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PROJECT REFERENCE NO.	SHEET NO.
W-5206AG	UC-01

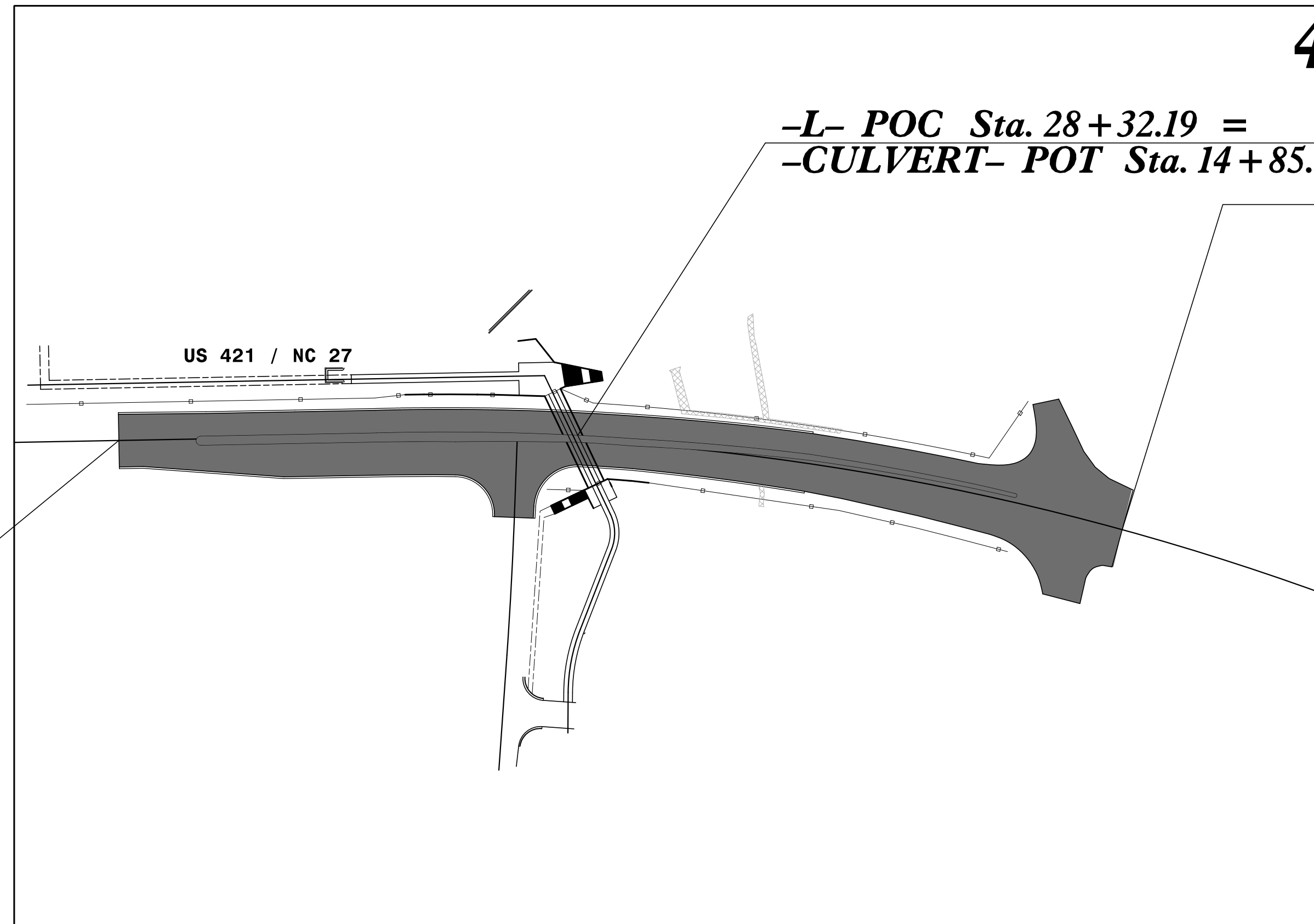
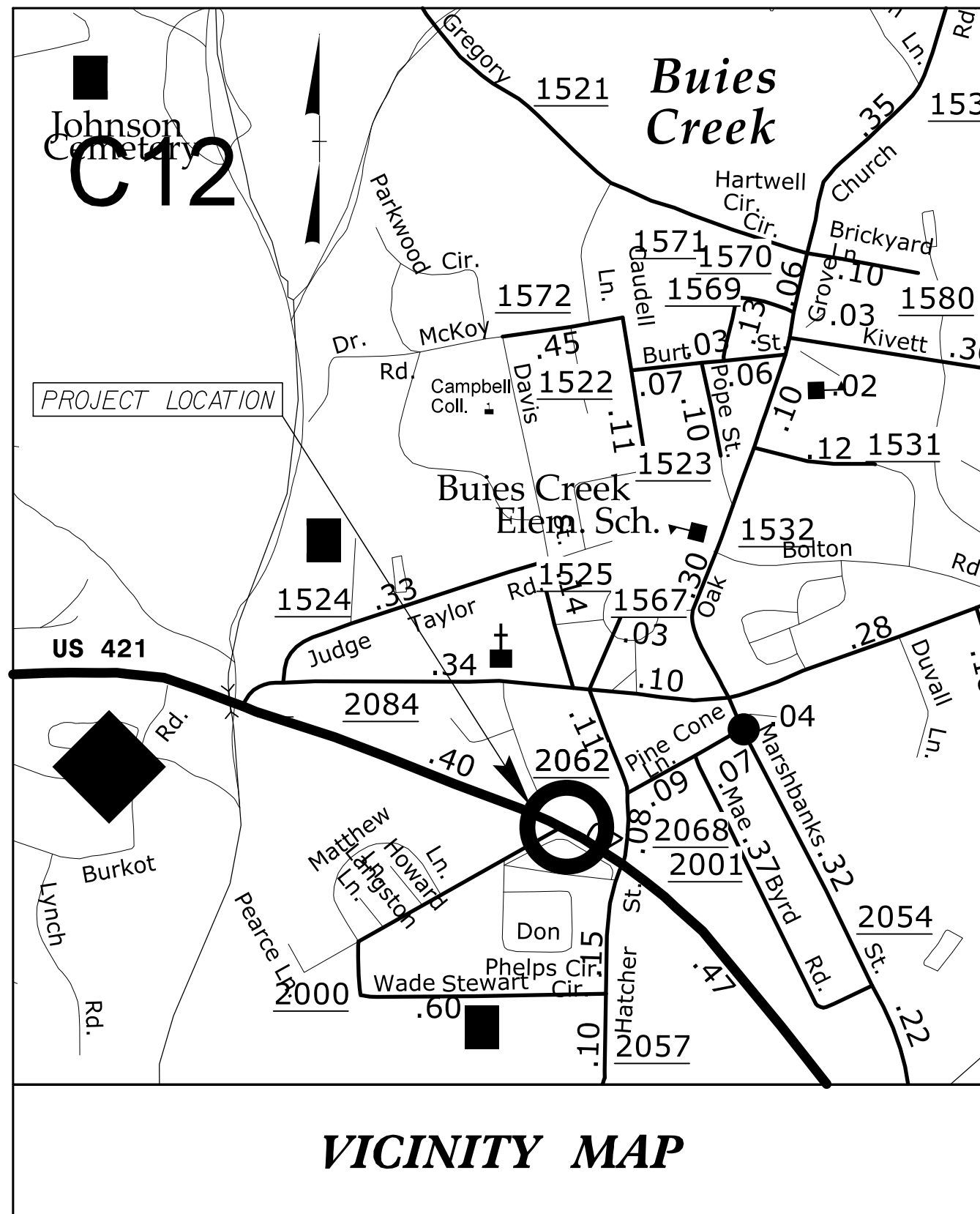
STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# HARNETT COUNTY

