STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

PAT L. MCCRORY
GOVERNOR

ANTHONY J. TATA
SECRETARY

July 10, 2013

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

ATTN: Ms. Lori Beckwith
NCDOT Coordinator

Subject: **Application for an Individual Section 404 Permit and Section 401 Water Quality Certification** for the US19E Widening from SR 1186 in Yancey County to multilane section west of Spruce Pine in Mitchell County. State Project No. 6.909001T, Division 13, TIP R-2519B. Debit $570 from WBS Number 35609.1.1

Dear Madam:

The North Carolina Department of Transportation (NCDOT) proposes to improve US 19E in Yancey and Mitchell Counties. The R-2519B project, approximately 7.5 miles in length, will be widening US 19E from two lanes to a multi-lane facility. The project begins at SR 1186 west of Micaville and ends at the existing multilane section west of Spruce Pine.

This application consists of: the cover letter, ENG form 4345, EEP mitigation acceptance letter, interagency hydraulic design review (4B) meeting minutes, South Toe River Bridge hydraulic review, interagency permit drawing review (4C) meeting minutes and actions taken, Right of Way Consultation, NCDWQ Onsite Mitigation Review, Mitigation Plan, Stormwater Management Plan, permit drawings, and half-size roadway plan sheets.

Purpose and Need:
The purpose of the project is to add capacity, correct roadway deficiencies, and provide system linkage along US 19E. The need is based on future capacity limitations and upgrading US 19E as part of the North Carolina Strategic Highway Corridor 10 between Asheville and Boone (I-26, US 19/US 19E, NC 105).

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LOCATION:
CENTURY CENTER, BUILDING B
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610

Summary of Jurisdictional Impacts:
Overall, the project will permanently impact approximately 7,256 linear feet of stream (6813 lf of permanent fill and 443 lf of total bank stabilization) and 0.15 acre of wetlands. The project will temporarily impact 0.52 acre of streams. The project will also impact <0.01 acre of surface water (pond).

Summary of Utility Impacts:
No impacts to jurisdictional resources as a result of utility relocations have been noted.

Summary of Mitigation:
The project has been design to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design process. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Onsite mitigation will yield 2,957 lf of mitigation credit to apply to the total permanent stream impacts for the project. EEP will provide mitigation for 3,788 lf of permanent stream impacts and 0.15 acre of permanent wetland impact. Please refer to the Compensatory Mitigation Section of this Cover Letter for details on impacts and mitigation.

PROJECT SCHEDULE

R-2519B is currently scheduled to Let on February 18, 2014 and Right of Way for the project was obtained on January 27, 2012.

NEPA DOCUMENT STATUS

The State EA for R-2519B was approved July 1, 2005 with the State FONSI being approved July 17, 2009. A Right-of-Way Consultation for the project was signed September 12, 2011.

In compliance with the NEPA/404 Merger Process, Concurrence Point 4B was reached for R-2519B on September 23, 2009 with separate meetings held on June 28, 2011, June 20, 2012 and August 22, 2012 for the South Toe River crossing. Concurrence Point 4C was reached on January 16, 2013.

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 any other reasonable foreseeable transportation improvements.

RESOURCE STATUS

Project R-2519B is located within sub-basin 040306 of the French Broad River Basin Watershed (HUC 06010108). Little Crabtree Creek, Big Crabtree Creek, Long Branch, Brushy Creek, English Creek and Ayles Creek and their tributaries have the North Carolina Division of Water Quality's (NCDWQ) stream classification of C; Tr. The South Toe River is classified as B;Tr, and is designated as an Outstanding Resource Water (ORW).

303 (d) Impaired Waters:
There are no streams from the R-2519B project footprint listed on the North Carolina Department of Environment and Natural Resources (NCDENR's) 2012 Final 303 (d) Lists for impaired waters.

Wetland and stream determinations for R-2519B were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual and the 2010 Eastern Mountains and Piedmont Supplement. The project was originally verified by Steve Lund of the U.S. Army Corps of Engineers (USACE) and a representative of the NCDWQ on September 1, 2004. Mr. Tyler Crumbley of the USACE and Mr. Mike Parker of the NCDWQ reverified the wetlands and surface waters on March 14, 2012. USACE requested revised Rapanos forms for the project that will be submitted concurrently with the permit application and will issue the Final Approved Jurisdictional Determination with the Individual Permit upon their approval.

IMPACTS TO WATERS OF THE U.S.

Tables 1, 2, 3, and 4 summarize the project-wide impacts to jurisdictional water resources from final design impacts for R-2519B. Site impact numbers correspond with the permit (hydraulic) drawings included in this application and the stream and wetland numbers correspond to the jurisdictional delineation maps provided to the agencies. Brief descriptions of each impact site will follow the section-specific tables.

Table 1. Impacts to jurisdictional streams

Project Section	Design Stage	Impact Type	Impact Length (linear feet)	Temporary Impacts (acres)
R-2519B	Final Impacts	Perm. Fill	6,813	--
		Bank Stabilization	443	--
		Temp. Fill	--	0.52
Total Permanent Impacts (Perm. Fill +Bank Stabilization):			7,256	--
Total Temporary Impacts:			--	0.52

Table 2. Impacts to jurisdictional wetlands

Project Section	Design Stage	Impact Type	Impact Area (acres)	Temporary Impacts (acres)
R-2519B	Final Impacts	Perm. Fill	0.06	--
		Temp. Fill	--	--
		Excavation	0.05	--
		Mechanized Clearing	0.04	--
Total Impacts :			0.15	--

Table 3. Impacts to ponds

Project Section	Design Stage	Permanent Impact Area (acres)	Temporary Impacts (acres)
R-2519B	Final Impacts	--	<0.01
	Total Impacts:	--	<0.01

Table 4. R-2519B – Final Design Stream Impacts

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet)	USACE Mitigation	NCDWQ Mitigation
1	UT Little Crabtree Creek	2UT2A	Perm. Fill	43	43	
			Bank Stabilization	--		
			Temp. Fill	--		
2	Little Crabtree Creek	2A	Perm. Fill	117	117	117
			Floodplain Bench	118	118	118
			Temp. Fill	--		
2A	UT Little Crabtree Creek	SA	Perm. Fill	65	65	
			Bank Stabilization	--		
			Temp. Fill	--		
3	UT Little Crabtree Creek	2B/UT2B	Perm. Fill	311	311	311
			Bank Stabilization	12		12
			Temp. Fill	--		
4	Phipps Creek	2C	Perm. Fill	97	97	
			Bank Stabilization	44		
			Temp. Fill	--		
4A	UT Beaver Creek	2-17	Perm. Fill	34	34	
			Bank Stabilization	--		
			Temp. Fill	--		
5	South Toe River	STR	Perm. Fill	--		
			Bank Stabilization	--		
			Temp. Fill	--		
5A	Long Branch	2D	Perm. Fill	148	148	148
			Bank Stabilization	--		
			Temp. Fill	--		
6	Long Branch	2D	Perm. Fill	28	28	28
			Bank Stabilization	--		
			Temp. Fill	--		
7	Long Branch	2D	Perm. Fill	358	358	358
			Bank Stabilization	--		
			Temp. Fill	--		
7A	UT Long Branch	UT2D	Perm. Fill	24	24	
			Bank Stabilization	--		
			Temp. Fill	--		
7B	UT Long Branch	2UT2D	Perm. Fill	131	131	
			Bank Stabilization	--		
			Temp. Fill	--		

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet	USACE Mitigation	NCDWQ Mitigation
7C	UT Long Branch	3UT2D	Perm. Fill	55	70	
			Bank Stabilization	--		
			Temp. Fill	--		
8	Long Branch	2D	Perm. Fill	432	432	432
			Bank Stabilization	--		
			Temp. Fill	--		
8A	UT Long Branch	7UT2D	Perm. Fill	94	94	
			Bank Stabilization			
			Temp. Fill	--		
8B	Long Branch	2D	Perm. Fill	58	58	58
			Bank Stabilization	--		
			Temp. Fill	--		
8C	Long Branch	2D	Perm. Fill	69	69	69
			Bank Stabilization	--		
			Temp. Fill	--		
9	Long Branch	2D	Perm. Fill	--		
			Bank Stabilization	37		37
			Temp. Fill	--		
10	UT Long Branch	12UT2D	Perm. Fill	183	183	183
			Bank Stabilization	--		
			Temp. Fill	--		
11	Long Branch	2D	Perm. Fill	--		
			Bank Stabilization	50		50
			Temp. Fill	--		
12	UT Long Branch	13UT2D	Perm. Fill	79	79	
			Bank Stabilization	--		
			Temp. Fill	--		
13	Long Branch	2D	Perm. Fill	110	110	110
			Bank Stabilization	--		
			Temp. Fill	--		
14	Long Branch	2D	Perm. Fill	220	220	220
			Bank Stabilization	--		
				--		
15	Long Branch	2D	Perm. Fill	78	78	78
			Bank Stabilization	--		
				--		
16	Big Crabtree Creek	1H	Perm. Fill	32	32	
			Bank Stabilization	50		
				--		
17	UT Big Crabtree Creek	UT1H	Perm. Fill	33	33	
			Bank Stabilization	20		
				--		

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet	USACE Mitigation	NCDWQ Mitigation
18	UT Big Crabtree Creek	2UT1H	Perm. Fill	152	152	152
			Bank Stabilization	--		
				--		
19	Big Crabtree Creek	1I	Perm. Fill	144	144	144
			Bank Stabilization	--		
				--		
21	Big Crabtree Creek	1I	Perm. Fill	412	412	412
			Bank Stabilization	--		
				--		
22	Big Crabtree Creek	1CC	Perm. Fill	--		
			Bank Stabilization	23		
				--		
23	UT Big Crabtree Creek	UT1CC	Perm. Fill	27	27	27
			Bank Stabilization	20		20
				--		
24	UT Big Crabtree Creek	UT1CC	Perm. Fill	175	175	175
			Bank Stabilization	--		
				--		
25	UT Brushy Creek	2E	Perm. Fill	174	174	174
			Bank Stabilization	--		
				--		
26	UT Brushy Creek	2E	Perm. Fill	129	129	
			Bank Stabilization	10		
				--		
27	UT Brushy Creek	SD	Perm. Fill	56	56	
			Bank Stabilization	10		
				--		
28	UT Brushy Creek	SE	Perm. Fill	120	120	120
			Bank Stabilization	--		
				--		
28A	UT Brushy Creek	SE	Perm. Fill	141	141	141
			Bank Stabilization	--		
				--		
29	Brushy Creek	2BC	Perm. Fill	89	89	89
			Bank Stabilization	62		62
				--		
29A	UT Brushy Creek	1G	Perm. Fill	149	149	149
			Bank Stabilization	--		
				--		

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet	USACE Mitigation	NCDWQ Mitigation
30	UT Brushy Creek	1G	Perm. Fill	321	321	321
			Bank Stabilization	--		
				--		
31	UT Brushy Creek	1G	Perm. Fill	59	59	59
			Bank Stabilization	32		32
			Temp. Fill	--		
32	UT Brushy Creek	8UT1G	Perm. Fill	52	52	
			Bank Stabilization	--		
				--		
33	UT Brushy Creek	1G	Perm. Fill	444	444	444
			Bank Stabilization	--		
				--		
34	UT Brushy Creek	5UT1G	Perm. Fill	33	33	
			Bank Stabilization	23		
				--		
35	UT Brushy Creek	SF	Perm. Fill	88	88	
			Bank Stabilization	10		
				--		
37	**UT Brushy Creek**	**SG**	Perm. Fill	247	247	247
			Bank Stabilization	10		10
				--		
38	UT English Creek	1D	Perm. Fill	22	22	
			Bank Stabilization	10		
				--		
39	UT Brushy Creek	SH	Perm. Fill	58	58	
			Bank Stabilization	--		
				--		
40	UT English Creek	SI	Perm. Fill	269	269	269
			Bank Stabilization	--		
				--		
41	UT English Creek	1C	Perm. Fill	103	103	
			Bank Stabilization	10		

Permit Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet	USACE Mitigation	NCDWQ Mitigation
42	UT English Creek	1Z	Perm. Fill	244	244	244
			Bank Stabilization	10		10
				--		
43	UT English Creek	SJ	Perm. Fill	26	26	
			Bank Stabilization	--		
				--		
44	UT English Creek	SKA	Perm. Fill	147	147	
			Bank Stabilization	--		
				--		
45	UT English Creek	SK	Perm. Fill	--		
			Bank Stabilization	--		
				*(288)		
Total Permanent Impacts (Perm. Fill +Bank Stabilization):				7,256		
Impacts requiring Mitigation by USACE (2:1):					6,813	
Impact requiring Mitigation by NCDWQ (1:1):						5,630

* Not an impact – already ditched stream will be re-ditched

Note: Bank stabilization is not considered a mitigable impact according to the USACE. Mitigable impacts calculated for NCDWQ are considering length of impacts to a stream that are greater than or equal to 150 linear feet.

Section R-2519B Permit Site Descriptions:

Permit Site 1: Stream UT2A is a perennial unnamed tributary to Little Crabtree Creek that will be impacted by a 54" reinforced concrete pipe (RCP) from an existing 30" corrugated metal pipe (CMP).
Permanent Stream Impacts: 43 lf

Permit Site 2: Little Crabtree Creek (Stream 2A) is a perennial stream that will be impacted by the extension of the existing 4@12'x 9' reinforced concrete box culverts (RCBC) upstream and downstream with one foot high baffles placed in the downstream extensions. Floodplain benches will be placed upstream and downstream of both outer barrels to direct flow into the two center barrels.
Permanent Stream Impacts: 117 lf
Temporary Stream Impacts: 0.06 ac
Floodplain bench: 118 lf

Permit Site 2A: Stream SA is a perennial unnamed tributary to Little Crabtree Creek that will be impacted by a base ditch and lateral base ditch.
Permanent Stream Impacts: 65 lf
Temporary Stream Impacts: 0.01 ac

Permit Site 3: Stream 2B is a perennial tributary to Little Crabtree Creek that will be impacted by a 48" RCP with bank stabilization. Stream UT2B is a short perennial stream that will be covered roadway fill.
Permanent Stream Impacts (Stream 2B): 303 lf
Temporary Stream Impacts (Stream 2B): <0.01 ac
Bank Stabilization: 12 lf
Permanent Stream Impacts (Stream UT2B): 8 lf

Permit Site 4: Phipps Creek (Stream 2C) is a perennial stream that will be impacted by a 36" RCP and a 42" RCP running in tandem with junction boxes to reduce outlet velocities and bank stabilization at the outlet.
Permanent Stream Impacts: 97 lf
Temporary Stream Impacts: <0.01 ac
Bank Stabilization: 44 lf

Permit Site 4A: Stream SB is a perennial unnamed tributary to the South Toe River that will be impacted by a 36" welded steel pipe with junction boxes to reduce velocities and rip rap at the outlet for energy dissipation.
Permanent Stream Impacts: 18 lf
Rip Rap: 16 lf

Permit Site 5: The South Toe River will be impacted by the replacement of the current 6 span bridges with dual 315 foot, three span, concrete girder bridges. Permanent stream impacts will arise from piers placed at the water's edge and temporary impacts will result from work pads being utilized for bridge demolition and bridge installation. Work pad installation will be staggered to avoid blocking 50% of the river at any one time. Mussels at the bridge site will be relocated prior to work initiation.
Temporary Stream Impacts: 0.15 ac

Permit Site 5A: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by its relocation to the north away from the work zone for the South Toe Bridges.
Permanent Stream Impacts: 148 lf Relocation
Natural Stream Design: 148 lf

Permit Site 6: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be daylighted by the removal of existing twin 6' x 6' RCBCs. Permanent impacts are from the installation of rock vanes which are considered nonmitigable impacts.
Permanent Stream Impacts: 28 lf (NonMitigable)
Temporary Stream Impacts: 0.01 ac
Daylighting/Natural Stream Design: 144 lf

Permit Site 7: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by the extension of existing 6' x 6' RCBCs.
Permanent Stream Impacts: 358 lf
Temporary Stream Impacts: <0.01 ac

Permit Site 7A: Stream UT2D, a perennial tributary to Long Branch, will be impacted by a 30" corrugated steel pipe (CSP).
Permanent Stream Impacts: 24 lf

Permit Site 7B: Stream 2UT2D, a perennial tributary to Long Branch, will be impacted by a 30" alternate pipe.
Permanent Stream Impacts: 131 lf

Permit Site 7C: Stream 3UT2D, a perennial tributary to Long Branch, will be impacted by a 54" RCP.
Permanent Stream Impacts: 70 lf
Temporary Stream Impacts: <0.01 ac

Permit Site 8: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by its relocation up and downstream of the existing 7' x7' and 7' x 5' RCBC (see Site 8B) because of roadway fill. Wetland 6UT2D will also be impacted by excavation and mechanical clearing.
Permanent Stream Impacts: 432 lf Relocation
Wetland Excavation: 0.01 ac
Wetland Mechanical clearing: 0.04 ac
Natural Stream Design: 449 lf

Permit Site 8A: Stream 7UT2D, a perennial tributary to Long Branch, will be impacted by a 36" CSP with rip rap placed at the outlet of the pipe for energy dissipation.
Permanent Stream Impacts: 94 lf
Temporary Stream Impacts: <0.01 ac

Permit Site 8B: Long Branch (Stream 2D), a perennial tributary to the South Toe River will be impacted by extension of existing 7' x 5' RCBC on the upstream end and the addition of a 7' x 7 RCBC on the downstream end with sills at the outlet.
Permanent Stream Impacts: 58 lf

Permit Site 8C: Long Branch (Stream 2D), a perennial tributary to the South Toe River will be impacted by the replacement of an existing stone culvert with a 8' x 6' RCBC with alternating sills in the culvert.
Permanent Stream Impacts: 69 lf
Temporary Stream Impacts: 0.01 ac

Permit Site 9: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be daylighted by the removal of an existing 36" CMP with bank stabilization placed near the confluence of Long Branch and Stream 11UT2D.
Temporary Stream Impacts: <0.01 ac
Bank Stabilization: 37 lf
Daylighting: 40 lf

Permit Site 10: Stream 12UT2D, a perennial tributary to Long Branch, will be impacted by a 36" RCP and rip rap at the outlet for energy dissipation.
Permanent Stream Impacts: 96 lf
Temporary Stream Impacts: <0.01 ac
Rip Rap: 87 lf

Permit Site 11: Long Branch (Stream 2D), a perennial tributary to the South Toe River will be impacted by the placement of bank stabilization at the outlet of a 42" RCP.
Bank Stabilization: 50 lf

Permit Site 12: Stream 3UT2D, a perennial tributary to Long Branch, will be impacted by a 42" RCP.
Permanent Stream Impacts: 79 lf
Temporary Stream Impacts: <0.01 ac

Permit Site 13: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by its relocation to the south because of roadway fill. Wetland 2DM will also be impacted by roadway fill and the removal of hydrology to the site.
Permanent Stream Impacts: 110 lf
Wetland Fill: 0.06 ac

Permit Site 14: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by its relocation to the south because of roadway fill.
Permanent Stream Impacts: 220 lf

Permit Site 15: Long Branch (Stream 2D), a perennial tributary to the South Toe River, will be impacted by a 24" CSP.
Permanent Stream Impacts: 78 lf
Temporary Stream Impacts: < 0.01 ac

Permit Site 16: Stream 1H, a perennial tributary to Big Crabtree Creek, will be impacted by a 36" RCP with bank stabilization at the outlet.
Permanent Stream Impacts: 32 lf
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 50 lf

Permit Site 17: Stream UT1H, a perennial tributary to Big Crabtree Creek, will be impacted by an 18" CSP with bank stabilization at the outlet.
Permanent Stream Impacts: 33 lf
Bank Stabilization: 20 lf

Permit Site 18: Stream 2UT1H, a perennial tributary to Big Crabtree Creek, will be impacted by a 54" welded steel pipe with a rip rap channel at the outlet for energy dissipation.
Permanent Stream Impacts: 152 lf
Temporary Stream Impacts: <0.01 ac
Natural Stream Design: 70 lf

Permit Site 19: Stream 1L, a perennial tributary to Big Crabtree Creek, will be impacted by a 48" alternate pipe with rip rap at the outlet for energy dissipation.
Permanent Stream Impacts: 132 lf
Rip Rap: 12 lf

Permit Site 20: Wetland 1C, will be impacted by the excavation of a standard base ditch. The entire wetland will be taken in this action.
Wetland Excavation: 0.04 ac

Permit Site 21: Stream 1L, a perennial tributary to Big Crabtree Creek, will be impacted by its relocation to the south to avoid roadway fill from the widening.
Permanent Stream Impacts: 412 lf Relocation
Natural Stream Design: 396 lf

Permit Site 22: Big Crabtree Creek (Stream 1CC) will be impacted by the removal of a 4 @12' x 12' RCBC and the installation of a single span 185' x 96" steel girder bridge with bank stabilization along the channel under the bridge. The removal of the culvert will result in daylighting 40 lf of the creek.
Temporary Stream Impacts: 0.17 ac
Bank Stabilization: 23 lf
Daylighting: 40 lf

Permit Site 23: Stream UT1CC, a perennial tributary to Big Crabtree Creek, will be impacted by a 60" RCP with bank stabilization at the outlet.
Permanent Stream Impacts: 27 lf
Temporary Stream Impacts: <0.01 ac
Bank Stabilization: 20 lf

Permit Site 24: Stream UT1CC, a perennial tributary to Big Crabtree Creek, will be impacted by a 24" RCP.
Permanent Stream Impacts: 175 lf Relocation
Temporary Stream Impacts: <0.01 ac

Permit Site 25: Stream 2E, a perennial tributary to Brushy Creek, will be impacted by its relocation into a 54" welded steel pipe inside of the existing 60" CMP with a standard base ditch at the inlet.
Permanent Stream Impacts: 174 lf Relocation
Temporary Stream Impacts: <0.01 ac
Natural Stream Design: 94 lf

Permit Site 26: Stream 2E, a perennial tributary to Brushy Creek, will be impacted by a 60" CSP with bank stabilization at the outlet.
Permanent Stream Impacts: 129 lf
Temporary Stream Impacts: <0.01 ac
Bank Stabilization: 10 lf

Permit Site 27: Stream SD, a perennial tributary to Brushy Creek, will be impacted by a 24" CSP with bank stabilization at the outlet.
Permanent Stream Impacts: 56 lf
Temporary Stream Impacts: <0.01 ac
Bank Stabilization: 10 lf

Permit Site 28: Stream SE, a perennial tributary to Brushy Creek, will be impacted by a 30" welded steel pipe with rip rap at the outlet for energy dissipation and a standard base ditch with rip rap at the inlet. .
Permanent Stream Impacts: 80 lf
Rip Rap: 40 lf

Permit Site 28A: Stream SL, a perennial tributary to Brushy Creek, will be impacted by a 30" welded steel pipe with rip rap at the outlet for energy dissipation and a standard base ditch with rip rap at the inlet.
Permanent Stream Impacts: 141 lf

Permit Site 29: Brushy Creek (Stream BC) is a perennial stream that will be impacted by the extension of the existing 3@8'x 8' RCBC. Place 1' high sill in 2 outer barrels at entrance only with 6" high sill in middle barrel @ 12' spacing in existing culvert and at entrance of proposed culvert extension. Extend existing 3@8'x11' RCBC downstream with fish ladder and bank stabilization at outlet.
Permanent Stream Impacts: 64 lf
Temporary Stream Impacts: 0.01 ac
Bank Stabilization: 62 lf
Fish Ladder: 25 lf

Permit Site 29A: Stream 1G, a perennial tributary to Brushy Creek, will be impacted by a 2@8'x 8' RCBC with 0.5' and 1' sills alternating at 20 foot intervals in the western most barrel.
Permanent Stream Impacts: 149 lf

Permit Site 30: Stream 1G, a perennial tributary to Brushy Creek, will be impacted by its relocation into a 2@8'x 8' RCBC with 0.5' and 1' sills alternating at 20 foot intervals in the western most barrel.
Permanent Stream Impacts: 321 lf Relocation
Temporary Stream Impacts: <0.01 ac
Natural Stream Design: 635 lf

Permit Site 31: Stream 1G, a perennial tributary to Brushy Creek, will be impacted by the extension of the existing 2@7'x 6' RCBC with 2@7'x 7' RCBC on the downstream end with bank stabilization at the outlet.
Permanent Stream Impacts: 59 lf
Bank Stabilization: 32 lf

Permit Site 32: Stream 8UT1G, a perennial tributary to Brushy Creek, will be impacted by its relocation into a 24" RCP. A small jurisdictional pond will be temporarily impacted during the installation of the 24" RCP.
Permanent Stream Impacts: 52 lf
Temporary Stream Impacts: <0.01 ac

Permit Site 33: Stream 1G, a perennial tributary to Brushy Creek, will be impacted by its relocation into the extension of an existing 2@7'x 6' RCBC.
Permanent Stream Impacts: 444 lf Relocation
Natural Stream Design: 300 lf

Permit Site 34: Stream 5UT1G, a perennial tributary to Brushy Creek, will be impacted by the replacement and extension of the existing 1@6'x 6' RCBC with a 1@6'x 7' RCBC with alternating 0.5' and 1' sills. Temporary impacts will result from channel enhancement on the upstream end.
Permanent Stream Impacts: 33 lf
Temporary Stream Impacts: 0.02 ac
Bank Stabilization: 23 lf

Permit Site 35: Stream SF, a perennial tributary to Brushy Creek, will be impacted by its relocation into a 30" welded steel pipe with bank stabilization at the outlet.
Permanent Stream Impacts: 88 lf Relocation
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 10 lf
Natural Stream Design: 46 lf

There is no Permit Site 36

Permit Site 37: Stream SG, a perennial tributary to Brushy Creek, will be impacted by a 42 RCP"/42" welded steel pipe with junction boxes to reduce outlet velocities and to dissipate energy with bank stabilization at the outlet.
Permanent Stream Impacts: 247 lf
Bank Stabilization: 10 lf

Permit Site 38: Stream 1D, a perennial tributary to Brushy Creek, will be impacted by a 24" alternate pipe with a junction box to reduce outlet velocities and to dissipate energy with bank stabilization at the outlet.
Permanent Stream Impacts: 22 lf
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 10 lf

Permit Site 39: Stream SH, a perennial tributary to Brushy Creek, will be impacted by rip rap placed for energy dissipation at the outlet of an 18" CSP.
Permanent Stream Impacts (Rip Rap): 58 lf
Temporary Stream Impacts: < 0.01 ac

Permit Site 40: Stream SI, a perennial tributary to English Creek, will be impacted by its relocation into a 24" CSP and rip rap placed for energy dissipation at the outlet of the pipe.
Permanent Stream Impacts: 258 lf
Temporary Stream Impacts: < 0.01 ac
Rip Rap: 11 lf

Permit Site 41: Stream 1C, a perennial tributary to English Creek, will be impacted by its relocation into a 24" CSP with a junction box to reduce outlet velocities and to dissipate energy with bank stabilization at the outlet.
Permanent Stream Impacts: 103 lf
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 10 lf

Permit Site 42: Stream 1Z, a perennial tributary to English Creek, will be impacted by a 24" CSP with a junction box to reduce outlet velocities and to dissipate energy with bank stabilization at the outlet.
Permanent Stream Impacts: 244 lf
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 10 lf

Permit Site 43: Stream SJ, a perennial tributary to English Creek, will be impacted by a 24" CSP with a junction box to reduce outlet velocities and to dissipate energy with bank stabilization at the outlet.
Permanent Stream Impacts: 16 lf
Temporary Stream Impacts: < 0.01 ac
Bank Stabilization: 10 lf

Permit Site 44: Stream SKA, a perennial tributary to English Creek, will be impacted by a 30" CSP with an open throat catch basin near the outlet to dissipate energy.
Permanent Stream Impacts: 147 lf

Permit Site 45: Stream SK, a perennial tributary to English Creek, will be impacted by the replacement of a concrete line channel with rip rap lined standard base ditch. During the 4C meeting, held January 16, 2013, the USACE stated that this site was "no net loss" therefore, a nonmitigable temporary impact.
Temporary Stream Impacts: 0.03 ac

MORATORIUM

The North Carolina Wildlife Resources Commission (NCWRC), in a letter dated July 9, 2007 issued the following moratoriums:

- Big Crabtree Creek (& UTs) - October 15 to April 15 (trout);
- Little Crabtree Creek (& UTs) - January 1 to April 15 (trout);
- Brushy Creek (& UTs) - January 1 to April 15 (trout);
- Long Branch (& UTs) - January 1 to April 15 (trout);

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 December 26, 2012 the USFWS lists nine federally protected species for Yancey County and eleven federally protected species for Mitchell County (Table 5).

Table 5. Federally Protected Species Listed for Yancey & Mitchell Counties.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion	County
Clemmys muhlenbergii	Bog turtle	T(S/A)	No	Not Required	Yancey/ Mitchell
Glaucomys sabrinus coloratus	Carolina northern flying squirrel	E	No	No Effect	Yancey/ Mitchell
Myotis sodalis	Indiana bat	E	Yes	MANLAA	Mitchell
Corynorhinus (=Plecotus) townsendii virginianus	Virginia big-eared bat	E	No	No Effect	Yancey
Alasmidonta raveneliana	Appalachian elktoe	E	Yes	MALAA	Yancey/ Mitchell
Microhexura montivaga	Spruce-fir moss spider	E	No	No Effect	Yancey/ Mitchell
Solidago spithamaea	BlueRidge goldenrod	T	No	No Effect	Mitchell
Liatris helleri	Heller's blazing star	T	No	No Effect	Mitchell
Houstonia montana (=Hedyotis purpurea var. montana)	Roan Mountain bluet	E	No	No Effect	Yancey/ Mitchell
Geum radiatum	Spreading avens	E	No	No Effect	Yancey/ Mitchell
Spiraea virginiana	Virginia spiraea	T	Yes	MANLAA	Yancey/ Mitchell
Gymnoderma lineare	Rock gnome lichen	E	No	No Effect	Yancey/ Mitchell

Summary of Species with Habitat

Indiana bat - No hibernating habitat for Indiana bat is known in the project footprint but potential roost trees are present though in not enough quantity to warrant mist netting surveys for the species.

Appalachian elktoe - Surveys performed in 2002 and 2005 by NCDOT personnel found Appalachian elktoe up and downstream of the South Toe River bridge and a 2008 survey found a nursery colony of Appalachian elktoe in a sand bar along a bent of the South Toe River bridge. A Biological Assessment (BA) was submitted to the US Army Corps of Engineers (USACE) and the US Fish and Wildlife Service (USFWS) on August 9, 2007. A Biological Opinion was issued by USFWS on March 14, 2008. Appalachian elktoe around the South Toe River bridge were relocated in 2008, 2009, 2010 and 2011 with USFWS approved protocol. USFWS reinitiated Section 7 Consultation for the South Toe Crossing only on June 29, 2011 because the temporary impacts at the site were much higher than anticipated and the design included bents in the water. A BA Addendum with reduced temporary impacts and bents only at the water's edge was submitted to USACE and USFWS on March 26, 2013. The Amended BO will be forwarded as soon as it is issued.

Virginia spiraea – A known population of Virginia spiraea is located 1.5 miles downstream of the South Toe River crossing though the last specimens were observed in 1988. Initial surveys for Virginia spiraea in the project study area were conducted in 2003 outside of the survey window. Subsequent surveys were conducted in June 2006 and July 2012 with no specimens found during any of the surveys.

INDIRECT CUMULATIVE IMPACT ANALYSIS

Existing rules for the 401 Water Quality Certification Program (15A NCAC 2H .0506(b)(4)) require that the NCDWQ 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."

Indirect and Cumulative Effects

A Qualitative Indirect and Cumulative Effects (ICE) Assessment was completed for the entire R-2518/R-2519 project in February 2004[1]. The report concluded that there would be some increase in regional accessibility throughout this part of western North Carolina when the project was considered cumulatively with other TIP projects (A-10, R-2520, and R-2598). However, even with the occurrence of other factors that also indicated the potential for indirect land use change related to the construction of the project, it was determined that declining population, unsuitable topography, and limited water and sewer availability would severely limit any potential effects. Potential deterioration to water quality as an indirect effect of the project was therefor also found to be minimal.

A Community Impact Assessment (CIA) was completed in February 2005[2], specifically for the B-section of R-2519. Within the CIA, an ICE Screening Analysis was performed. Consistent with the 2004 ICE, this analysis concluded that while some increase in regional mobility may occur, the overall the likelihood of any significant land use change associated with R-2519B was unlikely. Again, slow population and employment growth, unsuitable land (steep slopes), and lack of water and sewer were listed as the major growth inhibitors.

In July 2007[3], in response to specific comments from the USFWS, an analysis was made of the potential increase in impervious surface that could occur as a result of the R-2518 and R-2519 projects. This report set an arbitrary threshold of 6 percent impervious land cover as the point at which potential water quality problems may occur. The present level of impervious surface within the ICE Future Land Use Study Area (FLUSA) was measured. Calculations were then made to determine how many additional acres of particular land uses (low and high intensity residential, commercial/industrial) would be needed to reach the 6 percent threshold. In all cases, the necessary land use change needed substantially exceeded any realistic induced growth scenario. The overall dominant influence affecting future land development suitability was determined to be the availability of water and sewer service.

CULTURAL RESOURCES

Archaeology

Data Recovery Plans to recover archaeological materials for analysis and interpretation of the occupation of the sites have been prepared. Such an endeavor will include documenting the depth and extent of deposits and defining any additional intact deposits and features present within the archaeological sites. In a letter dated May 7, 2007, the USACE (Lead Federal Agency) indicated that NCDOT's coordination with the HPO to date is acceptable. A Memorandum of Agreement (MOA) between USACE and HPO regarding adverse impact mitigation for sites 31YC31, 31YC183, and 31ML80 was executed on June 18, 2012. This MOA includes the Tribal Historic Office of Historic Preservation for the Eastern Band of Cherokee Indians (THPO) as a consulting party in compliance with 36 CFR 800. The THPO has been copied on all relevant historic information throughout the project development process. The MOA was submitted to the pertinent parties and copies are available upon request.

Historic Architecture

The improvements to US 19E will have an effect on the National Register of Historic Places eligible E.W. and Dollie Huskins House (Figure 3). After consultation with the State Historic Property Office (HPO), NCDOT proposes to mitigate potential adverse effect to the property by including a seeded slope that is feasible for mowing by the owner in the proposed design. In a letter dated May 7, 2007, the lead federal agency for this project, the USACE concurred with the determination of effects under Section 106 of the National Historic Preservation Act and the coordination to date with HPO with respect to historic structures. The letter was submitted to the pertinent parties and copies are available upon request.

SECTION 4(f)

Section 4(f) and *de minimis*

Potential constraints associated with Section 4(f) resources (as defined in Section 4(f) of DOT Act of 1996, as amended, were evaluated and it was determined that the project will have no effect on Section 4(f) resources.

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-542, as amended).

MITIGATION OPTIONS

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide either on-site or 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.

Avoidance and Minimization

Avoidance and minimization measures for the Planning and Design Phase include the following items:

- Junction boxes will be utilized at several sites to dissipate energy and reduce outlet velocities.
- Hazardous spill basins will be located on both banks of the South Toe River crossing (Site 5) to minimize impacts to the river and endangered species.
- Dry detention basins will be employed at three sites to minimize erosive stormwater flows.
- Preformed Scour Holes will be utilized at three sites to attenuate and disperse stormwater flow.
- Design Standards in Sensitive Watersheds will be implemented throughout the project.

For the above bulleted items, please refer to attached Stormwater Management Plan for expanded details.

Further avoidance and minimization measures:

- The new bridges at the South Toe River crossing will largely span the river except for two bents which will be located at the edge of the water.
- Sills will be used in the outer barrels at the Brushy Creek crossing (Site 29) with baffles in the center barrel.
- Design for the new South Toe river bridges will eliminate deck drains while directing runoff to grassed swales/hazardous spill basins.
- The amount of temporary impacts to streams at the South Toe River crossing has been reduced through redesign from 0.22 acre to 0.15 acre.
- 2,957 lf of mitigation credit will result from onsite mitigation/natural stream design which will reduce the amount of mitigation required from EEP.

Compensatory Mitigation

Based on field and meeting discussions with agency representatives and per the NCDOT plans and 401/404 permit application for R-2519B; NCDOT proposes to provide a total of 2,322 linear feet of stream channel relocations and restorations for a total of 2957 feet of mitigation credit. This mitigation credit total is based on a 1:1 ratio for all the sites with the exception of a 1:2 ratio at Site 30 based on the existing and proposed condition. An as-built report will be submitted within 60 days of completion of the each mitigation site to verify actual mitigation areas constructed and planted. The success of the

mitigation areas and determination of final credits will be based upon successful completion and closeout of the monitoring period at each site.

Proposed Mitigation for R-2519B	
Permanent Stream Impacts on Project	7256 lf
Impacts Requiring Mitigation from USACE (See Table 4)	6813 lf
(Impacts Requiring Mitigation from NCDWQ = 5512)	
Subtract 28 lf of non-mitigable impact at site 6	-28 lf
Subtract 40 lf for day-lighting stream at site 22	-40 lf
Subtract Onsite mitigation (see mitigation plan)	-2957 lf
Impacts requiring Mitigation from EEP	
Streams	3788 lf
Wetlands	0.15 ac

REGULATORY APPROVALS

Application is hereby made for a USACE Individual 404 Permit as required for the above-described activities. Application is hereby made for a Section 401 Water Quality Certification from the N.C. Division of Water Quality. In compliance with Section 143-215.3DC of the NCAC we have provided a method of debiting $570, as noted in the subject line of this application, as payment for processing the Section 401 Water Quality Certification application. We are providing five copies of this application to DWQ, for their use.

A copy of this permit application will be posted to the DOT website at: http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html. If you have any questions or need additional information, please contact Jeff Hemphill at jhemphill@ncdot.gov or (919) 707-6126.

Sincerely,

for E. L. Lusk

Gregory J. Thorpe, Ph.D., Manager
Project Development and Environmental Analysis Unit

Cc: NCDOT Permit Application Standard Distribution

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 - Gregory Middle - J. Last - Thorpe	First - Phil Middle - Last - Harris
Company - NCDOT-PDEA	Company - NCDOT NES
E-mail Address - gthorpe@ncdot.gov	E-mail Address - pharris@ncdot.gov
6. APPLICANT'S ADDRESS:	9. AGENT'S ADDRESS:
Address-	Address-
City - State - Zip - Country -	City - State - Zip - Country -
7. APPLICANT'S PHONE NOs. w/AREA CODE	10. AGENTS PHONE NOs. w/AREA CODE
a. Residence b. Business 919-707-6111 c. Fax	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)

Improvements to US 19/US-19E from SR 1186 in Yancey County to west of Spruce Pine in Mitchell County (TIP No. R-2519B)

13. NAME OF WATERBODY, IF KNOWN (if applicable)	14. PROJECT STREET ADDRESS (if applicable)
Numerous - See permit drawings and cover letter	Address
15. LOCATION OF PROJECT Latitude: °N 35.90167 Longitude: °W 82.14413	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 improvement and expansion of the existing roadway to a multi-lane road facility.

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

The purpose of the project is to add traffic capacity, system linkage and safety to US 19/US 19E.

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

20. Reason(s) for Discharge

Roadway fill (in wetlands and surface water), pipe/culvert construction, bridge construction (temporary impacts only), stream relocation.

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.

E. L. Luek for Gregory J. Thape, PhD July 11, 2013

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

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.

Ecosystem

PROGRAM

July 9, 2013

Mr. Gregory J. Thorpe, Ph.D.
Manager, Project Development and Environmental Analysis Unit
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2519B, US 19E from SR 1186 (Old US 19) in Yancey County to Multi-lane section West of Spruce Pine, Mitchell and Yancey 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 8, 2013, the impacts are located in CU 06010108 of the French Broad River basin in the Northern Mountains (NM) Eco-Region, and are as follows:

French Broad 06010108 NM	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	3,788.0	0	0	0.15	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.

This mitigation acceptance letter replaces the mitigation acceptance letter issued on June 25, 2013. EEP commits to implementing sufficient compensatory stream 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 Ms. Beth Harmon at 919-707-8420.

Sincerely,

James B. Stanfill

James B. Stanfill
EEP Asset Management Supervisor

cc: Ms. Lori Beckwith, USACE – Asheville Regulatory Field Office
Ms. Amy Chapman, Division of Water Quality, Wetlands/401 Unit
Ms. Amy Euliss, Division of Water Quality, Winston-Salem Regional Office
File: R-2519B Revised

North Carolina Department of Environment and Natural Resources
Division of Water Quality
Charles Waklid, P.E.
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

RECEIVED
MAY 11 2012
DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT

May 9, 2012

Mr. Jeff Hemphill
NC Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Subject: NCDOT TIP R-2519B, Yancey and Mitchell Counties
Re-Verification for Final Approved Jurisdictional Determination
in the French Broad River Basin, 040306

On-Site Determination for Applicability to the Mitigation Rules (15A NCAC 2H .0506(h)

Dear Mr. Hemphill:

On March 14, 2012, at your request and in your attendance, Mike Parker, NC Division of Water Quality (NCDWQ) staff, conducted an on-site determination to review drainage features located north and south of US Highway 19E from its intersection with NCSR 1308 (Double Island Road) in Yancey County to NCSR 1271 in Mitchell County for applicability to the mitigation rules (15A NCAC 2H. 0506(h)). The drainage features are approximated on the attached maps initialed and dated May 9, 2012.

Stream SA	Perennial within Study Area
Stream SC	Deemed non-jurisdictional within Study Area
Stream UT1CC	Perennial within Study Area added 61 lin. ft.
Stream SL	Perennial within Study Area was added to list
Stream UT2D	Intermittent outside DOT ROW removed from list
Ponds A & C	Jurisdictional and inside NCDOT's ROW were added to the Brushy Creek Rapanos form
Wetland 2DN abuts Stream 2D is being mowed but wetland criteria being met Wetland WB	
Wetland 1IC at horse corral wetland criteria remains	
Wetland UT2BC hydrology has been cut off and no longer meets the three wetland criteria	

Your letter of March 28, 2012, the spread sheet list of streams and wetlands entitled Updated 2012 Change Summary from 2004 Verification and updated Rapanos forms for the Brushy Creek and Big Crabtree Creek drainage areas are also attached, initialed and dated. Please note that other sites identified in the jurisdiction verification request package but not reviewed on site by NCDWQ will be considered accurate as presented. Also, this letter only addresses the applicability to the mitigation rules at the site specifically marked on the attached maps as the study area and does not apply to reaches of the channel or feature outside of the NCDOT project area, or to any other drainage features in the vicinity.

This letter only addresses the applicability to the mitigation rules and the buffer rules and does not approve any activity within the buffer, Waters of the United States, or Waters of the State. Any impacts to wetlands or streams must comply with the 404/401 regulations, water supply regulations (15A NCAC 2B .0216), and any other required federal, state and local regulations.

SURFACE WATER PROTECTION SECTION-Asheville Regional Office
2090 U.S. Highway 70, Swannanoa, North Carolina 28778-8211
Phone: 828-296-4500 \ FAX: 828-299-7043
Internet: www.ncwaterquality.org

One NorthCarolina Naturally

An Equal Opportunity \ Affirmative Action Employer

The owner (or future owners) or permittee should notify NCDWQ (and other relevant agencies) of this determination in any future correspondences concerning this property and/or project. This on-site determination shall expire five (5) years from the date of this letter.

Landowners or affected parties that dispute a determination made by NCDWQ or Delegated Local Authority that a surface water exists and that it is subject to the mitigation rules may request a determination by the Director. A request for a determination by the Director shall be referred to the Director in writing c/o Brian Wrenn, NCDWQ Wetlands/401 Unit, 1650 Mail Service Center, Raleigh, NC 27699-1650.

Individuals that dispute a determination by NCDWQ or Delegated Local Authority that "exempts" a surface water from the mitigation rules may ask for an adjudicatory hearing. You may obtain the petition form from the Office of Administrative Hearings. You must file the petition with the Office of Administrative Hearings within sixty (60) days of receipt of this notice and the date the affected party (including downstream and adjacent landowners) is notified of this decision. A petition is considered filed when it is received in the Office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-733-2698, Facsimile: (919)-733-3478

A copy of the petition must also be served on DENR as follows:

Ms. Mary Penny Thompson, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

This determination is final and binding unless you ask for a hearing within 60 days.

If you have any additional questions or require additional information please call me at 828-296-4500 or at mike.parker@ncdenr.gov.

Sincerely,

Michael R. Parker

Michael R. Parker
Environmental Senior Specialist

Attachment
cc: Lori Beckwith, USACE – Asheville Regulatory Field Office
Transportation Permitting Unit
Mike Parker-ARO

Final Minutes for Hydraulic Design Review Meeting
R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section
West of Spruce Pines in Mitchell County
Division 13

A Hydraulic Design Review Meeting was held on Wednesday, July 22, 2009 in the Hydraulics Conference Room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Andrew Nottingham-Hydraulics (Present)
David Baker-USACE (Present)
Marella Buncick-USFWS (Present)
Marla Chambers-NCWRC (Present)
Brian Wrenn-NCDWQ (Present)
Kathy Matthews-EPA (Present)
Charles P. Nicholson-TVA (Absent)
Donnie Brew- FHWA (Present)
Brenda Moore-Roadway (Present)
Quang Nguyen-Structures (Present)
Steve Brown-PDEA (Present)
Carla Dagnino – PDEA-NEU(Present)
Ricky A. Tipton-Division 13 (Absent)

Participants:
Melanie Nguyen – Hydraulics
Chris Militscher-EPA
Linwood Stone-PDEA
Karen Reynolds – PDEA
Jeff Hemphill – NEU

The meeting began at 1:00 p.m. with introductions initiated by Andrew Notthingham (NCDOT Hydraulics) and proceeded with the review of the project as follows:

Sheet 4

- Recommended to move the outlet at station 25+50 –L- Rt (end of bridge) to left side of –L- and ditch down to left side of –Y1- and along –Y1- from STA 13+00 –Y1-Lt to 15+40 –Y1-Lt for some treatment before entering the Unnamed Tributary(UT) to Little Crabtree Creek(LCC).

- It was determined that the existing 54" CMP right of station 14+00 -Y1- Rt could not be removed and replaced with a open channel due to limited room between –Y1- and the new bridge slope.

Sheet 5

- No changes recommended.

Sheet 6

- The existing 4 @ 12' x 9' reinforced concrete box culvert (RCBC) at station 44+11 –L- will be extended up and downstream as a 4 @ 12' x 10' RCBC. The extension portions of the culvert will have baffles to retain bed material. Low flow floodplain benches will be used up and downstream of the culvert to maintain the natural channel width up and downstream of the culvert.
- Roadway drainage has been directed to grass swales for treatment prior to entering Little Crabtree Creek.

Sheet 7

- 2GI at station 52+80 –L- LT will be changed to a JB. Drainage that was flowing into this 2GI will be routed to grass swale on sheet 6.
- Existing 48" CMP at station 58+27 –L- on UT to LCC is in poor condition and will be lined with a 36" CSP. It will be extended upstream as a 36" CSP and downstream as a 48" RCP.
- Grass swale used from station 52+80 to 54+50 –L- Lt.

Sheet 8

- No jurisdictional features impacted, no changes recommended.

Sheet 9

- Existing 54" RCP that changes to a 4'x 4' RCBC at station 79+15 –L- on UT to South Toe River (STR) will be retained and extended upstream with a 54" RCP. It will be extended downstream with a junction box and 60" RCP. The outlet channel banks will be stabilized with Class II rip rap.
- Hazardous spill basin/detention basin will be used from station 83+00 Rt. to 84+50 Rt. –L-. Total capacity required is 8792 cubic ft and the total capacity provided is 11,505 cubic ft. Runoff from the project will be directed to this Hazardous spill basin prior to entering the South Toe River.

Sheet 10

- No jurisdictional features impacted, no changes recommended.

Sheet 11

- Grass swale/Hazardous spill basin/detention basin will be used from station 111+50 Rt. to 119+00 Rt. –L-. Total capacity required is 6377 cubic ft and the total capacity provided is 43,500 cubic ft. Runoff from the South Toe River bridge will be directed to this Hazardous spill basin. There is also an Archeological site in this location and further coordination will be required with the NCDOT Human Environment Unit.

Sheet 12

- NCDOT presented two bridge alternatives for the South Toe River bridge crossing. Alternative #1 is a steel plate girder bridge with 3 spans of 85', 175' and 55'. This alternative spans the river from top of bank to top of bank with no bents located in the normal water surface. Alternative #2 is 72" bulb tee concrete girder bridge with 3 spans of 120', 120' and 75'. This alternative has bents located along the edge of the normal water surface but spans the majority of the main channel. Alternative #2 cost approximately $400,000 less than alternative #1. NCDOT noted that alternative #2 would still have less permanent surface water impacts than the existing structure. It was decided to set up a meeting in the field with the team members and NCDOT construction personnel to discuss constructability and the pros and cons of each structure to make a decision on which alternative to use.
- Grass swale/Hazardous spill basin/detention basin will be used from station 124+50 Rt. to 127+00 Rt. –L-. Total capacity required is 5947 cubic ft and the total capacity provided is 24,550 cubic ft. Runoff from the project will be directed to this Hazardous spill basin prior to entering the South Toe River.
- The existing culvert on Long Branch Creek left of station 126+50 –L- will be removed.The str eam will be restored in this area.

Sheet 13

- The existing 2 @ 6' x 6' RCBC on Long Branch Creek at station 134+80 –L- will be extended upstream 144ft and connected with the existing 2 @ 6' x 6' RCBC at station 10+51 –Y14- and then extended another 194 ft upstream.
- The existing 54" CMP on UT to Long Branch Creek at station 139+18 –L- is in poor condition and it will be replaced with a new 54" pipe.
- A grass swale is proposed from station 135+75 to 139+00 –L-Lt.

Sheets 14

- It was noted that some of the wetlands shown south of the project on this sheet have been filled in by recent construction. NCDOT and the USACOE will investigate.

- The existing 30" CMP on UT to Long Branch Creek at station 150+90 –L- is in poor condition and it will be replaced with a new 36" RCP.
- Recommended the grass swale at station 155+50 –L- Rt. to station 156+50 –L- Rt. be expanded into a dry detention basin.
- The existing 7' x 5' RCBC on UT to Long Branch Creek at station 155+45 –L- will be extended upstream and downstream. There is approximately a 2 ft. drop at the outlet of the existing culvert. NCDOT will design the stream relocation at the outlet with step pools to bring the stream grade back up to the culvert outlet elevation.
- The existing 10' x 5' RCBC on UT to Long Branch Creek at station 14+90 –Y17- is in poor condition and will be removed and replaced with an 8' x 6' RCBC with alternating low flow baffles.

Sheet 15

- No changes recommended.

Sheet 16

- The existing 36" CMP on UT to Long Branch Creek left of station 179+75-L- will be removed. The stream bank adjacent to the road will need to be rip rapped in this area due to the close proximity of the creek.
- The existing 36" CMP on UT to Long Branch Creek at station 183+10-L- will be removed and replaced with a new 36" RCP. The stream begins just south of the project and all of the stream south of the project will be permanently impacted.

Sheet 17

- The existing 30" CMP on UT to Long Branch Creek at station 191+55-L- will be removed and will be replaced with a 42" RCP. The existing 36" CMP on UT to Long Branch Creek at station 195+61-L- will be removed. This tributary will be picked up in a 24" CSP south of the project and piped to the 42" RCP at station 191+55-L-.

Sheet 18

- UT's to Parsnip Branch at station 205+60 and 206+50 –L- north of the project will be impacted due to roadway widening.
- A historic property is located right of station 215+00 –L-. It is recommended to eliminate pipe outlet and rip rap ditch from station 214+10 –L- Rt to station 214+70 –L- Rt in this location to avoid impacts to the historic property.
- The existing 54" CMP on Parnsip Branch at station 214+00 –L- is in poor condition and it will be replaced with a new 60" pipe. Further coordination will be required with the NCDOT Human Environment Unit to determine if this will have an adverse impact on the historic property.

Sheet 19

- No changes recommended.

Sheet 20A

- Grass swale used from station 237+00 to 241+00 –L- Rt.
- Preformed scour used left of station 246+30 –L-
- Stream relocation of UT to Big Crabtree Creek from station 244+00 –L- Rt to station 248+00 –L- Rt. NCDOT will investigate if stream mitigation is possible at this location. It was noted that there is an archeological site in this location and that further coordination will be required with the NCDOT Human Environment Unit.

Sheet 21A

- The existing 4 @ 11' x 11' RCBC on Big Crabtree Creek at station 248+00 –L- will be replaced with a 3 span concrete girder bridge 216' in length. The center span will span the creek. NCDOT will restore Big Crabtree Creek where the culvert is removed.
- A dry detention Basin is proposed right of station 251+00 –L-.
- The existing 54" CMP on the UT to Big Crabtree Creek at station 15+05 –Y23A- is in poor condition and will be replaced with a 60" RCP. NCDOT will investigate if the rip rap bank protection upstream of the new 60" RCP in this location can be reduced.

At this point in the meeting it was decided that another meeting would be required to finish the 4b review. NCDOT will try to combine the rest of the 4b meeting with the field meeting to review the South Toe River bridge crossing.

The meeting was adjourned at 4:15 pm.

Final Minutes for Second Hydraulic Design Review Meeting R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section West of Spruce Pines in Mitchell County
Division 13

A Hydraulic Design Review Meeting was held on Wednesday, September 23, 2009 in the Hydraulics Conference Room at the NCDOT Century Center Complex, Raleigh.

Team Members: Andrew Nottingham-Hydraulics (Present)
David Baker-USACE (Present)
Marella Buncick-USFWS (Present)
Marla Chambers-NCWRC (Present)
Brian Wrenn-NCDWQ (Teleconference)
Kathy Matthews-EPA (Present)
Charles P. Nicholson-TVA (Absent)
Donnie Brew- FHWA (Present)
Brenda Moore-Roadway (Present)
Quang Nguyen-Structures (Present)
Carla Dagnino – PDEA-NEU(Present)
Ricky A. Tipton-Division 13 (Absent)

Participants: Rekha Patel-Roadway
Amy Billings-Hydraulics
Melanie Nguyen – Hydraulics
Jamie Lancaster-NEU
Marissa Rodman-NEU
Linwood Stone-PDEA
Karen Reynolds – PDEA
Jeff Hemphill – NEU

The meeting began at 10:00 a.m. with introductions initiated by Andrew Notthingham (NCDOT Hydraulics) and proceeded with the review of the project as follows:

Sheet 21

- No changes recommended.

Sheet 22

- All existing outlets in this vicinity are badly eroded. Now the drainage is being taken to the dry detention basin on Sht 21.
- It is recommended to stabilize the channel beyond the outlet at STA 270+70 –L-(RT) with rip rap.
- There was some concern about the wetland in the middle of the page. This wetland is being supplied by the stream along the property line on the bottom portion of the page.

Sheet 23

- Show a short section of ditch with rip rap around Sta 282+00 to the JS. (in the middle of the sheet)

Sheet 24

- It was recommended to change the angle of the outlet pipe around Sta 300+00 –L- (RT) to come into the stream at an angle less than 90 degrees. This may result in a longer pipe section.

Sheet 25

- At the outlet of the 60" CSP, there is a small section of stream before the existing stream. The outlet is very steep; therefore, junction boxes (JB's) are being used to come out at a flatter slope. The erosion is minimized by piping to JB's.
- There are additional jurisdictional streams (JS) identified by Jeff Hemphill on this sheet left of station 305+50 –L-. These streams as well as other new streams noted in these minutes will need to be confirmed by USACE and DWQ.

Sheet 26

- There is an additional JS identified by Jeff Hemphill at approximately Sta 317+00 –L- (LT). Drainage in this area will be revised. The existing 30" cmp will now be retained rather than plugged.
- Two options were handed out for the culvert crossing under US 19 in the vicinity of –Y30- and –Y31-. A pdf of these alternates are included with these meeting minutes. The first option would involve a stream relocation of the Tributary to Brushy Creek south of the project from station 320+00 to 325+00 –L- Rt. under –Y30- and through the gas station property right of station 322+00 –L-. Geotech has done some soil investigations in the gas station area right of station 322+00 –L- and the soil is contaminated. Geotech estimated the cost to clean up the soil and ground water to be $700,000 with a low cost of $500,000 and a high cost of $1,000,000. If a channel is put in this location, there is a chance that some of the contamination may leach out into the channel and a treatment system would be needed. Option 2 involves a culvert crossing under US 19 at station 323 + 50 –L- going diagonally towards the wetland on the north side of the sheet. It is believed that this wetland may also be an old remnant channel. NCDOT will investigate if this area can be used for mitigation by relocating the stream with a buffer through the wetland area and then into Brushy Creek. The property in this area is currently being used as a pasture. The wetland in this area is mostly grass and does not rank too high. There would also be opportunity to treat stormwater from the roadway in this area if it is bought for mitigation. The second option was the preferred by the team.
- There is a archeological site north of the project left of station 321+00 –L- that will have to be investigated.

- The existing 3 @ 8' x 8' reinforced concrete box culvert (RCBC) on Brushy Creek at station 319 +76 –L- is to be extended on the upstream and downstream ends. There was concern abut the 3.5' drop at the outlet side of the culvert. Hydraulics agreed to look into using step pools, cross vanes, sills in the culvert and flood plain benches in the channel to restore the stream in this area.
- The 2 @ 7'x 7' RCBC at Sta 327+50 –L- will be extended on the downstream end and normal flow will be maintained in the west side barrel.

Sheet 27

- Around Sta 335+00 –L- (LT), there is a proposed 24" RCP outletting to the stream. There is a big drop at the stream. It was requested that the pipe be placed at an angle more in the downstream direction rather than the 90 degree to the channel. A junction box (JB) will be added near the end of the pipe with a drop inside and the pipe will be angled more in the downstream direction.
- A preformed scour hole is proposed left of station 338+00 –L-.

Sheet 28

- The existing 2 @ 7' x 6' RCBC at Sta 345+00 –L- will be extended on the upstream end. A stream relocation will be required upstream of the culvert. It will not be a "natural stream design"; however the design will use natural stream design techniques to make the stream stable. There is also a conflict with the gas line. The gas line will probably have to be relocated and therefore there will be a utility easement. There may also be a need for a driveway access to the existing house in this area.
- Around Sta 350+00 –L- (RT) there is a proposed 24" pipe. It is recommended to use an outlet ditch to the stream from the 24" pipe.
- The existing 6' x 6' RCBC on –Y34- is perched on the outlet end. NCDOT proposes to replace this culvert with a new 6' x 7' RCBC buried 1 foot with baffles and a low flow channel. USFWS requested something more natural like an arched pipe or something other than concrete with a bankfull design through the structure. NCDOT prefers a concrete culvert for long term durability. Hydraulics may be able to look at a larger size culvert.
- Grass swale used from station 350+50 to 354+50 –L- RT.

Sheet 29

- There is an additional JS identified by Jeff Hemphill at approximately 358+50 –L- . The existing 30" pipe at this location is being extended with a 36" pipe. Since this stream is now jurisdictional, the rip rap pad at the outlet will be replaced with Class I rip rap on the banks only.
- Around Sta 360+00, it is recommended to adjust the angle on the 24" pipe and outlet channel near –Y36- to provide a smoother transition to the stream.

- There is an additional JS identified by Jeff Hemphill at approximately 367+50 –L- . The existing 42" pipe in this location will be extended on the upstream end and downstream end. The pipe is perched on the downstream end. A junction box with a drop in it will be used on the downstream end to dissipate the energy.

Sheet 30

- Grass swale used from station 379+00 to 381+50 –L- RT.

Sheets 31

- Two jurisdictional streams were identified by Jeff Hemphill at approximately stations 388+50 –L- rt. and 398+00 –L-. Topo of the stream at Sta 398+00 –L- needs to be extended beyond the limits of the fill slope on the right side.

Sheet 32

- At Sta 409+50 –L- (RT), see if a spring box is needed.

Sheet 33

- Sta 415+00 –L- (RT), there was some question as to whether this was a jurisdictional stream. It appears to be very steep, but not a JS. NEU will verify.

Sheet 34

- There is an additional JS identified by Jeff Hemphill at approximately 429+50 –L- at the 30" pipe crossing. The existing concrete lined ditches up and downstream of the 30" pipe crossing are badly eroded and in very poor condition. NCDOT proposes to replace the ditches with rip rap. NEU and Hydraulics will investigate if natural stream design is possible downstream of the 30" pipe crossing where the concrete ditches are to be replaced.

This concluded the review of the plans. Hydraulics will set up a field meeting to review and discuss the two design alternatives of the South Toe River Bridge.

The meeting was adjourned at 12:10 pm.

Minutes for South Toe River Bridge Field Meeting
R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section
West of Spruce Pine in Mitchell County
Division 13

Date: June 28, 2011
Time: 11:00 AM
Location: Bridge Site (South Toe River on US-19)

Team Members:
Andrew Nottingham-Hydraulics (Present)
Lori Beckwith-USACE (Present)
Marella Buncick-USFWS (Present)
Marla Chambers-NCWRC (Present)
Brian Wrenn-NCDWQ (Absent)
Chris Militscher-EPA (Absent)
Kenneth Parr-TVA (Absent)
Donnie Brew- FHWA (Absent)
Brenda Moore-Roadway (Absent)
Quang Nguyen-Structures (Absent)
Karen Reynolds-PDEA (Present)
Carla Dagnino – PDEA-NEU (Absent)
Ricky A. Tipton-Division 13 (Present)
David Harris-Roadside Environmental (Absent)

NCDOT:
Cameron Cochran-Bridge Construction
Jeff Hemphill – NEU
Melanie Nquyen-Hydraulics
Roger D. Bryan-Div 13
Barney Blackburn-REU
Jeff Walston-REU
Chuck Howard-TVA
Jeff Harris-Structures
Marc Cheek-Structures

The meeting began at 11:10 a.m. with introductions initiated by Andrew Nottingham (NCDOT Hydraulics).A summary of the comments and recommendations from the meeting are listed below.

The two alternatives presented in the information package for the meeting are as follows:

Alternative #1 is a steel plate girder bridge consisting of 3 spans of 1 @ 85 ft, 1 @ 175 ft, and 1 @ 55 ft. This alternative spans the entire river and has no permanent surface water impacts due to bridge piers. Anticipated temporary surface water impacts due to rock causeways required for construction for this alternative are approximately 0.37 acres (16,117 ft^2).

Alternative #2 is a concrete girder bridge consisting of 3 spans of 2 @ 120 ft and 1 @ 75ft. This alternative almost spans the entire river but does have permanent surface water impacts due to bridge piers of approximately 120 ft^2. Anticipated temporary surface water impacts due to rock causeways required for construction for this alternative are approximately 0.18 acres (7,841 ft^2).

Hydraulics noted that NCDOT has committed to spanning the South Toe River as documented in the Biological Assessment and the Biological Opinion for the project.

It was noted that the temporary impacts due to the causeways for Alternate #1 (16,117 ft^2) were more than the 9600 ft^2 estimated in the Biological Assessment.

USFWS noted that consultation would likely have to be reopened for this project since impacts have changed and another alternative other than spanning the river is being considered.

NCDOT noted that although Alternate #1 would span the river,th e temporary causeway impacts would be substantially more than Alternate #2 and it would be much more difficult to construct. Alternate #1 would likely require a temporary bent to help support the steel girders due to the length of the girders. It was also explained how steel girders would require cranes to hold them in place until they can safely stand on their own until after they are framed together. It was noted that Alternate #2 uses concrete girders that once they are set in place they can stand on their own and do not require an additional crane to hold them in place. Alternate #1 would likely require larger and more cranes than Alternate #2.

NCDOT noted that access roads would be required on both sides of the river on the upstream side of the bridge and on the west side of the river on the downstream side of the bridge. Access to the east side of the river on the downstream side of the bridge would have to be done by going under the bridge from the access road and temporary causeway on the upstream east side of the bridge. Due to this,the causew ay on the upstream east side of the bridge would likely have to remain in place throughout construction to allow access under the bridge. This would be more than a year. The causeway for Alternate #1 in this location is the biggest impact to the river and therefore of concern.

It was asked if there was any other option that would minimize the time and the amount of temporary impact by the causeways. NCDOT did not see any other option at this time to minimize the length of time. It was asked if a temporary work bridge could be used

instead of a causeway. NCDOT noted that rock causeways were preferred due to the large cranes that would be required.

TVA asked what is the cost difference between the causeways and work bridge. (not sure if a specific answer was given to this question)

It was asked if any pipes would be needed in the causeway on the upstream eastern side of the bridge for Alternate #1. It was noted that the causeway would have to be raised to put pipes under it which would in turn increase temporary impacts. It was also noted that the causeway in this area of the river is not in the main channel and due to the bend in the river the pipes could not be lined up effectively with the flow.

TVA questioned if the mussels that are removed would be returned to the same area. USFWS noted that that had not been determined yet. TVA asked how the site will look like when the construction is completed based on previous experiences. Roger D. Bryan (Division 13) said he was not sure because they mostly deal with bedrock and not fine material like this one.

NCDOT noted that removal of the existing bridge deck could be done by saw cutting the deck into pieces and removing it from the top. Removal of the existing piers would require rock causeways for access as shown in the information package drawings.

Hydraulics noted that hazardous spill basins are proposed upstream of the bridge on the east and west sides of the river and will collect the roadway drainage and bridge deck drainage.

USFWS noted that the area on the downstream west side of the river is where most of the mussels have been found. This area would be the most sensitive area and impacts to this area should be minimized as much as possible. Both alternates will impact this area due to the temporary causeways required in phase 3 to construct the downstream portion of the new bridge. NCDOT noted that they would look at revising Alternate #2 to minimize the impacts in this area by moving the piers out of the water in this location by changing the span arrangement.

It was decide that NCDOT would prepare drawings for the revised Alternate #2 showing the new span arrangement and the temporary rock causeways required to construct the bridge. NCDOT would then send this information to the team members for review and comment. USFWS will review the new drawings and prepare a list of questions for NCDOT to answer concerning the alternates and bridge construction to help in making a decision on which alternate to use. NCDOT will provide answers and set up another field meeting to decide which alternative to use.

USFWS noted that consultation would be officially reopened once the specific alternate has been decided.

Meeting adjourned at 12:45 pm.

Final Minutes for South Toe River
Second Hydraulic Design Review Meeting
R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section
West of Spruce Pines in Mitchell County
Division 13

A Hydraulic Design Review Meeting was held on Wednesday, June 20, 2012 in the Hydraulics Conference Room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Andrew Nottingham-Hydraulics (Present)
Stephen Morgan – Hydraulics (Present)
Lori Beckwith-USACE (Teleconference)
Marella Buncick-USFWS (Present)
Marla Chambers-NCWRC (Teleconference)
Amy Euliss-NCDWQ (Teleconference)
Chris Militscher-EPA (Teleconference)
Charles P. Nicholson-TVA (Absent)
Michael Batuzich - FHWA (Absent)
Greg Brew-Roadway (Present)
David Stutts-Structures (Present)
Carla Dagnino – PDEA-NEU(Present)
Ricky A. Tipton-Division 13 (Teleconference)

Participants:
Elizabeth Lusk- PDEA
Jeff Hemphill – PDEA – NEU
Thad Duncan-Roadway
Jared Gray – PDEA
Amy Simes - DENR
Karen Reynolds – PDEA
Mark Staley – Roadside Environmental
Amy Billings-Hydraulics
Cameron Cochran – Bridge Construction (Teleconference)
Roger Bryan – Div 13 (Teleconference)
Marissa Rodman-NEU
Lamees Esmail – Hydraulics

The meeting began at 9:00 a.m. with introductions initiated by Stephen Morgan (NCDOT Hydraulics) and then continued with a review of meeting minutes from the July 22, 2009 4B meeting and the June 28, 2011 field meeting pertaining to the South Toe River Bridge. The purpose of the meeting was to decide which alternate will be chosen for the bridge structure at the South Toe River Crossing, the steel girder option (alternative 1) or the concrete girder option (alternative 2). It was noted that alternative 1 had more temporary impacts than alternative 2 and more than were stated in the Biological Assessment.

Revised drawings were reviewed that showed alternative 2 interior bents shifted westward to get the bents out of the water in the more sensitive area of the project.

The group discussed how demolition of the existing bents could be accomplished. NCDOT bridge construction said the first attempt would be to pull the bents over and remove them completely. The next option would be to remove as much as possible. EPA asked if this could be done by sawing. NCDOT said the best method would be by hammering away the concrete and then cutting the reinforcing steel. The group had concerns about the environmental effects of saw cutting, noting containment of the saw dust is problematic. NCDENR noted the high pH levels of concrete dust. USFWS expressed concerns that the bent footings had established particular in-stream hydraulics that aided in the mussel habitat, and that total removal could disrupt this dynamic. NCDOT prefers that the work pads for removal of the existing bridge remain part of the contract and the team agreed. The team noted that the river has recreational uses and consideration must be given to boating safety- either the bents need to be removed well below the water surface, or they should remain exposed above the normal water surface with no re-bar exposed. NCDOT will gather more information from as-built plans, bridge inspection reports, and geotechnical information to make a final recommendation on bent removal. EPA said any special provisions for bent removal need to be well-written. NCDOT Division said no work would be performed during the removal stage without NCDOT inspectors present and an approved work plan.

NCDOT reminded the group that both alternatives have essentially the same impacts for the various phases of construction except for the larger work pad required for the initial phase of alternative 1. NCDOT's preference would be alternative 2 because a concrete girder bridge is better long-term for maintenance and short-term for cost. NCDOT also noted the original agreement to span the river (alternative1). Upon USFWS recommendation and no objection from the group, alternative 1 was chosen to move forward through design. Consultation for the Biological Assessment and Biological Opinion will be reopened to address the impact changes for this alternative. The consultation will include construction phasing timing among other things.

Other items discussed

NCDENR asked if the Hazardous Spill Basin (HSB) could be altered to also function as a dry detention basin. NCDOT said it could be. EPA inquired about the offsite drainage in the SE quadrant of the bridge. NCDOT noted the feature shown in this quadrant was

non-jurisdictional on recent field reviews, and the offsite drainage is currently in a pipe network all the way to the stream. EPA asked if the 18" pipe could be directed into the HSB. NCDENR replied this would not be preferred because it co-mingles responsibility for maintaining storm water discharge. NCDOT will further investigate the origin of the pipe. NCDENR asked if the access road along the northwestern quadrant could be moved away from the river bank as far as possible. NCDOT agreed it could.

NCDOT stated that the permit drawing review meeting (4C) will likely be in October 2012.

The meeting was adjourned at 10:35 a.m.

SRM

Final Minutes for South Toe River
Third Hydraulic Design Review Meeting
R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section
West of Spruce Pines in Mitchell County
Division 13

A Hydraulic Design Review Meeting was held on Wednesday, August 22, 2012 in the Hydraulics Conference Room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Stephen Morgan – Hydraulics (Present)
Lori Beckwith-USACE (Teleconference)
Marella Buncick-USFWS (Teleconference)
Marla Chambers-NCWRC (Teleconference)
Amy Euliss-NCDWQ (Teleconference)
Chris Militscher-EPA (Absent)
Charles P. Nicholson-TVA (Absent)
Mitch Batuzich - FHWA (Present)
Greg Brew-Roadway (Present)
David Stutts-Structures (Present)
Carla Dagnino – PDEA-NEU (Present)
Ricky A. Tipton-Division 13 (Teleconference)

Participants:
Jeff Hemphill – PDEA – NEU
Thad Duncan-Roadway
Jared Gray – PDEA
Amy Simes - DENR
Karen Reynolds – PDEA
Mark Staley – Roadside Environmental
Amy Billings-Hydraulics
Cameron Cochran – Bridge Construction (Teleconference)
Roger Bryan – Div 13 (Teleconference)
Marissa Cox-NES
Heather Wallace-NES
Ed Reams-Utilities

The meeting began at 9:00 a.m. with introductions initiated by Stephen Morgan (NCDOT Hydraulics) and then continued with a review of meeting minutes from the June 20, 2012 4B meeting about the South Toe River Bridge. The purpose of the meeting was to introduce a third alternate for the bridge structure at the South Toe River Crossing. The third alternative is similar to the concrete girder option (alternative 2). Alternative 3 has a different span arrangement (1@100', 1@140', and 1@75') and consists of prestressed

concrete girders (72" bulb tees). This alternative has less of an impact to the mussel nursery area.

Revised drawings were reviewed that showed alternative 3 interior bents locations. Photos were displayed showing this location in greater detail.

At the last meeting in June, the steel bridge alternative was selected. Upon further review, the DOT came up with a third alternative (prestressed girder with different span arrangements). This alternative seems to be better suited to the project for several reasons as outlined by Structures:

1. Steel is more expensive in all aspects including material, construction and maintenance
    a. Two joints would be required on the bridge and would need replacing.
    b. Joints will eventually leak causing corrosion at end of girders.
    c. Steel would require long-term maintenance for the life-span of the bridge
    d. Temporary bents required during construction causing more temporary impact
2. Prestressed Girders will be cheaper in material, construction and maintenance
    a. Can be designed continuous for live load which requires no joints on the bridge.
    b. Allows for more balanced span arrangement
    c. Less impact

The meeting was then open to discussion.

There was discussion about the footing at bent #2. It is believed that the existing bent 2 has a spread footing with dimensions 6'-9"x7'-6" according to old microfiche drawings. USFWS was ok with the new bent going in the same location as that of the existing. If the existing bents cannot be removed easily, another alternative would be to use a hammerhead bent located between the existing 2 piers (a distance of approximately 14' at bent 2). Structures commented that there may not be a need for hammerheads if drilled shaft construction were to be used which was agreeable to the Bridge Construction Engineer. If using hammerhead piers, the existing bents could be left in place.

An old bridge survey report (BSR) of the South Toe River dated November 1957 was displayed. The South Toe River seems stable based on the old BSR. The river and Long Branch Creek do not appear to be shifting since that time.

The discussion of work pads followed. Bridge Construction commented that Alternative 3 would have less permanent impacts but the temporary impacts would not be reduced much. The temporary impacts are mostly from bride demolition. Phase 2 will be very short in duration since the removal does not take long. NCWRC questioned why a work pad was being used instead of a work bridge. A work bridge would not be a viable

solution since very large cranes would be required for this bridge and therefore resulting in a very large work bridge. It was noted that the normal water surface at this location is very shallow. USFWS was satisfied with a concrete bridge alternative, however, they are unsure about the bent 2 removal and would like the plans refined with the room for work and construction clearly defined. Bridge Construction said bent 2 foundation appears to be 6' below the water level and has a thickness of approximately 2'-3". It would appear that a 10' deep hole would be required to dig it out. USFWS would be agreeable to the removal if it was done under low flow conditions. USFWS main concern is the sediment in the stream. They would prefer a turbidity curtain be used or other appropriate erosion control measures be taken. Bridge Construction said that the hole would be filled in as soon as possible during construction. NCDOT prefers removal of exiting bents if possible. Drilling thru the footing is not preferred since there may be a chance of hitting possible existing rebar or the edge of the footing. Bridge Construction commented that the contractor will minimize the causeways required for this location.

NCDOT and NEU discussed the mussel bed location. The location is approximate and there will be further investigation done in the field to locate the mussels more accurately before the next field meeting. NES will be in the field in the beginning of September and will be able to GPS the location of the mussels. NCWRC is concerned with the mussels during construction. NCDOT will move the mussels before construction and continue to monitor them after construction for a number of years. It was noted that the mussels have been moved in the past (every 5 years) and during the first 2 years there was a drought. The other years the mussels have been doing ok. The small mussels move up and down in the substrate. More details can be developed after further design details are complete and the mussel survey is complete.

USFWS requested another field meeting to discuss the timing and design and location of the hazardous spill basin. USFWS would also like to discuss more details about the construction phasing once the final bridge design is complete. There was also a request to have a representative from the Roadside Environmental group there to discuss erosion control plans. The timeline of the project will also be discussed.

The team will coordinate available dates to hold the field meeting. The 4C meeting may be held in December 2012.

Consultation for the Biological Assessment and Biological Opinion will be reopened to address the impact changes for this alternative. The HSB location needs to be considered for the BA/BO. NES will ask for assistance with the narrative portion of this report.

Follow up from Previous Meeting

NCDOT will further investigate the origin of the 18" pipe near the proposed HSB. This pipe was investigated in the field and it was determined that it carried just stormwater.
NCDOT stated that the permit drawing review meeting (4C) will likely be in October 2012. It is now likely this meeting will be held in December 2012.
The meeting was adjourned at 10:30 a.m.
SRM/AAB

Final Minutes for Permit Drawing Review (4C) Meeting
R-2519B

State Project 35609.1.1
US 19 east from NC 80 in Yancey County to multi-lane section
West of Spruce Pines in Mitchell County
Division 13

A Meeting was held on Wednesday, January 16, 2013 in the Structures Conference Room at the NCDOT Century Center Complex, Raleigh.

Team Members:
Stephen Morgan – Hydraulics (Present)
Lori Beckwith-USACE (Present)
Marella Buncick-USFWS (Present)
Marla Chambers-NCWRC (Present)
Amy Chapman for Amy Euliss-NCDWQ (Present)
Chris Militscher-EPA (Absent)
Charles P. Nicholson-TVA (Absent)
Mitch Batuzich - FHWA (Absent)
Greg Brew-Roadway (Present)
Kevin Fischer-Structures (Present)
Carla Dagnino – PDEA-NEU (Present)
Ricky A. Tipton-Division 13 (Teleconference)

Participants:
David Stutts-Structures
Thad Duncan-Roadway
Jeff Hemphill – PDEA – NEU
Heather Wallace-NES
Jamie Lancaster-NES
Marissa Cox-NES
Karen Reynolds- PDEA-NEU
Mark Staley – Roadside Environmental
Amy Billings-Hydraulics
Brian Radakovic-Hydraulics
Ed Reams-Utilities
Gary McLamb-Utilities

Non-Participants (Audit only)
Amanda Jones-USACE
Tasha McCormick-USACE
Monte Matthews-USACE
Tyler Crombley-USACE

The meeting began at 2:30pm with introductions initiated by Stephen Morgan (NCDOT Hydraulics). Meeting packets were distributed via the web prior to the meeting and available by paper copy during the meeting.

General Comments and Discussion

USFWS asked if NCDOT was aware of the Stormwater Management Plan (SMP) that had been implemented for all sections of the US19 project. NCDOT was not aware of a specific SMP for R-2519B that would supersede the present SMP developed during the final design and permitting phase, but would investigate. Note: after the meeting, the Biological Opinion (BO) was referenced. SMPs were developed for R-2518A, R-2518B and R-2519A but not R-2519B. "*....An SMP for R-2519B will be prepared during final design for that section of the project...*"

NCDOT stated the Stormwater Management Plan will reference site numbers in the final version.

NCDOT reminded the group that as the review of each site progressed, any design modification or revisions to hydraulic structures would have to be minor. Any significant changes need to be expressed during the hydraulic design review meeting (4B) at which time they could more easily be implemented.

Permit Drawing Review

The meeting then proceeded sheet by sheet for comments. Permit drawings were displayed on audiovisual equipment for group discussion.

Sheet 4:

- No comments.

Sheet 6:

- Impacts at Site 2A are near an existing 15" PVC on –Y4-. The existing pipe will be removed and replaced with 2@30" RCPs. Site 2A will be added to the SMP.

- Site 2 ***Little Crabtree Creek***: The group discussed the impacts where the four barrel culvert will be extended. The proposed culvert extensions are buried 1' and have baffles in them. Floodplain benching will be used to direct low flow through the center two barrels. An existing 18" CMP cross pipe is to be removed and replaced with a storm drainage system that outlets to an armored base ditch further from the creek. The existing cross pipe discharges directly to the creek. The proposed ditch provides some treatment before discharging to Little Crabtree Creek. There were no comments on this location in the previous 4B meeting minutes.

Sheet 7:

- Site 3: JS UT2B has been added to the list of streams for the project. This is a new site.

Sheet 9:

- There was some discussion about the Hazardous Spill Basin (HSB)/Dry Detention Basin (DDB) located in the middle of the page right of station 84+00. The basin is constructed on the inlet side of an existing cross pipe that will be replaced, with the outlet end of the cross pipe discharging to the South Toe River. NCDOT noted the HSB was requested at the hydraulic design review (4B) meeting. The basin will provide treatment where no treatment currently exists.

- The group discussed how the septic drain fields right of station 92+00 will be removed. The septic tanks will be pumped out, collapsed and removed prior to any earthwork.

Sheet 10:

- Site 4A is a new site.

Sheet 11/12:

- Site 5 ***South Toe River***: NCDOT noted the bridge design and construction had been discussed at length in the office and on site, with the plans showing the current span arrangement and impacts. The impacts shown are for the total impacts of all construction phases, with some impacts overlapping. The construction phasing is included in the permit drawings. Further discussion of this site will be included in the SMP.

- Site 5A will be discussed in the SMP. This site will also be included in the final design plans with design dimensions and details. NCDOT noted this is an in-kind stream replacement (148' for 148' of stream impacts) for no net loss. There will be no morphological table with this site. The relocation will be of similar dimension and profile. The stream will be stabilized with native vegetation and monitored for stability. USFWS would like to make sure stream stabilization can be ensured by language in the contract. The preference is for the stream to be relocated prior to bridge construction, with a minimum of one growing season prior to project completion. Consultation with the contractor for this location was requested by the resource agencies present. PDEA-NES will discuss proposals before finalizing in the permit.

- Site 6 involves culvert removal. This site would be eligible for stream restoration and on-site mitigation. USACE will coordinate restoration ratios with PDEA. DWQ would like information about the plants.

- The hazardous spill retention basin right of station 125+00 will be designed to have a dual function as a hazardous spill/dry detention basin.

- A match line will be added to designate the separation of sheets 11 and 12.

Sheet 13:

- Sites 7, 7A, 7B, 7C ***(Long Branch Creek)*** will be clarified and included in the SMP.

Sheet 14:

- Site 8 will be expanded to include site 8B and 8C and will be clarified in the SMP. 8B and 8C will be the two culverts. PDEA will discuss these sites with USACE.

- NCWRC would like to see baffles in the existing culvert. NCDOT Hydraulics noted cross vanes and sills were used in the downstream direction of the culvert to adjust the stream grade. Adding baffles would decrease culvert performance and increase flooding potential and are therefore not recommended.

- USFWS asked if the 36" pipe was connected through the side of the proposed culvert. NCDOT Hydraulics said it was and is designed as such to dissipate energy.

- USACE noted skewed culverts can present a problem with maintaining normal depth flow at the outlet due to the relationship of the baffles to the culvert geometry. Such low flow conditions are not suitable for fish passage. PDEA NES commented that cross vanes or other structure can be added downstream of culverts to maintain suitable low flow conditions when warranted.

Sheet 16:

- At the beginning of sheet 16, right of station 177+30, the rip rap will be drawn more accurately to show it does not enter the stream.

- Site 11 NCWRC prefers the pipe to angle toward the stream where it turns north. NCDWQ does not like the 90 degree bend. NCDOT Hydraulics commented that the pipe size is being increased therefore decreasing velocities and to realign the pipe would create more stream impacts. Having the rip rap bank stabilization allows the contractor to fix any sort of erosion problems that may exist and have a better transition from pipe outlet to existing stream dimensions. The team decided to keep the pipe outlet as shown.

Sheet 17:

- Site 13 showed part of the wetland being impacted by fill. The team agreed the remainder was so small and likely would be impacted so the entire wetland feature will be shown as a total take.

Sheet 18:

- Site 18: A drainage outlet previously shown at the 4B meeting right of station 215+00 has been removed to avoid impacts to the historic property.

Sheet 20/21:

- Site 20: The small wetland will be a total take. USACE and PDEA will discuss the stream relocation (Site21) to determine mitigation requirements.

- Site 22 ***Big Crabtree Creek***: No comment

- Site 23: Rip rap has been eliminated from the upstream side of the cross pipe as requested at the 4B meeting. The dry detention basin right of station 251+00 is receiving drainage from sheet 22 where existing eroded outlets have been abandoned.

- A match line will be added to the sheet to designate the separation of sheets 20 and 21.

Sheet 22 (no impacts):

- The SMP will discuss abandoning four badly eroded existing outlets and using a pipe system to discharge through the dry detention basin right of station 251+00 on sheet 21.

Sheet 23:

- Site 24 has a small ditch at the outlet of the storm drainage system as requested in a previous 4B meeting.

Sheet 24:

- As requested at the 4B meeting, the 54" pipe at Site 25 was angled toward the stream.

Sheet 25:

- The team discussed the stability of the short ditch between the two pipes at Site 26 (Non JS stream). The ditch detail will be changed to include rip rap.

Sheet 26:

- Site 29 ***(Brushy Creek)***: The fish ladder detail will be added to the permit drawings. The existing culvert will be retrofitted with sills and baffles. The tributary will be relocated to a new culvert at station 324+00 (Site 30). This stream relocation was the preferred alternative from the 4B meeting.

- Site 30 will include the culvert. All of parcel no. 154 will be purchased and used for stream restoration and floodplain preservation. There will be a planting plan for this site. The plants will be similar to existing vegetation. The stream relocation details will be part of the final design plans. Morphological table will be included in SMP.

- Site 31 will include temporary impacts on the upstream side of the culvert due to watercourse management for the downstream extension.

Sheet 27 (no impacts):

- (Non JS stream) Left of station 335+00 the outlet of the storm drainage system goes into a junction box for energy dissipation and outlets at an angle per request in the 4B meeting.

Sheet 28:

- Site 33: Right of station 350+00 a small open channel was added downstream of the 24" pipe per requested in the 4B meeting.

- Site 34: After the building adjacent to the stream is removed the stream banks will be re-graded to a more stable section upstream of the culvert. The site will then be placed in right-of-way.

Sheet 29:

- Site 35 is a new site added since the 2004 field verification.

- There is no Site 36.

- Site 37: The junction box and pipe stub-out right of station 367+00 will be reconfigured to a straighter alignment to the receiving stream. The note "flush out ditch" will be removed from the plans.

Sheet 30:

- No comments

Sheet 31:

- Sites 39 and 40 are new sites added since the 2004 field verification.

Sheet 32:

- Site 42: Right of station 409+50 a spring box was added as requested in the 4B meeting.

Sheet 33;

- The drainage feature shown right of station 414+50 is non-jurisdictional but had inadvertently been hatched as an impacted site. The hatching will be removed.

Sheet 34:

- Site 45: The concrete ditch replacement (with rip rap) will be shown as a non-mitigable permanent impact. Per USCACE, there is "no net loss".

No further comments

Meeting adjourned 5:45pm

Form Revised 6-10-92

North Carolina Department of Transportation
PROJECT ENVIRONMENTAL CONSULTATION FORM (REVISION)
I.D. No.: R-2519B

I. GENERAL INFORMATION

a.	Consultation Phase:	Right-of-Way	
b.	Project Description	US 19E Improvements from SR 1186 in Micaville to the existing multilane section west of Spruce Pine, Yancey and Mitchell Counties, Highway Division 13	
c.	State Project:	6.909001T	
	WBS Project	35609.1.1	
d.	Document Type:	State FONSI	07/17/09 Date

II. CONCLUSIONS

The above environmental document has been reevaluated as required by 23 CFR 771. It was determined that the current proposed action is essentially the same as the original proposed action. Proposed changes, if any, are noted below in Section III. It has been determined that anticipated social, economic, and environmental impacts were accurately described in the above referenced document(s), unless noted otherwise herein. Therefore, the original Administration Action remains valid.

III. CHANGES IN PROPOSED ACTION AND ENVIRONMENTAL CONSEQUENCES

No major design changes have occurred in this project since the FONSI was signed on July 17, 2009, however, some minor design changes have occurred within the project limits since then. These changes were the addition of small parcel segments adjacent to US 19 for additional right-of-way, permanent easements, permanent drainage easements and temporary drainage easements between Roadway Sta. 245+00 and Sta. 255+00, in the vicinity of the proposed Big Crabtree Creek Bridge. None of these additions will have any anticipated social, economic or environmental impacts to resources within the proposed project.

The Threatened & Endangered Species List for Yancey County was updated on March 21, 2011. The Eastern Cougar was dropped from the Yancey County list. The Threatened & Endangered Species List for Mitchell County was updated on September 22, 2010. The Appalachian elktoe mussel is still the only Threatened & Endangered species impacted by this project. Mussel salvaging and upstream relocation began in 2008, in the proposed South Toe River Bridge replacement location, and will continue for five years after construction is complete.

IV. LIST OF ENVIRONMENTAL COMMITMENTS

D.O.T. will implement all practical measures and procedures to minimize and avoid environmental impacts. See attached list of project commitments.

Form Revised 6-10-92

V. COORDINATION

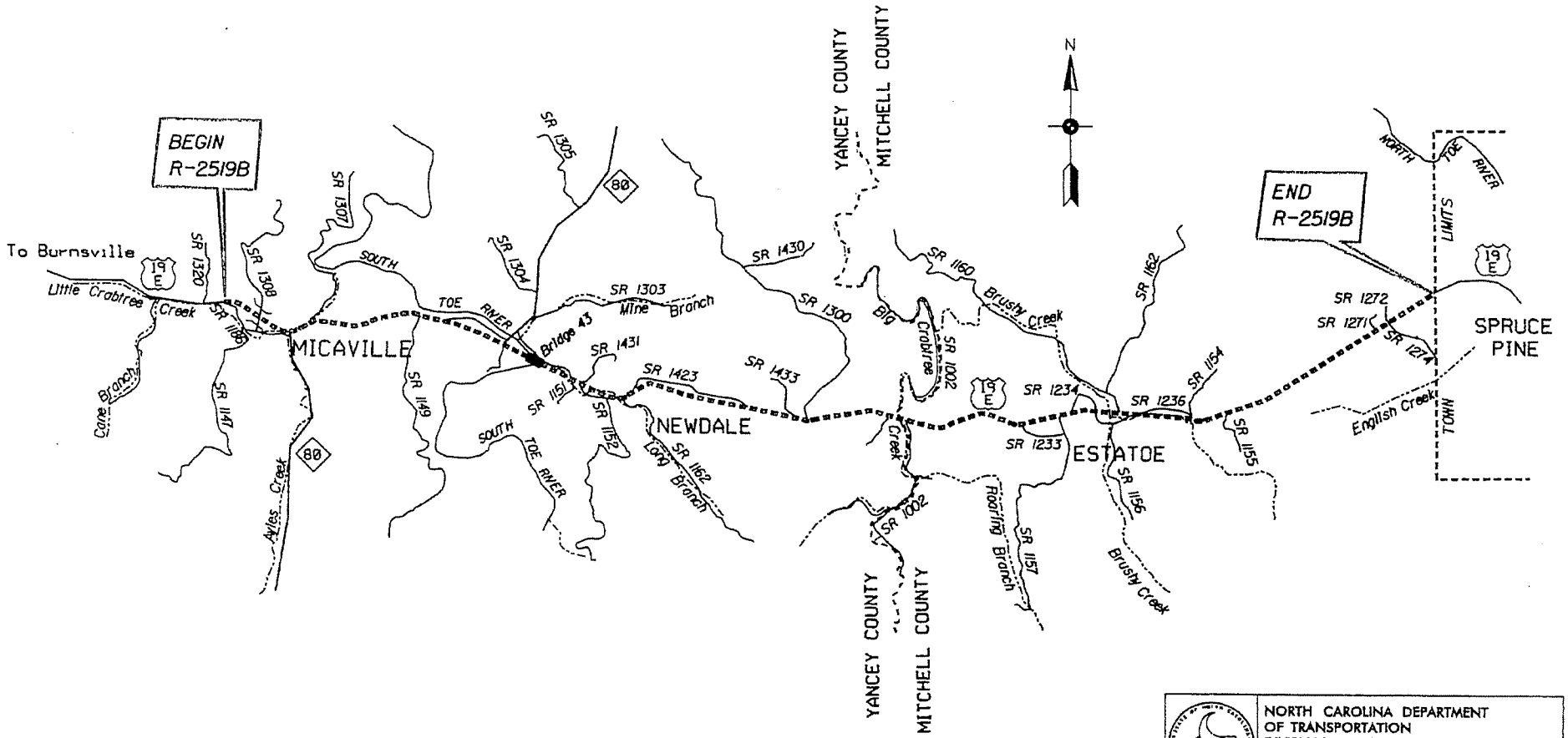
Project Development and Environmental Analysis Branch personnel have discussed current project proposals with others as follows:

Design Engineer:	Katrina Washington, PE, Roadway Design Unit	08/25/11 Date
Design Engineer:	Katrina Washington, PE, Roadway Design Unit	08/10/11 Date
Design Engineer:	Katrina Washington, PE, Roadway Design Unit	09/06/11 Date
Env. Review Coordinator:	Renee Gledhill-Earley, State Hist. Preservation Off.	08/21/09 Date
Archaeologist:	Gerold Glover, PhD, PDEA HEU	07/14/11 Date
Archaeologist:	Gerold Glover, PhD, PDEA HEU	09/06/11 Date
Permit Specialist:	Jeff Hemphill, PDEA NEU	07/14/11 Date
Permit Specialist:	Jeff Hemphill, PDEA NEU	01/18/11 Date
Soil & Water Opps. Engineer:	Mark Staley, EI, Roadside Environmental Unit	07/12/11 Date
Soil & Water Eng. Supvsr.:	Barney Blackburn, PE, Roadside Environmental Unit	07/12/11 Date
Project Mgr. – Design:	Andrew Nottingham, PE, Hydraulics Unit	08/11/11 Date
Project Mgr. – Design:	Andrew Nottingham, PE, Hydraulics Unit	09/06/11 Date
Project Engineer:	Quang Nguyen, PE, Structure Design Unit	09/07/11 Date
Asst. State Bridge Engineer:	Allen Raynor, PE, Structure Design Unit	09/09/11 Date

VI. N.C.D.O.T. CONCURRENCE

Karen S. Reynolds — 9/12/2011
Project Planning Engineer — Date

for Susan Fant — 9/12/2011
Manager of Planning and Environmental Branch — Date



NORTH CAROLINA DEPARTMENT
OF TRANSPORTATION
DIVISION OF HIGHWAYS
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS BRANCH

US 19E IMPROVEMENTS
FROM SR 1186 TO SPRUCE PINE
YANCEY AND MITCHELL COUNTIES
STATE PROJECT NUMBER 6.909001T
T I P PROJECT R-2519B

R-2519B PROJECT LOCATION

Mitigation Plan
US 19E Widening
Yancey & Mitchell Counties, North Carolina
T.I.P. Number R-2519B
WBS No. 35609.1.1
May 6, 2013

1.0 BASELINE INFORMATION

Transportation Improvement Project (TIP) R-2519B involves improvements to existing US 19 from SR 1186 (Old US 19) on the west side of Micaville in Yancey County to multi-lane sections west of Spruce Pine in Mitchell County. The proposed construction of R-2519B involves unavoidable impacts to jurisdictional resources within USGS hydrologic unit 06010108 of the French Broad-Holston River Basin. NCDOT proposes to offset a portion of these impacts with on-site mitigation.

The R-2519B study area is located in the Blue Ridge physiographic province of western North Carolina. The topography in the project study area is generally characterized as rolling hills with steeply sloping, deeply cut drainage ways. Elevations in the study area range from 2,600 to 3,000 feet above mean sea level (USGS 1978, 1994). The project study area consists of existing maintained right-of-way including fill slopes, rural, residential, commercial, agricultural, and forested areas. Surrounding land uses include agricultural, residential, commercial, and forested lands.

The R-2519B Natural Resources Technical Report (NRTR) dated October 2004 provides further details concerning existing roadway/project study area conditions and jurisdictional resources. The mitigation site selection and mitigation work plan sections of this plan will refer to the identification labels given the affected jurisdictional resources in that NRTR. However, the site names match the associated permit impact site number.

2.0 SITE SELECTION

Each site was evaluated both internally as well as discussed and reviewed with regulatory personnel during concurrence meetings and field visits. All sites are located either within the existing or the proposed NCDOT Right-of-Way for US 19.

