STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

July 21, 2014

U. S. Army Corps of Engineers
Regulatory Field Office
3331 Heritage Trade Drive Suite 105
Wake Forest, NC 27587

ATTN: Mr. Andrew Williams
NCDOT Coordinator

Dear Sir:

Subject: **Application for an Individual Section 404 and Section 401 Water Quality Certification** for the 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.

The North Carolina Department of Transportation (NCDOT) proposes to widen US 221 to a four-lane, median-divided facility from US 421 in the Deep Gap Community of Watauga County to the US 221 Business/NC 88 intersection in the town of Jefferson in Ashe County. The project is approximately 16.1 miles in length.

Please see the enclosed ENG 4345, Ecosystem Enhancement Program (EEP) mitigation acceptance letters, permit drawing review minutes (4B and 4C), letter and Effects Form for 4(f) properties, State Historic Preservation Office (HPO) letter for archaeological sites, State Stormwater Management Plan (SMP), permit drawings, and design plans for the above referenced project.

MAILING ADDRESS:
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LOCATION:
CENTURY CENTER, BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC, 27610-4328

Purpose and Need:
The purpose of this project is to upgrade the existing roadway to a multi-lane facility to increase capacity, alleviate congestion, improve traffic operations and reduce the rate of traffic crashes.

Existing US 221 currently experiences capacity deficiency and operates at levels of service D, E and F. Crash rates and accident severity are relatively high along portions of the project and will likely worsen if no improvements are made.

Summary of Jurisdictional Impacts:
The preliminary projected impacts for the overall (Sections A-E) project will be approximately 3.04 acres of permanent wetland impacts, 7,886 linear feet of permanent stream impacts (6,947 linear feet of fill and 939 linear feet of bank stabilization), and 0.31 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	6
R-2915C	Preliminary	5	16
R-2915D	Final	20	24
R-2915E	Preliminary	9	6
	Total	**46**	**62***

* 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	Preliminary	Perm. Wetland Fill	0.16	0.20
		Excavation in Wetlands	--	
		Mechanized Clearing in Wetlands	0.04	
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	**3.04**

†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	Preliminary	Permanent Fill	2,263	--	2,263
		Temporary	--	0.06	
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	**7,886**	**0.31**	**6,947**

* See Table 7
** See Table 9
*** See Table 11

Summary of Utility Impacts:
There will be no impacts associated with utility relocations in the A, B or D Sections of this project. For Sections C and E, the utility relocations will be determined at final design.

Summary of Mitigation:
The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Mitigation for impacts resulting from Section C (preliminary design) and Sections A, B and D (final design impacts) are provided. EEP will provide all required mitigation for these sections. See Tables 2 and 3 for a summary of impacts and Table 13 for a summary of proposed mitigation. These mitigable impacts include 6,542 linear feet of permanent stream impact and 2.52 acres of permanent wetland impact. It has been determined that onsite mitigation is not an option for this project. Section E is due to let post year, therefore no mitigation is proposed for this section at this time.

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 Points 4B and 4C were reached for R-2915D on April 18, 2013 and September 11, 2013, respectively. Concurrence Points 4B and 4C were reached for R-2915A and R-2915B on June 20, 2013 and January 23, 2014, respectively. Concurrence Point 4B was reached for R-2915C on September 11, 2013.

PROJECT SCHEDULE

The project will be permitted in phases due to project size, funding and TIP schedule. Table 4 describes the proposed project sections and phasing. The impacts reported in this Individual Permit Application for Sections A, B and D are based on final design. The proposed impacts for the remaining Sections C and E are based on preliminary design. Preliminary design impacts for Section C have been calculated using the Concurrence Point 4B drawings, and Section E impacts have been roughly calculated using preliminary slope stakes plus 10' for wetlands and to the existing ROW for most streams. Permit modification requests will be submitted as the final design is completed for each of the remaining sections (C and E) according to the phasing dates provided in Table 4.

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	Jun 2015
R-2915B	SR 1003 (Idlewild Road) to north of the South Fork New River	1.77 miles	Jun 2015
R-2915C	North of the South Fork New River to south of NC 194	3.98 miles	Feb 2017
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	Post-Year
	TOTAL	**16.1 miles**	

INDEPENDENT UTILITY

The subject project is in compliance with 23 CFR Part 771.111(f) which lists the Federal Highway Administration (FHWA) characteristics of independent utility of a project:

(1) The project connects logical termini and is of sufficient length to address environmental matters on a broad scope,
(2) The project is usable and a reasonable expenditure, even if no additional transportation improvements are made in the area;
(3) The project does not restrict consideration of alternatives for other reasonably foreseeable transportation improvements.

RESOURCE STATUS

Waters within the project area are located in the New River Basin (HUC 05050001, within subbasins 05-07-01 and 05-07-02). There are Outstanding Resource Waters (ORW) (a portion of Old Field Creek) as well as High Quality Waters (HQW) (South Fork New River) within the project area. No Water Supply Waters (WS-I or WS-II) waters occur within 1.0

mile of the project area. Six named streams as well as unnamed tributaries to two other named streams are located within the project area (Table 5).

Wetland and stream determinations within R-2915 were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the 2012 Eastern Mountains and Piedmont Supplement. Mr. Monte Matthews of the U.S. Army Corps of Engineers (USACE) and Sue Homewood of the North Carolina Division of Water Quality (DWR) field verified the wetlands and surface waters on June 12, 2007. Mr. Matthews and Amy Euliss of DWR field reverified the wetlands and surface waters on July 29, 2013. This Section 404 Individual Permit application includes a request for a final approved Jurisdictional Determination of the resources included in the R-2915 project area.

Table 5 – Project area streams

Stream Name	Stream Index Number	Best Usage Classification	Description
Subbasin 05-07-01			
Gap Creek	10-1-23	C;Tr+	From source to South Fork New River
South Fork New River	10-1-(20.5)	WS-V, HQW	From a point 0.4m upstream of Couches Creek to a point 2.8m upstream of Obids Creek
Old Field Creek	10-1-22-(0.3)	C;Tr+	From source to Call Creek
Old Field Creek	10-1-22-(0.7)	C;Tr, ORW	From Call Creek to South Fork New River
Beaver Creek	10-1-25	C;Tr+	From source to South Fork New River
Cole Branch*	10-1-21-1	C;Tr+	From source to Beaver Creek
South Beaver Creek*	10-1-25-2	C;Tr+	From source to Beaver Creek
Naked Creek	10-1-32	C+	From source to South Fork New River
Subbasin 05-07-02			
Little Buffalo Creek	10-2-20-1	C;Tr+	From source to Buffalo Creek

* Stream does not occur within the project area, only unnamed tributaries to stream occur within the project area

<u>303(d) Impaired Waters</u>:
Little Buffalo Creek is currently listed on the North Carolina 2012 Final 303(d) list of impaired waters for having impaired ecological/biological integrity for benthos.

IMPACTS TO WATERS OF THE U.S.

Tables 6 and 7 summarize the impacts to jurisdictional water resources for the final design of R-2915A. Tables 8 and 9 summarize the impacts to jurisdictional water resources for the final design of R-2915B. Tables 10 and 11 summarize the impacts to jurisdictional water resources for the final design of R-2915D. Site numbers correspond with the permit (hydraulic) drawings included in this application. The stream and wetland numbers correspond to the NRTR. A brief description of each impact site will follow the tables.

Table 6 – R-2915A 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	W2b	0.21	0.25	--	--	0.03	0.25
1A	W2a	0.56	0.03	--	--	<0.01	0.03
1B	W2a	0.56	0.07	--	0.02	<0.01	0.10
5	W3	0.05	<0.01	--	--	<0.01	<0.01
18	W6**	0.15	0.09	<0.01	0.05	--	0.15
21	W8	0.08	0.01	<0.01	--	<0.01	0.02
22	W9	0.14	0.03	--	--	<0.01	0.03
		Total Impacts	**0.48**	**0.01**	**0.08**	**0.05†**	**0.57*** **

* All wetlands impacted are riparian
** Total take of wetland
*** Values are based on rounding, due to calculating totals with actual numbers to the thousandths
†Additionally, 0.01 acre of temporary fill in wetlands will occur in the hand clearing areas for erosion control measures

Table 7 – R-2915A Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
1	N/A (wetland only)	--	--	--	--	--
1A	N/A (wetland only)	--	--	--	--	--
1B	N/A (wetland only)	--	--	--	--	--
2	Gap Creek (P)	S1	Perm. Fill	98	--	USACE & DWR
			Bank Stabilization	60	--	DWR
			Temp Fill	--	0.02	--
3	UT to Gap Creek (P)	S2	Perm. Fill	198	--	USACE & DWR
			Bank Stabilization	47	--	DWR
			Temp Fill	--	<0.01	--
3A	UT to Gap Creek (P)	S2	Perm. Fill	57	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01	--
4	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	19	--	DWR
			Temp Fill	--	--	--
5	UT to Gap Creek (P)	S6	Perm. Fill	--	--	--
			Bank Stabilization	9	--	DWR
			Temp Fill	--	<0.01	--
6	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	15	--	DWR
			Temp. Fill	--	--	-
7	UT to Gap Creek (I)	S6	Perm. Fill	250	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
8	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	12	--	DWR
			Temp. Fill	--	--	--
9	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	10	--	DWR
			Temp. Fill	--	--	--

Table 7 Continued – R-2915A Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
10	UT to Gap Creek (P)	S10	Perm. Fill	74	--	USACE
			Bank Stabilization	16	--	--
			Temp. Fill	--	<0.01	--
11	UT to Gap Creek (P)	S12	Perm. Fill	80	--	USACE
			Bank Stabilization	60	--	--
			Temp. Fill	--	<0.01	--
12	UT to Gap Creek (P)	S13	Perm. Fill	55	--	USACE
			Bank Stabilization	10	--	--
			Temp. Fill	--	<0.01	--
12A	UT to Gap Creek (P)	S13	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
12B	UT to Gap Creek (P)	S13	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
13	UT to Gap Creek (P)	S14	Perm. Fill	66	--	USACE
			Bank Stabilization	13	--	--
			Temp. Fill	--	<0.01	--
13A	UT to Gap Creek (P)	S14	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
13B	UT to Gap Creek (P)	S14	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
14	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	13	--	DWR
			Temp. Fill	--	--	--
15	UT to Gap Creek (I)	S18	Perm. Fill	84	--	USACE
			Bank Stabilization	26	--	--
			Temp. Fill	--	<0.01	--
16	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	9	--	DWR
			Temp. Fill	--	--	--
17	UT to Gap Creek (P)	S19	Perm. Fill	26	--	USACE
			Bank Stabilization	21	--	--
			Temp. Fill	--	<0.01	--
18	N/A (wetland only)	--	--	--	--	--
19	UT to Gap Creek (P)	S21	Perm. Fill	113	--	USACE
			Bank Stabilization	23	--	--
			Temp. Fill	--	<0.01	--
20	UT to Gap Creek (P)	S23	Perm. Fill	--	--	--
			Bank Stabilization	9	--	--
			Temp. Fill	--	--	--
21	N/A (wetland only)	--	--	--	--	--

Table 7 Continued – R-2915A Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
22	N/A (wetland only)	--	--	--	--	--
23	UT to Gap Creek (P)	S26	Perm. Fill	18	--	USACE
			Bank Stabilization	9	--	--
			Temp. Fill	--	<0.01	--
23A	UT to Gap Creek (P)	S26	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
24	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	21	--	DWR
			Temp. Fill	--	--	--
Total Temporary Impacts:				**--**	**0.05**[3]	**--**
Total Perm. Impacts (Perm. Fill + Bank Stabilization):				**1,521**	**--**	**--**
Permanent Impacts Requiring DWR Mitigation:				**818**	**--**	**--**
Permanent Impacts Requiring USACE Mitigation:				**1,119**	**--**	**--**
Total Impacts Requiring Mitigation:				**1,119**	**--**	**†**

1 – All 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, due to some of the individual impacts being <0.01 acre
† – Final mitigation requirement will be up to the USACE and DWR

Permit Site 1: The construction of a ramp for the new interchange with US 421 will result in 0.25 acre of permanent wetland fill and 0.03 acre of hand clearing in W2b.

Permit Site 1A: The construction of a ramp for the new interchange with US 421 will result in 0.03 acre of permanent wetland fill and <0.01 acre of hand clearing in W2a. An 18" RCP (reinforced concrete pipe) will be installed under the ramp at this location, which will continue to provide the hydrology of the un-impacted portion of W2b within the gore area.

Permit Site 1B: The construction of a ramp for the new interchange with US 421 will result in 0.07 acre of permanent wetland fill, 0.02 acre of mechanized clearing, and <0.01 acre of hand clearing in W2a.

Permit Site 2: The construction of a ramp for the new interchange with US 421will result in a new 11'x8' triple-barrel RCBC (reinforced concrete box culvert) being constructed to carry Gap Creek (S1) under the ramp. The installation of this new culvert will result in 98 lf (linear feet) of permanent stream impacts to Gap Creek, 60 lf of bank stabilization from floodplain bench construction, and 0.02 acre (78 lf) of temporary stream impacts.

Permit Site 3: The construction of a ramp for the new interchange with US 421 will result in a new 9'x7' single-barrel RCBC being constructed to carry S2 under the ramp. The installation of this new culvert will result in 198 lf of permanent stream impacts, 47 lf of bank stabilization and <0.01 (67 lf) acre of temporary impacts to S2.

Permit Site 3A: The construction of a driveway to maintain landowner access to property will result in a new 7.25'x5.25' metal arch culvert to carry S2 under the new driveway. The installation of this new culvert will result in 57 lf of permanent impacts and <0.01 (10 lf) acre of temporary impacts to S2.

Permit Site 4: There will be 19 lf of bank stabilization to Gap Creek (S1) to protect the outlet of an energy dissipator basin.

Permit Site 5: Two existing 30" RCPs carrying the flow to W3 and S6 will be removed and replaced as a single 30" RCP perpendicular with US 221. The installation of the new RCP and stabilization of the outlet will result in <0.01 acre of permanent wetland fill and <0.01 acre of hand clearing in wetlands to W3. It will also result in 9 lf of permanent impacts and <0.01 acre (10 lf) of temporary impacts to S6.

Permit Site 6: There will be 15 lf of bank stabilization to Gap Creek (S1) to protect the outlet of a new standard base ditch.

Permit Site 7: The widening of US 221 and construction of a ramp for the new interchange with US 421 will result in the installation of a 30" RCP to carry S6 under the new roadway slopes. The installation of this RCP will result in 250 lf of permanent impacts to and <0.01 acre (10 lf) of temporary impacts to S6.

Permit Site 8: There will be 12 lf of bank stabilization to Gap Creek (S1) to protect the outlet of a new standard base ditch.

Permit Site 9: There will be 10 lf of bank stabilization to Gap Creek (S1) to protect the outlet of a new standard base ditch.

Permit Site 10: The existing 5'x6' RCBC carrying S10 will be replaced and extended to the west with a 54" RCP. This pipe replacement will result in 74 lf of permanent impacts, 16 lf of bank stabilization and <0.01 acre (10 lf) of temporary stream impacts to S10.

Permit Site 11: The existing 6'x9' double-barrel RCBC carrying S12 will be replaced and extended to both the east and west with a 9'x6' double-barrel RCBC. This replacement and extension will result in 80 lf of permanent impacts, 60 lf of bank stabilization and <0.01 acre (20 lf) of temporary impacts to S12.

Permit Site 12: The existing 42" RCP and 15" RCP carrying S13 will be replaced and extended with a new 42" RCP. This action will result in 55 lf of permanent stream impacts, 10 lf of bank stabilization and <0.01 acre (20 lf) of temporary impacts to S13.

Permit Site 12A: The existing 30" CMP (corrugated metal pipe) carrying S13 will be removed and replaced in the same location with a new 42" RCP. This will result in <0.01 acre (10 lf) of temporary impacts to S13.

Permit Site 12B: The existing 24” CMP carrying S13 will be removed and replaced in the same location with a new 42” RCP. This will result in <0.01 acre (10 lf) of temporary impacts to S13.

Permit Site 13: The existing dual 42” RCPs carrying S14 will be replaced and extended to the east with a new 48” RCP. This replacement and extension will result in 66 lf of permanent stream impact, 13 lf of bank stabilization and <0.01 acre (25 lf) of temporary stream impacts to S14.

Permit Site 13A: The existing 48” CMP carrying S14 will be removed. This pipe removal will result in <0.01 acre (10 lf) of temporary impacts to S14.

Permit Site 13B: The existing 36” CMP carrying S14 will be removed and replaced in the same location with a new 48” RCP. This will result in <0.01 acre (10 lf) of temporary impacts to S14.

Permit Site 14: There will be 13 lf of bank stabilization to Gap Creek (S1) to protect the ditch outfall of a 36” RCP.

Permit Site 15: The existing 36” RCP carrying S18 will be replaced and extended with a new 36” RCP. Additionally a new standard base ditch will tie into S18 close to its confluence with Gap Creek (S1). These actions will result in 84 lf pf permanent impacts, 26 lf of bank stabilization and <0.01 acre (20 lf) of temporary impacts to S18.

Permit Site 16: There will be 9 lf of bank stabilization to Gap Creek (S1) to protect the outlet of a new standard base ditch.

Permit Site 17: The existing dual 42” RCPs and single 36” CMP carrying S19 will be replaced and extended with a new 60” RCP. This activity will result in 26 lf of permanent stream impacts, 21 lf of bank stabilization and <0.01 acre (20 lf) of temporary impacts to S19.

Permit Site 18: As a result of the new roadway slopes, there will be 0.09 acre of permanent wetland fill, <0.01 acre of excavation and 0.05 acre of mechanized clearing in W6. This will result in a total take of all 0.15 acre of W6.

Permit Site 19: The existing 66” RCP carrying S21 will be replaced and extended to both the east and west with a new 66” RCP. This action will result in 113 lf of permanent stream impacts, 23 lf of bank stabilization and <0.01a acre (20 lf) or temporary stream impacts to S21.

Permit Site 20: There will be 9 lf of bank stabilization to S23 to protect the outlet of a new standard base ditch.

Permit Site 21: Wetland W8 originates at the outlet of an existing 48” RCP. As a result of the new roadway slopes, the 48” RCP will be replaced and extended, resulting in 0.01 acre of permanent wetland fill, <0.01 of excavation in wetlands and <0.01 acre of hand clearing in wetlands within W8.

Permit Site 22: Wetland W9 originates at the outlet of an existing 18" RCP. As a result of the new roadway slopes, the 18" RCP will be replaced and extended, resulting in 0.03 acre of permanent wetland fill and <0.01 acre of hand clearing in wetlands within W9.

Permit Site 23: The existing 24" RCP carrying S26 will be replaced and extended resulting in 18 lf of permanent stream impacts, 9 lf of bank stabilization and <0.01 acre (10 lf) of temporary stream impacts to S26.

Permit Site 23A: The existing 15" TC (terra cotta pipe) carrying S26 will be removed and replaced in the same location with a new 24" RCP. This will result in <0.01 acre (10 lf) of temporary impacts to S26.

Permit Site 24: There will be 21 lf of bank stabilization to Gap Creek (S1) to protect the outlet of a new standard base ditch.

Table 8 – R-2915B Wetland Impacts*

Site	Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
4	W11	0.26	<0.01	--	<0.01	<0.01
5	W11	0.26	<0.01	--	--	<0.01
6	W11	0.26	<0.01	--	--	<0.01
7	W11	0.26	0.05	0.03	--	0.08
8	W12	0.05	<0.01	--	<0.01	<0.01
11	W14	0.02	<0.01	--	<0.01	<0.01
12	W15**	0.12	0.12	--	<0.01	0.12
14	W16	0.04	--	0.01	<0.01	0.02
15	W126**	0.19	0.14	--	0.05	0.19
		Total Impacts	**0.32**	**0.04**	**0.06**	**0.43*** **

* 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 9 – R-2915B Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
1A	UT to Gap Creek (P)	S32	Perm. Fill	170	--	USACE & DWR
			Bank Stabilization	44	--	DWR
			Temp Fill	--	<0.01	--
1B	Gap Creek (P)	S1	Perm. Fill	15	--	USACE & DWR
			Bank Stabilization	35	--	DWR
			Temp Fill	--	<0.01	--
2	UT to Gap Creek (P)	S35	Perm. Fill	34	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--
3	UT to Gap Creek (P)	S35	Perm. Fill	111	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--

Table 9 continued – R-2915B Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
4	N/A (wetland only)	--	--	--	--	--
5	N/A (wetland only)	--	--	--	--	--
6	N/A (wetland only)	--	--	--	--	--
7	N/A (wetland only)	--	--	--	--	--
8	N/A (wetland only)	--	--	--	--	--
9	UT to Gap Creek (P)	S36	Perm. Fill	124	--	USACE
			Bank Stabilization	23	--	--
			Temp. Fill	--	--	--
10	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	154	--	DWR
			Temp. Fill	--	0.02	--
11	N/A (wetland only)	--	--	--	--	--
12	N/A (wetland only)	--	--	--	--	--
13	UT to Gap Creek (P)	S40	Perm. Fill	52	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
14	N/A (wetland only)	--	--	--	--	--
15	N/A (wetland only)	--	--	--	--	--
16	UT to Gap Creek (P)	S42	Perm. Fill	27	--	USACE
			Bank Stabilization	9	--	--
			Temp. Fill	--	--	--
17	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	54	--	DWR
			Temp. Fill	--	--	--
18	Gap Creek (P)	S1	Perm. Fill	--	--	--
			Bank Stabilization	53	--	DWR
			Temp. Fill	--	--	--
19	South Fork New River (P)	S43	Perm. Fill	--	--	--
			Bank Stabilization	---	--	--
			Temp. Fill	--	0.12	--
20	South Fork New River (P)	S43	Perm. Fill	--	--	--
			Bank Stabilization	19	--	--
			Temp. Fill	--	--	--
21	South Fork New River (P)	S43	Perm. Fill	--	--	--
			Bank Stabilization	20	--	--
			Temp. Fill	--	--	--
			Total Temporary Impacts:	**--**	**0.15**[3]	**--**
			Total Permanent Impacts (Perm. Fill + Bank Stabilization):	**944**	**--**	**--**
			Permanent Impacts Requiring DWR Mitigation:	**525**	**--**	**--**
			Permanent Impacts Requiring USACE Mitigation:	**533**	**--**	**--**
			Total Impacts Requiring Mitigation:	**533**	**--**	**†**

1 – All streams are Class C; Tr+ waters except S43 (South Fork New River), which is WS-V; HQW
2 – Mitigation for bank stabilization impacts required by DWR – not required by USACE
3 – Values are based on rounding, due to some of the individual impacts being <0.01 acre
† – Final mitigation requirement will be up to the USACE and DWR

Permit Site 1A: The existing 8'x8' RCBC is being replaced and extended to the east, resulting in 170 (lf) of permanent impacts to S32. There will be 44 lf of stream bank stabilization at the inlet of the culvert extension and <0.01 acre (21 lf) of temporary impacts associated with the extension.

Permit Site 1B: As a result of the culvert replacement and extension, there will be 15 lf of permanent impact to Gap Creek (S1). Additionally there will 35 lf of bank stabilization and <0.01 acre (6 lf) of temporary impacts to Gap Creek at the outlet of the culvert carrying S32.

Permit Site 2: The existing 24" RCP carrying S35 is being replaced with a 30" RCP, resulting in 5 lf of permanent impacts to S35 from the pipe installation and 29 lf of permanent impacts to S35 due to shaping the downstream portion into a tail ditch for a total of 34 lf of permanent impacts.

Permit Site 3: The existing 12" CMP carrying S35 upstream of Permit Site 2 is being replaced with an 18" CMP. The new pipe will be slightly to the east of the existing one, and S35 will be directed in and out of the new pipe via a 2' base ditch on each side. These activities will result in 111 lf of permanent impact to S35.

Permit Site 4: The existing 30" RCP which drains to W11 is being replaced with a new 12" RCP. There will be <0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing in W11 at the outlet of the new pipe.

Permit Site 5: The existing 24" RCP draining into W11 directly across from Titus Ridge Drive (Y9) is being replaced with a 30" CSP (corrugated steel pipe). This will result in <0.01 acre of permanent wetland fill to W11 at the outlet of the new pipe.

Permit Site 6: A new 24" CSP is being installed under US 221 to carry flow from the east side of the road. There will be <0.01 acre of permanent wetland fill to W11 at the outlet of this new pipe.

Permit Site 7: Due to the new roadway slopes, a portion of W11 will be relocated to the west into a lateral 6' grassed swale. The swale has been designed to match the grade and shape of the existing portion of wetland and will be stabilized using coir fiber matting. This action will result in 0.05 acre of permanent wetland fill and 0.03 acre of wetland excavation in W11.

Permit Site 8: Due to the new roadway slopes there will be <0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing in W12. The nearby existing 18" RCP draining into W12 will be replaced and extended with 15" CSP.

Permit Site 9: The existing 42" RCP carrying S36 will be replaced and extended to the east with a 36" RCP. This will result in 124 lf of permanent impacts to S36. Additionally, there will be 23 lf of bank stabilization at the outlet of the pipe associated with the replacement and extension. The pipe inlet will not be buried, but the outlet has a less than 1% slope.

Permit Site 10: The existing 10'x12' triple-barrel RCBC carrying Gap Creek (S1) under US 221 is being pulled out and replaced with a 130-foot long, three-span, pre-stressed girder bridge. There will be 154 lf of stream bank stabilization to Gap Creek to reinforce the

channel after culvert removal. Additionally, there will be 0.02 acre (57 lf) of temporary impacts due to the placement of a temporary workpad needed to install the drilled piers for the northern interior bent.

Permit Site 11: As a result of the new roadway slopes, there will be <0.01 acre of permanent wetland fill and <0.01 acre of mechanized clearing in W14.

Permit Site 12: As a result of the new roadway slopes, there will be 0.12 acre of permanent wetland fill and <0.01 acre of mechanized clearing in W15, resulting in a total take of the wetland.

Permit Site 13: The existing 24" CMP that carries flow from W15 to the west side of US 221 where it becomes S40 is being replaced and extended with a 24" RCP. This pipe replacement and extension will result in 52 lf of permanent stream impacts to S40. In addition, the pipe installation will result in <0.01 acre (8 lf) of temporary stream impacts to S40.

Permit Site 14: As a result of the new roadway slopes, there will be 0.01 acre of wetland excavation and <0.01 acre of mechanized clearing in W16.

Permit Site 15: As a result of the new roadway slopes, there will be 0.14 acre of permanent wetland fill and 0.05 acre of mechanized clearing in W126, resulting in a functional total take of the wetland.

Permit Site 16: Currently, S42 is carried under US 221 all the way to Gap Creek via a 60" RCP and a 54" CMP. These pipes will be replaced with a 60" RCP that will not carry S42 all the way to the confluence with Gap Creek. At the outlet of the 60" RCP, the channel will be open, flowing into a new 5' base ditch until it reaches Gap Creek. These actions will result in 27 lf of permanent stream impacts to S42. Additionally there will be 9 lf of bank stabilization in S42 on the inlet side of the new pipe at the tie-in with a new 2' lateral base ditch from the south.

Permit Site 17: There will be 54 lf of bank stabilization to Gap Creek in order to protect the outlet of the new 5' base ditch created to carry S42 (permit site 16 above).

Permit Site 18: There will be 53 lf of bank stabilization to Gap Creek in order to protect the outlet of a new 3' base ditch. This ditch will serve to diffuse and slow drainage from a new 36" RCP that will replace an existing 36" CMP which currently drains directly into Gap Creek.

Permit Site 19: The existing bridge over the South Fork New River (S43) will be removed and replaced with dual 260-foot, three-span pre-stressed concrete girder bridges. Temporary work pads on the north and south banks of the river will be required in order to remove existing bents and install the drilled shafts for the new bridges. These work pads will result in 0.12 acre (115 lf) of temporary impacts to the South Fork New River (S43). Work pad construction and removal shall be staged so that no more than half the channel is blocked at any time.

Permit Site 20: There will be 19 lf of bank stabilization to the South Fork New River (S43) to protect the outlet of a new 4' base ditch on the east side of the road.

Permit Site 21: There will be 20 lf of bank stabilization to the South Fork New River (S43) to protect the outlet of a new 3' base ditch on the west side of the road.

Table 10 – R-2915D Wetland Impacts*

Site	Wetland Number	Wetland Size (ac)	Permanent Fill in Wetlands (ac)	Excavation (ac)	Mechanized Clearing (ac)	Impacts Requiring Mitigation (ac)
2	W53	0.02	<0.01	--	--	<0.01
3B	W58	0.05	<0.01	<0.01	0.02	0.03
4	W59**	0.14	0.10	--	0.04	0.14
7	W63	0.39	0.25	--	0.05	0.30
13	W72	0.02	<0.01	<0.01	--	0.01
14	W78	0.74	0.03	<0.01	0.01	0.05
15	W76	0.30	<0.01	--	0.02	0.02
16	W77	1.86	--	--	<0.01	<0.01
17A	W79	0.25	0.06	--	0.01	0.07
19	W81**/W82**	0.01/0.06	0.07	--	<0.01	0.07
20B	W85	0.03	<0.01	--	<0.01	0.01
21	W86**	0.18	0.17	<0.01	--	0.18
22	W88	0.06	<0.01	--	<0.01	<0.01
24	W89	0.09	<0.01	--	0.01	0.02
25	W93	0.54	0.11	--	0.05	0.15
27	W94	0.04	0.04	--	<0.01	0.04
28	W95	0.52	<0.01	--	0.02	0.02
30	W95	0.52	0.04	--	0.06	0.10
31	W96	0.3	0.06	--	<0.01	0.07
32	W98	0.07	0.02	--	<0.01	0.02
		Total Impacts	**1.01**	**0.01**	**0.3**	**1.32*** **

* 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 11 – R-2915D Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
1	UT to Old Field Creek (I)	S87	Perm. fill	312	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. fill	--	<0.01	--
2	N/A (wetland only)	--	--	--	--	--
3A	UT to Old Field Creek (P)	S90	Perm. Fill	60	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	--	--

Table 11 continued – R-2915D Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
3B	UT to Old Field Creek (P)	S92a	Perm. Fill	56	--	USACE
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01	--
4	UT to Old Field Creek (P)	S92a	Perm. Fill	--	--	--
			Bank Stabilization	--	--	--
			Temp Fill	--	<0.01	--
5	UT to Old Field Creek (P)	S92b	Perm. Fill	57	--	USACE
			Bank Stabilization	19	--	--
			Temp Fill	--	--	--
6	Old Field Creek (P)	S56	Perm. Fill	120	--	USACE & DWR
			Bank Stabilization	48	--	DWR
			Temp. Fill	--	<0.01	
7	N/A (wetland only)	--	--	--	--	--
8	UT to Old Field Creek (P)	S95	Perm. Fill	--	--	--
			Bank Stabilization	15	--	--
			Temp. Fill	--	--	--
9	UT to Old Field Creek (P)	S102	Perm. Fill	126	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
10	UT to Old Field Creek (P)	S104	Perm. Fill	396	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
11	UT to Old Field Creek (P)	S95	Perm. Fill	--	--	--
			Bank Stabilization	11	--	--
			Temp. Fill	--	--	--
12	UT to Beaver Creek (P)	S106	Perm. Fill	51	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
13	N/A (wetland only)	--	--	--	--	--
14	UT to South Beaver Creek (P)	S111	Perm. Fill	162	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
15	UT to South Beaver Creek (P)	S111	Perm. Fill	12	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
16	N/A (wetland only)	--	--	--	--	--
17A	UT to South Beaver Creek (P)	S112	Perm. Fill	28	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
17B	UT to South Beaver Creek (P)	S112	Perm. Fill	12	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--

Table 11 continued – R-2915D Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
18	UT to Beaver Creek (P)	S115	Perm. Fill	491	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
19	UT to Beaver Creek (P)	S116	Perm. Fill	100	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
20A	UT to Beaver Creek (P)	S117	Perm. Fill	55	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
20B	UT to Beaver Creek (P)	S118	Perm. Fill	57	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
21	UT to Beaver Creek (P)	S119	Perm. Fill	49	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
22	UT to Beaver Creek (P)	S120	Perm. Fill	61	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
23A	UT to Beaver Creek (P)	S122	Perm. Fill	19	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
23B	UT to Beaver Creek (P)	S123	Perm. Fill	66	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
24	UT to Beaver Creek (I)	S125	Perm. Fill	22	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
25	UT to Beaver Creek (P)	S127	Perm. Fill	12	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
26	Beaver Creek	S124	Perm. Fill	75	--	USACE
			Bank Stabilization	33	--	--
			Temp. Fill	--	0.01	--
27	UT to Beaver Creek (P)	S126	Perm. Fill	134	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
28	N/A (wetland only)	--	--	--	--	--
29	UT to Beaver Creek (P)	S126	Perm. Fill	69	--	USACE & DWR
			Bank Stabilization	--	--	--
			Temp. Fill	--	--	--
30	N/A (wetland only)	--	--	--	--	--
31	N/A (wetland only)	--	--	--	--	--

Table 11 continued – R-2915D Stream Impacts

Site	Stream Name & Intermittent (I) or Perennial (P) [1]	Stream Number	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)	Mitigation Requirement[2] (linear feet)
32	UT to Beaver Creek (P)	S128	Perm. Fill	25	--	USACE
			Bank Stabilization	--	--	--
			Temp. Fill	--	<0.01	--
			Total Temporary Impacts:	**--**	**0.05**[3]	**--**
			Total Perm. Impacts (Perm. Fill + Bank Stabilization):	**2,753**	**--**	**--**
			Permanent Impacts Requiring DWR Mitigation:	**1,744**	**--**	**--**
			Permanent Impacts Requiring USACE Mitigation:	**2,627**	**--**	**--**
			Total Impacts Requiring Mitigation:	**2,627**	**--**	**†**

1 – All 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, due to some of the individual impacts being <0.01 acre
† – Final mitigation requirement will be up to the USACE and DWR

Permit Site 1: The existing 18" RCP carrying S87 is being replaced and extended with a new 36" RCP. A portion of the stream at the outlet of the new pipe will be relocated to the east to accommodate new roadway slopes. The relocated channel will be constructed with coir fiber matting. These actions will result in 312 lf of permanent impacts to S87. There will be <0.01 acre (46 lf) of temporary impacts to S87 at the inlet and outlet associated with the pipe extension and channel relocation.

Permit Site 2: The existing 66" RCP is being extended to the east, resulting in <0.01 acre of permanent fill in W53.

Permit Site 3A: The existing 84" CMP carrying S90 will be extended to the west, resulting in 60 lf of permanent impacts to S90.

Permit Site 3B: The new fill slopes in this location will result in <0.01 acre of wetland fill, <0.01 acre of wetland excavation and 0.02 acre of mechanized clearing to W58. In addition, the 24" CMP carrying S92a under Y27 will be extended to the north, resulting in 56 linear lf of permanent stream impacts. There will be <0.01 ac (73 lf) of temporary stream impacts to S92a associated with the pipe extension and the mechanized clearing in W58.

Permit Site 4: The new roadway slopes will impact most of W59 due to wetland fill and mechanized clearing. This will disrupt the hydrology of the wetland such that it will be a total take of all 0.14 acre of W5 due to 0.1 acre of permanent fill and 0.04 acre of mechanized clearing. Additionally, there will be <0.01 acre (19 lf) of temporary stream impacts to the headwaters of S92a due to the mechanized clearing in W59.

Permit Site 5: The existing 60" CMP will be extended to the west with a 60" RCP, resulting in 57 lf of permanent impacts to S92. Additionally, a lateral v-ditch will tie into S92 at the outlet of the pipe extension, resulting in 19 lf of bank stabilization to S92.

Permit Site 6: The existing pair of 84" CMPs carrying Old Field Creek (S56) will be extended to the west with 84" CSPs (corrugated steel pipes). Additionally, due to extensive scour on the downstream end of the existing pipes, the entire channel will be stabilized with

rip rap and a rock cross vane structure will be constructed to direct flow and control stream grade. These activities will result in 120 lf of permanent impacts to Old Field Creek. There will also be 48 lf of bank stabilization on the upstream side of the extension and <0.01 acre (25 lf) of temporary impacts to Old Field Creek associated with the pipe extension.

Permit Site 7: The new roadway slopes will result in 0.25 acre of wetland fill and 0.05 acre of wetland mechanized clearing in W63.

Permit Site 8: There will be 15 lf of bank stabilization in S95 due to the outlet of a tail ditch.

Permit Site 9: The existing 30" CMP carrying S102 will be extended to the west. Due to the alignment of the existing pipe, the stream will be relocated slightly to the south in order to align with the inlet of the pipe extension. These activities will result in 126 lf of permanent impacts and <0.01 acre (22 lf) of temporary impacts to S102.

Permit Site 10: Stream S104 will be filled and relocated to the north due to the new roadway slopes. This will result in 396 lf of permanent impacts to S104.

Permit Site 11: There will be 11 lf of bank stabilization to S95 at the outlet of the existing 30" CMP to preserve the channel profile after pipes upstream of the outlet are replaced.

Permit Site 12: The existing 24" CMP is being extended to the east with a 24" CSP and 24" RCP. This will result in 51 lf of permanent impacts to S106 and <0.01 acre (11 lf) of temporary impacts.

Permit Site 13: The existing 24" CMP is being extended to the north with a 24" CSP and 24" RCP. This will result in in <0.01 acre of wetland fill and <0.01 acre of wetland excavation within W72.

Permit Site 14: Due to the new roadway slopes, the existing 36" CMP carrying S111 will be extended to the north with a 36" CSP and 36" RCP. A portion of S111 at the inlet will be relocated to align with the new pipe extension. This will result in 162 lf of permanent stream impacts and <0.01 acre (14 lf) of temporary stream impacts to S111. In addition, the new roadway slopes will result in 0.03 acre of wetland fill, <0.01 acre of wetland excavation and 0.01 acre of mechanized clearing within W78.

Permit Site 15: There will be 12 lf of permanent stream impacts to S111 at the outlet of the existing 36" CMP due to placement of riprap for outlet protection. Additionally, new roadway slopes in this area will result in <0.01 acre of permanent wetland fill and 0.02 acre of mechanized clearing in W76.

Permit Site 16: As a result of the new roadway slopes, there will be <0.01 acre of mechanized clearing in W77.

Permit Site 17A: The existing 36" CMP is being extended to the north with a 36" CSP and 36" RCP, resulting in 28 lf of permanent stream impacts and <0.01 acre (23 lf) of temporary

stream impacts to S112. The new roadway slopes in this vicinity will result in 0.06 acre of wetland fill and 0.01 acre of mechanized clearing in W79.

Permit Site 17B: The outlet of the existing 36" CMP carrying S112 will be stabilized with riprap, resulting in 12 lf of permanent impacts to S112.

Permit Site 18: New roadway slopes will fill the length of S115, resulting in 491 lf of permanent impacts to S115.

Permit Site 19: The existing 24" CMP carrying S116 will be extended with a 24" CSP and 24" RCP. This will result in 100 lf of permanent stream impacts and <0.01 (12 lf) of temporary impacts to S116. The new roadway slopes and subsequent pipe extension in this vicinity will entirely fill W82 (total take), and partially fill W81, with the rest of W81 cleared mechanically (functionally a total take). This will result in a total of 0.07 acre of wetland fill and <0.01 acre of mechanized clearing in W81 and W82.

Permit Site 20A: The existing 42" CMP is being extended to the south. The portion of the pipe extension carrying S117 will be extended using a 42" CSP and a 42" RCP. This will result in 55 lf of permanent impacts and <0.01 acre (18 lf) of temporary impacts to S117.

Permit Site 20B: The existing 42" CMP is being extended to the south. The portion of the pipe carrying S118 will be extended using a 42" RCP and a 24" RCP. This will result in 57 lf of permanent stream impacts and <0.01 acre (11 lf) of temporary stream impacts to S118. The new roadway slopes in the vicinity will result in <0.01 acre of wetland fill and <0.01 acre of mechanized clearing in W85.

Permit Site 21: The new roadway slopes will result in 0.17 acre of wetland fill and <0.01 acre of wetland excavation in W86 (functionally a total take). The new fill slope will also result in 49 lf of permanent stream impacts and <0.01 acre (17 lf) of temporary stream impacts to S119.

Permit Site 22: The existing 30" CMP is being extended with a 30" CSP and 30" RCP, which will result in 61 lf of permanent impacts to S120. The new roadway slopes will result in <0.01 acre of wetland fill and <0.01 acre of mechanized clearing in W88.

Permit Site 23A: The new roadway slopes and nearby pipe extension will fill the short section of S122, resulting in 19 lf of permanent stream impacts.

Permit Site 23B: The existing 24" CMP will be extended to the east with a 24" CSP and 24" RCP, resulting in 66 lf of permanent impacts and <0.01 acre (15 lf) of temporary impacts to S123.

Permit Site 24: The existing 30" CMP carrying S125 will be extended to the east with a 30" CSP and 30" RCP. This will result in 22 lf of permanent stream impacts and <0.01 acre (10 lf) of temporary stream impacts to S125. The new roadway slopes will result in <0.01 acre of wetland fill and 0.01 acre of mechanized clearing in W89.

Permit Site 25: There will be 12 lf of permanent stream impacts to S127 due to placement of riprap in the channel to alleviate the existing 3' drop-off at the outlet of the 36" CMP. The existing 36" CMP will be extended on the inlet side with a 36" CSP due to the new roadway slopes. The new slopes will result in 0.11 acre of wetland fill and 0.05 acre of mechanized clearing in W93.

Permit Site 26: The existing 8'x10' triple barrel box culvert carrying Beaver Creek (S124) will be extended to the east. This will result in 75 lf of permanent impacts to Beaver Creek as well as 33 lf of bank stabilization impacts to Beaver Creek at the outlet. In addition, there will be 0.01 acre (48 lf) of temporary impacts to Beaver Creek associated with construction of the extension and bank stabilization installation.

Permit Site 27: The existing pair of 60" CMPs that carry S126 and its overflow are being extended to the east with 60" CSPs. The outlet flow will be directed into a new lateral base ditch stabilized with coir fiber matting, before ultimately rejoining with the natural channel of S126 prior to the confluence with Beaver Creek. This will result in 134 lf of permanent stream impacts to S126. Additionally, the new fill slopes in this vicinity will result in 0.04 acre of wetland fill and <0.01 acre of mechanized clearing in W94 (a total take).

Permit Site 28: New roadway slopes in this location will necessitate <0.01 acre of wetland fill and 0.02 acre of mechanized clearing in W95.

Permit Site 29: The inlet side of the existing 60" CMPs carrying S126 is highly destabilized. There will be 69 lf of permanent impacts to S126 from the reshaping of the channel into a head ditch to better conform to the pipe baseflow and overflow inlets.

Permit Site 30: The new roadway slopes and accompanying rock plating will result in 0.04 acre of wetland fill and 0.06 acre of mechanized clearing in W95.

Permit Site 31: The new roadway slopes will result in 0.06 acre of wetland fill and <0.01 acre of mechanized clearing in W96.

Permit Site 32: The new roadway slopes will result in 0.02 acre of wetland fill and <0.01 acre of mechanized clearing in W98. The existing 24" CMP carrying S128 will be extended to the east with a 24" RCP. In addition, riprap will be used at the outlet of the existing pipe to the west to alleviate an existing drop-off. These actions will result in 25 lf of permanent stream impacts to S128. Additionally, the pipe extension and nearby mechanized clearing in wetlands will result in <0.01 acre (19 lf) of temporary impacts to S128.

MORATORIUM

The North Carolina Wildlife Resources Commission (NCWRC) has requested a trout moratorium prohibiting in-stream work and land disturbance within the 25-foot trout buffer from October 15 to April 15 for all streams supporting wild trout within the project area. This includes Cole Branch, Gap Creek, Old Field Creek and Beaver Creek and their unnamed tributaries. Little Buffalo Creek, South Beaver Creek and Naked Creek along with their unnamed tributaries, are not subject to any construction moratoria.

FEDERALLY PROTECTED SPECIES

Plants and animals with Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. As of January 14, 2014, the USFWS lists eight federally protected species for Watauga County and nine federally protected species for Ashe County (Table 12).

A US Fish and Wildlife Service proposal for listing the Northern Long-eared Bat (*Myotis septentrionalis*) as an Endangered species was published in the Federal Register in October 2013. The listing will become effective on or before April, 2015. Furthermore, this species is included in USFWS's current list of protected species for Ashe and Watauga County. NCDOT is working closely with the USFWS to understand how this proposed listing may impact NCDOT projects. NCDOT will continue to coordinate appropriately with USFWS to determine if this project will incur potential effects to the Northern long-eared bat, and how to address these potential effects, if necessary.

Summary of Species with Habitat:

Bog turtle: Assessments of the wetlands within the project vicinity and bog turtle surveys were conducted by NCDOT biologists in April, May and June 2008. Several of the wetlands provide potential habitat for bog turtles, and a bog turtle was found in one of the wetlands (that is not within the proposed construction limits of this project). However, this species is listed due to similarity of appearance, and is not subject to Section 7 consultation with the USFWS. Impacts to wetlands, including those that provide habitat for the bog turtle within the project have been avoided and minimized to the greatest extent practicable.

Swamp pink: Walking visual surveys of all areas of potential habitat were conducted in June 2008 and May 2013. No individuals of this species have been identified within the project and there are no known occurrences within 1.0 mile of the project.

Virginia spiraea: Surveys of all areas of suitable habitat were conducted in June 2008, July 2010 and June 2012. No individuals of this species have been identified within the project area during any of the surveys. After discussions with USFWS in April 2013, it was determined that the only area within the project providing reasonable habitat for Virginia spiraea was the crossing of the South Fork New River, which was surveyed again in July 2014. Though there is a known population of Virginia spiraea located less than 1.0m from this project along the South Fork New River, the biological conclusion for this species is 'No Effect' (verified by USFWS via e-mail on April 23, 2013). There is a tributary flowing into the South Fork New River between the proposed new bridge location and the known Element Occurrence of spiraea (which marks the westernmost known extent along the South Fork New River). In addition, the spiraea is located around a bend of the South Fork New River (and not directly straight downstream) so this project will likely not generate sedimentation that would affect the known population.

Table 12 – Federally protected species listed for Watauga and Ashe Counties

Scientific Name	Common Name	County*	Federal Status**	Habitat Present	Biological Conclusion
Clemmys muhlenbergii	Bog turtle	W, A	T (S/A)	Yes	Not Required
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	W, A	E	No	No Effect
Corynorhinus townsendii virginianus	Virginia big-eared bat	W	E	No	No Effect
Microhexura montivaga	Spruce-fir moss spider	W	E	No	No Effect
Solidago spithamaea	Blue ridge goldenrod	W, A	T	No	No Effect
Liatris helleri	Heller's blazing star	W, A	T	No	No Effect
Hedyotis purpurea var. *montana*	Roan mountain bluet	W, A	E	No	No Effect
Geum radiatum	Spreading avens	W, A	E	No	No Effect
Helonias bullata	Swamp pink	A	T	Yes	No Effect
Spiraea virginiana	Virginia spiraea	A	T	Yes	No Effect
Gymnoderma lineare	Rock gnome lichen	A	E	No	No Effect

*W – Watauga County, A – Ashe County
**T(S/A) - Threatened due to similarity of appearance, T – Threatened, E – Endangered

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4) require that the DWR determine that a project "does not result in cumulative impacts, based on past or reasonably anticipated future impacts, that cause or will cause a violation of downstream water quality standards."

An Indirect and Cumulative Effects Assessment (ICE) was completed for this project in 2009. Copies of this report are available upon request. This report concluded the following:

Indirect and Cumulative Effects to the Human Environment

Indirect Assessment:
The widening of US 221 from its existing two-lane configuration to a four-lane, median-divided facility will decrease travel times between US 421 (and Boone to the west) and Jefferson and West Jefferson. The travel time savings will come as a result of an increase in the capacity and decrease in traffic congestion on US 221. Residential development is expected to continue, particularly along the southern portion of the project, where it has already been occurring. The area has been, and will likely remain, a popular retirement and second home destination because of its scenic charm and rural appeal. The project is expected to result in a slight increase in this type of development, and the location will be

driven by the proximity to Boone and secondarily to the Towns of West Jefferson and Jefferson in the north. The intensity of the development along the southern portion of the project will be limited by the lack of water and sewer infrastructure. Future development will likely come in the form of single-family, larger-lot development. The increased number of residences will slightly strengthen the demand for commercial services. More intense development is possible in the Beaver Creek area and the Towns of Jefferson and West Jefferson. These areas are experiencing growth and have water and sewer facilities and the capacity to handle larger, more intense development. There is also ample available land in these areas to handle larger-scale development. Very few development regulations exist aside from the Trout Stream buffer requirements, which require a 50-foot buffer along waters designated as Trout Streams, and the Mountain Ridge Protection Act development regulations, which prevent construction higher than 500 feet from the adjacent valley floor. No notable indirect effects are anticipated to result from this project.

Cumulative Assessment:
Cumulative effects considers past, present, and reasonably foreseeable future actions within the Future Land Use Study Area. Past manmade actions include previous development along the alignment and the widening of US 421 to the south of the study area. Current or present actions include the project itself and construction of the Cedar Crossing and Titus Ridge neighborhoods along US 221. Future actions include the construction of the proposed water intake valve for the Town of Boone and the subsequent reclassification of its watershed to a WSW-IV, as well as TIP Project U-3812, which will upgrade NC 88. The proposed project crosses the South Fork New River, which is classified as High-Quality Water (HQW), and Old Field Creek, which is classified as Outstanding Resource Water (ORW). It also crosses Little Buffalo Creek, which is listed by the state as having impaired water quality. Indirect effects in the form of land use changes as a result of this existing location widening project may occur in the form of increased residential development and redevelopment. Increased commercial and industrial development is possible at the northern end of the project. Impacts to storm water runoff and downstream water quality are not expected from this change in development patterns due to a lack of water and sewer utilities and existing storm water runoff controls. The project is expected to result in a slight increase in residential development, which will likely take the form of larger-lot, single family residences. However, the cumulative effect of this project, when considered in the context of other past, present, and future actions, and the resulting impact to notable human and natural features is considered
minimal. No notable cumulative impacts are anticipated to result from this project.

Indirect and Cumulative Effects to the Natural Environment

Detailed analysis of the probable development patterns in the area suggest that this project will have little or no effect on future storm water run-off or water quality in this watershed. Regional population and job growth projections suggest that suburban development in the area will continue to occur with and without the project. The highest development potential is on the northern end of the project, particularly in the Beaver Creek area and the Towns of Jefferson and West Jefferson. Travel time savings will be the highest in these areas and will make commuting to and from Boone more appealing, and the availability of water and sewer in these areas make more intense development possible. Ashe County, The Town of West Jefferson, and the NC DWR have storm water runoff regulations in these areas that will serve

to protect the stream quality of the surrounding areas. The areas along the southern end of the project are also developing and will continue to develop, however the lack of water and sewer utilities will prevent any large-scale development. Ashe County and the NC DWR storm water regulations will address runoff and downstream water quality. For these reasons, indirect and cumulative effects on the existing resources, including downstream water quality should be minimal. No additional ICE study is recommended.

CULTURAL RESOURCES

Section 4(f) and Section 6(f) Resources:
The project study area includes four Section 4(f) resources: Baldwin Bethany Cemetery (National Register eligible), Barnett Idol House (National Register eligible), Fleetwood Community Center, and Foster Tyson Park. The only impact anticipated by this project is to the Fleetwood Community Center, where the driveway will need to be re-tied to US 221 (temporary impact). A letter of de minimis impact from the Ashe County School board regarding the Fleetwood Community Center is attached.

There are no 6(f) resources within the project study area.

Archaeological and Historic Architectural Resources:
The proposed improvements to U.S. 221 from US 421 in Deep Gap, Watauga County, to US 221 Business/NC 88 in Jefferson, Ashe County is a Federally-funded project. Therefore the project must comply with Section 106 of the National Historic Preservation Act that requires the lead Federal agency (the NCDOT on behalf of the Federal Highways Administration [FHWA]) to consult with the North Carolina State Historic Preservation Office (HPO [on behalf of the Advisory Council on Historic Preservation]) regarding the project's potential to impact archaeological resources eligible for or listed on the National Register of Historic Places (NRHP).

Consultation with HPO began in 1977 when personnel with the Archaeology Section of the N.C. Department of Cultural Resources, Division of Archives and History, conducted an archaeological survey of the section of proposed US 221 between Baldwin and Jefferson (Scheitlin et al. 1979). The survey identified 26 archaeological sites, all of which were recommended ineligible for the NRHP. HPO concurred with these recommendations, and the section was later constructed as a two-lane road. Updated scoping information was submitted to HPO on April 7, 2006. On May 24, 2006, HPO recommended that a comprehensive archaeological survey be conducted by an experienced archaeologist to identify and evaluate the significance of archaeological remains that may be damaged or destroyed by the proposed project.

In May 2012, the NCDOT sponsored an archaeological survey of the Area of Potential Effects (A.P.E.) of the section between Deep Gap in Watauga County and Baldwin in Ashe County. The survey identified five archaeological sites, all of which were recommended ineligible for the NRHP. The NCDOT submitted the archaeological survey report (O'Neal 2013) to HPO on January 24, 2013. On March 5, 2013 HPO concurred with the report's findings and recomm ended no further archaeological work for the project. Please see attached consultation letter from HPO.

FEMA COMPLIANCE

The project has been coordinated with appropriate state and local officials and the Federal Emergency Management Agency (FEMA) to assure compliance with FEMA, state, and local floodway regulations.

WILD AND SCENIC RIVER SYSTEM

The project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended). The South Fork New River is not designated as a Wild and Scenic River until the confluence with Dog Creek northeast of the project. The northern portion of the project closest to this confluence is over 3.5 straight miles and 6.4 river miles (via Naked Creek) away from the point at which the Wild and Scenic River designation begins.

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.

<u>Avoidance and Minimization:</u>
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. Other specific examples of avoidance and minimization measures include:

- Design Standards in Sensitive Watersheds will be implemented throughout the entire project during construction (15A NCAC 4B .0124).
- Best Management Practices (BMPs) will be utilized during construction to attempt to reduce the stormwater impacts to receiving streams and wetlands due to erosion and runoff.
- A trout moratorium from October 15 – April 15 will be adhered to in order to protect reproducing trout.
- Grassed swales will be utilized throughout the project (see SMPs) to reduce water velocity, promote infiltration and provide treatment for discharge before runoff enters streams. These grassed swales have side slopes that are 3:1 or flatter, with many side slopes being 6:1 and 4:1, have a velocity during the 2-Year Storm of less than 2 feet per second and have a minimum ditch length equivalent to 100 feet per acre of impervious area.

- Preformed scour holes (PSH) will be utilized in several locations (see SMPs) to diffuse the concentrated flow from storm drain outlet pipes into non-erosive sheet flow to surrounding water resources.
- Riprap aprons/pads will be utilized in several locations (see SMPs) to reduce velocity and erosion at pipe outlets.
- Multiple culvert extensions utilize junction boxes to dissipate energy, reduce the slope of the channel and provide a non-erosive outlet velocity to the stream bed and bank.
- Culverts will be buried 20% of the pipe diameter below the natural streambed up to 1 foot.
- Where possible, hand clearing in wetlands will be used in R-2915A rather than mechanized clearing.
- The relocated portion of a wetland at R-2915B permit site 7 will be a grassed swale that has been designed to match the grade and shape of the existing wetland as much as possible.
- The culvert carrying Gap Creek at R-2915B permit site 10 is being pulled out and replaced with a bridge.
- To alleviate scour and erosion at the downstream end of Old Field Creek at R-2915D permit site 6, a cross vane structure will be created to improve channel structure.
- Rock plating has been utilized near R-2915D permit sites 6 and 30 to tighten and reinforce slopes to reduce impacts to jurisdictional resources to the greatest extent practicable in these locations.

Compensation:
The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. Tables 2 and 3 summarize the wetland and stream impacts for each section of this project. This project will permanently impact 3.04 acres of wetlands, 7,886 linear feet of streams (6,947 linear feet of permanent fill and 939 linear feet of bank stabilization), and temporarily impact 0.31 acre of streams.

At this time, EEP will provide compensatory mitigation for Sections A, B, C and D impacts only as Section E is not due to let within the next five years. Table 13 summarizes the total mitigation needs as 2.52 acre of wetlands impacts and 6,542 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 13 – Summary of Mitigation Requested from EEP

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	Preliminary	0.20	2,263
R-2915D	Final	1.32	2,627
	Total	**2.52**	**6,542**

REGULATORY APPROVALS

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

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Resources. In compliance with Section 143 215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing five (5) copies of this application to the NCDWR for their review and approval.

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

Sincerely,

for Richard W. Hancock, P.E., Manager
Project Development and Environmental Analysis Unit

cc:

NCDOT Permit Application Standard Distribution List.

U.S. ARMY CORPS OF ENGINEERS

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT

33 CFR 325. The proponent agency is CECW-CO-R.

OMB APPROVAL NO. 0710-0003
EXPIRES: 28 FEBRUARY 2013

Public reporting for this collection of information is estimated to average 11 hours per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of the collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters, Executive Services and Communications Directorate, Information Management Division and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003). Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authorities: Rivers and Harbors Act, Section 10, 33 USC 403; Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research, and Sanctuaries Act, Section 103, 33 USC 1413; Regulatory Programs of the Corps of Engineers; Final Rule 33 CFR 320-332. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies, and the public and may be made available as part of a public notice as required by Federal law. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued. One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and/or instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

(ITEMS 1 THRU 4 TO BE FILLED BY THE CORPS)

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME	8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required)
First - Richard Middle - W. Last - Hancock	First - Middle - Last -
Company - NCDOT-PDEA	Company -
E-mail Address -	E-mail Address -
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address- 1548 Mail Service Center	Address-
City - Raleigh State - NC Zip - 27699 Country - USA	City - State - Zip - Country -
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business 919-707-6100 c. Fax 919-212-5785	a. Residence b. Business c. Fax

STATEMENT OF AUTHORIZATION

11. I hereby authorize, _____ to act in my behalf as my agent in the processing of this application and to furnish, upon request, supplemental information in support of this permit application.

_____ SIGNATURE OF APPLICANT _____ DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2915

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Gap,SF New,Old Fld,Bver,Naked,Ltl Buffalo,Cole Br,S Bver +UTs	Address
15. LOCATION OF PROJECT Latitude: ◦N 36.23647 (southern end) Longitude: ◦W -81.50907	City - State- Zip-

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions)
State Tax Parcel ID Municipality
Section - Township - Range -

17. DIRECTIONS TO THE SITE

Please see attached vicinity map and cover letter.

18. Nature of Activity (Description of project, include all features)

The project will widen US 221 to a four-lane, median-divided facility from US 421 in the Deep Gap Community of Watauga County to the US 221 Business/NC 88 intersection in the town of Jefferson in Ashe County. The project is approximately 16.1 miles in length, and construction will be phased over five sections (see attached cover letter for more detail regarding phasing).

19. Project Purpose (Describe the reason or purpose of the project, see instructions)

The purpose of this project is to upgrade the existing roadway to a multi-lane facility to increase capacity, alleviate congestion, improve traffic operations and reduce the rate of traffic crashes.

USE BLOCKS 20-23 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Impacts will result from widening the roadway and shoulders, lengthening/replacing hydraulic structures as well as bridge construction.

21. Type(s) of Material Being Discharged and the Amount of Each Type in Cubic Yards:

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
See attached cover letter.		

22. Surface Area in Acres of Wetlands or Other Waters Filled (see instructions)

Acres See attached cover letter.

or

Linear Feet See attached cover letter.

23. Description of Avoidance, Minimization, and Compensation (see instructions)

See attached cover letter.

24. Is Any Portion of the Work Already Complete? ☐ Yes ☒ No IF YES, DESCRIBE THE COMPLETED WORK

25. Addresses of Adjoining Property Owners, Lessees, Etc., Whose Property Adjoins the Waterbody (if more than can be entered here, please attach a supplemental list).

a. Address- See attached permit drawings.

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

26. List of Other Certificates or Approvals/Denials received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

* Would include but is not restricted to zoning, building, and flood plain permits

27. Application is hereby made for permit or permits to authorize the work described in this application. I certify that this information in this application is complete and accurate. I further certify that I possess the authority to undertake the work described herein or am acting as the duly authorized agent of the applicant.

SIGNATURE OF APPLICANT	DATE	SIGNATURE OF AGENT	DATE
	7-21-14		

The Application must be signed by the person who desires to undertake the proposed activity (applicant) or it may be signed by a duly authorized agent if the statement in block 11 has been filled out and signed.

18 U.S.C. Section 1001 provides that: Whoever, in any manner within the jurisdiction of any department or agency of the United States knowingly and willfully falsifies, conceals, or covers up any trick, scheme, or disguises a material fact or makes any false, fictitious or fraudulent statements or representations or makes or uses any false writing or document knowing same to contain any false, fictitious or fraudulent statements or entry, shall be fined not more than $10,000 or imprisoned not more than five years or both.

NCDENR
North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Michael Ellison, Director
Ecosystem Enhancement Program

John E. Skvarla, III
Secretary

July 17, 2014

Mr. Richard W. Hancock, P.E.
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Hancock:

Subject: EEP Mitigation Acceptance Letter:

R-2915A, Widening of US 221 from US 421 in Watauga County to SR 1003 (Idlewild Road) in Ashe County, Watauga and Ashe Counties

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on July 16, 2014, 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)	1,119.0	0	0	0.57	0	0	0	0

*Some of the stream and wetland impacts may be proposed to be mitigated at a 1:1 mitigation ratio. See permit application for details.

EEP commits to implementing sufficient compensatory stream mitigation and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 Asset Management Supervisor

cc: Mr. Andy Williams, USACE – Raleigh Regulatory Field Office
Mr. Dave Wanucha, NCDWQ – Winston-Salem Regional Office
Ms. Linda Fitzpatrick, NCDOT – PDEA
File: R-2915A

NCDENR
North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Michael Ellison, Director
Ecosystem Enhancement Program

John E. Skvarla, III
Secretary

June 18, 2014

Mr. Richard W. Hancock, P.E.
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Hancock:

Subject: EEP Mitigation Acceptance Letter:

R-2915B, Widening of US 221 from SR 1003 (Idlewild Road) to North of the South Fork New River, Ashe County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 17, 2014, 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)	533.0	0	0	0.43	0	0	0	0

EEP commits to implementing sufficient compensatory stream mitigation and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 Asset Management Supervisor

cc: Mr. Andy Williams, USACE – Raleigh Regulatory Field Office
Mr. Dave Wanucha, NCDWQ – Winston-Salem Regional Office
Ms. Linda Fitzpatrick, NCDOT – PDEA
File: R-2915B

NCDENR
North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Michael Ellison, Director
Ecosystem Enhancement Program

John E. Skvarla, III
Secretary

June 18, 2014

Mr. Richard W. Hancock, P.E.
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Hancock:

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 Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 17, 2014, 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)	2,263.0	0	0	0.20	0	0	0	0

This impact and associated mitigation need were under projected by the NCDOT in the 2014 impact data. EEP 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 N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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

James B. Stanfill
EEP Asset Management Supervisor

cc: Mr. Andy Williams, USACE – Raleigh Regulatory Field Office
Mr. Dave Wanucha, NCDWQ – Winston-Salem Regional Office
Ms. Linda Fitzpatrick, NCDOT – PDEA
File: R-2915C

NCDENR
North Carolina Department of Environment and Natural Resources

Pat McCrory
Governor

Michael Ellison, Director
Ecosystem Enhancement Program

John E. Skvarla, III
Secretary

June 3, 2014

Mr. Richard W. Hancock, P.E.
Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Mr. Hancock:

Subject: EEP Mitigation Acceptance Letter:

R-2915D, Widening of US 221 from South of NC 194 to US 211 Bypass, Ashe County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on June 2, 2014, 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)	2,627.0	0	0	1.32	0	0	0	0

EEP commits to implementing sufficient compensatory stream mitigation and riparian wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program 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 Asset Management Supervisor

cc: Mr. Andy Williams, USACE – Raleigh Regulatory Field Office
Mr. Dave Wanucha, NCDWQ – Winston-Salem Regional Office
Ms. Linda Fitzpatrick, NCDOT – PDEA
File: R-2915D

Minutes from the Interagency 4B Hydraulic Design Review Meeting
R-2915A in Ashe County
June 20, 2013

Team Members:

Monte Matthews, USACE	(present)
Marella Buncick, USFWS	(present)
Amy Euliss , NCDWQ	(present)
Marla Chambers, NCWRC	(present)
Chris Mittscher, EPA	(present)
Michael Batuzich, FHWA	(present)
Mark Staley, REU	(present)
Erin Cheely, NES	(present)

Participants:

Marshall Clawson, Hydraulics
Charles Smith, Hydraulics
Richard Bollinger, RS&H
Will Weathersbee, RS&H
Katrina Washington, Roadway Design
Tatia White, Roadway Design
Quang Nguyen, Structures

Minutes:

The subject meeting was held to review the development of the drainage design. Introductions were made by all in attendance. Richard Bollinger proceeded through the plan sheets and drainage design. Below is a brief summary of the items discussed during the meeting.

Sheet 4:

USFWS requested we consider making the center barrel of the proposed Gap Creek 3 @ 11'x8' RCBC wider than 11' to provide for improved fish passage. Details of a wider barrel may be provided for consideration. It was discussed that it may be difficult to make the middle barrel of the culvert wide enough to satisfy the requirements of the details and satisfy the structural design requirements of the culvert. The proposed culverts middle barrel has been sized to match the width of the existing stream channel. The flanking barrels will have one foot high channel benches which will mimic the existing channels floodplain flow. Once the daily flow rises approximately 3" it will flow into the two adjoining culvert barrels, reducing the velocity due to the discharge flowing through 3 cells vs. 1 cell, and helping prevent erosion of the bed material inside the culvert cells. The proposed culvert is larger than the 3-cell culvert just downstream under US 421, and that culvert shows signs of silt accumulation, not erosion, and therefore we do not consider erosion of the material inside the proposed culvert to be a concern. As requested by USFWS, we are going to examine making the middle cell of the culvert wider.

All of the area inside loop is to be considered as impacts.

Check for impact to pocket wetland around structure 450 before 4C meeting.

Realign outfall 0450 to reduce the impacts to the Jurisdictional Stream. Also, realign the end of the ditch at outfall 0454 to slightly bend to Gap Creek to prevent possible bank erosion.

Another model showing the fill placed at the Kubota tractor dealer needs to be completed. Using this model for comparison should eliminate the rise shown in the current model comparison.

Sheet 5:

Realign the end of the ditch at outfalls 0508 and 0519 to slightly bend to Gap Creek to prevent possible bank erosion.

Sheet 9:
Confirm bank slope steepness justifies outfall pipe at church.

Realign the end of the ditch at outfalls 0901 and 0914 to slightly bend to Gap Creek to prevent possible bank erosion.

Sheet 10:
There is a small wetland on west side of road that will be a complete take due to fill slope.

Sheet 11:
Realign the end of the ditch at outfall 1112 to slightly bend to Gap Creek to prevent possible bank erosion.

Sheet 12:
Discharge at 1206 will need more dissipation of discharge into wetlands.

Sheet 13:
Realign the end of the ditch at outfall 1303 to slightly bend to Gap Creek to prevent possible bank erosion.

General Comments:

Check pre vs. post velocities at the outfalls entering a Jurisdictional Streams or Gap Creek.

Provide bank stabilization along Gap Creek at ditch outfall locations.

Date when FONSI issued? Last month, not sure of exact date

Show PDE on all ditches and outfalls where required for Final ROW.

Check wetland file for possible missing WLB locations on plans.

Stormwater Management Plan - Identify any extra measures taken for stream stabilization and grass swales used for treatment.

The rationale for combining outfalls was explained to those present, and the agencies were in general agreement with the approach.

Per Amy Euliss, no SSP is required on this project.

Meeting adjourned.

Minutes from the Interagency 4C Hydraulic Design Review Meeting
R-2915A in Ashe County
January 23, 2014

Team Members:

Andrew Williams, USACE	(present)
Marella Buncick, USFWS	(via phone)
Marla Chambers, NCWRC	(present)
Michael Batuzich, FHWA	(present)
Chris Mittscher, EPA	(not present)
Amy Chapman, NCDWR	(not present)

Participants:

Erin Cheely, NES	(present)
Carla Dagnino, NES	(present)
Bill Zerman, Hydraulics	(present)
Charles Smith, Hydraulics	(present)
Richard Bollinger, RS&H	(present)
Joel Madden, RS&H	(present)
Trent Beaver, Div. 11 Construction	(present)
Katrina Washington, Roadway Design	(present)
Wael Arafat, Structures	(present)
David Harris, Roadside	(not present)
Brenda Moore, Roadway Design	(not present)
John Conforti, PDEA	(not present)
Quang Nguyen, Structures	(not present)

Minutes:

The purpose of this meeting was to review the drainage design, and resulting environmental impacts for the R-2915A project. The plans were reviewed, addressing each impact site sequentially. Introductions were made by all in attendance. Joel Madden proceeded through the plan sheets and drainage design. Below is a brief summary of the items discussed during the meeting.

Site 1/1A/1B

- The wetland area connected to site 1B within the proposed loop will be considered as a take because all natural drainage will be cut off by the loop; permit drawings to be revised accordingly.
- The wetland area connected to site 1A within the proposed loop will not be considered as a take because off site drainage will pass under the loop and continue to feed this area; no revisions.
- The streams inside the loop will remain as shown and will not be considered a take; no revisions

Site 2

- Label the size and quantity of the rip rap for the proposed culvert.
- Add the details of the "floodplain bench" for the culvert, and the culvert section with sills into the permit drawings.
- **Typical comment for all pipes/outlet stabilization:** Show permanent impacts for the entire footprint of the new proposed pipes and to the end of the bank stabilization. Show

temporary impacts beyond the end of the bank stabilization. Show the pipe impacts separately from the bank stabilization impacts in the Wetland Permit Impact Summary. Stream impacts will be permitted based upon linear feet, but area of impacts will also be included in the Wetland Permit Impact Summary table. All instances of bank stabilization and floodplain benches should reference a detail (like ZZ for all stabilization)

Site 3

- See typical comment under Site 2.

Site 4

- Impact is bank stabilization at outlet of dissipator basin.

Site 5

- Preliminary discussions were had pertaining to the particular configuration of the drainage system from 0456 to 0450. There were concerns about the indirect path from the JS on the upstream side of the road, to the stream/wetland on the downstream side of the road. (note: permit drawing to be revised to show 0456)
- This area was tabled and then revisited near the end of the meeting.
- Charles Smith showed the plans from the 4B meeting as well as his notes from that meeting. He explained that the configuration in this area was much different at the 4B meeting, and that it was agreed at that time that the configuration would be revised to how it is currently shown in order to eliminate multiple outfall locations.
- His notes from the 4B meeting read "We will continue with plan to combine outfalls, and the *environmentalists* are OK with that."
- It was also pointed out that the configuration was needed to go around the end of the proposed median retaining wall in the vicinity of 0414 for long term maintenance of the system & in order to avoid the wall footing.
- All parties were in agreement to retain the configuration as currently shown.
- Wetland/Stream symbology was clarified as wetlands with small stream running through.
- The USACE representative directed NCDOT to justify this configuration on the permit application using 4B and 4C minutes, and brief explanation of prior meeting (4C) decision and retaining wall.

Site 6

- Bank stabilization to be shown as permanent impacts instead of temporary. **(Typical Comment)**

Site 7

- No comments

Site 8-11

- See typical comment under Site 2.

Site 12

- Show 5' of temporary impacts at upstream and downstream ends of pipes that are being replaced in yards; i.e. two 42" RCP's downstream of the 42" road crossing result in 20'

total of temporary impacts. These impacts will be included as a part of Site 12, and will be labeled 12A, & 12B.

- See typical comment under Site 2.

Site 13

- Show 5' of temporary impacts at locations of pipes that are being replaced in yards. These impacts will be included as a part of Site 13, and will be labeled 13A.
- See typical comment under Site 2.

Site 14

- Discussions were had about the possibility of shortening this pipe. It was explained that due to the depth of the pipe, the creation of a channel in lieu of the pipe would be quite large (+/- 75' top width). It was agreed to leave this area as currently shown.
- Fish passage was discussed. The outlet of the existing pipe at Gap Creek will be matched with the proposed pipe which is a few feet above normal water surface of Gap Creek. It was agreed that fish passage was not reasonable to achieve in this location.
- Within Gap Creek, rock is to be bank stabilization only, and there will be no rock added to the stream bed.
- See typical comment under Site 2.

Site 15

- Fish passage was discussed. We are sinking all cross pipes in jurisdictional bodies 20% of pipe diameter up to 1'.
- See typical comment under Site 2.

Site 16

- Within Gap Creek, rock is to be bank stabilization only, and there will be no rock added to the stream bed.
- See typical comment under Site 2.

Site 17

- Alternate drainage configurations were briefly discussed; it was agreed to leave the configuration as shown.
- We are sinking all cross pipes in jurisdictional bodies 20% of pipe diameter up to 1'.
- For purposes of examining fish passage, the request was made during the meeting to provide pipe diameter, pipe slope, pipe length, and flow velocities for cross-pipes such as this one in the meeting minutes:
    - Existing Pipe Diameter/Material = 36" CMP & Double 42" RCP
    - Proposed Pipe Diameter/Material = 60" RCP
    - Proposed Pipe Slope = 3.3%
    - Proposed Pipe Length = 139'
    - Velocity of 10-yr event = 4.1 ft/sec
- Marla Chambers to investigate usage of baffles within round concrete pipes.
- Marla Chambers indicated that culverts over 3% were desirable candidates for baffles.

- Proposed pipe mimics the slope of the existing pipe system, and improves the possibility of fish passage by increasing the pipe diameter.
- It was noted that there would be no onsite mitigation for this project.

Site 18

- Revised the drawings to show the area of Site 18 on Sheet 11 as being taken, which will make this wetland area a total take.

Site 19

- The request was made during the meeting to provide pipe diameter, pipe slope, pipe length, and flow velocities for cross-pipes such as this one in the meeting minutes:
    - Existing Pipe Diameter/Material = 66" RCP
    - Proposed Pipe Diameter/Material = 66" RCP
    - Proposed Pipe Slope = 1.0%
    - Proposed Pipe Length =144'
    - Velocity of 10-yr event = 4.0 ft/sec
- The proposed pipe mimics the conditions of the existing pipe that is being replaced, and will be installed with the inverts 1' below stream bed elevation.
- See typical comment under Site 2.

Site 20

- See typical comment under Site 2.

Site 21

- No comments

Site 22

- No comments

Site 23

- Show 5' of temporary impacts at locations of pipes that are being replaced in yards. These impacts will be included as a part of Site 23, and will be labeled 23A.

Site 24

- See typical comment under Site 2.

HYDRAULIC DESIGN (4c) / PERMIT DRAWINGS REVIEW

Location: Structure Design Conference Room, DOT Century Center

TIP NO: R-2915A **DATE: 1.23.2014**

NAME	AGENCY/ UNIT	PHONE	Email
Bill Zerman	Hydraulics	919-707-6755	bzerman@ncdot.gov
Charles Smith	HYD	919-707 6716	crsmith5@ncdot.gov
Joel Madden	RS+H	704-940-4721	joel.madden@rsandh.com
Richard Bollinger	RS&H	919-480-4066	richard.bollinger@rsandh.com
Andrew Williams	USACE	919-554-4884	andrew.c.williams2@usace.army.mil
Trent Beaver	NCDOT - Div. 11 Const.	336-903-9117	tbeaver@ncdot.gov
Wael Arafat	Structures	919 707 6483	warafat@ncdot.gov
Alan Johnson	DWR	704 235 2200	alan.johnson@ncdenr.gov
Erin Cheely	NCDOT-PDEA-NES	919-707-6108	ekcheely@ncdot.gov
Carla Dagnino	NCDOT-NES	919 707 6110	cdagnino@ncdot.gov
Marla Chambers	NCWRC	704-982-9181	marla.chambers@ncwildlife.org

Minutes from the Interagency 4B Hydraulic Design Review Meeting
R-2915B in Ashe County
June 20, 2013

Team Members:

Monte Matthews, USACE	(present)
Marella Buncick, USFWS	(present)
Amy Euliss, NCDWQ	(present)
Marla Chambers, NCWRC	(present)
Chris Militscher, EPA	(via phone)
Mitch Batuzich, FHWA	(present)
Mark Staley, REU	(present)
Erin Cheely, NES	(present)

Participants:
Marshall Clawson, Hydraulics
Vincent Rivers, Hydraulics
Josh Dalton, Sungate Design Group
Brad Smith, Sungate Design Group
Tatia White, Roadway Design
Piotr Stojda, Roadway Design
David Stutts, Structures

Minutes:

Introductions were made by all in attendance.

Josh Dalton proceeded through the plan sheets and drainage design:

General:
Several plan sheets (8, 10, 11, and 14) show rip rap devices extending beyond the right-of-way lines. *The right-of-way shown on the plans is preliminary and will be finalized once the drainage design is complete. All rip rap devices will be contained within either right-of-way or Permanent Drainage Easements.*

Sheet 4:
Discussed grass swale treatment of impervious surfaces. No comments.

Sheet 5:
Discussed grass swale treatment of impervious surfaces and separation of cross drainage from roadway drainage to the maximum extent practicable. No comments.

Sheet 6:
Discussed grass swale treatment of impervious surfaces and separation of cross drainage from roadway drainage to the maximum extent practicable. There will be impacts to the wetland located left of station 180+00 to 182+10. The proposed fill slope covers the existing wetland. A 6' base grassed swale will replace the wetland area which matches the existing swale dimensions.

PDEA noted that there was no jurisdictional stream left of stations 177+00 to 182+50, only wetlands. The FS file will be corrected by NCDOT.

The plans depict an existing "spring house" located on top of the stream right of station 189+00. However, this is actually located on the top of bank. Pictures of the site were

reviewed. A question was asked regarding the slope of pipe 0615. Mr. Dalton could not recall the slope of the pipe but would review the design calculations and revise as necessary. A comment was also noted that pipe inlet 0613 should not be buried. *(Slope in original design was 4.1%. This has been revised to 1.0% by making structure 0614 deeper. Pipe inlet 0613 will not be buried.)*

Sheet 7:
Discussed grass swale treatment of impervious surfaces and separation of cross drainage from roadway drainage to the maximum extent practicable.

The existing triple barrel box culvert will be replaced with a three-span bridge. New channel banks will be constructed and lined with class II rip rap upon removal of the existing culvert.

The survey file from NCDOT denotes the stream as "Deep Gap Creek". It was noted that the stream name is "Gap Creek". The FS file will be corrected by NCDOT.

Reconfiguring the span arrangement was discussed with Structures to possibly remove the bents from the channel. A single span 72" MBT was suggested but would require raising the roadway grade several feet. This span arrangement was investigated during design but was eliminated as an option due to site constraints.

All runoff from the proposed roadway and off-site is discharged right of station 198+00 to the remnants of an existing pond. The plans do not depict this area as a jurisdictional feature. PDEA commented that they would verify this was correct. It was noted that if this area is determined to be jurisdictional, then it should be considered a total take. A comment requesting the designers investigate changing the "filter berm" to a hazardous spill basin. Mr. Dalton stated that there was not adequate volume at this location for a hazardous spill basin. *(Hazardous spill basins are discussed below.)*

Sheet 8:
Discussed grass swale treatment of impervious surfaces and separation of cross drainage from roadway drainage to the maximum extent practicable. It was noted that the grass swale calculation data was missing left of station 215+00.

Marshall Clawson stated that an elevation should be provided for the class II rip rap located along the right fill slope. He recommended using an elevation one foot above the 100-year event.

Sheet 9:
Discussed grass swale treatment of impervious surfaces and separation of cross drainage from roadway drainage to the maximum extent practicable. A retaining wall has been added to reduce impacts to the floodplain of Gap Creek. No comments.

There was a lengthy discussion regarding replacement of the existing 36” CMP. The current design uses a grassed swale to convey stormwater along the north side of the road all the way to the South Fork New River overflow bridge. *The existing pipe will be replaced to maintain the offsite existing drainage patterns.*

Sheets 10:
PDEA noted that there was no jurisdictional stream at the overflow bridge, only wetlands. The FS file will be corrected by NCDOT.

A comment was made that hazardous spill basins are needed at structures 1019 and 1021. Basins would not be needed at structures 1015 and 1017 due to the overland distance from the main stream. *Hazardous spill basins will not be required after discussion with DWQ. The storm water outlets near the river will be removed and the water piped further away to proposed PSH’s.*

Span arrangements for the bridge over the South Fork New River were discussed. Due to the amount of freeboard, a two span structure was feasible. However, that would place the bent in the middle of the stream. The Agency members did not prefer this option. Also, debris problems are recurrent at the existing bent in the channel. It was suggested to investigate shifting the spans to possibly get one bent out of the stream (1@80’, 1@100’, 1@80’). With this span arrangement, bent #1 would be further into the channel and possibly cause debris problems. Also, bent #2 would be right at the top of bank which is a bad location due to potential bank scour problems. It was determined that the proposed span arrangement was the best option.

Structures stated that a causeway will be required to remove the existing bridge and construct the proposed bridge on the South Fork New River. They will provide the General Drawings before the permit drawings are completed.

Sheets 11:
It was noted that the “Committee for the New River” requested a river access point at this location. Trent Beaver noted that property owners usually would not agree to this. Tatia White stated that she would check on this item and address the comment.

A comment was made that hazardous spill basins are needed at structures 1103, 1106, 1108, and 1111. The inlets should be tied together and outletted to a common hazardous spill basin. Several options for basins were discussed including putting the basin up at the shoulder point in fill or using a prefabricated tank system. *(Hazardous spill basins are discussed below.)*

Reviewed photos of jurisdictional sites.

Meeting adjourned.

Minutes from the Interagency 4C Hydraulic Design Review Meeting
R-2915B in Ashe County
January 23, 2014

Team Members:

Andrew Williams, USACE	(present)
Marella Buncick, USFWS	(via phone)
Alan Johnson, NCDWR	(present)
Marla Chambers, NCWRC	(present)
Chris Militscher, EPA	(not present)
Mitch Batuzich, FHWA	(not present)
Amy Chapman, NCDWR	(not present)

Participants:
Trent Beaver, Division
Bill Zerman, Hydraulics
Vincent Rivers, Hydraulics
Josh Dalton, Sungate Design Group
Brad Smith, Sungate Design Group
Piotr Stojda, Roadway Design
Tatia White, Roadway Design
David Sutts, Structures
Erin Cheely, PDEA/NES
Carla Dagnino, NES

Minutes:

Introductions were made by all in attendance.

Josh Dalton proceeded through the permit drawing plan sheets:

General

All instances of bank stabilization should reference a detail.

Construction Plan Sheet 10 was reviewed. There are wetlands located on the sheet, however, pending information from structures and utilities, no impacts are proposed. The sheet will be added to the permit package.

Permit Sheet 4:

Site 1: Split Gap Creek and Tributary to Site 1A and Site 1B

Why have the boulders been removed from the floodplain bench detail?
At the time of the meeting there was a misunderstanding regarding the boulders. Rather than removing them entirely, only the "keyed in" note and section of boulders should be removed from the detail. The detail has been revised to show the boulders sitting on the bed rather than keyed into the bed.

Permit Sheet 7:

Site 2: Is stream JS intermittent?
No, stream is perennial.

Separate bank stabilization impact

Site 3: No comment

Site 4: No comment

Site 5: No comment

Permit Sheet 9:

Site 6: No comment

Site 7: Wetland boundary should extend all the way to Gap Creek. PDEA will provide updated wetland file.
NEU Wetland file on server has been updated to display the correct line style.

Site 8: Discussed relocating preformed scour hole away from fill slope and wetland. Since the existing roadway pipe is source of wetland hydrology it was decided to leave outlet in current location and use rip rap pad rather than preformed scour hole.

Site 9: Pipe is not buried at inlet but outlet pipe has a less than 1% slope. Discussed using baffles in the pipe, but with approximately 22ft of drop from inlet to outlet, some sections of the system are too steep for fish passage to be successful. It was agreed to leave system as currently designed.

Permit Sheet 11:

Site 10: Don't account for temporary stream impacts in summary but leave hatching on plans.

Discussed if bent #2 could be moved out of water on downstream bridge. It was decided that it was not possible without major impacts elsewhere due to grade change, and Gap Creek, in this area, would likely narrow after removal of existing culvert.

Discussed temporary impacts associated with bents and bridge construction. David Stutts (structures) will provide what is needed.

Permit Sheet 13:

Site 11: No comment

Site 12: No comment

Site 13: No comment

Site 14: No comment

Permit Sheet 15:

Site 15: Leave hatching as shown but add note for a total take in permit plan sheet. Include total take area in impact summary and provide note on summary sheet showing amount of impact due to fill and mechanized clearing.

Site 16: Separate bank stabilization impacts

What is the slope of 60” RCP?
Slope is 0.7% and pipe is buried on both ends.

Site 17: Show impact as bank stabilization.

Site 18: Show impact as bank stabilization.

Permit Sheet 17:

Site 19 & 20: Reviewed hazardous spill basin discussion from 4B meeting.

Drawings will be updated for bent impacts and temporary impacts associated with bridge construction needs. David Stutts (structures) will provide causeway limits.

Meeting adjourned.

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 remained 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 with 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 no intersect the receiving lateral ditch at 90^0.

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.

Minutes from the Interagency 4B Hydraulic Design Review Meeting
R-2915D in Ashe County
April 18, 2013
1:00 PM – 2:30 PM

Team Members:		**Participants:**
Monte Matthews, USACE	(present)	Marshall Clawson, Hydraulics
Marella Buncick, USFWS	(present)	Will Hines, Sungate Design Group
Marla Chambers, NCWRC	(present)	Brad Smith, Sungate Design Group
Amy Chapman, NCDWQ	(present)	Quang Nguyen, Structure Design
Chris Militscher, EPA	(absent)	Tatia White, Roadway Design
Michael Batuzich, NCDOT	(absent)	Mark Staley, REU
David Harris, NCDOT	(absent)	Erin Cheely, PDEA
Brenda Moore, NCDOT	(absent)	John Conforti, PDEA
Trent Beaver, NCDOT	(absent)	Carla Dagnino, NES
		Elizabeth Lusk, NES

Minutes:

General Introduction was initiated by Marshall Clawson. Introductions were made by all in attendance.

<u>Sheet 4:</u>

No comments.

<u>Sheet 5:</u>

No comments.

<u>Sheet 6:</u>

No comments.

<u>Sheet 7:</u>

No impacts.

<u>Sheet 8:</u>

NES will let Hydraulics know if the wetland will be a total take.

Sheet 9:

No impacts.

Sheet 10:

No comments.

Sheet 11:

Station 537+00 -L- Left (Structure 1103): Investigate realigning 30” CSP with JS.

Sheet 12:

No impacts.

Sheet 13:

No comments.

Sheet 14:

No comments.

Sheet 15:

Station 587+50 -L- Right (Structure 1502): Investigate extending the proposed 24” pipe and using a Preformed Scour Hole if the design criteria allows.

Station 588+00 -L- Right: Remove debris (existing detached FES) from stream.

Sheet 16:

Station 607+50 -L- Left (Structure 1610): Add drop box in proposed 24” pipe in order to reduce velocity in the wetland.

Sheet 17:

No Comments.

Sheet 18:

Station 628+50 -L- Right (Structure 1808): Investigate realigning the proposed 24” pipe with JS.

Sheet 19:

Station 642+00 -L- Right: Hydraulics explained that the wetland to the left will head up and flow to the 30” pipe inlet.

Station 642+00 -L- Left: The Hydraulics Engineer explained that the gap between the two 30” pipes will be maintained and that the proposed riprap will be placed between the 30” outlet and the wetland boundary.

Sheet 20:

No comments.

Sheet 21

Station 663+50 -L- Right: Place a note on Plans stating to tamp down riprap at outlet of 60” pipes or call for riprap on banks only.

Station 17+00 – 21+00 -Y32- Right: Hand clear wetland 5 feet from slope stake line.

Station 668+00 -L- Right: The Hydraulics Engineer pointed out that a portion of the wetland shown on the Plans was actually a mowed lawn. NES stated that the wetlands on this project will be confirmed.

Station 670+00 -L- Right (Structure 2129): Place inlet of proposed 30” pipe on grade in order to avoid draining wetland.

Sheet 22

Station 677+00 -L- Right: Redesign Lateral “V” Ditch in order to reduce the velocity going into the wetland.

Sheet 23

No impacts.

Meeting adjourned.

Minutes from the Interagency 4C Hydraulic Design Review Meeting
R-2915D in Ashe County
September 11, 2013
2:45 PM – 4:15 PM

Team Members:		**Participants:**
Monte Matthews, USACE	(absent)	Marshall Clawson, Hydraulics
Marella Buncicke, USFWS	(present)	Will Hines, Sungate Design Group
Marla Chambers, NCWRC	(present)	Brad Smith, Sungate Design Group
Amy Euliss, NCDWQ	(present)	Bruce Klappenbach, Structure Design
Mitch Batuzich, FHWA	(absent)	Tatia White, Roadway Design
Chris Militscher, EPA	(phone)	Piotr Stojda, Roadway Design
		Erin Cheely, PDEA
		Carla Dagnino, NES
		Vincent Rivers, Hydraulics
		Andrew Williams, USACE
		Jeremy Goodwin, Roadside Environmental
		Trent Beaveer, Division 11 (phone)

Minutes:

General Comment: It was asked that the drawing of small impacts be blown up in size to make seeing the impact easier.

General Comment: In the Summary Sheet, break out streambank stabilization.

General Comment: In the Stormwater Management Plan, be more specific on the location of the grass swales.

<u>Sheet 4:</u>

No comments.

<u>Sheet 5:</u>

No comments.

<u>Sheet 6:</u>

Site 3: Label as Site 3A and 3B.

Site 3B: Label temporary impacts. The JS should be a Temporary Impact.

Site 4: Where does the JS start? In the Summary Table, show wetlands as a total take. USACE asked if a blow up of the drawing could be provided.

Site 5: If the Lateral V-ditch ties into the JS below OHW, then need to show as an impact.

Sheet 8:

Site 6: Investigate using a sill in one of the 84-inch cross-pipes. Investigate using a cross-vane downstream of the outlet.

Sheet 10:

Site 8: Do we need a Streambank Stabilization Detail? Why is the existing 18-inch pipe shown in red?

Sheet 11:

Site 11: Show Streambank Stabilization as a permanent impact.

Sheet 14:

Site 13: The Summary Sheet shows mechanized clearing, but the Permit Drawing does not. USACE asked if a blow up of the drawing could be provided.

Sheet 15:

Site 14: How will the inlet channel be constructed? Is additional easement needed? There is also a JS shown on the west side that should have impacts shown. The riprap at the outlet should be a permanent impact.

Site 15: The riprap at the outlet should be a permanent impact.

Sheet 16:

Station 607+50 -L- Left: Use a riprap pad instead of on banks only.

Sheet 17:

Site 17: Label as Site 17A and 17B. Streambank stabilization should be a permanent impact.

Sheet 18:

Site 23: It appears that the FS file has not been updated to show a JS on the downstream end of the 24-inch cross-pipe. Need to show a temporary impact for the pipe cleanout.

Sheet 19:

Station 645+00 -L- Right: The question was asked if the blue line was a JS. Based on the WET file, it is not.

Sheet 20:

Site 25: The riprap at the outlet should be a permanent impact.

Sheet 21

Site 26: How will the bevel at the inlet end of the box culvert be constructed? Are any temporary impacts needed to be shown? Investigate using a sill in one of the barrels.

Site 29: Revise Detail to show a floodplain bench.

Site 30: Leave as mechanized clearing.

Station 670+00 -L- Right (Structure 2129): Place inlet of proposed 30" pipe on grade in order to avoid draining wetland.

Sheet 22

No Comments.

Meeting adjourned.

ASHE COUNTY
schools
Challenging young minds to soar.
Donnie R. Johnson, Superintendent • Charles L. King, Chairman • Charles B. Jones, Jr., Vice-Chairman
Dr. Lee Beckworth • Polly Jones • Terry Williams

May 1, 2013

Tim D. Goins, PE
Parsons Engineering
5540 Centerview Drive, Suite 217
Raleigh, North Carolina 27606

Dear Mr. Goins:

The Ashe County School Board concurs that the NCDOT widening of US 221 (Project R-2915) will not adversely affect the activities, features, or attributes that qualify the Fleetwood Community Center for protection under Section 4(f) of the Safe, Accountable, Flexible, Efficient Transportation Equity Act.

Should you need any additional information in order to complete the preliminary phase of this project, please contact my office.

Thank you,

Donnie R. Johnson

Donnie R. Johnson
Superintendent

www.ashe.k12.nc.us
PO Box 604 • 320 South Street • Jefferson, NC 28640 • 336.246.7175 • 336.246.7609 fax • Courier No. 15-65-01

Federal Aid #: **STP-0221(13)** ***TIP#: R-2915*** ***County*:** **Ashe & Watauga**

CONCURRENCE FORM FOR ASSESSMENT OF EFFECTS

Project Description: Widen US 221 to four-lanes divided from US 421 in Watauga County to US 221 Business/NC 88 in Jefferson

On 11/23/2010, representatives of the

- [x] North Carolina Department of Transportation (NCDOT)
- [x] Federal Highway Administration (FHWA)
- [x] North Carolina State Historic Preservation Office (HPO)
- [ ] Other

Reviewed the subject project and agreed on the effects findings listed within the table on the reverse of this signature page.

Signed:

Mary Pope Furr — Nov. 23, 2010

Representative, NCDOT — Date

Dale W Burns — 11-23-10

FHWA, for the Division Administrator, or other Federal Agency — Date

Representative, HPO — Date

Renee Gledhill-Early — 11.23.10

State Historic Preservation Officer — Date

Federal Aid #: **STP-0221(13)** *TIP#: R-2915* ***County*: Ashe & Watauga**

Property and Status	Effect Finding	Alternative	Reasons
Baldwin Bethany Cemetery (DE), Criterion C	No effect	Best fit alt.	no constuction w/in historic boundary & no changes to ~~the~~ elements that make it eligible
Barnett Idol House (DE), Criterion C	No effect	Best fit alt.	no constuction w/in historic boundary and no changes to elements that make it eligible

Initialed: NCDOT MPT FHWA DB HPO Rgg

☐ FHWA intends to use HPO's call of "No Adverse Effect" as the basis of a "de minimis" finding for the following properties, pursuant to Section 4(f): FHWA initials _____

North Carolina Department of Cultural Resources

State Historic Preservation Office

Ramona M. Bartos, Administrator

Pat McCrory, Governor
Susan W. Kluttz, Secretary
Kevin Cherry, Deputy Secretary

Office of Archives and History
Division of Historical Resources
David Brook, Director

March 5, 2013

MEMORANDUM

TO: Matt Wilkerson
Office of Human Environment
NCDOT Division of Highways

FROM: Ramona M. Bartos RMB for Ramona M. Bartos

SUBJECT: Draft Report of the Archaeological Survey of US 221 Improvements, R-2915, Federal Aid # STP-125(1); Ashe and Watauga Counties, ER 06-1023

Thank you for your letter of January 24, 2013, transmitting the draft archaeological survey report by Michael O'Neal of Archaeological Consultants of the Carolinas for the above project. We have reviewed the report and offer the following comments.

For purposes of compliance with Section 106 of the National Historic Preservation Act, we concur that the following properties are not eligible for the National Register of Historic Places:

31WT300 (revisit), 31WT365&365**, 31WT366, 31WT367**, 31WT368, 31WT369, 31AH276, 31AH277&277**, 31AH278** and 31AH279

None of these archaeological sites retain sufficient integrity to provide important information regarding the prehistoric or historic past of North Carolina.

We concur with the author's recommendation that no additional archaeological investigation is warranted in connection with this project as currently proposed. The report meets our office's guidelines and those of the Secretary of the Interior. Specific concerns and/or corrections which need to be addressed in the preparation of a final report are attached for the author's use.

The above comments are made pursuant to Section 106 of the National Historic Preservation Act and the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106 codified at 36 CFR Part 800.

Thank you for your cooperation and consideration. If you have questions concerning the above comment, please contact Renee Gledhill-Earley, environmental review coordinator, at 919-807-6579. In all future communication concerning this project, please cite the above-referenced tracking number.

cc: Michael O'Neal, Archaeological Consultants of the Carolinas, Inc.

Specific Comments, US 221 Improvements, R-2915, Ashe and Watauga Counties

1. The report needs extensive editing. There are many missing words, typographical errors and sentence fragments scattered throughout the document.
2. The Tuscarora War did not end in 1712, as the last big battle of the war at Neoheroka did not occur until March of 1713.
3. In several places in the report during the discussion of corridor width, the document states that the corridor was primarily 61 meters (200 feet) wide, but in some places it was 91 meters (200 feet) wide.

WETLAND PERMIT IMPACT SUMMARY*

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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)
	SECTION A		0.48		0.01	0.08	0.05	0.17	0.05	1521	370	
	SECTION B		0.32		0.04	0.06		0.14	0.15	944	207	
	SECTION C		0.16			0.04		0.29	0.06	2263	434	
	SECTION D		1.01		0.01	0.30		0.43	0.05	2753	383	
	SECTION E		0.43			0.09		0.03	< 0.01	405	79	
TOTALS*:			2.41	0.01**	0.06	0.57	0.05	1.34	0.22	7886	1473	0

* Rounded totals are sum of actual impacts

** 0.01 acre of temporary fill in wetlands will occur in the hand clearing areas of R-2915A for erosion control measures

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01-16-14
R-2915 ASHE COUNTY
US 221 FROM US 421 IN WATAUGA COUNTY TO
US 221 BUSINESS IN ASHE COUNTY
SHEET 1 OF 1

ATN Revised 3/12/13

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 34518.1.2 (R-2915A) **County(ies):** Watauga Ashe

General Project Information

Project No.:	34518.1.2 (R-2915A)	**Project Type:**	Roadway Widening	**Date:**	7/14/2014
NCDOT Contact:	Bill Zerman, PE	**Contractor / Designer:**	Richard Bollinger, PE		
Address:	NCDOT Hydraulics Unit 1020 Birch Ridge Road Raleigh, NC 27610	**Address:**	RS&H 8601 Six Forks Road, Suite 260 Raleigh, NC 27615		
Phone:	919-707-6755	**Phone:**	919-926-4105		
Email:	bzerman@ncdot.gov	**Email:**	richard.bollinger@rsandh.com		
City/Town:		**County(ies):**	Watauga	Ashe	
River Basin(s):	New	**CAMA County?**	No	No	
Primary Receiving Water:	Gap Creek	**NCDWQ Stream Index No.:**	10-1-23		
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**	Class C			
	Supplemental:	Trout Waters (Tr)			
Other Stream Classification:	None				
303(d) Impairments:	None				
Buffer Rules in Effect	N/A				

Project Description

Project Length (lin. Miles or feet):	2.841 Miles	**Surrounding Land Use:**	Rural mainly residential with some business

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	28.94 ac.	7.80 ac.
Typical Cross Section Description:	Four-lane divded with raised grass median. Two 12' lanes on each side with 8' shoulders (4' paved).	Two-lane, two-way with 11' lanes with 4' - 6' grass shoulders.
Average Daily Traffic (veh/hr/day):	Design/Future: 2035 ADT = 20,400	Existing: 2010 ADT = 9,864

General Project Narrative:

This project is located approximately 10 miles east of the Town of Boone, and approximately 13 miles south of the Town of West Jefferson. The first portion of the project is located in Watauga County with the remainder in Ashe County. The entire project falls within the New River Basin.

The project begins with a new interchange at the intersection of US Highways 421 & 221. It continues along Highway 221, widening the existing two lane ditch section road to a four lane divided section. The project length is 2.8 miles along US 221, and 0.8 miles along US 421.

The project drainage system will consist mainly of ditches, cross pipes, storm drainage systems, and culverts, including two new box culverts within the proposed 221/421 interchange.

Gap Creek and its tributaries are the only streams that are affected by the project; NCDWQ Stream Index # 10-1-23 – Stream Classification C, Trout Waters (Tr).

Wherever possible, grassed swales have been used to treat surface water before it enters jurisdictional streams and wetlands. Cross pipes and culverts in jurisdictional streams will have the inverts buried a minimum of 20% of the diameter of the pipe size up to and including 60" diameter. For pipes 60" or greater and box culverts, the inverts will be buried 1.0'. Sills have been utilized in the two new box culverts within the 221/421 interchange to allow for maintenance of the existing stream low flow width, depth and velocity.

References

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 34518.1.2 (R-2915A) **County(ies):** Watauga Ashe

Swales

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
4	-LPC- 13+50 LT -LPC- 15+83 LT	NA	0.0	4	4	4.20	420	352	1.00%	7.7	1.7	10.1	1.9	No
6	-L- 41+43 LT -L- 43+50 LT	NA	2.0	2	2	5.67	567	207	0.60%	17.5	2.1	22.8	2.2	No
6	-L- 44+45 RT -L- 45+26 RT	NA	0.0	6	2	1.40	140	81	2.50%	2.3	1.9	2.9	2.1	No
6	-L- 45+26 RT -L- 47+00 RT	NA	0.0	6	2	3.03	303	174	0.40%	7.4	1.0	9.7	1.1	No
6	-L- 49+71 RT -L- 47+00 RT	NA	0.0	6	2	3.30	330	271	2.00%	3.2	1.4	4.1	1.4	No
6	-L- 46+17 RT -L- 46+50 RT	NA	2.0	3	3	0.23	23	33	0.30%	1.0	0.4	1.3	0.5	No
7	-L- 54+50 LT -L- 52+04 LT	NA	3.0	3	3	13.00	1300	246	1.50%	20.9	2.5	27.3	2.7	No
7	-L- 60+83 RT -L- 57+00 RT	NA	0.0	6	2	1.22	122	383	0.30%	1.7	0.4	2.2	0.4	No
7	-L- 64+37 RT -L- 66+25 RT	NA	0.0	6	2	6.80	680	188	3.80%	8.0	2.7	10.2	2.9	No
7	-L- 62+23 LT -L- 59+62 LT	NA	0.0	6	4	0.45	45	261	1.40%	1.2	0.8	1.6	0.9	No
8	-L- 78+00 RT -L- 78+48 RT	NA	0.0	6	2	1.55	155	48	1.00%	2.9	1.2	3.7	1.3	No
8	-L- 80+07 RT -L- 79+08 RT	NA	0.0	6	4	0.52	52	99	3.00%	1.0	2.1	1.2	2.2	No
8	-L- 79+15 LT -L- 79+91 LT	NA	2.0	2	2	0.46	46	76	10.00%	1.7	2.9	2.2	3.1	No
9	-L- 83+00 LT -L- 81+32 LT	NA	0.0	6	4	0.57	57	168	0.30%	2.0	0.4	2.6	0.4	No
9	-L- 81+50 RT -L- 82+00 RT	NA	0.0	6	4	3.36	336	50	0.30%	4.6	0.7	6.0	0.7	No
9	-L- 88+00 RT -L- 89+00 RT	NA	0.0	6	2	0.69	69	100	2.10%	1.0	0.9	1.2	0.9	No
9	-L- 88+86 LT -L- 89+07 LT	NA	2.0	2	2	1.07	107	80	1.00%	3.0	1.5	3.9	1.6	No
9	-L- 90+00 RT -L- 89+50 RT	NA	0.0	6	2	0.17	17	50	2.80%	0.2	0.9	0.3	1.0	No
9	-L- 94+50 LT -L- 89+50 LT	NA	0.0	2	2	1.01	101	500	1.20%	1.4	1.1	1.8	1.2	No
9	-L- 91+89 RT -L- 93+58 RT	NA	2.0	3	3	3.00	300	169	5.00%	4.1	1.3	5.4	1.4	No

☐ YES ☑ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

The design criteria from the NCDOT BMP Toolbox has been followed to the extent possible. Due to the challenging terrain and other existing conditions, the criteria could not be followed in all areas.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 34518.1.2 (R-2915A) **County(ies):** Watauga Ashe

Swale

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
9	-L- 92+13 LT -L- 92+17 LT	NA	2.0	2	2	11.80	1180	160	1.50%	13.8	2.5	17.7	2.6	No
10	-L- 98+68 LT -L- 99+66 LT	NA	0.0	2	2	0.24	24	98	3.60%	0.9	1.6	1.2	1.7	No
11	-L- 106+05 LT -L- 106+50 LT	NA	0.0	2	2	0.84	84	45	1.80%	1.7	1.2	2.3	1.3	No
11	-L- 117+62 RT -L- 115+77 RT	NA	0.0	6	2	5.22	522	211	0.70%	7.2	1.0	9.4	1.0	No
12	-L- 126+43 LT -L- 126+73 LT	NA	0.0	2	2	0.20	20	105	2.30%	0.8	1.6	1.1	1.8	No
12	-L- 130+00 RT -L- 131+00 RT	NA	0.0	6	4	0.90	90	100	0.30%	1.7	0.4	2.2	0.4	No
13	-L- 134+19 LT -L- 134+31 LT	NA	2.5	4	4	19.90	1990	88	0.50%	23.3	1.7	29.9	1.8	No
14, 15	-L- 154+45 RT -L- 157+50 RT	NA	2.0	3	3	8.70	870	305	0.30%	11.9	1.1	15.2	1.2	No
15	-Y9- 10+72 RT -Y9- 13+15 RT	NA	2.0	3	3	10.30	1030	243	0.50%	14.1	1.4	18.0	1.5	No
16	-SR1- 13+96 LT -SR1- 15+16 LT	NA	0.0	4	2	2.50	250	120	2.00%	3.5	1.6	4.5	1.7	No
16	-SR1- 20+00 LT -SR1- 20+48 LT	NA	0.0	4	4	1.00	100	48	0.90%	2.1	0.8	2.7	0.8	No
16	-SR1- 25+00 RT -SR1- 26+70 RT	NA	0.0	4	4	0.19	19	170	3.20%	0.3	0.8	0.5	1.0	No
							0							
							0							
							0							
							0							
							0							
							0							
							0							
							0							

☐ YES ☑ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

The design criteria from the NCDOT BMP Toolbox has been followed to the extent possible. Due to the challenging terrain and other existing conditions, the criteria could not be followed in all areas.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: 34518.1.2 (R-2915A) **County(ies):** Watauga Ashe **Page** 4 **of** 4

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
4	-L- 13+20 LT	Riprap Energy Dissipator Basin	Class I	2.05	Pipe	54" RCP	63.0	12.0
11	-L- 109+65 LT	PFSH	Class 'B'	1.51	Pipe	18" RCP	9.3	7.2
13	-L- 132+06 LT	PFSH	Class 'B'	0.36	Pipe	15" RCP	1.9	4.9
13	-L- 136+40 LT	PFSH	Class 'B'	0.35	Pipe	15" RCP	1.6	4.6

☑ YES ☐ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, 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-2915A

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34518.1.2	STP-0221 (13)	P.E.
34518.2.2	STP-0221 (13)	R/W & UTILITY

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA & ASHE COUNTIES

LOCATION: US 221 FROM US 421 IN WATAUGA COUNTY TO SR 1003 (IDLEWILD RD) IN ASHE COUNTY

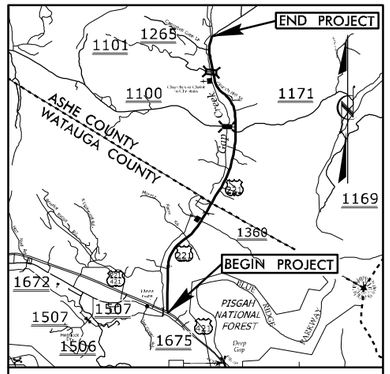
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, AND RETAINING WALLS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

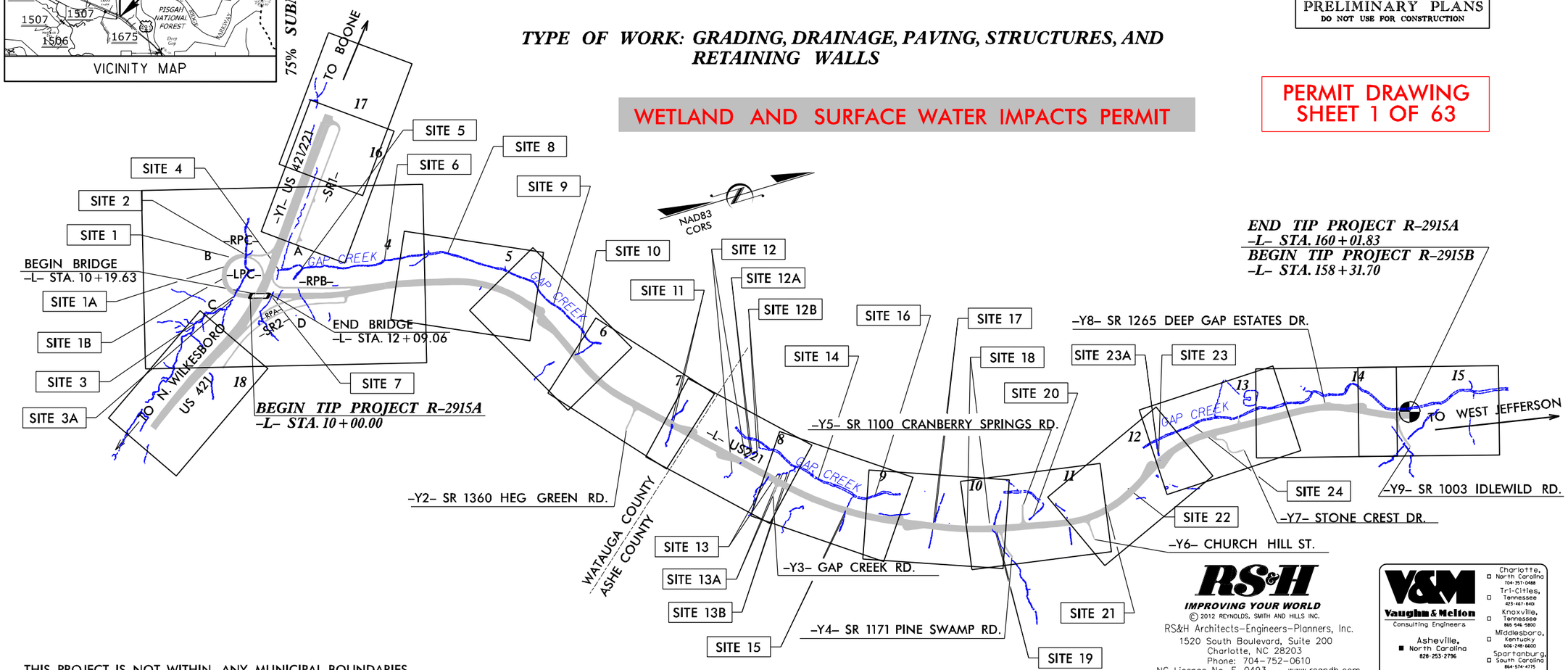
PERMIT DRAWING
SHEET 1 OF 63

WETLAND AND SURFACE WATER IMPACTS PERMIT

75% SUBMITTAL PLANS



VICINITY MAP



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

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Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-574-4175

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CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 11970
ADT 2035 = 20400
K = 10 %
D = 65 %
T = 9 %
V = 60 MPH
*(TTST 2%+DUALS 7%)
FUNC CLASS =
RURAL ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915A	=	2.805 MI.
LENGTH STRUCTURES TIP PROJECT R-2915A	=	0.036 MI.
TOTAL LENGTH OF TIP PROJECT R-2915A	=	2.841 MI.

Prepared in the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR NCDOT DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2013

LETTING DATE:
JUNE 16, 2015

REECE SCHULER, PE
PROJECT ENGINEER

AARON CARVER, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
BRENDA MOORE, PE

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

7/14/2014
X:\P\032850000 R-2915A\Project Production\Hydraulics\PERMITS_Environmental\Drawings\R-2915A_rdy_tsh.dgn
5:56:36 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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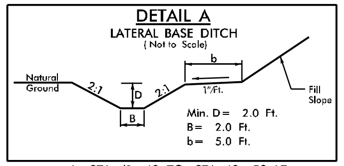
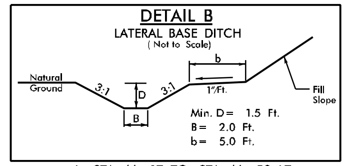
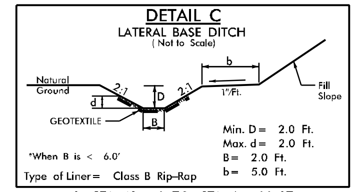
PERMIT DRAWING
SHEET 2 OF 63



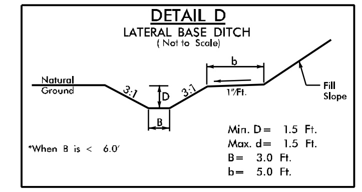
-L- STA. 41+43 TO STA. 43+50 LT



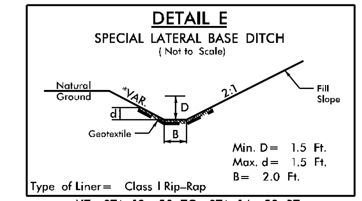
-L- STA. 46+17 TO STA. 46+50 LT
-L- STA. 91+89 TO STA. 93+58 RT
-L- STA. 154+45 TO STA. 157+50 RT
-Y9- STA. 11+35 TO STA. 13+15 RT



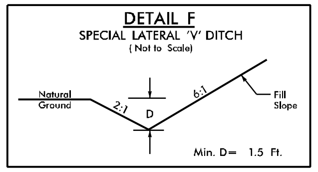
-L- STA. 43+50 TO STA. 45+00 LT



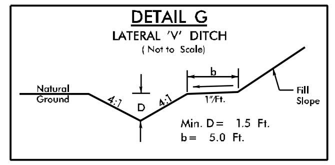
-L- STA. 52+04 TO STA. 54+50 LT



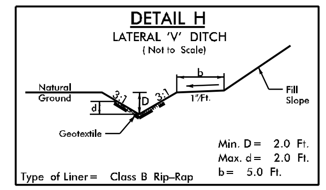
-Y7- STA. 12+50 TO STA. 14+50 RT



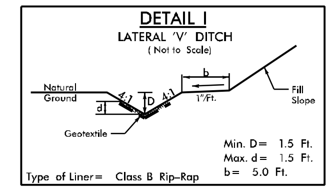
-L- STA. 44+45 TO STA. 45+26 RT
-L- STA. 47+00 TO STA. 49+71 RT



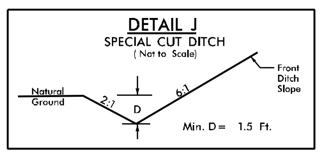
-LPC- STA. 13+50 TO STA. 15+83 RT



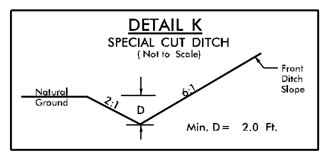
-L- STA. 105+89 TO STA. 107+09 RT



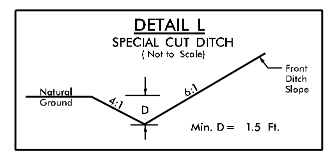
-LPC- STA. 15+83 TO STA. 16+00 RT



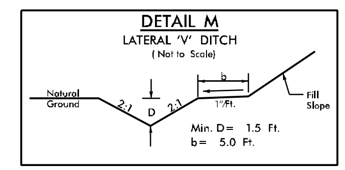
-L- STA. 45+26 TO STA. 47+00 RT
-L- STA. 57+00 TO STA. 60+83 RT
-L- STA. 64+37 TO STA. 66+25 RT
-L- STA. 78+00 TO STA. 78+48 RT



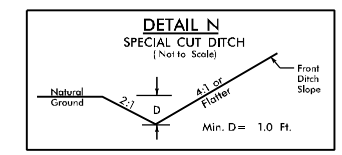
-L- STA. 88+00 TO STA. 89+00 RT
-L- STA. 89+50 TO STA. 90+00 RT
-L- STA. 115+77 TO STA. 117+62 RT



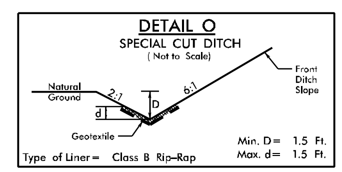
-L- STA. 59+62 TO STA. 62+23 LT
-L- STA. 79+08 TO STA. 80+07 RT
-L- STA. 81+32 TO STA. 83+00 LT
-L- STA. 81+50 TO STA. 82+00 RT
-L- STA. 130+00 TO STA. 131+00 RT



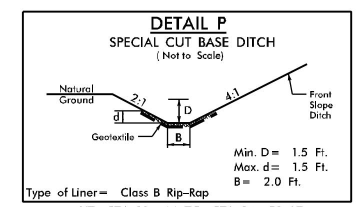
-L- STA. 89+50 TO STA. 94+00 LT
-L- STA. 106+05 TO STA. 106+50 LT



-SR1- STA. 13+96 TO STA. 15+16 LT



-L- STA. 78+48 TO STA. 78+94 RT
-L- STA. 89+00 TO STA. 89+12 RT
-L- STA. 89+18 TO STA. 89+50 RT



-Y7- STA. 12+44 TO STA. 14+50 LT

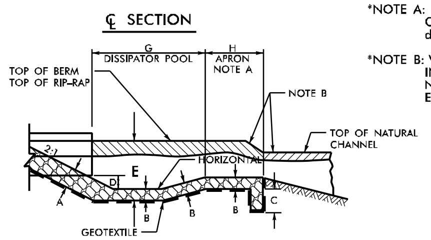
DETAIL Q

RIP-RAPPED ENERGY DISSIPATOR BASIN

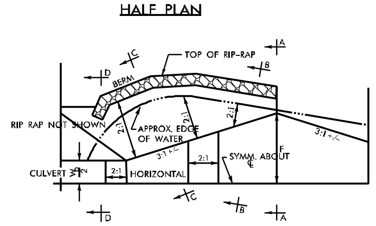
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A-A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A-A)= SPECIFIED VELOCITY.

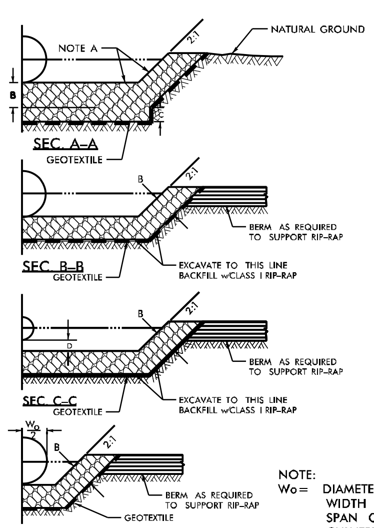
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A-A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





NOTE:
Wo= DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

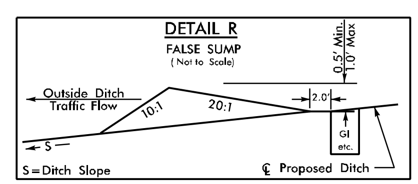
DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	3.0'							
B	2.5'							
C	2.0'							
D	2.5'							
E	8.0'							
F	12.0'							
G	18.0'							
H	9.0'							

BASIN #	LOCATION (AT OUTLET)
1	449
2	
3	
4	
5	
6	
7	
8	

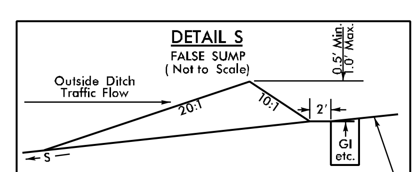
*ALL DIMENSIONS APPROXIMATE IN FEET

5/05

-L- STA. 13+20 TO STA. 13+54 LT



-L- STA. 82+10 RT
-L- STA. 120+80 RT
-L- STA. 130+60 RT
-L- STA. 152+80 RT

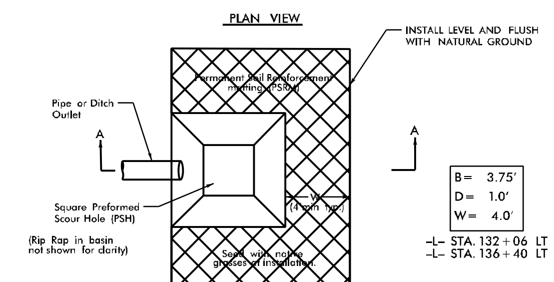


-L- STA. 54+38 RT
-L- STA. 84+60 LT
-L- STA. 84+85 RT
-L- STA. 99+30 RT
-Y2- STA. 10+70 RT

DETAIL T

PREFORMED SCOUR HOLE
*NOT TO SCALE

PLAN VIEW



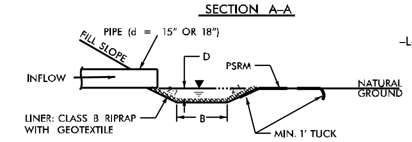
B=	3.75'
D=	1.0'
W=	4.0'

-L- STA. 132+06 LT
-L- STA. 136+40 LT

B=	4.5'
D=	1.5'
W=	4.0'

-L- STA. 109+65 LT

SECTION A-A



3/08

-L- STA. 109+65 LT
-L- STA. 132+06 LT
-L- STA. 136+40 LT

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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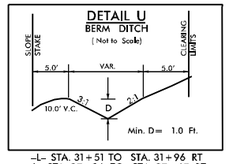
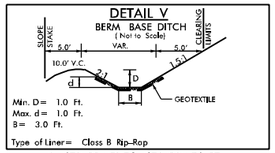
PERMIT DRAWING
SHEET 3 OF 63

DETAIL U
BERM DITCH
(Not to Scale)



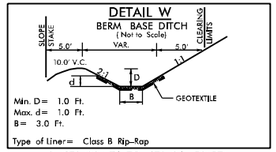
-L- STA. 31+51 TO STA. 31+96 RT
-L- STA. 37+76 TO STA. 37+67 RT

DETAIL V
BERM BASE DITCH
(Not to Scale)



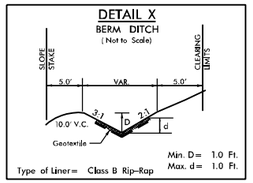
-L- STA. 22+51 TO STA. 23+76 RT
-L- STA. 32+00 TO STA. 33+98 RT
-L- STA. 54+51 TO STA. 58+97 RT
-L- STA. 141+48 TO STA. 142+49 RT

DETAIL W
BERM BASE DITCH
(Not to Scale)



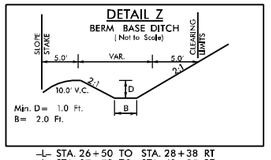
-L- STA. 23+76 TO STA. 26+50 RT

DETAIL X
BERM DITCH
(Not to Scale)



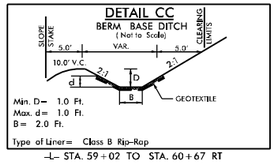
-L- STA. 84+97 TO STA. 87+85 RT

DETAIL Z
BERM BASE DITCH
(Not to Scale)



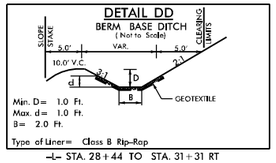
-L- STA. 26+50 TO STA. 28+38 RT
-L- STA. 37+73 TO STA. 42+95 RT
-L- STA. 54+04 TO STA. 54+48 RT
-L- STA. 71+61 TO STA. 71+98 RT
-L- STA. 129+72 TO STA. 130+17 RT
-L- STA. 132+98 TO STA. 133+50 RT
-L- STA. 137+97 TO STA. 138+88 RT

DETAIL CC
BERM BASE DITCH
(Not to Scale)



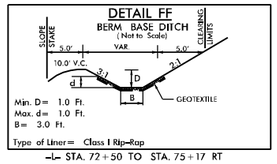
-L- STA. 59+02 TO STA. 60+67 RT
-L- STA. 71+98 TO STA. 72+50 RT
-L- STA. 103+51 TO STA. 105+89 RT
-L- STA. 108+23 TO STA. 113+33 RT
-L- STA. 130+17 TO STA. 132+98 RT
-L- STA. 133+50 TO STA. 136+28 RT
-L- STA. 138+93 TO STA. 141+48 RT
-L- STA. 142+51 TO STA. 145+00 RT
-Y4- STA. 11+00 TO STA. 13+50 LT

DETAIL DD
BERM BASE DITCH
(Not to Scale)



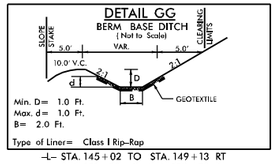
-L- STA. 28+44 TO STA. 31+31 RT

DETAIL FF
BERM BASE DITCH
(Not to Scale)



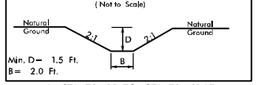
-L- STA. 72+50 TO STA. 75+17 RT

DETAIL GG
BERM BASE DITCH
(Not to Scale)



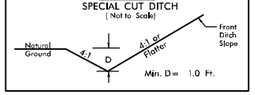
-L- STA. 145+02 TO STA. 149+13 RT
-L- STA. 151+08 TO STA. 153+73 RT

DETAIL HH
STANDARD BASE DITCH
(Not to Scale)



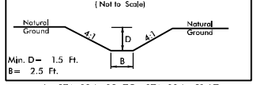
-L- STA. 79+15 TO STA. 79+91 LT
-L- STA. 88+86 TO STA. 89+07 LT
-L- STA. 92+13 TO STA. 92+17 LT

DETAIL II
SPECIAL CUT DITCH
(Not to Scale)



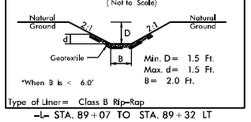
-SR1- STA. 20+00 TO STA. 20+48 LT
-SR1- STA. 25+00 TO STA. 26+70 RT

DETAIL JJ
STANDARD BASE DITCH
(Not to Scale)



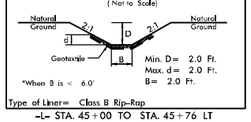
-L- STA. 134+19 TO STA. 134+31 LT

DETAIL KK
STANDARD BASE DITCH
(Not to Scale)



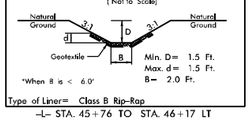
-L- STA. 89+07 TO STA. 89+32 LT

DETAIL LL
STANDARD BASE DITCH
(Not to Scale)



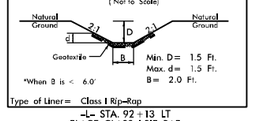
-L- STA. 45+00 TO STA. 45+76 LT

DETAIL MM
STANDARD BASE DITCH
(Not to Scale)



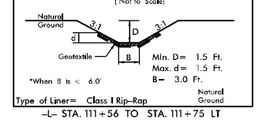
-L- STA. 45+76 TO STA. 46+17 LT

DETAIL NN
STANDARD BASE DITCH
(Not to Scale)



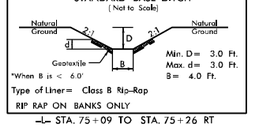
-L- STA. 92+13 LT
PLACE CLASS I RIP RAP
IN LAST 20' OF DITCH

DETAIL OO
STANDARD BASE DITCH
(Not to Scale)



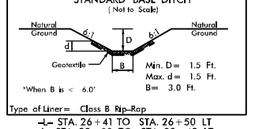
-L- STA. 111+56 TO STA. 111+75 LT

DETAIL PP
STANDARD BASE DITCH
(Not to Scale)



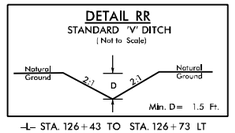
-L- STA. 75+09 TO STA. 75+26 RT

DETAIL QQ
STANDARD BASE DITCH
(Not to Scale)



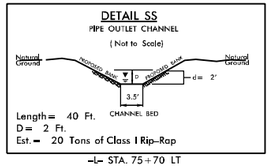
-L- STA. 26+41 TO STA. 26+50 LT
-L- STA. 33+00 TO STA. 33+48 LT

DETAIL RR
STANDARD 'V' DITCH
(Not to Scale)



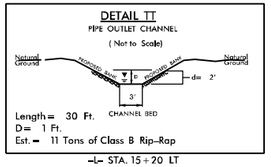
-L- STA. 126+43 TO STA. 126+73 LT

DETAIL SS
PIPE OUTLET CHANNEL
(Not to Scale)



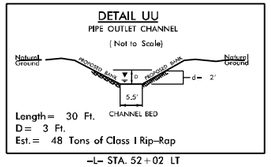
-L- STA. 75+70 LT

DETAIL TT
PIPE OUTLET CHANNEL
(Not to Scale)



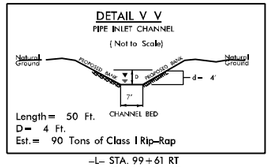
-L- STA. 15+20 LT
-L- STA. 89+18 LT
-L- STA. 115+50 LT
-L- STA. 129+45 LT

DETAIL UU
PIPE OUTLET CHANNEL
(Not to Scale)



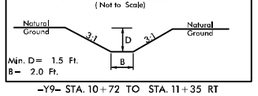
-L- STA. 52+02 LT
-L- STA. 107+00 LT

DETAIL V V
PIPE INLET CHANNEL
(Not to Scale)



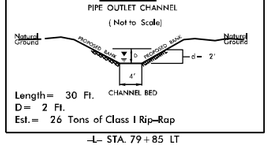
-L- STA. 99+61 RT
-L- STA. 99+76 LT

DETAIL WW
STANDARD BASE DITCH
(Not to Scale)



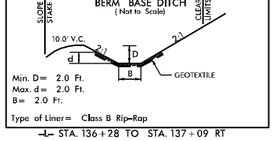
-Y9- STA. 10+72 TO STA. 11+35 RT

DETAIL XX
PIPE OUTLET CHANNEL
(Not to Scale)



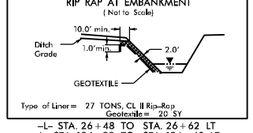
-L- STA. 79+85 LT

DETAIL YY
BERM BASE DITCH
(Not to Scale)



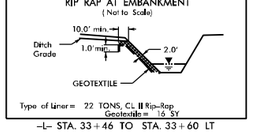
-L- STA. 136+28 TO STA. 137+09 RT

DETAIL ZZ
RIP RAP AT EMBANKMENT
(Not to Scale)



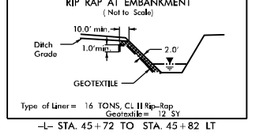
-L- STA. 26+48 TO STA. 26+62 LT
-L- STA. 134+22 TO STA. 134+40 LT

DETAIL AAA
RIP RAP AT EMBANKMENT
(Not to Scale)



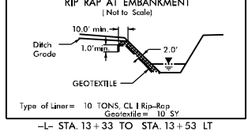
-L- STA. 33+46 TO STA. 33+60 LT

DETAIL BBB
RIP RAP AT EMBANKMENT
(Not to Scale)



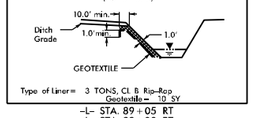
-L- STA. 45+72 TO STA. 45+82 LT
-L- STA. 84+80 TO STA. 84+90 LT
-L- STA. 89+31 TO STA. 89+37 LT
-L- STA. 92+05 TO STA. 92+08 LT

DETAIL CCC
RIP RAP AT EMBANKMENT
(Not to Scale)



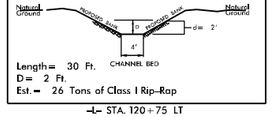
-L- STA. 13+33 TO STA. 13+53 LT

DETAIL EEE
RIP RAP AT EMBANKMENT
(Not to Scale)



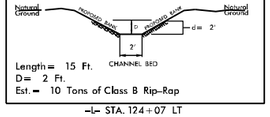
-L- STA. 89+05 RT
-L- STA. 89+20 RT
-L- STA. 107+20 RT
-L- STA. 111+57 LT

DETAIL FFF
PIPE OUTLET CHANNEL
(Not to Scale)



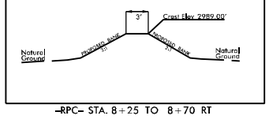
-L- STA. 120+75 LT

DETAIL GGG
PIPE OUTLET CHANNEL
(Not to Scale)



-L- STA. 124+07 LT

DETAIL HHH
EARTHEN BERM
(Not to Scale)



-RPC- STA. 8+25 TO 8+70 RT

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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PERMIT DRAWING
SHEET 4 OF 63

200' 0' 200' 400' 600'
GRAPHIC SCALE

HC HC DENOTES HAND CLEARING

DENOTES MECHANIZED CLEARING

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID
NAD 83/NSRS 2007

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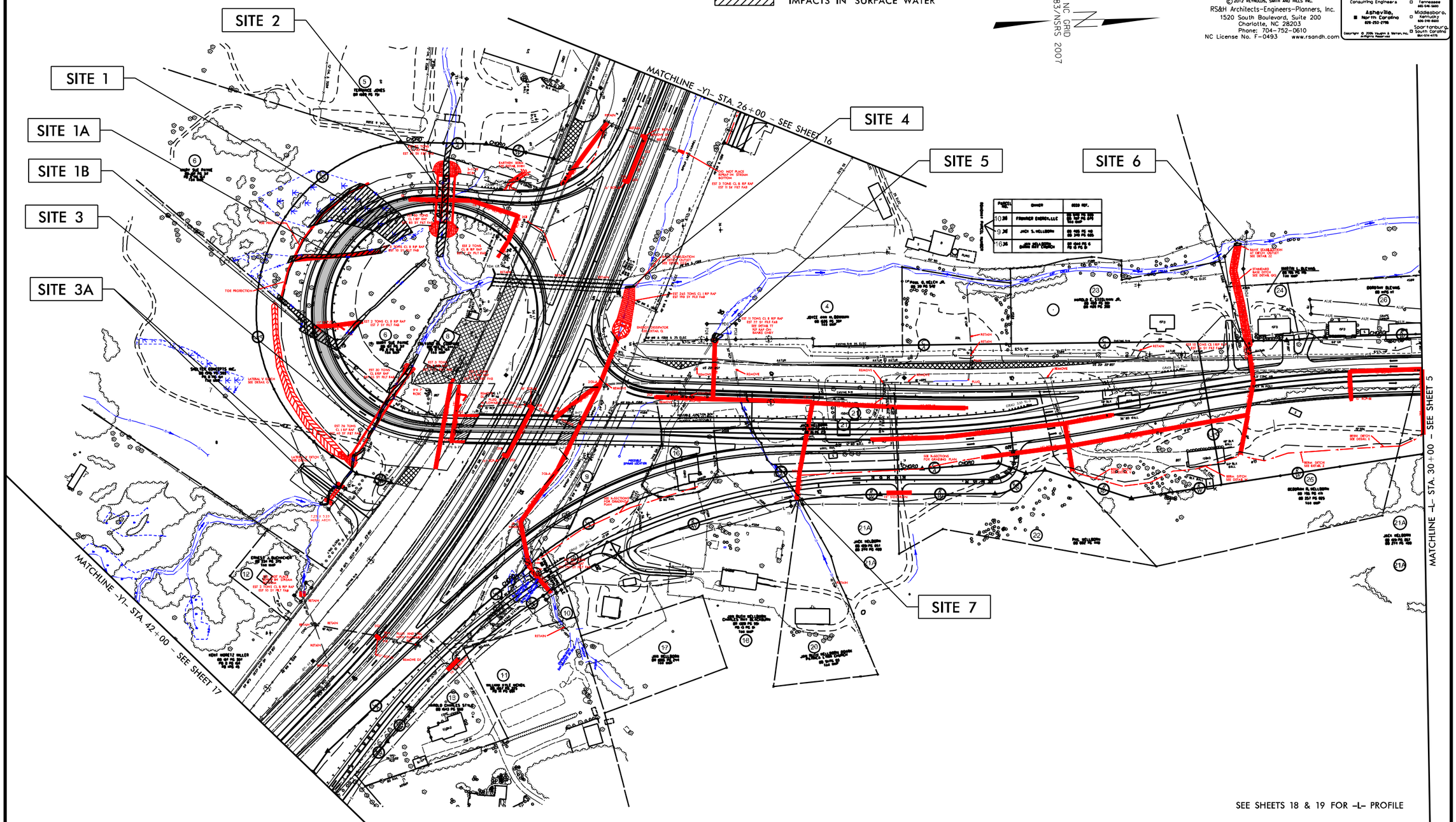

SEE SHEETS 18 & 19 FOR -L- PROFILE

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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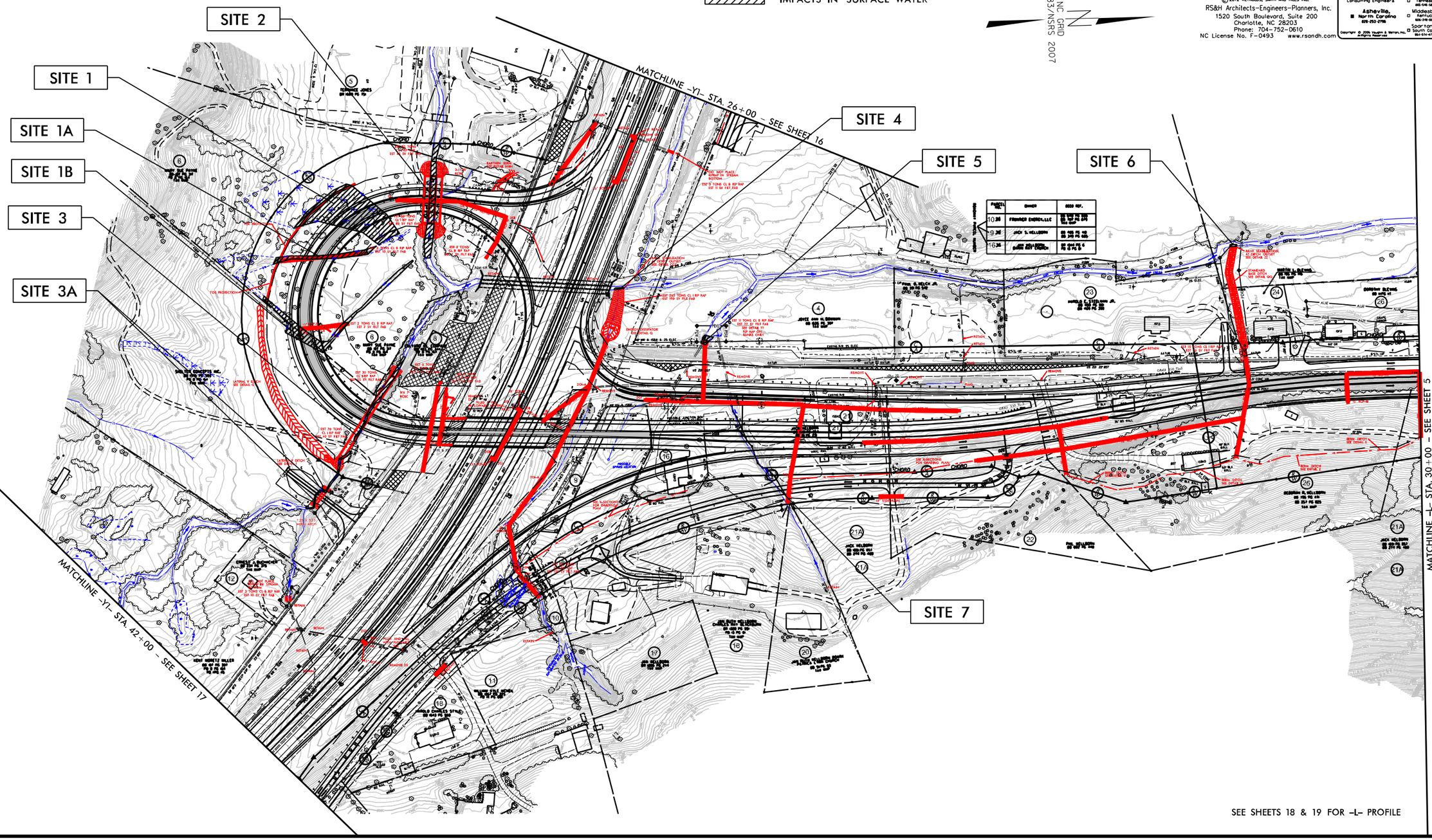
200′ 0′ 200′ 400′ 600′
GRAPHIC SCALE

HC HC DENOTES HAND CLEARING
DENOTES MECHANIZED CLEARING
F F DENOTES FILL IN WETLAND
S S DENOTES IMPACTS IN SURFACE WATER
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID NAD 83/NSRS 2007



$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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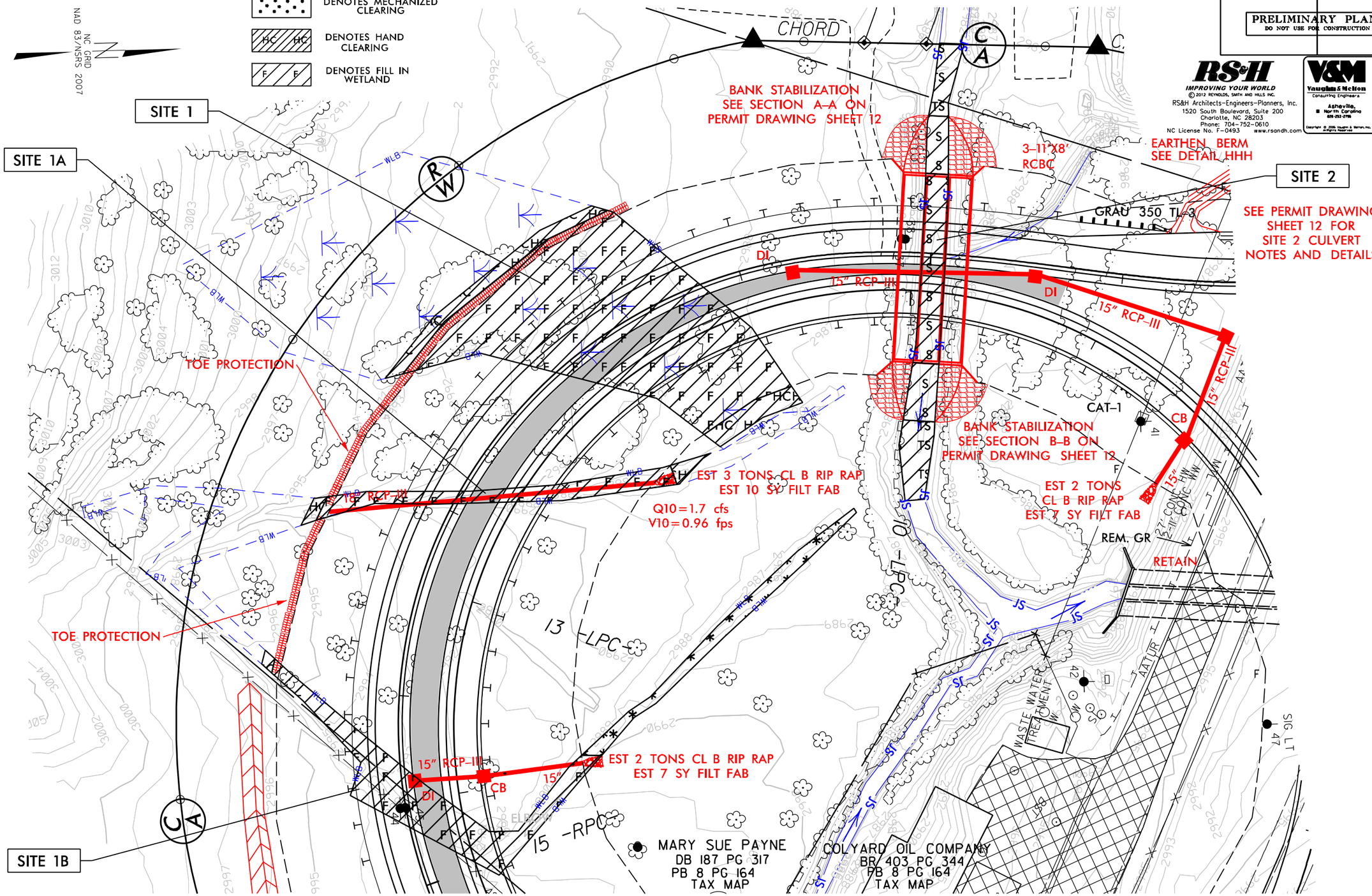
SHEET 6 OF 63

ENLARGEMENT SHEET

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
HC DENOTES HAND CLEARING
F DENOTES FILL IN WETLAND

50' 0' 50' 100' 150'
GRAPHIC SCALE

NC GRID NAD 83/NSRS 2007



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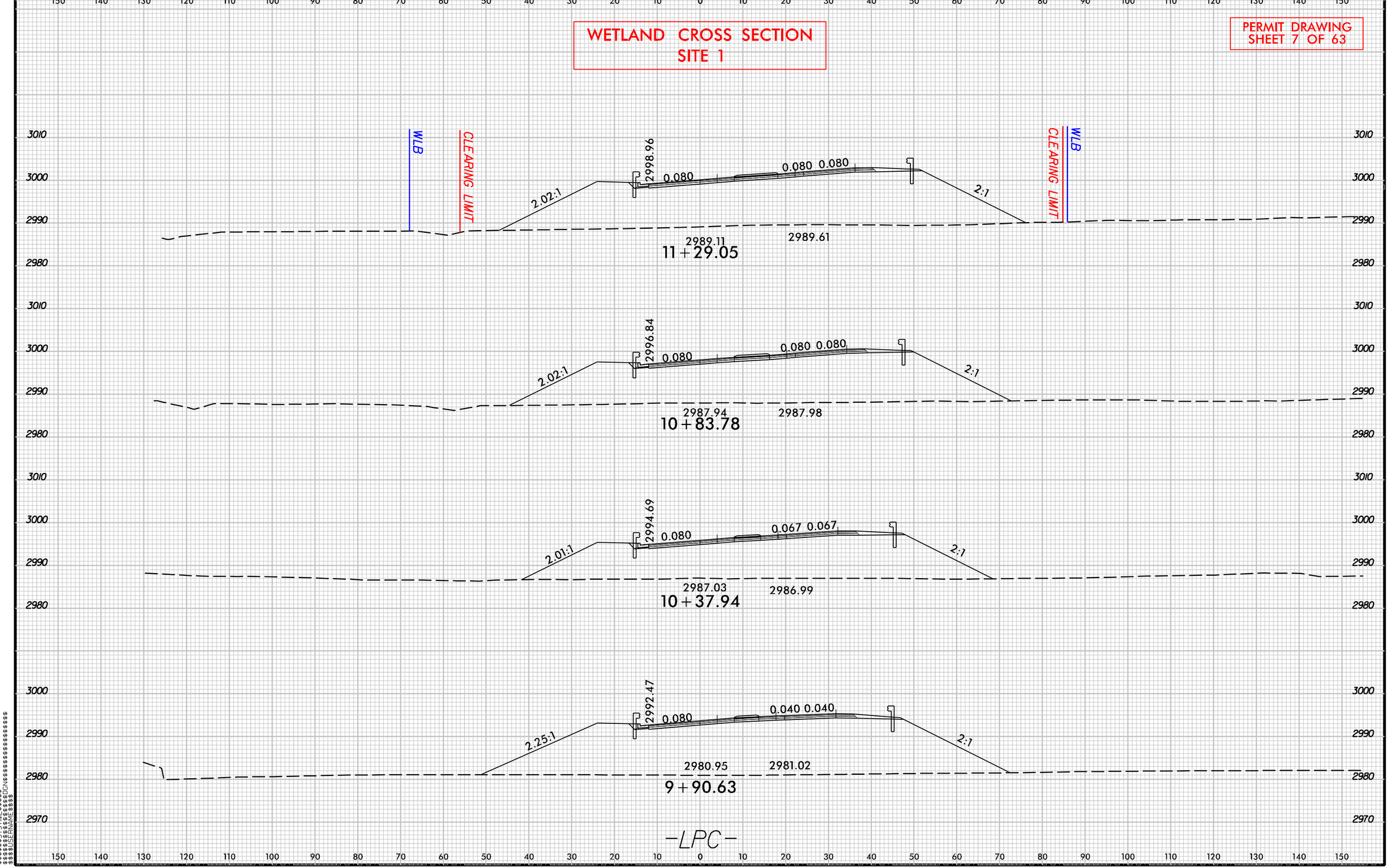
$FILE$
$DATE$

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-193

WETLAND CROSS SECTION
SITE 1

PERMIT DRAWING
SHEET 7 OF 63



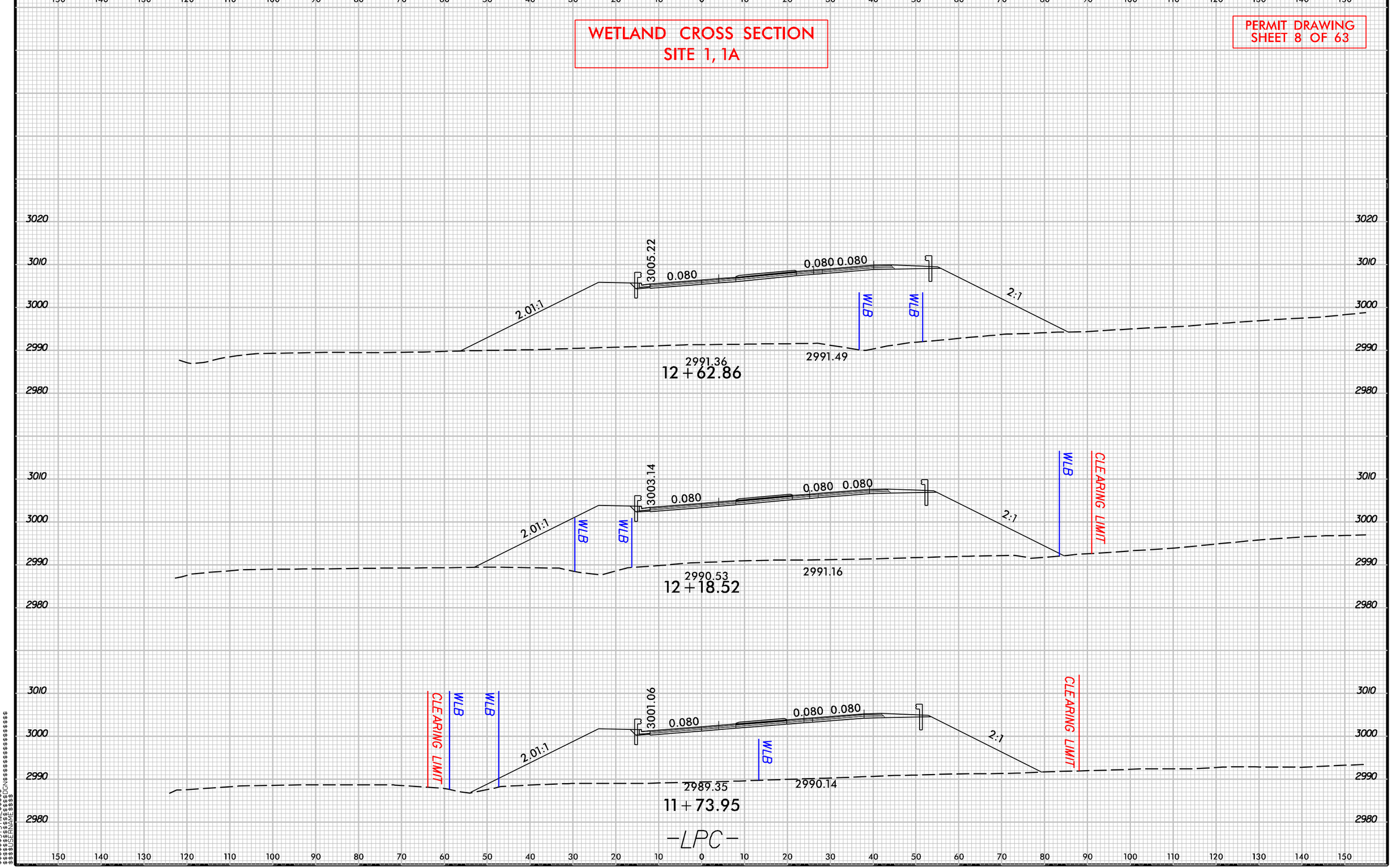
8/23/99

$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-194

WETLAND CROSS SECTION
SITE 1, 1A

PERMIT DRAWING
SHEET 8 OF 63



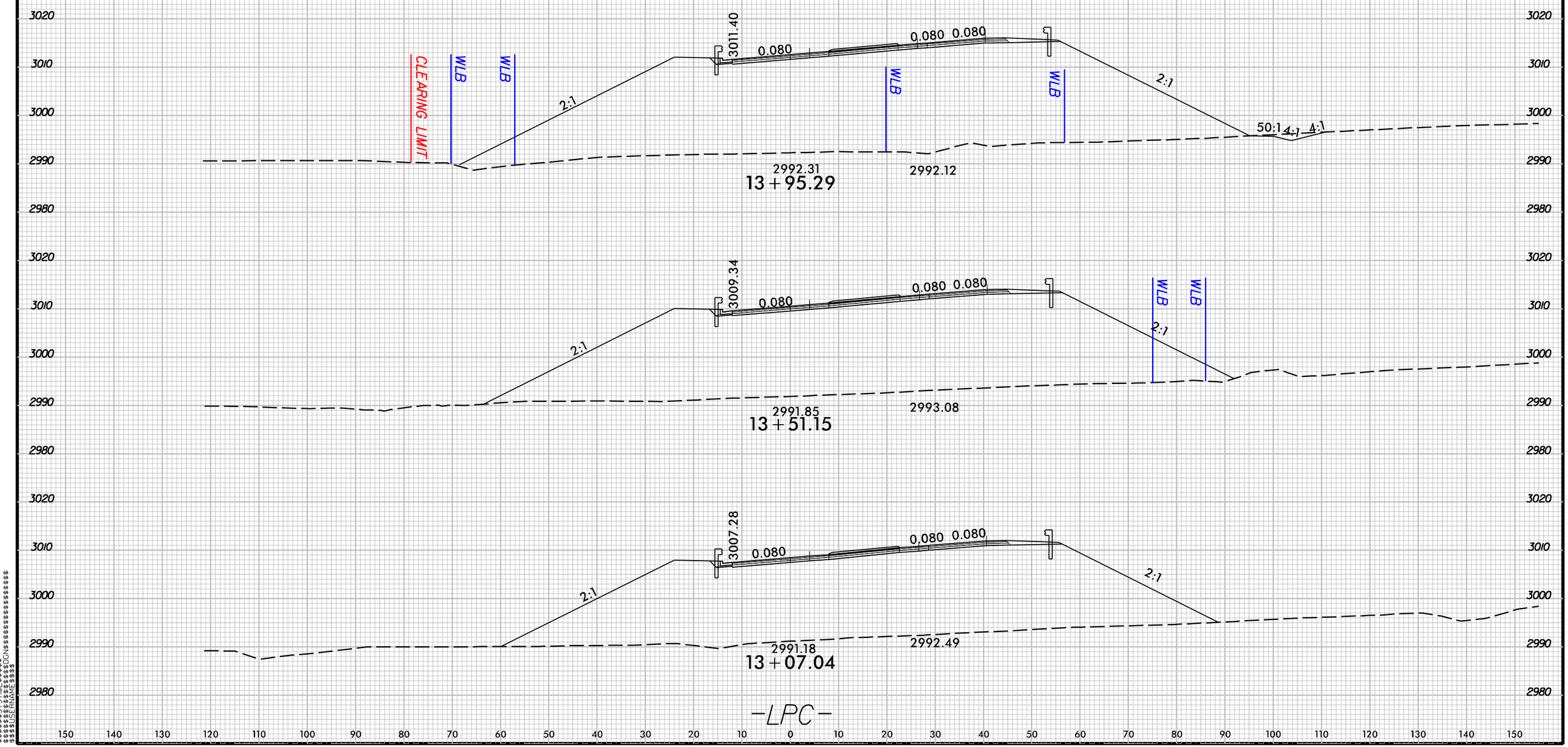
8/23/99

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-195

WETLAND CROSS SECTION
SITE 1B

PERMIT DRAWING
SHEET 9 OF 63

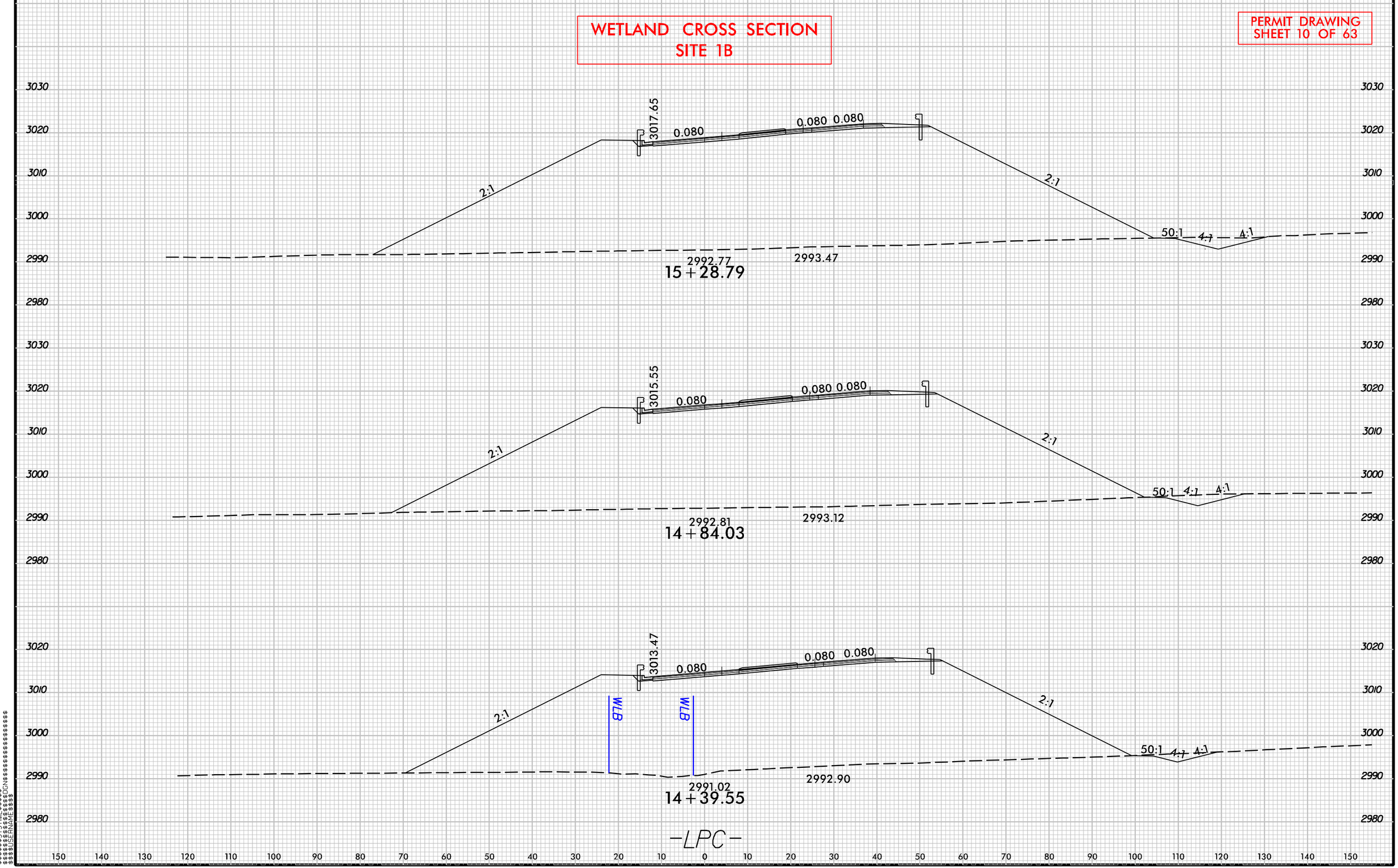


$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-196

WETLAND CROSS SECTION
SITE 1B

PERMIT DRAWING
SHEET 10 OF 63



8/23/99

$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 11 OF 63

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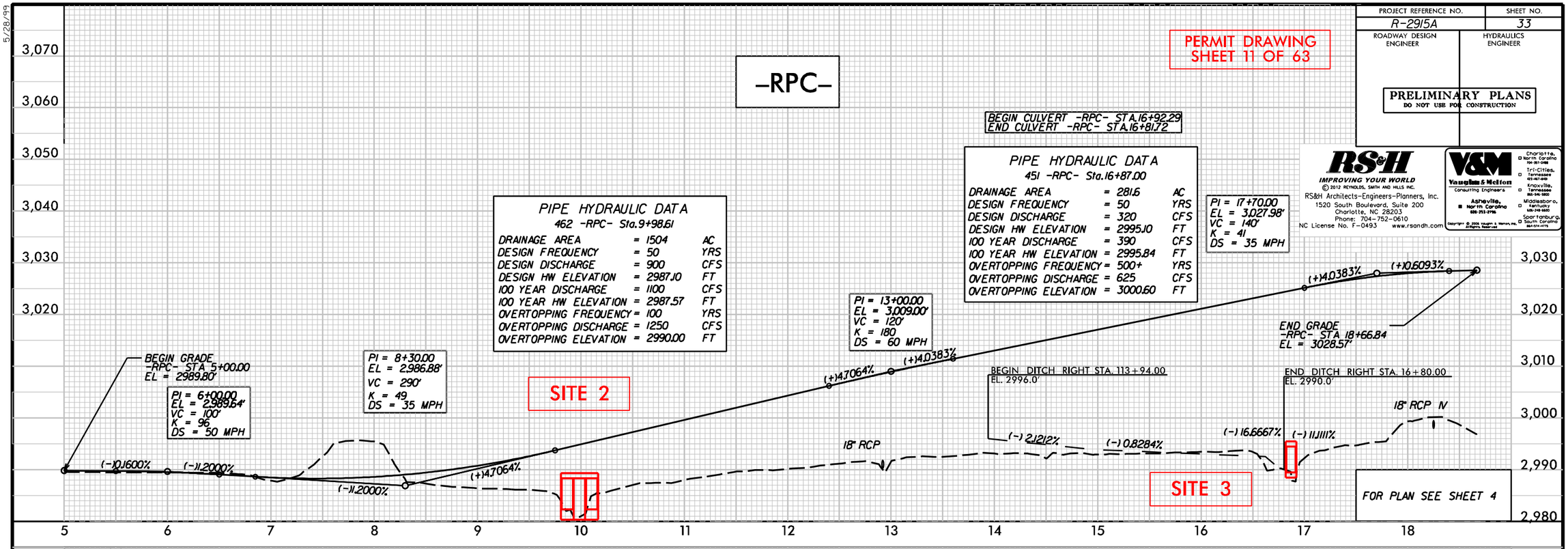


5/28/99

PERMIT DRAWING
SHEET 12 OF 63

SITE 2

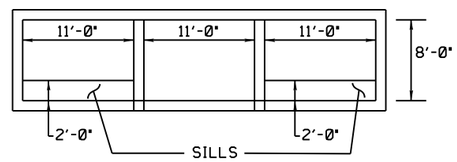
ADDITIONAL INFORMATION AND COMPUTATIONS

* * NATIVE MATERIAL AND BACKFILL SPECIFICATION

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S). IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. BACKFILL RIP RAP IN FLOODING BENCHES OF CHANNEL IMPROVEMENTS WITH NATIVE MATERIAL TO FILL VOIDS. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

NOTES: MAJORITY OF THE BANKS U/S AND D/S ARE WELL VEGETATED AND STABLE.

THIS PROJECT COMPLIES WITH LOCAL FLOODPLAIN REGULATIONS.



LOOKING DOWNSTREAM

BOX CULVERT SILL DETAIL AT INLET AND OUTLET

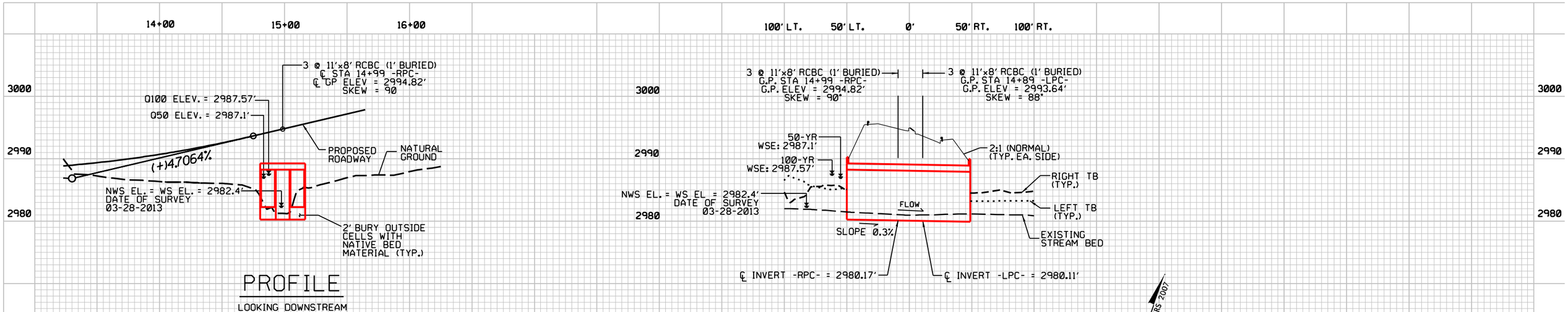
NOTES: SILLS TO BE CONSTRUCTED AT INLET AND OUTLET OF LEFT CELL AND RIGHT CELL.

SILLS TO BE 1' WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

BED MATERIAL IS COMPOSED OF SAND, GRAVEL AND BOULDERS. RETAIN NATIVE MATERIAL AND PLACE BACK IN RCBC TO BURY 1'.

BACK FILL LEFT AND RIGHT BARRELS UP TO THE FLOODPLAIN BENCH ELEVATION THAT EXISTS BOTH UPSTREAM AND DOWNSTREAM.

SEE NATIVE MATERIAL AND BACKFILL SPECIFICATION UNDER "ADDITIONAL INFORMATION AND COMPUTATIONS * *



PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

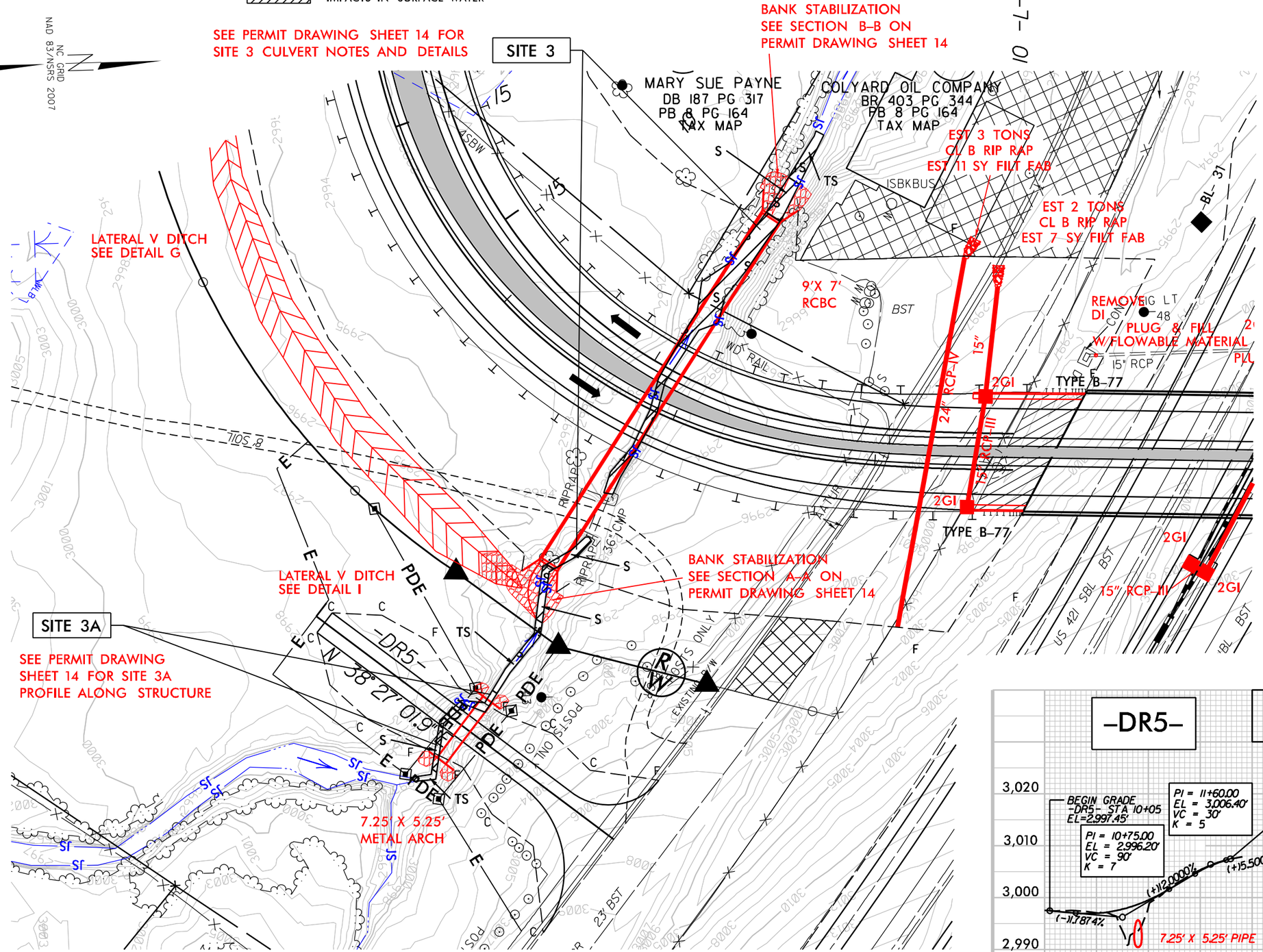
ENLARGEMENT SHEET

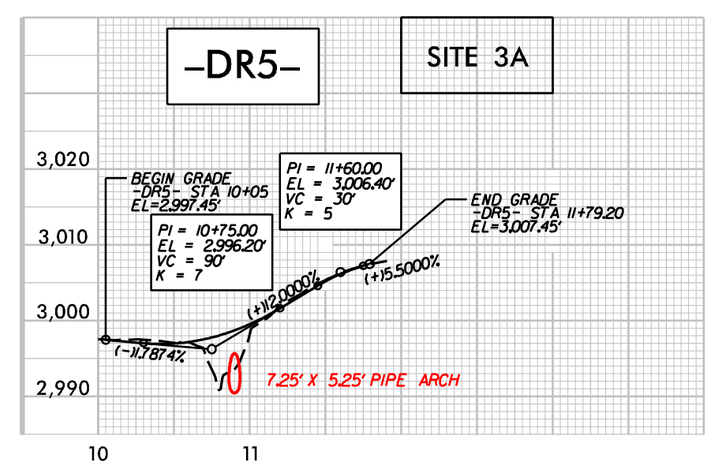
S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

PERMIT DRAWING
SHEET 13 OF 63





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$DATE$

PERMIT DRAWING
SHEET 14 OF 63

SITE 3

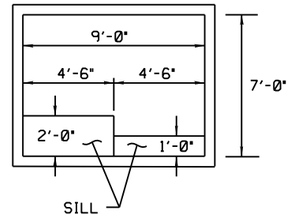
ADDITIONAL INFORMATION AND COMPUTATIONS

* * NATIVE MATERIAL AND BACKFILL SPECIFICATION

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. BACKFILL CULVERT TO LOW FLOW SILL AND BAFFLE ELEVATION WITH NATIVE MATERIAL. BACKFILL RIP RAP IN FLOODPLAIN BENCHES OF CHANNEL IMPROVEMENTS WITH NATIVE MATERIAL TO FILL VOIDS. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

NOTES: BED MATERIAL IS COMPOSED OF SAND, GRAVEL AND BOULDERS. RETAIN AND PLACE BACK IN RCBC TO CONSTRUCT LOW FLOW CHANNEL.

MAJORITY OF THE BANKS U/S AND D/S ARE WELL VEGETATED AND STABLE.



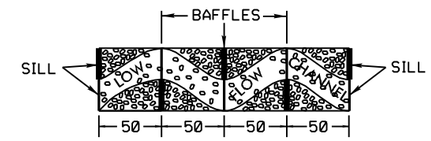
BOX CULVERT SILL DETAIL AT INLET AND OUTLET
LOOKING DOWNSTREAM

NOTES: 2' SILLS/BAFFLES TO BE CONSTRUCTED IN CELL AS SHOWN IN PLAN, BELOW.

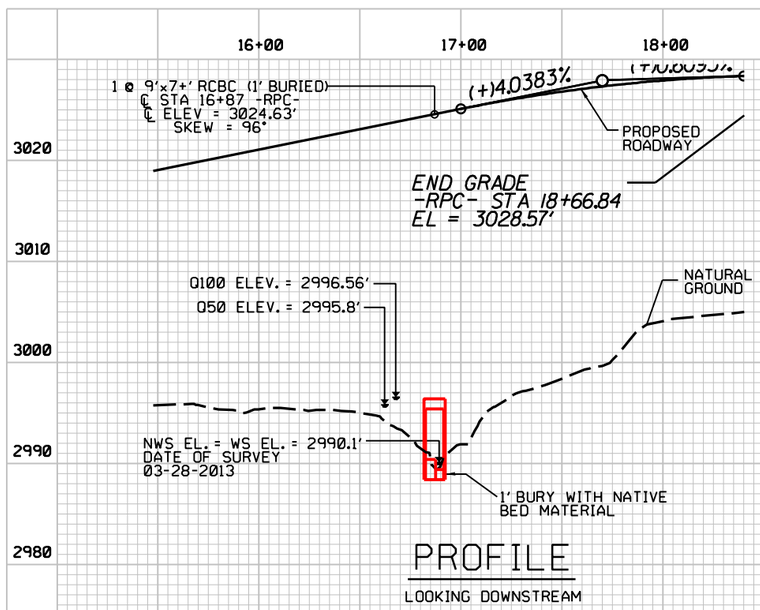
1' SILLS/BAFFLES TO BE CONSTRUCTED IN CELL AS SHOWN IN PLAN, BELOW.

