



PAT McCrory
Governor

NICHOLAS J. TENNYSON
Secretary

July 28, 2016

U. S. Army Corps of Engineers
Regulatory Field Office
151 Patton Avenue, Room 208
Asheville, NC 28801-5006

ATTN: Mr. Steve Kichefski
NCDOT Coordinator

Subject: **Request for Modification to the Section 401 Individual Permit and Section 401 Water Quality Certification** for the proposed US 221 Widening from US 421 to US 221 Business/NC 88 in Jefferson in Watauga and Ashe Counties. Federal Aid Project No. STP-0221(13), Division 11, TIP No. R-2915. Debit \$570 from WBS 34518.1.1.

Reference: USACE Individual Permit Action ID SAW-2012-00882, January 7, 2015.
NCDWR Project No. 20140762, Certification No. 4001, September 8, 2014.

Dear Sir:

The purpose of this letter is to request a modification to the United States Army Corps of Engineers (USACE) Section 404 Individual Permit and North Carolina Division of Water Resources Section 401 Certification for the above referenced project. The original 2014 permit application and subsequent permits (referenced above) presented final impacts for R-2915A, R-2915B and R-2915D. This modification presents the final impacts for R-2915C. The last section, R-2915E, is currently scheduled to let in September 2019. A permit modification for the final impacts for R-2915E will be submitted prior to let.

Please see the enclosed revised Division of Mitigation Services (DMS) mitigation acceptance letter (dated July 27, 2016), permit drawing review minutes (4B and 4C), stormwater management plan (SMP), permit drawings, and design plans for Section C.



State of North Carolina | Department of Transportation | PDEA-Natural Environment Section
1020 Birch Ridge Drive, 27610 | 1598 Mail Service Center | Raleigh, North Carolina 27699-1598
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Summary of R-2915C Jurisdictional Impacts:

The preliminary projected impacts for the overall (Sections A-E) project will be approximately 3.11 acres of permanent wetland impacts, 8,196 linear feet of permanent stream impacts (7,023 linear feet of fill and 1,173 linear feet of bank stabilization), and 0.34 acre of temporary stream impacts (see Tables 2 and 3 for a breakdown of impacts by Section). A total of the individual water resources impacted by each section can be found in Table 1.

Table 1 – Summary of Water Resources Impacted

Section	Design Stage	Total # Wetlands Impacted	Total # Streams Impacted
R-2915A	Final	6	12
R-2915B	Final	6	7
R-2915C	Final	6	21
R-2915D	Final	20	24
R-2915E	Preliminary	9	6
Total		47	68*

* S1 included in both Section A and B totals, S56 included in both Section C and D totals

Table 2 – Summary of Wetland Impacts for R-2915

Section	Design Stage	Wetland Impact Type	Wetland Impact Area (ac)	Wetland Impacts Requiring Mitigation (ac)
R-2915A	Final	Perm. Wetland Fill	0.48	0.57*
		Excavation in Wetlands	0.01	
		Mechanized Clearing in Wetlands	0.08	
		Hand Clearing in Wetlands	0.05†	
R-2915B	Final	Perm. Wetland Fill	0.32	0.43*
		Excavation in Wetlands	0.04	
		Mechanized Clearing in Wetlands	0.06	
R-2915C	Final	Perm. Wetland Fill	0.22	0.27*
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	0.05	
R-2915D	Final	Perm. Wetland Fill	1.01	1.32
		Excavation in Wetlands	0.01	
		Mechanized Clearing in Wetlands	0.30	
R-2915E	Preliminary	Perm. Wetland Fill	0.43	0.52
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	0.09	
Total				3.11

†Additionally, 0.01 acre of temporary fill in wetlands will occur in the hand clearing areas for erosion control measures

* Values are based on rounding, due to calculating totals with actual numbers to the thousandths

Table 3 – Summary of Stream Impacts for R-2915

Section	Design Stage	Stream Impact Type	Impact Length (lf)	Temporary Impacts (ac)	Stream Impacts Requiring Mitigation (lf)
R-2915A	Final	Permanent Fill	1,119	--	1,119
		Bank Stabilization	402	--	
		Temporary	--	0.05	
R-2915B	Final	Permanent Fill	533	--	533
		Bank Stabilization	411	--	
		Temporary	--	0.15	
R-2915C	Final	Permanent Fill	2,339	--	2,339*
		Bank Stabilization	234	--	
		Temporary	--	0.09	
R-2915D	Final	Permanent Fill	2,627	--	2,627
		Bank Stabilization	126	--	
		Temporary	--	0.05	
R-2915E	Preliminary	Permanent Fill	405	--	405
		Temporary	--	<0.01	
Total			8,196	0.34	7,023

* See Table 6

Summary of Utility Impacts:

There will be no impacts associated with utility relocations in C Section of this project. For Section E, the utility relocations will be determined at final design.

Summary of Mitigation:

Mitigation for impacts resulting from the Section C will be provided by DMS. See tables 5 and 6 for a summary of the mitigable impacts resulting from this Section. Total mitigable impacts for Section C include 0.27 acre of wetlands and 2,339 linear feet of stream.

NEPA DOCUMENT STATUS

An Environmental Assessment (EA) was completed for this project in October 2012. A Finding of No Significant Impact (FONSI) was completed in May 2013. In addition, a FONSI Addendum was completed in December 2013. Additional copies will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Point 4B was reached for R-2915C on September 11, 2013. Concurrence Point 4C was reached June 10, 2015 with a follow-up meeting held on August 12, 2015.

PROJECT SCHEDULE

The project is permitted in phases due to project size, funding and TIP schedule (see Table 4). Sections A, B, and D were permitted together in 2014/2015. Section C of this project is scheduled to let on November 15, 2016, and is covered in this phased permit modification request. Section E will be permitted via phased modification at a later date prior to let for that section.

Table 4 – Project phasing for US 221 Widening (R-2915)

Section	Approximate Section Limits	Approximate Length	Construction Letting
R-2915A	US 421 in Watauga County to SR 1003 (Idlewild Road)	2.8 miles	Sept 2015
R-2915B	SR 1003 (Idlewild Road) to north of the South Fork New River	1.77 miles	Sept 2015
R-2915C	North of the South Fork New River to south of NC 194	3.98 miles	Nov 2016
R-2915D	South of NC 194 to US 211 Bypass	4.3 miles	Feb 2015
R-2915E	US 221 Bypass to US 221 Business/NC 88 in Jefferson	3.3 miles	Sept 2019
TOTAL		16.1 miles	

IMPACTS TO WATERS OF THE U.S.

Tables 5 and 6 summarize the impacts to jurisdictional water resources for the final design of R-2915C. Site numbers correspond with the permit (hydraulic) drawings included in this application (sites 15 and 18 have been removed since the CP4C meeting due to redesigning Y8 and Y9). The stream and wetland numbers correspond to the NRTR. A brief description of each impact site will follow the tables.

Table 5 – R-2915C Wetland Impacts*

Site	Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)	Impacts Requiring Mitigation (ac)
1	WZ**	0.16	0.14	--	0.02	--	0.16
2A	WY**	0.03	0.01	--	<0.01	--	0.03
20	W33**	0.06	0.04	--	0.02	--	0.06
26	W41**	0.01	0.01	--	--	--	0.01
29	W48	0.01	<0.01	--	<0.01	--	0.01
30	W52	0.04	--	--	<0.01	--	<0.01
Total Impacts			0.22	--	0.05	--	0.27***

* All wetlands impacted are riparian

** Total take of wetland

*** Values are based on rounding, due to calculating totals with actual numbers to the thousandths

Table 6 – R-2915C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ² (linear feet)
1	N/A (wetland)	--	--	--	--	--
2A	UT to South Fork New River (P)	SZ	Perm. Fill	71	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (34')	--
2B	UT to South Fork New River (P)	S44	Perm. Fill	--	--	--
			Bank Stabilization	19	--	--
			Temp Fill	--	<0.01 (49')	--
3	UT to South Fork New River (P)	S44	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (10')	--

Table 6 Continued – R-2915C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ² (linear feet)
4	UT to Old Field Creek (P)	S47	Perm. Fill	210	--	USACE & DWR
			Bank Stabilization	16	--	DWR
			Temp Fill	--	<0.01 (35')	--
5	UT to Old Field Creek (P)	S48	Perm. Fill	236	--	USACE & DWR
			Bank Stabilization	20	--	DWR
			Temp Fill	--	<0.01 (21')	--
6	UT to Old Field Creek (P)	S50	Perm. Fill	53	--	USACE
			Bank Stabilization	10	--	--
			Temp. Fill	--	<0.01 (17')	--
7	UT to Old Field Creek (P)	S52	Perm. Fill	37	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01 (6')	--
8	UT to Old Field Creek (P)	S55	Perm. Fill	134	--	USACE
			Bank Stabilization	10	--	--
			Temp Fill	--	<0.01 (29')	--
9	UT to Old Field Creek (P)	S59	Perm. Fill	31	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (28')	--
10	UT to Old Field Creek (P)	S62	Perm. Fill	14	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (21')	--
11	UT to Old Field Creek (P)	S62	Perm. Fill	45	--	USACE
			Bank Stabilization	12	--	--
			Temp Fill	--	<0.01 (23')	--
12	UT to Old Field Creek (P)	S62	Perm. Fill	78	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (20')	--
13A	UT to Old Field Creek (P)	S63	Perm. Fill	270	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (23')	--
13B	UT to Old Field Creek (P)	S64	Perm. Fill	48	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--
14	UT to Old Field Creek (P)	S67	Perm. Fill	--	--	--
			Bank Stabilization	4	--	--
			Temp Fill	--	<0.01 (10')	--
14B	UT to Old Field Creek (P)	S68	Perm. Fill	--	--	--
			Bank Stabilization	13	--	--
			Temp Fill	--	--	--
16	Old Field Creek (P)	S56	Perm. Fill	256	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	0.04 (84')	--

Table 6 Continued – R-2915C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ² (linear feet)
17	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (30')	--
19A	UT to Old Field Creek (P)	S72	Perm. Fill	58	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--
19B	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	18	--	DWR
			Temp Fill	--	--	--
20	N/A (wetland)	--	--	--	--	--
21	UT to Old Field Creek (P/I)	S73	Perm. Fill (Per.)	170	--	USACE & DWR
			Perm. Fill (Inter.)	113	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--
22	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	21	--	DWR
			Temp Fill	--	--	--
23	UT to Old Field Creek (I)	S75	Perm. Fill	163	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (45')	--
24	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	16	--	DWR
			Temp Fill	--	--	--
25A	UT to Old Field Creek (P)	S77	Perm. Fill	262	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (10')	--
25B	UT to Old Field Creek (P)	S78	Perm. Fill	60	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01 (10')	--
26	UT to Old Field Creek (P)	S79	Perm. Fill	--	--	--
			Bank Stabilization	13	--	--
			Temp Fill	--	<0.01 (12')	--
27	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	17	--	DWR
			Temp Fill	--	--	--
28	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	17	--	DWR
			Temp Fill	--	--	--
29	N/A (wetland)	--	--	--	--	--
30	N/A (wetland)	--	--	--	--	--

Table 6 Continued – R-2915C Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) ¹	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres) (feet)	Mitigation Requirement ² (linear feet)
31	Old Field Creek (P)	S56	Perm. Fill	--	--	--
			Bank Stabilization	20	--	DWR
			Temp Fill	--	--	--
32	UT to Old Field Creek (P)	S172	Perm. Fill	30	--	USACE
			Bank Stabilization	8	--	--
			Temp Fill	--	<0.01 (12')	--
Total Temporary Impacts:				--	0.09 ³ (529')	--
Total Perm. Impacts (Perm. Fill + Bank Stabilization):				2,573 ³	--	--
Permanent Impacts Requiring DWR Mitigation:				1,549	--	--
Permanent Impacts Requiring USACE Mitigation:				2,339	--	--
Total Impacts Requiring Mitigation:				2,339	--	†

1 – SZ and S44 are WS-V; HQW. S47, S48, S50, and S52 are C; Tr, ORW. All other streams are Class C; Tr+ waters.

2 – Mitigation for bank stabilization impacts required by DWR – not required by USACE

3 – Values are based on rounding

† – Final mitigation requirement will be up to the USACE and DWR

Permit Site 1: The widening of US 221 will result in 0.14 acre of permanent wetland fill and 0.02 acre of mechanized clearing in wetland WZ. These impacts will result in a total take of wetland WZ.

Permit Site 2A: The widening of US 221 will result in 0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing in wetland WY, resulting in a total take of this wetland. In addition, the flow from stream SZ will be captured in a spring box and routed through a 6" PVC pipe. This will result in 71 linear feet (lf) of permanent stream impacts and <0.01 acre (34 lf) of temporary stream impacts.

Permit Site 2B: The adjacent piping of stream SZ and mechanized clearing/fill in wetland WY will necessitate 19 lf of bank stabilization and <0.01 acre (49 lf) of temporary impacts to stream S44.

Permit Site 3: There will be <0.01 acre (10 lf) of temporary stream impacts to stream S44 due to removal and replacement of spring boxes at the point at which S44 becomes jurisdictional.

Permit Site 4: The existing 48" corrugated metal pipe (CMP) will be extended on both ends with 48" corrugated steel pipes (CSP) resulting in 210 lf of permanent stream impacts and <0.01 acre (35 lf) of temporary impacts to stream S47. There will also be 16 lf of bank stabilization to S47 at the outlet of this extension.

Permit Site 5: The existing reinforced concrete box culvert (RCBC) will be filled with flowable material and replaced and extended slightly to the south with a 60" welded steel pipe (WSP) including 60" structural plate pipe (SPP) extensions. This will result in 236 lf of permanent stream impacts and <0.01 acre (21 lf) of temporary stream impacts to S48. In addition, there will be 20 lf of bank stabilization to S48 at the pipe outlet.

Permit Site 6: The existing 30" CMP will be extended with a 30" reinforced concrete pipe (RCP) resulting in 53 lf of permanent stream impacts and <0.01 acre (17 lf) of temporary impacts to stream S50. There will also be 10 lf bank stabilization to S50 at the outlet of the extension.

Permit Site 7: Flow from stream S52 will be routed into a 6" ductile iron pipe (DIP) and into a 24" WSP resulting in 37 lf of permanent stream impacts and <0.01 acre (6 lf) of temporary impacts to S52.

Permit Site 8: The existing 12" RCP and 24" CMP carrying stream S55 will be replaced and extended slightly to the south with a 30" RCP, 30" WSP and 30" CSP. This will result in 134 lf of permanent stream impacts and <0.01 acre (29 lf) of temporary impacts to S55. There will also be 10 lf of bank stabilization to S55 at the outlet of the 30" CSP.

Permit Site 9: Flow from stream S59 will be captured in a spring box and carried in a 6" PVC pipe resulting in 31 lf of permanent stream impacts and <0.01 acre (28 lf) of temporary impacts to S59.

Permit Site 10: The existing pipe carrying stream S62 will be replaced and slightly extended with a 36" RCP resulting in 14 lf of permanent stream impacts and <0.01 acre (21 lf) of temporary impacts to S62.

Permit Site 11: The existing 18" RCP carrying stream S62 will be replaced and extended with a 36" RCP resulting in 45 lf of permanent stream impacts and <0.01 acre (23 lf) of temporary impacts to S62. There will also be 12 lf of bank stabilization to S62 at the outlet of the new 36" RCP.

Permit Site 12: Flow from stream S62 will be redirected to the west to accommodate the adjacent pipe extension at permit site 13. This channel change will result in 78 lf of permanent stream impacts and <0.01 acre (20 lf) of temporary impacts to S62.

Permit Site 13A: The existing RCBC carrying S63 at this location will be filled with flowable material and replaced and extended with an 84" WSP and 84" SPP extensions. There will also be a slight channel shift at the upstream end of the 84" SPP to align the existing stream into the pipe. These actions will result in 270 lf of permanent stream impacts and <0.01 acre (23 lf) of temporary stream impacts to S63. Provided no constructability issues arise, there will be sills installed in the new WSP and SPP at 10' intervals and backfilled with native material if site constraints allow.

Permit Site 13B: The channel change at permit site 13A will result in 48 lf of permanent stream impacts to a short tributary, stream S64.

Permit Site 14: An adjacent 18" CSP extension will result in 4 lf of bank stabilization and <0.01 acre (10 lf) of temporary impacts to stream S67.

Permit Site 14B: The replacement of the adjacent 24" RCP with a 24" WSP will result in 13 lf of bank stabilization to stream S68 at the outlet of the new pipe.

Permit Site 16: The existing triple-barrel RCBC will be replaced and extended with a 15'x11' two-barrel RCBC. This replacement will result in 256 lf of permanent stream impacts and 0.04 acre (84 lf) of temporary impacts to Old Field Creek (S56). The new RCBC will have a 1' sill in the low flow barrel, a 3' sill in the high flow barrel, and be backfilled with large native material.

Permit Site 17: An existing bridge over Old Field Creek will be removed, resulting in <0.01 acre (30 lf) of temporary impacts to Old Field Creek (S56) to rebuild the banks in this location.

Permit Site 19A: Extension of a 48" RCP will result in 58 lf of permanent stream impacts to stream S72.

Permit Site 19B: There will be 18 lf of bank stabilization to Old Field Creek (S56) to protect the outlet of the 48" RCP extension from site 19A.

Permit Site 20: The widening of US 221 will result in 0.04 acre of permanent wetland fill and 0.02 acre of mechanized clearing in wetland W33. These impacts will result in a total take of wetland W33.

Permit Site 21: The flow from stream S73 will be routed into a 36" WSP under US 221 and outlet into a riprap lined channel due to the existing channel location under the proposed roadway. This will result in 283 lf of permanent stream impacts to S73 (113 lf of which is intermittent, 170 lf of which is perennial). The riprap in the channel relocation will be embedded along the bed.

Permit Site 22: There will be 21 lf of bank stabilization to Old Field Creek (S56) at the outlet of the riprap lined channel carrying the re-routed flow from S73.

Permit Site 23: Stream S75 will be shifted into a riprap lined channel (with riprap embedded along the bed) to accommodate the new roadway slopes from the widening of US 221. This will result in 163 lf of permanent stream impacts and <0.01 acre (45 lf) of temporary impacts to S75.

Permit Site 24: There will be 16 lf of bank stabilization to Old Field Creek (S56) at the outlet of a 24" RCP.

Permit Site 25A: The existing 24" RCP carrying stream S77 will be replaced and extended with a new 24" RCP and 24" WSP. This will result in 262 lf of permanent stream impacts and <0.01acre (10 lf) of temporary impacts to S77.

Permit Site 25B: Flow from stream S78 will be routed into a small berm ditch and join with stream S77 before flowing into a new 24" RCP. This will result in 60 lf of permanent stream impacts and <0.01 acre (10 lf) of temporary impacts to S78.

Permit Site 26: There will be 13 lf of bank stabilization at the outlet of the existing 24" RCP carrying stream S79. In addition, the location of the new roadway for US 221 will result in 0.01 acre of permanent wetland fill to W41 (which is a total take of this wetland).

Permit Site 27: There will be 17 lf of bank stabilization to Old Field Creek (S56) at the outlet of a new 18" RCP.

Permit Site 28: There will be 17 lf of bank stabilization to Old Field Creek (S56) at the outlet of a new base ditch.

Permit Site 29: A portion of linear wetland W48 will be piped with a 30" RCP to accommodate the new roadway slopes. This will result in <0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing in W48.

Permit Site 30: An existing 18" RCP will be replaced with a new 24" RCP, resulting in <0.01 acre of mechanized clearing in wetland W52 at the pipe outlet.

Permit Site 31: There will be 20 lf of bank stabilization to Old Field Creek (S56) at the outlet of a new base ditch.

Permit Site 32: The existing 24" CMP carrying stream S172 will be replaced and extended with a 24" RCP to accommodate the new roadway sloped associated with the realignment of Y4. This will result in 30 lf of permanent stream impacts and <0.01 acre (12 lf) of temporary impacts to S172. In addition, there will be 8 lf of bank stabilization at the outlet of the new RCP.

FEDERALLY PROTECTED SPECIES

As of July 24, 2015, the USFWS lists nine federally protected species for Watauga County and ten federally protected species for Ashe County. The only change since the 2014 permit application is that the northern long-eared bat (*Myotis septentrionalis*) was added to the list for both counties. A memo was sent to USFWS on March 11, 2016 indicating that NCDOT has satisfied the 4(d) requirements for this project. No response was received from USFWS within 30 days, therefore Section 7 has been satisfied for this species.

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

R-2915C Avoidance and Minimization:

NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands. Existing drainage patterns to the wetlands have been kept to maintain the hydrology feeding the wetlands. In addition to all of the measures listed in the 2014 phased permit application, other specific examples of avoidance and minimization measures include:

- Riprap aprons/pads will be utilized in several locations (see SMP) to reduce velocity and erosion at pipe outlets.
- Retaining walls were used throughout the project to limit impacts to jurisdictional streams and wetlands.
- In R-2915C, SR 1178 (Paul Goodman Road) was realigned to reduce project impacts to Old Field Creek.
- Preformed scour holes were used at pipe outlets throughout the project (see SMP) to dissipate energy and promote diffuse flow into jurisdictional areas.
- At jurisdictional stream crossings, bank stabilization was used at the outlets in lieu of standard rip-rap pads where practical.
- Pipe slopes were minimized at outlets to reduce flow velocities into streams.
- Floodplain benches were utilized at culvert sites to maintain continuity of the stream through the crossing.

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Tables 5 and 6 summarize the wetland and stream impacts for Section C of this project. Section C will permanently impact 0.27 acre of wetlands, 2,573 linear feet of streams (2,339 linear feet of permanent fill and 234 linear feet of bank stabilization), and temporarily impact 0.09 acre of streams.

At this time, DMS will provide compensatory mitigation for Sections A, B, C, and D impacts. Table 7 summarizes the total mitigation needs as 2.59 acre of wetlands impacts and 6,618 linear feet of stream impacts. Compensatory mitigation for Section E will be provided accordingly during the subsequent permit modification. This modification will occur when final design on the remaining Section has been completed.

Table 7 – Summary of Mitigation Requested from DMS

Section	Design Stage	Wetland Impacts Requiring Mitigation (ac)	Stream Impacts Requiring Mitigation (ac)
R-2915A	Final	0.57	1,119
R-2915B	Final	0.43	533
R-2915C	Final	0.27	2,339
R-2915D	Final	1.32	2,627
Total		2.59	6,618

REGULATORY APPROVALS

Section 404: Application is hereby made for a modification to the USACE Individual 404 Permit as required for the above-described activities.

Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the N. C. Division of Water Resources.

A copy of this application and distribution list will also be posted on the NCDOT website at: <http://connect.ncdot.gov/resources/Environmental>. If you have any questions or need additional information, please contact Erin Cheely at ekcheely@ncdot.gov or (919) 707-6108.

Sincerely,



Philip S. Harris III, P.E., C.P.M.
Natural Environment Section Head

cc:
NCDOT Permit Application Standard Distribution List



PAT MCCRORY
Governor

DONALD R. VAN DER VAART
Secretary

July 27, 2016

Mr. Philip S. Harris, P.E., CPM
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Harris:

Subject: EEP Mitigation Acceptance Letter:

R-2915C, US 221 Widening from North of the South Fork New River to South of NC 194, Ashe County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on July 26, 2016, the impacts are located in CU 05050001 of the New River basin in the Northern Mountains (NM) Eco-Region, and are as follows:

New 05050001 NM	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	2,339.0	0	0	0.27	0	0	0	0

This mitigation acceptance letter replaces the mitigation acceptance letter issued on June 18, 2014. This impact and associated mitigation need were under projected by the NCDOT in the 2016 impact data. DMS will commit to implement sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill
EEP Credit Management Supervisor

cc: Mr. Steve Kichefski, USACE – Asheville Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: R-2915C Revised

Subject: Minutes from CP-4B Hydraulic Design Review Meeting on September 11, 2013
for R-2915C in Ashe County

Team Members:

Andrew Williams - USACE	(present)
Mitch Batuzich - FHWA	(absent)
Amy Euliss - NCDWQ	(present)
Marla Chambers - NCWRC	(present)
Chris Militscher - EPA	(phone)
Marella Buncick - USFWS	(present)

Participants:

Marshall Clawson, NCDOT Hydraulics
Bill Zerman, NCDOT Hydraulics
Tatia White, NCDOT Roadway Design
Katrina Washington, NCDOT Roadway Design
Bruce Klappenbach, NCDOT SMU
Trent Beaver, NCDOT Division 11 (phone)
Jeremy Goodwin, NCDOT REU
Erin Cheely, NCDOT NES
Carla Dagnino, NCDOT NES
John Conforti, NCDOT PDEA
Jamie Byrd, HNTB
Ben Henegar, HNTB

The Project is a portion of US 221 from north of South Fork New River to south of NC 194.

The meeting began at 1:00pm.

GENERAL NOTES / COMMENTS

- HNTB advised that one (1) RCBC crossing was waiting for input from Division 11 as to whether it would be retained or replaced. The RCBC is located on Sheet 12 and will be discussed in more detail with the sheet.
- HNTB advised that a new “Wet” file was received several days before 4B Plans were due to be submitted and that the provided 4B Plans showed both jurisdictional streams from the new Wet File as well as the current FS file.
 - HNTB added that to date, an updated “FS” file incorporating recent stream surveys had not been received from NCDOT.
 - HNTB also noted that several JS stream in the new Wet file had not yet been field surveyed by Location & Surveys.
- HNTB advised that all riprap outlet protection for pipes and riprap toe protection for the project will be Class I.
- HNTB advised that actual designs may vary slightly from those on the 4B Plans. Specifically, junction boxes have been added to some cross pipe extensions to reduce the slope of the pipe and minimize velocities into the streams.

Sheet 4

- HNTB advised that the Riprap Energy Dissipator Basin call right of -L- Sta. 249+50 was no longer valid since the adjoining project (R-2915B) had designed a ditch that receives drainage from the 30" pipe and discharges it directly into South Fork New River.
- USFWS questioned the typical section for the outfall since it was not shown on the plans.
 - HNTB advised that the outfall was a 4' base ditch with 2:1 side slopes.
 - HNTB added that a portion of the ditch at the pipe outlet was lined with riprap while the remainder was grass lined.
 - USFWS expressed some concerns over the type of lining proposed for the outfall and suggested that it be "vegetated" instead of just being grassed.
- There was also a good bit of discussion about where NCDOT fencing would be placed with respect to the ditch and how livestock will be allowed to pass from one side of the road to the other.
- Roadway stated that the R/W and CA fencing would be outside the ditch limits with the possible exception of at the bridge where it typically ties to the bridge wing walls.

Sheet 5

- HNTB advised that to minimize impacts to the JS and property left of -L- Sta. 262+00, the majority of project water was captured in a closed drainage system and discharged in the lateral base ditch on Sheet 4.
- NES noted that a portion of stream left of -L- Sta. 264+00 that is currently shown as JS is not jurisdictional.

Sheet 6

- NES noted that a portion of stream left of -L- Sta. 266+00 that is currently shown as JS is not jurisdictional.

Sheet 7

- No comments.

Sheet 8

- HNTB advised that the stream located at -L- Sta. 299+00± is classified as an Outstanding Resource Water (ORW).
 - HNTB added that this crossing meets the criteria for a Hazardous Spill Basin but that site constraints don't allow for its construction.
 - HNTB added that the current 48" CMP will be retained, lined and extended if the pipe is found to be structurally sound by NCDOT.
- The Agencies had concerns about slope of the proposed pipe extensions and the perched condition of the existing 48" CMP.

Sheet 8 (Cont.)

- NCWRC questioned whether baffles could be added to the pipe.
 - HNTB responded that baffles can't be added to a concrete pipe.
- Division was questioned about the use of metal pipe and advised that it had no issues with using metal pipes.
- After some more discussion, it was decided that 1.5'± drops would be added in the proposed junction boxes and that metal pipe could be used for the extensions in lieu of concrete pipe. Also, the last pipe sections out of the JB will be at 0.0%.
- It was noted that comments from this discussion shall apply to the entire project.
- While not jurisdictional, DWQ expressed concerns with pipes outletting onto steep slopes such as left of 294+00±.
 - HNTB advised that while this is not a preferred condition, it is not unlike the current conditions on site.
 - HNTB added that the outlet pads could be upsized for added protection if acceptable to Hydraulics.
 - Based on follow-up discussions w/ Hydraulics, riprap outlet pads will be sized in accordance with Std. 876.02.

Sheet 9

- HNTB advised that the stream located at -L- Sta. 302+50± is classified as ORW in the EIS but that since it's not a "blue line" on the USGS Quad Map, it doesn't meet NCDOT guidelines.
 - Some of the Agencies were concerned with this but DWQ acknowledged this as an agreed upon policy.
- HNTB advised that current designs show the existing 1 @ 4' x 5' RCBC being extended with 60" RCP both upstream and downstream.
 - NCWRC questioned whether the existing RCBC could be extended as an RCBC with baffles added.
 - HNTB advised that it would review and discuss this item with Hydraulics.
- USFWS will investigate the stream for trout habitat and advise.
 - This will determine whether the existing RCBC is extended as a RCBC w/baffles or with pipes.

Sheet 10

- HNTB advised that the existing inlet right of -L- Sta. 317+50± is approximately 50' deep and has flowing water into it from an undetermined offsite location.
 - HNTB added that the inlet will be retained and adjusted for proposed conditions.
 - HNTB advise that the existing pipe will be "TV'ed" in the coming weeks to determine if it can be retained.
- The Agencies expressed concerns over how erosion control (i.e. dewatering) will be handled in a situation like this.
 - REU responded that it will likely be handled with impervious dikes and pumps.

Sheet 11

- No comments.

Sheet 12

- HNTB advised that the JS left of -L- Sta. 349+00± was not field surveyed but field surveys have been requested.
- HNTB advised that the existing RCBC located at -L- Sta. 351+50± is bottomless and will be inspected by Bridge Maintenance to determine whether it can be retained.
 - HNTB added that their field investigations revealed several wall cracks and undermined footings at several locations.
 - Should replacement required, it will create a significant traffic control issue since the RCBC is in a 45' deep cut.

Sheet 13

- No comments.

Sheet 14

- HNTB advised that the existing bottomless 3 @ 9'x 9' RCBC is proposed to be replaced with a "standard" RCBC of similar size due to Geotech notification that suitable rock for a bottomless culvert was not present.
 - HNTB added that the likely design would have 2 barrels conveying normal flows with the remaining barrel blocked by sills and floodplain benches.
- HNTB advised that Old Field Creek is FEMA Limited Detailed Study stream so an MOA is required for replacement of the crossing.
- The Agencies expressed concerns over the proposed structure given that 2A committed to a bottomless structure.
- NCWRC questioned whether a bridge could be constructed at this location.
 - Hydraulics advised that a SMU had looked at a bridge that too many physical site constraints exist at this location.
 - Roadway Design added that the current -Y8- & -Y9- designs take into account accessibility and constructability issues on the -L- Line.
- NCWRC also questioned what was being proposed at this location to reduce past flooding instances as evidenced from Public Hearing Comments.
 - HNTB advised that resident interviews did not indicate any significant flooding problems in the area.
- USFWS questioned whether the RCBC could be shortened by utilizing a retaining wall on the downstream end.
 - Hydraulics advised that a Roadway and Structure dictate where walls can be placed.
 - HNTB added that stream alignment on the downstream side would be a concern if a retaining wall were constructed.

Sheet 14 (Cont.)

- HNTB will clearly document any deviation from CP2A.
 - HNTB added that a majority of the existing roadway embankment would be removed to natural ground or sloped back at 3:1.
- HNTB advised that a JS which currently runs parallel to -L- in the roadside ditch will be taken across -L- on Sheet 15 and ditched down to Old Field Creek.
- HNTB advised that the proposed PSH right of -L- Sta. 379+15± does not impact the existing wetland.

Sheet 15

- The NC DWQ questioned whether “bank stabilization” would be placed at the new ditch intersection with Old Field Creek.
 - HNTB advised that designs have not been completed for this sheet but that bank stabilization would likely be required.

Sheet 16

- HNTB will investigate/revisit slope/stake limits right of -L- Sta. 395+00±.
- HNTB advised that S77 & S78 were recently added jurisdictional streams.

Sheet 17

- HNTB will revisit the outlet right of -L- Sta. 413+50± to insure the existing wetland is not impacted and that the pipe outlet velocity is less than 2.0fps if possible.

Sheet 17A

- No comments.

Sheet 18

- No comments.

Sheet 19

- HNTB advised that several “linear wetland” impacts are present on this sheet.
- NES noted that an existing stream left of -L- Sta. 445+00± that does not show on the plans.
 - NES added that the extensive “cut” in this area may impact the stream.
 - NES to investigate and advise.

Sheet 20

- HNTB advised that the existing indeterminate drainage system at the -L- Line / -Y15- intersection will be replaced in its entirety.
 - The Agencies noted that system should be treated as a live stream during construction.

Sheet 21

- The Agencies requested that the pipe outlet right of -L- Sta. 462+20 be angled so that it does not intersect the receiving lateral ditch at 90⁰.

Sheet 22

- HNTB advised that a pipe from offsite enters the R/W conveying flowing water left of -Y4- Sta. 16+50±.
 - HNTB added that the source of the water could not be determined from their field investigations.
 - NES advised that it will revisit this area.

Sheet 23

- No comments.

Sheet 24

- HNTB advised that it will work with Roadway Design to eliminate impacts to the existing pond left of -Y11- Sta. 11+50±.

Closing Statements

- NCWRC questioned the “purpose and need” for this project adding the new typical section is not needed in this area given current traffic needs.
- NCWRC questioned the validity of the traffic numbers for the project.
- Division 11 commented that this route is heavily traveled by commuters.
- Division 11 added that the public supports this project.
- After additional discussion on this matter, all agreed that the appropriate people needed for a discussion on purpose and need were not present.

The meeting adjourned at 3:00pm.

Subject: Final Minutes from CP-4C Hydraulic Design Review Meeting on June 10, 2015 for R-2915C in Ashe County. *These minutes also include follow-up conversations on several issues since the CP-4C Meeting.*

Team Members:

Andrew Williams - USACE	(present)
Steve Kichefski - USACE	(present)
Mitch Batuzich - FHWA	(present)
David Wanucha - NCDWR	(present)
Marla Chambers - NCWRC	(present)
Cynthia Vanderwiel - EPA	(phone)
Marella Buncick - USFWS	(present)

Participants:

Bill Zerman, NCDOT Hydraulics
Tatia White, NCDOT Roadway Design Unit
Doug Calhoun, NCDOT SMU
Trent Beaver, NCDOT Division 11 (phone)
Mark Staley, NCDOT REU
Erin Cheely, NCDOT NES
Jamie Byrd, HNTB
Ben Carroll, HNTB

The Project is a portion of US 221 from north of South Fork New River to south of NC 194.

The meeting began at 9:30 am.

GENERAL NOTES / COMMENTS

- HNTB advised that the sheet numbers referenced in the 4B Minutes were no longer correct. This is due to the removal of the original Sheet 4 from the plans.
- HNTB advised that Sheet 20 would be permitted under the R-2915D project.
- HNTB stated that detail sheet 2-E, which contains the details for sheet 13 was previously omitted from the permit drawings. HNTB provided copies of sheet 2-E to all in attendance.
- NCDOT NES stated that the permit drawings title sheet needs to be revised to read Old Field Creek not Old Fields Creek.
- USACE advised that the presence of the Northern Long-Eared Bat was still being determined in the project area. If a presence is found, construction restrictions will be imposed during the maternity season.
- USACE stated that all constructability impacts need to be shown and accounted for on the permit drawings.
- USACE stated that the proposed impacts for this project have increased from the preliminary permit drawings. NCDOT NES stated that this was caused by the addition of several jurisdictional features to the project since the preliminary permit drawings were prepared. USACE requested thorough explanation be included in the final permit package.
- A follow-up 4C meeting, to discuss outstanding issues, was tentatively scheduled for August 2015.
 - o *The follow-up CP-4C Meeting is scheduled for 8/12/15.*

Sheet 4 (Site 1):

Site 1:

- NES advised that the jurisdictional stream shown at Site 1 in the 4B plans is no longer considered jurisdictional.
- NCDOT Hydraulics requested that mechanized clearing in wetlands be extended to the Right of Way.
- NES stated that Site 1 is considered a “total take”. NES advised HNTB to note any “total take” on permit drawings and the impact summary sheet. It was decided that additional impacts associated with a “total take” would not be hatched but would be counted as permanent fill in wetlands.
- USFWS questioned the note “Stream has been replaced w/ 24” HDPE”. HNTB stated that approximately 100ft of the existing stream had been piped and filled by the property owner. It was decided that this area was not relevant to the proposed project.

Sheet 5 (Site 2A, Site 2B, & Site 3):

Site 2A:

- NCDOT NES stated that the jurisdictional stream under the proposed fill originates at an existing spring. NCDOT Hydraulics advised that a spring box should be added to the designs.
- NCDOT NES advised that this site is a “total take”.

Site 2B:

- NCDOT Hydraulics stated that temporary stream impacts should be extended to the C/A line.
- NCDWR questioned why the permanent stream impacts quantified for Site 2 were more than the detailed pipe outlet channel. HNTB stated that additional impacts were added for the approaching stream.

Site 3: No Comments.

Sheet 7 & 8 (Site 4 & Site 5):

Site 4: No Comments.

Site 5:

- HNTB stated that 1.5ft drops had been designed in the proposed junction boxes as agreed to at the September 11, 2013, 4B Meeting.
- USFWS and NCWRC expressed concerns that the 1.5ft drops and high velocities could eliminate fish passage.
 - USFWS stated that they will determine if fish passage is present in the existing stream/culvert and advise.
 - If fish passage is found to exist in the current conditions, USFWS stated that they will determine if there is a precedent of fish passage through culverts of similar slope and length.
 - All agreed if existing passage and precedent for future passage is found, designs will be revisited during the follow-up 4C meeting in August 2015. If fish passage is not observed and no precedent is found, the current designs will not be revised.
 - *Division inspected the existing 1 @ 5' x 4' RCBC and advised that it should be replaced.*
 - *The following comments were received from NCWRC via e-mail on 7/16/15:*
 - *Fish passage is no longer a concern for this stream.*
 - *The stream is ORW so we need to make sure that pipe outlet velocities are non-erosive and that the stream is stable at the pipe inlet and outlet.*

Sheet 9 (Site 6 & Site 7):

Site 6: No Comments.

Site 7:

- NES advised that the jurisdictional stream should be extended to the outlet of the existing 24" RCP in the FS file. HNTB stated that additional stream impacts will be quantified upon receipt of the updated FS file.
- *An updated FS file was provided to HNTB on 7/28/15 that showing the extension of S52.*

Sheet 10 (Site 8 & Site 9):

Site 8: No Comments.

Site 9:

- USACE requested a blow-up of the proposed impacts be provided.

Sheet 11 (Site 10, Site 11, Site 12, Site 13A, & Site 13B):

Site 10: No Comments.

Site 11: No Comments.

Site 12: No Comments.

Site 13A:

- HNTB advised that the existing RCBC has been deemed structurally deficient and could not be maintained in the proposed condition.
- USFWS and NCWRC expressed concerns over fish passage, stream stability, and construction impacts.
 - o NCDOT Division 11 stated that construction will begin soon for a similar crossing on R-2237C. However, the current project schedule does not allow time for the success of the R-2237C crossing to be evaluated.
 - o Based on R-2237C NCDOT Division 11 estimated the costs of the trenchless construction 84" WSP would be \$1,400 /ft. with an estimated progression of 5 - 10 ft./ day.
 - o Several alternatives were discussed including revising this crossing to a bridge, rehabilitating and extending the existing culvert, and using a larger pipe and constructing a low flow channel inside the pipe.
 - o HNTB and NCDOT Hydraulics will discuss potential alternatives for discussion at the follow-up 4C meeting.
 - o *Per discussions with Hydraulics, both the Welded Steel Pipe (WSP) and Structural Plate Pipe (SPP) sections will have 1' high baffles added. The baffles for the WSP will be added after the pipe is installed through the existing roadway embankment.*

Site 13B: No Comments.

Sheet 12 (Site 14 & Site 14B)

Site 14: No Comments.

Site 14B:

- NES stated that this site should be added as a result of revisions to the FS file.

Sheet 13 (Site 15, Site 16, Site 17, Site 18, Site 19, Site 20, & Site 21)

Site 15: No Comments.

Site 16:

- NCDOT Hydraulics requested that temporary stream impacts be extended to the C/A line.
- NCDOT Roadway Design stated that Division has requested existing -Y8- (Ira Jordan Rd.) be retained as is, which would require a culvert realignment. HNTB and NCDOT Hydraulics will discuss design alternatives and coordinate with the RDU.
- USFWS requested that the culvert be designed to contain low flows in one barrel not two as in the current designs and existing conditions.
 - o NCDOT SMU advised that a span of 14 – 15ft is the maximum span allowed by their current standards.
 - o HNTB advised that the existing channel is approximately 20ft wide at the inlet and outlet of the proposed culvert.
 - o HNTB, NCDOT Hydraulics, and NCDOT SMU will review available alternatives.
 - o *SMU advised that the maximum span for the RCBC is 15’.*
 - o *Preliminary hydraulic models for a 2 @ 15’ x 11’ RCBC indicate that the crossing would meet FEMA MOA guidelines.*
 - o *NCWRC, USFWS and NCDWR have advised that the revised RCBC size and alignment are acceptable.*

Site 17:

- NCDOT Hydraulics requested that a label for Stream Rebuild Detail AK be added to the permit drawings.

Site: 18:

- NCDOT NES requested this site be split into Site 18A & 18B to separate the impacts to S71 and S70.
- NCDOT NES advised that a small portion of S70 exists on the north side of Y9 that should be hatched with permanent impact and accounted for in the impact summary.
- USFWS expressed stability concerns about the proposed 90° intersections between the 30” and 18” cross pipes.
 - o HNTB advised that the 30” RCP outlets into a Class ‘I’ Riprap lined channel and the 18” RCP outlets onto a Class ‘I’ Riprap pad so stability should not be a concern.

Site 19:

- NCDOT NEU advised that Site 19 should be split into “a” & “b” to separate out bank stabilization to Old Fields Creek (S56) from the 48” RCP in S72.

Site 20:

- NCDOT NES advised that this site is a “total take”.

Site 21: No Comments.

Sheet 14 (Site 22)

Site 22:

- USACE requested a blow-up of the proposed impacts be added to the permit drawings for clarity.

Sheet 15 (Site 23, Site 24, Site 25A, & Site 25B):

Site 23:

- NCDOT NES stated that this stream is classified as intermittent.

Site 24: No Comments.

Site 25A: No Comments.

Site 25B:

- USFWS expressed concerns about the stability of the berm ditch proposed to tie Site 25B to Site 25A.
 - o NCDOT NES and HNTB stated that the stream flow is minimal and that the berm ditch should function effectively.

Sheet 16 (Site 26 & Site 27):

Site 26:

- NCDOT NES advised that the wetland at this site is a “total take”.

Site 27: No Comments.

Sheet 17 (Site 28):

Site 28: No Comments.

Sheet 18 (Site 29 & Site 30):

Site 29:

- NCDOT Hydraulics requested that temporary fill in wetland impacts be added to the C/A line.
 - o After some discussion it was decided that the impacts would remain as currently shown.

Site 30:

- NCDOT Hydraulics requested that mechanized clearing limits be limited to 10ft beyond construction and the remaining impacts be revised to temporary fill in wetlands.
 - o After some discussion it was decided that the mechanized clearing impacts would be reduced to 10ft and no other impacts would be shown.

Sheet 19 (Site 31):

Site 31: No Comments.

Sheet 21 (Site 32):

Site 32: No Comments.

Closing Statements

- All parties agreed that a follow-up meeting was needed for further discussion of design alternatives. The follow-up 4C was tentatively scheduled for August 2015.

The meeting adjourned at 12:00pm.

Subject: Final Minutes from CP-4C “Revisited” Hydraulic Design / Permit Drawing Review Meeting on August 12, 2015 for R-2915C in Ashe County.

Team Members:

Steve Kichefski - USACE	(present)
Mitch Batuzich - FHWA	(absent)
David Wanucha - NCDWR	(phone)
Marla Chambers - NCWRC	(present)
Cynthia Vanderwiel - EPA	(phone)
Marella Buncick - USFWS	(present)

Participants:

Bill Zerman, NCDOT Hydraulics
Tatia White, NCDOT Roadway Design Unit
Doug Calhoun, NCDOT SMU
Trent Beaver, NCDOT Division 11 (phone)
Mark Staley, NCDOT REU
Erin Cheely, NCDOT NES
Carla Dagnino, NCDOT NES
Jamie Byrd, HNTB

The purpose of this “Revisited” Meeting for the subject project is to revisit the observed field conditions and proposed designs at Sites 5, 13A & 16.

The meeting began at 9:00 am.

General Notes / Comments:

- EPA questioned whether NCDOT conducts post-construction site visits to determine the success of constructed designs.
 - Hydraulics advised that designers make every attempt to revisit sites (post-construction) when they are in the area.
- EPA added that these post-construction visits could be used to validate / document the success or failure of designs which in turn could be used to update design guidelines.

Site 5:

- NCWRC advised that field investigations indicated there is no fish passage in the stream.
- USFWS reiterated that the stream is ORW so designs need to insure that the stream remains stable upstream and downstream of the proposed crossing.
- HNTB advised that the proposed crossing will be comprised of a 1 @ 60” Welded Steel Pipe (WSP) tunneled through the existing roadway embankment and 1 @ 60” Structural Plate Pipe (SPP) sections upstream and downstream of the welded steel pipe.

Site 13A:

- HNTB advised that they encountered fish in the existing RCBC during supplemental surveys.
- HNTB advised that per discussions with Hydraulics, both the WSP and SPP sections will have 1’ high sills welded added across their bottoms. For the WSP, the sills will be added after the pipe is installed through the existing roadway embankment.

- o There were multiple discussions concerning the proposed sills with respect to height and spacing.
- o The general consensus was that the sills should be placed such that the existing stream conditions are replaced to the extent possible.
- o HNTB will coordinate with Hydraulics to determine the stream design through the proposed pipes.
 - o Based on discussion with Hydraulics, sills will be 1.5' in height and spaced at 10' intervals.
 - o If site constraints allow, native material will be used to backfill the WSP & SSP sections.
 - o In accordance with Agency comments, backfill material will be placed in a manner to avoid creating a series of "waterfalls".
- o There was also discussion with respect to the constructability of sills in the WSP post placement.
 - o HNTB advised that it will contact their Tunneling Group for information with respect to this issue and coordinate with Hydraulics.
 - Per discussions with HNTB Tunneling Group, the proposed construction is feasible but will need to meet all OSHA regulations.

Site 16:

- HNTB advised that Preliminary hydraulic models for a 2 @ 15' x 11' RCBC indicate that the crossing would meet FEMA MOA guidelines.
- HNTB also advised that the stream widths upstream and downstream of the existing RCBC crossing are wider than at the crossing and would more closely match the 15' width.
- NCWRC, USFWS and NCDWR reiterated that the size and alignment of the proposed 2 @ 15' x 11' RCBC with a 1' Sill in the low flow barrel (Lt.) and 3' Sill in the high flow barrel (Rt.) are acceptable.
- USFWS requested that a note be added to the plans directing that both barrels be backfilled with larger native material.
 - o Roadway and Hydraulics acknowledged that such a note will be added to the Roadway Plans.

The meeting adjourned at 11:00am.



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.02; Released April 2015)

WBS Element:	34518.1.4	TIP No.:	R-2915C	County(ies):	Ashe	Page	1	of	7
General Project Information									
WBS Element:	34518.1.4	TIP Number:	R-2915C	Project Type:	Roadway Widening	Date:	5/31/2016		
NCDOT Contact:	Heath Slaughter			Contractor / Designer:	HNTB North Carolina, P.C.				
	Address:	801 Statesville Rd North Wilkesboro, 28659				Address:	343 E. Six Forks Road Suite 200 Raleigh, NC 27609		
	Phone:	(336) 903-9202				Phone:	(919) 424-0424		
	Email:	hslaughter@ncdot.gov				Email:	jabyrd@hntb.com		
City/Town:	Fleetwood			County(ies):	Ashe				
River Basin(s):	New			CAMA County?	No				
Wetlands within Project Limits?	Yes								
Project Description									
Project Length (lin. miles or feet):	3.979 Miles		Surrounding Land Use:	Residential, Agricultural & Forest					
	Proposed Project			Existing Site					
Project Built-Up Area (ac.)	46.7 ac.			13.0 ac.					
Typical Cross Section Description:	4-lane divided roadway with 12' lanes, raised median, paved shoulders and roadside ditches			2-lane roadway with 11' lanes, paved shoulders and roadside ditches					
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	21,029		Year:	2037	Existing:	12,743		Year: 2017
General Project Narrative: (Description of Minimization of Water Quality Impacts)	R-2915C involves the widening on NC 221, from north of South Fork New River to south of NC 194, from 2-lanes to a 4-lane divided facility. The project includes jurisdictional stream crossings, closed system drainage, road side ditches and berm ditches. Retaining walls were used throughout the project to limit impacts to jurisdictional streams and wetlands. SR 1178 (Paul Goodman Rd.) was realigned to reduce project impacts to Old Field Creek. Preformed scour holes were used at pipes outlets throughout the project to dissipate energy and promote diffuse flow into jurisdictional areas. At jurisdictional stream crossings, bank stabilization was used at the outlets in lieu of standard rip-rap pads where practical. At these outlets, pipe slopes were minimized to reduce flow velocities into the streams. Floodplain benches were utilized at culvert sites to maintain continuity of the stream through the crossings.								
Waterbody Information									
Surface Water Body (1):	South Fork New River			NCDWR Stream Index No.:	10-1-(20.5)				
NCDWR Surface Water Classification for Water Body	Primary Classification:	Water Supply V (WS-V)							
	Supplemental Classification:	High Quality Waters (HQW)							
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	No	Comments:							
NRTR Stream ID:	S43			Buffer Rules in Effect:	N/A				
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A			Dissipator Pads Provided in Buffer?	N/A		
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)				
(If yes, provide justification in the General Project Narrative)									



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.02; Released April 2015)

WBS Element:	34518.1.4	TIP No.:	R-2915C	County(ies):	Ashe	Page	2	of	7
Additional Waterbody Information									
Surface Water Body (2):	Old Field Creek			NCDWR Stream Index No.:	10-1-22-(0.3)				
NCDWR Surface Water Classification for Water Body			Primary Classification:	Class C					
			Supplemental Classification:	Trout Waters (Tr)					
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	No			Comments:					
NRTR Stream ID:	S56			Buffer Rules in Effect:		N/A			
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)									
Surface Water Body (3):	UT S.F. New River			NCDWR Stream Index No.:	10-1-(20.5)*				
NCDWR Surface Water Classification for Water Body			Primary Classification:	Water Supply V (WS-V)					
			Supplemental Classification:	High Quality Waters (HQW)					
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	No			Comments:					
NRTR Stream ID:	S44			Buffer Rules in Effect:		N/A			
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)									
Surface Water Body (4):	UT Old Field Creek			NCDWR Stream Index No.:	10-1-22-(0.3)*				
NCDWR Surface Water Classification for Water Body			Primary Classification:	Class C					
			Supplemental Classification:	Trout Waters (Tr)		Waters (ORW)			
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	No			Comments:					
NRTR Stream ID:	S47			Buffer Rules in Effect:		N/A			
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)									
Surface Water Body (5):	UT Old Field Creek			NCDWR Stream Index No.:	10-1-22-(0.3)*				
NCDWR Surface Water Classification for Water Body			Primary Classification:	Class C					
			Supplemental Classification:	Trout Waters (Tr)		Waters (ORW)			
Other Stream Classification:	None								
Impairments:	None								
Aquatic T&E Species?	No			Comments:					
NRTR Stream ID:	S48			Buffer Rules in Effect:		N/A			
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A	(If yes, provide justification in the General Project Narrative)			(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)									



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.02; Released April 2015)

WBS Element: 34518.1.4 TIP No.: R-2915C County(ies): Ashe Page 3 of 7

Additional Waterbody Information

Surface Water Body (6):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		Trout Waters (Tr) Waters (ORW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No Comments:				
NRTR Stream ID:	S50		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (7):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		Trout Waters (Tr) Waters (ORW)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No Comments:				
NRTR Stream ID:	S52		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (8):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No Comments:				
NRTR Stream ID:	S55		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (9):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body	Primary Classification:		Class C		
	Supplemental Classification:		Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No Comments:				
NRTR Stream ID:	S62		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.02; Released April 2015)

WBS Element: 34518.1.4 TIP No.: R-2915C County(ies): Ashe Page 4 of 7

Additional Waterbody Information

Surface Water Body (10):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No		Comments:		
NRTR Stream ID:	S63		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (11):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No		Comments:		
NRTR Stream ID:	S70		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (12):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No		Comments:		
NRTR Stream ID:	S72		Buffer Rules in Effect:		
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (13):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No		Comments:		
NRTR Stream ID:	S79		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.02; Released April 2015)

WBS Element: 34518.1.4 TIP No.: R-2915C County(ies): Ashe Page 5 of 7

Additional Waterbody Information

Surface Water Body (14):	UT Old Field Creek		NCDWR Stream Index No.:	10-1-22-(0.3)*	
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C		
		Supplemental Classification:	Trout Waters (Tr)		
Other Stream Classification:	None				
Impairments:	None				
Aquatic T&E Species?	No		Comments:		
NRTR Stream ID:	S67		Buffer Rules in Effect:	N/A	
Project Includes Bridge Spanning Water Body?	No	Deck Drains Discharge Over Buffer?	N/A	Dissipator Pads Provided in Buffer?	N/A
Deck Drains Discharge Over Water Body?	N/A	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (15):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body		Primary Classification:			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?			Comments:		
NRTR Stream ID:			Buffer Rules in Effect:		
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (16):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body		Primary Classification:			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?			Comments:		
NRTR Stream ID:			Buffer Rules in Effect:		
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					

Surface Water Body (17):			NCDWR Stream Index No.:		
NCDWR Surface Water Classification for Water Body		Primary Classification:			
		Supplemental Classification:			
Other Stream Classification:					
Impairments:					
Aquatic T&E Species?			Comments:		
NRTR Stream ID:			Buffer Rules in Effect:		
Project Includes Bridge Spanning Water Body?		Deck Drains Discharge Over Buffer?		Dissipator Pads Provided in Buffer?	
Deck Drains Discharge Over Water Body?		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
(If yes, provide justification in the General Project Narrative)					



North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS



(Version 2.02; Released April 2015)

WBS Element: **TIP No.:** R-2915C **County(ies):** Ashe **Page** 6 **of** 7

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station & Coordinates (Road and Non Road Projects)	Surface Water Body	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)	BMP Associated w/ Buffer Rules?
5	-L- 266+07 LT 36.29940 / 81.49836	(3)UT S.F. New River	Riprap Apron / Pad	Class I	10.4	Pipe	30	18.2	7.7	N/A
7	-L- 298+23 LT 36.30521 / 81.50617	(4)UT Old Field Creek	Riprap Apron / Pad	Class I	42.3	Pipe	48	27.0	6.4	N/A
7	-L- 302+05 LT 36.30601 / 81.50654	(5)UT Old Field Creek	Riprap Apron / Pad	Class I	81.5	Pipe	60	48.0	8.4	N/A
9	-L- 317+58 LT 36.30961 / 81.50935	(6)UT Old Field Creek	Riprap Apron / Pad	Class I	19.4	Pipe	30	23.1	14.7	N/A
10	-L- 333+45 LT 36.31338 / 81.51245	(8)UT Old Field Creek	Riprap Apron / Pad	Class I	15.9	Pipe	30	15.0	8.2	N/A
11	-L- 348+76 LT 36.31723 / 81.51390	(9)UT Old Field Creek	Riprap Apron / Pad	Class I	22.9	Pipe	36	18.9	7.6	N/A
11	-L- 352+50 LT 36.31814 / 81.51465	(10)UT Old Field Creek	PSH	Class 'B'	1.8	Pipe	18	5.9	1.7	N/A
12	-L- 358+72 LT 36.31948 / 81.51608	(14)UT Old Field Creek	Riprap Apron / Pad	Class I	1.7	Pipe	18	3.7	10.4	N/A
13	-L- 371+50 LT 36.32288 / 81.51729	(2)Old Field Creek	PSH	Class 'B'	2.7	Pipe	18	7.3	1.8	N/A
13	-L- 375+15 LT 36.32383 / 81.51756	(2)Old Field Creek	PSH	Class 'B'	0.8	Pipe	15	3.4	1.4	N/A
13	-Y9- 15+18 LT 36.32485 / 81.51624	(11)UT Old Field Creek	Riprap Apron / Pad	Class I	1.7	Pipe	18	3.7	9.3	N/A
13	-L- 377+37 RT 36.32451 / 81.51750	(2)Old Field Creek	PSH	Class 'B'	0.3	Pipe	15	1.5	3.6	N/A
13	-L- 379+16 RT 36.32491 / 81.51768	(2)Old Field Creek	PSH	Class 'B'	0.2	Pipe	15	0.8	0.9	N/A
14	-L- 382+75 RT 36.32579 / 81.51848	(2)Old Field Creek	PSH	Class 'B'	1.2	Pipe	15	5.4	1.7	N/A
14	-L- 391+50 RT 36.32772 / 81.52023	(2)Old Field Creek	PSH	Class 'B'	1.5	Pipe	15	4.1	1.5	N/A
15	-L- 398+00 RT 36.32978 / 81.52113	(2)Old Field Creek	PSH	Class 'B'	0.8	Pipe	15	3.1	1.4	N/A

Additional Comments

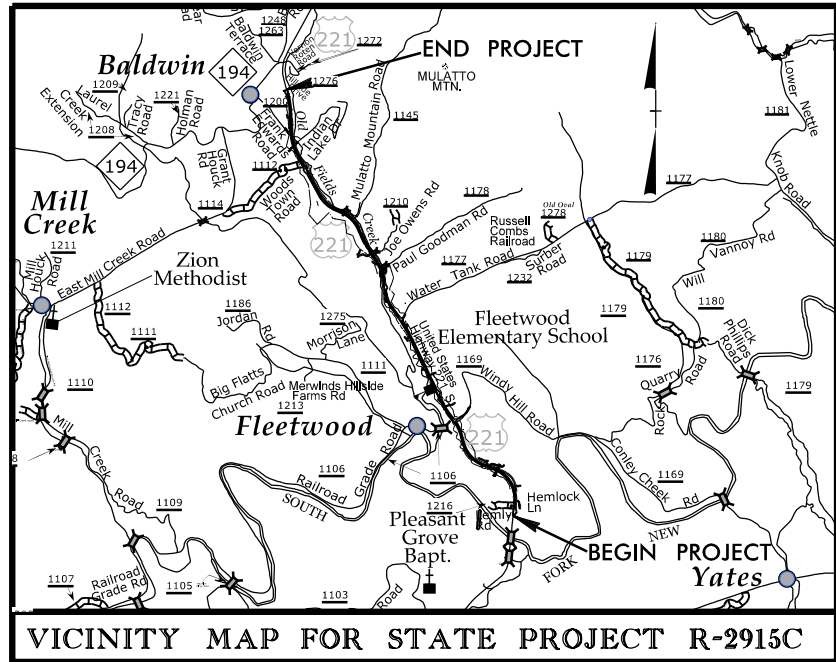
Where possible Junction Boxes were used to reduce slopes and velocities at pipe outlets. Outlet velocities were unable to be reduced below the desired 4 fps due to the steep terrain located thought out the project.

