

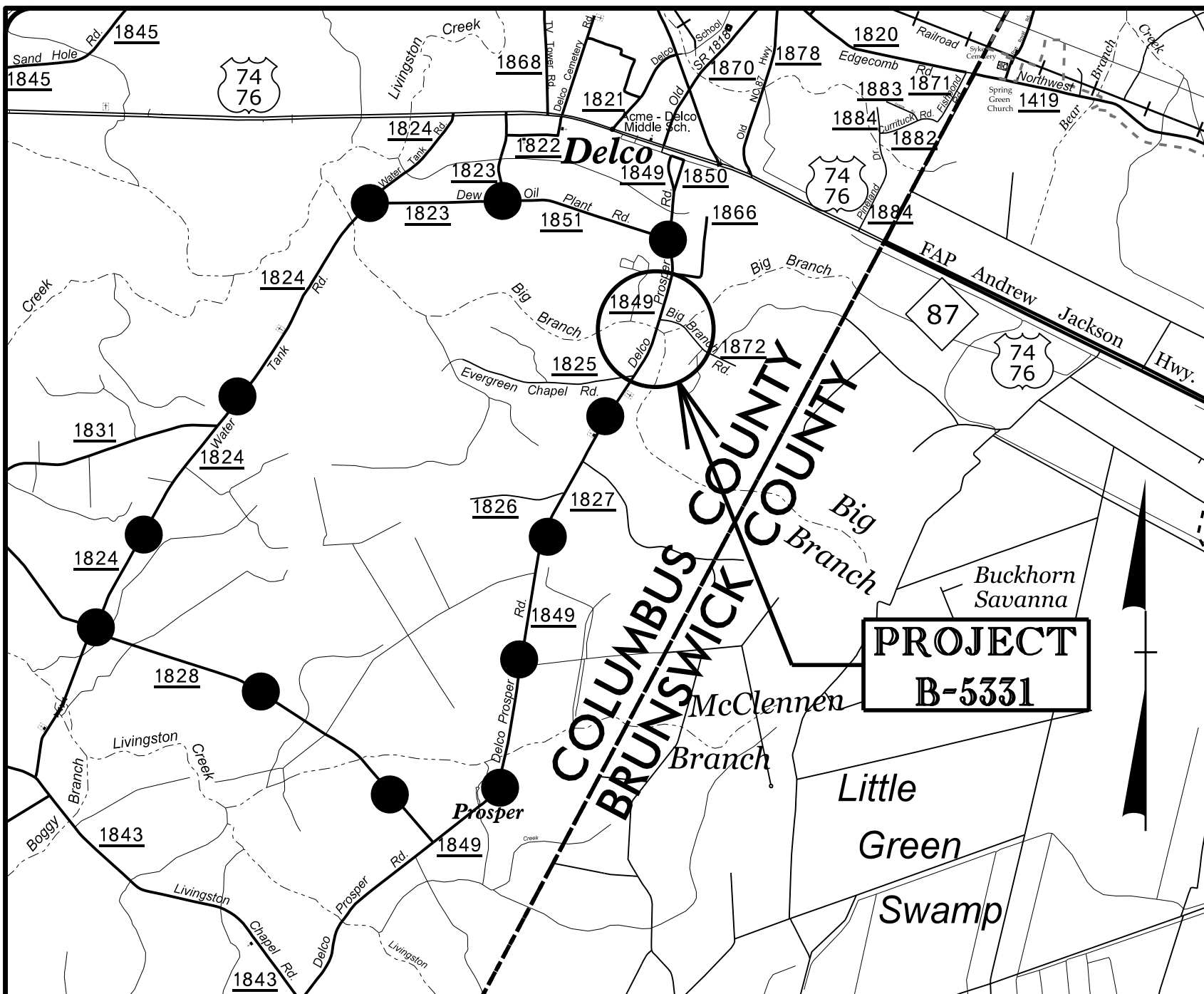
**This electronic collection of documents is provided
for the convenience of the user
and is Not a Certified Document –**

**The documents contained herein were originally issued
and sealed by the individuals whose names and license
numbers appear on each page, on the dates appearing
with their signature on that page.**

