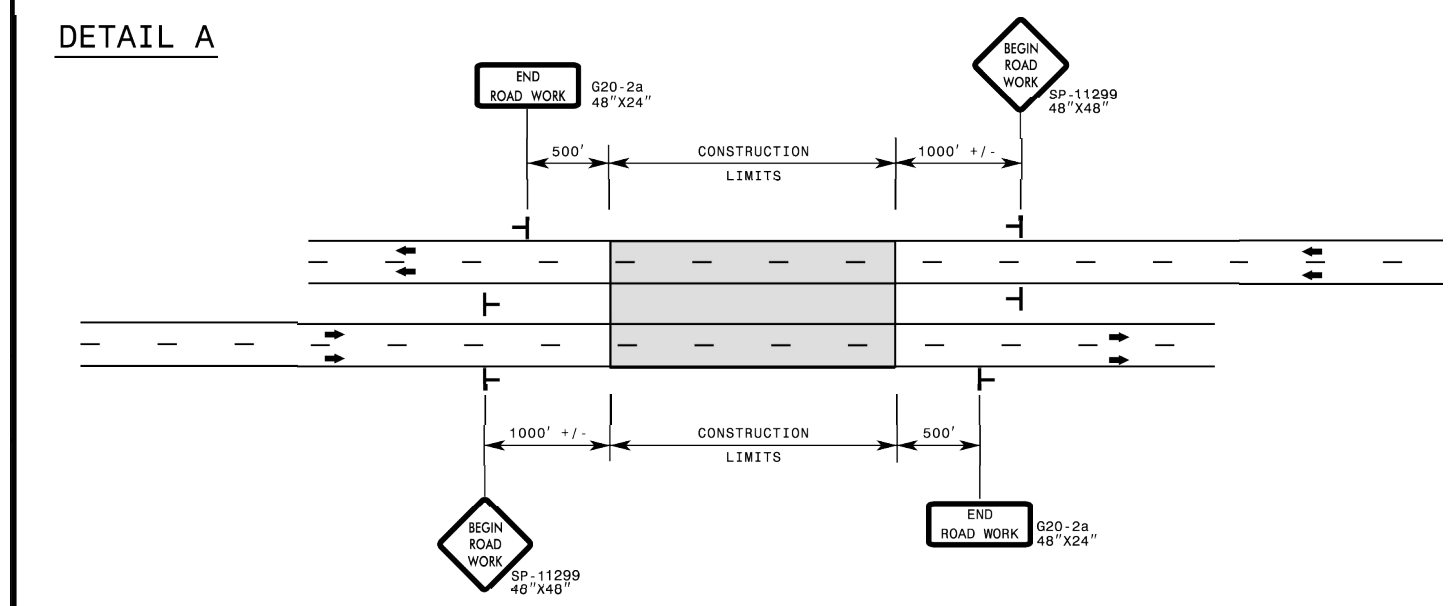
**PHASE 1**  
INSTALL SIGNING FOR PROJECT LIMITS PER 1101.01. ERECT ALL ADVANCE WARNING SIGNS AND CHANNELIZATION DEVICES PER NCDOT DETAILS FOR APPROPRIATE MAINTENANCE OF TRAFFIC FOR CONSTRUCTION STAGING.

**PHASE 2**  
COMMENCE CLEARING AND INSTALLATION OF EROSION CONTROL MEASURES IN ACCORDANCE WITH THE EROSION AND SEDIMENT CONTROL PLANS. REMOVAL, ABANDONMENT AND ADJUSTMENTS OF PUBLIC UTILITIES SHALL BE COMPLETED PRIOR TO OR DURING THIS PHASE. PERFORM GRADING OPERATIONS FOR PROPOSED WIDENING.

**PHASE 3**  
CONSTRUCT ROUGH GRADING, STORM STRUCTURES AND NETWORK, CURB AND GUTTER, PAVEMENT WIDENING, FINAL PAVING OPERATIONS, STRIPING AND INSTALLATION OF ROADSIDE SIGNS.

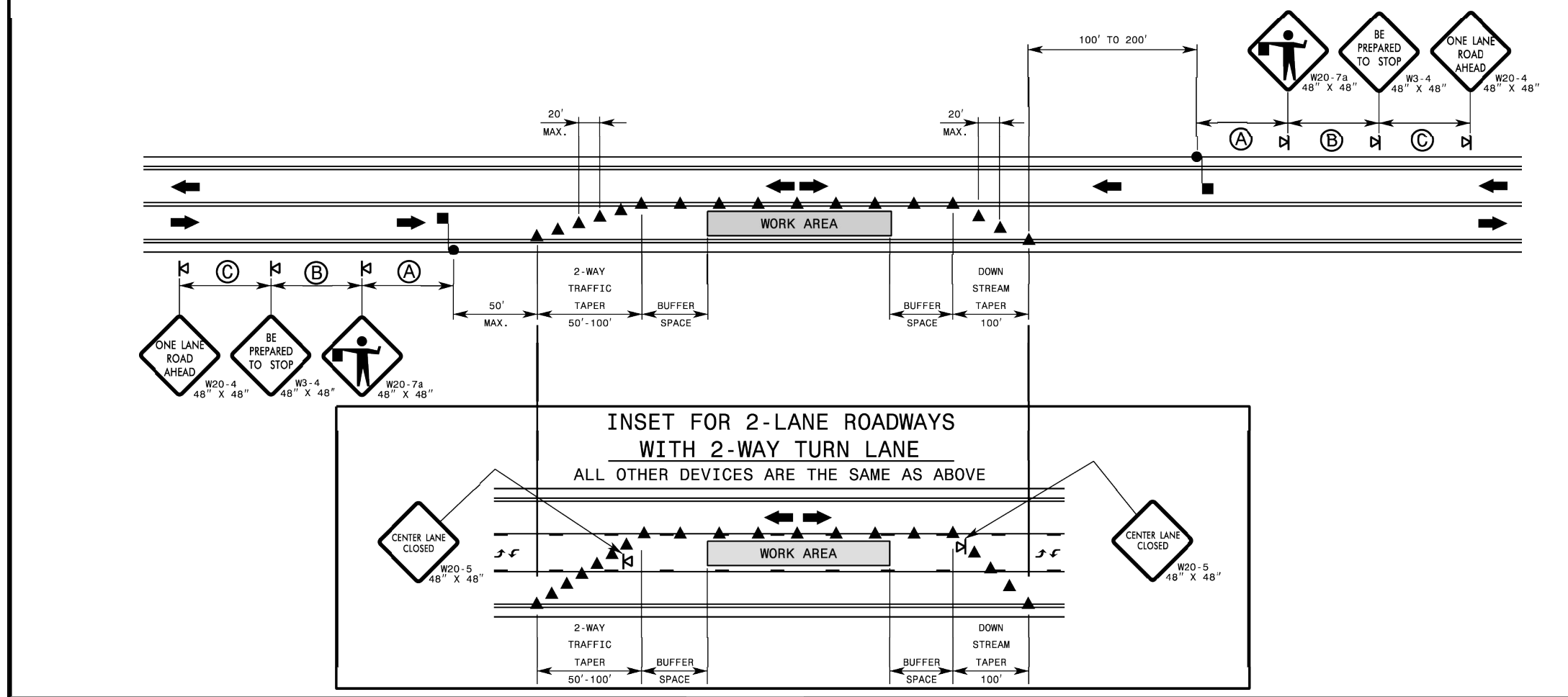
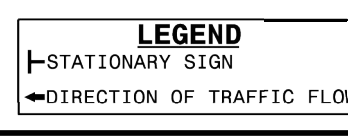
**PHASE 4**  
PERFORM FINAL GRADING OPERATIONS AND PLACE FINAL SEED MIX AND STABILIZE ALL WORK AREAS

**PHASE 5**  
UPON COMPLETION OF ALL WORK, REMOVE TEMPORARY EROSION AND SEDIMENT CONTROL MEASURES (AS APPROVED BY THE ENVIRONMENTAL ENGINEERING INSPECTOR) AND ALL TEMPORARY TRAFFIC CONTROL DEVICES.



**GENERAL NOTES**

- DO NOT INSTALL ADVANCE WARNING SIGNS MORE THAN 3 DAYS PRIOR TO BEGINNING OF WORK UNLESS COVERED.
- SIGNS SHOWN ARE REQUIRED FOR WORK ZONES THAT WILL REMAIN IN EFFECT LONGER THAN 3 CONSECUTIVE DAYS.
- ALL SIGN SPACING DIMENSIONS ARE APPROXIMATE, FIELD ADJUST AS NECESSARY OR AS DIRECTED.
- ERECT SIGNS PER RSD, 1110.01. PAYMENT FOR WOOD POSTS, 3LB STEEL U-CHANNEL AND SQUARE STEEL TUBING POSTS WITH SIGNS WILL BE MADE ACCORDING TO STANDARD SPECIFICATIONS FOR WORK ZONE SIGNS.
- WHEN NECESSARY, USE SPLICING IN ACCORDANCE WITH RSD, 1110.01.
- DO NOT BACK BRACE SIGN SUPPORTS.
- TWO-WAY UNDIVIDED ADVANCE WARNING SIGN CONFIGURATION MAY BE USED ON URBAN MULTI-LANE FACILITIES WHERE CONDITIONS LIMIT THE USE OF DUAL MOUNTED SIGNS AS DETERMINED BY THE ENGINEER.

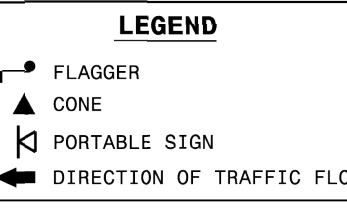


**GENERAL NOTES FOR FLAGGING OPERATIONS**

- REFER TO RSD, 1101.11, SHEETS 1 & 4, FOR "L" DISTANCE AND SIGN SPACING.
- INSTALL LANE CLOSURES WITH THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE UPSTREAM SIDE OF TRAFFIC.
- REMOVE LANE CLOSURES AGAINST THE TRAFFIC FLOW, BEGINNING WITH DEVICES ON THE DOWNSTREAM SIDE OF TRAFFIC.
- PLACE CONES THRU THE WORK AREA AT THE MAXIMUM SPACING EQUAL IN FEET TO 2 TIMES THE POSTED SPEED LIMIT.
- EXTEND LANE CLOSURES AT THE BUFFER SPACE SUCH THAT STOPPING SIGHT DISTANCE IS PROVIDED TO THE FLAGGER (REFER TO RSD, 1101.11, SHEET 2).
- DO NOT STOP TRAFFIC IN ANY ONE DIRECTION FOR MORE THAN 5 MINUTES AT A TIME.
- DRUMS OR SKINNY DRUMS MAY BE USED IN LIEU OF CONES. REFER TO RSD, 1180.01 FOR SKINNY DRUM REQUIREMENTS.
- USE FLAGGERS TO CONTROL TRAFFIC AT INTERSECTIONS AFFECTED BY THE LANE CLOSURE. SUPPLEMENT FLAGGERS LOCATED AT INTERSECTIONS WITH FLAGGER AHEAD SIGNS (W8-7a) PLACED APPROXIMATELY 250 FT. IN ADVANCE OF THE FLAGGER. FOR SIGNALIZED INTERSECTIONS PLACE SIGNALS IN THE FLASH MODE AND USE LAW ENFORCEMENT.
- REFER TO THE CURRENT MUTCD FOR FLAGGER CONTROL, REQUIREMENTS, AND PROCEDURES.
- DO NOT EXCEED A 1 MILE LANE CLOSURE LENGTH UNLESS OTHERWISE SHOWN IN THE TMP OR AS DIRECTED BY THE ENGINEER.
- IF VEHICLE QUEUES WILL REACH WITHIN 15' OF EITHER SIDE OF ACTIVE RAILROAD TRACKS, PROVIDE A UNIFORMED LAW ENFORCEMENT OFFICER OR FLAGGER TO PREVENT VEHICLES FROM STOPPING WITHIN THE CROSSING. PROVIDE OFFICER OR FLAGGER EVEN IF AUTOMATIC WARNING MEASURES ALREADY EXIST.

**GENERAL NOTES FOR PILOT CAR OPERATIONS**

- USE PILOT CARS WHEN DIRECTED BY THE ENGINEER.
- IF ROADWAY WIDTH IS LESS THAN 22 FEET (EOP TO EOP), CONES MAY NOT BE REQUIRED ALONG WORK AREA AND AT THE DISCRETION OF THE ENGINEER, CONES MAY BE OMITTED ALONG THE WORK AREA IF USING A PILOT CAR.
- CONES ARE ALWAYS REQUIRED IN THE UPSTREAM AND DOWNSTREAM TAPERS.
- MOUNT SIGN (W8-4) "PILOT CAR FOLLOW ME" AT A CONSPICUOUS POSITION ON THE REAR OF THE PILOT VEHICLE.
- DO NOT INSTALL MORE THAN ONE (1) MILE OF LANE CLOSURE, MEASURED FROM THE BEGINNING OF THE MERGE TAPER TO THE END OF THE LANE CLOSURE.
- ADVISE RESIDENTS AND BUSINESSES WITHIN THE LANE CLOSURE LIMITS ABOUT METHODS OF SAFE EGRESS AND INGRESS FROM DRIVEWAYS DURING FLAGGING AND PILOT CAR OPERATIONS.



STATE OF NORTH CAROLINA  
DEPT. OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
RALEIGH, N.C.

ROADWAY STANDARD DRAWING FOR  
**WORK ZONE ADVANCE WARNING SIGNS FOR FACILITIES WITH 55 MPH**

SHEET 2 OF 3  
**1101.01**

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WHEELER TRACT - OFFSITE IMPROVEMENTS  
ROLESVILLE - WAKE COUNTY STATE - NORTH CAROLINA  
TRAFFIC MANAGEMENT PLAN

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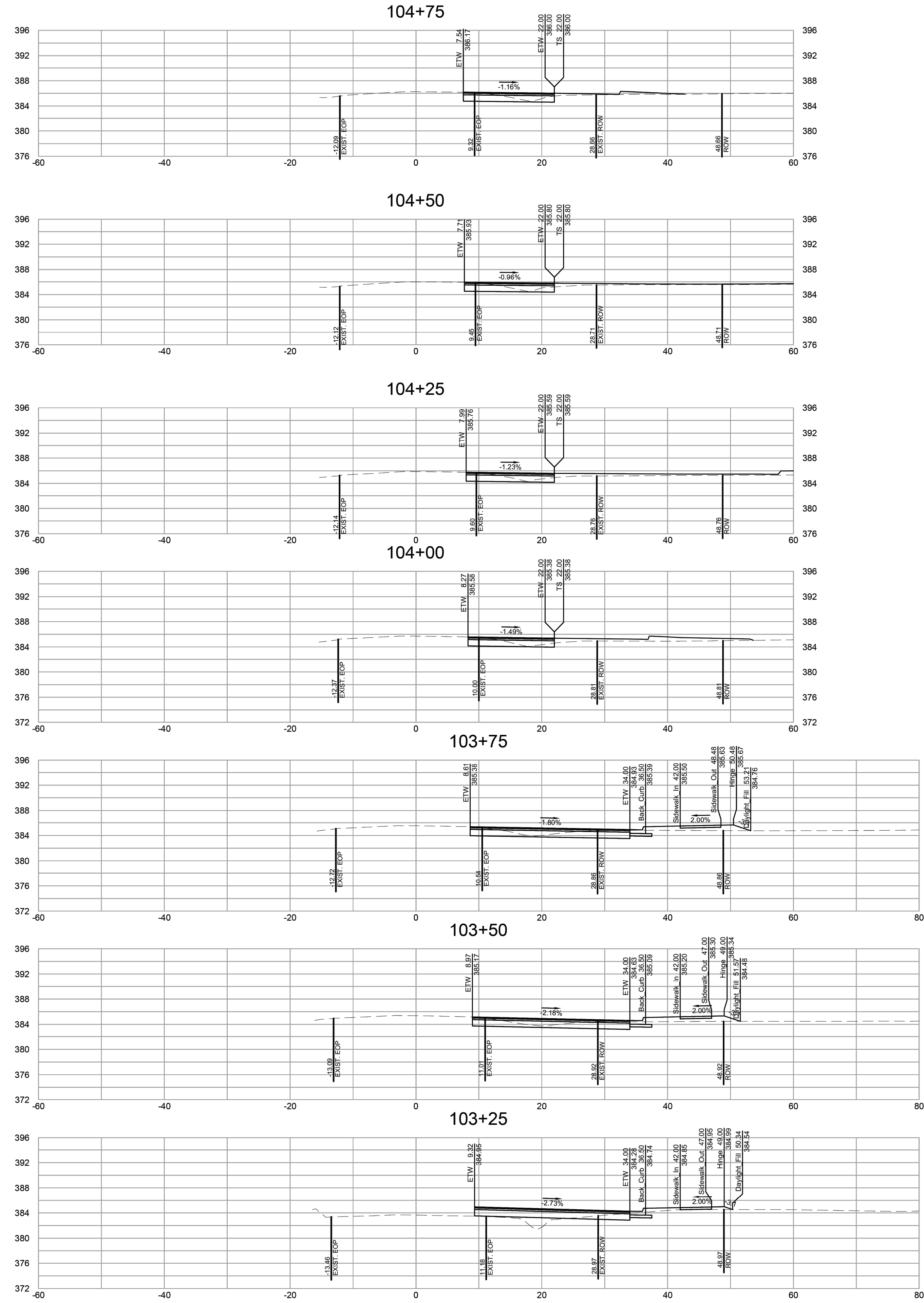
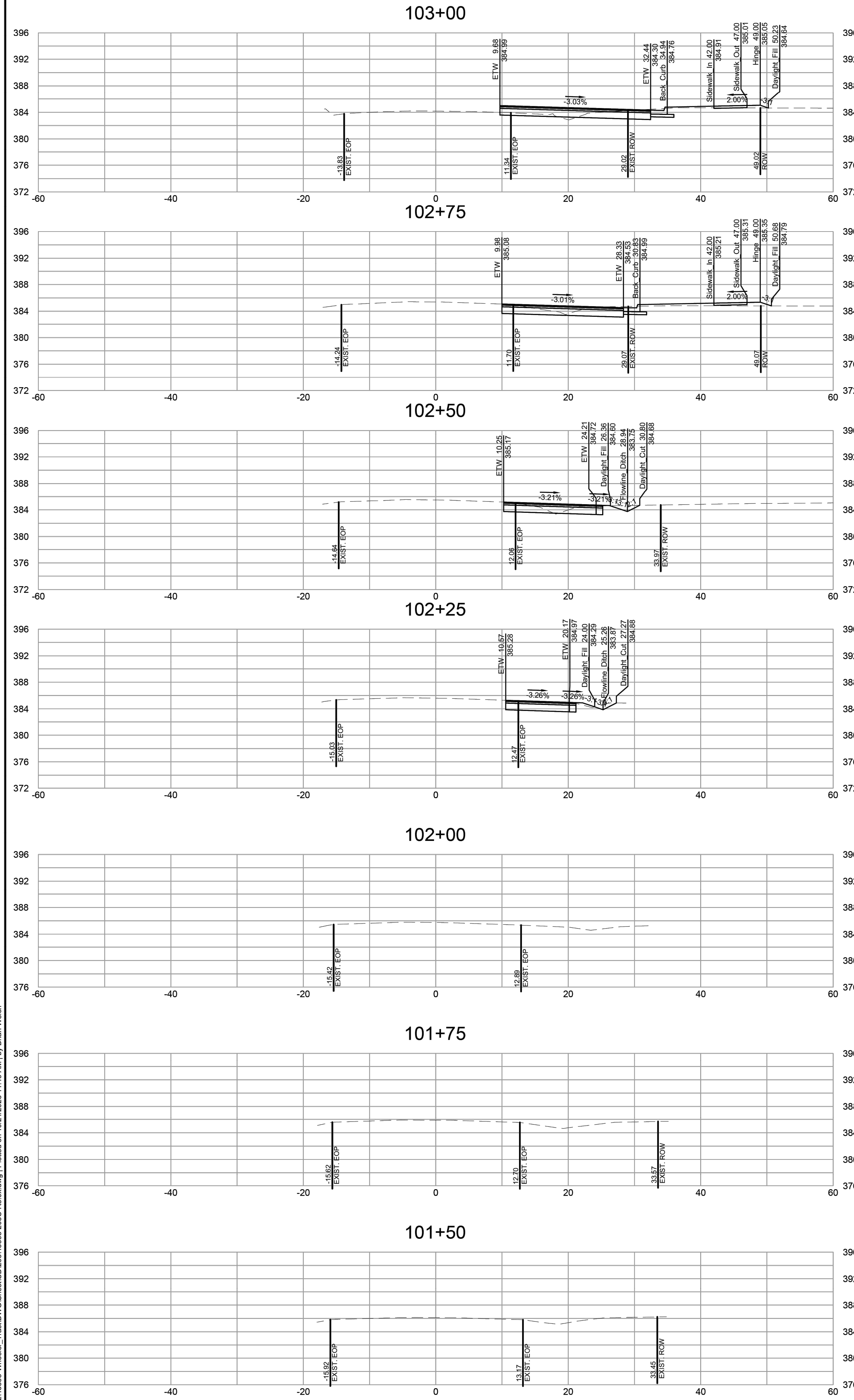
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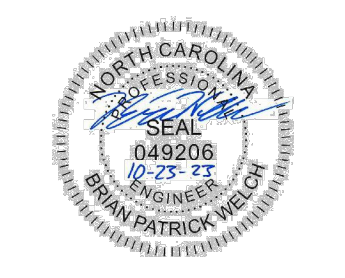
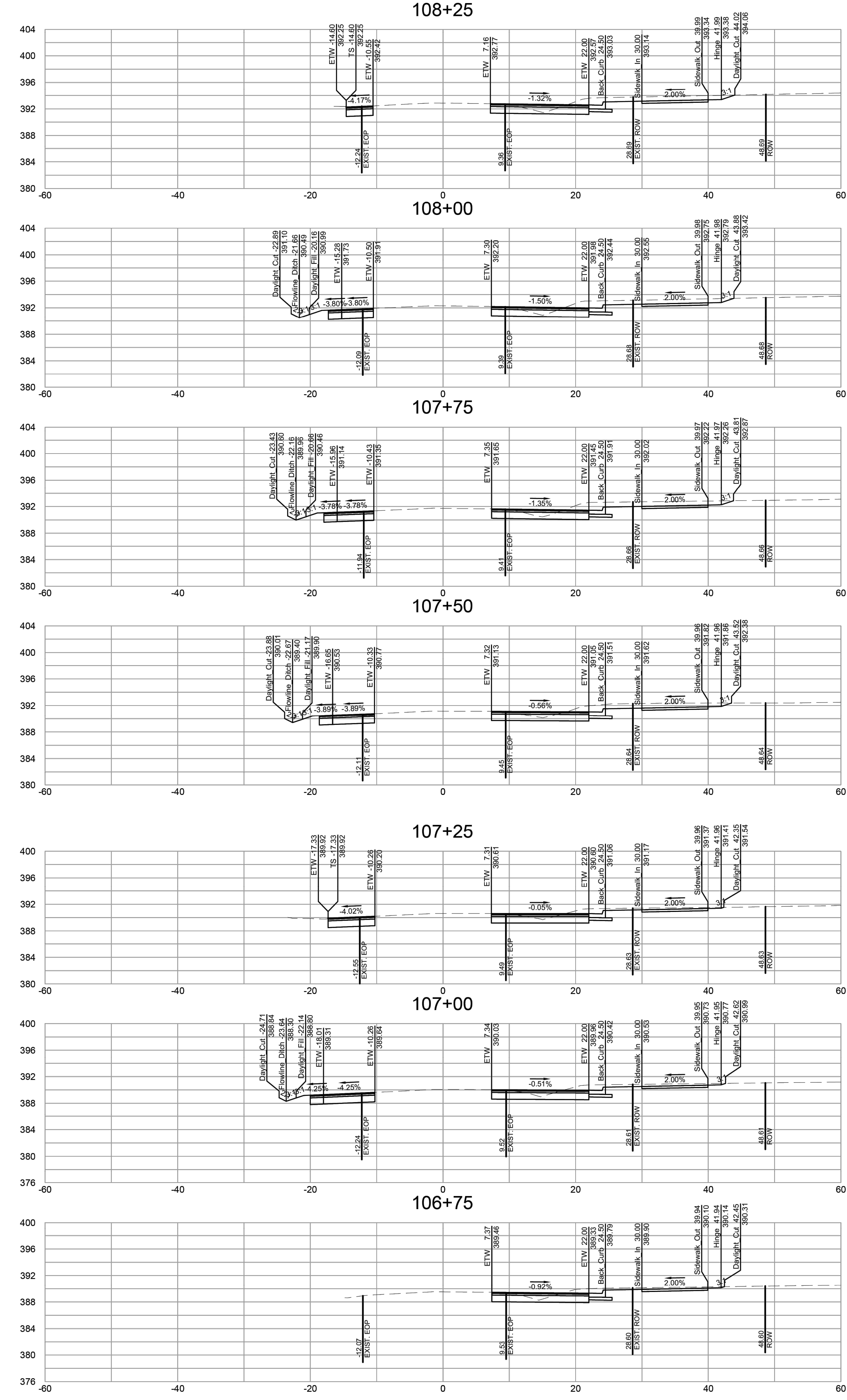
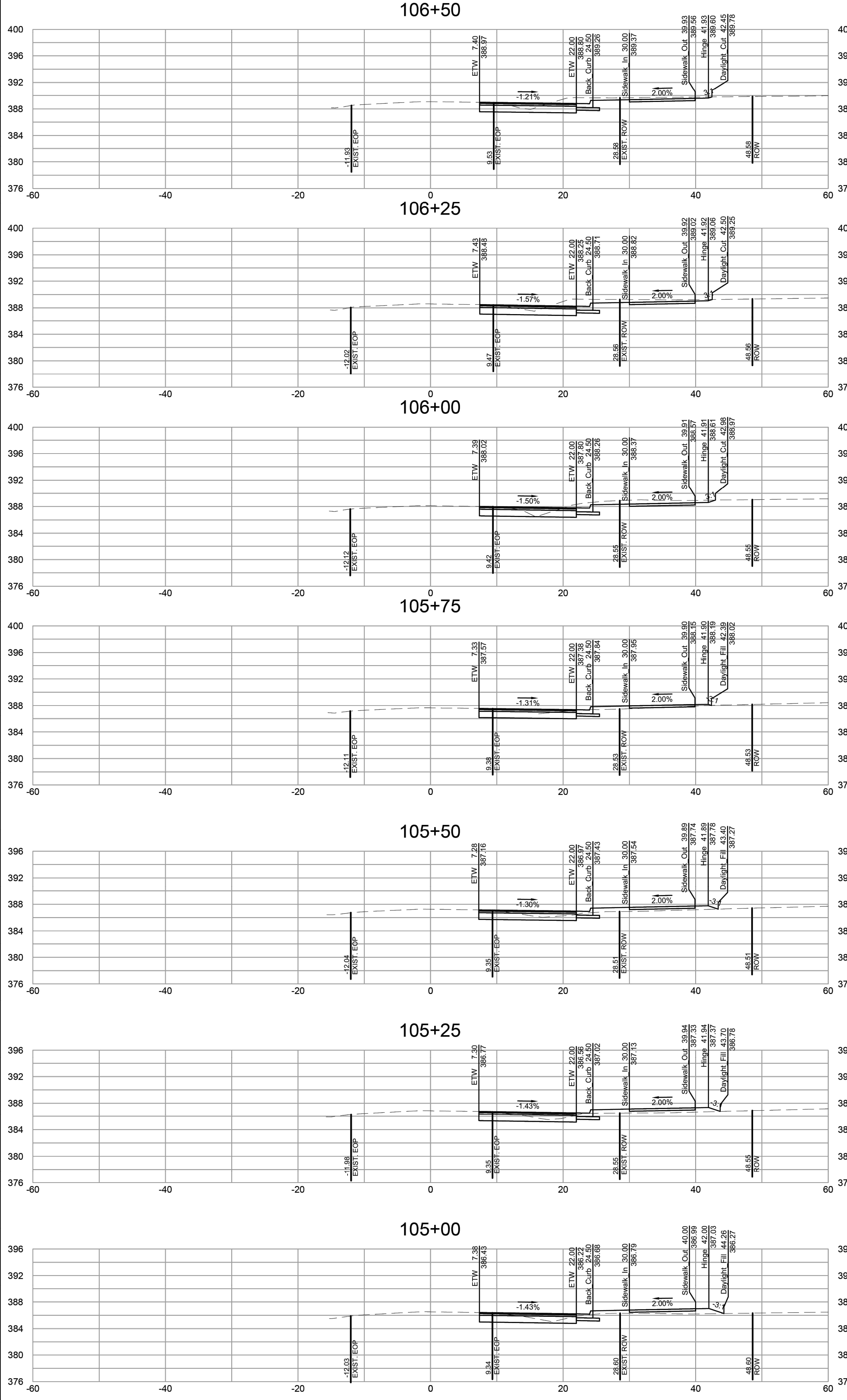
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WHEELER TRACT - OFFSITE IMPROVEMENTS  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
ROLESVILLE ROAD CROSS SECTIONS

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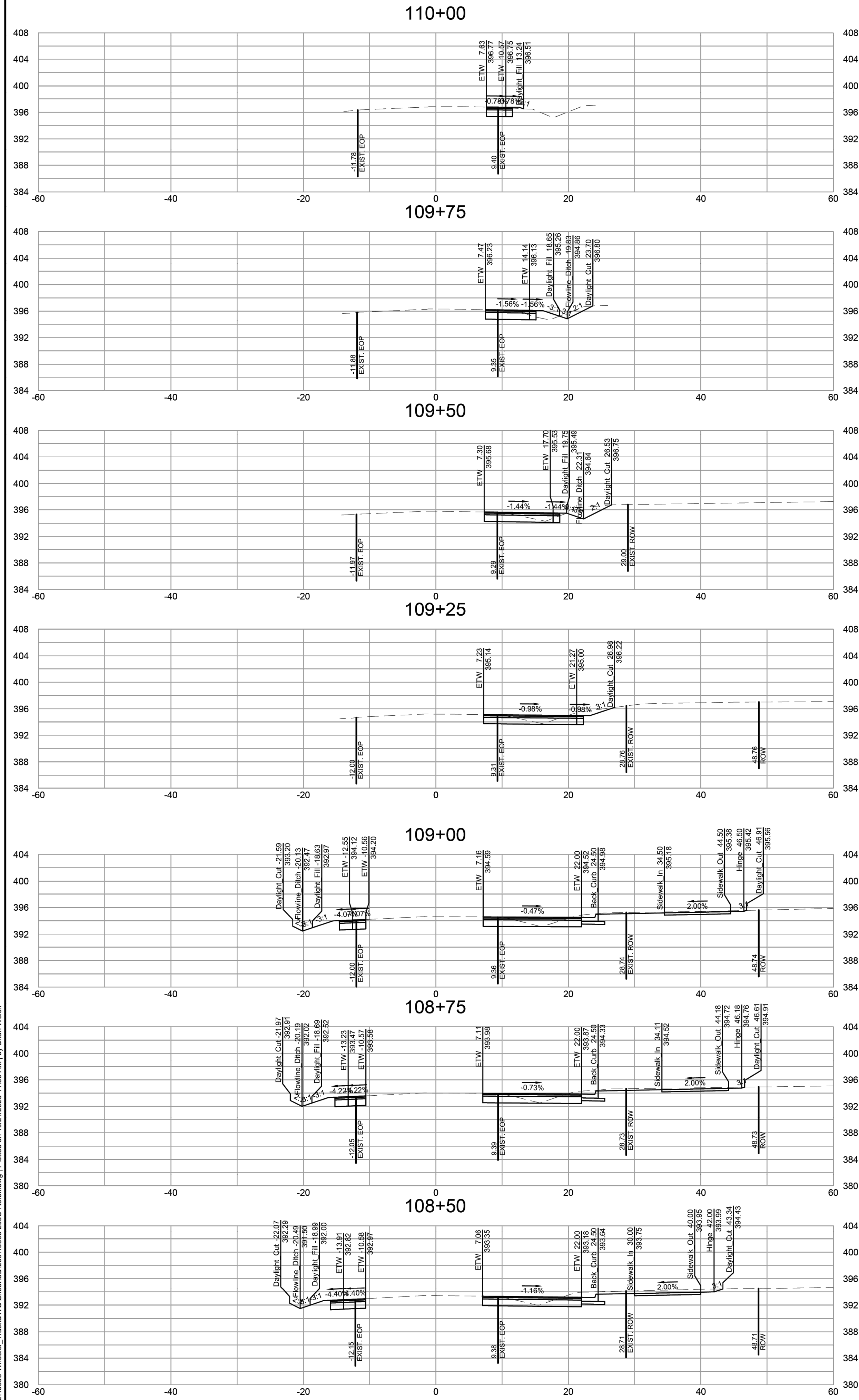
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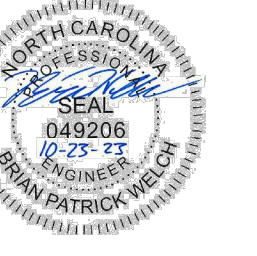
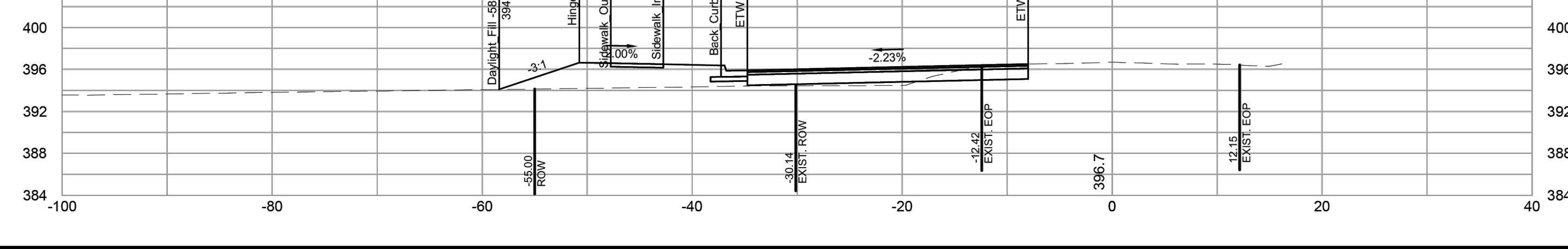
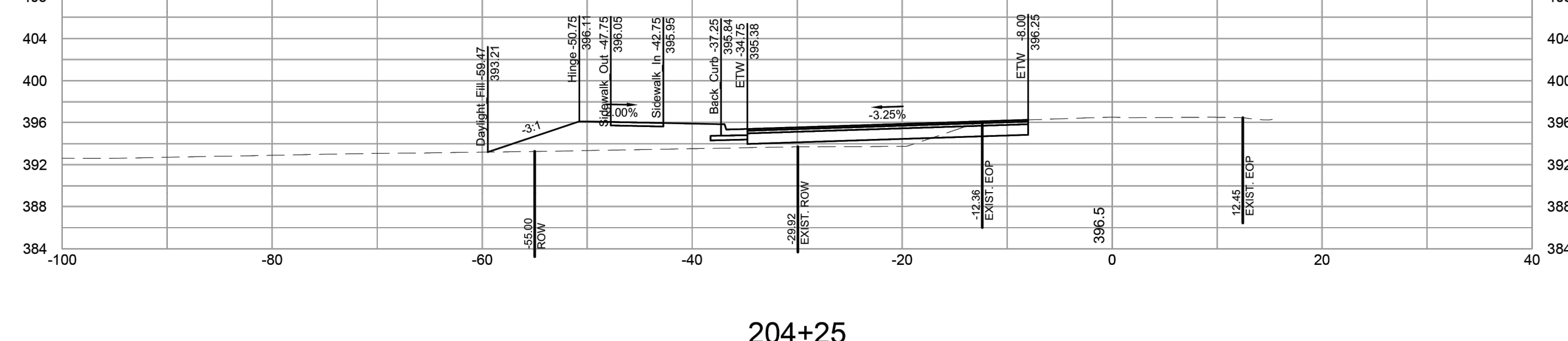
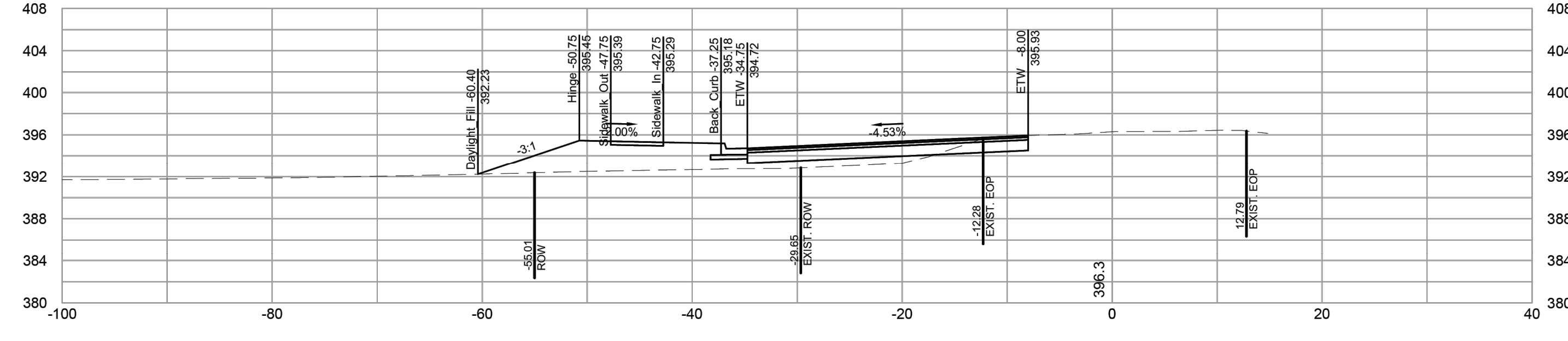
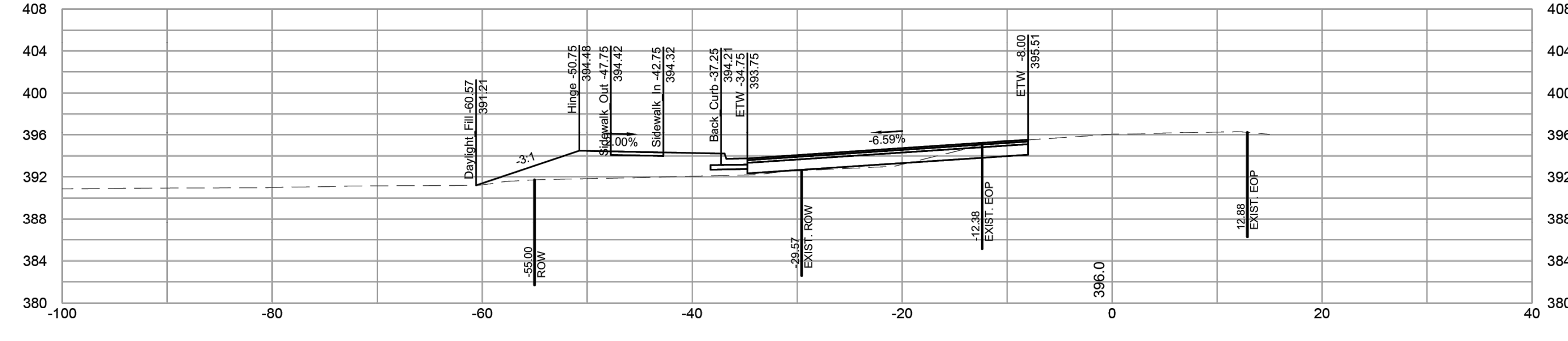
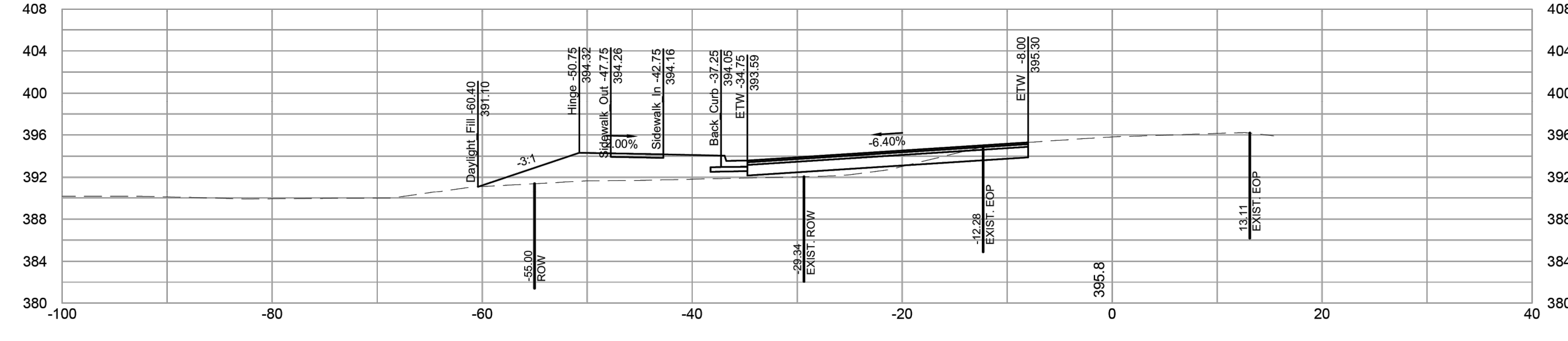
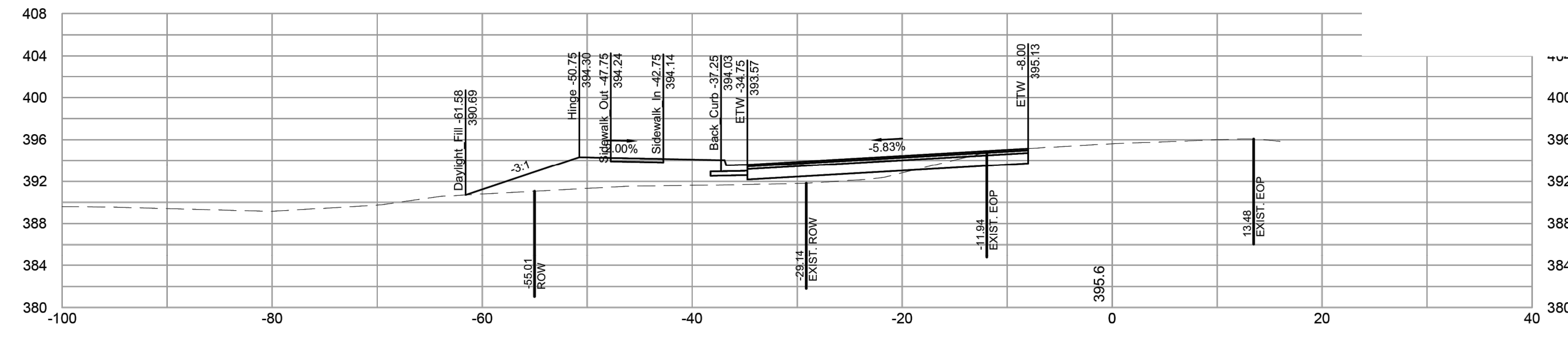
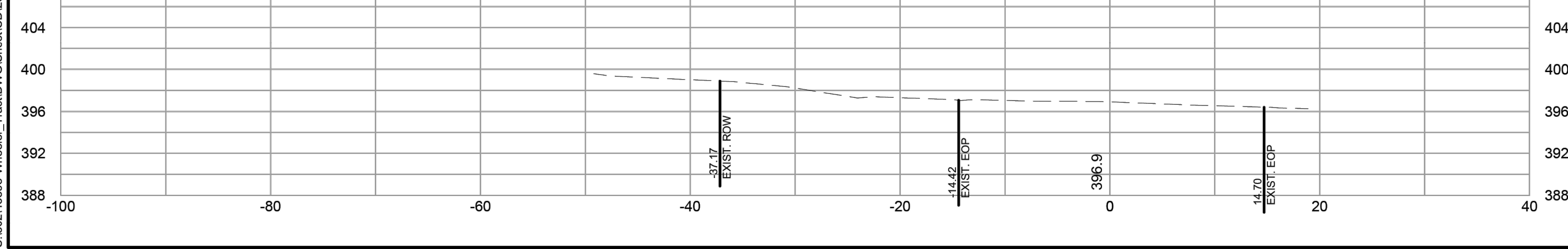
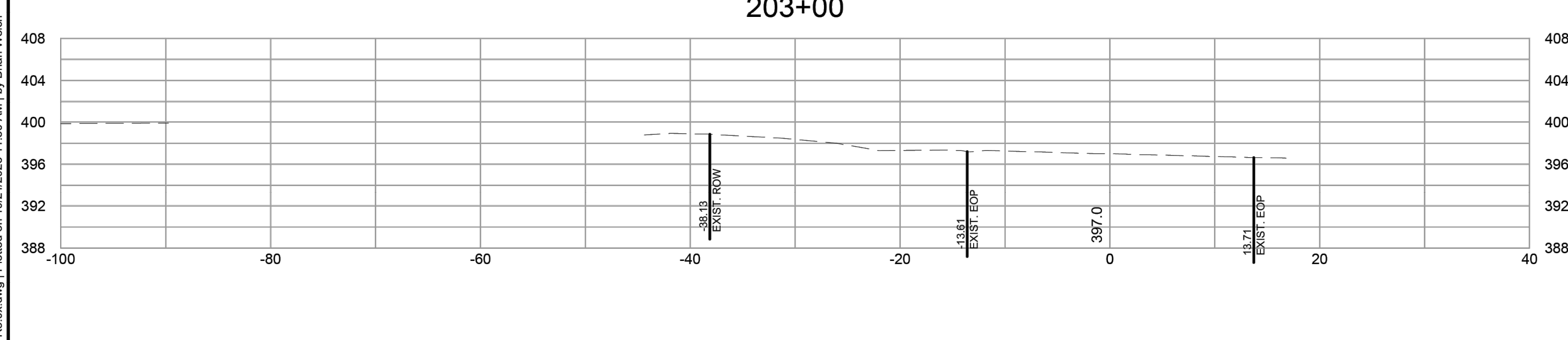
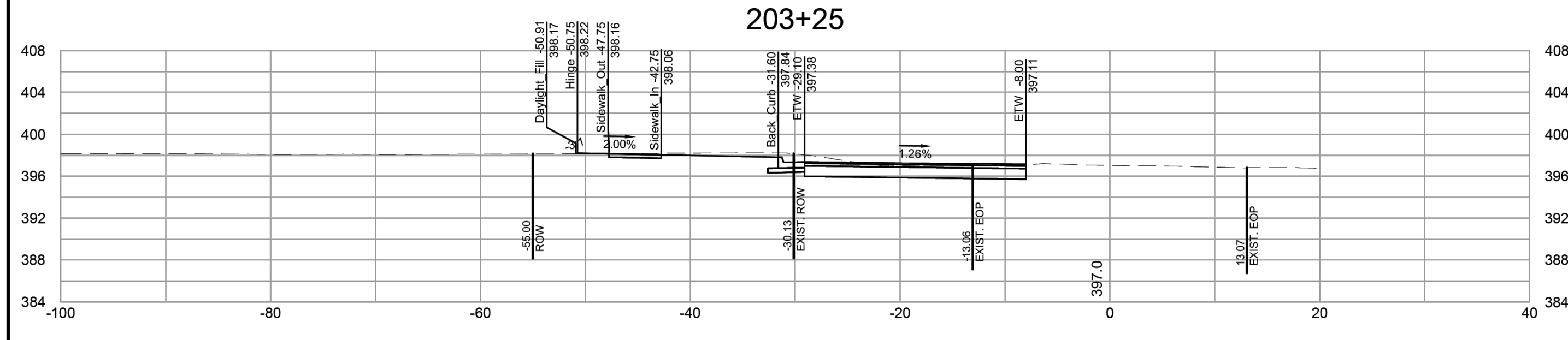
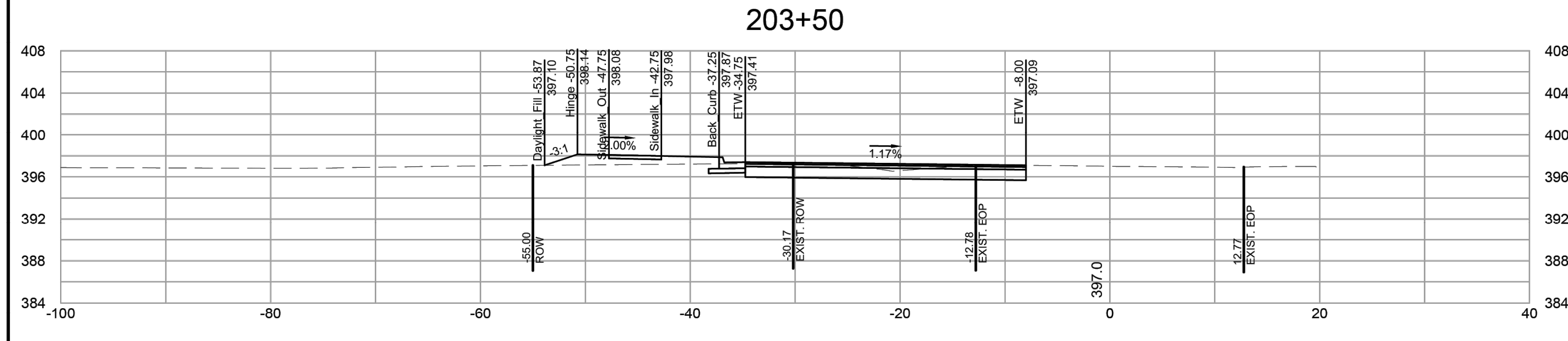
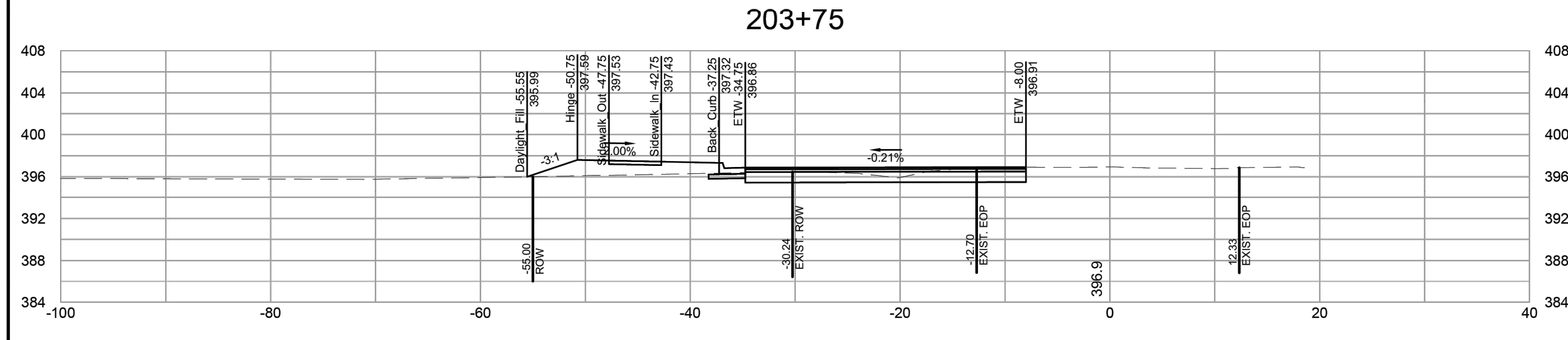
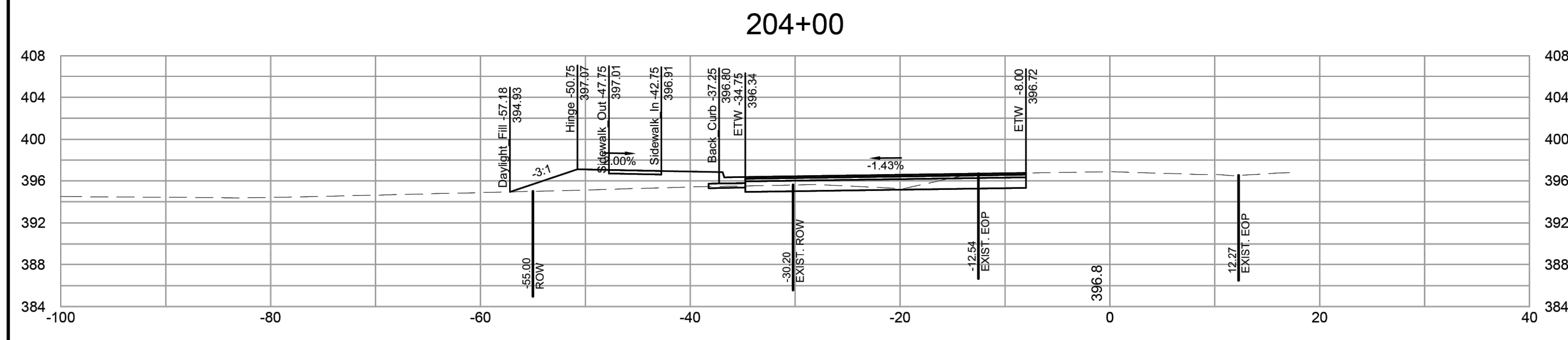
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