* Refer to the NCDOT Best Management Practices Toolbox (2014), NCDOT Standards, the Federal Highway Administration (FHWA) Hydraulic Engineering Circular No. 14 (HEC-14), Third Edition, Hydraulic Design of Energy Dissipators for Culverts and Channels (July 2006), as applicable, for design guidance and criteria.

09/08/99

TIP PROJECT: R-2915C

See Sheet 1-A For Index of Sheets
See Sheet 1-B For Conventional Symbols



FDPI SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

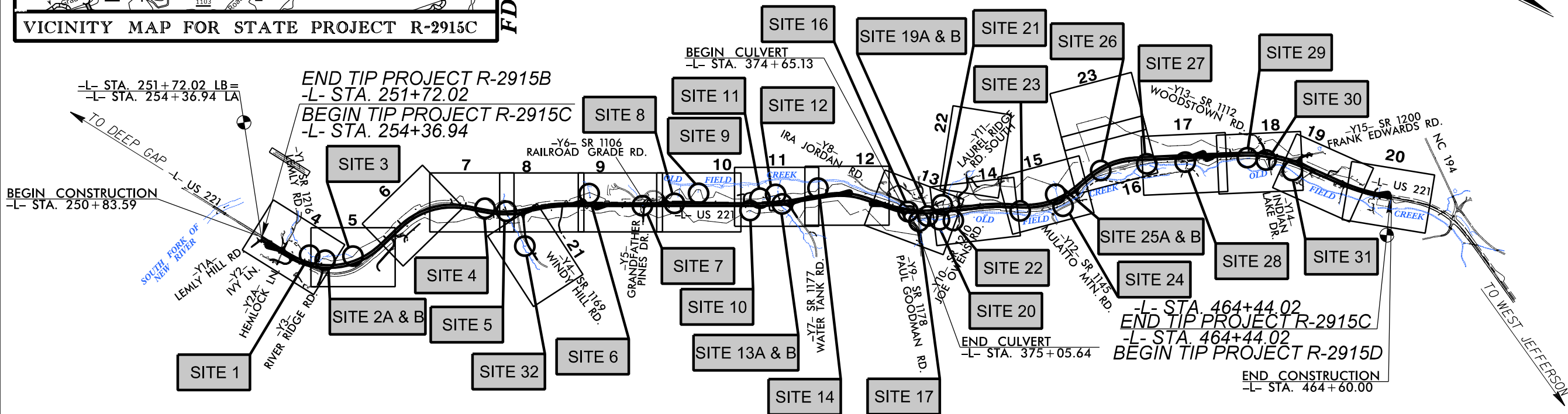
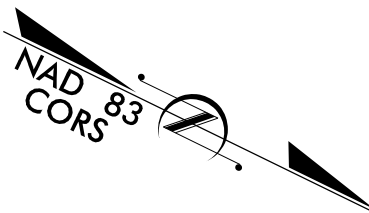
LOCATION: US 221 FROM NORTH OF SOUTH FORK NEW RIVER
TO SOUTH OF NC 194.

TYPE OF WORK: GRADING, DRAINAGE, PAVING, AND STRUCTURES

WETLAND & STREAM IMPACTS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34518.1.4	STP-0221(41)	P.E.	
34518.2.3	STP-0221(41)	R/W	
34518.2.U3	STP-0221(41)	UTILITIES	

PERMIT DRAWINGS
SHEET 1 OF 43



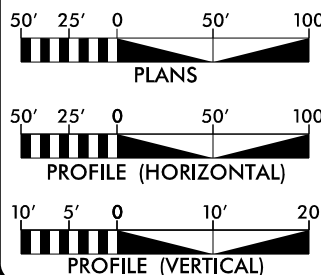
THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH
ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS.

** DESIGN EXCEPTION REQUIRED FOR MAXIMUM GRADE

PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC
PLANS COORDINATED BY:
Rekha Patel, PE - Roadway Design
Project Engineer (NCDOT)

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UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2017 = 12,743
ADT 2037 = 21,029
DHV = 9 %
D = 60 %
T = 9 % *
V = 60 MPH**
* = (TTST 2% + DUAL 7%)
FUNC CLASS =
RURAL ARTERIAL
STATE WIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915C = 3.971 Miles
LENGTH STRUCTURES TIP PROJECT R-2915C = 0.008 Miles
TOTAL LENGTH TIP PROJECT R-2915C = 3.979 Miles

Prepared In the Office of:

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number: F-0159

HNTB
HNTB
343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609
NC License Number: C-3554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
November 21, 2014

LETTING DATE:
November 15, 2016

Brian Eason, PE
PROJECT ENGINEER

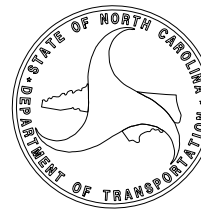
Bill Bollman
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.

ROADWAY DESIGN
ENGINEER

SIGNATURE: _____ P.E.



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CONTRACT:

8/17/99

REVISIONS

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LOCHNER

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RALEIGH, NC 27612

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343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

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PROJECT REFERENCE NO.

R-2915C

SHEET NO.

2D-1

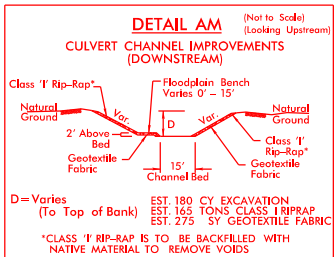
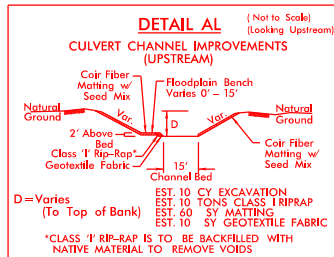
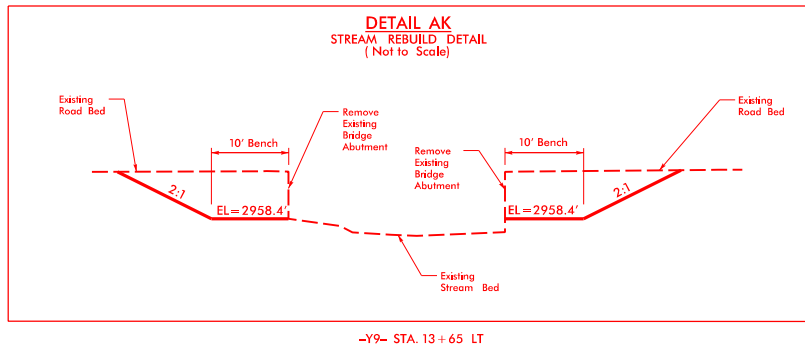
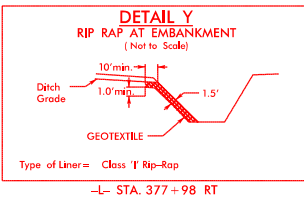
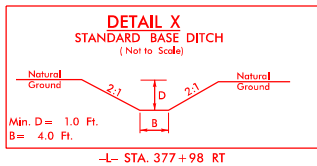
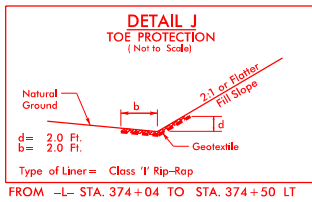
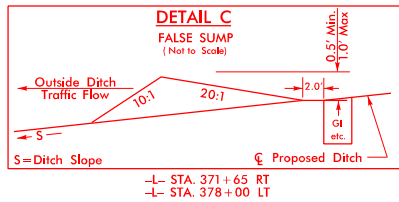
R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

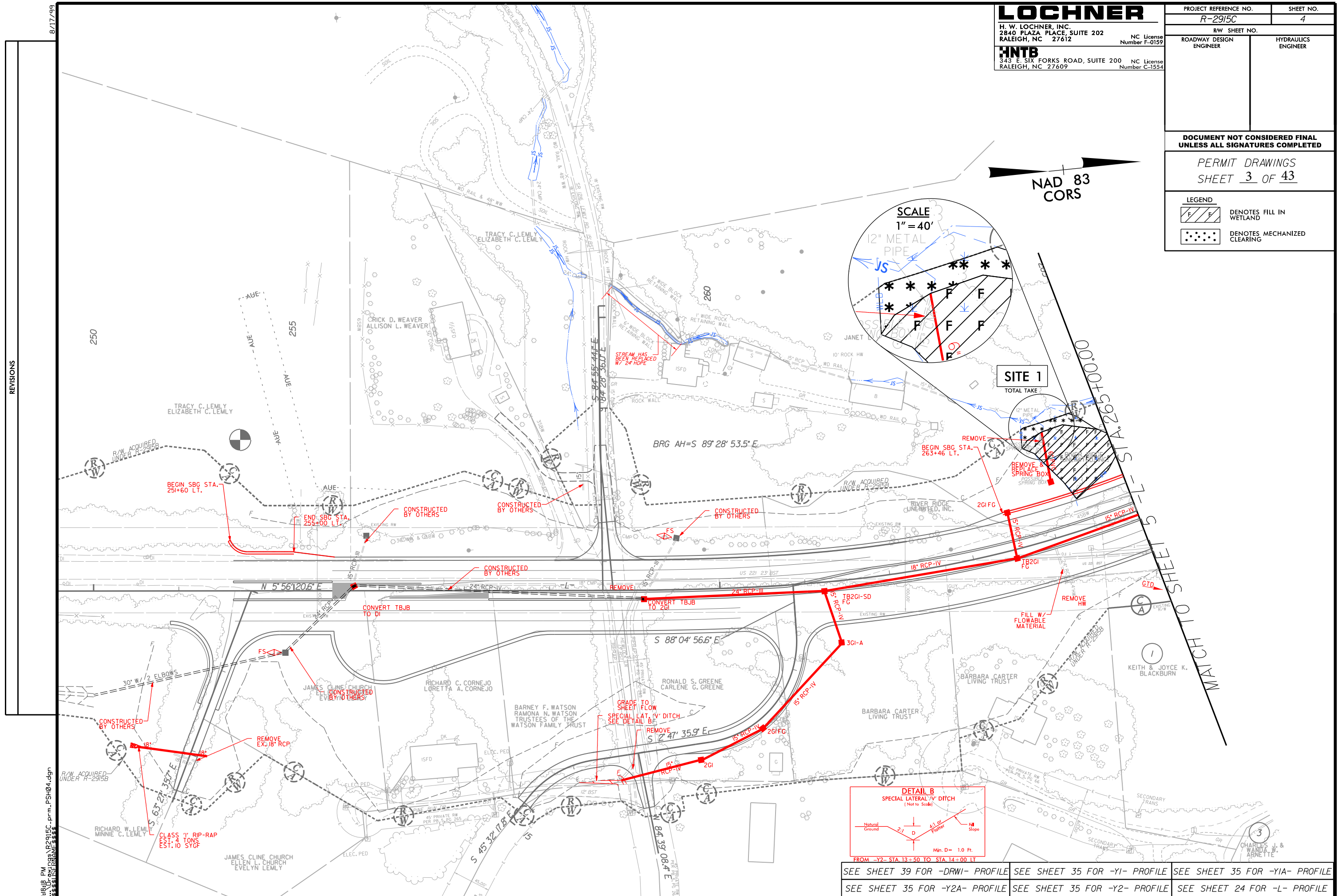
HYDRAULICS
ENGINEER

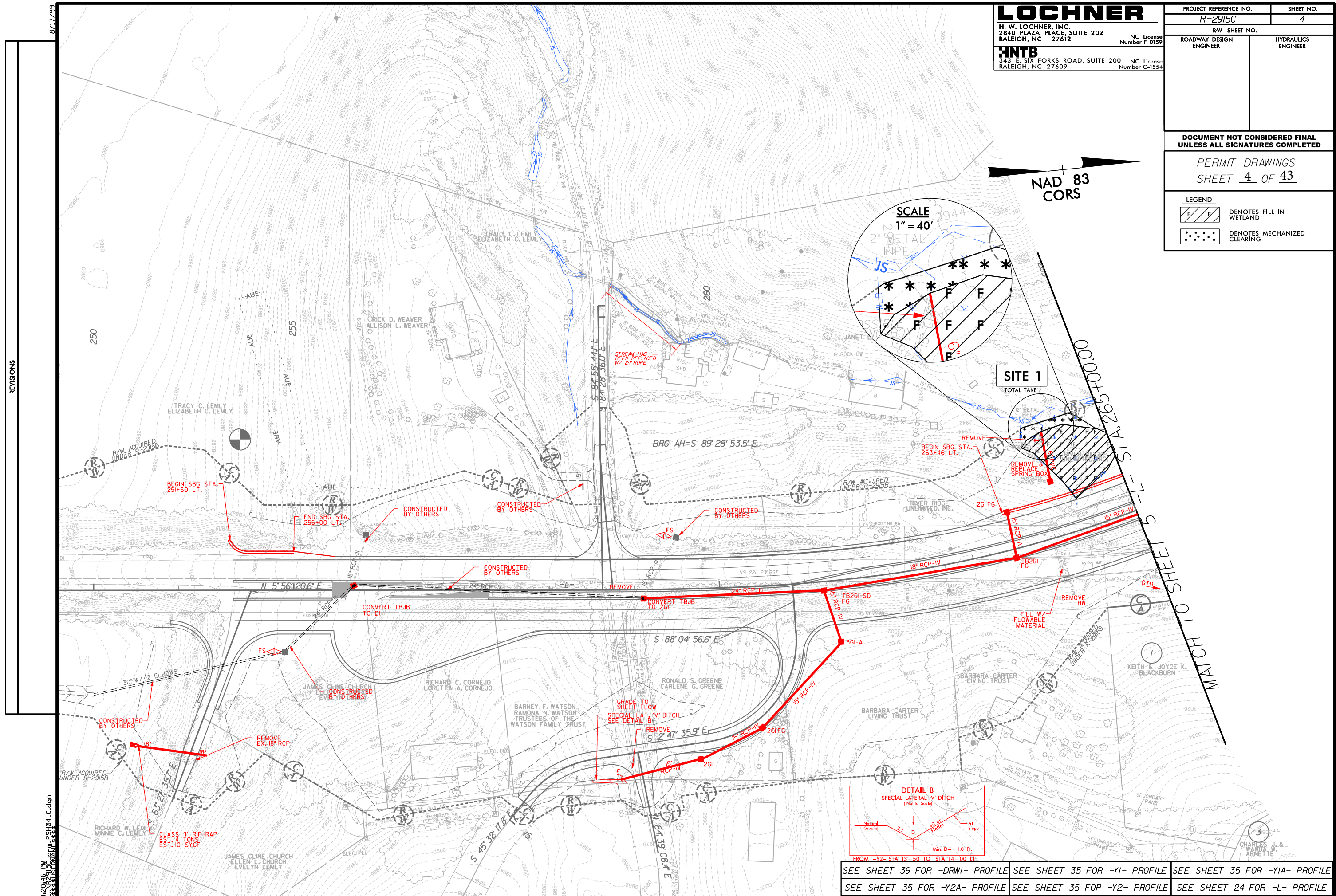
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PERMIT DRAWINGS
SHEET 2 OF 43



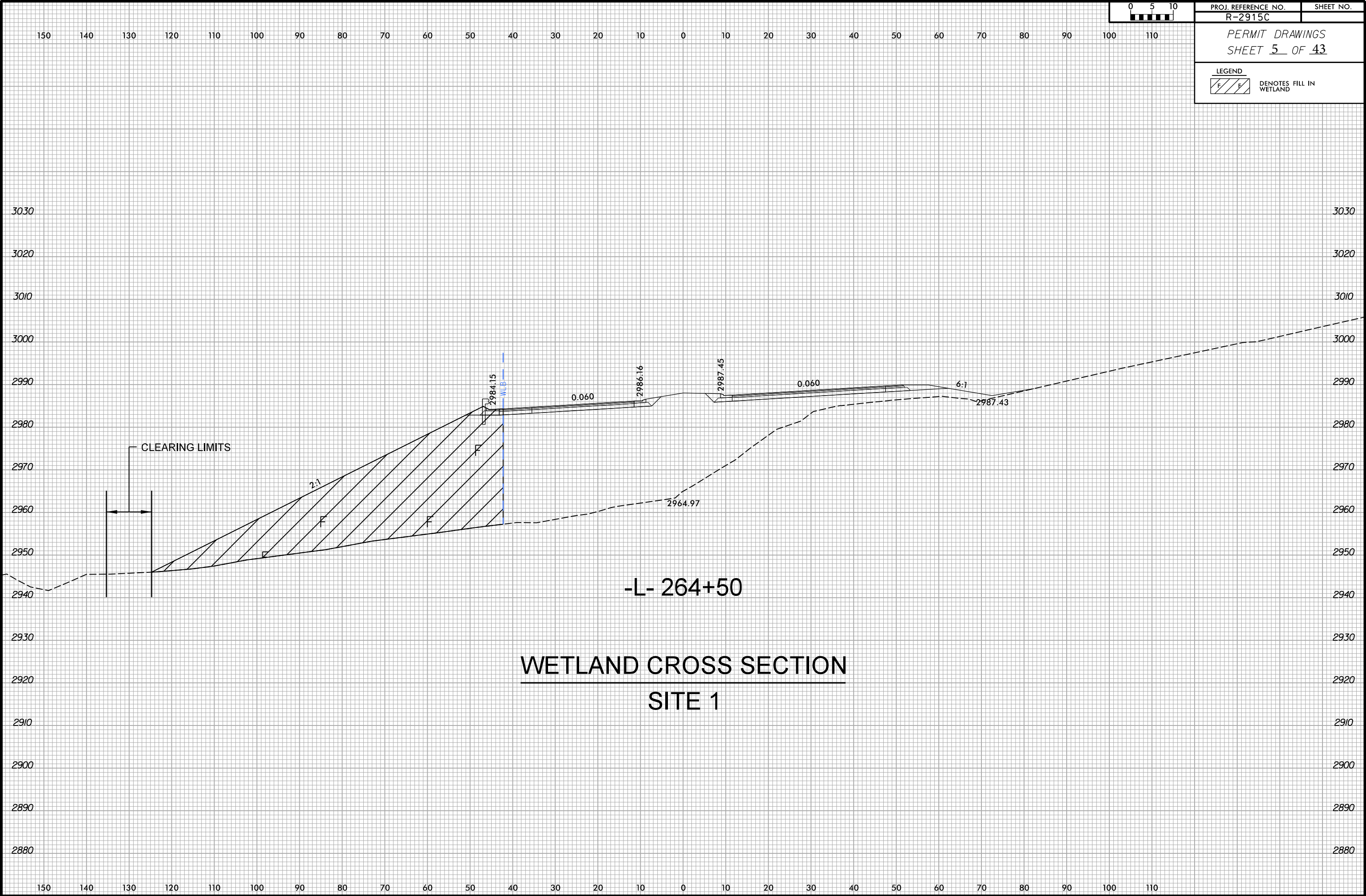
SEE SHEET 14 FOR PLAN VIEW





8/23/99

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johnd

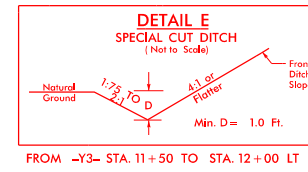
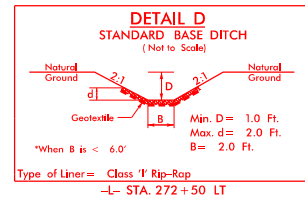
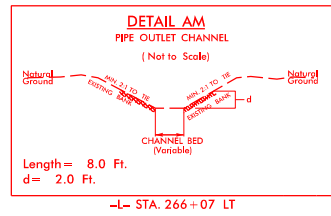


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NAD + 83
CORS

SECTION 276+50

MATCH TO SHEET 6
-L- STA. 279+00.00



~~SCALE~~
~~1" = 40~~

SCALE
1" = 40'

SITE 2A

SITE 2B

SITE 3

PERMIT DRAWINGS
SHEET 6 OF 43

LEGEND	
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

SEE SHEET 40 FOR -DRW2- PROFILE

SEE SHEET 36 FOR -Y3- PROFILE

SEE SHEET 25 FOR -L- PROFILE

REVISIONS

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NC License
Number F-0159

200 NC License
Number C-1554

	9
	HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
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NAD +

SECTION 276+50

MATCH TO SHEET 6
-L- STA. 279+00.00

DETAIL AM
PIPE OUTLET CHANNEL
 (Not to Scale)

Natural Ground

W/ 2.0 FT. CHAN. BED

W/ 2.0 FT. CHAN. BED

Natural Ground

CHANNEL BED (Variable)

Length = 8.0 Ft.

d = 2.0 Ft.

L- STA. 266 + 07 LT

DETAIL D
STANDARD BASE DITCH
 (Not to Scale)

Natural Ground

2:1

D

2:1

Natural Ground

Geotextile

B

Min. D = 1.0 Ft.
 Max. d = 2.0 Ft.
 B = 2.0 Ft.

"When B is < 6.0"

Type of Liner = Class 'I' Rip-Rap
Location = LT STA. 272 + 50 LT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground

1.75

1.0

D

1:1 or flatter

Front Ditch Slope

Min. D = 1.0 Ft.

FROM -Y3- STA. 11+50 TO STA. 12+00 LT

~~SCALE
1" = 40'~~

SCALE
1" = 40'

SITE 2A

SITE 2B

SITE 3

PERMIT DRAWINGS
SHEET 7 OF 43

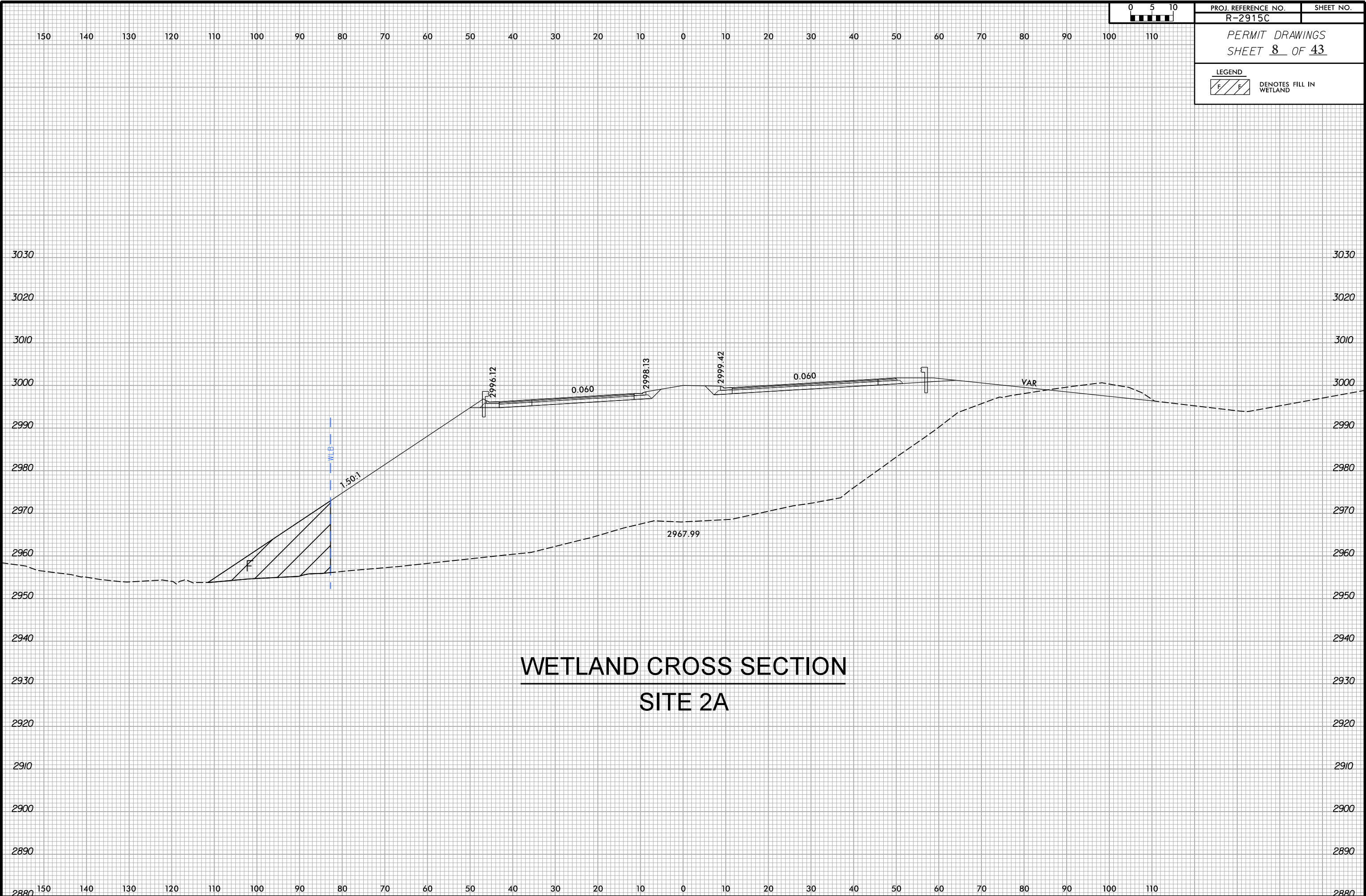
LEGEND	
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

SEE SHEET 40 FOR -DRW2- PROFILE
SEE SHEET 36 FOR -Y3- PROFILE
SEE SHEET 25 FOR -L- PROFILE

REVISIONS

8/17/99

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\$\$\$\$USER\$NAME\$\$\$\$



8/17/99

10952 PM
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2915C.dgn

REVISIONS

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H. W. LOCHNER, INC.
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Number F-0159

HNTB

343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

7

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 9 OF 43

LEGEND

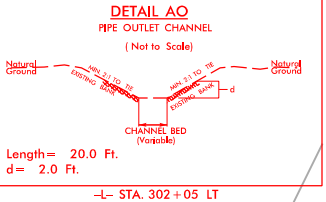
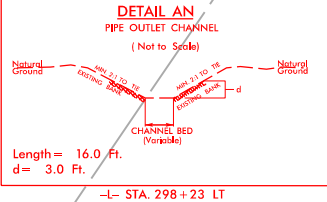
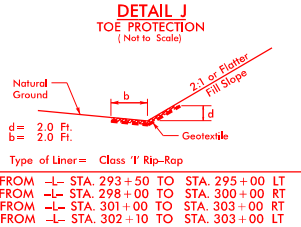
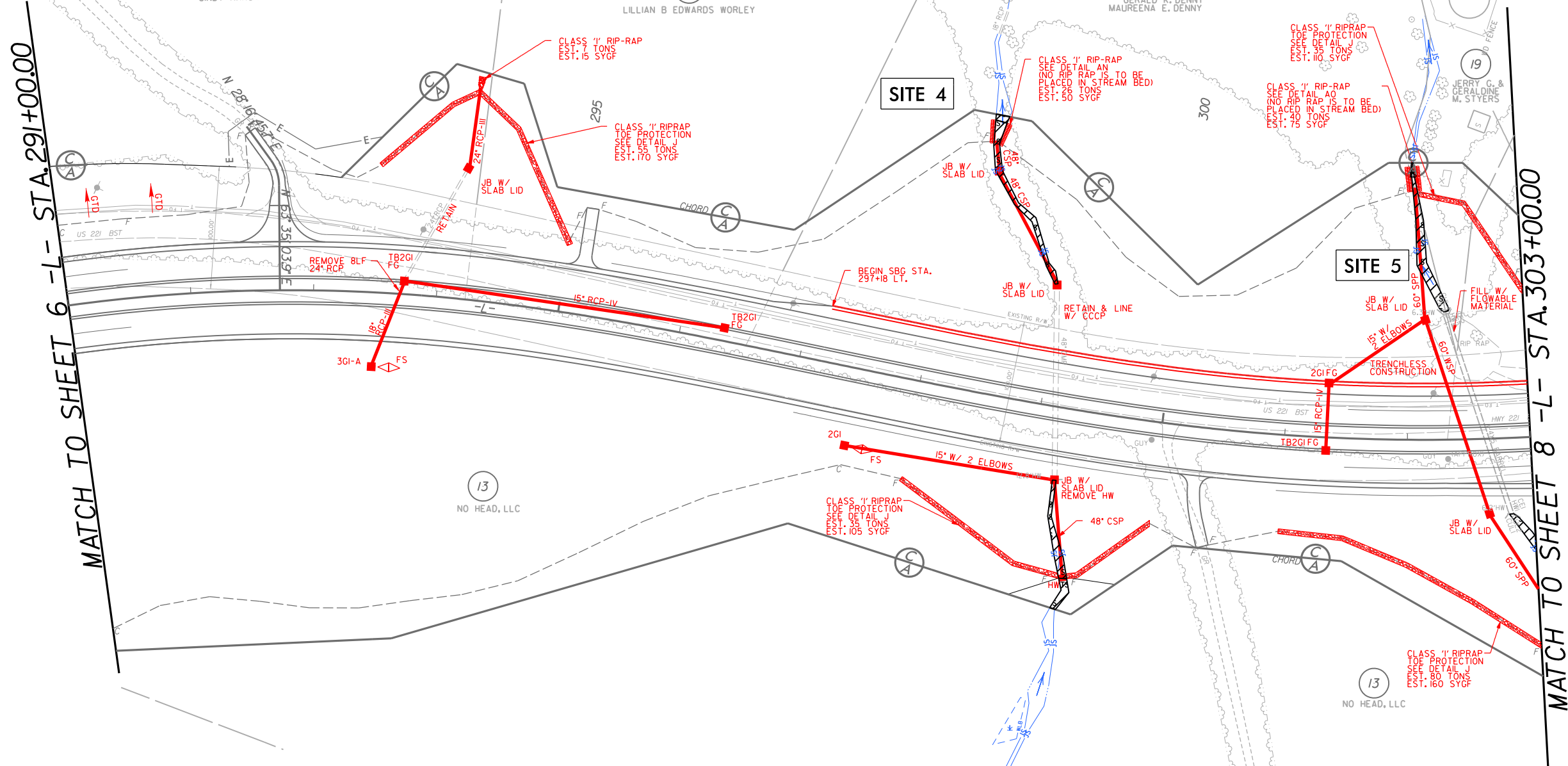


DENOTES IMPACTS IN
SURFACE WATER



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

NAD 83
CORS



SEE SHEET 40 FOR -DRW5- PROFILE

SEE SHEET 27 FOR -L- PROFILE

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REVISIONS

HW 2915C.dgn
PSH07.C.dgn

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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

7

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 10 OF 43

LEGEND



DENOTES IMPACTS IN
SURFACE WATER

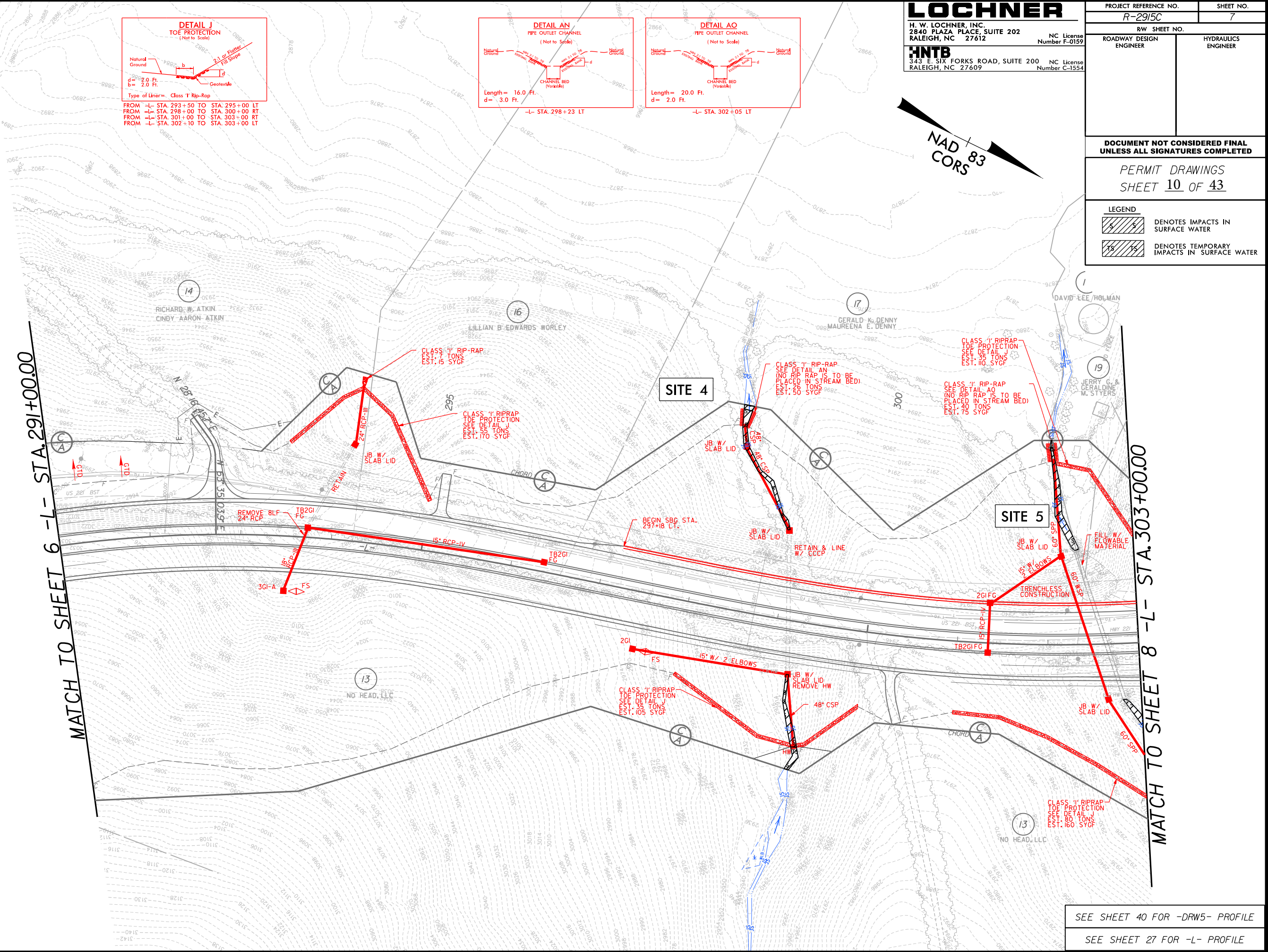


DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

NAD 83
CORS

MATCH TO SHEET 6 -L- STA. 291+00.00

MATCH TO SHEET 8 -L- STA. 303+00.00



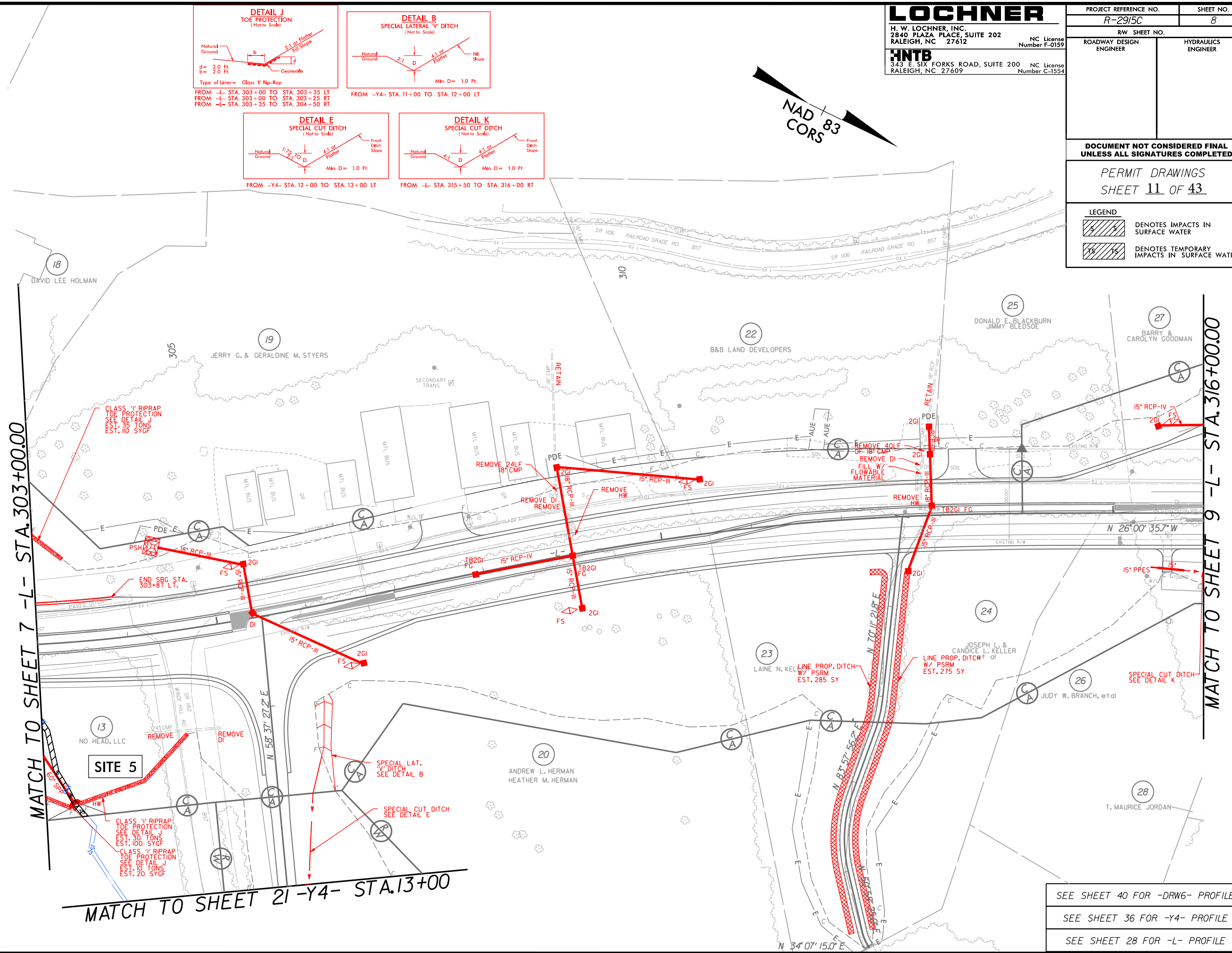
SEE SHEET 40 FOR -DRW5- PROFILE

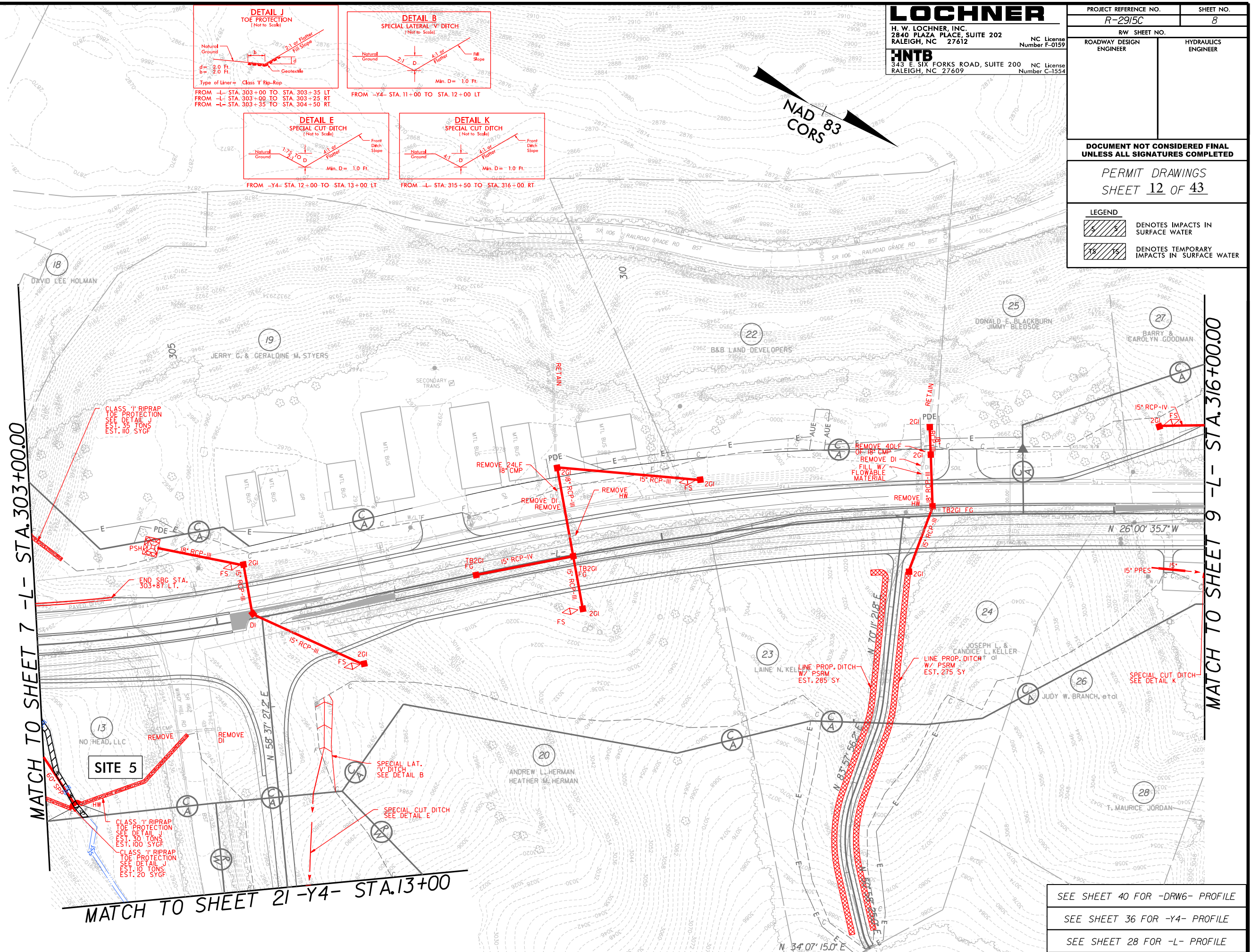
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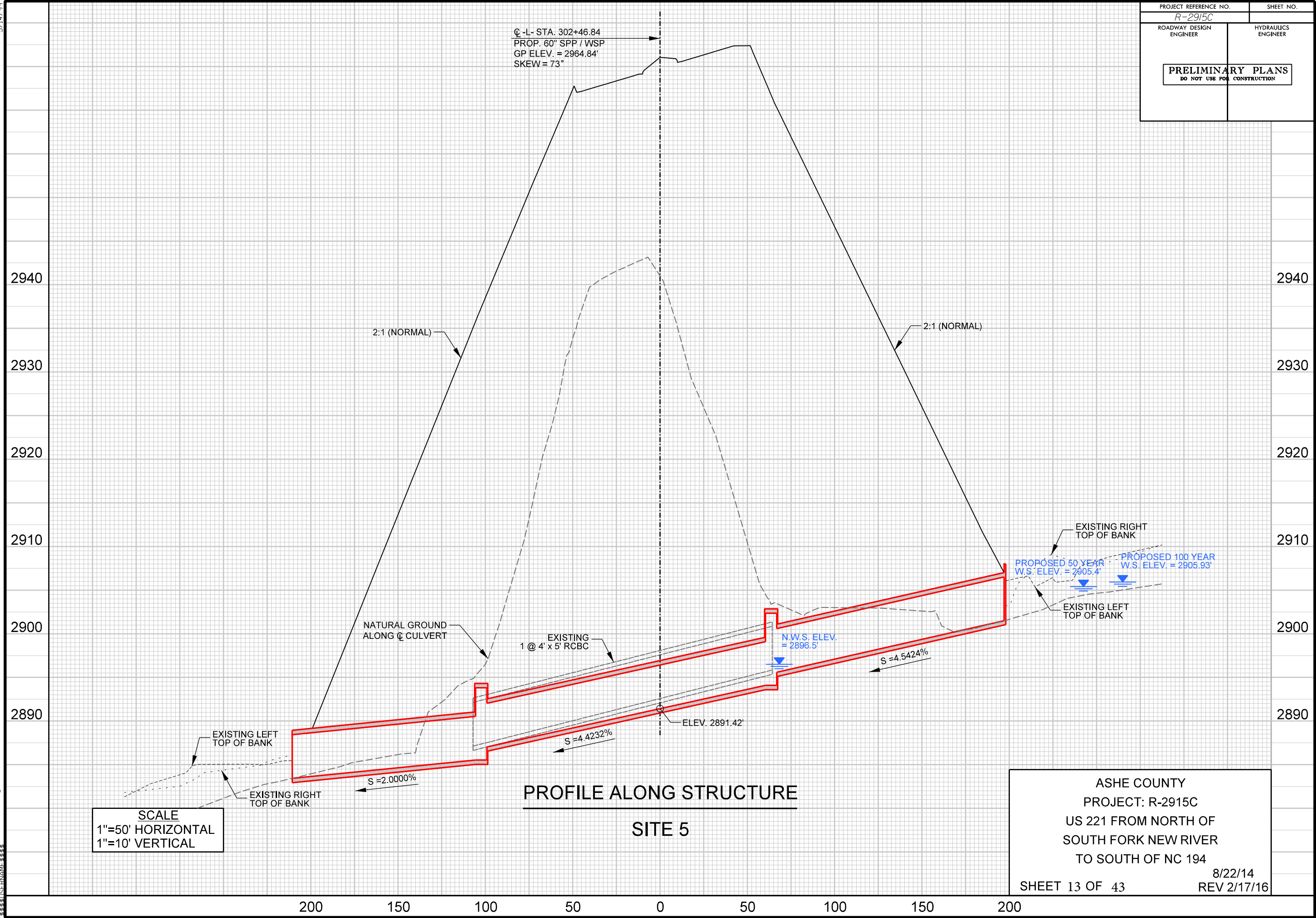
LOCHNER
 H. W. LOCHNER, INC.
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 RALEIGH, NC 27612
 NC License
 Number F-0139

HNTB
 343 E. SIX FORKS ROAD, SUITE 200
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 Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
<i>R-2915C</i>	<i>8</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
<i>PERMIT DRAWINGS</i> <i>SHEET <u>11</u> OF <u>43</u></i>	
LEGEND  DENOTES IMPACTS IN SURFACE WATER  DENOTES TEMPORARY IMPACTS IN SURFACE WATER	







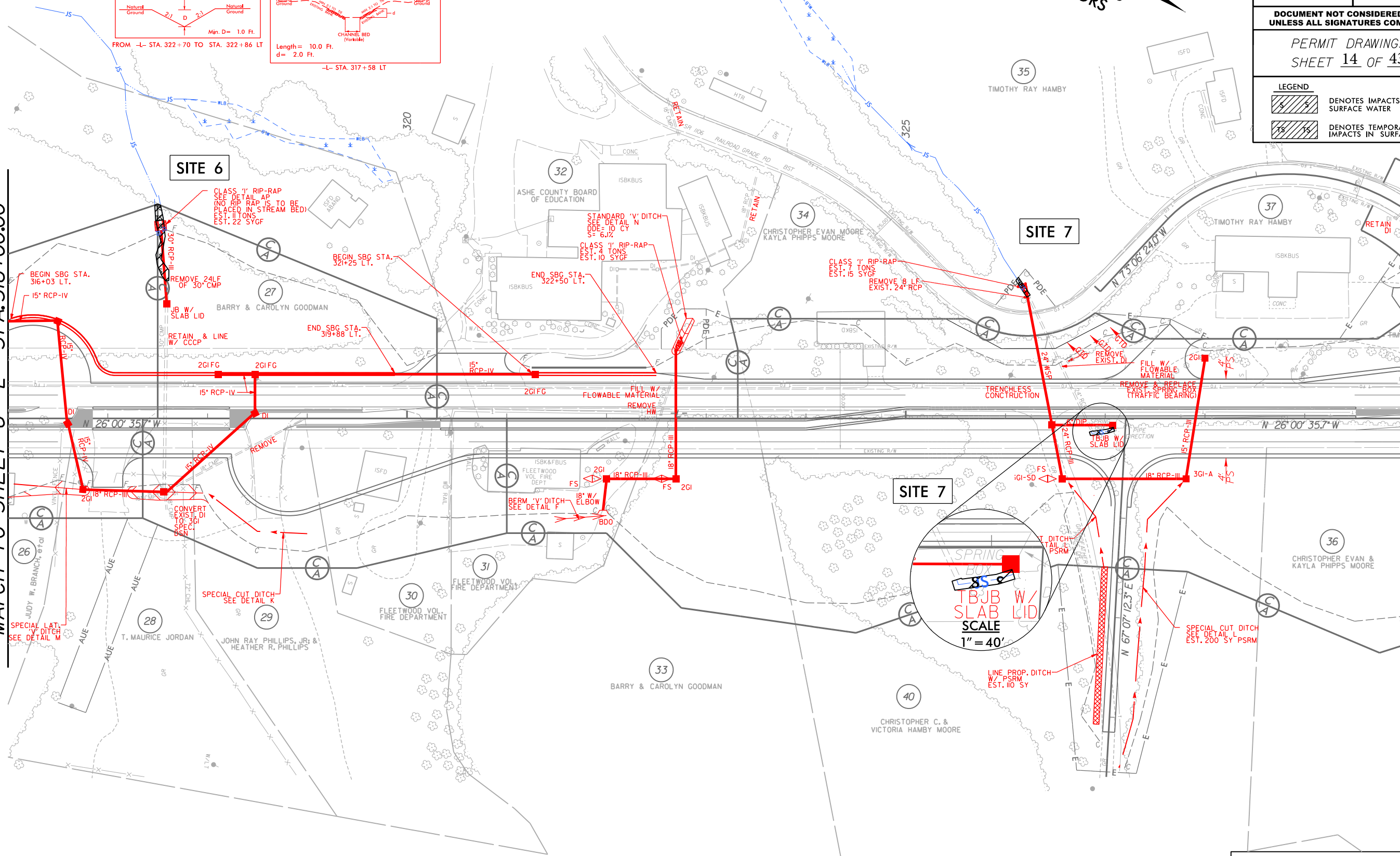
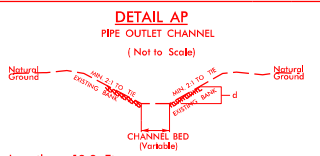
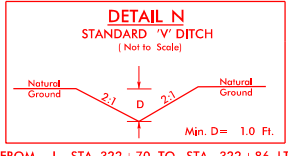
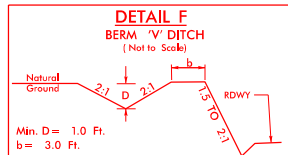
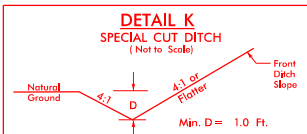
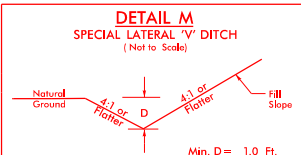
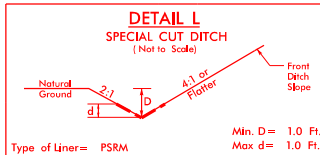
8/17/99

1/2/54 PM
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REVISIONS

MATCH TO SHEET 8 -L- STA.316+00.00

MATCH TO SHEET 10 -L- STA.330+00.00



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PROJECT REFERENCE NO.

R-2915C

SHEET NO.