SILLS/BAFFLES TO BE 1' WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

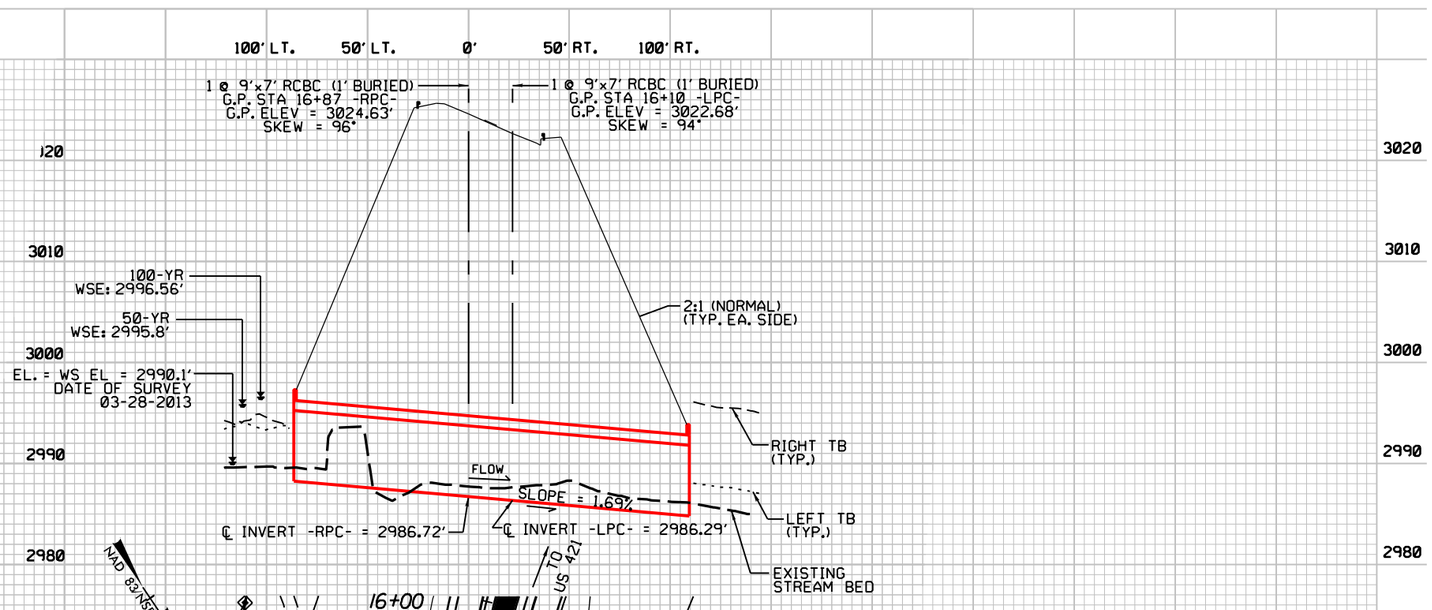
SEE NATIVE MATERIAL AND BACK FILL SPECIFICATION UNDER "ADDITIONAL INFORMATION AND COMPUTATIONS". * *

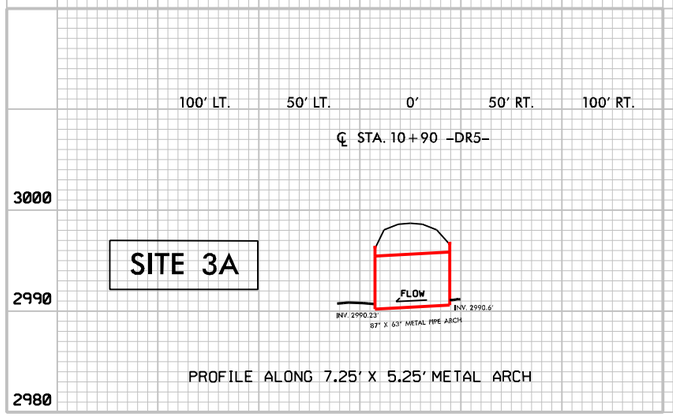


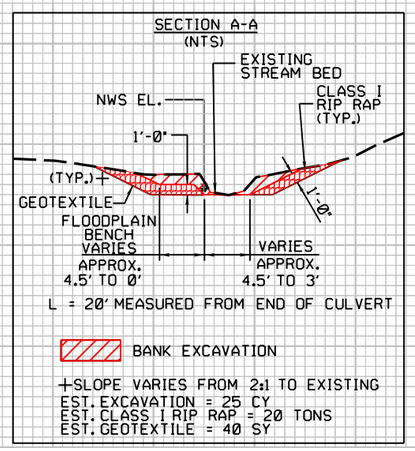
PLAN VIEW

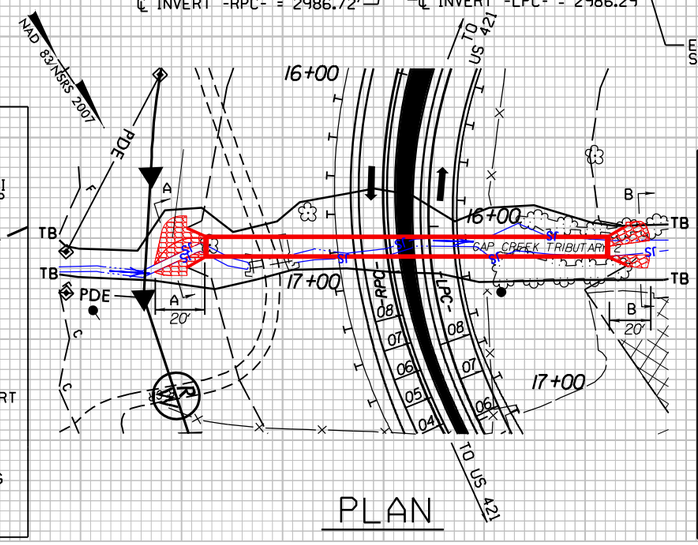


PROFILE
LOOKING DOWNSTREAM

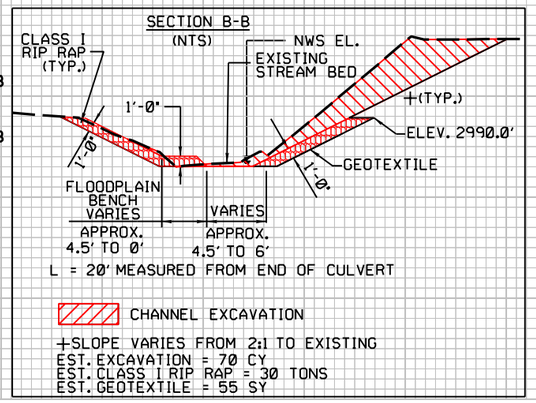








PLAN



PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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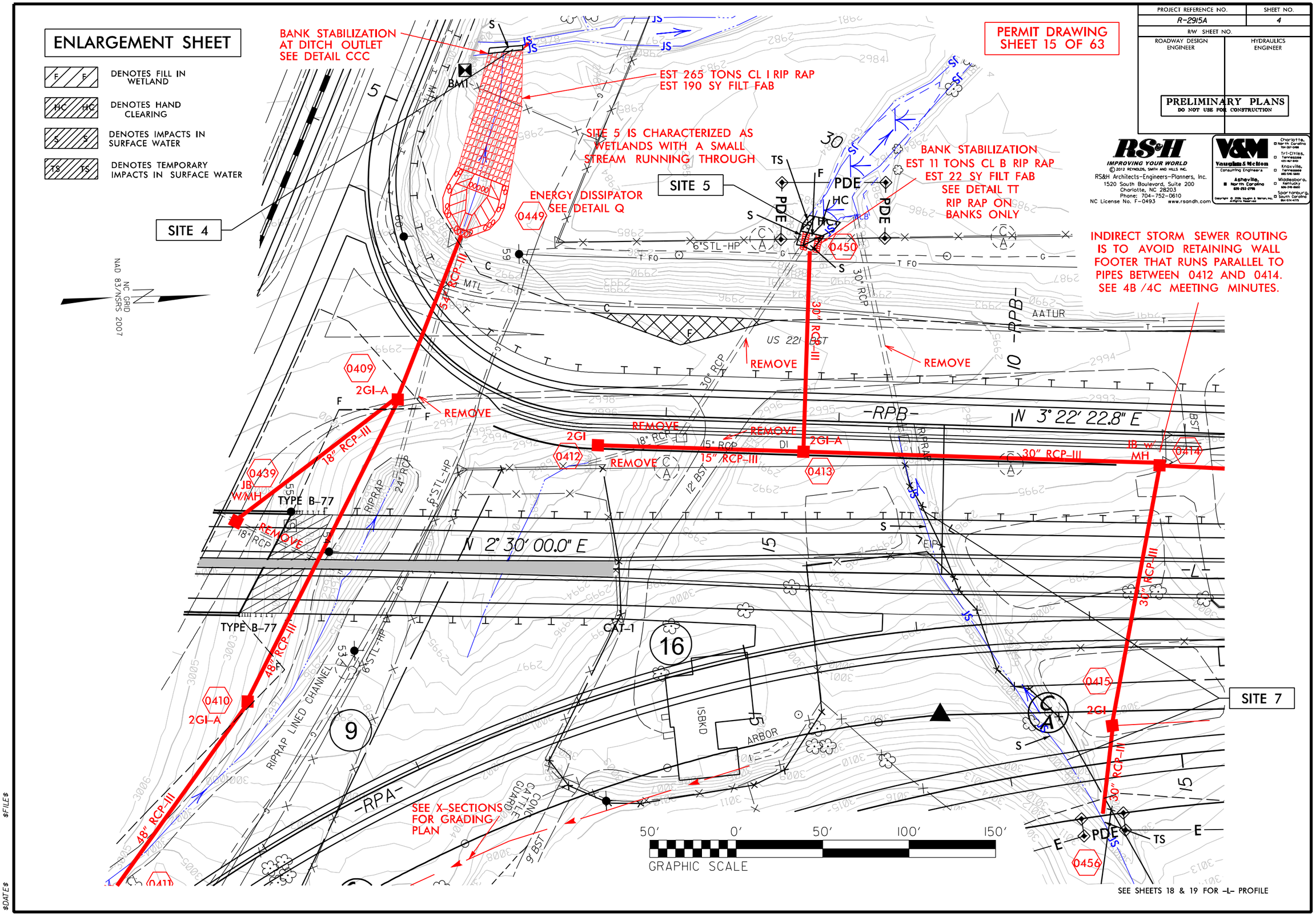
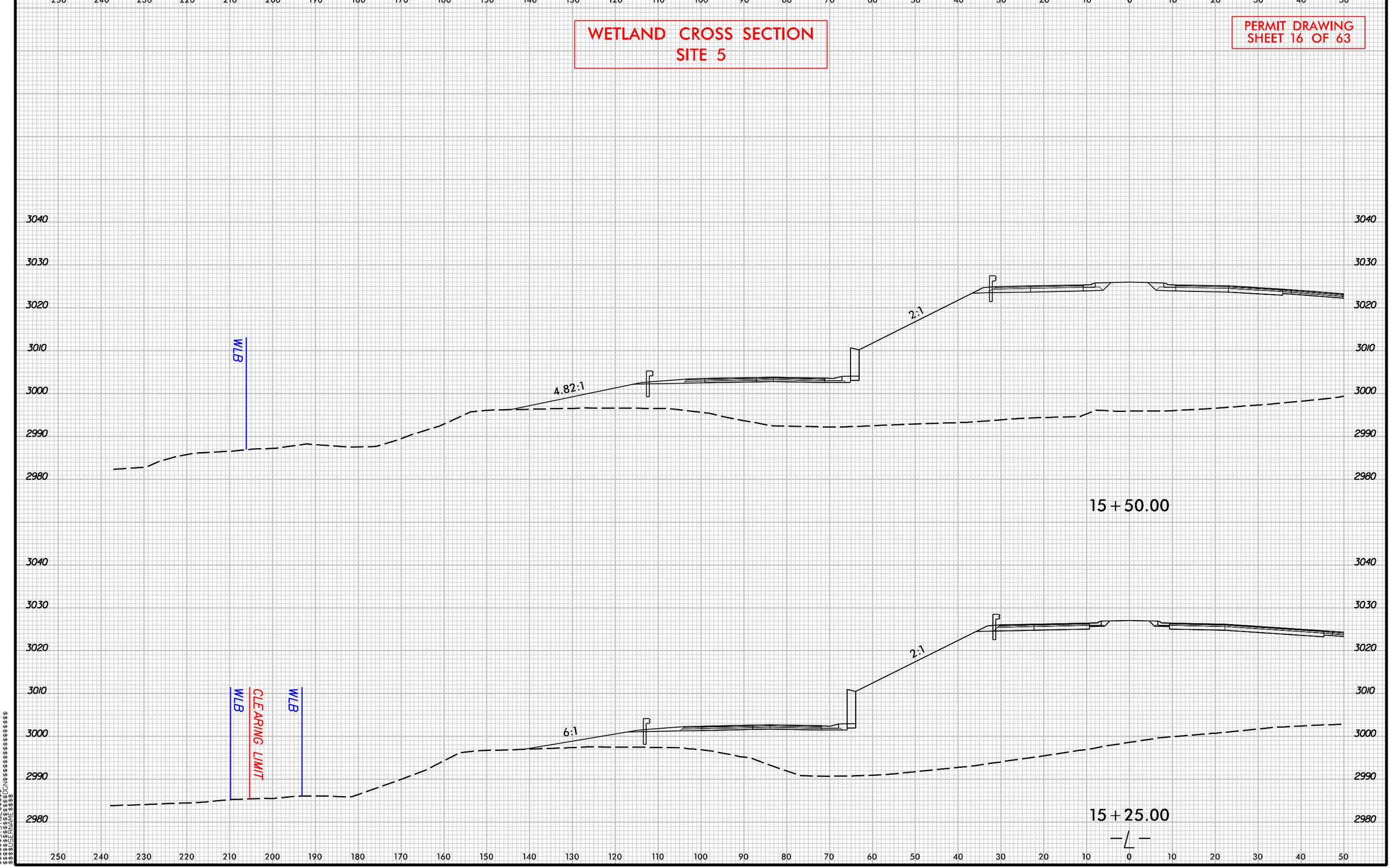


0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	X-6

WETLAND CROSS SECTION
SITE 5

PERMIT DRAWING
SHEET 16 OF 63



8/23/99

$$$$$$$SYSTIME$$$$$
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$$$$$$USERNAME$$$$

ENLARGEMENT SHEET

DENOTES IMPACTS IN SURFACE WATER

50' 0' 50' 100' 150'
GRAPHIC SCALE

PERMIT DRAWING
SHEET 17 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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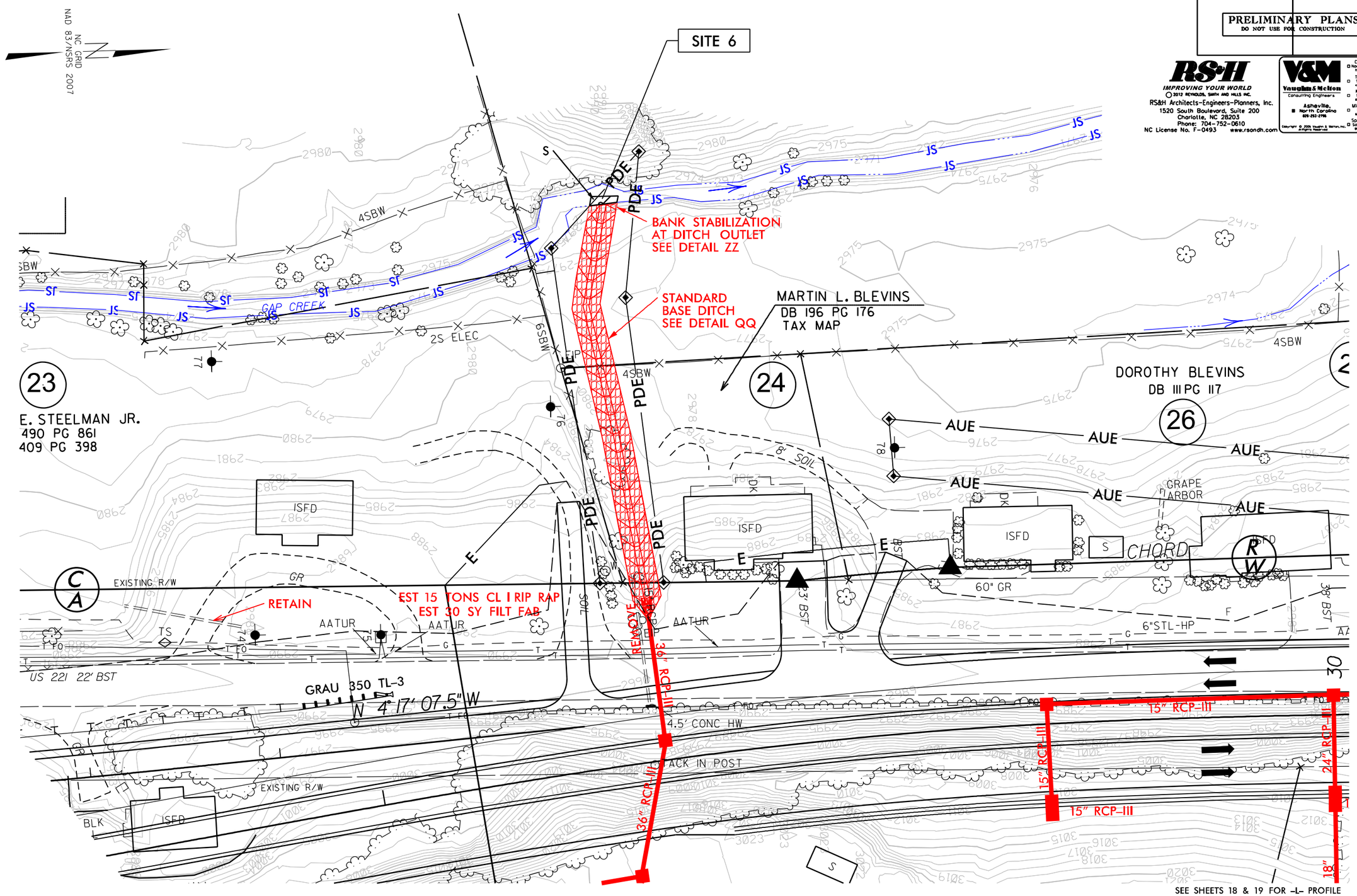

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R-2915A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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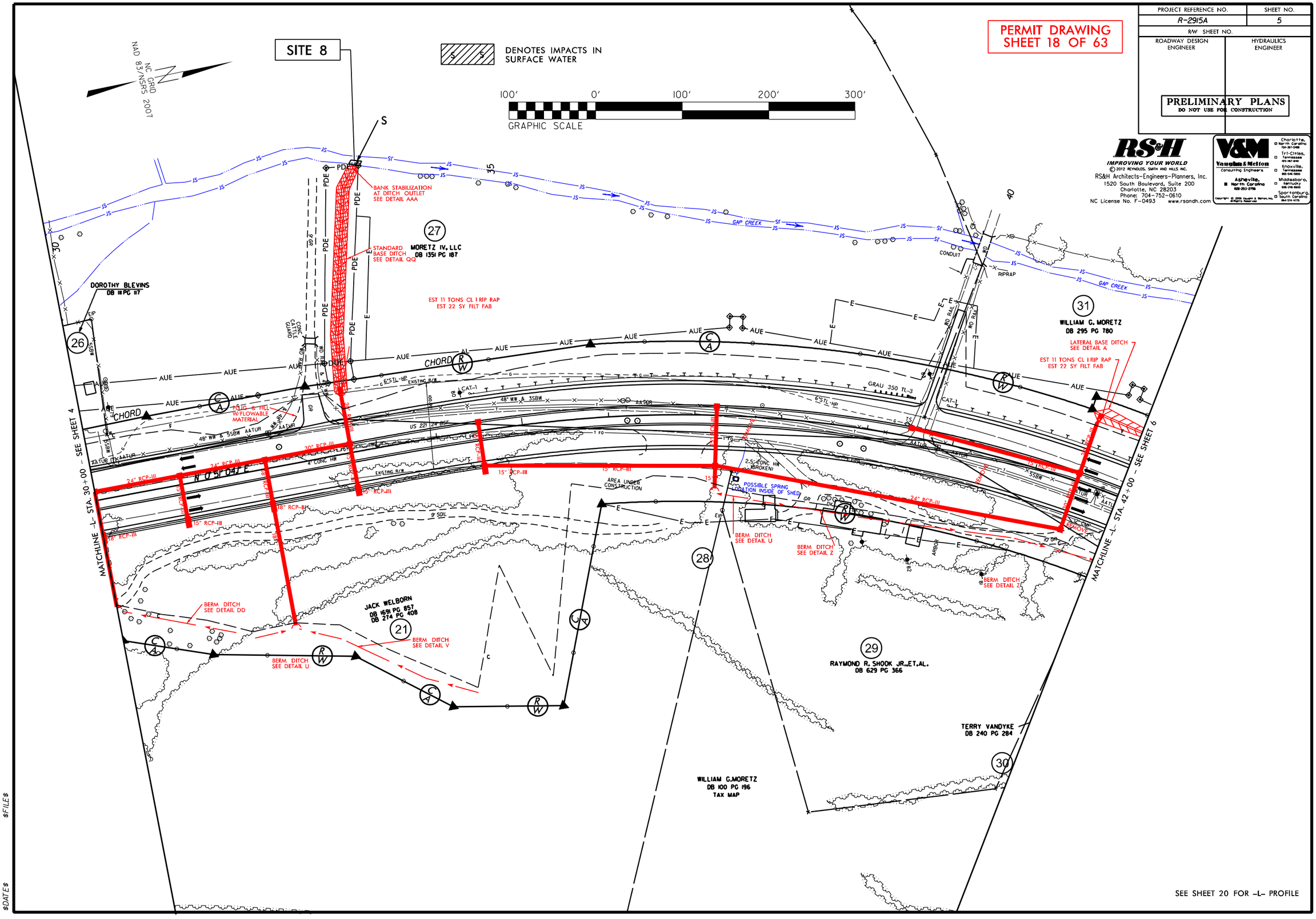
SHEET 18 OF 63



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R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 19 OF 63

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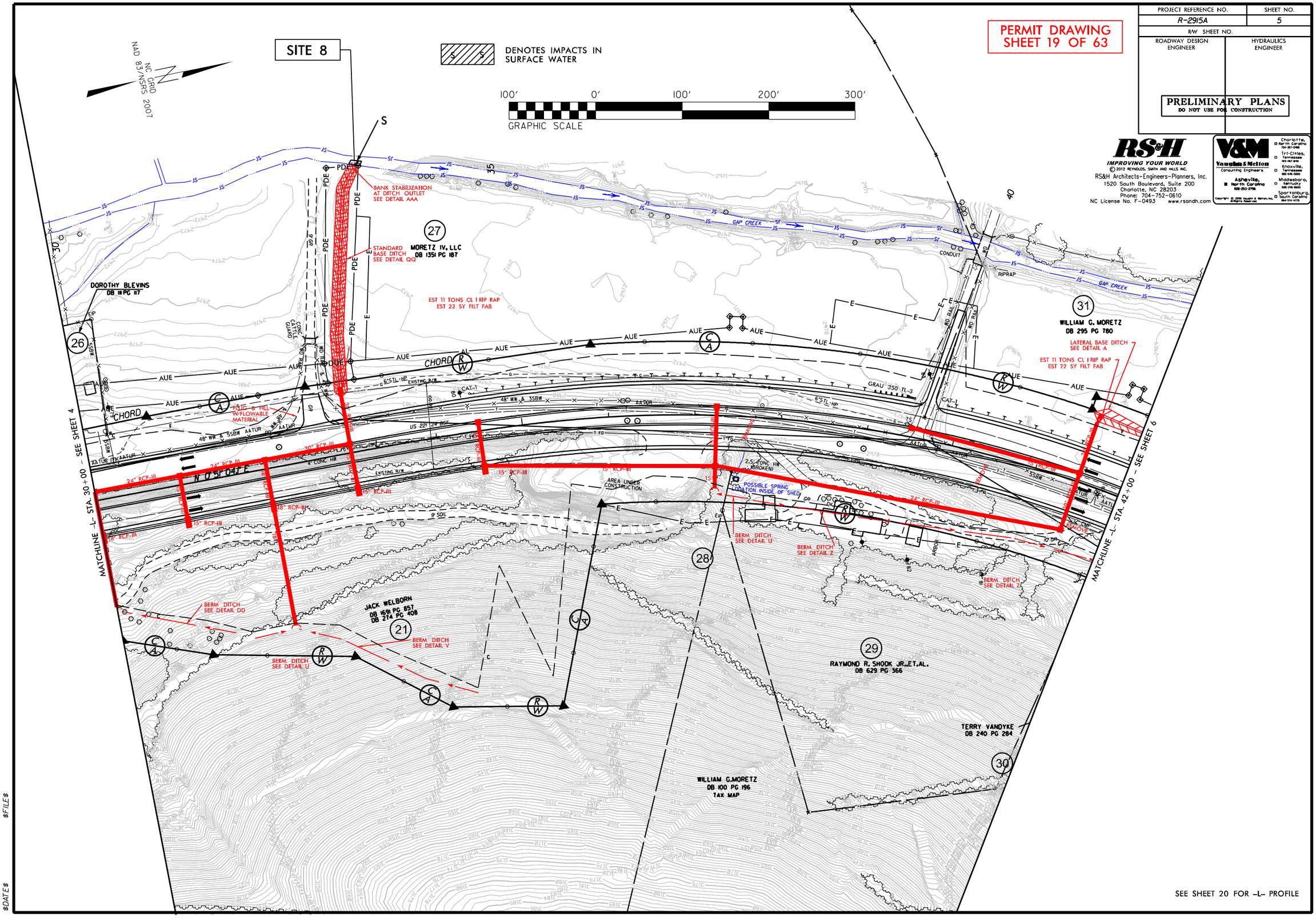

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ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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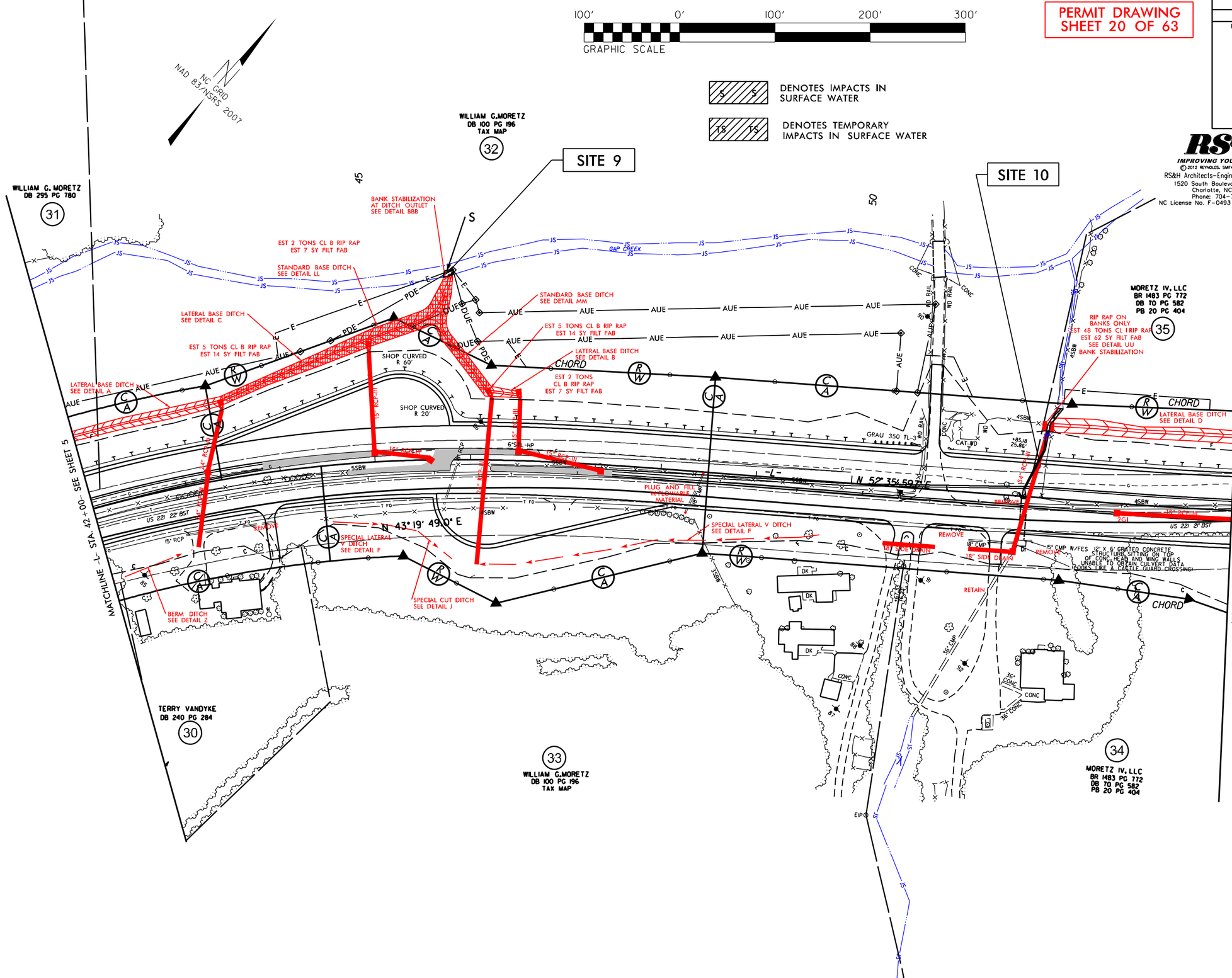


SEE SHEET 21 FOR -L- PROFILE

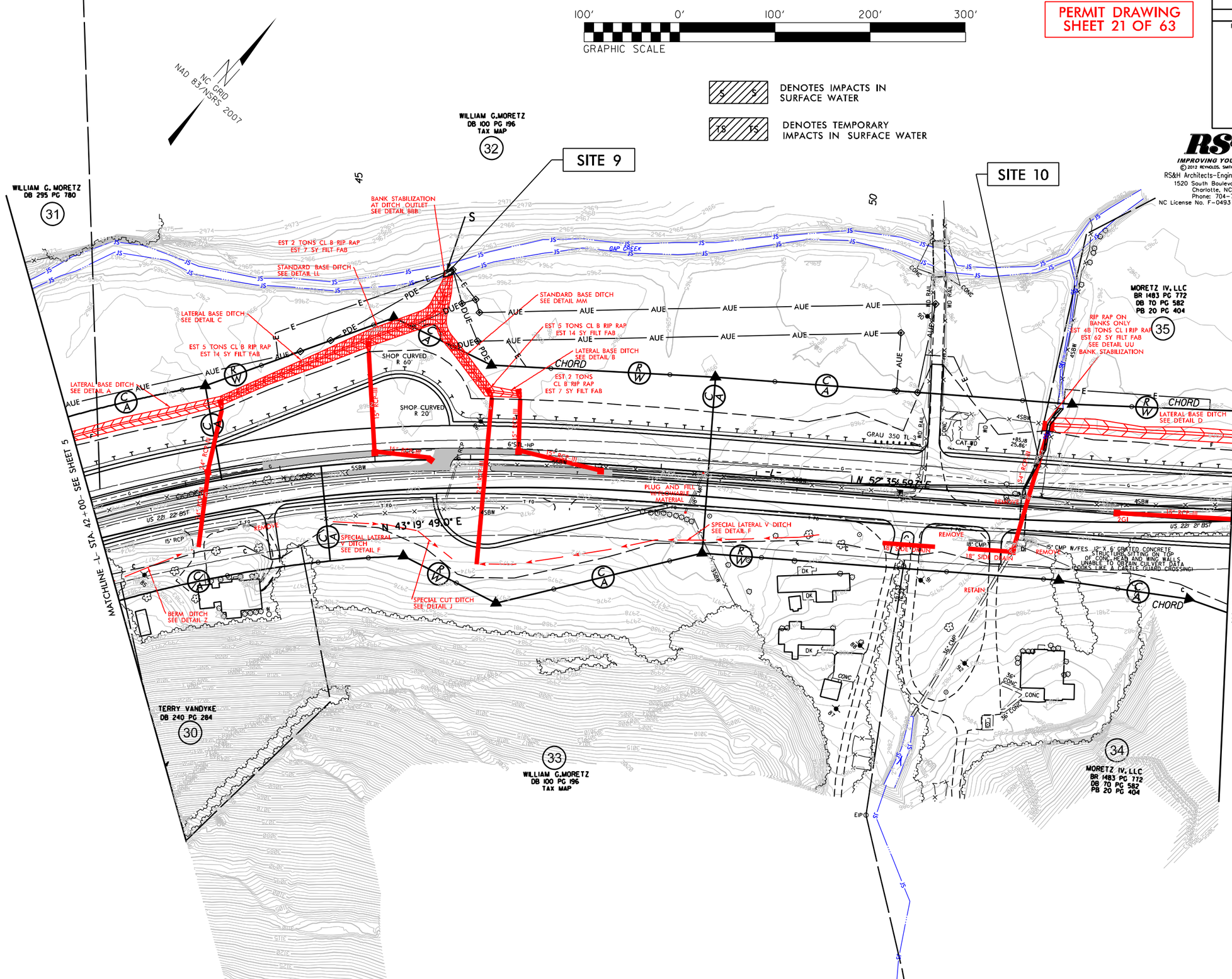
$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 21 OF 63



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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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PERMIT DRAWING
SHEET 22 OF 63

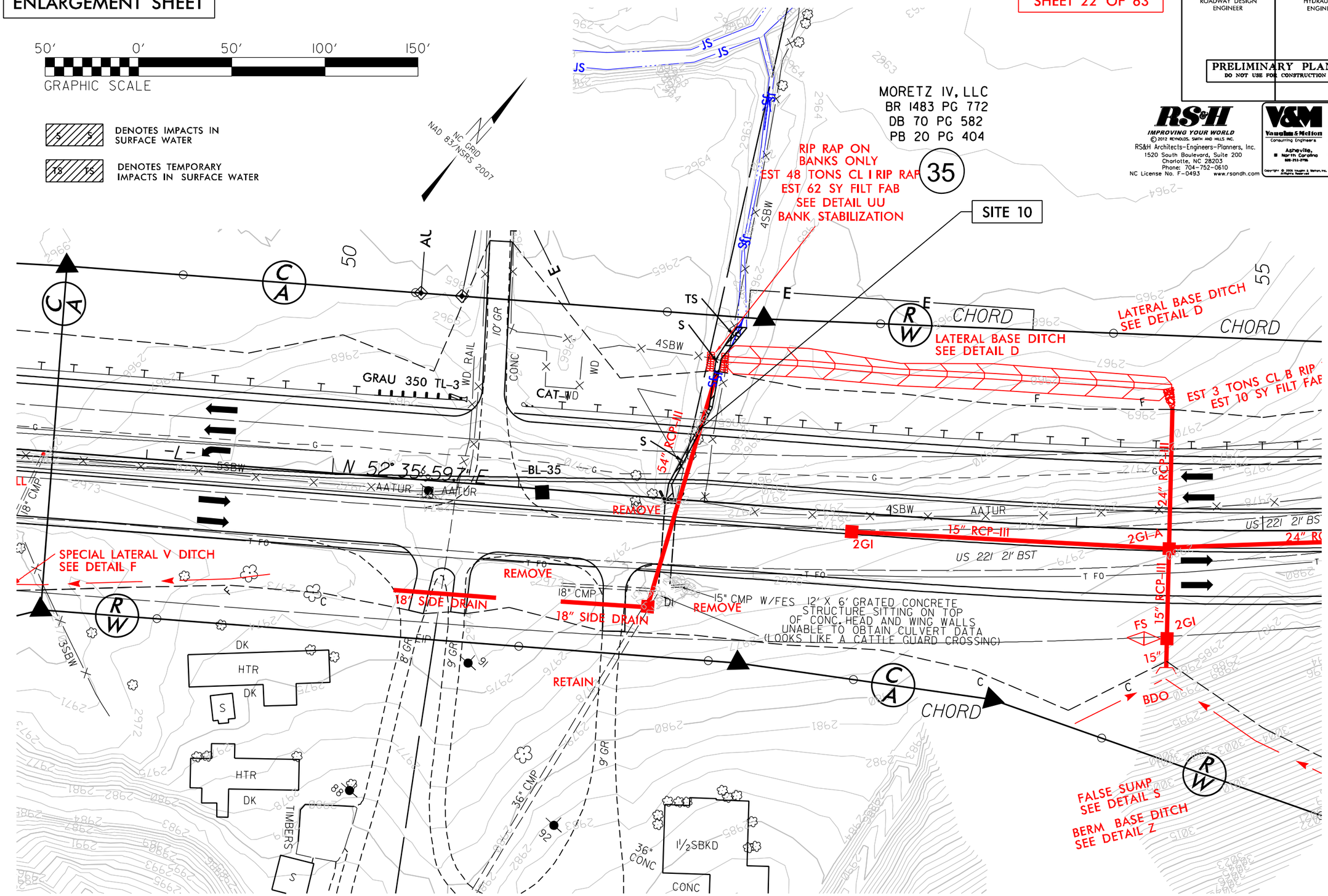
ENLARGEMENT SHEET

50' 0' 50' 100' 150'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID
NAD 83/NSRS 2007



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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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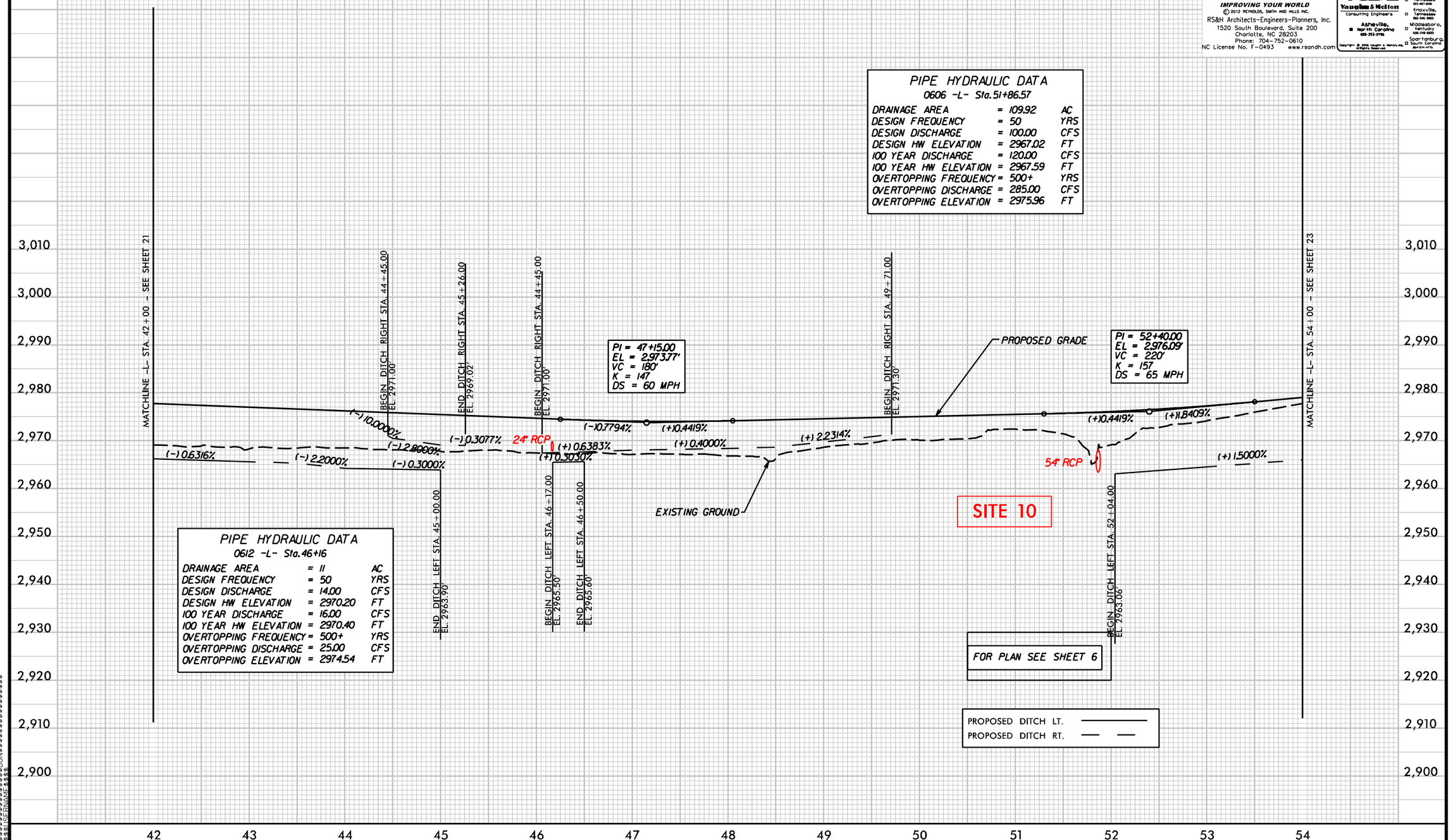

PIPE HYDRAULIC DATA
0606 -L- Sta.51+86.57

DRAINAGE AREA	=	109.92	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	100.00	CFS
DESIGN HW ELEVATION	=	2967.02	FT
100 YEAR DISCHARGE	=	120.00	CFS
100 YEAR HW ELEVATION	=	2967.59	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	285.00	CFS
OVERTOPPING ELEVATION	=	2975.96	FT

PIPE HYDRAULIC DATA
0612 -L- Sta.46+16

DRAINAGE AREA	=	11	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	14.00	CFS
DESIGN HW ELEVATION	=	2970.20	FT
100 YEAR DISCHARGE	=	16.00	CFS
100 YEAR HW ELEVATION	=	2970.40	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	25.00	CFS
OVERTOPPING ELEVATION	=	2974.54	FT

$$$$$$$SYSTIME$$$$$
$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$$FENAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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GRAPHIC SCALE 100′ 0′ 100′ 200′ 300′

NAD 83/NSRS 2007 NC GRID

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 11

MATCHLINE -L- STA. 54+00 SEE SHEET 6

MATCHLINE -L- STA. 67+00 SEE SHEET 8

MORETZ IV, LLC
BR 1483 PG 772
DB 70 PG 582
PB 20 PG 404
35

JACK WELLBORN, CARL CHEEK, COY HOLLAR
TRUSTEES OF GAP CREEK BAPTIST CHURCH
DB 31 PG 563
36

AURELIA S. LEONARD
DB 235 PG 302
37

MAURICE J. YATES
DB 401 PG 552
(WATAUGA R.O.D.)
DB 218 PG 196
(ASHE R.O.D.)
40

RALPH WILLIAM DAVIS
DB 574 PG 28
39

BONITA C. STEWART
DB 686 PG 502
PB 16 PG 81
38

MORETZ IV, LLC
BR 1483 PG 772
DB 70 PG 582
PB 20 PG 404
34

EST 2 TONS CL B RIP RAP
EST 7 SY FILT FAB
CUT /FILL TRANSITION

LATERAL BASE DITCH
SEE DETAIL D

EST 3 TONS CL B RIP RAP
EST 10 SY FILT FAB

SPECIAL CUT DITCH
SEE DETAIL L

15" SIDE DRAIN

EST 3 TONS CL B RIP RAP
EST 10 SY FILT FAB

SPECIAL CUT DITCH
SEE DETAIL J

FALSE SUMP
SEE DETAIL X

FALSE SUMP
SEE DETAIL S

BERM BASE DITCH
SEE DETAIL Z

BERM BASE DITCH
SEE DETAIL V

BERM BASE DITCH
SEE DETAIL DD

BERM BASE DITCH
SEE DETAIL CC

BERM BASE DITCH
SEE DETAIL CC

BERM BASE DITCH
SEE DETAIL CC

EST 5 TONS
CL I RIP RAP
EST 160 SY FILT FAB

REMOVE EX. BOX CULVERT

2-9'X6' ACBC

SPECIAL CUT DITCH
SEE DETAIL J

EST 90 TONS
CL I RIP RAP
EST 115 SY FILT FAB

3'x2' CONC HW

CHORD

US 221 22' BST

GRAU 350 TL-3

WD RAIL

SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 31 FOR -Y2- PROFILE

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 25 OF 63

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Middlesboro, Kentucky 606-248-1600
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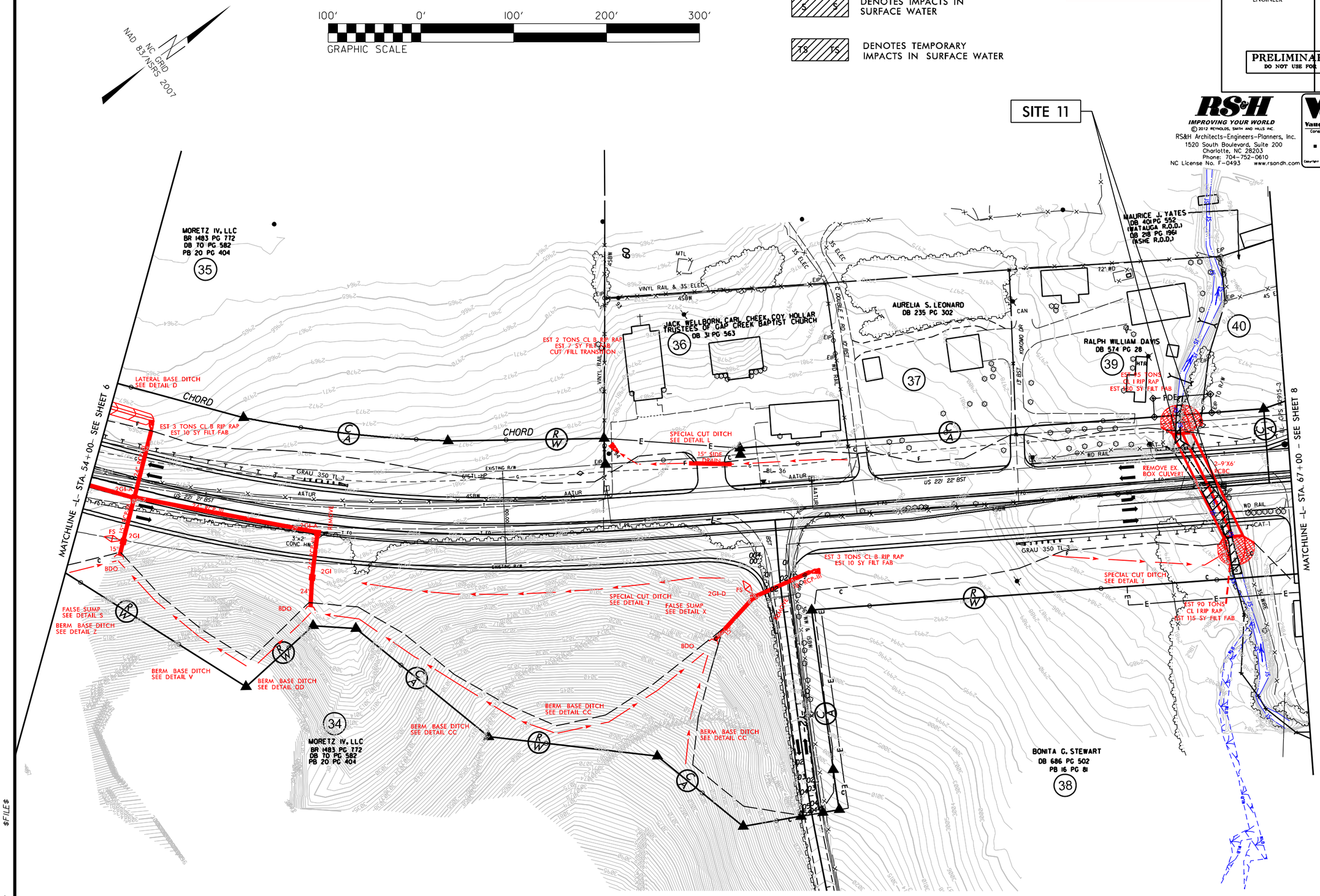

SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 31 FOR -Y2- PROFILE

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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PERMIT DRAWING
SHEET 26 OF 63

ENLARGEMENT SHEET

50' 0' 50' 100' 150'
GRAPHIC SCALE

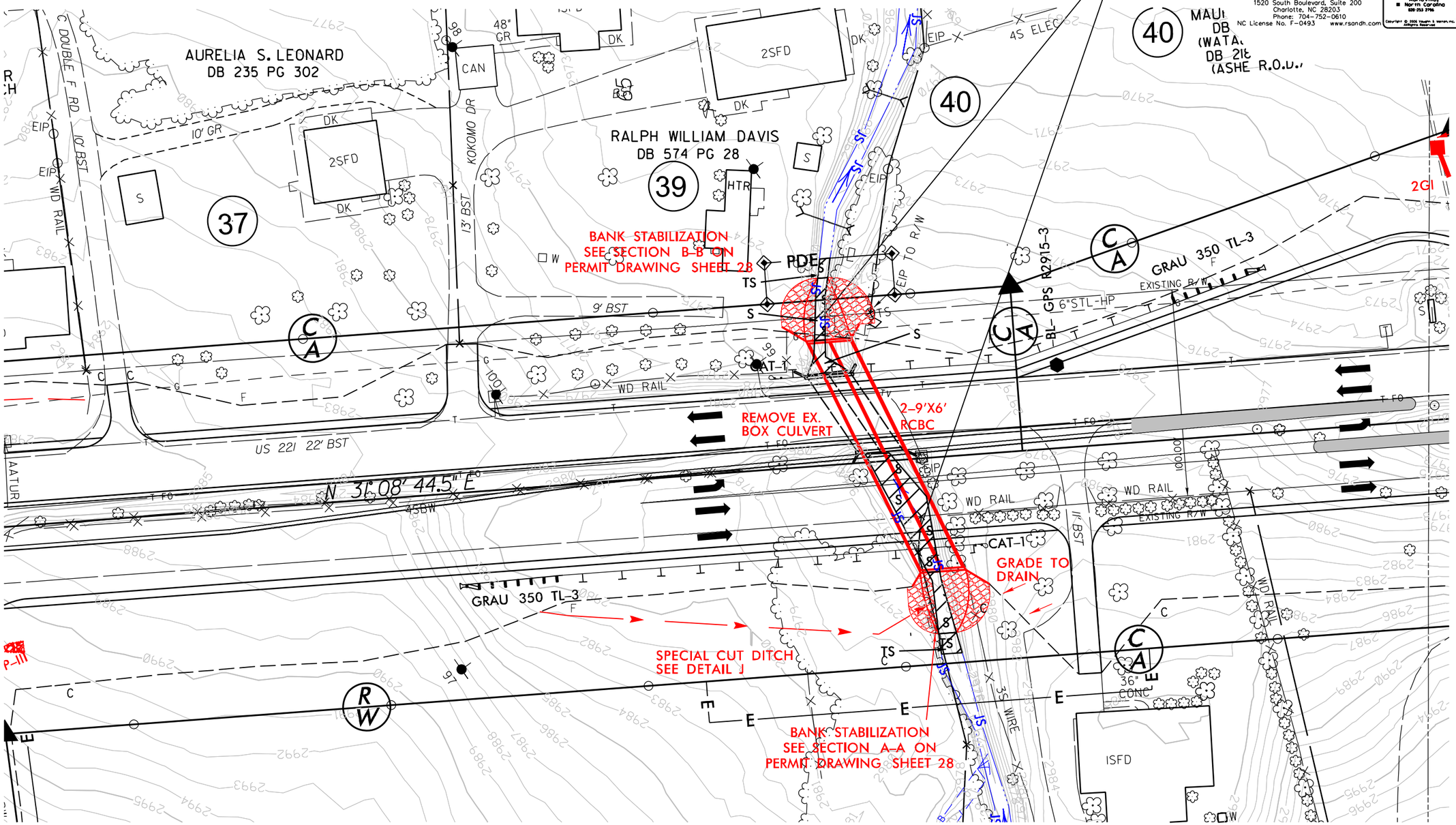
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID
NAD 83/NSRS 2007

SITE 11

SEE PERMIT DRAWING SHEET 28 FOR SITE 11 CULVERT NOTES AND DETAILS



SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 31 FOR -Y2- PROFILE

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–L–

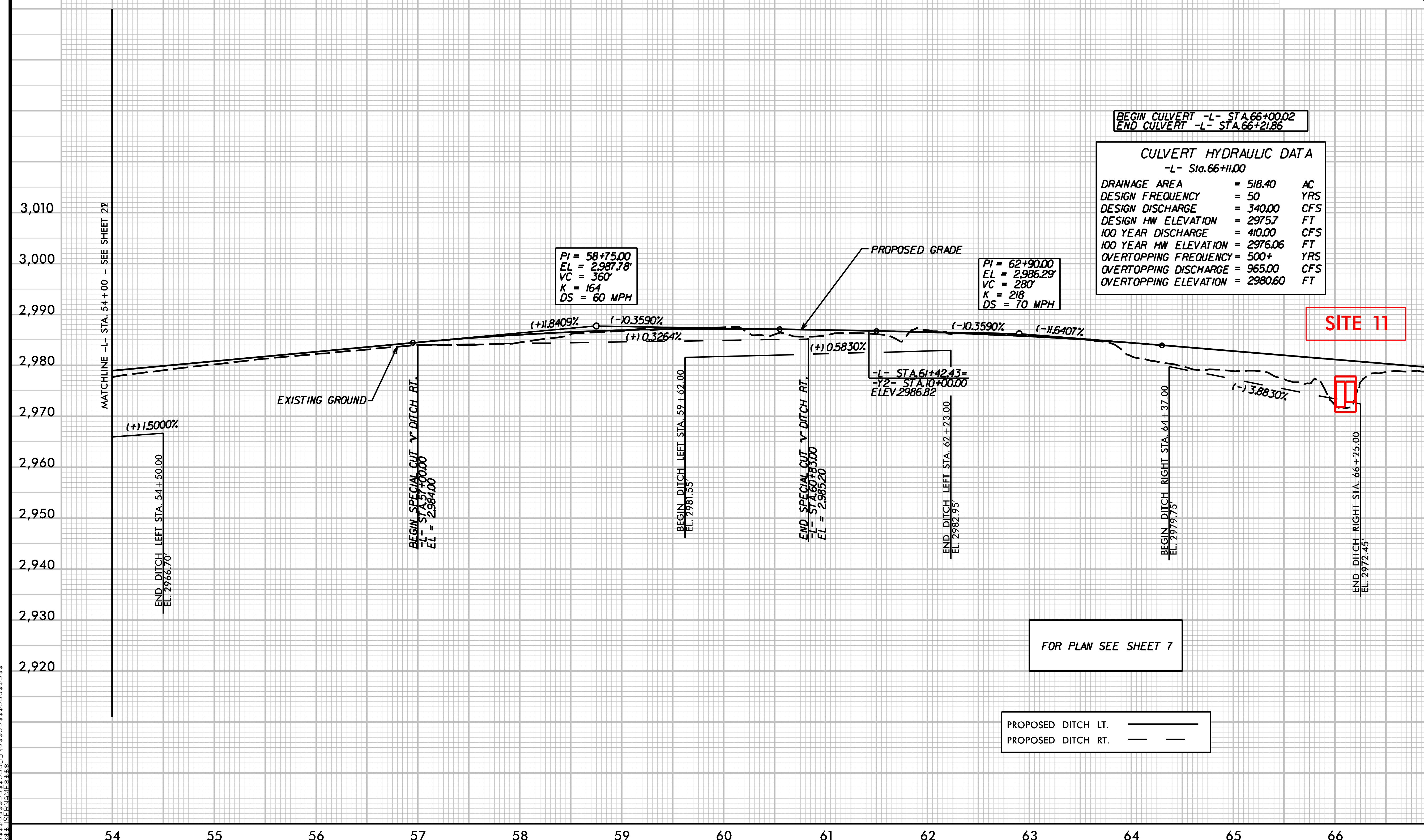
BEGIN CULVERT –L– STA.66+00.02
END CULVERT –L– STA.66+21.86

CULVERT HYDRAULIC DATA

–L– Sta.66+11.00

DRAINAGE AREA	=	518.40	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	340.00	CFS
DESIGN HW ELEVATION	=	2975.7	FT
100 YEAR DISCHARGE	=	410.00	CFS
100 YEAR HW ELEVATION	=	2976.06	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	965.00	CFS
OVERTOPPING ELEVATION	=	2980.60	FT

SITE 11



FOR PLAN SEE SHEET 7

PROPOSED DITCH LT.	———
PROPOSED DITCH RT.	— —

5/14/99

$$$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PERMIT DRAWING
SHEET 28 OF 63

SITE 11

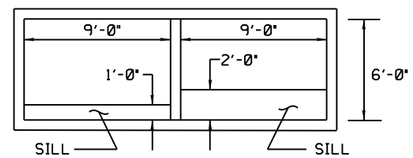
ADDITIONAL INFORMATION AND COMPUTATIONS

* * NATIVE MATERIAL AND BACKFILL SPECIFICATION

NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE STREAM BED OR FLOODPLAIN AT THE PROJECT SITE DURING CULVERT CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S). IF RIP RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. BACKFILL RIP RAP IN FLOODPLAIN BENCHES OF CHANNEL IMPROVEMENTS WITH NATIVE MATERIAL TO FILL VOIDS. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

NOTES: BED MATERIAL IS COMPOSED OF SAND, GRAVEL AND BOULDERS. RETAIN AND PLACE BACK IN RCBC TO BURY 1'.

MAJORITY OF THE BANKS U/S AND D/S ARE WELL VEGETATED AND STABLE.



BOX CULVERT SILL DETAIL AT INLET AND OUTLET

LOOKING DOWNSTREAM

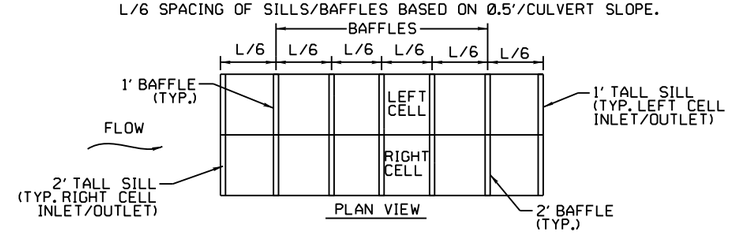
NOTES: 2' SILLS/BAFFLES TO BE CONSTRUCTED IN RIGHT CELL AS SHOWN IN PLAN.

1' SILLS/BAFFLES TO BE CONSTRUCTED IN LEFT CELL AS SHOWN IN PLAN.

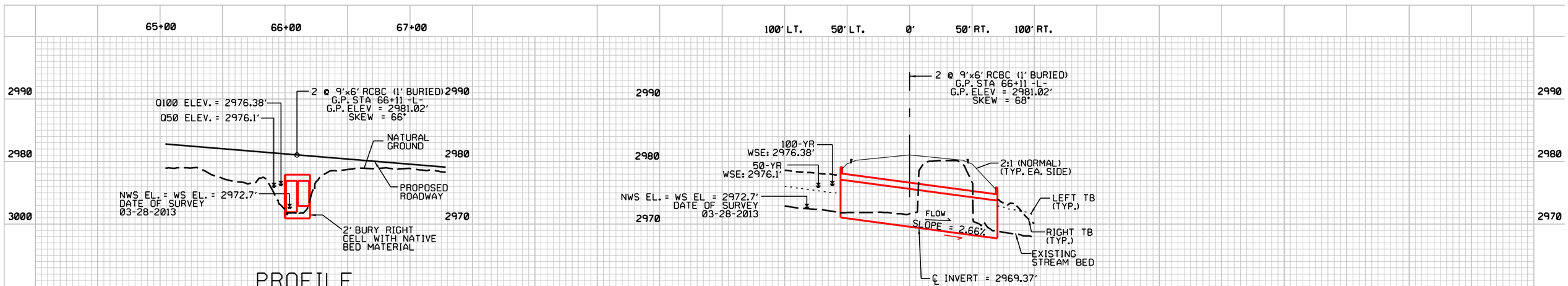
SILLS/BAFFLES TO BE 1' WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

SEE NATIVE MATERIAL AND BACK FILL SPECIFICATION UNDER "ADDITIONAL INFORMATION AND COMPUTATIONS". * *

L/6 SPACING OF SILLS/BAFFLES BASED ON 0.5'/CULVERT SLOPE.

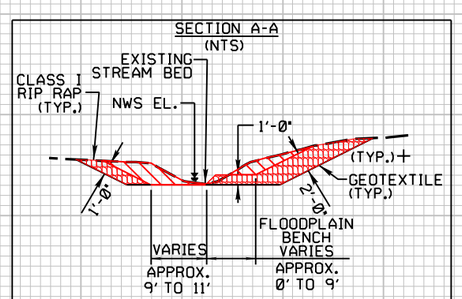


PLAN VIEW



PROFILE

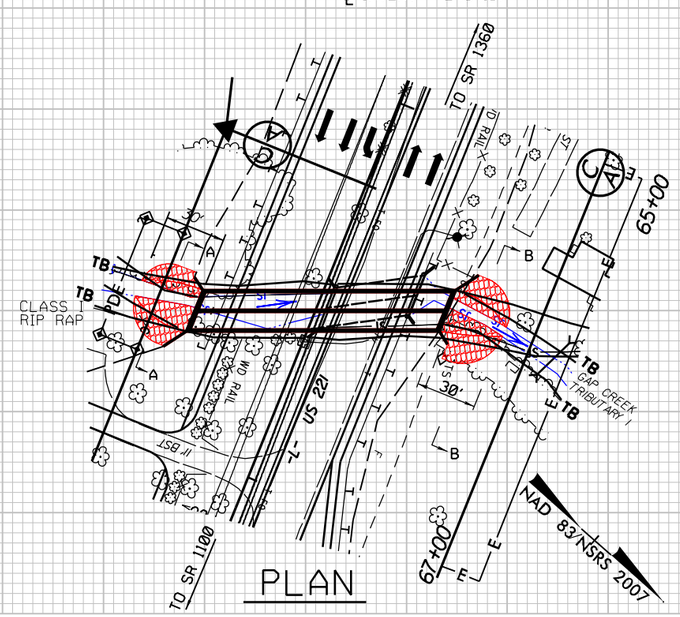
LOOKING DOWNSTREAM



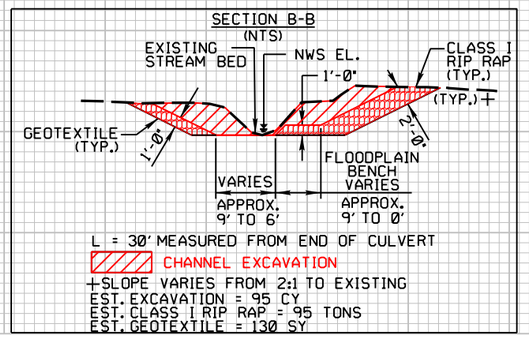
L = 30' MEASURED FROM END OF CULVERT

BANK EXCAVATION

+SLOPE VARIES FROM 2:1 TO EXISTING
EST. EXCAVATION = 97 CY
EST. CLASS I RIP RAP = 90 TONS
EST. GEOTEXTILE = 115 SY



PLAN



L = 30' MEASURED FROM END OF CULVERT

CHANNEL EXCAVATION

+SLOPE VARIES FROM 2:1 TO EXISTING
EST. EXCAVATION = 95 CY
EST. CLASS I RIP RAP = 95 TONS
EST. GEOTEXTILE = 130 SY

PERMIT DRAWING
SHEET 29 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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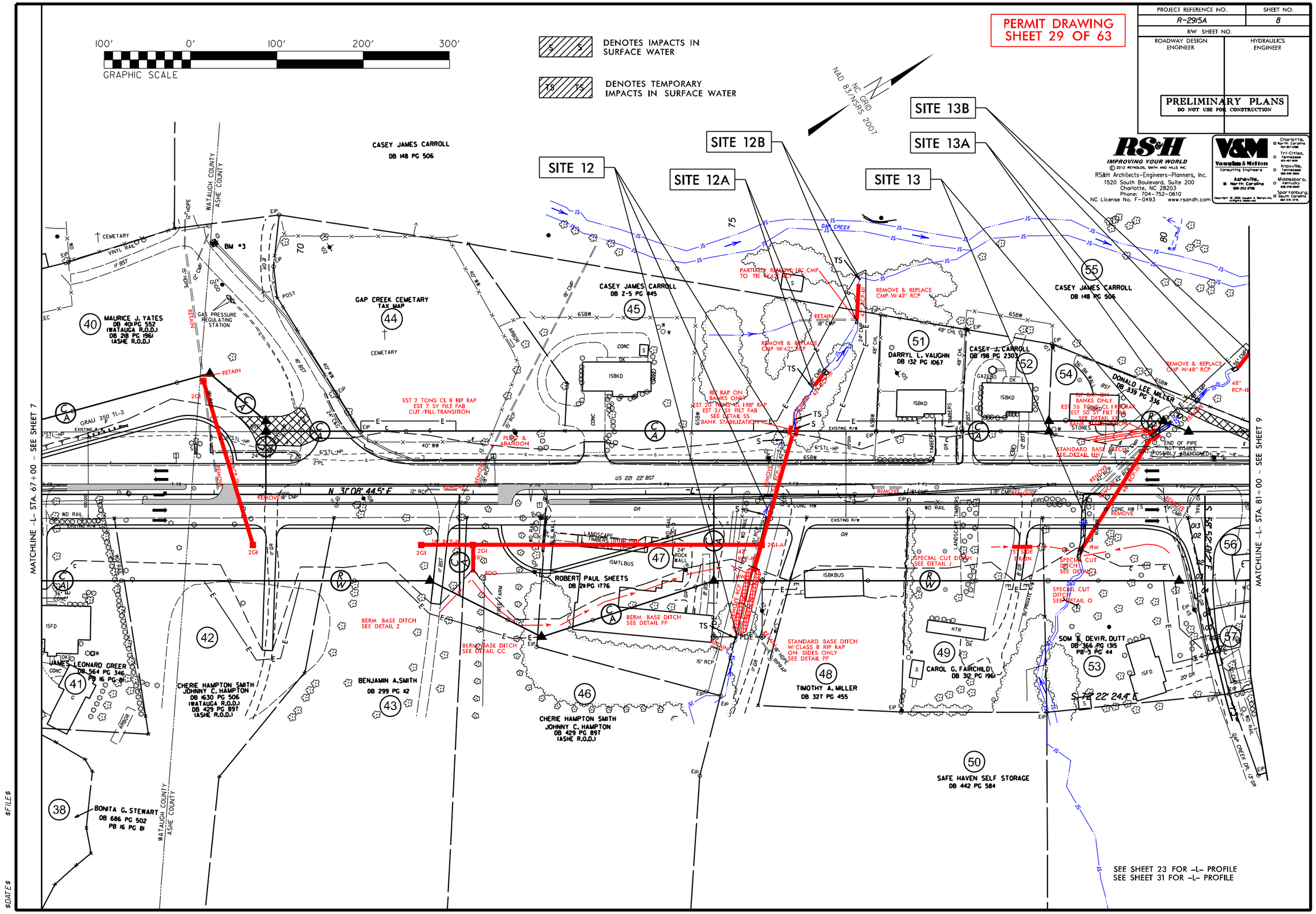

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	8
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100' 0' 100' 200' 300'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID NAD 83/NSRS 2007

SITE 12 SITE 12A SITE 12B SITE 13 SITE 13A SITE 13B

MATCHLINE -L- STA. 67+00 – SEE SHEET 7

MATCHLINE -L- STA. 81+00 – SEE SHEET 9

CASEY JAMES CARROLL DB 148 PG 506

MAURICE J. YATES DB 401 PG 552 (WATAUGA R.O.D.) DB 218 PG 196 (ASHE R.O.D.)

GAP CREEK CEMETERY TAX MAP 44

CASEY JAMES CARROLL DB Z-5 PG 445

DARRYL L. VAUGHN DB 132 PG 1067

CASEY J. CARROLL DB 198 PG 230

DONALD LEE MILLER DB 339 PG 336

ROBERT PAUL SHEETS DB 218 PG 1776

JAMES LEONARD GREER DB 564 PG 346 PB 16 PG 81

CHERIE HAMPTON SMITH JOHNNY C. HAMPTON DB 1630 PG 506 (WATAUGA R.O.D.) DB 429 PG 897 (ASHE R.O.D.)

BENJAMIN A. SMITH DB 299 PG 112

TIMOTHY A. MILLER DB 327 PG 455

CAROL G. FAIRCHILD DB 312 PG 196

SOM & DEVIR. DUTT DB 366 PG 1315 PB 3 PG 44

SAFE HAVEN SELF STORAGE DB 442 PG 584

BONITA G. STEWART DB 686 PG 502 PB 16 PG 81

WATAUGA COUNTY
ASHE COUNTY

GAP CREEK

REMOVE & REPLACE CMP W/42" RCP

PARTIALLY REMOVE 78" CMP TO TIE BACK

RETAIN 18" CMP

EST 2 TONS CL B RIP RAP EST 7 SY FILT FAB CUT/FILL TRANSITION

RIP RAP ON BANKS ONLY EST 20 TONS CL I RIP RAP EST 37 SY FILT FAB SEE DETAIL SS BANK STABILIZATION

RIP RAP ON BANKS ONLY EST 26 TONS CL I RIP RAP EST 50 SY FILT FAB SEE DETAIL XX BANK STABILIZATION

PLUG & ABANDON

END OF PIPE NOT VISIBLE (POSSIBLY ABANDONED)

STANDARD BASE DITCH SEE DETAIL HH

BERM BASE DITCH SEE DETAIL Z

BERM BASE DITCH SEE DETAIL CC

BERM BASE DITCH SEE DETAIL FF

STANDARD BASE DITCH W/ CLASS B RIP RAP ON SIDES ONLY SEE DETAIL PP

SPECIAL CUT DITCH SEE DETAIL J

SPECIAL CUT DITCH SEE DETAIL O

SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 31 FOR -L- PROFILE

$FILE$

$DATE$

ENLARGEMENT SHEET

50' 0' 50' 100' 150'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NC GRID NAD 83/NSRS 2007

PERMIT DRAWING
SHEET 31 OF 63

PROJECT REFERENCE NO.	SHEET NO.
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SITE 12B
SITE 12A
SITE 12
SITE 13A
SITE 13
SITE 13B

PARTIALLY REMOVE 18" CMP TO TIE W/42" RCP
REMOVE & REPLACE CMP W/42" RCP
RETAIN 18" CMP
REMOVE & REPLACE CMP W/42" RCP
RIP RAP ON BANKS ONLY
EST 20 TONS CL I RIP RAP
EST 37 SY FILT FAB
SEE DETAIL SS
BANK STABILIZATION
RIP RAP ON BANKS ONLY
EST 26 TONS CL I RIP RAP
EST 50 SY FILT FAB
SEE DETAIL XX
BANK STABILIZATION
REMOVE & REPLACE CMP W/48" RCP
48" RCP-III
STANDARD BASE DITCH
SEE DETAIL HH
REMOVE 42" RCP-III
REMOVE 42" RCP
REMOVE 42" RCP-III
REMOVE 18" CMP
REMOVE 18" CMP
REMOVE 18" CONC HW
REMOVE 14" CMP
REMOVE 42" RCP-III
REMOVE RCP
2GI-A
42" RCP-III
SPECIAL CUT DITCH
SEE DETAIL J
15" SIDE DRAIN
SPECIAL CUT DITCH
SEE DETAIL J
SPECIAL CUT DITCH
SEE DETAIL O
RETAIN

51 DARRYL L. VAUGHN DB 132 PG 1067
52 CASEY J. CARROLL DB 198 PG 2303
54 DONALD LEE MILLER DB 339 PG 336
56

END OF PIPE NOT VISIBLE (POSSIBLY ABANDONED)
CAT-1

EXISTING R/W
6SBW
6"STL-HP
48" CHL
36" BK WALL
GAZEBO
ISBKD
ISBKBUS
HTR
TIMBERS
LANDSCAPE TIMBERS
WD RAIL
24" ROCK WALL
DITCH
S 58° 52' 01.2" E

SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 31 FOR -L- PROFILE

$FILE$
$DATE$

5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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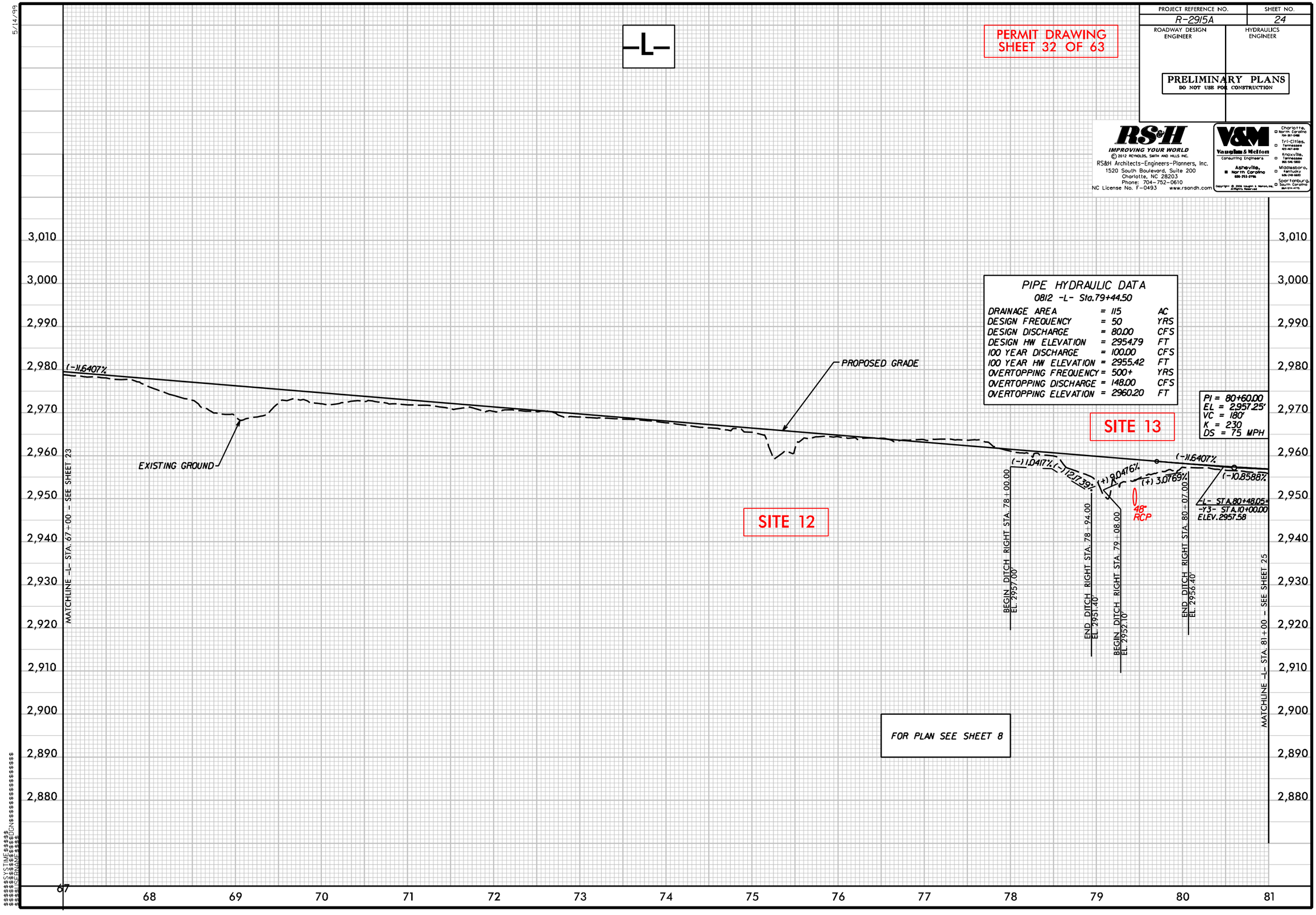

PIPE HYDRAULIC DATA
0812 -L- Sta.79+44.50

DRAINAGE AREA	=	115	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	80.00	CFS
DESIGN HW ELEVATION	=	2954.79	FT
100 YEAR DISCHARGE	=	100.00	CFS
100 YEAR HW ELEVATION	=	2955.42	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	148.00	CFS
OVERTOPPING ELEVATION	=	2960.20	FT

PI = 80+60.00
EL = 2957.25'
VC = 180'
K = 230
DS = 75 MPH

$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$$$
$$

PERMIT DRAWING
SHEET 33 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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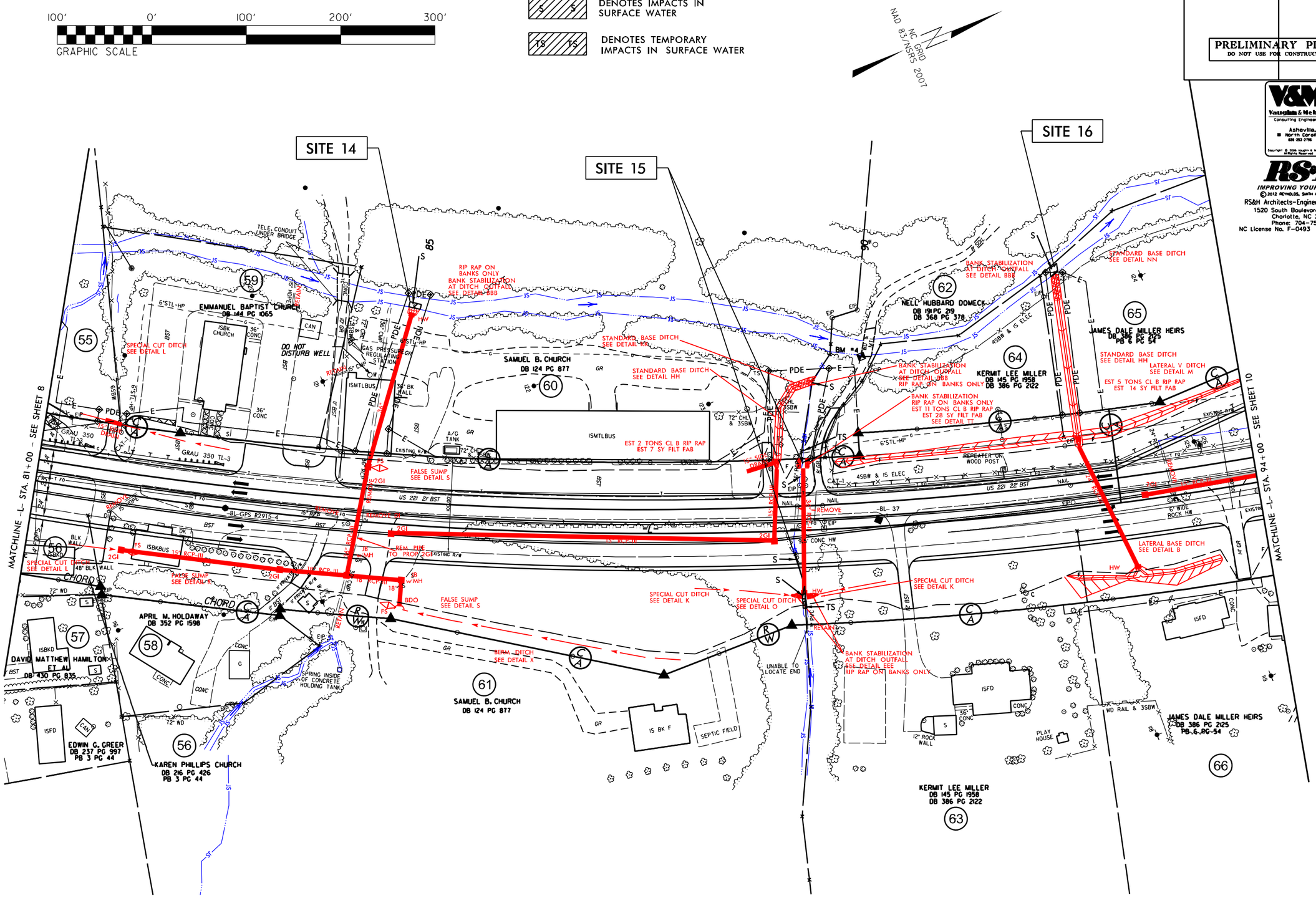

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SHEET 34 OF 63

PROJECT REFERENCE NO.	SHEET NO.
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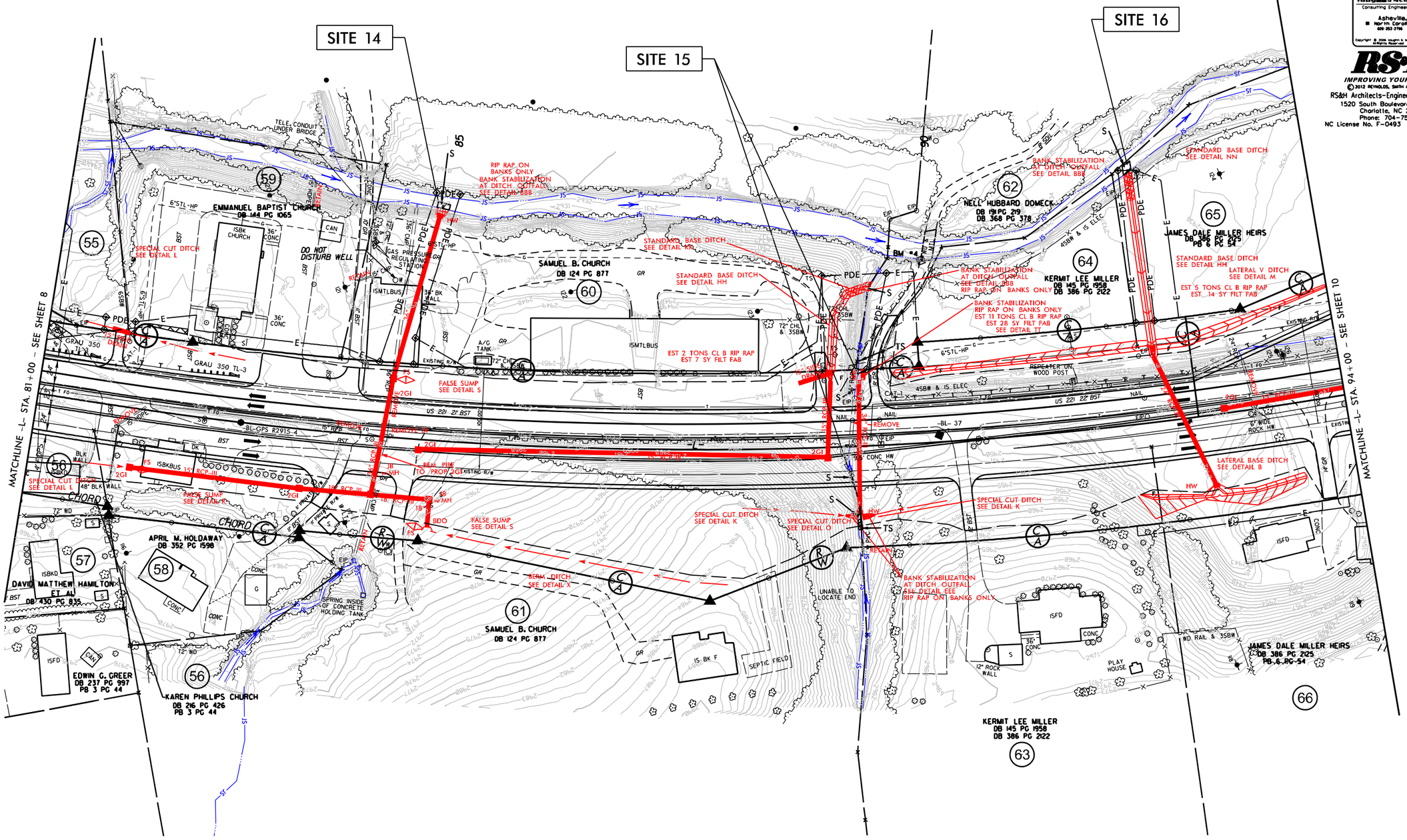

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SHEET 35 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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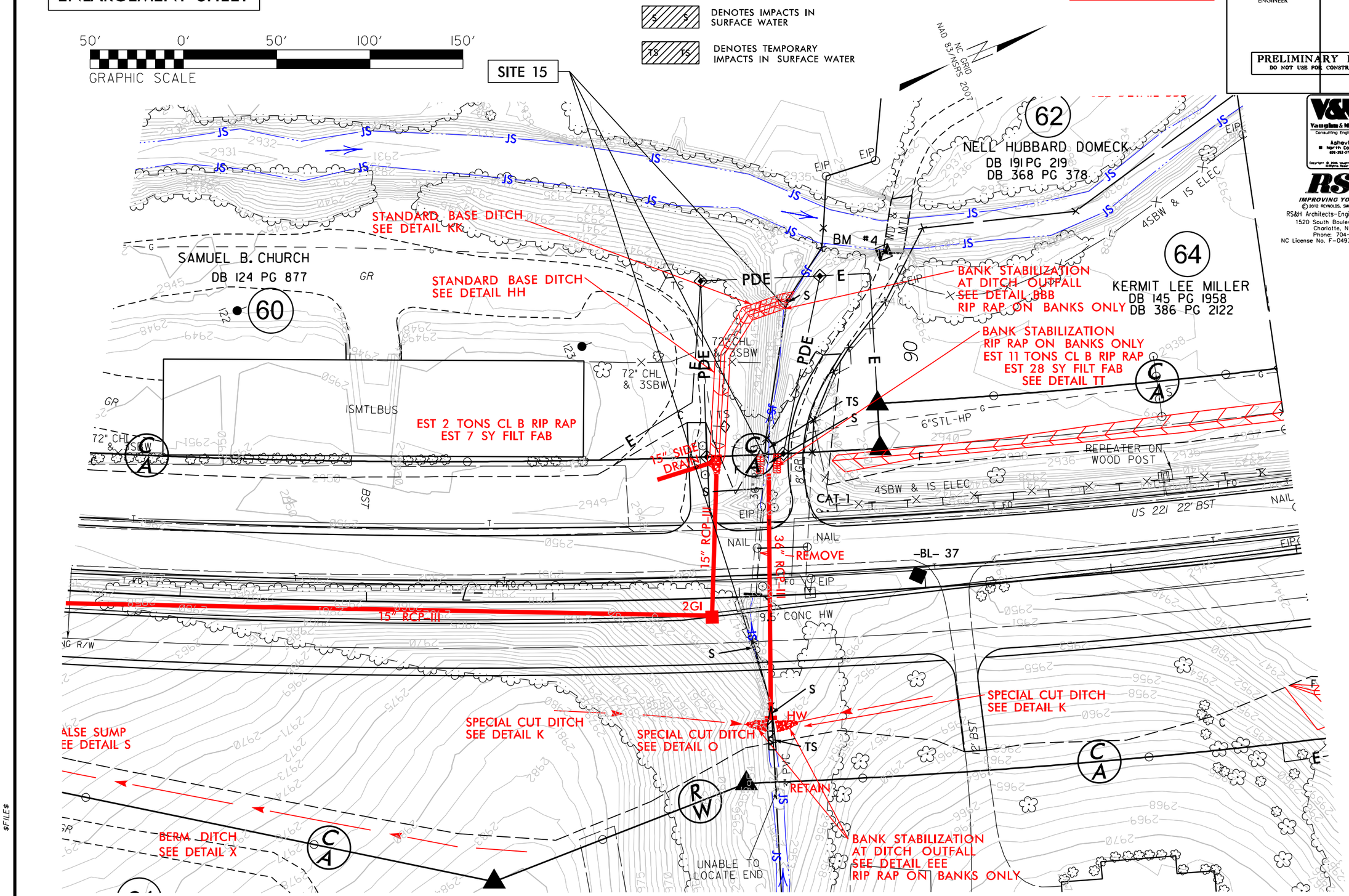

SEE SHEET 24 FOR -L- PROFILE

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	25

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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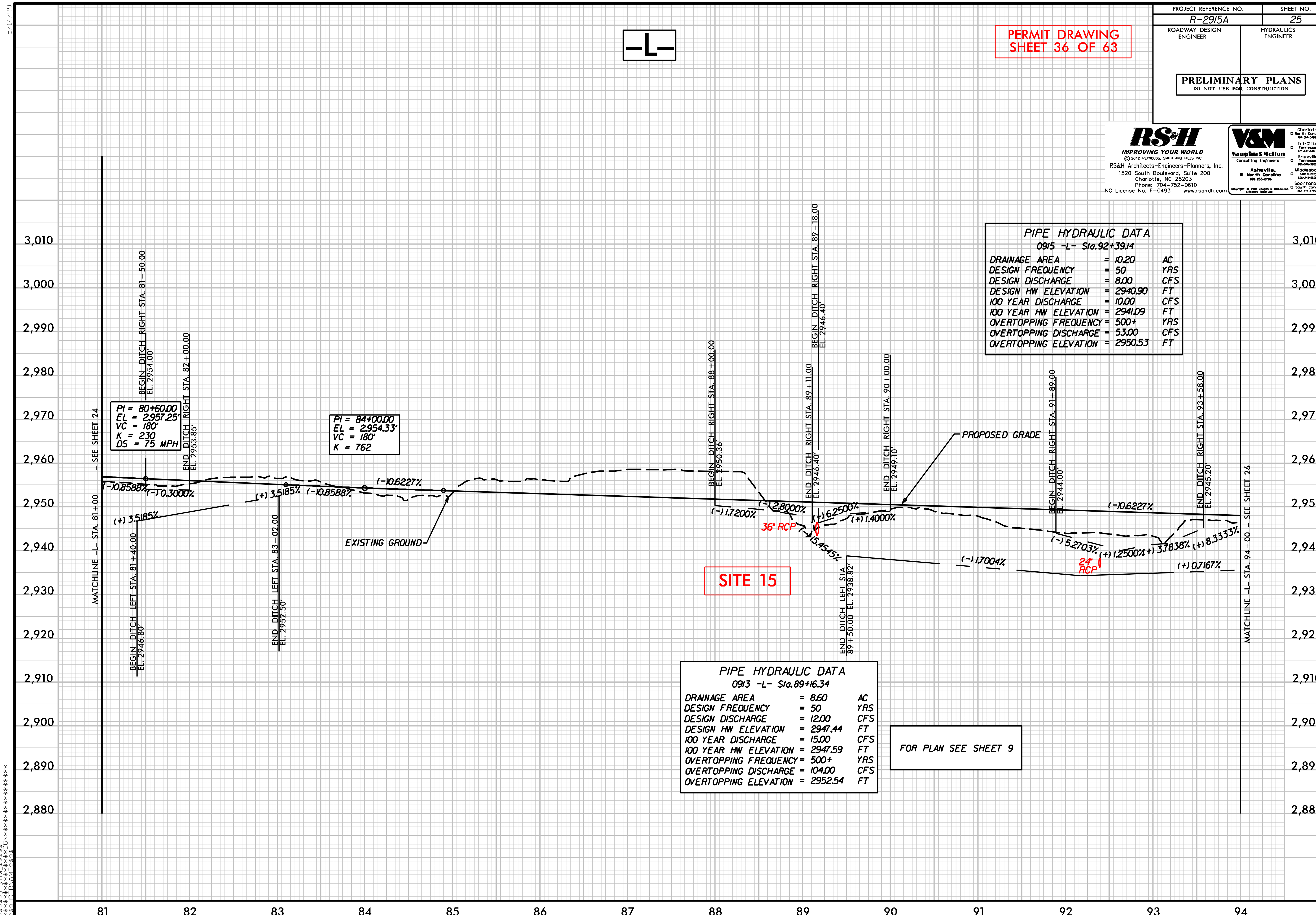
SHEET 36 OF 63

–L–



PIPE HYDRAULIC DATA
0915 -L- Sta.92+39.14

DRAINAGE AREA	=	10.20	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	8.00	CFS
DESIGN HW ELEVATION	=	2940.90	FT
100 YEAR DISCHARGE	=	10.00	CFS
100 YEAR HW ELEVATION	=	2941.09	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	53.00	CFS
OVERTOPPING ELEVATION	=	2950.53	FT

PIPE HYDRAULIC DATA
0913 -L- Sta.89+16.34

DRAINAGE AREA	=	8.60	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	12.00	CFS
DESIGN HW ELEVATION	=	2947.44	FT
100 YEAR DISCHARGE	=	15.00	CFS
100 YEAR HW ELEVATION	=	2947.59	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	104.00	CFS
OVERTOPPING ELEVATION	=	2952.54	FT

FOR PLAN SEE SHEET 9

$$$$$$SYSTIME$$$$$ $$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$ $$$$$USERNAME$$$$$

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SHEET 37 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Knoxville, Tennessee 865-546-1988
Middlesboro, Kentucky 606-248-6688
Spartanburg, South Carolina 864 574 4715

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GRAPHIC SCALE 100′ 0′ 100′ 200′ 300′

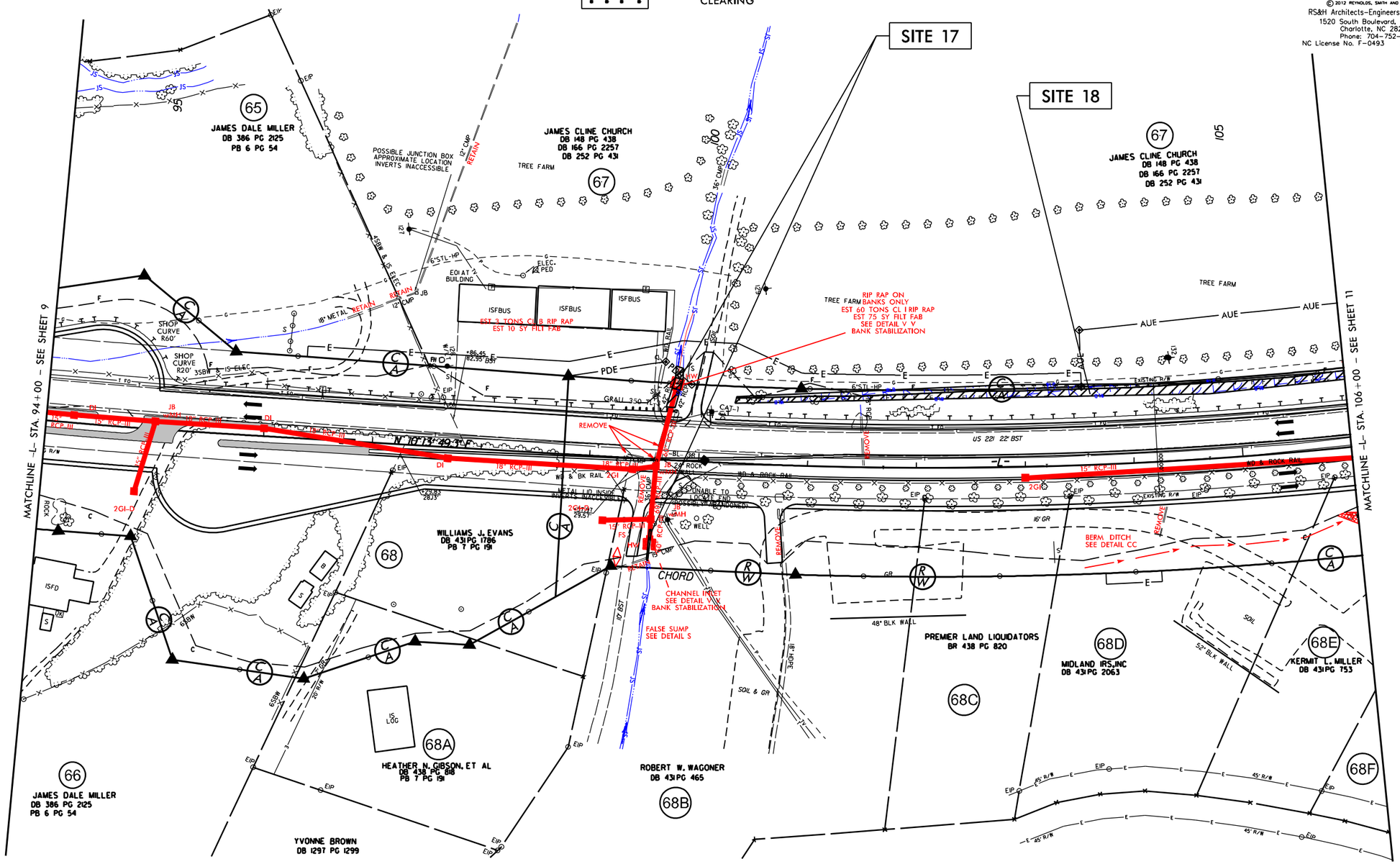
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NC GRID NAD 83/NSRS 2007



SEE SHEET 25 FOR -L- PROFILE

$FILE$

$DATE$

PERMIT DRAWING
SHEET 38 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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GRAPHIC SCALE 100' 0' 100' 200' 300'

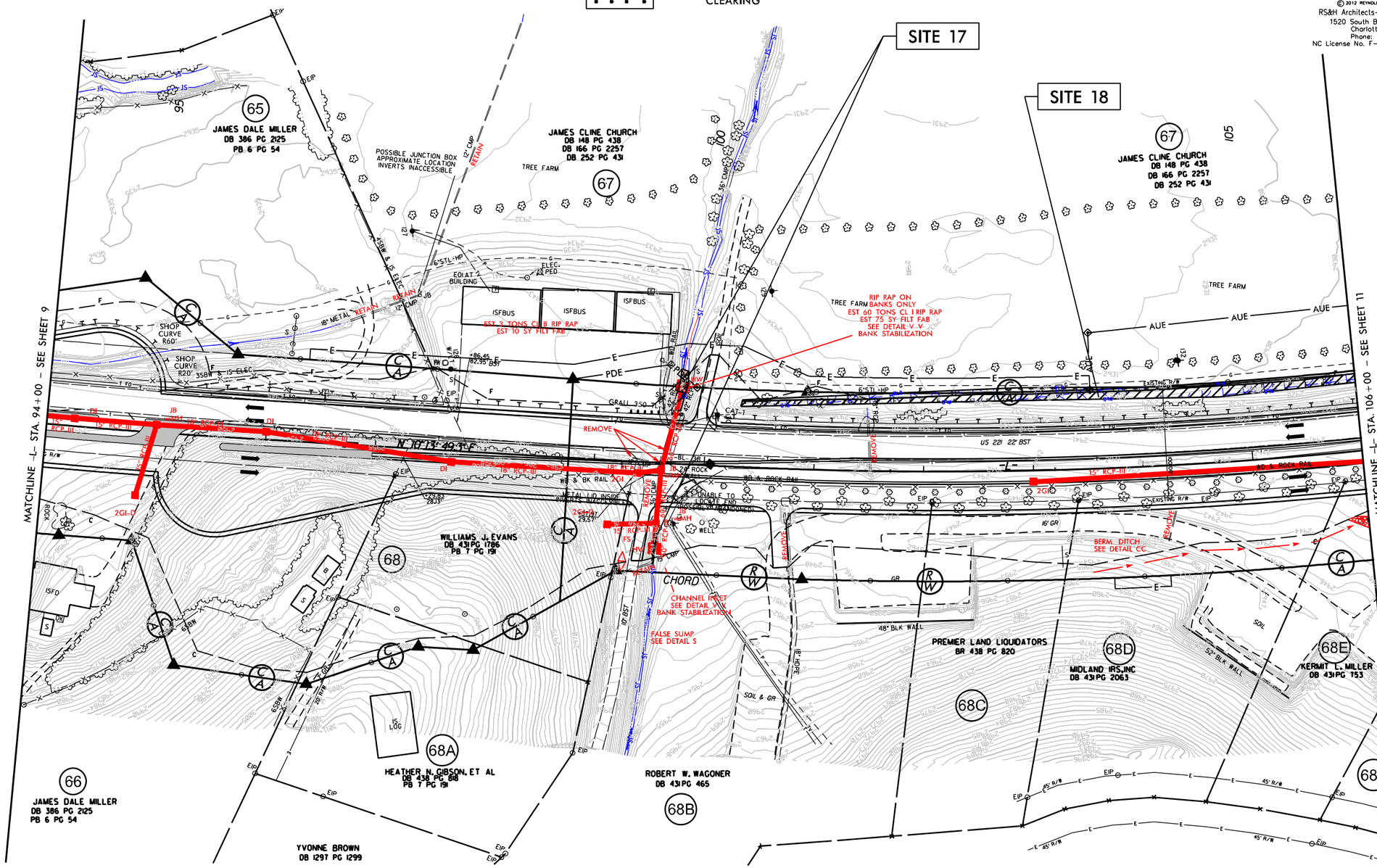
S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NC GRID NAD 83/NSRS 2007



SEE SHEET 25 FOR -L- PROFILE

$FILE$

$DATE$

ENLARGEMENT SHEET

50′ 0′ 50′ 100′ 150′
GRAPHIC SCALE

NC GRID NAD 83/NSRS 2007

S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

PERMIT DRAWING
SHEET 39 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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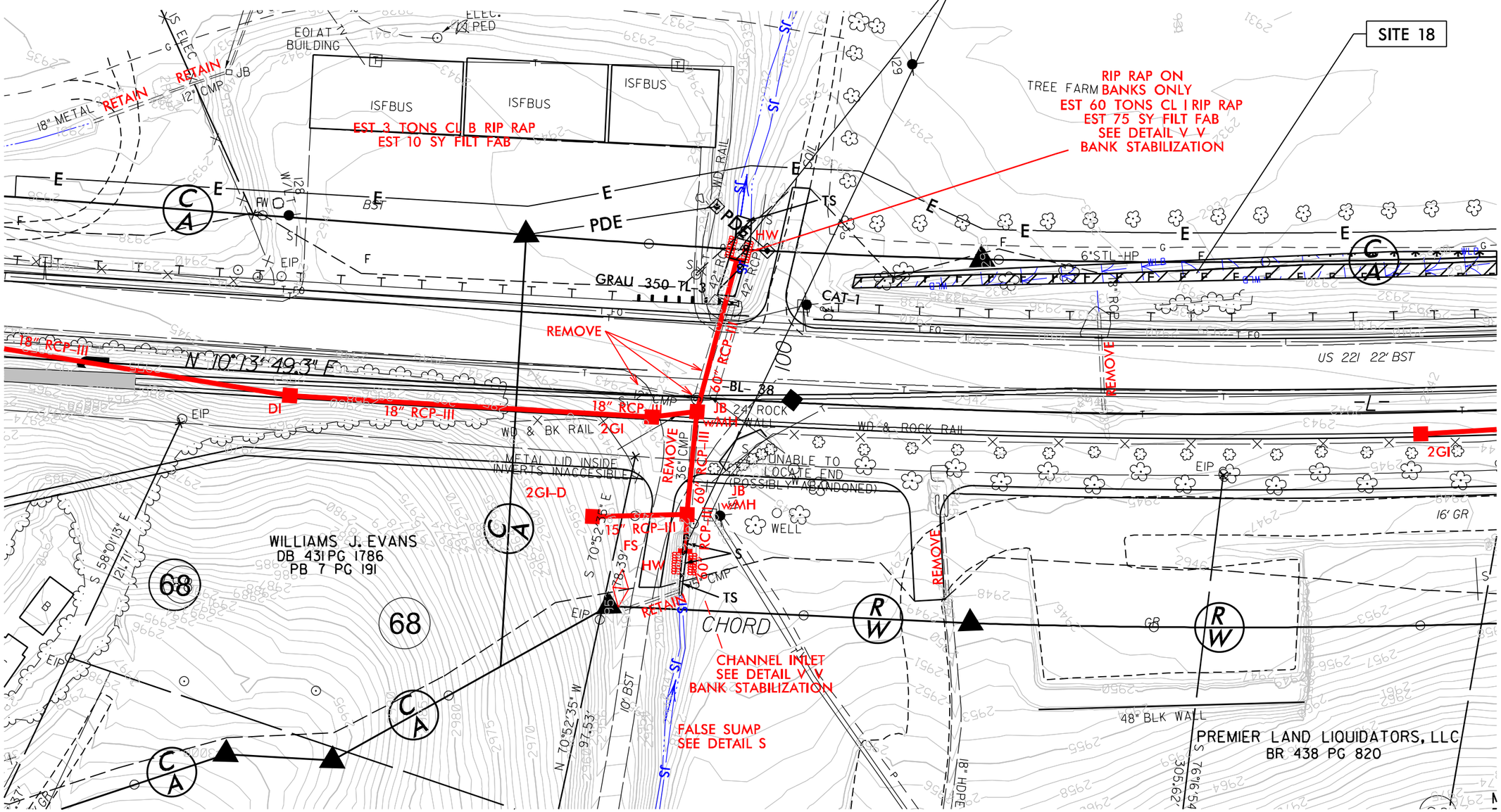

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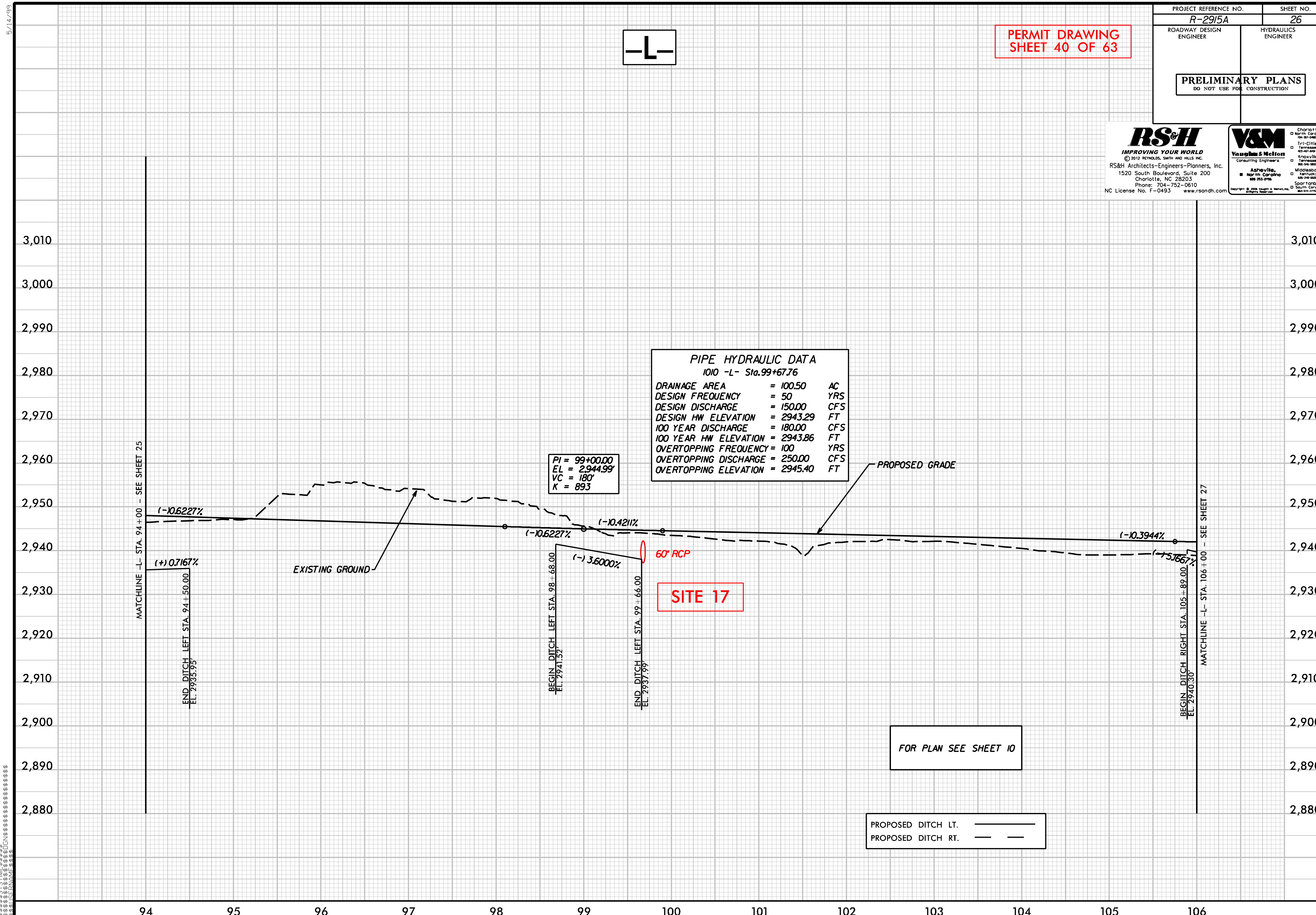
$DATE$


PROJECT REFERENCE NO. R-2915A
SHEET NO. 26
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 40 OF 63
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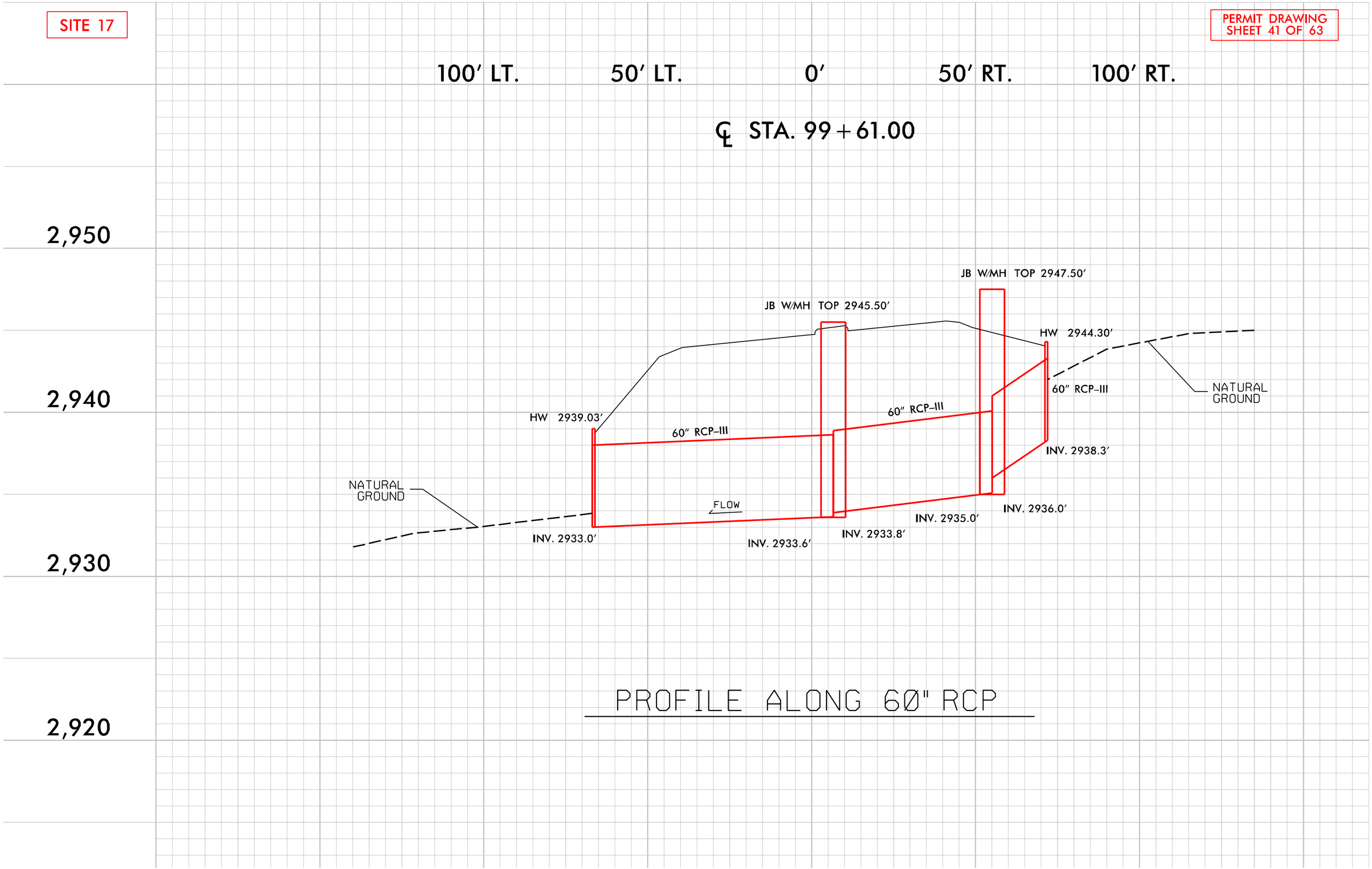
Spartanburg, South Carolina
-L-
PIPE HYDRAULIC DATA
1010 -L- Sta.99+67.76
DRAINAGE AREA = 100.50 AC
DESIGN FREQUENCY = 50 YRS
DESIGN DISCHARGE = 150.00 CFS
DESIGN HW ELEVATION = 2943.29 FT
100 YEAR DISCHARGE = 180.00 CFS
100 YEAR HW ELEVATION = 2943.86 FT
OVERTOPPING FREQUENCY = 100 YRS
OVERTOPPING DISCHARGE = 250.00 CFS
OVERTOPPING ELEVATION = 2945.40 FT
PI = 99+00.00
EL = 2,944.99'
VC = 180'
K = 893
PROPOSED GRADE
EXISTING GROUND
(-)0.6227%
(+) 0.7167%
(-)0.6227%
(-)0.4211%
(-) 3.6000%
(-)0.3944%
(-) 5.1667%
60" RCP
SITE 17
MATCHLINE -L- STA. 94+00 - SEE SHEET 25
END DITCH LEFT STA. 94+50.00
EL. 2935.95'
BEGIN DITCH LEFT STA. 98+68.00
EL. 2941.52'
END DITCH LEFT STA. 99+66.00
EL. 2937.99'
BEGIN DITCH RIGHT STA. 105+89.00
EL. 2940.30'
MATCHLINE -L- STA. 106+00 - SEE SHEET 27
FOR PLAN SEE SHEET 10
PROPOSED DITCH LT.
PROPOSED DITCH RT.
3,010
3,000
2,990
2,980
2,970
2,960
2,950
2,940
2,930
2,920
2,910
2,900
2,890
2,880
94
95
96
97
98
99
100
101
102
103
104
105
106
5/14/99

SITE 17

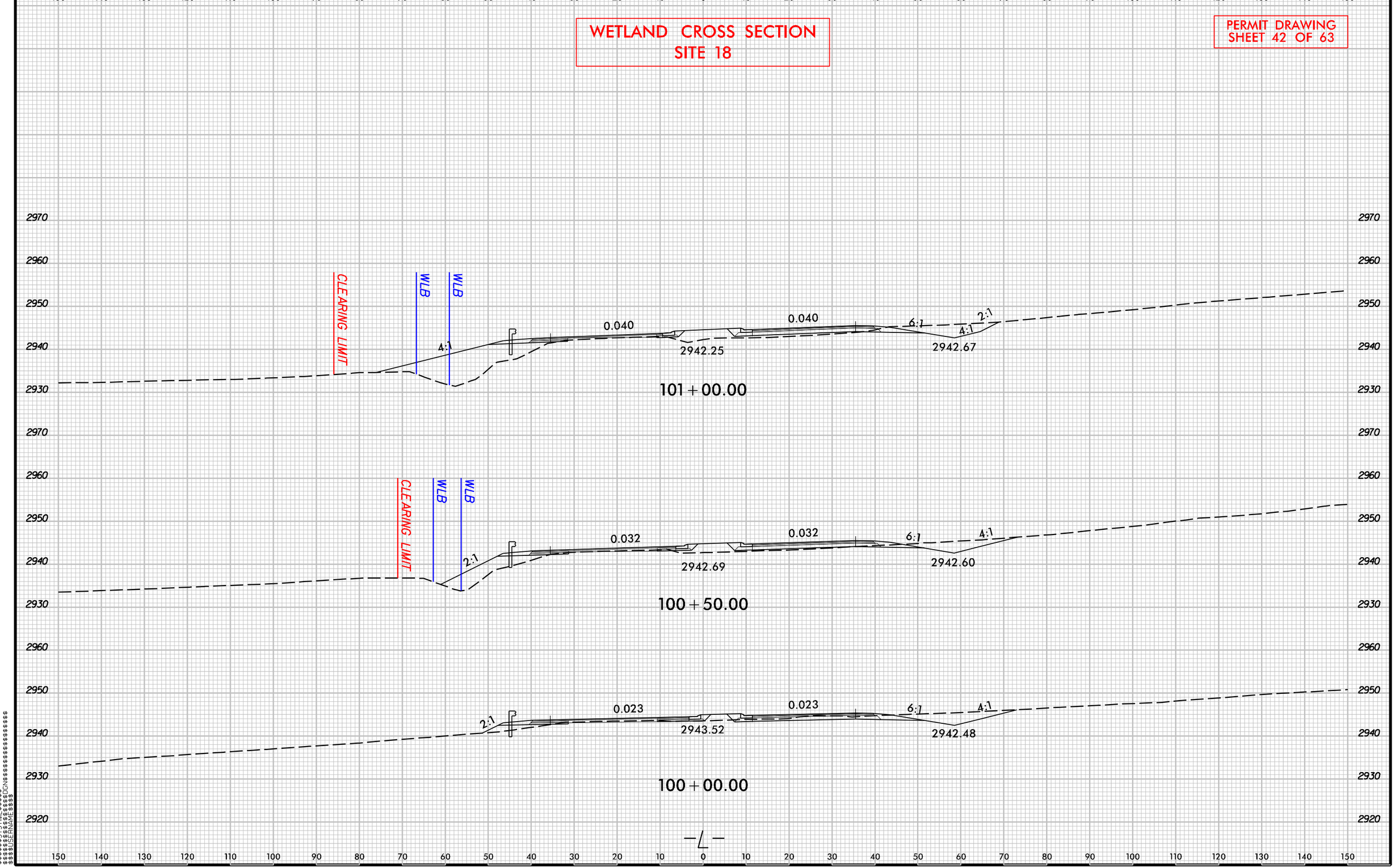
PERMIT DRAWING
SHEET 41 OF 63



PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-110

WETLAND CROSS SECTION
SITE 18

PERMIT DRAWING
SHEET 42 OF 63



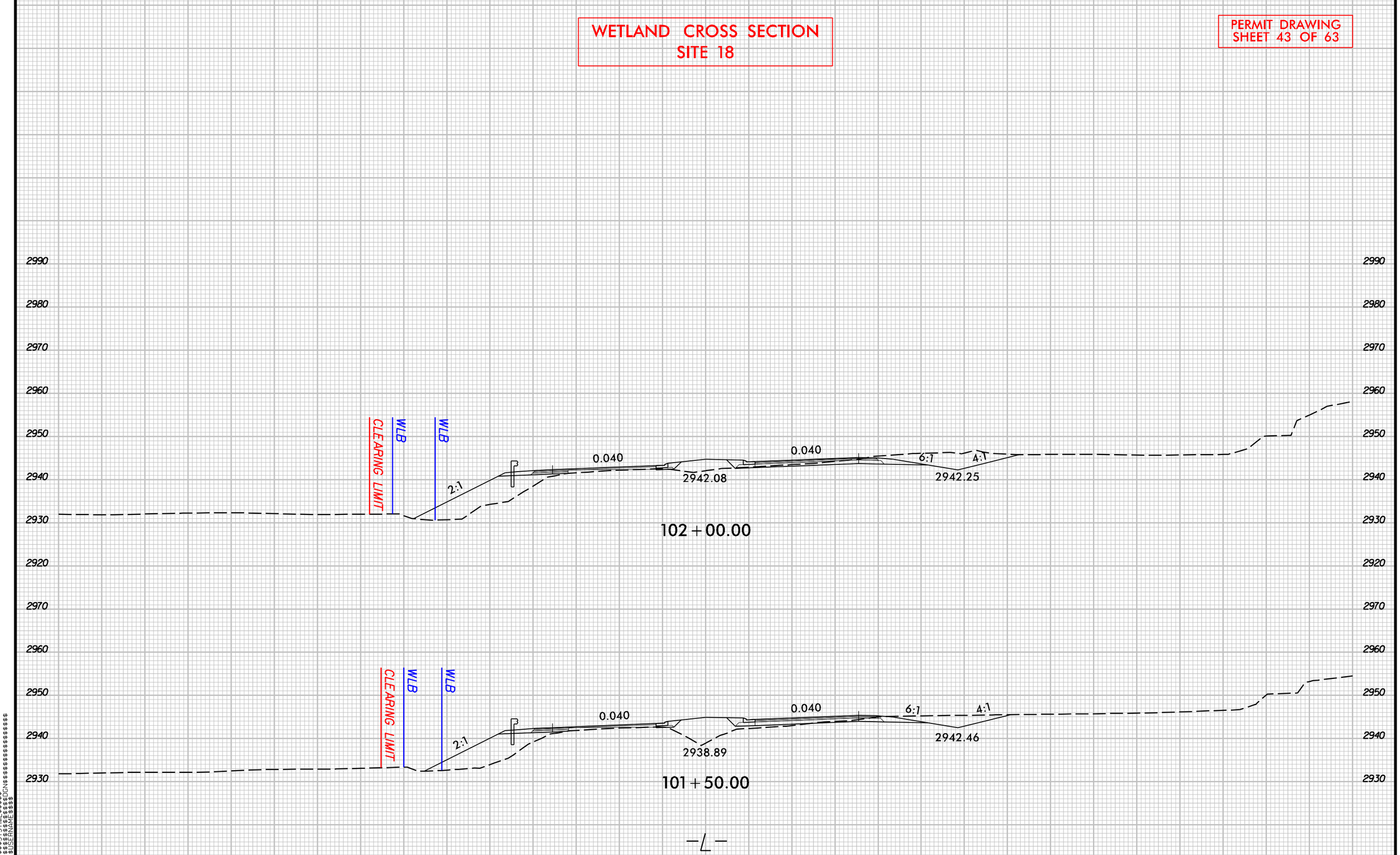
8/23/99

$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915A	X-111

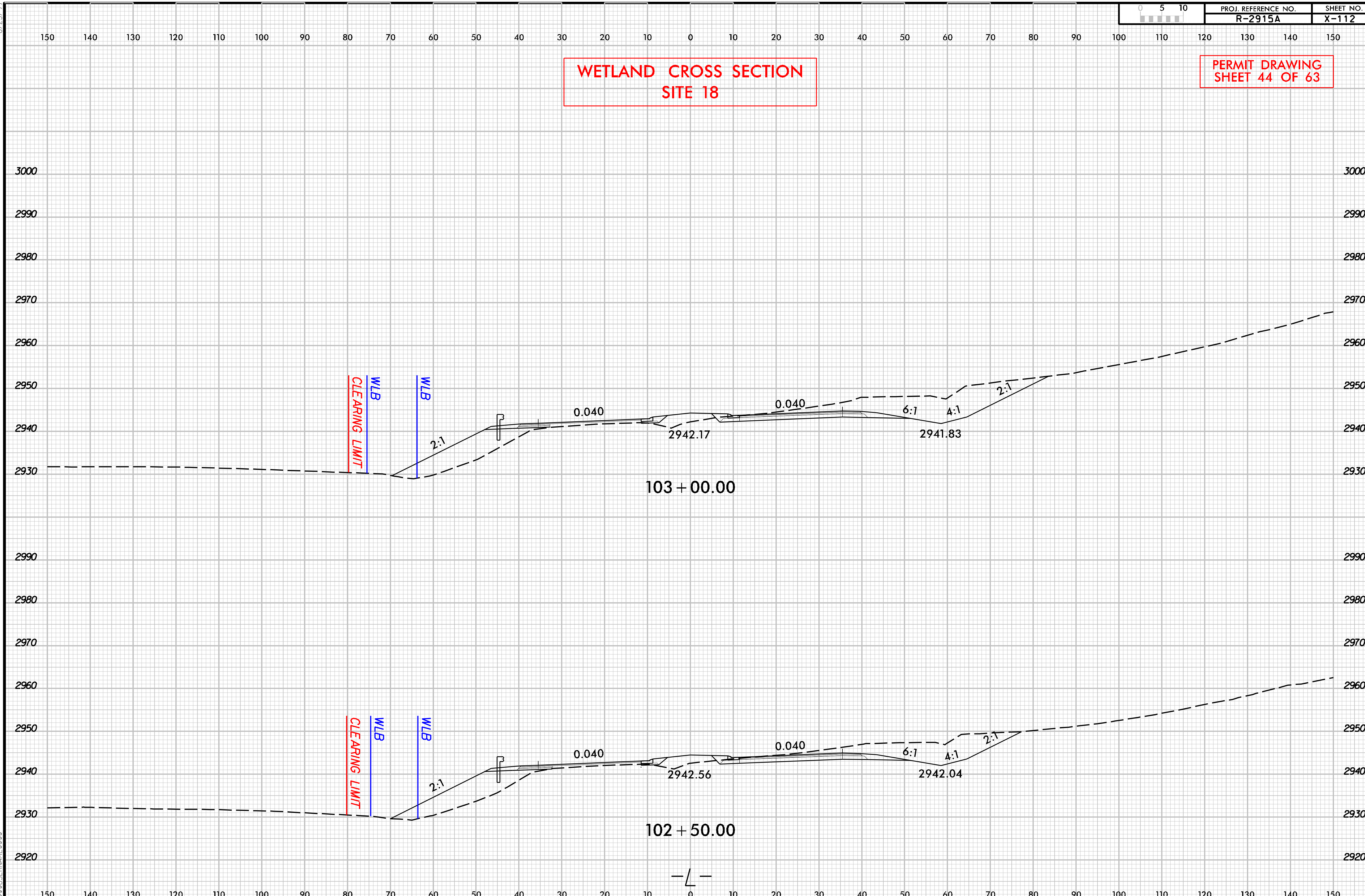
WETLAND CROSS SECTION
SITE 18

PERMIT DRAWING
SHEET 43 OF 63



8/23/99

$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$
$$$$$USERNAME$$$$

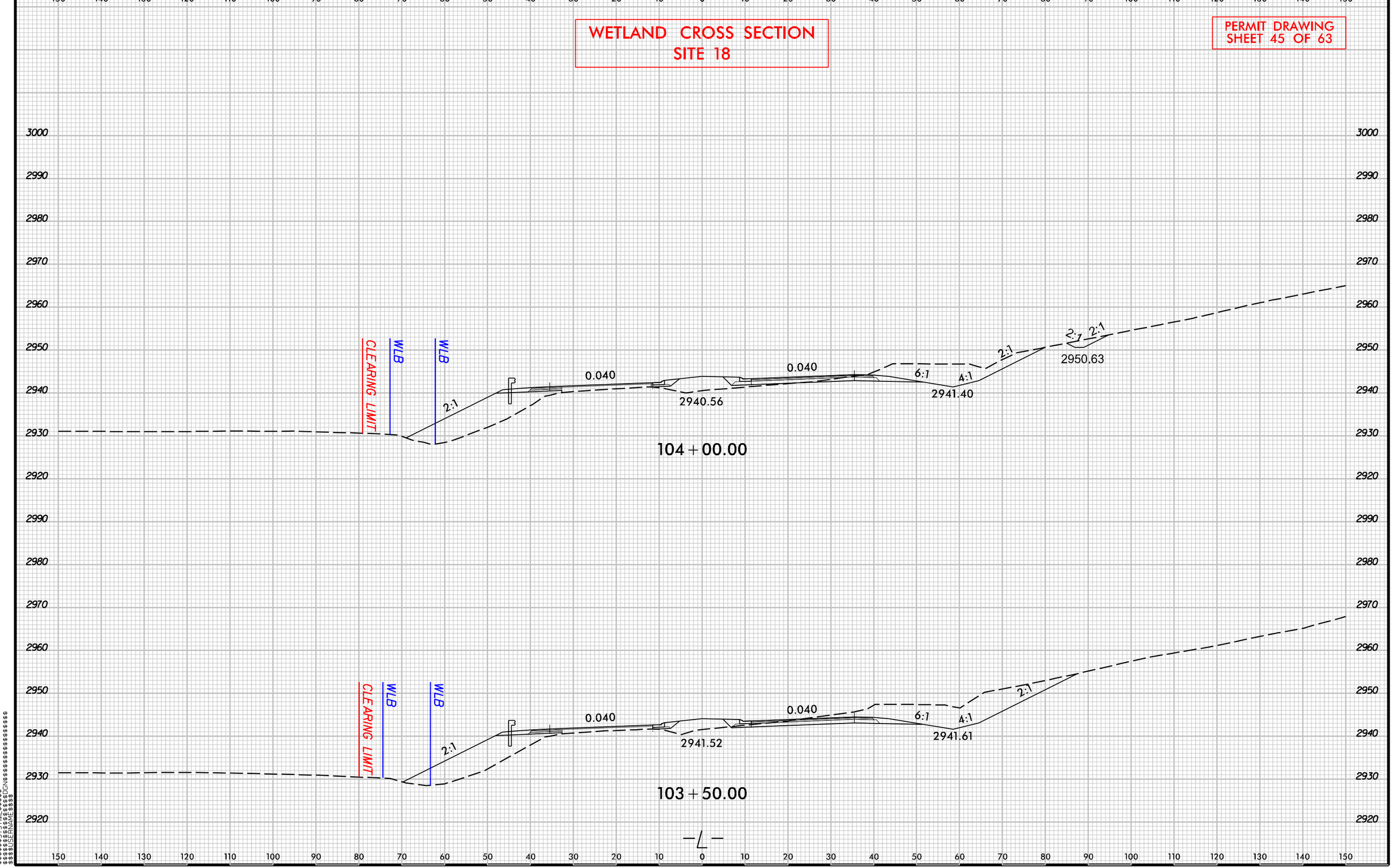


8/23/99
$$$$$$SYSTIME$$$$$
$$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-113

WETLAND CROSS SECTION
SITE 18

PERMIT DRAWING
SHEET 45 OF 63



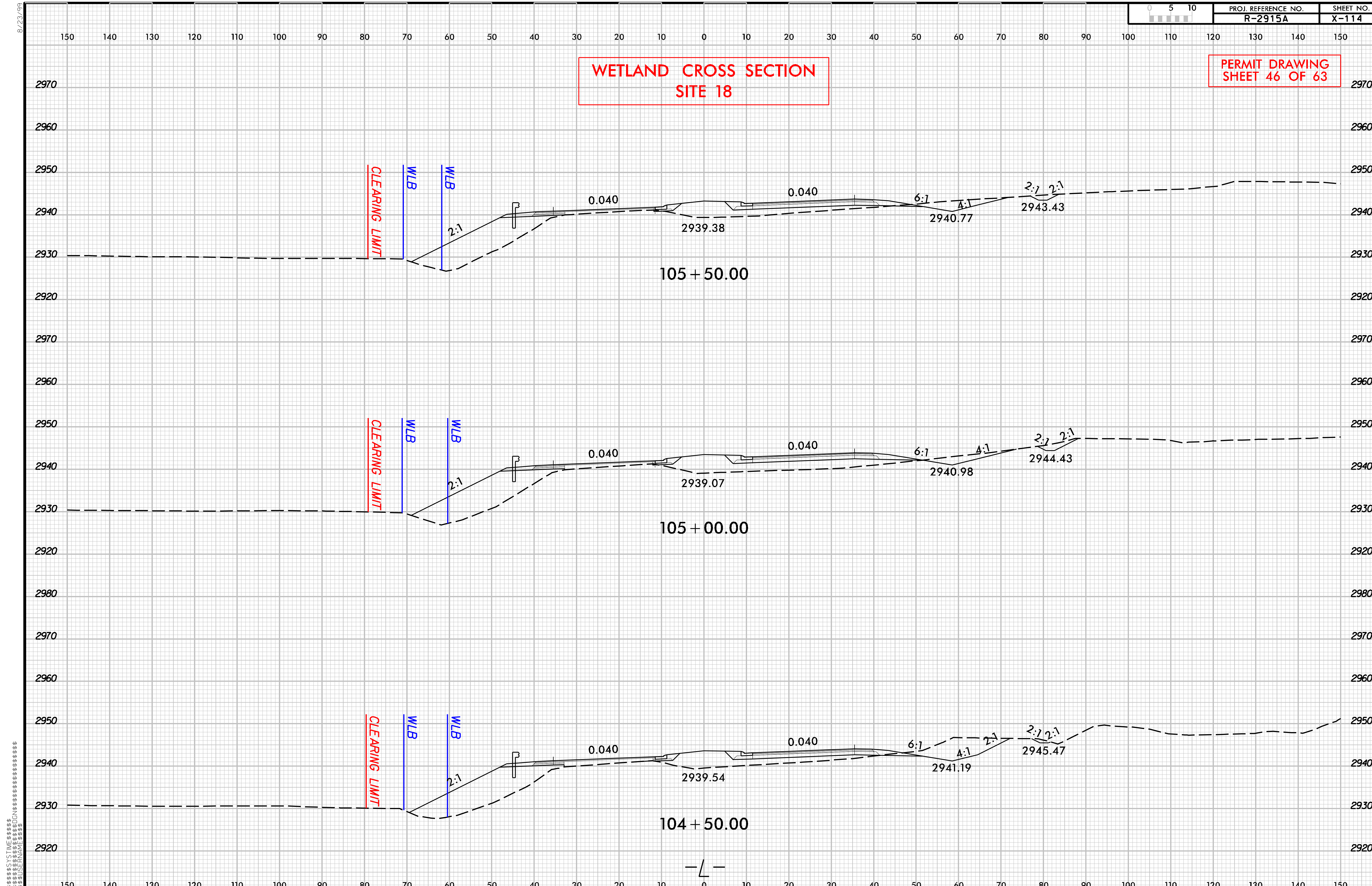
8/23/99

$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$

PROJ. REFERENCE NO. R-2915A | SHEET NO. X-114

WETLAND CROSS SECTION
SITE 18

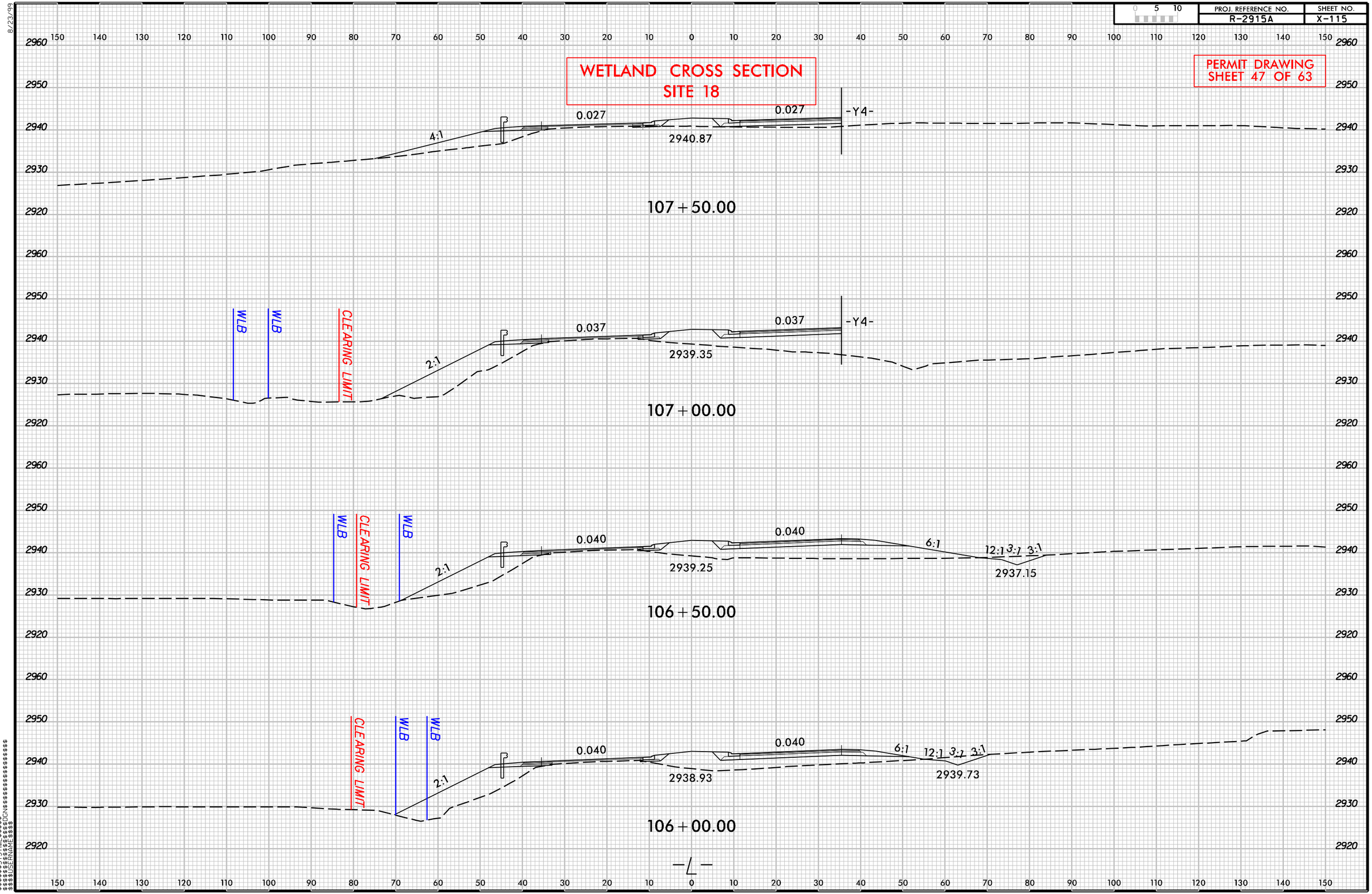
PERMIT DRAWING
SHEET 46 OF 63



PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-115

WETLAND CROSS SECTION
SITE 18

PERMIT DRAWING
SHEET 47 OF 63



8/23/99

$$$$$$$SYSTIME$$$$$$
$$$$$$$$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$$
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 48 OF 63

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

100' 0' 100' 200' 300'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83/NSRS 2007 NC GRID

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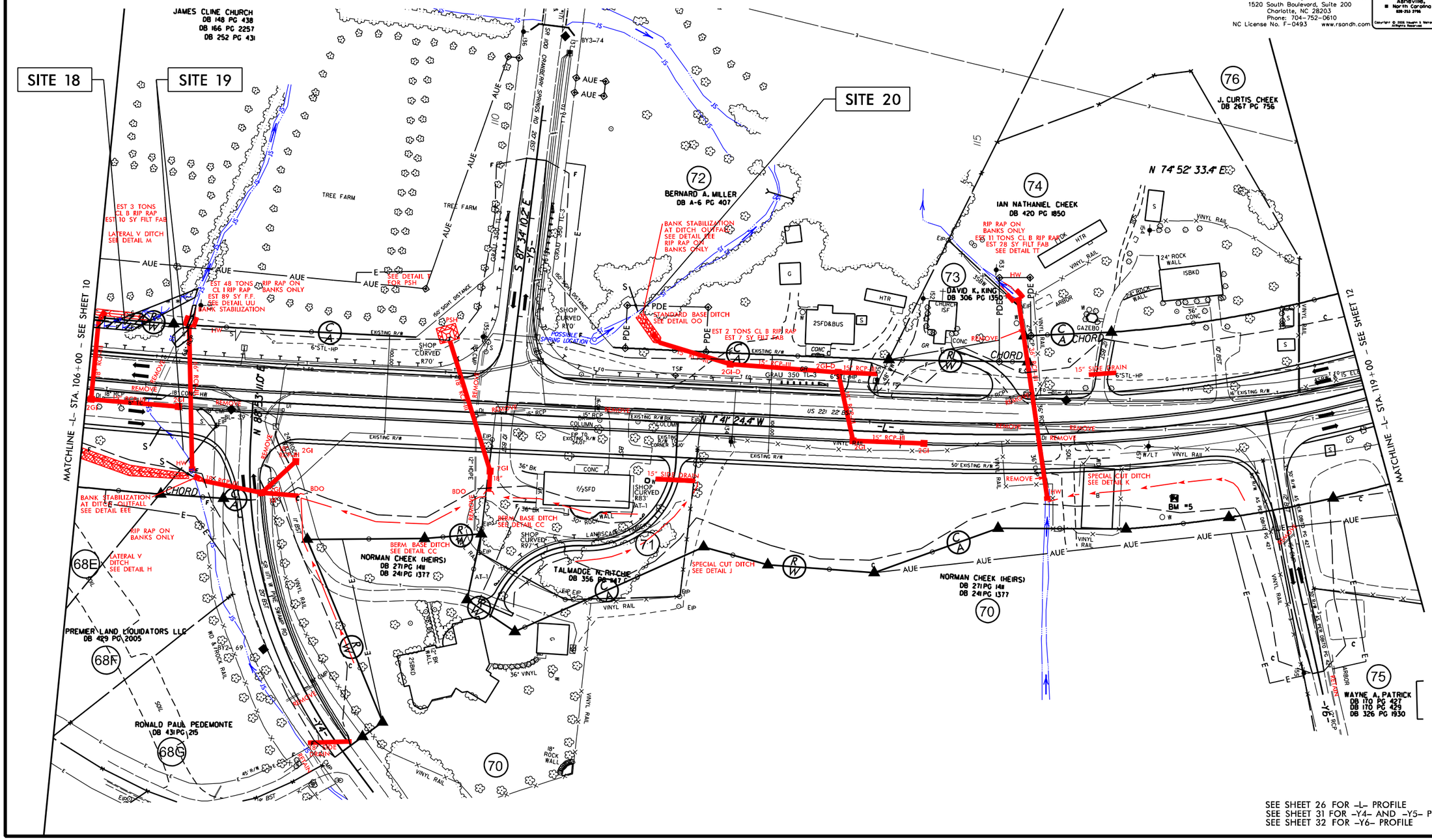

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 49 OF 63

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

100' 0' 100' 200' 300'
GRAPHIC SCALE

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

NC GRID
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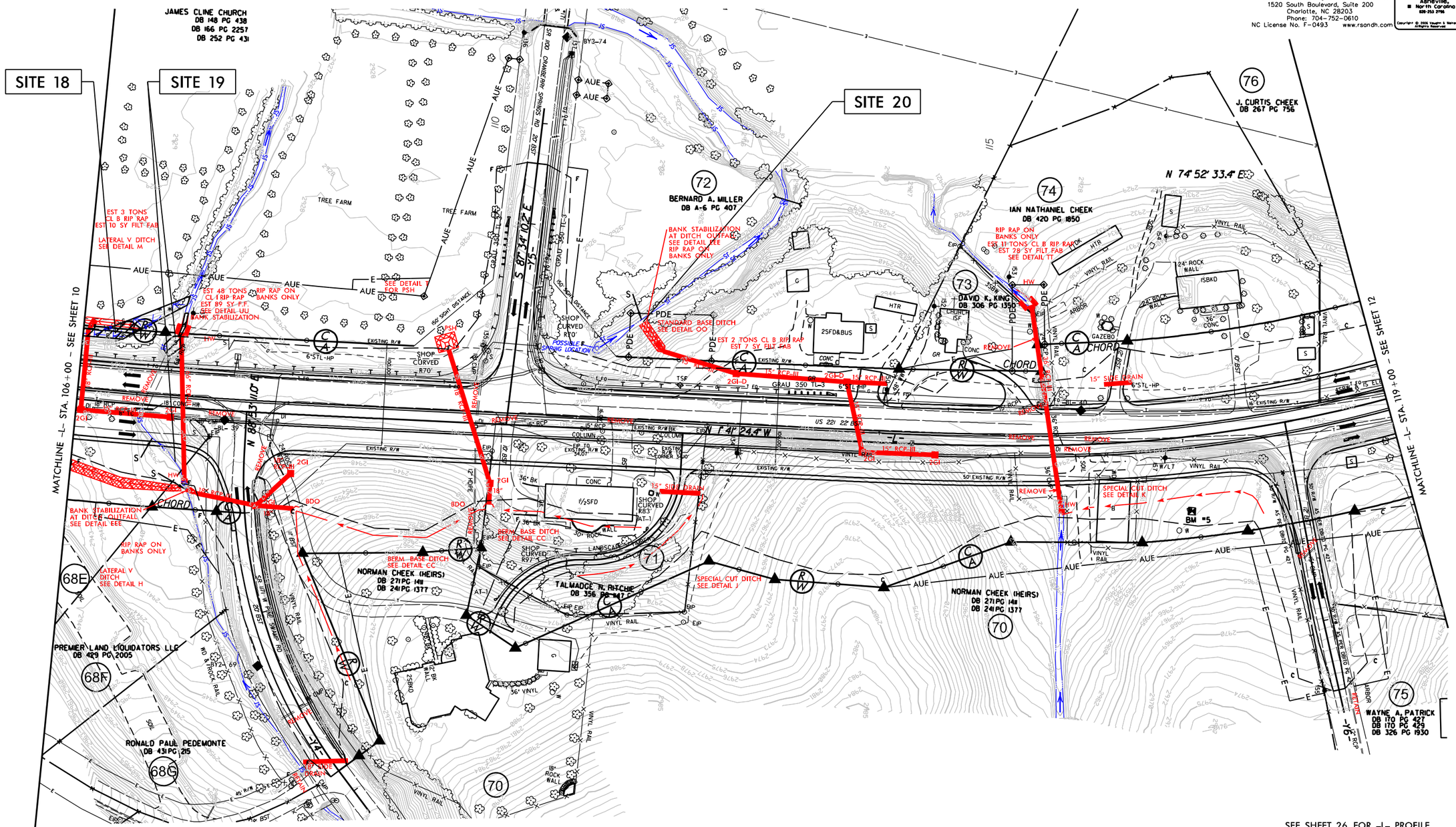

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y4- AND -Y5- PROFILE
SEE SHEET 32 FOR -Y6- PROFILE

$FILE$
$DATE$

ENLARGEMENT SHEET

50′ 0′ 50′ 100′ 150′
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83/NSRS 2007 NC GRID

PERMIT DRAWING
SHEET 50 OF 63

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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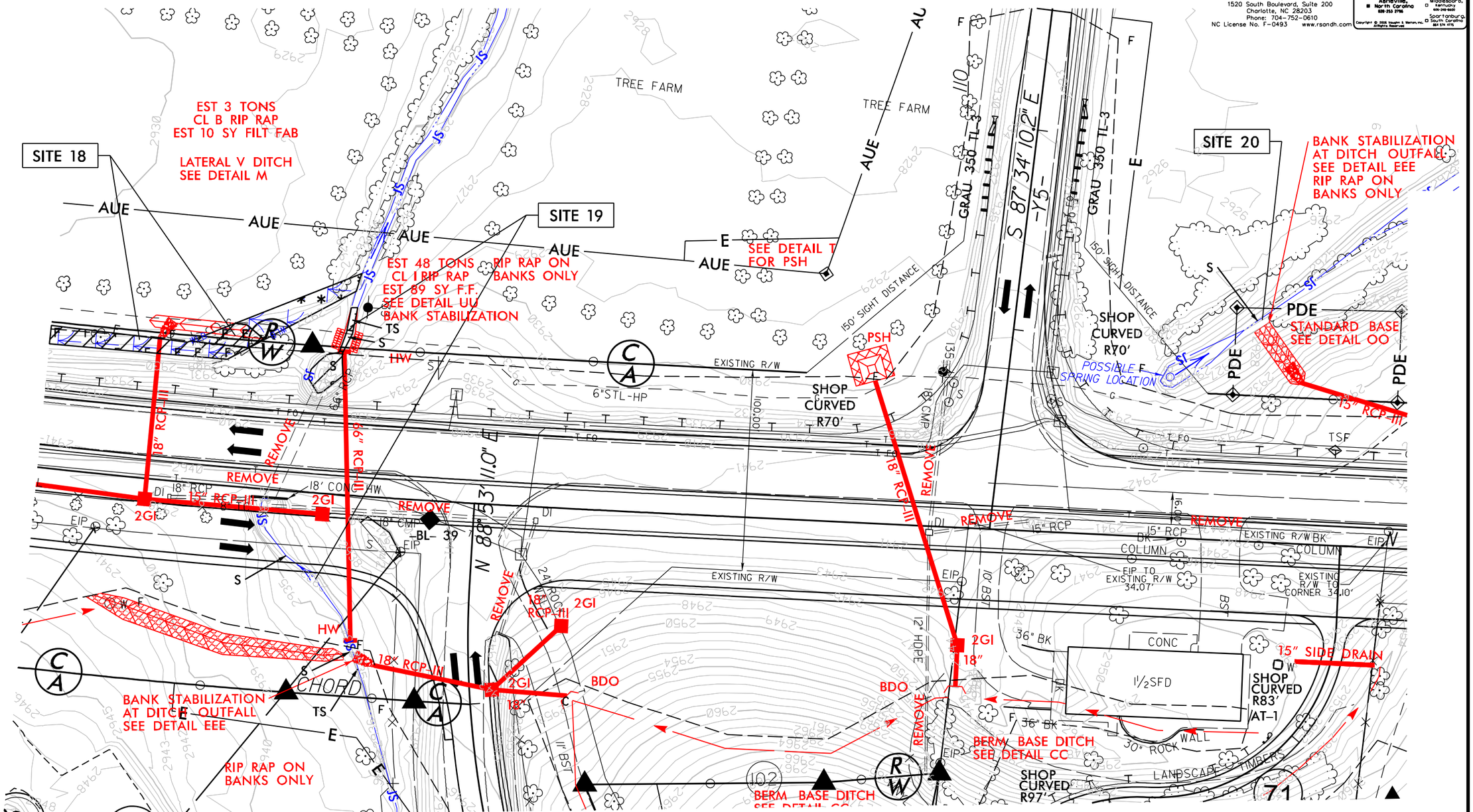

SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 31 FOR -Y4- AND -Y5- PROFILE
SEE SHEET 32 FOR -Y6- PROFILE

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	27

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 51 OF 63

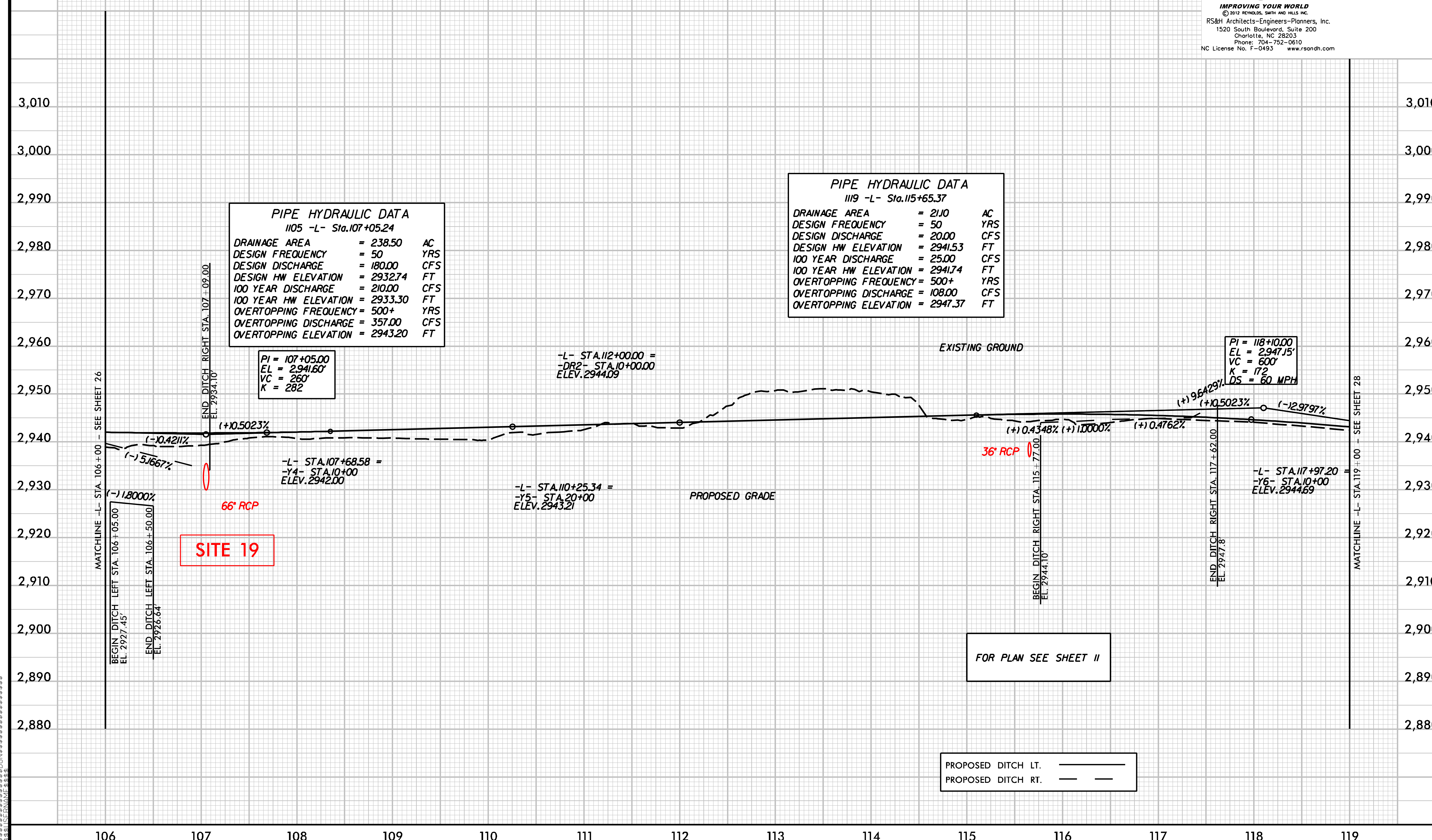
-L-

PIPE HYDRAULIC DATA
1105 -L- Sta.107+05.24

DRAINAGE AREA	=	238.50	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	180.00	CFS
DESIGN HW ELEVATION	=	2932.74	FT
100 YEAR DISCHARGE	=	210.00	CFS
100 YEAR HW ELEVATION	=	2933.30	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	357.00	CFS
OVERTOPPING ELEVATION	=	2943.20	FT

PIPE HYDRAULIC DATA
1119 -L- Sta.115+65.37

DRAINAGE AREA	=	21.10	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	20.00	CFS
DESIGN HW ELEVATION	=	2941.53	FT
100 YEAR DISCHARGE	=	25.00	CFS
100 YEAR HW ELEVATION	=	2941.74	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	108.00	CFS
OVERTOPPING ELEVATION	=	2947.37	FT

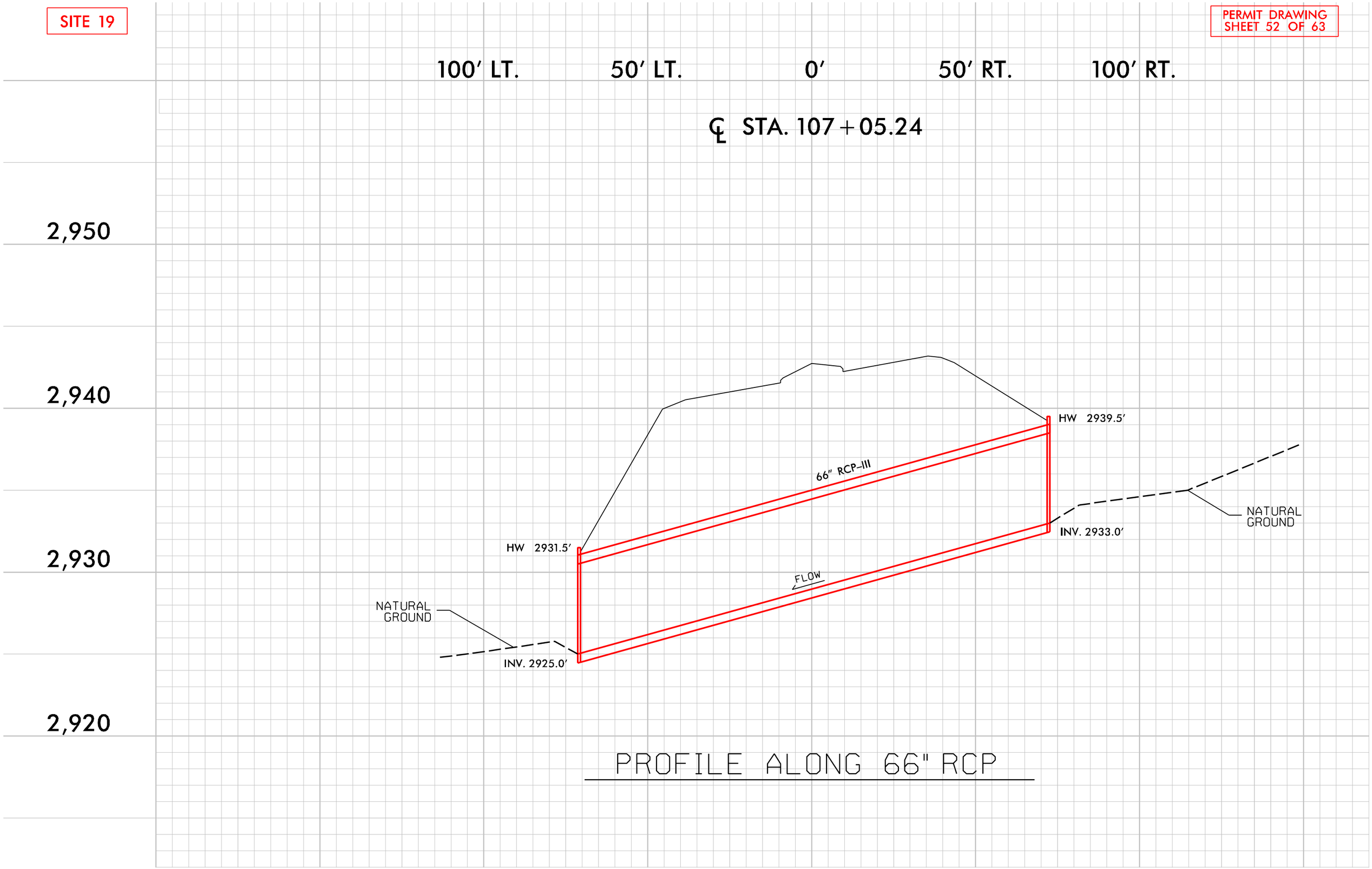


5/14/99

$$$$$$SYSTIME$$$$$
$$$$$$$$$DGN$$$$$$$$$$$$$$$$$$$
$$$$$$USERNAME$$$$$

SITE 19

PERMIT DRAWING
SHEET 52 OF 63



PROFILE ALONG 66" RCP

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 53 OF 63

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

100' 0' 100' 200' 300'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

HC HC DENOTES HAND CLEARING

NAD 83/NSRS 2007
NC GRID

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SITE 21
SITE 22
SITE 23
SITE 23A

MATCHLINE -L- STA. 119+00 - SEE SHEET 11
MATCHLINE -L- STA. 131+00 - SEE SHEET 12

J. CURTIS CHEEK
DB 267 PG 766

ROCK GAP LIMITED PARTNERSHIP
DB 249 PG 2135

WAYNE A. PATRICK
DB 170 PG 427
DB 170 PG 429
DB 326 PG 1930

RONALD D. CHEEK
DB 247 PG 1297
DB 186 PG 640
DB 136 PG 1562
DB 326 PG 1933

SETH RYAN OSBORNE
DB 412 PG 998

MARTHA B. BLACKBURN
DB 262 PG 156

DONALD E. BLACKBURN
DB J4 PG 329

TREE FARM

Q10=32.9 cfs
V10=1.9 fps

Q10=9.6 cfs
V10=1.5 fps

EST 2 TONS CL B RIP RAP
EST 7 SY FILT FAB

15" SIDE DRAIN

EST 26 TONS CL I RIP RAP
EST 35 SY FILT FAB
SEE DETAIL FFF

EST 10 TONS CL B RIP RAP
EST 20 SY FILT FAB
SEE DETAIL GGG

STANDARD V DITCH
SEE DETAIL RR

EST 2 TONS CL B RIP RAP
EST 7 SY FILT FAB

REMOVE & REPLACE TC W/24" RCP

BANK STABILIZATION
RIP RAP ON BANKS ONLY
EST 11 TONS CL B RIP RAP
EST 14 SY FILT FAB
SEE DETAIL TT

SPECIAL CUT DITCH
SEE DETAIL L

FALSE SUMP
SEE DETAIL R

POSSIBLE JUNCTION BOX
APPROXIMATE LOCATION
INVERTS INACCESSIBLE

BERM BASE DITCH
SEE DETAIL CC

BERM BASE DITCH
SEE DETAIL Z

3' DIAMETER SPRING BOX
TOP CONC.=297±(3)

SEE SHEET 27 FOR -L- PROFILE

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 54 OF 63

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

100' 0' 100' 200' 300'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

E E DENOTES EXCAVATION IN WETLAND

HC HC DENOTES HAND CLEARING

NAD 83/NSRS 2007
NC GRID

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SITE 21
SITE 22
SITE 23
SITE 23A

MATCHLINE -L- STA. 119+00 - SEE SHEET 11
MATCHLINE -L- STA. 131+00 - SEE SHEET 12

J. CURTIS CHEEK
DB 267 PG 766

ROCK GAP LIMITED PARTNERSHIP
DB 249 PG 2135

SETH RYAN OSBORNE
DB 412 PG 998

MARTHA B. BLACKBURN
DB 262 PG 156

DONALD E. BLACKBURN
DB J4 PG 329

RONALD D. CHEEK
DB 247 PG 1297
DB 186 PG 640
DB 136 PG 1562
DB 326 PG 1933

WAYNE A. PATRICK
DB 170 PG 427
DB 170 PG 429
DB 326 PG 1930

EST 2 TONS CL B RIP RAP
EST 7 SY FILT FAB

15' SIDE DRAIN

Q10=32.9 cfs
V10=1.9 fps

EST 26 TONS CL I RIP RAP
EST 35 SY FILT FAB
SEE DETAIL FFF

Q10=9.6 cfs
V10=1.5 fps

EST 10 TONS CL B RIP RAP
EST 20 SY FILT FAB
SEE DETAIL GGG

STANDARD V DITCH
SEE DETAIL RR

EST 2 TONS CL B RIP RAP
EST 7 SY FILT FAB

REMOVE & REPLACE TC W/24" RCP

BANK STABILIZATION
RIP RAP ON BANKS ONLY
EST 11 TONS CL B RIP RAP
EST 14 SY FILT FAB
SEE DETAIL TT

SPECIAL CUT DITCH
SEE DETAIL I

FALSE SUMP
SEE DETAIL R

POSSIBLE JUNCTION BOX
APPROXIMATE LOCATION
INVERTS INACCESSIBLE

BERM BASE DITCH
SEE DETAIL EE

BERM BASE DITCH
SEE DETAIL Z

3' DIAMETER SPRING BOX
TOP CONC=2974±(J)

BREMCO 100' EASEMENT

GRAU 350 TL-3

S 62 24' 43.4" E

S 62 26' 33.4" E

TREE FARM

SEE SHEET 27 FOR -L- PROFILE

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 55 OF 63

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ENLARGEMENT SHEET

50' 0' 50' 100' 150'

F F DENOTES FILL IN WETLAND

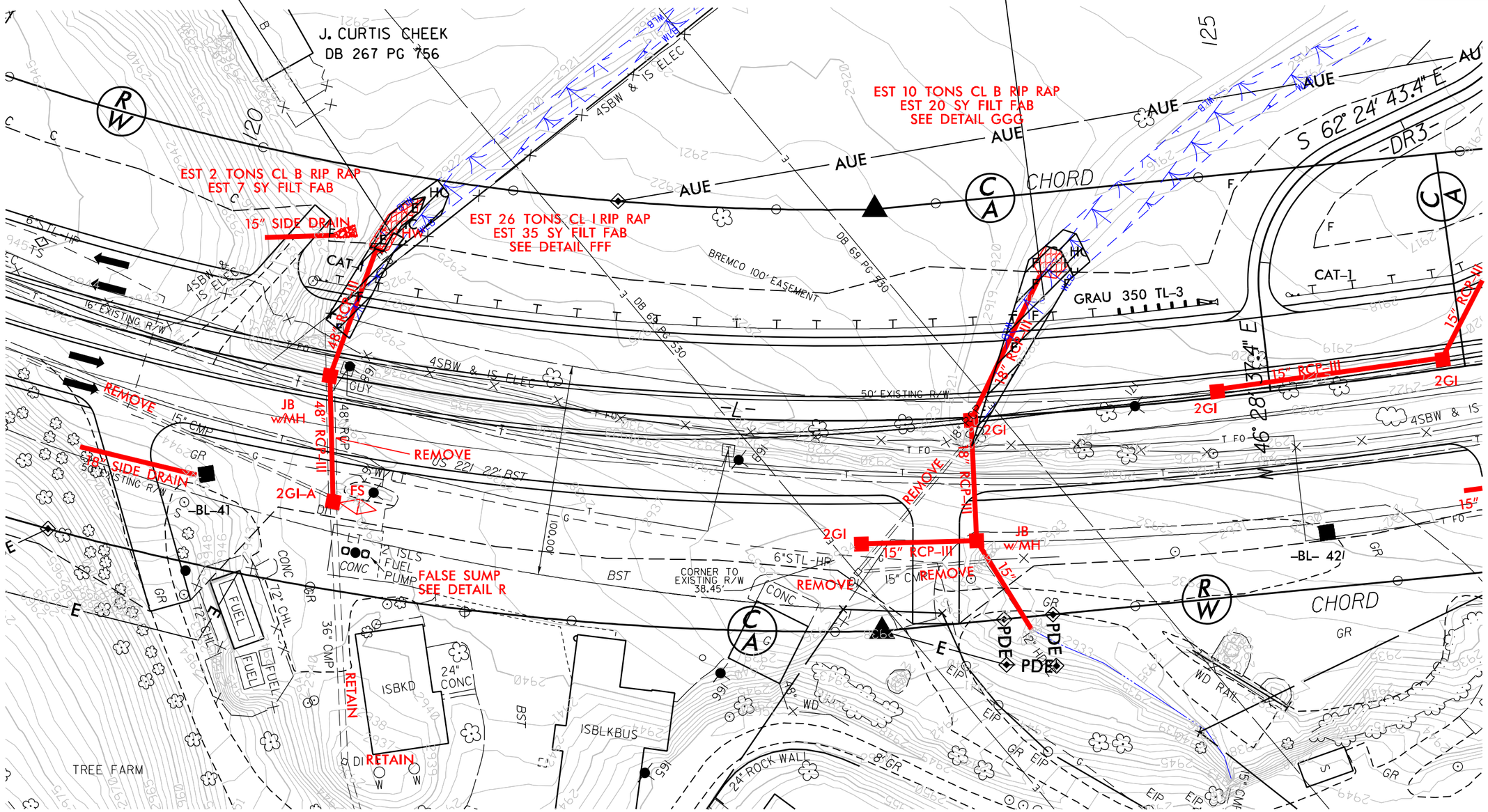
E E DENOTES EXCAVATION IN WETLAND

HC HC DENOTES HAND CLEARING

NAD 83/NSRS 2007
NC GRID

SITE 21

SITE 22



SEE SHEET 27 FOR -L- PROFILE

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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ENLARGEMENT SHEET

GRAPHIC SCALE 50′ 0′ 50′ 100′ 150′

DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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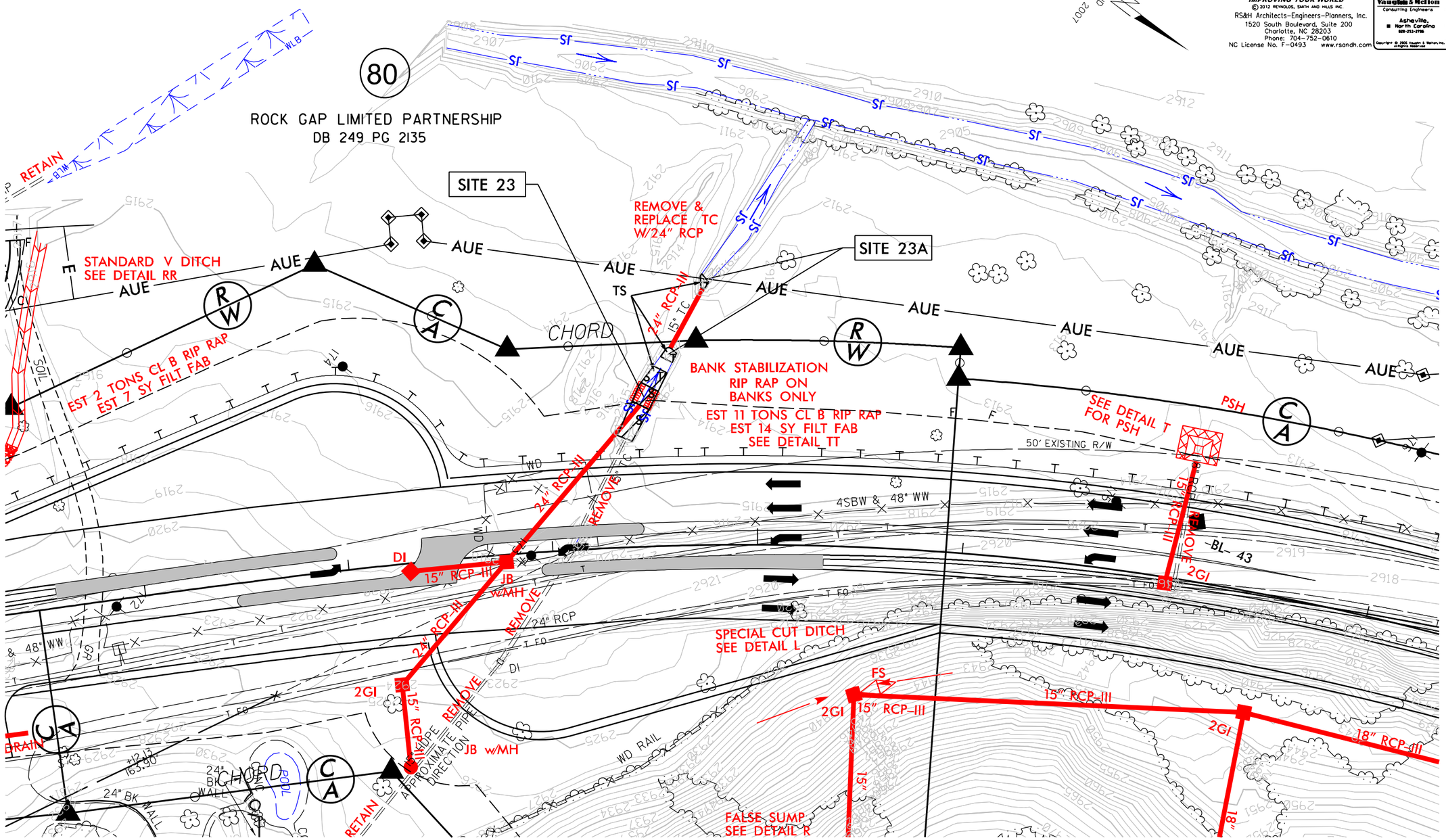

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5/14/99

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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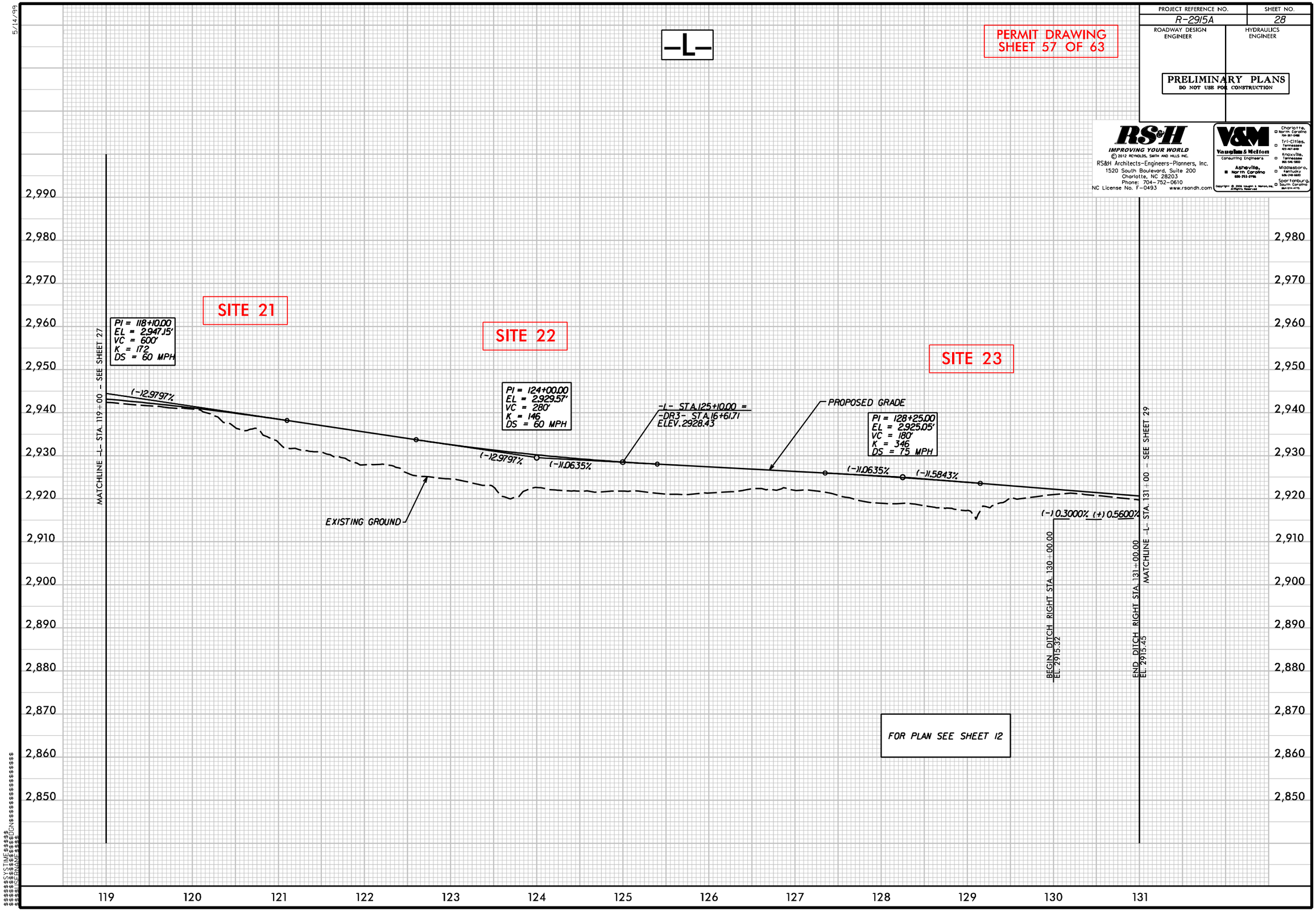

PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-126

WETLAND CROSS SECTION
SITE 21

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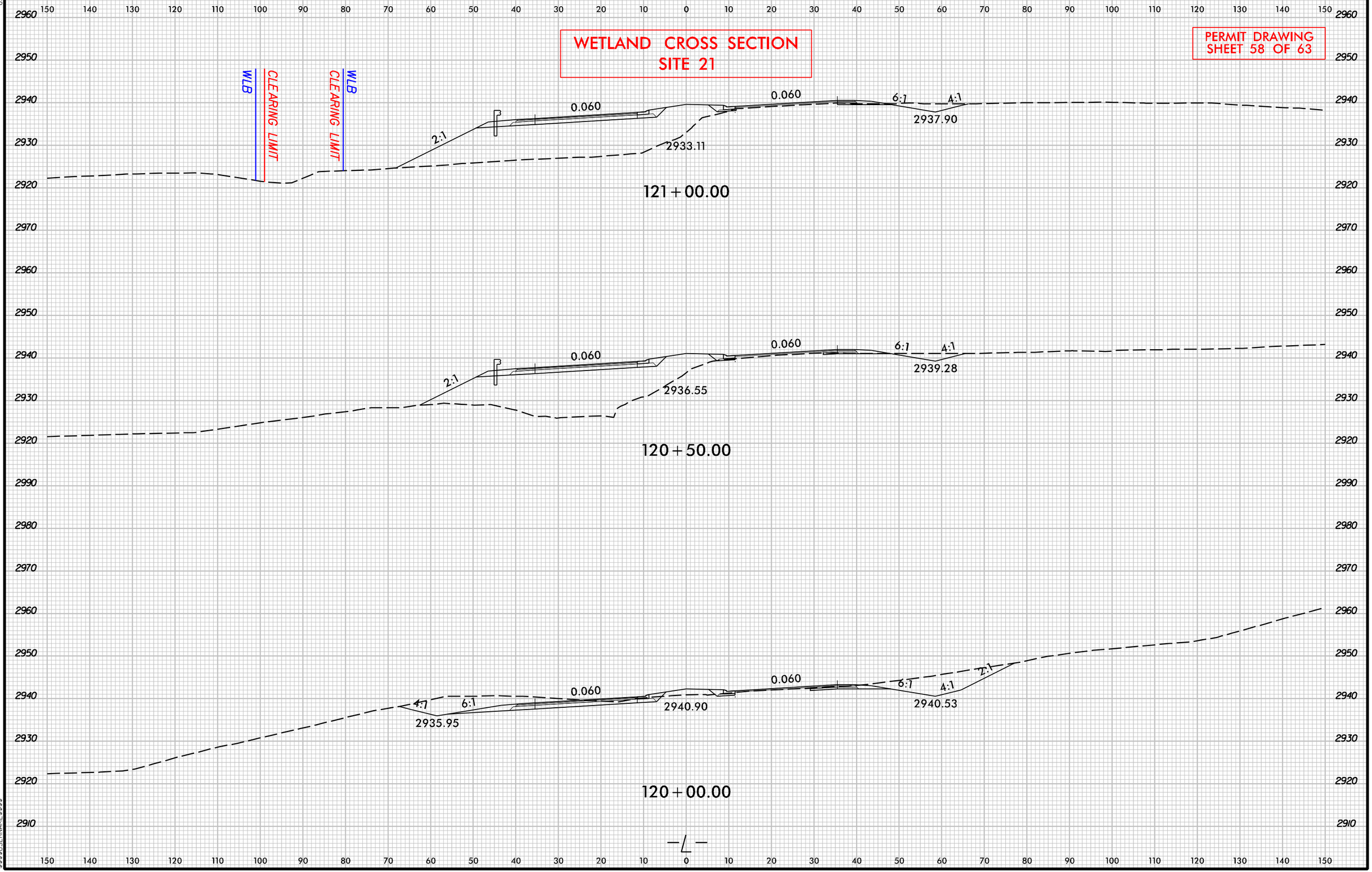
SHEET 58 OF 63



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PROJ. REFERENCE NO.	SHEET NO.
R-2915A	X-129

WETLAND CROSS SECTION
SITE 22

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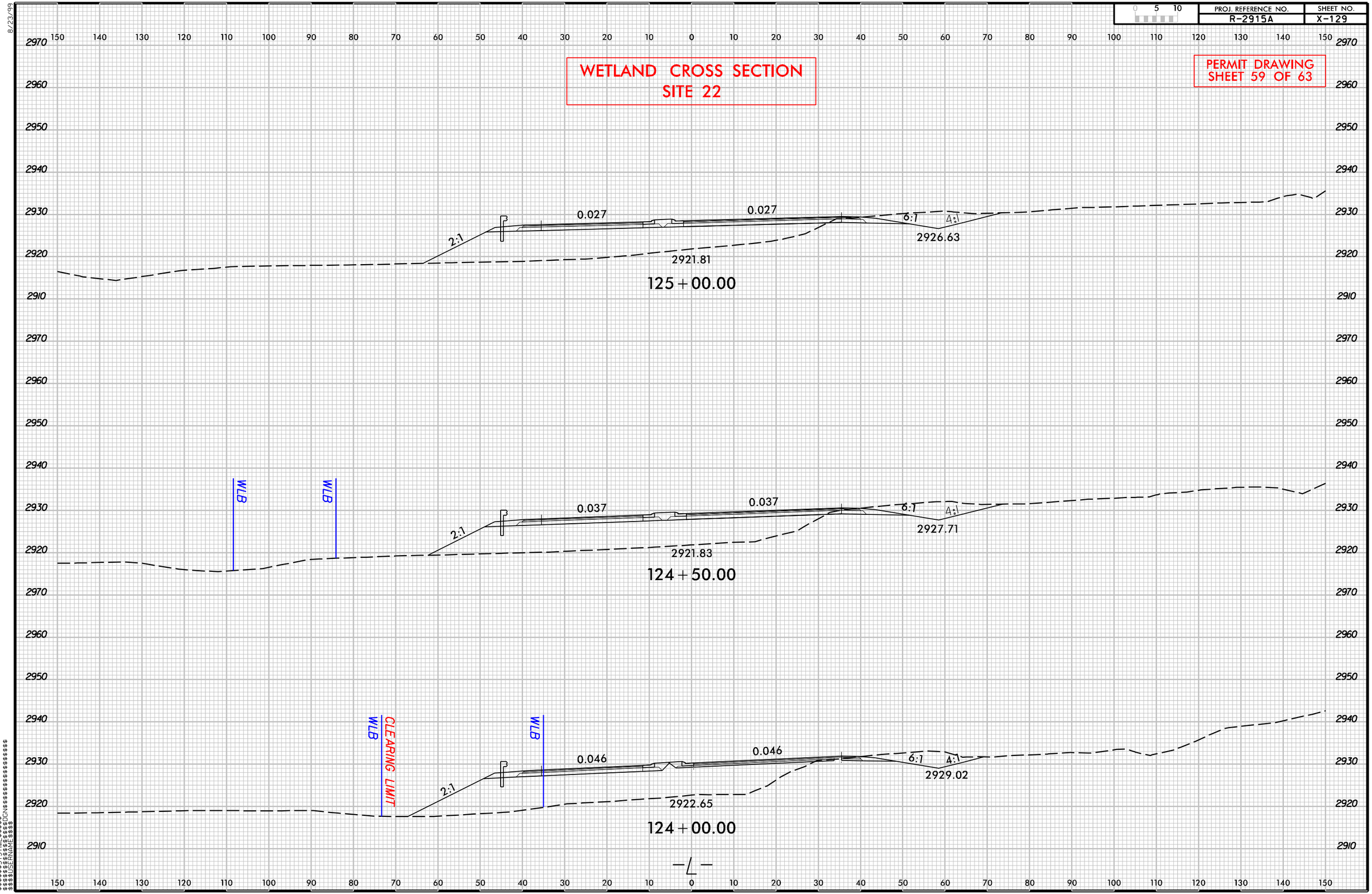
SHEET 59 OF 63



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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 60 OF 63

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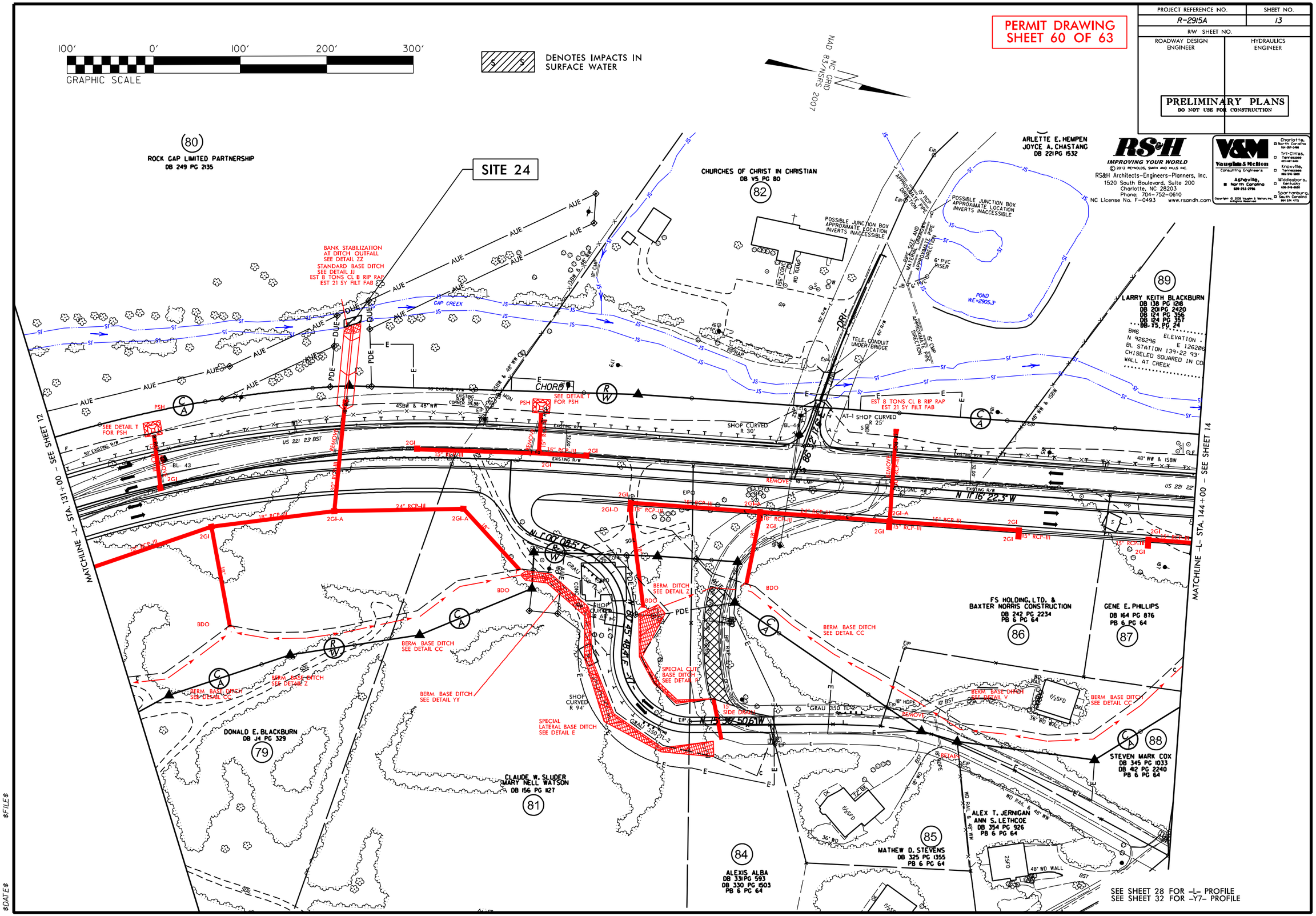

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SHEET 61 OF 63

PRELIMINARY PLANS
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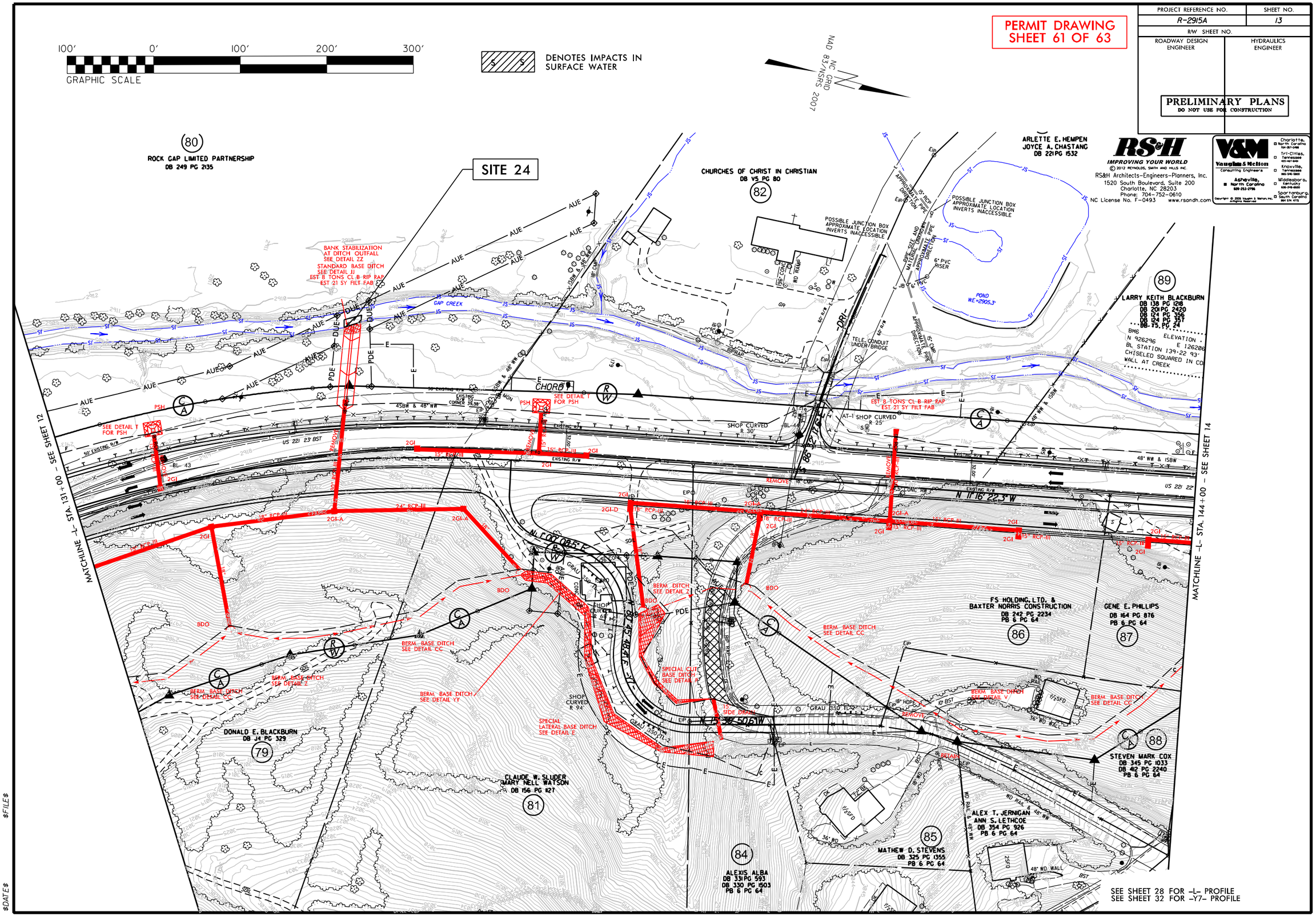

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WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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)
1	LPC 15+91 to 16+65	Roadway Fill	0.25	-	-	-	0.03	-	-	-	-	-
1A	LPC 17+34 to 17+43	18" RCP III	0.03	-	-	-	<0.01	-	-	-	-	-
1B	LPC 19+10 to 19+37	Roadway Fill	0.07	-	-	0.02	<0.01	-	-	-	-	-
2	LPC 14+83 to 14+95	3 @ 11'x8' RCBC	-	-	-	-	-	0.03	-	98	-	-
		Bank Stabilization	-	-	-	-	-	0.02	-	60	-	-
		Temporary Diversion	-	-	-	-	-	-	0.02	-	78	-
3	LPC 21+06 to 16+10	1 @ 9'x7' RCBC	-	-	-	-	-	0.03	-	198	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	-	47	-	-
		Temporary Diversion	-	-	-	-	-	-	<0.01	-	67	-
3A	DR5 10+90	7.25' x 5.25' Metal Arch	-	-	-	-	-	<0.01	<0.01	57	10	-
4	L 13+25 to 13+63	Bank Stabilization at outlet of Dissipator Basin	-	-	-	-	-	<0.01	-	19	-	-
5	L 15+13 to 15+36	Bank Stabilization	<0.01	-	-	-	<0.01	<0.01	<0.01	9	10	-
6	L 26+41 to 26+74	Bank Stabilization	-	-	-	-	-	<0.01	-	15	-	-
7	L 15+74 to 16+96	Roadway Fill	-	-	-	-	-	0.01	<0.01	250	10	-
8	L 33+45 to 33+72	Bank Stabilization	-	-	-	-	-	<0.01	-	12	-	-
9	L 45+63 to 45+91	Bank Stabilization	-	-	-	-	-	<0.01	-	10	-	-
10	L 51+79 to 52+12	54" RCP III	-	-	-	-	-	<0.01	-	74	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	16	10	-
11	L 65+75 to 66+44	2 @ 9'x6' RCBC	-	-	-	-	-	0.02	-	80	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	60	20	-
12	L 75+25 to 75+70	42" RCP III	-	-	-	-	-	<0.01	-	55	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	10	20	-
12A	L 75+93 to 76+10	42" RCP III	-	-	-	-	-	-	<0.01	-	10	-
12B	L 76+44 to 76+48	42" RCP III	-	-	-	-	-	-	<0.01	-	10	-
TOTALS:			0.35	-	-	0.02	0.04	0.13	0.04	1070	245	-

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WATAUGA & ASHE COUNTIES
WBS - 34518.1.2 (R-2915A)

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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)
13	L 79+03 to 79+85	Roadway Fill	-	-	-	-	-	<0.01	<0.01	66	10	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	13	15	-
13A	L 80+15 to 80+42	48" RCP III	-	-	-	-	-	-	<0.01	-	10	-
13B	L 80+79 to 90+03	48" RCP III	-	-	-	-	-	-	<0.01	-	10	-
14	L 84+80 to 84+90	Bank Stabilization	-	-	-	-	-	<0.01	-	13	-	-
15	L 89+14 to 89+19	36" RCP III	-	-	-	-	-	<0.01	-	84	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	26	20	-
16	L 91+98 to 92+24	Bank Stabilization	-	-	-	-	-	<0.01	-	9	-	-
17	L 99+59 to 99+76	60" RCP III	-	-	-	-	-	<0.01	-	26	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	21	20	-
18	L 100+31 to 106+67	Roadway Fill	0.09	-	<0.01	0.05	-	-	-	-	-	-
19	L 106+99 to 107+12	66" RCP III	-	-	-	-	-	<0.01	-	113	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	23	20	-
20	L 111+52 to 111+59	Bank Stabilization	-	-	-	-	-	<0.01	-	9	-	-
21	L 120+56 to 121+06	48" RCP III	0.01	-	<0.01	-	<0.01	-	-	-	-	-
22	L 123+67 to 124+35	18" RCP III	0.03	-	-	-	<0.01	-	-	-	-	-
23	L 129+34 to 129+58	24" RCP III	-	-	-	-	-	<0.01	-	18	-	-
		Bank Stabilization	-	-	-	-	-	<0.01	<0.01	9	10	-
23A	L 129+60 to 129+80	24" RCP III	-	-	-	-	-	-	<0.01	-	10	-
24	L 134+14 to 134+51	Bank Stabilization	-	-	-	-	-	<0.01	-	21	-	-
SHEET TOTALS (SITES 13 - 24)			0.13	-	0.01	0.05	0.01	0.03	0.01	451	125	-
SHEET TOTALS (SITES 1 - 12)			0.35	-	-	0.02	0.04	0.13	0.04	1070	245	-
TOTALS:			0.48	*0.01	0.01	0.08	0.05	0.17	0.05	1521	370	-

*0.01 acre of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

WATAUGA & ASHE COUNTIES
WBS - 34518.1.2 (R-2915A)

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released September 2011)

Project/TIP No.: R-2915B **County(ies):** Ashe

General Project Information

Project No.:	R-2915B	**Project Type:**	Roadway Widening	**Date:**	1/8/2014
NCDOT Contact:	Jay W. Twisdale, Jr. PE	**Contractor / Designer:**	Brian Elam, PE		
Address:	NCDOT Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699	**Address:**	Sungate Design Group 915 Jones Franklin Road Raleigh, NC 27606		
Phone:	919-707-6700	**Phone:**	919-859-2243 x207		
Email:	jtwisdale@ncdot.gov	**Email:**	belam@sungatedesign.com		
City/Town:	West Jefferson	**County(ies):**	Ashe		
River Basin(s):	New	**CAMA County?**	No		
Primary Receiving Water:	See Environmental Summary Sheet	**NCDWQ Stream Index No.:**			
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**				
	Supplemental:				
Other Stream Classification:					
303(d) Impairments:					
Buffer Rules in Effect	N/A				

Project Description

Project Length (lin. Miles or feet):	1.77	**Surrounding Land Use:**	Mountainous, Rural, Farmland

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	21.30 ac.	6.40 ac.
Typical Cross Section Description:	Two 12-foot lanes and a 4-foot paved shoulder in each direction with a 23-foot raised median (2-foot 9-inch mountable C&G and 17.5 feet of grass).	Two 12-foot lanes with roadway ditches.
Average Daily Traffic (veh/hr/day):	Design/Future: ADT for 2035 is 20,204	Existing: ADT for 2015 is 12,089

General Project Narrative:

US-221 from North of Idlewild Rd to North of Lemly Rd: Grassed Swales were used throughout the Project to treat the stormwater. These Grassed Swales have side slopes that are 3:1 or flatter, with many typical ditch side slopes being 6:1 and 4:1, have a velocity during the 2-Year Storm of less than 2 feet per second and have a minimum ditch length equivalent to 100 feet per contributing acre. In addition to the Grassed Swales, Preformed Scour Holes are used at many locations. Also, bridge deck drains are not used over open water, reducing impacts caused by direct roadway runoff.

References

Please fill out all yellow cells as completely as possible. Use pick lists where provided. For more information on the NCDOT Stormwater Management Plan form, please refer to the document, NCDOT Stormwater Best Management Practices Toolbox (2008).
Print area may be adjusted to include sheets as needed.

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released September 2011)

Project/TIP No.: R-2915B **County(ies):** Ashe

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
4	159+80 -L- Rt 161+80 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
4	162+00 -L- Lt 162+60 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
5	165+40 -L- Rt 165+45 -L- RT	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
5	165+95 -L- Lt 166+00 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
5	15+00 -DR2- Lt 13+85-DR2- Rt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
5	172+60 -L- Lt 172+80 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
5	173+90 -L- Lt 174+00 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
6	178+40 -L- Lt 178+50 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
6	180+00 -L- Lt 182+00 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
6	186+20 -L- Lt 186+40 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
6	187+60 -L- Rt 189+40 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
7	197+20 -L- Lt 198+90 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Stabilization		
8	207+00 -L- Rt 207+10 -L- Rt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
8	209+20 -L- Lt 209+25 -L- Lt	Stream		Gap Creek		10-1-23	C; Tr+	None	Culvert		
8	208+70 -L- Rt 209+60 -L- Rt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		
8	210+00 -L- Lt 210+40 -L- Lt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Excavation		
9	215+50 -L- Rt 217+40 -L- Rt	Wetland		Gap Creek		10-1-23	C; Tr+	None	Fill		

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released September 2011)

Project/TIP No.: R-2915B **County(ies):** Ashe

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
9	217+40 -L- Lt 217+50 -L- Lt	Stream		Gap Creek		10-1-23	C, Tr+	None	Culvert		
9	217+20 -L- Rt 217+70 -L- Rt	Stream		Gap Creek		10-1-23	C, Tr+	None	Stabilization		
9	222+50 -L- Rt 222+80 -L- Rt	Stream		Gap Creek		10-1-23	C, Tr+	None	Stabilization		
11	242+40 -L- Rt 242+50 -L- Rt	Stream		South Fork New River		10-1-(20.5)	WS-V; HQW	None	Stabilization		
11	243+30 -L- Lt 243+50 -L- Lt	Stream		South Fork New River		10-1-(20.5)	WS-V; HQW	None	Stabilization		

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released September 2011)

Project/TIP No.: R-2915B **County(ies):** Ashe

Swales

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
4	160+20 -L- Rt 161+00 -L- Rt	NA	2.0	3	3	0.78	78	80	0.50%	1.5	2.0	2.0	2.6	No
8	211+80 -L- Rt 215+55 -L- Rt	NA	2.0	6	3	0.98	98	375	1.60%	2.4	2.0	3.3	2.2	No
9	224+50 -L- Lt 229+50 -L- Lt	NA	5.0	4	3	4.70	470	500	0.70%	7.1	2.0	9.4	2.1	No
10	233+80 -L- Rt 238+00 -L- Rt	NA	2.0	3	3	2.10	210	420	0.31%	5.6	1.5	7.4	1.6	No
11	244+00 -L- Lt 247+00 -L- Lt	NA	3.0	3	3	1.70	170	300	1.50%	4.2	2.2	5.5	2.4	No
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☐ YES ☑ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

2yr velocity requirement not met for swale at 244+00 -L- LT due to ditch slope.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released September 2011)

Project/TIP No.: R-2915B **County(ies):** Ashe

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
5	165+00 -L- Lt	PFSH	Class 'B'	0.64	Pipe	15	2.4	0.8
5	171+50 -L- Lt	PFSH	Class 'B'	1.18	Pipe	15	4.4	1.0
5	174+00 -L- Lt	Riprap Apron / Pad	Class I	18.19	Pipe	30	28.6	1.9
6	178+50 -L- Lt	Riprap Apron / Pad	Class I	4.57	Pipe	24	7.8	1.3
6	182+75 -L- Lt	PFSH	Class 'B'	3.86	Pipe	18	8.9	1.4
6	186+43 -L- Lt	PFSH	Class 'B'	0.19	Pipe	15	0.9	0.6
7	200+00 -L- Rt	PFSH	Class 'B'	0.20	Pipe	15	0.8	0.5
8	204+00 -L- Rt	PFSH	Class 'B'	2.18	Pipe	15	4.7	1.1
8	206+50 -L- Rt	PFSH	Class 'B'	2.33	Pipe	15	4.0	1.0
8	211+27 -L- Rt	PFSH	Class 'B'	2.14	Pipe	15	4.7	1.1
9	216+75 -L- Rt	PFSH	Class 'B'	1.06	Pipe	15	4.8	1.1
9	221+95 -L- Rt	PFSH	Class 'B'	0.16	Pipe	15	0.6	0.5
10	231+50 -L- Rt	PFSH	Class 'B'	0.33	Pipe	15	1.2	0.6
10	232+80 -L- Rt	PFSH	Class 'B'	0.13	Pipe	15	0.5	0.4
10	238+00 -L- Lt	PFSH	Class 'B'	0.61	Pipe	15	2.5	0.8

☑ YES ☐ NO Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.

Additional Comments

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, 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-2915B

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

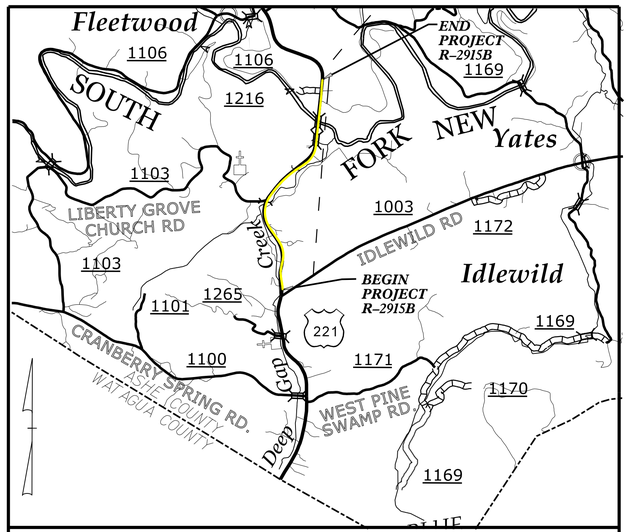
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915B	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34518.1.3	STP-0221(40)	P.E.
34518.2.FR2	STP-0221(40)	R /W
34518.2.UFR2	STP-0221(40)	UTILITIES

PERMIT DRAWING
SHEET 1 OF 31

LOCATION: US 221 FROM SR 1003 (IDLEWILD ROAD) TO NORTH OF SOUTH FORK NEW RIVER

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

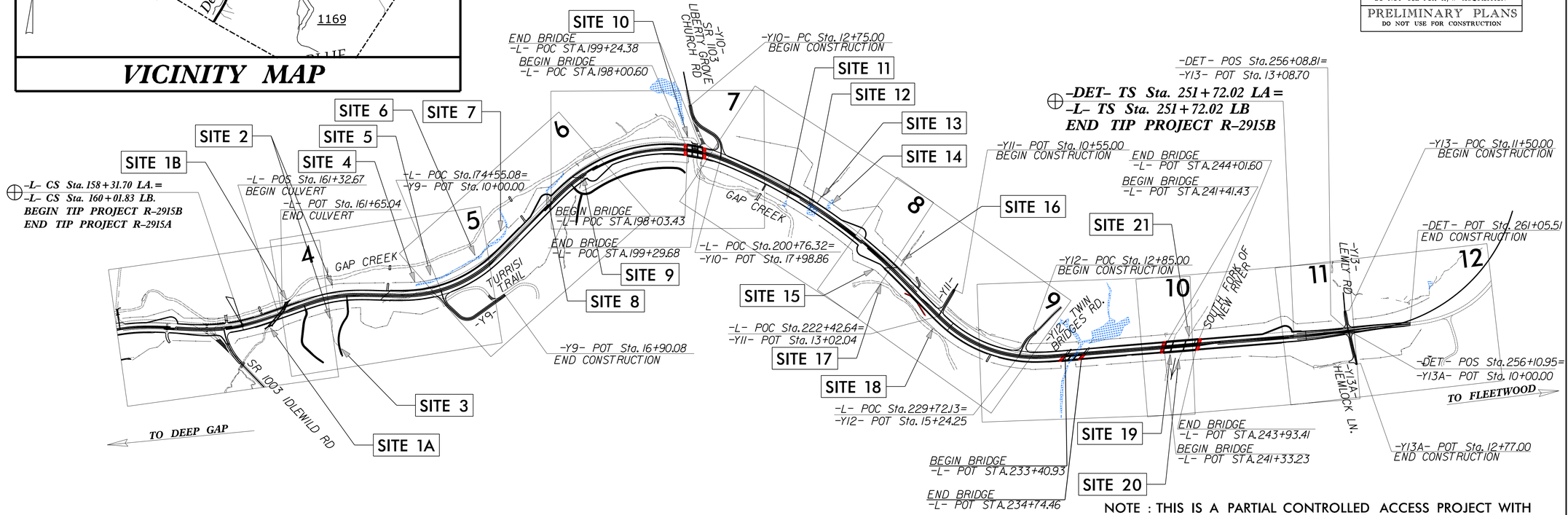


VICINITY MAP

R/W PLANS

NAD 83/CORS

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



WETLAND AND SURFACE WATER IMPACTS PERMIT

NOTE : THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO ONE DRIVEWAY PER PARCEL.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

NCDOT CONTACT: BRENDA L. MOORE, P.E.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 12,089
ADT 2035 = 20,204
DHV = 10 %
D = 65 %
T = 9 % *
V = 50 MPH
* TTST 2% DUAL 7%
FUNC CLASS = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915B = 1.675 MILES
LENGTH STRUCTURE TIP PROJECT R-2915B = 0.094 MILES
TOTAL LENGTH TIP PROJECT R-2915B = 1.769 MILES

Prepared in the Office of:
CDM Smith
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2013

LETTING DATE:
JUNE 16, 2015

DOUGLAS B. SAUNDERS, P.E.
PROJECT ENGINEER

RICKY E. STATON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

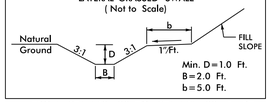
STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

6/6/2014
R2915B_Hyd_prm_wet_psh_01.dgn
bellgm

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

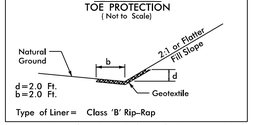
PERMIT DRAWING SHEET 2 OF 31

DETAIL #1
LATERAL GRASSED SWALE
(Not to Scale)



FROM STA. 160+20 TO STA. 161+00 –L– RT
FROM STA. 215+00 TO STA. 217+40 –L– LT
FROM STA. 234+35 TO STA. 238+00 –L– RT

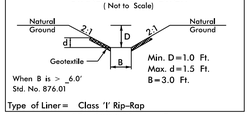
DETAIL #2
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 161+00 TO STA. 161+70 –L– RT
FROM STA. 197+50 TO STA. 197+80 –L– RT
FROM STA. 250+00 TO STA. 251+50 –L– RT
FROM STA. 251+00 TO STA. 252+50 –L– LT

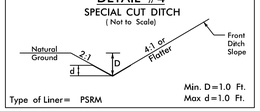
DETAIL #3
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

STA. 166+00 –L– LT

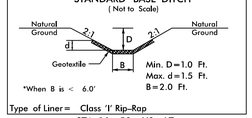
DETAIL #4
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 10+50 TO STA. 16+00 –Y9– LT & RT
FROM STA. 16+20 TO STA. 16+90 –Y9– RT
FROM STA. 10+50 TO STA. 12+10 –Y7A– RT
FROM STA. 10+50 TO STA. 12+50 –Y7A– LT
FROM STA. 11+50 TO STA. 12+50 –Y7– LT
FROM STA. 10+50 TO STA. 15+43 –DR1– RT & LT
FROM STA. 10+50 TO STA. 14+90 –DR2– RT & LT
FROM STA. 11+30 TO STA. 15+00 –DR3– RT & LT
FROM STA. 17+00 TO STA. 19+72 –DR3– RT & LT

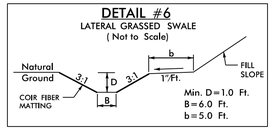
DETAIL #5
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

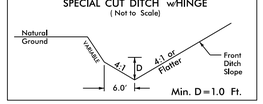
STA. 16+50 –Y9– LT

DETAIL #6
LATERAL GRASSED SWALE
(Not to Scale)



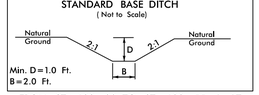
FROM STA. 180+00 TO STA. 182+00 –L– LT

DETAIL #7
SPECIAL CUT DITCH wHINGE
(Not to Scale)



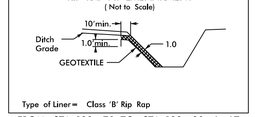
FROM STA. 196+50 TO STA. 197+00 –L– RT

DETAIL #8
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 198+80 TO STA. 199+55 –L– LT

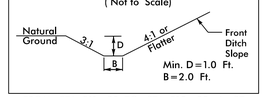
DETAIL #9
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'B' Rip Rap

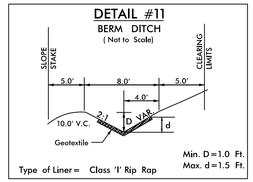
FROM STA. 198+70 TO STA. 198+90 –L– LT
FROM STA. 217+27 TO STA. 217+40 –L– LT
FROM STA. 242+50 TO STA. 242+70 –L– RT
FROM STA. 243+40 TO STA. 243+60 –L– LT

DETAIL #10
SPECIAL CUT GRASSED SWALE
(Not to Scale)



FROM STA. 211+80 TO STA. 215+55 –L– RT

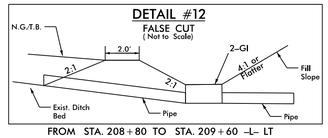
DETAIL #11
BERM DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip Rap

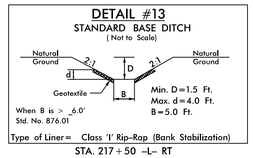
FROM STA. 171+50 TO STA. 172+75 –L– RT

DETAIL #12
FALSE CUT
(Not to Scale)



FROM STA. 208+80 TO STA. 209+60 –L– LT

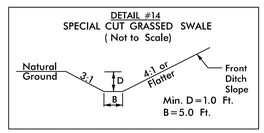
DETAIL #13
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap (Bank Stabilization)

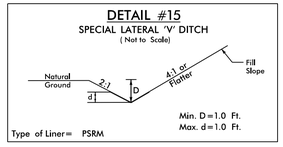
STA. 217+50 –L– RT

DETAIL #14
SPECIAL CUT GRASSED SWALE
(Not to Scale)



FROM STA. 222+50 TO STA. 229+50 –L– LT

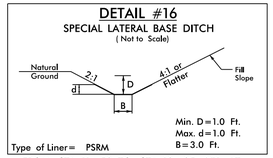
DETAIL #15
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 10+55 TO STA. 12+18 –Y11– RT
FROM STA. 13+95 TO STA. 14+55 –Y12– RT

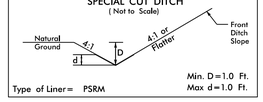
DETAIL #16
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 11+50 TO STA. 12+35 –Y11– LT

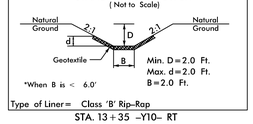
DETAIL #17
SPECIAL CUT DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 252+00 TO STA. 255+50 –DET– RT
FROM STA. 253+00 TO STA. 255+50 –DET– LT
FROM STA. 256+42 TO STA. 261+05 –DET– RT
FROM STA. 256+50 TO STA. 260+50 –DET– LT

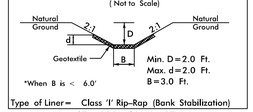
DETAIL #18
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

STA. 13+35 –Y10– RT

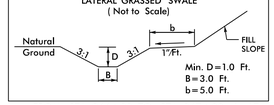
DETAIL #19
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap (Bank Stabilization)

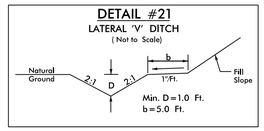
STA. 222+69 –L– RT

DETAIL #20
LATERAL GRASSED SWALE
(Not to Scale)



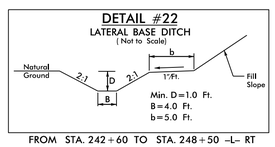
FROM STA. 244+00 TO STA. 247+00 –L– LT

DETAIL #21
LATERAL 'V' DITCH
(Not to Scale)



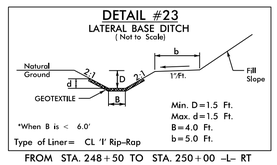
FROM STA. 247+00 TO STA. 249+00 –L– LT

DETAIL #22
LATERAL BASE DITCH
(Not to Scale)



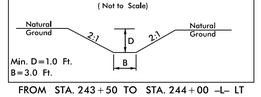
FROM STA. 242+60 TO STA. 248+50 –L– RT

DETAIL #23
LATERAL BASE DITCH
(Not to Scale)



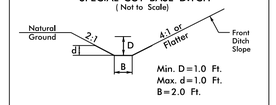
FROM STA. 248+50 TO STA. 250+00 –L– RT

DETAIL #24
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 243+50 TO STA. 244+00 –L– LT

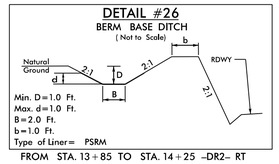
DETAIL #25
SPECIAL CUT BASE DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 14+50 TO STA. 14+90 –DR2– LT
FROM STA. 14+25 TO STA. 14+35 –DR2– RT

DETAIL #26
BERM BASE DITCH
(Not to Scale)



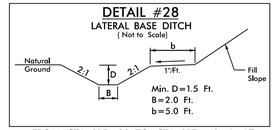
FROM STA. 13+85 TO STA. 14+25 –DR2– RT

DETAIL #27
STANDARD BASE GRASSED SWALE
(Not to Scale)

*NOTES:
1) LONGITUDINAL SLOPES BETWEEN 0.3% AND 4.0%.
2) MODIFICATIONS MAY BE NEEDED, AS APPROVED BY ENGINEER.

