

NORTH CAROLINA  
HENDERSON COUNTY

**UTILITY CONSTRUCTION AGREEMENT (UCA)**

DATE: 10/29/2020

NORTH CAROLINA DEPARTMENT OF  
TRANSPORTATION

Project: U-5887

AND

WBS Elements: 44634.3.1

CITY OF HENDERSONVILLE

THIS AGREEMENT is made and entered into on the last date executed below, by and between the North Carolina Department of Transportation, an agency of the State of North Carolina, hereinafter referred to as the "Department" and the City of Hendersonville, hereinafter referred to as the "Municipality."

**WITNESSETH:**

WHEREAS, the Department has prepared and adopted plans to make certain street and highway improvements under Project U-5887, in Henderson County, said plans consists of roadway upgrades on SR 1783 (Highland Lake Road), from NC 225 to US 176; Henderson County; said project having a right-of-way width as shown on the project plans on file with the Department's office in Raleigh, North Carolina; and,

WHEREAS, the parties hereto wish to enter into an agreement for certain utility work to be performed by the Department's construction contractor with full reimbursement by the Municipality for the costs thereof as hereinafter set out.

NOW, THEREFORE, it is agreed as follows:

**CONSTRUCTION**

1. The Department shall place provisions in the construction contract for Project U-5887, Henderson County, for the contractor to adjust and relocate water and sewer lines. The Department shall also include in its construction contract the upsizing of water lines and new construction as Utility Betterments. Said work shall be accomplished in accordance with plan sheets, attached hereto as Exhibit "A", cost estimate attached hereto as Exhibit "B", and project specific provisions, if applicable, attached hereto as Exhibit "C".

2. The Municipality shall be responsible for water and sewer lines cost as shown on the attached Exhibit "A". The estimated cost to the Municipality for the relocations and betterments is **\$510,000.00** as shown on the attached Exhibit "B". It is understood by both parties that this is an estimated cost and is subject to change.

#### **REIMBURSEMENT TO THE DEPARTMENT – FINAL BILLING**

3. The Municipality shall reimburse the Department for said costs as follows:
  - A. Upon completion of the highway work, the Department shall submit an itemized invoice to the Municipality for costs incurred. Billing will be based upon the actual bid prices and actual quantities used.
  - B. Reimbursement shall be made by the Municipality in one final payment within sixty (60) days of said invoice.
  - C. If the Municipality does not pay said invoice within sixty (60) days of the date of the invoice, the Department shall charge interest on any unpaid balance at a variable rate of the prime plus (1%) in accordance with G.S. 136-27.3.
  - D. Said interest rate shall be set upon final execution of the Agreement by the Department. The Municipality will be notified of the set interest rate by the Department's approval letter upon receipt of the fully executed agreement.
  - E. Any cost incurred due to additional utility work requested by the Municipality after award of the construction contract, shall be solely the responsibility of the Municipality. The Municipality shall reimburse the Department 100% of the additional utility cost.
  - F. In the event the Municipality fails for any reason to pay the Department in accordance with the provisions for payment hereinabove provided, North Carolina General Statute 136-41.3 authorizes the Department to withhold so much of the Municipality's share of funds allocated to said Municipality by North Carolina General Statute, Section 136-41.1, until such time as the Department has received payment in full.

- G. At any time prior to final billing by the Department, the Municipality may prepay any portion of the estimated cost by sending a check with the WBS Element noted to the below address. The Department will provide a final billing based on actual costs, less any previous payments that have been made.

REMITTANCE ADDRESS:

NC Department of Transportation  
ATTN: Accounts Receivable  
1514 Mail Service Center  
Raleigh, NC 27699-1514

4. Upon the satisfactory completion of the relocations and adjustments of the utility lines covered under this Agreement, the Municipality shall assume normal maintenance operations to the said utility lines. Upon completion of the construction of the highway project, the Municipality shall release the Department from any and all claims for damages in connection with adjustments made to its utility lines; and, further, the Municipality shall release the Department of any future responsibility for the cost of maintenance to said utility lines. Said releases shall be deemed to be given by the Municipality upon completion of construction of the project and its acceptance by the Department from its contractor unless the Municipality notifies the Department, in writing, to the contrary prior to the Department's acceptance of the project.
5. It is further agreed that the following provisions shall apply regarding the utilities covered in this Agreement.
- H. The Municipality obligates itself to service and to maintain its facilities to be retained and installed over and along the highway within the Department's right-of-way limits in accordance with the mandate of the North Carolina General Statutes and such other laws, rules, and regulations as have been or may be validly enacted or adopted, now or hereafter.
- I. If at any time the Department shall require the removal of or changes in the location of the encroaching facilities which are being relocated at the Municipality's expense, the Municipality binds itself, its successors and assigns, to promptly remove or alter said facilities, in order to conform to the said requirement (if applicable per G.S. 136-27.1), without any cost to the Department.
6. The other party to this Agreement shall comply with Title VI of the Civil Rights Act of 1964 (Title 49 CFR, Subtitle A, Part 21) and related nondiscrimination authorities. Title VI and related

authorities prohibit discrimination on the basis of race, color, national origin, disability, gender, and age in all programs or activities of any recipient of Federal assistance.

7. A copy or facsimile copy of the signature of any party shall be deemed an original with each fully executed copy of the Agreement as binding as an original, and the parties agree that this Agreement can be executed in counterparts, as duplicate originals, with facsimile signatures sufficient to evidence an agreement to be bound by the terms of the Agreement.
8. By Executive Order 24, issued by Governor Perdue, and N.C. G.S. § 133-32, it is unlawful for any vendor or contractor ( i.e. architect, bidder, contractor, construction manager, design professional, engineer, landlord, offeror, seller, subcontractor, supplier, or vendor), to make gifts or to give favors to any State employee of the Governor's Cabinet Agencies (i.e., Administration, Commerce, Environmental Quality, Health and Human Services, Information Technology, Military and Veterans Affairs, Natural and Cultural Resources, Public Safety, Revenue, Transportation, and the Office of the Governor).



IN WITNESS WHEREOF, this Agreement has been executed, in duplicate, the day and year heretofore set out, on the part of the Department and the Municipality by authority duly given.

L.S. ATTEST:

CITY OF HENDERSONVILLE

BY: \_\_\_\_\_ BY: \_\_\_\_\_

TITLE: \_\_\_\_\_ TITLE: \_\_\_\_\_

DATE: \_\_\_\_\_

N.C.G.S. § 133-32 and Executive Order 24 prohibit the offer to, or acceptance by, any State Employee of any gift from anyone with a contract with the State, or from any person seeking to do business with the State. By execution of any response in this procurement, you attest, for your entire organization and its employees or agents, that you are not aware that any such gift has been offered, accepted, or promised by any employees of your organization.

This instrument has been pre-audited in the manner required by the Local Government Budget and Fiscal Control Act.

(SEAL)

\_\_\_\_\_  
(FINANCE OFFICER)

Federal Tax Identification Number

Remittance Address:

City of Hendersonville

DEPARTMENT OF TRANSPORTATION

BY: \_\_\_\_\_  
(CHIEF ENGINEER)

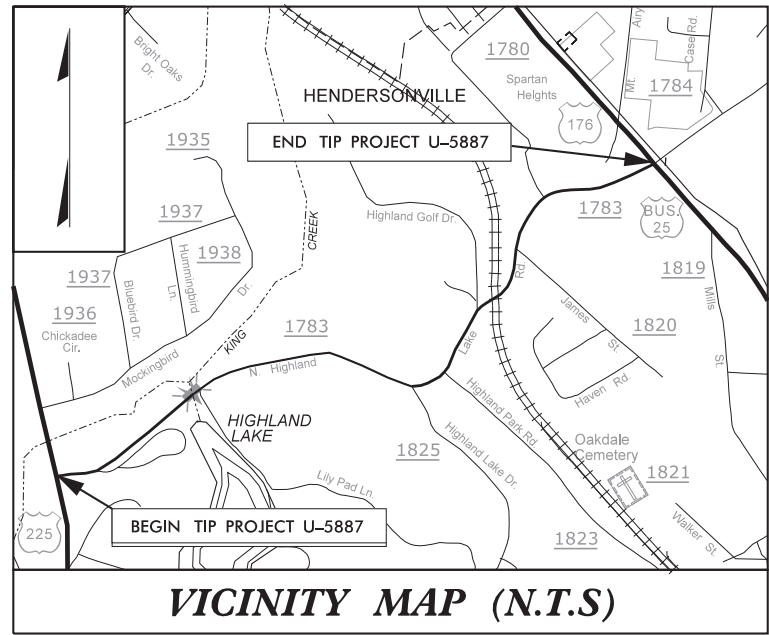
DATE: \_\_\_\_\_

APPROVED BY BOARD OF TRANSPORTATION ITEM O: \_\_\_\_\_ (Date)

12/31/20

TIP PROJECT: U-5887

1/19/2021 3:22:26 PM  
...U-5887-uti\_ucl - Betterment.dgn  
User:mr-davis



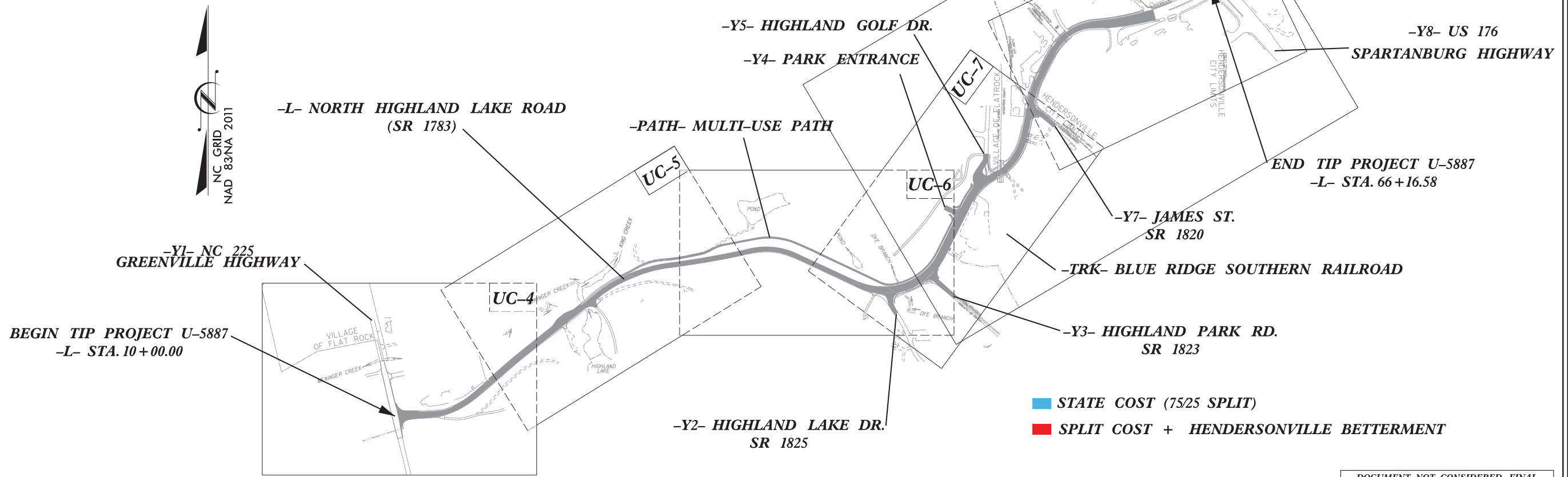
VICINITY MAP (N.T.S)

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

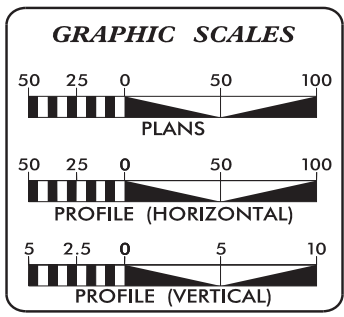
UTILITY CONSTRUCTION PLANS  
HENDERSON COUNTY

LOCATION: SR 1783 (NORTH HIGHLAND LAKE ROAD)  
FROM NC 225 TO WEST OF US 176  
TYPE OF WORK: RELOCATION OF WATER AND  
SEWER

EXHIBIT A



DOCUMENT NOT CONSIDERED FINAL  
UNTIL ALL SIGNATURES ARE COMPLETED



INDEX OF SHEETS	
SHEET NO.:	DESCRIPTION:
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3 THRU UC-3A	NOTES
UC-3B THRU UC-3F	DETAILS
UC-4 THRU UC-8	UTILITY CONSTRUCTION SHEETS

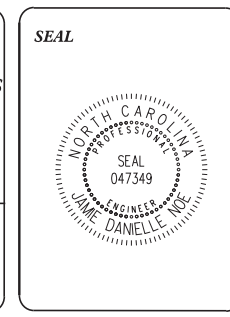
WATER AND SEWER OWNERS ON PROJECT	
(A) WATER - CITY OF HENDERSONVILLE	
(B) SEWER - CITY OF HENDERSONVILLE	

PREPARED IN THE OFFICE OF

**V&M**  
Vaughn & Melton  
Consulting Engineers

1318 PATTON AVE  
ASHEVILLE, NORTH CAROLINA  
828.253.2796

Jamie Noe, P.E.	PROJECT ENGINEER
Lynn Mann, P.G.	PROJECT UTILITY MANAGER
James Montgomery	PROJECT UTILITY COORDINATOR



**DIVISION OF HIGHWAYS UTILITIES UNIT**  
1555 MAIL SERVICES CENTER  
RALEIGH, NC 27699-1555  
PHONE (919) 707-6690  
FAX (919) 250-4151

Bob Golding	DIVISION UTILITY ENGINEER
Bill D. Green	DIVISION UTILITIES COORDINATOR
Michael Bright	WESTERN UTILITY ENGINEER

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS




PROJECT REFERENCE NO.	SHEET NO.
U-5887	UC-2

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	







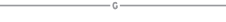












PROPOSED MISCELLANEOUS UTILITIES SYMBOLS

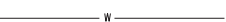
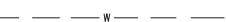
Power Pole	
Telephone Pole	
Joint Use Pole	
Telephone Pedestal	
Utility Line by Others (Type as Shown)	
Trenchless Installation	
Encasement by Open Cut	
Encasement	

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

EXISTING UTILITIES SYMBOLS

Power Pole	
Telephone Pole	
Joint Use Pole	
Utility Pole	
Utility Pole with Base	
H-Frame Pole	
Power Transmission Line Tower	
Water Manhole	
Power Manhole	
Telephone Manhole	
Sanitary Sewer Manhole	
Hand Hole for Cable	
Power Transformer	
Telephone Pedestal	
CATV Pedestal	
Gas Valve	
Gas Meter	
Located Miscellaneous Utility Object	
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

*Underground Power Line	
*Underground Telephone Cable	
*Underground Telephone Conduit	
*Underground Fiber Optics Telephone Cable	
*Underground TV Cable	
*Underground Fiber Optics TV Cable	
*Underground Gas Pipeline	
Aboveground Gas Pipeline	
*Underground Water Line	
Aboveground Water Line	
*Underground Gravity Sanitary Sewer Line	
Aboveground Gravity Sanitary Sewer Line	
*Underground SS Forced Main Line	
Underground Unknown Utility Line	
SUE Test Hole	
Water Meter	
Water Valve	
Fire Hydrant	
Sanitary Sewer Cleanout	

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

UTILITY CONSTRUCTION

HENDERSON COUNTY

GENERAL NOTES:

1. THE PROPOSED UTILITY CONSTRUCTION SHALL MEET THE APPLICABLE REQUIREMENTS OF THE NC DEPARTMENT OF TRANSPORTATION'S "STANDARD SPECIFICATIONS FOR ROADS AND STRUCTURES" DATED JANUARY 2018 OR LATEST EDITION AND CITY OF HENDERSONVILLE DESIGN STANDARDS AND SPECIFICATIONS.

