



# STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

## UTILITIES PLAN SHEET SYMBOLS

### PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11¼ Degree Bend	
22½ Degree Bend	
45 Degree Bend	
90 Degree Bend	
Plug	
Tee	
Cross	
Reducer	
Gate Valve	
Butterfly Valve	
Tapping Valve	
Line Stop	
Line Stop with Bypass	
Blow Off	
Fire Hydrant	
Relocate Fire Hydrant	
Remove Fire Hydrant	
Water Meter	
Relocate Water Meter	
Remove Water Meter	
Water Pump Station	
RPZ Backflow Preventer	
DCV Backflow Preventer	
Relocate RPZ Backflow Preventer	
Relocate DCV Backflow Preventer	

### PROPOSED SEWER SYMBOLS

Gravity Sewer Line (Sized as Shown)	
Force Main Sewer Line (Sized as Shown)	
Manhole (Sized per Note)	
Sewer Pump Station	

### PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement Method	
Encasement	

Thrust Block	
Air Release Valve	
Utility Vault	
Concrete Pier	
Steel Pier	
Plan Note	
Pay Item Note	

### EXISTING UTILITIES SYMBOLS

Power Pole		*Underground Power Line	
Telephone Pole		*Underground Telephone Cable	
Joint Use Pole		*Underground Telephone Conduit	
Utility Pole		*Underground Fiber Optics Telephone Cable	
Utility Pole with Base		*Underground TV Cable	
H-Frame Pole		*Underground Fiber Optics TV Cable	
Power Transmission Line Tower		*Underground Gas Pipeline	
Water Manhole		Aboveground Gas Pipeline	
Power Manhole		*Underground Water Line	
Telephone Manhole		Aboveground Water Line	
Sanitary Sewer Manhole		*Underground Gravity Sanitary Sewer Line	
Hand Hole for Cable		Aboveground Gravity Sanitary Sewer Line	
Power Transformer		*Underground SS Forced Main Line	
Telephone Pedestal		Underground Unknown Utility Line	
CATV Pedestal		SUE Test Hole	
Gas Valve		Water Meter	
Gas Meter		Water Valve	
Located Miscellaneous Utility Object		Fire Hydrant	
Abandoned According to Utility Records		Sanitary Sewer Cleanout	
End of Information			

\*For Existing Utilities  
 Utility Line Drawn from Record (Type as Shown)   
 Designated Utility Line (Type as Shown)



DESIGNED BY: ND

DRAWN BY: ND

CHECKED BY: MUP

APPROVED BY: MUP

REVISED:

UTILITIES ENGINEERING SEC.  
PHONE: (919) 707-6690  
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# UTILITY CONSTRUCTION

## GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATIONS'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2024.

2. THE EXISTING UTILITIES BELONG TO THE CITY OF HENDERSONVILLE. UTILITIES CONTACT: ADAM STEURER, P.E., UTILITIES DIRECTOR, asteurer@hvinc.gov, 828-697-3073

3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY, DIVISION OF WATER RESOURCES, PUBLIC WATER SUPPLY SECTION. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT QUALITY, DIVISION OF WATER RESOURCES, WATER QUALITY SECTION. PERFORM ALL WORK IN ACCORDANCE WITH THE APPLICABLE PLUMBING CODES.

4. THE UTILITY OWNER OWNS THE EXISTING UTILITY FACILITIES AND WILL OWN THE NEW UTILITY FACILITIES AFTER ACCEPTANCE BY THE DEPARTMENT. THE DEPARTMENT OWNS THE CONSTRUCTION CONTRACT AND HAS ADMINISTRATIVE AUTHORITY. COMMUNICATIONS AND DECISIONS BETWEEN THE CONTRACTOR AND UTILITY OWNER ARE NOT BINDING UPON THE DEPARTMENT OR THIS CONTRACT UNLESS AUTHORIZED BY THE ENGINEER. AGREEMENTS BETWEEN THE UTILITY OWNER AND CONTRACTOR FOR THE WORK THAT IS NOT PART OF THIS CONTRACT OR IS SECONDARY TO THIS CONTRACT ARE ALLOWED, BUT ARE NOT BINDING UPON THE DEPARTMENT.

5. PROVIDE ACCESS FOR THE DEPARTMENT PERSONNEL AND THE OWNER'S REPRESENTATIVES TO ALL PHASES OF CONSTRUCTION. NOTIFY DEPARTMENT PERSONNEL AND THE UTILITY OWNER TWO WEEKS PRIOR TO COMMENCEMENT OF ANY WORK AND ONE WEEK PRIOR TO SERVICE INTERRUPTION. KEEP UTILITY OWNERS' REPRESENTATIVES INFORMED OF WORK PROGRESS AND PROVIDE OPPORTUNITY FOR INSPECTION OF CONSTRUCTION AND TESTING.

6. MAKE FINAL CONNECTIONS OF THE NEW WORK TO THE EXISTING SYSTEM WHERE INDICATED ON THE PLANS, AS REQUIRED TO FIT THE ACTUAL CONDITIONS, OR AS DIRECTED.

7. THE PLANS DEPICT THE BEST AVAILABLE INFORMATION FOR THE LOCATION, SIZE, AND TYPE OF MATERIAL FOR ALL EXISTING UTILITIES. MAKE INVESTIGATIONS FOR DETERMINING THE EXACT LOCATION, SIZE, AND TYPE MATERIAL OF THE EXISTING FACILITIES AS NECESSARY FOR THE CONSTRUCTION OF THE PROPOSED UTILITIES AND FOR AVOIDING DAMAGE TO EXISTING FACILITIES. REPAIR ANY DAMAGE INCURRED TO EXISTING FACILITIES TO THE ORIGINAL OR BETTER CONDITION AT NO ADDITIONAL COST TO THE DEPARTMENT.

8. MAKE CONNECTIONS BETWEEN EXISTING AND PROPOSED UTILITIES AT TIMES MOST CONVENIENT TO THE PUBLIC, WITHOUT ENDANGERING THE UTILITY SERVICE, AND IN ACCORDANCE WITH THE UTILITY OWNER'S REQUIREMENTS. MAKE CONNECTIONS ON WEEKENDS, AT NIGHT, AND ON HOLIDAYS IF NECESSARY.

9. ALL UTILITY MATERIALS SHALL BE APPROVED PRIOR TO DELIVERY TO THE PROJECT. SEE 1500-7, " SUBMITTALS AND RECORDS" IN SECTION 1500 OF THE STANDARD SPECIFICATIONS.

## PROJECT SPECIFIC NOTES:

1. CONTRACTOR'S ATTENTION IS DIRECTED TO SECTIONS 102, 107, AND 1550 OF THE STANDARD SPECIFICATIONS CONCERNING TRENCHLESS INSTALLATION. IT IS CONTRACTOR'S RESPONSIBILITY TO HAVE BORE DESIGNED AND SEALED BY A LICENSED NORTH CAROLINA PROFESSIONAL ENGINEER. NO DAMAGE IS ALLOWED TO RIVER, WETLANDS, OR BUFFER ZONES.

2. IF HDPE PIPE IS INSTALLED BY DIRECTIONAL DRILL. IT SHALL BE FILLED WITH WATER AND NOT BE CONNECTED TO ANY OTHER PIPE OR FITTINGS FOR ONE WEEK FROM THE TIME OF INSTALLATION.