**This file or an individual page
shall not be considered a certified document.**

09/20/19

TIP PROJECT: B-5331



VICINITY MAP

DETOUR

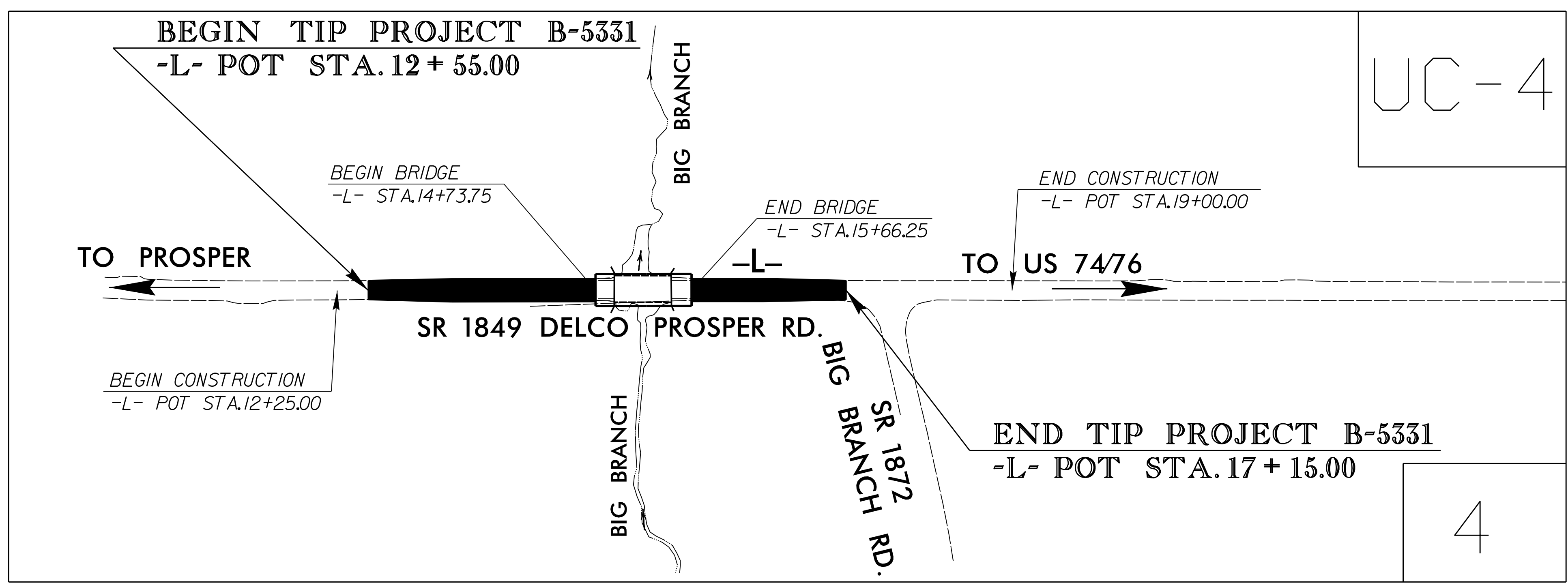
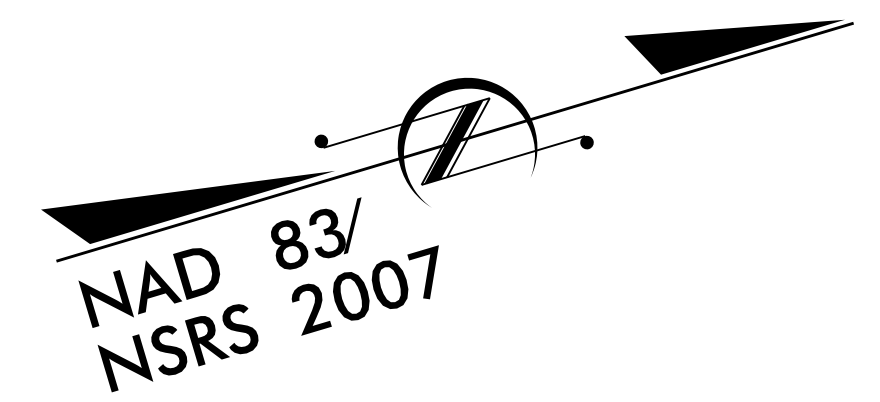
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

UTILITY CONSTRUCTION PLANS
COLUMBUS COUNTY

LOCATION: BRIDGE NO. 269 OVER BIG BRANCH
ON SR 1849 (DELCO PROSPER ROAD)