9

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 14 OF 43

LEGEND



DENOTES IMPACTS IN
SURFACE WATER



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

SEE SHEET 36 FOR -Y5- PROFILE

SEE SHEET 28 FOR -L- PROFILE

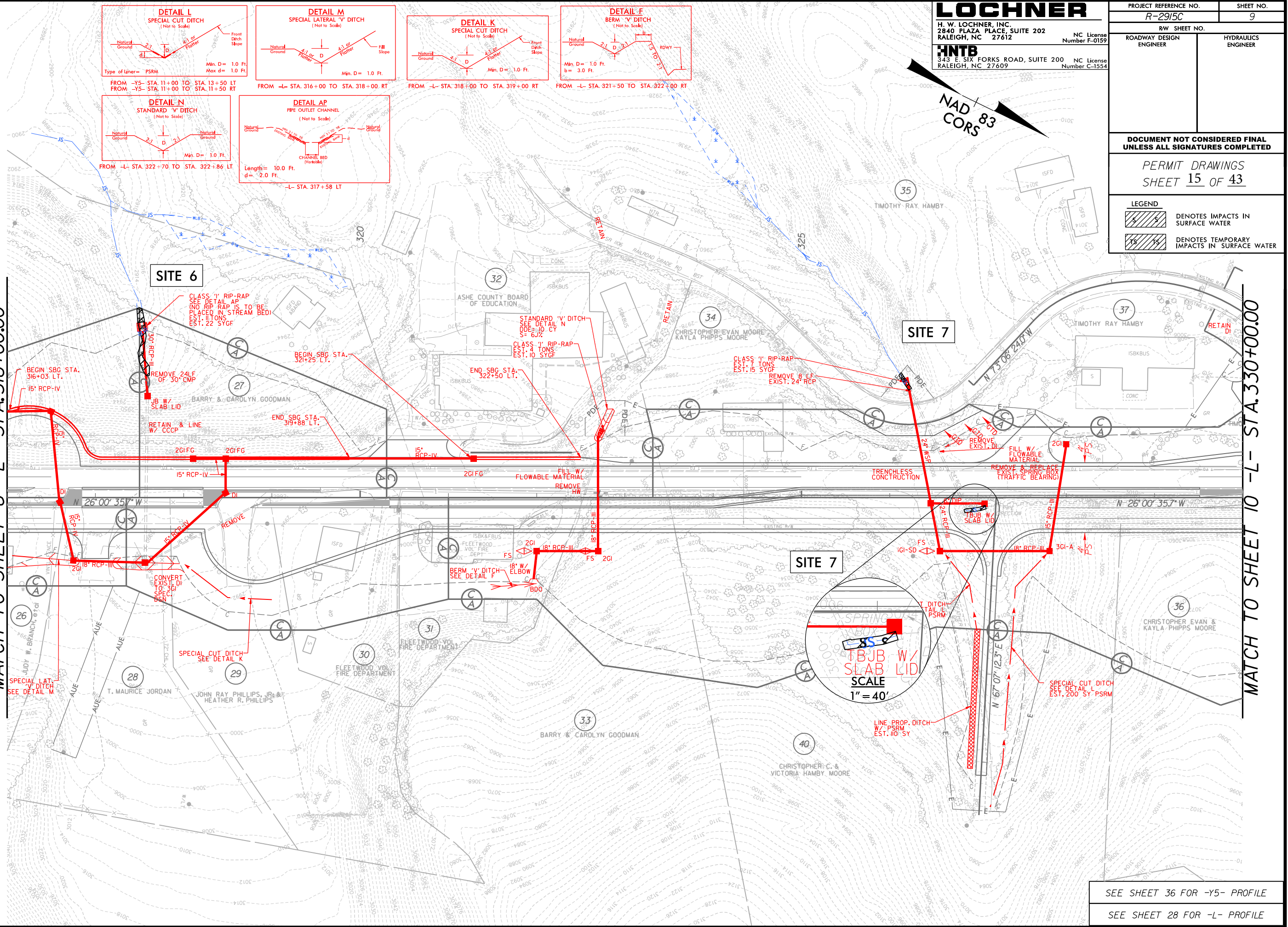
8/17/99

HA27 PM
3/3/2011
PSH09.C.dgn

REVISIONS

MATCH TO SHEET 8 -L- STA.316+00.00

MATCH TO SHEET 10 -L- STA.330+00.00



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PROJECT REFERENCE NO.		SHEET NO.	
R-2915C		9	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
PERMIT DRAWINGS SHEET 15 OF 43			
LEGEND			
		DENOTES IMPACTS IN SURFACE WATER	
		DENOTES TEMPORARY IMPACTS IN SURFACE WATER	

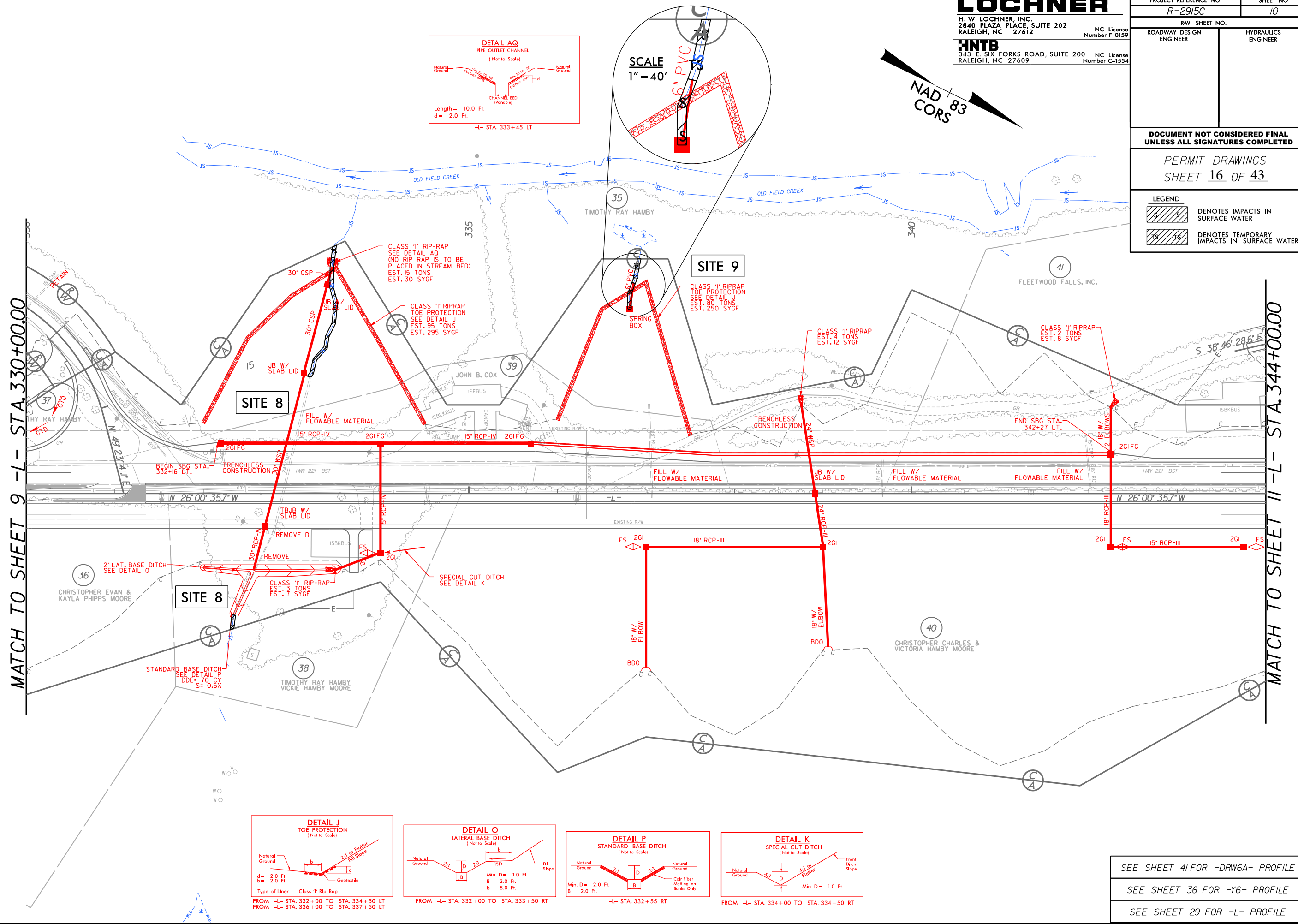
SEE SHEET 36 FOR -Y5- PROFILE
SEE SHEET 28 FOR -L- PROFILE

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWINGS
SHEET 16 OF 43

LEGEND

	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 41 FOR -DRW6A- PROFILE
SEE SHEET 36 FOR -Y6- PROFILE
SEE SHEET 29 FOR -L- PROFILE

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NC License
Number C-1554

PROJECT REFERENCE NO.
R-2915C

SHEET NO.
10

RW SHEET NO.
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

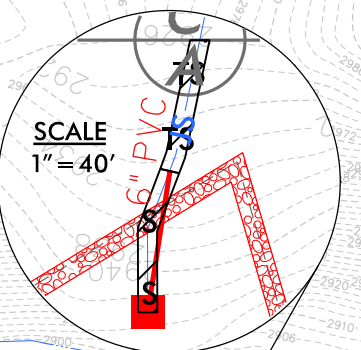
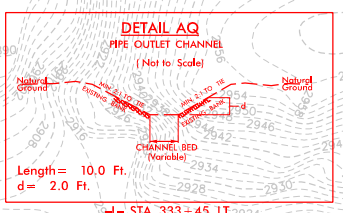
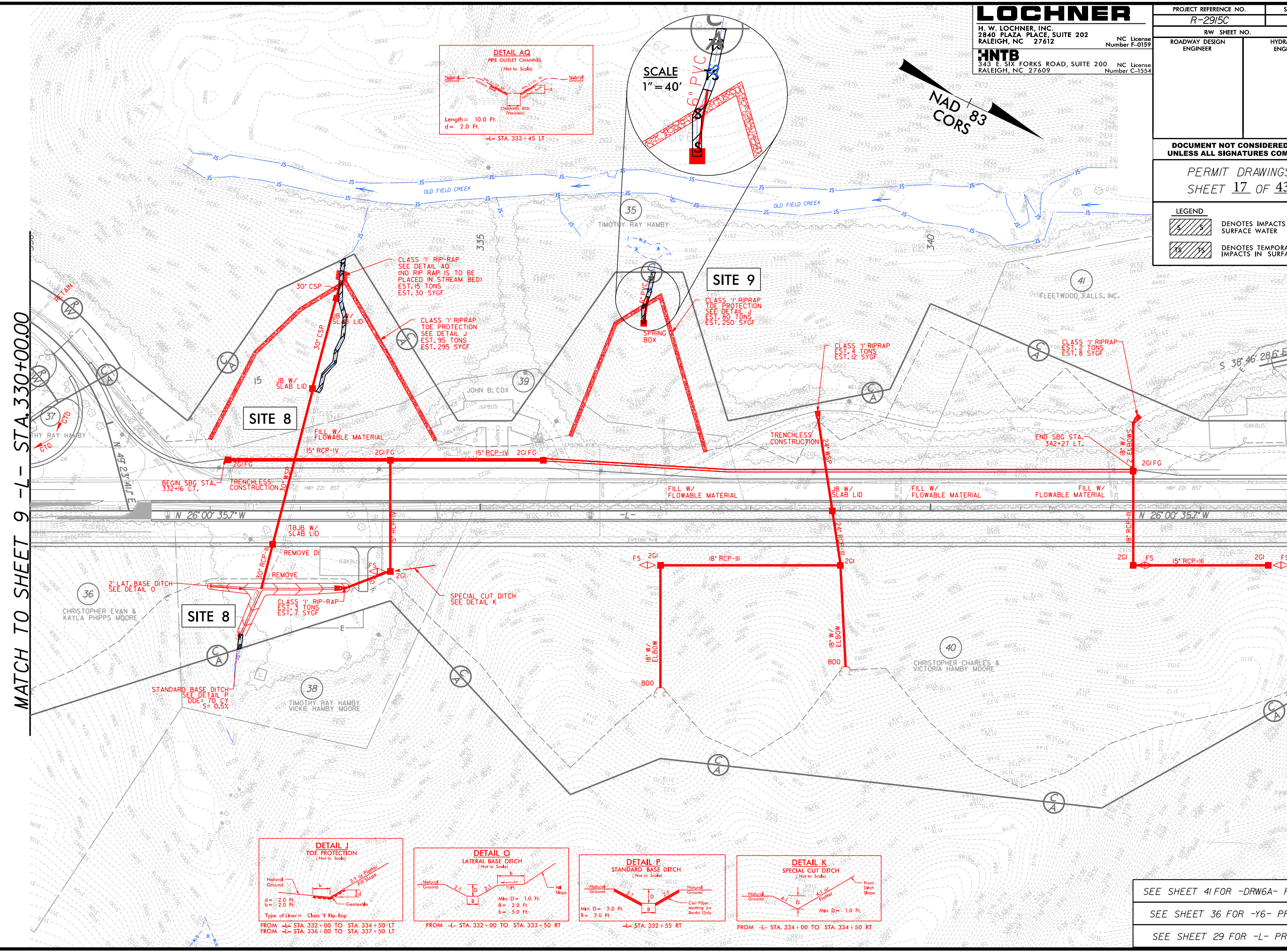
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UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 17 OF 43

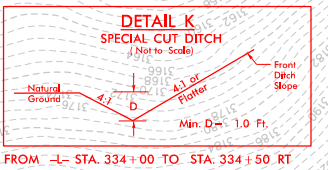
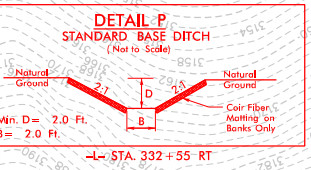
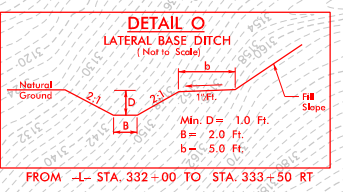
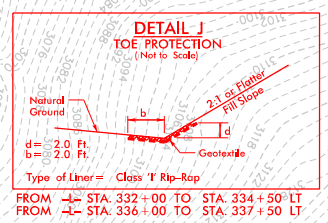
LEGEND	
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH TO SHEET 9 -L- STA. 330+00.00

MATCH TO SHEET 11 -L- STA. 344+00.00



NAD
CORS 83



SEE SHEET 41 FOR -DRW6A- PROFILE
SEE SHEET 36 FOR -Y6- PROFILE
SEE SHEET 29 FOR -L- PROFILE

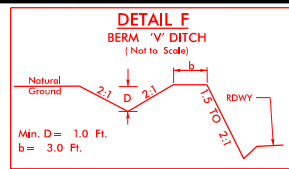
REVISIONS

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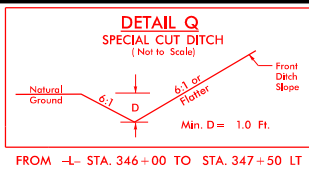
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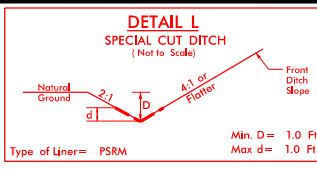
REVISIONS



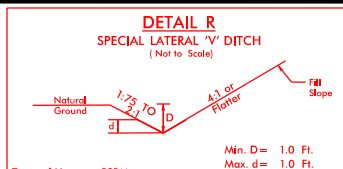
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FROM -L- STA. 356+08 TO STA. 357+00 RT



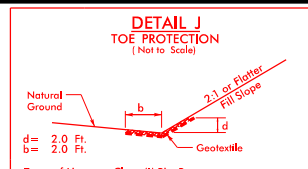
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FROM -DRW6A- STA. 11+50 TO STA. 12+00 RT



FROM -DRW6A- STA. 12+00 TO STA. 13+18.10 RT



FROM -L- STA. 351+00 TO STA. 352+00 RT

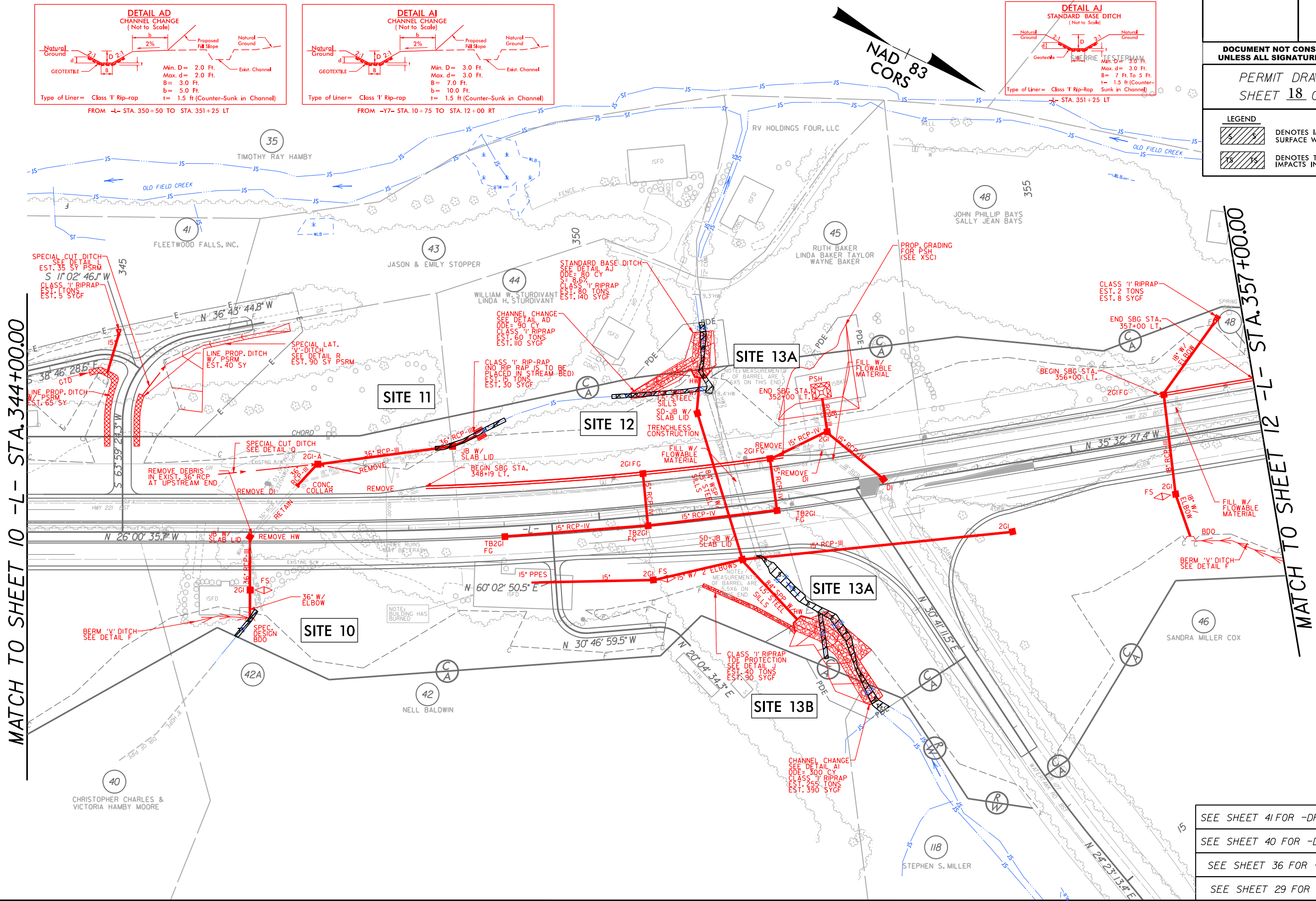
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
INTB
343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

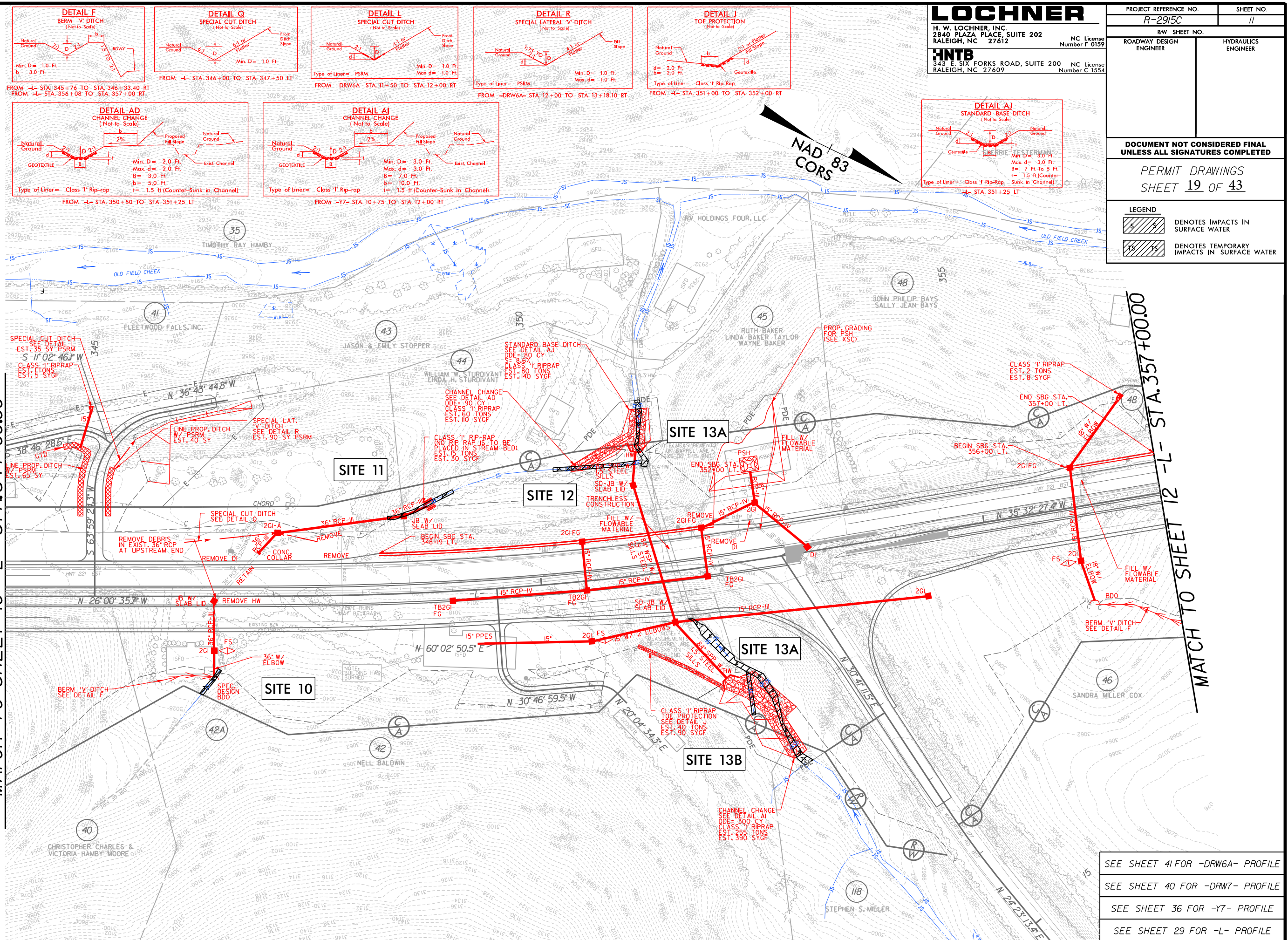
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 18 OF 43

LEGEND	
	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 41 FOR -DRW6A- PROFILE
SEE SHEET 40 FOR -DRW7- PROFILE
SEE SHEET 36 FOR -Y7- PROFILE
SEE SHEET 29 FOR -L- PROFILE

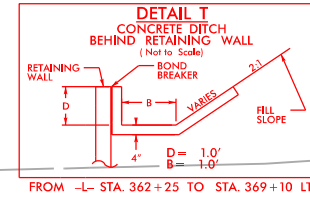
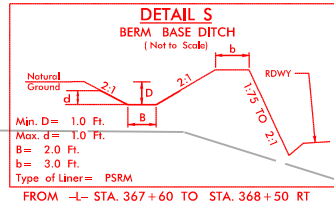
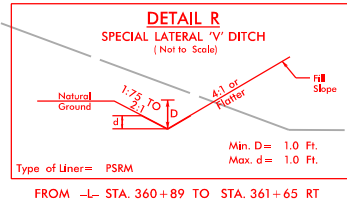
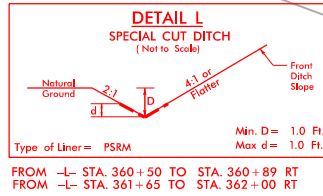


SEE SHEET 41 FOR -DRW6A- PROFILE
SEE SHEET 40 FOR -DRW7- PROFILE
SEE SHEET 36 FOR -Y7- PROFILE
SEE SHEET 29 FOR -L- PROFILE

8/17/99

5:37:58 PM
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SHERRIE TESTERMAN

REVISIONS



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PROJECT REFERENCE NO.

R-2915C

SHEET NO.

12

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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PERMIT DRAWINGS
SHEET 21 OF 43

LEGEND



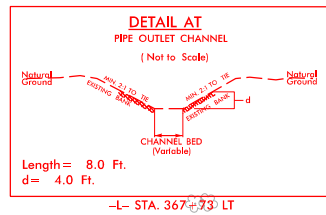
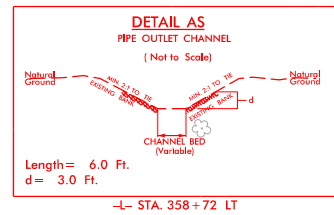
DENOTES IMPACTS IN
SURFACE WATER



DENOTES TEMPORARY
IMPACTS IN SURFACE WATER

MATCH TO SHEET 11 -L- STA. 357+00.00

MATCH TO SHEET 13 -L- STA. 369+00.00



SEE SHEET 30 FOR -L- PROFILE



RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ENGINEER	ENGINEER
e 4	

**DOCUMENT NOT CONSIDERED FINAL
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PERMIT DRAWINGS
SHEET 23 OF 43

LEGEND

	DENOTES IMPACTS IN SURFACE WATER
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
	DENOTES FILL IN WETLAND
	DENOTES MECHANIZED CLEARING

MATCH TO SHEET 12 -L- STA. 369+00.00

REVISIONS

11:48:21AM
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RCBC TO BE BACKFILLED
W/LARGE NATIVE MATERIAL.

SEE SHEET 2D-1 FOR DITCH DETAILS

SEE SHEET 41 FOR -DRW9- PROFILE
SEE SHEET 37 FOR -Y8- PROFILE
SEE SHEET 39 FOR -Y8A- PROFILE
SEE SHEET 37 FOR -Y8B- PROFILE
SEE SHEET 37 FOR -Y9- PROFILE
SEE SHEET 30 FOR -L- PROFILE

NC License
Number F-0159

00 NC License
Number C-1554

	75
	HYDRAULICS ENGINEER

PERMIT DRAWINGS
SHEET 24 OF 43

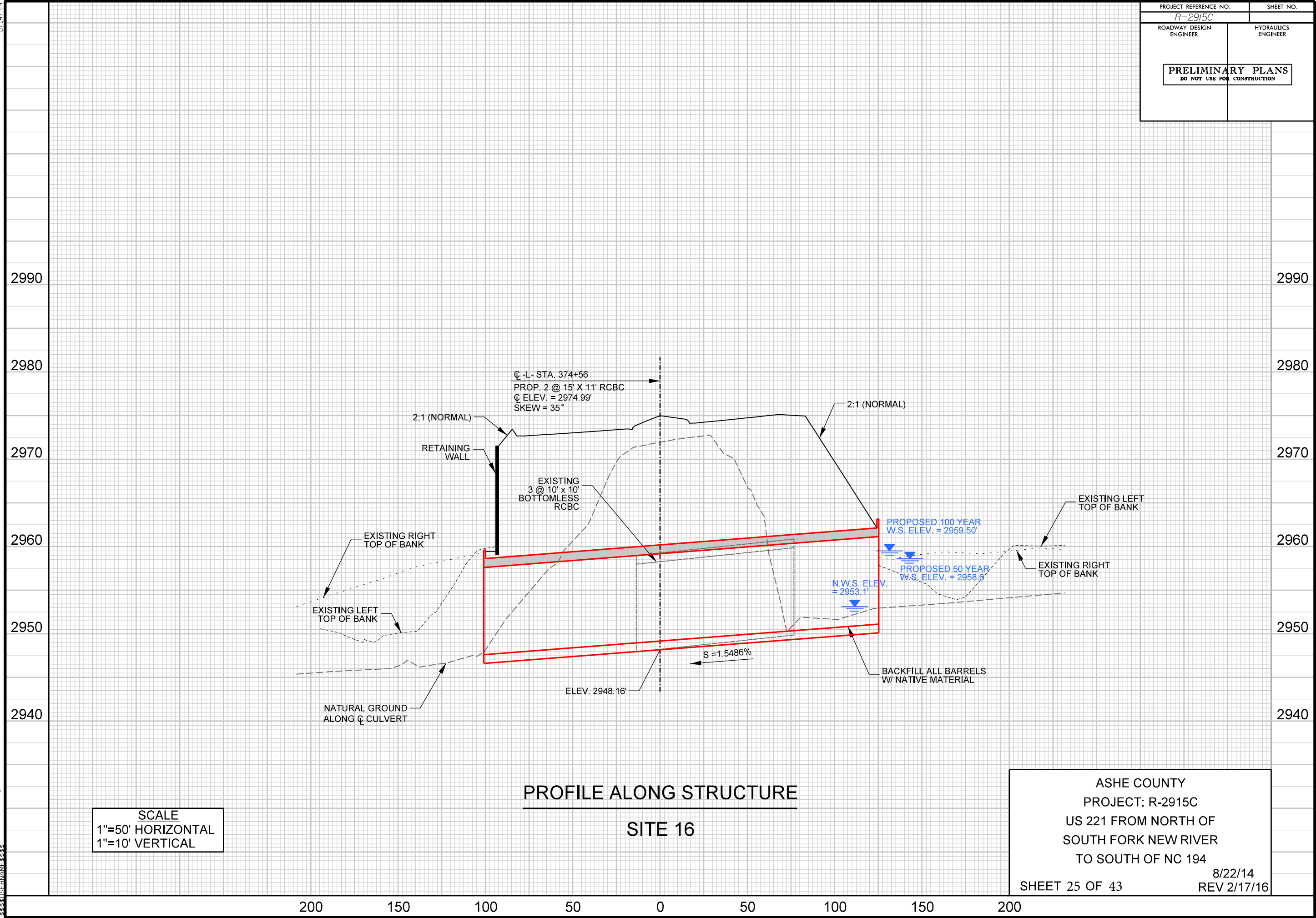
 DENOTES TEMPORARY DENOTES FILL IN

 DENOTES MECHANIZED

REVISIONS

SEE SHEET 30 FOR -L- PROFILE

SEE SHEET 2D-1 FOR DITCH DETAILS



SCALE
1"=50' HORIZONTAL
1"=10' VERTICAL

PROFILE ALONG STRUCTURE
SITE 16

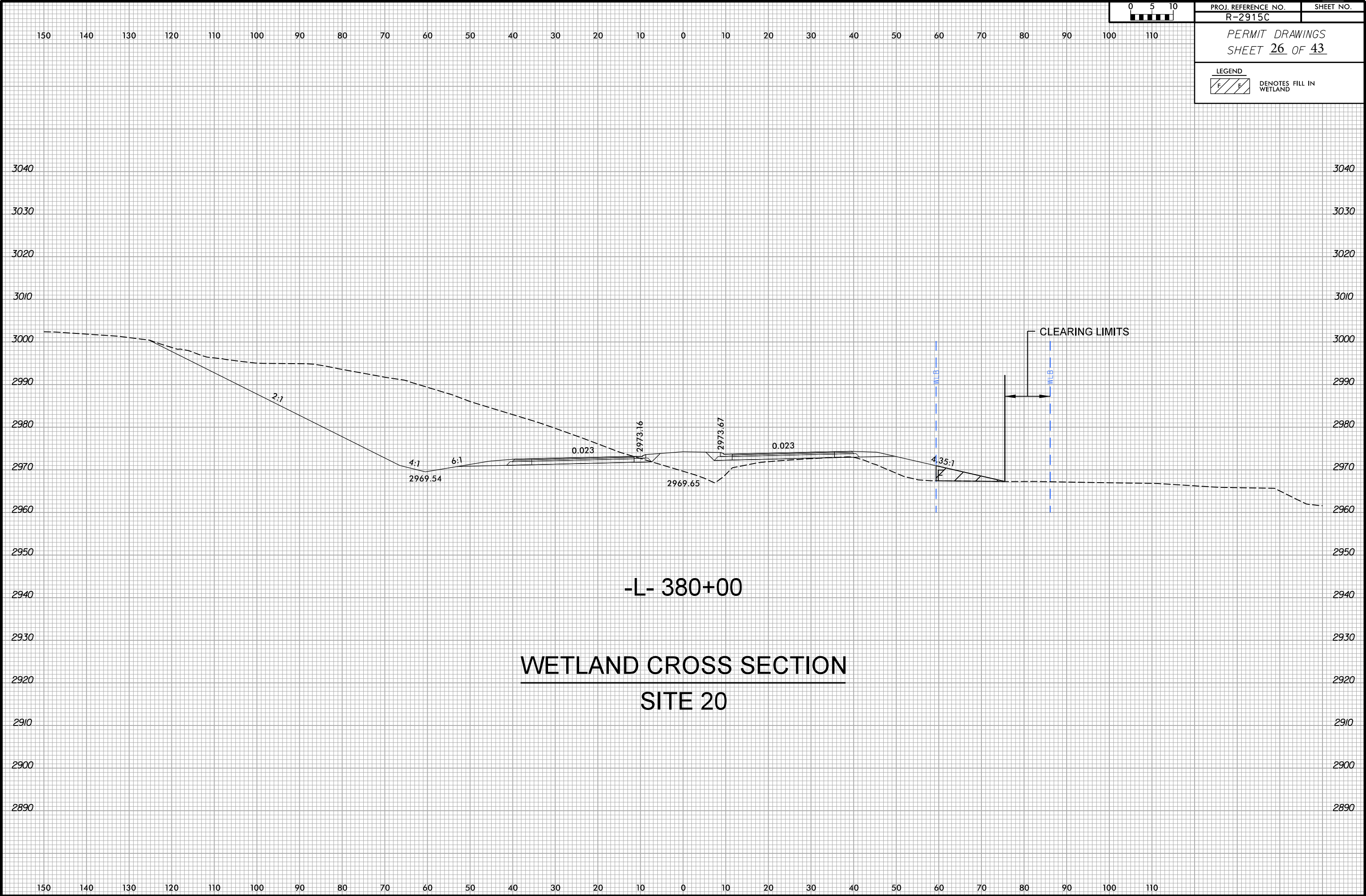
ASHE COUNTY
PROJECT: R-2915C
US 221 FROM NORTH OF
SOUTH FORK NEW RIVER
TO SOUTH OF NC 194
SHEET 25 OF 43
8/22/14
REV 2/17/16

8/23/99

11:05:59 AM
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User: jmc



PROJ. REFERENCE NO.	SHEET NO.
R-2915C	
PERMIT DRAWINGS SHEET 26 OF 43	
LEGEND	
	DENOTES FILL IN WETLAND



8/17/99

REVISIONS

149.45 PM
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3/3/2000 1:13:33 PM

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2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

NC License
Number F-0159

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PROJECT REFERENCE NO.
R-2915C

SHEET NO.
14

RW SHEET NO.
ENGINEER

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

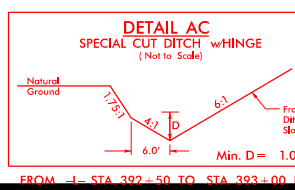
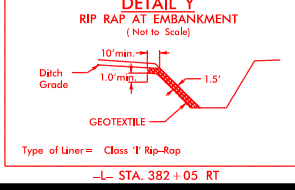
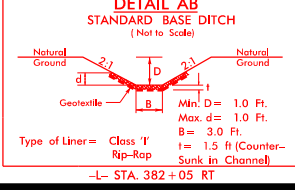
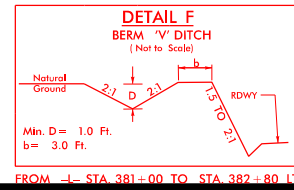
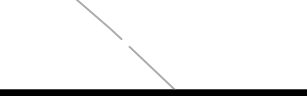
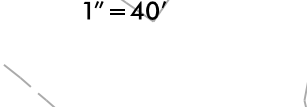
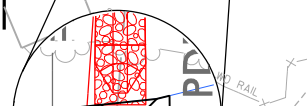
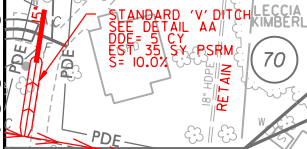
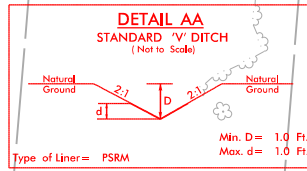
PERMIT DRAWINGS
SHEET **27** OF **43**

LEGEND
DENOTES IMPACTS IN
SURFACE WATER

MATCH TO SHEET 22
-YII- STA. 12+00.00

MATCH TO SHEET 13 -L- STA. 381+00.00

MATCH TO SHEET 15 -L- STA. 393+00.00



SEE SHEET 41 FOR -DRW10- PROFILE
SEE SHEET 41 FOR -DRW11- PROFILE
SEE SHEET 37 FOR -Y10- PROFILE
SEE SHEET 38 FOR -Y11- PROFILE
SEE SHEET 31 FOR -L- PROFILE

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REVISIONS

12/2/99
H. W. LOCHNER, INC.
PSH14.C.dgn

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2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

NC License
Number F-0159

HNTB

343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.
R-2915C

SHEET NO.
14

RW SHEET NO.
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

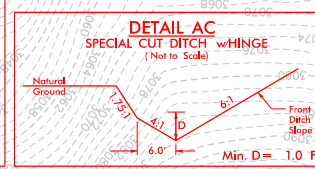
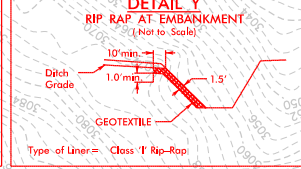
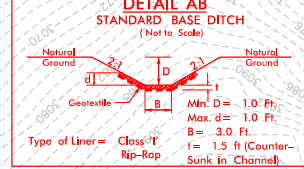
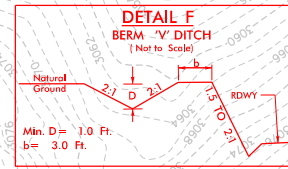
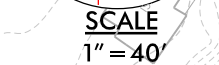
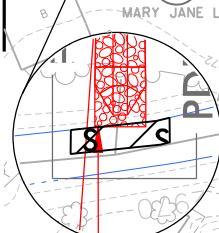
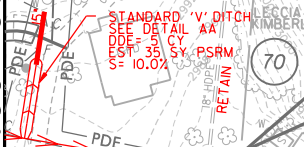
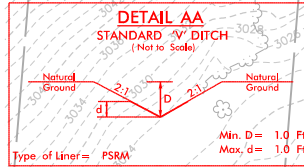
PERMIT DRAWINGS
SHEET **28** OF **43**

LEGEND
DENOTES IMPACTS IN
SURFACE WATER

MATCH TO SHEET 22
-YII- STA. 12+00.00

MATCH TO SHEET 13 -L- STA. 381+00.00

MATCH TO SHEET 15 -L- STA. 393+00.00



SEE SHEET 41 FOR -DRW10- PROFILE
SEE SHEET 41 FOR -DRW11- PROFILE
SEE SHEET 37 FOR -Y10- PROFILE
SEE SHEET 38 FOR -Y11- PROFILE
SEE SHEET 31 FOR -L- PROFILE

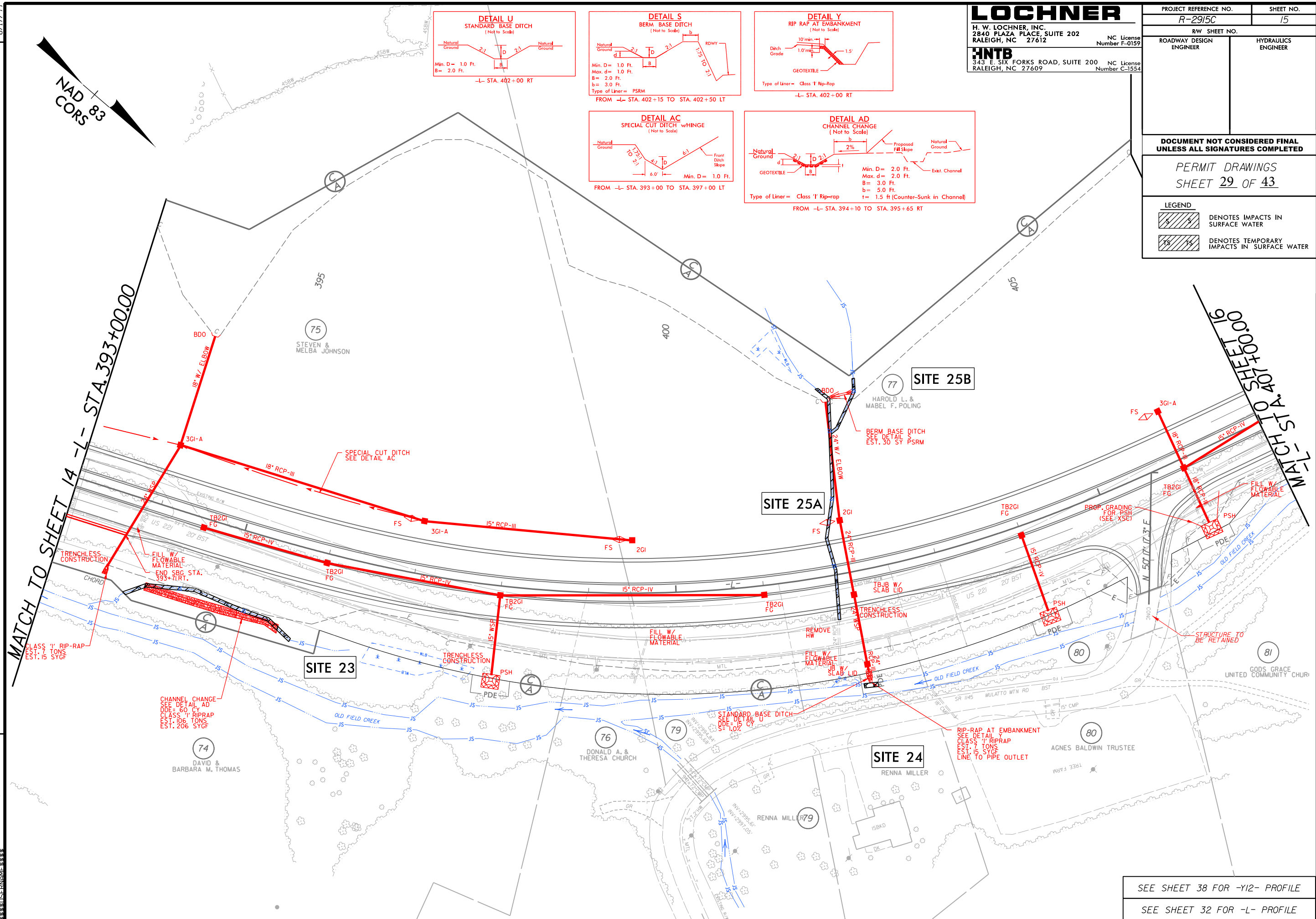
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWINGS
SHEET 29 OF 43

LEGEND

 DENOTES IMPACTS IN SURFACE WATER

 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



SEE SHEET 38 FOR -Y12- PROFILE
SEE SHEET 32 FOR -L- PROFILE

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.../R2915C-prm_PSH15-C.dgn
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REVISIONS

NAD +
COR 83

CLASS 'I' RIP-RAP
EST. 7 TONS
EST. 15 SYGF

CHANNEL CHANGE
SEE DETAIL AD
DDE = 60 CY
CLASS 'I' RIPRAP
EST. 106 TONS
EST. 206 SYGF

SITE 23

76
DONALD A. &
THERESA CHURCH

SITE 24

SITE 25B

SITE 25A

SEE SHEET 38 FOR -Y12- PROFILE

SEE SHEET 32 FOR -L- PROFILE

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

HNTB
343 E. SIX FORKS ROAD, SUITE
RALEIGH, NC 27609

NC License
Number F-0159

00 NC License
Number C-1554

R-29/5C

RW SHEET NO.

ROADWAY DESIGN ENGINEER	
----------------------------	--

15

**HYDRAULICS
ENGINEER**

[illegible]

PERMIT DRAWINGS

SHEET 30 OF 43

DENOTES IMPACTS IN
SURFACE WATER

SURFACE WATER

DENOTES TEMPORARY

IMPACTS IN SURFACE

8/17/99

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RALEIGH, NC 27612

NC License
Number F-0159

HNTB

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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

16

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 31 OF 43

LEGEND



DENOTES IMPACTS IN
SURFACE WATER



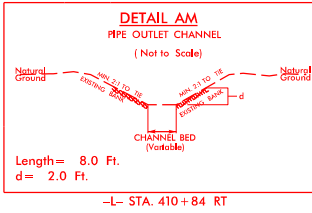
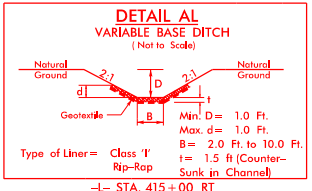
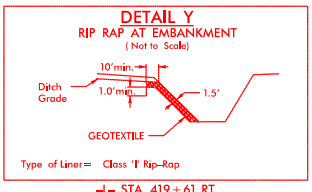
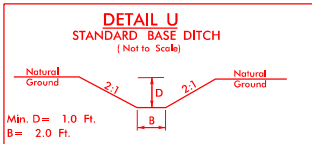
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER



DENOTES FILL IN
WETLAND

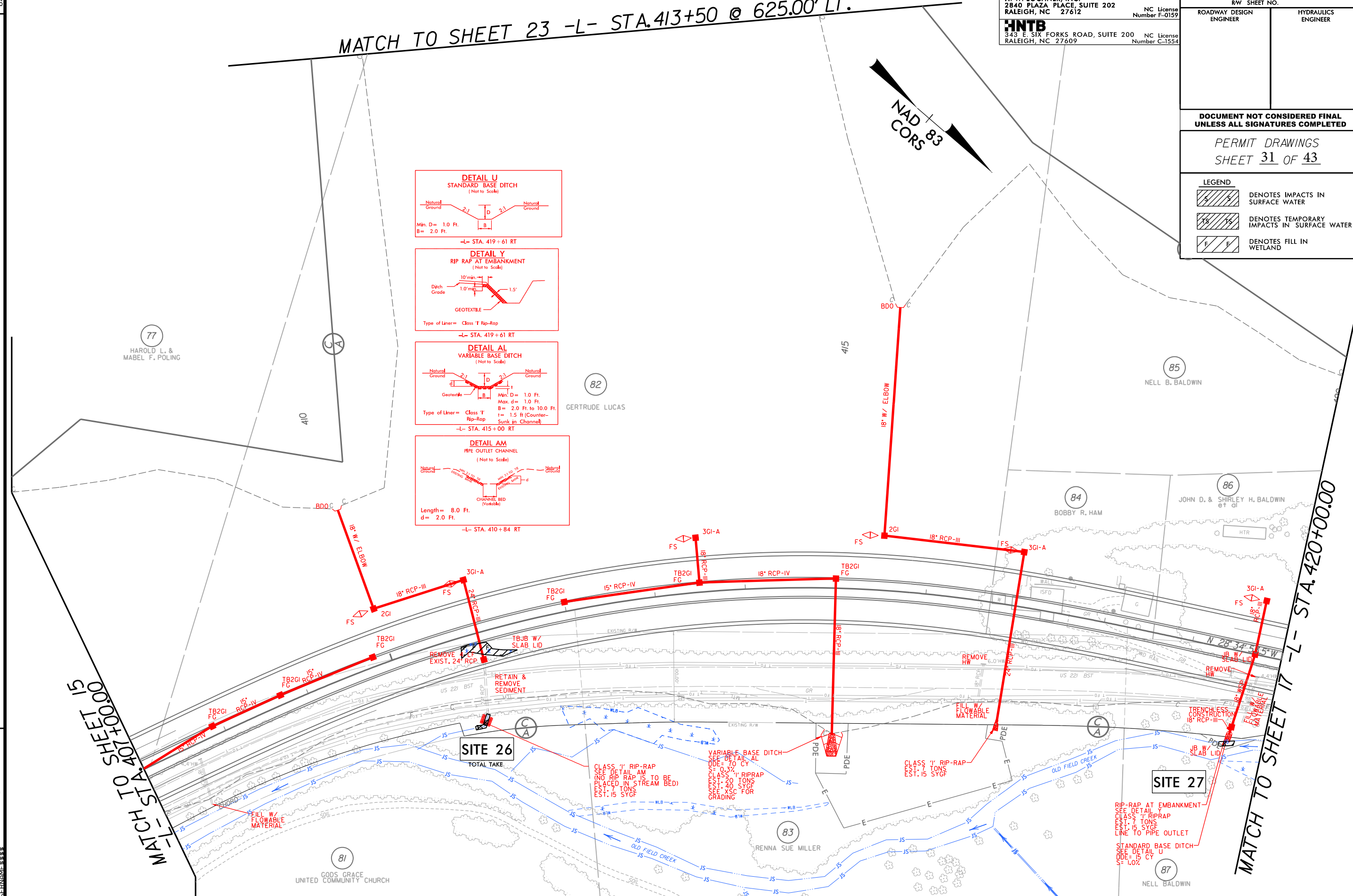
MATCH TO SHEET 23 -L- STA. 413+50 @ 625.00' LT.

NAD
CORS 83



MATCH TO SHEET 15
-L- STA. 407+00.00

MATCH TO SHEET 17 -L- STA. 420+00.00



SITE 26
TOTAL TAKE

SITE 27

CLASS 'I' RIP-RAP
SEE DETAIL AM
(NO RIP RAP IS TO BE
PLACED IN STREAM BED)
EST. 7 TONS
EST. 15 SYCF

VARIABLE BASE DITCH
SEE DETAIL AL
ODE = 70 CY
ODE = 0.3%
CLASS 'I' RIPRAP
EST. 20 TONS
EST. 40 SYCF
SEE XSC FOR
GRADING

CLASS 'I' RIP-RAP
EST. 15 SYCF

RIP-RAP AT EMBANKMENT
SEE DETAIL Y
CLASS 'I' RIPRAP
EST. 7 TONS
EST. 15 SYCF
LINE TO PIPE OUTLET
STANDARD BASE DITCH
SEE DETAIL U
ODE = 15 CY
S = 1.0%

SEE SHEET 33 FOR -L- PROFILE

8/17/99

REVISIONS

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PSH16

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NC License
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HNTB
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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

16

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 32 OF 43

LEGEND



DENOTES IMPACTS IN
SURFACE WATER



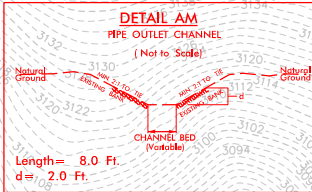
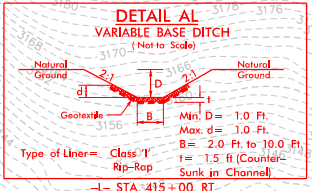
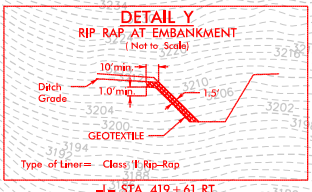
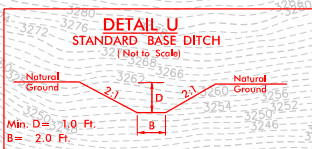
DENOTES TEMPORARY
IMPACTS IN SURFACE WATER



DENOTES FILL IN
WETLAND

MATCH TO SHEET 23 -L- STA.413+50 @ 625.00' LT.

NAD
CORS 83



MATCH TO SHEET 15
-L- STA. 407+00.00

MATCH TO SHEET 17 -L- STA. 420+00.00

SITE 26
TOTAL TAKE

SITE 27

CLASS 'Y' RIP-RAP
SEE DETAIL A1
NO RIP-RAP IS TO BE
PLACED IN STREAM BED
EST. 15 SYCF

VARIABLE BASE DITCH
SEE DETAIL A1
EST. 15 SYCF

CLASS 'Y' RIP-RAP
EST. 15 SYCF

RIP-RAP AT EMBANKMENT
SEE DETAIL Y
CLASS 'Y' RIP-RAP
EST. 15 SYCF
LINE TO PIPE OUTLET
STANDARD BASE DITCH
SEE DETAIL U
EST. 1.0 SYCF

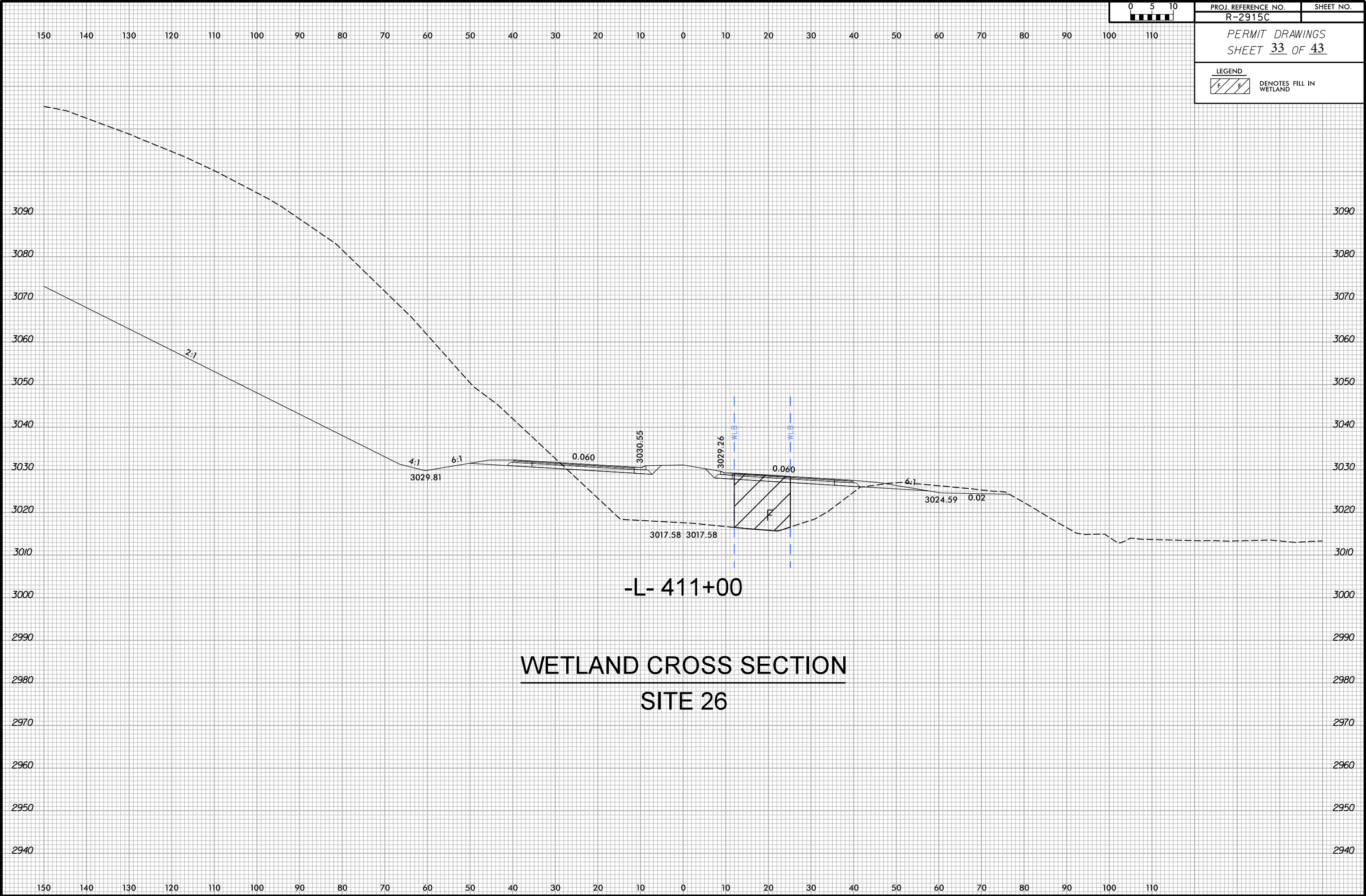
SEE SHEET 33 FOR -L- PROFILE

8/23/99

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PROJ. REFERENCE NO.	SHEET NO.
R-2915C	
PERMIT DRAWINGS SHEET <u>33</u> OF <u>43</u>	
LEGEND  DENOTES FILL IN WETLAND	



8/17/99

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REVISIONS

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RALEIGH, NC 27612

NC License
Number F-0159

HNTB

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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

17

RW SHEET NO.

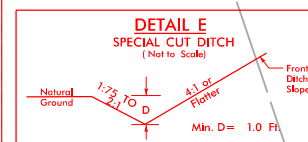
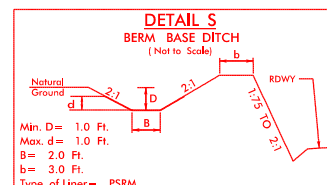
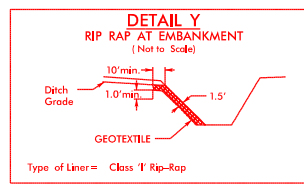
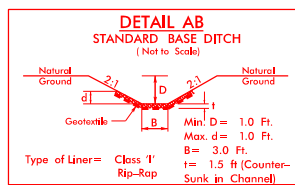
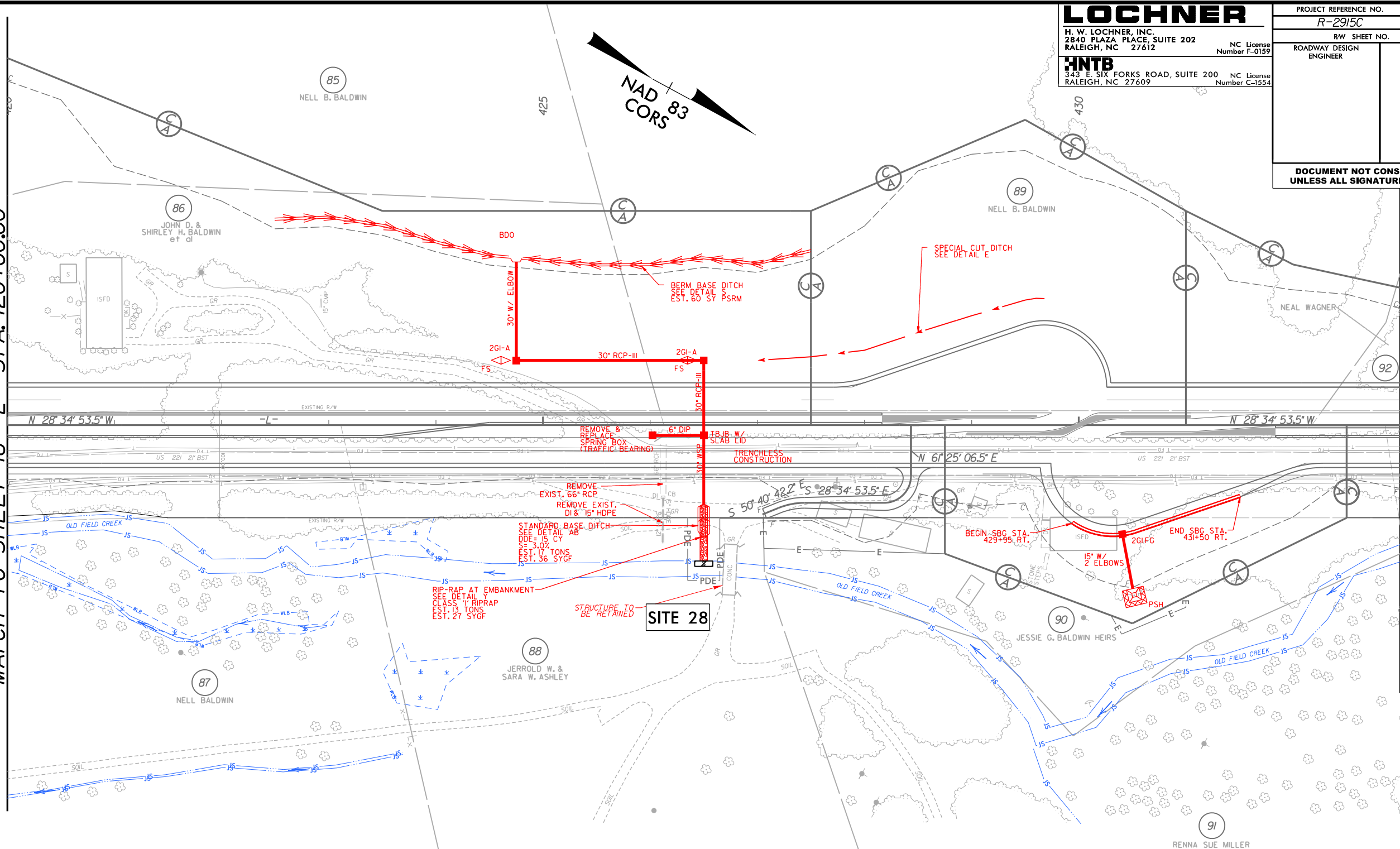
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MATCH TO SHEET 16 -L- STA. 420+00.00

MATCH TO SHEET 18 -L- STA. 433+00.00



PERMIT DRAWINGS
SHEET 34 OF 43

LEGEND
DENOTES IMPACTS IN
SURFACE WATER

SEE SHEET 41 FOR -DRW13- PROFILE

SEE SHEET 33 FOR -L- PROFILE

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12/17/2009
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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

17

RW SHEET NO.