3. MATERIALS AND INSTALLATION FOR FORCE MAIN CONSTRUCTION SHALL CONFORM TO THE LATEST VERSIONS OF CITY SPECIFICATIONS AND DETAILS AND AWWA STANDARDS AND REQUIREMENTS.

4. CONTRACTOR SHALL NOTIFY NC811 & APPROPRIATE UTILITIES AGENCIES PRIOR TO PERFORMING ANY WORK.

5. REGULAR WORKING HOURS SHALL BE FROM 7:00 AM TO 5:00 PM MONDAY THROUGH FRIDAY, EXCEPT IN CASES OF EMERGENCY OR OTHERWISE APPROVED IN WRITING BY THE CITY OR AUTHORIZED REPRESENTATIVES. THE CONTRACTOR SHALL ENSURE THE CONSTRUCTION SITE IS SAFE FOR ANY PERSONS WHO MAY BE ON SITE DURING NON-WORKING HOURS.

6. ALL PERSONS SHALL BE COURTEOUS AND RESPECTFUL TO THE PUBLIC. CURSING OR FOUL LANGUAGE IS NOT PERMITTED AND WILL NOT BE TOLERATED.

7. THE CONTRACTOR IS RESPONSIBLE FOR PROVIDING TRAFFIC CONTROL ON ALL ROADWAYS DURING THE PROJECT. THE CONTRACTOR SHALL NOTIFY LOCAL EMERGENCY, SCHOOL AND OTHER NECESSARY AUTHORITIES PRIOR TO ANY STREET CLOSING OR TRAFFIC CHANGE.

8. THE CONTRACTOR AT HIS OWN EXPENSE SHALL KEEP THE CONSTRUCTION SITE AND ADJACENT PUBLIC AND PRIVATE ROADWAYS CLEAN DURING THE PROJECT. THE CONTRACTOR IS RESPONSIBLE FOR CONTROLLING DUST WITHIN THE PROJECT AREA.

9. THE CONTRACTOR IS RESPONSIBLE FOR ALL CONSTRUCTION IN ACCORDANCE WITH THE LINES, GRADES AND ELEVATIONS SHOWN ON THE PLANS OR AS GIVEN BY THE ENGINEER IN THE FIELD.

10. CONTRACTOR SHALL VERIFY THE EXACT LOCATION AND ELEVATION FOR ALL UTILITIES, DRAINAGE AND OTHER UNDERGROUND FACILITIES BOTH EXISTING AND PROPOSED, AND SHALL NOTIFY THE ENGINEER OF ANY DISCREPANCIES OR CONFLICTS PRIOR TO CONSTRUCTION.

11. CONTRACTOR SHALL PROTECT EXISTING UTILITIES DURING CONSTRUCTION. REPAIRS SHALL BE MADE IN ACCORDANCE WITH APPLICABLE STANDARDS OF APPROPRIATE AGENCIES AT THE CONTRACTOR'S EXPENSE.

12. THE CONTRACTOR SHALL BE RESPONSIBLE FOR THE TEMPORARY OR PERMANENT RELOCATION OF STRUCTURES AND UTILITIES, INCLUDING BUT NOT LIMITED TO POLES, SIGNS, FENCES, HYDRANTS, VALVES, PIPING, CONDUITS AND DRAINS THAT INTERFERE WITH THE POSITIONING OF THE WORK SHOWN ON THE DRAWINGS.

13. DURING CONSTRUCTION THE CONTRACTOR SHALL MAINTAIN THE OPERATION OF EXISTING UTILITIES WITH THE LEAST AMOUNT OF SERVICE INTERRUPTION POSSIBLE IN COORDINATION WITH THE CITY OF HENDERSONVILLE. CONTINUOUS SERVICE, PUBLIC HEALTH AND SAFETY CONSIDERATIONS SHALL EXCEED ALL OTHERS AND CONTRACTOR'S SCHEDULE, PLANS AND WORK SHALL AT ALL TIMES BE SUBJECT TO ALTERATION AND REVISION IF NECESSARY FOR THESE CONSIDERATIONS.

14. CONTRACTOR SHALL BE REQUIRED TO CONFORM AND COMPLY WITH ALL RESTRICTIONS AND EASEMENT CONDITIONS AND IS RESPONSIBLE FOR ALL RELATED INCIDENTAL COSTS INVOLVED.

15. ALL DISTURBED AREAS, INCLUDING BUT NOT LIMITED TO ASPHALT, CONCRETE, DRIVEWAYS, ROADS, LANDSCAPING, SHALL BE REPAIRED TO EQUAL OR BETTER CONDITION THAN THE ORIGINAL SITE. GRASS AND LANDSCAPED AREAS FILL MATERIAL MUST BE REPLACED IN TRENCH TO GRADE AS SOON AS CONSTRUCTION ALLOWS. ADEQUATE SEEDING AND STRAW OR MULCH SHALL THEN BE APPLIED TO THE DISTURBED TRENCH AREA. ADDITIONAL FILL AND SITE RESTORATION MAY BE REQUIRED WITHIN THE WARRANTY PERIOD AT THE CITY'S DISCRETION.

16. CONTRACTOR SHALL PROVIDE EROSION CONTROL DEVICES TO CONTROL RUNOFF AS REQUIRED. THE CONTRACTOR IS RESPONSIBLE FOR ANY FINES THAT MAY BE LEVIED DUE TO RUNOFF FROM CONSTRUCTION.

17. IT IS SOLE RESPONSIBILITY OF THE CONTRACTOR TO FOLLOW ALL APPLICABLE FEDERAL, STATE AND LOCAL HEALTH AND SAFETY REGULATIONS PERTAINING TO CONSTRUCTION OPERATIONS.

REVISIONS



DESIGNED BY: ND

DRAWN BY: ND

CHECKED BY: MUP

APPROVED BY: MUP

REVISED:

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SEE NOTE 4 FOR BACKFILL REQUIREMENTS

BACKFILL SHALL BE COMPACTED TO THE REQUIREMENTS IN THE SPECIFICATIONS.

TRENCH WIDTH

TOP OF PIPE

6"

BEDDING MATERIAL AS SPECIFIED TO 6" ABOVE TOP OF PIPE

6" WITH 6" MIN.

TRENCH WIDTH: O.D. PIPE + 2'-0"

NOTES:

1. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS 'B' BEDDING FOR RIGID PIPING.
2. IN ROCK OR WET SOIL, PIPE MUST BE BEDDED IN AT LEAST 6" OF #57 WASHED STONE.
3. FORCE MAIN BEDDING SHALL BE SELECT NATURAL SAND WELL COMPACTED IN 6" LIFTS.
4. TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND SLOANLY RIGHTS-OF-WAY SHALL BE BACKFILLED WITH COMMON BACKFILL MATERIAL CONSISTING OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS AND TAMPED THOROUGHLY. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS. ALL MATERIAL SHALL HAVE AN IN-PLACE DENSITY OF AT LEAST 85% OF MAXIMUM DRY DENSITY (STANDARD PROCTOR) OR AS APPROVED BY THE ENGINEER. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.
5. WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEUS MATERIAL AND PROPER Dewatering, Drying, Protection, and Storage OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS M, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 85% STANDARD PROCTOR.
6. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

DATE: 10/19/2023 SS-D DWG. NO. 1  
SCALE: NOT TO SCALE

GRAVITY SEWER  
TRENCH CONSTRUCTION  
OUTSIDE PAVEMENT

City of Hendersonville Engineering Department  
305 Williams Street  
Hendersonville, NC 28792  
(828) 697-3000 (office)  
www.cityofhendersonville.org

SEE DETAILS FOR TYPICAL PAVEMENT REPLACEMENT SECTIONS SS-D DWG. NO. 19

SEE NOTE 4 FOR BACKFILL REQUIREMENTS UNDER SUBGRADE

UNDISTURBED EARTH

12"

TRENCH WIDTH

POLYETHYLENE TAPE MARKER

BACKFILL SHALL MEET THE REQUIREMENTS OF NOTE 3 BELOW. BACKFILL SHALL BE PLACED IN MAX. 6" LOOSE LIFTS, 98% COMPACTION.