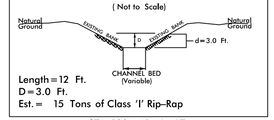
FROM STA. 233+80 TO STA. 234+35 –L– RT

DETAIL #28
LATERAL BASE DITCH
(Not to Scale)



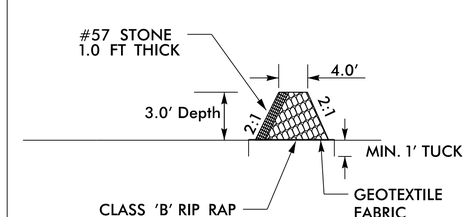
FROM STA. 215+00 TO STA. 217+40 –L– LT

DETAIL #29
PIPE OUTLET CHANNEL
(Not to Scale)



STA. 189+40 –L– LT

DETAIL #30
FILTER BERM SECTION VIEW
(Not to Scale)



EST 10 TONS #57 STONE
EST 40 TONS CL B RIP RAP
EST 70 SY GEOTEXTILE

STA. 198+00 –L– RT

5/14/99

6/13/2014
R2915B_hyd_DETAILS.dgn
bstem

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 3 OF 31

DETAIL #31

(NOT TO SCALE)

SKEWED MULTI-BARREL CULVERT LOW FLOW CHANNEL,SILLS AND FLOOD PLAIN

*NOTES:

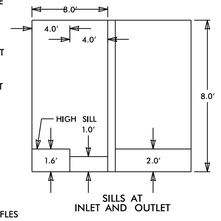
1) NATIVE MATERIAL BETWEEN SILLS/BAFFLES IN THE CULVERT SHALL PROVIDE A CONTINUOUS LOW FLOW CHANNEL. NATIVE MATERIAL CONSISTS OF MATERIAL THAT IS EXCAVATED FROM THE THE STREAM OR FLOODPLAIN AT THE PROJECT SITE DURING CONSTRUCTION. ONLY MATERIAL THAT IS EXCAVATED FROM THE STREAM BED MAY BE USED TO LINE THE LOW FLOW CULVERT BARREL. RIP-RAP MAY BE USED TO SUPPLEMENT THE NATIVE MATERIAL IN THE HIGH FLOW CULVERT BARREL(S). IF RIP-RAP IS USED TO LINE THE HIGH FLOW CULVERT BARREL(S), NATIVE MATERIAL SHOULD BE PLACED ON TOP TO FILL VOIDS AND PROVIDE A FLAT SURFACE FOR ANIMAL PASSAGE. NATIVE MATERIAL IS SUBJECT TO APPROVAL BY THE ENGINEER AND MAY BE SUBJECT TO PERMIT CONDITIONS.

2) SILLS/BAFFLES ARE TO BE 1.0 FT. WIDE, CAST SEPARATELY AND ATTACHED BY DOWELS.

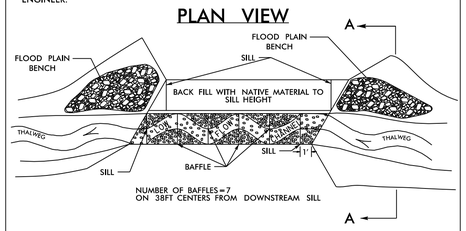
3) TOP OF LOW FLOW SILLS/BAFFLES SHOULD MATCH STREAM BED ELEVATION IN LOW FLOW CHANNEL OF STREAM. (THALWEG)

4) DO NOT SET ELEVATION OF HIGH SILL/BAFFLES ABOVE BANK FULL.

5) NUMBER OF SILL/BAFFLES DETERMINED BY THE ENGINEER.

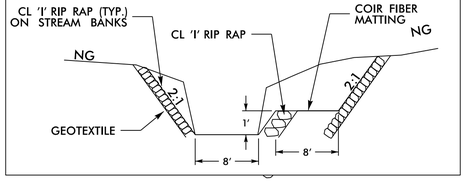


PLAN VIEW



SECTION A-A

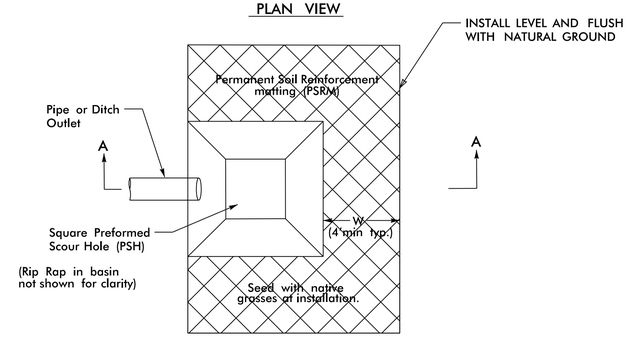
INLET AND OUTLET CHANNEL



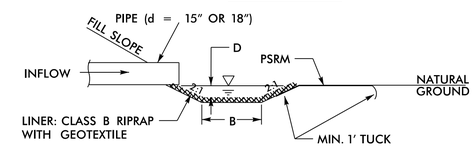
PREFORMED SCOUR HOLE

*NOT TO SCALE

PLAN VIEW



SECTION A-A



STATION	B FT.	D FT.	CLASS B RIP RAP TONS	DDE (CU YD)	GEOTEXTILE FABRIC (SQ YD)	PSRM (SQ YD)
FOR 15" PIPE	4.0	1.0	7	19.6	20	30
165+00 -L- LT	4.0	1.0	7	19.6	20	30
171+50 -L- LT	4.0	1.0	7	19.6	20	30
186+43 -L- LT	4.0	1.0	7	19.6	20	30
200+00 -L- RT	4.0	1.0	7	19.6	20	30
204+00 -L- RT	4.0	1.0	7	19.6	20	30
206+50 -L- RT	4.0	1.0	7	19.6	20	30
211+27 -L- RT	4.0	1.0	7	19.6	20	30
216+75 -L- RT	4.0	1.0	7	19.6	20	30
221+95 -L- RT	4.0	1.0	7	19.6	20	30
231+50 -L- RT	4.0	1.0	7	19.6	20	30
232+80 -L- RT	4.0	1.0	7	19.6	20	30
238+00 -L- LT	4.0	1.0	7	19.6	20	30
TOTAL			84	236	240	360
FOR 18" PIPE	6.0	1.0	10	28.0	27	35
182+75 -L- LT	6.0	1.0	10	28.0	27	35
TOTAL			10	28	27	35
GRAND TOTAL			157	440	447	665

5/14/99
6/6/2014
R2915B_hyd_DETAILS.dgn
bmilam

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412
SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING
SHEET 4 OF 31

NAD 83 /CORS

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- CS Sta. 158+31.70 LA.=
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

HERBERT D. WATSON, L/E
CATHERINE R. CLARK
HUBERT E. HAMILTON
SHANE VANNOY, LLC
RAY T. SMITH, ET.AL
FS HOLDING, LTD. & BAXTER NORRIS CONSTRUCTION
KAREN FLOWE PRESLAR
AMY F. ROSE
SHANE VANNOY, LLC
AREA UNDER CONSTRUCTION
RICHARD FAYKO, JR. AND WIFE DONNA FAYKO
BRUCE R. GREENE AND WIFE RETA H. GREENE
KEITH BLACKBURN
LAVERNE E. WATSON
MARTHA D. WATSON
BAXTER DERRICK HARDIN
LONNIE MILLER
KENNETH DAY
WENDELL WILCOX
TRUSTEES OF MORNING STAR BAPTIST CHURCH
THOMAS R. GRIGGS
PATRICIA D. GRIGGS
CHARLES G. DEAL
VIOLA A. DEAL
THOMAS R. GRIGGS
DEAN POTTER

SITE 1B

-L- TS Sta. 162+63.70
-L- POT Sta. 161+65.04
END CULVERT
-L- ST Sta. 161+55.70
-L- POS Sta. 161+32.67
BEGIN CULVERT
-L- POS Sta. 163+50.44=
-DRI- POT Sta. 10+00.00
CL 'I' RIP RAP STREAM BANK STABILIZATION AND FLOODPLAIN BENCH EST. 15 TONS SEE DETAIL #31
SHOULDER BERM GUTTER FROM STA. 160+25 TO STA. 162+63 -L- LT
GRADE TO DRAIN
-DRI- PC Sta. 10+53.29
-DRI- PRC Sta. 10+88.19
TOE PROTECTION CL 'B' RIP RAP SEE DETAIL#2
-DRI- PT Sta. 11+61.45
REMOVE
CL 'B' RIP RAP EST. 2 TONS EST. 7 SY GF
LAT 2' GRASSED SWALE SEE DETAIL #1
CL 'I' RIP RAP STREAM BANK STABILIZATION AND FLOOPLAIN BENCH EST 45 TONS SEE DETAIL #31
-DRI- PC Sta. 12+79.58
-DRI- PT Sta. 13+49.50
LINE PROP DITCH W/PSRM EST. 660 SY SEE DETAIL #4
-DRI- PC Sta. 14+35.40
-DRI- PT Sta. 14+98.10
-DRI- POT Sta. 15+43.00
N 8°58' 22.7" W
MATCH TO SHEET 5 -L- POC Sta. 164+00.00

SEE SHEET 13 FOR -L- PROFILE
SEE SHEET 20 FOR -DRI- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2014
R2915B_Hyd_prm_wet_psh_04.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING SHEET 5 OF 31

NAD 83 /CORS

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-L- CS Sta. 158+31.70 LA.=
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

HERBERT D. WATSON, L/E
CATHERINE R. CLARK
HUBERT E. HAMILTON
SHANE VANNOY, LLC
RAY T. SMITH, ET.AL
F.S HOLDING, LTD. & BAXTER NORRIS CONSTRUCTION
KAREN FLOWE PRESLAR, AMY F. ROSE
RICHARD FAYKO, JR. AND WIFE DONNA FAYKO
BRUCE R. GREENE AND WIFE RETA H. GREENE
KEITH BLACKBURN
LAVERNE E. WATSON, MARTHA D. WATSON
BAXTER DERRICK HARDIN, LONNIE MILLER, KENNETH DAY, WENDELL WILCOX, TRUSTEES OF MORNING STAR BAPTIST CHURCH
THOMAS R. GRIGGS, PATRICIA D. GRIGGS, CHARLES G. DEAL, VIOLA A. DEAL
THOMAS R. GRIGGS
DEAN POTTER

-L- TS Sta. 162+63.70
-L- POT Sta. 161+65.04 END CULVERT
-L- ST Sta. 161+55.70
-L- POS Sta. 161+32.67 BEGIN CULVERT
-L- POS Sta. 163+50.44= -DRI- POT Sta. 10+00.00
-DRI- PC Sta. 10+53.29
-DRI- PRC Sta. 10+88.19
-DRI- PT Sta. 11+61.45
-DRI- PC Sta. 12+79.58
-DRI- PT Sta. 13+49.50
-DRI- PC Sta. 14+35.40
-DRI- PT Sta. 14+98.10
-DRI- POT Sta. 15+43.00

SITE 1B
SITE 1A

CL 'I' RIP RAP STREAM BANK STABILIZATION AND FLOODPLAIN BENCH EST. 15 TONS SEE DETAIL #31
SHOULDER BERM GUTTER FROM STA. 160+25 TO STA. 162+63 -L- LT
GRADE TO DRAIN
TOE PROTECTION CL 'B' RIP RAP SEE DETAIL #2
CL 'B' RIP RAP EST. 2 TONS EST. 7 SY GF
LAT 2' GRASSED SWALE SEE DETAIL #1
REMOVE
CL 'I' RIP RAP STREAM BANK STABILIZATION AND FLOODPLAIN BENCH EST 45 TONS SEE DETAIL #31
LINE PROP DITCH W/PSRM EST. 660 SY SEE DETAIL #4

MATCH TO SHEET 5 -L- POC Sta. 164+00.00

SEE SHEET 13 FOR -L- PROFILE
SEE SHEET 20 FOR -DRI- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2014
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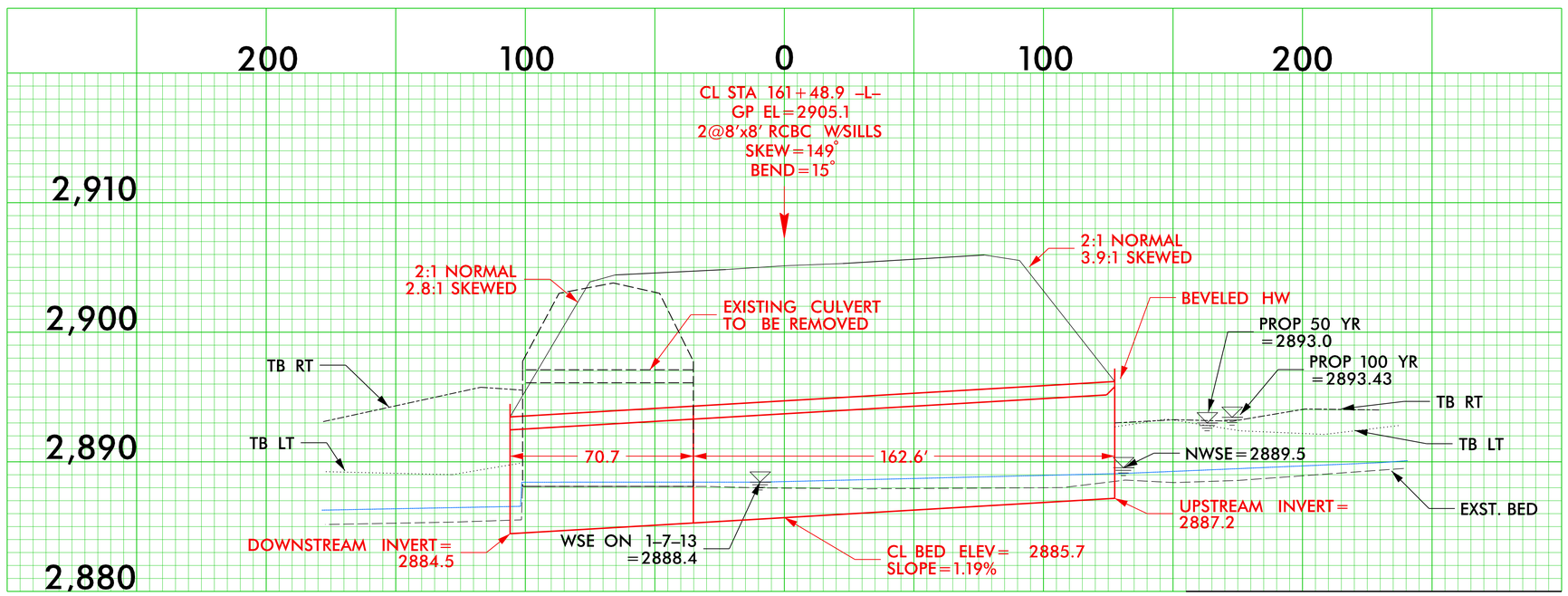
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	CULV
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 31



REVISIONS

8/17/99

6/6/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

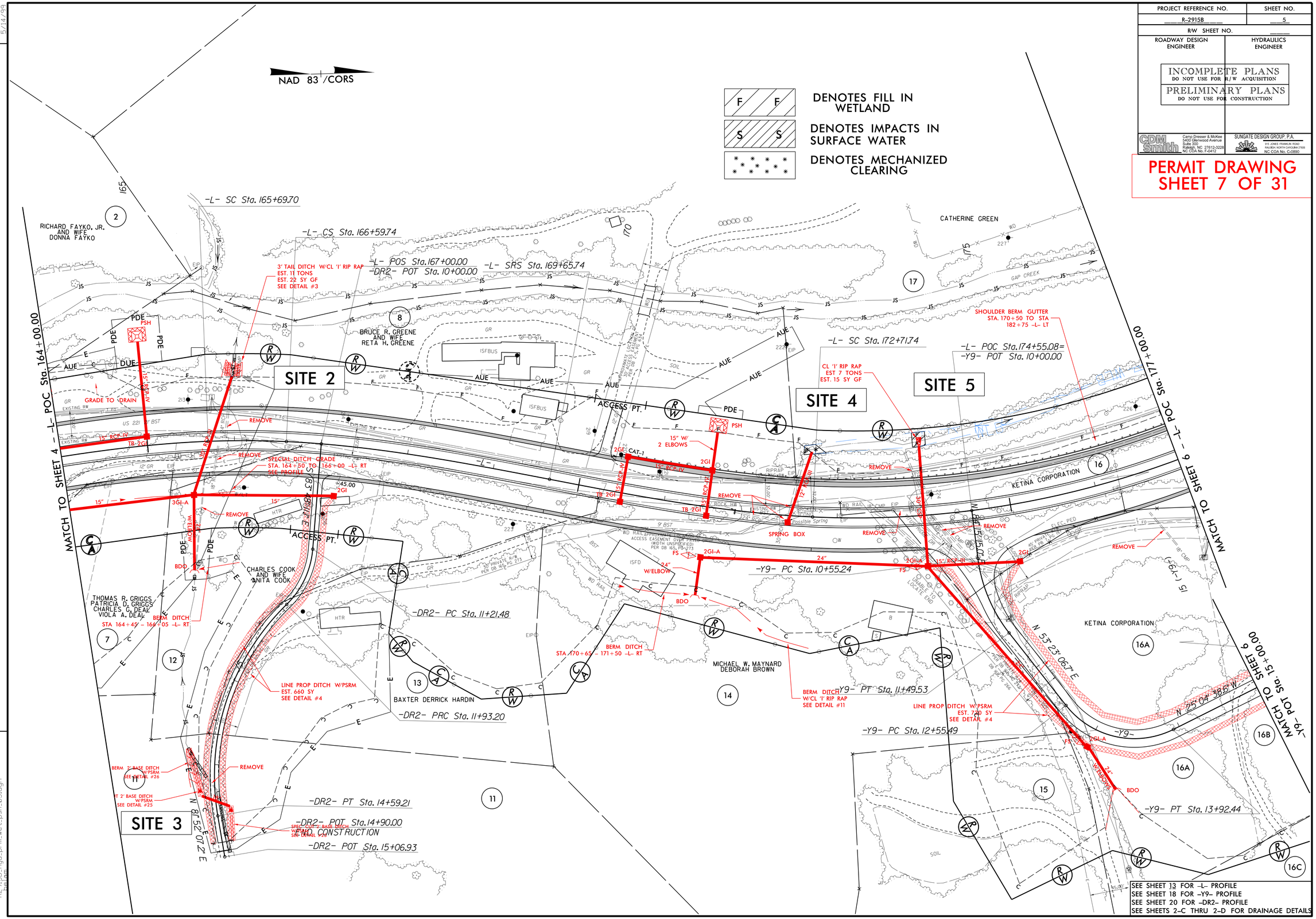
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC CDA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING
SHEET 7 OF 31



REVISIONS

5/14/99

8/6/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

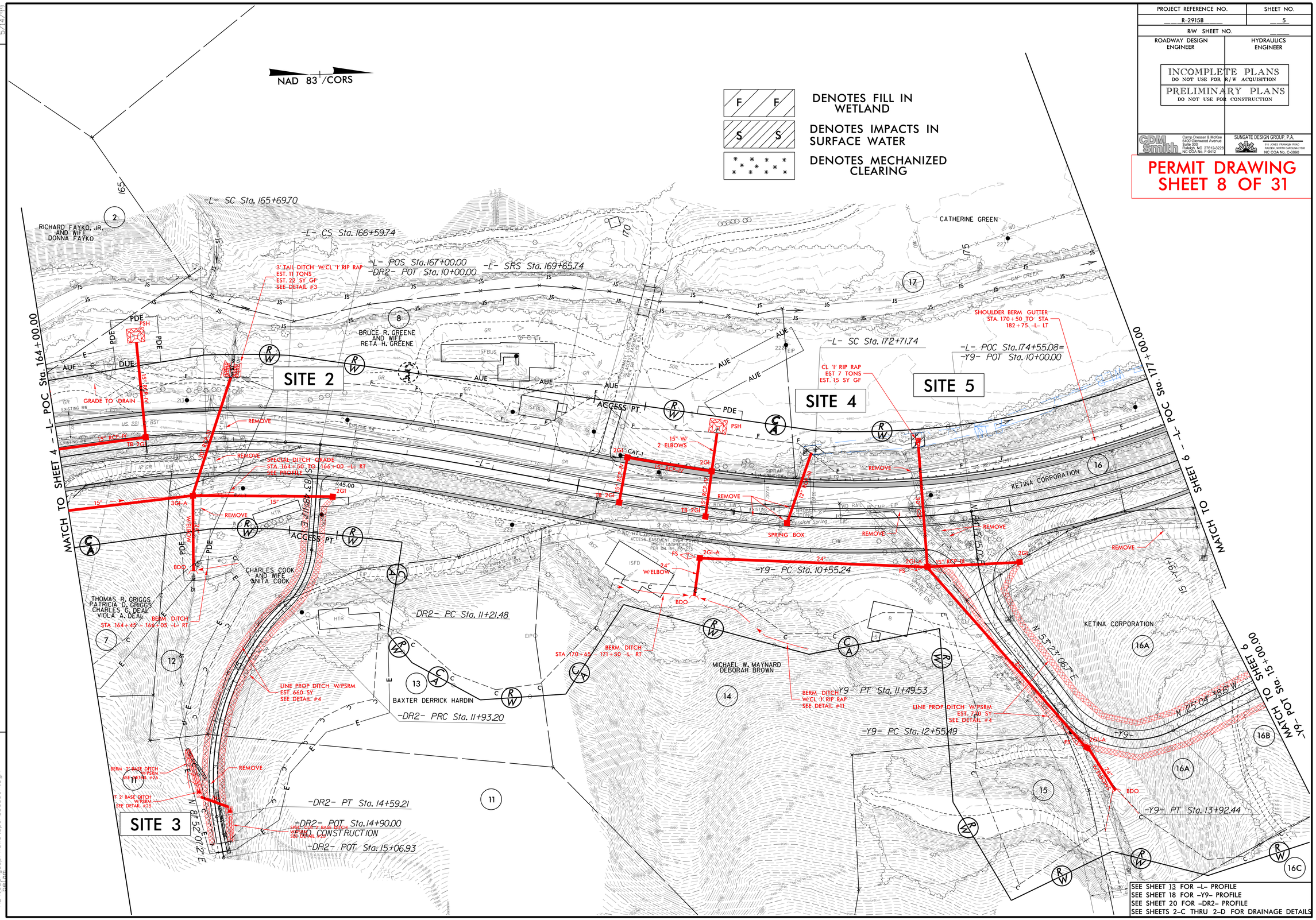
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

PERMIT DRAWING
SHEET 8 OF 31



REVISIONS

5/14/99

6/6/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

PERMIT DRAWING
SHEET 9 OF 31

DENOTES IMPACTS IN SURFACE WATER

DENOTES EXCAVATION IN WETLAND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83 / CORS

SITE 6

SITE 7

SITE 8

SITE 9

-L- CS Sta. 178+39.62

-L- ST Sta. 181+45.62

-L- TS Sta. 185+41.14

-L- POS Sta. 188+09.10=
-DR3- POT Sta. 10+00.00

-L- SC Sta. 188+47.14

-DR3- PC Sta. 10+54.16

-DR3- PRC Sta. 12+02.77

-DR3- POC Sta. 11+16.30=
-DR3B- POT Sta. 10+00.00

-DR3B- PC Sta. 10+81.99

-DR3B- PT Sta. 11+31.74

-DR3B- POT Sta. 12+35.00
END CONSTRUCTION

-DR3B- POT Sta. 12+57.84

-Y9- POT Sta. 16+90.08
END CONSTRUCTION

MATCH TO SHEET 5 – -L- POC Sta. 177+00.00

MATCH TO SHEET 7 – -L- POC Sta. 190+00.00

MATCH TO SHEET 5
-Y9- POT Sta. 15+00.00

CATHERINE GREEN (17)

KETINA CORPORATION (16)

KETINA CORPORATION (16B)

KETINA CORPORATION (16C)

RODNEY C. OLIVER
MILLICENT J. OLIVER (18)

JONATHAN ROY COLLINS
TERRY LYNN IRISH (19)

OAK RIDGE CONSTRUCTION, INC. (20)

R.C. MILLER
ZELMA MILLER
DOUGLAS M. RUDERSDORF (21)

JAMES D. ALEXANDER
DONNA T. ALEXANDER (22)

RICHARD E. WATSON
LISA H. WATSON (23)

GARY E. TAYLOR
VICKIE TAYLOR (24)

LAT 6' GRASSED SWALE W/COIR FIBER MATTING
EST. 340 SY
SEE DETAIL #6

CL '1' RIP RAP
EST. 7 TONS
EST. 15 SY GF

SHOULDER BERM GUTTER
FROM STA 170+50 TO
STA 182+75 -L- LT

CL '8' RIP RAP
EST. 1 TON
EST. 5 SY GF

CL '4' RIP RAP
(BANKS ONLY)
SEE DETAIL #29

LINE PROP DITCH W/PSRM
EST. 730 SY
SEE DETAIL #4

2' BASE DITCH
W/CL '1' RIP RAP
EST. 70 TONS
EST. 120 SY GF
SEE DETAIL #5

LINE EXTG DITCH W/PSRM
EST. 120 SY

SPECIAL CUT DITCH
W/PSRM
SEE DETAIL #4

15" CSP
W/ELBOW

24" W/ELBOW

18" W/ELBOW

15" RCP-III

15" RCP-IV

18" RCP-III

24" RCP-III

36" RCP-III

REMOVE

ACCESS PT.

GRAU, 350

CAT 1

N 34° 48' 05.0" W

N 25° 04' 38.6" W

S 64° 49' 06.1" E

S 73° 58' 40.5" E

N 63° 47' 02.5" E

US 221 22' BST

TURRISI TRAIL 18' BST

72' ROCK WALL

12' BST

GAP CREEK

SEE SHEET 14 FOR -L- PROFILE
SEE SHEET 18 FOR -Y9- PROFILE
SEE SHEET 19 FOR -DR3- PROFILE
SEE SHEET 19 FOR -DR3B- PROFILE
SEE SHEET 2-E FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

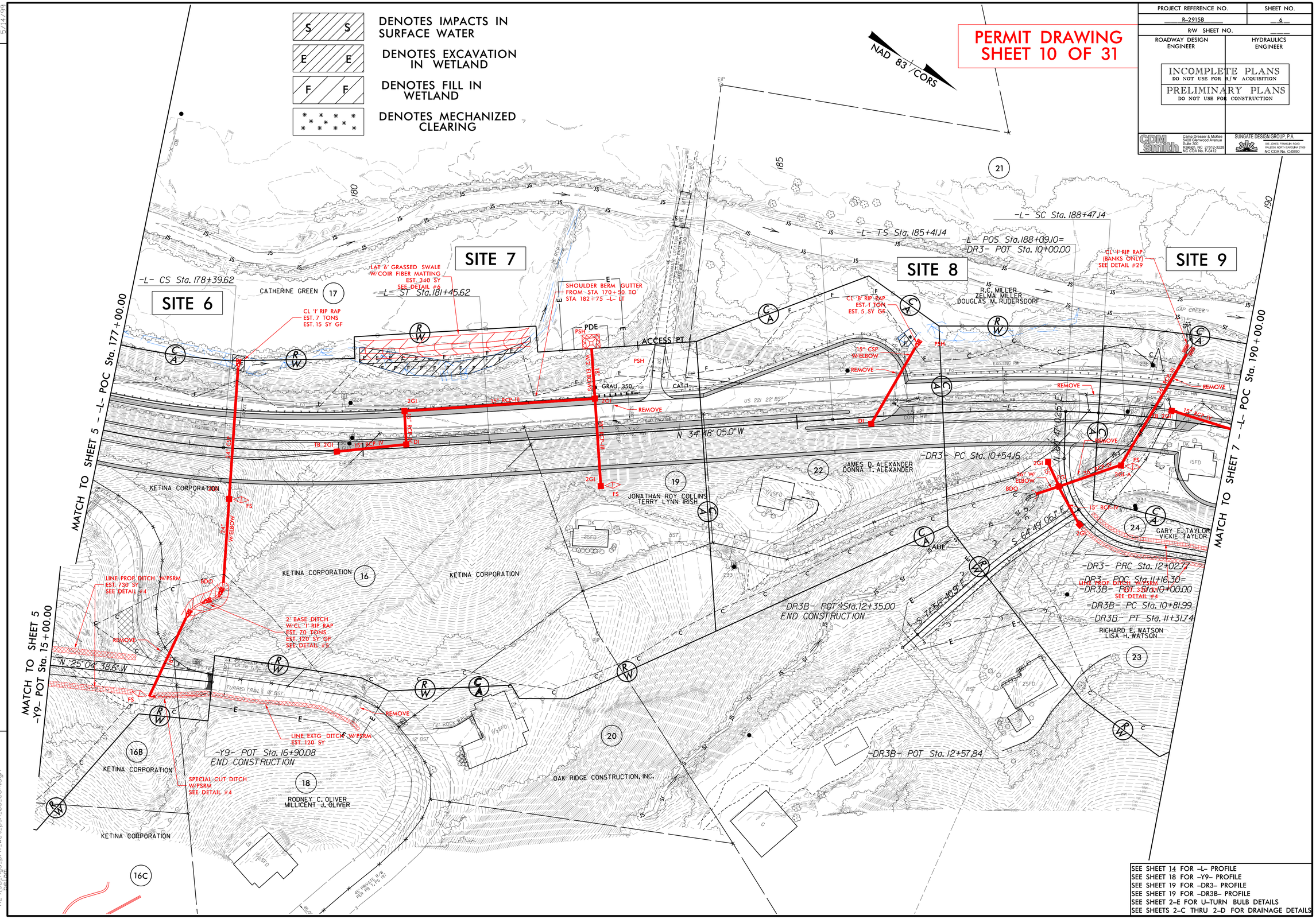
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

PERMIT DRAWING
SHEET 10 OF 31



SEE SHEET 14 FOR -L- PROFILE
SEE SHEET 18 FOR -Y9- PROFILE
SEE SHEET 19 FOR -DR3- PROFILE
SEE SHEET 19 FOR -DR3B- PROFILE
SEE SHEET 2-E FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2004
R2915B_sht_prm_wet_psh_06_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH NORTH CAROLINA 27606
NC COA No. C-0890

PERMIT DRAWING
SHEET 11 OF 31

NAD 83 1/CORS

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

SITE 10

-Y10- PC Sta. 12+75.00
BEGIN CONSTRUCTION

-Y10- PC Sta. 13+25.00

-Y10- PT Sta. 14+91.13

-Y10- PC Sta. 15+75.47

-L- CS Sta. 200+60.03

-Y10- PT Sta. 17+43.86

-L- SC Sta. 201+66.03

-L- POC Sta. 200+76.32=
-Y10- POT Sta. 17+98.86

-DR3- PCC Sta. 19+08.88

-DR3- POT Sta. 19+95.47

-DR3- PT Sta. 19+85.75

MATCH TO SHEET 6 -L- POC Sta. 190+00.00

MATCH TO SHEET 8 -L- POC Sta. 203+00.00

N 89°16'21" E

N 41°40'43.8" E

21 R.C. MILLER
ZELMA MILLER
DOUGLAS M. RUDERSDORF

25 PER A. KJONSO
MICHELLE KJONSO

24 GARY E. TAYLOR
VICKIE TAYLOR
DB 343, PG 1963

23 RICHARD E. WATSON
LISA H. WATSON
DB 313, PG 2429

26 LUIS M. FALERO
ROSARY P. FALERO

27 ROBERT L. KILBY
JOYCE T. KILBY

28 ROBERT L. KILBY
JOYCE T. KILBY

29 UNKNOWN

30 NITA FERRELL LANGER, TRUSTEE

31 JERRY GRAY STYERS
GERALDINE MYERS STYERS
DB 217, PG 171
LOTS 22-25 OF
PB 5, PG 70

GAP CREEK

TEMPORARY WORK PADS
SEE GENERAL DRAWINGS
ON SHEETS 26 & 27

SPEC DITCH GRADE
STA 12+75 TO 13+50 -Y11- LT
SEE PROFILE

STD 2' BASE DITCH
W/CL 'B' RIP RAP
EST. DDE=35 CY
EST. 10 TONS
EST. 20 SY GF
SEE DETAIL #18

REMOVE 175' EXTG 15" CMP

24" RCP-IV

GRADE TO DRAIN

RIP RAP AT EMBANKMENT
SEE DETAIL #9

STD 2' BASE DITCH
EST. DDE=60 CY
SEE DETAIL #8

CL 'B' RIP RAP
EST. 5 TONS
EST. 14 SY GF

24" RCP-IV

REMOVE

SHOULDER BERM GUTTER
FROM STA 199+00 TO
APPROACH SLAB

15" RCP-IV

24" W/ ELBOW

15" W/ ELBOWS

18" W/ ELBOW

FILL W/FLOWABLE MATERIAL

PLUG

SPEC CUT DITCH W/HINGE
SEE DETAIL #7

CL 'B' RIP RAP
EST. 3 TONS
EST. 11 SY GF

CL 'B' RIP RAP
EST. 1 TON
EST. 3 SY GF

LINE PROP DITCH W/PSRM
EST. 120 SY
SEE DETAIL #4

LINE PROP DITCH W/PSRM
EST. 330 SY
SEE DETAIL #4

FILTER BERM
SEE DETAIL #30

SHOULDER BERM GUTTER
FROM STA 199+62 TO
STA 200+05 -L- RT

CL 'B' RIP RAP TO EL 2874.0
STA. 199+70 TO 205+00 -L- RT
EST. 540 TONS

SPEC DITCH GRADE
STA. 164+50 TO 166+00 -L- RT
SEE PROFILE

TYPE B-77

TYPE M350

GRAU 350

PSH

AUE

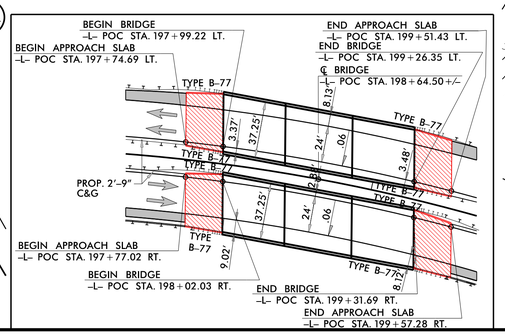
JS

ISFD

AVERAGE DAILY TRAFFIC
2015 / 2035
-11-
LIBERTY GROVE CH RD

10258 / 17400	-L- US 221	10572 / 18000

100 / 180 415 / 700



SEE SHEET 14 FOR -L- PROFILE
SEE SHEET 19 FOR -Y10- PROFILE
SEE SHEET 19 FOR -DR3- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2014
R2915B_Hyd_prm_wet_psh_07.dgn
bellam

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

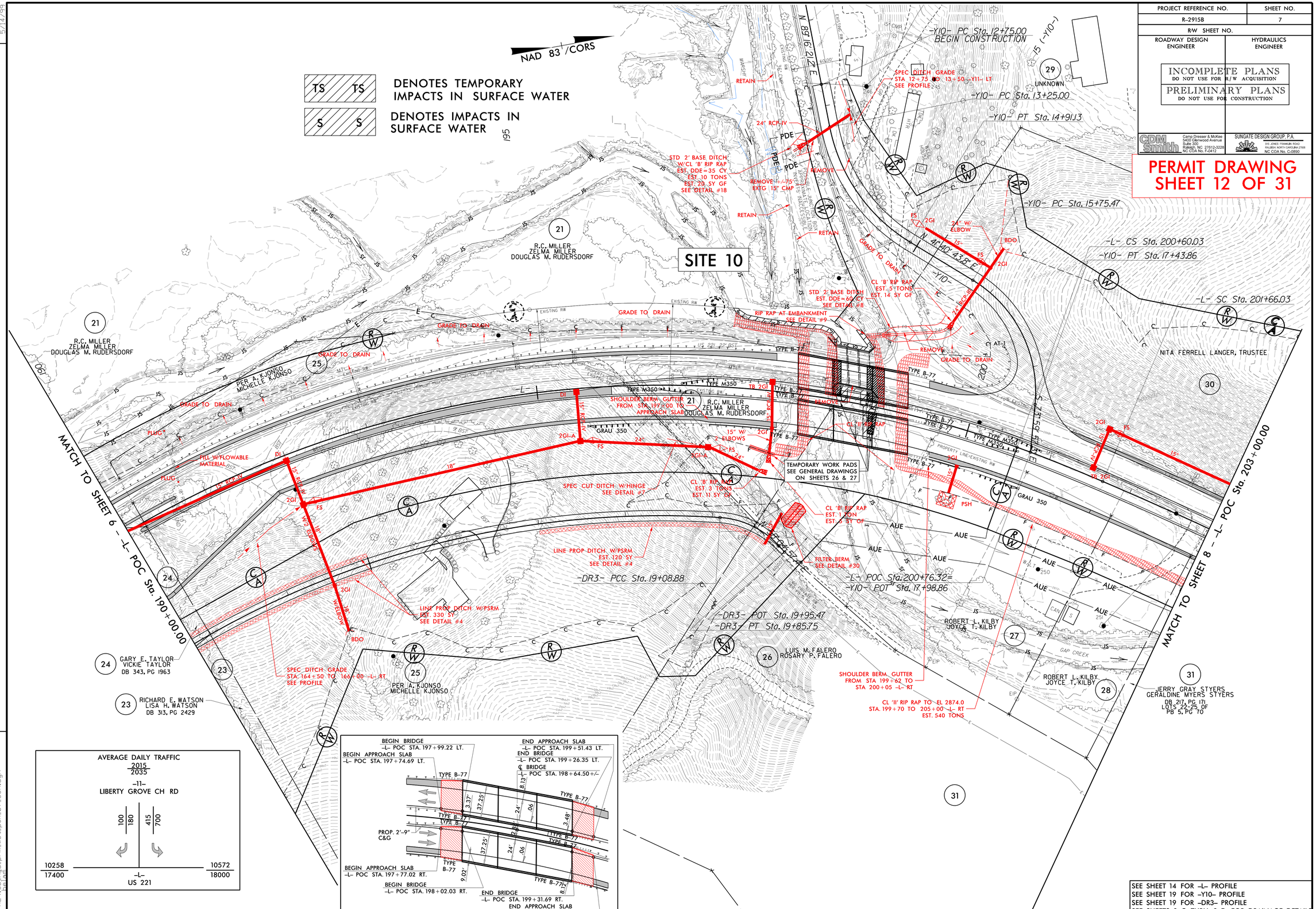
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING SHEET 12 OF 31



REVISIONS

5/14/99

6/6/2014
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PERMIT DRAWING
SHEET 13 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

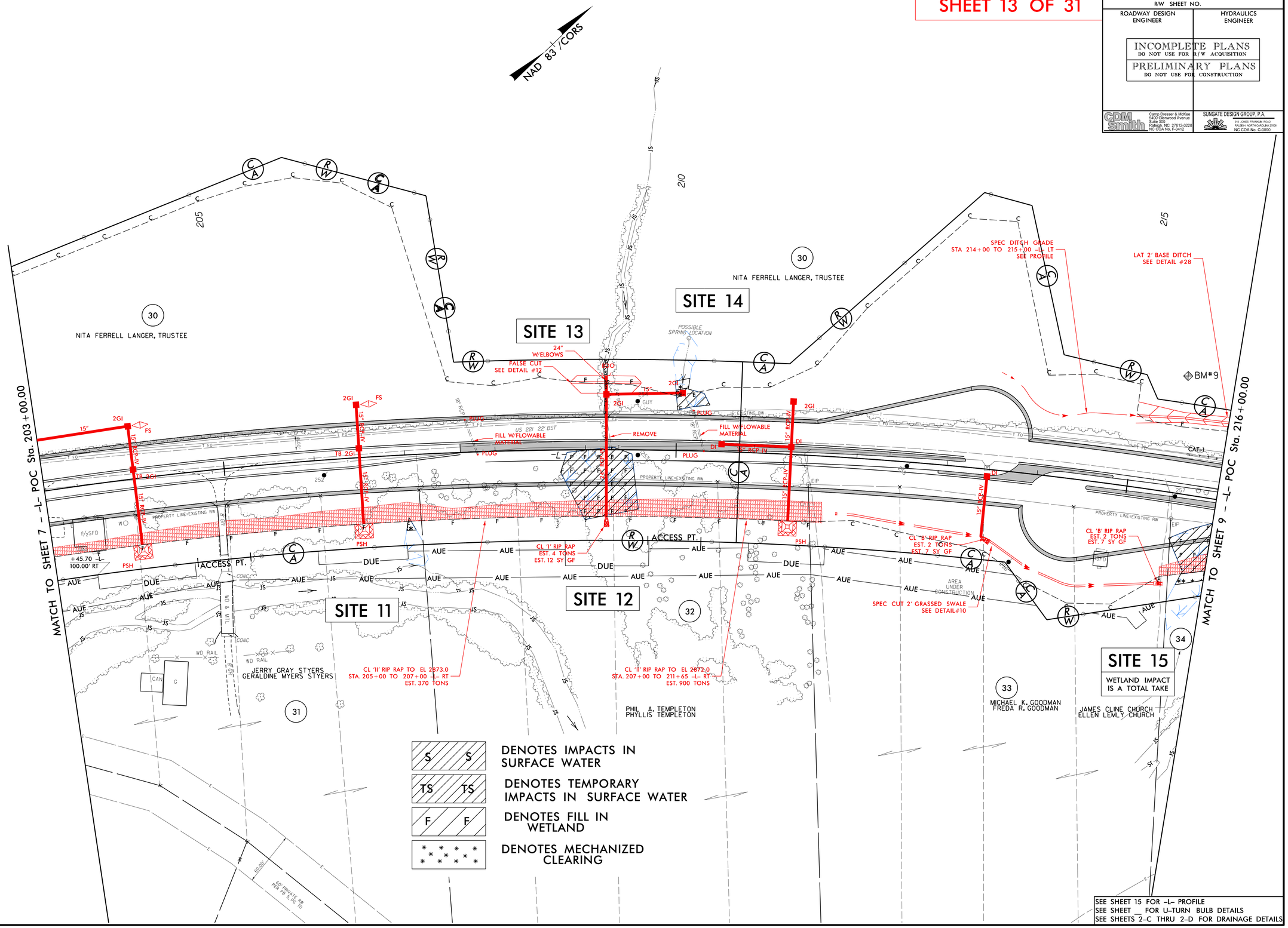
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 30
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
810 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

REVISIONS

5/14/99



SEE SHEET 15 FOR -L- PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

6/6/2014
R2915B_Hyd_prm_wet_psh_08.dgn

PERMIT DRAWING
SHEET 14 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
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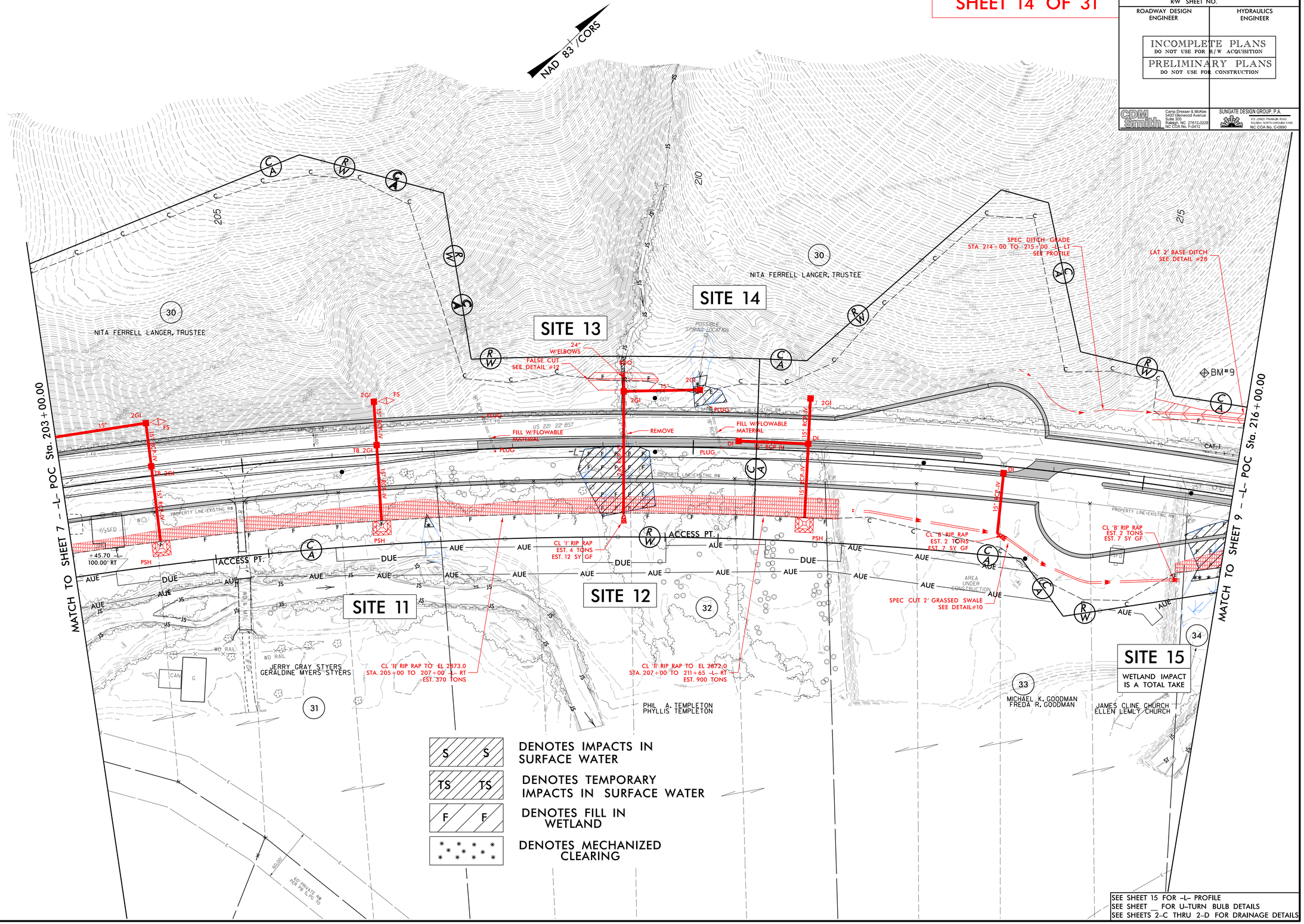
NC COA No. C-0890

5/14/99

REVISIONS



SEE SHEET 15 FOR -L- PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

R2915B_Hyd_prm_wet_psh_08_con.dgn
6/6/2014
bethomas

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING
SHEET 15 OF 31

REVISIONS

5/14/99

DENOTES IMPACTS IN SURFACE WATER

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83 /CORS

SITE 16

SITE 15
WETLAND IMPACT IS A TOTAL TAKE

SITE 17

SITE 18

MATCH TO SHEET 8 – -L- POC Sta. 216+00.00

MATCH TO SHEET 10 – -L- POC Sta. 229+00.00

-L- CS Sta. 217+38.86

-L- ST Sta. 219+50.86

-L- TS Sta. 221+34.86

-L- SC Sta. 223+68.86

-Y11- POT Sta. 10+00.00

-Y11- POT Sta. 10+55.00
BEGIN CONSTRUCTION

-L- POC Sta. 222+42.64=
-Y11- POT Sta. 13+02.04

N 56°22'25.2" E

S 49°42'29.2" E

NITA FERRELL LANGER, TRUSTEE

ARCHIE L. PIERCE
NANCY C. PIERCE
RETAIN

JAMES CLINE CHURCH
ELLEN LEMLY CHURCH

RICHARD W. LEMLY
MINNIE C. LEMLY
TRUSTEES OF THE
RICHARD W. LEMLY LIVING TRUST

LAT 2' BASE DITCH
SEE DETAIL #28

RIP RAP AT EMBANKMENT
SEE DETAIL #9
HW
BURY PIPE 1.0 FT

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

SPEC LAT 'V' DITCH
W/PSRM
SEE DETAIL #15

SPEC DITCH GRADE
STA 218+75 TO 221+90 -L-RT
SEE PROFILE

SPEC LAT 3' BASE DITCH
W/ PSRM
SEE DETAIL #16

SPEC. CUT 5' GRASSED SWALE
SEE DETAIL #14

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

SHOULDER BERM GUTTER
FROM STA 216+75 TO
STA 221+35 -L- RT

CL 'II' RIP RAP TO EL 2868.0
STA. 215+50 TO STA. 219+20 -L- RT
EST. 500 TONS

STD 5' BASE DITCH
W/CL 'I' RIP RAP
EST. DDE=120 CY
EST. 75 TONS
EST. 135 SY GF
SEE DETAIL #13

STD 3' BASE DITCH
W/CL 'I' RIP RAP
EST. DDE=50 CY
EST. 40 TONS
EST. 65 SY GF
SEE DETAIL #19

CL 'II' RIP RAP TO EL 2867.0
STA. 221+70 TO STA. 223+80 -L- RT
EST. 215 TONS

REMOVE

18" RCP-III

36" RCP-III

15" RCP-IV

SEE SHEET 15 FOR -L- PROFILE
SEE SHEET 18 FOR -Y11- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

6/10/2014
R2915B_Hyd_prm_wet_psh_09.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

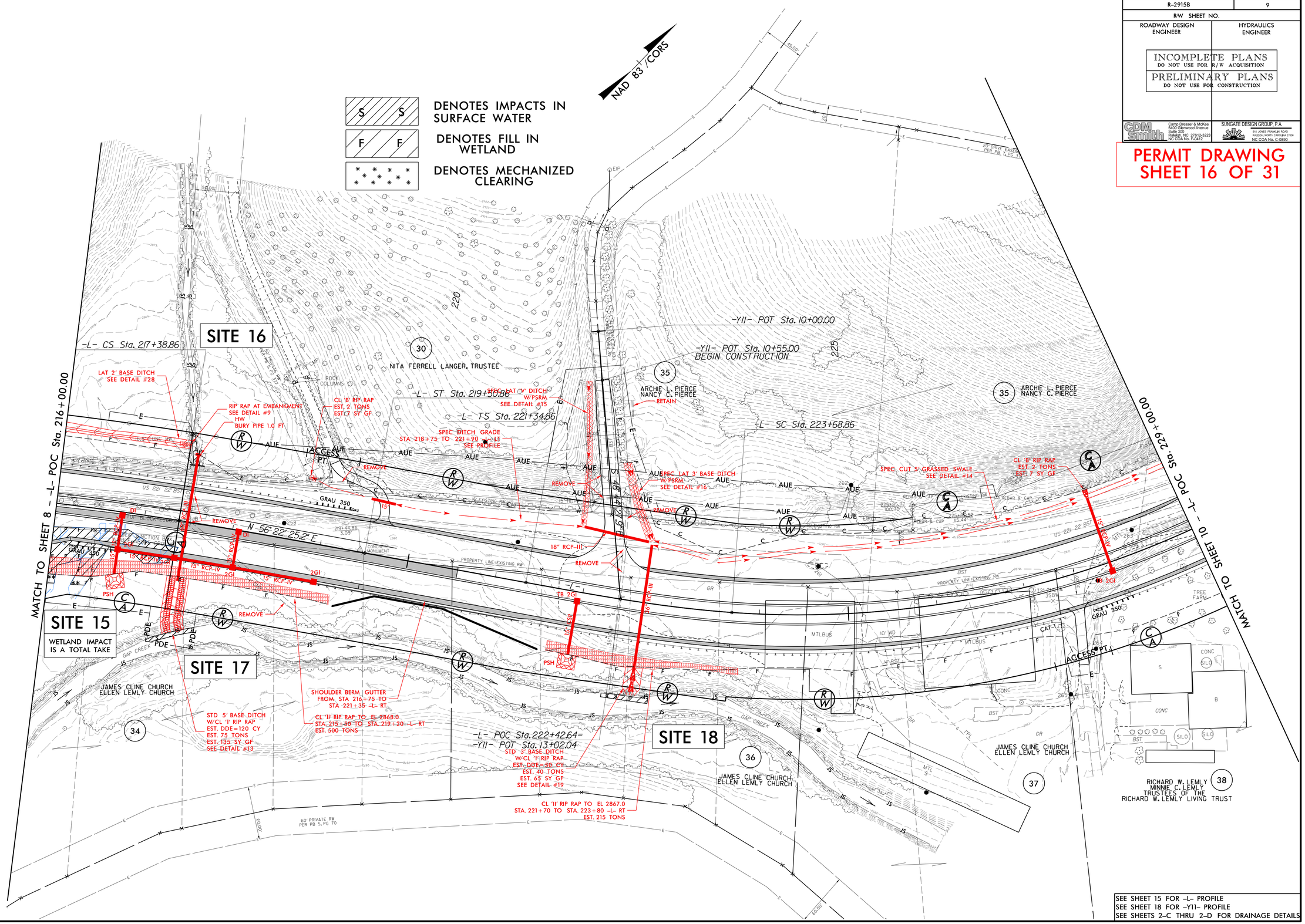
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

PERMIT DRAWING
SHEET 16 OF 31



SEE SHEET 15 FOR -L- PROFILE
SEE SHEET 18 FOR -Y11- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/10/2014
R2915B_Hyd_prm_wet_psh_09_con.dgn
ESTPOT

PERMIT DRAWING
SHEET 17 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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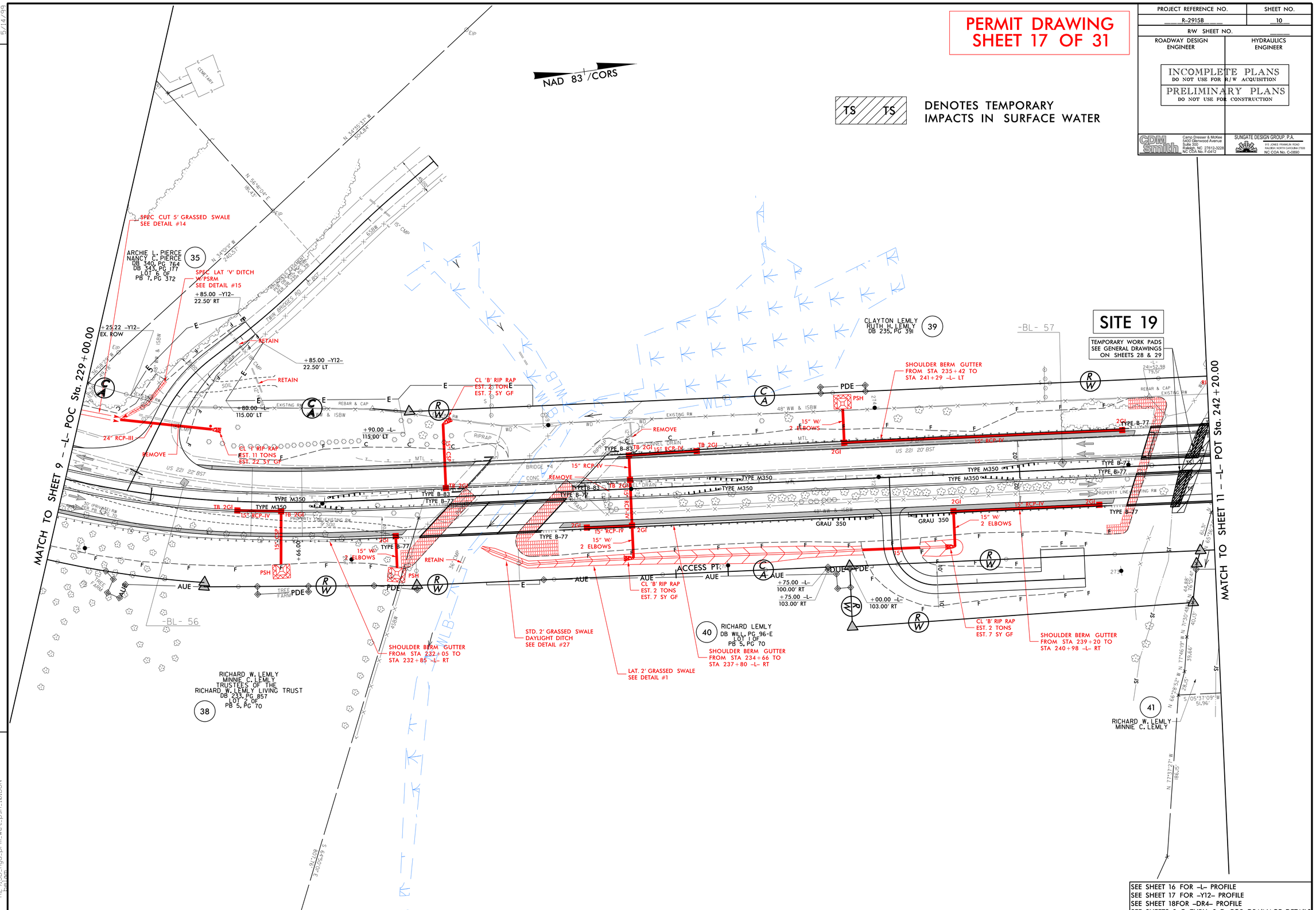
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



SEE SHEET 16 FOR -L- PROFILE
SEE SHEET 17 FOR -Y12- PROFILE
SEE SHEET 18FOR -DR4- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

PERMIT DRAWING
SHEET 18 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83 /CORS

SITE 19

TEMPORARY WORK PADS SEE GENERAL DRAWINGS ON SHEETS 28 & 29

MATCH TO SHEET 9 – -L- POC Sta. 229+00.00

MATCH TO SHEET 11 – -L- POT Sta. 242+20.00

ARCHIE L. PIERCE
NANCY C. PIERCE
DB 340, PG 764
DB 343, PG 177
LOT 6 OF
PB 7, PG 372
35

CLAYTON LEMLY
RUTH H. LEMLY
DB 235, PG 391
39

RICHARD LEMLY
DB WILL, PG 96-E
LOT 1 OF
PB 5, PG 70
40

RICHARD W. LEMLY
MINNIE C. LEMLY
TRUSTEES OF THE
RICHARD W. LEMLY LIVING TRUST
DB 233, PG 857
LOT 2 OF
PB 5, PG 70
38

RICHARD W. LEMLY
MINNIE C. LEMLY
41

SPEC CUT 5' GRASSED SWALE
SEE DETAIL #14

SPEC LAT 'V' DITCH
W/ PSBM
SEE DETAIL #15

+85.00 -Y12-
22.50' RT

+85.00 -Y12-
22.50' LT

+25.22 -Y12-
EX. ROW

RETAIN

+80.00 -L-
115.00' LT

+90.00 -L-
113.00' LT

24" RCP-III

REMOVE

CL 'A' RIP RAP
EST. 11 TONS
EST. 22 SY GF

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

15" RCP-IV

TB 2GI

TYPE B-83

TYPE B-77

TYPE M350

GRAU 350

15" W/
2 ELBOWS

PSH

PDE

AUE

ACCESS PT.

+66.00

+75.00 -L-
100.00' RT

+75.00 -L-
103.00' RT

+00.00 -L-
103.00' RT

SHOULDER BERM GUTTER
FROM STA 235+42 TO
STA 241+29 -L- LT

SHOULDER BERM GUTTER
FROM STA 232+05 TO
STA 232+85 -L- RT

STD. 2' GRASSED SWALE
DAYLIGHT DITCH
SEE DETAIL #27

LAT. 2' GRASSED SWALE
SEE DETAIL #1

SHOULDER BERM GUTTER
FROM STA 234+66 TO
STA 237+80 -L- RT

SHOULDER BERM GUTTER
FROM STA 239+20 TO
STA 240+98 -L- RT

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

-BL- 56

-BL- 57

US 221 20' BST

48" WW & ISBW

REBAR & CAP

EXISTING R/W

PROPERTY LINE

TREE FARM

S 69°50'30" E
807.76'

N 34°55'31" W
304.64'

N 77°46'19" W
79.51'

N 77°37'27" W
186.15'

S 05°37'09" W
51.96'

SEE SHEET 16 FOR -L- PROFILE
SEE SHEET 17 FOR -Y12- PROFILE
SEE SHEET 18FOR -DR4- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

R2915B_hyd_prm_wet_psh_10_con.DGN
6/6/2014

PERMIT DRAWING
SHEET 19 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

NAD 83 /CORS

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 19

REMOVE SECTION OF TEMPORARY WORK PAD IMMEDIATELY FOLLOWING REMOVAL OF EXISTING BENT. WORK PAD CONSTRUCTION AND REMOVAL SHOULD BE STAGED SO THAT NO MORE THAN HALF THE CHANNEL IS BLOCKED AT ONE TIME.

SITE 21

SITE 20

TEMPORARY WORK PADS SEE GENERAL DRAWINGS ON SHEETS 28 & 29

–DET– TS Sta. 251+72.02 LA =
–L– TS Sta. 251+72.02 LB
–L– TS Sta 254+36.94 AH
END TIP PROJECT R-2915B

–DET– CS Sta. 254+66.15

–DET– SC Sta. 253+31.02

MATCH TO SHEET 10 – –L– POT Sta. 242+20.00

MATCH TO SHEET 12 – –L– POS Sta. 255+00.00

CLAYTON LEMLY
RUTH H. LEMLY (39)

TRACY C. LEMLY
ELIZABETH C. LEMLY (42)

TRACY C. LEMLY
ELIZABETH C. LEMLY
DB M-5, PG 121 (47)

RICK D. WEAVER
ALLISON L. WEAVER (44)

RICHARD C. CORNEJO
LORETTA A. CORNEJO (46)

JAMES CLINE CHURCH
ELLEN L. CHURCH
EVELYN LEMLY (45, 43, 55)

BARNEY F. WATSON
RAMONA N. WATSON
TRUSTEES OF THE
WATSON FAMILY TRUST
DB 217, PG 1209
LOT 12 OF
PB 5, PG 265 (53)

RICHARD W. LEMLY
MINNIE C. LEMLY (41)

STD 3' BASE DITCH EST. DOE 30 CY SEE DETAIL #24

RAP AT EMBANKMENT SEE DETAIL #9

LAT 3' GRASSED SWALE SEE DETAIL #20

CL 'B' RIP RAP EST. 2 TONS EST. 7 SY GF

SHOULDER BERM GUTTER FROM STA 244+37 TO STA 252+30 –L– LT

LAT 'V' DITCH SEE DETAIL #21

TOE PROTECTION CL 'B' RIP RAP SEE DETAIL #2

SPEC DITCH GRADE STA 252+86 TO 253+50 –DET– LT SEE PROFILE

LINE PROP DITCH W/SRM EST. 175 SY SEE DETAIL #17

15" W/ 2 ELBOWS

24" RCP-IV

30" W/2 ELBOWS

SPEC DITCH GRADE STA 252+05 TO 253+90 –DET– RT SEE PROFILE

SHOULDER BERM GUTTER FROM STA 244+05 TO STA 251+60 –L– RT

LAT 4' BASE DITCH SEE DETAIL #22

RIP RAP AT EMBANKMENT SEE DETAIL #9

CL 'B' RIP RAP EST. 2 TONS EST. 7 SY GF

LAT 4' BASE DITCH W/CL 'I' RIP RAP SEE DETAIL #23

TOE PROTECTION CL 'B' RIP RAP SEE DETAIL #2

LINE PROP DITCH W/SRM EST. 390 SY SEE DETAIL #17

ACCESS PT.

N 5°56' 20.6" E

TYPE B-77 — GRAU 350 — ATTENUATOR — REMOVE — 15" RCP-IV — 2GI — UNABLE TO LOCATE END — RIPRAP — CONCRETE MONUMENT — ELEC. PED — 45' PRIVATE R/W PER PB 5, PG 265

BRIDGE SKETCH – –L– OVER SOUTH FORK OF NEW RIVER

BEGIN BRIDGE –L– POT STA. 241+41.43 +/- LT.
BEGIN APPROACH SLAB –L– POT STA. 241+17.49 +/- LT.
℄ BRIDGE –L– POT STA. 242+67.42 +/-
END APPROACH SLAB –L– POT STA. 244+25.54 +/- LT.
END BRIDGE –L– POT STA. 244+01.60 +/- LT.
TYPE B-77 — 8' — 34' — 24' — 11.5' — 2% — 02 — PROP 2'-9" — C&G — 2.4 — 20.00
BEGIN BRIDGE –L– POT STA. 241+33.23 +/- RT.
BEGIN APPROACH SLAB –L– POT STA. 241+09.29 +/- RT.
END BRIDGE –L– POT STA. 243+93.41 +/- RT.
END APPROACH SLAB –L– POT STA. 244+17.34 +/- RT.

SEE SHEET 16 FOR –L– PROFILE
SEE SHEET 16 FOR –DET– PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

5/14/99

6/6/2014
R:\2915B_Hyd_prm_wet_psh_11.dgn

PERMIT DRAWING
SHEET 20 OF 31

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 301
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

NAD 83 /CORS

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SITE 19

REMOVE SECTION OF TEMPORARY WORK PAD IMMEDIATELY FOLLOWING REMOVAL OF EXISTING BENT. WORK PAD CONSTRUCTION AND REMOVAL SHOULD BE STAGED SO THAT NO MORE THAN HALF THE CHANNEL IS BLOCKED AT ONE TIME.

SITE 21

SITE 20

–DET– TS Sta. 251+72.02 LA=
–L– TS Sta. 251+72.02 LB
–L– TS Sta 254+36.94 AH
END TIP PROJECT R-2915B

–DET– CS Sta. 254+66.15

–DET– SC Sta. 253+31.02

MATCH TO SHEET 10 – –L– POT Sta. 242+20.00

MATCH TO SHEET 12 – –L– POS Sta. 255+00.00

CLAYTON LEMLY
RUTH H. LEMLY
39

TRACY C. LEMLY
ELIZABETH C. LEMLY
42

TRACY C. LEMLY
ELIZABETH C. LEMLY
DB M-5, PG 121
47

RICK D. WEAVER
ALLISON L. WEAVER
44

RICHARD C. CORNEJO
LORETTA A. CORNEJO
46

BARNEY F. WATSON
RAMONA N. WATSON
TRUSTEES OF THE
WATSON FAMILY TRUST
DB 217, PG 1209
LOT 12 OF
PB 5, PG 265

JAMES CLINE CHURCH
ELLEN L. CHURCH
EVELYN LEMLY
45
43
55
53

RICHARD W. LEMLY
MINNIE C. LEMLY
41

STD 3' BASE DITCH
EST. DDE 30 CY
SEE DETAIL #24

RAP AT EMBANKMENT
SEE DETAIL #9

LAT 3' GRASSED SWALE
SEE DETAIL #20

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

SHOULDER BERM GUTTER
FROM STA 244+37 TO
STA 252+30 –L– LT

LAT 'V' DITCH
SEE DETAIL #21

15" W/
2 ELBOWS

15" RCP IV

TYPE B-77

GRAU 350

ATTENUATOR

N 5°56' 20.6" E

REMOVE

TEMPORARY WORK PADS
SEE GENERAL DRAWINGS
ON SHEETS 28 & 29

LAT 4' BASE DITCH
SEE DETAIL #22

SHOULDER BERM GUTTER
FROM STA 244+05 TO
STA 251+00 –L– RT

CL 'B' RIP RAP
EST. 2 TONS
EST. 7 SY GF

LAT 4' BASE DITCH
W/CL 'I' RIP RAP
SEE DETAIL #23

ACCESS PT.

TOE PROTECTION
CL 'B' RIP RAP
SEE DETAIL #2

SPEC DITCH GRADE
STA 252+86 TO 253+50 –DET– LT
SEE PROFILE

LINE PROP DITCH W/SRM
EST. 175 SY
SEE DETAIL #17

24" RCP IV

TB JB
w/Slab Lid

30" W/2 ELBOWS

SPEC DITCH GRADE
STA 252+CS TO 253+00 –DET– RT
SEE PROFILE

LINE PROP DITCH W/SRM
EST. 390 SY
SEE DETAIL #17

ELEC. PED

BRIDGE SKETCH – –L– OVER SOUTH FORK OF NEW RIVER

BEGIN BRIDGE
–L– POT STA. 241+41.43 +/– LT.

BEGIN APPROACH SLAB
–L– POT STA. 241+17.49 +/– LT.

℄ BRIDGE
–L– POT STA. 242+67.42 +/–

END APPROACH SLAB
–L– POT STA. 244+25.54 +/– LT.

END BRIDGE
–L– POT STA. 244+01.60 +/– LT.

TYPE B-77

8'
34'
24'
11.5'
02
2'
PROP 2'-9"
C&G
2.4
20.00

BEGIN BRIDGE
–L– POT STA. 241+33.23 +/– RT.

BEGIN APPROACH SLAB
–L– POT STA. 241+09.29 +/– RT.

END BRIDGE
–L– POT STA. 243+93.41 +/– RT.

END APPROACH SLAB
–L– POT STA. 244+17.34 +/– RT.

SEE SHEET 16 FOR –L– PROFILE
SEE SHEET 16 FOR –DET– PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

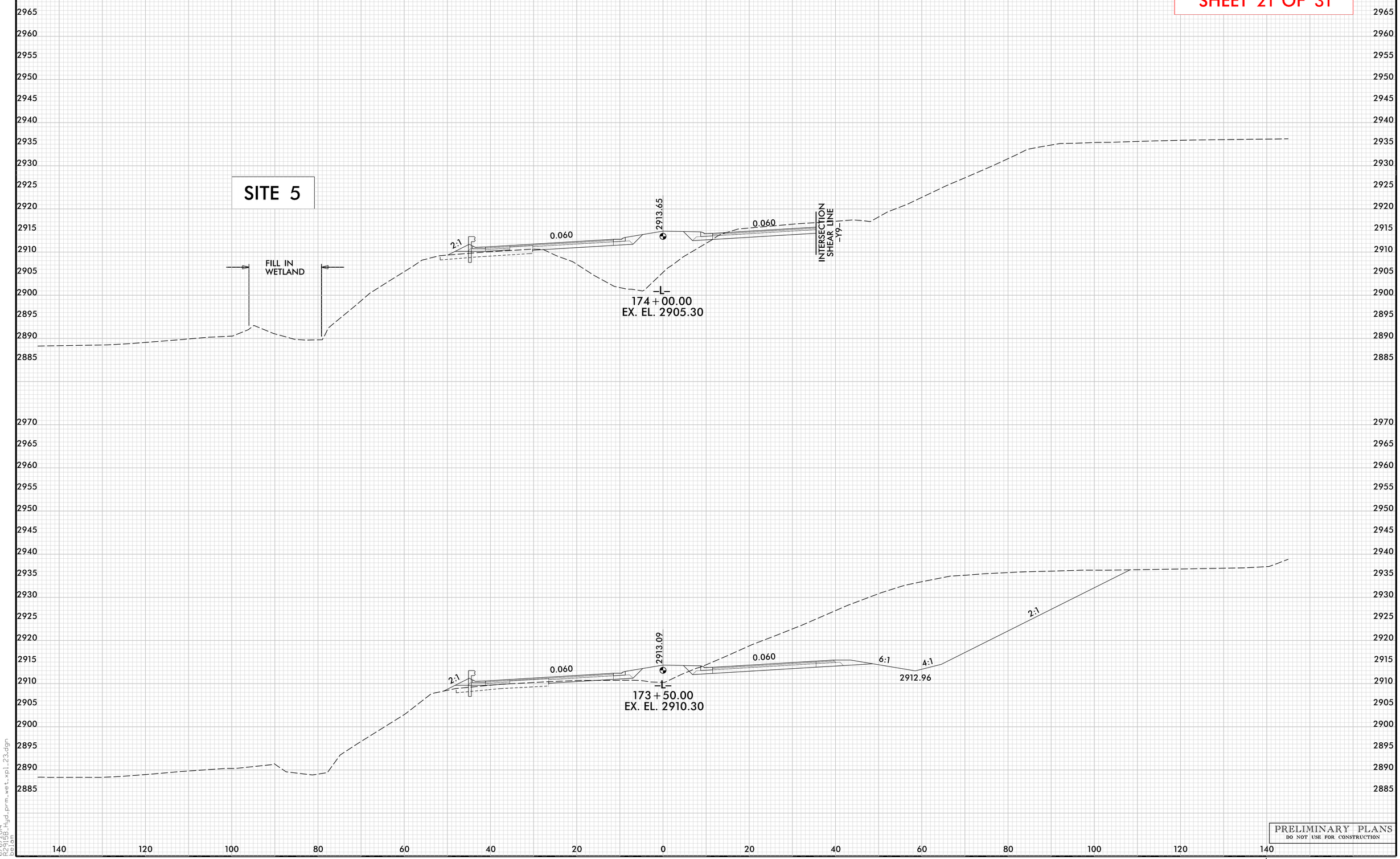
REVISIONS

5/14/99

6/6/2014
R2915B_Hydr_prm_wet_psh_11_con.dgn

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915B	X-23

PERMIT DRAWING
SHEET 21 OF 31



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

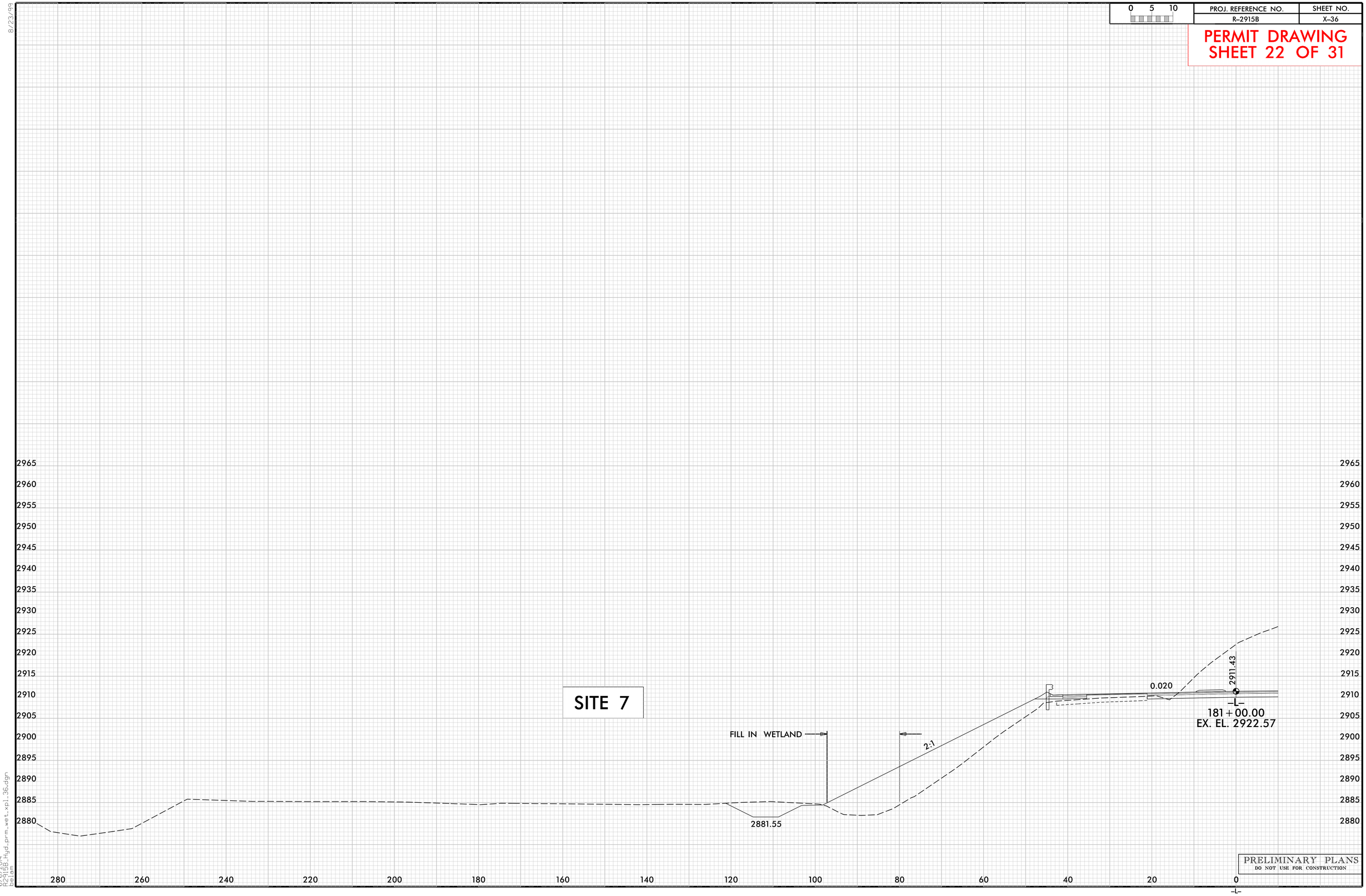
8/23/99

6/6/2014
R2915B_hyd_prm_wet_xpl_23.dgn
belam

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915B	X-36

PERMIT DRAWING
SHEET 22 OF 31



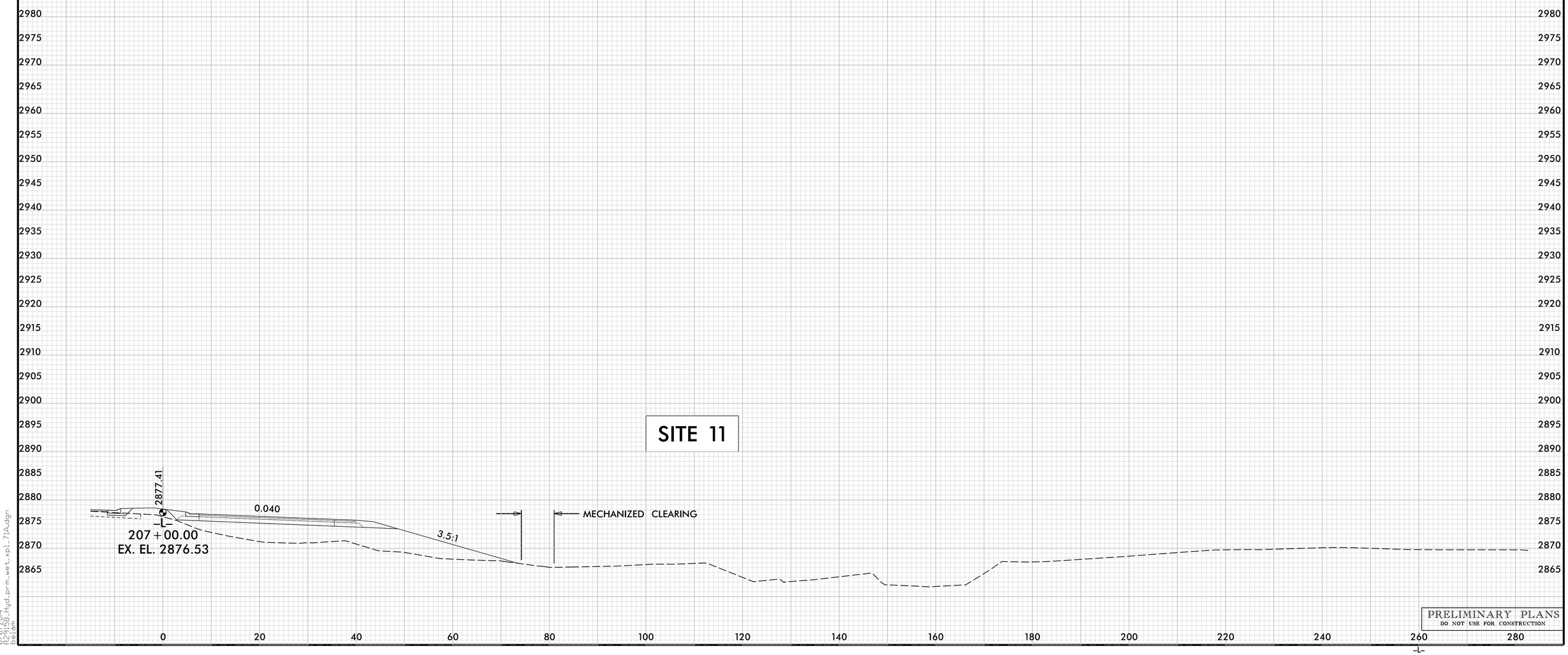
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/6/2014
R2915B_Hyd_prm_wet_xpl_36.dgn
belam

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915B	X-71A

PERMIT DRAWING
SHEET 23 OF 31

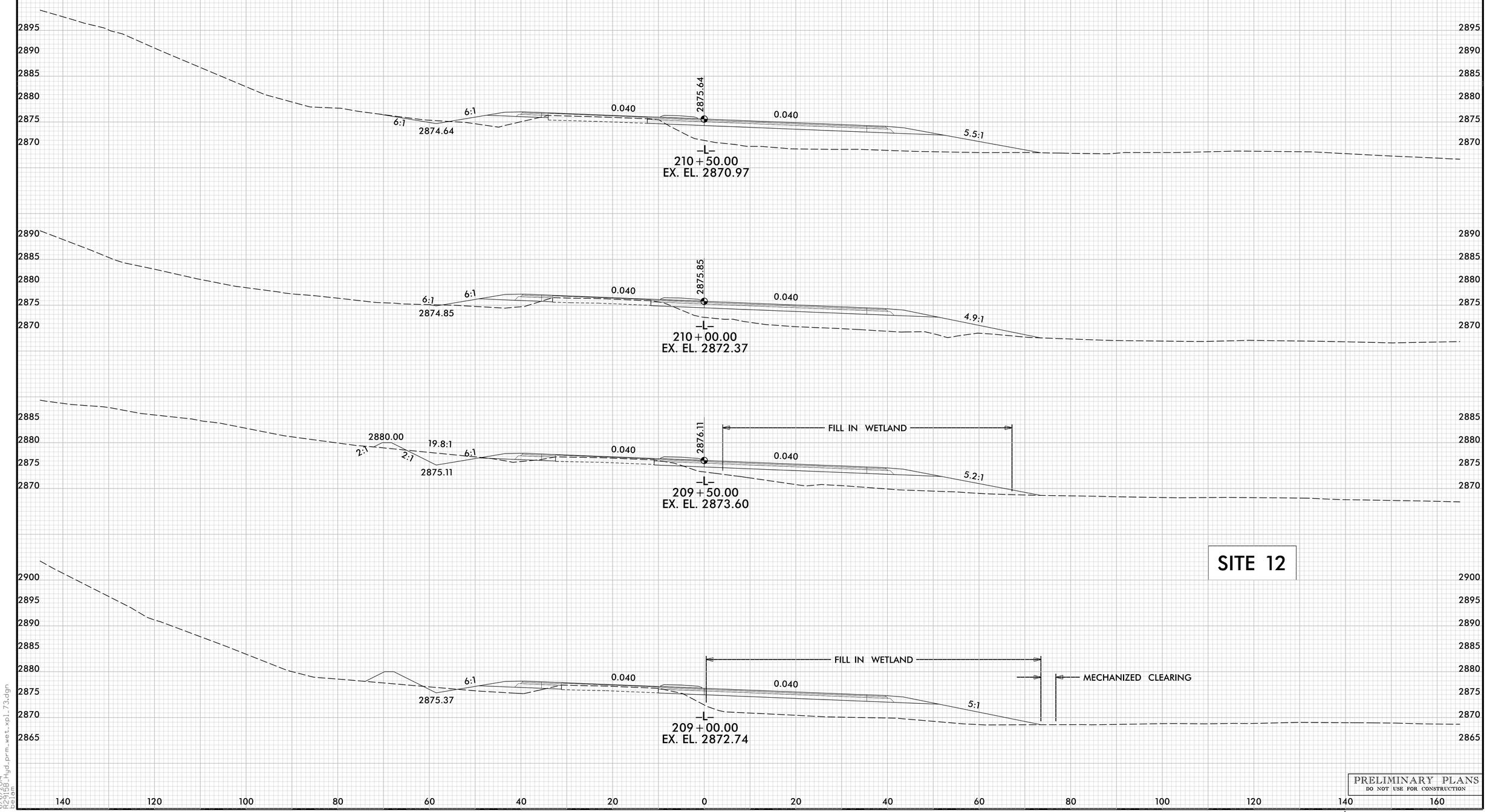


PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

6/6/2014
R2915B_Hyd_prm_wet_xpl_71A.dgn
belam

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915B	X-73

PERMIT DRAWING
SHEET 24 OF 31



PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

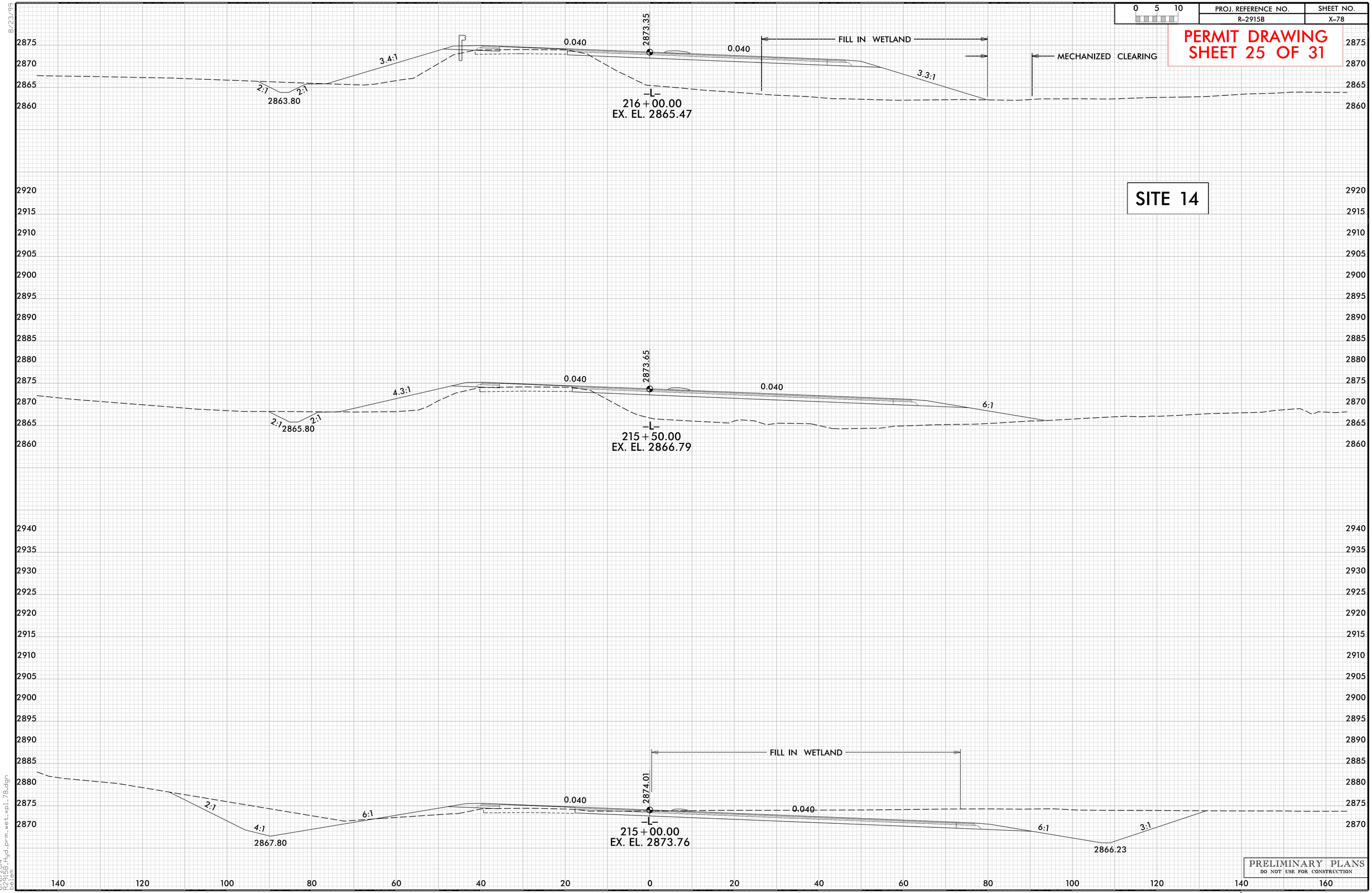
8/23/99

6/6/2014
R2915B_hyd_prm_wet_xpl_73.dgn
belam

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915B	X-78

PERMIT DRAWING
SHEET 25 OF 31

SITE 14



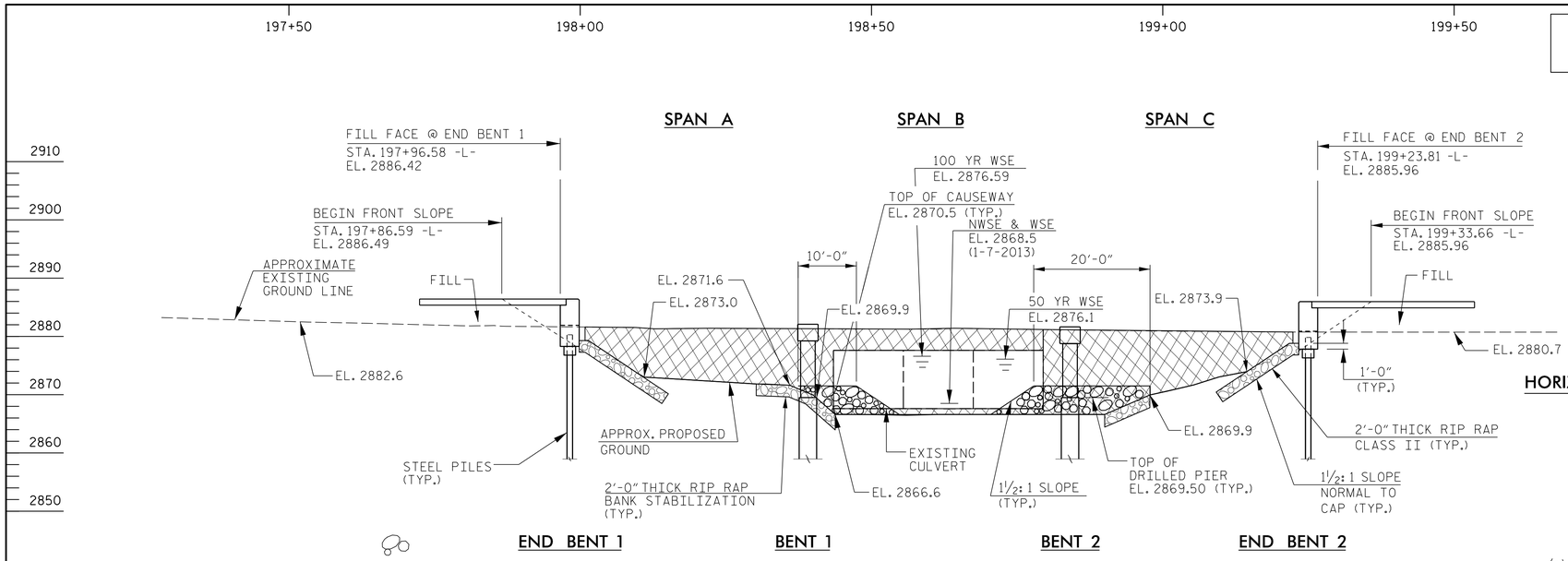
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/23/99

6/6/2014
R2915B_hyd_prm_wet_xpl_78.dgn
belom

PERMIT DRAWING
SHEET 26 OF 31

F.A. PROJECT NO. STP–0221(40)



SECTION ALONG –SBL– BRIDGE CONTROL LINE & ℄ BRIDGE

(SECTION AT END BENTS AND BENTS ARE AT RIGHT ANGLES)

UNCLASSIFIED STRUCTURE EXCAVATION

NOTES

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

HORIZONTAL CURVE DATA –L–

PI STA. 195+10.72
△ = 57° 44' 33.0" (RT)
D = 4° 45' 38.7"
L = 1,212.88'
T = 663.58'
R = 1,203.50'

GRADE DATA –L–

(-) 1.4200% (-) 0.3400%

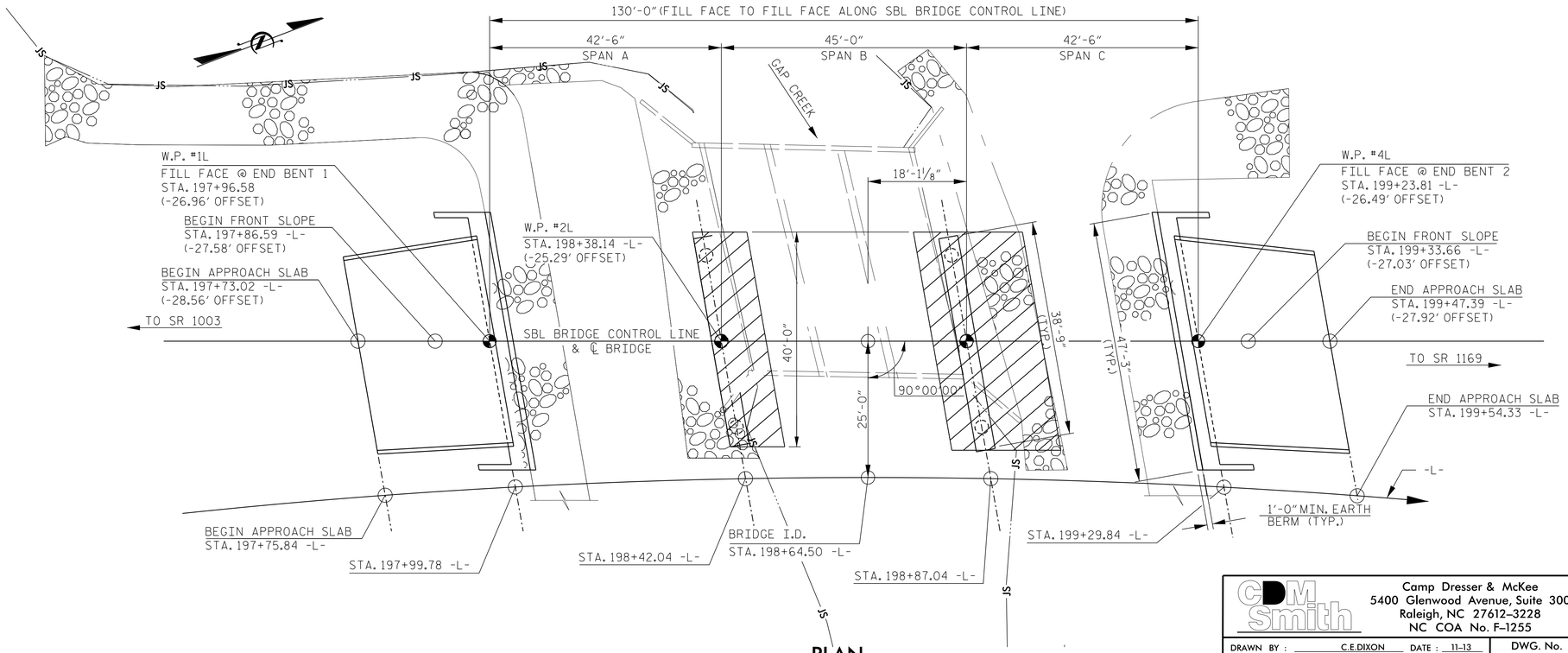
PI = 195+00.00
EL = 2,885.81'
VC = 200.00'

HYDRAULIC DATA

DESIGN DISCHARGE	= 2400 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 2,876.1 FT.
DRAINAGE AREA	= 9.5 SQ. MI.
BASE DISCHARGE (Q100)	= 2,900 CFS
BASE HIGH WATER ELEVATION	= 2,876.59 FT.

OVERTOPPING FLOOD DATA

= >3,900 CFS
= >500 YEARS
= 2,884.0 FT.
= 200+00 -L-



PLAN

PROJECT NO. R–2915B
ASHE COUNTY
STATION: 198 + 64.50 –L–

SHEET 1 OF 2 BRIDGE NO. 538

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH
PRELIMINARY
GENERAL DRAWING
BRIDGE OVER GAP CREEK ON US 221 BETWEEN SR 1003 AND SR 1169
(SBL)

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612–3228
NC COA No. F–1255

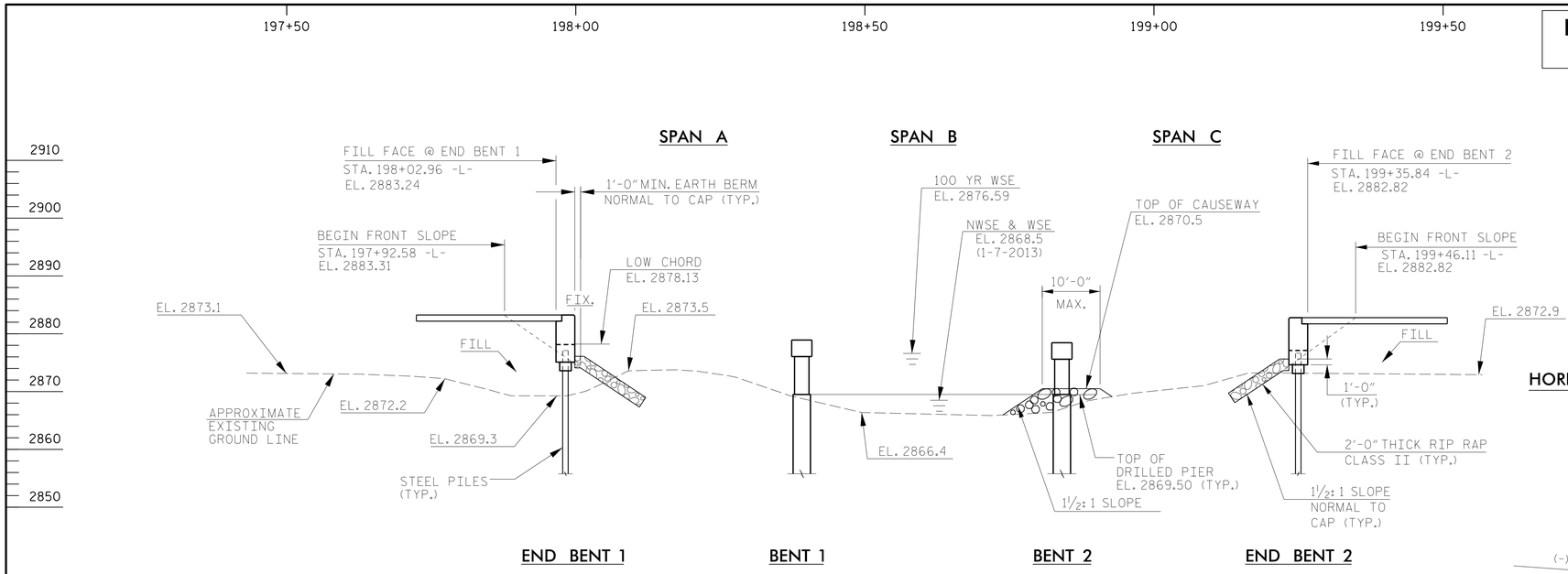
DRAWN BY :	C.E.DIXON	DATE :	11–13
CHECKED BY :	J.TAYLOR	DATE :	11–13
DESIGN ENGINEER :	J.TAYLOR	DATE :	11–13

DWG. No.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S1–01
1			3			TOTAL SHEETS
2			4			

STR. NO. 1



SECTION ALONG –NBL– BRIDGE CONTROL LINE & ℄ BRIDGE

(SECTION AT END BENTS AND BENTS ARE AT RIGHT ANGLES)

NOTES

ASSUMED LIVE LOAD = HL 93 OR ALTERNATE LOADING.

THIS BRIDGE HAS BEEN DESIGNED IN ACCORDANCE WITH THE REQUIREMENTS OF THE AASHTO LRFD BRIDGE DESIGN SPECIFICATIONS.

THIS BRIDGE IS LOCATED IN SEISMIC ZONE 1.

HORIZONTAL CURVE DATA –L–

PI STA. 195+10.72
△ = 57° 44' 33.0" (RT)
D = 4° 45' 38.7"
L = 1,212.88'
T = 663.58'
R = 1,203.50'

GRADE DATA –L–

(-) 1.4200% (-) 0.3400%

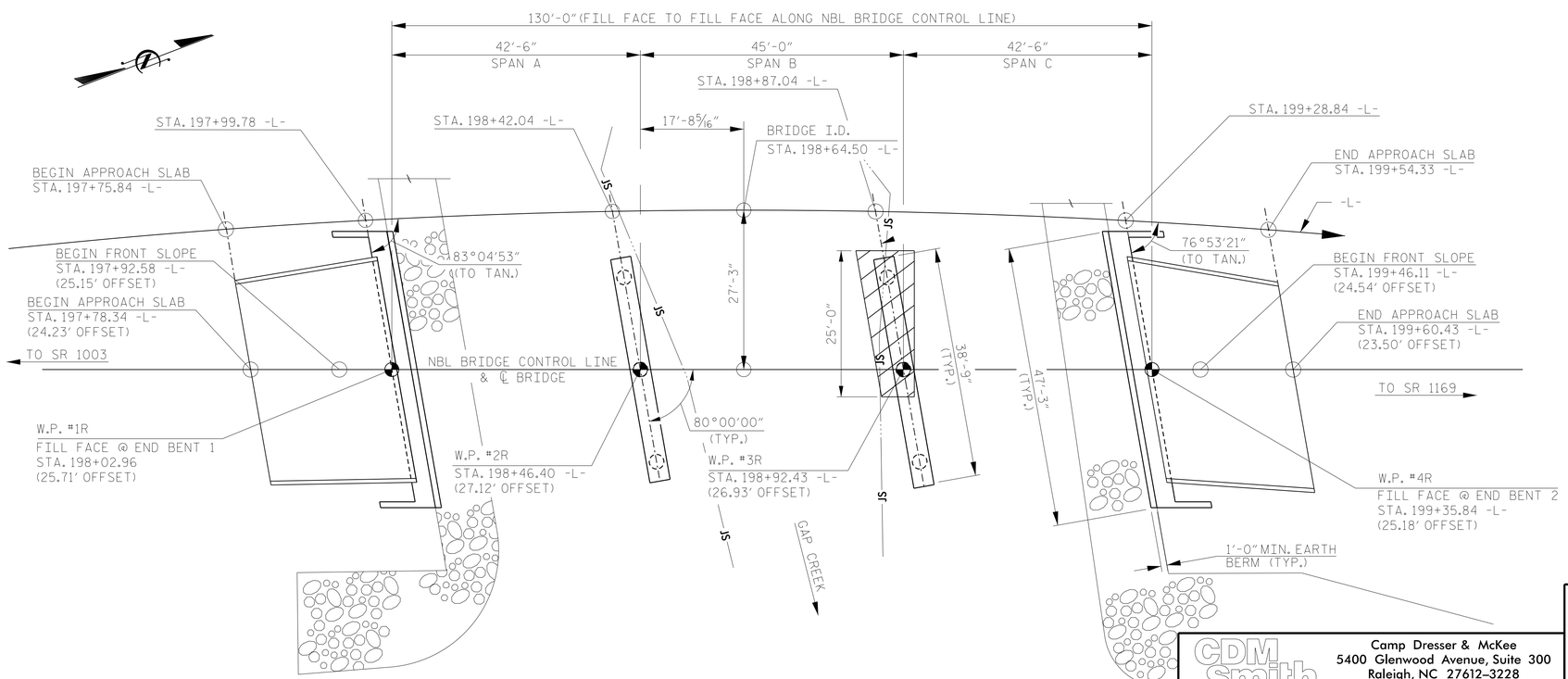
PI = 195+00.00
EL = 2,885.81'
VC = 200.00'

HYDRAULIC DATA

DESIGN DISCHARGE	= 2400 CFS
FREQUENCY OF DESIGN FLOOD	= 50 YEARS
DESIGN HIGH WATER ELEVATION	= 2,876.1 FT.
DRAINAGE AREA	= 9.5 SQ. MI.
BASE DISCHARGE (Q100)	= 2,900 CFS
BASE HIGH WATER ELEVATION	= 2,876.59 FT.

OVERTOPPING FLOOD DATA

OVERTOPPING DISCHARGE	= >3,900 CFS
FREQUENCY OF OVERTOPPING FLOOD	= >500 YEARS
OVERTOPPING FLOOD ELEVATION	= 2,884.0 FT.
OVERTOPPING ROAD	= 200+00 -L-



PLAN

PROJECT NO. R–2915B

ASHE COUNTY

STATION: 198 + 64.50 –L–

SHEET 1 OF 2 BRIDGE NO. 539

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRELIMINARY
GENERAL DRAWING

BRIDGE OVER GAP CREEK ON
US 221 BETWEEN
SR 1003 AND SR 1169
(NBL)

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue, Suite 300
Raleigh, NC 27612–3228
NC COA No. F–1255

DRAWN BY : C.E.DIXON DATE : 11–13
CHECKED BY : J.TAYLOR DATE : 11–13
DESIGN ENGINEER : J.TAYLOR DATE : 11–13

DWG. No.

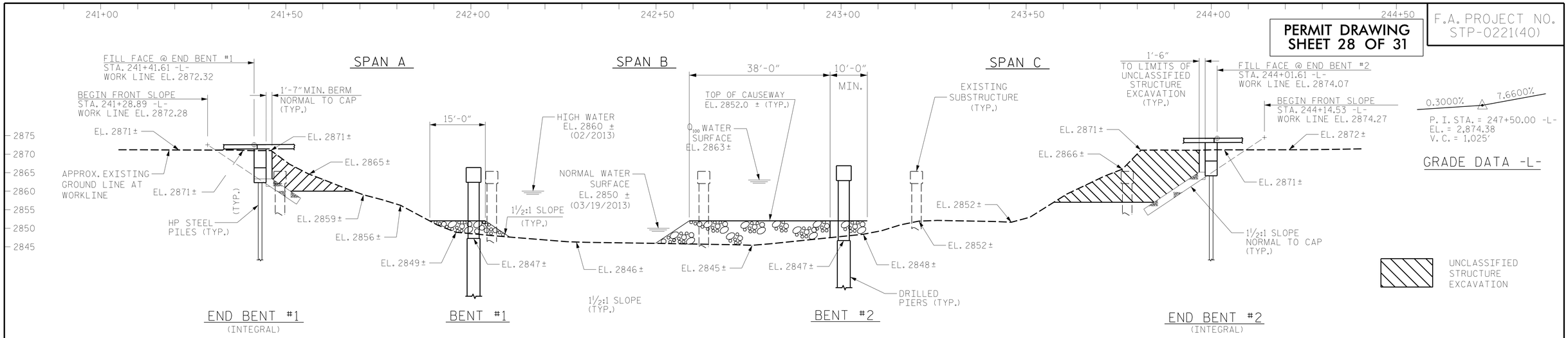
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS						SHEET No.
No.	BY:	DATE:	No.	BY:	DATE:	S2–01
1			3			TOTAL SHEETS
2			4			

STR. NO. 2

PERMIT DRAWING
SHEET 28 OF 31

F.A. PROJECT NO.
STP-0221(40)

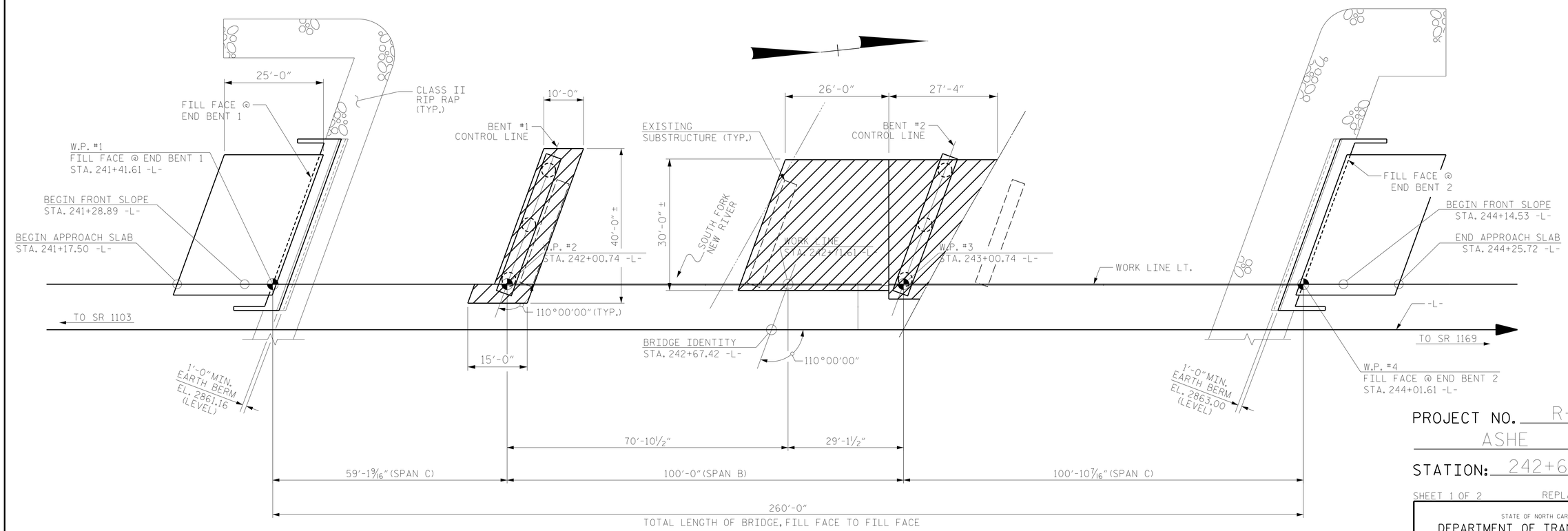


0.3000% 7.6600%
P. I. STA. = 247+50.00 -L-
EL. = 2,874.38
V. C. = 1,025'

GRADE DATA -L-

UNCLASSIFIED
STRUCTURE
EXCAVATION

SECTION ALONG WORK LINE



PLAN

(PILES NOT SHOWN IN PLAN VIEW)

PROJECT NO. R-2915B

ASHE COUNTY

STATION: 242+67.42 -L-

SHEET 1 OF 2 REPLACES BRIDGE NO. 10

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRELIMINARY
GENERAL DRAWING
BRIDGE OVER
SOUTH FORK NEW RIVER
ON US 221
BETWEEN SR 1103
& SR 1169

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			2

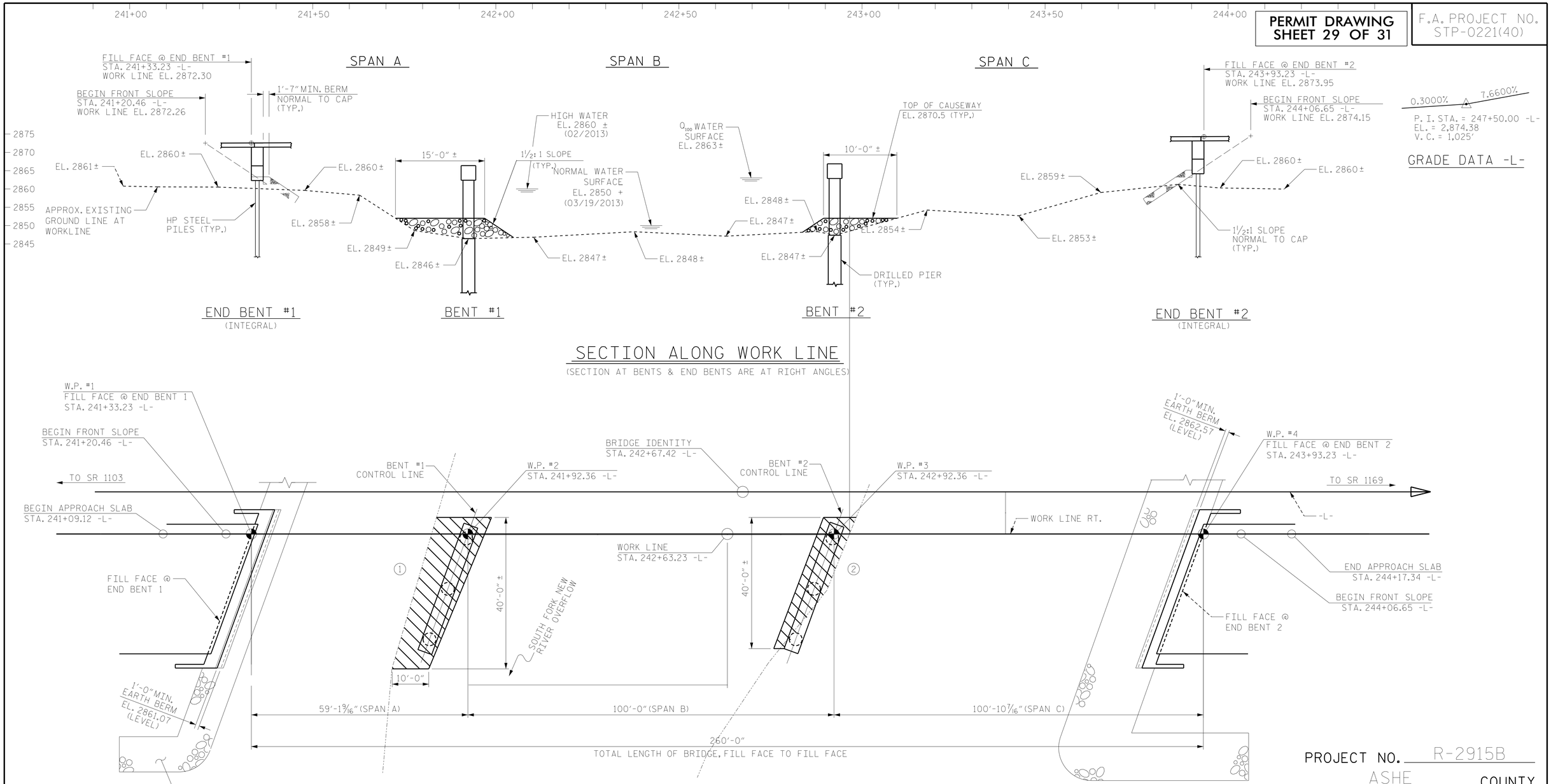
STR. NO. 4

DRAWN BY :	J. S. HOBSON	DATE :	10/16/13
CHECKED BY :	R. F. WERTMAN	DATE :	11/15/13
DESIGN ENGINEER OF RECORD :	R. F. WERTMAN	DATE :	11/15/13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 29 OF 31

F.A. PROJECT NO.
STP-0221(40)



PROJECT NO. R-2915B

ASHE COUNTY

STATION: 242+67.42 -L-

SHEET 1 OF 2

BRIDGE NO. 541

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PRELIMINARY
GENERAL DRAWING
BRIDGE OVER
SOUTH FORK NEW RIVER
ON US 221
BETWEEN SR 1103
& SR 1169

REVISIONS						SHEET NO.
NO.	BY:	DATE:	NO.	BY:	DATE:	S-1
1			3			TOTAL SHEETS
2			4			2

DRAWN BY : J. S. HOBSON DATE : 10/16/13
CHECKED BY : R. F. WERTMAN DATE : 11/19/13
DESIGN ENGINEER OF RECORD : R. F. WERTMAN DATE : 11/19/13

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

STR. NO. 5

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1A	159+80 / 160+40 -L- RT	BANK STABILIZATION (TRIB.)						0.01	< 0.01	44	21	
	160+40 / 161+80 -L-	CULVERT (TRIB.)						0.05		170		
1B	162+15 / 162+30 -L- LT	CULVERT (GAP CREEK)						< 0.01	< 0.01	15	6	
	162+15 / 162+65 -L- LT	BANK STABILIZATION (GAP CREEK)						< 0.01		35		
2	165+73 -L-	BDO / 30" RCP						< 0.01		5		
	166+00 -L- LT	TAIL DITCH						< 0.01		29		
3	13+85 / 15+03 -DR2-	18" PIPE						< 0.01		111		
4	172+58 / 172+85 -L- LT	12" RCP	< 0.01			< 0.01						
5	174+00 -L- LT	30" CSP	< 0.01									
6	178+50 -L- LT	24" CSP	< 0.01									
7	180+00 / 182+00 -L- LT	ROAD FILL	0.05		0.03							
8	186+21 / 186+43 -L- LT	ROAD FILL	< 0.01			< 0.01						
9	187+63 / 189+15 -L-	36" RCP						0.01		124		
	189+35 / 189+45 -L- LT	BANK STABILIZATION						< 0.01		23		
10	197+20 / 198+90 -L-	BANK STABILIZATION						0.02		154		
	198+80 / 198+90 -L-	WORKPAD / CULVERT REMOVAL							0.02		57	
11	207+00 / 207+05 -L- RT	ROAD FILL	< 0.01			< 0.01						
12	208+72 / 209+51 -L- RT	ROAD FILL	0.12			< 0.01						
13	209+23 -L- LT	24" Pipe						< 0.01	< 0.01	52	8	
14	210+01 / 210+36 -L- LT	ROAD FILL			0.01	< 0.01						
15	215+54 / 217+43 -L- RT	ROAD FILL	0.14			0.05						
16	217+48 -L- LT	60" RCP						< 0.01		27		
	217+45 -L- LT	BANK STABILIZATION						< 0.01		9		
SUBTOTALS*:			0.32		0.04	0.06		0.12	0.03	798	92	

*Rounded totals are sum of actual impacts

NOTES:
Site 10: Total Permanent Pier Impacts = 25.1 SF = 0.0006 AC
Site 15: Fill Imapcts = 0.14 ac, Mechanized Clearing Impacts=0.013, Total Take Impacts=0.036

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-6-2014
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
17	217+22 / 217+75 -L- RT	BANK STABILIZATION						< 0.01		54		
18	222+55 / 222+83 -L- RT	BANK STABILIZATION						< 0.01		53		
19	241+75 / 243+25 -L-	WORK PAD							0.12		115	
20	242+41 / 242+54 -L- RT	BANK STABILIZATION						< 0.01		19		
21	243+31 / 243+46 -L- LT	BANK STABILIZATION						< 0.01		20		
SUBTOTALS*:								0.02	0.12	146	115	
SUBTOTALS FROM PAGE 1*:			0.32		0.04	0.06		0.12	0.03	798	92	
TOTALS*:			0.32		0.04	0.06		0.14	0.15	944	207	

*Rounded totals are sum of actual impacts

NOTES:
Site 19: Total Permanent Pier Impacts = 150.8 SF = 0.003 AC

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
6-6-2014
R-2915B ASHE COUNTY
ON US 221 FROM SR 1003 (IDLEWILD RD)
TO NORTH OF SOUTH FORK NEW RIVER

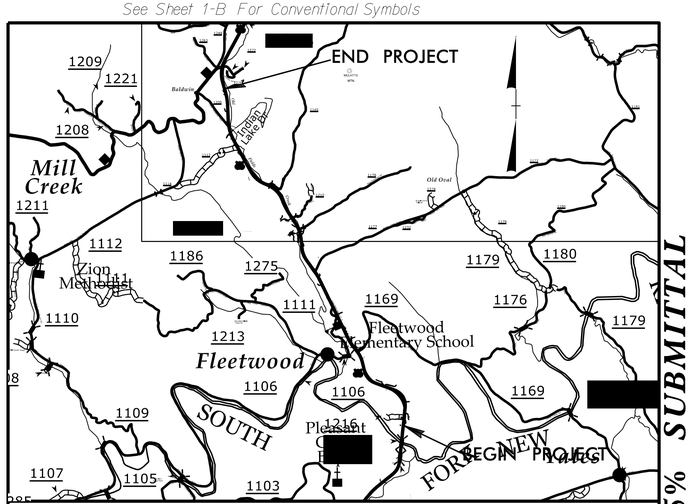
ATN Revised 3/12/13

TIP PROJECT: R-2915C

CONTRACT:

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.	

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



VICINITY MAP FOR STATE PROJECT R-2915C

25% SUBMITTAL

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

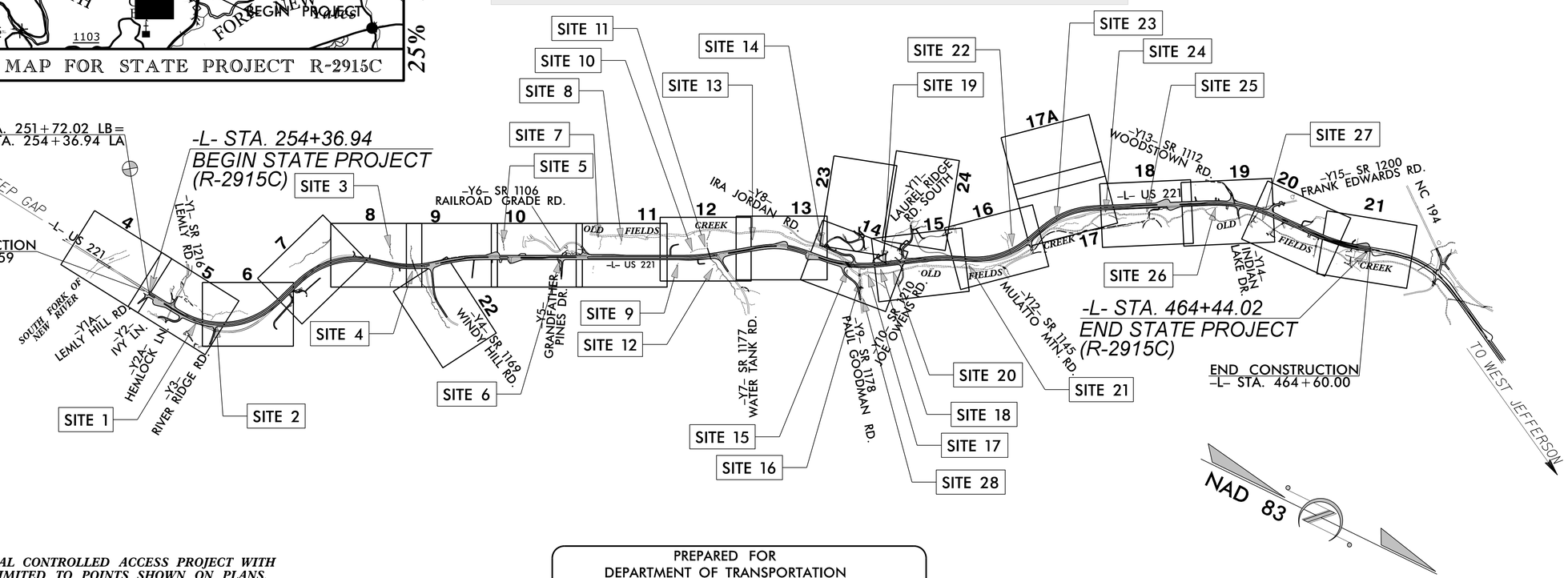
ASHE COUNTY

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

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

PERMIT DRAWING
SHEET 1 OF 33

WETLAND AND SURFACE WATER IMPACTS PERMIT



THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD _____ .
THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
DESIGN EXCEPTION IS REQUIRED FOR 8% GRADE ALONG -L- STATION 254+36.94 TO -L- STATION 276+95.00.

PREPARED FOR
DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, NC
PLANS COORDINATED BY:
Brenda L. Moore, PE – Project Engineer (NCDOT)

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50′ 25′ 0 50′ 100′
PLANS

50′ 25′ 0 50′ 100′
PROFILE (HORIZONTAL)

10′ 5′ 0 10′ 20′
PROFILE (VERTICAL)

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
REGIONAL TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915C = 3.979 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
NC License Number C-1554

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
April 18, 2014

LETTING DATE:
February 21, 2017

Stephen C. Browde, PE
PROJECT ENGINEER

Bill Bollman
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

09/08/99

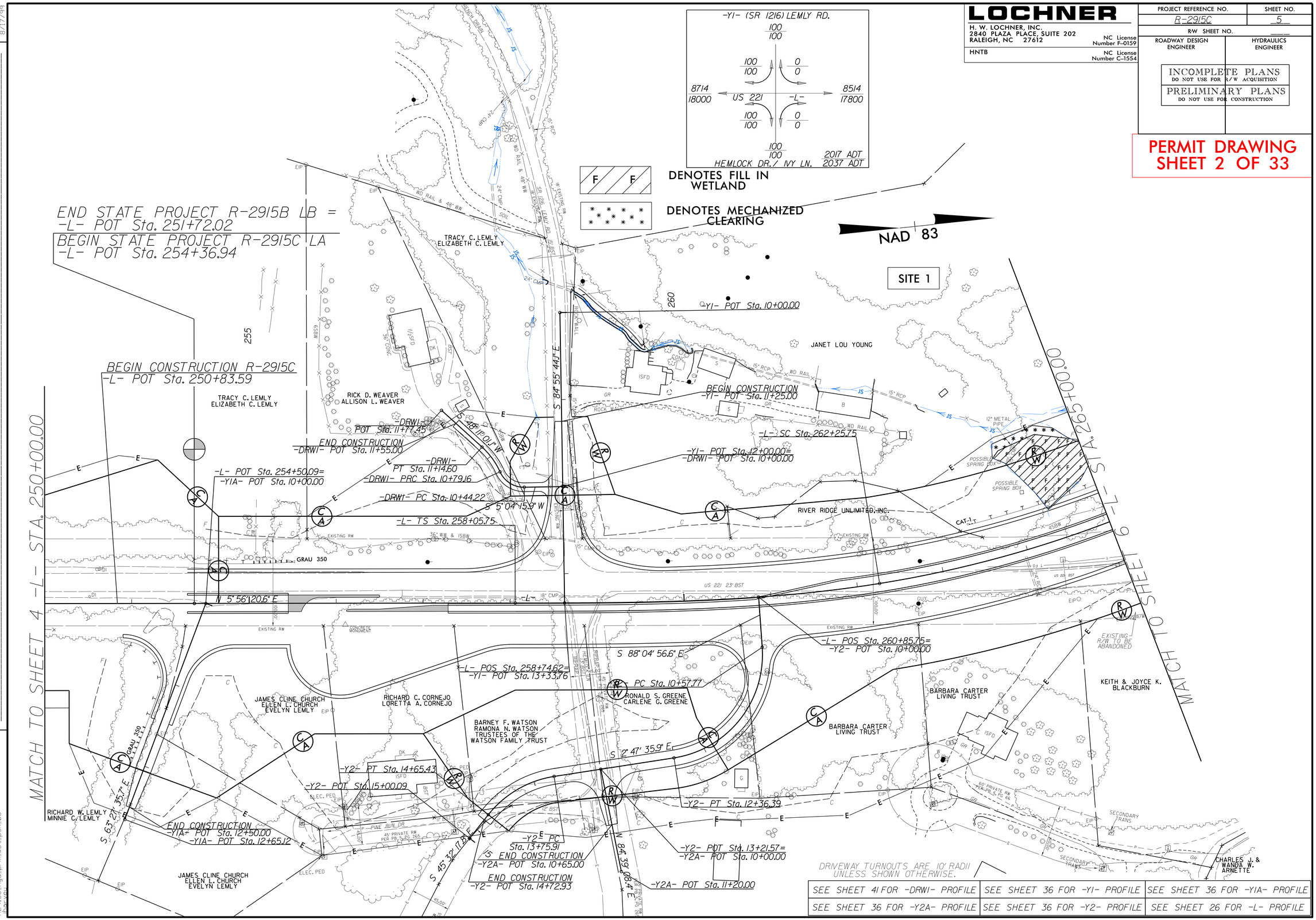
6/10/2014
R2915C_Hyd_prm_wet_psh_01.dgn
jdalton

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 2 OF 33

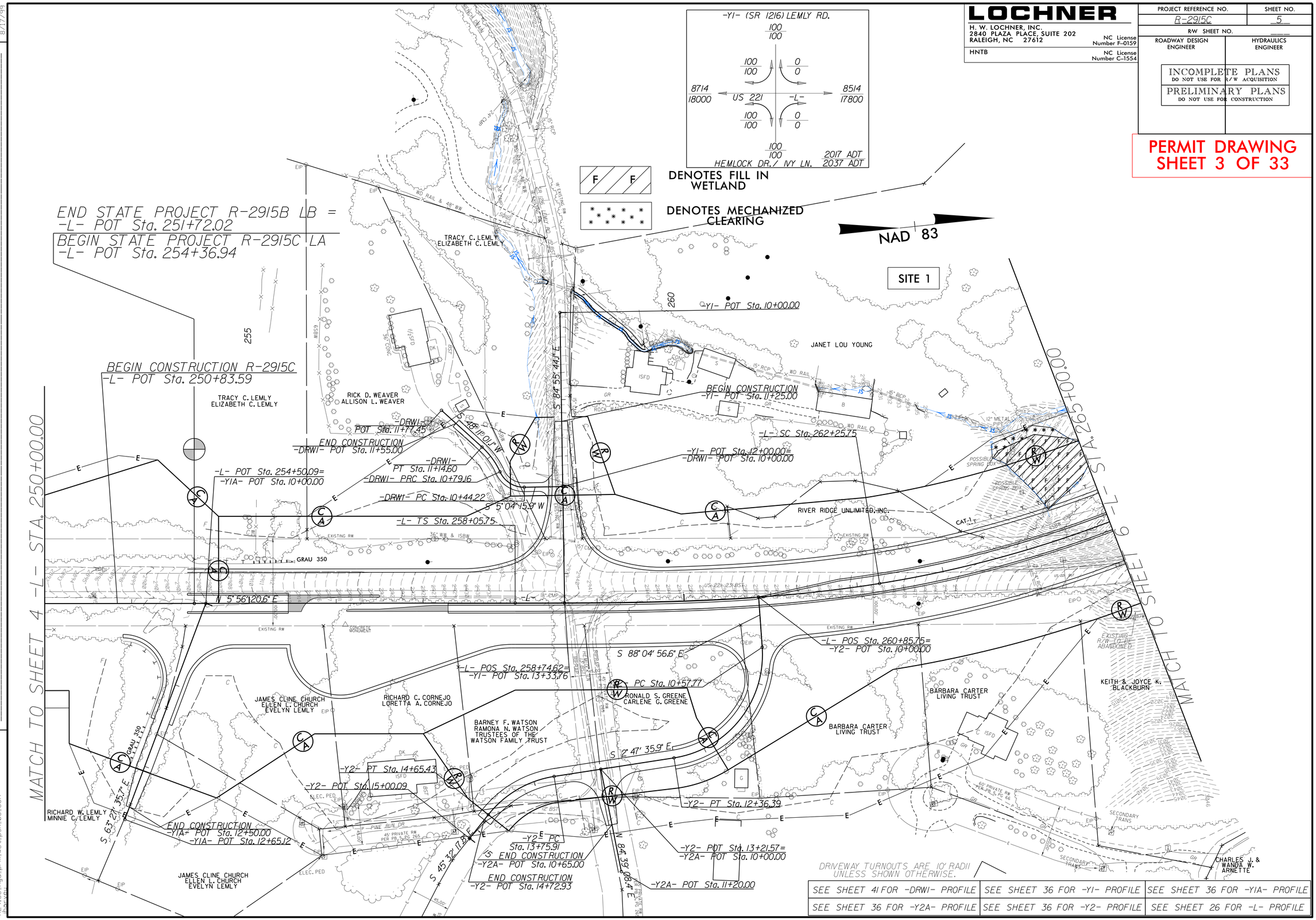


SEE SHEET 41 FOR -DRW1- PROFILE	SEE SHEET 36 FOR -Y1- PROFILE	SEE SHEET 36 FOR -Y1A- PROFILE
SEE SHEET 36 FOR -Y2A- PROFILE	SEE SHEET 36 FOR -Y2- PROFILE	SEE SHEET 26 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_05
bdavis



LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 3 OF 33

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_05.con
bdavis

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 4 OF 33

REVISIONS
8/17/99

F F DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

NAD 83

MATCH TO SHEET 5 -L- STA. 265+00.00

MATCH TO SHEET 7 -L- STA. 279+00.00

SITE 1

SITE 2

GROVER & SUE GOODMAN

-L- POC Sta. 266+50.00=
-Y3- POT Sta. 10+00.00

-L- CS Sta. 276+16.91

-Y3- PC Sta. 10+60.49

-Y3- PT Sta. 11+73.17

-Y3- PC Sta. 12+66.80

-Y3- PT Sta. 13+13.53

END CONSTRUCTION
-Y3- POT Sta. 13+45.00
-Y3- POT Sta. 13+45.72

-DRW2- PC Sta. 15+90.80

-DRW2- PT Sta. 17+75.80

END CONSTRUCTION
-DRW2- POT Sta. 17+55.00

N 68° 37' 00.0" E

N 82° 46' 30.3" E

N 89° 07' 23.3" E

S 74° 11' 33.2" E

KEITH & JOYCE K. BLACKBURN

RIVER RIDGE UNLIMITED

CHARLES J. & WANDA W. ARNETTE

DONALD EDWARD BLACKBURN et al.

TERRI ANNE WELLS

LESLIE DELEON & BETTY ROSE SASSER

MICHAEL DEAN & MARLENE E. BLEDSOE

WAYLON B & RACHEL THOMAS

EXISTING R/W TO BE ABANDONED

EASEMENT REQUIRED HERE FOR TEMPORARY DETOUR WIDENING (REF. SHT. 12-C)

PAVED DITCH

POSSIBLE SPRING BOX

GRAU 350

CAT-1

HWY 221 BST

-L-		
PIs Sta 260+86.12	PI Sta 269+92.55	PIs Sta 277+27.08
Θs = 9° 02' 48.1"	Δ = 59° 55' 50.5" (LT)	Θs = 7° 06' 29.2"
Ls = 420.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 280.37'	L = 1,391.16'	LT = 220.18'
ST = 140.33'	T = 766.80'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

-Y3-	-Y3-	-DRW2-
PI Sta 11+17.12	PI Sta 12+90.20	PI Sta 17+39.93
Δ = 14° 09' 30.3" (RT)	Δ = 7° 38' 58.6" (RT)	Δ = 117° 46' 45.2" (LT)
D = 12° 33' 53.5"	D = 16° 22' 12.8"	D = 63° 39' 43.1"
L = 112.68'	L = 46.73'	L = 185.01'
T = 56.63'	T = 23.40'	T = 149.13'
R = 456.00'	R = 350.00'	R = 90.00'
SE = .05	SE = As Shown	
Ro = As Shown	Ro = As Shown	

DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.

SEE SHEET 41 FOR -DRW2- PROFILE

SEE SHEET 37 FOR -Y3- PROFILE

SEE SHEET 28 FOR -L- PROFILE

1/7/2014
R2915C_Hyd_prm_wet_psh_06
bbryan

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

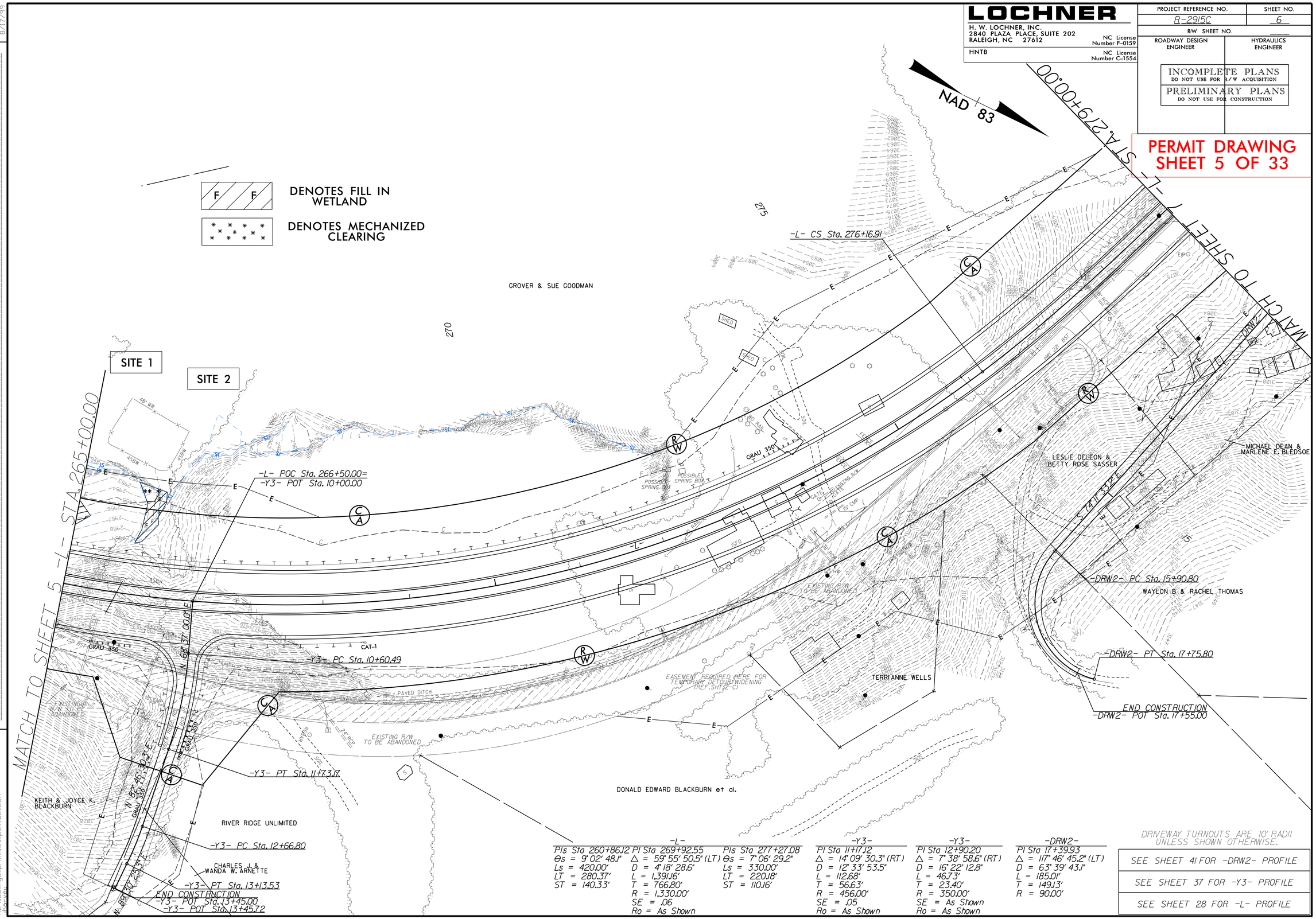
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 5 OF 33

REVISIONS

8/17/99



-L-		
PIs Sta 260+86.12	PI Sta 269+92.55	PIs Sta 277+27.08
Θs = 9° 02' 48.1"	Δ = 59° 55' 50.5" (LT)	Θs = 7° 06' 29.2"
Ls = 420.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 280.37'	L = 1,391.16'	LT = 220.18'
ST = 140.33'	T = 766.80'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

-Y3-	-Y3-	-DRW2-
PI Sta 11+17.12	PI Sta 12+90.20	PI Sta 17+39.93
Δ = 14° 09' 30.3" (RT)	Δ = 7° 38' 58.6" (RT)	Δ = 117° 46' 45.2" (LT)
D = 12° 33' 53.5"	D = 16° 22' 12.8"	D = 63° 39' 43.1"
L = 112.68'	L = 46.73'	L = 185.01'
T = 56.63'	T = 23.40'	T = 149.13'
R = 456.00'	R = 350.00'	R = 90.00'
SE = .05	SE = As Shown	
Ro = As Shown	Ro = As Shown	

DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.

SEE SHEET 41 FOR -DRW2- PROFILE

SEE SHEET 37 FOR -Y3- PROFILE

SEE SHEET 28 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_06.con
jhorvath

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

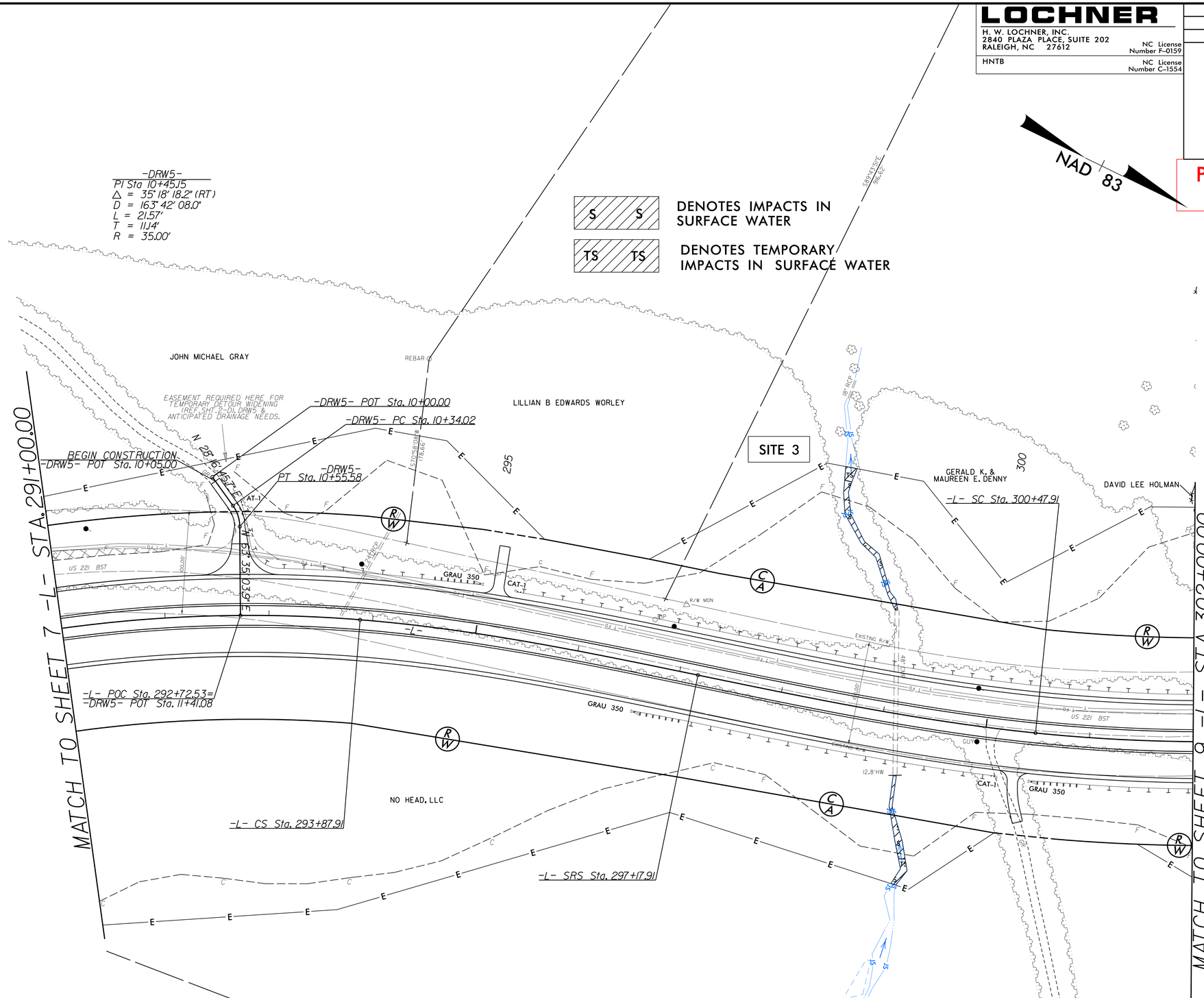
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 33

NAD 83

REVISIONS

8/17/99



-L-		
PIs Sta 283+12.59	PI Sta 289+27.54	PIs Sta 294+98.07
Θs = 7° 06' 29.2"	△ = 41° 35' 36.0" (RT)	Θs = 7° 06' 29.2"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 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-		
PIs Sta 299+38.03	PI Sta 302+14.38	PIs Sta 304+89.79
Θs = 5° 50' 08.5"	△ = 11° 44' 01.8" (LT)	Θs = 5° 50' 08.5"
Ls = 330.00'	D = 3° 32' 12.4"	Ls = 330.00'
LT = 220.12'	L = 331.77'	LT = 220.12'
ST = 110.11'	T = 166.47'	ST = 110.11'
	R = 1,620.00'	
	SE = .06	
	Ro = As Shown	

DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.

SEE SHEET 41 FOR -DRW5- PROFILE

SEE SHEET 29 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_08
Jbarnes

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 7 OF 33

REVISIONS

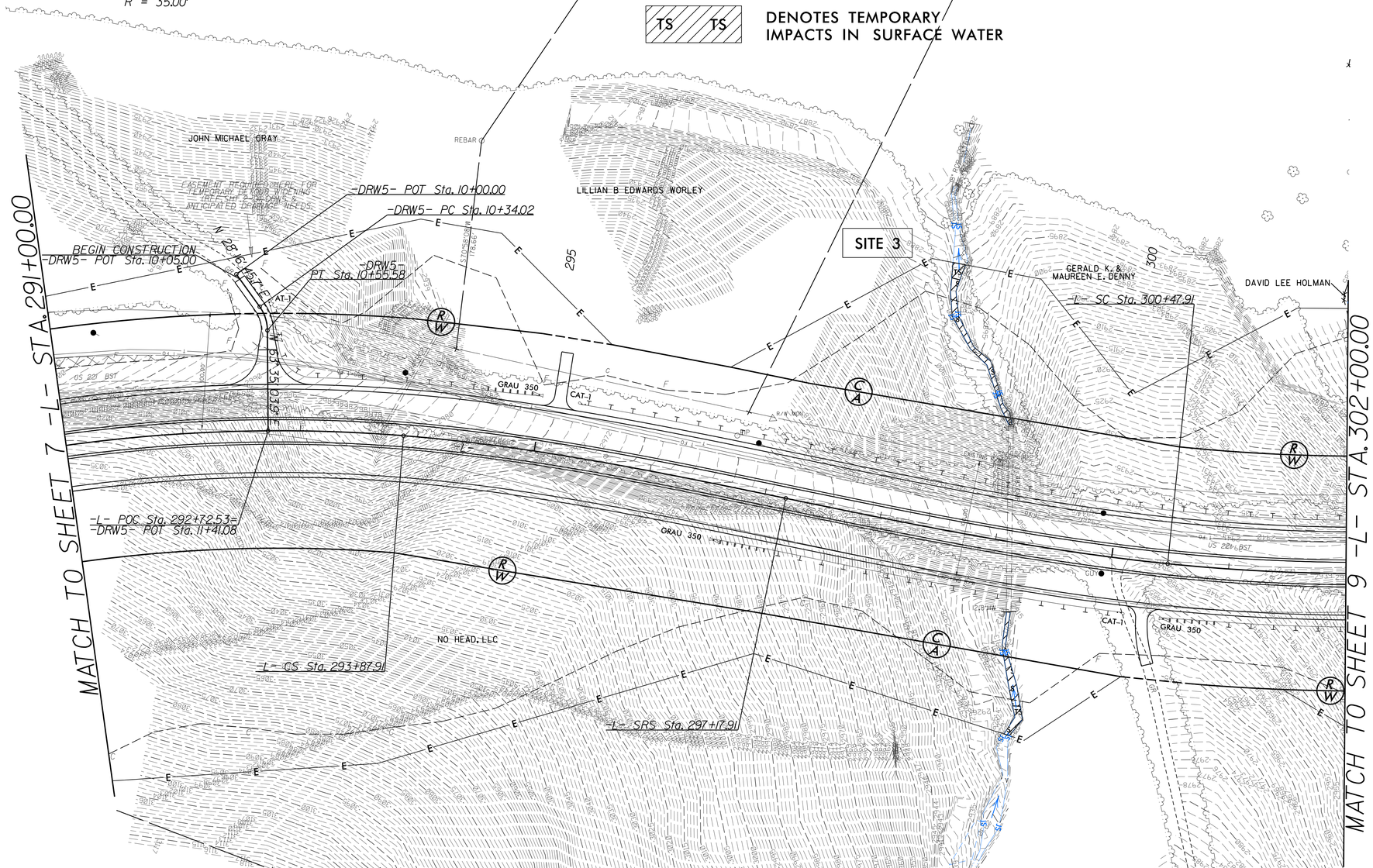
8/17/99

NAD 83

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

-DRW5-
PI Sta 10+45.15
△ = 35° 18' 18.2" (RT)
D = 16.3° 42' 08.0"
L = 21.57'
T = 11.14'
R = 35.00'



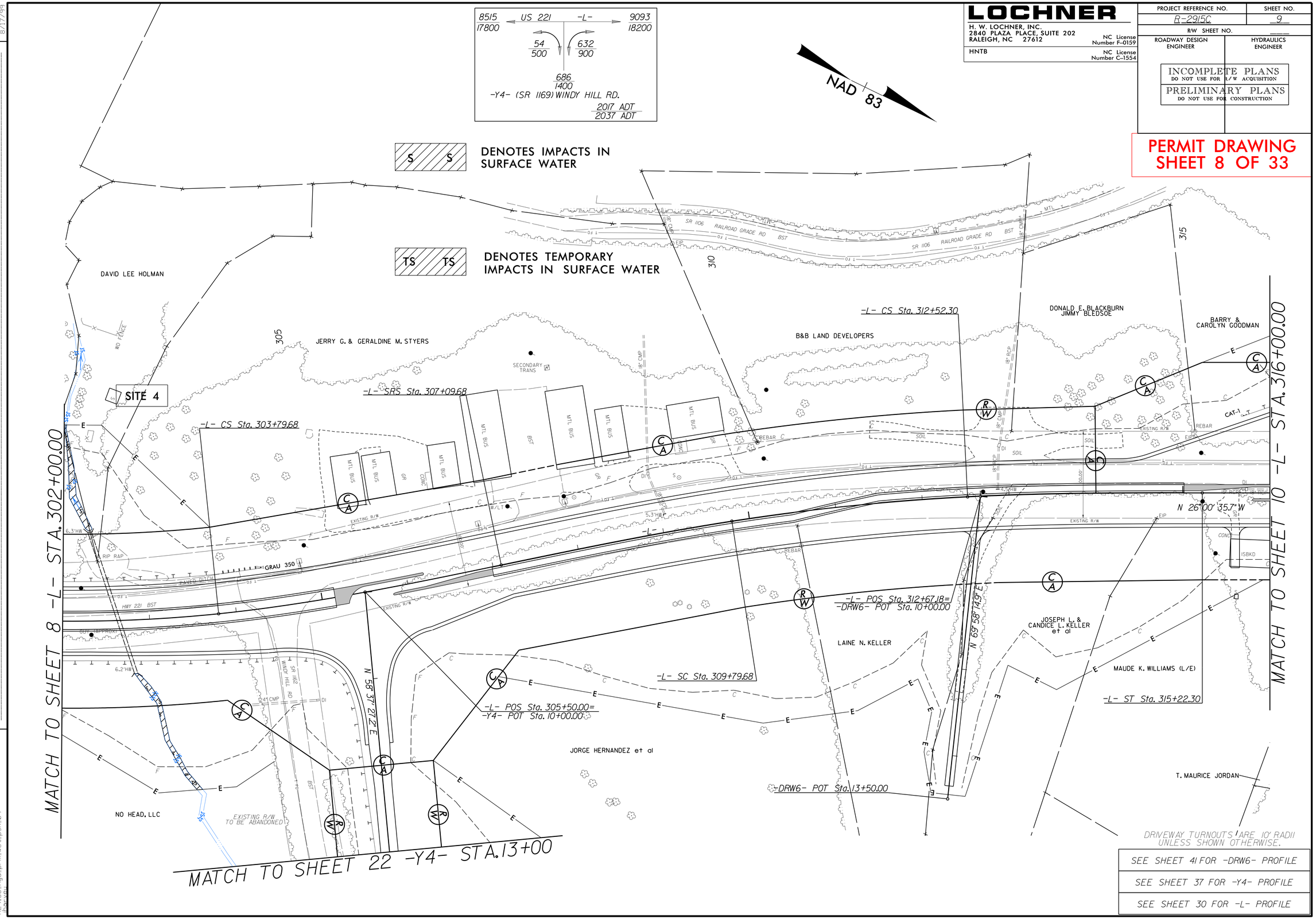
-L-				-L-	
PIs Sta 283+12.59	PI Sta 289+27.54	PIs Sta 294+98.07	PIs Sta 299+38.03	PI Sta 302+14.38	PIs Sta 304+89.79
Θs = 7° 06' 29.2"	△ = 41° 35' 36.0" (RT)	Θs = 7° 06' 29.2"	Θs = 5° 50' 08.5"	△ = 11° 44' 01.8" (LT)	Θs = 5° 50' 08.5"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'	Ls = 330.00'	D = 3° 32' 12.4"	Ls = 330.00'
LT = 220.18'	L = 965.50'	LT = 220.18'	LT = 220.12'	L = 331.77'	LT = 220.12'
ST = 110.16'	T = 505.13'	ST = 110.16'	ST = 110.11'	T = 166.47'	ST = 110.11'
	R = 1,330.00'			R = 1,620.00'	
	SE = .06			SE = .06	
	Ro = As Shown			Ro = As Shown	

DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.

SEE SHEET 41 FOR -DRW5- PROFILE

SEE SHEET 29 FOR -L- PROFILE

1/7/2014
R2915C_Hyd_prm_wet_psh_08.con
jbarvey

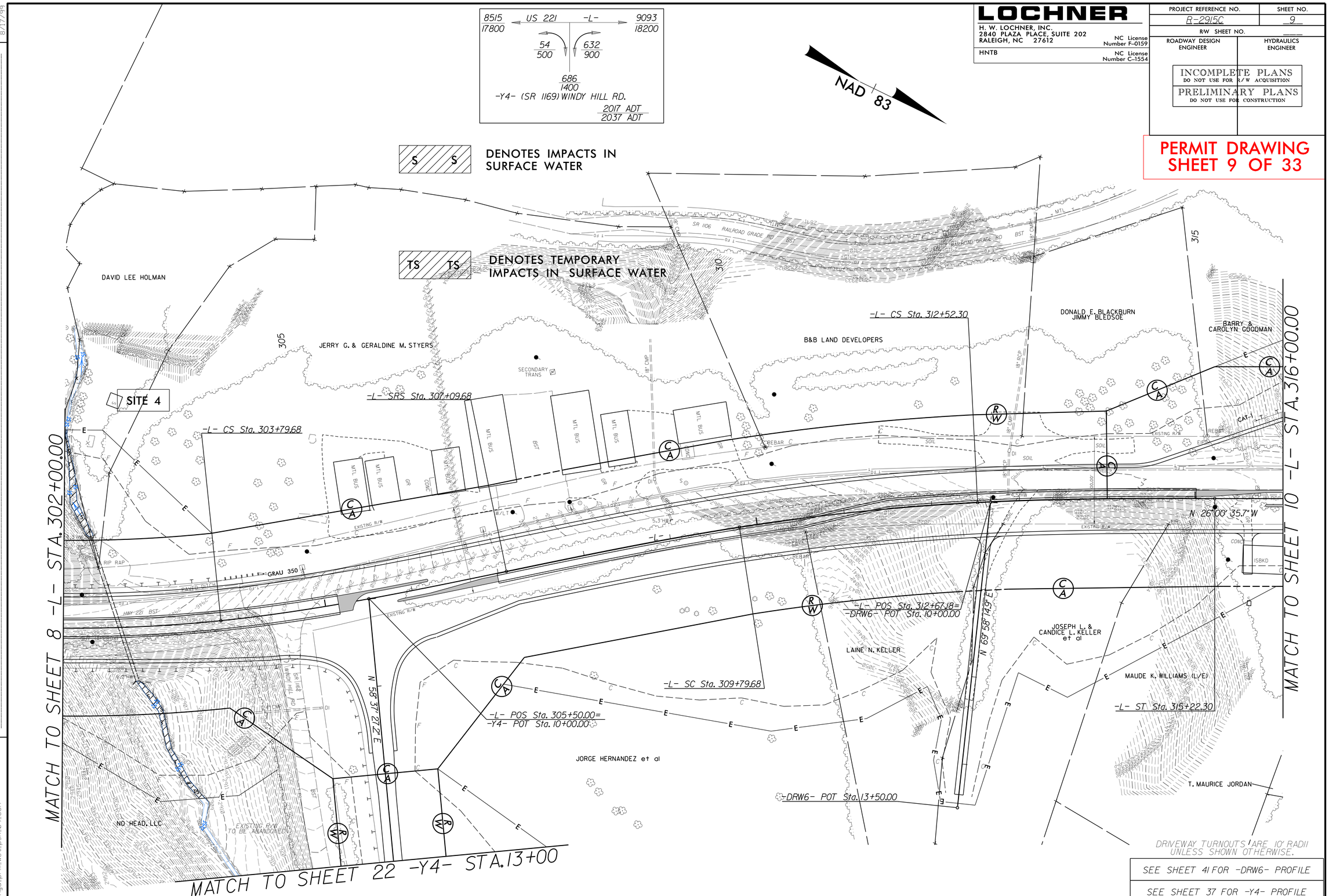

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554
PROJECT REFERENCE NO.
R-2915C
SHEET NO.
9
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PERMIT DRAWING
SHEET 8 OF 33
8515
17800
US 221
-L-
9093
18200
54
500
632
900
686
1400
-Y4- (SR 1169) WINDY HILL RD.
2017 ADT
2037 ADT
NAD 83
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DAVID LEE HOLMAN
JERRY G. & GERALDINE M. STYERS
B&B LAND DEVELOPERS
DONALD E. BLACKBURN
JIMMY BLEDSOE
BARRY & CAROLYN GOODMAN
LAINE N. KELLER
JOSEPH L. & CANDICE L. KELLER et al
MAUDE K. WILLIAMS (L/E)
JORGE HERNANDEZ et al
T. MAURICE JORDAN
NO HEAD, LLC
SITE 4
-L- CS Sta. 303+79.68
-L- SRS Sta. 307+09.68
-L- CS Sta. 312+52.30
-L- POS Sta. 312+67.18=
-DRW6- POT Sta. 10+00.00
-L- SC Sta. 309+79.68
-L- POS Sta. 305+50.00=
-Y4- POT Sta. 10+00.00
-DRW6- POT Sta. 13+50.00
-L- ST Sta. 315+22.30
N 26° 00' 35.7" W
N 69° 58' 14.9" E
N 58° 37' 27.2" E
MATCH TO SHEET 8 -L- STA. 302+00.00
MATCH TO SHEET 10 -L- STA. 316+00.00
MATCH TO SHEET 22 -Y4- STA. 13+00
DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.
SEE SHEET 41 FOR -DRW6- PROFILE
SEE SHEET 37 FOR -Y4- PROFILE
SEE SHEET 30 FOR -L- PROFILE
REVISIONS
8/17/99
1/3/2014
R2915C_Hyd_prm_wet_psh_09

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 9 OF 33



DRIVEWAY TURNOUTS ARE 10' RADII UNLESS SHOWN OTHERWISE.

SEE SHEET 41 FOR -DRW6- PROFILE
SEE SHEET 37 FOR -Y4- PROFILE
SEE SHEET 30 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_09.con
bpowell

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

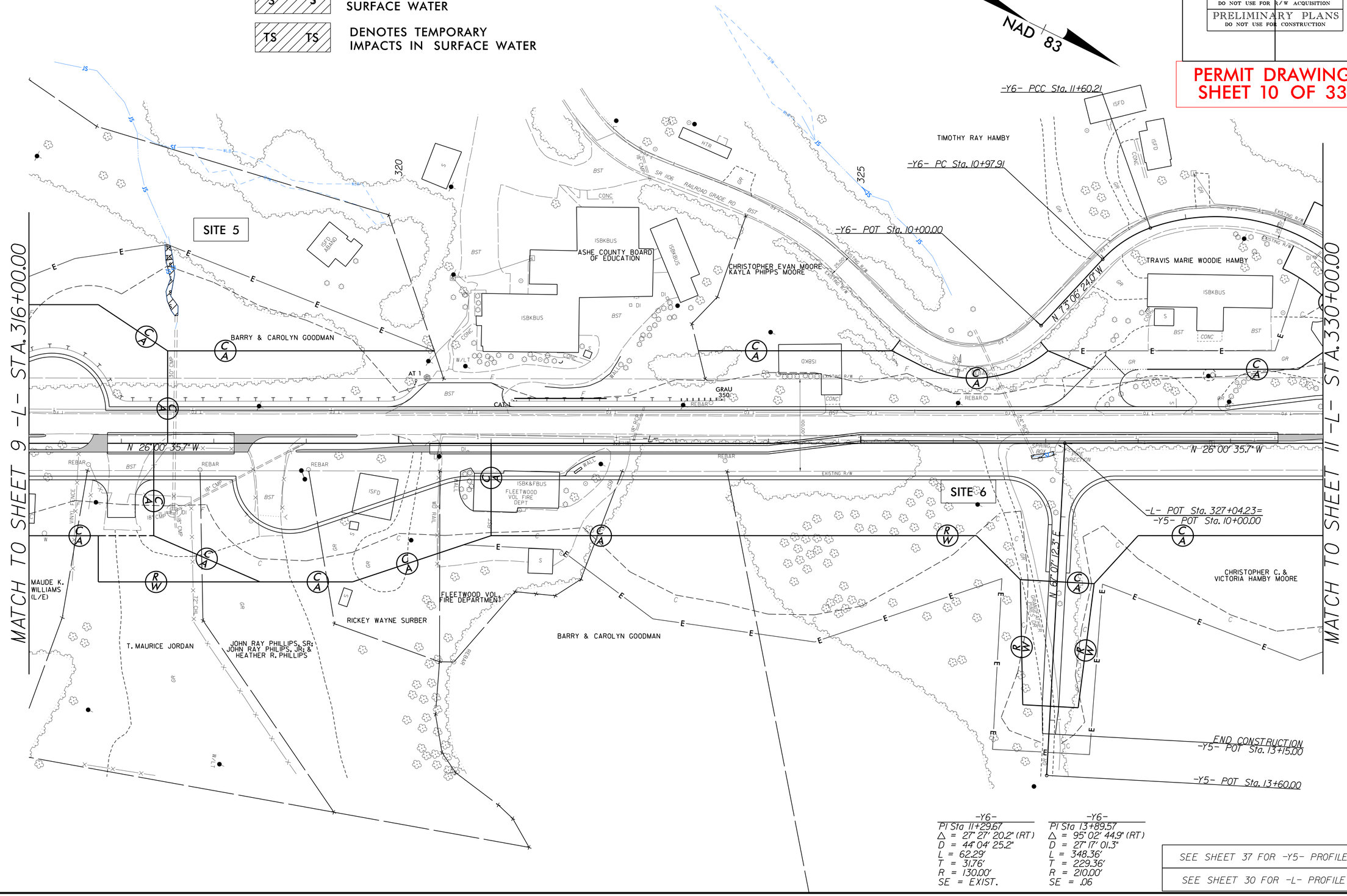
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 10 OF 33

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83



-Y6-	-Y6-
PI Sta 11+29.67	PI Sta 13+89.57
Δ = 27° 27' 20.2" (RT)	Δ = 95° 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

SEE SHEET 37 FOR -Y5- PROFILE

SEE SHEET 30 FOR -L- PROFILE

REVISIONS

8/17/99

L73 2014
R2915C Hyd_prm_wet_psh_10
DOT VER

LOCHNER

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RALEIGH, NC 27612
NC License Number F-0159

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

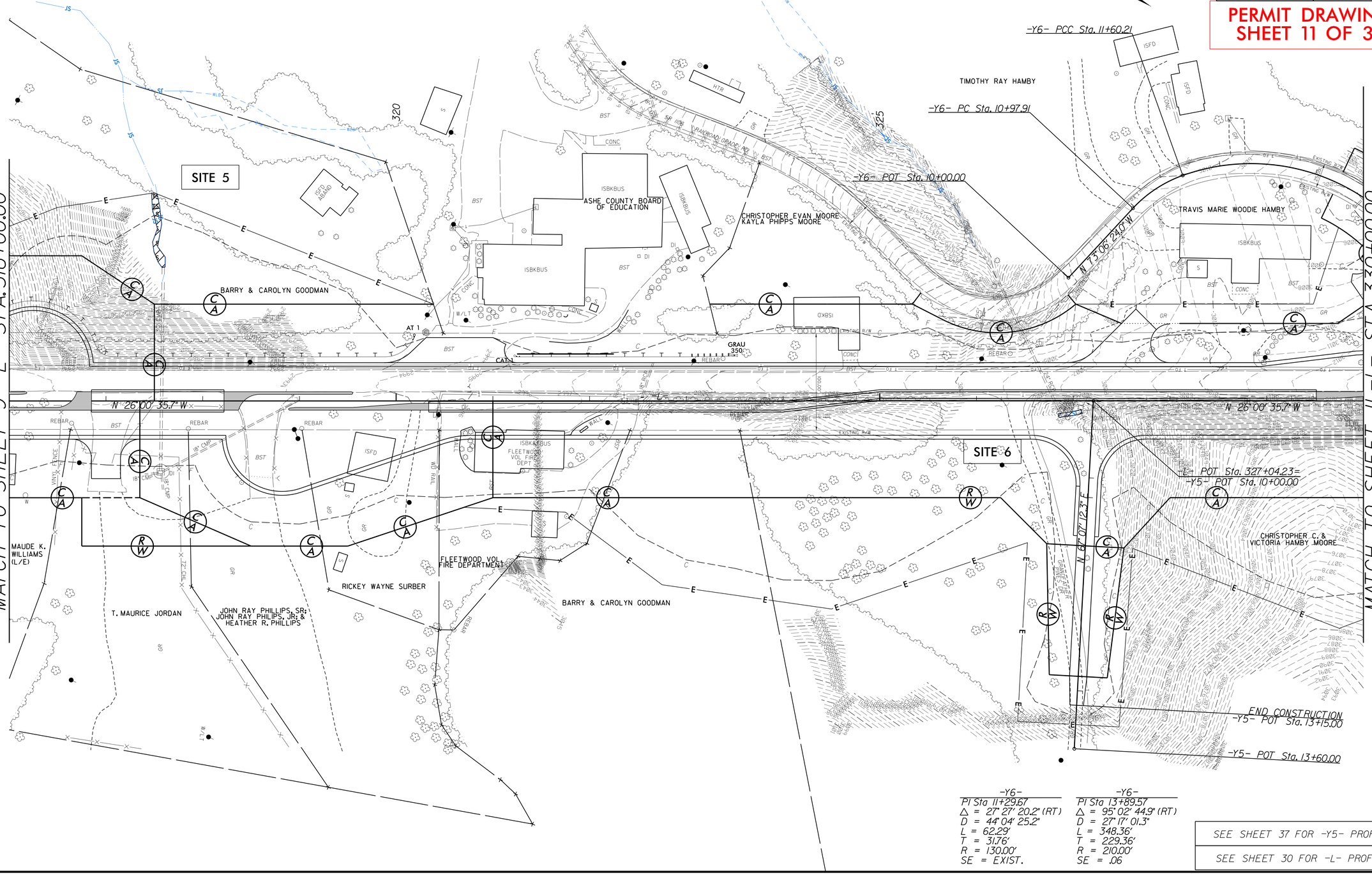
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 11 OF 33

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83



-Y6-	-Y6-
PI Sta 11+29.67	PI Sta 13+89.57
△ = 27° 27' 20.2" (RT)	△ = 95° 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

SEE SHEET 37 FOR -Y5- PROFILE

SEE SHEET 30 FOR -L- PROFILE

REVISIONS

8/17/99

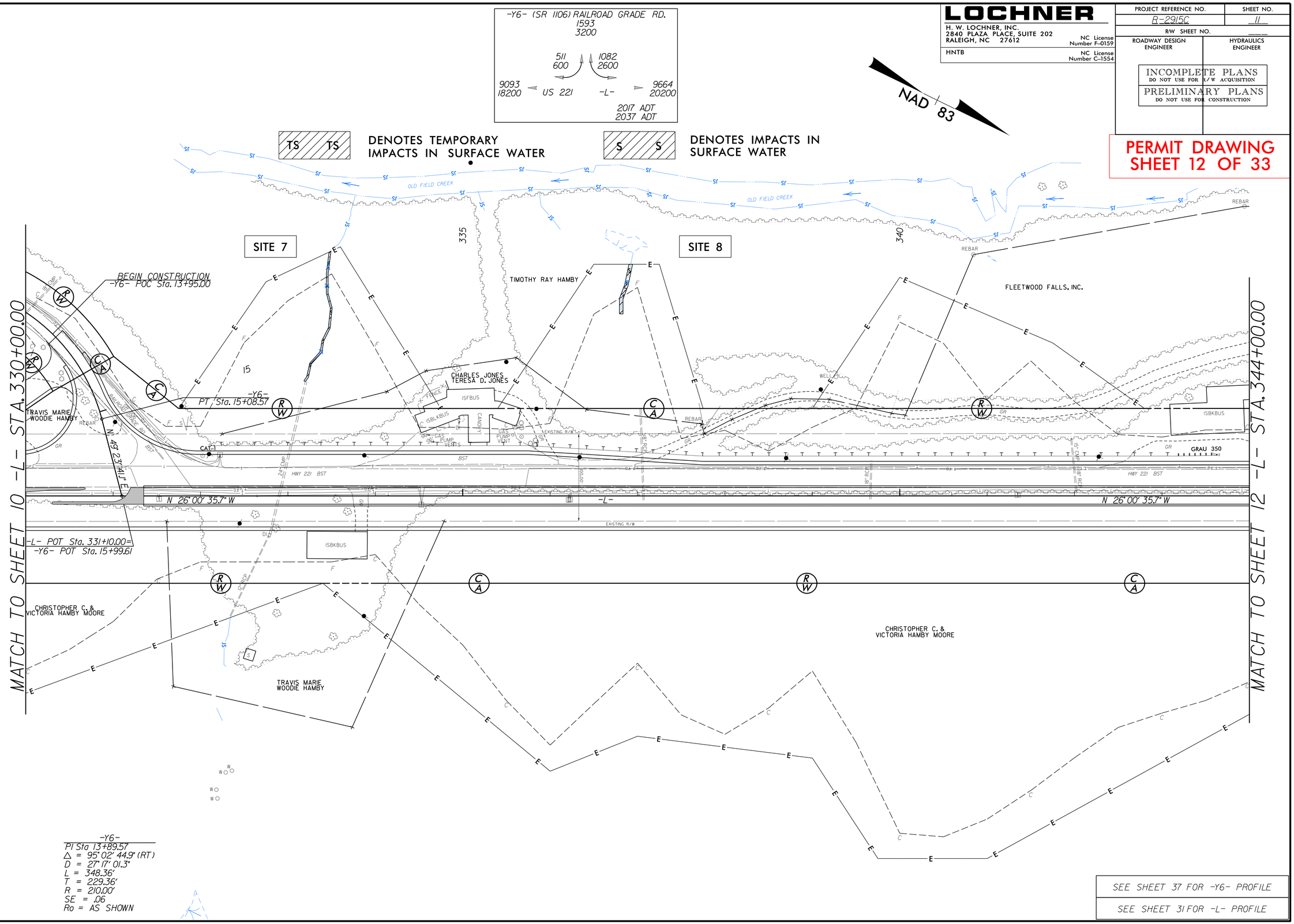
1/3/2014
R2915C_Hyd_prm_wet_psh_10.con
bar_vau

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 12 OF 33



-Y6-
PI Sta 13+89.57
△ = 95° 02' 44.9" (RT)
D = 27° 17' 01.3"
L = 348.36'
T = 229.36'
R = 210.00'
SE = .06
Ro = AS SHOWN

SEE SHEET 37 FOR -Y6- PROFILE

SEE SHEET 31 FOR -L- PROFILE

REVISIONS

8/17/99

1/7/2014
R2915C_Hyd_prm_wet_psh_11
bpowell

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 13 OF 33

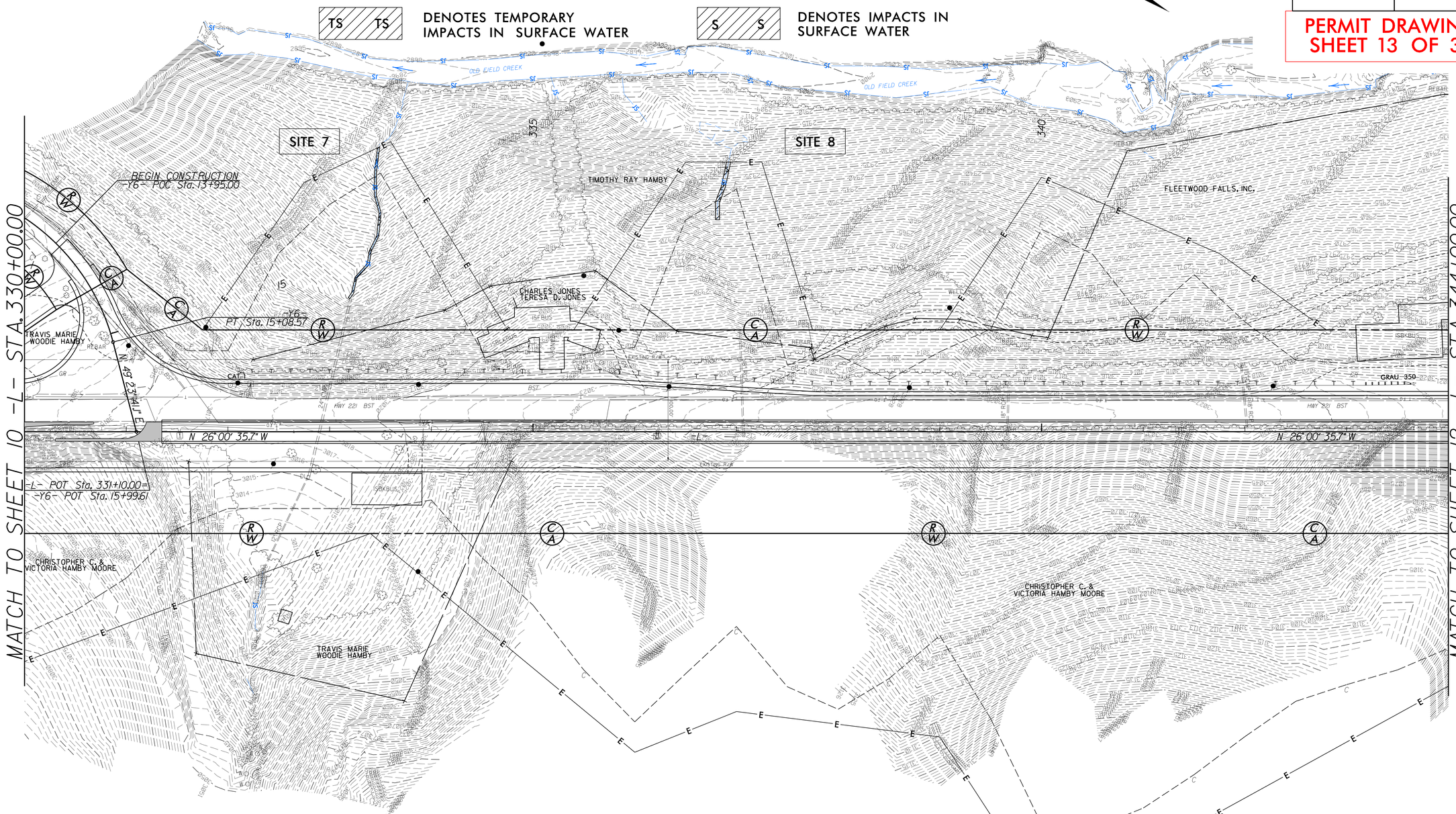
-Y6- (SR 1106) RAILROAD GRADE RD.
1593
3200

511 / 600 — 1082 / 2600
9093 / 18200 — US 221 — -L- — 9664 / 20200
2017 ADT
2037 ADT

NAD 83

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER



-Y6-
PI Sta 13+89.57
△ = 95° 02' 44.9" (RT)
D = 27° 17' 01.3"
L = 348.36'
T = 229.36'
R = 210.00'
SE = .06
Ro = AS SHOWN

SEE SHEET 37 FOR -Y6- PROFILE

SEE SHEET 31 FOR -L- PROFILE

REVISIONS

8/17/99

1/7/2014
R2915C_Hyd_prm_wet_psh_11.con
bpowell

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

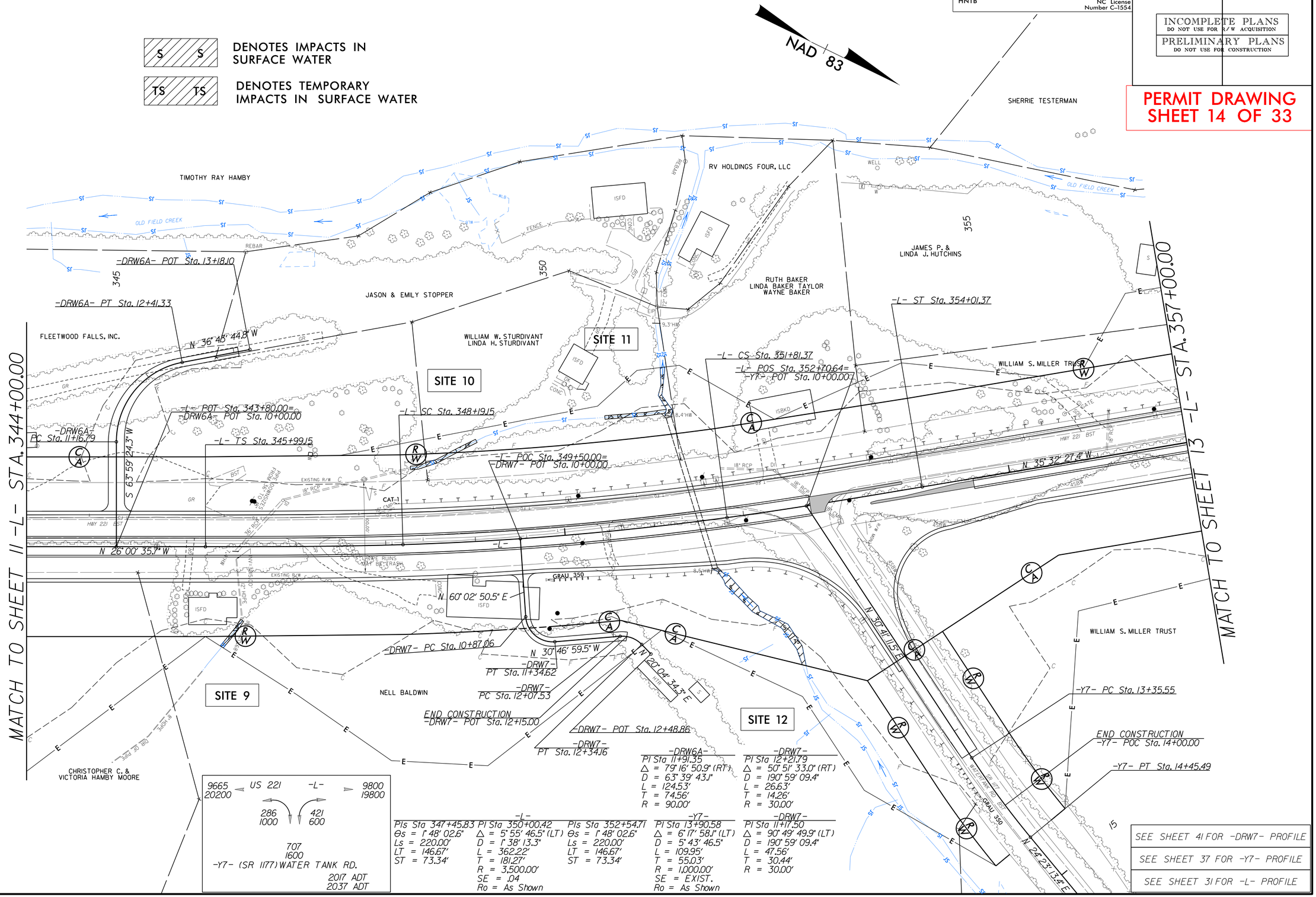
PROJECT REFERENCE NO.	SHEET NO.
R-2915C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 14 OF 33

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_12
bbryan

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

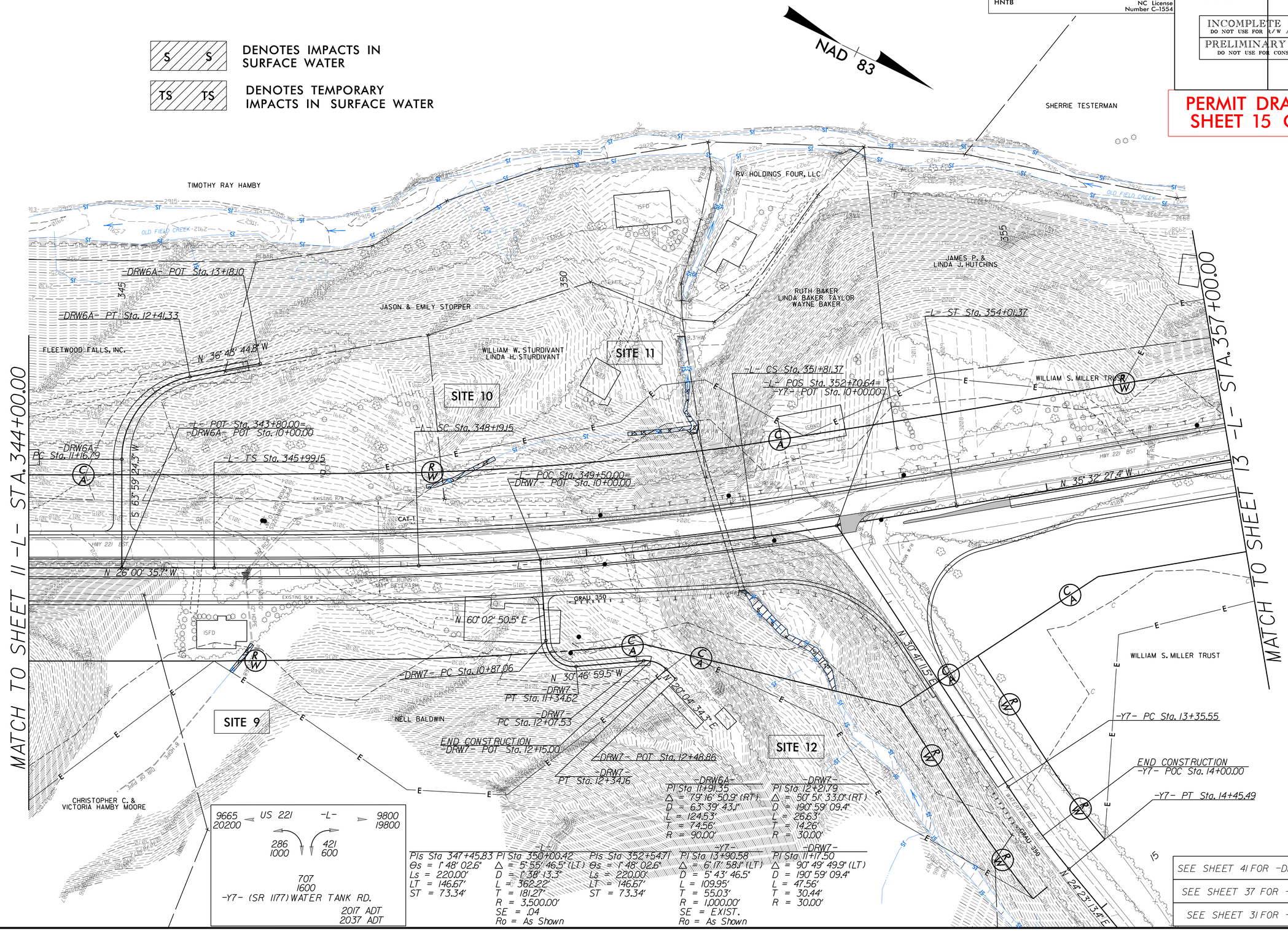
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 15 OF 33

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



-DRW6A-

PI Sta 11+91.35	
Δ =	79° 16' 50.9" (RT)
D =	63° 39' 43.1"
L =	124.53'
T =	74.56'
R =	90.00'

-DRW7-

PI Sta 12+21.79	
Δ =	50° 51' 33.0" (RT)
D =	190° 59' 09.4"
L =	26.63'
T =	14.26'
R =	30.00'

-L-

PIs Sta 347+45.83	PI Sta 350+00.42	PIs Sta 352+54.71
θs = 1° 48' 02.6"	Δ = 5° 55' 46.5" (LT)	θs = 1° 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	

-Y7-

PI Sta 13+90.58	
Δ =	6° 17' 58.1" (LT)
D =	5° 43' 46.5"
L =	109.95'
T =	55.03'
R =	1,000.00'
SE =	EXIST.
Ro =	As Shown

-DRW7-

PI Sta 11+17.50	
Δ =	90° 49' 49.9" (LT)
D =	190° 59' 09.4"
L =	47.56'
T =	30.44'
R =	30.00'

SEE SHEET 41 FOR -DRW7- PROFILE
SEE SHEET 37 FOR -Y7- PROFILE
SEE SHEET 31 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R-2915C_Hyd_prm_wet_psh_12.dgn
bhargrai

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

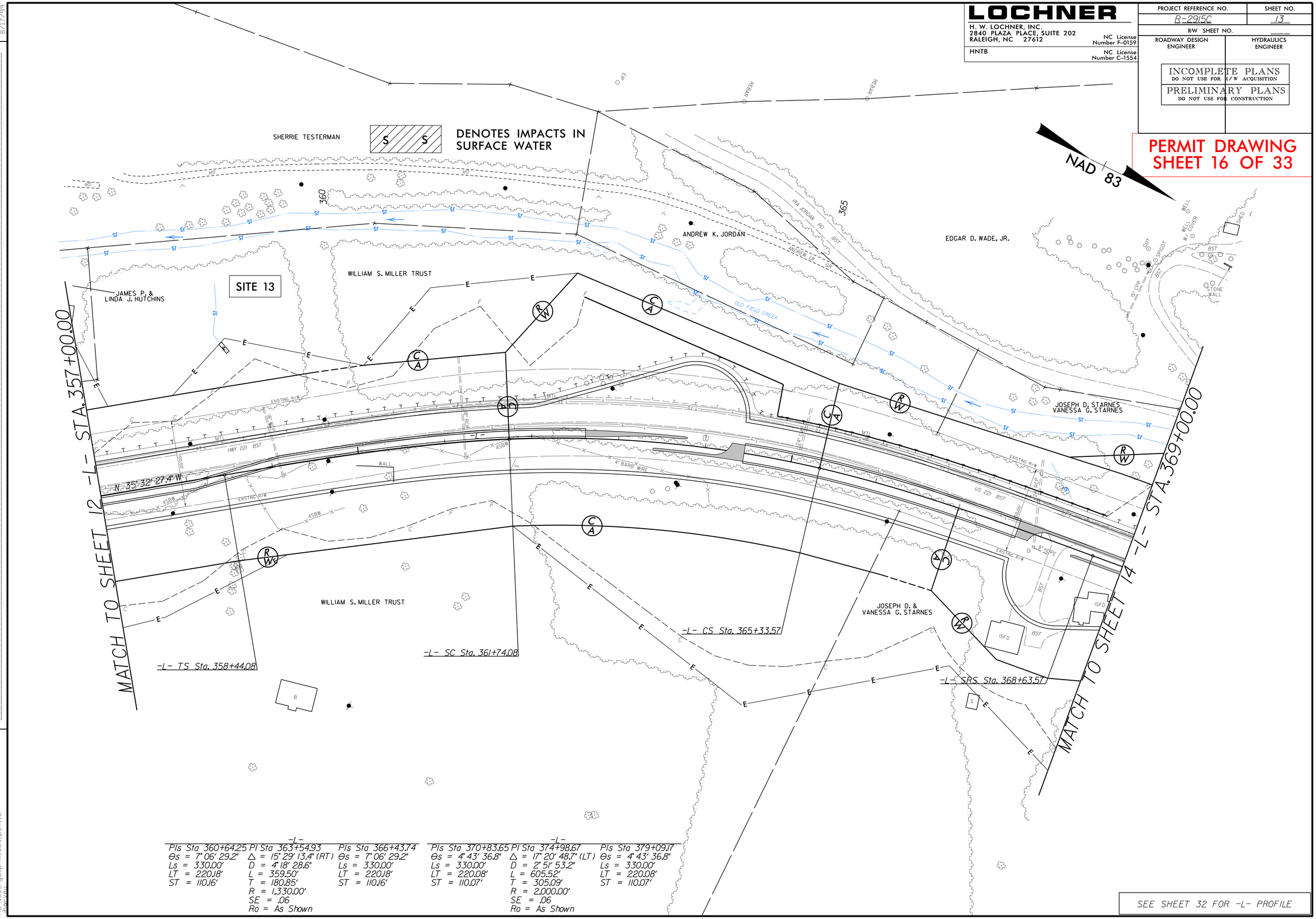
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 16 OF 33

REVISIONS

8/17/99



-L-

PIs Sta 360+64.25	PI Sta 363+54.93	PIs Sta 366+43.74
Θs = 7° 06' 29.2"	Δ = 15° 29' 13.4" (RT)	Θs = 7° 06' 29.2"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 220.18'	L = 359.50'	LT = 220.18'
ST = 110.16'	T = 180.85'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

-L-

PIs Sta 370+83.65	PI Sta 374+98.67	PIs Sta 379+09.17
Θs = 4° 43' 36.8"	Δ = 17° 20' 48.7" (LT)	Θs = 4° 43' 36.8"
Ls = 330.00'	D = 2° 51' 53.2"	Ls = 330.00'
LT = 220.08'	L = 605.52'	LT = 220.08'
ST = 110.07'	T = 305.09'	ST = 110.07'
	R = 2,000.00'	
	SE = .06	
	Ro = As Shown	

SEE SHEET 32 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_13
bpowell

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

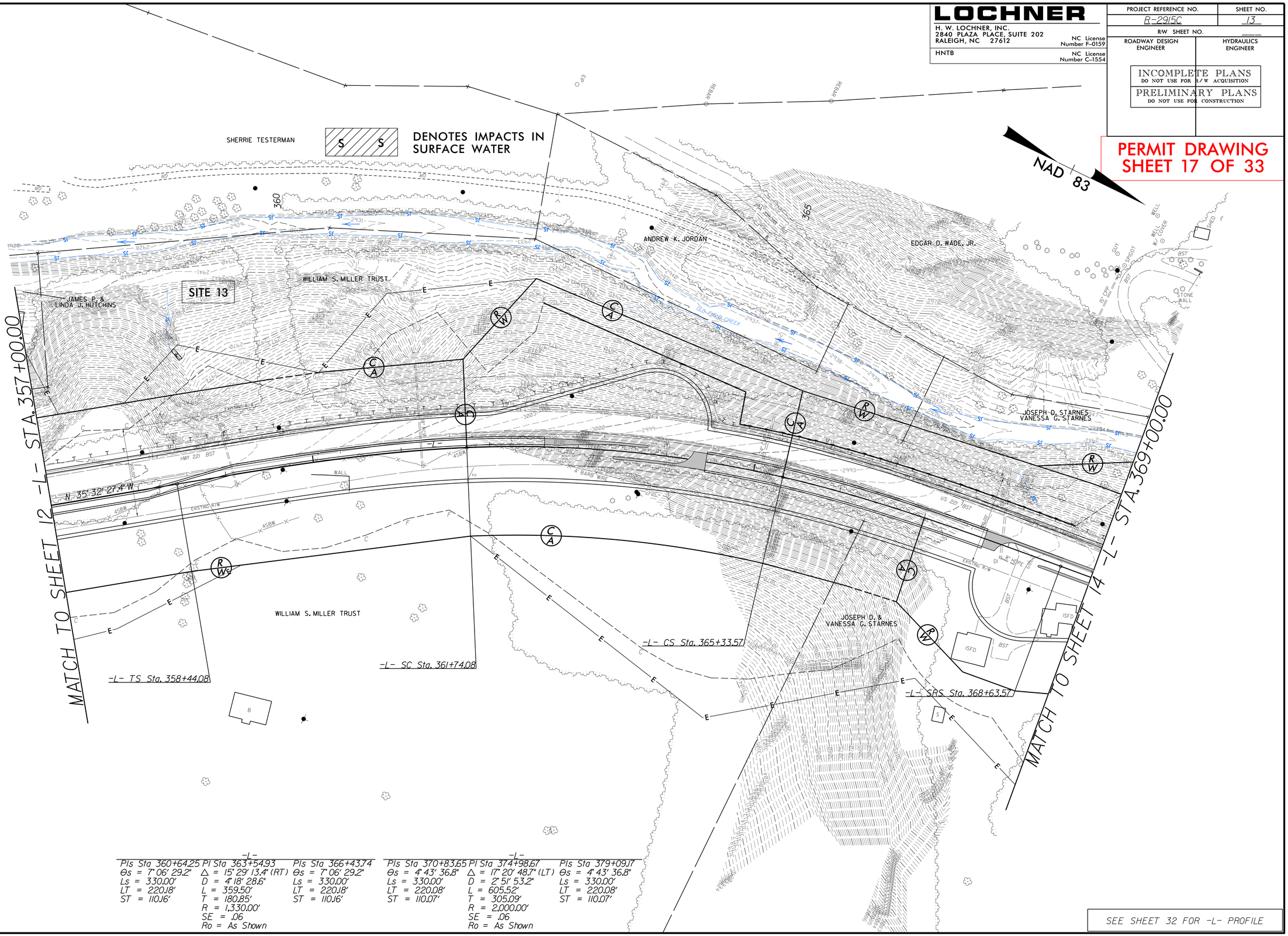
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 17 OF 33

REVISIONS

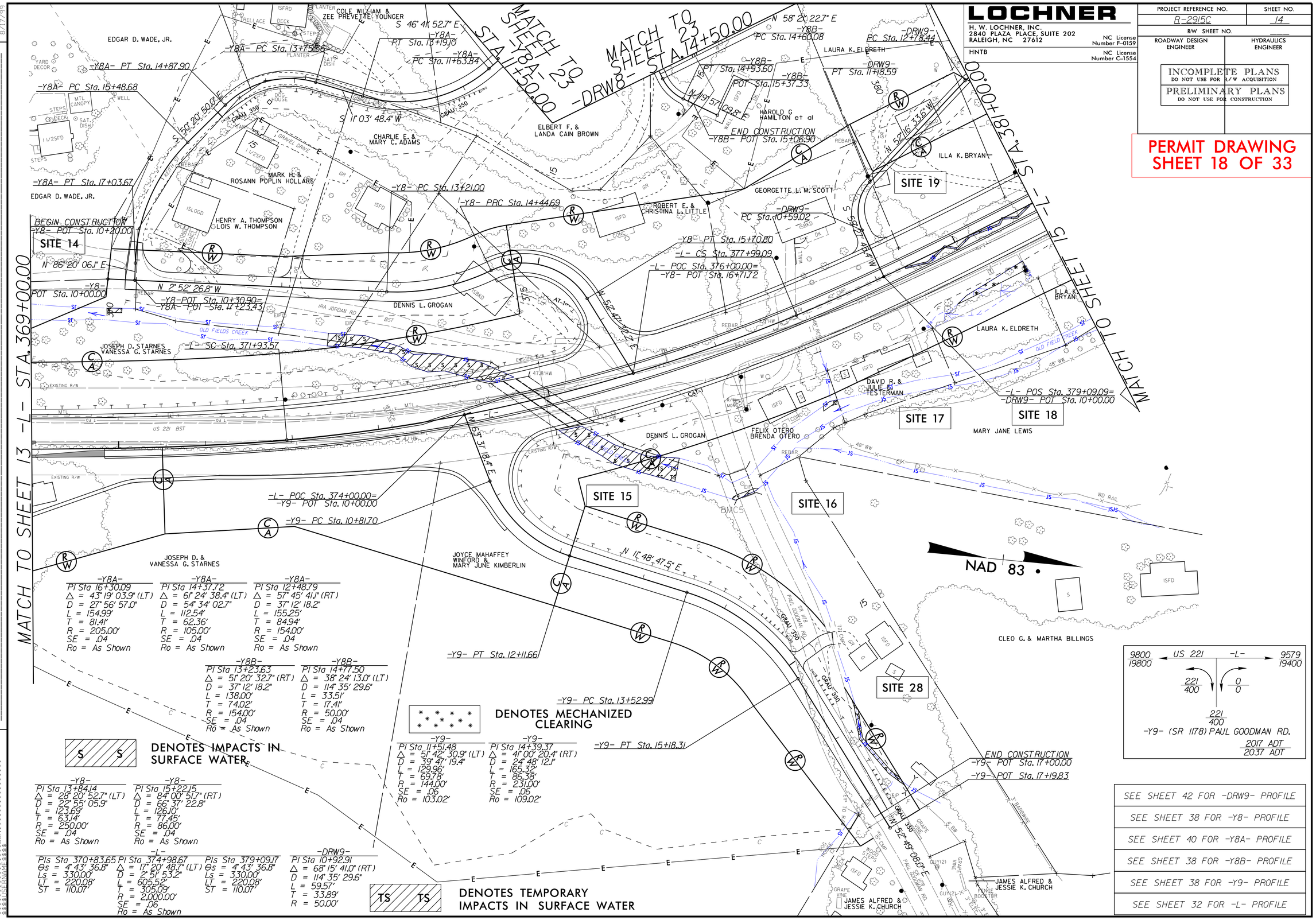
8/17/99



-L-			-L-		
PIs Sta 360+64.25	PI Sta 363+54.93	PIs Sta 366+43.74	PIs Sta 370+83.65	PI Sta 374+98.67	PIs Sta 379+09.17
Θs = 7° 06' 29.2"	Δ = 15° 29' 13.4" (RT)	Θs = 7° 06' 29.2"	Θs = 4° 43' 36.8"	Δ = 17° 20' 48.7" (LT)	Θs = 4° 43' 36.8"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'	Ls = 330.00'	D = 2° 51' 53.2"	Ls = 330.00'
LT = 220.18'	L = 359.50'	LT = 220.18'	LT = 220.08'	L = 605.52'	LT = 220.08'
ST = 110.16'	T = 180.85'	ST = 110.16'	ST = 110.07'	T = 305.09'	ST = 110.07'
	R = 1,330.00'			R = 2,000.00'	
	SE = .06			SE = .06	
	Ro = As Shown			Ro = As Shown	

SEE SHEET 32 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_13.con
hbarnes



LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

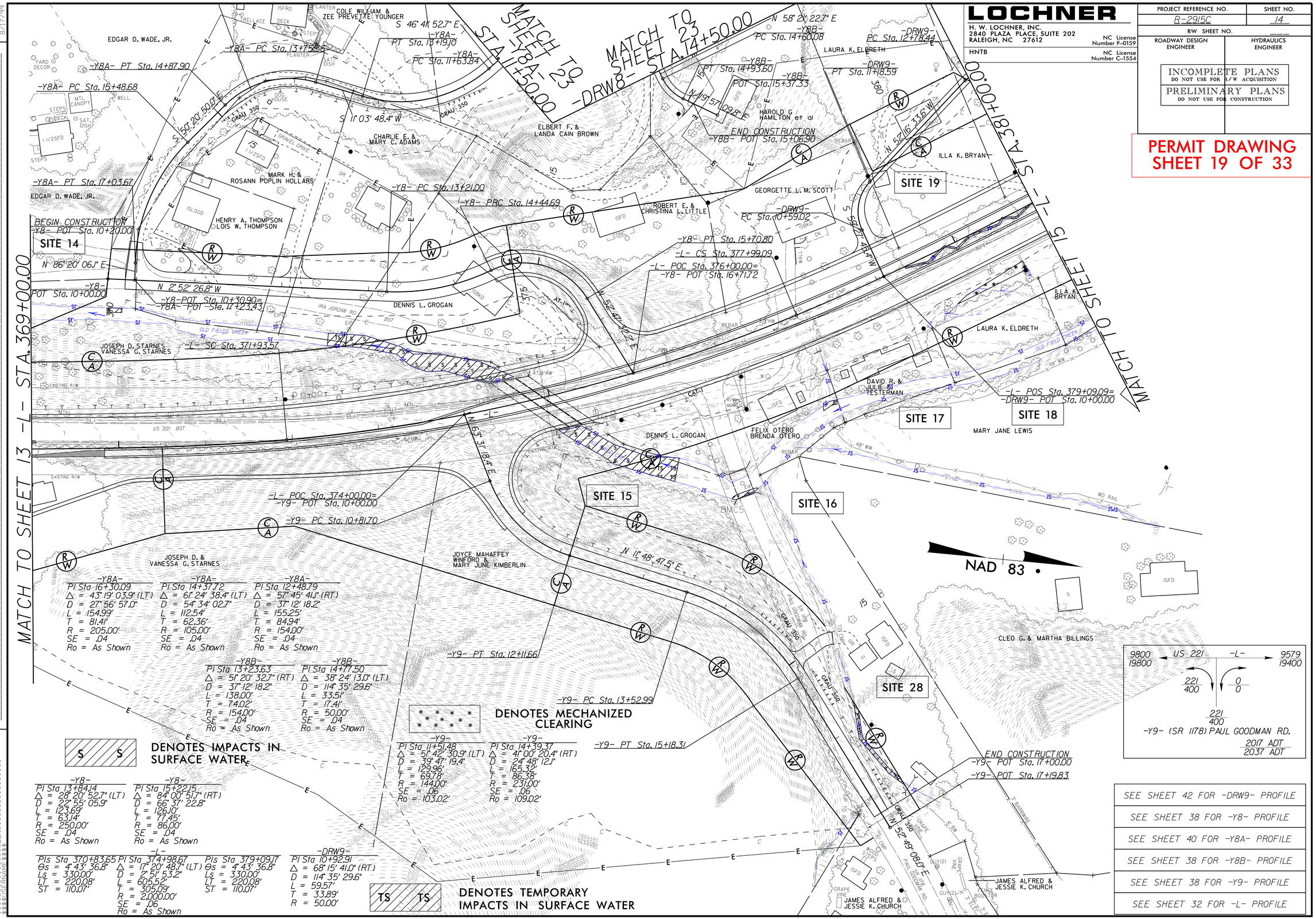
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 18 OF 33

REVISIONS

8/17/99

R2915C_Hyd_prm_wet_psh_14.dgn 1/3/2014 2:52:41 PM



LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 19 OF 33

REVISIONS

8/17/99

R2915C_Hyd_prm_wet_psh_14_con.dgn 1/3/2014 2:53:31 PM

LOCHNER

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

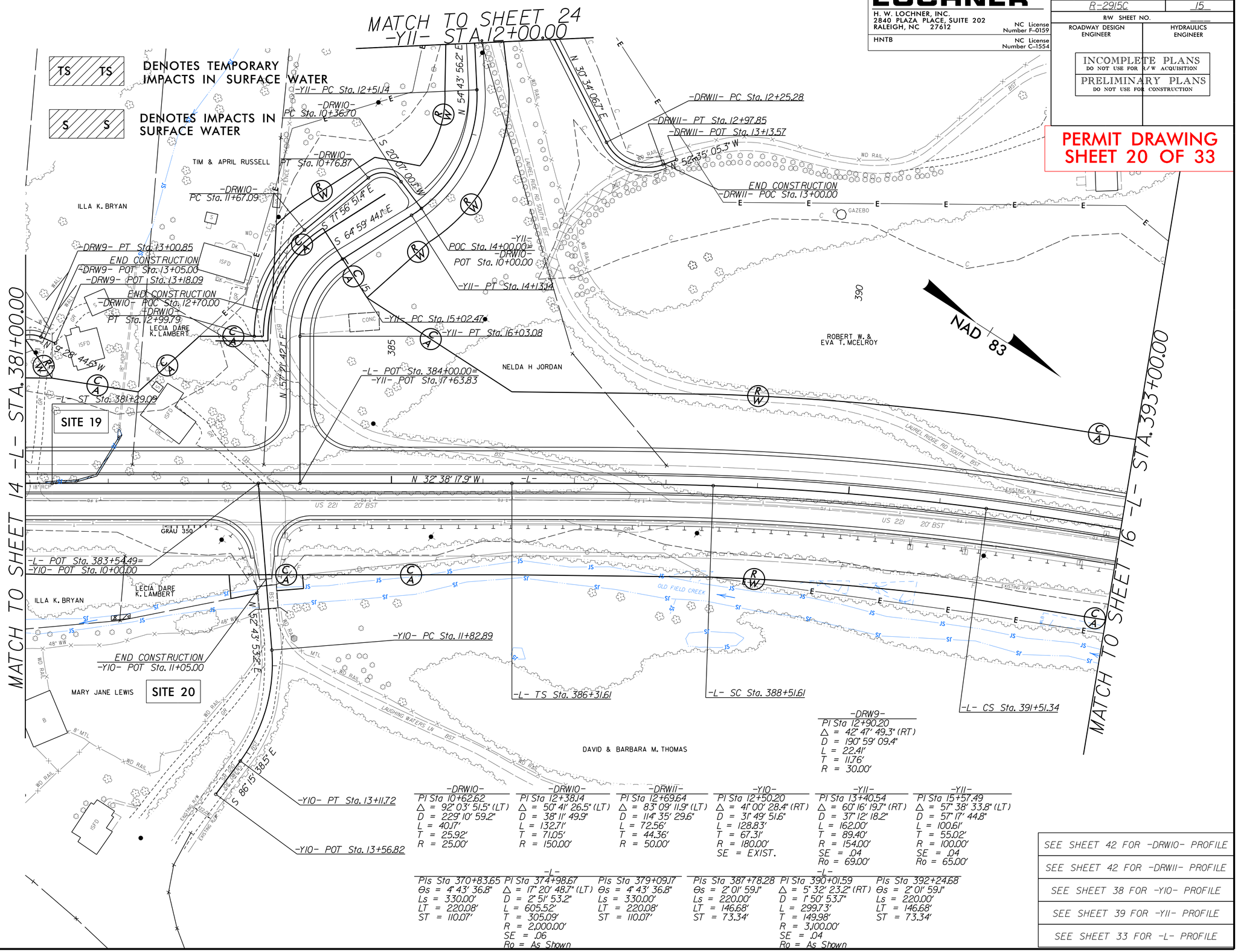
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 20 OF 33



-DRW9-
PI Sta 12+90.20
Δ = 42° 47' 49.3" (RT)
D = 190° 59' 09.4"
L = 22.41'
T = 11.76'
R = 30.00'

-DRW10-
PI Sta 10+62.62
Δ = 92° 03' 51.5" (LT)
D = 229° 10' 59.2"
L = 40.17'
T = 25.92'
R = 25.00'

-DRW10-
PI Sta 12+38.14
Δ = 50° 41' 26.5" (LT)
D = 38° 11' 49.9"
L = 132.71'
T = 71.05'
R = 150.00'

-DRW11-
PI Sta 12+69.64
Δ = 83° 09' 11.9" (LT)
D = 114° 35' 29.6"
L = 72.56'
T = 44.36'
R = 50.00'

-Y10-
PI Sta 12+50.20
Δ = 41° 00' 28.4" (RT)
D = 31° 49' 51.6"
L = 128.83'
T = 67.31'
R = 180.00'
SE = EXIST.