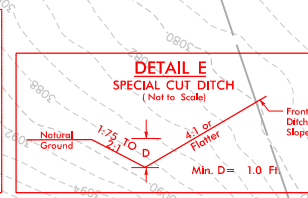
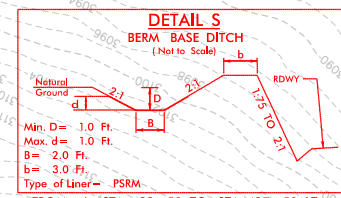
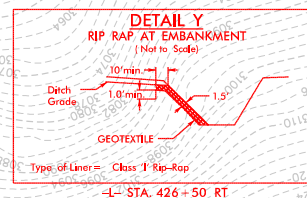
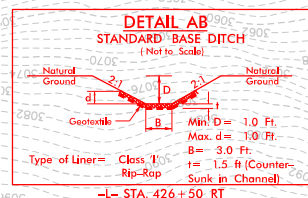
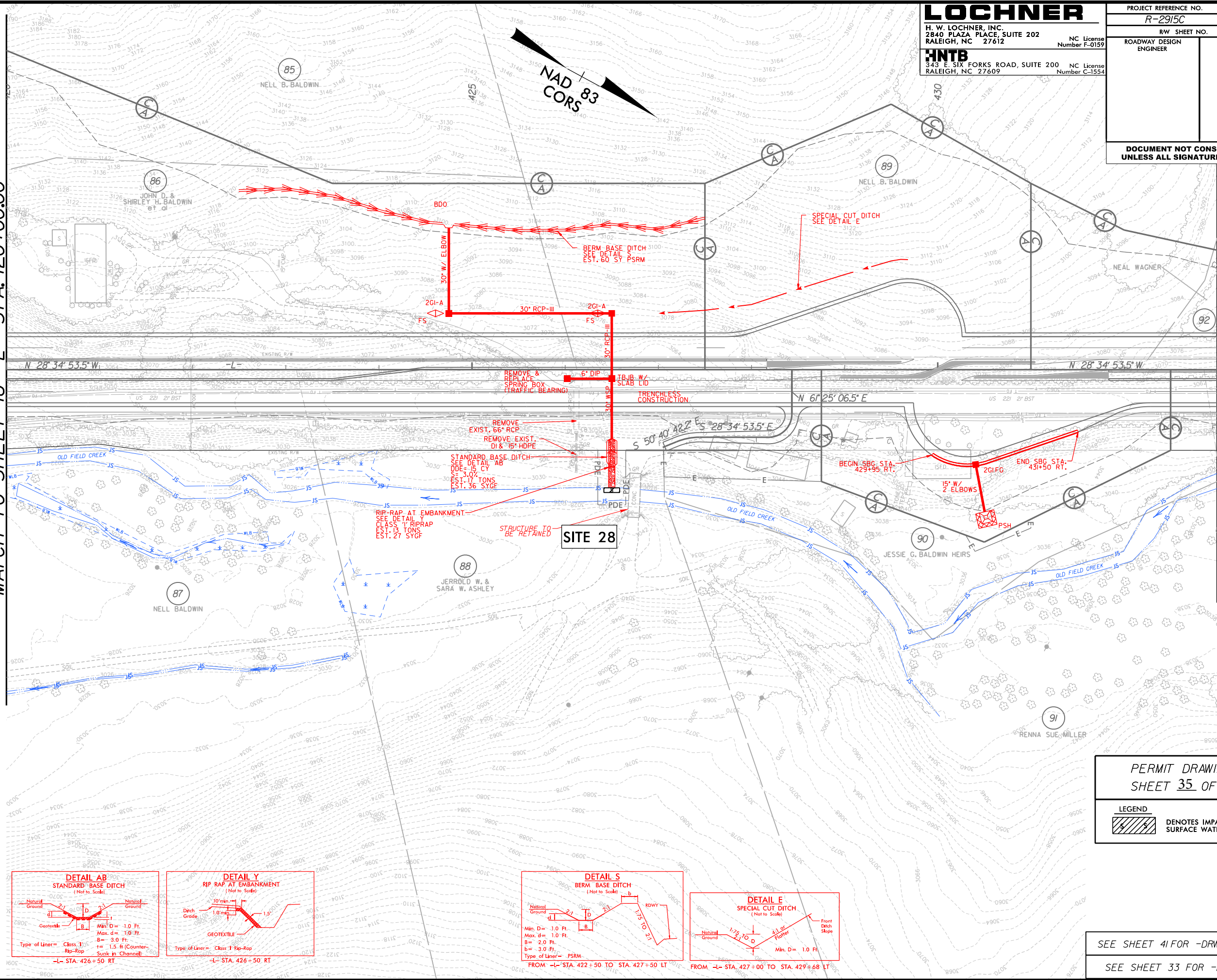
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MATCH TO SHEET 16 -L- STA. 420+00.00

MATCH TO SHEET 18 -L- STA. 433+00.00



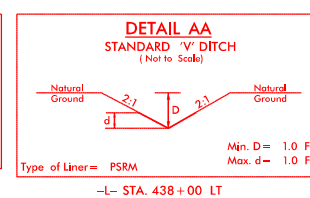
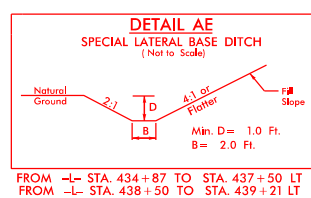
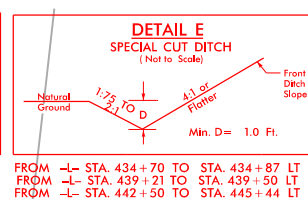
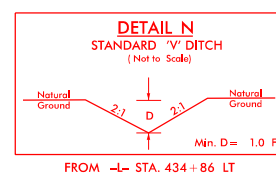
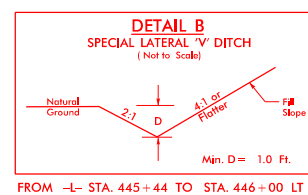
PERMIT DRAWINGS
SHEET 35 OF 43

LEGEND
DENOTES IMPACTS IN
SURFACE WATER

SEE SHEET 41 FOR -DRW13- PROFILE

SEE SHEET 33 FOR -L- PROFILE

MATCH TO SHEET 17 -L- STA. 433+00.00



SEE SHEET 38 FOR -Y13- PROFILE
SEE SHEET 38 FOR -Y14- PROFILE
SEE SHEET 34 FOR -L- PROFILE

REVISIONS

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8/17/99

REVISIONS

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NC License
Number F-0159

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343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

18

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PERMIT DRAWINGS
SHEET 37 OF 43

LEGEND



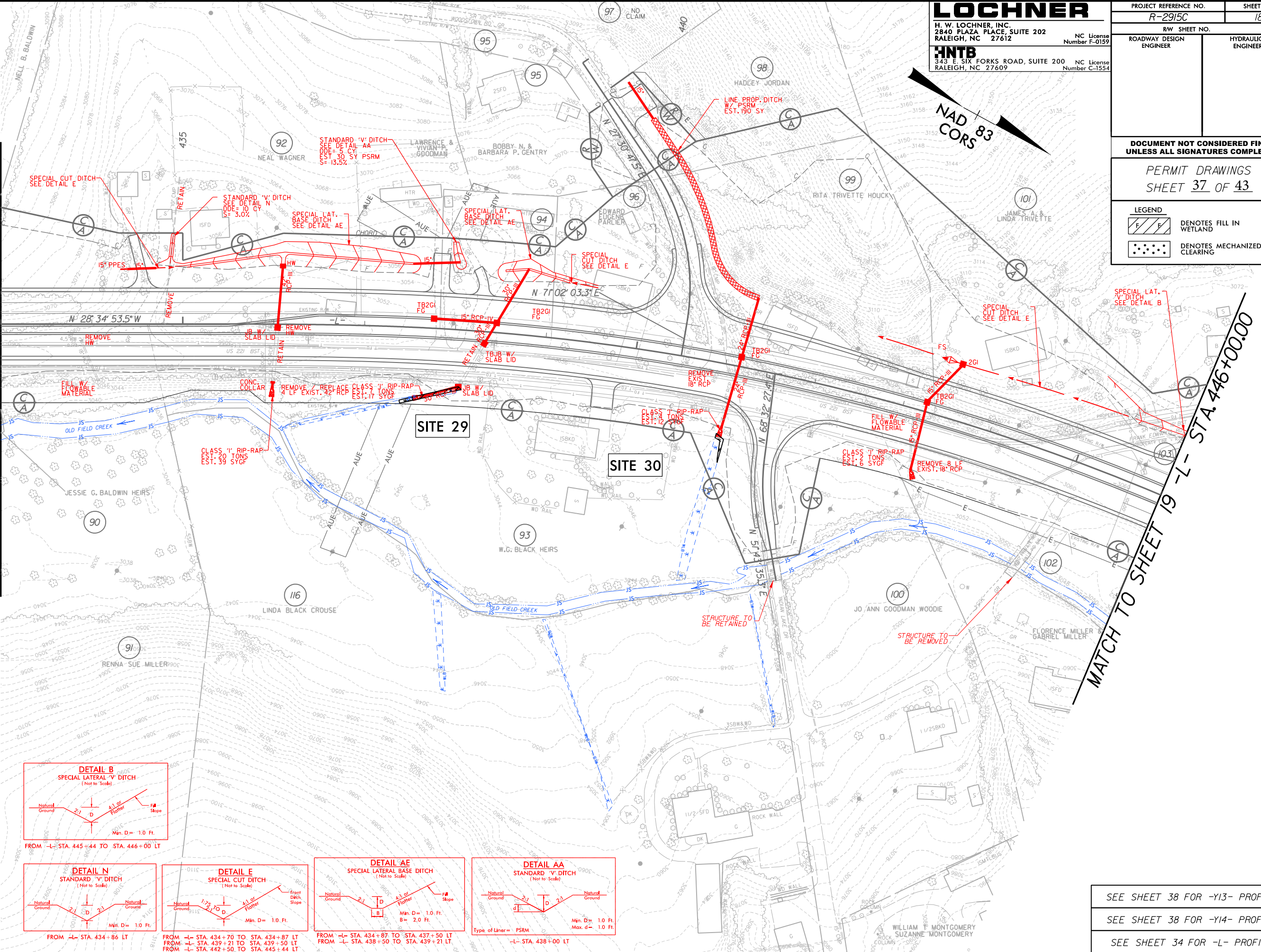
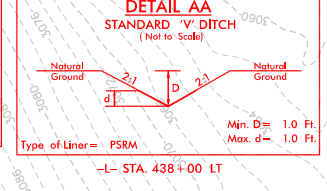
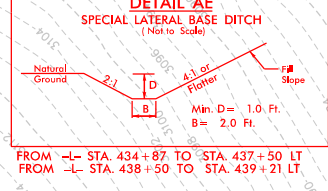
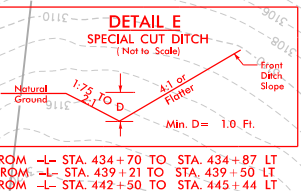
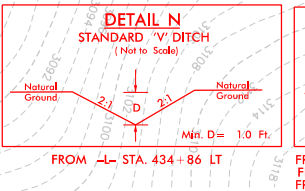
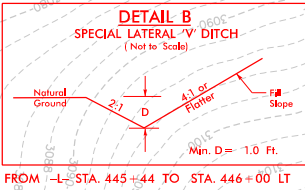
DENOTES FILL IN
WETLAND



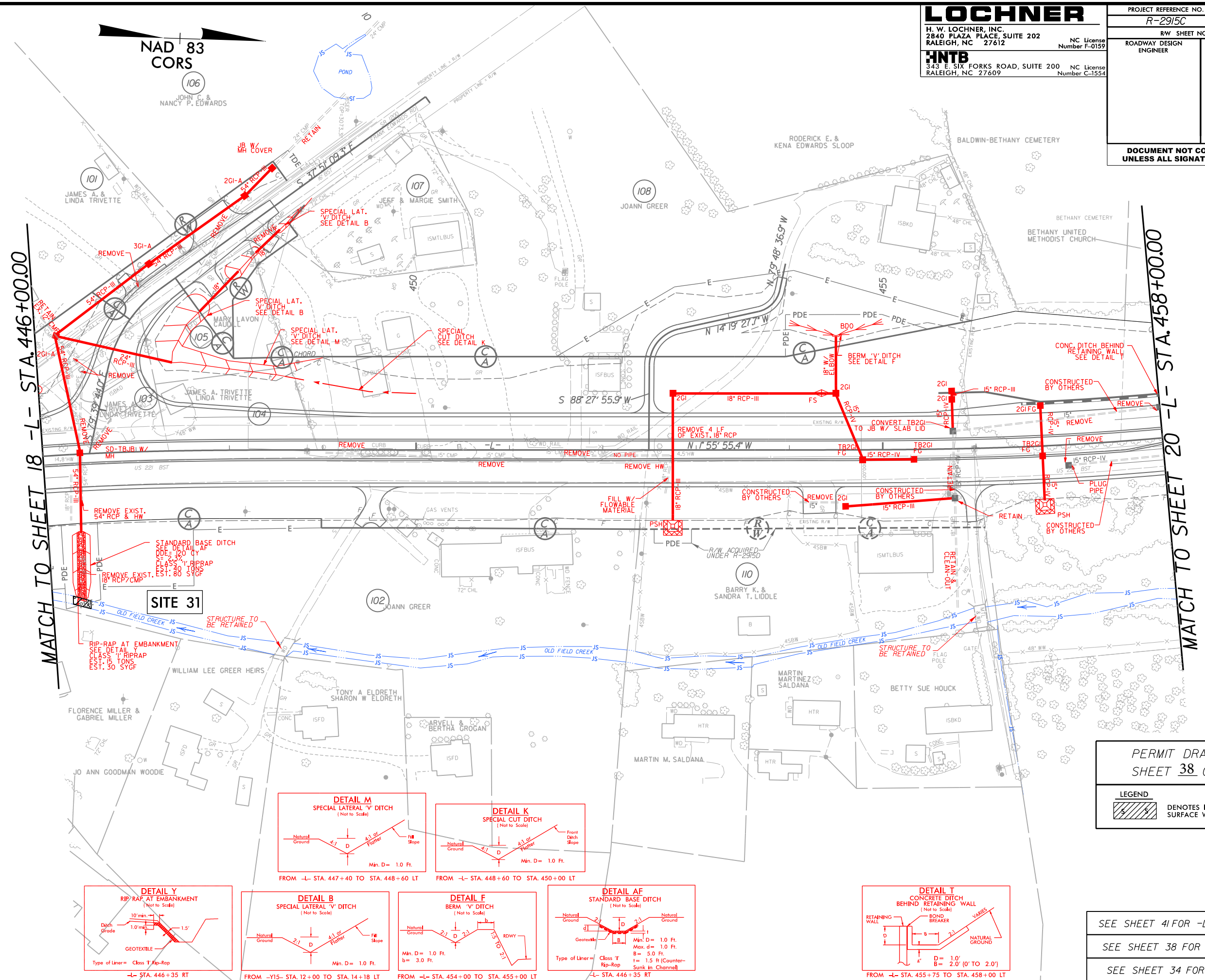
DENOTES MECHANIZED
CLEARING

MATCH TO SHEET 17 -L- STA. 433+00.00

MATCH TO SHEET 19 -L- STA. 446+00.00



SEE SHEET 38 FOR -Y13- PROFILE
SEE SHEET 38 FOR -Y14- PROFILE
SEE SHEET 34 FOR -L- PROFILE



PERMIT DRAWINGS
SHEET 38 OF 43

LEGEND

 DENOTES IMPACTS IN SURFACE WATER

SEE SHEET 41 FOR -DRWI2- PROFILE

SEE SHEET 38 FOR -Y15- PROFILE

SEE SHEET 34 FOR -L- PROFILE

REVISIONS

8/17/99

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8/17/99

REVISIONS

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338113

LOCHNER

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2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

NC License
Number F-0159

INTB

343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

19

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

MATCH TO SHEET 18 -L- STA. 446+00.00

MATCH TO SHEET 20 -L- STA. 458+00.00

NAD 83
CORS

106

JOHN C. &
NANCY P. EDWARDS

101

JAMES A. &
LINDA TRIVETTE

107

JEFF & MARGIE SMITH

108

JOANN GREER

RODERICK E. &
KENA EDWARDS SLOOP

BALDWIN BETHANY CEMETERY

BETHANY CEMETERY

BETHANY UNITED
METHODIST CHURCH

SITE 31

102

JOANN GREER

110

BARRY K. &
SANDRA T. LIDDLE

MARTIN MARTINEZ
SALDANA

BETTY SUE HOUCK

FLORENCE MILLER &
GABRIEL MILLER

JO ANN GOODMAN WOODIE

TONY A. ELDRETH
SHARON W. ELDRETH

ARVELL &
BERTHA GROGAN

MARTIN M. SALDANA

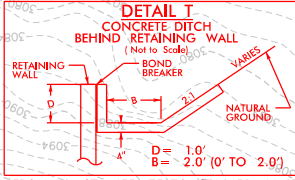
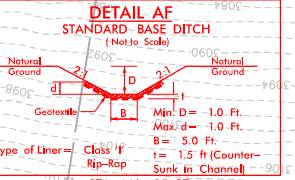
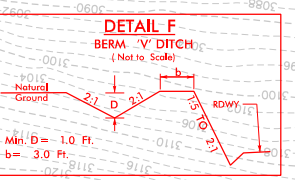
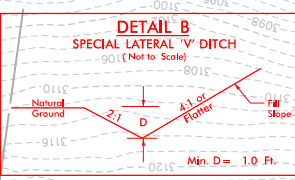
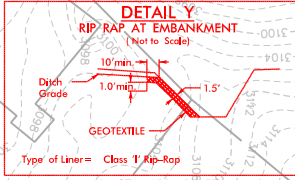
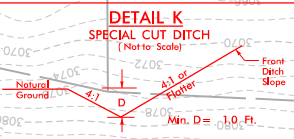
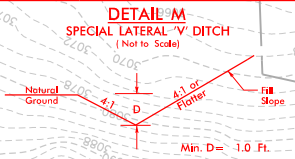
ISFD

ISFD

HTR

HTR

ISBKD



PERMIT DRAWINGS
SHEET 39 OF 43

LEGEND
DENOTES IMPACTS IN
SURFACE WATER

SEE SHEET 41 FOR -DRW2- PROFILE

SEE SHEET 38 FOR -Y15- PROFILE

SEE SHEET 34 FOR -L- PROFILE

8/17/99

REVISIONS

12:34 PM
C:\pwworkspace\VR2915C-prm_PSH21.dgn
3/3/2016 12:34 PM

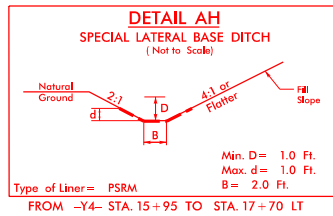
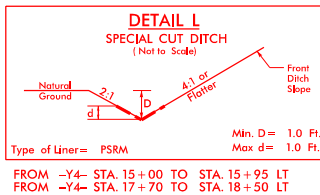
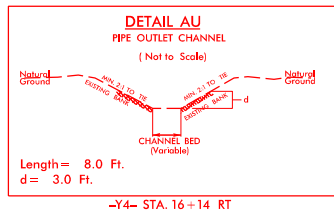
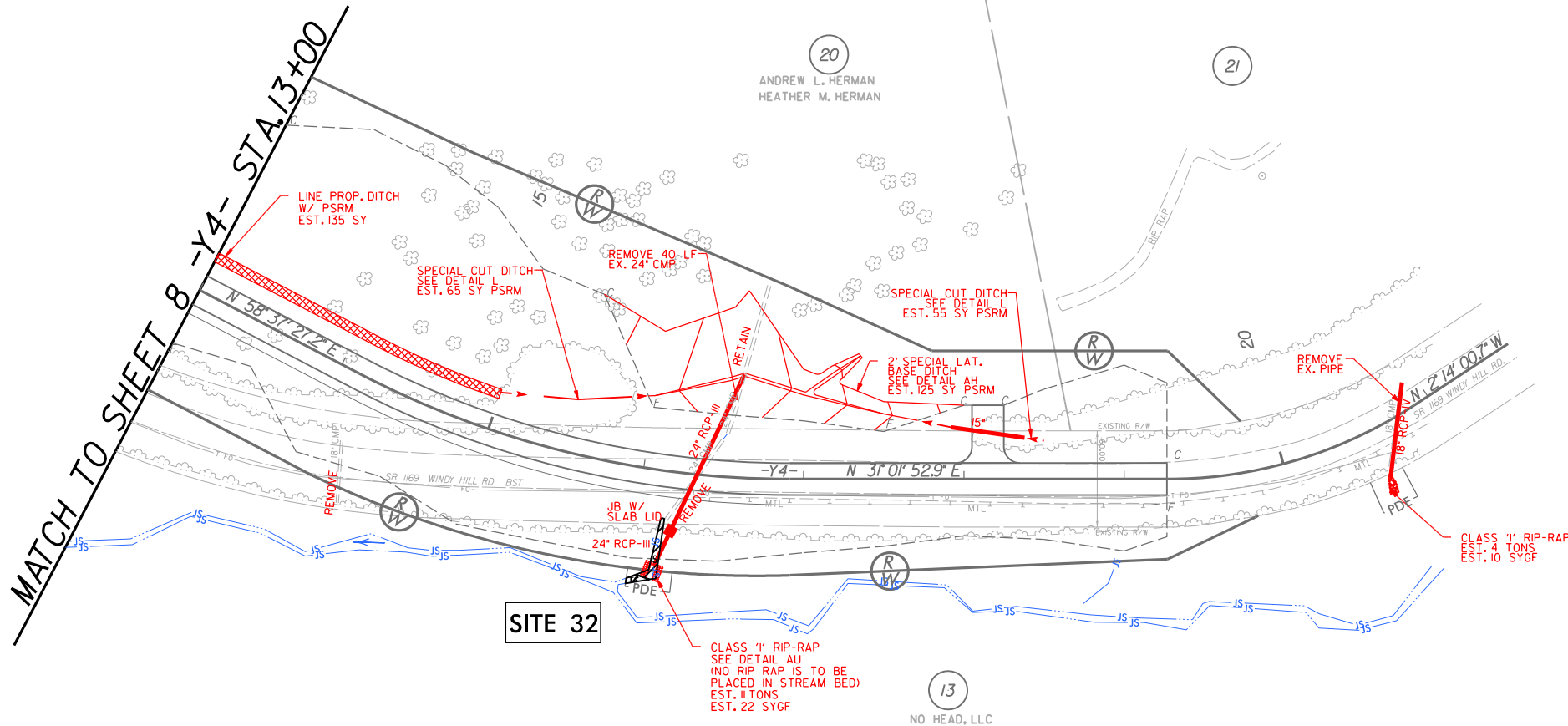
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612

NC License
Number F-0159

HNTB
343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.		SHEET NO.
R-2915C		21
RW SHEET NO.		
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		
PERMIT DRAWINGS SHEET <u>40</u> OF <u>43</u>		
LEGEND		
	DENOTES IMPACTS IN SURFACE WATER	
	DENOTES TEMPORARY IMPACTS IN SURFACE WATER	



SEE SHEET 36 FOR -Y4- PROFILE

WETLAND PERMIT IMPACT SUMMARY (SHEET 1)												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands	Temp. Fill In Wetlands	Excavation in Wetlands	Mechanized Clearing in Wetlands	Hand Clearing in Wetlands	Permanent SW impacts	Temp. SW impacts	Existing Channel Impacts Permanent	Existing Channel Impacts Temp.	Natural Stream Design
Site No.	Station (From/To)	Structure Size / Type	(ac)	(ac)	(ac)	(ac)	(ac)	(ac)	(ac)	(ft)	(ft)	(ft)
1	-L- 263+91 - 265+17 (LT)	ROAD FILL / 6" PVC	0.14			0.02						
2A	-L- 265+62 - 266+07 (LT)	ROAD FILL	0.01			< 0.01			< 0.01	71	34	
2B	-L- 265+74 - 266+21 (LT)	BANK STABILIZATION						< 0.01	< 0.01	19	49	
3	-L- 272+17 - 272+34 (LT)	DITCH							< 0.01		10	
4	-L- 298+19 - 299+46	48" CSP						0.02	< 0.01	210	35	
		BANK STABILIZATION						< 0.01		16		
5	-L- 302+01 - 303+41	60" SPP & WSP						0.03	< 0.01	236	21	
		BANK STABILIZATION						< 0.01		20		
6	-L- 317+47 - 317+61 (LT)	30" RCP						< 0.01	< 0.01	53	17	
		BANK STABILIZATION						< 0.01		10		
7	-L- 326+84 - 327+09 (RT)	ROAD FILL						< 0.01	< 0.01	37	6	
8	-L- 332+30 - 333+52	30" CSP						0.01	< 0.01	134	29	
		BANK STABILIZATION						< 0.01		10		
9	-L- 336+79 - 336+94 (LT)	6" PVC						< 0.01	< 0.01	31	28	
10	-L- 346+17 - 346+42 (RT)	36" RCP						< 0.01	< 0.01	14	21	
11	-L- 348+30 - 349+08 (LT)	36" RCP						< 0.01	< 0.01	45	23	
		BANK STABILIZATION						< 0.01		12		
12	-L- 350+35 - 351+29 (LT)	DITCH / ROAD FILL						< 0.01	< 0.01	78	20	
13A	-L- 351+21 - 352+70	84" SPP / WSP						0.04	< 0.01	270	23	
13B	-L- 352+15 (RT)	CHANNEL CHANGE						< 0.01		48		
14	-L- 358+63 - 358+73 (LT)	BANK STABILIZATION						< 0.01	< 0.01	4	10	
14B	-L- 367+73 - 367+79	BANK STABILIZATION						< 0.01		13		
16	-L- 373+71 - 375+47	2 @ 15' x 11' RCBC						0.05		100		
16	-L- 372+94 - 375+80	CHANNEL CHANGE						0.06	0.04	156	84	
SHEET 1 TOTALS*:			0.16			0.03		0.25	0.08	1587	410	0

*Rounded totals are sum of actual impacts

NOTES:

(1) WETLAND TOTAL TAKES: SITE 1, 2A (2) SITE 15 REMOVED DURING Y8 REDESIGN.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/22/14 (REV. 07/21/16)
ASHE COUNTY
US 221 FROM NORTH OF SOUTH FORK
NEW RIVER TO SOUTH OF US 194
SHEET 42 OF 43

WETLAND PERMIT IMPACT SUMMARY (SHEET 2)

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
Site	Station	Structure										
No.	(From/To)	Size / Type										
17	-L- 376+62 - 376+92 (RT)	BRIDGE REMOVAL / STREAM REBUILD							< 0.01		30	
19A	-L- 377+95 - 378+10 (RT)	48" RCP						< 0.01		58		
19B	-L- 377+87 - 378+05 (RT)	BANK STABILIZATION						< 0.01		18		
20	-L- 379+29 - 380+60 (RT)	ROADWAY FILL	0.04			0.02						
21	-L- 379+35 - 382+07 (LT)	ROADWAY FILL						0.03		283		
22	-L- 381+94 - 382+14 (RT)	BANK STABILIZATION						< 0.01		21		
23	-L- 393+88 - 395+82 (RT)	ROADWAY FILL / DITCH						0.01	< 0.01	163	45	
24	-L- 401+93 - 402+07 (RT)	BANK STABILIZATION						< 0.01		16		
25A	-L- 401+78 - 402+54 (LT)	24" SIDE DRAIN & RCP						0.02	< 0.01	262	10	
25B	-L- 402+11 - 402+54 (LT)	BERM BASE DITCH						< 0.01	< 0.01	60	10	
26	-L- 410+74 - 411+37 (RT)	ROADWAY FILL	0.01									
26	-L- 410+66 - 410+87 (RT)	BANK STABILIZATION						< 0.01	< 0.01	13	12	
27	-L- 419+51 - 419+68 (RT)	BANK STABILIZATION						< 0.01		17		
28	-L- 426+42 - 426+59 (RT)	BANK STABILIZATION						< 0.01		17		
29	-L- 437+41 - 438+11 (RT)	30" RCP	< 0.01			< 0.01						
30	-L- 441+00 - 441+13 (RT)	24" RCP				< 0.01						
31	-L- 446+23 - 446+44 (RT)	BANK STABILIZATION						< 0.01		20		
32	-Y4- 16+00 -16+17 (RT)	24" RCP						< 0.01	< 0.01	30	12	
		BANK STABILIZATION						< 0.01		8		
	SHEET 1 TOTALS		0.16			0.03		0.25	0.08	1587	410	
PROJECT TOTALS*:			0.22			0.05		0.34	0.09	2573	529	0

*Rounded totals are sum of actual impacts

NOTES:

(1) WETLAND TOTAL TAKES: SITE 20, 26 (2) SITE 18 REMOVED DURING Y9 REDESIGN.

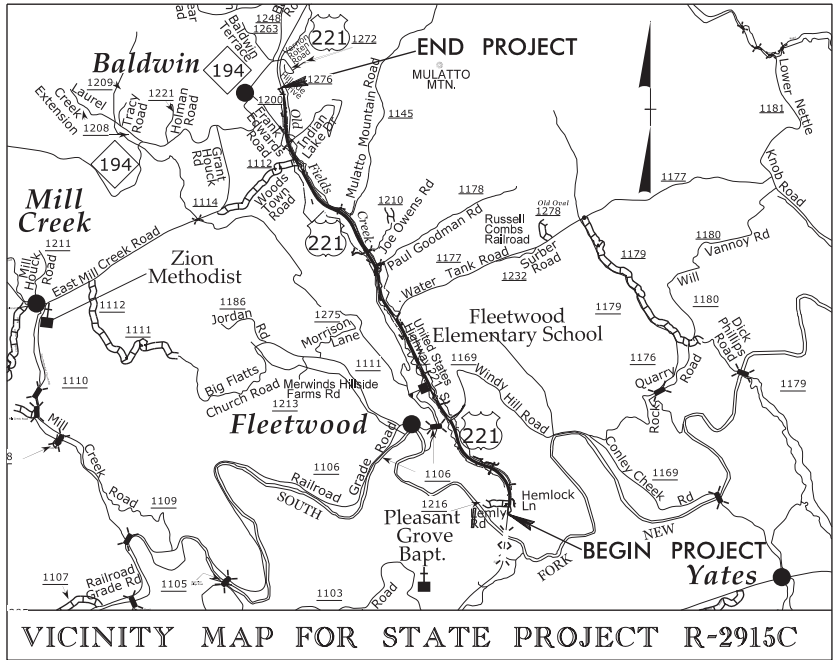
ATN Revised 3/12/13

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
08/22/14 (REV. 07/21/16)
ASHE COUNTY
US 221 FROM NORTH OF SOUTH FORK
NEW RIVER TO SOUTH OF US 194
SHEET 43 OF 43

TIP PROJECT: R-2915C

CONTRACT: C203801

See Sheet 1A For Index of Sheets
See Sheet 1B For Conventional Symbols
See Sheet 1C-1 - 1C-3 For Survey Control Sheets



VICINITY MAP FOR STATE PROJECT R-2915C

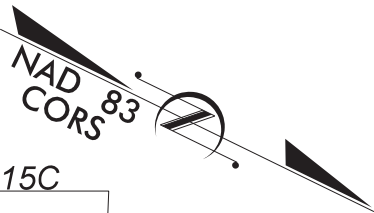
PLFI SUBMITTAL

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS ASHE COUNTY

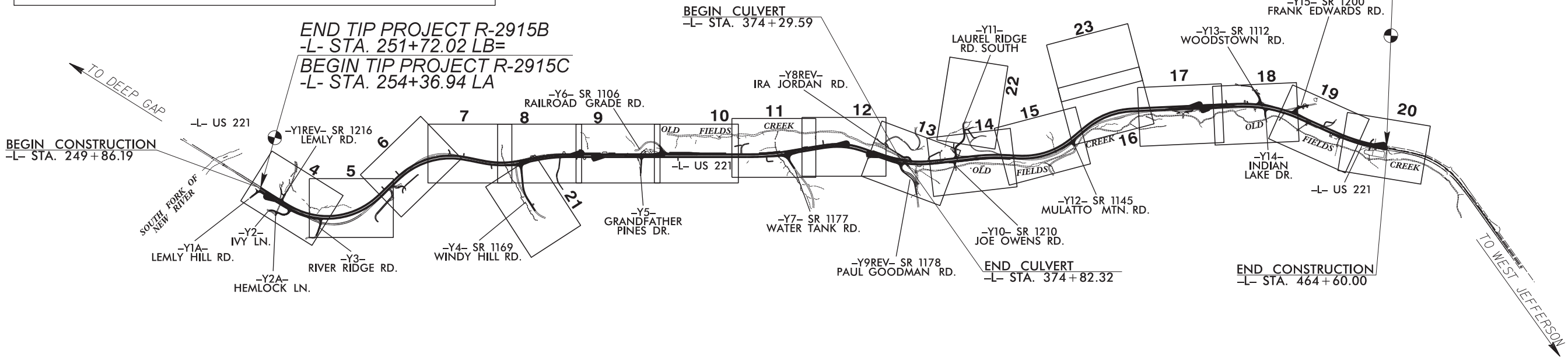
LOCATION: US 221 FROM NORTH OF SOUTH FORK NEW RIVER
TO SOUTH OF NC 194.

TYPE OF WORK: GRADING, DRAINAGE, PAVING, CULVERTS, AND
RETAINING WALLS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915C	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34518.1.4	STP-0221(41)	P.E.	
34518.2.FR3	STP-0221(41)	R/W	
34518.2.FR3	STP-0221(41)	UTILITIES	
34518.3.FR3	STP-0221(41)	CONSTR.	



-L- STA. 464+44.02
END TIP PROJECT R-2915C
-L- STA. 464+44.02
BEGIN TIP PROJECT R-2915D



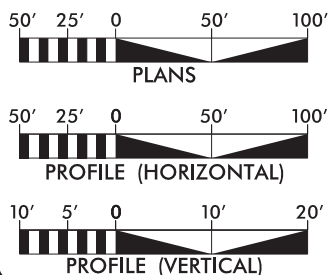
THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH
ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS.

** DESIGN EXCEPTION REQUIRED FOR MAXIMUM GRADE

PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC
PLANS COORDINATED BY:
Rekha Patel, PE – Roadway Design
Project Engineer (NCDOT)

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2016 = 12,743
ADT 2036 = 21,029
K = 9 %
D = 60 %
T = 9 % *
V = 60 MPH**
* = (TTST 2% + DUAL 7%)
FUNC CLASS =
RURAL ARTERIAL
STATEWIDE TIER

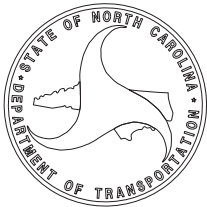
PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915C = 3.969 Miles
LENGTH STRUCTURES TIP PROJECT R-2915C = 0.010 Miles
TOTAL LENGTH TIP PROJECT R-2915C = 3.979 Miles

Prepared in the Office of:
LOCHNER
H.W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919) 571-1111
NC License Number 7-0159
HNTB
HNTB
343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609
NC License Number C-354
2012 STANDARD SPECIFICATIONS
RIGHT OF WAY DATE:
November 21, 2014
LETTING DATE:
November 15, 2016
Brian Eason, PE
PROJECT ENGINEER
Bill Bollman
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: _____ P.E.
ROADWAY DESIGN
ENGINEER
SIGNATURE: _____ P.E.



PROJECT REFERENCE NO.	SHEET NO.
R-2915C	1A
	ROADWAY DESIGN ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS
CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale

*S.U.E. = Subsurface Utility Engineering

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	1B

BOUNDARIES AND PROPERTY:

State Line	
County Line	
Township Line	
City Line	
Reservation Line	
Property Line	
Existing Iron Pin	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	

Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

Gas Pump Vent or U/G Tank Cap	
Sign	
Well	
Small Mine	
Foundation	
Area Outline	
Cemetery	
Building	
School	
Church	
Dam	

HYDROLOGY:

Stream or Body of Water	
Hydro, Pool or Reservoir	
Jurisdictional Stream	
Buffer Zone 1	
Buffer Zone 2	
Flow Arrow	
Disappearing Stream	
Spring	
Wetland	
Proposed Lateral, Tail, Head Ditch	
False Sump	

RAILROADS:

Standard Gauge	
RR Signal Milepost	
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	
Proposed Right of Way Line with Iron Pin and Cap Marker	
Proposed Right of Way Line with Concrete or Granite R/W Marker	
Proposed Control of Access Line with Concrete C/A Marker	
Existing Control of Access	
Proposed Control of Access	
Existing Easement Line	
Proposed Temporary Construction Easement	
Proposed Temporary Drainage Easement	
Proposed Permanent Drainage Easement	
Proposed Permanent Drainage / Utility Easement	
Proposed Permanent Utility Easement	
Proposed Temporary Utility Easement	
Proposed Aerial Utility Easement	
Proposed Permanent Easement with Iron Pin and Cap Marker	

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
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	

EXISTING STRUCTURES:

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

UTILITIES:

POWER:	
Existing Power Pole	
Proposed Power Pole	
Existing Joint Use Pole	
Proposed Joint Use Pole	
Power Manhole	
Power Line Tower	
Power Transformer	
U/G Power Cable Hand Hole	
H-Frame Pole	
U/G Power Line LOS B (S.U.E.*)	
U/G Power Line LOS C (S.U.E.*)	
U/G Power Line LOS D (S.U.E.*)	

TELEPHONE:

Existing Telephone Pole	
Proposed Telephone Pole	
Telephone Manhole	
Telephone Pedestal	
Telephone Cell Tower	
U/G Telephone Cable Hand Hole	
U/G Telephone Cable LOS B (S.U.E.*)	
U/G Telephone Cable LOS C (S.U.E.*)	
U/G Telephone Cable LOS D (S.U.E.*)	
U/G Telephone Conduit LOS B (S.U.E.*)	
U/G Telephone Conduit LOS C (S.U.E.*)	
U/G Telephone Conduit LOS D (S.U.E.*)	
U/G Fiber Optics Cable LOS B (S.U.E.*)	
U/G Fiber Optics Cable LOS C (S.U.E.*)	
U/G Fiber Optics Cable LOS D (S.U.E.*)	

WATER:

Water Manhole	
Water Meter	
Water Valve	
Water Hydrant	
U/G Water Line LOS B (S.U.E.*)	
U/G Water Line LOS C (S.U.E.*)	
U/G Water Line LOS D (S.U.E.*)	
Above Ground Water Line	

TV:

TV Pedestal	
TV Tower	
U/G TV Cable Hand Hole	
U/G TV Cable LOS B (S.U.E.*)	
U/G TV Cable LOS C (S.U.E.*)	
U/G TV Cable LOS D (S.U.E.*)	
U/G Fiber Optic Cable LOS B (S.U.E.*)	
U/G Fiber Optic Cable LOS C (S.U.E.*)	
U/G Fiber Optic Cable LOS D (S.U.E.*)	

GAS:

Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

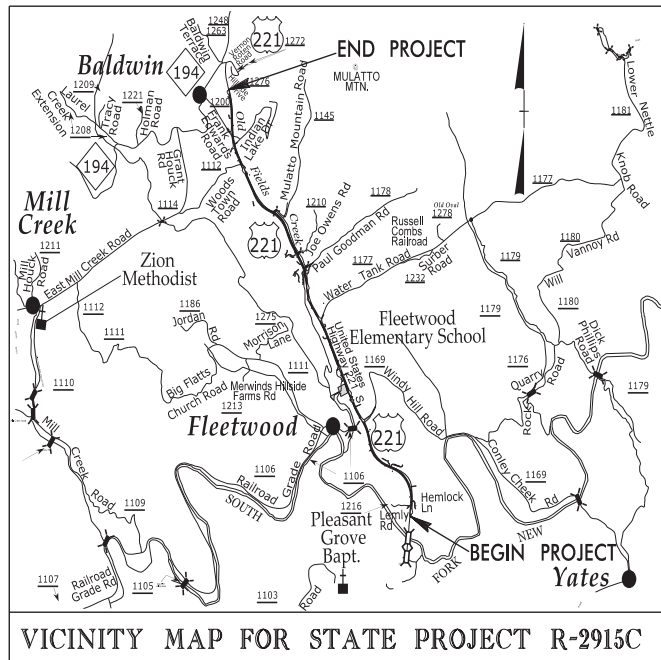
SANITARY SEWER:

Sanitary Sewer Manhole	
Sanitary Sewer Cleanout	
U/G Sanitary Sewer Line	
Above Ground Sanitary Sewer	
SS Forced Main Line LOS B (S.U.E.*)	
SS Forced Main Line LOS C (S.U.E.*)	
SS Forced Main Line LOS D (S.U.E.*)	

MISCELLANEOUS:

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

SURVEY CONTROL SHEET R-2915C



B/LC	POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
B/L56	B/L-56	1339791,-180	1263655,-010		26780,83		OUTSIDE PROJECT LIMITS
B/L57	B/L-57	1339791,-1246	1263765,-0528		26780,93		2446,-66 7,77
B/L58	B/L-58	1339749,-1246	1263765,-0528		26886,-86		2446,-65 7,88
B/L59	B/L-59	1339624,-493	1263716,-0781		26723,49		258,-55 43,14
B/L60	B/L-60	1337239,-180	1263655,-010		26683,-98		258,-55 43,14
B/L61	B/L-61	1337534,-3877	1263695,-5654		26927,43		268,-28 58,39
B/L62	B/L-62	1337896,-0994	1263463,-6362		26737,87		274,-30 56,58
B/L63	B/L-63	1338845,-0994	1263463,-6362		26877,-68		274,-30 56,58
B/L64	B/L-64	1338289,-2888	1262287,-8787		26324,-48		286,-27 49,37
B/L65	B/L-65	1339615,-515	1261785,-7052		26146,-95		291,-56 61,21
B/L66	B/L-66	1339498,-8481	1261785,-7052		26146,-95		291,-56 61,21
B/L67	B/L-67	1339266,-0949	1261798,-7052		25668,-21		285,-07 66,38
B/L68	B/L-68	1334481,-0568	1261798,-7052		25986,-85		285,-07 66,38
B/L69	B/L-69	1334031,-7493	1260892,-5682		25991,-31		316,-78 2,65
B/L70	GPS-R2110	1334233,-4343	1260892,-5682		25991,-31		316,-78 2,65
B/L71	B/L-71	1417722,-1410	1265448,-3832		30805,-78		302,-06 82,87
B/L72	B/L-72	1422681,-2144	1268142,-1275		38126,-34		331,-94 48,06
B/L73	B/L-73	1428666,-0180	1265689,-0683		38253,-98		342,-39 37,52
B/L74	B/L-74	1432222,-8626	1265689,-0683		38253,-98		342,-39 37,52
B/L75	B/L-75	1436370,-8751	1259462,-2748		38111,42		347,-48 45,26
B/L76	B/L-76	1441183,-3808	1259462,-2748		38111,42		347,-48 45,26
B/L77	B/L-77	1445446,-4108	1259688,-9636		38005,-78		357,-10 47,81
B/L78	B/L-78	1458581,-2772	1259688,-9636		38005,-78		357,-10 47,81
B/L79	B/L-79	1458368,-3536	1259844,-9413		37977,-77		371,-58 33,54
B/L80	B/L-80	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L81	B/L-81	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L82	B/L-82	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L83	B/L-83	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L84	B/L-84	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L85	B/L-85	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L86	B/L-86	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L87	B/L-87	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L88	B/L-88	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L89	B/L-89	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L90	B/L-90	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L91	B/L-91	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L92	B/L-92	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L93	B/L-93	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L94	B/L-94	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L95	B/L-95	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L96	B/L-96	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L97	B/L-97	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L98	B/L-98	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L99	B/L-99	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L00	B/L-00	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L01	B/L-01	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L02	B/L-02	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L03	B/L-03	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L04	B/L-04	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L05	B/L-05	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L06	B/L-06	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L07	B/L-07	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L08	B/L-08	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L09	B/L-09	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L10	B/L-10	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L11	B/L-11	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L12	B/L-12	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L13	B/L-13	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L14	B/L-14	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L15	B/L-15	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L16	B/L-16	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L17	B/L-17	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L18	B/L-18	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L19	B/L-19	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L20	B/L-20	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L21	B/L-21	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L22	B/L-22	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L23	B/L-23	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L24	B/L-24	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L25	B/L-25	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L26	B/L-26	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L27	B/L-27	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L28	B/L-28	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L29	B/L-29	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L30	B/L-30	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L31	B/L-31	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L32	B/L-32	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L33	B/L-33	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L34	B/L-34	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L35	B/L-35	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L36	B/L-36	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L37	B/L-37	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L38	B/L-38	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L39	B/L-39	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L40	B/L-40	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L41	B/L-41	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L42	B/L-42	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L43	B/L-43	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L44	B/L-44	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L45	B/L-45	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L46	B/L-46	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L47	B/L-47	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L48	B/L-48	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L49	B/L-49	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L50	B/L-50	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L51	B/L-51	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L52	B/L-52	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L53	B/L-53	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L54	B/L-54	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L55	B/L-55	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L56	B/L-56	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L57	B/L-57	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L58	B/L-58	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L59	B/L-59	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L60	B/L-60	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L61	B/L-61	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L62	B/L-62	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L63	B/L-63	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L64	B/L-64	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L65	B/L-65	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L66	B/L-66	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L67	B/L-67	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L68	B/L-68	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L69	B/L-69	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L70	B/L-70	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L71	B/L-71	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L72	B/L-72	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L73	B/L-73	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L74	B/L-74	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L75	B/L-75	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L76	B/L-76	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L77	B/L-77	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L78	B/L-78	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L79	B/L-79	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L80	B/L-80	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L81	B/L-81	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L82	B/L-82	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L83	B/L-83	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L84	B/L-84	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L85	B/L-85	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L86	B/L-86	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L87	B/L-87	1463231,-3457	1259844,-9413		37977,-77		371,-58 33,54
B/L88	B/L-88	1463231,-3457	1259844,-9413		37977		

BYC1	POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
BYC130	BY C130	BL 67	908956.8946	1261398.7052	2968.21	OUTSIDE PROJECT LIMITS	
BYC131	BY C131	BY 132	940031.1722	1261398.7052	2968.17	12-99.96	181.48 R
BYC132	BY C132	BY 133	940223.4959	1261958.6781	2938.26	16-19.28	16.06 R
BYC134	BY C134	BY 134	940681.8608	1262159.5086	2969.81	20-24.89	16.96 R
BYC135	BY C135	BY 135	940951.6344	1262153.4412	2969.89	OUTSIDE PROJECT LIMITS	

BYC2	POINT	DESC.	NORTH	EAST	ELEVATION	Y6 STATION	OFFSET
BYC236	BYC-236	941232.5036	1260302.7315	2992.76		OUTSIDE PROJECT LIMITS	
BYC237	BYC-237	941784.9531	1260341.2732	2994.40		OUTSIDE PROJECT LIMITS	
BYC238	BYC-238	941818.3655	1260159.6193	3009.53	11-24.29	19.30 L	
BYC239	BYC-239	941992.2283	1260840.6030	3005.53	13-15.87	36.12 L	
BYC240		942281.2144	1260142.1275	3016.34	15-78.27	92.90 L	

BYC3		POINT		DESC.	NORTH	EAST	ELEVATION	Y73 STATION	OFFSET
BYC341					944183.8005	1259268.6680	3083.47	OUTSIDE PROJECT LIMITS	
BYC342				BT-C342	944270.8205	1259269.1852	3080.46	11-72.45	12.09 LT
BYC343				BT-C343	944489.5555	1259268.5807	3017.29	OUTSIDE PROJECT LIMITS	
BYC344				BT-C344	945128.2516	1268134.1974	3624.87	OUTSIDE PROJECT LIMITS	
BYC4		POINT		DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
BYC445				BT-C19	946321.3457	1250841.8927	2464.35	12-76.86	219.68 LT
BYC446				GPS-RTS15-11	946476.3510	1259433.4528	2461.54	14-77.29	137.45 LT
BYC447				BT-C447	946523.2864	1258772.1117	2477.20	15-82.80	4.18 RT
BYC448				BT-C448	946659.4733	1258766.8454	2466.77	OUTSIDE PROJECT LIMITS	
BYC5		POINT		DESC.	NORTH	EAST	ELEVATION	Y18 STATION	OFFSET
BYC549				BT-C20	946520.2772	1250823.1991	2461.88	18-10.76	5.34 RT
BYC550				GPS-RTS15-12	947842.3510	1259133.1700	2476.76	11-72.29	135.21 LT
BYC551				BT-C51	947857.2803	1259416.4933	3080.28	OUTSIDE PROJECT LIMITS	
BYC6		POINT		DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
BYC652				BT-C24	948678.8827	1256666.321	3019.87	11-86.97	61.22 RT
BYC653				BT-C653	948769.6243	1256743.4681	3011.23	OUTSIDE PROJECT LIMITS	
BYC654				BT-C654	948955.5355	1257135.5535	3089.89	OUTSIDE PROJECT LIMITS	
BYC655				BT-C655	948758.5341	1257536.8330	3030.34	OUTSIDE PROJECT LIMITS	
BYC7		POINT		DESC.	NORTH	EAST	ELEVATION	Y13 STATION	OFFSET
BYC756				GPS-RTS15-756	950864.5210	1254546.9778	3069.61	11-87.29	137.65 LT
BYC757				BT-C757	950970.9774	1254530.8899	3095.72	OUTSIDE PROJECT LIMITS	
BYC758				BT-C758	951277.4248	1254571.8567	3082.47	11-27.27	11.67 LT
BYC759				GPS-RTS15-13	951569.5128	1254626.4558	3052.21	OUTSIDE PROJECT LIMITS	
BYC8		POINT		DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
BYC856				GPS-RTS15-14	952268.7888	1254545.9778	3076.45	OUTSIDE PROJECT LIMITS	
BYC861				GPS-RTS15-13	951945.5128	1254626.4558	3052.21	OUTSIDE PROJECT LIMITS	

BMC1 ELEVATION = 3061.35
N 937902 E 1262994
L STATION 278+54.00 112 LEFT
0+ SPIKE IN ROOT OF 15' WHITE PINE

BMC2 ELEVATION = 2973.57
N 939619 E 1261815
L STATION 300+70.00 151 RIGHT
8" SPIKE IN ROOT OF 15' WHITE PINE

BMC3 ELEVATION = 2955.31
N 941144 E 1260286
L STATION 321+09.00 414 LEFT
CHISELED SQUARE IN NE CORNER OF
CONCRETE PAD

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*****
BMC4      ELEVATION = 3054.68
N 944909  E 1259389
L STATION 358+01.00 572 RIGHT
*****

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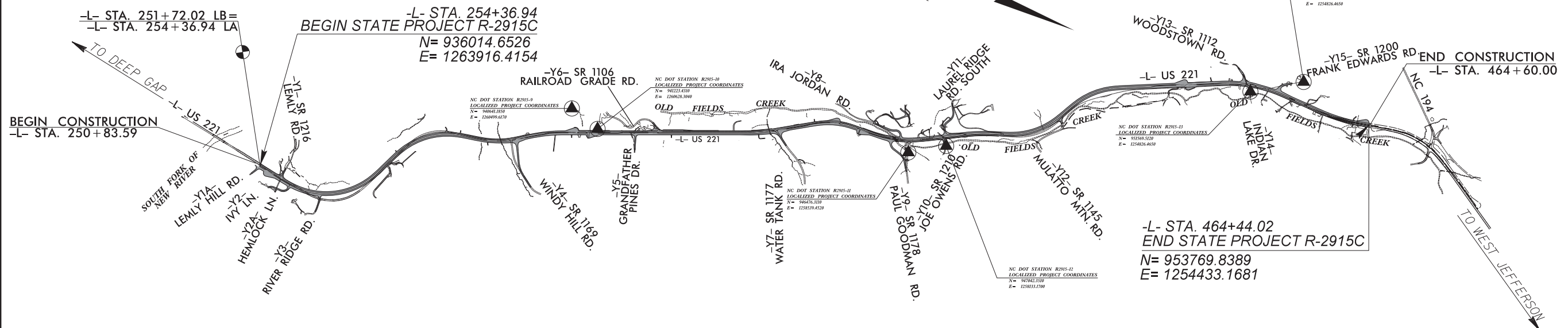
BMC5 ELEVATION = 2964.46

N 946397 E 1258521
Y9 STATION 13+68.80 120 LEFT
CHISELED SQUARE IN SW WING WALL
OF BRIDGE

BMC6 ELEVATION = 3884.34
N 948522 E 1257341
L STATION 400+29.80 228 RIGHT
CHISELED SQUARE IN NORTH HEAD WALL OF
94X72 PIPE

BMC7 ELEVATION * 3043.40
N 950254 E 1255523

L STATION 426+67.00 158 RIGHT
CHISELED SQUARE IN EAST HEAD WALL OF
PRIVATE BRIDGE



DATUM	DESCRIPTION
1	10/1/2018
2	10/2/2018
3	10/3/2018
4	10/4/2018
5	10/5/2018
6	10/6/2018
7	10/7/2018
8	10/8/2018
9	10/9/2018
10	10/10/2018
11	10/11/2018
12	10/12/2018
13	10/13/2018
14	10/14/2018
15	10/15/2018
16	10/16/2018
17	10/17/2018
18	10/18/2018
19	10/19/2018
20	10/20/2018
21	10/21/2018
22	10/22/2018
23	10/23/2018
24	10/24/2018
25	10/25/2018
26	10/26/2018
27	10/27/2018
28	10/28/2018
29	10/29/2018
30	10/30/2018
31	10/31/2018

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCODT FOR MONUMENT "R2915-15"
WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF
NORTHING: 954880.7810(±) EASTING: 1254012.2870(±)
ELEVATION: 3097.5210(±)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.99991292
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R2915-15" TO -L- STATION 254+36.94 IS
S 27°41'53" E 21307.8051
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/CORS ADJUSTMENT THIS CALIBRATION WILL ALLOW THE END USER TO WORK WITHIN THE SAME COORDINATE SYSTEM WHEN USING RTK (REAL TIME KINEMATIC) GPS AND A LOCAL BASE STATION. IF ANOTHER SYSTEM SUCH AS VRS (VIRTUAL REFERENCE STATION) IS USED, ADDITIONAL FIELD TIES MAY BE NEEDED TO REDUCE POSSIBLE ERRORS, OR BIASES.
 2. THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
[HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/](https://connect.ncdot.gov/resources/location/)

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915C_LS_GPSCALIB.HTM
R2915C_LS_WGS84.TXT
R2915C_LS_LOCAL.TXT
R2915C_LS_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
- INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
- PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
- SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