12"

TOP OF PIPE

6"

BEDDING MATERIAL AS SPECIFIED IN NOTE 2, 6" UNDER BOTTOM OF PIPE TO 12" ABOVE TOP OF PIPE.

6"

TRENCH WIDTH: OUTSIDE DIAMETER OF PIPE + 2'-0"

NOTES:

1. THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT, CURB AND GUTTER, AND SIDEWALK.
2. BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS B BEDDING FOR RIGID PIPING.
3. COMMON BACKFILL MATERIAL SHALL CONSIST OF EXCAVATED MATERIALS EXCEPT HIGHLY ORGANIC SILTS AND CLAYS. FILL SHALL BE DEPOSITED IN SUCCESSIVE, UNIFORM, APPROXIMATELY HORIZONTAL LAYERS NOT EXCEEDING EIGHT (8) INCHES IN DEPTH FOR THE FULL WIDTH. MATERIAL SHALL BE FREE OF ROOTS, STONES, AND DEBRIS AND CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR. COMMON BACKFILL SHALL NOT CONTAIN STONE BLOCKS, BROKEN CONCRETE, MASONRY RUBBLE, OR OTHER SIMILAR MATERIALS. IT SHALL HAVE PHYSICAL PROPERTIES SUCH THAT IT CAN BE READILY SPREAD AND COMPACTED DURING FILLING. SNOW, ICE, AND FROZEN SOIL WILL NOT BE PERMITTED.
4. WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEUS MATERIAL AND PROPER Dewatering, Drying, Protection, and Storage OF THE EXCAVATION BY THE CONTRACTOR, CANNOT BE PREPARED TO MEET THE REQUIREMENTS FOR COMMON BACKFILL, DUE TO THE NATURE OF THE MATERIAL (E.G., EXCESSIVE ROCK, MUCK, ORGANICS, CLAY, SILT, OR OTHER MATERIAL), AND AS DETERMINED BY THE ENGINEER, THE UNACCEPTABLE EXCAVATION SHALL BE REMOVED FROM THE SITE AND DISPOSED OF BY THE CONTRACTOR AND REPLACED BY IMPORTED BACKFILL MEETING THE REQUIREMENTS OF STRUCTURAL BACKFILL. IMPORTED STRUCTURAL BACKFILL SHALL BE FREE OF ORGANICS, ROOTS OR OTHER DELETERIOUS MATERIALS AND SHALL NOT CONTAIN MORE THAN FIVE PERCENT (BY WEIGHT) ORGANIC MATERIAL, HAVE A PLASTICITY INDEX (PI) GREATER THAN 25, OR HAVE A MAXIMUM DRY DENSITY LESS THAN 90 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS M, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 85% STANDARD PROCTOR.
5. THE TOP 12 INCHES OF FINAL BACKFILL FOR ROAD OR STREET SUBGRADE SHALL BE COMPACTED TO 98% STANDARD PROCTOR.
6. THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

DATE: 10/19/2023 SS-D DWG. NO. 2  
SCALE: NOT TO SCALE

GRAVITY SEWER  
TRENCH CONSTRUCTION  
UNDER PAVEMENT

City of Hendersonville Engineering Department  
305 Williams Street  
Hendersonville, NC 28792  
(828) 697-3000 (office)  
www.cityofhendersonville.org

FORCE MAIN

24" MH FRAME AND COVER

SHORT BODY COMBINATION AIR VALVE

4" DIA. PRECAST MANHOLE CONCENTRIC CONE

ABC STONE BASE

TRAFFIC RATED MANHOLE FLAT-TOP

MANHOLE RING & COVER

1/2" GROUT

2'-0"

18" MAX.

DEPTH AS REQUIRED

4" DIA. PRECAST MANHOLE CONCENTRIC CONE

2" THREADED BRASS PIPE

2" BRASS BALL VALVE

2" TAPPING SADDLE

ABC STONE BASE

FM

NOTES:

1. TAP ON THE MAIN SHALL BE MADE IN THE POSITION SHOWN.
2. LOCATE MANHOLE AS SHOWN ON THE PLAN OR AS DIRECTED BY THE CITY ENGINEER.
3. AIR VENT DISCHARGE SHALL BE PIPED WITH BRASS PIPE IN A DIRECTION TO PREVENT SPLASHING.

NOT TO SCALE

**AUTOMATIC AIR RELEASE VALVE - DIRECT**

RUBBER SEAL

RESTRAINED: KEEPS CARRIER AT BOTTOM OF CASING WHILE RESTRAINING AGAINST MOVEMENT

CARRIER PIPE

STEEL CASING PIPE

CARRIER PIPE

STAINLESS STEEL BANDS

CASING END SEAL

ENDS OF CASING TO HAVE MASONRY SEAL WITH 8" THICKNESS MINIMUM.

INVERT ELEVATIONS AND GRADES SPECIFIED ON SEWER PROFILE DRAWINGS.

POSITIONING

NUMBER OF RISER/RUNNERS REQ'D FOR STANDARD SPACERS

4 RUNNERS 8"-24" PIPE

6 RUNNERS 24"-36" PIPE

7 RUNNERS 36"-48" PIPE

SPACERS AND RUNNERS FOR 24" PIPES & LESS PLACED 10' O.C. AND NO MORE THAN 5' FROM EACH END OF CASING PIPE. SEE TECHNICAL SPECS.

NOTES:

1. RESTRAINED POSITIONING TO BE USED AT ALL TIMES.
2. CARRIER PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED, DUCTILE IRON OR C900 PVC ONLY.
3. STAINLESS STEEL CASING SPACERS SHALL BE STYLE CCS AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.
4. CASING END SEAL SHALL BE STYLE CCE AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.

RUNNER

LINER

RIBBED FLANGE

SHELL

STAINLESS STEEL CASING SPACER

RESTRAINED JOINT CARRIER PIPE

STEEL ENCASEMENT

STAINLESS STEEL CASING SPACER MIN. OF 2 PER STICK OF CARRIER PIPE (10' O.C. AND NOT MORE THAN 5' FROM EACH END OF CASING PIPE SPACING TYP.)

5'-0" MAX.

5'-0" MAX.

CASING SPACER PLACEMENT DIAGRAM

DATE: 10/19/2023 SS-D DWG. NO. 14  
SCALE: NOT TO SCALE

PIPE BORING  
AND  
ENCASEMENT

City of Hendersonville Engineering Department  
305 Williams Street  
Hendersonville, NC 28792  
(828) 697-3000 (office)  
www.cityofhendersonville.org

CLASS 'B' CONCRETE

12" MIN.