### ROLESVILLE ROAD CROSS SECTIONS

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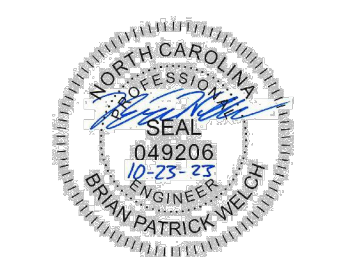
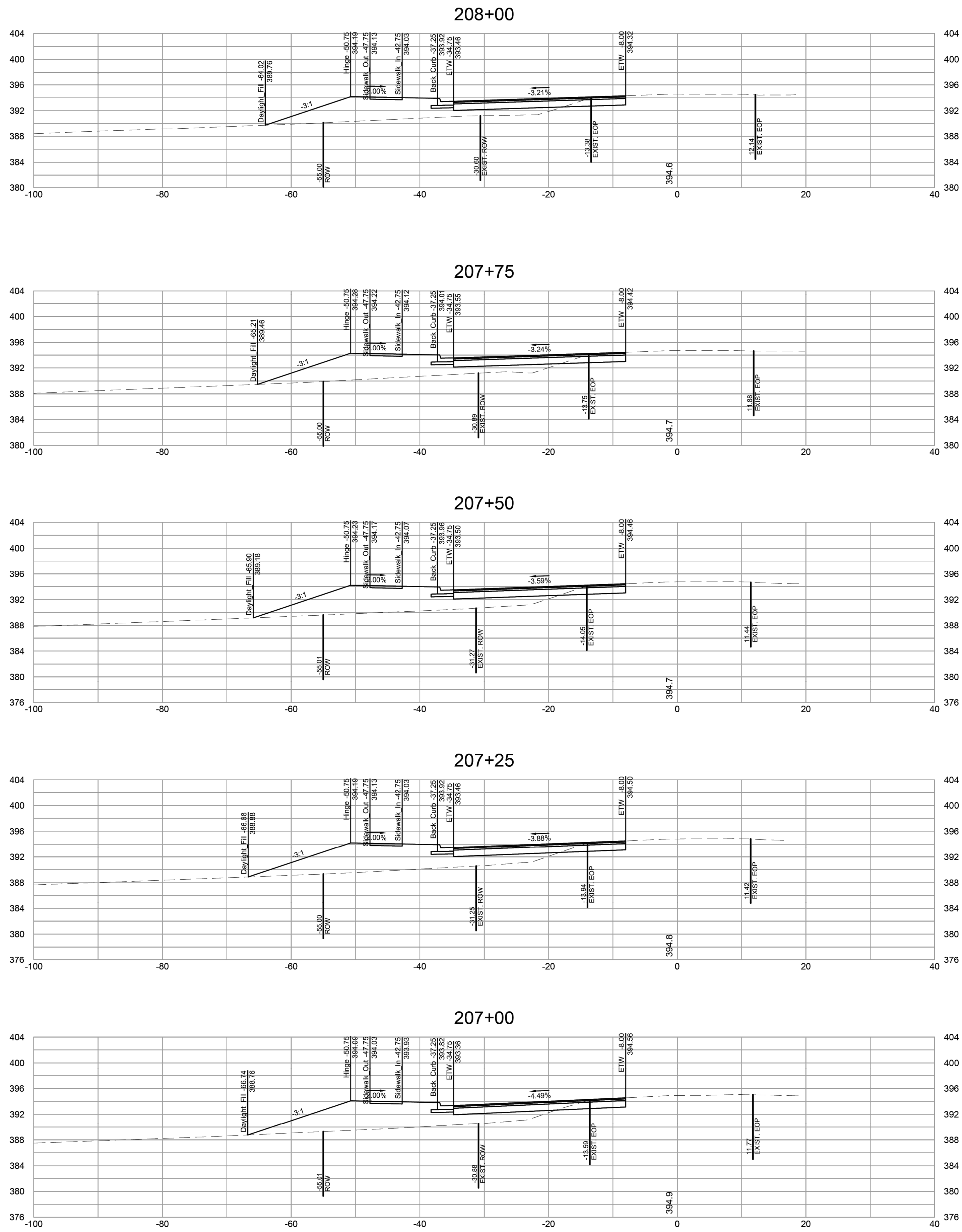
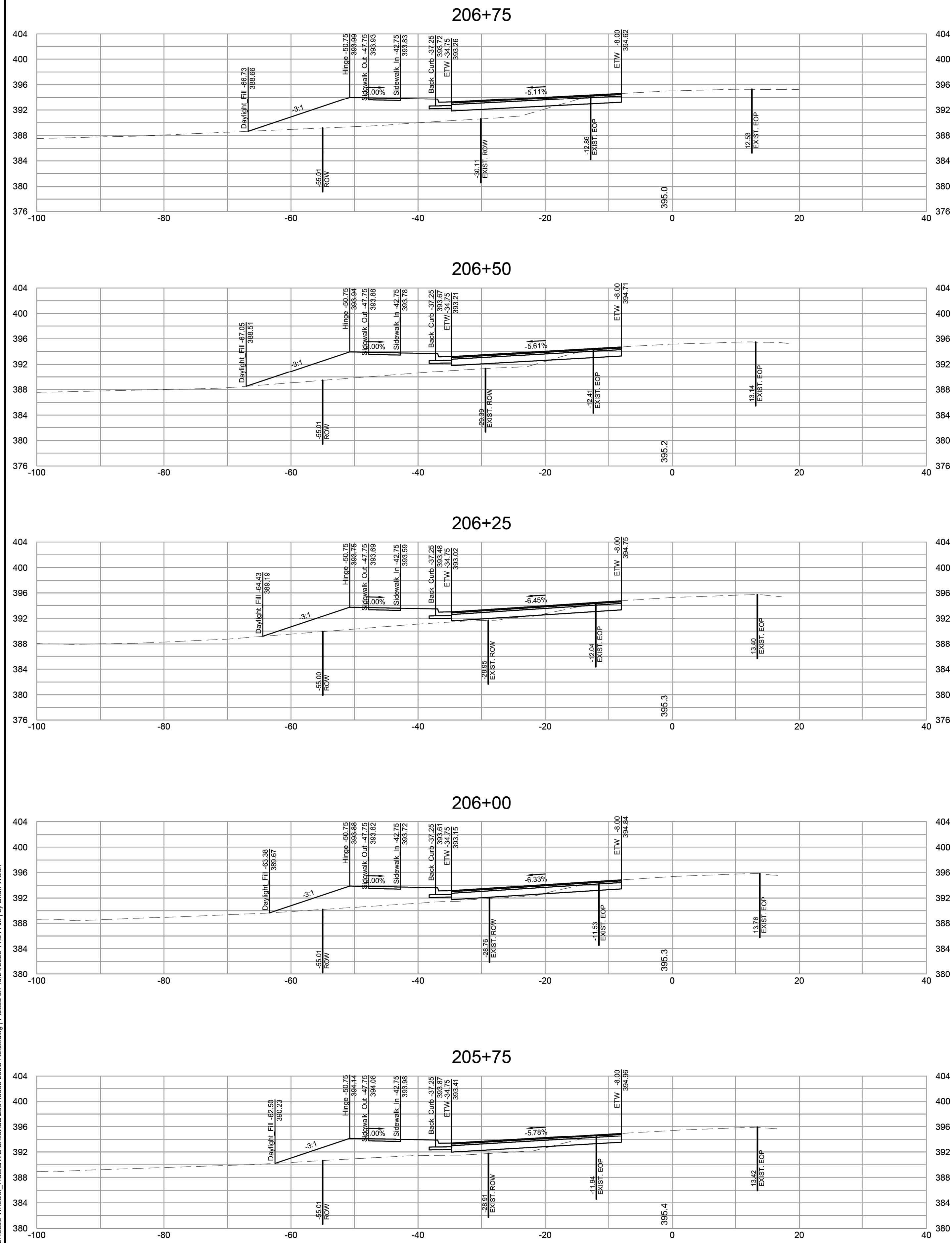
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

### MITCHELL MILL ROAD CROSS SECTIONS

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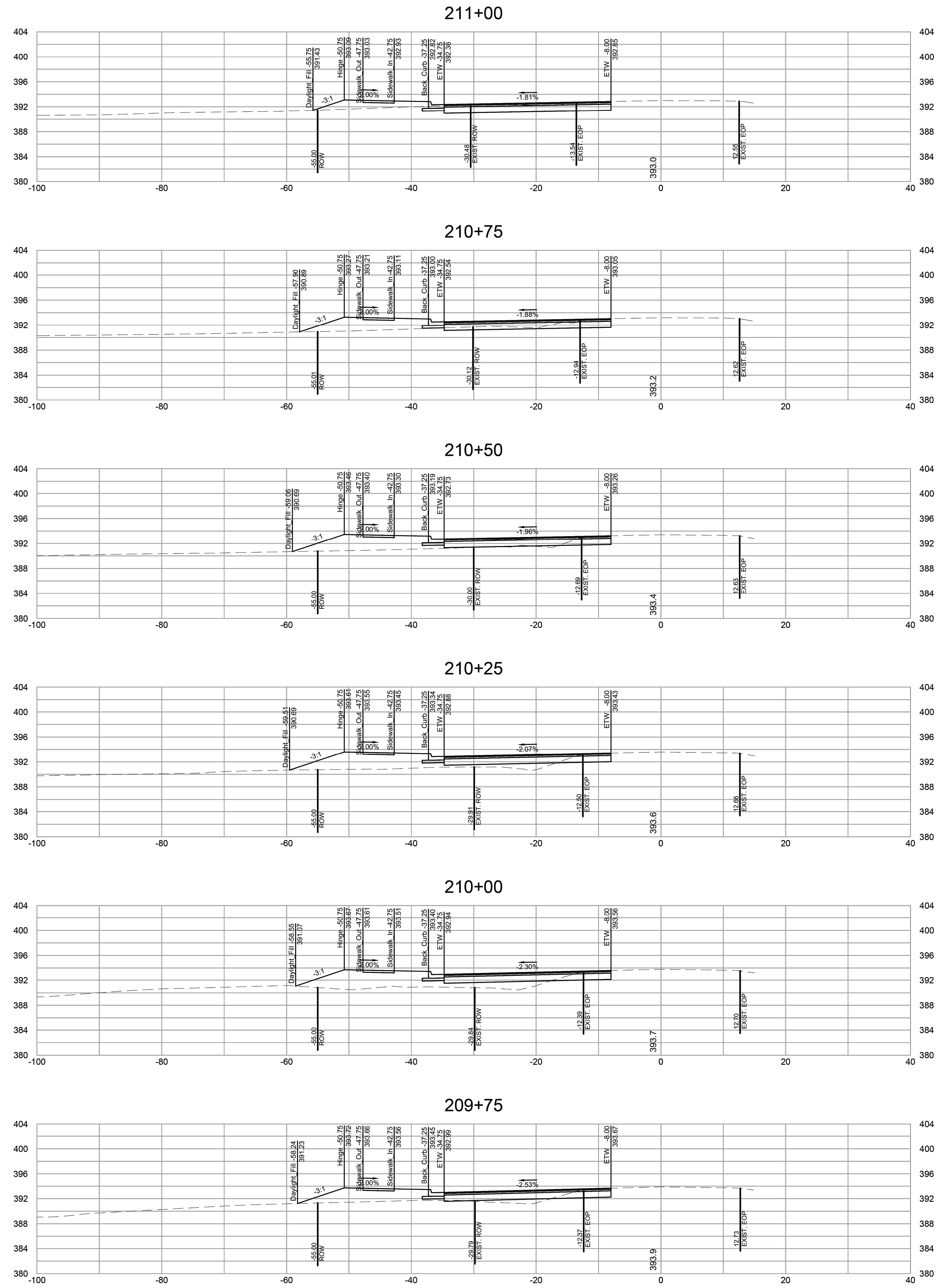
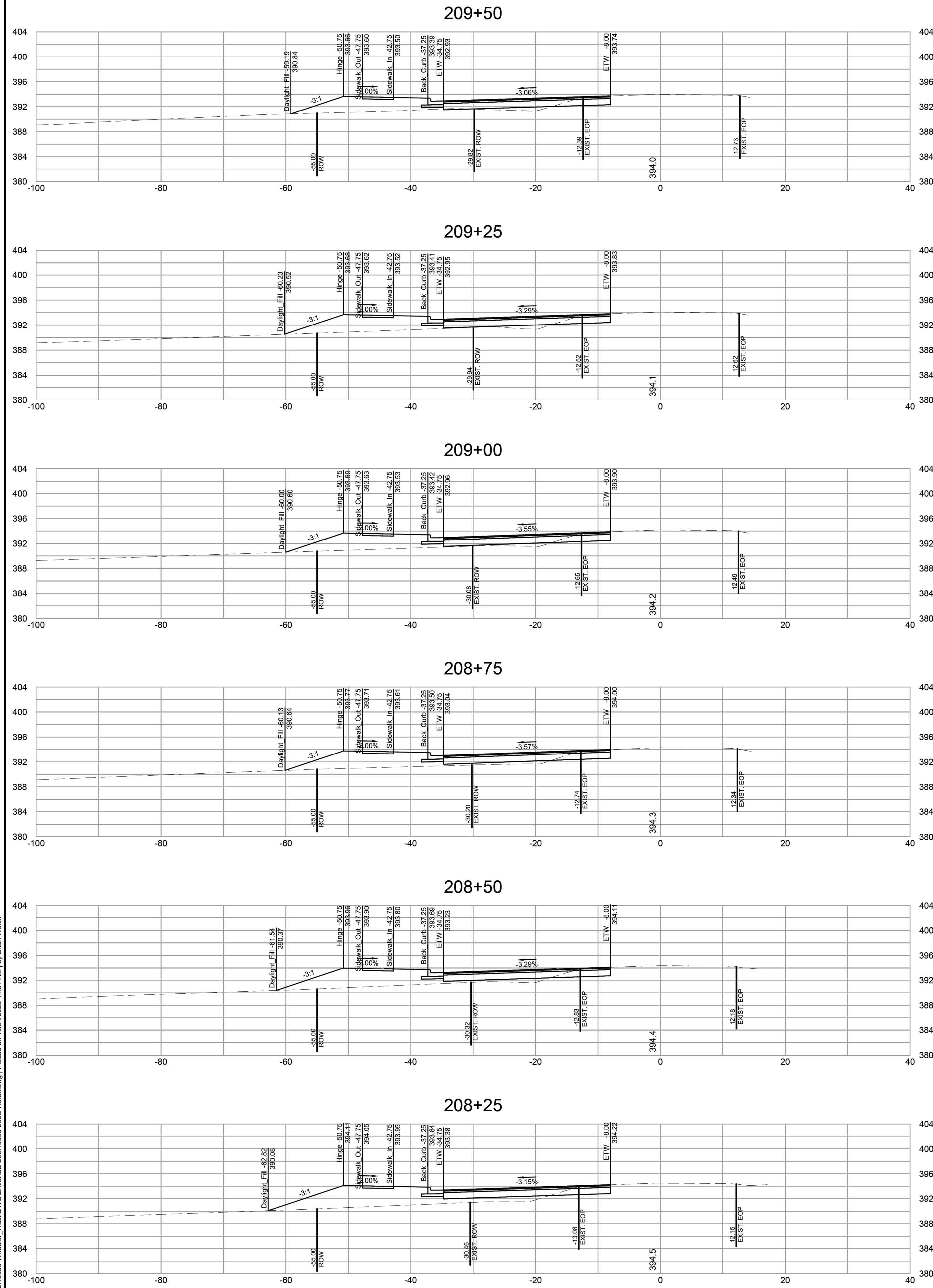
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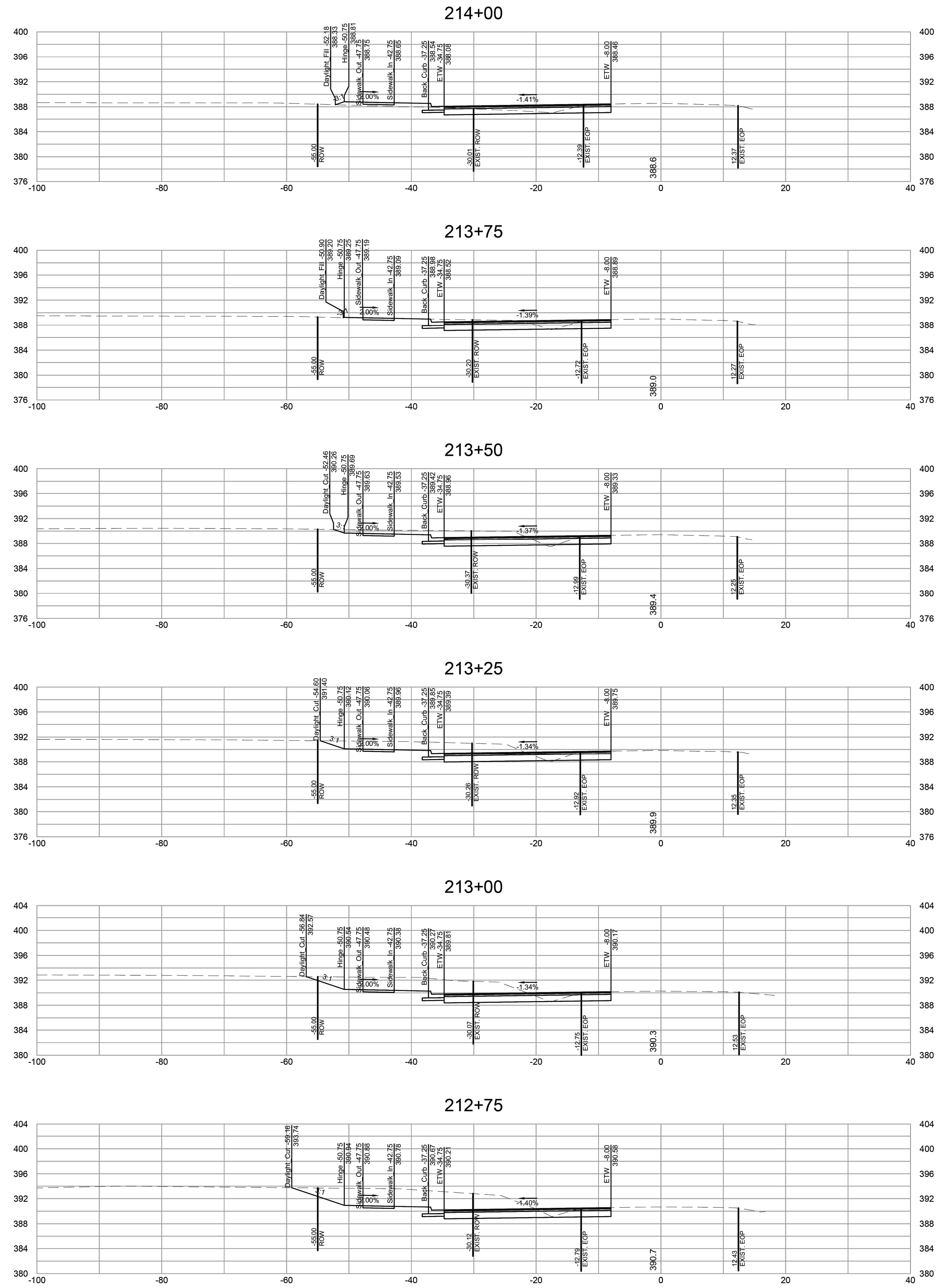
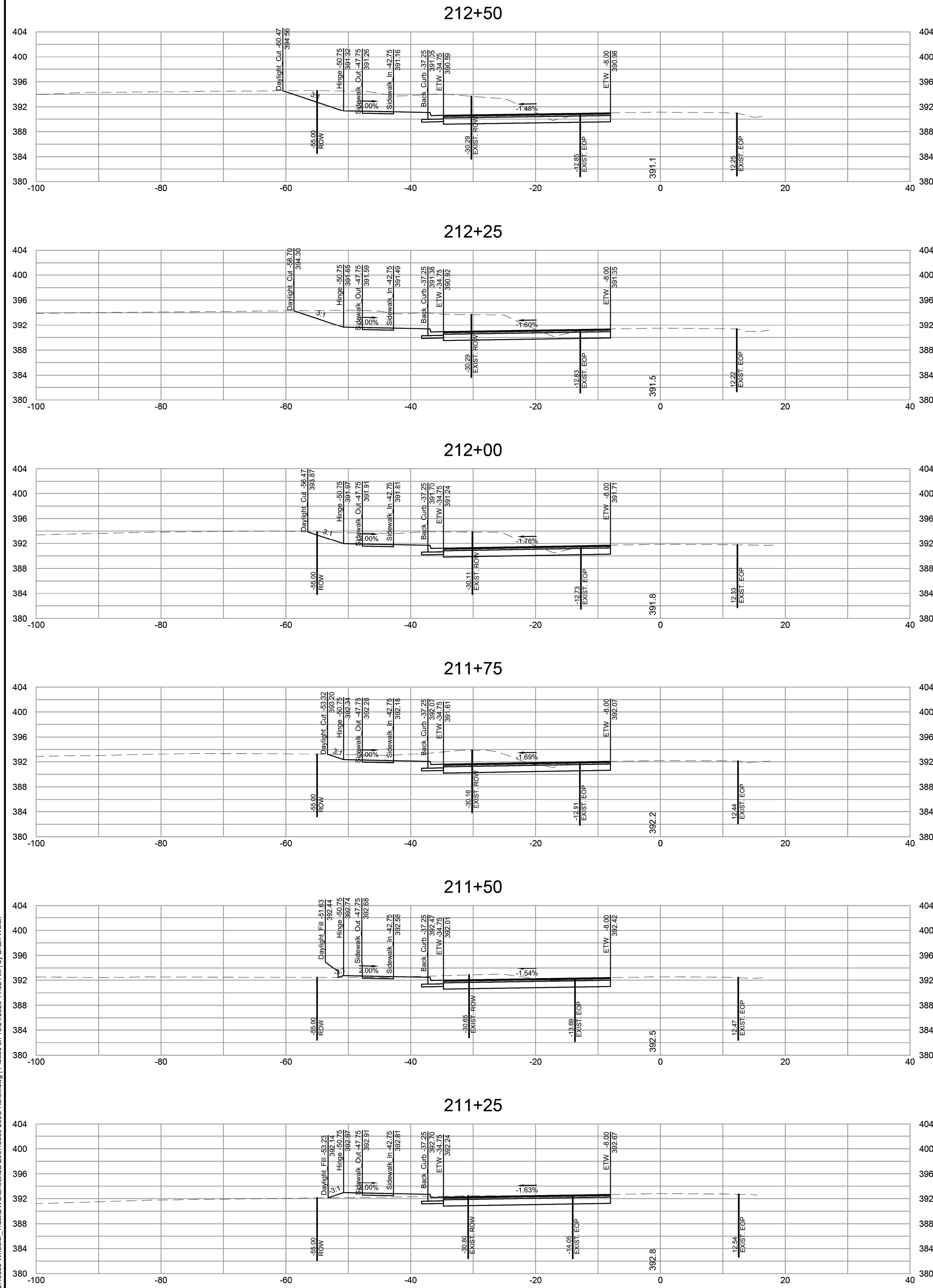


# WHEELER TRACT - OFFSITE IMPROVEMENTS

ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
MITCHELL MILL ROAD CROSS SECTIONS