NOTE: DRAWING NOT TO SCALE

NOTE: DRAWING NOT TO SCALE

SURVEY CONTROL SHEET R-2915C

Longitude	81°31'55.59073"W	Elevation	3078.5171sft	Easting	1254245.9770sft
Height	2976.0465sft	Horz error	0.015sft	Elevation	3078.5190sft
		Vert error	0.002sft	Utilized	Horz and Vert
		3D error	0.016sft	Quality	Survey quality
Point	R2915-15_WGS84	Northing	954880.7882sft	Point R2915-15_Local	
Latitude	36°20'50.57260"N	Easting	1254012.3126sft	Northing	954880.7810sft
Longitude	81°31'59.23136"W	Elevation	3097.5370sft	Easting	1254012.2870sft
Height	2995.1423sft	Horz error	0.027sft	Elevation	3097.5210sft
		Vert error	0.016sft	Utilized	Horz and Vert
		3D error	0.031sft	Quality	Survey quality
Point	R2915-16_WGS84	Northing	955689.2599sft	Point R2915-16_Local	
Latitude	36°20'58.40190"N	Easting	1253372.2604sft	Northing	955689.2700sft
Longitude	81°32'07.30385"W	Elevation	3139.7336sft	Easting	1253372.2370sft
Height	3037.3781sft	Horz error	0.025sft	Elevation	3139.6930sft
		Vert error	0.041sft	Utilized	Horz and Vert
		3D error	0.048sft	Quality	Survey quality
Point	R2915-17_WGS84	Northing	960732.3214sft	Point R2915-17_Local	
Latitude	36°21'50.14423"N	Easting	1260924.8880sft	Northing	960732.3040sft
Longitude	81°30'36.58112"W	Elevation	3355.9956sft	Easting	1260924.8760sft
Height	3253.5217sft	Horz error	0.021sft	Elevation	3356.0160sft
		Vert error	0.020sft	Utilized	Horz and Vert
		3D error	0.029sft	Quality	Survey quality
Point	R2915-18_WGS84	Northing	959689.5169sft	Point R2915-18_Local	
Latitude	36°21'39.95242"N	Easting	1261385.6028sft	Northing	959689.4970sft
Longitude	81°30'30.62882"W	Elevation	3396.5313sft	Easting	1261385.5910sft
Height	3294.0193sft	Horz error	0.023sft	Elevation	3396.5580sft
		Vert error	0.027sft	Utilized	Horz and Vert
		3D error	0.035sft	Quality	Survey quality
Point	R2915-19_WGS84	Northing	967060.7220sft	Point R2915-19_Local	
Latitude	36°22'54.39872"N	Easting	1267779.1405sft	Northing	967060.7040sft
Longitude	81°29'14.75578"W	Elevation	3005.2191sft	Easting	1267779.1370sft
Height	2902.6651sft	Horz error	0.018sft	Elevation	3005.2590sft
		Vert error	0.040sft	Utilized	Horz and Vert
		3D error	0.044sft	Quality	Survey quality
Point	R2915-20_WGS84	Northing	966821.8373sft	Point R2915-20_Local	
Latitude	36°22'52.19547"N	Easting	1268416.6439sft	Northing	966821.8150sft
Longitude	81°29'06.89021"W	Elevation	3001.8897sft	Easting	1268416.6390sft
Height	2899.3121sft	Horz error	0.023sft	Elevation	3001.9300sft
		Vert error	0.040sft	Utilized	Horz and Vert
		3D error	0.046sft	Quality	Survey quality
Point	R2915-21_WGS84	Northing	972084.6876sft	Point R2915-21_Local	
Latitude	36°23'44.52005"N	Easting	1269660.6108sft	Northing	972084.6700sft
Longitude	81°28'53.29316"W	Elevation	3132.4940sft	Easting	1269660.6140sft
Height	3029.9808sft	Horz error	0.018sft	Elevation	3132.5390sft
		Vert error	0.045sft	Utilized	Horz and Vert
		3D error	0.048sft	Quality	Survey quality
Point	R2915-22_WGS84	Northing	973156.5253sft	Point R2915-22_Local	
Latitude	36°23'55.25041"N	Easting	1270213.4941sft	Northing	973156.5140sft

NOTE: DRAWING NOT TO SCALE

- NOTES:
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THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915C_1S_GPSALIB.HTML
R2915C_1S_WGS84.TXT
R2915C_1S_LOCAL.TXT
R2915C_1S_CONTROL.TXT

THE WGS84 AND LOCAL FILES ARE COMMA DELIMITED AND CAN BE USED TO REPRODUCE THE SITE CALIBRATION FOR THE END USER'S GPS EQUIPMENT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.
- INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2915-15"

WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF
NORTHING: 954880.7810(±) EASTING: 1254012.2870(±)
ELEVATION: 3097.5210(±)

THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99991292

THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2915-15" TO -L- STATION 254+36.94 IS
S 27°41'53" E 21307.8051

ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	238+00.00	934649.9983	1263774.4519
2	L	239+00.00	934749.4616	1263784.7990
3	L	240+00.00	934848.9248	1263795.1460
4	L	241+00.00	934948.3881	1263805.4931
5	L	242+00.00	935047.8513	1263815.8401
6	L	243+00.00	935147.3146	1263826.1872
7	L	244+00.00	935246.7778	1263836.5342
8	L	245+00.00	935346.2411	1263846.8813
9	L	246+00.00	935445.7043	1263857.2283
10	L	247+00.00	935545.1676	1263867.5754
11	L	248+00.00	935644.6308	1263877.9224
12	L	249+00.00	935744.0941	1263888.2695
13	L	250+00.00	935843.5574	1263898.6165
14	L	251+00.00	935943.0206	1263908.9636
15	L	255+00.00	936077.3741	1263922.9402
16	L	256+00.00	936176.8374	1263933.2873
17	L	257+00.00	936276.3006	1263943.6343
18	L	258+00.00	936375.7639	1263953.9814
19	L	259+00.00	936475.2524	1263964.0799
20	L	260+00.00	936574.8946	1263972.4982
21	L	261+00.00	936674.7641	1263977.4468
22	L	262+00.00	936774.7478	1263977.1303
23	L	263+00.00	936874.4616	1263969.8861
24	L	264+00.00	936973.3501	1263955.1772
25	L	265+00.00	937070.8543	1263933.0816
26	L	266+00.00	937166.4233	1263903.7242
27	L	267+00.00	937259.5170	1263867.2708
28	L	268+00.00	937349.6095	1263823.9276
29	L	269+00.00	937436.1916	1263773.9392
30	L	270+00.00	937518.7741	1263717.5884
31	L	271+00.00	937596.8903	1263655.1933
32	L	272+00.00	937670.0990	1263587.1067
33	L	273+00.00	937737.9863	1263513.7133
34	L	274+00.00	937800.1687	1263435.4276
35	L	275+00.00	937856.2948	1263352.6922
36	L	276+00.00	937906.0475	1263265.9745
37	L	277+00.00	937949.3440	1263175.8546
38	L	278+00.00	937987.5105	1263083.4336
39	L	279+00.00	938022.5648	1262989.7812
40	L	280+00.00	938056.5634	1262895.7381
41	L	281+00.00	938090.5252	1262801.6818
42	L	282+00.00	938124.9309	1262707.7877
43	L	283+00.00	938161.6260	1262614.7695
44	L	284+00.00	938202.6743	1262523.5985
45	L	285+00.00	938249.8456	1262435.4498
46	L	286+00.00	938303.5013	1262351.0913
47	L	287+00.00	938363.3422	1262271.0016
48	L	288+00.00	938429.0302	1262195.6333
49	L	289+00.00	938500.1940	1262125.4122
50	L	290+00.00	938576.4316	1262060.7352
51	L	291+00.00	938657.3121	1262001.9676
52	L	292+00.00	938742.3786	1261949.4416
53	L	293+00.00	938831.1503	1261903.4539
54	L	294+00.00	938923.1255	1261864.2638
55	L	295+00.00	939017.6192	1261831.5863
56	L	296+00.00	939113.6273	1261803.6360
57	L	297+00.00	939210.3565	1261778.2734
58	L	298+00.00	939307.1986	1261753.3420
59	L	299+00.00	939403.6443	1261726.9276
60	L	300+00.00	939499.1294	1261697.2457
61	L	301+00.00	939592.9247	1261662.6129
62	L	302+00.00	939684.4179	1261622.2915
63	L	303+00.00	939773.2495	1261576.4028
64	L	304+00.00	939859.0825	1261525.1238
65	L	305+00.00	939941.8961	1261469.0887
66	L	306+00.00	940022.4537	1261409.8458
67	L	307+00.00	940101.7817	1261348.9609
68	L	308+00.00	940180.9641	1261287.8862
69	L	309+00.00	940260.9099	1261227.8168
70	L	310+00.00	940342.4215	1261169.8951
71	L	311+00.00	940425.9946	1261114.9920
72	L	312+00.00	940511.5795	1261063.2809
73	L	313+00.00	940599.0425	1261014.8133
74	L	314+00.00	940687.9564	1260969.0549
75	L	315+00.00	940777.6413	1260924.8222
76	L	316+00.00	940867.5120	1260880.9672
77	L	317+00.00	940957.3838	1260837.1145
78	L	318+00.00	941047.2556	1260793.2619
79	L	319+00.00	941137.1275	1260749.4092
80	L	320+00.00	941226.9993	1260705.5566
81	L	321+00.00	941316.8711	1260661.7039

Point #	Chain	Station	Northing (Y)	Easting (X)
82	L	322+00.00	941406.7429	1260617.8512
83	L	323+00.00	941496.6148	1260573.9986
84	L	324+00.00	941586.4866	1260530.1459
85	L	325+00.00	941676.3584	1260486.2933
86	L	326+00.00	941766.2302	1260442.4406
87	L	327+00.00	941856.1020	1260398.5879
88	L	328+00.00	941945.9739	1260354.7353
89	L	329+00.00	942035.8457	1260310.8826
90	L	330+00.00	942125.7175	1260267.0300
91	L	331+00.00	942215.5893	1260223.1773
92	L	332+00.00	942305.4611	1260179.3246
93	L	333+00.00	942395.3330	1260135.4720
94	L	334+00.00	942485.2048	1260091.6193
95	L	335+00.00	942575.0766	1260047.7667
96	L	336+00.00	942664.9484	1260003.9140
97	L	337+00.00	942754.8203	1259960.0613
98	L	338+00.00	942844.6921	1259916.2087
99	L	339+00.00	942934.5639	1259872.3560
100	L	340+00.00	943024.4357	1259828.5034
101	L	341+00.00	943114.3075	1259784.6507
102	L	342+00.00	943204.1794	1259740.7980
103	L	343+00.00	943294.0512	1259696.9454
104	L	344+00.00	943383.9230	1259653.0927
105	L	345+00.00	943473.7948	1259609.2401
106	L	346+00.00	943563.6666	1259565.3874
107	L	347+00.00	943653.4407	1259521.3354
108	L	348+00.00	943742.6289	1259476.1121
109	L	349+00.00	943830.6600	1259428.6795
110	L	350+00.00	943917.3009	1259378.7528
111	L	351+00.00	944002.4801	1259326.3714
112	L	352+00.00	944086.1290	1259271.5791
113	L	353+00.00	944168.3843	1259214.7131
114	L	354+00.00	944249.8850	1259156.7684
115	L	355+00.00	944331.2550	1259098.6399
116	L	356+00.00	944412.6251	1259040.5115
117	L	357+00.00	944493.9951	1258982.3830
118	L	358+00.00	944575.3651	1258924.2545
119	L	359+00.00	944656.7737	1258866.1802
120	L	360+00.00	944738.9322	1258809.1759
121	L	361+00.00	944823.0579	1258755.1293
122	L	362+00.00	944910.1776	1258706.0768
123	L	363+00.00	945000.6671	1258663.5689
124	L	364+00.00	945094.0941	1258627.9784
125	L	365+00.00	945189.9306	1258599.5063
126	L	366+00.00	945287.6141	1258578.2044
127	L	367+00.00	945386.4085	1258562.7878
128	L	368+00.00	945485.7159	1258551.0621
129	L	369+00.00	945585.1860	1258540.7819
130	L	370+00.00	945684.6007	1258529.9854
131	L	371+00.00	945783.7685	1258517.1368
132	L	372+00.00	945882.4080	1258500.7456
133	L	373+00.00	945980.1464	1258479.6477
134	L	374+00.00	946076.7082	1258453.6912
135	L	375+00.00	946171.8520	1258422.9411
136	L	376+00.00	946265.3401	1258387.4743
137	L	377+00.00	946356.9387	1258347.3793
138	L	378+00.00	946446.4190	1258302.7564
139	L	379+00.00	946533.6867	1258253.9419
140	L	380+00.00	946619.2115	1258202.1260
141	L	381+00.00	946703.7086	1258148.6460
142	L	382+00.00	946787.9211	1258094.7178
143	L	383+00.00	946872.1303	1258040.7844
144	L	384+00.00	946956.3395	1257986.8510
145	L	385+00.00	947040.5487	1257932.9176
146	L	386+00.00	947124.7579	1257878.9842
147	L	387+00.00	947209.0092	1257825.1166
148	L	388+00.00	947293.7995	1257772.1039
149	L	389+00.00	947379.8563	1257721.1781
150	L	390+00.00	947467.4944	1257673.0252
151	L	391+00.00	947556.6399	1257627.7238
152	L	392+00.00	947647.1884	1257585.2955
153	L	393+00.00	947738.7634	1257545.1239
154	L	394+00.00	947830.7534	1257505.9089
155	L	395+00.00	947922.4647	1257466.0495
156	L	396+00.00	948012.9632	1257423.5215
157	L	397+00.00	948101.1156	1257376.3432
158	L	398+00.00	948185.6807	1257323.0137
159	L	399+00.00	948266.0009	1257263.4827
160	L	400+00.00	948341.6225	1257198.0864
161	L	401+00.00	948412.1180	1257127.1944
162	L	402+00.00	948477.0891	1257051.2073
163	L	403+00.00	948536.1687	1256970.5544

Point #	Chain	Station	Northing (Y)	Easting (X)
164	L	404+00.00	948589.0275	1256885.6941
165	L	405+00.00	948635.9968	1256797.4272
166	L	406+00.00	948678.7754	1256707.0451
167	L	407+00.00	948719.3594	1256615.6514
168	L	408+00.00	948759.8172	1256524.2016
169	L	409+00.00	948802.2210	1256435.0521
170	L	410+00.00	948848.5798	1256343.6416
171	L	411+00.00	948900.6732	1256259.7188
172	L	412+00.00	948959.0146	1256178.5304
173	L	413+00.00	949023.2898	1256101.9537
174	L	414+00.00	949093.1357	1256030.4216
175	L	415+00.00	949168.1575	1255964.3381
176	L	416+00.00	949247.9300	1255904.0750
177	L	417+00.00	949331.6743	1255849.4498
178	L	418+00.00	949417.9661	1255798.9267
179	L	419+00.00	949505.5230	1255750.6192
180	L	420+00.00	949593.3365	1255702.7778
181	L	421+00.00	949681.1502	1255654.9369
182	L	422+00.00	949768.9639	1255607.0960
183	L	423+00.00	949856.7776	1255559.2551
184	L	424+00.00	949944.5913	1255511.4142
185	L	425+00.00	950032.4050	1255463.5733
186	L	426+00.00	950120.2188	1255415.7324
187	L	427+00.00	950208.0325	1255367.8915
188	L	428+00.00	950295.8462	1255320.0506
189	L	429+00.00	950383.6599	1255272.2097
190	L	430+00.00	950471.4736	1255224.3688
191	L	431+00.00	950559.2873	1255176.5279
192	L	432+00.00	950647.1011	1255128.6870
193	L	433+00.00	950734.9148	1255080.8462
194	L	434+00.00	950822.7285	1255033.0053
195	L	435+00.00	950910.5422	1254985.1644
196	L	436+00.00	950998.4389	1254937.4764
197	L	437+00.00	951086.9722	1254890.9848
198	L	438+00.00	951176.8115	1254847.0784
199	L	439+00.00	951268.3429	1254806.8220
200	L	440+00.00	951361.4716	1254770.4133
201	L	441+00.00	951456.0361	1254737.9155
202	L	442+00.00	951551.8722	1254709.3849
203	L	443+00.00	951648.8135	1254684.8710
204	L	444+00.00	951746.6919	1254664.4165
205	L	445+00.00	951845.3373	1254648.0569
206	L	446+00.00	951944.5785	1254635.8205
207	L	447+00.00	952044.2368	1254627.6347
208	L	448+00.00	952144.1027	1254622.4991
209	L	449+00.00	952244.0370	1254618.8820
210	L	450+00.00	952343.9801	1254615.5105
211	L	451+00.00	952443.9233	1254612.1391
212	L	452+00.00	952543.8664	1254608.7677
213	L	453+00.00	952643.8096	1254605.3962
214	L	454+00.00	952743.7527	1254602.0248
215	L	455+00.00	952843.6877	1254598.4251
216	L	456+00.00	952943.5680	1254593.5639
217	L	457+00.00	953043.2954	1254586.2378
218	L	458+00.00	953142.7301	1254575.6636
219	L	459+00.00	953241.7572	1254561.7814
220	L	460+00.00	953340.2666	1254544.6066
221	L	461+00.00	953438.1488	1254524.1583
222	L	462+00.00	953535.2968	1254500.4650
223	L	463+00.00	953631.7213	1254473.9725
224	L	464+00.00	953727.6703	1254445.8004
225	L	465+00.00	953823.4581	1254417.0827
226	L	466+00.00	953919.2409	1254388.3485
227	L	466+31.59	953949.4990	1254379.2712

LOCHNER

NC License
Number F-0159

SHEET NO.

2A-1

PAVEMENT DESIGN
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**



MD=MACHINE DIRECTION

12"

MD

BASE COURSE

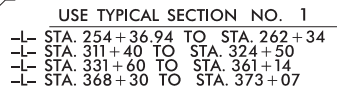
(K) (N)

GRADE TO THIS LINE

TYPICAL SECTION NO. 1A

*USE TYPICAL SECTION NO. 1A WITH TYPICALS 1, 2, 7 & 8

*THESE LOCATIONS TO BE INVESTIGATED
DURING CONSTRUCTION



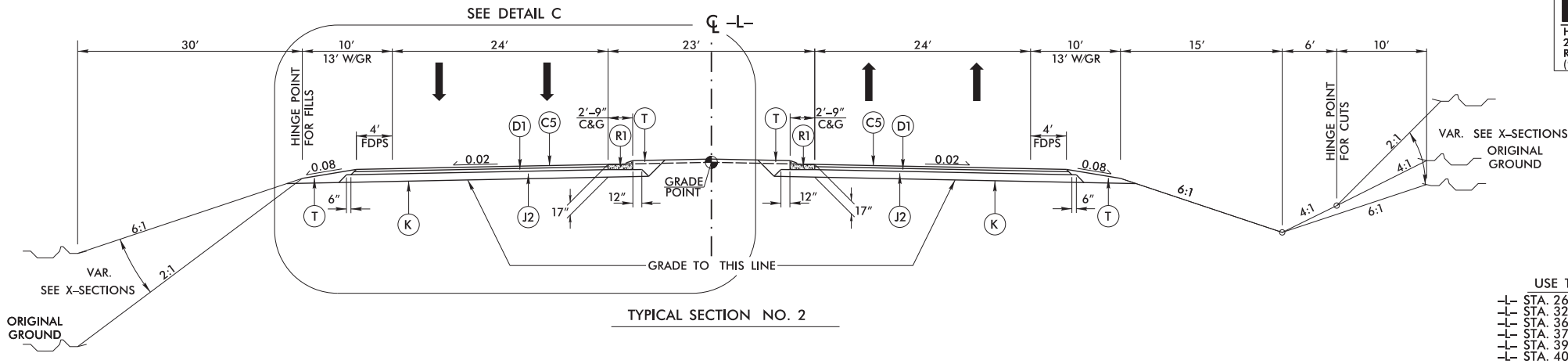
USE REVERSE OF TYPICAL SECTION NO. 1



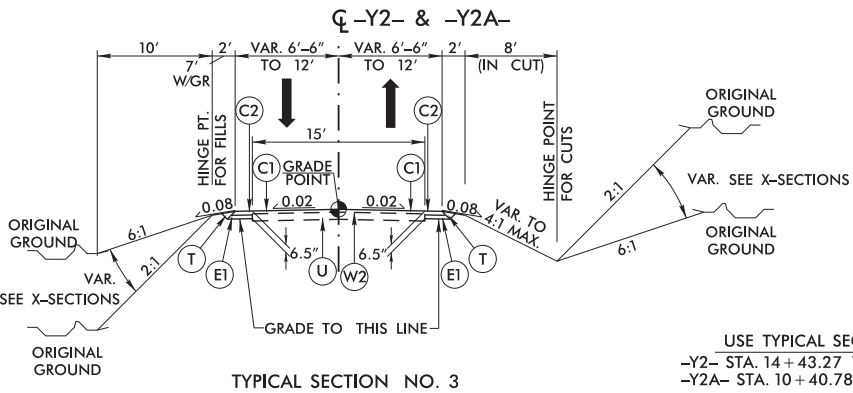
LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919)571-7111

NC License
Number F-0159

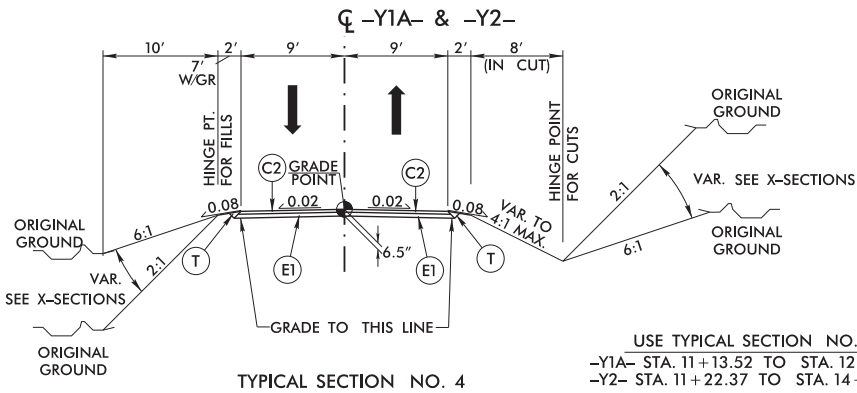
PROJECT REFERENCE NO.		SHEET NO.
R-2915C		2A-2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



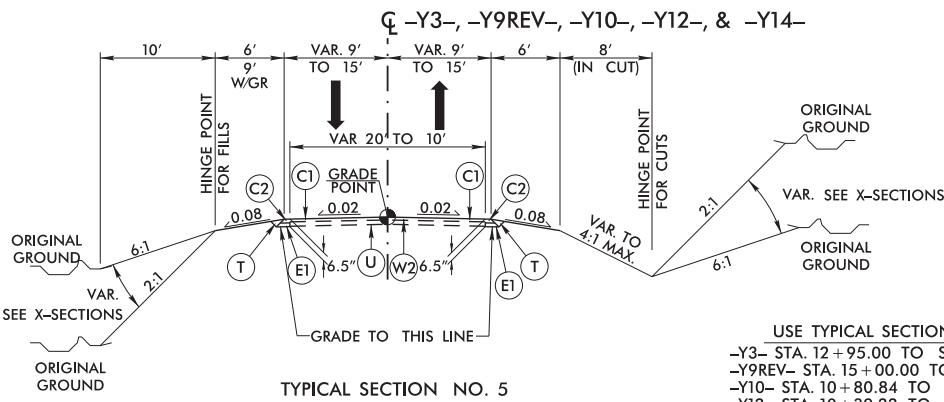
USE TYPICAL SECTION NO. 2
-L- STA. 262+34 TO STA. 311+40
-L- STA. 324+50 TO STA. 331+60
-L- STA. 361+14 TO STA. 368+30
-L- STA. 373+07 TO STA. 380+57
-L- STA. 395+50 TO STA. 405+30
-L- STA. 409+79 TO STA. 419+51



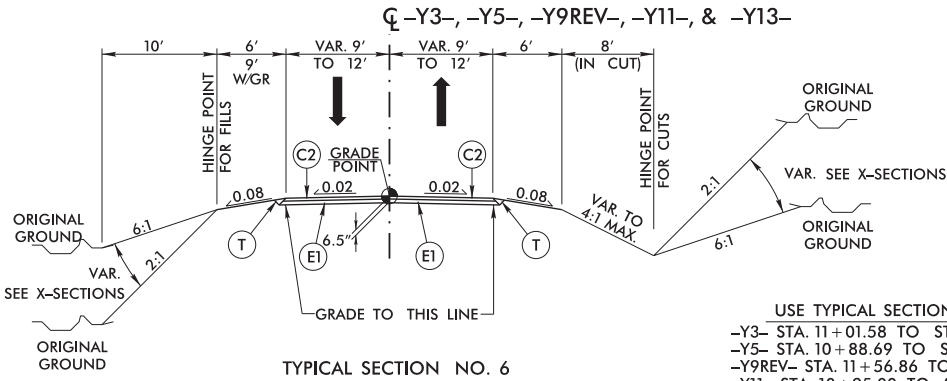
USE TYPICAL SECTION NO. 3
-Y2- STA. 14+43.27 TO STA. 14+72.93
-Y2A- STA. 10+40.78 TO STA. 10+65.00



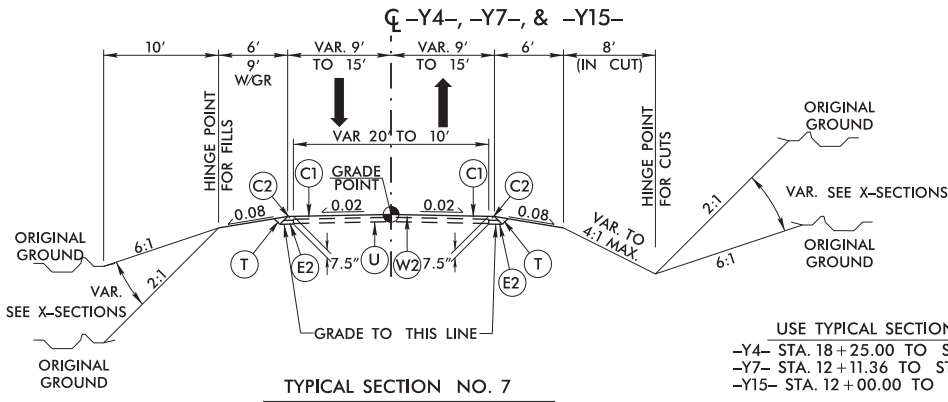
USE TYPICAL SECTION NO. 4
-Y1A- STA. 11+13.52 TO STA. 12+05.00
-Y2- STA. 11+22.37 TO STA. 14+43.27



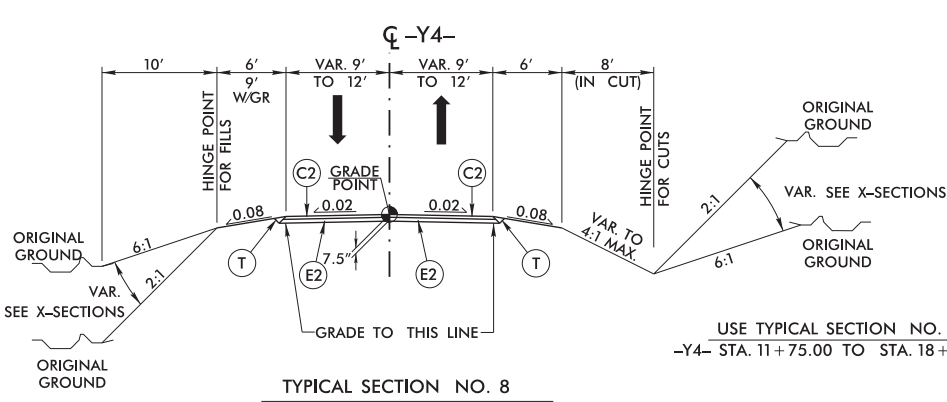
USE TYPICAL SECTION NO. 5
-Y3- STA. 12+95.00 TO STA. 13+45.00
-Y9REV- STA. 15+00.00 TO STA. 15+73.64
-Y10- STA. 10+80.84 TO STA. 11+05.00
-Y12- STA. 10+39.22 TO STA. 11+35.00
-Y14- STA. 11+06.72 TO STA. 11+95.00



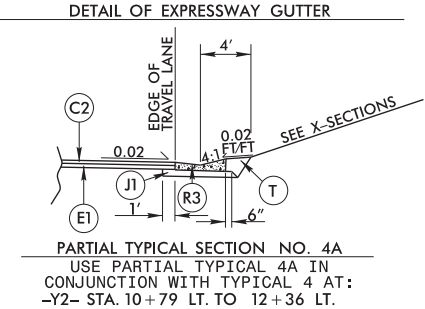
USE TYPICAL SECTION NO. 6
-Y3- STA. 11+01.58 TO STA. 12+95.00
-Y5- STA. 10+88.69 TO STA. 13+15.00
-Y9REV- STA. 11+56.86 TO STA. 15+00.00
-Y11- STA. 10+95.00 TO STA. 16+78.33
-Y13- STA. 10+50.00 TO STA. 11+96.54



USE TYPICAL SECTION NO. 7
-Y4- STA. 18+25.00 TO STA. 19+26.60
-Y7- STA. 12+11.36 TO STA. 13+30.00
-Y15- STA. 12+00.00 TO STA. 13+31.45



USE TYPICAL SECTION NO. 8
-Y4- STA. 11+75.00 TO STA. 18+25.00

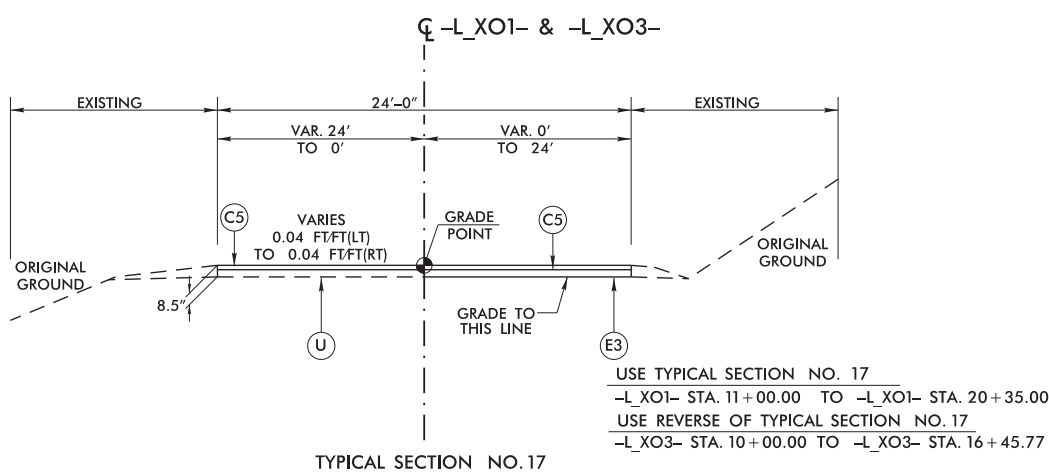
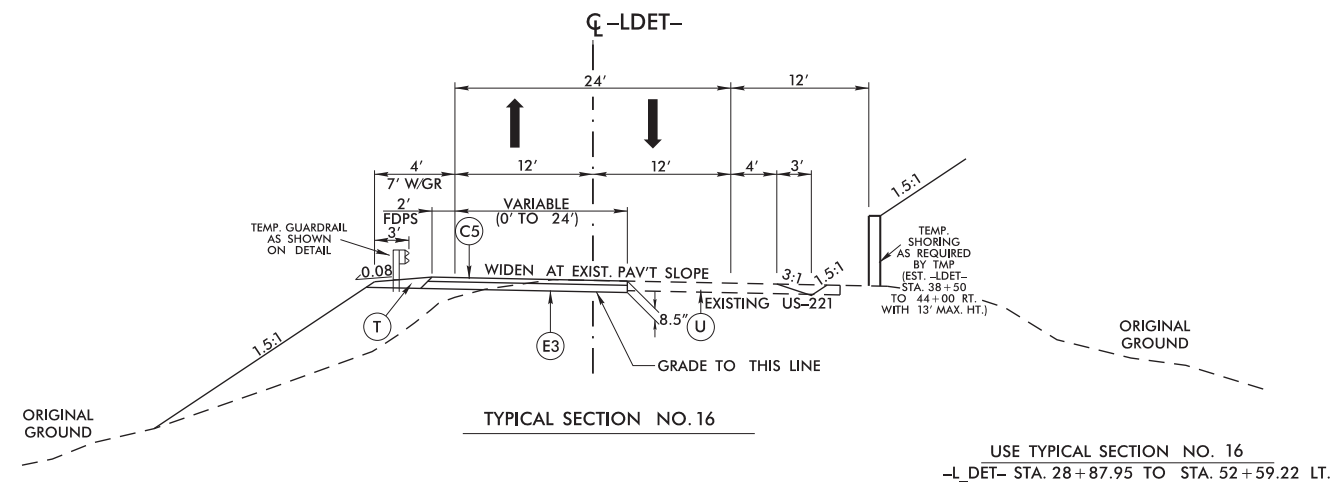
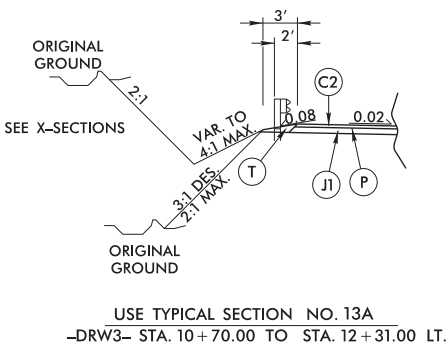
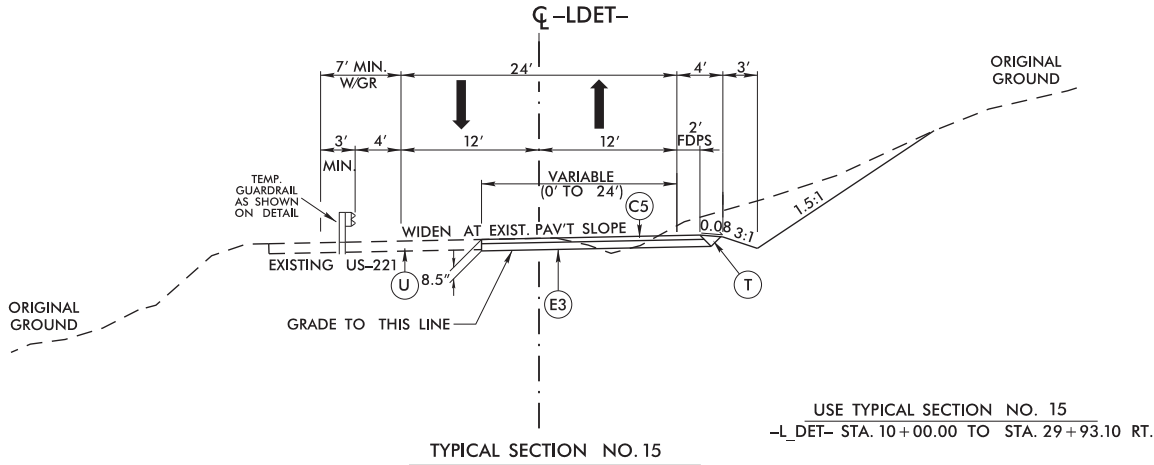
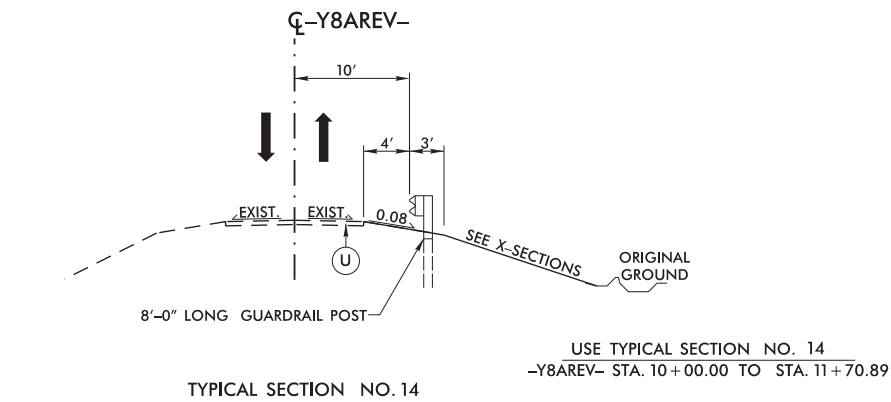
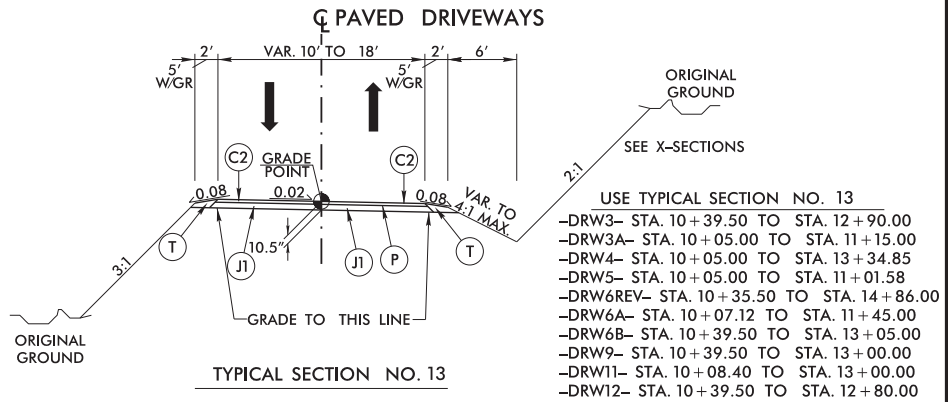
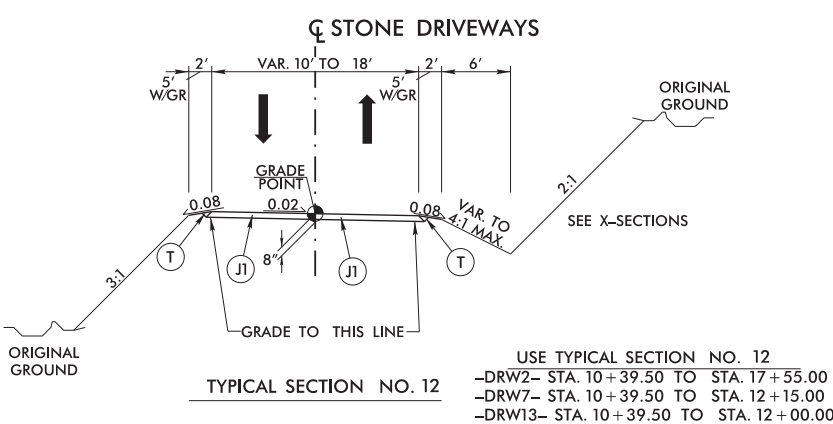
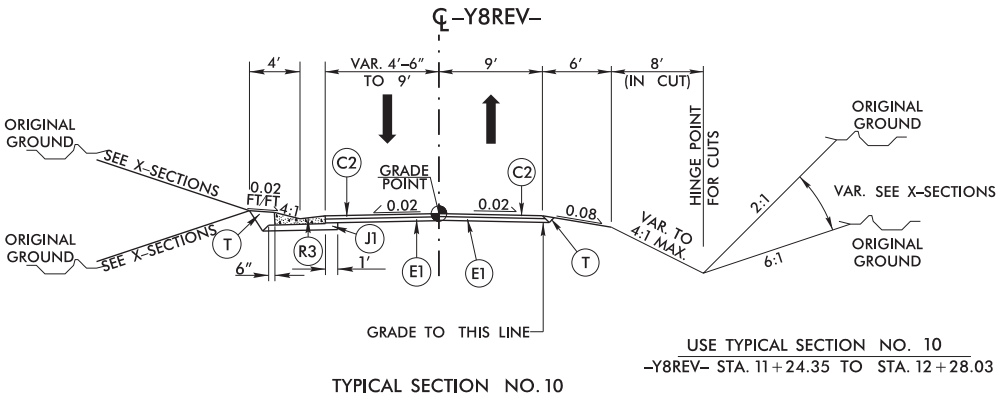
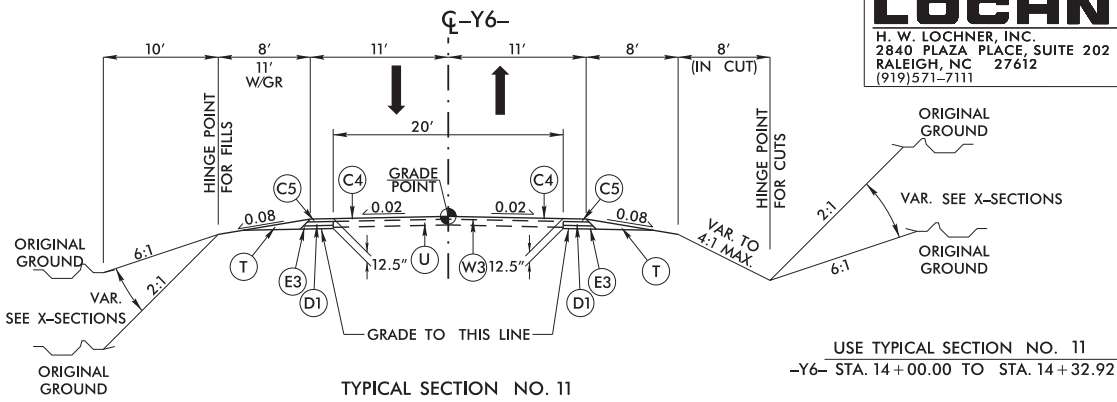
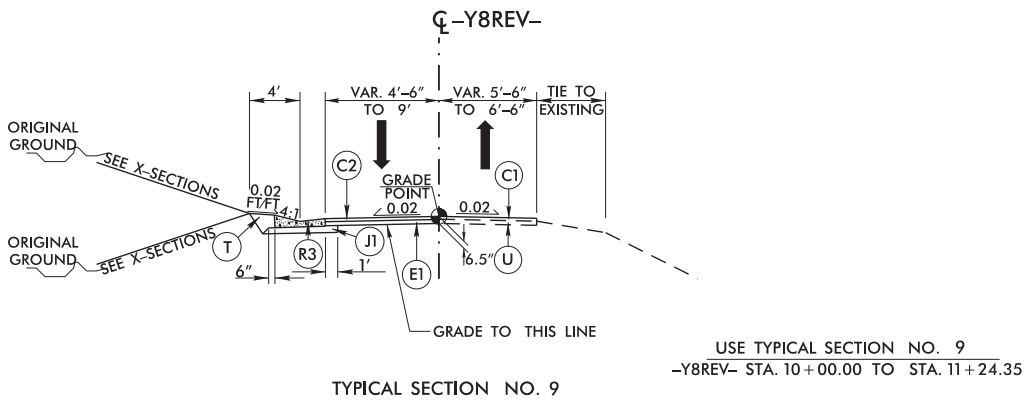


PAVEMENT SCHEDULE	
C1	1.25" TYPE SF9.5A
C2	2.5" TYPE SF9.5A
C3	VAR. TYPE SF9.5A
C4	1.5" TYPE S9.5B
C5	3" TYPE S9.5B
C6	VAR. TYPE S9.5B
D1	4" TYPE I19.0B
D2	VAR. TYPE I19.0B
E1	4" TYPE B25.0B
E2	5" TYPE B25.0B
E3	5.5" TYPE B25.0B
E4	VAR. TYPE B25.0B
J1	8" ABC
J2	10" ABC
K	8" LIME OR 7" CEMENT
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
V	MILLING
R1	2'-9" C & G
R2	SHOULDER BERM GUTTER
R3	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W1	WEDGING SEE DETAIL 1
W2	WEDGING SEE DETAIL 2
W3	WEDGING SEE DETAIL 3

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PROJECT REFERENCE NO.		SHEET NO.
R-2915C		2A-3
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		



PAVEMENT SCHEDULE	
C1	1.25" TYPE SF9.5A
C2	2.5" TYPE SF9.5A
C3	VAR. TYPE SF9.5A
C4	1.5" TYPE S9.5B
C5	3" TYPE S9.5B
C6	VAR. TYPE S9.5B
D1	4" TYPE I19.0B
D2	VAR. TYPE I19.0B
E1	4" TYPE B25.0B
E2	5" TYPE B25.0B
E3	5.5" TYPE B25.0B
E4	VAR. TYPE B25.0B
J1	8" ABC
J2	10" ABC
K	8" LIME OR 7" CEMENT
N	GEOTEXTILE FOR PAVEMENT STABILIZATION
V	MILLING
R1	2'-9" C & G
R2	SHOULDER BERM GUTTER
R3	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W1	WEDGING SEE DETAIL 1
W2	WEDGING SEE DETAIL 2
W3	WEDGING SEE DETAIL 3



DETAIL SHOWING
-L- DETOUR

SEE SHEET 2A-3 FOR -L_DET- TYPICAL SECTION

SEE SHEET 2B-3 FOR -L_DET- PROFILE

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Number F-0159

HNTB
343 E. SIX FORKS ROAD, SUITE 200 NC License
RALEIGH, NC 27609 Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

2B-1

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

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BEGIN CONSTRUCTION
-L-DET- POT Sta. 10+00.0
-L- POC Sta. 270+68.79
OFFSET 128.79' LT

-L_DET-
PI Sta 12+80.38
Δ = 26° 27' 12.5" (LT)
D = 5° 24' 18.9"
L = 489.40'
T = 249.14'
R = 1,060.00'
R0 = EXISTING

DETAIL AM

TEMPORARY CUT DITCH
(Not to Scale)

FROM -L DET- STA. 18+33 TO STA. 19+60 RT

83
NAD
CORS

83
NAD
CORS

DETAIL SHOWING
-L- DETOUR

-L-DET-

PI Sta 30+29.28
Δ = 56° 02' 03.1" (RT)
D = 6° 52' 41.7"
L = 814.66'
T = 443.23'
R = 833.00'
R_o = EXISTING

MATCH TO SHEET 2B-1
-L_DET - STA. 24+00.00

SEE SHEET 2B-3 FOR -L_DET- PROFILE

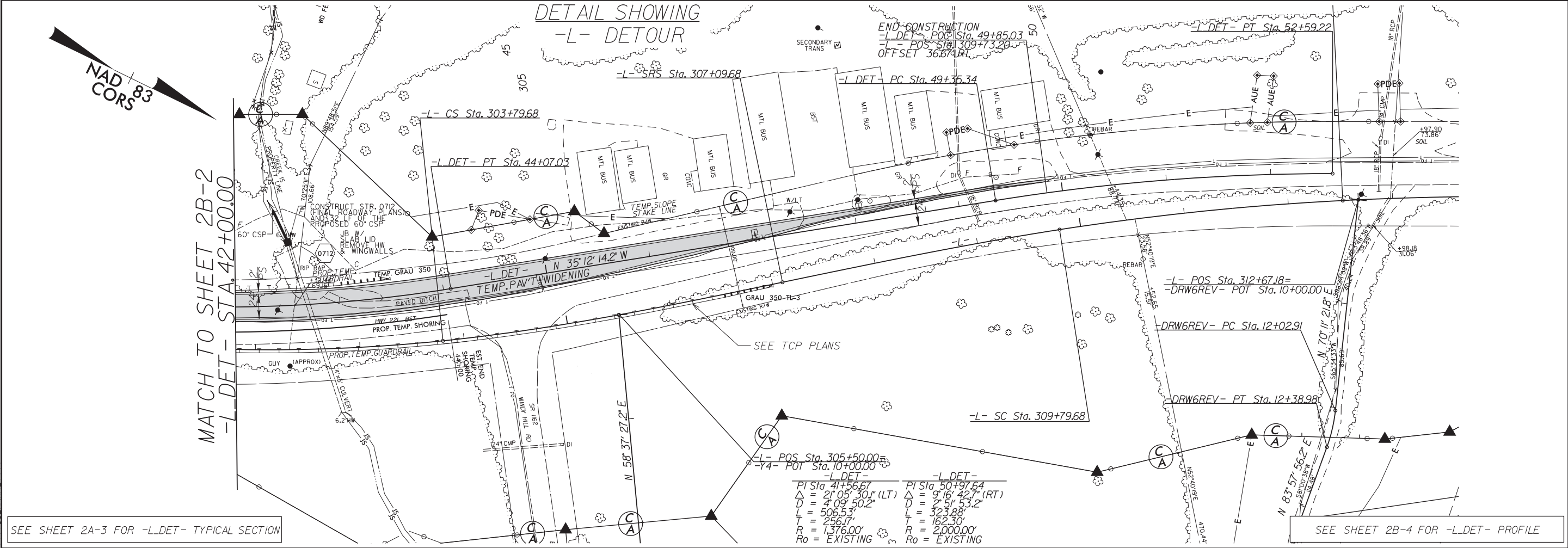
SEE SHEET 2B-3 FOR -DRW2TEMP- PROFILE

SEE SHEET 2B-4 FOR -DRW3TEMP- PROFILE

SEE SHEET 2A-3 FOR -L_DET- TYPICAL SECTION

SEE SHEET 2A-3 FOR -DRW2TEMP- TYPICAL SECTION

SEE SHEET 2A-3 FOR -DRW3TEMP- TYPICAL SECTION



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-L_DET-

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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

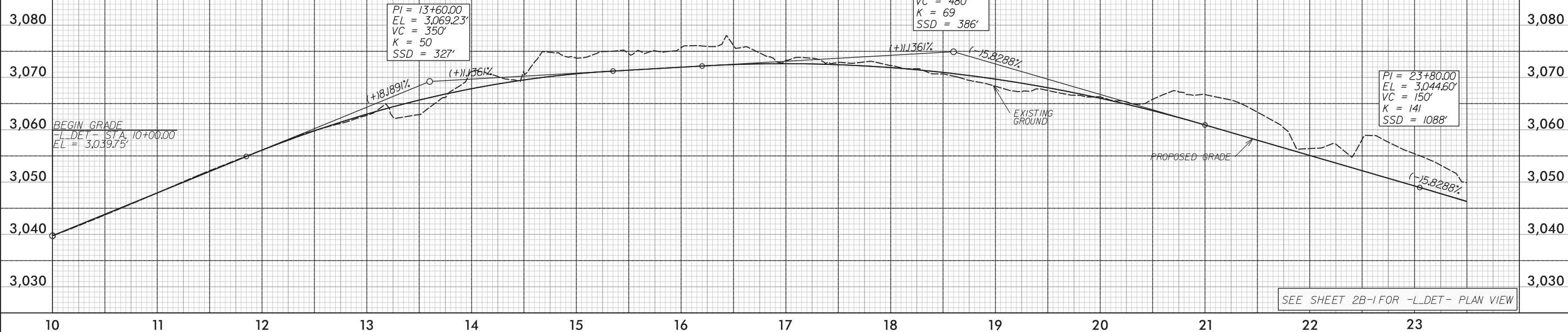
SHEET NO.