O.D. PIPE

12" MIN.

12" MIN.

O.D. PIPE

12" MIN.

WIDTH OF ENCASEMENT IN ROCK: O.D. PIPE + 24"

DATE: 10/19/2023 SS-D DWG. NO. 3  
SCALE: NOT TO SCALE

CONCRETE PIPE ENCASEMENT

City of Hendersonville Engineering Department  
305 Williams Street  
Hendersonville, NC 28792  
(828) 697-3000 (office)  
www.cityofhendersonville.org

FINISHED GRADE OR ROADWAY SURFACE

STORM OR UTILITY PIPE

DEFLECTIONS AS ALLOWED BY MANUFACTURER

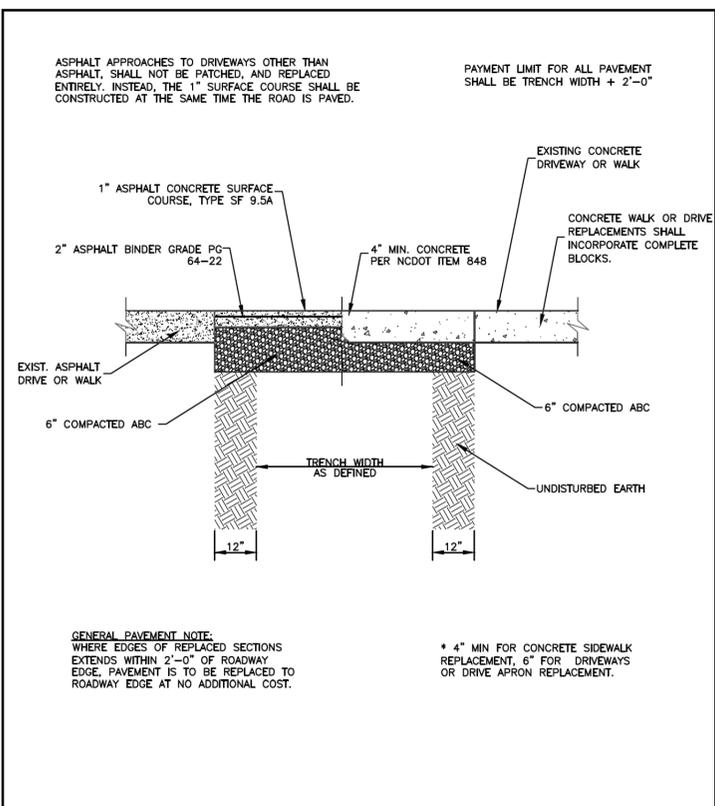
18" MIN. SEPARATION

WATER/SEWER MAIN

NOT TO SCALE

**WATER/SEWER MAIN CROSSING UNDER STORM/UTILITY PIPE**

REVISIONS



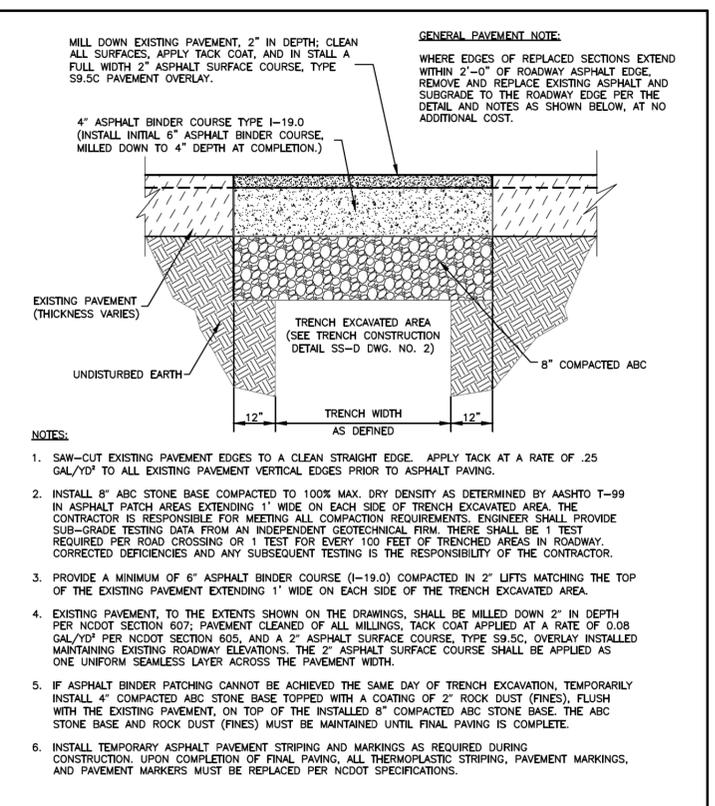
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 SCALE: NOT TO SCALE

ASPHALT OR CONCRETE DRIVEWAY AND WALKWAY

City of Hendersonville Engineering Department  
 305 Williams Street  
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[www.cityofhendersonville.org](http://www.cityofhendersonville.org)



H:\DETAILS - Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, ASPH-CONC DRV WALK-18



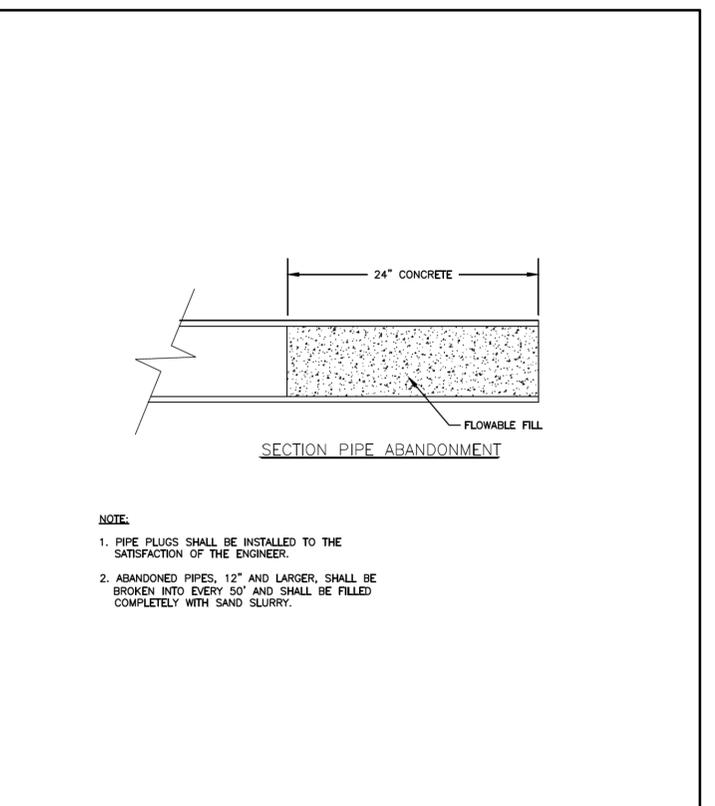
DATE: 10/19/2023 SS-D DWG. NO. 19  
 SCALE: NOT TO SCALE

ASPHALT PAVEMENT REPLACEMENT WITH OVERLAY

City of Hendersonville Engineering Department  
 305 Williams Street  
 Hendersonville, NC 28792  
 (828) 697-3000 (office)  
[www.cityofhendersonville.org](http://www.cityofhendersonville.org)