Site 5A - Long Branch
ONE ID# 100-013

This site is located on plan sheet 12 from Station 122+00 to 124+00 Lt and involves the relocation of 148 feet of Long Branch (2D). Long Branch is a tributary of the South Toe River and has a NCDWQ Best Use Classification of C and Tr. Long Branch has an USACE Stream Quality Assessment Worksheet score of 53.5 at this location where it flows between US 19 and SR 1424, Deneen Road. Relocating this portion of Long Branch prior to construction of the South Toe Bridge will avoid impacts directly to the channel as well as result in an improved tie-in further downstream from the existing confluence. The new tie-in will prevent Long Branch from discharging directly into the existing Appalachian Elktoe habitat located in the South Toe River.

Existing conditions on Long Branch include a bankfull width of 12 feet, eroding banks ranging from two to eight feet in height, beaver dams, and lack of a wooded buffer. There is currently an overhead utility line with a 30 foot easement that crosses Long Branch near the beginning of the relocation and runs parallel to Long Branch at this site.

Site 6 – Long Branch
ONE ID# 100-014
Located on plan sheet 12 from station 125+95 to 127+17 Lt, this site involves the removal of a perched, two-barrel, six foot by six foot, reinforced concrete box culvert (RCBC) on Long Branch (2D). NCDOT will restore 144 linear feet of Long Branch through the removal of the existing RCBC and soil path. The stress of the existing structure is evident by the presence of flow behind one of the wing walls at the inlet and a blowhole at the outlet. Long Branch has an USACE Stream Quality Assessment Worksheet score of 62.5 at this location where it flows between US 19 and SR 1424, Deneen Road. The US19 utility plans indicate that there are no existing utility easements at this location.

Site 8 – Long Branch
ONE ID# 100-015
NCDOT plans to relocate a total of 449 feet of Long Branch (2D) from station 152+50 to 155+00 Rt. and 155+98 to 157+80 Lt. to avoid additional impacts to the channel due to the road widening and associated fill slopes. Long Branch has an USACE Stream Quality Assessment Worksheet score of 59 at this location. Existing conditions include a scarcely vegetated buffer on the upstream portion, adjacent fill slope and cutover buffer conditions downstream, and a perched culvert. The upstream portion has fairly stable stream conditions, but the downstream portion has eroding, collapsing, and undercut banks. Utility plans show an existing overhead utility just south of Long Branch from station 152+00 to 155+00 Rt. The current buffer is affected by mowing of this utility easement.

Site 9 – Long Branch
ONE ID# 100-016
NCDOT will remove a perched 36 inch corrugated metal pipe and restore 40 feet of Long Branch at this site which is located on plan sheet 15 at station 179+80. Existing channel conditions include a bankfull width of five to six feet, bank heights of two to three feet, and a narrow scrubby vegetated buffer approximately 10-15 feet wide. Long Branch at this location has an USACE Stream Quality Assessment Worksheet score of 60.5. Existing adjacent conditions include an agricultural field and a cutover. The utility plans indicate that there are no existing utility easements at this location.

Site 18 – Parsnip Branch
ONE ID# 100-017
Due to the installation of a new 54" pipe, NCDOT plans to relocate 70 feet of Parsnip branch instead of extending the new pipe structure at this site which is located on plan sheet 18 at station 214+00 Lt. Existing channel conditions include a varying bankfull width from two to six feet, bank heights ranging from two to ten feet and an existing 54" pipe that is perched 12-18". Parsnip Branch has a sparsely vegetated buffer on one side, a grass buffer on the other, and scored 60.5 on the USACE Stream Quality Assessment Worksheet at this location. The utility plans indicate that

there are no existing utilities at this location.

Site 21 – UT Big Crabtree Creek
ONE ID# 100-018
This site involves the relocation of 396 feet of UT Crabtree Creek (1I) due to the widening of the roadway. This site is located on plan sheets 20 and 21 from station 244+10 to 247+94 Rt. Existing conditions include a very narrow buffer with a few trees on the north side due to the proximity of the existing US 19 fill slope and a narrow buffer on the southern side due to the adjacent pasture. UT Big Crabtree Creek has an USACE Stream Quality Assessment Worksheet score of 59.5 at this location. The utility plans indicate an existing overhead utility that crosses UT Big Crabtree Creek near the confluence with Big Crabtree Creek.

Site 25 – Fox Hollow Creek
ONE ID# 061-003
Located on plan sheet 24 at station 299+30 to 300+31 Rt, this site involves the relocation of 94 feet of Fox Hollow Creek (stream 2E) due to the road widening and new 54 inch reinforced concrete pipe at this location. Existing conditions of Fox Hollow Creek include a bankfull width of six feet, bank heights of two to four feet (some of which are unstable), a slight head cut in the channel, and a wooded buffer on both sides greater than 50 feet. The stream has an USACE Stream Quality Assessment Worksheet score of 67. No current utility easements exist that neither cross nor run adjacent to the stream at this location.

Site 30 – UT Brushy Creek
ONE ID# 061-004
This site involves the relocation and restoration of 635 feet of an unnamed tributary to Brushy Creek (stream 1G) into the historic, relic channel location. It is located on plan sheet 26 at station 325+00. The existing channel currently runs parallel between US 19 and a gas station/repair shop and parking lot. The channel has a narrow, maintained grass buffer and receives direct storm water runoff from the parking lot and road. There are several areas exhibiting severe erosion problems. Existing channel conditions include a bankfull width of four to six feet, bank heights between one and two feet, and an USACE Stream Quality Assessment Worksheet score of 22.5. There are no existing utility easements at this location.

Site 33 – UT Brushy Creek
ONE ID# 061-005
This site is located on plan sheet 28 at station 346+50 Rt. and involves the relocation of 300 feet of an unnamed tributary to Brushy Creek (stream 1G). The existing channel runs parallel to US 19 with a narrow, fifteen foot wide, wooded buffer on both sides of the channel. It has an existing bankfull width of six feet, two foot bank heights, and an USACE Stream Quality Assessment Worksheet score of 60.5. Currently, there is an overhead transmission line that both crosses as well as runs parallel to the stream at this location. There is also an existing gas line that crosses the stream at this location.

Site 35 – UT Brushy Creek
ONE ID# 061-006
On plan sheet 29 at station 358+50, NCDOT plans to relocate 46 feet of UT Brushy Creek to

establish a better alignment with the new structure. An existing 24 inch reinforced concrete pipe and a 30 inch corrugated metal pipe are being removed and replaced with a 30 inch welded steel pipe which SF will flow through under US 19. The existing channel has a bankfull width of two to three feet, one foot bank heights, and an USACE Stream Quality Assessment Worksheet score of 65. There are no existing utility easements at this location.

3.0 SITE PROTECTION INSTRUMENT

The mitigation areas are within the NCDOT Right-of-Way for the project. They will be managed to prohibit all use inconsistent with their use as mitigation properties, including any activity that would materially alter the biological integrity or functional and educational value of the sites, consistent with the mitigation plan.

The sites will be placed on the Natural Environment Section's Mitigation GeoDatabase. This database is provided to all NCDOT personnel as a record of mitigation sites and their attributes, including prohibited activities. NCDOT is held by virtue of the permit associated with these mitigation sites and the associated roadway impacts to protect the sites in perpetuity.

4.0 OBJECTIVES

The goal of the proposed onsite mitigation is to offset and mitigate for impacts due to R-2519B by restoring adjacent stream systems to their natural conditions through the removal of structures, restoration of channel dimensions and profiles, and establishment of riparian buffer areas. This will be achieved on ten individual sites described below on a total of 2347 linear feet of stream.

5.0 MITIGATION WORK PLAN

Each mitigation site will be constructed in conjunction with the construction of the roadway project. Following the successful completion of site grading and stabilization, each site will be reforested with a mix of bare-root tree species and live stakes as described in the Streambank Reforestation Detail in Appendix A. The stream channels will be stabilized by planting live stakes on three foot centers and matting with coir fiber on the banks as necessary.

In accordance with the guidance and standard procedures of NCDOT's Roadside Environmental Unit (REU), seeding and mulching will be performed on all disturbed areas within the mitigation sites for stabilization purposes. An as-built report will be submitted within 60 days of completion of the project.

The Natural Environment Section shall be contacted to provide construction assistance to ensure that each mitigation area is constructed appropriately.

Site 5A - Long Branch
ONE ID# 100-013

This site involves the relocation of 148 feet of Long Branch at the confluence with the South Toe River. The proposed stream channel will be nine feet wide with a three foot bankfull depth and a 21 foot bankfull width. A five foot wide bankfull bench will be constructed along the southern bank for the entire length of the relocation. The new channel will have a 25 ft. buffer on the north

bank and a 30 ft. buffer on the south bank. The utility plans show that the existing utility will remain unchanged along this section therefore utility maintenance will continue to affect the buffer along Long Branch at this location.

Site 6 - Long Branch
ONE ID# 100-014
The proposed removal of two, existing, six foot by six foot barrel RCBCs and a soil path at this location will restore 144 feet of Long Branch. The proposed stream channel design will be nine feet wide with a three foot bankfull depth and a 21 foot bankfull width. A five foot wide bankfull bench will be constructed on both sides of the new channel. A 50 foot buffer will be planted on the north side and a 30 foot buffer will be planted on the south side (Appendix A). The US19 utility plans indicate that there are no existing utility easements at this location.

Site 8 - Long Branch
ONE ID# 100-015
NCDOT will relocate two sections of Long Branch for a total of 449 feet. The new channel will be six feet wide and two feet deep with a bankfull width of 14 feet. A five foot bankfull bench will be constructed on the south bank for the entire 449 feet. Also, six cross vanes will be installed for grade control. Additionally, installation of an extension structure at the outlet of the culvert in conjunction with the channel relocation will correct the perched culvert condition. The new stream channel will have a total forested buffer width of 35 feet on the upstream section and approximately 20 feet wide on the downstream section (Appendix A). Proposed utility plans indicate that the existing overhead utility will remain in place until approximately Sta. 153+75 Rt and then shift slightly south until Sta. 155+00 Rt.

Site 9 - Long Branch
ONE ID# 100-016
This site involves removal of a 36 inch corrugated metal pipe and associated daylighting and restoration of 40 feet of Long Branch. The restored channel will be three feet deep with a three foot wide base resulting in a bankfull width of 13.5 feet. The stream bank adjacent to the new roadway fill slope will be lined with Class II rip rap to provide stability while the other bank will have a 20 foot reforested buffer (Appendix A). No proposed utility easements will affect this mitigation area.

Site 18 - Parsnip Branch
ONE ID# 100-017
Proposed conditions for the relocation of 70 feet of Parsnip Branch include a constructed channel base of five feet with a two foot depth resulting in a 13 foot bankfull width. The channel will be lined with Class I rip rap from the channel toe up the side slopes to a height of 1.5 feet. A 50 foot buffer will be planted on the eastern bank and a 40-50 foot wide buffer will be planted on the western side (Appendix A). The utility plans indicate a new overhead utility will be installed just west of Arbuckle Road but it should not have any effect on the stream mitigation area.

Site 21 - UT Big Crabtree Creek
ONE ID# 100-018
Proposed channel design for the relocation of 396 feet of UT Crabtree Creek includes a channel base of four feet with a two foot depth. A buffer ranging in width from 18 to 45 feet will be planted

along the southern bank and a buffer 12 feet wide will be planted along the northern bank between the stream restoration and US 19 (Appendix A). The utility plans indicate an existing overhead utility that crosses UT Big Crabtree Creek near the confluence with Big Crabtree Creek will be removed.

Site 25 – Fox Hollow Creek
ONE ID# 061-002
NCDOT will relocate 94 feet of Fox Hollow Creek due to the road widening and new 54 inch reinforced concrete pipe at this location. Proposed channel design for Fox Hollow Creek include a five foot wide base with a depth of two and a half feet resulting in a bankfull width of 15 feet. The stream will have a 50 foot buffer on the northern bank and a 10-25 foot buffer on the southern bank (Appendix A). The US 19 utility plans show no proposed utility easements that would affect the mitigation area.

Site 30 – UT Brushy Creek
ONE ID# 061-003
This site involves the proposed relocation and restoration of 635 feet of an unnamed tributary to Brushy Creek to its historic, relic channel location. The stream will run under US 19 through two, new, 8x8, reinforced concrete box culverts and will flow into an adjacent field reestablishing the original flow path. The proposed channel design includes a six foot wide base with a two foot depth in the riffle sections resulting in a bankfull width of 14 feet. The proposed design also includes construction of a 10 foot wide bankfull bench. The new stream channel will have a wooded buffer greater than 50 feet on both sides (Appendix A). There are no proposed utility easements at this location.

Site 33 – UT Brushy Creek
ONE ID# 061-004
Due to the roadway fill, the existing UT to Brushy Creek culvert under US 19 will be extending with two, new, 7x7 reinforced concrete box culverts on the inlet side. Also, the existing stream channel will be filled. Therefore, NCDOT plans to relocate 300 feet of UT to Brushy Creek at this location. The proposed channel design has an eight foot base and a two foot depth resulting in a bankfull width of 16 feet. A five feet wide bench on the northern bank and a 10 feet wide bench on the southern bank will also be constructed. The existing transmission line and gas line will not be moved per the utility plans for this project and will continue to similarly affect the stream and buffer at this location.

Site 35 – UT Brushy Creek
ONE ID# 061-005
Due to the installation of a new location structure, NCDOT will daylight and relocate portions of UT Brushy Creek for 46 feet at the inlet end of the stream to provide a better alignment and tie-in. The proposed design includes a "v" shaped channel with a bankfull width of seven feet. The channel will be lined with a permanent soil reinforcement matting and a wooded buffer of 10 feet will be planted on each side of the stream (Appendix A).There are no utility easements proposed per the utility plans at this location.

6.0 PERFORMANCE STANDARDS

Success for vegetation monitoring within the riparian buffer areas are based on the survival of at least 260 stems of five year old trees at year five. Assessment of channel stability will be based on the survival of riparian vegetation and lack of significant bank erosion, channel widening or down-cutting.

7.0 MONITORING REQUIREMENTS

All of the mitigation sites will be monitored according to the April 2003 Stream Mitigation Guidelines. The following components of Level 1 monitoring will be performed annually for five years: reference photos, plant survival monitoring (identification of specific problem areas and remedial action), and visual inspection of channel stability. Vegetation stem counts will be conducted on Sites 8, 21 and 30 only. Physical measurements of channel stability/morphology will not be performed. An as-built will be submitted for each site and will include stream channel profile and cross-section surveys which will provide a baseline for comparison if it is determined at any time during the monitoring period that a problem has occurred.

8.0 OTHER INFORMATION

No additional information to provide.

9.0 DETERMINATION OF CREDITS

Based on field and meeting discussions with agency representatives and per the NCDOT plans and 401/404 permit application for R-2519B; NCDOT proposes to provide a total of 2,322 linear feet of stream channel relocations and restorations for a total of 2957 feet of mitigation credit. This mitigation credit total is based on a 1:1 ratio for all the sites with the exception of a 1:2 ratio at Site 30 based on the existing and proposed condition.

An as-built report will be submitted within 60 days of completion of the each mitigation site to verify actual mitigation areas constructed and planted. The success of the mitigation areas and determination of final credits will be based upon successful completion and closeout of the monitoring period at each site.

9.1 CREDIT RELEASE SCHEDULE

NCDOT proposes immediate, full release of the proposed mitigation to offset the unavoidable impacts associated with R-2519B.

10.0 GEOGRAPHIC SERVICE AREA

The proposed Geographic Service Area (GSA) for the mitigation sites is composed of the 8-digit Hydrologic Cataloging Unit (HUC) 06010108.

11.0 MAINTENANCE PLAN

The mitigation sites will be held by NCDOT and placed on the NES mitigation geodatabase. Once monitoring is completed and the sites are closed out, they will be placed in the NCDOT Stewardship Program for long term maintenance and protection.

If an appropriate third party recipient is identified in the future, then the transfer of the property will include a conservation easement or other measure to protect the natural features and mitigation value of the site in perpetuity.

12.0 LONG TERM ADAPTIVE MANAGEMENT PLAN

The sites will be managed by NCDOT according to the mitigation plan. Encroachments into the areas will be investigated and appropriate measures taken to minimize any negative effects. In the event that unforeseen issues arise that affect the management of the site, any remediation will be addressed by NCDOT in coordination with the Interagency Review Team.

13.0 FINANCIAL ASSURANCES

NCDOT is held by permit conditions associated with R-2519B to construct, monitor, and steward the mitigation sites. NCDOT has established funds for each project and within each Division to monitor mitigation sites and protect them in perpetuity.

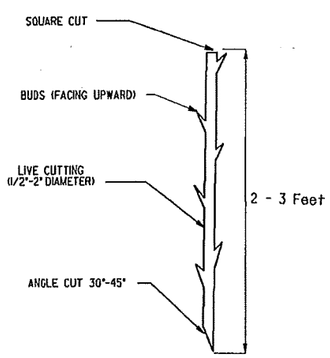
APPENDIX A.

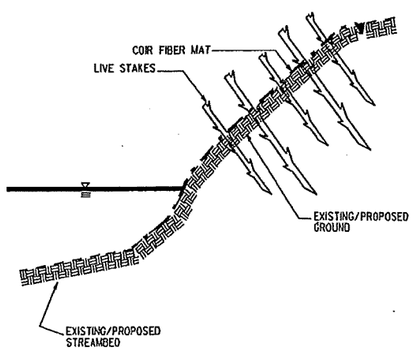
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	RF-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PLANTING DETAILS

LIVE STAKES PLANTING DETAIL

LIVE STAKE

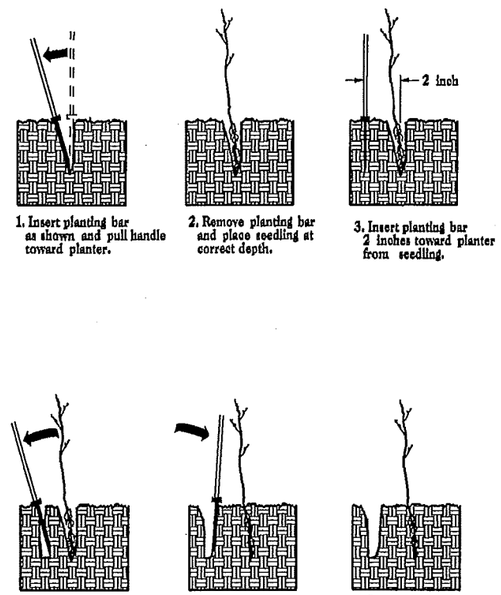




BANK STABILIZATION WITH LIVE STAKES

NOTE:
LIVE STAKES SHALL BE SPACED APPROXIMATELY 4 FEET ON CENTER
LIVE STAKES SHALL BE DRIVEN UNTIL APPROXIMATELY 3/4 OF LIVE STAKE IS WITHIN GROUND

BAREROOT PLANTING DETAIL DIBBLE PLANTING METHOD USING THE KBC PLANTING BAR



1. Insert planting bar as shown and pull handle toward planter.
2. Remove planting bar and place seedling at correct depth.
3. Insert planting bar 2 inches toward planter from seedling.
4. Pull handle of bar toward planter, firming soil at bottom.
5. Push handle forward firming soil at top.
6. Leave compaction hole open. Water thoroughly.

PLANTING NOTES:

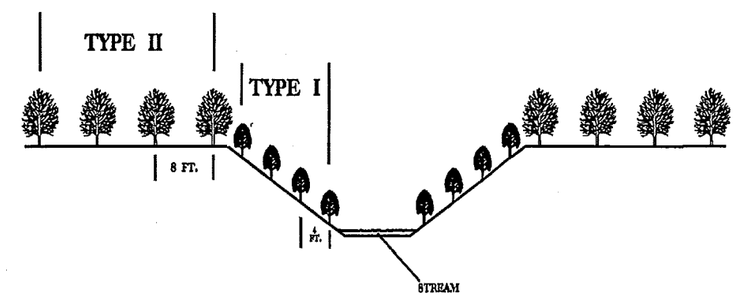
PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

KBC PLANTING BAR
Planting bar shall have a blade with a triangular cross section, and shall be 12 inches long, 4 inches wide and 1 inch thick at center.

ROOT PRUNING
All seedlings shall be root pruned, if necessary, so that no roots extend more than 10 inches below the root collar.

- ☐ TYPE 1 STREAMBANK REFORESTATION SHALL BE PLANTED 3 FT. TO 5 FT. ON CENTER, RANDOM SPACING, AVERAGING 4 FT. ON CENTER, APPROXIMATELY 2724 PLANTS PER ACRE.
- ☐ TYPE 2 STREAMBANK REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.
- ☐ NOTE: TYPE 1 AND TYPE 2 STREAMBANK REFORESTATION SHALL BE PAID FOR AS "STREAMBANK REFORESTATION"

STREAMBANK REFORESTATION TYPICAL



STREAMBANK REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:

TYPE 1			
50%	SALIX NIGRA	BLACK WILLOW	2 ft - 3 ft LIVE STAKES
50%	CORNUS AMOMUM	SILKY DOGWOOD	2 ft - 3 ft LIVE STAKES
TYPE 2			
25%	LIRIODENDRON TULIPIFERA	TULIP POPLAR	12 in - 18 in BR
25%	PLATANUS OCCIDENTALIS	SYCAMORE	12 in - 18 in BR
25%	FRAXINUS PENNSYLVANICA	GREEN ASH	12 in - 18 in BR
25%	QUERCUS ALBA	WHITE OAK	12 in - 18 in BR

- ☐ SEE PLAN SHEETS FOR AREAS TO BE PLANTED

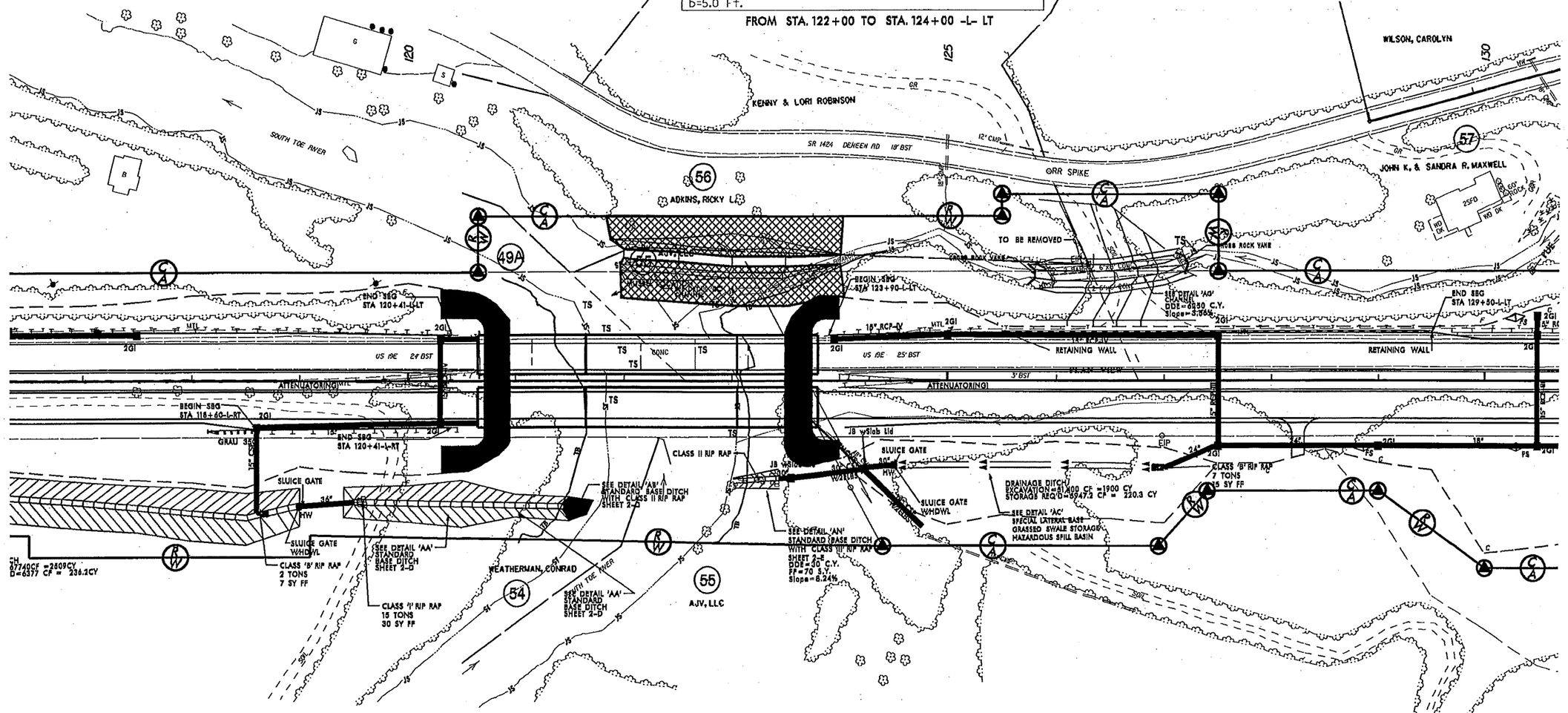
STREAMBANK REFORESTATION DETAIL SHEET 1 OF 2

N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 5a Stream Relocation
Streambank Reforestation

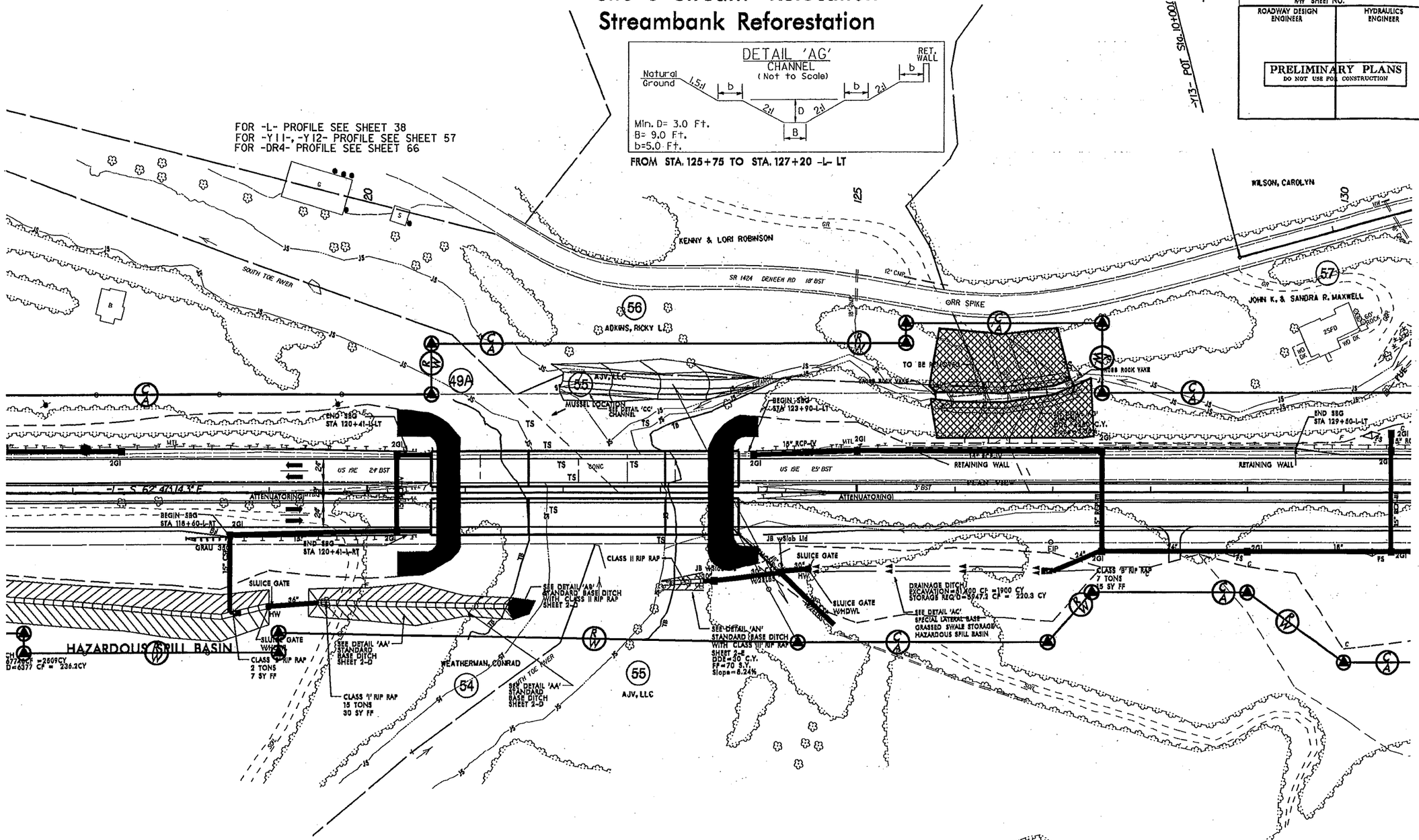


Streambank Reforestation
Buffer widths looking downstream
Right side – 25 feet
Left side – 30 feet

Site 6 Stream Relocation
Streambank Reforestation

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

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



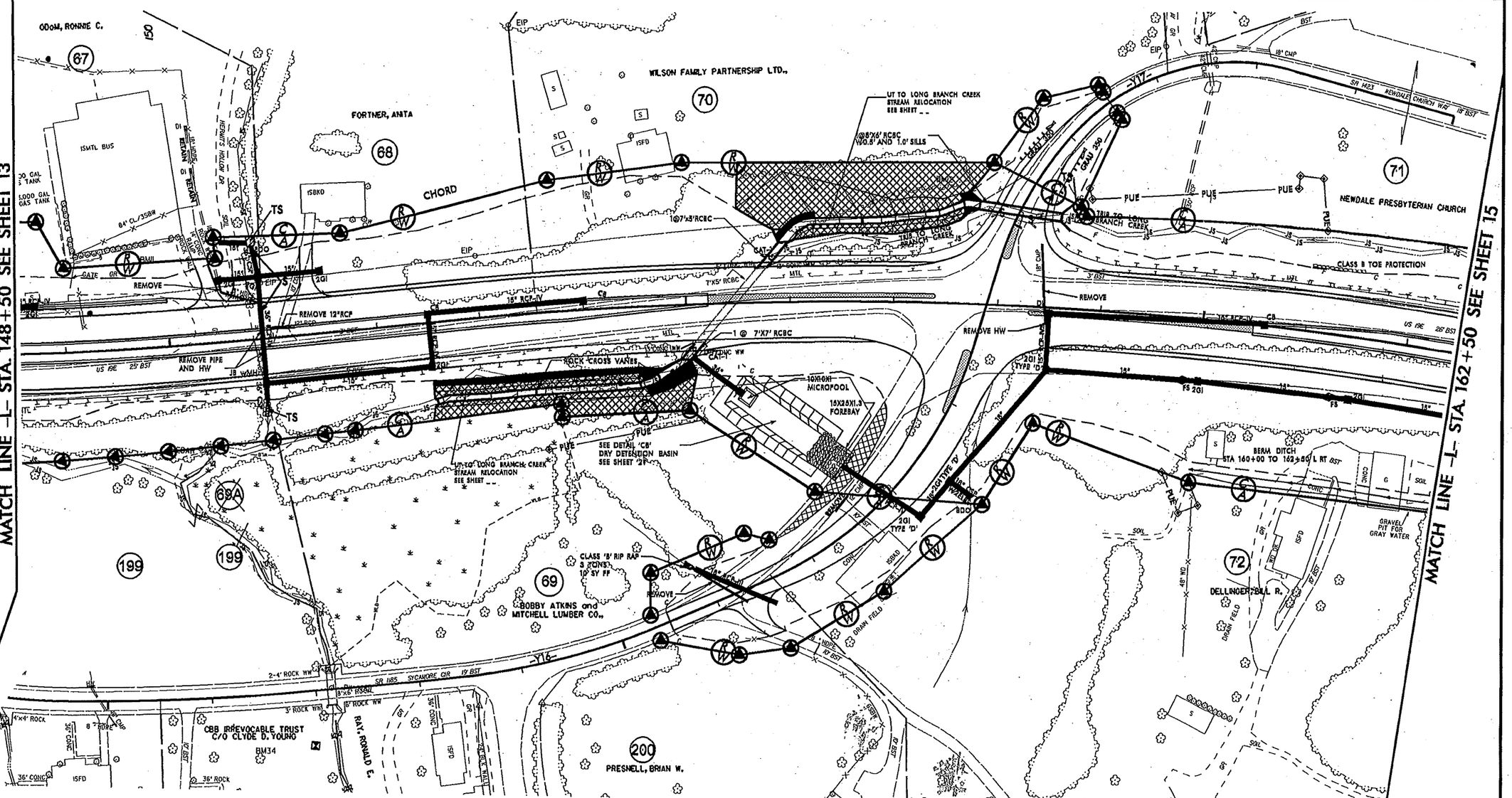
SITE 8
STREAMBANK REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

NAD 83



Streambank Reforestation
Buffer widths looking downstream
Right side – up stream >30 feet, down stream – 5 feet
Left side – up stream – 5 feet, down stream – 5 to 15 feet

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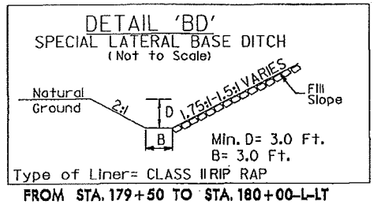
8/17/99



FROM STA. 179+50 TO STA. 180+00-L-LT

SITE 9
STREAMBANK REFORESTATION

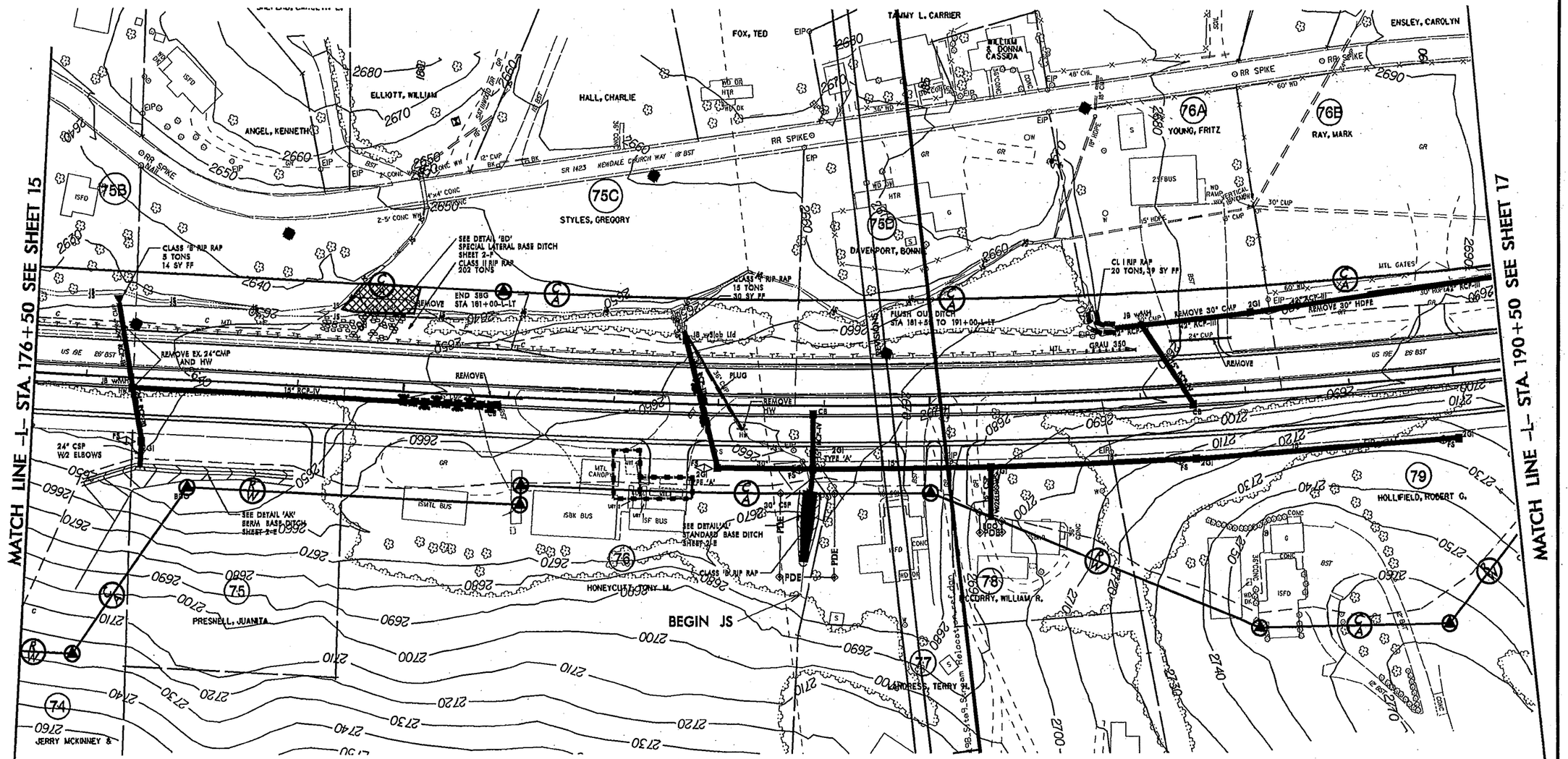
GRAPHIC SCALE 50' 0' 50' 100' 150'

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-25198	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 42



Streambank Reforestation
Buffer widths looking downstream
Right side – 20 feet
Left side – will be lined with Class II Rip Rap

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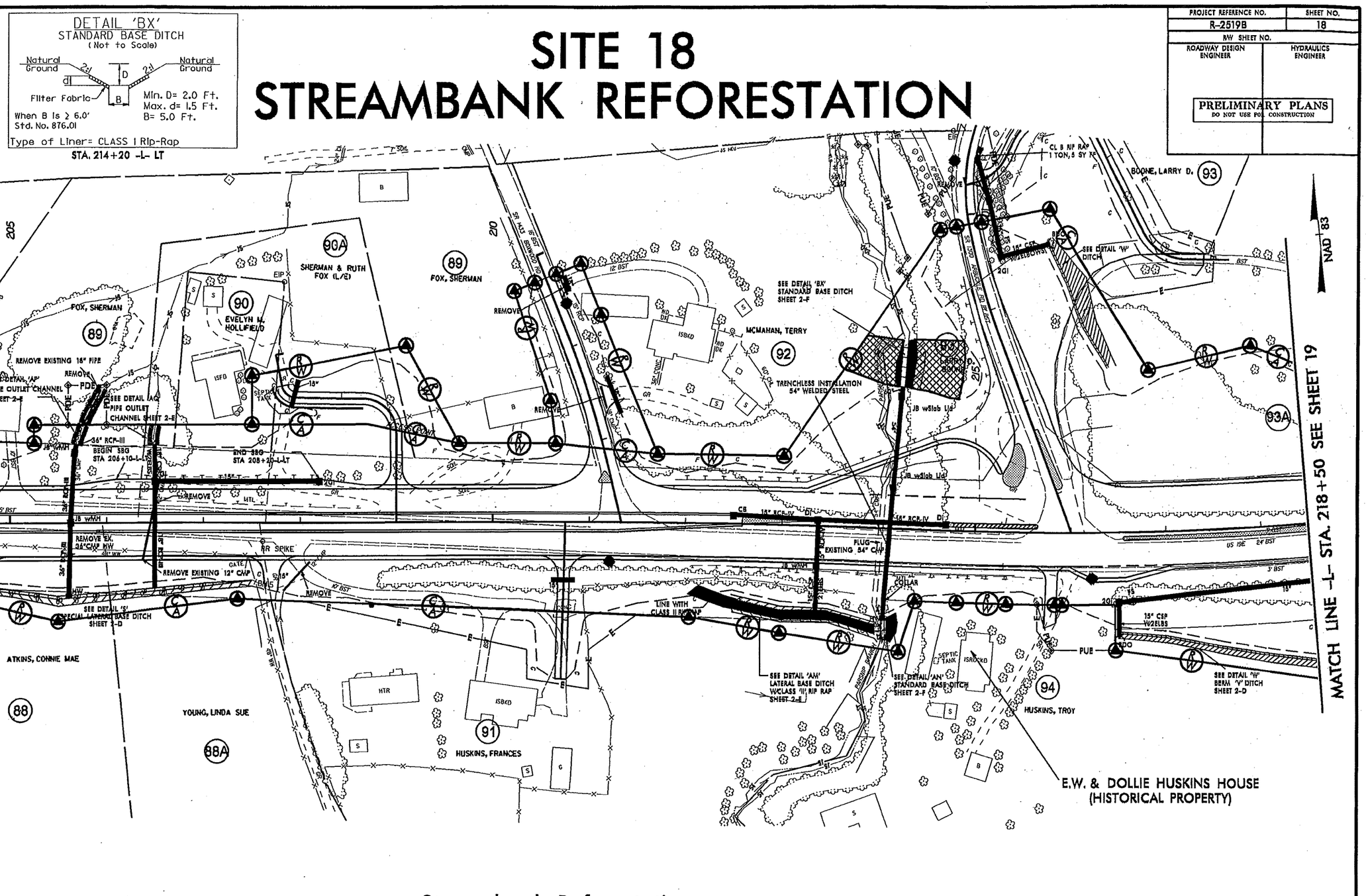
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 18
STREAMBANK REFORESTATION



REVISIONS

8/17/99

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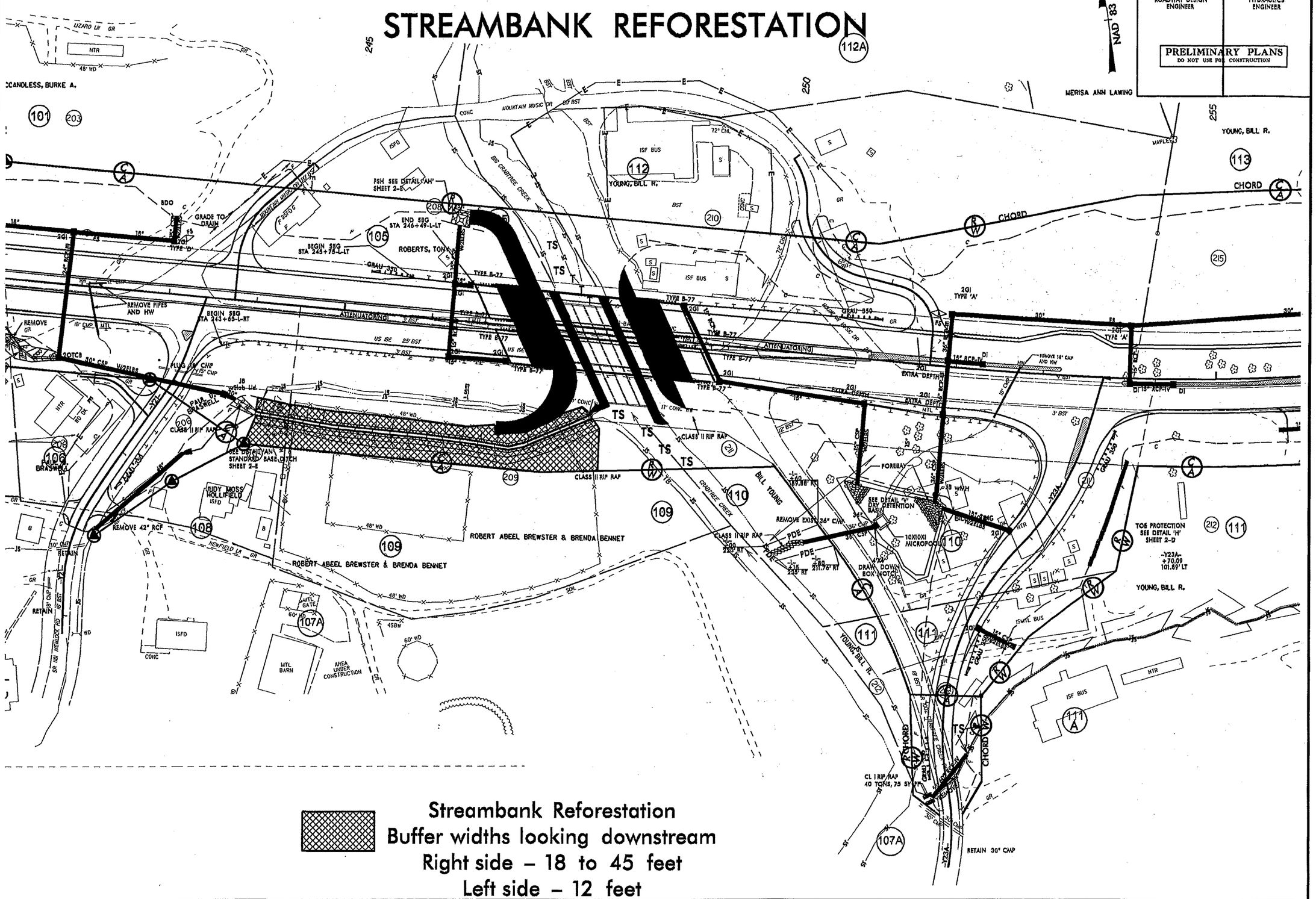
SITE 21
STREAMBANK REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	20 & 21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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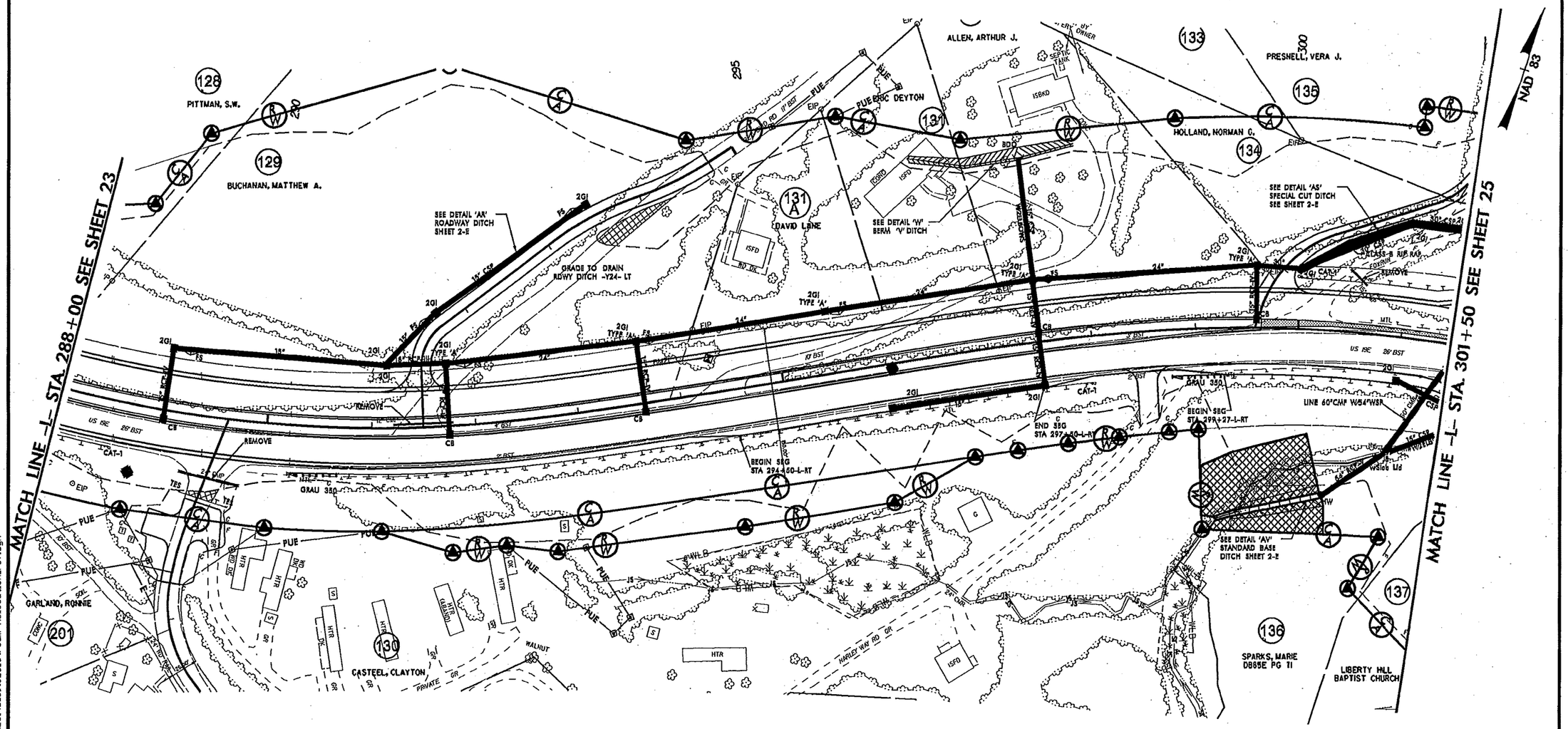
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 25
STREAMBANK REFORESTATION



Streambank Reforestation
Buffer widths looking downstream
Right side – 10 to 25 feet
Left side – 50 feet

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

8/17/99

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SITE 30 UT TO BRUSHY CREEK STREAM RELOCATION REFORESTATION

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

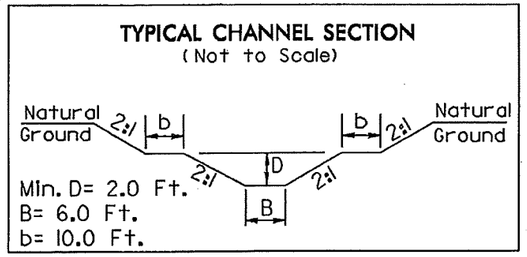
50' 0' 50' 100'
GRAPHIC SCALE

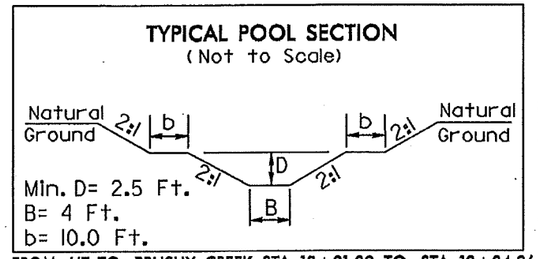
BEGIN STREAM RELOCATION
STA 10+00.00 UT TO BRUSHY CREEK
-L- STA 323+03.10 63.67 FT LT

END STREAM RELOCATION
STA 15+14.4 UT TO BRUSHY CREEK
-L- STA 319+92.70 432.68 FT LT

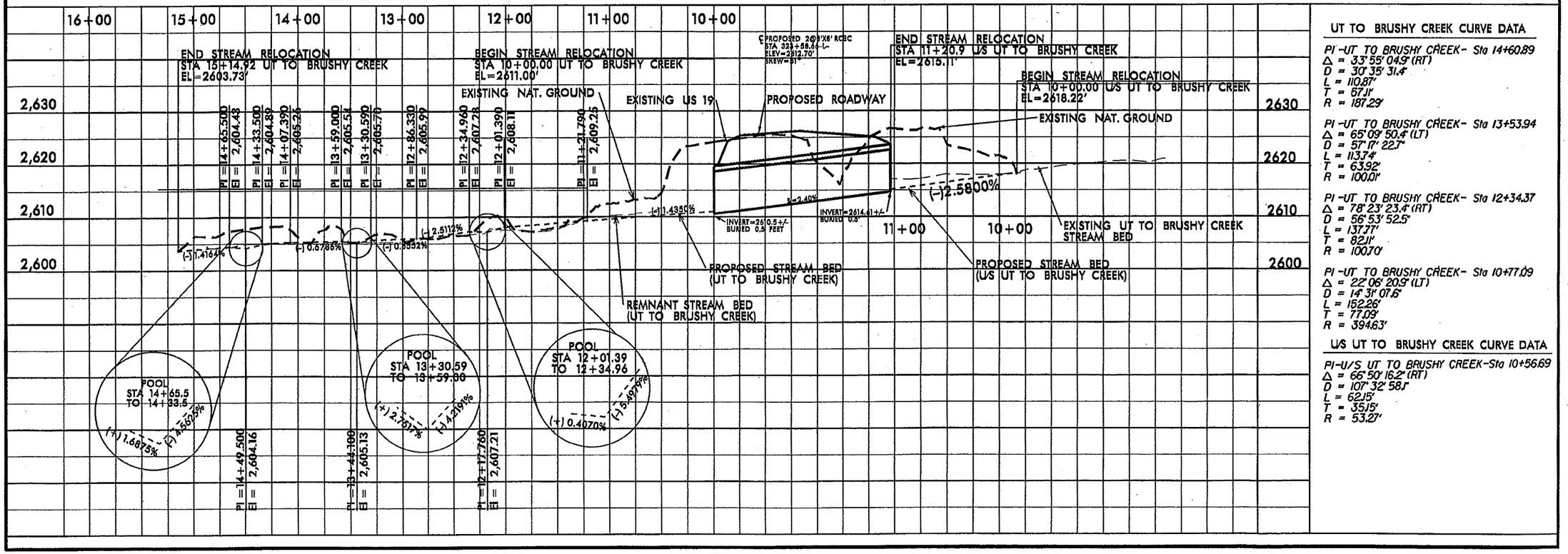
BEGIN STREAM RELOCATION
STA 10+00.00 U/S UT TO BRUSHY CREEK
-L- STA 325+10.93 110.14 FT RT

END STREAM RELOCATION
STA 11+20.9 U/S UT TO BRUSHY CREEK
-L- STA 324+10.51 69.42 FT RT





FROM UT TO BRUSHY CREEK STA 12+01.39 TO STA 12+34.96
FROM UT TO BRUSHY CREEK STA 13+30.59 TO STA 13+59.00
FROM UT TO BRUSHY CREEK STA 14+33.50 TO STA 14+65.5



UT TO BRUSHY CREEK CURVE DATA

PI -UT TO BRUSHY CREEK- Sta 14+60.89
Δ = 33° 55' 04.9" (RT)
D = 30° 35' 31.4"
L = 110.87'
T = 57.11'
R = 187.29'

PI -UT TO BRUSHY CREEK- Sta 13+53.94
Δ = 65° 09' 50.4" (LT)
D = 57° 17' 22.7"
L = 113.74'
T = 63.92'
R = 100.01'

PI -UT TO BRUSHY CREEK- Sta 12+34.37
Δ = 78° 23' 23.4" (RT)
D = 56° 53' 52.5"
L = 137.77'
T = 82.11'
R = 100.70'

PI -UT TO BRUSHY CREEK- Sta 10+77.09
Δ = 22° 06' 20.9" (LT)
D = 14° 31' 07.6"
L = 152.26'
T = 77.09'
R = 394.63'

U/S UT TO BRUSHY CREEK CURVE DATA

PI-U/S UT TO BRUSHY CREEK-Sta 10+56.69
Δ = 66° 50' 16.2" (RT)
D = 107° 32' 58.1"
L = 62.15'
T = 35.15'
R = 53.27'

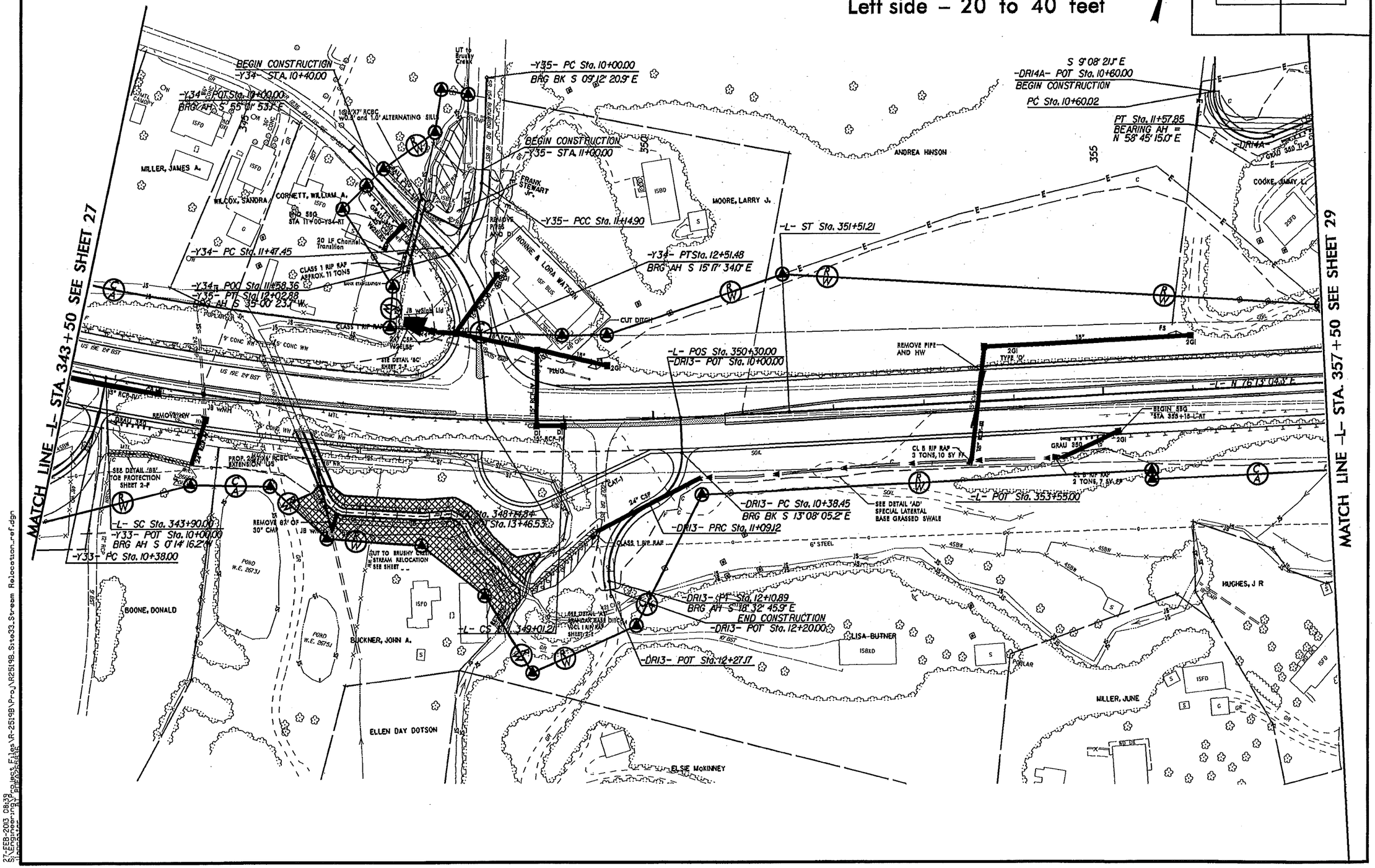
SITE 33
STREAMBANK REFORESTATION

Streambank Reforestation
Buffer widths looking downstream
Right side – 10 feet
Left side – 20 to 40 feet

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



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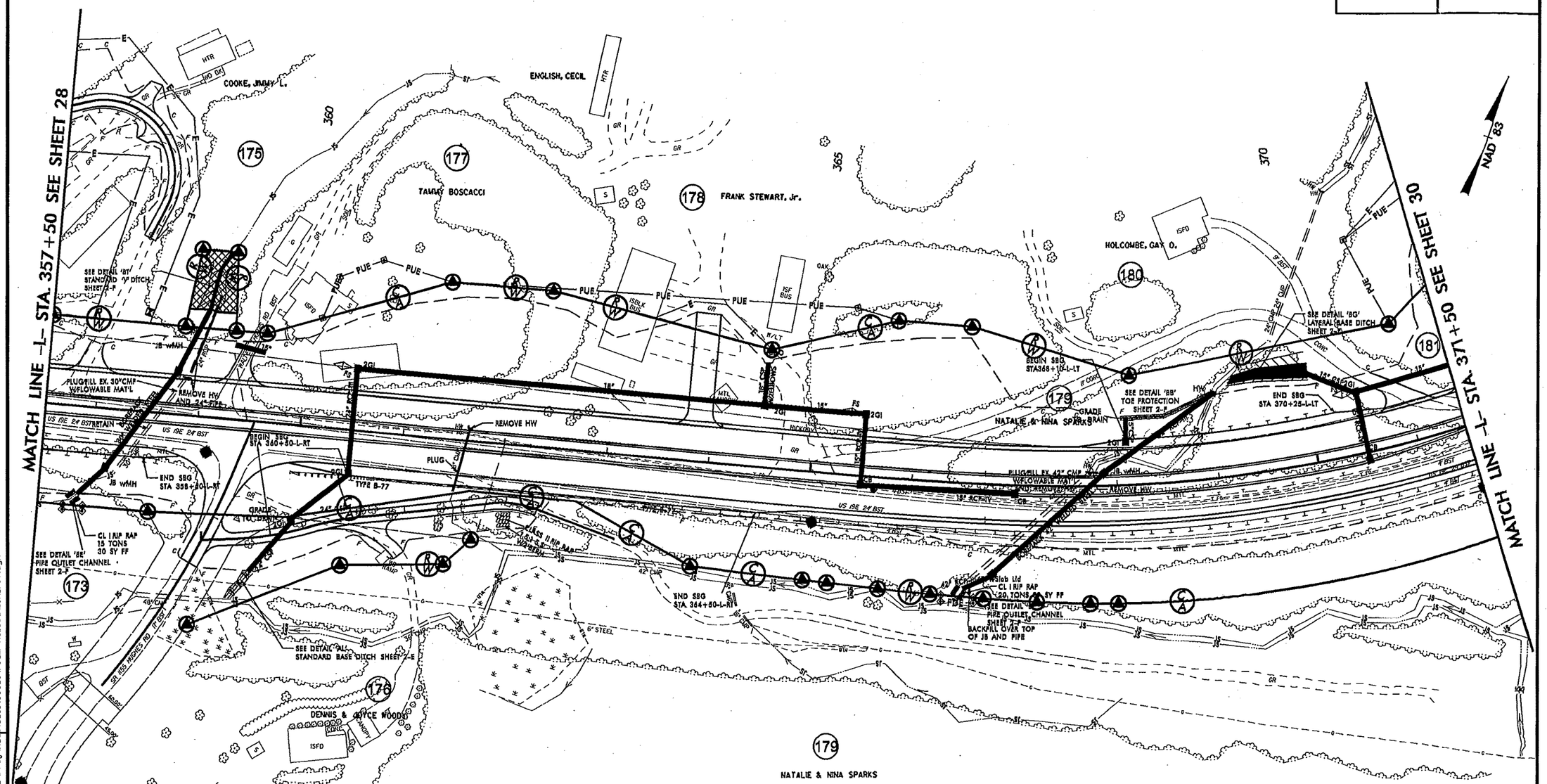
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

SITE 35
STREAMBANK REFORESTATION



Streambank Reforestation
Buffer widths looking downstream
Right side – 10 feet
Left side – 10 feet

REVISIONS

8/17/99

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STORMWATER MANAGEMENT PLAN

R-2519B, State Project: 35609.1.1 March 6, 2013
County: Yancey/Mitchell
Hydraulics Project Manager: Stephen Morgan, PE

ROADWAY DESCRIPTION

The project involves the widening of US 19E from SR 1186 (Old US 19) on the west side of Micaville in Yancey County to Multi-Lane section west of Spruce Pine in Mitchell County. The proposed typical section is a four lane divided shoulder and ditch section with a 20 ft. raised median.

ENVIRONMENTAL DESCRIPTION

(State Environmental Assessment, NRTR; NCDOT)

The study area is located in the Blue Ridge physiographic province of western North Carolina. The topography in the project study area is generally characterized as rolling hills with steeply sloping, deeply cut drainage ways. Elevations in the study area range from 2,600 to 3,000 feet above mean sea level (USGS 1978, 1994). The project study area consists of existing maintained right-of-way including fill slopes, rural residential, commercial, agricultural, and forested areas.

The project study area is located within the French Broad River Basin. All streams in the study area classified by NCDWQ have been assigned a Best Usage Classification of B, C, and may contain Tr and/or ORW supplemental classifications (NCDENR 2003). The unnamed tributaries (UT) present within the project area have not been individually classified by NCDWQ; therefore, they carry the same classification as their receiving streams. The major streams are shown in Table1, along with identifications, indexes and best usage classifications. The physical characteristics of all the streams within the project study area are shown in Table 2 and Table 3.

Table 1: NCDWQ Stream Identification, Index Numbers, and Best Usage Classification for the Major Drainages within the R-2519B Study Area. *(NCDOT NRTR, 2004)*

NCDWQ Stream Identification	Stream Identification and Map Code	NCDWQ Stream Index Number (SIN)	DWQ Best Usage Classification
South Toe River	STR	7-2-52-(30.5)	B; Tr, ORW
Little Crabtree Creek	2A	7-2-52-33	C; Tr
Big Crabtree Creek	1CC	7-2-48	C; Tr
Long Branch	2D, 6UT2D	7-2-48-52-31	C; Tr
Mine Branch	UT STR	7-2-52-32	C; Tr
Brushy Creek	2BC	7-2-48-4	C; Tr
English Creek	1F, 2UT1F	7-2-42	C; Tr
Ayles Creek	3UT2A	7-2-52-33-11	C; Tr

Table 2. Physical Characteristics of Surface Water within the R-2519B Study Area. *(NCDOT NRTR, 2004)*

Stream ID and Map Code*	Bank Height (feet)	Bankfull Width (feet)	Bank Stability	Sinuosity	Substrate	Water Clarity	USACE Stream Quality Assessment Score	Stream Determination**
UT2A	3-6	3	Stable	None	Gravel/sand	Clear	45.5	Perennial
2A	18-20	15	Stable	Low	Sand/gravel/cobble	Clear	74.5	Perennial
2UT2A	3	2.5	Stable	None	Sand/gravel/cobble	Clear	48.5	Perennial
3UT2A	10	15	Stable	Low	Sand/cobble	Clear	63	Perennial
2B	5-10	3	Stable	Low	Sand/cobble	Clear	60	Perennial
UT2B	0.5	2	Stable	Low	Sand/cobble	Clear	51	Perennial
2C	3-40	3	Stable	Moderate	Sand/cobble	Clear	65	Perennial
STR	10-30	60-100	Stable	Moderate	Sand/gravel/cobble	Clear	83	Perennial
2UT STR	5	3	Stable	Low	Sand/cobble	Clear	41	Perennial
UT STR	5	3	Stable	Low	Sand/cobble	Clear	63	Perennial
3UT STR	0.5-10	2	Stable	Low	Sand/gravel/cobble	Clear	34	Perennial
2D Upstream	3-4	5-6	Stable	Moderate	Sand/gravel/cobble	Clear	60	Perennial
2D Midstream	3-40	10	Stable	Low	Sand/gravel/cobble	Clear	88	Perennial
2D Downstream	2-8	12	Stable	Low	Sand/gravel/cobble	Clear	75	Perennial
UT2D Upstream	2	4	Stable	Low	Sand/gravel	Clear	32	Intermittent
UT2D Downstream	1-3	0.5-1	Stable	Low	Sand/gravel	Clear	55	Perennial
2UT2D	4	2-3	Stable	Moderate	Sand	Clear	62	Perennial
3UT2D	3	3-15	Stable	Low	Sand	Clear	59	Perennial
4UT2D	0.5-10	2-20	Stable	Moderate	Sand/gravel/cobble	Clear	61	Perennial
UT4UT2D	0.5-6	2-3	Stable	Low	Sand/gravel/cobble	Clear	62	Perennial
5UT2D	1-3	1-3	Stable	Low	Sand/gravel/cobble	Clear	51	Perennial
6UT2D	1-3	1-3	Stable	Low	Sand/gravel/cobble	Clear	43	Perennial
7UT2D	2-3	2-3	Stable	Low	Sand/gravel/cobble	Clear	25	Perennial
8UT2D	1-3	2-6	Stable	Low	Sand/gravel/cobble	Clear	25	Perennial
9UT2D	1-2	1-4	Stable	Low	Sand/gravel/cobble	Clear	35	Perennial
10UT2D	0.5	1	Stable	Low	Sand/gravel/cobble	Clear	42	Perennial
11UT2D	3-5	1.5-3	Stable	Moderate	Sand/gravel/cobble	Clear	50	Perennial
12UT2D	3-18	2-3	Stable	Moderate	Sand/gravel/cobble	Clear	35	Perennial
14UT2D	1-3	1-1.5	Stable	Moderate	Sand/gravel/cobble	Clear	45	Perennial
13UT2D	1-3	1-1.5	Stable	Low	Sand/gravel/cobble	Clear	54	Perennial
1H	2-30	3-40	Stable	High	Sand/gravel/cobble	Clear	72	Perennial
4UT1H	2	1-3	Stable	Low	Cobble/gravel/silt	Clear	64	Perennial
UT1H	1-3	1-2	Stable	Low	Cobble/gravel/silt	Clear	77	Perennial
2UT1H	2-10	2-6	Stable	Moderate	Cobble/gravel/silt	Clear	54	Perennial
1I Upstream	1-3	1-3	Stable	Low	Gravel/sand/mud	Clear	75	Perennial
1I Downstream	0.5-10	0.5-6	Stable	Low	Cobble/sand	Clear	60	Perennial
UT1I	0.5	1	Stable	Low	Sand/gravel/cobble	Clear	47	Perennial
1CC	5-20	25	Stable	Moderate	Sand/gravel/cobble	Clear	77	Perennial
UT1CC	5-20	1-5	Stable	Moderate	Sand/gravel/cobble	Clear	67	Perennial
UTUT1CC	1	1	Stable	Low	Silt/cobble	Clear	57	Perennial

Table 2 Continued… Physical Characteristics of Surface Water within the R-2519B Study Area. *(NCDOT NRTR, 2004)*

Stream ID and Map Code*	Bank Height (feet)	Bankfull Width (feet)	Bank Stability	Sinuosity	Substrate	Water Clarity	USACE Stream Quality Assessment Score	Stream Determination**
2UTUT1CC	1-20	1	Stable	Low	Silt/cobble	Clear	54	Perennial
2UT1CC	1	2	Stable	Moderate	Silt/cobble	Clear	78	Perennial
3UTUT1CC	0.5-5	1-5	Stable	Moderate	Silt/cobble	Clear	72	Perennial
UT3UTUT1CC	0.5-5	1-2	Stable	Moderate	Silt/cobble	Clear	69	Perennial
UTUT3UTUT1CC	0.5-3	1-5	Stable	Low	Silt/cobble	Clear	67	Perennial
2E	2-4	6	Stable	Moderate	Cobble/gravel/sand	Clear	69	Perennial
UT2E	1	4	Stable	Moderate	Cobble/gravel/sand	Clear	54	Perennial
2UT2E	2	5	Stable	Moderate	Silt/cobble	Clear	50	Perennial
3UT2E	2	3	Stable	Moderate	Silt/sand/gravel	Clear	69	Perennial
UT3UT2E	2	0.5	Stable	Low	Sand/gravel	Clear	37	Perennial
2BC	2-4	15	Stable	Moderate	Cobble/gravel/sand	Clear	21	Perennial
UT2BC	1	3	Stable	Low	Gravel/sand	Clear	55	Perennial
11UT1G	3-5	3-6	Stable	Low	Gravel/cobble/sand	Clear	68	Perennial
1G Upstream	0.5-1.5	2-8	Stable	Low	Gravel/cobble/sand	Clear	73	Perennial
1G Downstream	1-4	4-10	Stable	Moderate	Silt/sand/gravel/cobble	Clear	58	Perennial
UT1G	0.5-29	2-4	Stable	Low	Sand/cobble	Clear	50	Perennial
2UT1G	1-2	3-6	Stable	Moderate	Sand/cobble	Clear	66	Perennial
3UT1G	2-6	2-4	Stable	Low	Sand/cobble	Clear	12	Perennial
4UT1G	0-2	1-4	Stable	Low	Sand/cobble	Clear	51	Perennial
5UT1G	2	5	Stable	Low	Sand/silt/gravel	Clear	40	Perennial
6UT1G	1	2	Stable	Low	Sand/gravel	Clear	18	Perennial
7UT1G	0.5	1-2	Stable	Low	Silt/sand	Clear	6	Perennial
8UT1G	0.5	1	Stable	Low	Silt/gravel	Clear	53	Perennial
9UT1G	4	1	Stable	Low	Gravel/sand	Clear	52	Perennial
10UT1G	0.5	1	Stable	Low	Silt	Clear	72	Perennial
1D	0.5-2	1-8	Stable	Low	Gravel/Sand	Clear	52	Perennial
1B	2-8	2-4	Stable	Moderate	Sand/clay	Clear	60	Perennial
1C	0.5-3	2-8	Stable	Moderate	Sand/clay	Clear	64	Perennial
1F	0.5-2	1-3	Stable	Moderate	Sand/clay	Clear	70	Perennial
UT1F	0.5-2	0.5-2	Stable	Moderate	Sand/clay	Clear	60	Perennial
2UT1F	3-15	1-2	Stable	Moderate	Sand/clay	Clear	57	Perennial
1A	4-8	1.5-2	Stable	Low	Clay/sand	Clear	59	Perennial
1Z	2-18	1-2	Stable	Moderate	Sand/clay	Clear	51	Perennial

*UT = Unnamed tributary

** Stream Determination is derived from information gathered during the completion of USACE Stream Quality Assessment Worksheets and NCDWQ Stream Classification Forms

Table 3: Updated 2012 Change Summary from 2004 Verification *(NCDOT Natural Environment Section)*

Resource Type	Map Id.	Status	Size in Study Area	Project Location	Comments
Stream	SA	Added	468 lf x 5 lf	Figures 2 & 3	Perennial stream connected to Little Crabtree Creek
Stream	SB	Added	449 lf x 3 lf	Figure 5	Perennial stream connected to the South Toe River
Stream	3UTSTR	Removed	346 lf x 5 lf	Figure 6	Stream no longer exists – original survey prior to drought
Wetland	5UT2D	Removed	0.2 ac	Figure 7	Wetland filled by property owner
Wetland	2DO	Partially removed	0.1 ac/0.06 ac remaining	Figure 10	Wetland partially filled by property owner
Wetland	WA	Added	0.01 ac	Figure 10	Wetland connected to stream 1H
Wetland	1IC	Partially disturbed	0.03 ac	Figure 12	Wetland partially disturbed by property owner (Horse corral) though wetland function remains
Wetland	UT1CC-B	Removed	0.1 ac	Figure 13	Wetland filled by property owner
Stream	SC	Removed	303 lf x 2 lf	Figure 14	Stream SC was added for the 2012 Re-Verification by NCDOT but was thrown out by DWQ & USACE
Stream	UT1CC	Extended	3,368 lf x 320 lf	Figure 14	Perennial stream extended 320 lf from original endpoint just past Wetland UT1CC-C
Stream	SD	Added	235 lf x 2 lf	Figure 15	Perennial stream that connects to Stream 2E
Wetland	WB	Added	0.03 ac	Figure 15	Wetland connected to Stream SD
Stream	2UT2E	Removed	171	Figure 15	Couldn't find this channel – possibly combined with flow of main channel – 2E
Stream	SE	Added	565 lf x 2 lf	Figure 16	Stream SE connects to Brushy Creek
Wetland	UT2BC	Removed	0.3 ac	Figure 16	Hydrology has been apparently changed not sure if natural or intentional
Stream	SL	Added	149 x 2 lf	Figure 16	Perennial Stream emerges from a spring and is connected to Stream SE
Stream	SF	Added	620 lf x 3 lf	Figure 18	Perennial stream that connects to stream 1G
Stream	SG	Added	478 lf x 2 lf	Figure 18	Perennial stream that connects to stream 1G
Stream	SH	Added	176 lf x 1 lf	Figure 19	Perennial stream that may connect to Pond H
Stream	SI	Added	547 lf x 2 lf	Figures 19 & 20	Perennial stream that emerges from a spring
Stream	1B	Removed	208 lf x 5 lf	Figure 20	Perennial tributary to stream 1C that existed prior to the drought
Stream	SJ	Added	248 lf x 2 lf	Figure 21	Perennial tributary to stream to English Creek
Stream	SK	Added	238 lf x 4 lf	Figure 21	Perennial tributary to the North Toe River
Stream	SKA	Added	645 lf x 1 lf	Figure 21	Perennial stream SKA emerges from a spring and runs in a pipe and concrete ditch to Stream SK
Stream	SKB	Added	107 lf x 3 lf	Figure 21	Perennial tributary to SK

ENVIRONMENTAL DESCRIPTION, continued

(State Environmental Assessment, NCDOT)

The South Toe River and nearly all its tributaries are classified as ORW. The endangered Appalachian Elktoe Mussel has been found in the South Toe River. No streams within the study area are designated as North Carolina Natural and Scenic Rivers, or as National Wild and Scenic Rivers. Furthermore, the French Broad River Basin is not currently subject to riparian buffer protection rules by the NCDWQ. None of the water resources within the project vicinity are designated as biologically impaired water bodies regulated under the provisions of CWA §303(d) (NCDWQ 2002).

PROJECT IMPACTS

To accommodate road widening, existing drainage structures and waterway conveyances will need to be extended, replaced, or relocated. There are 9 Reinforced Concrete Box Culverts (RCBC) on this project. The following streams are conveyed with RCBC's: Little Crabtree Creek, Long Branch Creek (2), Tributary to Long Branch Creek, Brushy Creek, and Unnamed Tributary to Brushy Creek (4). There are 2 bridges on the project, one over South Toe River and one over Big Crabtree Creek. Six sites will require stream relocations. A summary of project impacts is listed in Table 4.

Table 4 Summary of Project Impacts

	Permanent Fill In Wetlands	Temp. Fill In Wetlands	Excavation in Wetlands	Mechanized Clearing in Wetlands	Hand Clearing in Wetlands	Permanent SW impacts	Temp. SW impacts	Exist. Channel Impacts Permanent	Exist. Channel Impacts Temp.	Natural Stream Design
	ac	ac	ac	ac	ac	ac	ac	ft	ft	ft
Total Impacts	0.07		0.05	0.04		1.08	0.46	7646	1052	2231

Short-term impacts to water quality, such as sedimentation and turbidity, may result from construction-related activities. Temporary construction impacts due to erosion and sedimentation will be minimized through implementation of NCDOT's "Design Standards in Sensitive Watersheds" (15A NCAC 04B.0024).

BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES

Best Management Practices (BMPs) and measures used on the project are an attempt to reduce the stormwater impacts to the receiving streams due to erosion and runoff. The primary BMP on this project is the grass swale. Grass swales were used to reduce velocities and promote infiltration. Grass swales remove suspended solids, metals, and nutrients through sedimentation, vegetative filtration, infiltration, and biological uptake. The use of grassed roadway ditches (which meet grass swale criteria) and shoulders also aids in pollutant removal through vegetative filtration and infiltration.

Preformed scour holes (PSHs) and energy dissipaters will be used to attenuate and disperse flow. Preformed scour holes promote runoff infiltration and reduce downgrade erosion. Rip rapped ditches and riprap along stream banks were used where warranted to control erosion. Where possible, piped drainage systems were designed to outlet away

from surface waters to allow time for infiltration in ditches or natural areas. Ditches were ended in flat floodplain areas where possible to allow dispersal and infiltration.

Hazardous Spill Basins will be used at the South Toe River crossing. Dry detention, where practicable, will be used on the project. A dry detention basin is a stormwater runoff quantity control BMP that attenuates stormwater flows, promotes settlement of suspended solids and reduces erosive velocities downstream of the outlet structure. The dry detention basin is a permanent BMP device that will be maintained under NCDOT's Inspection and Maintenance program.

The inverts of new culverts on jurisdictional streams or wetlands will be buried 20% of the pipe diameter up to 1 ft. deep. Culverts were designed to protect stream stability and provide fish passage where possible. Low flow sills with low flow channels were used on new culverts and culvert extensions where enough hydraulic conveyance exists.

Hazardous Spill Basins

- Station 111+50 to station 119+00 –L- right side. South Toe River. Capacity=2509 cy, Storage required=236.2 cy.
- Station 124+50 to station 127+00 –L- right side. South Toe River. Capacity=532 cy, Storage required=81 cy. This basin also doubles as a Dry Detention Basin.

Dry Detention Basins

- Station 83+00 to station 84+50 –L- right side. Capacity required=326 cy, capacity provided=426 cy.
- Station 155+00 to station 157+00 –L- right side. Capacity required=208 cy., capacity provided=197 cy.
- Station 250+75 to station 252+00 –L- Capacity required=545 cy, capacity provided= 678 cy.

Preformed Scour Holes (PSH)

- Station 246+30 –L- LT
- Station 324+70 –L- LT
- Station 337+90 –L- RT

Culverts (9 Total)

- Station 44+12 –L-. (Site 2) Little Crabtree Creek (Stream 2A). Retain existing 4@12'x9' RCBC and extend up and downstream with a 4@ 12'x9' RCBC. The culvert extensions are buried 1' below the stream bed. The downstream extension has 1' high baffles spaced at 35 ft. intervals. Floodplain benches are used up and downstream in the outer barrels of the culvert. Class II riprap is used for bank stabilization at the inlet and outlet.
- Station 134+80 –L-. (Site 7) Long Branch Creek. (Stream 2D) Extend 2 @ 6'x6' RCBC on US 19 upstream and connect to existing 2 @ 6'x6' RCBC on –Y14_ and extend 2 @ 6'x6' RCBC on –Y14- upstream. The upstream culvert extension is buried 1' below the streambed.

- Station 155+45 –L- (Site 8B) Tributary to Long Branch Creek. (Stream 2D) Retain existing 7'x5' RCBC and extend with 1 @ 7'x5' RCBC upstream and extend with 1 @ 7'x7' RCBC downstream with sills at outlet. Use rock cross vanes at outlet backfilled with native stone to bring stream grade up to culvert outlet elevation. Rock cross vanes are used at the outlet stream. Natural stream design is not used due to the limited right of way.
- Station 158+00 –L- (Site 8C) Tributary to Long Branch Creek. (Stream 2D) Replace existing 1@10'x5' stone culvert (w/concrete top slab) with 1@ 8'x6' RCBC with alternating 0.5' and 1.0' sills @ 20' intervals. There will be a low flow meandering channel inside the culvert. Downstream of this culvert is a stream relocation with 2 rock cross vanes. Class I rip rap is used downstream for bank stabilization. Construct floodplain bench at outlet of culvert. Natural stream design is not used due to the limited right of way
- Station 320+00 –L-. (Site 29) Brushy Creek. (Stream 2BC) Extend existing 3@8'x8' RCBC upstream and extend at 3@8'x11' RCBC downstream with fish ladder. Include 1' high sill in 2 outer barrels of culvert at entrance only. Include 6" high sill in middle barrel @12' spacing in existing culvert and at entrance of proposed culvert extension. Existing culvert outlet is perched. Bank stabilization is used up and downstream.
- Station 324+00 –L-. (Site 30) Unnamed Tributary to Brushy Creek. (Stream 1G) Install a new 2 @ 8'x8' RCBC with low flow meandering channel and sills. Place alternating 0.5' and 1.0' high sills @ 20' intervals in western most barrel. Upstream is a stream relocation and downstream there is bank stabilization and natural stream design, placing the tributary back in its historical location.
- Station 327+50 –L-. (Site 31) Unnamed Tributary to Brushy Creek. (Stream 1G) Extend existing 2 @ 7'x7' RCBC downstream. Culvert extension is buried 1'. Bank stabilization is used downstream.
- Station 346+50 –L-. (Site 33) Unnamed Tributary to Brushy Creek. (Stream 1G) Extend existing 2@7'x6' RCBC upstream. The upstream extension is buried 0.5'. There is stream relocation on the upstream side with natural stream design. The design includes a low flow bench at the upstream side of the culvert extension.
- Station 11+00 –Y34-. (Site 34) Unnamed Tributary to Brushy Creek. (Stream 5UT1G) Replace 1 @ 6'x6' concrete culvert with concrete wing walls with 1@6'x7' RCBC with alternating 0.5' and 1.0' sills @ 15' intervals. Channel improvements will be done upstream and 20' of channel transition will be done downstream. The culvert is buried 1' upstream and 0.5' downstream.

STORMWATER OUTFALLS
(Permit sites referenced)
(BMP's noted where used)

Plan sheet 4 (Site 1)

- **(Site 1)** Station 23+45 –L- (11+88 –Y1-). (Stream 2UT2A) Part of existing 30" CMP is replaced with a junction box and 30" RCP outlet to Class 'I' rip rap. This will dissipate the energy and help reduce the outlet velocities.
- Station 25+50 –L- Lt. (Stream 2UT2A) A small drainage system drains to standard 'V' ditch for 115 ft. and then to standard 'V' ditch with PSRM for 240 ft. before entering stream 17' away.

Plan sheet 5 (No Site, Non JS)

- Station 32+70 –L- Rt. (Non JS) Existing 15" CMP has a 7' vertical drop at outlet. The existing 18" CMP downstream is perched 1'. The new drainage system includes a grass ditch into a drainage system with a junction box to dissipate the energy and another open throat catch basin (where there is currently a large 4'deep x8'wide scour hole) to dissipate the energy again before discharging onto a rip rap pad reducing outlet velocities before entering Little Crabtree Creek (Stream 2A).

Plan sheet 6 (Site 2/2A)

- **(Site 2)** Station 44+50 –L- (Stream 2A) Little Crabtree Creek. Retain existing 4@12'x9' RCBC and extend up and downstream with a 4@ 12'x9' RCBC. The culvert extensions are buried 1' below the stream bed. The downstream extension has 1' high baffles spaced at 35 ft. intervals. Floodplain benches are used up and downstream in the outer barrels of the culvert. Class II riprap is used for bank stabilization at the inlet and outlet. During construction, erosion control devices, such as stilling basin and impervious dikes may be used.
  There is also an existing 18" CMP cross pipe that will be removed. This drainage is now in a system that outlets further away from Little Crabtree Creek in a standard base ditch lined with rip rap.

- **(Site 2A)** Station 9+70 –Y4- (Stream SA) Replace existing 15" PVC pipe with 2 @ 30". Place Class I Rip Rap on banks at outlet for bank stabilization.
- Along –Y4- on the right side is a long lateral base grassed swale approximately 450' long (see detail 'T' on plan sheet 2-D of the roadway plans). This minimizes impacts to stream SA.

Plan sheet 7 (site 3)

- **(Site 3)** Station 55+00 –L- (Stream 2B) Drainage system outlets into stream with rip rap stream bank protection at the outlet. Several drop structures will be used to dissipate the energy in the drainage system and reduce outlet velocities.
- Station 57+60 to 58+50 –L- Rt. (Non JS) Use lateral grassed swale before flow goes over rip rap toe protection Station 58+50 to 59+00 -L-Rt. and enters stream. Toe protection also used upstream from Station 59+05 to 60+00 –L- Rt. before flow enters stream.

Plan sheet 9 (Site 4)

- **(Site 4)** Station 79+00 –L- Lt. (Stream 2C) (Phipps Ck) Existing 4'x4' RCBC has a large scour hole at the outlet. The existing outlet is perched 2.6'. The new drainage system will have several deep junction boxes to dissipate the energy and reduce the outlet velocities. Use Class 'II' rip rap at outlet on bank only. (Stream 2C)
- Station 83+00 to 84+50 –L- Rt. Hazardous Spill Basin/Dry Detention Basin before drainage system to South Toe River (STR)

Plan sheet 10 (Site 4A)

- **(Site 4A)** Station 99+65 –L-. (Stream SB) Replace existing 36" (labeled 42") CMP with 36" welded steel pipe. Existing outlet is perched 2.3'. In lieu of rock cross vanes, the proposed drainage system will include several junction boxes to dissipate the energy and reduce outlet velocities. Use Class 'I' rip rap at outlet before entering stream. Rip rap only on the bank is not practicable at this location.

Plan sheet 11/12 (Site 5,5A,6) South Toe River

- **(Site 5) South Toe River Bridge** This bridge design includes 2 hazardous spill basins on either side of the bridge. The proposed bridge design minimizes piers in the water (as described in the BO). The design is going from a 6 span bridge to a 3 span bridge. Two piers in the main channel are being eliminated. Phase 1 of the bridge construction will involve temporary impacts due to work pad needed to install the piers and set girder of the south side of the proposed bridge (eastbound). Phase 2 of the bridge construction includes work pads installed on either side of the South Toe River at different times to maintain 50% river flow. The temporary work pads are used to remove the existing bridge on the north side (westbound). Phase 3 of the bridge construction includes work pads needed for drilling the piers and girder erection. Note: Mussels will be relocated prior to any work on this bridge. A deck drainage system is included in the proposed design to further minimize the impacts to the stream. The proposed work pads are minimized to a temporary impact of 0.15 ac=6,534 sf versus the preliminary estimate of 9,600 sf. included in the BO. Permanent impacts are not totally avoided due to piers at the bank on the east side of the bridge (31.8 sf.)

- **(Site 5A)** Station 122+00 to Station 124+00 –L- (Lt) Stream relocation of Long Branch Creek. As an alternative to having impacts to Long Branch Creek during

construction , the stream will be relocated within the floodplain away from the work zone using similar dimension and profile. The relocated stream will be stabilized with native vegetation. The preference is for the stream to be relocated prior to bridge construction, with a minimum of one growing season prior to project completion.

- From Station 111+50 to 119+00 –L- (Rt.) Lateral base grassed swale/ Hazardous Spill Basin. From station 119+50 to 121+50 –L- (Rt.) Standard base ditch. (Excavation 67,740 cf.=2509 cy., storage required=6377 cf=236.2 cy.) From Station 121+50 to 121+75 –L- (Rt.) Standard Base ditch with Class 'II' rip rap before entering stream (South Toe River).
- Grassed Swale/Hazardous Spill Basin/Dry Detention Basin to small drainage system then to standard base ditch with Class 'II' rip rap from Station 123+00 to 123+50 –L- Rt. (Stream 3UTSTR) to South Toe River. (STR)
- Hazardous Spill Basin volume required=2,208 cf=81 cy
- Dry Detention Basin water quality volume required=3,009 cf=111 cy
- Basin capacity =14,355 cf=532 cy
- **(Site 6)** Station 125+75 to 127+20 -L- Lt. (Stream 2D) Long Branch Creek. Remove existing 2@ 6'x6' RCBC and replace with channel between US 19 and SR 1424 (Deneen Rd.)

<u>Plan sheet 13 (Site 7) Long Branch Creek</u>

- **(Site 7)** Station 135+00 to Station 138+00 –L- Long Branch Creek (Stream 2D) Extend existing 2@6'x6' RCBC upstream. Continue existing 2 @ 6'x6' RCBC between 2 culverts (2@6'x6').
- **(Site 7A)** Station 136+00 (Stream UT2D) Tie in stream to culvert with 30" CSP.
- **(Site 7B)** Station 137+50 –L- Rt. (Stream 2UT2D) Replace existing 24" CMP drive pipe with 30" alternate pipe storm drainage system near SR 1151 Black Jack Rd. An extra depth 2GI is used near the outlet to dissipate the energy and reduce outlet velocities.
- **(Site 7C)** Station 139+50 –L- (Stream 3UT2D) Replace existing 54" CMP cross pipe with 54" CSP and 54" RCP near SR 1431 (Silver Springs Rd.).

<u>Plan sheet 14 (Site 8)</u>

- **(Site 8)** Station 152+00 to 155+00 -L- Rt. and 156+00 to 157+50 –L- Lt. (Stream 2D) The stream was filled over with roadway fill and relocated further away from the –L- line. The dimensions are similar to those of the existing stream. Rock cross vanes are used in the design to maintain a stable slope.
- **(Site 8A)** Station 150+90 –L- Existing 30" CMP is replaced with 36" RCP and 36" CSP. A junction box is used in the system to reduce outlet velocities.
- (Non JS) Station 155+40 to 157+00 –L- Rt. (Stream 2D) Dry Detention Basin is used at the end of a drainage system before outlet to culvert for energy dissipation.
- **(Site 8B)** Station 155+00 –L- (Site 8) Tributary to Long Branch Creek. (Stream 2D) Retain existing 7'x5' RCBC and extend with 1 @ 7'x5' RCBC upstream and extend

with 1 @ 7'x7' RCBC downstream with sills at outlet. Rock cross vanes at outlet backfilled with native stone to bring stream grade up to culvert outlet elevation.

- **(Site 8C)** Station 158+00 –L- (14+90 –Y17-) (Stream 2D) Tributary to Long Branch Creek. Replace existing 1@10'x5' stone culvert (w/concrete top slab) with 1@ 8'x6' RCBC with alternating 0.5' and 1.0' sills @ 20' intervals. There will be a low flow meandering channel inside the culvert. Downstream of this culvert is a stream relocation with 2 rock cross vanes. Class I rip rap is used downstream for bank stabilization. Construct floodplain bench at outlet of culvert.
- Note: Wetland 5UT2D is no longer present.

Plan sheet 15

- Avoided wetlands with roadway design.

Plan sheet 16 (Site 9,10,11)

- **(Site 9)** Station 179+80 –L- (Stream 2D) Remove existing 36" CMP and replace with Special Lateral Base Ditch.
- **(Site 10)** Station 182+80 –L- (Stream 12UT2C) Plug existing 36" CMP and replace with drainage system. Outlet lined with rip rap. Inlet standard base ditch lined with rip rap.
- **(Site 11)** Station 186+50 –L- (Stream 2D) Bank Stabilization used at outlet of drainage system.

Plan sheet 17 (Sites 12-15)

- **(Site 12)** Station 191+50 –L- (Stream 13UT2D) Stream replaced with 42" RCP in drainage system. Outlet of system has bank stabilization.
- **(Site 13)** Station 195+00 –L- (Wet 2DM) Fill in wetlands (0.05 ac.) Replace portion of stream (Stream 2D) with drainage system. Outlet of drainage system has bank stabilization.
- **(Site 14)** Station 197+00 –L- (Stream 2D) Fill in portion of stream and replace with drainage system.
- **(Site 15)** Station 198+50 –L- (Stream 2D) Fill in portion of stream and replace with drainage system.

Plan sheet 18 (Site 16-18)

- **(Site 16)** Station 205+66 –L- Lt. (Stream 1H) Remove existing 36" CMP and remove 18" HDPE and replace with 36" RCP and 60' of bank stabilization (where 18" HDPE was existing).
- **(Site 17)** Station 206+55 –L- Lt. (Stream UT1H) Remove existing 12" CMP and replace with 18" RCP and 18" CSP and bank stabilization.
- **(Site 18)** Station 214+00 –L- (Stream 2UT1H) Plug existing 54" CMP and replace with 54" Welded Steel Pipe and 54"RCP. Near the outlet, place a junction box to dissipate the energy and outlet with 60" RCP and standard base ditch with rip rap.

Plan sheet 20 -21 (Sites 19-23) Big Crabtree Creek

- **(Site 19)** Station 12+00 –Y21- (Stream 1I) Replace existing 42" RCP with 48" alternate pipe and Class "I' rip rap at outlet.
- **(Site 20)** Station 244+50 –L- Rt. (Wetland 1IC) Standard base ditch through wetland. All of wetland is being taken.
- **(Site 21)** Station 246+00 –L- Rt. (Stream 1I) Fill over existing stream due to road being widened. Stream is replaced parallel to the roadway with standard base ditch. Natural stream design is not used due to limited right of way.
- **(Site 22)** Station 247+85 –L- **(Big Crabtree Creek)** (Stream 1CC) 4@ 12'x12' RCBC replaced with bridge. (Single span 185' long, 96" steel girders) One alternative reviewed at this location was to extend the culvert and use retaining walls. This alternative was not acceptable to several agencies, therefore the culvert is being replaced by a bridge. Due to the bridge design, the grade had to be raised at this location. This pushed out the location of the slope stakes. This is a single span bridge, therefore there will be no piers in the channel. Existing Big Crabtree Creek channel dimensions will be matched for the day-lighted stream.
- **(Site 23)** Station 15+00 –Y23A- (Stream UT1CC) Replace 48" CMP with 60" RCP due to extending the limits of –Y23A-.
- Station 251+50 –L- (Rt) Dry detention basin used to minimize stormwater effects. Best management practice.

Plan sheet 22

- (Non JS) Three existing outlets are heavily eroded (some have 10' deep holes) on the south side of the project. These outlets will no longer be used. Pipe drainage system will convey storm drainage past these outlets to the basin

Plan sheet 23 (Site 24)

- **(Site 24)** Station 281+50 –L- (Stream UT1CC) Plug existing 24" CMP and replace with a drainage system. Outlet of drainage system has standard 'V' ditch with Class 'I' rip rap as requested in a previous 4B meeting.

Plan sheet 24 (Site 25)

- **(Site 25)** Station 300+00 –L- (Stream 2E) Replace stream with drainage system. Existing 60" CMP is lined with 54" welded steel pipe. Standard base ditch is used at outlet of system.