**LOCATION: CAMPBELL UNIVERSITY PEDESTRIAN TUNNEL  
UNDER US 421/NC 27 IN BUIES CREEK**

**TYPE OF WORK: WET UTILITY CONSTRUCTION**

**TIP PROJECT: W-5206AG**



**BEGIN TIP PROJECT W-5206AG  
POT STA. -L- 23+12.00**

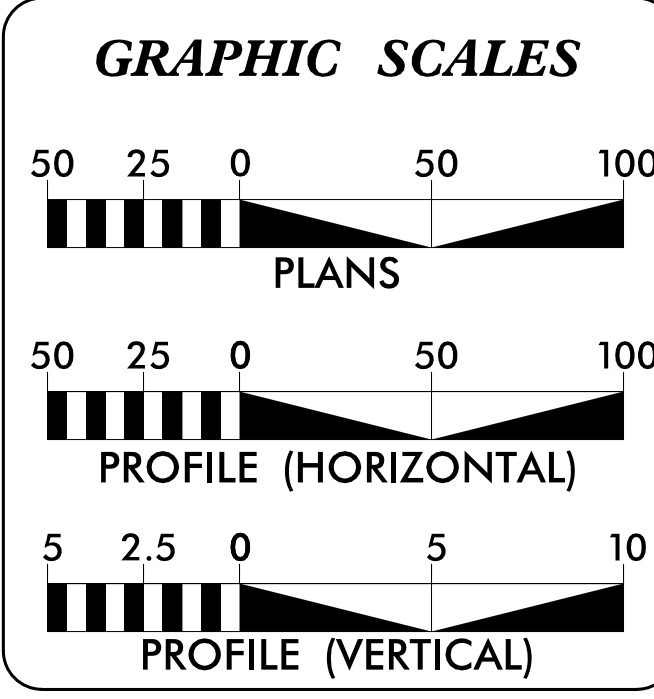
**-L- POC Sta. 28+32.19 =  
-CULVERT- POT Sta. 14+85.31**