-Y11-
PI Sta 13+40.54
Δ = 60° 16' 19.7" (RT)
D = 37° 12' 18.2"
L = 162.00'
T = 89.40'
R = 154.00'
SE = .04
Ro = 69.00'

-Y11-
PI Sta 15+57.49
Δ = 57° 38' 33.8" (LT)
D = 57° 17' 44.8"
L = 100.61'
T = 55.02'
R = 100.00'
SE = .04
Ro = 65.00'

-L-
PIs Sta 370+83.65
θs = 4° 43' 36.8"
Ls = 330.00'
LT = 220.08'
ST = 110.07'

PI Sta 374+98.67
Δ = 17° 20' 48.7" (LT)
D = 2° 51' 53.2"
L = 605.52'
T = 305.09'
R = 2,000.00'
SE = .06
Ro = As Shown

PIs Sta 379+09.17
θs = 4° 43' 36.8"
Ls = 330.00'
LT = 220.08'
ST = 110.07'

PIs Sta 387+78.28
θs = 2° 01' 59.1"
Ls = 220.00'
LT = 146.68'
ST = 73.34'

PI Sta 390+01.59
Δ = 5° 32' 23.2" (RT)
D = 1° 50' 53.7"
L = 299.73'
T = 149.98'
R = 3,100.00'
SE = .04
Ro = As Shown

PIs Sta 392+24.68
θs = 2° 01' 59.1"
Ls = 220.00'
LT = 146.68'
ST = 73.34'

SEE SHEET 42 FOR -DRW10- PROFILE
SEE SHEET 42 FOR -DRW11- PROFILE
SEE SHEET 38 FOR -Y10- PROFILE
SEE SHEET 39 FOR -Y11- PROFILE
SEE SHEET 33 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_15
Jordan, Geri

LOCHNER

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

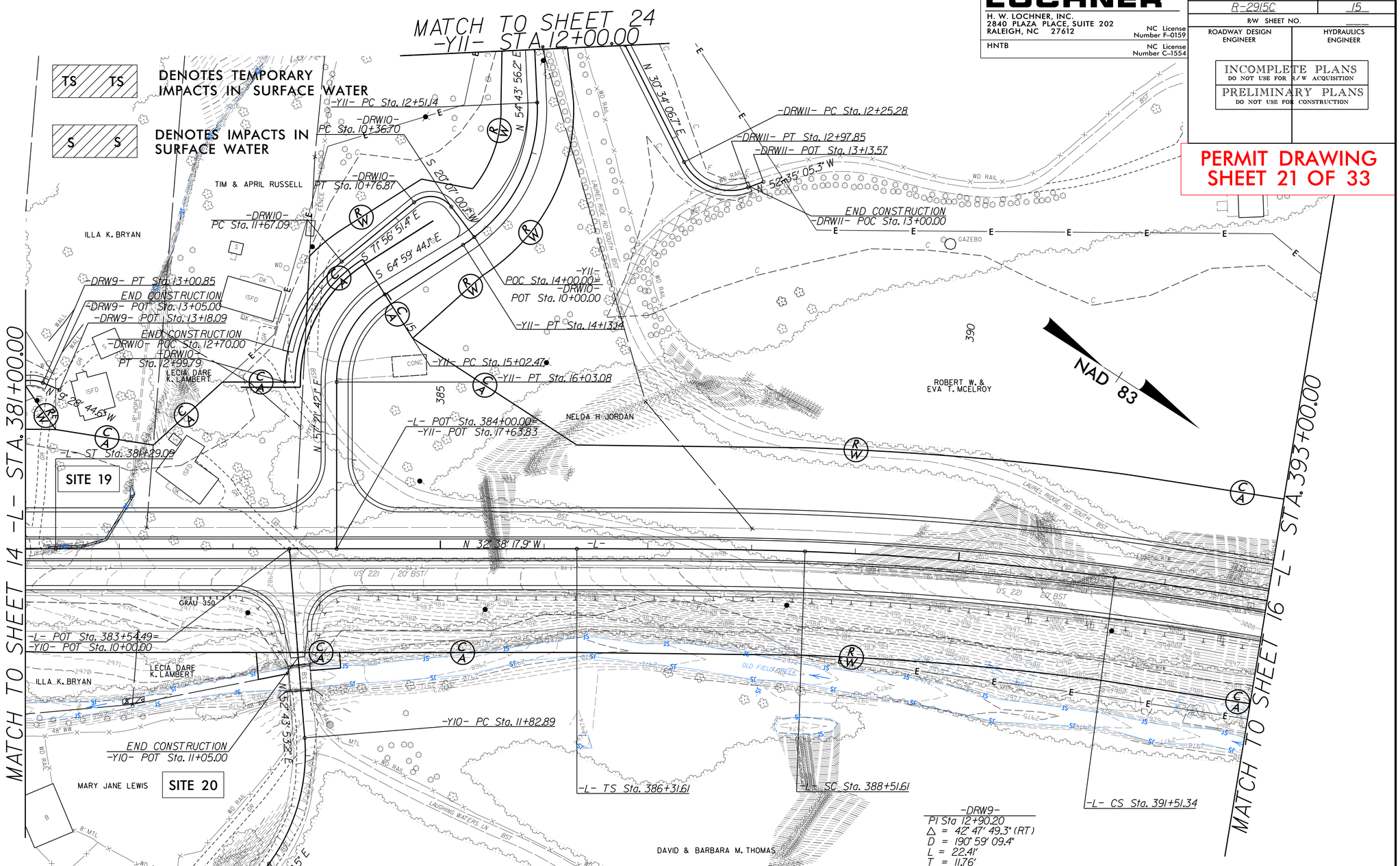
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 21 OF 33



-DRW9-
PI Sta 12+90.20
Δ = 42° 47' 49.3" (RT)
D = 190° 59' 09.4"
L = 22.41'
T = 11.76'
R = 30.00'

-DRW10-
PI Sta 10+62.62
Δ = 92° 03' 51.5" (LT)
D = 229° 10' 59.2"
L = 40.17'
T = 25.92'
R = 25.00'

-DRW10-
PI Sta 12+38.14
Δ = 50° 41' 26.5" (LT)
D = 38° 11' 49.9"
L = 132.71'
T = 71.05'
R = 150.00'

-DRW11-
PI Sta 12+69.64
Δ = 83° 09' 11.9" (LT)
D = 114° 35' 29.6"
L = 72.56'
T = 44.36'
R = 50.00'

-Y10-
PI Sta 12+50.20
Δ = 41° 00' 28.4" (RT)
D = 31° 49' 51.6"
L = 128.83'
T = 67.31'
R = 180.00'
SE = EXIST.

-Y11-
PI Sta 13+40.54
Δ = 60° 16' 19.7" (RT)
D = 37° 12' 18.2"
L = 162.00'
T = 89.40'
R = 154.00'
SE = .04
Ro = 69.00'

-Y11-
PI Sta 15+57.49
Δ = 57° 38' 33.8" (LT)
D = 57° 17' 44.8"
L = 100.61'
T = 55.02'
R = 100.00'
SE = .04
Ro = 65.00'

-L-

PIs Sta 370+83.65
Θs = 4° 43' 36.8"
Ls = 330.00'
LT = 220.08'
ST = 110.07'

PI Sta 374+98.67
Δ = 17° 20' 48.7" (LT)
D = 2° 51' 53.2"
L = 605.52'
T = 305.09'
R = 2,000.00'
SE = .06
Ro = As Shown

PIs Sta 379+09.17
Θs = 4° 43' 36.8"
Ls = 330.00'
LT = 220.08'
ST = 110.07'

PIs Sta 387+78.28
Θs = 2° 01' 59.1"
Ls = 220.00'
LT = 146.68'
ST = 73.34'

PI Sta 390+01.59
Δ = 5° 32' 23.2" (RT)
D = 1° 50' 53.7"
L = 299.73'
T = 149.98'
R = 3,100.00'
SE = .04
Ro = As Shown

PIs Sta 392+24.68
Θs = 2° 01' 59.1"
Ls = 220.00'
LT = 146.68'
ST = 73.34'

SEE SHEET 42 FOR -DRW10- PROFILE
SEE SHEET 42 FOR -DRW11- PROFILE
SEE SHEET 38 FOR -Y10- PROFILE
SEE SHEET 39 FOR -Y11- PROFILE
SEE SHEET 33 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_15.con
(Dan Veal)

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

HNTB
NC License Number F-????

PERMIT DRAWING
SHEET 22 OF 33

REVISIONS

8/17/99

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83

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

MATCH SHEET 17 -L- STA. 407+00.00

71 ROBERT W. & EVA T. MCELROY

142 HAROLD L. & MABEL F. POLING

-L- SC Sta. 397+01.34

-L- CS Sta. 403+76.07

-L- POS Sta. 405+63.94=
-Y12- POT Sta. 10+00.00

END CONSTRUCTION
-Y12- POT Sta. 11+35.00

-Y12- POT Sta. 11+50.98

-L- SRS Sta. 393+71.34

SITE 21

SITE 22

70 DAVID & BARBARA M. THOMAS

72 DONALD A. & THERESA CHURCH

73 WILLIAM S. MILLER TRUST & CLYDE B. MILLER

74 RENNA MILLER

75 AGNES BALDWIN TRUSTEE

76 NELL BALDWIN

US 221 20' BST

SR 1145 MULATTO MTN RD BST

OLD FIELD CREEK

EXISTING R/W TO BE ABANDONED

N 50° 17' 73" E

-L-		
PIs Sta 387+78.28 Θs = 2° 01' 59.1" Ls = 220.00' LT = 146.68' ST = 73.34'	PI Sta 390+01.59 Δ = 5° 32' 23.2" (RT) D = 1° 50' 53.7" L = 299.73' T = 149.98' R = 3,100.00' SE = .04 Rc = See Plans	PIs Sta 392+24.68 Θs = 2° 01' 59.1" Ls = 220.00' LT = 146.68' ST = 73.34'

-L-		
PIs Sta 395+91.52 Θs = 7° 06' 29.2" Ls = 330.00' LT = 220.18' ST = 110.16'	PI Sta 400+46.13 Δ = 29° 04' 01.1" (LT) D = 4° 18' 28.6" L = 674.73' T = 344.79' R = 1,330.00' SE = .06 Rc = As Shown	PIs Sta 404+86.23 Θs = 7° 06' 29.2" Ls = 330.00' LT = 220.18' ST = 110.16'

-Y12-
PI Sta 10+58.24 Δ = 24° 44' 21.7" (RT) D = 38° 11' 49.9" L = 64.77' T = 32.90' R = 150.00' SE = EXIST.

9579 / 19400 ◄ US 221 -L- ► 9379 / 19200

211 / 300 ◄ ▼ ► 11 / 100

221 / 400

-Y12- (SR 1145) MULATTO MOUNTAIN RD.

2017 ADT / 2037 ADT

SEE SHEET 39 FOR -Y12- PROFILE

SEE SHEET 33 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_16
(Darren)

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

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 23 OF 33

REVISIONS

8/17/99

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
S S — DENOTES IMPACTS IN SURFACE WATER

NAD 83

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

MATCH TO SHEET 17 -L- STA. 407+00.00

-L- SRS Sta. 393+71.34

-L- SC Sta. 397+01.34

-L- CS Sta. 403+76.07

-L- POS Sta. 405+63.94=
-Y12- POT Sta. 10+00.00

END CONSTRUCTION
-Y12- POT Sta. 11+35.00

-Y12- POT Sta. 11+50.98

N 50° 17' 17.3" E

SITE 21

SITE 22

71 ROBERT W. & EVA T. MCELROY

70 DAVID & BARBARA M. THOMAS

72 DONALD A. & THERESA CHURCH

73 WILLIAM S. MILLER TRUST & CLYDE B. MILLER

74 RENNA MILLER

75 AGNES BALDWIN TRUSTEE

76 NELL BALDWIN

142 HAROLD L. & MABEL F. POLING

CAT-1

US 221 — 20' BST — EXISTING R/W — EXISTING RW TO BE MAINTAINED — OLD FIELD CREEK — SR 1145 MULATTO MTN RD BST — 15" CMP — R/W MON — INV=3000.39' — TREE FARM — ISBKD — DR — GR — REBAR

-L-		
PIs Sta 387+78.28	PI Sta 390+01.59	PIs Sta 392+24.68
Θs = 2° 01' 59.1"	Δ = 5° 32' 23.2" (RT)	Θs = 2° 01' 59.1"
Ls = 220.00'	D = 1° 50' 53.7"	Ls = 220.00'
LT = 146.68'	L = 299.73'	LT = 146.68'
ST = 73.34'	T = 149.98'	ST = 73.34'
	R = 3,100.00'	
	SE = .04	
	Ro = See Plans	

-L-		
PIs Sta 395+91.52	PI Sta 400+46.13	PIs Sta 404+86.23
Θs = 7° 06' 29.2"	Δ = 29° 04' 01.1" (LT)	Θs = 7° 06' 29.2"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 220.18'	L = 674.73'	LT = 220.18'
ST = 110.16'	T = 344.79'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

-Y12-
PI Sta 10+58.24
Δ = 24° 44' 21.7" (RT)
D = 38° 11' 49.9"
L = 64.77'
T = 32.90'
R = 150.00'
SE = EXIST.

9579 / 19400 — US 221 -L- — 9379 / 19200
211 / 300 — 11 / 100
221 / 400
-Y12- (SR 1145) MULATTO MOUNTAIN RD.
2017 ADT / 2037 ADT

SEE SHEET 39 FOR -Y12- PROFILE

SEE SHEET 33 FOR -L- PROFILE

1/3/2014
R2915C_Hyd_prm_wet_psh_16.con
(Ver. 1)

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 24 OF 33

REVISIONS

8/17/99

MATCH TO SHEET 17A -L- STA. 413+50 @ 625.00' LT.)

-L-

PIs Sta 395+91.52	PI Sta 400+46.13	PIs Sta 404+86.23
Θs = 7° 06' 29.2"	Δ = 29° 04' 01.1" (LT)	Θs = 7° 06' 29.2"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 220.18'	L = 674.73'	LT = 220.18'
ST = 110.16'	T = 344.79'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

-L-

PIs Sta 409+26.24	PI Sta 413+12.92	PIs Sta 416+92.14
Θs = 7° 06' 29.2"	Δ = 23° 31' 04.1" (RT)	Θs = 7° 06' 29.2"
Ls = 330.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 220.18'	L = 545.92'	LT = 220.18'
ST = 110.16'	T = 276.86'	ST = 110.16'
	R = 1,330.00'	
	SE = .06	
	Ro = As Shown	

F F DENOTES FILL IN WETLAND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

HAROLD L. & MABEL F. POLING

HOMER R. & GERTRUDE LUCAS

NELL B. BALDWIN

BOBBY R. HAM

JOHN D. & SHIRLEY H. BALDWIN et al

SITE 23

SITE 24

-L- SRS Sta. 407+06.07

-L- SC Sta. 410+36.07

-L- CS Sta. 415+81.98

-L- ST Sta. 419+11.98

WILLIAM S. MILLER TRUST & CLYDE B. MILLER

NELL BALDWIN

N 28° 34' 53.5" W

GRAU 350

US 221 BST

EXISTING R/W TO BE ABANDONED

EXISTING R/W

OLD FIELD CREEK

MATCH TO SHEET 16 -L- STA. 407+00.00

MATCH TO SHEET 18 -L- STA. 420+00.00

SEE SHEET 34 FOR -L- PROFILE

1/7/2014
R2915C_Hyd_prm_wet_psh_17
jbarnes

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

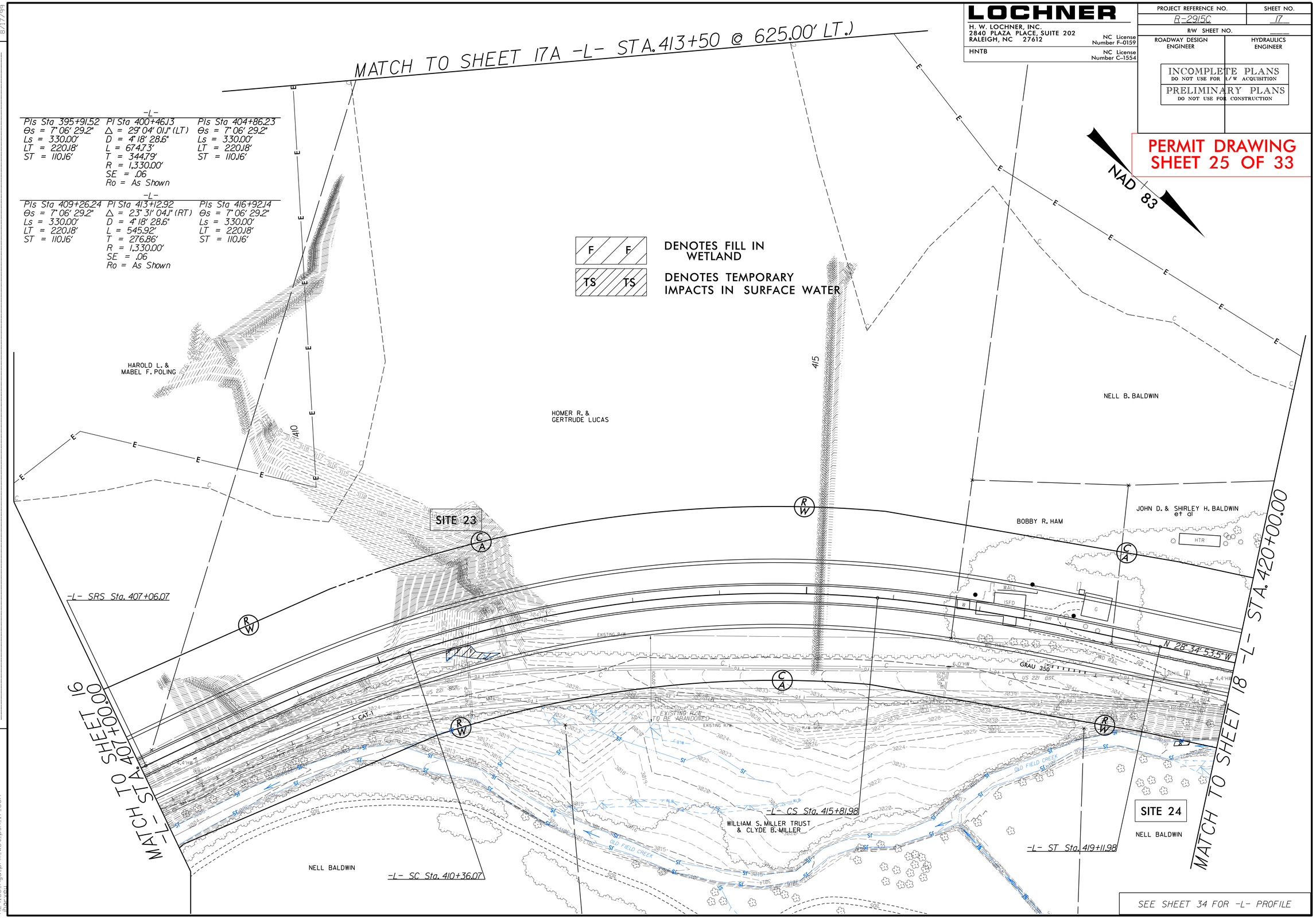
PROJECT REFERENCE NO.	SHEET NO.
R-2915C	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 25 OF 33

REVISIONS

8/17/99



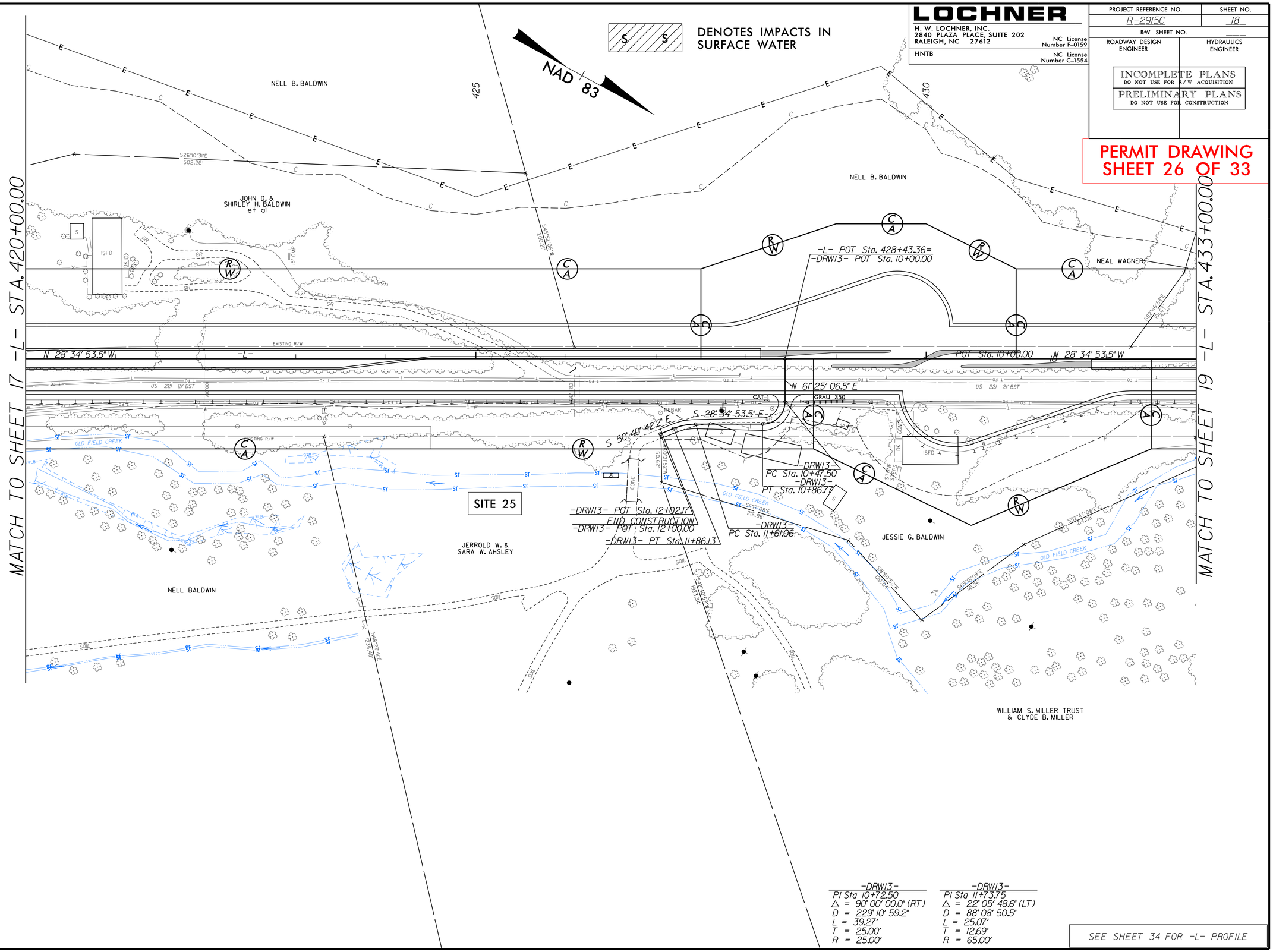
1/3/2014
R2915C_Hyd_prm_wet_psh_17.con
bpriddy

LOCHNER
H. W. LOCHNER, INC.
2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 26 OF 33



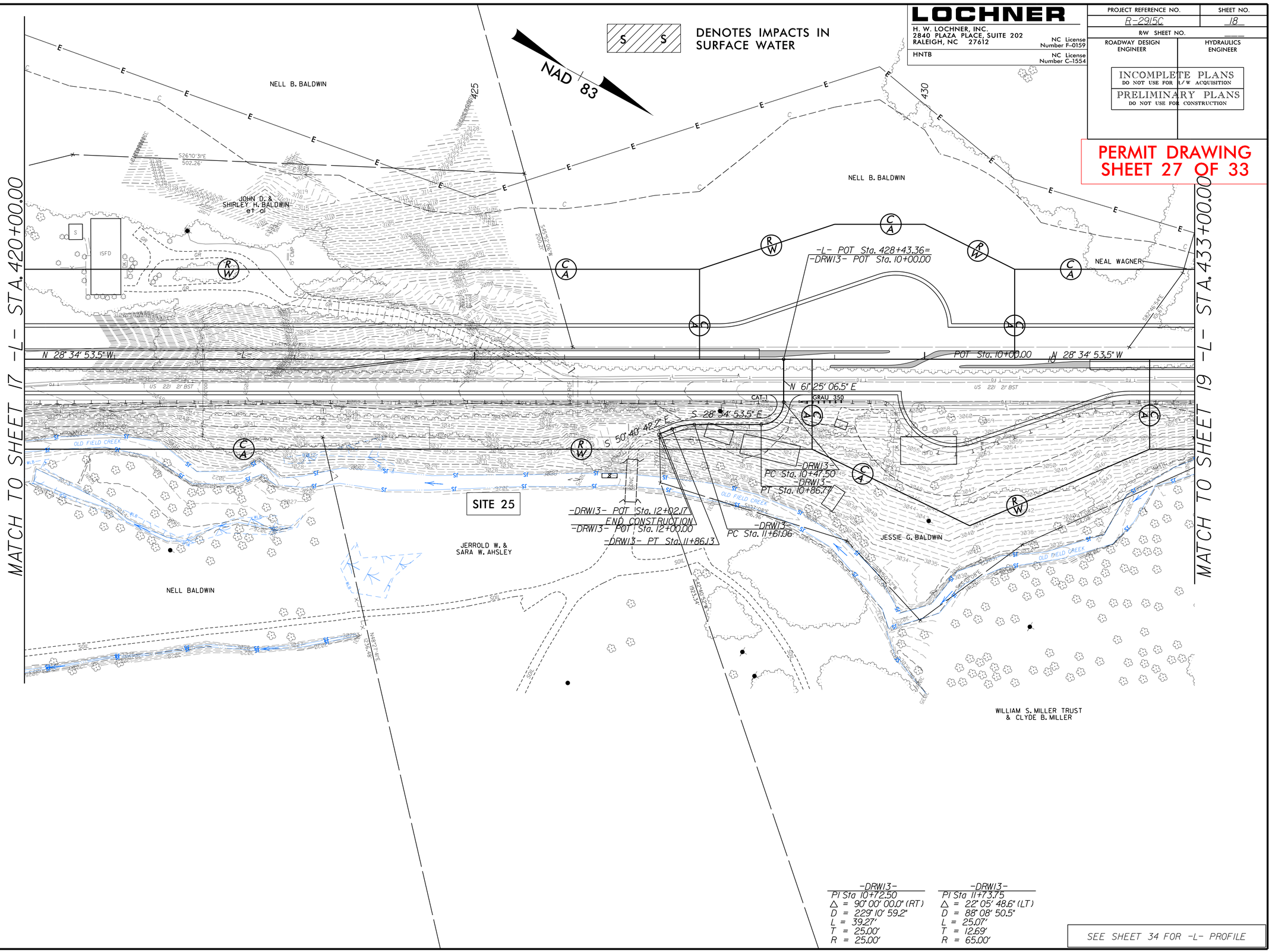
-DRW13-	-DRW13-
PI Sta 10+72.50	PI Sta 11+73.75
Δ = 90° 00' 00.0" (RT)	Δ = 22° 05' 48.6" (LT)
D = 229° 10' 59.2"	D = 88° 08' 50.5"
L = 39.27'	L = 25.07'
T = 25.00'	T = 12.69'
R = 25.00'	R = 65.00'

SEE SHEET 34 FOR -L- PROFILE

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_18
bpr_vau



-DRW13-
PI Sta 10+72.50
△ = 90° 00' 00.0" (RT)
D = 229° 10' 59.2"
L = 39.27'
T = 25.00'
R = 25.00'

-DRW13-
PI Sta 11+73.75
△ = 22° 05' 48.6" (LT)
D = 88° 08' 50.5"
L = 25.07'
T = 12.69'
R = 65.00'

SEE SHEET 34 FOR -L- PROFILE

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

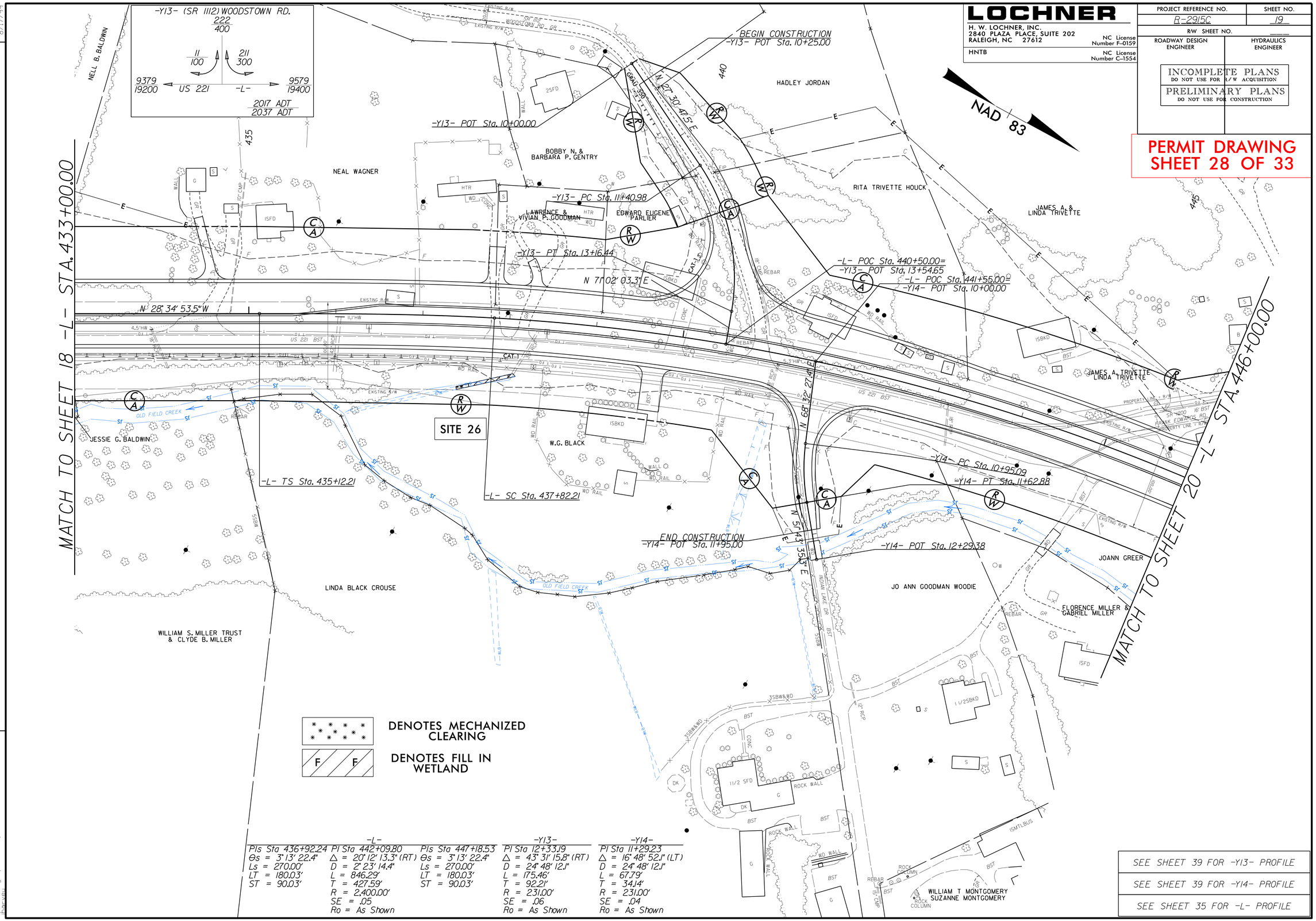
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 27 OF 33

REVISIONS

8/17/99

1/7/2014
R2915C_Hyd_prm_wet_psh_18.dgn
lbarvey



-L-			-Y13-	-Y14-
PIs Sta 436+92.24	PI Sta 442+09.80	PIs Sta 447+18.53	PI Sta 12+33.19	PI Sta 11+29.23
Θs = 3° 13' 22.4"	Δ = 20° 12' 13.3" (RT)	Θs = 3° 13' 22.4"	Δ = 43° 31' 15.8" (RT)	Δ = 16° 48' 52.1" (LT)
Ls = 270.00'	D = 2° 23' 14.4"	Ls = 270.00'	D = 24° 48' 12.1"	D = 24° 48' 12.1"
LT = 180.03'	L = 846.29'	LT = 180.03'	L = 175.46'	L = 67.79'
ST = 90.03'	T = 427.59'	ST = 90.03'	T = 92.21'	T = 34.14'
	R = 2,400.00'		R = 231.00'	R = 231.00'
	SE = .05		SE = .06	SE = .04
	Ro = As Shown		Ro = As Shown	Ro = As Shown

SEE SHEET 39 FOR -Y13- PROFILE

SEE SHEET 39 FOR -Y14- PROFILE

SEE SHEET 35 FOR -L- PROFILE

LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

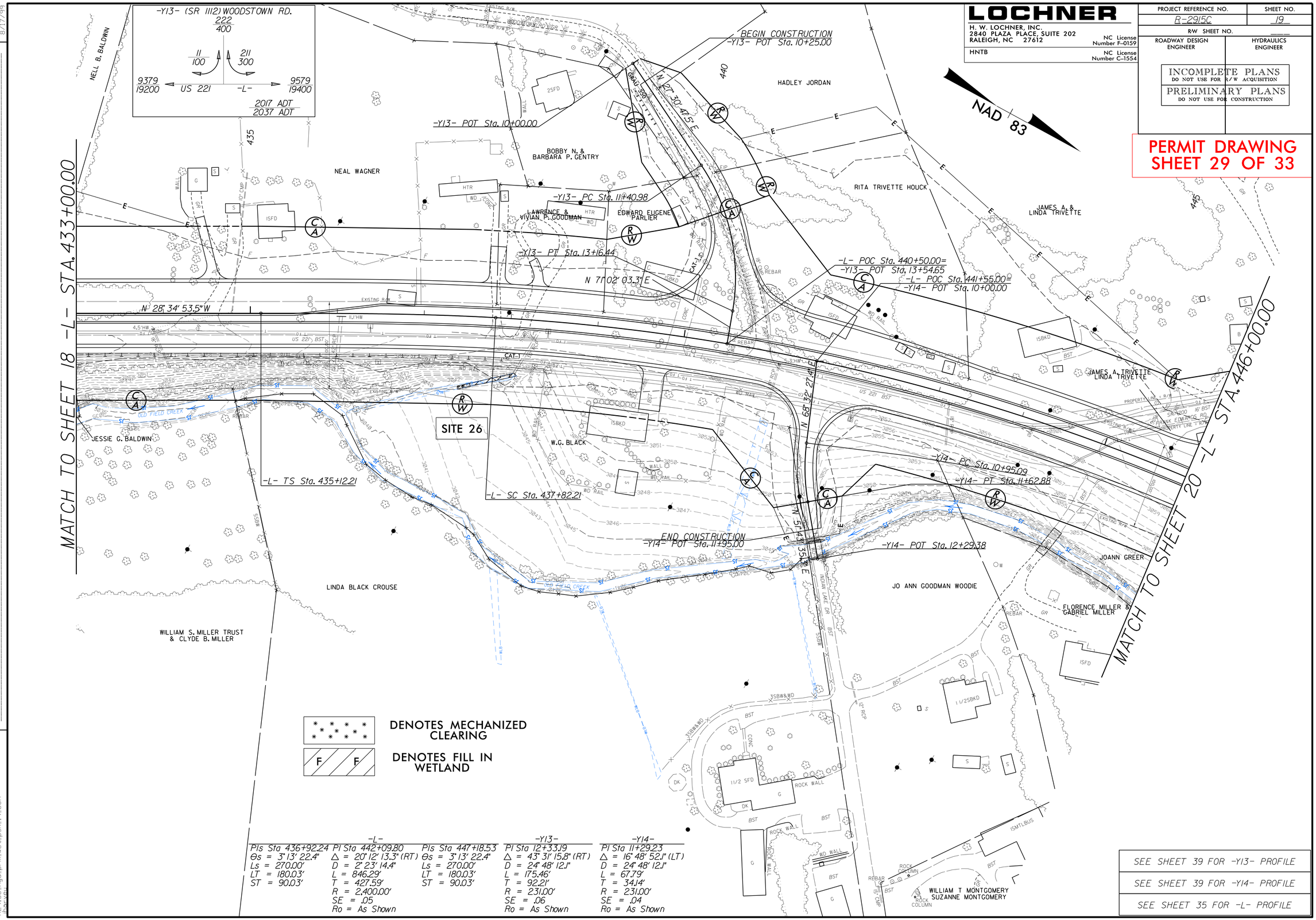
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 28 OF 33

REVISIONS

8/17/99

1/7/2014
R2915C_Hyd_prm_wet_psh_19
bbryan



LOCHNER

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

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 29 OF 33

-L-			-Y13-	-Y14-
PIs Sta 436+92.24	PI Sta 442+09.80	PIs Sta 447+18.53	PI Sta 12+33.19	PI Sta 11+29.23
Θs = 3° 13' 22.4"	Δ = 20° 12' 13.3" (RT)	Θs = 3° 13' 22.4"	Δ = 43° 31' 15.8" (RT)	Δ = 16° 48' 52.1" (LT)
Ls = 270.00'	D = 2° 23' 14.4"	Ls = 270.00'	D = 24° 48' 12.1"	D = 24° 48' 12.1"
LT = 180.03'	L = 846.29'	LT = 180.03'	L = 175.46'	L = 67.79'
ST = 90.03'	T = 427.59'	ST = 90.03'	T = 92.21'	T = 34.14'
	R = 2,400.00'		R = 231.00'	R = 231.00'
	SE = .05		SE = .06	SE = .04
	Ro = As Shown		Ro = As Shown	Ro = As Shown

SEE SHEET 39 FOR -Y13- PROFILE
SEE SHEET 39 FOR -Y14- PROFILE
SEE SHEET 35 FOR -L- PROFILE

REVISIONS

8/17/99

1/7/2014
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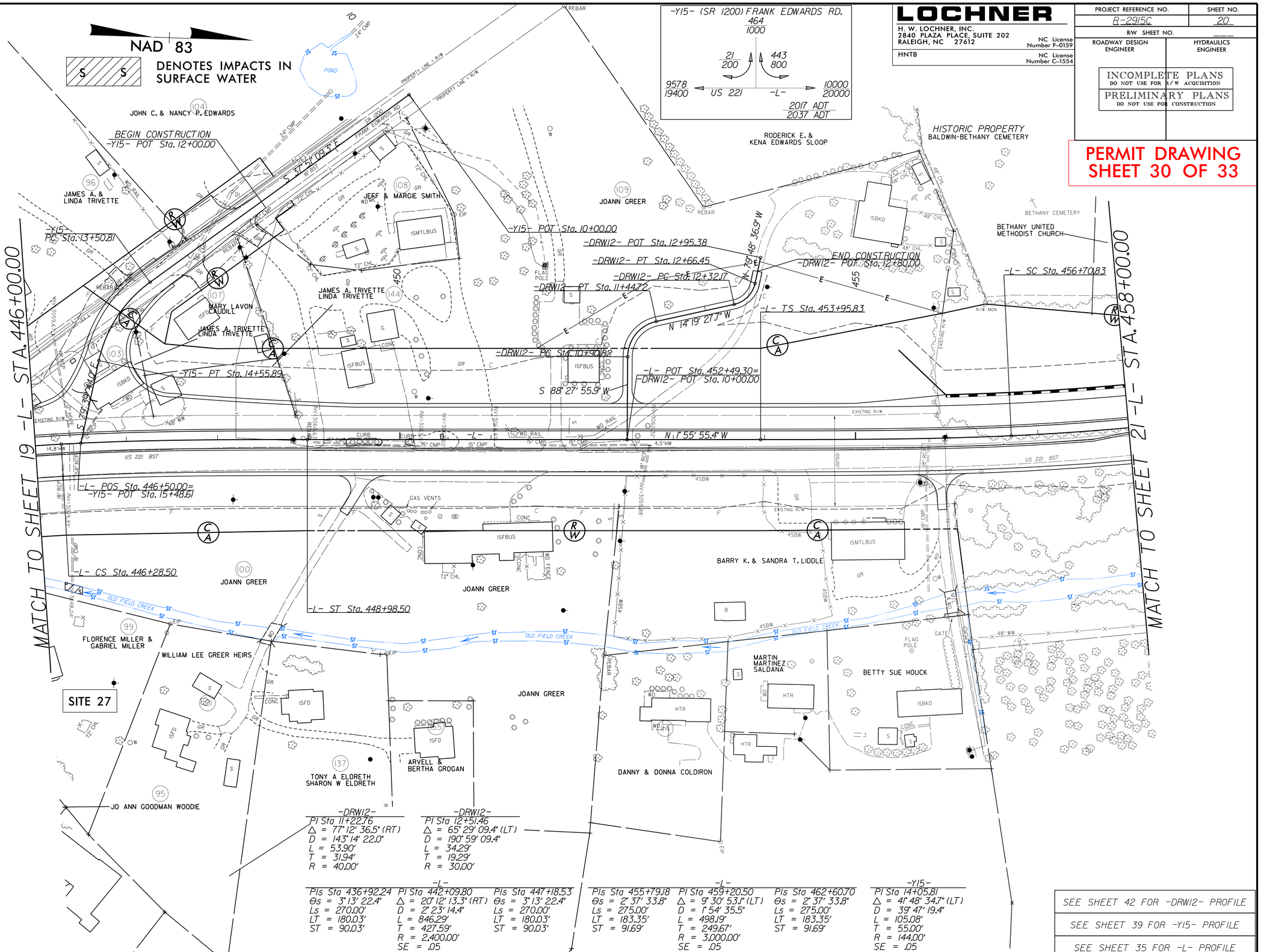
jbarvey



-DRW12-
PI Sta 11+22.76
Δ = 77° 12' 36.5" (RT)
D = 143° 14' 22.0"
L = 53.90'
T = 31.94'
R = 40.00'

-DRW12-
PI Sta 12+51.46
Δ = 65° 29' 09.4" (LT)
D = 190° 59' 09.4"
L = 34.29'
T = 19.29'
R = 30.00'

-L-

PIs Sta 436+92.24	PI Sta 442+09.80	PIs Sta 447+18.53
θs = 3° 13' 22.4"	Δ = 20° 12' 13.3" (RT)	θs = 3° 13' 22.4"
Ls = 270.00'	D = 2° 23' 14.4"	Ls = 270.00'
LT = 180.03'	L = 846.29'	LT = 180.03'
ST = 90.03'	T = 427.59'	ST = 90.03'
	R = 2,400.00'	
	SE = .05	
	Ro = As Shown	

-L-

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

-Y15-
PI Sta 14+05.81
Δ = 41° 48' 34.7" (LT)
D = 39° 47' 19.4"
L = 105.08'
T = 55.00'
R = 144.00'
SE = .05
Ro = As Shown

SEE SHEET 42 FOR -DRW12- PROFILE
SEE SHEET 39 FOR -Y15- PROFILE
SEE SHEET 35 FOR -L- PROFILE

LOCHNER
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2840 PLAZA PLACE, SUITE 202
RALEIGH, NC 27612
NC License Number F-0159
HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

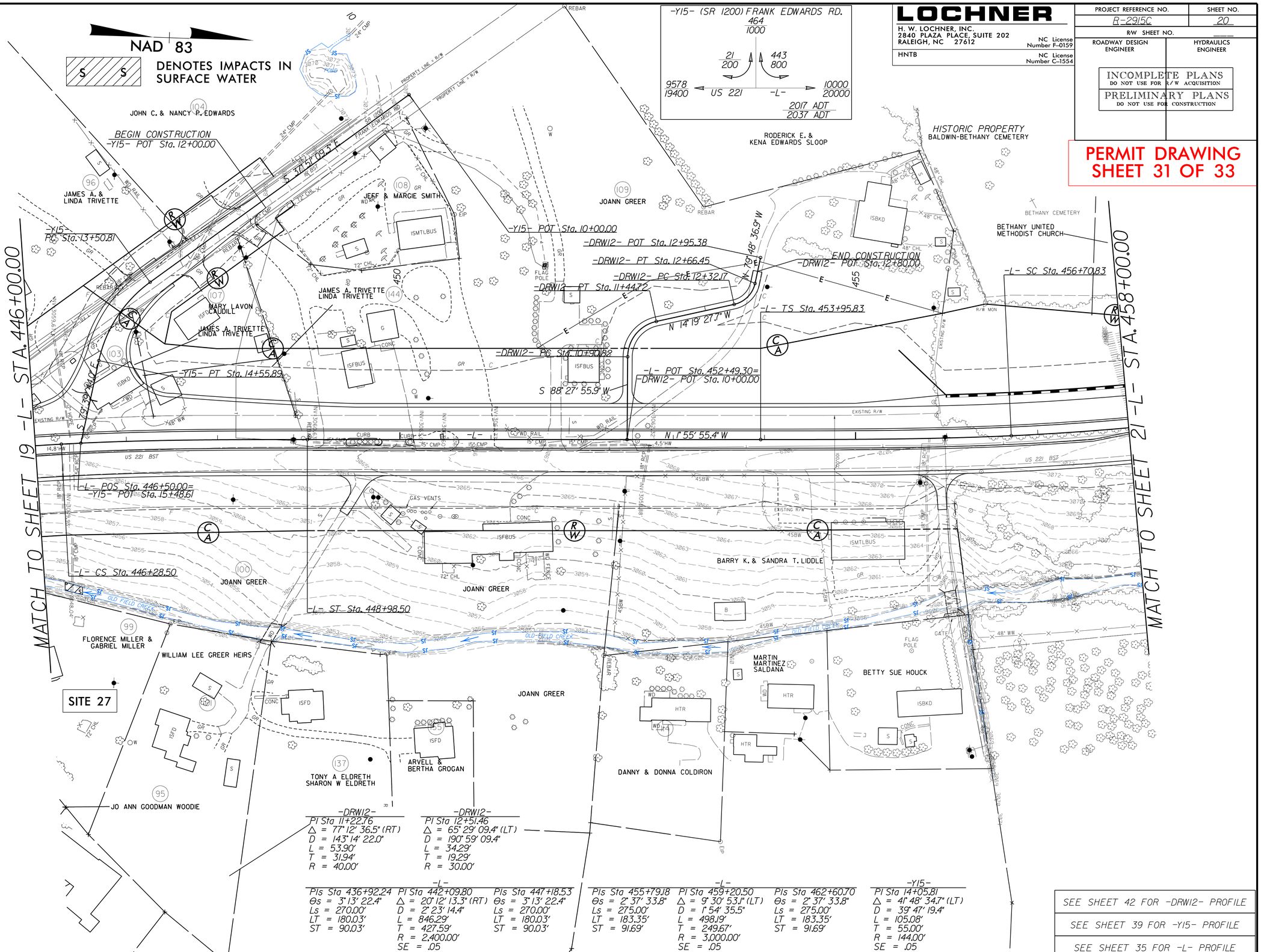
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 30 OF 33

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_20
ldarvari



SEE SHEET 42 FOR -DRW12- PROFILE

SEE SHEET 39 FOR -Y15- PROFILE

SEE SHEET 35 FOR -L- PROFILE

LOCHNER

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2840 PLAZA PLACE, SUITE 202
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NC License Number F-0159

HNTB
NC License Number C-1554

PROJECT REFERENCE NO.	SHEET NO.
R-2915C	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 31 OF 33

REVISIONS

8/17/99

1/3/2014
R2915C_Hyd_prm_wet_psh_20.con
(Darryl)

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	263+91-265+17-L-LT	ROAD FILL	0.13			0.02						
2	265+75-266+07-L-LT	ROAD FILL	0.02			< 0.01						
3	299+12-L-	48" CSP						0.02	< 0.01	219.6	41.3	
4	302+65-L-	60" CSP						0.03	< 0.01	245.5	36.1	
5	317+57-L-LT	30" RCP						< 0.01	< 0.01	63.3	16.5	
6	326+84-327+09-L-RT	ROAD FILL						< 0.01		23		
7	333+18-333+51-L-LT	ROAD FILL						< 0.01	< 0.01	143.8	13.3	
8	336+88-L-LT	6" PVC						< 0.01	< 0.01	30.5	27.9	
9	346+16-346+42-L-RT	36"						< 0.01	< 0.01	13.7	23.7	
10	348+31-34*+08-L-LT	36" RCP						< 0.01	< 0.01	55	25	
11	350+57-351+27-L-LT	ROAD FILL						< 0.01	< 0.01	43.3	25.3	
12	351+52-L-	CULVERT						0.02	< 0.01	136.1	73	
13	358+69-L-LT	18" CSP						< 0.01		13.8		
14	369+90-370+07-L-LT	24" RCP						< 0.01		16.3		
15	374+85-L-	CULVERT						0.11	0.02	286.3	53.2	
16	376+62-376+92-L-RT								< 0.01		30.1	
17	377+87-378+05-L-RT							< 0.01		17.3		
18	379+71-380+60-L-RT	ROAD FILL				0.01						
19	379+36-382+15-L-	ROAD FILL						0.01		297.8		
20	382+03-382+24-L-RT	36" RCP						< 0.01		20.8		
21	393+86-395+81-L-RT							< 0.01	< 0.01	162.7	48.6	
22	402+00-L-	24"						0.02		333.6		
23	410+74-411+37-L- RT	ROAD FILL	0.01									
TOTALS*:			0.16			0.04		0.27	0.06	2122	414	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01-08-14
ASHE COUNTY
US 221 FROM NORTH OF SOUTH FORK
NEW RIVER TO SOUTH OF US 194

ATN Revised 3/12/13

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	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)
24	419+51-419+68-L-RT	18" RCP						< 0.01		17		
25	426+42-426+59-L-RT	30" WSP						< 0.01		16.9		
26	437-41-438+11-L-RT	30" RCP	< 0.01			< 0.01						
27	446+24-446+44-L-RT							< 0.01		20		
28	15+72-16+87-Y9-LT							< 0.01	< 0.01	87.4	19.5	
	SHEET 1		0.16			0.04		0.27	0.06	2122	414	
TOTALS*:			0.16			0.04		0.29	0.06	2263	434	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01-08-14
ASHE COUNTY
US 221 FROM NORTH OF SOUTH FORK
NEW RIVER TO SOUTH OF US 194

ATN Revised 3/12/13

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: R-2915D **County(ies):** Ashe

General Project Information

Project No.:	R-2915D	**Project Type:**	Roadway Widening	**Date:**	1/3/2014
NCDOT Contact:	Jay W. Twisdale, Jr. PE	**Contractor / Designer:**	W. Henry Wells, Jr., PE		
Address:	NCDOT Hydraulics Unit 1590 Mail Service Center Raleigh, NC 27699	**Address:**	Sungate Design Group 915 Jones Franklin Road Raleigh, NC 27606		
Phone:	919-707-6700	**Phone:**	919-859-2243 x202		
Email:	jtwisdale@ncdot.gov	**Email:**	hwells@sungatedesign.com		
City/Town:	West Jefferson	**County(ies):**	Ashe		
River Basin(s):	New	**CAMA County?**	No		
Primary Receiving Water:	See Environmental Summary Sheet	**NCDWQ Stream Index No.:**			
NCDWQ Surface Water Classification for Primary Receiving Water	**Primary:**				
	Supplemental:				
Other Stream Classification:					
303(d) Impairments:					
Buffer Rules in Effect					

Project Description

Project Length (lin. Miles or feet):	4.30 miles	**Surrounding Land Use:**	Mountainous, Rural, Farmland

	Proposed Project	**Existing Site**
Project Built-Upon Area (ac.)	ac.	ac.
Typical Cross Section Description:	Two 12-foot lanes and a 4-foot paved shoulder in each direction with a 23-foot raised median (2-foot 9-inch mountable C&G and 17.5 feet of grass).	Two 12-foot lanes with roadway ditches.
Average Daily Traffic (veh/hr/day):	Design/Future: ADT for 2035 is 25000	Existing: ADT for 2015 is 14715

General Project Narrative:

US-221 from South of NC-194 to US-221 Bypass: Grassed Swales were used throughout the Project to treat the stormwater. These Grassed Swales have side slopes that are 3:1 or flatter, with many side slopes being 6:1 and 4:1, have a velocity during the 2-Year Storm of less than 2 feet per second and have a minimum ditch length equivalent to 100 feet per acre of impervious area. In addition to the Grassed Swales, Preformed Scour Holes are used at several locations.

References

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
4	460+40 -L- 462+30 -L-	Stream		Old Field Creek			C; Tr+		Fill		
5	464+50 -L- Rt 464+60 -L- Rt	Wetland		Old Field Creek			C; Tr+		Culvert		
6	474+40 -L- Lt 474+60 -L- Lt	Stream		Old Field Creek			C; Tr+		Culvert		
6	474+60 -L- Lt 475+40 -L- Lt	Wetland		Old Field Creek			C; Tr+		Fill		
6	476+50 -L- Lt 476+90 -L- Lt	Stream		Old Field Creek			C; Tr+		Culvert		
6	477+60 -L- Lt 481+00 -L- Lt	Wetland		Old Field Creek			C; Tr+		Fill		
6	482+60 -L- Lt 483+40 -L- Lt	Stream		Old Field Creek			C; Tr+		Culvert		
8	503+10 -L- Rt 503+60 -L- Rt	Stream		Old Field Creek			C; Tr+		Stabilization		
8	504+70 -L- Lt 506+10 -L- Lt	Stream		Old Field Creek			C; Tr+		Culvert		
8	505+60 -L- Lt 508+70 -L- Lt	Wetland		Old Field Creek			C; Tr+		Fill		
10	522+70 -L- Rt 522+90 -L-Rt	Stream		Old Field Creek			C; Tr+		Excavation		
11	536+70 -L- Lt 538+10 -L- Lt	Stream		Old Field Creek			C; Tr+		Culvert		
11	540+50 -L- Lt 544+50 -L- Lt	Stream		Old Field Creek			C; Tr+		Fill		
11	544+30 -L- Rt 544+40 -L- Rt	Stream		Old Field Creek			C; Tr+		Stabilization		
13	564+70 -L- Rt 565+00 -L- Rt	Stream		Beaver Creek			C; Tr+		Culvert		
14	577+70 -L- Lt 577+90 -L- Lt	Wetland		South Beaver Creek			C; Tr+		Culvert		
15	586+60 -L- Lt 587+30 -L- Lt	Wetland		South Beaver Creek			C; Tr+		Fill		

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
15	588+00 -L- Rt 588+10 -L- Rt	Stream		South Beaver Creek			C, Tr+		Stabilization		
15	588+30 -L- Rt 589+10 -L- Rt	Wetland		South Beaver Creek			C, Tr+		Fill		
15	591+40 -L- Lt 594+40 -L- Lt	Wetland		South Beaver Creek			C, Tr+		Fill		
15	594+00 -L- Rt 594+10 -L- Rt	Stream		South Beaver Creek			C, Tr+		Stabilization		
17	608+50 -L- Rt 611+00 -L- Rt	Stream		Beaver Creek			C, Tr+		Fill		
17	610+10 -L- Rt 611+10 -L- Rt	Stream		Beaver Creek			C, Tr+		Culvert		
17	610+90 -L- Rt 613+00 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
17	618+60 -L- Rt 619+60 -L- Rt	Stream		Beaver Creek			C, Tr+		Culvert		
17	619+80 -L- Rt 622+90 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
18	624+10 -L- Rt 624+40 -L- Rt	Stream		Beaver Creek			C, Tr+		Culvert		
18	628+40 -L- Rt 628+70 -L- Rt	Stream		Beaver Creek			C, Tr+		Culvert		
19	641+40 -L- Rt 642+20 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
20	650+50 -L- Rt 652+40 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
20	652+00 -L- Lt 652+20 -L- Lt	Stream		Beaver Creek			C, Tr+		Culvert		
21	660+70 -L- Rt 661+40 -L- Rt	Stream		Beaver Creek			C, Tr+		Culvert		
21	661+60 -L- Rt 662+70 -L- Rt	Stream		Beaver Creek			C, Tr+		Fill		
21	662+70 -L- Rt 664+00 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

Project/TIP No.: R-2915D **County(ies):** Ashe

Project Environmental Summary

Surface Water Impacts

Sheet No.	Station (From / To)	Feature Impacted	Water / Wetland / Buffer Type	Receiving Surface Water Name	NRTR Map ID	NCDWQ Stream Index	NCDWQ Surface Water Classification	303(d) Impairments	Type of Impact	Existing SCM	Proposed SCM
21	662+00 -L- Lt 663+20 -L- Lt	Wetland		Beaver Creek			C, Tr+		Clearing		
21	663+60 -L- Lt 664+40 -L- Lt	Stream		Beaver Creek			C, Tr+		Excavation		
21	667+50 -L- Rt 669+90 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
21	17+80 -Y32- Rt 20+80 -Y32- Rt	Wetland		Beaver Creek			C, Tr+		Fill		
22	675+40 -L- Lt 675+70 -L- Lt	Stream		Beaver Creek			C, Tr+		Stabilization		
22	676+40 -L- Rt 677+00 -L- Rt	Wetland		Beaver Creek			C, Tr+		Fill		

* List all stream and surface water impact locations regardless of jurisdiction or size.
Equalizer Pipes to be noted as a minimization of impacts.
All proposed SCMs listed must also be listed under Swales, Preformed Sour Holes and other Energy Dissipators, or Other Stormwater Control Measures.

Description of Minimization of Impacts or Mitigation

References

Project/TIP No.: R-2915D **County(ies):** Ashe

Swales

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
4,5	455+80 -L- 462+25 -L- Lt	455+70 -L- Rt	0.0	4	6	1.88	188	625	0.68%	1.6	1.1	2.1	1.2	No
4,5	462+25 -L- 472+50 -L- Lt	462+25 -L-	0.0	4	6	5.30	530	1060	2.06%	2.2	1.8	2.9	1.9	No
5	462+80 -L- 463+70 -L- Rt	462+25 -L-	0.0	4	6	0.19	19	115	1.64%	0.4	1.2	0.5	1.2	No
5,6	468+60 -L- 475+80 -L- Rt	468+50 -L- Rt	0.0	4	6	1.22	122	690	1.51%	1.3	1.6	1.7	1.7	No
6	477+50 -L- 481+30 -L- Rt	477+50 -L- Rt	0.0	4	6	0.59	59	370	2.00%	1.1	1.6	1.5	1.7	No
6,7	484+50 -L- 496+20 -L- Lt	482+30 -L-	0.0	4	6	4.23	423	1350	1.37%	2.4	1.5	3.2	1.7	No
7,8	496+20 -L- 502+00 -L- Lt	495+90 -L- Rt	0.0	4	6	1.85	185	575	1.48%	1.5	1.4	2.0	1.5	No
6,7	482+50 -L- 494+70 -L- Rt	482+30 -L-	0.0	4	6	2.22	222	1220	0.57%	2.0	1.2	2.6	1.3	No
7,8	495+90 -L- 498+00 -L- Rt	495+90 -L- Rt	0.0	4	6	1.02	102	450	1.40%	2.0	1.6	2.6	1.7	No
9	514+90 -L- 517+60 -L- Rt	514+90 -L- Rt	0.0	4	6	0.44	44	265	1.00%	0.8	1.1	1.1	1.2	No
9	513+50 -L- 517+70 -L- Lt	514+90 -L- Rt	0.0	4	6	0.68	68	395	3.15%	0.3	1.2	0.4	1.5	No
9,10	517+70 -L- 522+25 -L- Lt	517+70 -L- Rt	0.0	4	6	2.72	272	415	3.47%	2.0	1.9	2.7	2.1	No
10	522+25 -L- 529+15 -L- Lt	522+25 -L- Rt	0.0	4	6	4.01	401	645	3.92%	1.8	1.9	2.3	2.1	No
10,11	529+15 -L- 534+50 -L- Lt	523+00 -L- Rt	0.0	4	6	3.90	390	555	3.10%	2.6	1.9	2.0	2.1	No
12	552+70 -L- 558+00 -L- Lt	544+70 -L- Rt	0.0	4	6	1.97	197	520	2.48%	3.3	1.9	4.3	2.0	No
12	552+70 -L- 556+50 -L- Rt	544+70 -L- Rt	0.0	4	6	1.76	176	390	2.64%	2.4	1.9	3.2	2.1	No
12,13	558+00 -L- 561+70 -L- Lt	564+90 -L Rt	0.0	4	6	0.26	26	275	1.28%	0.5	1.1	0.6	1.1	No
12,13	556+50 -L- 561+70 -L- Rt	564+90 -L- Rt	0.0	4	6	1.36	136	525	2.86%	2.6	2.0	3.4	2.2	No
13,14	566+60 -L- 576+40 -L- Lt	581+00 -L- Rt	0.0	4	6	4.30	430	905	2.69%	2.5	1.9	3.2	2.1	No
14	570+50 -L- 575+00 -L- Lt	581+00 -L- Rt	0.0	4	6	0.77	77	495	2.58%	0.7	1.7	0.9	1.9	No

Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

Yes, these swales meet the minimum design criteria. In the table above where the swale listed is made of more than one segment, the total "Drainage Area" and total "Actual Length" are shown. The Q2, V2, Q10 and V10 are averages.

Project/TIP No.: R-2915D **County(ies):** Ashe

Swale

Sheet No.	Station (From / To)	Stream Crossing Station	Base Width (ft)	Front Slope (H:V)	Back Slope (H:V)	Drainage Area (ac)	Recommended Treatment Length (ft)	Actual Length (ft)	Longitudinal Slope (%)	Q2 (cfs)	V2 (fps)	Q10 (cfs)	V10 (fps)	Rock Checks Used
14	578+20 -L- / 583+50 -L- Lt	588+00 -L- Rt	0.0	4	6	2.60	260	510	2.88%	2.0	1.8	2.7	2.0	No
14,15	578+50 -L- / 586+00 -L- Rt	588+00 -L- Rt	0.0	4	6	1.56	156	720	2.49%	1.5	1.8	2.0	1.9	No
18	625+95 -L- / 628+00 -L- Rt	628+50 -L-	0.0	4	6	1.06	106	205	3.22%	1.7	1.8	2.2	2.0	No
18	629+50 -L- / 633+30 -L- Rt	634+00 -L- Lt	0.0	4	6	1.77	177	380	1.07%	1.4	1.2	1.8	1.3	No
18	630+00 -L- / 633+30 -L- Lt	634+00 -L- Lt	0.0	4	6	0.66	66	355	0.92%	1.2	1.2	1.6	1.3	No
19	633+00 -L- / 640+50 -L- Rt	NA	0.0	4	6	5.83	583	680	1.32%	4.3	1.7	5.7	1.9	No
19	644+00 -L- / 647+40 -L- Rt	NA	0.0	4	6	1.82	182	360	2.00%	2.8	2.0	3.7	2.1	No
20	654+00 -L- / 660+00 -L- Rt	659+20 -L- Lt	0.0	4	6	2.73	273	605	0.72%	2.2	1.2	2.9	1.3	No
20	655+50 -L- / 658+50 -L- Lt	659+20 -L- Lt	0.0	4	6	1.73	173	510	1.58%	2.8	1.8	3.7	1.9	No
21,22	672+00 -L- / 675+50 -L- Rt	661+50 -L- Rt	0.0	4	6	0.83	83	375	3.70%	1.0	1.9	1.3	2.0	No
21	666+60 -L- / 668+00 -L- Rt	661+50 -L- Rt	0.0	4	6	0.57	57	165	0.78%	0.8	1.0	1.0	1.1	No
21	669+50 -L- / 674+50 -L- Lt	664+80 -L- Lt	0.0	4	6	1.30	130	510	3.32%	2.6	1.9	3.4	2.1	No
21	19+00 -Y32- / 20+50 -Y32- Lt	664+80 -L- Lt	0.0	3	3	0.79	79	150	0.30%	2.4	1.0	3.1	1.1	No
							0							
							0							
							0							
							0							
							0							
							0							
							0							

Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), been met and verified? If No, provide further explanantion of why design criteria was not met.

Additional Comments

Yes, these swales meet the minimum design criteria. In the table above where the swale listed is made of more than one segment, the total "Drainage Area" and total "Actual Length" are shown. The Q2, V2, Q10 and V10 are averages.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR LINEAR ROADWAY PROJECTS

(Version 1.2; Released July 2012)

Project/TIP No.: R-2915D **County(ies):** Ashe

Preformed Scour Holes and Energy Dissipators

Sheet No.	Station	Energy Dissipator Type	Riprap Type	Drainage Area (ac)	Conveyance Structure	Pipe/Structure Dimensions (in)	Q10 (cfs)	V10 (fps)
4	459+00 -L- Rt	PFSH	Class 'B'	0.50	Pipe	15	2.2	0.6
5	464+55 -L- Rt	Riprap Apron / Pad	Class 'B'	3.02	Pipe	66	7.5	0.7
8	504+50 -L- Rt	PFSH	Class 'B'	0.41	Pipe	15	1.8	0.6
8	506+50 -L- Lt	PFSH	Class 'B'	0.42	Pipe	15	1.9	0.6
15	588+65 -L- Lt	Riprap Apron / Pad	Class 'B'	0.72	Pipe	15	3.2	0.8
15	591+50 -L- Lt	Riprap Apron / Pad	Class 'B'	0.27	Pipe	15	1.2	0.6
17	613+50 -L- Rt	PFSH	Class 'B'	0.71	Pipe	15	3.2	0.7
21	661+00 -L- Lt	PFSH	Class 'B'	1.18	Pipe	18	5.3	0.9
21	19+75 -Y32- Rt	Riprap Apron / Pad	Class 'B'	0.89	Pipe	15	3.5	0.8

Have minimum design criteria, as presented in the NCDOT Best Management Practices Toolbox (2008), NCDOT Standard Details, or FHWA HEC-14 (July 2006), been met and verified, as applicable? If No, provide further explanantion of why design criteria was not met.

Additional Comments

Yes, these devices meet the minimum design criteria.

* Refer to the NCDOT Best Management Practices Toolbox, Version 1 (March 2008), NCDOT Standard Details, 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-2915D

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915D	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34518.1.1	STP-0221(42)	P.E.
34518.2.4	STP-0221(42)	R/W,UTIL.

LOCATION: US 221 FROM SOUTH OF NC 194 TO US 221 BYPASS

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB AND GUTTER, SIGNALS, AND CULVERT

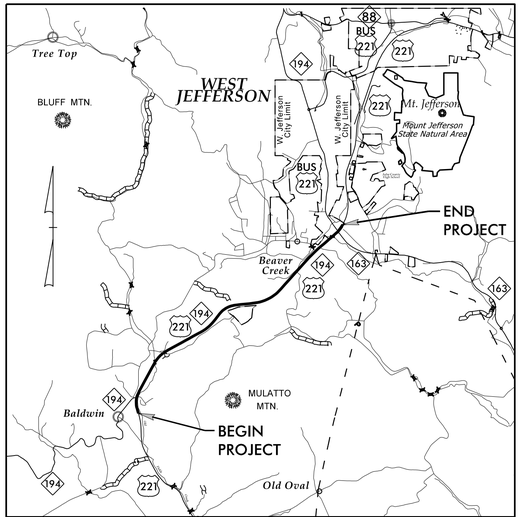
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 1 OF 52

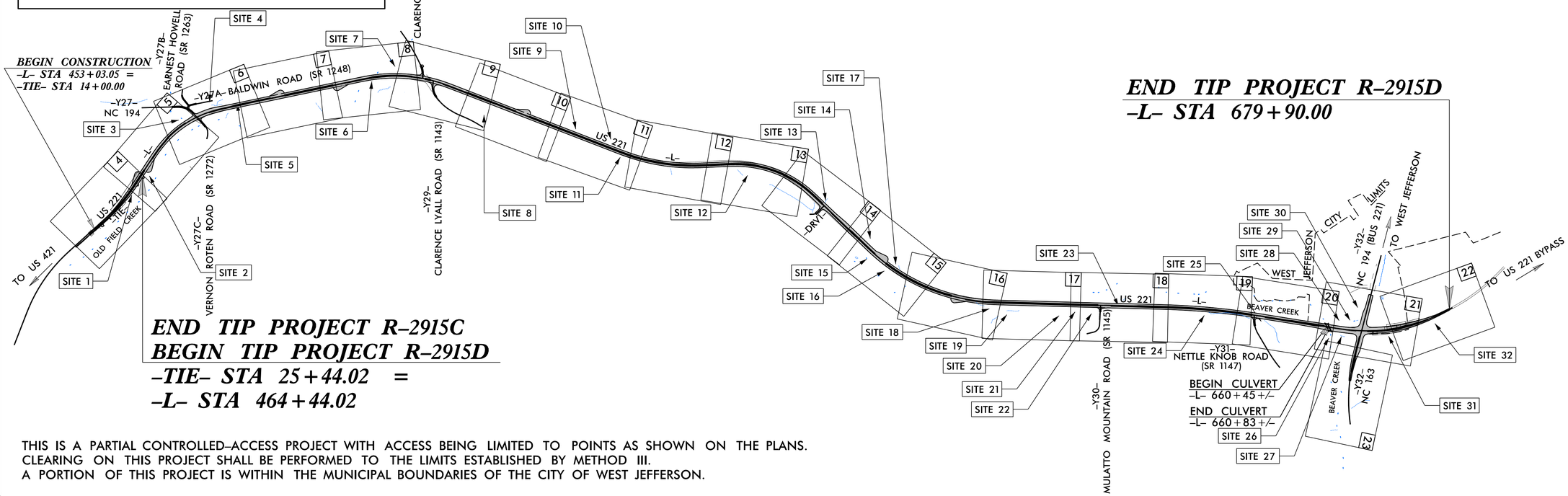
NAD 83/CORS

WETLAND AND SURFACE WATER IMPACTS PERMIT

ROW PLANS



VICINITY MAP



THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF WEST JEFFERSON.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 14715
ADT 2035 = 25000
DHV = 9 %
D = 55 %
T = 9 % *
V = 60 MPH
* TTST = 2 DUAL 7
FUNC CLASS =
Major Collector
Statewide Tier

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT R-2915D	=	4.290 MI
LENGTH OF STRUCTURE PROJECT R-2915D	=	0.007 MI
TOTAL LENGTH OF PROJECT R-2915D	=	4.297 MI

Prepared In the Office of:
KCI Associates of N.C., P.A.
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Landmark Center II, Suite 220
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266
http://www.kci.com

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 30, 2013

LETTING DATE:
FEBRUARY 17, 2015

NCDOT CONTACT: BRENDA MOORE, PE
PROJECT ENGINEER - ROADWAY DESIGN

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

1/15/2014
R2915D_Hyd_prm_wet_psh_01(tsh)
jharvey

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 2 OF 52

S S DENOTES IMPACTS IN SURFACE WATER

NAD 83/CORS

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

DETAIL 4
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, 4:1 or Flatter, Fill Slope

Min. D = 2 Ft.
Max. d = 2 Ft.
B = 2 Ft.

Type of Liner = Coir Fiber Matting
FROM STA. 21+44 TO STA. 23+00 –TIE– RT

THOMAS M. HOWELL AND W
KATHY H. HOWELL

RODERICK E. & KENA EDWARDS SLOOP

BETHANY UNITED METHODIST CHURCH

JEFF & MARGIE SMITH

JOANN GREER

BALDWIN-BETHANY CEMETERY

JAMES A. TRIVETTE
LINDA TRIVETTE

JOANN GREER

BARRY K. & SANDRA T. LIDDLE

MARTIN MARTINEZ SALDANA

BETTY SUE HOUCK

TONY A ELDRETH
SHARON W ELDRETH

ARVELL & BERTHA GROGAN

JOANN GREER

DANNY & DONNA COLDIRON

TONY A ELDRETH
SHARON W ELDRETH

MARY EDWARDS HOLCOMB AND HUSBAND, C. J. HOLCOMB, JR.

SITE 1

BERM DITCH
STA 20+00 – 24+90 –TIE– LT

MATCH LINE –L– STA. 462+50
SEE SHEET NO. 5

BEGIN CONSTRUCTION R-2915D
–L– POT Sta. 453+03.05, OS: 23.5' RT =
–TIE– POT Sta. 14+00.00, OS: 0'

N 1°55' 55.4" W

–L–

–TIE–

Convert to JB-MH

RETAIN AND EXTEND

RETAIN

REMOVE

18" RCP-III
COLLAR

15" RCP-IV

15" RCP-III

TB2GI
FG

2GI
NS

FS

BDO

36" 45° ELBOW

SPEC LAT 2' BASE DITCH w/ COIR FIBER MATTING SEE DETAIL 4

CL I RIPRAP ON BANKS ONLY EST 15 TONS EST FF 30 SY

OLD FIELD CREEK

EXISTING R/W

FOR –TIE– PROFILE, SEE SHEET 24

REVISIONS

8/17/99

3/28/2014
SUNGATESRV02\NewData\ProjectList\1220\1101G - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_04.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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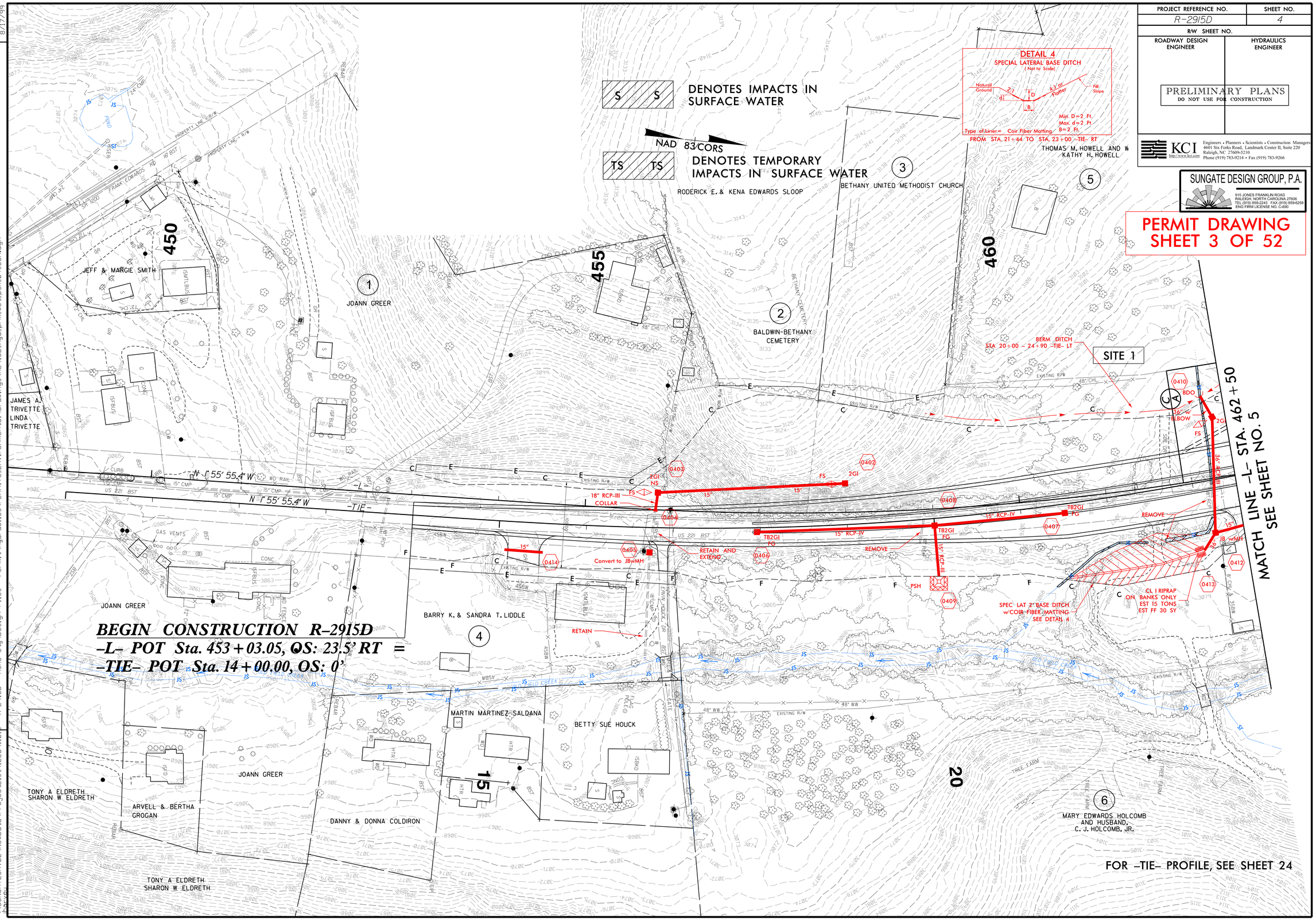
PERMIT DRAWING
SHEET 3 OF 52



REVISIONS

8/17/99

3/28/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	5
R/W SHEET NO.	
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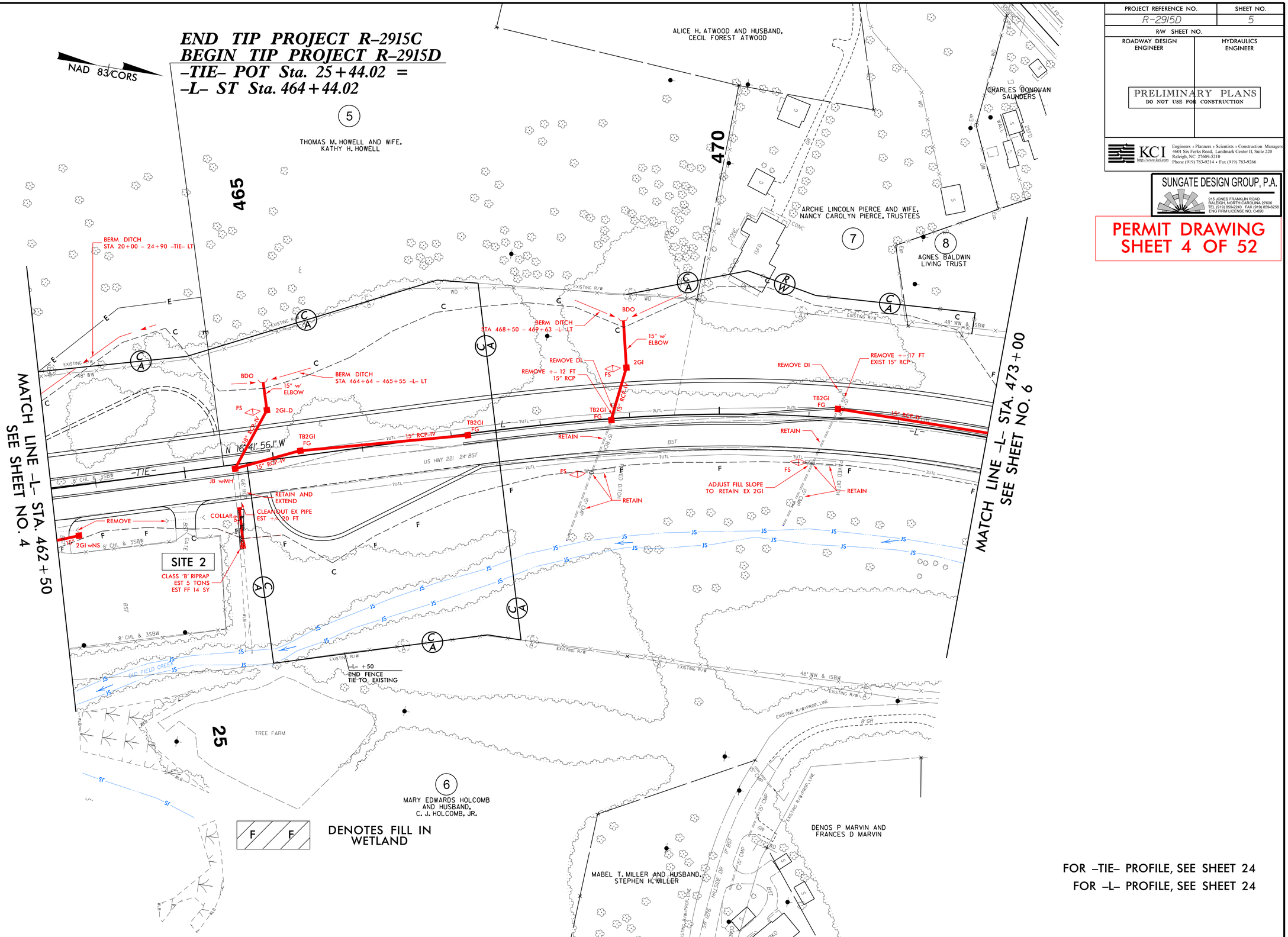
PERMIT DRAWING
SHEET 4 OF 52



FOR -TIE- PROFILE, SEE SHEET 24
FOR -L- PROFILE, SEE SHEET 24

REVISIONS

8/17/99

3/28/2014
J:\KCI\ESRV02\NewData\ProjectList\1220\110106 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_05.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	5
R/W SHEET NO.	
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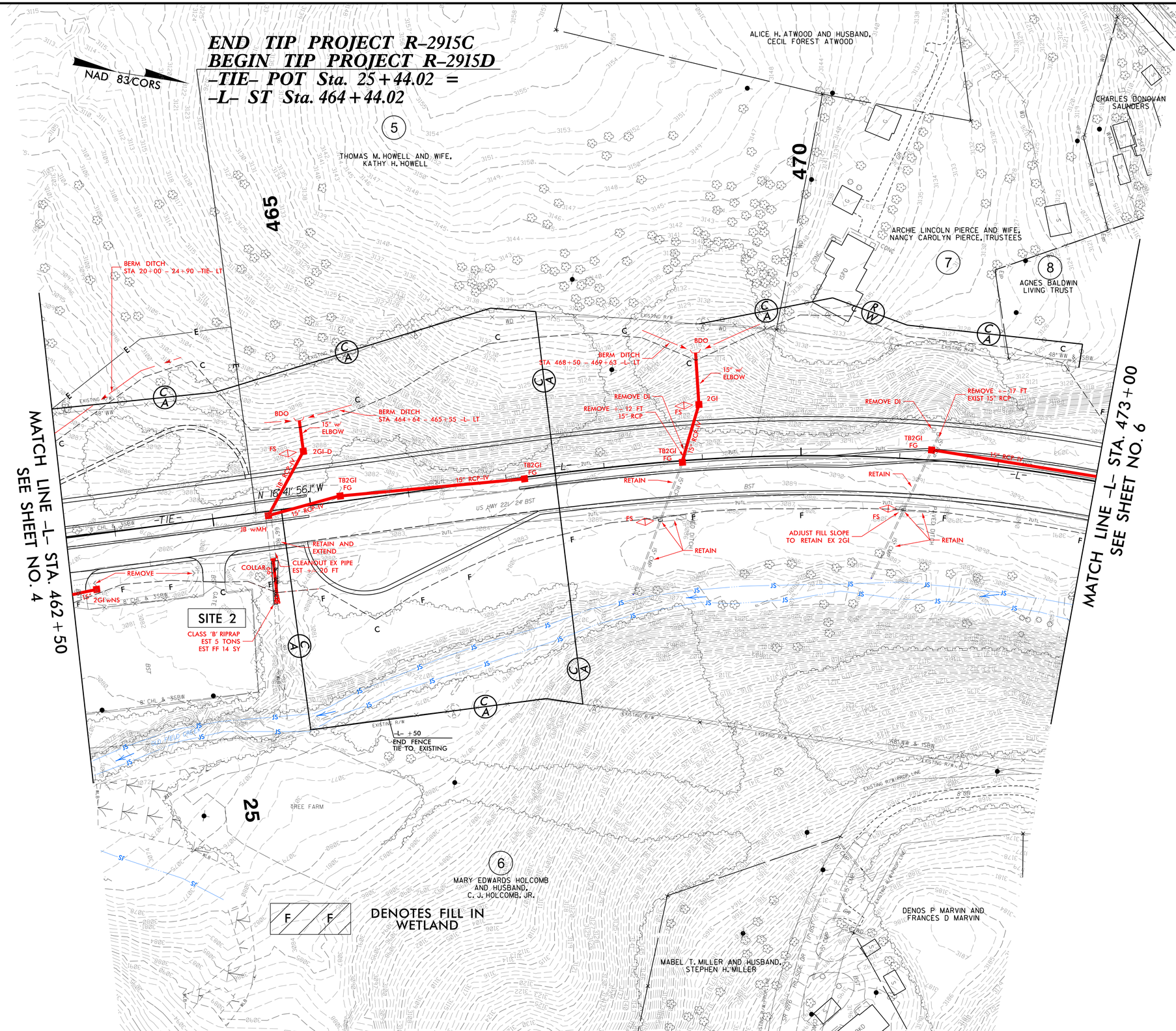
SHEET 5 OF 52



FOR -TIE- PROFILE, SEE SHEET 24
FOR -L- PROFILE, SEE SHEET 24

REVISIONS

8/17/99

3/28/2014
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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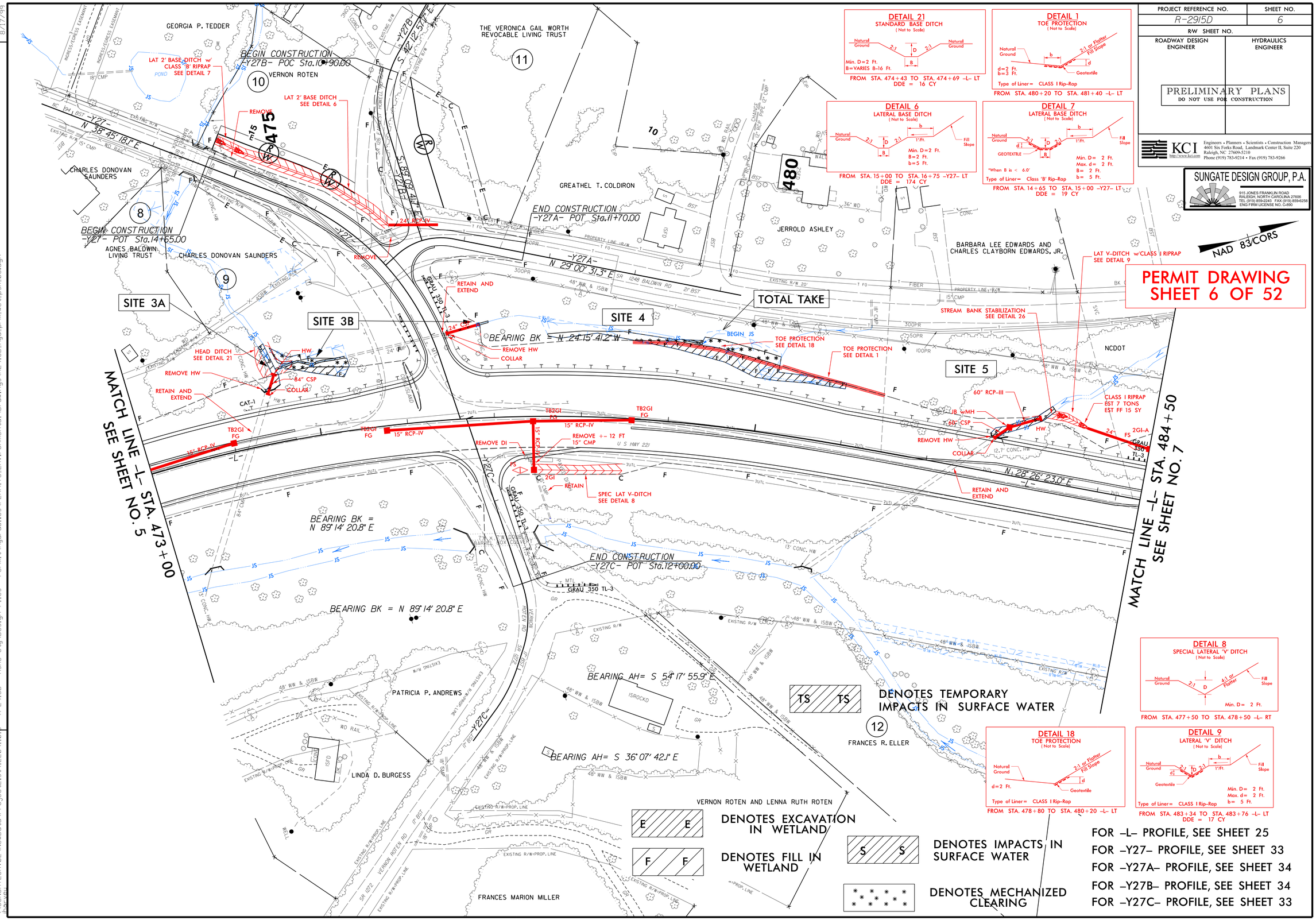
NAD 83/CORS

PERMIT DRAWING
SHEET 6 OF 52



DETAIL 21
STANDARD BASE DITCH
(Not to Scale)

Min. D = 2 Ft.
B = VARIES 8-16 Ft.

FROM STA. 474+43 TO STA. 474+69 -L- LT
DDE = 16 CY

DETAIL 1
TOE PROTECTION
(Not to Scale)

d = 2 Ft.
b = 3 Ft.
Type of Liner = CLASS I Rip-Rap

FROM STA. 480+20 TO STA. 481+40 -L- LT

DETAIL 6
LATERAL BASE DITCH
(Not to Scale)

Min. D = 2 Ft.
B = 2 Ft.
b = 5 Ft.

FROM STA. 15+00 TO STA. 16+75 -Y27- LT
DDE = 174 CY

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)

*When B is < 6.0'
Type of Liner = Class 'B' Rip-Rap
Min. D = 2 Ft.
Max. d = 2 Ft.
B = 2 Ft.
b = 5 Ft.

FROM STA. 14+65 TO STA. 15+00 -Y27- LT
DDE = 19 CY

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Min. D = 2 Ft.

FROM STA. 477+50 TO STA. 478+50 -L- RT

DETAIL 18
TOE PROTECTION
(Not to Scale)

d = 2 Ft.
Type of Liner = CLASS I Rip-Rap

FROM STA. 478+80 TO STA. 480+20 -L- LT

DETAIL 9
LATERAL 'V' DITCH
(Not to Scale)

Min. D = 2 Ft.
Max. d = 2 Ft.
b = 5 Ft.
Type of Liner = CLASS I Rip-Rap

FROM STA. 483+34 TO STA. 483+76 -L- LT
DDE = 17 CY

FOR -L- PROFILE, SEE SHEET 25
FOR -Y27- PROFILE, SEE SHEET 33
FOR -Y27A- PROFILE, SEE SHEET 34
FOR -Y27B- PROFILE, SEE SHEET 34
FOR -Y27C- PROFILE, SEE SHEET 33

REVISIONS

8/17/99

3/28/2014
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R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_06.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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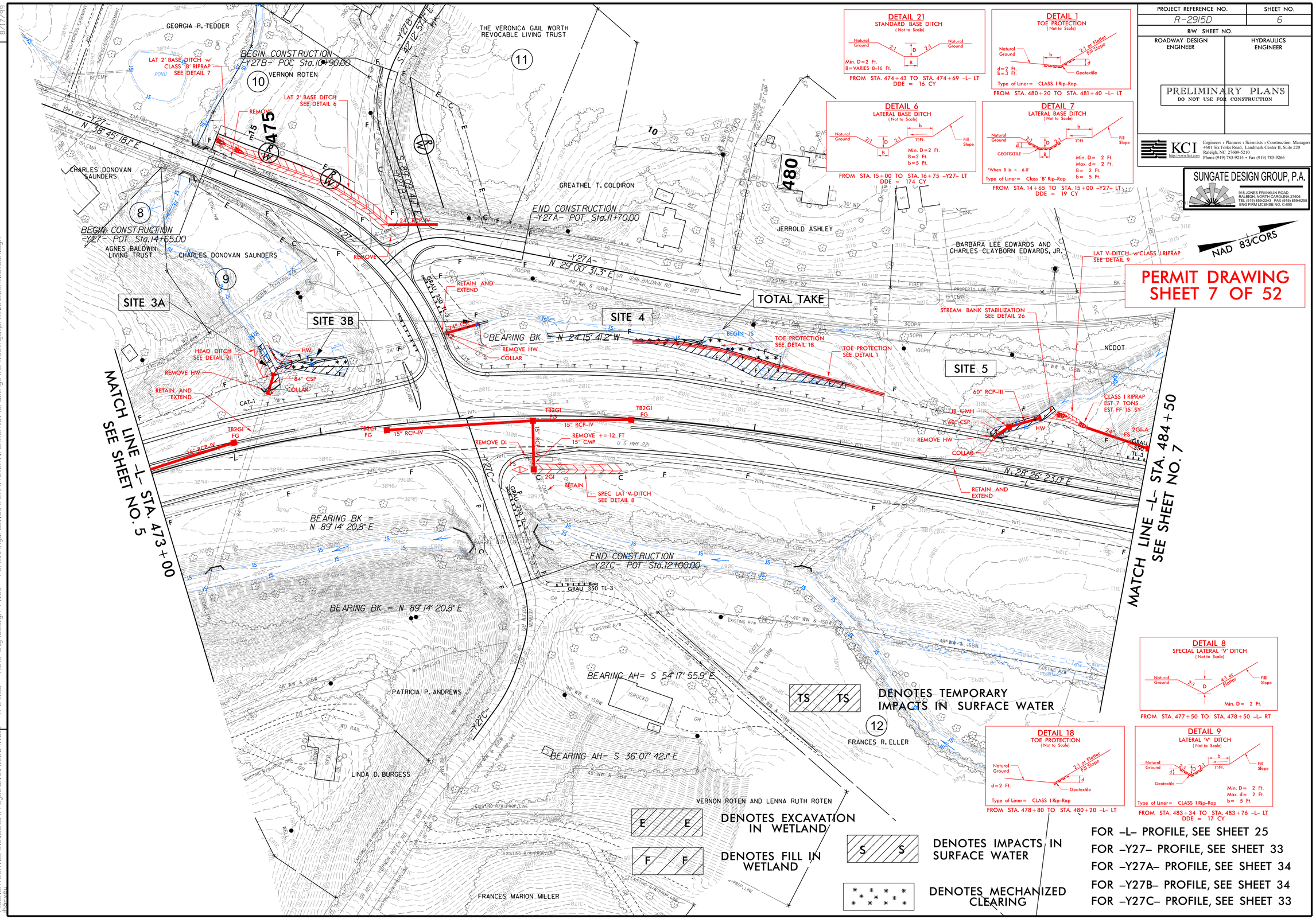
NAD 83/CORS

PERMIT DRAWING
SHEET 7 OF 52



DETAIL 21
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground, B
Min. D=2 Ft.
B=VARIES 8-16 Ft.
FROM STA. 474+43 TO STA. 474+69 -L- LT
DDE = 16 CY

DETAIL 1
TOE PROTECTION
(Not to Scale)
Natural Ground, b, 2:1 or Flatter Fill Slope, d, Geotextile
d=2 Ft.
b=3 Ft.
Type of Liner= CLASS I Rip-Rap
FROM STA. 480+20 TO STA. 481+40 -L- LT

DETAIL 6
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, b, 1'Ft., Fill Slope, B
Min. D=2 Ft.
B=2 Ft.
b=5 Ft.
FROM STA. 15+00 TO STA. 16+75 -Y27- LT
DDE = 174 CY

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, b, 1'Ft., Fill Slope, d, GEOTEXTILE, B
*When B is < 6.0'
Min. D= 2 Ft.
Max. d= 2 Ft.
B= 2 Ft.
b= 5 Ft.
Type of Liner= Class 'B' Rip-Rap
FROM STA. 14+65 TO STA. 15+00 -Y27- LT
DDE = 19 CY

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 4:1 or Flatter, Fill Slope
Min. D= 2 Ft.
FROM STA. 477+50 TO STA. 478+50 -L- RT

DETAIL 18
TOE PROTECTION
(Not to Scale)
Natural Ground, 2:1 or Flatter Fill Slope, d, Geotextile
d=2 Ft.
Type of Liner= CLASS I Rip-Rap
FROM STA. 478+80 TO STA. 480+20 -L- LT

DETAIL 9
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, b, 2:1, 1'Ft., Fill Slope, d, Geotextile
Min. D= 2 Ft.
Max. d= 2 Ft.
b= 5 Ft.
Type of Liner= CLASS I Rip-Rap
FROM STA. 483+34 TO STA. 483+76 -L- LT
DDE = 17 CY

FOR -L- PROFILE, SEE SHEET 25
FOR -Y27- PROFILE, SEE SHEET 33
FOR -Y27A- PROFILE, SEE SHEET 34
FOR -Y27B- PROFILE, SEE SHEET 34
FOR -Y27C- PROFILE, SEE SHEET 33

REVISIONS

8/17/99

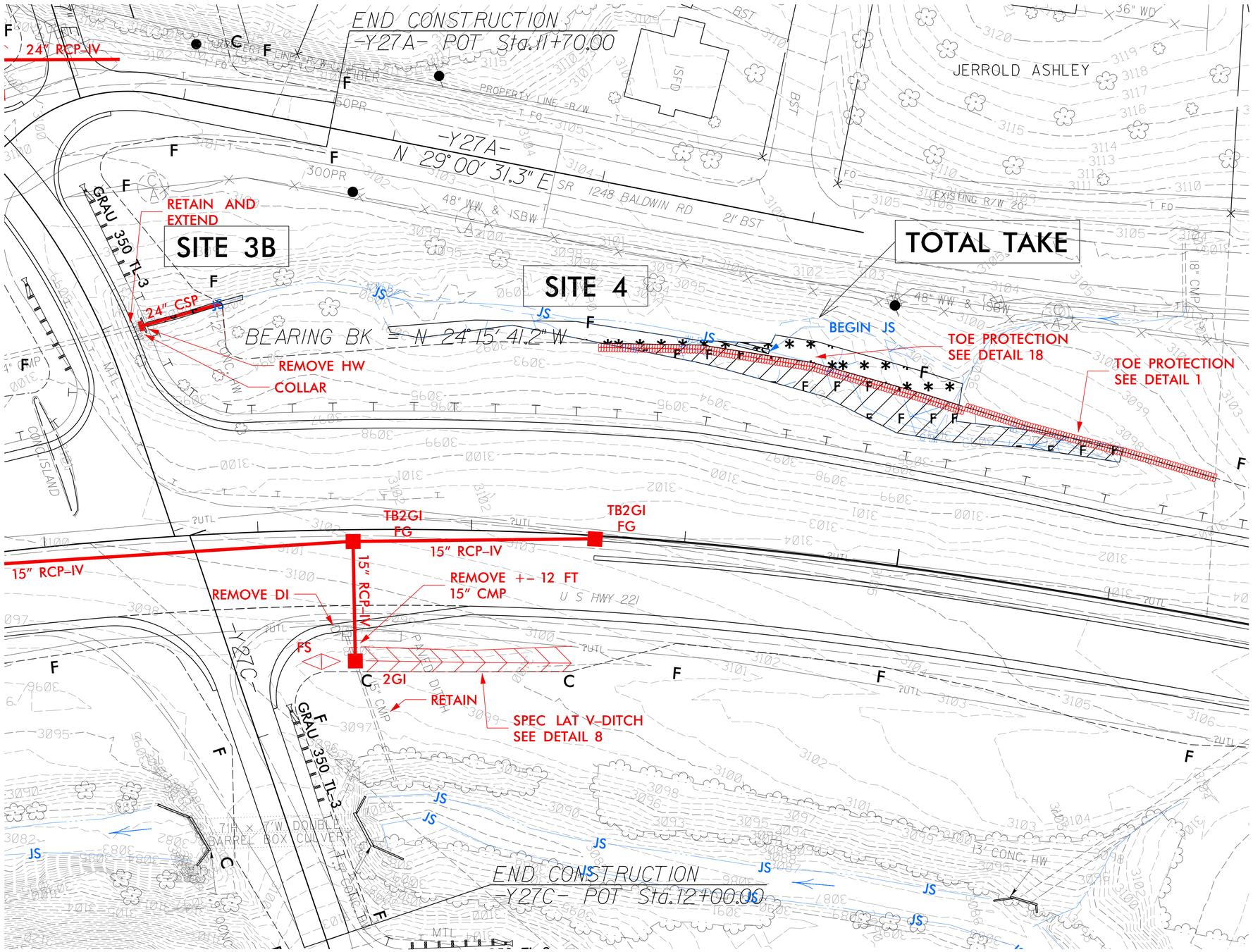
3/28/2014
R:\ROADWAY\PROJECTS\R2915D_ASHE_CO\ESRI\02\NewData\ProjectList\1220\11015 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_06_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	6-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING SHEET 8 OF 52



25 12.5 0 25 50
PLANS

REVISIONS

8/17/99

3/28/2014
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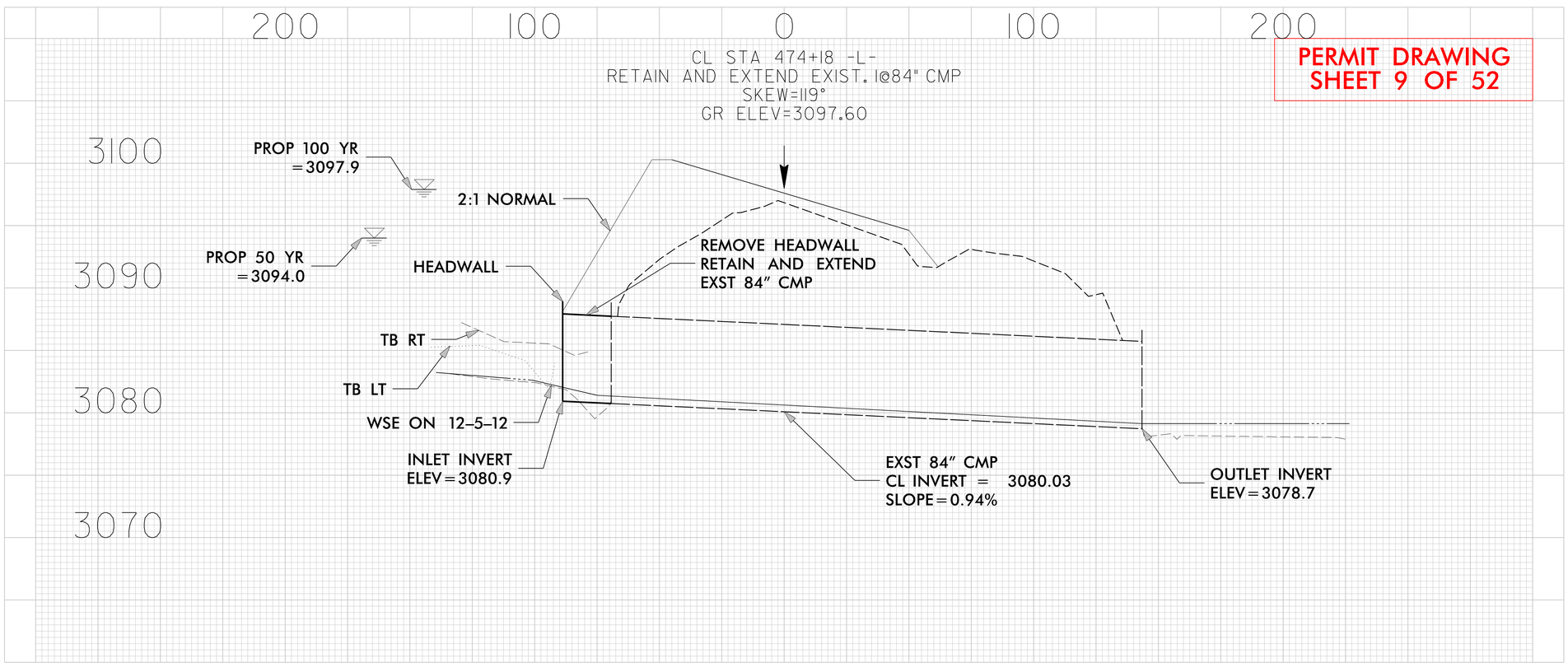
PERMIT DRAWING
SHEET 9 OF 52



PROJECT REFERENCE NO.	SHEET NO.
R-2915D	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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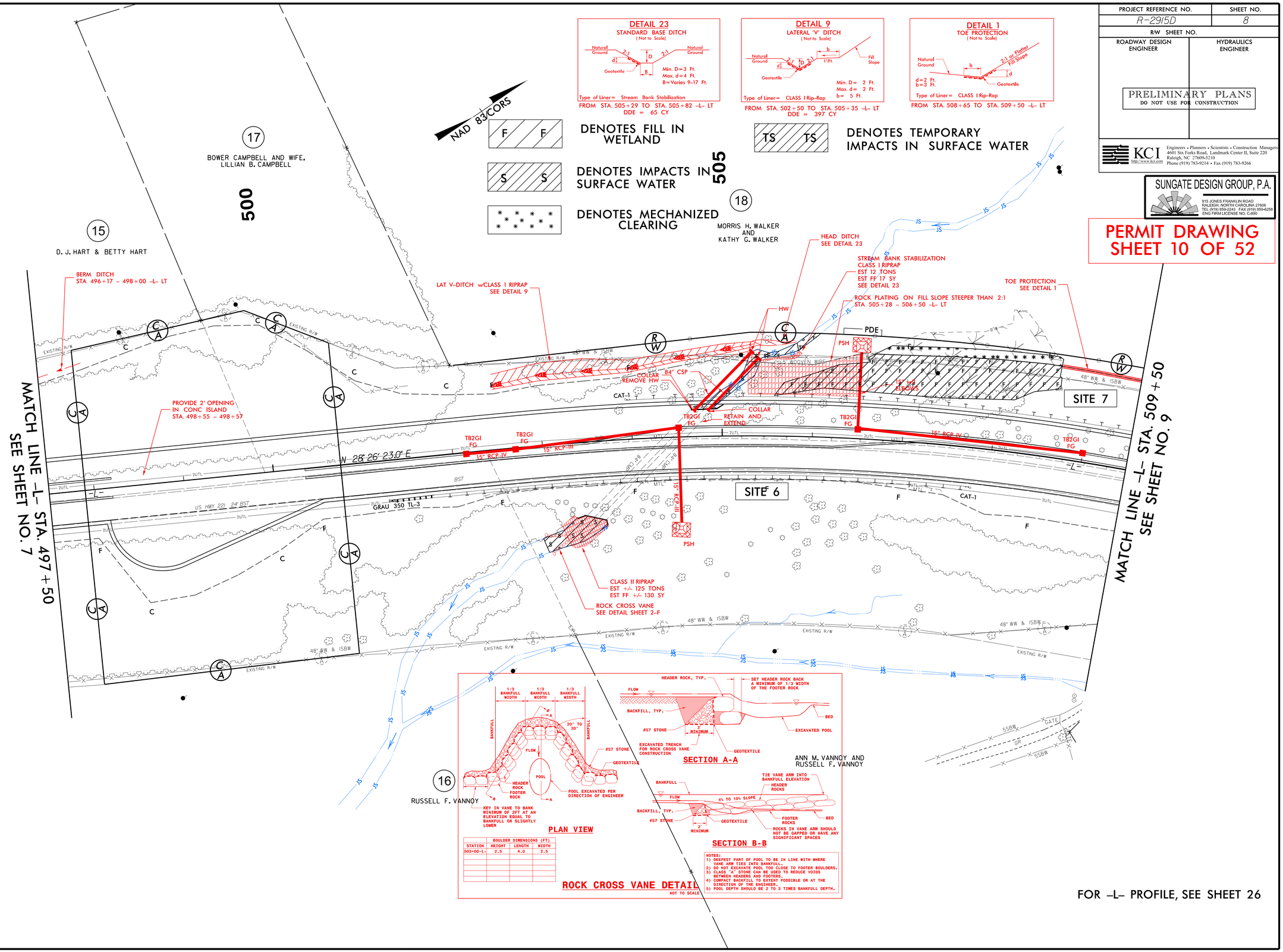
PERMIT DRAWING
SHEET 10 OF 52



FOR -L- PROFILE, SEE SHEET 26

REVISIONS

8/17/99

3/28/2014
R:\SUNGATESRV02\NewData\ProjectList\1220\11016 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_08.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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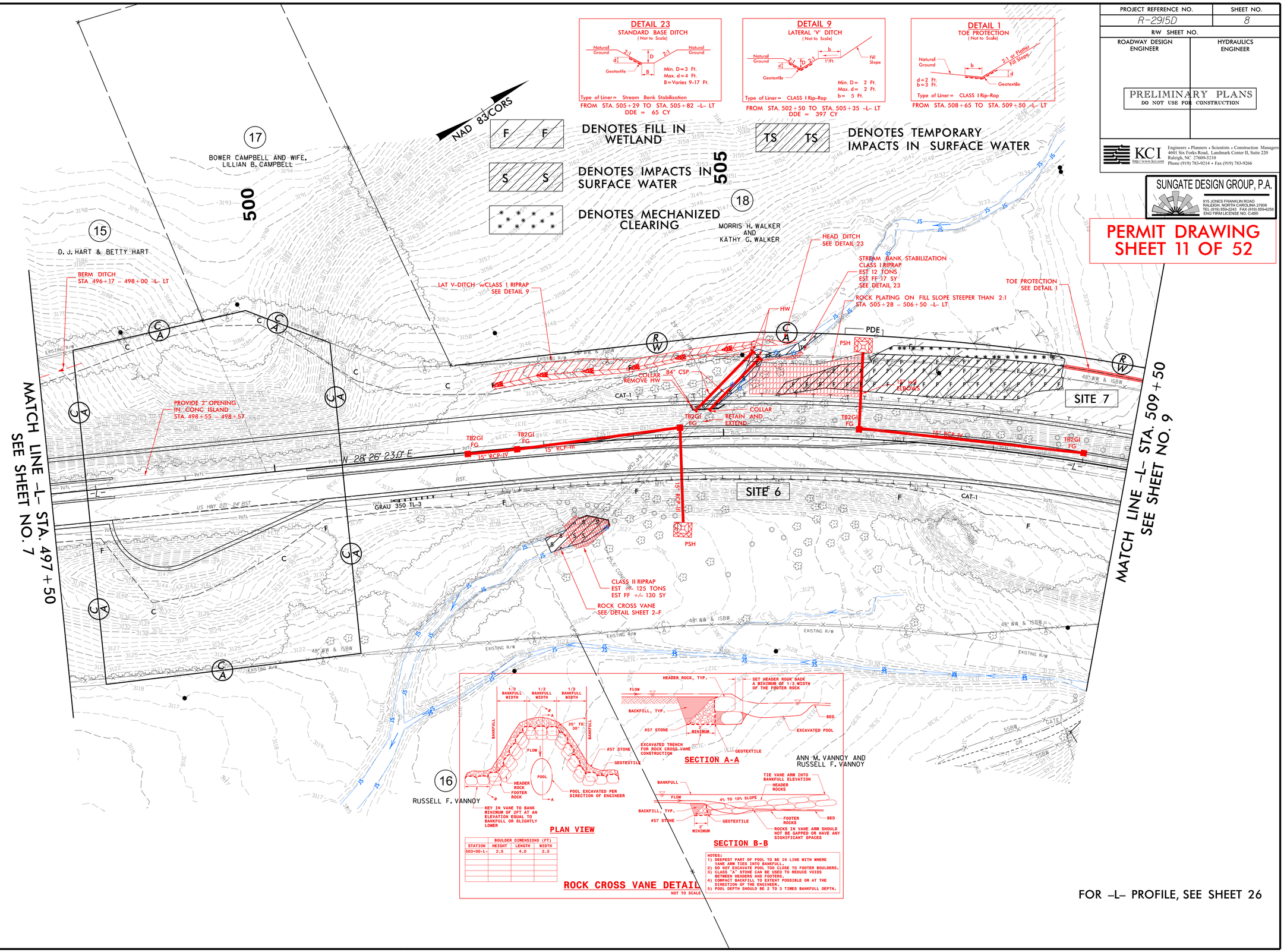
SHEET 11 OF 52



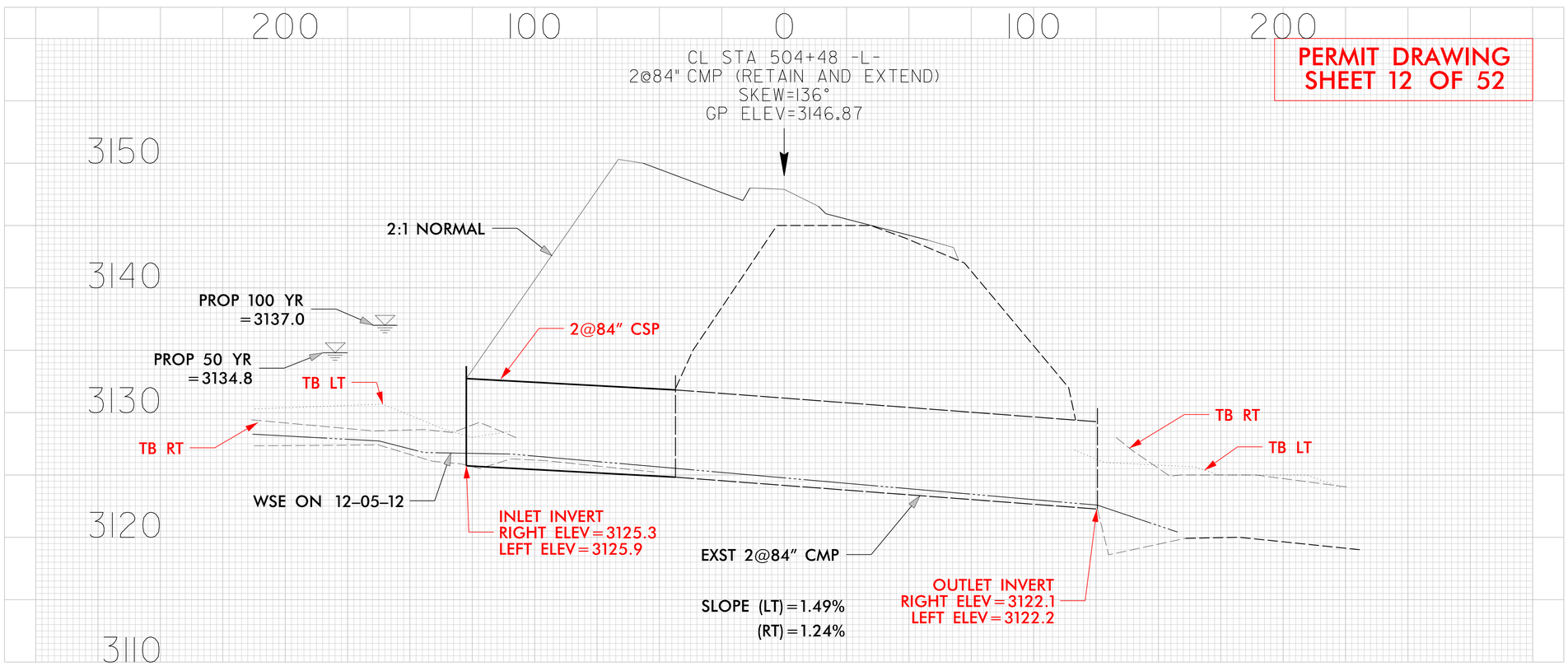
	BOULDER DIMENSIONS (FT)		
STATION	HEIGHT	LENGTH	WIDTH
503+00-L-	2.5	4.0	2.5

REVISIONS

8/17/99

3/28/2014
ESONGA
ESRV02\NewData\ProjectList\1220\1101E - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_08_con.dgn

PERMIT DRAWING
SHEET 12 OF 52



PROJECT REFERENCE NO.	SHEET NO.
R-2915D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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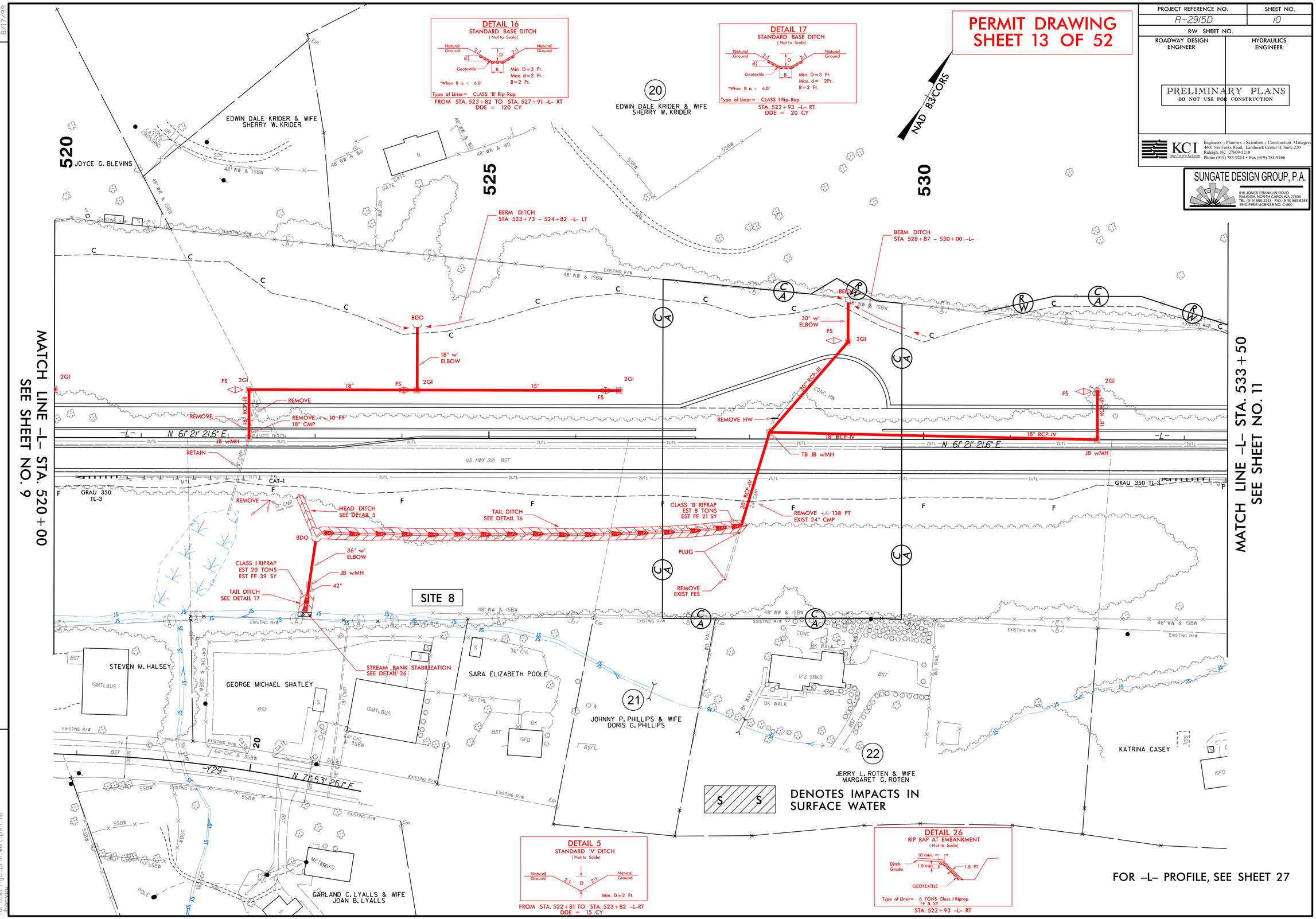
PERMIT DRAWING SHEET 13 OF 52

REVISIONS

8/17/99



1/3/2014
R2915D_Hyd_prm_wet_psh_10
bpowell

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING SHEET 14 OF 52

REVISIONS

8/17/99

DETAIL 16
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground; Geotextile; B

Min. D=3 Ft.
Max. d=2 Ft.
B=2 Ft.

*When B is < 6.0'

Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 523+82 TO STA. 527+91 -L- RT
DDE = 120 CY

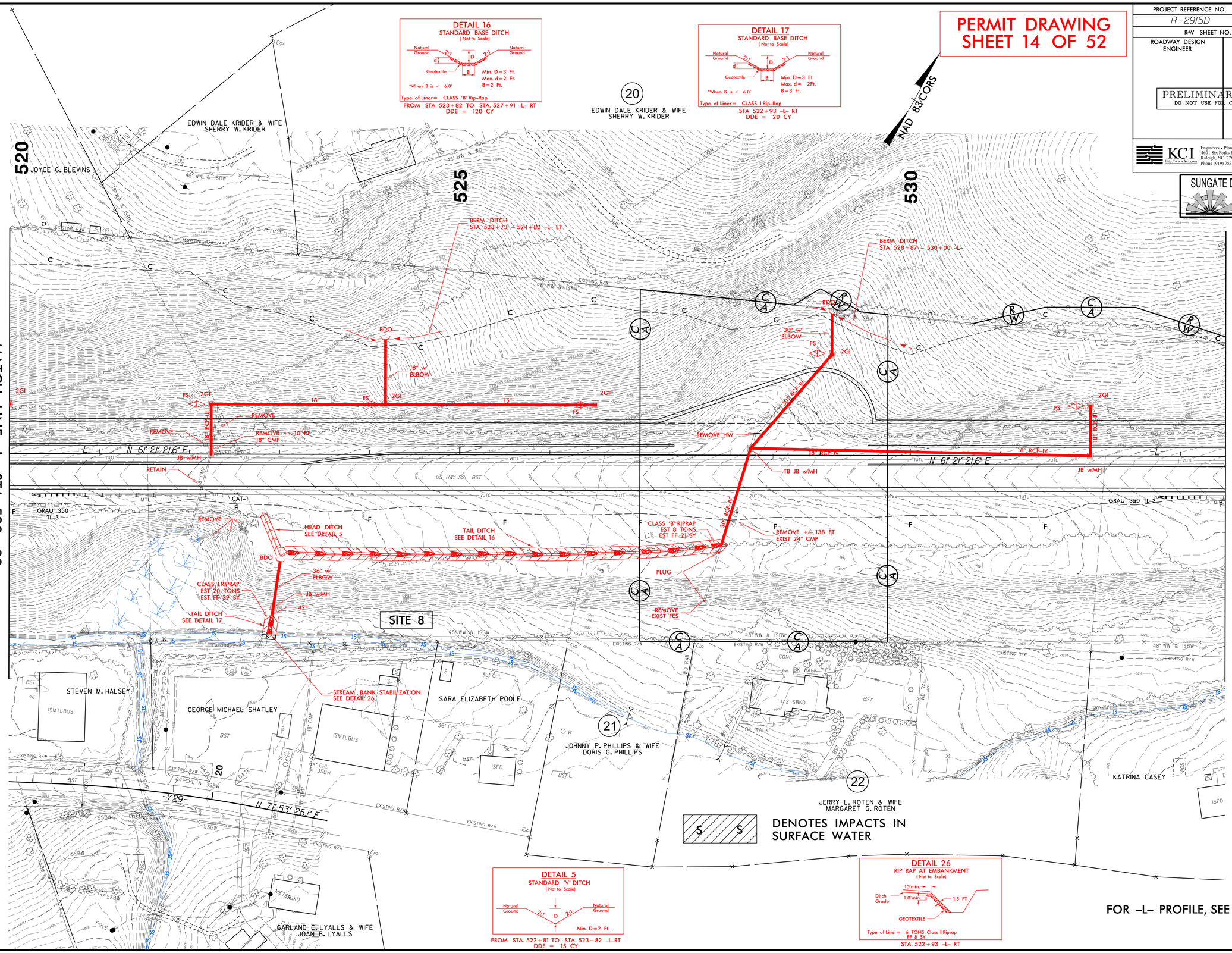
DETAIL 17
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, Natural Ground; Geotextile; B

Min. D=3 Ft.
Max. d= 2Ft.
B=3 Ft.

*When B is < 6.0'

Type of Liner= CLASS I Rip-Rap
STA. 522+93 -L- RT
DDE = 20 CY



DETAIL 5
STANDARD 'V' DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, Natural Ground

Min. D=2 Ft.

FROM STA. 522+81 TO STA. 523+82 -L-RT
DDE = 15 CY

DETAIL 26
RIP RAP AT EMBANKMENT
(Not to Scale)

10' min., 1.0' min., Ditch Grade, 1.5 FT, GEOTEXTILE

Type of Liner= 6 TONS Class I Riprap
FF 8 SY
STA. 522+93 -L- RT

FOR -L- PROFILE, SEE SHEET 27

1/3/2014
R2915D_Hyd_prm_wet_psh_10.con
bpowell

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 15 OF 52

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

DETAIL 22
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, B, 2:1, b, 1'-Ft., Fill Slope
Min. D=2 Ft.
Max. d=2 Ft.
B=2 Ft.
b=5 Ft.
Type of Liner= Coir Fiber Matting
FROM STA. 537+33 TO STA. 537+61 -L- LT
DDE = 116 CY

DETAIL 7
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, B, 2:1, b, 1'-Ft., Fill Slope, GEOTEXTILE
Min. D= 2 Ft.
Max. d= 2 Ft.
B= 2 Ft.
b= 5 Ft.
*When B is < 6.0'
Type of Liner= Class 'B' Rip-Rap
FROM STA. 541+10 TO STA. 545+50 -L- LT
DDE = 1,237 CY

DETAIL 10
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, 2:1, b, 1'-Ft., Fill Slope, Geotextile
Min. D=2 Ft.
Max. d=2 Ft.
b=5 Ft.
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 536+00 TO STA. 537+32 -L- LT
DDE = 415 CY

DETAIL 11
LATERAL 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, b, 1'-Ft., Fill Slope
Min. D=1.4 Ft.
b=5 Ft.
FROM STA. 539+50 TO STA. 541+10 -L- LT
DDE = 995 CY

NAD 83/CORS

535 540 545

20 EDWIN DALE KRIDER & WIFE SHERRY W. KRIDER

23 RITZ C. RAY, JR.

24 RAY FARMS, LLC

MATCH LINE -L- STA. 533+50 SEE SHEET NO. 10

MATCH LINE -L- STA. 547+00 SEE SHEET NO. 12

SITE 9

SITE 10

SITE 11

LAT 'V' DITCH w/CLASS 'B' RIPRAP SEE DETAIL 10

LAT 2' BASE DITCH w/COIR FIBER MATTING SEE DETAIL 22

STREAM BANK STABILIZATION CLASS I RIPRAP EST 19 TONS EST FF 23 SY SEE DETAIL 29

CLASS 'B' RIPRAP EST 2 TONS EST FF 7 SY

LAT V-DITCH SEE DETAIL 11

LAT 2' BASE DITCH w/CLASS 'B' RIP RAP SEE DETAIL 7

TIE TO EXIST BERM DITCH

BERM DITCH STA 545+50 - 546+07 -L- LT

CLASS 'B' RIPRAP EST 2 TONS EST FF 7 SY

CLASS 'B' RIPRAP EST 2 TONS EST FF 7 SY

15" w/ ELBOW
REMOVE HW
15"
COLLAR
30" CSP
2GI w/ FLAT GRATE
RETAIN AND EXTEND
CAT-1
REMOVE
15"
COLLAR
RETAIN AND EXTEND
2GI
GRAU 350 TL-3
15" RCP-IV
TB2GI FG
30" RCP-IV
TB2GI-A FG
AT-2
CLASS I RIPRAP ON BANKS ONLY EST 11 TONS EST FF 22 SY SEE DETAIL 29
RETAIN
REMOVE
Convert to JBwMH
N 61°21'21.6" E
US HWY 221 BST
PAVED DITCH
30" CMP
48" WW & ISBW
EXISTING R/W
EXISTING R/W PROP. LINE
12" HDPE LENGTH UNKNOWN
12" CMP
CLARENCE LYALL RD
CONC
DOG PEN
HTR
ISBKO
1 1/2SFD
1SFD
DK
CYNTHIA K. HOUCK
KATRINA CASEY
LESIA HAM MILLER
GARLAND LYALLS & WIFE JOAN LYALLS
TERESA L. HAWKINS
GARLAND C. LYALLS & WIFE JOAN B. LYALLS

DETAIL 27
LATERAL BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, B, 2:1, b, 1'-Ft., Fill Slope, CL 'I' RIP RAP, GEOTEXTILE
Min. D=2 Ft.
Max. d=2 Ft.
B=2 Ft.
b=5 Ft.
Type of Liner= 16 TONS,CL 'I' Rip-Rap
Geotextile= 23 sy
FROM STA. 537+61 TO STA. 537+94 -L- LT

DETAIL 29
RIP RAP STREAM BANK ONLY
(Not to Scale)
Natural Ground, Natural Ground, Geotextile
Type of Liner= Class "I" Rip-Rap
STA. 544+87 -L- RT

FOR -L- PROFILE, SEE SHEET 27

REVISIONS

8/17/99

5/8/2014
J.MCDATESRV02\NewData\ProjectList\1220\1101 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_11.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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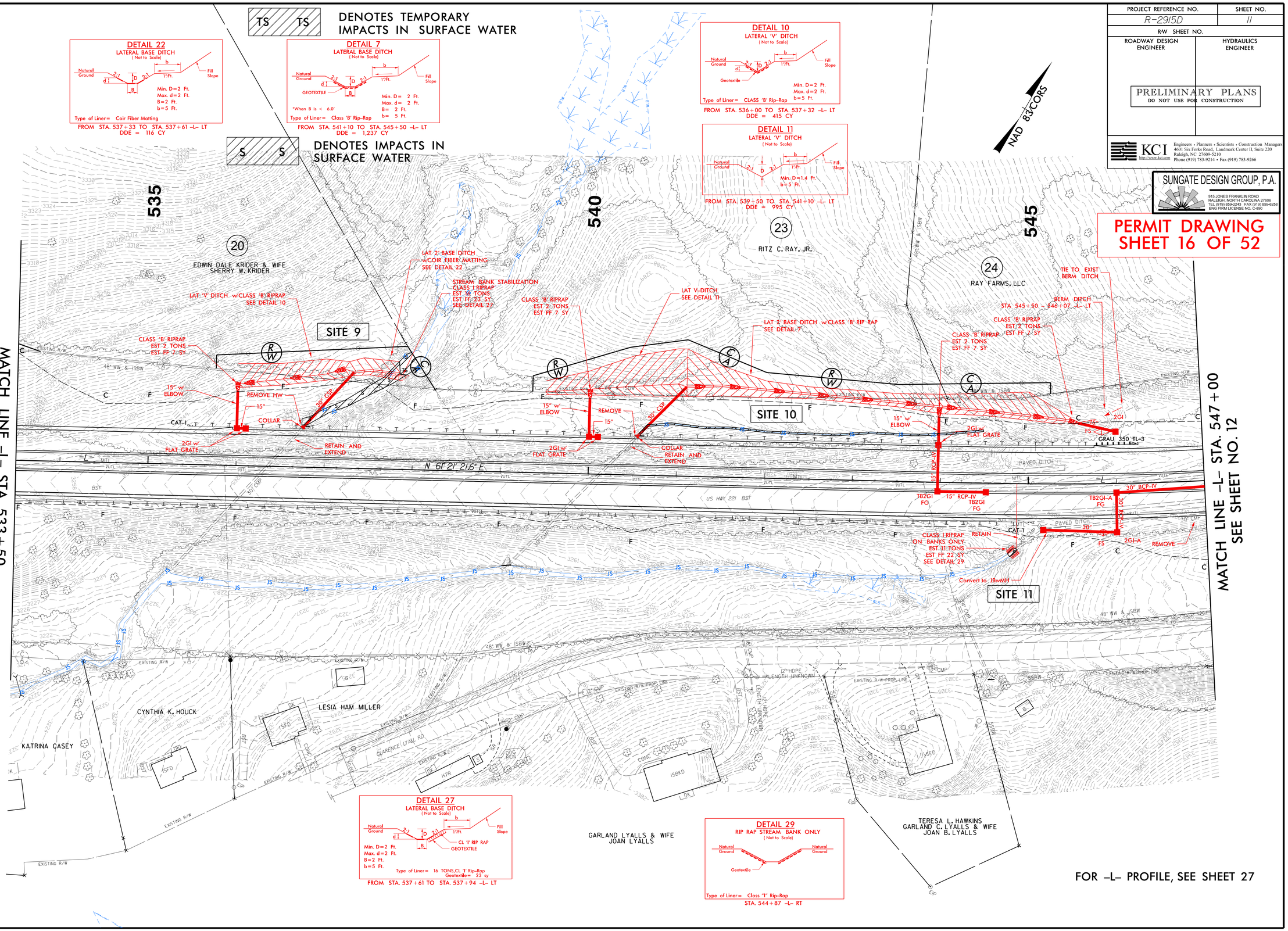
PERMIT DRAWING
SHEET 16 OF 52



FOR -L- PROFILE, SEE SHEET 27

REVISIONS

8/17/99

5/8/2014
DATE
DATA
TESRV02\NewData\ProjectList\1220\110ft - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_11_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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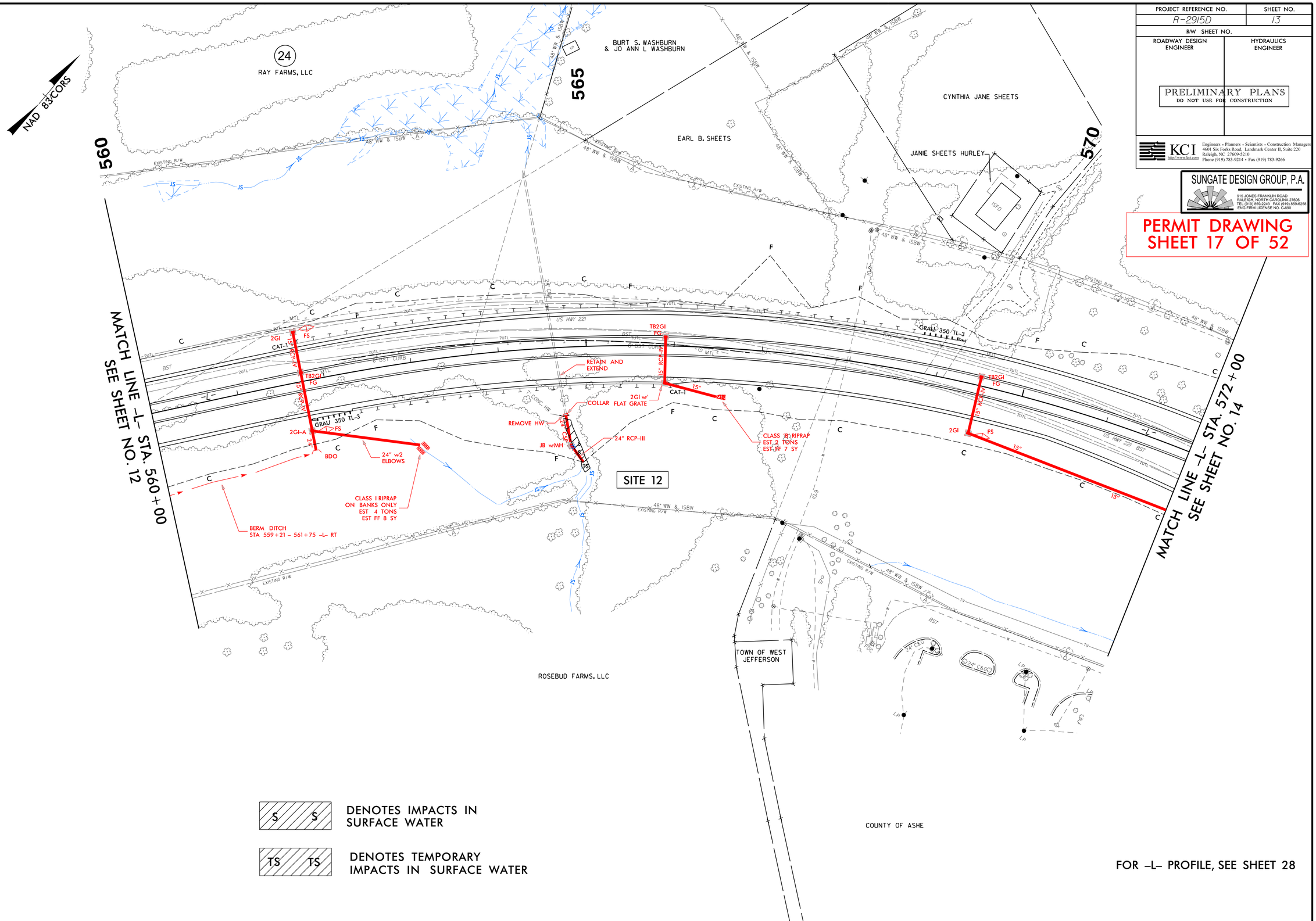
PERMIT DRAWING
SHEET 17 OF 52



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 28

REVISIONS

8/17/99

1/7/2014
R2915D_Hyd_prm_wet_psh_13
bbryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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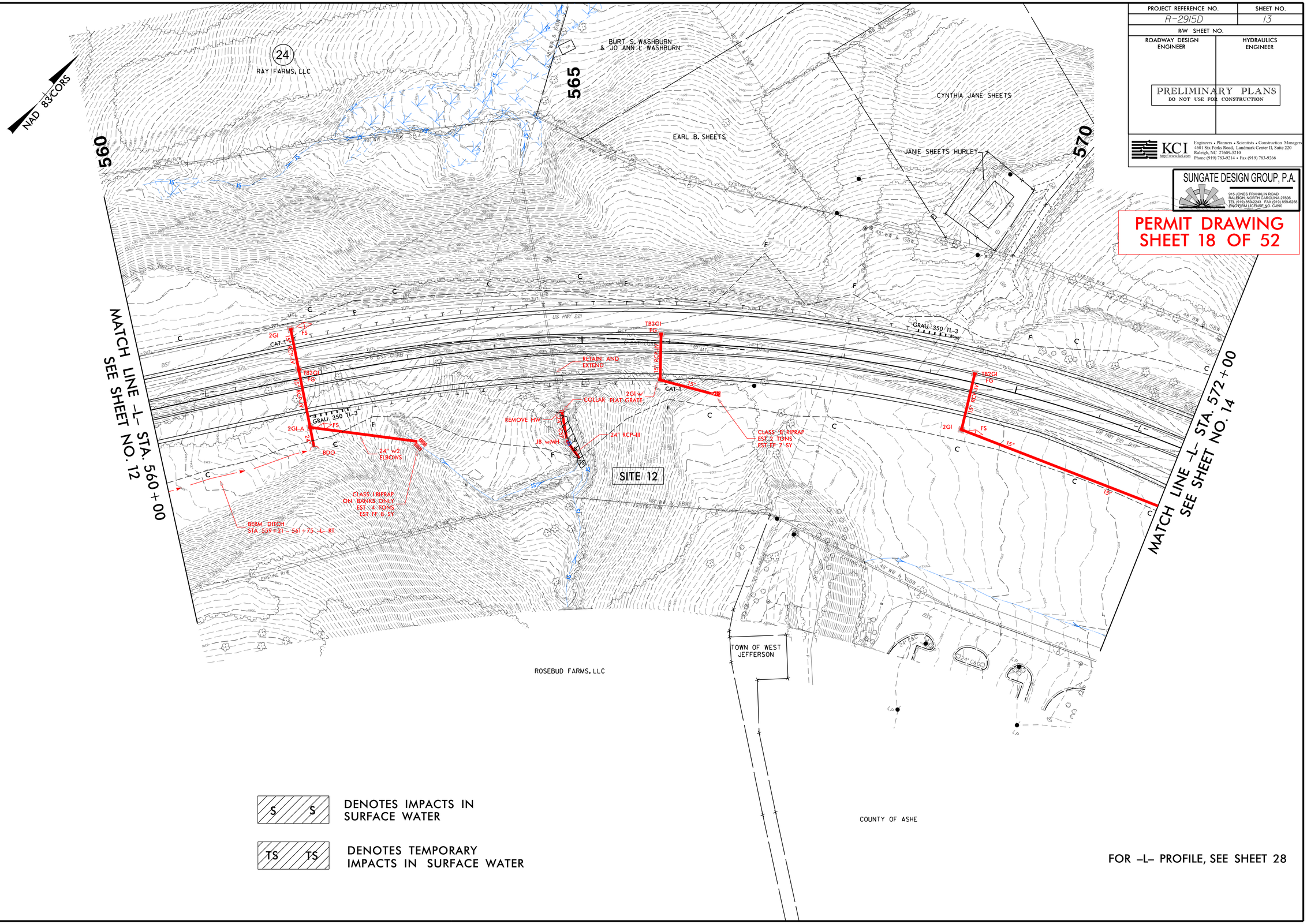
ENGINEERING LICENSE NO. C-660

PERMIT DRAWING
SHEET 18 OF 52



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 28

REVISIONS

8/17/99

1/3/2014
R2915D_Hyd_prm_wet_psh_13.con
bar_ven

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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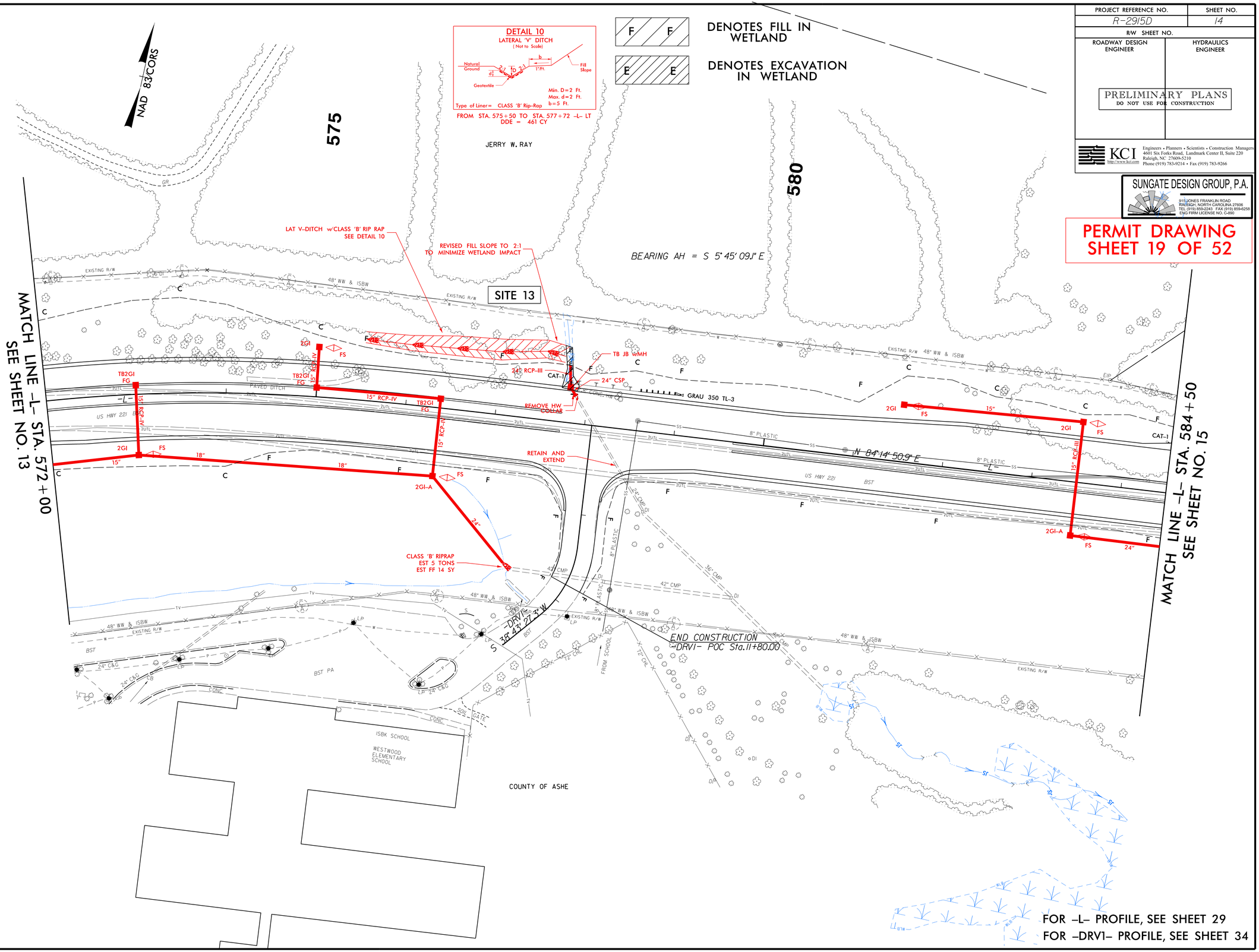
PERMIT DRAWING
SHEET 19 OF 52



REVISIONS

8/17/99

3/28/2014
KCI
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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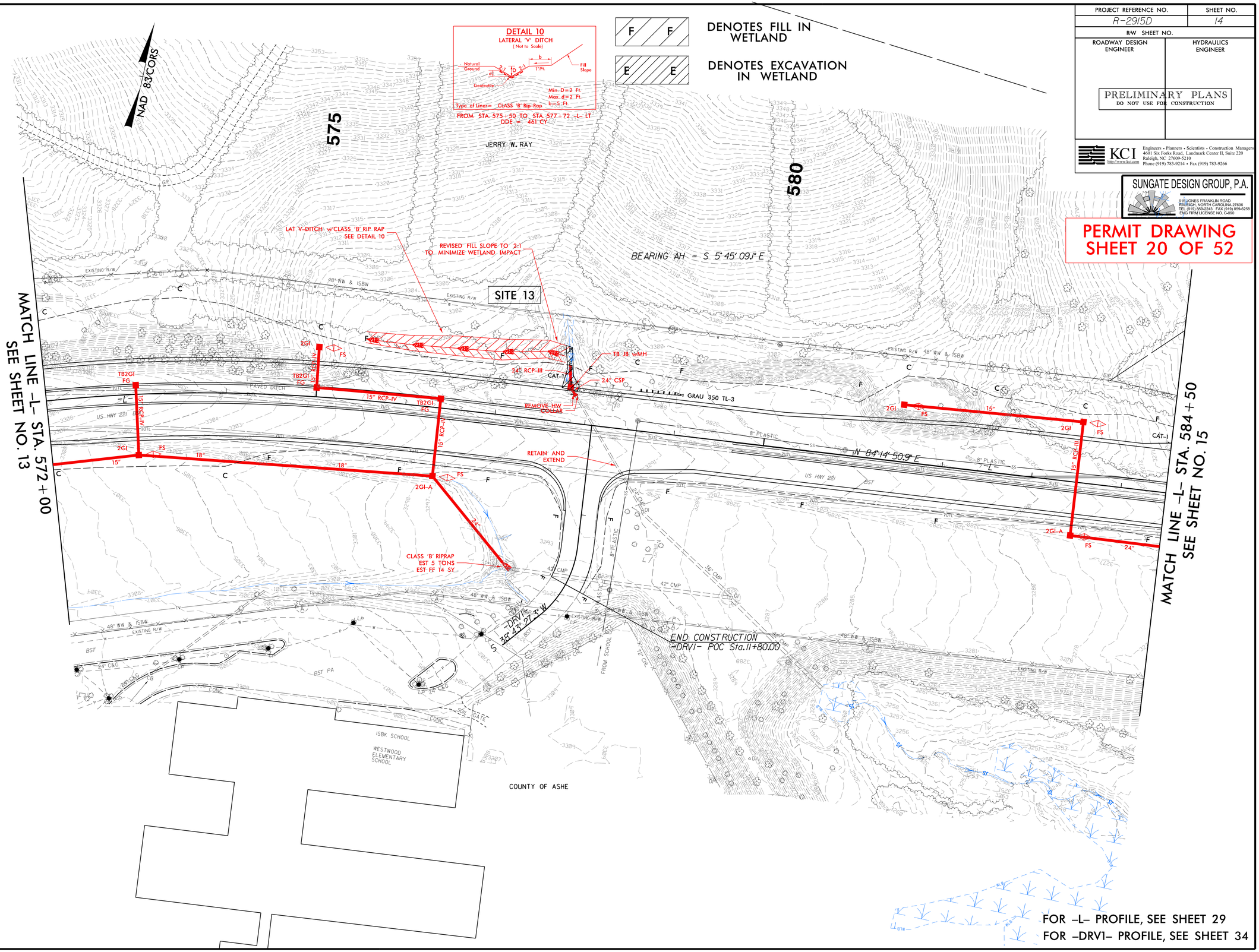
PERMIT DRAWING
SHEET 20 OF 52



FOR -L- PROFILE, SEE SHEET 29
FOR -DRV1- PROFILE, SEE SHEET 34

REVISIONS

8/17/99

3/28/2014
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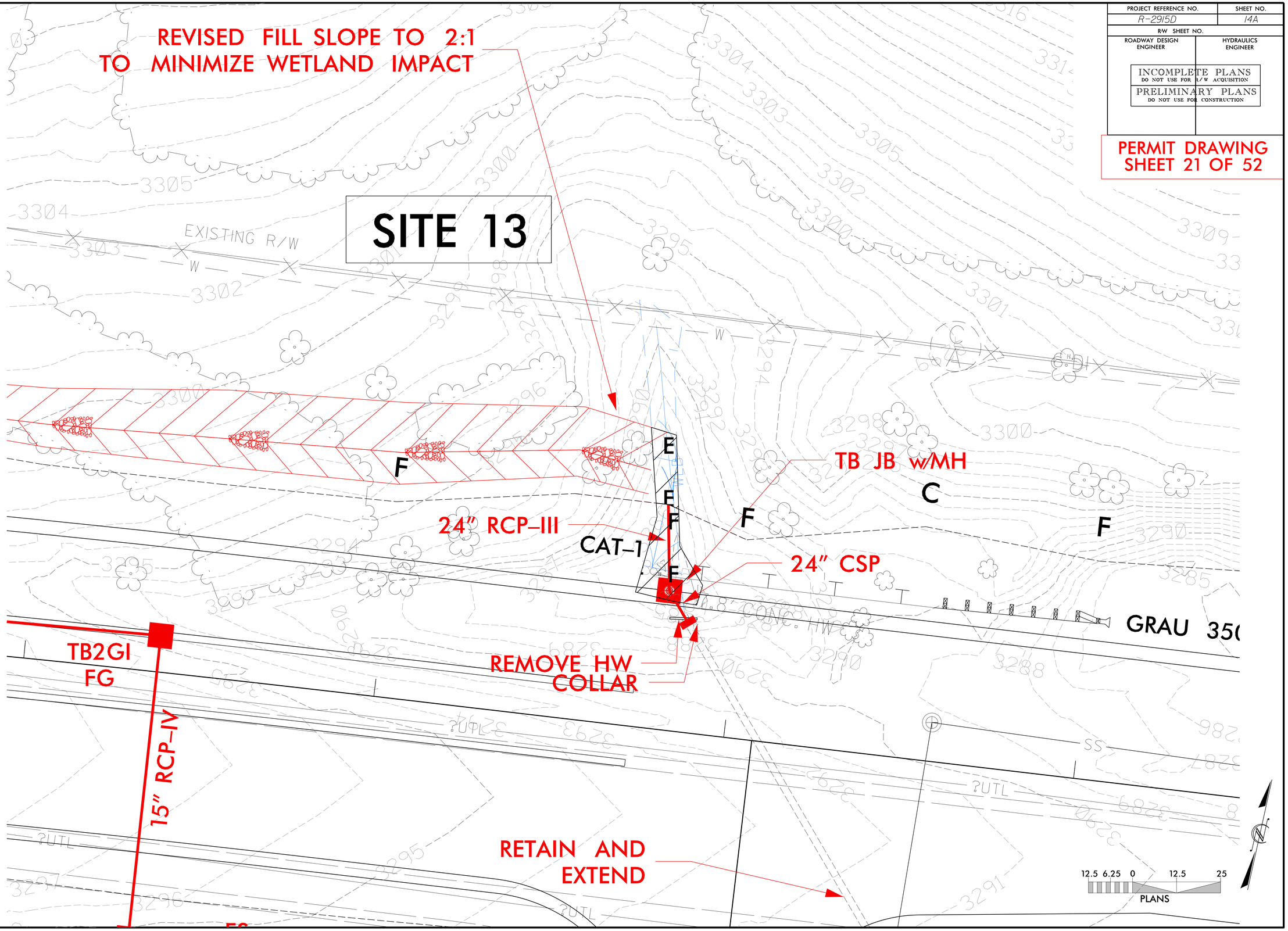
PROJECT REFERENCE NO.	SHEET NO.
R-2915D	14A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 21 OF 52



REVISIONS

8/17/99

R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_14_con_a.dgn

3/28/2014

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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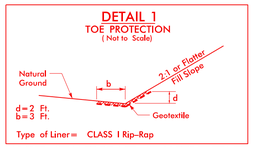
PERMIT DRAWING
SHEET 22 OF 52

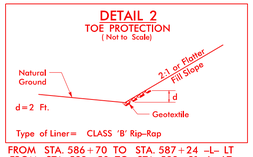
NAD 83/CORS

DETAIL 1
TOE PROTECTION
(Not to Scale)



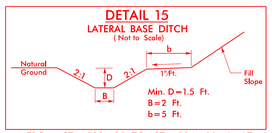
Type of Liner= CLASS I Rip-Rap
FROM STA. 587+24 TO STA. 588+65 -L- LT
FROM STA. 591+50 TO STA. 592+50 -L- LT

DETAIL 2
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 586+70 TO STA. 587+24 -L- LT
FROM STA. 592+50 TO STA. 593+21 -L- LT

DETAIL 15
LATERAL BASE DITCH
(Not to Scale)



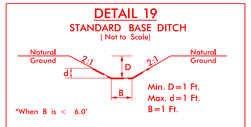
FROM STA. 593+25 TO STA. 594+00 -L- LT
DDE = 90 CY

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
F F — DENOTES FILL IN WETLAND
S S — DENOTES IMPACTS IN SURFACE WATER
DENOTES MECHANIZED CLEARING
E E — DENOTES EXCAVATION IN WETLAND

ZEB V. GAMBILL & WIFE
ANGIE TRIBBLE GAMBLE

585
590
595
25
GAMBILL PROPERTIES, LLC
SITE 14
SITE 15
SITE 16
SITE 17A
SITE 17B
MATCH LINE -L- STA. 584+50 SEE SHEET NO. 14
MATCH LINE -L- STA. 597+00 SEE SHEET NO. 16
N184°14'50.9"E
TOE PROTECTION SEE DETAIL 1
TOE PROTECTION SEE DETAIL 2
HEAD DITCH SEE DETAIL 19
CLASS 'B' RIPRAP EST 2 TONS EST FF 7 SY
15" w2 ELBOWS
36" RCP-III
JB w/MH
COLLAR
REMOVE HW
RETAIN AND EXTEND
2GI w/ FLAT GRATE
15" RCP-IV
TB2GI FG
15" RCP-IV
24" w2 ELBOWS
CLASS I RIPRAP EST 7 TONS EST FF 15 SY
CLASS I RIPRAP EST 15 TONS EST FF 30 SY
GRAU 350 TL-3
2GI-A
FS
REMOVE DEBRIS
DEBRIS
US HWY 221
TOE PROTECTION SEE DETAIL 1
CLASS 'B' RIPRAP EST 2 TONS EST FF 7 SY
TOE PROTECTION SEE DETAIL 2
15" CSP w2 ELBOWS
REMOVE HW COLLAR
RETAIN AND EXTEND
JB w/MH 36" CSP
LAT 2' BASE DITCH SEE DETAIL 15
BERM DITCH STA 594+00 - 598+56 -L- LT
DITCH BLOCK TO ELEV 3230.2
CLASS I RIPRAP EST 15 TONS EST FF 30 SY
48" WW & ISBW
EXISTING R/W
8" PLASTIC
COUNTY OF ASHE
26
RALPH GOODMAN & TED GOODMAN
27
IVY S. GOODMAN

DETAIL 19
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Coir Fiber Matting
FROM STA. 587+03 TO STA. 587+14 -L- LT
DDE = 3 CY

FOR -L- PROFILE, SEE SHEET 29

REVISIONS

8/17/99

3/28/2014
R:\Roadway\Proj\R2915D_Ashe_Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_15.dgn
$USER$ ESRV02\NewData\ProjectList\12201101\R - R-2915D - Ashe Cty

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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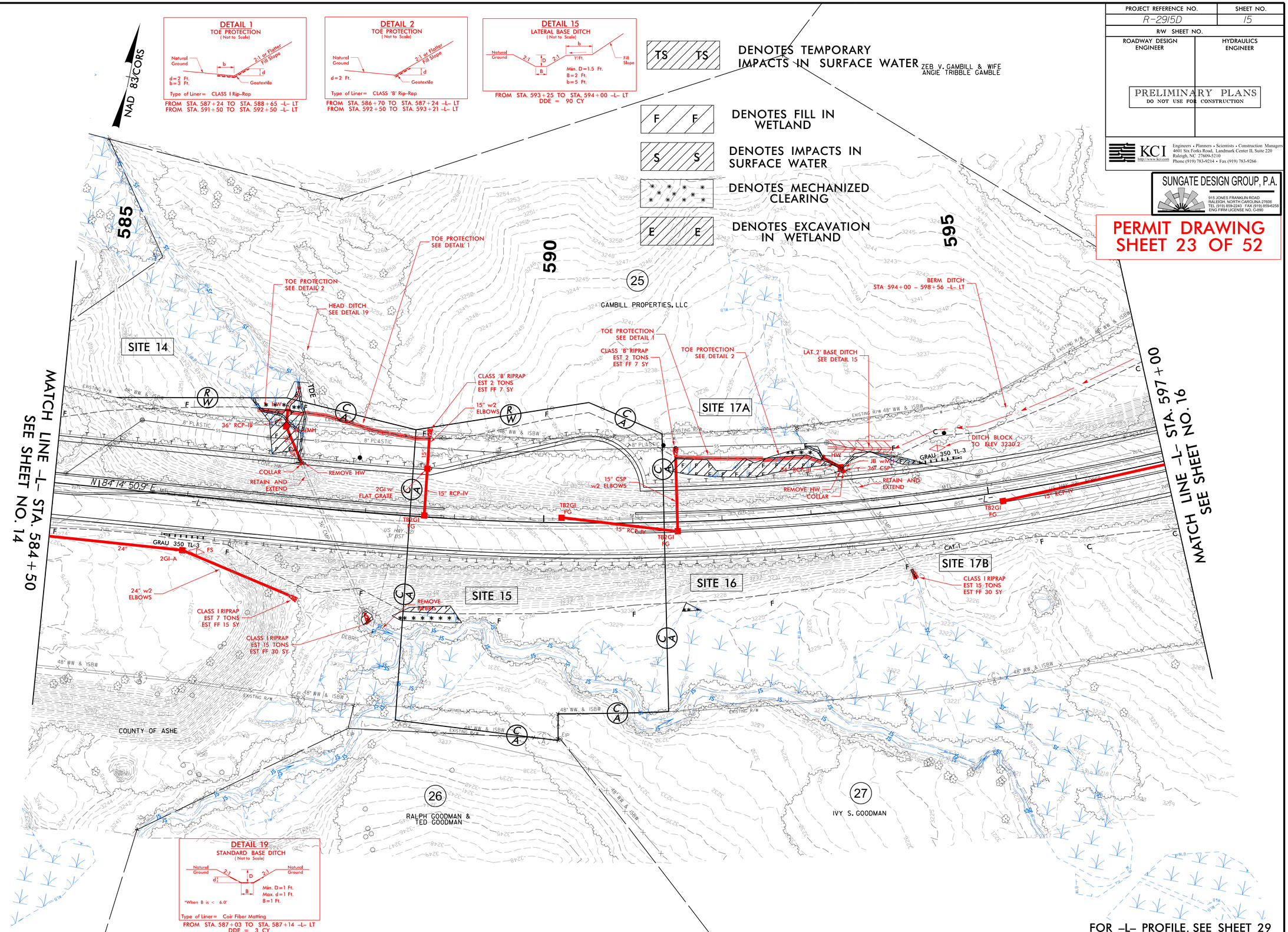
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 23 OF 52



FOR -L- PROFILE, SEE SHEET 29

REVISIONS

8/17/99

3/28/2014
SONGA
DRAWN BY:

R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_15_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 24 OF 52

REVISIONS

8/17/99

NAD 83/CORS

-L-

PI Sta 598+87.47
Δ = 36° 59' 04.8" (LT)
D = 1° 58' 32.6"
L = 1,871.96'
T = 969.90'
R = 2,900.00'
SE = .05
RUNOFF = 275'

PIs Sta 608+81.22
Θs = 2° 42' 59.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'

29
MARLETTE B. CULLEN (TRUSTEE)

ZEB V. GAMBILL & WIFE
ANGIE TRIBBLE GAMBLE

600

605

BERM DITCH
STA 594+00 – 598+56 -L- LT

MATCH LINE -L- STA. 597+00
SEE SHEET NO. 15

MATCH LINE -L- STA. 608+50
SEE SHEET NO. 17

-L- CS Sta. 607+89.54

48" WW & ISBW
EXISTING R/W
8" PLASTIC
US HWY 221
PAVED DITCH
GRAU 350 TL-3
55'
15"
24"
18" RCP-IV
15" RCP-IV
18" RCP-IV
15" RCP-IV
2GI
FS
TB2GI
FG
2GI-A
CAT-1
JB w/MH
30" w2 ELBOWS
CLASS I RIPRAP
EST 11 TONS
EST FF 22 SY
TOE PROTECTION
SITE 18
TOE PROTECTION
SEE DETAIL 1
ISFD
BST
SSBW & 15 ELEC

27
IVY S. GOODMAN

28
JERRY WAYNE JONES & WIFE
DONNA H. JONES

ROBERT GLENN POE
AND
DEBRA E. POE

DETAIL 1
TOE PROTECTION
(Not to Scale)

Natural Ground
2:1 or Flatter Fill Slope
b
d
d = 2 Ft.
b = 3 Ft.
Geotextile
Type of Liner= CLASS I Rip-Rap
FROM STA. 606+50 TO STA. 610+19 -L- RT

S S DENOTES IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 30

1/3/2014
R2915D_Hyd_prm_wet_psh_16

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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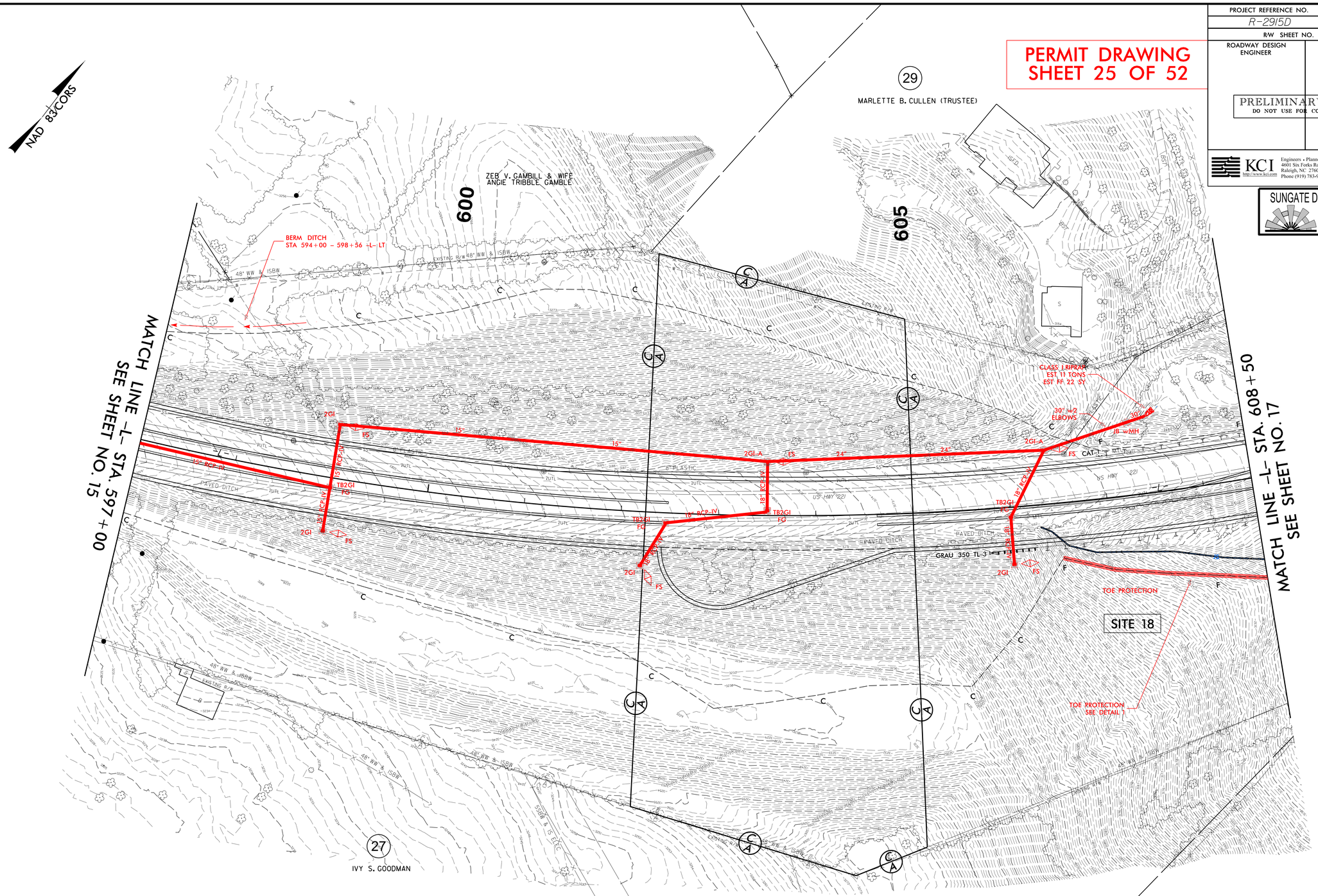
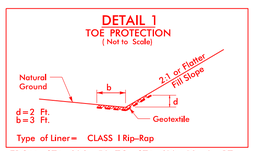
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 25 OF 52



DETAIL 1
TOE PROTECTION
(Not to Scale)



d = 2 Ft.
b = 3 Ft.
Type of Liner = CLASS I Rip-Rap
FROM STA. 606+50 TO STA. 610+19 -L- RT

S S DENOTES IMPACTS IN SURFACE WATER

FOR -L- PROFILE, SEE SHEET 30

REVISIONS

8/17/99

1/3/2014
R2915D_hyd_prm_wet_psh_16.con
hydraul

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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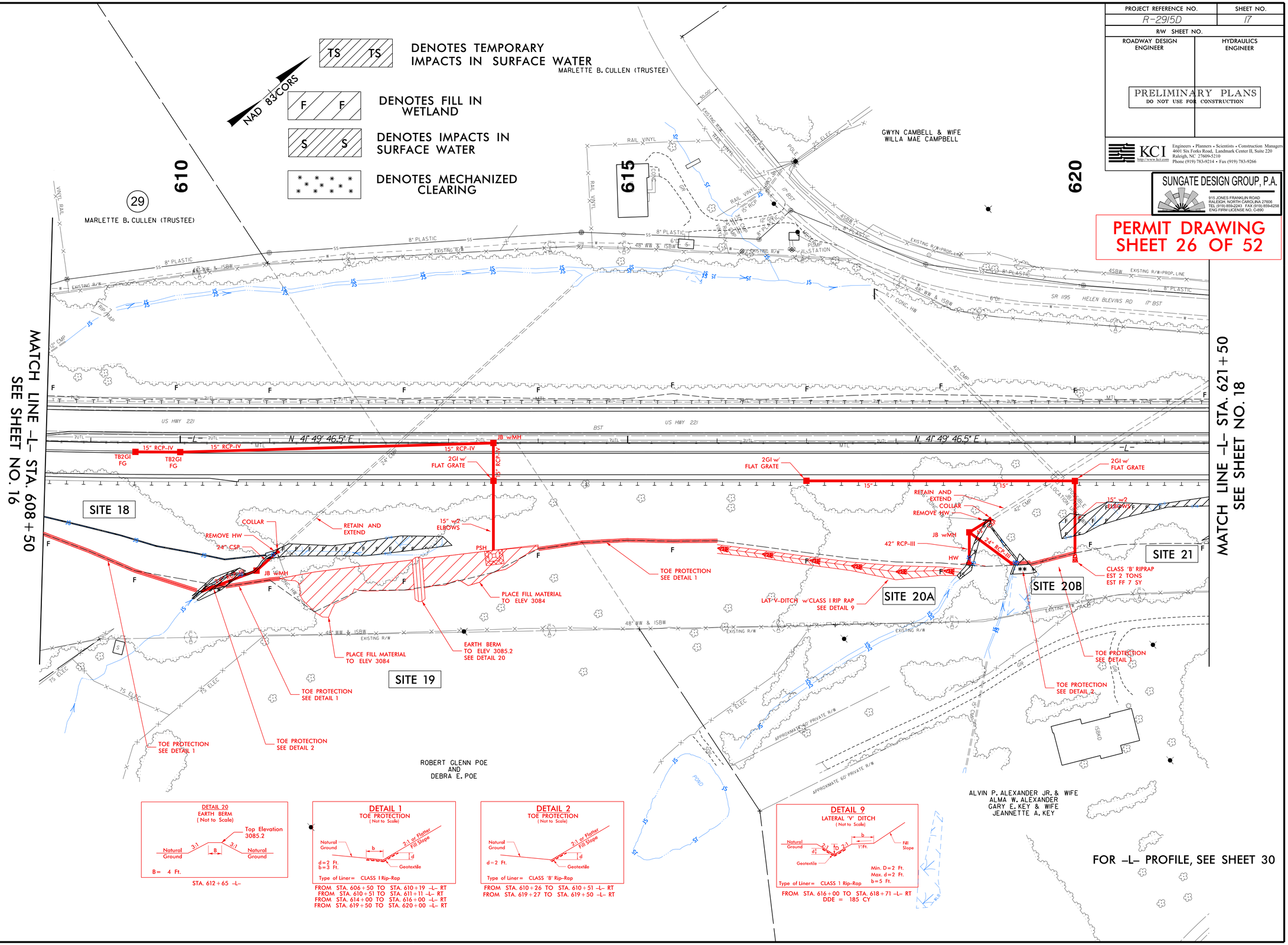
PERMIT DRAWING
SHEET 26 OF 52



REVISIONS

8/17/99

R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_17.dgn

3/28/2014
SUNGATE

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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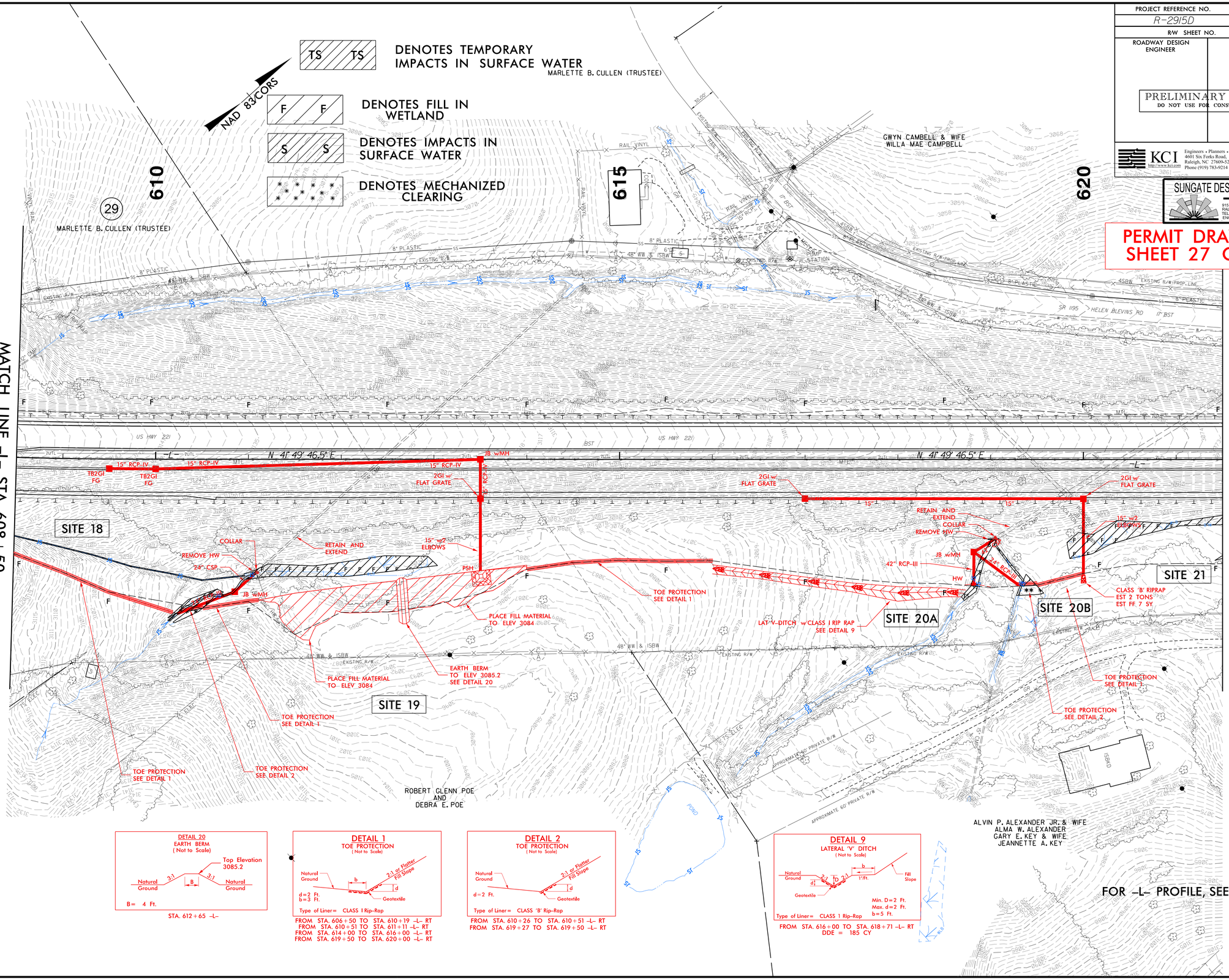
PERMIT DRAWING
SHEET 27 OF 52



DETAIL 20
EARTH BERM
(Not to Scale)

B= 4 Ft.