2. THE EXISTING UTILITIES BELONG TO THE CITY OF HENDERSONVILLE. CONTACT: LEE SMITH, UTILITIES DIRECTOR 828-697-3060 LSMITH@HVLNC.GOV

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 ENVIRONMENTAL 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. 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.

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

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, OR ON HOLIDAYS IF NECESSARY.

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

PROJECT SPECIFIC NOTES

1. WATER CONSTRUCTION ON THIS SITE IS AUTHORIZED BY PERMITS ISSUED BY THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL QUALITY (NCDEQ) AND AUTHORIZED BY THE REPRESENTATIVES OF NCDEQ, THE CITY OF HENDERSONVILLE, THE OWNER OR THE ENGINEER. THE PERMITS REQUIRES CERTIFICATION OF COMPLETION OF THE WATER SYSTEMS BY THE ENGINEER AND THE APPLICANT PRIOR TO ISSUANCE OF FINAL OPERATION APPROVAL.

2. MATERIALS AND INSTALLATION FOR WATER CONSTRUCTION SHALL CONFORM TO THE LATEST VERSIONS OF CITY SPECIFICATION AND DETAILS AND AWWA STANDARDS AND REQUIREMENTS.

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

4. REGULAR WORKING HOURS SHALL BE FROM 7:00 A.M. TO 5:00 P.M. MONDAY THROUGH FRIDAY, EXCEPT IN CASES OF EMERGENCY OR OTHERWISE APPROVED IN WRITING BY THE CITY OF AUTHORIZED REPRESENTATIVES. THE CONTRACTOR SHALL ENSURE THE CONSTRUCTION SITE IS SAFE FOR ANY PERSONS WHO MAY BE ON SITE DURING NON-WORKING HOURS. SEE TRANSPORTAION MANAGEMENT PLANS FOR PORTION OF WATER LINE RELOCATION WORK IN NC 176/SPARTANBURG HIGHWAY.

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

6. 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.

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

8. 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.

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


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

11. 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.


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 AS SHOWN ON THE DRAWINGS.

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

14. EXISTING WATER SERVICES SHALL BE REPLACED TO THE EXISTING METER UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY. SPLICING OF THE WATER SERVICE ON THE DOWNSTREAM SIDE OF THE METER IS NOT PERMITTED.

PROJECT REFERENCE NO.		SHEET NO.	
U-5887		UC-3	
DESIGNED BY: SSD			
DRAWN BY: BAB			
CHECKED BY: JDN			
APPROVED BY: JDN			
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		UTILITY CONSTRUCTION PLANS ONLY	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151			
DOCUMENT NOT CONSIDERED FINAL UNTIL ALL SIGNATURES ARE COMPLETED			

UTILITY CONSTRUCTION



**Vaughn & Melton**  
Consulting Engineers

Asheville, North Carolina  
828-253-2796

Charlotte, NC 704-357-0488  
Boone, NC 828-355-9933  
Kennesaw, GA 770-627-3590

Tri-Cities, TN 423-467-8401  
Knoxville, TN 865-546-5800  
Spartanburg, SC 864-574-4775  
Charleston, SC 843-974-5650  
Middleboro, KY 606-248-6600



UTILITY CONSTRUCTION

HENDERSON COUNTY

PROJECT SPECIFIC NOTES:

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

18. ALL WATER MAINS SHALL HAVE 3 FEET MINIMUM COVER

19. INSTALL FERROUS PIPING FOR BOTH WATER AND SEWER WITHIN 10 FT. OF A CROSSING IF:

19.1. SEWER LINE CROSSES OVER WATER, OR

19.2. VERTICAL CLEARANCE BETWEEN WATER AND SEWER IS LESS THAN 18 INCHES.

19.3. MAINTAIN 10 FEET HORIZONTAL SEPARATION BETWEEN SEWER AND WATER MAINS UNLESS LAID IN SEPARATE TRENCHES WITH THE BOTTOM OF THE WATER LINE AT LEAST 18 INCHES ABOVE THE TOP OF THE SEWER LINE OR USE FERROUS MATERIAL FOR BOTH WATER AND SEWER.

DISCLAIMER:

THE STANDARD WATER DETAILS ARE FOR THE SOLE USE OF PROJECTS DIRECTLY FOR, OR THOSE PROJECTS IN WHICH OWNERSHIP WILL BE TRANSFERRED TO THE CITY OF HENDERSONVILLE. THESE TYPICALS ARE INTENDED TO SHOW THE CITY OF HENDERSONVILLE'S EXPECTATIONS FOR THE GENERAL LAYOUT, ARRANGEMENT, AND THE QUALITY OF EQUIPMENT AND MATERIALS FOR WATER DISTRIBUTION SYSTEM ITEMS AND THEIR RELATED APPURTENANCES. IT REMAINS THE SOLE RESPONSIBILITY OF THE ENGINEER IN RESPONSIBLE CHARGE (ERC) OF EACH APPLICATION TO DETERMINE, DESIGN TO, AND CERTIFY TO THE DESIGN PARAMETERS FOR EACH INSTALLATION. THE ERC MUST ALSO ENSURE THE DESIGN COMPLIES WITH THE MINIMUM DESIGN CRITERIA OF NC DIVISION OF ENVIRONMENTAL QUALITY AND ALL LOCAL AND STATE LAWS AND REGULATIONS.

20. MAINTAIN 18 INCHES VERTICAL SEPARATION BETWEEN STORM DRAIN AND WATER, OR INSTALL FERROUS MATERIAL WATER LINE WITHIN 10 FEET EACH SIDE OF CROSSING.

21. TAPS GREATER THAN ONE-INCH IN DIAMETER IN EXISTING, ACTIVE WATER MAIN ARE TO BE PERFORMED BY THE CITY UNLESS OTHERWISE APPROVED IN WRITING BY THE CITY. TAPS IN NEW CONSTRUCTION ARE TO BE PERFORMED BY THE CONTRACTOR IN ACCORDANCE WITH CITY REQUIREMENTS.

22. ALL WATER METERS WILL BE SET BY CITY STAFF UNLESS THE CONTRACTOR IS GRANTED WRITTEN PERMISSION BY THE CITY.

22.1. THE CONTRACTOR WILL PROVIDE THE CITY NOTICE OF 10 WORKING DAYS MINIMUM PRIOR TO THE DATE OF METER INSTALLATION.

22.2. THE CONTRACTOR WILL PROVIDE A LICENSED PLUMBER DURING THE METER INSTALLATION TO VERIFY LINES SERVICES IN ALL MULTI-METER BOXES.

23. ALL PUBLIC WATER MAIN CONSTRUCTION SHALL BE PERFORMED BY A NORTH CAROLINA LICENSED UTILITY CONTRACTOR.

24. ALL WATER APPURTENANCES ARE TO BE MADE USING LEAD FREE MATERIALS. PIPE, FITTINGS, VALVES, HYDRANTS, PIPE CLAMPS, RESTRAINTS, FLANGES, CASTINGS, REBAR, HATCHES, INLETS, METER BOXES AND ALL OTHER CAST IRON COMPONENTS SHALL BE MANUFACTURED IN THE USA.

25. RESTRAINED JOINTS BY AN APPROVED PIPE MANUFACTURER ARE TO BE USED FOR ALL PUBLIC WATER LINES WHERE THRUST RESTRAINING IS REQUIRED IN ACCORDANCE WITH THE PLANS AND MANUFACTURER'S SPECIFICATION. CONCRETE THRUST BLOCKS ARE PERMITTED ONLY WHERE CONNECTIONS ARE MADE TO EXISTING WATER LINES OR WHERE THE USE OF MECHANICAL RESTRAINT IS NOT FEASIBLE.

26. ALL FIRE HYDRANTS, VAULTS, BACKFLOW PREVENTERS, HOT BOXES AND WATER METERS ARE TO BE INSTALLED ON RELATIVELY FLAT AREAS OUTSIDE OF PAVEMENT.

27. TAMPERING WITH OR ILLEGAL USE OF THE PUBLIC WATER SUPPLY WILL RESULT IN SUSPENSION OF WATER SERVICE, INCLUDING DOMESTIC AND COMMERCIAL, UNTIL FINAL APPROVAL BY THE CITY IS ISSUED. A PERSON FOUND TO BE USING WATER ILLEGALLY SHALL BE SUBJECT TO PENALTIES OR FINES, AS PRESCRIBED AND APPROVED BY CITY COUNCIL.

28. CONTRACTOR SHALL PHASE WATER LINE INSTALLATION AND ROUGH GRADE, IF NECESSARY, SO THAT PROPOSED WATER LINE WILL HAVE MINIMUM 3' OF COVER ONCE INSTALLED.

TESTING & INSPECTION:

1. NOTIFY THE CITY OF HENDERSONVILLE AND ENGINEER AT LEAST 5 WORKING DAYS BEFORE STARTING CONSTRUCTION OF WATER FACILITIES TO SCHEDULE A PRE-CONSTRUCTION CONFERENCE. THE ENGINEER SHALL PERIODICALLY INSPECT THE PROGRESS OF INSTALLATION AT A MINIMUM AND SHALL COMPLETE A FINAL WATER CERTIFICATION.

2. ALL CHANGES TO THE APPROVED CONSTRUCTION PLANS AND SUBMITTALS MUST BE APPROVED IN WRITING BY THE CITY PRIOR TO IMPLEMENTATION IN THE FIELD.

3. THE CONTRACTOR SHALL FURNISH SECURE AND PROVIDE ALL NECESSARY TESTING MATERIALS, EQUIPMENT, LABOR. THE CONTRACTOR SHALL COORDINATE TESTING, FLUSHING, DISINFECTION, AND BACTERIOLOGICAL SAMPLING WITH CITY INSPECTOR.

4. THE ENGINEER OF CONTRACTOR SHALL NOTIFY THE CITY CONSTRUCTION INSPECTORS 72 HOURS (MINIMUM) PRIOR TO ANY WATER MAIN OR TESTING OPERATIONS. AT A MINIMUM CITY STAFF SHALL BE NOTIFIED PRIOR TO TAPS, TESTING, FLUSHING, DISINFECTIONS, AND SAMPLING.

5. PRESSURE TEST WATER MAINS TO 200 PSI MIN. FOR A MINIMUM OF TWO HOURS IN ACCORDANCE WITH CITY REQUIREMENTS AND AWWA C600.

6. DISINFECT WATER LINES AND PROVIDE ACCEPTABLE BACTERIOLOGICAL TEST FROM A CERTIFIED TESTING LABORATORY IN ACCORDANCE WITH CITY REQUIREMENTS AND AWWA C651. THE CONTRACTOR MAY ELECT TO USE THE CITY’S CERTIFIED TESTING LABORATORY.

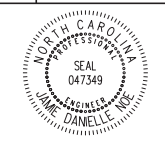
7. PRIVATELY OWNED FIRE SYSTEMS SHALL BE APPROVED BY THE APPROPRIATE LOCAL PERMITTING AUTHORITY. THE CITY ENGINEERING OR WATER SEWER DEPARTMENTS ARE NOT RESPONSIBLE FOR ENSURING COMPLIANCE WITH APPROPRIATE FIRE PROTECTION REGULATIONS. THE CITY DOES NOT PROVIDE ANY GUARANTEE OF ITS WATER SYSTEM'S CAPABILITY TO DELIVER WATER FLOW AND RESIDUAL PRESSURE THE FIRE PERMITTING AUTHORITY MAY REQUIRE.


8. ALL BACKFLOW PREVENTION ASSEMBLIES SHALL BE USC APPROVED AND REVIEWED BY THE CITY'S. PROTECTION OF THE PUBLIC WATER DISTRIBUTION SYSTEM SHALL BE ASSURED BY INSPECTION OF THE INSTALLATION AND TESTING OF BACKFLOW PREVENTION ASSEMBLY. THIS ASSEMBLY INSTALLATION MUST BE TESTED BY A LICENSED PLUMBER AND TEST RESULTS SUBMITTED TO THE CITY BEFORE USE OF CONSTRUCTION WATER.

9. CONSTRUCTION WATER SOURCING MUST BE APPROVED IN WRITING BY THE CITY. CONSTRUCTION WATER CONNECTIONS SHALL BE PAIRED WITH AN IRRIGATION METER AND APPROVED BACKFLOW PREVENTION ASSEMBLY. THIS ASSEMBLY INSTALLATION MUST BE TESTED BY A LICENSED PLUMBER AND TEST RESULTS SUBMITTED TO THE CITY BEFORE USE OF CONSTRUCTION WATER.

10. SECURE FINAL WRITTEN ACCEPTANCE FROM THE CITY OF HENDERSONVILLE PRIOR TO ACTIVATION OF THE SYSTEM. WATER SERVICE WILL NOT BE PROVIDED UNTIL WRITTEN ACCEPTANCE OF THE SYSTEM IS ISSUED BY THE CITY.