TYPE OF WORK: WATER LINE RELOCATION

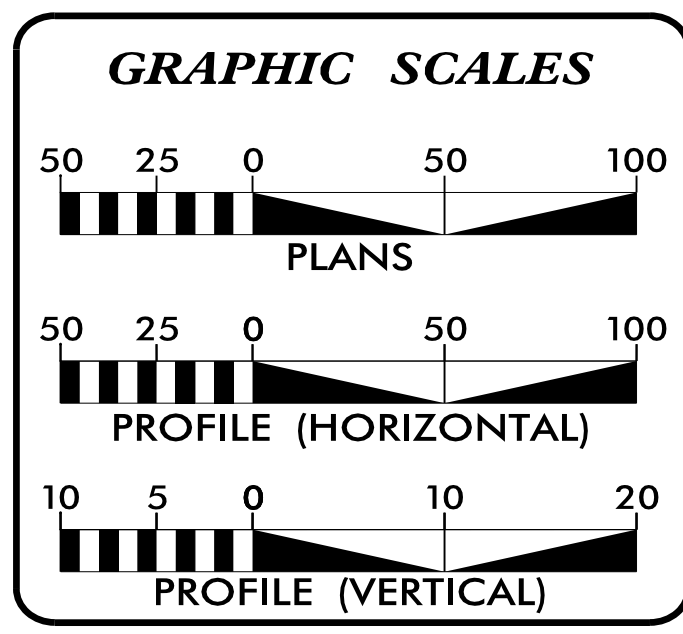
T.I.P. NO.	SHEET NO.
B-5331	UC-1



UC-4

4

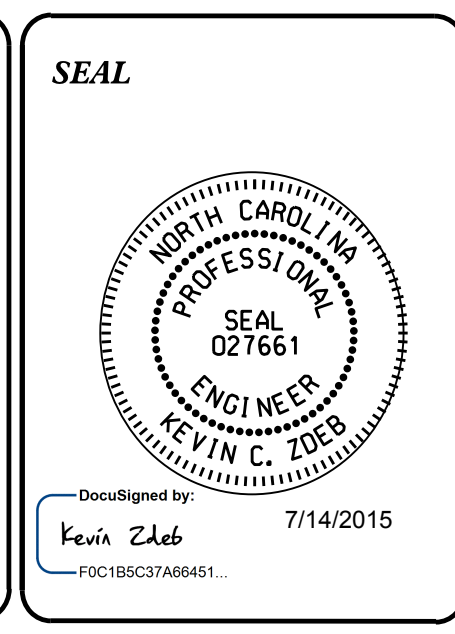
M A Engineering Consultants, Inc. 598 East Chatham Street - Suite 137
Cary, NC 27511
Phone: 919.297.0220 Fax: 919.297.0221
NC License: F-0160



SHEET NO.	DESCRIPTION
UC-1	TITLE SHEET
UC-2	UTILITY SYMBOLOGY
UC-3	NOTES
UC-3A THRU UC-3B	DETAILS
UC-4	UTILITY CONSTRUCTION SHEET & PROFILE

WATER AND SEWER OWNERS ON PROJECT

(1) COLUMBUS COUNTY PUBLIC UTILITIES- WATER



PREPARED IN THE OFFICE OF:
DIVISION OF HIGHWAYS
UTILITIES UNIT
UTILITIES ENGINEERING

1555 MAIL SERVICES CENTER
RALEIGH NC 27699-1555
PHONE (919) 707-6690
FAX (919) 250-4151

Roger Worthington, P.E. UTILITIES SECTION ENGINEER
Bo Hemphill, P.E. UTILITIES SQUAD LEADER PROJECT ENGINEER
Kifah Kamil UTILITIES PROJECT DESIGNER

\$\$\$\$\$ SYSTEM TIME \$\$\$\$\$\$
\$\$\$\$\$ USER NAME \$\$\$\$\$\$

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITIES PLAN SHEET SYMBOLS

PROPOSED WATER SYMBOLS

Water Line (Sized as Shown)	
11 1/4 Degree Bend	
22 1/2 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	

NOTE
PAY ITEM

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	AATUR	Sanitary Sewer Cleanout	
End of Information	E.O.I.		

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

5/14/99
REV: 2/1/2012

8/17/99

REVISIONS

UTILITY CONSTRUCTION

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 2012.
2. THE EXISTING UTILITIES BELONG TO:

COLUMBUS COUNTY PUBLIC UTILITIES
CONTACT: DANNY FOWLER
PHONE: 910-642-5257
CONTACT: HAROLD NOBLES
PHONE: 910-770-2034
3. ALL WATER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENTAL AND NATURAL RESOURCES, DIVISION OF ENVIRONMENTAL HEALTH. ALL SEWER LINES TO BE INSTALLED WITHIN COMPLIANCE OF THE RULES AND REGULATIONS OF THE NORTH CAROLINA DEPARTMENT OF ENVIRONMENT AND NATURAL RESOURCES, DIVISION OF WATER QUALITY. 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 OPPROTUNITY 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 SYSTEM 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, 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. PROPOSED WATER LINE SHALL BE DUCTILE IRON RESTRAINED JOINT PIPE.
2. ALL WATER LINE FITTINGS, 4-INCHES THRU 12-INCHES IN DIAMETER, SHALL BE DUCTILE IRON.
3. ALL FITTINGS (BENDS, TEES, CROSSES, REDUCERS, PLUGS, ETC.) SHALL BE ADEQUATELY RESTRAINED BY THE USE OF RESTRAINED JOINT CONSTRUCTION AND /OR CAST IN PLACE CONCRETE THRUST RESTRAINTS AS DETAILED ON THESE DRAWINGS, OR AS DIRECTED BY THE RESIDENT ENGINEER.
4. THE EXISTING 8" LINE SHALL BE RESTRAINED ON THE PORTION TO REMAIN AFTER INSTALLATION. THE CONTRACTOR SHALL EXCAVATE THE EXISTING LINE AND INSTALL THE BELL RESTRAINT CLAMPS AT EVERY BELL JOINT FOR THE DISTANCE NOTED IN THE TABLE ON SHEET UC-3B.
5. CONTRACTOR SHALL INSTALL CONCRETE THRUST RESTRAINT ON THE EXISTING DUCTILE IRON LINE THAT IS TO REMAIN AS NOTED ON SHEET UC-3B, OR AS DIRECTED BY THE RESIDENT ENGINEER.
6. MAXIMUM SHUT DOWN TIME FOR THE 8" WATER LINE IS 4 HOURS. IF TIE-IN WORK AND WATER LINE TESTING WILL TAKE LONGER THAN THIS, THEN THE CONTRACTOR WILL NEED TO INSTALL TWO (2) LINE STOP WITH BYPASS ASSEMBLIES, ONE AT EACH TIE-IN LOCATION, IN ORDER TO CONDUCT PROPER WORK.
7. CONTRACTOR SHALL EXCAVATE EXISTING WATER LINE AT PROPOSED TIE-IN LOCATION ON NORTH SIDE OF BIG BRANCH TO VERIFY PIPE MATERIAL AND ELEVATION OF TOP OF PIPE PRIOR TO BEGINNING ANY WORK.