STA. 612+65 -L-

DETAIL 1
TOE PROTECTION
(Not to Scale)

d=2 Ft.
b=3 Ft.
Type of Liner= CLASS I Rip-Rap

FROM STA. 606+50 TO STA. 610+19 -L- RT
FROM STA. 610+51 TO STA. 611+11 -L- RT
FROM STA. 614+00 TO STA. 616+00 -L- RT
FROM STA. 619+50 TO STA. 620+00 -L- RT

DETAIL 2
TOE PROTECTION
(Not to Scale)

d=2 Ft.
Type of Liner= CLASS 'B' Rip-Rap

FROM STA. 610+26 TO STA. 610+51 -L- RT
FROM STA. 619+27 TO STA. 619+50 -L- RT

DETAIL 9
LATERAL 'V' DITCH
(Not to Scale)

Min. D=2 Ft.
Max. d=2 Ft.
b=5 Ft.
Type of Liner= CLASS 1 Rip-Rap

FROM STA. 616+00 TO STA. 618+71 -L- RT
DDE = 185 CY

REVISIONS

8/17/99

3/28/2014
R:\ENGINEERING\ESRV02\NewData\ProjectList\12201101\6 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_17_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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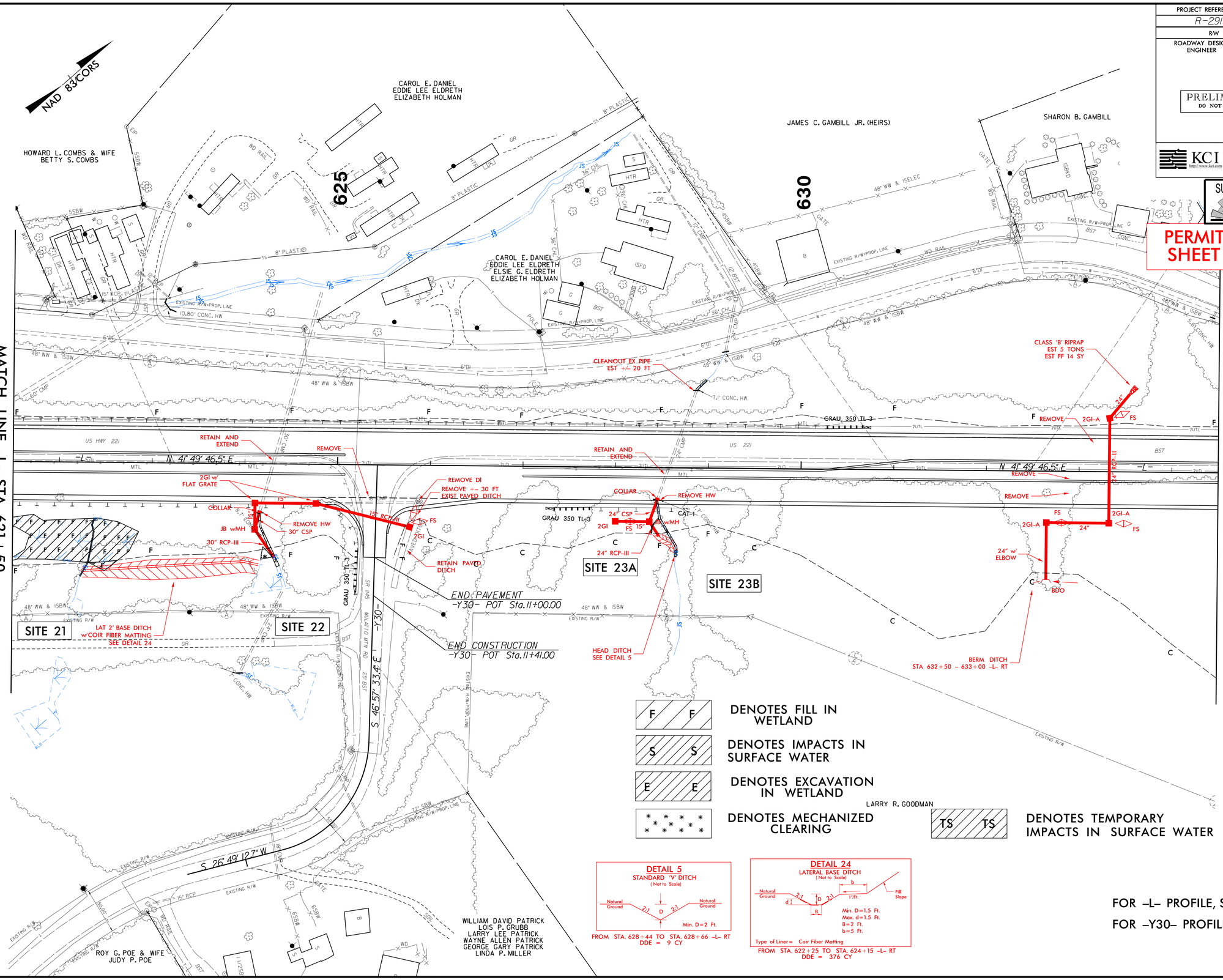
PERMIT DRAWING
SHEET 28 OF 52



FOR -L- PROFILE, SEE SHEET 31

FOR -Y30- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

3/28/2014
R:\ROADWAY\PROJECTS\ESRV02\NewData\ProjectList\1220\110ft - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_18.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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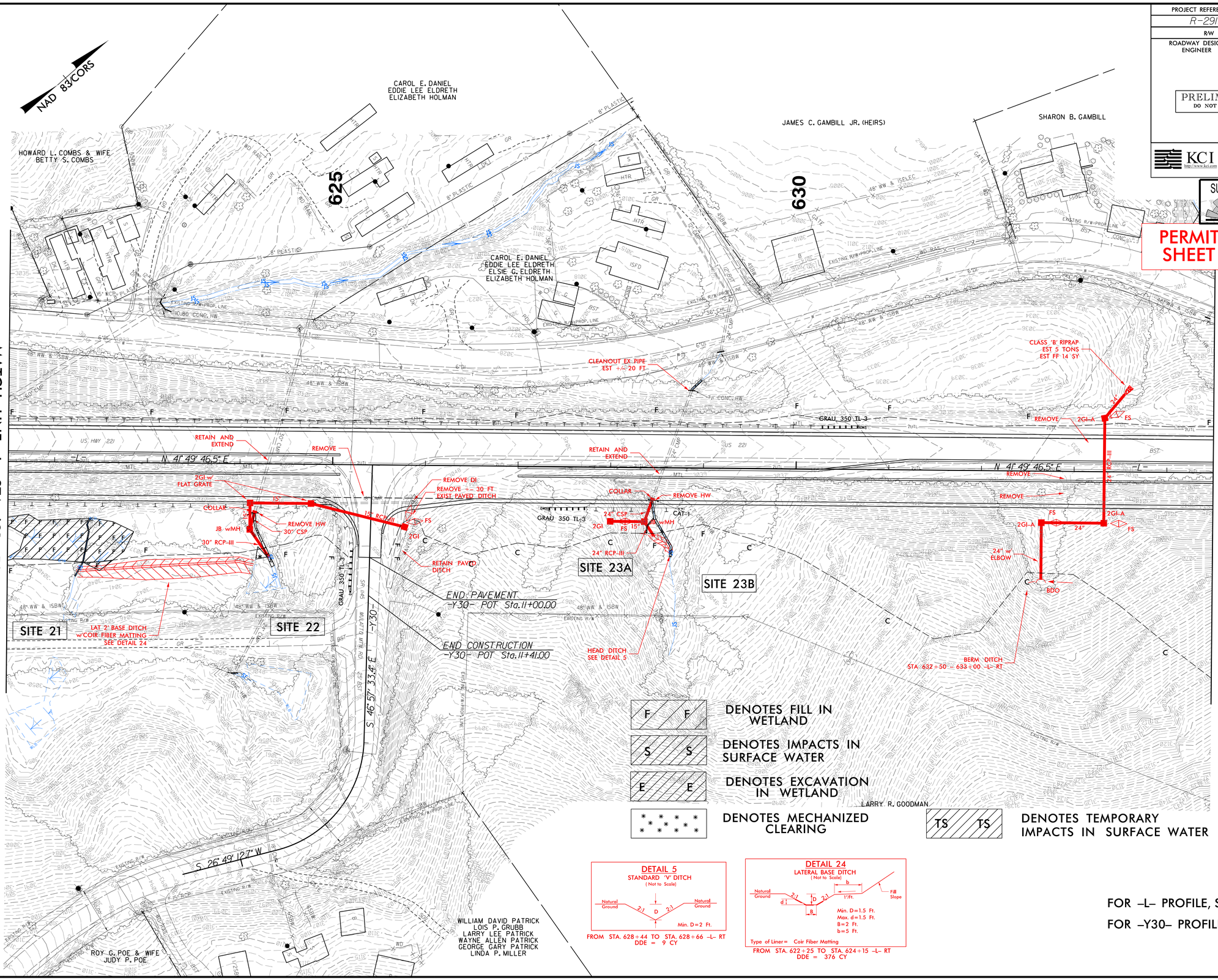
PERMIT DRAWING
SHEET 29 OF 52



FOR -L- PROFILE, SEE SHEET 31
FOR -Y30- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_18_con.dgn

3/28/2014
ESRV02\NewData\ProjectList\1220\1106

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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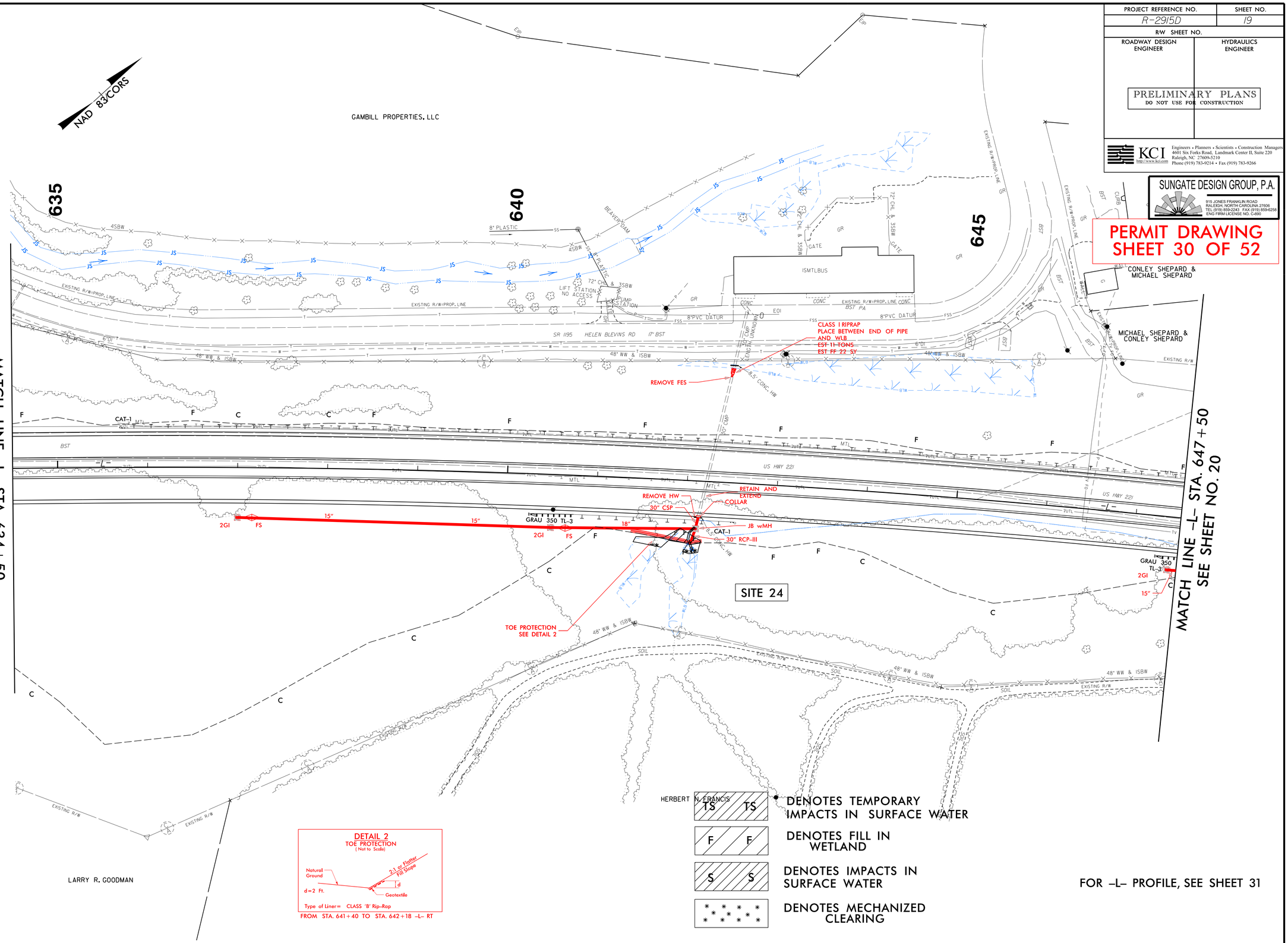
PERMIT DRAWING
SHEET 30 OF 52



REVISIONS

8/17/99

1/3/2014
R2915D_Hyd_prm_wet_psh_19
(hydraulics)

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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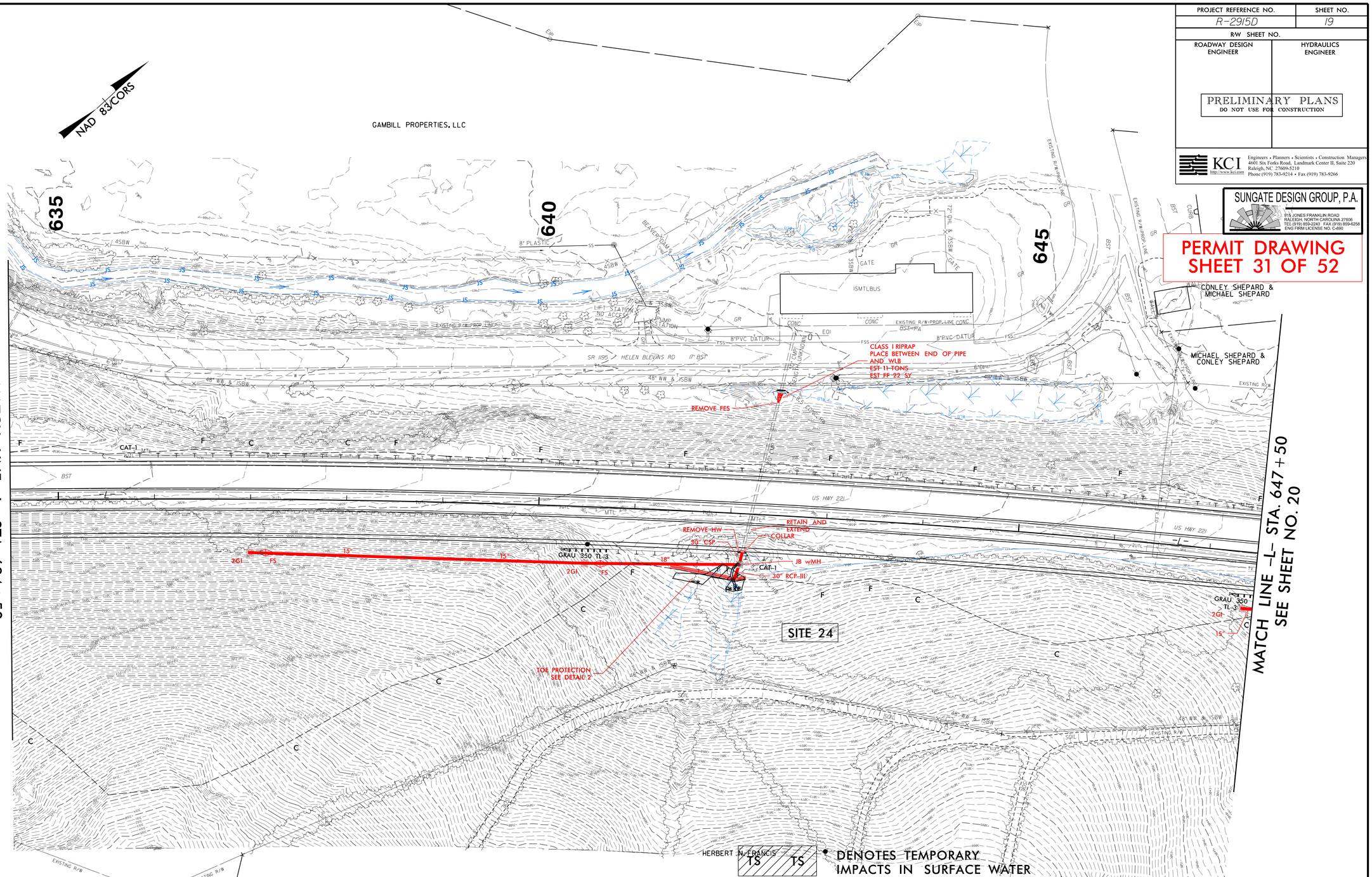
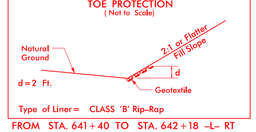
ENG FIRM LICENSE NO. C-690

PERMIT DRAWING
SHEET 31 OF 52



DETAIL 2
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 641+40 TO STA. 642+18 -L- RT

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

FOR -L- PROFILE, SEE SHEET 31

REVISIONS

8/17/99

1/3/2014
R-2915D_Hyd_prm_wet_psh_19.con
(hanrahan)

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	20
R/W SHEET NO.	
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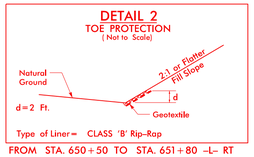
PERMIT DRAWING
SHEET 32 OF 52

DETAIL 2
TOE PROTECTION
(Not to Scale)



FROM STA. 650+50 TO STA. 651+80 -L- RT

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/CORS

MATCH LINE -L- STA. 647+50
SEE SHEET NO. 19

MATCH LINE -L- STA. 660+00
SEE SHEET NO. 21

SITE 26

SITE 25

BEARING AH = S 50°25'53.1" E

N 49°22'07.9" E

S 80°19'26.7" E

END CONSTRUCTION
-Y31- POC Sta:11+65.00

CLASS I RIPRAP
EST 15 TONS
EST FF 30 SY

CLASS 'B' RIPRAP
EST 5 TONS
EST FF 14 SY

REMOVE HW

COLLAR RETAIN AND EXTEND

RETAIN

TOE PROTECTION
SEE DETAIL 2

JB w/MH

24" RCP-III

18" RCP-III

24" RCP-III

2GI-A NS

2GI NS

GRAU 350 TL-3

CAT-1

US HWY 221

JEB HOTEL CORPORATION

MICHAEL SHEPARD & CONLEY SHEPARD

JAMES RICHARD BEAMON, JR. & WIFE CAROLINE KNOX BEAMON

BOB MCCOY

LARRY E. GREER & WIFE GINGER B. GREER

RAY C. TAYLOR & WIFE LOUISE P. TAYLOR

LANNY M. LEWIS & WIFE MARIE T. LEWIS

ARTHUR JOE BALL & WIFE BETTY BALL

AVERY ERNEST ROARK & WIFE JANET SUE ROARK

KENNETH G. HERTEL (HEIRS)

GARY DEAN HALL & WIFE BRENDA K. HALL

TONY A. WALLACE & WIFE JUDY W. WALLACE

JOHN A. WEAVER JR. & WIFE IMAGENE H. WEAVER

FOR -L- PROFILE, SEE SHEET 32
FOR -Y31- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

3/28/2014
R:\ENGINEERING\ESRV02\NewData\ProjectList\12201101\R - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_20.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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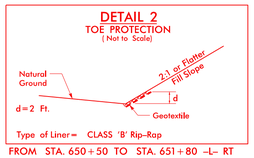
SHEET 33 OF 52

DETAIL 2
TOE PROTECTION
(Not to Scale)



Type of Liner = CLASS 'B' Rip-Rap
FROM STA. 650+50 TO STA. 651+80 -L- RT

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83/CORS

MATCH LINE -L- STA. 647+50
SEE SHEET NO. 19

MATCH LINE -L- STA. 660+00
SEE SHEET NO. 21

650

655

CANOPY
CAR WASH
ISBLKBUS
CONC.
HTR
ISMTLBUS
ISBKBUS
MTLS
GR
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JAMES RICHARD BEAMON, JR. & WIFE CAROLINE KNOX BEAMON
BOB MCCOY
LARRY E. GREER & WIFE GINGER B. GREER
LARRY E. GREER & WIFE GINGER B. GREER
EXISTING R/W
48" WW & ISBW
BEARING AH = S 50°25' 53.1" E
CLASS I RIPRAP
EST 15 TONS
EST FF 30 SY
CLASS "B" RIPRAP
EST 5 TONS
EST FF 14 SY
SITE 26
GRAU 350 TL-3
US HWY 221
N 49° 22' 07.9" E
-L-
REMOVE HW
COLLAR
RETAIN AND EXTEND
RETAIN
JB wMH
CAT-1
SITE 25
2GI-A NS
2GI NS
24" RCP
15" CMP
18" CMP
24" CMP
18" C&G
GRAU 350 TL-3
END CONSTRUCTION
-Y31- POC Sta.11+65.00
-Y31-
TOE PROTECTION
SEE DETAIL 2
RAY C. TAYLOR & WIFE LOUISE P. TAYLOR
LANNY M. LEWIS & WIFE MARIE T. LEWIS
ARTHUR JOE BALL & WIFE BETTY BALL
AVERY ERNEST ROARK & WIFE JANET SUE ROARK
KENNETH G. HERTEL (HEIRS)
GARY DEAN HALL & WIFE BRENDA K. HALL
TONY A. WALLACE & WIFE JUDY W. WALLACE
JOHN A. WEAVER JR. & WIFE IMAGENE H. WEAVER
S 80°19' 26" E
15" RCP
18" RCP
24" RCP
36" CMP
FS
JB wMH
CONC. DRIVE
DWY STA. 10+00

FOR -L- PROFILE, SEE SHEET 32
FOR -Y31- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

3/28/2014
R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_20_con.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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PERMIT DRAWING
SHEET 34 OF 52

REVISED SIGNAL

FOR –L– PROFILE, SEE SHEET 32
FOR –Y32– PROFILE, SEE SHEET 35

NAD 83/CORS

DETAIL 13
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, b, 1'Ft., Fill Slope
Min. D=2.0 Ft.
b=5 Ft.

FROM STA. 19+00 TO STA. 20+50 –Y32– LT
DDE = 404 CY

DETAIL 25
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, b, B, d, 2:1, Natural Ground
Min. D=2 Ft. d=1 Ft.
B=Varies 5–12 Ft. b=Varies 0–16 Ft.

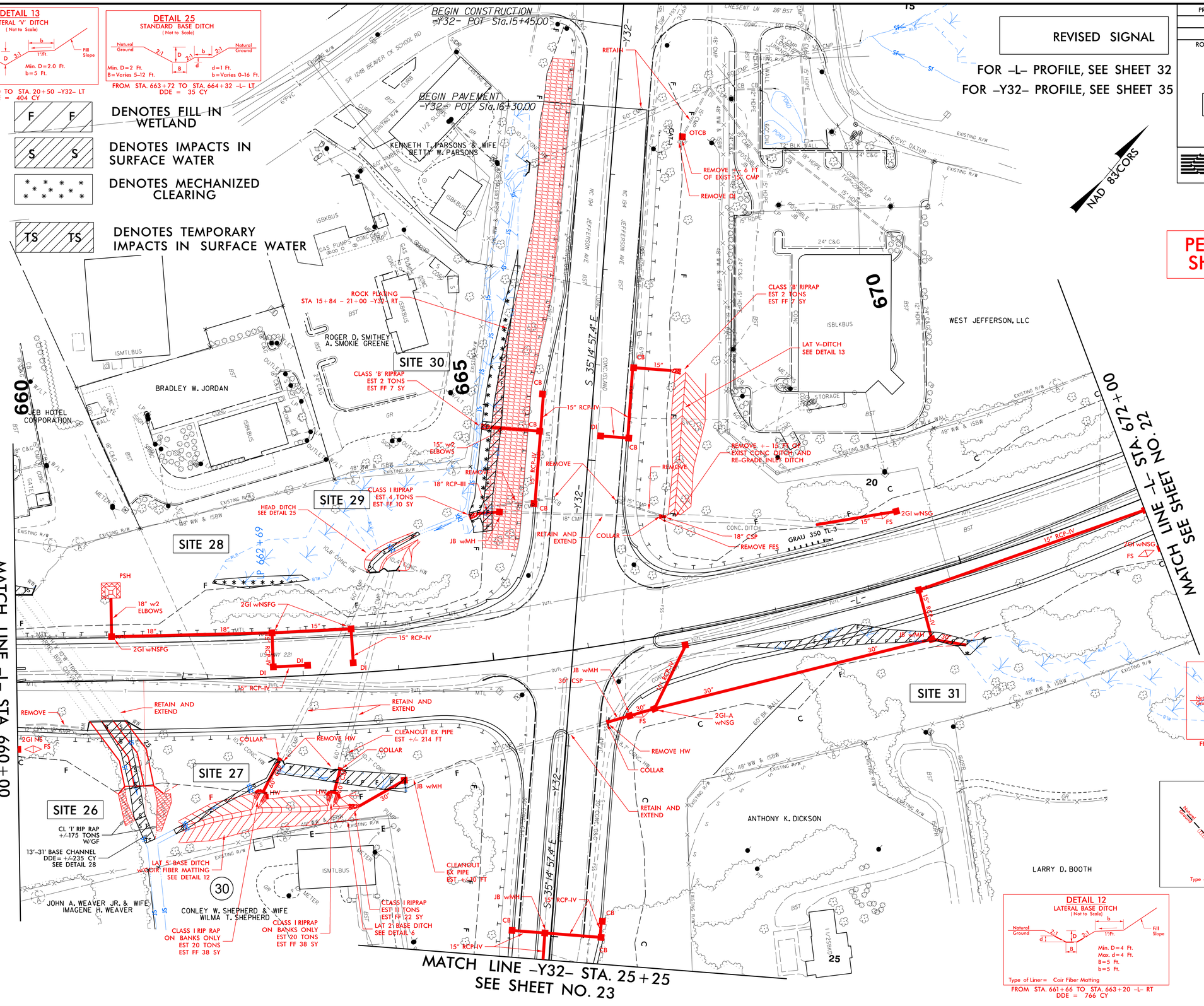
FROM STA. 663+72 TO STA. 664+32 –L– LT
DDE = 35 CY

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER



DETAIL 6
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, b, B, 1'Ft., Fill Slope
Min. D=2 Ft.
B=2 Ft.
b=5 Ft.

FROM STA. 663+20 TO STA. 663+50 –L– RT
DDE = 131 CY

DETAIL 28
BASE CHANNEL
(Not to Scale)

Natural Ground, 1.5:1, CL 'I' RIP RAP W/GF

Type of Liner= 175 TONS,CL 'I' Rip-Rap Geotextile= 100 sy

FROM STA. 601+33 –L– RT

DETAIL 12
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, b, B, 1'Ft., Fill Slope
Min. D=4 Ft.
Max. d=4 Ft.
B=5 Ft.
b=5 Ft.

Type of Liner= Coir Fiber Matting

FROM STA. 661+66 TO STA. 663+20 –L– RT
DDE = 766 CY

REVISIONS

8/17/99

3/28/2014
KCI TECHNOLOGIES\ESRV02\NewData\ProjectList\1220\110\R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_21.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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Phone (919) 783-9214 • Fax (919) 783-9266

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915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-9258
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 35 OF 52

REVISED SIGNAL

FOR –L– PROFILE, SEE SHEET 32
FOR –Y32– PROFILE, SEE SHEET 35

NAD 83/CORS

DETAIL 13
LATERAL 'V' DITCH
(Not to Scale)

Natural Ground, 3:1, D, 3:1, b, 1'Ft., Fill Slope
Min. D=2.0 Ft.
b=5 Ft.

FROM STA. 19+00 TO STA. 20+50 –Y32– LT
DDE = 404 CY

DETAIL 25
STANDARD BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, b, d, B, 2:1, Natural Ground
Min. D=2 Ft. d=1 Ft.
B=Varies 5–12 Ft. b=Varies 0–16 Ft.

FROM STA. 663+72 TO STA. 664+32 –L– LT
DDE = 35 CY

F F — DENOTES FILL IN WETLAND

S S — DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

BEGIN CONSTRUCTION
–Y32– POT Sta.15+45.00

BEGIN PAVEMENT
–Y32– POT Sta.16+30.00

KENNETH T. PARSONS & WIFE BETTY W. PARSONS

ROGER D. SMITHEY
A. SMOKIE GREENE

BRADLEY W. JORDAN

JEB HOTEL CORPORATION

WEST JEFFERSON, LLC

JOHN A. WEAVER JR. & WIFE IMAGENE H. WEAVER

CONLEY W. SHEPHERD & WIFE WILMA T. SHEPHERD

ANTHONY K. DICKSON

LARRY D. BOOTH

SITE 26
SITE 27
SITE 28
SITE 29
SITE 30
SITE 31

ROCK PLUNGE
STA 15+84 – 21+00 –Y32– RT

CLASS 'B' RIPRAP
EST 2 TONS
EST FF 7 SY

CLASS I RIPRAP
EST 4 TONS
EST FF 10 SY

CL 'I' RIP RAP
+/-175 TONS
W/GF

13'-31' BASE CHANNEL
DDE= +/-235 CY
SEE DETAIL 28

LAT 5 BASE DITCH
W/COIR FIBER MATTING
SEE DETAIL 12

CLASS I RIP RAP
ON BANKS ONLY
EST 20 TONS
EST FF 38 SY

CLASS I RIPRAP
ON BANKS ONLY
EST 20 TONS
EST FF 38 SY

CLASS I RIPRAP
EST 11 TONS
EST FF 22 SY

LAT 2 BASE DITCH
SEE DETAIL 6

CLEANOUT EX PIPE
EST +/- 214 FT

CLEANOUT
EX PIPE
EST +/- 140 FT

LAT V-DITCH
SEE DETAIL 13

REMOVE +/- 6 FT
OF EXIST 15" CMP

REMOVE +/- 15 FT OF
EXIST CONC DITCH AND
RE-GRADE INLET DITCH

REMOVE FES

RETAIN AND EXTEND

COLLAR

REMOVE HW

REMOVE

15" RCP-IV

18" RCP-III

18" w2 ELBOWS

2GI wNSFG

2GI wNSG

2GI-A wNSG

JB wMH

HEAD DITCH
SEE DETAIL 25

S 35°14'57.4" E

–Y32–

–L–

GRAU 350 TL-3

MATCH LINE –L– STA. 660+00
SEE SHEET NO. 20

MATCH LINE –L– STA. 672+00
SEE SHEET NO. 22

MATCH LINE –Y32– STA. 25+25
SEE SHEET NO. 23

DETAIL 6
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, D, 2:1, b, 1'Ft., Fill Slope, B
Min. D=2 Ft.
B=2 Ft.
b=5 Ft.

FROM STA. 663+20 TO STA. 663+50 –L– RT
DDE = 131 CY

DETAIL 28
BASE CHANNEL
(Not to Scale)

Natural Ground, 1.5:1, CL 'I' RIP RAP W/GF
Type of Liner= 175 TONS,CL 'I' Rip-Rap
Geotextile= 100 sy

FROM STA. 601+33 –L– RT

DETAIL 12
LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, 2:1, b, 1'Ft., Fill Slope, B
Min. D=4 Ft.
Max. d=4 Ft.
B=5 Ft.
b=5 Ft.

Type of Liner= Coir Fiber Matting

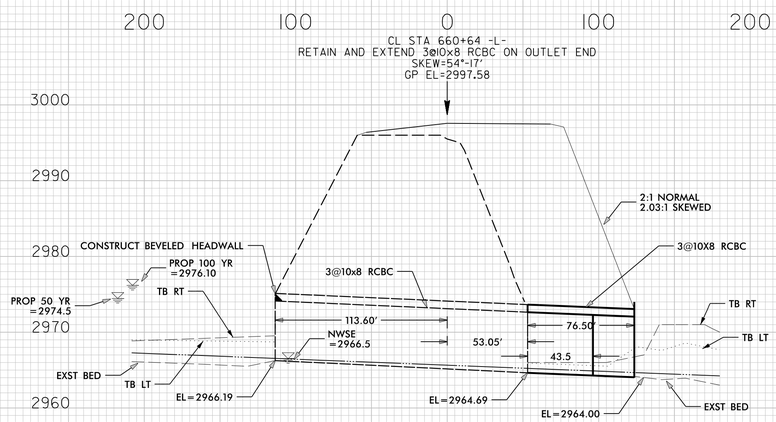
FROM STA. 661+66 TO STA. 663+20 –L– RT
DDE = 766 CY

REVISIONS

8/17/99

3/28/2014
R-2915D_ESRV02_NewData\ProjectList\1220\110ft - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_21_con.dgn

PERMIT DRAWING
SHEET 36 OF 52



PROJECT REFERENCE NO.	SHEET NO.
R-2915D	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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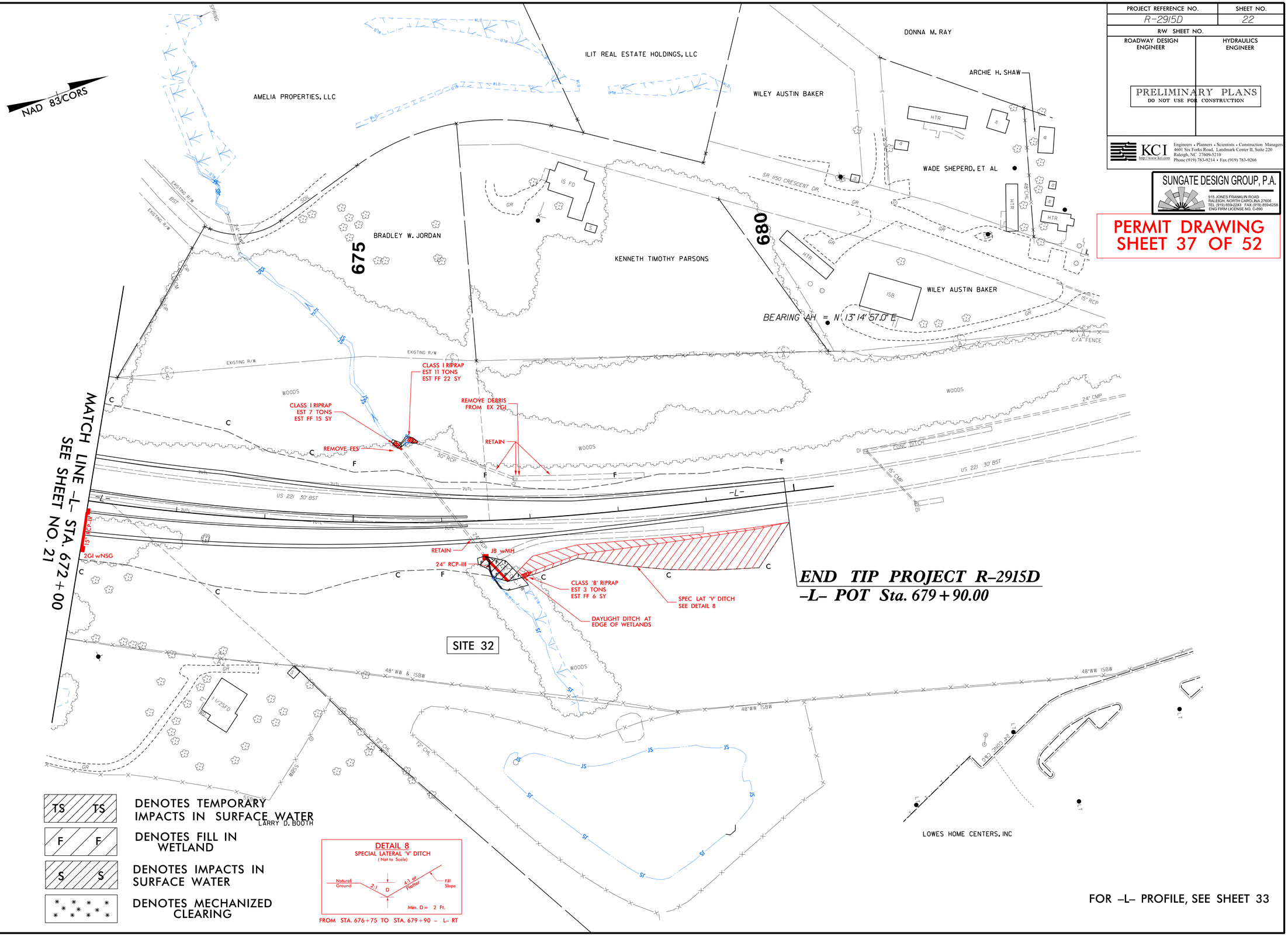
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 37 OF 52



REVISIONS

8/17/99

5/8/2014
SUNGATESRV02\NewData\ProjectList\1220\11016 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_22.dgn

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-890

PERMIT DRAWING
SHEET 38 OF 52

REVISIONS

8/17/99

NAD 83/CORS

AMELIA PROPERTIES, LLC
DB 394 PG 14

ILIT REAL ESTATE HOLDINGS, LLC
DB 292 PG 109

WILEY AUSTIN BAKER
DB 174 PG 2360

DONNA M. RAY
DB P-4 PG 487
PB 2 PG 41
DB B-4 PG 191

ARCHIE H. SHAW
DB Y-4 PG 492
PB 2 PG 41

WADE SHEPERD, ET AL
DB 362 PG 1096
PB 2 PG 41

BRADLEY W. JORDAN
DB 403 PG 2289

KENNETH TIMOTHY PARSONS
DB 232 PG 1915

WILEY AUSTIN BAKER
DB 215 PG 1510

675

680

-L- ST Sta. 679+85.77
BEARING AH = N 13° 14' 57.0" E

-L- POT Sta. 680+45.00

CS Sta. 677+05.77

MATCH LINE -L- STA. 672+00
SEE SHEET NO. 21

CLASS I RIPRAP
EST 11 TONS
EST FF 22 SY

CLASS I RIPRAP
EST 7 TONS
EST FF 15 SY

REMOVE DEBRIS
FROM EX 2G1

REMOVE EES

RETAIN

8" MONOLITHIC ISLAND

400' TAPER LT

2'-9" C&G

60' R

720' TAPER RT

925' TAPER LT & RT

2G1 w/NSG

24" RCP-III

JB w/MH

CLASS 'B' RIPRAP
EST 3 TONS
EST FF 6 SY

SPEC LAT 'V' DITCH
SEE DETAIL 8

DAYLIGHT DITCH AT
EDGE OF WETLANDS

-BL- D267

SITE 32

END TIP PROJECT R-2915D
-L- POT Sta. 679+90.00

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

S S DENOTES IMPACTS IN SURFACE WATER

DENOTES MECHANIZED CLEARING

LARRY D. BOOTH
DB 354 PG 733

LOWES HOME CENTERS, INC.
DB 358 PG 403
PB 6 PG 441

DETAIL 8
SPECIAL LATERAL 'V' DITCH
(Not to Scale)

Natural Ground — 2:1 — D — 4:1 or Flatter — Fill Slope

Min. D = 2 Ft.

FROM STA. 676+75 TO STA. 679+90 - L- RT

PI Sta 672+70.19
Δ = 20° 35' 52.2" (LT)
D = 2° 20' 19.0"
L = 880.77'
T = 445.19'
R = 2,450.00'
SE = .05
RUNOFF = SEE PLANS

PIs Sta 677+99.14
Θs = 3° 16' 26.6"
Ls = 280.00'
LT = 186.70'
ST = 93.36'

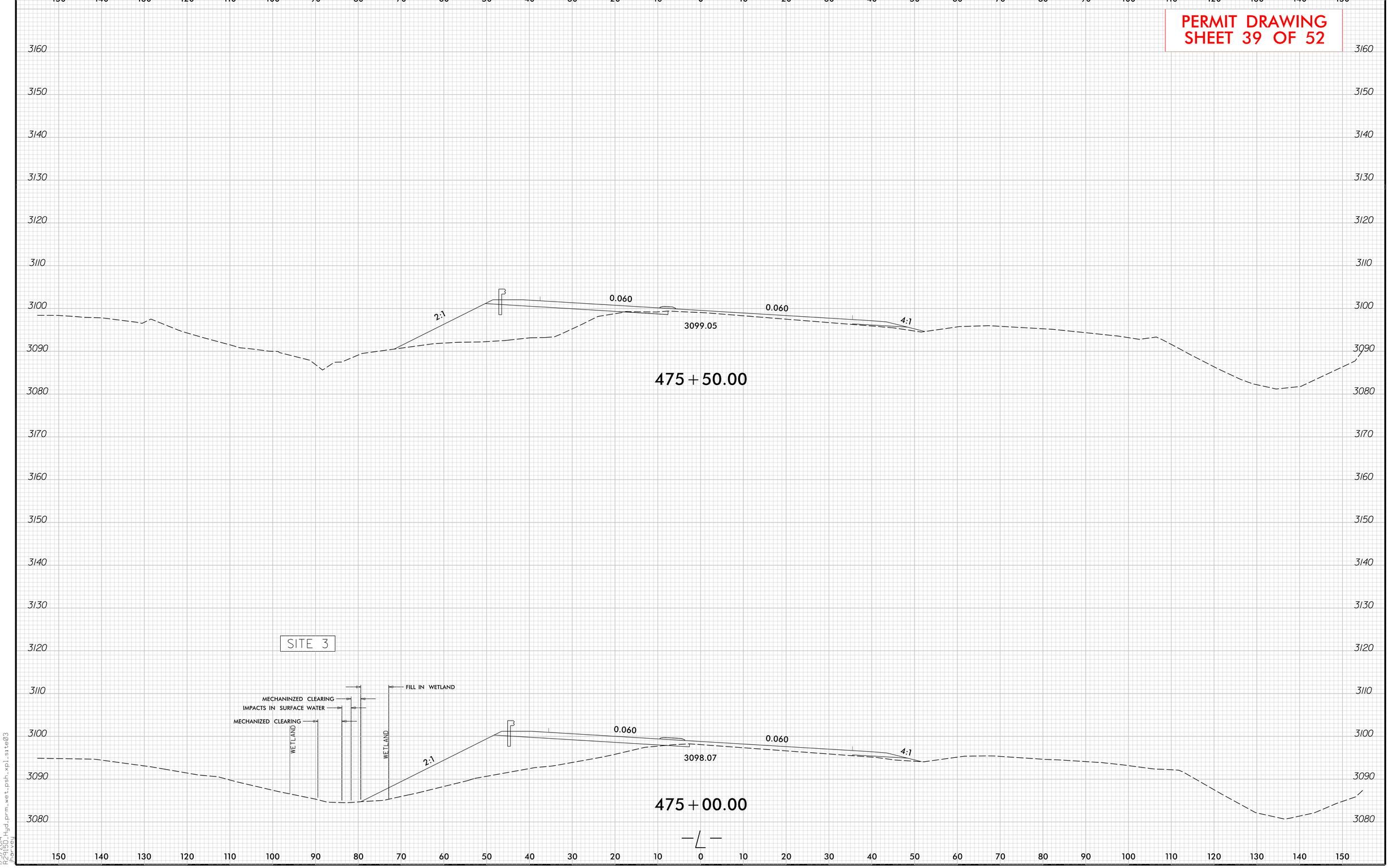
FOR -L- PROFILE, SEE SHEET 33

5/8/2014
R:\DGNDATASRV02\NewData\ProjectList\12201101\R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_22_con.dgn

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-21

0 5 10

PERMIT DRAWING
SHEET 39 OF 52

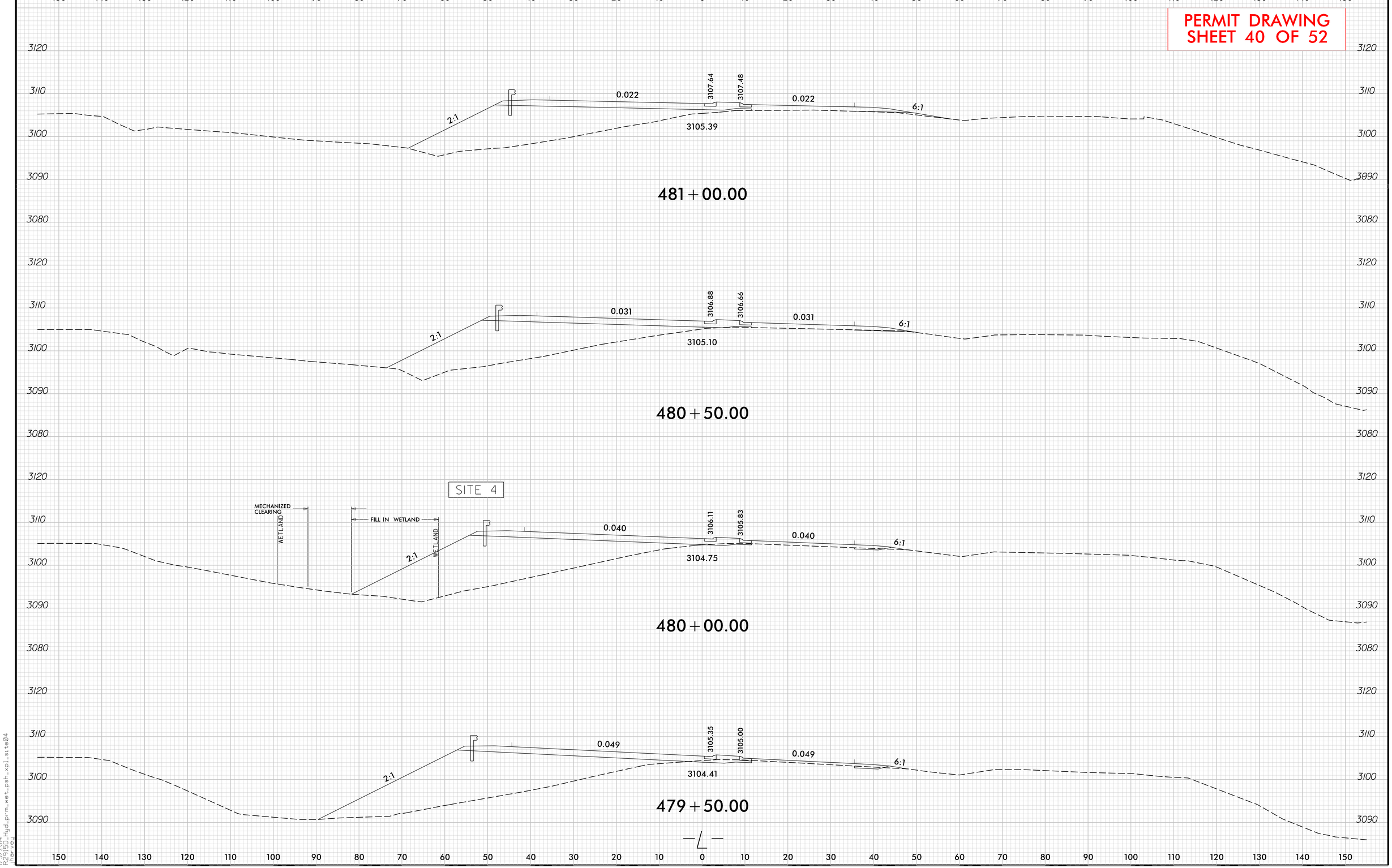


8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site03
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-24

PERMIT DRAWING
SHEET 40 OF 52

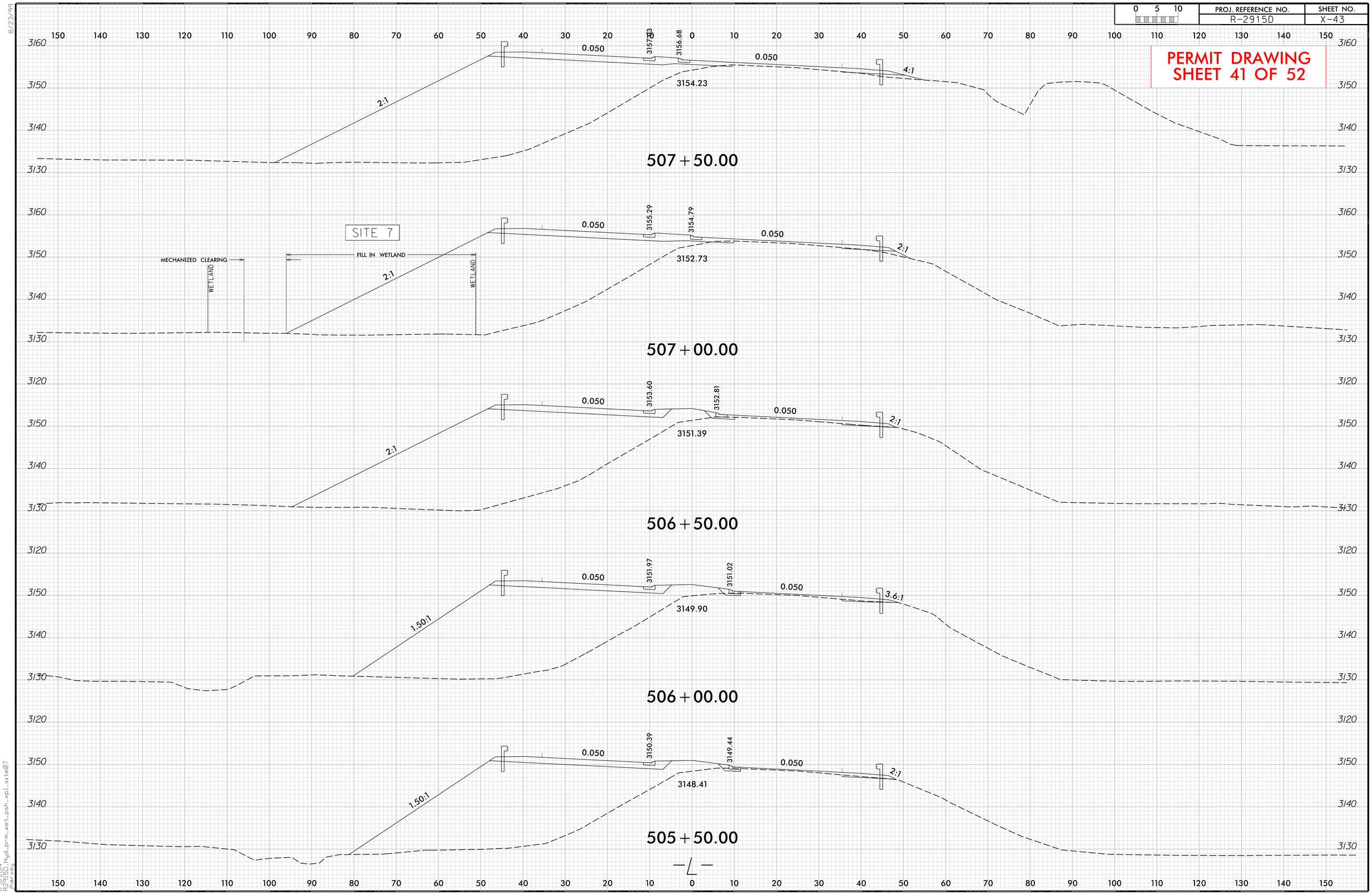


8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site04
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-43

PERMIT DRAWING
SHEET 41 OF 52

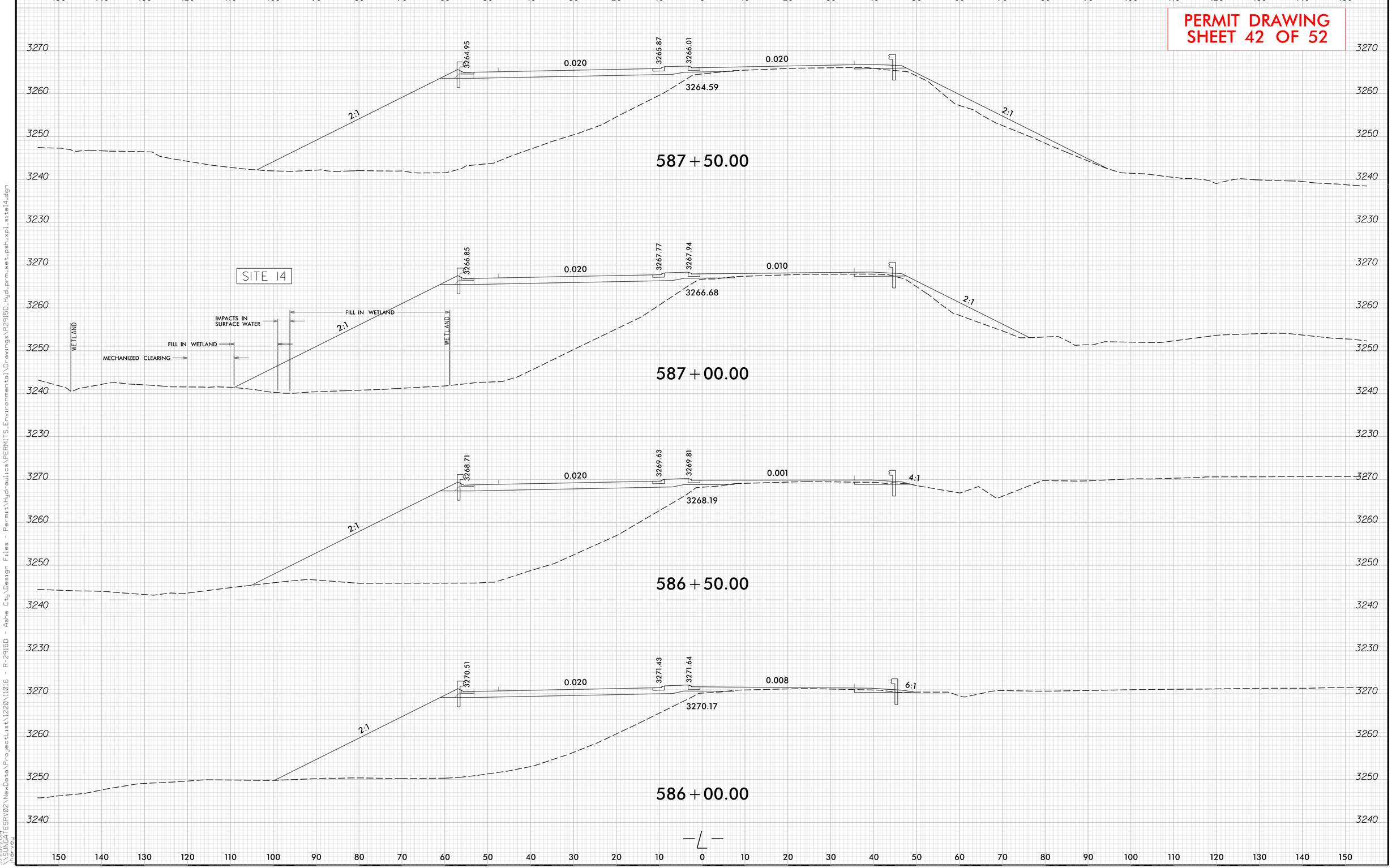


8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site07
jharvey

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915D	X-114

PERMIT DRAWING
SHEET 42 OF 52



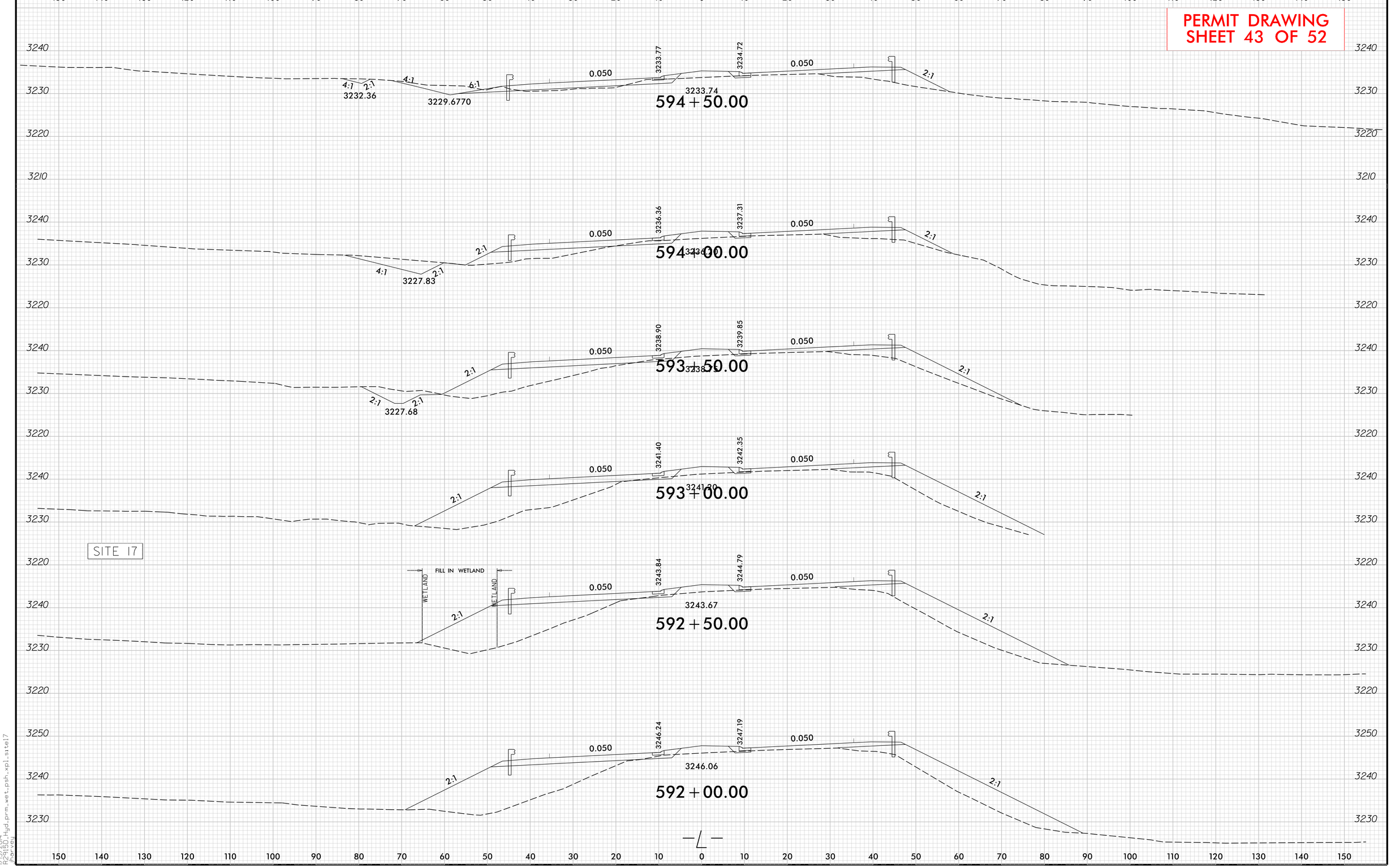
8/23/99

3/28/2014
S:\GNGATESRV02\NewData\ProjectList\1220\11016 - R-2915D - Ashe Cty\Design Files - Permit\Hydraulics\PERMITS_Environmental\Drawings\R2915D_Hyd_prm_wet_psh_xpl_site14.dgn
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-117

0 5 10

PERMIT DRAWING
SHEET 43 OF 52



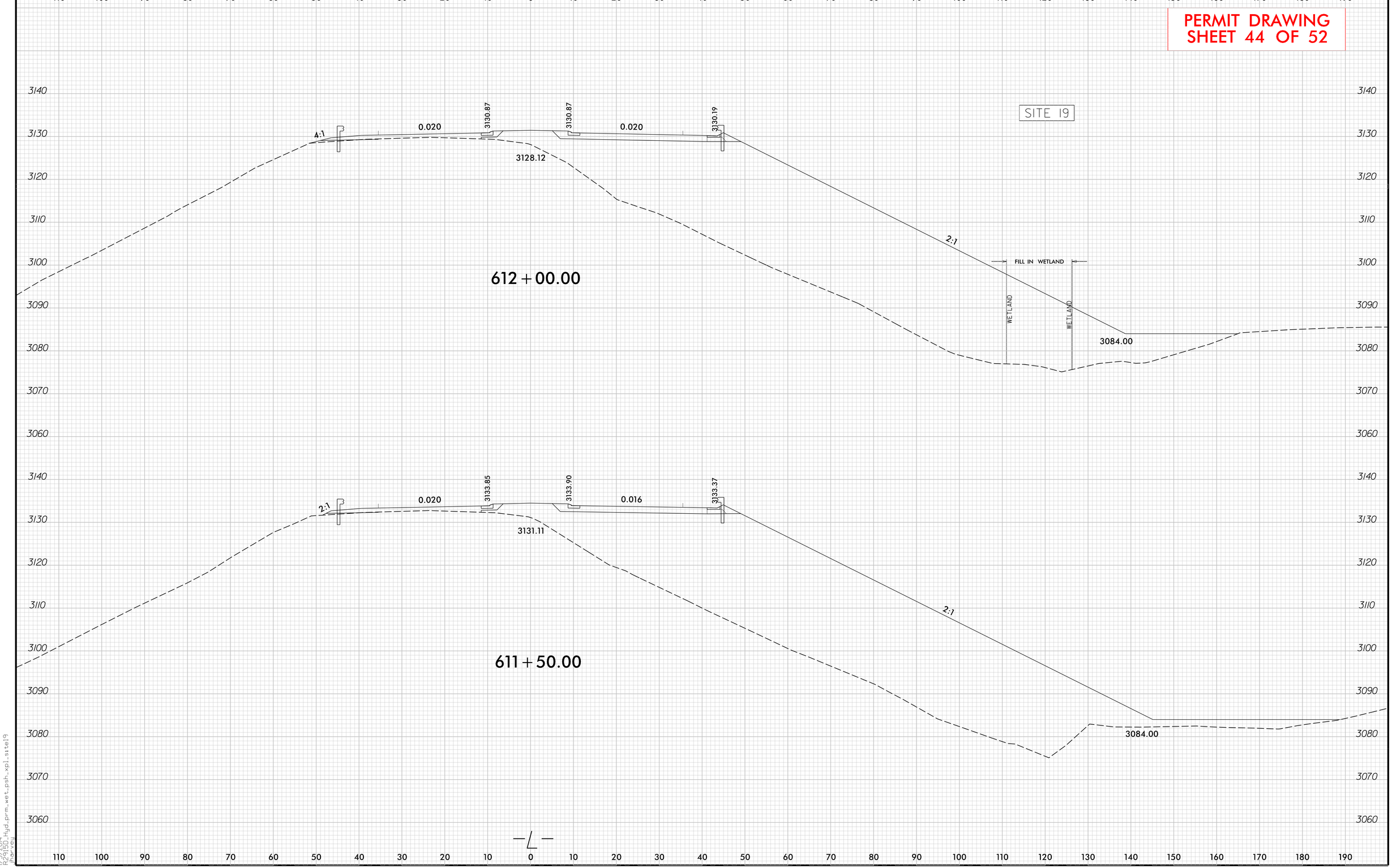
8/23/99

1/15/2014
R2915D_Hyd_prm_wet_psh_xpl_site17
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-132

0 5 10

PERMIT DRAWING
SHEET 44 OF 52



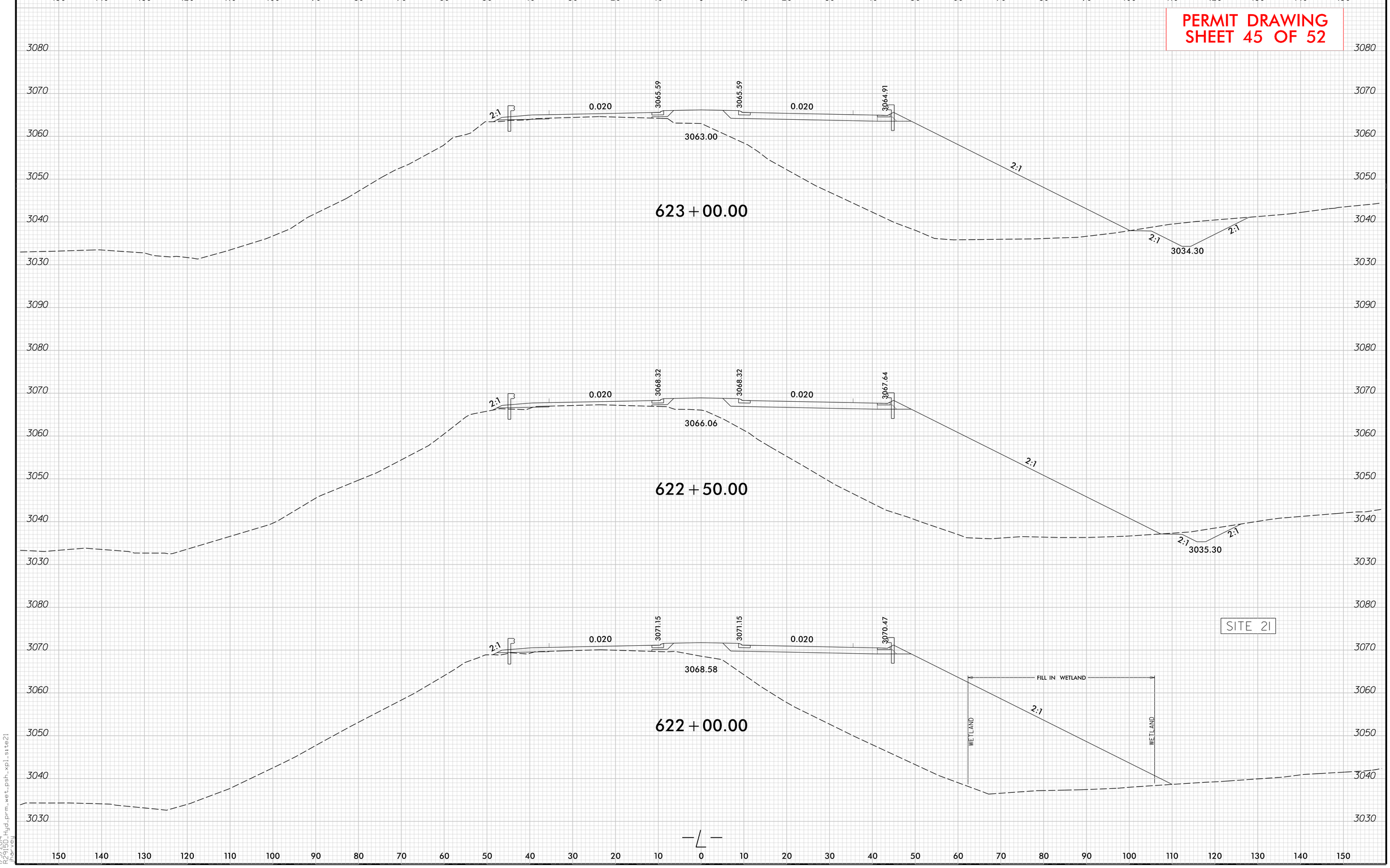
8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site19
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-141

0 5 10

PERMIT DRAWING
SHEET 45 OF 52



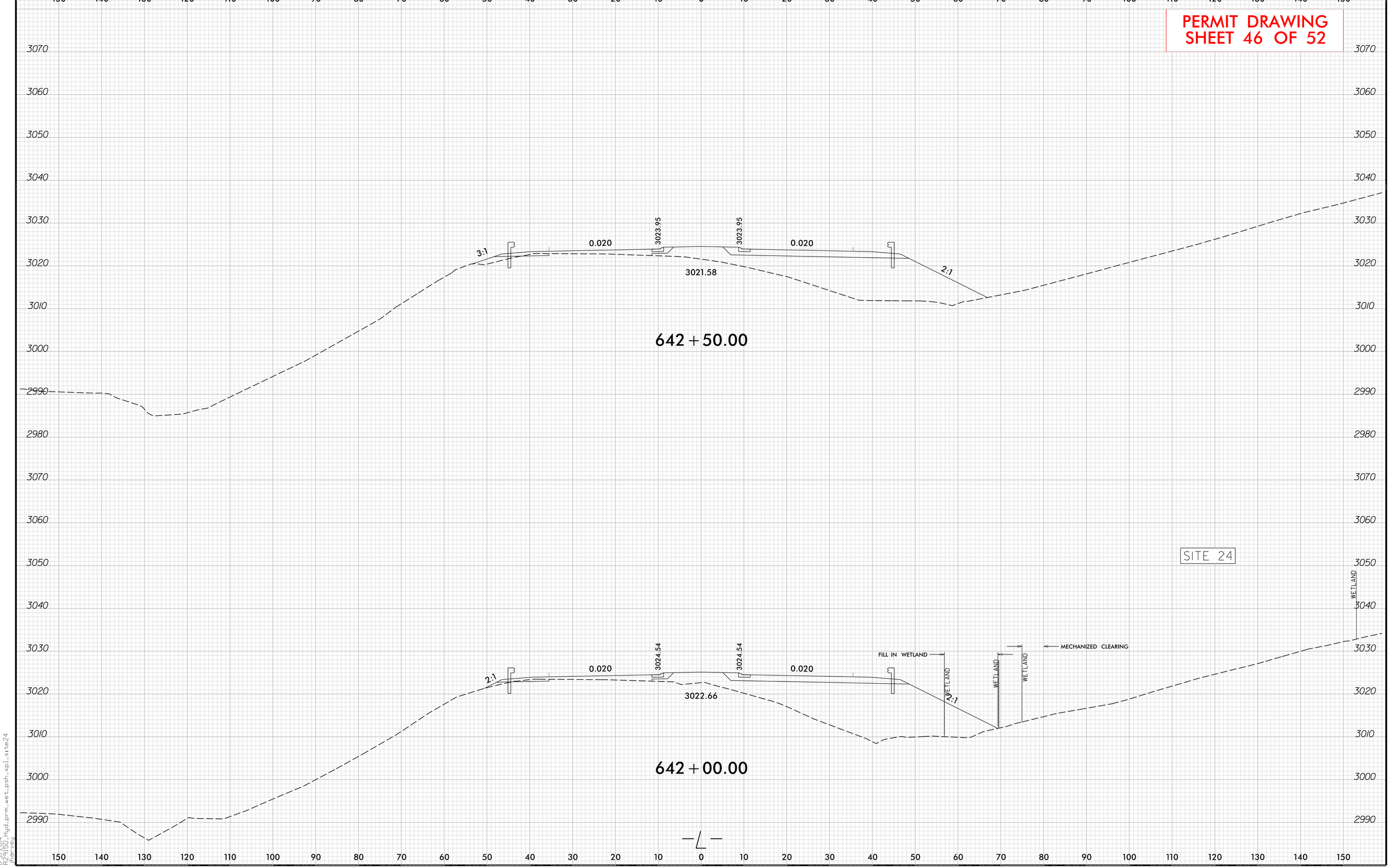
8/23/99

1/3/2014
R2915D Hyd_prm_wet_psh_xpl_site21
jharvey

PROJ. REFERENCE NO.	SHEET NO.
R-2915D	X-162

0 5 10

PERMIT DRAWING
SHEET 46 OF 52

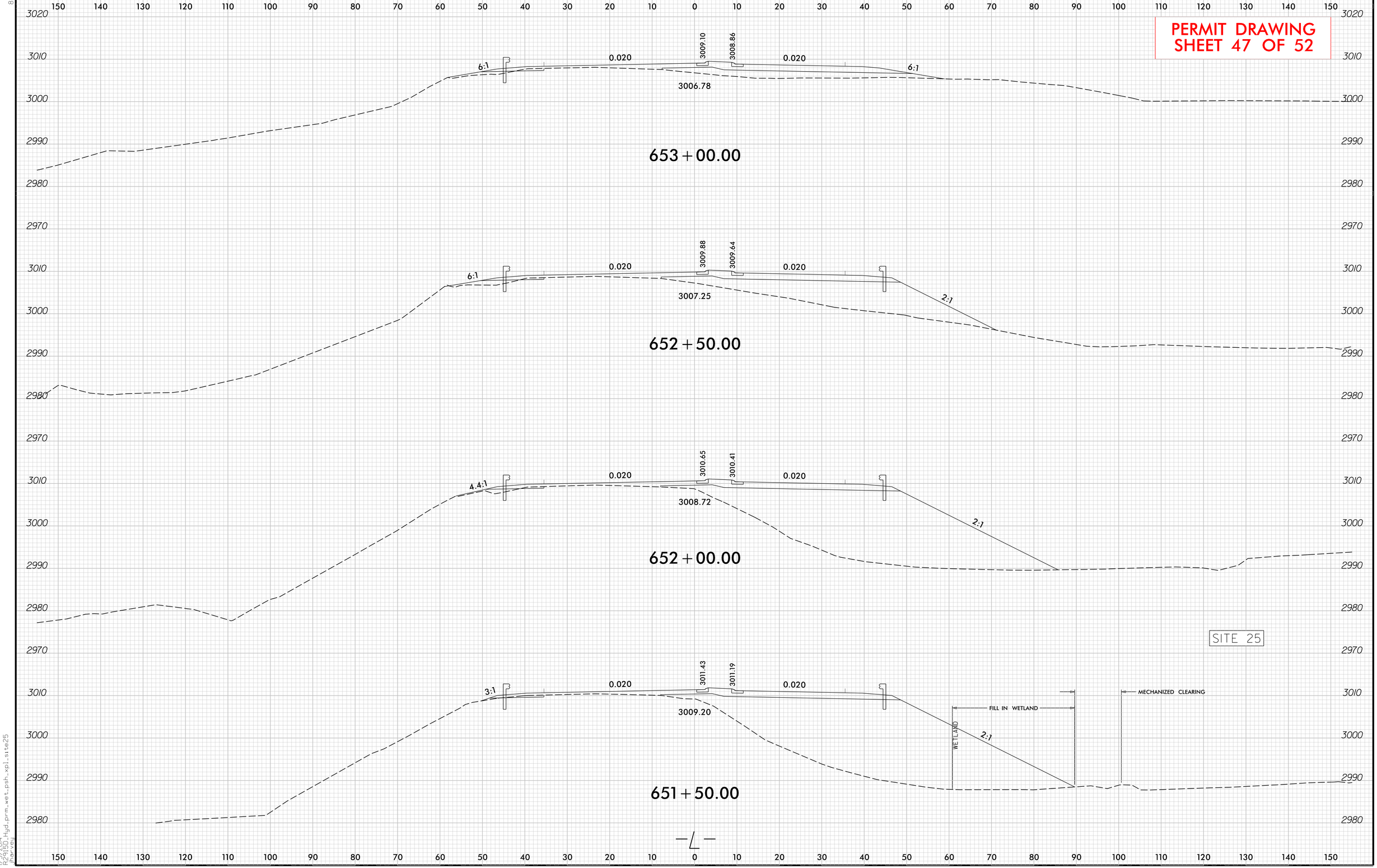


8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site24
jharvey

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915D	X-170

PERMIT DRAWING
SHEET 47 OF 52

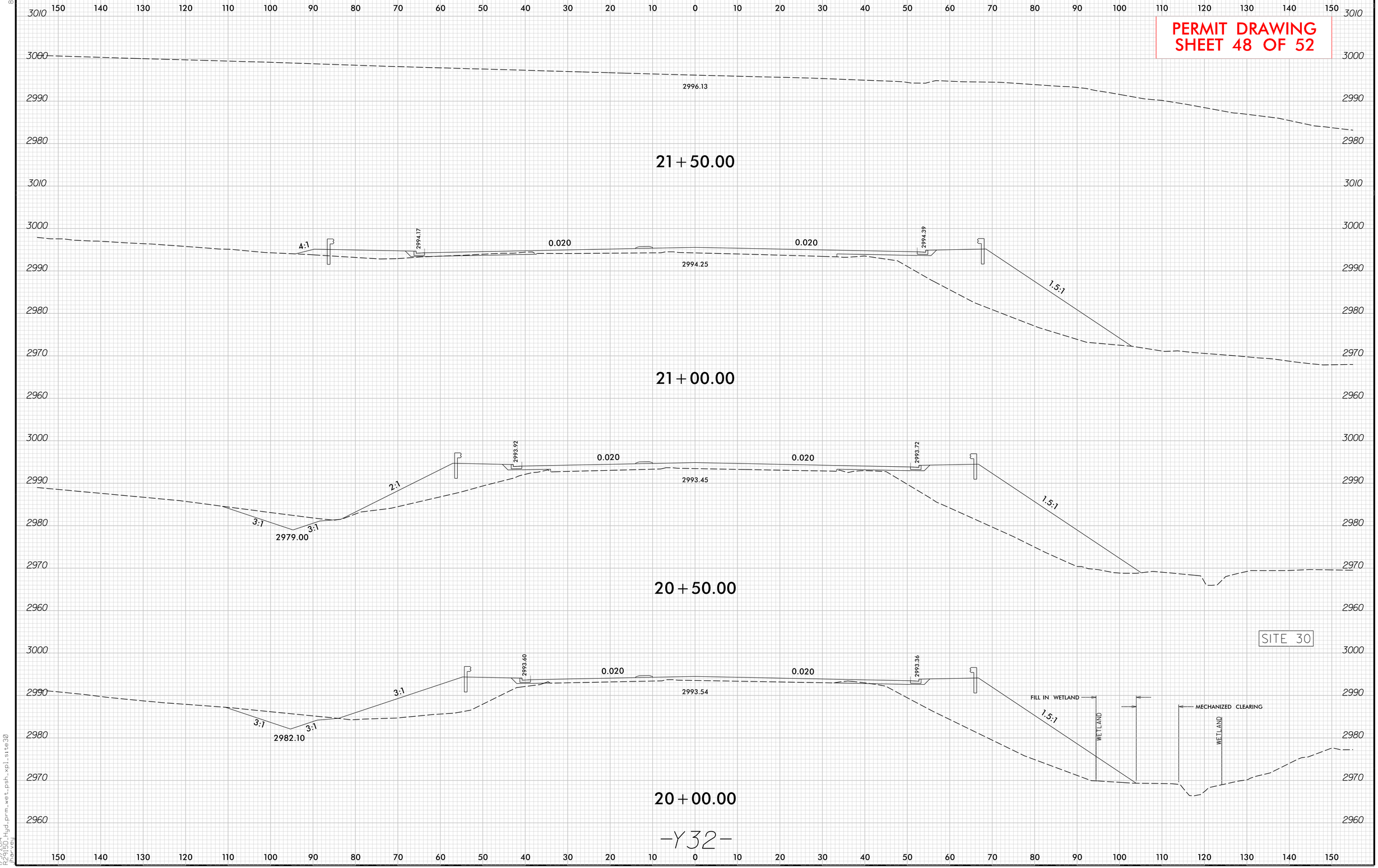


8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site25
jharvey

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915D	X-207

PERMIT DRAWING
SHEET 48 OF 52



-Y32-

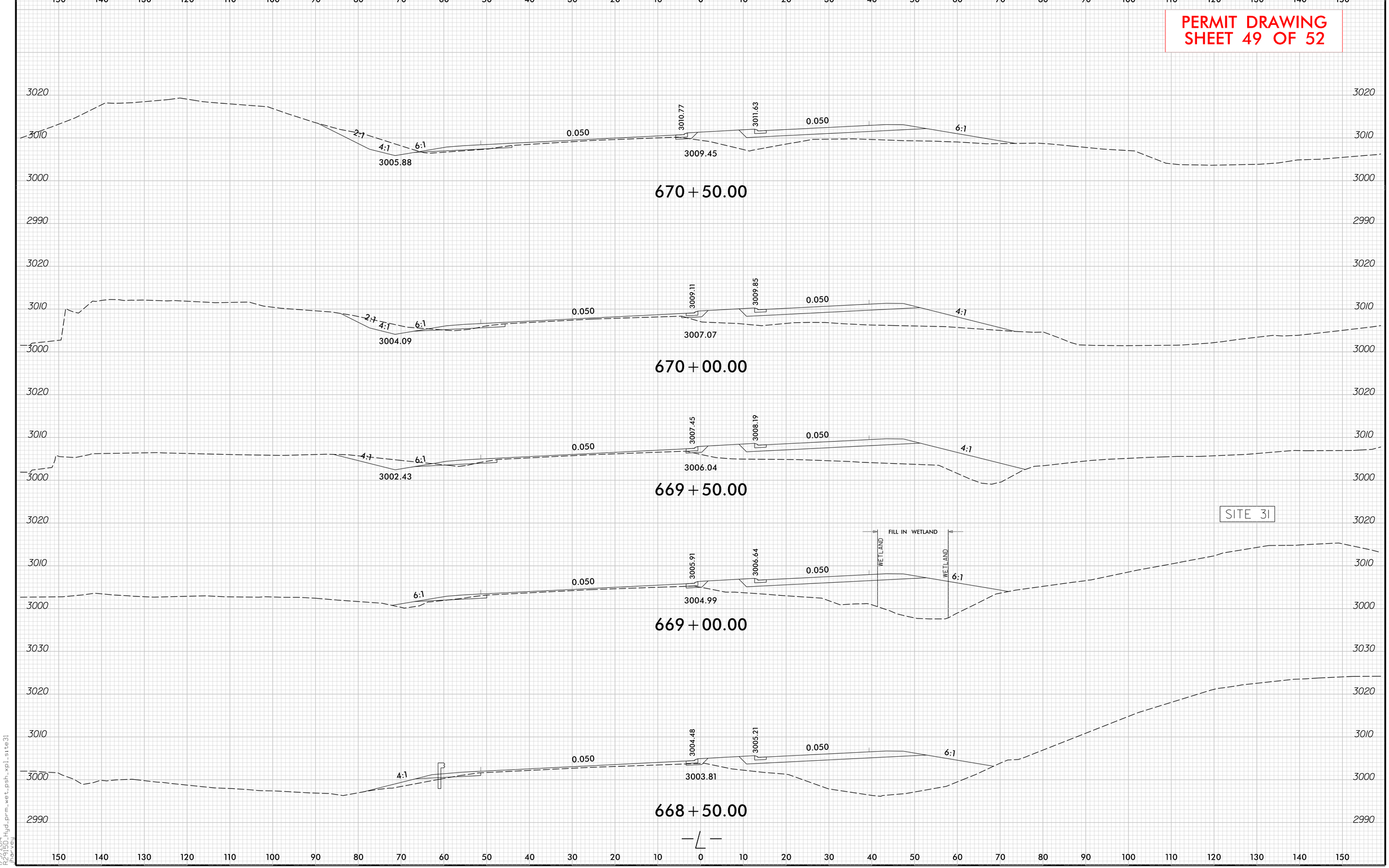
8/23/99

1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site30
jharvey

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915D	X-181

PERMIT DRAWING
SHEET 49 OF 52

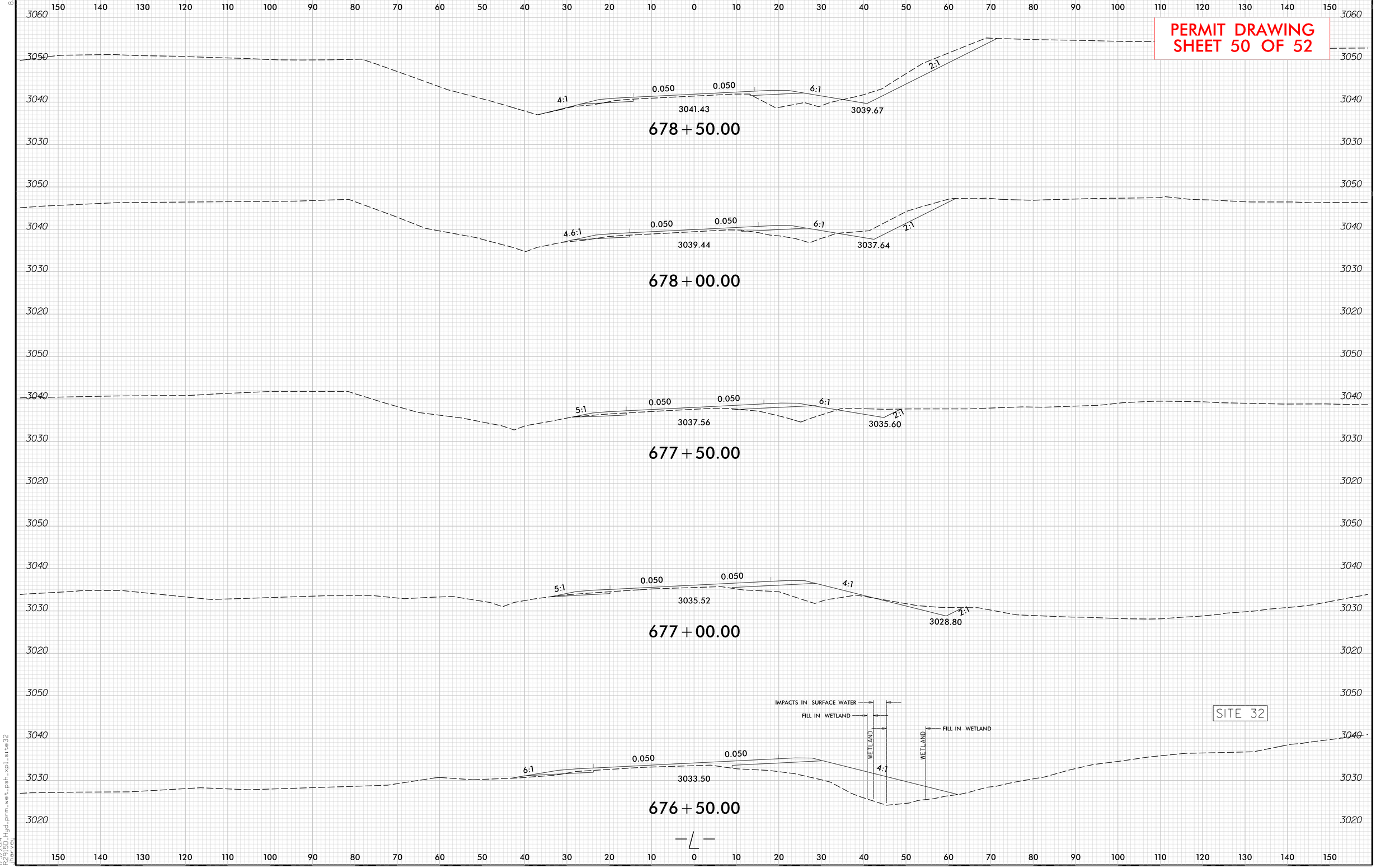


1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site31
jharvey

8/23/99

0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	R-2915D	X-185

PERMIT DRAWING
SHEET 50 OF 52



1/3/2014
R2915D_Hyd_prm_wet_psh_xpl_site32
jharvey

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	21+40-23+21-TIE-L-R	ROAD FILL						0.02	< 0.01	312	46	
2	25+56 -TIE- R	ROAD FILL	< 0.01									
3A	474+48-474+65 -L- L	ROAD FILL						< 0.01		60		
3B	474+65-475+42 -L- L	ROAD FILL	< 0.01		< 0.01	0.02		< 0.01	< 0.01	56	73	
4	477+62-480+95 -L- L	ROAD FILL	0.10			0.04			< 0.01		19	
5	482+68-483+36 -L- L	ROAD FILL						0.01		57		
		STREAMBANK STABILIZATION						< 0.01		19		
6	504+48 -L-	ROAD FILL						0.05		120		
		STREAMBANK STABILIZATION						< 0.01	< 0.01	48	25	
7	505+57-508+66 -L- L	ROAD FILL	0.25			0.05						
8	522+90-L- R	STREAMBANK STABILIZATION						< 0.01		15		
9	536+74-538+06 -L- L	ROAD FILL						0.03	< 0.01	126	22	
10	540+58-544+48 -L- L	ROAD FILL						0.18		396		
11	544+82 -L- R	STREAMBANK STABILIZATION						< 0.01		11		
12	564+82 -L- R	ROAD FILL						< 0.01	< 0.01	51	11	
13	577+76 -L- L	ROAD FILL	< 0.01		< 0.01							
14	587+50 -L-	ROAD FILL	0.03		< 0.01	0.01		< 0.01	< 0.01	162	14	
15	588+39-589+14 -L- R	ROAD FILL	< 0.01			0.02		< 0.01		12		
16	591+57 -L- R	ROAD FILL				< 0.01						
17A	591+38-594+35 -L- L	ROAD FILL	0.06			0.01		< 0.01	< 0.01	28	23	
17B	594+07 -L- R	RIP RAP						< 0.01		12		
18	606+30-610+13 -L- R	ROAD FILL						0.01		491		
19	610+14-613+04 -L- R	ROAD FILL	0.07			< 0.01		< 0.01	< 0.01	100	12	
SUBTOTALS*:			0.55		< 0.01	0.15		0.35	0.02	2076	245	

*Rounded totals are sum of actual impacts

NOTES:
* SITE 4 - ADDITIONAL 0.04 ACRE ACCOUNTED FOR AS FILL IS ADDED DUE TO TOTAL TAKE OF WETLAND

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5-6-2014
R-2915D ASHE COUNTY
ON US 221 FROM SOUTH OF NC 194
TO US 221 BYPASS

ATN Revised 3/12/13

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
20A	618+68-619+57 -L- R	ROAD FILL						< 0.01	< 0.01	55	18	
20B	618+68-619+57 -L- R	ROAD FILL	< 0.01			< 0.01		< 0.01	< 0.01	57	11	
21	619+82-622+86 -L- R	ROAD FILL	0.17		< 0.01			< 0.01	< 0.01	49	17	
22	624+24 -L- R	ROAD FILL	< 0.01			< 0.01		< 0.01		61		
23A	628+44-628+98 -L-	ROAD FILL						< 0.01		19		
23B	628+44-628+98 -L-	ROAD FILL						< 0.01	< 0.01	66	15	
24	641+42-642+18-L- R	ROAD FILL	< 0.01			0.01		< 0.01	< 0.01	22	10	
25	650+46-652+40-L- R	ROAD FILL	0.11			0.05		< 0.01		12		
26	659+63-661+42 -L-	CULVERT						0.03	0.01	75	22	
		STREAMBANK STABILIZATION						< 0.01	< 0.01	33	26	
27	651+61-653+98 -L- R	ROAD FILL	0.04			< 0.01		0.01		134		
28	652+08-653+11-L- L	ROAD FILL	< 0.01			0.02						
29	653+75-654+35-L- L	CHANNEL						0.01		69		
30	17+86-2085-Y32- R	ROAD FILL	0.04			0.06						
31	667+52-670+07-L- R	ROAD FILL	0.06			< 0.01						
32	676+39-676+92-L- R	ROAD FILL	0.02			< 0.01		< 0.01	< 0.01	25	19	
SUBTOTALS*:			0.46		< 0.01	0.15		0.08	0.03	677	138	
SUBTOTALS FROM PAGE 1*:			0.55		< 0.01	0.15		0.35	0.02	2076	245	
TOTALS*:			1.01		0.01	0.30		0.43	0.05	2753	383	

*Rounded totals are sum of actual impacts

NOTES:
* SITE 21 TOTAL TAKE OF WETLAND = 0.18 Acre

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
5-6-2014
R-2915D ASHE COUNTY
ON US 221 FROM SOUTH OF NC 194
TO US 221 BYPASS

ATN Revised 3/12/13

09/08/99

TIP PROJECT: R-2915E

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915E	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION

PERMIT DRAWING
SHEET 1 OF 16

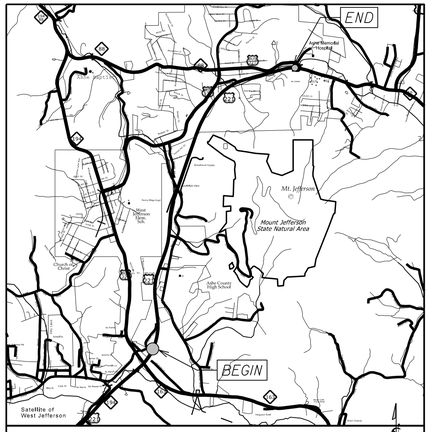
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

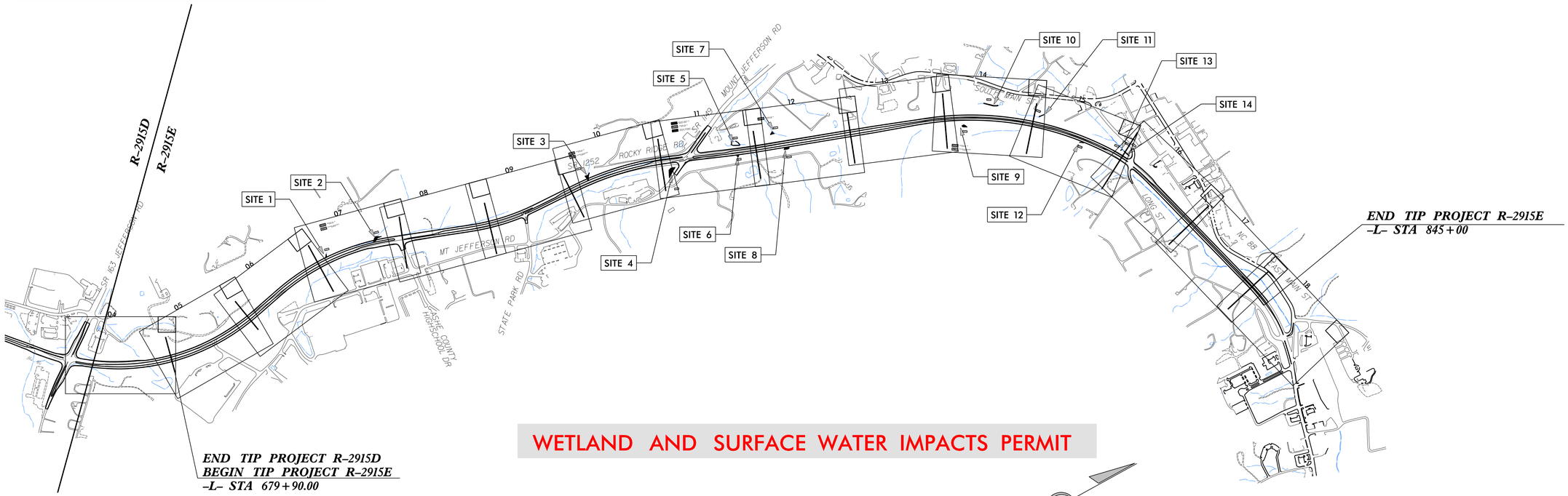
LOCATION: US 221 FROM NC 163 TO US 221 BUS

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB AND GUTTER, SIGNALS, BRIDGE AND CULVERT

See Sheet 1-A For Index of Sheets



VICINITY MAP



WETLAND AND SURFACE WATER IMPACTS PERMIT

THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF WEST JEFFERSON.

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

0
PROFILE (HORIZONTAL)

0
PROFILE (VERTICAL)

DESIGN DATA

ADT =
ADT =
DHV = %
D = %
T = % *
V = MPH
* TTST = DUAL
FUNC CLASS =

TIER

PROJECT LENGTH

Prepared in the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

PROJECT ENGINEER

PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

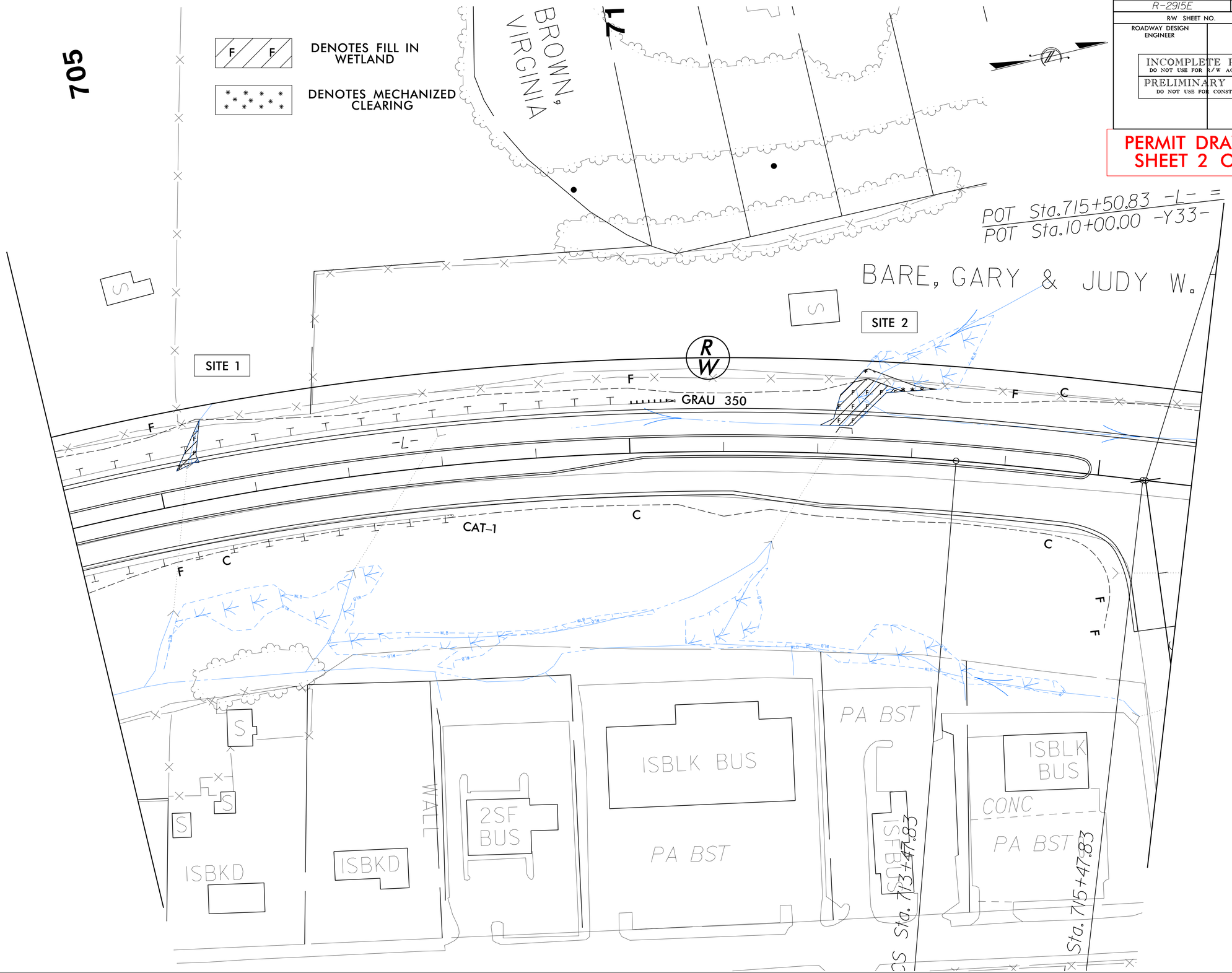
1/3/2014
R2915E_Hyd_prm_wet_psh_01
jnarvey

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 2 OF 16



REVISIONS

8/17/99

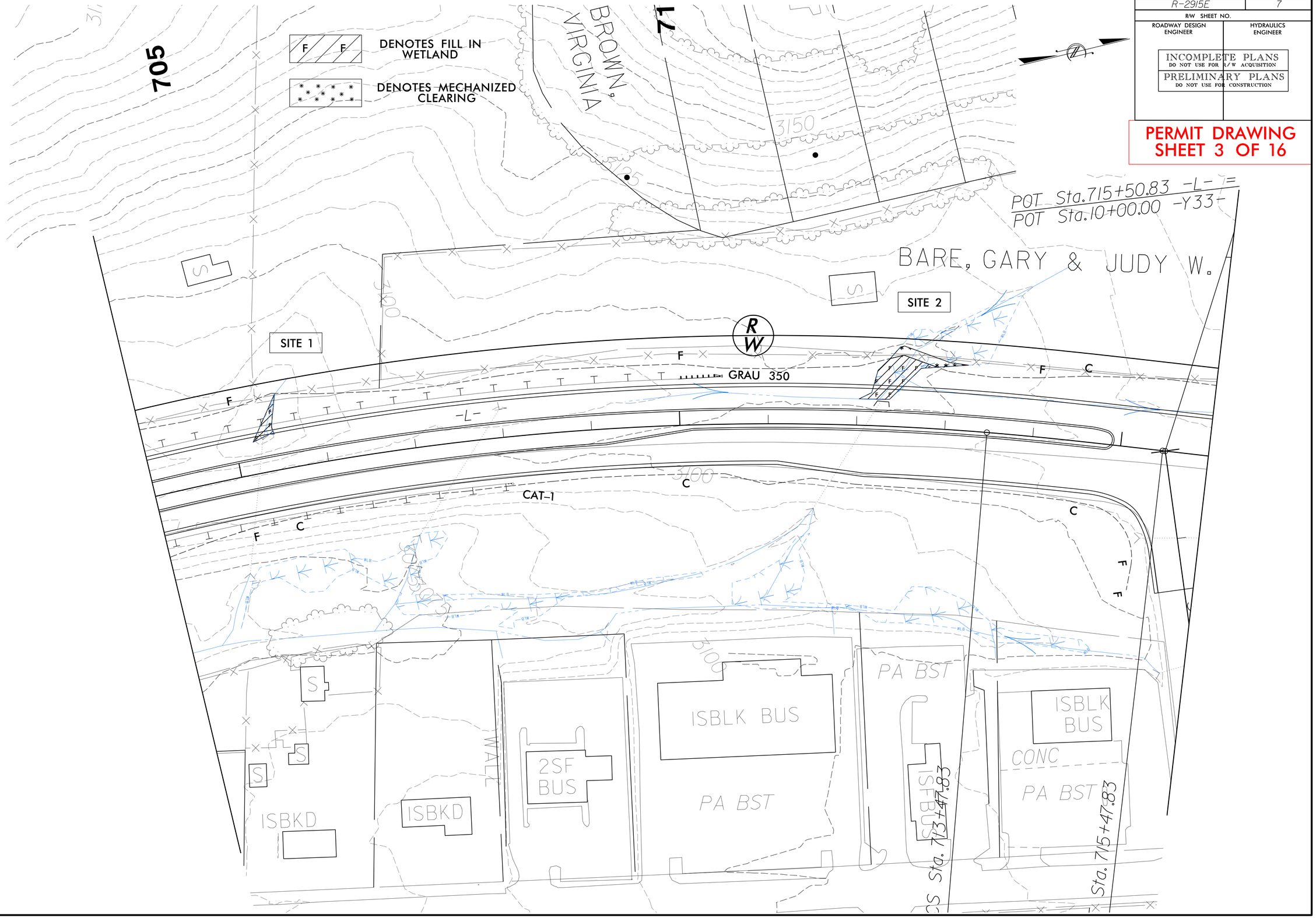
1/3/2014
R2915E_Hyd_prm_wet_psh_07
hbryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 3 OF 16



REVISIONS

8/17/99

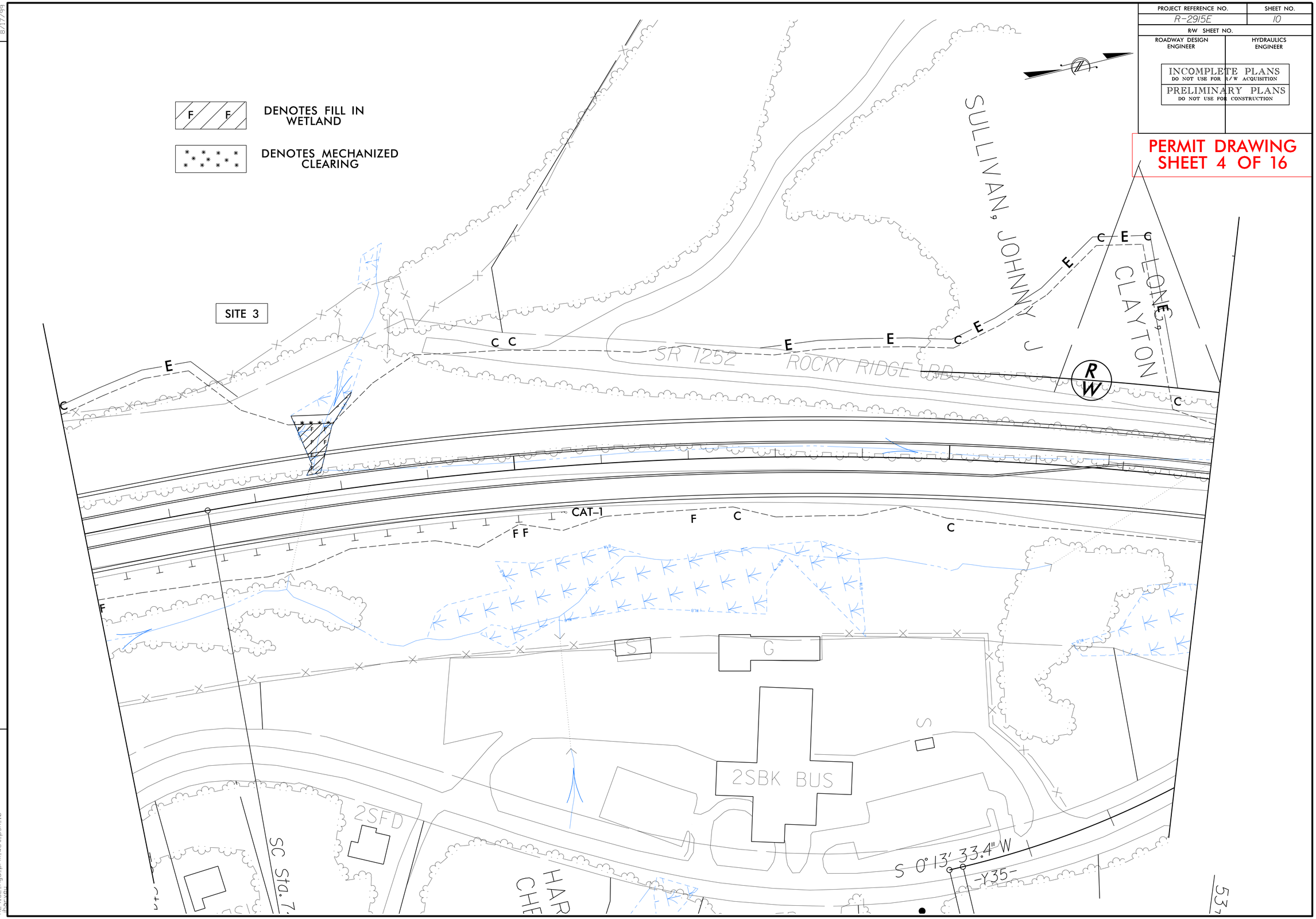
1/3/2014
R2915E_Hyd_prm_wet_psh_07.con
hbryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 4 OF 16

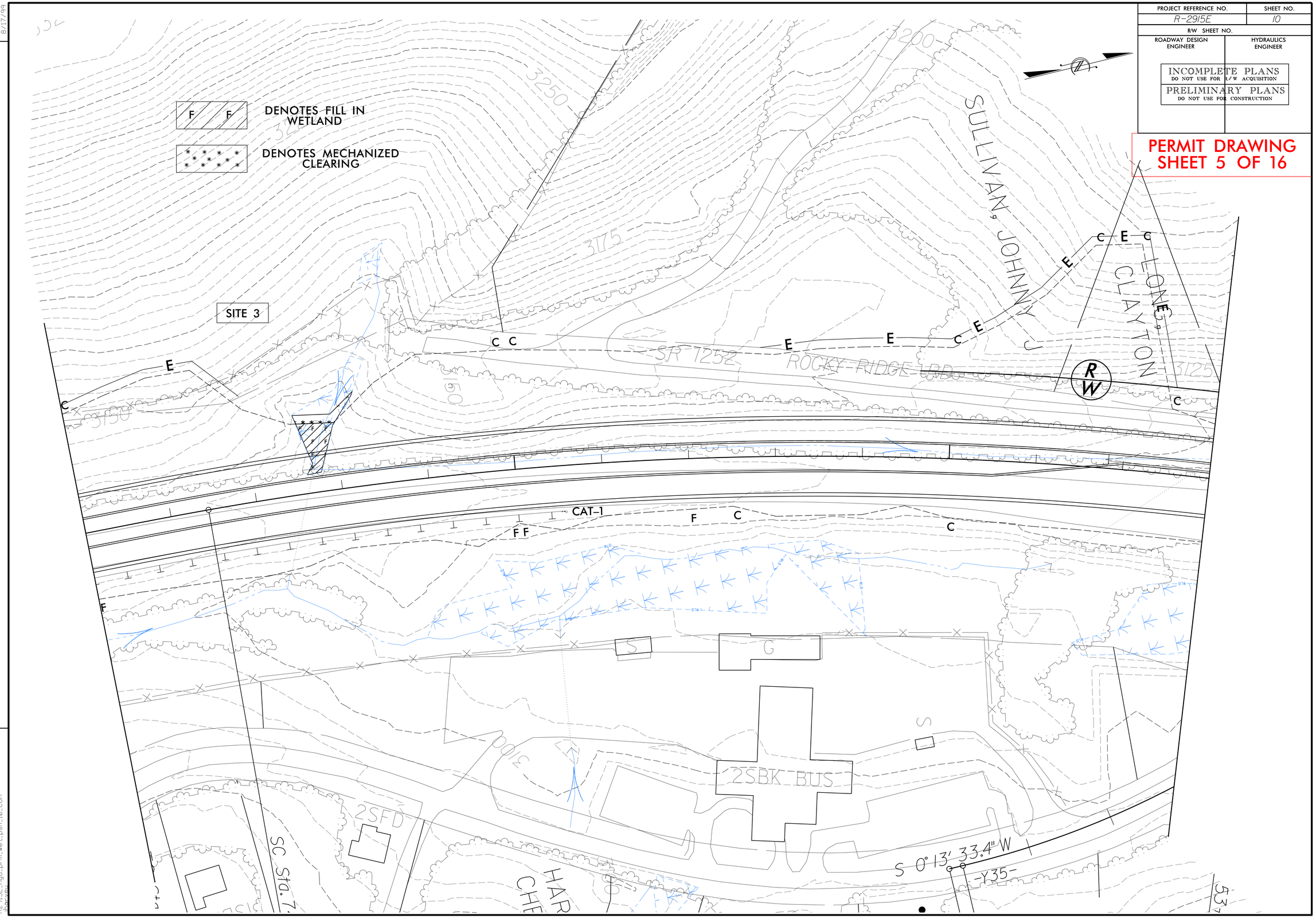


PROJECT REFERENCE NO.	SHEET NO.
R-2915E	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 5 OF 16



REVISIONS

8/17/99

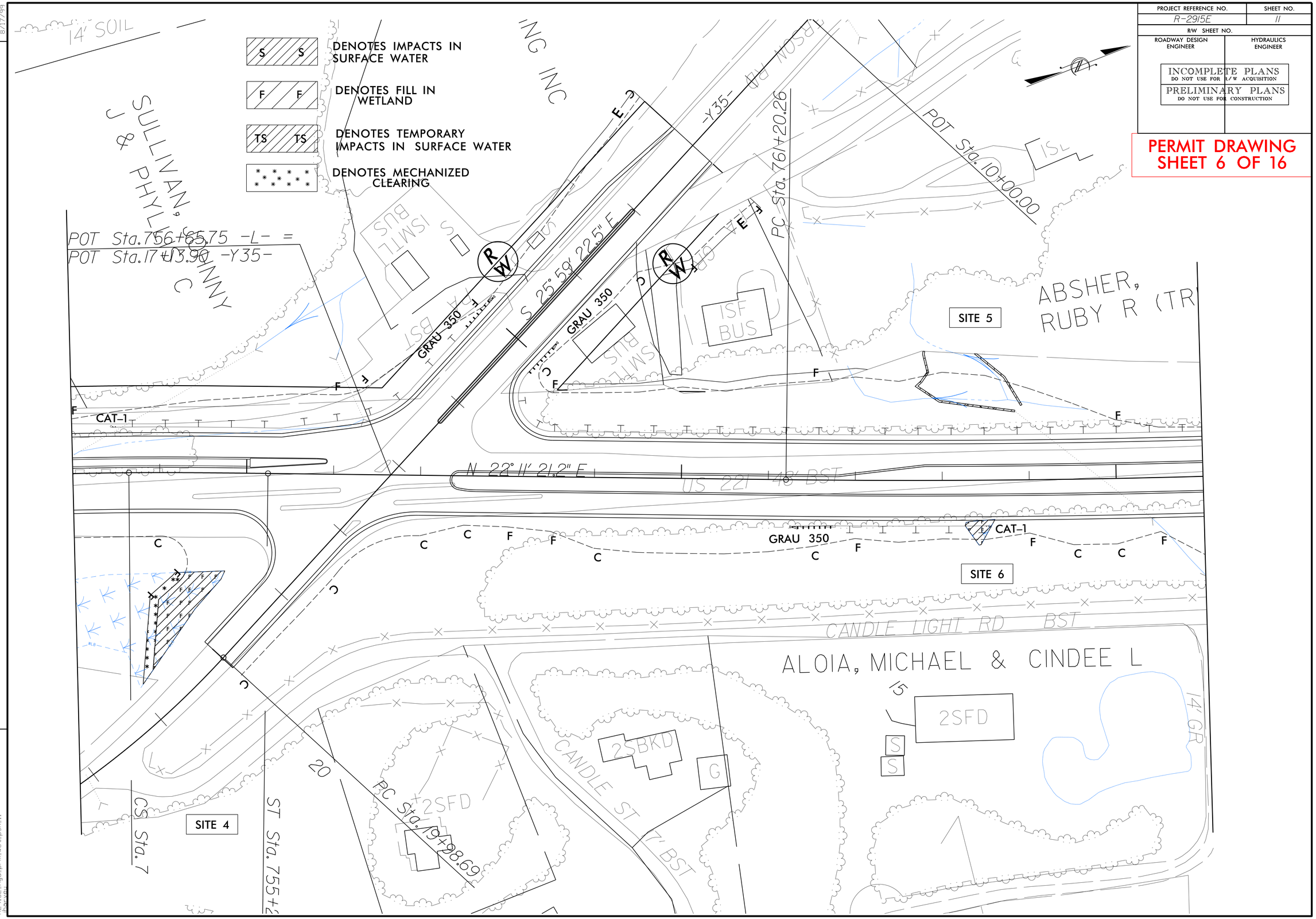
1/3/2014
R2915E_Hyd_prm_wet_psh_10.con
jbarnes

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 6 OF 16



REVISIONS

8/17/99

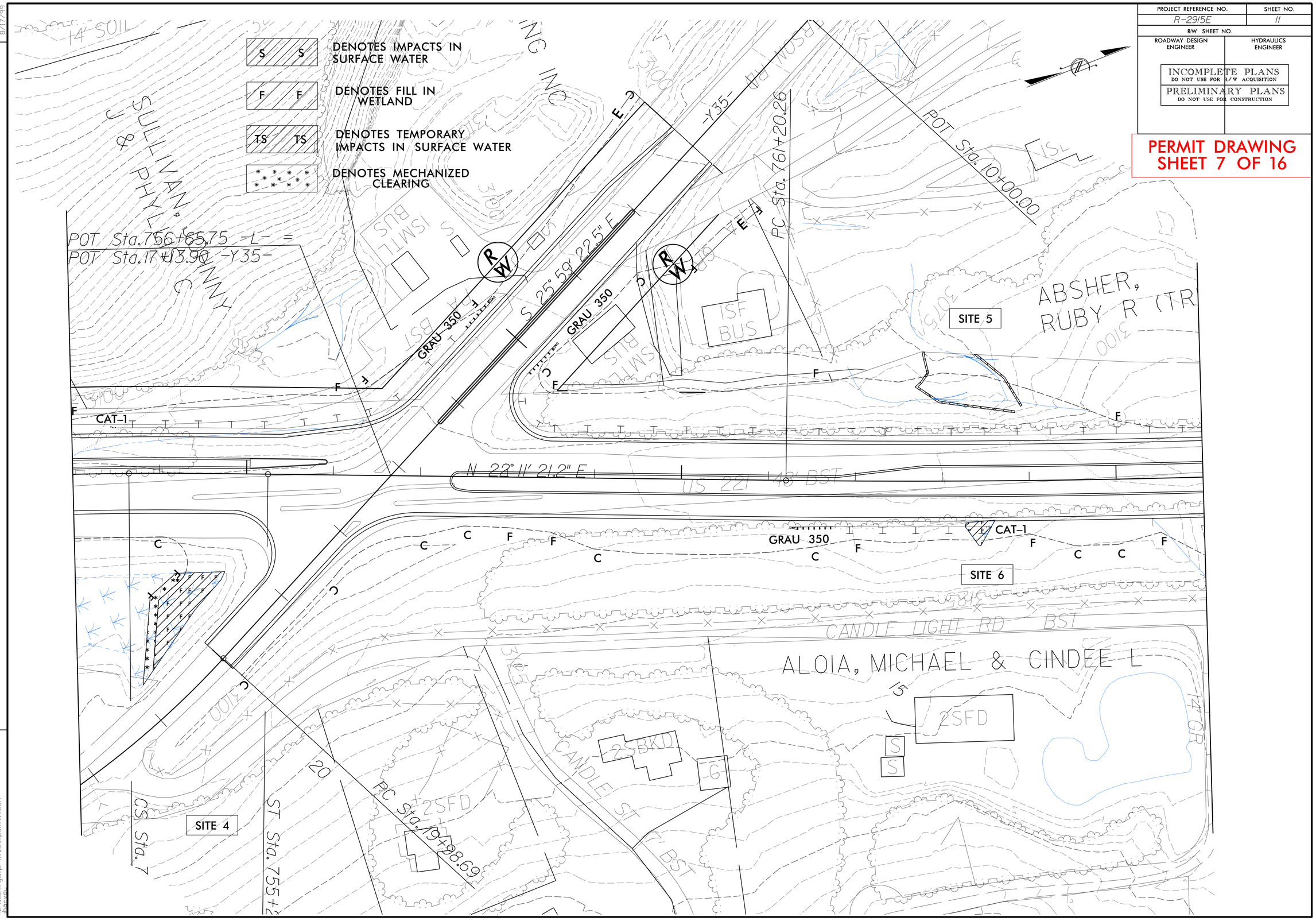
1/3/2014
R2915E_Hyd_prm_wet_psh_11
bpr_ven

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 7 OF 16



REVISIONS

8/17/99

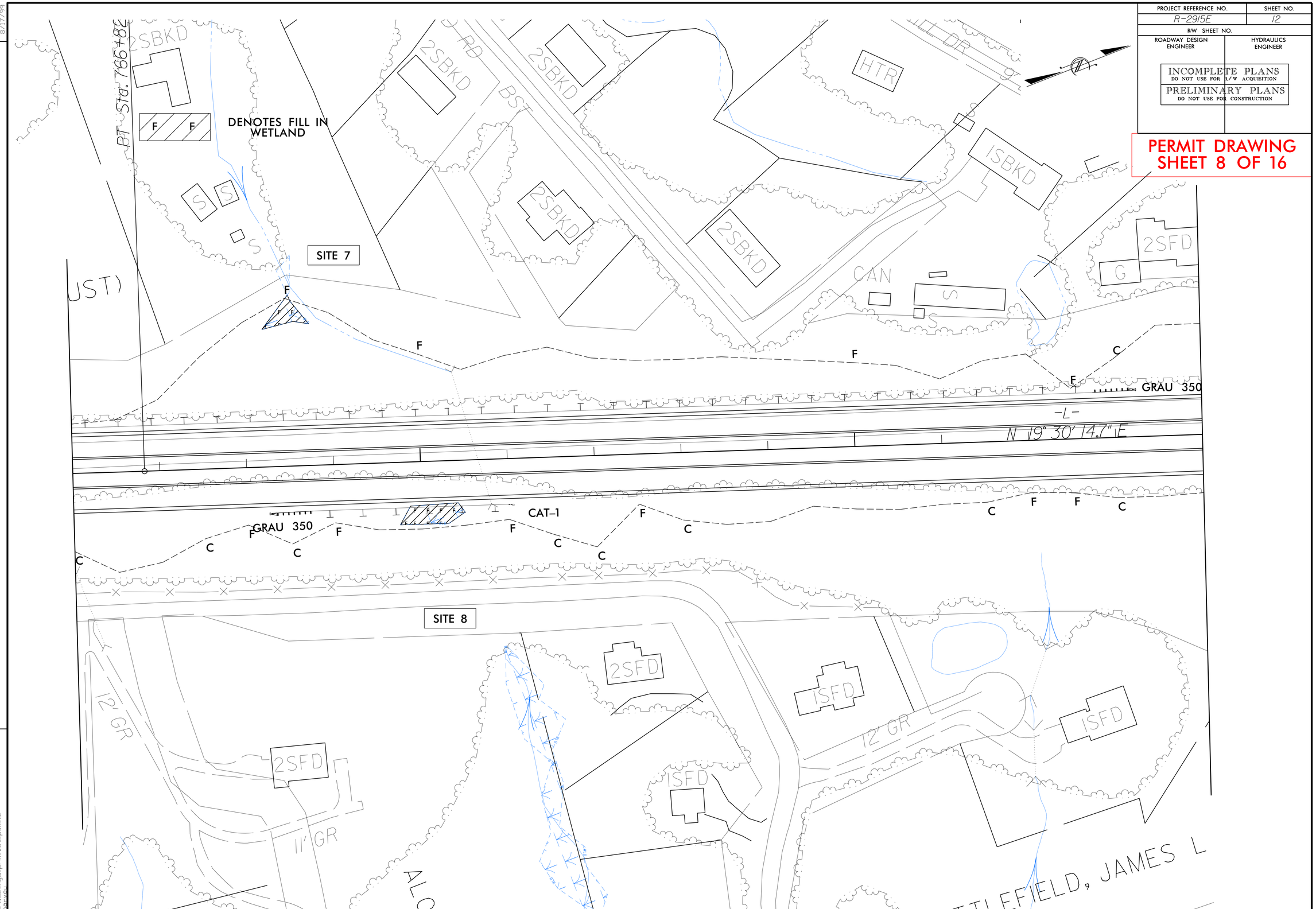
1/3/2014
R2915E_Hyd_prm_wet_psh_11.con
bpriyu

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 8 OF 16



REVISIONS

8/17/99

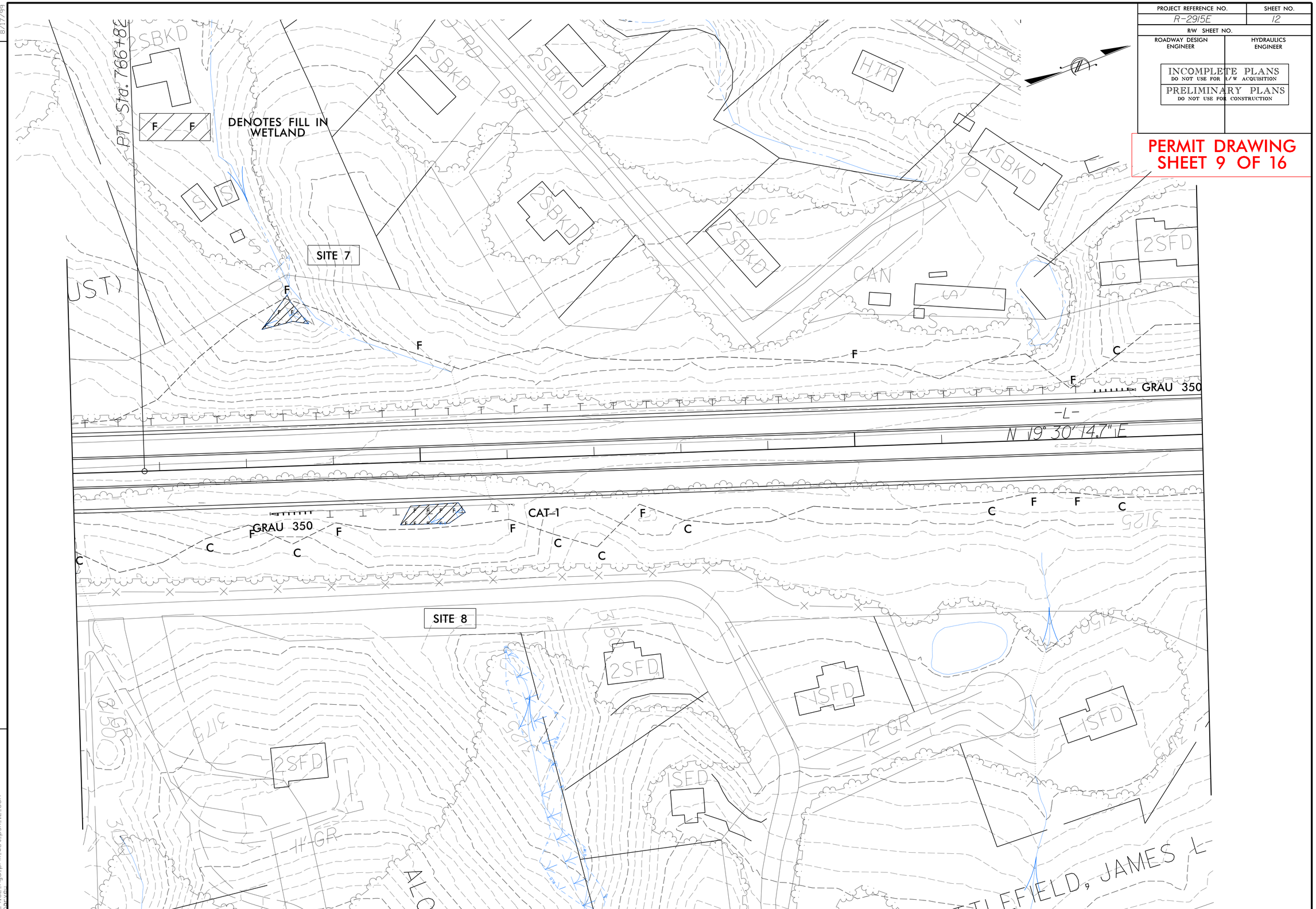
1/3/2014
R-2915E_Hyd_prm_wet_psh_12
(hpriver)

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 9 OF 16



REVISIONS

8/17/99

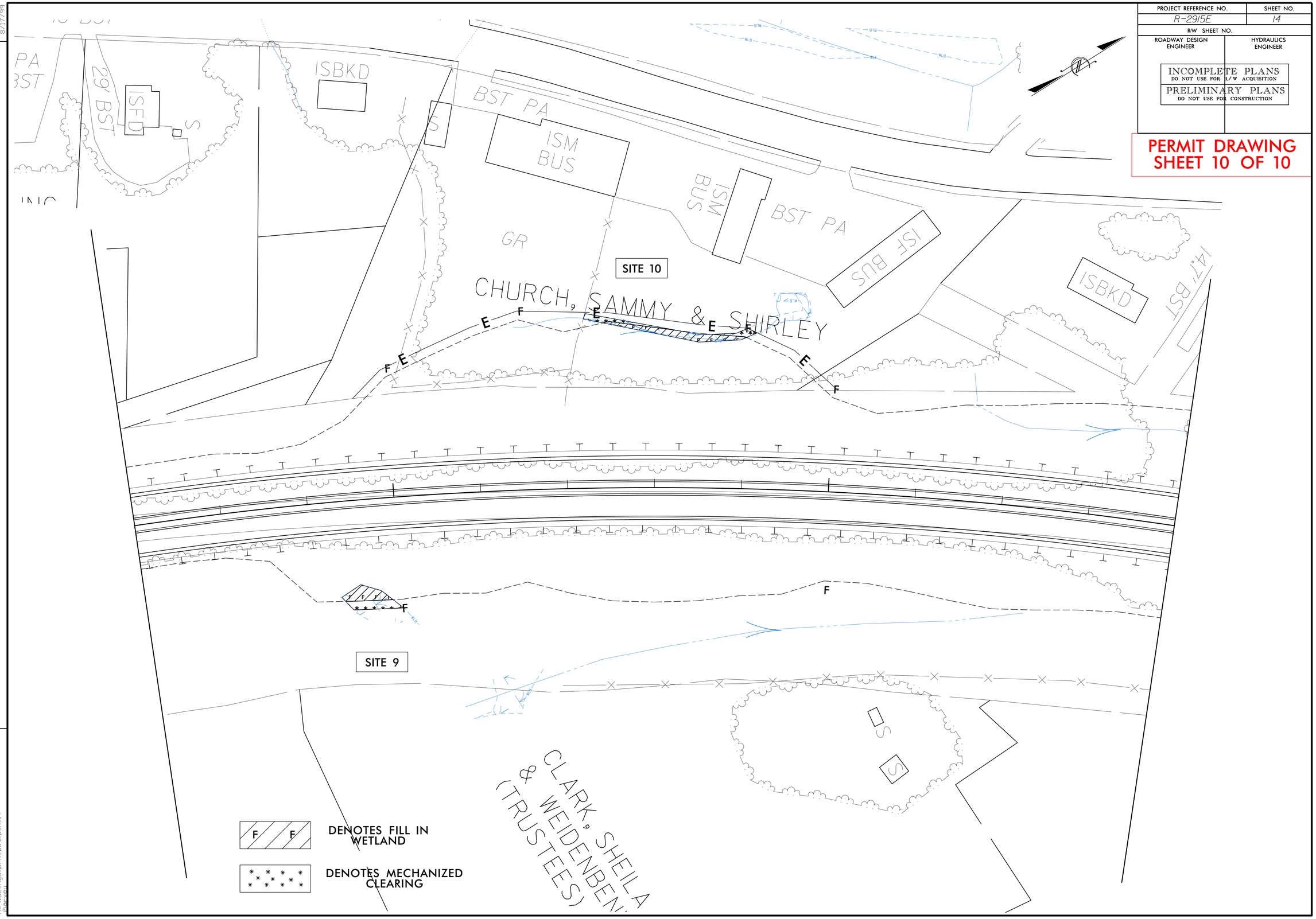
1/3/2014
R-2915E_Hyd_prm_wet_psh_12.con
(hydraulic)

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 10 OF 10



REVISIONS

8/17/99

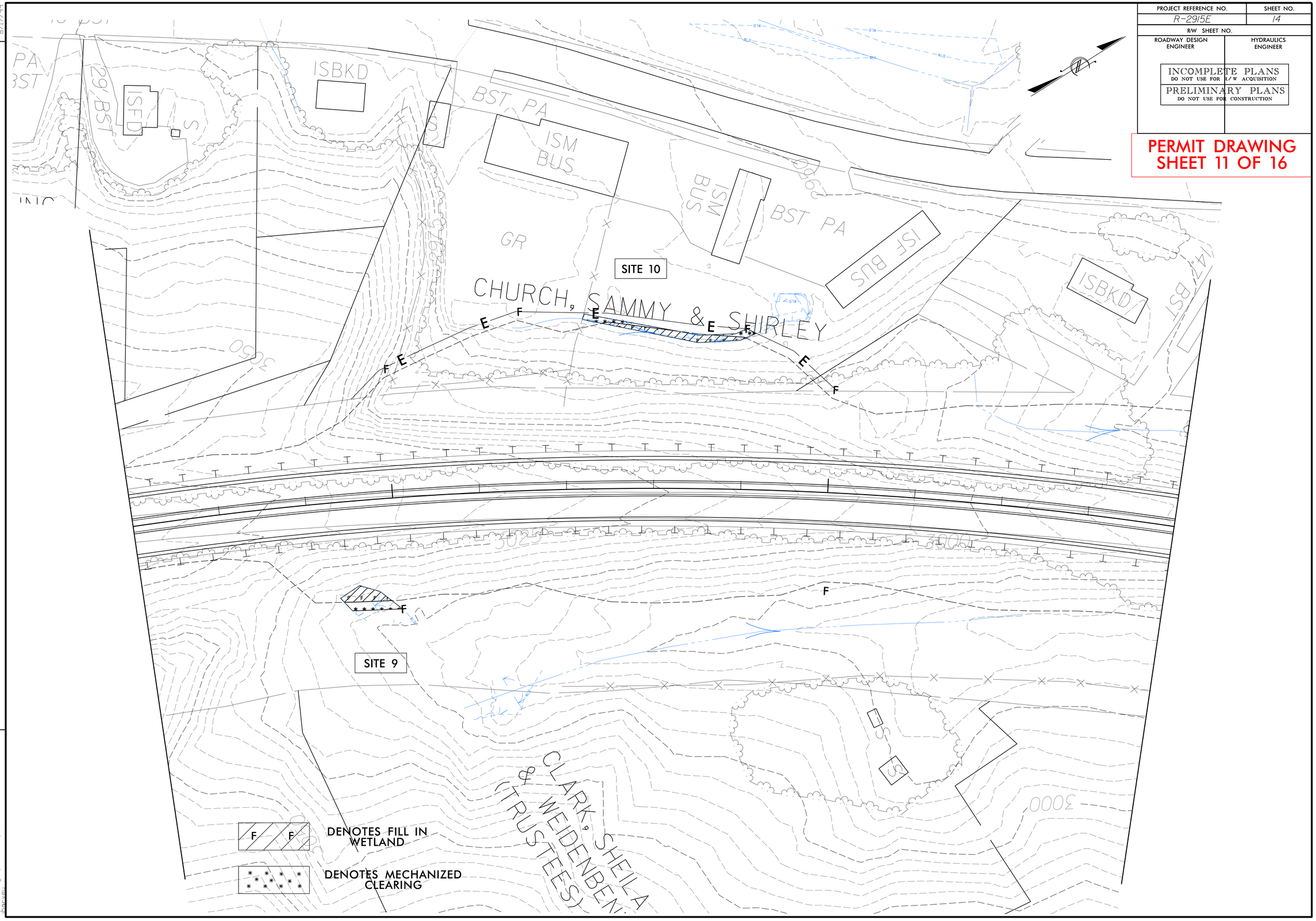
1/3/2014
R2915E_Hyd_prm_wet_psh_14
bpryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 11 OF 16



REVISIONS

8/17/99

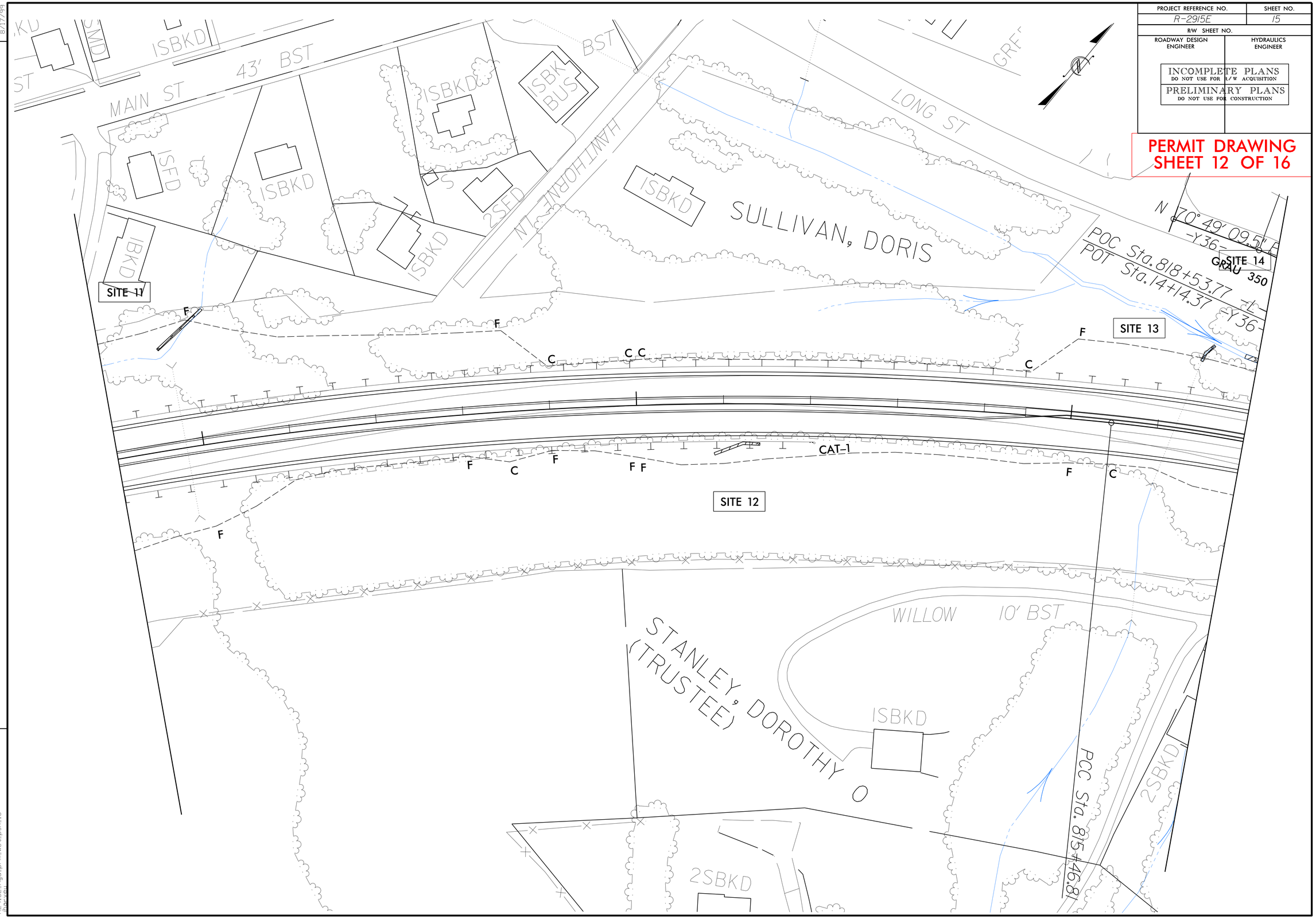
1/3/2014
R-2915E_Hyd_prm_wet_psh_14.con
bhargrai

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 12 OF 16



REVISIONS

8/17/99

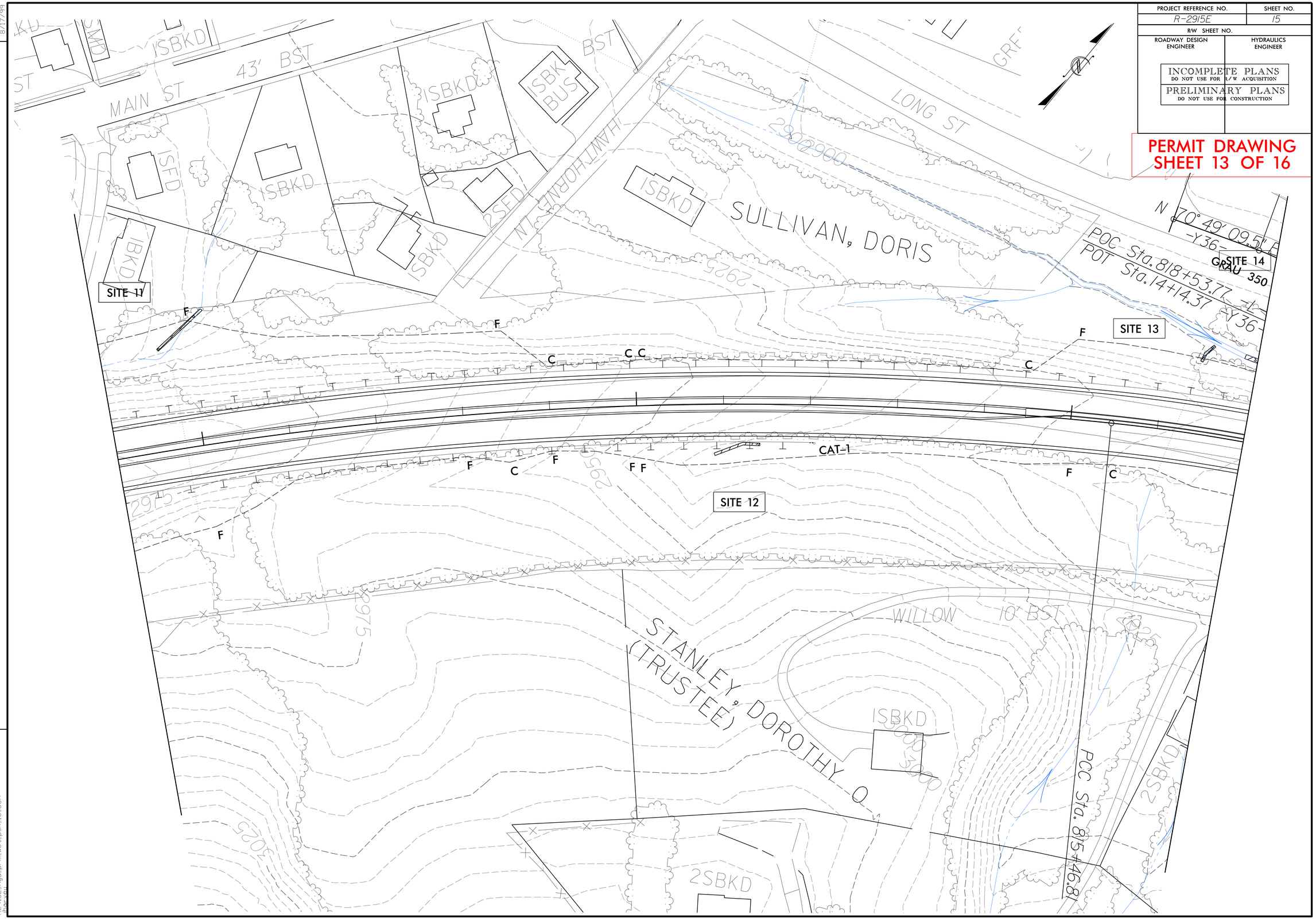
1/7/2014
R2915E_Hyd_prm_wet_psh_15
bpryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 13 OF 16



REVISIONS

8/17/99

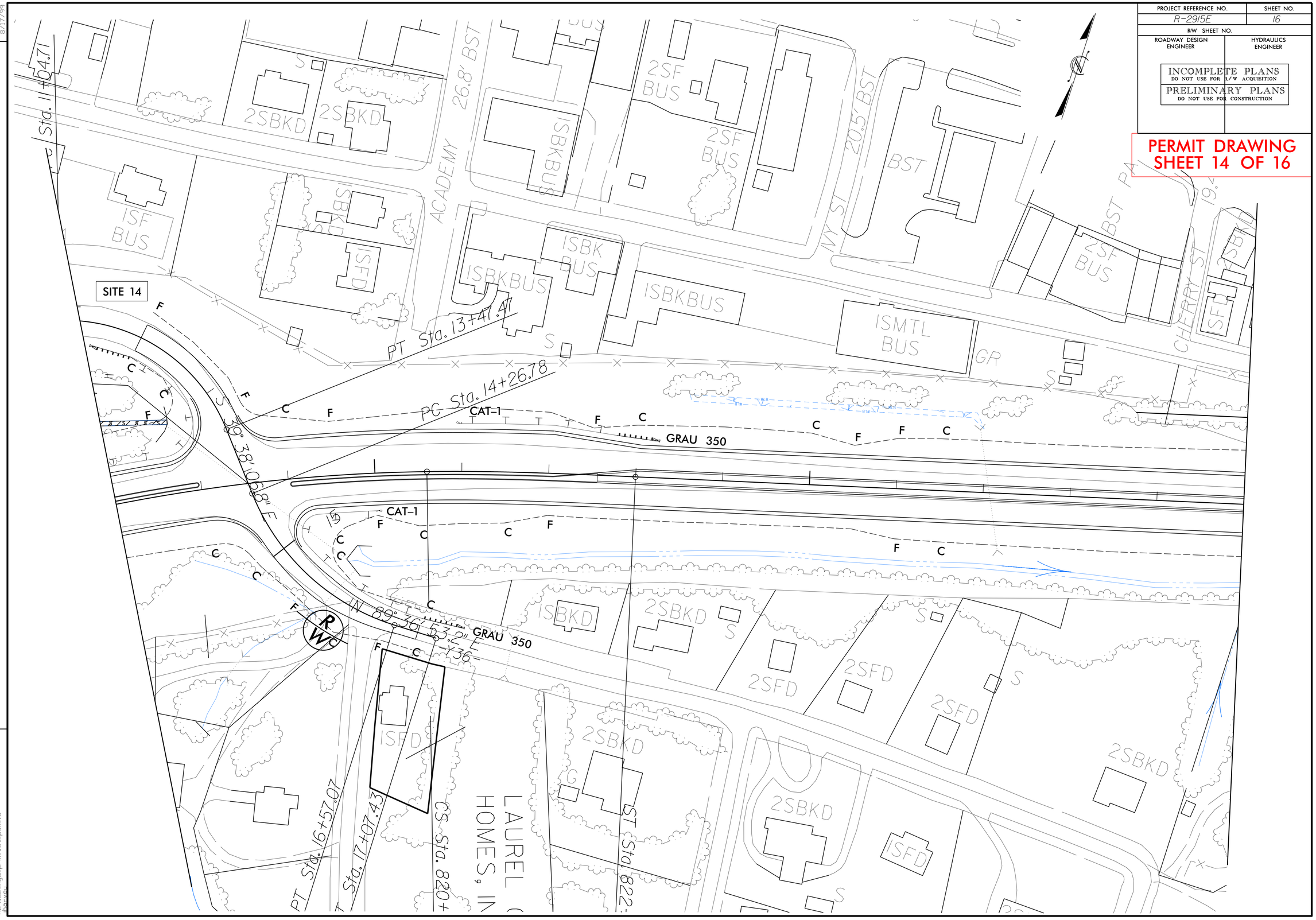
1/7/2014
R2915E_Hyd_prm_wet_psh_15.con
bpryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 14 OF 16



REVISIONS

8/17/99

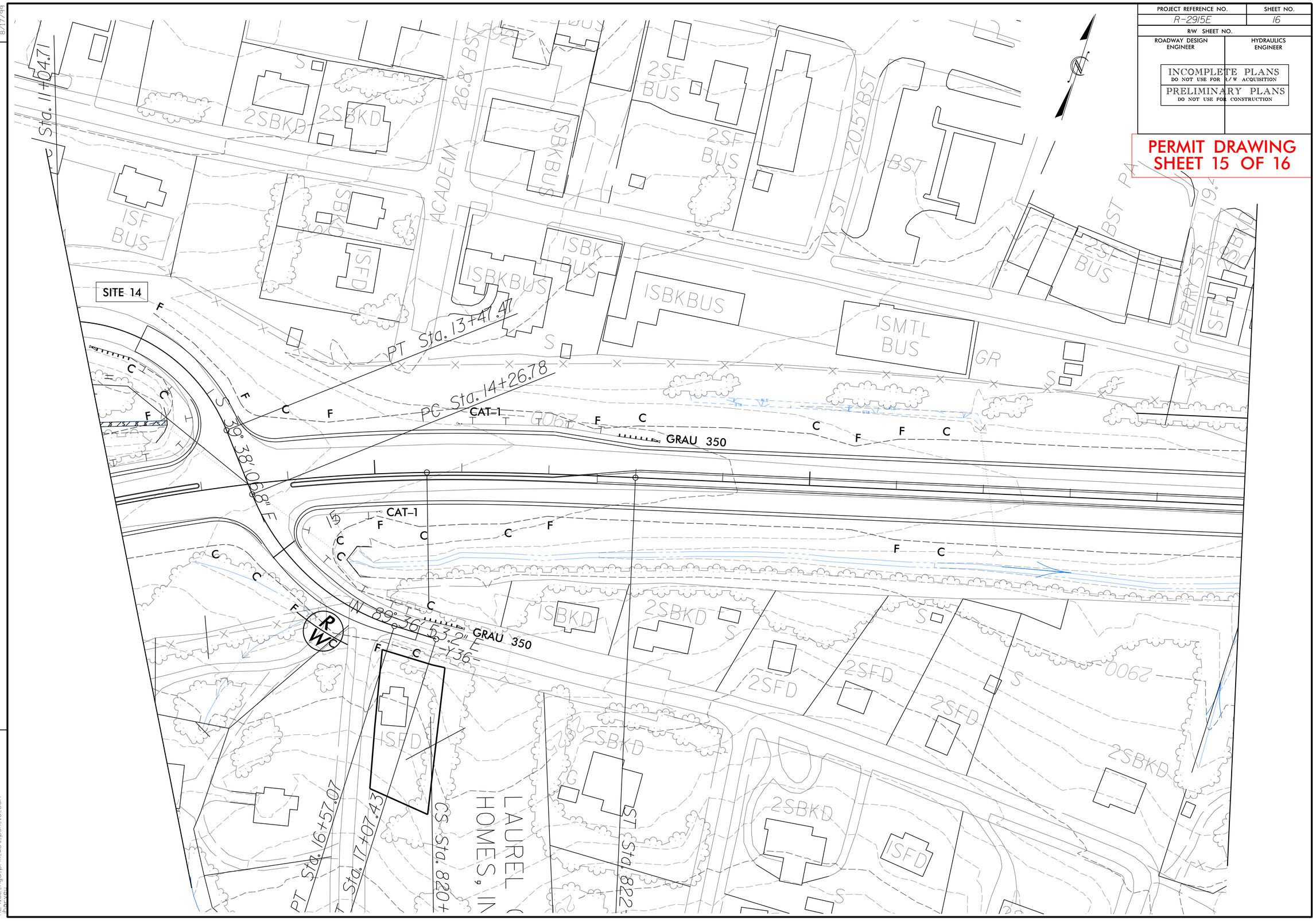
1/3/2014
R2915E_Hyd_prm_wet_psh_16
bbryan

PROJECT REFERENCE NO.	SHEET NO.
R-2915E	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PERMIT DRAWING
SHEET 15 OF 16



REVISIONS

8/17/99

1/3/2014
R2915E_Hyd_prm_wet_psh_16.con
bpriver

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND 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)	SURFACE WATER IMPACTS: Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	705+20-405+45-L-LT	ROAD FILL	0.01									
2	712+02-713+22-L-LT	ROAD FILL	0.04			0.02						
3	742+55-743+25-L-LT	ROAD FILL	0.03			0.02						
4	19+24-20+67-Y35-RT	ROAD FILL	0.08			0.03						
5	762+69-763+93-L-LT	ROAD FILL						< 0.01	< 0.01	165.8	78.8	
6	762+26-762+60-L-RT	ROAD FILL	0.01									
7	768+23-768+77-L-LT	ROAD FILL	0.18									
8	769+75-770+50-L-RT	ROAD FILL	0.03									
9	794+30-795+02-L-RT	ROAD FILL	0.02			0.01						
10	797+22-799+13-L-LT	ROAD FILL	0.02			0.01						
11	804+64-805+21-L-LT	ROAD FILL						< 0.01		68.7		
12	810+89-811+42-L-RT	ROAD FILL						< 0.01		54.4		
13	816+38-816+52-L-LT	ROAD FILL						< 0.01		23.9		
14	816+85-817+72-L-LT	ROAD FILL						0.01		91.8		
TOTALS*:			0.43			0.09		0.03	< 0.01	405	79	0

*Rounded totals are sum of actual impacts

NOTES:

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
01-08-14
ASHE COUNTY
US 221 FROM NC 163
TO US 221 BUSINESS

ATN Revised 3/12/13

09/08/99

TIP PROJECT: R-2915A

CONTRACT:

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WATAUGA & ASHE COUNTIES

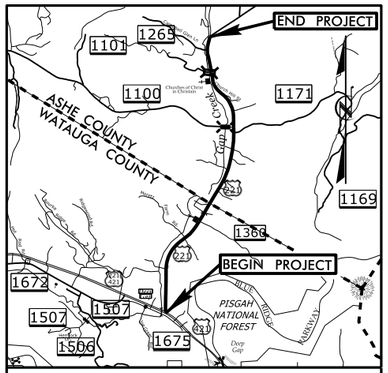
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34518.1.2	STP-0221 (39)	P.E.
34518.2.FR1	STP-0221 (39)	R/W
34518.2.UFR1	STP-0221 (39)	UTILITIES

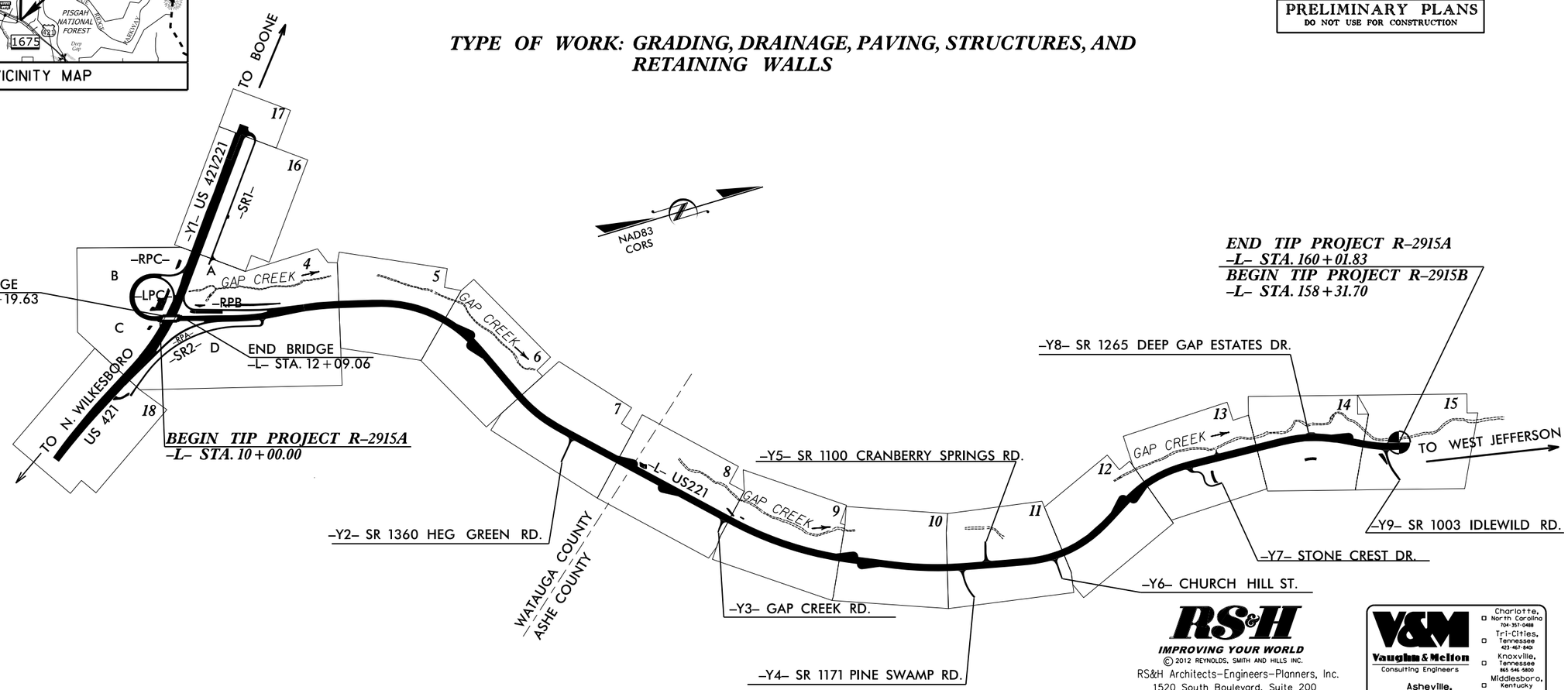
LOCATION: US 221 FROM US 421 IN WATAUGA COUNTY TO SR 1003 (IDLEWILD RD) IN ASHE COUNTY

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



VICINITY MAP



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

RS&H
IMPROVING YOUR WORLD
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RS&H Architects-Engineers-Planners, Inc.
1520 South Boulevard, Suite 200
Charlotte, NC 28203
Phone: 704-752-0610
NC License No. F-0493 www.rsandh.com

V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina 828-253-2796
Charlotte, North Carolina 704-357-0488
Tri-Cities, Tennessee 423-467-8401
Knoxville, Tennessee 865-546-5800
Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-574-4175
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GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 11970
ADT 2035 = 20400
K = 10 %
D = 65 %
T = 9 %
V = 60 MPH
*(TTST 2% + DUALS 7%)
FUNC CLASS =
RURAL ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915A	=	2.805 MI.
LENGTH STRUCTURES TIP PROJECT R-2915A	=	0.036 MI.
TOTAL LENGTH OF TIP PROJECT R-2915A	=	2.841 MI.

Prepared In the Office of:
VAUGHN & MELTON
1318-F PATTON AVE.
ASHEVILLE NC, 28806
FOR NCDOT DIVISION OF HIGHWAYS

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
SEPTEMBER 30, 2013

LETTING DATE:
JUNE 16, 2015

REECE SCHULER, PE
PROJECT ENGINEER

AARON CARVER, PE
PROJECT DESIGN ENGINEER

NCDOT CONTACT:
BRENDA MOORE, PE

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

08-JUL-2014 10:25
R:\Roadway\Proj\R-2915A_rdy_tsh.dgn
$$$$USERNAME$$$$

12/05/11

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

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

- Standard Gauge
- RR Signal Milepost — CSX TRANSPORTATION, MILEPOST 35
- Switch — SWITCH
- RR Abandoned
- RR Dismantled

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

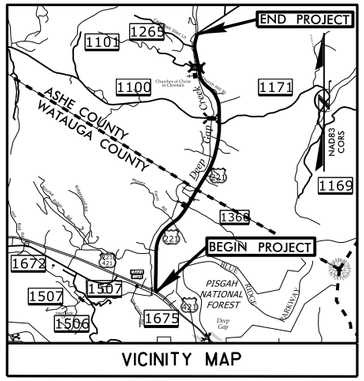
- Sanitary Sewer Manhole
- Sanitary Sewer Cleanout
- U/G Sanitary Sewer Line — SS
- Above Ground Sanitary Sewer — A/G Sanitary Sewer
- Recorded SS Forced Main Line — FSS
- Designated SS Forced Main Line (S.U.E.*) — FSS

MISCELLANEOUS:

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

PROJECT REFERENCE NO.	SHEET NO.
34518.1.1	1-C
Location and Surveys	

SURVEY CONTROL SHEET R-2915A



VICINITY MAP

BL						
POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL31	BL-31	914231.3163	1260001.4743	2996.36	10+00.74	112.22 LT
BL32	BL-32	915056.9090	1260109.7839	2992.35	14+20.12	116.45 LT
BL33	BL-33	916426.7594	1260096.2899	2984.52	32+94.00	40.21 LT
BL34	BL-34	917005.9249	1260255.2487	2976.26	39+70.30	0.26 RT
BL35	BL-35	917905.8097	1261027.9966	2972.55	51+12.90	1.70 RT
BL36	NCDS MON CAP	918669.8205	1261677.3259	2985.67	61+33.00	42.82 LT
R29153	GPS R2915-3	919149.7040	1261969.9680	2977.41	66+95.74	40.18 LT
R29154	GPS R2915-4	920506.4880	1262832.0570	2957.01	83+82.98	0.02 RT
BL37	BL-37	921144.0567	1263100.9761	2949.15	89+96.40	6.86 LT
BL38	BL-38	922126.6192	1263321.6829	2943.40	100+05.24	1.19 LT
BL39	BL-39	922865.1325	1263389.3999	2948.63	107+47.13	9.35 RT
BL40	BL-40	923780.4131	1263314.5824	2943.82	115+95.20	33.61 LT
BL41	BL-41	924139.8336	1263288.2637	2944.24	120+15.19	57.84 RT
BL42	BL-42	924588.7753	1262942.2353	2929.67	125+28.47	69.59 RT
BL43	BL-43	925844.3824	1262485.3746	2919.16	132+18.91	28.98 LT
BL44	BL-44	925745.5320	1262264.3667	2913.17	139+38.81	51.23 LT
BL45	BL-45	926798.8027	1262069.3736	2989.03	149+47.33	68.46 LT
R29155	GPS R2915-5	927532.5788	1262287.7910	2982.28	157+48.32	18.37 RT
BL46	BL-46	928482.6858	1262144.5944	2986.48	OUTSIDE PROJECT LIMITS	
BL47	BL-47	929326.9848	1262283.2698	2918.77	OUTSIDE PROJECT LIMITS	
BL48	BL-48	929833.8683	1262134.8936	2912.87	OUTSIDE PROJECT LIMITS	
BL49	BL-49	930252.5771	1261888.4631	2984.69	OUTSIDE PROJECT LIMITS	
BL50	BL-50	930705.8836	1261535.6732	2897.84	OUTSIDE PROJECT LIMITS	
BL51	BL-51	931116.8346	1261433.8956	2898.72	OUTSIDE PROJECT LIMITS	
BL52	BL-52	931641.1471	1261537.6793	2881.92	OUTSIDE PROJECT LIMITS	
BL53	BL-53	932216.8529	1261999.6996	2876.74	OUTSIDE PROJECT LIMITS	
BL54	BL-54	932765.6858	1262461.6863	2874.49	OUTSIDE PROJECT LIMITS	
BL55	BL-55	933354.5662	1263268.6938	2871.17	OUTSIDE PROJECT LIMITS	
BL56	BL-56	933897.1988	1263665.8128	2878.83	OUTSIDE PROJECT LIMITS	
BL57	BL-57	934899.1246	1263742.9538	2878.93	OUTSIDE PROJECT LIMITS	
BL58	BL-58	935748.1689	1263888.7456	2884.86	OUTSIDE PROJECT LIMITS	
BL59	BL-59	936429.4463	1263916.1781	2937.49	OUTSIDE PROJECT LIMITS	
BL60	BL-60	937238.1186	1264803.2714	3084.18	OUTSIDE PROJECT LIMITS	

BY1						
POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
BY166	BY1-66	918669.8205	1261677.3259	2985.67	OUTSIDE PROJECT LIMITS	
BY167	BY1-67	918487.4172	1262218.1671	3020.37	15+50.86	7.62 LT
BY2						
POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
BY268	BY2-68	922865.1325	1263389.3999	2948.63	10+99.31	21.49 RT
BY269	BY2-69	922916.5000	1263629.3149	2948.73	12+47.91	20.69 RT
BY270	BY2-70	923132.2200	1263891.8377	2968.15	15+82.72	11.27 LT
BY271	BY2-71	923286.9353	1264241.1875	2979.74	19+62.86	12.73 LT
BY272	BY2-72	923319.8097	1264699.2989	3007.14	OUTSIDE PROJECT LIMITS	
BY3						
POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
BY373	BY3-73	923173.7894	1263319.6864	2966.46	OUTSIDE PROJECT LIMITS	
BY374	BY3-74	923173.4784	1262985.9563	2930.95	16+12.43	13.83 LT
BY375	BY3-75	922865.1325	1263389.3999	2948.63	OUTSIDE PROJECT LIMITS	
BY4						
POINT	DESC.	NORTH	EAST	ELEVATION	Y8 STATION	OFFSET
BY476	BY4-76	926958.2639	1261551.4117	2912.85	OUTSIDE PROJECT LIMITS	
BY477	BY4-77	926798.8027	1262069.3736	2989.03	14+82.89	27.96 RT
BY5						
POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
BY578	BY5-78	927532.5788	1262287.7910	2982.28	18+89.69	186.83 RT
BY579	BY5-79	928848.8446	1263848.8471	2928.92	OUTSIDE PROJECT LIMITS	

BM1 ELEVATION - 2986.63
N 914478 E 1259917
L STATION 13+20.00 207 LEFT
CHISLED SQUARE ON TOP OF HEADWALL

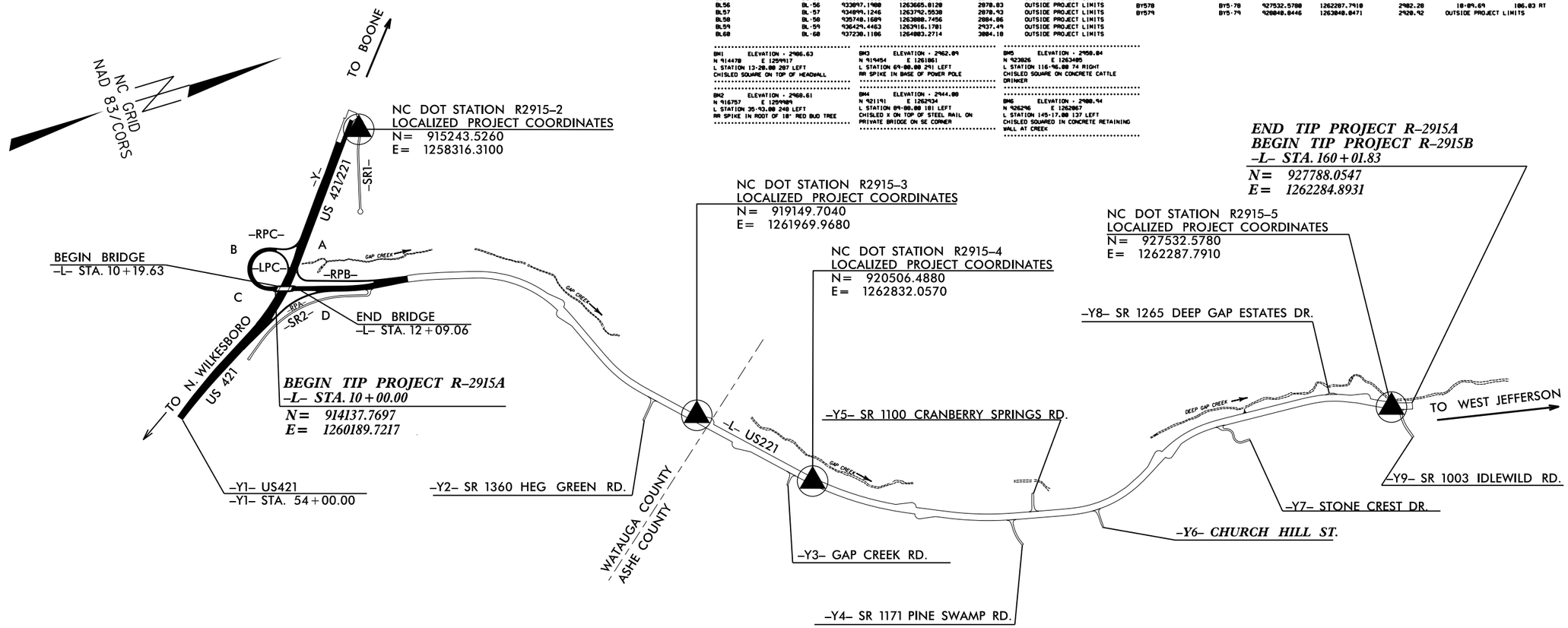
BM2 ELEVATION - 2968.61
N 916757 E 1259989
L STATION 35+93.00 248 LEFT
RR SPIKE IN ROOT OF 18" RED BUD TREE

BM3 ELEVATION - 2962.89
N 919454 E 1261861
L STATION 69+88.00 291 LEFT
RR SPIKE IN BASE OF POWER POLE

BM4 ELEVATION - 2944.88
N 921191 E 1262934
L STATION 89+88.88 181 LEFT
CHISLED X ON TOP OF STEEL RAIL ON PRIVATE BRIDGE ON SE CORNER

BM5 ELEVATION - 2958.84
N 923826 E 1263485
L STATION 116+96.88 74 RIGHT
CHISLED SQUARE ON CONCRETE CATTLE DRINKER

BM6 ELEVATION - 2988.94
N 926296 E 1262867
L STATION 145+17.88 137 LEFT
CHISLED SQUARED IN CONCRETE RETAINING WALL AT CREEK



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(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 10+00.00 IS
S 08°37'17" E 41208.6602
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 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/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915A_LS_GPSCALIB.HTML
R2915A_LS_WGS84.TXT
R2915A_LS_LOCAL.TXT
R2915A_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.

6/2/99
08-JUL-2014 10:25
R:\Roadway\Proj\r2915a_ls_l-C.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
34518.1.1	1-D
Location and Surveys	

SURVEY CONTROL SHEET R-2915A

GPS Calibration Report

Project: r2915abcde

TIP Number	r2915abcde		
User name	[illegible]	Date & Time	[illegible]
Coordinate System	US State Plane 1983	Zone	North Carolina 3200
Horizontal Datum	NAD 1983 (Conus)		
Vertical Datum		Geoid Model	[illegible]
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

LOCAL SITE INFORMATION

Localization and

Latitude	N/A
Longitude	N/A
Site Scale Factor	N/A
Height	N/A

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived. Please take care in utilizing these coordinates to eliminate confusion of the two systems. This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

Northing coordinate of rotation center	[illegible]
Easting coordinate of rotation center	[illegible]
Rotation about the center point	[illegible]
Translation north	[illegible]
Translation east	[illegible]
Scale factor	[illegible]

Vertical Adjustment Parameters

Northing coordinate of origin point	[illegible]
Easting coordinate of origin point	[illegible]
Vertical separation at origin	[illegible]
Slope north	[illegible]
Slope east	[illegible]

Geoid Model Definition

G03NC

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	[illegible]	[illegible]	[illegible]
Vertical	[illegible]	[illegible]	[illegible]
Three dimensional	[illegible]	[illegible]	[illegible]

Point Residuals

WGS84 Coordinates		Calculated point FOR DISPLAY ONLY		Local Coordinates	
Point	R2915-1 WGS84	Northing	[illegible]	Point R2915-1 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-2 WGS84	Northing	[illegible]	Point R2915-2 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-3 WGS84	Northing	[illegible]	Point R2915-3 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-4 WGS84	Northing	[illegible]	Point R2915-4 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-5 WGS84	Northing	[illegible]	Point R2915-5 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-6 WGS84	Northing	[illegible]	Point R2915-6 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-7 WGS84	Northing	[illegible]	Point R2915-7 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-8 WGS84	Northing	[illegible]	Point R2915-8 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-9 WGS84	Northing	[illegible]	Point R2915-9 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-10 WGS84	Northing	[illegible]	Point R2915-10 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-11 WGS84	Northing	[illegible]	Point R2915-11 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-12 WGS84	Northing	[illegible]	Point R2915-12 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-13 WGS84	Northing	[illegible]	Point R2915-13 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Utilized	Horz and Vert
		3D error	[illegible]	Quality	Survey quality
Point	R2915-14 WGS84	Northing	[illegible]	Point R2915-14 Local	
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]

DATUM DESCRIPTION

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WITH NAD 83/CORS STATE PLANE GRID COORDINATES OF
NORTHING: 954880.7810(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 10+00.00 IS
S 08°37'17" E 41208.6602
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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/

   THE FILES TO BE FOUND ARE AS FOLLOWS:
   R2915A_LS_GPSCALIB.HTML
   R2915A_LS_WGS84.TXT
   R2915A_LS_LOCAL.TXT
   R2915A_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.

PROJECT REFERENCE NO.	SHEET NO.
34518.1.1	1-E
Location and Surveys	

SURVEY CONTROL SHEET R–2915A

Latitude	[illegible]	Elevation	[illegible]	Northing	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Latitude	[illegible]	Elevation	[illegible]	Northing	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-12 WGS84	Northing	[illegible]	Point	R2915-12 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-22 WGS84	Northing	[illegible]	Point	R2915-22 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-16 WGS84	Northing	[illegible]	Point	R2915-16 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-24 WGS84	Northing	[illegible]	Point	R2915-24 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-17 WGS84	Northing	[illegible]	Point	R2915-17 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-18 WGS84	Northing	[illegible]	Point	R2915-18 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-19 WGS84	Northing	[illegible]	Point	R2915-19 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-20 WGS84	Northing	[illegible]	Point	R2915-20 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-21 WGS84	Northing	[illegible]	Point	R2915-21 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]
Longitude	[illegible]	Elevation	[illegible]	Easting	[illegible]
Height	[illegible]	Horz error	[illegible]	Elevation	[illegible]
		Vert error	[illegible]	Method	Forward Vert
		3D error	[illegible]	Quality	Survey quality

Point	R2915-22 WGS84	Northing	[illegible]	Point	R2915-22 Local
Latitude	[illegible]	Easting	[illegible]	Northing	[illegible]

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(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 10+00.00 IS
S 08°37'17" E 41208.6602
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 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/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915A_LS_GPSCALIB.HTML
R2915A_LS_WGS84.TXT
R2915A_LS_LOCAL.TXT
R2915A_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.

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina 828-253-3796
Charlotte, North Carolina 704-357-0400
Tri-Cities, Tennessee 423-467-8400
Knoxville, Tennessee 865-546-9400
Middlesboro, Kentucky 606-248-5600
Spartanburg, South Carolina 864-574-4775

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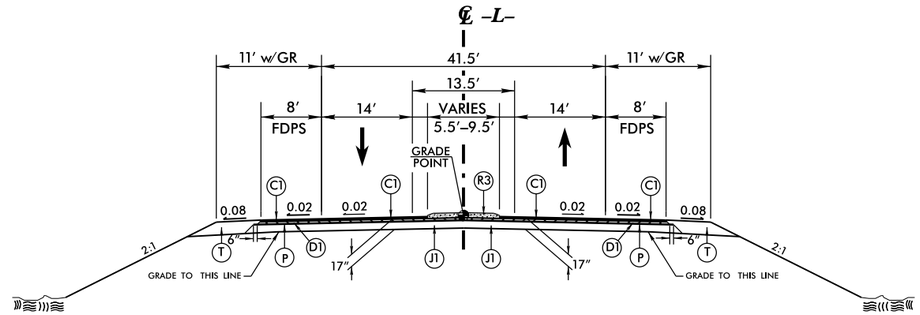
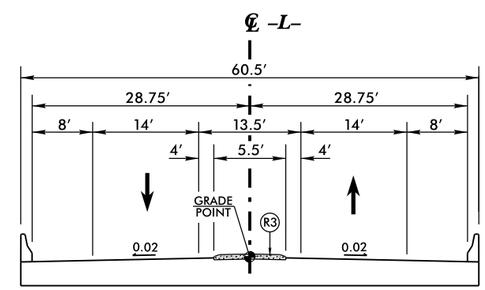
	PRELIMINARY PAVEMENT DESIGN
C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0X, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E2	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E3	PROP. APPROX. 4½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E4	PROP. APPROX. 5½" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5½" IN DEPTH.
J1	10" AGGREGATE BASE COURSE
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R1	2'-9" MOUNTABLE CURB & GUTTER
R2	2'-6" CURB & GUTTER
R3	5" MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
R5	DOUBLE FACED CONCRETE BARRIER, TYPE T
R6	DOUBLE FACED CONCRETE BARRIER, TYPE T1
R7	DOUBLE FACED CONCRETE BARRIER, TYPE T2
R8	SINGLE FACED CONCRETE BARRIER
T	EARTH MATERIAL.
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

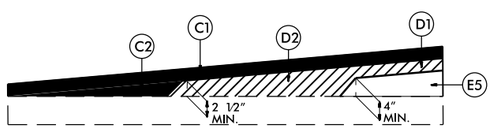
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



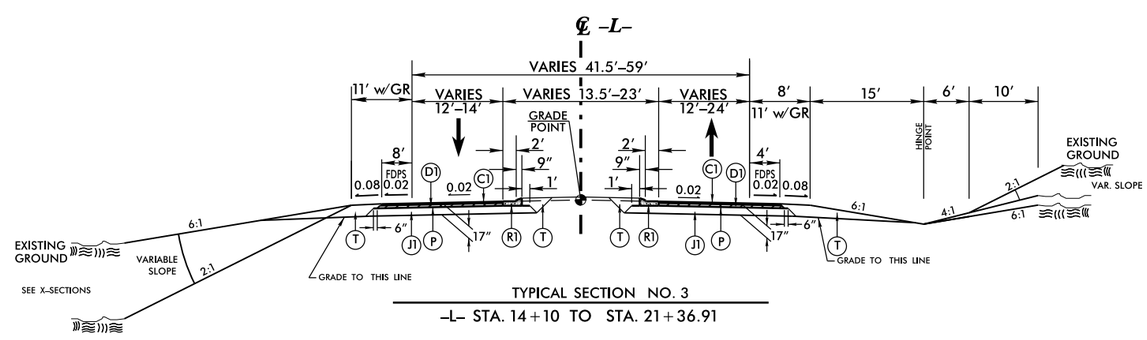
TYPICAL SECTION NO. 1
-L- STA. 10+00 TO STA. 10+19.63
-L- STA. 12+09.06 TO STA. 14+10



TYPICAL SECTION NO. 2
-L- STA. 10+19.63 TO STA. 12+09.06



Wedging Detail For -L-



TYPICAL SECTION NO. 3
-L- STA. 14+10 TO STA. 21+36.91

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina 828-253-3796
Charlotte, North Carolina 704-351-0488
Tri-Cities, Tennessee 423-467-8400
Knoxville, Tennessee 865-546-1600
Middlesboro, Kentucky 606-248-5600
Spartanburg, South Carolina 864-574-4775

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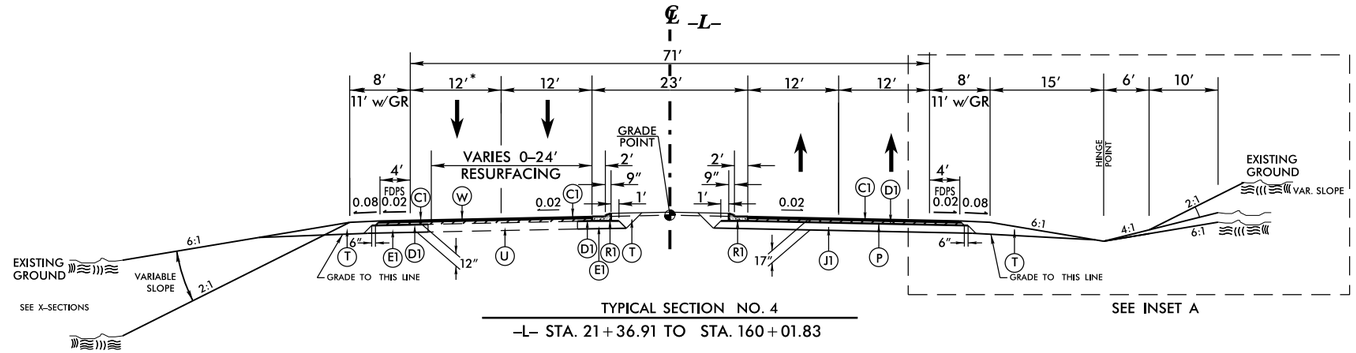
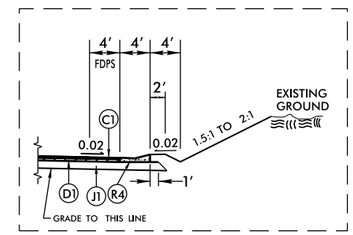
	PRELIMINARY PAVEMENT DESIGN
C1	3" S9.5B
C2	VAR. S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	5" B25.0B
E2	4" B25.0B
E3	4½" B25.0B
E4	5½" B25.0B
E5	VAR. B25.0B
J1	10" ABC
P	PRIME COAT AT THE RATE OF .35 GAL. PER SQ. YD.
R1	2'-9" MOUNTABLE CURB & GUTTER
R2	2'-6" CONCRETE CURB AND GUTTER.
R3	5" MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
R5	DOUBLE FACED CONCRETE BARRIER, TYPE T
R6	DOUBLE FACED CONCRETE BARRIER, TYPE T1
R7	DOUBLE FACED CONCRETE BARRIER, TYPE T2
R8	SINGLE FACED CONCRETE BARRIER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

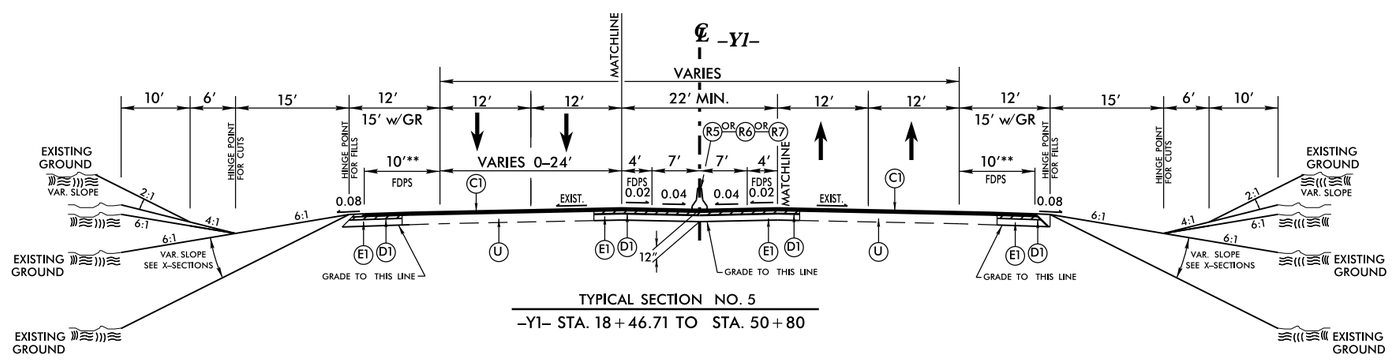


TYPICAL SECTION NO. 4
-L- STA. 21+36.91 TO STA. 160+01.83

*NO OUTSIDE LANE -L- STA. 21+36.91 TO STA. 26+09.56
(SEE -RPB- ON TYPICAL SECTION NO. 10)



INSET A
-L- STA. 26+80 TO STA. 34+50
-L- STA. 136+93.01 TO STA. 152+75.00



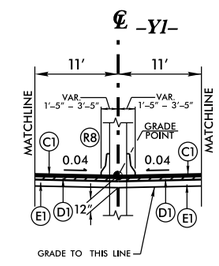
TYPICAL SECTION NO. 5
-Y1- STA. 18+46.71 TO STA. 50+80

** EXISTING PAVED SHOULDER TO BE REMOVED

NOTE: RESURFACE AND WIDEN AS NEEDED
FROM -Y1- STA. 10+90 TO STA. 18+46.71
AND -Y1- STA. 50+80 TO STA. 54+00

(R6) USE DOUBLE FACED CONCRETE BARRIER TYPE T1 FOR:
-Y1- STA. 23+50 TO -Y1- STA. 33+00
-Y1- STA. 40+25 TO -Y1- STA. 48+50

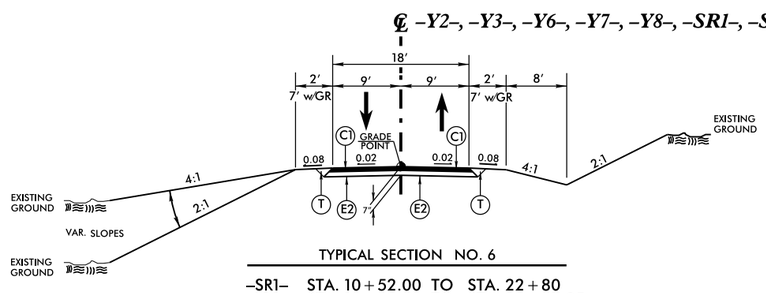
(R7) USE DOUBLE FACED CONCRETE BARRIER TYPE T2 FOR:
-Y1- STA.33+00 TO -Y1- STA. 40+25



PARTIAL TYPICAL SECTION NO. 5A
CONC. BARRIER WALL DETAIL AT BRIDGE PIER

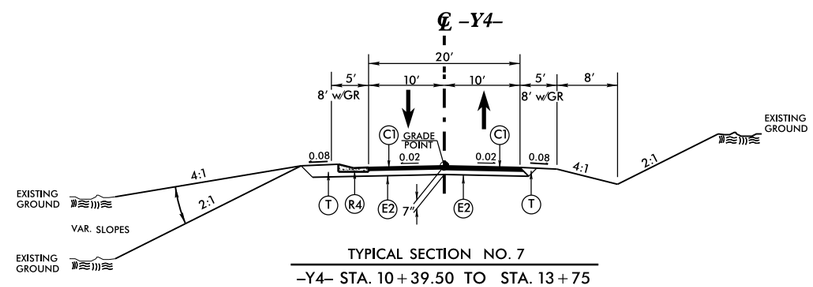
USE PARTIAL TYPICAL SECTION NO. 5A IN CONJUNCTION WITH T.S. NO.5 FOR:

-Y1- STA. 33+00 TO STA. 34+70



TYPICAL SECTION NO. 6

-SR1-	STA. 10+52.00	TO	STA. 22+80
-SR2-	STA. 10+39.50	TO	STA. 28+57.05
-Y2-	STA. 10+39.50	TO	STA. 13+20
-Y3-	STA. 10+39.50	TO	STA. 11+85
-Y6-	STA. 10+39.50	TO	STA. 12+70
-Y7-	STA. 10+39.50	TO	STA. 15+20
-Y8-	STA. 14+96.57	TO	STA. 15+14.50



TYPICAL SECTION NO. 7
-Y4- STA. 10+39.50 TO STA. 13+75

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Vaughn & Melton
Consulting Engineers
Asheville, North Carolina
Charlotte, North Carolina 704-357-0485
Tri-Cities, Tennessee 423-467-8400
Knoxville, Tennessee 865-546-9400
Middlesboro, Kentucky 606-248-5600
Spartanburg, South Carolina 864-574-4775

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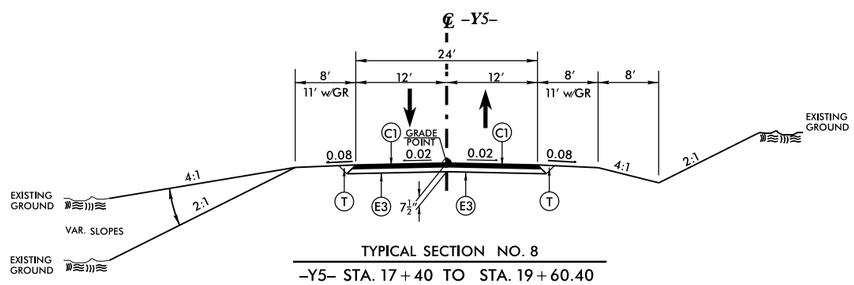
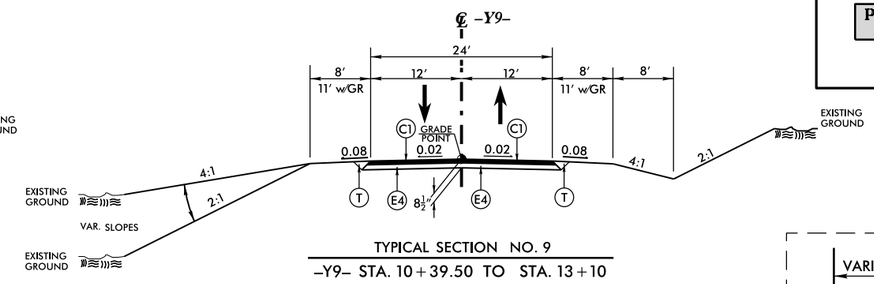
	PRELIMINARY PAVEMENT DESIGN
C1	3" S9.5B
C2	VAR. S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	5" B25.0B,
E2	4" B25.0B,
E3	4½" B25.0B,
E4	5½" B25.0B,
E5	VAR. B25.0B,
J1	10" ABC
R1	2'-9" MOUNTABLE CURB & GUTTER
R2	2'-6" CONCRETE CURB AND GUTTER.
R3	5" MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
R5	DOUBLE FACED CONCRETE BARRIER, TYPE T
R6	DOUBLE FACED CONCRETE BARRIER, TYPE T1
R7	DOUBLE FACED CONCRETE BARRIER, TYPE T2
R8	SINGLE FACED CONCRETE BARRIER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

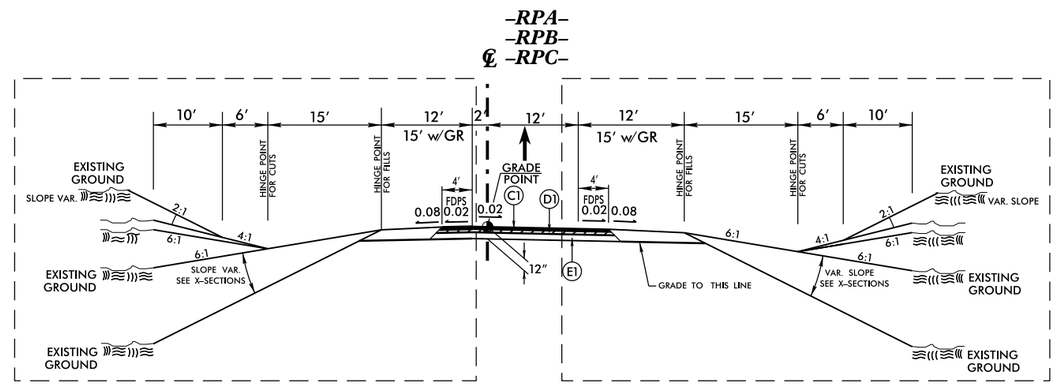
NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.