11. THE ENGINEER SHALL SUPPLY THE CITY WITH FINAL AS-BUILT DRAWINGS AND COMPLETE ALL PROJECT CLOSE OUT REQUIREMENTS.

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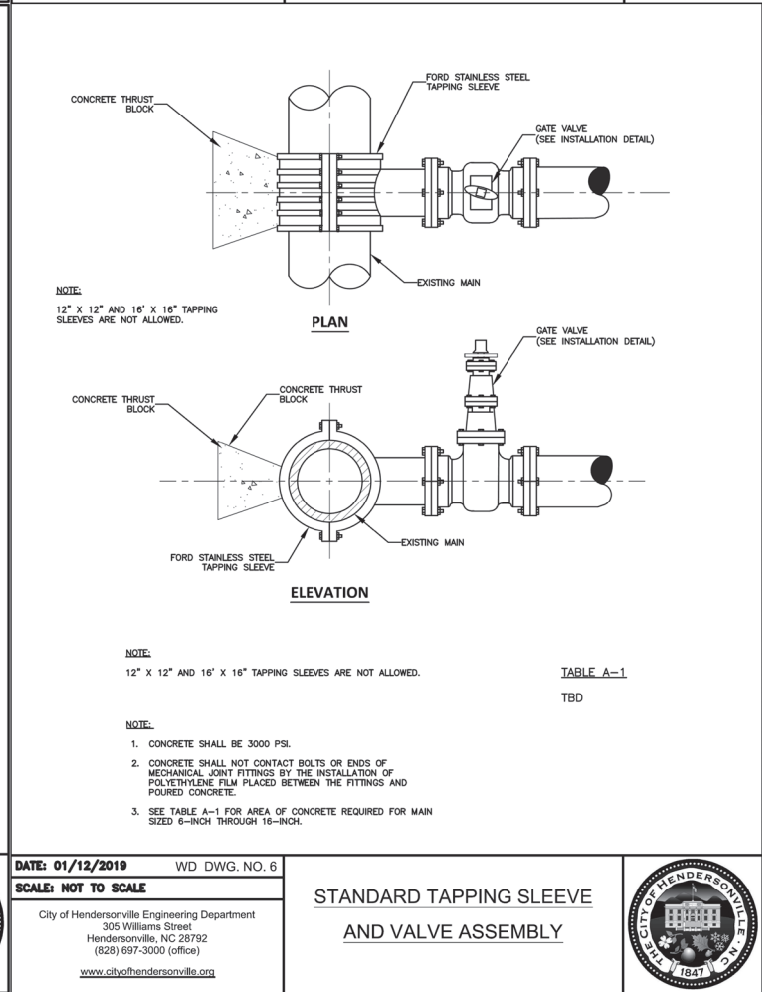
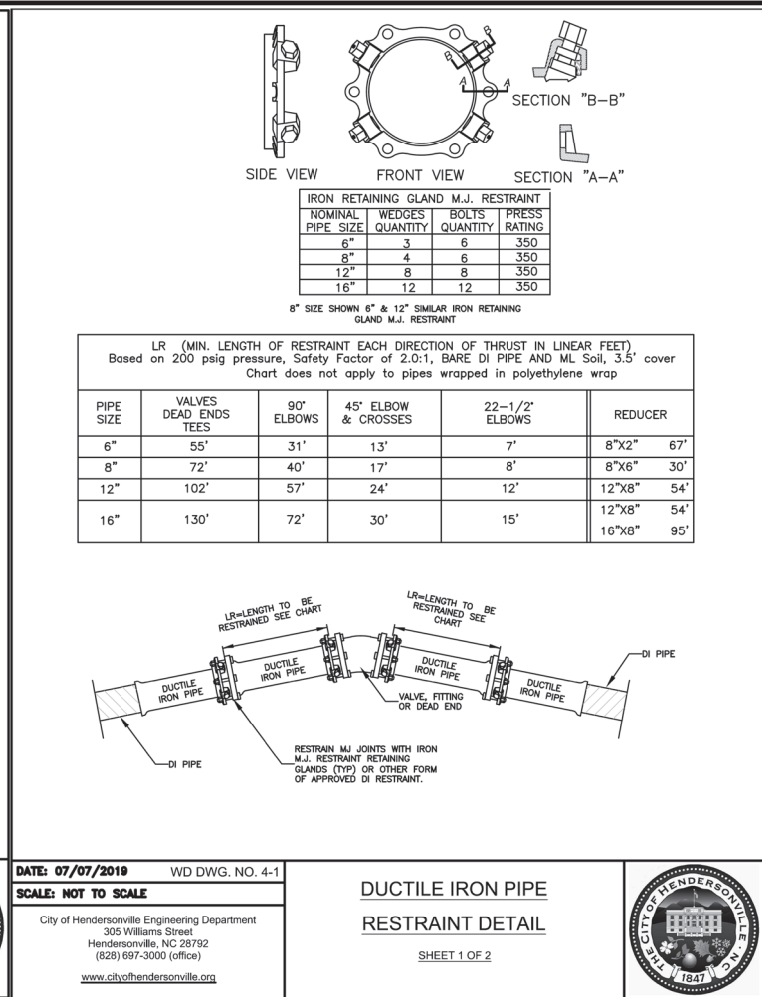
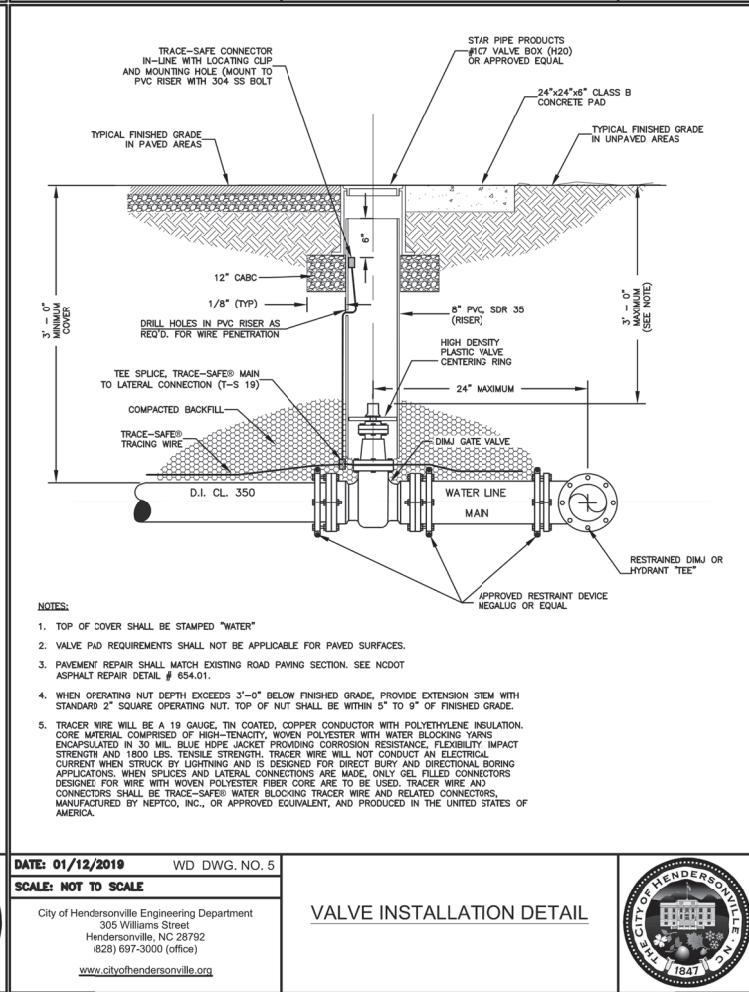
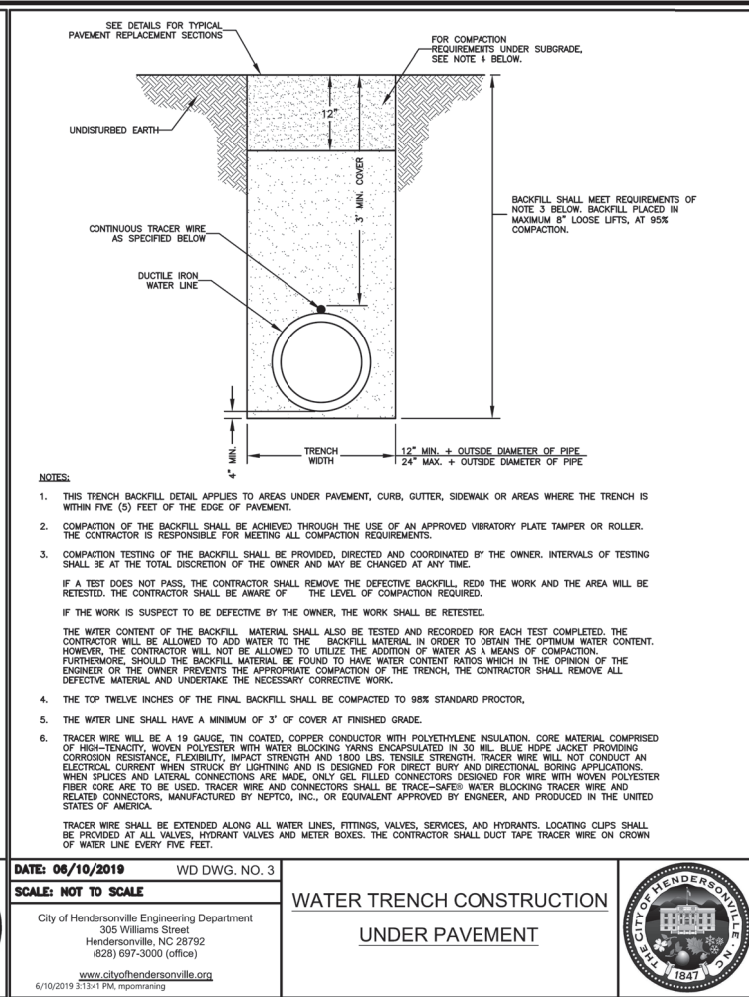
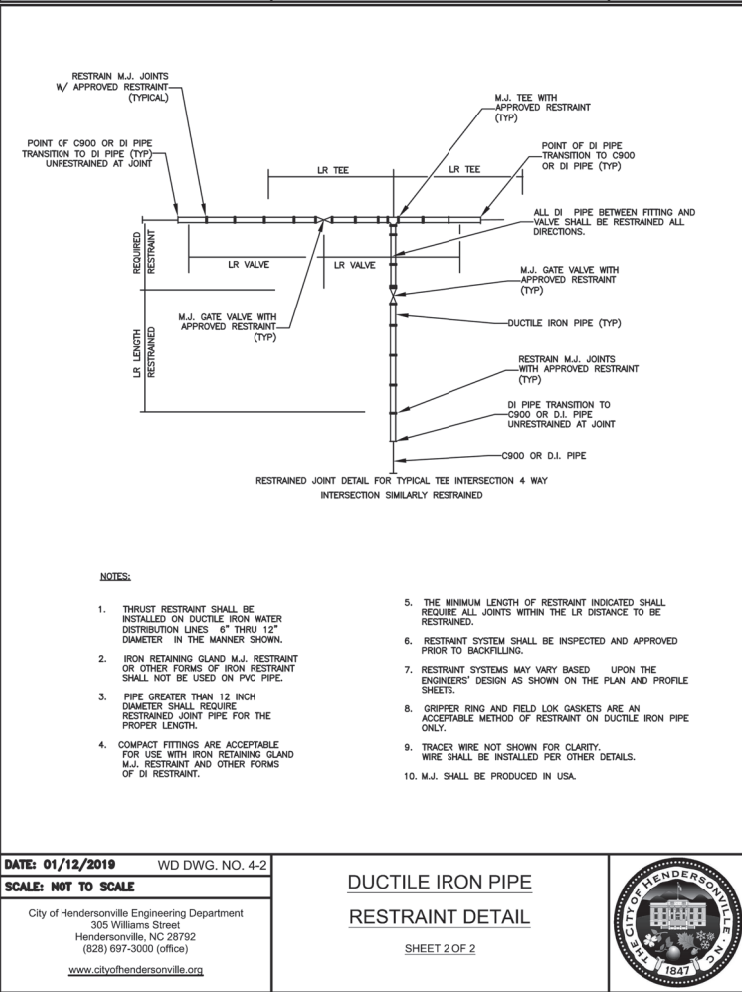
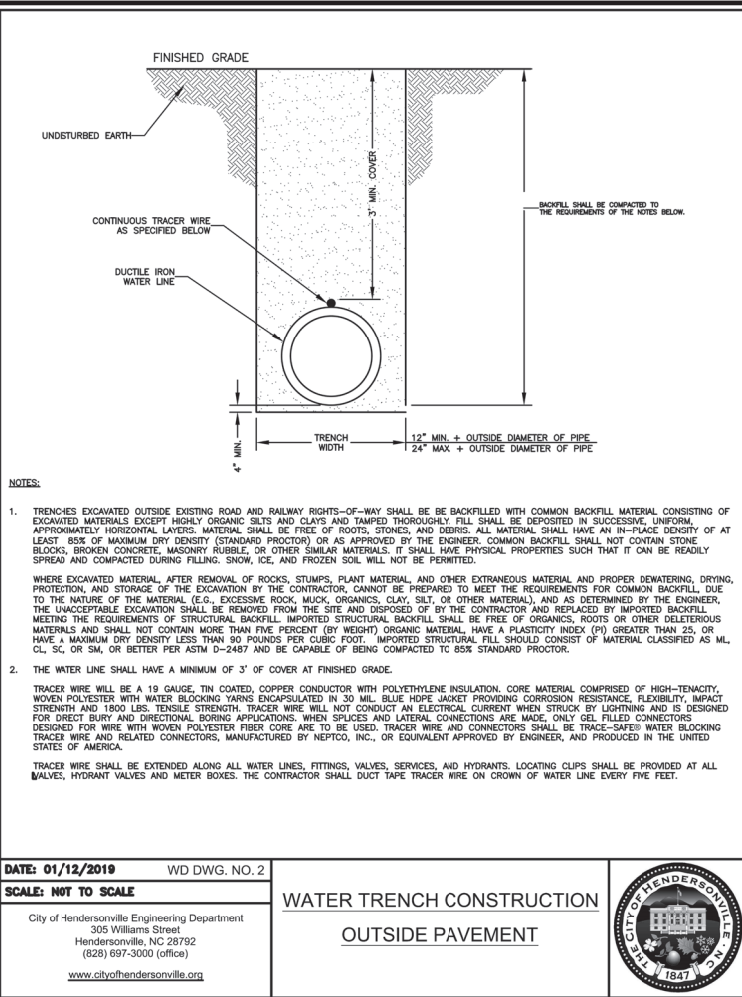
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Charlotte, NC 704-357-0488  
Boone, NC 828-355-9933

Tri-Cities, TN 423-467-8401  
Knoxville, TN 865-546-5800  
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**HENDERSON COUNTY**

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UTILITY CONSTRUCTION

Diagram showing the installation of a standard air release valve. It includes a cross-section view of the valve assembly with labels for components like the ball valve, brass nipple, adaptor, and air release valve box. A side drainage ditch is also shown. Notes specify pipe and fitting sizes, location relative to the meter box, and coordination with the city owner.

THE CITY OF HENDERSONVILLE, NC

STANDARD AIR RELEASE VALVE  
INSTALLATION DETAIL

DATE: 04/08/2019

WD DWG. NO. 7

SCALE: NOT TO SCALE

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Diagram showing the elevation view of a service valve installation. It includes a cross-section view of the valve assembly with labels for components like the meter box, straight ball service valve, and straight dual cartridge check valve. A side drainage ditch is also shown. Notes specify the city's responsibility for installing water meters and the requirements for the meter box and tracer wire.

THE CITY OF HENDERSONVILLE, NC

1" SERVICE LATERAL INSTALLATION

DATE: 04/29/2019

WD DWG. NO. 8

SCALE: NOT TO SCALE

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Diagram showing the installation of a fire hydrant ditch. It includes a cross-section view of the ditch assembly with labels for components like the fire hydrant, storz nozzle, and ditch. A table provides dimensions for different ditch sizes. Notes specify the fire hydrant standard installation detail, M.J. connections, and the placement of the offset connector.