**END TIP PROJECT W-5206AG  
POT STA. -L- 34+65.71**

**100% REVIEW SET:**

12" & 20" WL PERMIT 14-00944 (PENDING)  
6" WL PERMIT 14-00857R1  
SEWER PERMITTED UNDER 02T .0303(a) 4 D

**CONTRACT:**



**SHEET INDEX**

UC-01	TITLE SHEET
UC-02	INDEX
UC-03	WATER DETAILS
UC-03A	WATER DETAILS & NOTES
UC-04	20" WATERLINE PLAN & PROFILE (HARNETT)
UC-05	12" WATERLINE PLAN & PROFILE (HARNETT)

Prepared for the North Carolina Department of Transportation in the office of:

2012 STANDARD SPECIFICATIONS

**RIGHT OF WAY DATE:**  
AUGUST 27, 2014

**LETTING DATE:**  
MAY 19, 2015

**CH ENGINEERING**  
3220 GLEN ROYAL RD. RALEIGH, NC 27617  
TELE 919.788.0224 FAX 919.788.0232  
NC LICENSE #P-0189

**ERIC M. TWEED, P.E.**  
UTILITY DESIGN ENGINEER

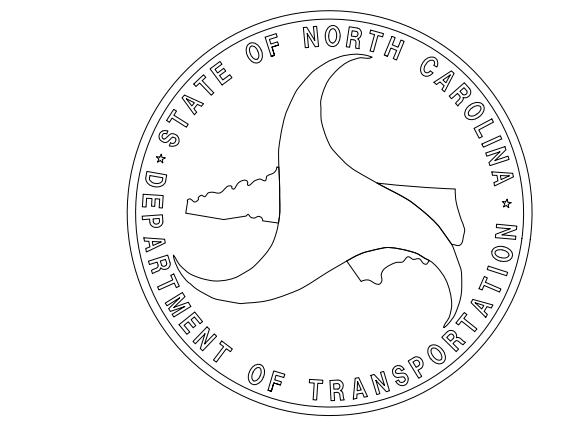
**UTILITY ENGINEER**

**ERIC M. TWEED, P.E.**

SIGNATURE: \_\_\_\_\_

4/1/2015

Professional Engineer Seal for Eric M. Tweed, License #028912, State of North Carolina.



\$\$\$\$\$ SYSTEM \$\$\$\$\$\$ DGN \$\$\$\$\$\$ USER NAME \$\$\$\$\$\$

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

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DIVISION OF HIGHWAYS

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PROJECT REFERENCE NO. W-5206AG	SHEET NO. UC-02
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# CONVENTIONAL PLAN SHEET SYMBOLS

## BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	⊙ EIP
Property Corner	⊗
Property Monument	⊠ ECM
Parcel/Sequence Number	Ⓜ 123
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	⊠
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	--- WLB ---
Proposed Wetland Boundary	--- WLB ---
Existing Endangered Animal Boundary	--- EAB ---
Existing Endangered Plant Boundary	--- EPB ---
Known Soil Contamination: Area or Site	☠ ☠
Potential Soil Contamination: Area or Site	☠ ?

## BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	○
Sign	Ⓞ
Well	Ⓞ W
Small Mine	⊗
Foundation	⊠
Area Outline	⊠
Cemetery	⊠ †
Building	⊠
School	⊠
Church	⊠
Dam	⊠

## HYDROLOGY:

Stream or Body of Water	-----
Hydro, Pool or Reservoir	⊠
Jurisdictional Stream	--- JS ---
Buffer Zone 1	--- BZ 1 ---
Buffer Zone 2	--- BZ 2 ---
Flow Arrow	←
Disappearing Stream	→
Spring	⊙
Wetland	⊠
Proposed Lateral, Tail, Head Ditch	⊠
False Sump	⊠

## RAILROADS:

Standard Gauge	-----
RR Signal Milepost	Ⓞ CSX TRANSPORTATION MILEPOST 35
Switch	⊠ SWITCH
RR Abandoned	-----
RR Dismantled	-----