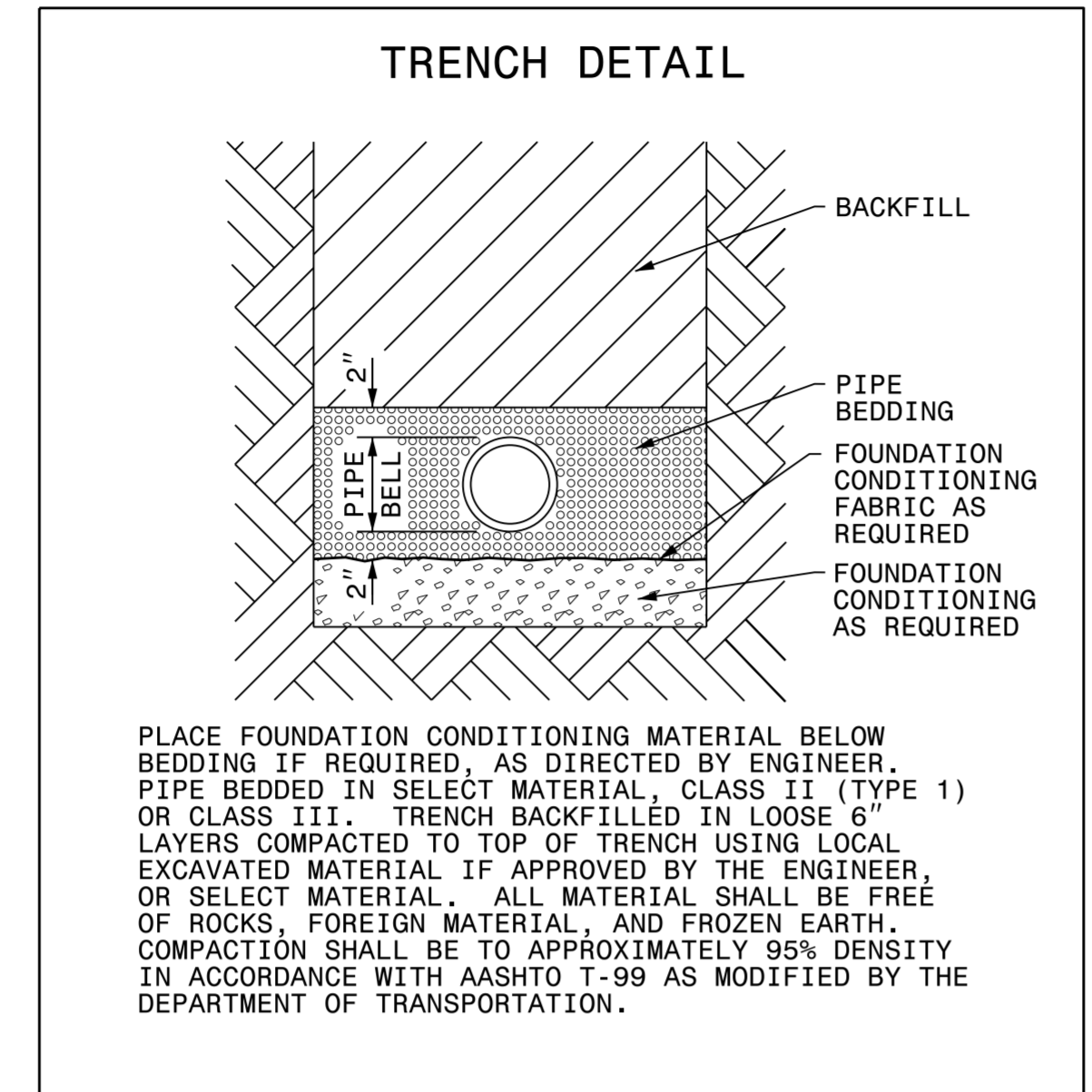
PROJECT REFERENCE NO. <i>B-5331</i>	SHEET NO. <i>UC-3</i>
DESIGNED BY: SAG	
DRAWN BY: SAG	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