2B-3

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

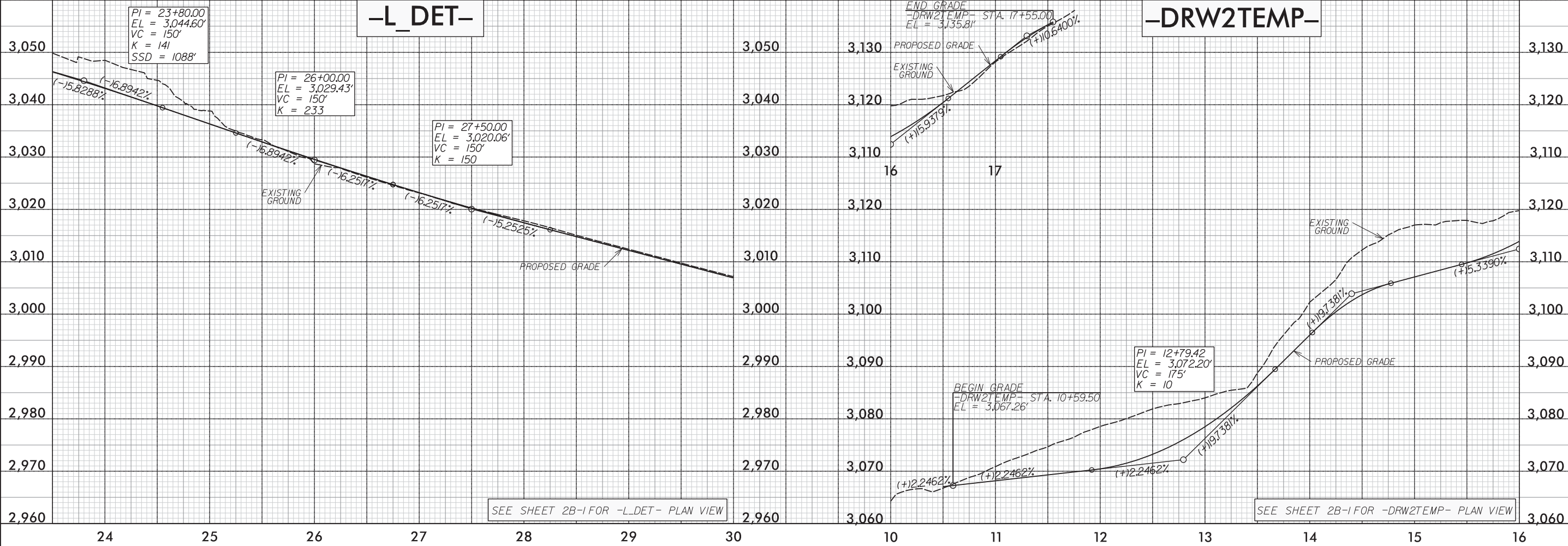
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 2B-1 FOR -L_DET- PLAN VIEW

-L_DET-

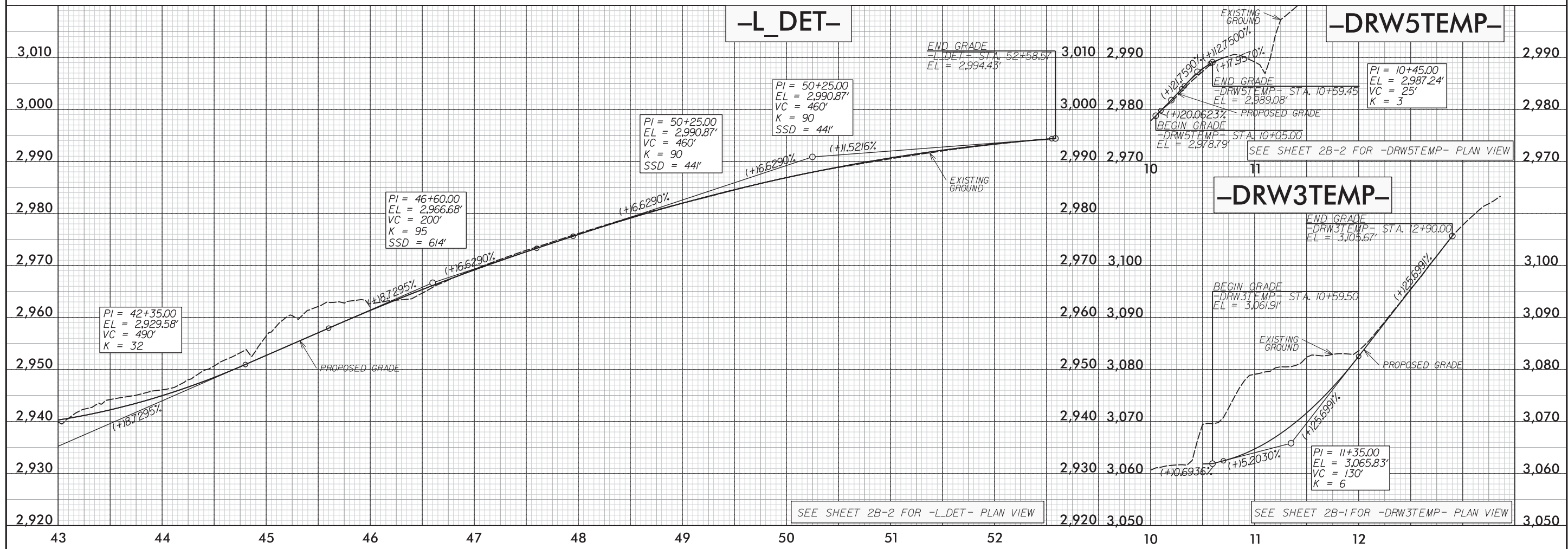
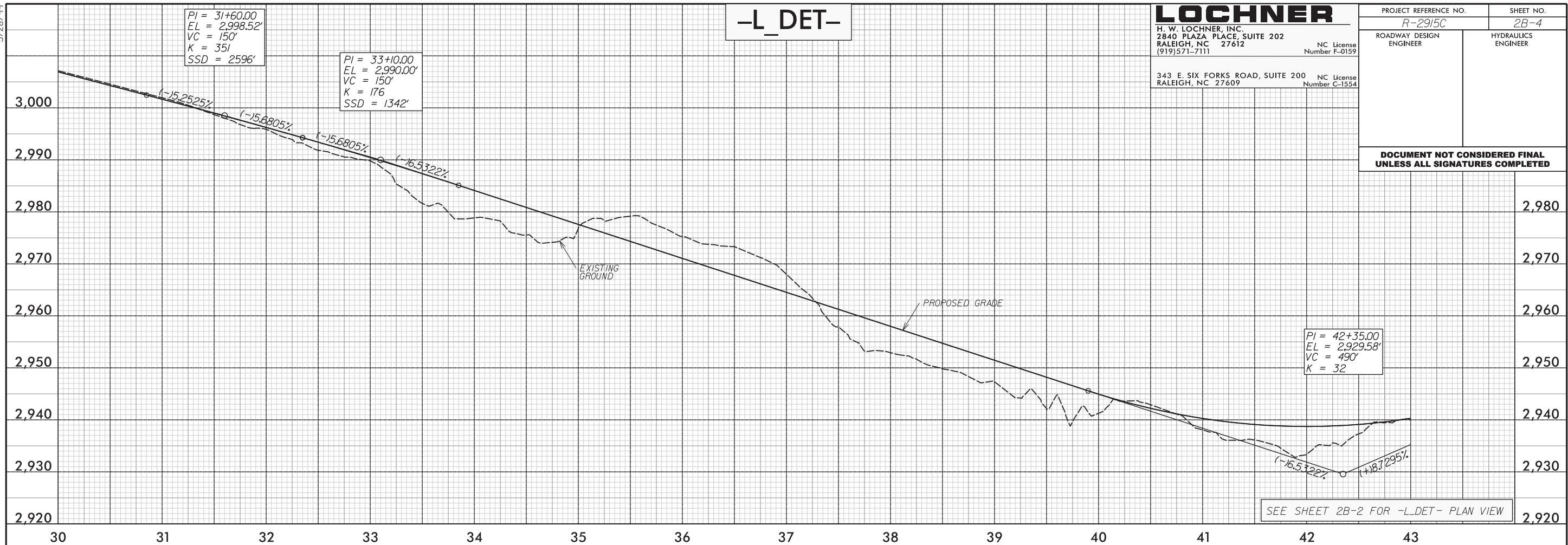
-DRW2TEMP-



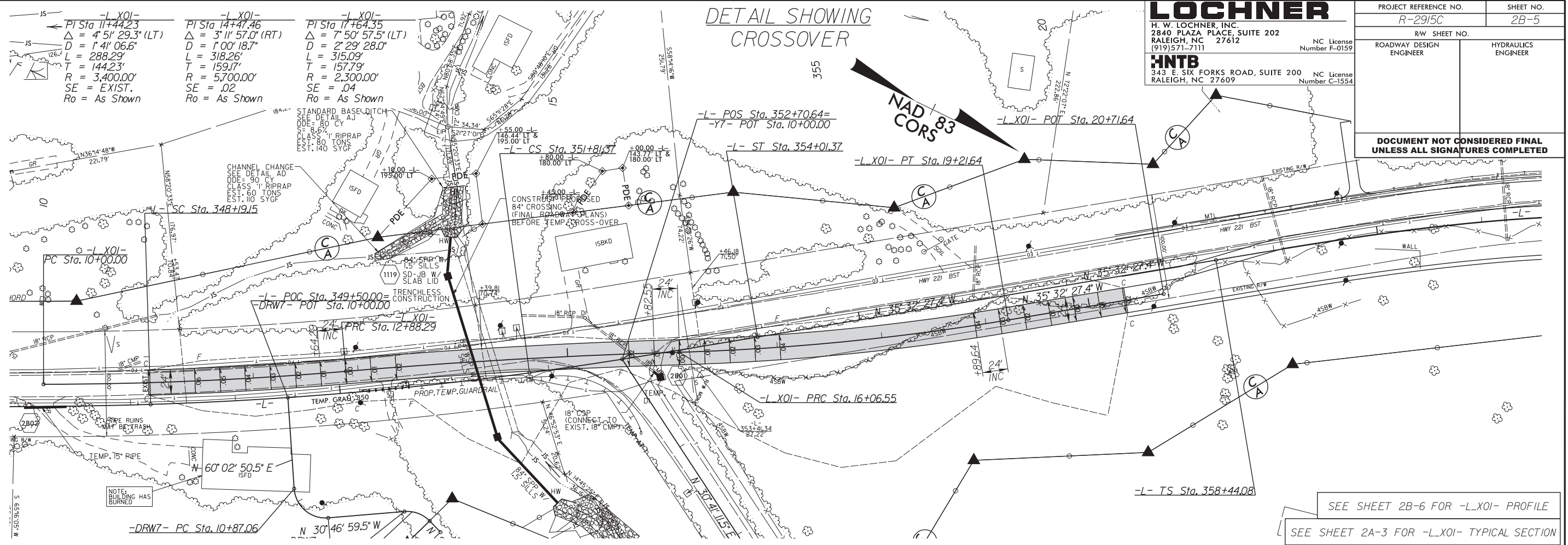
SEE SHEET 2B-1 FOR -L_DET- PLAN VIEW

SEE SHEET 2B-1 FOR -DRW2TEMP- PLAN VIEW

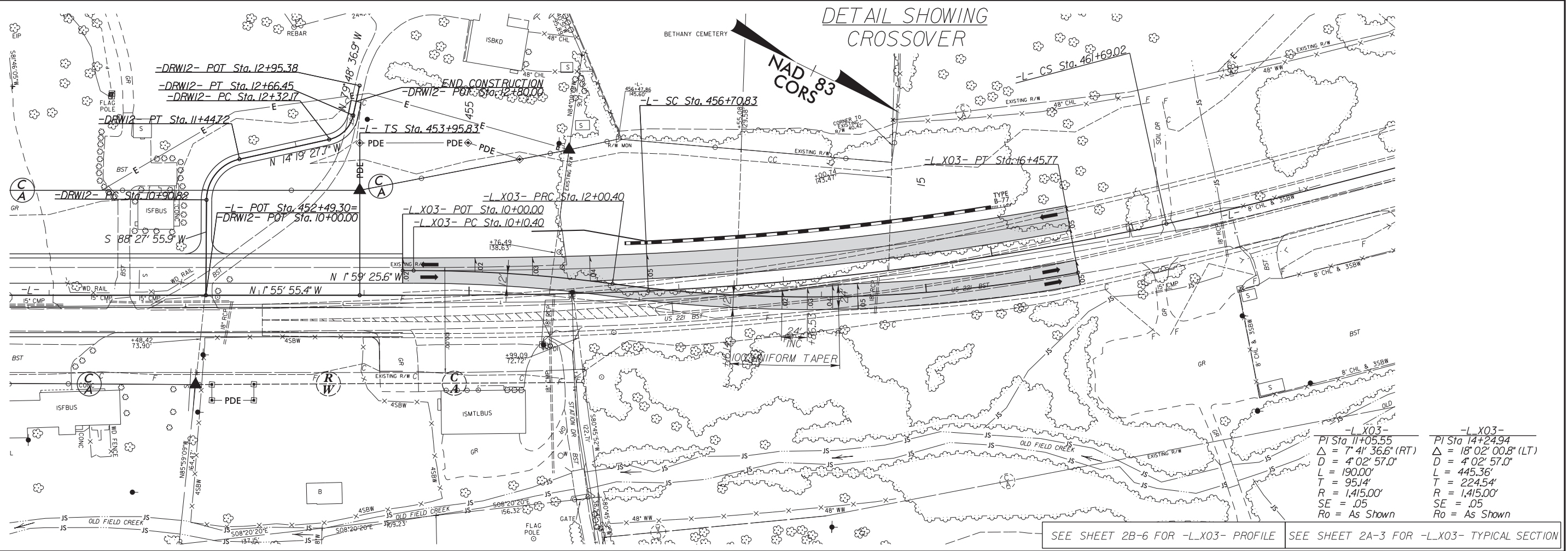
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LOCHNER



8/17/99



22 APR 2016 15:00 R2915C_r.dwg PSH02B-5.dgn
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-L_XO1-

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RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

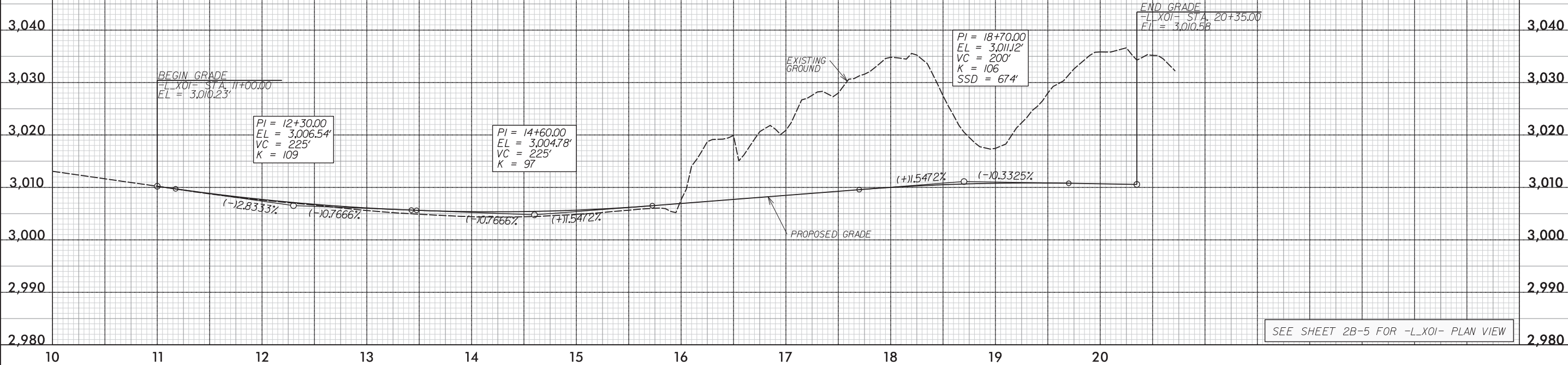
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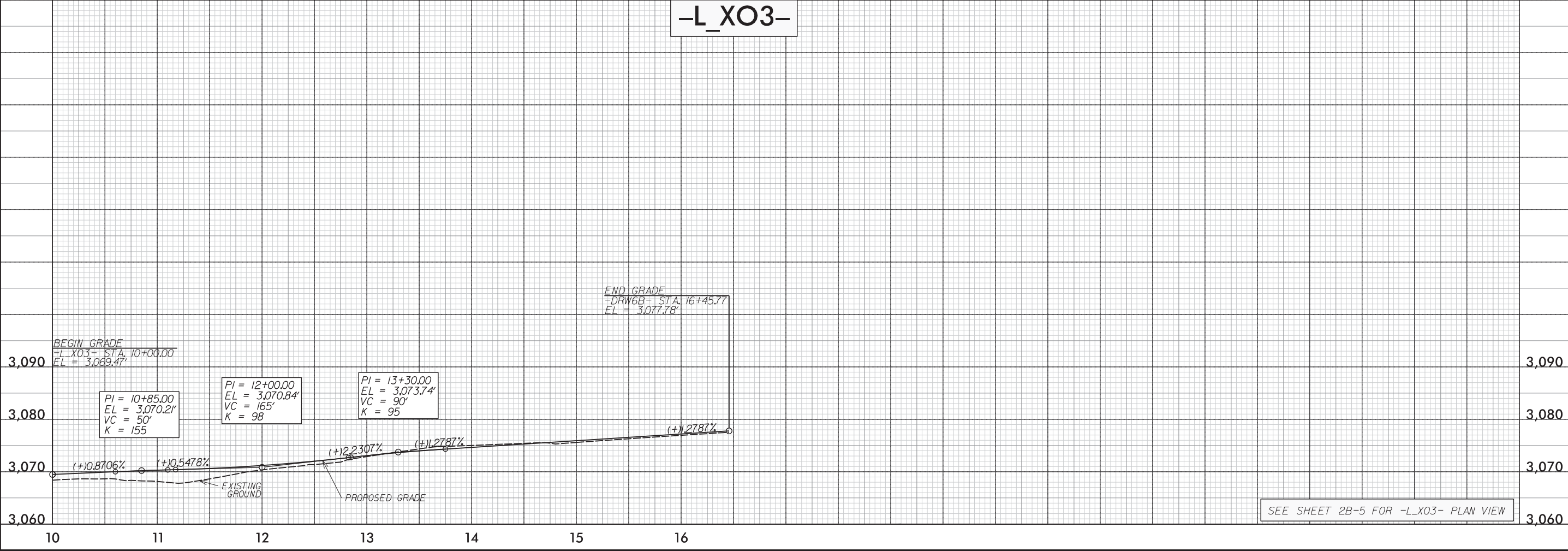
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



-L_XO3-



8/17/99

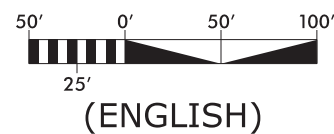
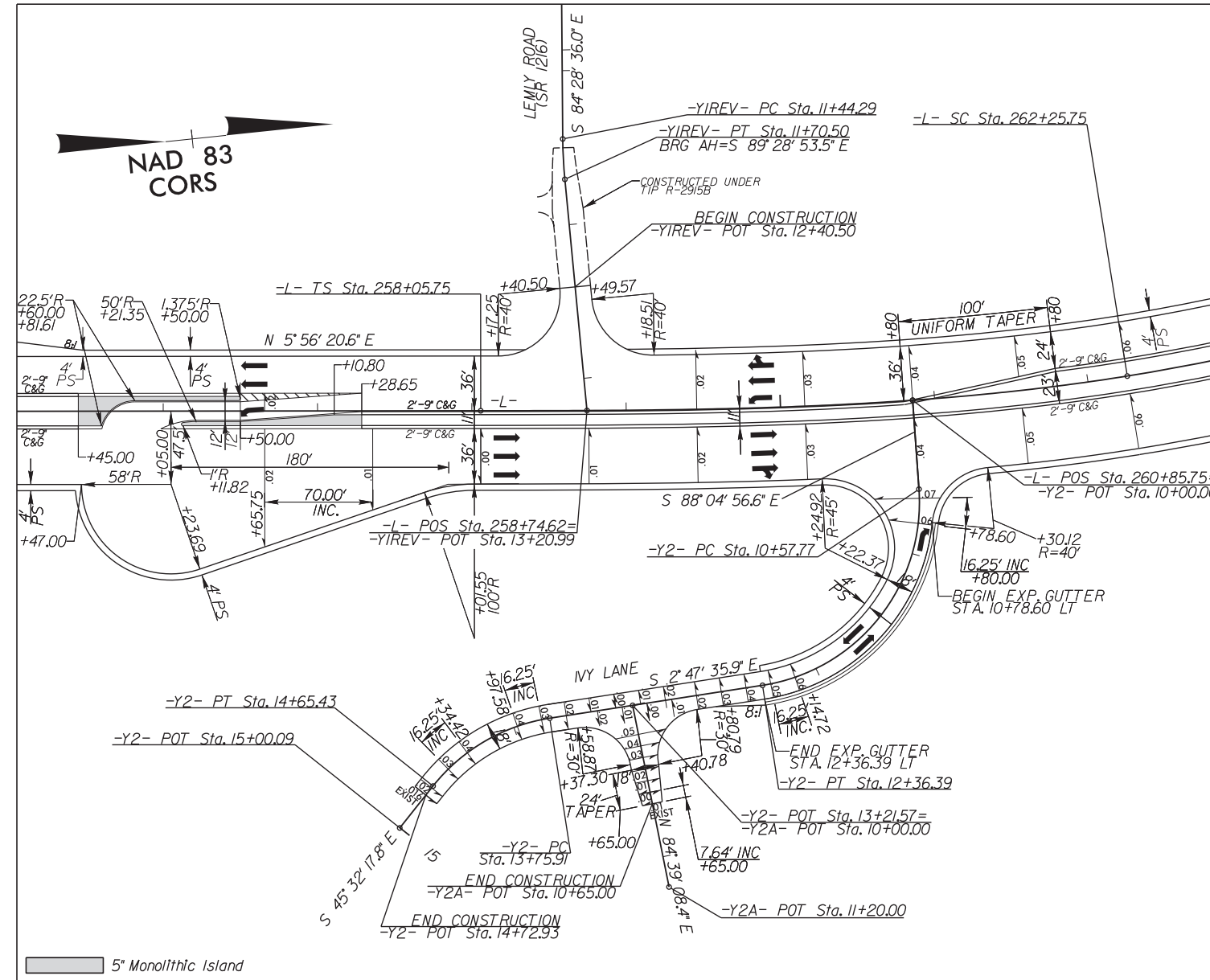
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\$\$\$\$\$

DETAIL SHOWING
INTERSECTION OF -L- (US 221) AT -YIREV- LEMLY ROAD (SR 1216)
& -Y2- IVY LANE

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RALEIGH, NC 27609
NC License
Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	2B-7
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

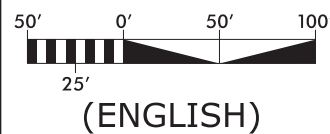
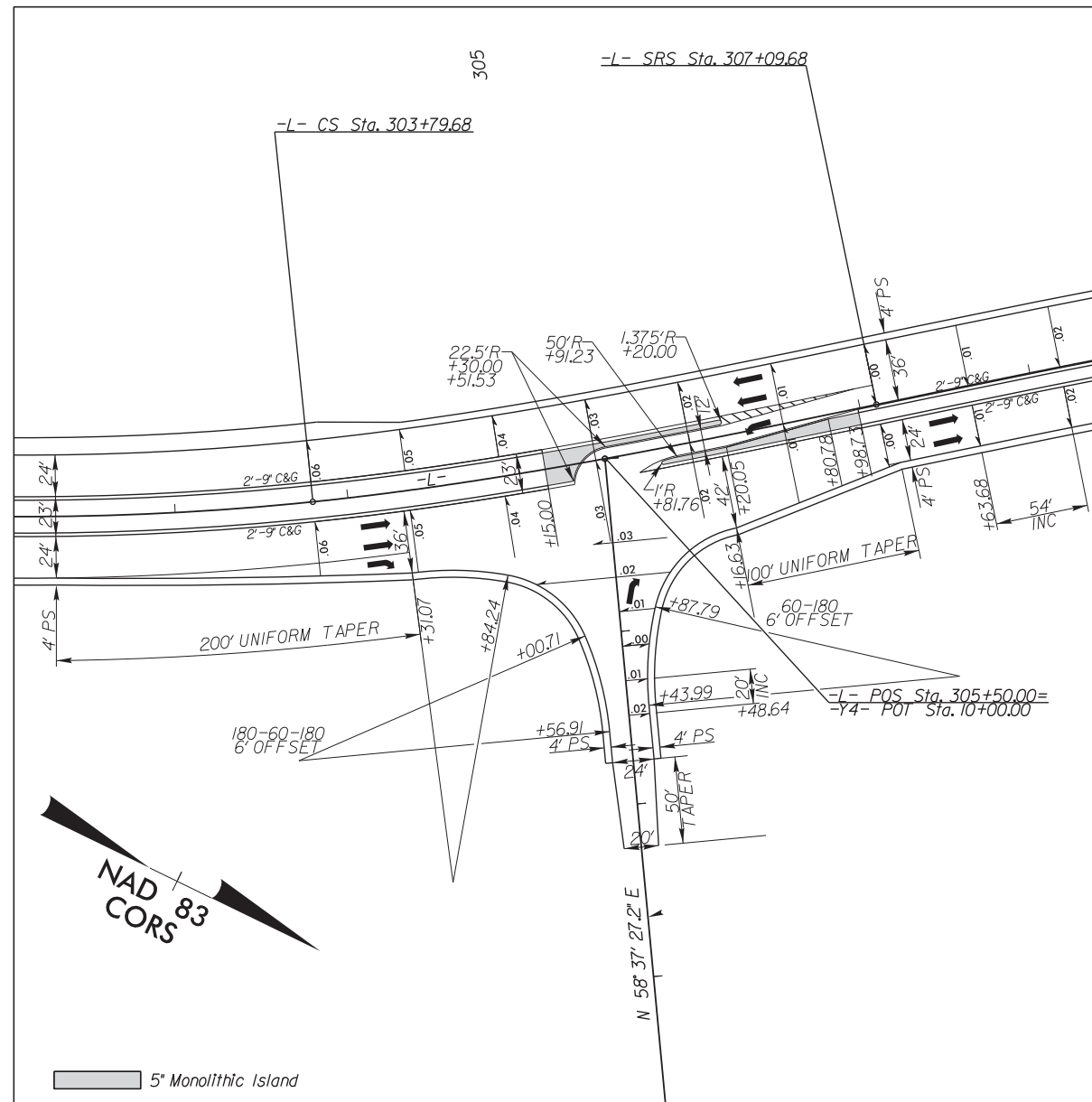


-L-		-Y2-		-Y2-	
PI Sta 260+86.12	PI Sta 269+92.55	PI Sta 277+27.08	PI Sta 11+68.28	PI Sta 14+22.87	
$\Delta = 9^{\circ} 02' 48.1''$	$\Delta = 59^{\circ} 55' 50.5''$ (LT)	$\Delta = 7^{\circ} 06' 29.2''$	$\Delta = 85^{\circ} 17' 20.7''$ (RT)	$\Delta = 42^{\circ} 44' 42.0''$ (LT)	
LS = 420.00'	D = 4' 18' 28.6"	LS = 330.00'	D = 47' 44' 47.3"	D = 47' 44' 47.3"	
LT = 280.37'	L = 139.16'	LT = 220.18'	L = 178.63'	L = 89.52'	
ST = 140.33'	T = 766.80'	ST = 110.16'	T = 110.52'	T = 46.96'	
	R = 1,330.00'		R = 120.00'	R = 120.00'	
	SE = .06		SE = .06	SE = .04	
	Ro = As Shown		Ro = As Shown	Ro = As Shown	

SEE SHEET 4 FOR ROADWAY PLAN VIEW

DETAIL SHOWING

INTERSECTION OF -L- (US 221) AT
-Y4- WINDY HILL ROAD (SR 1169)



<i>P</i> ₁ <i>S</i> ₁ 299+38.03	<i>P</i> ₁ <i>S</i> ₁ 302+14.38	<i>P</i> ₁ <i>S</i> ₁ 304+89.79
Θ _s = 5° 50' 08.5"	Δ = 1" 44' 01.8" (LT)	Θ _s = 5° 50' 08.5"
<i>L</i> _s = 330.00'	<i>D</i> = 3° 32' 12.4"	<i>L</i> _s = 330.00'
<i>LT</i> = 220.12'	<i>T</i> = 331.77'	<i>LT</i> = 220.12'
<i>ST</i> = 110.11'	<i>T</i> = 166.47'	<i>ST</i> = 110.11'
	<i>R</i> = 1,620.00'	
	<i>SE</i> = .06	
	<i>Ro</i> = <i>As</i> Shown	

SEE SHEET 8 FOR ROADWAY PLAN VIEW

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RALEIGH, NC 27609 Number C-1554

PROJECT REFERENCE NO.

R-29/5C

SHEET NO.

2B-8

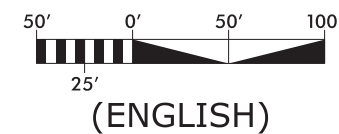
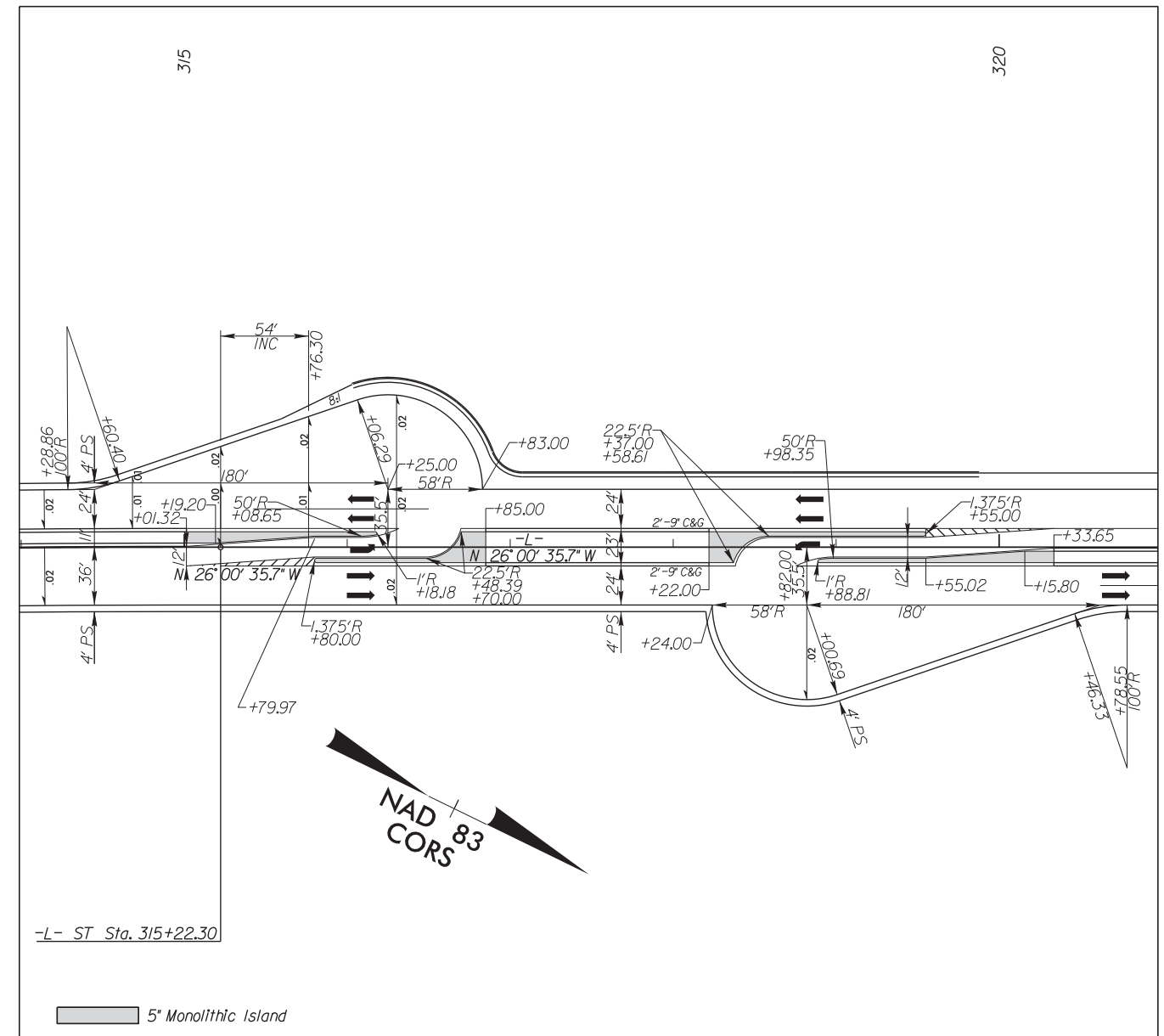
RW SHEET NO.

ROADWAY DESIGN
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

DETAIL SHOWING

INTERSECTION OF -L- (US 221) AT
JUG HANDLES

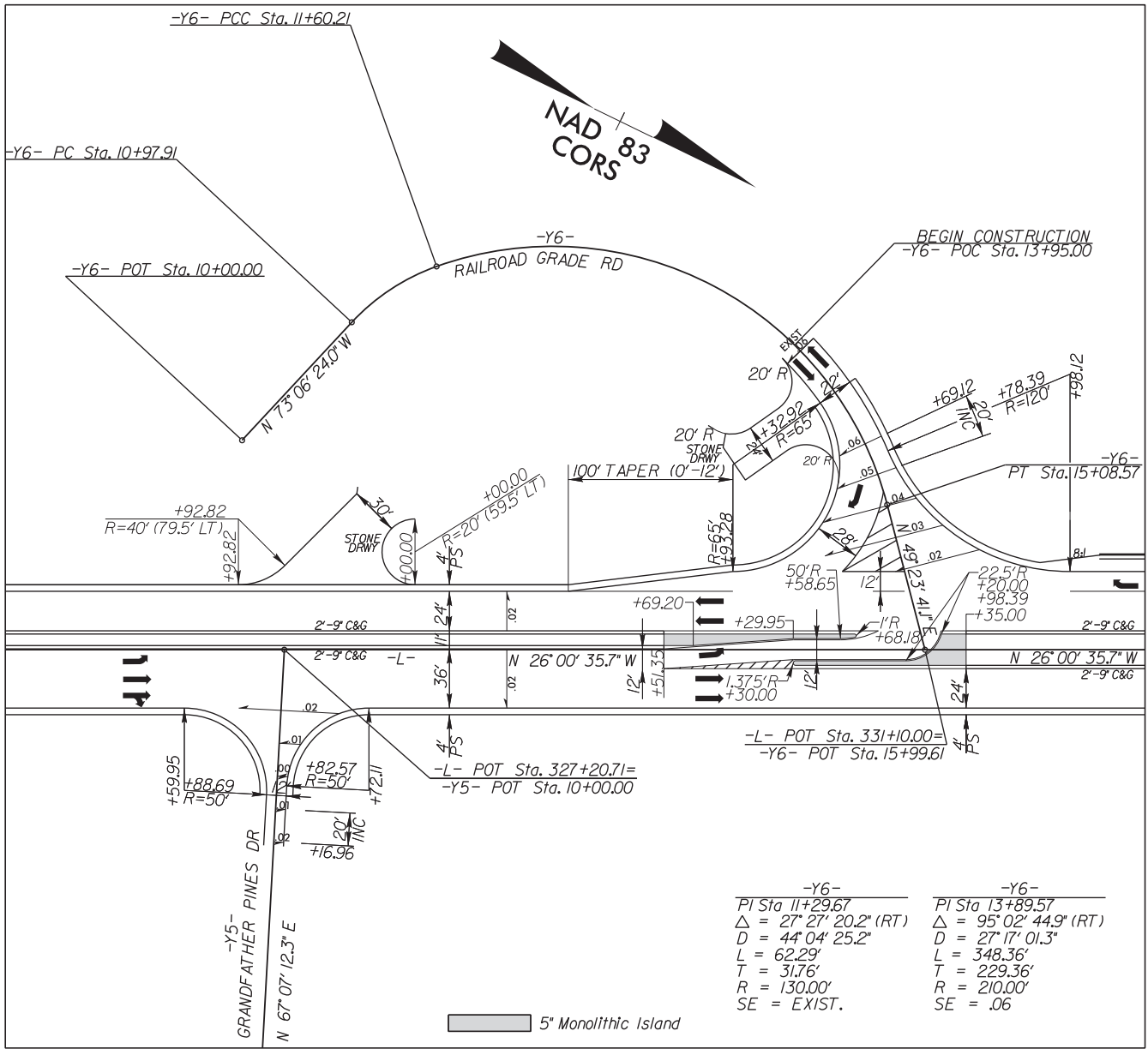


<i>Pls Sta 308+89.70</i>	<i>PI Sta 311+16.11</i>	<i>Pls Sta 313+42.33</i>
<i>Θs = 2° 55' 07.8"</i>	<i>Δ = 5° 53' 40.2" (RT)</i>	<i>Θs = 2° 55' 07.8"</i>
<i>Ls = 270.00'</i>	<i>D = 2° 09' 43.6"</i>	<i>Ls = 270.00'</i>
<i>LT = 180.02'</i>	<i>L = 272.63'</i>	<i>LT = 180.02'</i>
<i>ST = 90.02'</i>	<i>T = 136.43'</i>	<i>ST = 90.02'</i>
	<i>R = 2,650.00'</i>	
	<i>SE = .05</i>	
	<i>Ro = As Shown</i>	

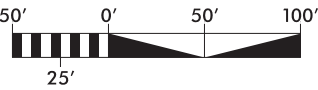
SEE SHEETS 8 & 9 FOR ROADWAY PLAN VIEW

DETAIL SHOWING

INTERSECTION OF -L- (US 221) AT
-Y5- GRANDFATHER PINES DRIVE &
-Y6- RAILROAD GRADE ROAD (SR 1106)



-Y6-	-Y6-
PI Sta 11+29.67	PI Sta 13+89.57
$\Delta = 27^\circ 27' 20.2''$ (RT)	$\Delta = 95^\circ 02' 44.9''$ (RT)
D = 44' 04" 25.2"	D = 27' 17" 01.3"
L = 62.29'	L = 348.36'
T = 31.76'	T = 229.36'
R = 130.00'	R = 210.00'
SE = EXIST.	SE = .06



(ENGLISH)

SEE SHEETS 9 & 10 FOR ROADWAY PLAN VIEWS

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343 E. SIX FORKS ROAD, SUITE 200
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Number C-1554

PROJECT REFERENCE NO. SHEET NO.

R-2915C 2B-9

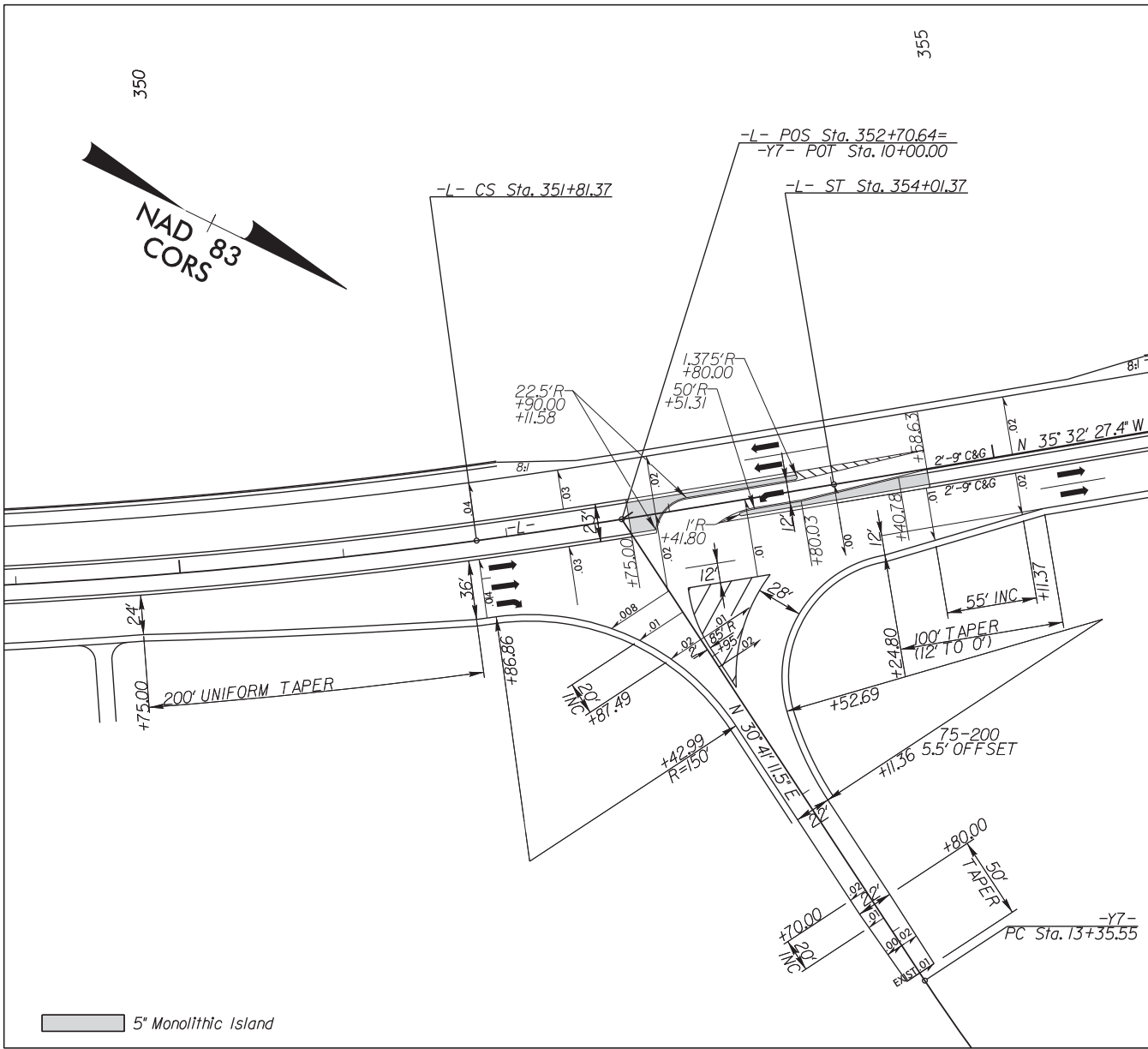
RW SHEET NO.

ROADWAY DESIGN
ENGINEER

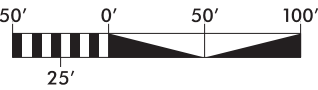
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

DETAIL SHOWING

INTERSECTION OF -L- (US 221) AT
-Y7- WATER TANK ROAD (SR 1177)



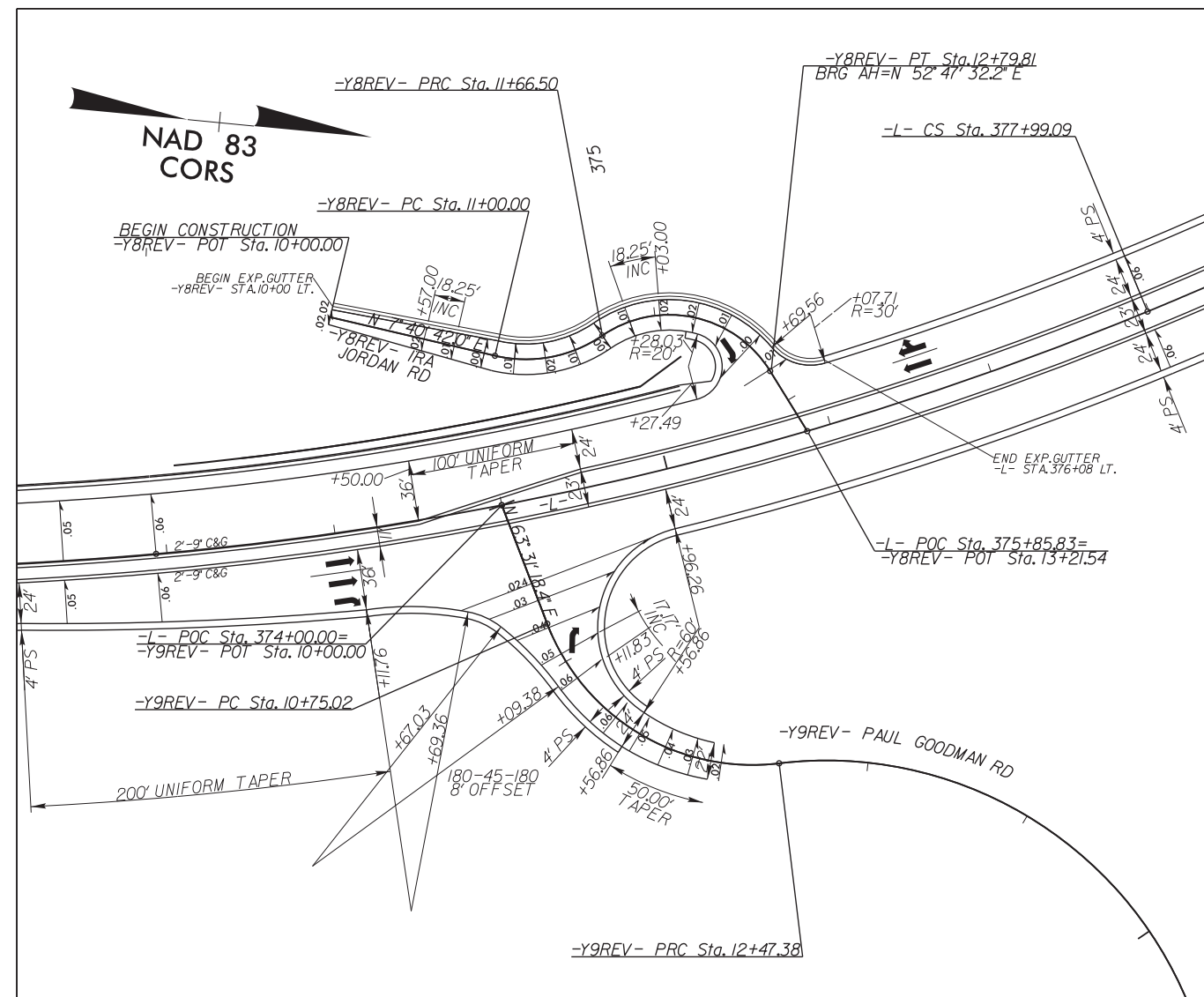
-L-	-L-	-L-
PIs Sta 347+45.83	PI Sta 350+00.42	PIs Sta 352+54.71
$\Theta_s = 1^\circ 48' 02.6''$	$\Delta = 5^\circ 55' 46.5''$ (LT)	$\Theta_s = 1^\circ 48' 02.6''$
Ls = 220.00'	D = 1' 38" 13.3"	Ls = 220.00'
LT = 146.67'	L = 362.22'	LT = 146.67'
ST = 73.34'	T = 181.27'	ST = 73.34'
	R = 3,500.00'	
	SE = .04	
	Ro = As Shown	



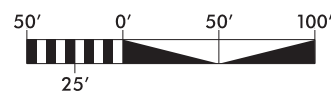
(ENGLISH)

SEE SHEET 11 FOR ROADWAY PLAN VIEW

DETAIL SHOWING
INTERSECTION OF -L- (US 221) AT
-Y8REV- IRA JORDAN ROAD &
-Y9REV- PAUL GOODMAN ROAD (SR 1178)



-L-				-Y8REV-				-Y9REV-			
Pls Sta 370+83.65	Pl Sta 374+98.67	Pls Sta 379+09.17	Pl Sta 11+35.31	Pl Sta 12+39.94	Pl Sta 11+76.52	Pl Sta 14+44.41					
Os = 4° 43' 36.8"	Δ = 17° 20' 48.7" (LT)	Os = 4° 43' 36.8"	Δ = 47° 37' 44.8" (LT)	Δ = 92° 44' 35.0" (RT)	Δ = 75° 58' 03.6" (LT)	Δ = 80° 55' 23.2" (RT)					
Ls = 330.00'	D = 2° 51' 53.2"	Ls = 330.00'	D = 71° 37' 11.0"	D = 8° 51' 04.0"	D = 44° 04' 25.2"	D = 24° 48' 12.1"					
LT = 220.08'	L = 605.52'	LT = 220.08'	L = 66.50'	L = 113.31'	L = 172.37'	L = 326.26'					
ST = 110.07'	T = 305.09'	ST = 110.07'	T = 35.31'	T = 73.43'	T = 101.51'	T = 197.02'					
	R = 2,000.00'		R = 80.00'	R = 70.00'	R = 130.00'	R = 231.00'					
	SE = .06		SE = .02	SE = .02	SE = .06	SE = .06					
	Ro = As Shown		Ro = As Shown	Ro = As Shown	Ro = 97.00'	Ro = 109.00'					
50'	0'	50'	100'								



(ENGLISH)

SEE SHEET 13 FOR ROADWAY PLAN VIEW

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RALEIGH, NC 27609
NC License
Number C-1554

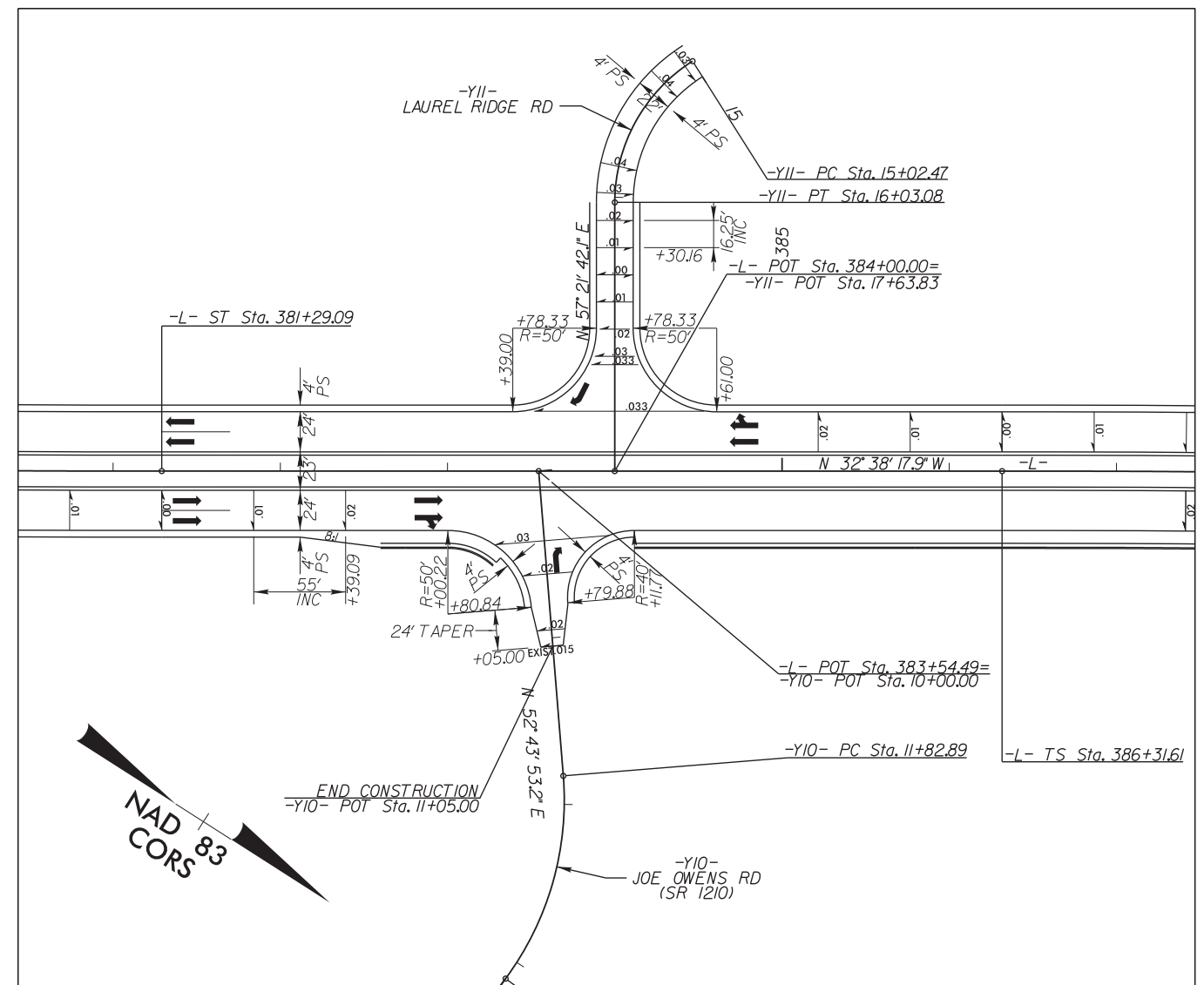
R-29/5C	2B-11
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ROADWAY DESIGN
ENGINEER

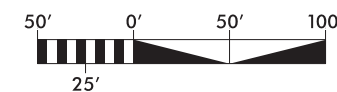
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

DETAIL SHOWING

INTERSECTION OF -L- (US 221) AT
-Y10- JOE OWENS ROAD (SR 1210)
& -Y11- LAUREL RIDGE ROAD



-Y10-	-Y11-
PISta 12+50.20	PISta 15+57.49
$\Delta = 41^{\circ}00' 28.4" (RT)$	$\Delta = 57^{\circ}38' 33.8" (LT)$
D = 31' 49" 51.6"	D = 57' 17" 44.8"
L = 128.83'	L = 100.61'
T = 67.31'	T = 55.02'
R = 180.00'	R = 100.00'
SE = EXIST.	SE = .04
	Ro = 65.00'



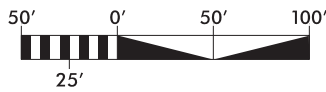
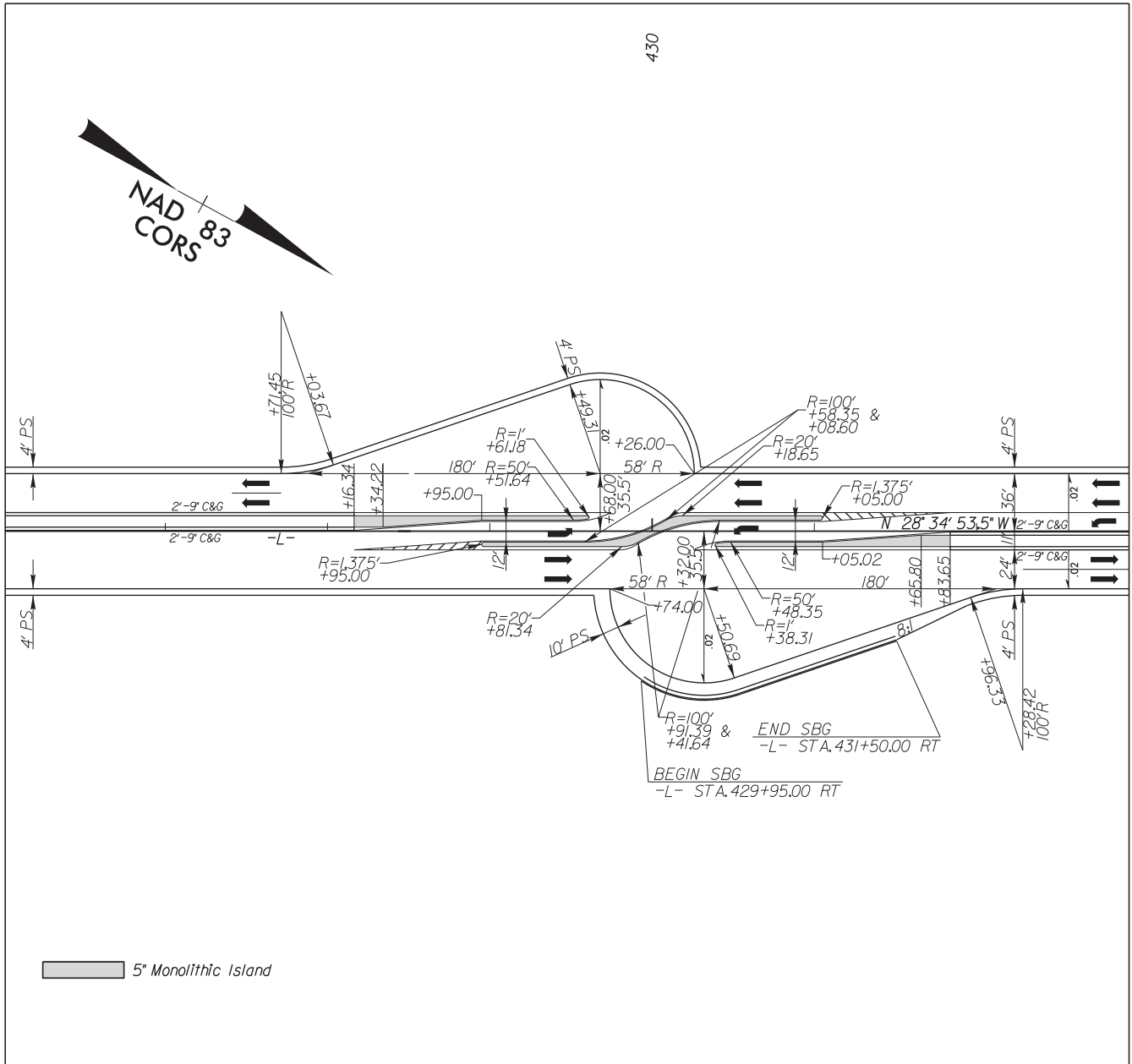
(ENGLISH)

SEE SHEET 14 FOR ROADWAY PLAN VIEW

8/17/99

22-APR-2016 14:58 R2915C_PSH02B-12.dgn
R:\Road\Drawings\83333333

DETAIL SHOWING
INTERSECTION OF -L- (US 221) AT JUG HANDLES



(ENGLISH)

SEE SHEET 17 FOR ROADWAY PLAN VIEW

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(919) 571-7111

NC License
Number F-0159

HNTB

343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

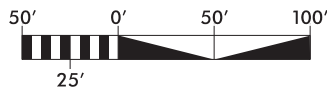
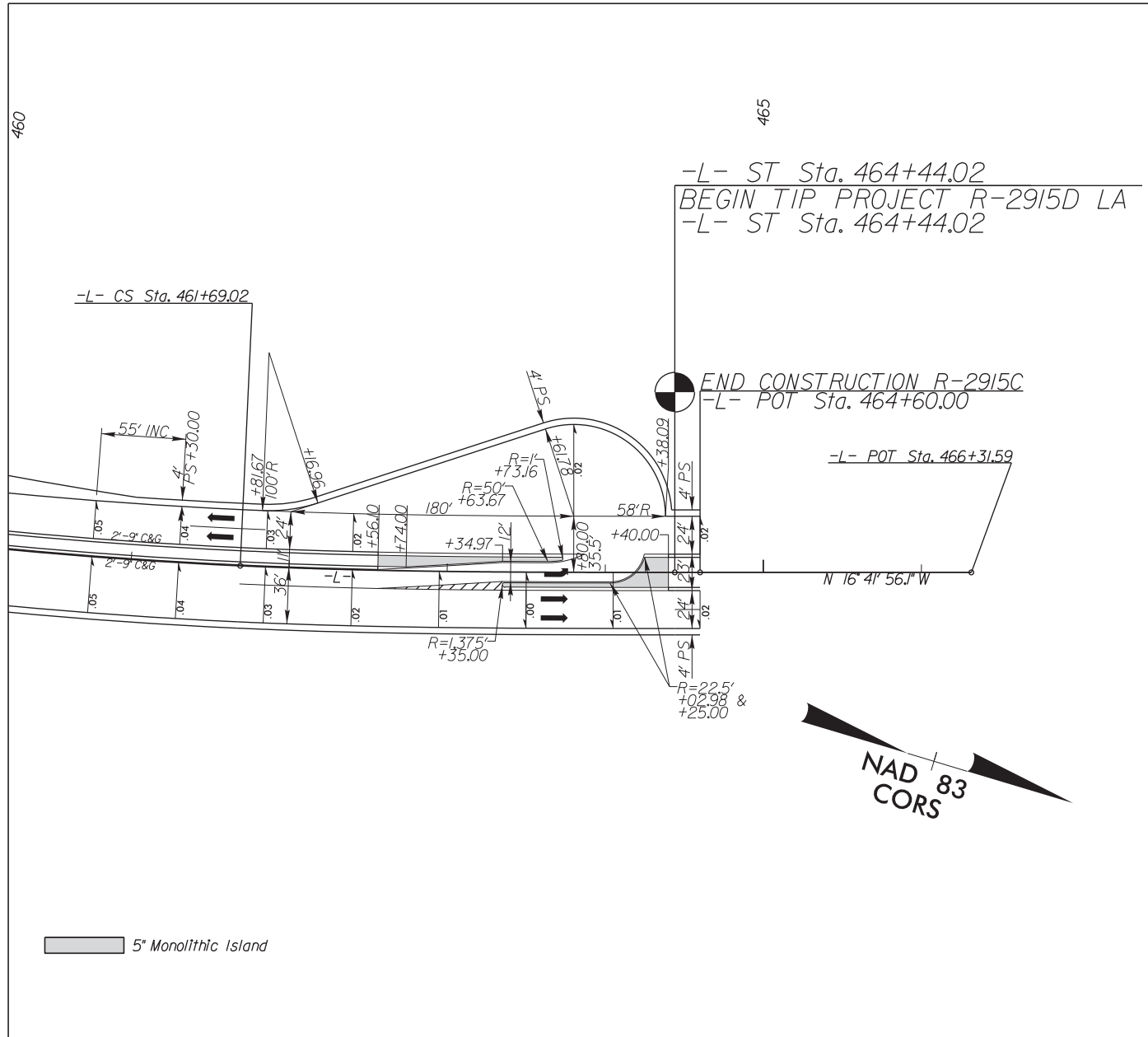
2B-12

RW SHEET NO.