## RIGHT OF WAY:

Baseline Control Point	◆
Existing Right of Way Marker	△
Existing Right of Way Line	-----
Proposed Right of Way Line	Ⓜ RW
Proposed Right of Way Line with Iron Pin and Cap Marker	Ⓜ RW ▲
Proposed Right of Way Line with Concrete or Granite RW Marker	▲ Ⓜ RW
Proposed Control of Access Line with Concrete CA Marker	Ⓜ CA
Existing Control of Access	Ⓜ CA
Proposed Control of Access	Ⓜ CA
Existing Easement Line	--- E ---
Proposed Temporary Construction Easement	--- E ---
Proposed Temporary Drainage Easement	--- TDE ---
Proposed Permanent Drainage Easement	--- PDE ---
Proposed Permanent Drainage / Utility Easement	--- DUE ---
Proposed Permanent Utility Easement	--- PUE ---
Proposed Temporary Utility Easement	--- TUE ---
Proposed Aerial Utility Easement	--- AUE ---
Proposed Permanent Easement with Iron Pin and Cap Marker	◆

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	--- C ---
Proposed Slope Stakes Fill	--- F ---
Proposed Curb Ramp	Ⓜ CR
Existing Metal Guardrail	⊠
Proposed Guardrail	⊠
Existing Cable Guiderail	⊠
Proposed Cable Guiderail	⊠
Equality Symbol	⊠
Pavement Removal	⊠

## VEGETATION:

Single Tree	⊠
Single Shrub	⊠
Hedge	⊠
Woods Line	⊠

Orchard	⊠
Vineyard	⊠ Vineyard

## EXISTING STRUCTURES:

MAJOR:	
Bridge, Tunnel or Box Culvert	⊠ CONC
Bridge Wing Wall, Head Wall and End Wall	⊠ CONC WW
MINOR:	
Head and End Wall	⊠ CONC HW
Pipe Culvert	⊠
Footbridge	⊠
Drainage Box: Catch Basin, DI or JB	⊠ CB
Paved Ditch Gutter	⊠
Storm Sewer Manhole	⊠ S
Storm Sewer	⊠ S

## UTILITIES:

POWER:	
Existing Power Pole	●
Proposed Power Pole	○
Existing Joint Use Pole	●
Proposed Joint Use Pole	○
Power Manhole	⊠ P
Power Line Tower	⊠
Power Transformer	⊠
U/G Power Cable Hand Hole	⊠
H-Frame Pole	●
Recorded U/G Power Line	--- P ---
Designated U/G Power Line (S.U.E.*)	--- P ---

## TELEPHONE:

Existing Telephone Pole	●
Proposed Telephone Pole	○
Telephone Manhole	⊠ T
Telephone Booth	⊠
Telephone Pedestal	⊠
Telephone Cell Tower	⊠
U/G Telephone Cable Hand Hole	⊠
Recorded U/G Telephone Cable	--- T ---
Designated U/G Telephone Cable (S.U.E.*)	--- T ---
Recorded U/G Telephone Conduit	--- TC ---
Designated U/G Telephone Conduit (S.U.E.*)	--- TC ---
Recorded U/G Fiber Optics Cable	--- T FO ---
Designated U/G Fiber Optics Cable (S.U.E.*)	--- T FO ---

## WATER:

Water Manhole	⊠ W
Water Meter	⊠
Water Valve	⊠
Water Hydrant	⊠
Recorded U/G Water Line	--- W ---
Designated U/G Water Line (S.U.E.*)	--- W ---
Above Ground Water Line	--- A/G Water ---

## TV:

TV Satellite Dish	⊠
TV Pedestal	⊠
TV Tower	⊠
U/G TV Cable Hand Hole	⊠
Recorded U/G TV Cable	--- TV ---
Designated U/G TV Cable (S.U.E.*)	--- TV ---
Recorded U/G Fiber Optic Cable	--- TV FO ---
Designated U/G Fiber Optic Cable (S.U.E.*)	--- TV FO ---

## GAS:

Gas Valve	⊠
Gas Meter	⊠
Recorded U/G Gas Line	--- G ---
Designated U/G Gas Line (S.U.E.*)	--- G ---
Above Ground Gas Line	--- A/G Gas ---

## SANITARY SEWER:

Sanitary Sewer Manhole	⊠ SS
Sanitary Sewer Cleanout	⊠
U/G Sanitary Sewer Line	--- SS ---
Above Ground Sanitary Sewer	--- A/G Sanitary Sewer ---
Recorded SS Forced Main Line	--- FSS ---
Designated SS Forced Main Line (S.U.E.*)	--- FSS ---

## MISCELLANEOUS:

Utility Pole	●
Utility Pole with Base	⊠
Utility Located Object	○
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line	--- ?UTL ---
U/G Tank; Water, Gas, Oil	⊠
Underground Storage Tank, Approx. Loc.	⊠ UST
A/G Tank; Water, Gas, Oil	⊠
Geoenvironmental Boring	⊠
U/G Test Hole (S.U.E.*)	⊠
Abandoned According to Utility Records	AATUR
End of Information	E.O.I.