Plan sheet 25 (Site 26-27)

- **(Site 26)** Station 302+50 –L- Lt. (Stream 2E) Portion of stream has bank stabilization at outlet. Portion of stream has 60" CSP replacing stream. At the outlet of the storm drain system is a 4' base ditch lined with rip rap.

- **(Site 27)** Station 305+50 –L- Lt. (Stream SD) Existing 18" CMP is replaced with storm drain system. Bank stabilization is used at outlet of system.

Plan sheet 26 (Site 28-31) Brushy Creek

- **(Site 28)** Station 317+00 –L- (Stream SE) Existing 30" CMP is plugged and filled with flowable material. A new 30" welded steel pipe is installed using trenchless installation. The proposed drainage system has Class 'I' rip rap at the outlet. The inlet side has a standard base ditch lined with Class "I" rip rap.
- **(Site 29)** Station 320+00 –L- (Stream 2BC/1G) **Brushy Creek**. Extend existing 3@8'x8' RCBC with 3@8'x8' RCBC (buried 0.5') upstream. Place 1' high sill in 2 outer barrels at entrance only with 6" high sill in middle barrel @ 12' spacing in existing culvert and at entrance of proposed culvert extension. Extend existing 3@8'x11' RCBC downstream with fish ladder. During construction, erosion control devices, such as stilling basins and impervious dikes may be used. Due to the widening of the road, Stream 1G is filled in. (see next)
- **(Site 30)** Station 324+00 –L- (Stream 1G) Remove existing RCBC on SR 1235 Old US 19E (-Y30 -) Remove 2 each 72" CMP from driveways, Fill over stream and replace with new stream relocation. Install new 2@8'x8' RCBC. Space alternating 0.5' and 1.0' high sills @ 20' intervals in western most barrel. Natural stream design is used downstream of new culvert. (See UT to Brushy Creek Stream Relocation sheet.) There was a remnant stream located where the new natural stream will be placed. Station 324+70 –L- (Rt) preformed scour hole (PSH) at outlet of storm drainage system.
- **(Site 31)** Station 327+50 –L- (Stream 1G) Extend existing 2@ 7'x6' RCBC with 2@7'x7' RCBC downstream. Low flow is in western barrel only. Bank stabilization is used downstream for flood plain benching. Downstream extension is buried 1.5'. Temporary impacts are designated upstream to be used during construction.

Plan sheet 28 (Site 32-34)

- **(Site32)** Station 345+00 –L- Rt. (Stream 8UT1G) Stream is replaced with junction box and 24" RCP. The junction box will dissipate the energy and reduce outlet velocities.
- **(Site 33)** Station 346+50 –L- Rt. (Stream 1G) Extend existing 2@ 7'x6' RCBC with 2@ 7'x6' RCBC upstream. Bury culvert 0.5'. Channel improvement upstream of proposed culvert extension. Proposed 24" CSP in the vicinity of -DR13- outlets into a standard base ditch with rip rap as requested in previous 4B meeting.
- **(Site 34)** Station 11+00 –Y34- (Stream 5UT1G) Replace existing 1@ 6'x6' RCBC with 1@ 6'x7' RCBC with 0.5' and 1.0' alternating sills. Bank stabilization is used downstream of the culvert. Channel improvements upstream of the culvert extend for 120 ft. Culvert is buried 1.0'.

Plan sheet 29 (Site 35 and Site 37) (No Site 36)

- **(Site 35)** Station 358+50 –L- (Stream SF) Site 35 Replace 30" CMP with 30" welded steel pipe and junction boxes. Bank stabilization is used downstream of the drainage system. Standard 'V' ditch is used upstream of the system.
- NOTE: There is no Site 36.
- **(Site 37)** Station 368+50 –L- (Stream SG) Site 37 Replace existing 42" CMP with 42" welded steel pipe. Replace stream with 42" RCP upstream. Junction boxes are used in the system to dissipate the energy and reduce outlet velocities. Bank stabilization is used downstream of the system.

Plan sheet 30 (Site 38)

- **(Site 38)** Station 384+00 –L- (Stream 1D) Replace 24" CMP with 24" alternate pipe and junction box. The JB will dissipate the energy and reduce outlet velocities. Bank stabilization is used downstream of the system.

Plan sheet 31 (Site 39-40)

- **(Site 39)** Station 388+00 –L- (Stream SH) Existing 18" CMP is replaced with 18" CSP with elbows. Class I rip rap is used downstream of drainage system.
- **(Site 40)** Station 397+75 –L- (Stream SI) Replace stream with drainage system. 24" CSP with elbows and rod and lug connectors are used. Use several junction boxes to dissipate energy and reduce outlet velocities. Class I rip rap is used at outlet of system.

Plan sheet 32 (Site 41-42)

- **(Site 41)** Station 404+50 –L- Rt. (Stream 1C) Existing 18" CMP cross pipe is plugged and filled with flowable material. Stream is replaced with drainage system including 24" CSP with elbows and junction box near outlet to dissipate energy and reduce outlet velocities. Bank stabilization is used downstream of the system.

- **(Site 42)** Station 409+00 –L- Rt. (Stream 1Z) Existing 18" CMP cross pipe is plugged and filled with flowable material. Existing Stream is replaced with drainage system including 15" CSP with elbows and 24" CSP with elbows and junction box near outlet to dissipate energy and reduce outlet velocities. Bank stabilization is used downstream of the system. Toe protection is also used on the fill slope.

Plan sheet 33 (Site 43)

- **(Site 43)** Station 419+75 –L- Rt. (Stream SJ) Existing 18" CMP and 24" CMP cross pipes are plugged and filled with flowable material. Existing Stream is replaced with drainage system including 24" CSP with elbows and junction boxes near outlet to dissipate energy and reduce outlet velocities. Class 'B' rip rap is used downstream of the system.

Plan sheet 34 (Site 44-45)

- **(Site 44)** Station 428+50 –L- Lt. (Stream SKA) Remove existing concrete lined ditch and replace with drainage system including 30" CSP and open throat catch basin near outlet.
- **(Site 45)** Station 431+00 –L- Rt. (Stream SK) Remove concrete lined ditch and replace with Class 'I' rip rap lined standard base ditch. No net loss.

STREAM RELOCATIONS

- **(Site 5A)** Station 122+00 to station 124+00 –L-(Lt.) Long Branch Creek (Stream 2D) Relocate 148 ft. of existing stream where Long Branch Creek ties into the South Toe River due to the construction of the new bridge over the South Toe River. Currently there are beaver dams in this stream. The new stream will have similar dimensions and profile as that of the existing stream. The new stream will be contained inside the right of way. Further upstream **(Site 6)** from Station 125+95 to station 127+17, approximately 144' of Long Branch Creek (Stream 2D) is reclaimed after removing an existing 2@ 6'x6' RCBC. With this stream design, 2 rock cross vanes are used for grade control. The new stream will have similar dimensions and profile as that of the existing stream. The new stream will be contained inside the right of way.

- **(Site 8)** Station 152+50 to station 155+00 –L- (Rt.) Long Branch Creek (Stream 2D) 257 feet of stream relocation proposed downstream. The existing stream flows along the toe of fill and crosses under the road with a 7'x5' RCBC. The culvert is extended upstream and downstream due to widening of the road. The stream is relocated parallel to the road with similar dimensions and profile. Rock cross vanes are used for grade control. On the downstream side, rip rap is used along the toe of fill. Bank stabilization is also used in the vicinity of the culvert extensions. On the upstream side from Station 155+98 to 157+80 –L- (Lt.) 192 feet of stream relocation is proposed. The stream is relocated parallel to the road with similar dimensions and profile. Rock cross vanes are used for grade control. The culvert on Newdale Church Way is being replaced due to the widening on –Y17-.

- **(Site 19)** -Y21-Hemlock Rd is being widened and an existing 42" RCP will be replaced with a new 48" pipe. (Stream 1I) From Station 244+10 to station 247+88 –L- (Rt.) 396 feet of stream is being relocated. The existing stream is stable. The proposed stream is parallel to the road similar to the existing stream. Due to the widening, the stream will be relocated further south. The proposed stream has similar channel dimensions and profile. The proposed stream is inside the right of way.

- **(Site 25)** Station 299+30 to station 300+31 –L- (Rt.) 94 feet of stream is being relocated. The stream is being relocated due to the road being widened. A standard base ditch with similar channel dimensions and profile will replace the

stream. The proposed stream is parallel to the road and contained within the right of way.

- **(Site 30)** Station 320+00 to station 323+00 –L- (Lt.) (Stream 1G) 660 feet of new stream is proposed. It appears during original construction of US 19, the unnamed tributary to Brushy Creek was realigned to fall along the south side of US 19/Old US 19/ Penland Rd. and then travel through the triple 8'x8' RCBC at Brushy Creek. The new double 8'x8' RCBC will convey water across the widened US 19 and outlet into a newly constructed stream that ties in with Brushy Creek at the same location as that of the remnant channel. The project will reestablish the original flow path of the tributary in the new double barrel culvert. At this time, the remnant channel is visible at the same location as that of the new stream. The existing triple 8'x8' RCBC will be extended on both sides. Bank stabilization will be used both upstream and downstream along Brushy Creek. The new stream will be fully contained within the right of way. On the upstream side, an old culvert will be removed and the new channel dimensions will mimic the old stream.

- **(Site 33)** Station 346+42 to station 348+50 –L- (Rt.) (Stream 1G) Due to the widening of the road, 275 feet of stream realignment is proposed. The new stream will run parallel to the toe of fill. The existing double 7'x6' RCBC will be extended upstream. The new stream will be contained within the right of way. Natural stream design techniques will be used in the design to mimic the existing stream dimensions and profile.

CONCRETE DITCH REMOVAL

- **(Site 45)** Station 429+67 to 432+94 –L- Rt. (Stream SK) Existing concrete ditch will be removed and replaced with rip rap.

STRUCTURE REMOVAL

- **(Site 6)** Station 126+50 –L- (Lt) Remove existing 2@6'x6' RCBC and replace with channel. (Total length=144')
- **(Non Site)** Station 27+550 –Y16- Remove existing bridge structure.
- **(Site 22)** Big Crabtree Creek. Remove 4 barrel culvert and replace with bridge.
- **(Site 30)** Remove existing RCBC on –Y30- (Old US 19) near Station 324+70 –L- (Rt).

RETAINING WALLS

- Wall #1 Station 78+50 to 87+50 –L- (Lt) reduced the impacts to the South Toe River.
- Wall #2 Station 125+50 to 129+50 –L- (Lt) reduced the impacts to Long Branch Creek.

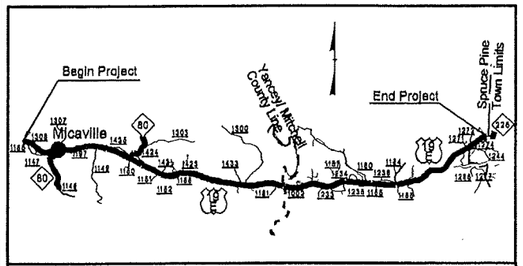
- Wall #4 Station 226+50 to 229+50 –L- (Rt) reduced the impacts to JS (Stream 1I) and wetland (Wet 1IB).
- Wall #11 Station 360+72 to 363+50 –L- (Rt) reduced the impacts to JS (Stream 1G) and wetland (Wet1G-B).

09/08/99

TIP PROJECT: R-2519B

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2519B	1	

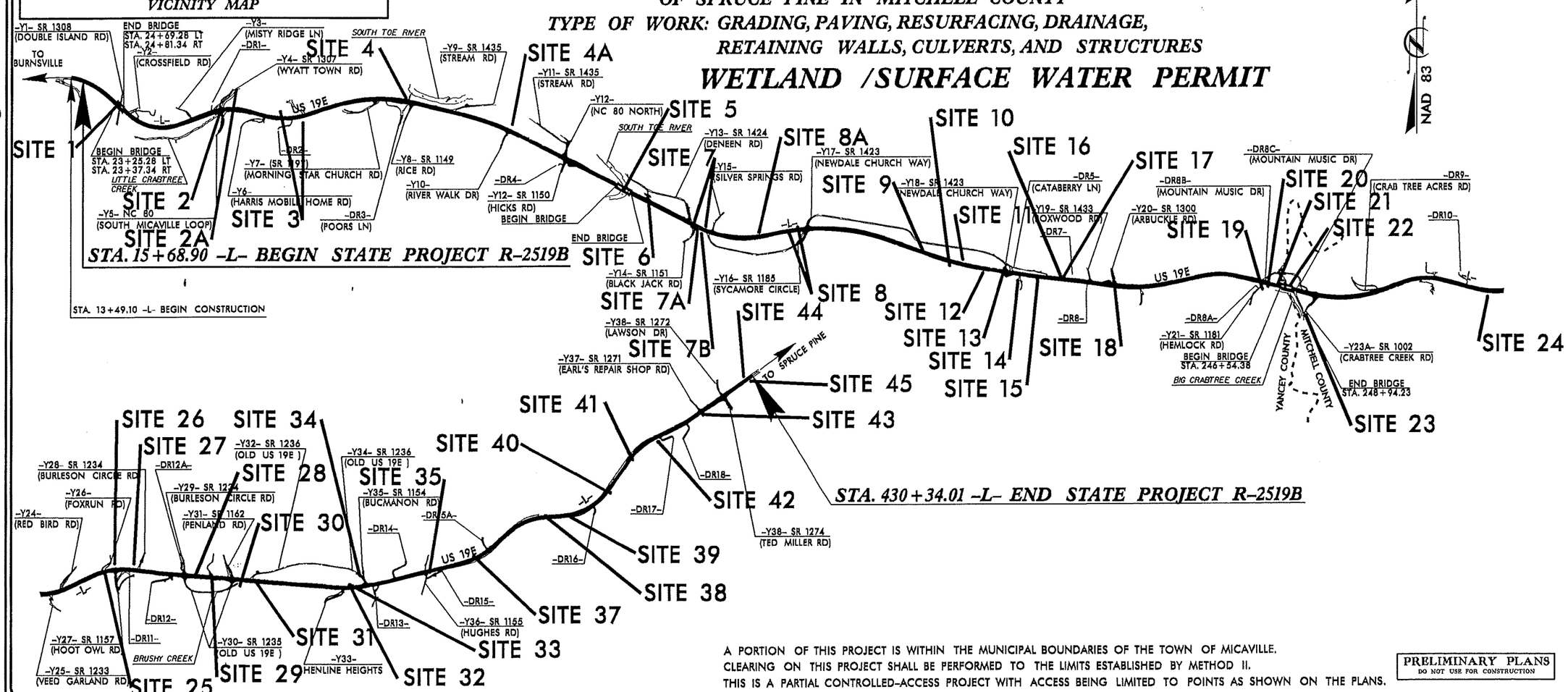
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35609.1.1		PE
35609.2.2		R/W, UTIL

YANCEY/MITCHELL COUNTIES

LOCATION: US 19E FROM SR 1186 (OLD US 19) IN YANCEY COUNTY TO MULTI-LANE SECTION WEST OF SPRUCE PINE IN MITCHELL COUNTY

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

WETLAND /SURFACE WATER PERMIT



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF MICAVILLE.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

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 2014 = 13,277
ADT 2034 = 19,181
DHV = 11 %
D = 60 %
T = 7 % *
V = 60 MPH
* (TTST 3% + DUAL 4%)
FUNC. CLASS. = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2519B	=	7.724 MI
LENGTH STRUCTURE TIP PROJECT R-2519B	=	0.129 MI
TOTAL LENGTH TIP PROJECT R-2519B	=	7.853 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JANUARY 27, 2012

LETTING DATE:
FEBRUARY 18, 2014

G. E. BREW, PE
PROJECT ENGINEER

THAD F. DUNCAN, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

Permit Drawing
Sheet 1 of 117

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

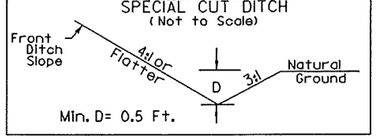
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

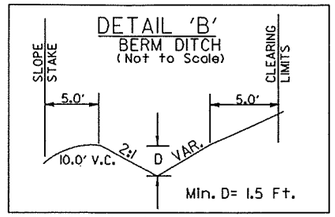
REVISIONS

DETAIL 'A'
SPECIAL CUT DITCH
(Not to Scale)



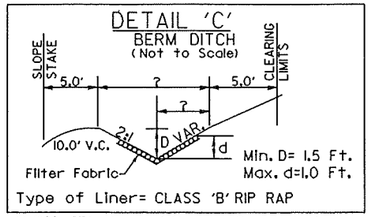
FROM STA. 19+00 TO STA. 21+00 -L- RT

DETAIL 'B'
BERM DITCH
(Not to Scale)



FROM STA. 18+00 TO STA. 18+50 -L- LT

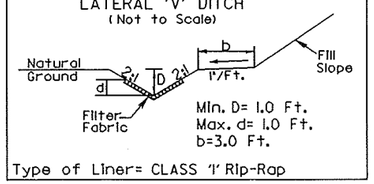
DETAIL 'C'
BERM DITCH
(Not to Scale)



Type of Liner= CLASS 'B' RIP RAP

FROM STA. 18+50 TO STA. 19+50 -L- LT

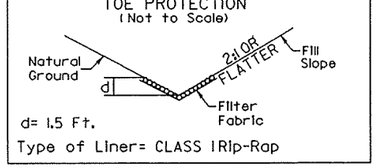
DETAIL 'D'
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= CLASS 'I' Rip-Rap

FROM STA. 21+50 TO STA. 23+25 -L- LT

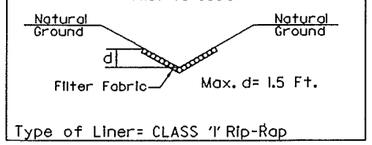
DETAIL 'E'
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS I Rip-Rap

FROM STA. 22+10 TO STA. 22+70 -L- RT

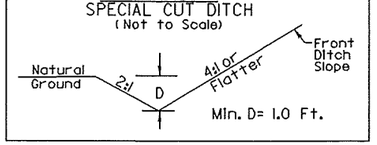
DETAIL 'F'
EXISTING DITCH
(Not to Scale)



Type of Liner= CLASS 'I' Rip-Rap

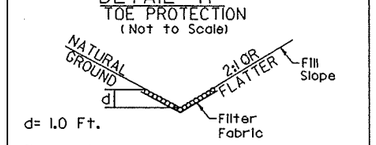
FROM STA. 22+70 TO STA. 23+80 -L- RT

DETAIL 'G'
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 71+20 TO STA. 71+60 -L- LT
FROM STA. 12+50 TO STA. 12+75 -Y38- RT
FROM STA. 13+70 TO STA. 14+30 -DR3- RT
FROM STA. 12+00 TO STA. 12+50 -Y31- LT

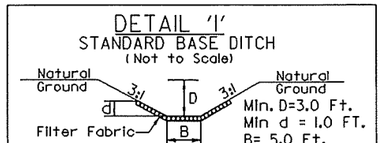
DETAIL 'H'
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 52+80 TO STA 53+50 -L- RT
FROM STA. 58+50 TO STA. 59+00 -L- RT
FROM STA. 91+50 TO STA. 92+00 -L- LT
FROM STA. 139+00 TO STA. 140+50 -L- RT
FROM STA. 276+00 TO STA. 276+50 -L- LT
FROM STA. 283+50 TO STA. 284+00 -L- LT
FROM STA. 282+00 TO STA. 284+50 -L- RT
FROM STA. 10+80 TO STA. 11+80 -Y23A- LT

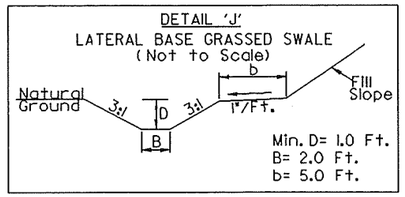
DETAIL 'I'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap

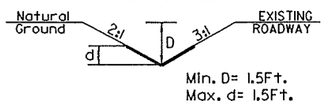
FROM STA. 46+10 TO STA. 46+50 -L- LT

DETAIL 'J'
LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 46+50 TO STA. 49+50 -L- LT
FROM STA. 237+00 TO STA. 241+00 -L- RT

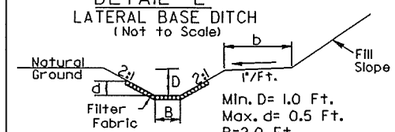
DETAIL 'K'
STANDARD 'V' DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 12+92 TO STA. 15+20 -Y1- LT

DETAIL 'L'
LATERAL BASE DITCH
(Not to Scale)

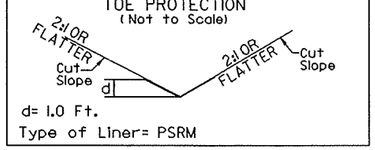


•When B is < 6.0'

Type of Liner= CLASS 'B' Rip-Rap

FROM STA. 49+50 TO STA. 50+50 -L- LT

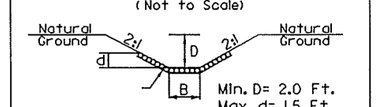
DETAIL 'M'
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 48+00 TO STA. 51+50 -L- RT

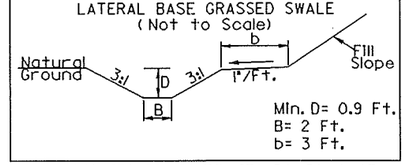
DETAIL 'N'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

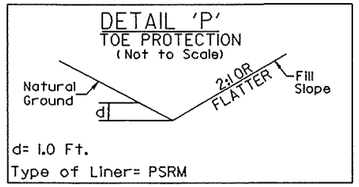
STA. 52+80 -L- LT

DETAIL 'O'
LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 52+80 TO STA. 54+50 -L- LT

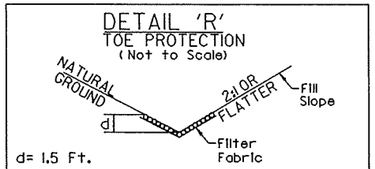
DETAIL 'P'
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 10+50 TO STA. 13+00 -DR2- RT
FROM STA. 10+50 TO STA. 13+50 -DR2- LT

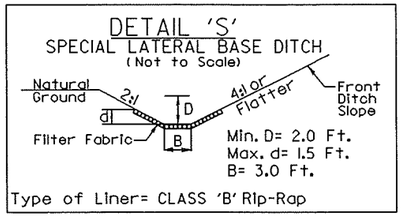
DETAIL 'R'
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

FROM STA. 59+05 TO STA. 60+00 -L- RT

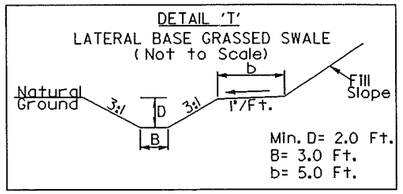
DETAIL 'S'
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap

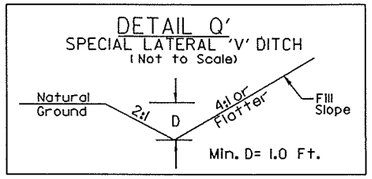
FROM STA. 43+00 TO STA. 43+50 -L- LT
FROM STA. 204+50 TO STA. 207+00 -L- RT

DETAIL 'T'
LATERAL BASE GRASSED SWALE
(Not to Scale)



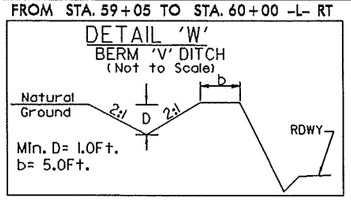
FROM STA. 13+00 TO STA. 13+72 -Y4- RT

DETAIL Q'
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



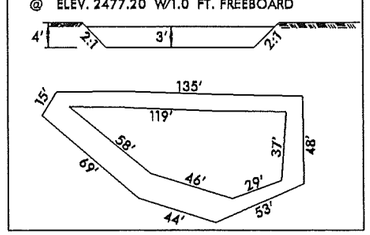
FROM STA. 224+00 TO STA. 225+50 -L- LT

DETAIL 'W'
BERM 'V' DITCH
(Not to Scale)



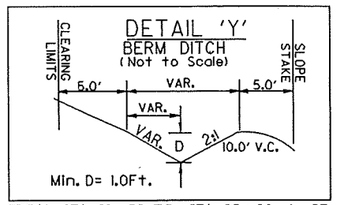
FROM STA. 194+50 TO STA. 195+80 -L- RT
FROM STA. 216+50 TO STA. 219+00 -L- RT
FROM STA. 227+50 TO STA. 232+50 -L- LT
FROM STA. 235+57 TO STA. 240+00 -L- LT
FROM STA. 296+50 TO STA. 298+00 -L- LT
FROM STA. 10+50 TO STA. 12+00 -Y20- LT
FROM STA. 258+00 TO STA. 259+00 -L- LT
FROM STA. 284+40 TO STA. 285+20 -L- LT

DETAIL 'X'
DRY DETENTION BASIN
TOTAL CAPACITY REQUIRED : 8792 CU FT
TOTAL CAPACITY PROVIDED : 11505 CU FT
@ ELEV. 2477.20 W/1.0 FT. FREEBOARD



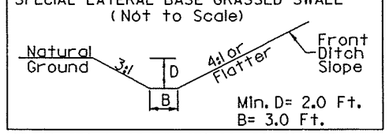
FROM STA. 83+00 TO STA. 84+50 -L- RT

DETAIL 'Y'
BERM DITCH
(Not to Scale)



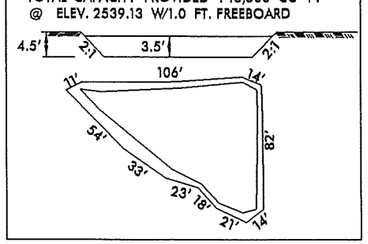
FROM STA. 91+50 TO STA. 95+00 -L- RT
FROM STA. 410+00 TO STA. 412+50 -L- LT
FROM STA. 11+50 TO STA. 12+00 -Y8- LT

DETAIL 'U'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



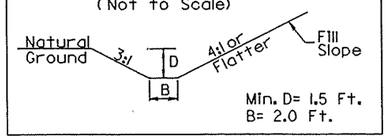
FROM STA. 9+85 TO STA. 13+00 -Y4- RT

DETAIL 'V'
DRY DETENTION BASIN
TOTAL CAPACITY REQUIRED : 14,700 CU FT
TOTAL CAPACITY PROVIDED : 18,300 CU FT
@ ELEV. 2539.13 W/1.0 FT. FREEBOARD



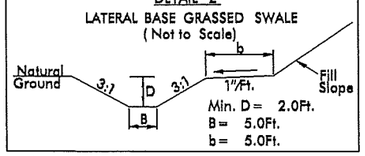
FROM STA. 250+75 TO STA. 252+01 -L- RT

DETAIL 'AD'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



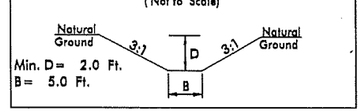
FROM STA. 135+75 TO STA. 139+00 -L- LT
FROM STA. 350+50 TO STA. 354+50 -L- RT

DETAIL 'Z'
LATERAL BASE GRASSED SWALE
(Not to Scale)



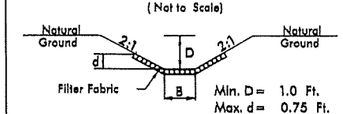
FROM STA 111+50-L- TO STA 119+00 -L- RT
FROM STA 319+62-L- TO STA 321+84 -L- LT

DETAIL 'AA'
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 119+50 TO STA. 121+50 -L- RT

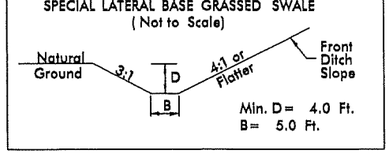
DETAIL 'AB'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= CLASS II Rip-Rap

FROM STA. 121+50 TO STA. 121+75 -L- RT

DETAIL 'AC'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 124+50 TO STA.127+00 -L- RT

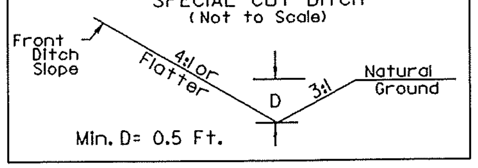
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2E
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

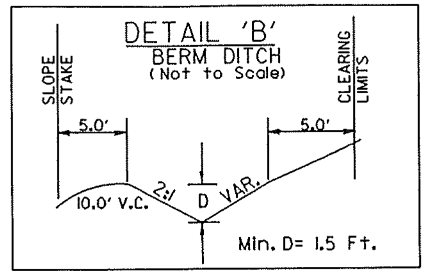
REVISIONS

DETAIL 'A'
SPECIAL CUT DITCH
(Not to Scale)



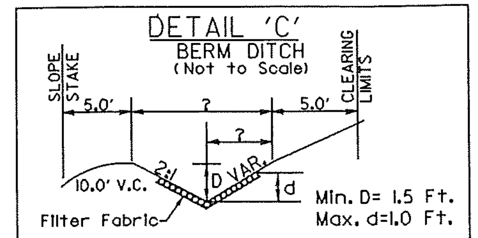
FROM STA. 19+00 TO STA. 21+00 -L- RT

DETAIL 'B'
BERM DITCH
(Not to Scale)



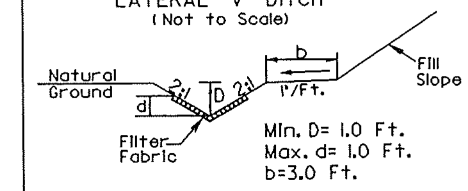
FROM STA. 18+00 TO STA. 18+50 -L- LT

DETAIL 'C'
BERM DITCH
(Not to Scale)



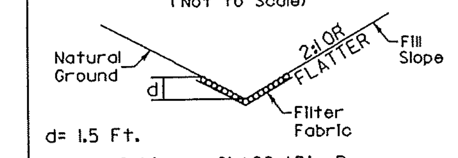
FROM STA. 18+50 TO STA. 19+50 -L- LT

DETAIL 'D'
LATERAL 'V' DITCH
(Not to Scale)



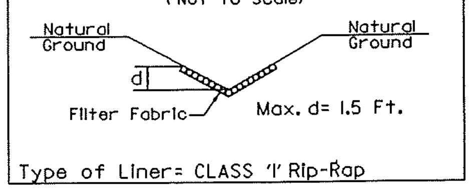
FROM STA. 21+50 TO STA. 23+25 -L- LT

DETAIL 'E'
TOE PROTECTION
(Not to Scale)



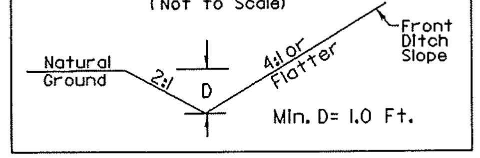
FROM STA. 22+10 TO STA. 22+70 -L- RT

DETAIL 'F'
EXISTING DITCH
(Not to Scale)



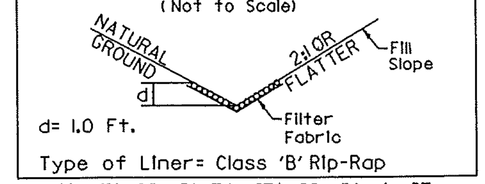
FROM STA. 22+70 TO STA. 23+80 -L- RT

DETAIL 'G'
SPECIAL CUT DITCH
(Not to Scale)



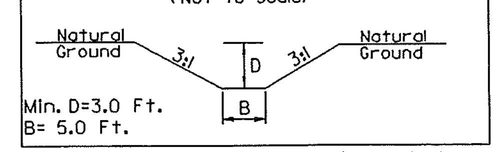
FROM STA. 57+50 TO STA. 59+00 -L RT
FROM STA. 71+00 TO STA. 71+50 -L- LT
FROM STA. 12+50 TO STA. 12+75 -Y38- RT
FROM STA. 13+70 TO STA. 14+30 -DR3- RT
STA 12+00 -Y31- LT

DETAIL 'H'
TOE PROTECTION
(Not to Scale)



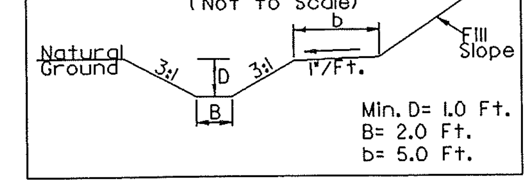
FROM STA 32+50 TO STA 32+80 -L- RT
FROM STA. 52+80 TO STA 53+50 -L- RT
FROM STA. 84+65 TO STA. 85+00 -L- RT
FROM STA. 91+50 TO STA. 92+00 -L- LT
FROM STA. 276+00 TO STA. 276+50 -L- LT
FROM STA. 283+50 TO STA. 284+00 -L- LT
FROM STA. 282+00 TO STA. 284+50 -L- RT
FROM STA. 10+80 TO STA. 11+80 -Y23A- LT

DETAIL 'I'
STANDARD BASE DITCH
(Not to Scale)



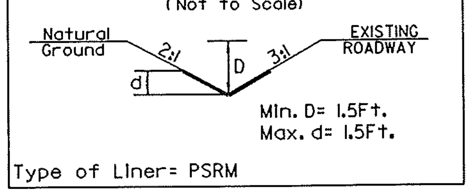
FROM STA. 46+10 TO STA. 46+50 -L- LT

DETAIL 'J'
LATERAL BASE GRASSED SWALE
(Not to Scale)



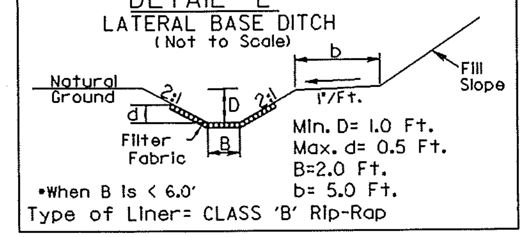
FROM STA. 46+50 TO STA. 49+50 -L- LT
FROM STA. 237+00 TO STA. 241+00 -L- RT

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



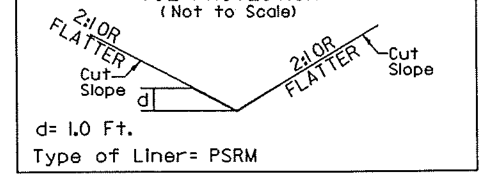
FROM STA. 12+92 TO STA. 15+20 -Y1- LT

DETAIL 'L'
LATERAL BASE DITCH
(Not to Scale)



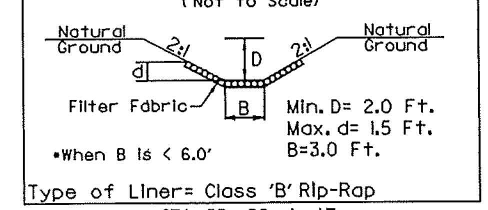
FROM STA. 49+50 TO STA. 50+50 -L- LT

DETAIL 'M'
TOE PROTECTION
(Not to Scale)



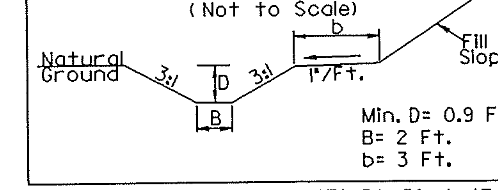
FROM STA. 48+00 TO STA. 51+50 -L- RT

DETAIL 'N'
STANDARD BASE DITCH
(Not to Scale)



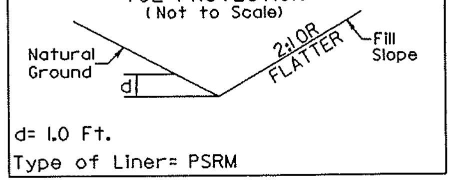
STA. 52+80 -L- LT

DETAIL 'O'
LATERAL BASE GRASSED SWALE
(Not to Scale)



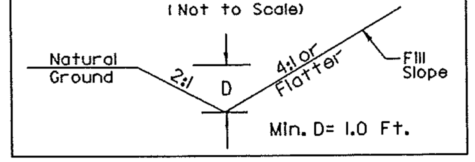
FROM STA. 52+80 TO STA. 54+50 -L- LT

DETAIL 'P'
TOE PROTECTION
(Not to Scale)



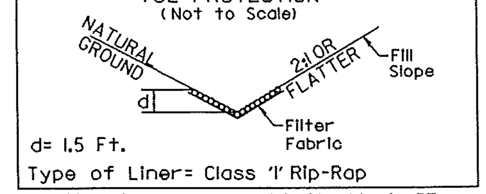
FROM STA. 10+50 TO STA. 13+00 -DR2- RT
FROM STA. 10+50 TO STA. 13+50 -DR2- LT

DETAIL Q'
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



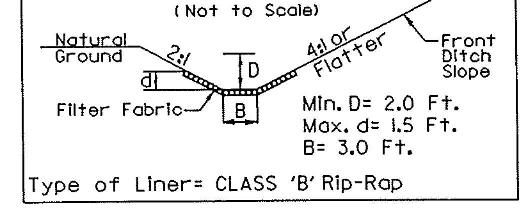
FROM STA. 224+00 TO STA. 225+50 -L- LT

DETAIL 'R'
TOE PROTECTION
(Not to Scale)



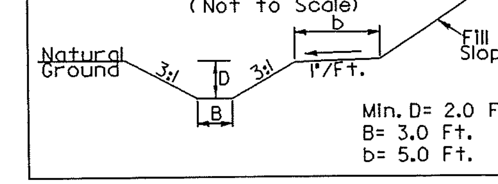
FROM STA. 59+00 TO STA. 60+00 -L- RT

DETAIL 'S'
SPECIAL LATERAL BASE DITCH
(Not to Scale)



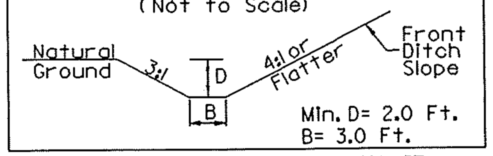
FROM STA. 43+00 TO STA. 43+50 -L- LT
FROM STA. 204+50 TO STA. 207+00 -L- RT

DETAIL 'T'
LATERAL BASE GRASSED SWALE
(Not to Scale)



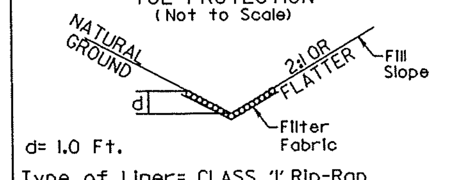
FROM STA. 13+00 TO STA. 13+72 -Y4- RT

DETAIL 'U'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



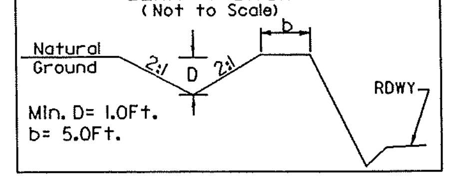
FROM STA. 9+85 TO STA. 13+00 -Y4- RT

DETAIL 'V'
TOE PROTECTION
(Not to Scale)



FROM STA. 71+50 TO STA. 72+60 -L- LT

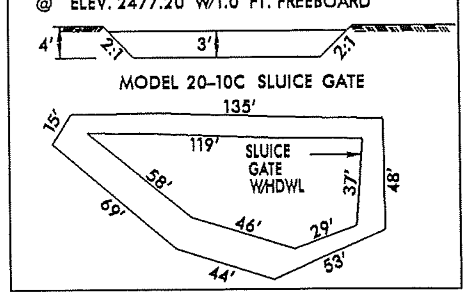
DETAIL 'W'
BERM 'V' DITCH
(Not to Scale)



FROM STA. 194+50 TO STA. 195+80 -L- RT
FROM STA. 216+50 TO STA. 219+00 -L- RT
FROM STA. 227+50 TO STA. 232+50 -L- LT
FROM STA. 235+57 TO STA. 240+00 -L- LT
FROM STA. 296+50 TO STA. 298+00 -L- LT
FROM STA. 10+50 TO STA. 12+00 -Y20- LT

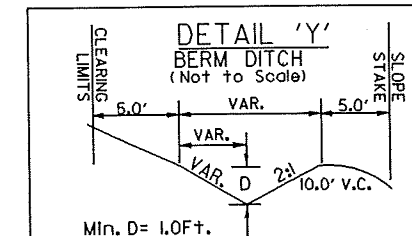
DETAIL 'X'
HAZARDOUS SPILLBASIN

TOTAL CAPACITY REQUIRED : 8792 CU FT
TOTAL CAPACITY PROVIDED : 11505 CU FT
@ ELEV. 2477.20 W/1.0 FT. FREEBOARD



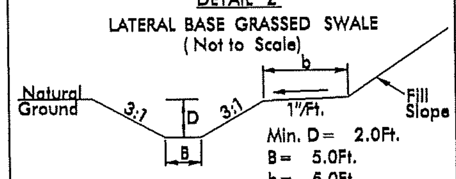
FROM STA. 83+00 TO STA. 84+50 -L- RT

DETAIL 'Y'
BERM DITCH
(Not to Scale)



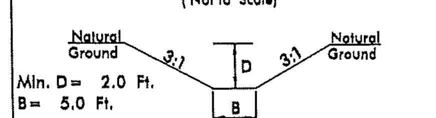
FROM STA. 91+50 TO STA. 96+50 -L- RT
FROM STA. 410+00 TO STA. 412+50 -L- LT
FROM STA. 11+50 TO STA. 12+00 -Y8- LT

DETAIL 'Z'
LATERAL BASE GRASSED SWALE
(Not to Scale)



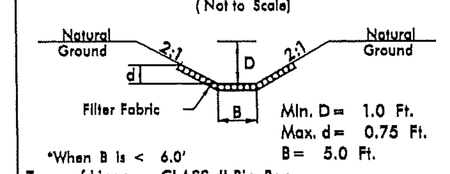
FROM STA 111+50-L- TO STA 119+00 -L- RT
FROM STA 319+80-L- TO STA 321+80 -L- LT

DETAIL 'AA'
STANDARD BASE DITCH
(Not to Scale)



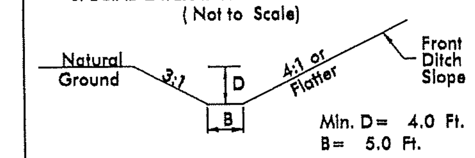
FROM STA. 119+50 TO STA. 121+50 -L- RT

DETAIL 'AB'
STANDARD BASE DITCH
(Not to Scale)



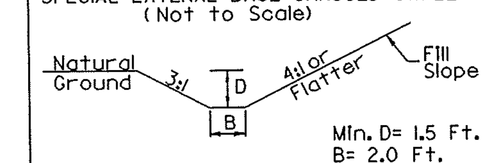
FROM STA. 121+50 TO STA. 121+75 -L- RT

DETAIL 'AC'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 124+50 TO STA.127+00 -L- RT

DETAIL 'AD'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 135+75 TO STA. 139+00 -L- LT
FROM STA. 350+50 TO STA. 354+50 -L- RT

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

Permit Drawing
Sheet 3 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

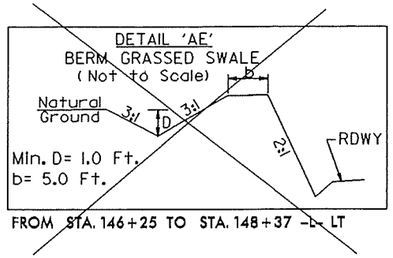
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

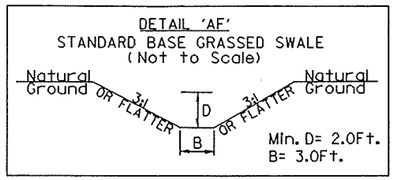
DETAIL 'AE'
BERM GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
b= 5.0 Ft.

FROM STA. 146+25 TO STA. 148+37 -L- LT

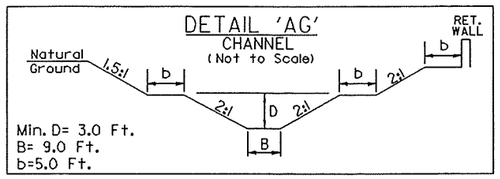
DETAIL 'AF'
STANDARD BASE GRASSED SWALE
(Not to Scale)



Min. D= 2.0Ft.
B= 3.0Ft.

FROM STA. 155+50 TO STA. 156+53 -L- RT

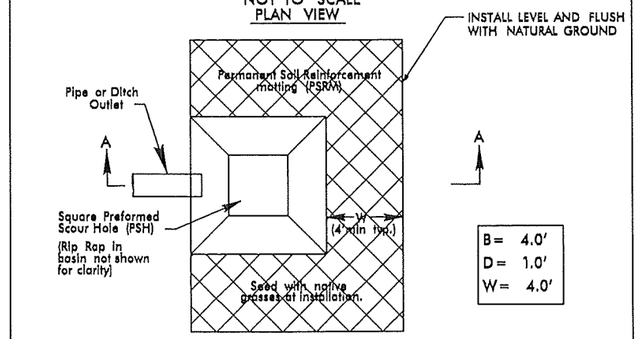
DETAIL 'AG'
CHANNEL
(Not to Scale)



Min. D= 3.0 Ft.
B= 9.0 Ft.
b=5.0 Ft.

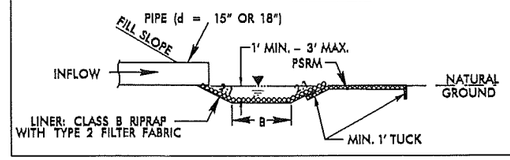
FROM STA. 126+00 TO STA. 127+00 -L- LT

PREFORMED SCOUR HOLE
DETAIL 'AH'
*NOT TO SCALE
PLAN VIEW



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

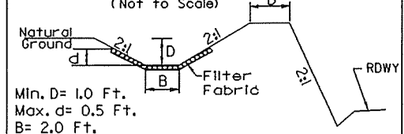
SECTION A-A



3/08

STA. 246+30 -L- LT
STA. 337+90 -L- LT

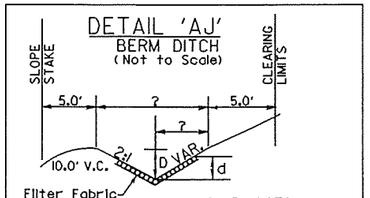
DETAIL 'AI'
BERM BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 2.0 Ft.
b= 5.0Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 169+50 TO STA. 172+50 -L- RT
FROM STA. 10+50 TO STA. 11+60 -DR10- LT

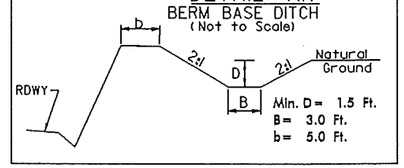
DETAIL 'AJ'
BERM DITCH
(Not to Scale)



Min. D= 1.0Ft.
Max. d= 0.75Ft.
Type of Liner= CLASS B RIP RAP

FROM STA. 172+50 TO STA. 176+25 -L- RT

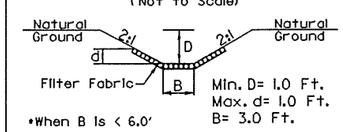
DETAIL 'AK'
BERM BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

FROM STA. 177+00 TO STA. 179+00 -L- RT
FROM STA. 195+80 TO STA. 198+00 -L- RT

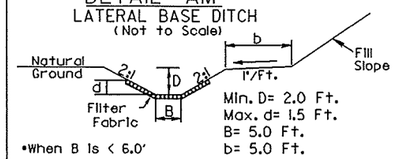
DETAIL 'AL'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 3.0 Ft.
*When B is < 6.0'
Type of Liner= CLASS B Rip-Rap

STA. 183+88 -L- RT
STA. 10+50 -DR15- RT

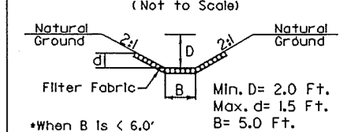
DETAIL 'AM'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
*When B is < 6.0'
Type of Liner= CLASS II RIP RAP

FROM STA. 212+50 TO STA. 214+00-L-RT

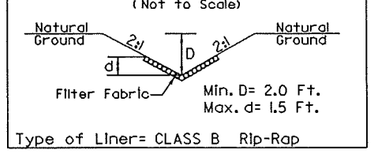
DETAIL 'AN'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.
*When B is < 6.0'
Type of Liner= CLASS II Rip-Rap

STA. 214+08-L-RT
STA. 10+88 -Y21- LT
FROM STA 123+00 TO STA 123+50 -L- RT

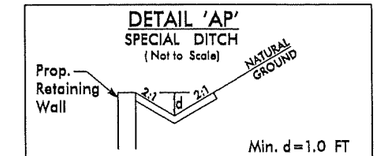
DETAIL 'AO'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 23+84-L- TO STA. 25+06-L-

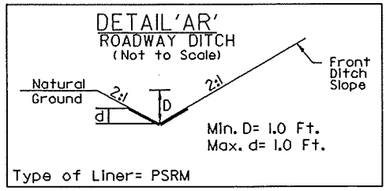
DETAIL 'AP'
SPECIAL DITCH
(Not to Scale)



Min. d=1.0 FT
Type of Liner= PAVED CONCRETE

FROM STA. 198+00 TO STA. 201+50 -L- LT
~~FROM STA. 286+00 TO STA. 289+00 -L- RT~~

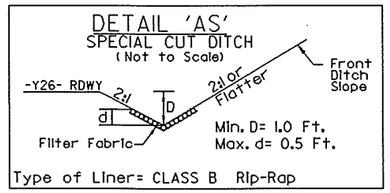
DETAIL 'AR'
ROADWAY DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= PSRM

FROM STA. 10+00 TO STA. 13+50-Y24-RT
FROM STA. 10+00 TO STA. 14+00 -DR14-RT
FROM STA. 10+00 TO STA. 14+00 -DR14-LT

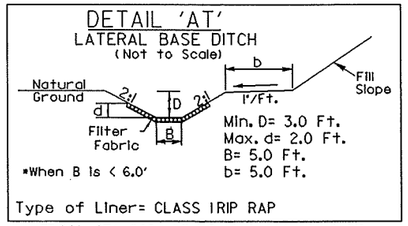
DETAIL 'AS'
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 300+50 TO STA. 301+00-L-LT

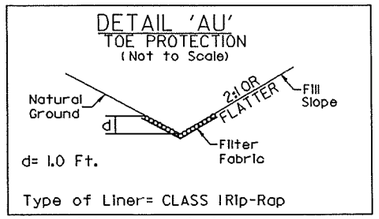
DETAIL 'AT'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 3.0 Ft.
Max. d= 2.0 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
*When B is < 6.0'
Type of Liner= CLASS I RIP RAP

FROM STA. 302+05 TO STA. 302+50-L-RT

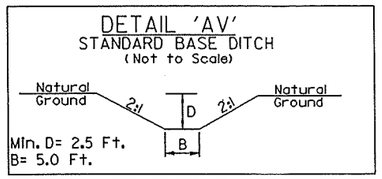
DETAIL 'AU'
TOE PROTECTION
(Not to Scale)



d= 1.0 Ft.
Type of Liner= CLASS I Rip-Rap

FROM STA. 301+50 TO STA. 302+00-L-LT

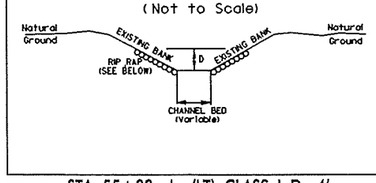
DETAIL 'AV'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.5 Ft.
B= 5.0 Ft.

FROM STA. 299+30 TO STA. 300+30 -L- RT

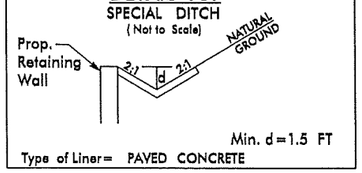
DETAIL 'AW'
BANK STABILIZATION
(Not to Scale)



STA 55+00 -L- (LT), CLASS I, D=4'
STA 79+36 -L- (LT), CLASS II, D=8'
STA 179+80 -L- (LT), CLASS II, D=3' (RIGHT SIDE ONLY)
STA 186+50 -L- (LT), CLASS I, D=4'
STA 205+66 -L- (LT), CLASS I, D=2'
STA 206+55 -L- (LT), CLASS I, D=2'
STA 247+85 -L- , CLASS II, D=4' TO 5'
STA 15+00 -Y23A-, CLASS I, D=5'
STA 302+50 -L-, CLASS II, D=5'
STA 305+50 -L-, CLASS I, D=2'
STA 320+00 -L-, CLASS II, D=8' TO 13'
STA 327+50 -L- (RT), CLASS B, D=1.5' TO 2.5'

STA 11+00 -Y34-, CLASS I, D=3'
STA 357+89 -L- (RT), CLASS I, D=3'
STA 366+54 -L- (RT), CLASS I, D=6'
STA 383+79 -L- (RT), CLASS I, D=2'
STA 404+50 -L-, CLASS I, D=2'
STA 409+00 -L- (RT), CLASS I, D=2'

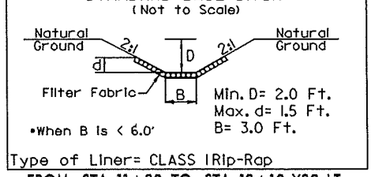
DETAIL 'AX'
SPECIAL DITCH
(Not to Scale)



Min. d=1.5 FT
Type of Liner= PAVED CONCRETE

FROM STA. 305+00 TO STA. 308+50 -L- RT

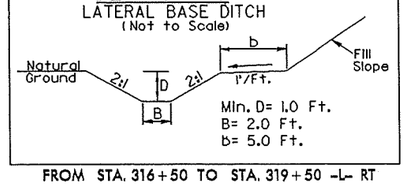
DETAIL 'AY'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 3.0 Ft.
*When B is < 6.0'
Type of Liner= CLASS I Rip-Rap

FROM STA. 11+80 TO STA. 12+10-Y30-LT
STA. 230+67-L-RT
FROM STA. 348+64 TO STA. 349+43 -L- RT

DETAIL 'AZ'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

FROM STA. 316+50 TO STA. 319+50 -L- RT

\$\$\$\$\$CYSTIME\$\$\$\$\$
\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

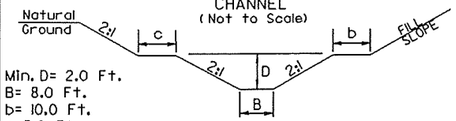
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

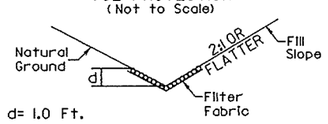
DETAIL 'BA'
CHANNEL
(Not to Scale)



Min. D= 2.0 Ft.
B= 8.0 Ft.
b= 10.0 Ft.
c=5.0 Ft.

FROM STA. 346+39 TO STA. 348+40 -L- RT

DETAIL 'BB'
TOE PROTECTION
(Not to Scale)

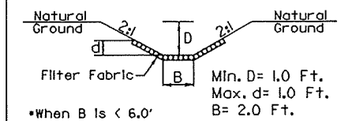


d= 1.0 Ft.

Type of Liner= CLASS B Rip-Rap

FROM STA. 344+00 TO STA. 345+00 -L- RT
FROM STA. 368+10 TO STA. 369+00 -L- LT
FROM STA. 409+00 TO STA. 410+88 -L- RT
FROM STA. 413+76 TO STA. 414+87 -L- RT

DETAIL 'BC'
STANDARD BASE DITCH
(Not to Scale)



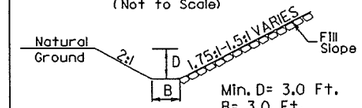
Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.

*When B is < 6.0'

Type of Liner= CLASS I Rip-Rap

FROM STA. 241+00 TO STA. 241+80 -L- RT
FROM STA. 347+16 TO STA. 347+39 -L- LT

DETAIL 'BD'
SPECIAL LATERAL BASE DITCH
(Not to Scale)

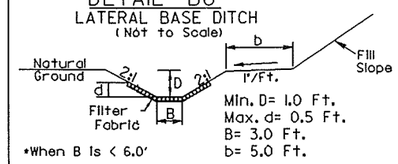


Min. D= 3.0 Ft.
B= 3.0 Ft.

Type of Liner= CLASS II RIP RAP

FROM STA. 179+50 TO STA. 180+00-L-LT

DETAIL 'BG'
LATERAL BASE DITCH
(Not to Scale)



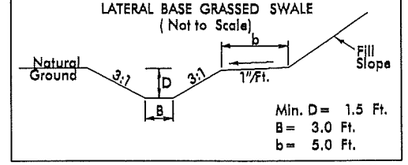
Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

*When B is < 6.0'

Type of Liner= CLASS I Rip-Rap

FROM STA. 369+10 TO STA.370+00 -L- LT

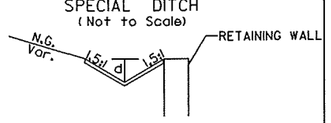
DETAIL 'BH'
LATERAL BASE GRASSED SWALE
(Not to Scale)



Min. D= 1.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

FROM STA. 379+00 TO STA. 381+50-L-RT

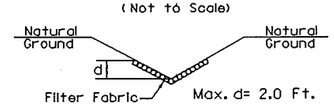
DETAIL 'BJ'
SPECIAL DITCH
(Not to Scale)



Min. d = 1.0'
Type of Liner= PAVED CONCRETE

FROM STA. 398+50 TO STA. 402+50 -L- LT

DETAIL 'BK'
EXISTING DITCH
(Not to Scale)

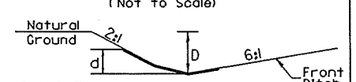


Max. d= 2.0 Ft.

Type of Liner= CLASS B Rip-Rap

STA. 388+40-L-RT

DETAIL 'BL'
ROADWAY DITCH
(Not to Scale)

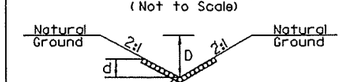


Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of Liner= PSRM

FROM STA. 410+00 TO STA. 418+24-L-LT
FROM STA 420+10 TO STA 424+00-L-LT
FROM STA 425+50 TO STA 427+90-L-RT

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

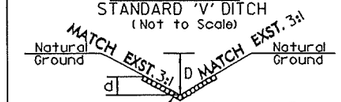


Min. D= 2.0 Ft.
Max. d= 2.0 Ft.

Type of Liner= CLASS I Rip-Rap

FROM STA. 281+50 TO STA. 282+00-L-RT

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

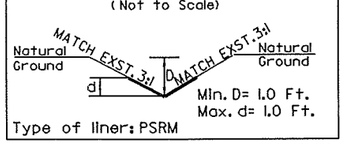


Min. D= 1.0 Ft.
Max. d= 0.5 Ft.

Type of Liner= CLASS B RIP RAP

FROM STA. 427+75 TO STA. 428+74-L-LT
FROM STA. 427+90 TO STA. 429+05-L-LT

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

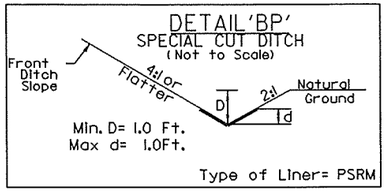


Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of liner: PSRM

FROM STA. 429+10 TO STA. 430+30-L-LT

DETAIL 'BP'
SPECIAL CUT DITCH
(Not to Scale)

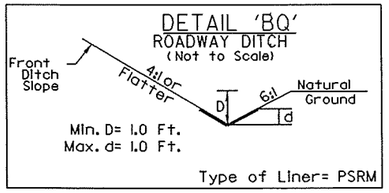


Min. D= 1.0 Ft.
Max d= 1.0Ft.

Type of Liner= PSRM

FROM STA. 423+00 TO STA. 424+00-L-RT
FROM STA. 15+00 TO STA. 15+60-Y38-RT

DETAIL 'BQ'
ROADWAY DITCH
(Not to Scale)

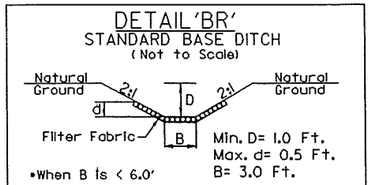


Min. D= 1.0 Ft.
Max. d= 1.0 Ft.

Type of Liner= PSRM

FROM STA. 14+25 TO STA.15+00-Y38-RT

DETAIL 'BR'
STANDARD BASE DITCH
(Not to Scale)



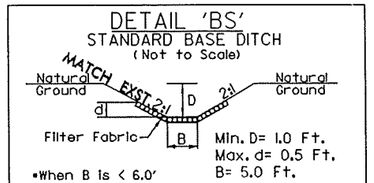
Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 3.0 Ft.

*When B is < 6.0'

Type of Liner= CLASS I RIP RAP

FROM STA. 427+90 TO STA. 429+60-L-RT

DETAIL 'BS'
STANDARD BASE DITCH
(Not to Scale)



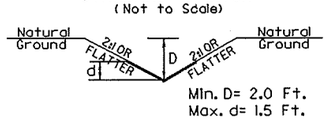
Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 5.0 Ft.

*When B is < 6.0'

Type of Liner= CLASS I RIP RAP

FROM STA. 429+60 TO STA. 431+30 -L- RT

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

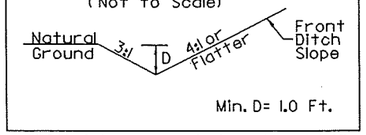


Min. D= 2.0 Ft.
Max. d= 1.5 Ft.

Type of Liner= PSRM

STA. 359+00-L-LT

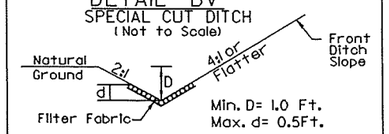
DETAIL BU'
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.

FROM STA. 331+50 TO STA. 332+50-L-LT

DETAIL 'BV'
SPECIAL CUT DITCH
(Not to Scale)

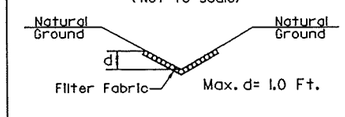


Min. D= 1.0 Ft.
Max. d= 0.5Ft.

Type of Liner= CLASS B Rip-Rap

FROM STA. 330+78 TO STA. 331+50-L-LT

DETAIL 'BW'
EXISTING DITCH
(Not to Scale)

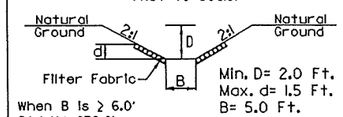


Max. d= 1.0 Ft.

Type of Liner= CLASS B Rip-Rap

FROM STA. 330+50 TO STA. 330+78-L-LT
FROM STA. 222+75 TO STA. 223+00-L-RT

DETAIL 'BX'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.

When B is ≥ 6.0'
Std. No. 876.01

Type of Liner= CLASS I Rip-Rap

STA. 214+20 -L- LT

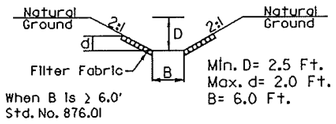
Permit Drawing
Sheet 5 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2H
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

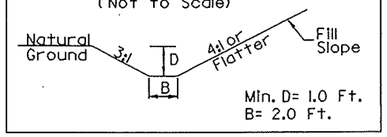
DETAIL 'BY'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= CLASS I Rip-Rap

FROM STA. 9+58 -Y4- LT

DETAIL 'BZ'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 239+00 TO STA. 241+00 -L- RT

REVISIONS

8/17/99

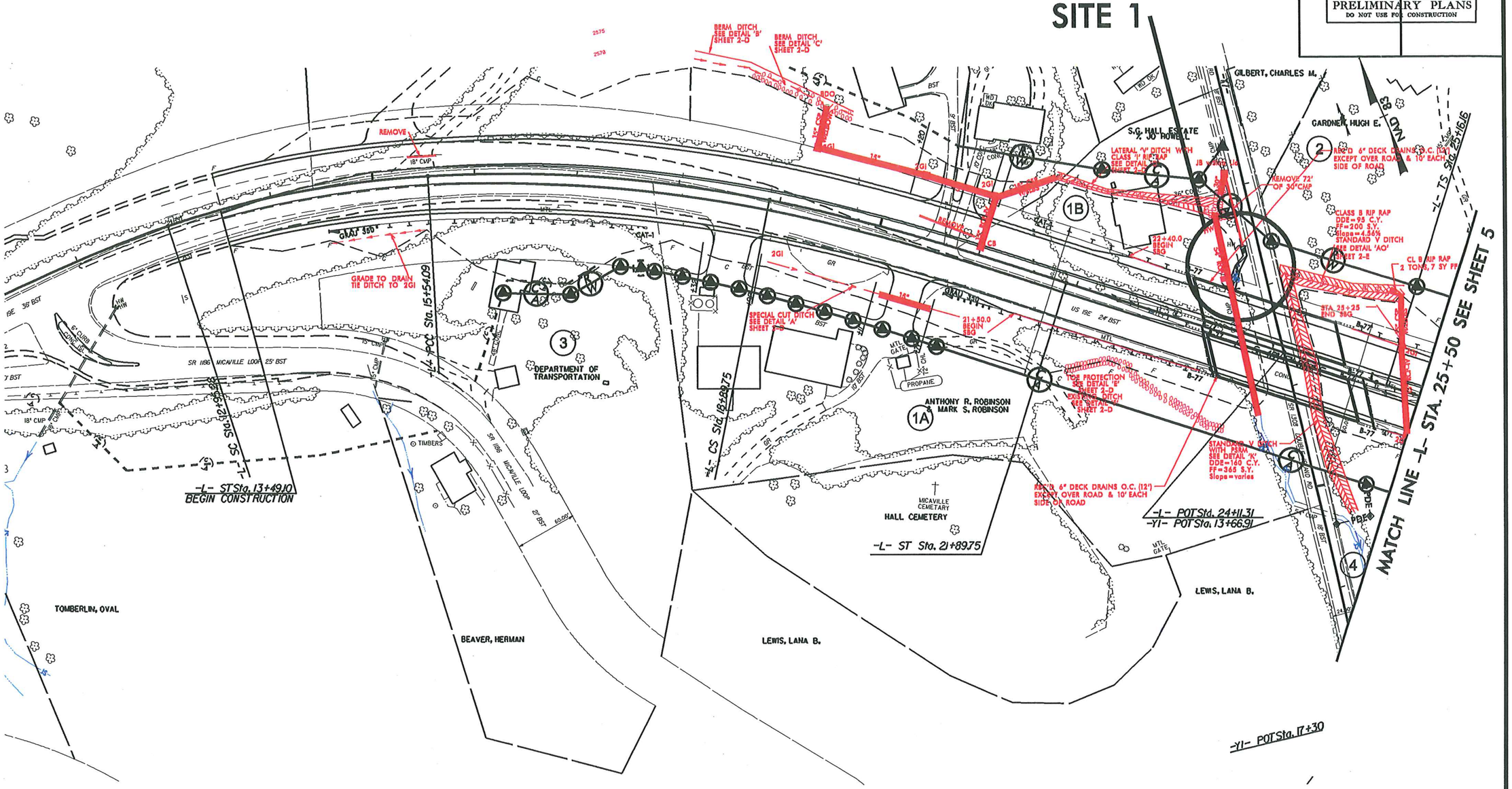
$$$$SYSTIME$$$$
$$$$SYSLOGON$$$$
$$$$USERNAME$$$$

Permit Drawing
Sheet 6 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	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



DENOTES IMPACTS IN SURFACE WATER

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

REVISIONS

8/17/99

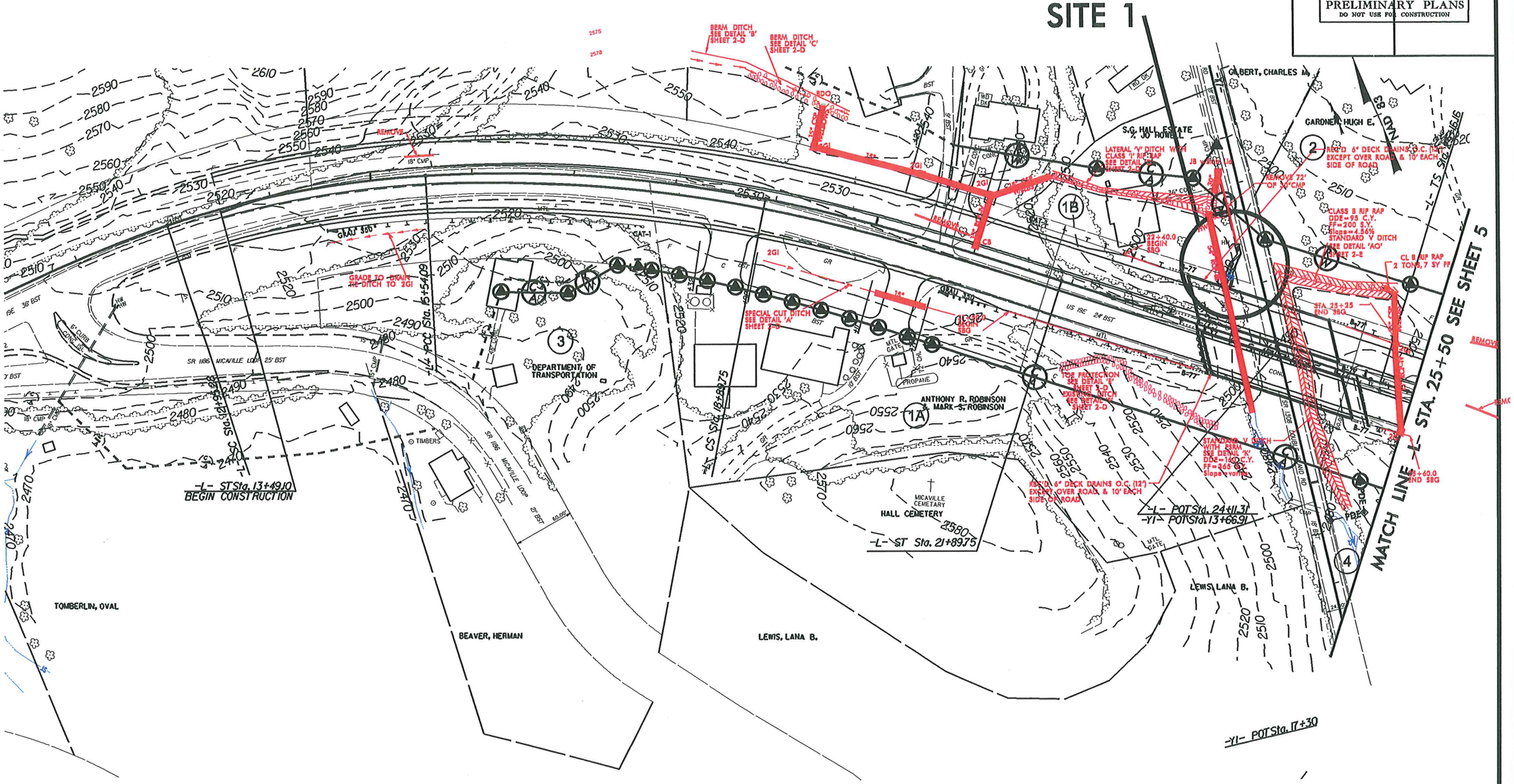
SYSTIME
SIGN
USERNAME

Permit Drawing
Sheet 7 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	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



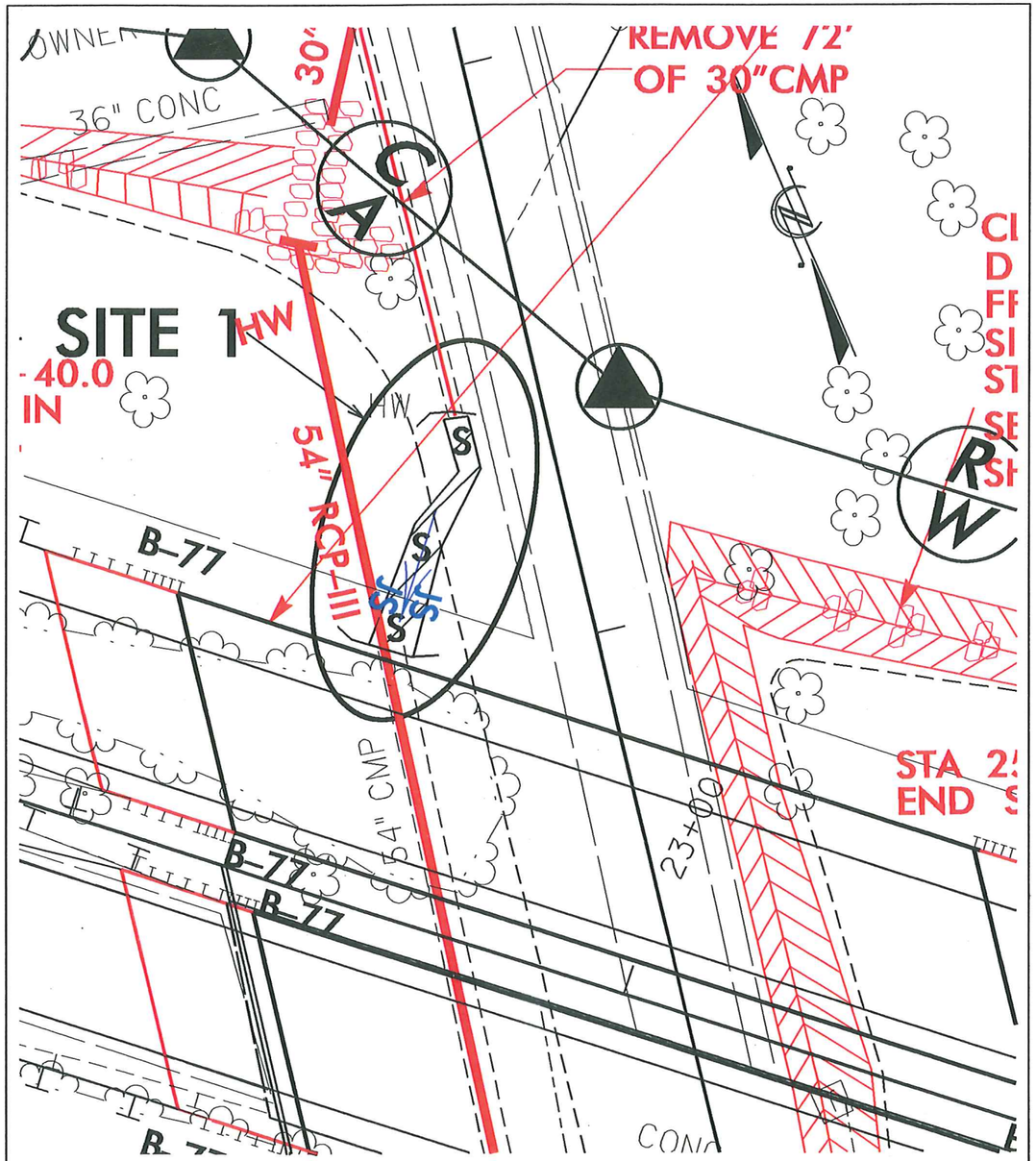
DENOTES IMPACTS IN SURFACE WATER

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

REVISIONS

8/17/99

Permit Drawing
Sheet 8 of 114



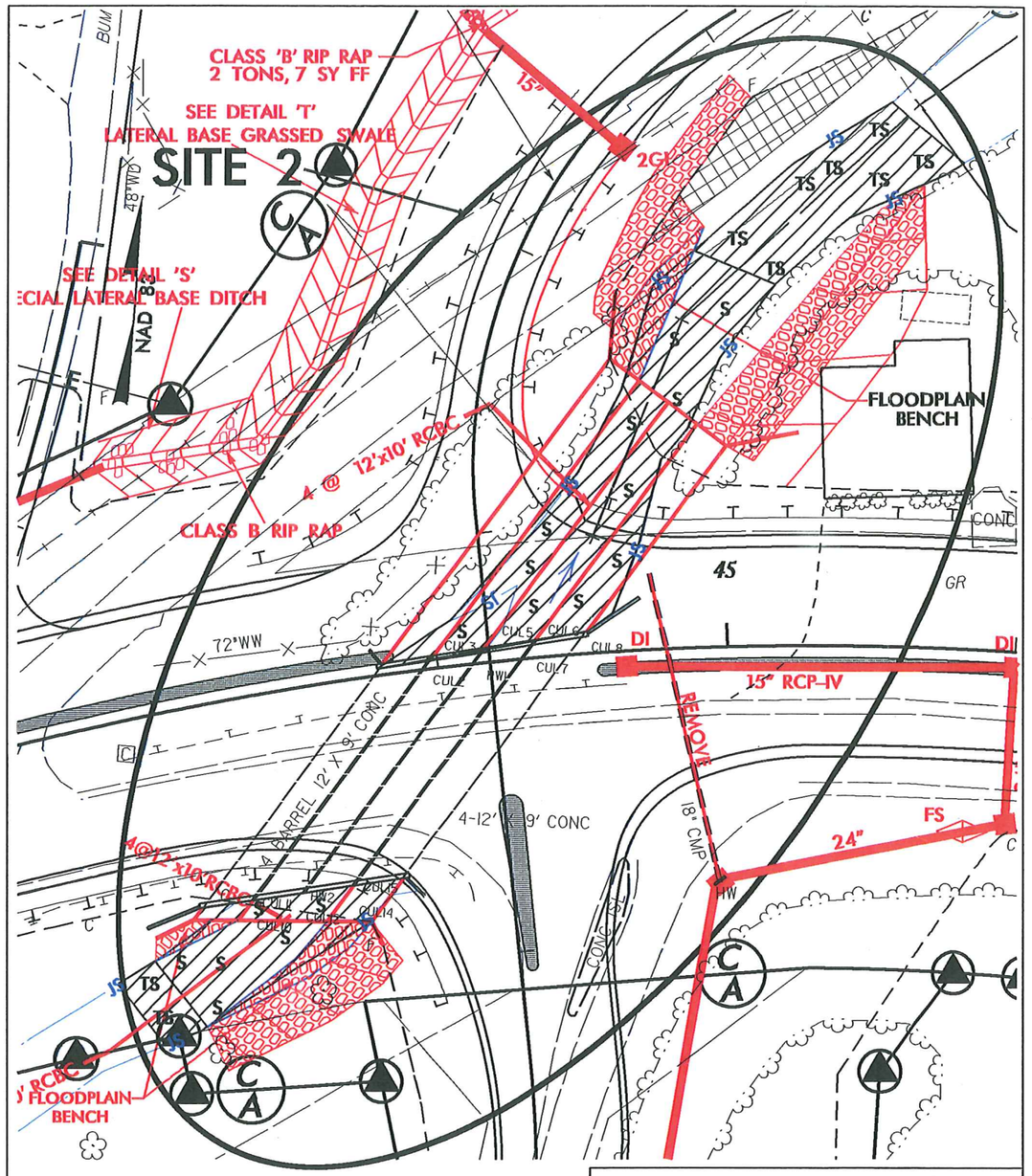
IMPACT ENLARGEMENT

25' 0' 25'
GRAPHIC SCALE

S S DENOTES IMPACTS IN SURFACE WATER

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13

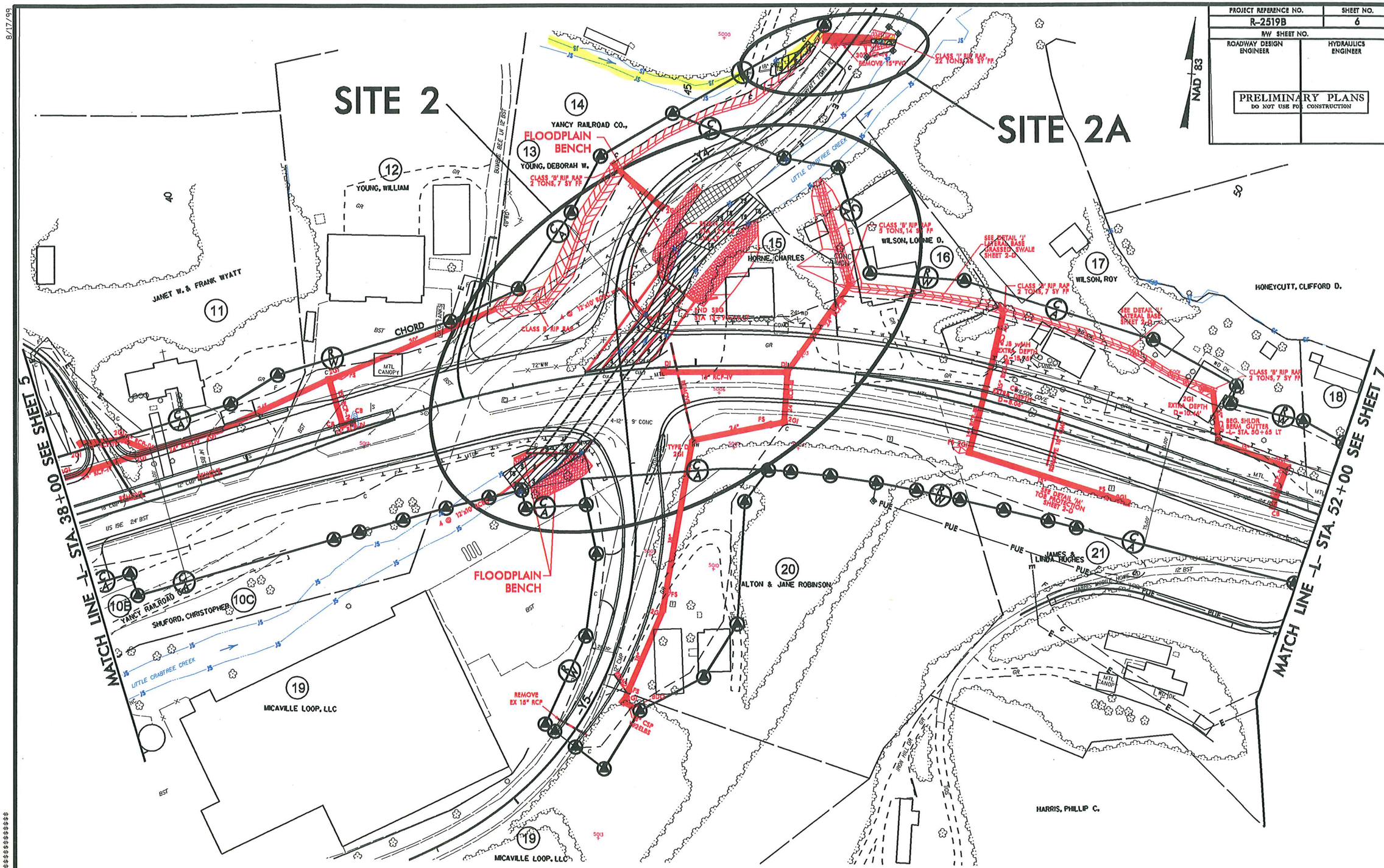
Permit Drawing
Sheet 9 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

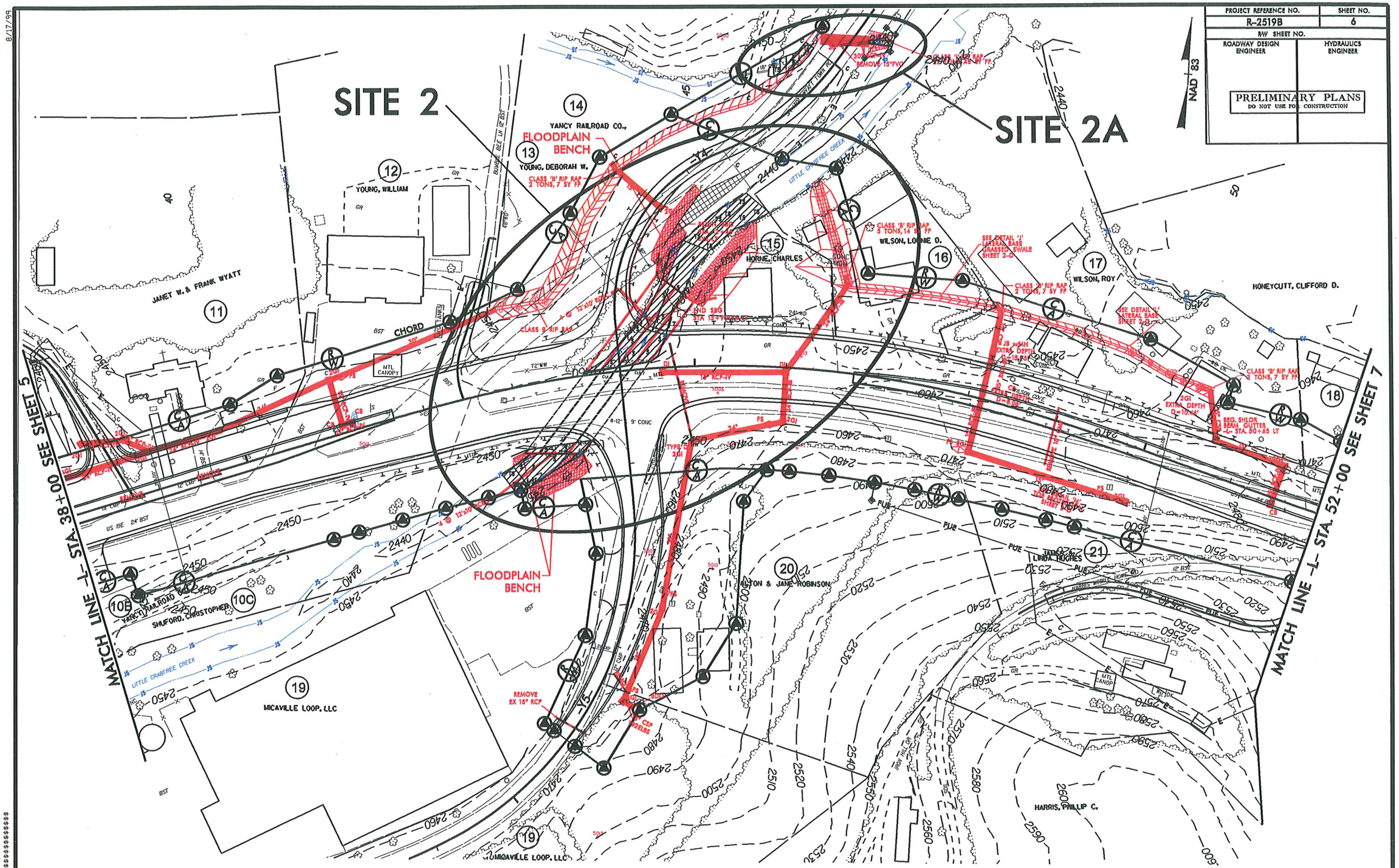


Permit Drawing
Sheet 16 of 114

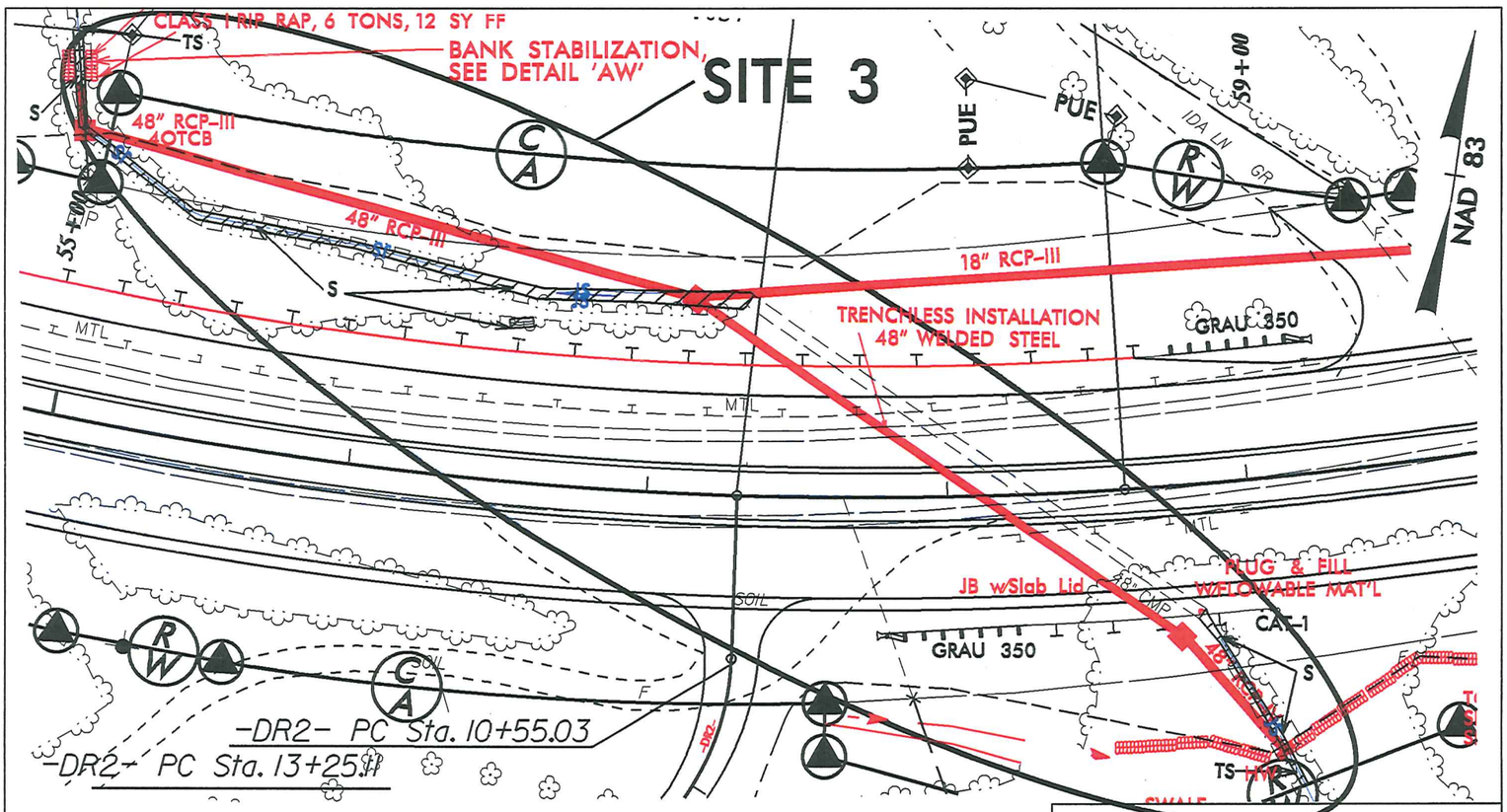
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 11 of 114



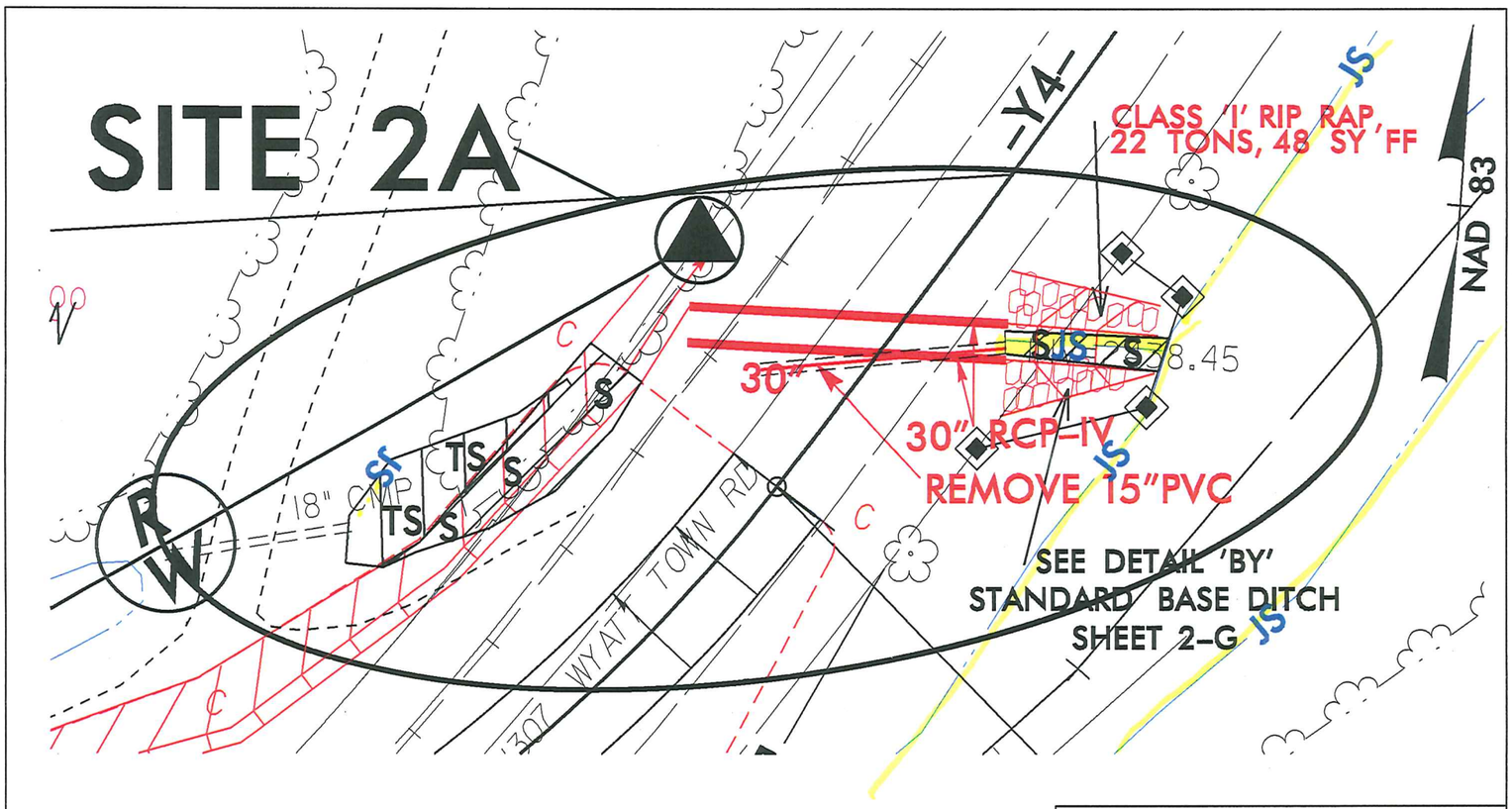
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL
SHEET OF 05/10/13



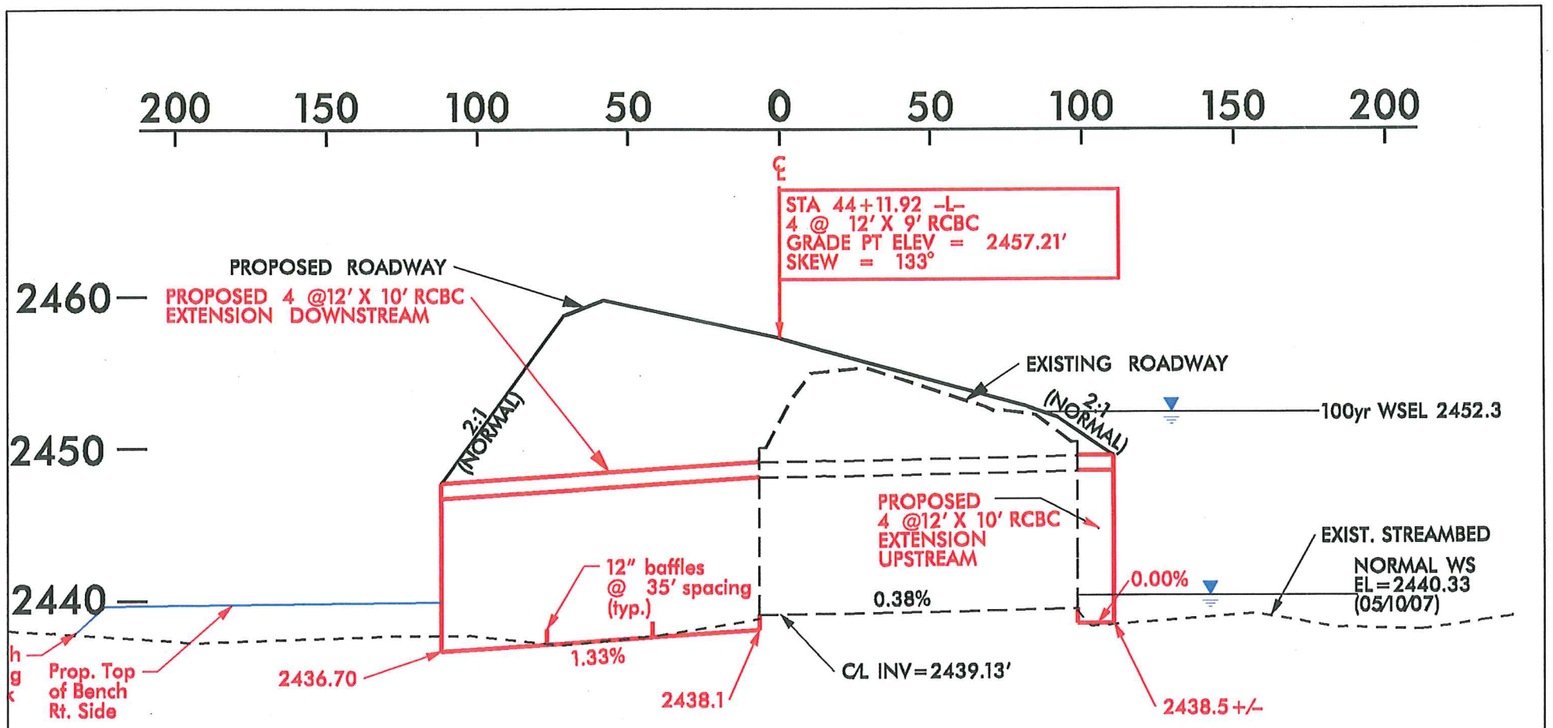
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL
SHEET OF 05/10/13