8/17/99

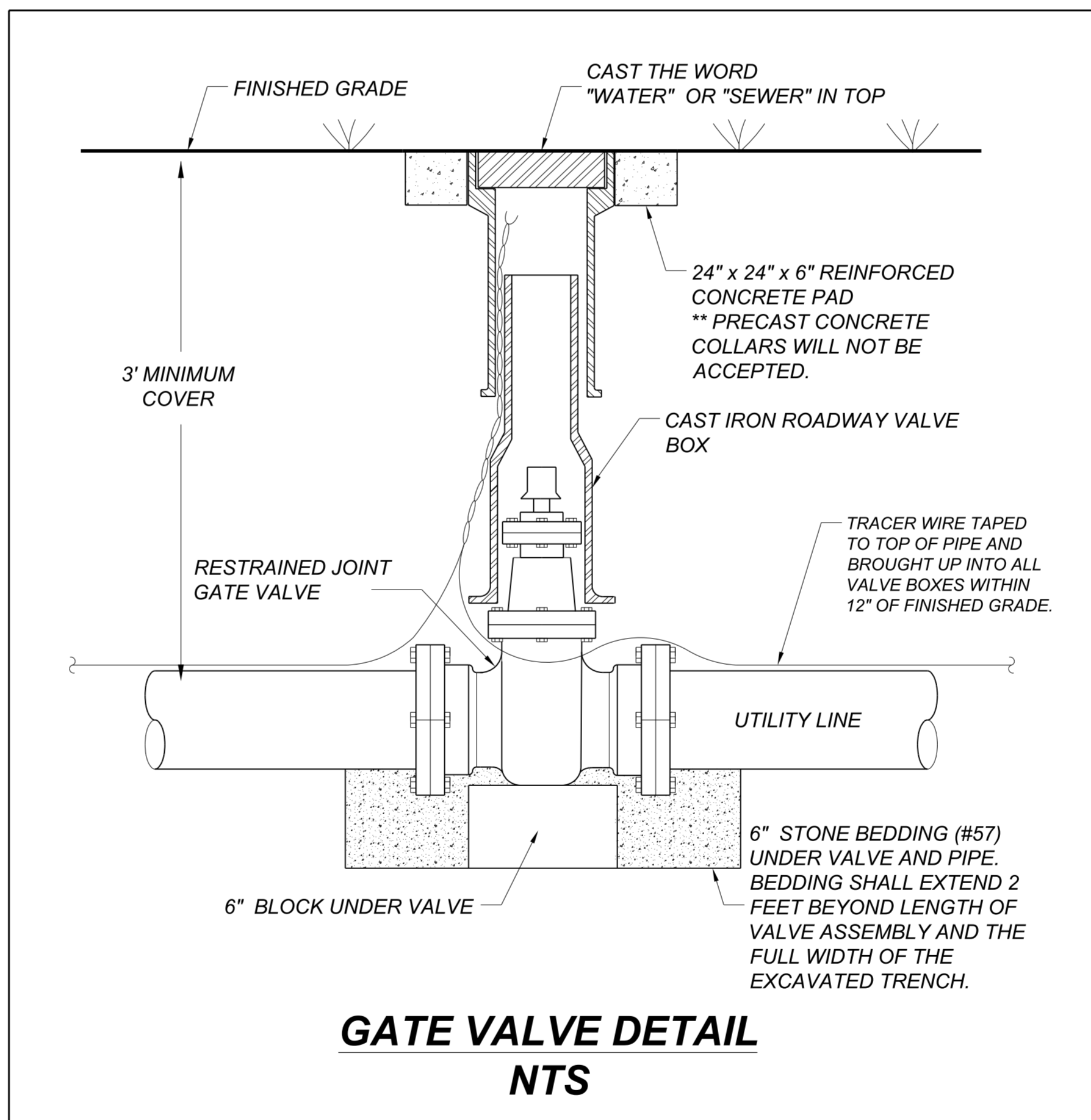
REVISIONS

PROJECT REFERENCE NO. <i>B-5331</i>	SHEET NO. <i>UC-3A</i>
DESIGNED BY: SAG	
DRAWN BY: SAG	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	