8/17/99

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PROJECT REFERENCE NO. W-5206AG	SHEET NO. UC-03
DETAILS	
UTILITY ENGINEER NORTH CAROLINA PROFESSIONAL SEAL 028912 E. M. TWEED 300C8831499415 4/12/015	

REVISIONS

	SUIT AND DISTANCE OF BEDDING	STATIC THRUST IN POUNDS	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET	CONCRETE LAYER THICKNESS IN FEET
20" PIPE										
11 1/4"	12,315	3	7	8	2	2	3	13	2	
22 1/2"	24,517	7	13	15	4	4	7	25	3	
45"	48,991	12	24	29	6	6	12	48	5	
90"	98,944	23	45	53	12	12	23	89	9	
PLUG OR TEE	62,832	16	32	38	8	8	16	63	7	

GENERAL NOTES:  
 1. ALL DIMENSIONS ARE IN FEET AND INCHES.  
 2. BEDDING BARS ARE TO BE PLACED IN A VERTICAL PLANE IN THE CENTER OF THE PIPE.  
 3. USE OF SAND MUST BE IN ACCORDANCE WITH ADDITIONAL SPECIFICATIONS.

HORIZONTAL THRUST BLOCKING SCHEDULE	SCALE: NTS
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SIZED FOR LINE STOP (DEAD END)  
 COLLAR THRUST FORCE  $T = P \times A$   
 $T = 75 \times 344.4 = 25,830 \text{ LBS}$   
 25,830 LBS / 150 LBS/CF = 172 CF

FOR REFERENCE: 45° BEND ROD LESS WEIGHT  
 COLLAR THRUST FORCE  $T = P \times A \times (1 - \cos(45^\circ))$   
 $T = 200 \times 344.4 \times (1 - 0.707) = 20,175 \text{ LBS}$