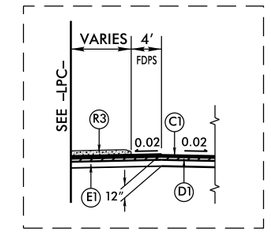
TYPICAL SECTION NO. 8
-Y5- STA. 17+40 TO STA. 19+60.40



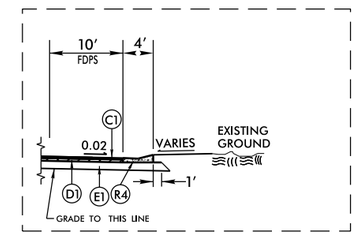
TYPICAL SECTION NO. 9
-Y9- STA. 10+39.50 TO STA. 13+10



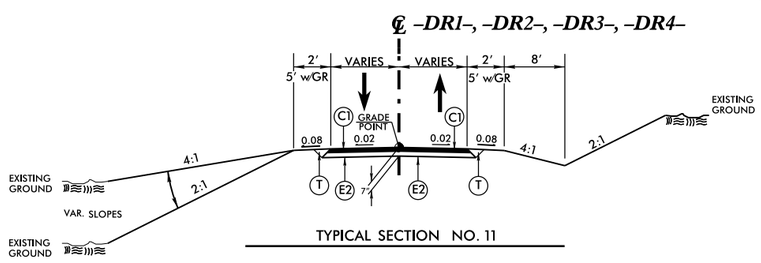
TYPICAL SECTION NO. 10
-RPA- STA. 5+00.00 TO STA. 18+00.65
-RPB- STA. 5+00.00 TO STA. 19+60.25
-RPC- STA. 5+00.00 TO STA. 18+66.84



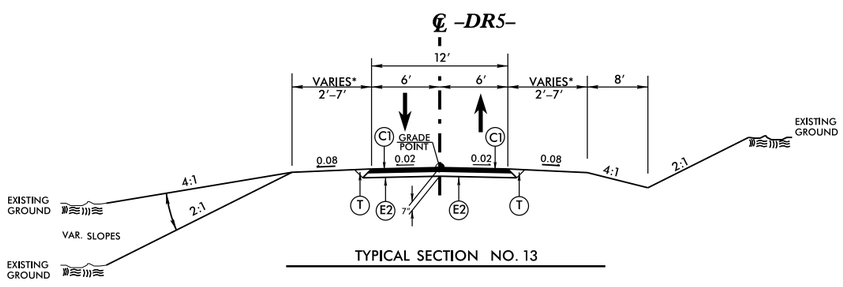
INSET B
-RPC- STA. 14+28.00 TO STA. 23+66.84



INSET C
-RPC- STA. 6+75 TO STA. 8+50



TYPICAL SECTION NO. 11

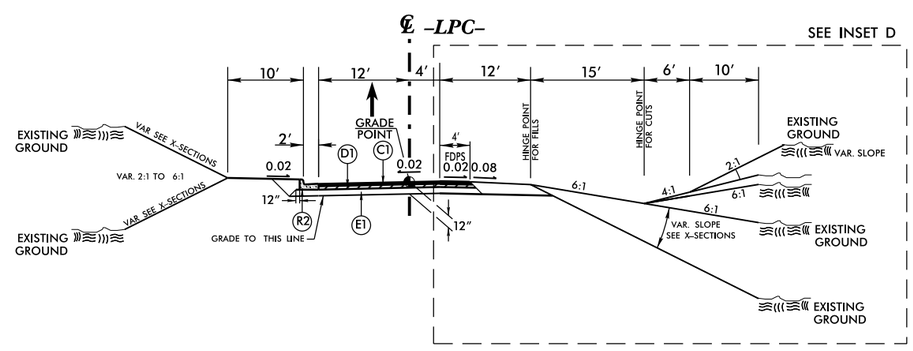


TYPICAL SECTION NO. 13

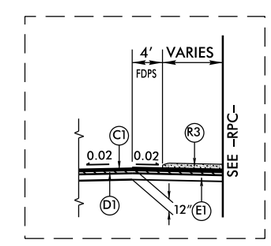
*NOTE: 2' SHOULDER WIDTH FROM -DR5- STA. 10+05 TO STA. 10+25
AND FROM -DR5- STA. 11+50 TO 11+79.20

7' SHOULDER WIDTH AT CREEK CROSSING FROM -DR5- STA. 10+75 TO STA. 11+00

TAPER SHOULDER WIDTH FROM -DR5- STA. 10+25 TO STA. 10+75
AND FROM -DR5- STA. 11+00 TO 11+50



TYPICAL SECTION NO. 12
-LPC- STA. 5+00 TO STA. 17+78.98



INSET D
-LPC- STA. 14+25.00 TO STA. 22+78.98

DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

V&M
Vaughn & Melton
Consulting Engineers
Asheville, North Carolina 828-253-2796
Charlotte, North Carolina 704-357-0488
Tri-Cities, Tennessee 423-467-8401
Knoxville, Tennessee 865-546-5800
Middlesboro, Kentucky 606-248-6600
Spartanburg, South Carolina 864-574-4775

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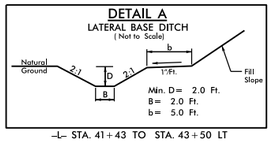
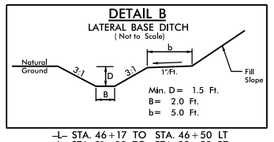
DETAIL A
LATERAL BASE DITCH
(Not to Scale)



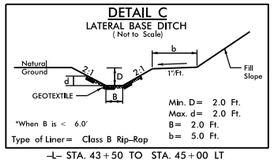
–L– STA. 41+43 TO STA. 43+50 LT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



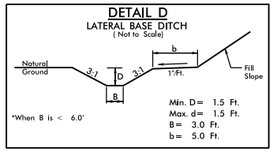
–L– STA. 46+17 TO STA. 46+50 LT
–L– STA. 91+89 TO STA. 93+58 RT
–L– STA. 154+45 TO STA. 157+50 RT
–Y9– STA. 11+35 TO STA. 13+15 RT

DETAIL C
LATERAL BASE DITCH
(Not to Scale)



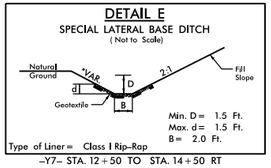
–L– STA. 43+50 TO STA. 45+00 LT

DETAIL D
LATERAL BASE DITCH
(Not to Scale)



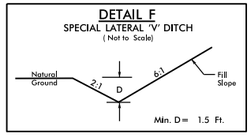
–L– STA. 52+04 TO STA. 54+50 LT

DETAIL E
SPECIAL LATERAL BASE DITCH
(Not to Scale)



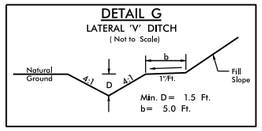
–Y7– STA. 12+50 TO STA. 14+50 RT

DETAIL F
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



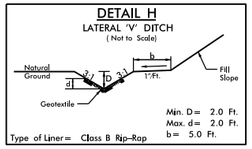
–L– STA. 44+45 TO STA. 45+26 RT
–L– STA. 47+00 TO STA. 49+71 RT

DETAIL G
LATERAL 'V' DITCH
(Not to Scale)



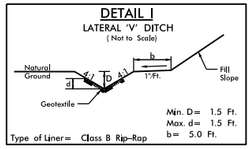
–LPC– STA. 13+50 TO STA. 15+83 RT

DETAIL H
LATERAL 'V' DITCH
(Not to Scale)



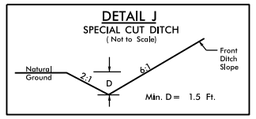
–L– STA. 105+89 TO STA. 107+09 RT

DETAIL I
LATERAL 'V' DITCH
(Not to Scale)



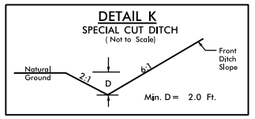
–LPC– STA. 15+83 TO STA. 16+00 RT

DETAIL J
SPECIAL CUT DITCH
(Not to Scale)



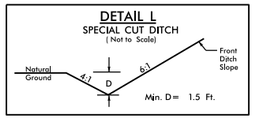
–L– STA. 45+26 TO STA. 47+00 RT
–L– STA. 57+00 TO STA. 60+83 RT
–L– STA. 64+37 TO STA. 66+25 RT
–L– STA. 78+00 TO STA. 78+48 RT
–DR4– STA. 10+60 TO STA. 12+00 LT

DETAIL K
SPECIAL CUT DITCH
(Not to Scale)



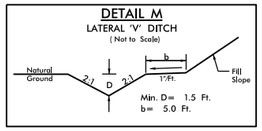
–L– STA. 88+00 TO STA. 89+00 RT
–L– STA. 89+50 TO STA. 90+00 RT
–L– STA. 115+77 TO STA. 117+62 RT

DETAIL L
SPECIAL CUT DITCH
(Not to Scale)



–L– STA. 59+62 TO STA. 62+23 LT
–L– STA. 79+08 TO STA. 80+07 RT
–L– STA. 81+32 TO STA. 83+00 LT
–L– STA. 81+50 TO STA. 82+00 RT
–L– STA. 130+00 TO STA. 131+00 RT

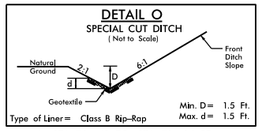
DETAIL M
LATERAL 'V' DITCH
(Not to Scale)



–L– STA. 89+50 TO STA. 94+50 LT
–L– STA. 106+05 TO STA. 106+50 LT

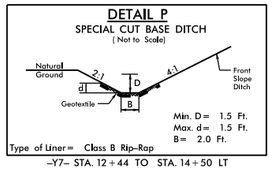
NOTE:
DITCH DETAIL N
IS NOT BEING USED

DETAIL O
SPECIAL CUT DITCH
(Not to Scale)



–L– STA. 78+48 TO STA. 78+94 RT
–L– STA. 89+00 TO STA. 89+12 RT
–L– STA. 89+18 TO STA. 89+50 RT

DETAIL P
SPECIAL CUT BASE DITCH
(Not to Scale)



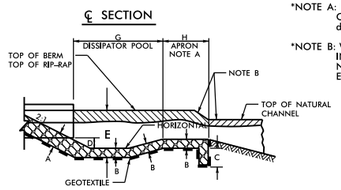
–Y7– STA. 12+44 TO STA. 14+50 LT

DETAIL Q
RIP-RAPPED ENERGY DISSIPATOR BASIN

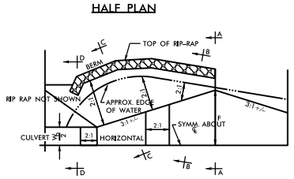
*NOTE A: IF EXIT VELOCITY OF BASIN IS SPECIFIED, EXTEND BASIN AS REQUIRED TO OBTAIN SUFFICIENT CROSS SECTIONAL AREA AT SECTION A–A SUCH THAT Q des/(CROSS SECTION AREA AT SEC. A–A)= SPECIFIED VELOCITY.

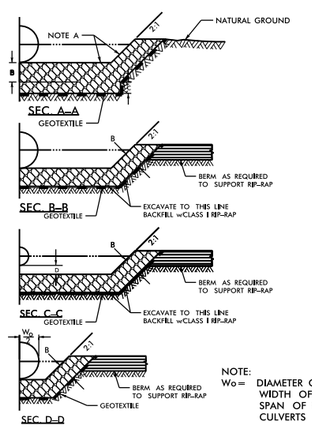
*NOTE B: WARP BASIN TO CONFORM TO NATURAL STREAM CHANNEL. TOP OF RIP-RAP IN FLOOR OF BASIN SHOULD BE AT SAME ELEVATION OR LOWER THAN NATURAL CHANNEL BOTTOM AT SEC. A–A. PROVIDE SMOOTH TRANSITION FROM END OF APRON TO NATURAL CHANNEL WIDTH.

℄ SECTION



HALF PLAN





DIM.	RIP RAP BASIN # 1	2	3	4	5	6	7	8
A	3.0'							
B	2.5'							
C	2.0'							
D	2.5'							
E	8.0'							
F	12.0'							
G	18.0'							
H	9.0'							

*ALL DIMENSIONS APPROXIMATE IN FEET

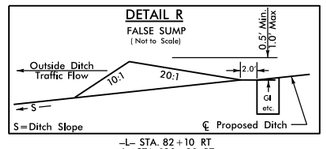
BASIN #	LOCATION (AT OUTLET)
1	449
2	
3	
4	
5	
6	
7	
8	

NOTE:
Wo= DIAMETER OF PIPE, WIDTH OF BOX OR SPAN OF PIPE-ARCH CULVERTS

5/05

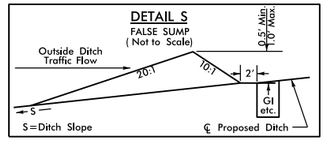
–L– STA. 13+20 TO STA. 13+54 LT

DETAIL R
FALSE SUMP
(Not to Scale)



–L– STA. 82+10 RT
–L– STA. 120+80 RT
–L– STA. 130+60 RT
–L– STA. 152+80 RT

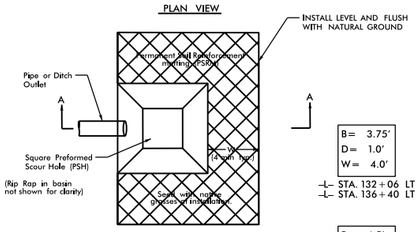
DETAIL S
FALSE SUMP
(Not to Scale)



–L– STA. 54+38 RT
–L– STA. 84+60 LT
–L– STA. 84+85 RT
–L– STA. 99+30 RT
–Y2– STA. 10+70 RT

DETAIL T
PREFORMED SCOUR HOLE
*NOT TO SCALE

PLAN VIEW



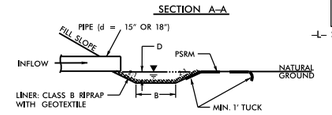
B= 3.75'
D= 1.0'
W= 4.0'

–L– STA. 132+06 LT
–L– STA. 136+40 LT

B= 4.5'
D= 1.5'
W= 4.0'

–L– STA. 109+65 LT

SECTION A–A



3/08

–L– STA. 109+65 LT
–L– STA. 132+06 LT
–L– STA. 136+40 LT

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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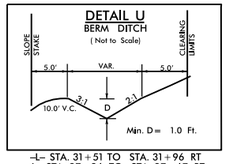
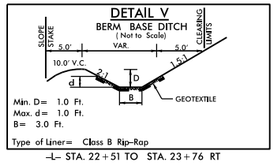
DRAINAGE DETAILS

DETAIL U
BERM DITCH
(Not to Scale)



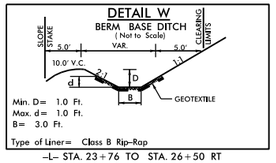
–L– STA. 31+51 TO STA. 31+96 RT
–L– STA. 37+26 TO STA. 37+67 RT

DETAIL V
BERM BASE DITCH
(Not to Scale)



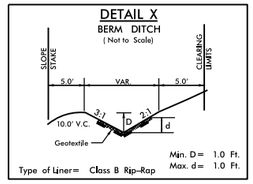
–L– STA. 22+51 TO STA. 23+76 RT
–L– STA. 32+00 TO STA. 33+98 RT
–L– STA. 54+51 TO STA. 58+97 RT
–L– STA. 141+48 TO STA. 142+49 RT

DETAIL W
BERM BASE DITCH
(Not to Scale)



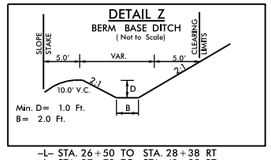
–L– STA. 23+76 TO STA. 26+50 RT

DETAIL X
BERM DITCH
(Not to Scale)



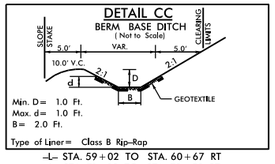
–L– STA. 84+97 TO STA. 87+85 RT

DETAIL Z
BERM BASE DITCH
(Not to Scale)



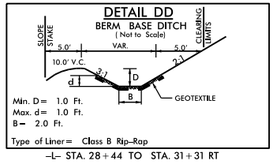
–L– STA. 26+50 TO STA. 28+38 RT
–L– STA. 37+73 TO STA. 42+95 RT
–L– STA. 54+04 TO STA. 54+48 RT
–L– STA. 71+61 TO STA. 71+98 RT
–L– STA. 129+72 TO STA. 130+17 RT
–L– STA. 132+98 TO STA. 133+50 RT
–L– STA. 137+97 TO STA. 138+88 RT

DETAIL CC
BERM BASE DITCH
(Not to Scale)



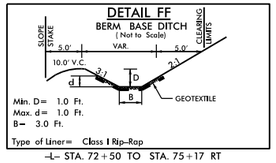
–L– STA. 59+02 TO STA. 60+67 RT
–L– STA. 71+98 TO STA. 72+50 RT
–L– STA. 103+51 TO STA. 105+89 RT
–L– STA. 108+23 TO STA. 113+33 RT
–L– STA. 130+17 TO STA. 132+98 RT
–L– STA. 133+50 TO STA. 136+28 RT
–L– STA. 138+93 TO STA. 141+48 RT
–L– STA. 142+51 TO STA. 145+00 RT
–Y4– STA. 11+00 TO STA. 13+50 LT

DETAIL DD
BERM BASE DITCH
(Not to Scale)



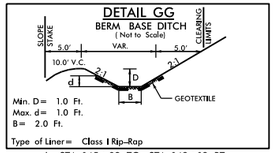
–L– STA. 28+44 TO STA. 31+31 RT

DETAIL FF
BERM BASE DITCH
(Not to Scale)



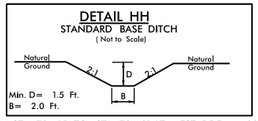
–L– STA. 72+50 TO STA. 75+17 RT

DETAIL GG
BERM BASE DITCH
(Not to Scale)



–L– STA. 145+02 TO STA. 149+13 RT
–L– STA. 151+08 TO STA. 153+73 RT

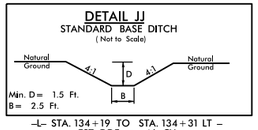
DETAIL HH
STANDARD BASE DITCH
(Not to Scale)



–L– STA. 79+15 TO STA. 79+91 LT – EST. DDE = 22 CY
–L– STA. 88+86 TO STA. 89+07 LT – EST. DDE = 29 CY
–L– STA. 92+13 TO STA. 92+17 LT – EST. DDE = 44 CY

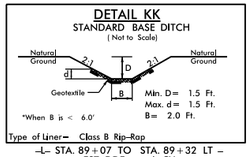
NOTE:
DITCH DETAIL II
IS NOT BEING USED

DETAIL JJ
STANDARD BASE DITCH
(Not to Scale)



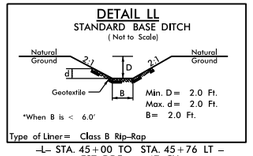
–L– STA. 134+19 TO STA. 134+31 LT –
EST. DDE = 46 CY

DETAIL KK
STANDARD BASE DITCH
(Not to Scale)



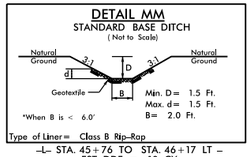
–L– STA. 89+07 TO STA. 89+32 LT –
EST. DDE = 6 CY

DETAIL LL
STANDARD BASE DITCH
(Not to Scale)



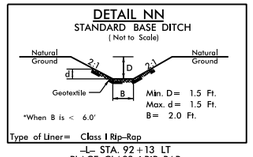
–L– STA. 45+00 TO STA. 45+76 LT –
EST. DDE = 47 CY

DETAIL MM
STANDARD BASE DITCH
(Not to Scale)



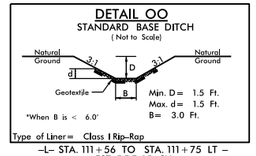
–L– STA. 45+76 TO STA. 46+17 LT –
EST. DDE = 10 CY

DETAIL NN
STANDARD BASE DITCH
(Not to Scale)



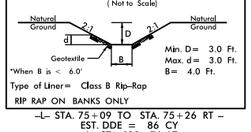
–L– STA. 92+13 LT
PLACE CLASS I RIP RAP
IN LAST 20' OF DITCH –
EST. DDE = 6 CY

DETAIL OO
STANDARD BASE DITCH
(Not to Scale)



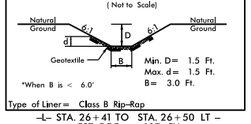
–L– STA. 111+56 TO STA. 111+75 LT –
EST. DDE 15 CY

DETAIL PP
STANDARD BASE DITCH
(Not to Scale)



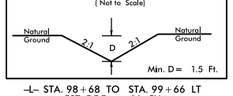
–L– STA. 75+09 TO STA. 75+26 RT –
EST. DDE = 86 CY
–L– STA. 120+76 LT
EST. DDE = 38 CY

DETAIL QQ
STANDARD BASE DITCH
(Not to Scale)



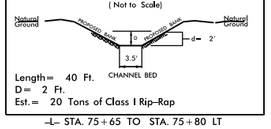
–L– STA. 26+41 TO STA. 26+50 LT –
EST. DDE = 137 CY
–L– STA. 33+00 TO STA. 33+48 LT –
EST. DDE = 176 CY

DETAIL RR
STANDARD 'V' DITCH
(Not to Scale)



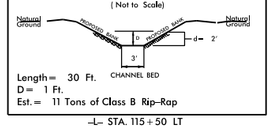
–L– STA. 98+68 TO STA. 99+66 LT
EST. DDE = 16 CY
–L– STA. 126+43 TO STA. 126+73 LT –
EST. DDE = 18 CY

DETAIL SS
PIPE OUTLET CHANNEL
(Not to Scale)



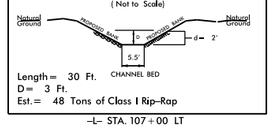
–L– STA. 75+65 TO STA. 75+80 LT

DETAIL TT
PIPE OUTLET CHANNEL
(Not to Scale)



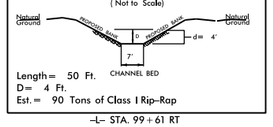
–L– STA. 115+50 LT

DETAIL UU
PIPE OUTLET CHANNEL
(Not to Scale)



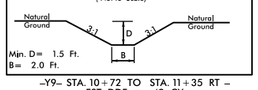
–L– STA. 107+00 LT

DETAIL V V
PIPE INLET CHANNEL
(Not to Scale)



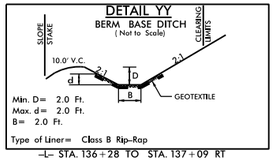
–L– STA. 99+61 RT

DETAIL WW
STANDARD BASE DITCH
(Not to Scale)



–Y9– STA. 10+72 TO STA. 11+35 RT –
EST. DDE = 42 CY

DETAIL YY
BERM BASE DITCH
(Not to Scale)



–L– STA. 136+28 TO STA. 137+09 RT

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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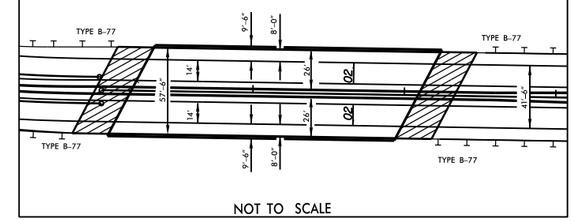
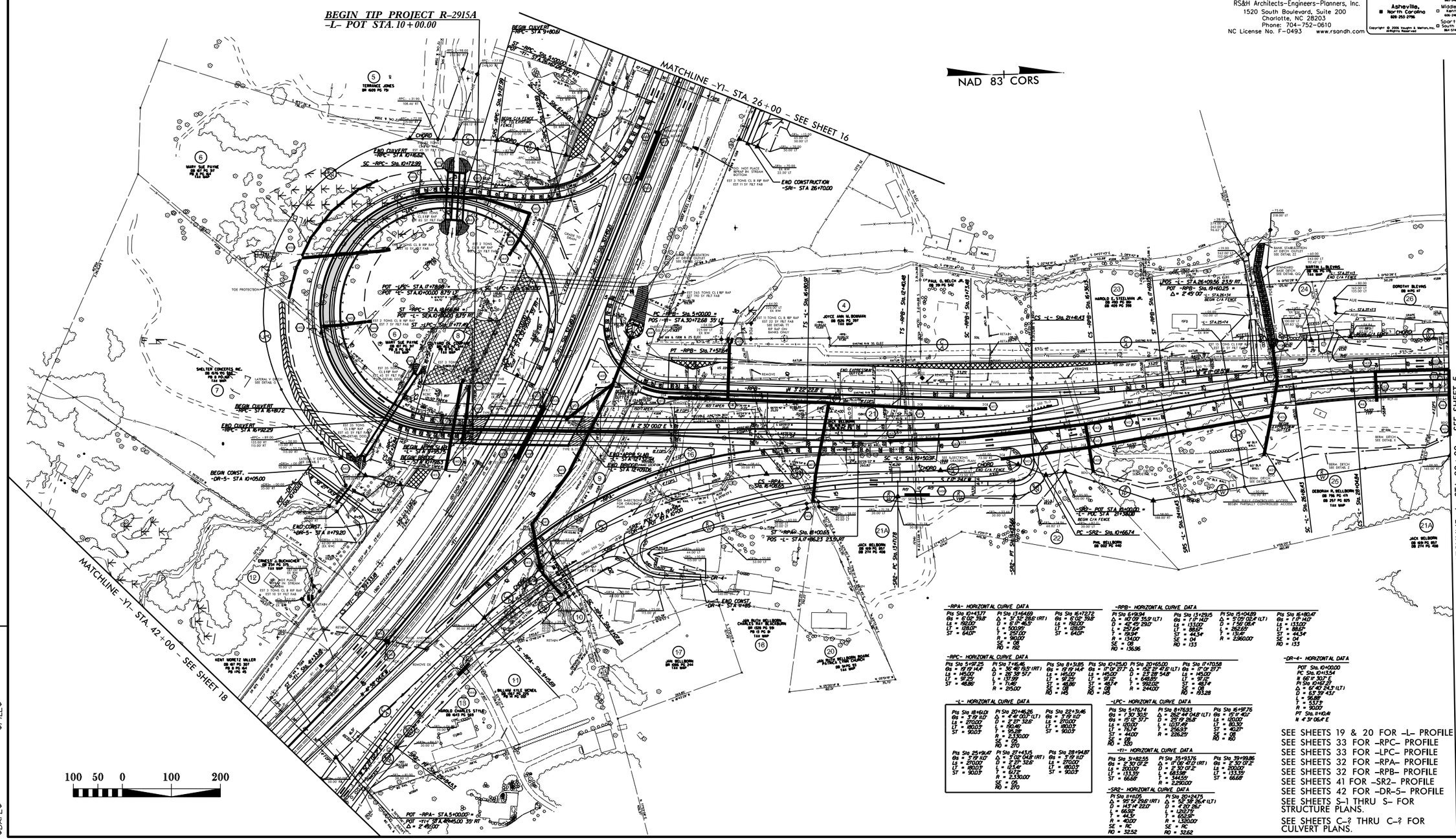
SKETCH SHOWING RELATIONSHIP OF PAVEMENT WIDTH TO BRIDGE WIDTH



NOT TO SCALE

YR 2015	12,600
YR 2035	20,600

US 421 -Y1-: 20,110 / 33,400 — 9750 / 16600 — 12,110 / 20,400
-L- US 221: 2230 / 3800



REVISIONS

12/12/13 - ROW REV: REVISED ROW BETWEEN -RPA- 9+15.69 & -RPA- 11+07.69 ON PARCEL 21; REVISED ROW BETWEEN -RPA- 16+08.65 & -L- 19+50.97 ON PARCELS 18, 21, & 22; CORRECTED OFFSET ON TCE LABEL AT -SR2- 26+81 FROM 50' TO 38' LT ON PARCEL 13 - KNW

01/31/14 - ROW REV: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 5, 7, & 13; ADDED DEED REFERENCES ON PARCELS 19 & 24; UPDATED PROPERTY OWNER NAME ON PARCEL 26 - KNW

6/27/14 - ROW REV: COMBINED PARCELS 4 & 19 AND OMITTED PARCEL 19; ADDED -DR-5- AND REVISED EASEMENT ON PARCEL 7; AMENDED PROPERTY LINES ON PARCELS 10, 18, 21, & 21A; REVISED EASEMENT ON PARCEL 18 AND ADDED PARCEL 21A; UPDATED PROPERTY OWNER NAME ON PARCEL 25 - JDS

-RPA- HORIZONTAL CURVE DATA

Pts Sta 10+43.77	Pt Sta 13+64.69	Pts Sta 16+72.72
Θs = 0°05'39.8"	Δ = 37°32'26.6" (RT)	Θs = 0°05'39.8"
Ls = 192.00'	D = 6°17'46.5"	Ls = 192.00'
LT = 128.07'	L = 500.99'	LT = 128.07'
ST = 64.04'	T = 257.00'	ST = 64.04'
	R = 90.00'	
	SE = 08	
	RO = 192	

-RPB- HORIZONTAL CURVE DATA

Pts Sta 6+94.94	Pt Sta 13+29.15	Pt Sta 15+04.89
Δ = 143°03'35.9" (LT)	Δ = 11°11'40.7"	Δ = 5°09'02.4" (LT)
D = 45°49'29.0"	D = 13.00'	D = 1°56'08.4"
L = 257.54'	Ls = 133.00'	L = 265.69'
T = 194.94'	LT = 88.67'	T = 133.41'
R = 134.00'	ST = 44.34'	R = 2,960.00'
SE = 08	SE = 04	
RO = 136.96	RO = 133	

Pts Sta 16+80.47
Θs = 11°11'40.7"
Ls = 133.00'
LT = 88.67'
ST = 44.34'
SE = 04
RO = 133

-RPC- HORIZONTAL CURVE DATA

Pts Sta 5+97.25	Pt Sta 7+16.46	Pts Sta 8+31.85	Pts Sta 10+25.10	Pt Sta 20+65.00	Pts Sta 17+70.58
Θs = 19°19'14.4"	Δ = 36°46'13.5" (RT)	Θs = 19°19'14.4"	Δ = 11°01'27"	Δ = 152°31'41.8" (LT)	Δ = 17°01'27"
Ls = 145.00'	D = 26°33'57.1"	Ls = 145.00'	Ls = 145.00'	D = 23°29'54.8"	Ls = 145.00'
LT = 97.25'	L = 137.59'	LT = 97.25'	LT = 97.15'	L = 648.85'	LT = 97.15'
ST = 48.86'	T = 71.46'	ST = 48.86'	ST = 48.74'	T = 392.02'	ST = 48.74'
	R = 215.00'	SE = 08	SE = 08	R = 244.00'	SE = 08
		RO = 145	RO = 145		RO = 145.28

-DR-4- HORIZONTAL DATA

POT Sta. 10+00.00
PC Sta. 10+13.54
N 66° 11' 10.7" E
PI Sta. 10+67.27
Δ = 67°47'24.3" (LT)
D = 63°39'43.1"
L = 96.89'
T = 53.17'
R = 90.00'
PT Sta. 11+10.41
N 4° 31' 06.4" E

-L- HORIZONTAL CURVE DATA

Pts Sta 18+45.01	Pt Sta 20+45.26	Pts Sta 22+31.46
Θs = 3°19'11.0"	Δ = 4°41'00.7" (LT)	Θs = 3°19'11.0"
Ls = 270.00'	D = 2°07'32.6"	Ls = 270.00'
LT = 180.03'	L = 190.46'	LT = 180.03'
ST = 90.03'	T = 95.26'	ST = 90.03'
	R = 2,530.00'	
	SE = 05	
	RO = 270	

Pts Sta 25+19.47	Pt Sta 27+43.15	Pts Sta 28+94.87
Θs = 3°19'11.0"	Δ = 1°00'04.8" (RT)	Θs = 3°19'11.0"
Ls = 270.00'	D = 2°27'52.6"	Ls = 270.00'
LT = 180.03'	L = 243.14'	LT = 180.03'
ST = 90.03'	T = 121.72'	ST = 90.03'
	R = 2,530.00'	
	SE = 05	
	RO = 270	

-LPC- HORIZONTAL CURVE DATA

Pts Sta 5+17.74	Pt Sta 8+76.93	Pts Sta 15+97.76	
Θs = 1°30'30.5"	Δ = 262°44'04.8" (LT)	Θs = 15°11'40.7"	
Ls = 0°12'37.7"	D = 25°17'28.8"	Ls = 133.00'	
Ls = 150.00'	L = 1,037.46'	LT = 80.30'	
LT = 75.74'	T = 756.93'	ST = 40.27'	
ST = 44.00'	R = 226.29'	SE = 08	
SE = 08		RO = 180	
RO = 300			

-Y1- HORIZONTAL CURVE DATA

Pts Sta 31+82.55	Pt Sta 35+93.76	Pts Sta 39+99.86
Θs = 2°30'01.2"	Δ = 11°06'40.0" (RT)	Θs = 2°30'01.2"
Ls = 200.00'	D = 2°30'01.2"	Ls = 200.00'
LT = 133.35'	L = 681.58'	LT = 133.35'
ST = 66.68'	T = 344.35'	ST = 66.68'
	R = 2,290.00'	
	SE = 05	
	RO = 270	

-SR2- HORIZONTAL CURVE DATA

Pt Sta 8+14.05	Pt Sta 20+18.475
Δ = 95°5'29.6" (RT)	Δ = 52°38'26.4" (LT)
D = 145°14'22.0"	D = 4°20'26.1"
Ls = 66.92'	L = 1,212.77'
T = 44.5'	T = 652.97'
R = 40.00'	R = 1,320.00'
SE = RC	SE = RC
RO = 32.52	RO = 32.52

SEE SHEETS 19 & 20 FOR -L- PROFILE
SEE SHEETS 33 FOR -RPC- PROFILE
SEE SHEETS 33 FOR -LPC- PROFILE
SEE SHEETS 32 FOR -RPA- PROFILE
SEE SHEETS 32 FOR -RPB- PROFILE
SEE SHEETS 41 FOR -SR2- PROFILE
SEE SHEETS 42 FOR -DR-5- PROFILE
SEE SHEETS S-1 THRU S- FOR STRUCTURE PLANS.
SEE SHEETS C-? THRU C-? FOR CULVERT PLANS.

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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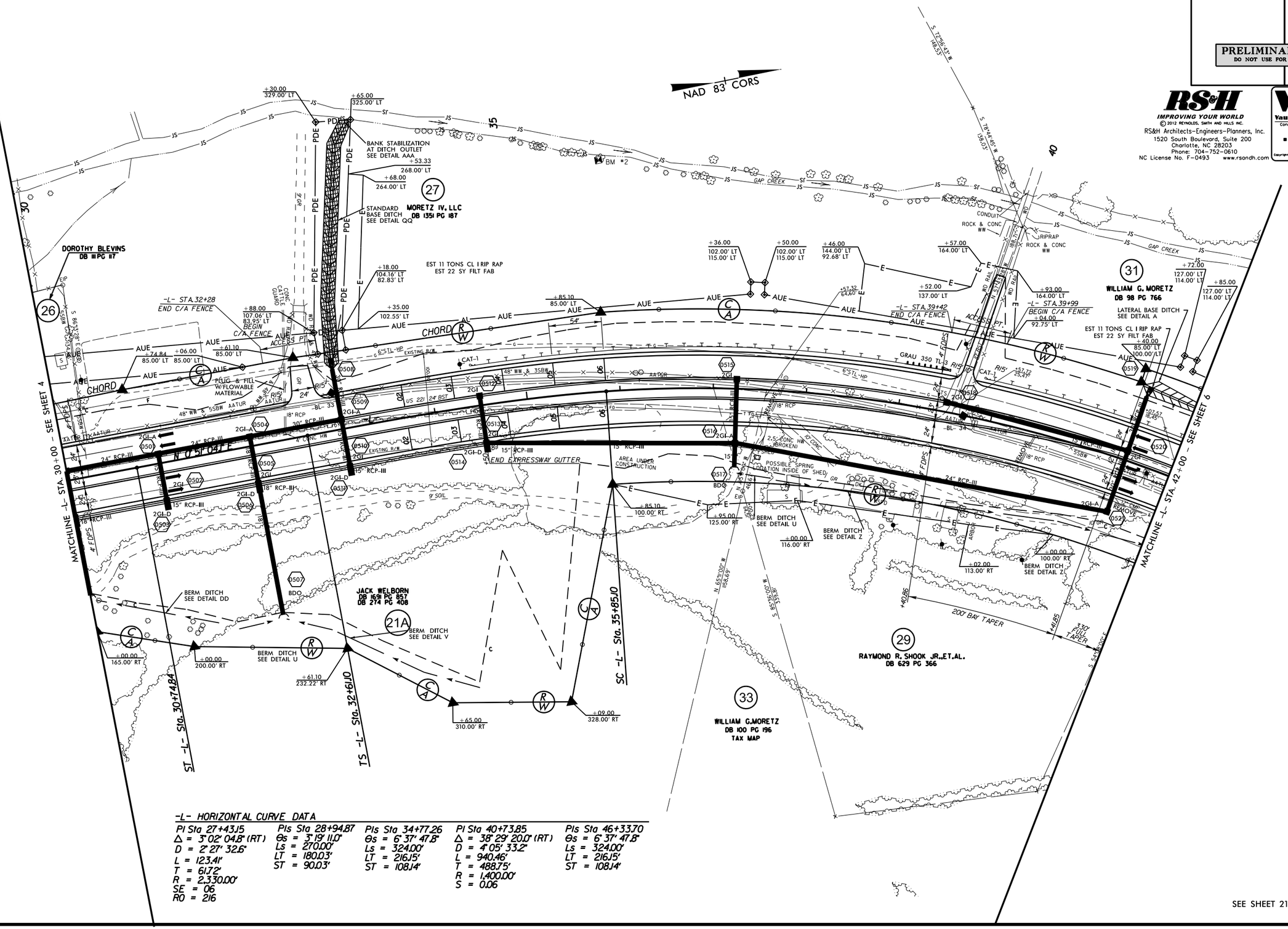
REVISIONS

12/12/13 ROW REV: CORRECTED STATION ON ROW MONUMENT FROM -L- 31+30 TO -L- 31+00 ON PARCEL 21; REVISED ROW AND ADJUSTED DUE BETWEEN -L- 32+61.10 & -L- 35+85.10 ON PARCEL 21; ADDED -L- STATION & OFFSET AT -L- 39+57, 164' LT ON PARCEL 27. - KNW
01/31/14 ROW REV: UPDATED PROPERTY OWNER NAMES ON PARCELS 28 & 31. - KNW
06/27/14 ROW REV: CHANGED PARCEL 21 TO 21A, COMBINED PARCELS 28 & 33 TO BECOME PARCEL 33, REVISED PROPERTY LINES, AND OMITTED PARCEL 28; UPDATED DEED REFERENCE ON PARCEL 31. - JDS



-L- HORIZONTAL CURVE DATA

PI Sta 27+43.15	PIs Sta 28+94.87	PIs Sta 34+77.26	PI Sta 40+73.85	PIs Sta 46+33.70
Δ = 3° 02' 04.8" (RT)	Θs = 3° 19' 11.0"	Θs = 6° 37' 47.8"	Δ = 38° 29' 20.0" (RT)	Θs = 6° 37' 47.8"
D = 2° 27' 32.6"	Ls = 270.00'	Ls = 324.00'	D = 4° 05' 33.2"	Ls = 324.00'
L = 123.41'	LT = 180.03'	LT = 216.15'	L = 940.46'	LT = 216.15'
T = 61.72'	ST = 90.03'	ST = 108.14'	T = 488.75'	ST = 108.14'
R = 2,330.00'			R = 1,400.00'	
SE = 06			S = 0.06	
RO = 216				

SEE SHEET 21 FOR -L- PROFILE

$DATE$ $FILE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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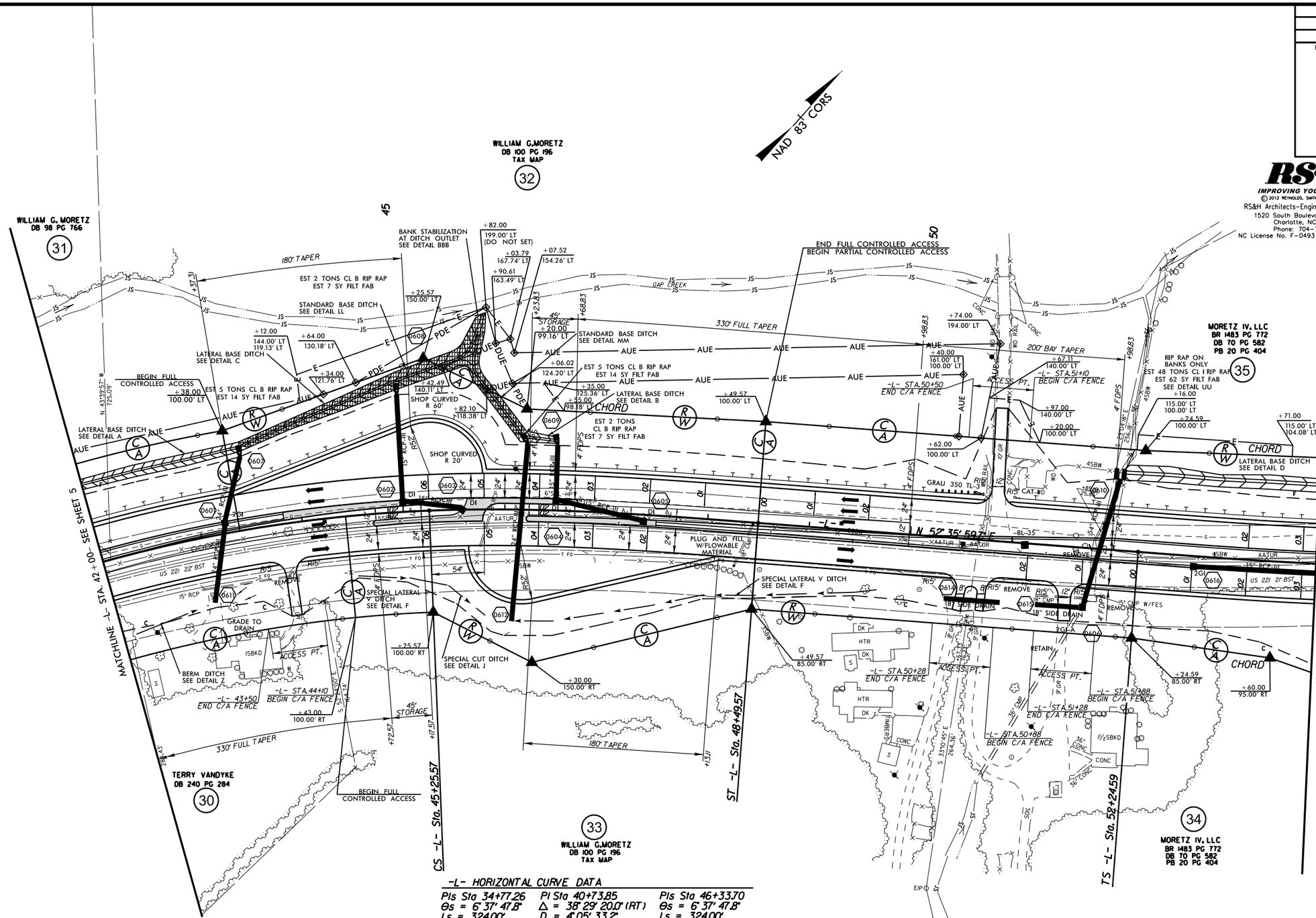
REVISIONS

12/12/13 ROW REV: CORRECTED OFFSET ON AUE LABEL AT -L- 50+40 FROM 160' TO 161' LT ON PARCEL 32 - KNW
01/31/14 ROW REV: UPDATED PROPERTY OWNER NAME ON PARCEL 31; ADDED DEED REFERENCE ON PARCEL 30 - KNW
06/27/14 ROW REV: REVISED PROPERTY LINE BETWEEN PARCELS 30 & 33; UPDATED DEED REFERENCE ON PARCEL 31. CORRECTED C/A STATION LABELS BETWEEN -L- 51+28 AND 51+88 ON PARCEL 34. - JDS



-L- HORIZONTAL CURVE DATA

PIs Sta 34+77.26	PI Sta 40+73.85	PIs Sta 46+33.70
Θs = 6° 37' 47.8"	Δ = 38° 29' 20.0" (RT)	Θs = 6° 37' 47.8"
Ls = 324.00'	D = 4° 05' 33.2"	Ls = 324.00'
LT = 216.15'	L = 940.46'	LT = 216.15'
ST = 108.14'	T = 488.75'	ST = 108.14'
	R = 1,400.00'	
	SE = 06	
	RO = 324	
PIs Sta 54+40.72	PI Sta 56+67.67	PIs Sta 58+94.38
Θs = 6° 11' 16.6"	Δ = 9° 04' 42.1" (LT)	Θs = 6° 11' 16.6"
Ls = 324.00'	D = 3° 49' 11.0"	Ls = 324.00'
LT = 216.13'	L = 237.67'	LT = 216.13'
ST = 108.12'	T = 119.08'	ST = 108.12'
	R = 1,500.00'	
	SE = 06	
	RO = 237.67	

SEE SHEET 22 FOR -L- PROFILE

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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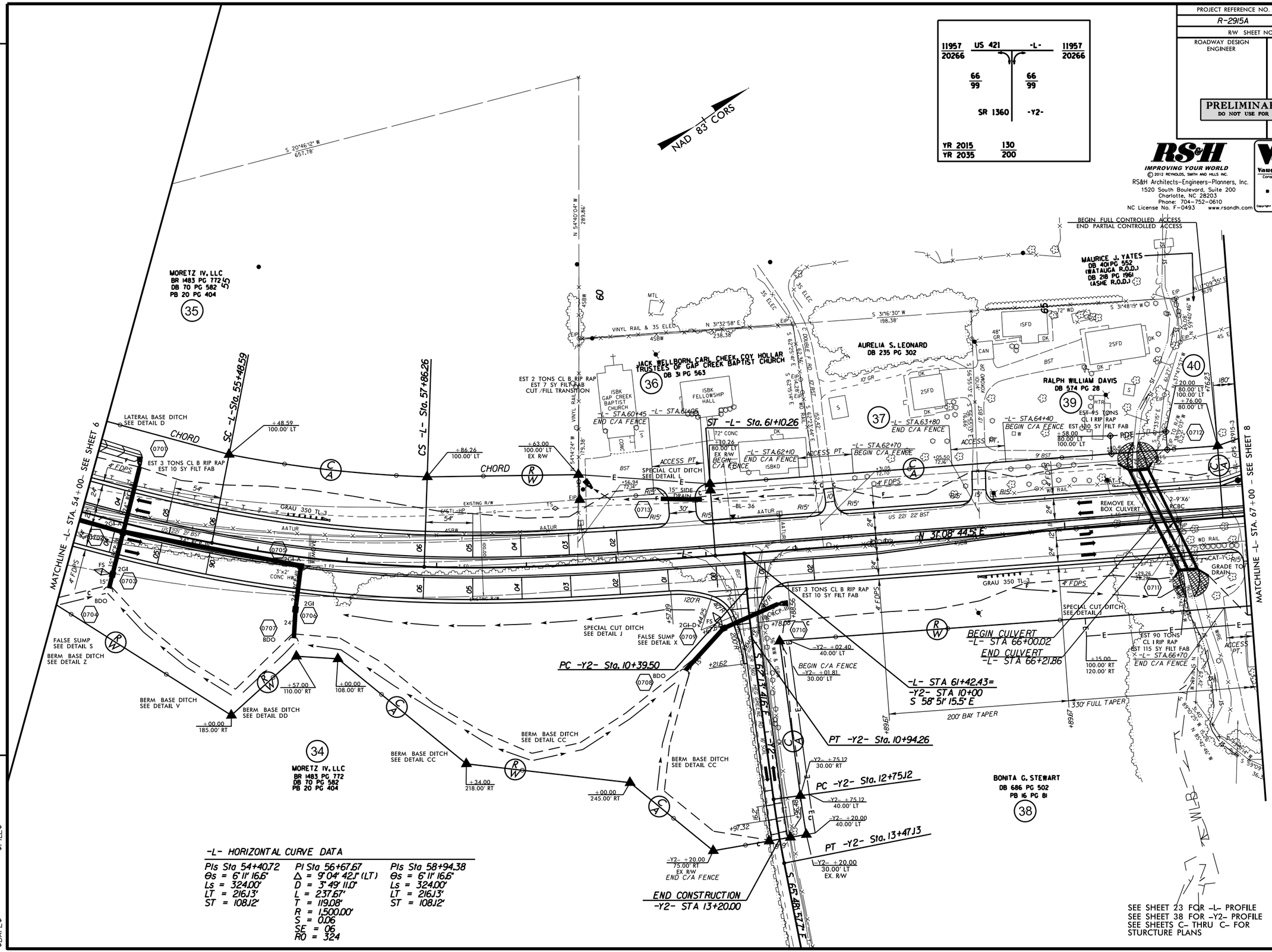
US 421	-L-
11957 / 20266	11957 / 20266
66 / 99	66 / 99
SR 1360	-Y2-
YR 2015 / YR 2035	130 / 200



-L- HORIZONTAL CURVE DATA

PIs Sta 54+40.72	PI Sta 56+67.67	PIs Sta 58+94.38
Θs = 6° 11' 16.6"	Δ = 9° 04' 42.1" (LT)	Θs = 6° 11' 16.6"
Ls = 324.00'	D = 3° 49' 11.0"	Ls = 324.00'
LT = 216.13'	L = 237.67'	LT = 216.13'
ST = 108.12'	T = 119.08'	ST = 108.12'
	R = 1,500.00'	
	S = 0.06	
	SE = 06	
	RO = 324	

REVISIONS

12/12/13 ROW REV: REMOVED ROW STATION & OFFSET NEAR -L- 55+04 RT ON PARCEL 34; ADDED ROW BETWEEN MONUMENTS AT -L- 61+10.26 LT ON PARCEL 36; CORRECTED TCE AT -L- 61+10.26, 80' LT ON PARCEL 36. - KNW

$FILE$

$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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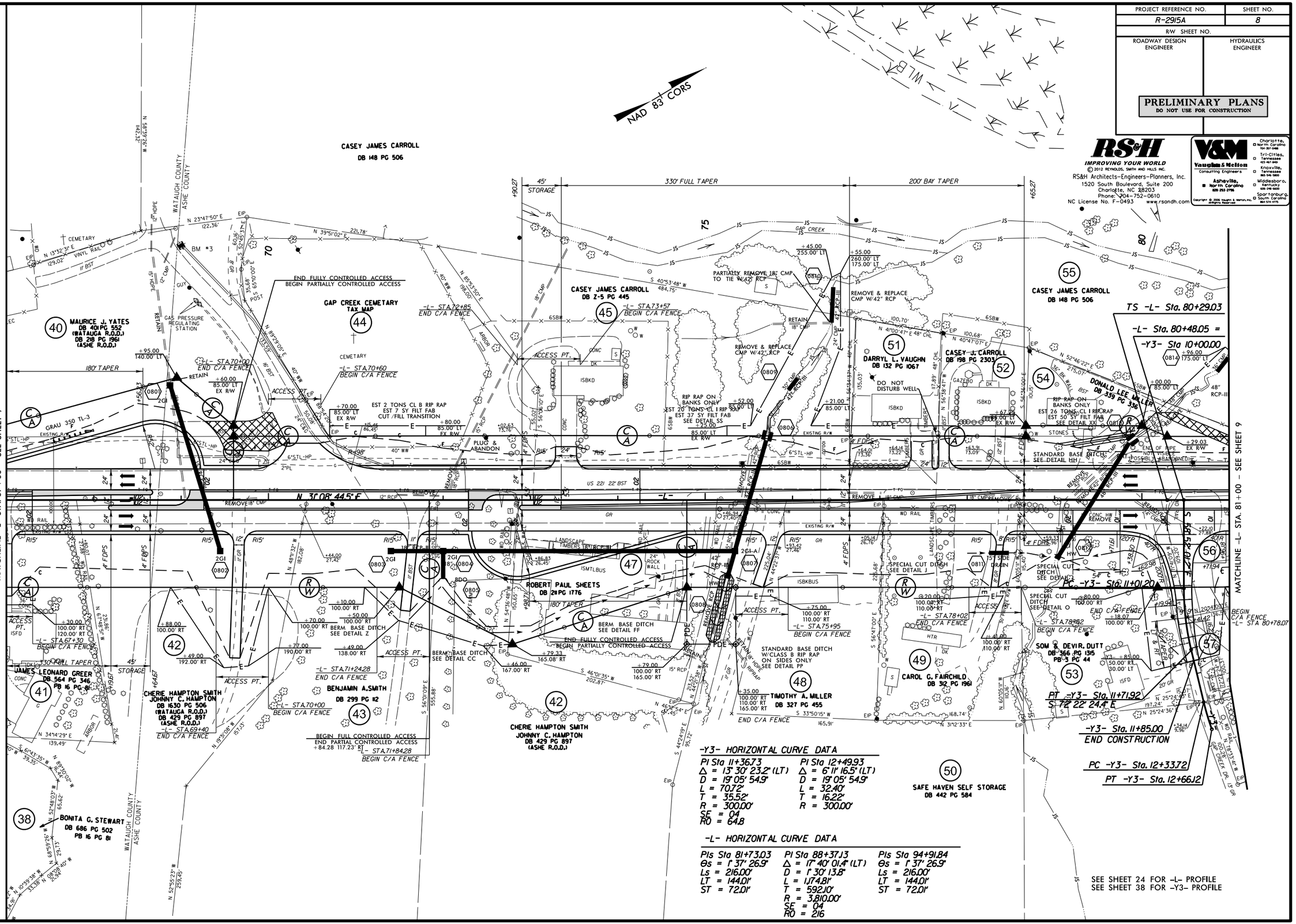
REVISIONS

12/12/13 ROW REV: REVISED ROW AT -L- 78+67.25 BETWEEN EX ROW & 85' LT ON PARCELS 52 & 54; CORRECTED STATION ON ROW LABEL FROM -L- 80+17 TO -L- 80+00 ON PARCEL 54; REMOVED ROW MONUMENT AT -L- 80+95 FROM 100' TO 99.70' RT ON PARCEL 56. - KNW

01/31/14 ROW REV: ADDED DEED REFERENCE ON PARCEL 40; UPDATED PROPERTY OWNER NAME ON PARCEL 56; REVISED TCE OFFSET AT -L- 80+95 FROM 100' TO 99.70' RT ON PARCEL 56. - KNW

06/27/14 ROW REV: COMBINED PARCELS 42 & 46 AND OMITTED PARCEL 46; ADDED "DO NOT DISTURB" NOTE TO WELL ON PARCEL 51; REVISED C/A BREAK LIMITS BETWEEN -L- 80+71.21 AND -L- 80+78.07 ON PARCEL 53 & 56. - JDS



-Y3- HORIZONTAL CURVE DATA

PI Sta 11+36.73	PI Sta 12+49.93
Δ = 13° 30' 23.2" (LT)	Δ = 6° 11' 16.5" (LT)
D = 19° 05' 54.9"	D = 19° 05' 54.9"
L = 70.72'	L = 32.40'
T = 35.52'	T = 16.22'
R = 300.00'	R = 300.00'
SE = 04	
RO = 64.8	

-L- HORIZONTAL CURVE DATA

PIs Sta 81+73.03	PI Sta 88+37.13	PIs Sta 94+91.84
Θs = 1° 37' 26.9"	Δ = 17° 40' 01.4" (LT)	Θs = 1° 37' 26.9"
Ls = 216.00'	D = 1° 30' 13.8"	Ls = 216.00'
LT = 144.01'	L = 1,174.81'	LT = 144.01'
ST = 72.01'	T = 592.10'	ST = 72.01'
	R = 3,810.00'	
	SE = 04	
	RO = 216	

SEE SHEET 24 FOR -L- PROFILE
SEE SHEET 38 FOR -Y3- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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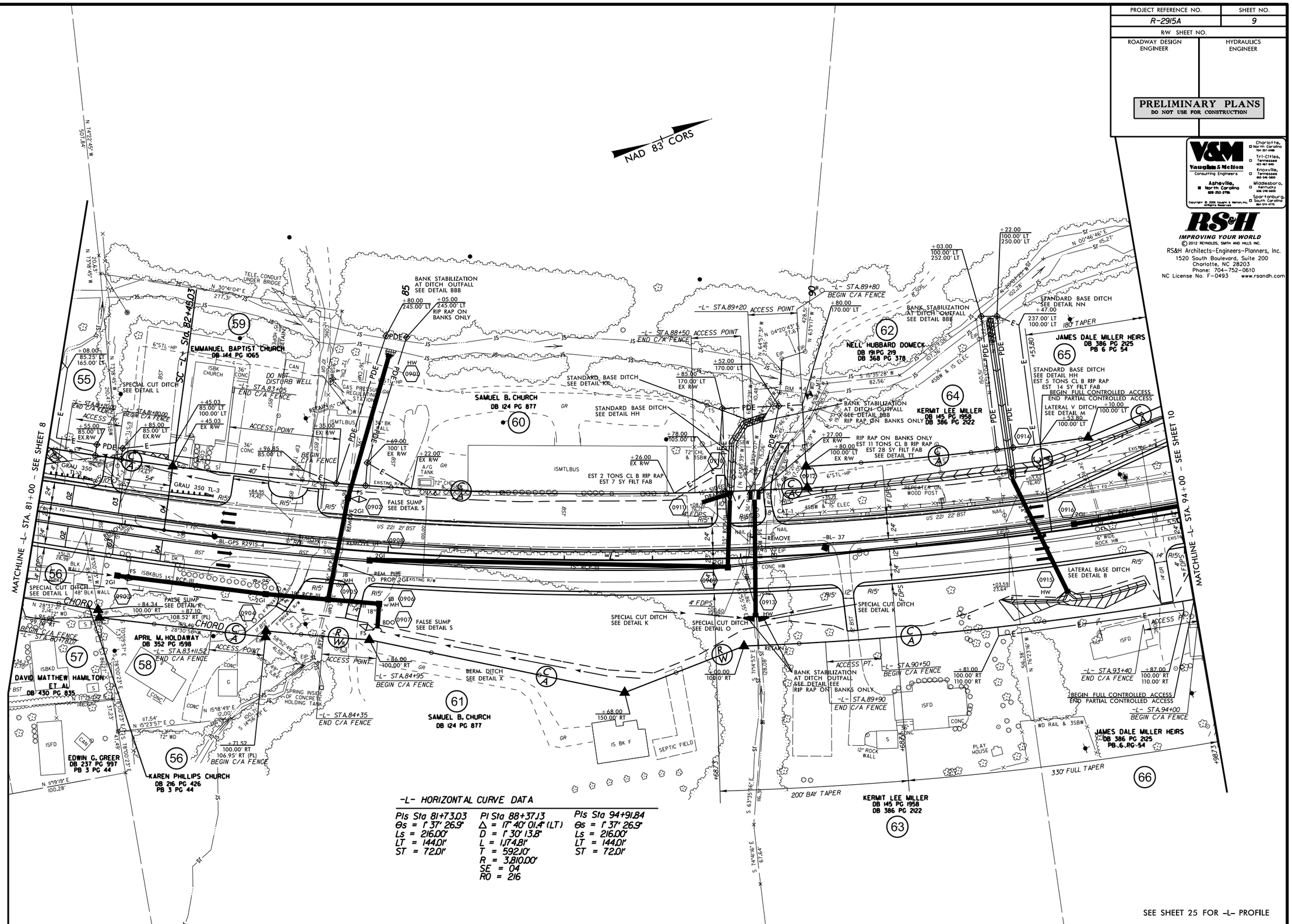
REVISIONS
01/31/14 ROW REV: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 57. - KNW
05/09/14 ROW REV: REVISED ROW & C/A BETWEEN -L- 92+53.80 & -L- 96+35.83 ON PARCEL 65. - ACC
06/27/14 ROW REV: ADDED DRIVEWAY, PROPOSED PDE, AND REVISED TCE ON PARCEL 55; CHANGED PROPERTY OWNER NAMES ON PARCELS 56, 65, AND 66; REVISED PDE AND ADDED 'DO NOT DISTURB' NOTE TO WELL ON PARCEL 60. - JDS



-L- HORIZONTAL CURVE DATA

PIs Sta 81+73.03	PI Sta 88+37.13	PIs Sta 94+91.84
Θs = 1° 37' 26.9"	Δ = 17° 40' 01.4" (LT)	Θs = 1° 37' 26.9"
Ls = 216.00'	D = 1° 30' 13.8"	Ls = 216.00'
LT = 144.01'	L = 1,174.81'	LT = 144.01'
ST = 72.01'	T = 592.10'	ST = 72.01'
	R = 3,810.00'	
	SE = 04	
	RO = 216	

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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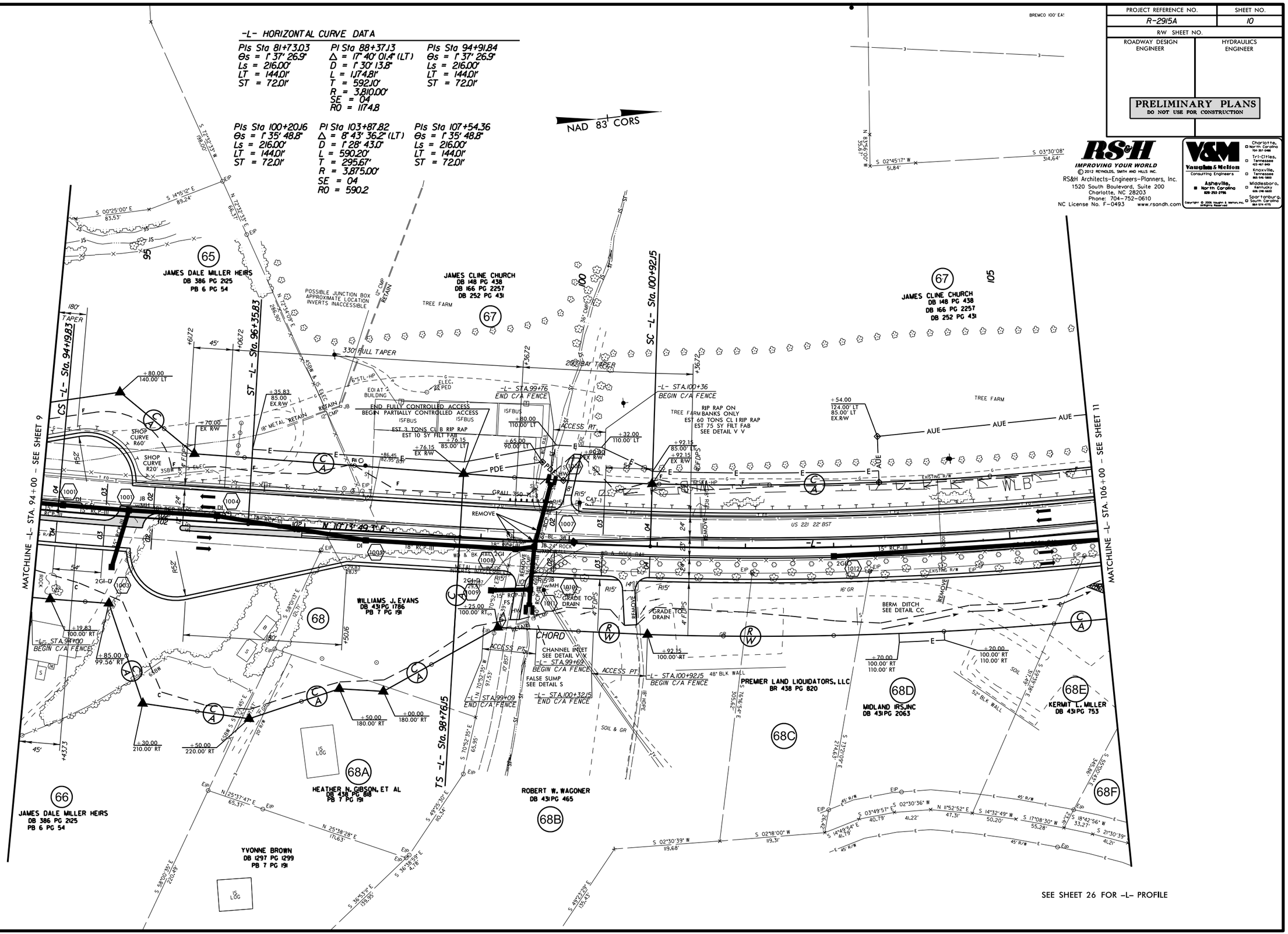
REVISIONS

12/12/13 ROW REV: REVISED ROW AT –L– 94+19.83, 100' RT ON PARCEL 66; CORRECTED ROW AT –L– 99+25, 100' RT ON PARCEL 69; REMOVED TCE OFFSETS OF 85.73' AT –L– 99+80 LT AND 85.68' AT –L– 100+32 LT ON PARCEL 67; REVISED ROW AT –L– 100+92.15, 100' RT ON PARCEL 69. – KNW

01/31/14 ROW REV: SUBDIVIDED PARCEL 68 INTO PARCELS 68, & 68A WITH PROPERTY OWNERS AND DEED REFERENCES; SUBDIVIDED PARCEL 69 INTO PARCELS 68B, 68C, 68D, 68E, & 68F WITH PROPERTY OWNERS AND DEED REFERENCES; REMOVED PARCEL 67 FROM PARCEL 68. – KNW

05/09/14 ROW REV: REVISED ROW & ADDED TCE BETWEEN –L– 94+85 & –L– 99+25 ON PARCELS 66, 68, 68A, & 68B. – ACC

06/27/14 ROW REV: CHANGED PROPERTY OWNER NAMES ON PARCELS 65, 66, AND 68C. – IDS



$DATE$ $FILE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	11
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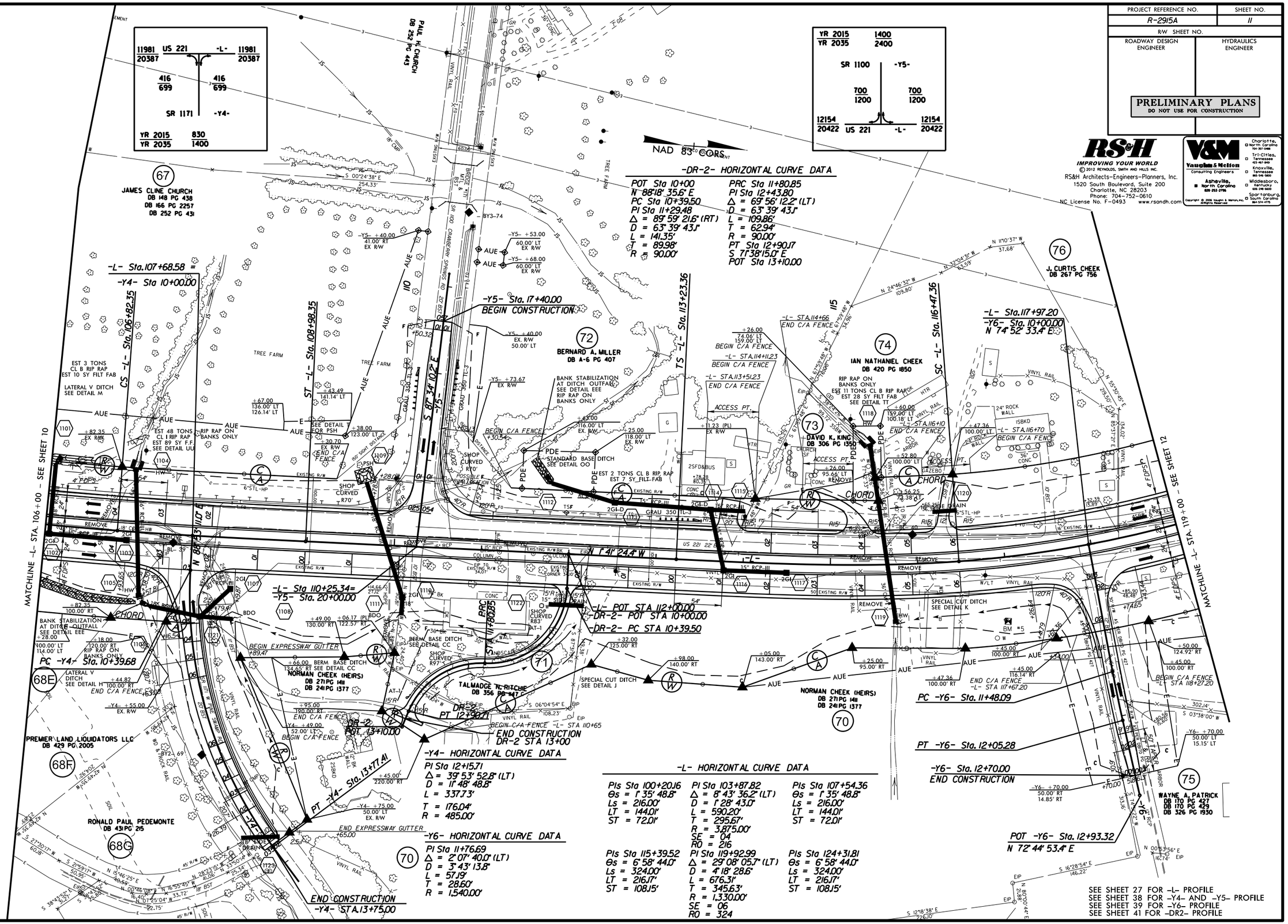
REVISIONS

12/12/13 ROW REV: REVISED ROW AT -L- 106+82.35, 100' RT ON PARCEL 69; REVISED ROW AT -Y4- 13+75, EX. ROW RT ON PARCEL 69; REVISED ROW & 50' LT ON PARCEL 70; REVISED AUE AT -L- 109+38, 123' LT ON PARCEL 67; REVISED TCE TO TIE TO AUE AT -L- 109+43.19, 141.14' LT ON PARCEL 67; CORRECTED ROW STATION & OFFSET LABEL FROM -L- 109+83, 182' RT TO -L- 109+95, 190' RT ON PARCEL 70; REMOVED TCE STATION & OFFSET LABEL NEAR -L- 114+11.23 LT ON PARCELS 72 & 73; REVISED ROW AND ADJUSTED PDE BETWEEN -L- 114+11.23 & 115+56.25 LT ON PARCEL 73; REVISED ROW AND ADJUSTED PDE BETWEEN -L- 115+52.80 & -L- 116+47.36 LT ON PARCEL 74; REVISED TCE AT -Y6- 12+70 TO TIE TO EXIST EASEMENT LT/RT ON PARCELS 70 & 75. - KNW

01/31/14 ROW REV: SUBDIVIDED PARCEL 69 INTO PARCELS 68E, 68F, & 68G WITH PROPERTY OWNERS AND DEED REFERENCES; REMOVED PARCEL 69; UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 74. - KNW

06/27/14 ROW REV: DELETED PROPOSED ROW AND REVISED TCE ALONG -Y4- RT; REMOVED ACCESS POINT ON PARCEL 71; REVISED C/A LIMITS BETWEEN -L- 117+67.20 AND -L- 118+27.20 ON PARCELS 70 & 75. - ACC



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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	12
R/W SHEET NO.	
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REVISIONS

12/12/13 ROW REV: ADDED ROW MONUMENT AT -L- 126+47.66, 100' RT ON PARCEL 79; CORRECTED ROW AND ADJUSTED PDE BETWEEN -L- 123+23.66, 100' RT & -L- 126+47.66, 100' RT ON PARCELS 78 & 79; CORRECTED OFFSET ON TCE LABEL AT -L- 125+95 FROM 145.08' TO 145.21' LT ON PARCEL 80. - KNW

01/31/14 ROW REV: SUBDIVIDED PARCEL 78 INTO PARCELS 78 & 78A WITH PROPERTY OWNERS AND DEED REFERENCES. - KNW

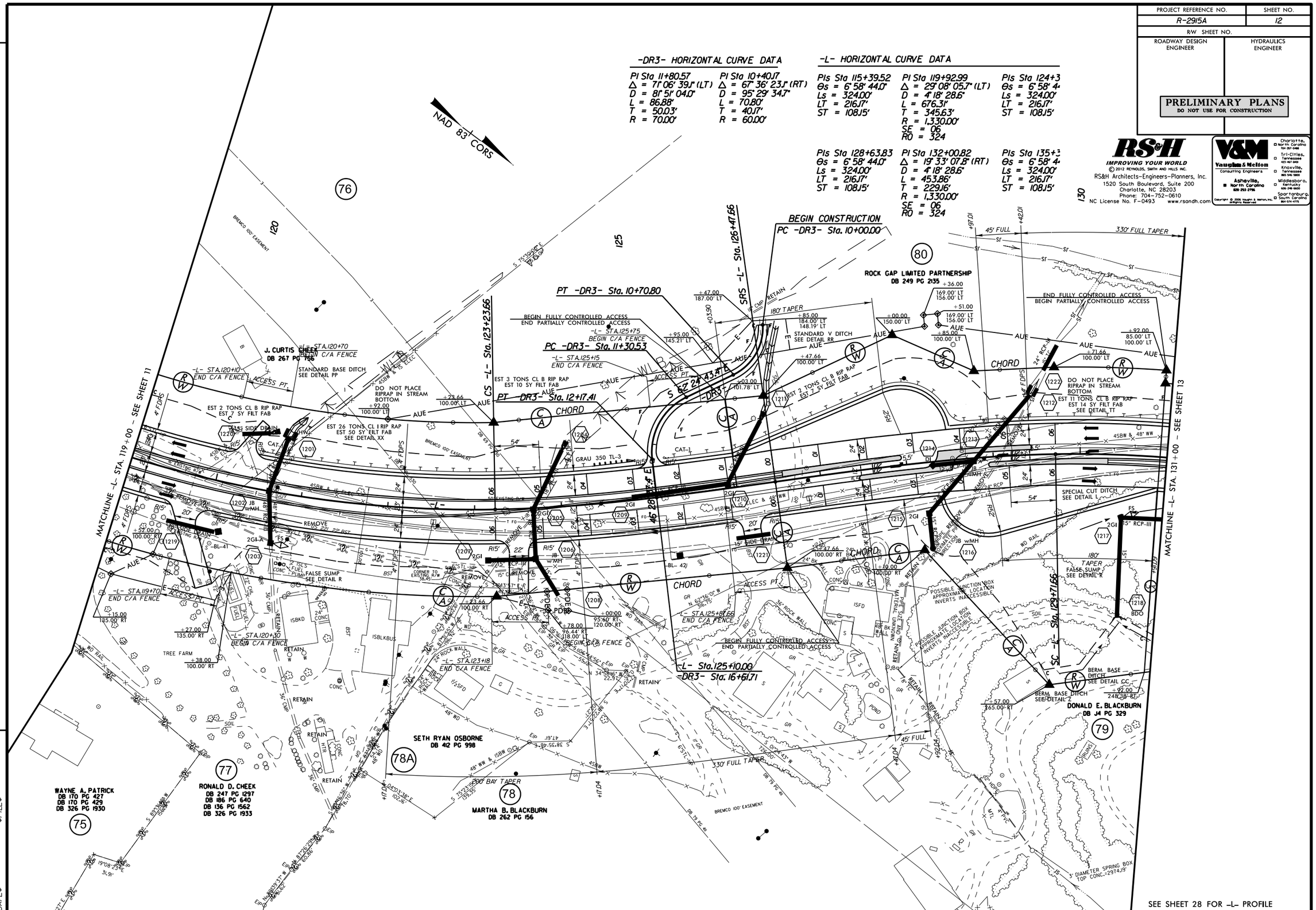
-DR3- HORIZONTAL CURVE DATA

PI Sta 11+80.57	PI Sta 10+40.17
Δ = 71° 06' 39.1" (LT)	Δ = 67° 36' 23.1" (RT)
D = 81° 51' 04.0"	D = 95° 29' 34.7"
L = 86.88'	L = 70.80'
T = 50.03'	T = 40.17'
R = 70.00'	R = 60.00'

-L- HORIZONTAL CURVE DATA

PIs Sta 115+39.52	PI Sta 119+92.99	PIs Sta 124+3
Θs = 6° 58' 44.0"	Δ = 29° 08' 05.7" (LT)	Θs = 6° 58' 4
Ls = 324.00'	D = 4° 18' 28.6"	Ls = 324.00'
LT = 216.17'	L = 676.31'	LT = 216.17'
ST = 108.15'	T = 345.63'	ST = 108.15'
	R = 1,330.00'	
	SE = 06	
	RO = 324	

PIs Sta 128+63.83	PI Sta 132+00.82	PIs Sta 135+3
Θs = 6° 58' 44.0"	Δ = 19° 33' 07.8" (RT)	Θs = 6° 58' 4
Ls = 324.00'	D = 4° 18' 28.6"	Ls = 324.00'
LT = 216.17'	L = 453.86'	LT = 216.17'
ST = 108.15'	T = 229.16'	ST = 108.15'
	R = 1,330.00'	
	SE = 06	
	RO = 324	



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$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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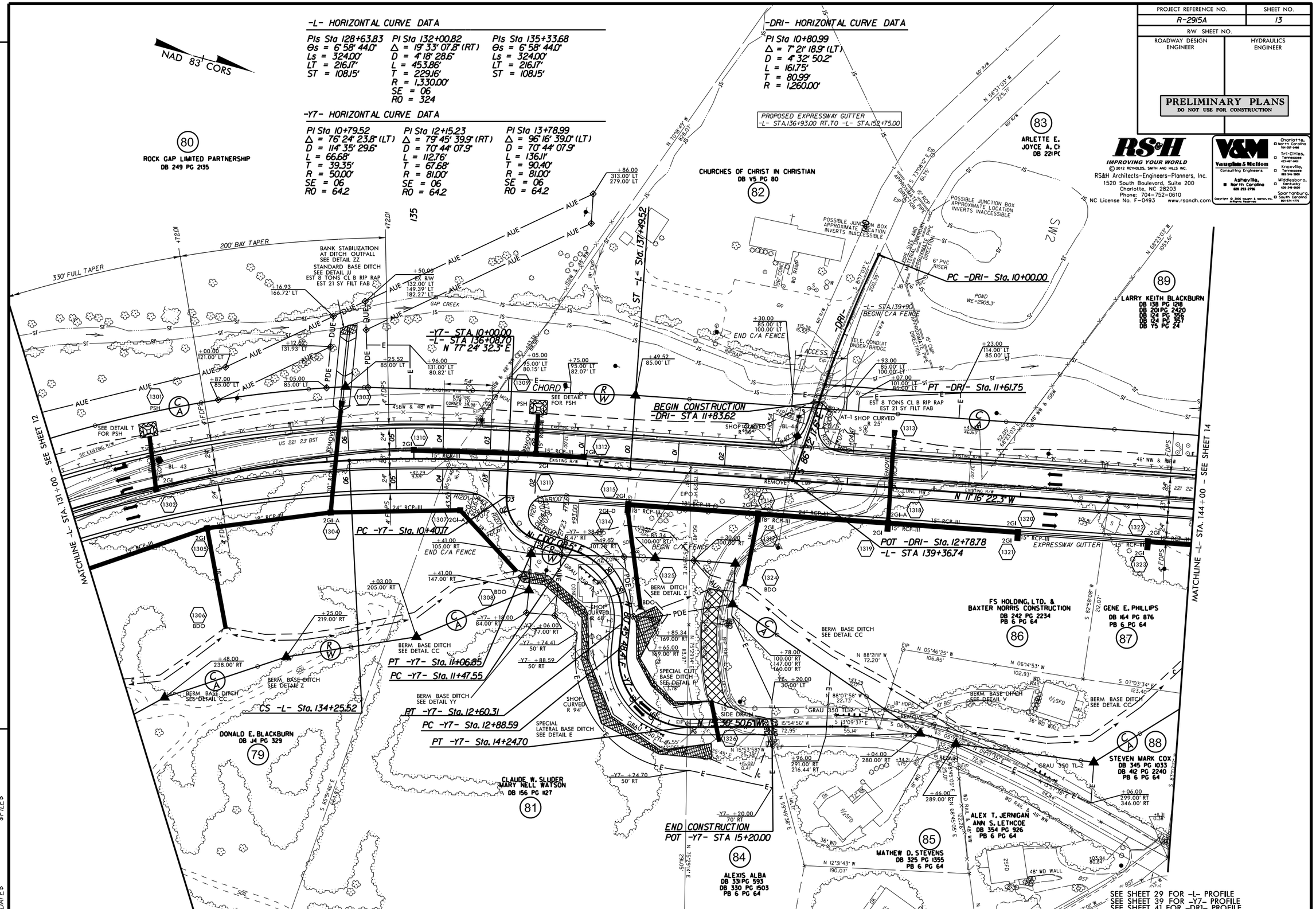
REVISIONS

12/12/13 ROW REV: CORRECTED STATION ON TCE LABEL FROM -L- 143+96 TO -L- 143+06 ON PARCEL 88. - KNW
01/31/14 ROW REV: ADDED DEED BOOK REFERENCE ON PARCEL 88. - KNW



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$DATE$

PROJECT REFERENCE NO.	SHEET NO.
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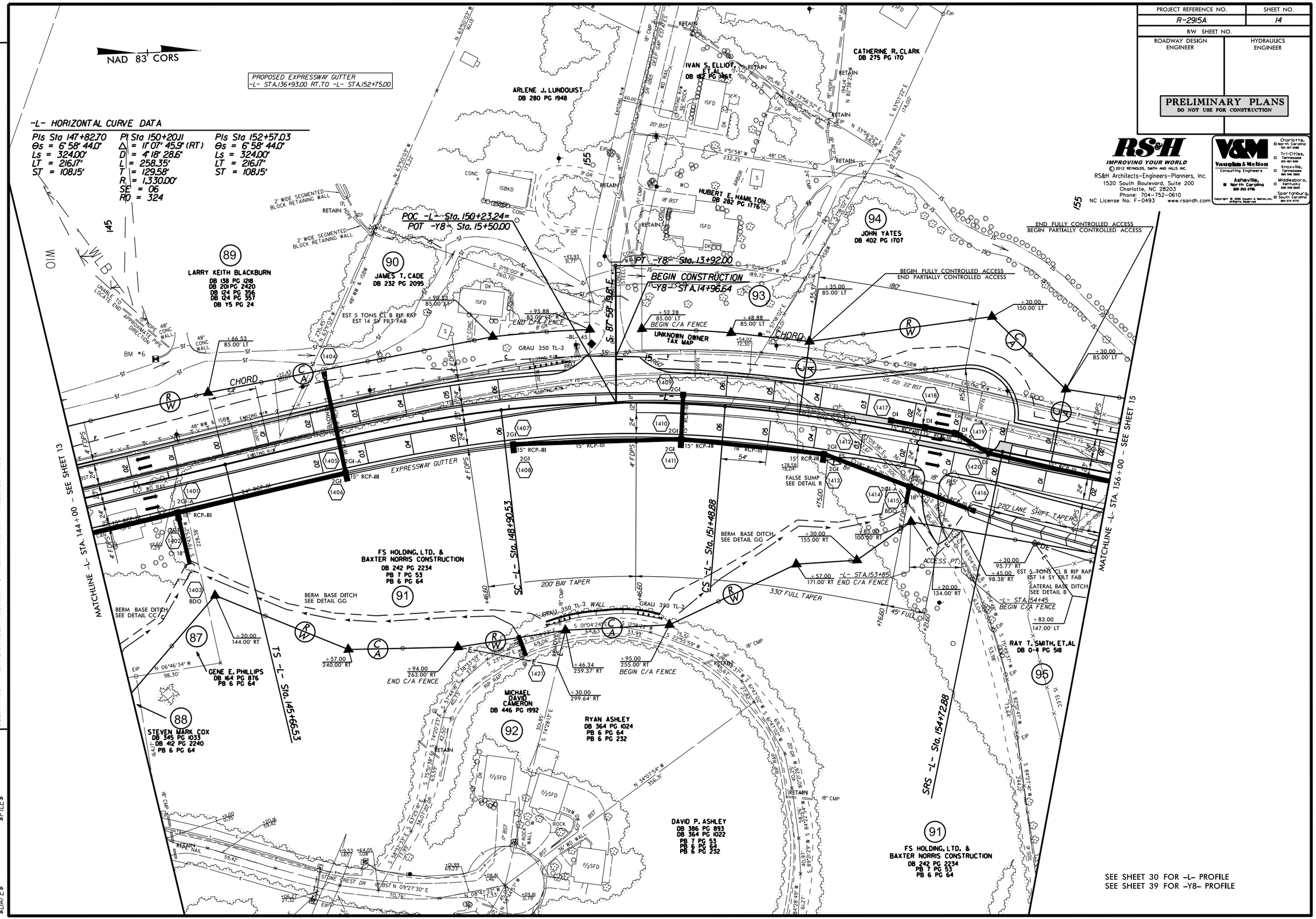
REVISIONS

12/12/13	ROW	REV: REVISED ROW BETWEEN -L- 151+48.88 & -L- 152+35 LT ON PARCEL 93; REMOVED ROW MONUMENT AT -L- 155+30, 97.82' RT ON PARCEL 95; ADDED A PERMANENT EASEMENT MONUMENT AND ADJUSTED PDE & TCE AT -L- 155+30, 95.77' RT ON PARCEL 95. - KNW
01/31/14	ROW	REV: ADDED DEED REFERENCE ON PARCEL 88; UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 94. - KNW
06/27/14	ROW	REV: CHANGED PROPERTY OWNER NAME ON PARCEL 92. - JDS

$FILE$
$DATE$



PROJECT REFERENCE NO.	SHEET NO.
R-2915A	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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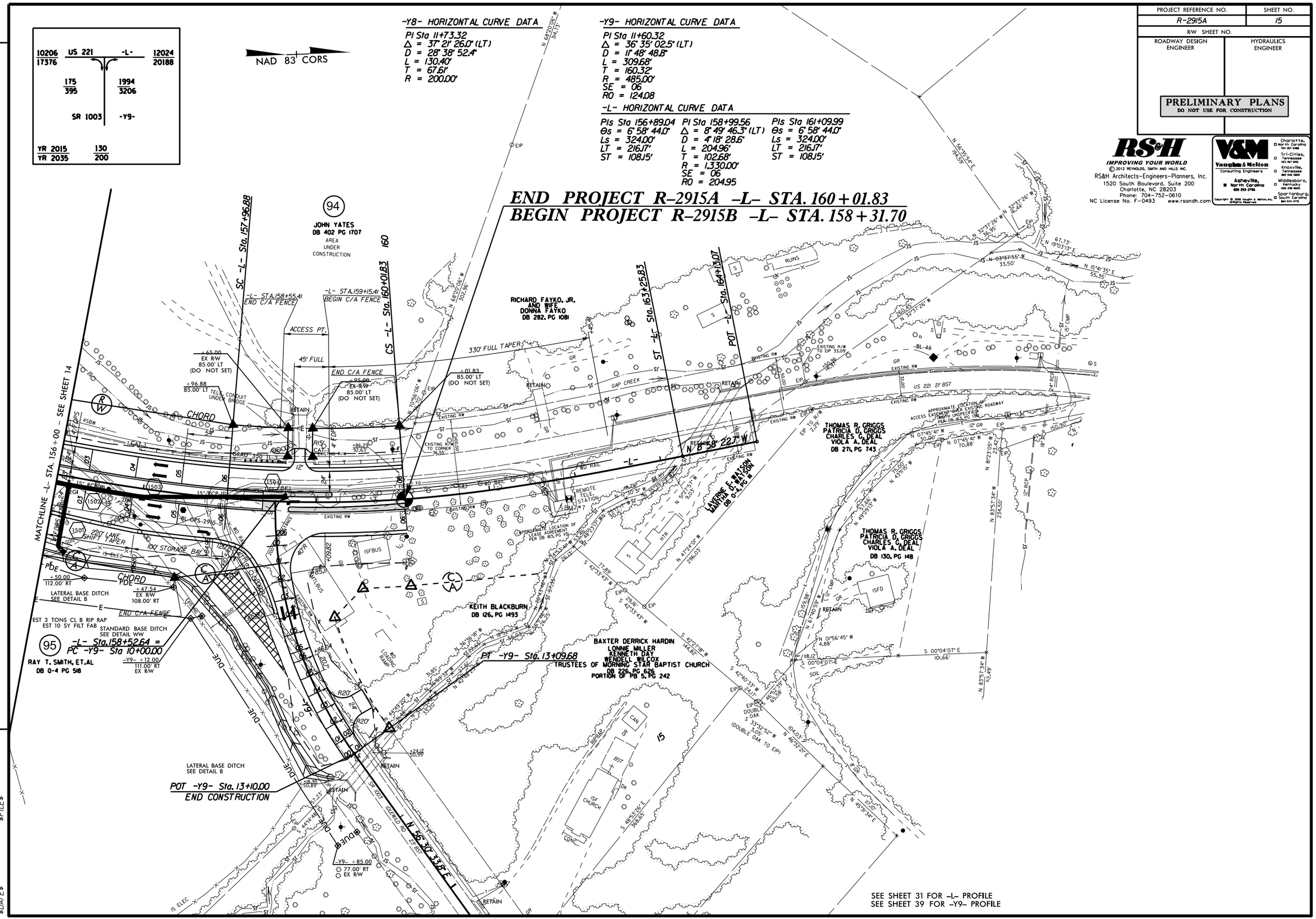
REVISIONS

01/31/14 ROW REV: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 94. - KNW
06/27/14 ROW REV: OMITTED PARCEL 96 (TO BE COMBINED WITH R-2915B PARCEL 3); ADDED 24' DRIVE AT -Y9- STA. 12+62 LT. - JDS



PROJECT REFERENCE NO.	SHEET NO.
R-2915A	16
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REVISIONS

01/31/14 ROW REV: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 94. - KNW
06/27/14 ROW REV: REVISED PROPERTY LINES AND ADDED PARCEL 1A WITH PROPERTY OWNER AND DEED REFERENCE; ADDED PARCEL 19. - JDS

-SRI- HORIZONTAL CURVE DATA

PI Sta. 11+77.41
Δ = 90° 00' 00.0" (RT)
D = 71° 37' 11.0"
L = 125.66'
T = 80.00'
R = 80.00'

NAD 83 CORS

N 85°00'31" W 476.60'

BRADLEY HARRIS
DB 1689 PG 34
PB 23 PG 433

1
BR 1004 PG 848
DB 632 PG 861
DB 592 PG 200
PB 18 PG 41
PB 23 PG 433
HIGH COUNTRY COMMERCIAL PROPERTY ,LLC

1A
ISBLKBUS
VENTURE PROPERTIES VII, LLC
DB 1737 PG 688
PB 23 PG 433

2
MAURICE J. YATES
DB 260 PG 106
TAX MAP

3
DEEP GAP ASSOC LLC
BR 928 PG 844
DB 406 PG 418
DB 559 PG 675
TAX MAP

4
JOYCE ANN M. BOWMAN
DB 1526 PG 397

19
JOHNNY H. ANDERSON
DB 540 PG 177
PB 8 PG 164
TAX MAP

MASONIC LODGE
PB 8 PG 164
TAX MAP

PT Sta. 12+23.07

-SR1- +00.00 120.00' LT 50.00' LT
-SR1- +23.07 50.00' LT
-SR1- +23.07 22.50' LT
-SR1- +68.00 65.00' LT 50.00' LT

S 66°30' 05.4" E

480' TURN LANE
200' TAPER
420' LANE SHIFT TAPER
300' ACCEL LANE TAPER
1020' ACCEL LANE
300' DECEL TAPER
460' DECEL LANE
960' LANE SHIFT TAPER

US 421 NBL 26' BST
US 421 SBL 26' BST
ATTENUATOR
BEGIN DOUBLE FACED CONC. BARRIER -Y1- STA.18+46.71
DO NOT PLACE RIPRAP IN STREAM BOTTOM
SPECIAL CUT DITCH SEE DETAIL II
SPECIAL CUT DITCH SEE DETAIL N
EST 2 TONS CL B RIP RAP EST 7 SY FILT FAB CUT-FILL TRANSITION
EST 5 TONS CL B RIP RAP EST 14 SY FILT FAB
EST 3 TONS CL B RIP RAP EST 10 SY FILT FAB
RIPRAP LINED CHANNEL
AREA UNDER CONSTRUCTION
SEE SHEET 40 FOR -SR1- PROFILE

MATCHLINE -Y1- STA. 12+00 - SEE INSET, SHEET 17

MATCHLINE -Y1- STA. 26+00 - SEE SHEET 4

$FILE$
$DATE$

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	17
R/W SHEET NO.	
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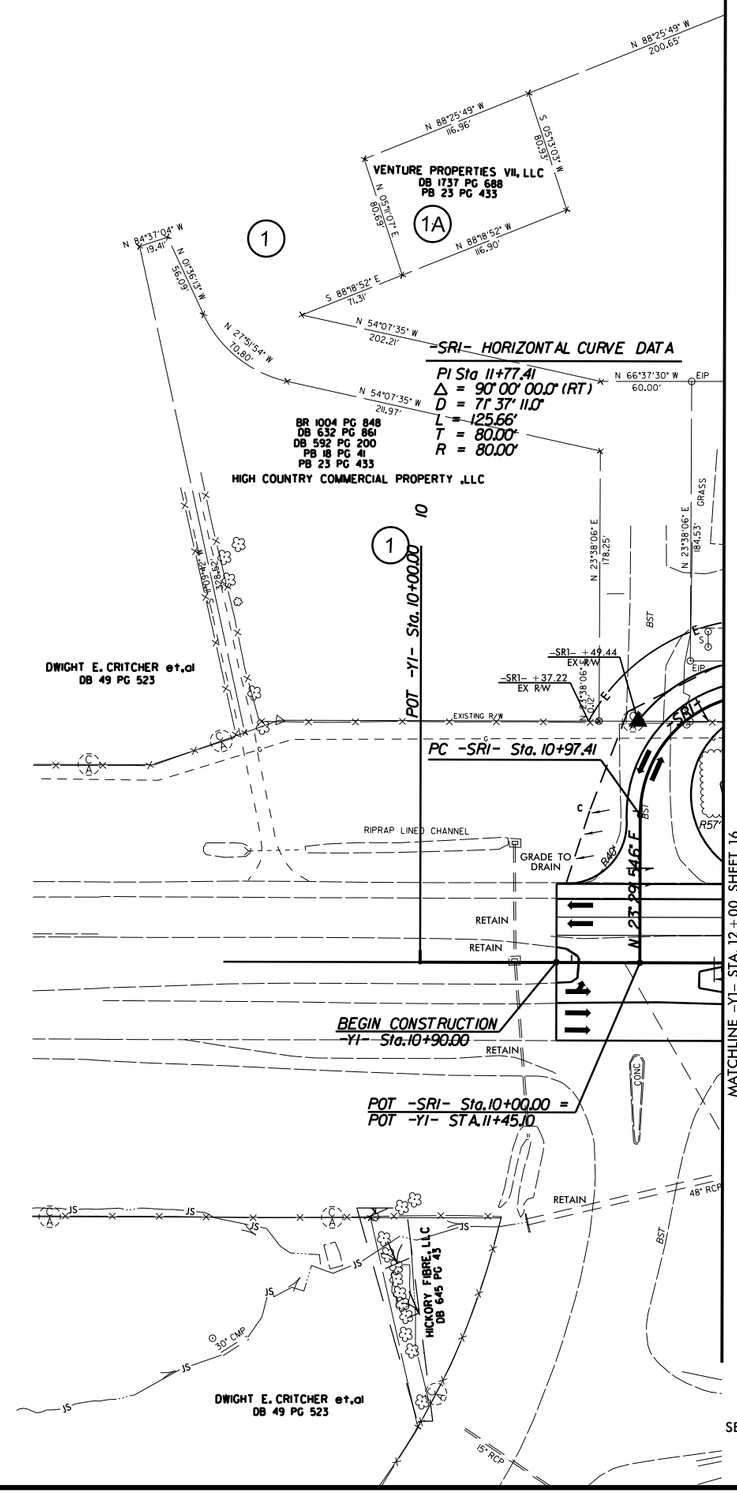

SEE SHEET 41 FOR -Y1- PROFILE

REVISIONS

06/27/14 - ROW REV: REVISED PROPERTY LINES AND ADDED PARCEL 1A WITH PROPERTY OWNER AND DEED REFERENCE. - KNW

$FILE$

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	18
R/W SHEET NO.	
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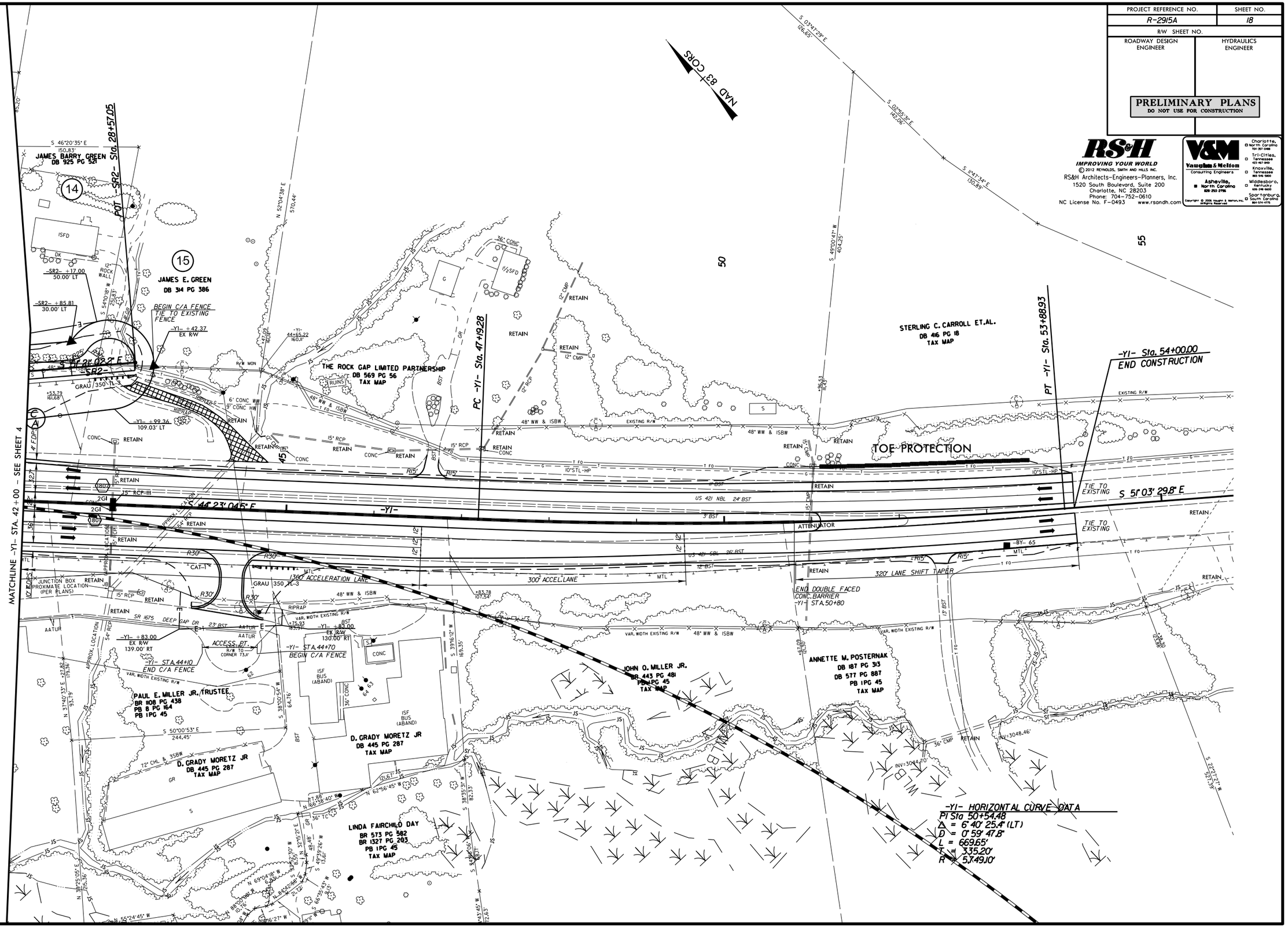

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PROJECT REFERENCE NO.	SHEET NO.
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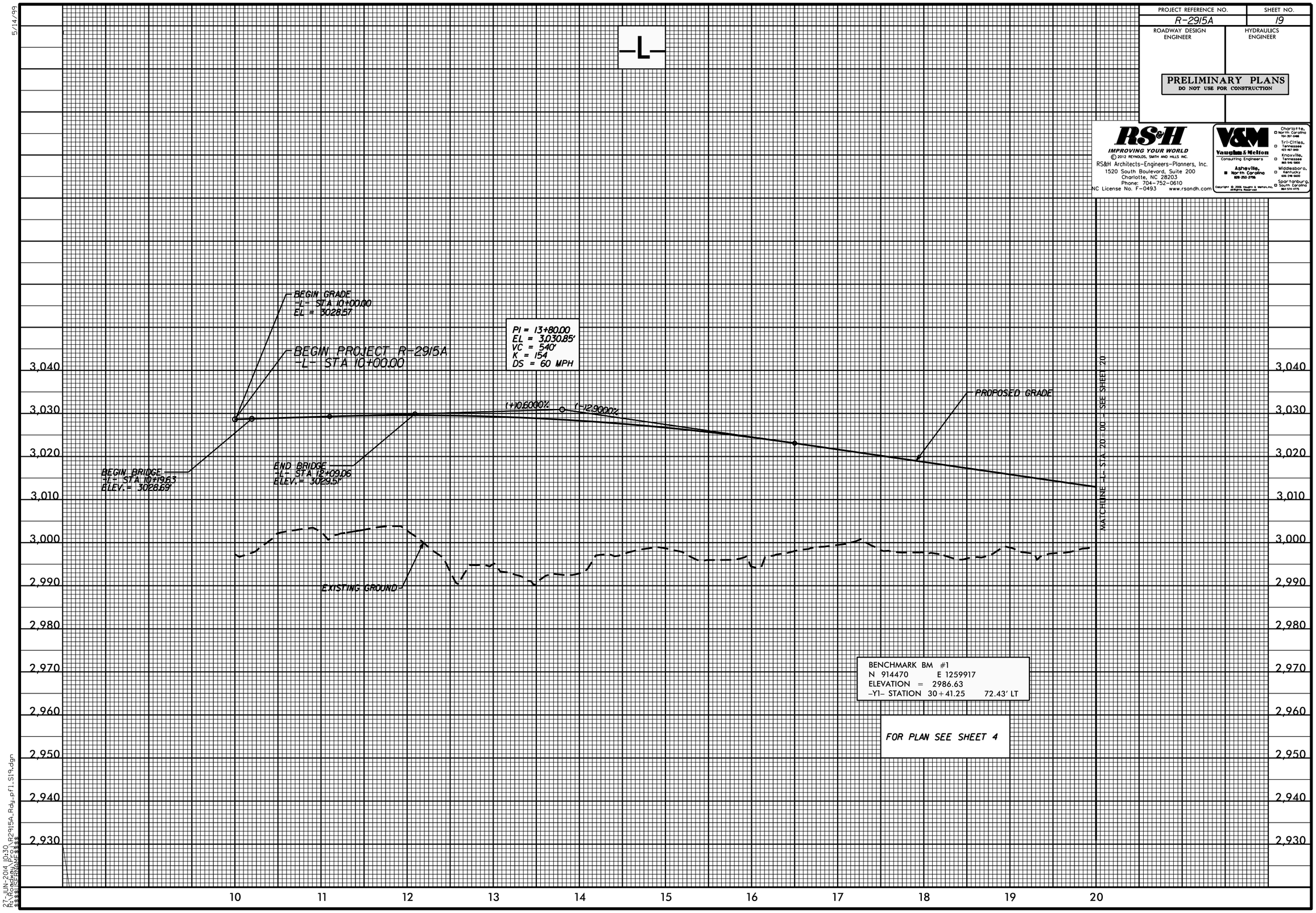

BENCHMARK BM #1
N 914470 E 1259917
ELEVATION = 2986.63
-Y1- STATION 30+41.25 72.43' LT

FOR PLAN SEE SHEET 4

27-JUN-2014 10:30
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$$$$USERNAME$$$$

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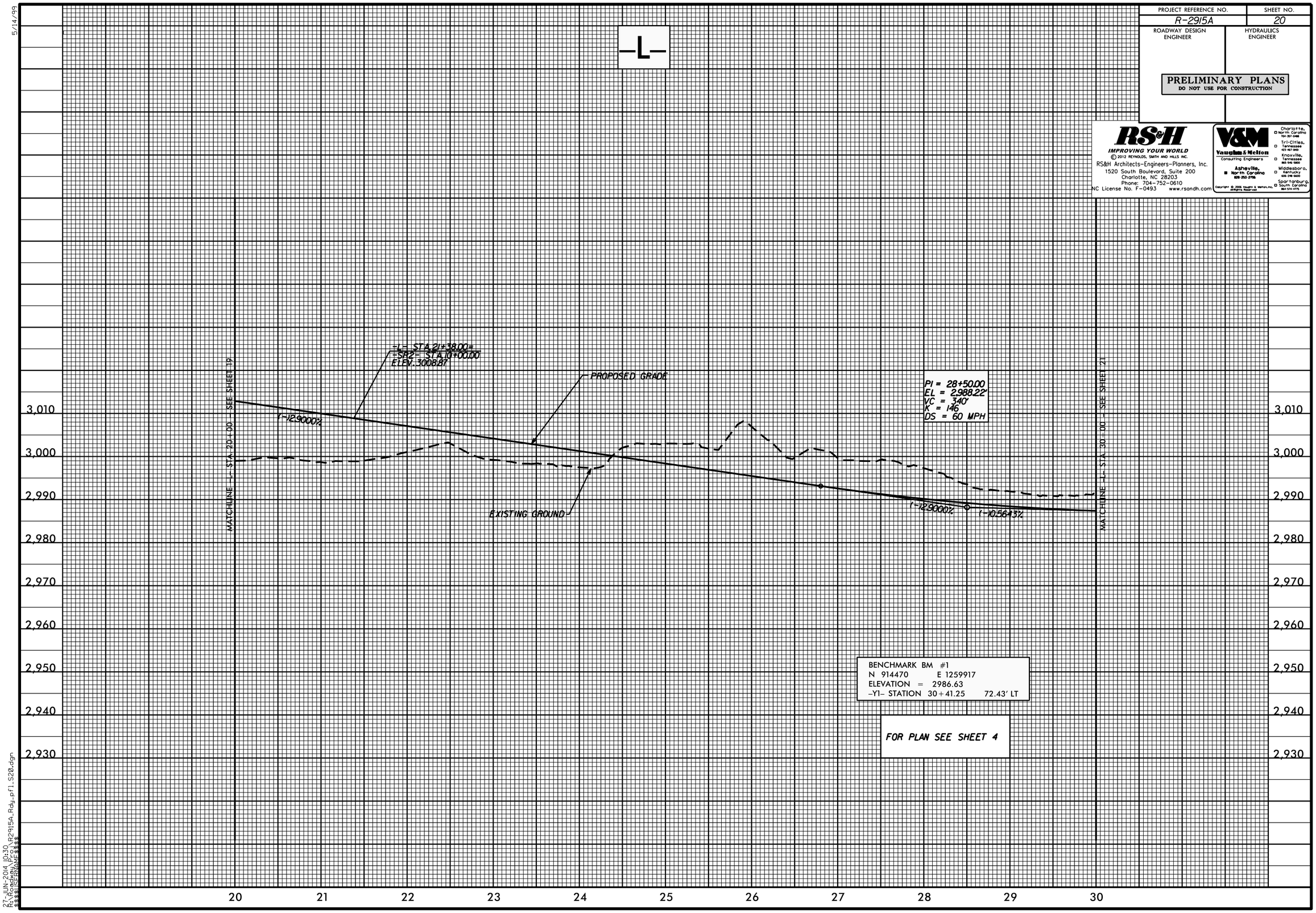

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PROJECT REFERENCE NO.	SHEET NO.
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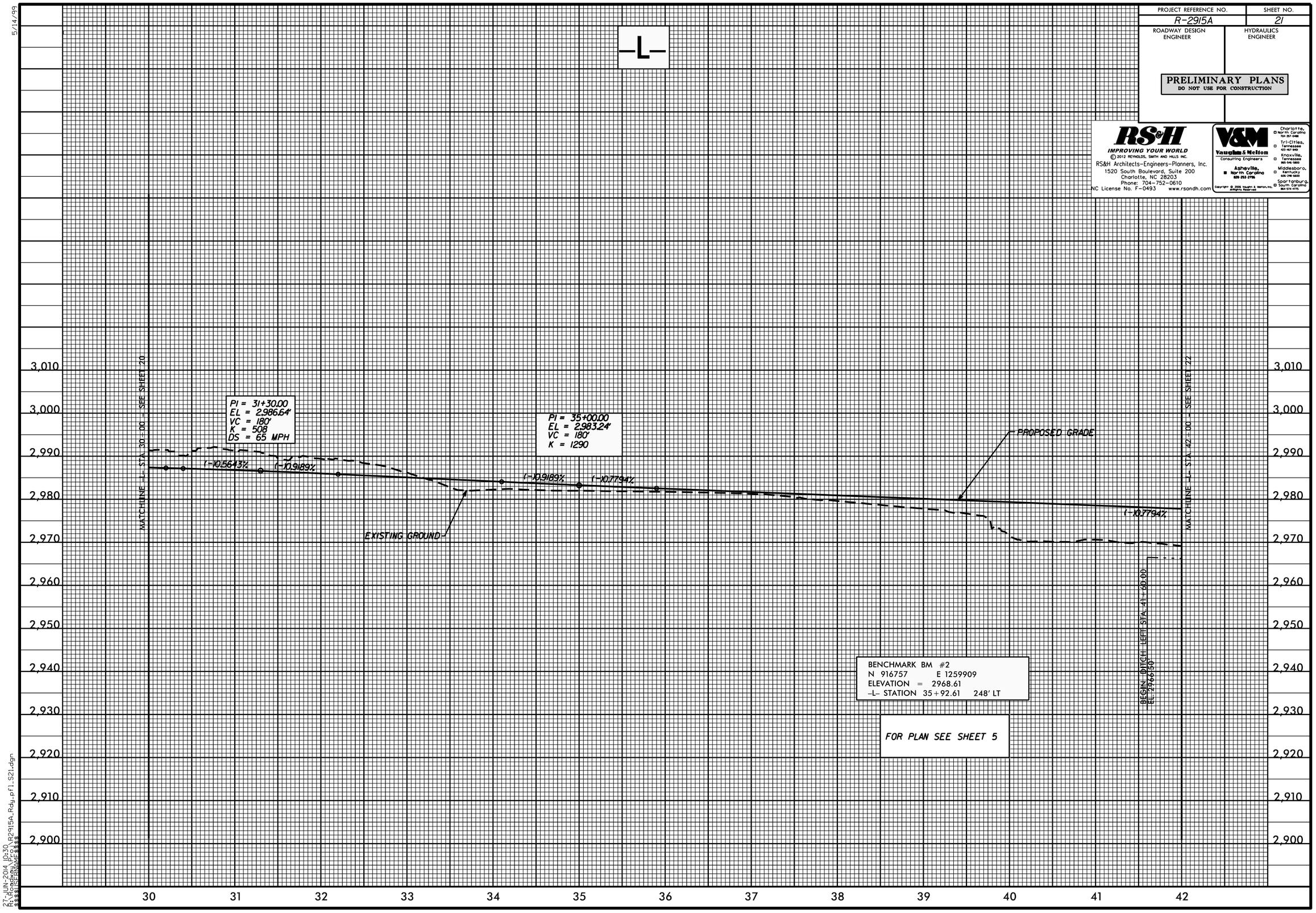

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PROJECT REFERENCE NO.	SHEET NO.
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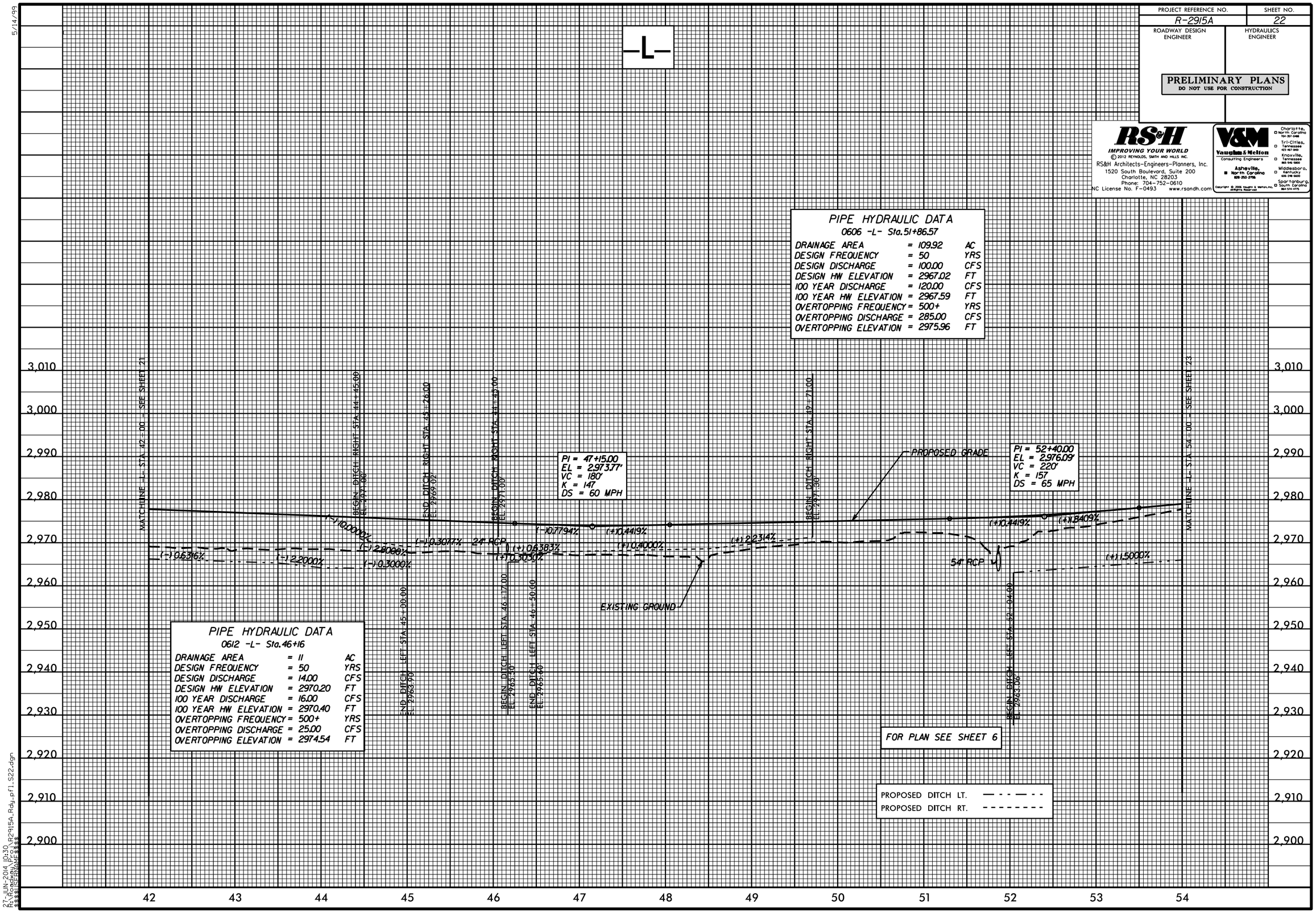

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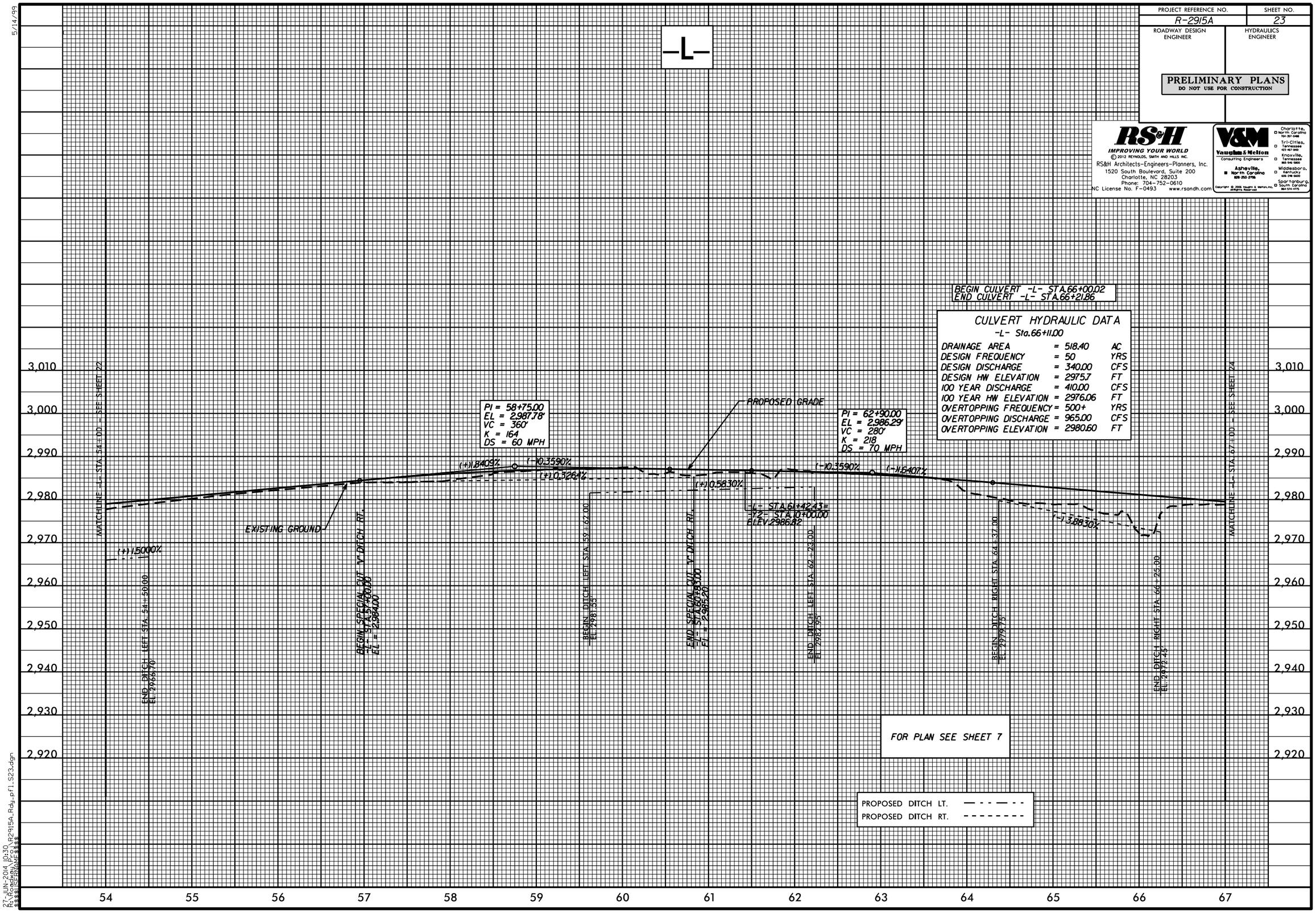

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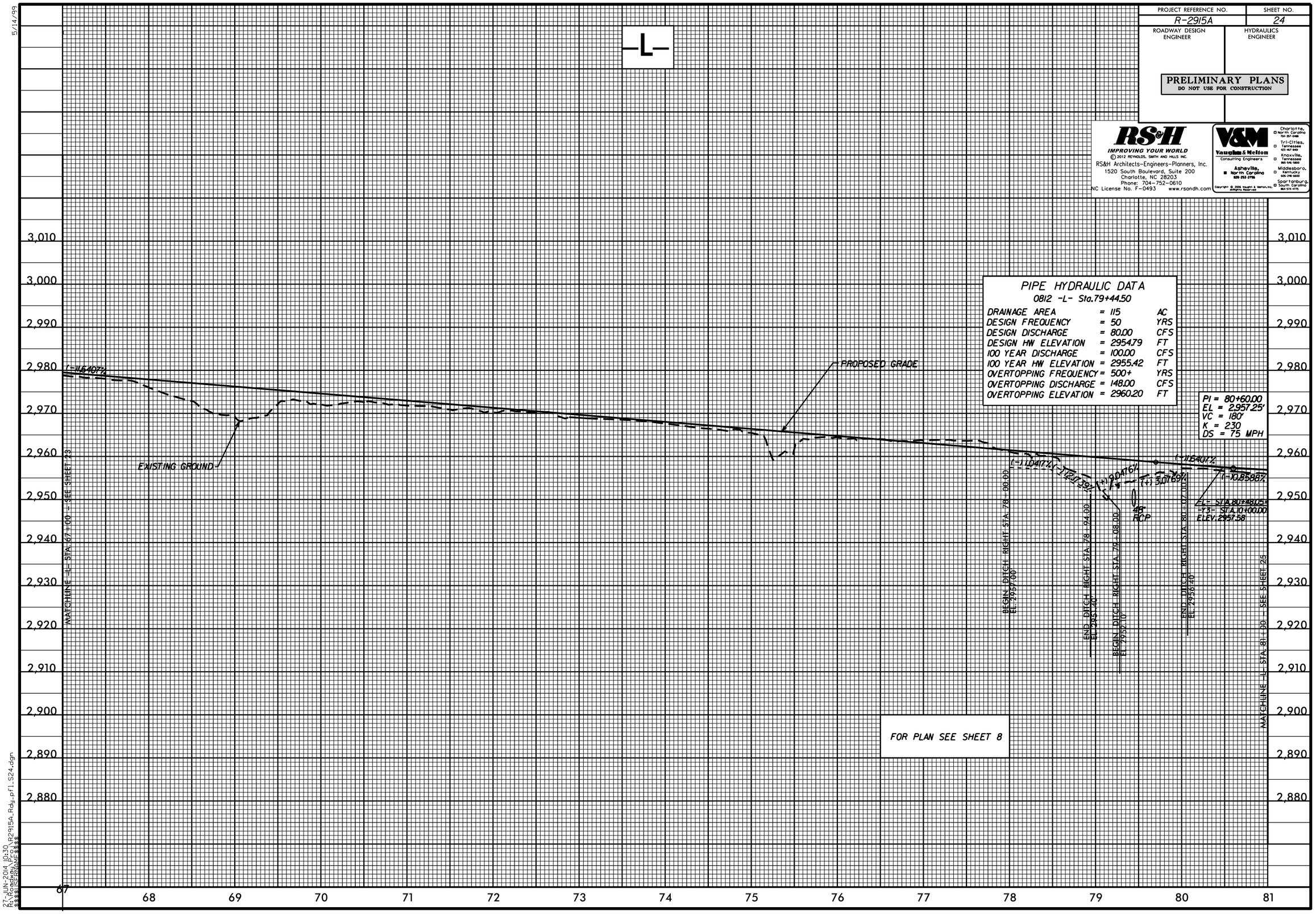

PIPE HYDRAULIC DATA
0812 -L- Sta.79+44.50

DRAINAGE AREA	=	115	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	80.00	CFS
DESIGN HW ELEVATION	=	2954.79	FT
100 YEAR DISCHARGE	=	100.00	CFS
100 YEAR HW ELEVATION	=	2955.42	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	148.00	CFS
OVERTOPPING ELEVATION	=	2960.20	FT

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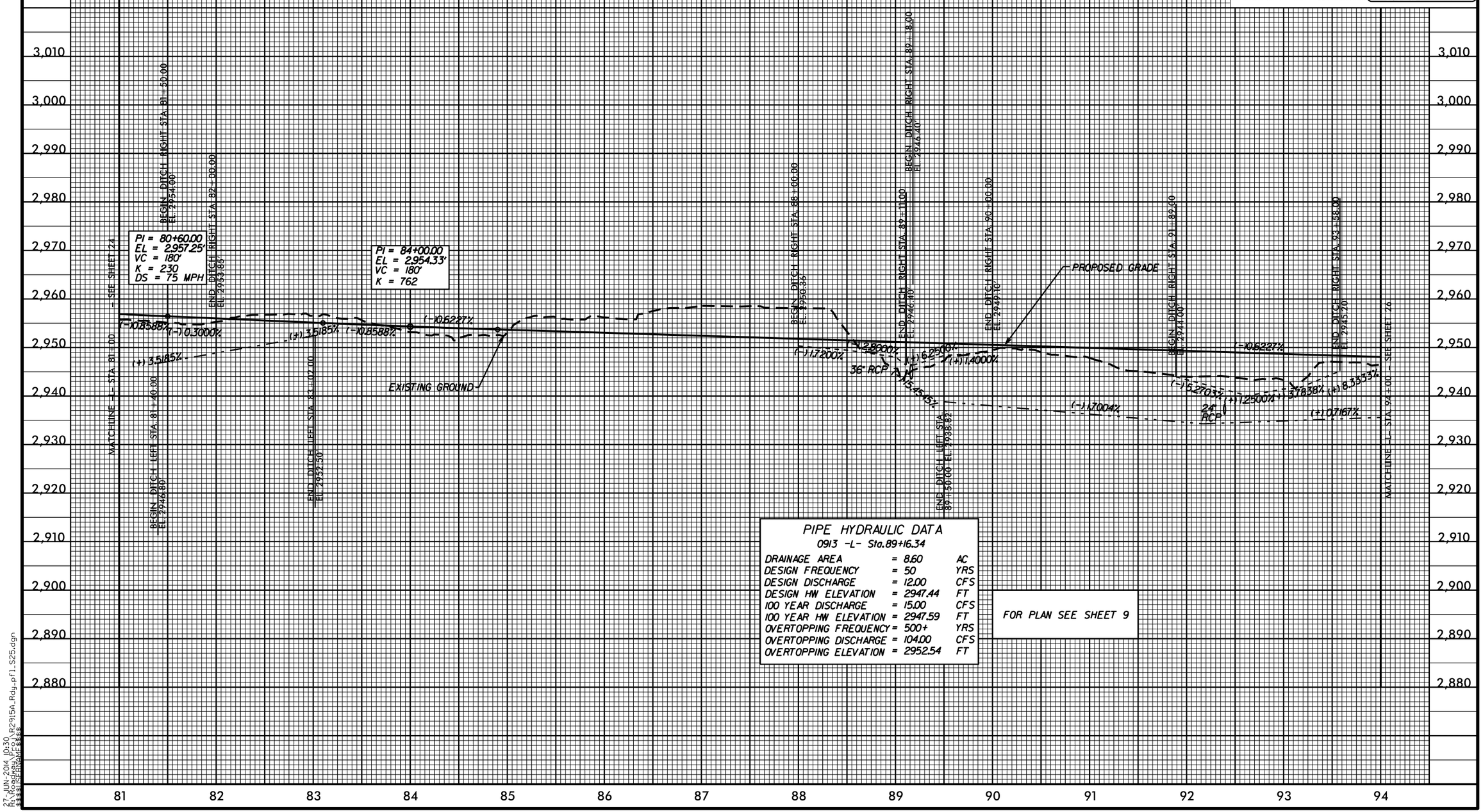

PIPE HYDRAULIC DATA

0913 -L- Sta.89+16.34

DRAINAGE AREA	=	8.60	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	12.00	CFS
DESIGN HW ELEVATION	=	2947.44	FT
100 YEAR DISCHARGE	=	15.00	CFS
100 YEAR HW ELEVATION	=	2947.59	FT
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING DISCHARGE	=	104.00	CFS
OVERTOPPING ELEVATION	=	2952.54	FT

FOR PLAN SEE SHEET 9

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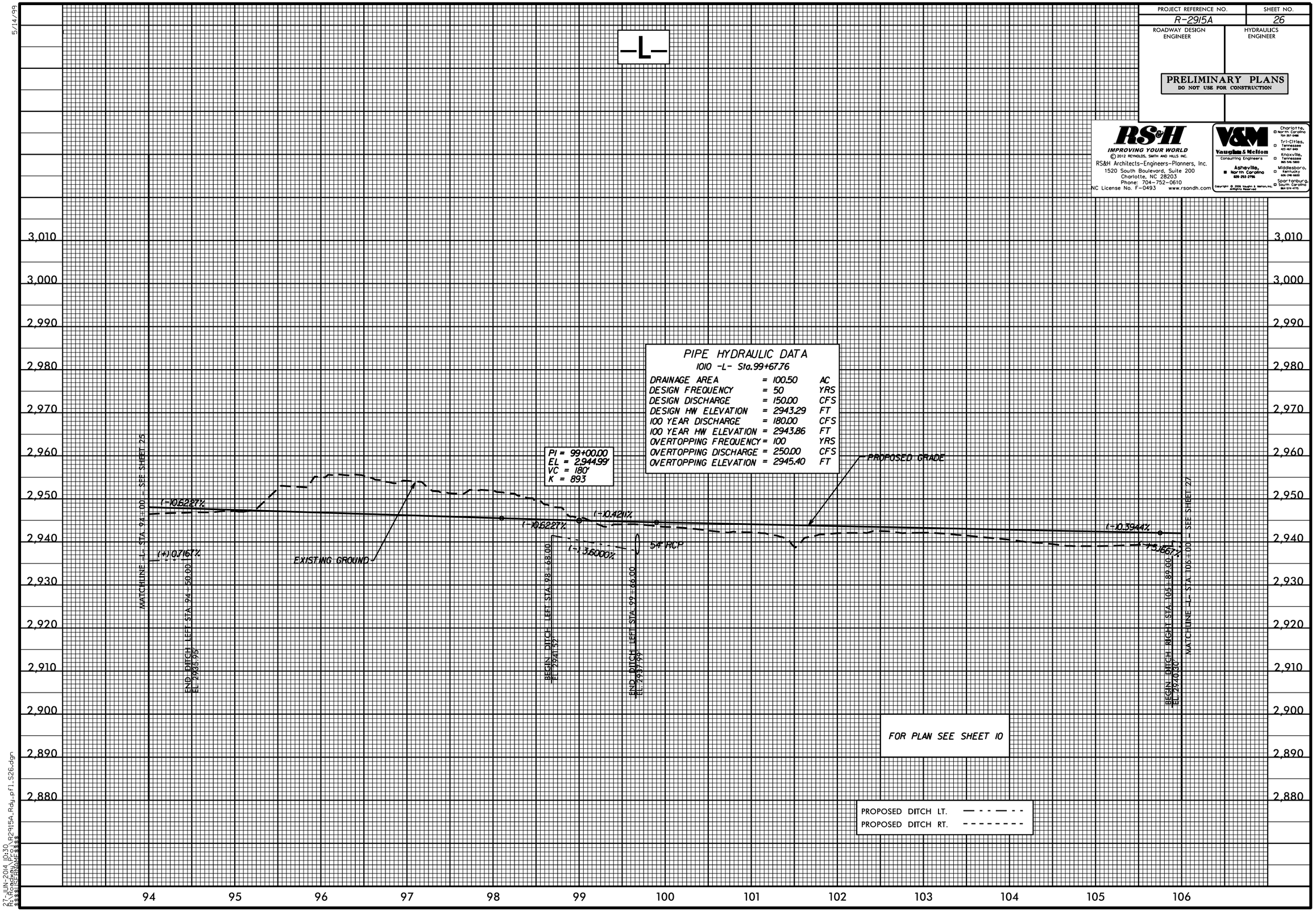

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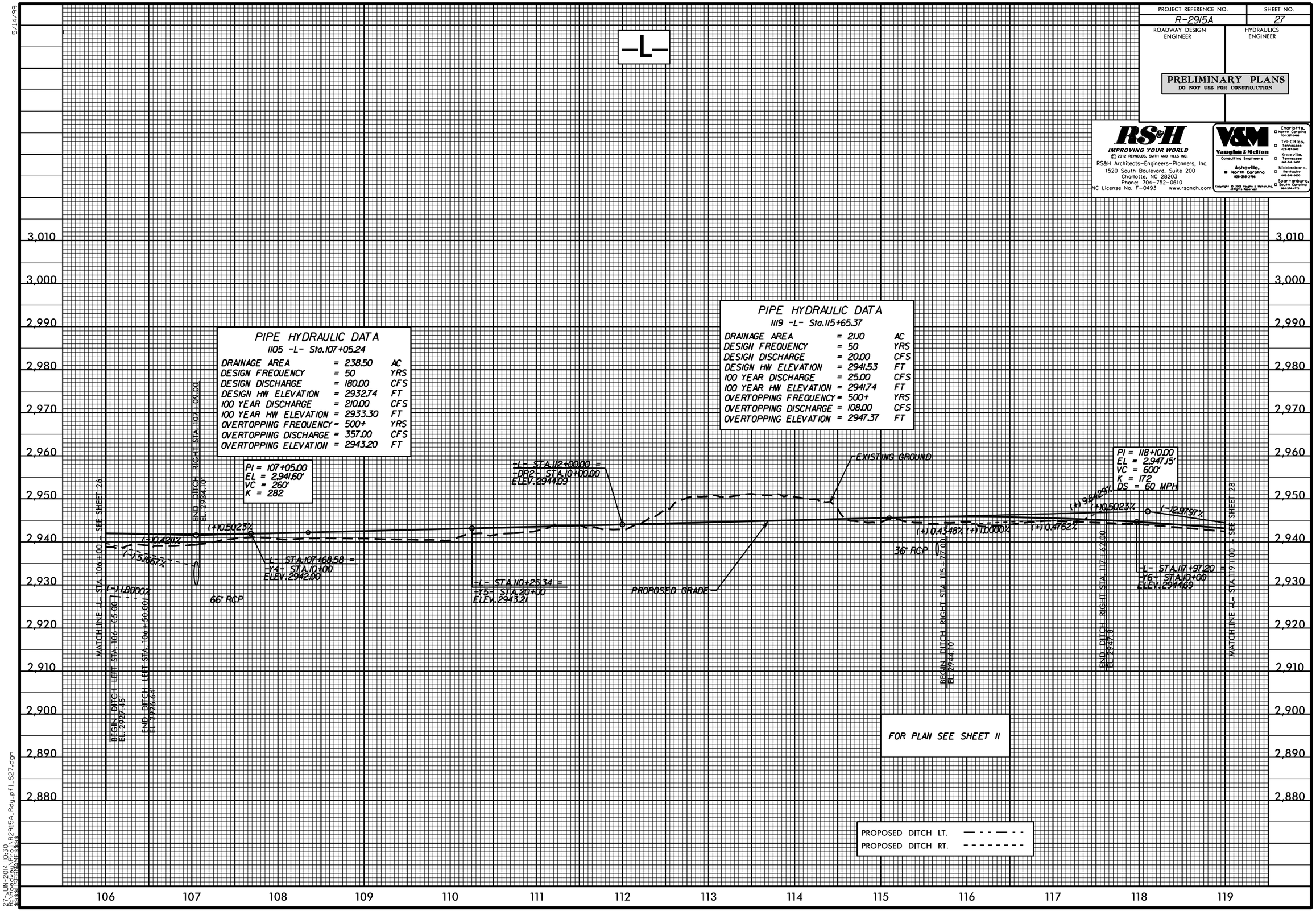

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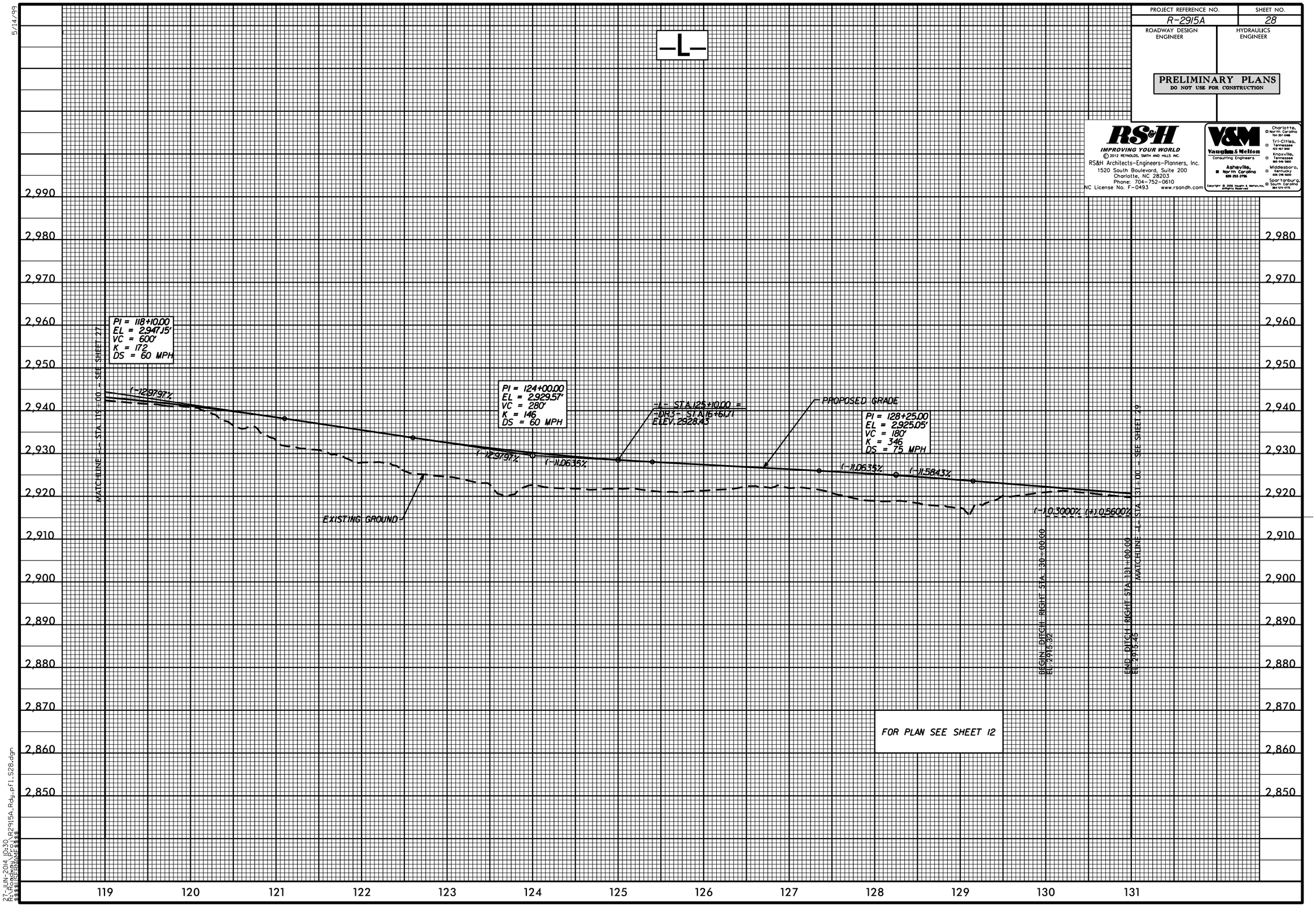

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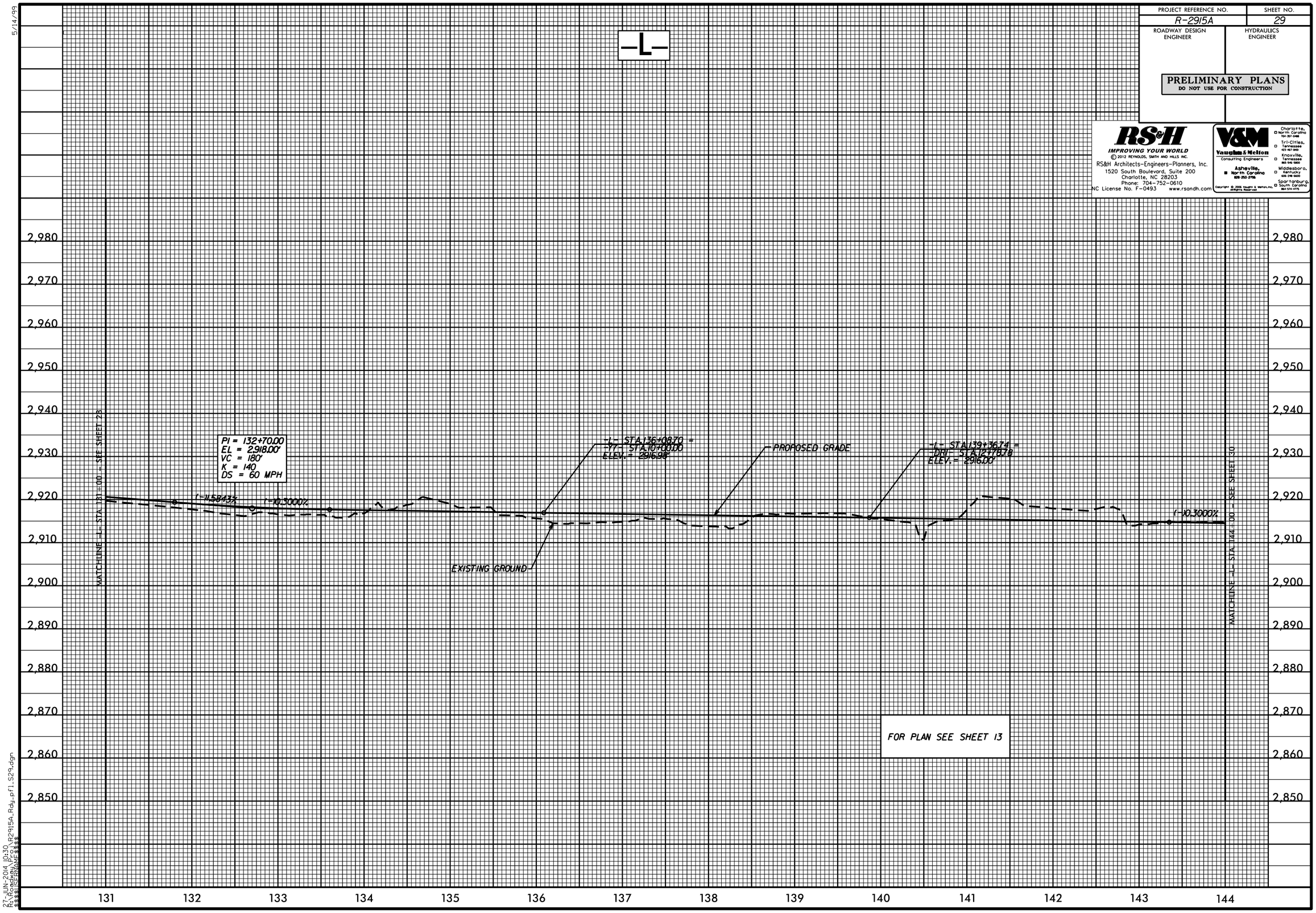

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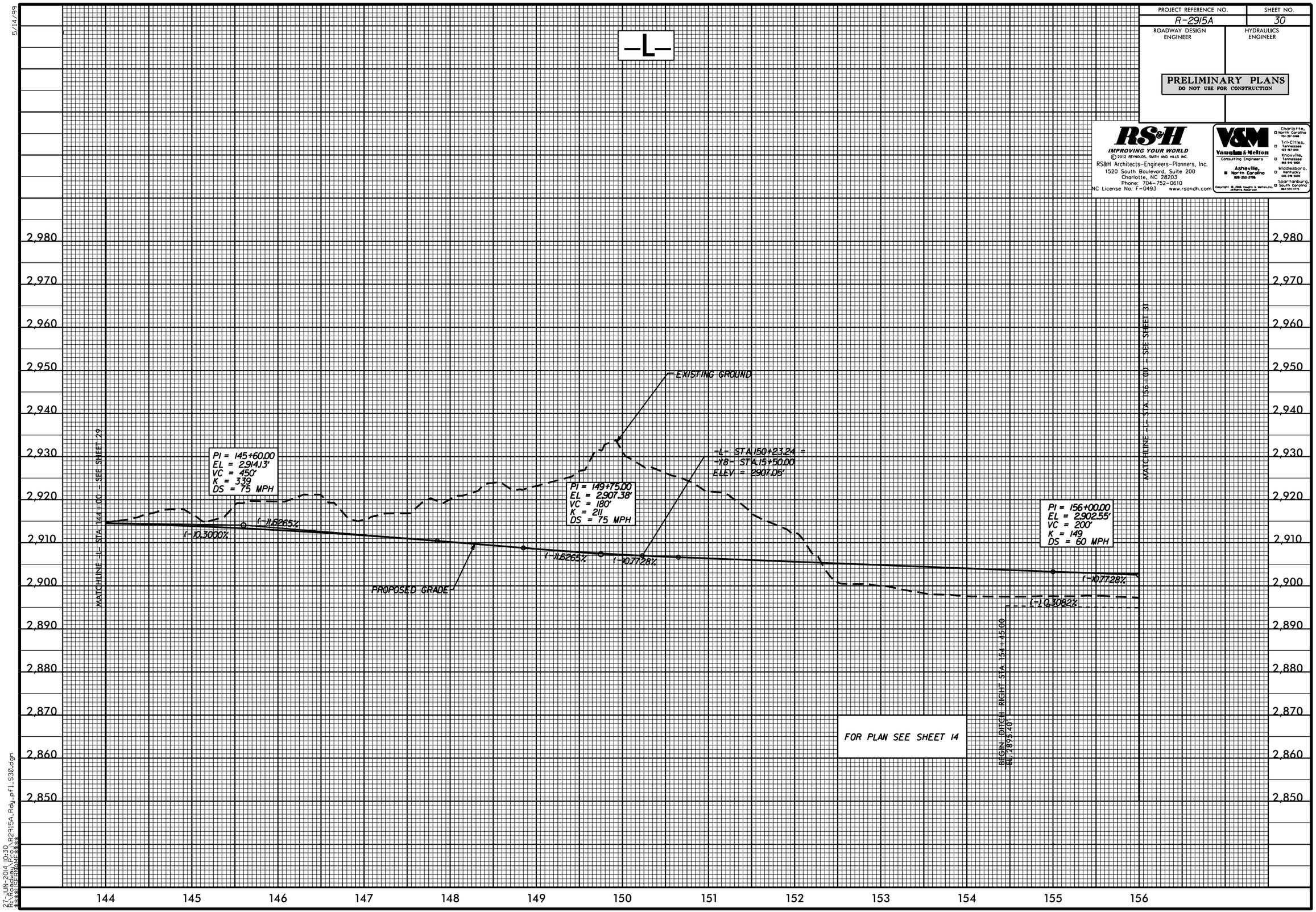

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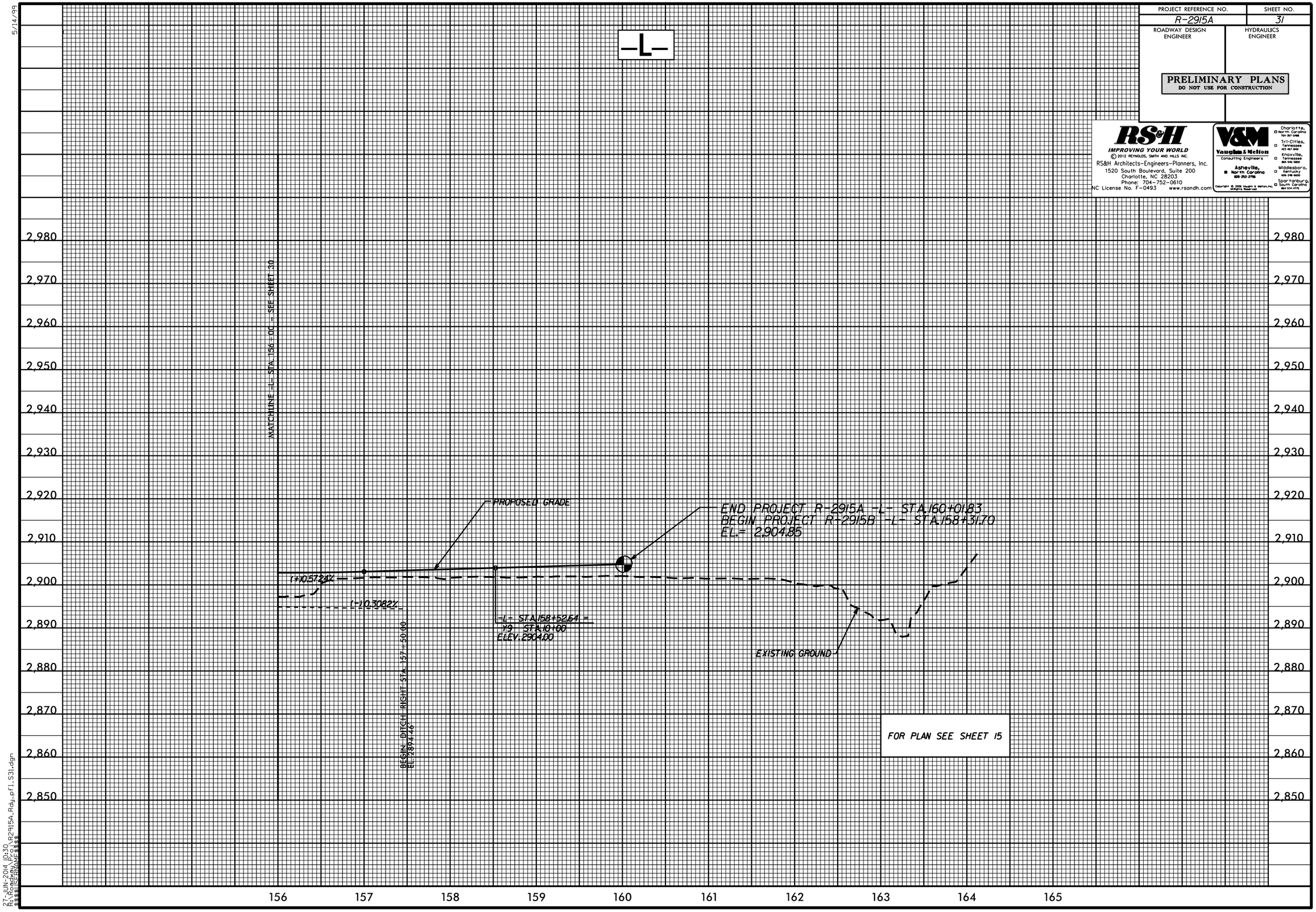

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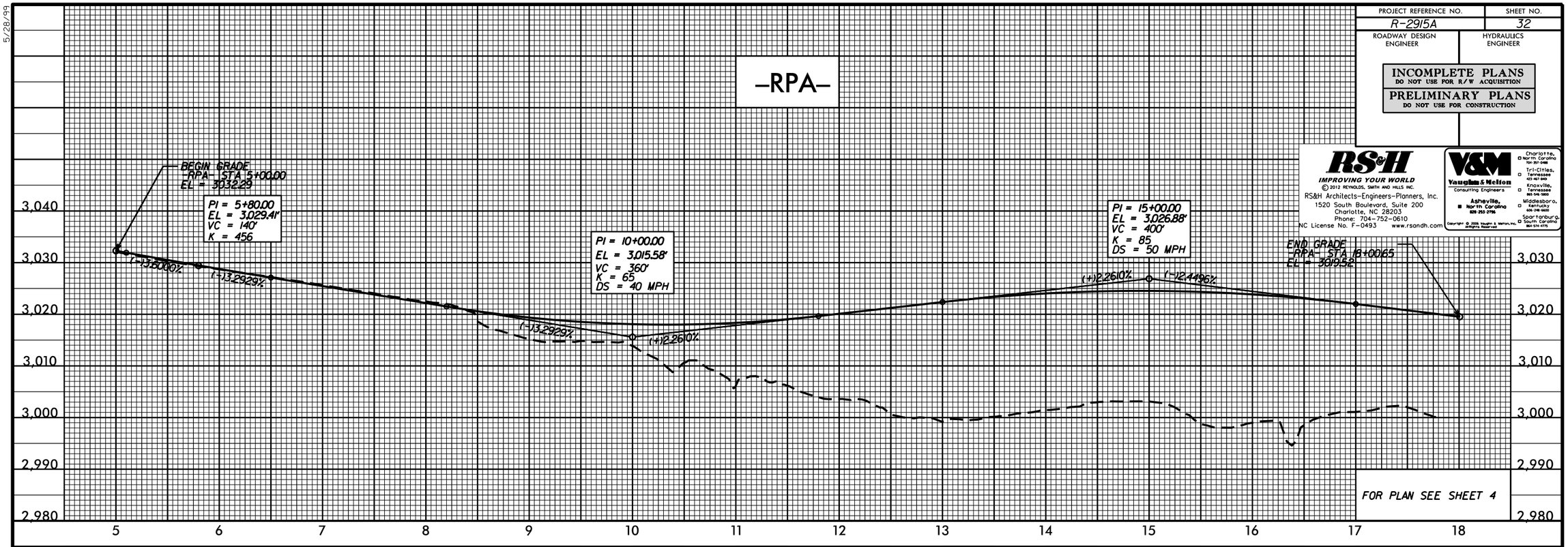

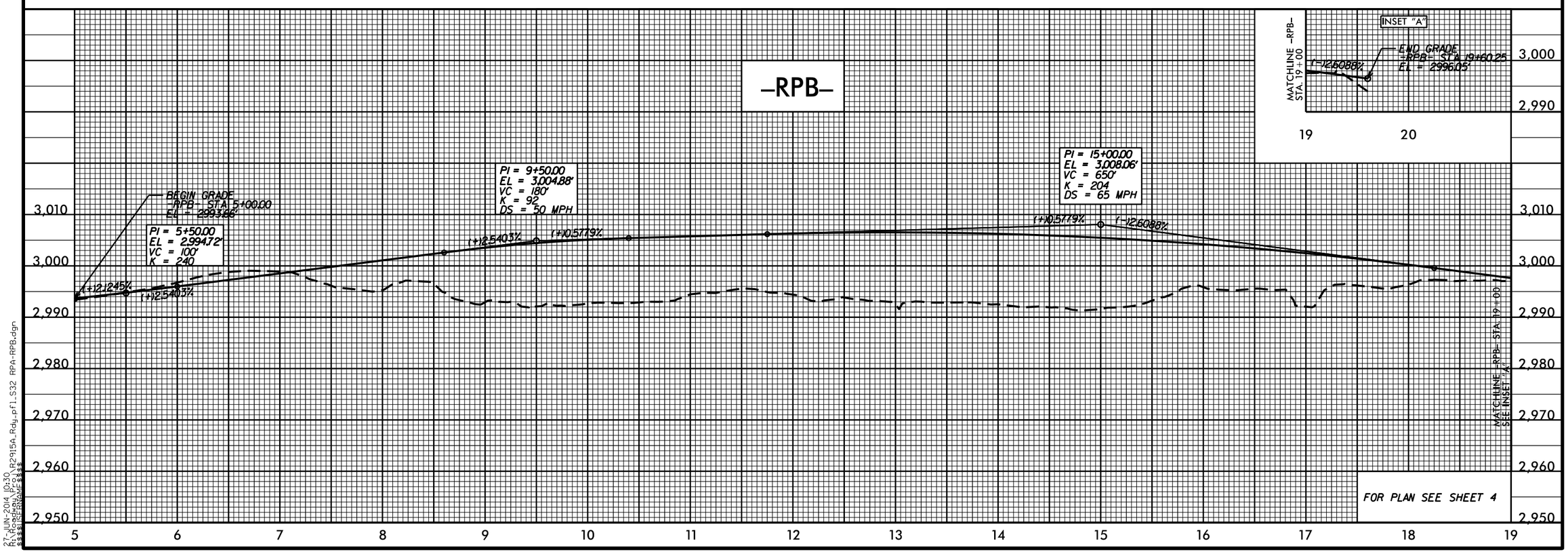

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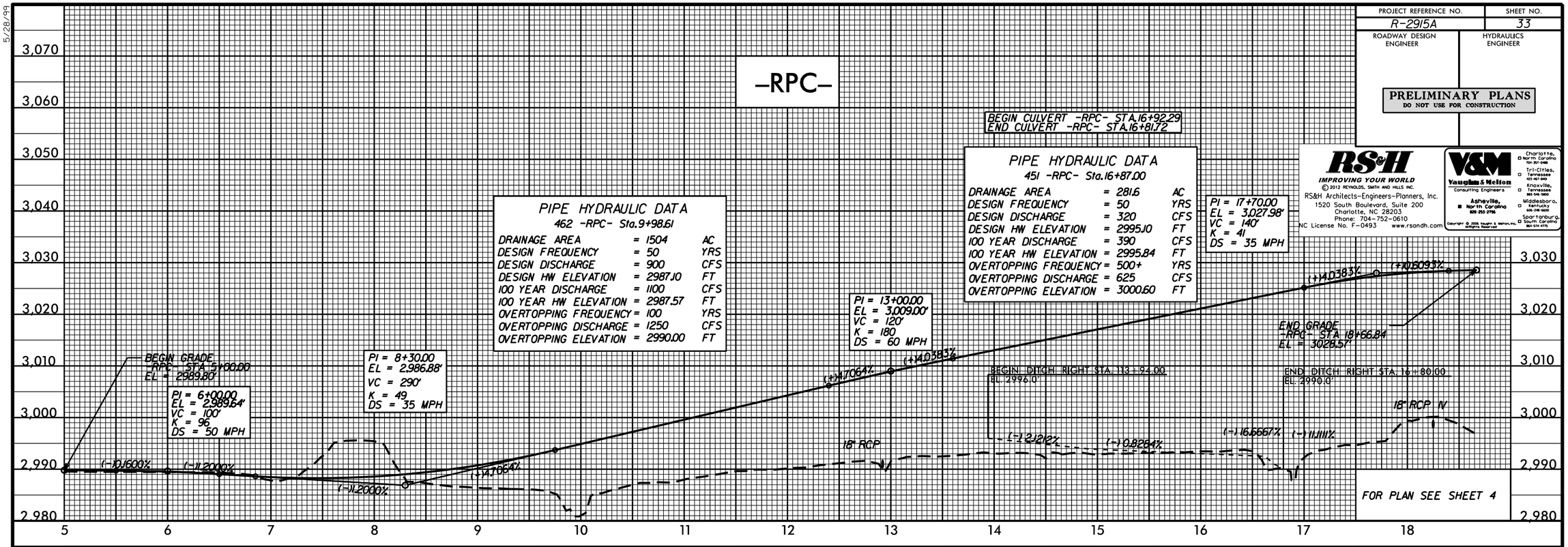

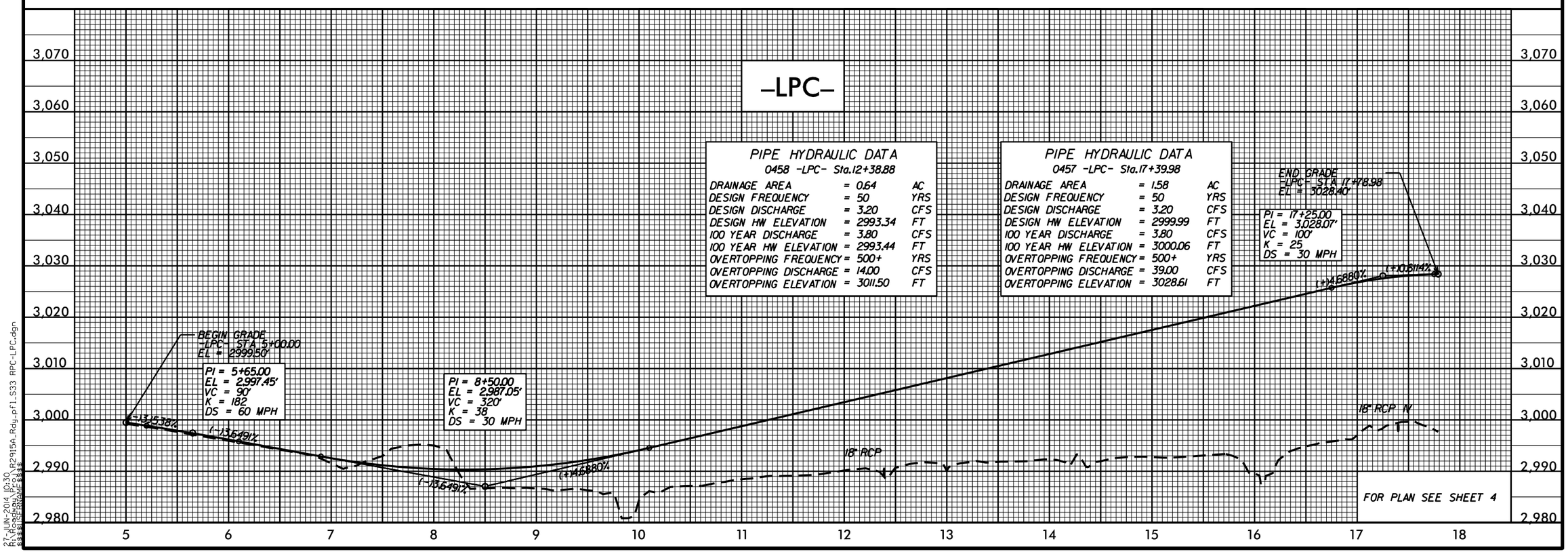

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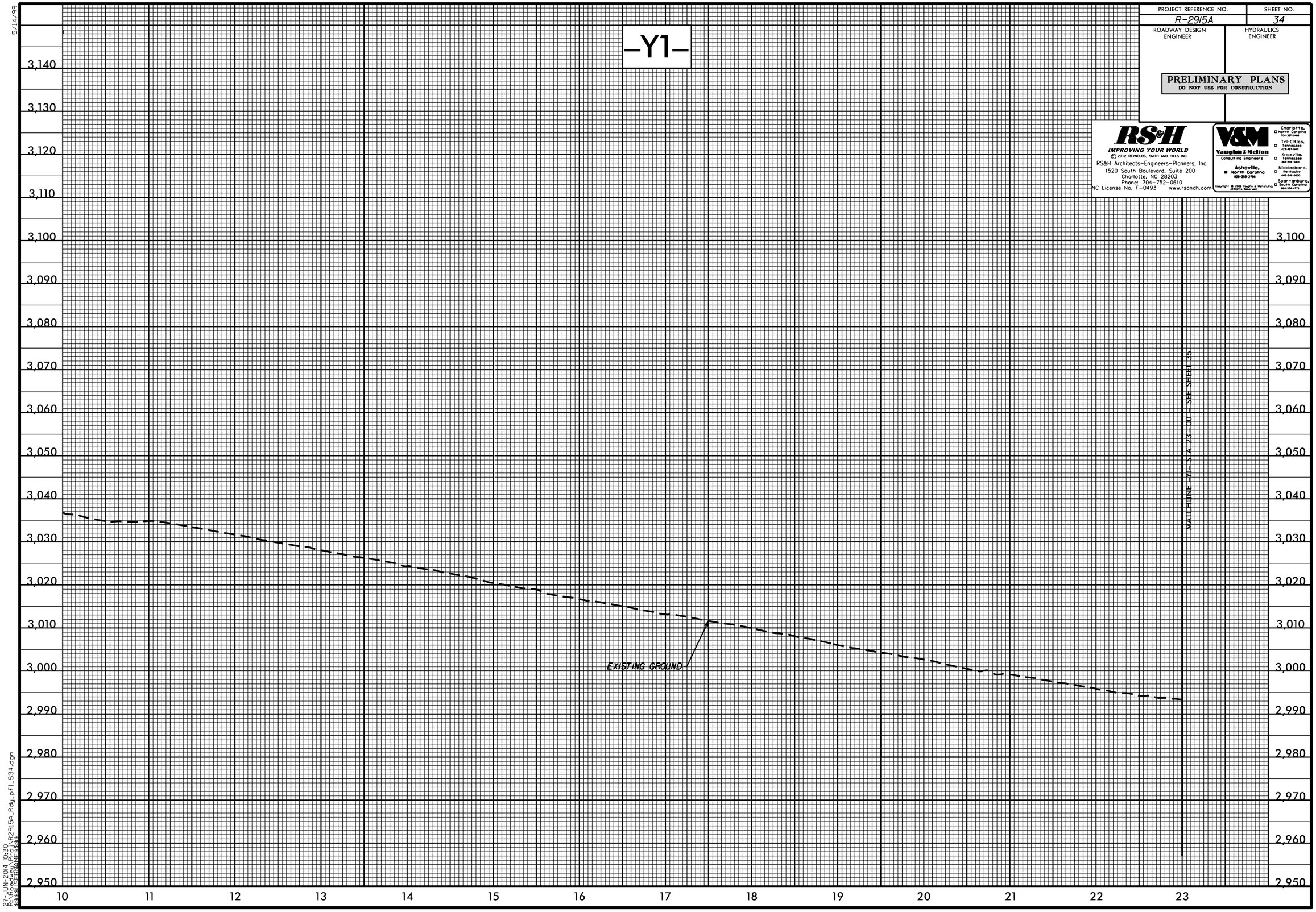

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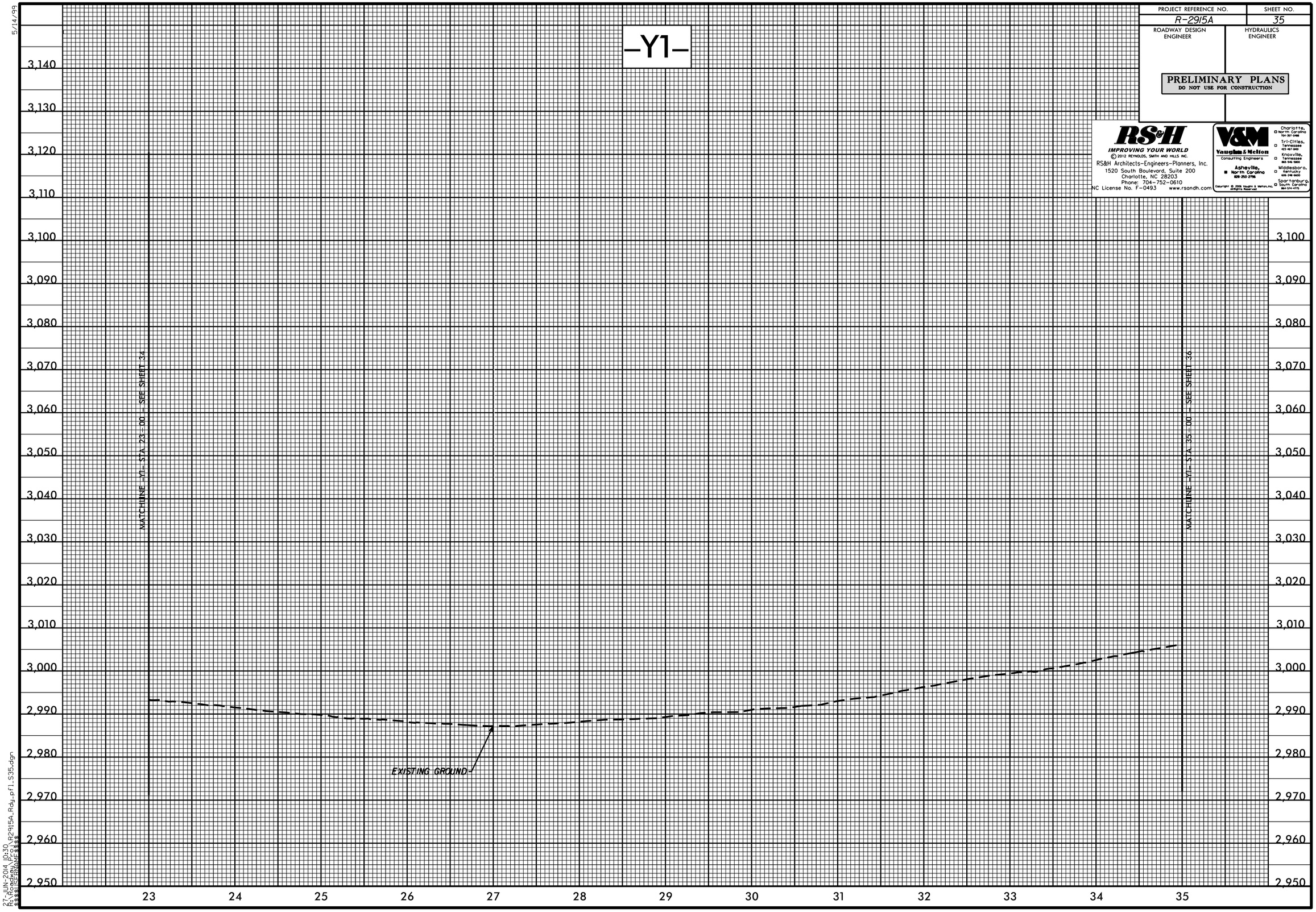

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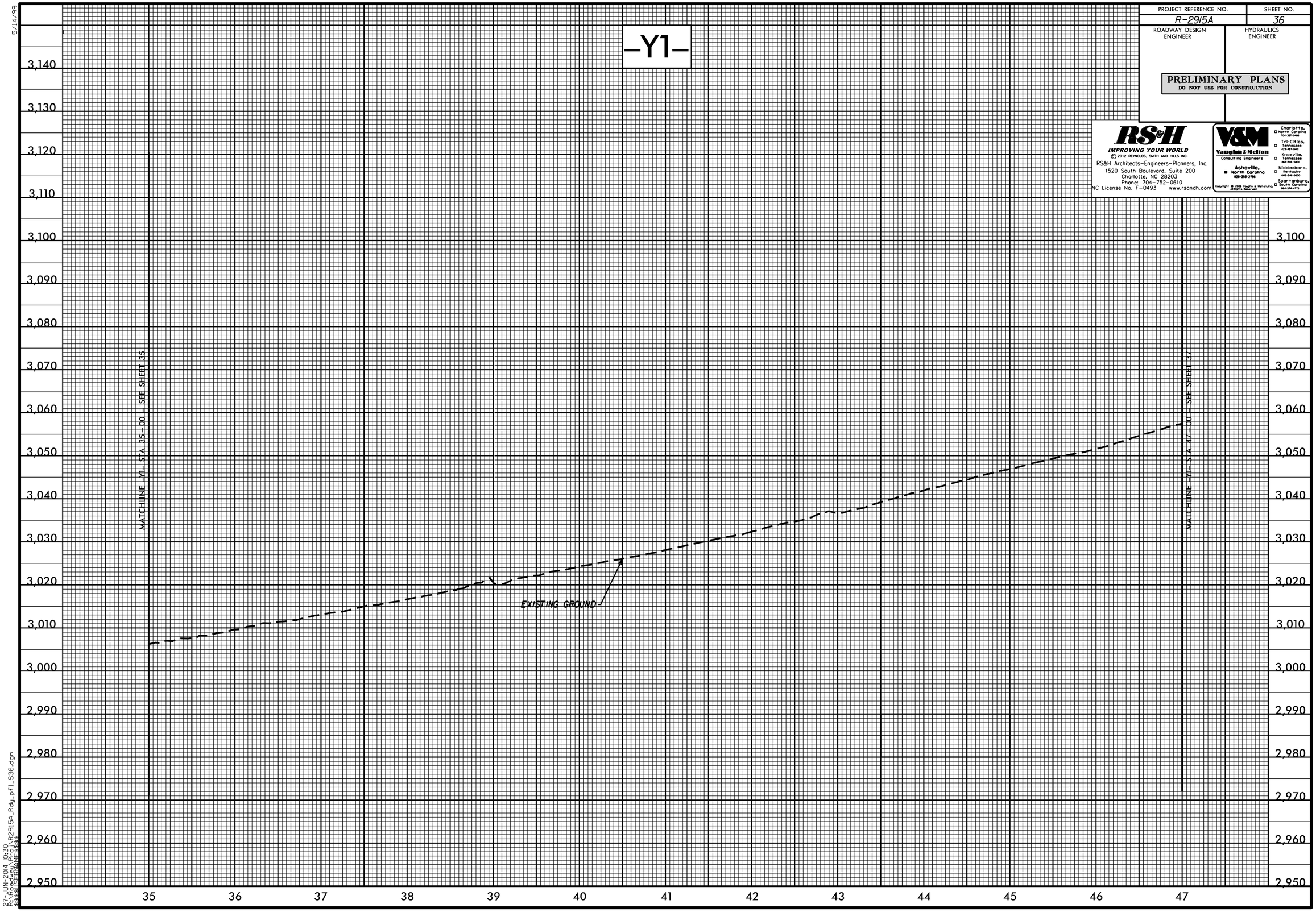

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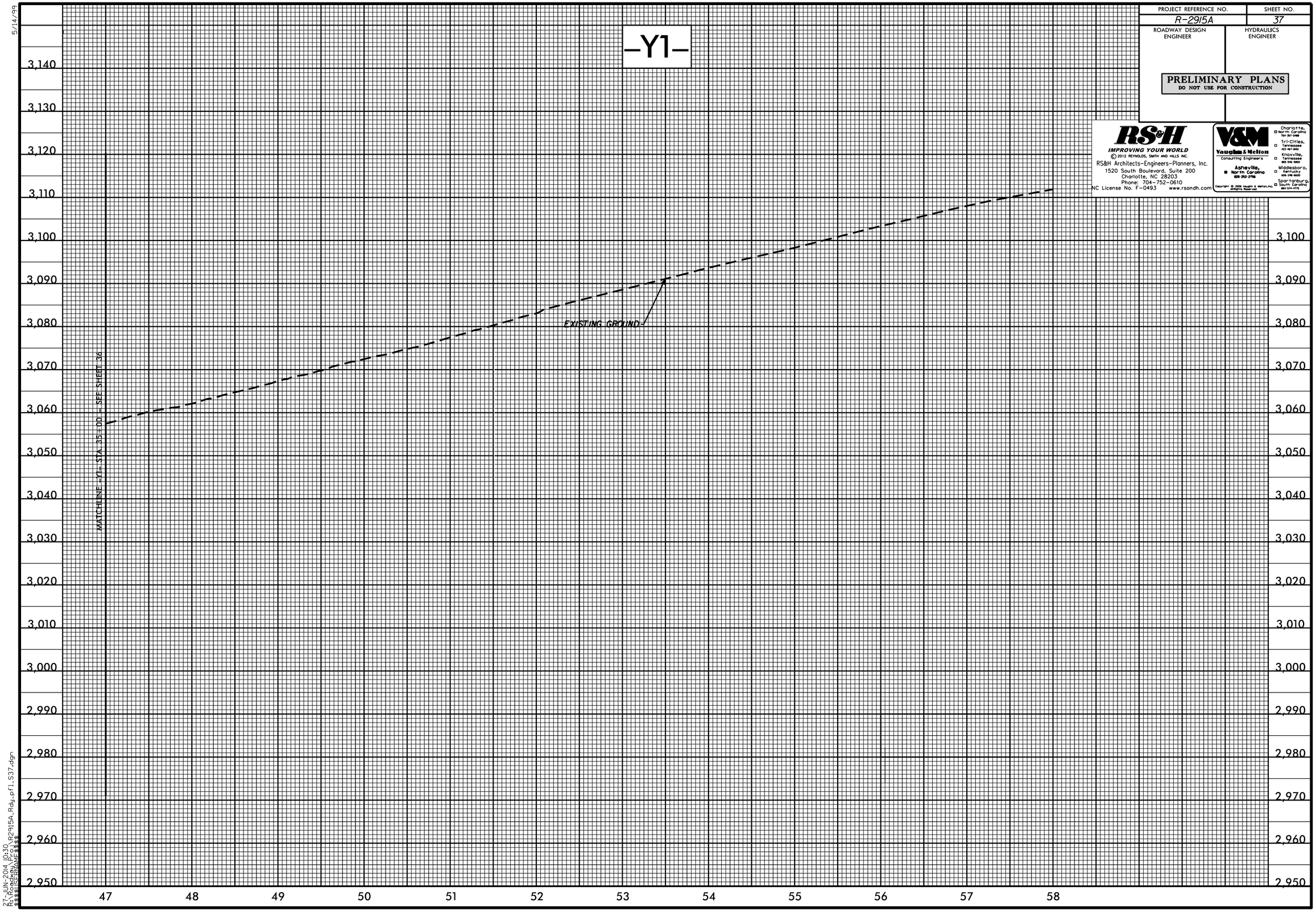

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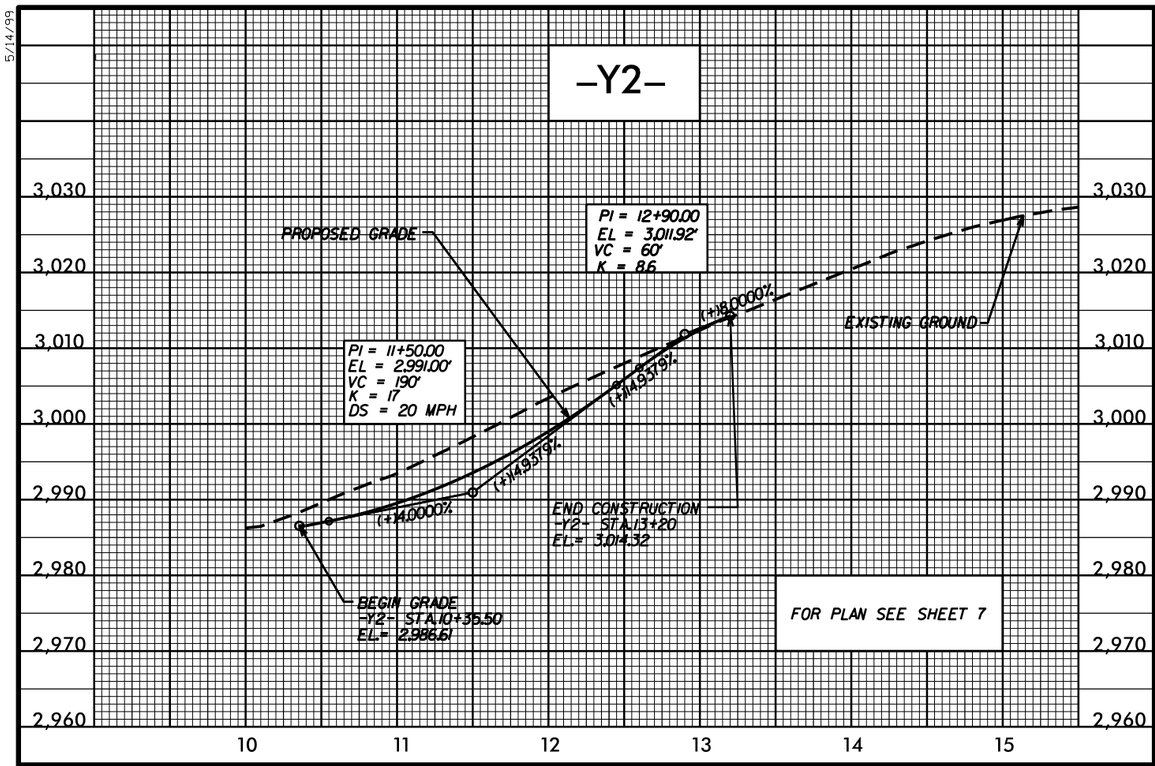

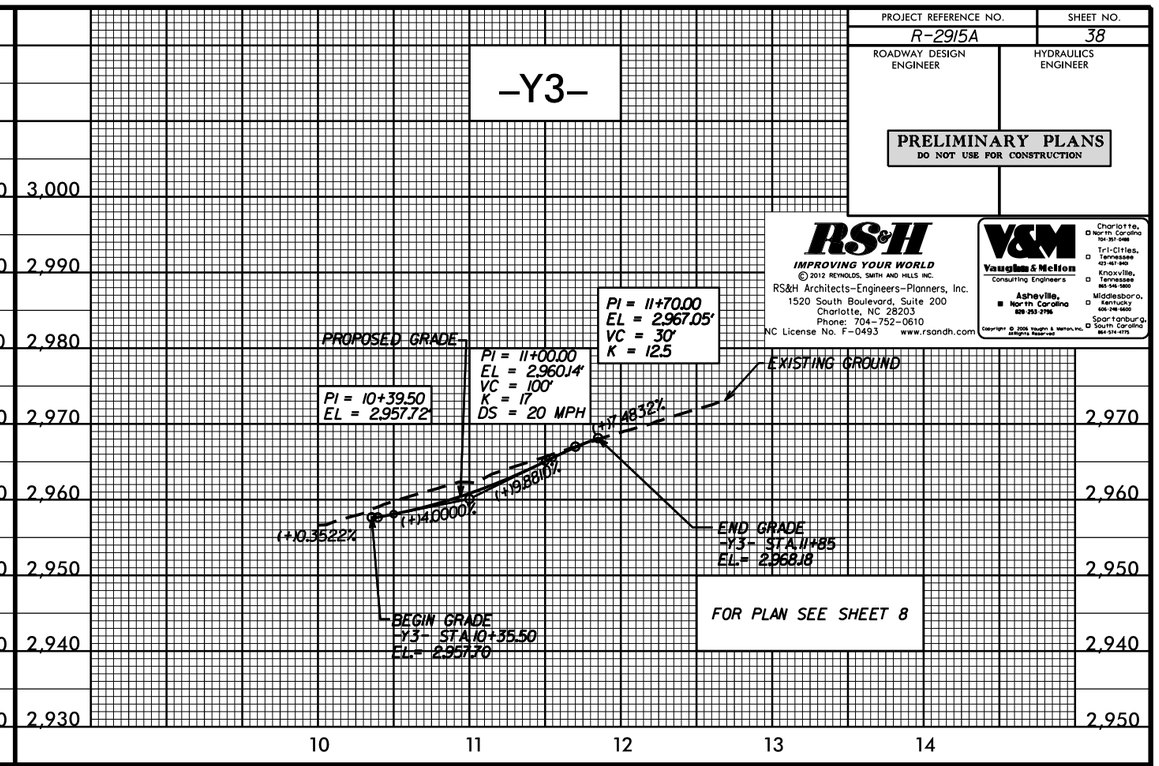

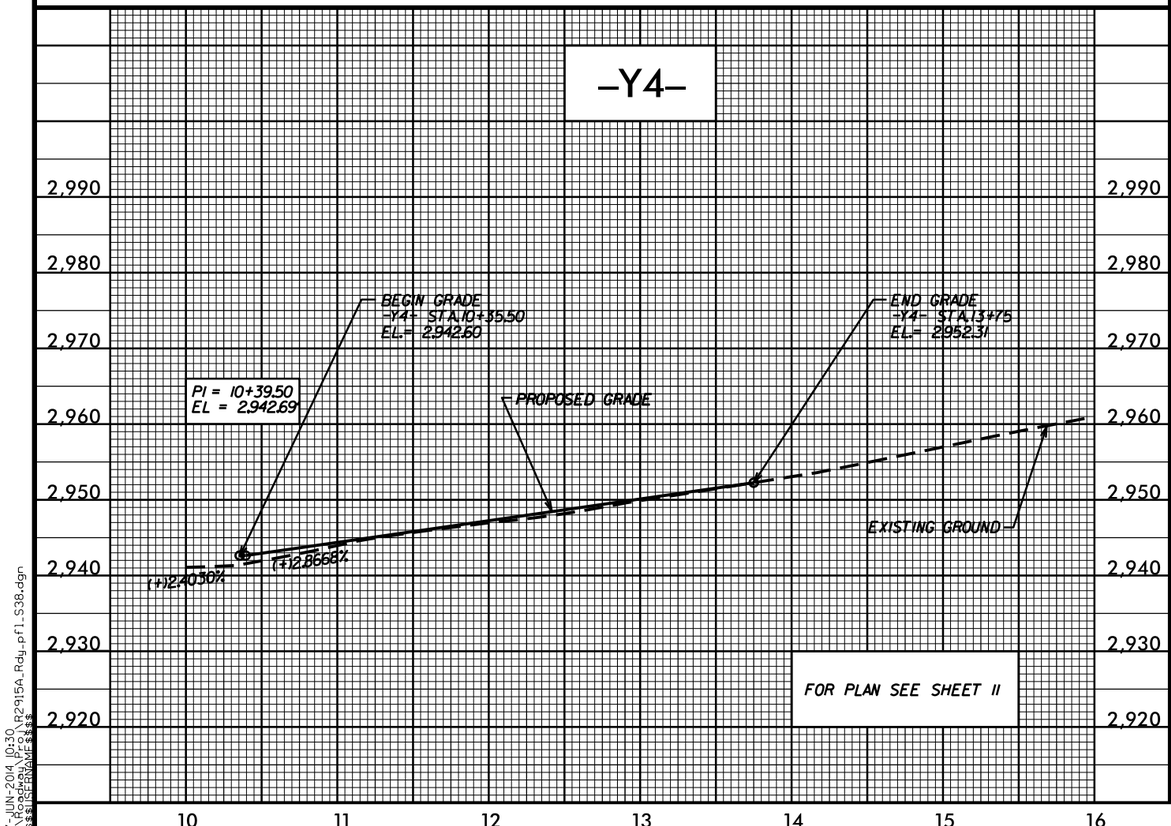

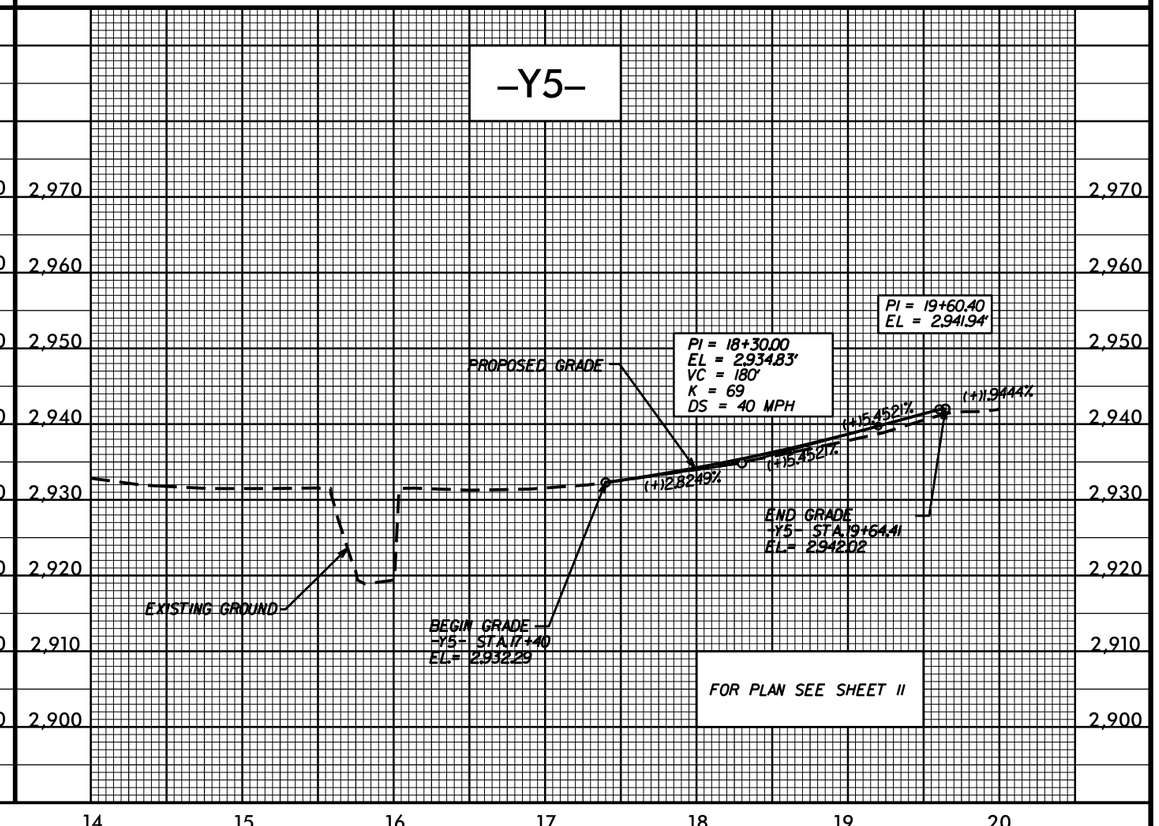

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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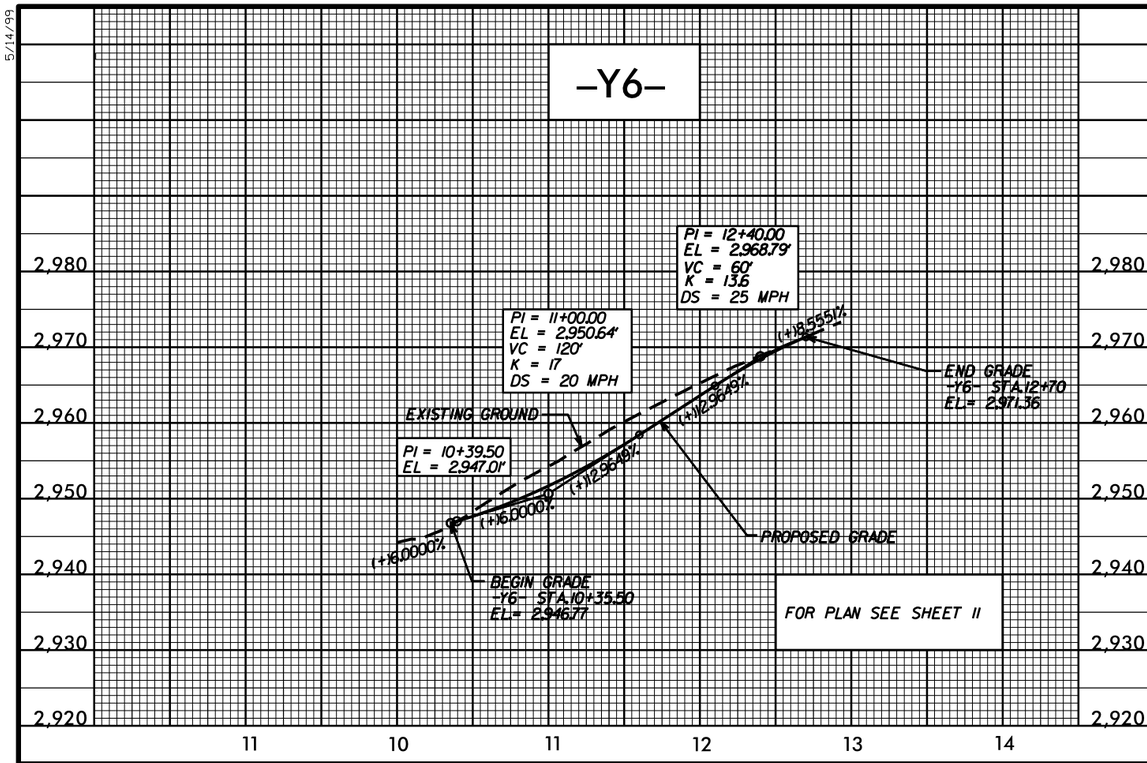
-Y6-



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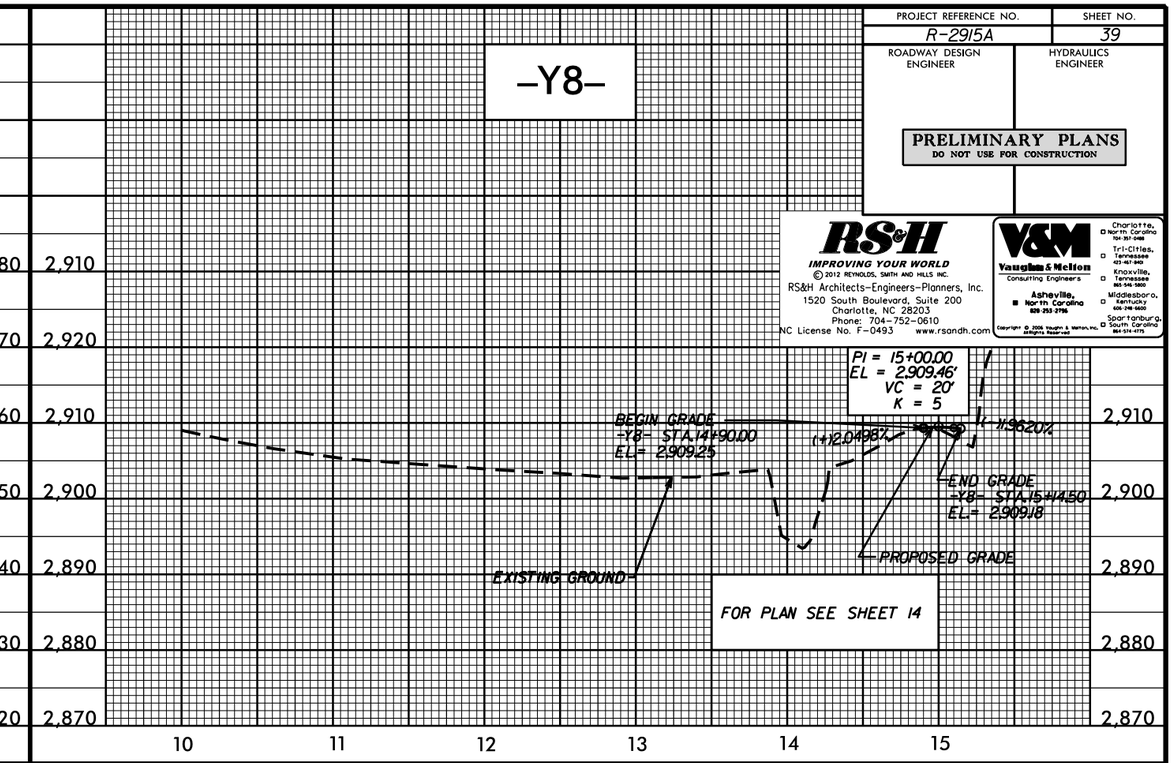

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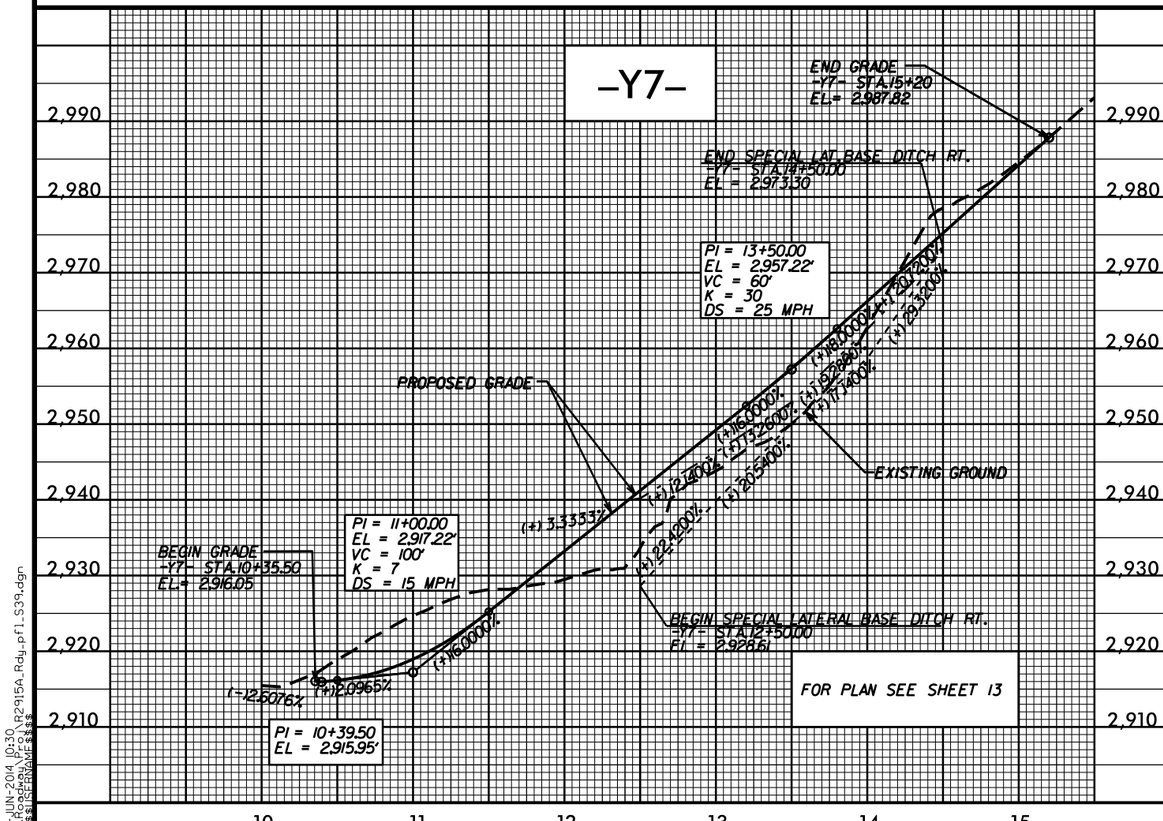

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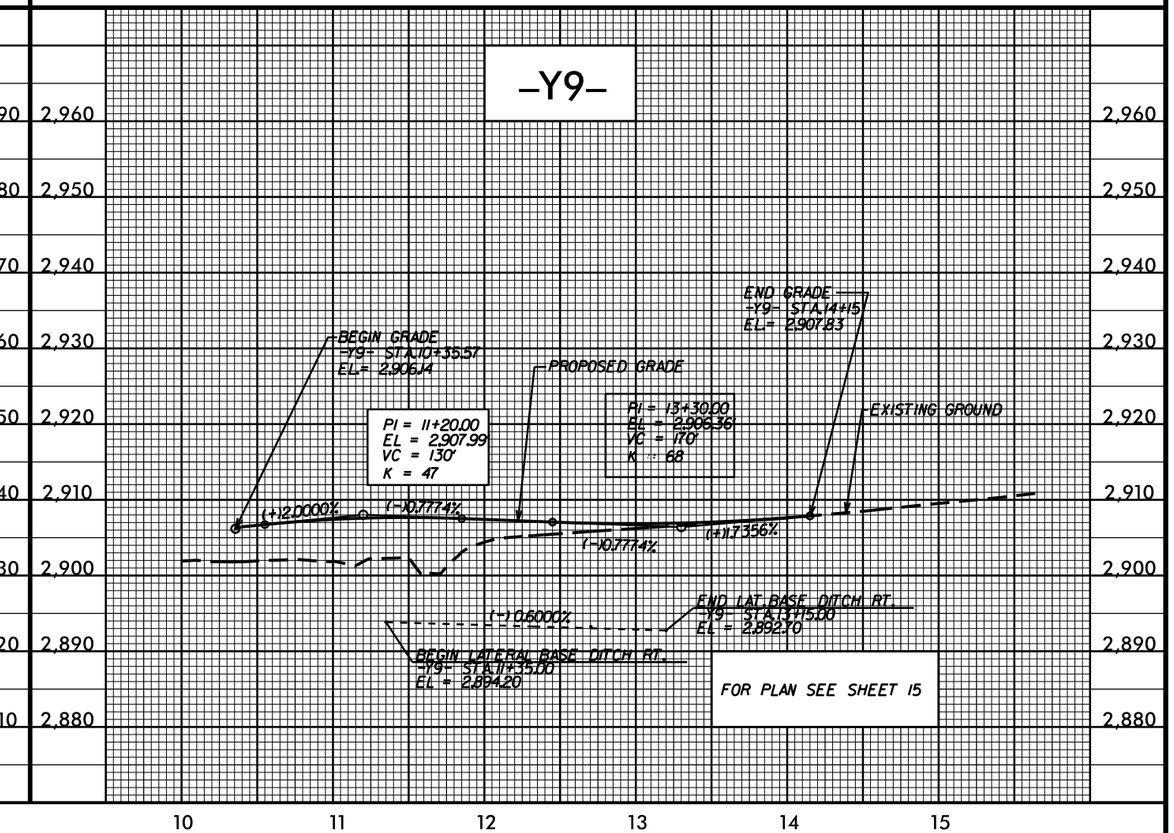

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Middlesboro, Kentucky 606-248-5600
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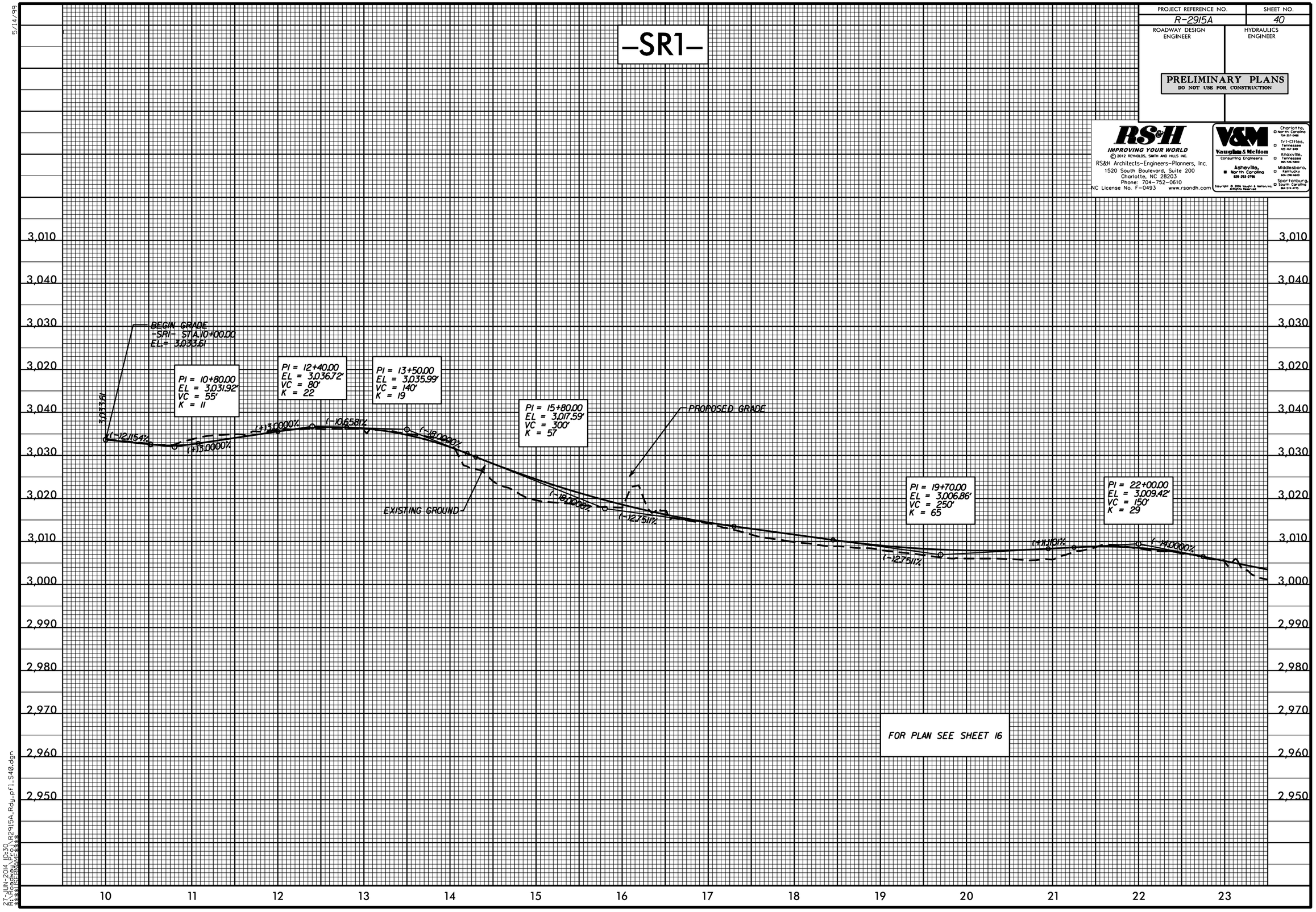

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PROJECT REFERENCE NO.	SHEET NO.
R-2915A	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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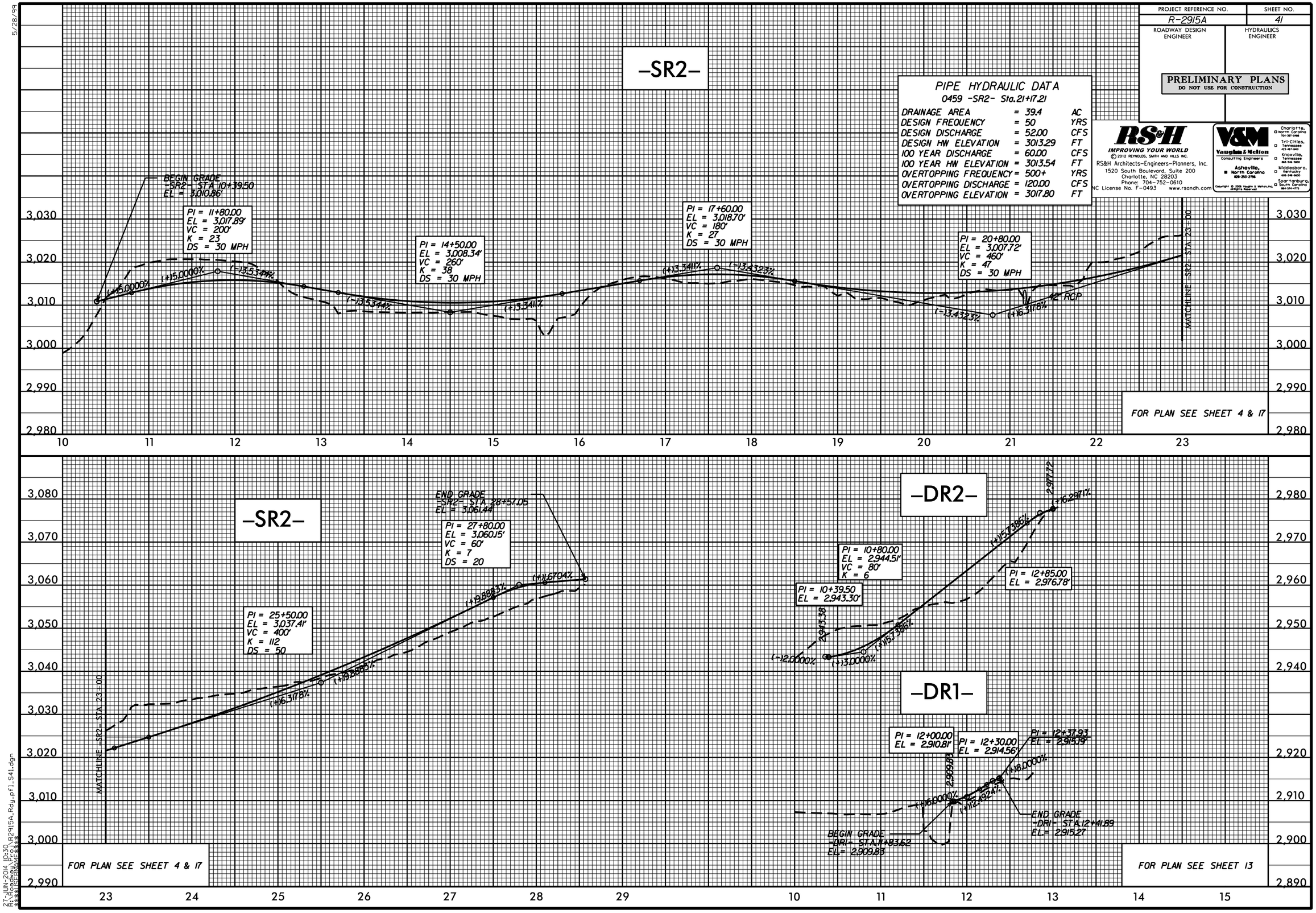

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2915A	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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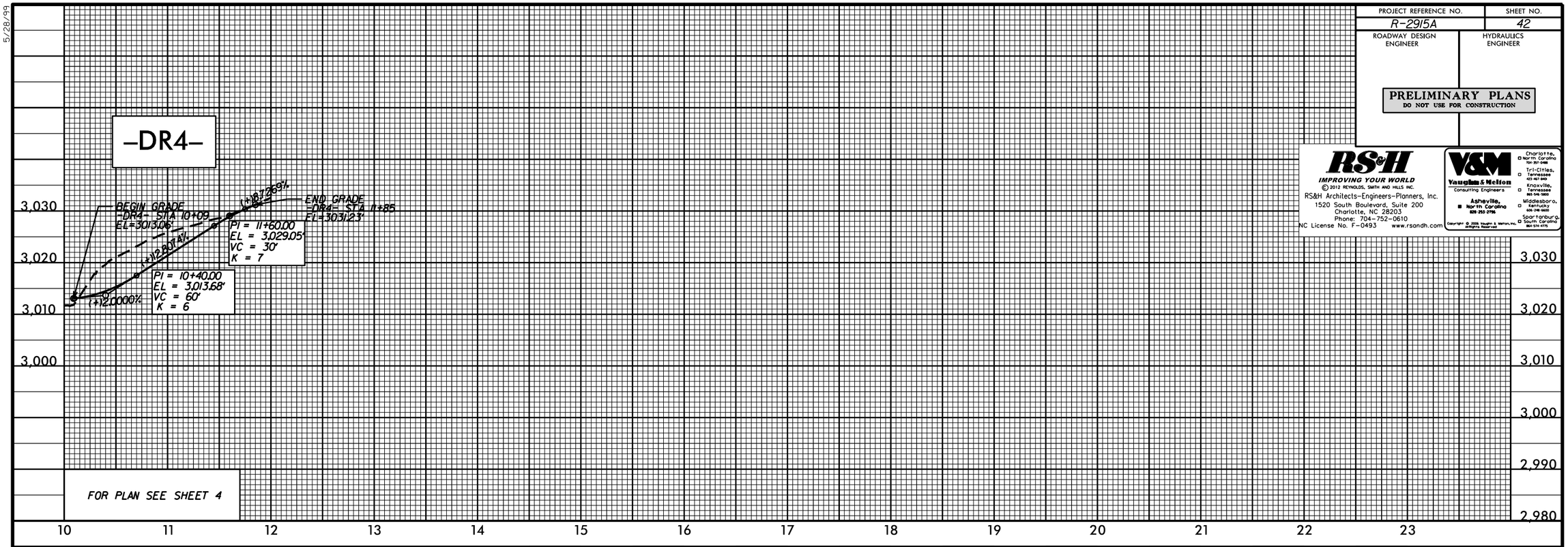

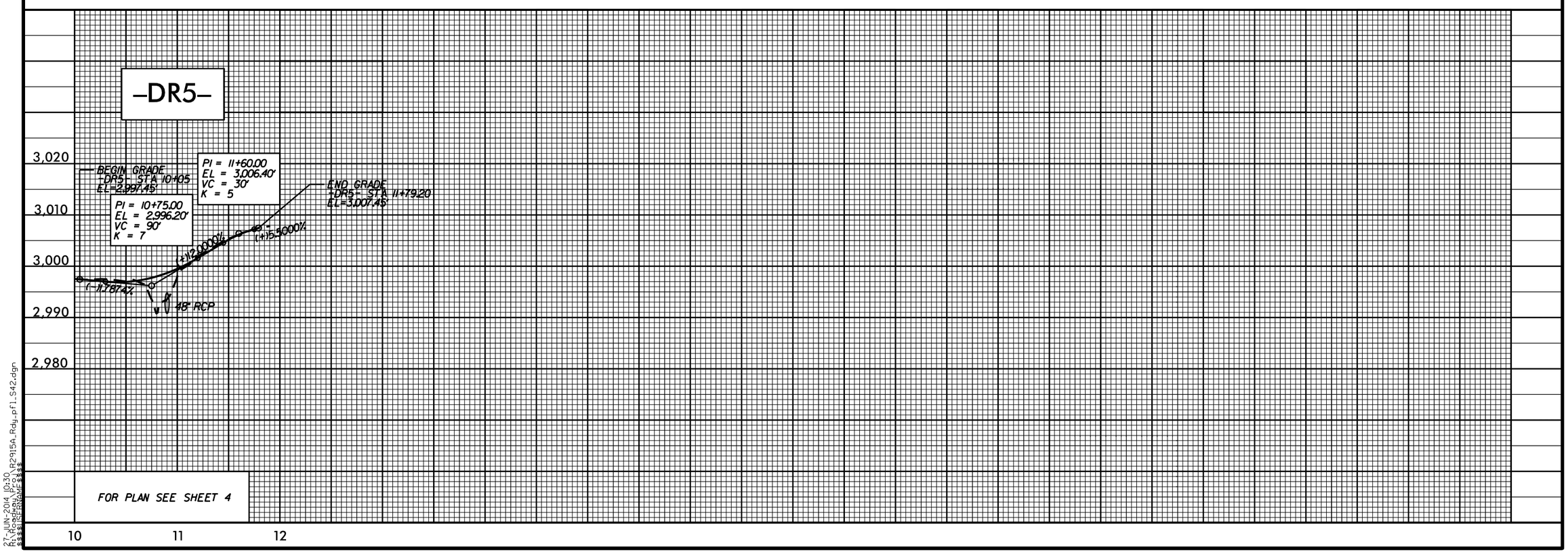

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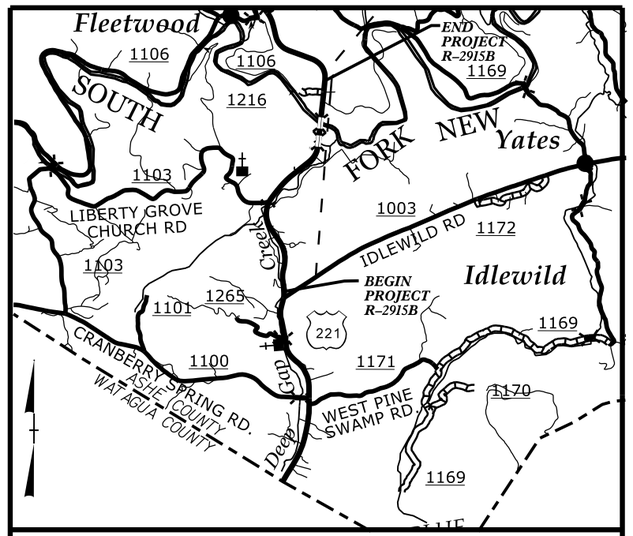
09/08/99

TIP PROJECT: R-2915B

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



VICINITY MAP

R/W PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2915B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34518.1.3	STP-0221(40)	P.E.
34518.2.FR2	STP-0221(40)	R /W
34518.2.UFR2	STP-0221(40)	UTILITIES

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850

LOCATION: US 221 FROM SR 1003 (IDLEWILD ROAD) TO NORTH OF SOUTH FORK NEW RIVER

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

NAD 83/CORS

PRELIMINARY PLANS
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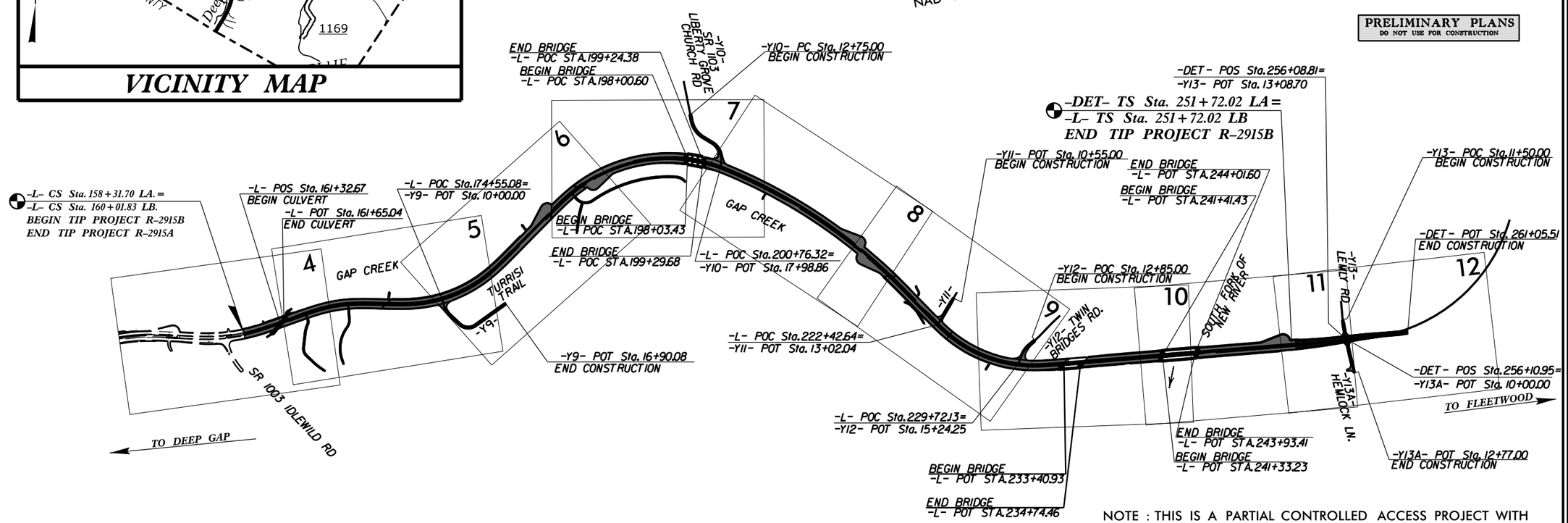

NOTE : THIS IS A PARTIAL CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO ONE DRIVEWAY PER PARCEL.

THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III

NCDOT CONTACT: BRENDA L. MOORE, P.E.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100 — PLANS

50 25 0 50 100 — PROFILE (HORIZONTAL)

10 5 0 10 20 — PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 12,089
ADT 2035 = 20,204
DHV = 10 %
D = 65 %
T = 9 % *
V = 50 MPH
* TTST 2% DUAL 7%
FUNC CLASS = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2915B = 1.675 MILES
LENGTH STRUCTURE TIP PROJECT R-2915B = 0.094 MILES
TOTAL LENGTH TIP PROJECT R-2915B = 1.769 MILES

Prepared In the Office of:
CDM Smith
5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: SEPTEMBER 30, 2013

LETTING DATE: JUNE 16, 2015

DOUGLAS B. SAUNDERS, P.E.
PROJECT ENGINEER

RICKY E. STATON
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA · DEPARTMENT OF TRANSPORTATION

03-OCT-2013 07:06
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	1B

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

REVISIONS

12/05/11

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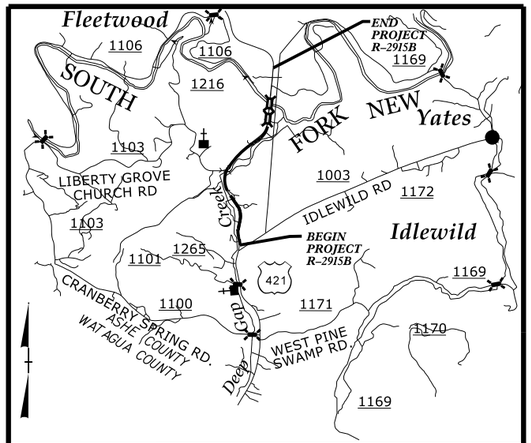
PROJECT REFERENCE NO.	SHEET NO.
34518.1.3	1-C
Location and Surveys	

SURVEY CONTROL SHEET R-2915B



VICINITY MAP

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
BL46	BL-46	928402.6058	1262144.5944	2906.40	164+57.70	59.72 LT
BL47	BL-47	929326.9840	1262283.2690	2910.77	173+86.62	21.84 LT
BL48	BL-48	929833.8683	1262134.0936	2912.87	179+30.93	18.77 LT
BL49	BL-49	930252.5771	1261808.4631	2904.69	184+62.04	52.22 LT
BL50	BL-50	930705.0036	1261535.6732	2897.84	189+78.77	56.31 LT
BL51	BL-51	931116.0346	1261433.0556	2890.72	193+82.19	74.07 LT
BL52	BL-52	931641.1471	1261537.6793	2881.92	198+92.50	62.93 LT
BL53	BL-53	932216.8529	1261999.6996	2876.74	206+18.26	5.40 RT
BL54	BL-54	932765.6058	1262461.6063	2874.49	213+30.49	49.96 LT
BL55	BL-55	933354.5662	1263260.6930	2871.17	223+21.60	61.35 LT
BL56	BL-56	933897.1980	1263665.8120	2870.83	230+36.98	17.88 LT
BL57	BL-57	934899.1246	1263792.5538	2870.93	240+49.66	7.77 LT
BL58	BL-58	935740.1689	1263880.7456	2884.86	248+95.32	7.08 LT

BY6

POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
BY680	BY6-80	931624.6900	1260669.6512	2913.15	OUTSIDE PROJECT LIMITS	
BY681	BY6-81	931641.1471	1261537.6793	2881.92	15+36.22	122.93 RT

BY7

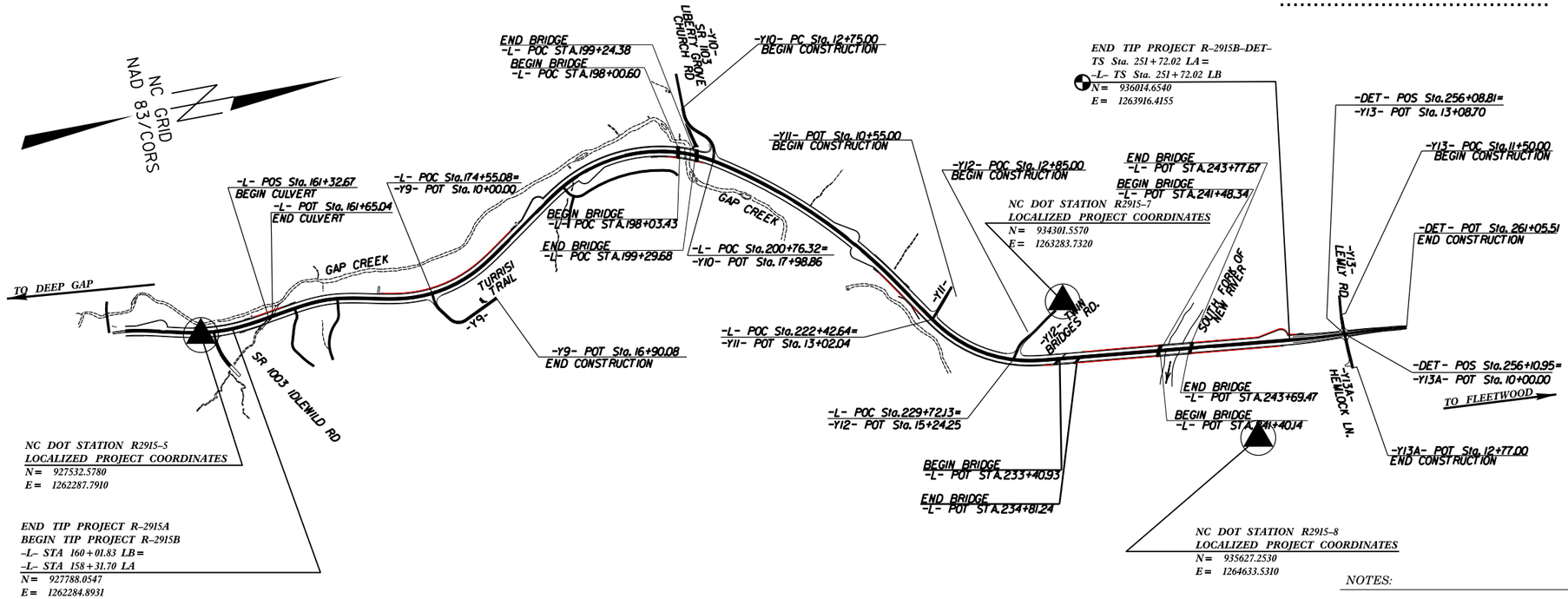
POINT	DESC.	NORTH	EAST	ELEVATION	Y13 STATION	OFFSET
BY782	BY7-82	936407.6723	1263268.6732	2888.19	OUTSIDE PROJECT LIMITS	
BY783	BY7-83	936468.4871	1263464.0511	2903.80	OUTSIDE PROJECT LIMITS	
BY784	BY7-84	936429.4463	1263916.1701	2937.49	12+75.74	20.96 RT

BM7 ELEVATION = 2900.68
N 927977 E 1262292
L STATION 160+18.00 24 RIGHT
CHISELED SQUARE IN CONCRETE FLOOR OF TELEPHONE EXCHANGE

BM8 ELEVATION = 2881.14
N 930658 E 1261410
L STATION 189+80.00 191 LEFT
RR SPIKE IN 30" WHITE PINE

BM9 ELEVATION = 2871.28
N 932968 E 1262584
L STATION 215+49.00 130 LEFT
RR SPIKE IN ROOT OF 24" FORKED CHERRY TREE

BM10 ELEVATION = 2974.62
N 936805 E 1263884
L STATION 161+56.00
N 10°39'23.54" E DIST 8848.34
RR SPIKE IN ROOT OF 8" WHITE PINE



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(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 158+31.70 IS
S 16°58'47" E 28327.5827
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NC DOT STATION R2915-6
LOCALIZED PROJECT COORDINATES
N = 926551.4520
E = 1265372.0870

NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 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/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915B_LS_GPSCALIB.HTML
R2915B_LS_WGS84.TXT
R2915B_LS_LOCAL.TXT
R2915B_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.

6/2/99

03-OCT-2013 07:06
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SURVEY CONTROL SHEET R–2915B

PROJECT REFERENCE NO.	SHEET NO.
34518.1.3	1–D
Location and Surveys	

GPS Calibration Report

Project : r2915abcde

TIP Number	r2915abcde		
User name	rhwagoner	Date & Time	8:15:20 AM 3/29/2010
Coordinate System	US State Plane 1983	Zone	North Carolina 3200
Horizontal Datum	NAD 1983 (Conus)		
Vertical Datum		Geoid Model	G03NC
Coordinate Units	US survey feet		
Distance Units	US survey feet		
Height Units	US survey feet		

LOCAL SITE INFORMATION

Localized around	
Latitude	N/A
Longitude	N/A
Site Scale Factor	N/A
Height	N/A

The North Carolina Department of Transportation uses a Localized Coordinate System which is very similar to North Carolina Zone 3200 from which it is derived.
Please take care in utilizing these coordinates to eliminate confusion of the two systems.
This file is to aid in the use of Real Time Kinematic (RTK) GPS during construction layout.

Datum Transformation Parameters

Datum Transformation computation not requested

Updated Default Projection (Transverse Mercator) Definition

Updated default projection not requested

Horizontal Adjustment Parameters

Northing coordinate of rotation center	947934.1223sft
Easting coordinate of rotation center	1262471.3754sft
Rotation about the center point	0°00'00"
Translation north	-0.6128sft
Translation east	0.7058sft
Scale factor	1.00008668

Vertical Adjustment Parameters

Northing coordinate of origin point	916355.6589sft
Easting coordinate of origin point	1255522.7706sft
Vertical separation at origin	0.0728sft
Slope north	2.018ppm
Slope east	-3.981ppm

Geoid Model Definition

G03NC

Residual Differences Between GPS (WGS84) And Local Coordinates

Summary

	Maximum error	Root Mean Square error	Point
Horizontal	0.037sft	0.006	R2915-23_WGS84
Vertical	0.080sft	0.010	R2915-23_WGS84
Three-dimensional	0.088sft	0.011	R2915-23_WGS84

Point Residuals

WGS84 Coordinates		Calculated point FOR DISPLAY ONLY		Local Coordinates	
Point	R2915-1 WGS84	Northing	916355.6589sft	Point	R2915-1 Local
Latitude	36°14'30.16499"N	Easting	1255522.7706sft	Northing	916355.6590sft
Longitude	81°31'28.80325"W	Elevation	3142.3037sft	Easting	1255522.7760sft
Height	3038.5989sft	Horz error	0.005sft	Elevation	3142.2840sft
		Vert error	0.020sft	Utilized	Horz and Vert
		3D error	0.020sft	Quality	Survey quality
Point	R2915-2_WGS84	Northing	915243.5295sft	Point	R2915-2_Local
Latitude	36°14'19.87328"N	Easting	1258316.3057sft	Northing	915243.5260sft
Longitude	81°30'54.37263"W	Elevation	3035.6772sft	Easting	1258316.3100sft
Height	2931.8298sft	Horz error	0.006sft	Elevation	3035.6720sft
		Vert error	0.005sft	Utilized	Horz and Vert
		3D error	0.008sft	Quality	Survey quality
Point	R2915-3_WGS84	Northing	919149.7074sft	Point	R2915-3_Local
Latitude	36°14'59.39661"N	Easting	1261969.9588sft	Northing	919149.7040sft
Longitude	81°30'10.99416"W	Elevation	2977.4067sft	Easting	1261969.9680sft
Height	2873.5914sft	Horz error	0.010sft	Elevation	2977.4070sft
		Vert error	0.000sft	Utilized	Horz and Vert
		3D error	0.010sft	Quality	Survey quality
Point	R2915-4_WGS84	Northing	920506.4892sft	Point	R2915-4_Local
Latitude	36°15'13.02239"N	Easting	1262832.0488sft	Northing	920506.4880sft
Longitude	81°30'00.89092"W	Elevation	2956.9814sft	Easting	1262832.0570sft
Height	2853.1869sft	Horz error	0.008sft	Elevation	2956.9900sft
		Vert error	0.009sft	Utilized	Horz and Vert
		3D error	0.012sft	Quality	Survey quality
Point	R2915-5 WGS84	Northing	927532.5716sft	Point	R2915-5 Local
Latitude	36°16'22.33517"N	Easting	1262287.7805sft	Northing	927532.5780sft
Longitude	81°30'09.69521"W	Elevation	2902.2729sft	Easting	1262287.7910sft
Height	2798.7405sft	Horz error	0.012sft	Elevation	2902.2770sft
		Vert error	0.004sft	Utilized	Horz and Vert
		3D error	0.013sft	Quality	Survey quality
Point	R2915-6 WGS84	Northing	929551.4461sft	Point	R2915-6 Local
Latitude	36°16'43.05751"N	Easting	1265372.0745sft	Northing	929551.4520sft
Longitude	81°29'32.66468"W	Elevation	3037.6229sft	Easting	1265372.0870sft
Height	2934.0460sft	Horz error	0.014sft	Elevation	3037.6360sft
		Vert error	0.013sft	Utilized	Horz and Vert
		3D error	0.019sft	Quality	Survey quality
Point	R2915-7 WGS84	Northing	934301.5436sft	Point	R2915-7 Local
Latitude	36°17'29.48965"N	Easting	1263283.7338sft	Northing	934301.5570sft
Longitude	81°29'59.61899"W	Elevation	2870.4241sft	Easting	1263283.7320sft
Height	2767.0788sft	Horz error	0.014sft	Elevation	2870.4170sft
		Vert error	0.007sft	Utilized	Horz and Vert
		3D error	0.015sft	Quality	Survey quality
Point	R2915-8_WGS84	Northing	935627.2416sft	Point	R2915-8_Local
Latitude	36°17'42.92890"N	Easting	1264633.5337sft	Northing	935627.2530sft
Longitude	81°29'43.54539"W	Elevation	2872.3172sft	Easting	1264633.5310sft
Height	2768.9685sft	Horz error	0.012sft	Elevation	2872.3310sft
		Vert error	0.014sft	Utilized	Horz and Vert
		3D error	0.018sft	Quality	Survey quality
Point	R2915-9_WGS84	Northing	940641.1693sft	Point	R2915-9_Local
Latitude	36°18'31.45715"N	Easting	1260499.6148sft	Northing	940641.1850sft
Longitude	81°30'35.56934"W	Elevation	2893.9308sft	Easting	1260499.6170sft
Height	2790.8934sft	Horz error	0.016sft	Elevation	2893.9060sft
		Vert error	0.025sft	Utilized	Horz and Vert
		3D error	0.029sft	Quality	Survey quality
Point	R2915-10_WGS84	Northing	941223.4149sft	Point	R2915-10_Local
Latitude	36°18'37.24430"N	Easting	1260628.2994sft	Northing	941223.4310sft
Longitude	81°30'34.17760"W	Elevation	2992.8526sft	Easting	1260628.3040sft
Height	2889.8302sft	Horz error	0.017sft	Elevation	2992.8370sft
		Vert error	0.016sft	Utilized	Horz and Vert
		3D error	0.023sft	Quality	Survey quality
Point	R2915-11_WGS84	Northing	946476.2925sft	Point	R2915-11_Local
Latitude	36°19'28.64133"N	Easting	1258539.4421sft	Northing	946476.3110sft
Longitude	81°31'01.31448"W	Elevation	2961.5603sft	Easting	1258539.4520sft
Height	2858.7761sft	Horz error	0.021sft	Elevation	2961.5280sft
		Vert error	0.032sft	Utilized	Horz and Vert
		3D error	0.039sft	Quality	Survey quality
Point	R2915-12 WGS84	Northing	947042.3574sft	Point	R2915-12 Local
Latitude	36°19'34.13447"N	Easting	1258133.1858sft	Northing	947042.3510sft
Longitude	81°31'06.45218"W	Elevation	2976.4319sft	Easting	1258133.1700sft
Height	2873.6799sft	Horz error	0.017sft	Elevation	2976.4580sft
		Vert error	0.026sft	Utilized	Horz and Vert
		3D error	0.031sft	Quality	Survey quality
Point	R2915-13 WGS84	Northing	951569.5121sft	Point	R2915-13 Local
Latitude	36°20'18.04952"N	Easting	1254826.4800sft	Northing	951569.5120sft
Longitude	81°31'48.25253"W	Elevation	3052.2178sft	Easting	1254826.4650sft
Height	2949.7070sft	Horz error	0.015sft	Elevation	3052.2240sft
		Vert error	0.006sft	Utilized	Horz and Vert
		3D error	0.016sft	Quality	Survey quality
Point	R2915-14_WGS84	Northing	952360.7067sft	Point	R2915-14_Local
Latitude	36°20'25.72331"N	Easting	1254245.9924sft	Northing	952360.7080sft

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(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 158+31.70 IS
S 16°58'47" E 28327.5827
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. *THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 8395 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/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915B_LS_GPSCALIB.HTML
R2915B_LS_WGS84.TXT
R2915B_LS_LOCAL.TXT
R2915B_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.

03-OCT-2013 07:07
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
34518.1.3	1-E
Location and Surveys	

SURVEY CONTROL SHEET R-2915B

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
Longitude	81°28'46.86125"W	Elevation	3163.2767sft	Easting	1270213.5010sft
Height	3060.7659sft	Horz error	0.013sft	Elevation	3163.3260sft
		Vert error	0.049sft	Utilized	Horz and Vert
		3D error	0.051sft	Quality	Survey quality

Point	R2915-23_WGS84	Northing	981712.8608sft	Point	R2915-23_Local
Latitude	36°25'21.32188"N	Easting	1276325.1593sft	Northing	981712.8790sft
Longitude	81°27'34.73217"W	Elevation	2903.7232sft	Easting	1276325.1910sft
Height	2801.1821sft	Horz error	0.037sft	Elevation	2903.6430sft
		Vert error	0.080sft	Utilized	Horz and Vert
		3D error	0.088sft	Quality	Survey quality

Point	R2915-24_WGS84	Northing	980994.0668sft	Point	R2915-24_Local
Latitude	36°25'14.17430"N	Easting	1276148.6155sft	Northing	980994.0780sft
Longitude	81°27'36.67335"W	Elevation	2878.9461sft	Easting	1276148.6390sft
Height	2776.3983sft	Horz error	0.026sft	Elevation	2878.8920sft
		Vert error	0.054sft	Utilized	Horz and Vert
		3D error	0.060sft	Quality	Survey quality

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(ft) EASTING: 1254012.2870(ft)
ELEVATION: 3097.5210(ft)
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 158+31.70 IS
S 16°58'47" E 28327.5827
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

1. THE SITE CALIBRATION SHOWN IS BASED UPON A NETWORK TIED TO THE HARN (HIGH ACCURACY REFERENCE NETWORK) NAD 83/95 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/

THE FILES TO BE FOUND ARE AS FOLLOWS:
R2915B_LS_GPSCALIB.HTML
R2915B_LS_WGS84.TXT
R2915B_LS_LOCAL.TXT
R2915B_LS_CONTROL.TXT

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○ 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.

PAVEMENT SCHEDULE (PRELIMINARY)

ITEM	DESCRIPTION	ITEM	DESCRIPTION	ITEM	DESCRIPTION
C1	PROPOSED APPROXIMATE 3.0 IN. ASPHALT SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS/SY IN EACH OF TWO LAYERS.	E2	PROP. APPROX. 5.0 IN. ASPHALT BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS/SY.	R1	2'-9" CURB & GUTTER
C2	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS/SY/IN. IN LIFTS NOT LESS THAN 1.5 IN. NOR GREATER THAN 2.0 IN.	E3	PROP. VAR. DEPTH ASPHALT BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS/SY/IN IN LIFTS NOT LESS THAN 3 IN. NOR GREATER THAN 5.5 IN.	R2	5" MONOLITHIC CONCRETE ISLAND (KEYED IN)
C3	PROPOSED APPROXIMATE 2.0 IN. ASPHALT SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS/SY	J1	10" AGGREGATE BASE COURSE	T	EARTH MATERIAL
D1	PROP. APPROX. 4.0 IN. ASPHALT INT. COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS/SY	J2	VARIABLE DEPTH AGGREGATE BASE COURSE	U	EXISTING PAVEMENT
D2	PROP. VAR. DEPTH ASPHALT INT. COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS/SY/IN. IN LIFTS NOT LESS THAN 2.5 IN. NOR GREATER THAN 4.0 IN. (MAX TOTAL LAYER=4.0 IN.)	J3	8" AGGREGATE BASE COURSE	W	WEDGING (SEE WEDGE DETAIL ABOVE)
E1	PROP. APPROX. 4.0 IN. ASPHALT BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS/SY.	P	PRIME COAT		

NOTES :
PAVEMENT EDGES ARE 1:1 UNLESS OTHERWISE NOTED.

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

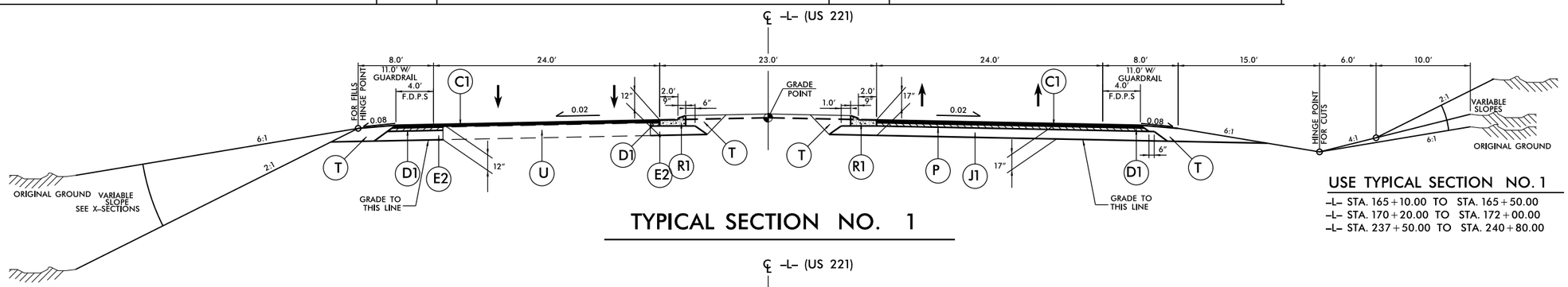
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 350, Raleigh, NC 27612-3228, NC COA No. F-0412

NC DEPARTMENT OF TRANSPORTATION, PAVEMENT MANAGEMENT UNIT, 1593 MAIL SERVICE CENTER, RALEIGH, NC 27699-1593

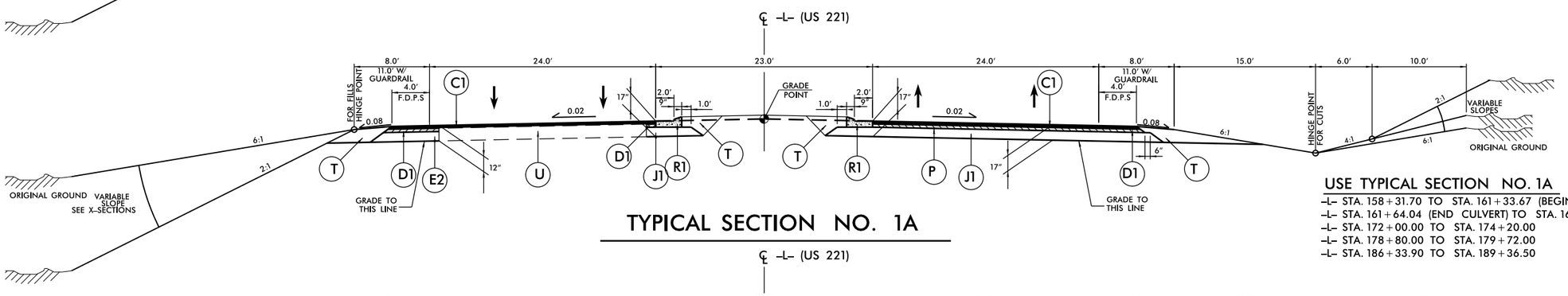
REVISIONS

6/2/99



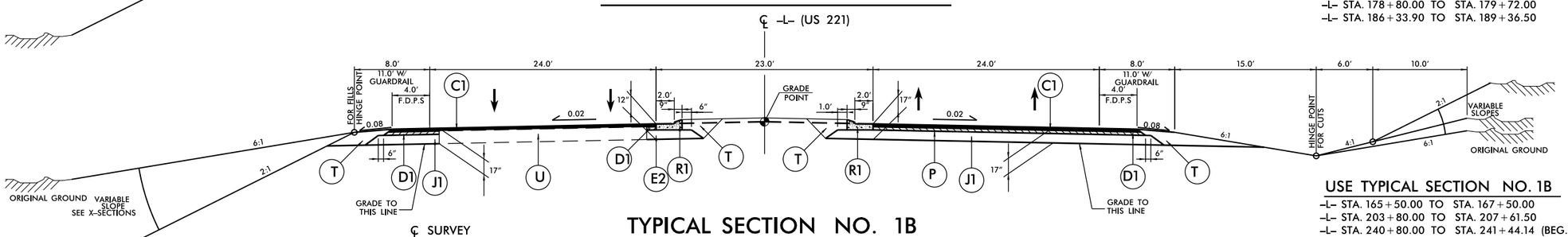
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 165+10.00 TO STA. 165+50.00
-L- STA. 170+20.00 TO STA. 172+00.00
-L- STA. 237+50.00 TO STA. 240+80.00



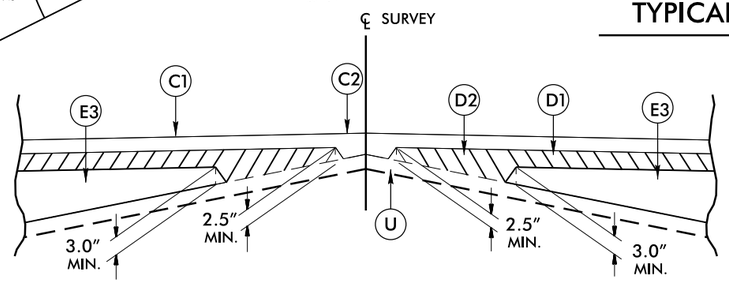
TYPICAL SECTION NO. 1A

USE TYPICAL SECTION NO. 1A
-L- STA. 158+31.70 TO STA. 161+33.67 (BEGIN CULVERT)
-L- STA. 161+64.04 (END CULVERT) TO STA. 165+10.00
-L- STA. 172+00.00 TO STA. 174+20.00
-L- STA. 178+80.00 TO STA. 179+72.00
-L- STA. 186+33.90 TO STA. 189+36.50

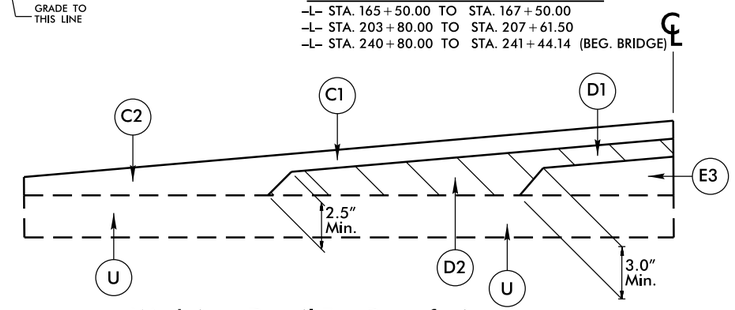


TYPICAL SECTION NO. 1B

USE TYPICAL SECTION NO. 1B
-L- STA. 165+50.00 TO STA. 167+50.00
-L- STA. 203+80.00 TO STA. 207+61.50
-L- STA. 240+80.00 TO STA. 241+44.14 (BEG. BRIDGE)



Detail Showing Method of Wedging



Wedging Detail For Resurfacing

03-OCT-2013 07:07
R:\Roadway\Proj\R2915B_RDY_TYP_2.DGN
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

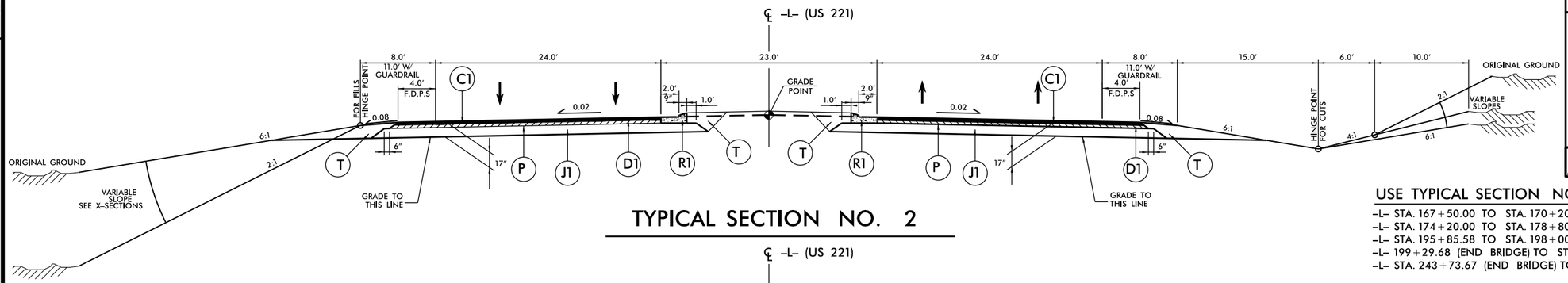
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5438 Glenwood Avenue
Suite 350
Raleigh, NC 27612-3228
NC CDA No. F-0412

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

PAVEMENT SCHEDULE

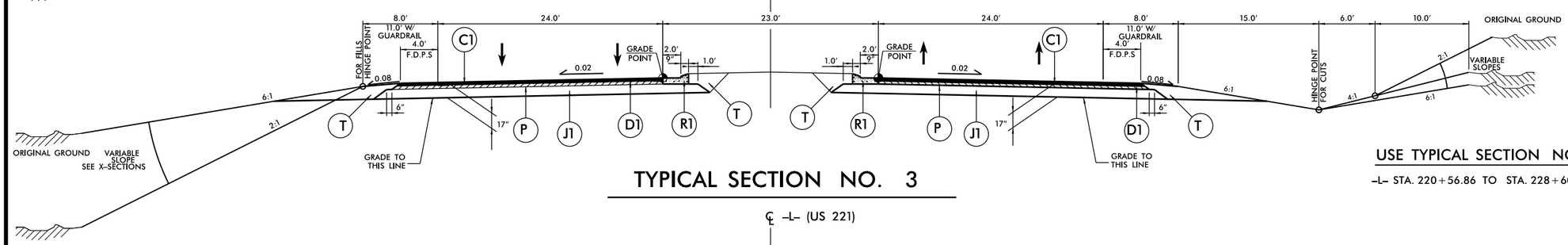
C1	3" S9.5B
C2	VAR. S9.5B
C3	2" S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
J1	10" ABC
J2	VAR. ABC
J3	8" ABC
P	PRIME COAT
R1	2'-9" C&G
R2	5" MONO. CONC. MEDIAN
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING SEE SHEET 2



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

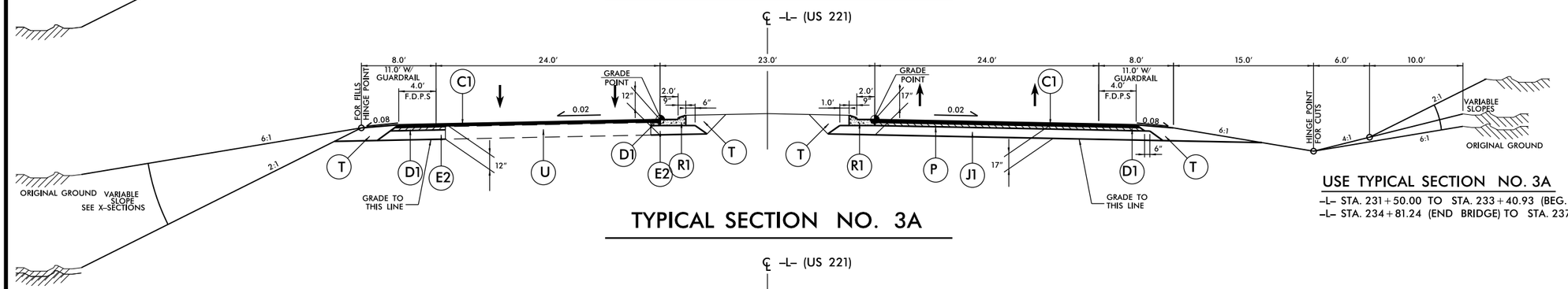
-L- STA. 167+50.00 TO STA. 170+20.00
-L- STA. 174+20.00 TO STA. 178+80.00
-L- STA. 195+85.58 TO STA. 198+00.60 (BEG. BRIDGE)
-L- 199+29.68 (END BRIDGE) TO STA. 203+80.00
-L- STA. 243+73.67 (END BRIDGE) TO STA. 245+22.48



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

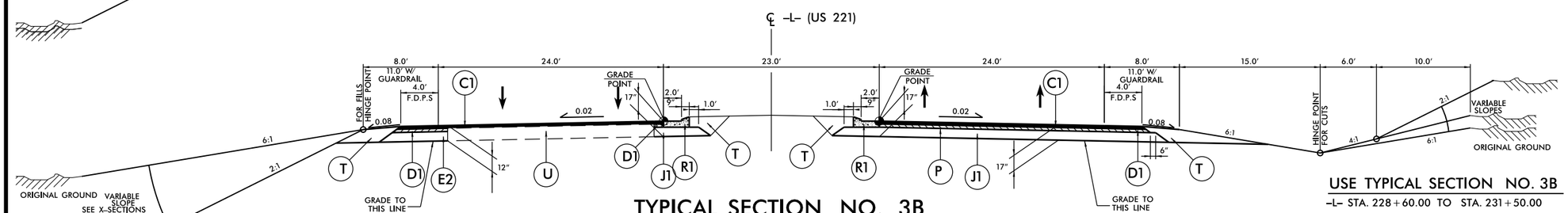
-L- STA. 220+56.86 TO STA. 228+60.00



TYPICAL SECTION NO. 3A

USE TYPICAL SECTION NO. 3A

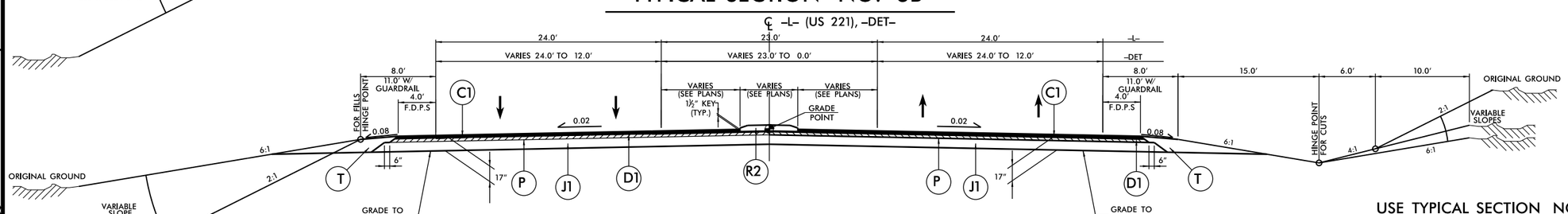
-L- STA. 231+50.00 TO STA. 233+40.93 (BEG. BRIDGE)
-L- STA. 234+81.24 (END BRIDGE) TO STA. 237+50.00



TYPICAL SECTION NO. 3B

USE TYPICAL SECTION NO. 3B

-L- STA. 228+60.00 TO STA. 231+50.00



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

-L- STA. 190+70.00 TO STA. 195+85.57
-L- STA. 218+30.00 TO STA. 220+56.86
-L- STA. 245+22.48 TO STA. 251+72.02
-DET- STA. 251+72.02 TO STA. 252+00.00

REVISIONS

REVISIONS

6/2/99

03-OCT-2013 07:07
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6/2/99

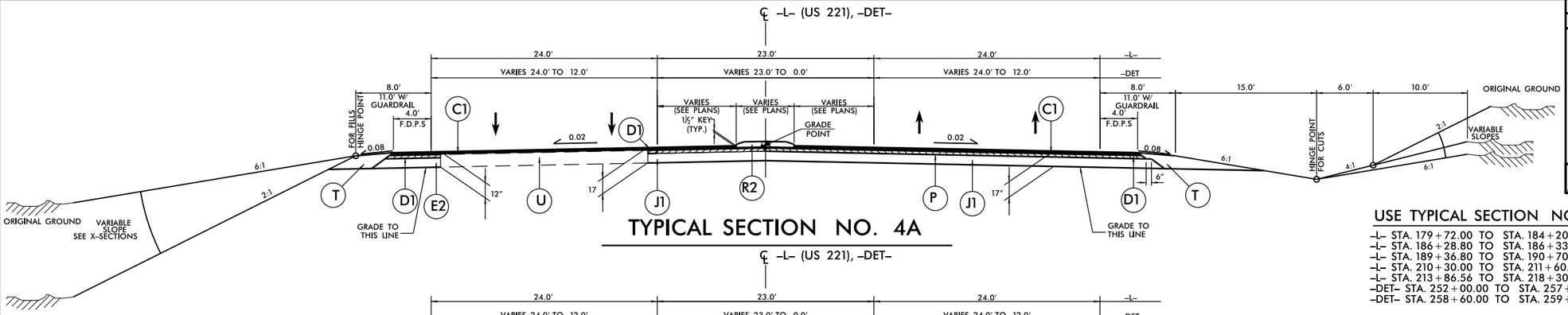
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Cairns Dresser & McKee
5400 Glenwood Avenue
Suite 350
Raleigh, NC 27612-3228
NC COA No. F-0412

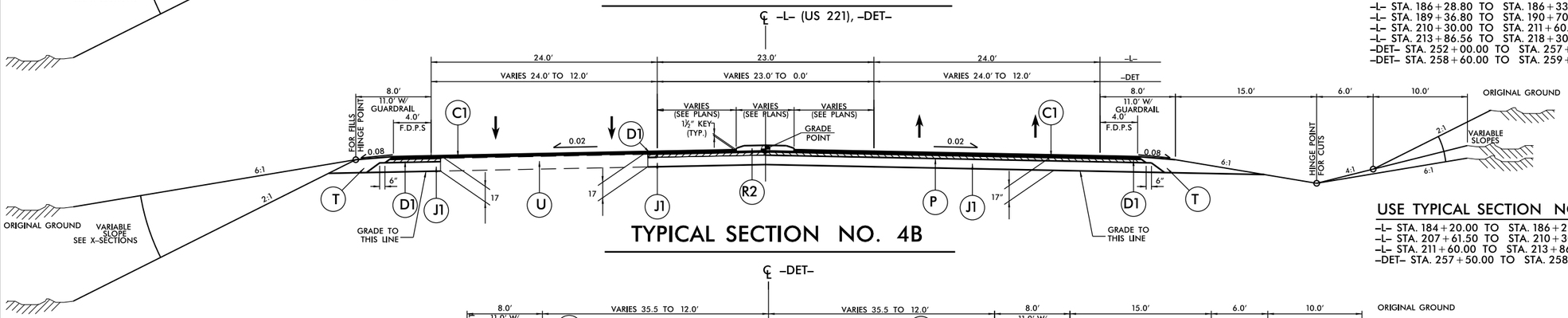
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



TYPICAL SECTION NO. 4A

USE TYPICAL SECTION NO. 4A

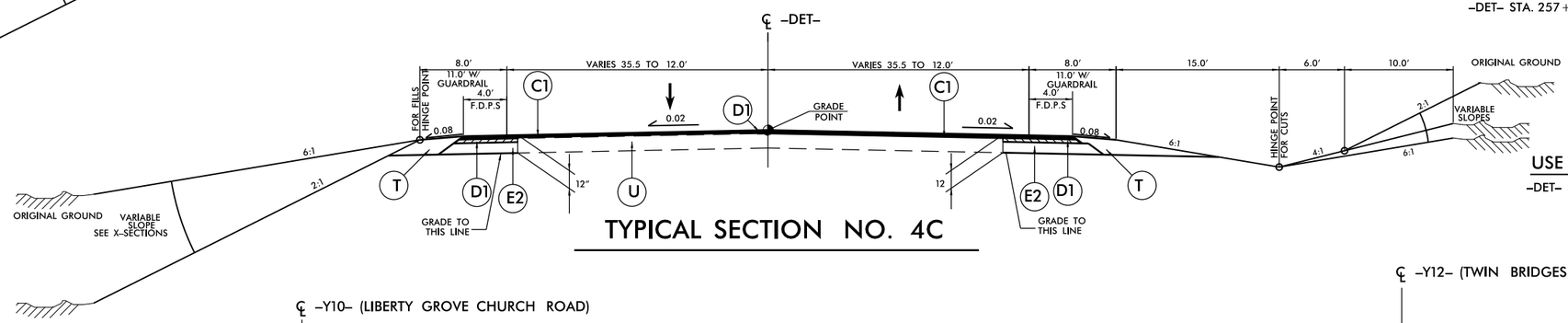
-L- STA. 179+72.00 TO STA. 184+20.00
-L- STA. 186+28.80 TO STA. 186+33.90
-L- STA. 189+36.80 TO STA. 190+70.00
-L- STA. 210+30.00 TO STA. 211+60.00
-L- STA. 213+86.56 TO STA. 218+30.00
-DET- STA. 252+00.00 TO STA. 257+50.00
-DET- STA. 258+60.00 TO STA. 259+00.00



TYPICAL SECTION NO. 4B

USE TYPICAL SECTION NO. 4B

-L- STA. 184+20.00 TO STA. 186+28.80
-L- STA. 207+61.50 TO STA. 210+30.00
-L- STA. 211+60.00 TO STA. 213+86.56
-DET- STA. 257+50.00 TO STA. 258+60.00

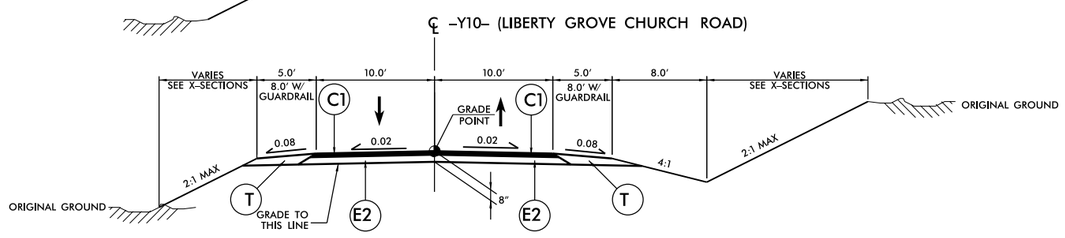


TYPICAL SECTION NO. 4C

USE TYPICAL SECTION NO. 4C

-DET- STA. 259+00.00 TO STA. 261+05.51

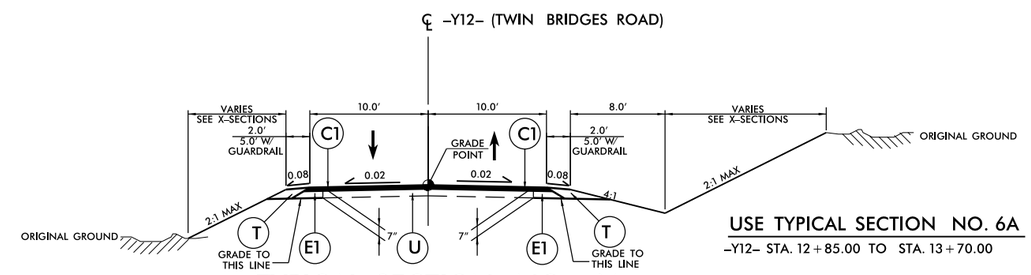
PAVEMENT SCHEDULE	
C1	3" S9.5B
C2	VAR. S9.5B
C3	2" S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	4" B25.0B
E2	5" B25.0B
E3	VAR. B25.0B
J1	10" ABC
J2	VAR. ABC
J3	8" ABC
P	PRIME COAT
R1	2'-9" C&G
R2	5" MONO. CONC. MEDIAN
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	WEDGING SEE SHEET 2



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

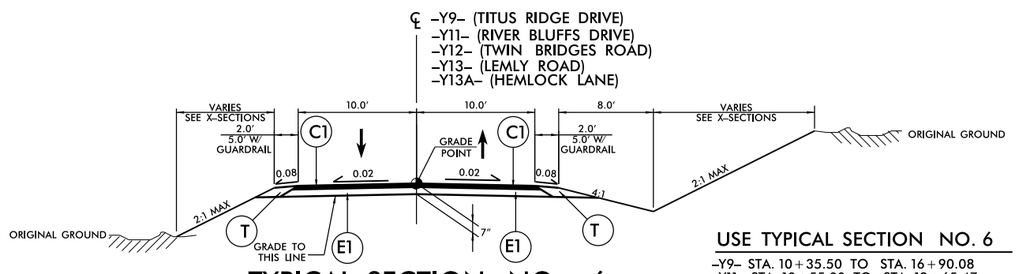
-Y10- STA. 12+75.00 TO STA. 17+62.15



TYPICAL SECTION NO. 6A

USE TYPICAL SECTION NO. 6A

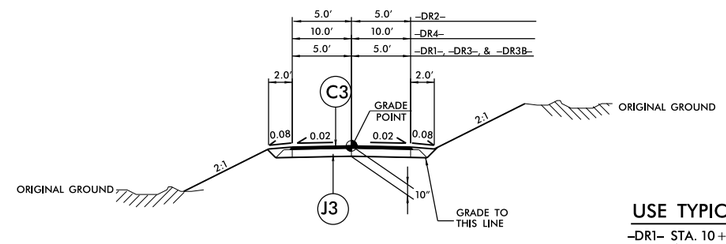
-Y12- STA. 12+85.00 TO STA. 13+70.00



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6

-Y9- STA. 10+35.50 TO STA. 16+90.08
-Y11- STA. 10+55.00 TO STA. 12+65.47
-Y12- STA. 13+70.00 TO STA. 14+87.00
-Y13- STA. 11+50.00 TO STA. 12+86.60
-Y13A- STA. 10+21.98 TO STA. 12+77.00



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

-DR1- STA. 10+35.50 TO STA. 15+43.00
-DR2- STA. 10+35.50 TO STA. 14+90.00
-DR3- STA. 10+35.50 TO STA. 19+95.00
-DR3B- STA. 10+06.00 TO STA. 12+35.00
-DR4- STA 10+35.50 TO STA. 13+24.54

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DRAINAGE DETAILS

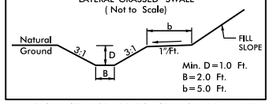
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

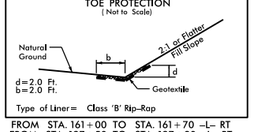
SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

DETAIL #1
LATERAL GRASSED SWALE
(Not to Scale)



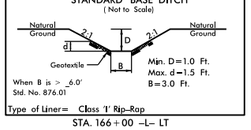
FROM STA. 160+20 TO STA. 161+00 –L– RT
FROM STA. 215+00 TO STA. 217+40 –L– LT

DETAIL #2
TOE PROTECTION
(Not to Scale)



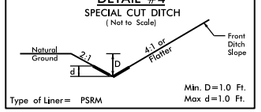
FROM STA. 161+00 TO STA. 161+70 –L– RT
FROM STA. 197+50 TO STA. 197+80 –L– RT
FROM STA. 250+00 TO STA. 251+50 –L– RT
FROM STA. 251+00 TO STA. 253+00 –L– LT

DETAIL #3
STANDARD BASE DITCH
(Not to Scale)



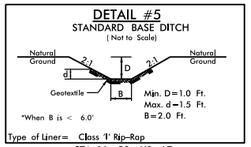
STA. 166+00 –L– LT

DETAIL #4
SPECIAL CUT DITCH
(Not to Scale)



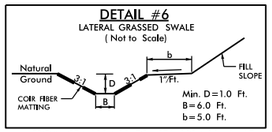
FROM STA. 10+50 TO STA. 16+00 –Y9– LT & RT
FROM STA. 16+20 TO STA. 16+90 –Y9– RT
FROM STA. 10+50 TO STA. 12+10 –Y7A– RT
FROM STA. 10+50 TO STA. 12+50 –Y7A– LT
FROM STA. 11+50 TO STA. 12+50 –Y7– LT
FROM STA. 10+50 TO STA. 15+43 –DR1– RT & LT
FROM STA. 10+50 TO STA. 14+90 –DR2– RT & LT

DETAIL #5
STANDARD BASE DITCH
(Not to Scale)



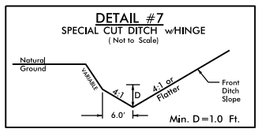
STA. 16+50 –Y9– LT

DETAIL #6
LATERAL GRASSED SWALE
(Not to Scale)



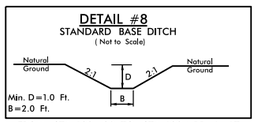
FROM STA. 180+00 TO STA. 182+00 –L– LT

DETAIL #7
SPECIAL CUT DITCH wHINGE
(Not to Scale)



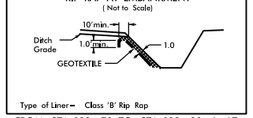
FROM STA. 196+50 TO STA. 197+00 –L– RT

DETAIL #8
STANDARD BASE DITCH
(Not to Scale)



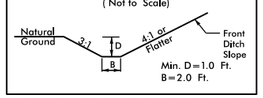
FROM STA. 198+80 TO STA. 199+55 –L– LT

DETAIL #9
RIP RAP AT EMBANKMENT
(Not to Scale)



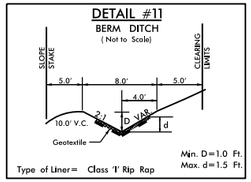
FROM STA. 198+70 TO STA. 198+90 –L– LT
FROM STA. 217+27 TO STA. 217+40 –L– LT
FROM STA. 242+50 TO STA. 242+70 –L– RT
FROM STA. 243+40 TO STA. 243+60 –L– LT

DETAIL #10
SPECIAL CUT GRASSED SWALE
(Not to Scale)



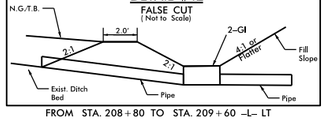
FROM STA. 212+00 TO STA. 215+00 –L– RT

DETAIL #11
BERM DITCH
(Not to Scale)



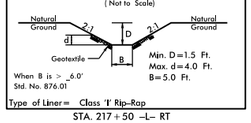
FROM STA. 171+50 TO STA. 172+75 –L– RT

DETAIL #12
FALSE CUT
(Not to Scale)



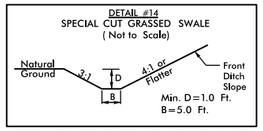
FROM STA. 208+80 TO STA. 209+60 –L– LT

DETAIL #13
STANDARD BASE DITCH
(Not to Scale)



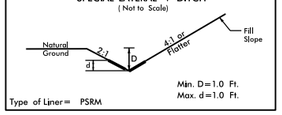
STA. 217+50 –L– RT

DETAIL #14
SPECIAL CUT GRASSED SWALE
(Not to Scale)



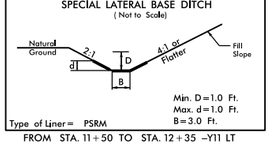
FROM STA. 222+50 TO STA. 229+50 –L– LT

DETAIL #15
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



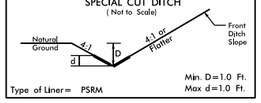
FROM STA. 10+55 TO STA. 12+18 –Y11– RT
FROM STA. 13+95 TO STA. 14+55 –Y12– RT

DETAIL #16
SPECIAL LATERAL BASE DITCH
(Not to Scale)



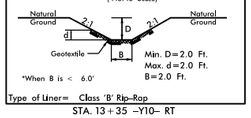
FROM STA. 11+50 TO STA. 12+35 –Y11 LT

DETAIL #17
SPECIAL CUT DITCH
(Not to Scale)



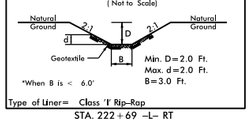
FROM STA. 252+00 TO STA. 255+50 –DET– RT
FROM STA. 253+00 TO STA. 255+50 –DET– LT
FROM STA. 256+42 TO STA. 261+05 –DET– RT
FROM STA. 256+50 TO STA. 260+50 –DET– LT

DETAIL #18
STANDARD BASE DITCH
(Not to Scale)



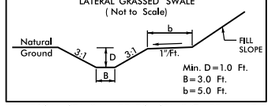
STA. 13+35 –Y10– RT

DETAIL #19
STANDARD BASE DITCH
(Not to Scale)



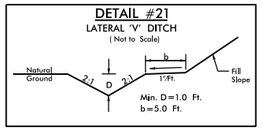
STA. 222+69 –L– RT

DETAIL #20
LATERAL GRASSED SWALE
(Not to Scale)



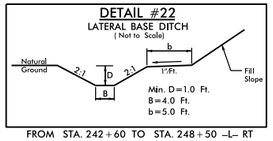
FROM STA. 244+00 TO STA. 247+00 –L– LT

DETAIL #21
LATERAL 'V' DITCH
(Not to Scale)



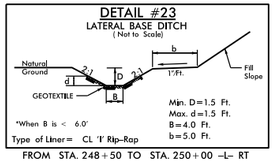
FROM STA. 247+00 TO STA. 249+00 –L– LT

DETAIL #22
LATERAL BASE DITCH
(Not to Scale)



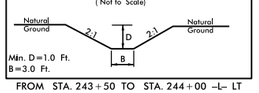
FROM STA. 242+60 TO STA. 248+50 –L– RT

DETAIL #23
LATERAL BASE DITCH
(Not to Scale)



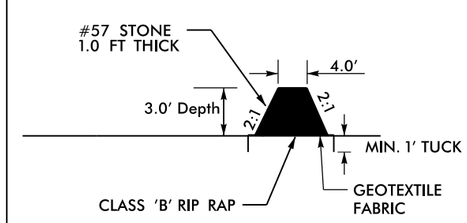
FROM STA. 248+50 TO STA. 250+00 –L– RT

DETAIL #24
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 243+50 TO STA. 244+00 –L– LT

FILTER BERM DETAIL
SECTION VIEW
(Not to Scale)



EST 15 TONS #57 STONE
EST 100 TONS CL B RIP RAP
EST 210 SY GEOTEXTILE

STA. 198+00 –L– RT

REVISIONS

5/14/99

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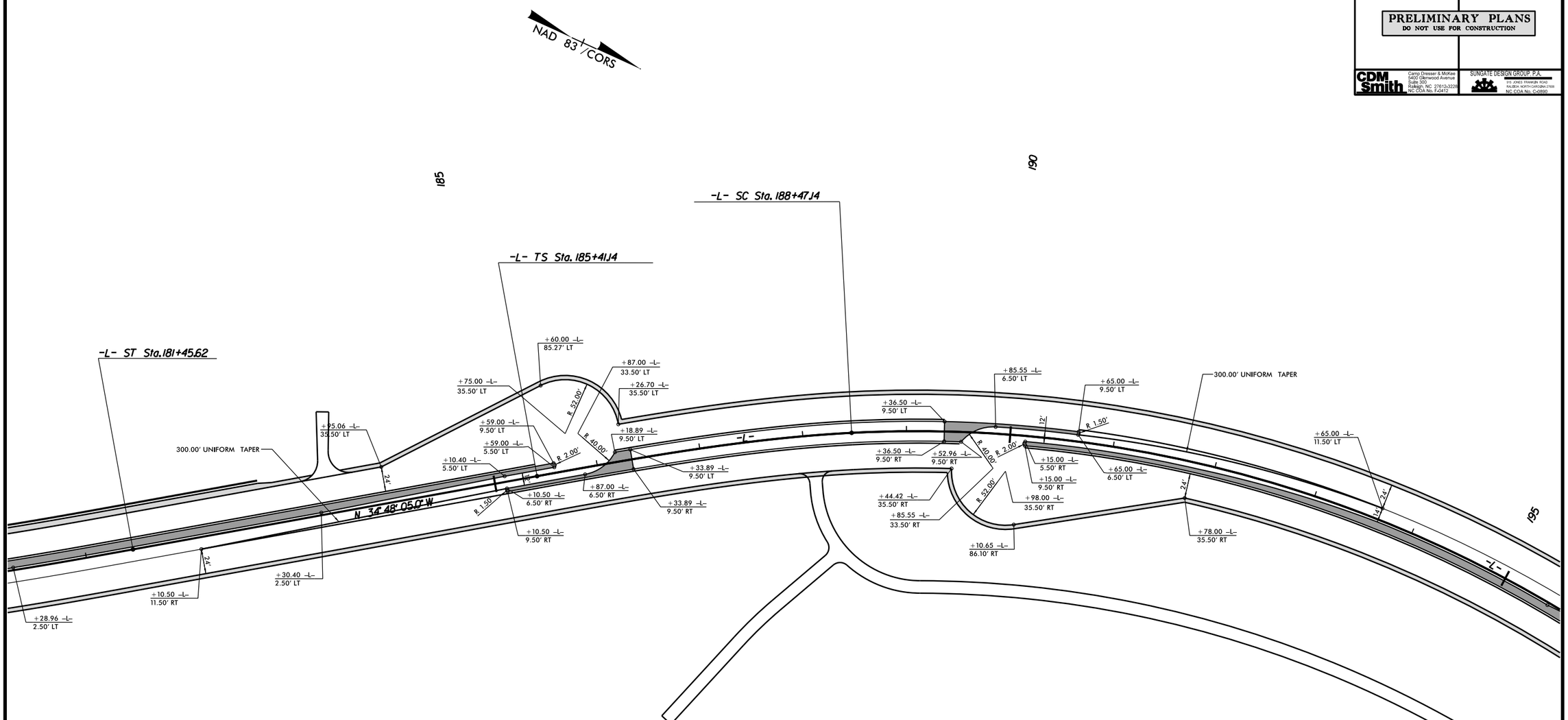
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



U-TURN BULB DETAIL
(SCALE: 1" = 50')

REVISIONS

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

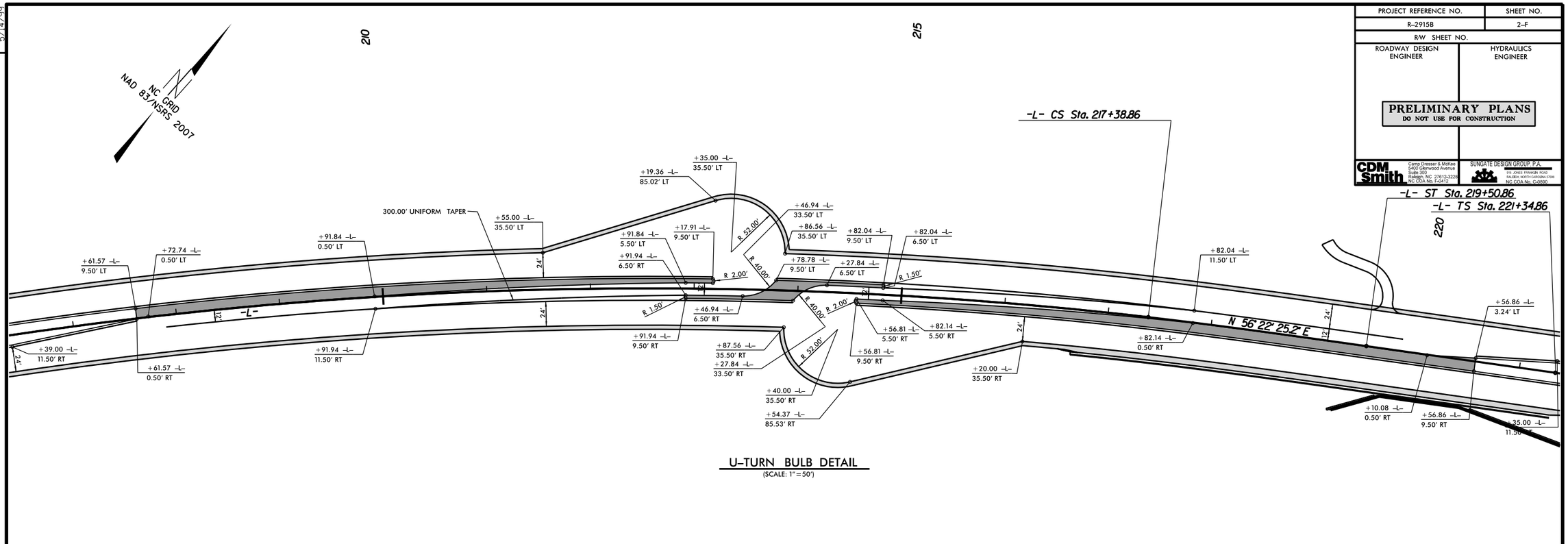
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

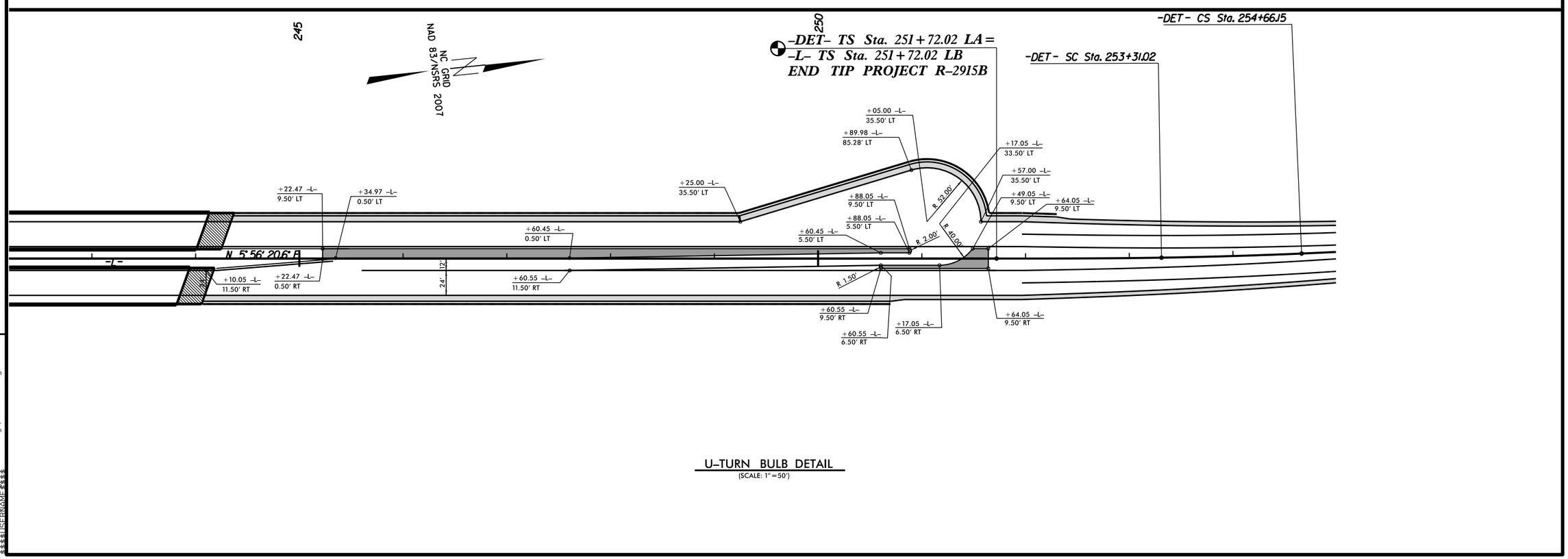
SUNGATE DESIGN GROUP, P.A.
919 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0850

REVISIONS

5/14/99



U-TURN BULB DETAIL
(SCALE: 1" = 50')



U-TURN BULB DETAIL
(SCALE: 1" = 50')

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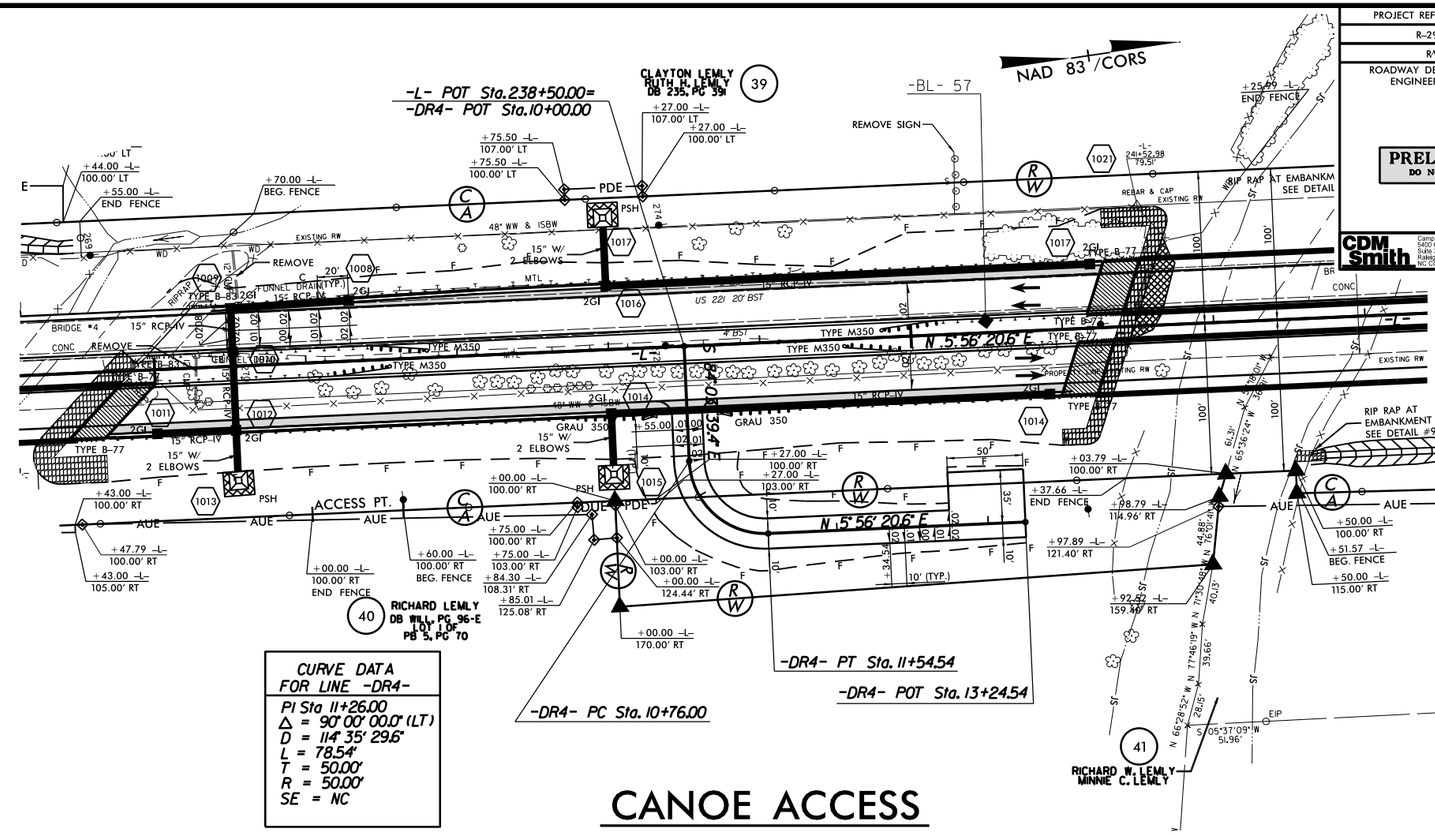
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

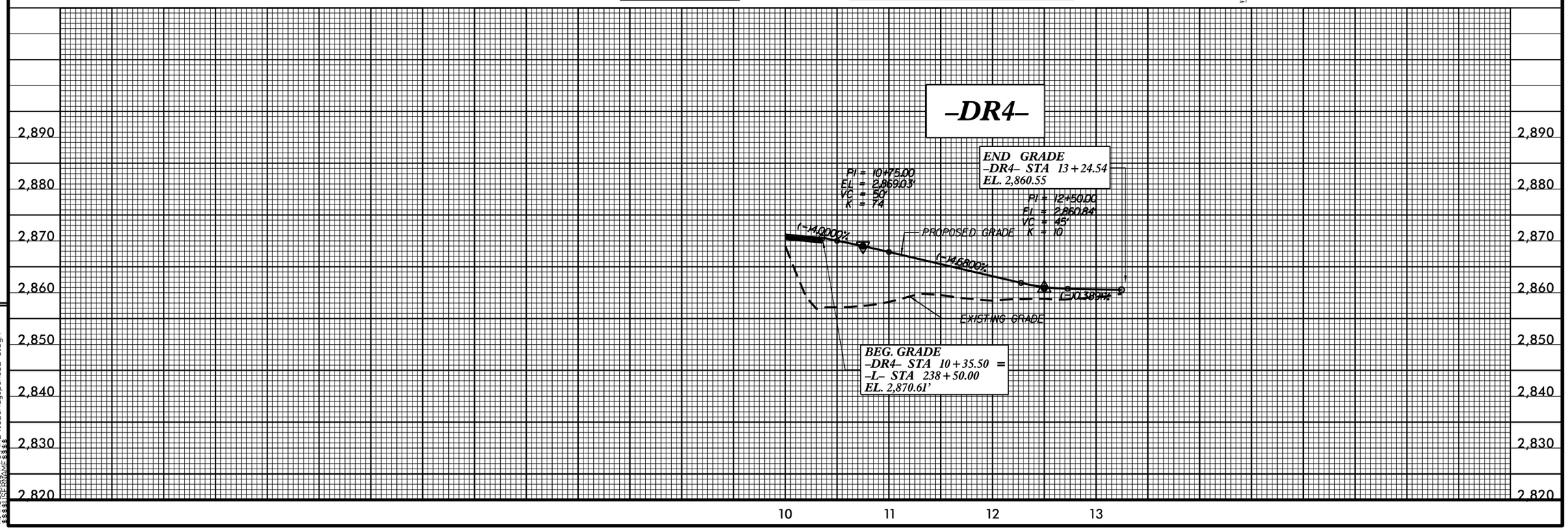
SUNGATE DESIGN GROUP, P.A. — 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27610, NC COA No. C-0890



CURVE DATA FOR LINE -DR4-

PI Sta 11+26.00
Δ = 90° 00' 00.0" (LT)
D = 114° 35' 29.6"
L = 78.54'
T = 50.00'
R = 50.00'
SE = NC

CANOE ACCESS



8/17/99

REVISIONS

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COMPUTED BY: RES DATE: 6-26-2013
CHECKED BY: DATE:

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	3-A

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	4	SHANE VANNOY, LLC
2	4,5	RICHARD FAYKO, JR. AND WIFE DONNA FAYKO
3	4	KEITH BLACKBURN
4	4	BAXTER DERRICK HARDIN, LONNIE MILLER, KENNETH DAY,
		WENDELL WILCOX, TRUSTEES OF MORNING STAR
		BAPTIST CHURCH
5	4	LAVERNE E. WATSON, MARTHA D. WATSON
6	4,5	THOMAS R. GRIGGS, PATRICIA D. GRIGGS,
		CHARLES G. DEAL, VIOLA A. DEAL
7	4,5	THOMAS R. GRIGGS, PATRICIA D. GRIGGS,
		CHARLES G. DEAL, VIOLA A. DEAL
8	4,5	BRUCE R. GREENE AND WIFE RETA H. GREENE
9	4	THOMAS R. GRIGGS
10	4	DEAN POTTER
11	4,5	UNKNOWN
12	5	CHARLES COOK AND WIFE ANITA COOK
13	5	BAXTER DERRICK HARDIN
14	5	MICHAEL W. MAYNARD, DEBORAH BROWN
15	5	UNKNOWN
16	5,6	KETINA CORPORATION
17	5,6	CATHERINE GREEN
18	6	RODNEY C. OLIVER, MILLICENT J. OLIVER
19	6	JONATHAN ROY COLLINS, TERRY LYNN IRISH
20	6	OAK RIDGE CONSTRUCTION, INC.
21	6,7	R.C. MILLER, ZELMA MILLER, DOUGLAS M. RUDERSDORF
22	6	JAMES D. ALEXANDER, DONNA T. ALEXANDER
23	6,7	RICHARD E. WATSON, LISA H. WATSON
24	6,7	GARY E. TAYLOR, VICKIE TAYLOR
25	7	PER A. KJONSO, MICHELLE KJONSO
26	7	LUIS M. FALERO, ROSARY P. FALERO
27	7	ROBERT L. KILBY, JOYCE T. KILBY
28	7	ROBERT L. KILBY, JOYCE T. KILBY
29	7	UNKNOWN
30	7,8,9	NITA FERRELL LANGER, TRUSTEE
31	7,8	JERRY GRAY STYERS, GERALDINE MYERS STYERS
32	8	PHIL A. TEMPLETON, PHYLLIS TEMPLETON
33	8	MICHAEL K. GOODMAN, FREDA R. GOODMAN
34	8,9	JAMES CLINE CHURCH, ELLEN LEMLY CHURCH
35	9,10	ARCHIE L. PIERCE, 6/20/2013 2:30:40 PMNANCY C. PIERCE
36	9	JAMES CLINE CHURCH, ELLEN LEMLY CHURCH
37	9	JAMES CLINE CHURCH, ELLEN LEMLY CHURCH
38	9,10	RICHARD W. LEMLY, MINNIE C. LEMLY, TRUSTEES OF THE
		RICHARD W. LEMLY LIVING TRUST
39	10,11	CLAYTON LEMLY, RUTH H. LEMLY
40	10,11	RICHARD LEMLY
41	11	RICHARD W. LEMLY, MINNIE C. LEMLY
42	11	TRACY C. LEMLY, ELIZABETH C. LEMLY
43	11	JAMES CLINE CHURCH, ELLEN L. CHURCH, EVELYN LEMLY
44	11,12	RICK D. WEAVER, ALLISON L. WEAVER
45	11	RICHARD C. CORNEJO, LORETTA A. CORNEJO
46	11,12	BARNEY F. WATSON, RAMONA N. WATSON, TRUSTEES OF
		THE WATSON FAMILY TRUST
47	11,12	TRACY C. LEMLY, ELIZABETH C. LEMLY
48	12	JANET LOU YOUNG
49	12	RONALD S. GREENE, CARLENE G. GREENE
50	12	RIVER RIDGE UNLIMITED, INC.
51	12	BARBARA CARTER LIVING TRUST
52	12	BARBARA CARTER LIVING TRUST
53	12	UNKNOWN
54	12	UNKNOWN

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

SUMMARY OF EARTHWORK

IN CUBIC YARDS

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

LOCATION			UNCLASSIFIED EXCAVATION	UNDERCUT	EMBANKMENT +%	BORROW	WASTE
-L- 158+31.70	TO	186+00.00	370,982		23,735		347,247
-Y9- 10.35.50	TO	16+90.08	67,812		8		67,804
-DR1- 10+35.50	TO	15+43.00	27,618				27,618
-DR2- 10+35.50	TO	14+90.00	26,979				26,979
		SUBTOTAL	493,391		23,743		469,648
-L- 186+00.00	TO	198+02.00 (BRIDGE)	116,145		7,171		108,974
-DR3- 10+35.50	TO	19+95.00	78,548		38		78,510
-DR3B- 10+06.00	TO	12+35.00	5,406		1		5,405
		SUBTOTAL	200,099		7,211		192,889
-L- 199+27.00 (BRIDGE)	TO	216+00	108,817		23,419		85,398
-Y10- 12+75.00	TO	17+62.15	11,545		902		10,643
		SUBTOTAL	120,362		24,320		96,042
-L- 216+00	TO	233+52.57 (BRIDGE)	4,337		41,425	37,088	
-Y11- 10+55.00	TO	12+65.47	463		577	114	
-Y12- 12+85.00	TO	14+87.00	2,310		439		1,871
		SUBTOTAL	7,110		42,442	37,203	1,871
-L- 234+92.87 (BRIDGE)	TO	241+44.24 (BRIDGE)	275		15,282	15,007	
		SUBTOTAL	275		15,282	15,007	
-L- 243+73.57 (BRIDGE)	TO	251+72.02					
-DET- 251+72.02	TO	261+05.51					
-Y13- 11+50.00	TO	12+86.60					
-Y13A- 10+21.98	TO	12+77.00	4,461				4,461
		SUBTOTAL	55,356		68,005	65,595	52,945
TOTAL			876,593		181,003	117,805	813,394
LOSS DUE TO CLEARING & GRUBBING							
ADDITIONAL UNDERCUT							
ROCK WASTE TO REPLACE BORROW							
ADJUST FOR ROCK WASTE							
WASTE IN LIEU OF BORROW						-117,805	-117,805
PROJECT TOTAL			876,593		181,003		695,590
EST. 5% TO REPLACE TOP SOIL ON BORROW PIT							
GRAND TOTAL			876,593		181,003		695,590
SAY			876,600		181,100		695,600
EST. DDE = 682 CUBIC YARDS							
SHOULDER BORROW = X,XXX CUBIC YARDS							

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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 919 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

REVISIONS

5/14/99 – RW REVISIONS: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 1. – PJS

01/31/14 – RW REVISIONS: ADDED PROPOSED R/W & C/A FROM -Y9A- 13+09.68 TO -L- 160+01.83 RIGHT ON PARCEL 3; REMOVED GREEN HOUSE AND PROVIDED ACCESS ON PARCEL 3; UPDATED PROPERTY OWNER NAMES ON PARCELS 5, 7 AND 8; SUBDIVIDED PARCEL 11 INTO 11, 11A, AND 11B AND ADDED PROPERTY OWNER NAMES AND DEED REFERENCES. – JBW

06/03/14

CURVE DATA FOR LINE -L-		
PIs Sta 159+39.85	PIs Sta 164+67.93	PI Sta 166+14.75
Θs = 6° 58' 44.0"	Θs = 8° 16' 12.2"	Δ = 4° 52' 01.0" (RT)
Ls = 324.00'	Ls = 306.00'	D = 5° 24' 18.9"
LT = 216.17'	LT = 204.22'	L = 90.04'
ST = 108.15'	ST = 102.20'	T = 45.05'
		R = 1,060.00'
		SE = 0.06
		RUNOFF = 306.00'

NAD 83 /CORS

-L- CS Sta. 158+31.70 LA. =
-L- CS Sta. 160+01.83 LB.
BEGIN TIP PROJECT R-2915B
END TIP PROJECT R-2915A

-L- SC Sta. 157+96.88

-L- TS Sta. 162+63.70

-L- POT Sta. 161+65.04
END CULVERT

-L- ST Sta. 161+55.70

-L- POS Sta. 161+32.67
BEGIN CULVERT

-L- POS Sta. 163+50.44 =
-DRI- POT Sta. 10+00.00

-L- POC Sta. 164+00.00

MATCH TO SHEET 5 – -L- POC Sta. 164+00.00

-L- Sta. 158+52.64 =
-Y9A- PC Sta 10+00.00

-L- SRS Sta. 154+72.88

-Y9A- PT Sta. 13+09.68

-Y9A- POT Sta. 13+10.00
END CONSTRUCTION

-DRI- PC Sta. 10+53.29

-DRI- PRC Sta. 10+88.19

-DRI- PT Sta. 11+61.45

-DRI- PC Sta. 12+79.58

-DRI- PT Sta. 13+49.50

-DRI- PC Sta. 14+35.40

-DRI- PT Sta. 14+98.10

-DRI- POT Sta. 15+43.00

-BL-GPS-2915-5

TO BE DONE BY OTHERS

24' DRIVE TO BE CONSTRUCTED BY OTHERS

HERBERT D. WATSON, L/E
DB 0-4 PG 255

CATHERINE R. CLARK
DB 275 PG 170

HUBERT E. HAMILTON?
DB 282 PG 1776

SHANE VANNOY, LLC
DB 390 PG 769

RAY T. SMITH, ET.AL
DB 0-4 PG 518

FS HOLDING, LTD. &
BAXTER NORRIS CONSTRUCTION
DB 242 PG 2234
PB 7 PG 53
PB 6 PG 64

JOHN YATES
DB 402 PG 1707

RICHARD FAYKO, JR.
AND WIFE
DONNA FAYKO
DB 282, PG 1081

KEITH BLACKBURN
DB 126, PG 1493

MARTHA D. WATSON
DB 0-4, PG 111

BAXTER DERRICK HARDIN
LONNIE MILLER
KENNETH DAY
WENDELL WILCOX
TRUSTEES OF MORNING STAR BAPTIST CHURCH
DB 226, PG 626
PORTION OF PB 5, PG 242

BRICE R. GREENE
AND WIFE
RETA H. GREENE
DB 253, PG 1693

THOMAS R. GRIGGS
PATRICIA D. GRIGGS
CHARLES G. DEAL
VIOLA A. DEAL
DB 271, PG 743

THOMAS R. GRIGGS
PATRICIA D. GRIGGS
CHARLES G. DEAL
VIOLA A. DEAL
CHARLES L. DEAL
DB 130, PG 148

THOMAS R. GRIGGS
PATRICIA D. GRIGGS
DB 197, PG 1097
DB 254, PG 2157

JOSEPH TURRISI
ANGELA TURRISI
DB 254, PG 380
DB 350, PG 270
DB 212, PG 471
DB 255, PG 131
DB 254, PG 378

THOMAS R. GRIGGS
DB 254, PG 2159
PORTION OF PB 5, PG 590

DEAN POTTER
DB 251, PG 1563
PORTION OF PB 5, PG 590

KAREN FLOWE PRESLAR
AMY F. ROSE
DB 206 PG 1446
PB 5 PG 242

CURVE DATA FOR LINE -DRI-			
PI Sta 10+71.67	PI Sta 11+25.16	PI Sta 13+17.28	PI Sta 14+66.81
Δ = 44° 26' 06.8" (RT)	Δ = 19° 04' 45.2" (LT)	Δ = 53° 08' 01.5" (LT)	Δ = 8° 58' 51.4" (LT)
D = 127° 19' 26.2"	D = 26° 02' 36.7"	D = 75° 59' 20.8"	D = 14° 19' 26.2"
L = 34.90'	L = 73.26'	L = 69.92'	L = 62.70'
T = 18.38'	T = 36.97'	T = 37.70'	T = 31.41'
R = 45.00'	R = 220.00'	R = 75.40'	R = 400.00'
SE = NC	SE = NC	SE = NC	SE = NC

SEE SHEET 13 FOR -L- PROFILE
SEE SHEET 20 FOR -DRI- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

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REVISIONS

01/31/14 – R/W REVISIONS: UPDATED PROPERTY OWNER NAME ON PARCEL 8; UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 11 AND 16; SUBDIVIDED PARCEL 16 CREATING PARCELS 16, 16A, 16B AND 16C. – PJS

06/03/14 – R/W REVISIONS: UPDATED PROPERTY OWNER NAMES ON PARCELS 7 AND 8; SUBDIVIDED PARCEL 11 INTO PARCELS 11, 11A AND 11B AND ADDED PROPERTY OWNER NAMES AND DEED REFERENCES; UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 14 AND 15. – JBW

PROJECT REFERENCE NO.	SHEET NO.
R–2915B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

CURVE DATA FOR LINE -L-

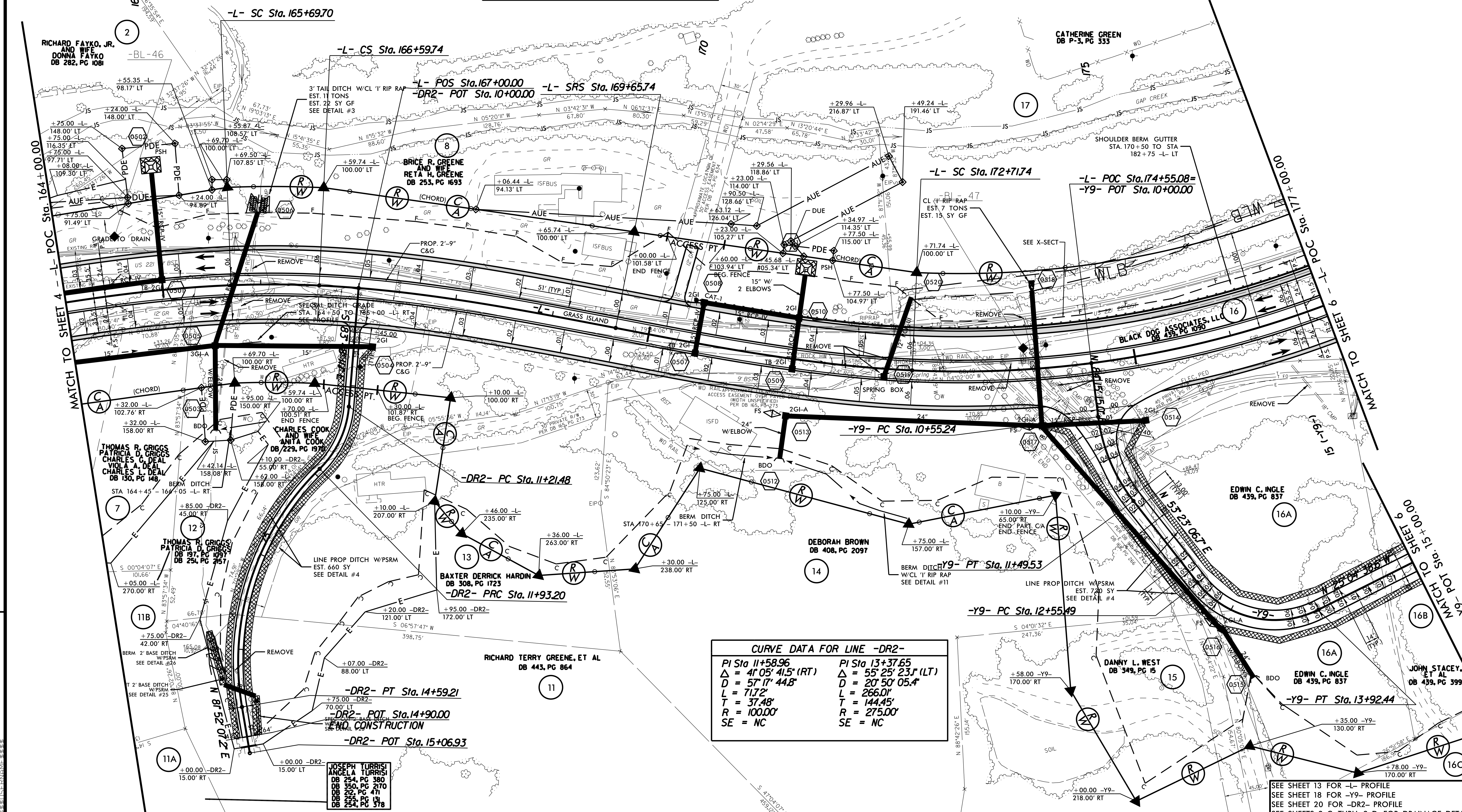
Pls Sta 164+67.93	PI Sta 166+14.75	Pls Sta 167+61.95	Pls Sta 171+69.97	PI Sta 175+62.67
Θs = 8°16′12.2″	Δ = 4°52′01.0″ (RT)	Θs = 8°16′12.2″	Θs = 8°16′12.2″	Δ = 30°41′43.3″ (LT)
Ls = 306.00′	D = 5°24′18.9″	Ls = 306.00′	Ls = 306.00′	D = 5°24′18.9″
LT = 204.22′	L = 90.04′	LT = 204.22′	LT = 204.22′	L = 567.88′
ST = 102.20′	T = 45.05′	ST = 102.20′	ST = 102.20′	T = 290.93′
	R = 1,060.00′			R = 1,060.00′
	SE = 0.06			SE = 0.06
	RUNOFF = 306.00′			RUNOFF = 306.00′

CURVE DATA FOR LINE -Y9-

PI Sta 11+03.56	PI Sta 13+37.14
Δ = 30°52′08.4″ (LT)	Δ = 78°27′45.3″ (LT)
D = 32°44′25.6″	D = 57°17′44.8″
L = 94.28′	L = 136.94′
T = 48.32′	T = 81.65′
R = 175.00′	R = 100.00′
SE = 0.04	SE = 0.06
RUNOFF = 52.00′	RUNOFF = 84.00′

CURVE DATA FOR LINE -DR2-

PI Sta 11+58.96	PI Sta 13+37.65
Δ = 41°05′41.5″ (RT)	Δ = 55°25′23.1″ (LT)
D = 57°17′44.8″	D = 20°50′05.4″
L = 71.72′	L = 266.01′
T = 37.48′	T = 144.45′
R = 100.00′	R = 275.00′
SE = NC	SE = NC



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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

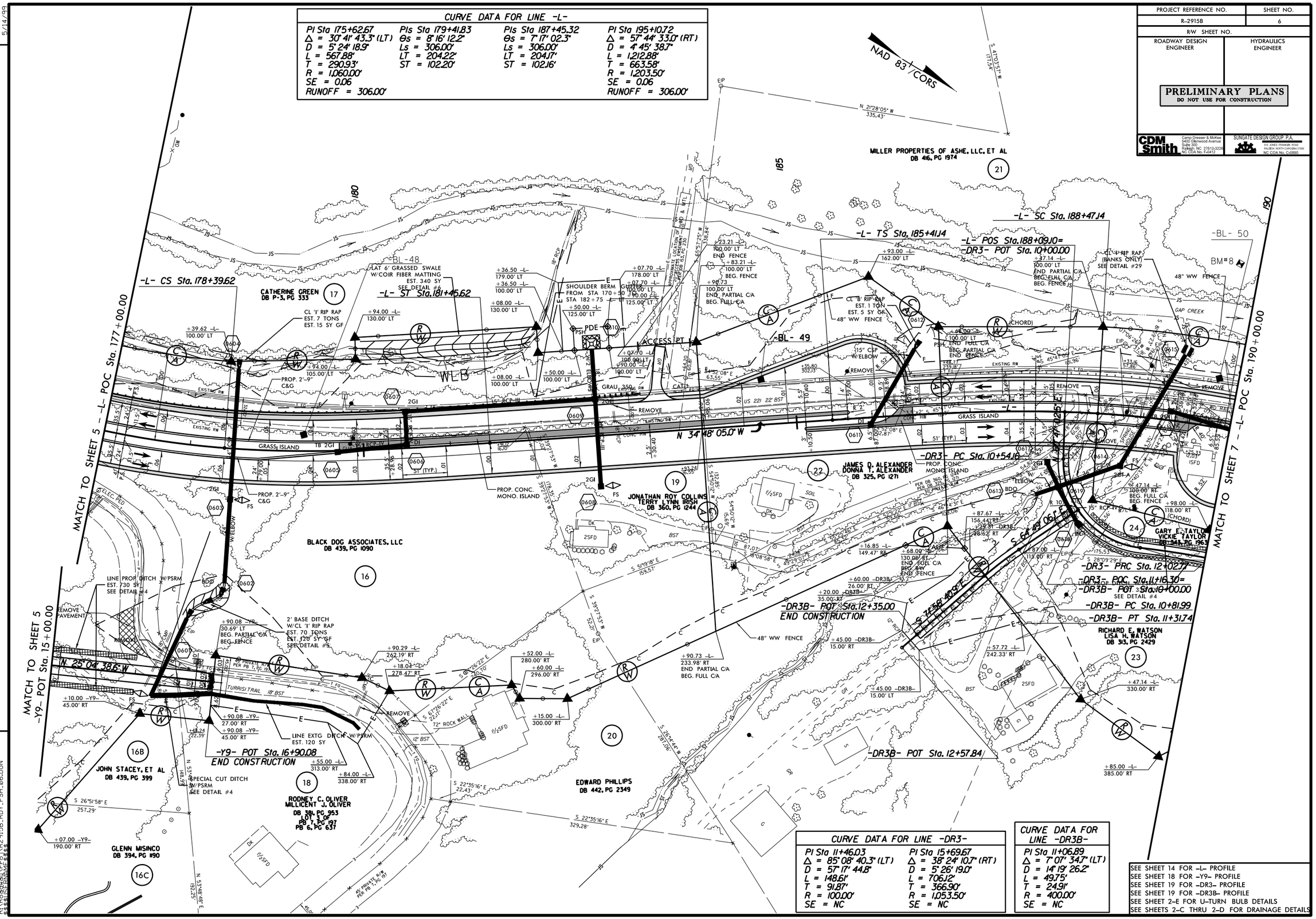
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412
SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850

5/14/99

REVISIONS

01/31/14 - R/W REVISIONS; UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 16, 20 AND 21; SUBDIVIDED PARCEL 16 CREATING PARCELS 16, 16B AND 16C. - PJS



CURVE DATA FOR LINE -L-			
PI Sta 175+62.67	PIs Sta 179+41.83	PIs Sta 187+45.32	PI Sta 195+10.72
Δ = 30° 41' 43.3" (LT)	Θs = 8° 16' 12.2"	Θs = 7° 17' 02.3"	Δ = 57° 44' 33.0" (RT)
D = 5° 24' 18.9"	Ls = 306.00'	Ls = 306.00'	D = 4° 45' 38.7"
L = 567.88'	LT = 204.22'	LT = 204.17'	L = 1,212.88'
T = 290.93'	ST = 102.20'	ST = 102.16'	T = 663.58'
R = 1,060.00'			R = 1,203.50'
SE = 0.06			SE = 0.06
RUNOFF = 306.00'			RUNOFF = 306.00'

CURVE DATA FOR LINE -DR3-	
PI Sta 11+46.03	PI Sta 15+69.67
Δ = 85° 08' 40.3" (LT)	Δ = 38° 24' 10.7" (RT)
D = 57° 17' 44.8"	D = 5° 26' 19.0"
L = 148.61'	L = 706.12'
T = 91.87'	T = 366.90'
R = 100.00'	R = 1,053.50'
SE = NC	SE = NC

CURVE DATA FOR LINE -DR3B-
PI Sta 11+06.89
Δ = 7° 07' 34.7" (LT)
D = 14° 19' 26.2"
L = 49.75'
T = 24.91'
R = 400.00'
SE = NC

SEE SHEET 14 FOR -L- PROFILE
SEE SHEET 18 FOR -Y9- PROFILE
SEE SHEET 19 FOR -DR3- PROFILE
SEE SHEET 19 FOR -DR3B- PROFILE
SEE SHEET 2-E FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0850

REVISIONS

01/31/14 – R/W REVISIONS: UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 21 AND 29. – PJS

5/14/99

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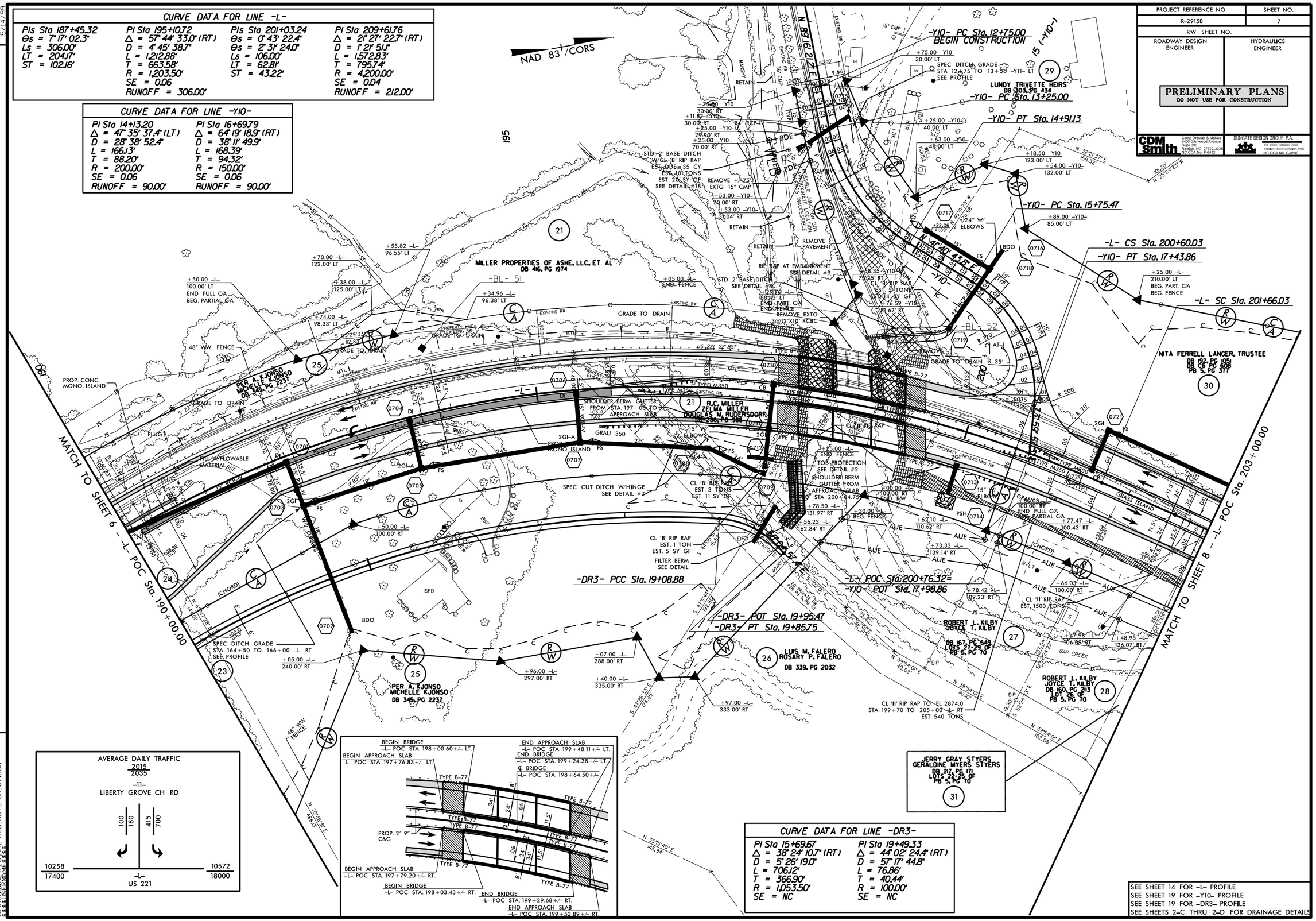


CURVE DATA FOR LINE -L-			
PIs Sta 187+45.32	PI Sta 195+10.72	PIs Sta 201+03.24	PI Sta 209+61.76
Θs = 7° 17' 02.3"	Δ = 57° 44' 33.0" (RT)	Θs = 0° 43' 22.4"	Δ = 21° 27' 22.7" (RT)
Ls = 306.00'	D = 4° 45' 38.7"	Θs = 2° 31' 24.0"	D = 1° 21' 51.1"
LT = 204.17'	L = 1,212.88'	Ls = 106.00'	L = 1,572.83'
ST = 102.16'	T = 663.58'	LT = 62.81'	T = 795.74'
	R = 1,203.50'	ST = 43.22'	R = 4,200.00'
	SE = 0.06		SE = 0.04
	RUNOFF = 306.00'		RUNOFF = 212.00'

CURVE DATA FOR LINE -Y10-	
PI Sta 14+13.20	PI Sta 16+69.79
Δ = 47° 35' 37.4" (LT)	Δ = 64° 19' 18.9" (RT)
D = 28° 38' 52.4"	D = 38° 11' 49.9"
L = 166.13'	L = 168.39'
T = 88.20'	T = 94.32'
R = 200.00'	R = 150.00'
SE = 0.06	SE = 0.06
RUNOFF = 90.00'	RUNOFF = 90.00'

CURVE DATA FOR LINE -DR3-	
PI Sta 15+69.67	PI Sta 19+49.33
Δ = 38° 24' 10.7" (RT)	Δ = 44° 02' 24.4" (RT)
D = 5° 26' 19.0"	D = 57° 17' 44.8"
L = 706.12'	L = 76.86'
T = 366.90'	T = 40.44'
R = 1,053.50'	R = 100.00'
SE = NC	SE = NC

AVERAGE DAILY TRAFFIC
2015 / 2035
-11-
LIBERTY GROVE CH RD
100 / 180 — 415 / 700
10258 / 17400 — -L- US 221 — 10572 / 18000

SEE SHEET 14 FOR -L- PROFILE
SEE SHEET 19 FOR -Y10- PROFILE
SEE SHEET 19 FOR -DR3- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2915B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412

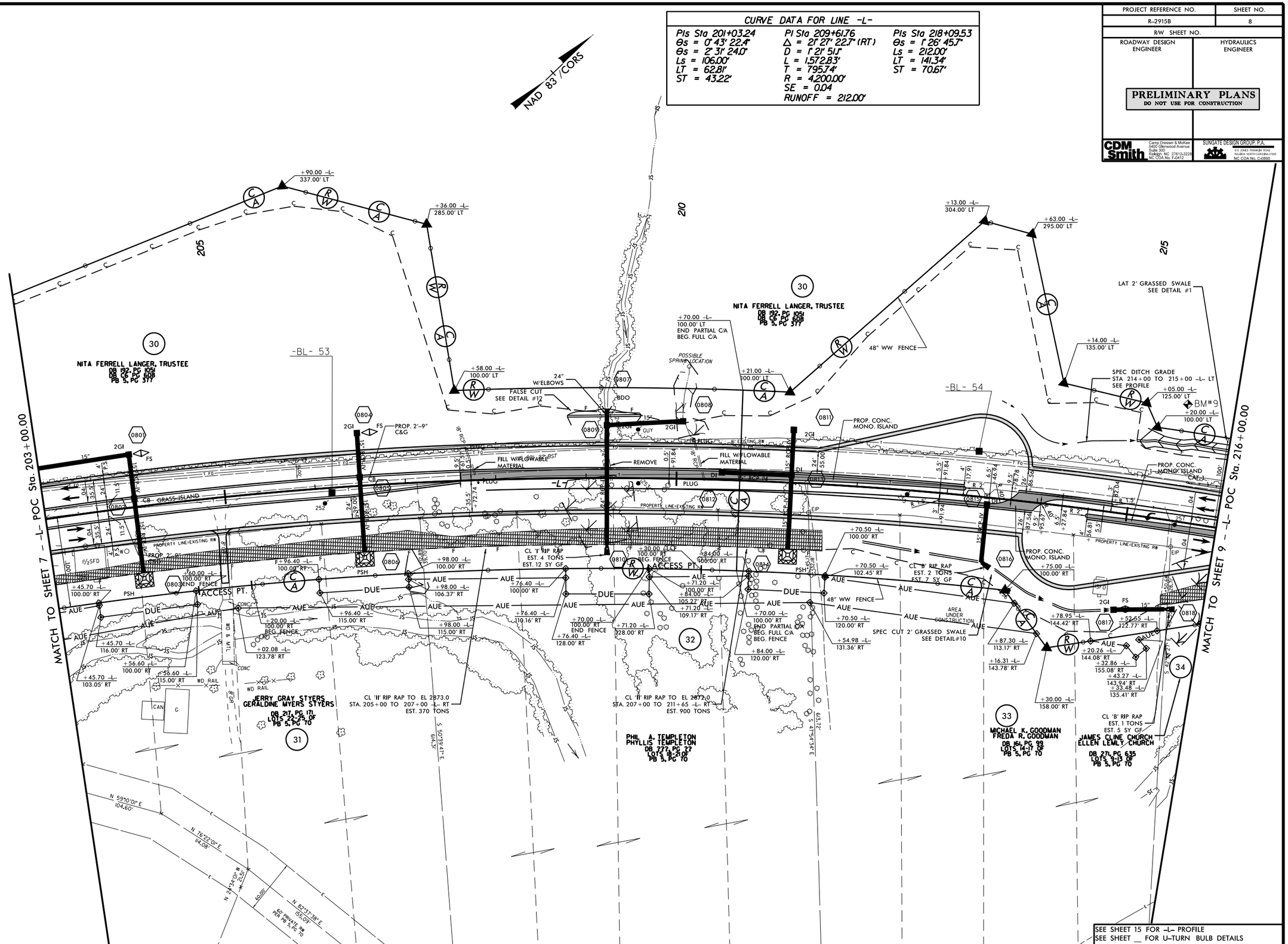
SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

REVISIONS

5/14/99

CURVE DATA FOR LINE -L-

PIs Sta 201+03.24	PI Sta 209+61.76	PIs Sta 218+09.53
Θs = 0° 43' 22.4"	Δ = 21° 27' 22.7" (RT)	Θs = 1° 26' 45.7"
Θs = 2° 31' 24.0"	D = 1° 21' 51.1"	Ls = 212.00'
Ls = 106.00'	L = 1,572.83'	LT = 141.34'
LT = 62.81'	T = 795.74'	ST = 70.67'
ST = 43.22'	R = 4,200.00'	
	SE = 0.04	
	RUNOFF = 212.00'	



SEE SHEET 15 FOR -L- PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

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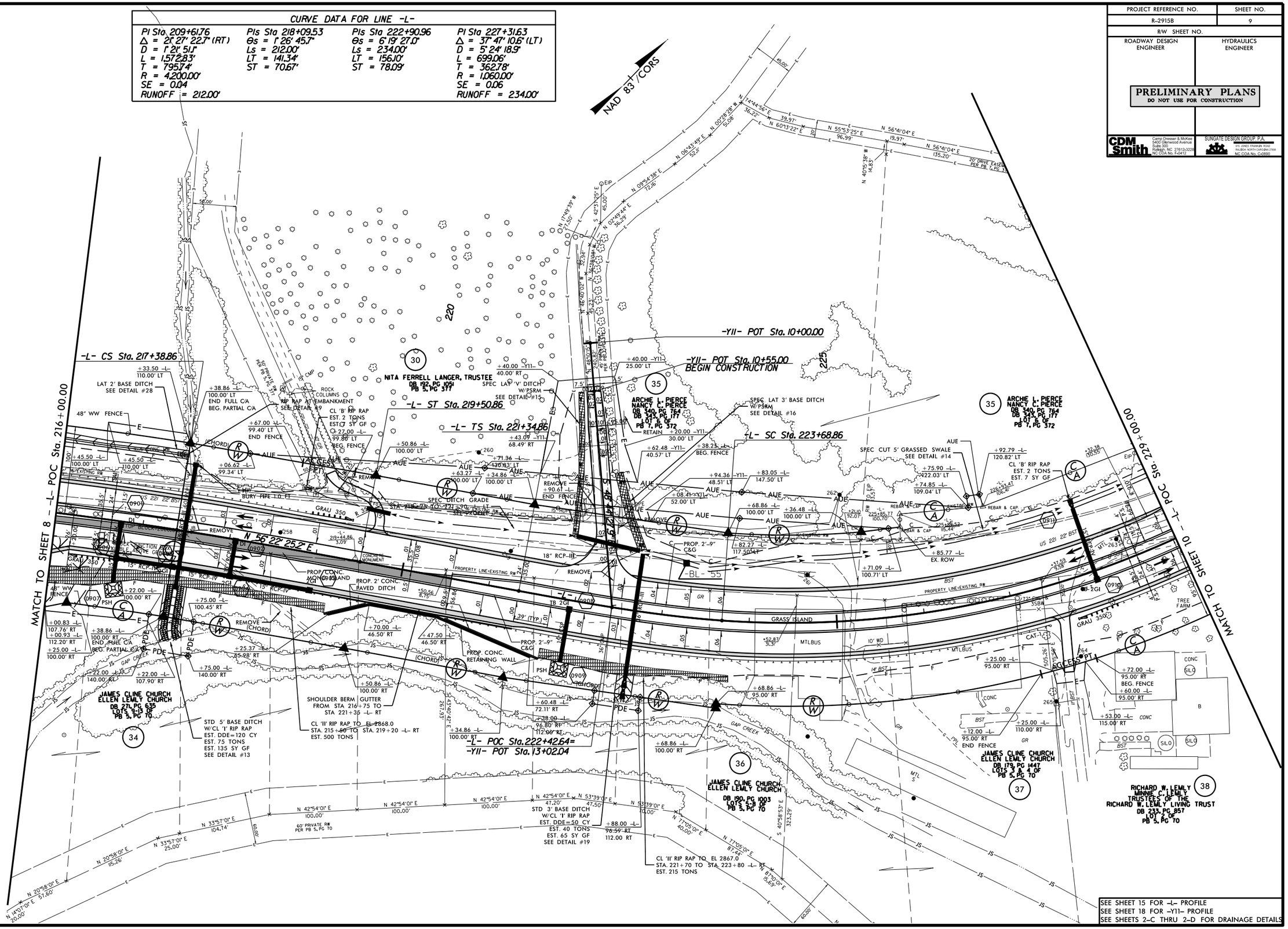
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

CURVE DATA FOR LINE -L-			
PI Sta. 209+61.76	PIs Sta 218+09.53	PIs Sta 222+90.96	PI Sta 227+31.63
Δ = 21° 27' 22.7" (RT)	Θs = 1° 26' 45.7"	Θs = 6° 19' 27.0"	Δ = 37° 47' 10.6" (LT)
D = 1° 21' 51.1"	Ls = 212.00'	Ls = 234.00'	D = 5° 24' 18.9"
L = 1,572.83'	LT = 141.34'	LT = 156.10'	L = 699.06'
T = 795.74'	ST = 70.67'	ST = 78.09'	T = 362.78'
R = 4,200.00'			R = 1,060.00'
SE = 0.04			SE = 0.06
RUNOFF = 212.00'			RUNOFF = 234.00'



SEE SHEET 15 FOR -L- PROFILE
SEE SHEET 18 FOR -Y11- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS
0603/14 - R/W REVISIONS: ADDED PDE FROM -L- STATION 222+38.00 TO 222+88.00 RIGHT ON PARCEL 36. - JBW

5/14/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A. — 919 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

REVISIONS

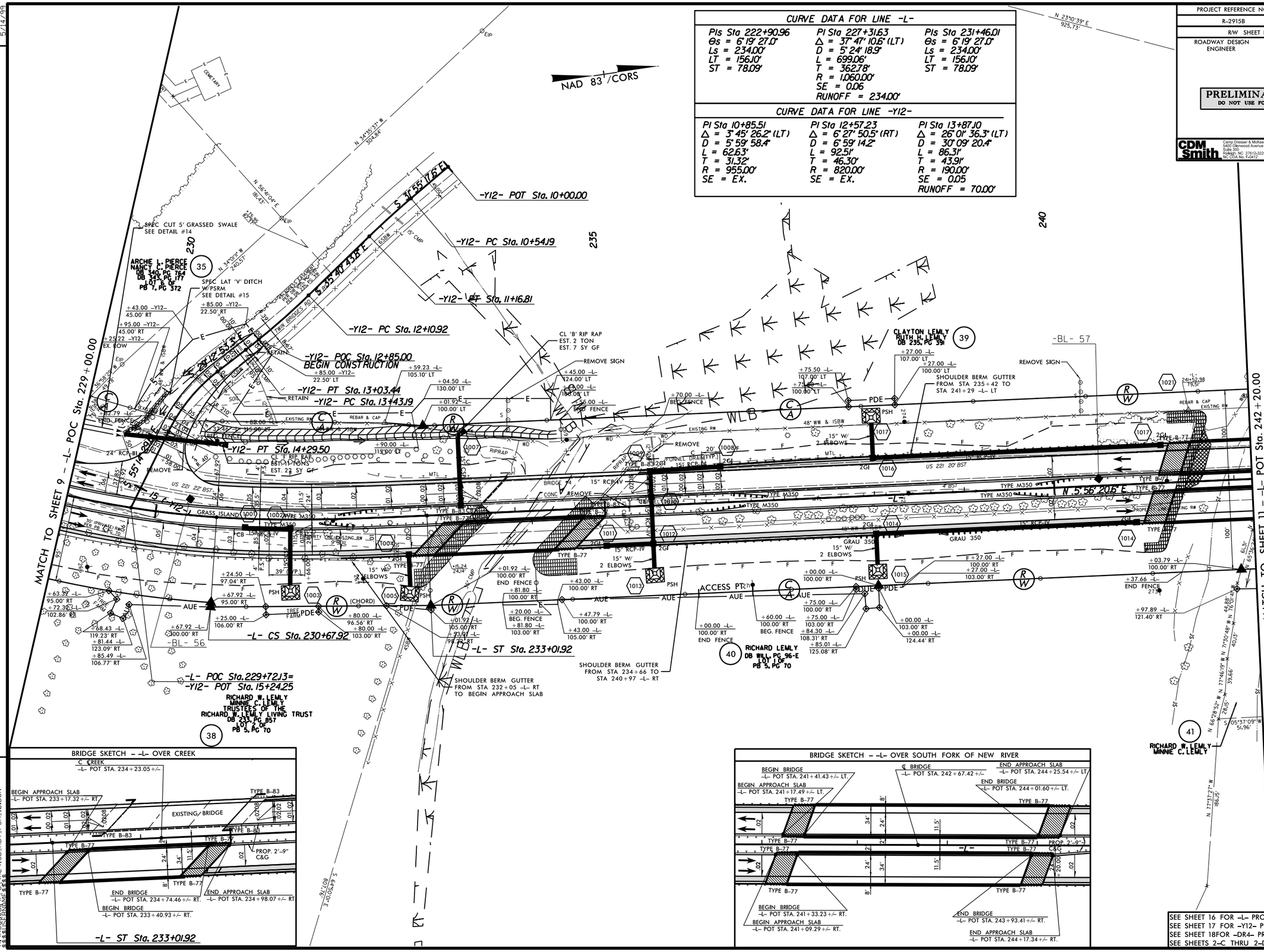
5/14/99

CURVE DATA FOR LINE -L-

PIs Sta 222+90.96	PI Sta 227+31.63	PIs Sta 231+46.01
Θs = 6°19' 27.0"	Δ = 37° 47' 10.6" (LT)	Θs = 6°19' 27.0"
Ls = 234.00'	D = 5° 24' 18.9"	Ls = 234.00'
LT = 156.10'	L = 699.06'	LT = 156.10'
ST = 78.09'	T = 362.78'	ST = 78.09'
	R = 1,060.00'	
	SE = 0.06	
	RUNOFF = 234.00'	

CURVE DATA FOR LINE -Y12-

PI Sta 10+85.51	PI Sta 12+57.23	PI Sta 13+87.10
Δ = 3° 45' 26.2" (LT)	Δ = 6° 27' 50.5" (RT)	Δ = 26° 01' 36.3" (LT)
D = 5° 59' 58.4"	D = 6° 59' 14.2"	D = 30° 09' 20.4"
L = 62.63'	L = 92.51'	L = 86.31'
T = 31.32'	T = 46.30'	T = 43.91'
R = 955.00'	R = 820.00'	R = 190.00'
SE = EX.	SE = EX.	SE = 0.05
		RUNOFF = 70.00'



SEE SHEET 16 FOR -L- PROFILE
SEE SHEET 17 FOR -Y12- PROFILE
SEE SHEET 18FOR -DR4- PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

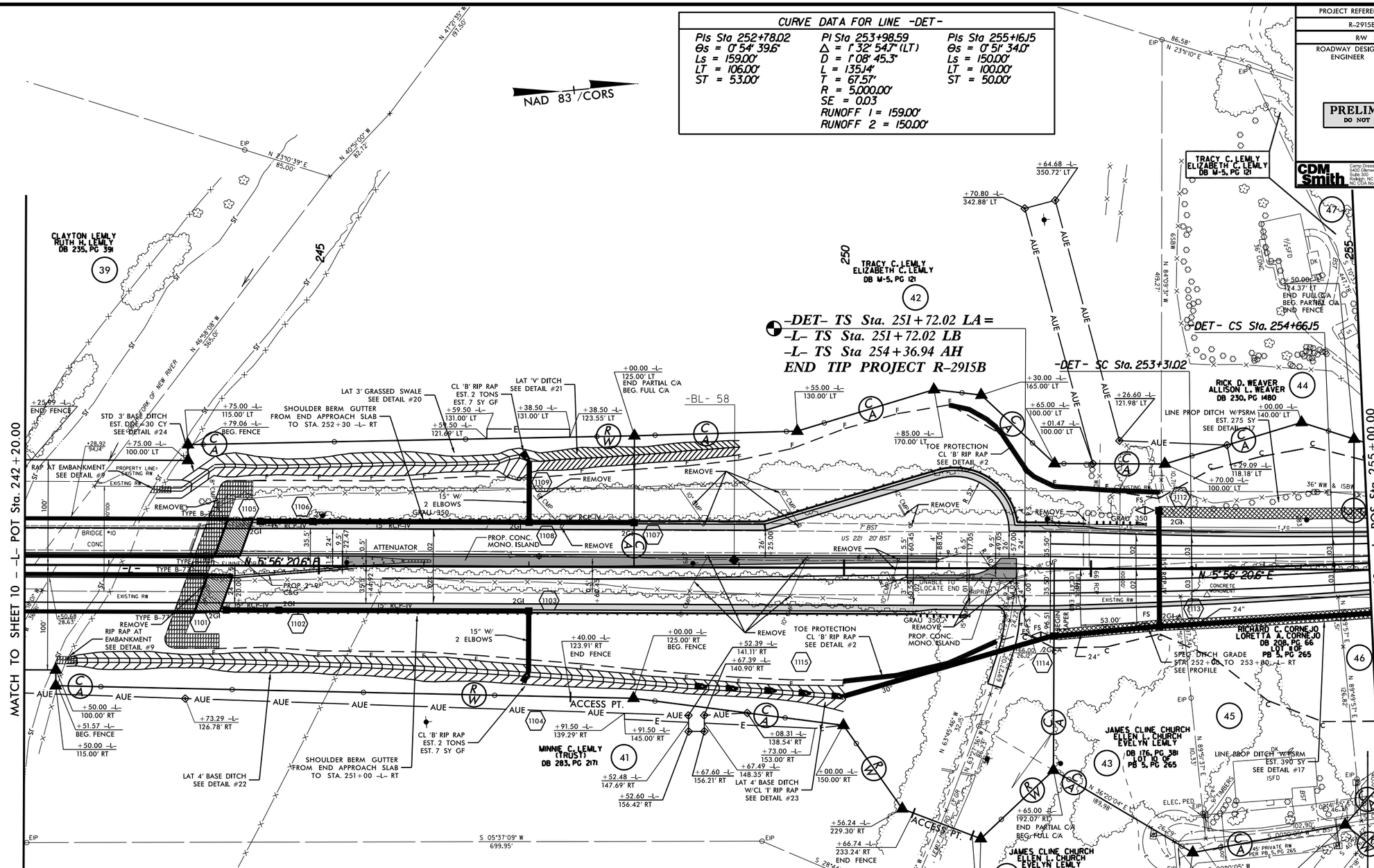
CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3226, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 915 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890

REVISIONS

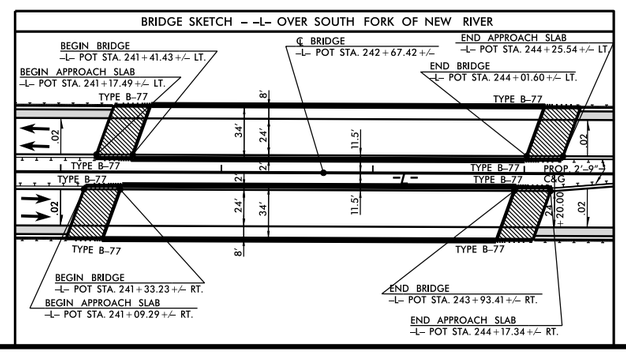
5/14/99

01/31/14 - R/W REVISIONS: UPDATED PROPOERTY OWNER NAME ON PARCEL 41. - PJS
03/25/14 - R/W REVISIONS: REVISED PROPOSED R/W ON PARCELS 41, 43, 44, 45, 46, 53 AND 55; ADDED AUE ON PARCELS 42 AND 44; REVISED C/A LIMITS TO PROVIDE DRIVEWAY ACCESS ON PARCEL 43; ADDED PARCEL NUMBER 55. - DJC



CURVE DATA FOR LINE -DET-		
PIs Sta 252+78.02	PI Sta 253+98.59	PIs Sta 255+16.15
θs = 0° 54' 39.6"	Δ = 1° 32' 54.7" (LT)	θs = 0° 51' 34.0"
Ls = 159.00'	D = 1° 08' 45.3"	Ls = 150.00'
LT = 106.00'	L = 135.14'	LT = 100.00'
ST = 53.00'	T = 67.57'	ST = 50.00'
	R = 5,000.00'	
	SE = 0.03	
	RUNOFF 1 = 159.00'	
	RUNOFF 2 = 150.00'	

BRIDGE SKETCH - -L- OVER SOUTH FORK OF NEW RIVER



SEE SHEET 16 FOR -L- PROFILE
SEE SHEET 16 FOR -DET- PROFILE
SEE SHEET __ FOR U-TURN BULB DETAILS
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

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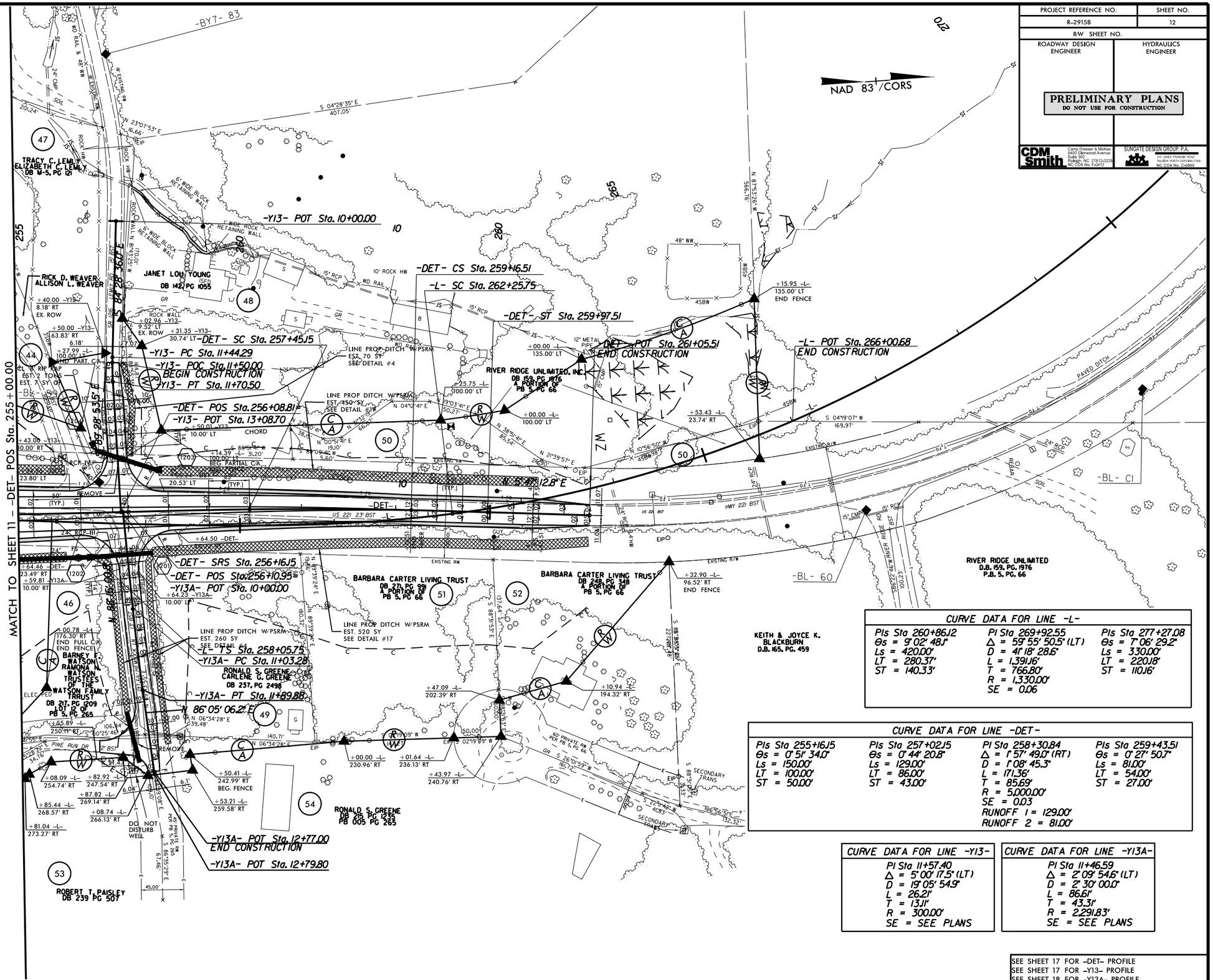
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CDM Smith — Camp Dresser & McKee, 5400 Glenwood Avenue, Suite 300, Raleigh, NC 27612-3228, NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A., 919 JONES FRANKLIN ROAD, RALEIGH, NORTH CAROLINA 27606, NC COA No. C-0890



CURVE DATA FOR LINE -L-		
PIs Sta 260+86.12	PI Sta 269+92.55	PIs Sta 277+27.08
Θs = 9° 02' 48.1"	Δ = 59° 55' 50.5" (LT)	Θs = 7° 06' 29.2"
Ls = 420.00'	D = 4° 18' 28.6"	Ls = 330.00'
LT = 280.37'	L = 1,391.16'	LT = 220.18'
ST = 140.33'	T = 766.80'	ST = 110.16'
	R = 1,330.00'	
	SE = 0.06	

CURVE DATA FOR LINE -DET-			
PIs Sta 255+16.15	PIs Sta 257+02.15	PI Sta 258+30.84	PIs Sta 259+43.51
Θs = 0° 51' 34.0"	Θs = 0° 44' 20.8"	Δ = 1° 57' 49.0" (RT)	Θs = 0° 27' 50.7"
Ls = 150.00'	Ls = 129.00'	D = 1° 08' 45.3"	Ls = 81.00'
LT = 100.00'	LT = 86.00'	L = 171.36'	LT = 54.00'
ST = 50.00'	ST = 43.00'	T = 85.69'	ST = 27.00'
		R = 5,000.00'	
		SE = 0.03	
		RUNOFF 1 = 129.00'	
		RUNOFF 2 = 81.00'	

CURVE DATA FOR LINE -Y13-	CURVE DATA FOR LINE -Y13A-
PI Sta 11+57.40	PI Sta 11+46.59
Δ = 5° 00' 17.5" (LT)	Δ = 2° 09' 54.6" (LT)
D = 19° 05' 54.9"	D = 2° 30' 00.0"
L = 26.21'	L = 86.61'
T = 13.11'	T = 43.31'
R = 300.00'	R = 2,291.83'
SE = SEE PLANS	SE = SEE PLANS

SEE SHEET 17 FOR –DET– PROFILE
SEE SHEET 17 FOR –Y13– PROFILE
SEE SHEET 18 FOR –Y13A– PROFILE
SEE SHEETS 2-C THRU 2-D FOR DRAINAGE DETAILS

REVISIONS

11/2013 – R/W REVISIONS: CORRECTED THE R/W FROM –L– STA. 259+14.39 TO STA. 262+25.75 LT. ON PARCELS 48 AND 50. – PJS
01/3/14 – R/W REVISIONS; UPDATED PROPERTY OWNER NAMES AND DEED REFERENCES ON PARCELS 53 AND 54. – PJS
03/25/14 – R/W REVISIONS; REVISED PROPOSED R/W ON PARCELS 46, 48, 53 AND 54; CORRECTED PARCEL NUMBER FROM 53 TO 50 ON PARCEL 50. – DJC
05/12/14 – R/W REVISIONS; REVISED PROPOSED R/W AND ADDED TCE ON PARCEL 53. – JBW

5/14/99

12-MAY-2014 16:09
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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

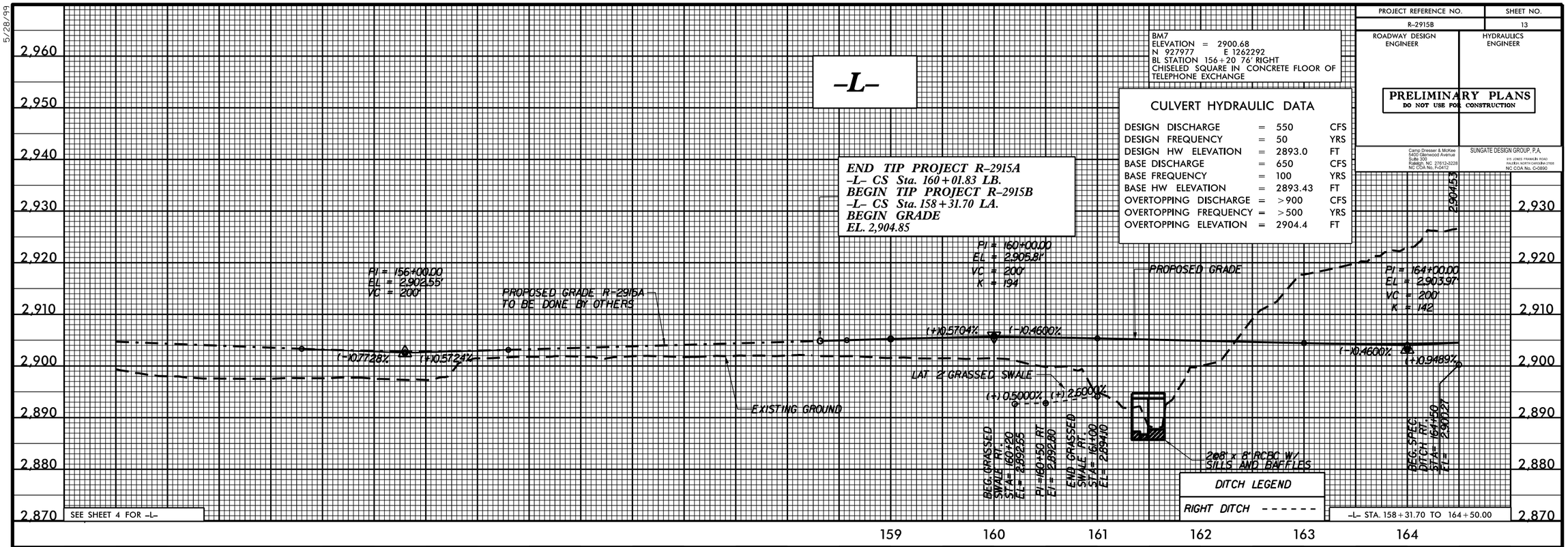
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

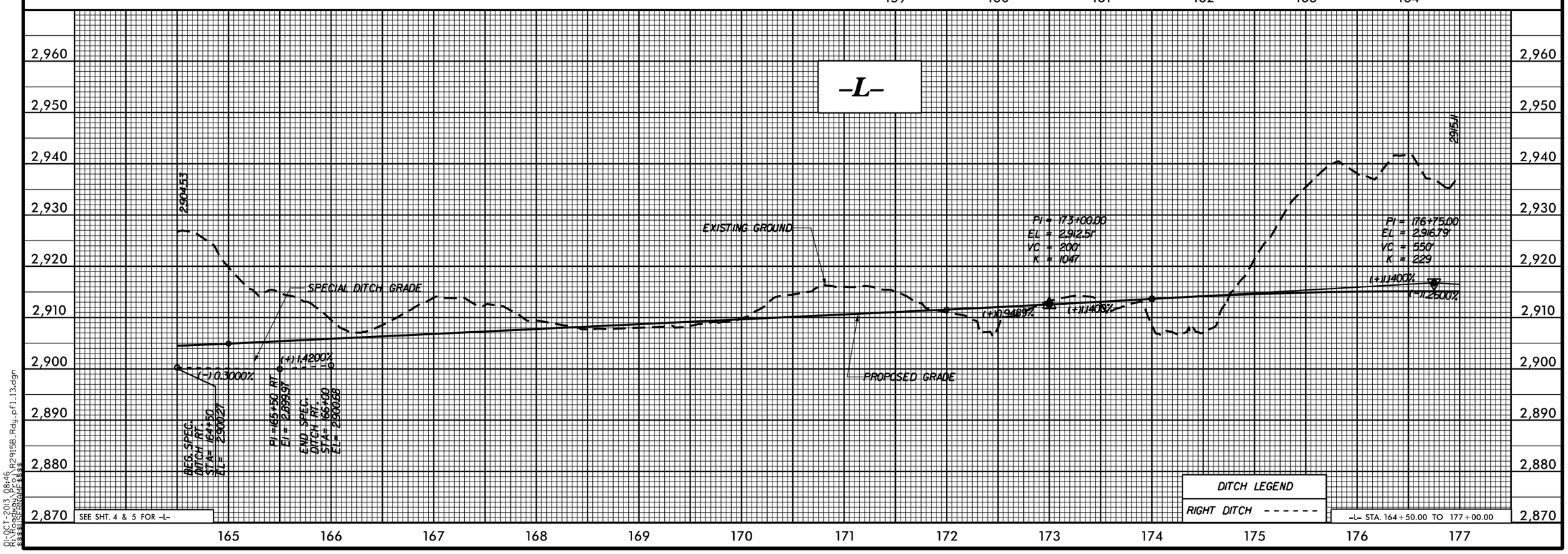
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

BM7
ELEVATION = 2900.68
N 927977 E 1262292
BL STATION 156+20 76' RIGHT
CHISELED SQUARE IN CONCRETE FLOOR OF TELEPHONE EXCHANGE

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	550	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2893.0	FT
BASE DISCHARGE	=	650	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2893.43	FT
OVERTOPPING DISCHARGE	=	>900	CFS
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING ELEVATION	=	2904.4	FT





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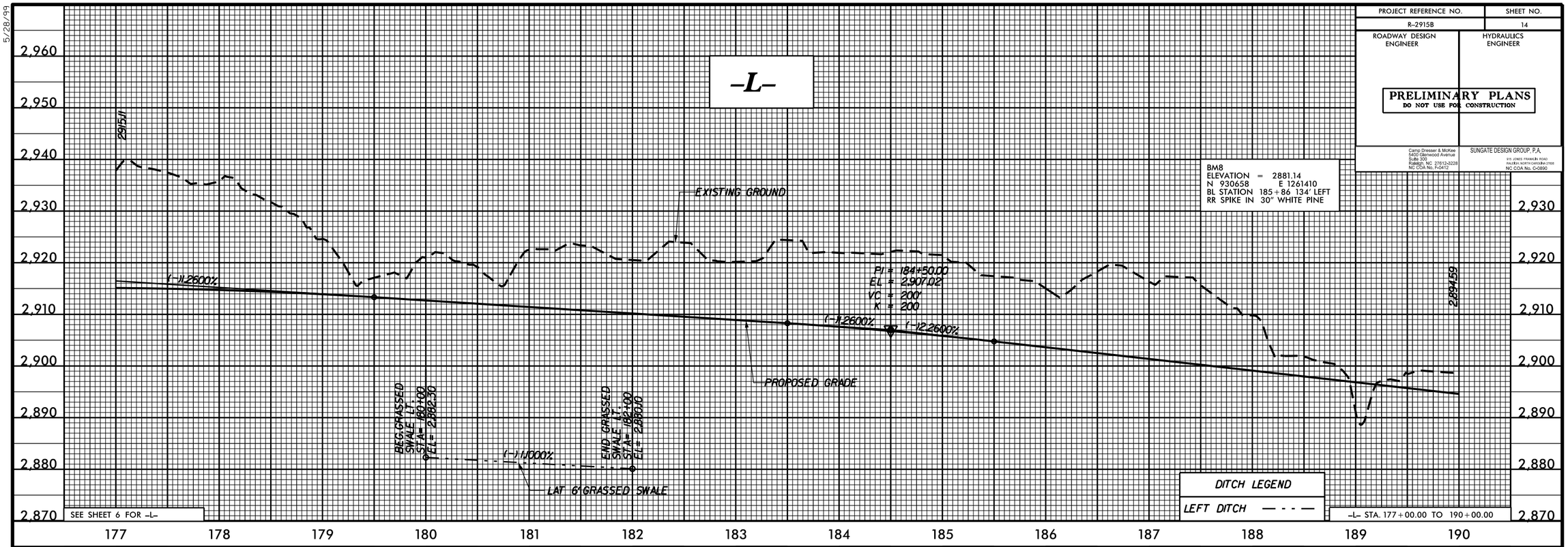
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

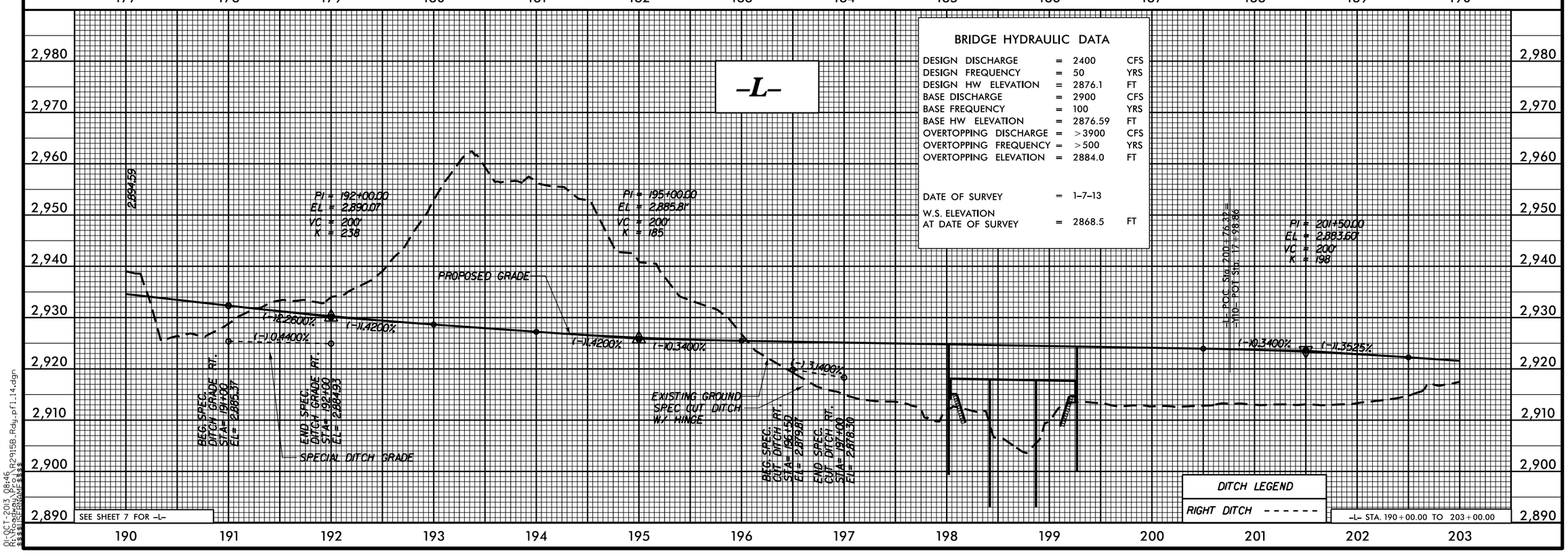
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
810 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



BM8
ELEVATION = 2881.14
N 930658 E 1261410
BL STATION 185+86 134' LEFT
RR SPIKE IN 30" WHITE PINE



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	2400	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2876.1	FT
BASE DISCHARGE	=	2900	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2876.59	FT
OVERTOPPING DISCHARGE	=	>3900	CFS
OVERTOPPING FREQUENCY	=	>500	YRS
OVERTOPPING ELEVATION	=	2884.0	FT
DATE OF SURVEY	=	1-7-13	
W.S. ELEVATION AT DATE OF SURVEY	=	2868.5	FT

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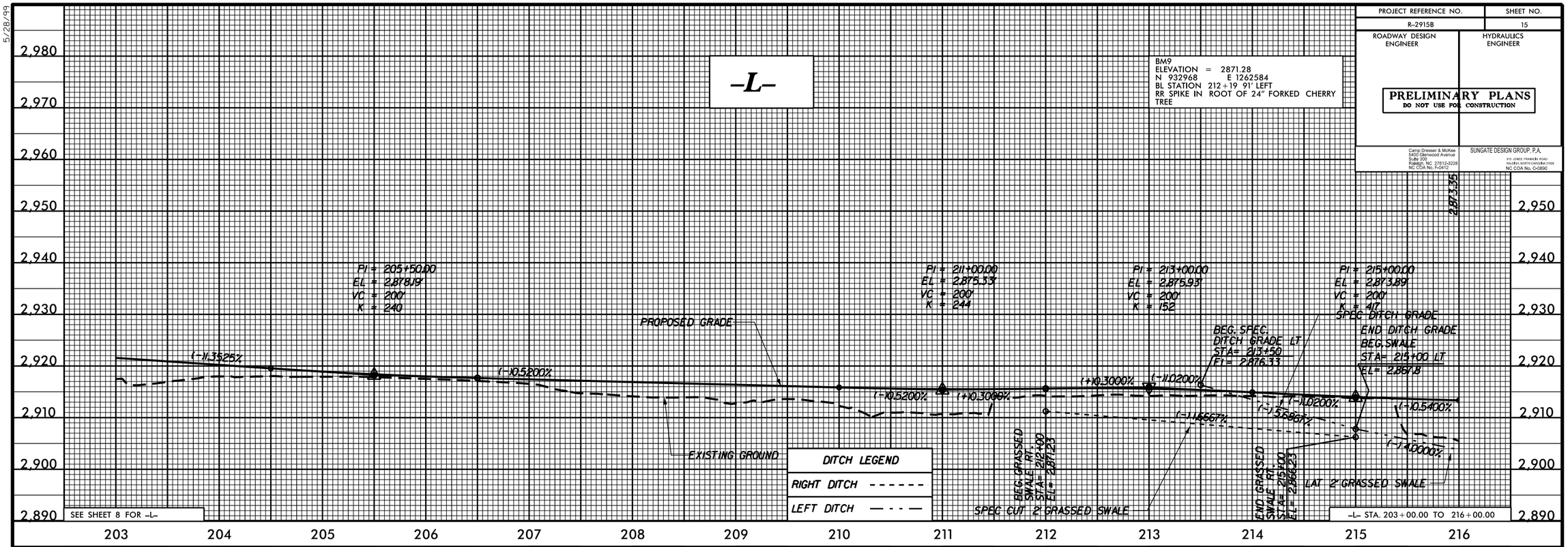
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

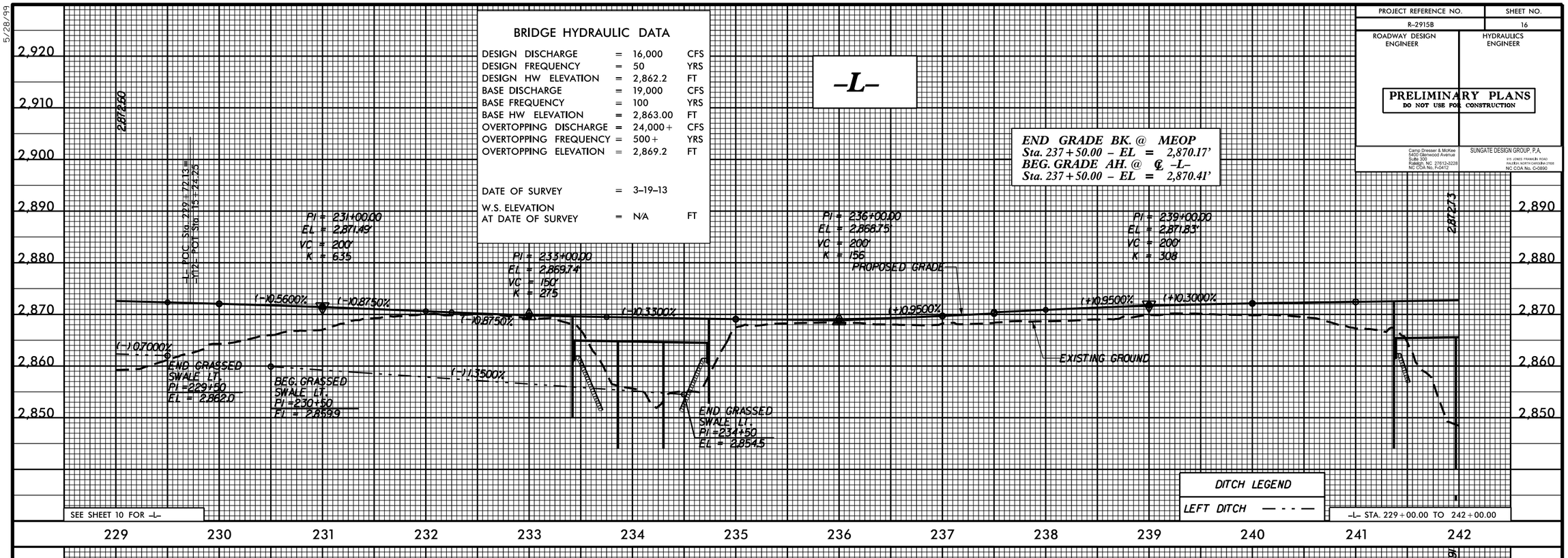
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890

5/28/99

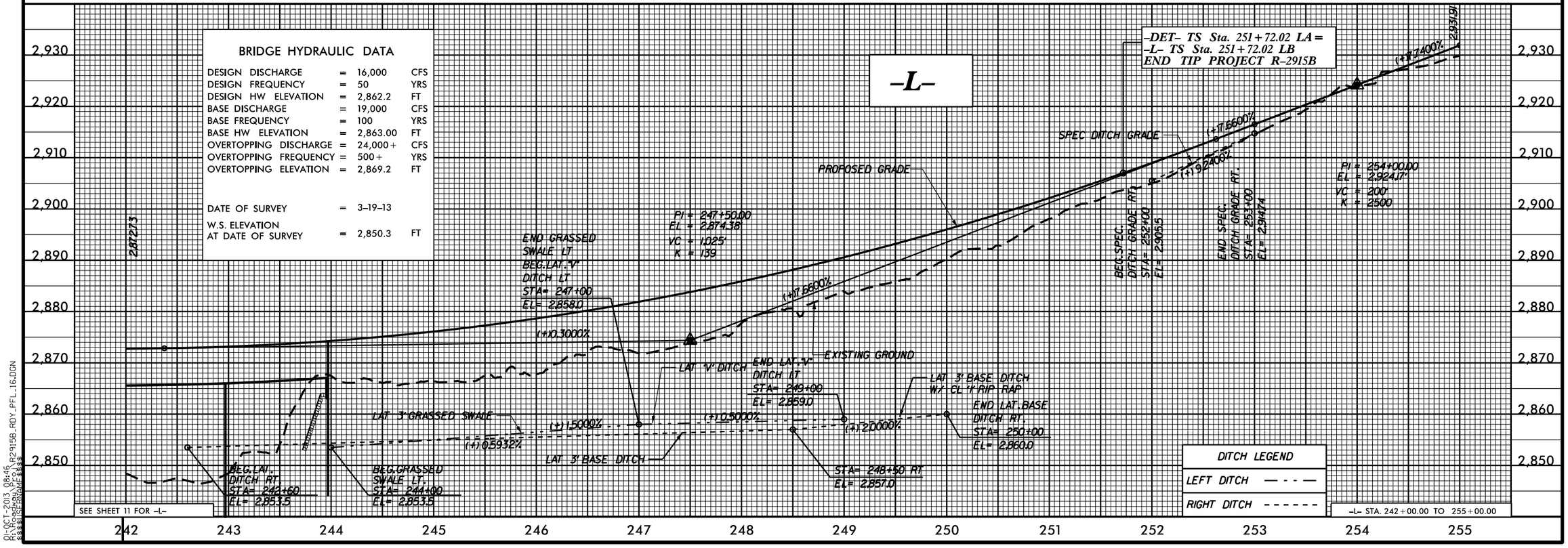
BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	16,000	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2,862.2	FT
BASE DISCHARGE	=	19,000	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2,863.00	FT
OVERTOPPING DISCHARGE	=	24,000+	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	2,869.2	FT
DATE OF SURVEY	=	3-19-13	
W.S. ELEVATION AT DATE OF SURVEY	=	N/A	FT



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	=	16,000	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2,862.2	FT
BASE DISCHARGE	=	19,000	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2,863.00	FT
OVERTOPPING DISCHARGE	=	24,000+	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	2,869.2	FT
DATE OF SURVEY	=	3-19-13	
W.S. ELEVATION AT DATE OF SURVEY	=	2,850.3	FT



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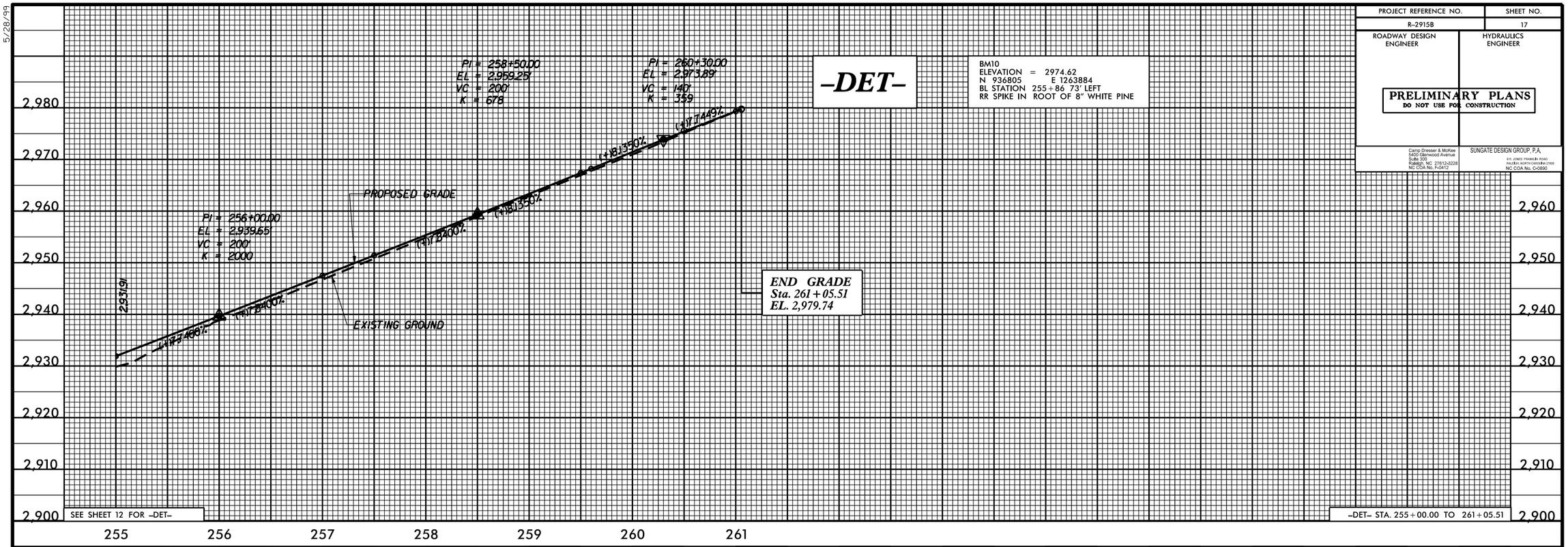
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



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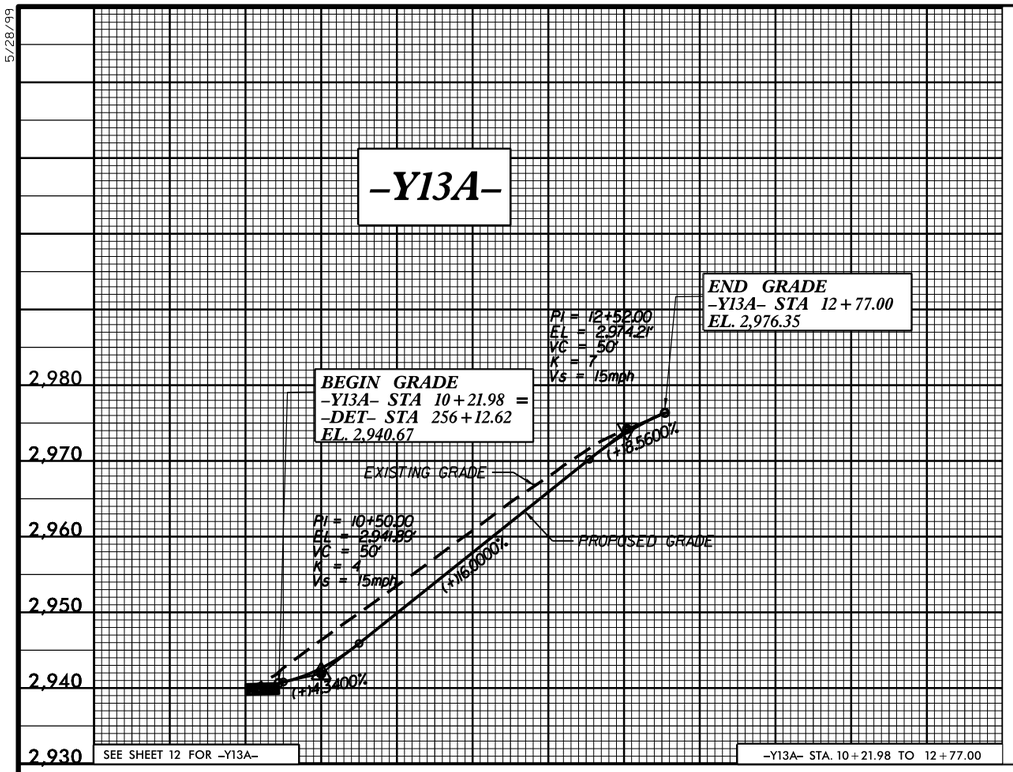
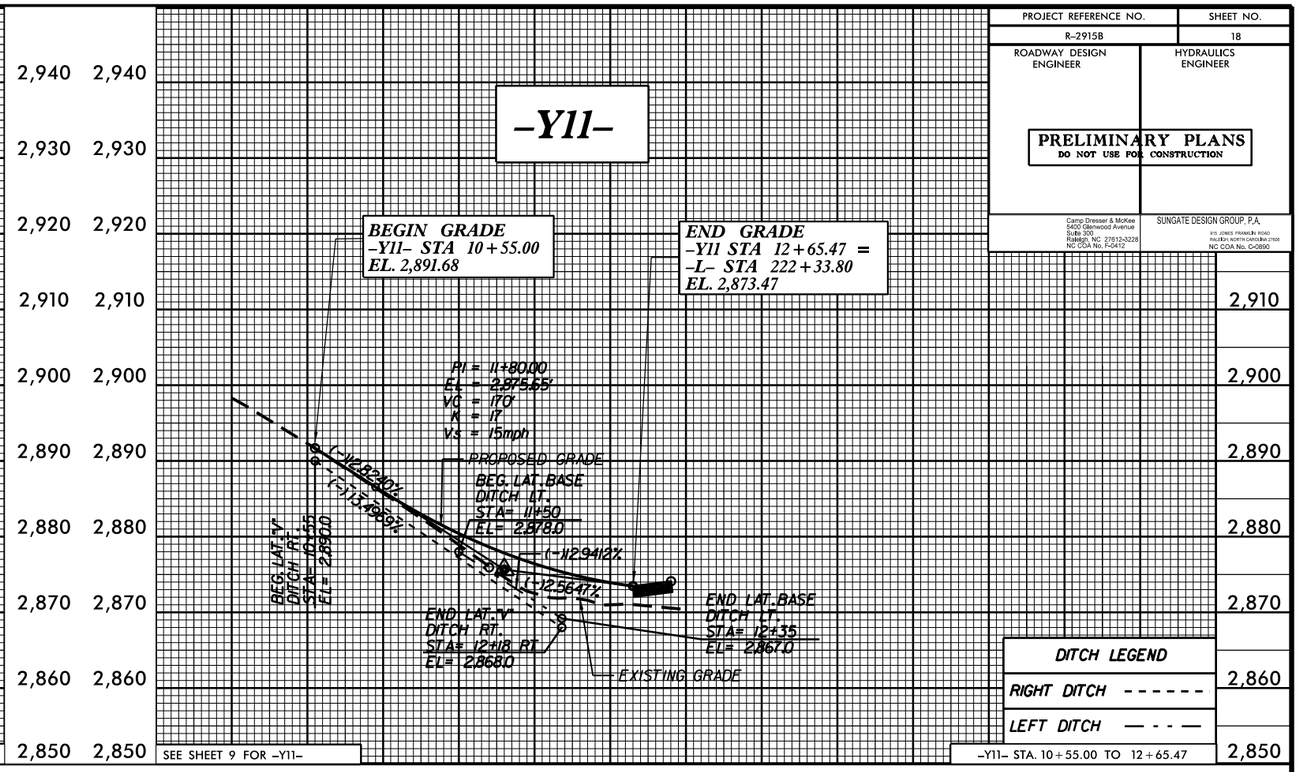
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

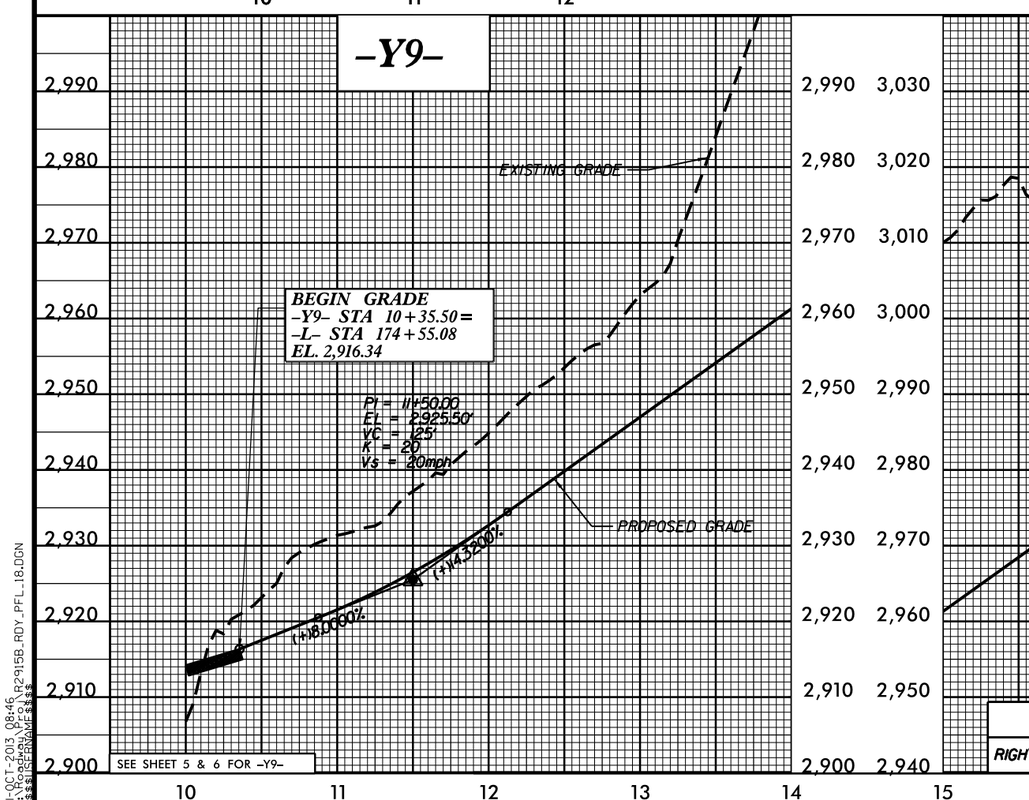
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

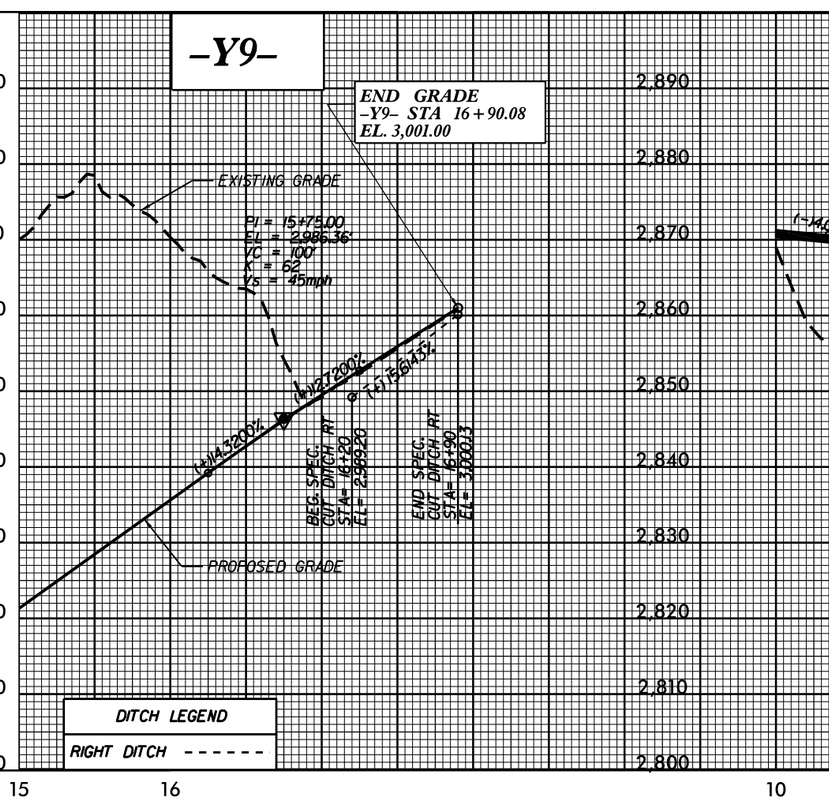
Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

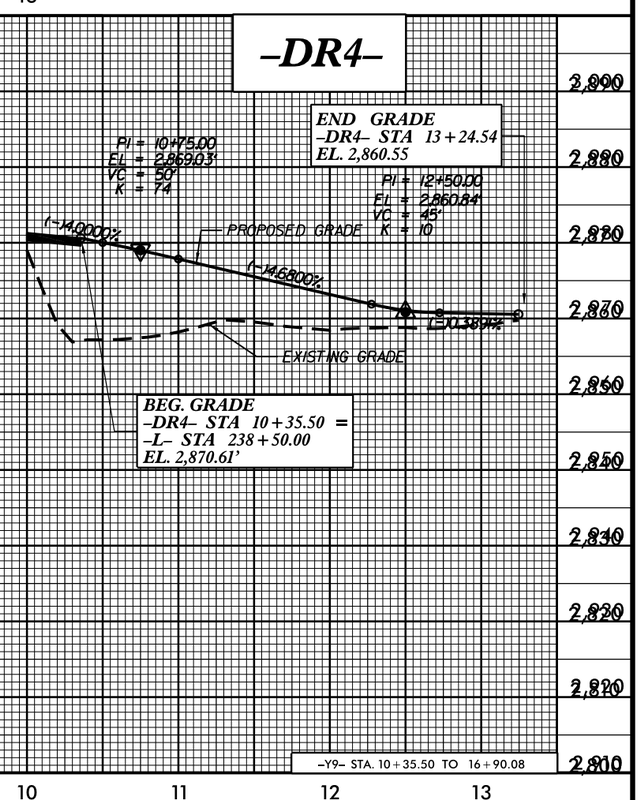
SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890











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PROJECT REFERENCE NO.	SHEET NO.
R-2915B	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27610
NC COA No. C-0890

–Y10–

BEGIN GRADE
–Y10– STA 12+75.00
EL. 2,882.21

END GRADE
–Y10 STA 17+62.15 =
–L– STA 200+67.09
EL. 2,885.96

EXISTING GRADE
PROPOSED GRADE

PI = 14+05.00
EL = 2,879.98'
VC = 260'
K = 38
Vs = 30mph

PI = 16+25.00
EL = 2,891.42'
VC = 180'
K = 20
Vs = 30mph

(-) 3.8735%
(-)0.7154%
(+)0.3125%
(+)5.2000%
(-)13.9810%

BEG. SPEC. DITCH
GRADE LT
STA= 13+00
EL= 2,879.29

PI = 13+18 LT
EL= 2,878.60

END SPEC. DITCH
GRADE LT
STA= 13+50
EL= 2,876.67

DITCH LEGEND
LEFT DITCH — - - —

SEE SHEET 7 FOR –Y10–

–Y10– STA. 12+75.00 TO 17+62.15

–DR3–

BEG. GRADE
–DR3– STA 10+35.50 =
–L– STA 188+09.10
EL. 2,897.04'

END GRADE
–DR3– STA 19+95.00
EL. 2,883.37

PI = 10+80.00
EL = 2,894.69'
VC = 49'
K = 9

PI = 13+00.00
EL = 2,895.35'
VC = 100'
K = 6

PI = 14+50.00
EL = 2,919.74'
VC = 200'
K = 11

PI = 18+00.00
EL = 2,941.14'
VC = 200'
K = 10

PI = 19+50.00
EL = 2,882.84'
VC = 50'
K = 2

(-)5.2809%
(-)0.3000%
(+)0.3000%
(+)16.2000%
(-)1.6000%
(-)1.6000%
(-)20.8667%
(-)20.8667%
(+)1.0778%

SEE SHEET 6,7 FOR –DR3– & –DR3B–

–DR3B–

END GRADE
–DR3B– STA 12+35.00
EL. 2,938.66

BEG. GRADE
–DR3B– STA 10+06.00
EL. 2,894.68

PI = 10+25.00
EL = 2,894.30'
VC = 38.00'
K = 2

PI = 12+00.00
EL = 2,934.66'
VC = 70.00'
K = 6

(-)12.0000%
(+)23.0625%
(+)23.0625%
(+)11.4286%

–DR3– STA. 10+35.00 TO 19+95.00
–DR3B– STA. 10+06.00 TO 12+35.00

5/28/99

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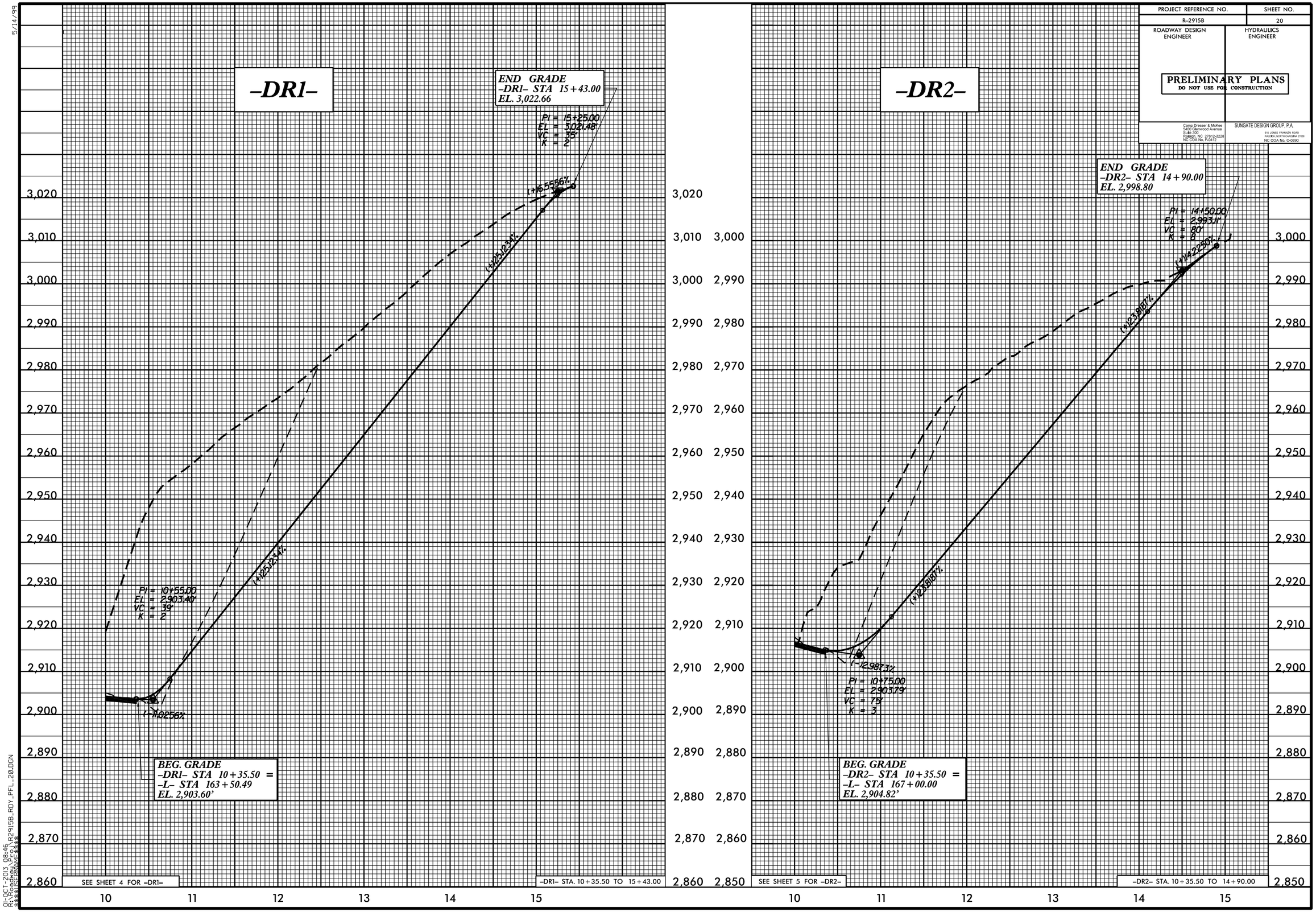
PROJECT REFERENCE NO.	SHEET NO.
R-2915B	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Camp Dresser & McKee
5400 Glenwood Avenue
Suite 300
Raleigh, NC 27612-3228
NC COA No. F-0412

SUNGATE DESIGN GROUP, P.A.
115 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
NC COA No. C-0890



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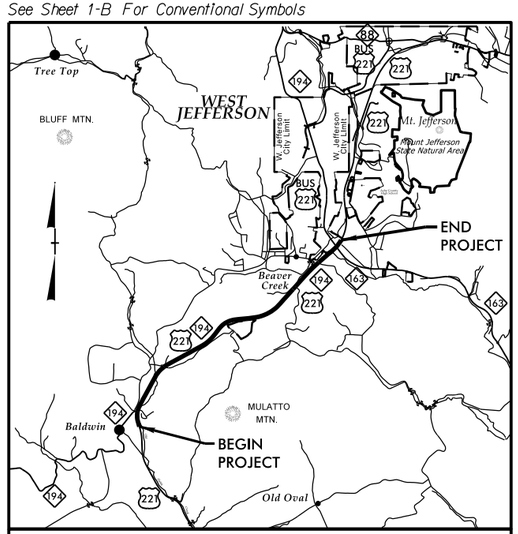
09/08/99

TIP PROJECT: R–2915D

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



VICINITY MAP

ROW PLANS

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

ASHE COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R–2915D	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34518.1.1	STP–0221(42)	P.E.
34518.2.4	STP–0221(42)	R/W,UTIL.