PROFILE

SITE 2

SCALE

1:50' HORIZONTAL

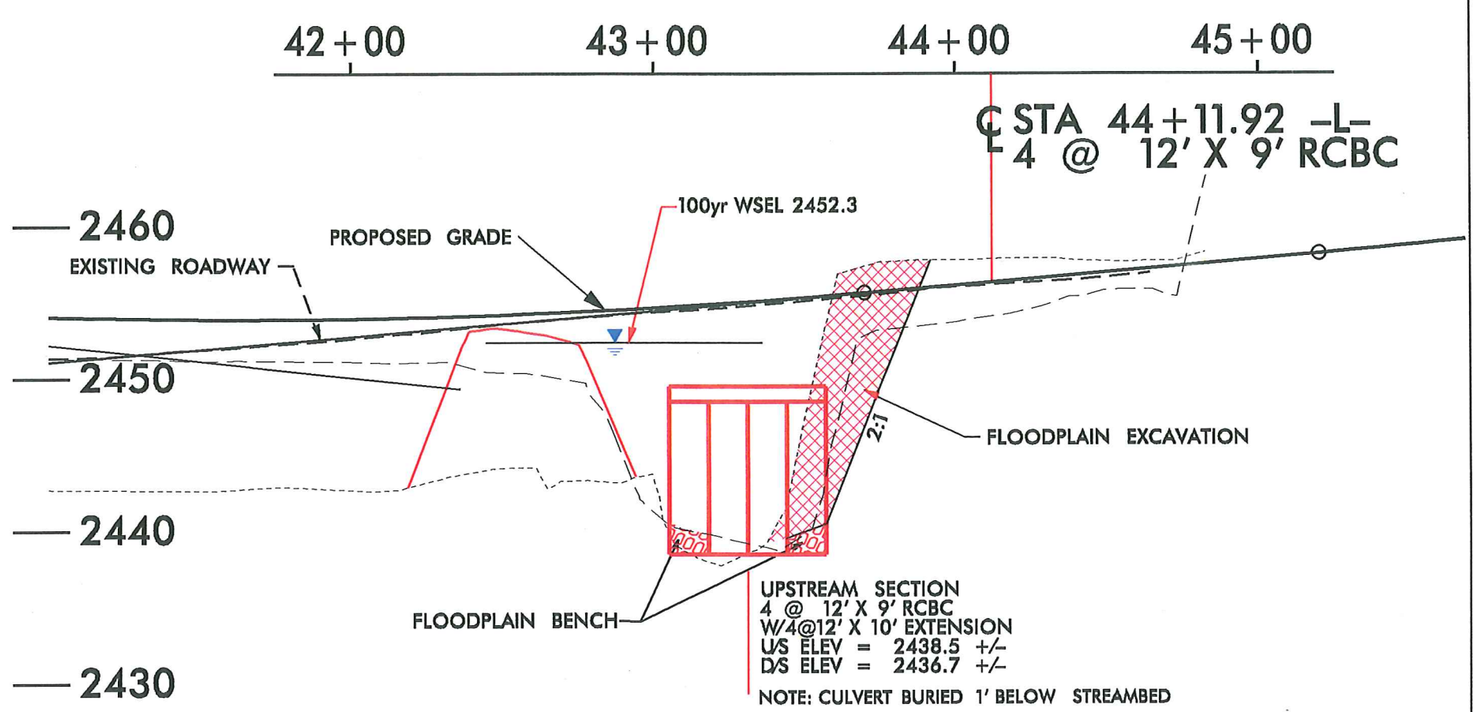
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13

Permit Drawing
Sheet 13 of 114



SECTION
SITE 2

SCALE

1:50' HORIZONTAL
1:10' VERTICAL

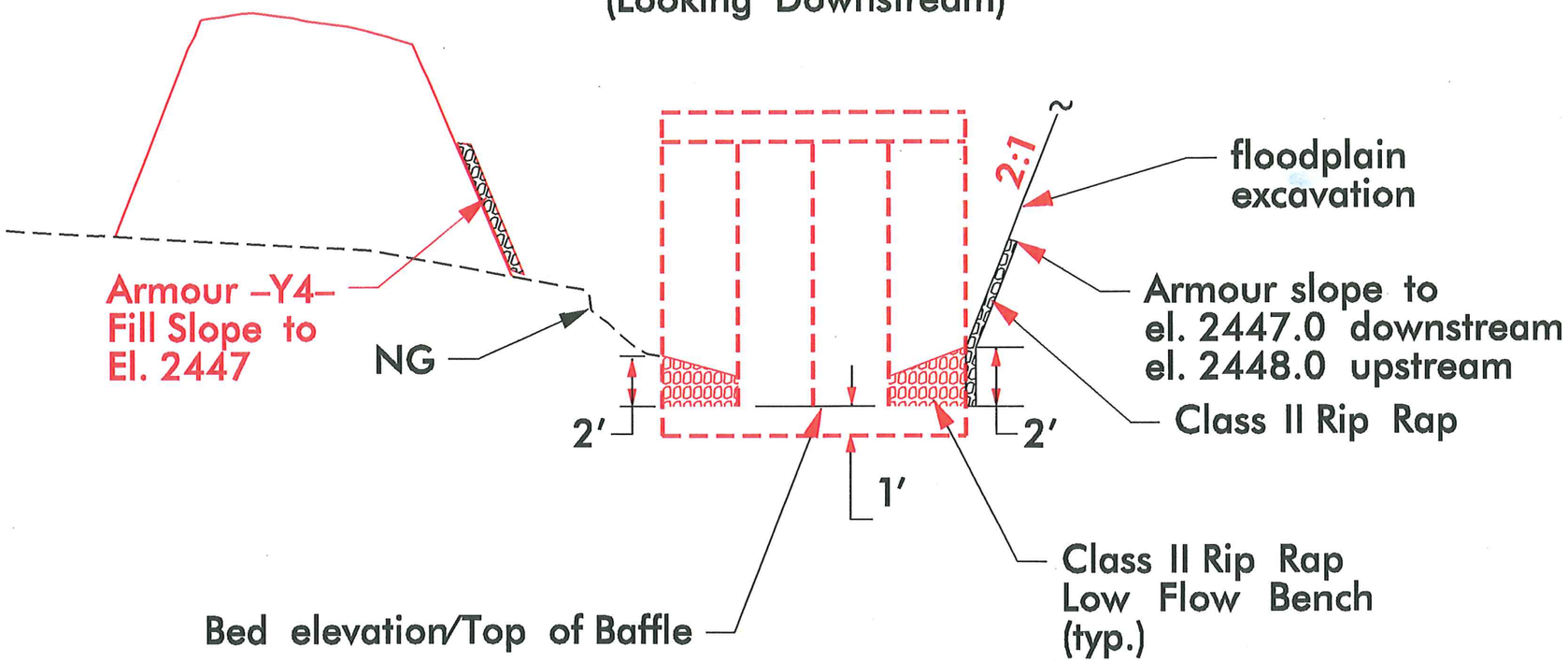
NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13

Permit Drawing
Sheet 14 of 114

Detail of Low Flow Benching,
Excavation, and Armouring
(Looking Downstream)



DETAIL

(NOT TO SCALE)

SITE 2

NCDOT

DIVISION OF HIGHWAYS

YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80

IN YANCEY TO WEST OF

SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13

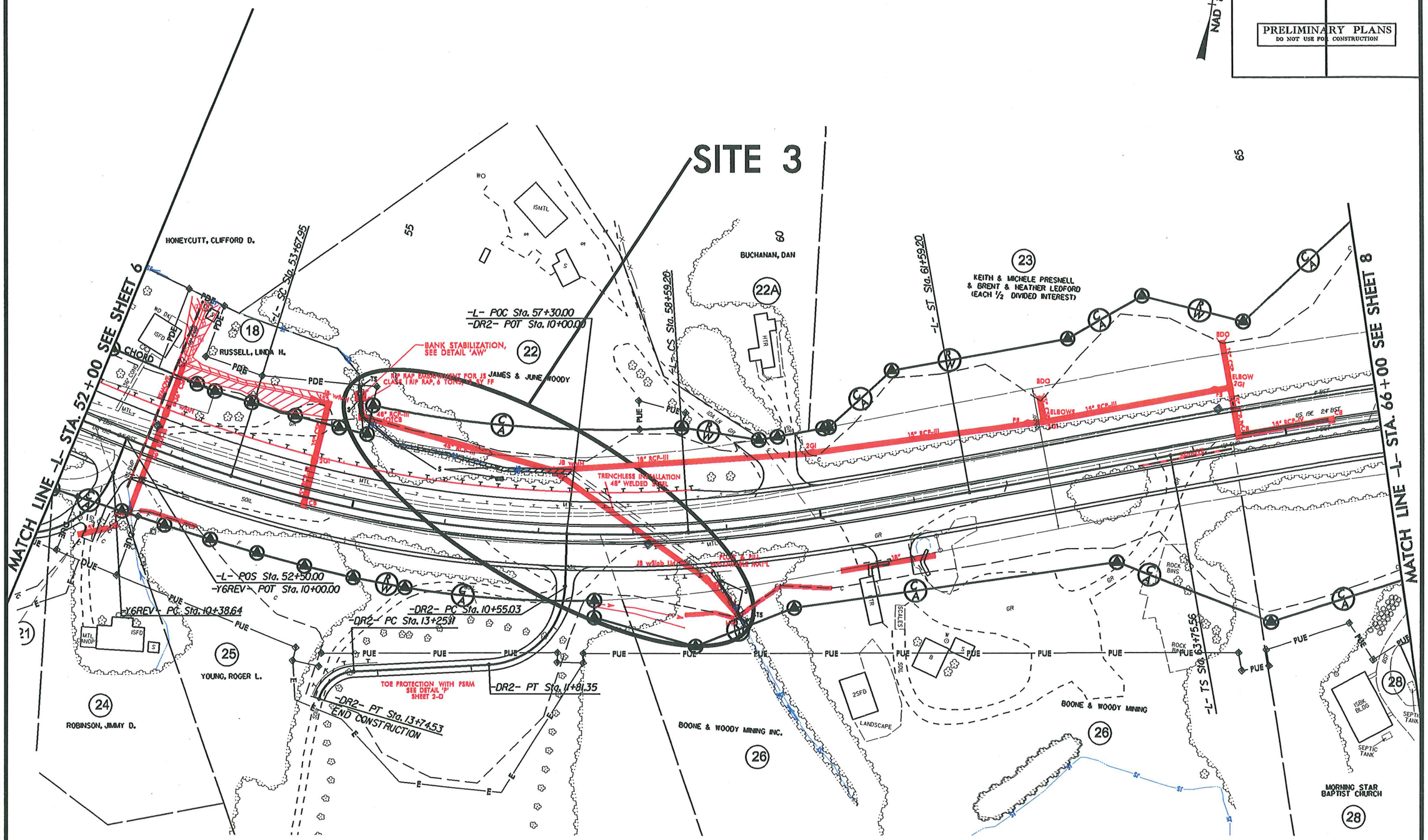
Permit Drawing
Sheet 15 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

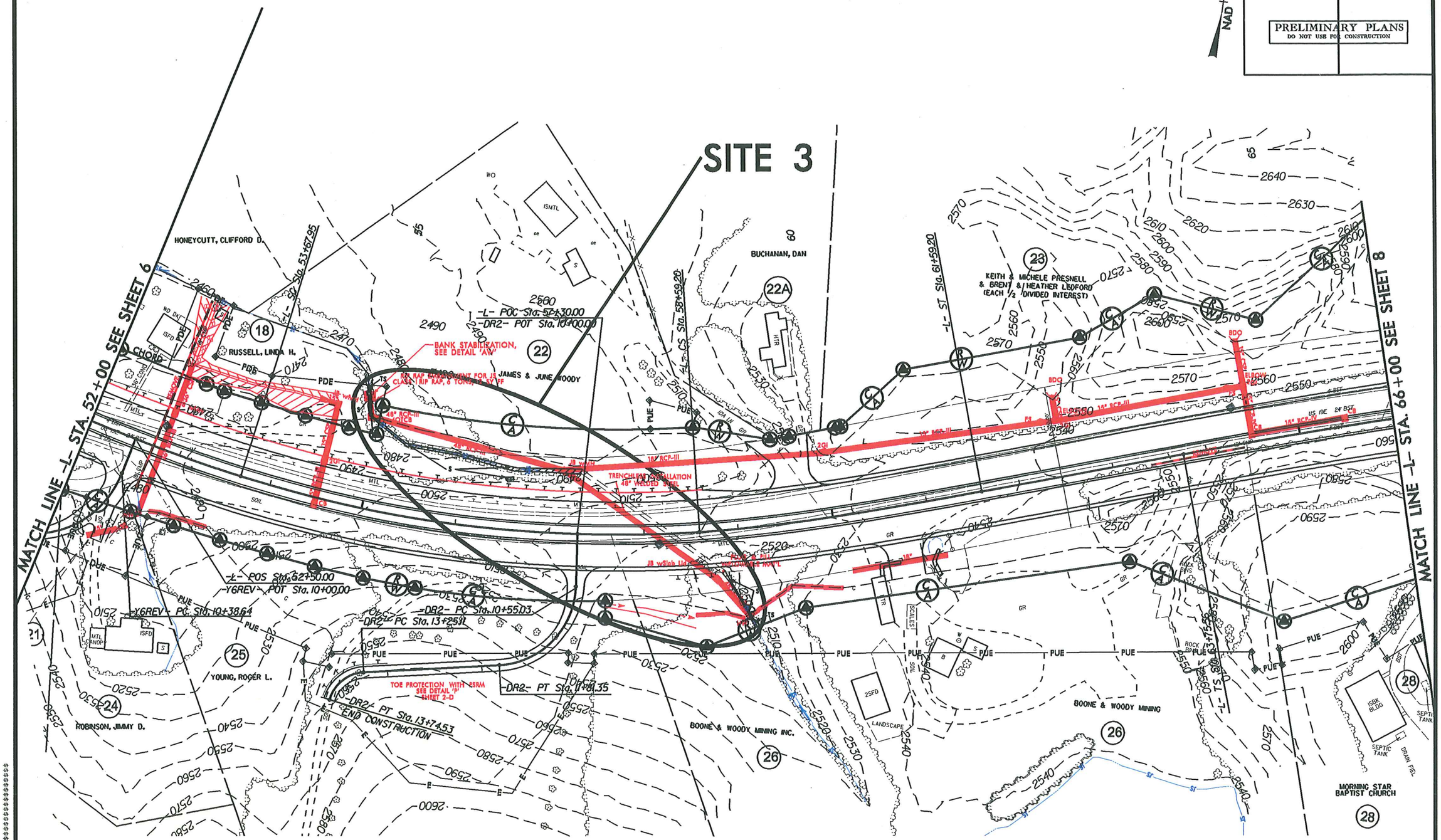


Permit Drawing
Sheet 16 of 117

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



Permit Drawing
Sheet 17 of 109

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

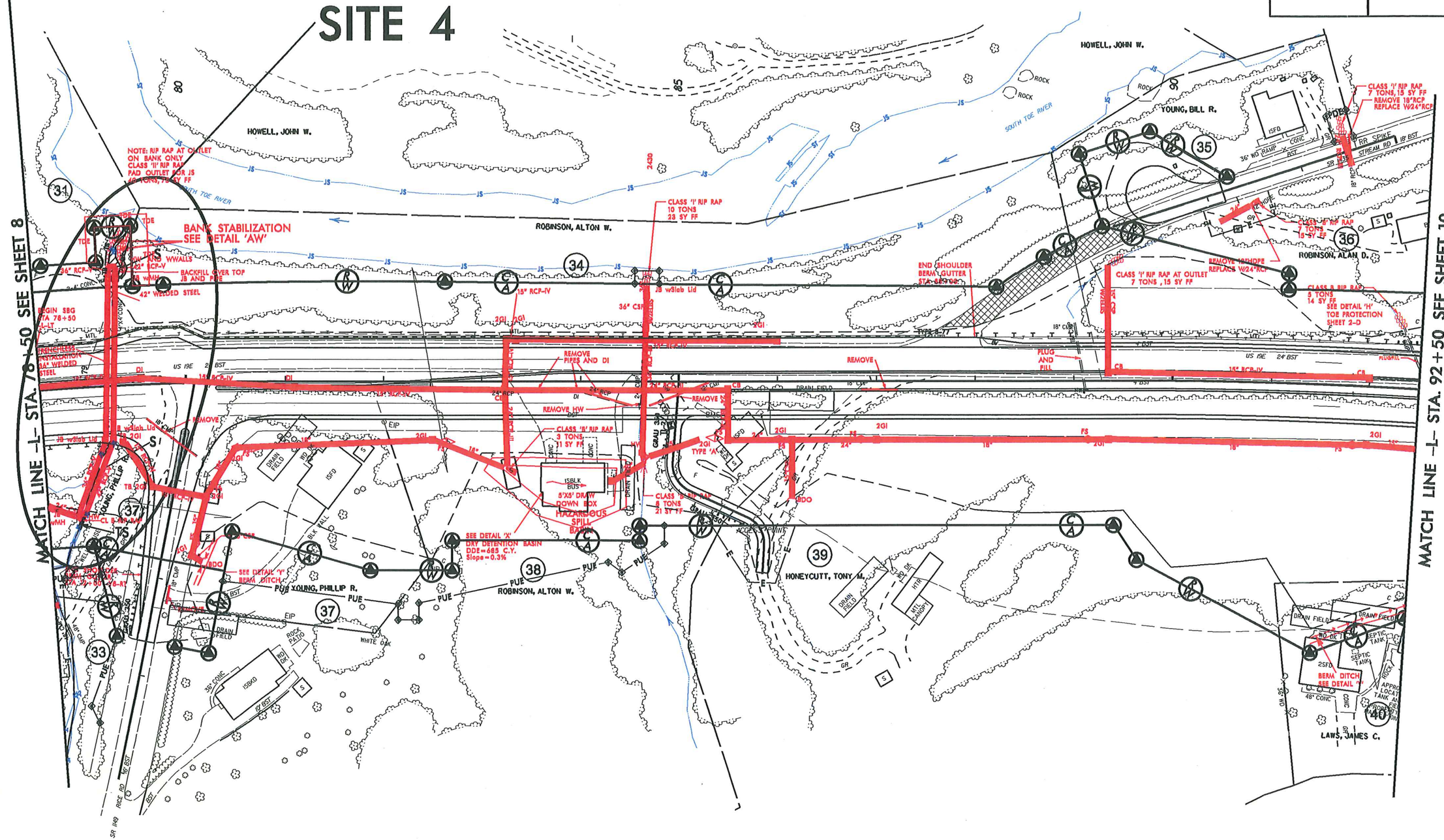
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS

SITE 4



Permit Drawing
Sheet 18 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

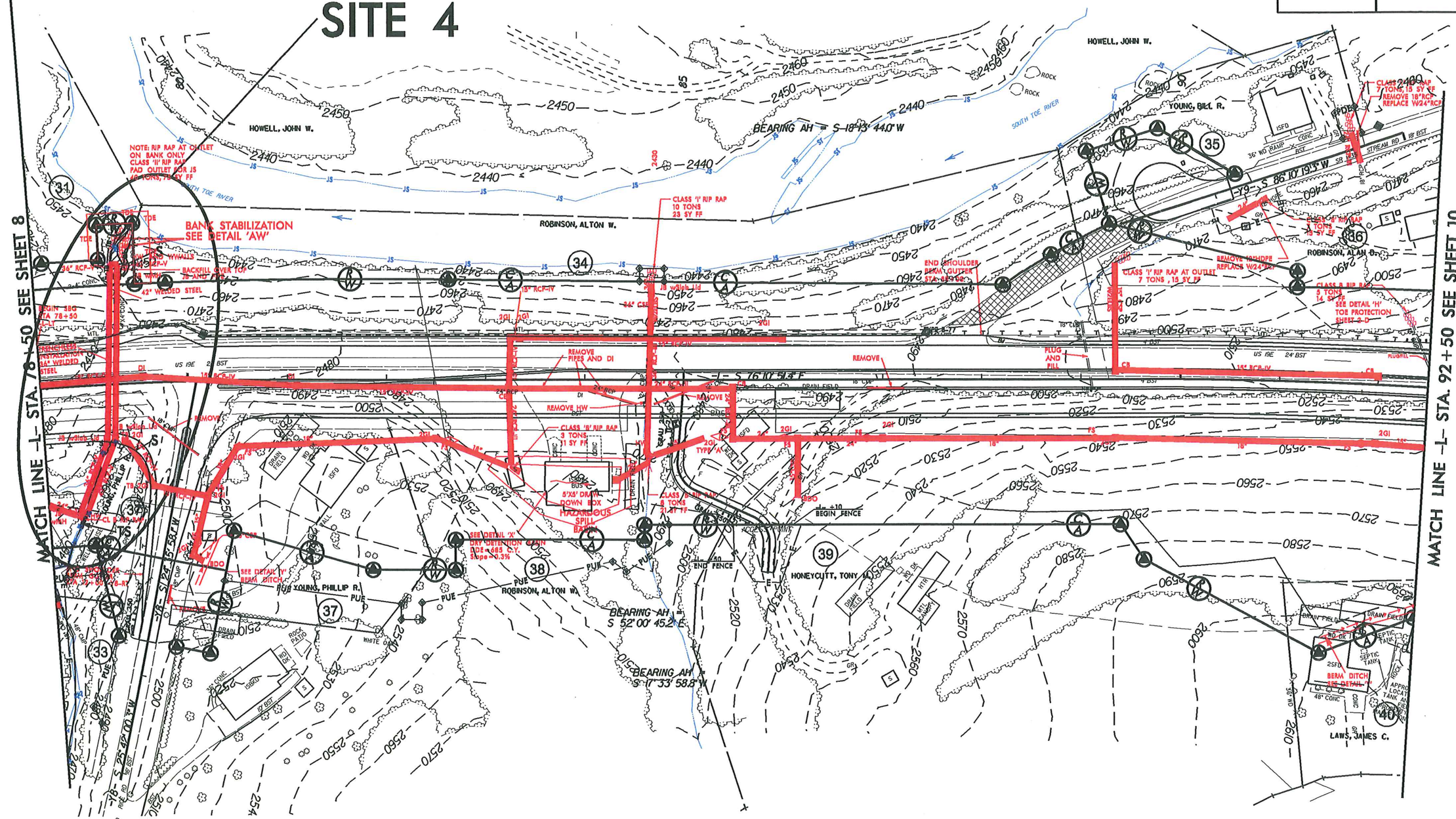
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

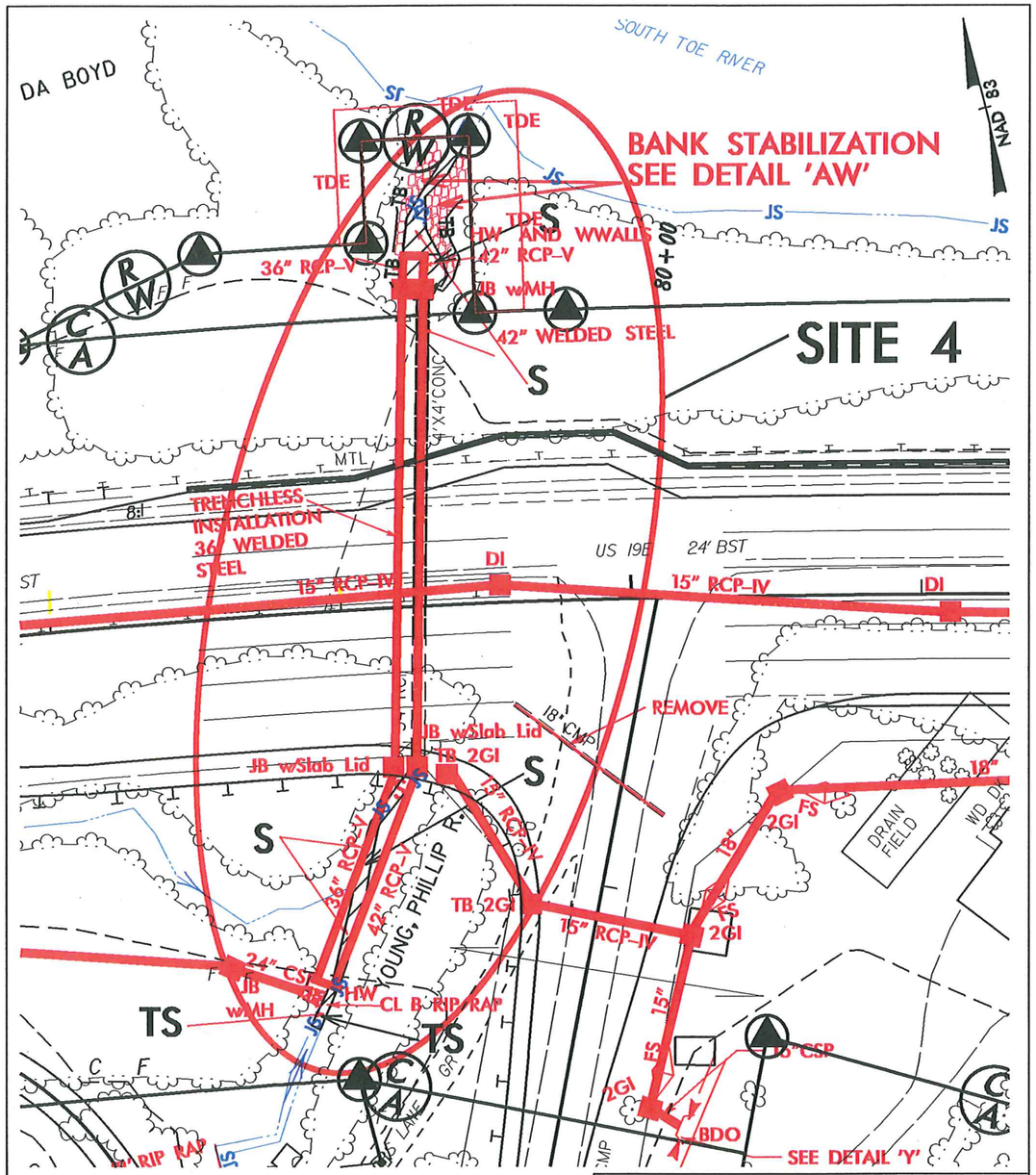
8/17/99

REVISIONS

SITE 4



Permit Drawing
Sheet 19 of 117



IMPACT ENLARGEMENT

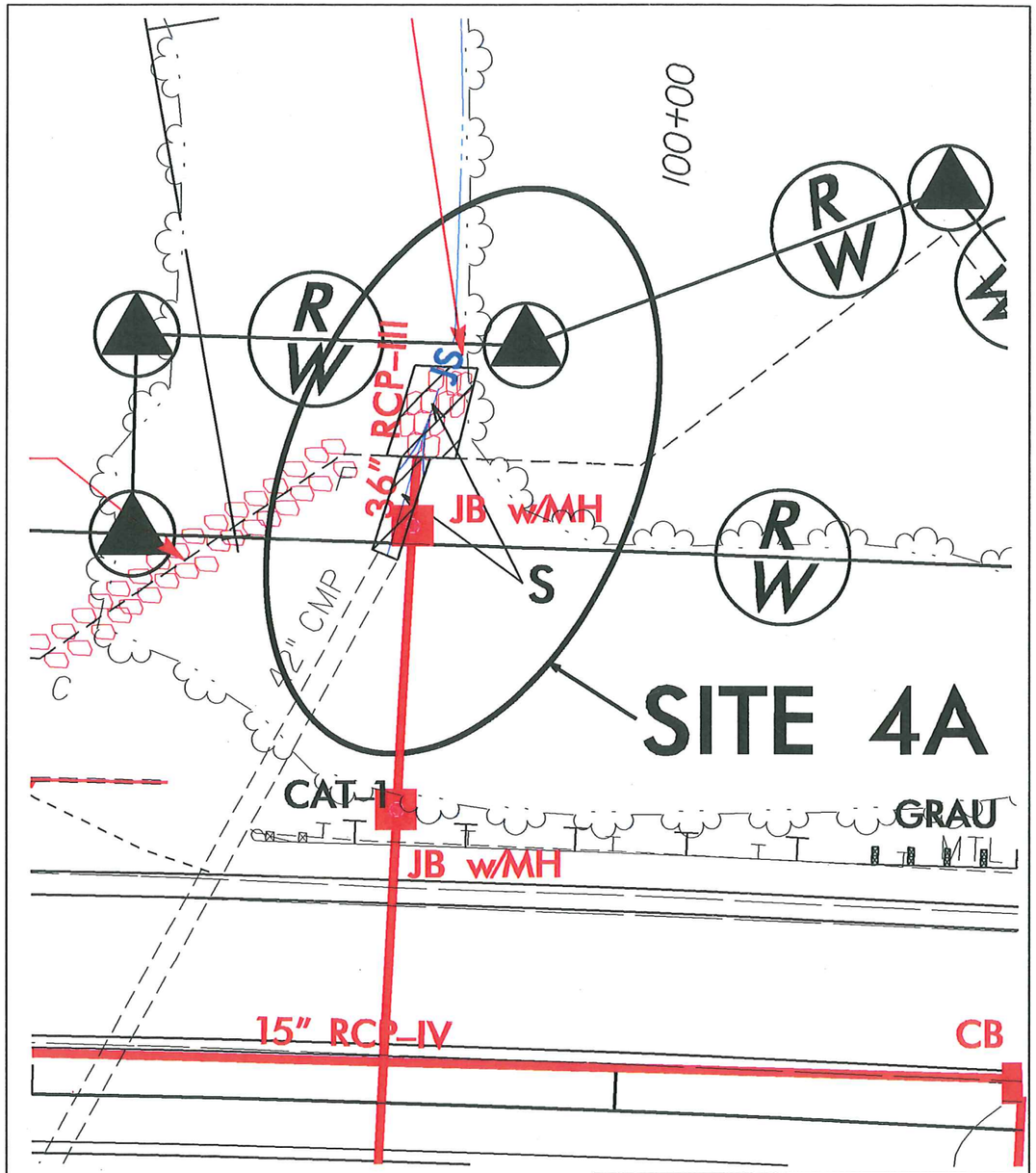
S/S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

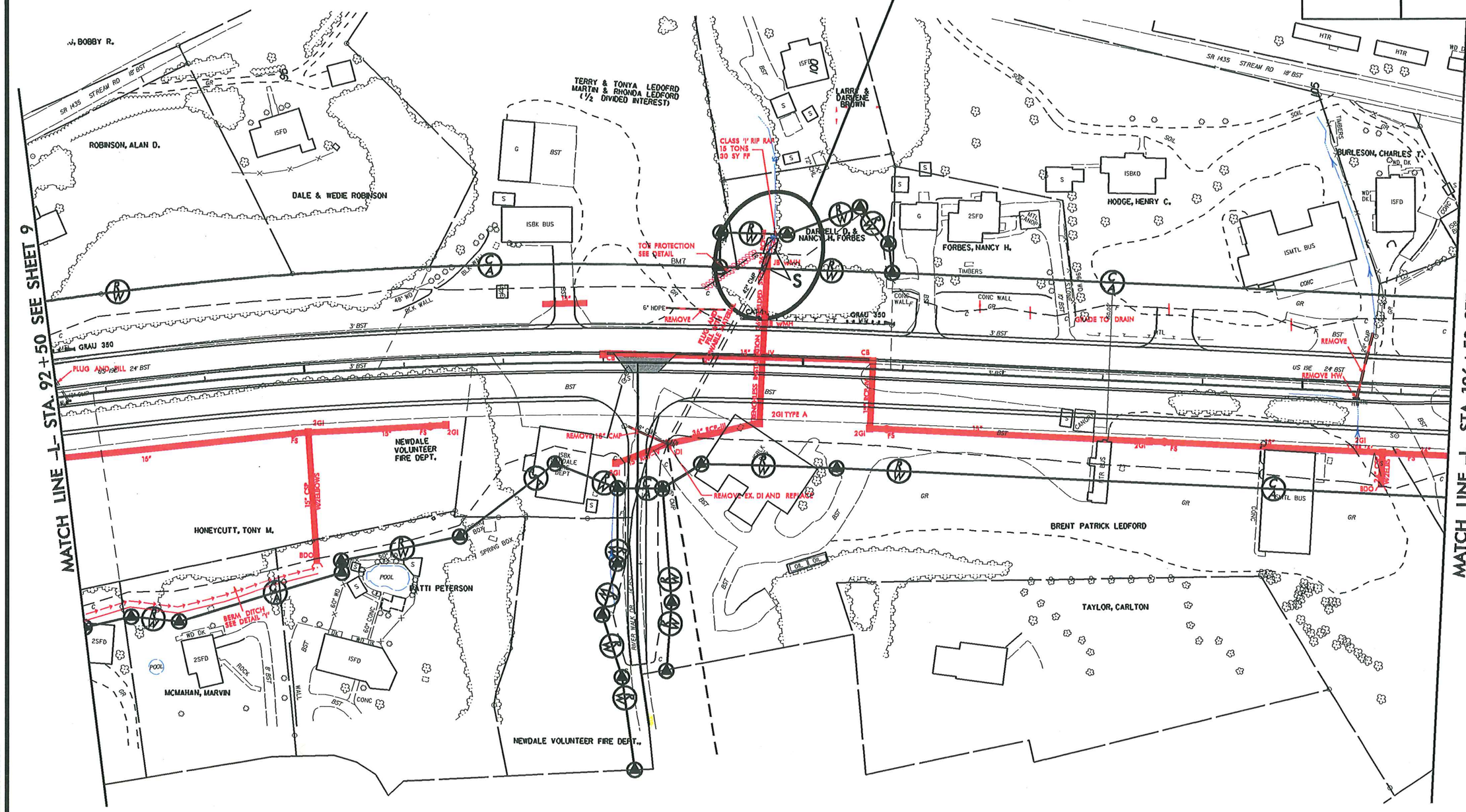
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

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

NAD 83

SITE 4A



Permit Drawing
Sheet 21 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

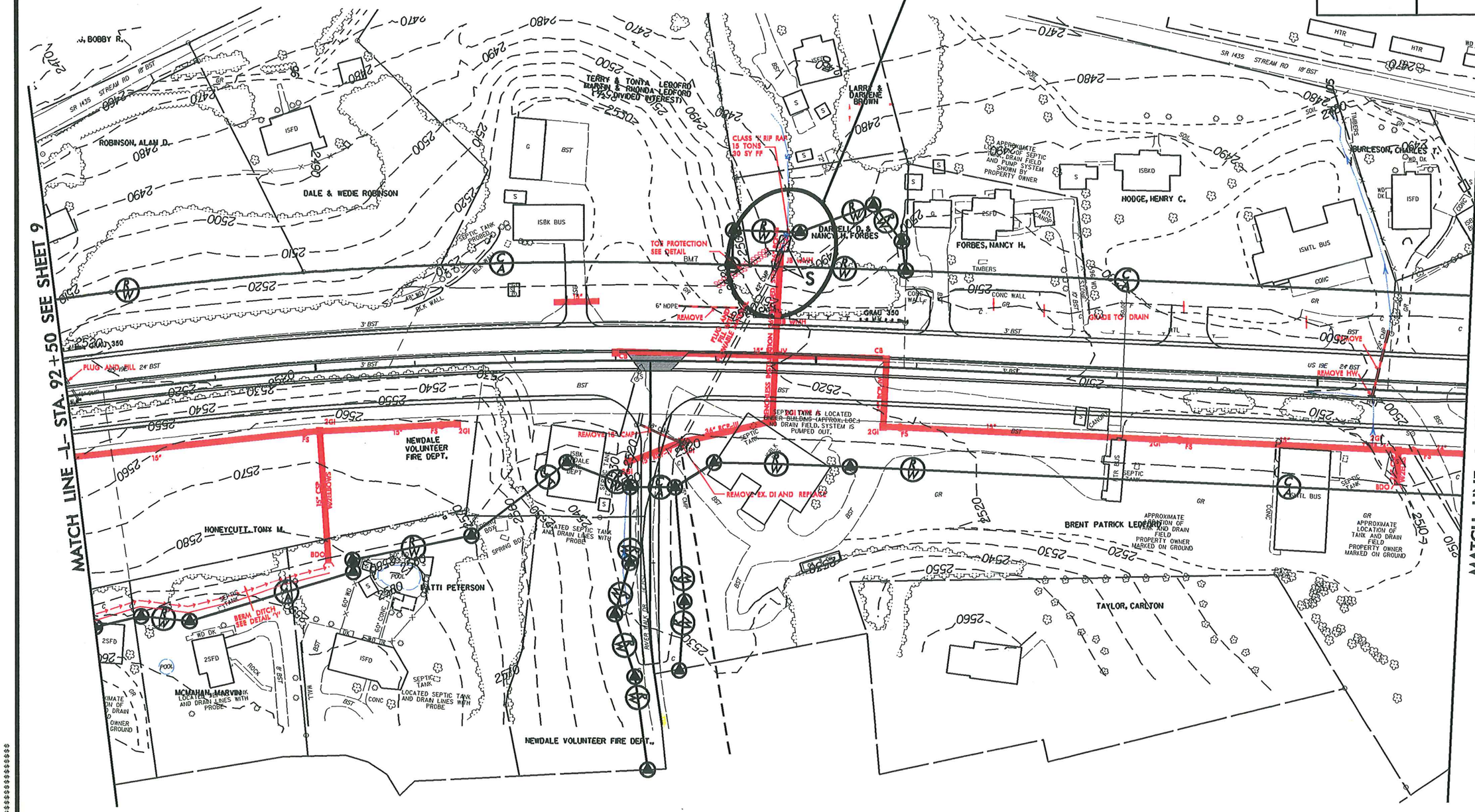
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

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

NAD 83

SITE 4A

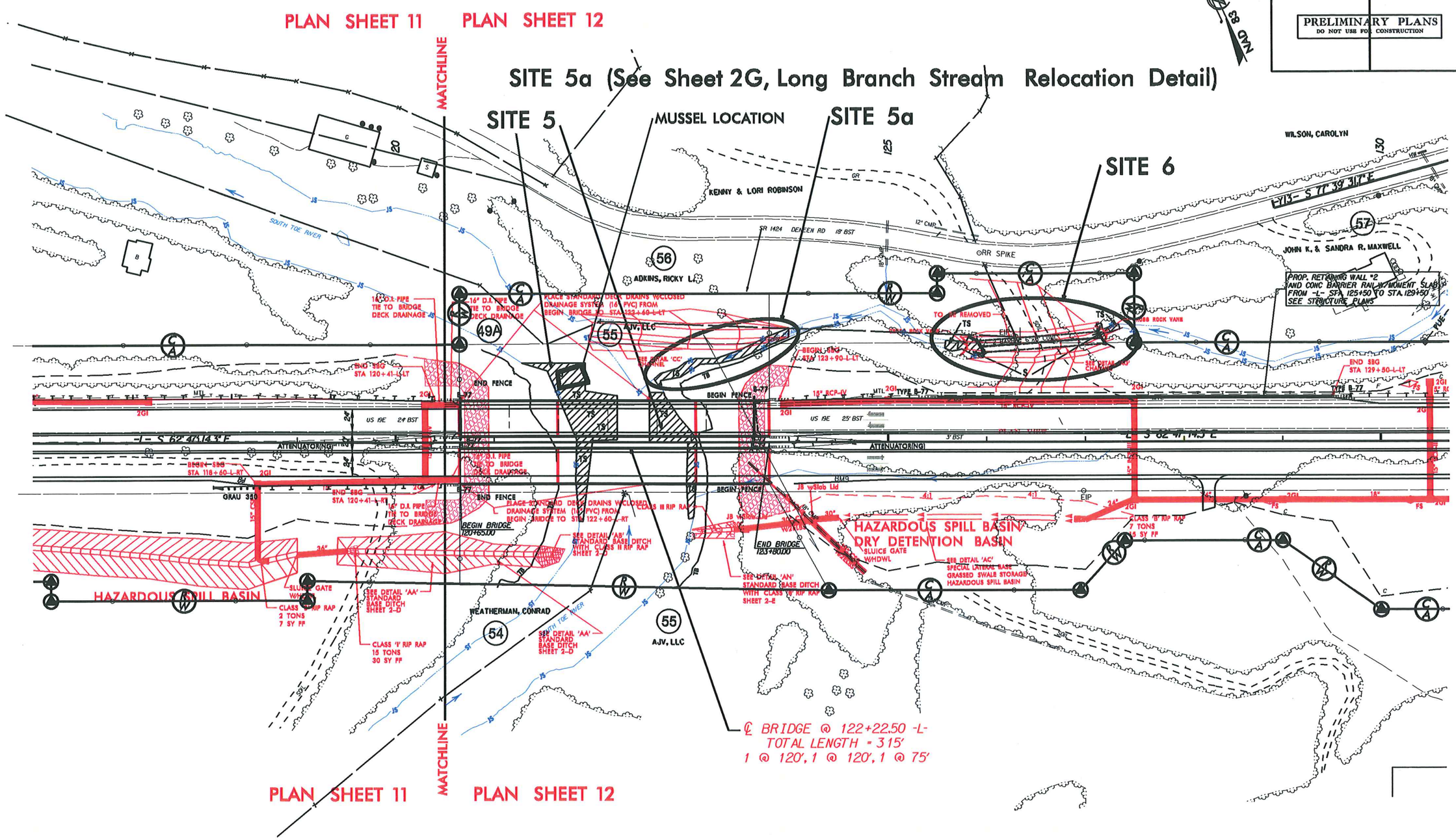


Permit Drawing
Sheet 22 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
	11/12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



S S DENOTES IMPACTS IN SURFACE WATER

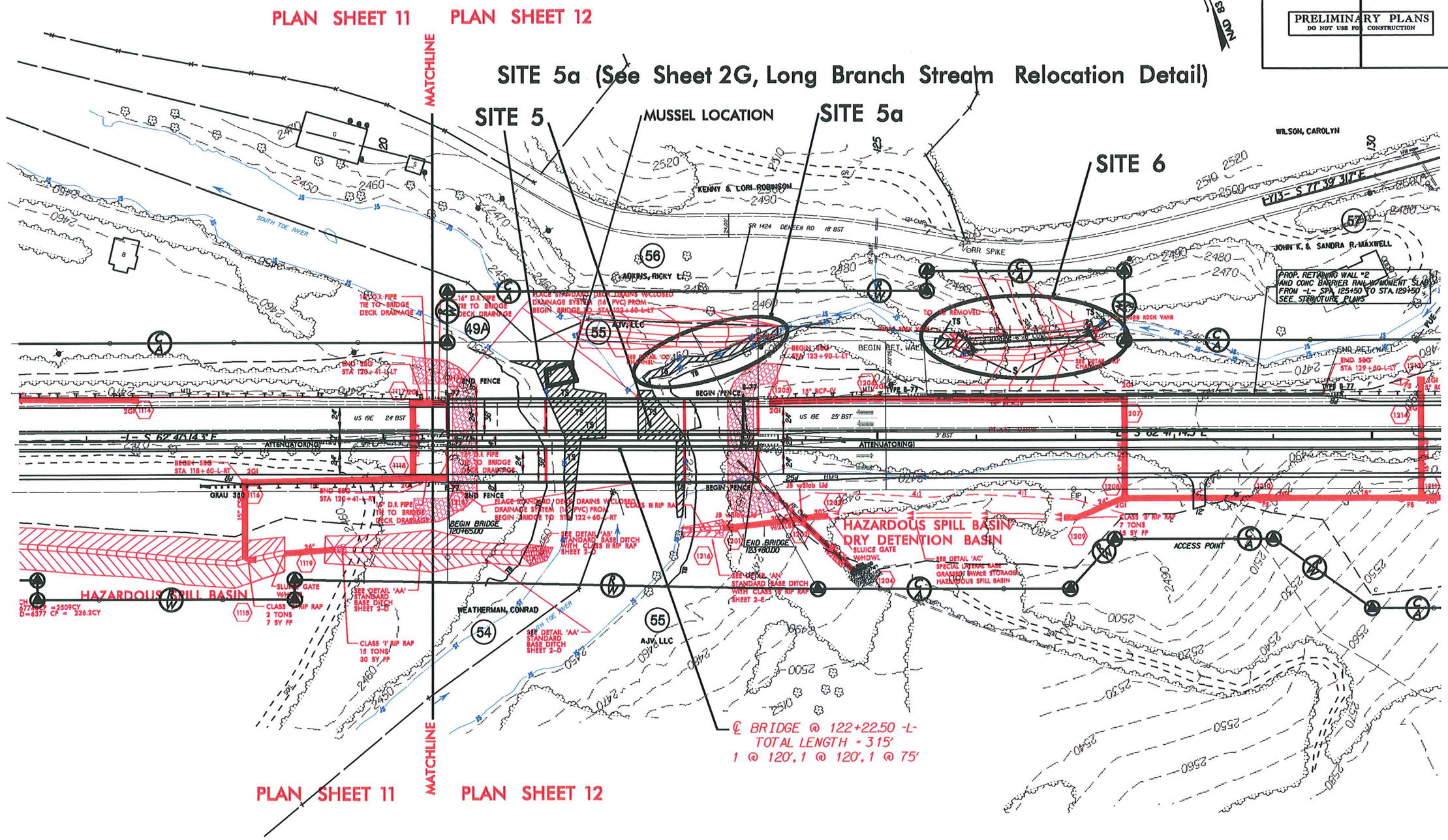
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 23 of 114

PROJECT REFERENCE NO.	SHEET NO.
	11/12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

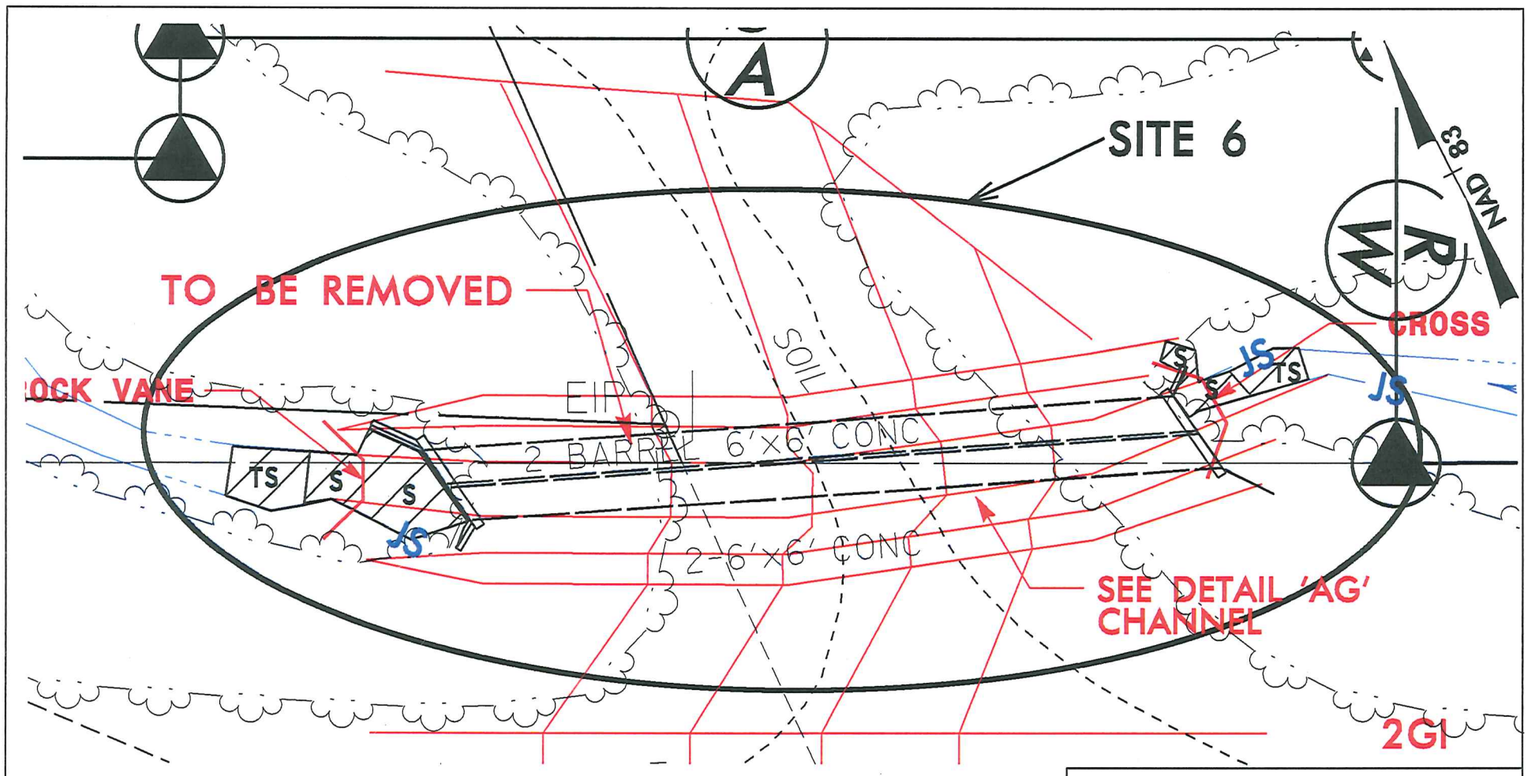


DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 24 of 114



IMPACT ENLARGEMENT

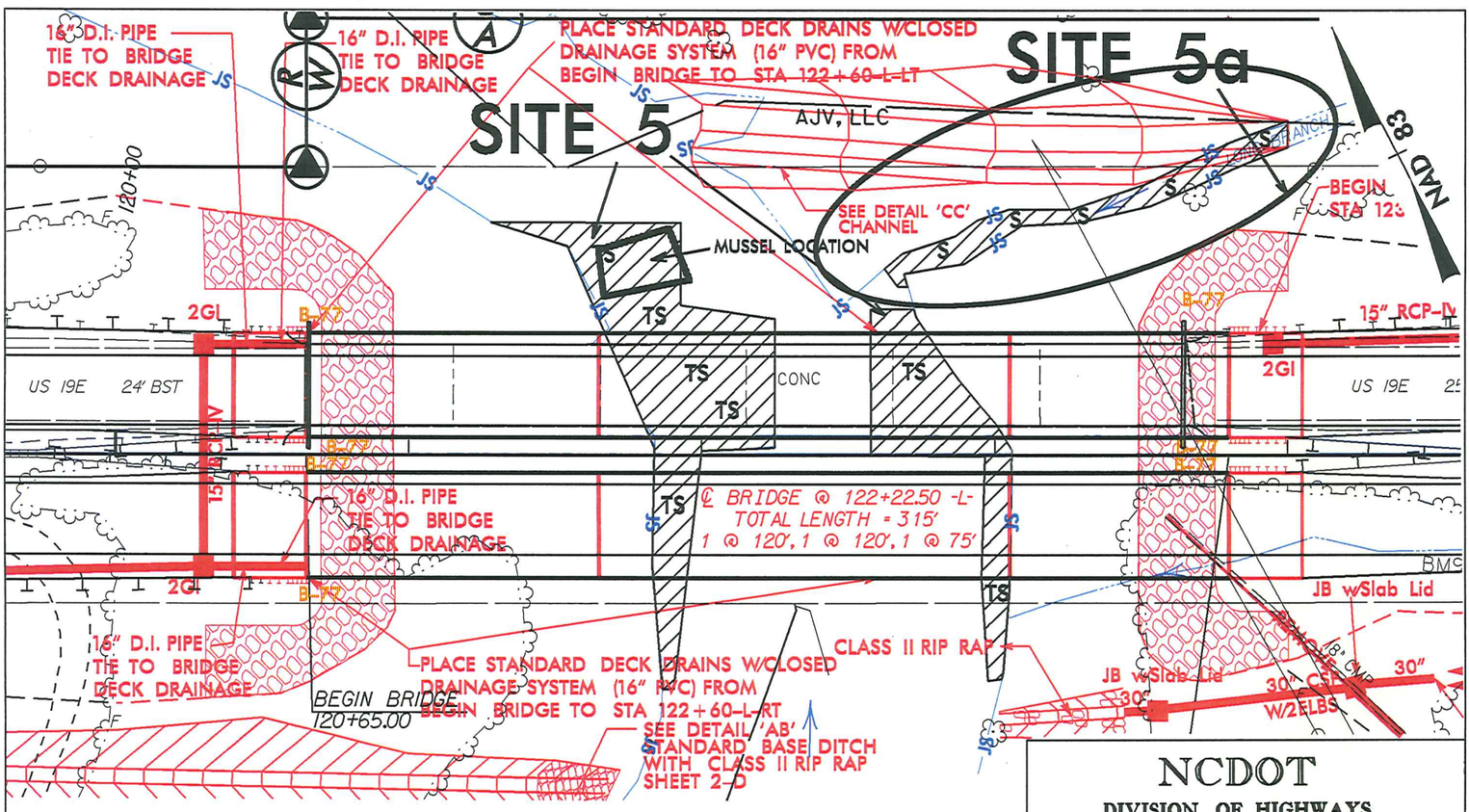
S / S — DENOTES IMPACTS IN SURFACE WATER

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13



IMPACT ENLARGEMENT

S / S — DENOTES IMPACTS IN SURFACE WATER

TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

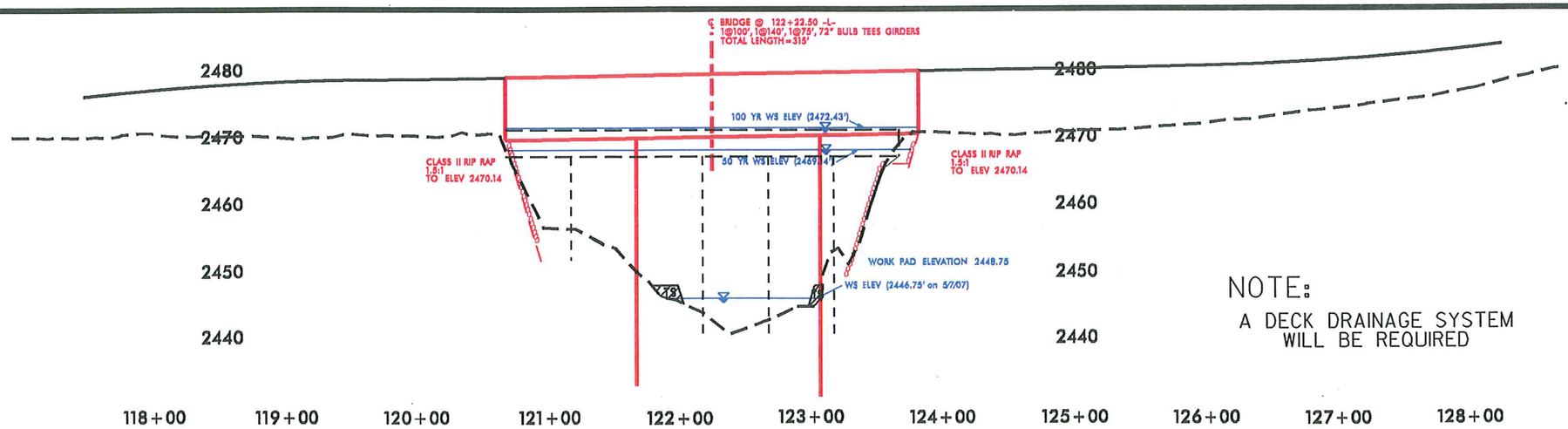
NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13

PROJECT REFERENCE NO.	SHEET NO.
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

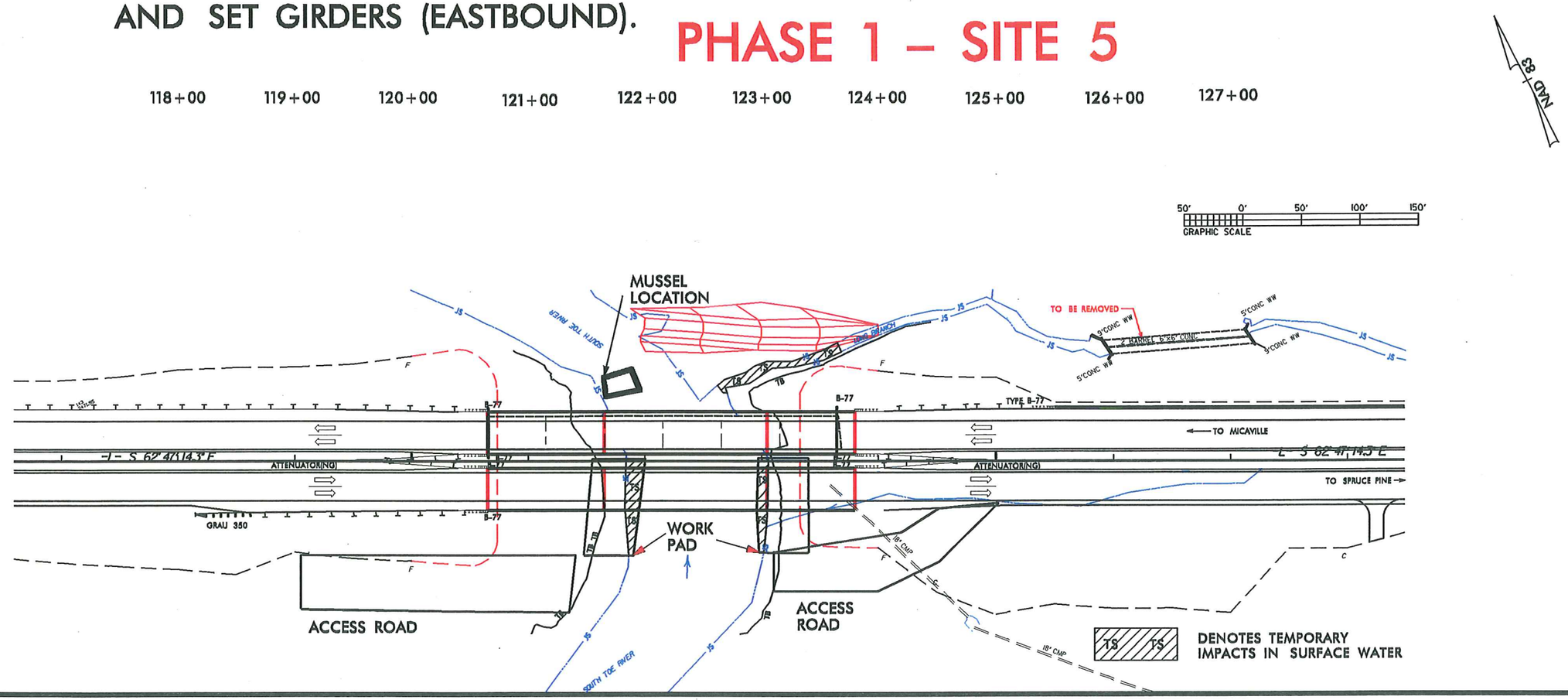


NOTE:
A DECK DRAINAGE SYSTEM WILL BE REQUIRED

3 SPANS–1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE

RELOCATE LONG BRANCH CREEK TO ALLOW MIN. OF 1 GROWING SEASON PRIOR TO PROJECT COMPLETION. WORK PAD WILL BE NEEDED TO INSTALL THE PIERS AND SET GIRDERS (EASTBOUND).

PHASE 1 – SITE 5



REVISIONS

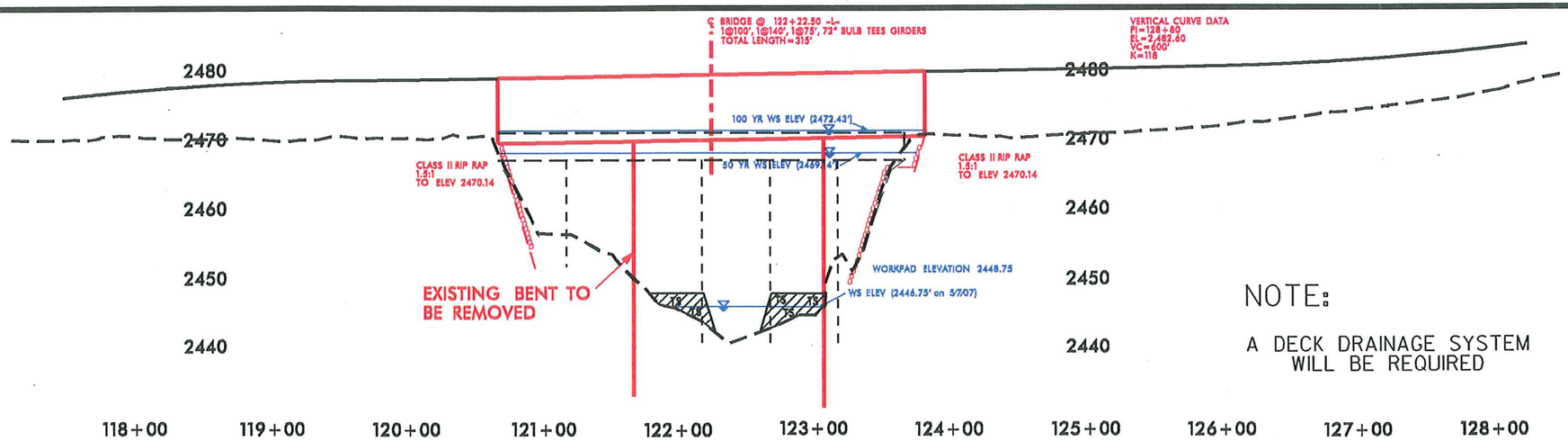
8/17/99

Permit Drawing
Sheet 20 of 114

PROJECT REFERENCE NO.	SHEET NO.
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



NOTE:

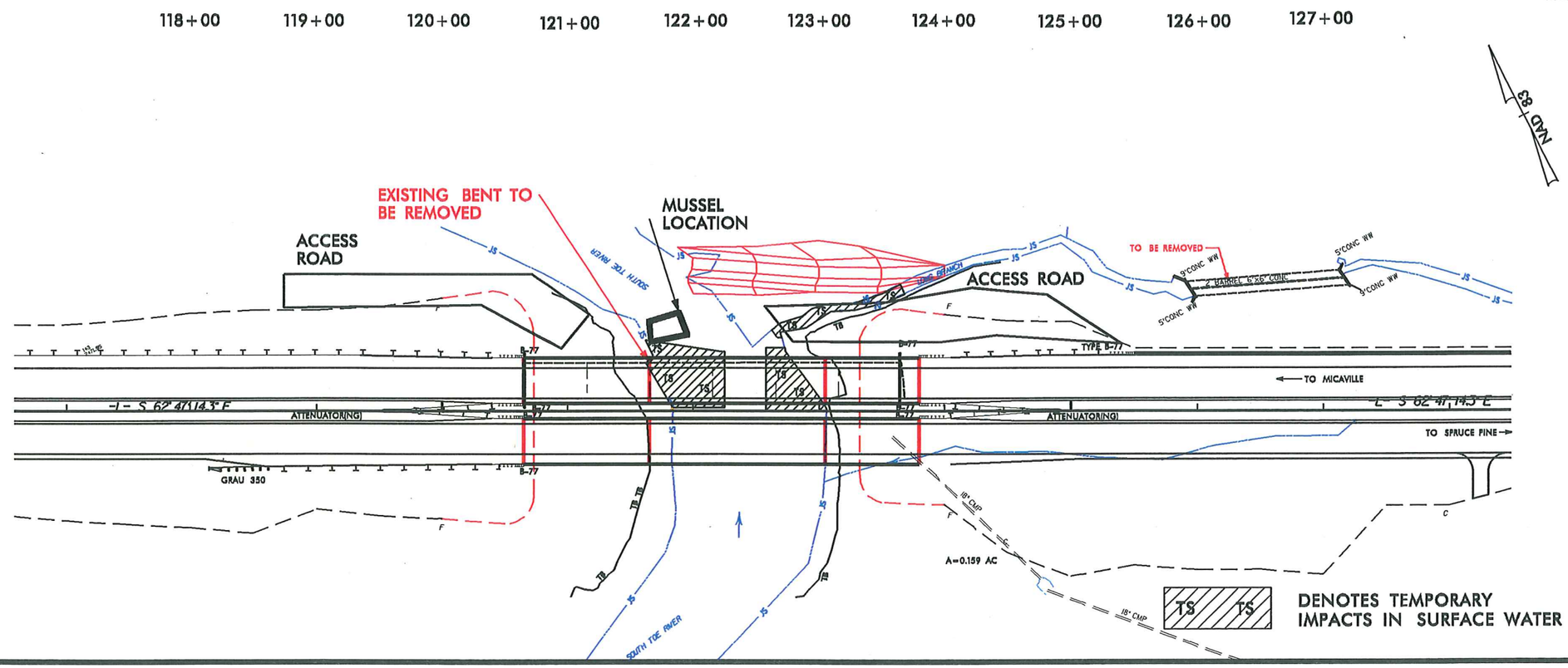
A DECK DRAINAGE SYSTEM
WILL BE REQUIRED

3 SPANS–1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE

ACCESS SHOWN FOR DEMOLITION OF THE EXISTING STRUCTURE (WESTBOUND).
EACH WORK PAD CAN BE INSTALLED AT DIFFERENT TIMES TO MAINTAIN 50% RIVER FLOW.

PHASE 2 – SITE 5

50' 0' 50' 100' 150'
SCALE: 1"= 100'



REVISIONS

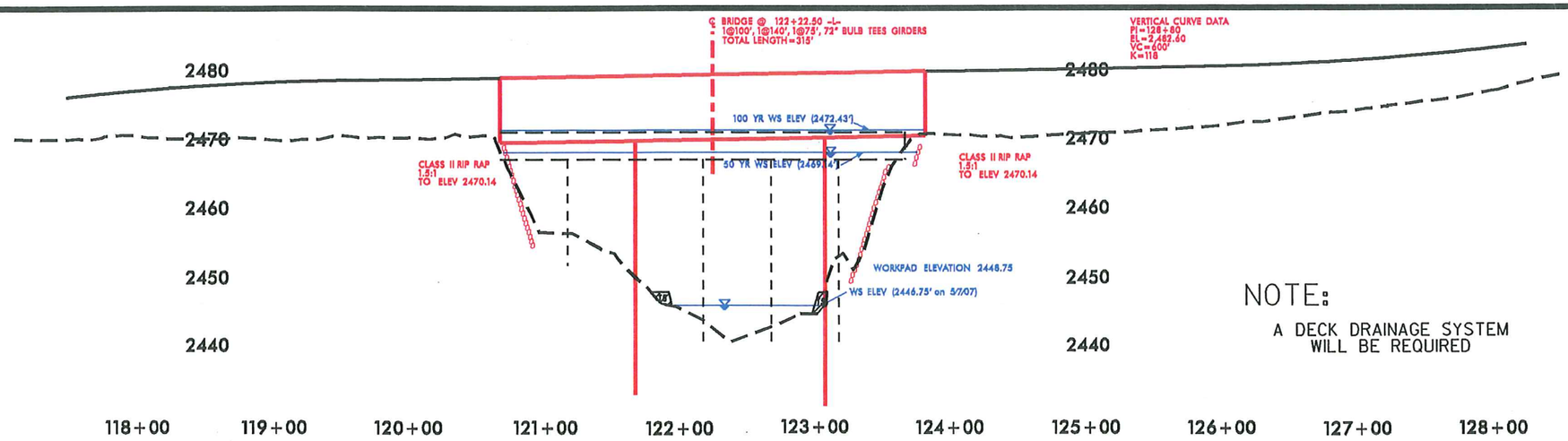
8/17/99

Permit Drawing
Sheet 27 of 114

PROJECT REFERENCE NO.	SHEET NO.
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



NOTE:

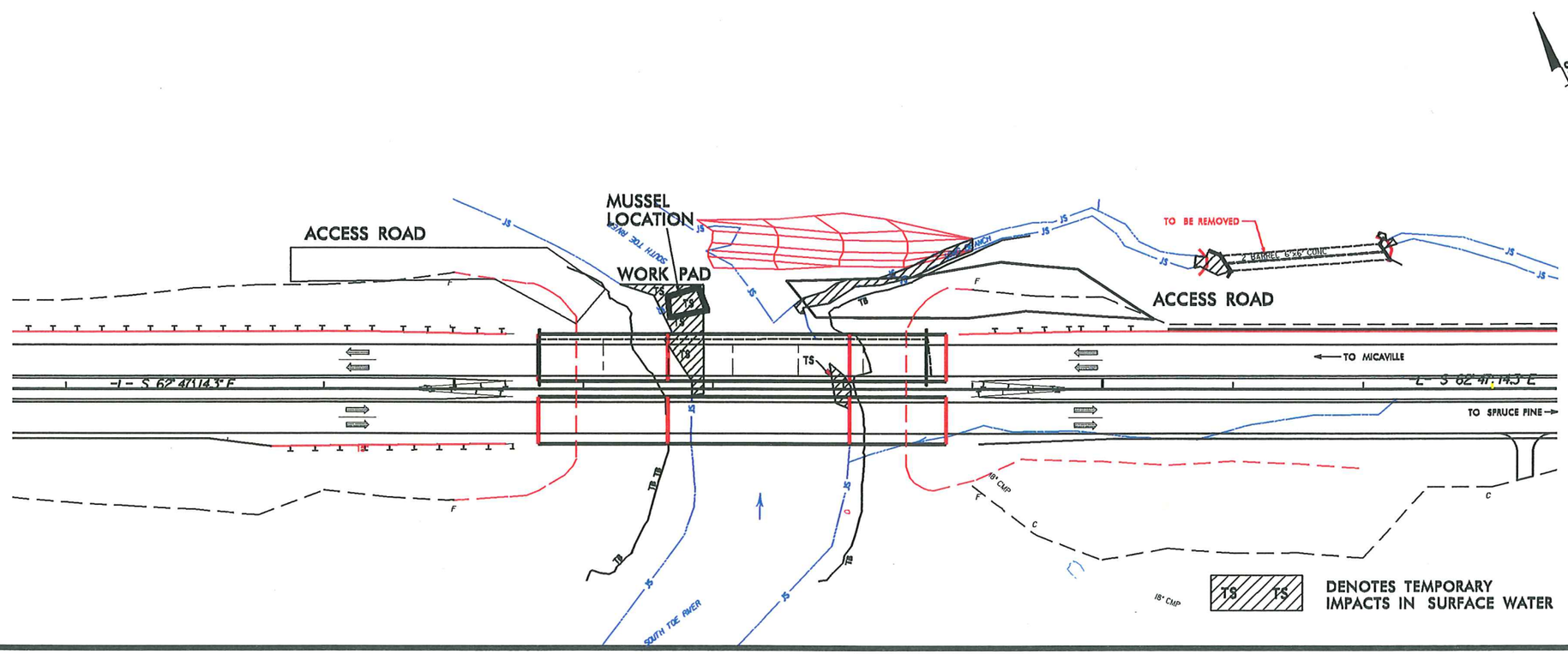
A DECK DRAINAGE SYSTEM WILL BE REQUIRED

3 SPANS–1@100', 1@140', 1 @ 75'; CONCRETE GIRDER BRIDGE

WORK PADS WILL BE NEEDED FOR DRILLING THE PIERS AND GIRDER ERECTION. LONG BRANCH CREEK WILL HAVE ALREADY BEEN RELOCATED.

PHASE 3 – SITE 5

SCALE: 1"= 100'



REVISIONS

8/17/99

Permit Drawing
Sheet 28 of 119

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2G
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

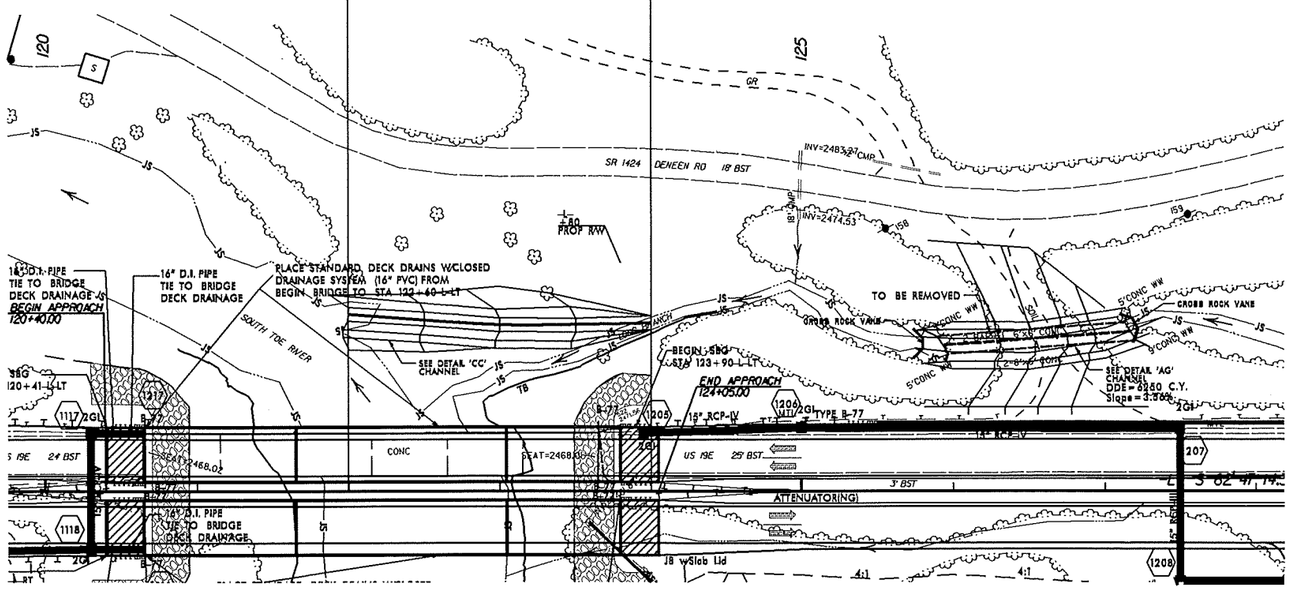
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

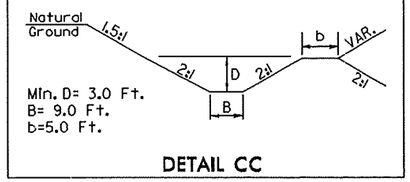
LONG BRANCH STREAM RELOCATION
SITE 5a

END STREAM RELOCATION
-LB STREAM- STA 12+00.23
-L- STA 121+99.74 116.33 FT LT

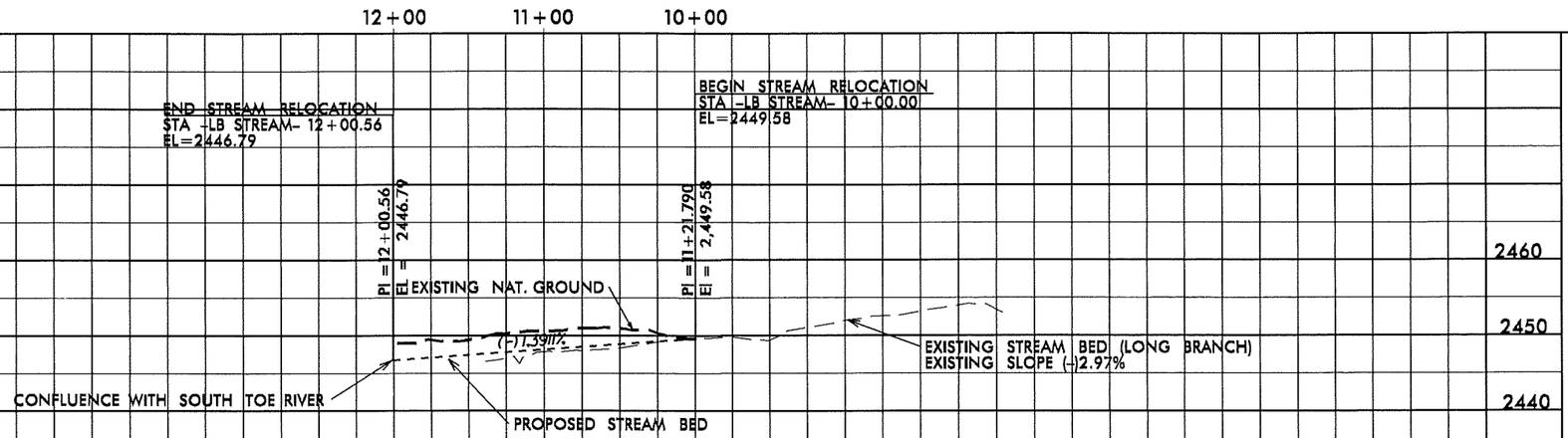
BEGIN STREAM RELOCATION
-LB STREAM- STA 10+00.00
-L- STA 124+00.03 110.60 FT LT



TYPICAL CHANNEL SECTION
(Not to Scale)



DETAIL CC



PROPOSED LONG BRANCH
HORIZONTAL ALIGNMENT
PI -LP STREAM- Sta 10+97.20
Δ = 5° 35' 17.0" (RT)
D = 8° 46' 14.7"
L = 63.71'
T = 31.88'
R = 653.26'

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

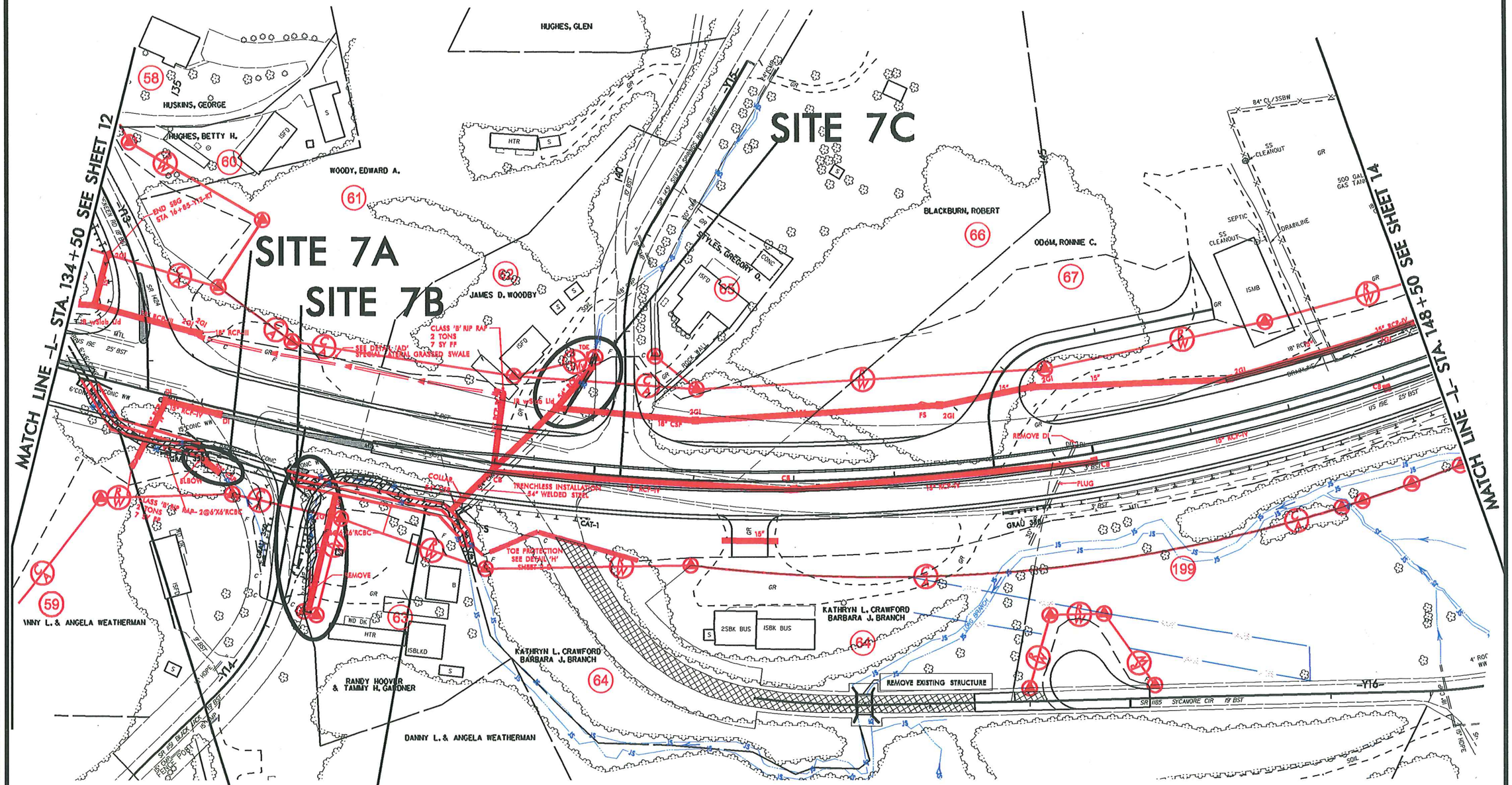
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
Sheet 30 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

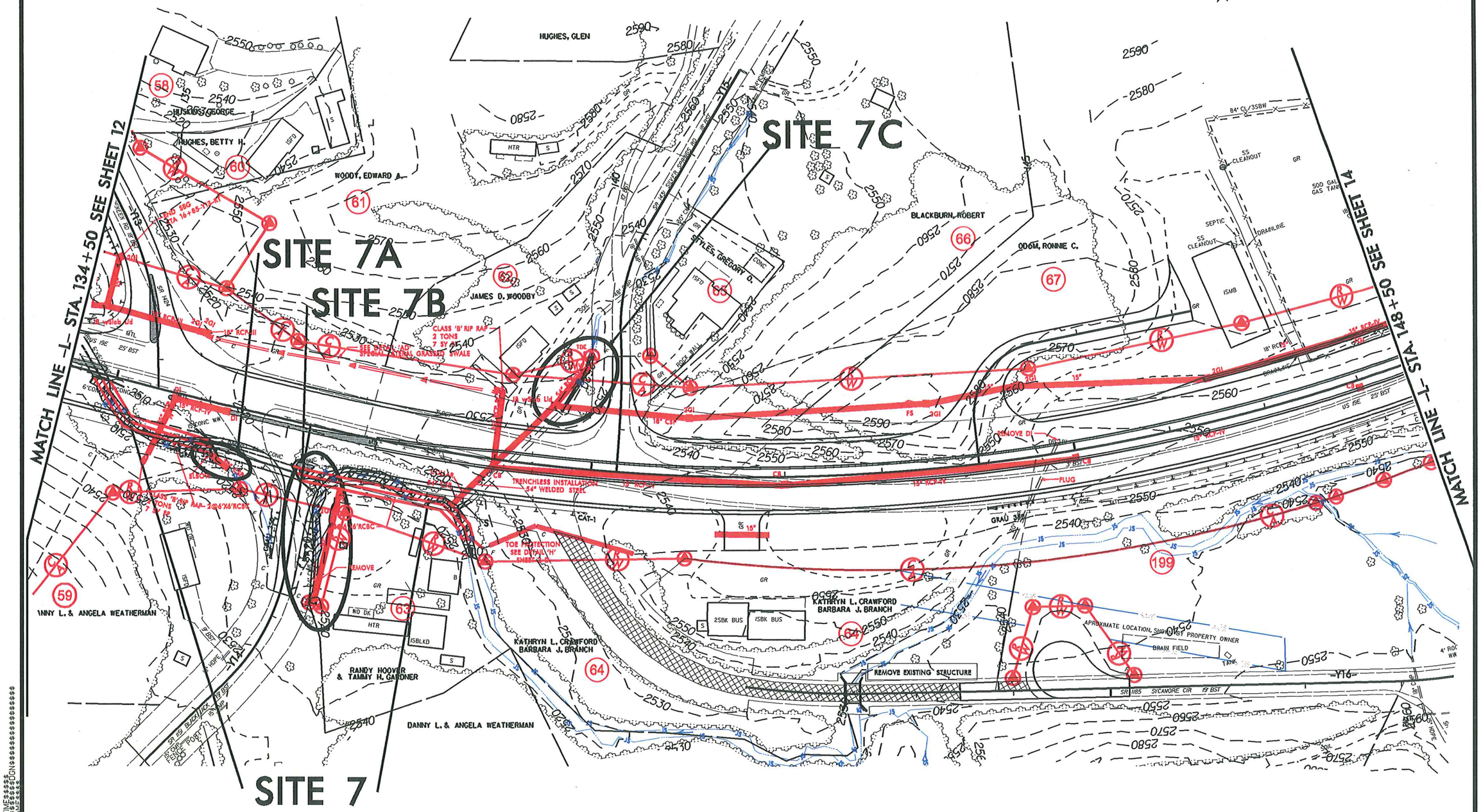
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

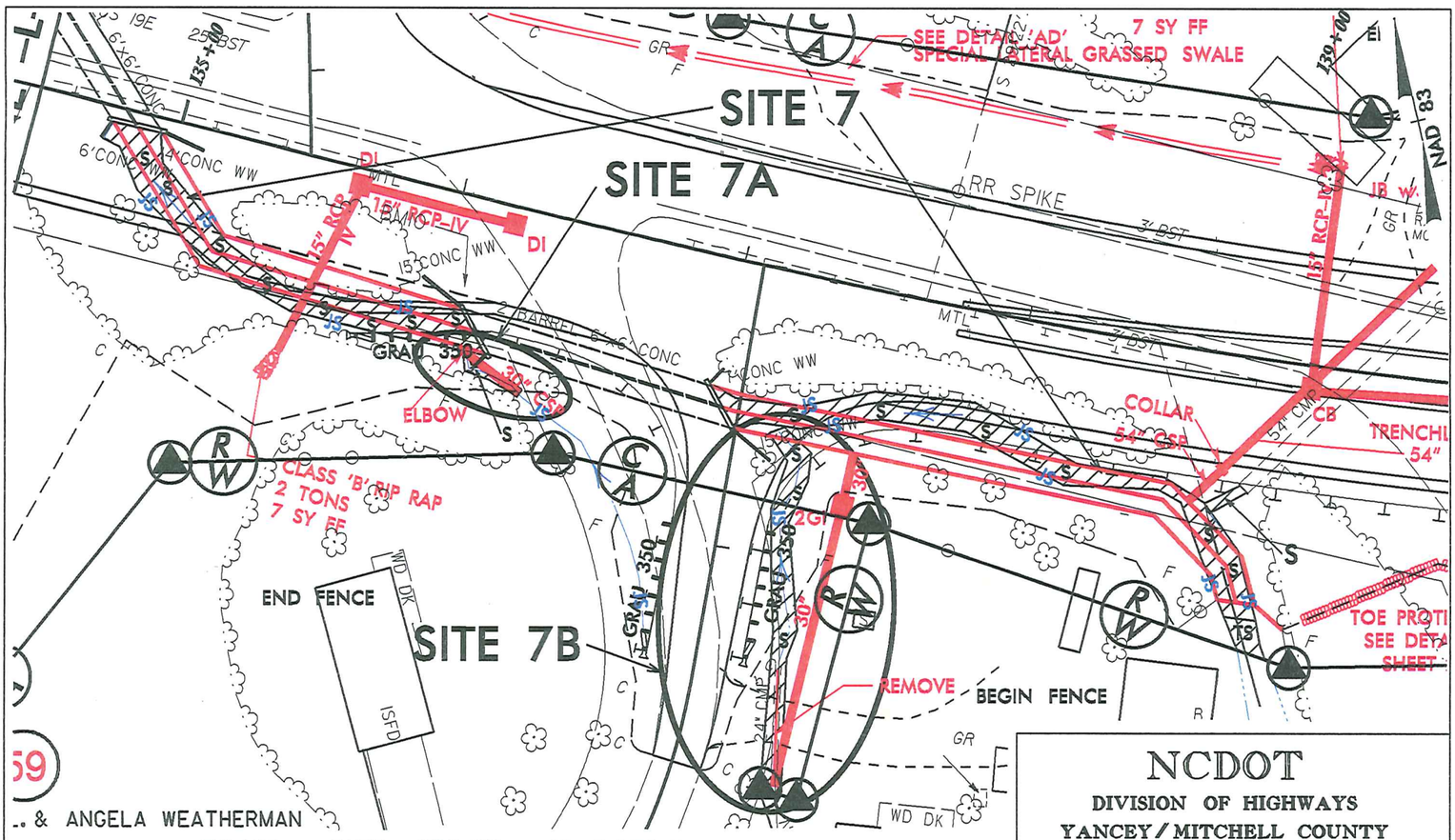
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
Sheet 37 of 119



IMPACT ENLARGEMENT

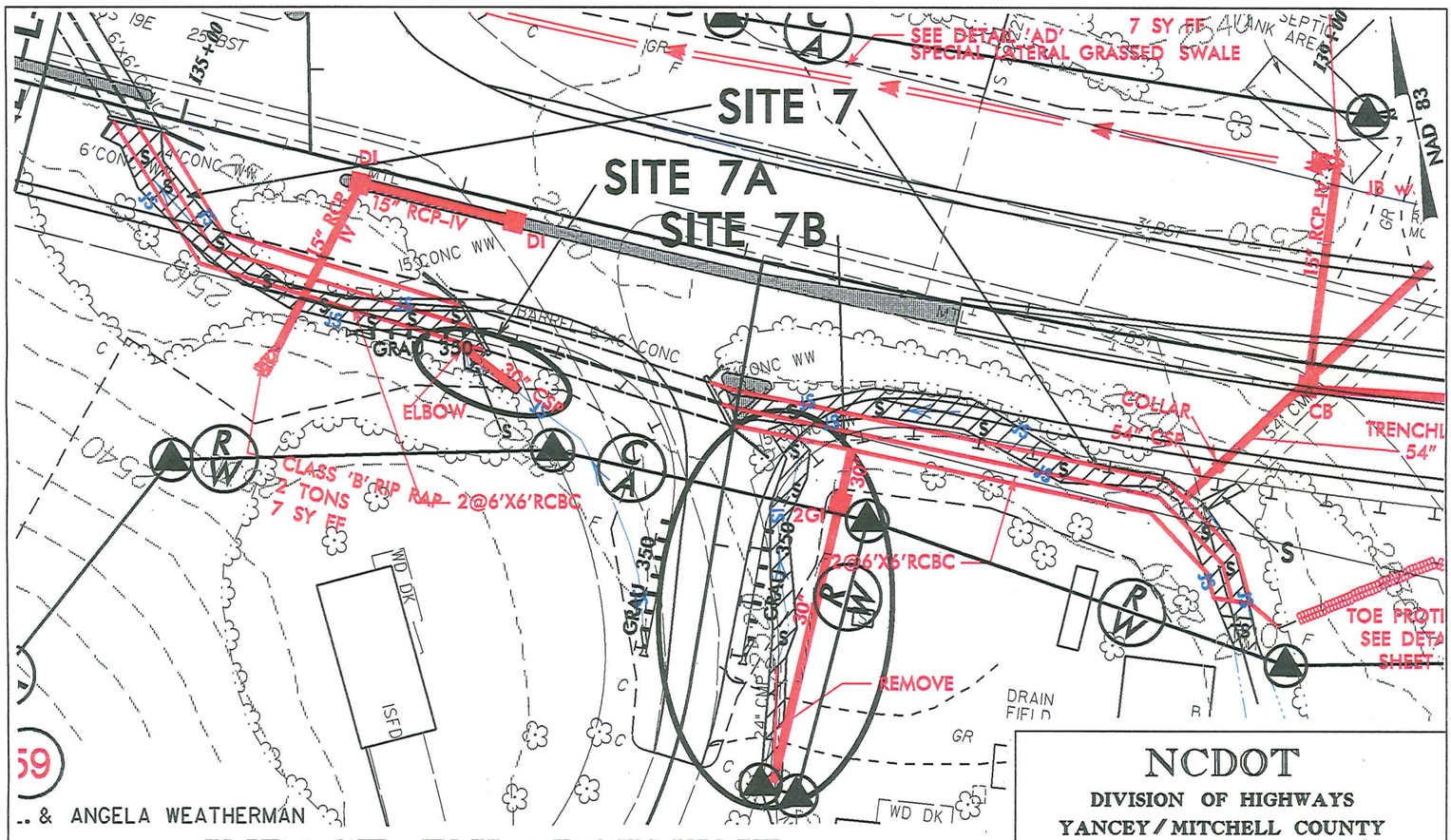
S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13



IMPACT ENLARGEMENT

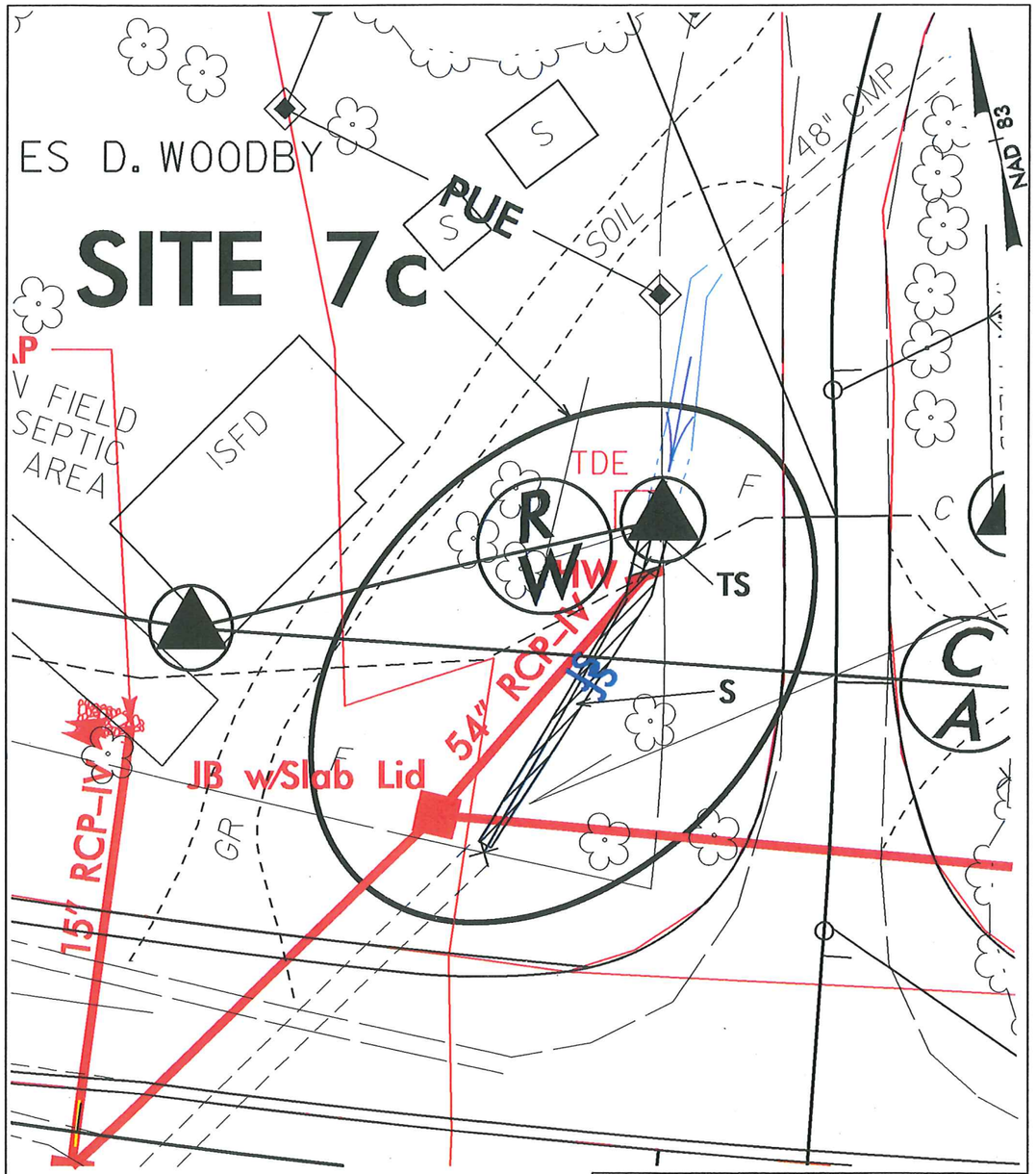
S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