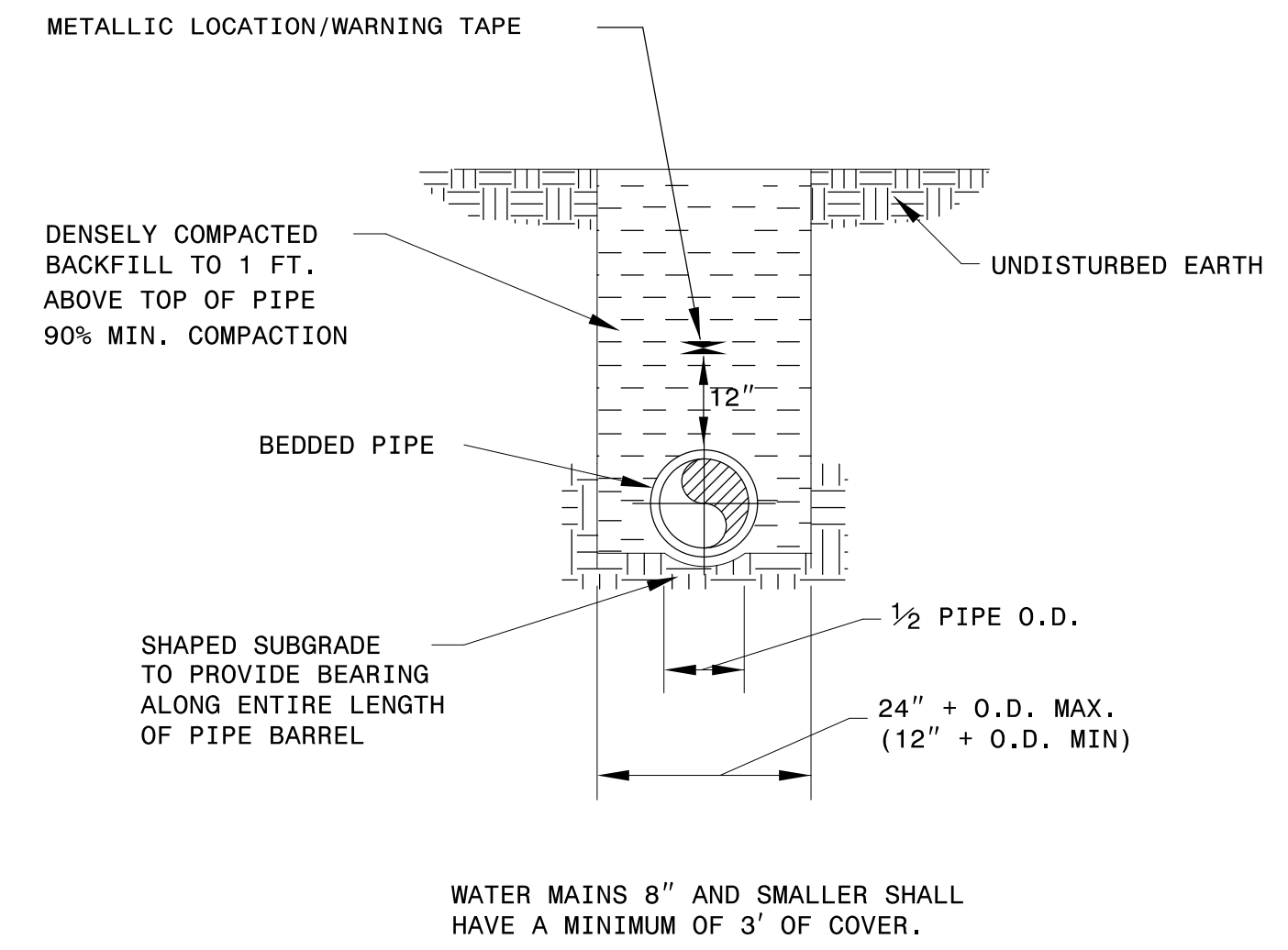
SECTION ELEVATION

CALCULATED BEARING SURFACE = 38 SF  
 WEIGHT = 34,200 LBS

WELDED ON THRUST COLLAR	THRUST COLLAR REINFORCING	
I.D. PIPE	"A"	"Y" BAR
6"-16"	2"	BAR LENGTH 42" + O.D. PIPE 42"
20"-24"	3"	REBAR SIZE #6
30"-36"	4"	NUMBER REO'D 24
		12

NOTES:  
 1. CONCRETE SHALL BE 3000 P.S.I.  
 2. REINFORCING BARS SHALL BE DEFORMED, AND TIED TOGETHER.  
 3. BACKFILL TAMPED IN 6" LAYERS.  
 4. TRENCH BOTTOM WIDTH IN VICINITY OF THRUST BLOCK(S) INSTALLATION SHALL BE THE MINIMUM WIDTH AS DESCRIBED BY THE ENGINEER.

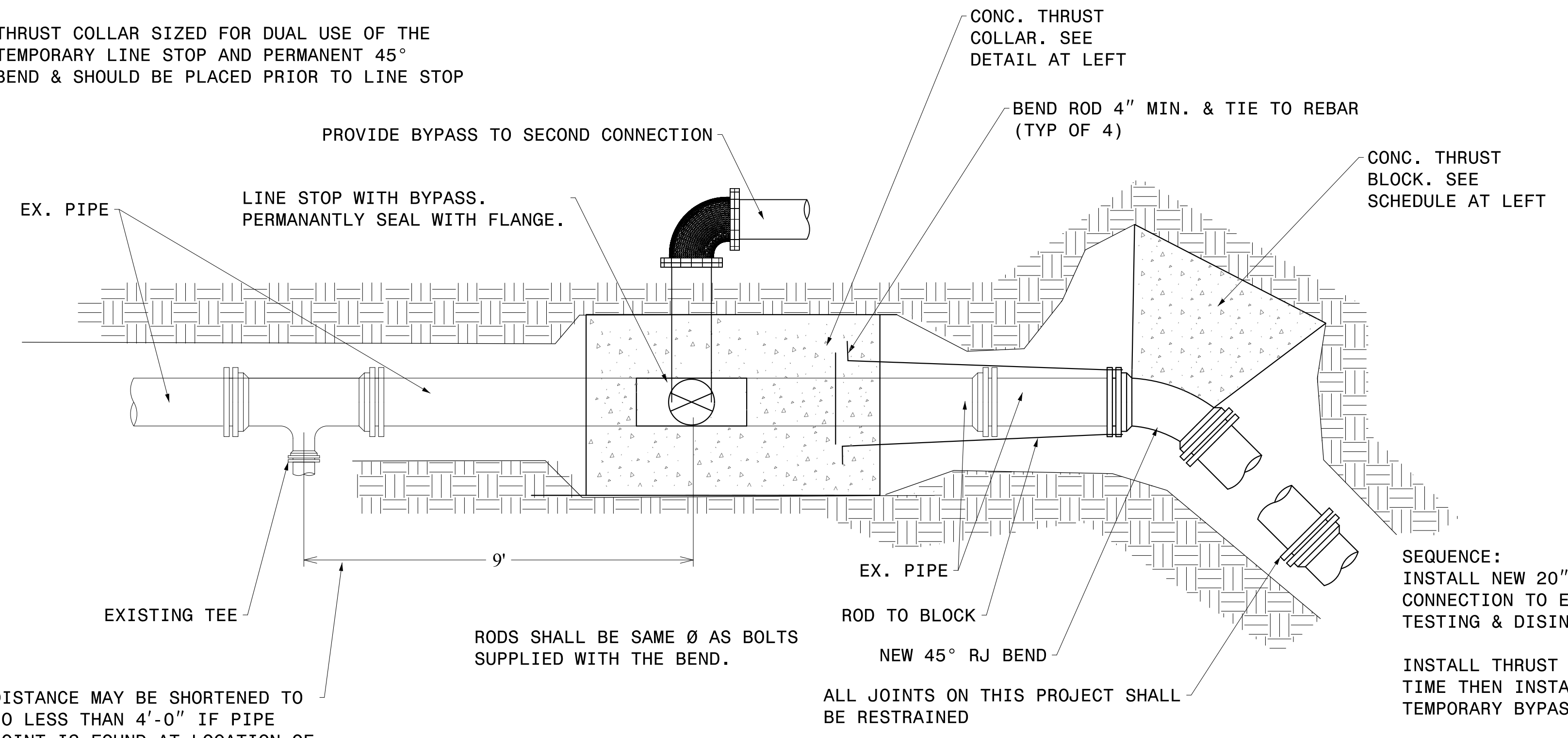
CONCRETE THRUST COLLAR
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## PIPE LAYING CONDITION