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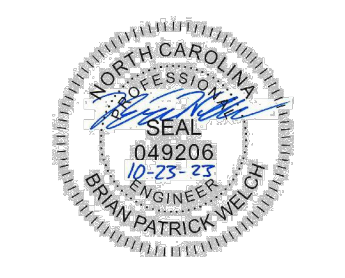
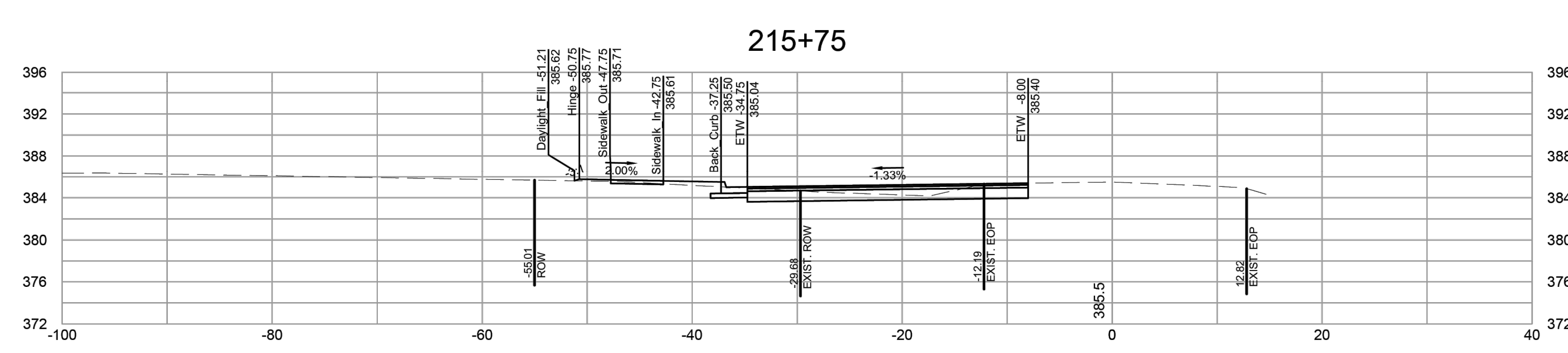
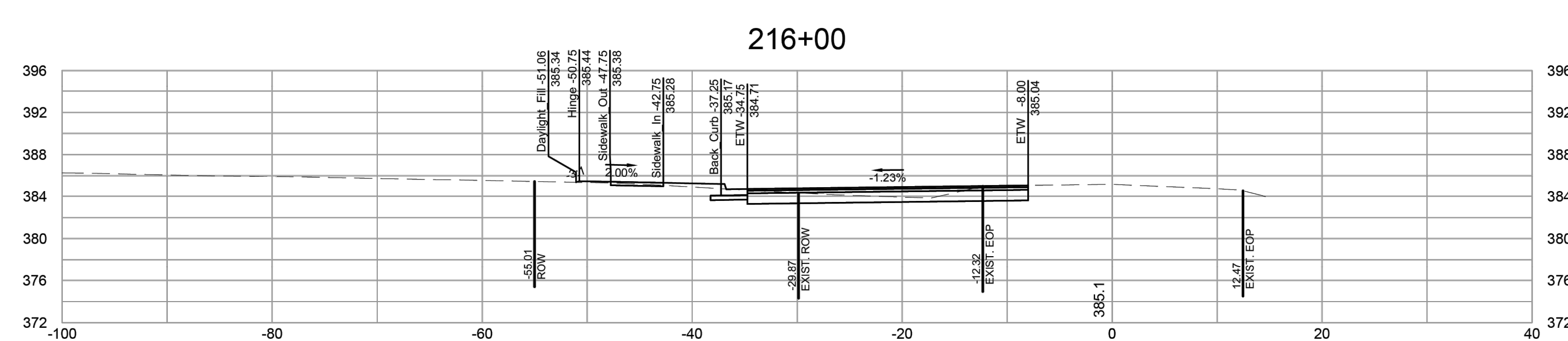
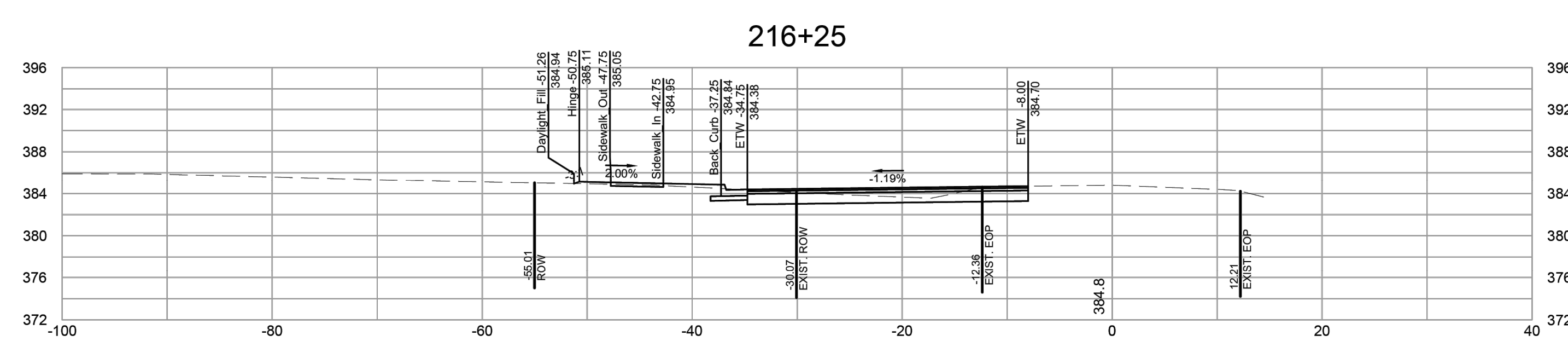
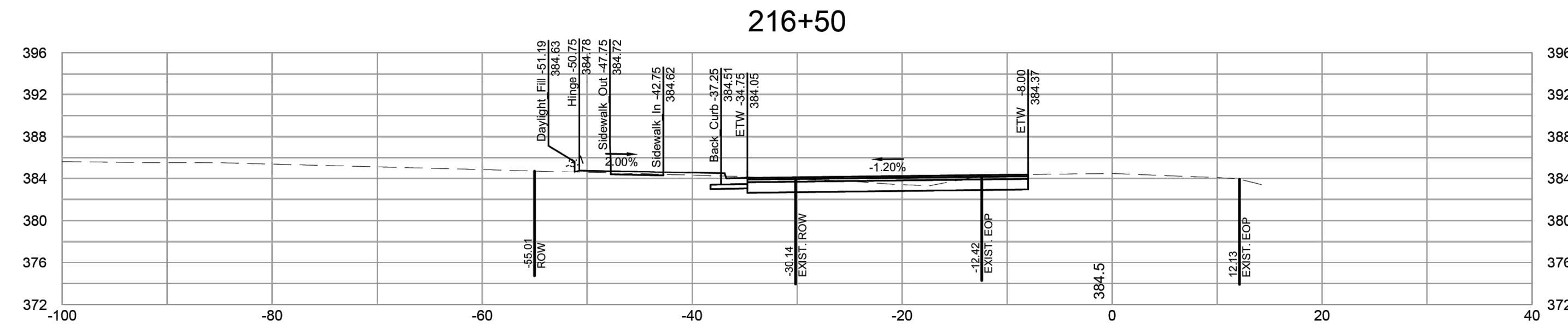
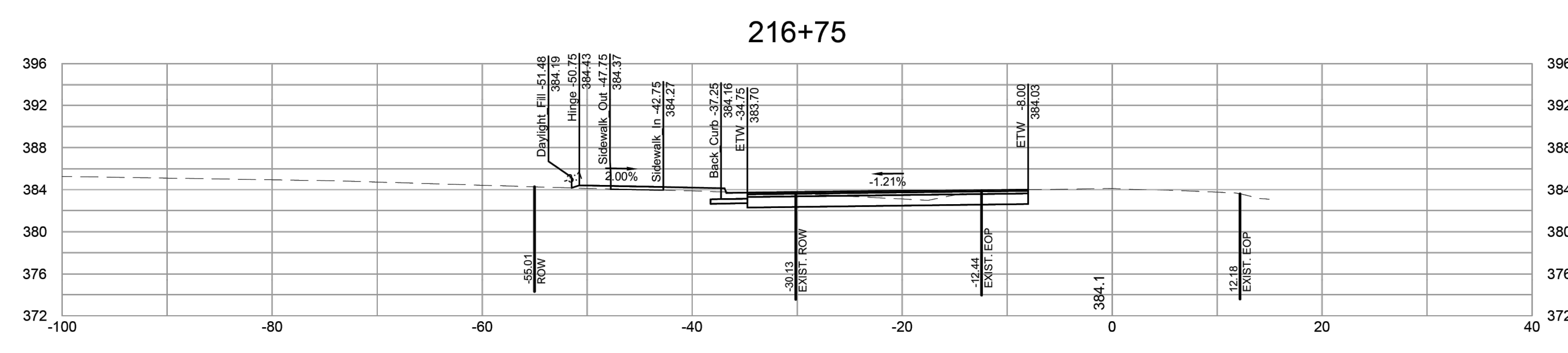
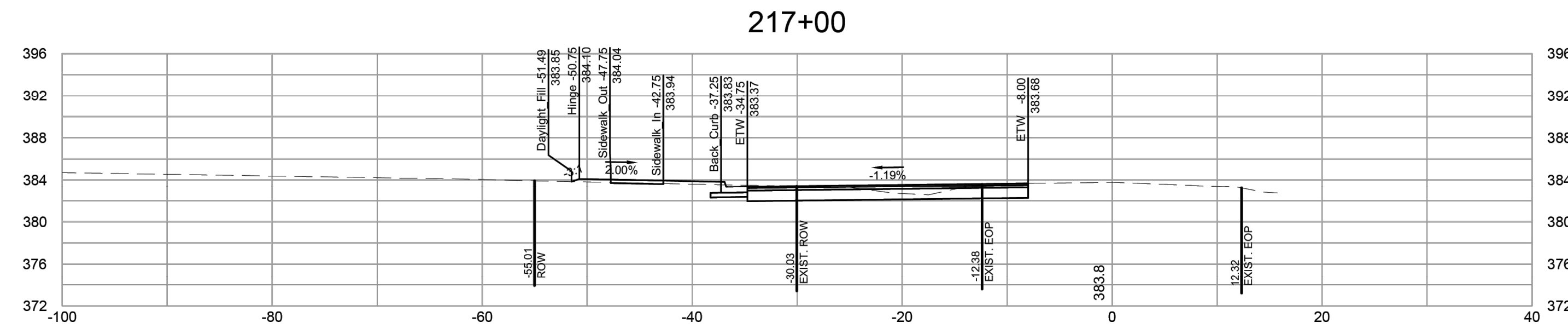
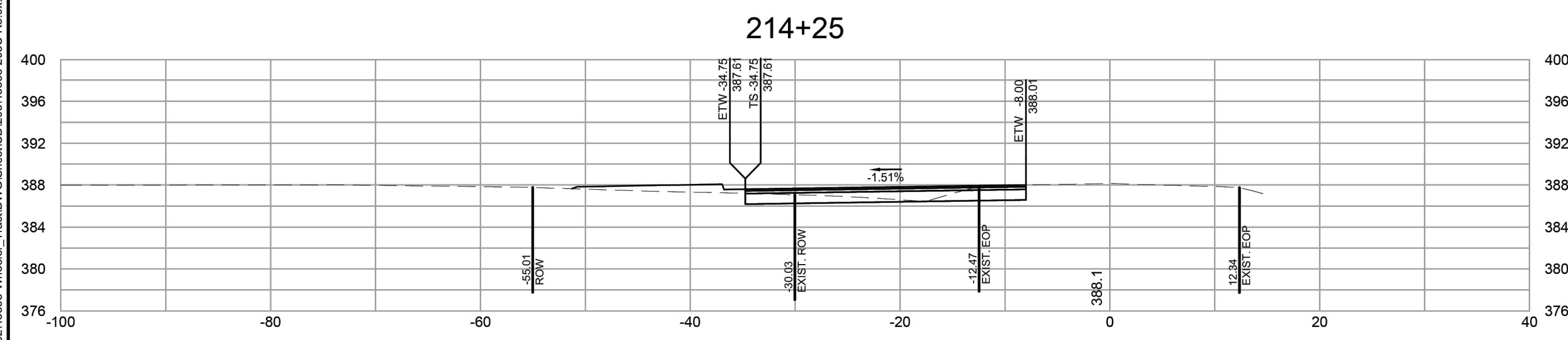
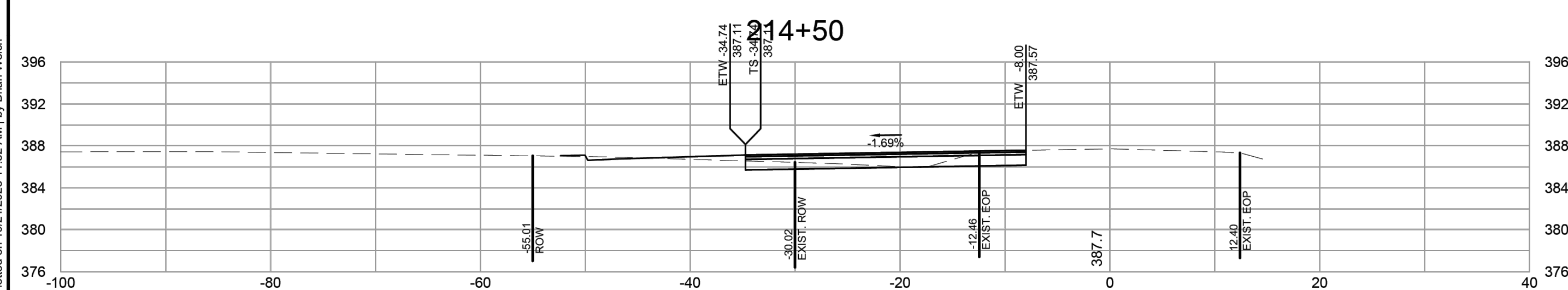
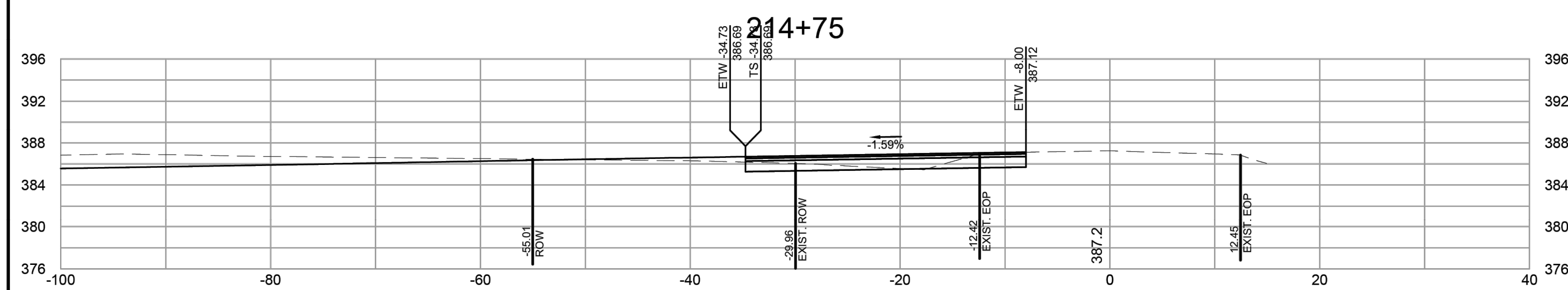
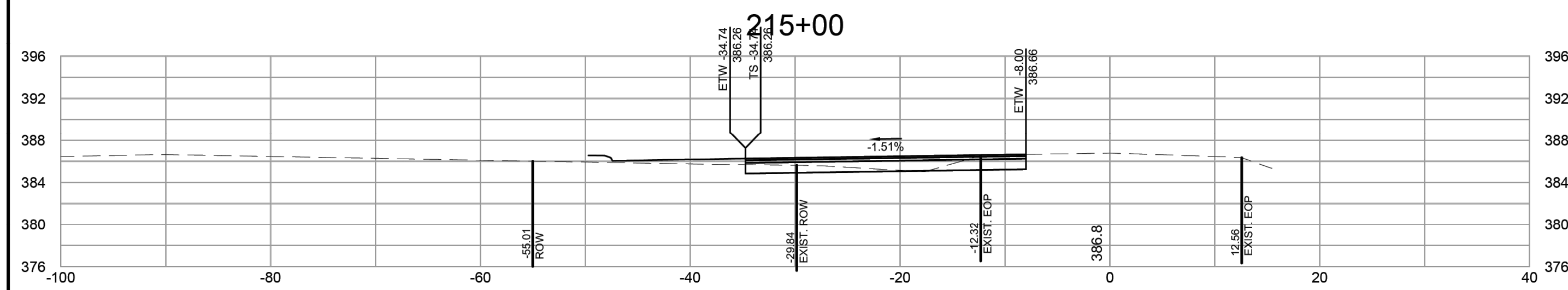
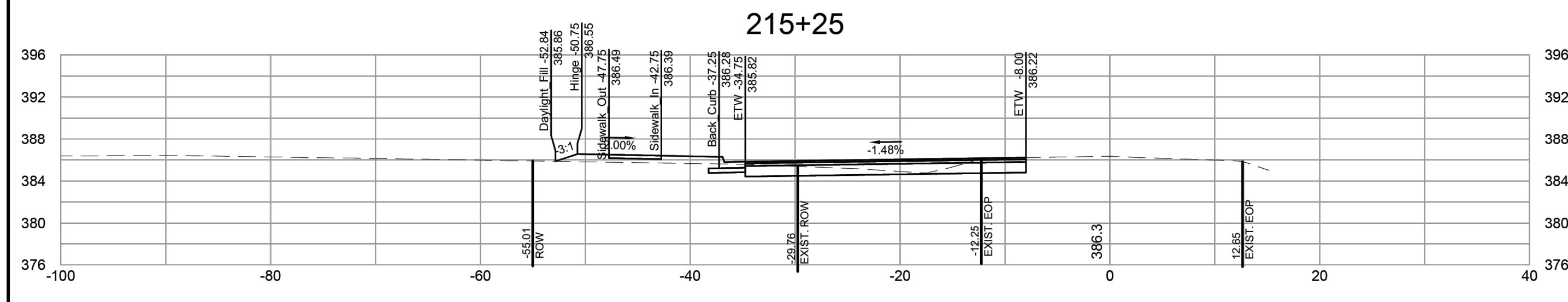
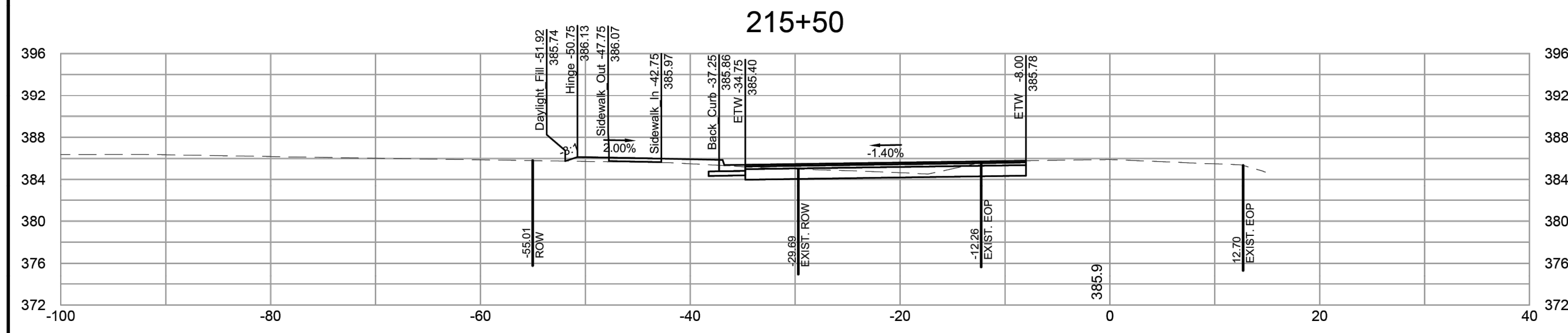
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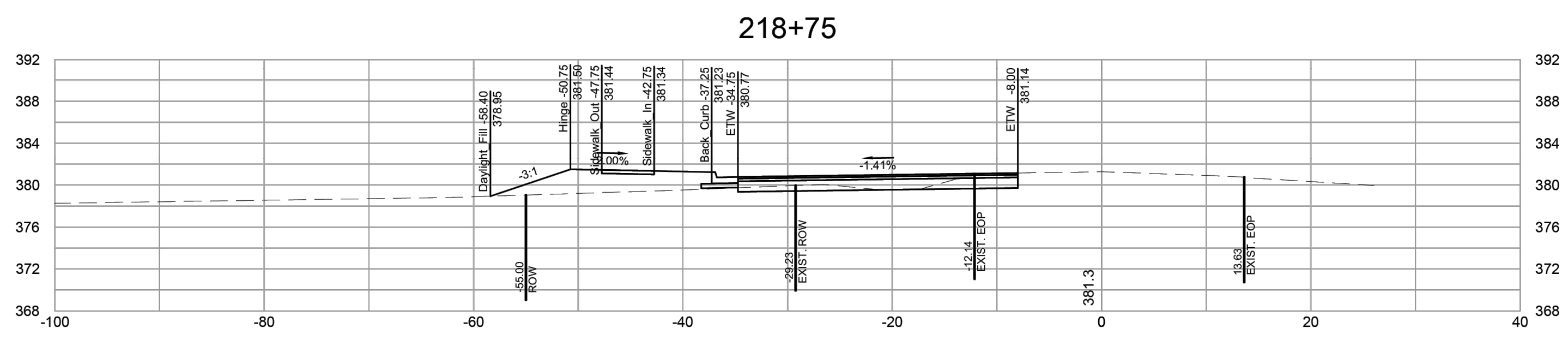
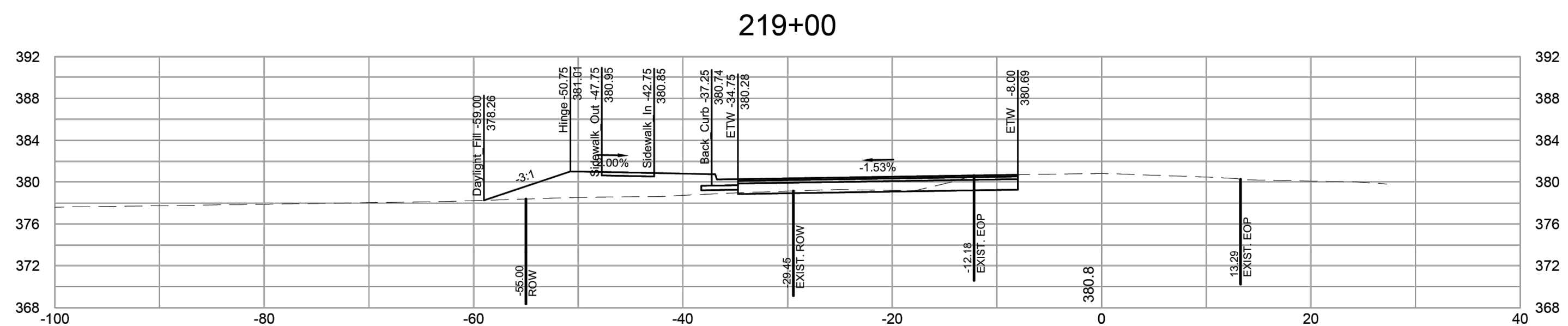
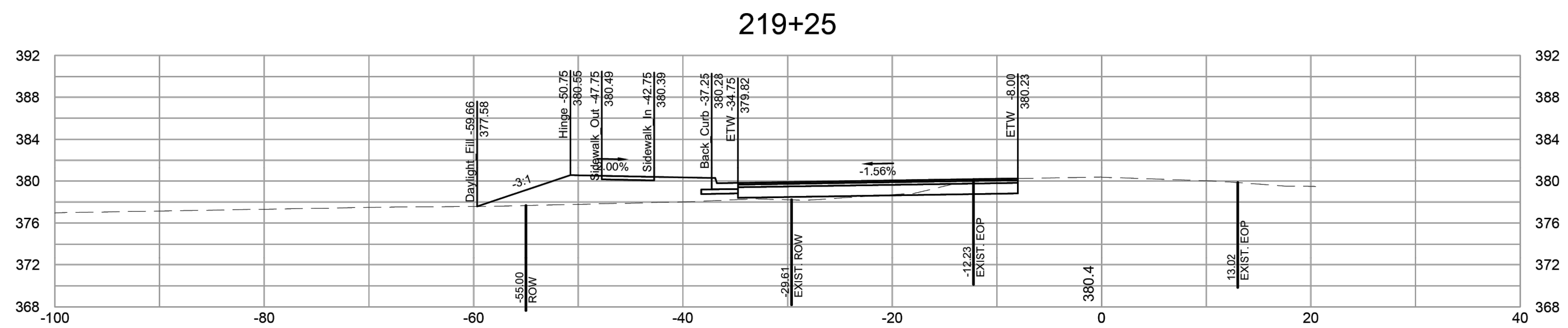
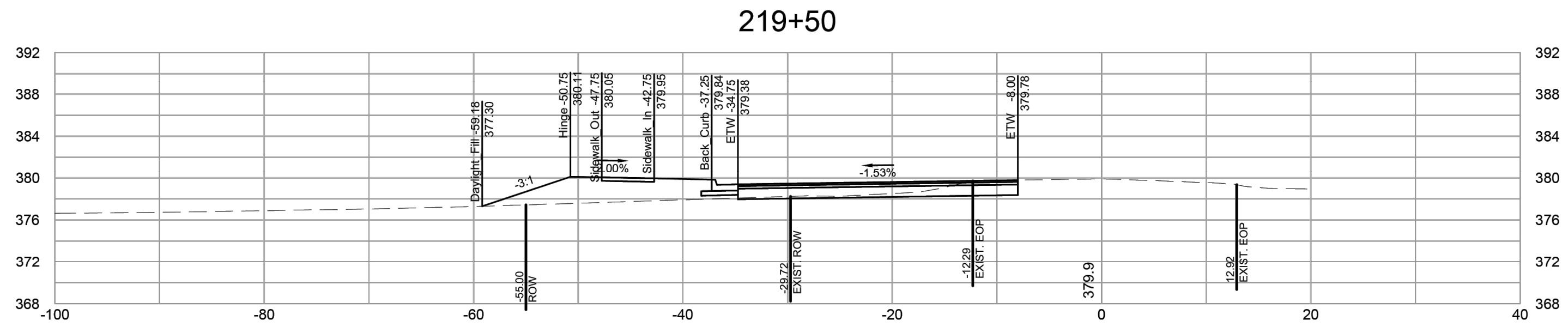
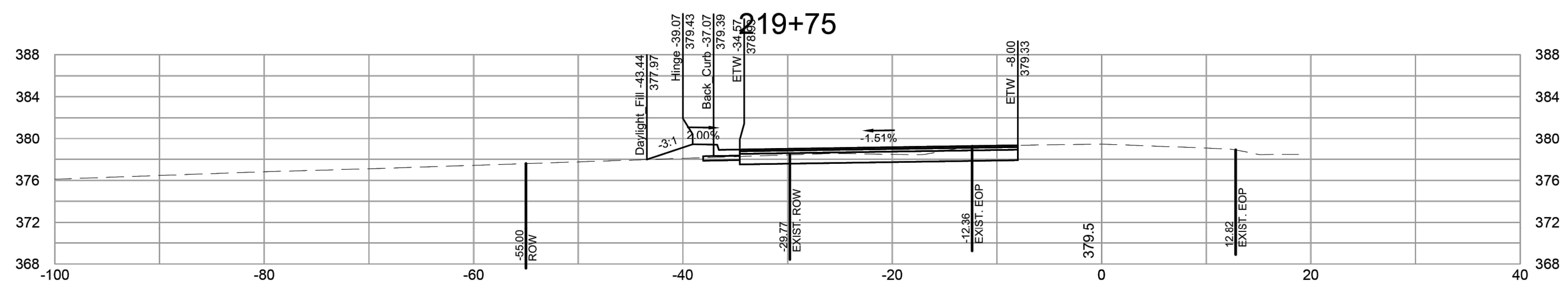
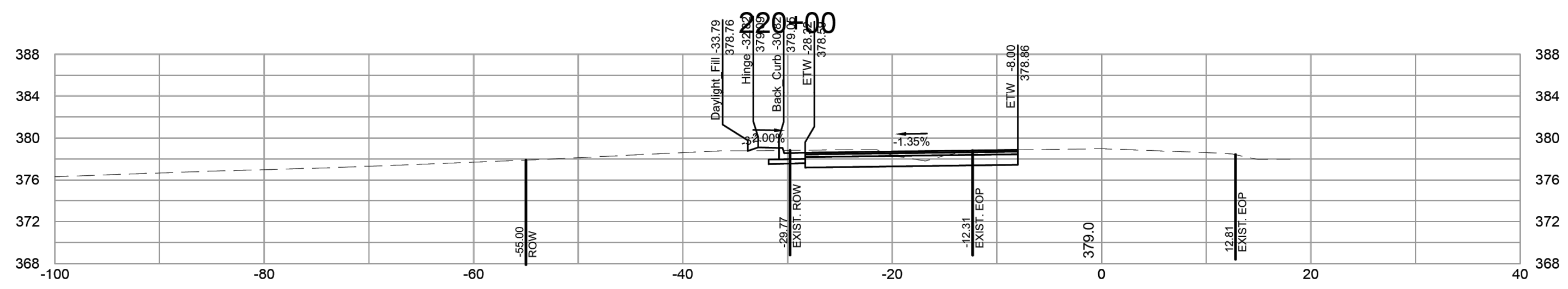
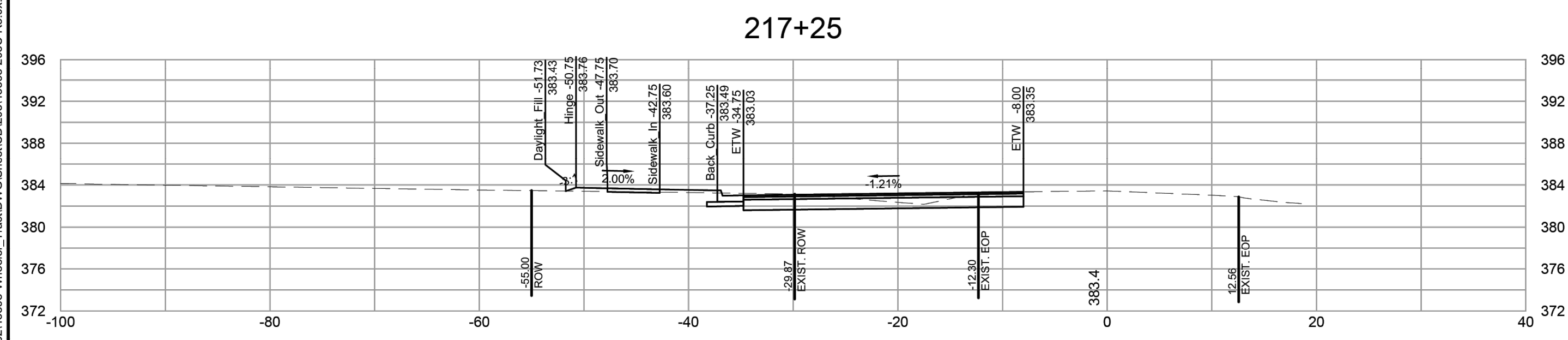
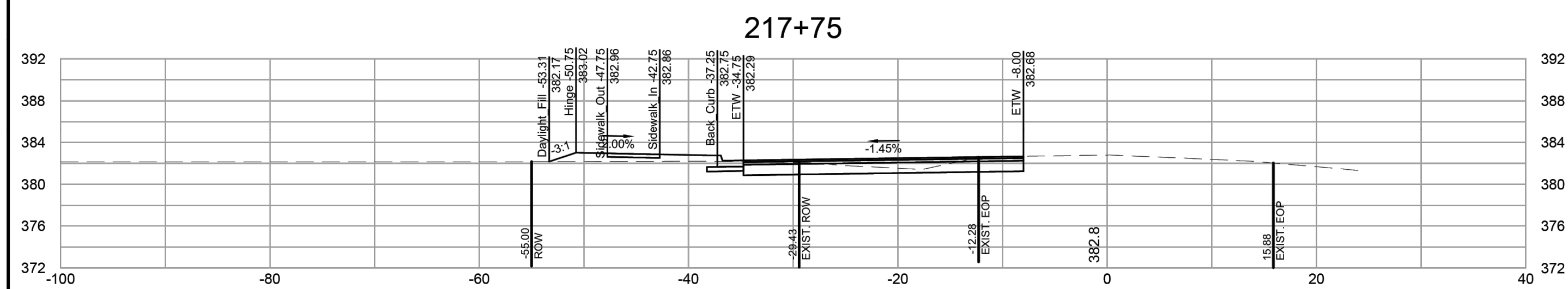
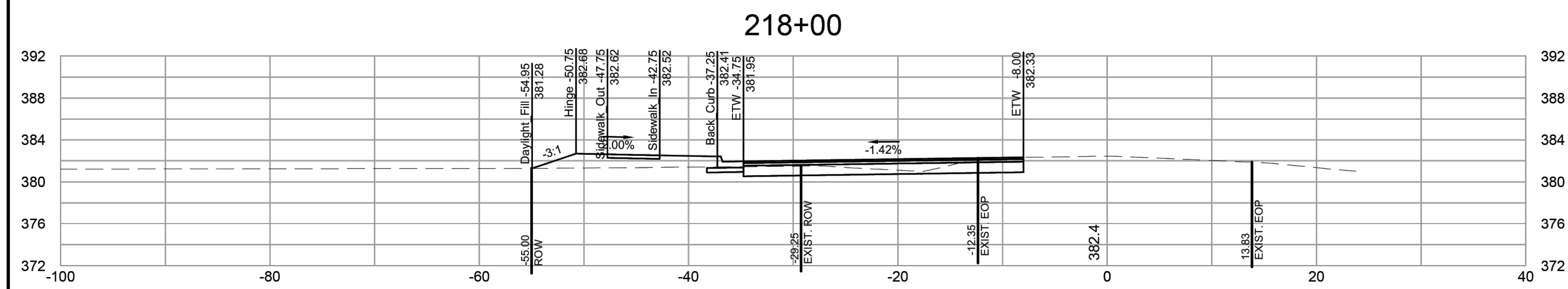
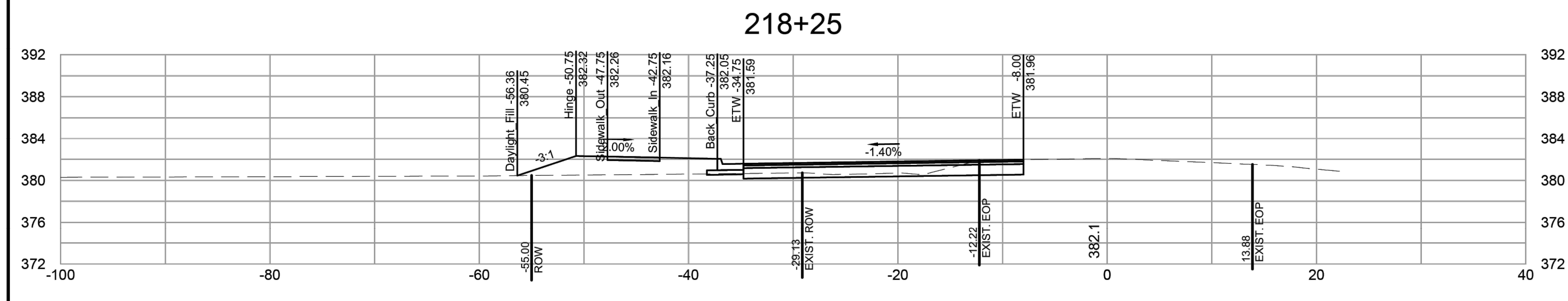
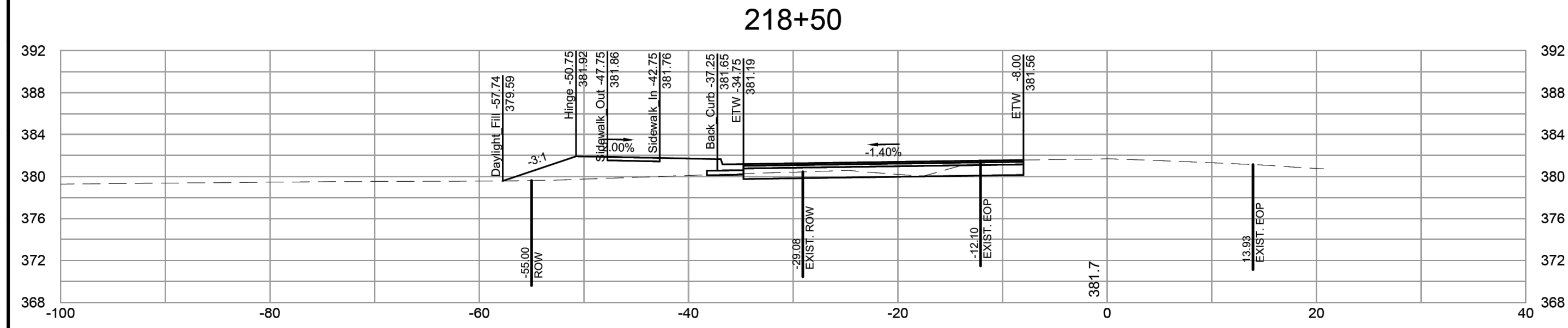
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 MITCHELL MILL ROAD CROSS SECTIONS

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REVISION DESCRIPTION  
ROLESVILLE ROAD TAPER SHIFT AND STORM NETWORK UPDATE  
GRADING AND STORM NETWORK ADJUSTMENTS

DATE  
06-15-2023  
10-24-2023

DATE  
07/21/22

DRAWN BY  
BPW

DESIGNED BY  
BPW

CHECKED BY  
BPW

SCALE  
1" = 10'

JOB NO.  
43398

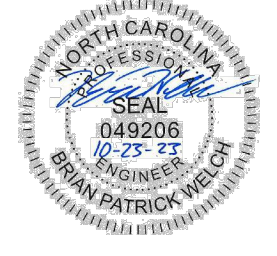
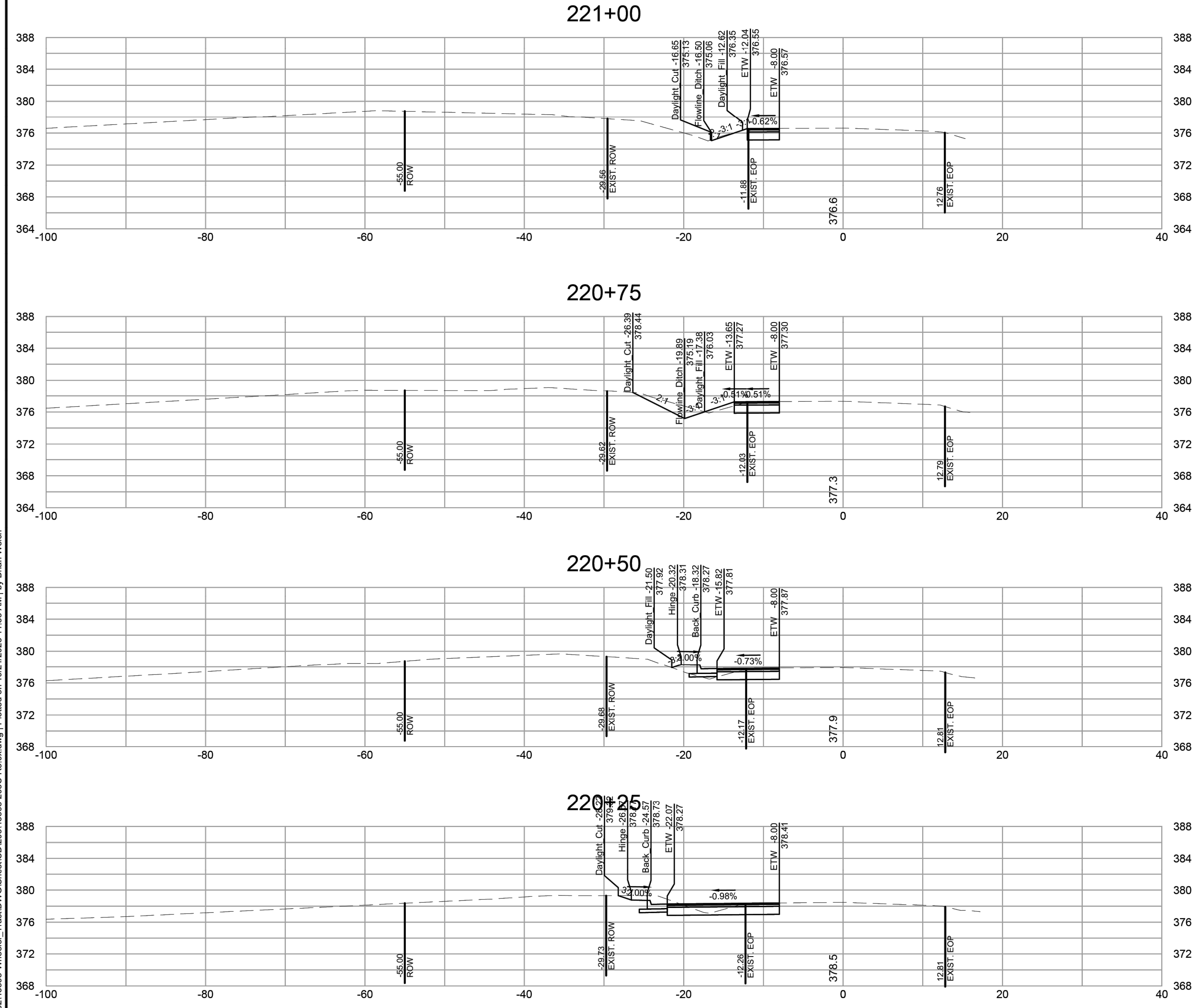
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R8.09

WHEELER TRACT - OFFSITE IMPROVEMENTS  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
MITCHELL MILL ROAD CROSS SECTIONS

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DATE	REVISION DESCRIPTION
06-15-2023	ROLESVILLE ROAD TAPER SHIFT AND STORM NETWORK UPDATE
10-24-2023	GRADING AND STORM NETWORK ADJUSTMENTS

# TIMMONS GROUP

## WHEELER TRACT - OFFSITE IMPROVEMENTS

ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

### MITCHELL MILL ROAD CROSS SECTIONS

JOB NO.  
**43398**

SHEET NO.  
**R8.10**

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STRUCTURE LOCATION TABLE						
CALLOUT	DESCRIPTION	NORTHING	EASTING	RIM	INVERT IN	INVERT OUT
1	NEW 72" Ø MANHOLE, CENTER	778384.98'	2166624.53'	349.00'	329.00'	328.80'
2	NEW 72" Ø WET WELL, CENTER	778405.93'	2166607.73'	349.50'	328.50'	N/A
3	NEW 5' x 5.5' VALVE VAULT, CENTER	778412.82'	2166616.32'	349.50'	N/A	N/A

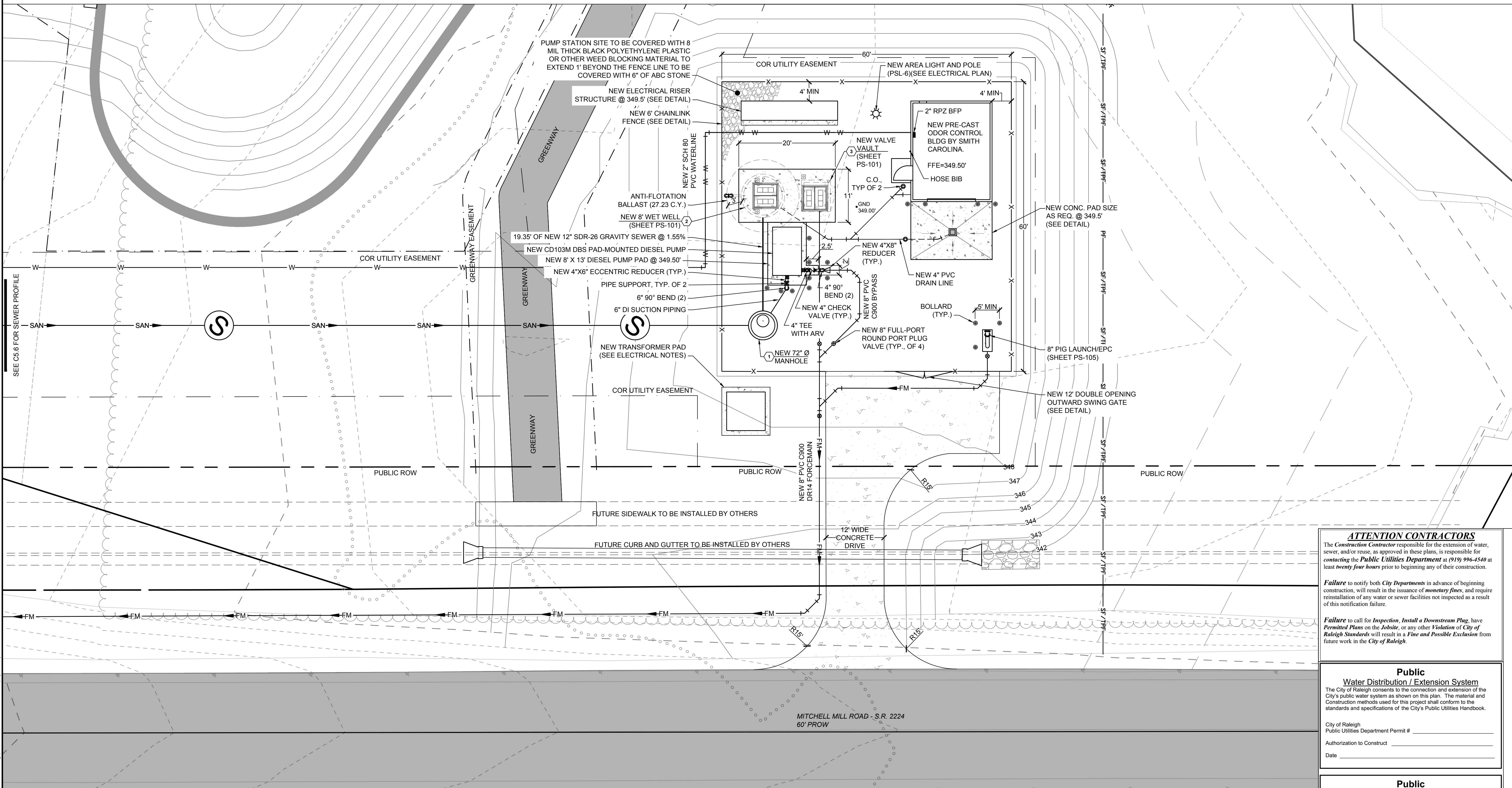
- GENERAL NOTES:**
- ALL WORK RELATED TO THE PUMP STATION, WET WELL, AND FORCE MAIN SHALL BE TO THE CITY OF RALEIGH STANDARDS AND SPECIFICATIONS.
  - WET WELL EXTERIOR TO BE COATED WITH TWO SUCCESSIVE COATS OF COAL TAR EPOXY (APPROVED BY THE CITY OF RALEIGH)
  - WET WELL SHALL BE PRE-CAST CONCRETE PER ASTM C478. MANHOLE SECTION JOINTS SHALL BE DURABLE MASTIC SEALING MATERIAL AND WATERPROOFED BY USE OF ASPHALTIC CEMENT AND WRAPPED WITH A BUTYL RESIN SEALANT WITH A 6" WIDTH.
  - ALL PENETRATIONS INTO THE WET WELL SHALL BE WATERTIGHT BY LINK SEAL OR NON SHRINK GROUT.
  - ALL HARDWARE IN THE WET WELL TO BE STAINLESS STEEL.
  - THERE SHALL BE NO VALVES, ELECTRICAL JUNCTION BOXES, OR CABLE SPLICES OF ANY KIND IN THE WET WELL.

**DESIGN CRITERIA:**

THE WHEELER TRACT PUMP STATION HAS BEEN DESIGNED TO SERVE A TOTAL OF 177 SINGLE-FAMILY RESIDENCES (250 GPD/RESIDENCE), 120 TOWNHOMES (250 GPD/TOWNHOME), AND A CLUBHOUSE WITH A SWIMMING POOL (10 GPD/PERSON). FLOWS FROM THE ADJACENT DRAINAGE BASIN HAVE BEEN INCLUDED, WHICH INCLUDES 280 ACRES (720 GPD/ACRE). THE TOTAL DESIGN FLOW IS APPROXIMATELY 277,350 GPD. USING A 2.5 PEAKING FACTOR, THE PEAK INFLUENT RATE IS 481.51 GPM. THE STATION WILL HAVE TWO (2) SULZER XFP100G CB1 60HZ PE250/4-G-60HZ SUBMERSIBLE PUMPS. THE NEW 8-INCH PVC-C900 DR14 FORCE MAIN WILL DISCHARGE INTO THE GRAVITY SEWER PARALLEL TO HARRIS CREEK NEAR AMAZON TRAIL OWNED BY THE CITY OF RALEIGH.

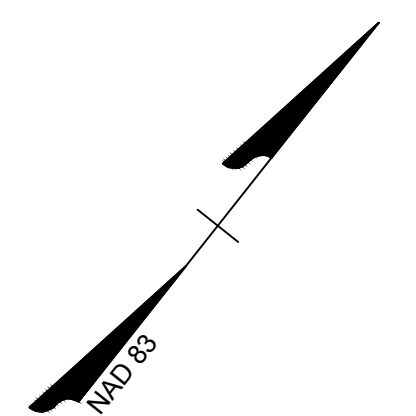
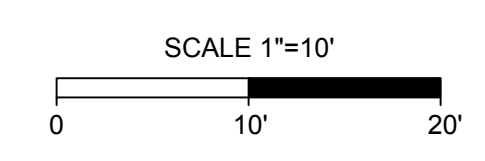
**DESIGN SUMMARY:**

PUMP STATION FLOWS ARE HANDLED BY TWO (2) SULZER XFP100G CB1 60HZ PE250/4-G-60HZ SUBMERSIBLE PUMPS, EACH OPERATING AT 302 GPM @ 92' TDH AT 52.59 HZ AND 482 GPM @ 112' TDH AT 60 HZ.



SEE C5.6 FOR SEWER PROFILE

**PUMP STATION SITE PLAN**  
SCALE: 1" = 10'



**ATTENTION CONTRACTORS**

The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the Public Utilities Department at (919) 996-4540 at least twenty four hours prior to beginning any of their construction.

**Failure** to notify both City Departments in advance of beginning construction, will result in the issuance of monetary fines, and require reinstatement of any water or sewer facilities not inspected as a result of this notification failure.

**Failure** to call for Inspection, Install a Downstream Plug, have Permitted Plans on the Jobsite, or any other Violation of City of Raleigh Standards will result in a Fine and Possible Exclusion from future work in the City of Raleigh.

**Public Water Distribution / Extension System**

The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.

City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

**Public Sewer Collection / Extension System**

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City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
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DATE  
09/06/23

DRAWN BY  
A. KABAT

DESIGNED BY  
A. KABAT

CHECKED BY  
C. PETREE

SCALE  
1" = 10'

**TIMMONS GROUP**

ROLESVILLE CROSSING  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

PUMP STATION PLAN

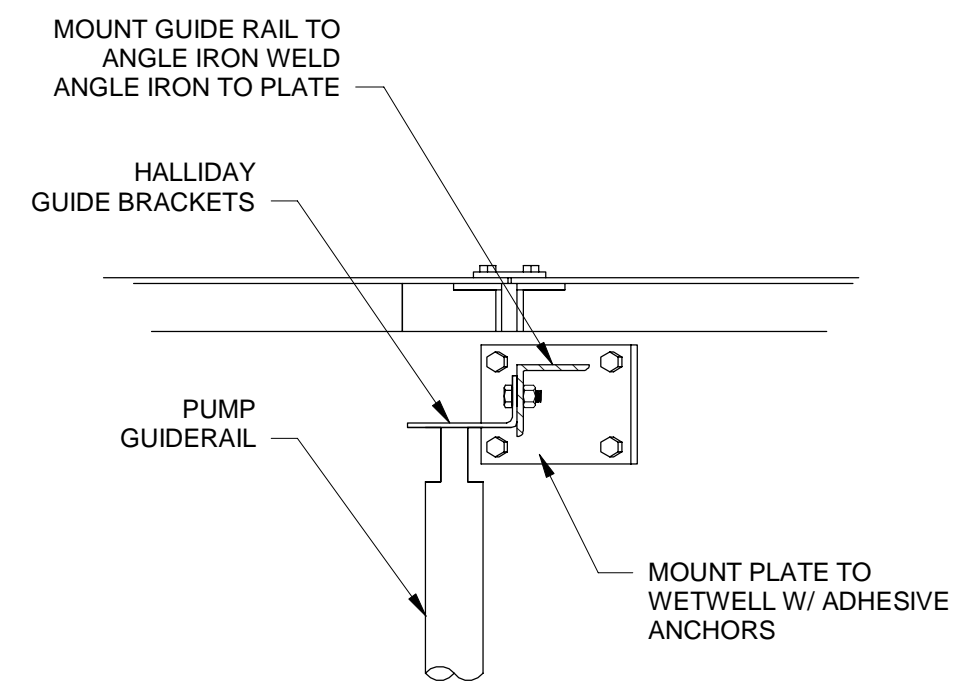
JOB NO.  
43398

SHEET NO.  
PS-100

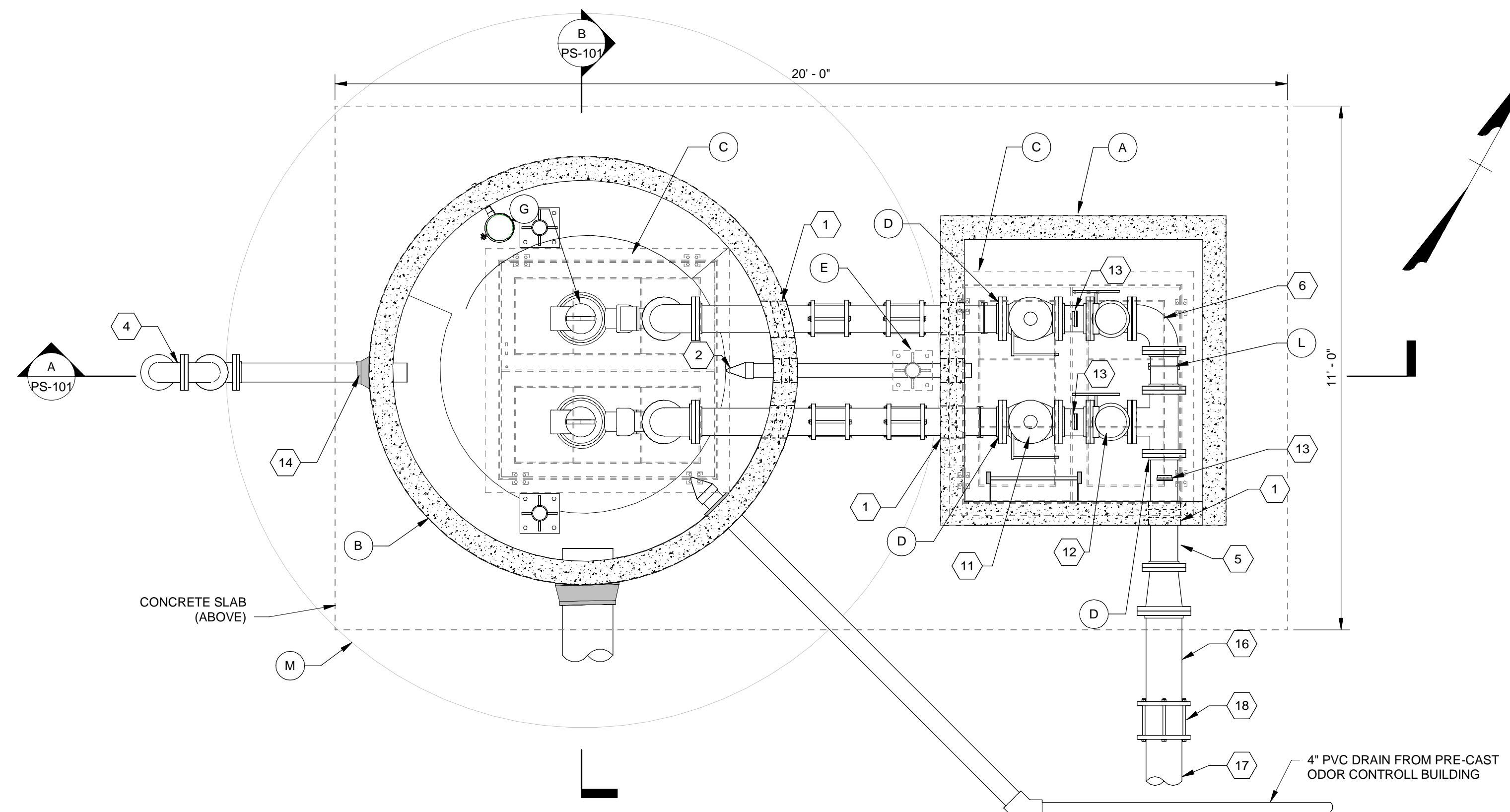


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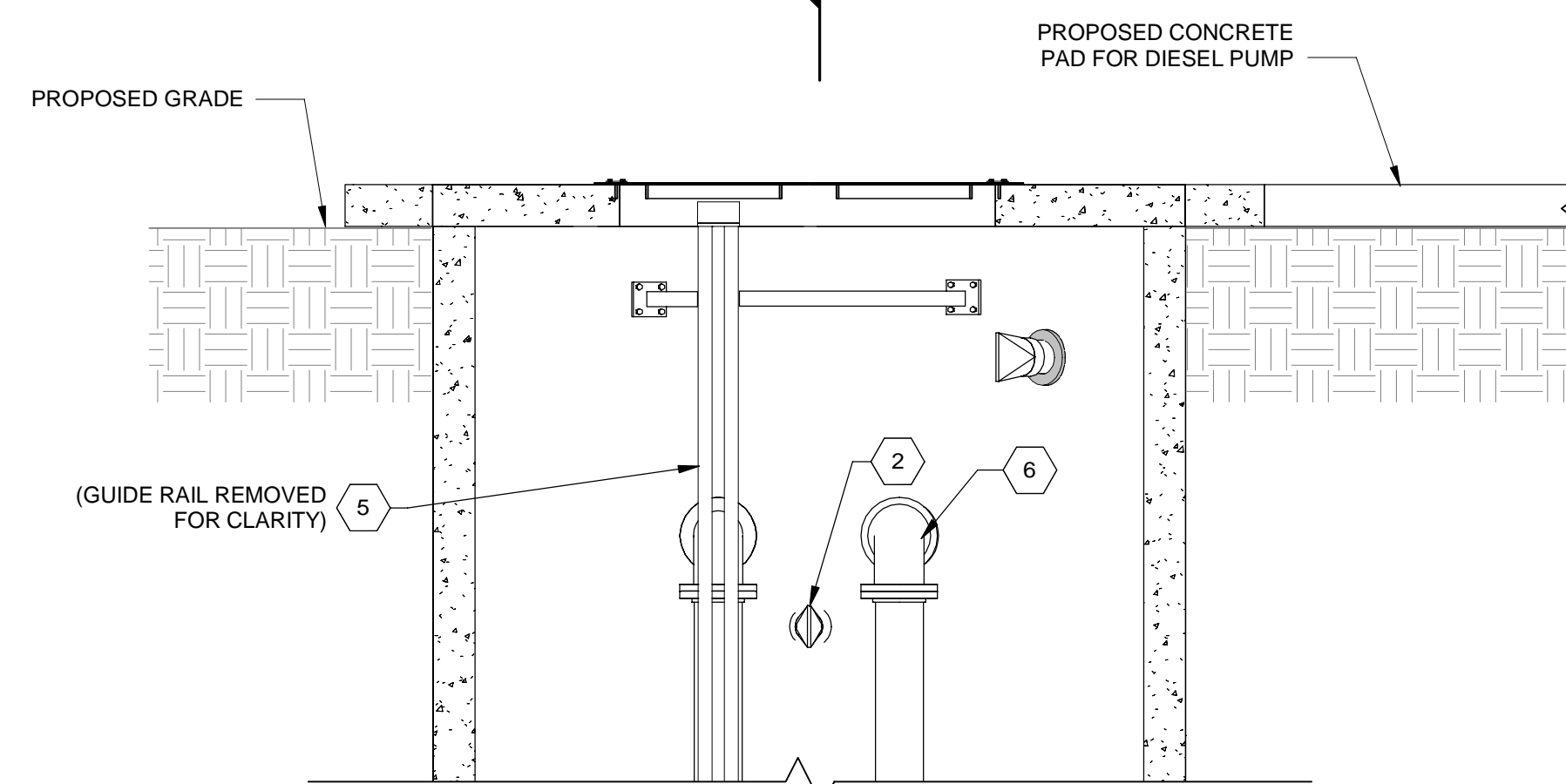
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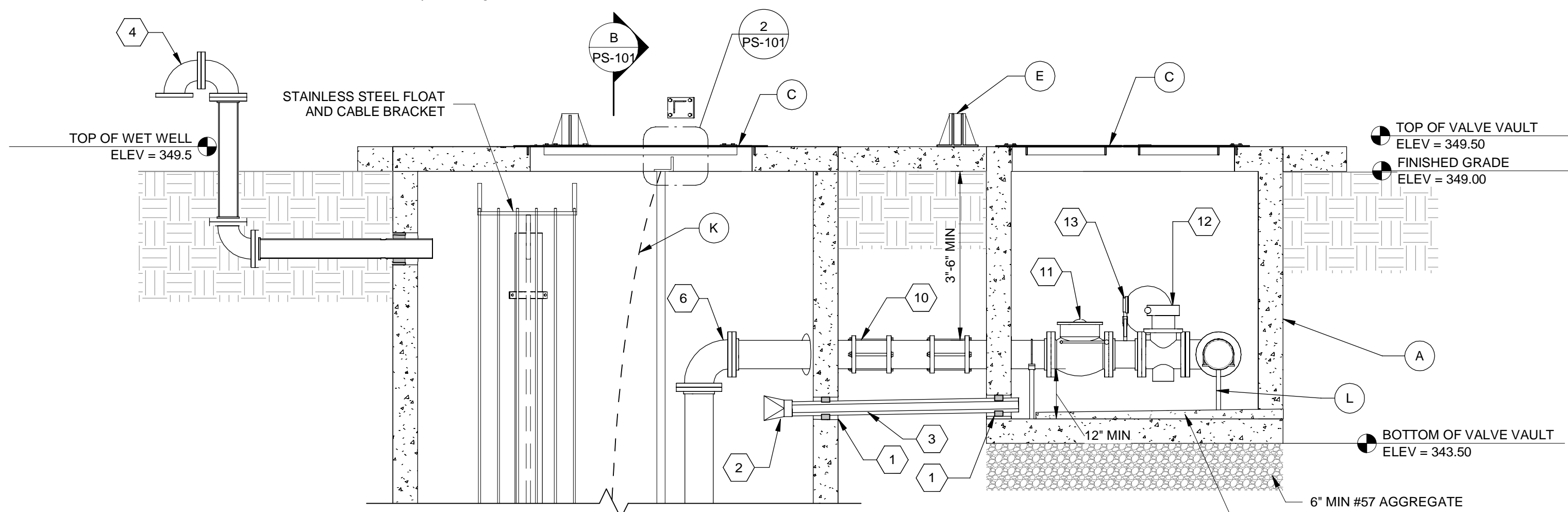
2 PUMP GUIDERAIL BRACKET MOUNTING  
NOT TO SCALE