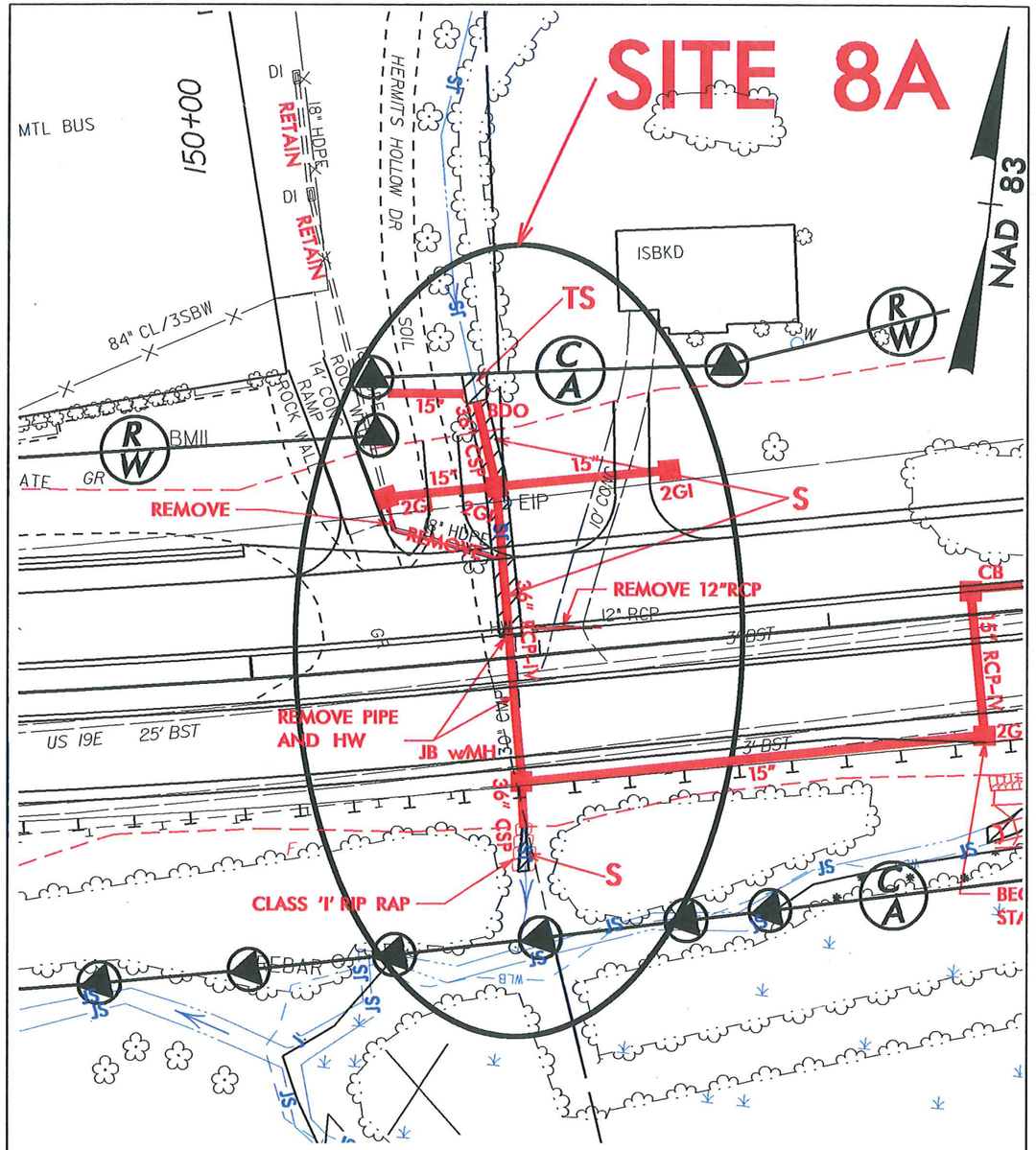
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

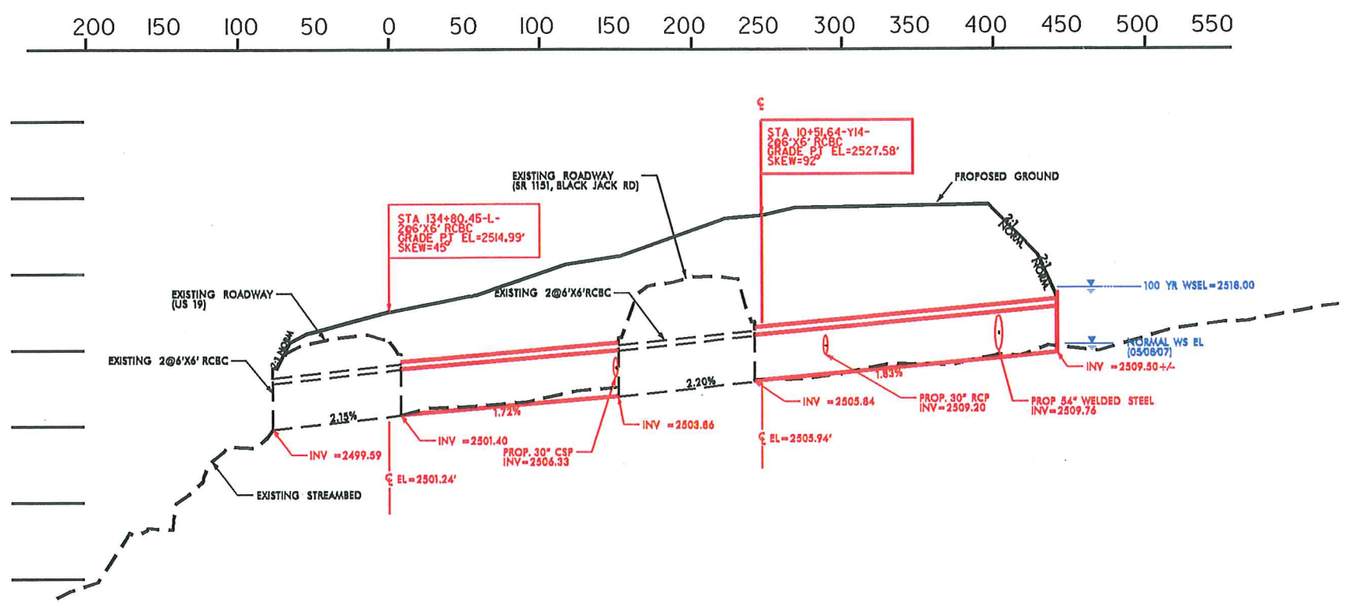
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/10/13



PROFILE

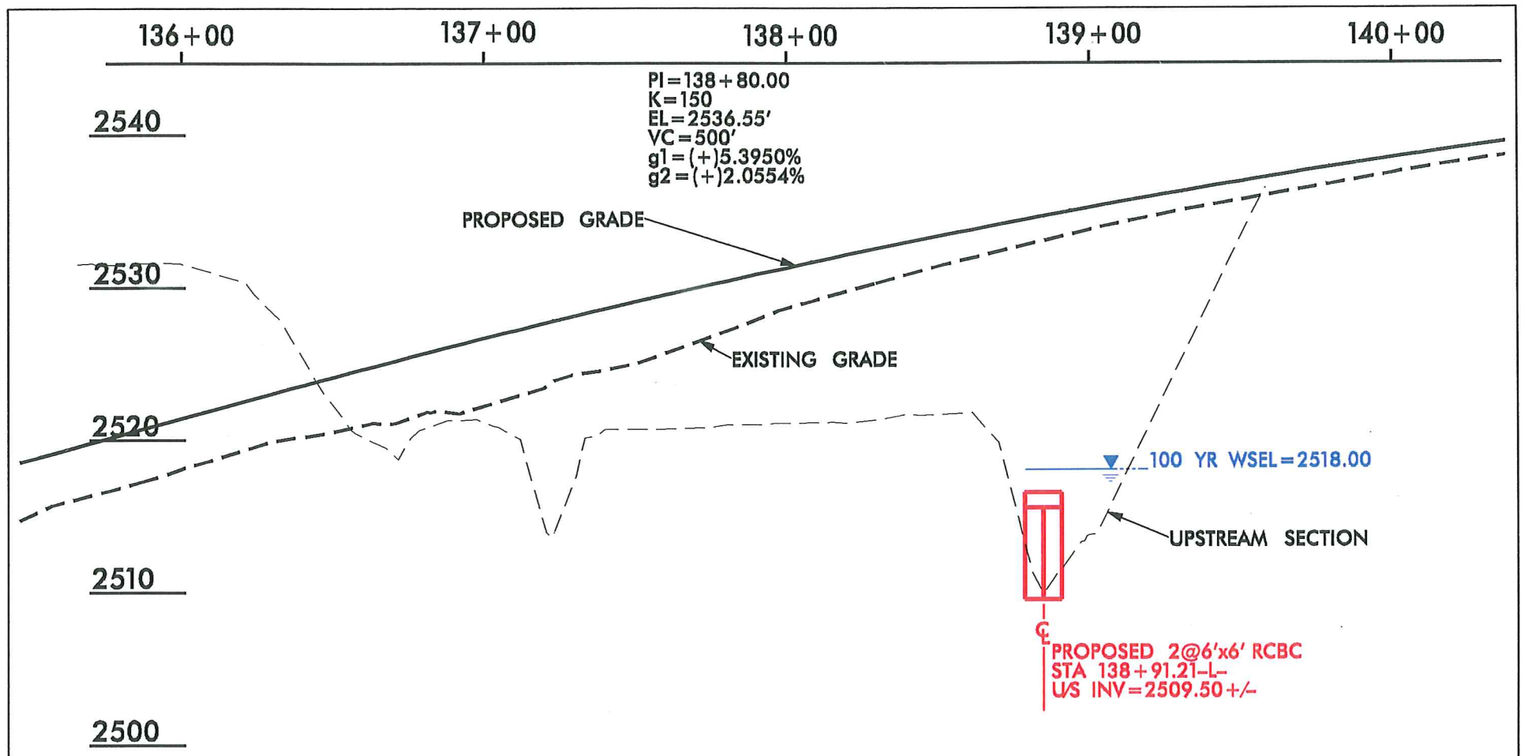
SITE 7

SCALE

1:100' HORIZONTAL
1:20' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13



SECTION

SITE 7

SCALE

1:50' HORIZONTAL
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

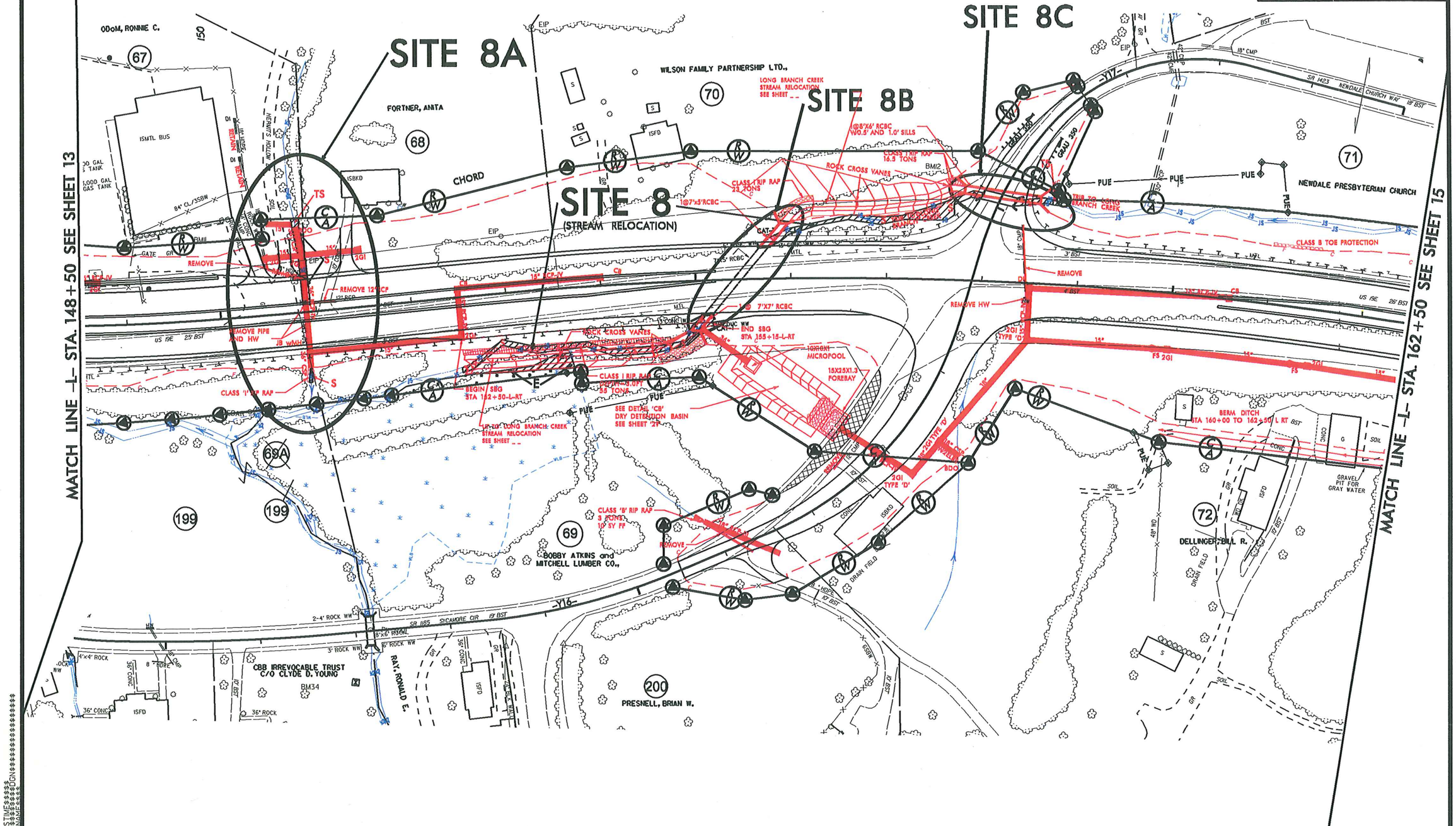
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

E E DENOTES EXCAVATION IN WETLAND

DENOTES MECHANIZED CLEARING

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



Permit Drawing
Sheet 36 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

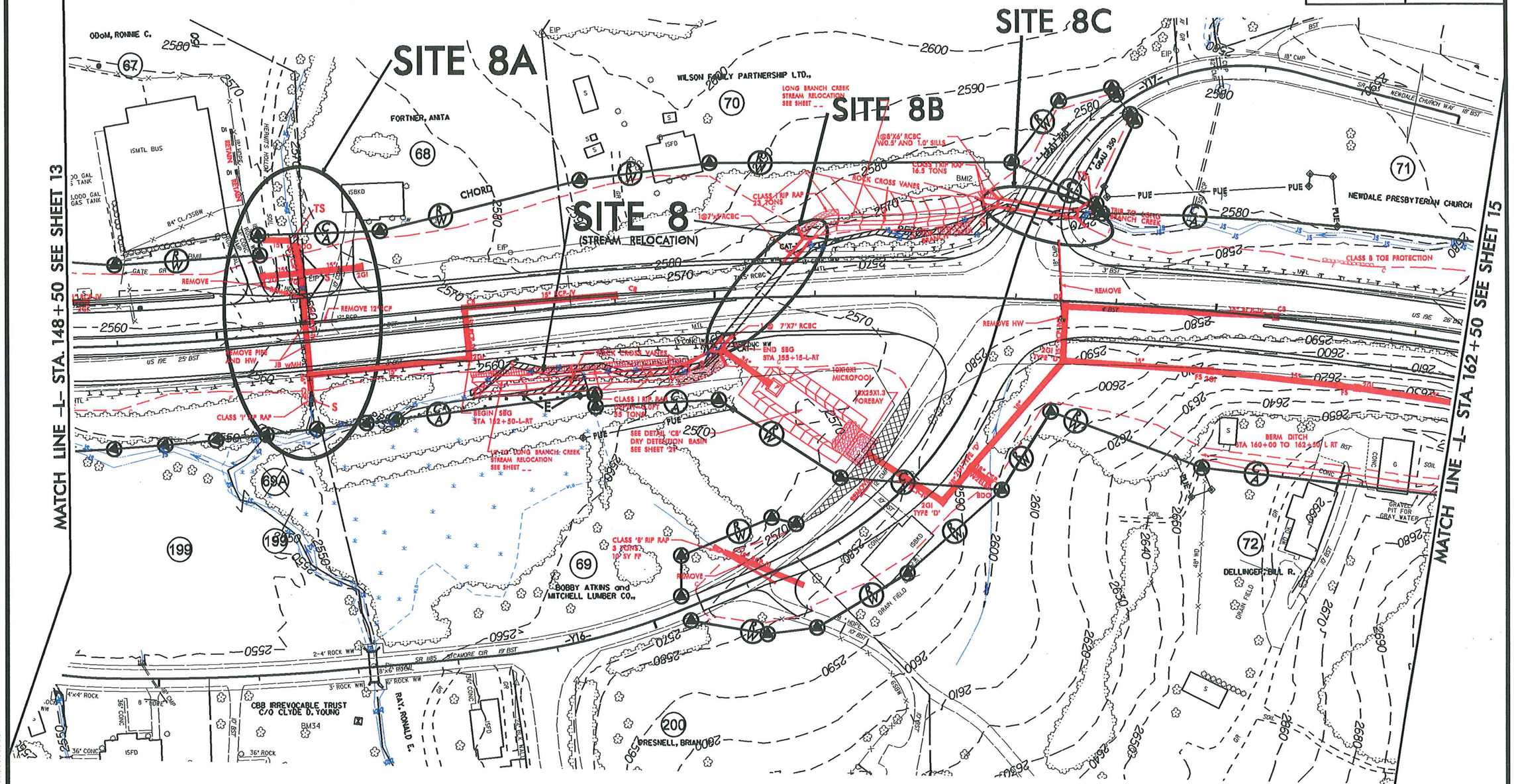
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

E E DENOTES EXCAVATION IN WETLAND

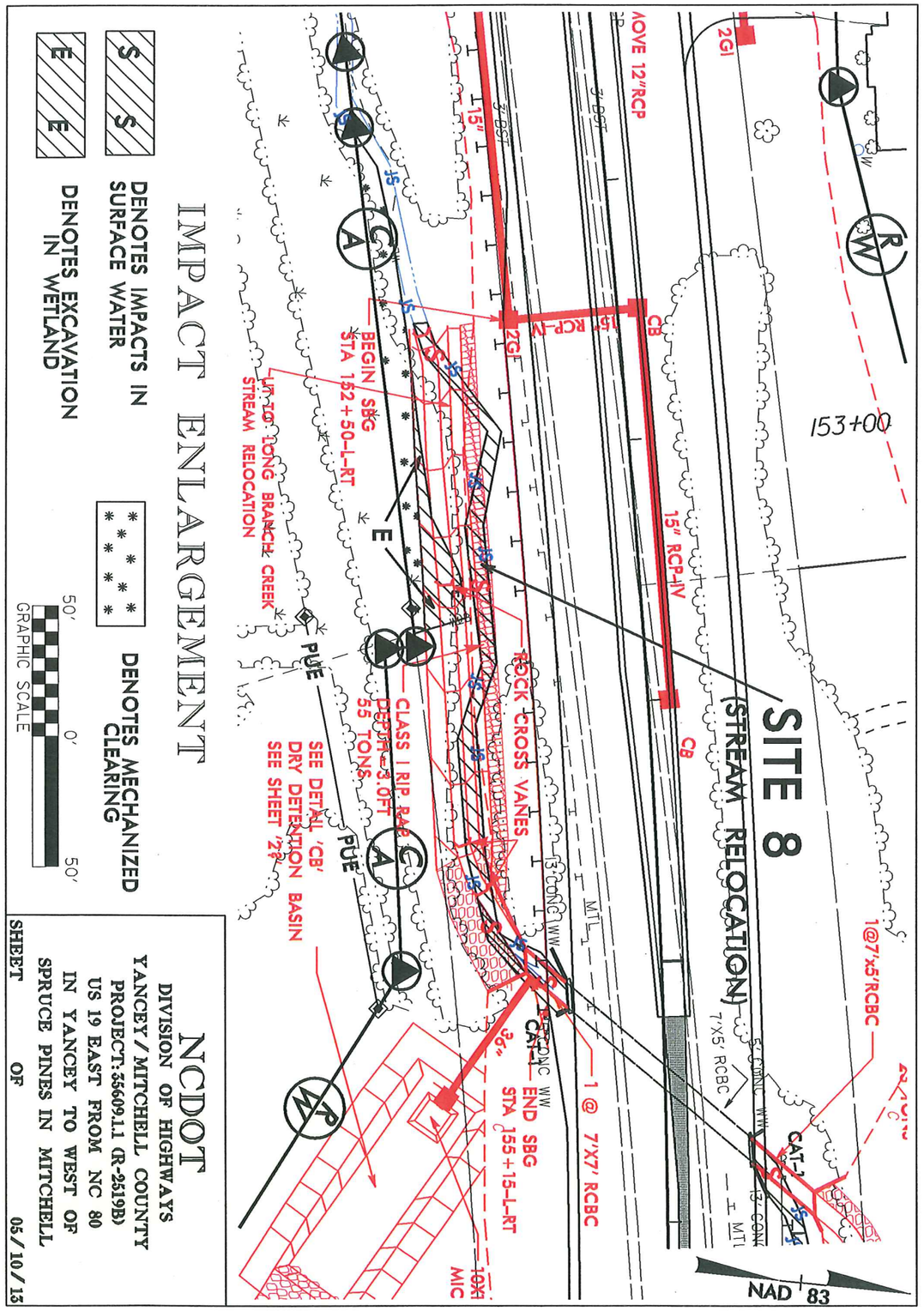
DENOTES MECHANIZED CLEARING

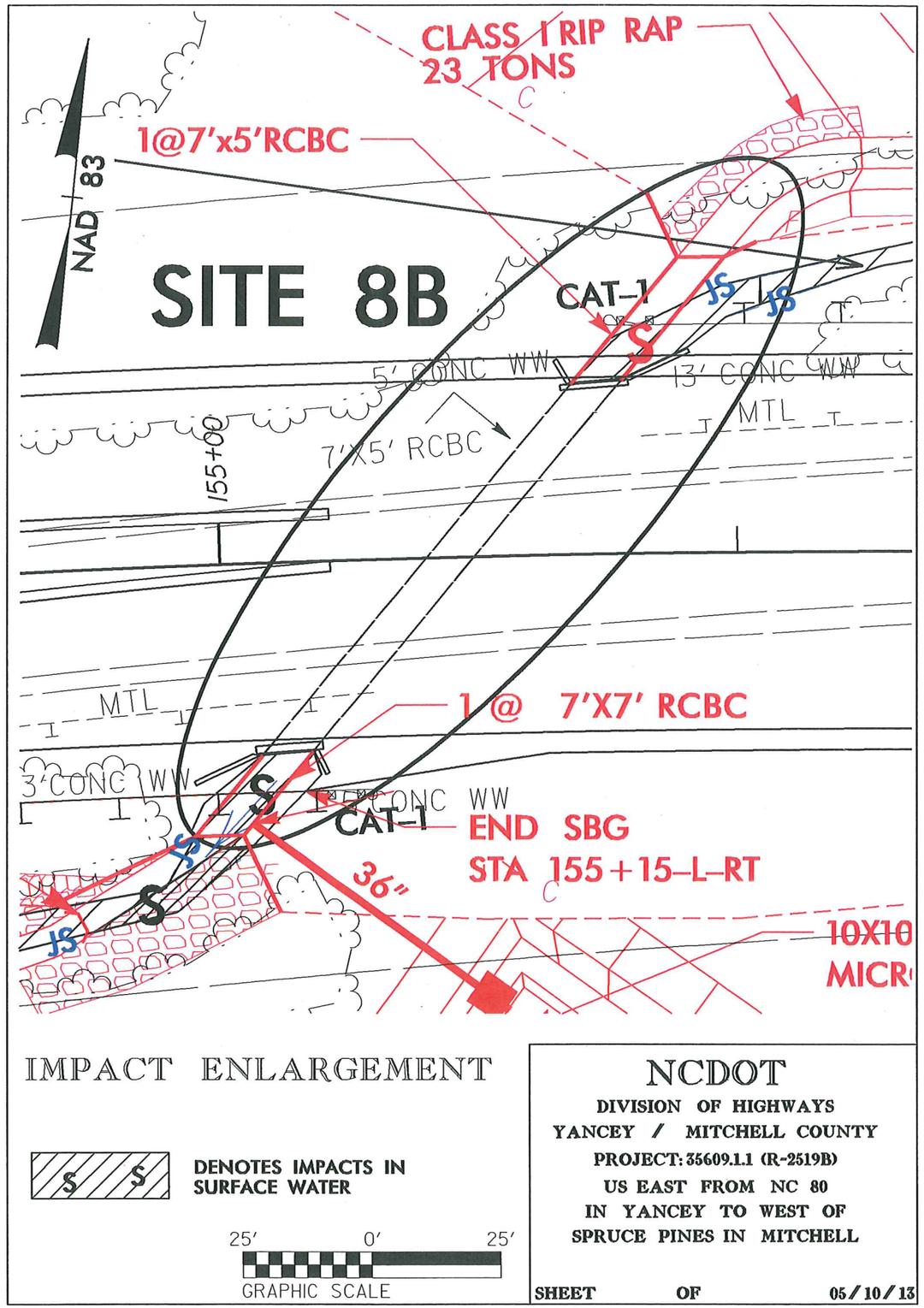
50' 0' 50' 100' 150'
GRAPHIC SCALE

NAD 83

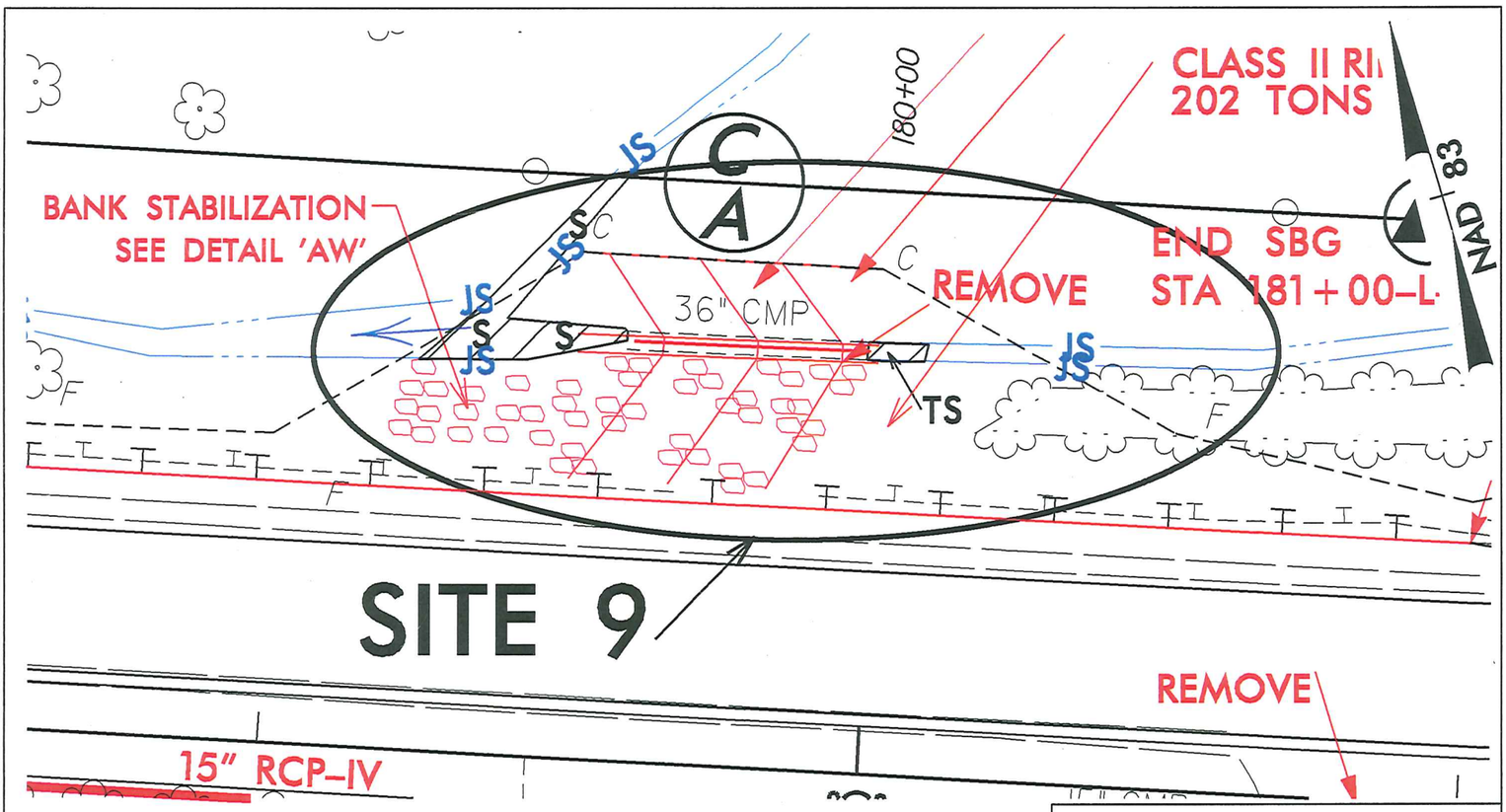


Permit Drawing
Sheet 37 of 114





Permit Drawing
Sheet 38 of 114



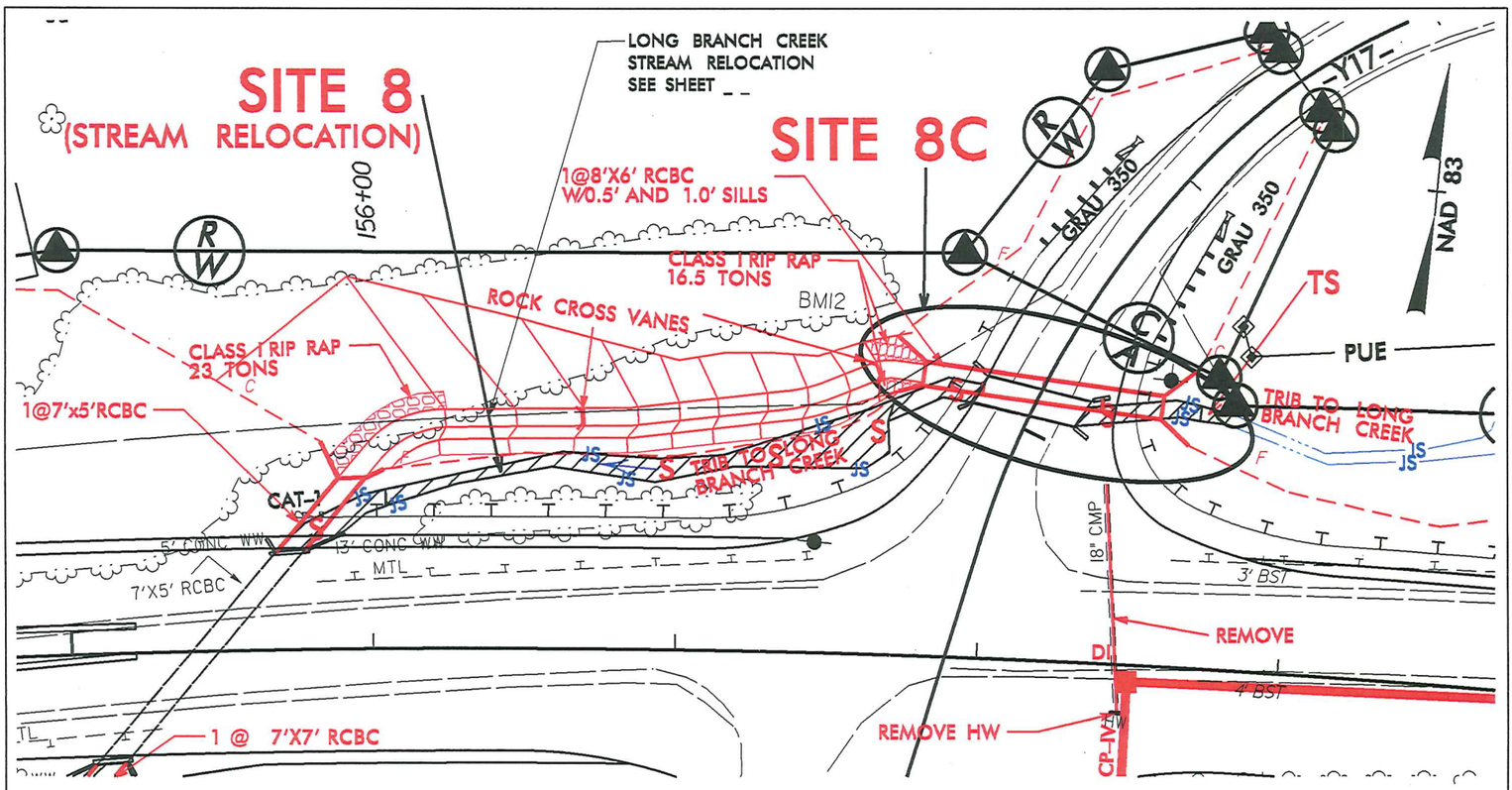
IMPACT ENLARGEMENT

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL
SHEET OF 05/13/13



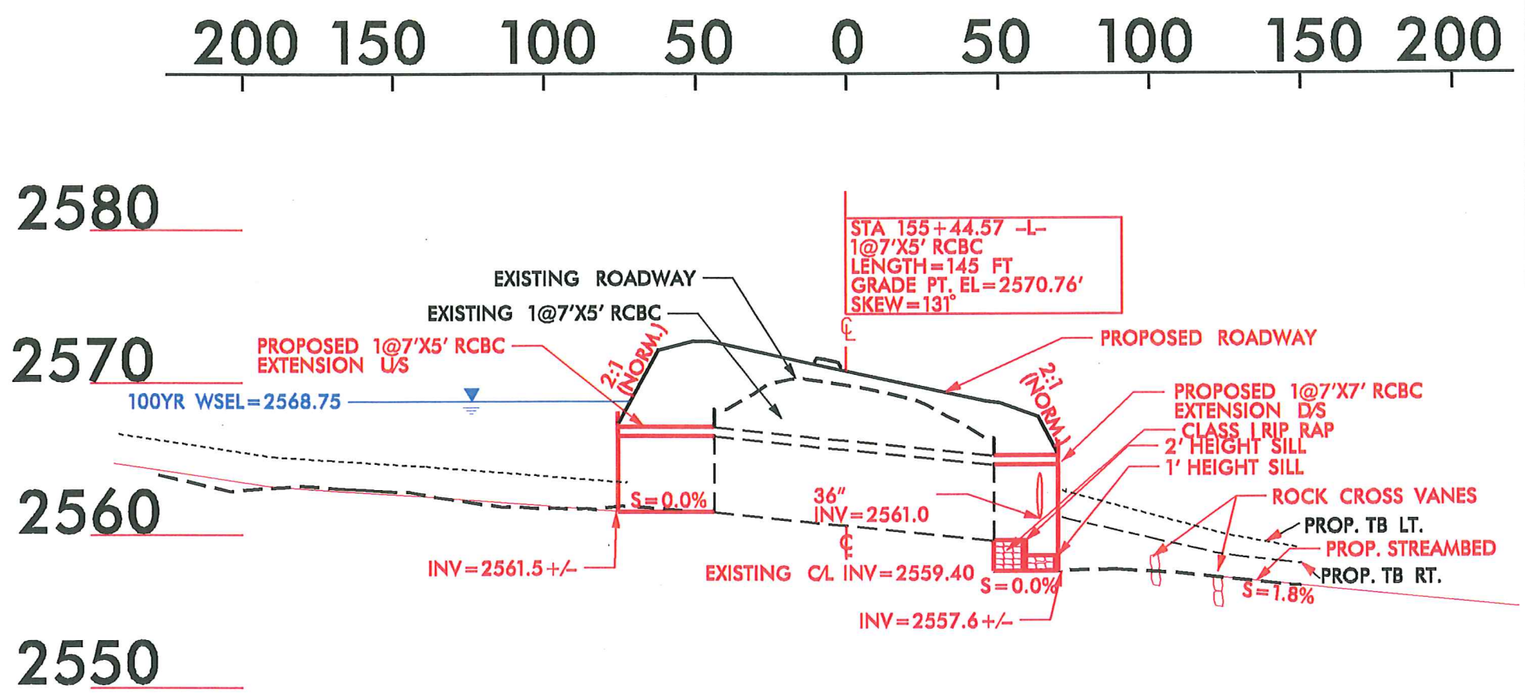
IMPACT ENLARGEMENT

S S — DENOTES IMPACTS IN SURFACE WATER

TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL
SHEET OF 05/10/13



PROFILE

SITE 8B

SCALE

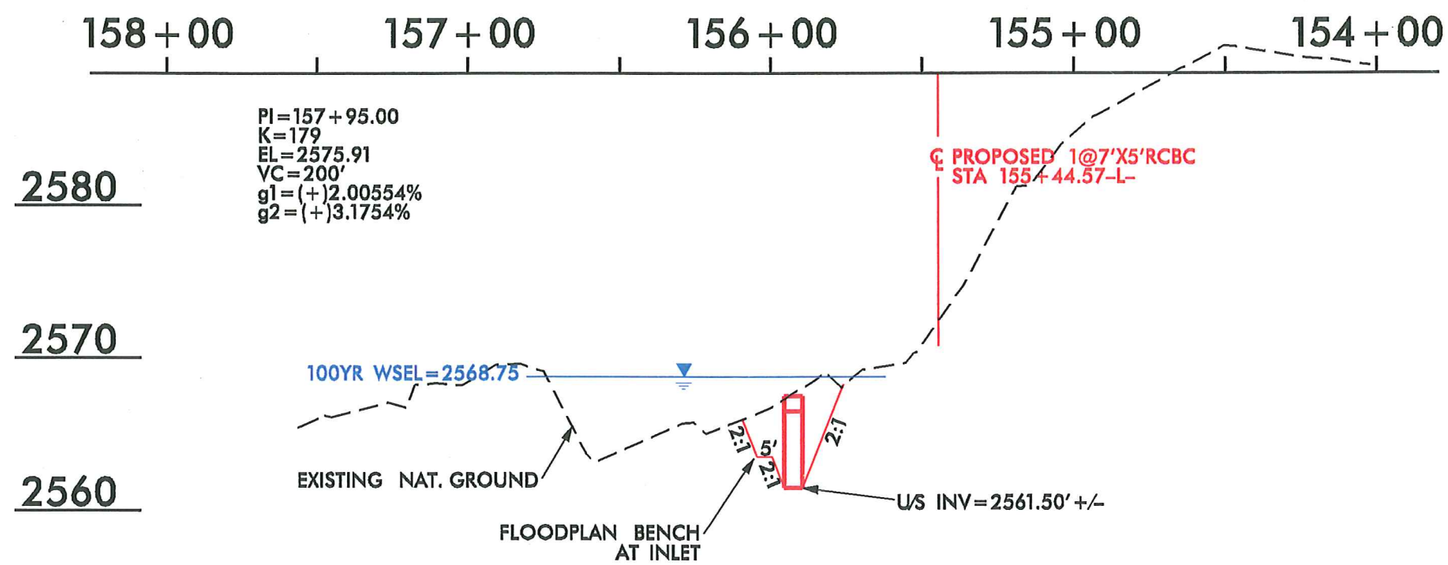
1:50' HORIZONTAL

1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13



SECTION

SITE 8B

SCALE

1:50' HORIZONTAL

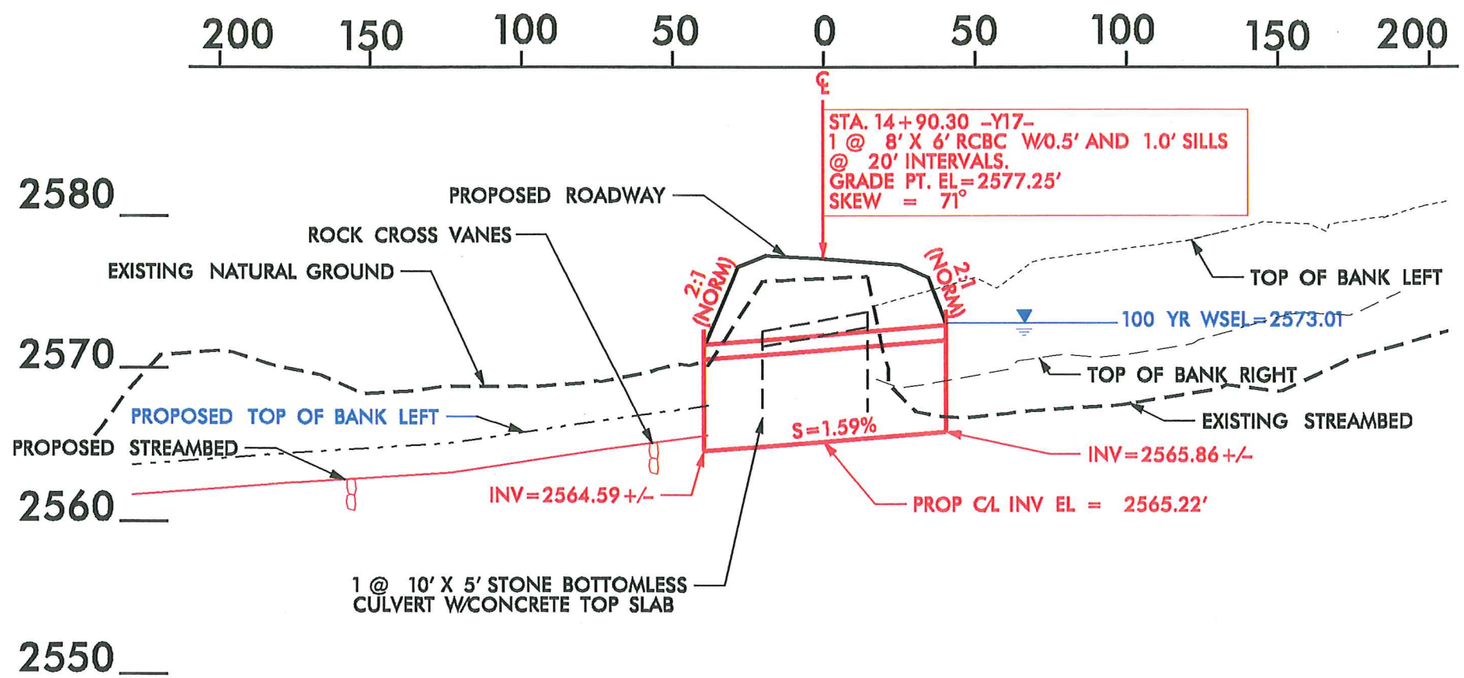
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13

Permit Drawing
Sheet 41 of 114



PROFILE
SITE 8C

SCALE

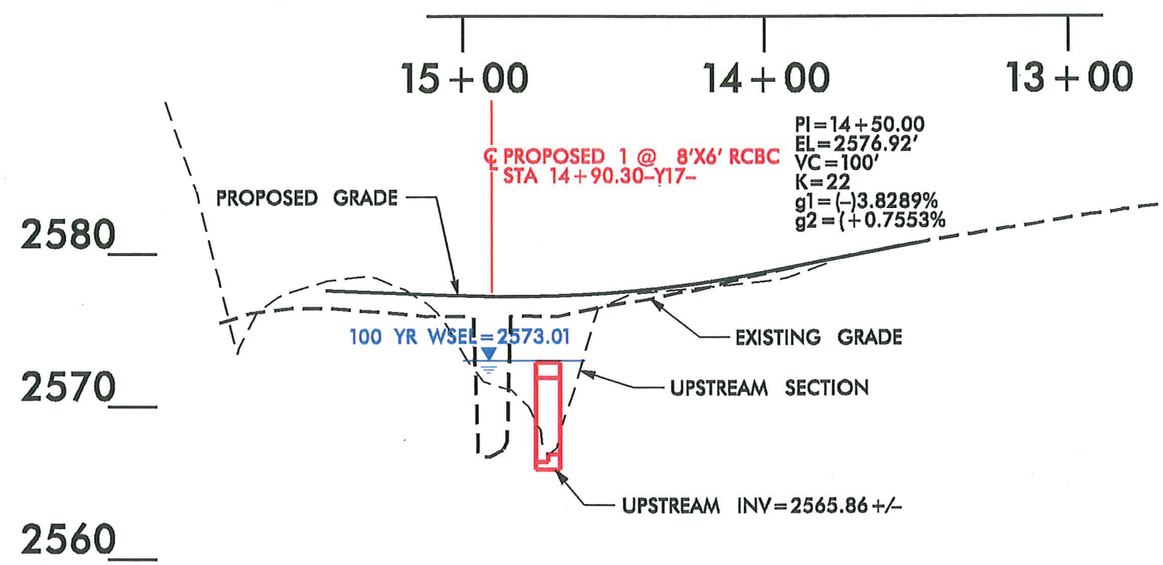
1:50' HORIZONTAL

1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13

Permit Drawing
Sheet 42 of 44



SECTION

SITE 8C

SCALE

1:50' HORIZONTAL

1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

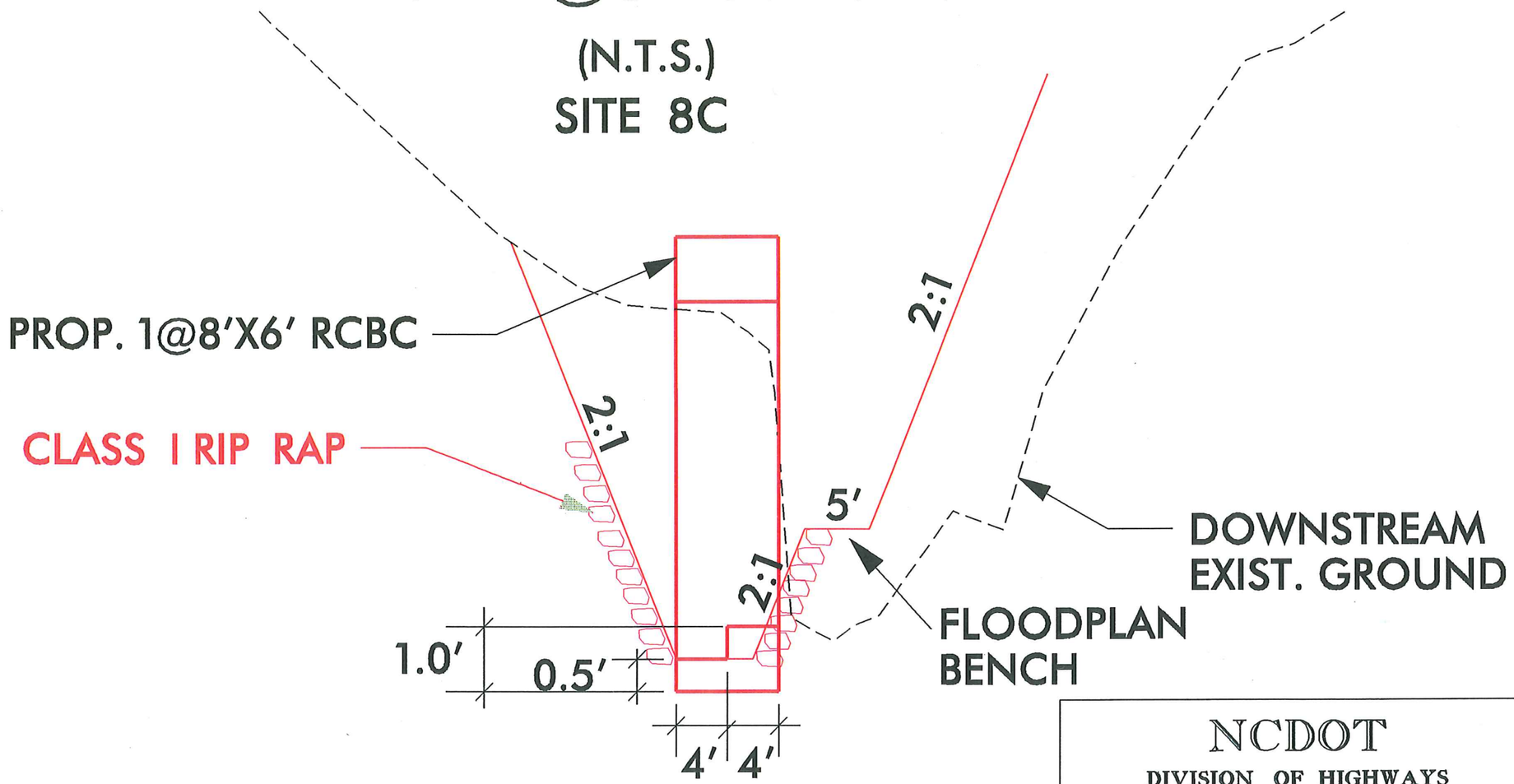
SHEET OF 05/10/13

Permit Drawing
Sheet 43 of 44

DETAIL OF SILLS AT DOWNSTREAM FACE OF 1@8'X6' RCBC

(N.T.S.)

SITE 8C



NOTE: SPACE ALTERNATING 0.5' AND 1.0' HIGH SILLS @ 20' INTERVALS.

NCDOT

DIVISION OF HIGHWAYS

YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80 IN YANCEY TO WEST OF SPRUCE PINES IN MITCHELL

SHEET OF 05 / 10 / 13

Permit Drawing
Sheet 44 of 44

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

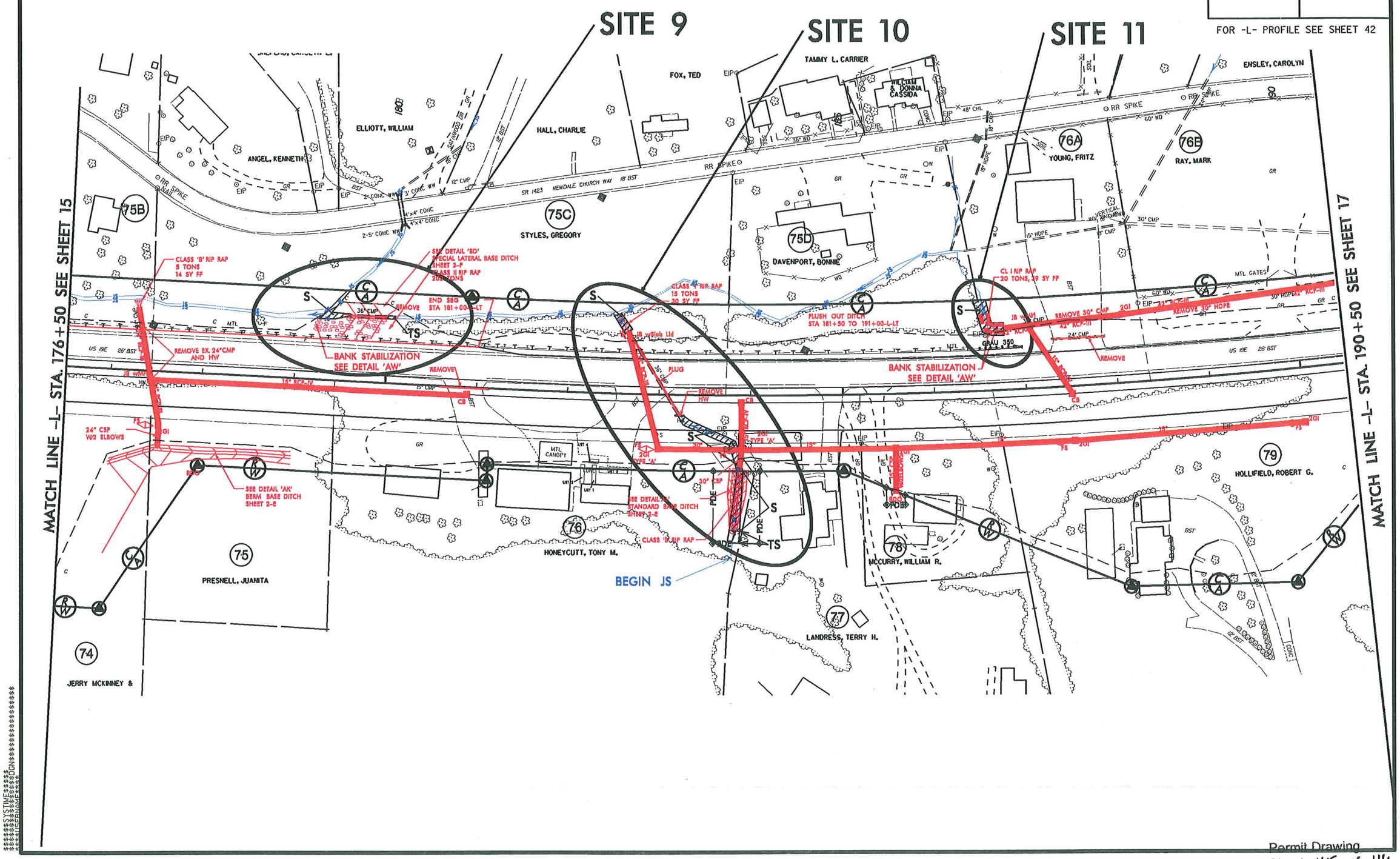
FOR -L- PROFILE SEE SHEET 42

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
Sheet 45 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

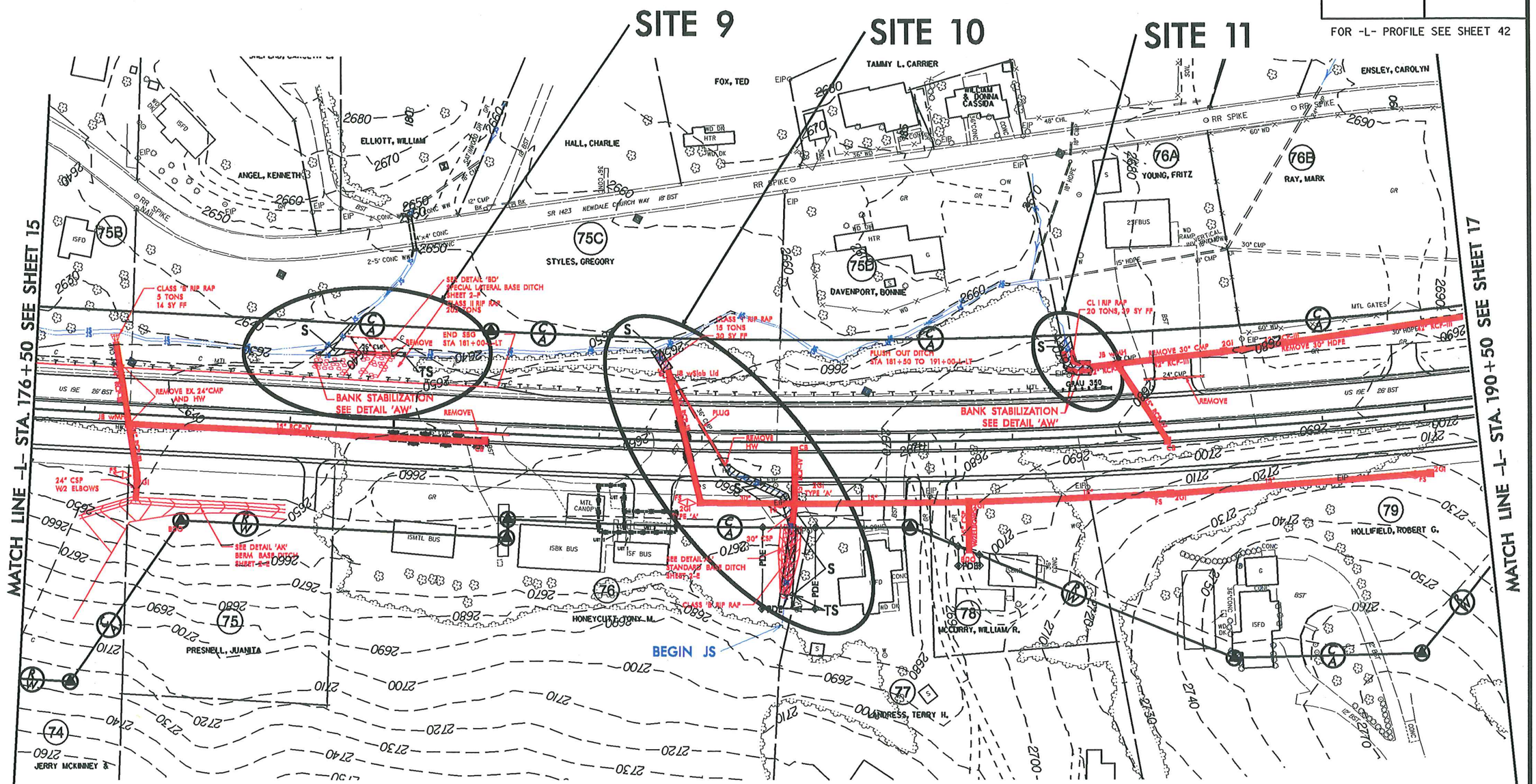
FOR -L- PROFILE SEE SHEET 42

S S DENOTES IMPACTS IN SURFACE WATER

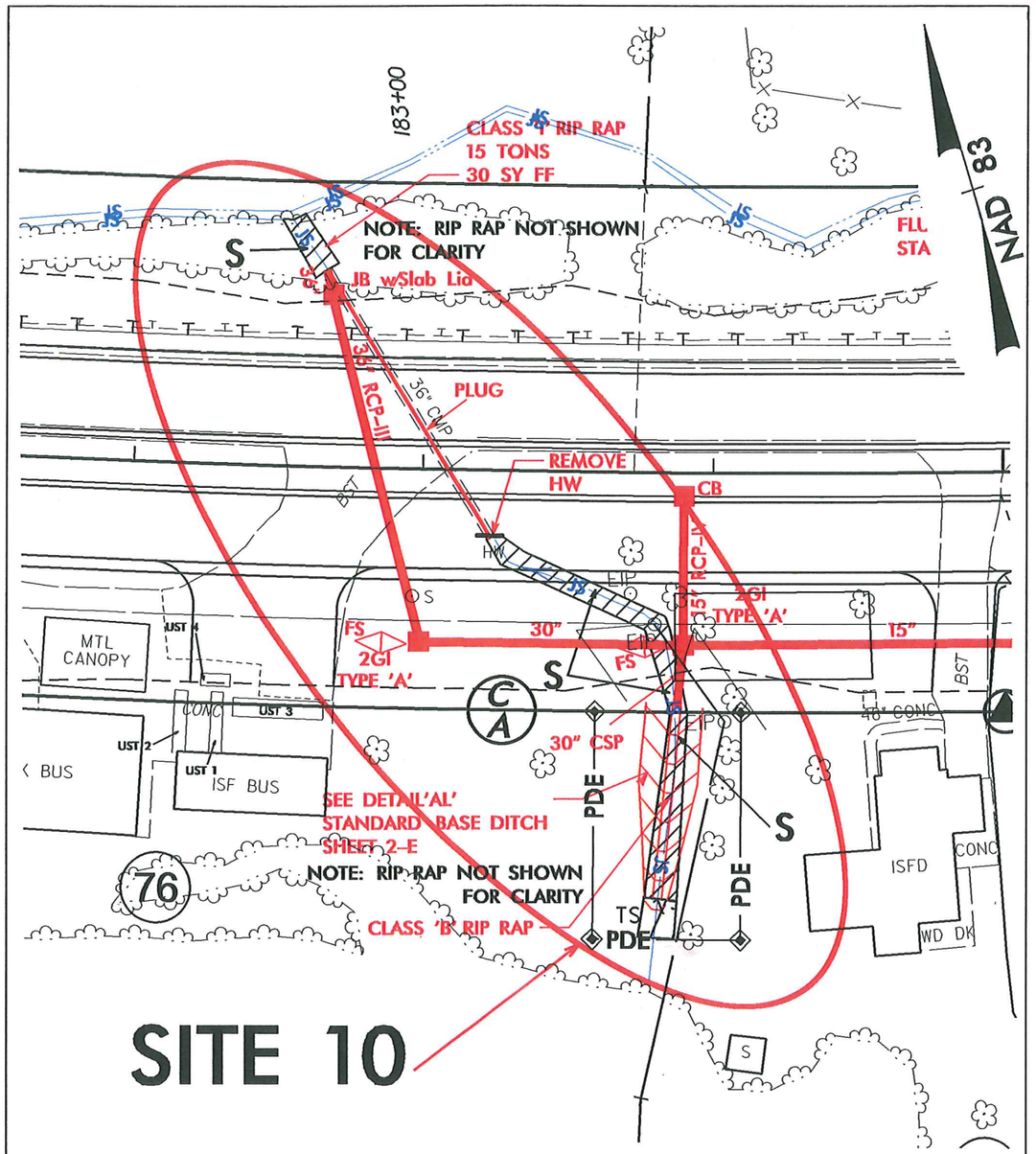
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
Sheet 46 of 114



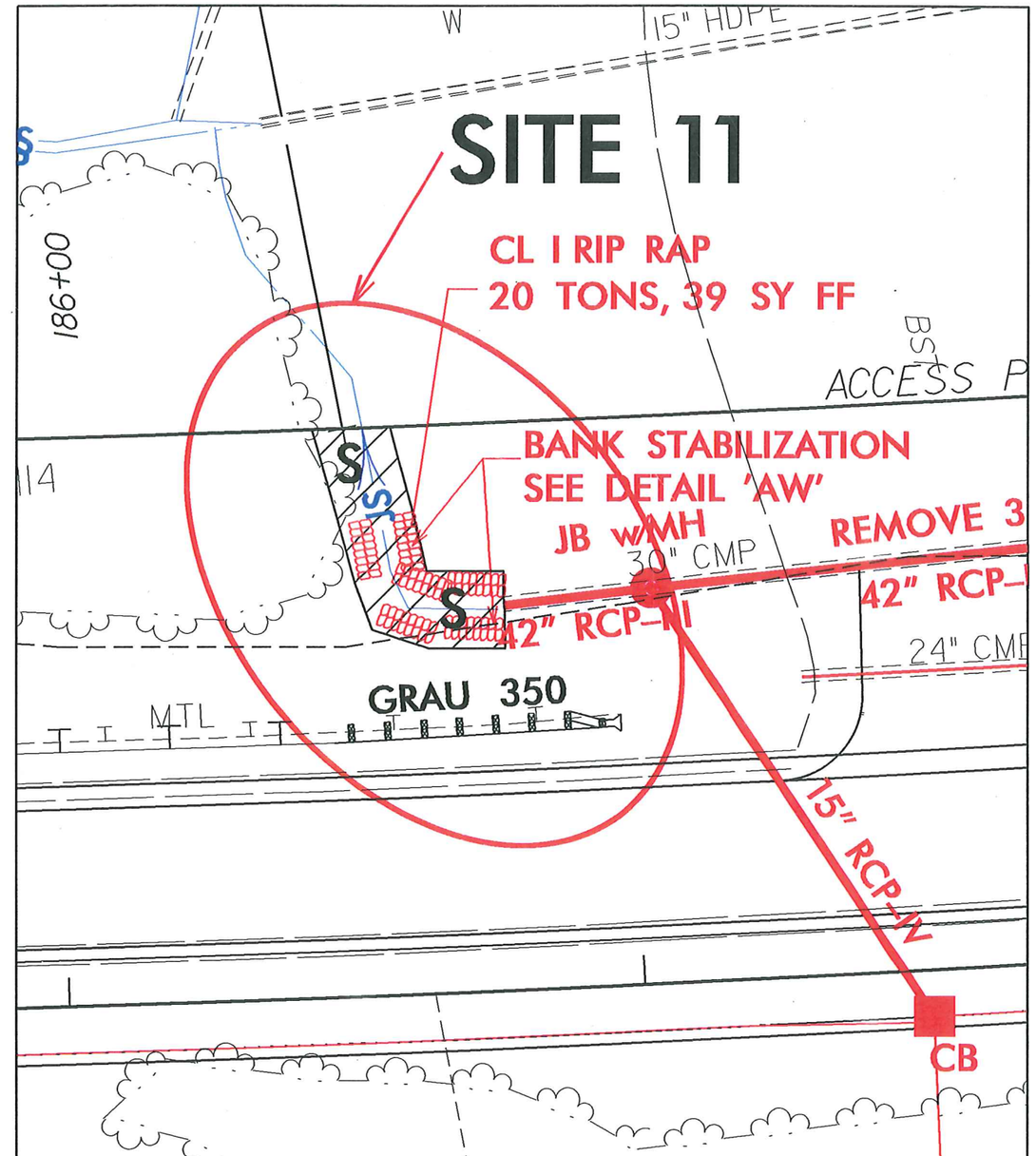
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

50′ 0′ 50′
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13



IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

25′ 0′ 25′
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05 / 13 / 13

Permit Drawing
Sheet 47 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

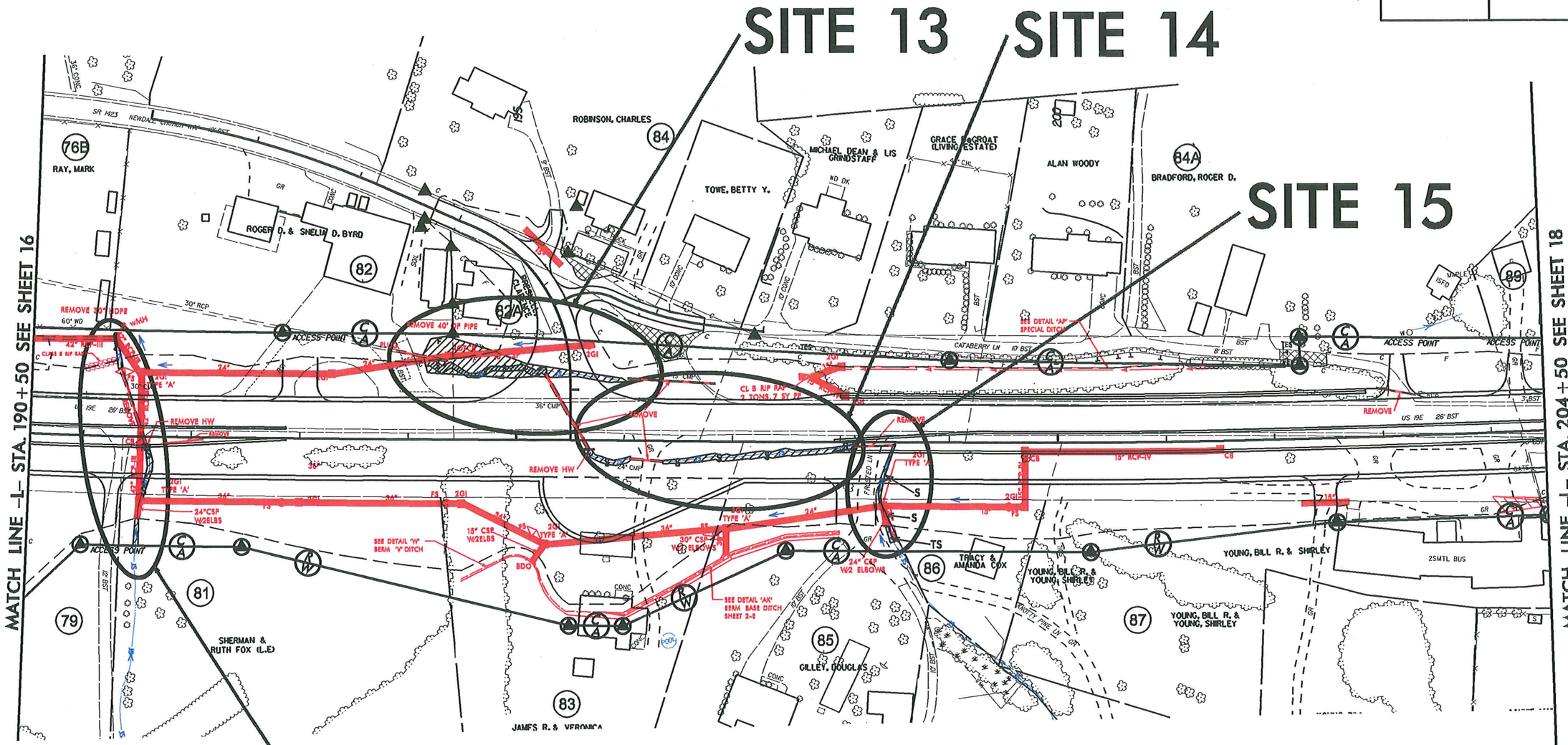
S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
Sheet 48 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

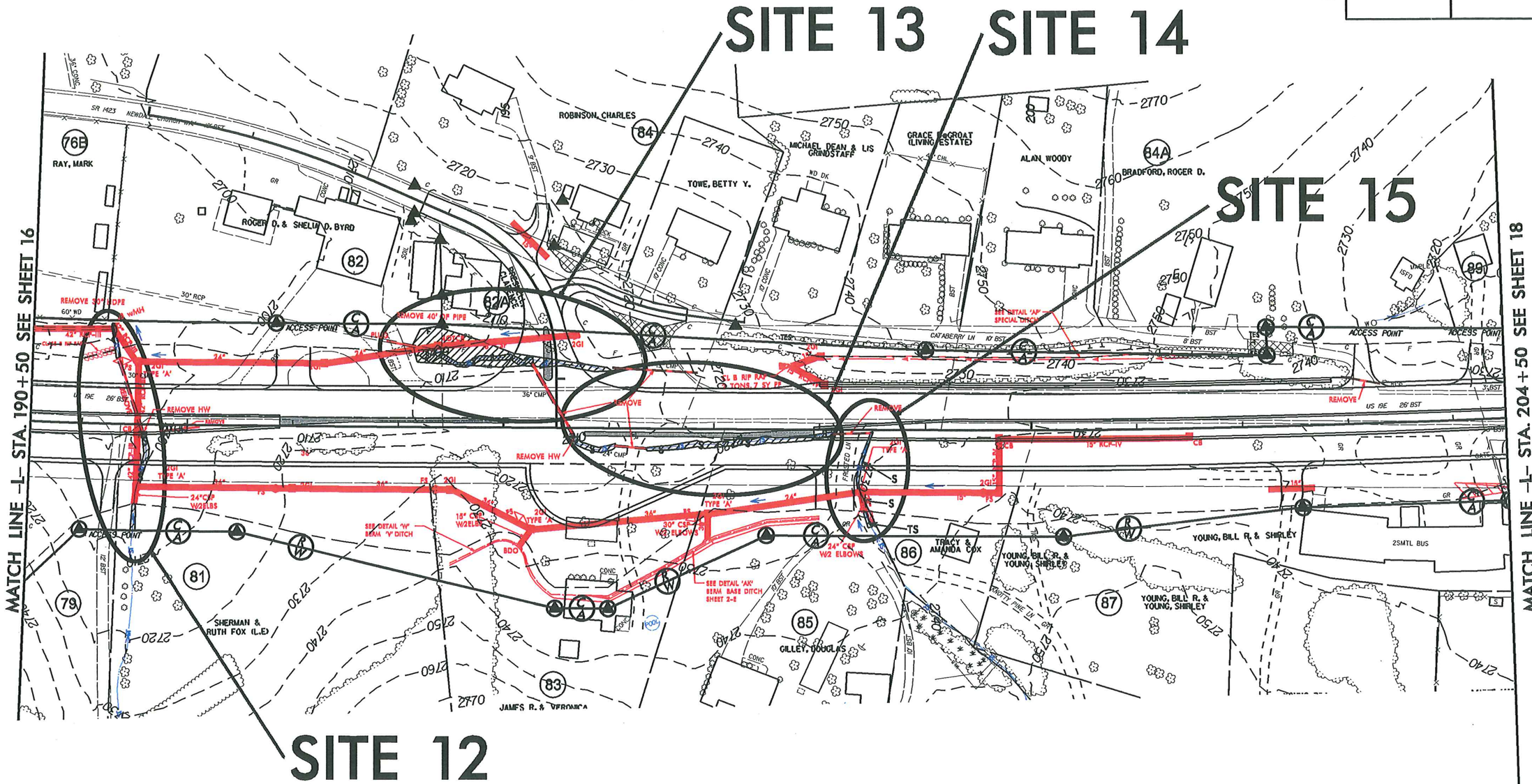
S S DENOTES IMPACTS IN SURFACE WATER

F F DENOTES FILL IN WETLAND

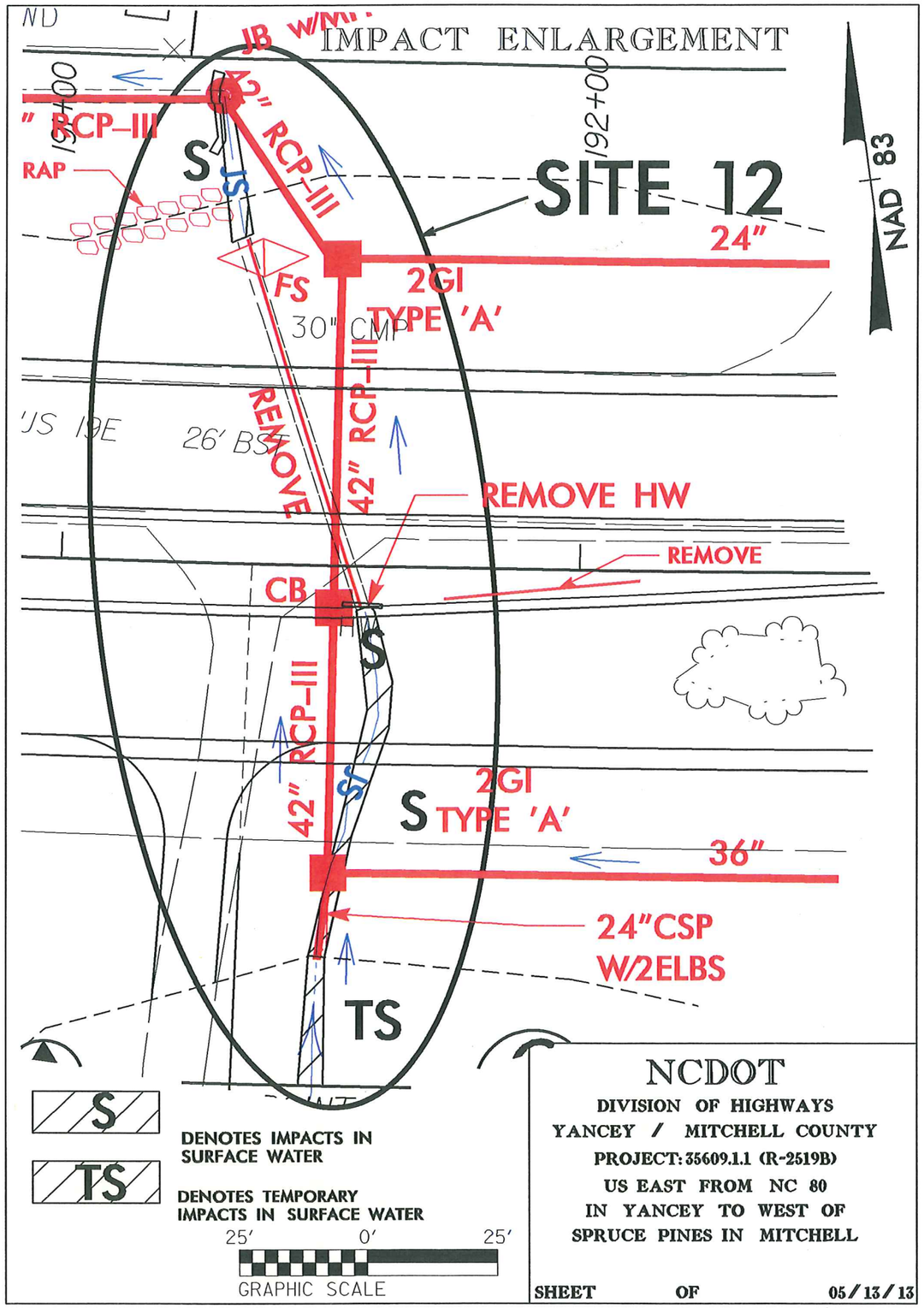
TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83

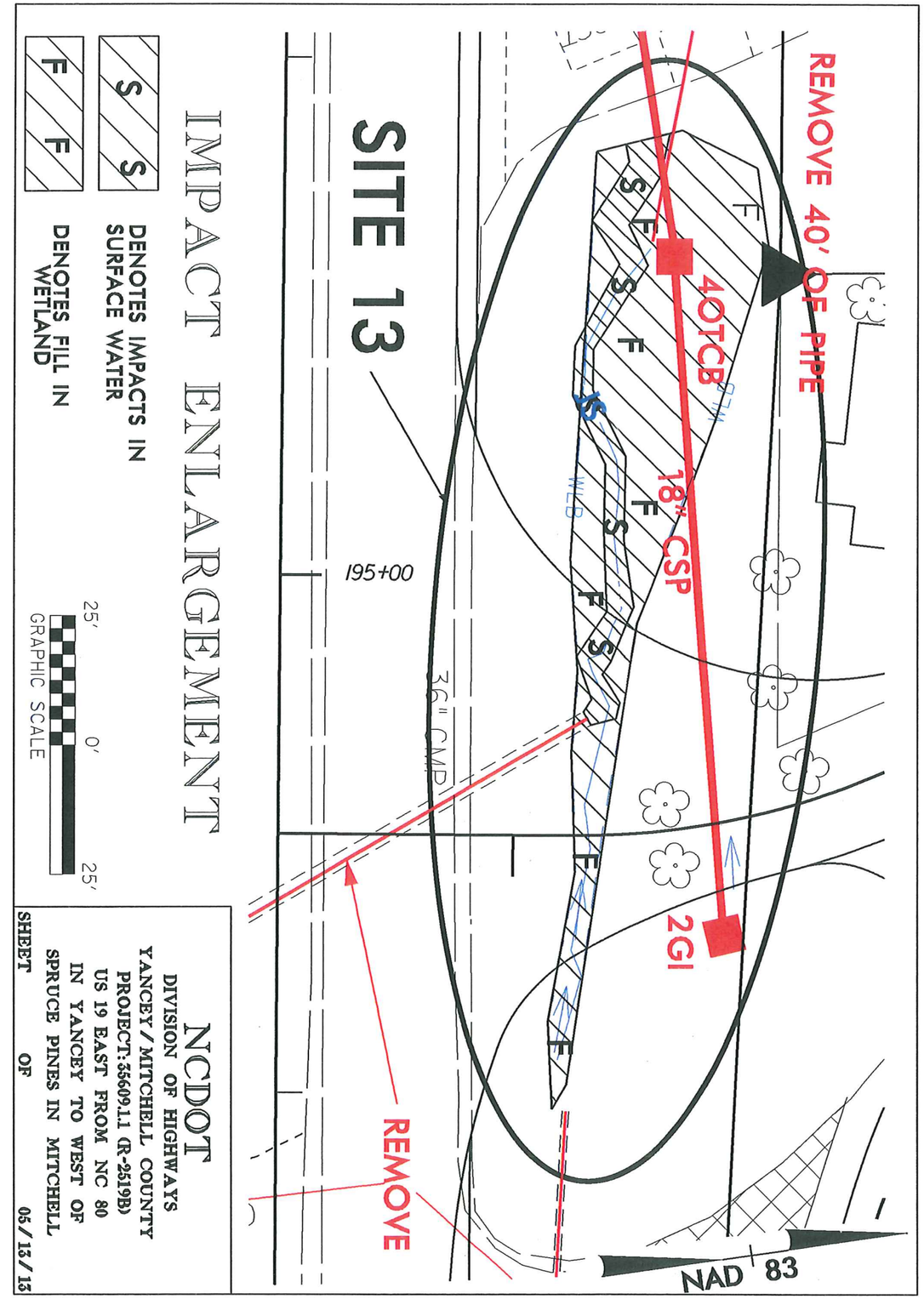


Permit Drawing
Sheet 49 of 114



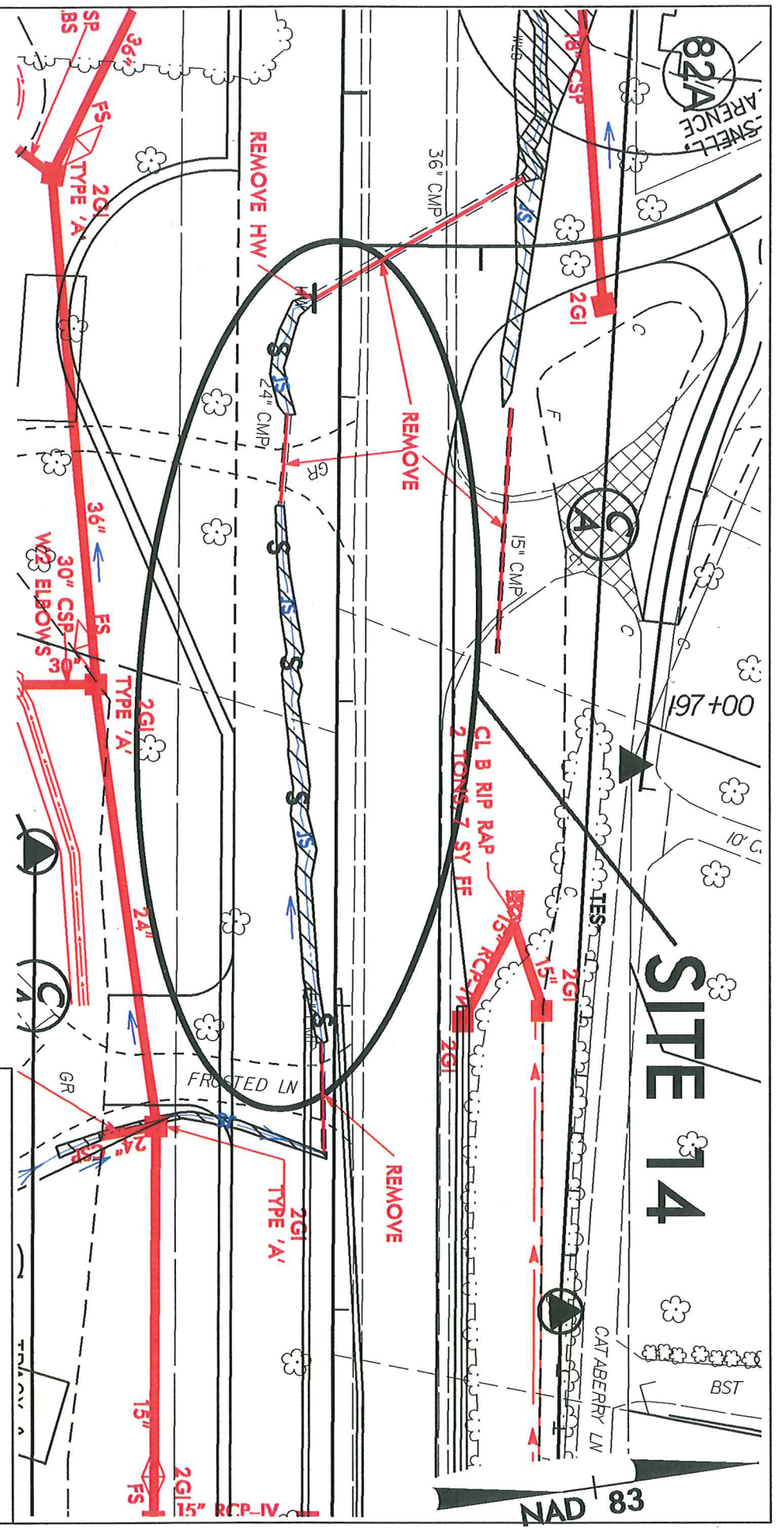
NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



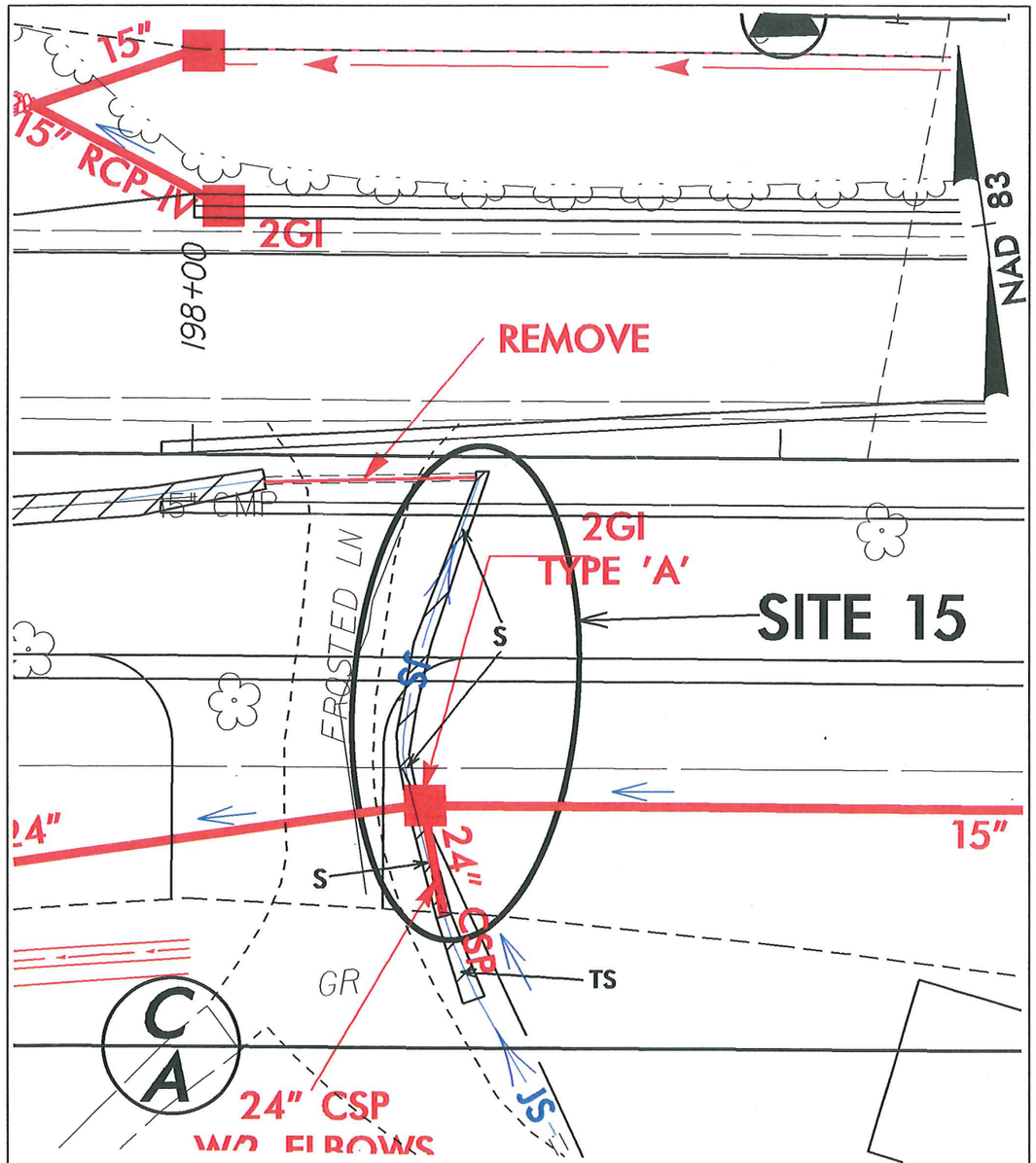
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

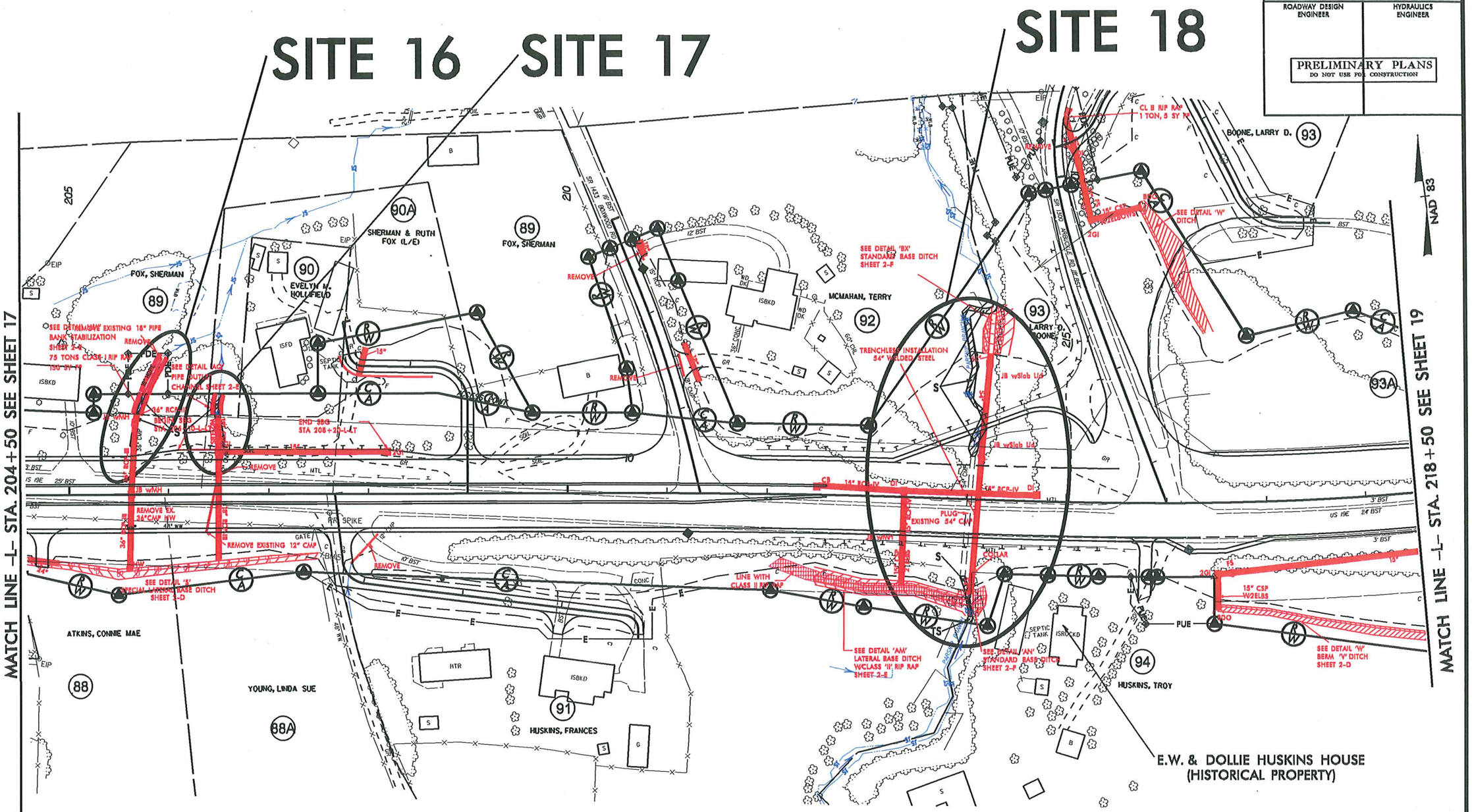
25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
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REVISIONS

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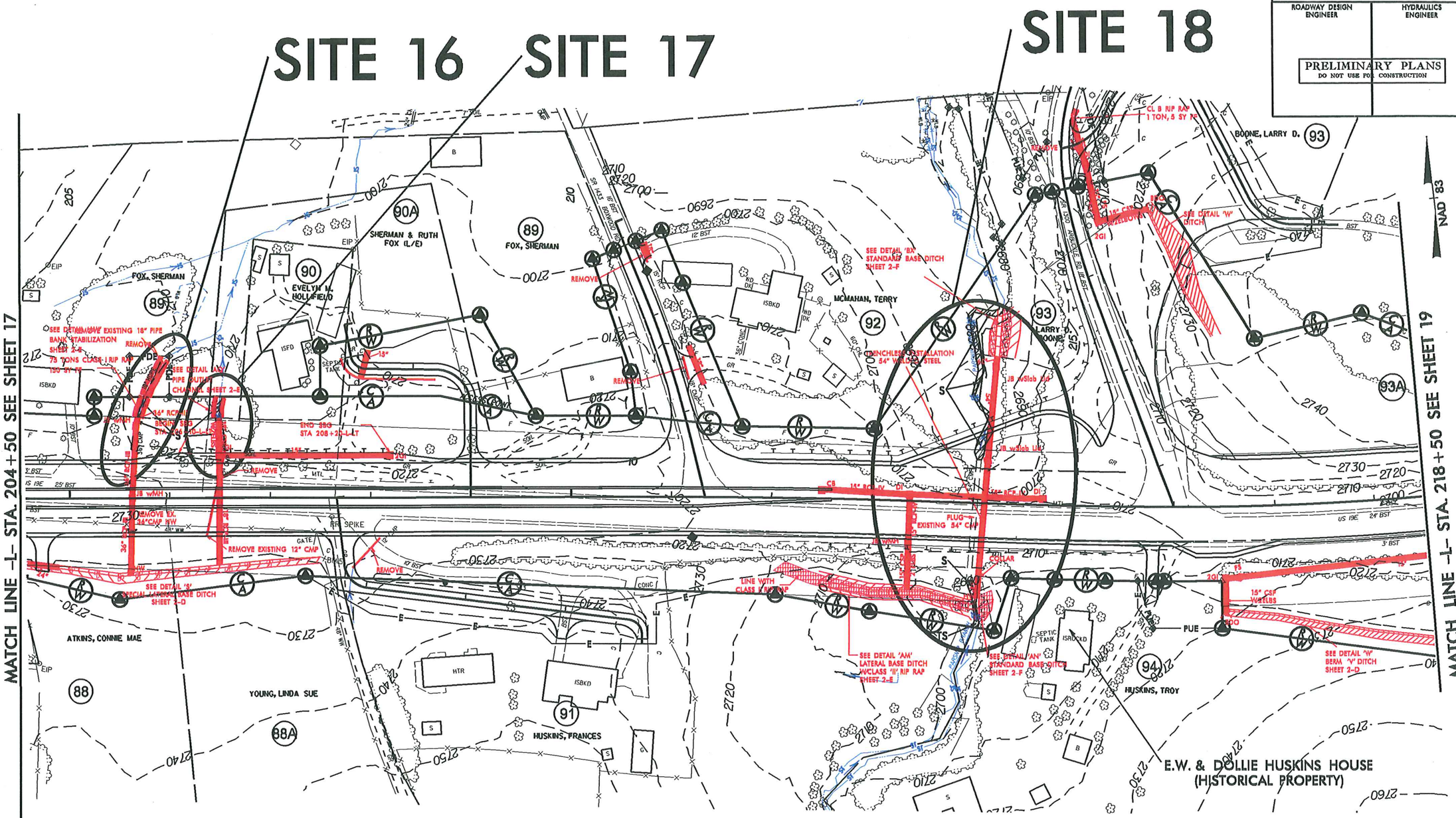
$$$$$SYSTIME$$$$$
$$$$$DGN$$$$$
$$$$$USERNAME$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