NOT TO SCALE

THRUST COLLAR SIZED FOR DUAL USE OF THE TEMPORARY LINE STOP AND PERMANENT 45° BEND & SHOULD BE PLACED PRIOR TO LINE STOP



DISTANCE MAY BE SHORTENED TO NO LESS THAN 4'-0" IF PIPE JOINT IS FOUND AT LOCATION OF THE PROPOSED LINE STOP

NEW-TO-OLD PIPE CONNECTION DETAIL  
 TYPICAL FOR EACH CONNECTION  
 NO SCALE

SEQUENCE:  
 INSTALL NEW 20" WL WITH EXCEPTION OF CONNECTION TO EXISTING MAIN AND PROVIDE TESTING & DISINFECTION.  
 INSTALL THRUST COLLAR ALLOWING CURE TIME THEN INSTALL HOT TAP BYPASS AND TEMPORARY BYPASS PIPING ABOVE GRADE.  
 PERFORM LINE STOP AND CONNECT NEW 45° BEND WITH BLOCKING. ALLOW CURE TIME.  
 REMOVE LINE STOP AND BYPASS LINE.

# 20" LINE CONNECTION WITH TEMPORARY BYPASS





8/17/99

COORDINATE WITH HARNETT COUNTY FOR MAKING CONNECTIONS AND OPERATION OF EXISTING VALVES FOR ISOLATION.

CONTRACTOR TO MINIMIZE DISRUPTIONS TO SERVICE BY LAYING AND TESTING THE LINE PRIOR TO TAKING EXISTING LINE OUT OF SERVICE. COORDINATE WITH CAMPBELL AS ELEVATED TANK SHALL BE AT HIGH WATER LEVEL BEFORE TAKING EXISTING LINE OUT OF SERVICE.

CONTRACTOR SHALL BE RESPONSIBLE FOR TESTING AND DISINFECTION OF WATER LINE. USE "HIGH-EARLY" ADDITIVES FOR BLOCKING IN TIME SENSITIVE APPLICATIONS.