THE CITY OF HENDERSONVILLE, NC

FIRE HYDRANT  
DITCH INSTALLATION  
DETAIL

DATE: 01/12/2019

WD DWG. NO. 13

SCALE: NOT TO SCALE

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HENDERSON  
COUNTY


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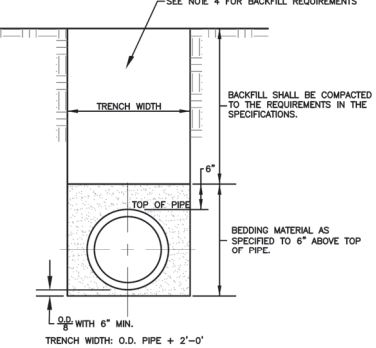
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GRAVITY SEWER  
TRENCH CONSTRUCTION  
OUTSIDE PAVEMENT





SEE NOTE 4 FOR BACKFILL REQUIREMENTS

BACKFILL SHALL BE COMPACTED TO THE REQUIREMENTS IN THE SPECIFICATIONS.

TRENCH WIDTH

6"

TOP OF PIPE

6" WITH 6" MIN.

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

NOTES:


- BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS 'B' BEDDING FOR RIGID PIPING IN ROCK OR WET SOIL. PIPE MUST BE BEDDED IN AT LEAST 6" OF #57 WASHED STONE.
- FORCE MAIN BEDDING SHALL BE SELECT NATURAL SAND WELL COMPACTED IN 6" LIFTS.
- TRENCHES EXCAVATED OUTSIDE EXISTING ROAD AND RAILWAY 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.
- WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DRAINAGE, 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 80 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 95% STANDARD PROCTOR.
- THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

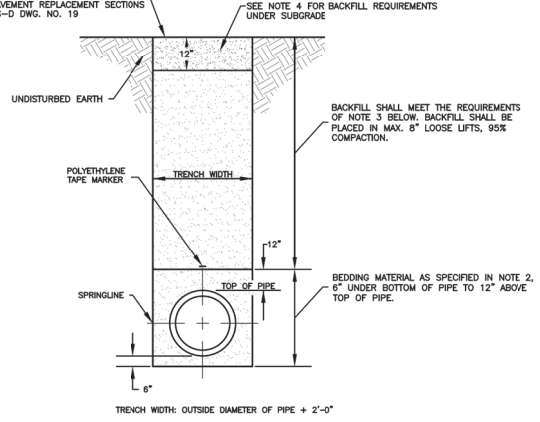
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GRAVITY SEWER  
TRENCH CONSTRUCTION  
UNDER PAVEMENT





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

SEE NOTE 4 FOR BACKFILL REQUIREMENTS UNDER SUBGRADE

UNDISTURBED EARTH

POLYETHYLENE TAPE MARKER

TRENCH WIDTH

12"

BACKFILL SHALL MEET THE REQUIREMENTS OF NOTE 3 BELOW. BACKFILL SHALL BE PLACED IN MAX. 6" LOOSE LIFTS, 95% COMPACTION.

12"

TOP OF PIPE

6" UNDER BOTTOM OF PIPE TO 12" ABOVE TOP OF PIPE

12"

6"

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

NOTES:


- THIS TRENCH BACKFILL DETAIL APPLIES TO AREAS UNDER PAVEMENT, CURB AND GUTTER, AND SIDEWALK.
- BEDDING CLASSIFICATION SHALL MEET OR EXCEED ASTM D2321 CLASS 1 BEDDING FOR FLEXIBLE PIPING, AND ASTM C12, CLASS B BEDDING FOR RIGID PIPING.
- 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.
- WHERE EXCAVATED MATERIAL, AFTER REMOVAL OF ROCKS, STUMPS, PLANT MATERIAL, AND OTHER EXTRANEOUS MATERIAL AND PROPER DRAINAGE, 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 80 POUNDS PER CUBIC FOOT. IMPORTED STRUCTURAL FILL SHOULD CONSIST OF MATERIAL CLASSIFIED AS M, CL, CL, SC, OR SM, OR BETTER PER ASTM D-2487 AND BE CAPABLE OF BEING COMPACTED TO 95% STANDARD PROCTOR.
- THE TOP 12 INCHES OF FINAL BACKFILL FOR ROAD OR STREET SUBGRADE SHALL BE COMPACTED TO 98% STANDARD PROCTOR.
- THE CONTRACTOR IS RESPONSIBLE FOR MEETING ALL COMPACTION REQUIREMENTS.

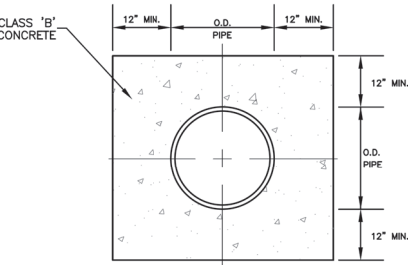
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CONCRETE PIPE ENCASEMENT





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"

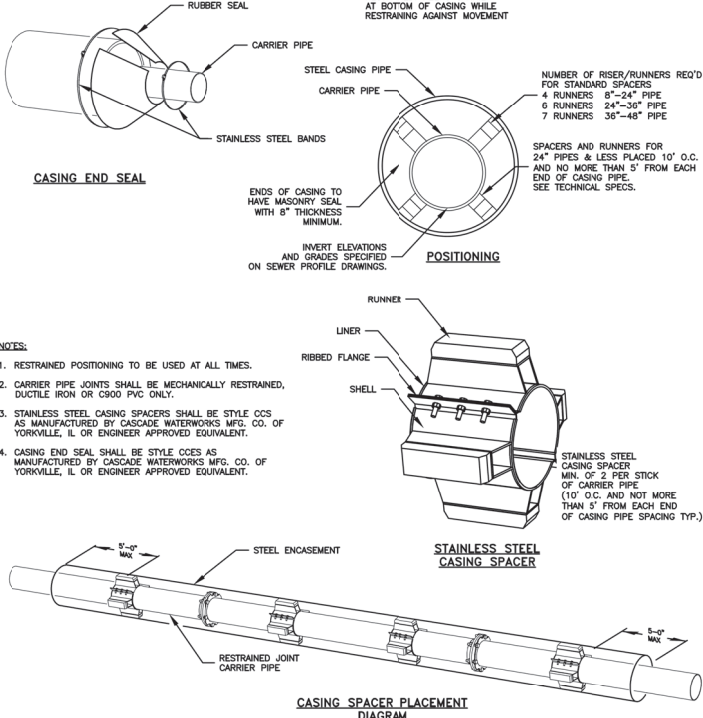
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PIPE BORING  
AND  
ENCASEMENT





RUBBER SEAL

CARRIER PIPE

STEEL CASING PIPE

CARRIER PIPE

STAINLESS STEEL BANDS

CASING END SEAL

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

NUMBER OF RISER/RUNNERS REQ'D FOR STANDARD SPACERS

4 RUNNERS 8"-24" PIPE

6 RUNNERS 24"-30" PIPE

7 RUNNERS 30"-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.

POSITIONING

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

INVERT ELEVATIONS AND GRADES SPECIFIED ON SEWER PROFILE DRAWINGS.

RUNNER

LINER

RIBBED FLANGE

SHELL

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.

STEEL ENCASEMENT

RESTRAINED JOINT CARRIER PIPE

8'-0" MAX.

CASING SPACER PLACEMENT DIAGRAM

NOTES:


- RESTRAINED POSITIONING TO BE USED AT ALL TIMES.
- CARRIER PIPE JOINTS SHALL BE MECHANICALLY RESTRAINED, DUCTILE IRON OR CS90 PVC ONLY.
- STAINLESS STEEL CASING SPACERS SHALL BE STYLE CCS AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.
- CASING END SEAL SHALL BE STYLE CCS AS MANUFACTURED BY CASCADE WATERWORKS MFG. CO. OF YORKVILLE, IL OR ENGINEER APPROVED EQUIVALENT.

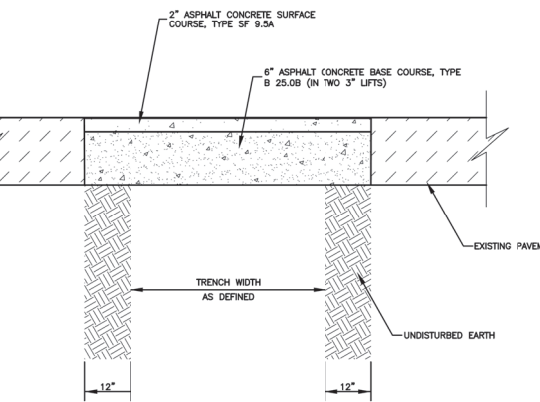
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ASPHALT CONCRETE  
REPLACEMENT





2" ASPHALT CONCRETE SURFACE COURSE, TYPE SF 9.5A

6" ASPHALT CONCRETE BASE COURSE, TYPE B 25.0B (IN TWO 3" LIFTS)

EXISTING PAVEMENT

UNDISTURBED EARTH

TRENCH WIDTH AS DEFINED

12"

12"

GENERAL PAVEMENT NOTE: WHERE EDGES OF REPLACED SECTIONS EXTENDS WITHIN 2'-0" OF ROADWAY EDGE, PAVEMENT IS TO BE REPLACED TO ROADWAY EDGE AT NO ADDITIONAL COST.


PAYMENT LIMIT FOR ALL PAVEMENT SHALL BE TRENCH WIDTH + 2'-0"

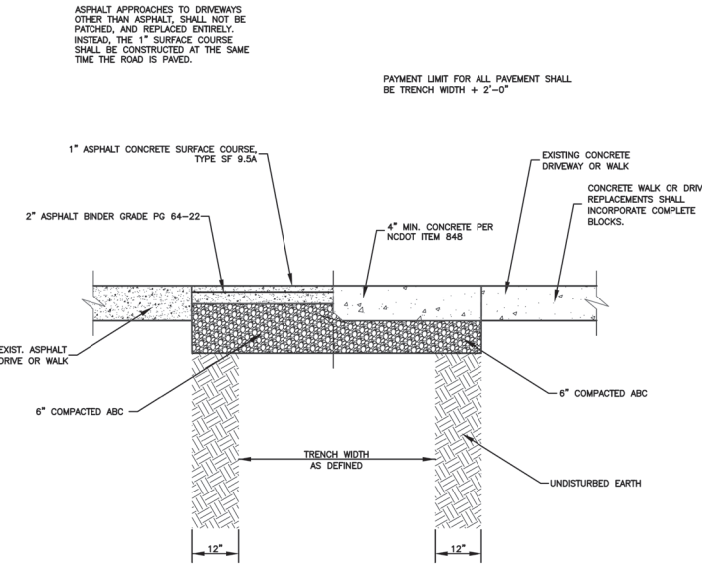
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ASPHALT OR CONCRETE  
DRIVEWAY AND WALKWAY





ASPHALT APPROACHES TO DRIVEWAYS OTHER THAN ASPHALT, SHALL NOT BE PATCHED, AND REPLACED ENTIRELY. INSTEAD, THE 1" SURFACE COURSE SHALL BE CONSTRUCTED AT THE SAME TIME THE ROAD IS PAVED.

1" ASPHALT CONCRETE SURFACE COURSE, TYPE SF 9.5A

2" ASPHALT BINDER GRADE PG 64-22

EXIST. ASPHALT DRIVE OR WALK

6" COMPACTED ABC

TRENCH WIDTH AS DEFINED

12"

12"

UNDISTURBED EARTH

4" MIN. CONCRETE PER NC DOT ITEM 848

EXISTING CONCRETE DRIVEWAY OR WALK

CONCRETE WALK OR DRIVE REPLACEMENTS SHALL INCORPORATE COMPLETE BLOCKS.

PAYMENT LIMIT FOR ALL PAVEMENT SHALL BE TRENCH WIDTH + 2'-0"

GENERAL PAVEMENT NOTE: WHERE EDGES OF REPLACED SECTIONS EXTENDS WITHIN 2'-0" OF ROADWAY EDGE, PAVEMENT IS TO BE REPLACED TO ROADWAY EDGE AT NO ADDITIONAL COST.

\* 4" MIN. FOR CONCRETE SIDEWALK REPLACEMENT, 6" FOR DRIVEWAYS OR DRIVE APRON REPLACEMENT.

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<p align="center"><b>UTILITY CONSTRUCTION</b></p>			



1. PIPE PLUGS SHALL BE INSTALLED TO THE SATISFACTION OF THE ENGINEER.
2. ABANDONED PIPES, 12" AND LARGER, SHALL BE BROKEN INTO EVERY 50' AND SHALL BE FILLED COMPLETELY WITH SAND SLURRY.

SCALE: NOT TO SCALE

## PIPE ABANDONMENT




12/31/20

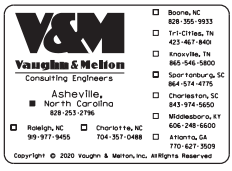
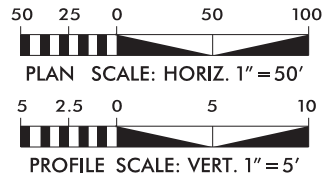
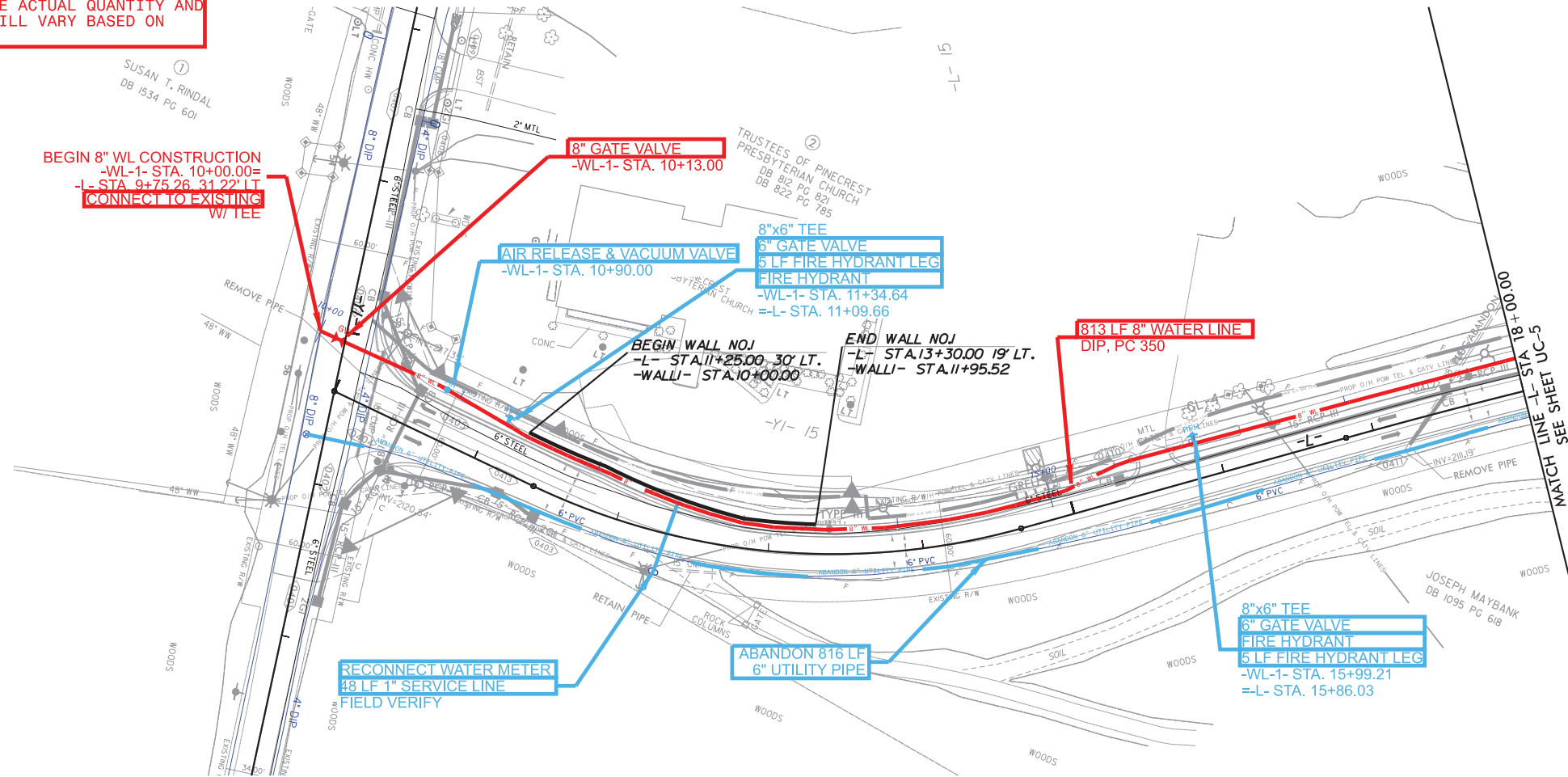
REVISIONS