S DENOTES IMPACTS IN SURFACE WATER

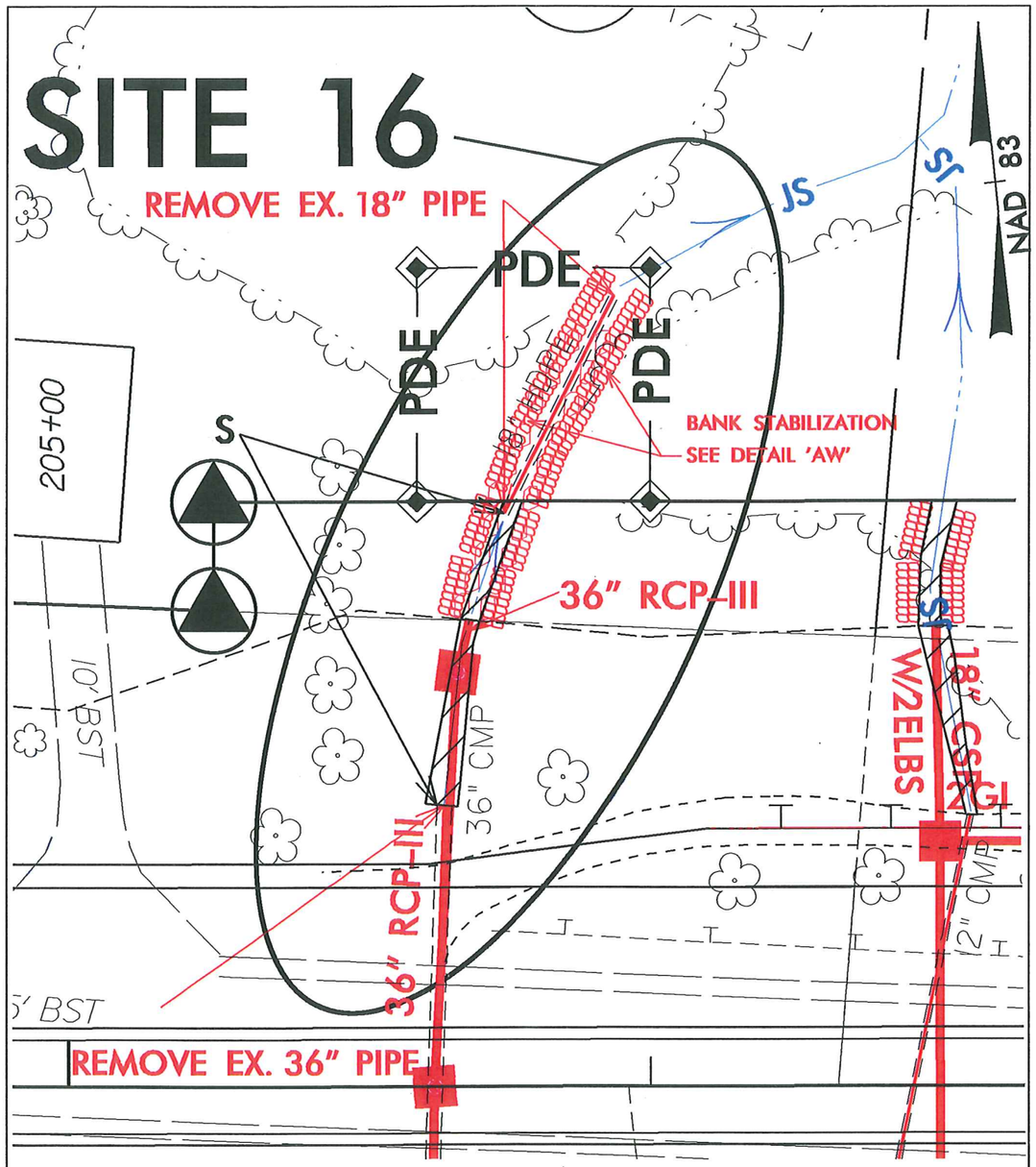
TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

REVISIONS

8/17/99

Permit Drawing
Sheet 52 of 114



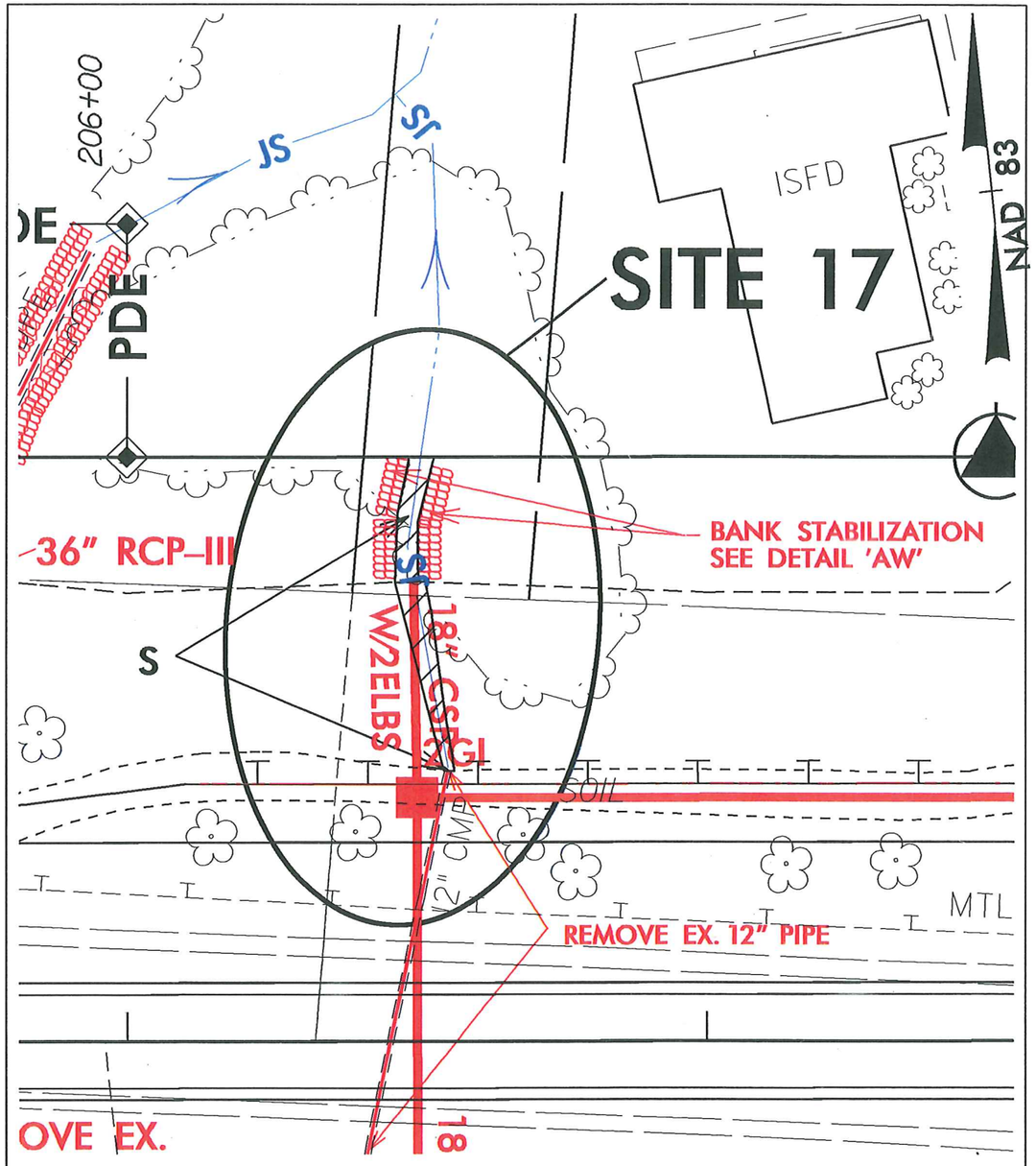
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



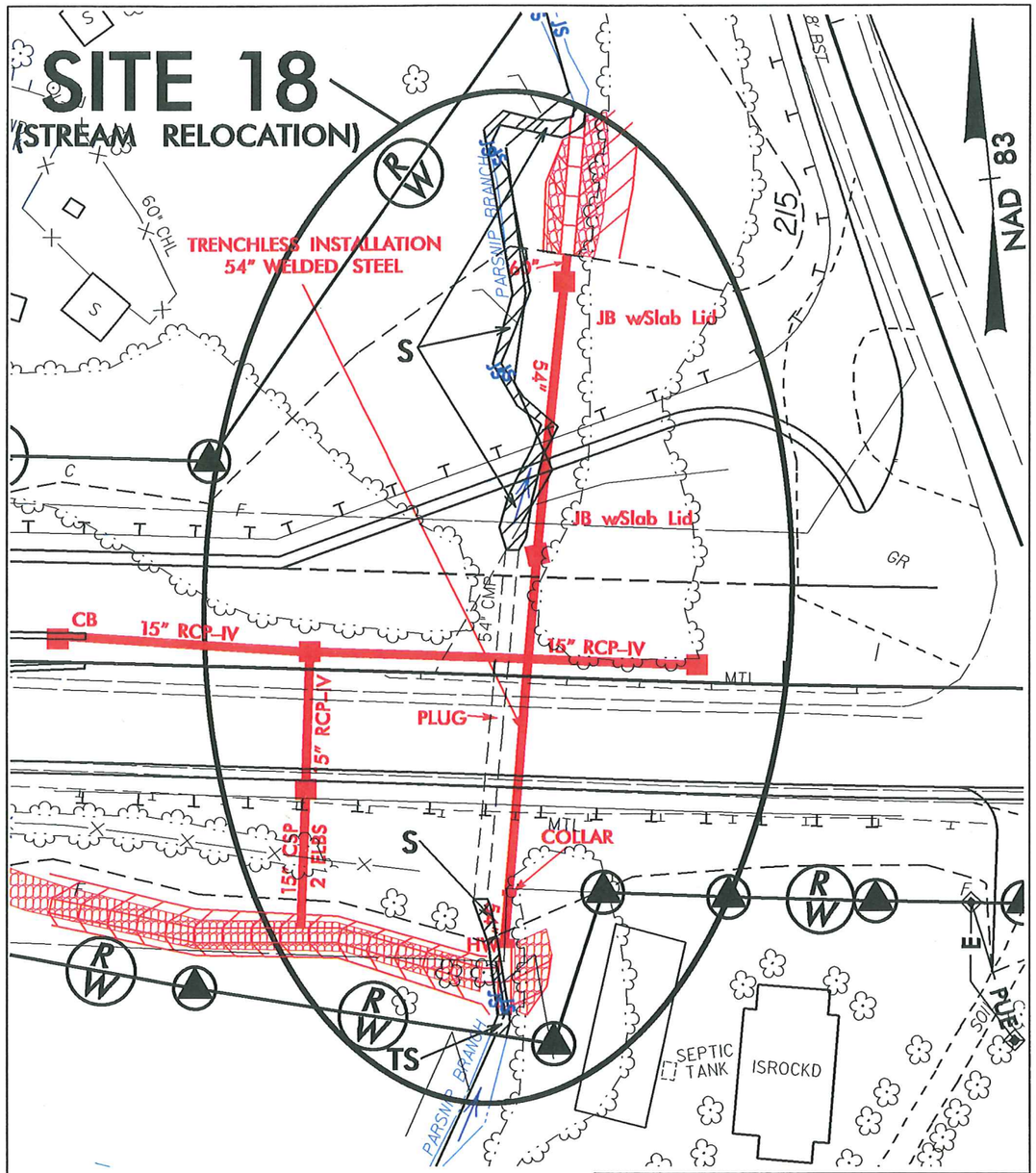
IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

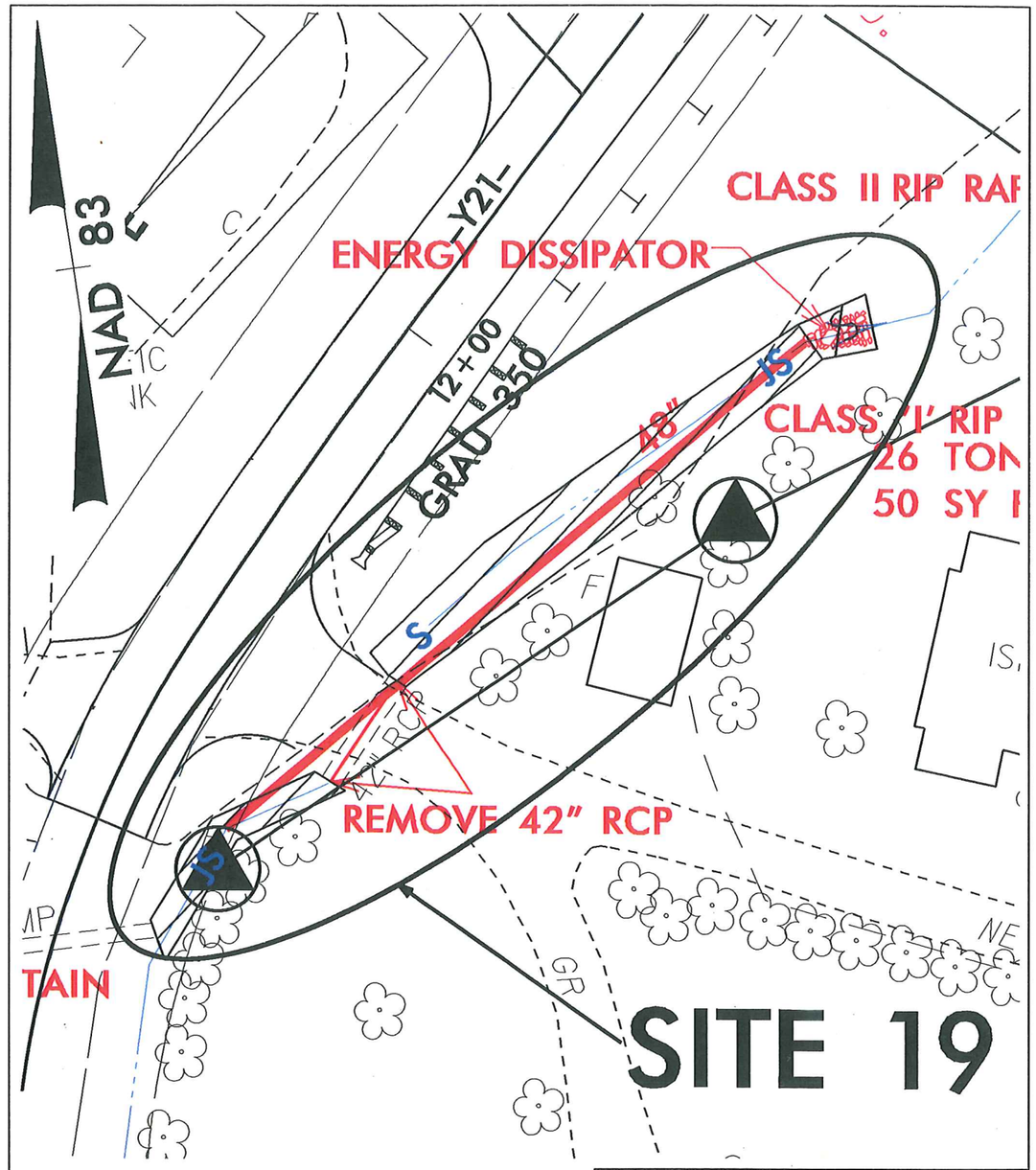
S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

S DENOTES IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13

Permit Drawing
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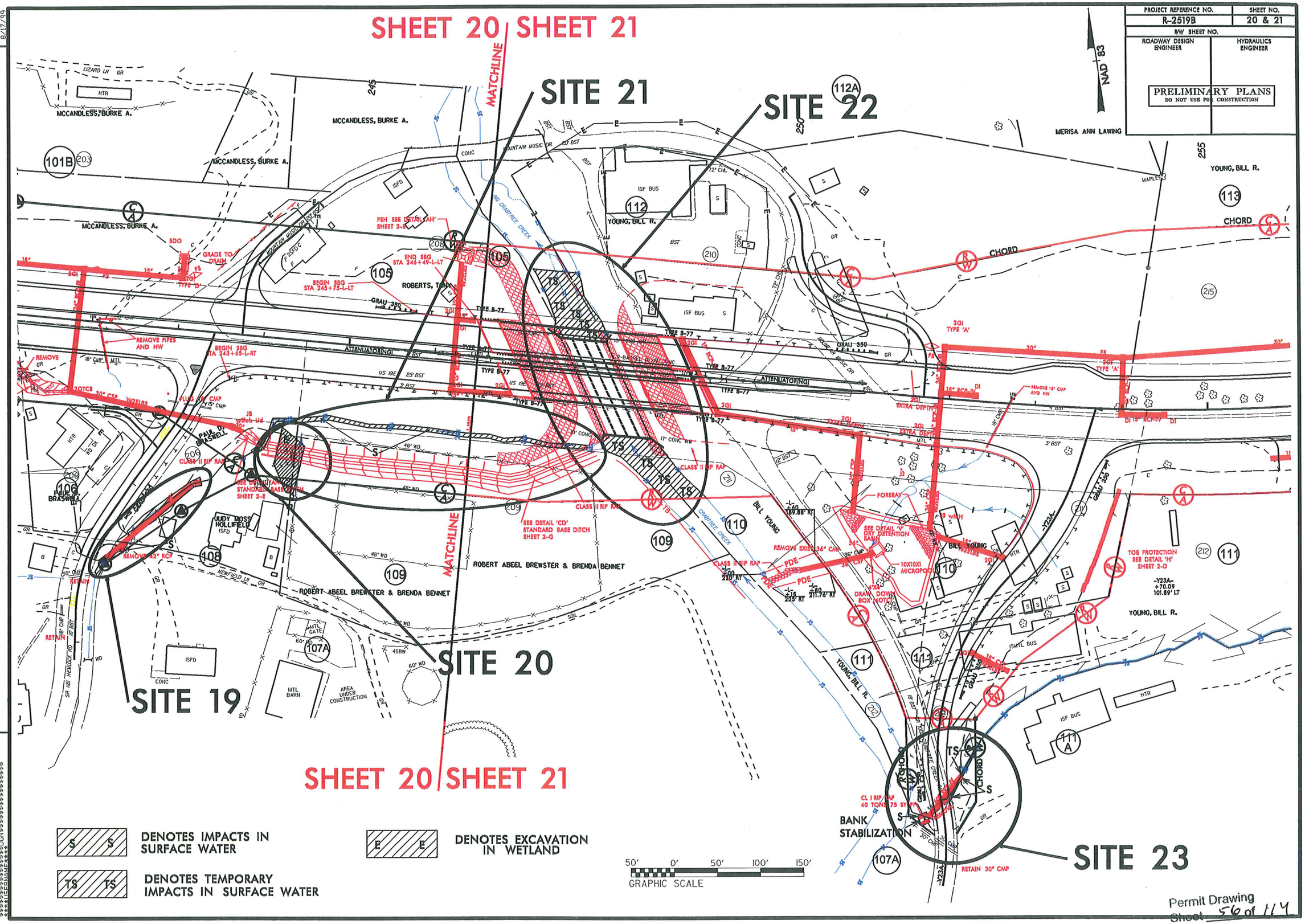
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	20 & 21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

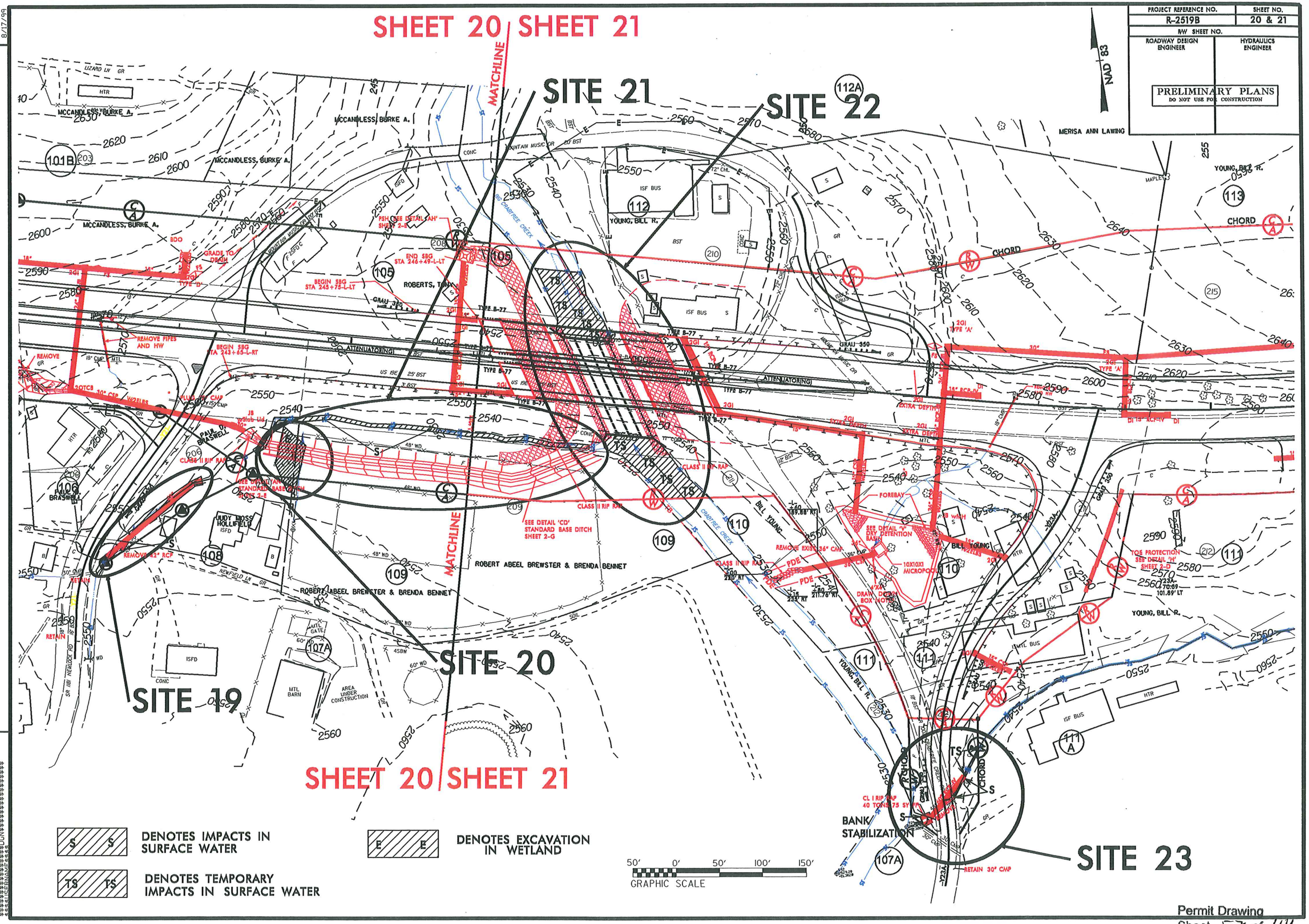
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 56 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	20 & 21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
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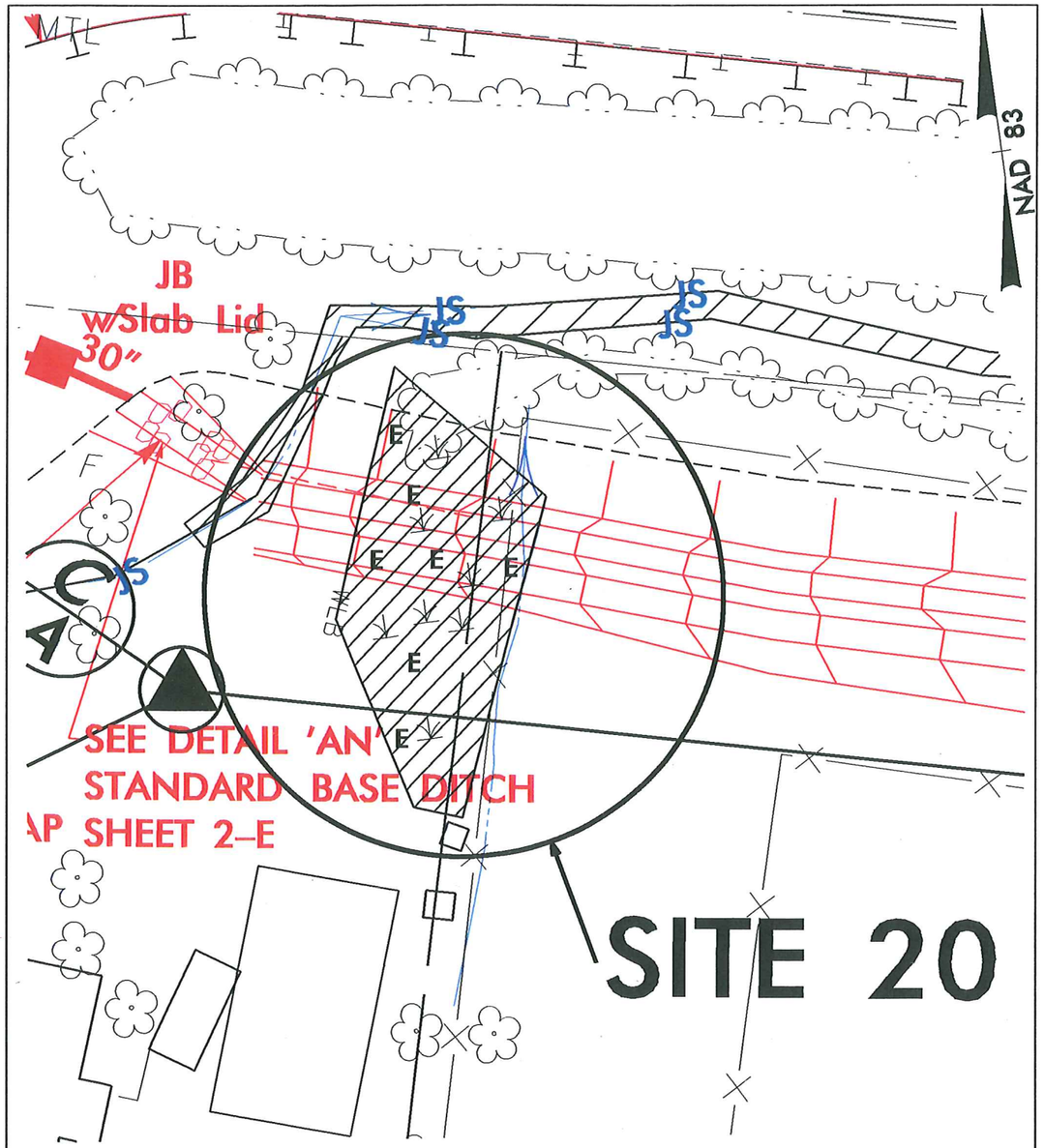


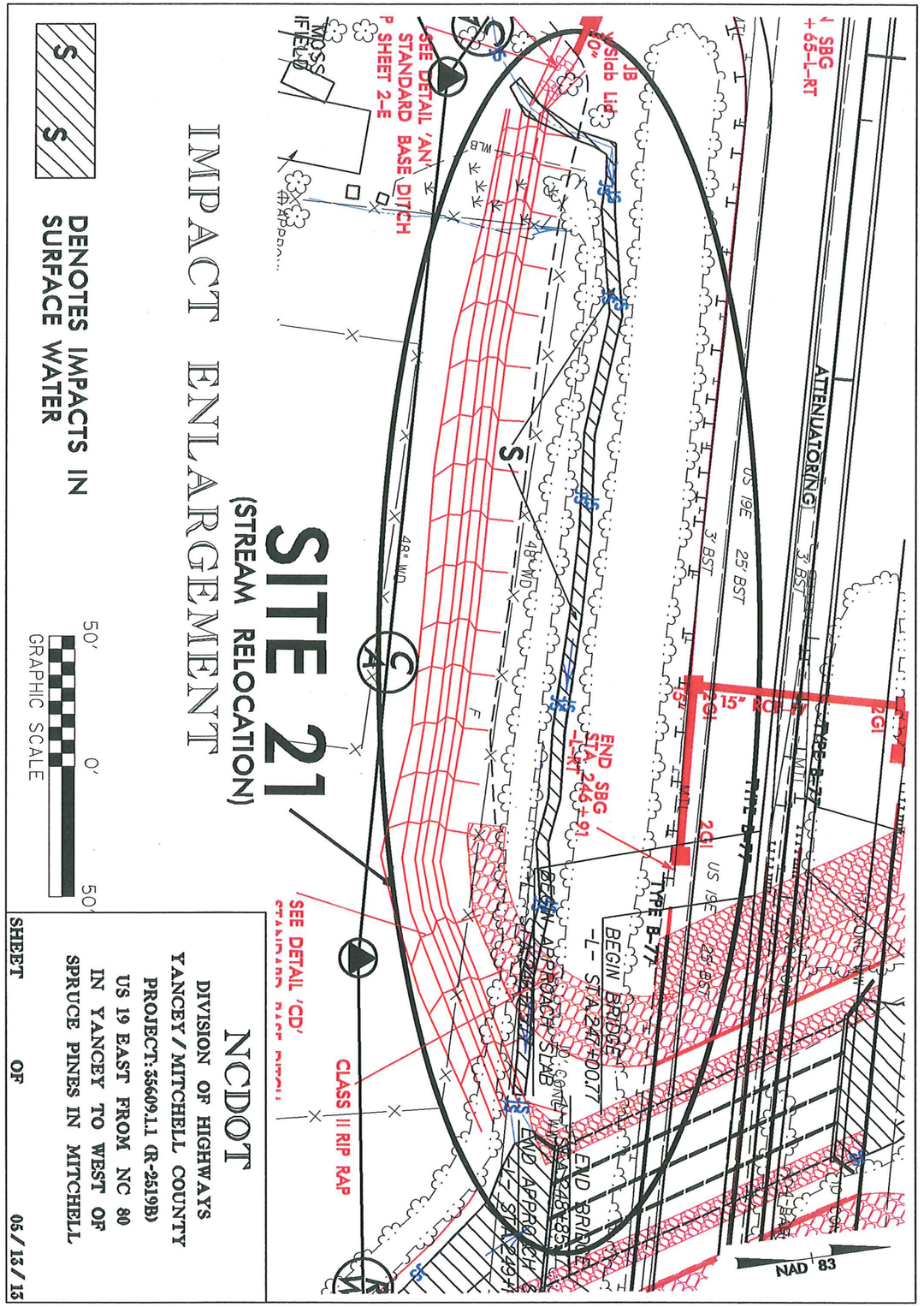
IMPACT ENLARGEMENT

E E DENOTES EXCAVATION IN WETLAND

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



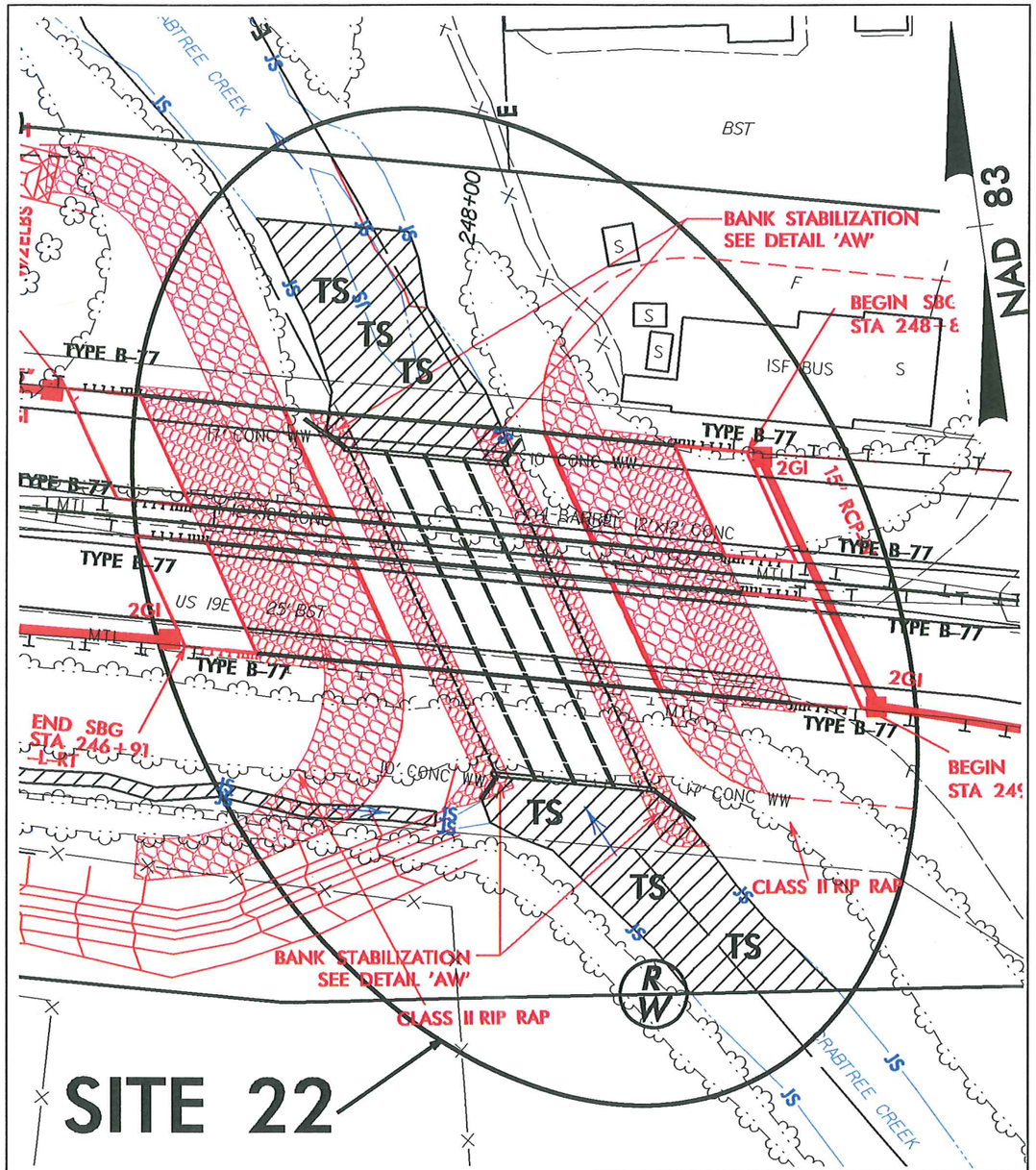
S S DENOTES IMPACTS IN SURFACE WATER

IMPACT ENLARGEMENT

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

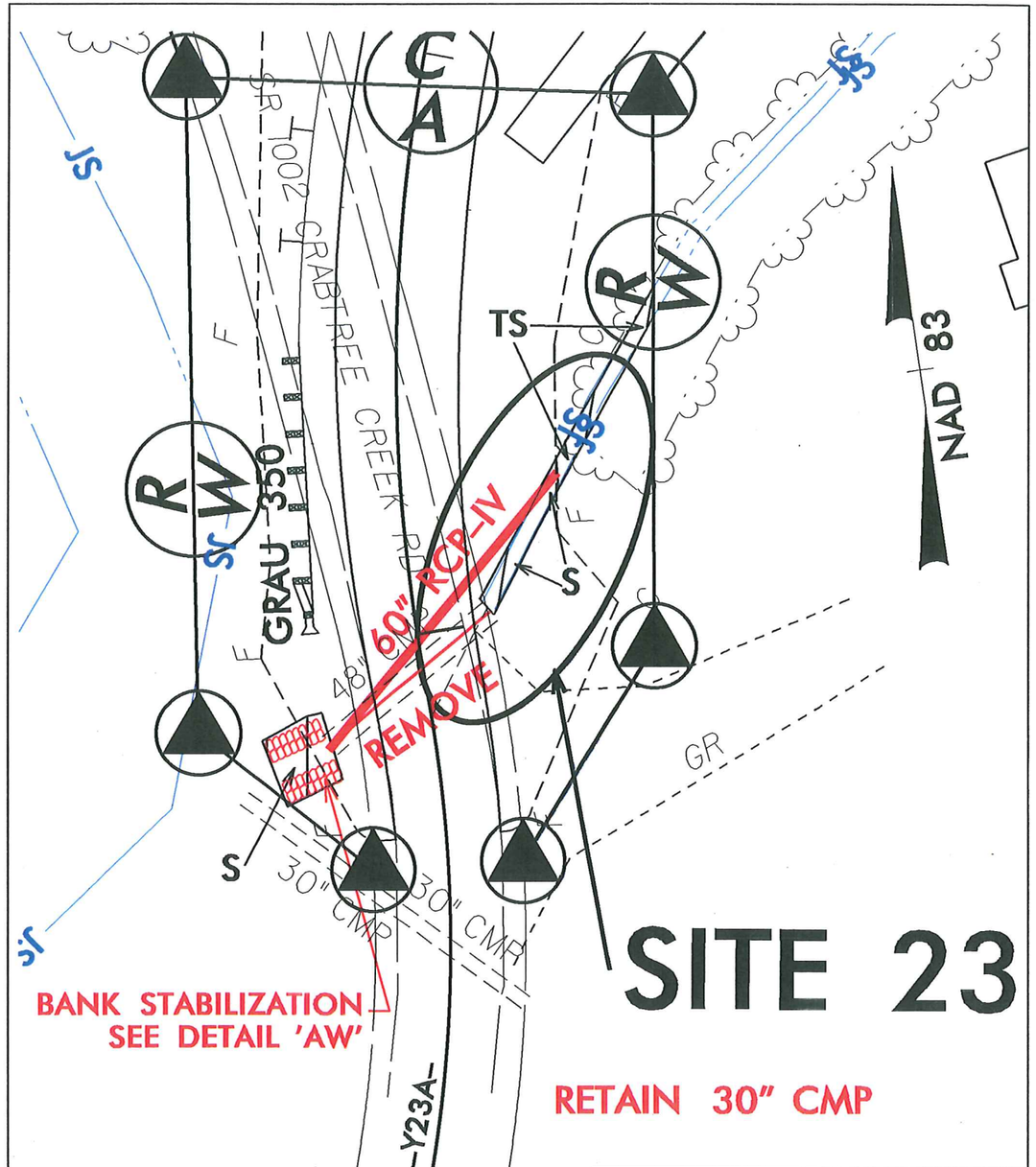
S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

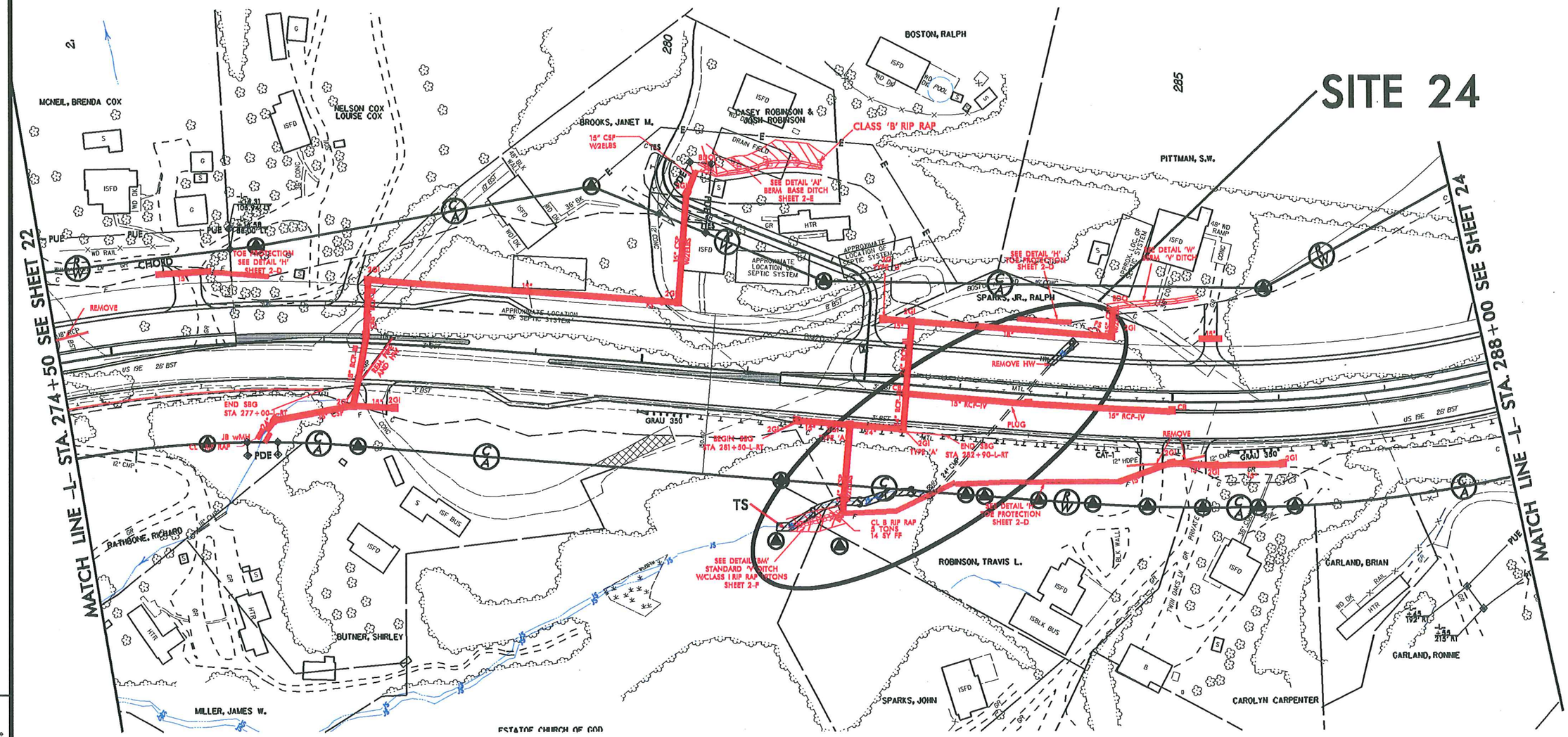
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS

SITE 24



S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 60 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

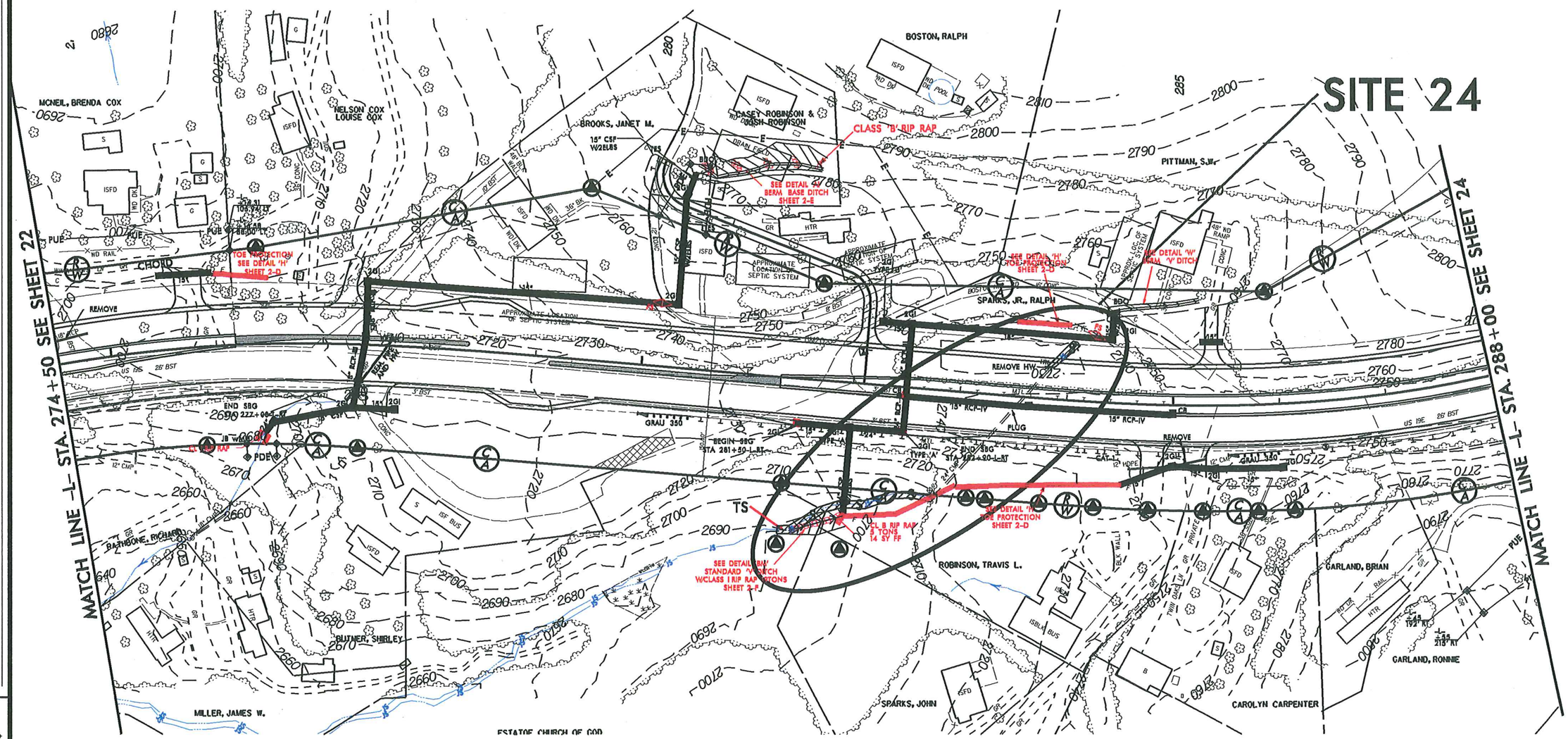
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS



DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
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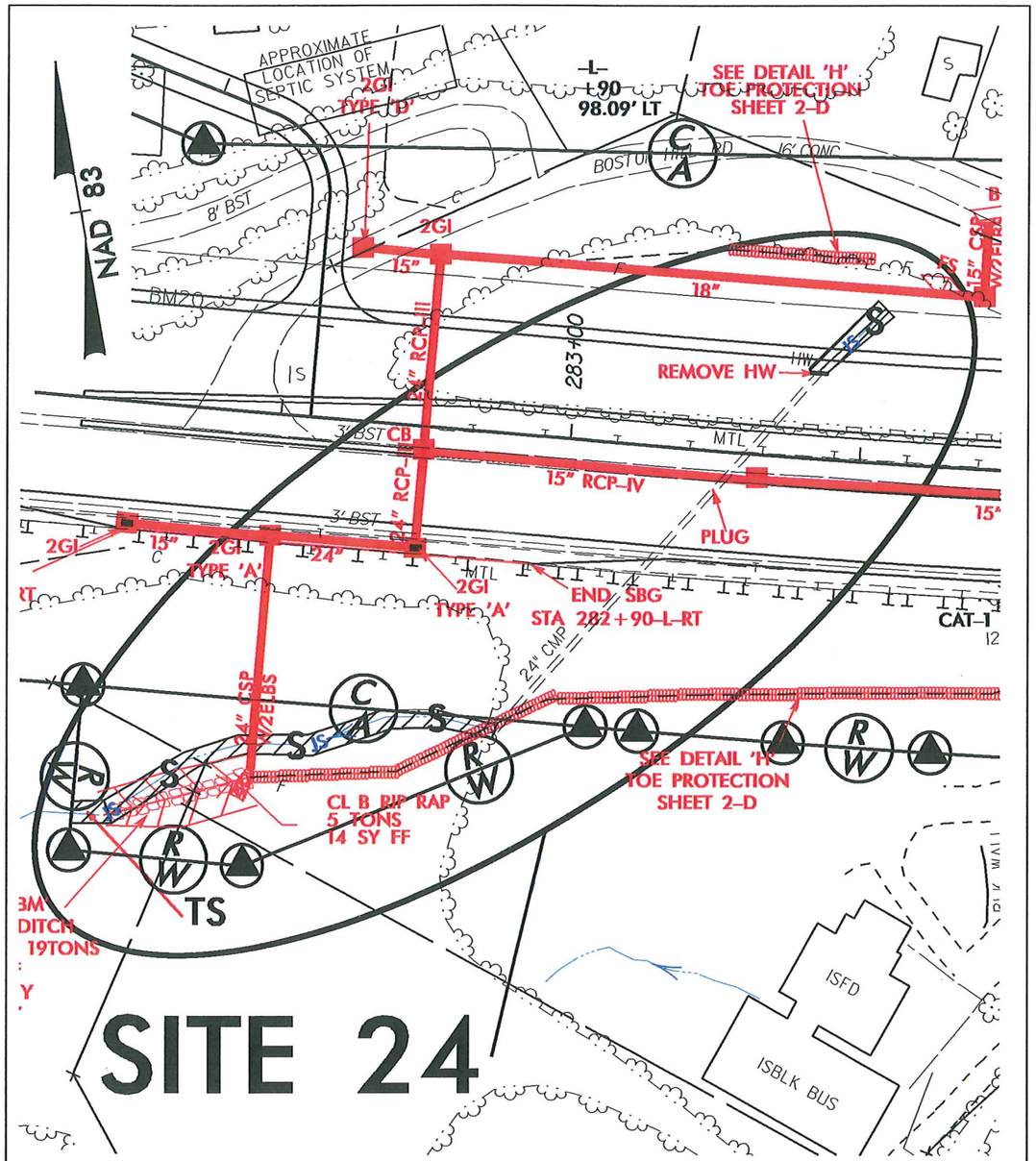


IMPACT ENLARGEMENT

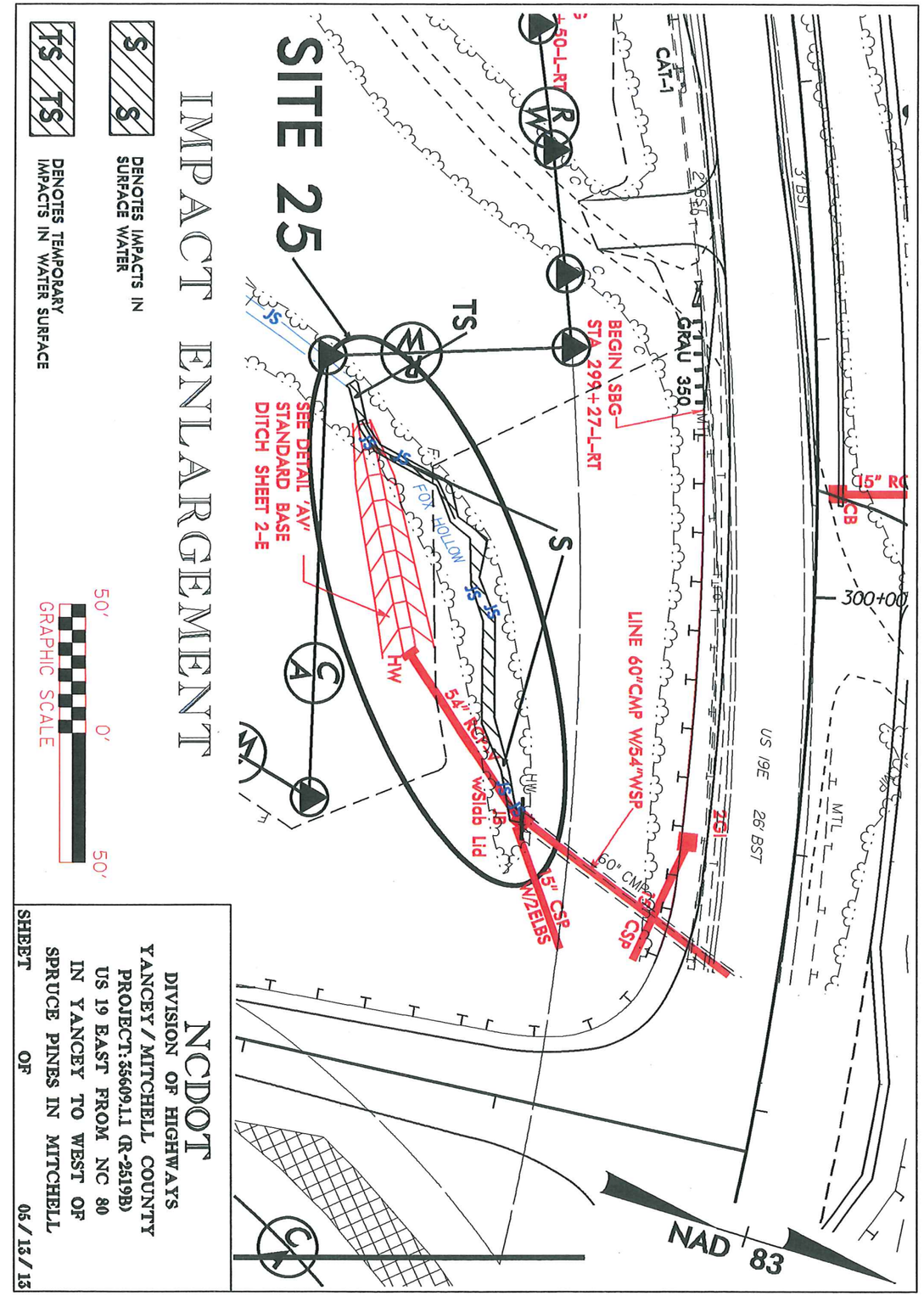
S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY/MITCHELL COUNTRY
PROJECT:35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

TS/TS DENOTES TEMPORARY IMPACTS IN WATER SURFACE

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY/MITCHELL COUNTY
PROJECT:35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

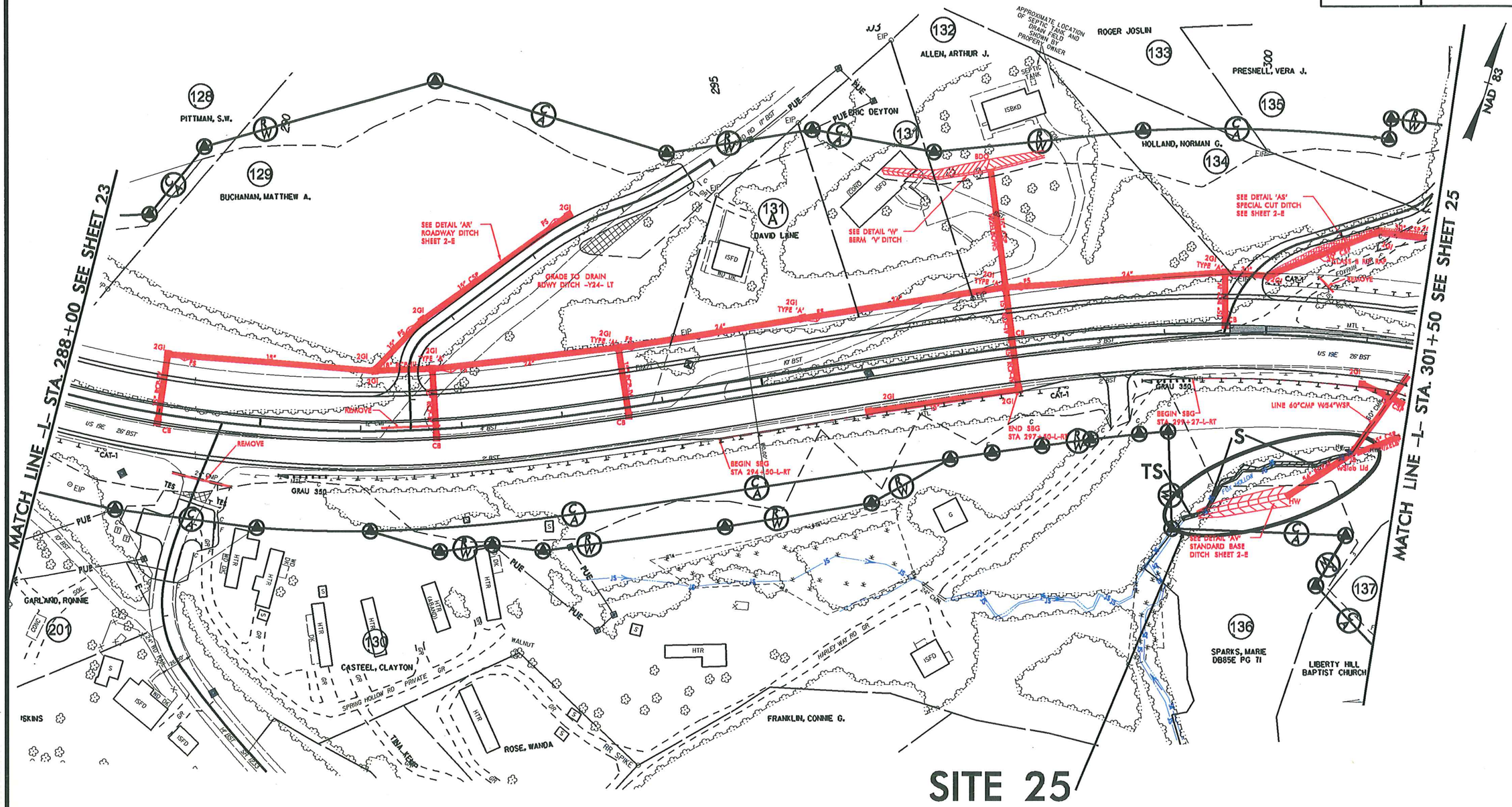
SHEET OF 05/13/13

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	24
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



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
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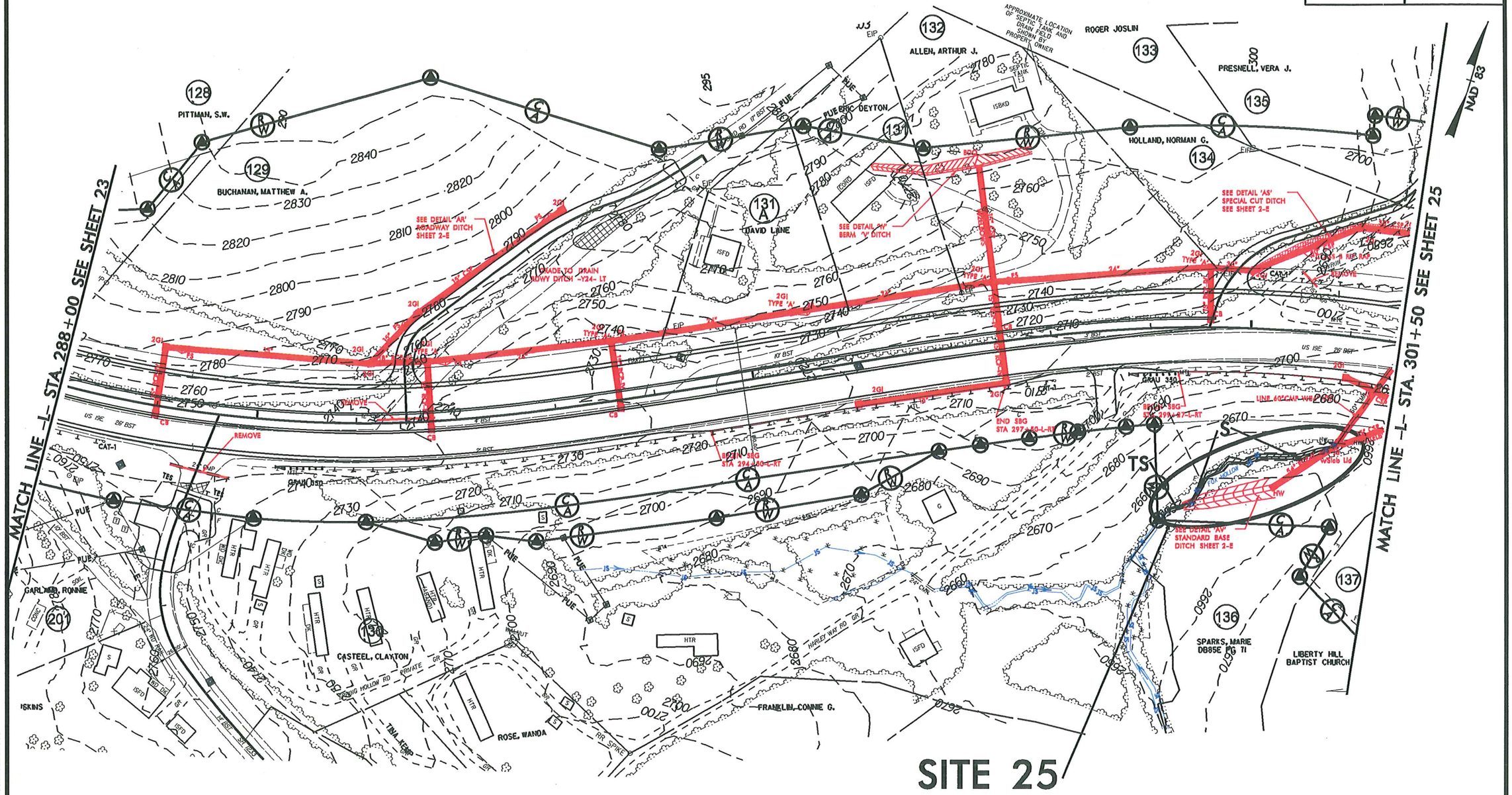
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	24
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



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 64 of 114

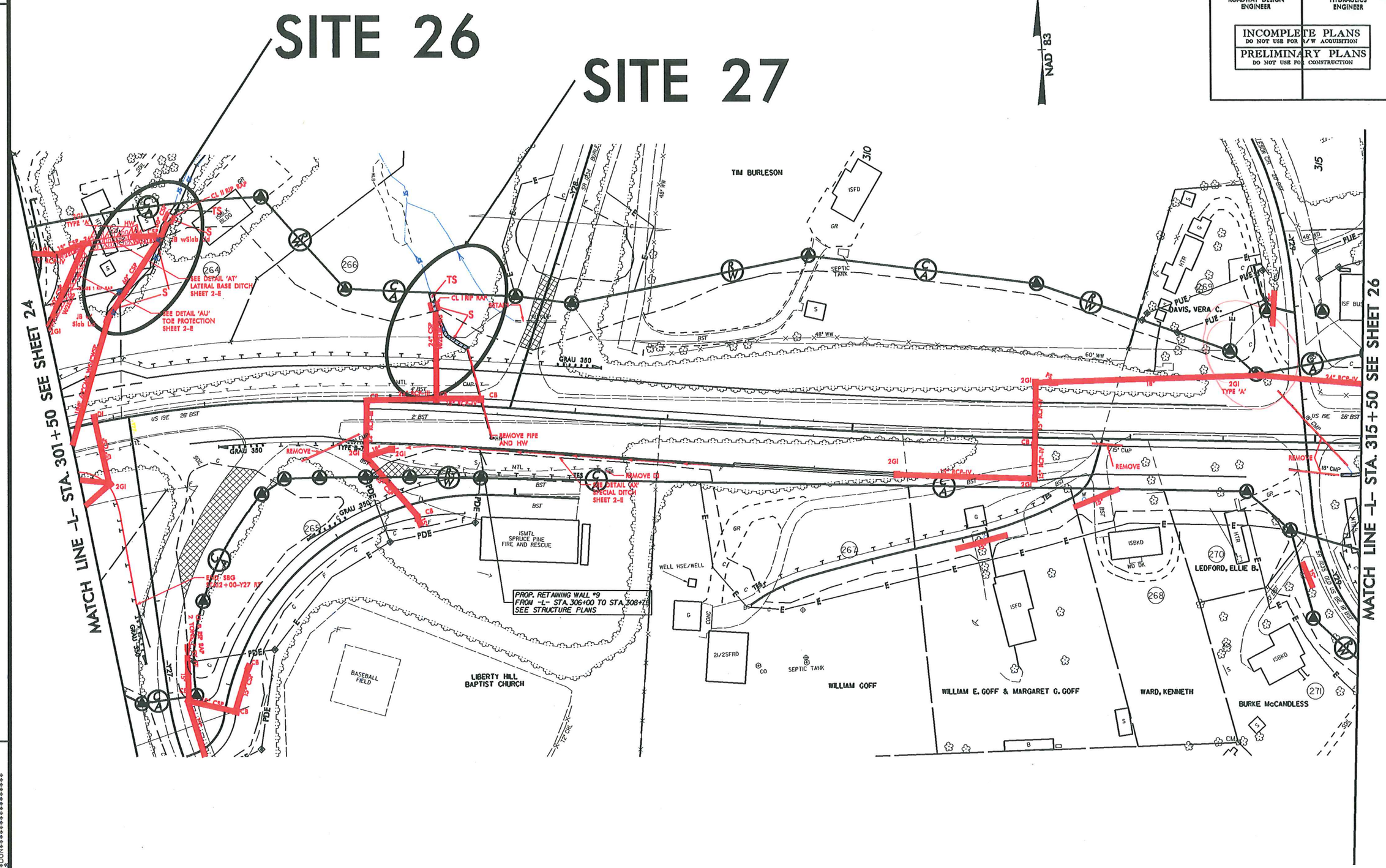
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



Permit Drawing
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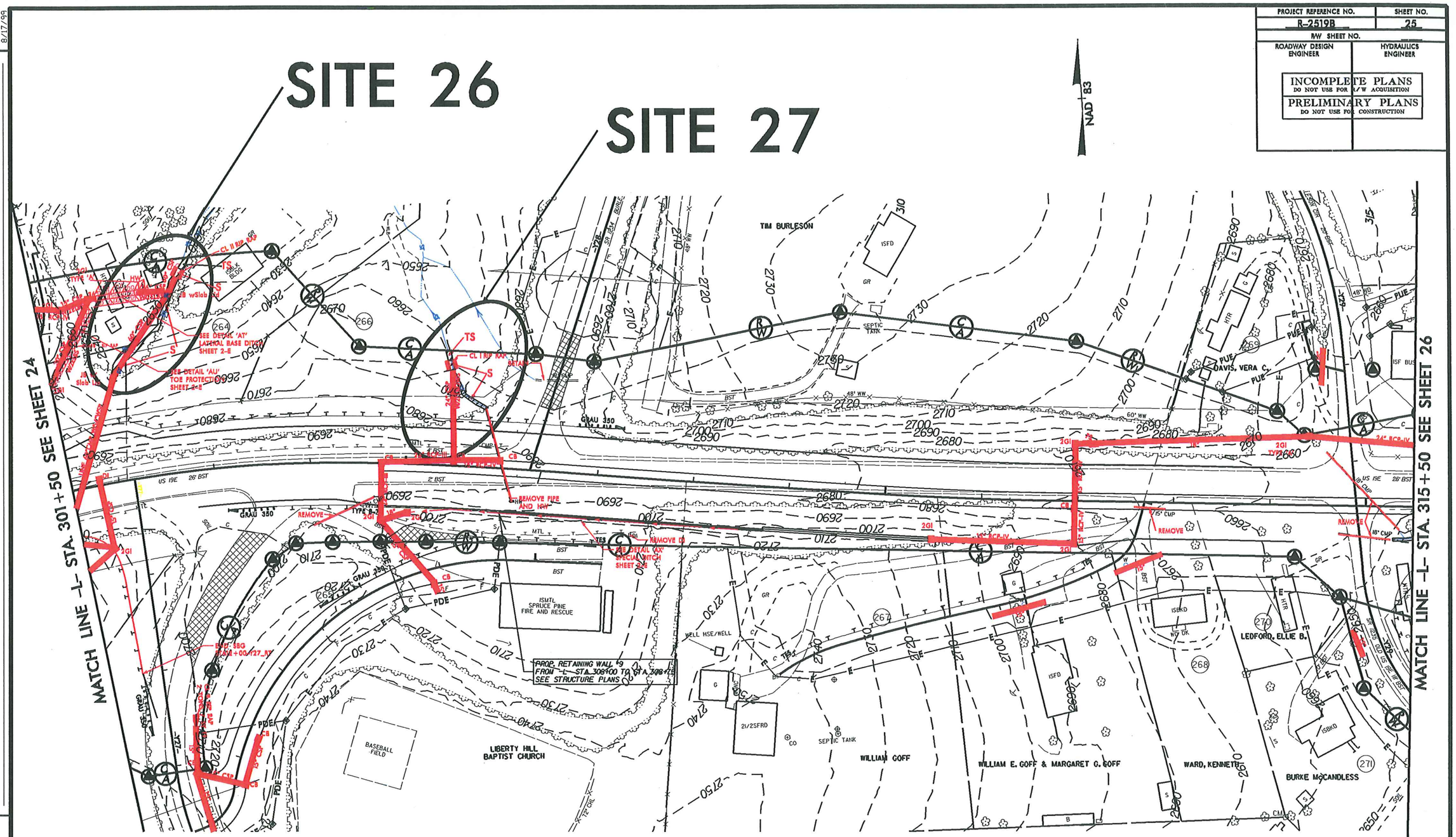
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

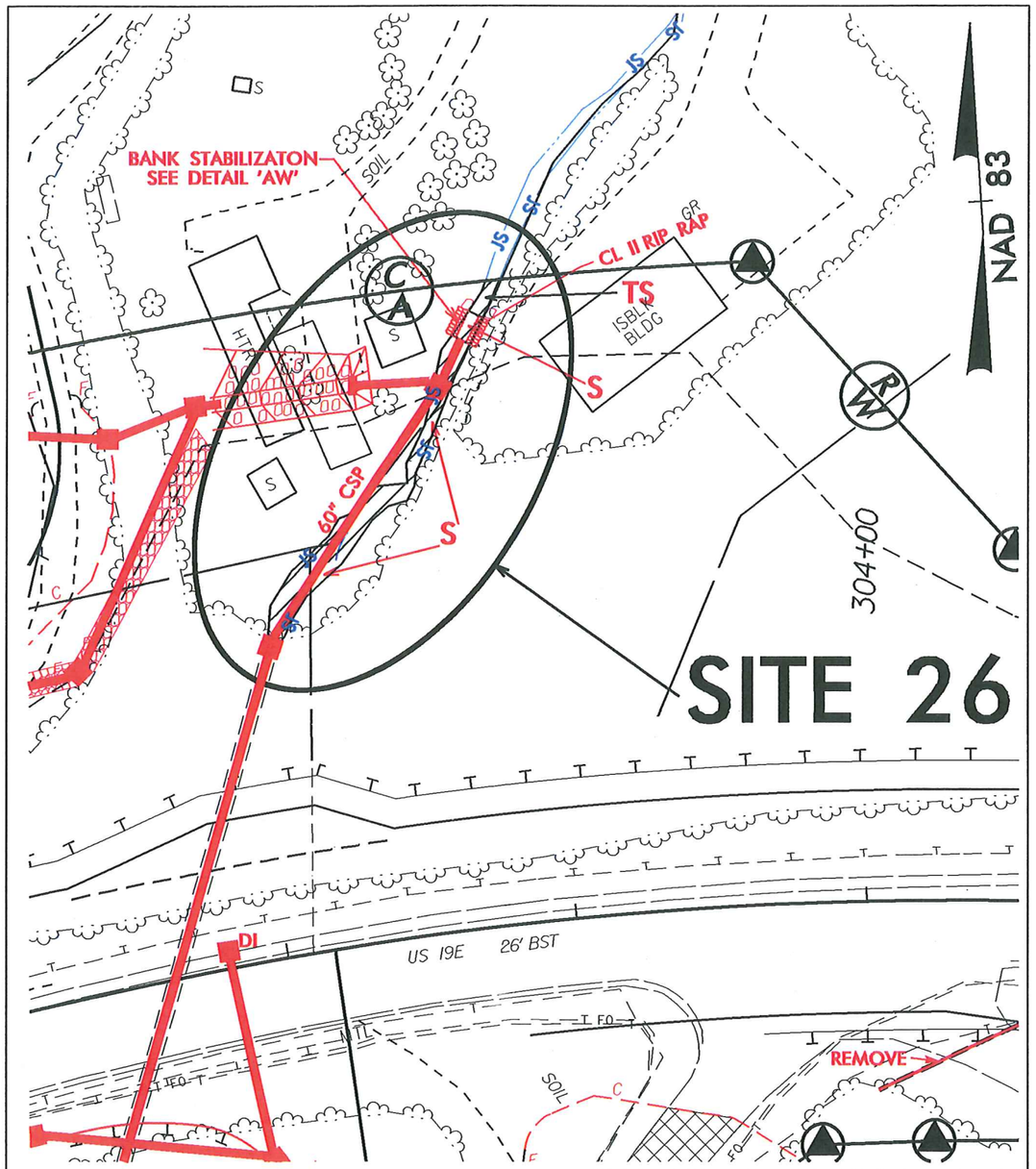


S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 66 of 114



IMPACT ENLARGEMENT

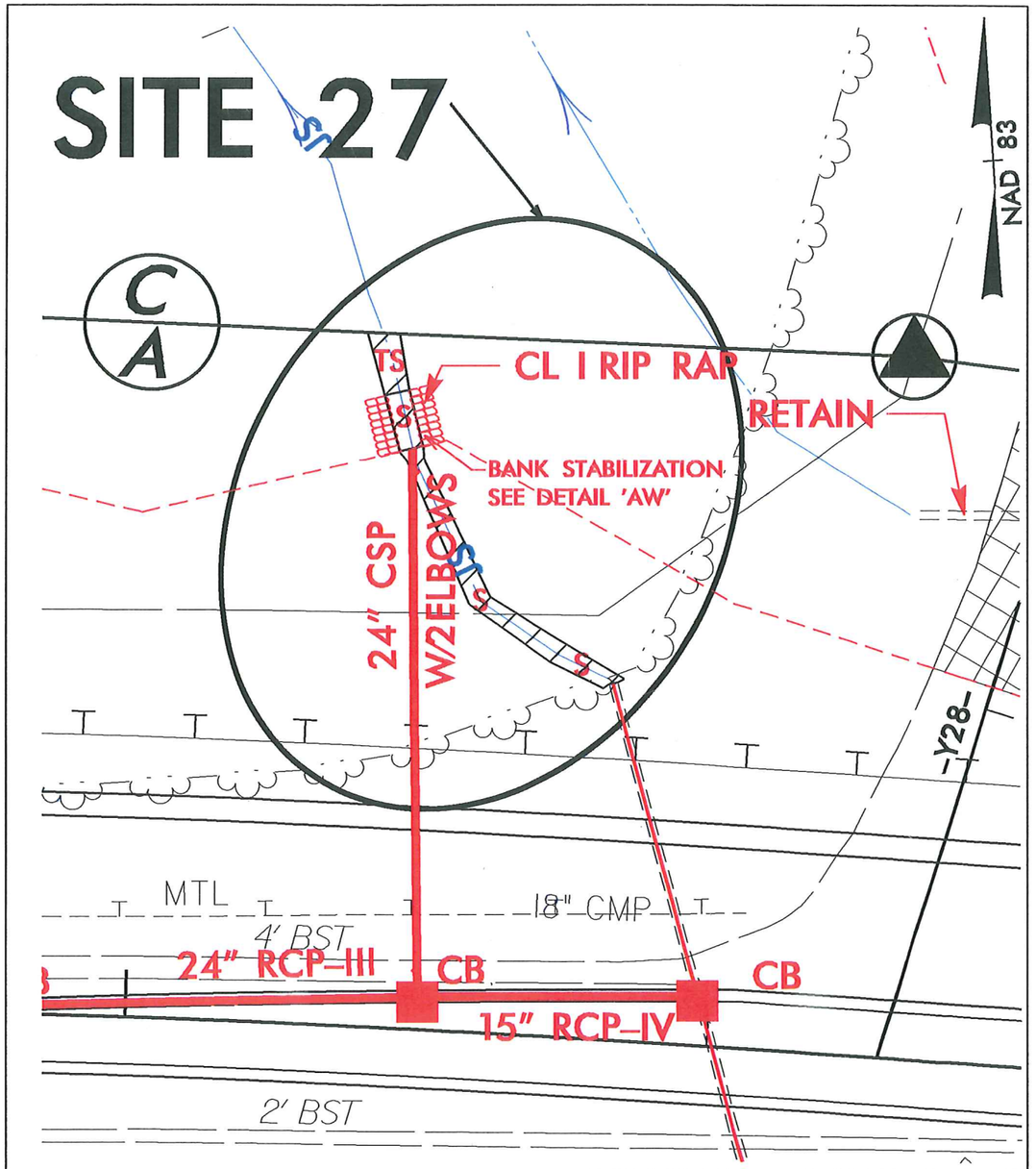
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13



IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/13/13

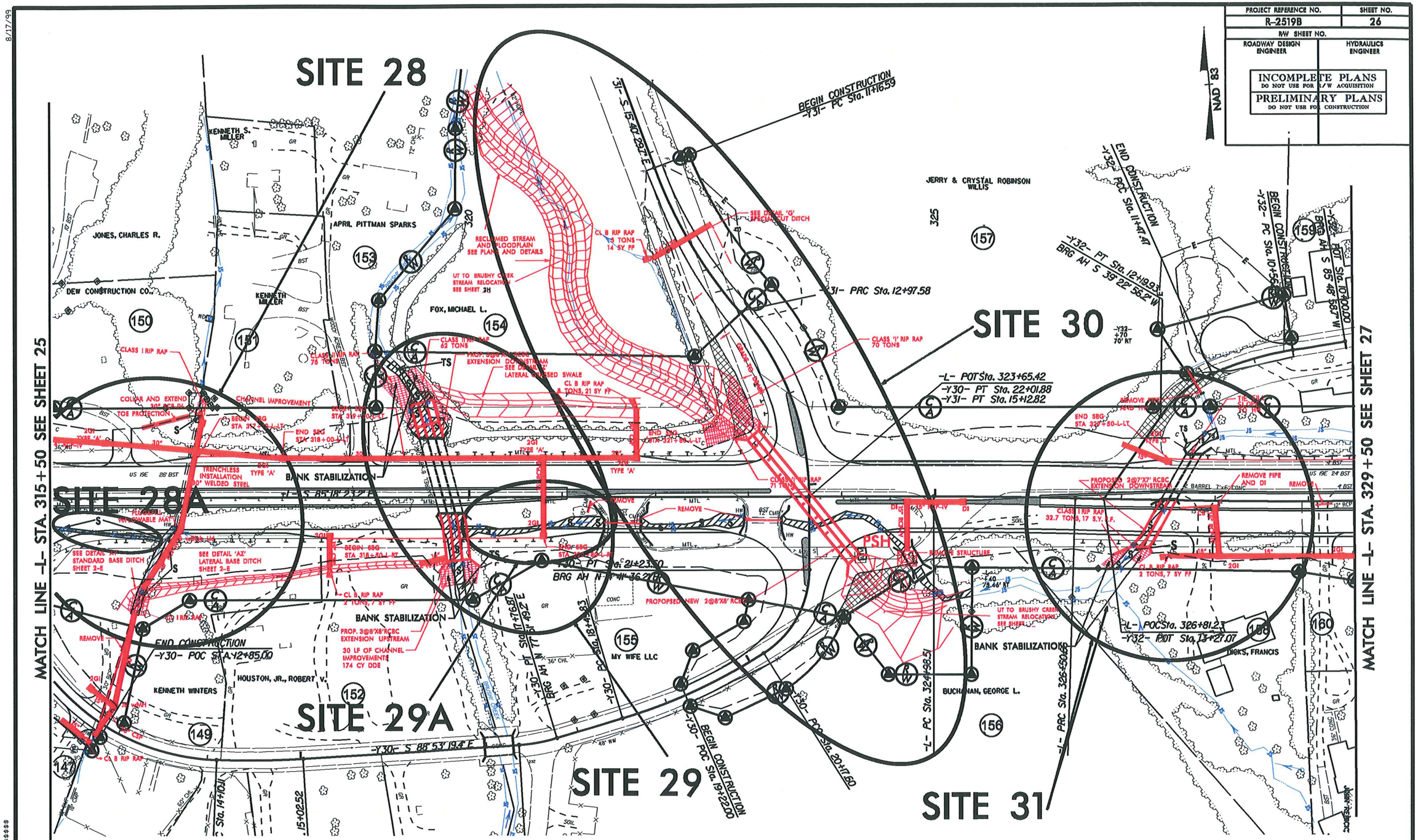
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
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

NAD 83



Permit Drawing
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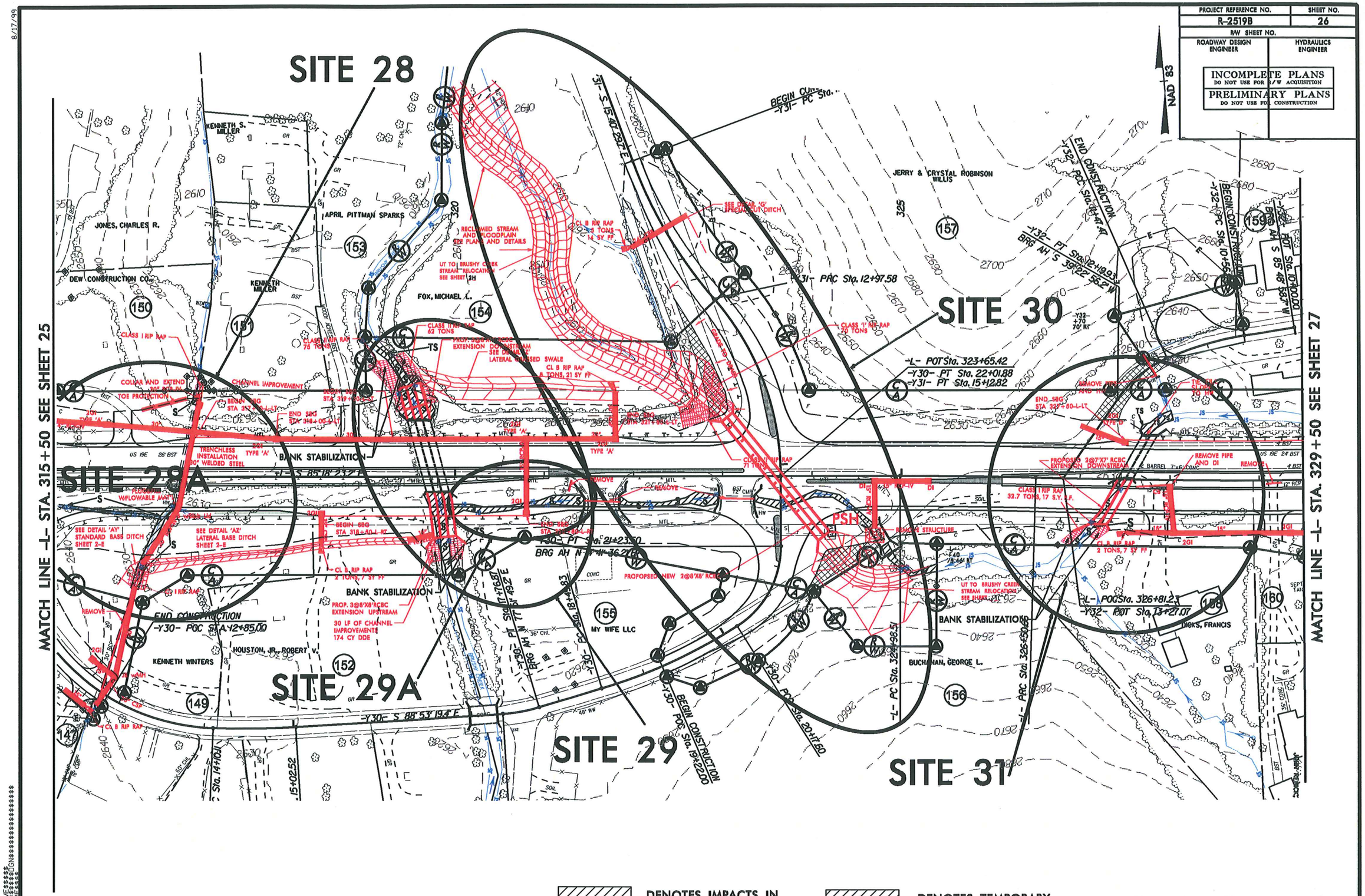
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
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



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
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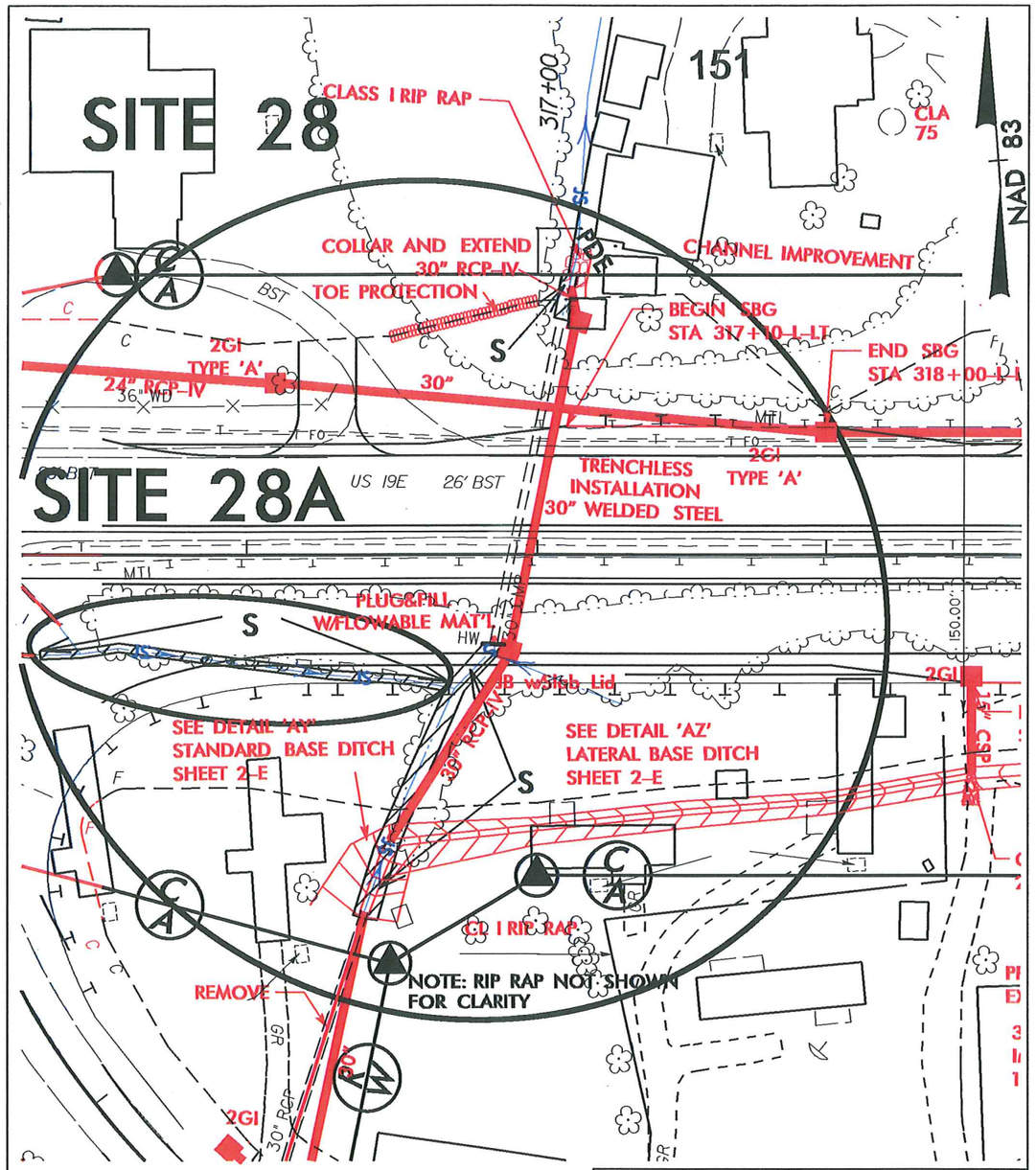


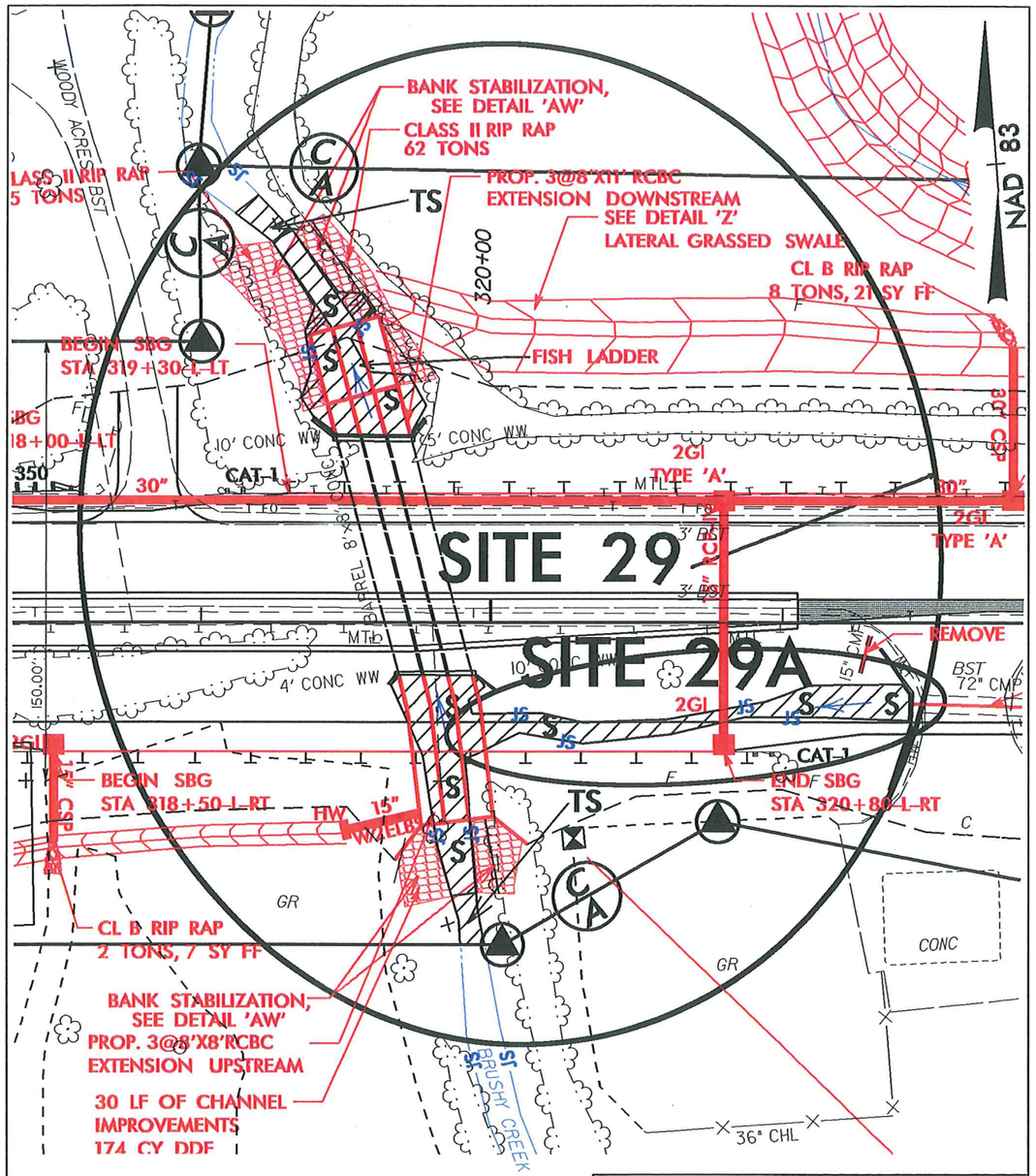
IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

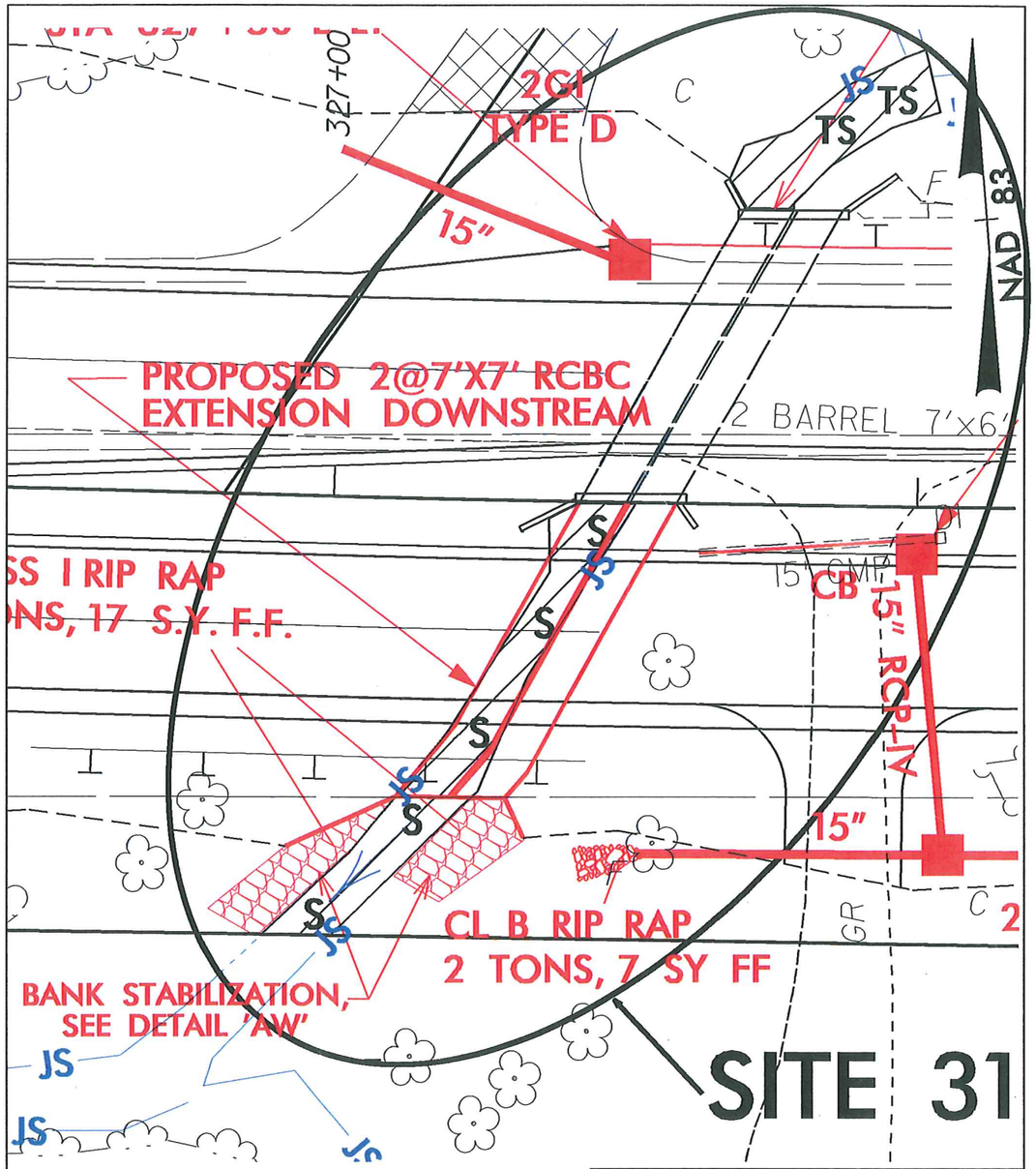
TS/TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13