ROADWAY DESIGN
ENGINEER

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DETAIL SHOWING
INTERSECTION OF -L- (US 221) AT JUG HANDLE



(ENGLISH)

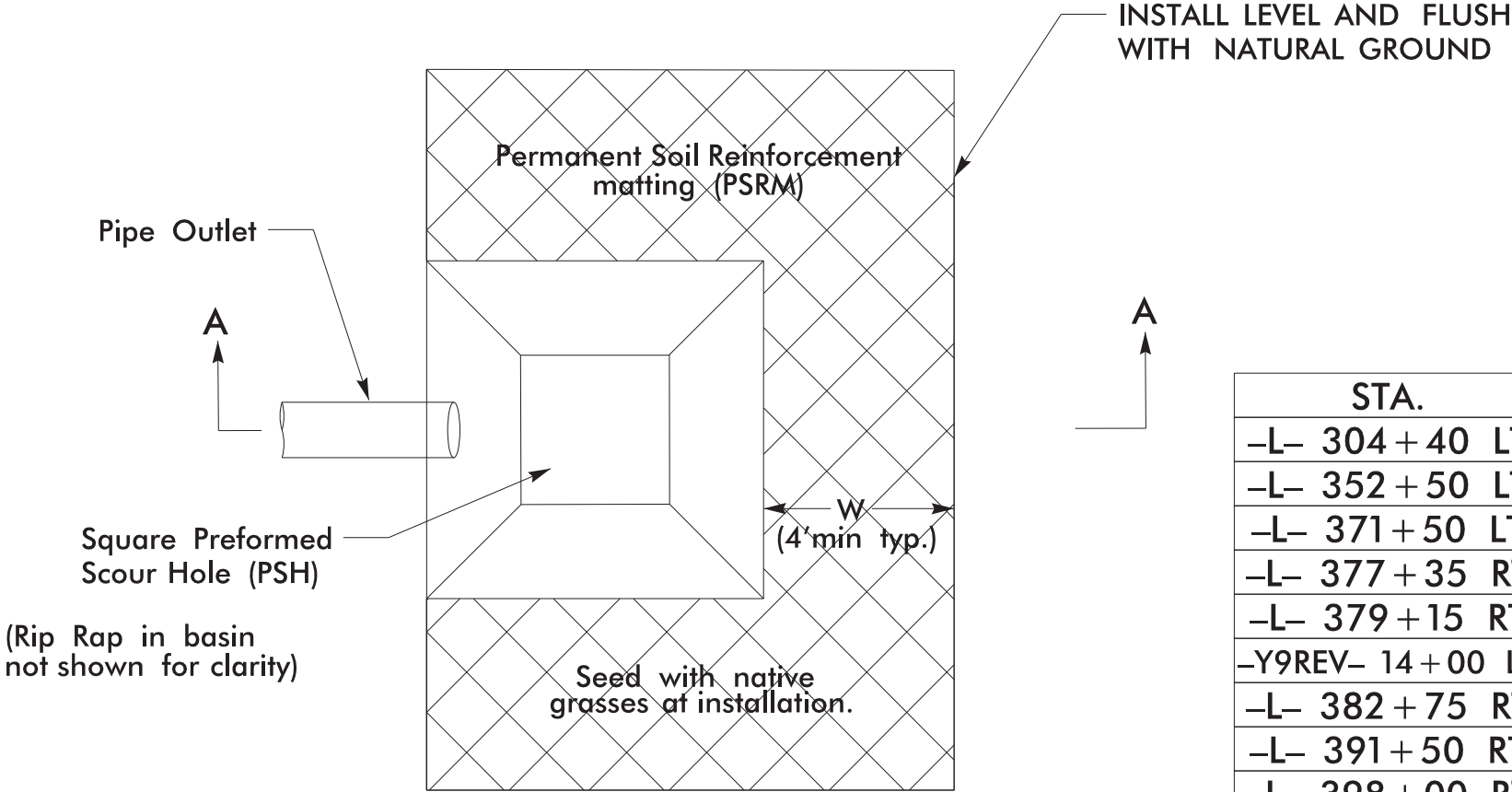
SEE SHEET 20 FOR ROADWAY PLAN VIEW

-L-
Pls Sta 455+79.18
θs = 2° 37' 33.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'
PI Sta 459+20.50
Δ = 9° 30' 53.1" (LT)
D = 1° 54' 35.5"
L = 498.19'
T = 249.67'
R = 3,000.00'
SE = .05
Ro = See Plans
Pls Sta 462+60.70
θs = 2° 37' 33.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'

PREFORMED SCOUR HOLE

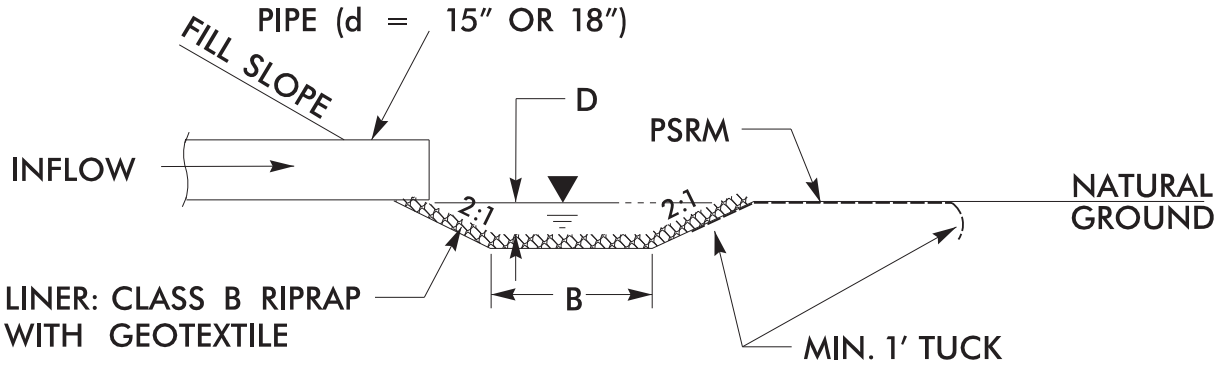
*NOT TO SCALE

PLAN VIEW



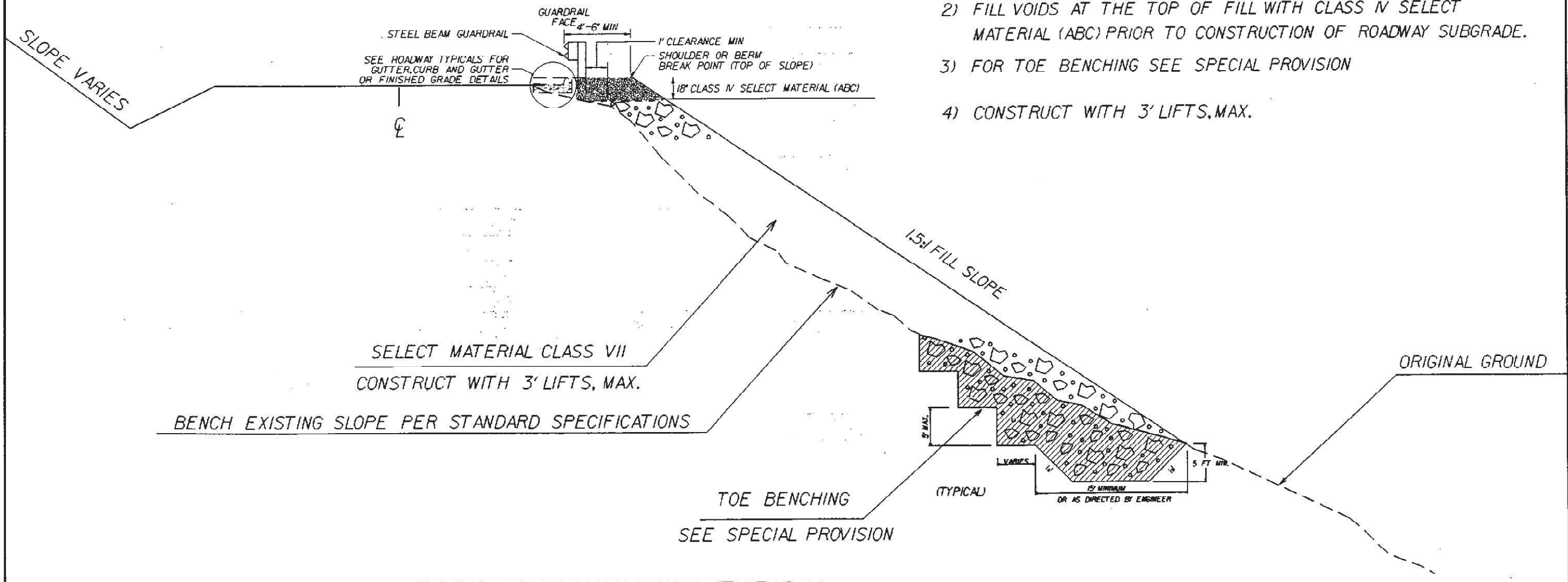
STA.	B	W	D	d
-L- 304 + 40 LT	5'	4'	2'	18"
-L- 352 + 50 LT	5'	4'	2'	18"
-L- 371 + 50 LT	5'	4'	2'	18"
-L- 377 + 35 RT	5'	4'	2'	15"
-L- 379 + 15 RT	5'	4'	2'	15"
-Y9REV- 14 + 00 LT	5'	4'	2'	18"
-L- 382 + 75 RT	5'	4'	2'	15"
-L- 391 + 50 RT	5'	4'	2'	15"
-L- 398 + 00 RT	5'	4'	2'	15"
-L- 404 + 00 RT	5'	4'	2'	15"
-L- 406 + 00 RT	5'	4'	2'	18"
-L- 430 + 50 RT	5'	4'	2'	15"
-L- 452 + 75 RT	5'	4'	2'	18"
-L- 456 + 70 RT	5'	4'	2'	15"

SECTION A-A



NOTES:

- 1) USE SELECT MATERIAL CLASS VII TO CONSTRUCT ALL FILLS WHICH ARE 1.5:1 (H:V) AS SHOWN ON PLANS.
- 2) FILL VOIDS AT THE TOP OF FILL WITH CLASS IV SELECT MATERIAL (ABC) PRIOR TO CONSTRUCTION OF ROADWAY SUBGRADE.
- 3) FOR TOE BENCHING SEE SPECIAL PROVISION
- 4) CONSTRUCT WITH 3' LIFTS, MAX.



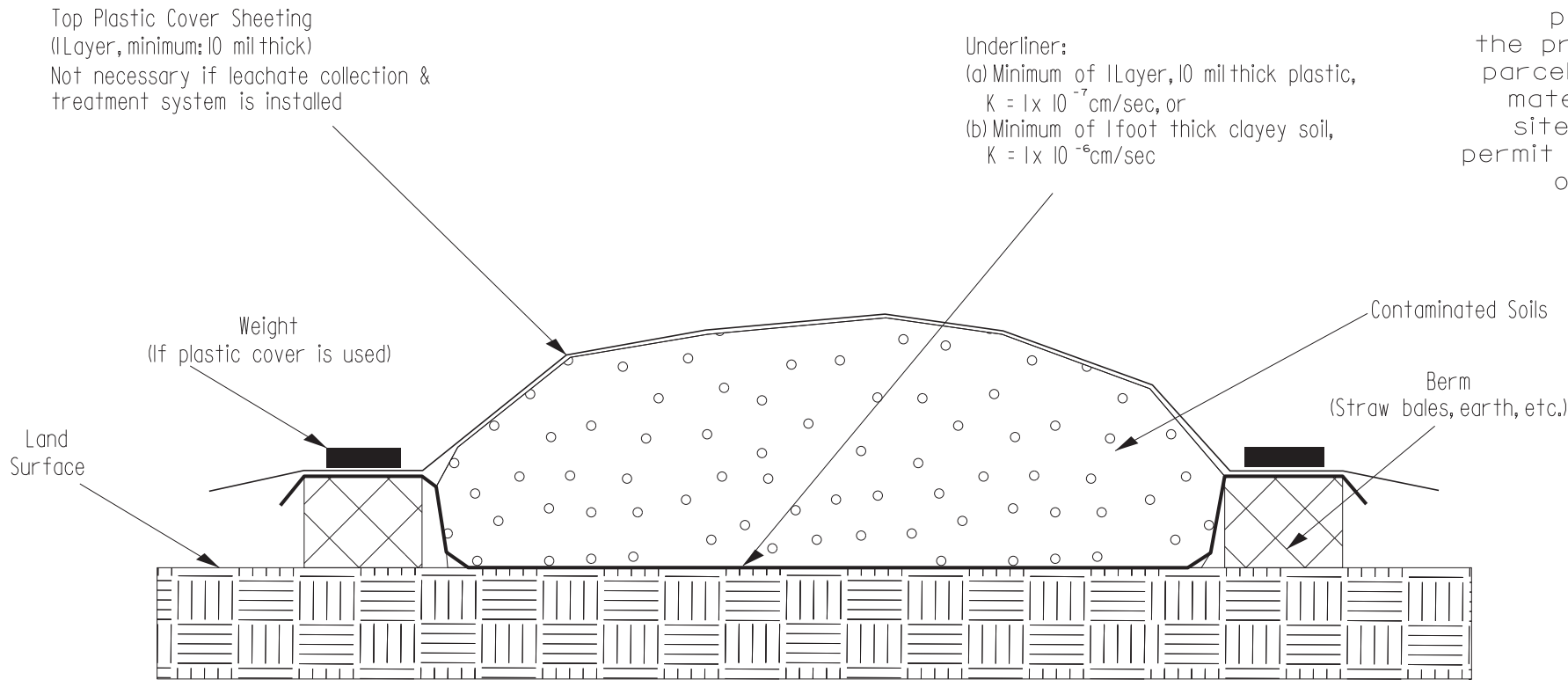
ROCK EMBANKMENT TYPICAL

N.T.S.
TYPICAL FOR ALL FILL SLOPES 1.5:1 (H:V)
AS SHOWN ON PLANS

		GEOTECHNICAL ENGINEERING UNIT ☐ EASTERN REGIONAL OFFICE ☒ WESTERN REGIONAL OFFICE ☐ CONTRACT OFFICE STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION RALEIGH		ROCK BUTTRESS AND TOE BENCHING DETAILS	
REVISIONS					
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

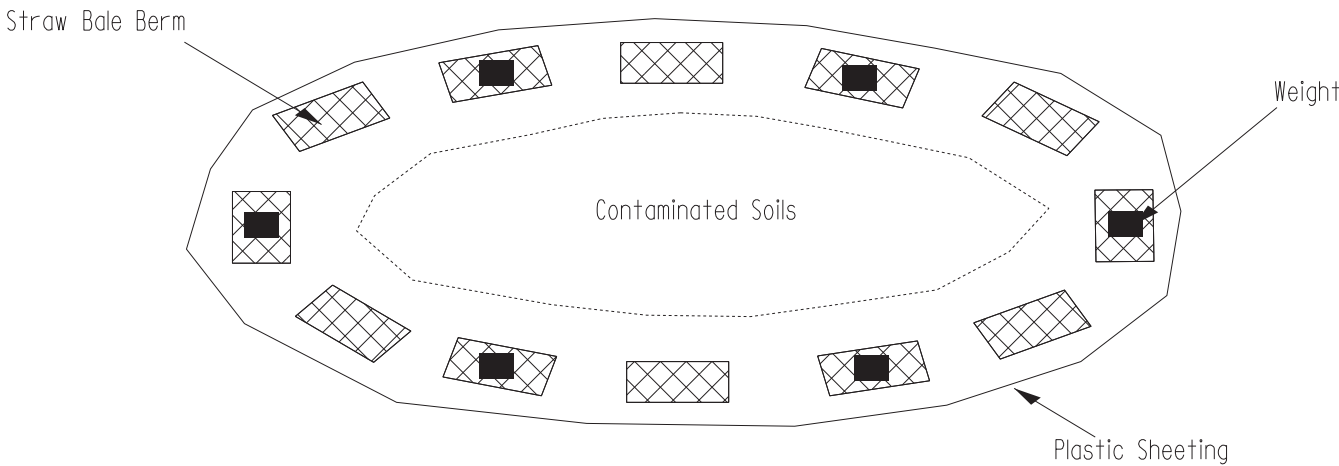
Detail for Temporary Containment of Contaminated Soil

Cross-Section View



NOTE:
The Contractor shall stockpile all contaminated soil excavated from a property in a location within the property boundaries of the source parcel. If the volume of contaminated material exceeds available space on site, the Contractor shall obtain a permit from the NCDENR UST Section for off-site temporary storage.

Map View



GEOTECHNICAL ENGINEERING UNIT

☐ EASTERN REGIONAL OFFICE

☐ WESTERN REGIONAL OFFICE

☒ CONTRACT OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

STOCKPILE CONTAINMENT DETAIL

REVISIONS

NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

PREPARED BY:	DATE:
REVIEWED BY:	DATE:

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

WOVEN WIRE FENCE SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	LINEAR FEET	4" POST	5" POST
-L-/-Y3-	264+33	11+65	RT	178.81	9	7
-Y3-/-L-	11+65	279+62	LT/RT	1,404.18	90	19
-L-	266+16	279+20	LT	1,223.53	74	25
-L-	279+80	282+70	LT	297.22	17	7
-L-	280+22	280+81	RT	59.34	2	4
-L-	281+41	299+36	RT	1,717.95	109	25
-L-	283+30	292+40	LT	1,046.10	64	19
-L-	293+00	294+85	LT	298.86	14	13
-L-	295+45	307+37	LT	1,320.50	77	31
-L-	299+42	300+20	RT	96.57	3	7
-L-	300+80	303+25	RT	293.71	16	10
-L-/-Y4-	303+34	12+00	RT	152.59	7	7
-Y4-/-DRW6REV-	12+00	12+37	LT/RT	623.73	37	13
-L-	307+97	310+60	LT	268.62	17	4
-L-	311+20	313+14	LT	199.70	12	4
-DRW6REV-/-L-	12+23	315+30	LT/RT	285.69	17	7
-L-	313+74	320+30	LT	756.07	44	19
-L-	315+90	316+75	RT	85.00	4	4
-L-	317+35	323+00	RT	610.75	37	13
-L-	323+32	324+80	LT	187.11	10	7
-L-/-Y5-	323+60	11+50	RT	304.78	18	7
-L-	325+40	327+45	LT	223.76	9	13
-Y5-/-L-	11+50	333+43	LT/RT	595.01	37	10
-L-/-Y6-	328+05	14+53	LT/RT	238.62	13	7
-Y6-/-L-	14+53	344+70	LT	1,877.21	112	40
-L-	334+00	344+80	RT	1,227.11	77	19
-L-	345+40	350+50	RT	545.22	32	13
-L-	345+30	349+00	LT	366.26	22	7
-L-	349+60	351+11	LT	146.47	8	4
-L-	350+95	351+88	RT	108.21	4	7
-L-	351+33	351+60	LT	27.99	1	7
-L-	352+20	359+60	LT	774.32	45	19
-Y7-/-L-	13+60	366+40	LT/RT	1,315.22	84	19
-L-	360+20	373+21	LT	1,407.43	89	22
-L-/-Y9REV-	367+00	15+74	RT	1,158.73	74	16
-L-/-DRW9-	373+11.04	11+25	LT	579.56	36	10
-L-	375+80	383+22	RT	765.79	48	13
-L-/-Y11-	380+00	16+03	LT	371.78	23	7
-Y11-	13+97	16+03	LT	171.17	10	4
-L-/-Y12-	384+00	11+50	RT	2,241.83	138	40
-L-	386+60	408+70	LT	2,236.83	144	28
-L-	409+30	409+50	LT	26.87	-	4
-L-	410+10	421+80	LT	2,305.05	148	31
-Y12-/-L-	11+30	413+70	LT/RT	844.15	48	22
-L-	414+30	426+65	RT	1,208.29	78	16
-L-	422+40	432+00	LT	1,020.32	64	16
-L-	427+25	439+40	RT	1,280.88	75	31
-L-	432+60	434+30	LT	173.97	10	4
-L-	434+90	437+55	LT	303.50	15	13
-L-/-Y13-	438+15	11+41	LT/RT	171.71	8	7
-L-/-Y14-	440+00	12+05	RT	253.38	13	10
-Y13-/-Y15-	11+41	13+97	LT/RT	763.82	47	13
-Y14-/-L-	12+05	444+62	LT/RT	337.45	20	7
-L-	445+22	448+98.50	RT	369.06	23	7
-L-	448+05	452+20	LT	415.68	26	7
-L-	449+84	452+40	RT	256.02	16	4
-L-	452+80	459+27	LT	666.86	41	13
TOTAL:				38,187.34	2,316	762
SAY:				38,380	2,330	770

8' CHAIN LINK W3SBW FENCE

SURVEY LINE	STATION	STATION	LINEAR FEET	4" POST	5" POST
	SECURITY FENCE (FDFI 04/1014) CONTINGENCY		500		16
	TOTAL:		500		16
	SAY:		500		20

PAVEMENT REMOVAL SUMMARY

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
-Y2-	13+15	13+28	RT	67.14
-Y2-	13+51	14+37	LT	93.70
-Y2-	15+00		RT	314.53
-L-	261+18	266+88	CL	1,381.99
-L-	266+72	273+05	RT	1,784.78
-L-	271+78	294+50	CL	4,819.65
-L-	287+03	292+13	LT	459.53
-Y4-	11+21	14+57	RT	657.20
-L-	324+50	326+50	LT	488.89
-L-	329+50	331+00	LT	366.67
-L-	361+14	368+30	LT	1,750.22
-L-	373+07	380+57	CL	2,150.31
-Y9REV-	13+30	13+55	LT	145.26
-Y9REV-	13+71	14+98	LT	211.78
-L-	386+71	387+73	LT	132.47
-L-	395+50	429+64	RT	6,536.14
-L-	396+75	397+13	RT	5.86
-L-	409+34	409+74	RT	3.61
-L-	419+41	420+49	RT	15.79
-L-	431+92	441+17	RT	1,063.32
-L-	442+14	445+54	RT	90.52
-L-	444+29	446+47	LT	332.93
TOTAL:				22,711.45
SAY:				22,720

5" MONOLITHIC ISLANDS
(KEYED IN)

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
-L-	255+45	256+50	CL	69.34
-L-	256+12	257+29	RT	58.12
-L-	305+15	306+20	CL	69.21
-L-	305+82	306+99	RT	58.25
-L-	315+01	316+18	LT	58.14
-L-	315+80	316+85	CL	69.35
-L-	318+22	319+55	CL	77.90
-L-	318+89	320+34	RT	66.67
-L-	329+51	330+68	LT	58.12
-L-	330+30	331+35	CL	69.35
-L-	352+75	353+80	CL	69.29
-L-	353+42	354+59	RT	58.12
-L-	362+62	363+78	LT	58.16
-L-	363+40	364+45	CL	68.99
-L-	367+72	369+05	CL	77.92
-L-	368+39	369+84	RT	66.60
-L-	428+16	429+61	LT	66.69
-L-	428+95	431+05	CL	79.91
-L-	430+39	431+84	RT	66.67
-L-	462+56	463+73	LT	58.19
-L-	463+35	464+40	CL	69.37
TOTAL:				1,394.35
SAY:				1,400

4 SBW FENCE

SURVEY LINE	STATION	STATION	LINEAR FEET	4" POST	5" POST
	TEMP. FENCE (FDFI 04/1014) CONTINGENCY		2,000		
	TOTAL:		2,000		
	SAY:		2,000		

SUMMARY OF BREAKING
EXISTING ASPHALT PAVEMENT

SURVEY LINE	STATION	STATION	LOCATION LT/RT/CL	YD'
-L-	293+50	311+00	LT	4,277.78
-L-	326+50	329+50	LT	733.33
TOTAL:				5,011.11
SAY:				5,020

EXPRESSWAY GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-Y2-	10+79	12+36	157.00
-Y8REV-/-L-	10+00	376+08	309.37
TOTAL:			466.37
SAY:			470

SHOULDER BERM GUTTER SUMMARY

SURVEY LINE	STATION	STATION	LENGTH
-L-	251+60	251+72	12.00
-L-	254+37	255+00	63.06
-L-	263+46	268+00	454.00
-L-	297+18	303+87	669.00
-L-	316+03	319+88	385.00
-L-	321+25	322+50	125.00
-L-	332+16	342+27	1,011.00
-L-	348+19	352+00	381.00
-L-	356+00	357+00	100.00
-L-	368+64	375+19	655.00
-L-	382+60	383+29	69.00
-L-	384+12	393+71	959.00
-L-	429+95	431+50	155.00
TOTAL:			5,038.06
SAY:			5,040

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
GUARDRAIL SUMMARY

12/06/07

COMPUTED BY: B. BOLLMAN	DATE: 02-19-16
CHECKED BY: B. EASON	DATE: 03-09-16

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	36-1

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

GEOTECHNICAL SUMMARY

SUMMARY OF SUBSURFACE DRAINAGE

SURVEY LINE	STATION	STATION	LOCATION (LT/CL/RT)	DRAIN TYPE* UD/BD/SD	6" PERFORATED SUBDRAIN PIPE LF
CONT INGENCY				SD	2,500
				TOTAL LF	2,500
				SAY	2,500

* UD - UNDERDRAIN
* BD - BLIND DRAIN
* SD - SUBSURFACE DRAIN

Note: From GEOTECHNICAL LETTER 11/06/13

SUMMARY OF AGGREGATE
SUBGRADE STABILIZATION

LOCATION	SHALLOW UNDERCUT CY	CLASS IV SUBGRADE STABILIZATION TONS	GEOTEXTILE FOR SOIL STABILIZATION SY
* CONT INGENCY	500	200	1,000
** CONT INGENCY			1,000
TOTAL	500	200	2,000

Note: From GEOTECHNICAL LETTER 11/06/13
* SECTION 11.A FOR USE WITH AGGREGATE SUBGRADE
** SECTION 11.D FOR USED WITH UNDERCUT

SUMMARY OF GEOTEXTILE FOR
PAVEMENT STABILIZATION

SURVEY LINE	STATION	STATION	LOCATION (LT/CL/RT)	SY
-L-	264+50	268+50	CL	3,036
-L-	297+50	305+50	CL	5,683
-L-	315+75	316+75	LT	993
-L-	350+75	352+50	RT	795
-L-	373+00	375+00	RT	783
-Y4-	10+00	12+00	CL	685
-Y4-	15+00	17+00	CL	444
TOTAL SY				12,419
				SAY 12,419

Note: From GEOTECHNICAL LETTER 03/20/14

SUMMARY OF MISCELLANEOUS
GEOTECH ITEMS

LOCATION	BLOTTING SAND TONS	STABILIZER AGGREGATE TONS	SELECT GRANULAR MATERIAL CY
* CONT INGENCY	15	250	
** CONT INGENCY			1,000
TOTAL	15	250	1,000

* Note: From GEOTECHNICAL LETTER 03/20/14
** Note: From GEOTECHNICAL LETTER 11/06/13

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	3P-1

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4,5	KEITH & JOYCE K. BLACKBURN
2	5	RIVER RIDGE UNLIMITED
3	5	CHARLES J. & WANDA W. ARNETTE
4	5,6	GROVER A. & LORETTA B. GOODMAN
5	5	DONALD EDWARD BLACKBURN et al.
6	5	TERRI ANNE WELLS DEES
7	5	LESLIE DELEON & BETTY ROSE SASSER
8	5,6	MICHAEL DEAN & MARLENE E. BLEDSOE
9	6	JAMES MICHAEL & RHONDA B. HERMAN
10	6	LARRY BAKER
11	6	RICHARD W. ATKIN & CINDY AARON ATKIN
12	6	DELORIS TRIPLETT
13	6,7,8,21	NO HEAD, LLC
14	6,7	RICHARD W. ATKIN & CINDY AARON ATKIN
15		NO CLAIM
16	7	LILLIAN B. EDWARDS WORLEY
17	7	GERALD K. DENNY & MAUREENA E. DENNY
18	7,8	DAVID LEE HOLMAN
19	7,8	JERRY G. & GERALDINE M. STYERS
20	8,21	ANDREW L. HERMAN & HEATHER M. HERMAN
21	21	AFFORDABLE HOUSING ASSOCIATES, LLC
22	8	B&B LAND DEVELOPERS
23	8	LAINE N. KELLER
24	8	JOSEPH L. & CANDICE L. KELLER
25	8	DONALD E. BLACKBURN & JIMMY BLEDSOE
26	8,9	JUDY W. BRANCH, et al
27	8,9	BARRY & CAROLYN GOODMAN
28	8,9	T. MAURICE JORDAN
29	9	JOHN RAY PHILLIPS, JR; & HEATHER R. PHILLIPS
30	9	FLEETWOOD VOL. FIRE DEPARTMENT
31	9	FLEETWOOD VOL. FIRE DEPARTMENT
32	9	ASHE COUNTY BOARD OF EDUCATION
33	9	BARRY & CAROLYN GOODMAN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
34	9	CHRISTOPHER EVAN MOORE & KAYLA PHIPPS MOORE
35	9,10,11	TIMOTHY RAY HAMBY
36	9,10	CHRISTOPHER EVAN & KAYLA PHIPPS MOORE
37	9,10	TIMOTHY RAY HAMBY
38	10	TIMOTHY RAY HAMBY & VICKIE HAMBY MOORE
39	10	JOHN B. COX
40	9,10,11	CHRISTOPHER CHARLES & VICTORIA HAMBY MOORE
41	10,11	FLEETWOOD FALLS, INC
42	11	NELL BALDWIN
42A	11	NELL BALDWIN
43	11	JASON & EMILY STOPPER
44	11	WILLIAM W. STURDIVANT & LINDA H. STURDIVANT
45	11	RUTH BAKER, LINDA BAKER TAYLOR & WAYNE BAKER
46	11,12	SANDRA MILLER COX
47		NO CLAIM
48	11,12	JOHN PHILLIP BAYS & SALLY JEAN BAYS
49		NO CLAIM
50	12,13	JOSEPH ANDREW STARNES et al.
51		NO CLAIM
52		NO CLAIM
53	13	MARK H. & ROSANN POPLIN HOLLARS
54	13	JESSE PRESTON MELTON & ALAINA JOELLE BORGET
55		NO CLAIM
56	13	DENNIS L. GROGAN
57	13	JOYCE MAHAFFEY WINFORD & MARY JUNE KIMBERLIN
58	13	NO CLAIM
59		NO CLAIM
60	13	ROBERT E. & CHRISTINA L. LITTLE
61	13	ELBERT F. & LANDA CAIN BROWN
62	13	HAROLD G. HAMILTON et al
63	13	GEORGETTE L. M. SCOTT
64	13	FELIX OTERO & BRENDA OTERO
65	13	DAVID R. & JULIE E. TESTERMAN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
66	13	LAURA K. ELDTRETH
67		NO CLAIM
68	13,14,22	ILLA K. BRYAN
69		NO CLAIM
70	14	PAUL LAMBERT
71		NO CLAIM
72	14,22	TIM & APRIL RUSSELL
73	14,22	NELDA H. JORDAN
74	14,15	DAVID & BARBARA M. THOMAS
75	14,15,22	STEVEN & MELBA JOHNSON
76	15	DONALD A. & THERESA CHURCH
77	15,16,23	HAROLD L. & MABEL F. POLING
78		NO CLAIM
79	15	RENNA MILLER
80	15	AGNES BALDWIN TRUSTEE
81	15,16	GODS GRACE UNITED COMMUNITY CHURCH
82	16,23	GERTRUDE LUCAS
83	16	RENNA SUE MILLER
84	16	BOBBY R. HAM
85	16,17,23	NELL B. BALDWIN
86	16,17	JOHN D. & SHIRLEY H. BALDWIN et al
87	16,17	NELL BALDWIN
88	17	JERROLD W. & SARA W. ASHLEY
89	17	NELL B. BALDWIN
90	17,18	JESSIE G. BALDWIN HEIRS
91	17,18	RENNA SUE MILLER
92	17,18	NEAL WAGNER
93	18	W.G. BLACK HEIRS
94	18	LAWRENCE & VIVIAN P. GOODWIN
95	18	BOBBY N. & BARBARA P. GENTRY
96	18	EDWARD EUGENE PARLIER
97		NO CLAIM
98	18	HADLEY GOSS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
PARCEL INDEX

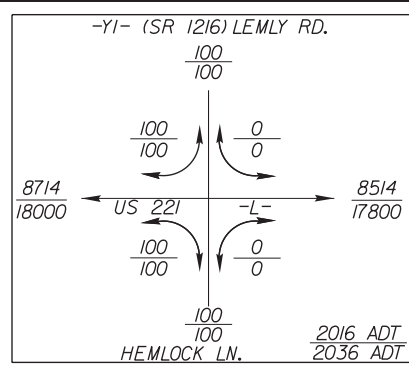
PROJECT REFERENCE NO.	SHEET NO.
R-29/5C	3P-2

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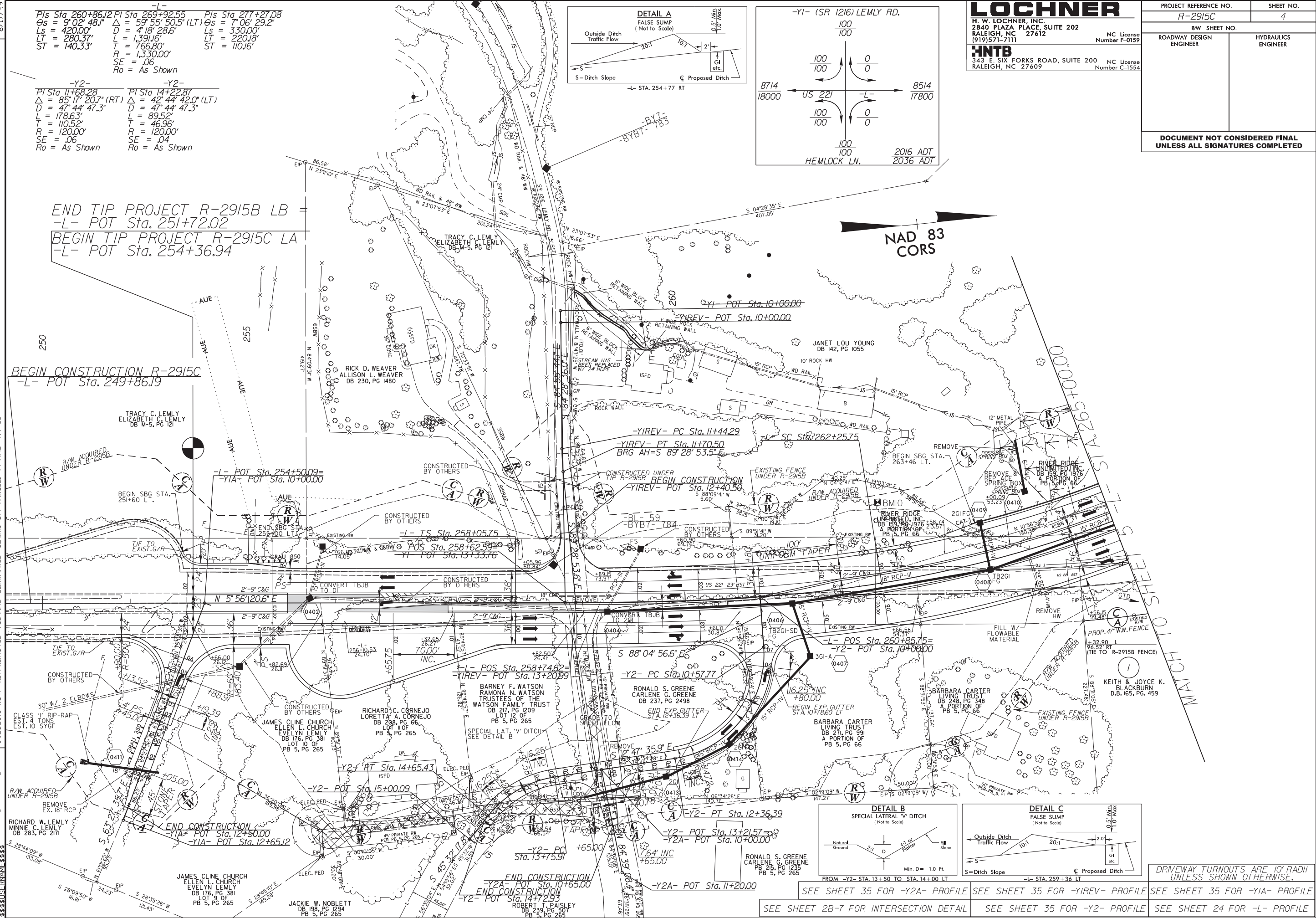
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END TIP PROJECT R-2915B LB =
-L- POT Sta. 251+72.02

BEGIN TIP PROJECT R-2915C LA
-L- POT Sta. 254+36.94



PROJECT REFERENCE NO.		SHEET NO.	
R-2915C		4	
R/W SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			

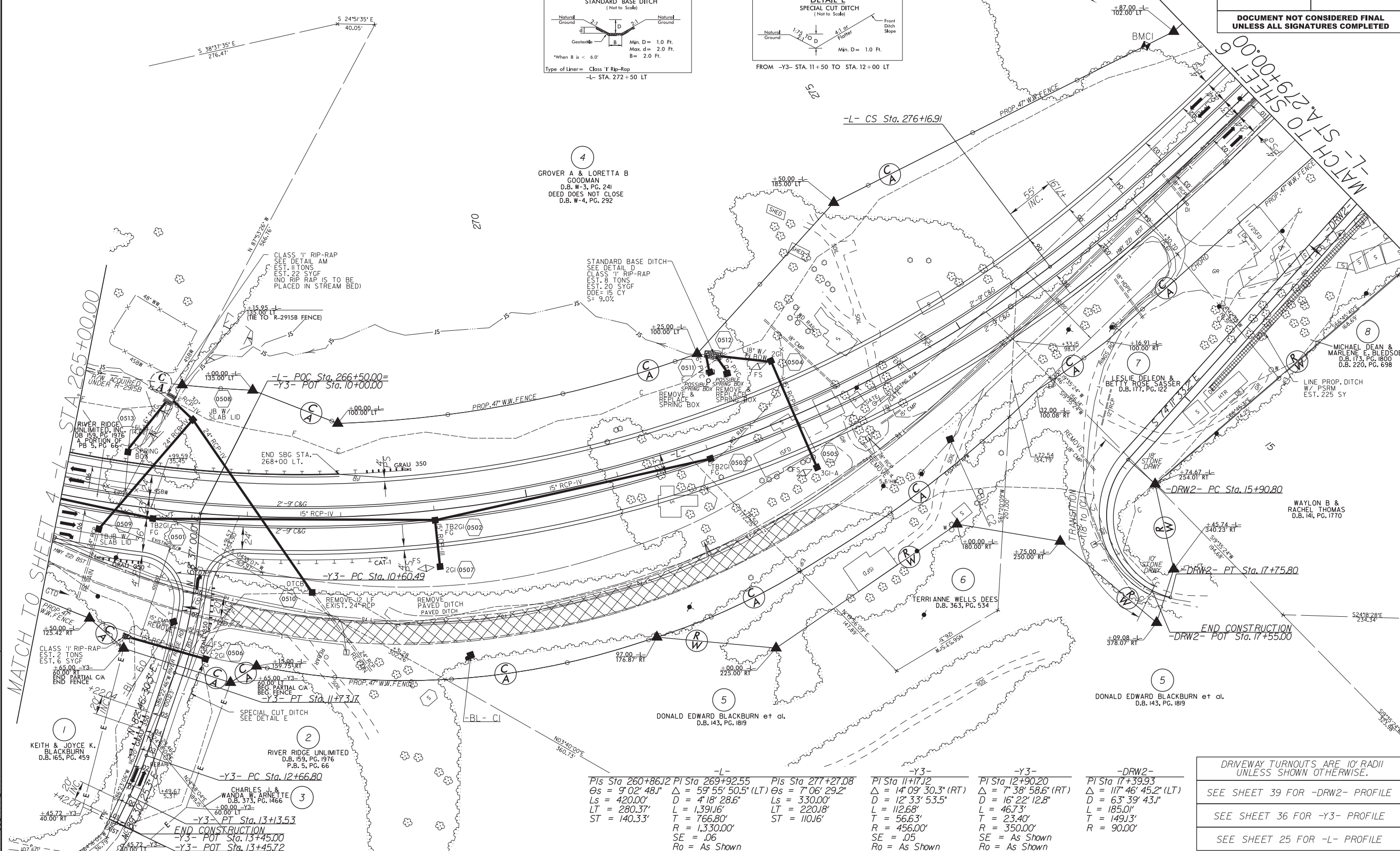
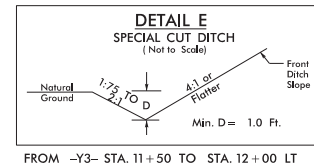


**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETE**

	REVISIONS
03/25/2015 ROW REV.	AMENDED PROPERTY OWNER NAME ON PARCEL 6 - KH
03/25/2015 ROW REV.	ADDED EASEMENT OFFSET FROM EXISTING TRAIL TO STAKE OUT PARCELS 1 & 5. AMENDED PROPERTY OWNER NAME AND CHANGE/ESTATION FOR ROW MONUMENT

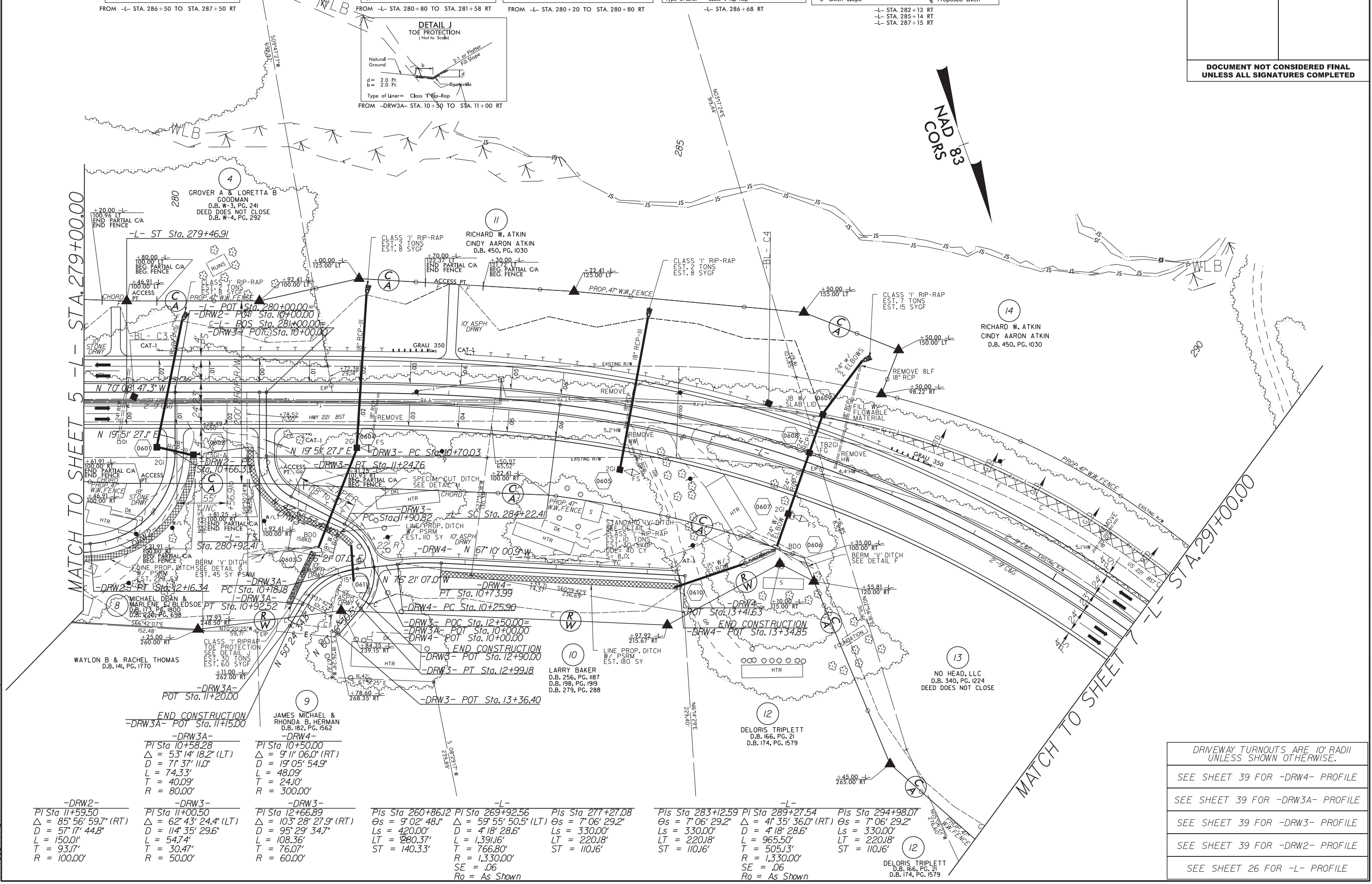
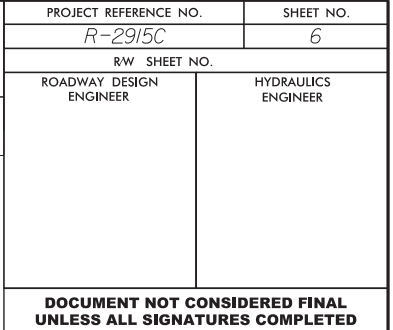
8/17/99

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REVISIONS

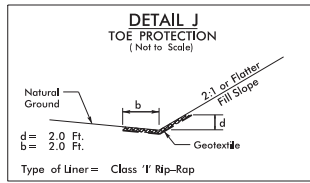
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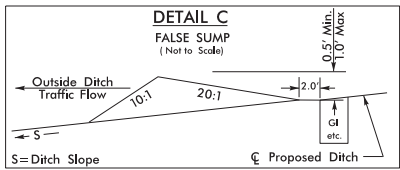
8/17/99

REVISIONS
03/25/2015 ROW REV: AMENDED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCEL 14; ADDED DEED REFERENCE ON PARCEL 14; AMENDED PROPERTY OWNER NAME ON PARCEL 17;
12/11/2015 ROW REV: AMENDED DEED REFERENCE ON PARCEL 18; KH FIELD STAKING ON PARCEL 14. - BB

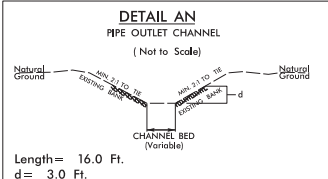
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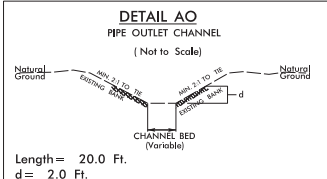
FROM -L- STA. 293+50 TO STA. 295+00 LT
FROM -L- STA. 298+00 TO STA. 300+00 RT
FROM -L- STA. 301+00 TO STA. 303+00 RT
FROM -L- STA. 302+10 TO STA. 303+00 LT



-L- STA. 293+65 RT
-L- STA. 297+64 RT



-L- STA. 298+23 LT



-L- STA. 302+05 LT

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2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919)571-7111

NC License
Number F-0159

HNTB

343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

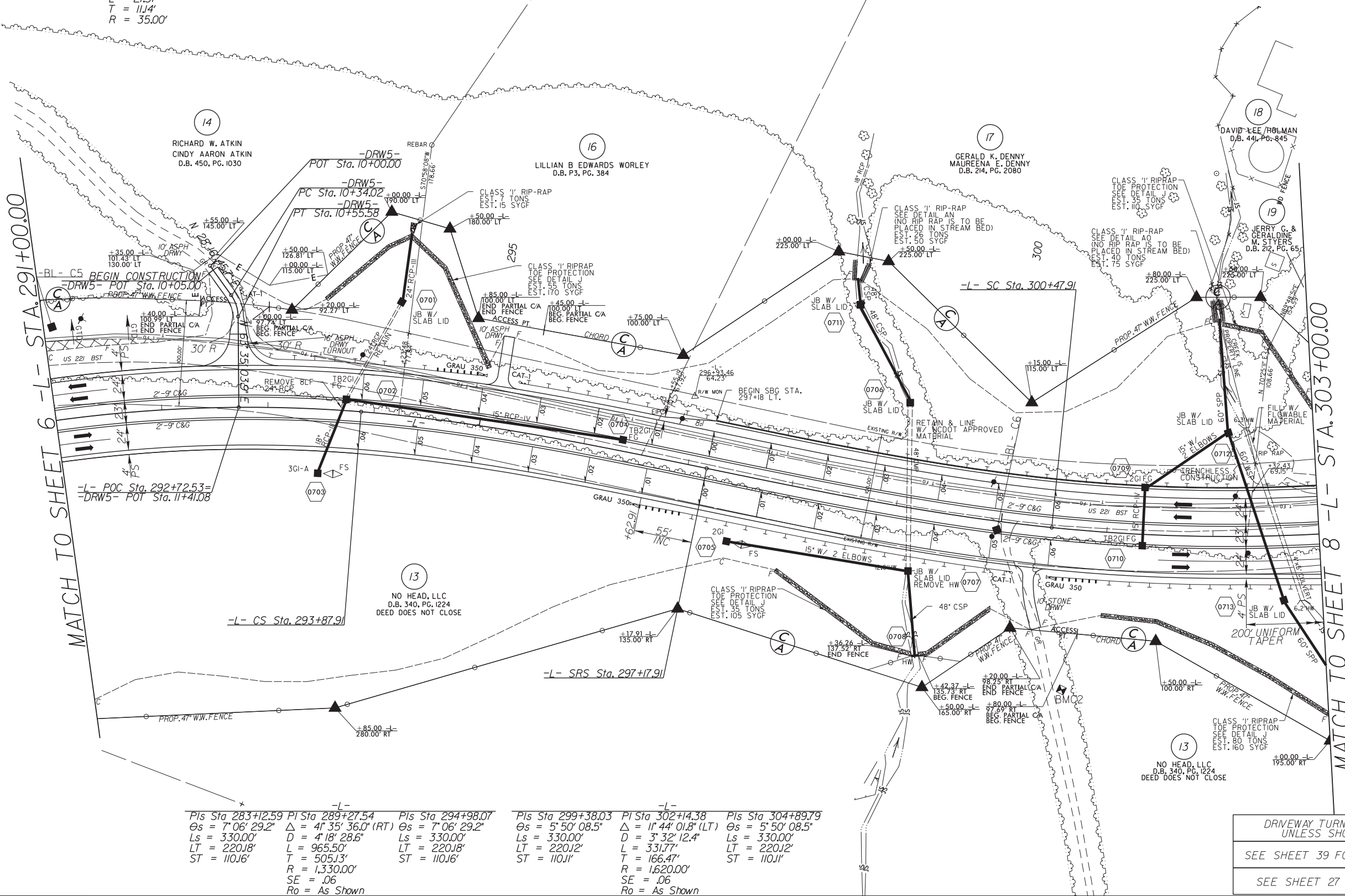
7

R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



-DRW5-
PI Sta 10+45.15
 $\Delta = 35^{\circ}18'18.2''$ (RT)
 $D = 163^{\circ}42'08.0''$
 $L = 21.57'$
 $T = 11.14'$
 $R = 35.00'$

14
RICHARD W. ATKIN
CINDY AARON ATKIN
D.B. 450, PG. 1030

16
LILLIAN B. EDWARDS WORLEY
D.B. P3, PG. 384

17
GERALD K. DENNY
MAUREENA E. DENNY
D.B. 214, PG. 2080

18
DAVID LEE HOLMAN
D.B. 441, PG. 845

19
JERRY C. &
GERALDINE
M. STYERS
D.B. 212, PG. 65

13
NO HEAD, LLC
D.B. 340, PG. 1224
DEED DOES NOT CLOSE

13
NO HEAD, LLC
D.B. 340, PG. 1224
DEED DOES NOT CLOSE

-L-
Pls Sta 283+12.59 PI Sta 289+27.54 Pls Sta 294+98.07
 $\Theta_s = 7^{\circ}06'29.2''$ $\Delta = 41^{\circ}35'36.0''$ (RT) $\Theta_s = 7^{\circ}06'29.2''$
 $L_s = 330.00'$ $D = 4^{\circ}18'28.6''$ $L_s = 330.00'$
 $LT = 220.18'$ $L = 965.50'$ $LT = 220.18'$
 $ST = 110.16'$ $T = 505.13'$ $ST = 110.16'$
 $R = 1,330.00'$
 $SE = .06$
 $Ro = As Shown$

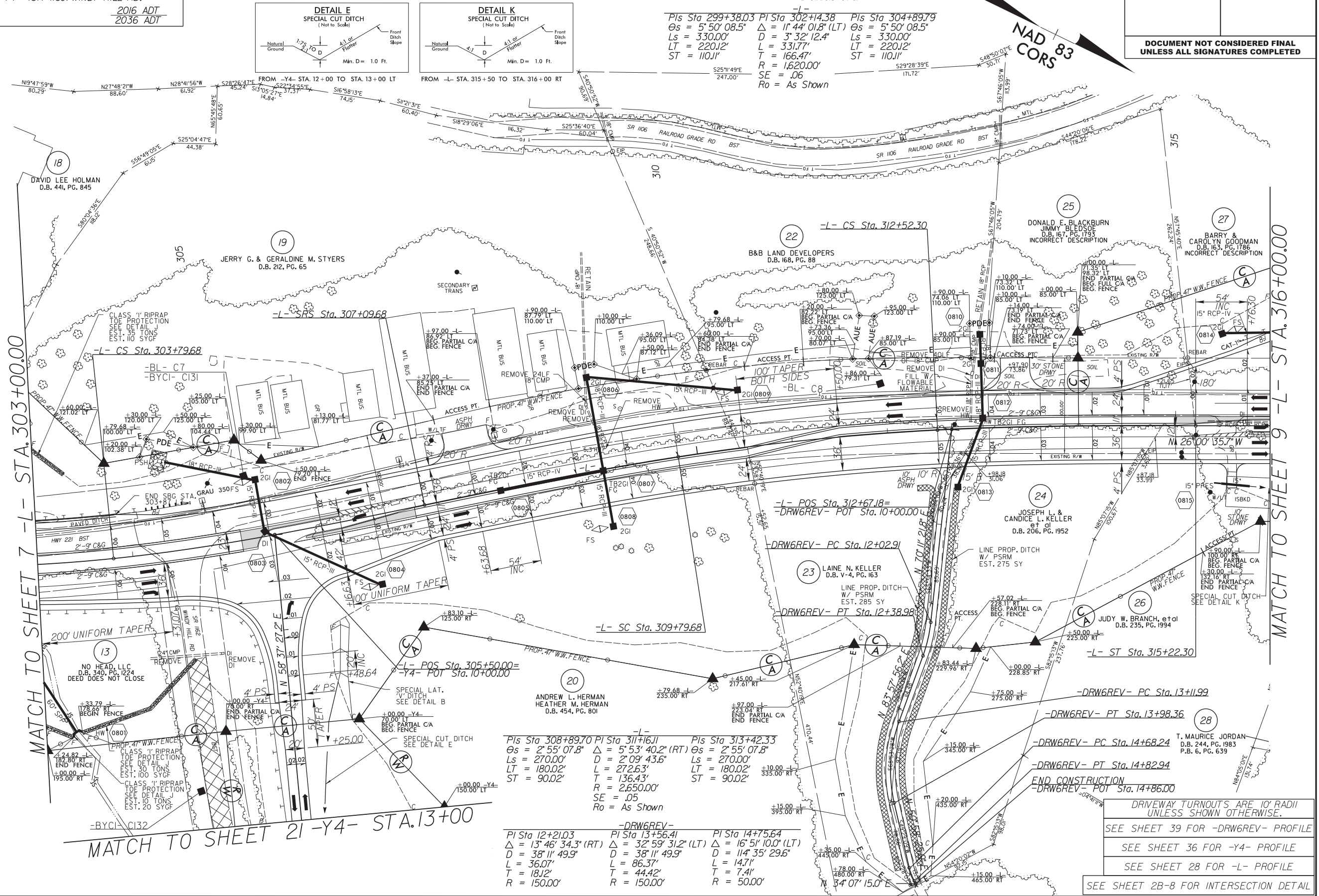
-L-
Pls Sta 299+38.03 PI Sta 302+14.38 Pls Sta 304+89.79
 $\Theta_s = 5^{\circ}50'08.5''$ $\Delta = 11^{\circ}44'01.8''$ (LT) $\Theta_s = 5^{\circ}50'08.5''$
 $L_s = 330.00'$ $D = 3^{\circ}32'12.4''$ $L_s = 330.00'$
 $LT = 220.12'$ $L = 331.77'$ $LT = 220.12'$
 $ST = 110.11'$ $T = 166.47'$ $ST = 110.11'$
 $R = 1,620.00'$
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 $Ro = As Shown$

DRIVEWAY TURNOUTS ARE 10' RADII
UNLESS SHOWN OTHERWISE.