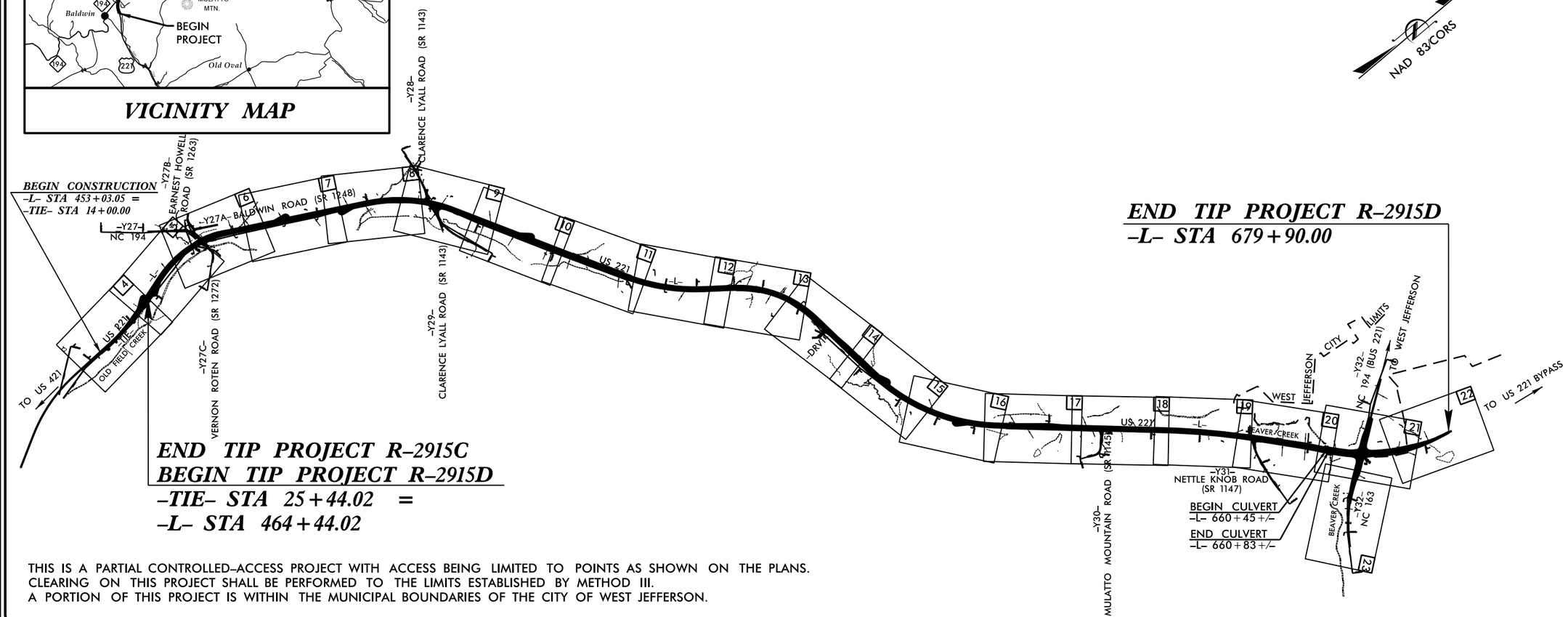
LOCATION: US 221 FROM SOUTH OF NC 194 TO US 221 BYPASS

TYPE OF WORK: GRADING, PAVING, DRAINAGE, CURB AND GUTTER, SIGNALS, AND CULVERT

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83/CORS

BEGIN CONSTRUCTION
–L– STA 453+03.05 =
–TIE– STA 14+00.00



END TIP PROJECT R–2915D
–L– STA 679+90.00

END TIP PROJECT R–2915C
BEGIN TIP PROJECT R–2915D
–TIE– STA 25+44.02 =
–L– STA 464+44.02

THIS IS A PARTIAL CONTROLLED–ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.
A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF WEST JEFFERSON.

CONTRACT:

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 14715
ADT 2035 = 25000
DHV = 9 %
D = 55 %
T = 9 % *
V = 60 MPH
* TTST =2 DUAL 7
FUNC CLASS =
Major Collector
Statewide Tier

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT R–2915D	=	4.290 MI
LENGTH OF STRUCTURE PROJECT R–2915D	=	0.007 MI
TOTAL LENGTH OF PROJECT R–2915D	=	4.297 MI

Prepared In the Office of:
KCI Associates of N.C., P.A.
4601 Six Forks Road
Landmark Center II, Suite 220
Raleigh, NC 27609
Phone (919) 783-9214
Fax (919) 783-9266

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JULY 30, 2013

LETTING DATE:
FEBRUARY 17, 2015

NCDOT CONTACT: BRENDA MOORE, PE
PROJECT ENGINEER – ROADWAY DESIGN

Plans Prepared For:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr.
Raleigh NC, 27610

CHARLES L. FLOWE, P.E.
PROJECT ENGINEER

BARRY C. SMITH, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

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04/16/11

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

Note: Not to Scale

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

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

BOUNDARIES AND PROPERTY:

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

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

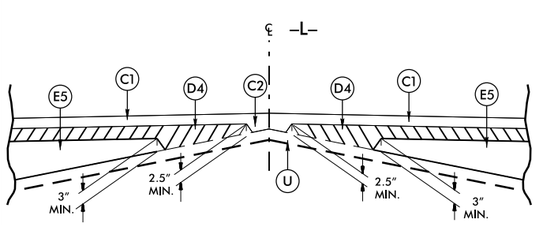
6/2/99

PAVEMENT SCHEDULE

PRELIMINARY PAVEMENT DESIGN

C1	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.
C2	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.
D1	PROP. APPROX. 2.5" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. APPROX. 3" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
D3	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2½" IN DEPTH OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 4" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E2	PROP. APPROX. 4.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 513 LBS. PER SQ. YD.
E3	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E4	PROP. APPROX. 5.5" ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E5	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5½" IN DEPTH OR LESS THAN 3" IN DEPTH.
J1	PROP. 6" AGGREGATE BASE COURSE.
J2	PROP. 10" AGGREGATE BASE COURSE.
J3	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
R1	2'-6" CONCRETE CURB AND GUTTER.
R2	2'-9" CONCRETE CURB AND GUTTER.
R3	5" MONOLITHIC CONCRETE ISLAND (KEYED IN).
R4	CONCRETE EXPRESSWAY GUTTER.
T	EARTH MATERIAL.
U	EXISTING PAVEMENT.
W	VAR. DEPTH ASPHALT PAVEMENT (SEE STANDARD WEDGING DETAIL).

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

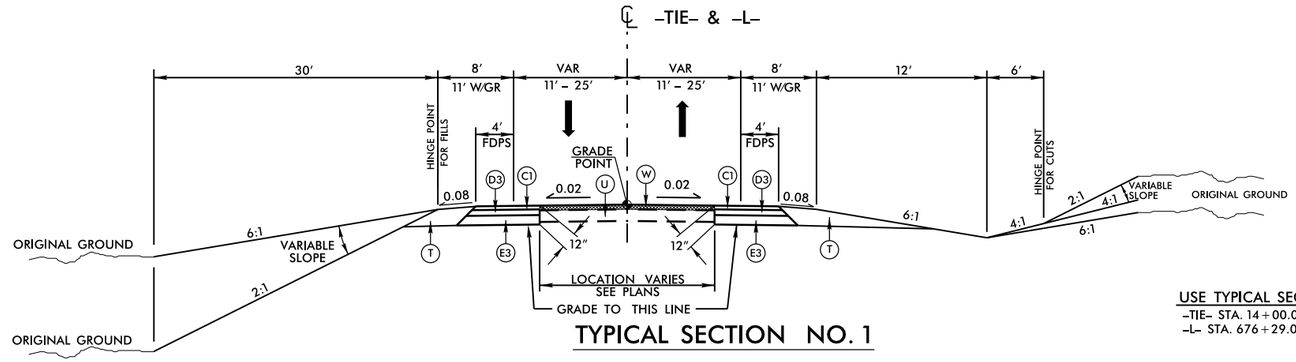


Detail Showing Method of Wedging

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

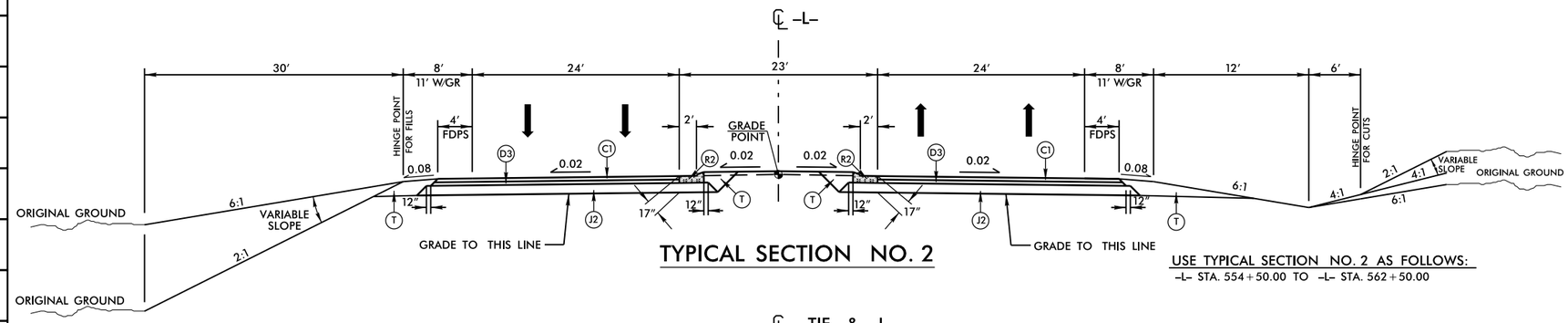
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

KCI
Engineers • Planners • Scientists • Construction Managers
4601 Six Forks Road, Landmark Center II, Suite 220
Raleigh, NC 27609-5210
http://www.kci.com
Phone (919) 783-9214 • Fax (919) 783-9266



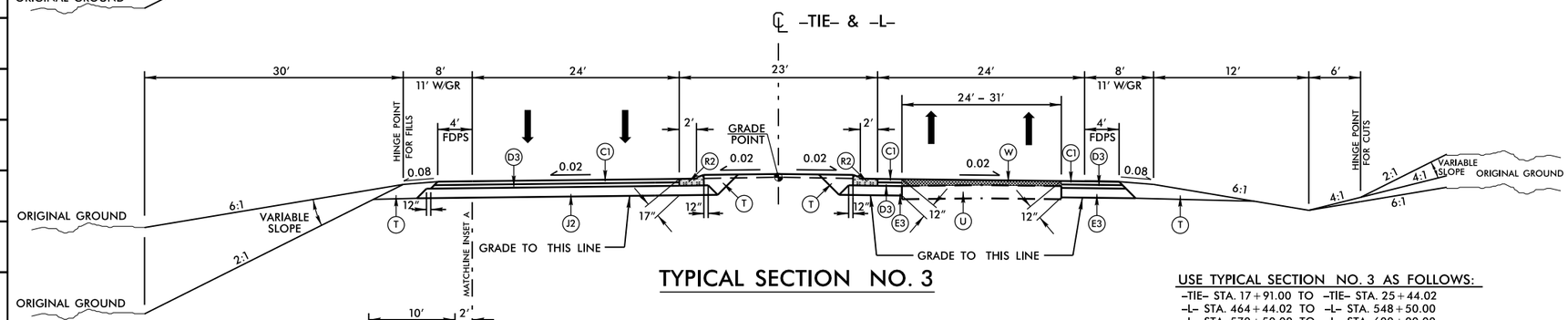
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1 AS FOLLOWS:
–TIE– STA. 14+00.00 TO –TIE– STA. 17+91.00
–L– STA. 676+29.00 TO –L– STA. 679+90.00



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2 AS FOLLOWS:
–L– STA. 554+50.00 TO –L– STA. 562+50.00

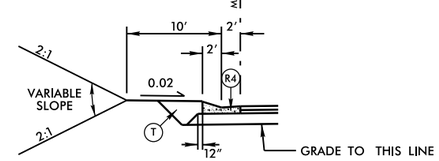


TYPICAL SECTION NO. 3

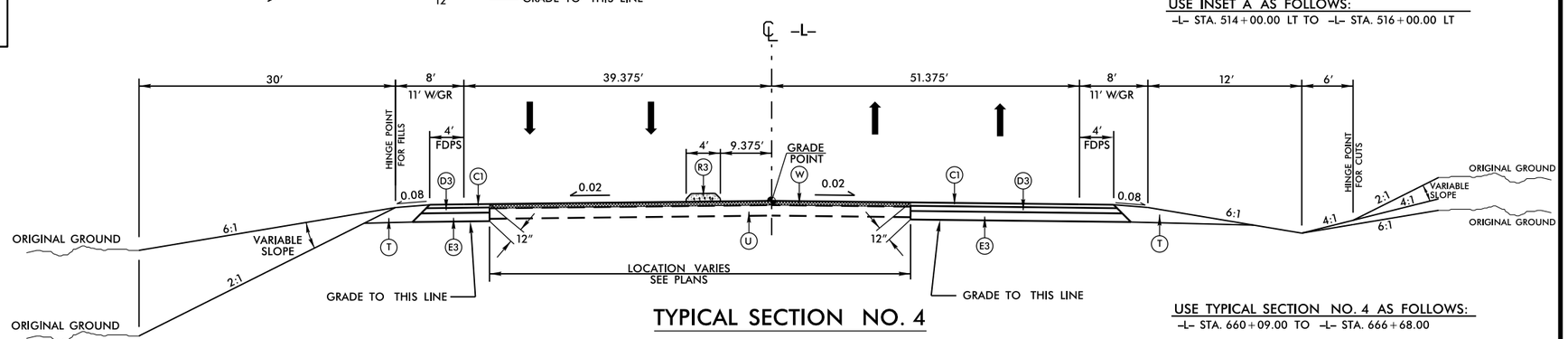
USE TYPICAL SECTION NO. 3 AS FOLLOWS:
–TIE– STA. 17+91.00 TO –TIE– STA. 25+44.02
–L– STA. 464+44.02 TO –L– STA. 548+50.00
–L– STA. 570+50.00 TO –L– STA. 600+00.00

USE REVERSE OF TYPICAL SECTION NO. 3 AS FOLLOWS:
–L– STA. 548+50.00 TO –L– STA. 554+50.00
–L– STA. 562+50.00 TO –L– STA. 570+50.00
–L– STA. 600+00.00 TO –L– STA. 660+09.00
–L– STA. 666+68.00 TO –L– STA. 676+29.00

USE INSET A AS FOLLOWS:
–L– STA. 514+00.00 LT TO –L– STA. 516+00.00 LT



INSET A



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4 AS FOLLOWS:
–L– STA. 660+09.00 TO –L– STA. 666+68.00

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6/2/99

PAVEMENT SCHEDULE PREL.PAVEMENT DESIGN	
C1	3″ S9.5B
C2	VAR. S9.5B
D1	2.5″ I19.0B
D2	3″ I19.0B
D3	4″ I19.0B
D4	VAR. I19.0B
E1	4″ B25.0B
E2	4.5″ B25.0B
E3	5″ B25.0B
E4	5.5″ B25.0B
E5	VAR. B25.0B
J1	6″ ABC
J2	10″ ABC
J3	VAR. ABC
R1	2′-6″ C & G
R2	2′-9″ C & G
R3	5″ MONO. ISLAND
R4	EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
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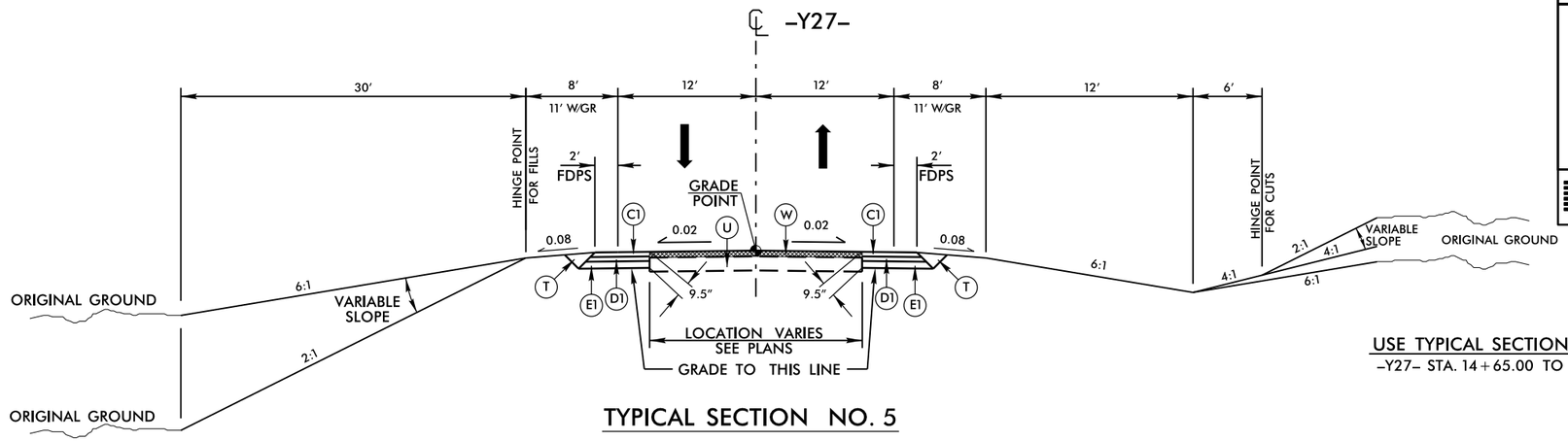
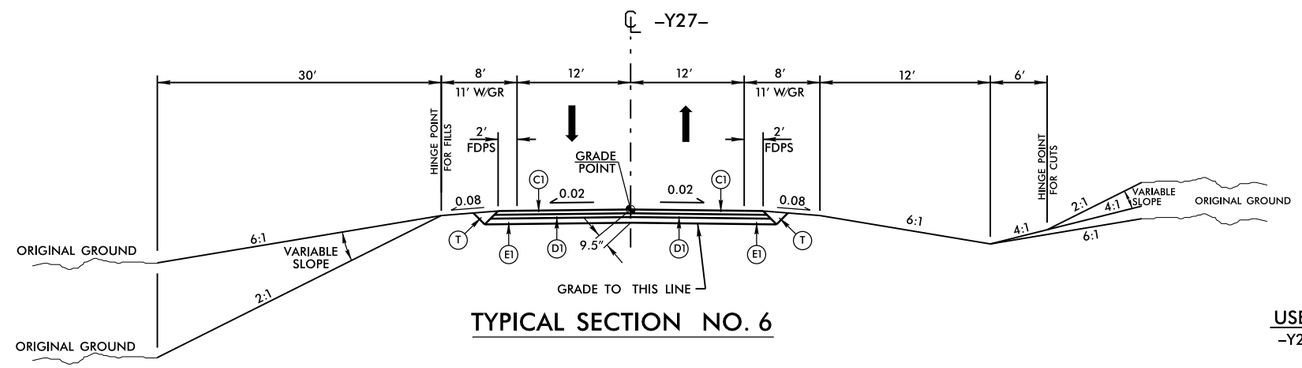


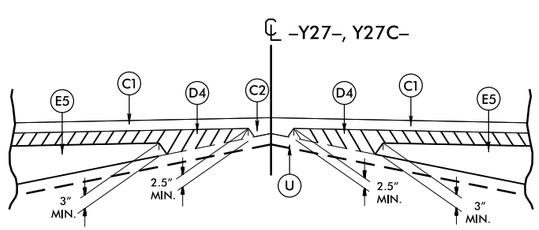
TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5 AS FOLLOWS:
–Y27– STA. 14+65.00 TO –Y27– STA. 15+60.00

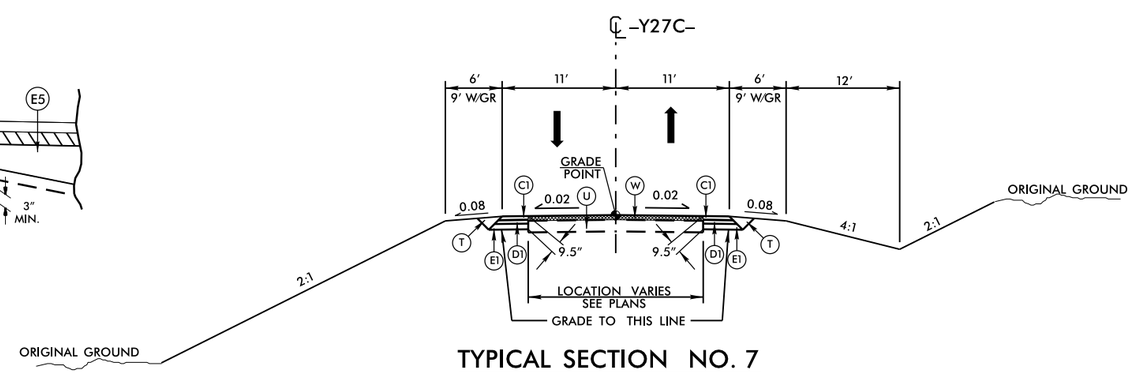


TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6 AS FOLLOWS:
–Y27– STA. 15+60.00 TO –Y27– STA. 18+53.39



Detail Showing Method of Wedging



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7 AS FOLLOWS:
–Y27C– STA. 10+36.83 TO –Y27C– STA. 12+00.00

21-JAN-2014 09:38
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6/2/99

PAVEMENT SCHEDULE PREL.PAVEMENT DESIGN	
C1	3″ S9.5B
C2	VAR. S9.5B
D1	2.5″ I19.0B
D2	3″ I19.0B
D3	4″ I19.0B
D4	VAR. I19.0B
E1	4″ B25.0B
E2	4.5″ B25.0B
E3	5″ B25.0B
E4	5.5″ B25.0B
E5	VAR. B25.0B
J1	6″ ABC
J2	10″ ABC
J3	VAR. ABC
R1	2′-6″ C & G
R2	2′-9″ C & G
R3	5″ MONO. ISLAND
R4	EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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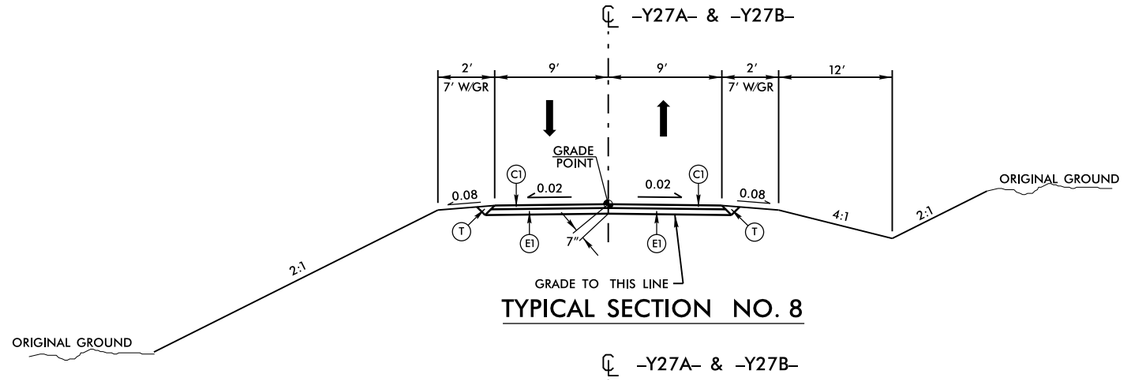
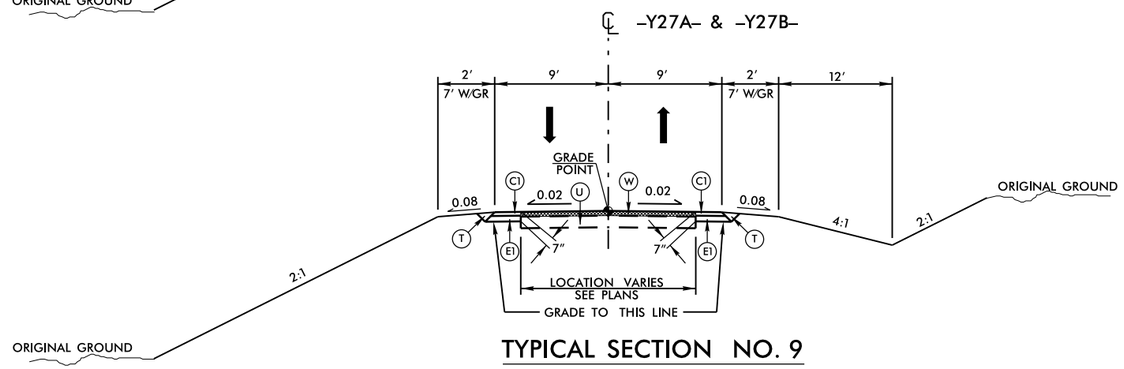


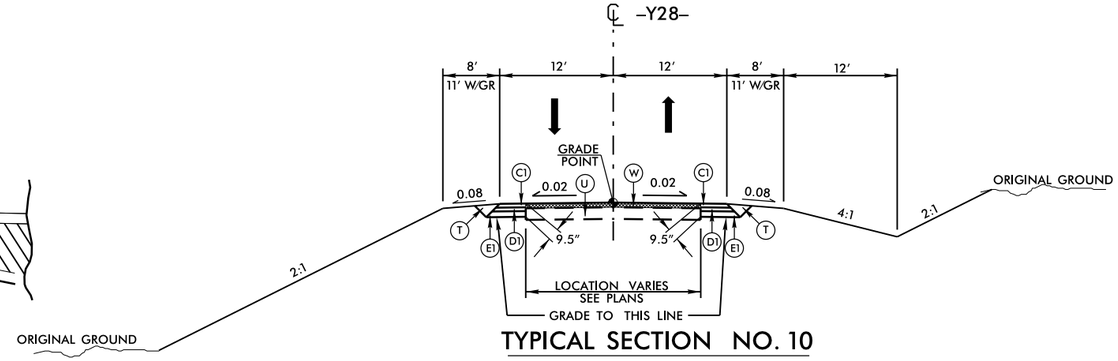
TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8 AS FOLLOWS:
–Y27A– STA. 10+12.00 TO –Y27A– STA. 11+25.00
–Y27B– STA. 11+45.00 TO –Y27B– STA. 12+83.78



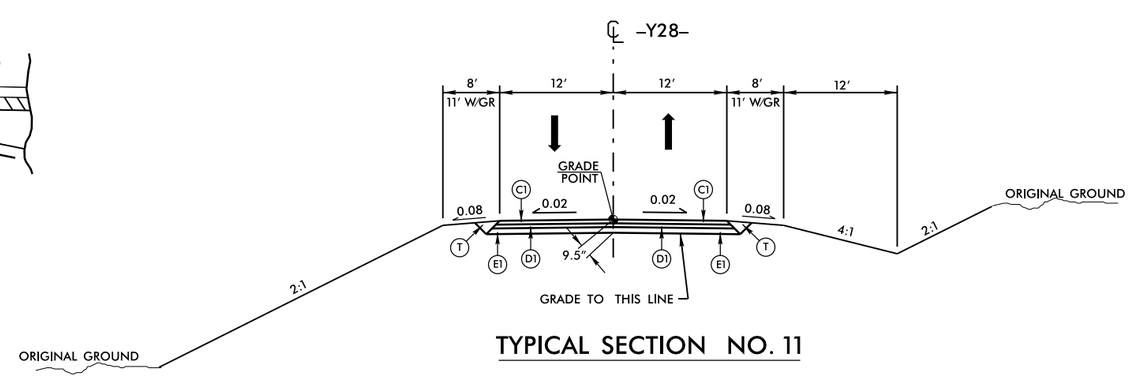
TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9 AS FOLLOWS:
–Y27A– STA. 11+25.00 TO –Y27A– STA. 11+70.00
–Y27B– STA. 10+90.00 TO –Y27B– STA. 11+45.00



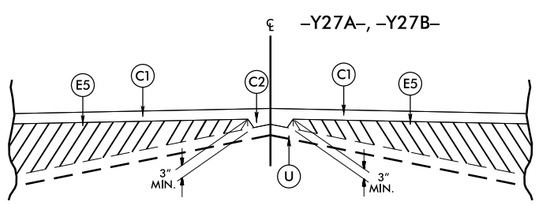
TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10 AS FOLLOWS:
–Y28– STA. 16+15.00 TO –Y28– STA. 17+08.00

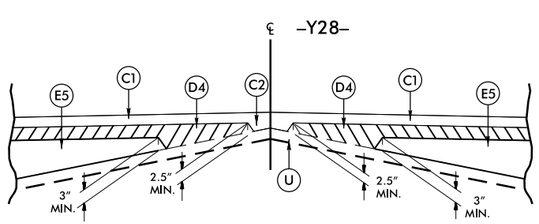


TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11 AS FOLLOWS:
–Y28– STA. 17+08.00 TO –Y28– STA. 17+82.70



Detail Showing Method of Wedging



Detail Showing Method of Wedging

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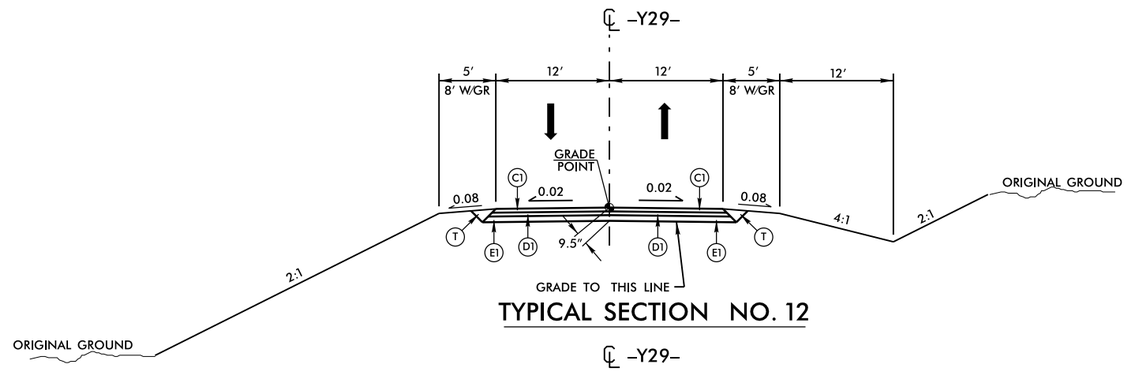
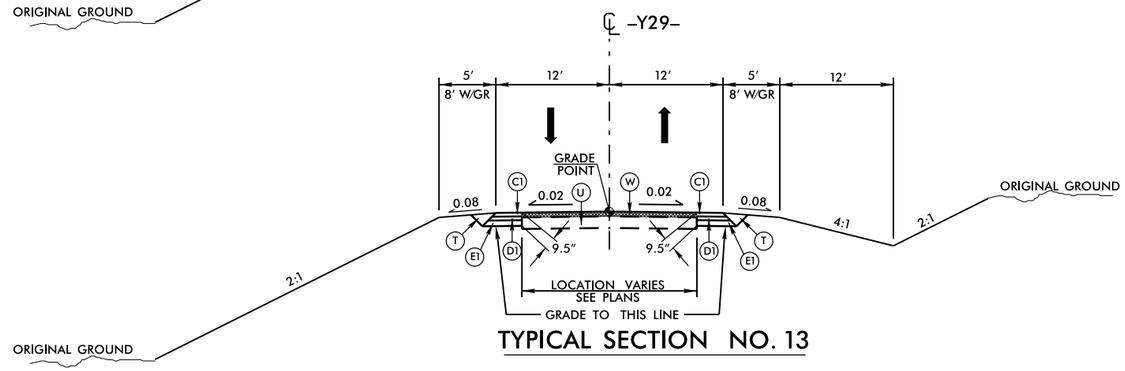
6/2/99

PAVEMENT SCHEDULE PREL.PAVEMENT DESIGN	
C1	3″ S9.5B
C2	VAR. S9.5B
D1	2.5″ I19.0B
D2	3″ I19.0B
D3	4″ I19.0B
D4	VAR. I19.0B
E1	4″ B25.0B
E2	4.5″ B25.0B
E3	5″ B25.0B
E4	5.5″ B25.0B
E5	VAR. B25.0B
J1	6″ ABC
J2	10″ ABC
J3	VAR. ABC
R1	2′-6″ C & G
R2	2′-9″ C & G
R3	5″ MONO. ISLAND
R4	EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING



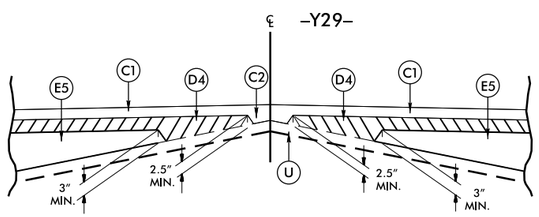
TYPICAL SECTION NO. 12

USE TYPICAL SECTION NO. 12 AS FOLLOWS:
–Y29– STA. 10+36.03 TO –Y29– STA. 11+32.00

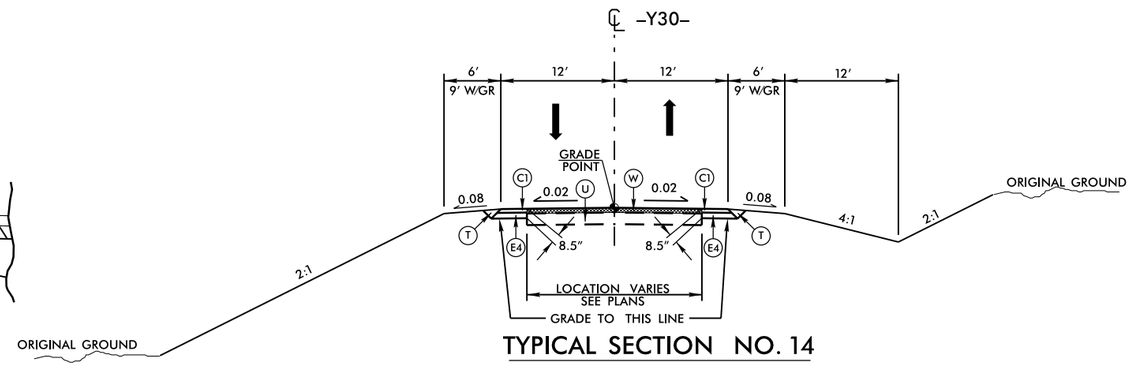


TYPICAL SECTION NO. 13

USE TYPICAL SECTION NO. 13 AS FOLLOWS:
–Y29– STA. 11+32.00 TO –Y29– STA. 12+60.00

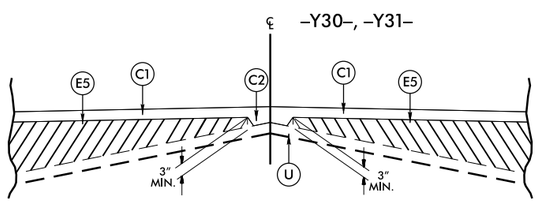


Detail Showing Method of Wedging

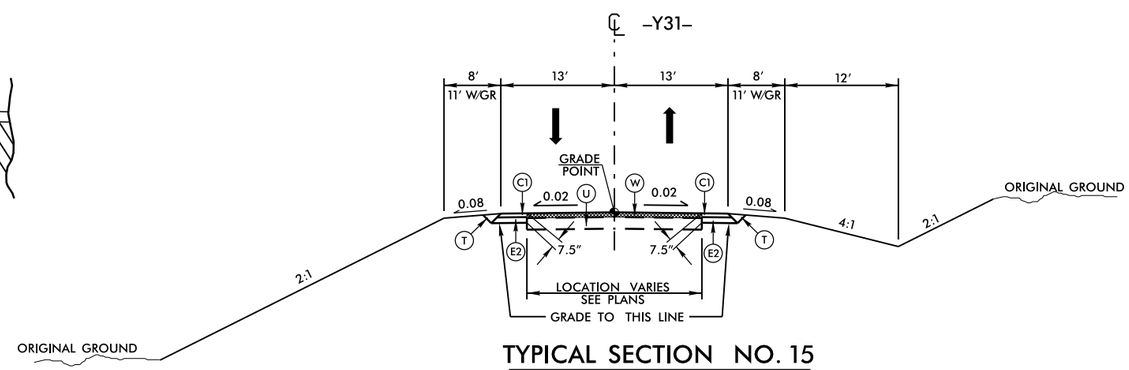


TYPICAL SECTION NO. 14

USE TYPICAL SECTION NO. 14 AS FOLLOWS:
–Y30– STA. 10+35.51 TO –Y30– STA. 11+00.00



Detail Showing Method of Wedging



TYPICAL SECTION NO. 15

USE TYPICAL SECTION NO. 15 AS FOLLOWS:
–Y31– STA. 10+35.98 TO –Y31– STA. 11+65.00

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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6/2/99

PAVEMENT SCHEDULE PREL.PAVEMENT DESIGN	
C1	3″ S9.5B
C2	VAR. S9.5B
D1	2.5″ I19.0B
D2	3″ I19.0B
D3	4″ I19.0B
D4	VAR. I19.0B
E1	4″ B25.0B
E2	4.5″ B25.0B
E3	5″ B25.0B
E4	5.5″ B25.0B
E5	VAR. B25.0B
J1	6″ ABC
J2	10″ ABC
J3	VAR. ABC
R1	2′-6″ C & G
R2	2′-9″ C & G
R3	5″ MONO. ISLAND
R4	EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2-D
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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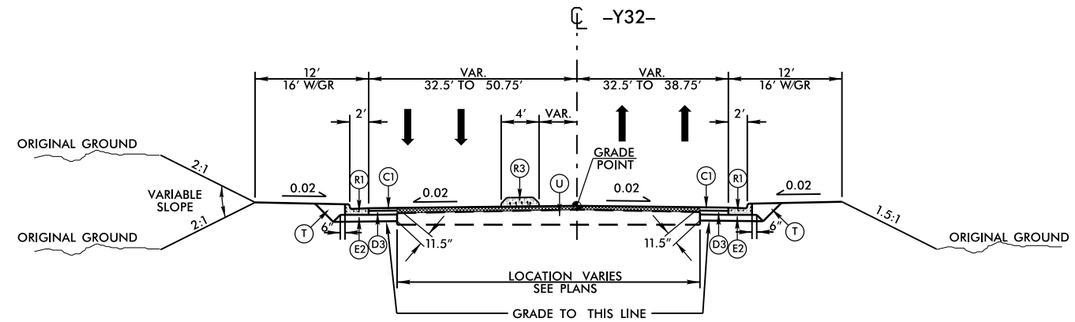
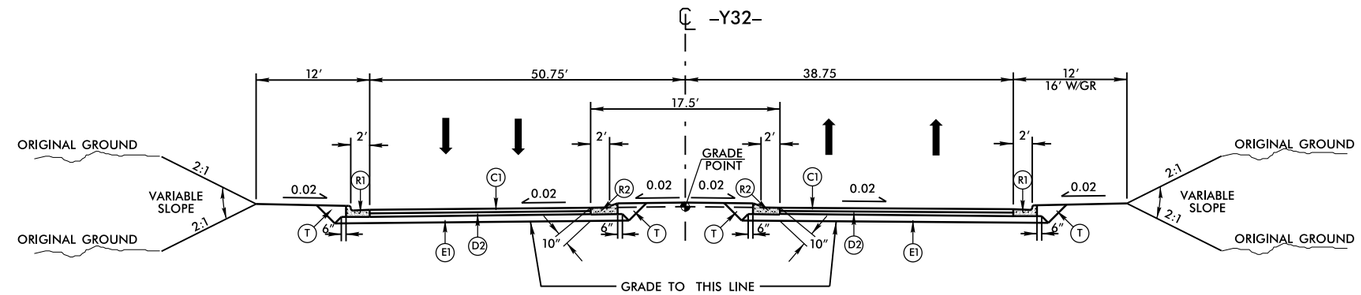


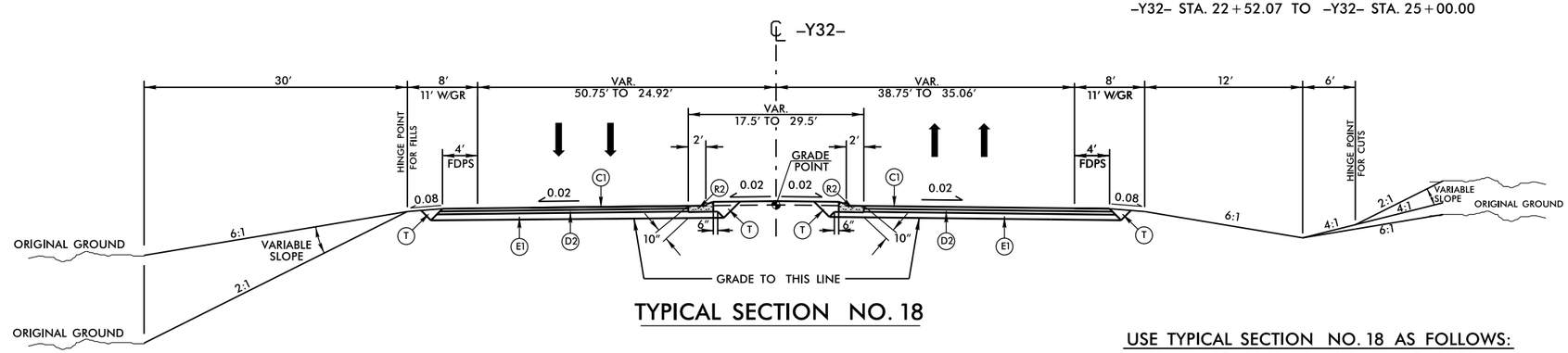
TYPICAL SECTION NO. 16

USE TYPICAL SECTION NO. 16 AS FOLLOWS:
–Y32– STA. 16+30.00 TO –Y32– STA. 21+46.70



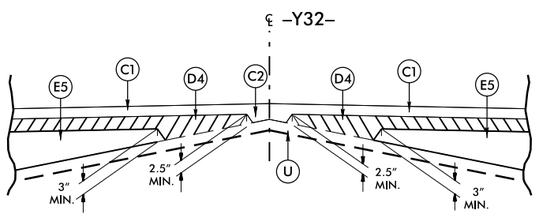
TYPICAL SECTION NO. 17

USE TYPICAL SECTION NO. 17 AS FOLLOWS:
–Y32– STA. 22+52.07 TO –Y32– STA. 25+00.00

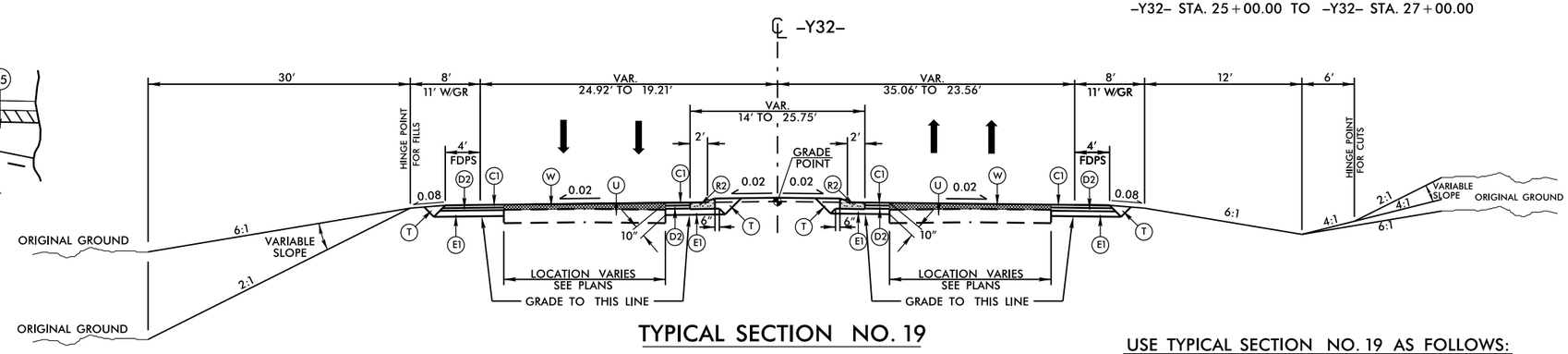


TYPICAL SECTION NO. 18

USE TYPICAL SECTION NO. 18 AS FOLLOWS:
–Y32– STA. 25+00.00 TO –Y32– STA. 27+00.00



Detail Showing Method of Wedging



TYPICAL SECTION NO. 19

USE TYPICAL SECTION NO. 19 AS FOLLOWS:
–Y32– STA. 27+00.00 TO –Y32– STA. 28+56.00

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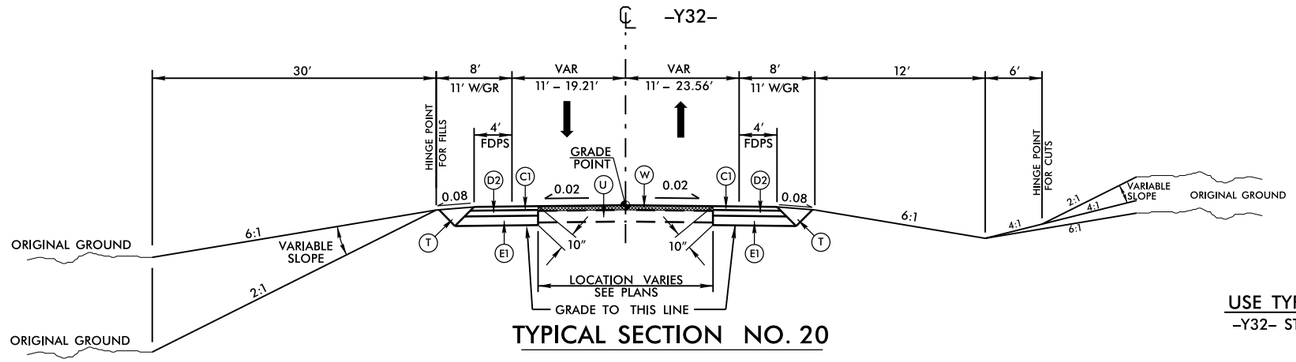
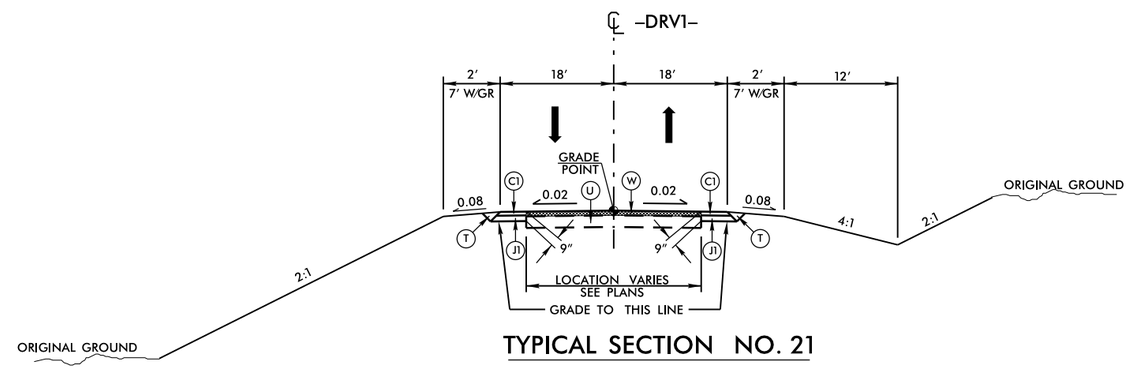
6/2/99

PAVEMENT SCHEDULE PRELIMINARY PAVEMENT DESIGN	
C1	3″ S9.5B
C2	VAR. S9.5B
D1	2.5″ I19.0B
D2	3″ I19.0B
D3	4″ I19.0B
D4	VAR. I19.0B
E1	4″ B25.0B
E2	4.5″ B25.0B
E3	5″ B25.0B
E4	5.5″ B25.0B
E5	VAR. B25.0B
J1	6″ ABC
J2	10″ ABC
J3	VAR. ABC
R1	2′-6″ C & G
R2	2′-9″ C & G
R3	5″ MONO. ISLAND
R4	EXPR. GUTTER
T	EARTH MATERIAL
U	EXIST. PAVEMENT
W	WEDGING



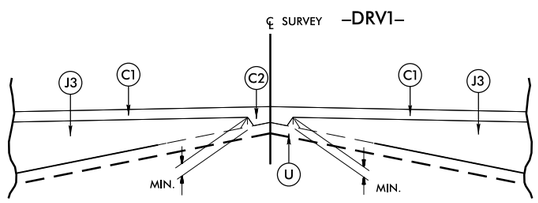
TYPICAL SECTION NO. 20

USE TYPICAL SECTION NO. 20 AS FOLLOWS:
–Y32– STA. 28+56.00 TO –Y32– STA. 29+90.00

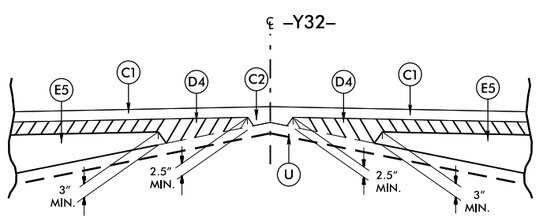


TYPICAL SECTION NO. 21

USE TYPICAL SECTION NO. 21 AS FOLLOWS:
–DRV1– STA. 10+47.50 TO –DRV1– STA. 11+80.00



Detail Showing Method of Wedging



Detail Showing Method of Wedging

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	2-E
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	4
R/W SHEET NO.	
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ENG FIRM LICENSE NO. C-690

REVISIONS

8/17/99 022514 - R/W REVISIONS; UPDATED EXISTING R/W AND PROPERTY LINE ON PARCELS 3 AND 5; REVISED TCE FROM -L- STA. 458+50.00 TO STA. 459+27.60 LT. ON PARCEL 3; REMOVED TCE AND ADDED PROPOSED R/W FROM -L- STA. 452+39.52 TO STA. 456+07.64 RT. AND ADDED PDE FROM -L- STA. 452+55.00 TO STA. 452+95.00 RT. ON PARCEL 4. - PJS

-L-

Pls Sta 447+18.53	Pls Sta 455+79.8	Pl Sta 459+20.50	Pls Sta 462+60.70
Θs = 3° 13' 22.4"	Θs = 2° 37' 33.8"	Δ = 9° 30' 53.1" (LT)	Θs = 2° 37' 33.8"
Ls = 270.00'	Ls = 275.00'	D = 1° 54' 35.5"	Ls = 275.00'
LT = 180.03'	LT = 183.35'	L = 498.19'	LT = 183.35'
ST = 90.03'	ST = 91.69'	T = 249.67'	ST = 91.69'
		R = 3,000.00'	

DETAIL 4
SPECIAL LATERAL BASE DITCH
(Not to Scale)

Natural Ground, 2:1, d, D, B, 4:1 or Flatter, Fill Slope

Min. D = 2 Ft.
Max. d = 2 Ft.
B = 2 Ft.

Type of Liner = Coir Fiber Matting

FROM STA. 21+44 TO STA. 23+00 -TIE- RT

NAD 83/CORS

GPS R2915-14

JOANN GREER D.B. 212, PG. 2033 (1)

JEFF & MARGIE SMITH D.B. 386, PG. 598 P.B. 7, PG. 45

JAMES A. TRIVETTE, LINDA TRIVETTE D.B. 124, PG. 1063

JOANN GREER D.B. K-4, PG. 233

RODERICK E. & KENA EDWARDS SLOOP D.B. 384, PG. 1117

BETHANY UNITED METHODIST CHURCH D.B. I-5, PG. 432 (3)

BALDWIN-BETHANY CEMETERY NO REFERENCE (2)

THOMAS M. HOWELL AND W KATHY H. HOWELL DB 313 PG 1332 (5)

BARRY K. & SANDRA T. LIDDLE D.B. 250, PG. 12 (4)

MARTIN MARTINEZ-SALDANA D.B. 247, PG. 1985

BETTY SUE HOUCK D.B. T-5, PG. 491

TONY A ELDRETH, SHARON W ELDRETH D.B. 374, PG. 1276 PB 7 PG 16

ARVELL & BERTHA GROGAN D.B. 129, PG. 1558

JOANN GREER D.B. 316, PG. 2414 P.B. 7, PG. 16

DANNY & DONNA COLDIRON D.B. 174, PG. 1093

MARY EDWARDS HOLCOMB AND HUSBAND, C. J. HOLCOMB, JR. DB 161 PG 351 (6)

BEGIN CONSTRUCTION R-2915D
-L- POT Sta. 453+03.05, OS: 23.5' RT =
-TIE- POT Sta. 14+00.00, OS: 0'

-L- ST Sta. 448+98.50
-L- TS Sta. 453+95.83
-L- SC Sta. 456+70.83
-L- CS Sta. 461+69.02
-TIE- SC Sta. 16+19.63
-TIE- CS Sta. 21+76.82
-TIE- PC Sta. 10+00.00

MATCH LINE -L- STA. 462+50
SEE SHEET NO. 5

-TIE-

Pls Sta 15+86.98	Pl Sta 19+28.30	Pls Sta 22+68.50
Θs = 2° 37' 33.8"	Δ = 9° 30' 53.1" (LT)	Θs = 2° 37' 33.8"
Ls = 275.00'	D = 1° 54' 35.5"	Ls = 275.00'
LT = 183.35'	L = 498.19'	LT = 183.35'
ST = 91.69'	T = 249.67'	ST = 91.69'
	R = 3,000.00'	
	SE = 0.05	
	RUNOFF = 275'	

FOR -TIE- PROFILE, SEE SHEET 24

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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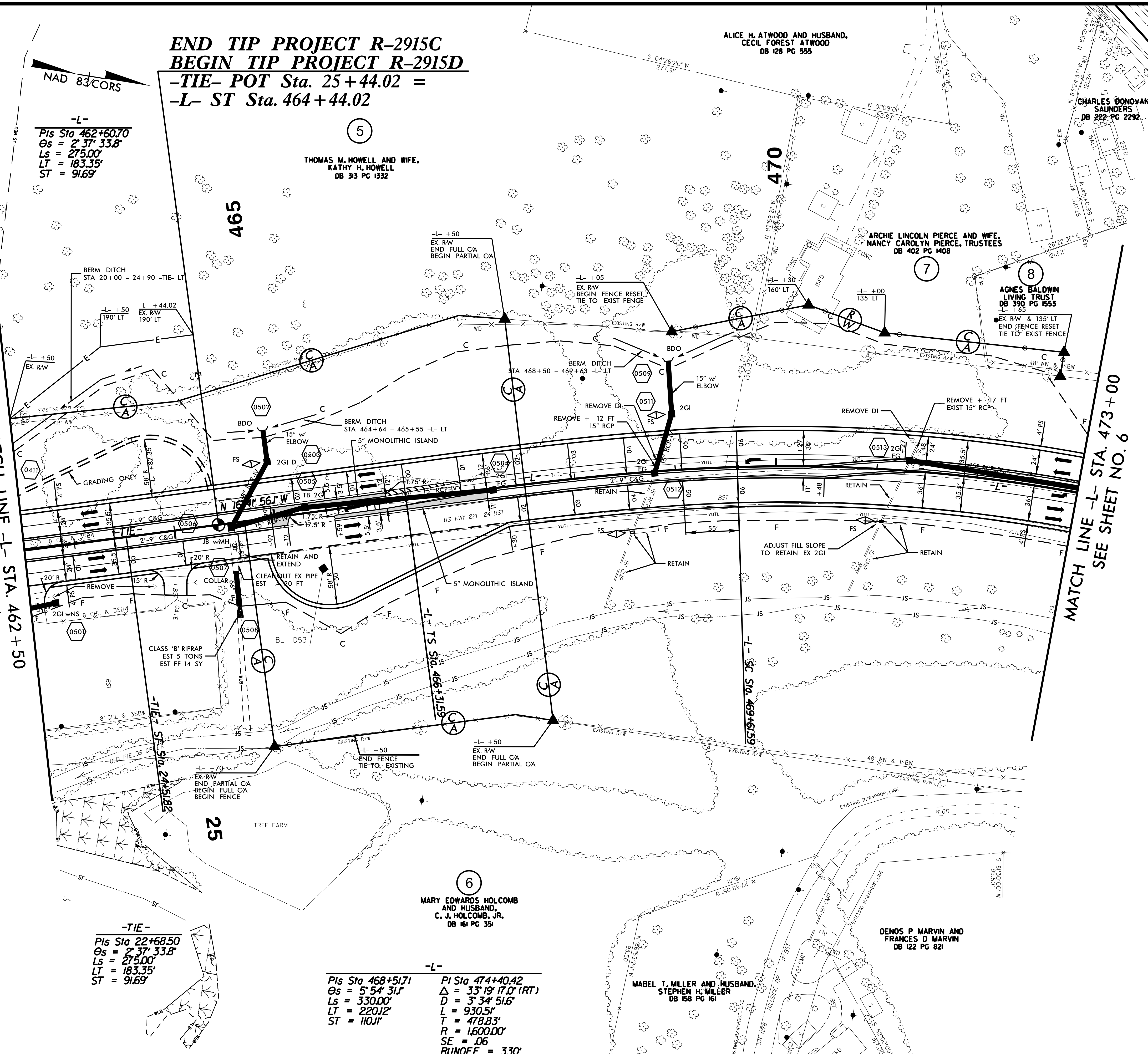
ENG FIRM LICENSE NO. C-890

8/17/99

REVISIONS

END TIP PROJECT R-2915C
BEGIN TIP PROJECT R-2915D
-TIE- POT Sta. 25+44.02 =
-L- ST Sta. 464+44.02



-L-
Pls Sta 462+60.70
Θs = 2° 37' 33.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'

-TIE-
PIs Sta 22+68.50
Θs = 2° 37' 33.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'

-L-

PIs Sta 468+51.71	PI Sta 474+40.42
Θs = 5° 54' 31.1"	Δ = 33° 19' 17.0" (RT)
Ls = 330.00'	D = 3° 34' 51.6"
LT = 220.12'	L = 930.51'
ST = 110.11'	T = 478.83'
	R = 1,600.00'
	SE = .06
	RUNOFF = 330'

FOR -TIE- PROFILE, SEE SHEET 24
FOR -L- PROFILE, SEE SHEET 24

29-JUL-2013 11:40
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NAD 83/CORS

REVISIONS

02/25/14 - R/W REVISIONS; UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 10. - PJS

8/17/99

-Y27B- PC Sta. 10+67.44
BEGIN CONSTRUCTION
-Y27B- POC Sta.10+90.00
-Y27B- PT Sta. 11+65.77
-Y27A- PT Sta. 10+87.87
END CONSTRUCTION
-Y27A- POT Sta.11+70.00
BEGIN CONSTRUCTION
-Y27- POT Sta.14+65.00
-Y27- PC Sta. 15+62.71
-Y27- PT Sta. 18+27.05
-Y27A- POC Sta.10+51.00 =
-Y27B- POT Sta. 12+92.78
-Y27A- PC Sta. 10+18.14
BEARING BK = N 24°15'41.2" W
-L- POC Sta.476+68.00 =
-Y27C- POT Sta. 10+00.00
-Y27- POC Sta.17+04.00 =
-Y27A- POT Sta. 10+00.00
-L- POC Sta.476+61.00 =
-Y27- POT Sta.19+02.51
BEARING BK =
N 89°14'20.8" E
-L- CS Sta. 478+92.10
END CONSTRUCTION
-Y27C- POT Sta.12+00.00
-Y27C- PC Sta. 12+00.69
BEARING BK = N 89°14'20.8" E
-Y27C- PC Sta. 12+98.39
-Y27C- PT Sta. 12+77.06
BEARING AH= S 54°17'55.9" E
-Y27C- PT Sta. 13+53.89
BEARING AH= S 36°07'42.1" E
-Y27C- POT Sta. 13+97.64

-Y27A-
PI Sta 10+55.76
Δ = 53°16'12.5" (RT)
D = 76°23'39.7"
L = 69.73'
T = 37.61'
R = 75.00'

-Y27B-
PI Sta 11+19.55
Δ = 46°56'43.9" (LT)
D = 47°44'47.3"
L = 98.32'
T = 52.11'
R = 120.00'

PI Sta 17+04.15
Δ = 50°29'02.7" (RT)
D = 19°05'54.9"
L = 264.33'
T = 141.44'
R = 300.00'

-Y27C-
PI Sta 12+40.22
Δ = 36°27'43.3" (RT)
D = 47°44'47.3"
L = 76.37'
T = 39.53'
R = 120.00'

PI Sta 13+26.37
Δ = 18°10'13.9" (RT)
D = 32°44'25.6"
L = 55.50'
T = 27.98'
R = 175.00'

-L-
PI Sta 474+40.42
Δ = 33°19'17.0" (RT)
D = 3°34'51.6"
L = 930.51'
T = 478.83'
R = 1,600.00'
SE = .06
RUNOFF = 330'

PIs Sta 480+02.21
Θs = 5°54'31.1"
Ls = 330.00'
LT = 220.12'
ST = 110.11'

MATCH LINE -L- STA. 473+00
SEE SHEET NO. 5

MATCH LINE -L- STA. 484+50
SEE SHEET NO. 7

GEORGIA P. TEDDER
DB 253 PG 215

QUENTINA PRICE
DB E-5 PG 502
DB 144 PG 2194

THE VERONICA GAIL WORTH
REVOCABLE LIVING TRUST
DB 401 PG 001

CHARLES DONOVAN SAUNDERS
DB 222 PG 2292

AGNES BALDWIN
LIVING TRUST
DB 590 PG 1553

CHARLES DONOVAN SAUNDERS
TAX MAP

GREATHEL T. COLDIRON
DB 320 PG 517

JERROLD ASHLEY
DB K-5 PG 414

BARBARA LEE EDWARDS AND
CHARLES CLAYBORN EDWARDS, JR.
DB 316 PG 536

NCDOT
DB 225 PG 2040

PATRICIA P. ANDREWS
DB 263 PG 137

LINDA D. BURGESS
DB 349 PG 422

FRANCES R. ELLER
DB 187 PG 698

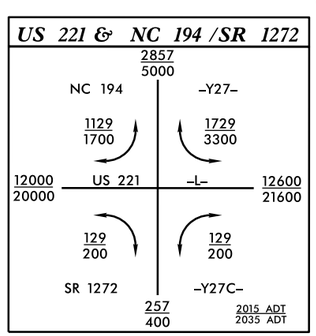
VERNON ROTEN AND LENNA RUTH ROTEN
DB I-4 PG 446

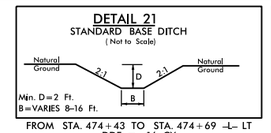
FRANCES MARION MILLER
DB M-4 PG 553

SR 1248 BALDWIN RD

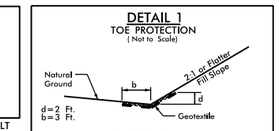
U S HWY 221

SR 1272 VERNON ROTEN RD

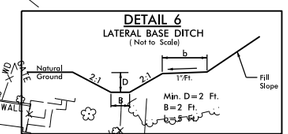




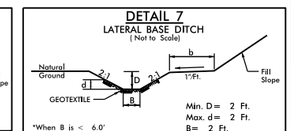
FROM STA. 474+43 TO STA. 474+69 -L- LT
DDE = 16 CY



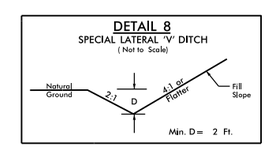
FROM STA. 480+20 TO STA. 481+40 -L- LT



FROM STA. 15+00 TO STA. 16+75 -Y27- LT
DDE = 174 CY

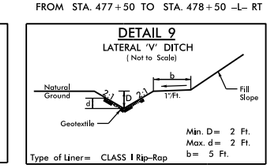


FROM STA. 14+65 TO STA. 15+00 -Y27- LT
DDE = 19 CY



FROM STA. 477+50 TO STA. 478+50 -L- RT

FROM STA. 478+80 TO STA. 480+20 -L- LT



FROM STA. 483+34 TO STA. 483+76 -L- LT
DDE = 17 CY

FOR -L- PROFILE, SEE SHEET 25
FOR -Y27- PROFILE, SEE SHEET 33
FOR -Y27A- PROFILE, SEE SHEET 34
FOR -Y27B- PROFILE, SEE SHEET 34
FOR -Y27C- PROFILE, SEE SHEET 33

21-FEB-2014 15:27
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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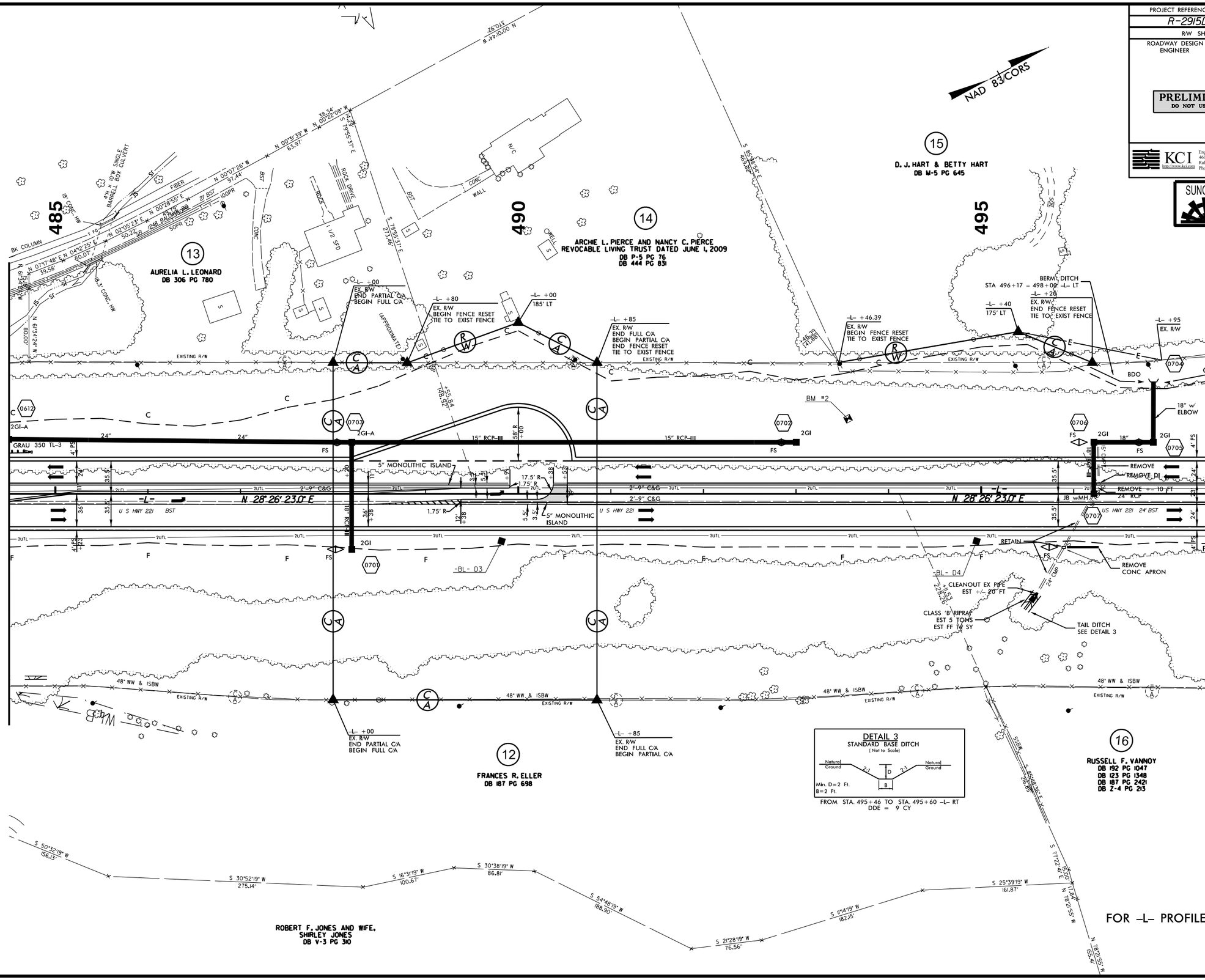
915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-6258
ENG FIRM LICENSE NO. C-890



FOR -L- PROFILE, SEE SHEET 25

REVISIONS

02/25/14 - R/W REVISIONS: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 14; UPDATED EXISTING R/W ON PARCEL 16. - PJS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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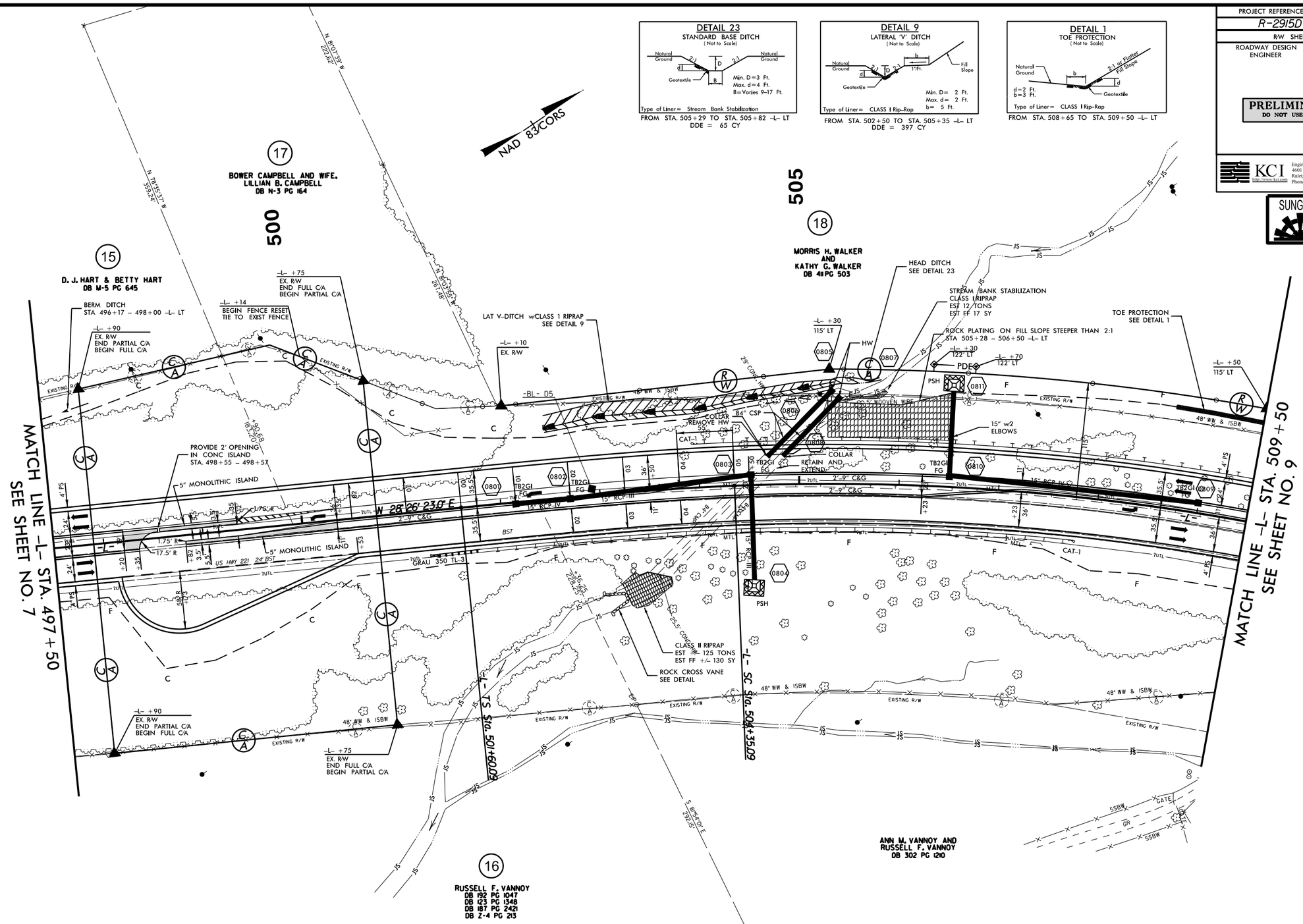
FROM STA. 505+29 TO STA. 505+82 -L- LT
DDE = 65 CY

FROM STA. 502+50 TO STA. 505+35 -L- LT
DDE = 397 CY

FROM STA. 508+65 TO STA. 509+50 -L- LT



-L-

PIs Sta 503+43.45	PI Sta 509+76.31
Θs = 3° 22' 52.3"	Δ = 26° 09' 14.0" (RT)
Ls = 275.00'	D = 2° 27' 32.6"
LT = 183.37'	L = 1,063.58'
ST = 91.70'	T = 541.22'
	R = 2,330.00'
	SE = .05
	RUNOFF = 275'

FOR -L- PROFILE, SEE SHEET 26

REVISIONS
022514 – R/W REVISIONS: UPDATED EXISTING R/W AND PROPOSED C/A ON PARCEL 16. – PJS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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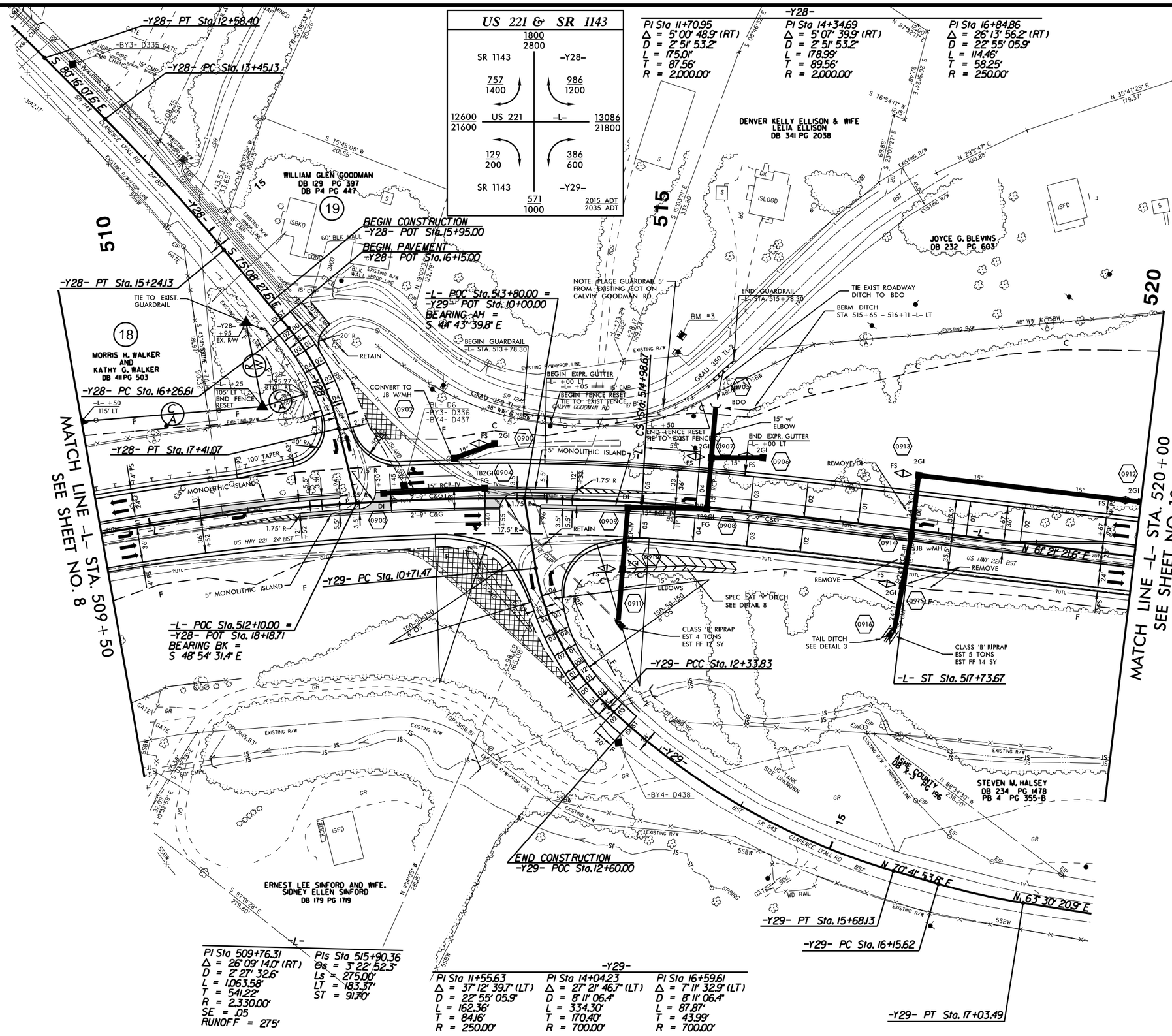
REVISIONS

02/25/14 – R/W REVISIONS: UPDATED PROPERTY OWNER NAME AND DEED REFERENCE ON PARCEL 19; LOCATED AN UNDERGROUND TANK AT –Y29– STA. 14+15+/– LT. AND REMOVED AN EXISTING BUILDING AT –Y29– STA. 14+75+/– LT.; UPDATED EXISTING R/W AND PROPERTY LINES FROM –L– STA. 517+52.31 TO STA. 523+33.45 RT. – PJS

8/17/99



PI Sta 509+76.31
Δ = 26° 09' 14.0" (RT)
D = 2° 27' 32.6"
L = 1,063.58'
T = 541.22'
R = 2,330.00'
SE = .05
RUNOFF = 275'

PIs Sta 515+90.36
Θs = 3° 22' 52.3"
Ls = 275.00'
LT = 183.37'
ST = 91.70'

–Y29–

PI Sta 11+55.63
Δ = 37° 12' 39.7" (LT)
D = 22° 55' 05.9"
L = 162.36'
T = 84.16'
R = 250.00'

PI Sta 14+04.23
Δ = 27° 21' 46.7" (LT)
D = 8° 11' 06.4"
L = 334.30'
T = 170.40'
R = 700.00'

PI Sta 16+59.61
Δ = 7° 11' 32.9" (LT)
D = 8° 11' 06.4"
L = 87.87'
T = 43.99'
R = 700.00'

FOR –L– PROFILE, SEE SHEET 26
FOR –Y28– PROFILE, SEE SHEET 34
FOR –Y29– PROFILE, SEE SHEET 34

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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ENG FIRM LICENSE NO. C-890

REVISIONS

8/17/99 022514 - R/W REVISIONS; UPDATED EXISTING R/W AND PROPERTY LINES FROM -L- STA. 517+52.31 TO STA. 523+33.45 RT. - PJS

MATCH LINE -L- STA. 520+00
SEE SHEET NO. 9

MATCH LINE -L- STA. 533+50
SEE SHEET NO. 11

DETAIL 16
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, 2:1, Natural Ground, Geotextile, B
Min. D=3 Ft.
Max. d=2 Ft.
B=2 Ft.
*When B is < 6.0'
Type of Liner= CLASS 'B' Rip-Rap
FROM STA. 523+82 TO STA. 527+91 -L- RT
DDE = 120 CY

DETAIL 17
STANDARD BASE DITCH
(Not to Scale)
Natural Ground, 2:1, d, D, 2:1, Natural Ground, Geotextile, B
Min. D=3 Ft.
Max. d= 2Ft.
B=3 Ft.
*When B is < 6.0'
Type of Liner= CLASS I Rip-Rap
STA. 522+93 -L- RT
DDE = 20 CY

DETAIL 5
STANDARD 'V' DITCH
(Not to Scale)
Natural Ground, 2:1, D, 2:1, Natural Ground
Min. D=2 Ft.
FROM STA. 522+81 TO STA. 523+82 -L-RT
DDE = 15 CY

DETAIL 26
RIP RAP AT EMBANKMENT
(Not to Scale)
10' min., 1.0' max., Ditch Grade, 1.5 FT, GEOTEXTILE
Type of Liner= 6 TONS Class I Riprap
FF 8 SY
STA. 522+93 -L- RT

-Y29-
PI Sta 19+30.82
Δ = 8°23' 04.2" (RT)
D = 3°49' 11.0"
L = 219.51'
T = 109.95'
R = 1,500.00'

-Y29- PC Sta. 18+20.87
-Y29- POT Sta. 21+30.25
-Y29- PT Sta. 20+40.37

EDWIN DALE KRIDER & WIFE
SHERRY W. KRIDER
DB 374 PG 225
PB 7 PG 6

JOYCE G. BLEVINS
DB 232 PG 603

EDWIN DALE KRIDER & WIFE
SHERRY W. KRIDER
DB 185 PG 837

STEVEN M. HALSEY
DB 254 PG 1478
PB 4 PG 355-B

GEORGE MICHAEL SHATLEY
DB 216 PG 2491
PB 5 PG 287

SARA ELIZABETH POOLE
DB 302 PG 247
PB 5 PG 287

JOHNNY P. PHILLIPS & WIFE
DORIS G. PHILLIPS
DB 302 PG 247
PB 5 PG 287

JERRY L. ROTEN & WIFE
MARGARET G. ROTEN
DB 215 PG 635
PB 4 PG 355-B

KATRINA CASEY
DB 342 PG 1747

GARLAND C. LYALLS & WIFE
JOAN B. LYALLS
DB 404 PG 2171

US HWY 221 BST

FOR -L- PROFILE, SEE SHEET 27

21-FEB-2014 15:27
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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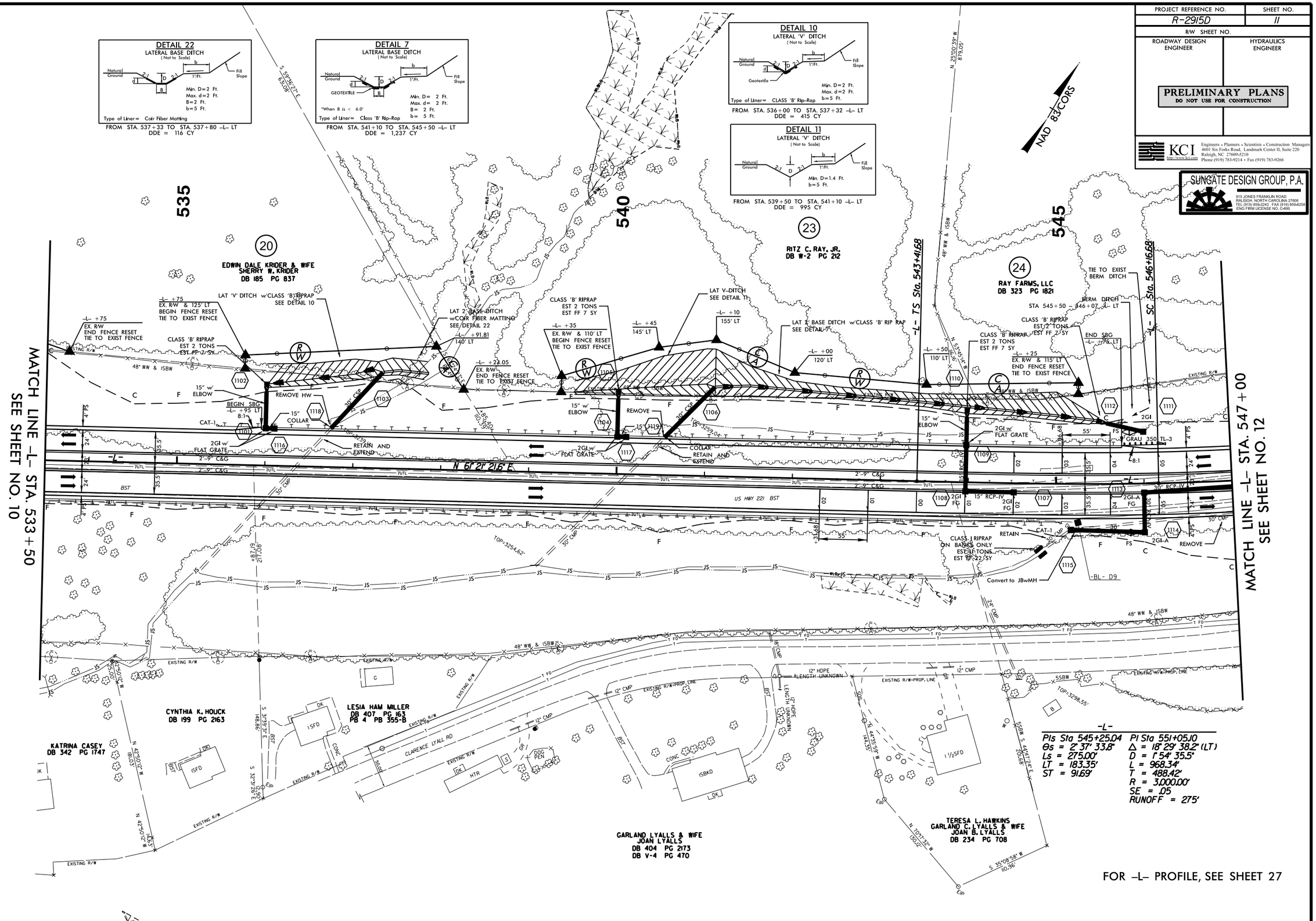
ENG FIRM LICENSE NO. C-690

8/17/99

REVISIONS



FOR -L- PROFILE, SEE SHEET 27

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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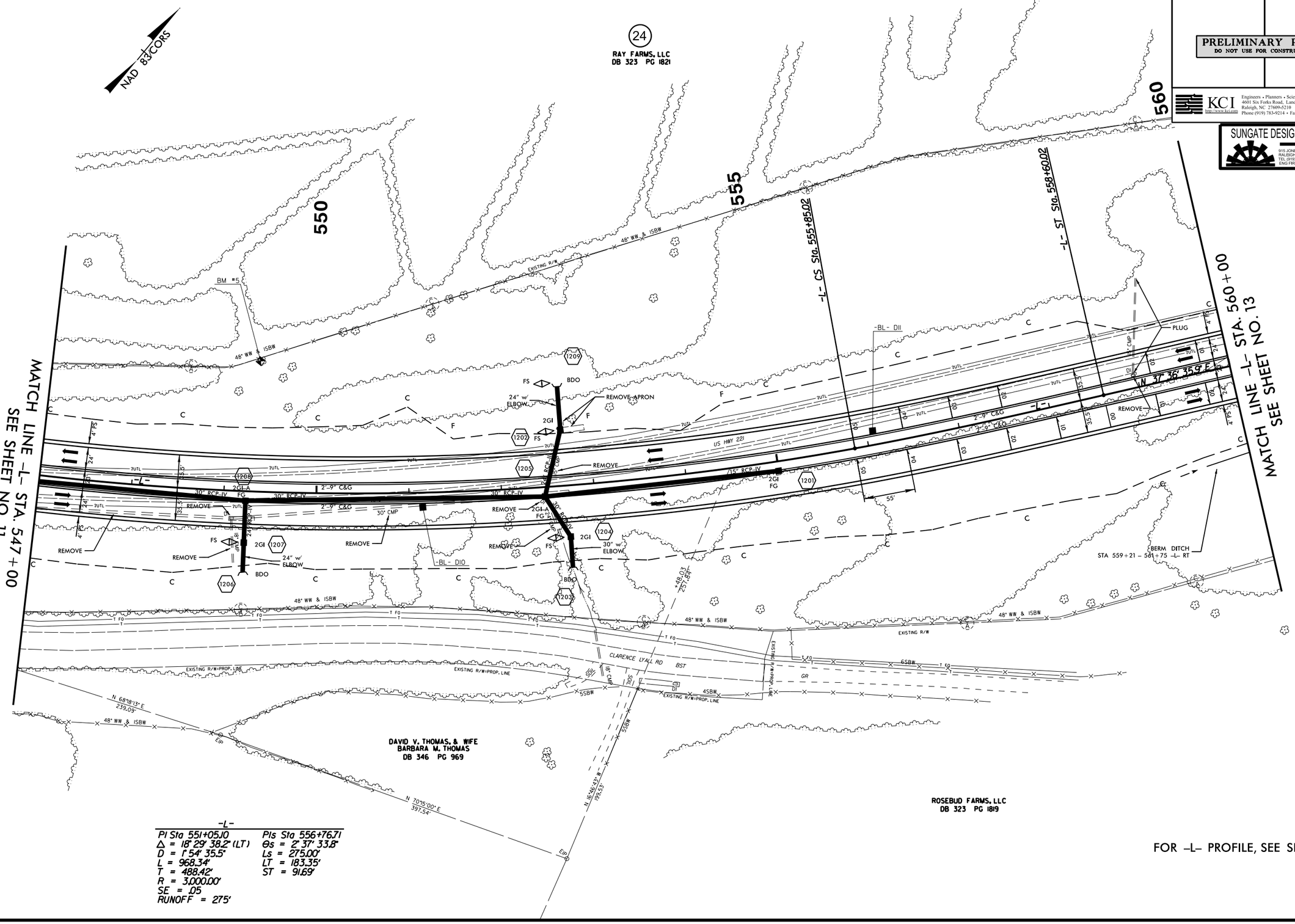

-L-	
PI Sta 551+05.10	PIs Sta 556+76.71
Δ = 18° 29' 38.2" (LT)	Θs = 2° 37' 33.8"
D = 1° 54' 35.5"	Ls = 275.00'
L = 968.34'	LT = 183.35'
T = 488.42'	ST = 91.69'
R = 3,000.00'	
SE = .05	
RUNOFF = 275'	

FOR -L- PROFILE, SEE SHEET 28

REVISIONS

8/17/99

29-JUL-2013 11:29
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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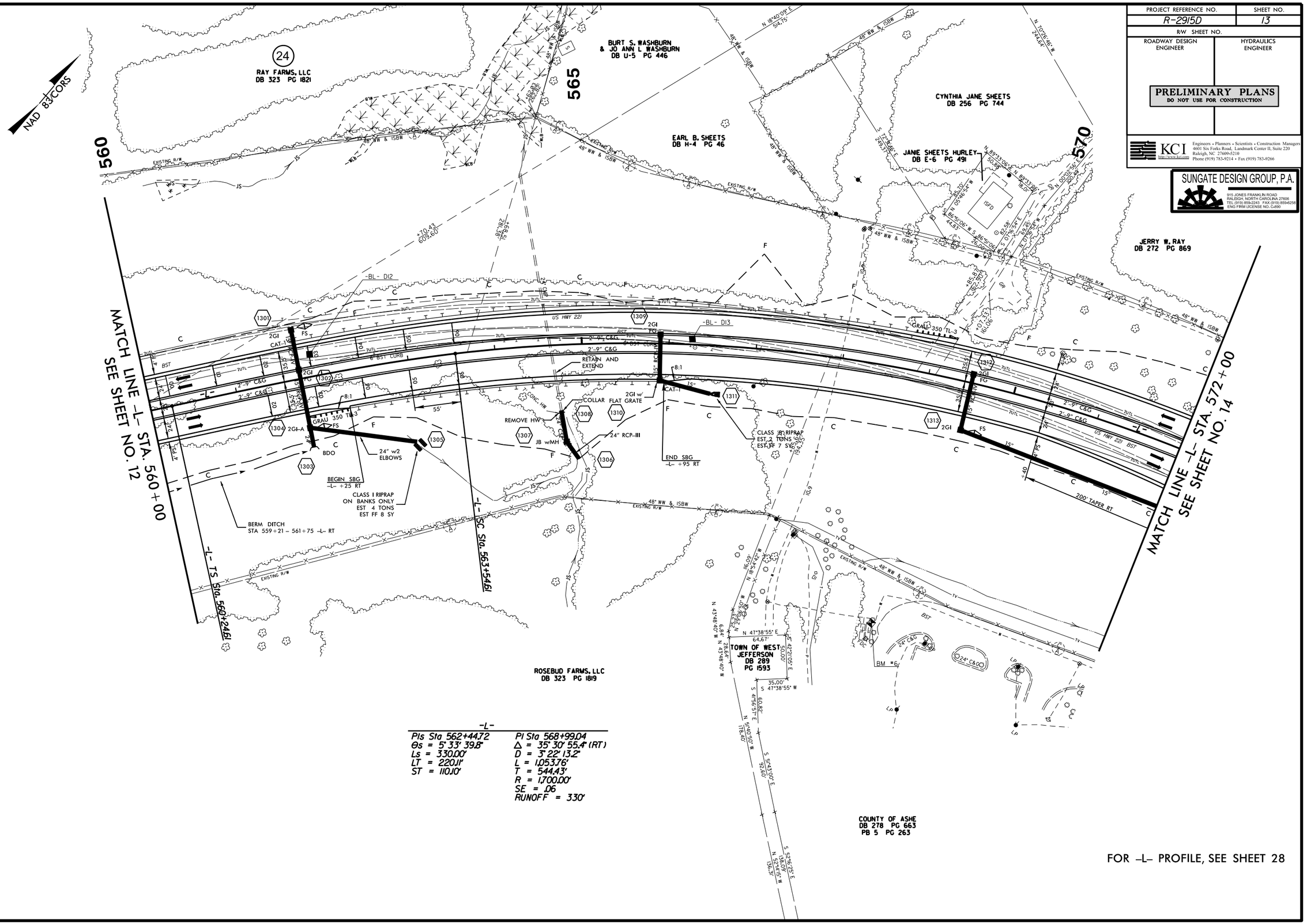
ENG FIRM LICENSE NO. C-690



-L-	
Pls Sta 562+44.72	PI Sta 568+99.04
Θs = 5°33' 39.8"	Δ = 35°30' 55.4" (RT)
Ls = 330.00'	D = 3°22' 13.2"
LT = 220.01'	L = 1,053.76'
ST = 110.10'	T = 544.43'
	R = 1,700.00'
	SE = .06
	RUNOFF = 330'

REVISIONS

8/17/99

29-JUL-2013 11:29
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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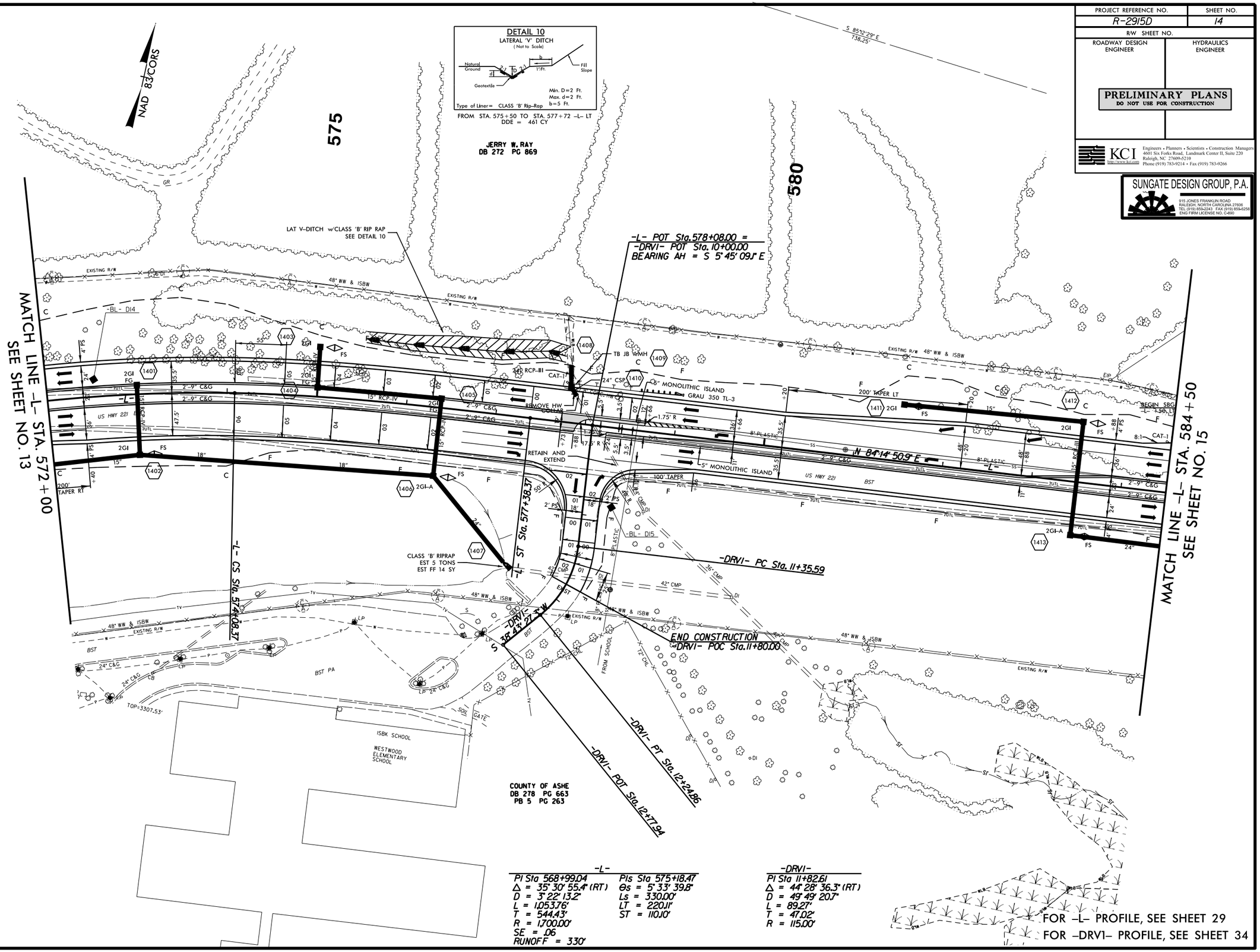

FOR -L- PROFILE, SEE SHEET 29
FOR -DRV1- PROFILE, SEE SHEET 34

REVISIONS

8/17/99

29-JUL-2013 11:29
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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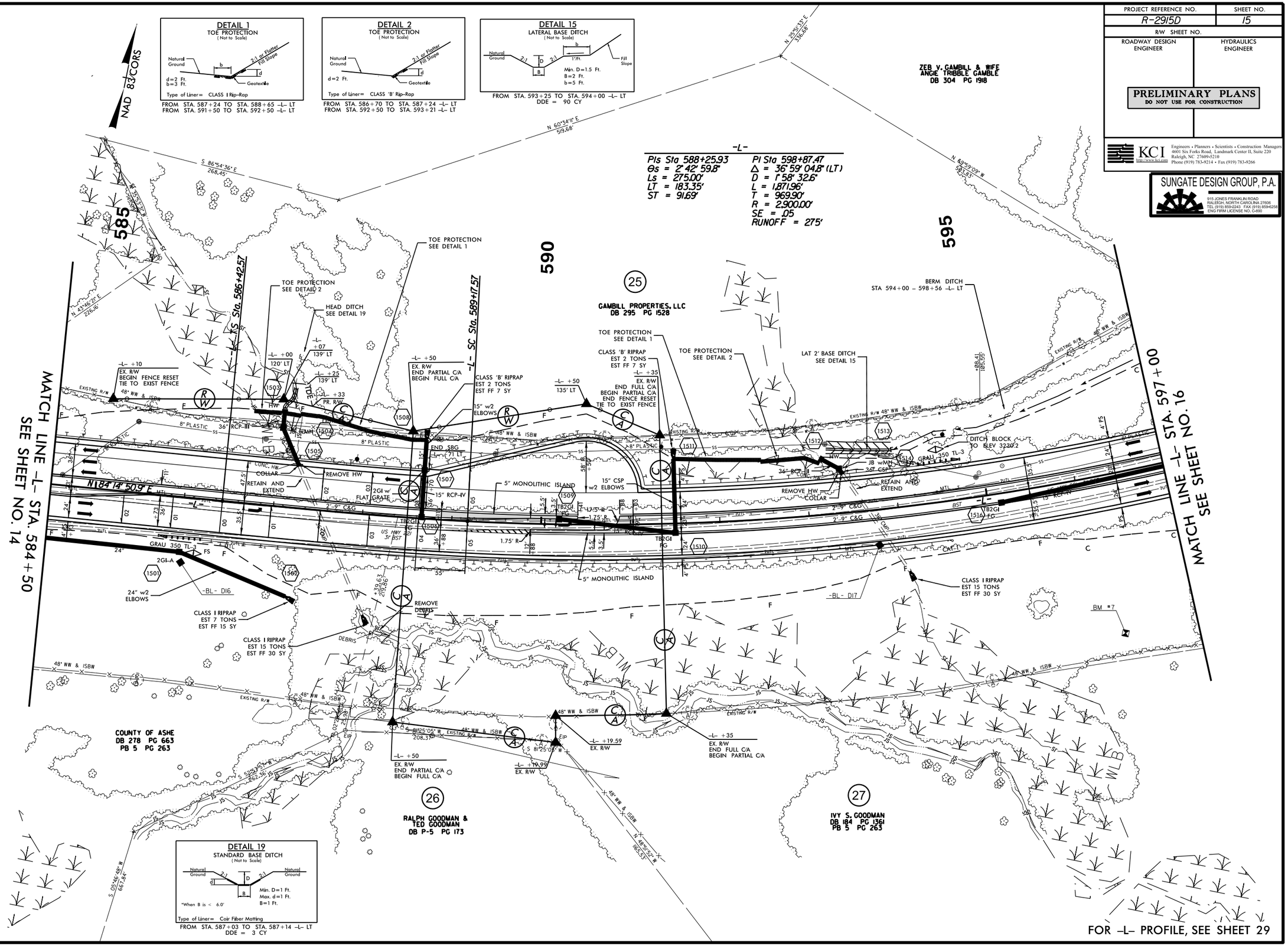

FOR -L- PROFILE, SEE SHEET 29

REVISIONS

01/09/14 – R/W REVISION: REVISED TOE AT -L- STA. 587+33 LT ON PARCEL 25. – TLW

8/17/99

10-JAN-2014 18:17
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
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915 JONES FRANKLIN ROAD
RALEIGH, NORTH CAROLINA 27606
TEL (919) 859-2243 FAX (919) 859-6258
ENG FIRM LICENSE NO. C-690

NAD 83/CORS

-L-
PI Sta 598+87.47
Δ = 36° 59' 04.8" (LT)
D = 1° 58' 32.6"
L = 1,871.96'
T = 969.90'
R = 2,900.00'
SE = .05
RUNOFF = 275'

PIs Sta 608+81.22
Θs = 2° 42' 59.8"
Ls = 275.00'
LT = 183.35'
ST = 91.69'

ZEB V. GAMBILL & WIFE
ANGIE TRIBBLE GAMBLE
DB 304 PG 1918

MARLETTE B. CULLEN (TRUSTEE)
DB 387 PG 379

IVY S. GOODMAN
DB 184 PG 1361
PB 5 PG 263

JERRY WAYNE JONES & WIFE
DONNA H. JONES
DB 280 PG 1632

ROBERT GLENN POE
AND
DEBRA E. POE
DB 131 PG 1332

MATCH LINE -L- STA. 597+00
SEE SHEET NO. 15

MATCH LINE -L- STA. 608+50
SEE SHEET NO. 17

-L- +25
EX. R/W
END PARTIAL C/A
BEGIN FULL C/A

-L- +00
EX. R/W
END FULL C/A
BEGIN PARTIAL C/A

-L- +33.99
EX. R/W

BERM DITCH
STA 594+00 – 598+56 -L- LT

5" MONOLITHIC ISLAND

CLASS I RIPRAP
ON BANKS ONLY
EST 6 TONS
EST FF 10 SY
30" w/
ELBOW

TOE PROTECTION

TOE PROTECTION
SEE DETAIL 1

US HWY 221

GRAU 350 TL-3

-BL- DI8

-BL- DI9

DETAIL 1
TOE PROTECTION
(Not to Scale)

d=2 Ft.
b=3 Ft.

Type of Liner– CLASS I Rip-Rap

FROM STA. 606+50 TO STA. 610+19 -L- RT

FOR –L– PROFILE, SEE SHEET 30

REVISIONS

8/17/99

29-JUL-2013 11:30
R:\Roadway\Proj\R2915D_Rdy_psh_16.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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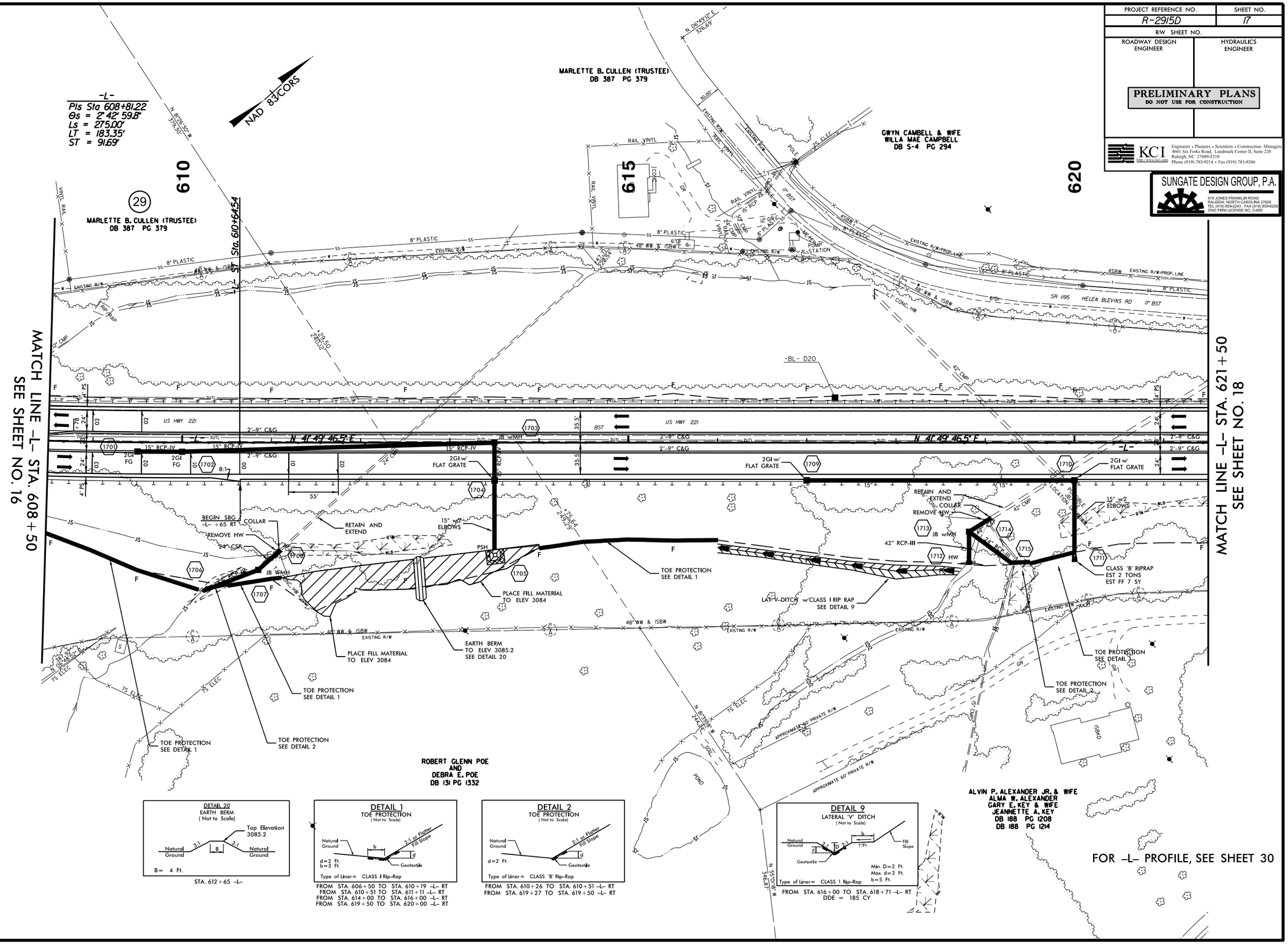

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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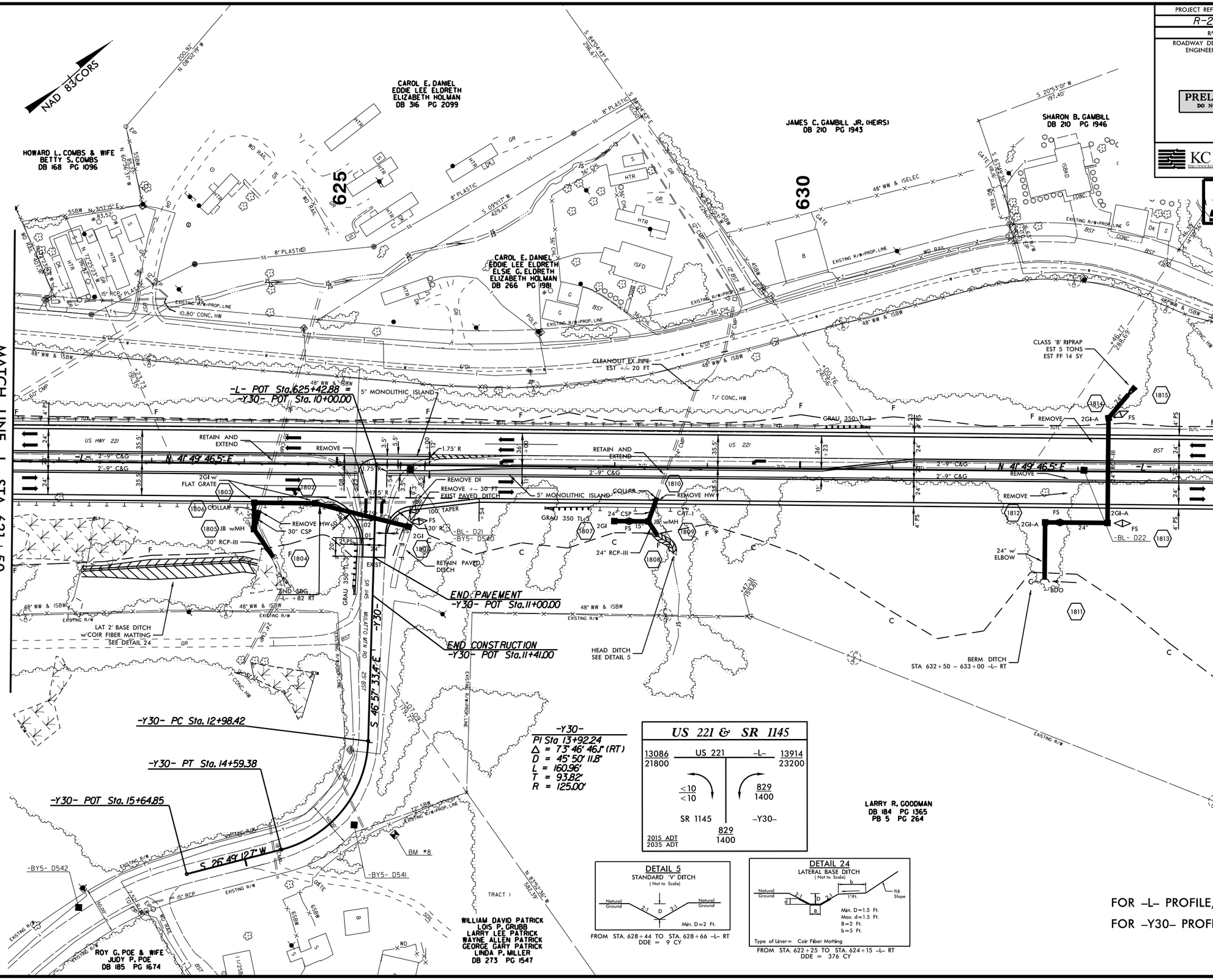

FOR -L- PROFILE, SEE SHEET 31
FOR -Y30- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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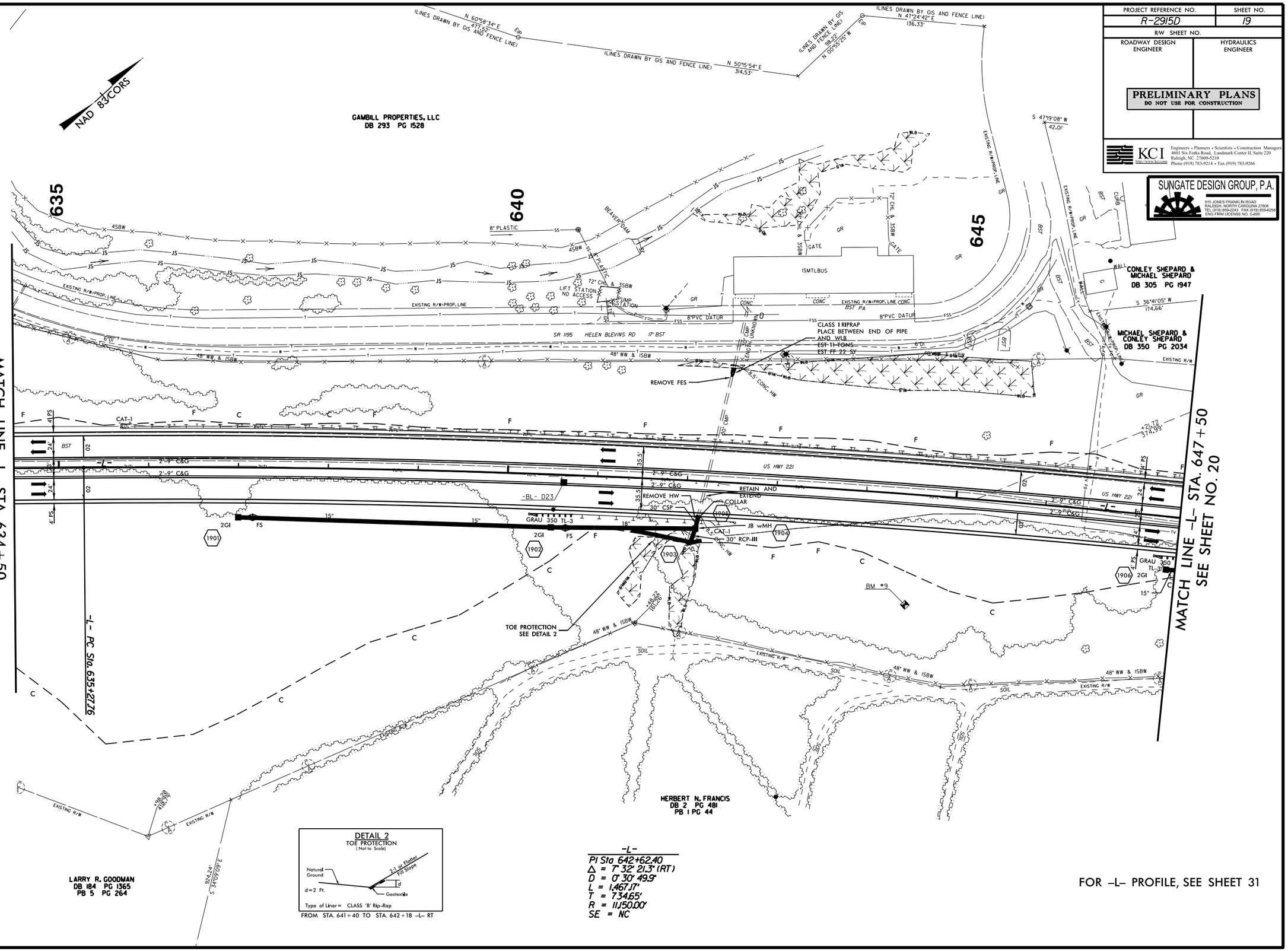

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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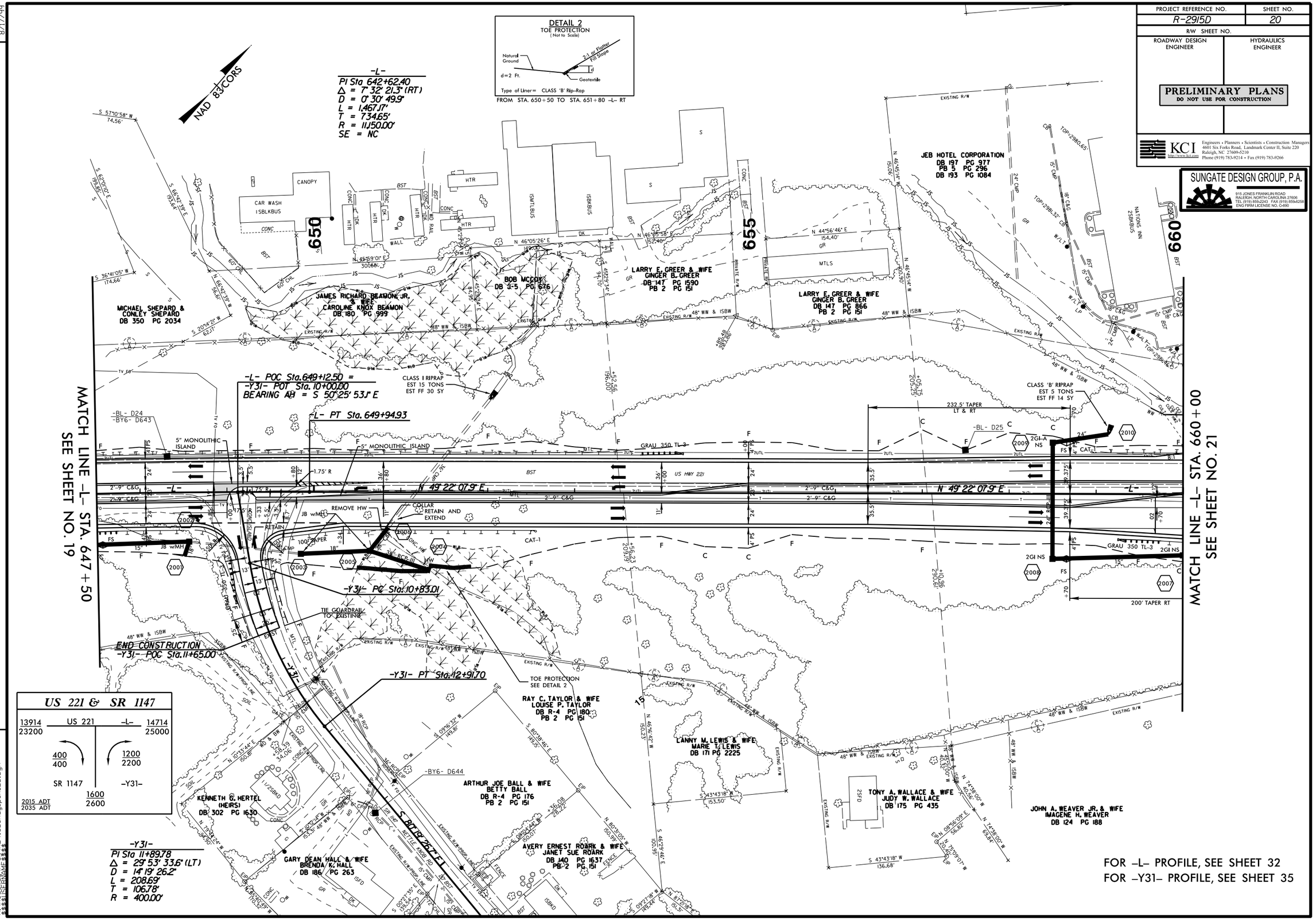
ENG FIRM LICENSE NO. C-965

REVISIONS

8/17/99



FOR -L- PROFILE, SEE SHEET 32
FOR -Y31- PROFILE, SEE SHEET 35

23-JUL-2013 11:30
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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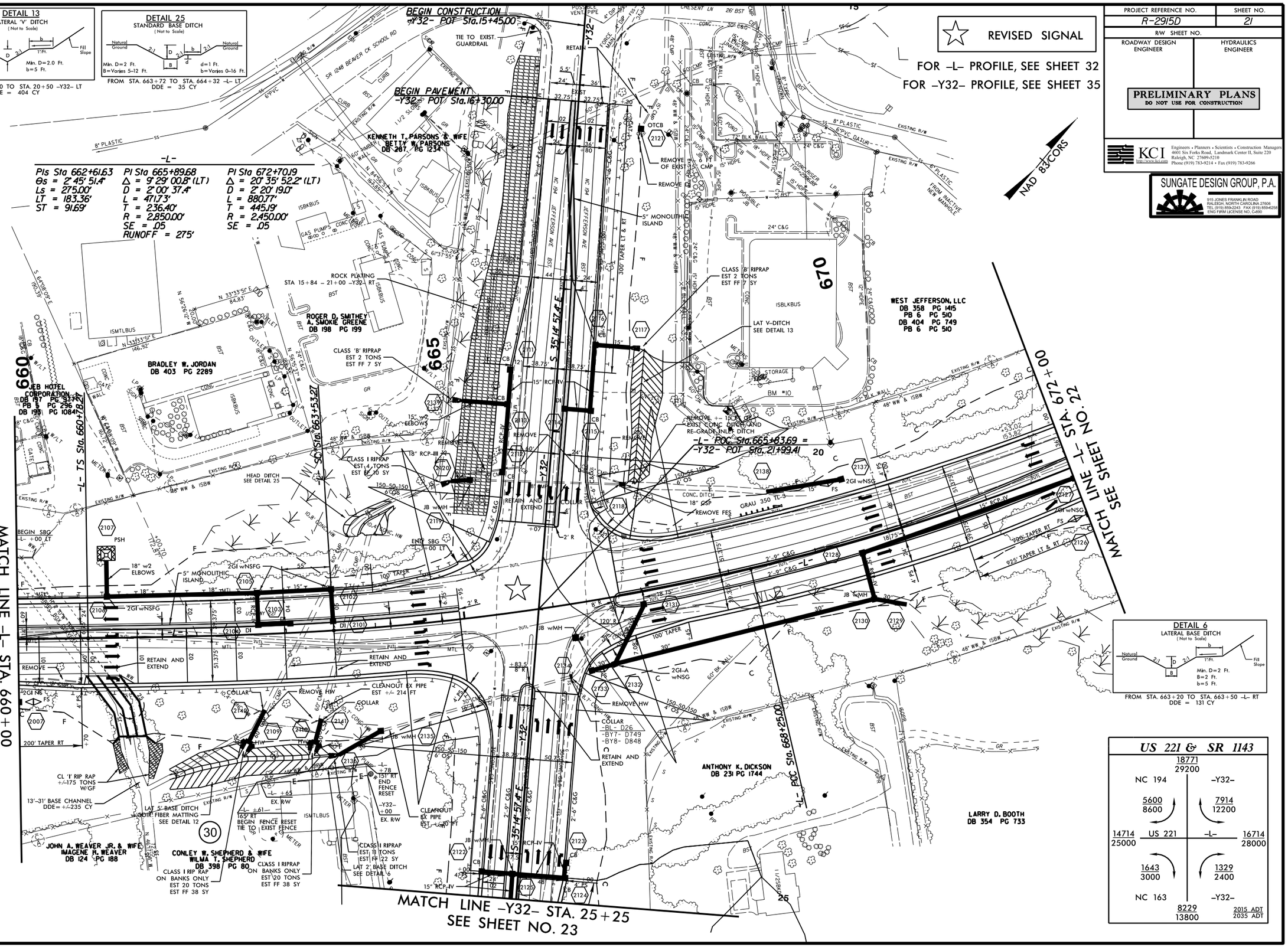
ENG FIRM LICENSE NO. C-690

8/17/99

REVISIONS

022514 – R/W REVISIONS; LOCATED AN ADDITION TO THE EXISTING BUILDING ON PARCEL 30 – PJS



21-FEB-2014 15:28
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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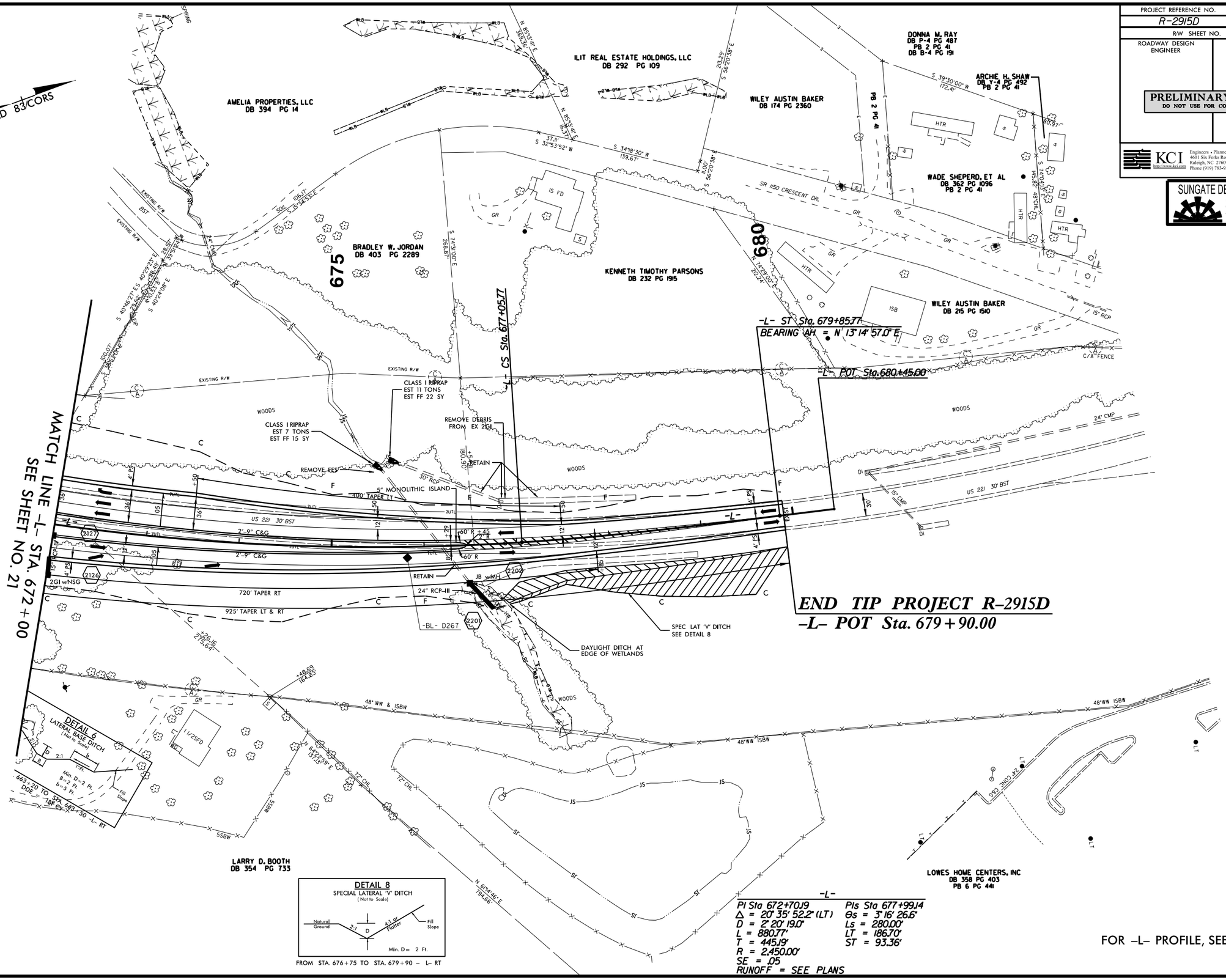

REVISIONS

8/17/99

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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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NAD 83/CORS

-Y32-

PI Sta 29+60.93	PI Sta 34+16.19
Δ = 12° 50' 01.9" (LT)	Δ = 8° 37' 02.5" (LT)
D = 2° 43' 42.1"	D = 2° 17' 30.6"
L = 470.39'	L = 376.00'
T = 236.18'	T = 188.36'
R = 2,100.00'	R = 2,500.00'

MATCH LINE -Y32- STA. 25+25
SEE SHEET NO. 21

G. MICHAEL BURGESS & WIFE
MARY P. BURGESS
DB 312 PG 675

GEORGE A. BURGESS & WIFE
RUTH A. BURGESS
DB H-4 PG 56

ANN G. HENDRIX
SANDRA G. MCNEILL
KATHY G. MCNEILL
DB T-4 PG 217

KATRINA V. MILLER
DB C-3 PG 323

CONLEY W. SHEPHERD & WIFE
WILMA T. SHEPHERD
DB 398 PG 80

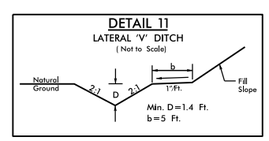
RALPH DAVIS
DB 364 PG 526

END CONSTRUCTION
-Y32- POC Sta. 29+90.00

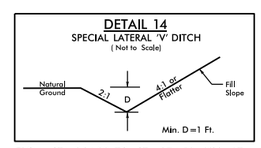
-Y32- PC Sta. 27+24.74
-Y32- PT Sta. 31+95.13
-Y32- PC Sta. 32+27.83
-Y32- PT Sta. 36+03.83
-Y32- POT Sta. 36+62.52

S 56°42'01.7" E
S 48°04'59.2" E

NC HWY 163
EXISTING R/W
SPEC LAT V-DITCH SEE DETAIL 14
REVISE SS TO KEEP EXIST DITCH
CLASS 'B' RIPRAP EST 2 TONS EST 7 SY
340' TAPER LT & RT
150' TAPER LT
GRAU 350 TL-3
LAT V-DITCH SEE DETAIL 11
MTL STORAGE
CLASS I RIP RAP EST 49 TONS EST FF 75 SY



FROM STA. 27+50 TO STA. 28+87 -Y32- RT
DDE = 24 CY



FROM STA. 26+00 TO STA. 27+50 -Y32- LT

FOR -Y32- PROFILE, SEE SHEET 35

REVISIONS

8/17/99

29-JUL-2013 11:30
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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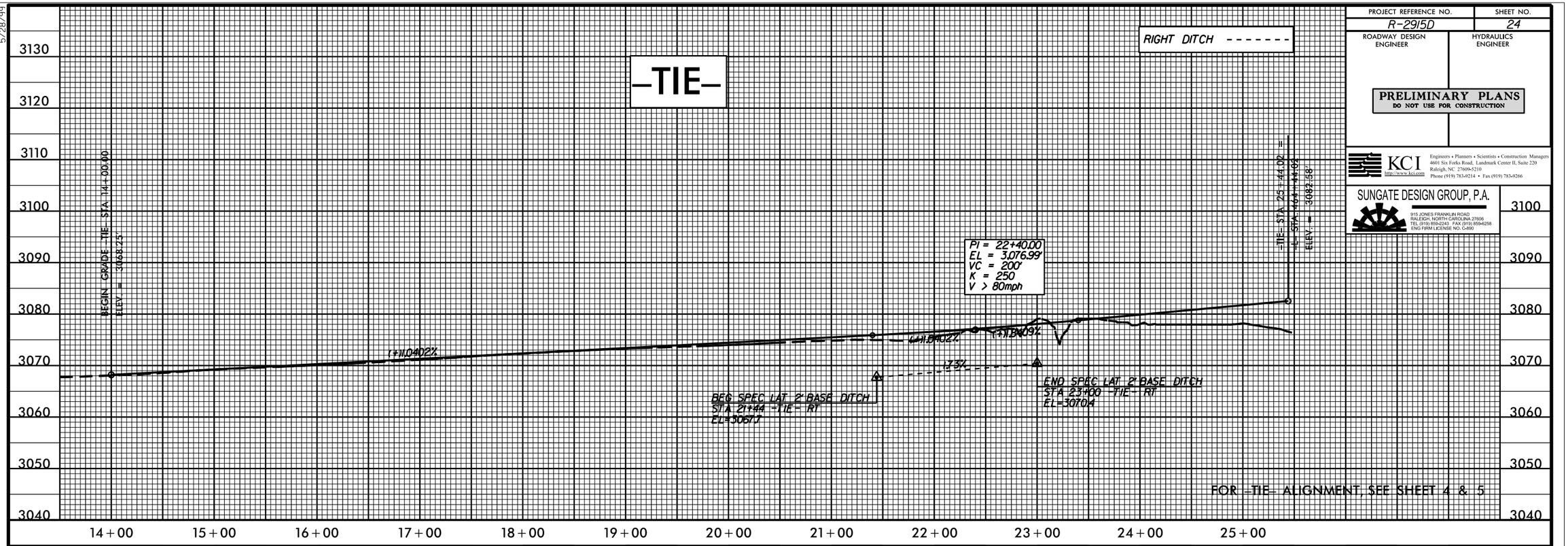

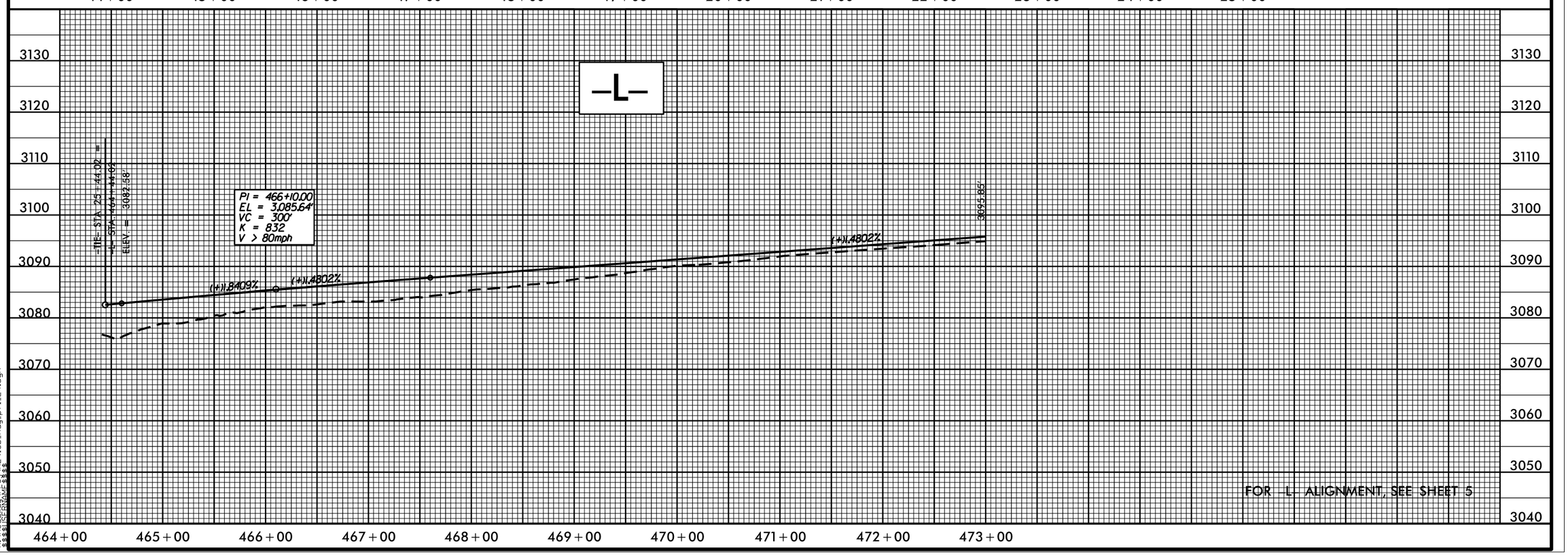

5/28/99

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5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	25
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LEFT DITCH — - - — -

RIGHT DITCH - - - - - - -

BM #1 – TOP CENTER OF CONC. R/W MON. IN NW CORNER OF INTERSECTION OF EARNEST HOWELL RD SR 1263 & BALDWIN RD SR 1248
ELEV. = 3102.49'

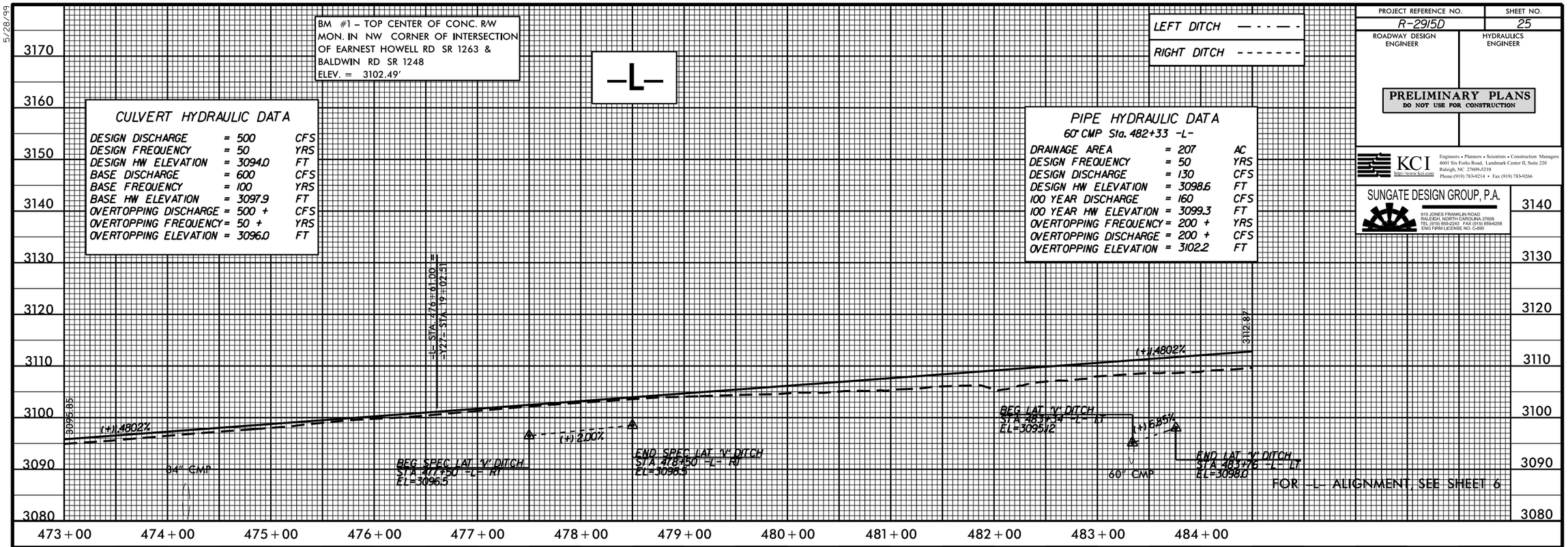
CULVERT HYDRAULIC DATA

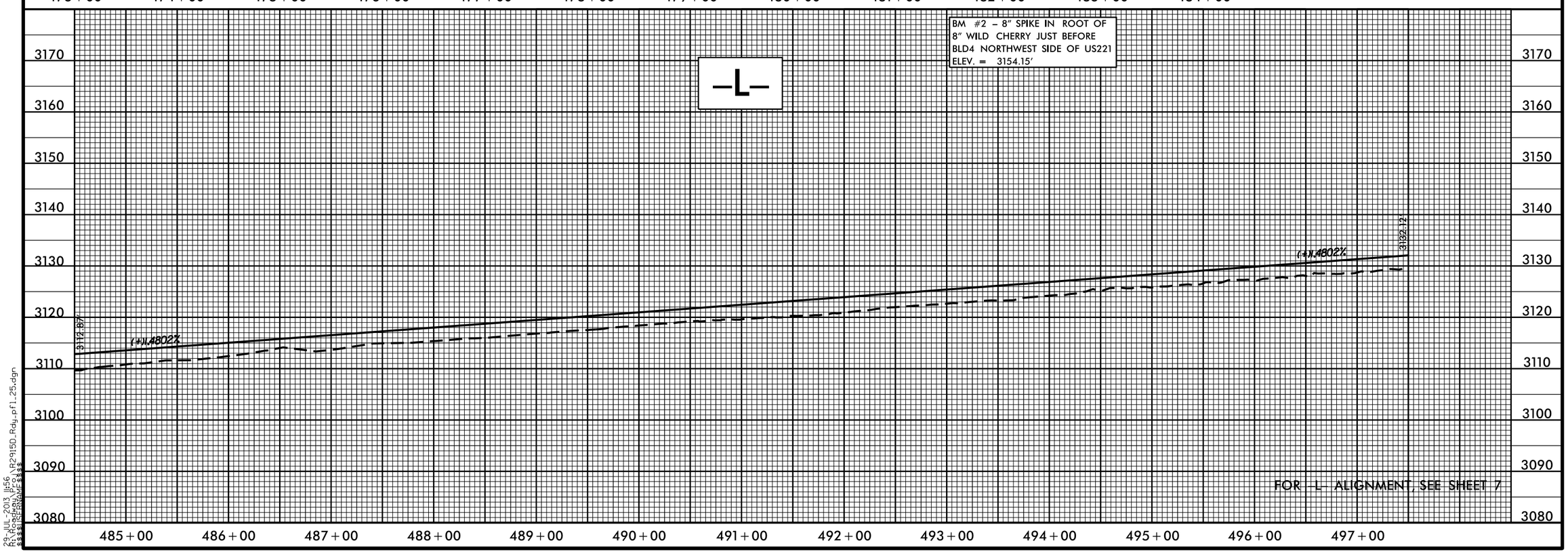
DESIGN DISCHARGE	= 500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 3094.0	FT
BASE DISCHARGE	= 600	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 3097.9	FT
OVERTOPPING DISCHARGE	= 500 +	CFS
OVERTOPPING FREQUENCY	= 50 +	YRS
OVERTOPPING ELEVATION	= 3096.0	FT

PIPE HYDRAULIC DATA

60" CMP Sta. 482+33 -L-

DRAINAGE AREA	= 207	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 130	CFS
DESIGN HW ELEVATION	= 3098.6	FT
100 YEAR DISCHARGE	= 160	CFS
100 YEAR HW ELEVATION	= 3099.3	FT
OVERTOPPING FREQUENCY	= 200 +	YRS
OVERTOPPING DISCHARGE	= 200 +	CFS
OVERTOPPING ELEVATION	= 3102.2	FT





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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -

-L-

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 800	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 3134.8	FT
BASE DISCHARGE	= 950	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 3137.0	FT
OVERTOPPING DISCHARGE	= 950 +	CFS
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING ELEVATION	= 3138.5	FT

PI = 503+65.00
EL = 3141.22'
VC = 1100'
K = 454
V > 80mph

3132.12'
(+)1.4802%
(+)3.9055%
3164.07'
(+)1.4802%
(-)0.65%
(-)5.42%
(+)3.9055%
BEG LAT 'V' DITCH
STA 502+50 -L- LT
EL=3139.55
END LAT 'V' DITCH
STA 503+50 -L- LT
EL=3135.59
2 @ 84" CMP
END LAT 'V' DITCH
STA 505+35 -L- LT
EL=3125.87

FOR -L- ALIGNMENT, SEE SHEET 8

3200 3190 3180 3170 3160 3150 3140 3130 3120 3110

498+00 499+00 500+00 501+00 502+00 503+00 504+00 505+00 506+00 507+00 508+00 509+00

-L-

BM #3 - 8" PUNCHED HOLE IN BOTTOM MTL STEP
OF A 85' MTL POWER POLE #BT 51
NORTHEAST OF CALVIN GOODMAN ROAD
ELEV. = 3209.47'

PI = 511+90.00
EL = 3173.44'
VC = 450'
K = 1691
V > 80mph

PI = 517+50.00
EL = 3193.82'
VC = 200'
K = 723
V > 80mph

3164.07'
(+)3.9055%
(+)3.6393%
(+)4.85%
(+)3.6393%
(+)3.9160%
3208.61'
-L- STA. 512+16.00 Lt =
-Y28- STA. 18+18.71
-L- STA. 513+89.00 Rt =
-Y29- STA. 110+86.90
BEG SPEC LAT 'V' DITCH
STA 514+38
-L- RT
EL = 3177.45
END SPEC LAT 'V' DITCH
STA 516+00
-L- RT
EL = 3182.29

FOR -L- ALIGNMENT, SEE SHEET 9

3230 3220 3210 3200 3190 3180 3170 3160 3150 3140

510+00 511+00 512+00 513+00 514+00 515+00 516+00 517+00 518+00 519+00 520+00

5/28/99

29-JUL-2013 11:56
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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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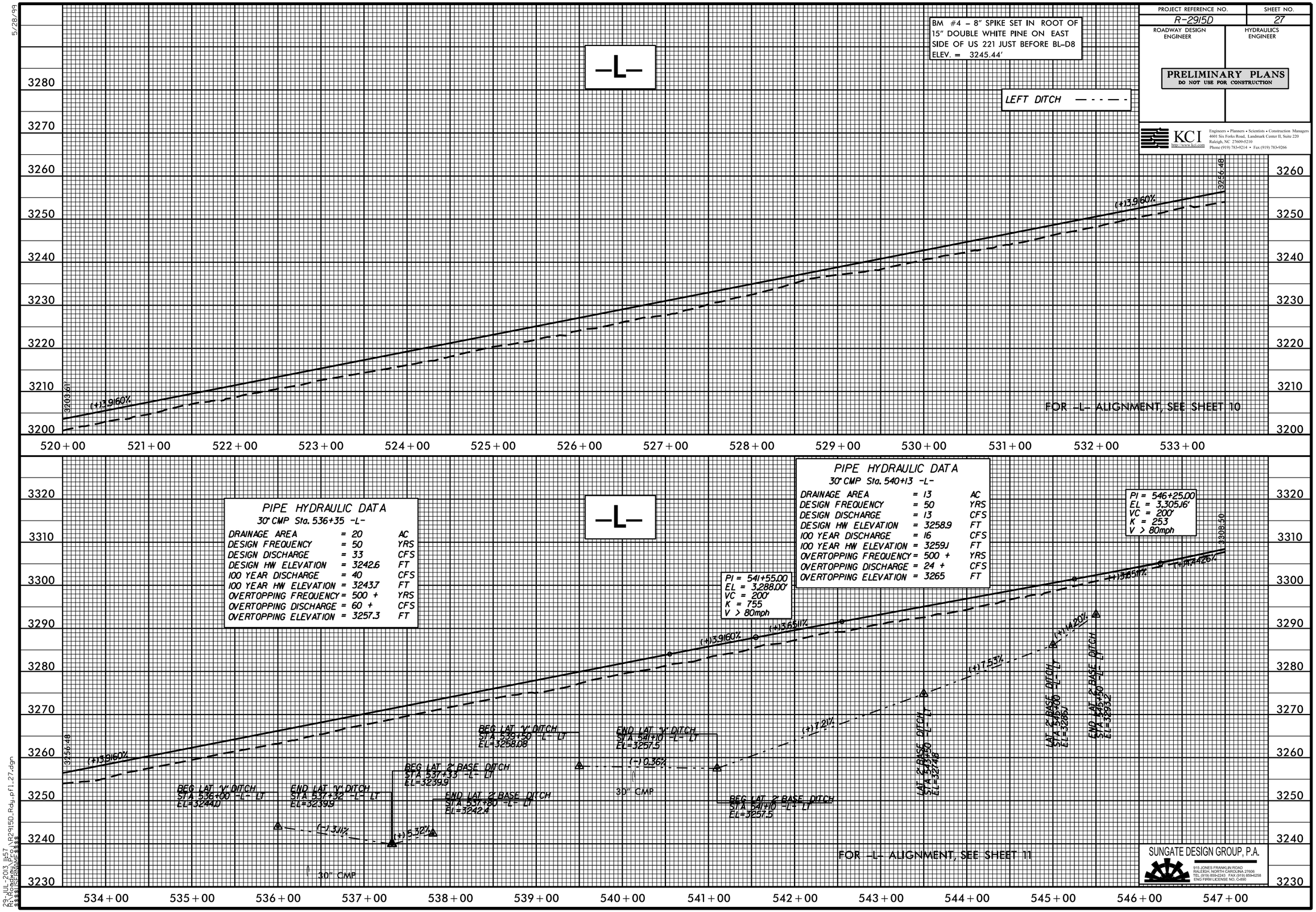
BM #4 – 8" SPIKE SET IN ROOT OF 15" DOUBLE WHITE PINE ON EAST SIDE OF US 221 JUST BEFORE BL-D8 ELEV. = 3245.44'



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5/28/99

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	28
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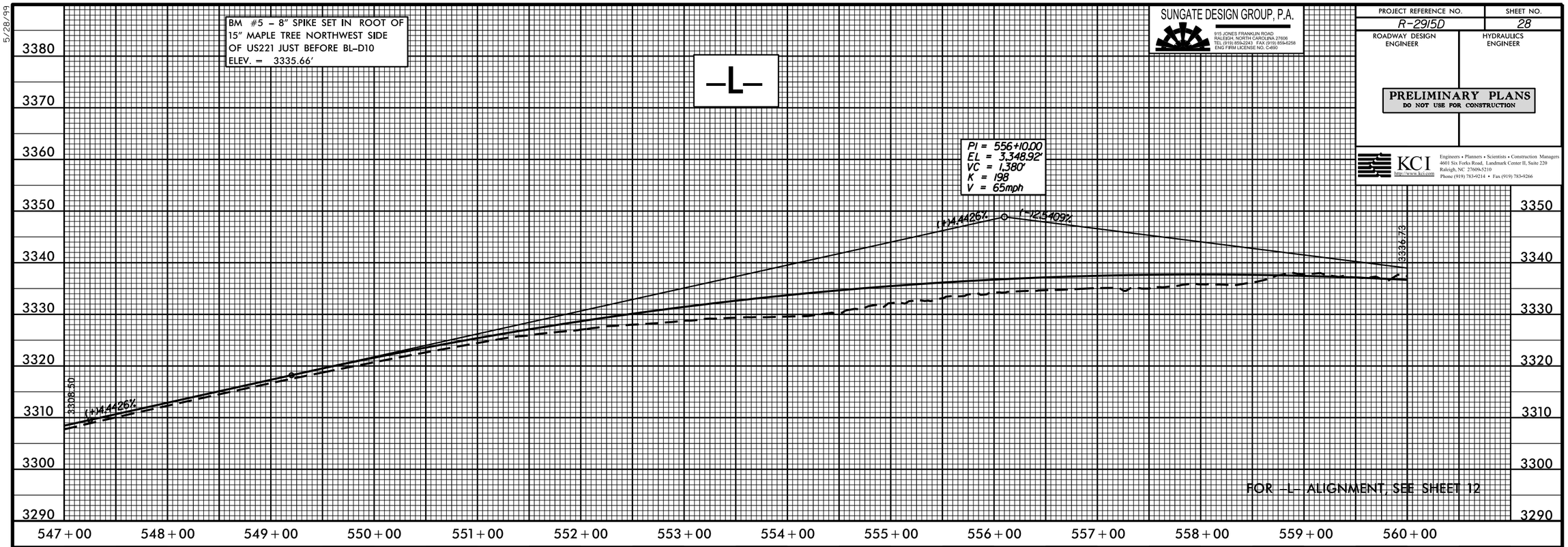

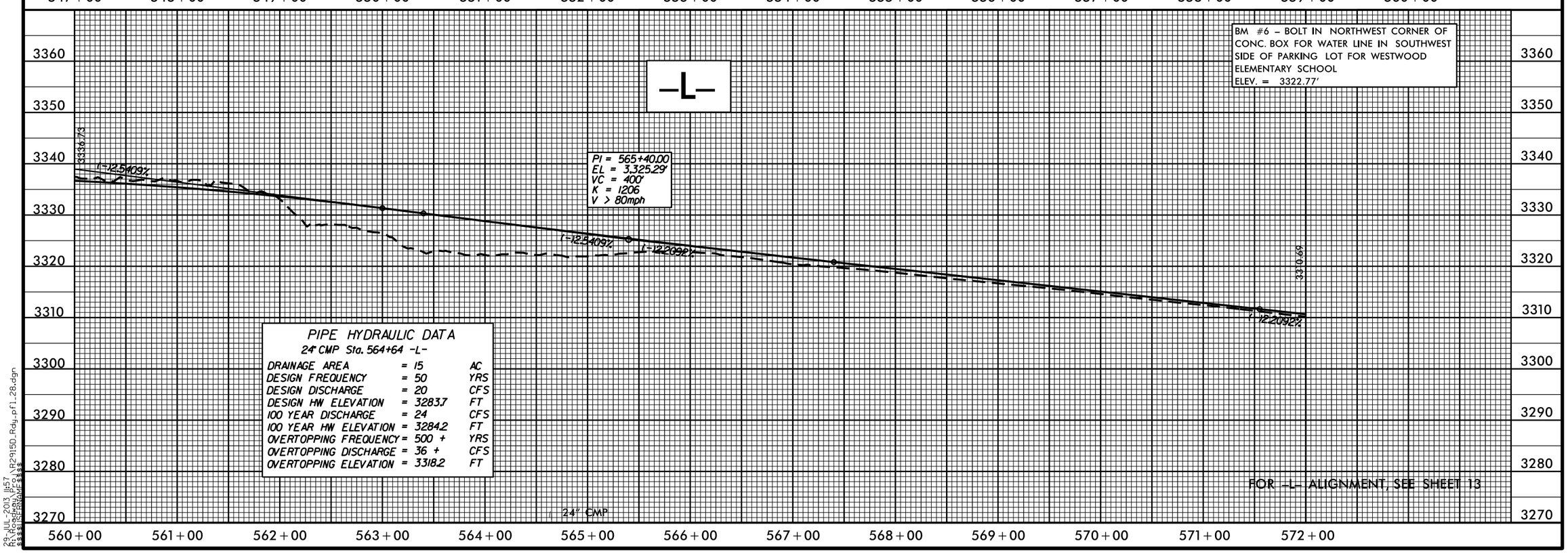

PIPE HYDRAULIC DATA
24" CMP Sta. 564+64 -L-

DRAINAGE AREA	= 15	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 20	CFS
DESIGN HW ELEVATION	= 3283.7	FT
100 YEAR DISCHARGE	= 24	CFS
100 YEAR HW ELEVATION	= 3284.2	FT
OVERTOPPING FREQUENCY	= 500 +	YRS
OVERTOPPING DISCHARGE	= 36 +	CFS
OVERTOPPING ELEVATION	= 3318.2	FT

29-JUL-2013 11:57
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2915D	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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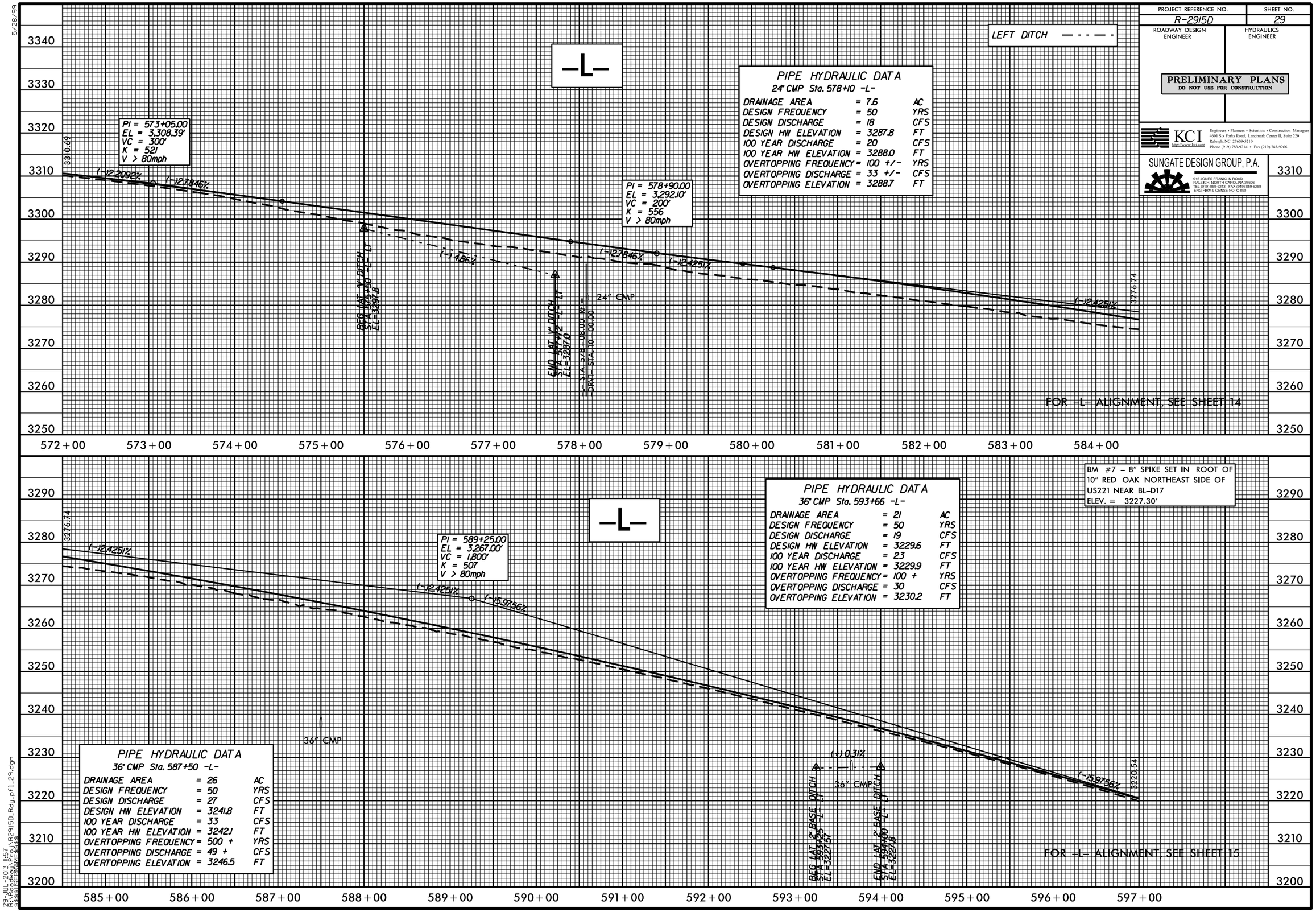

PIPE HYDRAULIC DATA
24" CMP Sta. 578+10 -L-

DRAINAGE AREA	= 7.6	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 18	CFS
DESIGN HW ELEVATION	= 3287.8	FT
100 YEAR DISCHARGE	= 20	CFS
100 YEAR HW ELEVATION	= 3288.0	FT
OVERTOPPING FREQUENCY	= 100 +/-	YRS
OVERTOPPING DISCHARGE	= 33 +/-	CFS
OVERTOPPING ELEVATION	= 3288.7	FT

PIPE HYDRAULIC DATA
36" CMP Sta. 587+50 -L-

DRAINAGE AREA	= 26	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 27	CFS
DESIGN HW ELEVATION	= 3241.8	FT
100 YEAR DISCHARGE	= 33	CFS
100 YEAR HW ELEVATION	= 3242.1	FT
OVERTOPPING FREQUENCY	= 500 +	YRS
OVERTOPPING DISCHARGE	= 49 +	CFS
OVERTOPPING ELEVATION	= 3246.5	FT

PIPE HYDRAULIC DATA
36" CMP Sta. 593+66 -L-

DRAINAGE AREA	= 21	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 19	CFS
DESIGN HW ELEVATION	= 3229.6	FT
100 YEAR DISCHARGE	= 23	CFS
100 YEAR HW ELEVATION	= 3229.9	FT
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING DISCHARGE	= 30	CFS
OVERTOPPING ELEVATION	= 3230.2	FT

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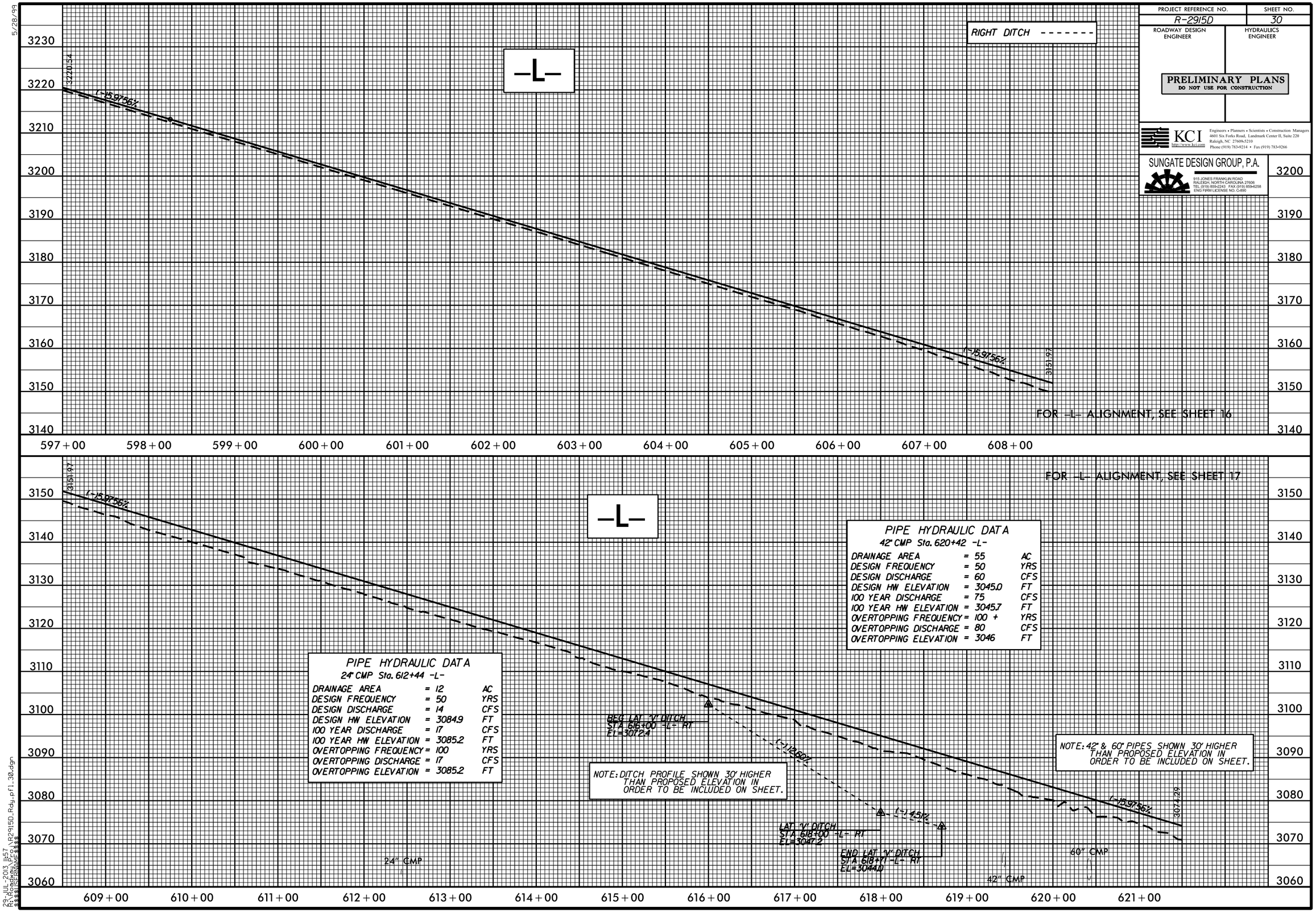

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	31
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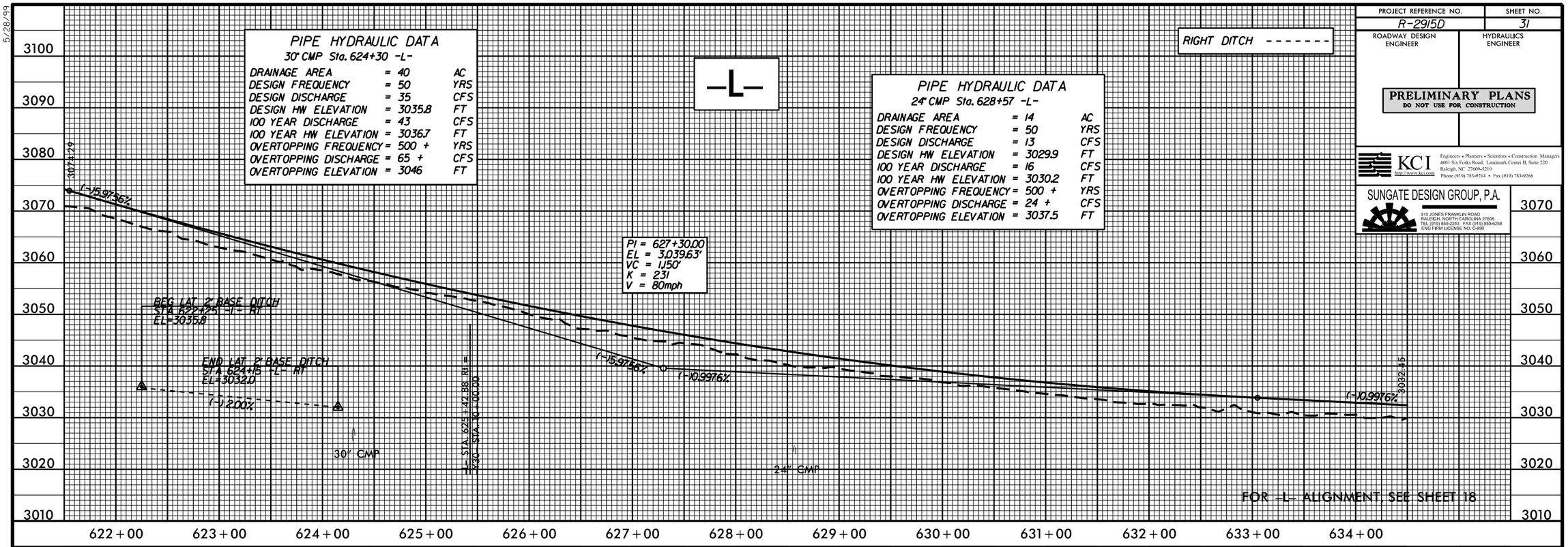

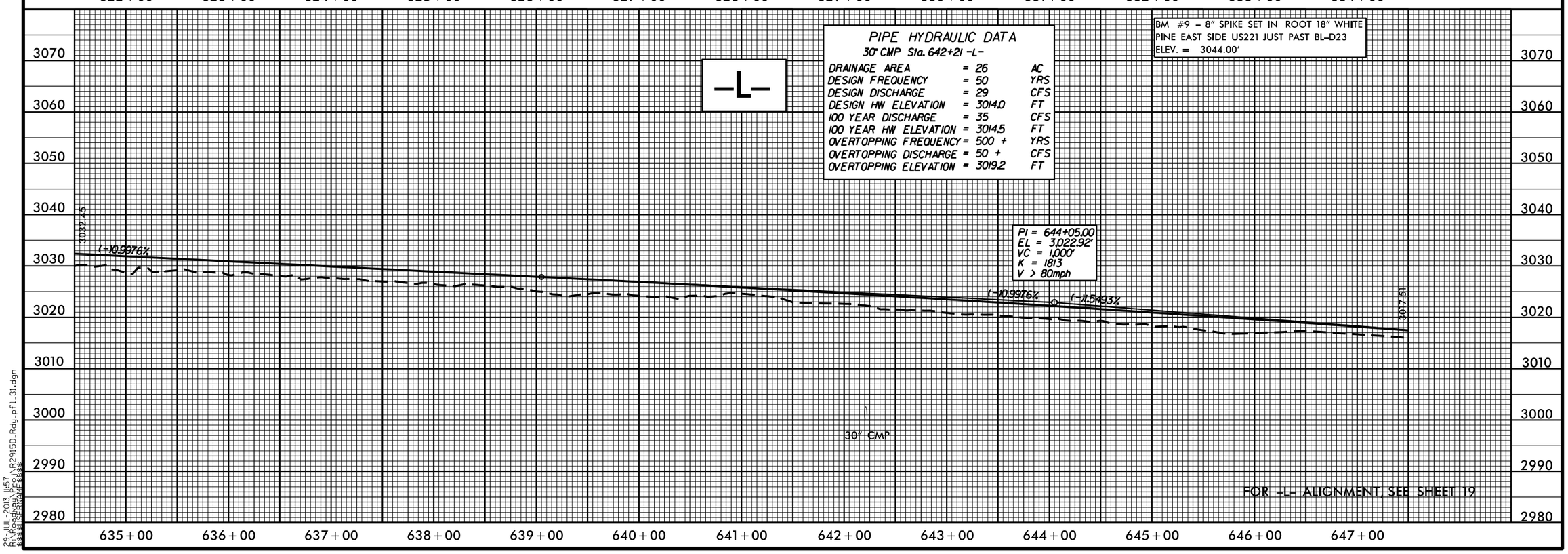

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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	32
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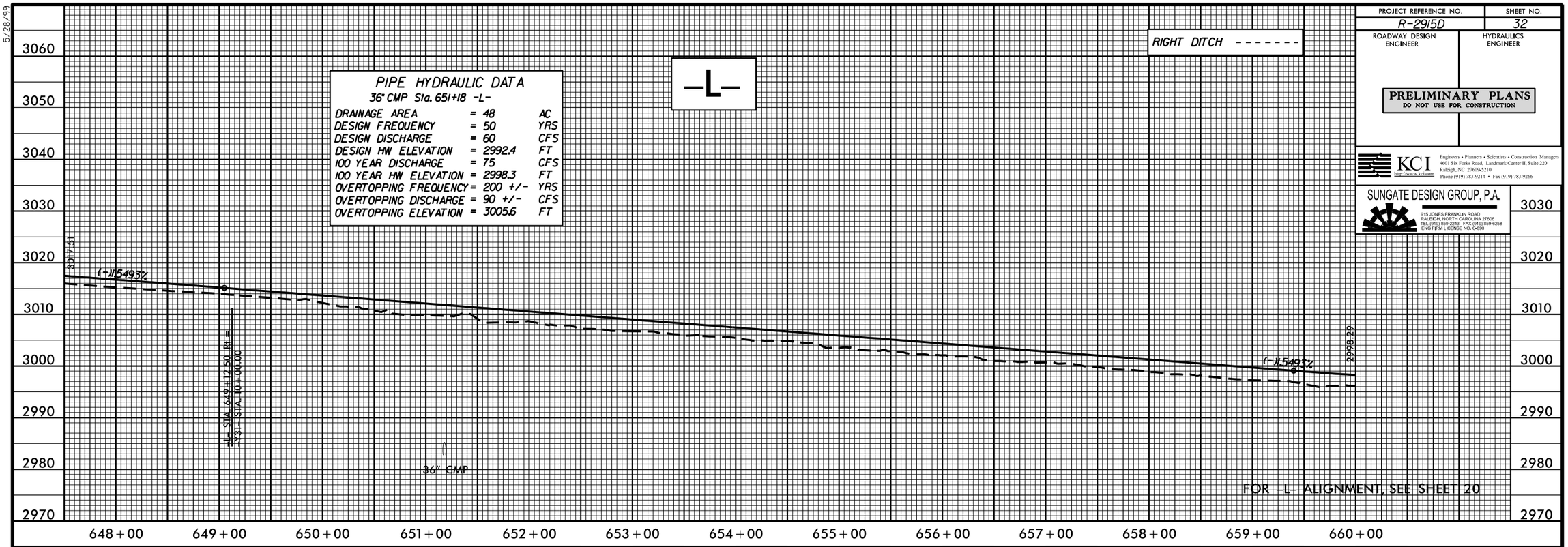
RIGHT DITCH - - - - - - -

PIPE HYDRAULIC DATA
36" CMP Sta. 651+18 -L-

DRAINAGE AREA	= 48	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 60	CFS
DESIGN HW ELEVATION	= 2992.4	FT
100 YEAR DISCHARGE	= 75	CFS
100 YEAR HW ELEVATION	= 2998.3	FT
OVERTOPPING FREQUENCY	= 200 +/-	YRS
OVERTOPPING DISCHARGE	= 90 +/-	CFS
OVERTOPPING ELEVATION	= 3005.6	FT



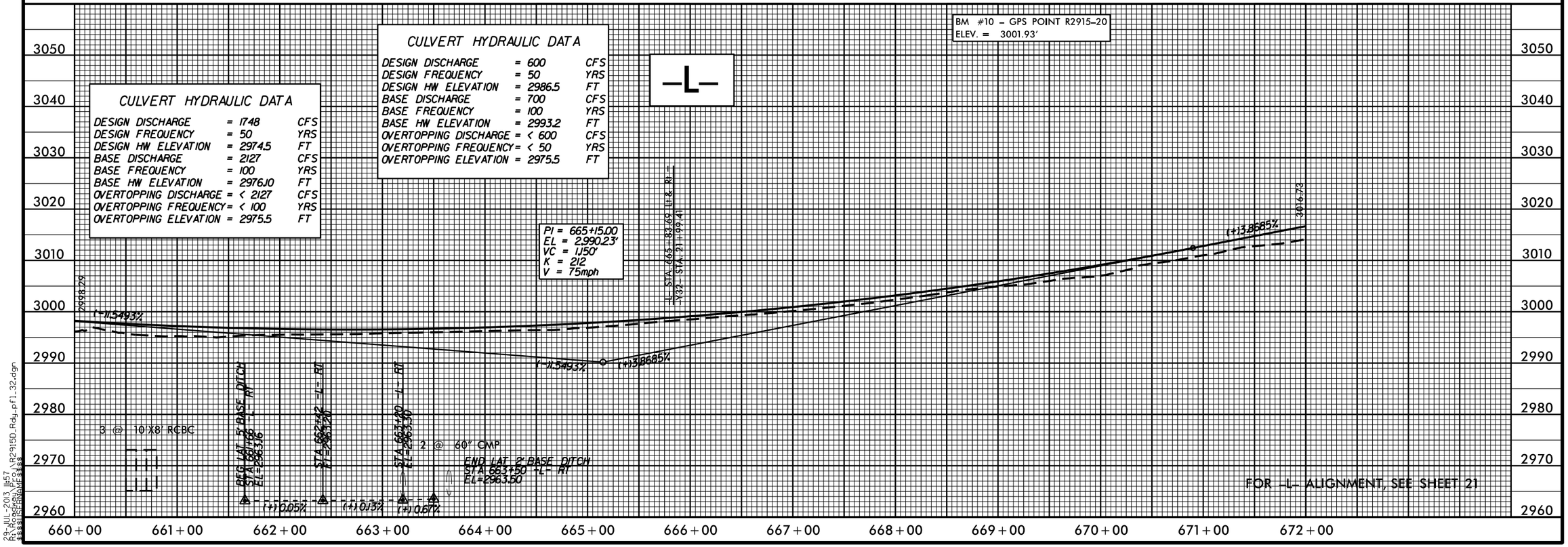
CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 1748	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2974.5	FT
BASE DISCHARGE	= 2127	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2976.0	FT
OVERTOPPING DISCHARGE	= < 2127	CFS
OVERTOPPING FREQUENCY	= < 100	YRS
OVERTOPPING ELEVATION	= 2975.5	FT

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	= 600	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2986.5	FT
BASE DISCHARGE	= 700	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2993.2	FT
OVERTOPPING DISCHARGE	= < 600	CFS
OVERTOPPING FREQUENCY	= < 50	YRS
OVERTOPPING ELEVATION	= 2975.5	FT

BM #10 - GPS POINT R2915-20
ELEV. = 3001.93'



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PROJECT REFERENCE NO.	SHEET NO.
R-2915D	33
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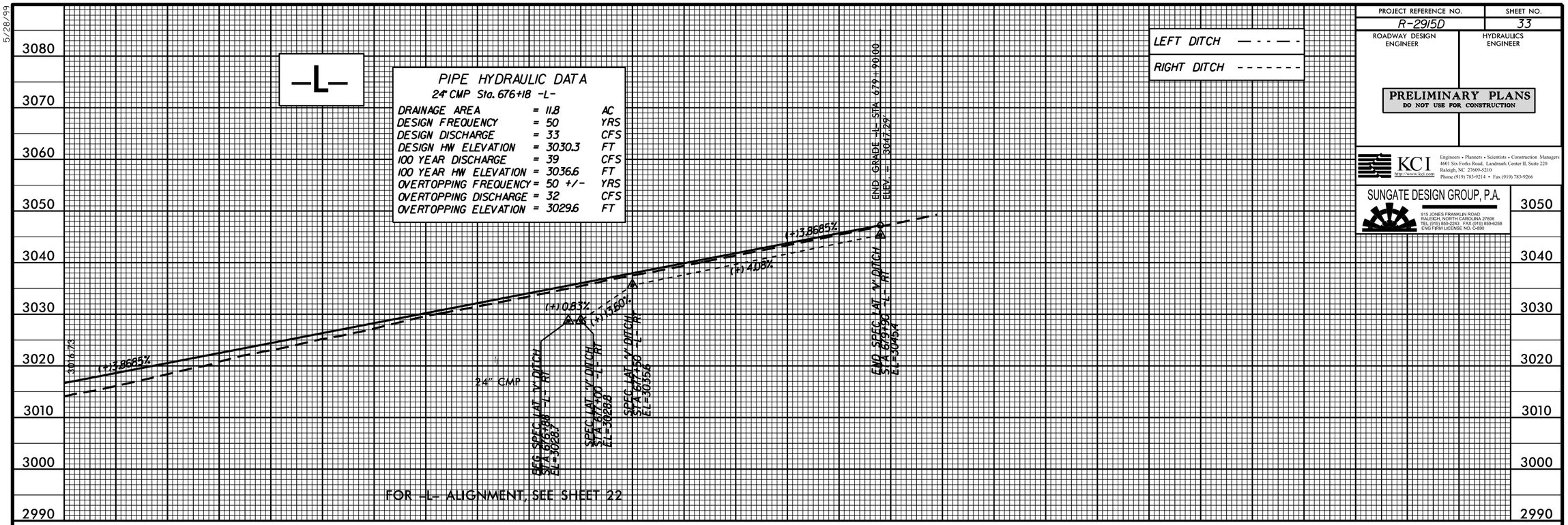
LEFT DITCH — - - — -
RIGHT DITCH - - - - - - -

-L-

PIPE HYDRAULIC DATA
24" CMP Sta. 676+18 -L-

DRAINAGE AREA	=	11.8	AC
DESIGN FREQUENCY	=	50	YRS
DESIGN DISCHARGE	=	33	CFS
DESIGN HW ELEVATION	=	3030.3	FT
100 YEAR DISCHARGE	=	39	CFS
100 YEAR HW ELEVATION	=	3036.6	FT
OVERTOPPING FREQUENCY	=	50 +/-	YRS
OVERTOPPING DISCHARGE	=	32	CFS
OVERTOPPING ELEVATION	=	3029.6	FT



FOR -L- ALIGNMENT, SEE SHEET 22

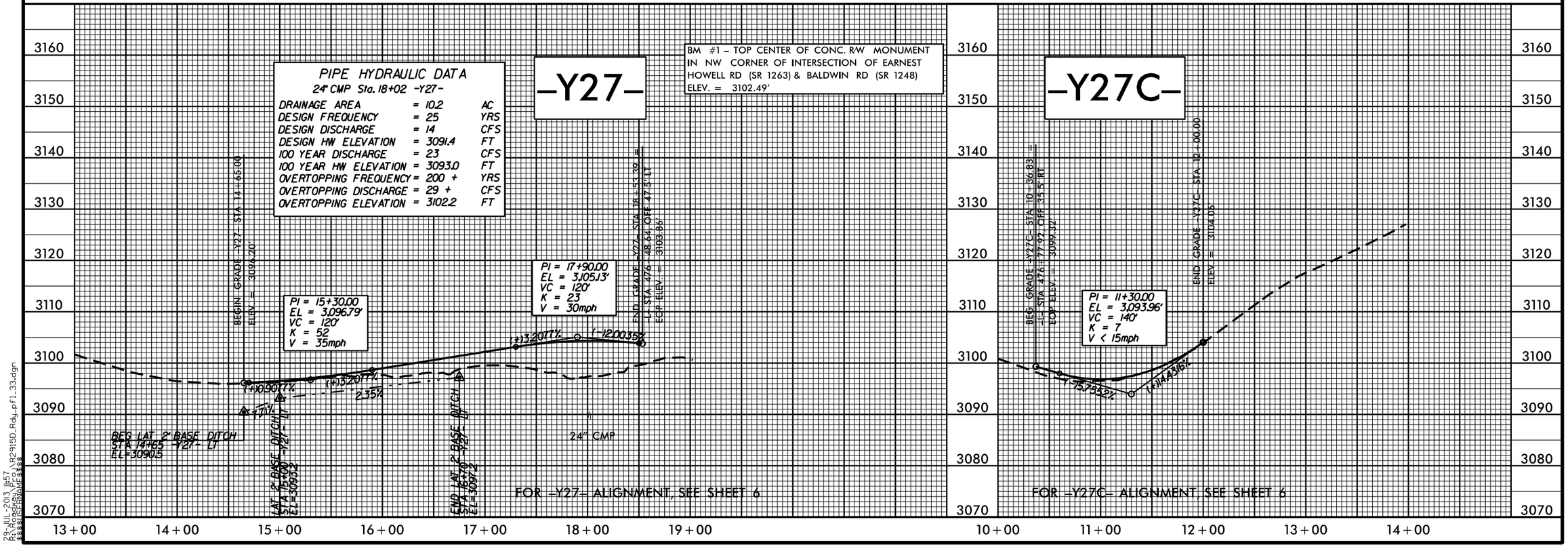
-Y27-

PIPE HYDRAULIC DATA
24" CMP Sta. 18+02 -Y27-

DRAINAGE AREA	=	10.2	AC
DESIGN FREQUENCY	=	25	YRS
DESIGN DISCHARGE	=	14	CFS
DESIGN HW ELEVATION	=	3091.4	FT
100 YEAR DISCHARGE	=	23	CFS
100 YEAR HW ELEVATION	=	3093.0	FT
OVERTOPPING FREQUENCY	=	200 +	YRS
OVERTOPPING DISCHARGE	=	29 +	CFS
OVERTOPPING ELEVATION	=	3102.2	FT

BM #1 – TOP CENTER OF CONC. R/W MONUMENT
IN NW CORNER OF INTERSECTION OF EARNEST
HOWELL RD (SR 1263) & BALDWIN RD (SR 1248)
ELEV. = 3102.49'

-Y27C-



FOR -Y27- ALIGNMENT, SEE SHEET 6

FOR -Y27C- ALIGNMENT, SEE SHEET 6

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R-2915D	34
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–Y27A–

BEG GRADE –Y27A– STA 10+12.00 =
–L– STA 11+04.00 OFF 12.0' LT
EOP ELEV. = 3108.09

END GRADE –Y27A– STA 11+79.00
ELEV. = 3102.45

PI = 10+50.00
EL = 3,104.23'
VC = 70'
K = 12
V = 25mph

PI = 11+30.00
EL = 3,101.93'
VC = 60'
K = 14
V = 15mph

(+)3.0000% (-)2.8750% (+)1.3000%

FOR –Y27A– ALIGNMENT, SEE SHEET 6

–Y27B–

BEGIN GRADE –Y27B– STA 10+90.00
ELEV. = 3107.12

PI = 11+60.00
EL = 3,104.32'
VC = 90'
K = 25
V = 20mph

END GRADE –Y27B– STA 12+83.78 =
–Y27A– STA 10+56.00 OFF 9.0' LT
EOP ELEV. = 3103.96

(-)14.0000% (-)10.3393%

FOR –Y27B– ALIGNMENT, SEE SHEET 6

–Y28–

BEGIN GRADE –Y28– STA 16+15.00
ELEV. = 3163.45

PI = 17+60.00
EL = 3,175.66'
VC = 35'
K = 4
V = 15mph

(-)10.3084% (-)10.3084% (+)8.4201%

END GRADE –Y28– STA 17+82.40 =
–L– STA 5+12+03.97 OFF 355.5' LT
EOP ELEV. = 3175.69'

FOR –Y28– ALIGNMENT, SEE SHEET 9

–Y29–

BEG GRADE –Y29– STA 10+38.93 =
–L– STA 11+86.22 OFF 35.5' RT
EOP ELEV. = 3178.30

END GRADE –Y29– STA 12+69.00
ELEV. = 3171.41'

PI = 11+80.00
EL = 3,171.65'
VC = 150'
K = 32
V = 25mph

(-)14.9663% (-)14.9663% (-)10.3000%

60" CMP

FOR –Y29– ALIGNMENT, SEE SHEET 9

PIPE HYDRAULIC DATA
60" CMP Sta. 12+35 –Y29–

DRAINAGE AREA	= 211	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 210	CFS
DESIGN HW ELEVATION	= 3168.8	FT
100 YEAR DISCHARGE	= 250	CFS
100 YEAR HW ELEVATION	= 3170.8	FT
OVERTOPPING FREQUENCY	= 100 +	YRS
OVERTOPPING DISCHARGE	= 250 +	CFS
OVERTOPPING ELEVATION	= 3172	FT

–DRV1–

BEG GRADE –DRV1– STA 10+47.50 =
–L– STA 5+78+08.00 OFF 47.5' RT
EOP ELEV. = 3298.44'

END GRADE –DRV1– STA 11+88.00
ELEV. = 3294.41'

PI = 11+30.00
EL = 3,291.91'
VC = 100'
K = 15
V = 15mph

(+)8.5375% (+)5.0000%

42" CMP

FOR –DRV1– ALIGNMENT, SEE SHEET 14

PIPE HYDRAULIC DATA
42" CMP Sta. 11+70 –DRV1–

DRAINAGE AREA	= 14	AC
DESIGN FREQUENCY	= 25	YRS
DESIGN DISCHARGE	= 27	CFS
DESIGN HW ELEVATION	= 3288.7	FT
100 YEAR DISCHARGE	= 43	CFS
100 YEAR HW ELEVATION	= 3289.6	FT
OVERTOPPING FREQUENCY	= 500 +	YRS
OVERTOPPING DISCHARGE	= 75 +	CFS
OVERTOPPING ELEVATION	= 3292.6	FT

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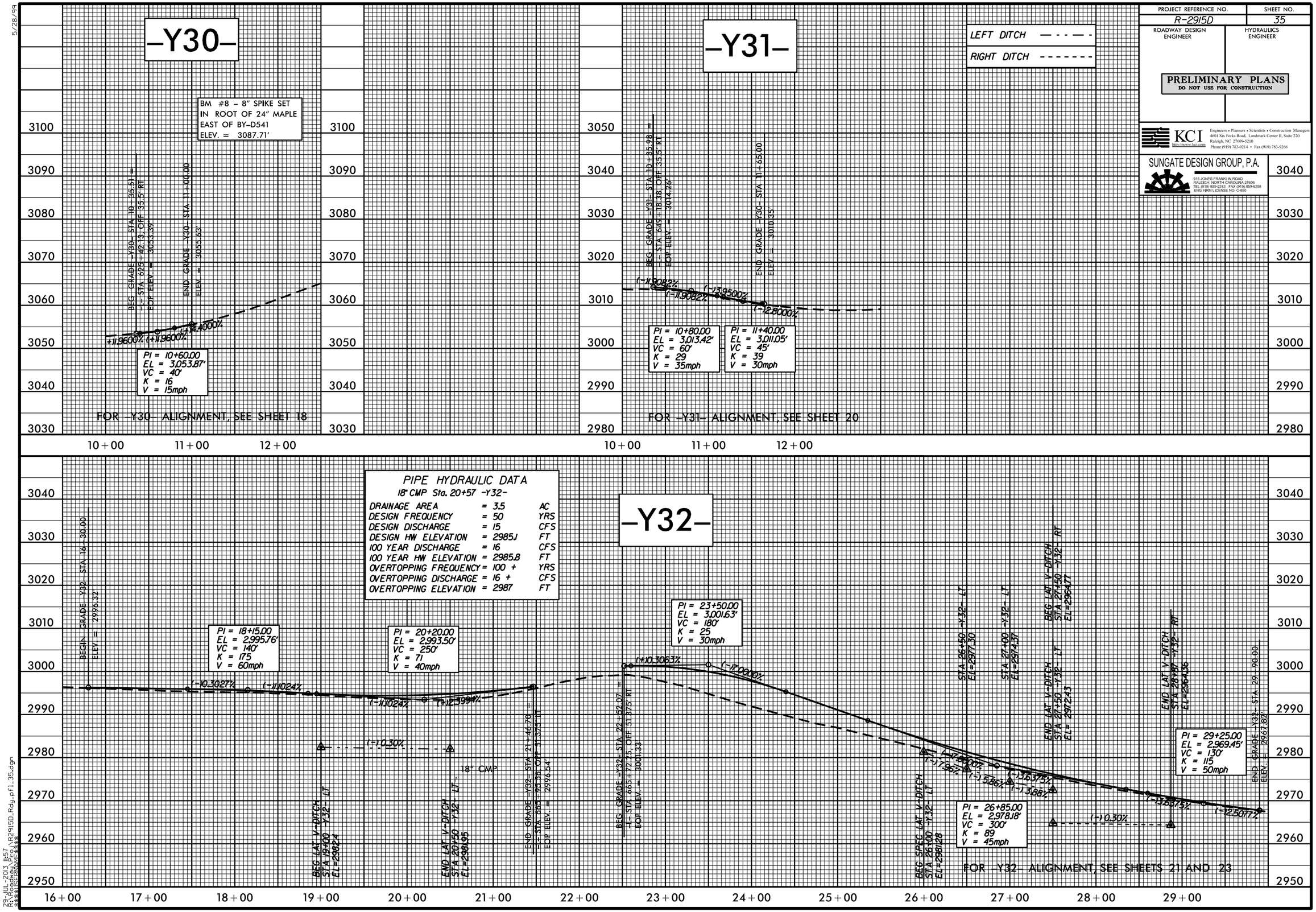

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