Permit Drawing
Sheet 70 of 114



IMPACT ENLARGEMENT

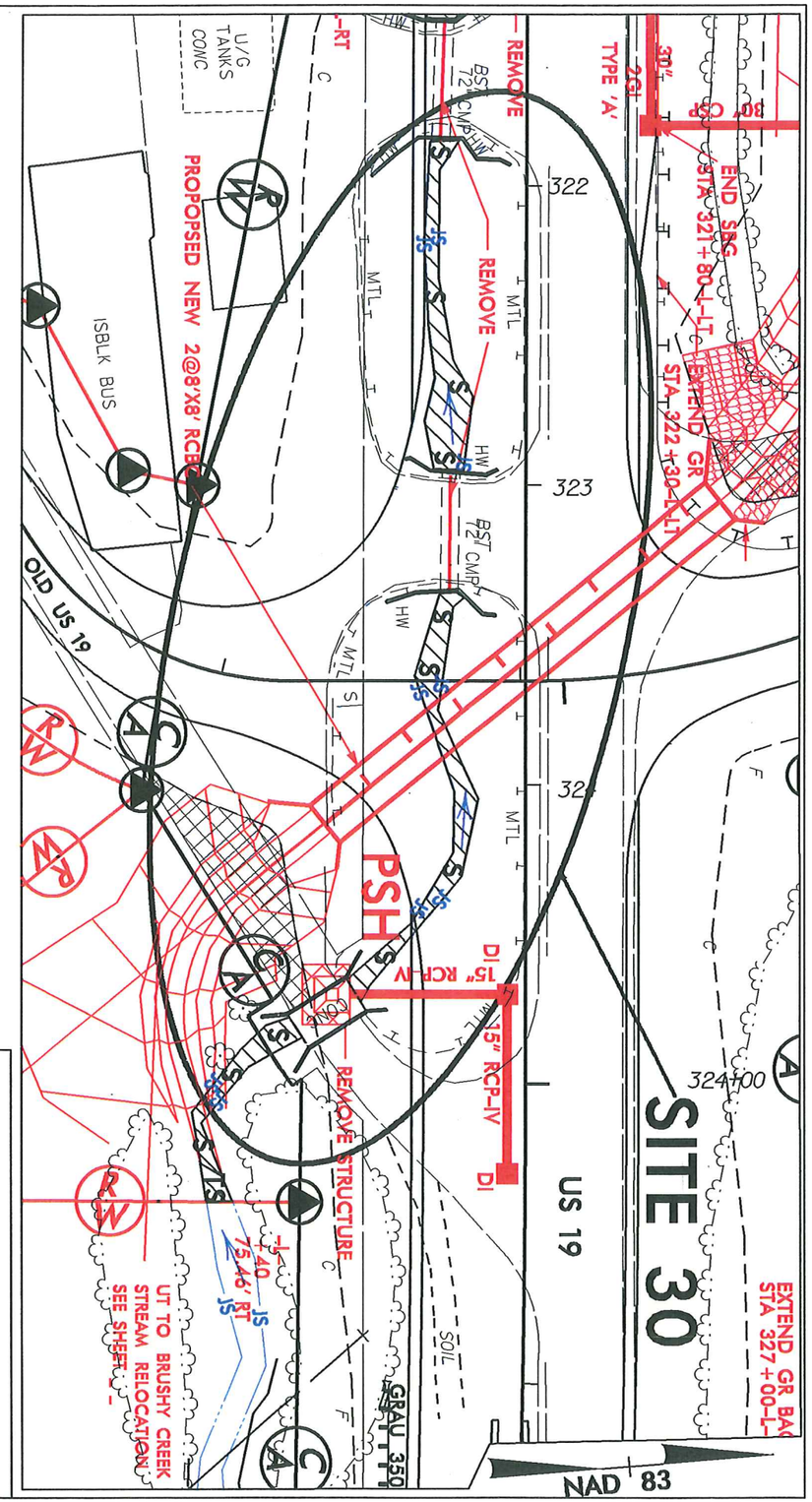
S / S DENOTES IMPACTS IN SURFACE WATER

TS / TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

S / S DENOTES IMPACTS IN SURFACE WATER

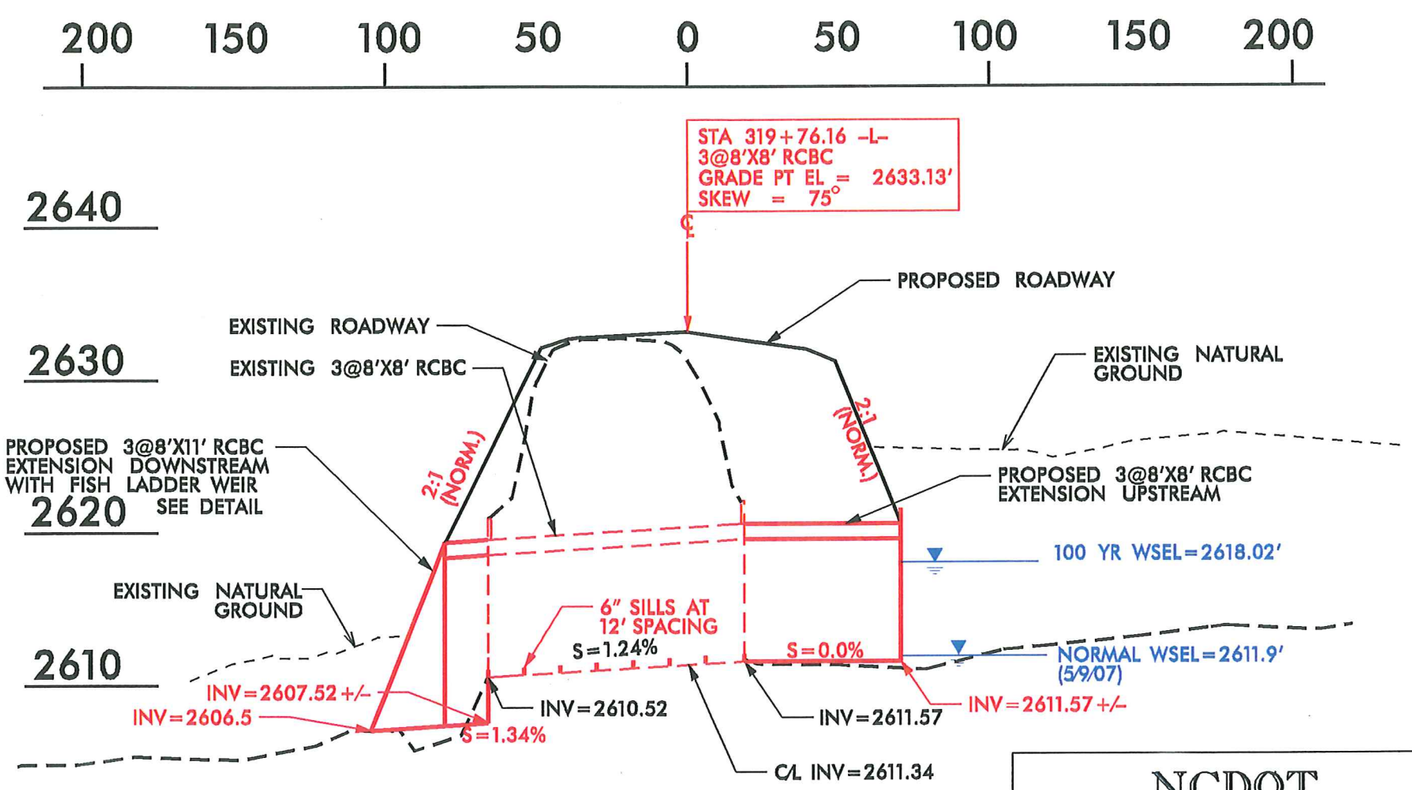
TS / TS DENOTES IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13

Permit Drawing
Sheet 71 of 114



PROFILE

SITE 29

SCALE

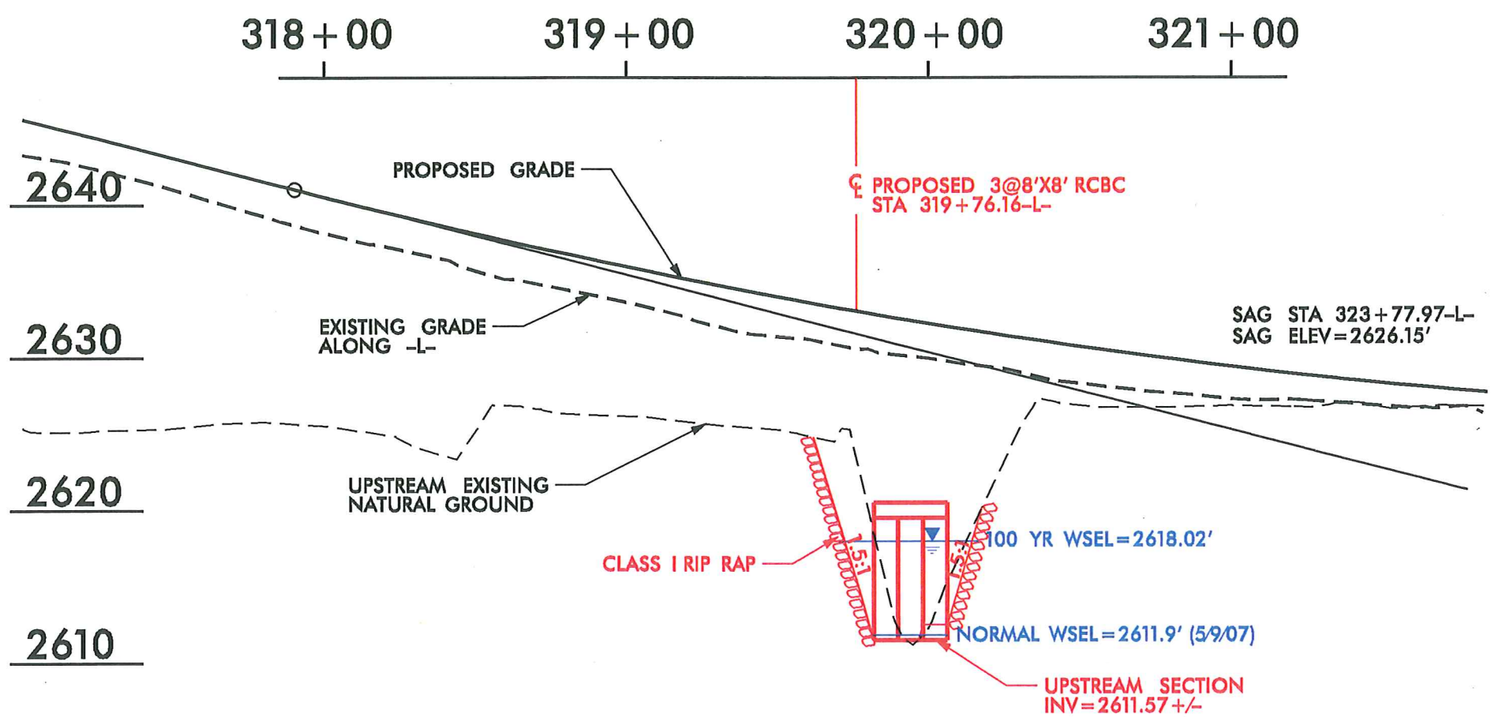
1:50' HORIZONTAL

1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13



SECTION
SITE 29

SCALE

1:50' HORIZONTAL

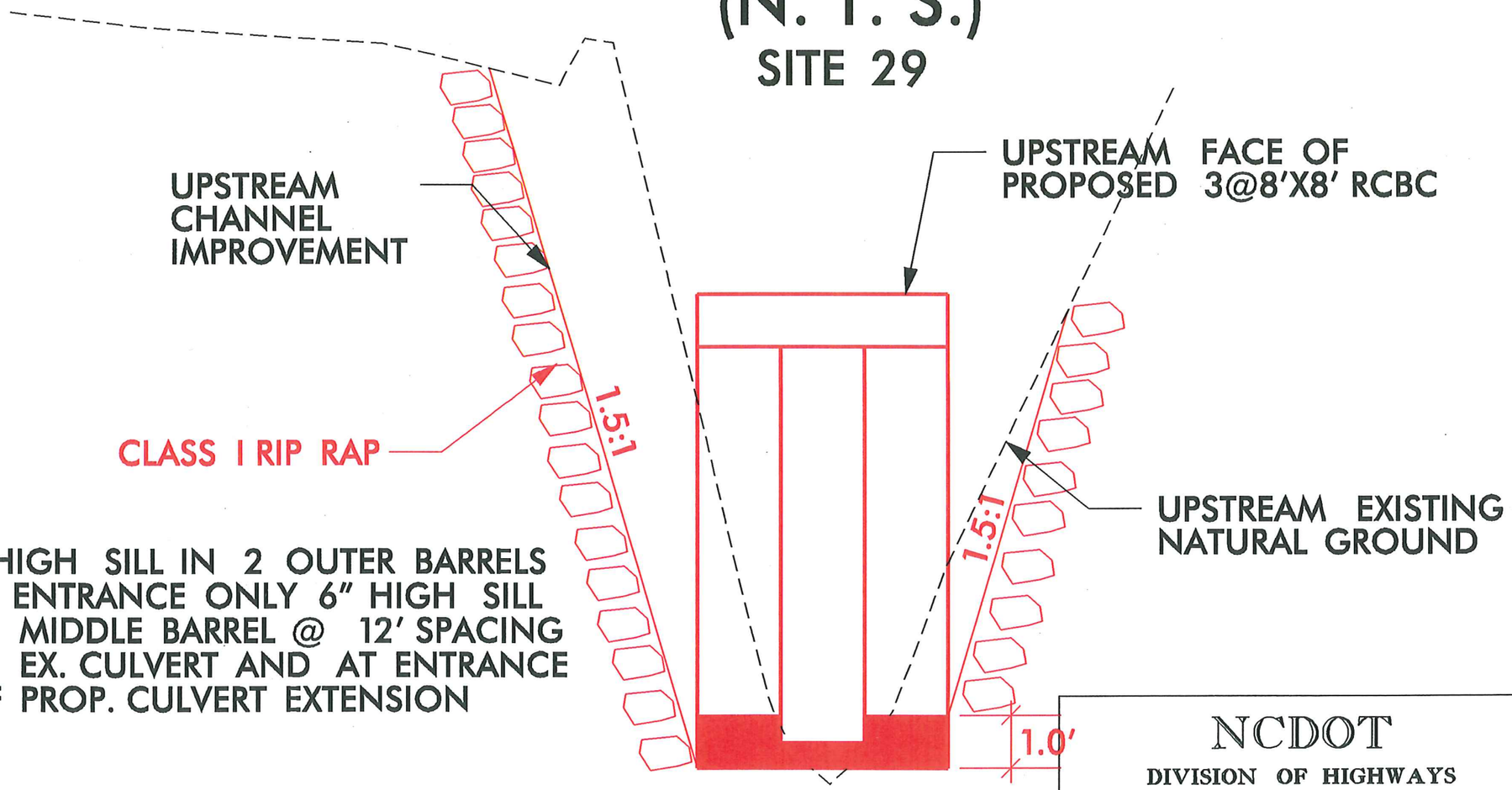
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

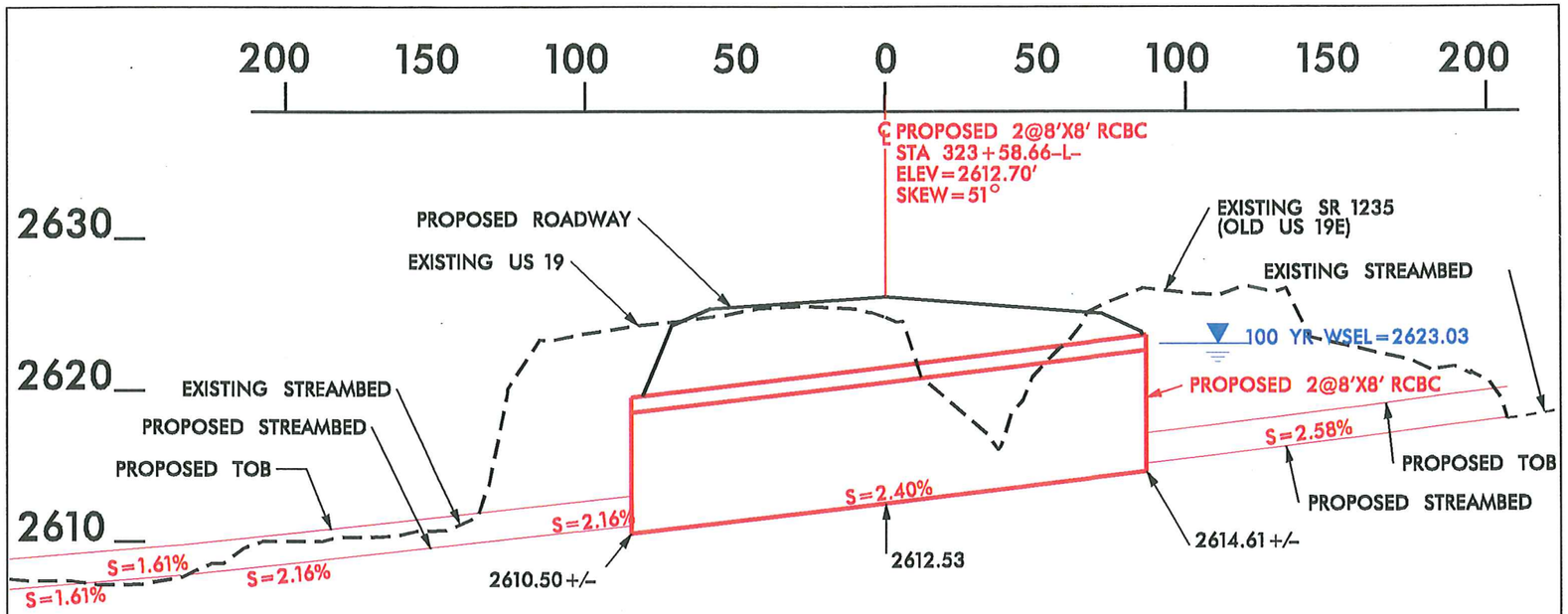
DETAIL OF UPSTREAM RCBC
(N. T. S.)
SITE 29



1' HIGH SILL IN 2 OUTER BARRELS AT ENTRANCE ONLY 6" HIGH SILL IN MIDDLE BARREL @ 12' SPACING IN EX. CULVERT AND AT ENTRANCE OF PROP. CULVERT EXTENSION

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13



PROFILE
SITE 30

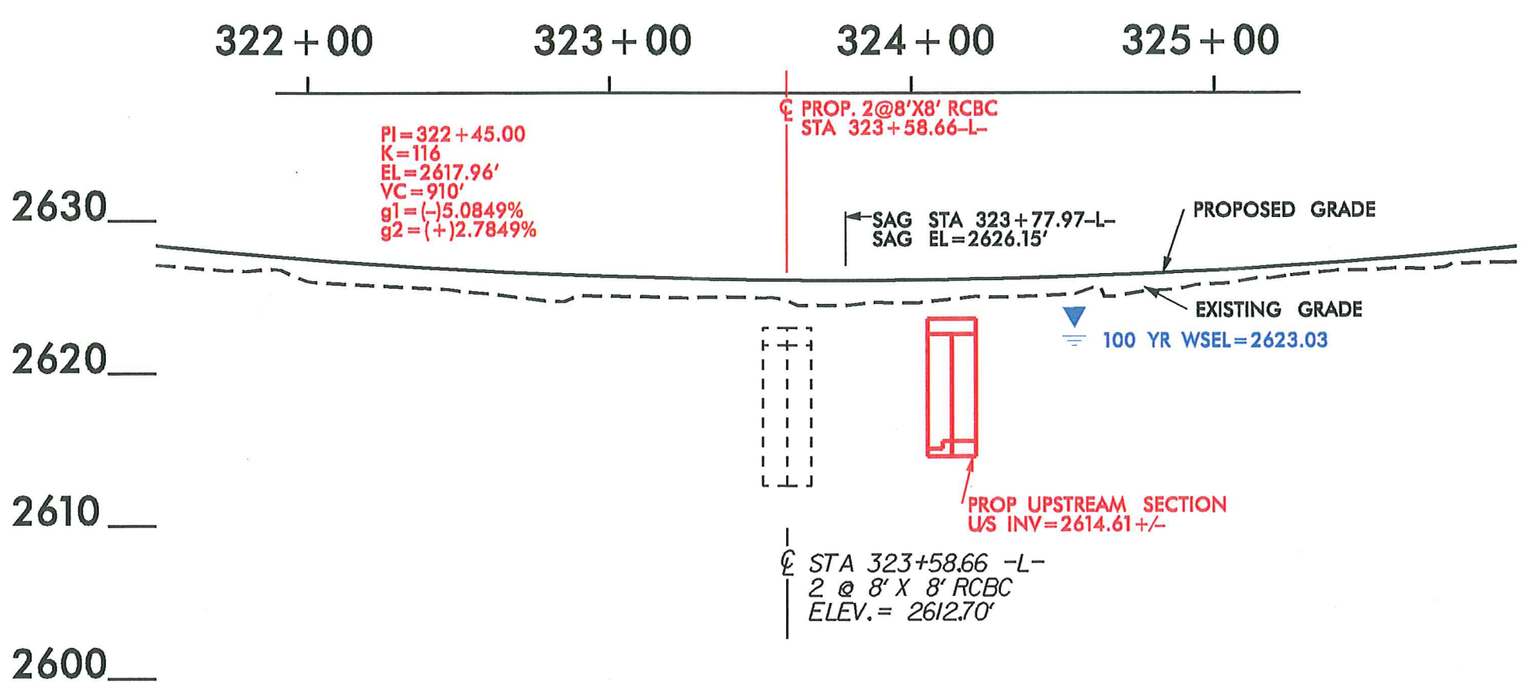
SCALE

1:50' HORIZONTAL

1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13



SECTION
SITE 30

SCALE

1:50' HORIZONTAL

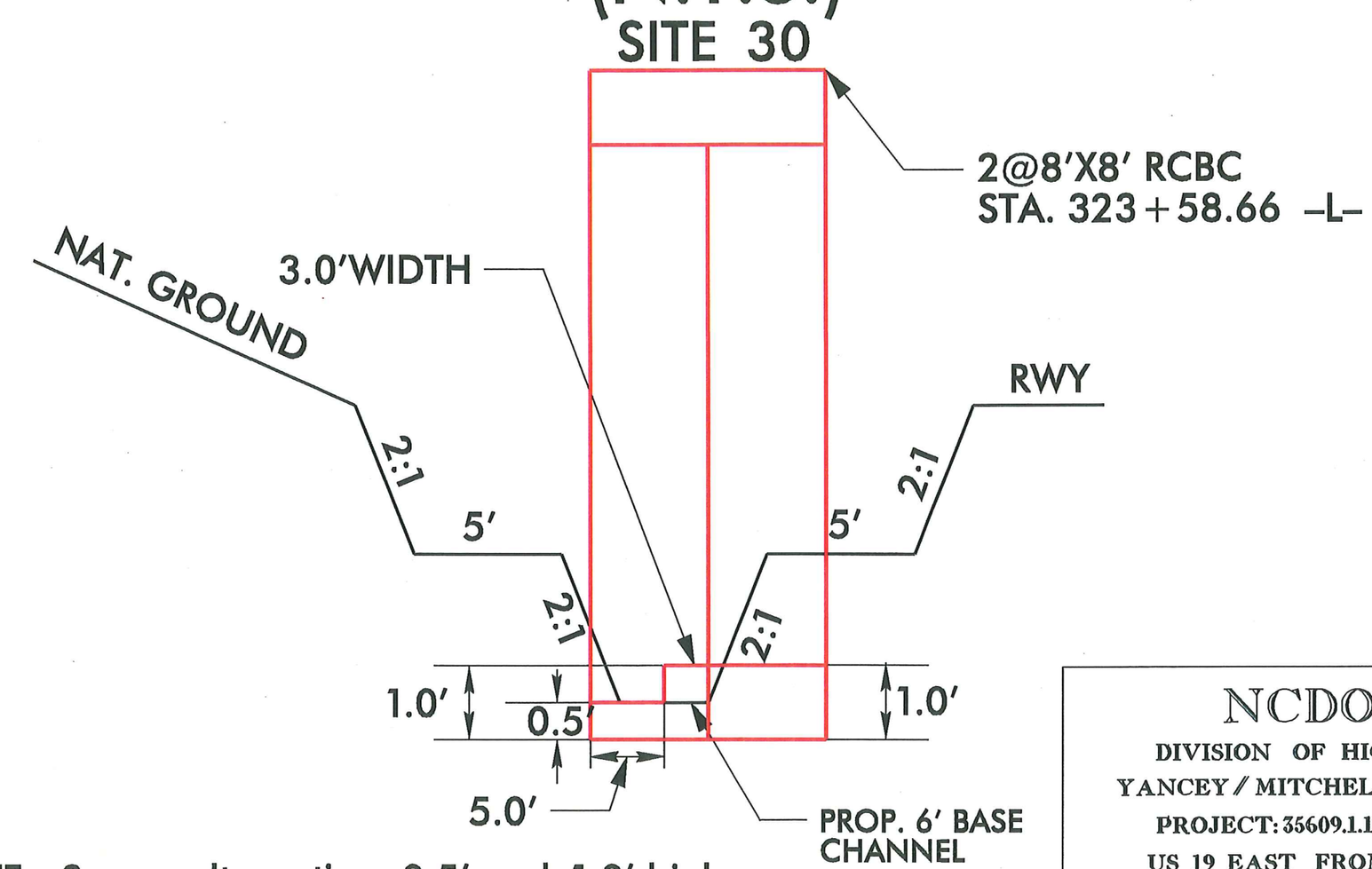
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

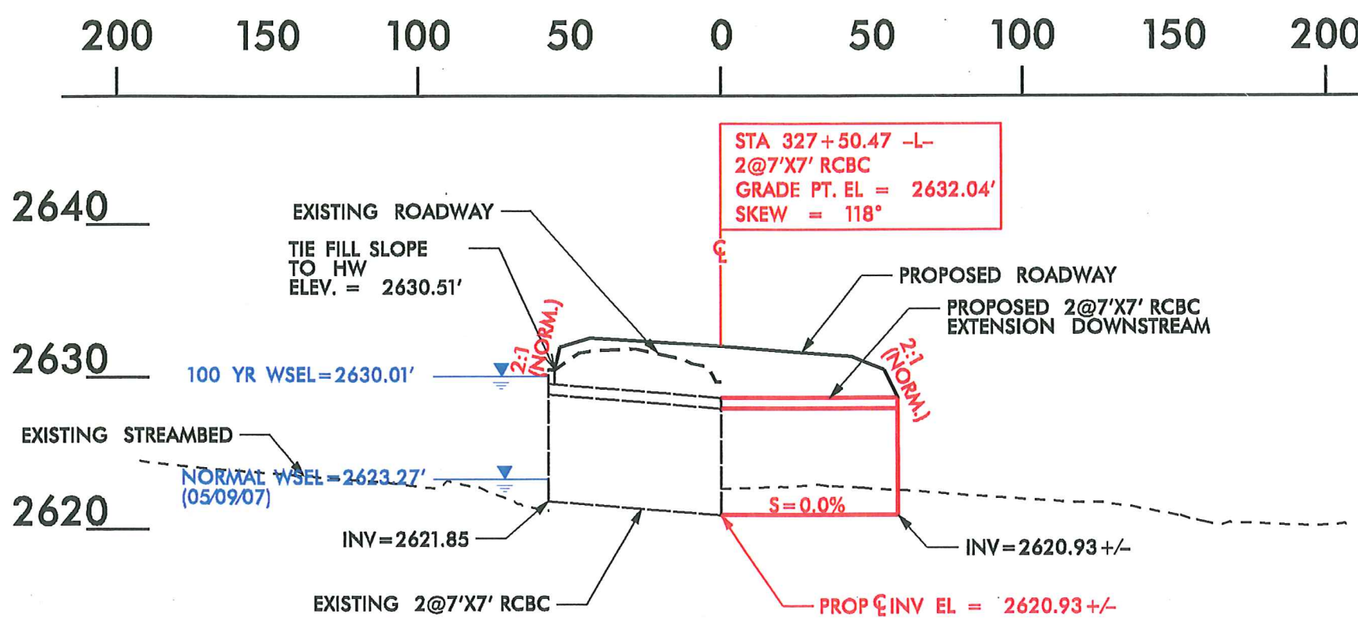
DETAIL OF SILLS AT UPSTREAM OF RCBC
(N.T.S.)



NOTE: Space alternating 0.5' and 1.0' high sills @ 20' intervals in western most barrel.

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13



PROFILE
SITE 31

SCALE

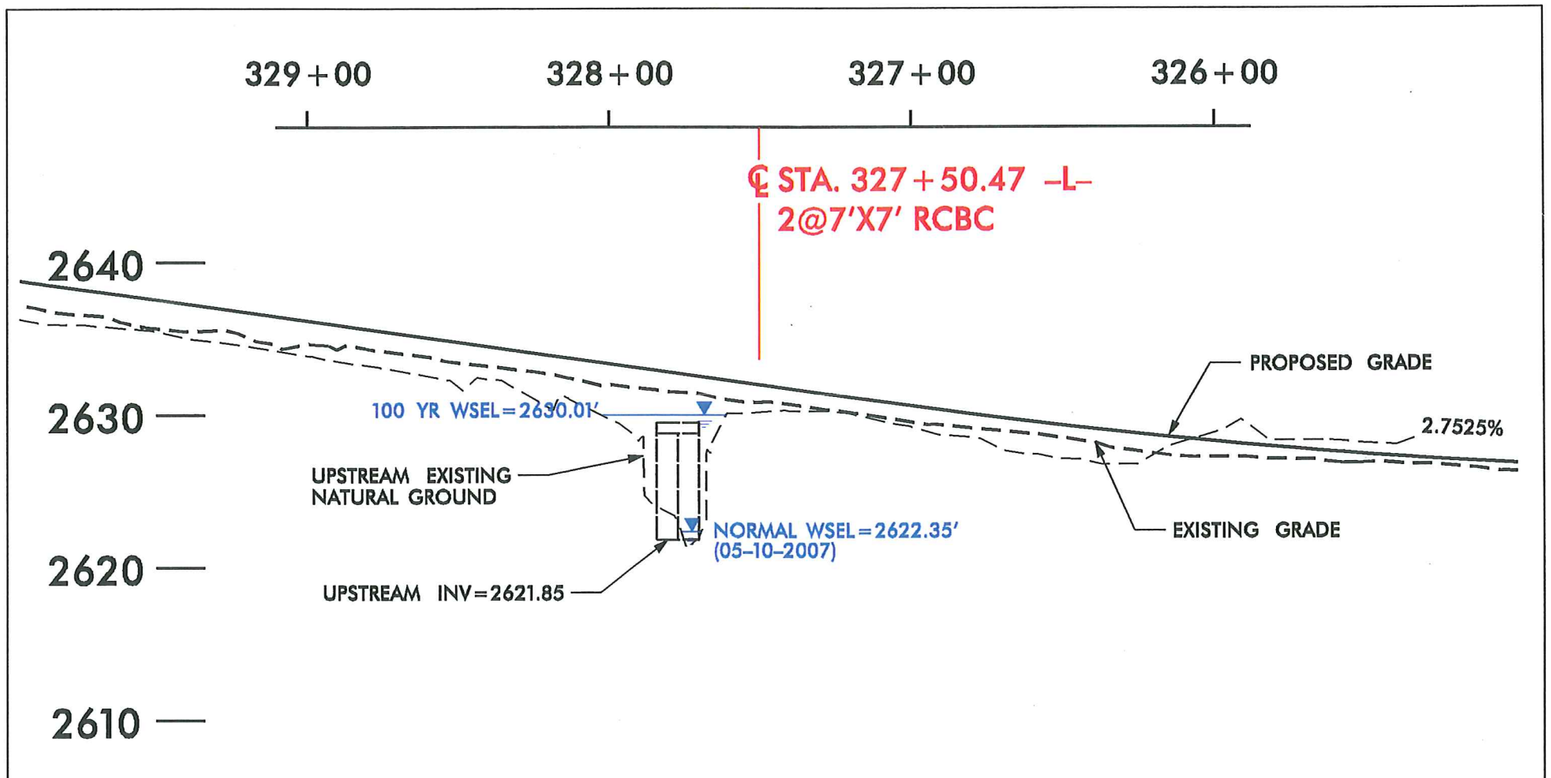
1:50' HORIZONTAL

1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13



SECTION
SITE 31

SCALE

1:50' HORIZONTAL

1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

UT TO BRUSHY CREEK STREAM RELOCATION

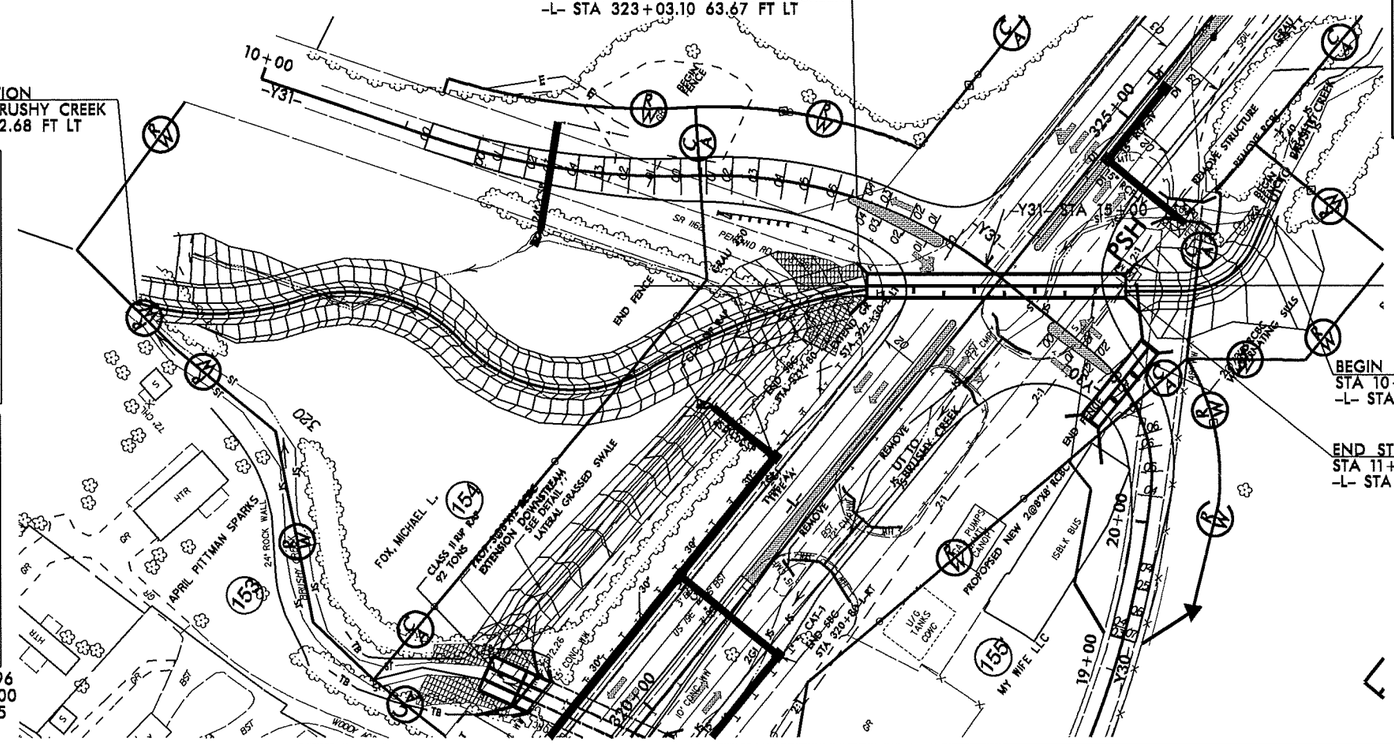
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2H
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

50' 0' 50' 100'
GRAPHIC SCALE

BEGIN STREAM RELOCATION
STA 10+00.00 UT TO BRUSHY CREEK
-L- STA 323+03.10 63.67 FT LT

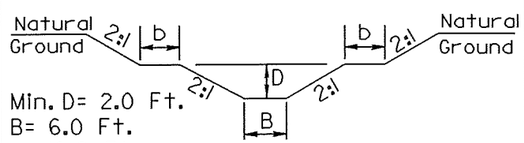
END STREAM RELOCATION
STA 15+14.4 UT TO BRUSHY CREEK
-L- STA 319+92.70 432.68 FT LT



BEGIN STREAM RELOCATION
STA 10+00.00 U/S UT TO BRUSHY CREEK
-L- STA 325+10.93 110.14 FT RT

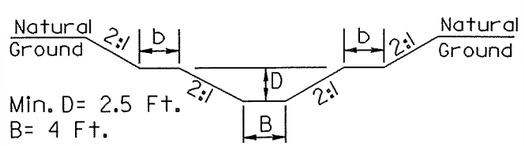
END STREAM RELOCATION
STA 11+20.9 U/S UT TO BRUSHY CREEK
-L- STA 324+10.51 69.42 FT RT

TYPICAL CHANNEL SECTION
(Not to Scale)



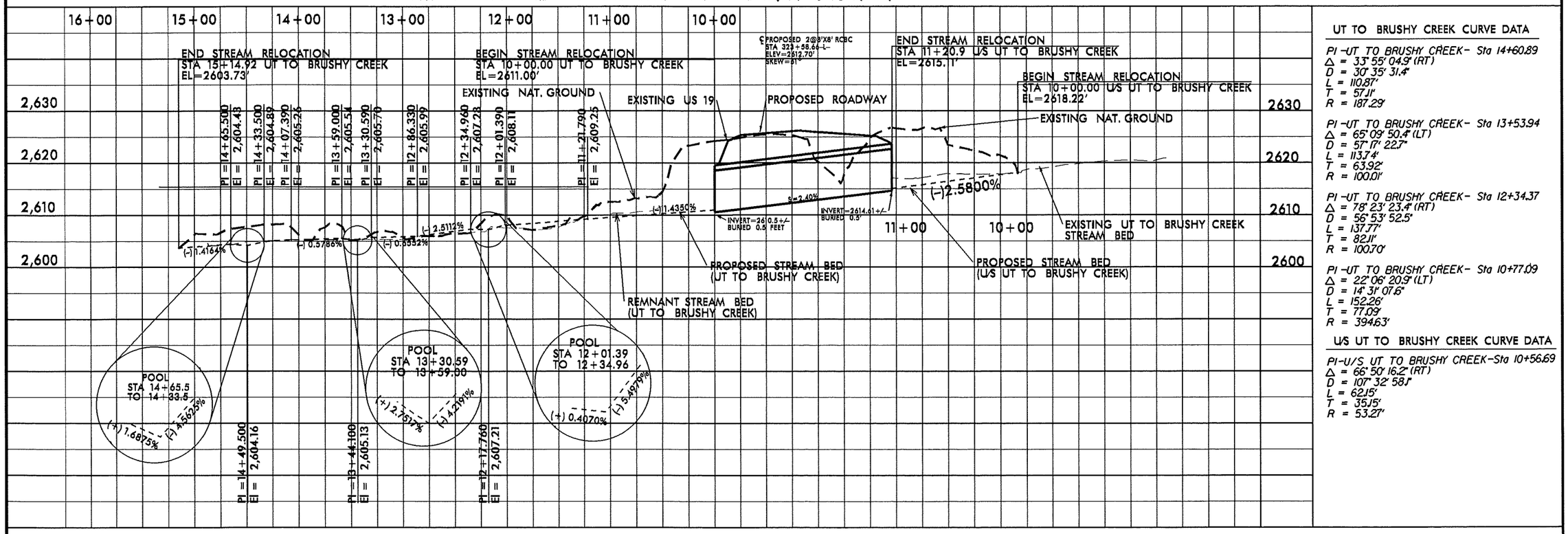
Min. D= 2.0 Ft.
B= 6.0 Ft.
b= 10.0 Ft.

TYPICAL POOL SECTION
(Not to Scale)



Min. D= 2.5 Ft.
B= 4 Ft.
b= 10.0 Ft.

FROM UT TO BRUSHY CREEK STA 12+01.39 TO STA 12+34.96
FROM UT TO BRUSHY CREEK STA 13+30.59 TO STA 13+59.00
FROM UT TO BRUSHY CREEK STA 14+33.50 TO STA 14+65.5



UT TO BRUSHY CREEK CURVE DATA

PI -UT TO BRUSHY CREEK- Sta 14+60.89
Δ = 33° 55' 04.9" (RT)
D = 30° 35' 31.4"
L = 110.87'
T = 57.11'
R = 187.29'

PI -UT TO BRUSHY CREEK- Sta 13+53.94
Δ = 65° 09' 50.4" (LT)
D = 57° 17' 22.7"
L = 113.74'
T = 63.92'
R = 100.01'

PI -UT TO BRUSHY CREEK- Sta 12+34.37
Δ = 78° 23' 23.4" (RT)
D = 56° 53' 52.5"
L = 137.77'
T = 82.11'
R = 100.70'

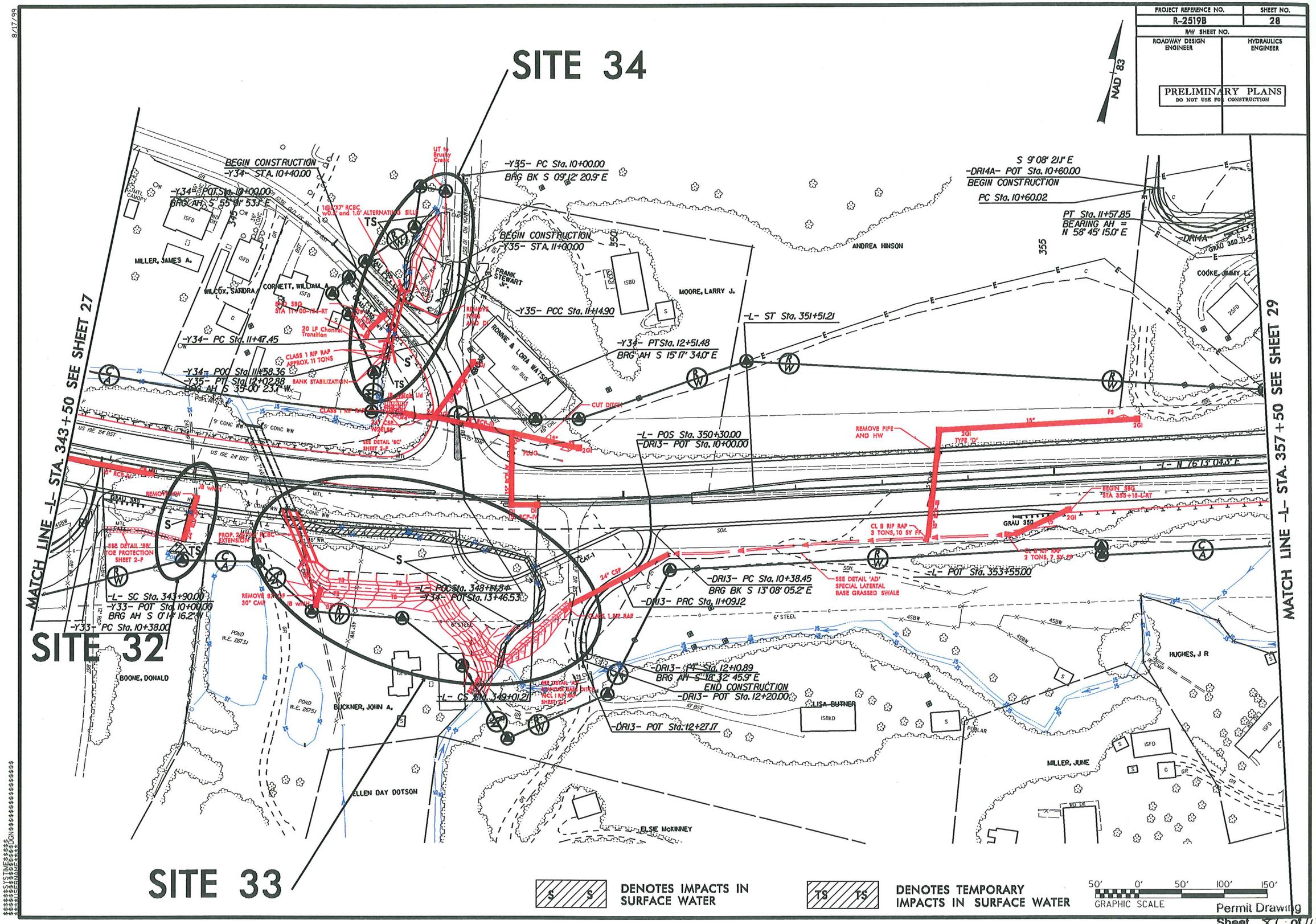
PI -UT TO BRUSHY CREEK- Sta 10+77.09
Δ = 22° 06' 20.9" (LT)
D = 14° 31' 07.6"
L = 152.26'
T = 77.09'
R = 394.63'

U/S UT TO BRUSHY CREEK CURVE DATA

PI-U/S UT TO BRUSHY CREEK-Sta 10+56.69
Δ = 66° 50' 16.2" (RT)
D = 107° 32' 58.1"
L = 62.15'
T = 35.15'
R = 53.27'

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
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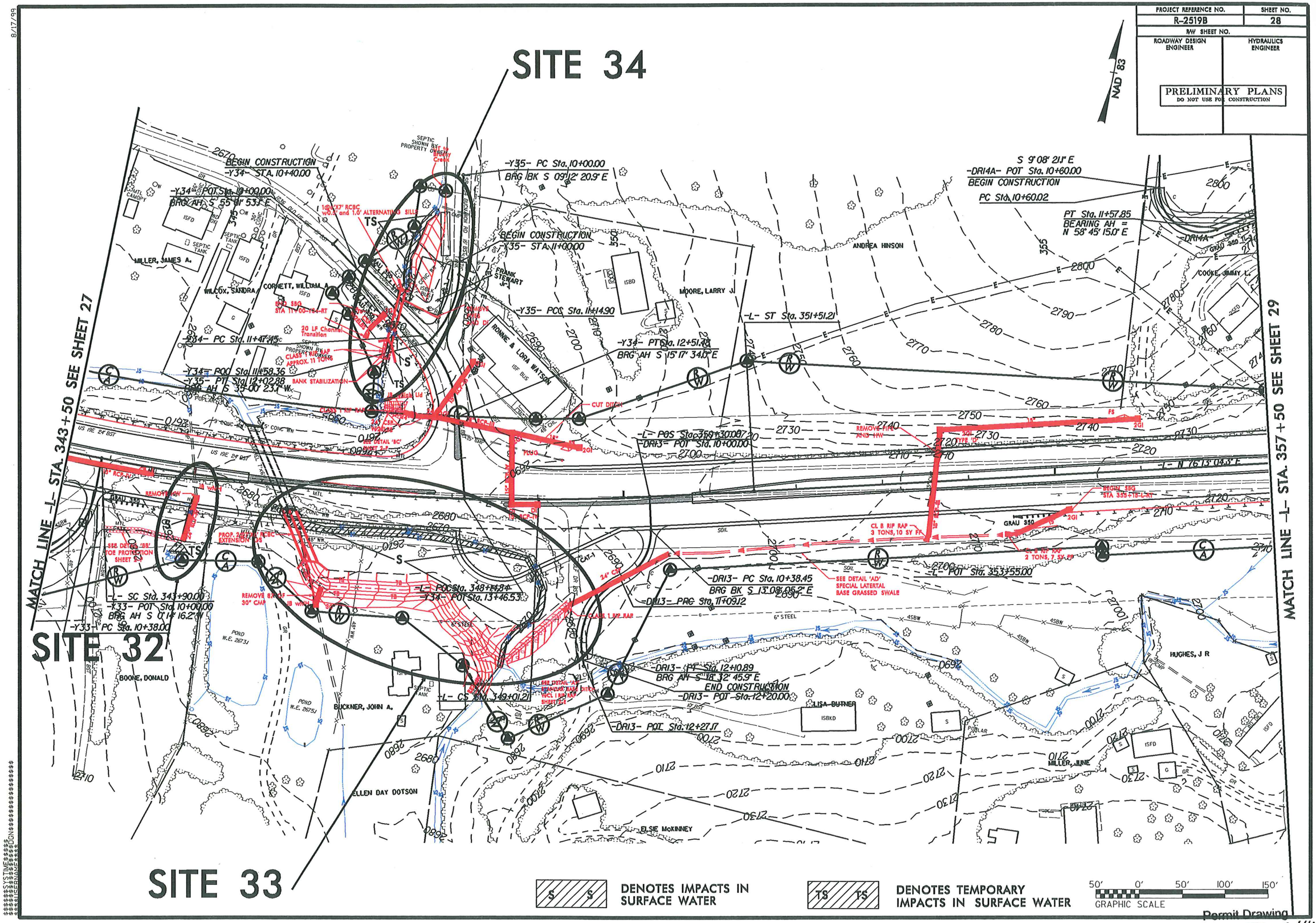
8/17/99

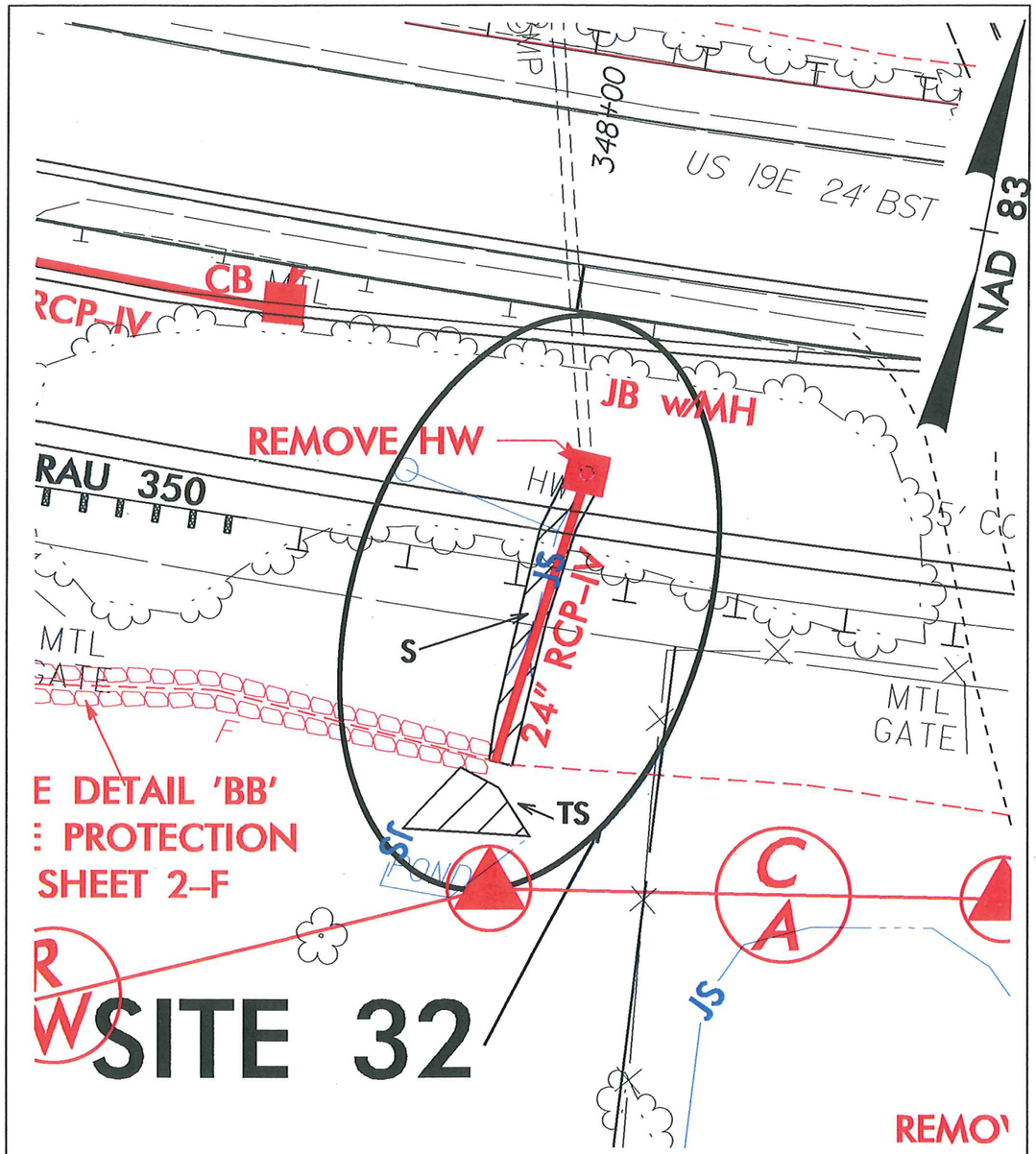
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



Permit Drawing
Sheet 82 of 114

8/17/99



IMPACT ENLARGEMENT

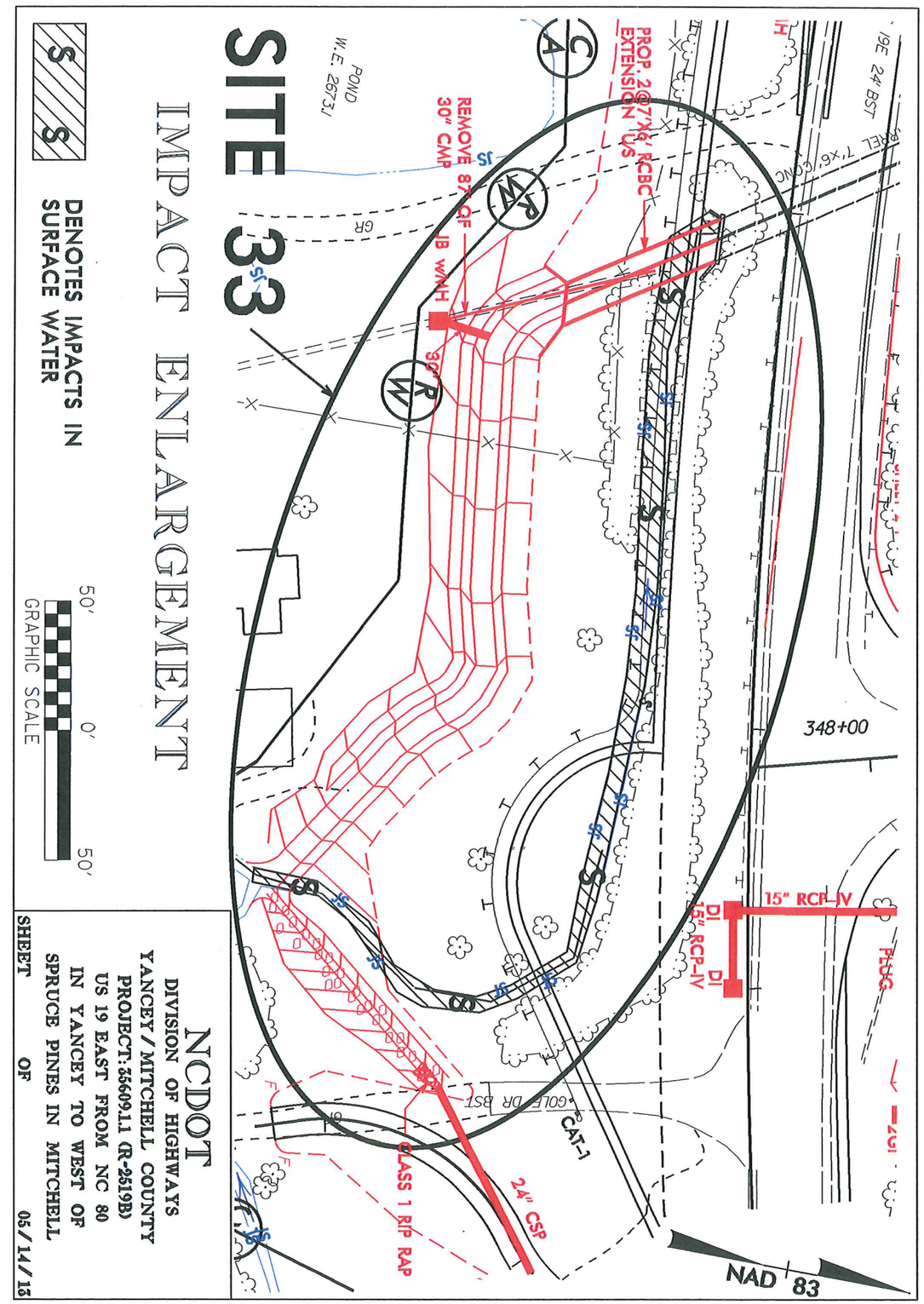
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

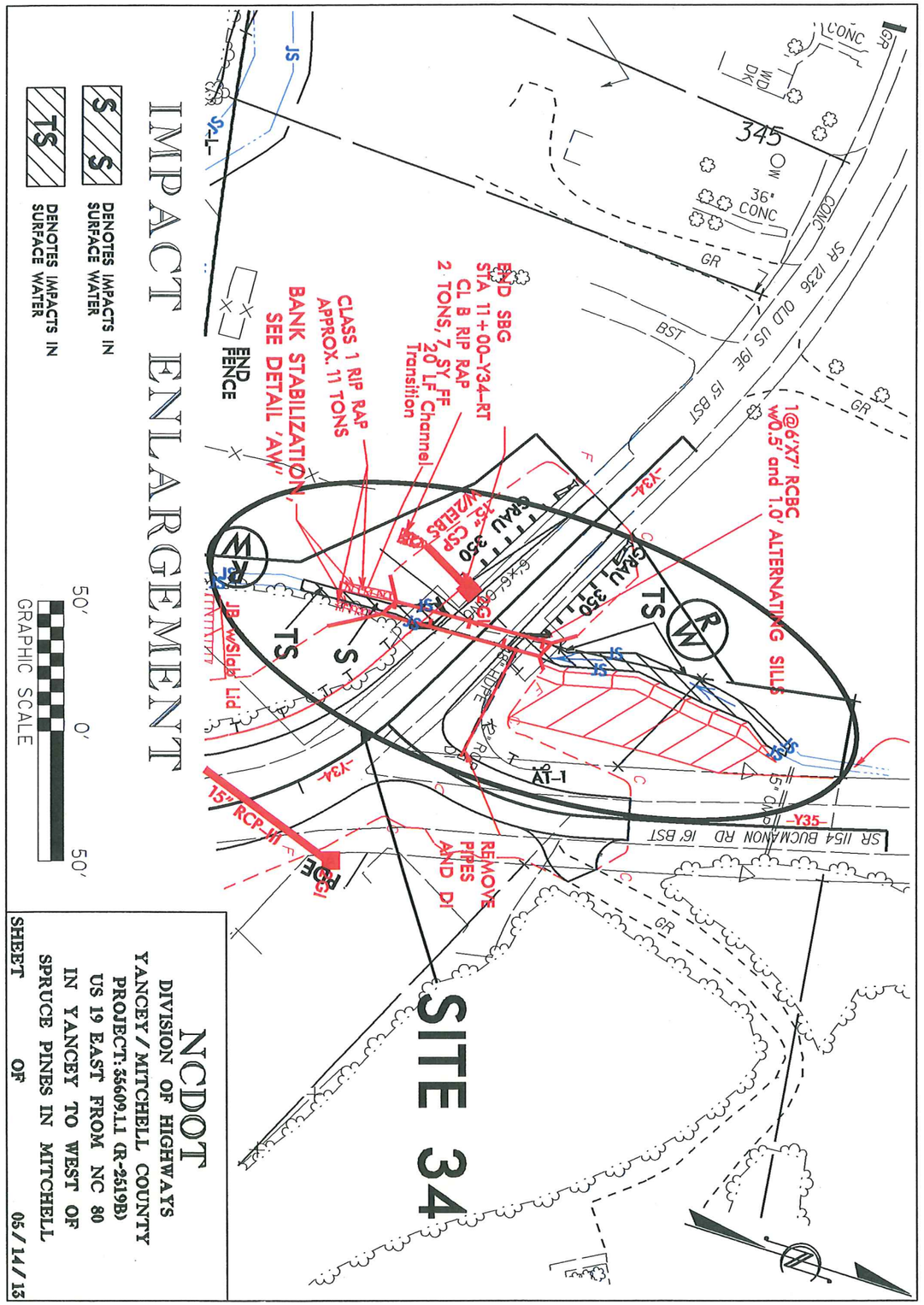
S S DENOTES IMPACTS IN SURFACE WATER

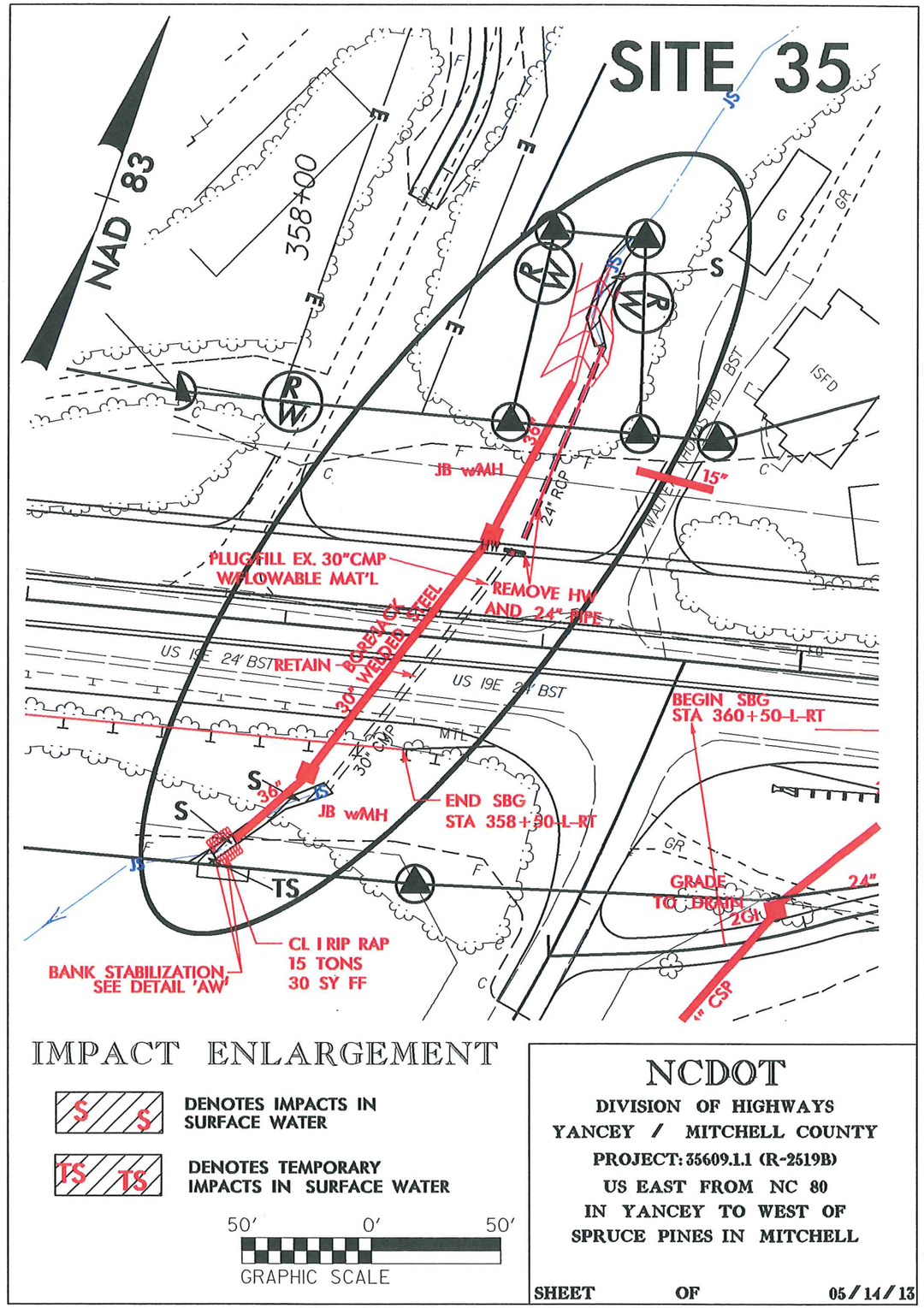
50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

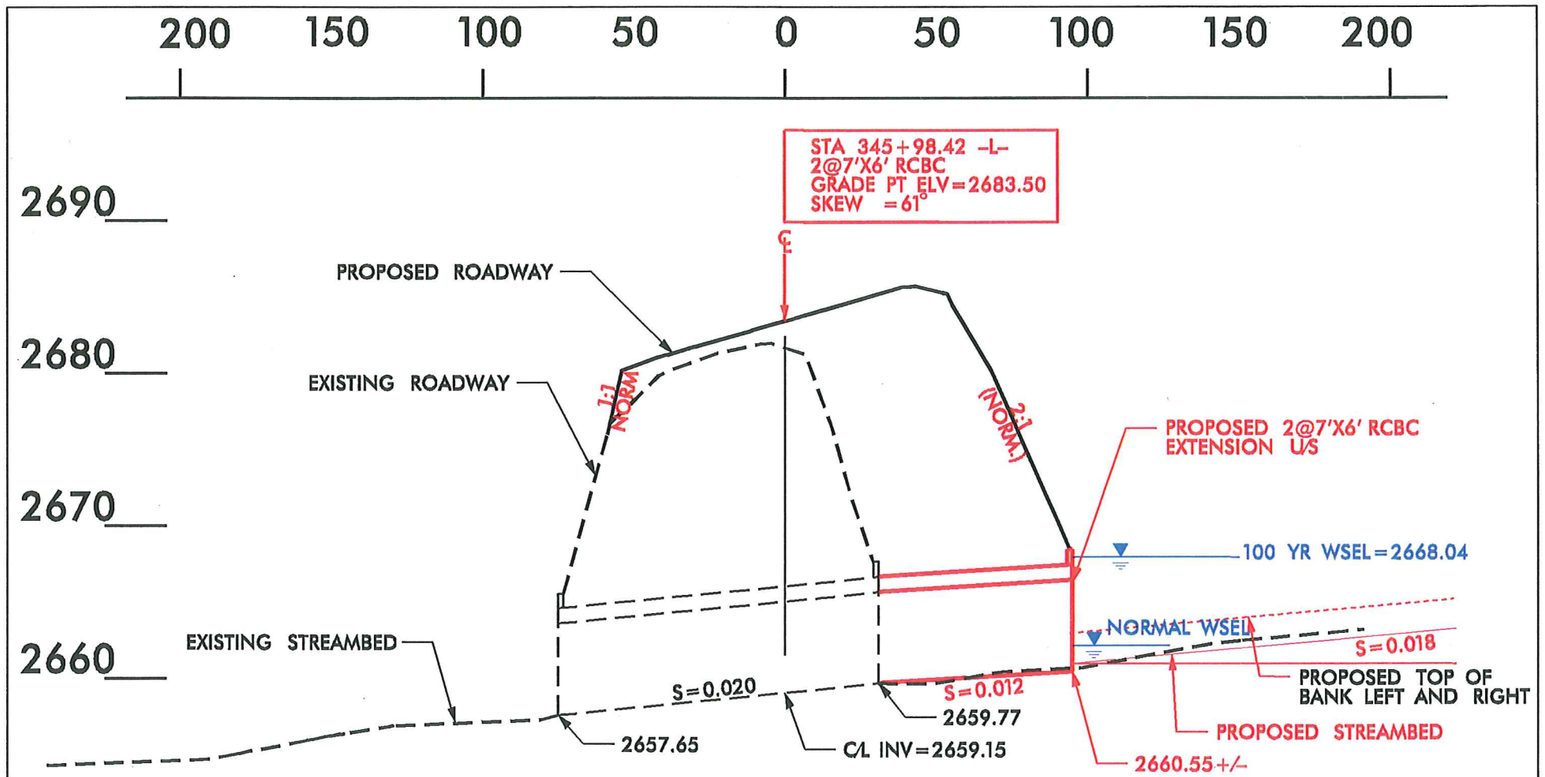
SHEET OF 05/14/13

Permit Drawing
Sheet 83 of 114





Permit Drawing
Sheet 84 of 114

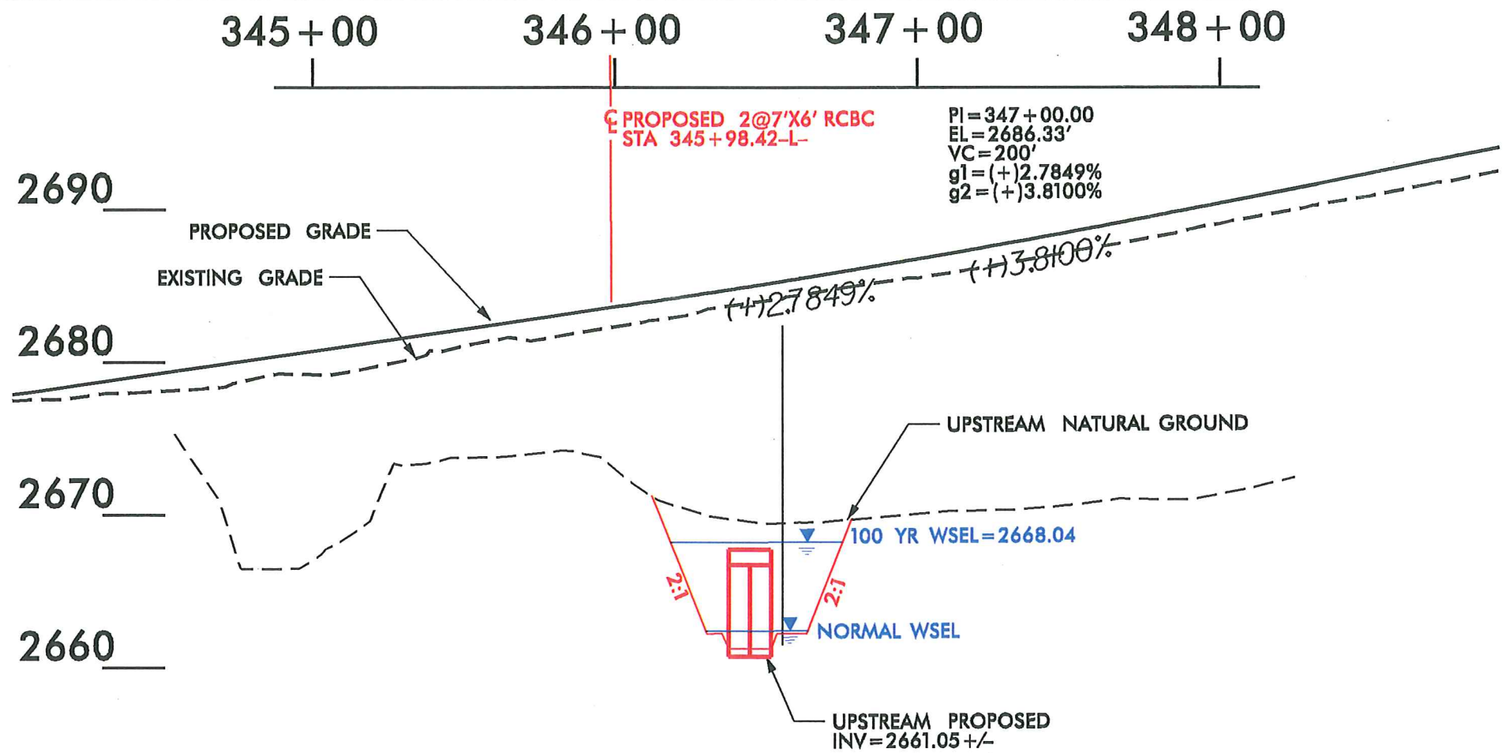


PROFILE
SITE 33

SCALE
1:50' HORIZONTAL
1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13



SECTION
SITE 33

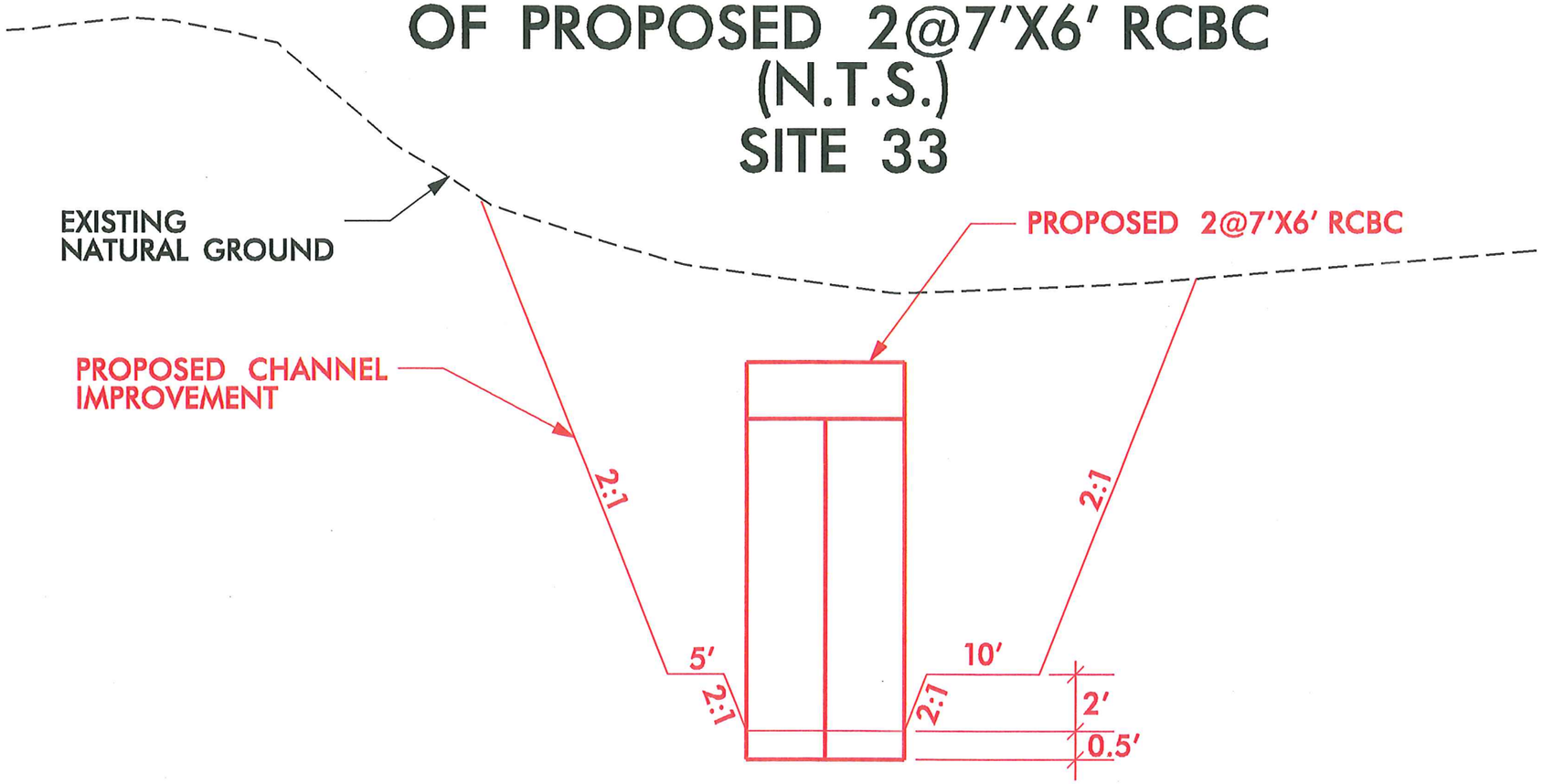
SCALE
1:50' HORIZONTAL

1:10' VERTICAL

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13

DETAIL OF UPSTREAM FACE OF PROPOSED 2@7'X6' RCBC (N.T.S.) SITE 33



NCDOT

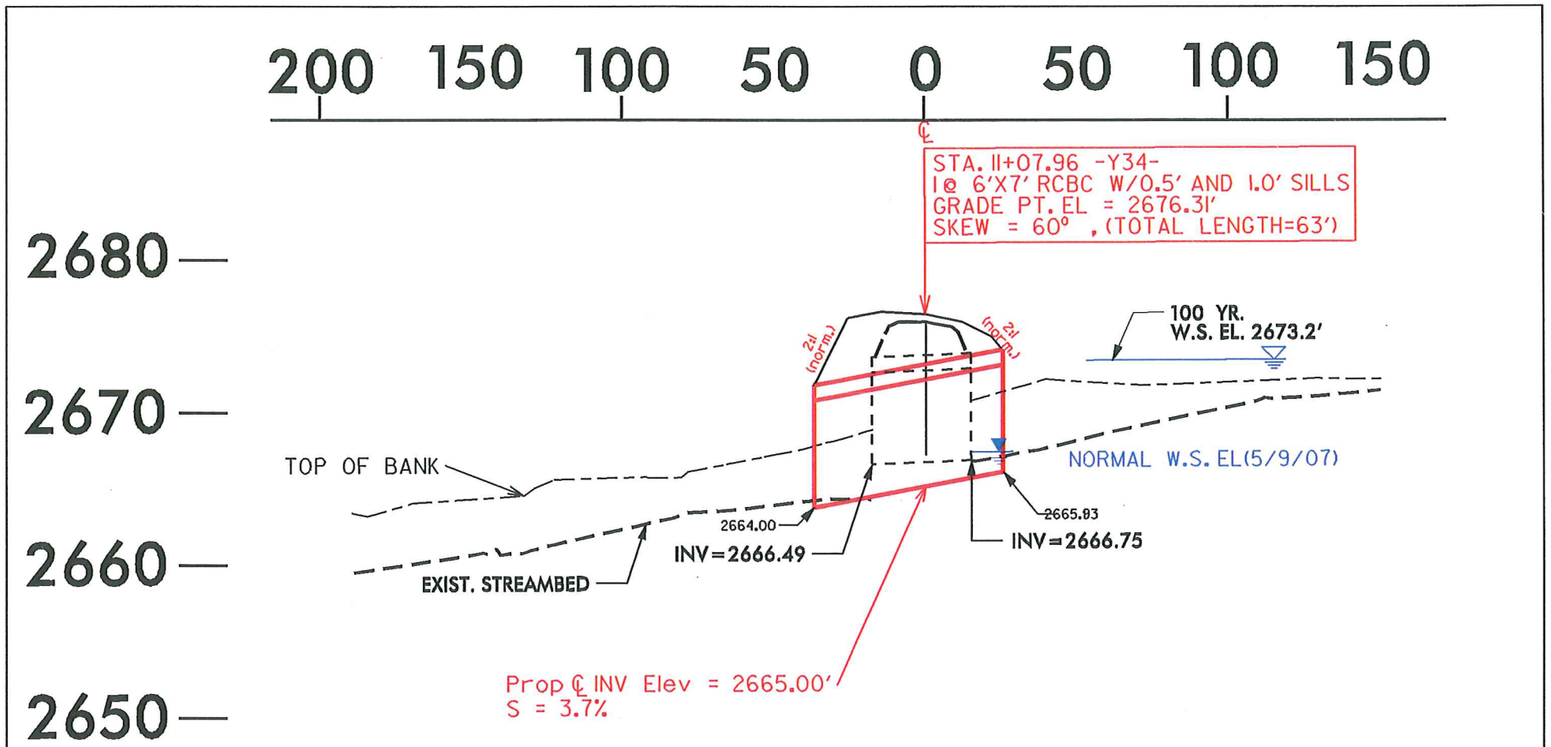
DIVISION OF HIGHWAYS

YANCEY / MITCHELL COUNTY

PROJECT: 35609.1.1 (R2519B)

US 19 EAST FROM NC 80 IN YANCEY TO WEST OF SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13



PROFILE
SITE 34

SCALE

1:50' HORIZONTAL

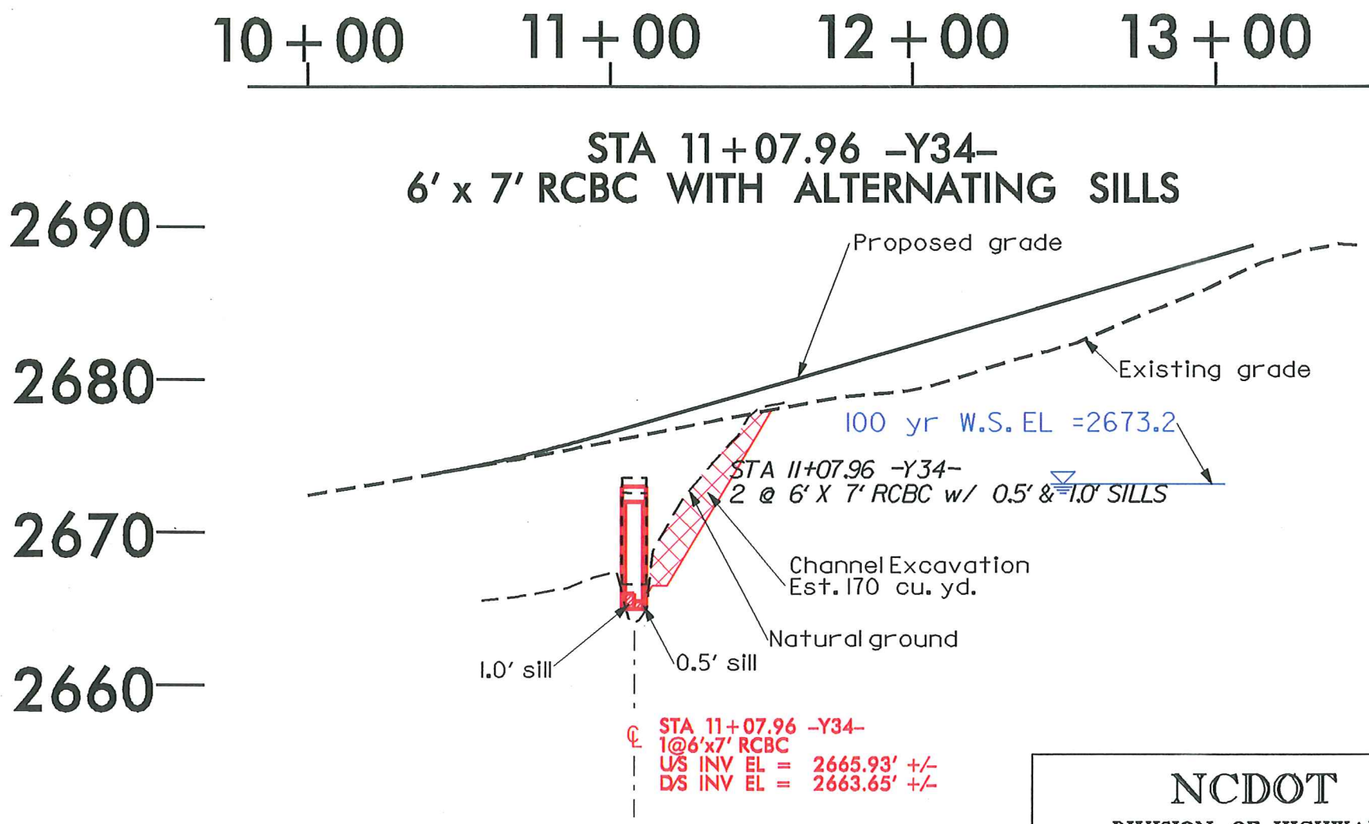
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

Permit Drawing
Sheet 88 of 114



SECTION
SITE 34

SCALE

1:50' HORIZONTAL

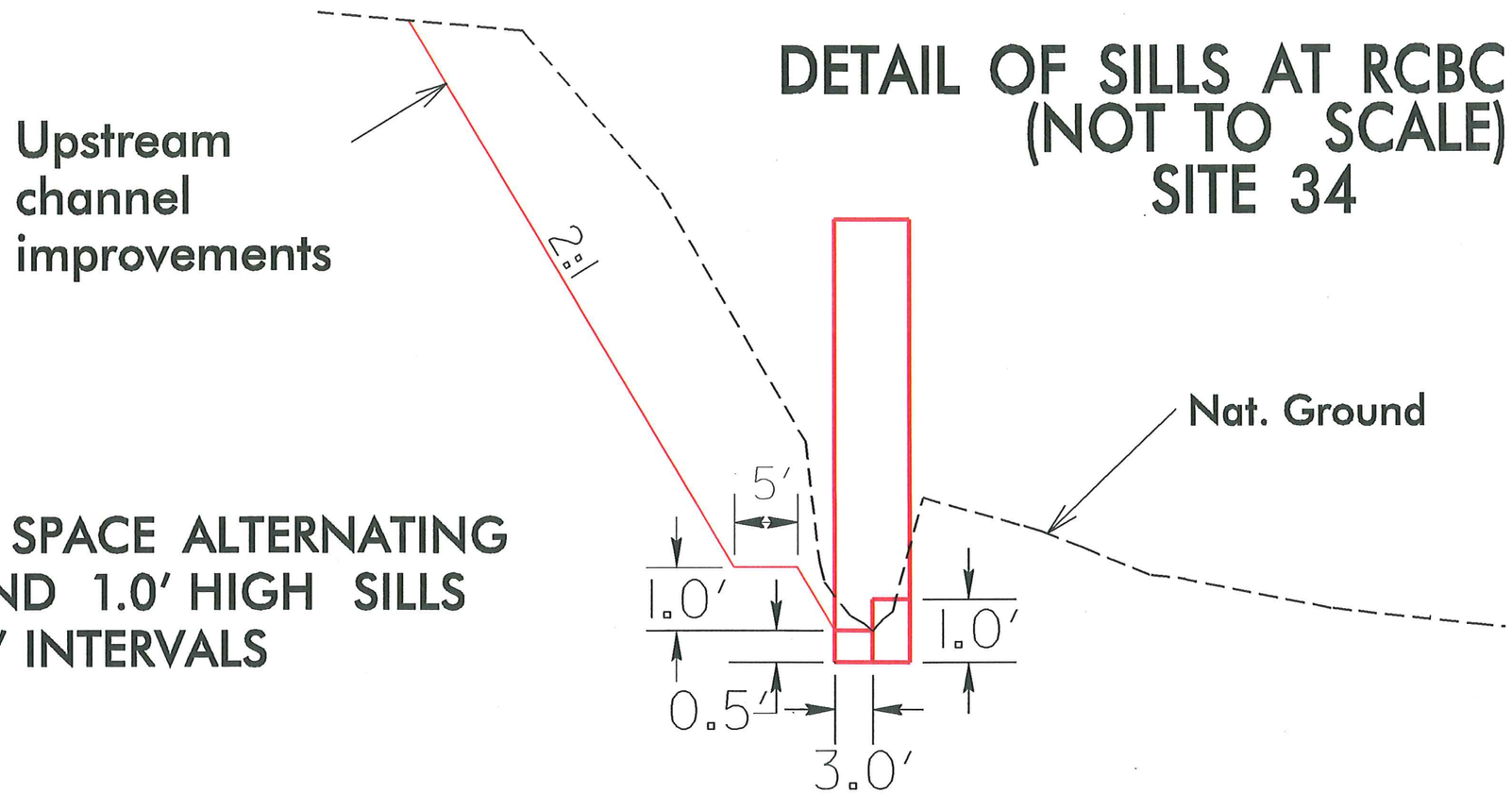
1:10' VERTICAL

NCDOT

DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01/16/13

DETAIL OF SILLS AT RCBC (NOT TO SCALE) SITE 34



NOTE: SPACE ALTERNATING 0.5' AND 1.0' HIGH SILLS @ 15' INTERVALS

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 01 / 16 / 13

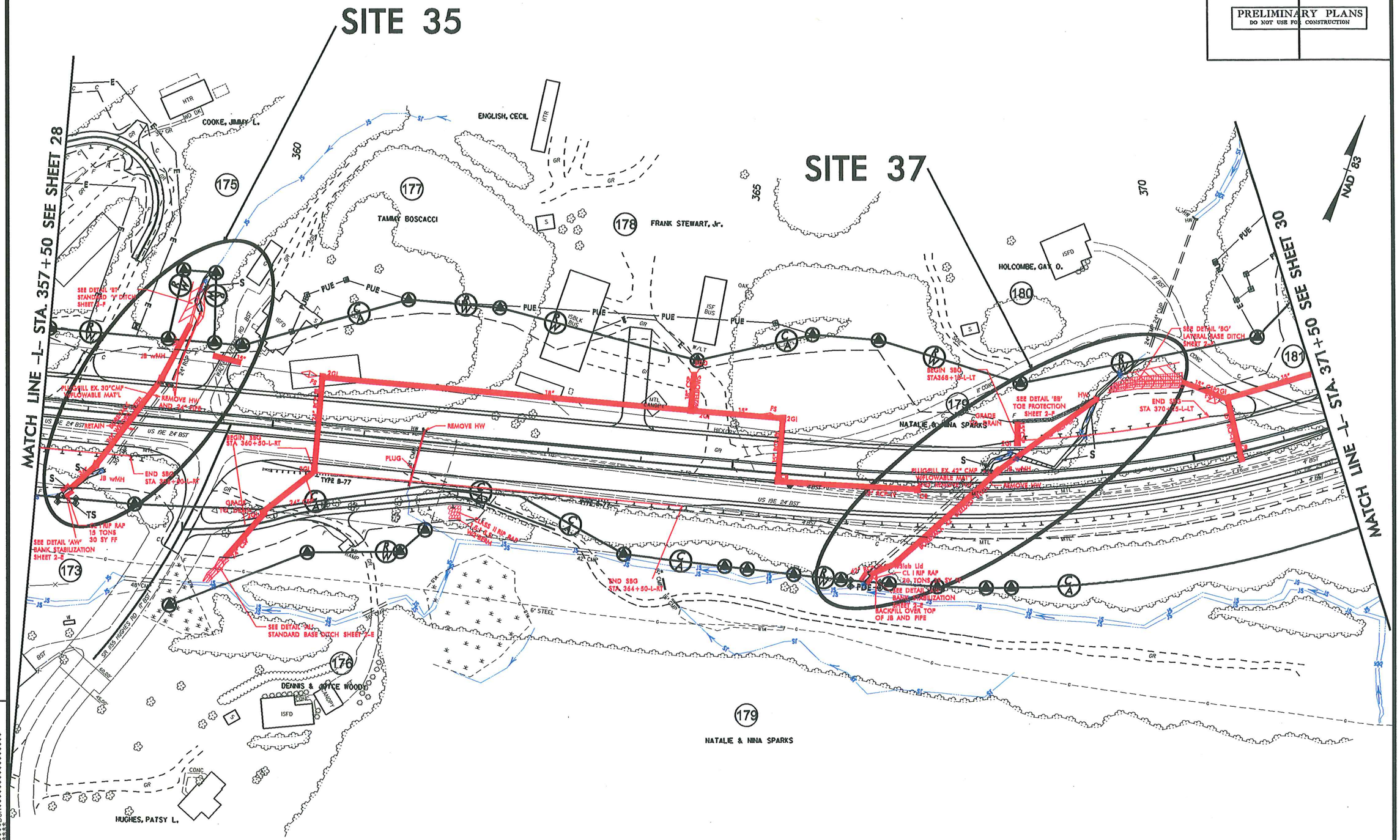
Permit Drawing
Sheet 90 of 119

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



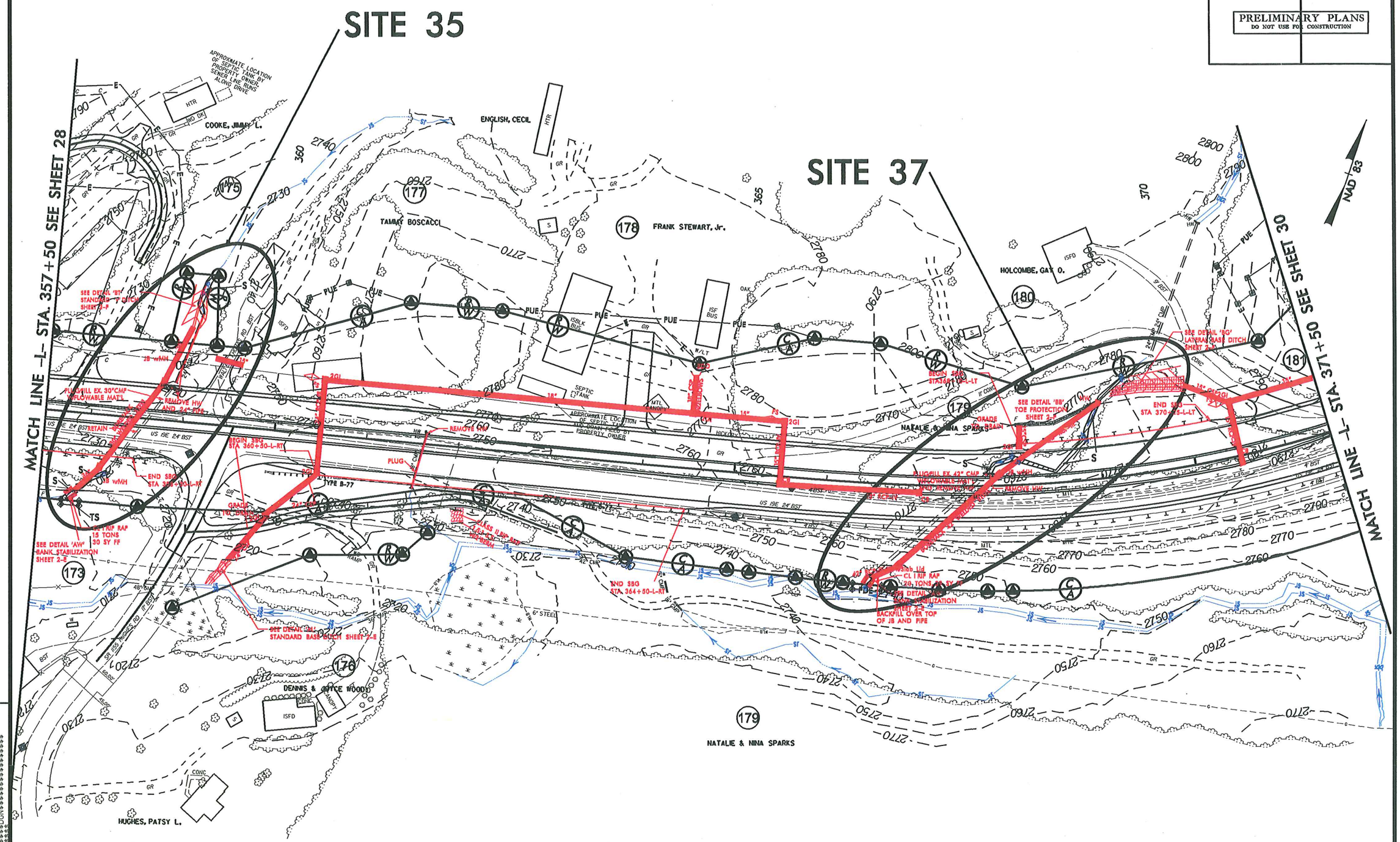
Permit Drawing
Sheet 91 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS



Permit Drawing
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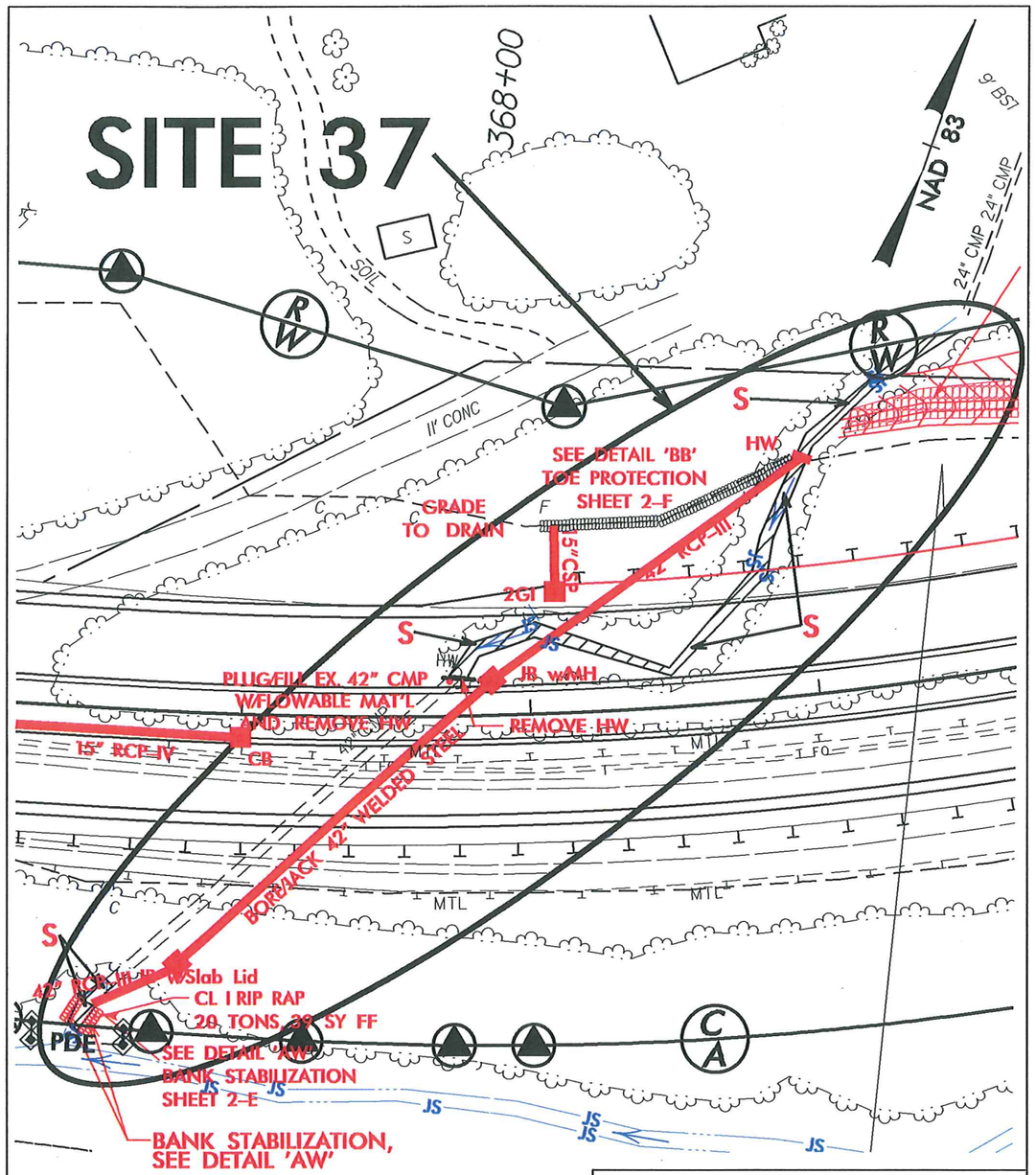