MAXIMUM TRENCH WIDTH AT TOP OF PIPE

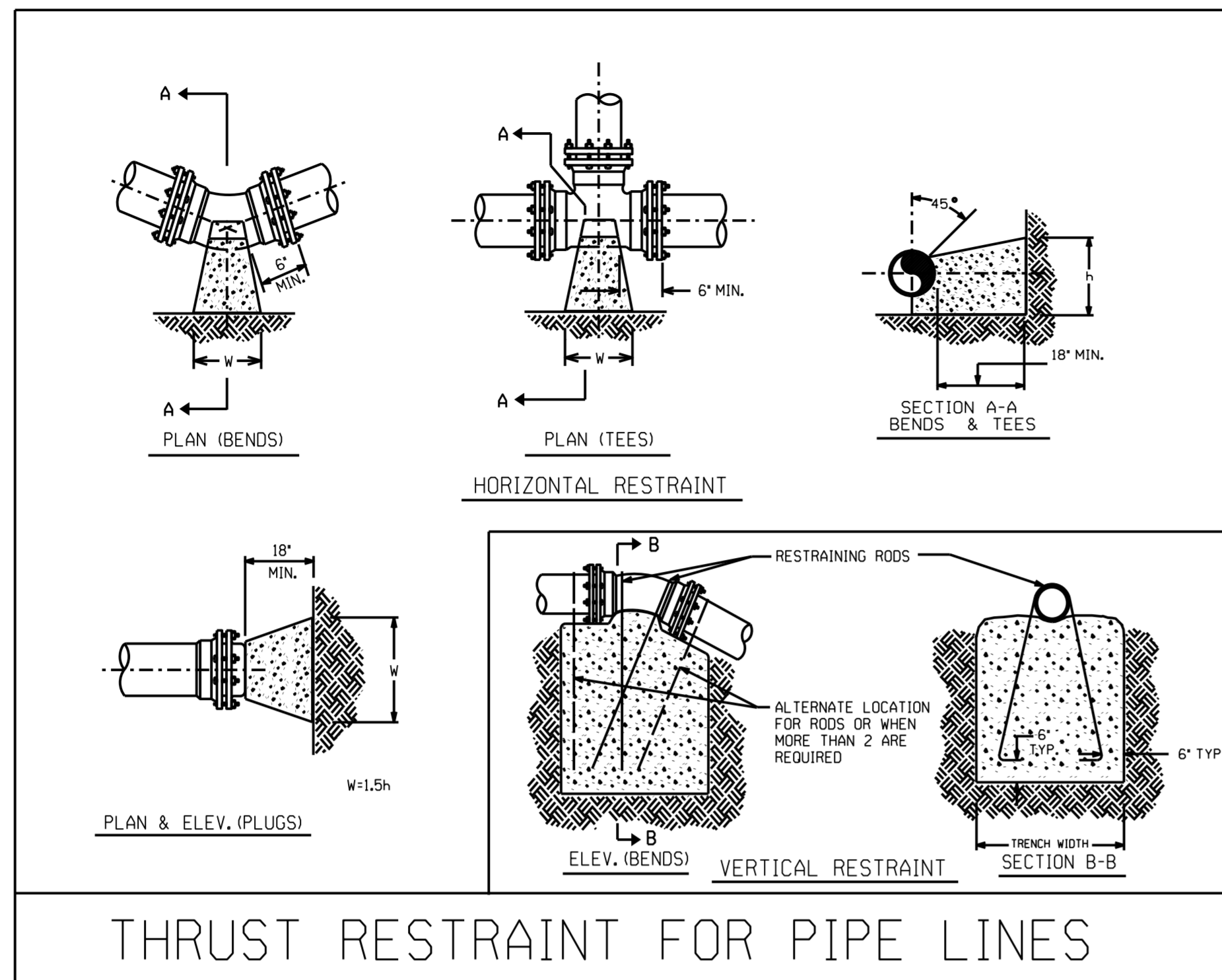
NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)	NOMINAL PIPE SIZE (INCHES)	TRENCH WIDTH (INCHES)
4	28	20	44
6	30	24	48
8	32	30	54
10	34	36	60
12	36	42	66
14	38	48	72
16	40	54	78
18	42		



UTILITY CONSTRUCTION

PROJECT REFERENCE NO. <i>B-5331</i>	SHEET NO. <i>UC-3B</i>
DESIGNED BY: SAG	
DRAWN BY: SAG	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	

UTILITY CONSTRUCTION



THRUST RESTRAINT FOR PIPE LINES

BASED ON TEST PRESSURE OF 200 P.S.I.

HORIZONTAL RESTRAINT (ALL AREAS GIVEN ARE IN SQUARE FEET)				VERTICAL RESTRAINT (ALL VOLUMES GIVEN ARE IN CUBIC YARDS)**													
PIPE SIZE	DEGREE OF BEND	LBS. STATIC THRUST *	ALLOWABLE SOIL BEARING (PSF)							PIPE SIZE	RESTRAINING RODS NO. REQ'D	DIA.	DEGREE OF BEND				
			1000	2000	3000	4000	5000	6000	7000				8000	11 1/4"	22 1/2"	45°	
4"	11 1/4"	516	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	22 1/2"	1,226	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
	90°	4,444	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
6"	TEE/PLUG	3,484	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	11 1/4"	1,885	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
	22 1/2"	4,785	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
8"	90°	8,403	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	TEE/PLUG	7,468	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	11 1/4"	2,454	2	2	2	2	2	2	2	2	2	2	2	2	2	2	2
10"	22 1/2"	4,903	3	3	3	3	3	3	3	3	3	3	3	3	3	3	3
	90°	17,773	18	18	18	18	18	18	18	18	18	18	18	18	18	18	18
	TEE/PLUG	16,888	14	14	14	14	14	14	14	14	14	14	14	14	14	14	14
12"	11 1/4"	3,456	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	22 1/2"	7,851	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8
	90°	27,768	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
14"	TEE/PLUG	19,635	20	20	20	20	20	20	20	20	20	20	20	20	20	20	20
	11 1/4"	4,454	5	5	5	5	5	5	5	5	5	5	5	5	5	5	5
	22 1/2"	10,342	11	11	11	11	11	11	11	11	11	11	11	11	11	11	11
16"	90°	49,987	40	40	40	40	40	40	40	40	40	40	40	40	40	40	40
	TEE/PLUG	28,274	28	28	28	28	28	28	28	28	28	28	28	28	28	28	28
	11 1/4"	7,454	8	8	8	8	8	8	8	8	8	8	8	8	8	8	8

* INCLUDES 1.25 SAFETY FACTOR

**INCLUDES 1.50 SAFETY FACTOR

GENERAL NOTES:
 1. CONCRETE SHALL BE CLASS "B".
 2. CONCRETE SHALL NOT CONTACT BOLTS ENDS OF MECHANICAL JOINT FITTINGS.
 3. CONSULT WITH ENGINEER FOR CONCRETE REQUIREMENTS ON MAINS LARGER THAN 16 INCHES. (FOR VERTICAL & HORIZONTAL BENDS)
 4. ALLOWABLE SOIL BEARING SHALL BE DETERMINED BY THE ENGINEER.