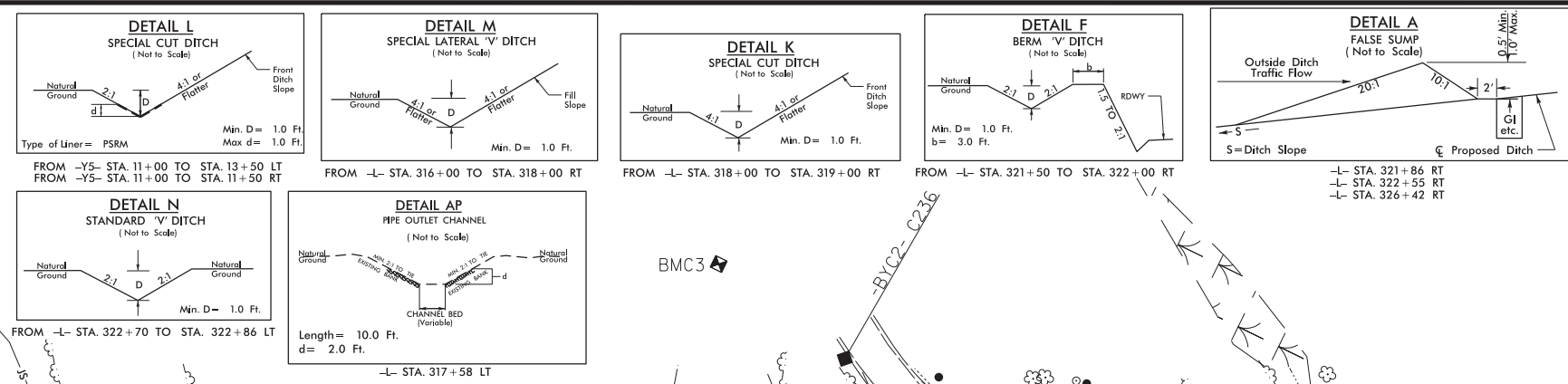
SEE SHEET 39 FOR -DRW5- PROFILE

SEE SHEET 27 FOR -L- PROFILE

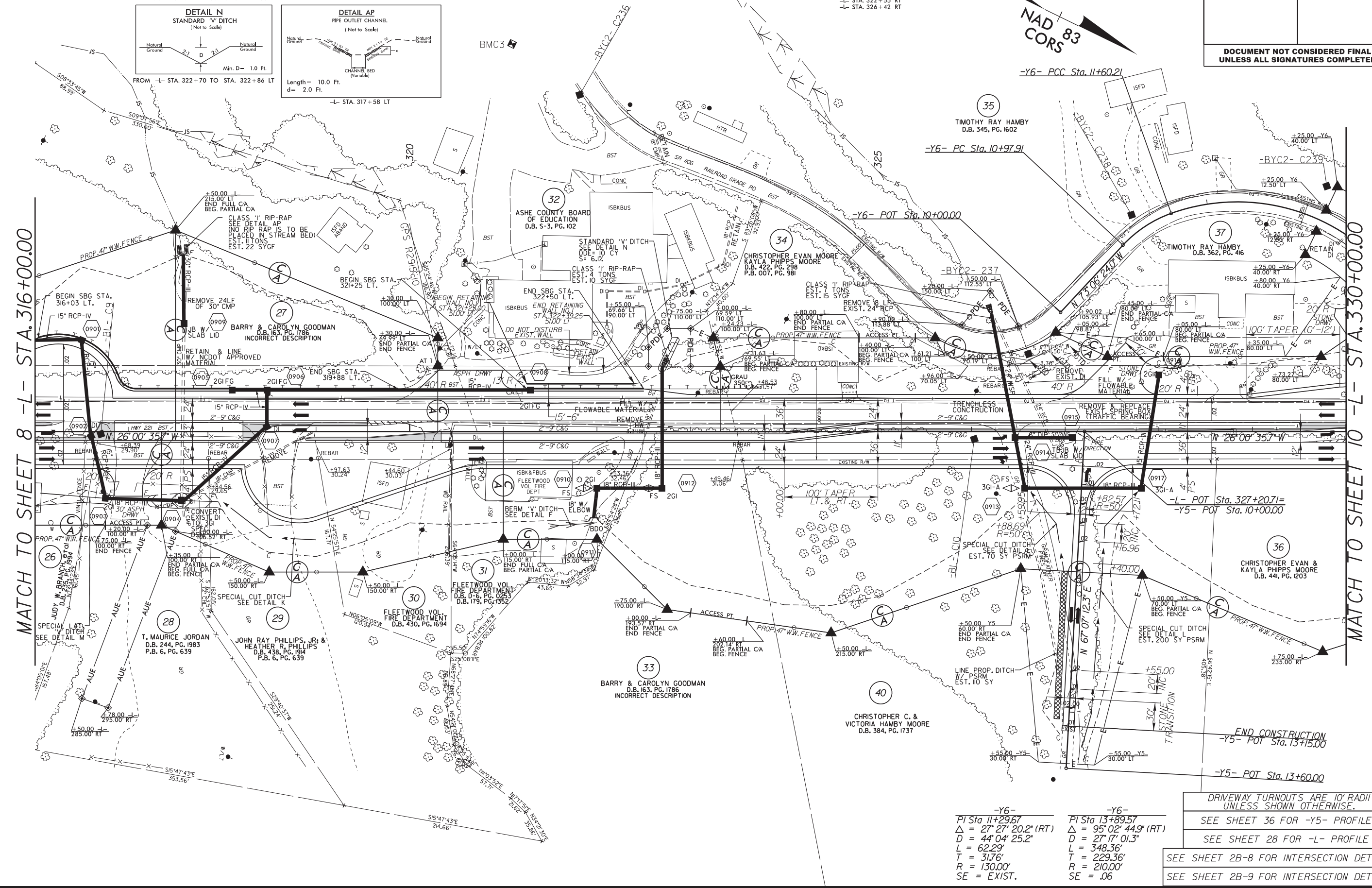
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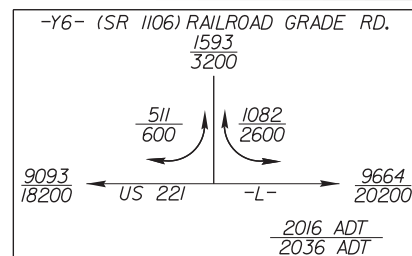
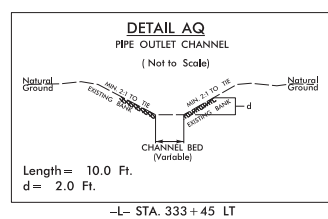
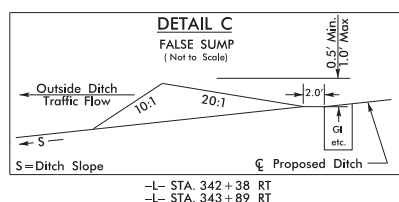
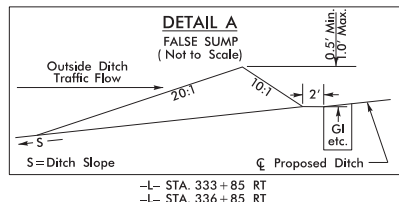
LOCHNER		PROJECT REFERENCE NO. R-29J5C		SHEET NO. 9	
H. W. LOCHNER, INC. 2840 PLAZA PLACE, SUITE 202 RALEIGH, NC 27612 (919) 571-7111		NC License Number F-0159		RW SHEET NO.	
HNTB 343 E. SIX FORKS ROAD, SUITE 200 RALEIGH, NC 27609		NC License Number C-1554		ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED					



-Y6-	-Y6-
<u>PI Sta 11+29.67</u>	<u>PI Sta 13+89.57</u>
$\Delta = 27^{\circ} 27' 20.2" (RT)$	$\Delta = 95^{\circ} 02' 44.9" (RT)$
$D = 44^{\circ} 04' 25.2"$	$D = 27^{\circ} 17' 01.3"$
$L = 62.29'$	$L = 348.36'$
$T = 31.76'$	$T = 229.36'$
$R = 130.00'$	$R = 210.00'$
$SE = EXIST.$	$SE = .06$

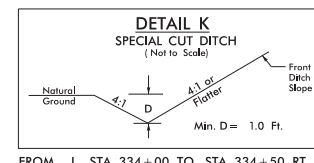
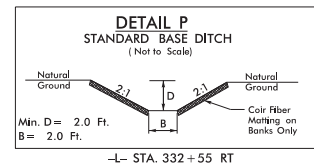
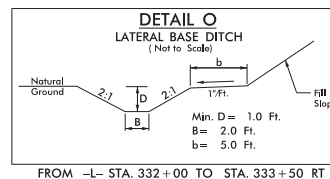
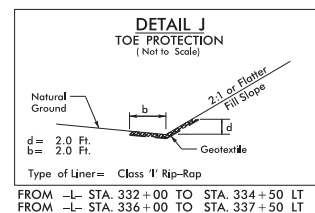
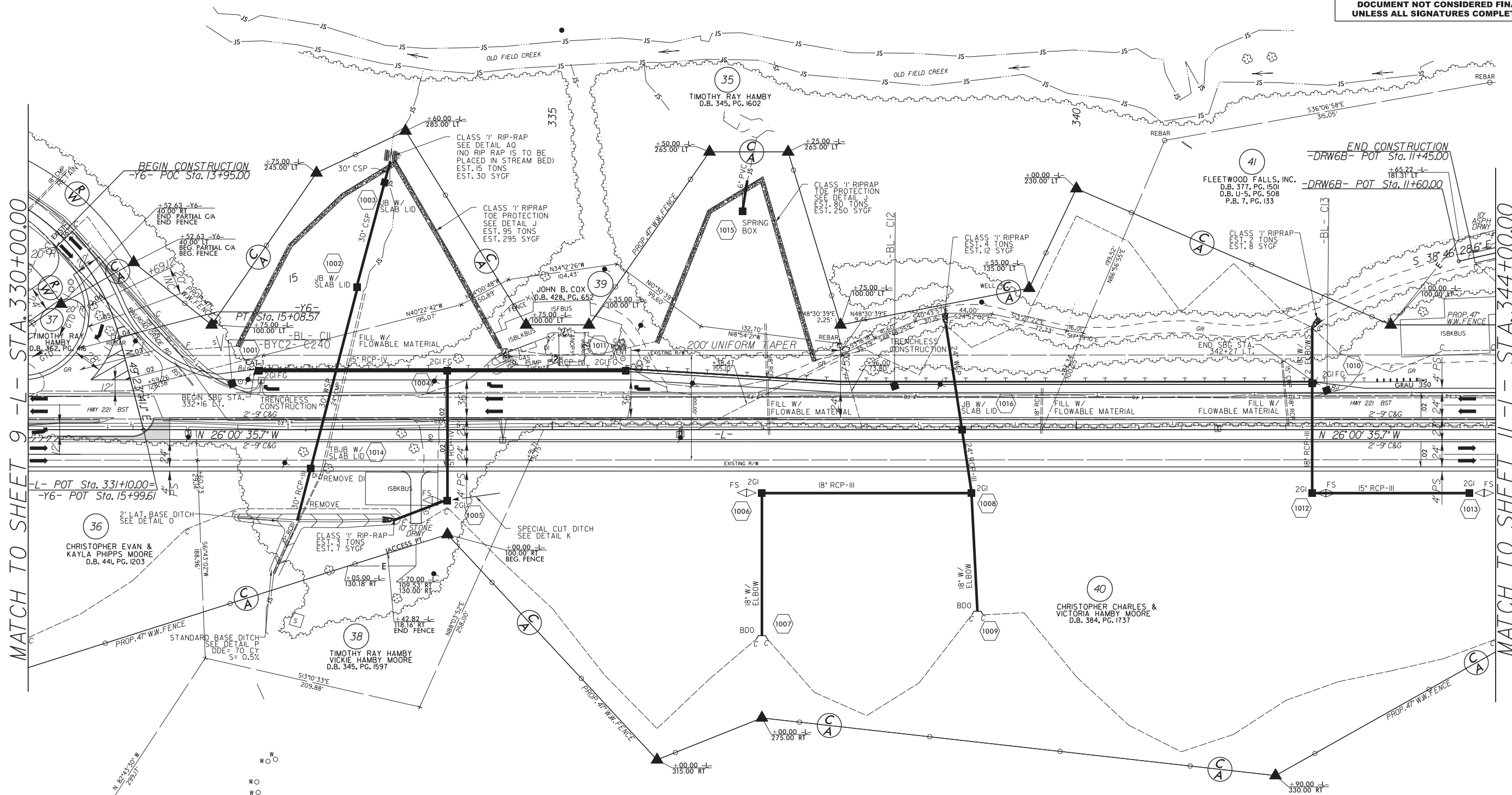
	DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.
	SEE SHEET 36 FOR -Y5- PROFILE
	SEE SHEET 28 FOR -L- PROFILE
SEE SHEET 2B-8 FOR INTERSECTION DETAIL	
SEE SHEET 2B-9 FOR INTERSECTION DETAIL	

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PROJECT REFERENCE NO.	SHEET NO.
<i>R-2915C</i>	<i>10</i>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	



DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.
SEE SHEET 40 FOR -DRW6B- PROFILE
SEE SHEET 36 FOR -Y6- PROFILE
SEE SHEET 29 FOR -L- PROFILE
SEE SHEET 2B-9 FOR INTERSECTION DETAIL

FROM -L- STA. 345+76 TO STA. 346+33.40 RT
FROM -L- STA. 356+08 TO STA. 357+00 RT

FROM -L- STA. 346+00 TO STA. 347+50 LT

FROM -DRW6A- STA. 11+50 TO STA. 12+00 RT

Type of Liner— PSRM

Type of Liner= Class 'I' Rip-Rap
FROM -L- STA. 351+00 TO STA. 352+00 RT

FROM -L- STA. 350+50 TO STA. 351+25 LT

FROM -Y7- STA. 10+75 TO STA. 12+00 RT JS

... $N 35^{\circ} 07' 42'' W$... $22^{\circ} 38' 17''$...

108.52'

13

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343 E. SIX FORKS ROAD, SUITE 200 NC License
RALEIGH, NC 27609 Number C-1554

NC License
Number F-0159

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.	
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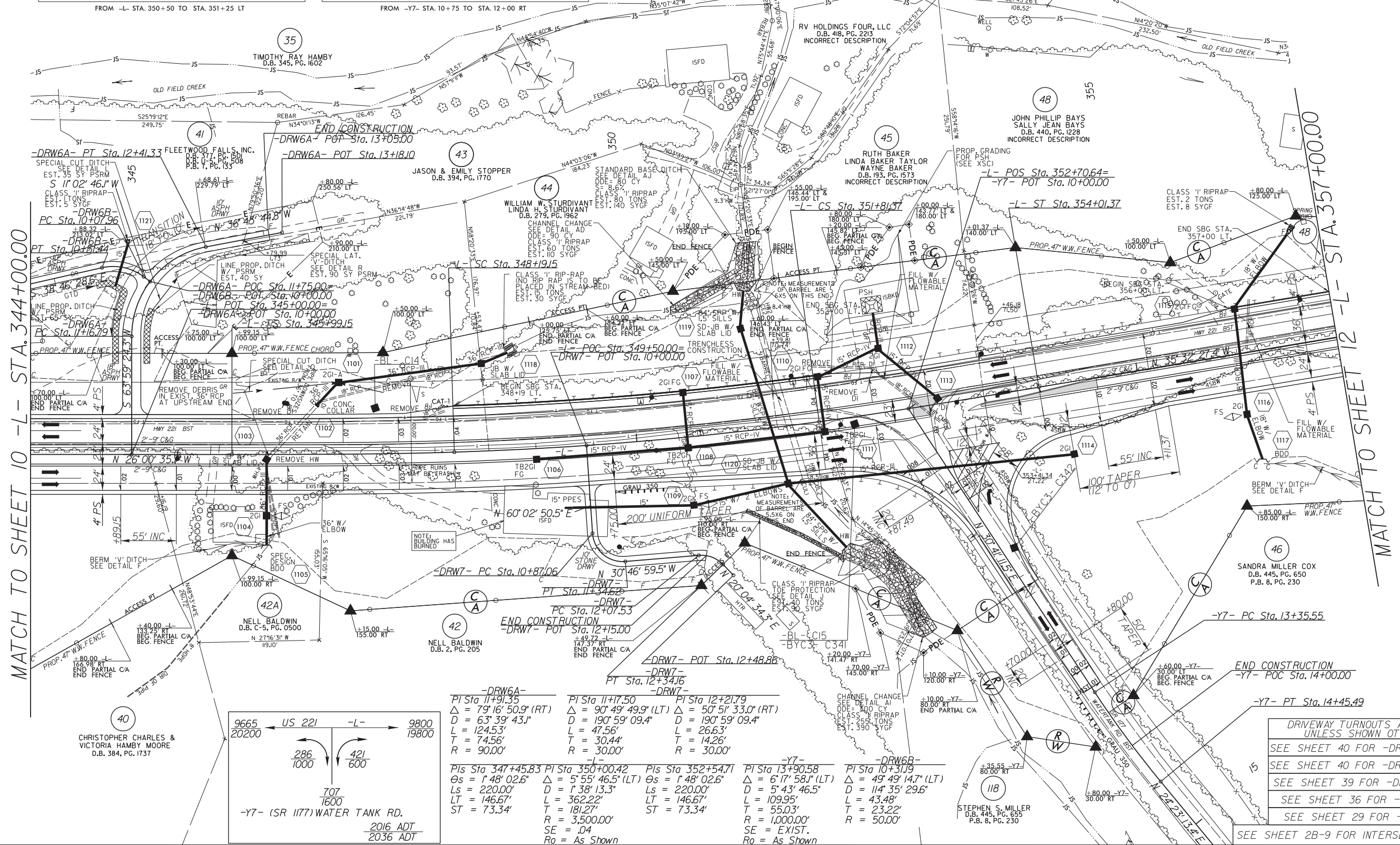
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RW SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

**DOCUMENT NOT CONSIDERED FINAL
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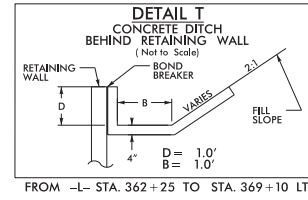
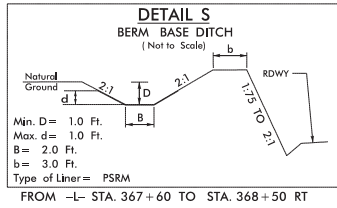
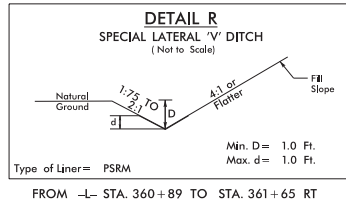
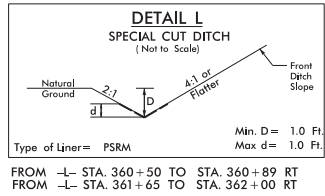


DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.
SEE SHEET 40 FOR -DRW6A- PROFILE
SEE SHEET 40 FOR -DRW6B- PROFILE
SEE SHEET 39 FOR -DRW7- PROFILE
SEE SHEET 36 FOR -Y7- PROFILE
SEE SHEET 29 FOR -L- PROFILE
SHEET 2B-9 FOR INTERSECTION DETAIL

8/17/99

REVISIONS
03/25/2015 ROW REV. AMENDED DEED, REFERENCE ON PARCELS 46 & 47, AMENDED PROPERTY LINES BETWEEN PARCELS 47, 48, & 50; AMENDED PROPERTY OWNER NAME AND COMBINED PARCELS 48 & 50 INTO PARCEL 50; REMOVED PARCEL NO. 51 - N/A
04/24/2015 ROW REV. COMBINED PARCELS 46 & 47 INTO PARCEL 46 AND OMITTED PARCEL 47 - BB

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RALEIGH, NC 27609

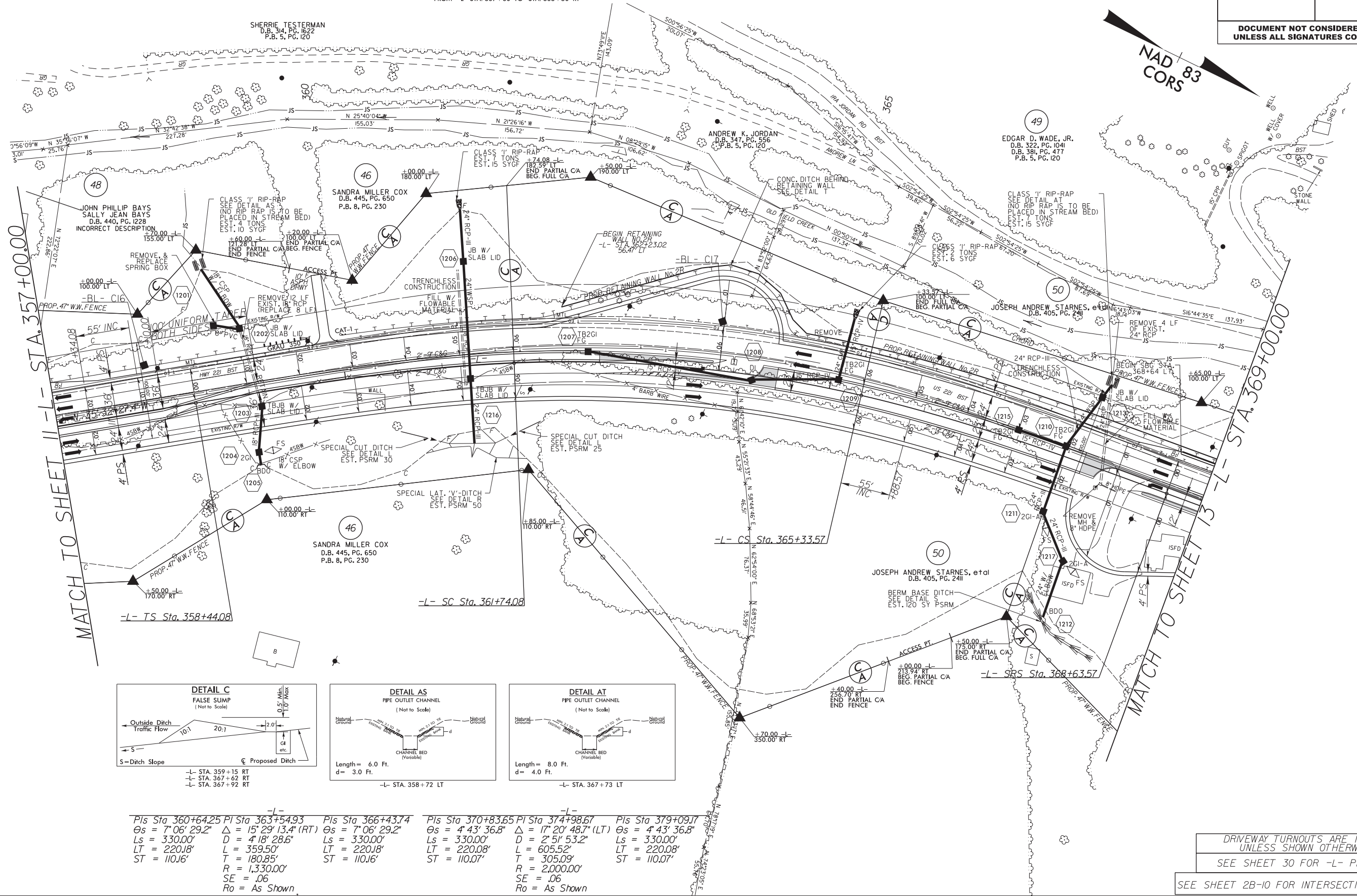
NC License
Number C-1554

PROJECT REFERENCE NO. SHEET NO.

R-2915C 12

R/W SHEET NO. ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

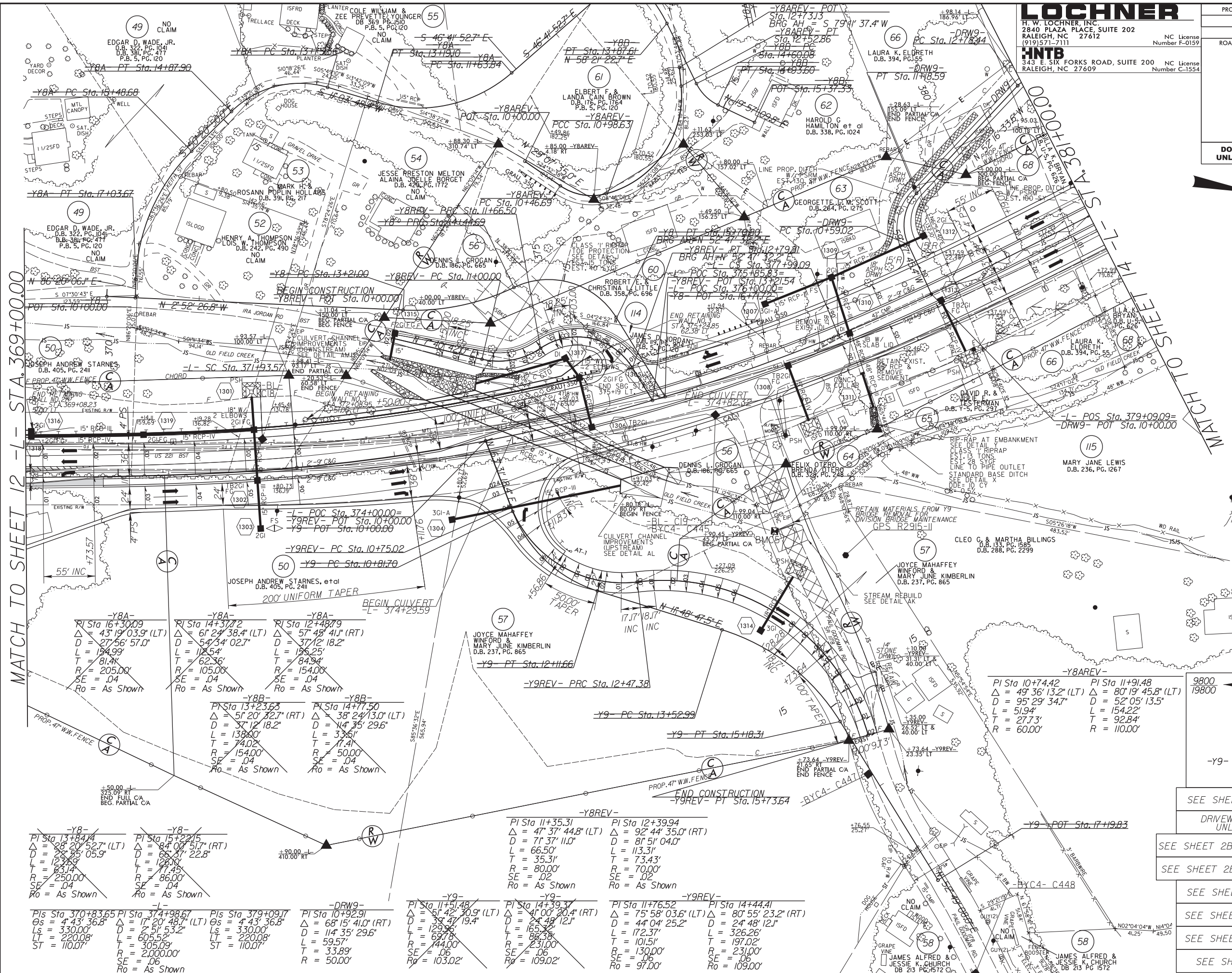
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PROJECT REFERENCE NO.	SHEET NO.
<i>R-2915C</i>	<i>13</i>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	

NAD 83
CORS



SEE SHEET 30 FOR -L- PROFILE

NC License
Number F-0159

00 NC License
Number C-1554

HYDRAULICS

ENGINEER

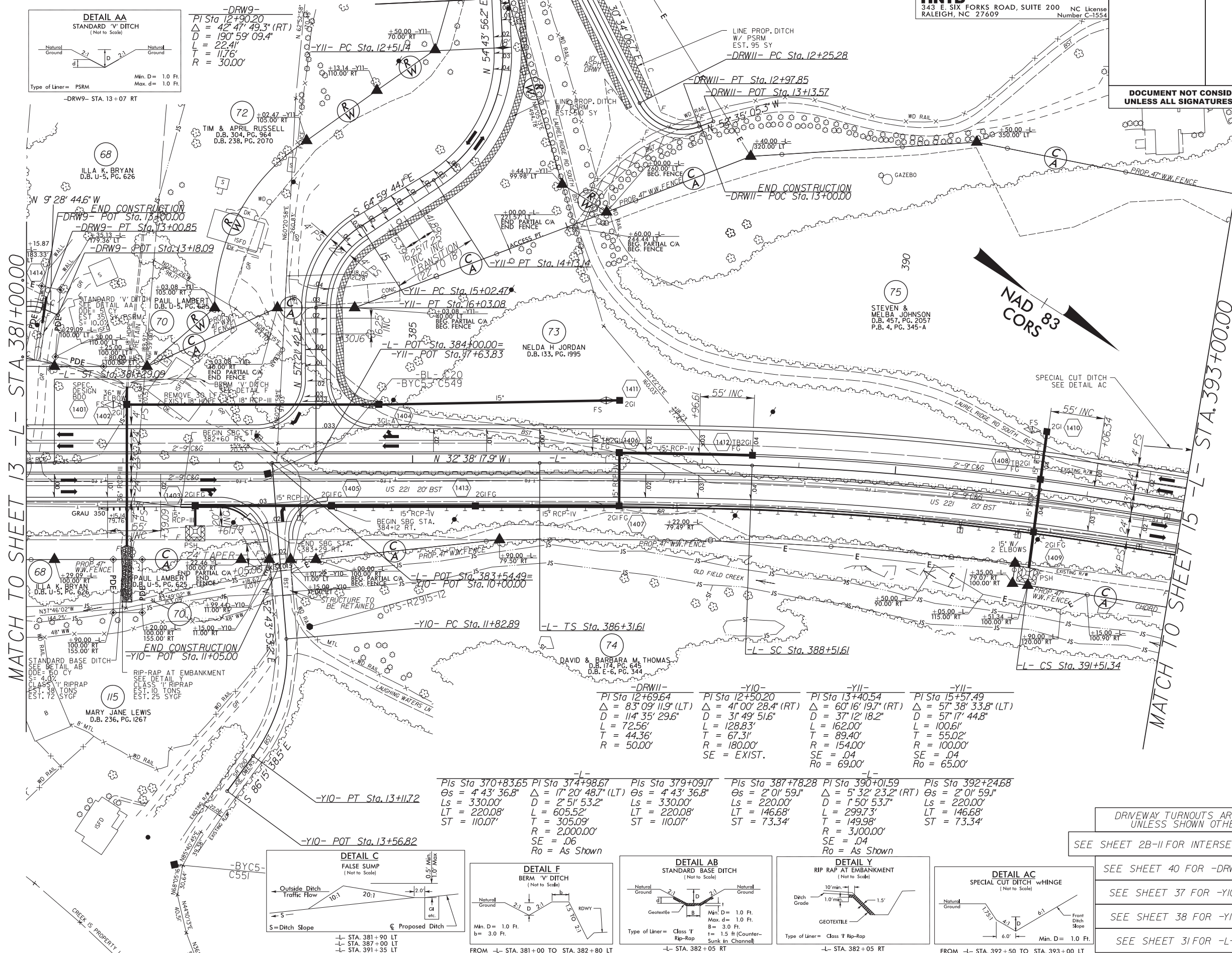
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UNLESS ALL SIGNATURES COMPLETED**

REVISIONS	
03/25/2015	ROW REV: CORRECTED ALIGNMENT NAME ON ROW MONUMENT FROM -Y11-12+70 TO -DRW10-12+70 AND CORRECTED STATION ON PDE MONUMENT LABEL FROM -13+10 TO -DRW9-12+95 ON PARCEL 68; AMENDED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCEL 75; ADDED PARCEL NO. 115 - KH
04/24/2015	ROW REV: COMBINED PARCELS 68 & 69 INTO PARCEL 68 AND OMITTED PARCEL 69; AMENDED PROPERTY OWNER NAME ON PARCEL 70; COMBINED PARCELS 70 & 71 INTO
12/10/2015	ROW REV: REVISED STATION AND OFFSET LABELS TO REFERENCE -L- INSTAD OF -DRW9- ON PARCEL 68; AMENDED PROPERTY OWNER NAME AND DEED BOOK REFERENCE ON
12/10/2015	ROW REV: REVISED ROW & TCE ON PARCELS 70, 72, & 73 BASED ON ELIMINATING -WALLA-; ADJUSTED EXIST RW OFFSET LABELS BASED ON FIELD STAKING ON PARCELS 70 & 74 - BB
02/27/2016	ROW REV: REMOVED TCE AND REVISED ROW ON PARCEL 73 - BB

8/17/99

21-APR-2016 22:37
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MATCH TO SHEET 22
-YII- STA. 12+00.00



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343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609

NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

15

R/W SHEET NO.

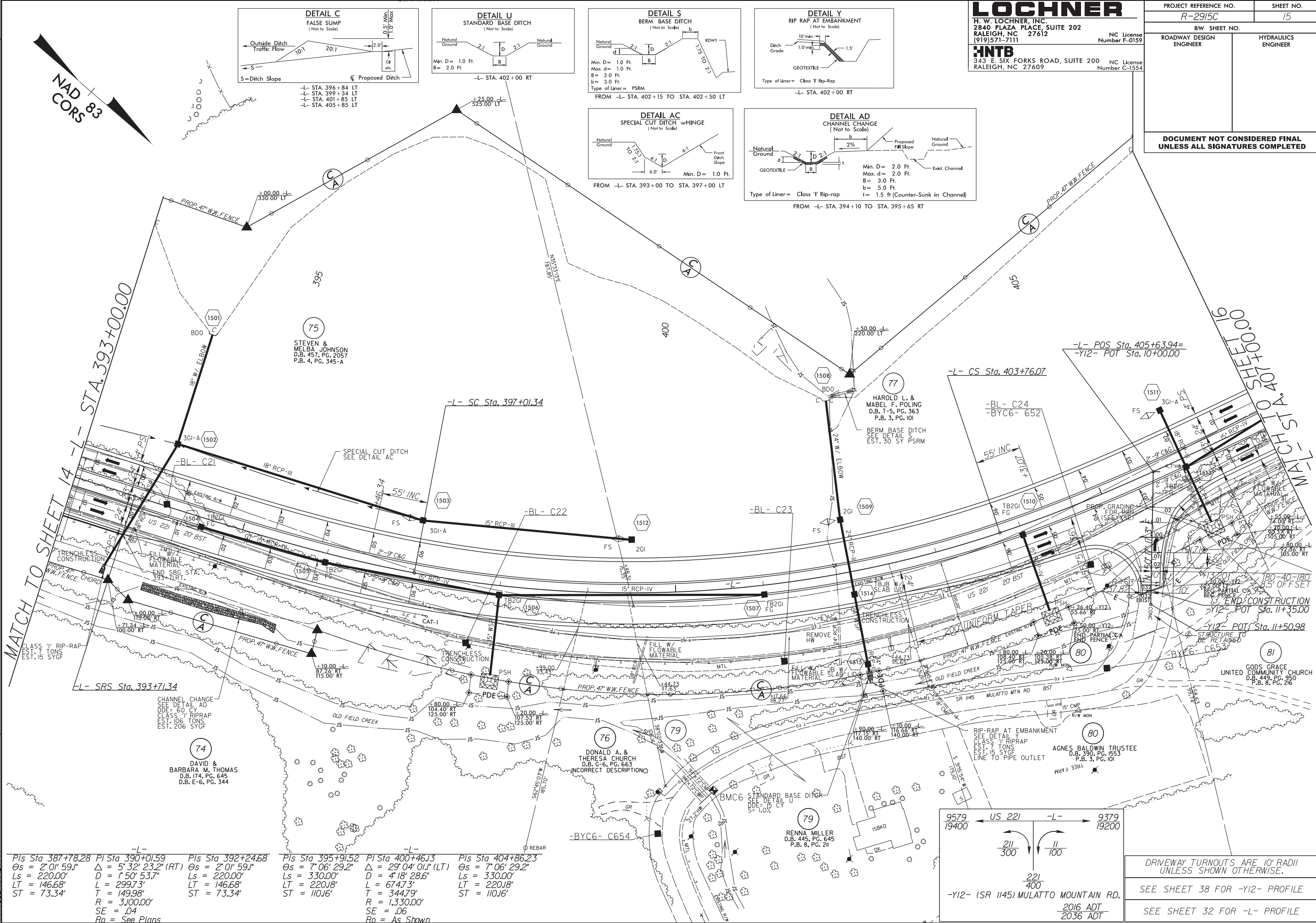
ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

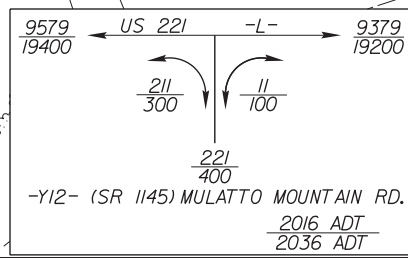
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

REVISIONS
03/25/2015 ROW REV. AMENDED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCELS 75 & 81 - KH
12/11/2015 ROW REV. ADJUSTED EXIST RW OFFSET LABELS BASED ON FIELD STAKING ON PARCELS 74, 77, 80, & 81 - BB

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-L-		-L-		-L-		-L-	
Pls Sta 387+78.28	Pl Sta 390+01.59	Pls Sta 392+24.68	Pls Sta 395+91.52	Pl Sta 400+46.13	Pls Sta 404+86.23		
Θs = 2° 01' 59.1"	Δ = 5° 32' 23.2" (RT)	Θs = 2° 01' 59.1"	Θs = 7° 06' 29.2"	Δ = 29° 04' 01.1" (LT)	Θs = 7° 06' 29.2"		
Ls = 220.00'	D = 1° 50' 53.7"	Ls = 220.00'	Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'		
LT = 146.68'	L = 299.73'	LT = 146.68'	LT = 220.18'	L = 674.73'	LT = 220.18'		
ST = 73.34'	T = 149.98'	ST = 73.34'	T = 344.79'	R = 1,330.00'	ST = 110.16'		
	R = 3,100.00'			SE = .06			
	SE = .04			Ro = As Shown			
	Ro = See Plans						



DRIVEWAY TURNOUTS ARE 10' RADII
UNLESS SHOWN OTHERWISE.

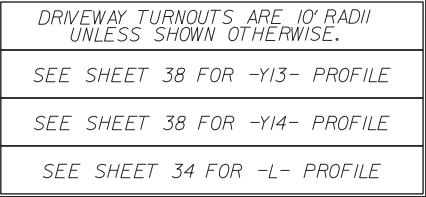
SEE SHEET 38 FOR -Y12- PROFILE

SEE SHEET 32 FOR -L- PROFILE

SEE SHEET 33 FOR -L- PROFILE

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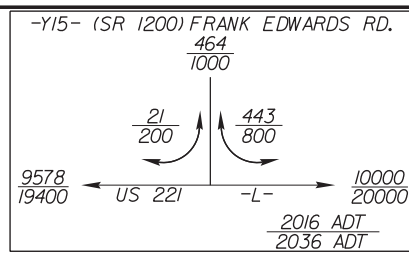
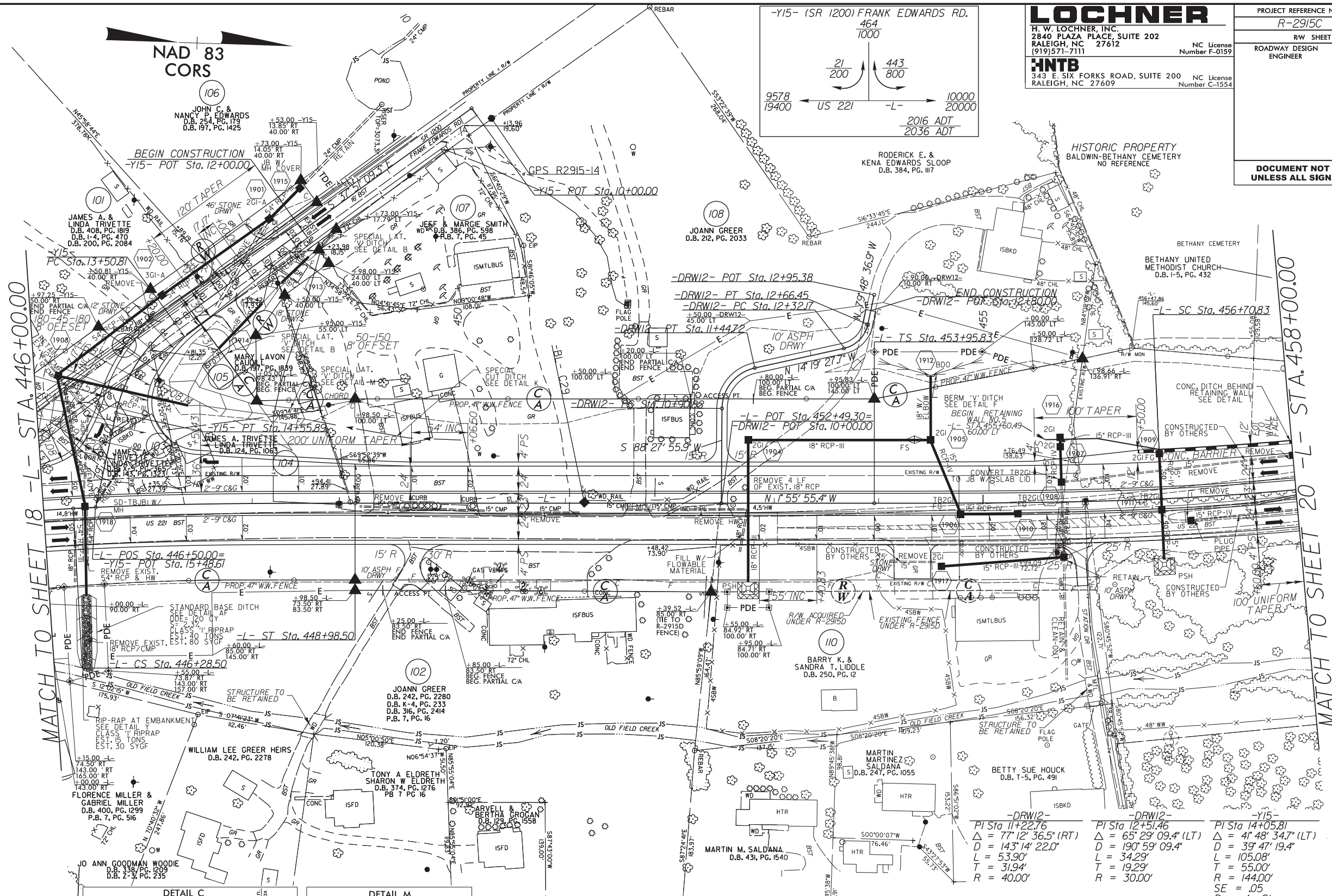
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8/17/99

REVISIONS
03/25/2015 ROW REV. AMENDED PROPERTY LINES FOR PARCELS 102 & 109 INTO PARCEL 102, REMOVED PARCEL NO. 109. - KH
04/22/2015 ROW REV. REVISED C/B BREAK BETWEEN PARCELS 102 & 109 AND DRIVEWAY PARCELS 102, 106, & 107. - BB
12/20/2015 ROW REV. ADJUSTED EXIST. R/W OFFSET LABELS BASED ON FIELD STAKING PARCELS 102, 106, & 107. - BB

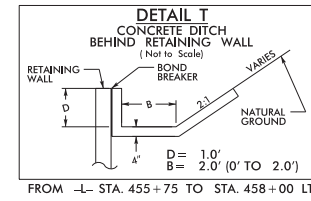
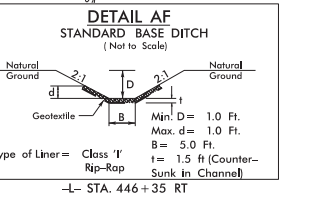
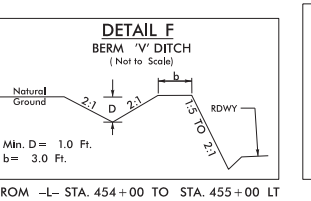
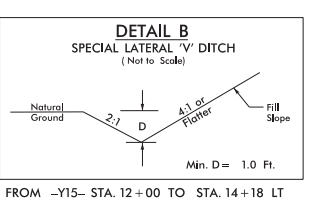
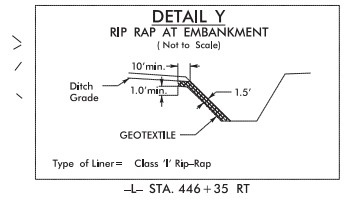
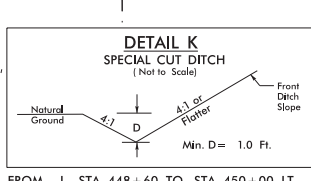
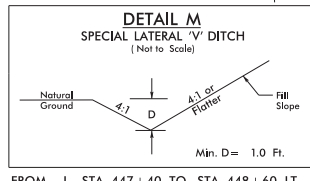
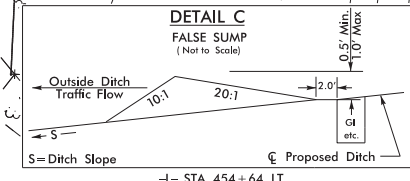
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RALEIGH, NC 27609

NC License Number F-0159
NC License Number C-1554

PROJECT REFERENCE NO.		SHEET NO.	
R-2915C		19	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			



Sta	Sta	Sta	Sta	Sta	Sta
436+92.24	442+09.80	447+18.53	455+79.18	459+20.50	462+60.70
Os = 3'13" 22.4"	Δ = 20'12" 13.3" (RT)	Os = 3'13" 22.4"	Os = 2'37" 33.8"	Δ = 9'30" 53.1" (LT)	Os = 2'37" 33.8"
Ls = 270.00'	D = 2'23" 14.4"	Ls = 270.00'	Ls = 275.00'	D = 1'54" 35.5"	Ls = 275.00'
LT = 180.03'	R = 846.29'	LT = 180.03'	LT = 183.35'	L = 498.19'	LT = 183.35'
ST = 90.03'	T = 427.59'	ST = 90.03'	T = 19.29'	T = 249.67'	ST = 91.69'
	R = 2,400.00'		R = 30.00'	R = 3,000.00'	
	SE = .05		SE = .05	SE = .05	
	Ro = As Shown		Ro = As Shown	Ro = As Shown	

DRIVEWAY TURNOUTS ARE 10' RADII
UNLESS SHOWN OTHERWISE.

SEE SHEET 40 FOR -DRW12- PROFILE

SEE SHEET 38 FOR -Y15- PROFILE

SEE SHEET 34 FOR -L- PROFILE

8/17/99

REVISIONS

03/25/2015 ROW REV: AMENDED PROPERTY OWNER NAMES AND DEED REFERENCE ON PARCEL 20 - KH
12/21/2015 ROW REV: ADJUSTED EXIST RW OFFSET LABELS BASED ON FIELD STAKING ON PARCELS 13 & 21 - BB
01/27/2016 ROW REV: ADDED 20' DRIVE AT -Y4- 18+15 LT ON PARCEL 20 - BB

22-APR-2016 09:19 R:\Roadway\Projects\2915C-rdy-PSH21.dgn
\$\$\$\$\$ USER NAME \$\$\$\$\$

LOCHNER

H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
(919)571-7111 NC License
Number F-0159

HNTB
343 E. SIX FORKS ROAD, SUITE 200
RALEIGH, NC 27609 NC License
Number C-1554

PROJECT REFERENCE NO.

R-2915C

SHEET NO.

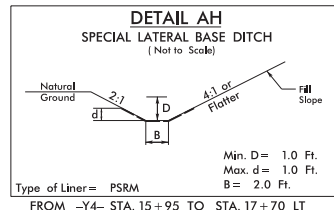
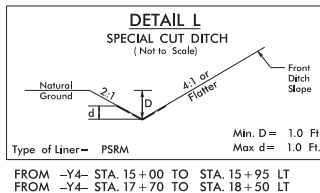
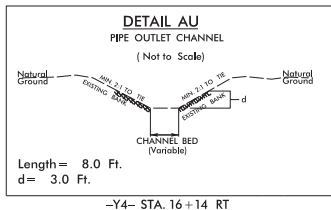
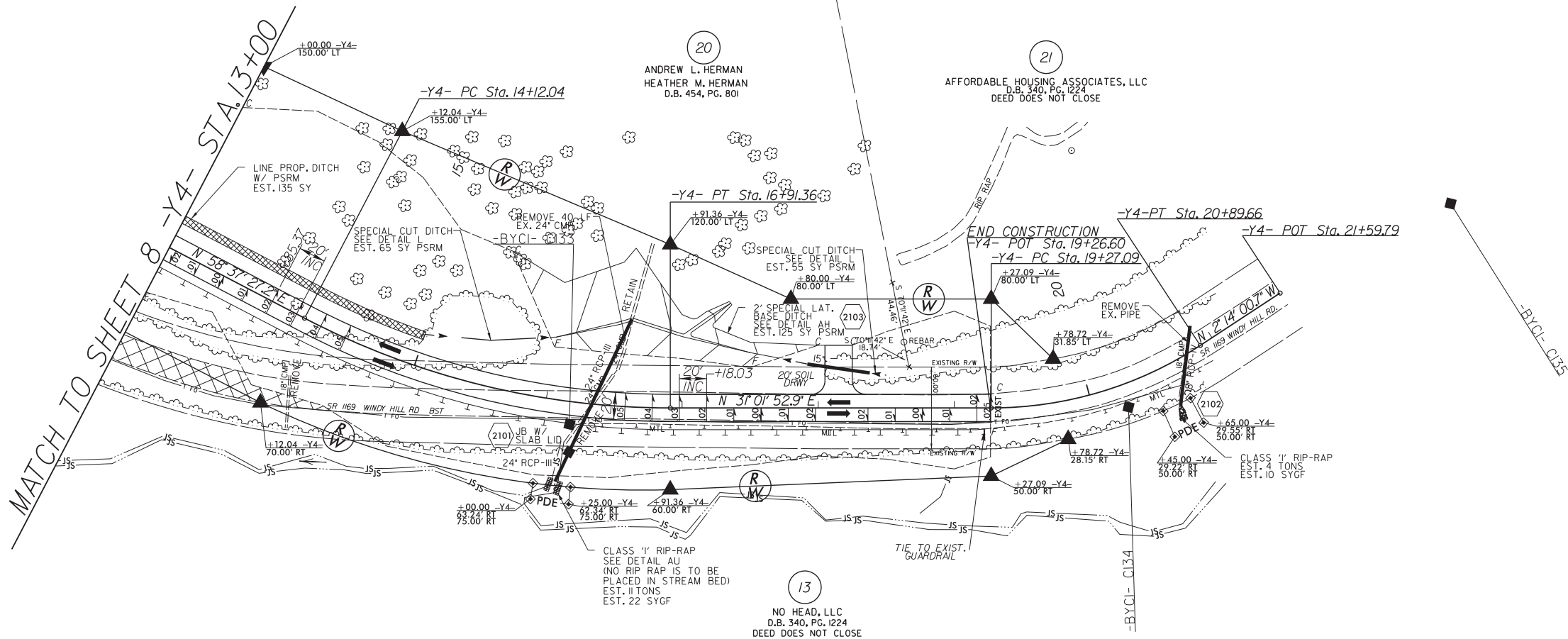
21

R/W SHEET NO.

ROADWAY DESIGN
ENGINEER

HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



-Y4-
PI Sta 15+54.47
 $\Delta = 27^{\circ}35'34.3''$ (LT)
D = $9^{\circ}52'42.9''$
L = 279.32'
T = 142.42'
R = 580.00'
SE = .05
Ro = 100.00'

-Y4-
PI Sta 20+10.74
 $\Delta = 33^{\circ}15'53.7''$ (LT)
D = $20^{\circ}27'46.0''$
L = 162.56'
T = 83.64'
R = 280.00'
SE = EXIST.
Ro = As Shown

DRIVEWAY TURNOUTS ARE 10' RADII
UNLESS SHOWN OTHERWISE.

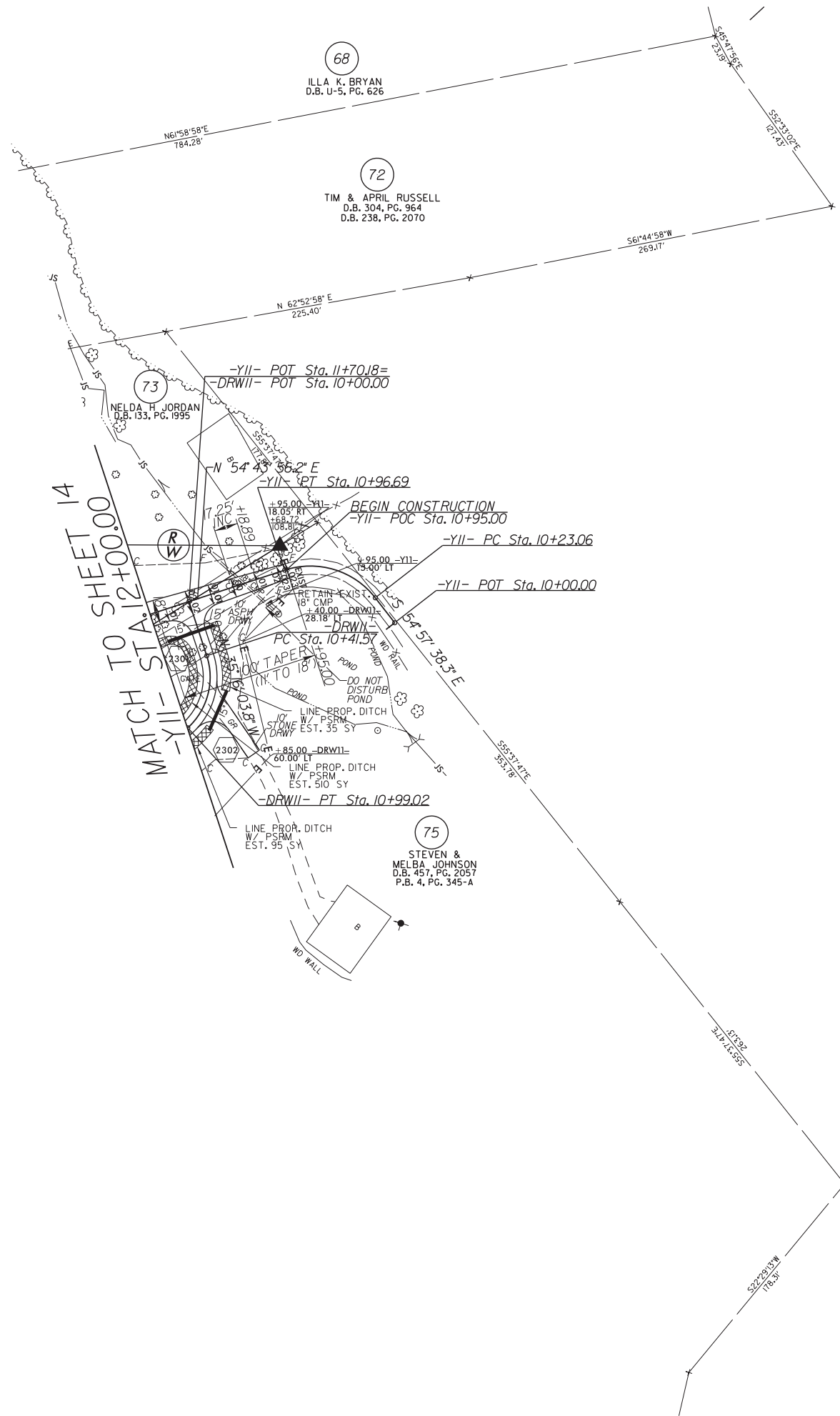
SEE SHEET 36 FOR -Y4- PROFILE

1272016 ROW REV: REMOVED TCE AND REVISED ROW ON PARCEL 73. - BB

LOCHNER
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Number

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RALEIGH, NC 27609
Number

PROJECT REFERENCE NO.		SHEET NO.	
R-2915C		22	
R/W SHEET NO.		23	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
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NAD 83
CORS

$-YII-$	$-DRWII-$
$Pi\ St\alpha\ 10^{\circ}46.5'31''$	$Pi\ St\alpha\ 10^{\circ}47.3'9.4''$
$\Delta = 70^{\circ}18'25.5''(LT)$	$\Delta = 65^{\circ}50'10.5''(RT)$
$D = 95^{\circ}29'34.7''$	$D = 114^{\circ}35'29.6''$
$L = 73.63^{\circ}$	$L = 57.45^{\circ}$
$T = 42.25^{\circ}$	$T = 32.37^{\circ}$
$R = 60.00^{\circ}$	$R = 50.00^{\circ}$
$SE = .04$	
$Ro = As\ Shown$	

DRIVEWAY TURNOUTS ARE 10' RADII
UNLESS SHOWN OTHERWISE.

SEE SHEET 40 FOR -DRWII- PROFILE

SEE SHEET 38 FOR -YII- PROFILE

REVISIONS

21-APR-2016 23:44
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\$\$\$\$\$USFRNAME\$\$\$\$\$

HNTB
343 E. SIX FORKS ROAD, SUITE 200 NC License
RALEIGH, NC 27609 Number C-1554

23

24

HYDRAULICS
ENGINEER

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UNLESS ALL SIGNATURES COMPLETED**

~~NAD
CORS 83~~