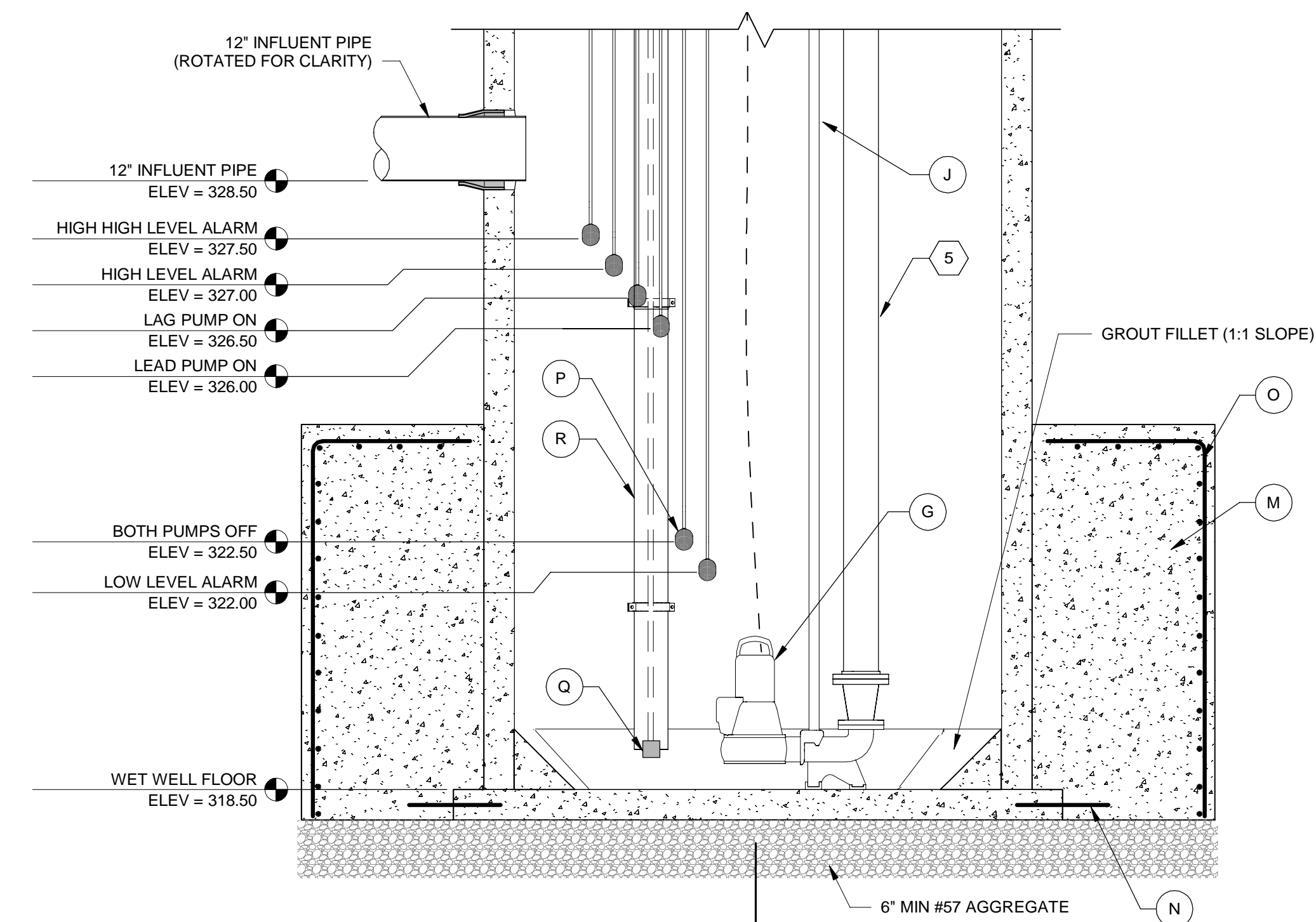
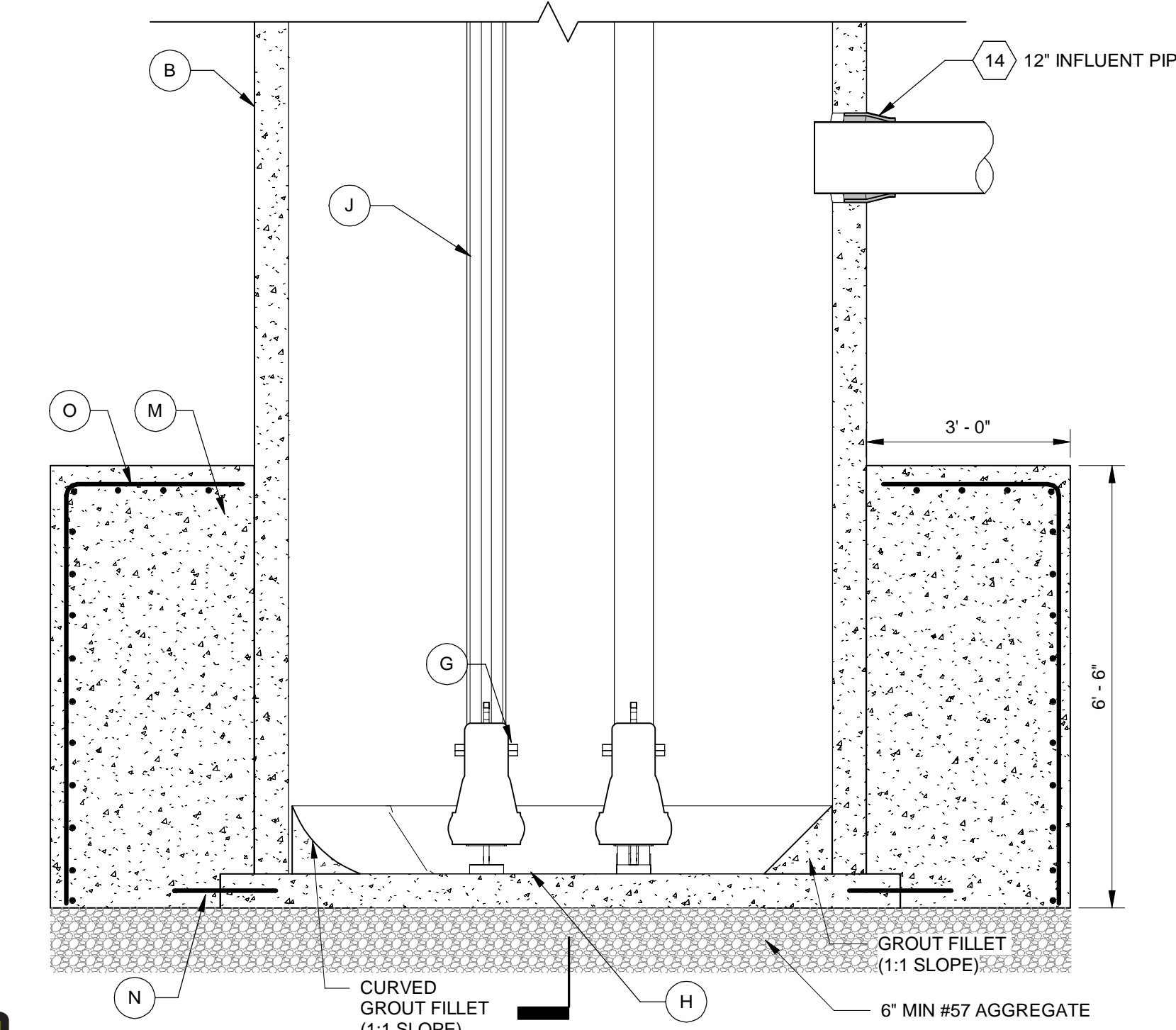
1 PUMP STATION PLAN  
1/2" = 1'-0"



B SECTION B  
1/2" = 1'-0"



A SECTION A  
1/2" = 1'-0"



FITTING AND EQUIPMENT SCHEDULE	
LABEL	DESCRIPTION
1	LINK SEAL
2	3" TIDEFLEX TF-2 CHECK VALVE
3	3" PVC DRAIN SLOPED 1/4" PER FOOT (MIN) WITH FLEXIBLE COUPLING
4	4" VENT WITH REMOVABLE BRONZE OR ALUMINUM INSECT SCREEN
5	6" FLG CLASS 50 DI PIPE
6	6" FLG 90 DEGREE BEND
10	6" DRESSER COUPLING
11	6" SWING CHECK VALVE
12	6" GEAR OPERATED PLUG VALVE
13	PRESSURE GAUGE AND BALL VALVE (TAPPED)
14	MANHOLE BOOT
16	8" CLASS 50 DI PIPE
17	8" PVC C-900 DR14
18	8" TRANSITION COUPLING
A	5' X 5.5' PRECAST VALVE VAULT
B	8' DIAMETER PRECAST WET WELL
C	W25S454 HALLIDAY HATCH (OR APPROVED EQUAL)
D	6" FLANGE ADAPTER
E	HALLIDAY D2R HOIST SOCKET (OR APPROVED EQUAL)
G	SUMBERSIBLE NON-CLOG SEWAGE PUMP SULZER XFP100G CB1 60HZ PE250/4-G-60HZ
H	STAINLESS STEEL ANCHORS PER PUMP MANUFACTURER
J	STAINLESS STEEL GUIDE RAIL
K	STAINLESS STEEL HOIST CABLE W/ 1" STAINLESS STEEL CHAIN
L	ADJUSTABLE PIPE SUPPORT (AS REQUIRED)
M	ANTI-FLOATATION COLLAR (27.23 C.Y. MIN CONCRETE)
N	3/4"X18" STEEL ROD @ 24" O.C.
O	#4 REBAR (CONTINUOUS) @ 8" O.C.
P	FLOAT SWITCH (TYP)
Q	INTRINSICALLY SAFE PRESSURE TRANSDUCER
R	6" PVC SCH80 STILLING WELL

- GENERAL NOTES:
- BASE AND FIRST RISER UNIT TO BE CAST MONOLITHIC
  - VALVE VAULT TO HAVE SEALED FLOOR AND DRAIN
  - ALL LOCATIONS WHERE PIPES ENTER OR LEAVE THE WET WELL OR VALVE VAULT SHALL BE MADE WATERTIGHT WITH WALL SLEEVE OR NON-SHRINK GROUT
  - THERE SHALL BE NO VALVES OR ELECTRICAL JUNCTION BOXES IN THE WET WELL
  - CHECK VALVES SHALL BE IRON-BODIED, FULLY BRONZE CLAPPER DISC AND BRONZE SEAT RING, AND SHALL HAVE A SPRING LOADED LEVER ARM CAPABLE OF BEING MOUNTED ON EITHER SIDE OF THE VALVE
  - PLUG VALVES SHALL BE 1/4 TURN, ECCENTRIC ACTION AND RESILIENT PLUG FACING WITH HEAVY DUTY STAINLESS STEEL BEARINGS AND WELDED-IN CORROSION RESISTANT NICKEL SEAT. PUMP STATION PLUG VALVES SHALL BE "FULL-PORT" ROUND PORT" CROSS-SECTIONAL AREA PERPENDICULAR TO THE FLOW OF AT LEAST 100% OF THE ADJOINING PIPE
  - FLEXIBLE COUPLING SHALL BE SLEEVE TYPE
  - PUMPING SPECIFICATIONS ARE BELOW:  
THE PUMPING EQUIPMENT SHALL BE A DUPLEX SOLIDS HANDLING SUBMERSIBLE SEWAGE PUMP INSTALLATION AS MANUFACTURED BY SULZER (OR APPROVED EQUIVALENT). THE INSTALLATION SHALL INCLUDE ALL MOTORS, VALVES, PIPING, HARDWARE, HATCH COVERS, CONTROLS, ALARM BELL, ALARM LIGHT, AUTO DIALER, PUMP RUN TIME INDICATOR, ELECTRICAL EQUIPMENT AND WIRING. THE PUMPING EQUIPMENT SHALL BE CAPABLE OF DELIVERING 302 GPM AT 92.0 FEET TDH AND 482 GPM AT 112.0 FEET TDH. A SULZER XFP100G CB1 60 HZ PE250/4-G-60HZ OR APPROVED EQUIVALENT SHALL BE USED.
  - PUMP MOTORS SHALL MEET ALL REQUIREMENTS OF CLASS 1, DIVISION 1, GROUP D
  - PUMP STATION MUST COMPLY WITH ALL CITY OF RALEIGH AND TOWN OF ROLESVILLE SPECIFICATIONS
  - ALL DISCHARGE PIPING SHALL BE CLASS 50 DUCTILE IRON FLANGED PIPE IN ACCORDANCE WITH AWWA C 141
  - ALL PIPING, COUPLINGS, FITTINGS, VALVES, ETC. SHALL BE CLASS 125 FLANGES MEETING ANSI B16.1 SPECIFICATIONS
  - PUMP STATION IS NOT LOCATED WITHIN 100-YR FLOODPLAIN ACCORDING TO FEMA FIRM MAP 3720176600J (EFFECTIVE DATE 05/02/2006)
  - WET WELL EXTERIOR TO BE COATED WITH TWO SUCCESSIVE COATS OF COAL TAR EPOXY AS APPROVED BY THE CITY OF RALEIGH
  - WET WELL SHALL BE PRE-CAST CONCRETE PER ASTM C478. MANHOLE SECTION JOINTS SHALL BE DURABLE MASTIC SEALING MATERIAL AND WATERPROOFED BY USE OF ASPHALTIC CEMENT AND WRAPPED WITH A BUTYL RESIN SEALANT WITH A 8" WIDTH
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  - ALL HARDWARE IN THE WET WELL TO BE STAINLESS STEEL
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**Public Water Distribution / Extension System**

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City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

**Public Sewer Collection / Extension System**

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Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

PRELIMINARY - NOT RELEASED FOR CONSTRUCTION

ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH, NCDOD AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS



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REVISION DESCRIPTION	DATE
REVISIONS PER COR COMMENTS RECEIVED 11/19/2021	12/07/2021
REVISIONS PER COR COMMENTS RECEIVED 01/20/2022	03/18/2022
REVISIONS PER COR COMMENTS RECEIVED 05/19/2022	06/01/2022

DATE 09/07/2023  
DRAWN BY L. KIM  
DESIGNED BY A. KABAT  
CHECKED BY C. PETREE  
SCALE AS SHOWN

**TIMMONS GROUP**  
NORTH CAROLINA LICENSE NO. C-1652  
ROLESVILLE CROSSING  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
PUMP STATION LAYOUT AND SECTIONS

JOB NO. 43398  
SHEET NO. PS-101



### Wastewater Pump Station Calculations

Project: Wheeler Tract  
Project No: 43398  
Prepared by: A. Kabat  
Prepared on: 09/08/2021  
Date Revised: 12/13/2021



Current Design Flows					
Type	Units	GPD/Unit	ADD (GPD)	Peaked Design Flow (GPM)	
Single-Family Residences	177	residences	250	44,250	77
Townhomes	120	townhomes	250	30,000	52
Clubhouse with Swimming Pool	150	people	10	1,500	3
<b>Total</b>				<b>75,750</b>	<b>132</b>

Future Design Flows					
Type	Units	GPD/Unit	ADD (GPD)	Peaked Design Flow (GPM)	
Undeveloped Land	280	acres	720	201,600	350
<b>Total</b>				<b>201,600</b>	<b>350</b>

**Total Basin Build-Out: 277,350 GPD 482 GPM**

Printed: 9/5/2023  
Copy of TG Pump Station Calcs v4.0\_350\_5\_31+2022

### Pump Station Buoyancy Calculations

Project: Wheeler Tract  
Project No: 43398  
Prepared by: A. Kabat  
Prepared on: 09/08/2021  
Date Revised: 12/13/2021



Wet Well Buoyancy			
Description	Value	Units	Notes
Inner Diameter	8.0	ft	
Outer Diameter	9.0	ft	6-inch wall thickness
Depth	31.0	ft	
Concrete Volume	413.90	ft <sup>3</sup>	
Wetwell Weight	60,016	lb	Based on 145-lb/ft <sup>3</sup> for concrete
Displaced Volume	1,972	ft <sup>3</sup>	
Buoyancy Force	-123,061	lb	Based on 62.4-lb/ft <sup>3</sup> for water
Buoyant Weight of Wetwell	-63,045	lbs	Structure is buoyant without base

Base Buoyancy Credit			
Description	Value	Units	Notes
Base Diameter	10.0	ft	6 inches beyond WW outer diameter
Base Thickness	6.0	in	Base Thickness should be no greater than 12"
Concrete / Displaced Volume	39.27	ft <sup>3</sup>	
Base Weight	5,694	lb	Based on 145-lb/ft <sup>3</sup> for concrete
Buoyancy Force	-2,450	lb	Based on 62.4-lb/ft <sup>3</sup> for water
Buoyant Weight of Base	3,244	lb	
Buoyant Weight of Structure	-59,801	lb	Structure is buoyant without AF collar

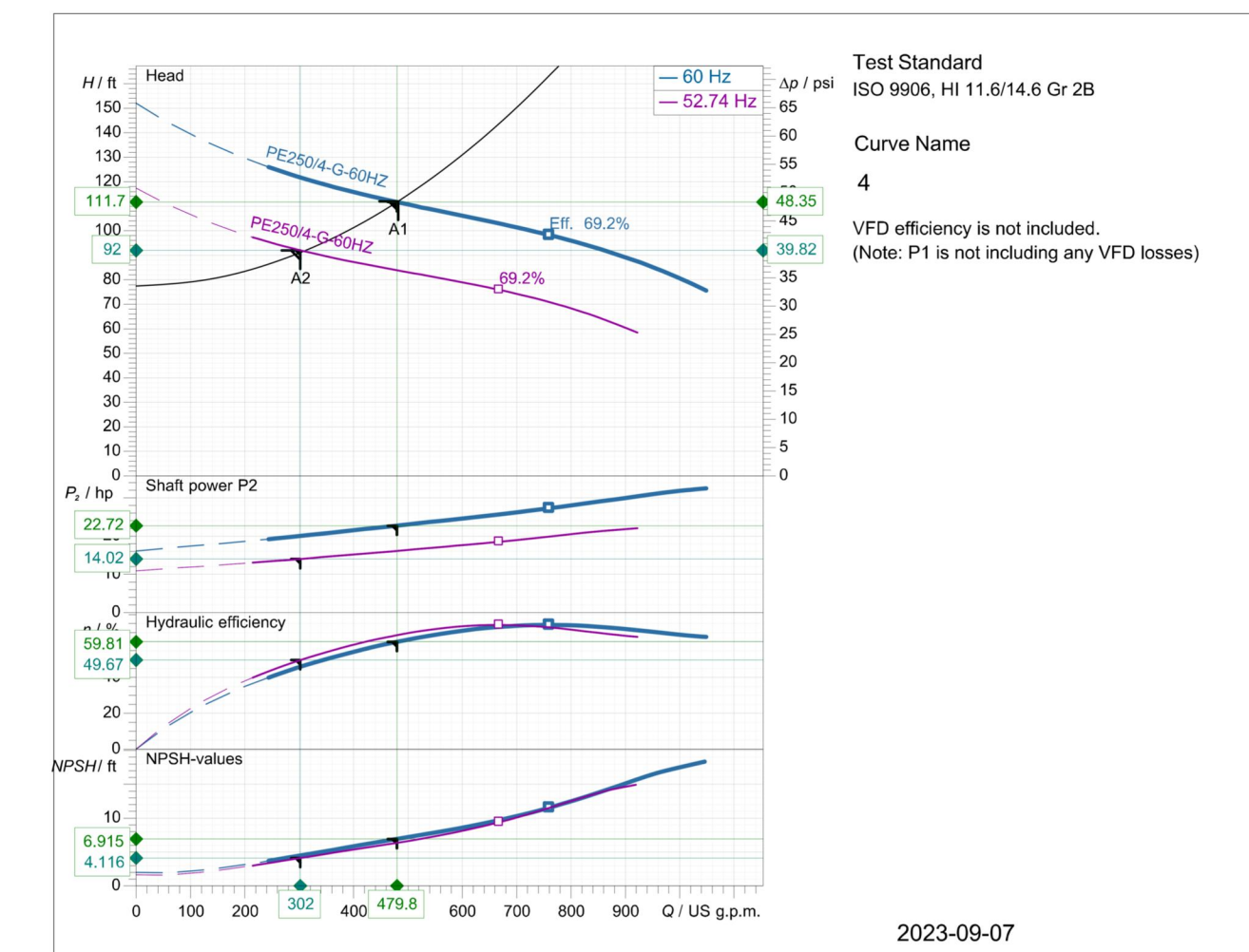
  

(Optional) Anti-Flotation Collar Credit			
Description	Value	Units	Notes
Collar Inner Diameter	9.0	ft	
Collar Thickness	3.00	ft	If no collar used, set thickness to "0"
Collar Height	6.5	ft	
Concrete / Displaced Volume	735.13	ft <sup>3</sup>	
Base Weight	106,594	lb	Based on 145-lb/ft <sup>3</sup> for concrete
Buoyancy Force	-45,872	lb	Based on 62.4-lb/ft <sup>3</sup> for water
Buoyant Weight of Collar	60,722	lb	
Buoyant Weight of Structure	921	lb	Structure is not buoyant without soil

Note: The buoyancy calculations above reflect the worst case scenario during construction with the wet well empty, the excavation pit flooded and the absence of overbearing soil. Minimum concrete thicknesses were used for the wall and base sections to ensure a conservative approach. Actual wall and base thicknesses may increase per the manufacturer shop drawings which would reduce the size of the anti-flotation collar. Consideration would also be given to reducing the size of the anti-flotation collar if positive drainage away from the excavation could be maintained during construction.

Printed: 9/5/2023  
Copy of TG Pump Station Calcs v4.0\_350\_5\_31+2022

### XFP100G CB1 60HZ (wet pit/dry pit)



Operating data specification		Power input	
Flow	479.8 US g.p.m.	Head	24.3 hp
Efficiency	59.8 %	Shaft power	112 ft
NPSH	6.92 ft	Fluid	Water
Temperature	68 °F	Nature of system	Single head pump
No. of pumps	1		

Pump data		Make	
Type	XFP100G CB1 60HZ (wet pit/dry pit)	Impeller	SULZER
Series	XFP PE1-PE3	Impeller size	Contrablock Plus impeller, 1 vane
N° of vanes	1	Suction flange	11.02 inch
Free passage	3.94 inch	Type of installation	DN100
Discharge flange	DN100	Wet well installation with pedestal (without cooling jacket)	
Moment of inertia	2.25 lb ft <sup>2</sup>		

Motor data		Frequency	
Rated voltage	460 V	Rated power P2	60 Hz
Rated power P2	33.5 hp	Nominal Speed	1760 rpm
Number of poles	4	Efficiency	93.6 %
Power factor	0.821	Rated current	40.8 A
Starting current	315 A	Rated torque	100 lb ft
Starting torque	279 lb ft	Degree of protection	IP 68
Insulation class	H	No. starts per hour	15

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### Wastewater Pump Station Calculations

Project: Wheeler Tract  
Project No: 43398  
Prepared by: A. Kabat  
Prepared on: 09/08/2021  
Date Revised: 12/13/2021



Pump Station Capacity			
Description	Value	Units	Notes
Average Daily Flowrate	52.60	gpm	
Peak Factor Used	2.50		
Design Peak Influent Rate	131.51	gpm	
Design Pumping Rate	302.00	gpm	Must be greater than Design Influent Rate Update based on pump / system curves

Wet Well Sizing			
Description	Value	Units	Notes
Wetwell Diameter	8.0	feet	
Minimum Pump Cycle Time	10	min	
Unit Volume	375.99	gal/ft	
Wet Well Drawdown Volume	755.00	gal	Based on $V = \frac{TP}{4}$
Average Pump Run Time	5.28	min	Based on control settings below
Average Pump Cycle Time	30.29	min	Time between pump starts
Peak Pump Run Time	7.72	min	
Peak Pump Cycle Time	17.73	min	
Minimum Operating Depth	2.01	ft	

Control Settings			
Description	Value	Units	Notes
100-year Flood Plain Elevation	346.00	ft AMSL	Zone AE or Zone X - Map 3720176600J.Eff.
Top of Wet Well Elevation	349.50	ft AMSL	ASSUMED
Lowest Invert In Elevation	328.50	ft AMSL	
High Level Alarm Elevation	327.00	ft AMSL	1.50' Below Influent Line
Lag Pump On Elevation	326.50	ft AMSL	0.50' Below High Level Alarm
Lead Pump On Elevation	326.00	ft AMSL	0.50' Below Lag Pump On
Both Pumps Off Elevation	322.50	ft AMSL	3.50' Below Lead Pump On
Pump entrance diameter	4.00	inches	
Minimum Submergence	2.14	ft	H.I. Stds: S=(1+2.3F/D) where F=(gD) <sup>0.15</sup>
Suction Entrance Elevation	319.00	ft AMSL	3.50' Below Both Pump Off
Wetwell Floor Elevation	318.50	ft AMSL	6" Below Suction Entrance
Depth of Wet Well	31.00	ft	

Pump Station Head Loss - Discharge Side			
Description	Value	Units	Notes
Pump Station Pipe Diameter	6.00	inch	From design plans
Pump Station Pipe Velocity	3.43	fps	
Pump Station Pipe "c" value	120		(Hazen-Williams)
Equivalent Length of Fittings	114.79	ft	From Fitting Friction Loss Table Below
Straight Pipe Quantity	30.00	ft	From design plans
Total Equivalent Length	144.79	ft	
Pump Station Head Loss	1.36	ft	

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Copy of TG Pump Station Calcs v4.0\_350\_5\_31+2022

### Pump Station Buoyancy Calculations

Project: Wheeler Tract  
Project No: 43398  
Prepared by: A. Kabat  
Prepared on: 09/08/2021  
Date Revised: 12/13/2021



Soil Impact			
Description	Value	Units	Notes
Angle of Influence	15.0	degrees	
Angle of Influence	0.262	radians	
Top of Triangle	8	ft	
Top Diameter	27	ft	
Bottom Diameter	10	ft	
Saturated Soil Density	110.0	lb/ft <sup>3</sup>	From Geotechnical Report or Estimate
Depth of Soil above Base	31.0	ft	
Volume of Soil	6,747	ft <sup>3</sup>	Volume of Soil (frustum of cone, less wetwell)
Buoyant Weight of Soil	321,168	lb	

Buoyancy Float Check			
Description	Value	Units	Notes
Total Difference After Backfill	322,089	lb	Structure is not buoyant after backfill

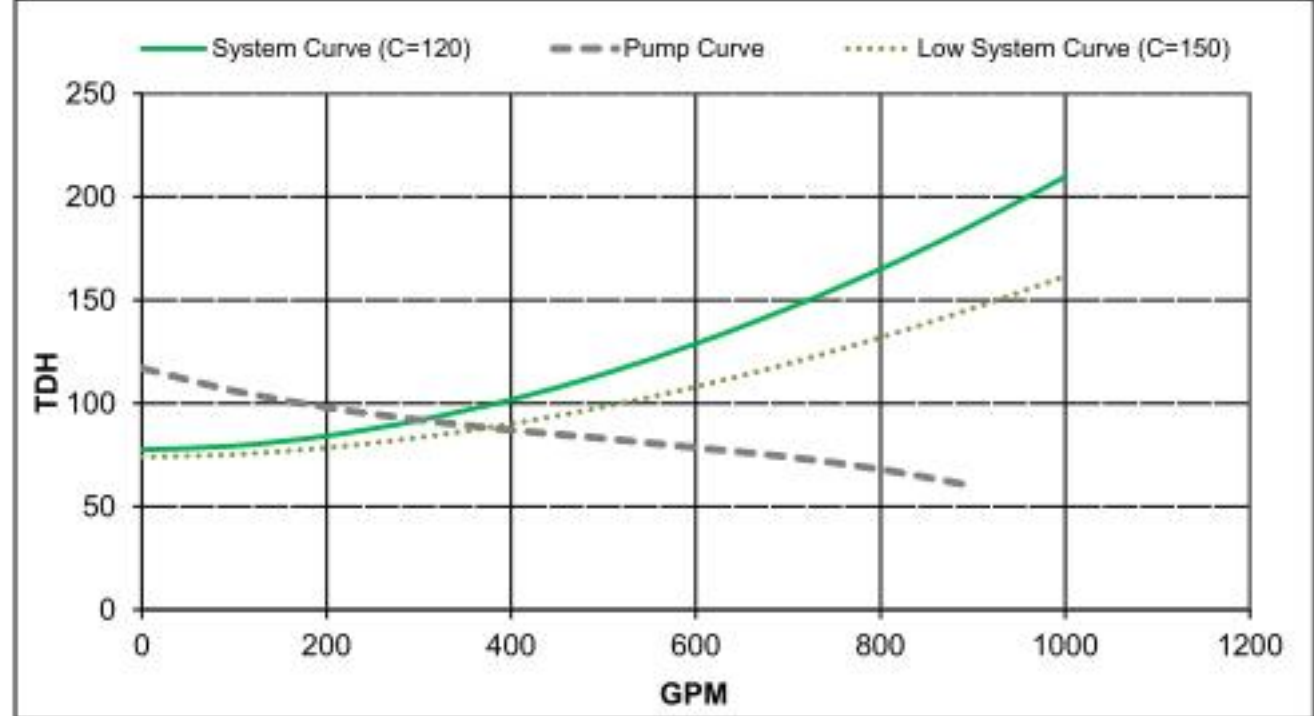
Printed: 9/5/2023  
Copy of TG Pump Station Calcs v4.0\_350\_5\_31+2022

### Wastewater Pump Station Calculations

Project: Wheeler Tract  
Project No: 43398  
Prepared by: A. Kabat  
Prepared on: 09/08/2021  
Date Revised: 12/13/2021



Force Main Head Loss			
Description	Value	Units	Notes
Force Main "c" Value	120		(Hazen Williams)
Force Main Nominal Diameter	8	in	
Force Main Material	PVC - C900 DR14		
Force Main Inside Diameter	7.68	in	From Pipe Properties Table
Flowrate	302	gpm	
Velocity	2.09	fps	
Force Main Length	4400	ft	Flow Away Condition Control Point
Equivalent Length of Fittings	210.1	ft	From Fitting Friction Loss Table Below
Total Equivalent Length	4610.1	ft	
Force Main Friction Loss	13.07	ft	
Force Main High Point Elev.	400.00	ft AMSL	Check FM / HGL plot for special design considerations
Manifold Condition?	No		
Manifold Elevation	0.0	ft AMSL	
Peak Residual Pressure Head	0.0	ft	At manifold connection
Minimum Residual Pressure Head	0.0	ft	At manifold connection
Pump Station LWL	322.5	ft AMSL	
System Static Head	77.5	ft	
Total Dynamic Head	479.8	ft	



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DATE	REVISION DESCRIPTION
12/07/2021	REVISIONS PER COR COMMENTS RECEIVED 11/19/2021
03/18/2022	REVISIONS PER COR COMMENTS RECEIVED 01/20/2022
06/01/2022	REVISIONS PER COR COMMENTS RECEIVED 05/19/2022

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DATE: 09/07/2023  
DRAWN BY: L. KIM  
DESIGNED BY: A. KABAT  
CHECKED BY: C. PETREE  
SCALE: AS SHOWN

TIMMONS GROUP

NORTH CAROLINA LICENSE NO. C-1652  
ROLESVILLE CROSSING  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
PUMP STATION DATA

**ATTENTION CONTRACTORS**  
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City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

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City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

PRELIMINARY - NOT RELEASED FOR CONSTRUCTION

ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH, NCDOT AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS

JOB NO. 43398  
SHEET NO. PS-102

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L:\2143398-Wheeler\_Tract\RTV\43398-MPP\PUMP.rvt 9/7/2023 2:50:11 PM