REVISIONS
 NO. DATE DESCRIPTION

SHEET 2 OF 2

THRUST RESTRAINT FOR WATER MAINS

DUCTILE IRON PIPE RESTRAINED JOINT DESIGN TABLE

FITTING	REQUIRED RESTRAINED LENGTH (FT) OF BARE D.I. PIPE BY DEPTH OF COVER							
	3 FT	4 FT	5 FT	6 FT	7 FT	8 FT	9 FT	10 FT
HORIZONTAL BENDS								
8 INCH DIA - 11.25 DEG	3	3	2	2	2	2	2	2
8 INCH DIA - 22.5 DEG	7	6	5	5	4	4	3	3
8 INCH DIA - 45 DEG	14	12	10	9	8	8	7	7
8 INCH DIA - 90 DEG	33	29	25	23	20	19	17	16
VERTICAL DOWN BENDS								
8 INCH DIA - 11.25 DEG	10	8	7	6	6	5	5	5
8 INCH DIA - 22.5 DEG	19	17	15	13	12	11	10	9
8 INCH DIA - 45 DEG	40	35	30	27	25	22	21	19
VERTICAL UP BENDS								
8 INCH DIA - 11.25 DEG	3	3	2	2	2	2	2	2
8 INCH DIA - 22.5 DEG	7	6	5	5	4	4	3	3
8 INCH DIA - 45 DEG	14	12	10	9	8	8	7	7
DEAD ENDS / VALVES								
8 INCH DIA	65	59	54	50	46	43	40	38

ASSUMPTIONS

LAYING CONDITION = TYPE 4
 SOIL DESIGNATION = GC = COHESIVE-GRANULAR
 DESIGN PRESSURE = 200 PSI (TEST PRESSURE)
 SAFETY FACTOR = 1.5

NOTES

- RESTRAINED LENGTH IS MEASURED FROM THE CENTER OF THE BEND AS FOLLOWS:
 - HORIZONTAL AND VERTICAL BENDS: ALONG EACH SIDE OF BEND.
 - HORIZONTAL AND VERTICAL BENDS - OFFSET OR COMBINED: ALONG THE OUTER SIDE OF EACH BEND.
 ALL PIPE BETWEEN THE TWO BENDS SHALL BE RESTRAINED JOINT WHEN THE DISTANCE BETWEEN THEM IS EQUAL TO OR LESS THAN THE REQUIRED RESTRAINED LENGTH. WHEN THE DISTANCE BETWEEN BENDS IS LESS THAN REQUIRED, THE BALANCE OF THE REQUIRED RESTRAINED LENGTH SHALL BE ADDED ON TO THE LENGTH ALONG THE OUTSIDE OF EACH BEND RESPECTIVELY TO MAKE UP FOR THE DEFICIENCY IN THAT DIRECTION.

HORIZONTAL BEND EXAMPLE...

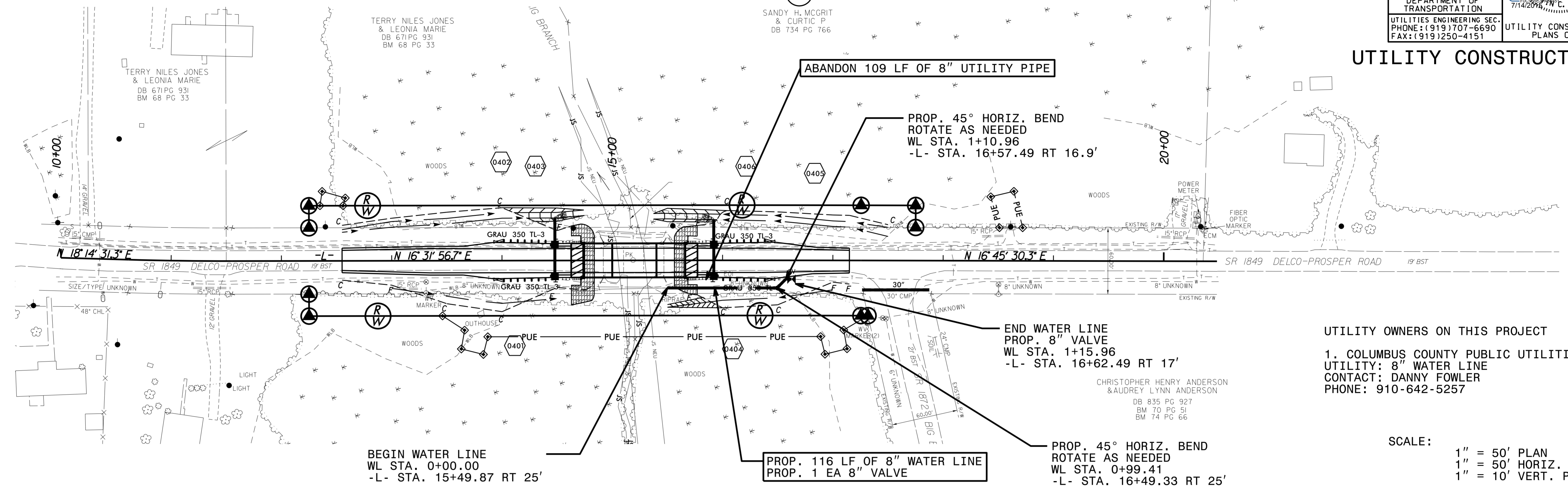
 INSTALL A 8 INCH 45 DEG BEND AND A 22.5 DEG BEND WITH 10 FEET BETWEEN BENDS AND 4 FEET OF COVER. THE CONTRACTOR SHALL PROVIDE AN ADDITIONAL 1 FOOT OF RESTRAINED LENGTH BEYOND THE 45 DEGREE BEND (FOR A TOTAL OF 13 FEET) AND AN ADDITIONAL 7 FEET OF RESTRAINED LENGTH BEYOND THE 22.5 DEGREE BEND (FOR A TOTAL OF 13 FEET).
- WHEN IT IS NOT POSSIBLE TO INSTALL THE RESTRAINED LENGTHS AS NOTED BY THIS TABLE, THE CONTRACTOR SHALL INSTALL THE APPROPRIATE CONCRETE THRUST RESTRAINTS AS PER THE DETAILS HEREIN.