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1060 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

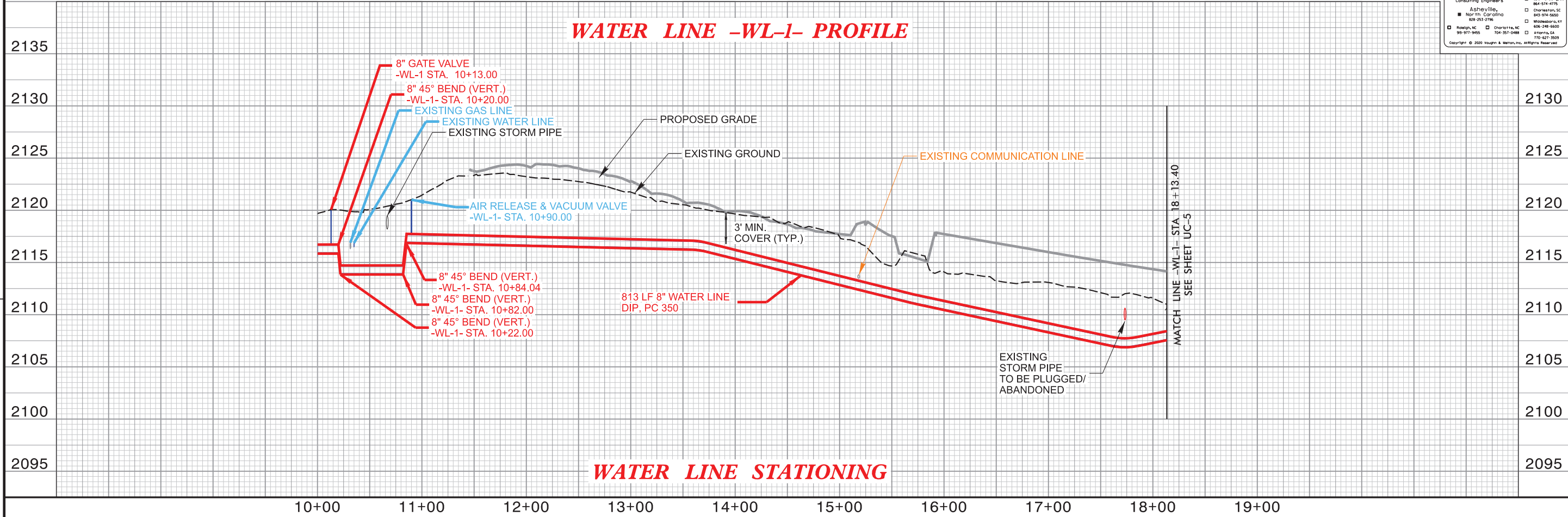
HENDERSON COUNTY

PROJECT REFERENCE NO.	SHEET NO.
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### WATER LINE -WL-1- PROFILE





12/31/20

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,010 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

8" 45° BEND (HORZ.)  
-WL-1- STA. 22+38.27  
8" 45° BEND (HORZ.)  
-WL-1- STA. 22+12.50

BORE & JACK 71 LF  
16" STEEL ENCASUREMENT PIPE  
0.25" MIN. WALL THICKNESS  
INCLUDES SS SPACERS

8" 45° BEND (HORZ.)  
-WL-1- STA. 23+16.61  
8" 45° BEND (HORZ.)  
-WL-1- STA. 23+74.40

AIR RELEASE & VACUUM VALVE  
-WL-1- STA. 23+88.89

8"x6" TEE  
6" GATE VALVE  
FIRE HYDRANT  
7 LF FIRE HYDRANT LEG  
-WL-1- STA. 24+27.69  
-L- STA. 23+93.02

8" 22-1/2° BEND (HORZ.)  
-WL-1- STA. 27+99.37  
8" 22-1/2° BEND (HORZ.)  
-WL-1- STA. 28+14.54

AIR RELEASE & VACUUM VALVE  
-WL-1- STA. 22+06.00

8"x6" TEE  
6" GATE VALVE  
FIRE HYDRANT  
5 LF FIRE HYDRANT LEG  
-WL-1- STA. 20+68.86  
-L- STA. 20+54.66

REMOVE FIRE HYDRANT  
427 LF 8" WATER LINE  
DIP, PC 350

AIR RELEASE & VACUUM VALVE  
-WL-1- STA. 18+80.00

RECONNECT EXISTING METER  
80 LF 1" SERVICE LINE  
FIELD VERIFY

ABANDON 1,201 LF  
6" UTILITY PIPE

RELOCATE  
WATER METER

74 LF 8" TRENCHLESS  
WATER LINE - DIP, PC 350

731 LF 8" WATER LINE  
DIP, PC 350

54 LF 1" SERVICE LINE  
FIELD VERIFY

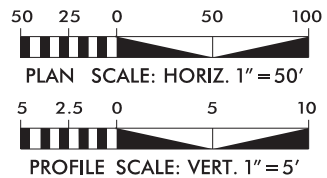
MATCH LINE -L- STA 18+00.00  
SEE SHEET UC-4

MATCH LINE -L- STA 30+00.00  
SEE SHEET UC-6

HENDERSON COUNTY

PROJECT REFERENCE NO.	SHEET NO.
U-5887	UC-5
DESIGNED BY: SSD	
DRAWN BY: BAB	
CHECKED BY: JDN	
APPROVED BY: JDN	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	SEAL 047349 ENGINEER JANE DANIELLE JOE
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

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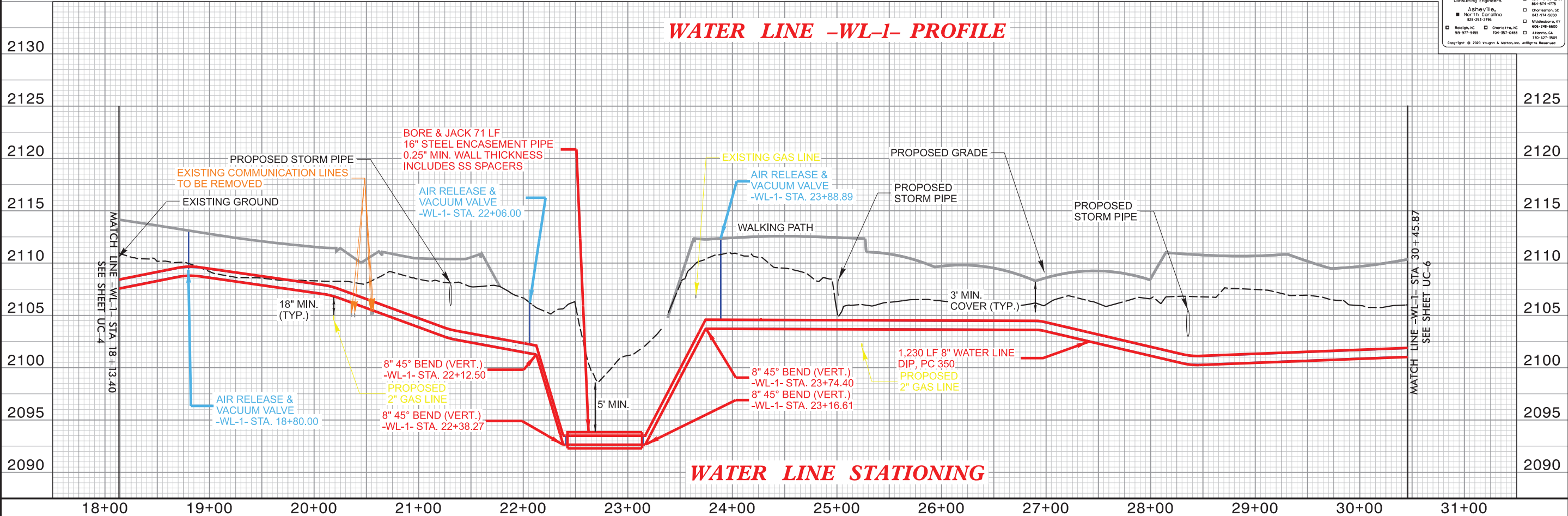
**V&M**  
Vaughan & McElroy  
Consulting Engineers  
Asheville, North Carolina  
828-253-2786  
919-977-9455

□ Boone, NC 828-265-9935  
□ Charlotte, NC 704-582-4400  
□ Knoxville, TN 865-546-9800  
□ Spartanburg, SC 864-574-4775  
□ Charleston, SC 843-974-5600  
□ Winston-Salem, NC 704-281-6600  
□ Atlanta, GA 770-627-3009

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REVISIONS

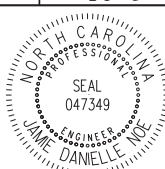
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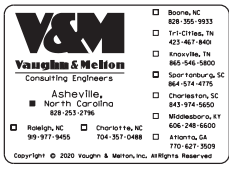
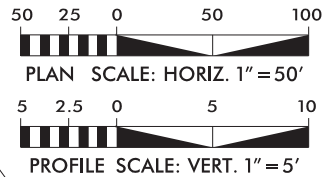
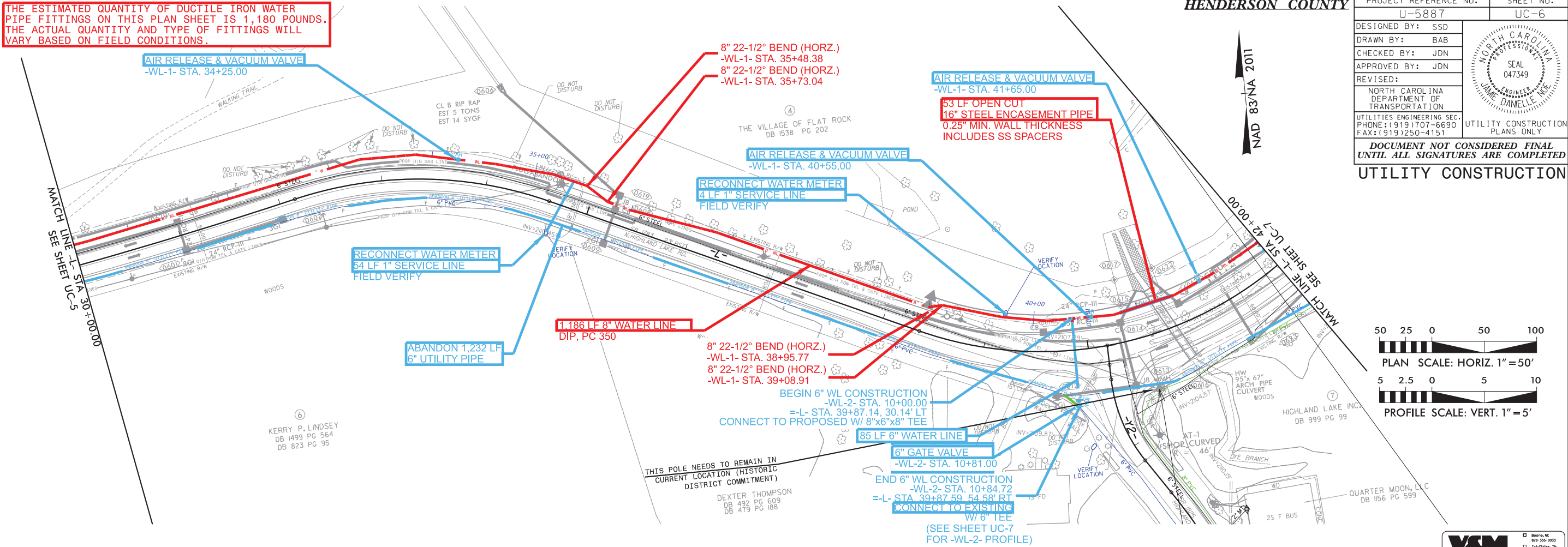


12/31/20

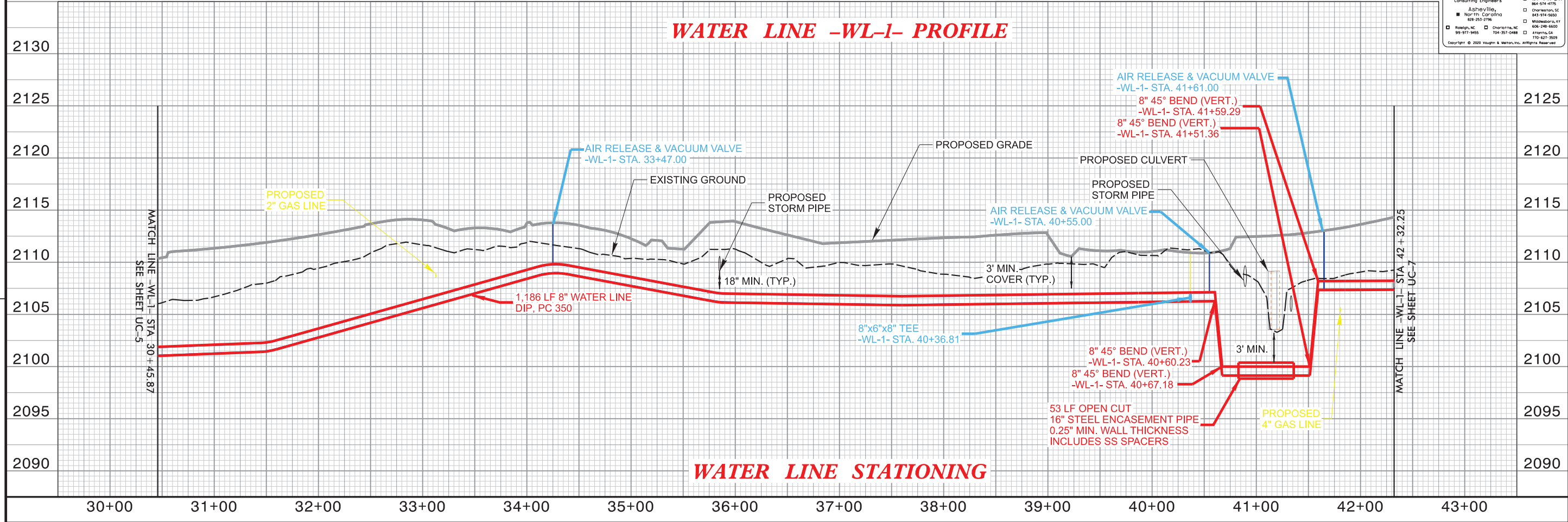
THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,180 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