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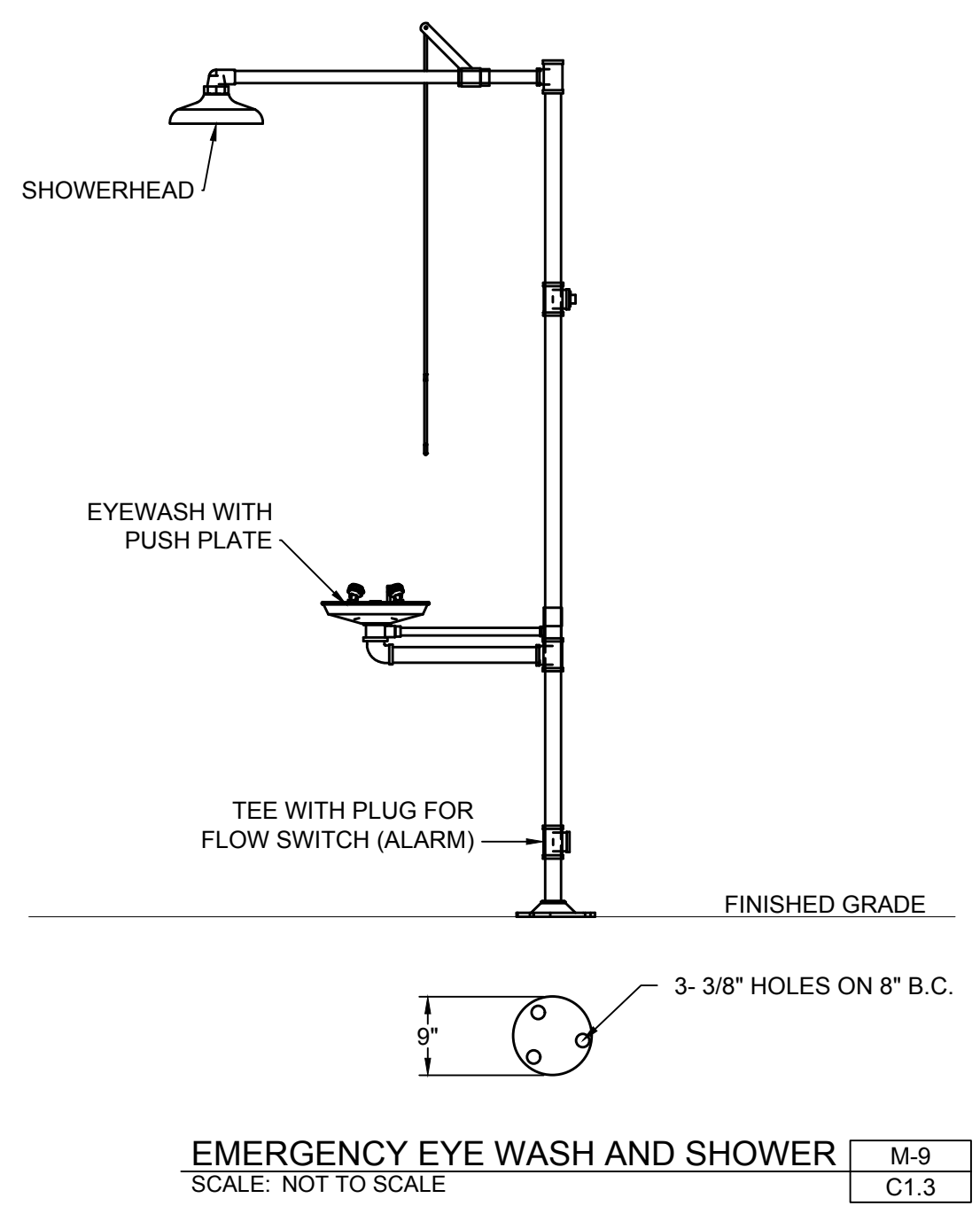
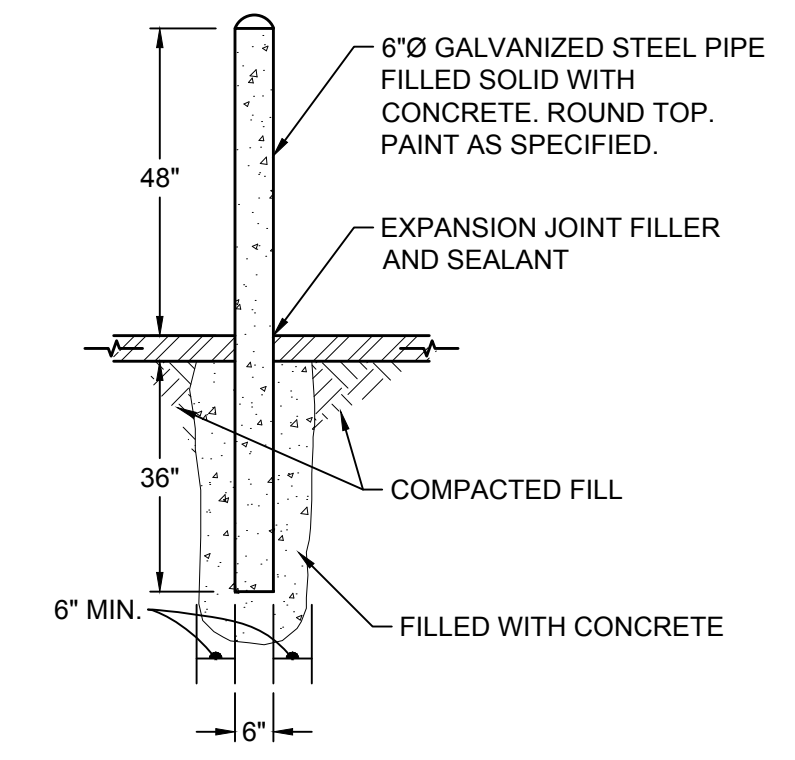
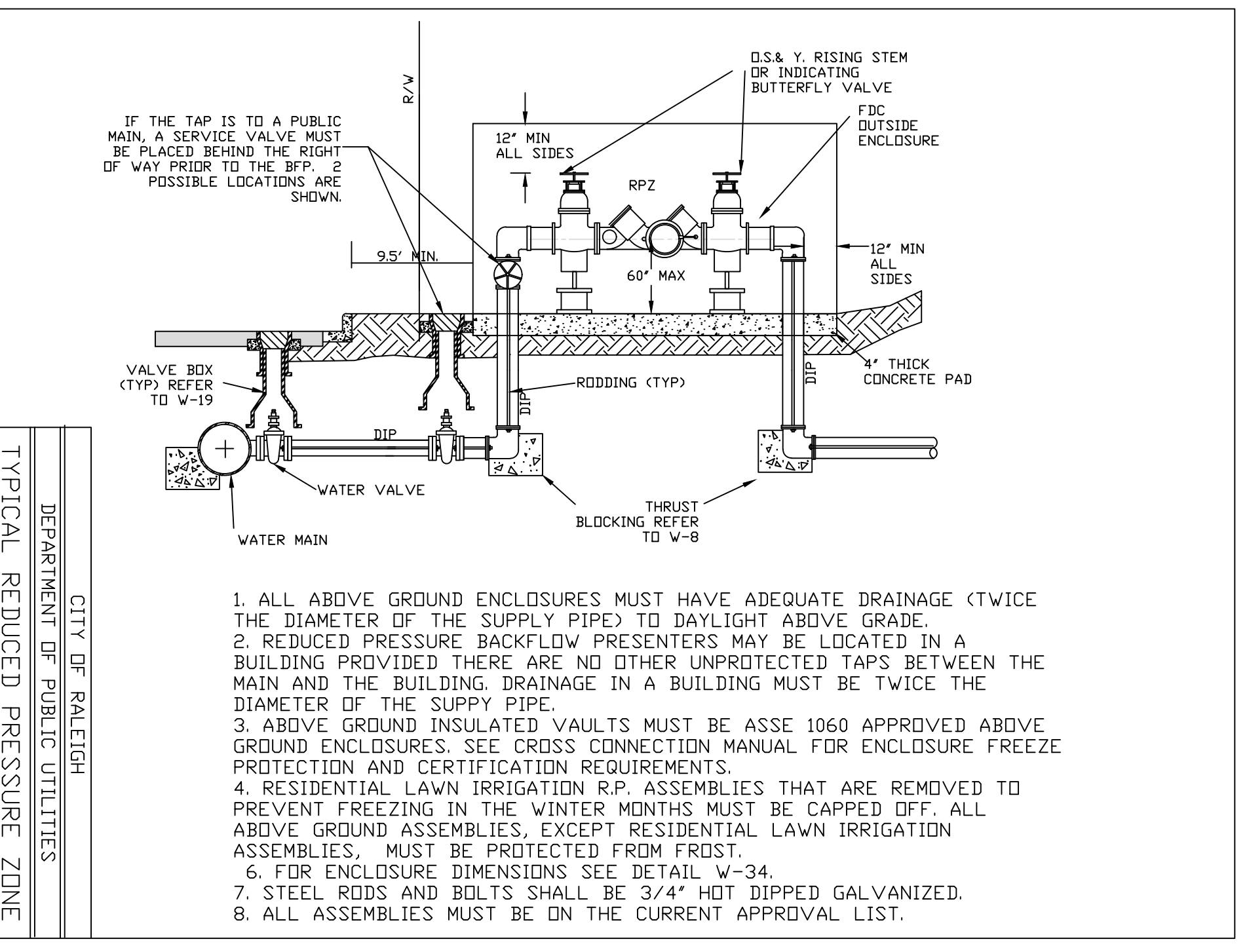
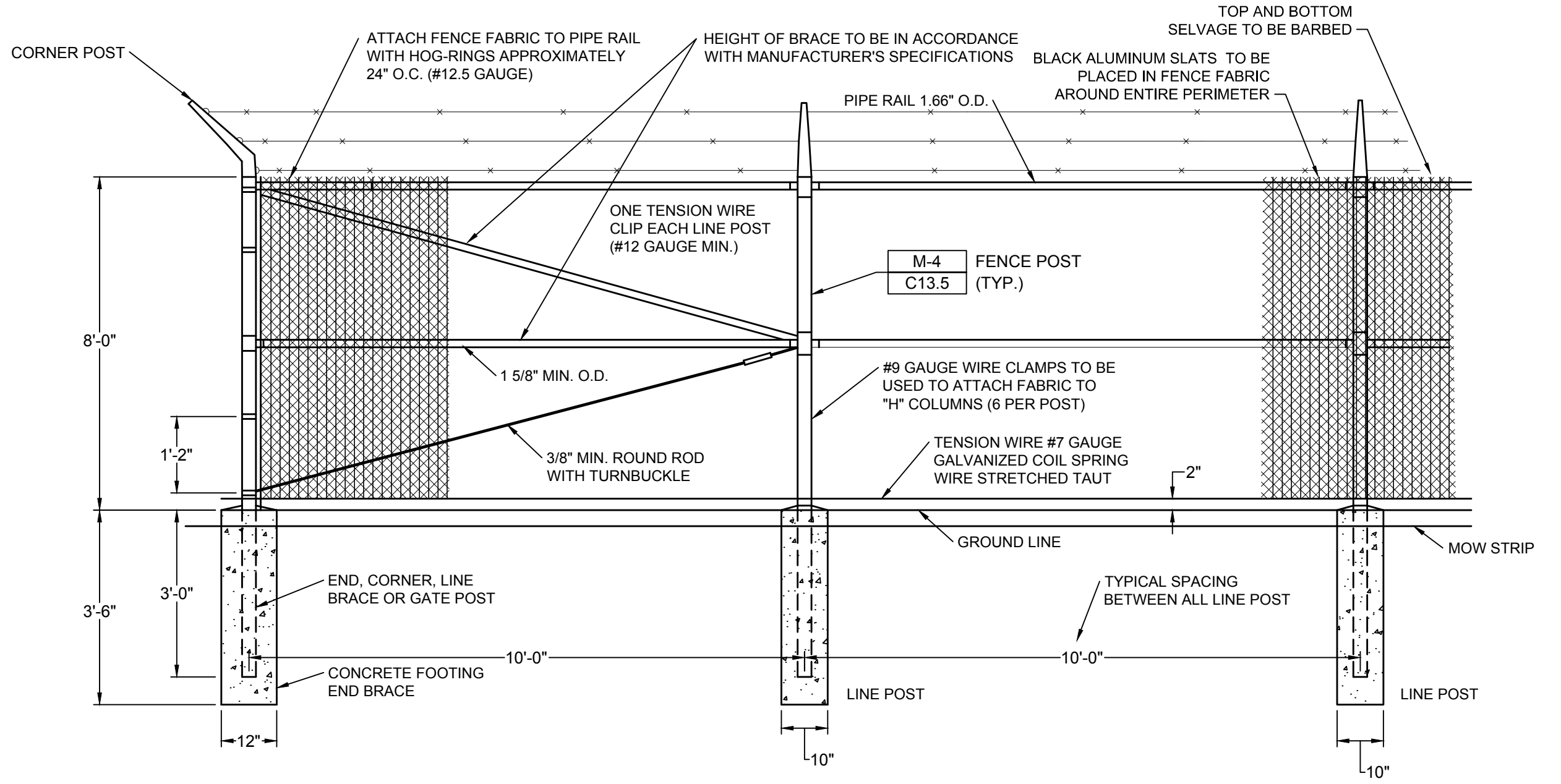
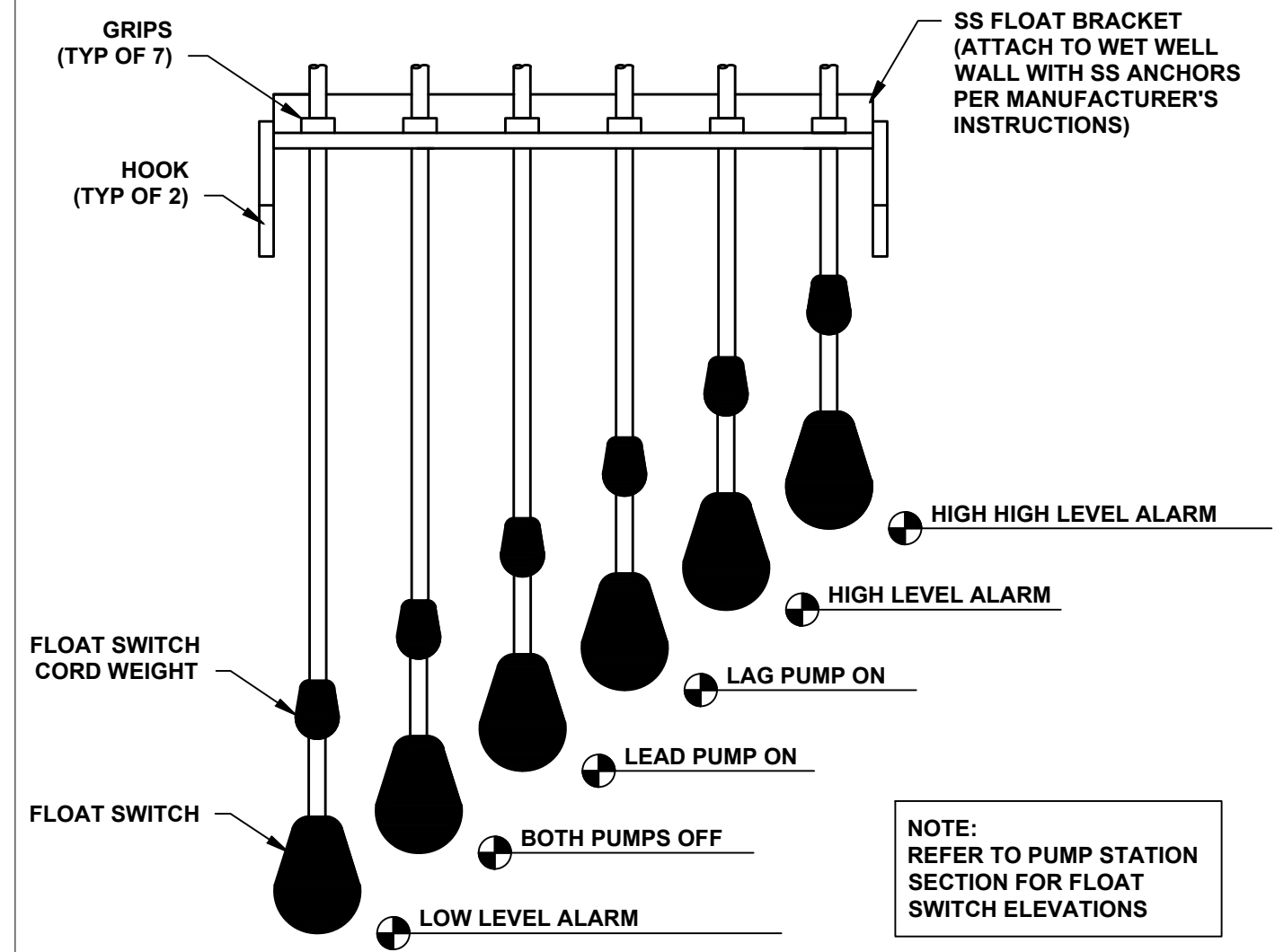
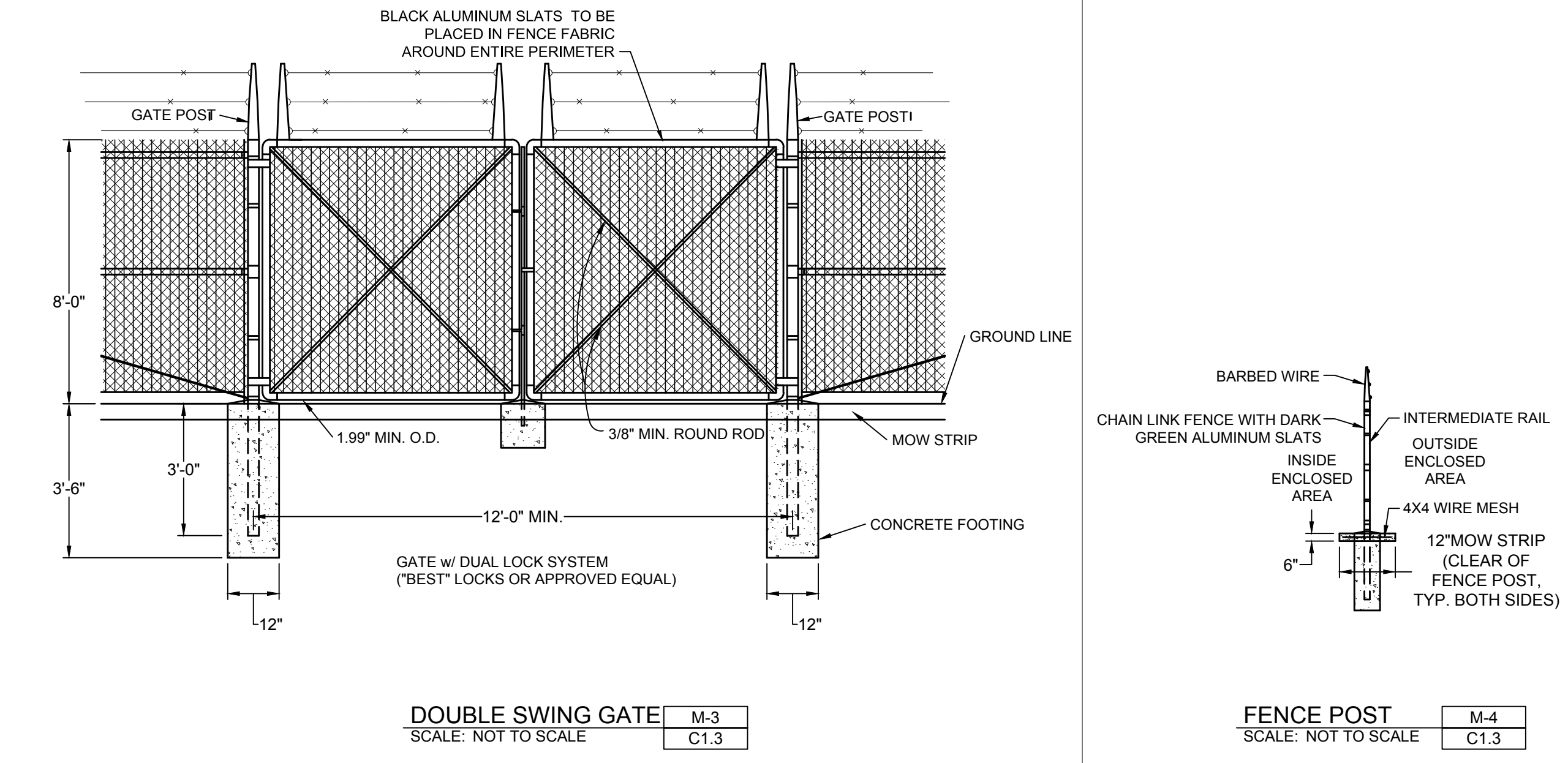
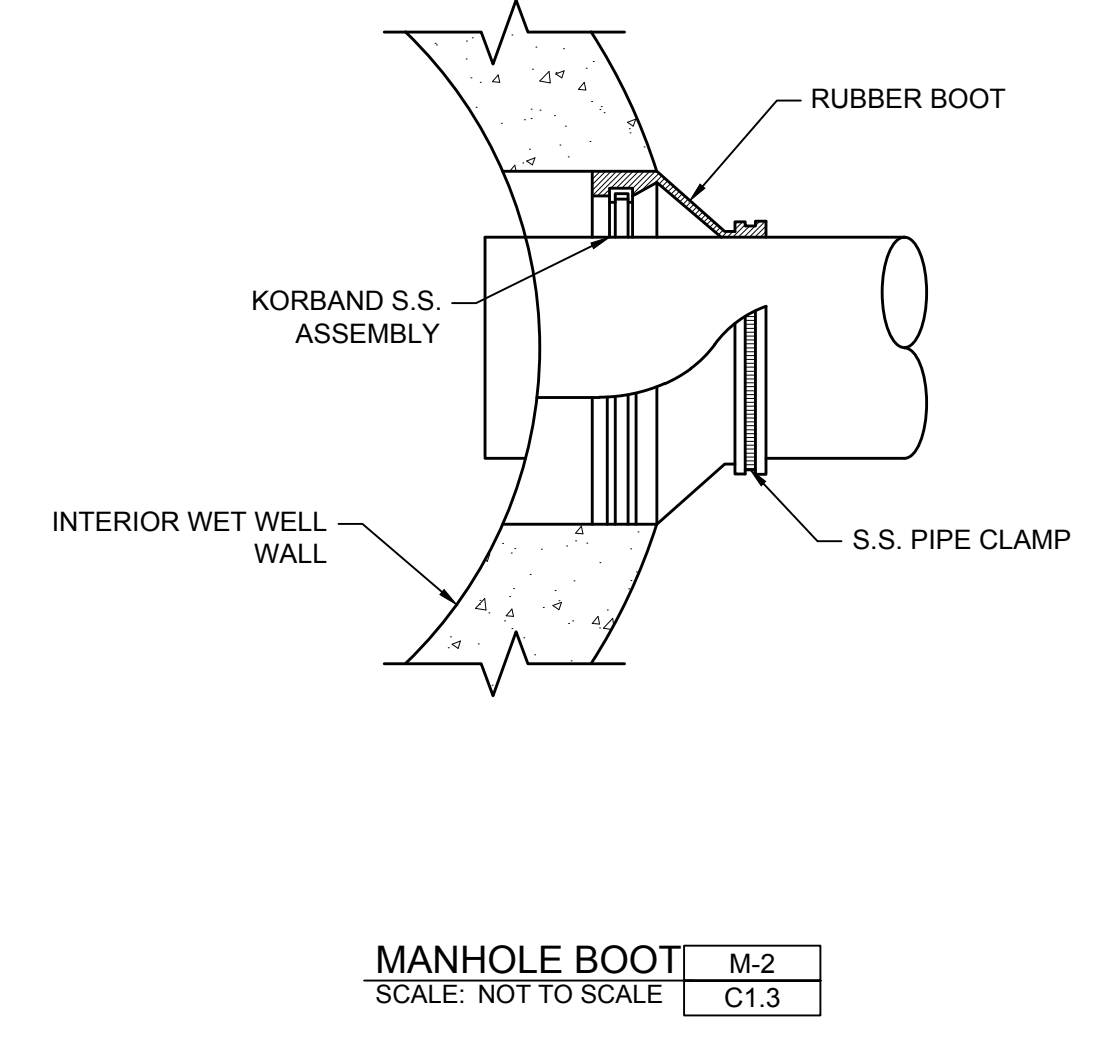
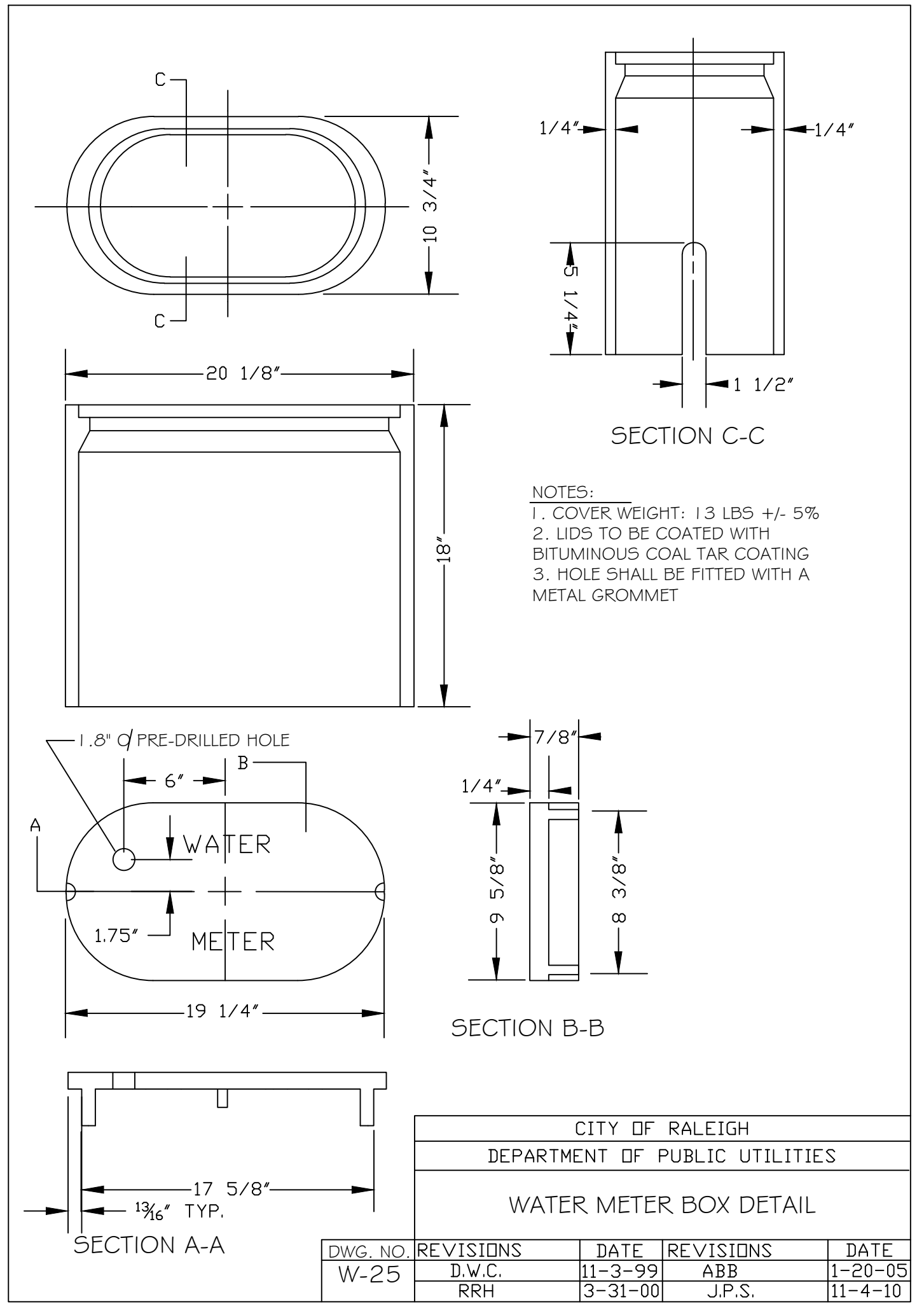
DATE	REVISION DESCRIPTION
09/06/23 <td></td>	

DESIGNED BY	L. KIM
CHECKED BY	A. KABAT
SCALE	C. PETREE
AS SHOWN	

# TIMMONS GROUP

ROLESVILLE CROSSING  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

## PUMP STATION DETAILS



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City of Raleigh  
 Public Utilities Department Permit # \_\_\_\_\_  
 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_

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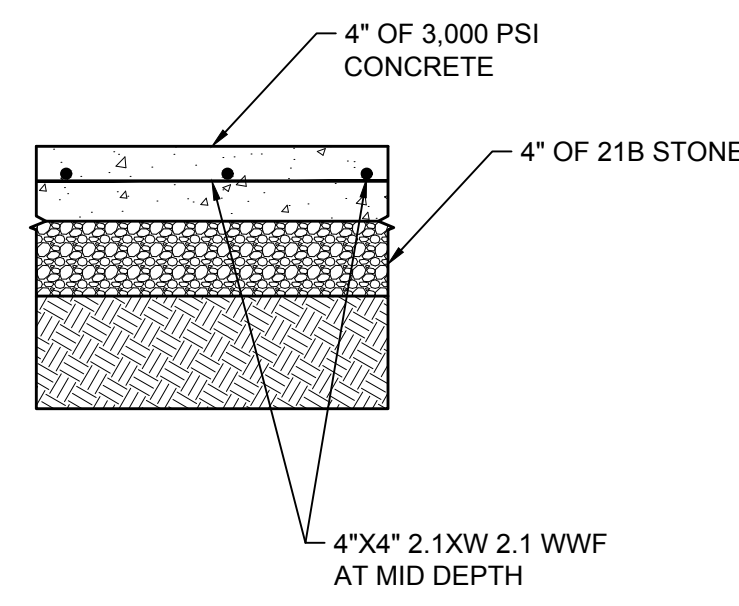
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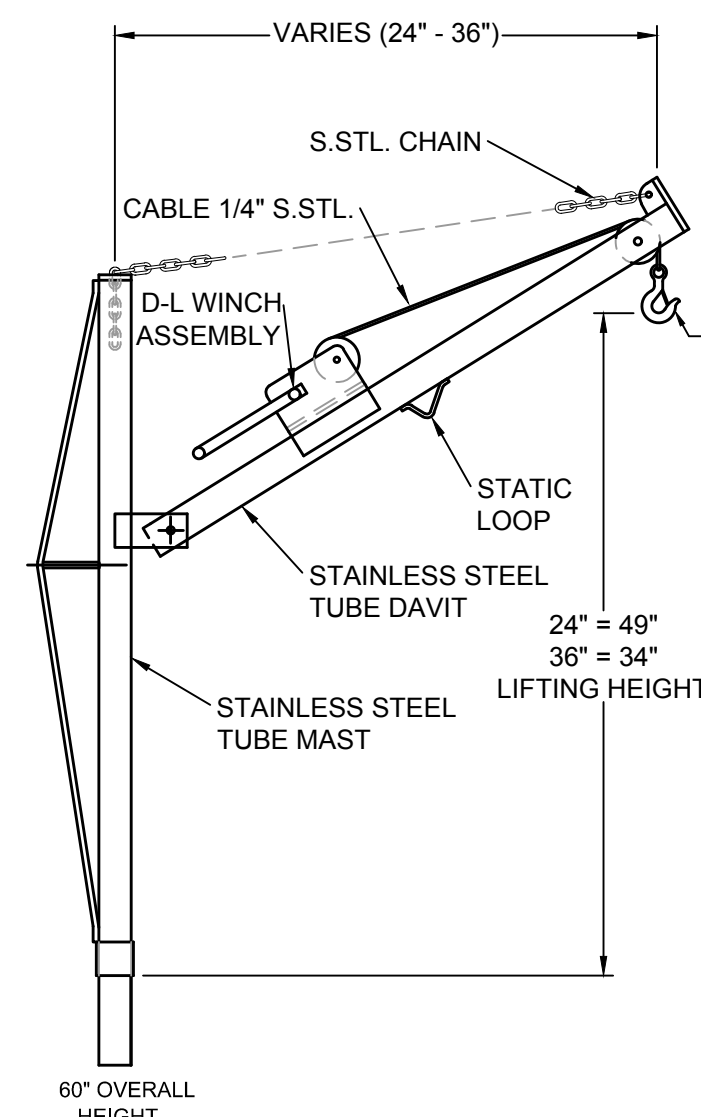






**CONCRETE PAD**  
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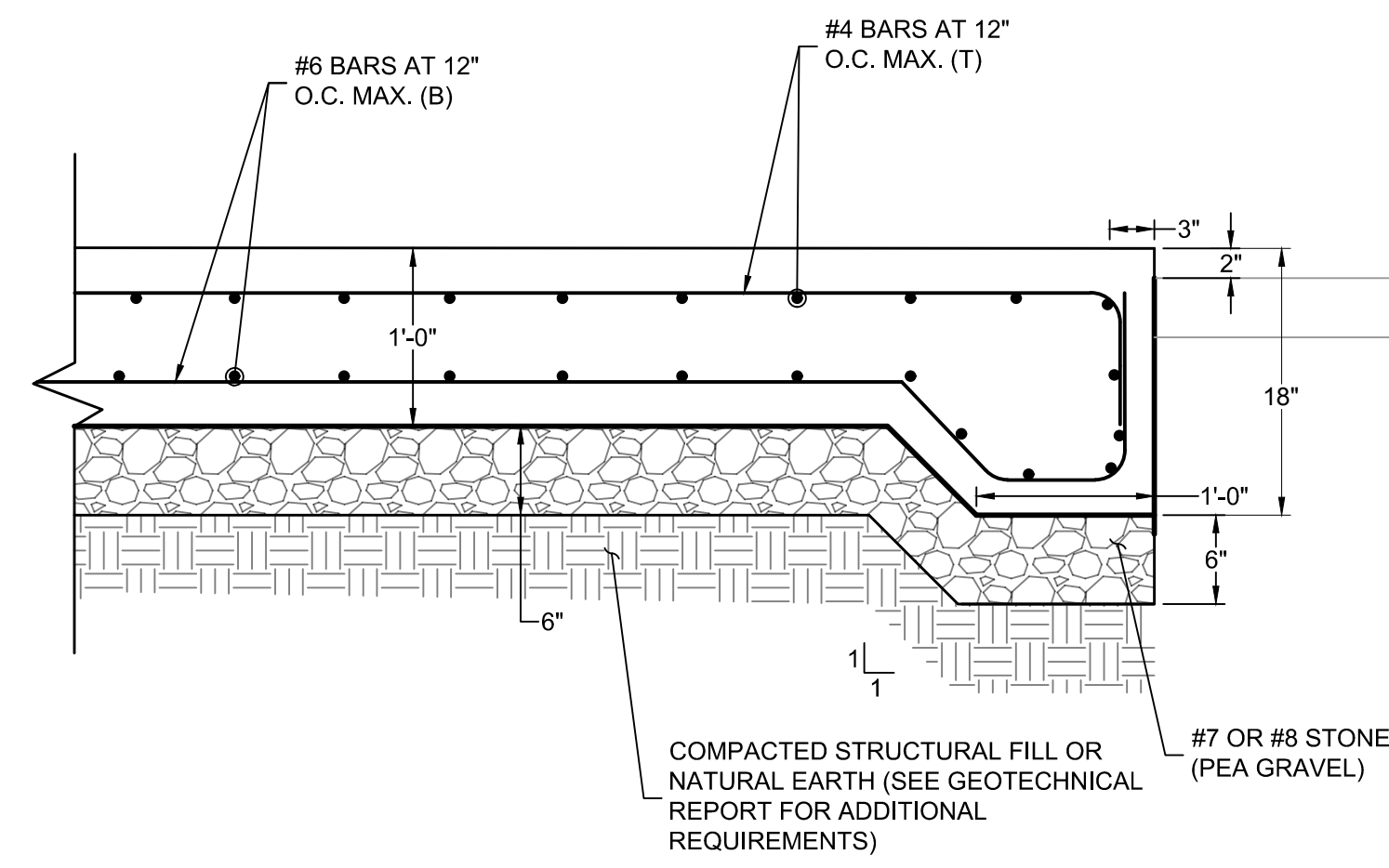
M-21
C1.5



**ADJUSTABLE PORTABLE HOIST AND S.S. SOCKET**  
SCALE: NOT TO SCALE

M-22
C1.5

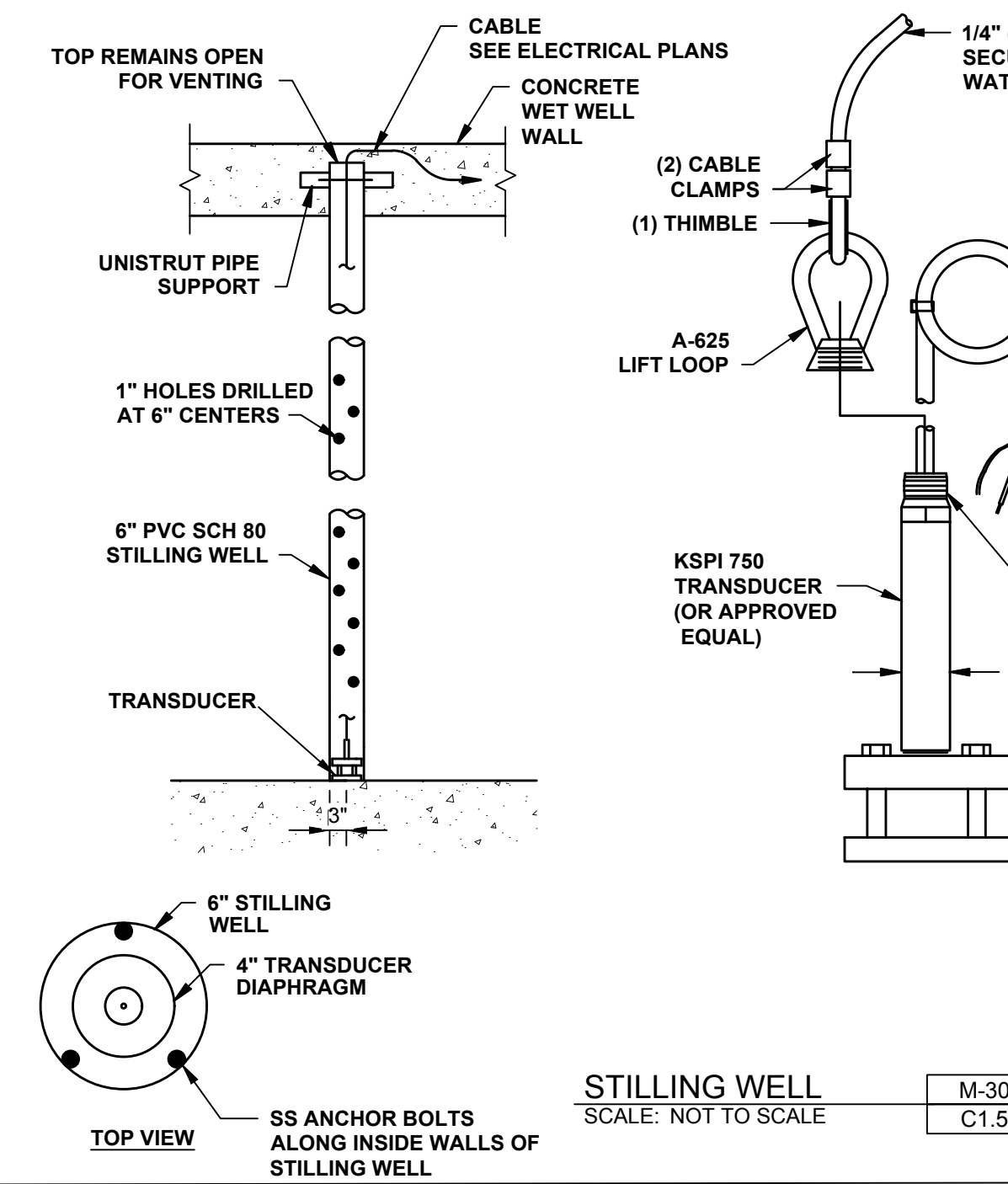
- NOTES:**
- HOIST TO BE CONSTRUCTED OF STAINLESS STEEL
  - HOIST TO HAVE AN ADJUSTABLE REACH FROM 24" TO 36"
  - PROVIDE 30 FEET OF STAINLESS STEEL CABLE AND SAFETY HOOK
  - HAND WINCH TO BE DUTTON-LAINSON OR EQUAL
  - HOIST SHALL HAVE A MINIMUM LOAD OF 890 LBS FULLY EXTENDED TO 36".
- 



**CONCRETE FOUNDATION PAD**  
SCALE: NOT TO SCALE

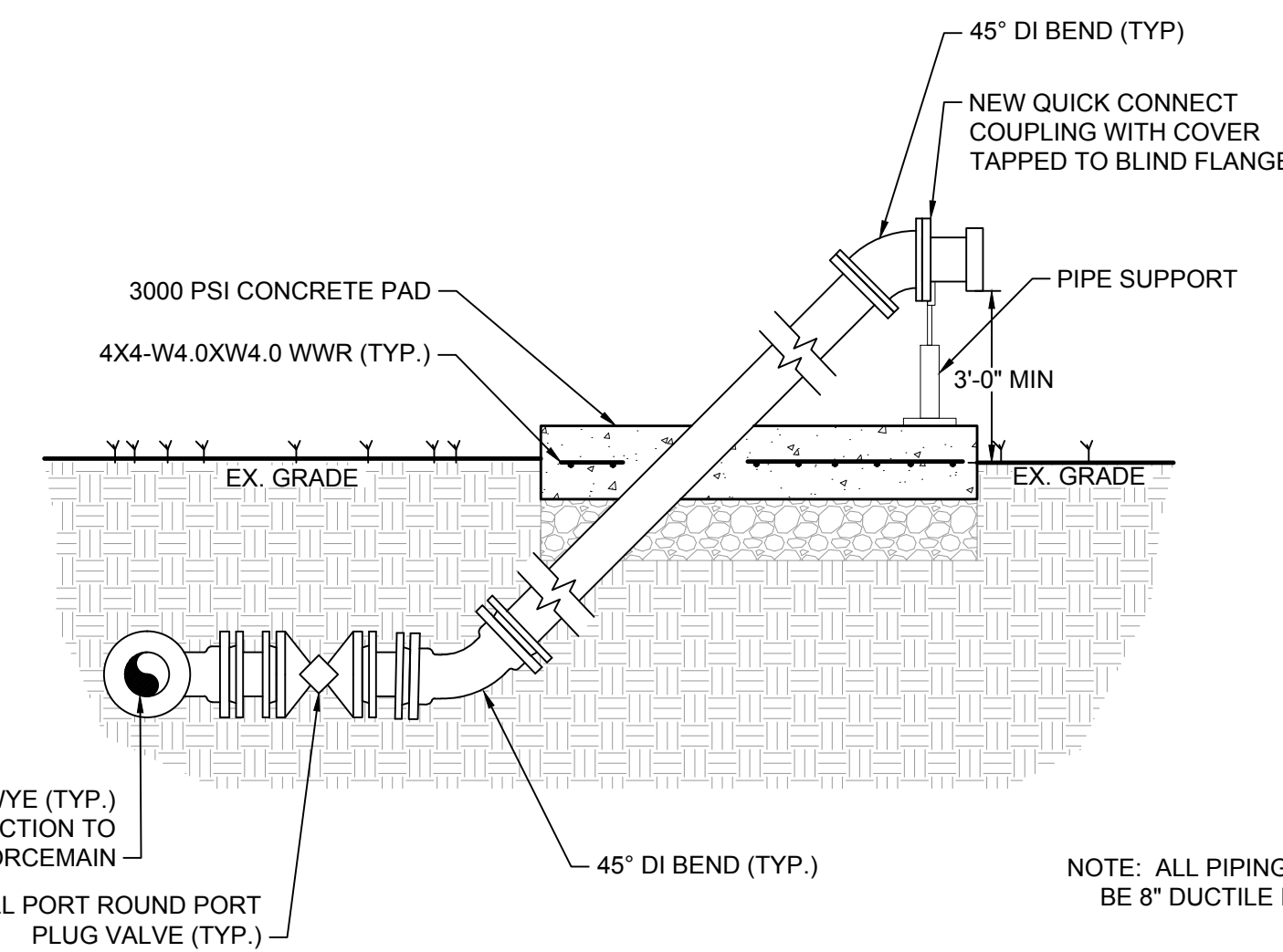
M-23
C1.5

- GENERAL NOTES:**
- SLAB DIMENSIONS TO BE 4" LONGER AND WIDER THAN OUTSIDE DIMENSION OF PRECAST CONCRETE BUILDING.
  - FLOOR STUB UPS MUST NOT BE ANY CLOSER THAN 4" IN FROM THE INSIDE WALL FACE TO PROVIDE CLEARANCE FOR WALL TO FLOOR ANCHORAGE.



**STILLING WELL**  
SCALE: NOT TO SCALE

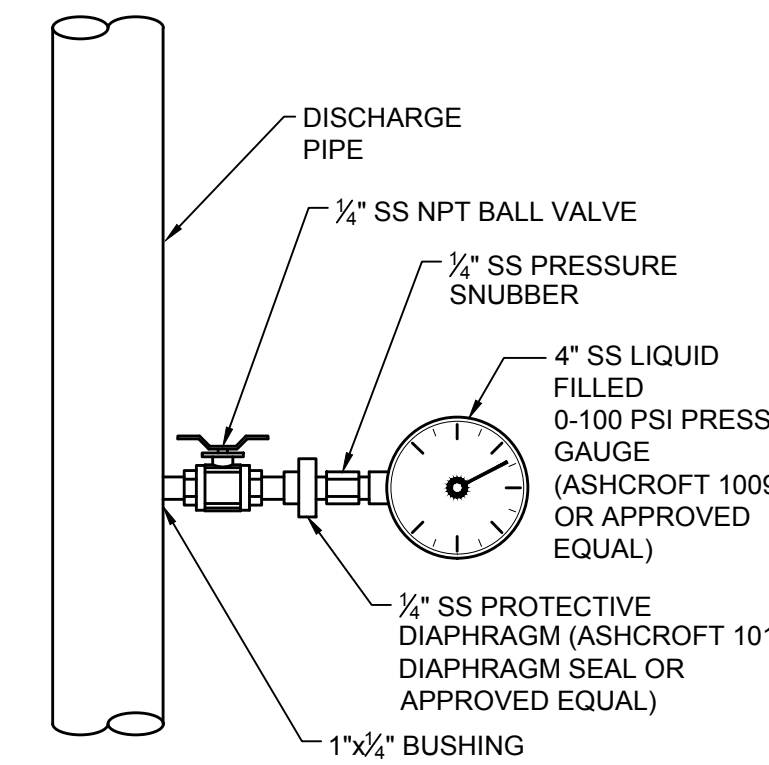
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C1.5



**PIG ACCESS AND EPC CONNECTION DETAIL**  
SCALE: NOT TO SCALE

M-27
C1.5

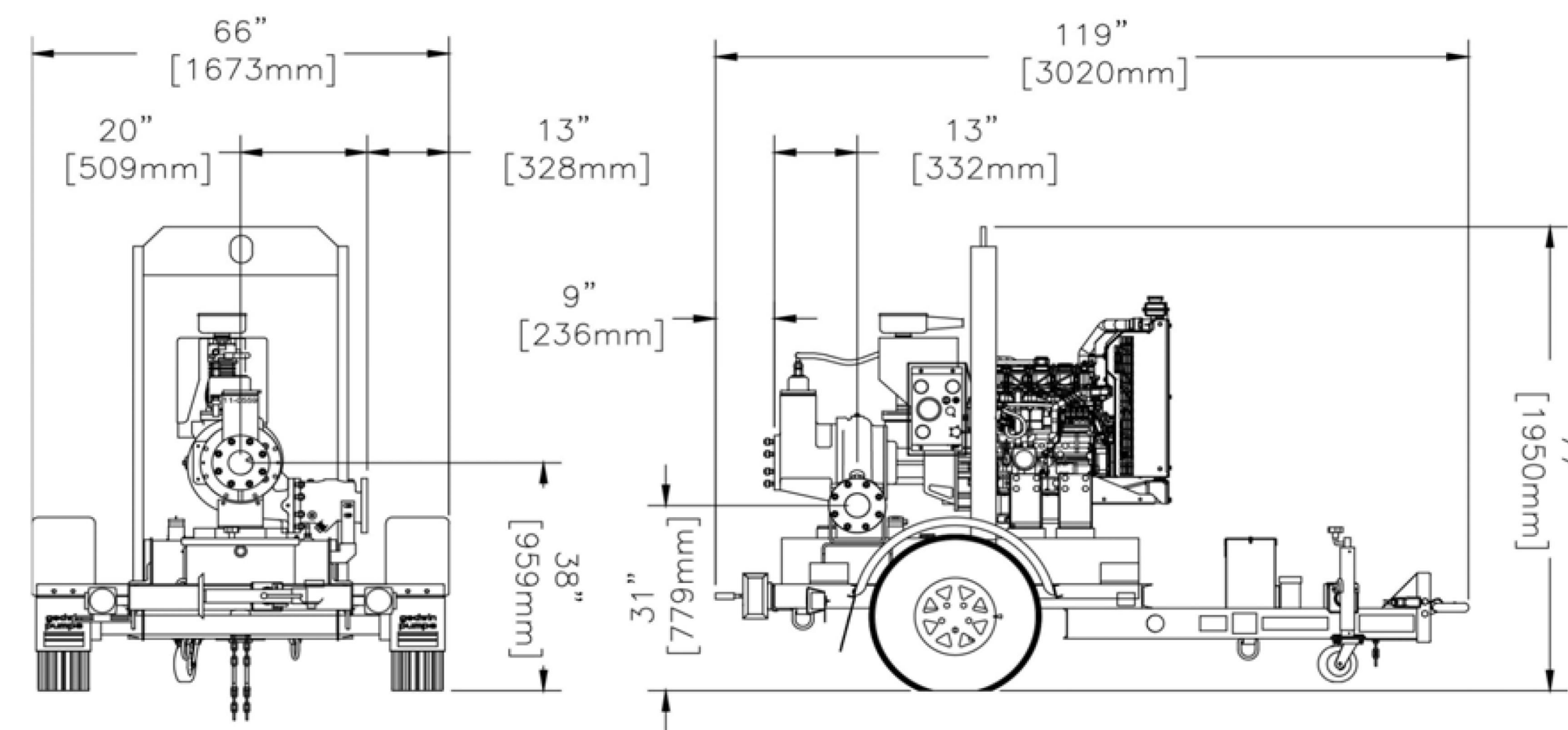
NOTE: ALL PIPING SHALL BE 8" DUCTILE IRON



NOTE: STAINLESS STEEL (SS) TO BE GRADE 304 OR 316

**PRESSURE GAUGE ASSEMBLY**  
SCALE: NOT TO SCALE

M-28
C1.5



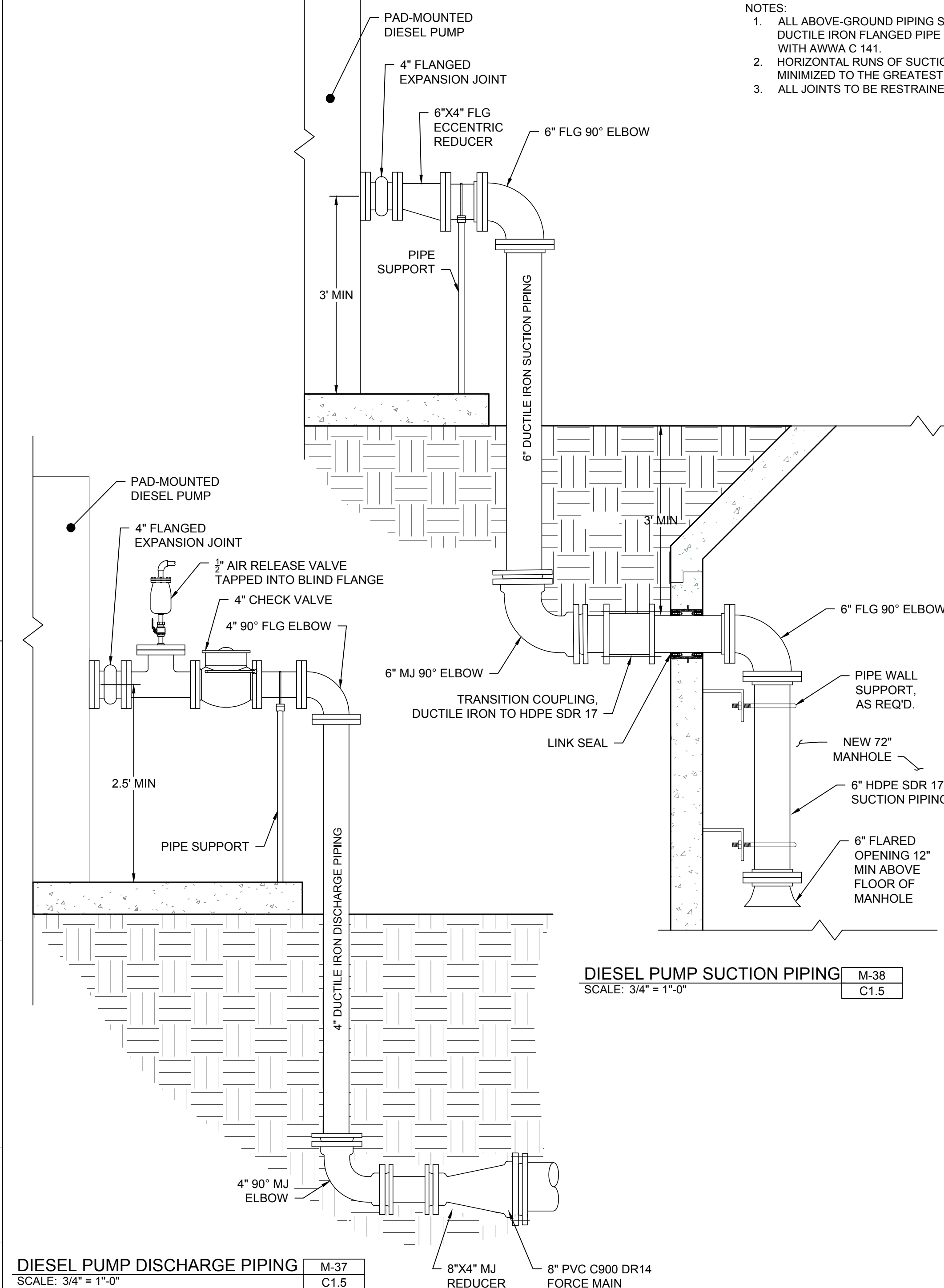
84 Floodgate Road  
Bridgeport, NJ 08014 USA  
(856) 467-3636 . Fax (856) 467-4841  
Email: sales@godwinpumps.com

Reference number : 95-1008-3000  
Date of issue : February 26, 2014  
Issue : 5

[www.godwinpumps.com](http://www.godwinpumps.com)

**DIESEL PUMP DISCHARGE PIPING**  
SCALE: 3/4" = 1'-0"

M-37
C1.5



- NOTES:**
- ALL ABOVE-GROUND PIPING SHALL BE CLASS 50 DUCTILE IRON FLANGED PIPE IN ACCORDANCE WITH AWWA C 141.
  - HORIZONTAL RUNS OF SUCTION PIPING SHALL BE MINIMIZED TO THE GREATEST EXTENT POSSIBLE.
  - ALL JOINTS TO BE RESTRAINED.