8/17/99

- NOTES:
1. ALL PIPE FOR OPEN TRENCH CONSTRUCTION SHALL BE DUCTILE IRON RESTRAINED JOINT.
 2. REFER TO SHEET UC-3 FOR PROJECT SPECIFIC NOTES.
 3. VERTICAL LOCATION OF EXISTING WATER LINE HAS BEEN ESTIMATED FROM AS-BUILT RECORDS OBTAINED FROM NCDOT.
 4. WATER LINE SHALL BE INSTALLED WITH A MINIMUM OF 3 FEET OF COVER FROM FINAL GRADE AND FROM SUBGRADE OF RIP RAP LIMITS AROUND BRIDGE ABUTMENT.

PROJECT REFERENCE NO. B-5331	SHEET NO. UC-4
DESIGNED BY: SAG	
DRAWN BY: SAG	
CHECKED BY: KCZ	
APPROVED BY: KCZ	
REVISED:	
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION UTILITIES ENGINEERING SEC. PHONE: (919) 707-6690 FAX: (919) 250-4151	
UTILITY CONSTRUCTION PLANS ONLY	

UTILITY CONSTRUCTION

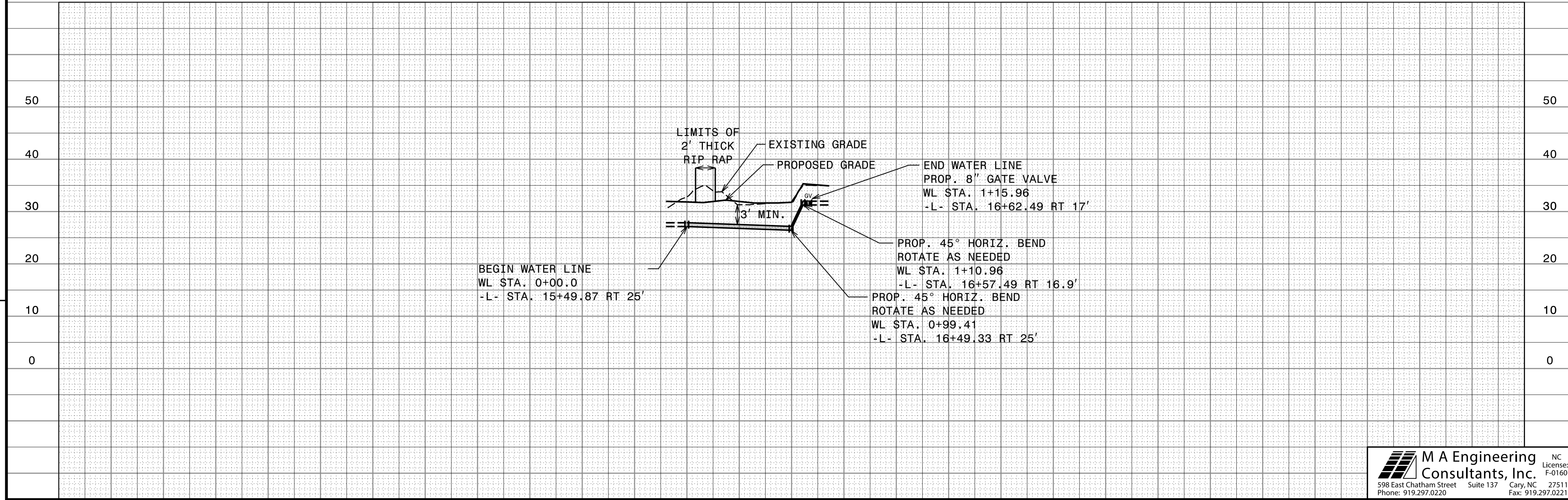


UTILITY OWNERS ON THIS PROJECT

1. COLUMBUS COUNTY PUBLIC UTILITIES
 UTILITY: 8" WATER LINE
 CONTACT: DANNY FOWLER
 PHONE: 910-642-5257

SCALE:

1" = 50' PLAN
 1" = 50' HORIZ. PFL
 1" = 10' VERT. PFL



0+00 1+00