H:\DETAILS - Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, ASPH-CONC REPLACEMENT-19



DATE: 10/19/2023 SS-D DWG. NO. 24  
 SCALE: NOT TO SCALE

PIPE ABANDONMENT

City of Hendersonville Engineering Department  
 305 Williams Street  
 Hendersonville, NC 28792  
 (828) 697-3000 (office)  
[www.cityofhendersonville.org](http://www.cityofhendersonville.org)



H:\DETAILS - Current Standard Details\Sewer Only\COH-SEWER-DETAILS-102023.dwg, PIPE ABANDONMENT-24

24-00277-019  
 UC 03B  
 NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY



UTILITY DESIGN UNIT  
 UTILITY CONSTRUCTION PLANS ONLY



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 DRAWN BY: ND  
 CHECKED BY: MUP  
 APPROVED BY: MUP  
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Johnson, Mirremon, & Thompson, Inc.  
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 Raleigh, NC, 27609  
 License No: C-3097

REVISIONS



UTILITY DESIGN UNIT  
UTILITY CONSTRUCTION  
PLANS ONLY



DESIGNED BY: ND

DRAWN BY: ND

CHECKED BY: MUP

APPROVED BY: MUP

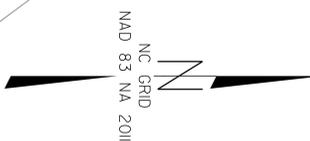
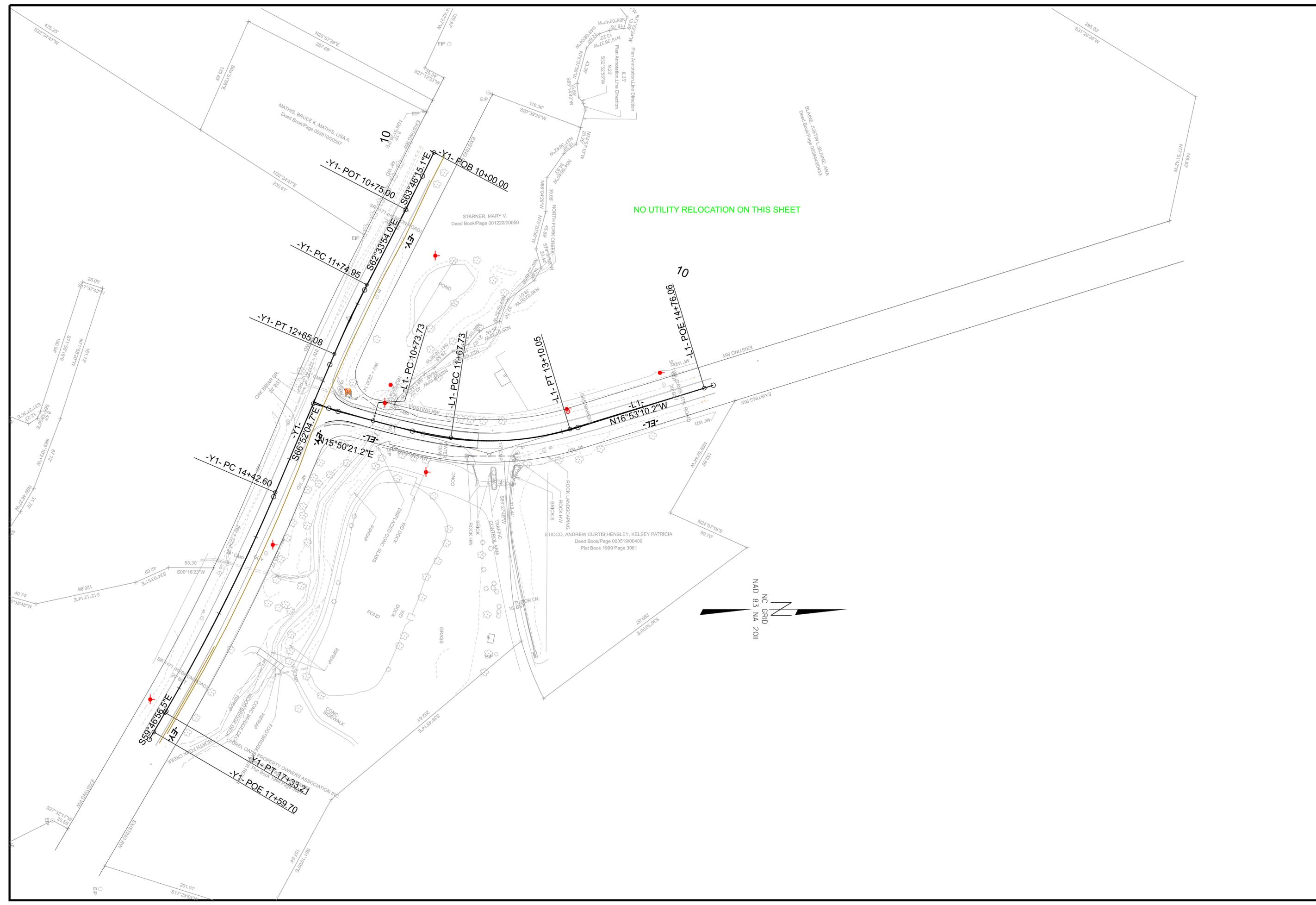
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NO UTILITY RELOCATION ON THIS SHEET