**DIESEL PUMP SUCTION PIPING**  
SCALE: 3/4" = 1'-0"

M-38
C1.5

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Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

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Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_



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DESIGNED BY A. KABAT
CHECKED BY C. PETREE
SCALE AS SHOWN

**TIMMONS GROUP**

**ROLESVILLE CROSSING**  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

**PUMP STATION DETAILS**

JOB NO.  
**43398**

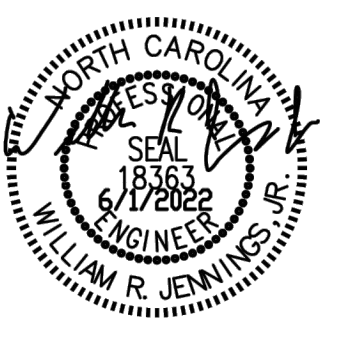
SHEET NO.  
**PS-105**

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 6/1/2022

DATE  
 3/16/2022

DRAWN BY  
 JTP

DESIGNED BY  
 WRJ

CHECKED BY  
 WRJ

SCALE

**TIMMONS GROUP**

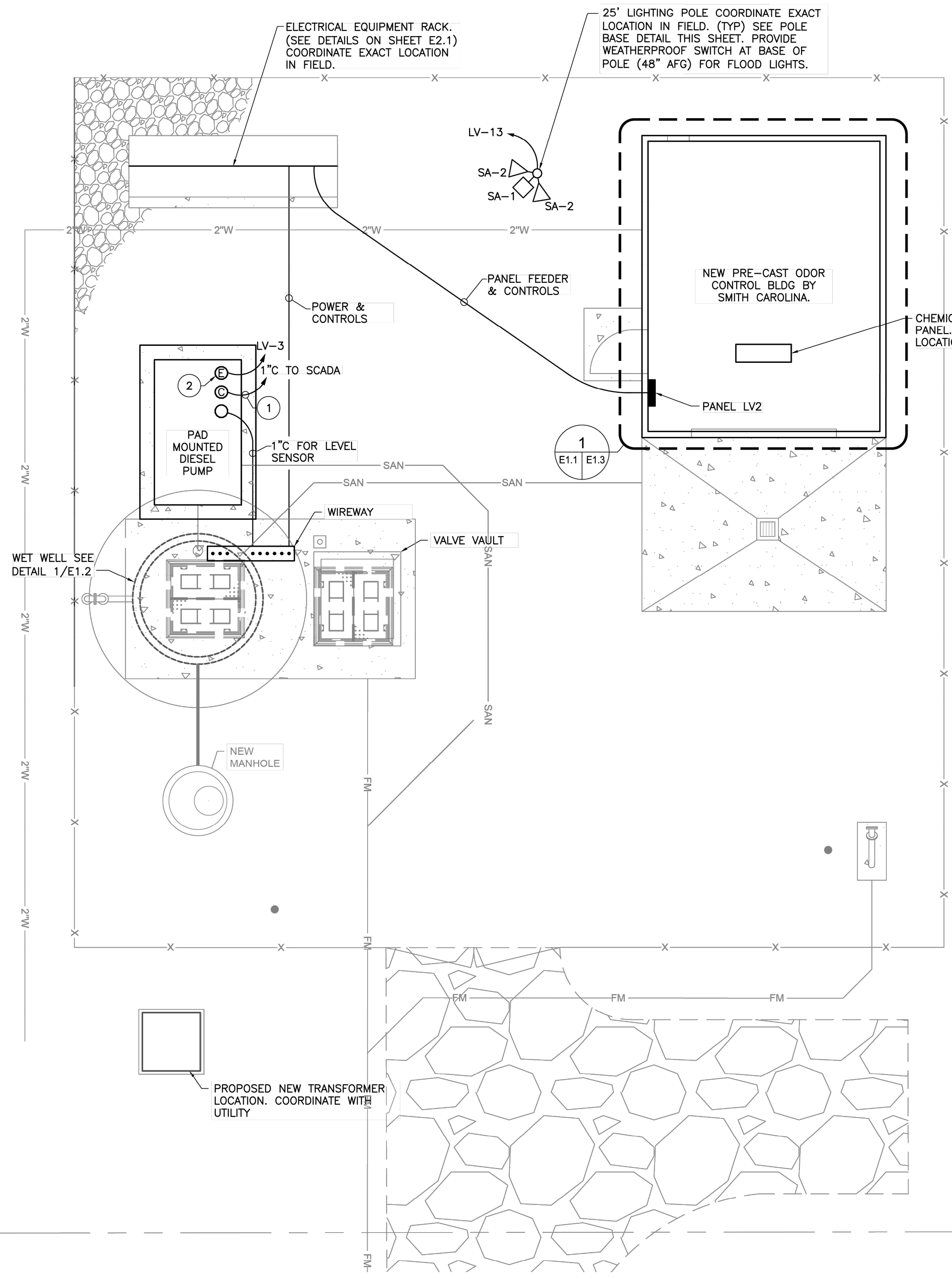
**ROLESVILLE CROSSING**  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

**ELECTRICAL - SITE PLAN, NOTES & LEGEND**

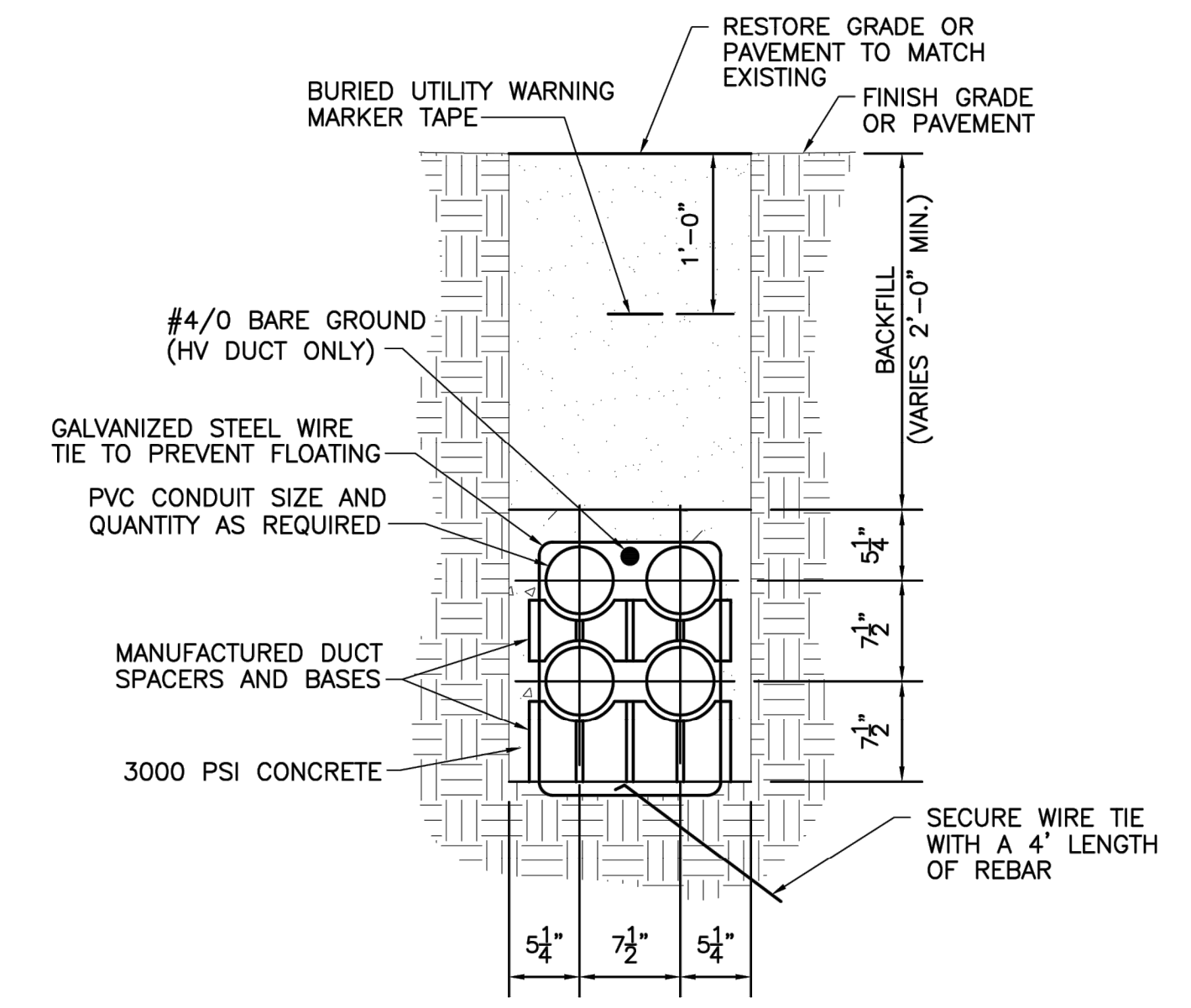
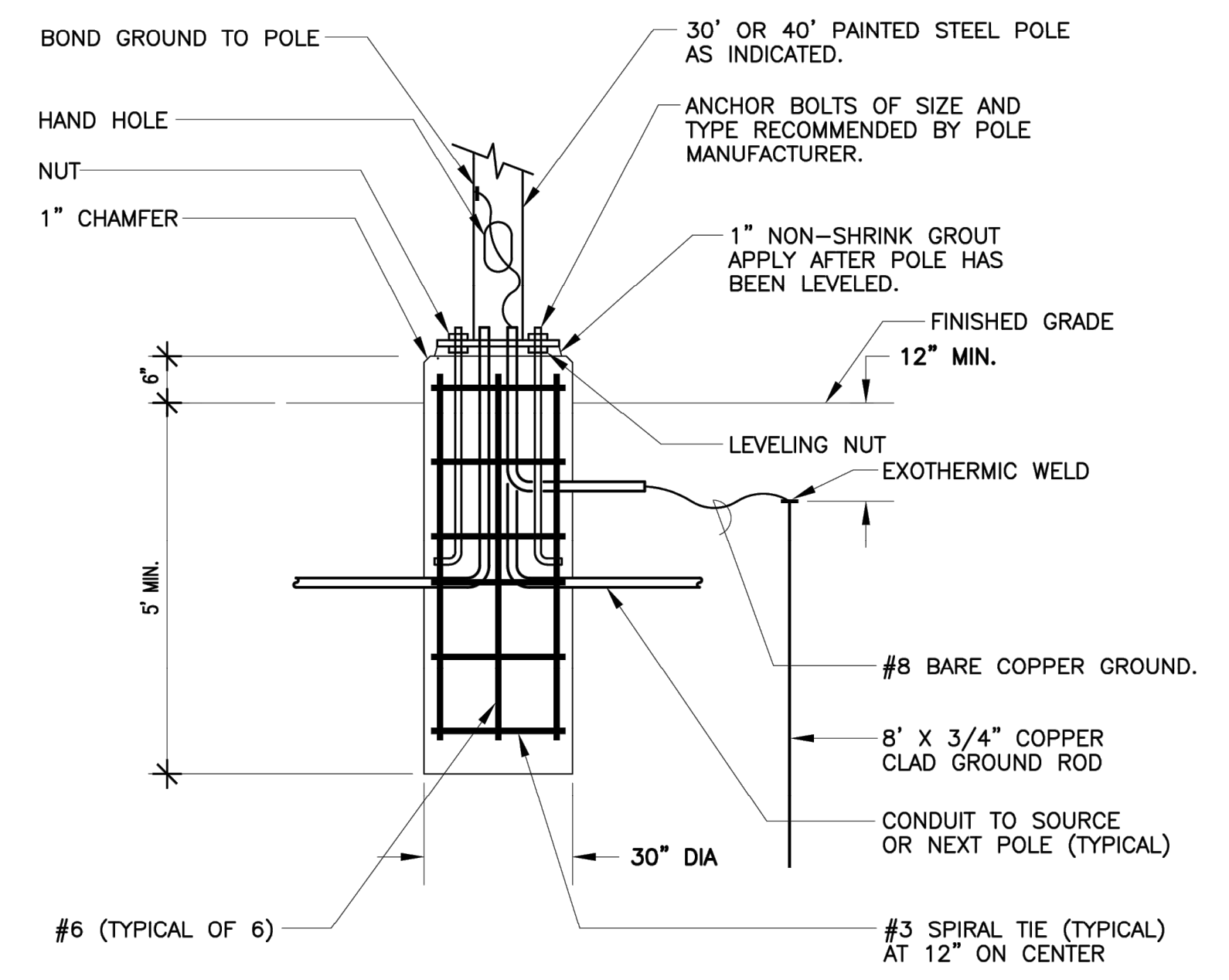
JOB NO.  
 43398

SHEET NO.  
 E1.1

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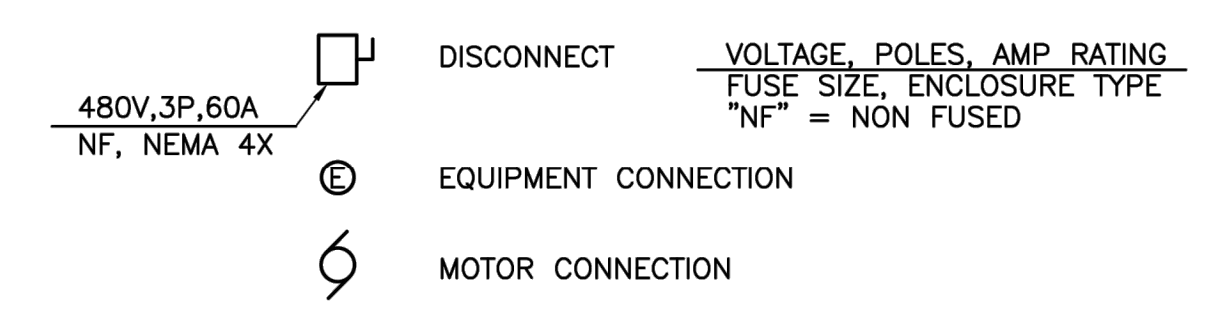


- SPECIFIC NOTES:**
- ALARM WIRING TO RTU/SCADA TO BE 8#14 & GND IN 1-1/2" CONDUIT (VERIFY EXACT QUANTITY OF CONDUCTORS WITH RTU/SCADA PROVIDER).
  - 1" CONDUIT FOR DIESEL PUMP AUXILIARY POWER WIRING (BLOCK HEATER, BATTERY CHARGER). CONNECT TO GFCI RECEPTACLE PROVIDED WITH DIESEL PUMP.



NOTE: REPEAT CONSTRUCTION SHOWN IN THIS DETAIL ON 8'-0" CENTERS ALONG LENGTH OF DUCTBANK.

**ELECTRIC LEGEND**



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**Public**  
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City of Raleigh  
 Public Utilities Department Permit # \_\_\_\_\_  
 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_

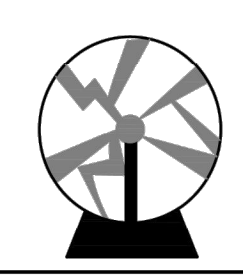
**Public**  
**Sewer Collection / Extension System**

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 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_

**ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH, NCDEQ AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS**

T:\JOBS\21139 - Rolesville Crossing Pump Sta - Wake Co\CAD\21139 - E1\_1.dwg (Printed on 6/1/2022 1:18 PM) by Jinf Fanon



**William R. Jennings, Jr.**  
**Consulting Engineering, PC**  
 3212 HILL STREET, UNIT A  
 LYNCHBURG, VA 24501  
 Phone: (434) 525-7099  
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 Email: bjennings@jenningspe.com



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 DATE: 3/16/2022  
 DRAWN BY: JTP  
 DESIGNED BY: WRJ  
 CHECKED BY: WRJ  
 SCALE:

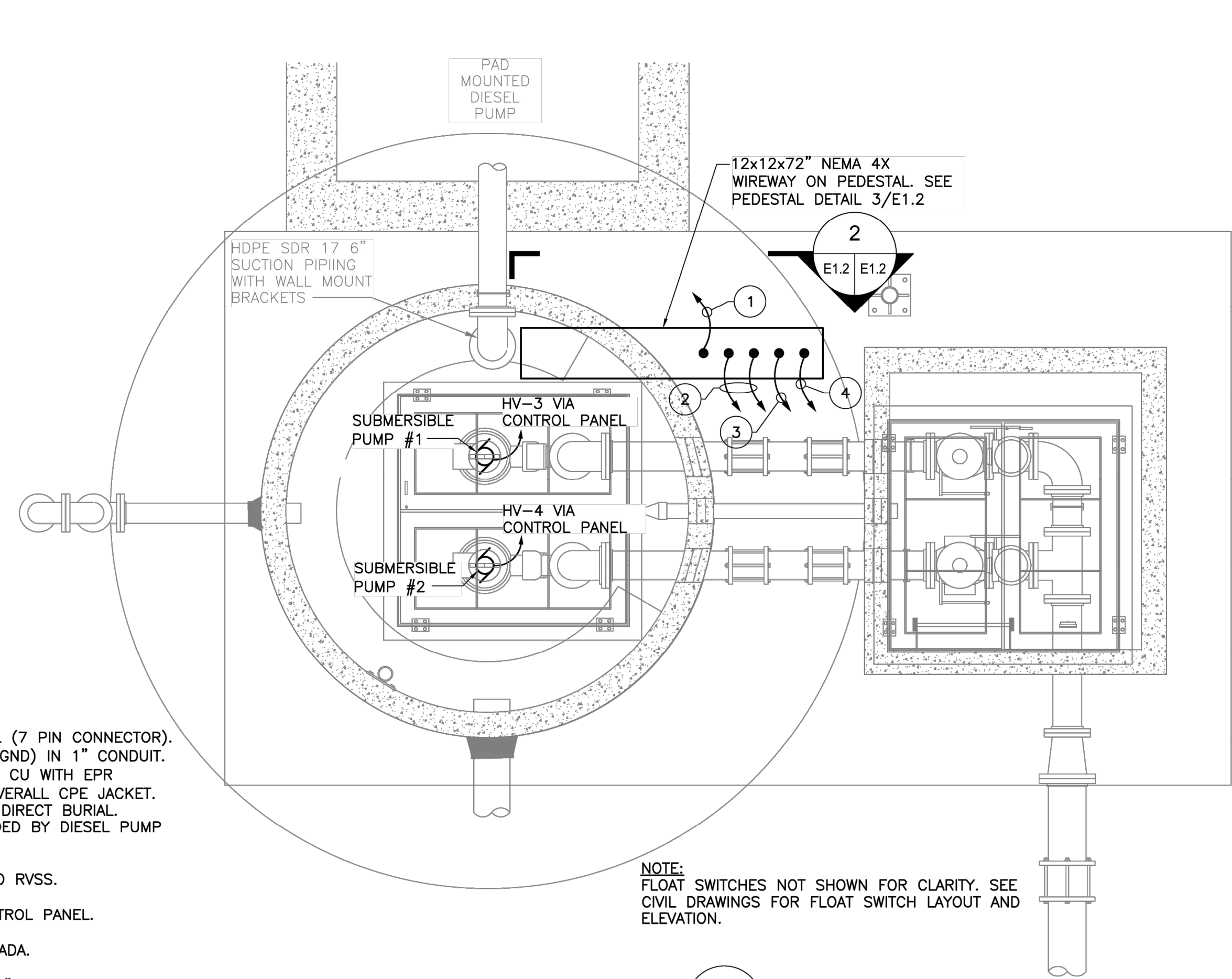
REVISION DESCRIPTION  
 REVISED PER COMMENTS

**TIMMONS GROUP**

**ROLESVILLE CROSSING**  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

**PUMP STATION PLAN - ELECTRICAL**

JOB NO. 43398  
 SHEET NO. E1.2

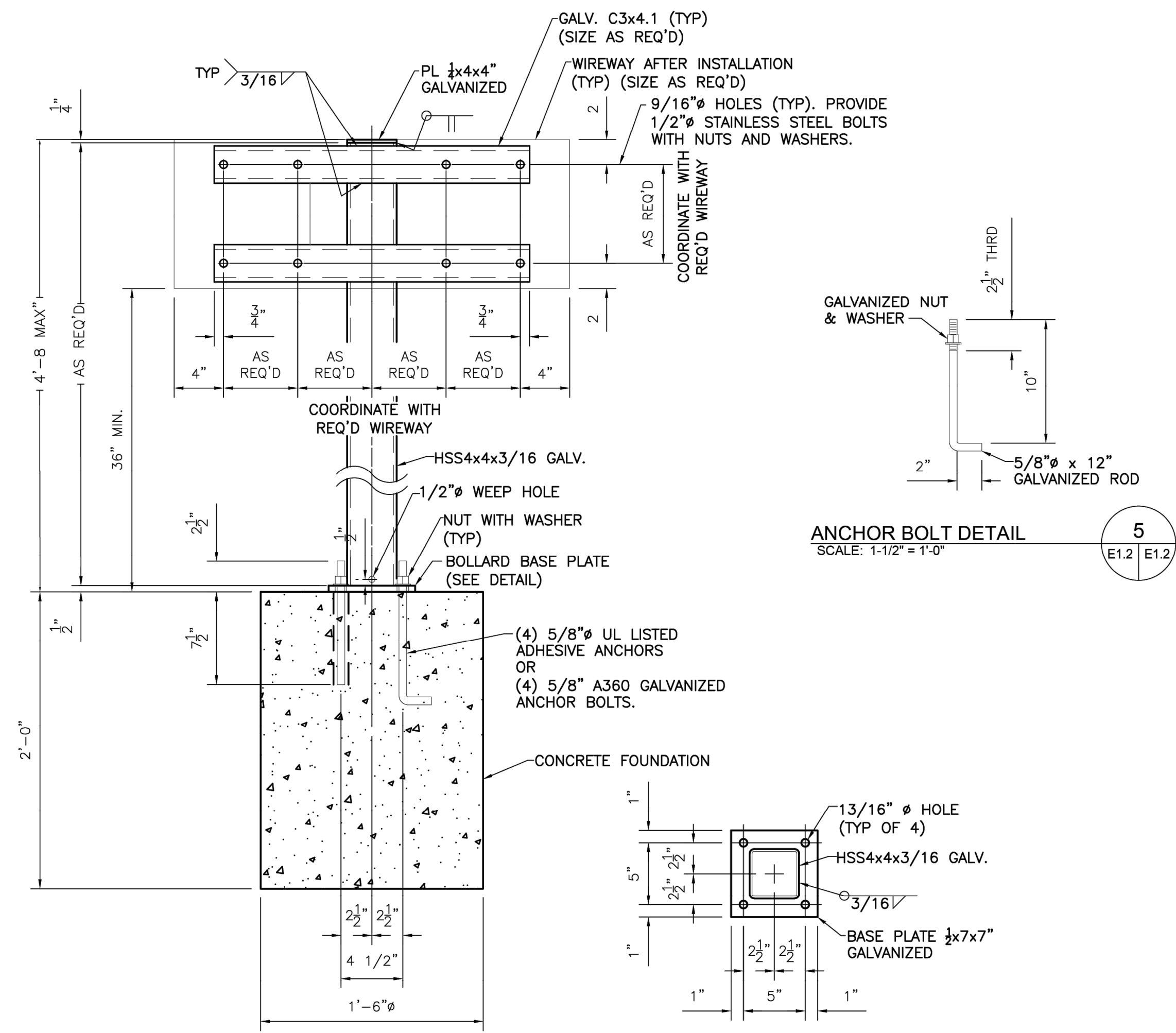


**PUMP STATION PLAN VIEW - ELECTRICAL**  
 SCALE: 1/2" = 1'-0"  
 1 E1.1 E1.2

**SPECIFIC NOTES:**

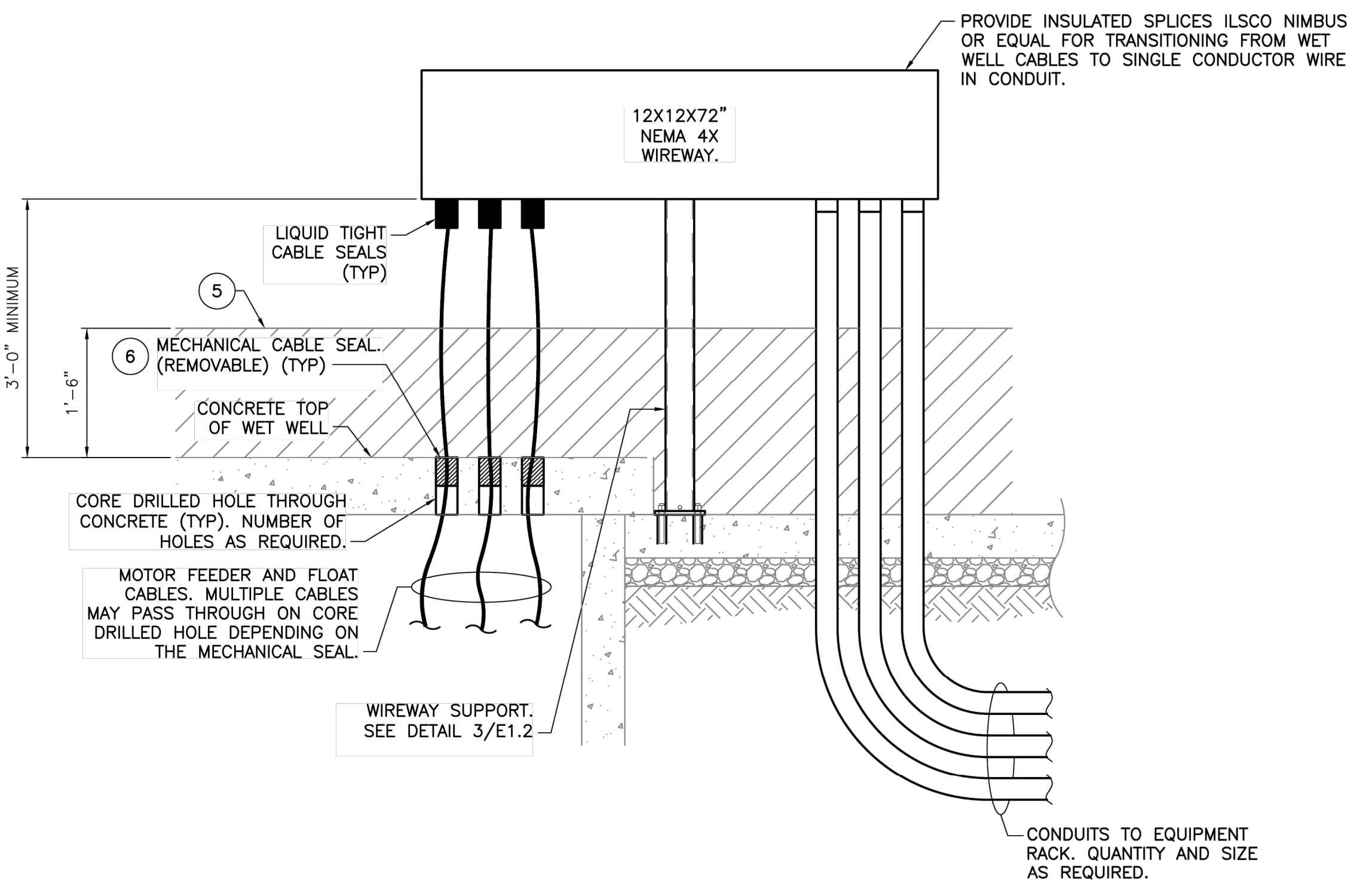
- 1 TO DIESEL PUMP CONTROL PANEL (7 PIN CONNECTOR). USE 7 CONDUCTOR CABLE (6 + GND) IN 1" CONDUIT. CONDUCTORS SHALL BE #14 AWG CU WITH EPR INSULATION (XHHW-2) AND AN OVERALL CPE JACKET. ASSEMBLY SHALL BE RATED FOR DIRECT BURIAL. TERMINATE IN CONNECTOR PROVIDED BY DIESEL PUMP SUPPLIER.
- 2 1" CONDUIT FOR PUMP POWER TO RVSS.
- 3 2" CONTROL CONDUIT PUMP CONTROL PANEL.
- 4 1" CONTROL CONDUIT TO RTU/SCADA.
- 5 CLASS 1, DIV 2 AREA EXTENDS 18" ABOVE SLAB WITHIN 3'-0" OF THE SEALED OPENINGS FOR CABLE. NOTE: IF OPENINGS ARE NOT SEALED IT IS CLASS 1, DIV 1 WITHIN 3'-0" IN ALL DIRECTIONS OF OPENING AND CLASS 1, DIV 2 WITHIN 5'-0" OF OPENINGS.
- 6 SEAL TO BE ROXTEC RS SEAL OR EQUAL. METAL PARTS TO BE STAINLESS STEEL. ENTIRE FITTING SHALL BE "ACID PROOF".

NOTE:  
 FLOAT SWITCHES NOT SHOWN FOR CLARITY. SEE CIVIL DRAWINGS FOR FLOAT SWITCH LAYOUT AND ELEVATION.



**WIREWAY BOLLARD DETAIL**  
 SCALE: 1-1/2" = 1'-0"  
 3 E1.2 E1.2

**BOLLARD BASE PLATE DETAIL**  
 SCALE: 1-1/2" = 1'-0"  
 4 E1.2 E1.2



**PARTIAL PUMP STATION SECTION VIEW**  
 SCALE: 3/4" = 1'-0"  
 2 E1.2 E1.2

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City of Raleigh  
 Public Utilities Department Permit # \_\_\_\_\_  
 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_

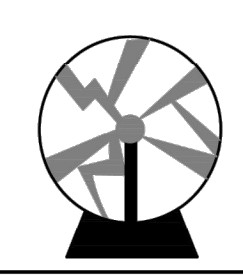
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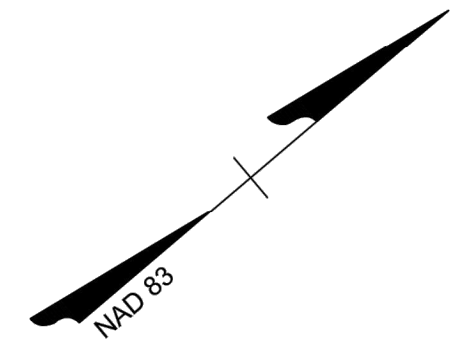
City of Raleigh  
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 Date \_\_\_\_\_

T:\JOBS\21139 - Roleville Crossing Pump Sta - Wake Co\CADD\21139 - E1\_1.dwg [Plotted on 6/1/2022 1:18 PM] by: Jinf Fanon



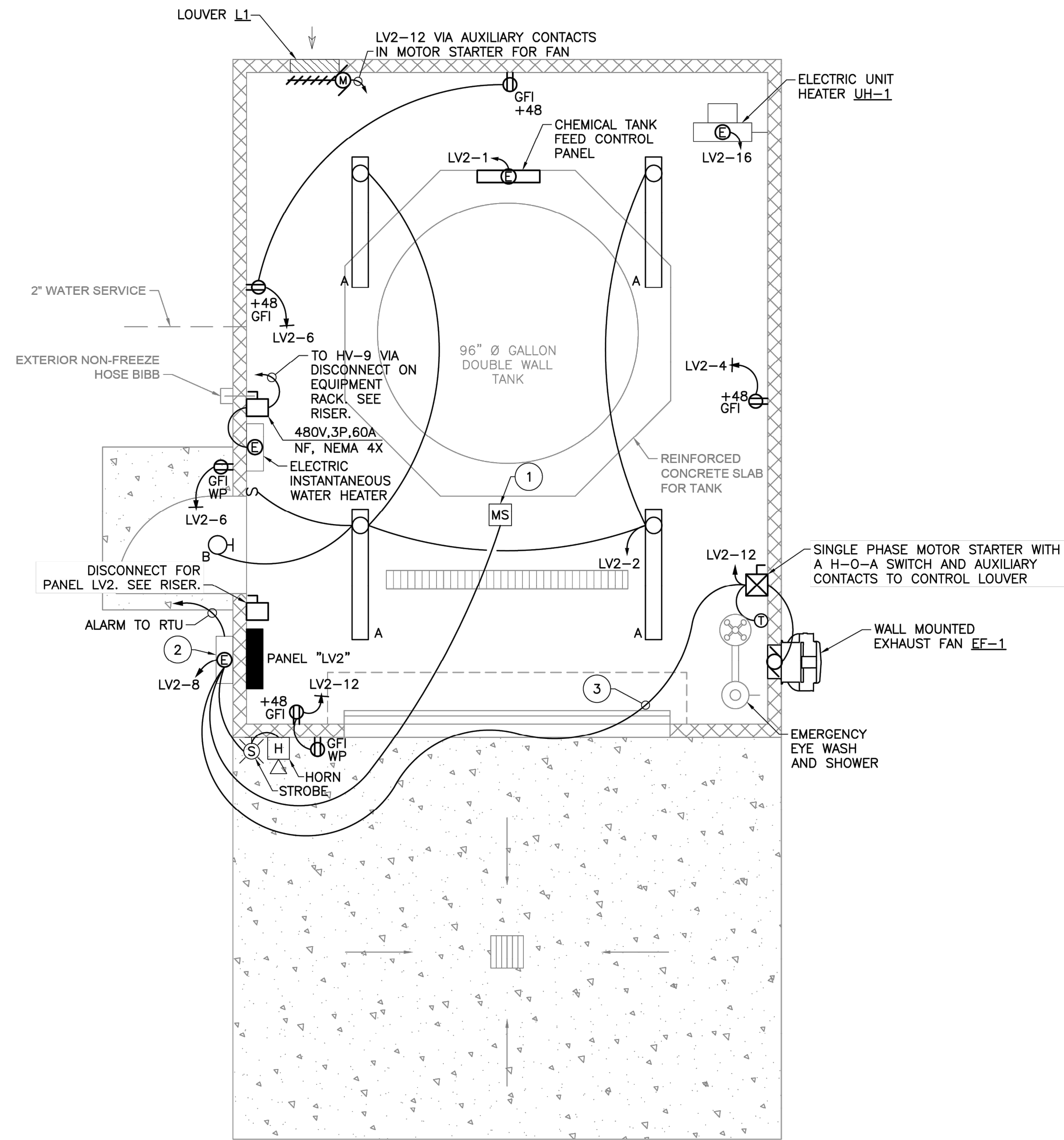
**William R. Jennings, Jr.**  
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 LYNCHBURG, VA 24501  
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 Fax: (757) 282-2636  
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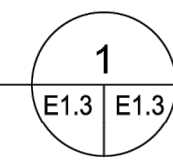


**SPECIFIC NOTES:**

- 1 METHANE SENSOR - RKI INSTRUMENTS 65-264RK-04 M2A OR EQUAL.
- 2 GAS MONITOR - RKI INSTRUMENTS BEACON 110 MODEL IN NEMA 4X ENCLOSURE. SET SENSOR TO CLOSE CONTACTS AND ACTIVATE THE EXHAUST FAN @ 10% LEL (LOW EXPLOSIVE LIMIT). SECOND SET POINT SHALL BE AT 50% LEL AND THAT SHALL ACTIVATE THE HORN AND STROBE AND SEND A SIGNAL TO THE RTU.
- 3 FAN CONTROL WIRING CONNECTED IN PARALLEL WITH THE THERMOSTAT.



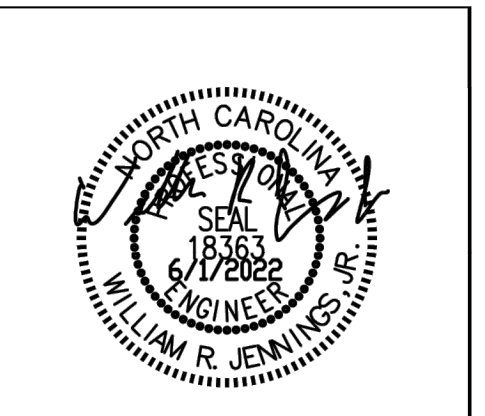
ODOR CONTROL BUILDING FLOOR PLAN - ELECTRICAL  
SCALE: 3/8" = 1'-0"



**ATTENTION CONTRACTORS**  
The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the Public Utilities Department at (919) 996-4540 at least twenty four hours prior to beginning any of their construction.  
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**Public**  
**Water Distribution / Extension System**  
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City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
Authorization to Construct \_\_\_\_\_  
Date \_\_\_\_\_

**Public**  
**Sewer Collection / Extension System**  
The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and Construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.  
City of Raleigh  
Public Utilities Department Permit # \_\_\_\_\_  
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DATE	REVISION DESCRIPTION
6/1/2022	REVISED PER COMMENTS

DATE	3/16/2022
DRAWN BY	JTP
DESIGNED BY	WRJ
CHECKED BY	WRJ
SCALE	

**TIMMONS GROUP**

**ROLESVILLE CROSSING**  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

**ODOR CONTROL BUILDING FLOOR PLAN - ELECTRICAL**

JOB NO. 43398  
SHEET NO. E1.3

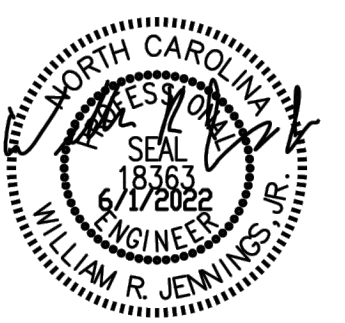
T:\JOBS\21139 - Rolesville Crossing Pump Sta - Wake ColCAD\21139 - E1\_3.dwg | Printed on 6/1/2022 1:20 PM | by: Jeff Patton



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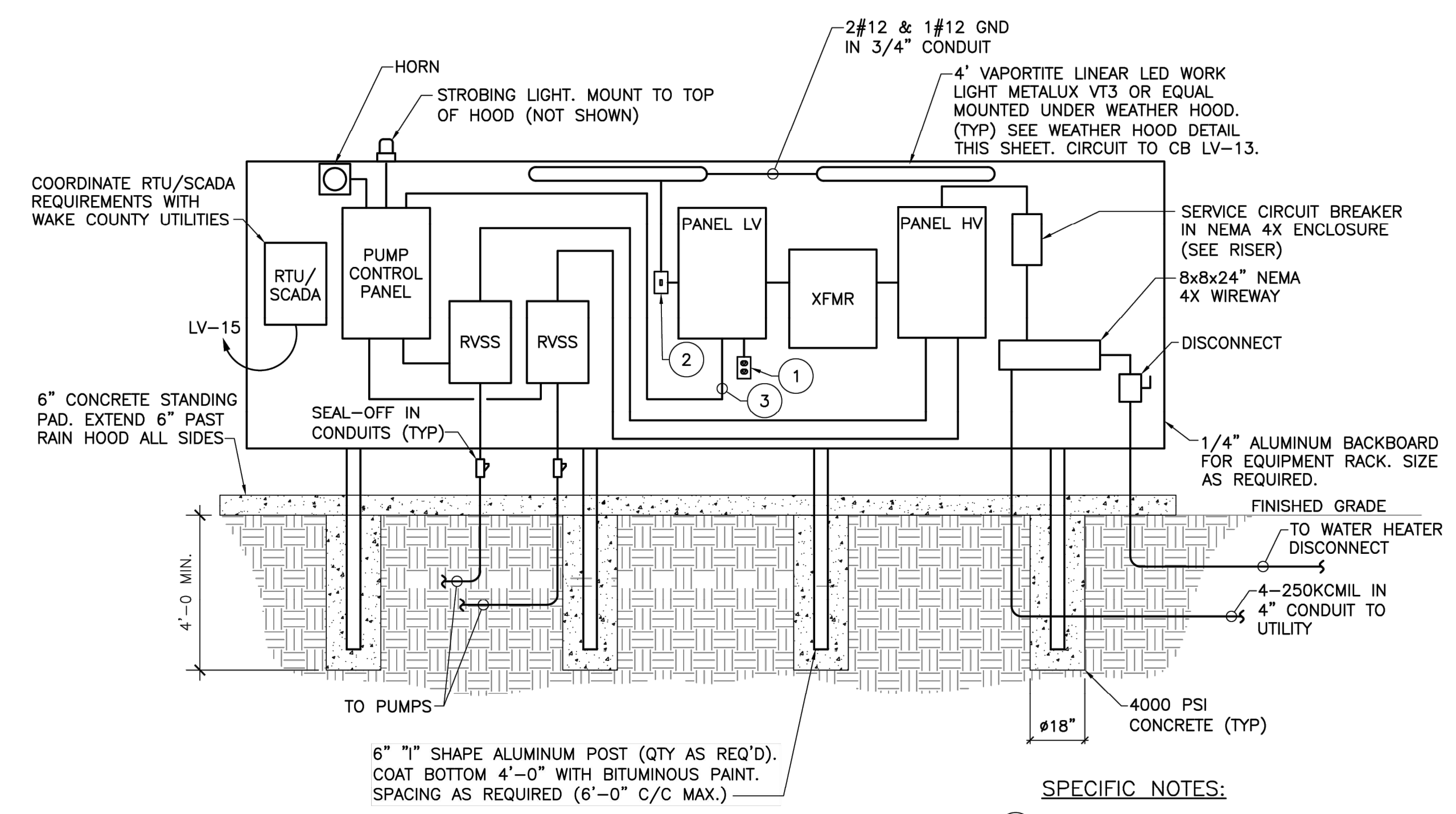
REVISION DESCRIPTION  
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FRONT VIEW

- SPECIFIC NOTES:**
- 20A GFCI RECEPTACLE WITH "IN-USE" TYPE WEATHERPROOF COVER. CIRCUIT TO CB LV-7.
  - WEATHER-PROOF SWITCH.
  - 120V PUMP CONTROL CIRCUIT TO CB LV-5.

**NOTES:**

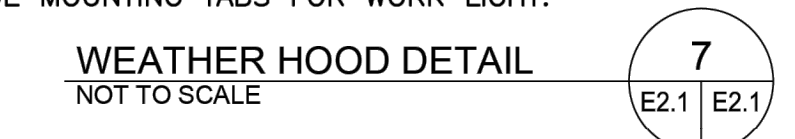
- REFERENCE RISER DIAGRAM FOR CONDUIT AND WIRE SIZES.
- CONDUITS SHOWN DIAGMATICALLY. SEE CIVIL DRAWINGS FOR LAYOUT.
- BACKING PLATE TO BE 1/4" ALUMINUM. MOUNT TO I-SHAPE POSTS WITH STAINLESS STEEL NUT, BOLTS, WASHERS.
- ALL ELECTRICAL WORK SHALL CONFORM TO LATEST NATIONAL, STATE AND LOCAL CODES AND REQUIREMENTS.
- SHOW CONDUIT SIZE AND RUNS WITH WIRE SIZE AND NUMBER ON PUMP STATION PLANS.
- PANEL LAYOUT IS SCHEMATIC ONLY. ADJUST AS NEEDED TO ACCOMMODATE EQUIPMENT. MAINTAIN 4" MIN. CLEARANCE BETWEEN PANELS AND SIDE SHIELDS.
- ALL ENCLOSURES SHALL BE NEMA 4X RATED AND LOCKABLE.
- ALL ENCLOSURES SHALL BE MOUNTED TO ALUMINUM BACKING PLATE WITH NYLON SPACERS AND STAINLESS STEEL NUTS, BOLTS AND WASHERS.
- CONDUIT SHALL BE RIGID ALUMINUM OR GALVANIZED. MEYERS HUBS SHALL BE USED AT ALL PANEL CONNECTIONS.
- NO EQUIPMENT SHALL BE MOUNTED LESS THAN 36" ABOVE FINISHED GRADE. MINIMUM CLEARANCE FROM WORK LIGHT TO STANDING PAD SHALL BE 6'-6".
- SEE DETAIL 8/E2.1 FOR WEATHER HOOD DETAILS.