HENDERSON COUNTY

PROJECT REFERENCE NO.		SHEET NO.
U-5887		UC-6
DESIGNED BY: SSD		UTILITY CONSTRUCTION PLANS ONLY
DRAWN BY: BAB		
CHECKED BY: JDN		
APPROVED BY: JDN		
REVISED:		
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION		
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151		
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UTILITY CONSTRUCTION		

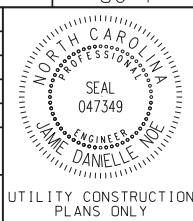


## WATER LINE -WL-1- PROFILE





DESIGNED BY: SSD
DRAWN BY: BAB
CHECKED BY: JDN
APPROVED BY: JDN
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## UTILITY CONSTRUCTION



**FILE SCALE: VERT. 1"=5'**

**V&M**  
**Vaughan & Melton**  
Consulting Engineers

Asheville, NC  
■ North Carolina  
828-253-2796

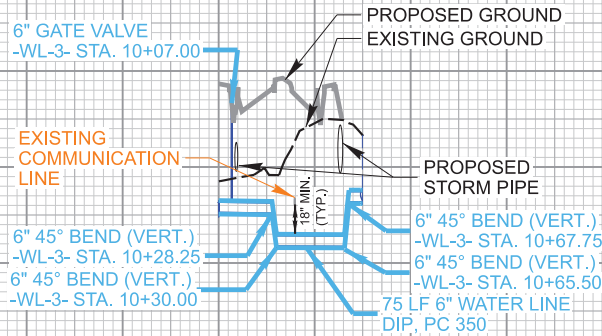
□ Roanoke, NC 919-977-9455    □ Charlotte, NC 704-357-0488

□ Boone, NC 828-355-9933  
□ Tri-Cities, TN 423-687-8400  
□ Knoxville, TN 865-546-5800  
□ Spartanburg, SC 864-574-4775  
□ Charleston, SC 843-714-5650  
□ Milledgeville, GA 706-248-6600  
□ Atlanta, GA 770-627-3509

1/4/21

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS SHEET IS 475 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

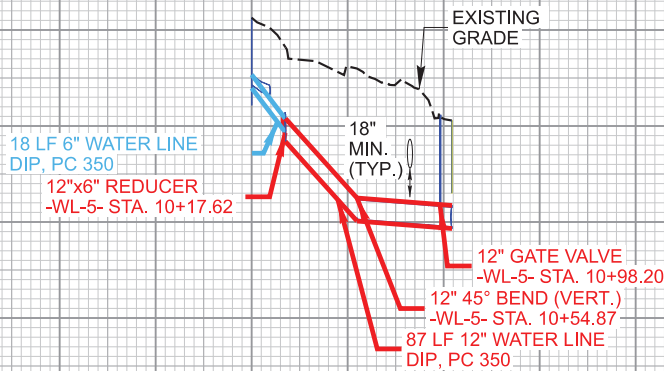
WATER LINE -WL-3- PROFILE



WATER LINE STATIONING

10+00 11+00

WATER LINE -WL-5- PROFILE



WATER LINE STATIONING

10+00 11+00

1/9/2021 2:20:16 PM UC Water Sewer Sheets.dgn  
... User: davis

PROJECT REFERENCE NO.  
U-5887

SHEET NO.  
UC-7A

DESIGNED BY: SSD

DRAWN BY: BAB

CHECKED BY: JDN

APPROVED BY: JDN

REVISED:

NORTH CAROLINA  
DEPARTMENT OF  
TRANSPORTATION

UTILITIES ENGINEERING SEC.  
PHONE: (919) 707-6690  
FAX: (919) 250-4151

UTILITY CONSTRUCTION  
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Vaughan & Melton  
Consulting Engineers

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Raleigh, NC  
919-977-9465

Charlotte, NC  
704-357-0488

Boone, NC  
828-355-1933

Tri-Cities, TN  
423-467-1460

Knoxville, TN  
865-546-1800

Spartanburg, SC  
803-574-4775

Cherokee, SC  
843-974-6660

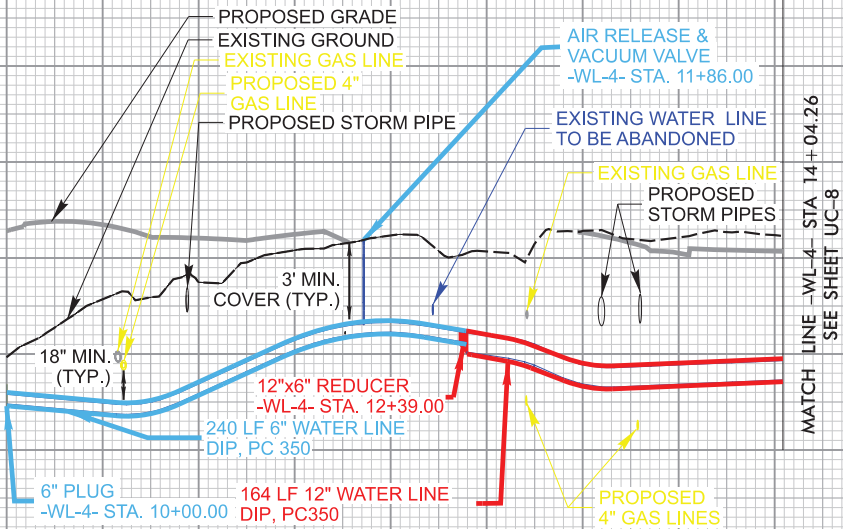
Wadesboro, NC  
843-248-6600

Alamogordo, CA  
760-427-3509

5 2.5 0 5 10

PROFILE SCALE: VERT. 1"=5'

WATER LINE -WL-4- PROFILE



WATER LINE STATIONING

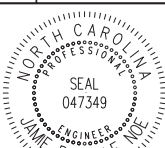
10+00 11+00 12+00 13+00 14+00



1/4/21

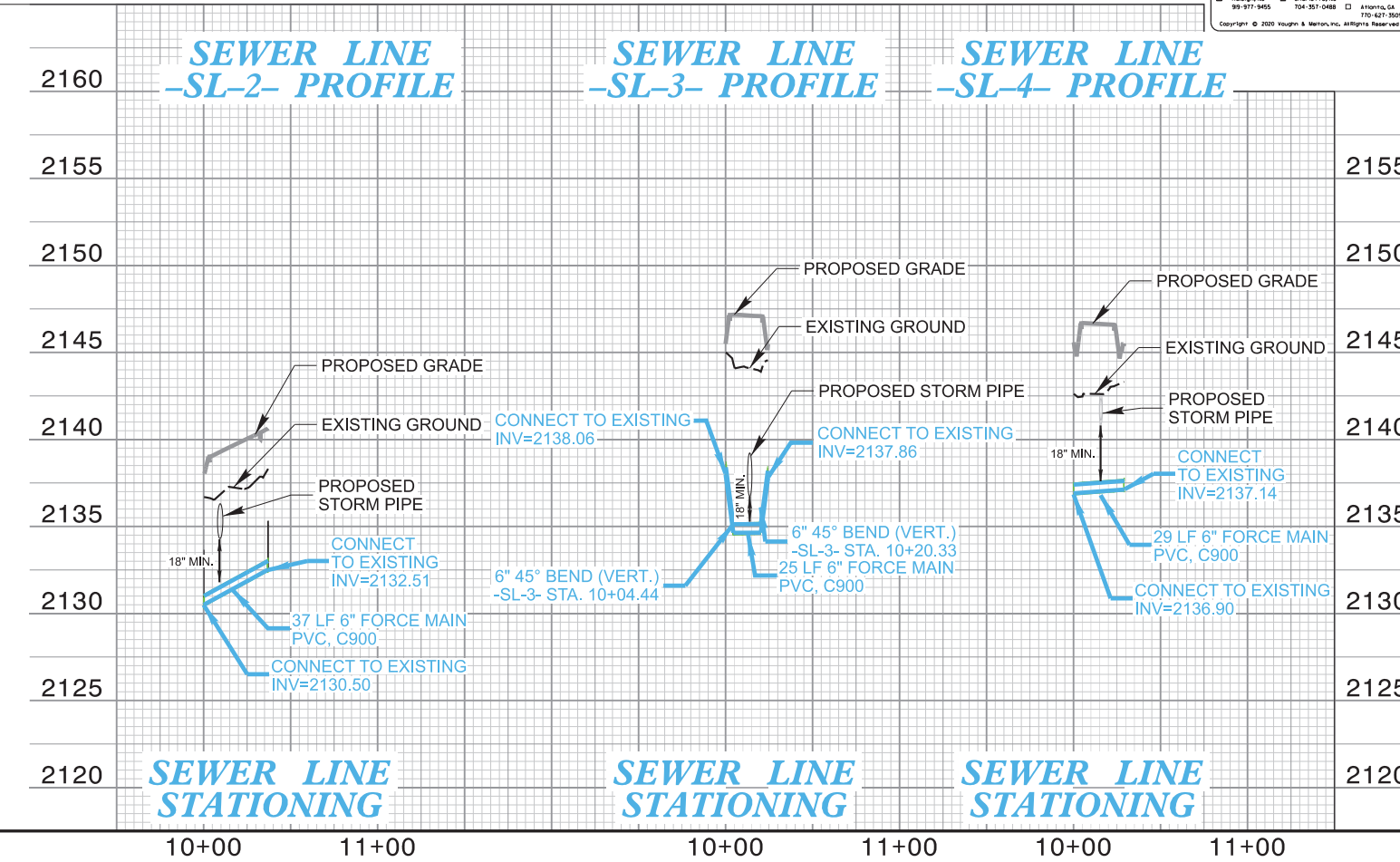
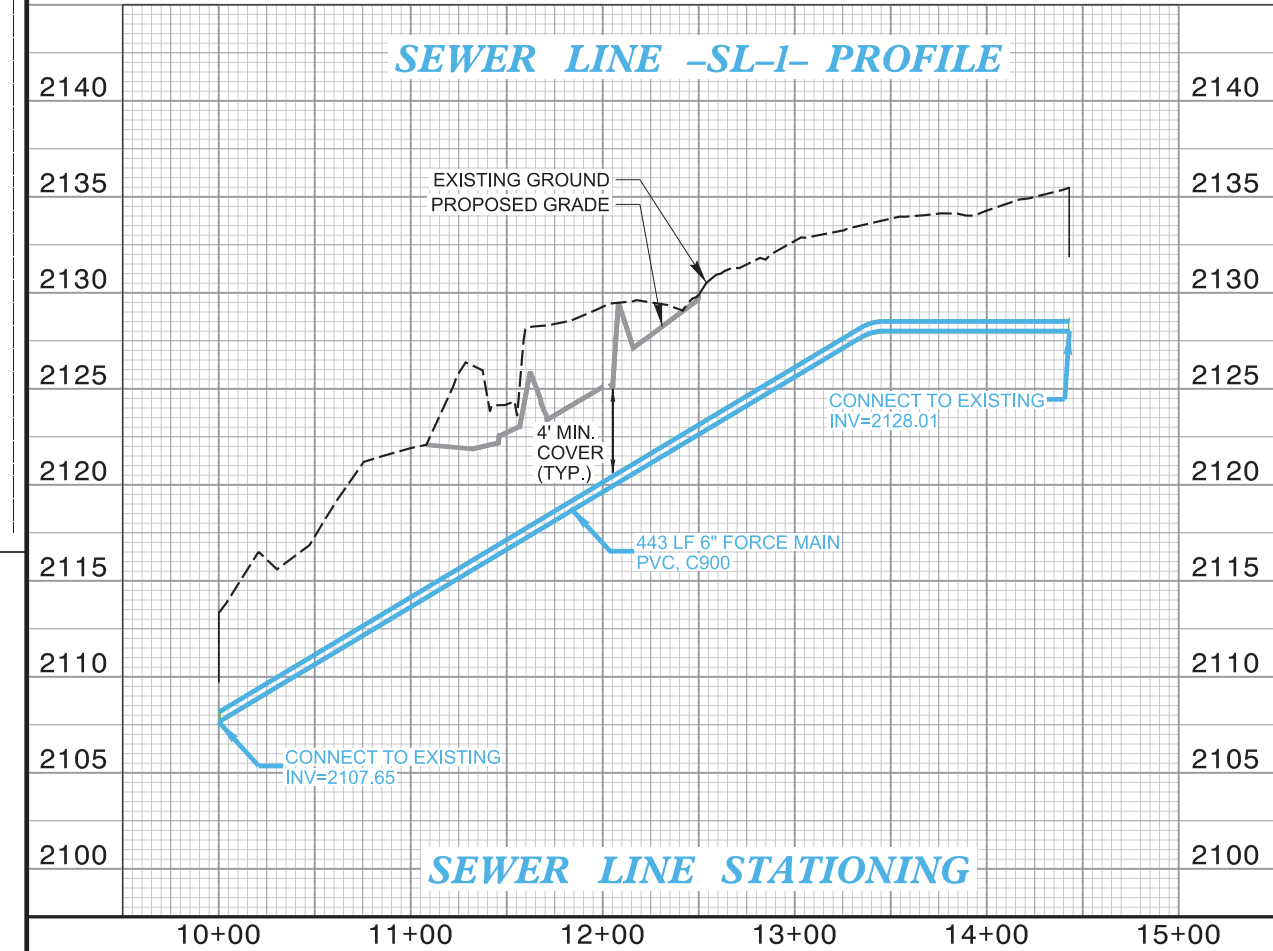
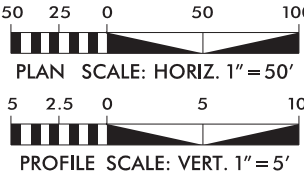
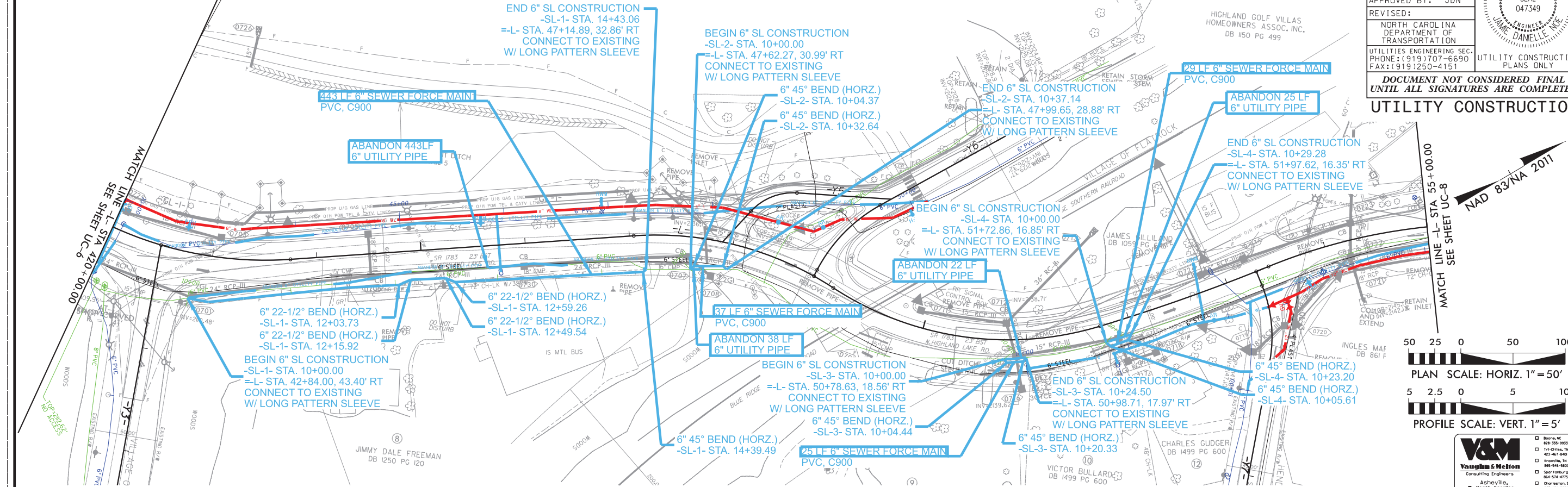
THE ESTIMATED QUANTITY OF DUCTILE IRON SEWER PIPE FITTINGS ON THIS PLAN SHEET IS 1,345 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