REVISIONS



DESIGNED BY: ND

DRAWN BY: ND

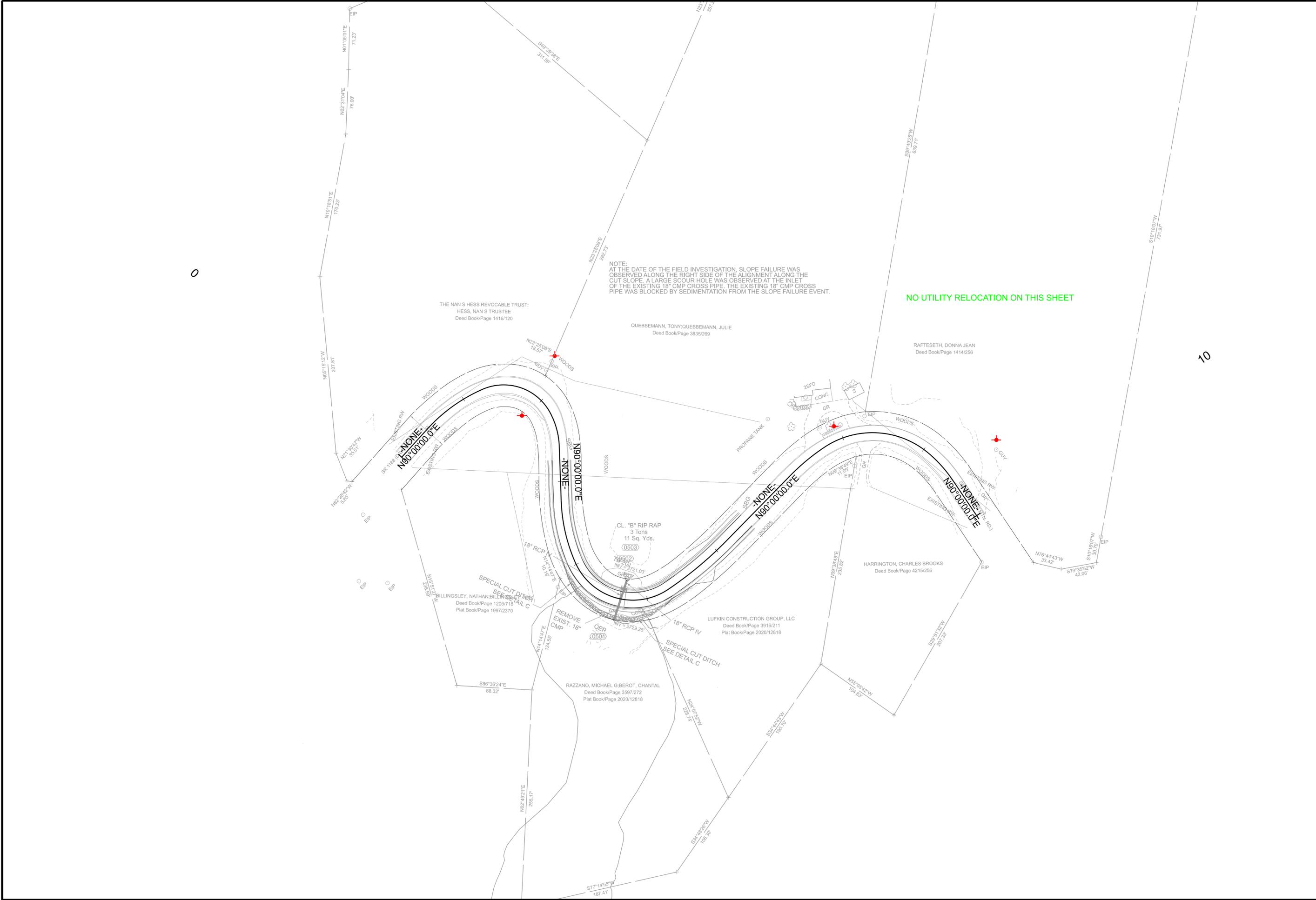
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NOTE:  
AT THE DATE OF THE FIELD INVESTIGATION, SLOPE FAILURE WAS OBSERVED ALONG THE RIGHT SIDE OF THE ALIGNMENT ALONG THE CUT SLOPE. A LARGE SCOUR HOLE WAS OBSERVED AT THE INLET OF THE EXISTING 18" CMP CROSS PIPE. THE EXISTING 18" CMP CROSS PIPE WAS BLOCKED BY SEDIMENTATION FROM THE SLOPE FAILURE EVENT.

NO UTILITY RELOCATION ON THIS SHEET

THE NAN S HESS REVOCABLE TRUST;  
HESS, NAN S TRUSTEE  
Deed Book/Page 1416/120

QUEBBEMANN, TONY; QUEBBEMANN, JULIE  
Deed Book/Page 3835/269

RAFTSETH, DONNA JEAN  
Deed Book/Page 1414/256

BILLINGSLEY, NATHAN; BILLINGSLEY, JESSIE  
Deed Book/Page 1206/718  
Plat Book/Page 1997/2370

RAZZANO, MICHAEL G; BEROT, CHANTAL  
Deed Book/Page 3597/272  
Plat Book/Page 2020/12818

LUFKIN CONSTRUCTION GROUP, LLC  
Deed Book/Page 3916/211  
Plat Book/Page 2020/12818

HARRINGTON, CHARLES BROOKS  
Deed Book/Page 4215/256

CL. "B" RIP RAP  
3 Tons  
11 Sq. Yds.  
(0503)

REMOVE  
EXIST. 18"  
CMP  
(0501)

SPECIAL CUT DITCH  
SEE DETAIL C

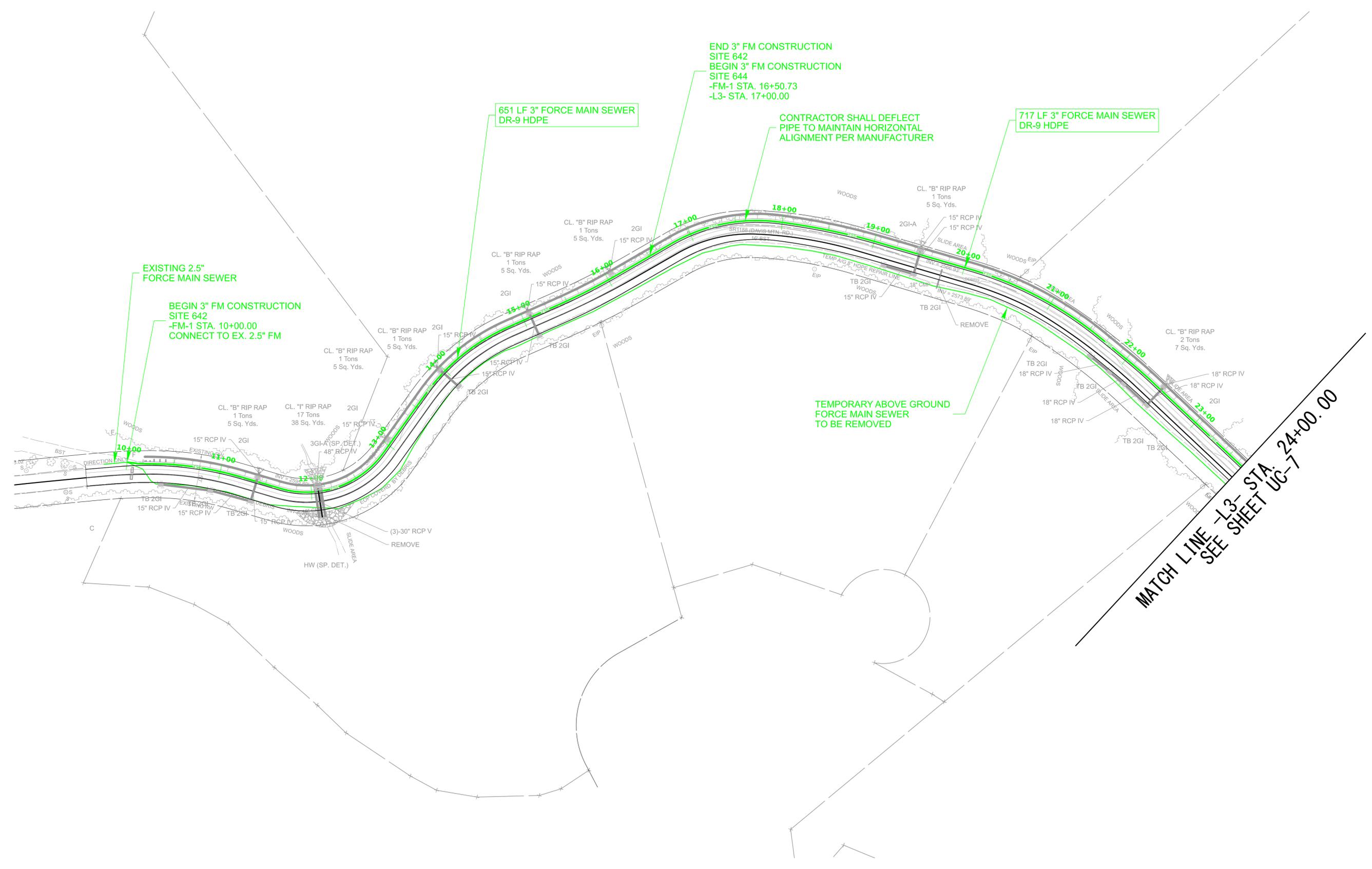
SPECIAL CUT DITCH  
SEE DETAIL C

10

REVISIONS



DESIGNED BY: ND  
DRAWN BY: ND  
CHECKED BY: MUP  
APPROVED BY: MUP  
REVISED:  
UTILITIES ENGINEERING SEC.  
PHONE: (919) 707-6690  
FAX: (919) 250-4151  
DOCUMENT NOT CONSIDERED FINAL  
UNLESS ALL SIGNATURES COMPLETED