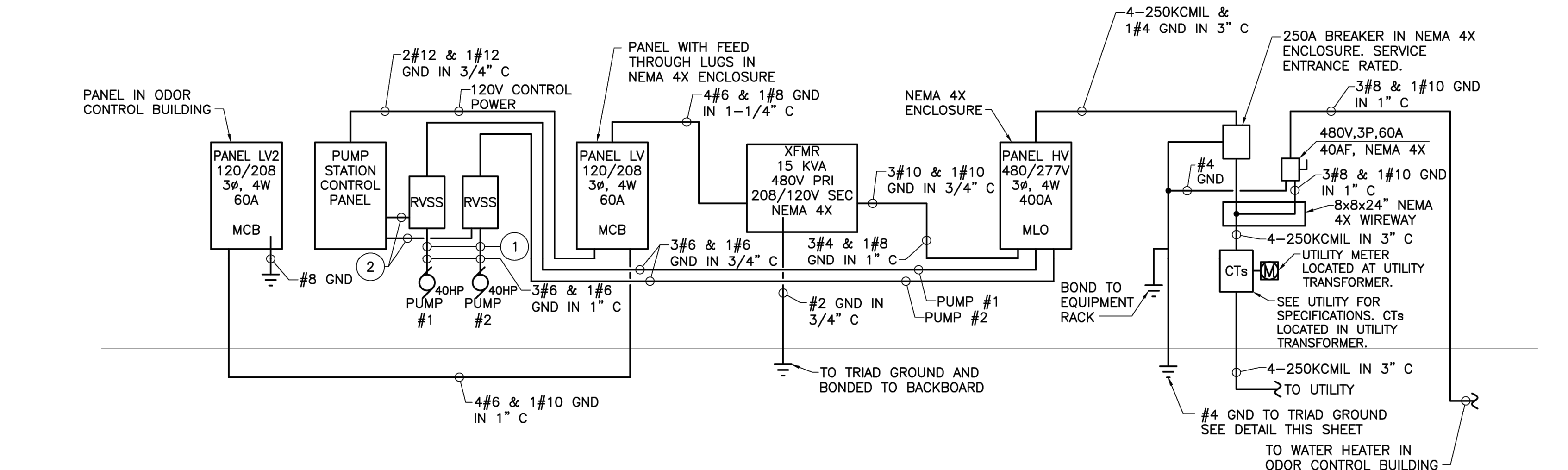
EQUIPMENT LAYOUT DETAIL

**NOTES:**

- HOOD TO BE 12 GA MILL FINISH ALUMINUM.
- HOOD TO BE HELIARC "STITCH" WELDED TO 1/4" ALUMINUM PLATE EQUIPMENT BACKING BOARD.
- HOOD SHALL BE SAME WIDTH AS ALUMINUM PLATE EQUIPMENT BACKING BOARD.
- PROVIDE MOUNTING TABS FOR WORK LIGHT.



WEATHER HOOD DETAIL

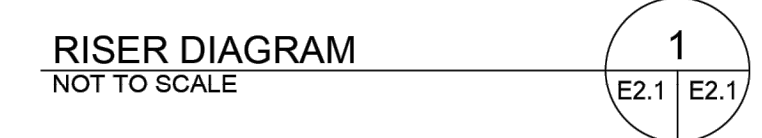


**SPECIFIC NOTES:**

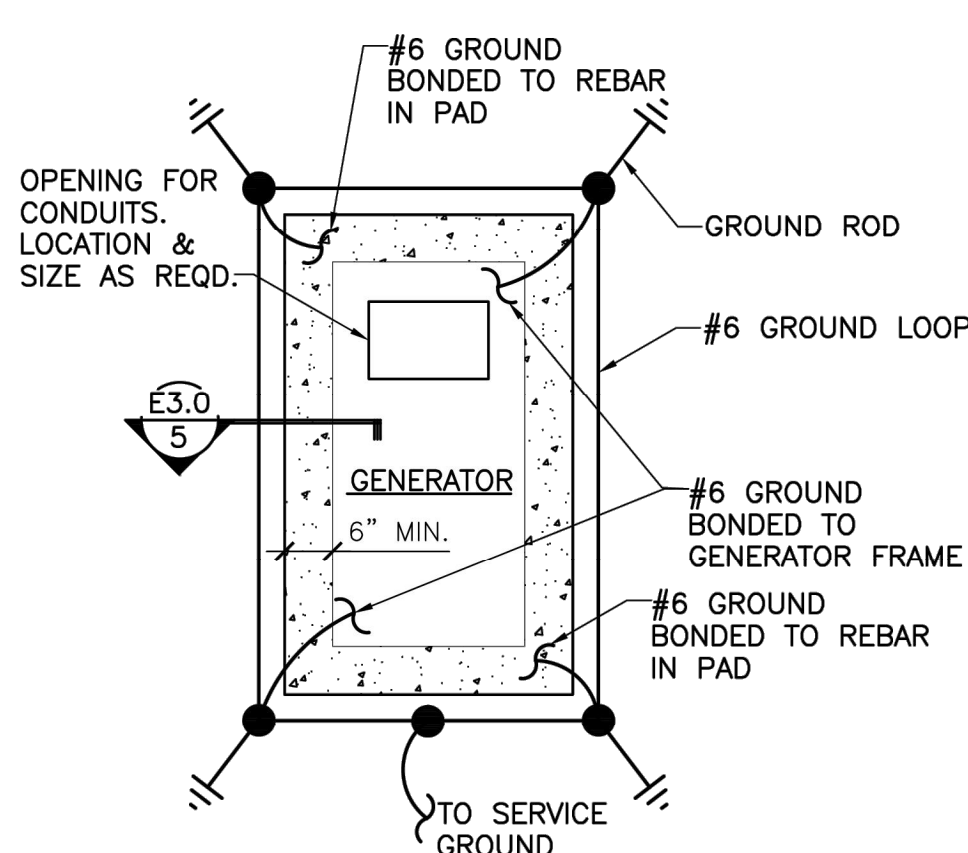
- TO JUNCTION BOX AT WETWELL. SEE DETAIL E1.2
- 1" CONDUIT FOR CONTROL WIRING (RUN, STOP, RUNNING AND FAULT).

**GENERAL NOTES:**

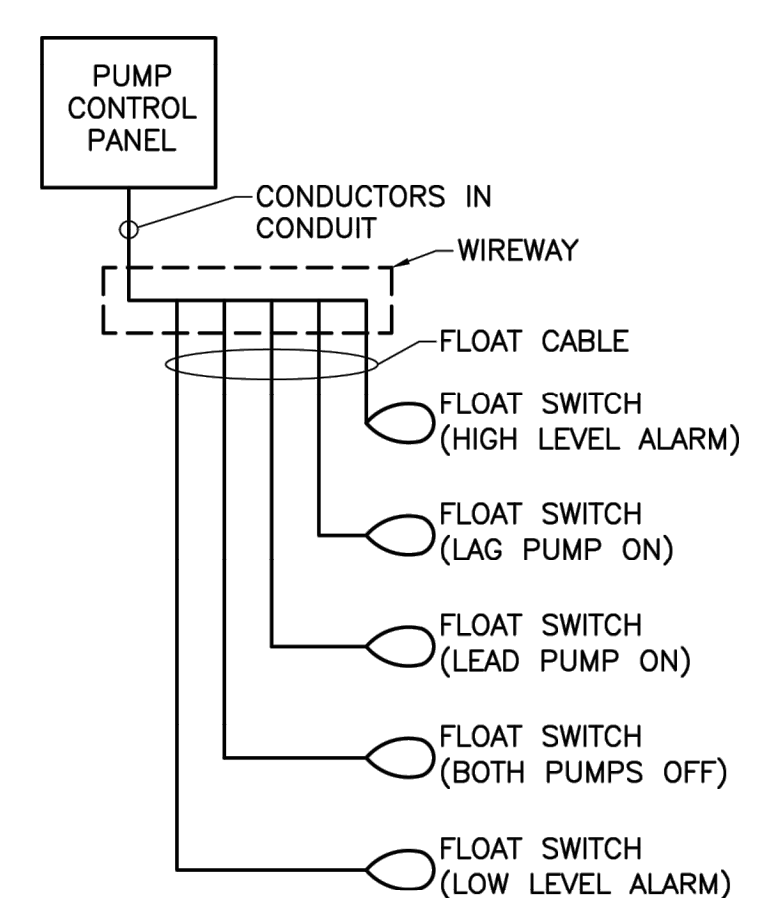
- CONDUCTOR SIZES SHOWN ARE FOR COPPER.
- CONDUIT SHALL BE GALVANIZED RIGID STEEL, EXCEPT BELOW GRADE.
- BREAKERS AND EQUIPMENT CONNECTED TO THE UTILITY SHALL BE RATED FOR 50 KAIC MINIMUM.
- GENERATOR SHALL HAVE EXTERIOR E-STOP MOUNTED NO MORE THAN 6'-0 AFF.
- GENERATOR CONTROLLER SHALL PROVIDE OVERCURRENT PROTECTION FOR THE GENERATOR INDEPENDENT OF THE GENERATOR CIRCUIT BREAKER.
- PROVIDE PLC BASED PUMP CONTROL PANEL IN NEMA 4X ENCLOSURE. PANEL SHALL HAVE THE FOLLOWING FUNCTIONS:
  - HAND-OFF-AUTO TOGGLE SWITCH FOR EACH PUMP
  - RED PUMP RUN PILOT LIGHT FOR EACH PUMP
  - ALARM TEST AND SILENCE SWITCHES
  - RED ALARM BEACON INCLUDED WITH NEMA 4X ENCLOSURE SEPARATELY MOUNTED ON ELECTRICAL SHELTER (SEE DETAIL) AND AUDIBLE ALARM HORN (MOUNTED REMOTELY) WITH 83 TO 85 DECIBEL RATING FOR A HIGH-WATER CONDITION AND ALARM SILENCE SWITCH.
  - AUXILIARY DRY CONTACT FOR THE FOLLOWING:
    - HIGH WATER ALARM
    - PUMP SEAL FAILURE
    - PUMP MOTOR STARTER FAULT
  - ALTERNATING MECHANISM
  - NUMBERED TERMINAL STRIP FOR CONNECTING ALARMS AND VARIABLE LEVEL FLOAT SWITCHES AND ALL OTHER EXTERNAL CONNECTIONS.
- CONTRACTOR SHALL PROVIDE A COORDINATION STUDY PREPARED BY A NORTH CAROLINA LICENSED PROFESSIONAL ENGINEER THAT DEMONSTRATES THAT THE SYSTEM IS IN COMPLIANCE WITH THE SELECTIVE COORDINATION REQUIREMENTS OF ARTICLE 701 OF THE NATIONAL ELECTRICAL CODE. STUDY SHALL BE SUBMITTED PRIOR TO OR IN CONJUNCTION WITH THE RELEVANT ELECTRICAL SHOP DRAWING, INCLUDING THE GENERATOR.
- PANEL SHALL BE UL LISTED AS AN ASSEMBLY PER UL 508A
- NEMA 4X, WATERTIGHT ENCLOSURES
- VARIABLE LEVEL FLOAT SWITCH CONTROL OPERATION AS INDICATED.
- PANEL SHALL HAVE A TOUCH SCREEN DISPLAY FOR CONTROL AND MONITORING. DISPLAY SHALL BE NEMA 4X.



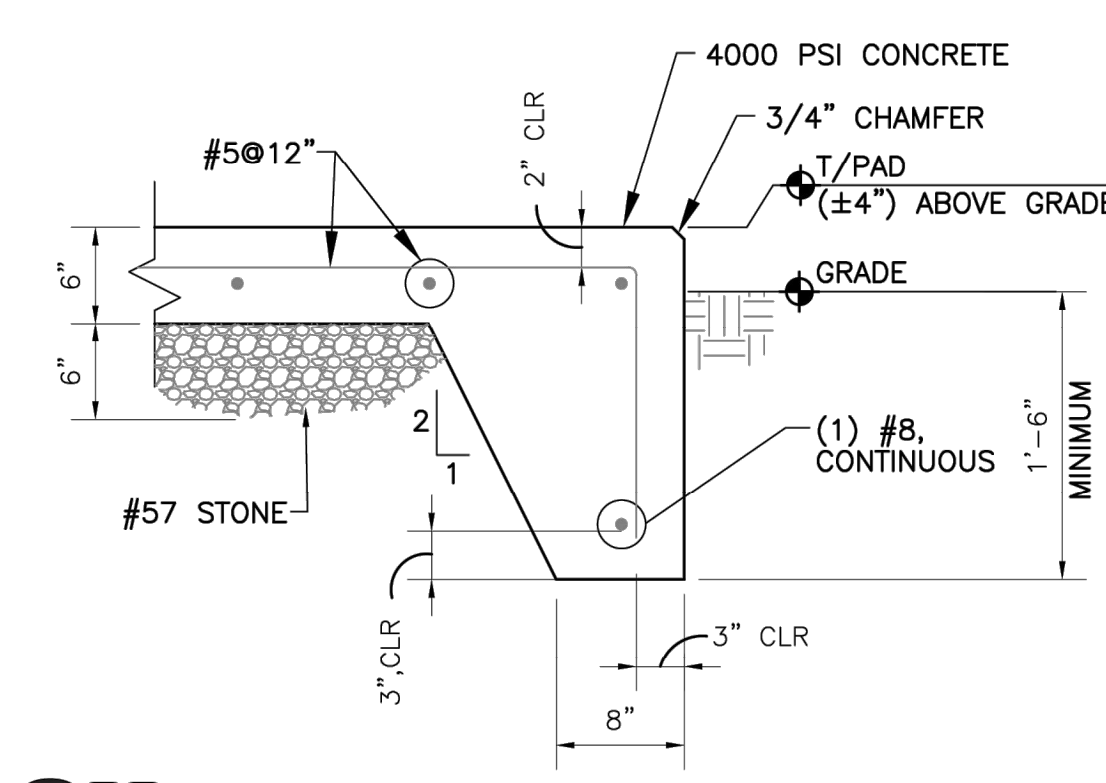
RISER DIAGRAM



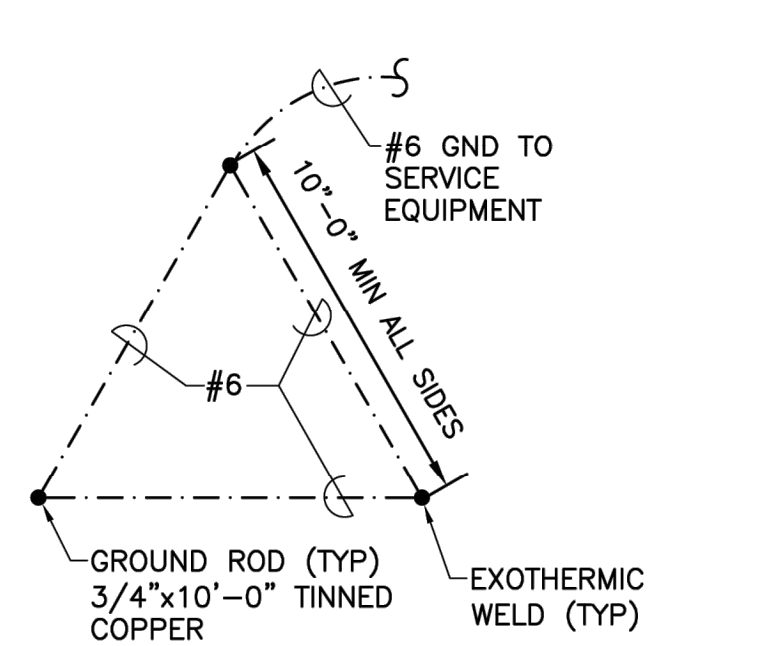
GENERATOR PAD DETAIL



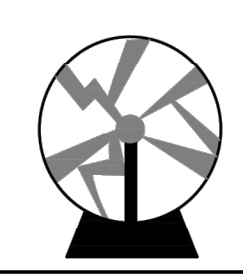
PUMP CONTROL SCHEME



GENERATOR PAD SECTION



TRIAD GROUND DETAIL



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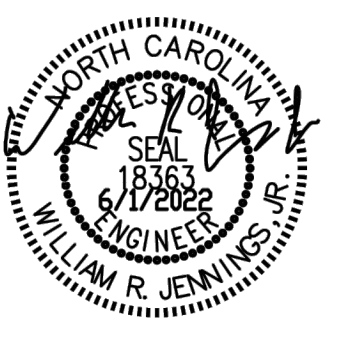
**TIMMONS GROUP**  
ROLESVILLE CROSSING  
ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
RISER AND DETAILS

JOB NO.  
43398  
SHEET NO.  
E2.1

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 WRJ

SCALE

REVISION DESCRIPTION  
 REVISED PER COMMENTS

ROLESVILLE CROSSING  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

**TIMMONS GROUP**

SCHEDULES

JOB NO.  
 43398

SHEET NO.  
 E3.1

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**LIGHTING FIXTURE SCHEDULE**

TYPE	MANUFACTURER	CATALOG NUMBER	VOLTS	VOLT-AMPS	EFFLAMPS		DESCRIPTION	REMARKS
					QTY	TYPE		
A	METALUX	4VT2-LD4-4-DR-UNV-L840-CD-1 WL	120/277	38	N/A	N/A	4' SURFACE MOUNTED, SEALED AND GASKETED FIXTURE SUITABLE FOR WET LOCATIONS. 4000 LUMEN OUTPUT.	PROVIDE WITH STAINLESS STEEL MOUNTING BRACKETS CAT#VT2-SS-MBK, AS REQUIRED.
B	SPAULDING LIGHTING	LCC-12LU-2-PC1	120/277	12.8	N/A	N/A	WALL MOUNTED FULL CUT-OFF EXTERIOR LED FIXTURE WITH 820 NOMINAL LLUMENS. FIXTURE IS CONTROLLED BY INTEGRAL PHOTO-EYE.	
SA-1	LITHONIA	RSX1-LED-P1-30K-R3-MVOLT-SPA-DDXBD	MVOLT	51.4	N/A	N/A	RSX AREA FIXTURE SIZE 1 P1. LUMEN PACKAGE 3000CCT. TYPE R3 DISTRIBUTION.	PROVIDE 25' SQUARE PAINTED STEEL POLE WITH 3 LIGHT BULLHORN @ 180 DEGREES. SA-1 FIXTURE IN THE CENTER AND SA-2 FIXTURES ON THE OUTSIDE.
SA-2	LITHONIA	TXF2 LED 40K Mvolt IS DDBXD	MVOLT	94	N/A	N/A	FLOOD LIGHT WITH 13,200 LUMEN OUTPUT	MOUNT ON SAME POLE AS SA-1 FIXTURE. AIM AS DIRECTED BY THE OWNER. PROVIDE SWITCH FOR FLOODS ONLY AT BASE OF POLE

**PANEL HV SCHEDULE**

PANELBOARD CHARACTERISTICS:  
 VOLTS: 480/277V  
 PHASES: 3  
 WIRES: 4  
 SOLID NEUTRAL, GROUND BAR

PHASE TO PHASE VOLTS: 480  
 PHASE TO NEUT. VOLTS: 277

MAIN LUGS: 225A  
 MINIMUM SHORT CIRCUIT RATING: 50K RMS SYM AMPS  
 SERIES RATED WITH UPSTREAM DEVICE

CKT. NO.	POLE NO.	DESCRIPTION	LOAD TYPE	CONN. KVA	CONN. AMPS			BREAKER		NO. & WIRE SIZE			COND. SIZE
					A	B	C	P	AT	PHASE	NEUT.	GND	
3	3	PUMP #1 VIA CONTROL PANEL*	M	43.2	52.0			3	70	3#8		#8	3/4"
9	7	INSTANTANEOUS WATER HEATER	E	28.8	34.6	34.6		3	45	3#10	#10	#10	3/4"
13	13	SPACE											
15	15	SPACE											
17	17	SPACE											
19	19	SPACE											
21	21	SPACE											
23	23	SPACE											
25	25	SPACE											
27	27	SPACE											
29	29	SPACE											
31	31	SPACE											
33	33	SPACE											
35	35	SPACE											
37	37	SPACE											
39	39	SPACE											
41	41	SPACE											
4	2	PUMP #2 VIA CONTROL PANEL	M	43.2	52.0	52.0		3	70	3#8		#8	3/4"
10	10	PSL VIA 30 KVA XFMR		4.29	5.2	5.2		3	50	SEE RISER DIAGRAM			
14	14	SPACE											
16	16	SPACE											
18	18	SPACE											
20	20	SPACE											
22	22	SPACE											
24	24	SPACE											
26	26	SPACE											
28	28	SPACE											
30	30	SPACE											
32	32	SPACE											
34	34	SPACE											
36	36	SPACE											
38	38	SPACE											
40	40	SPACE											
42	42	SPACE											

CONNECTED LOADS	DEMAND FACTOR	
RECEPTACLE	0.41	FIRST 10 KVA @ 100%, REMAINDER@50%
LIGHTING	1.44	100%
MECHANICAL	48.3	100%
EQUIPMENT	31.9	100%
KITCHEN	100%	USE TABLE 220.55 OR .6
TOTAL KVA CONNECTED	82.0	TOTAL KVA DEMAND
FEEDER DEMAND AMPS	98.7	AMPS
FEEDER SIZE AT 80%	123.4	AMPS
25% SPARE CAPACITY	154.3	AMPS

**PANEL LV SCHEDULE**

PANELBOARD CHARACTERISTICS:  
 VOLTS: 120/208  
 PHASES: 3  
 WIRES: 4  
 SOLID NEUTRAL, GROUND BAR, FEED THROUGH LUGS

PHASE TO PHASE VOLTS: 208  
 PHASE TO NEUT. VOLTS: 120

MAIN LUGS: 100A  
 MINIMUM SHORT CIRCUIT RATING: 10K RMS SYM AMPS  
 SERIES RATED WITH UPSTREAM DEVICE

CKT. NO.	POLE NO.	DESCRIPTION	LOAD TYPE	CONN. KVA	CONN. AMPS			BREAKER		NO. & WIRE SIZE			COND. SIZE
					A	B	C	P	AT	PHASE	NEUT.	GND	
1	1	SPACE											
3	3	BATT CHGR / BLK HTR FOR DIESEL PUMP	E	0.1		0.8		1	20	1#12	#12	#12	3/4"
5	5	CONTROL PANEL	E	0.1				1	20	1#12	#12	#12	3/4"
7	7	RECEPTACLE	R	0.18	1.5			1	20	1#12	#12	#12	3/4"
9	9	MAG-METER	E	0.1		0.8		1	15	1#12	#12	#12	3/4"
11	11	RECEPTACLE	R	0.18			1.5	1	20	1#12	#12	#12	3/4"
13	13	LIGHTS	L	0.24	2.0			1	20	1#12	#12	#12	3/4"
15	15	RTU	E	0.1		0.8		1	20	1#12	#12	#12	3/4"
17	17	SPACE											
19	19	SPACE											
21	21	SPACE											
23	23	SPACE											
2	2	SPACE											
4	4	SPACE											
6	6	SPACE											
8	8	SPACE											
10	10	SPACE											
12	12	SPACE											
14	14	SPACE											
16	16	SPACE											
18	18	SPACE											
20	20	SPACE											
22	22	SPACE											
24	24	SPACE											
		TOTALS		1	3.5	2.5	2.3						

**PANEL LV2 SCHEDULE**

PANELBOARD CHARACTERISTICS:  
 VOLTS: 120/208  
 PHASES: 3  
 WIRES: 4  
 SOLID NEUTRAL, GROUND BAR

PHASE TO PHASE VOLTS: 208  
 PHASE TO NEUT. VOLTS: 120

MAIN CIRCUIT BREAKER: 100A  
 MINIMUM SHORT CIRCUIT RATING: 10K RMS SYM AMPS  
 SERIES RATED WITH UPSTREAM DEVICE

CKT. NO.	POLE NO.	DESCRIPTION	LOAD TYPE	CONN. KVA	CONN. AMPS			BREAKER		NO. & WIRE SIZE			COND. SIZE
					A	B	C	P	AT	PHASE	NEUT.	GND	
1	1	ODOR CONTROL CONTROL PANEL	E	2.56	21.3			1	30	1#10	#10	#10	3/4"
3	3	SPACE											
5	5	SPACE											
7	7	SPACE											
9	9	SPACE											
11	11	SPACE											
13	13	SPACE											
15	15	SPACE											
17	17	SPACE											
19	19	SPACE											
21	21	SPACE											
23	23	SPACE											
2	2	LIGHTING	L	0.17	1.4			1	20	1#12	#12	#12	3/4"
4	4	RECEPTACLES	R	0.54		4.5		1	20	1#12	#12	#12	3/4"
6	6	RECEPTACLES	R	0.54			4.5	1	20	1#12	#12	#12	3/4"
8	8	GAS MONITOR	E	0.1	0.8			1	20	1#12	#12	#12	3/4"
10	10	SPACE											
12	12	EXHAUST FAN EF-1	M	0.12			1.0	1	20	1#12	#12	#12	3/4"
14	14	SPACE				13.9							
16	16	UNIT HEATER UH-1	M	5		13.9		3	20	3#12	#12	#12	3/4"
20	20	SPACE											
22	22	SPACE											
24	24	SPACE											
		TOTALS		9.03	37.5	18.4	19.4						

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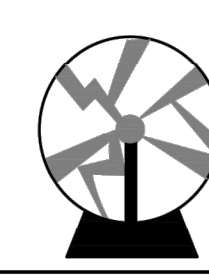
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ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH, NCDEQ AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS



PART 1 GENERAL

- 1.01 SUBMITTALS
A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conductors and cables, including detailed information on materials, construction, ratings, listings, and available sizes, configurations, and stranding.

PART 2 PRODUCTS

- 2.01 CONDUCTOR AND CABLE APPLICATIONS
A. Provide single conductor building wire installed in suitable raceway unless otherwise indicated, permitted, or required.
B. Nonmetallic-sheathed cable is not permitted.
C. Underground feeder and branch-circuit cable is not permitted.
D. Service entrance cable is not permitted.
E. Armored cable is not permitted.
F. Metal-clad cable is not permitted.
G. Manufactured wiring systems are not permitted.

- 2.02 CONDUCTOR AND CABLE GENERAL REQUIREMENTS
A. Provide products listed, classified, and labeled as suitable for the purpose intended.
B. Unless specifically indicated to be excluded, provide all required conduit, boxes, wiring, connectors, etc. as required for a complete operating system.
C. Comply with NEMA WC 70.
D. Thermoplastic-Insulated Conductors and Cables: Listed and labeled as complying with UL 83.
E. Thermoset-Insulated Conductors and Cables: Listed and labeled as complying with UL 44.
F. Conductors for Grounding and Bonding: Also comply with Section 26 0526.
G. Conductor Material:

- 1. Provide copper conductors only. Aluminum conductors are not acceptable for this project. Conductor sizes indicated are based on copper.
2. Copper Conductors: Soft drawn annealed, 98 percent conductivity, uncoated copper conductors complying with ASTM B3, ASTM B8, or ASTM B787/B787M unless otherwise indicated.
3. Tinned Copper Conductors: Comply with ASTM B33.

- H. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

- I. Conductor Color Coding:
1. Color code conductors as indicated unless otherwise required by the authority having jurisdiction. Maintain consistent color coding throughout project.
2. Color Coding Method: Integrally colored insulation.

- a. Conductors size 4 AWG and larger may have black insulation color coded using vinyl color coding electrical tape.

- 3. Color Code:
a. 480Y/277 V, 3 Phase, 4 Wire System:
1) Phase A: Brown.
2) Phase B: Orange.
3) Phase C: Yellow.
4) Neutral/Grounded: Gray.

- b. 208Y/120 V, 3 Phase, 4 Wire System:
1) Phase A: Black.
2) Phase B: Red.
3) Phase C: Blue.
4) Neutral/Grounded: White.

- c. Equipment Ground, All Systems: Green.
d. For control circuits, comply with manufacturer's recommended color code.

2.03 SINGLE CONDUCTOR BUILDING WIRE

- A. Description: Single conductor insulated wire.
B. Conductor Stranding:
1. Feeders and Branch Circuits:
a. Size 10 AWG and Smaller: Solid.
b. Size 8 AWG and Larger: Stranded.
2. Control Circuits: Stranded.
C. Insulation Voltage Rating: 600 V.
D. Insulation:
1. Copper Building Wire: Type XHHW-2.

2.04 WIRING CONNECTORS

- A. Description: Wiring connectors appropriate for the application, suitable for use with the conductors to be connected, and listed as complying with UL 486A-486B or UL 486C as applicable.

- B. Connectors for Grounding and Bonding: Comply with Section 26 0526.

C. Wiring Connectors for Splices and Taps:

- 1. Copper Conductors Size 8 AWG and Smaller: Use twist-on insulated spring connectors.
2. Copper Conductors Size 6 AWG and Larger: Use mechanical connectors or compression connectors.

D. Wiring Connectors for Terminations:

- 1. Provide terminal lugs for connecting conductors to equipment furnished with terminations designed for terminal lugs.
2. Where over-sized conductors are larger than the equipment terminations can accommodate, provide connectors suitable for reducing to appropriate size, but not less than required for the rating of the overcurrent protective device.
3. Copper Conductors Size 8 AWG and Larger: Use mechanical connectors or compression connectors where connectors are required.
4. Stranded Conductors Size 10 AWG and Smaller: Use crimped terminals for connections to terminal screws.
5. Conductors for Control Circuits: Use crimped terminals for all connections.
E. Do not use insulation-piercing or insulation-displacement connectors designed for use with conductors without stripping insulation.
F. Do not use push-in wire connectors as a substitute for twist-on insulated spring connectors.
G. Twist-on Insulated Spring Connectors: Rated 600 V, 221 degrees F for standard applications and 302 degrees F for high temperature applications; pre-filled with sealant and listed as complying with UL 486D for damp and wet locations.
H. Mechanical Connectors: Provide bolted type or set-screw type.
I. Compression Connectors: Provide circumferential type or hex type crimp configuration.
J. Crimped Terminals: Nylon-insulated, with insulation grip and terminal configuration suitable for connection to be made.

2.05 ACCESSORIES

A. Electrical Tape:

- 1. Vinyl Color Coding Electrical Tape: Integrally colored to match color code indicated; listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; suitable for continuous temperature environment up to 221 degrees F.
2. Vinyl Insulating Electrical Tape: Complying with ASTM D3005 and listed as complying with UL 510; minimum thickness of 7 mil; resistant to abrasion, corrosion, and sunlight; conformable for application down to 0 degrees F and suitable for continuous temperature environment up to 221 degrees F.
3. Rubber Splicing Electrical Tape: Ethylene Propylene Rubber (EPR) tape, complying with ASTM D4388; minimum thickness of 30 mil; suitable for continuous temperature environment up to 194 degrees F and short-term 266 degrees F overload service.
4. Electrical Filler Tape: Rubber-based insulating moldable putty, minimum thickness of 125 mil; suitable for continuous temperature environment up to 176 degrees F.

- B. Heat Shrink Tubing: Heavy-wall, split-resistant, with factory-applied adhesive; rated 600 V; suitable for direct burial applications; listed as complying with UL 486D.
C. Wire Pulling Lubricant:
1. Listed and labeled as complying with UL 267.
2. Suitable for use with conductors/cables and associated insulation/jackets to be installed.
3. Suitable for use at installation temperature.

- D. Cable Ties: Material and tensile strength rating suitable for application.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Circuiting Requirements:
1. Include circuit lengths required to install connected devices within 10 ft of location indicated.
2. Common Neutrals: Unless otherwise indicated, sharing of neutral/grounded conductors among up to three single phase branch circuits of different phases installed in the same raceway is not permitted. Provide dedicated neutral/grounded conductor for each individual branch circuit.
B. Install products in accordance with manufacturer's instructions.
C. Perform work in accordance with NECA 1 (general workmanship).
D. Secure and support conductors and cables in accordance with NFPA 70 using suitable supports and methods approved by the authority having jurisdiction. Provide independent support from building structure. Do not provide support from raceways, piping, ductwork, or other systems.
E. Install conductors with a minimum of 18 inches of slack at each outlet.
F. Make wiring connections using specified wiring connectors.
G. Unless specifically indicated to be excluded, provide final connections to all equipment and devices, including those furnished by others, as required for a complete operating system.

END OF SECTION 26 0519

PART 1 GENERAL

- 1.01 SUBMITTALS
A. Product Data: Provide manufacturer's standard catalog pages and data sheets for grounding and bonding system components.

PART 2 PRODUCTS

2.01 GROUNDING AND BONDING REQUIREMENTS

- A. Unless specifically indicated to be excluded, provide all required components, conductors, connectors, conduit, boxes, fittings, supports, accessories, etc. as necessary for a complete grounding and bonding system.
B. Where conductor size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.
C. Grounding Electrode System:
1. Provide connection to required and supplemental grounding electrodes indicated to form grounding electrode system.
a. Provide continuous grounding electrode conductors without splice or joint.
b. Install grounding electrode conductors in raceway where exposed to physical damage. Bond grounding electrode conductor to metallic raceways at each end with bonding jumper.
2. Metal In-Ground Support Structure:
a. Provide connection to metal in-ground support structure that is in direct contact with earth in accordance with NFPA 70.
3. Ground Rod Electrode(s):
a. Provide three electrodes in an equilateral triangle configuration unless otherwise indicated or required.
b. Space electrodes not less than 10 feet from each other and any other ground electrode.
c. Where location is not indicated, locate electrode(s) at least 5 feet outside building perimeter foundation as near as possible to electrical service entrance; where possible, locate in softscape (uncovered) area.

D. Bonding and Equipment Grounding:

- 1. Provide bonding for equipment grounding conductors, equipment ground busses, metallic equipment enclosures, metallic raceways and boxes, device grounding terminals, and other normally non-current-carrying conductive materials enclosing electrical conductors/equipment or likely to become energized as indicated and in accordance with NFPA 70.
2. Provide insulated equipment grounding conductor in each feeder and branch circuit raceway. Do not use raceways as sole equipment grounding conductor.
3. Provide bonding for interior metal piping systems in accordance with NFPA 70. This includes, but is not limited to:
a. Metal water piping where not already effectively bonded to metal underground water pipe used as grounding electrode.
b. Metal process piping.

2.02 GROUNDING AND BONDING COMPONENTS

A. General Requirements:

- 1. Provide products listed, classified, and labeled as suitable for the purpose intended.
2. Provide products listed and labeled as complying with UL 467 where applicable.
B. Conductors for Grounding and Bonding, in Addition to Requirements of Section 26 0526:
1. Use insulated copper conductors unless otherwise indicated.
a. Exceptions:
1) Use bare copper conductors where installed underground in direct contact with earth.
2) Use bare copper conductors where directly encased in concrete (not in raceway).

C. Connectors for Grounding and Bonding:

- 1. Description: Connectors appropriate for the application and suitable for the conductors and items to be connected; listed and labeled as complying with UL 467.
2. Unless otherwise indicated, use exothermic welded connections for underground, concealed and other inaccessible connections.
3. Unless otherwise indicated, use compression connectors or exothermic welded connections for accessible connections.
a. Exceptions:
1) Use exothermic welded connections for Metallic above ground structures.
D. Ground Rod Electrodes:
1. Comply with NEMA GR 1.
2. Material: Copper-bonded (copper-clad) steel.
3. Size: 3/4 inch diameter by 10 feet length, unless otherwise indicated.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
B. Perform work in accordance with NECA 1 (general workmanship).
C. Ground Rod Electrodes: Unless otherwise indicated, install ground rod electrodes vertically. Where encountered rock prohibits vertical installation, install at 45 degree angle or bury horizontally in trench at least 30 inches (750 mm) deep in accordance with NFPA 70.
1. Outdoor Installations: Unless otherwise indicated, install with top of rod 12 inches below finished grade.

END OF SECTION 26 0526

PART 1 GENERAL

1.01 SUBMITTALS

- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for channel/strut framing systems, nonpenetrating rooftop supports, and post-installed concrete/masonry anchors.

1.02 QUALITY ASSURANCE

PART 2 PRODUCTS

2.01 SUPPORT AND ATTACHMENT COMPONENTS

- A. General Requirements:
1. Comply with the following. Where requirements differ, comply with most stringent.
a. NFPA 70.
b. Requirements of authorities having jurisdiction.
2. Do not use products for applications other than as permitted by NFPA 70 and product listing.
3. Do not use wire, chain, perforated pipe strap, or wood for permanent supports unless specifically indicated or permitted.
4. Steel Components: Use corrosion-resistant materials suitable for environment where installed.
a. Indoor Dry Locations: Use Galvanized Steel unless otherwise indicated.
b. Outdoor and Damp or Wet Indoor Locations: Use fiberglass, galvanized steel or stainless steel unless otherwise indicated. All treatment areas shall be considered wet locations.
c. Galvanized Steel: Hot-dip galvanized after fabrication in accordance with ASTM A123/A123M or ASTM A153/A153M.

- B. Conduit and Cable Supports: Straps and clamps suitable for conduit or cable to be supported.

- 1. Conduit Straps: One-hole or two-hole type; malleable iron for indoor dry locations. Stainless steel for outdoor, damp or wet locations. This includes all treatment buildings and structures.
2. Conduit Clamps: Bolted type unless otherwise indicated.

- C. Outlet Box Supports: Hangers and brackets suitable for boxes to be supported.

D. Metal Channel/Strut Framing Systems:

- 1. Description: Factory-fabricated, continuous-slot, metal channel/strut and associated fittings, accessories, and hardware required for field assembly of supports.
2. Comply with MFMA-4.
3. Channel/Strut Used as Raceway, Where Indicated: Listed and labeled as complying with UL 5B.
4. Channel Material:
a. Indoor Dry Locations: Use galvanized steel.
b. Outdoor and Damp or Wet Indoor Locations: Use fiberglass or stainless steel. All fittings and hardware for stainless steel channel shall be stainless steel. All fitting and hardware for fiberglass channel shall be Glass Reinforced Polyurethane, except that components that must be metal (springs) shall be stainless steel.
5. Minimum Channel Thickness: Steel sheet, 12 gauge, 0.1046 inch.
6. Minimum Channel Dimensions: 1-5/8 inch wide by 13/16 inch high.

PART 3 EXECUTION

3.01 INSTALLATION

- A. Install products in accordance with manufacturer's instructions.
B. Install hangers and supports in accordance with NECA 1.
C. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
D. Unless specifically indicated or approved by Engineer, do not provide support from suspended ceiling support system or ceiling grid.
E. Unless specifically indicated or approved by Engineer, do not provide support from roof deck.
F. Do not penetrate or otherwise notch or cut structural members without approval of Engineer.
G. Equipment Support and Attachment:
1. Use metal, fabricated supports or supports assembled from metal channel/strut to support equipment as required.

SPECIFICATIONS CONTINUED ON NEXT SHEET



THIS DRAWING PREPARED AT THE RALEIGH OFFICE
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Table with 2 columns: REVISION DESCRIPTION, REVISED PER COMMENTS. Includes a row for DATE 07/2022 and YOUR VISION ACHIEVED THROUGH OURS.

Table with 2 columns: DATE, DRAWN BY, DESIGNED BY, CHECKED BY, SCALE. Values include 3/16/2022, JTP, WRJ, WRJ.

TIMMONS GROUP logo and contact information for ROLESVILLE CROSSING, ROLESVILLE - WAKE COUNTY - NORTH CAROLINA. Includes job number 43398 and sheet number E4.1.

ATTENTION CONTRACTORS notice regarding construction permits and public utility systems (Water Distribution/Extension System and Sewer Collection/Extension System).

T:\08921139 - Rolesville Crossing Pump Sta - Wake Co\CADD\21139 - E4\_1.dwg [Plotted on 07/20/22 1:20 PM] by: Jeff Poron



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- 2. Use metal channel/strut secured to studs to support equipment surface mounted on hollow stud walls when wall strength is not sufficient to resist pull-out.
  - 3. Use metal channel/strut to support surface-mounted equipment in wet or damp locations to provide space between equipment and mounting surface.
  - 4. Unless otherwise indicated, mount floor-mounted equipment on properly sized concrete pad 3 inches in height; see Section 03 3000.
  - 5. Securely fasten floor-mounted equipment. Do not install equipment such that it relies on its own weight for support.
- H. Identify independent electrical component support wires above accessible ceilings, where permitted, with color distinguishable from ceiling support wires in accordance with NFPA 70.

**END OF SECTION 26 0529**

**PART 1 GENERAL**

- 1.01 SUBMITTALS
- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for conduits and fittings.
  - B. Shop Drawings:
    - 1. Include proposed locations of roof penetrations and proposed methods for sealing.
  - C. Project Record Documents: Record actual routing for conduits installed underground and conduits 2 inch (53 mm) trade size and larger.
- 1.02 QUALITY ASSURANCE

**PART 2 PRODUCTS**

- 2.01 CONDUIT APPLICATIONS
- A. Do not use conduit and associated fittings for applications other than as permitted by NFPA 70, manufacturer's instructions, and product listing.
  - B. Unless otherwise indicated and where not otherwise restricted, use conduit types indicated for specified applications. Where more than one listed application applies, comply with most restrictive requirements. Where conduit type for particular application is not specified, use galvanized steel rigid metal conduit.
  - C. Underground:
    - 1. Under Slab on Grade: Use galvanized steel rigid metal conduit.
    - 2. Exterior, Direct-Buried: Use galvanized steel rigid metal conduit.
    - 3. Exterior Concrete Encased Duct Bank: Use rigid PVC conduit.
    - 4. Where rigid polyvinyl chloride (PVC) conduit is provided, transition to galvanized steel rigid metal conduit (RMC) where emerging from underground.
  - D. Embedded Within Concrete:
    - 1. Within Slab on Grade: Not permitted.
    - 2. Within Slab Above Ground: Not permitted.
  - E. Exposed, Exterior: Use galvanized steel rigid metal conduit.
  - F. Connections to Luminaires: Use liquidtight flexible metal conduit.
    - 1. Maximum Length: 6 feet.
  - G. Flexible Connections to Vibrating Equipment:
    - 1. Dry Locations: Use Liquidtight Flexible Metal Conduit (LFMC).
    - 2. Damp, Wet, or Corrosive Locations: Use liquidtight flexible metal conduit (LFMC).
    - 3. Maximum Length: 6 feet unless otherwise indicated.
    - 4. Vibrating equipment includes, but is not limited to:
      - a. Transformers.
      - b. Motors.

2.02 CONDUIT - GENERAL REQUIREMENTS

- A. Fittings for Grounding and Bonding: See Section 26 0526 for additional requirements.
- B. Provide conduit, fittings, supports, and accessories required for complete raceway system.
- C. Provide products listed, classified, and labeled as suitable for purpose intended.
- D. Minimum Conduit Size, Unless Otherwise Indicated:
- E. Where conduit size is not indicated, size to comply with NFPA 70 but not less than applicable minimum size requirements specified.

2.03 GALVANIZED STEEL RIGID METAL CONDUIT (RMC)

- A. Description: NFPA 70, Type RMC galvanized steel rigid metal conduit complying with ANSI C80.1 and listed and labeled as complying with UL 6.
- B. Fittings:
  - 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 6.
  - 2. Material: Use steel or malleable iron.
    - a. Do not use die cast zinc fittings.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.04 GALVANIZED STEEL INTERMEDIATE METAL CONDUIT (IMC)

- A. Description: NFPA 70, Type IMC galvanized steel intermediate metal conduit complying with ANSI C80.6 and listed and labeled as complying with UL 1242.
- B. Fittings:
  - 1. Nonhazardous Locations: Use fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B or UL 1242.
  - 2. Material: Use steel or malleable iron.
    - a. Do not use die cast zinc fittings.
  - 3. Connectors and Couplings: Use threaded type fittings only. Threadless fittings, including set screw and compression/gland types, are not permitted.

2.05 LIQUIDTIGHT FLEXIBLE METAL CONDUIT (LFMC)

- A. Description: NFPA 70, Type LFMC polyvinyl chloride (PVC) jacketed steel flexible metal conduit listed and labeled as complying with UL 360.
- B. Fittings:
  - 1. Description: Fittings complying with NEMA FB 1 and listed and labeled as complying with UL 514B.
  - 2. Material: Use steel or malleable iron.

**PART 3 EXECUTION**

- 3.01 INSTALLATION
- A. Install products in accordance with manufacturer's instructions.
  - B. Install conduit in accordance with NECA 1.
  - C. Install galvanized steel rigid metal conduit (RMC) in accordance with NECA 101.
  - D. Install intermediate metal conduit (IMC) in accordance with NECA 101.
  - E. Conduit Support:
    - 1. Secure and support conduits in accordance with NFPA 70 using suitable supports and methods approved by authorities having jurisdiction; see Section 26 0529.
    - 2. Provide independent support from building structure. Do not provide support from piping, ductwork, or other systems.
    - 3. Installation Above Suspended Ceilings: Do not provide support from ceiling support system. Do not provide support from ceiling grid or allow conduits to lay on ceiling tiles.
    - 4. Use conduit strap to support single surface-mounted conduit.
      - a. Use clamp back spacer with conduit strap for damp and wet locations to provide space between conduit and mounting surface.
    - 5. Use metal channel/strut with accessory conduit clamps to support multiple parallel surface-mounted conduits.
    - 6. Use conduit clamp to support single conduit from beam clamp or threaded rod.
    - 7. Use trapeze hangers assembled from threaded rods and metal channel/strut with accessory conduit clamps to support multiple parallel suspended conduits.
  - F. Connections and Terminations:
    - 1. Use approved zinc-rich paint or conduit joint compound on field-cut threads of galvanized steel conduits prior to making connections.
    - 2. Where two threaded conduits must be joined and neither can be rotated, use three-piece couplings or split couplings. Do not use running threads.
    - 3. Provide drip loops for liquidtight flexible conduit connections to prevent drainage of liquid into connectors.
    - 4. Terminate threaded conduits in boxes and enclosures using threaded hubs or double lock nuts for dry locations and raintight hubs for wet locations.
    - 5. Provide insulating bushings, insulated throats, or listed metal fittings with smooth, rounded edges at conduit terminations to protect conductors.
  - G. Penetrations:
    - 1. Do not penetrate or otherwise notch or cut structural members, including footings and grade beams, without approval of Structural Engineer.
    - 2. Provide sleeves for penetrations as indicated or as required to facilitate installation. Set sleeves flush with exposed surfaces unless otherwise indicated or required.
    - 3. Where conduits penetrate waterproof membrane, seal as required to maintain integrity of membrane.
    - 4. Make penetrations for roof-mounted equipment within associated equipment openings and curbs where possible to minimize roofing system penetrations. Where penetrations are necessary, seal as indicated or as required to preserve integrity of roofing system and maintain roof warranty.