HENDERSON COUNTY

PROJECT REFERENCE NO.	SHEET NO.
U-5887	UC-7B
DESIGNED BY: SSD	
DRAWN BY: BAB	
CHECKED BY: JDN	
APPROVED BY: JDN	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

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UTILITY CONSTRUCTION





12/31/20

THE ESTIMATED QUANTITY OF DUCTILE IRON WATER PIPE FITTINGS ON THIS PLAN SHEET IS 1,950 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

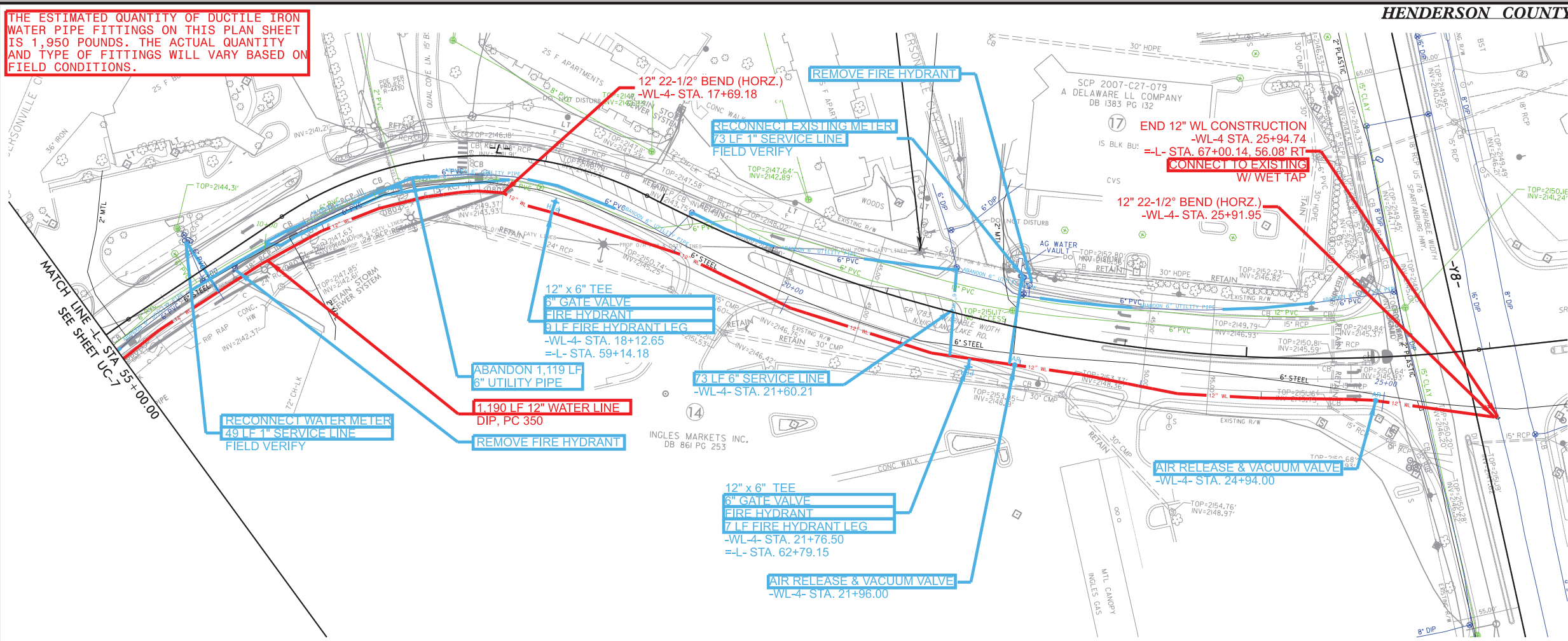
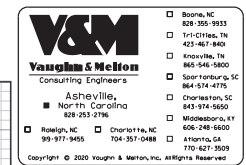
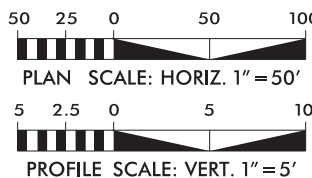
HENDERSON COUNTY

PROJECT REFERENCE NO.	SHEET NO.
U-5887	UC-8
DESIGNED BY: SSD	
DRAWN BY: BAB	
CHECKED BY: JDN	
APPROVED BY: JDN	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION	
UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	UTILITY CONSTRUCTION PLANS ONLY

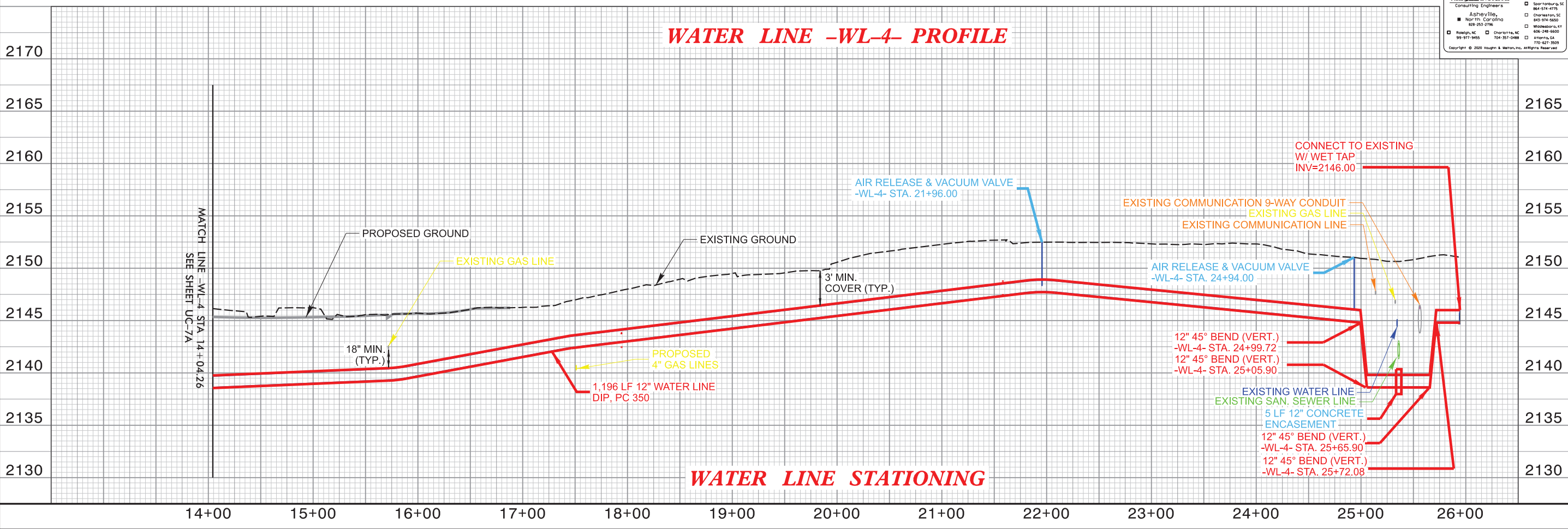


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UTILITY CONSTRUCTION



## WATER LINE -WL-4- PROFILE



PROJECT REFERENCE NO.  
U-5887

SHEET NO.  
UC-8A

DESIGNED BY: SSD

DRAWN BY: BAB

CHECKED BY: JDN

APPROVED BY: JDN

REVISED:

NORTH CAROLINA  
DEPARTMENT OF  
TRANSPORTATION

UTILITY ENGINEERING SEC.  
PHONE: (919) 707-6690  
FAX: (919) 250-4151

UTILITY CONSTRUCTION  
PLANS ONLY

SEAL  
047349

ENGINEER  
JANE DANIELLE JOE

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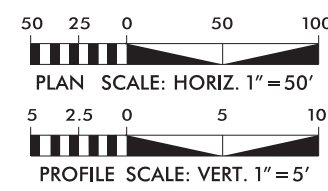
UTILITY CONSTRUCTION

THE ESTIMATED QUANTITY OF DUCTILE IRON SEWER PIPE FITTINGS ON THIS PLAN SHEET IS 205 POUNDS. THE ACTUAL QUANTITY AND TYPE OF FITTINGS WILL VARY BASED ON FIELD CONDITIONS.

6 LF 2" SERVICE LINE  
-SL-5- STA. 11+21.64  
ABANDON 211 LF  
6" UTILITY PIPE  
211 LF 6" SEWER FORCE MAIN  
PVC, C900

END 6" SL CONSTRUCTION  
-SL-5- STA. 12+10.83  
=L- STA. 58+71.79, 18.73' RT  
CONNECT TO EXISTING  
W/ LONG PATTERN SLEEVE

6" 45° BEND (HORZ.)  
-SL-5- STA. 10+13.26  
BEGIN 6" SL CONSTRUCTION  
-SL-5- STA. 10+00.00  
=L- STA. 56+49.89, 10.62' RT  
CONNECT TO EXISTING  
W/ LONG PATTERN SLEEVE



**V&M**  
Vaughan & McElroy  
Consulting Engineers

Asheville, NC  
828-253-2786  
919-977-9455

Charlotte, NC  
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Atlanta, GA  
770-627-3093

Boone, NC  
828-266-7933

Tri-Cities, TN  
423-487-8400

Knoxville, TN  
865-546-1900

Spartanburg, SC  
864-574-4775

Cherokee, SC  
843-974-5600

Wadesboro, NC  
704-288-6600

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SEWER LINE -SL-5- PROFILE



EXHIBIT B

TIP No.: U-5887  
Route: SR 1783 (North Highland Lake Rd\_ from NC 225 to west of US 176  
Type of Work: Sewer and Water Line Construction  
V&M Project No. 031535-06  
Prepared By: MRD Rev. Date: 6/26/2020  
Requested By: SSD Rev. Date: 1/7/2020  
HENDERSONVILLE

County: HENDERSON

ESTIMATE OF QUANTITIES																		
				-WL-1-	-WL-1-	-WL-1-	-WL-1- -WL-2-	-WL-3- -WL-4-	-SL-1- -SL-2- -SL-3- -SL-4-	-WL-4-	-SL-5-							
Item No.	Type	Section No.	Description	UC-4	UC-5	UC-6	UC-7	UC-7A	UC-7B	UC-8	UC-8A	ITEM TOTAL	Unit	UNIT Price	State Cost	City of Hendersonville Responsibility (25%)	City of Hendersonville Responsibility (Betterment- Upsize)	TOTAL Amount
5325600000-E	U	1510	6" WATER LINE (DIP, PC350)			85	333			73		491	LF	\$96.00	\$35,352.00	\$11,784.00	\$0.00	\$47,136.00
5325800000-E	U	1510	8" WATER LINE (DIP, PC350)	813	1232	1186	783					4,014	LF	\$125.00	\$289,008.00	\$96,336.00	\$116,406.00	\$501,750.00
5326200000-E	U	1510	12" WATER LINE (DIP, PC350)				251			1190		1,441	LF	\$155.00	\$103,752.00	\$34,584.00	\$85,019.00	\$223,355.00
5329000000-E	U	1510	DUCTILE IRON WATER PIPE FITTINGS	1060	1010	1180	3305	475		1950		8,980	LB	\$9.50	\$37,263.75	\$12,421.25	\$35,625.00	\$85,310.00
5540000000-E	U	1515	6" GATE VALVE & VALVE BOX	2	2	1	6			2		13	EA	\$2,100.00	\$20,475.00	\$6,825.00	\$0.00	\$27,300.00
5546000000-E	U	1515	8" GATE VALVE & VALVE BOX	1								1	EA	\$2,700.00	\$1,575.00	\$525.00	\$600.00	\$2,700.00
5558000000-E	U	1515	12" GATE VALVE & VALVE BOX				1					1	EA	\$5,500.00	\$1,575.00	\$525.00	\$3,400.00	\$5,500.00
5572600000-E	U	1515	16" TAPPING SLEEVE AND VALVE							1		1	EA	\$22,000.00	\$16,500.00	\$5,500.00	\$0.00	\$22,000.00
5589100000-E	U	1515	1" AIR RELEASE VALVE	1	3	3	3			3		13	EA	\$5,000.00	\$48,750.00	\$16,250.00	\$0.00	\$65,000.00
5648000000-N	U	1515	RELOCATE WATER METER		1		2					3	EA	\$1,500.00	\$3,375.00	\$1,125.00	\$0.00	\$4,500.00
5649000000-N	U	1515	RECONNECT WATER METER	1	1	2	1			2		7	EA	\$1,650.00	\$8,662.50	\$2,887.50	\$0.00	\$11,550.00
5666000000-E	U	1515	FIRE HYDRANT	2	2		4			2		10	EA	\$4,800.00	\$36,000.00	\$12,000.00	\$0.00	\$48,000.00
5672000000-N	U	1515	RELOCATE FIRE HYDRANT				1					1	EA	\$3,800.00	\$2,850.00	\$950.00	\$0.00	\$3,800.00
5673000000-E	U	1515	FIRE HYDRANT LEG	10	12		25			16		63	LF	\$140.00	\$6,615.00	\$2,205.00	\$0.00	\$8,820.00
5686500000-E	U	1515	WATER SERVICE LINE	48	134	58	109			122		471	LF	\$32.00	\$11,304.00	\$3,768.00	\$0.00	\$15,072.00
5689000000-E	U	1515	CONNECTION TO EXISTING 16-INCH WATER LINE							1		1	EA	\$9,100.00	\$6,825.00	\$2,275.00	\$0.00	\$9,100.00
5689000000-E	U	1515	CONNECTION TO EXISTING 8-INCH WATER LINE	1								1	EA	\$6,400.00	\$4,800.00	\$1,600.00	\$0.00	\$6,400.00
5689000000-E	U	1515	CONNECTION TO EXISTING 6-INCH WATER LINE			1	3					4	EA	\$5,700.00	\$17,100.00	\$5,700.00	\$0.00	\$22,800.00
5709300000-E	U	1520	6" FORCE MAIN SEWER (PVC, C900)						534		211	745	LF	\$50.00	\$27,937.50	\$9,312.50	\$0.00	\$37,250.00
5768500000-E	U	1520	SEWER SERVICE LINE								6	6	LF	\$35.00	\$157.50	\$52.50	\$0.00	\$210.00
5769000000-E	U	1520	DI SEWER PIPE FITTINGS						1345		205	1,550	LF	\$9.70	\$11,276.25	\$3,758.75	\$0.00	\$15,035.00
5800000000-E	U	1530	ABANDON 6" UTILITY PIPE	816	1201	1232	1014		528	1119	211	6,121	LF	\$15.00	\$68,861.25	\$22,953.75	\$0.00	\$91,815.00
5815500000-N	U	1530	REMOVE FIRE HYDRANT		1		1			2		4	EA	\$1,800.00	\$5,400.00	\$1,800.00	\$0.00	\$7,200.00
5835700000-E	U	1540	16" ENCASEMENT PIPE (0.25" THICK)		71	53						124	LF	\$130.00	\$12,090.00	\$4,030.00	\$0.00	\$16,120.00
5872500000-E	U	1550	BORE AND JACK OF 16" STEEL ENCASEMENT PIPE		71							71	LF	\$500.00	\$26,625.00	\$8,875.00	\$0.00	\$35,500.00
5882000000-N	U	1550	CONCRETE ENCASEMENT				5			5		6	CY	\$550.00	\$2,475.00	\$825.00	\$0.00	\$3,300.00
														TOTALS:	\$806,604.75	\$268,868.25	\$241,050.00	\$1,316,523.00
														\$509,918.25 Total City Cost				