EXISTING 2.5" FORCE MAIN SEWER

BEGIN 3" FM CONSTRUCTION  
SITE 642  
-FM-1 STA. 10+00.00  
CONNECT TO EX. 2.5" FM

651 LF 3" FORCE MAIN SEWER  
DR-9 HDPE

END 3" FM CONSTRUCTION  
SITE 642  
BEGIN 3" FM CONSTRUCTION  
SITE 644  
-FM-1 STA. 16+50.73  
-L3- STA. 17+00.00

CONTRACTOR SHALL DEFLECT  
PIPE TO MAINTAIN HORIZONTAL  
ALIGNMENT PER MANUFACTURER

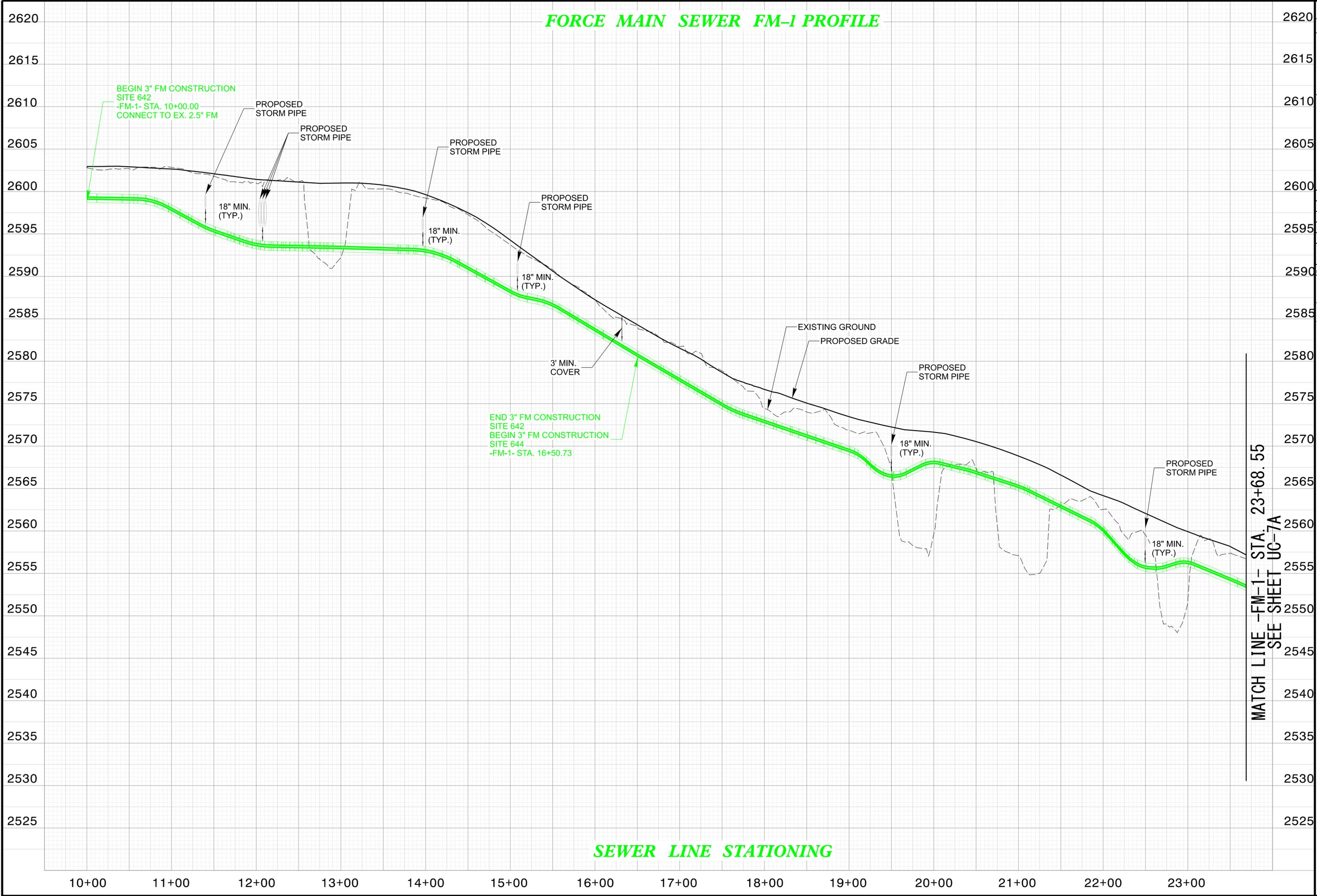
717 LF 3" FORCE MAIN SEWER  
DR-9 HDPE

TEMPORARY ABOVE GROUND  
FORCE MAIN SEWER  
TO BE REMOVED

MATCH LINE -L3- STA. 24+00.00  
SEE SHEET UC-7

REVISIONS

# FORCE MAIN SEWER FM-1 PROFILE



24-00277-019  
UC 06A

NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION  
HENDERSON COUNTY

UTILITY DESIGN UNIT  
UTILITY CONSTRUCTION  
PLANS ONLY

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**JMT**  
Johnson, Mirreton, & Thompson, Inc.  
4700 Falls of Neuse Rd., Suite 100,  
Raleigh, NC, 27609  
License No: C-3097