H. Underground Installation:

- 1. Minimum Cover, Unless Otherwise Indicated or Required:
  - a. Underground, Exterior: 18 inches.
- I. Embedment Within Structural Concrete Slabs (only where approved by Structural Engineer):
- J. Concrete Encasement: Where conduits not otherwise embedded within concrete are indicated to be concrete-encased, provide concrete in accordance with Section 03 3000 with minimum concrete cover of 3 inches on all sides unless otherwise indicated.
- K. Conduit Movement Provisions: Where conduits are subject to movement, provide expansion and expansion/deflection fittings to prevent damage to enclosed conductors or connected equipment. This includes, but is not limited to:

- 1. Where conduits cross structural joints intended for expansion, contraction, or deflection.
  - 2. Where conduits are subject to earth movement by settlement or frost.
- L. Conduit Sealing:
- 1. Use foam conduit sealant to prevent entry of moisture and gases. This includes, but is not limited to:
    - a. Where conduits enter building from outside.
    - b. Where conduits enter building from underground.
    - c. Where conduits may transport moisture to contact live parts.
  - 2. Where conduits cross barriers between areas of potential substantial temperature differential, use foam conduit sealant at accessible point near penetration to prevent condensation. This includes, but is not limited to:
    - a. Where conduits pass from outdoors into conditioned interior spaces.
    - b. Where conduits pass from unconditioned interior spaces into conditioned interior spaces.

**END OF SECTION 26 0533.13**

**PART 1 GENERAL**

- 1.01 SUBMITTALS
- A. Product Data: Provide manufacturer's standard catalog pages and data sheets for panelboards, enclosures, overcurrent protective devices, and other installed components and accessories.
  - 1. Include characteristic trip curves for each type and rating of overcurrent protective device.
  - B. Shop Drawings: Indicate outline and support point dimensions, voltage, main bus ampacity, overcurrent protective device arrangement and sizes, short circuit current ratings, conduit entry locations, conductor terminal information, and installed features and accessories.
    - 1. Include dimensioned plan and elevation views of panelboards and adjacent equipment with all required clearances indicated.
    - 2. Clearly indicate whether proposed short circuit current ratings are fully rated or, where acceptable, series rated systems.
    - 3. Include documentation of listed series ratings.
  - C. Source Quality Control Test Reports: Include reports for tests designated in NEMA PB 1 as routine tests.
  - D. Project Record Documents: Record actual installed locations of panelboards and actual installed circuiting arrangements.

1.02 QUALITY ASSURANCE

- A. Comply with requirements of NFPA 70.

**PART 2 PRODUCTS**

- 2.01 PANELBOARDS - GENERAL REQUIREMENTS
- A. Provide products listed, classified, and labeled as suitable for the purpose intended.
  - B. Short Circuit Current Rating:
    - 1. Provide panelboards with listed short circuit current rating not less than the available fault current at the installed location as determined by short circuit study performed in accordance with Section 26 0573.
    - 2. Listed series ratings are not acceptable.
  - C. Panelboards Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
  - D. Mains: Configure for top or bottom incoming feed as indicated or as required for the installation.
  - E. Conductor Terminations: Suitable for use with the conductors to be installed.
  - F. Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
    - 1. Boxes: Galvanized steel unless otherwise indicated.
      - a. Provide wiring gutters sized to accommodate the conductors to be installed.
      - b. Provide painted steel boxes for surface-mounted panelboards where indicated, finish to match fronts.
    - 2. Fronts:
    - 3. Lockable Doors: All locks keyed alike unless otherwise indicated.
  - G. Future Provisions: Prepare all unused spaces for future installation of devices including bussing, connectors, mounting hardware and all other required provisions.
  - H. Surge Protective Devices: Surge Protective Devices shall be factory-installed, internally mounted surge protective devices are provided in accordance with Section 26 4300, list and label panelboards as a complete assembly including surge protective device.
    - 1. Provide SPD's internally mounted in all panels.
  - I. Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.
  - J. Load centers are not acceptable.

2.02 POWER DISTRIBUTION PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, power and feeder distribution type, circuit breaker type, and listed and labeled as complying with UL

- 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
- 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
- 1. Phase and Neutral Bus Material: Aluminum or copper.
  - 2. Ground Bus Material: Aluminum or copper.
- D. Circuit Breakers:
- 1. Provide bolt-on type or plug-in type secured with locking mechanical restraints.
  - 2. Provide thermal magnetic circuit breakers for circuit breaker frame sizes less than 100 amperes.
  - 3. Provide electronic trip circuit breakers for circuit breaker frame sizes 100 amperes and above.
- E. Enclosures:
- 1. Provide surface-mounted enclosures unless otherwise indicated.
  - 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
  - 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.03 LIGHTING AND APPLIANCE PANELBOARDS

- A. Description: Panelboards complying with NEMA PB 1, lighting and appliance branch circuit type, circuit breaker type, and listed and labeled as complying with UL 67; ratings, configurations and features as indicated on the drawings.
- B. Conductor Terminations:
  - 1. Main and Neutral Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 2. Main and Neutral Lug Type: Mechanical.
- C. Bussing:
  - 1. Phase and Neutral Bus Material: Aluminum or copper.
  - 2. Ground Bus Material: Aluminum or copper.
- D. Circuit Breakers: Thermal magnetic bolt-on type unless otherwise indicated.
- E. Enclosures:
  - 1. Provide surface-mounted or flush-mounted enclosures as indicated.
  - 2. Fronts: Provide lockable hinged door with concealed hinges for access to overcurrent protective device handles without exposing live parts.
  - 3. Provide clear plastic circuit directory holder mounted on inside of door.

2.04 OVERCURRENT PROTECTIVE DEVICES

- A. Molded Case Circuit Breakers:
  - 1. Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
  - 2. Interrupting Capacity:
    - a. Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating indicated, but not less than:
      - 1) 10,000 rms symmetrical amperes at 240 VAC or 208 VAC.
      - 2) 14,000 rms symmetrical amperes at 480 VAC.
    - b. Fully Rated Systems: Provide circuit breakers with interrupting capacity not less than the short circuit current rating indicated.
  - 3. Conductor Terminations:
    - a. Provide mechanical lugs unless otherwise indicated.
    - b. Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
  - 4. Thermal Magnetic Circuit Breakers: For each pole, furnish thermal inverse time tripping element for overload protection and magnetic instantaneous tripping element for short circuit protection.
  - 5. Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
    - a. Provide the following field-adjustable trip response settings that are individually adjustable:
      - 1) Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
      - 2) Long time delay.
      - 3) Short time pickup and delay.
      - 4) Instantaneous pickup.
      - 5) Ground fault pickup and delay where ground fault protection is indicated.
  - 6. Provide the following circuit breaker types where indicated:
    - a. Ground Fault Circuit Interrupter (GFCI) Circuit Breakers: Listed as complying with UL 943, class A for protection of personnel.

SPECIFICATIONS CONTINUED ON NEXT SHEET

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City of Raleigh  
 Public Utilities Department Permit #: \_\_\_\_\_  
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City of Raleigh  
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DATE	07/2022
DATE	3/16/2022
DRAWN BY	JTP
DESIGNED BY	WRJ
CHECKED BY	WRJ
SCALE	

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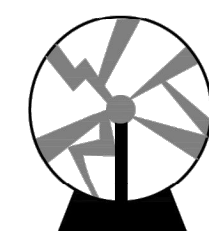
**ROLESVILLE CROSSING**  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA  
**SPECIFICATIONS**

JOB NO.	43398
SHEET NO.	E4.2

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# TIMMONS GROUP

## ROLESVILLE CROSSING ROLESVILLE - WAKE COUNTY - NORTH CAROLINA SPECIFICATIONS

JOB NO.  
**43398**  
SHEET NO.  
**E4.3**

- Provide listed switching duty rated circuit breakers with SWD marking for all branch circuits serving fluorescent lighting.
- Provide listed high intensity discharge lighting rated circuit breakers with HID marking for all branch circuits serving HID lighting.
- Do not use tandem circuit breakers.
- Do not use handle ties in lieu of multi-pole circuit breakers.

### PART 3 EXECUTION

- 3.01 INSTALLATION
- Perform work in accordance with NECA 1 (general workmanship).
  - Install products in accordance with manufacturer's instructions.
  - Install panelboards in accordance with NECA 407 and NEMA PB 1.1.
  - Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
  - Provide required support and attachment in accordance with Section 26 0529.
  - Mount panelboards such that the highest position of any operating handle for circuit breakers or switches does not exceed 79 inches above the floor or working platform.
  - Provide minimum of six spare 1 inch trade size conduits out of each flush-mounted panelboard stubbed into accessible space above ceiling and below floor.
  - Provide grounding and bonding in accordance with Section 26 0526.
  - Set field-adjustable circuit breaker tripping function settings as directed.
  - Set field-adjustable ground fault protection pickup and time delay settings as directed.
  - Provide filler plates to cover unused spaces in panelboards.

### END OF SECTION 26 2416

### PART 1 GENERAL

- 1.01 SUBMITTALS
- Product Data: Provide manufacturer's standard catalog pages and data sheets for circuit breakers, enclosures, and other installed components and accessories.
    - Include characteristic trip curves for each type and rating of circuit breaker upon request.

### PART 2 PRODUCTS

- 2.01 ENCLOSED CIRCUIT BREAKERS
- Description: Units consisting of molded case circuit breakers individually mounted in enclosures.
  - Short Circuit Current Rating:
    - Provide enclosed circuit breakers with listed short circuit current rating as calculated in the Power System Study.
  - Enclosed Circuit Breakers Used for Service Entrance: Listed and labeled as suitable for use as service equipment according to UL 869A.
  - Conductor Terminations: Suitable for use with the conductors to be installed.
  - Provide electronic trip circuit breakers.
  - Provide solidly bonded equipment ground bus in each enclosed circuit breaker, with a suitable lug for terminating each equipment grounding conductor.
  - Enclosures: Comply with NEMA 250, and list and label as complying with UL 50 and UL 50E.
    - Finish for Painted Steel Enclosures: Manufacturer's standard, factory applied grey unless otherwise indicated.
    - Provide surface-mounted enclosures unless otherwise indicated.
  - Provide externally operable handle with means for locking in the OFF position.
  - Selectivity: Where the requirement for selectivity is indicated, furnish products as required to achieve selective coordination.

### 2.02 MOLDED CASE CIRCUIT BREAKERS

- Description: Quick-make, quick-break, over center toggle, trip-free, trip-indicating circuit breakers listed and labeled as complying with UL 489, and complying with FS W-C-375 where applicable; ratings, configurations, and features as indicated on the drawings.
- Interrupting Capacity:
  - Provide circuit breakers with interrupting capacity as required to provide the short circuit current rating calculated in the power systems analysis.
- Conductor Terminations:
  - Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
- Electronic Trip Circuit Breakers: Furnish solid state, microprocessor-based, true rms sensing trip units.
  - Provide the following field-adjustable trip response settings:
    - Long time pickup, adjustable by replacing interchangeable trip unit or by setting dial.
    - Long time delay.
    - Short time pickup.
    - Short time delay.

### PART 3 EXECUTION

- 3.01 INSTALLATION
- Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
  - Provide required support and attachment in accordance with Section 26 0529.
  - Provide grounding and bonding in accordance with Section 26 0526.
  - Set field-adjustable circuit breaker tripping function settings as determined by overcurrent protective device coordination study performed according to Section 26 0573.

### END OF SECTION 26 2816.13

### PART 1 GENERAL

- 1.01 SUBMITTALS
- Product Data: Provide manufacturer's standard catalog pages and data sheets for enclosed switches and other installed components and accessories.
- 1.02 QUALITY ASSURANCE
- Comply with requirements of NFPA 70.

### PART 2 PRODUCTS

- 2.01 ENCLOSED SAFETY SWITCHES
- Description: Quick-make, quick-break enclosed safety switches listed and labeled as complying with UL 98; heavy duty; ratings, configurations, and features as indicated on the drawings.
  - Provide products listed, classified, and labeled as suitable for the purpose intended.
  - Horsepower Rating: Suitable for connected load.
  - Voltage Rating: Suitable for circuit voltage.
  - Short Circuit Current Rating:
    - Minimum Ratings:
      - Heavy Duty Single Throw Switches Protected by Class R Fuses: 200,000 rms symmetrical amperes.
  - Fuse Clips for Fusible Switches: As required to accept fuses indicated.
    - Where NEMA Class R fuses are installed, provide rejection feature to prevent installation of fuses other than Class R.
  - Provide safety interlock to prevent opening the cover with the switch in the ON position with capability of overriding interlock for testing purposes.
  - Heavy Duty Switches:
    - Comply with NEMA KS 1.
    - Conductor Terminations:
      - Provide mechanical lugs.
      - Lug Material: Aluminum, suitable for terminating aluminum or copper conductors.
    - Provide externally operable handle with means for locking in the OFF position, capable of accepting three padlocks.

### PART 3 EXECUTION

- 3.01 INSTALLATION
- Install products in accordance with manufacturer's instructions.
  - Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
  - Provide required support and attachment in accordance with Section 26 0529.

### END OF SECTION 26 2816.16

### PART 1 GENERAL

- 1.01 SUBMITTALS
- Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.
- PART 2 PRODUCTS
- 2.01 ENCLOSED CONTROLLERS
- Provide products listed, classified, and labeled as suitable for the purpose intended.
  - Description: Enclosed controllers complying with NEMA ICS 2, and listed and labeled as complying with UL 60947-1 and UL 60947-4-1; ratings, configurations and features as indicated on the drawings.
  - Service Conditions:
    - Provide controllers and associated components suitable for operation at indicated ratings under the service conditions at the installed location.
  - Conductor Terminations: Suitable for use with the conductors to be installed.
  - Enclosures:
    - Comply with NEMA ICS 6.
    - Environment Type per NEMA 250: Unless otherwise indicated, as specified for the following installation locations:
      - Indoor Clean, Dry Locations: Type 1 or Type 12.
      - Outdoor Locations: 4X.

### END OF SECTION 26 2913

### PART 1 GENERAL

- 1.01 SUBMITTALS
- Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.
  - Project Record Documents: Record actual installed locations of controllers and final equipment settings.
    - Include nameplate data of actual installed motors and associated overload relay selections and settings.
    - Motor Circuit Protectors: Include magnetic instantaneous trip settings.

### F. Magnetic Motor Starters: Combination or noncombination type as indicated.

- Combination Magnetic Motor Starters: NEMA ICS 2, Class A combination motor controllers with magnetic contactor(s), externally operable disconnect and overload relay(s).
- Configuration: Full-voltage non-reversing unless otherwise indicated.
- Minimum Starter Size: NEMA Size 0.
- Use of non-standard starter sizes smaller than specified standard NEMA sizes is not permitted.
- Overload Relays: Solid-state type unless otherwise indicated.

### 2.02 OVERCURRENT PROTECTIVE DEVICES

- A. Overload Relays:
- Provide overload relays and, where applicable, associated current elements/heaters, selected according to actual installed motor nameplate data, in accordance with manufacturer's recommendations and NFPA 70; include consideration for motor service factor and ambient temperature correction, where applicable.
  - Inverse-Time Trip Class Rating: Class 20 unless otherwise indicated or required.
  - Resettable.
    - Employ manual reset unless otherwise indicated.
    - Do not employ automatic reset with two-wire control.
  - Solid-State Overload Relays:
    - Adjustable full load current.
    - Phase loss protection.
    - Phase imbalance protection.
    - Thermal memory.
    - Provide isolated alarm contact.

### 2.03 CONTROL ACCESSORIES

- A. Auxiliary Contacts:
- Comply with NEMA ICS 5.
  - Provide number and type of contacts indicated or required to perform necessary functions, including holding (seal-in) circuit and interlocking, plus one normally open (NO) and one normally closed (NC) spare contact for each magnetic motor starter, minimum.
- B. Pilot Devices:
- Comply with NEMA ICS 5; heavy-duty type.
  - Nominal Size: 30 mm.
  - Pushbuttons: Unless otherwise indicated, provide momentary, non-illuminated type with flush button operator; normally open or normally closed as indicated or as required.
  - Selector Switches: Unless otherwise indicated, provide maintained, non-illuminated type with knob operator; number of switch positions as indicated or as required.
  - Indicating Lights: Push-to-test type unless otherwise indicated.
  - Provide LED lamp source for indicating lights and illuminated devices.
- C. Control Power Transformers:
- Size to accommodate burden of contactor coil(s) and all connected auxiliary devices.
  - Include primary and secondary fuses.
- D. Control Terminal Blocks: Include 25 percent spare terminals.

### PART 3 EXECUTION

- 3.01 INSTALLATION
- Install products in accordance with manufacturer's instructions.
  - Arrange equipment to provide minimum clearances in accordance with manufacturer's instructions and NFPA 70.
  - Where accessories are not self-powered, provide control power source as indicated or as required to complete installation.
  - Set field-adjustable controllers and associated components according to installed motor requirements, in accordance with manufacturer's recommendations and NFPA 70.

### END OF SECTION 26 2913

### PART 1 GENERAL

- 1.01 SUBMITTALS
- Product Data: Provide manufacturer's standard catalog pages and data sheets for motor controllers, enclosures, overcurrent protective devices, and other installed components and accessories.
  - Project Record Documents: Record actual installed locations of controllers and final equipment settings.
    - Include nameplate data of actual installed motors and associated overload relay selections and settings.
    - Motor Circuit Protectors: Include magnetic instantaneous trip settings.

### PART 2 PRODUCTS

- 2.01 REDUCED VOLTAGE SOLID STATE STARTERS
- Output Power Section
    - The Soft starter shall be available in Amperage ratings from 8A through 1100A at 208 to 600Vac.
    - Three Phase
    - Standard Three Wire L1/U, L2/V, L3/W or Six Wire Inside Delta (Programmable)
  - Soft Starter Keypad
    - The Soft Starter shall be supplied with a backlit alphanumeric Liquid Crystal Display (LCD) Multi-Function Keypad. The Keypad shall be capable of programming and monitoring the Soft starter.
    - Keypad shall be divided into 3 functional groups:
      - Graphical display shall two lines of 16 alphanumeric characters each with full text programming. Codes are not accepted.
      - LEDs – To display soft starter functions
      - Navigation keys to program soft starter, display operational data, and faults
    - The Soft Starter shall have Indication LEDs as follows:
      - Green – The soft starter is "On"
      - Yellow – The soft starter is in "Ramp"
      - Green – The soft starter is in "Run" mode
      - Red – The soft starter is in "Fault" mode
    - The Soft Starter shall display operating data, fault information, and programming parameters in English with other languages - Spanish, German and Italian available by parameter setting.
    - The keypad shall display the last 10 faults and provides detailed information on soft starter operating conditions at the time of fault occurrence.
    - The Soft Starter shall have the following user adjustments
      - Two Motor full load amp settings with individual adjustments from 50 to 100% of the soft starters full load amp rating.
      - Two acceleration ramps with individual adjustments from 1 to 90 seconds.
      - Two deceleration ramps with individual adjustments from 0 to 90 seconds.
      - Two initial voltage settings with individual adjustments from 10 to 80% of nominal voltage.
      - Final torque setting adjustable from 0 to 10 (maximum level).
      - Two current limit settings with individual adjustments from 100 to 500% of motor full load amps.
      - Three selectable pump control acceleration curves.
      - Three selectable pump control deceleration curves.
      - Torque acceleration curve
      - Torque deceleration curve
      - Current control ramp
    - Kick-start (80% voltage boost) shall be adjustable from 0.1 to 1 second.
    - Maximum starting time (stall protection) shall be adjustable from 1 to 60 minutes.
    - Number of starts shall be adjustable from 1 to 10, in a programmable time period of 1 to 60 minutes.
    - The start inhibit time period shall be adjustable from 1 to 60 minutes.
    - Under current trip setting shall be adjustable from 20 to 90% of the motor full load amps. Under current shall be disabled when set to 'Off'.
    - Under current trip shall have an adjustable delay from 1 to 40 seconds.
    - Shear pin shall have an adjustable trip level from 100 to 850% of motor full load amps.

### C. Soft Starter I/O Control

- The Soft starter shall have 6 digital inputs with the following assigned functions:
  - Start
  - Stop
  - Soft Stop
  - External Fault Input
- The Soft starter shall have 3 Form C relay outputs with the following assigned functions:
  - Run
  - End of Ramp
  - Fault
- The Soft Starter shall have 1 analog output signal with either 0/4-20mA or 0-10V settings on ratings 58A and above. The analog output must reflect the motor current.
- The Soft Starter shall have 1 dedicated thermistor input that is programmable for PTC or NTC type thermistors.

SPECIFICATIONS CONTINUED  
ON NEXT SHEET

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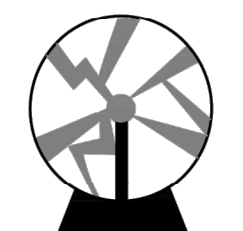
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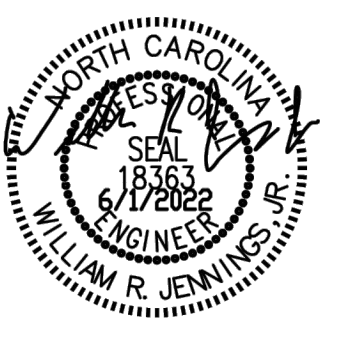


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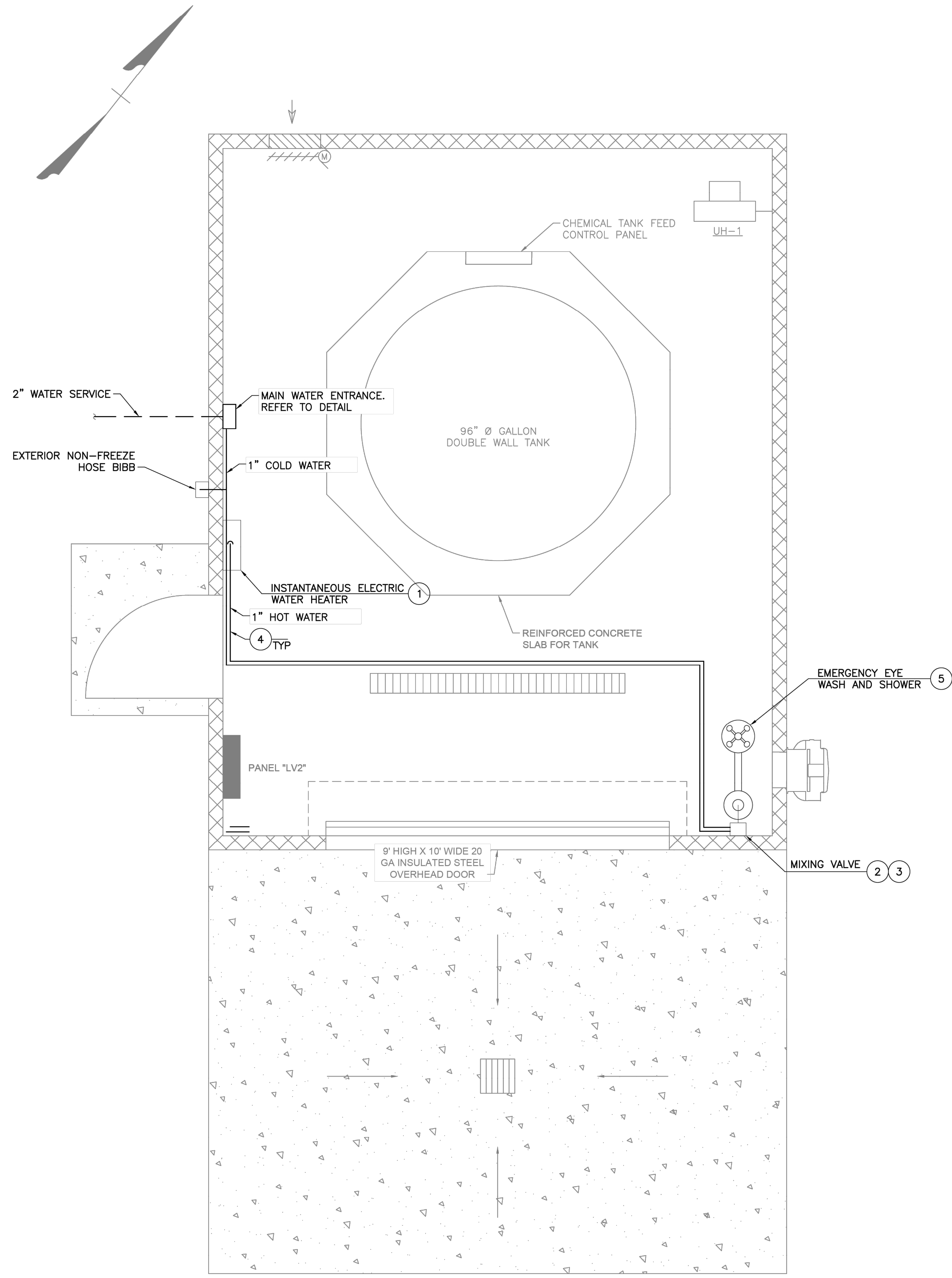
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 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

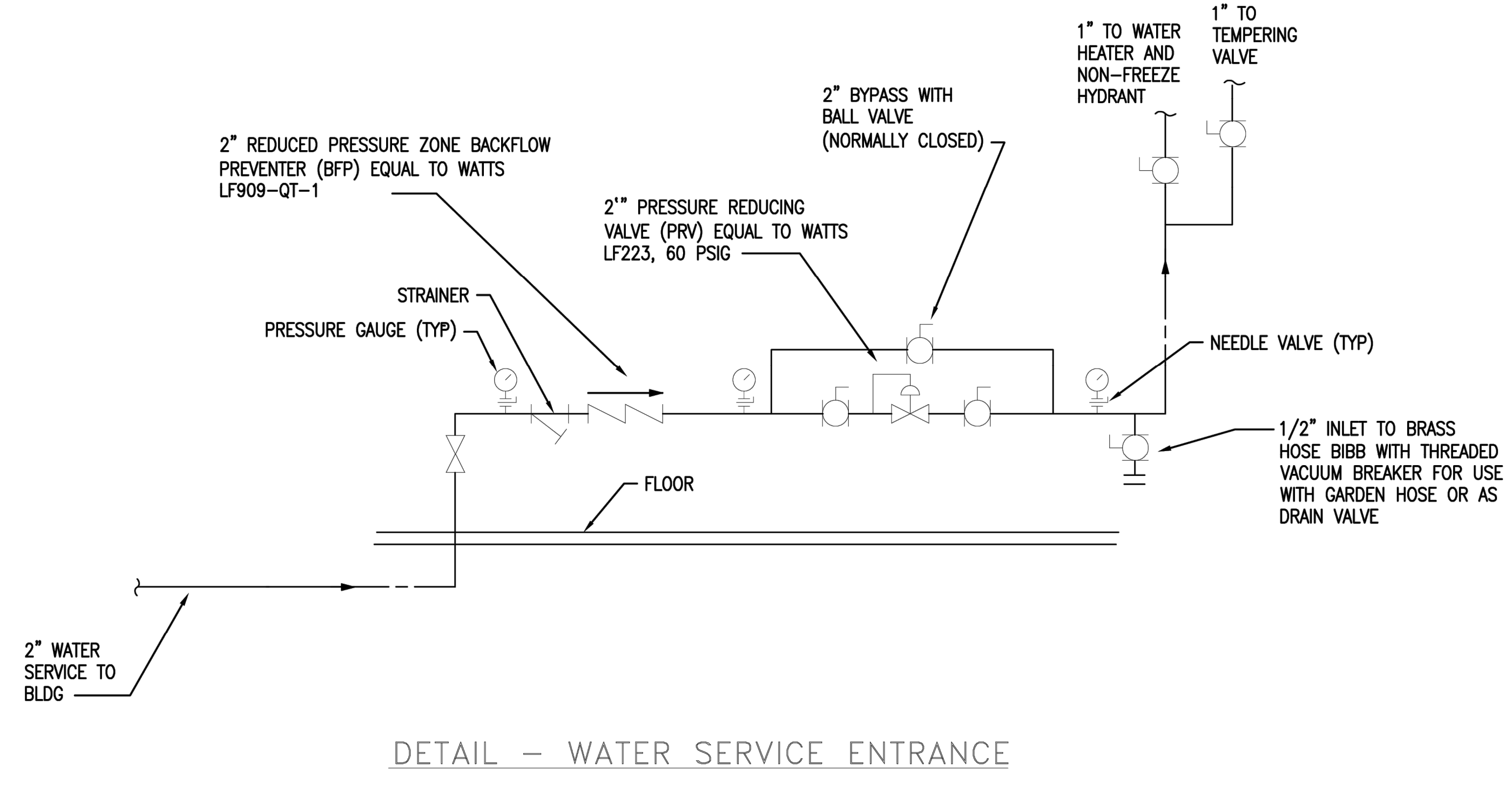
ODOR CONTROL BUILDING FLOOR PLAN - PLUMBING

JOB NO.  
 43398

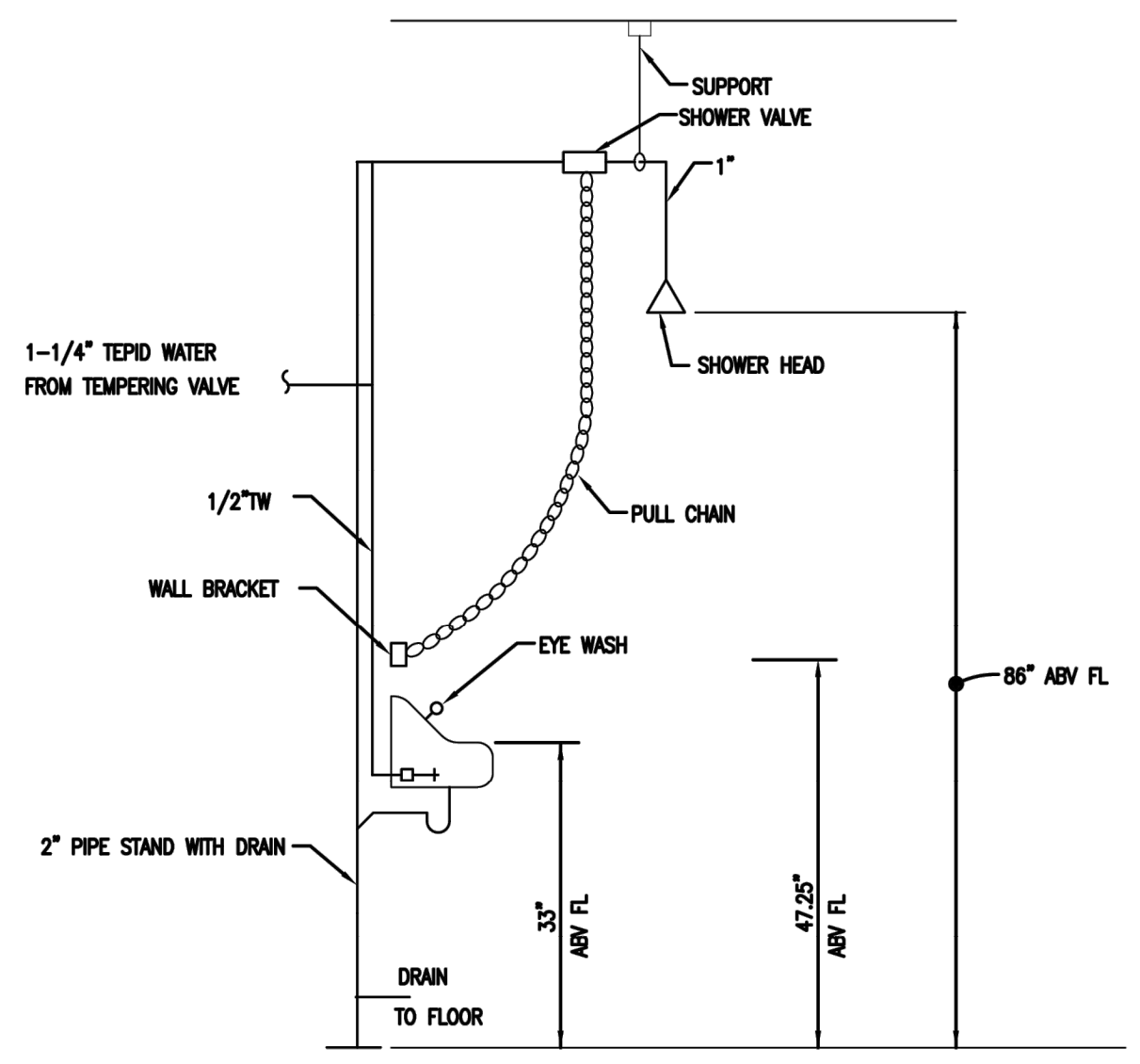
SHEET NO.  
 H1.1



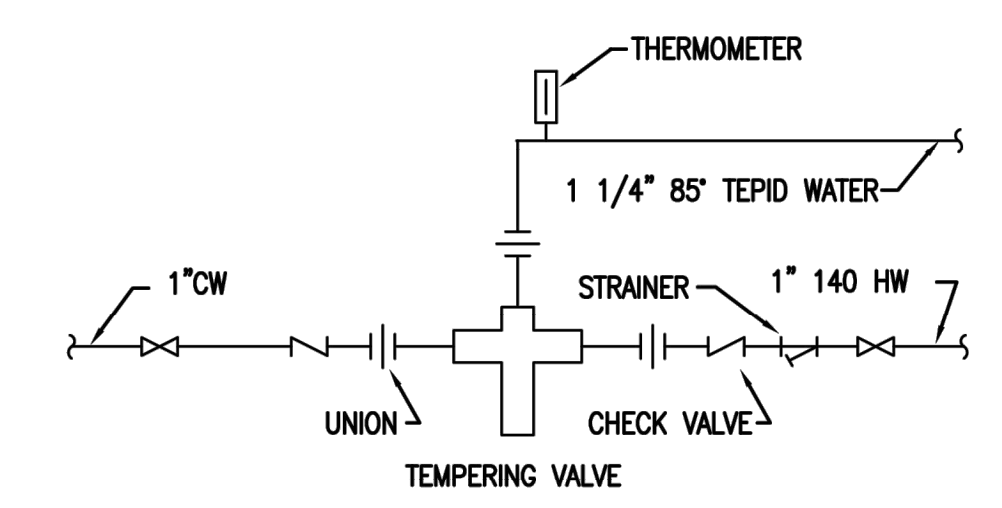
ODOR CONTROL BUILDING FLOOR PLAN - PLUMBING  
 SCALE: 1/2" = 1'-0" 1  
 H1.1 H1.1



DETAIL - WATER SERVICE ENTRANCE



SCHEMATIC DETAIL OF CONNECTIONS  
 TO EYE WASH & EMERGENCY SHOWER  
 NOT TO SCALE



DETAIL OF CONNECTIONS  
 FOR TEMPERING VALVE  
 NO SCALE

**SPECIFIC NOTES:**

- 1 PROVIDE CHROMONITE ELECTRIC TANKLESS WATER HEATER MODEL ER-60H/480\_3P OR EQUAL. HEATER TO BE 480V, 3 PHASE/1 NEMA 4X ENCLOSURE. MOUNT 48" AFF MINIMUM.
- 2 SET THERMOSTATIC MIXING VALVE FOR 86 DEG F DISCHARGE OF TEPID WATER TO EYEWASH/FACEWASH.
- 3 PROVIDE THERMOSTATIC MIXING VALVE EQUAL TO PROVIDE 0.4 GPM TO EYEWASH AND 20 GPM TO SHOWER WITH TEPID WATER (60 DEG F TO 90 DEG F). PROVIDE UNIONS AND CONCENTRIC REDUCERS TO CONVERT 3/4" OUTLET TO 1-1/4" PIPING TO EYEWASH.
- 4 ALL WATER PIPING SHALL BE TYPE K COPPER. ALL COLD WATER AND HOT WATER PIPING TO BE INSULATED WITH 1 INCH THICK CLOSED-CELL FOAM INSULATION.
- 5 PROVIDE COMBINATION EYEWASH/SHOWER EQUAL TO GUARDIAN G1942. BALANCE WATERFLOW TO EYEWASH AND TO SHOWER PER OSHA STANDARDS. PROVIDE BALL VALVES AS REQUIRED TO BALANCE AS DETERMINED BY SYSTEM WATER PRESSURE.

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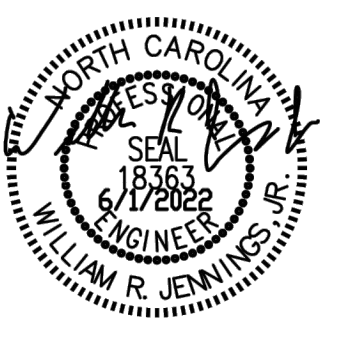
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DATE	REVISION DESCRIPTION
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3/16/2022	

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3/16/2022  
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JTP  
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WRJ  
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ROLESVILLE CROSSING  
 ROLESVILLE - WAKE COUNTY - NORTH CAROLINA

ODOR CONTROL BUILDING FLOOR PLAN - MECHANICAL

JOB NO.  
43398

SHEET NO.  
M1.1

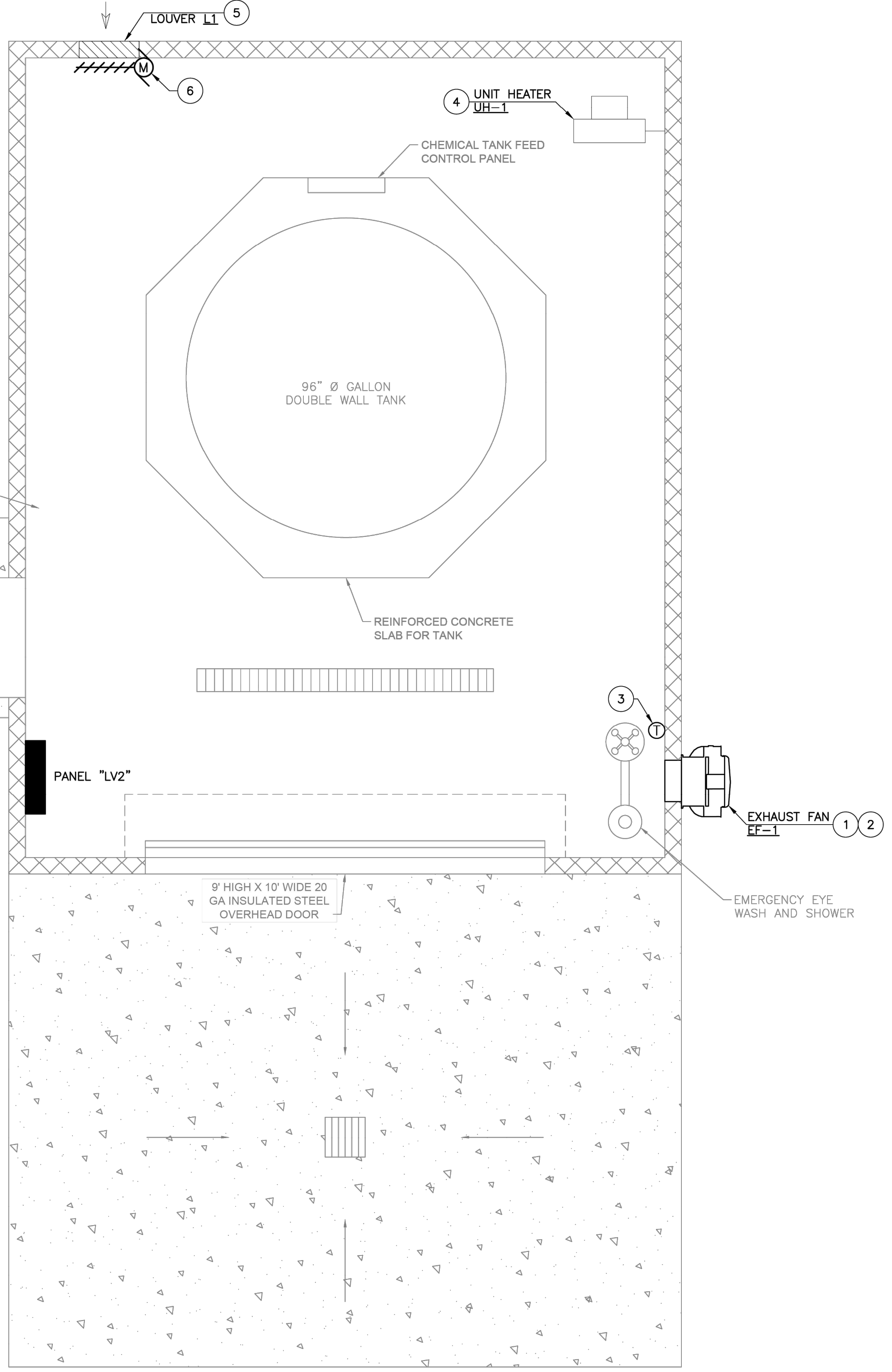
**SPECIFIC NOTES:**

- EF-1: PROVIDE WALL MOUNTED EXHAUST FAN EQUAL TO GREENHECK CUE-090 (650 CFM AT 0.25 INWG, 1550 RPM, 7.5 SONES, 1/6 HP MOTOR, 120V/1PH), WITH DIRECT DRIVE EC MOTOR AND MANUAL SPEED CONTROLLER EQUAL TO GREENHECK VARI-GREEN, APPROXIMATELY 12.5" X 12.5" WALL OPENING. PROVIDE WITH WALL OPENING SUPPORT FRAME. COVER FAN INTAKE WITH ALUMINUM BIRD SCREEN. PROVIDE FAN WITH BACKDRAFT DAMPER. PROVIDE WITH FAN RELAY SO THAT ASSOCIATED INTAKE MOTORIZED DAMPER IS FULLY OPEN PRIOR TO FAN ENERGIZING. PROVIDE WITH WALL MOUNTED MOTOR STARTER. CONTROL SHALL BE WALL MOUNTED THERMOSTAT (85 DEG F, ADJ).
- MOUNT TOP OF FAN APPROXIMATELY 18 INCHES BELOW ROOF STRUCTURE.
- WALL MOUNTED THERMOSTAT FOR FAN CONTROL. MOUNT AT 48 INCHES ABOVE FINISHED FLOOR.
- PROVIDE ELECTRIC UNIT HEATER EQUAL TO MARKEL F2FUH05003 (5KW, 208V/3 PHASE, 18 AMPS, 400 CFM). WITH FACTORY BUILT-IN THERMOSTAT. PROVIDE WITH WALL MOUNTING BRACKET AND DISCONNECT. SET THERMOSTAT FOR 45 DEG F (ADJ).
- L-1: PROVIDE STATIONARY WALL LOUVER FOR INTAKE AIR. MINIMUM DIMENSIONS OF 24" WIDE X 18" WIDE. EQUAL TO GREENHECK MODEL EHM-601, CONSTRUCTED OF HEAVY GAUGE ALUMINUM WITH 45 DEG DUAL DRAINABLE LOUVERS. LOUVER FINISH SHALL BE FACTORY BAKED ENAMEL, COLOR TO MATCH DOORS AND FRAME ON BUILDING. PROVIDE WITH BIRDSCREEN. PROVIDE WITH DAMPER CONNECTION FOR MOTORIZED DAMPER. MOUNT BOTTOM OF LOUVER APPROXIMATELY 12 INCHES ABOVE FINISHED FLOOR.
- PROVIDE LOW LEAKAGE MOTORIZED DAMPER, SPRING LOADED TO BE NORMALLY CLOSED. INTERLOCK WITH EXHAUST FAN EF-1. ACTUATOR SHALL BE LINE VOLTAGE. COORDINATE WITH EXHAUST FAN. DAMPER SHALL OPEN BASED ON THERMOSTAT/FAN OPERATION AND SHALL BE CLOSED WHEN FAN IS OFF.

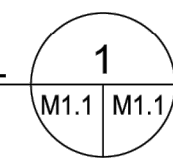
**ATTENTION CONTRACTORS**  
 The Construction Contractor responsible for the extension of water, sewer, and/or reuse, as approved in these plans, is responsible for contacting the Public Utilities Department at (919) 996-4540 at least twenty four hours prior to beginning any of their construction.  
 Failure to notify both City Departments in advance of beginning construction, will result in the issuance of monetary fines, and require reinstallation of any water or sewer facilities not inspected as a result of this notification failure.  
 Failure to call for Inspection, Install a Downstream Plug, have Permitted Plans on the Jobsite, or any other Violation of City of Raleigh Standards will result in a Fine and Possible Exclusion from future work in the City of Raleigh.

**Public Water Distribution / Extension System**  
 The City of Raleigh consents to the connection and extension of the City's public water system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.  
 City of Raleigh  
 Public Utilities Department Permit # \_\_\_\_\_  
 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_

**Public Sewer Collection / Extension System**  
 The City of Raleigh consents to the connection and extension of the City's public sewer system as shown on this plan. The material and construction methods used for this project shall conform to the standards and specifications of the City's Public Utilities Handbook.  
 City of Raleigh  
 Public Utilities Department Permit # \_\_\_\_\_  
 Authorization to Construct \_\_\_\_\_  
 Date \_\_\_\_\_



ODOR CONTROL BUILDING FLOOR PLAN - MECHANICAL  
 SCALE: 1/2" = 1'-0"



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ALL CONSTRUCTION TO BE IN ACCORDANCE WITH ALL TOWN OF ROLESVILLE, CITY OF RALEIGH, NCDEQ AND NCDOT STANDARDS, SPECIFICATIONS, AND DETAILS

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