Project: U-5887

UC-1

County: Henderson

PROJECT SPECIAL PROVISIONS  
Utility Construction



1909 Ailor Ave  
Knoxville, Tennessee 37921  
Tel: (865)546-5800 / Fax: (865) 467-8402



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Revise the 2018 Standard Specifications as follows:

**Section 1036- Water Pipe and Fittings**

**Page 10-62, Sub-article 1036-3 Plastic Pipe**

Add the following sentence:

Use PEX-A pipe for water service lines.

**Page 10-62, Sub-article 1036-4 Steel Pipe (B)**

Add the following sentence:

Steel encasement pipe shall be coated.

**Page 10-63, Sub-article 1036-6 Fire Hydrants**

Add the following sentence:

Fire hydrants shall have a 5 1/4" diameter valve opening with a Storz connection.

**Division 15, Section 1500-General Utility Requirements**

**Page 15-1, Sub-article 1500-1 Description**

Add the following sentences:

Construction of all water and sewer systems shall be in accordance with the NCDOT standards or the local jurisdictional standards whichever is more stringent and Special Provisions in effect at the time of bid.

Project: U-5887

UC-2

County: Henderson

City of Hendersonville contact Adam Steurer, P.E. at (828) 233-3207 to obtain the current technical specification and a list of approved manufactures list.

**Page 15-1, Sub-article 1500-2 Cooperation with the Utility Owner, paragraph 2:**

Add the following sentences:

City of Hendersonville (COH) the contact person is Adam Steurer, P.E. and can be reached by phone at (828) 233-3207 Business Hours or (828) 243-4430 after hours.

All water and sewer lines are to remain active during construction of the project. To accomplish this the Contractor may elect to utilize bypass pumping, line stops, inserting valves, temporary water or other methods to complete the work. These methods and means of construction must be approved by the engineer prior to commencement of the work and all such work shall be considered incidental to various other utility pay items included in the contract. All proposed water line and sewer line relocation work shall be performed at a time to be coordinated with the utility owner. Water lines or sewer lines shall not be taken out of service without prior approval of the utility owner and service interruptions shall not exceed four hours. Contractor shall not interfere or cover active water or sewer infrastructure including but not limited to water meters, water valves and sewer cleanouts.

**Page 15-2, Sub-article 1500-7 SUBMITTALS AND RECORDS, paragraph 3:**

Add the following sentences:

The City of Hendersonville shall be copied on contractor pay applications that include relevant utility items.

Any revisions to the utility plans shall be approved by the utility design engineer and reviewed and approved by the City prior to construction

Partial and final engineering utility certifications should be provided by the design engineer prior to activation of services.

As-built plans and associated documentation shall be provided to the Engineer prior to acceptance of the work. A final inspection walk through with representation from the City, NCDOT, Contractor, and design engineer at completion of punch-list items is required before final acceptance.

As-built plans shall be provided to the City of Hendersonville showing the size and type of material installed and the coordinates of all utility horizontal and vertical locations of all installed piping and appurtenances. As-built drawings shall be signed, sealed and dated on each sheet by a North Carolina registered engineer (PE) as part of the City's acceptance process. As-Built Drawings shall be submitted and approved prior to issuance of final acceptance. All applicable information listed in the City's as-built drawing checklist shall be included.

Submit to the City's Engineering Department certified "Surveyed As-Built Drawings", including a

Project: U-5887

UC-3

County: Henderson

.dxf and/or .dwg file and a PDF of the as-built construction drawings and a comma-delimited text file of the infrastructure and easement points with point descriptions (including point number, northing, easting, elevation, description).

**Page 15-4, Sub-article 1505-3 (E) Thrust Restraint for Ductile Iron Water Pipe Paragraph 3**  
Add the following:

**Thrust Collars** shall be installed on water line pipe at all points recommended by the ENGINEER. Thrust collars shall be considered an integral part of the water line work. Work shall include a minimum of 3,000 psi concrete, reinforcement bars, threaded rod, retainer gland (mega-lug) and anchor ring i.e. mega-lug as shown in detail.

Where feasible joint restraints (i.e. Field Lok gaskets or approved equal) shall be used in lieu of concrete thrust collars.

**Measurement & Payment:**

**Thrust Collars** shall be constructed as shown in the detail, paid per each and installed in place at the location shown on the Drawings or as directed by the Engineer.

**Page 15-5, Sub-article 1510-2 Paragraph 3**

Add the following:

Use Trace-Safe 19 AWG solid-copper wire for the utility locator wires.

**Page 15-6, Sub-article 1510-3(B) Testing and Sterilization:**

Add the following:

After the pipeline has been satisfactorily constructed compete with the required fire hydrants, services, and all other appurtenances, and the trench backfilled satisfactorily, and after line flushing and approval by the Engineer, the newly constructed pipeline and valved sections shall be subjected to a hydrostatic pressure leakage test. The Contractor shall notify the Engineer when the work is ready for testing with all testing done in the presence of the Engineer. All labor, equipment, water and materials, including meters and gauges shall be furnished by the Contractor at his own expense.

Ductile iron pipe will be tested in accordance with AWWA C600.

Each completed section of the pipeline shall be plugged at both ends and slowly filled with water. As the main is being filed with water in preparation of the tests, all air shall be expelled from the pipe. The main shall be subjected to hydrostatic pressure of 200 pounds per square inch for a period of two (2) hours unless otherwise specified. Pressure shall be applied to the main by means of a hand pump for small lines or by use of a gasoline pump or fire engine for larger lines.

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The rate of leakage shall be determined at fifteen (15) minute intervals by means of volumetric measurement of the water added during the test until the rate has stabilized at the constant value for three (3) consecutive fifteen (15) minute periods.

Leakage is defined as the quantity of water to be supplied into the newly laid pipe, or any valved section, necessary to maintain the specified leakage test pressure after the pipe has been filled with water and the air expelled. No piping installation will be accepted until the leakage is less than ten (10) gallons per inch of pipe diameter per mile of pipe per twenty-four (24) hours.

Cracked or defective pipe, joints, fittings, valves, or hydrants discovered in consequence of this test shall be removed and replaced with sound materials, and the test shall be repeated until the test results are satisfactory. Precautions shall be taken to remove or otherwise protect equipment in, or attached to, pipe to prevent damage or injury.

Pipe interiors, fittings, and valves shall be protected from contamination. Pipe delivered for construction shall be strung so as to minimize entrance of foreign matter. When pipe laying is not in progress for more than one hour, all openings in the pipeline shall be closed by watertight plugs. Joint of all pipe in the trench shall be completed before work is stopped. If water accumulates in the trench, the plug shall remain in place until the trench is dry.

If dirt enters the pipe that, in the opinion of the Engineer, will not be removed by flushing operations, the interior of the pipe shall be cleaned and swabbed as necessary, with a 5% hypochlorite disinfecting solution.

Sampling taps may be used as blow-offs. The number and locations of the taps/blow-offs must be approved by the Engineer. Hydrants may not be used for bacterial sampling.

The Contractor shall construct taps so that bacteriological samples can be easily collected without danger to personnel or likelihood of sample contamination. The Contractor shall legibly mark each sample tap with identifying letters or numbers for sample reference purposes. The Contractor shall not designate hydrants as taps for bacteriological sampling purposes. If the service or corporation taps are installed before the laboratory tests are completed, each tap will be tested for coliform bacterial.

Before being placed in service, all new mains and existing piping disturbed in any manner by the work shall be disinfected. Draining the water from existing piping or even lowering the water pressure more than one-half will constitute disturbance of the piping.

The disinfecting of water mains, valves and other appurtenances incorporated into the main construction shall be done by means of a chlorinating measuring apparatus, with proper devices for regulating the flow and providing an effective diffusion into the water within the main being disinfected by an application of chlorine-bearing compound bearing a high-test calcium hypochlorite (65-70%) available chlorine). In the preparation of the solution, the powder shall first be made into a paste and then gradually thinned with water to approximately 1% chlorine solution (10,000 parts per pound of powder). This will require about 7.50 gallons of water to each

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one pound of powder. Solution shall be applied to the main through a rubber hose by gravity, siphonage, injection or by suitable pump feeder.

The point of chlorine application shall be at the beginning of the water main construction and/or any valve section thereof, through corporation cock installed close to and on the downstream side of the regulating gate valve controlling the flow of such proportion to the rate of water flow entering the main that the chlorine applied shall produce fifty (50) parts per million (420 pounds per million gallons) chlorine concentration in the water within the main.

During the disinfecting operation, valves, hydrants, and other mechanical devices controlling the flow of water shall be operated to permit full effectiveness of the chlorine. Valves shall be manipulated so that the strong solution within the main being sterilized will not flow back into the supply line nor flow into mains already in service. A chlorine concentration test shall be made, in turn, at each of the hydrants and/or taps provided for that purpose.

The tablet method of disinfection may be utilized for disinfection provided the total length of potable water main to be laid is less than 2,000 linear feet of pipe less than 12" in diameter. This method will be suitable only, if in the opinion of the Engineer, the pipeline has been maintained suitable free from foreign matter and any other contaminants during construction.

The Contractor shall provide sampling taps, Generally, sampling taps shall be provided on the water main every 1,000' and at the end of each main and at the end of each branch, in order to afford representative water testing and sample collection.

All disinfection shall be performed in accordance with AWWA Standard C651 and the Rules Governing Public Water Systems. All bacteriological tests shall be performed by a state-approved, certified laboratory per Rule .1001.

**Page 15-10, Sub-article 1520-2 Paragraph 4**

Add the following:

Use Trace-Safe 19 AWG solid-copper wire for the utility locator wires.

**Page 15-10, Sub-article 1520-3 Paragraph 8**

Add the following:

Sewer steel encasement line for future use shall be capped on both ends after installation.

**Page 15-10, Sub-article 1520-3(A) Gravity Sanitary Sewer:**

Add the following sentences:



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Sewer by-pass pump plan shall be submitted for the City's approval with primary and backup pump specifications with telemetry to carry full flows of the sewer lines along with quick disconnect galvanized piping.

Air-testing will be conducted as the project is being installed. This includes all mainline between manholes, future mainline stubs and laterals out of manholes. The air testing shall be in accordance with ASTM F 1417.

CCTV all gravity sewer. All defects shall be corrected to the City's satisfaction prior to acceptance.

Deflection testing of all new PVC sewer pipe shall be conducted 30 days after installation and backfilling of the pipe or as otherwise directed by the Engineer.

The contractor shall furnish all necessary equipment including an approvable mandrel or other approved device and conduct the deflection tests at the direction of the Engineer.

The maximum allowable limits for deflection of installed pipe under this specification shall be 7.5%. Base inside diameters and 7.5% deflection mandrel dimensions shall be per ASTM F-679 (latest edition). Deflection shall be measured with a rigid mandrel (Go/No Go) device cylindrical in shape and constructed with a minimum of nine evenly spaced arms or prongs. Drawings of the mandrel with complete dimensions shall be submitted to the Engineer for each diameter of pipe to be tested. The mandrel shall be hand pulled through all sewer lines.

Any section of sewer not passing the mandrel shall be uncovered and the bedding and backfill replaced to prevent excessive deflection. Repaired pipe shall be retested to ensure that acceptable deflection limits are not exceeded.

The Contractor shall furnish and install during backfill operation for all gravity mainline sewers and laterals printed polyethylene green (SEWER) tape above the bedding material, three (3) feet above the crown of the pipe.

All testing of pipe and associated sewer manholes and appurtenances shall be considered incidental to the applicable pay items for gravity sanitary sewer pipe.

**Page 15-14, Sub-article 1525-3(B) Installation of Precast Units:**

Add the following sentences:

No doghouse manholes will be allowed on this project.

Air Testing of all new manholes is required and shall meet the requirements of ASTM C1244. Manholes shall be sealed with plate-style sealing equipment on top of the casting so that the adjustment rings can also be tested. Bladder-style sealers are not acceptable. If a lateral is extended out of a manhole to a property the lateral shall be air tested with the manhole test, i.e. the lateral shall not be sealed off during the test.

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All testing of manholes and appurtenances shall be considered incidental to the applicable pay items for utility manholes.

**Page 15-15, Sub-article 1525-3(D) Testing:**

Add the following sentence:

Vacuum test all existing manholes with new connections before grouting and backfilling. Test according to ASTM C1244.

**END OF SECTION**