MATCH LINE -FM-1- STA. 23+68.55  
SEE SHEET UC-7A

SEWER LINE STATIONING

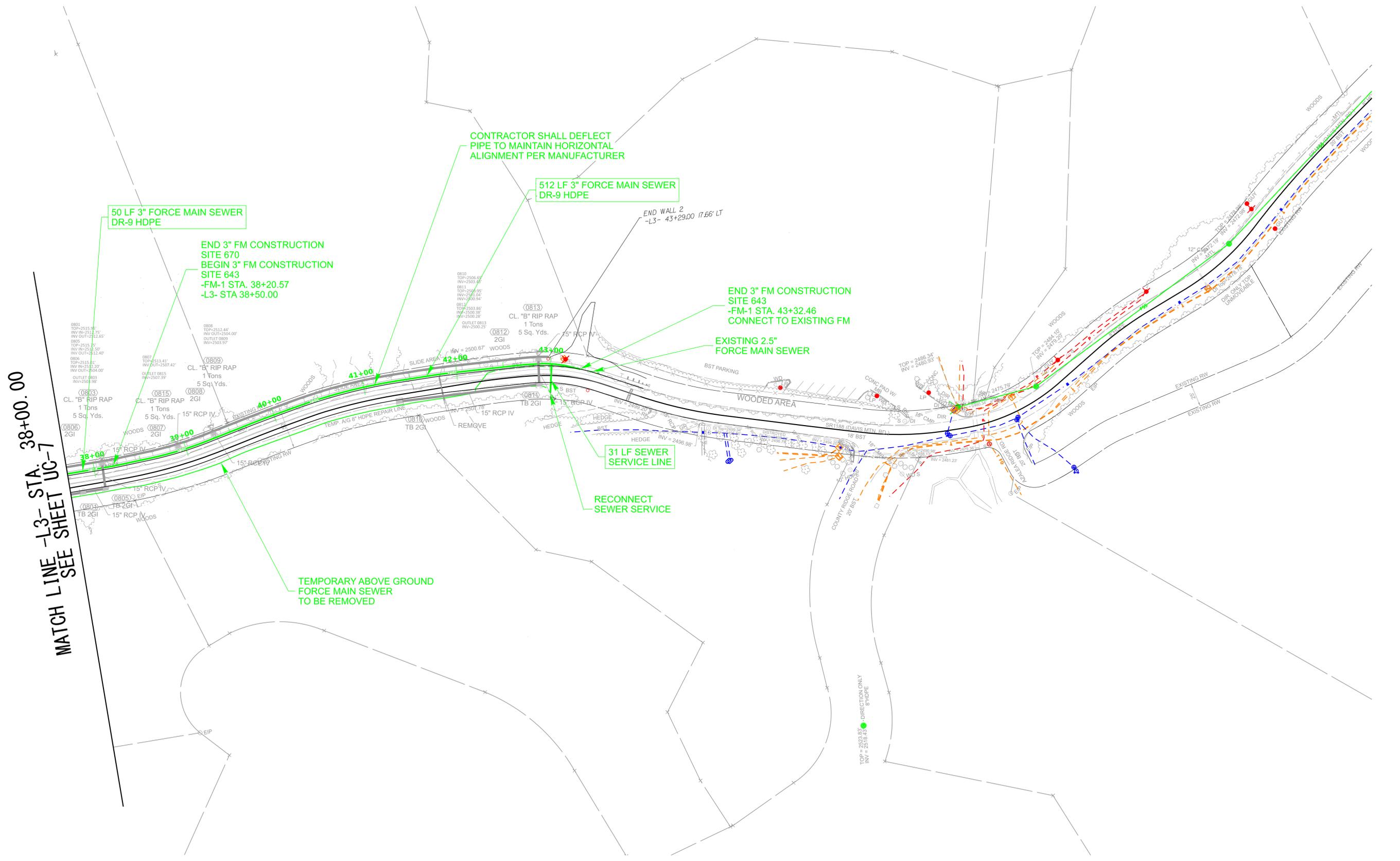
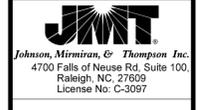
REVISIONS







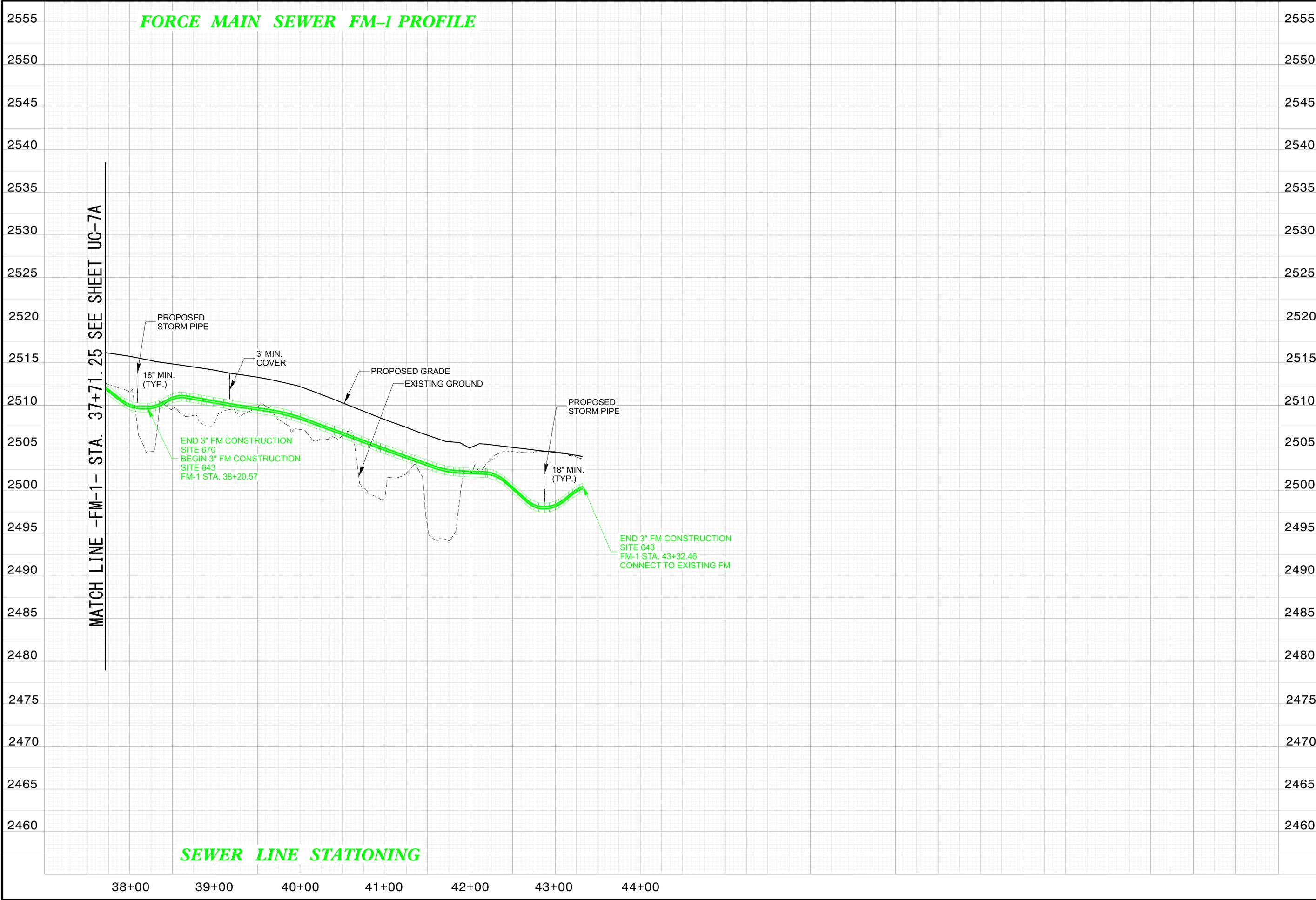
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MATCH LINE -L3- STA. 38+00.00  
SEE SHEET UC-7

REVISIONS

# FORCE MAIN SEWER FM-1 PROFILE



MATCH LINE -FM-1- STA. 37+71.25 SEE SHEET UC-7A

SEWER LINE STATIONING

2555	24-00277-019
2550	UC 08A
2545	NORTH CAROLINA DEPARTMENT OF TRANSPORTATION HENDERSON COUNTY
2540	UTILITY DESIGN UNIT
2535	UTILITY CONSTRUCTION PLANS ONLY
2530	DESIGNED BY: ND
2525	DRAWN BY: ND
2520	CHECKED BY: MUP
2515	APPROVED BY: MUP
2510	REVISOR:
2505	UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151
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2490	REVISIONS
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