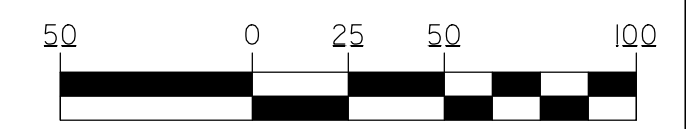


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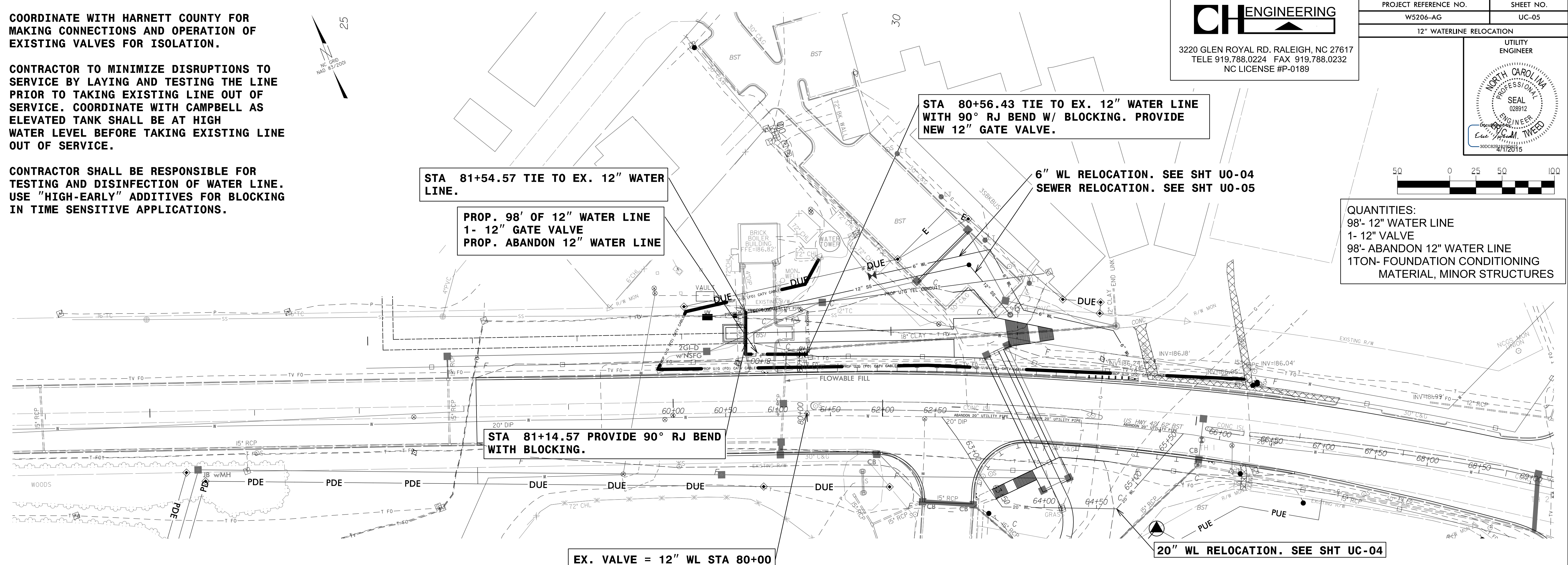
PROJECT REFERENCE NO.	SHEET NO.
W5206-AG	UC-05

12" WATERLINE RELOCATION

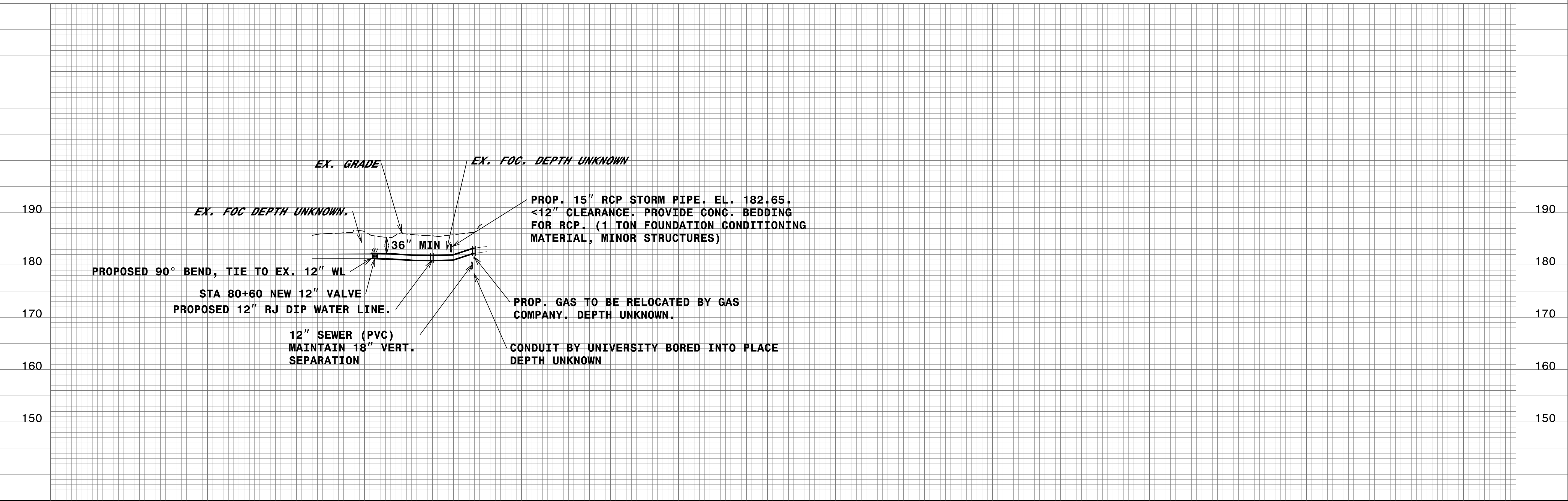
UTILITY ENGINEER



QUANTITIES:  
 98'- 12" WATER LINE  
 1- 12" VALVE  
 98'- ABANDON 12" WATER LINE  
 1TON- FOUNDATION CONDITIONING MATERIAL, MINOR STRUCTURES



REVISIONS



80+00 80+50 81+00 81+50 82+00