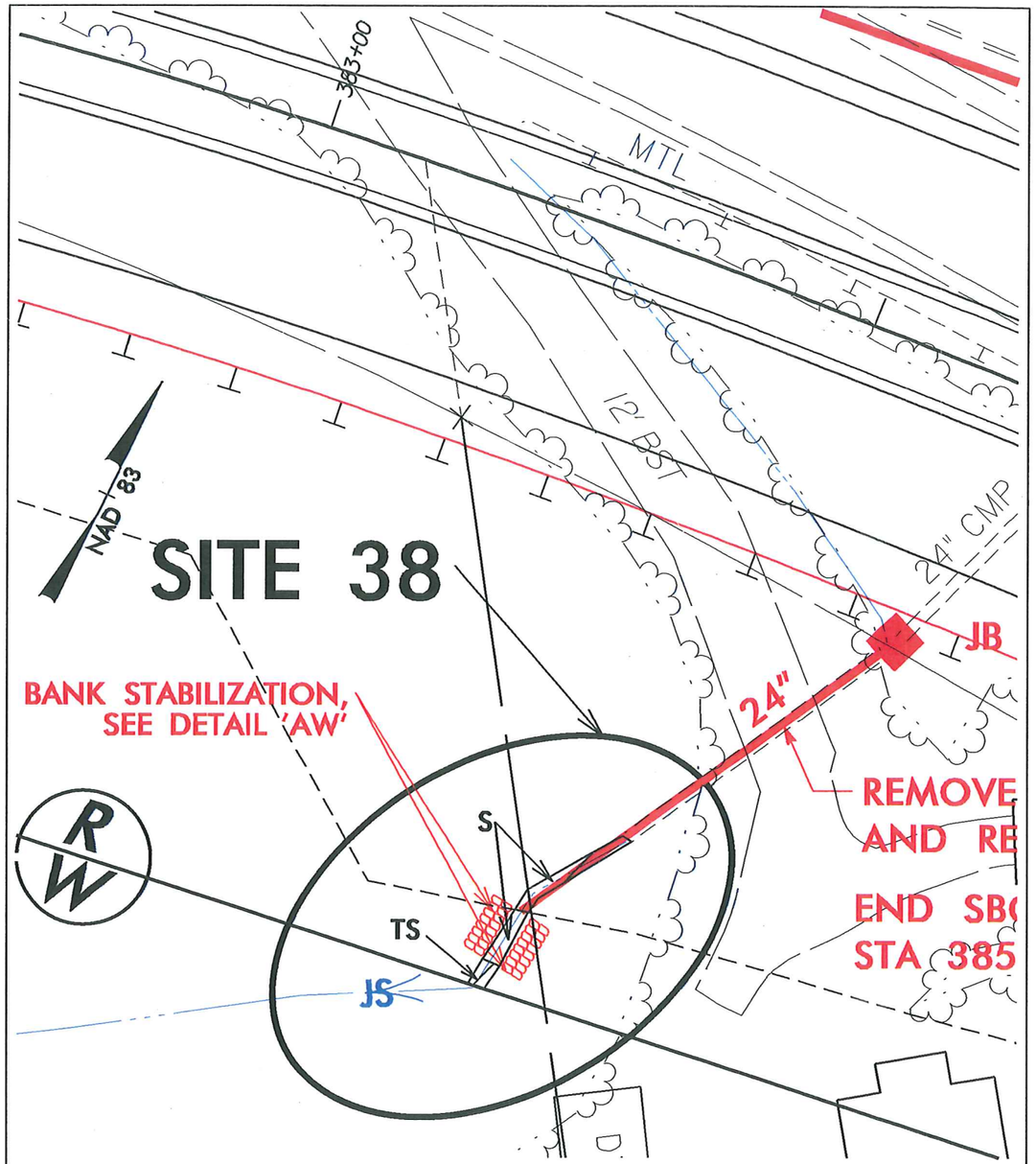
IMPACT ENLARGEMENT

S DENOTES IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

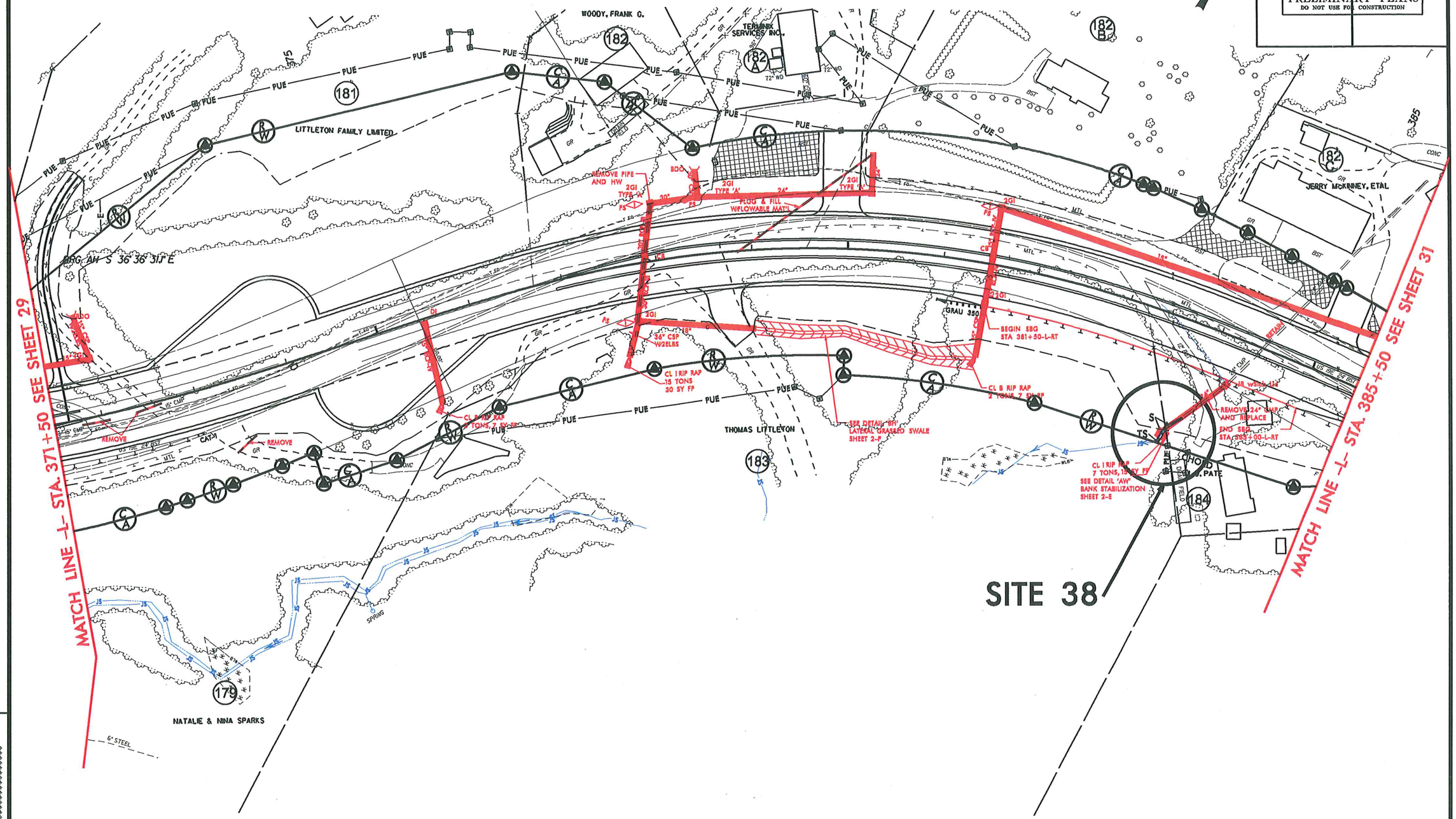
SHEET OF 05/14/13

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	30
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

NAD 83



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

REVISIONS

8/17/99

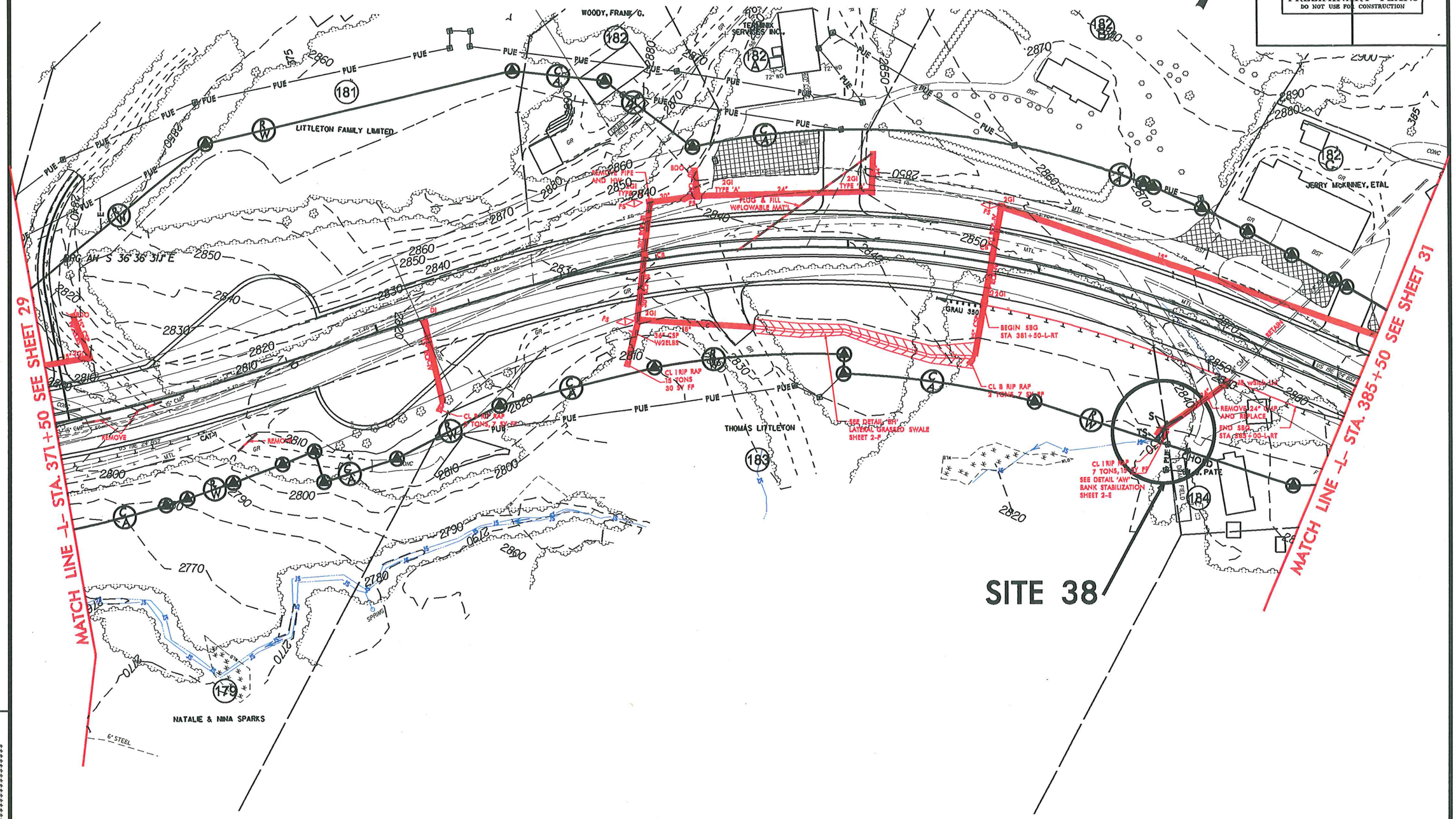
Permit Drawing
Sheet 94 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	30
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

NAD '83



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 95 of 114

REVISIONS

8/17/99

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

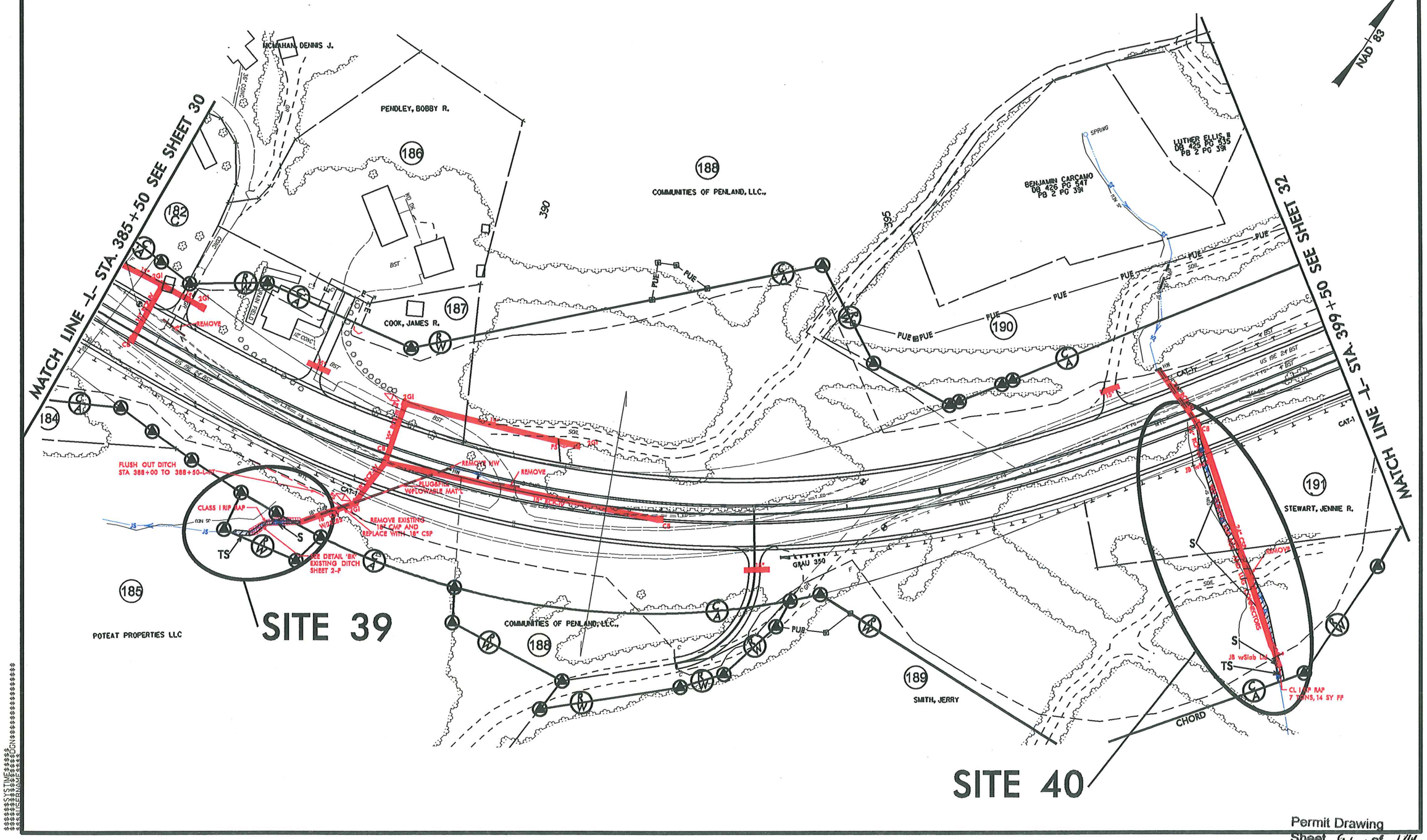
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

NAD 83



Permit Drawing
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8/17/99

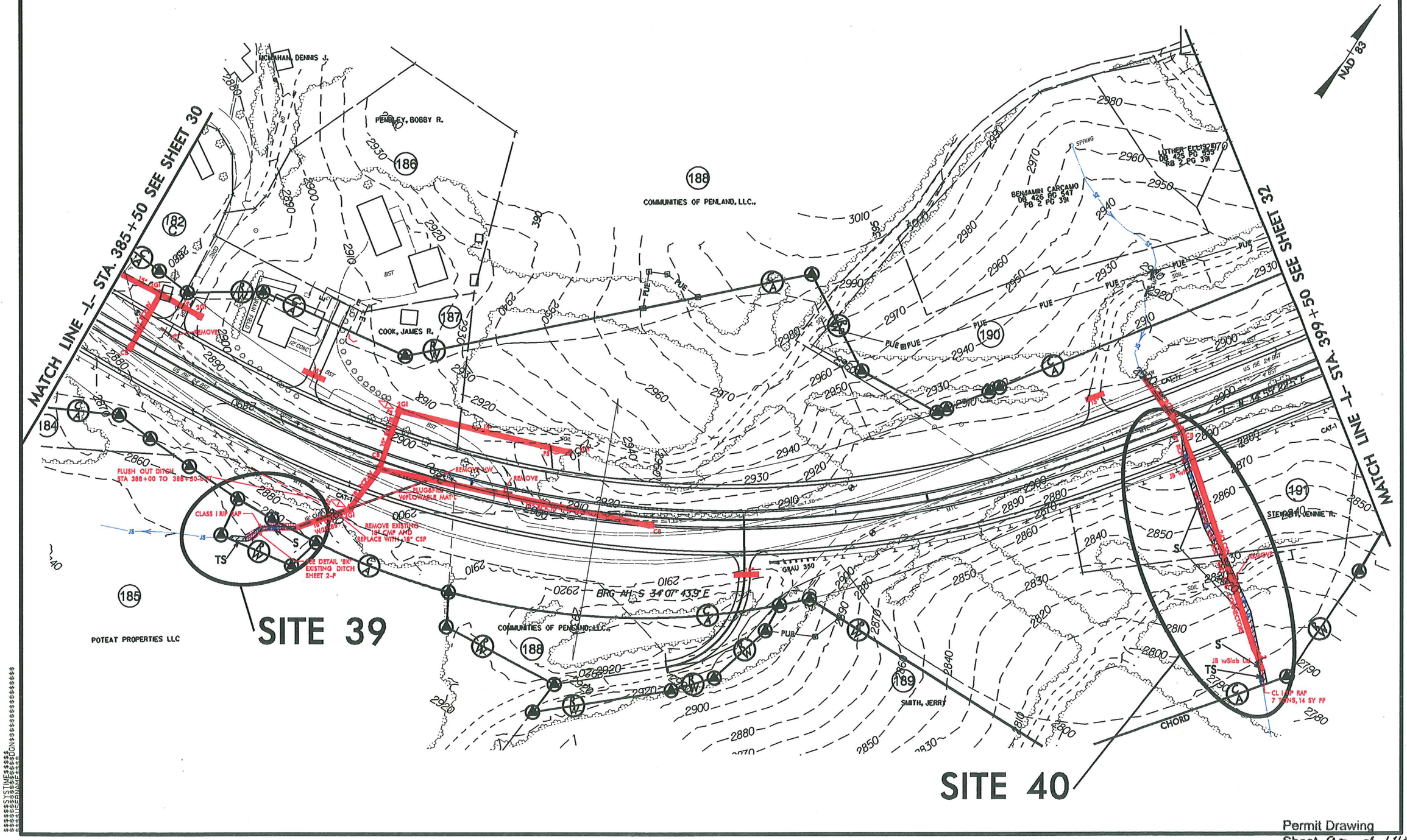
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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



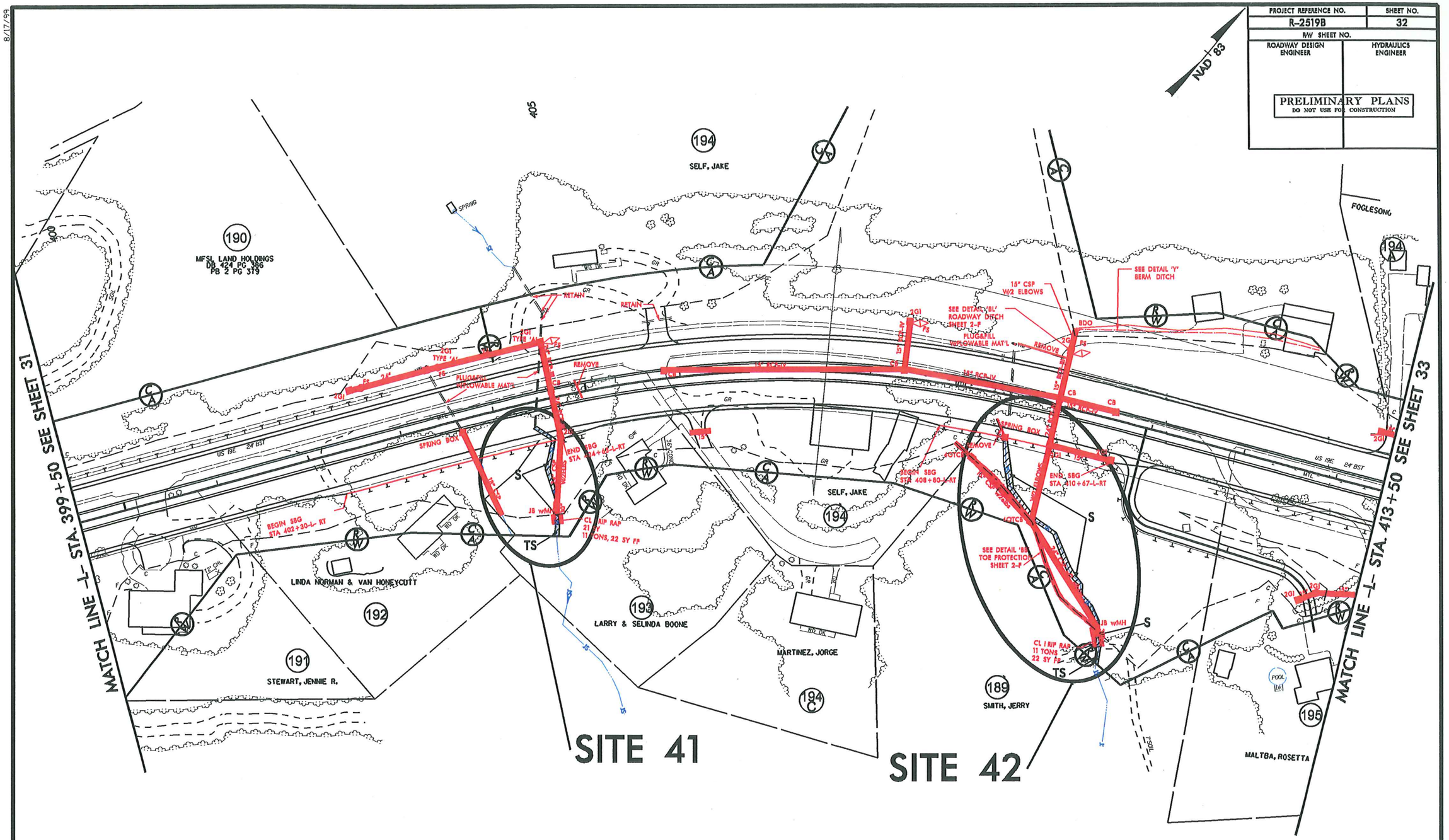
Permit Drawing
Sheet 97 of 114

Permit Drawing
Sheet 95 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

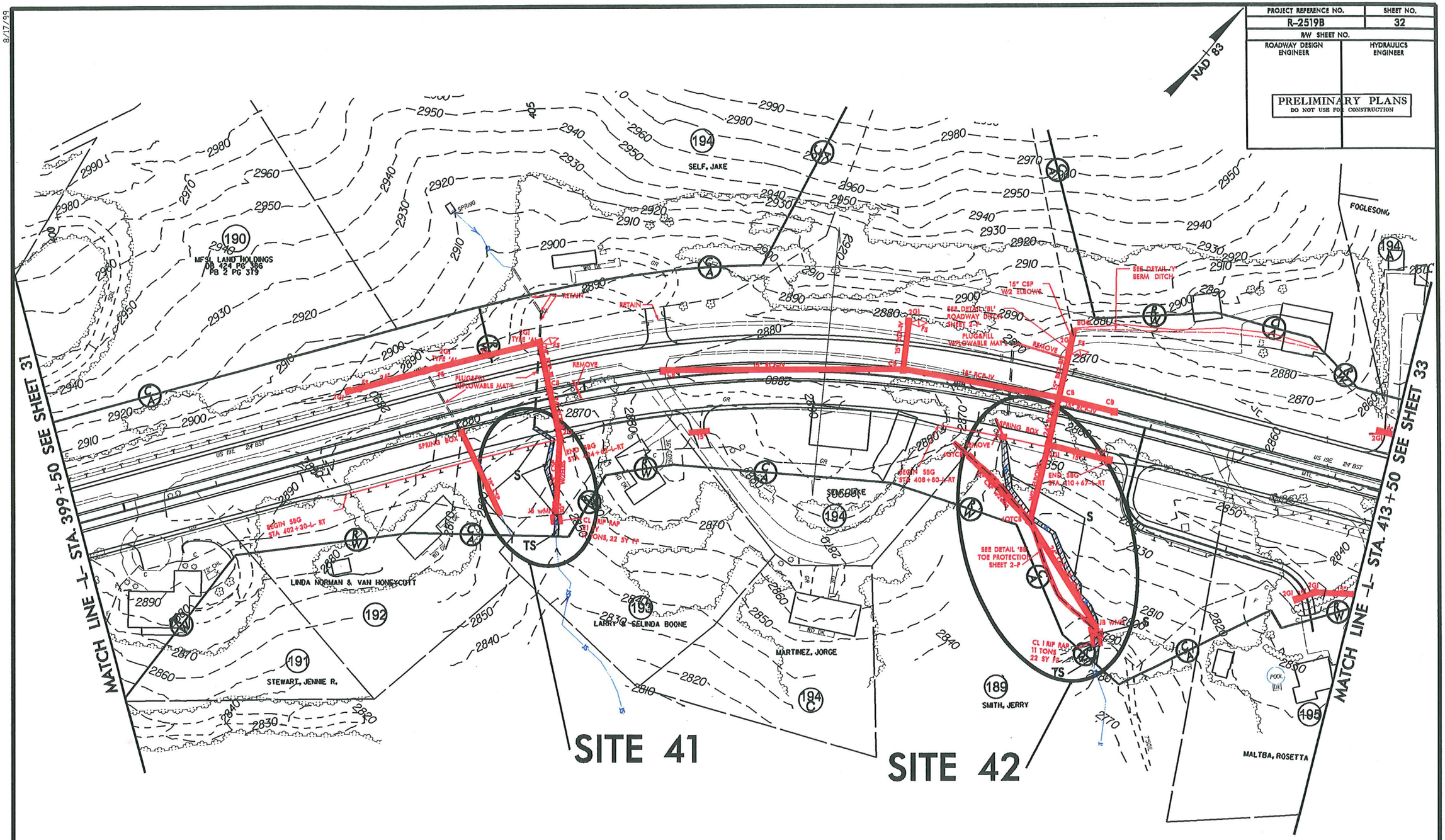
50' 0' 50' 100' 150'
GRAPHIC SCALE

Permit Drawing
Sheet 99 of 114

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

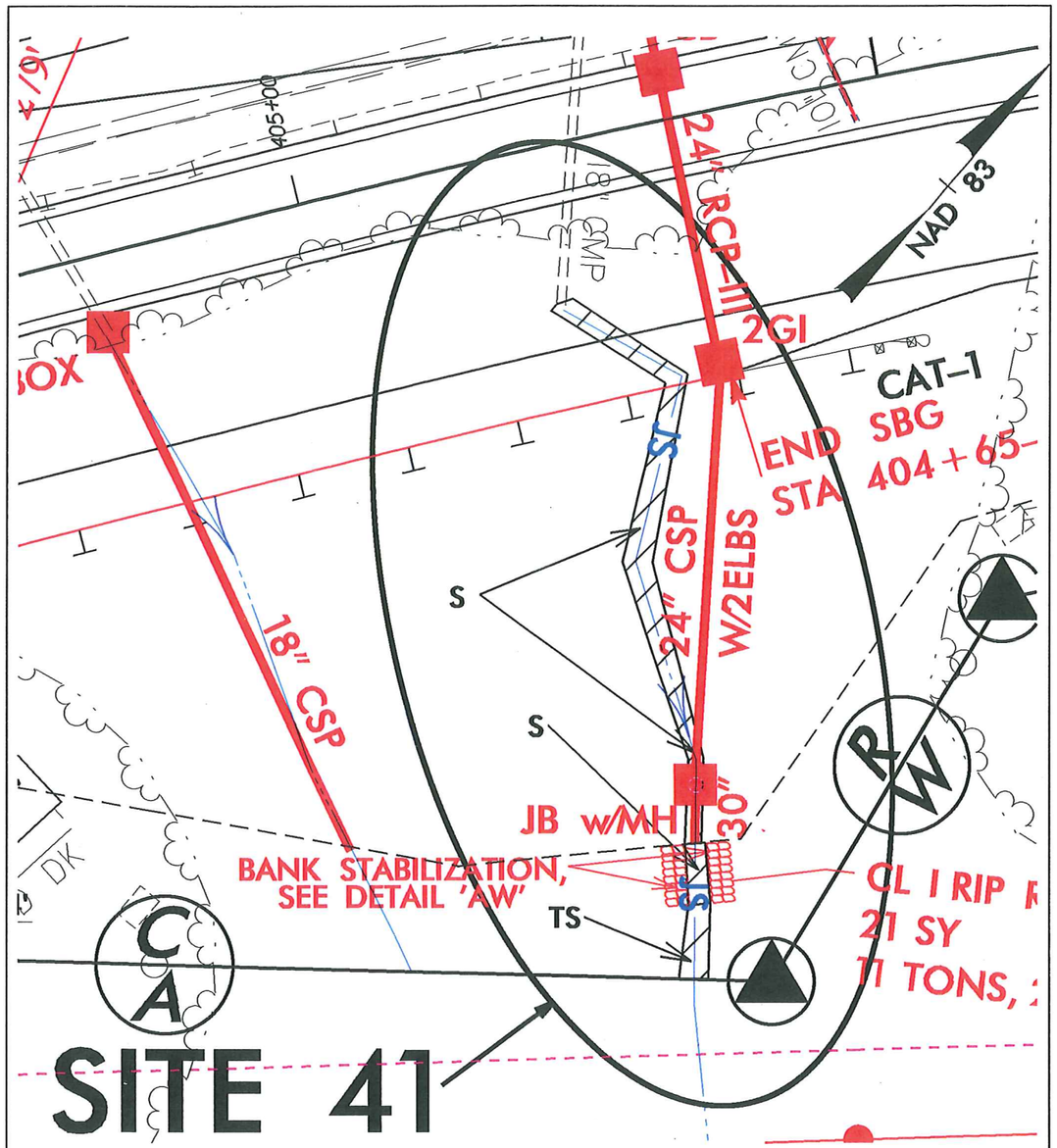


S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 100 of 114



IMPACT ENLARGEMENT

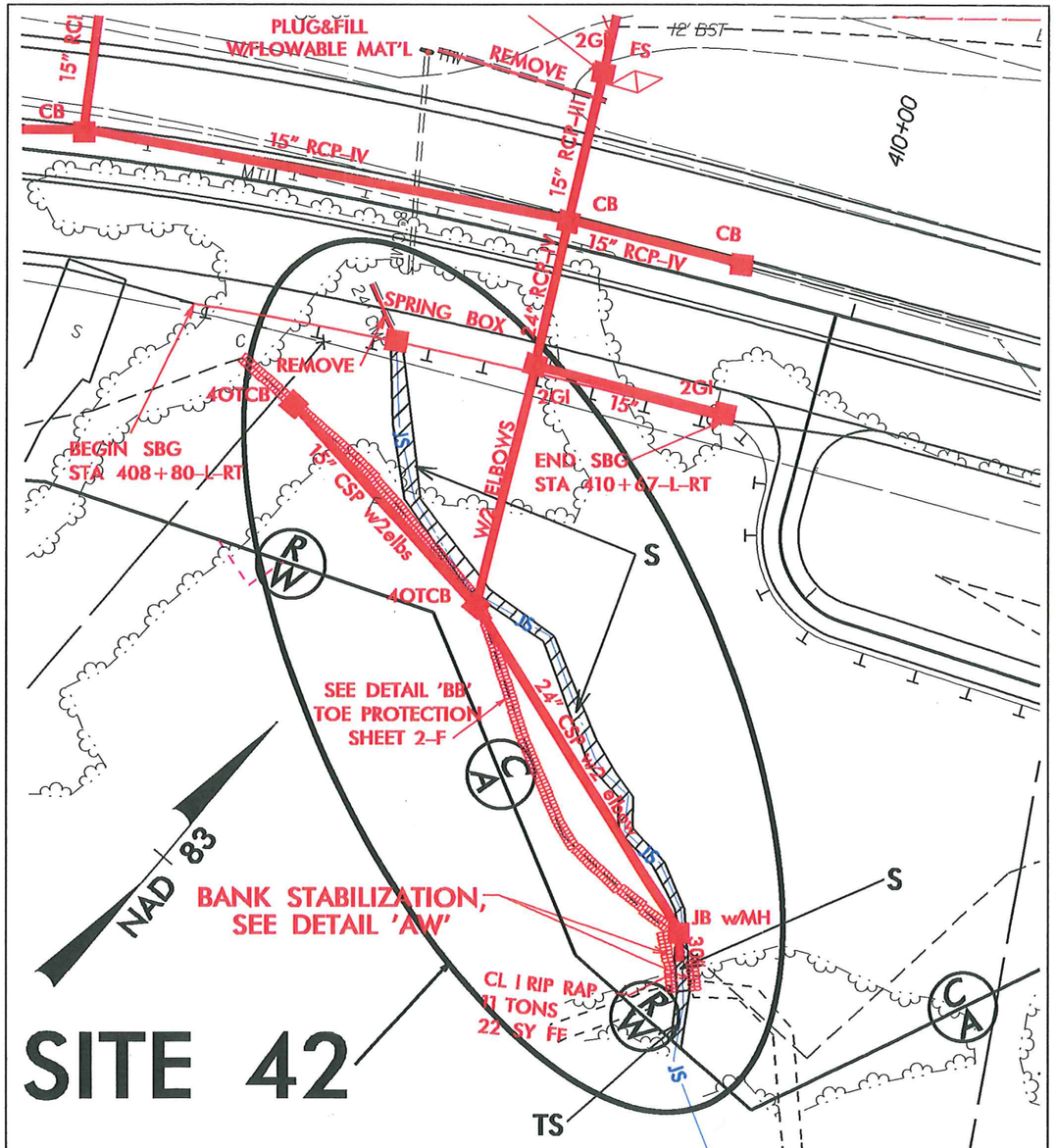
S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25' 0' 25'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTRY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

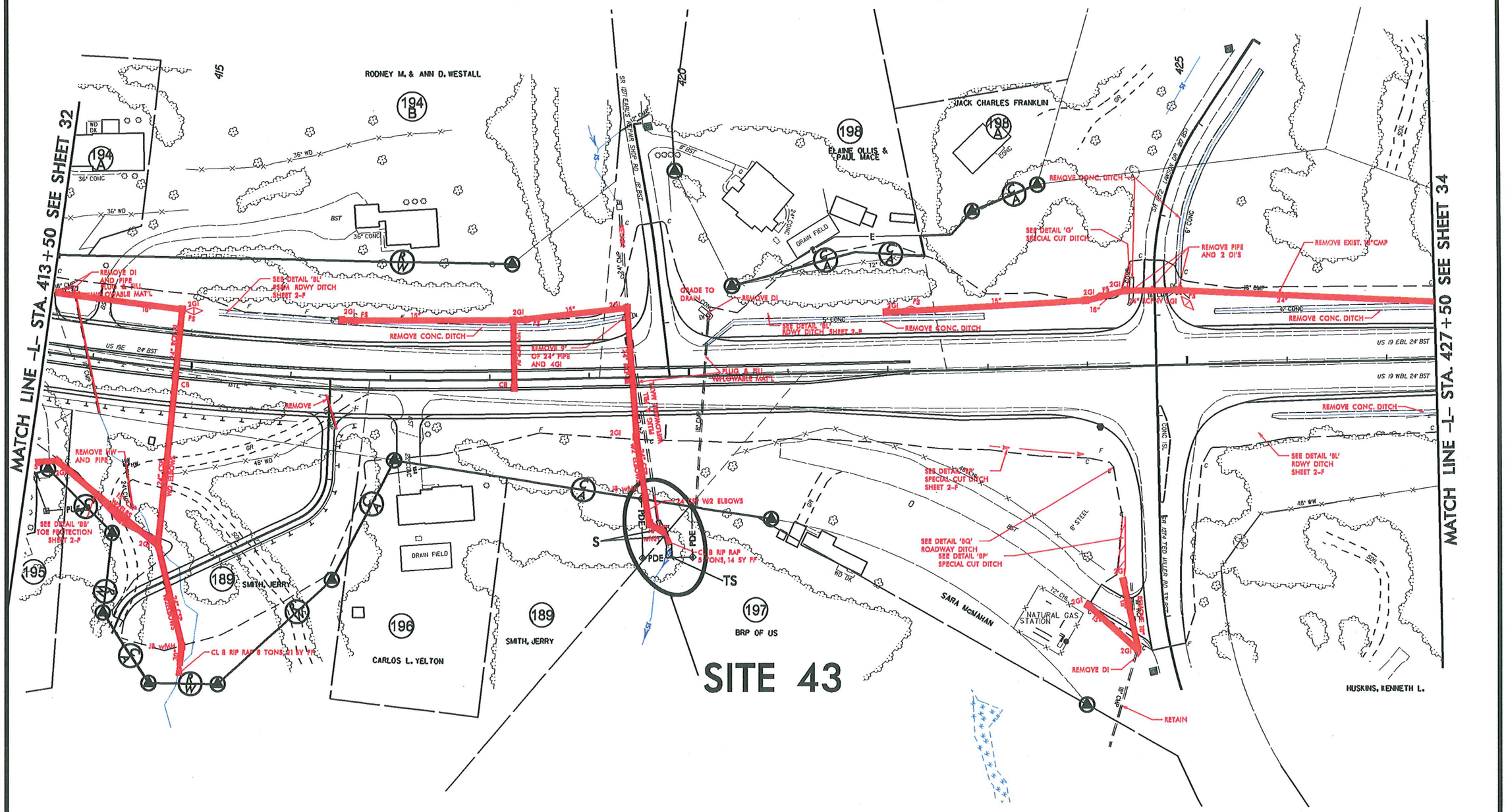
SHEET OF 05/14/13

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



S S DENOTES IMPACTS IN SURFACE WATER

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

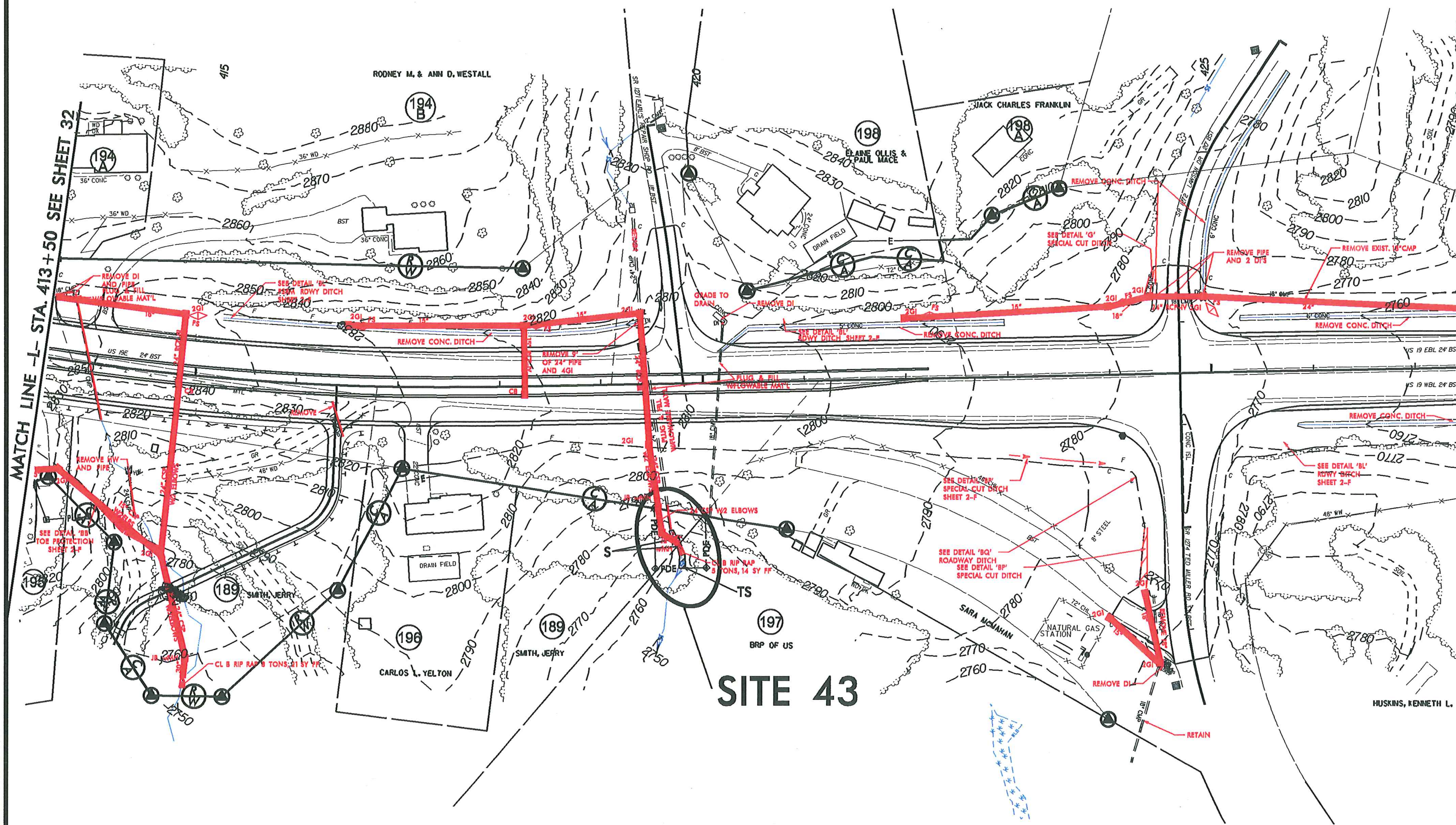
Permit Drawing
Sheet 102 of 114

SYSTIME$$$$$$$$$$
SYSDATE$$$$$$$$$$
USERNAME$$$$$$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99



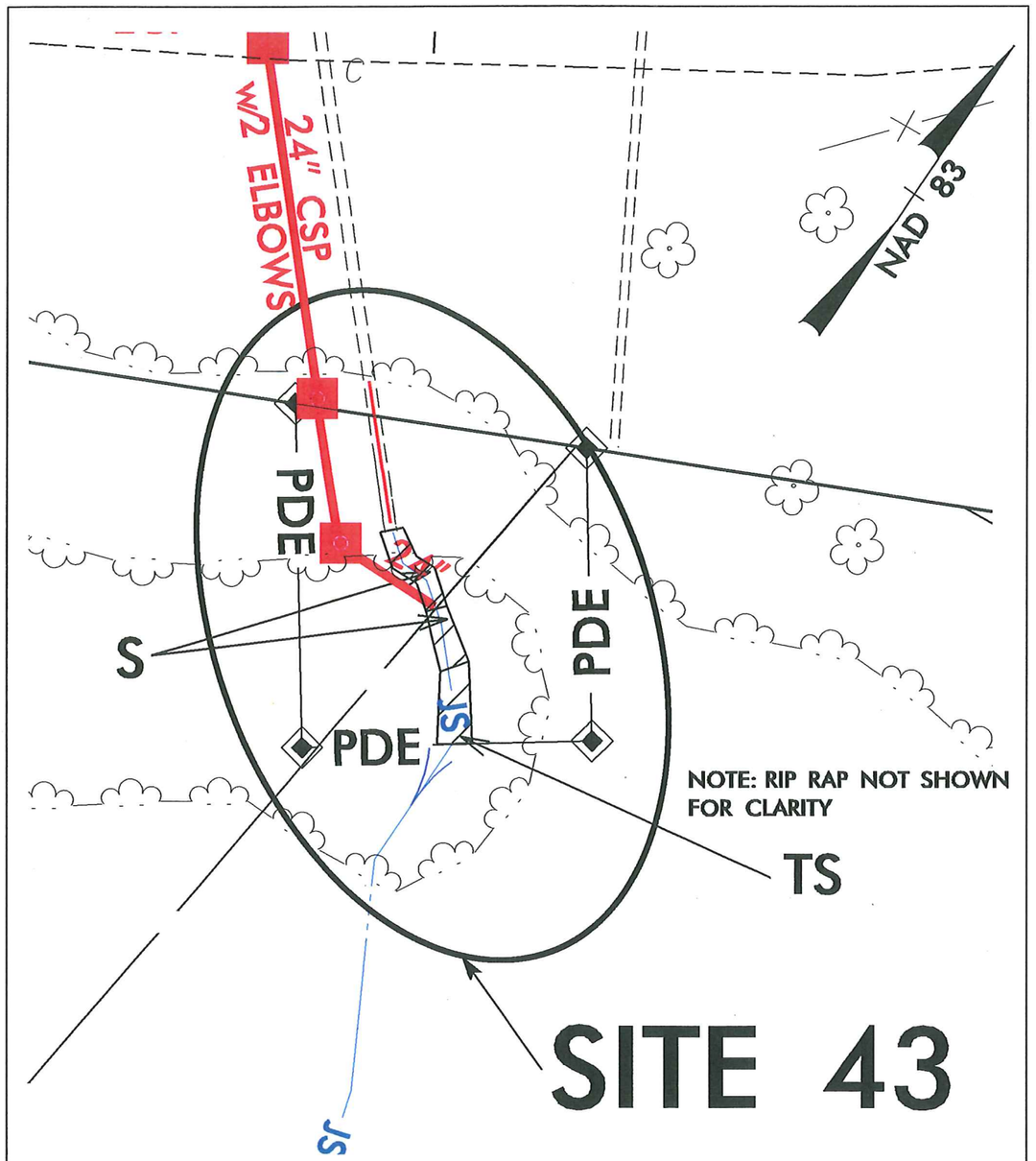
DENOTES IMPACTS IN SURFACE WATER

DENOTES TEMPORARY IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 103 of 114

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



IMPACT ENLARGEMENT

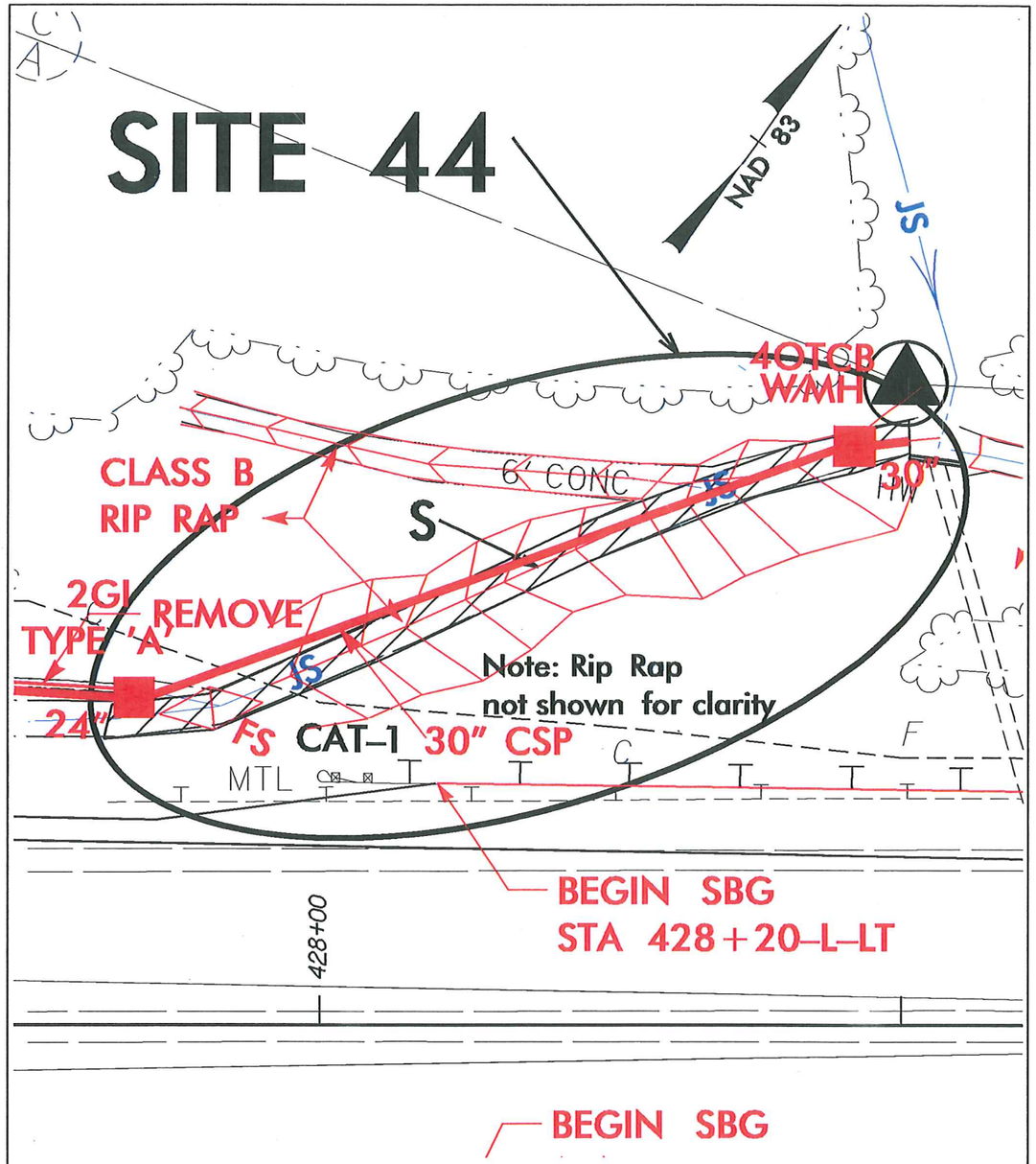
S/S DENOTES IMPACTS IN SURFACE WATER

TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

25′ 0′ 25′
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13



IMPACT ENLARGEMENT

S/S DENOTES IMPACTS IN SURFACE WATER

25′ 0′ 25′
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

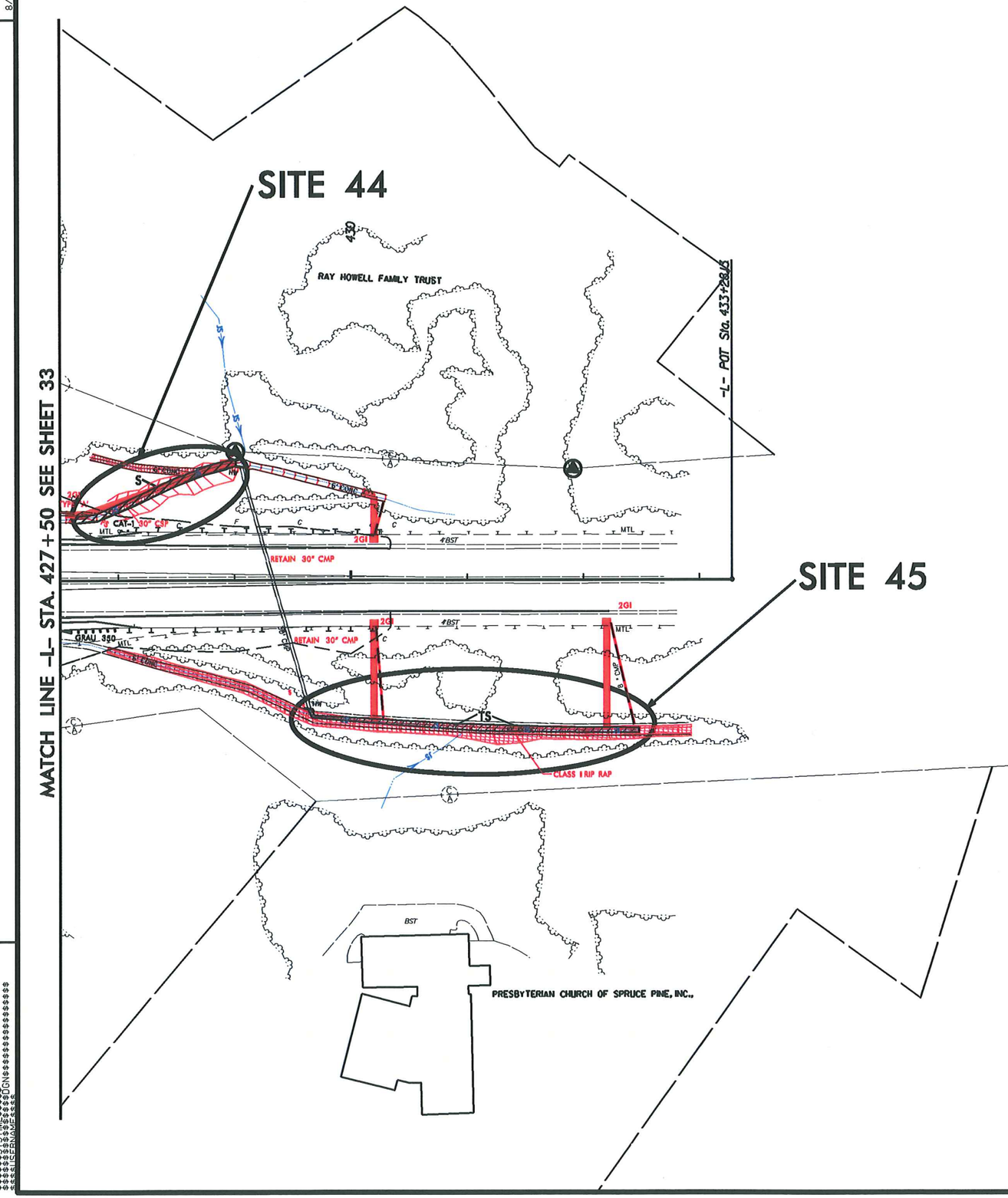
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS



TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SF SF DENOTES IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 105 of 114

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

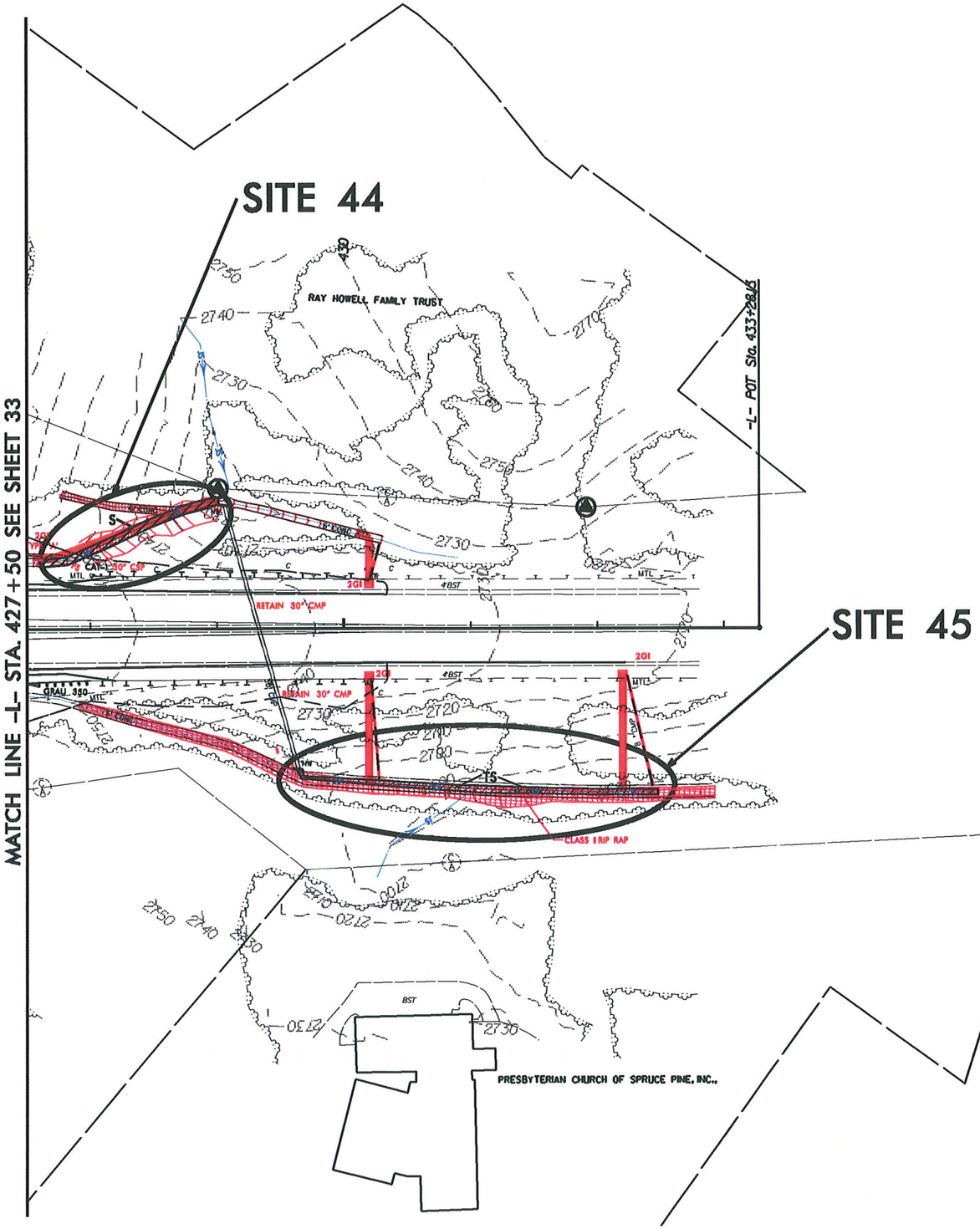
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

8/17/99

REVISIONS

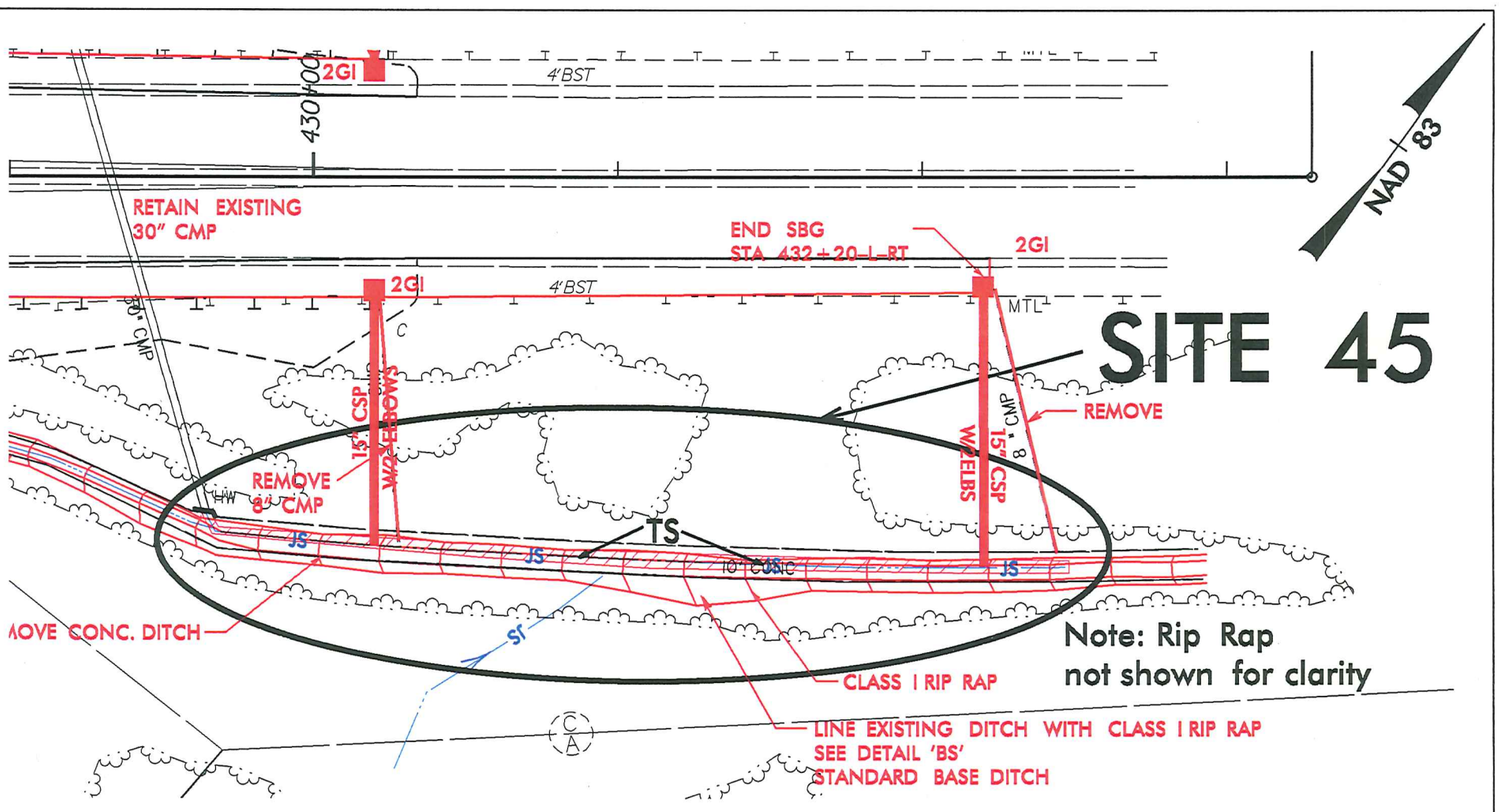


TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

S S DENOTES IMPACTS IN SURFACE WATER

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

Permit Drawing
Sheet 106 of 114



IMPACT ENLARGEMENT

TS TS DENOTES TEMPORARY IMPACTS IN SURFACE WATER

50' 0' 50'
GRAPHIC SCALE

NCDOT
DIVISION OF HIGHWAYS
YANCEY / MITCHELL COUNTY
PROJECT: 35609.1.1 (R-2519B)
US 19 EAST FROM NC 80
IN YANCEY TO WEST OF
SPRUCE PINES IN MITCHELL

SHEET OF 05/14/13

WETLAND PERMIT IMPACT SUMMARY SHEET 1 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
2UT2A	1	23+45 -L-	54" RCP						0.01		43			
2A	2	44+50 -L-	4 @ 12'X10' RCBC						0.09		117			
		Little Crabtree Ck.	Floodplain Bench						0.07		118			
			Temp. Const.							0.06		97		
SA	2A	9+70 -Y4-	Base Ditch								27			
			Lateral Base Grass Swale								38			
			Temp. Const. (Inlet side)							0.01		44		
2B	3	55+00 -L-	48" RCP						0.02		303			
			Temp. Const.							<0.01		21		
			Bank Stabilization						<0.01		12			
UT2B	3	55+00 -L- LT	Roadway Fill						<0.01		8			
2C	4	79+00 -L-	36" RCP & 42" RCP						0.02		97			
		Phipps Ck.	Bank Stabilization								44			
			Temp. Const.							<0.01		15		
SB	4A	99+65 -L-	36" RCP						0.01		18			
			Rip Rap						0.01		16			
STR	5	122+50 -L-	315' BRIDGE						<0.01	0.15		160		Perm. surface water imp. due to piers = 31.8 SQ. FT., (0.15ac=6,534 sf)
2D	5A	123+00 -L-	STREAM RELOC.*								148		148	Site 5A is an in-kind stream relocation of Long Branch (See Sht 12A)
														Length of natural stream design equals length of culvert
2D	6	126+50 -L-	2 @ 6'X6' RCBC Removal							0.01		57	144	
			Rock Cross Vanes							<0.01	28			
2D	7	135+00 -L-	2 @ 6'X6' RCBC						0.04		144			
		138+00 -L-	2 @ 6'X6' RCBC						0.04		214			
		Long Branch Ck.	Temp. Const.							<0.01		15		
UT2D	7A	136+00 -L-	Roadway Fill						<0.01		24			
2UT2D	7B	137+50 -L-	30" Alternate Pipe						0.02		131			
3UT2D	7C	139+50 -L-	54" RCP						<0.01		70			
			Temp. Const.							<0.01		15		
TOTAL SHEET 1:									0.33	0.25	1600	424	292	

WETLAND PERMIT IMPACT SUMMARY SHEET 2 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
2D	8	152+00/157+50-L-	Stream Relocation			0.014	0.037		0.07		432		449	
7UT2D8A	8A	150+90 -L-	36"CSP/36" RCP						0.05		79			
			Rip Rap Outlet						<0.01		15			
			Pipe Installation							<0.01		11		
2D	8B	155+00 -L-	7'X7' & 7'X5' RCBC ext.						0.01		58			
2D	8C	158+00 -L-	8'X6' RCBC						0.01		69			
			Temp. Const.							0.01		11		
11UT2D/2D	9	179+80 -L-	36" CMP Removal							<0.01		10	40	Includes 40' of stream that will be restored due to pipe removal
			Bank Stabilization						0.01		37			
12UT2D	10	182+80 -L-	36" RCP						0.02	<0.01	96	15		
			Rip Rap/Base Ditch						0.02		87			
2D	11	186+50 -L-	Bank Stabilization						0.01		50			
13UT2D	12	191+50 -L-	42" RCP						0.01		79			
			Temp. Const.							<0.01		25		
2DM	13	195+00 -L-	Roadway Fill	0.06					0.01		110			
2D	13													
2D	14	197+00 -L-	Roadway Fill						0.02		220			
2D	15	198+50 -L-	Roadway Fill						<0.01		59			
			24" CSP						<0.01		19			
			Temp. Const.							<0.01		15		
TOTAL SHEET 2:				0.06		0.01	0.04		0.25	0.02	1410	87	489	

WETLAND PERMIT IMPACT SUMMARY SHEET 3 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
1H	16	205+66 -L-	36" RCP						<0.01		32			
			Bank Stabilization						<0.01		50			Includes 40' of pipe removal
UT1H	17	206+55 -L-	18" CSP						<0.01		33			
			Bank Stabilization						<0.01		20			
2UT1H	18	214+00 -L-	Stream Relocation						0.02	<0.01	152	8		
			New Channel										70	
1I	19	12+00 -Y21-	48" Pipe						0.03		132			
			Rip Rap Energy Dissipator								12			
1IC	20	244+50 -L-	Excavation			0.037								
1I	21	246+00 -L-	Stream Relocation						0.04		412		396	
1CC	22	247+85 -L-	Culvert Removal/Replace with Bridge							0.17		177		Includes 123' of culvert removal, 40' of daylighting
			Bank Stabilization						0.01		23			
UT1CC	23	15+00 -Y23A-	60" RCP						<0.01	<0.01	27	34		
			Bank Stabilization								20			
TOTAL SHEET 3:						0.04			0.12	0.17	913	219	466	

Yancey

Mitchell

WETLAND PERMIT IMPACT SUMMARY SHEET 4 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
UT1CC	24	281+50 -L-	Stream Relocation						0.03	<0.01	175	12		
2E	25	300+00 -L-	Stream Relocation						0.02	<0.01	174	15	94	Includes 94' of stream relocation
2E	26	302+50 -L-	60"CSP						0.02		129			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		15		
SD	27	305+50 -L-	24" CSP						<0.01		56			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		10		
SE	28	317+00 -L-	30" RCP						<0.01		80			
			Rip Rap						0.01		40			
SL	28A	316+00 -L-	Roadway Fill						0.01		141			
2BC	29	320+00 -L-	3 @ 8'X8' RCBC						0.03		64			
		BRUSHY CREEK	Fish Ladder						0.01		25			
		320+50 -L-	Bank Stabilization						0.02		62			
			Temp. Const.							0.01		30		
1G	29A	320+00 -L-	Roadway Fill/St. Reloc.						0.03		149			
TOTAL SHEET 4:									0.18	0.01	1115	82	94	

WETLAND PERMIT IMPACT SUMMARY SHEET 5 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
1G	30	324+00 -L-	Stream Relocation						0.05		321		635	Stream Relocation see details
			Temp. Const.							<0.01		10		
1G	31	327+50 -L-	2 @ 7'X7' RCBC						0.01	0.01	59	31		
			Bank Stabilization						0.01		32			
8UT1G	32	345+00 -L-	24" RCP						0.01	<0.01	52	10		
1G	33	346+50 -L-	2 @ 7'X6' RCBC /						0.07		444			
			Stream Relocation										300	
5UT1G	34	11+00 -Y34-	6'X7' RCBC						<0.01		33			
			Bank Stabilization								23			
			Temp. Const.							0.02		118		
SF	35	358+50 -L-	Stream Realignment						0.01		46		46	Includes 46' of stream realignment
			30" Welded Steel						<0.01		42			
		357+89 -L- (RT)	Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		8		
	36	N/A												
SG	37	368+50 -L-	42" RCP/ Stream Reloc.						0.02		247			
		366+54 -L- (RT)	Bank Stabilization						<0.01		10			
TOTAL SHEET 5:									0.18	0.03	1319	177	981	

WETLAND PERMIT IMPACT SUMMARY SHEET 6 OF 7

				WETLAND IMPACTS					SURFACE WATER IMPACTS					
Feature	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)	Notes
1D	38	384+00 -L-	24"						<0.01		22			
		383+79 -L- (RT)	Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		5		
SH	39	388+00 -L-	Rip Rap						<0.01		58			
			Temp. Const.							<0.01		15		
SI	40	397+75 -L-	24" CSP						0.03		258			
			Rip Rap						<0.01		11			
			Temp. Const.							<0.01		15		
1C	41	404+50 -L-	24" CSP						0.01		103			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		15		
1Z	42	409+00 -L-	15" CSP & 24" CSP						0.03		244			
			Bank Stabilization						<0.01		10			
			Temp. Const.							<0.01		18		
SJ	43	419+75 -L-	24" CSP						<0.01		16			
			Rip Rap						<0.01		10			
			Temp. Const.							<0.01		15		
SKA	44	428+50 -L-	30" CSP						0.02		147			
SK	45	431+00 -L-	Ditch Lined /							0.03		288		(288') Existing concrete ditch replaced with (288') rip rap
			Class I Rip Rap											No Net Loss
TOTAL SHEET 6:									0.10	0.04	899	371		

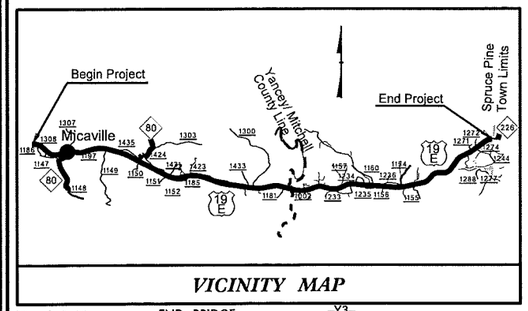
	WETLAND IMPACTS					SURFACE WATER IMPACTS					
	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	Notes
Total Sheet 1						0.33	0.25	1600	424	292	
Total Sheet 2	0.06		0.01	0.04		0.25	0.02	1410	87	489	
Total Sheet 3			0.04			0.12	0.17	913	219	466	
Total Sheet 4						0.18	0.01	1115	82	94	
Total sheet 5						0.18	0.03	1319	177	981	
Total sheet 6						0.10	0.04	899	371		
TOTAL	0.06		0.05	0.04		1.15	0.52	7256	1360	2322	

09/08/99

TIP PROJECT: R-2519B

CONTRACT:

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



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

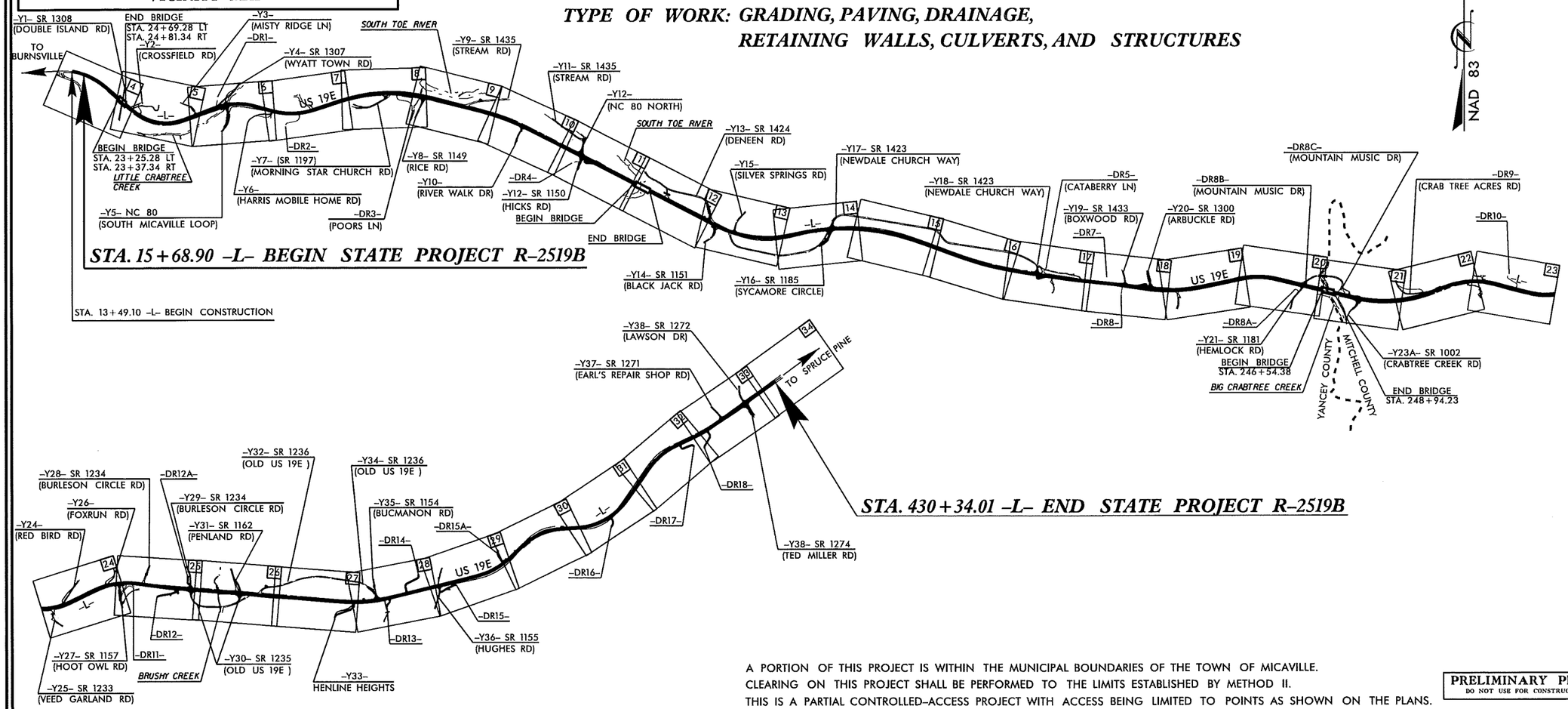
YANCEY/MITCHELL COUNTIES

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2519B	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
35609.1.1		PE
35609.2.2		R/W, UTIL

LOCATION: US 19E FROM SR 1186 (OLD US 19) IN YANCEY COUNTY TO MULTI-LANE SECTION WEST OF SPRUCE PINE IN MITCHELL COUNTY

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



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE TOWN OF MICAVILLE.
CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II.
THIS IS A PARTIAL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS AS SHOWN ON THE PLANS.

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 2014 = 13,277
ADT 2034 = 19,181
DHV = 11 %
D = 60 %
T = 7 % *
V = 60 MPH
* (TTST 3% + DUAL 4%)
FUNC. CLASS. = ARTERIAL
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2519B	=	7.724 MI
LENGTH STRUCTURE TIP PROJECT R-2519B	=	0.129 MI
TOTAL LENGTH TIP PROJECT R-2519B	=	7.853 MI

Prepared In the Office of:
DIVISION OF HIGHWAYS
1000 Birch Ridge Dr., Raleigh NC, 27610

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JANUARY 27, 2012

LETTING DATE: FEBRUARY 18, 2014

G. E. BREW, PE
PROJECT ENGINEER

THAD F. DUNCAN, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

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$$$$USERNAME$$$$

04/16/11

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	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 — EP
- 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

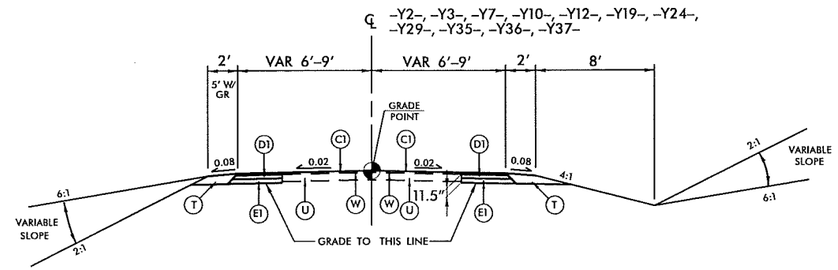
MISCELLANEOUS:

- 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.

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

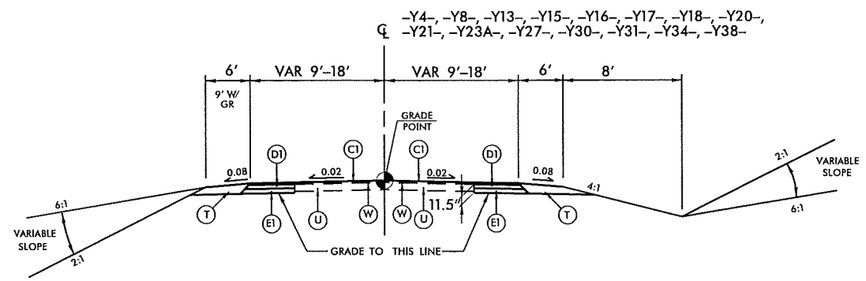
PREL. PAVE. SCHEDULE	
C1	3" S9.5B
C2	VAR. S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	4½" B25.0B
E2	VAR. B25.0B
J1	6" AGGREGATE
J2	10" AGGREGATE
T	EARTH MATERIAL
U	EXISTING PAVE.
W	WEDGING
Y	6" CONC. DRIVEWAY



TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

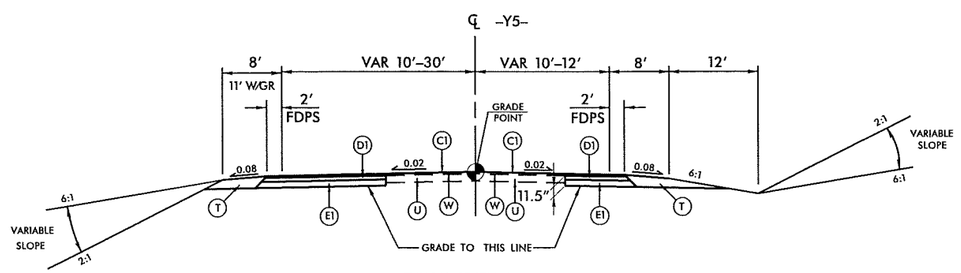
–Y2– STA. 10+00.00 TO –Y2– STA. 12+36.38
–Y3– STA. 11+90.00 TO –Y3– STA. 13+43.89
–Y7– STA. 10+34.00 TO –Y7– STA. 11+75.00
–Y10– STA. 10+34.00 TO –Y10– STA. 13+00.00
–Y12– STA. 13+88.07 TO –Y12– STA. 16+00.00
–Y19– STA. 10+25.00 TO –Y19– STA. 12+51.25
–Y24– STA. 10+26.52 TO –Y24– STA. 13+95.85
–Y29– STA. 12+50.00 TO –Y29– STA. 14+11.60
–Y35– STA. 11+00.00 TO –Y35– STA. 11+89.08
–Y36– STA. 10+35.82 TO –Y36– STA. 11+50.00
–Y37– STA. 11+00.00 TO –Y37– STA. 12+19.54



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

–Y4– STA. 10+00.00 TO –Y4– STA. 11+25.00
–Y8– STA. 10+47.11 TO –Y8– STA. 12+64.81
–Y13– STA. 14+82.34 TO –Y13– STA. 17+94.22
–Y15– STA. 13+25.00 TO –Y15– STA. 14+09.34
–Y16– STA. 13+25.00 TO –Y16– STA. 14+50.00
–Y17– STA. 13+50.00 TO –Y17– STA. 15+45.33
–Y18– STA. 12+75.00 TO –Y18– STA. 15+11.95
–Y20– STA. 10+10.00 TO –Y20– STA. 12+93.26
–Y21– STA. 10+35.20 TO –Y21– STA. 13+00.00
–Y23A– STA. 10+47.59 TO –Y23A– STA. 15+35.00
–Y27– STA. 10+34.00 TO –Y27– STA. 13+99.84
–Y30– STA. 10+34.19 TO –Y30– STA. 12+85.00
–Y31– STA. 11+16.59 TO –Y31– STA. 14+78.75
–Y34– STA. 10+40.00 TO –Y34– STA. 13+12.33
–Y38– STA. 12+45.00 TO –Y38– STA. 13+15.67
–Y38– STA. 13+95.67 TO –Y38– STA. 16+30.00



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

–Y5– STA. 10+46.00 TO –Y5– STA. 14+15.32

6/2/99

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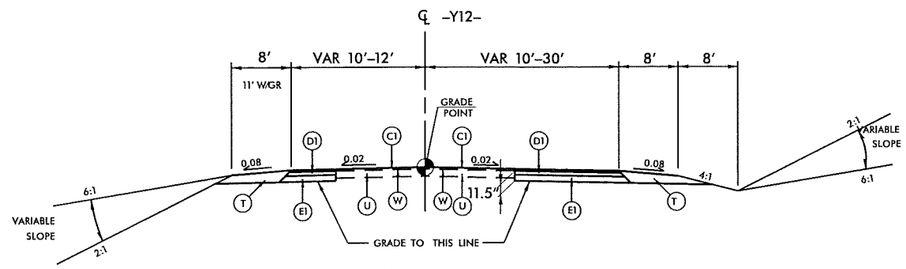
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-B
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

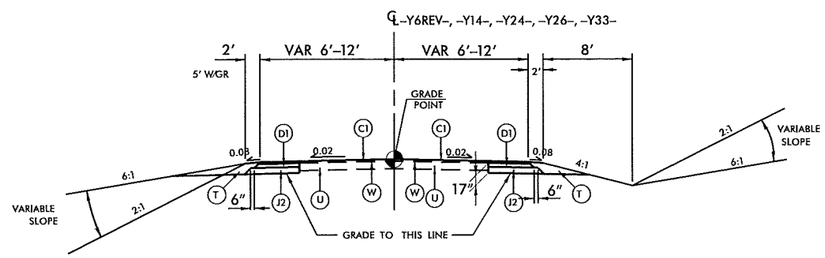
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PREL. PAVE. SCHEDULE	
C1	3" S9.5B
C2	VAR. S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	4½" B25.0B
E2	VAR. B25.0B
J1	6" AGGREGATE
J2	10" AGGREGATE
T	EARTH MATERIAL
U	EXISTING PAVE.
W	WEDGING
Y	6" CONC. DRIVEWAY



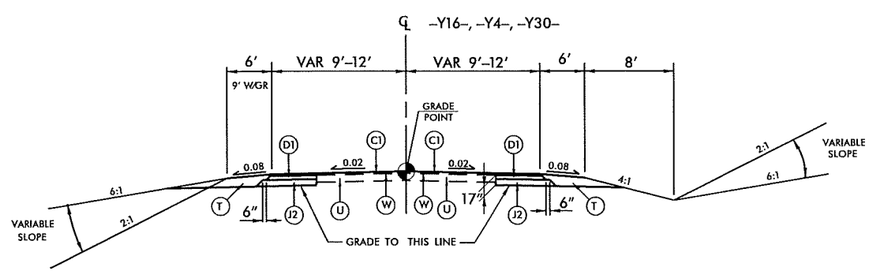
TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6
-Y12- STA. 10+03.00 TO -Y12- STA. 13+05.24



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7
-Y6REV- STA. 10+34.00 TO -Y6REV- STA. 14+06.45
-Y14- STA. 10+34.04 TO -Y14- STA. 11+75.00
-Y24- STA. 10+26.52 TO -Y24- STA. 13+95.85
-Y26- STA. 10+45.40 TO -Y26- STA. 13+26.12
-Y33- STA. 10+34.00 TO -Y33- STA. 14+72.94



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8
-Y4- STA. 11+25.00 TO -Y4- STA. 14+10.49
-Y16- STA. 10+35.21 TO -Y16- STA. 13+25.00
-Y30- STA. 19+22.00 TO -Y30- STA. 21+67.88

6/2/99

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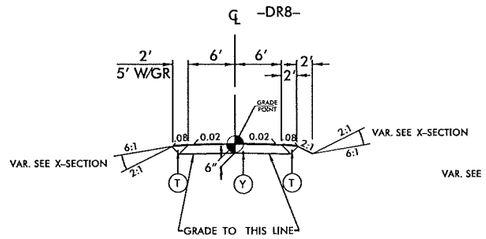
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

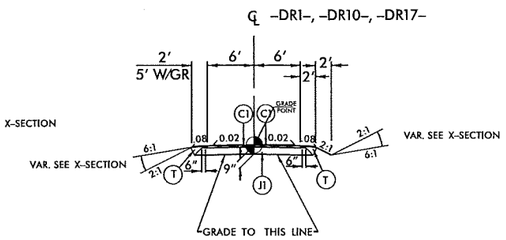
PREL. PAVE. SCHEDULE	
C1	3" S9.5B
C2	VAR. S9.5B
D1	4" I19.0B
D2	VAR. I19.0B
E1	4½" B25.0B
E2	VAR. B25.0B
R5	2'-6" C & G
J1	6" AGGREGATE
J2	10" AGGREGATE
T	EARTH MATERIAL
U	EXISTING PAVE.
W	WEDGING
Y	6" CONC. DRIVEWAY



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11

-DR8- STA. 10+38.02 TO -DR8- STA. 11+60.00

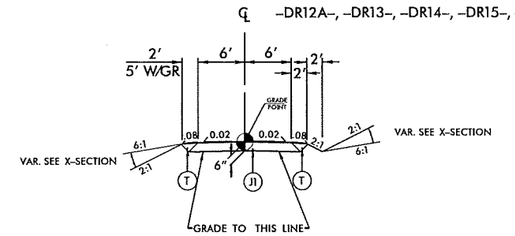


TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

-DR1- STA. 10+50.00 TO -DR1- STA. 11+45.88
-DR10- STA. 10+00.00 TO -DR10- STA. 12+97.36
-DR17- STA. 10+34.00 TO -DR17- STA. 13+20.00

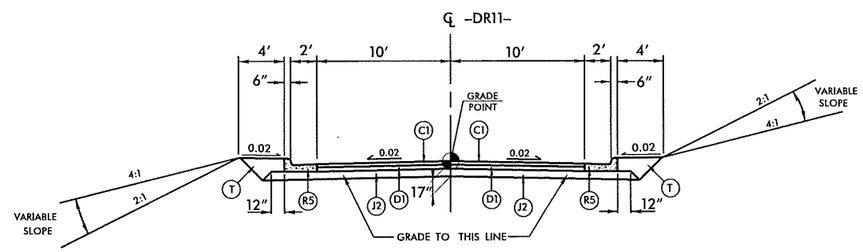
-DR2-, -DR3-, -DR4-, -DR5-, -DR7-, -DR8A-, -DR9-, -DR12-,
-DR12A-, -DR13-, -DR14-, -DR15-, -DR16-, -DR18-



TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

-DR2- STA. 10+34.00 TO -DR2- STA. 13+74.53
-DR3- STA. 10+35.21 TO -DR3- STA. 14+84.07
-DR4- STA. 10+22.79 TO -DR4- STA. 11+08.00
-DR5- STA. 10+12.00 TO -DR5- STA. 11+45.31
-DR7- STA. 10+32.31 TO -DR7- STA. 12+34.37
-DR8A- STA. 10+09.14 TO -DR8A- STA. 10+69.90
-DR9- STA. 10+50.00 TO -DR9- STA. 16+01.72
-DR12- STA. 10+35.20 TO -DR12- STA. 14+25.00
-DR12B- STA. 10+00.00 TO -DR12B- STA. 10+65.38
-DR13- STA. 10+34.00 TO -DR13- STA. 12+20.00
-DR14A- STA. 10+60.00 TO -DR14A- STA. 14+15.00
-DR15- STA. 10+10.37 TO -DR15- STA. 13+30.94
-DR16- STA. 10+34.00 TO -DR16- STA. 12+01.17
-DR18- STA. 10+34.00 TO -DR18- STA. 13+60.00
-DR8B- STA. 10+25.00 TO -DR8B- STA. 11+53.30
-DR8C- STA. 10+70.00 TO -DR8C- STA. 12+81.55
-DR19- STA. 10+34.10 TO -DR19- STA. 12+44.00
-DR20- STA. 10+08.27 TO -DR20- STA. 13+58.00



TYPICAL SECTION NO. 12

USE TYPICAL SECTION NO. 10

-DR11- STA. 10+10.00 TO -DR1- STA. 14+45.00

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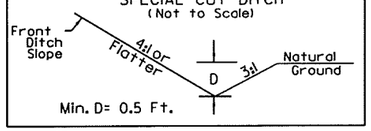
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

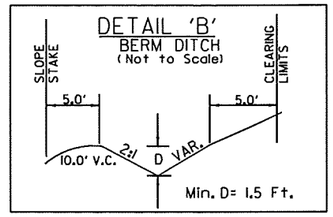
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DETAIL 'A'
SPECIAL CUT DITCH
(Not to Scale)



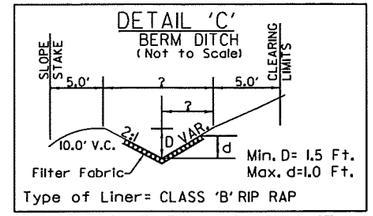
FROM STA. 19+00 TO STA. 21+00 -L- RT

DETAIL 'B'
BERM DITCH
(Not to Scale)



FROM STA. 18+00 TO STA. 18+50 -L- LT

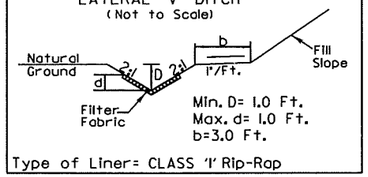
DETAIL 'C'
BERM DITCH
(Not to Scale)



Type of Liner= CLASS 'B' RIP RAP

FROM STA. 18+50 TO STA. 19+50 -L- LT

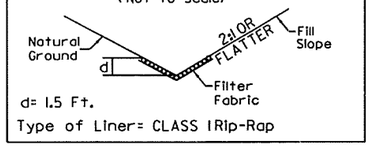
DETAIL 'D'
LATERAL 'V' DITCH
(Not to Scale)



Type of Liner= CLASS 'I' Rip-Rap

FROM STA. 21+50 TO STA. 23+25 -L- LT

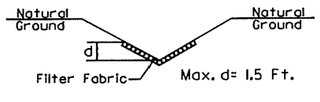
DETAIL 'E'
TOE PROTECTION
(Not to Scale)



Type of Liner= CLASS I Rip-Rap

FROM STA. 22+10 TO STA. 22+70 -L- RT

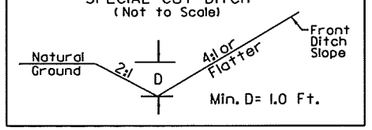
DETAIL 'F'
EXISTING DITCH
(Not to Scale)



Type of Liner= CLASS 'I' Rip-Rap

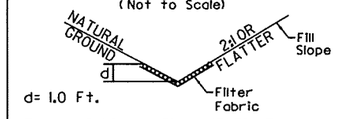
FROM STA. 22+70 TO STA. 23+80 -L- RT

DETAIL 'G'
SPECIAL CUT DITCH
(Not to Scale)



FROM STA. 71+20 TO STA. 71+60 -L- LT
FROM STA. 12+50 TO STA. 12+75 -Y38- RT
FROM STA. 13+70 TO STA. 14+30 -DR3- RT
FROM STA. 12+00 TO STA. 12+50 -Y31- LT

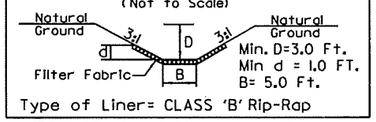
DETAIL 'H'
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

FROM STA. 52+80 TO STA 53+50 -L- RT
FROM STA. 58+50 TO STA. 59+00 -L- RT
FROM STA. 91+50 TO STA. 92+00 -L- LT
FROM STA. 139+00 TO STA. 140+50 -L- RT
FROM STA. 276+00 TO STA. 276+50 -L- LT
FROM STA. 283+50 TO STA. 284+00 -L- LT
FROM STA. 282+00 TO STA. 284+50 -L- RT
FROM STA. 10+80 TO STA. 11+80 -Y23A- LT

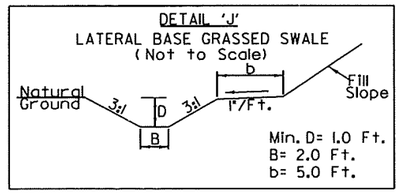
DETAIL 'I'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap

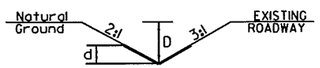
FROM STA. 46+10 TO STA. 46+50 -L- LT

DETAIL 'J'
LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 46+50 TO STA. 49+50 -L- LT
FROM STA. 237+00 TO STA. 241+00 -L- RT

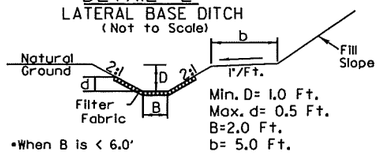
DETAIL 'K'
STANDARD 'V' DITCH
(Not to Scale)



Type of Liner= PSRM

FROM STA. 12+92 TO STA. 15+20 -Y1- LT

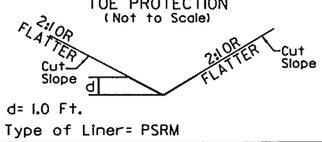
DETAIL 'L'
LATERAL BASE DITCH
(Not to Scale)



*When B is < 6.0'
Type of Liner= CLASS 'B' Rip-Rap

FROM STA. 49+50 TO STA. 50+50 -L- LT

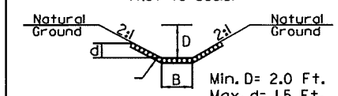
DETAIL 'M'
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 48+00 TO STA. 51+50 -L- RT

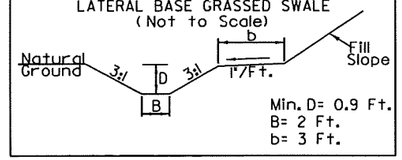
DETAIL 'N'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= Class 'B' Rip-Rap

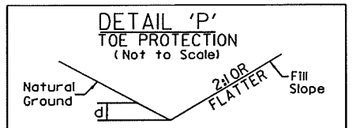
STA. 52+80 -L- LT

DETAIL 'O'
LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 52+80 TO STA. 54+50 -L- LT

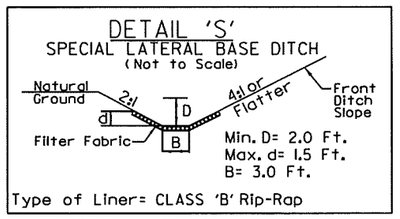
DETAIL 'P'
TOE PROTECTION
(Not to Scale)



Type of Liner= PSRM

FROM STA. 10+50 TO STA. 13+00 -DR2- RT
FROM STA. 10+50 TO STA. 13+50 -DR2- LT

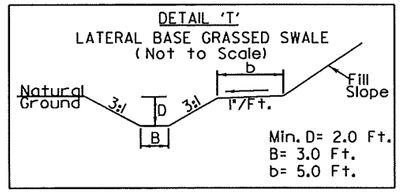
DETAIL 'S'
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Type of Liner= CLASS 'B' Rip-Rap

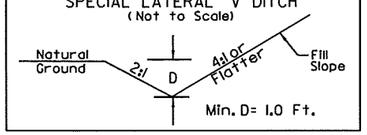
FROM STA. 43+00 TO STA. 43+50 -L- LT
FROM STA. 204+50 TO STA. 207+00 -L- RT

DETAIL 'T'
LATERAL BASE GRASSED SWALE
(Not to Scale)



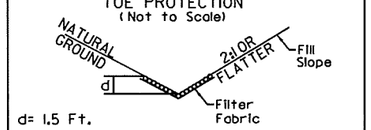
FROM STA. 13+00 TO STA. 13+72 -Y4- RT

DETAIL 'Q'
SPECIAL LATERAL 'V' DITCH
(Not to Scale)



FROM STA. 224+00 TO STA. 225+50 -L- LT

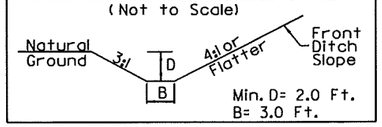
DETAIL 'R'
TOE PROTECTION
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

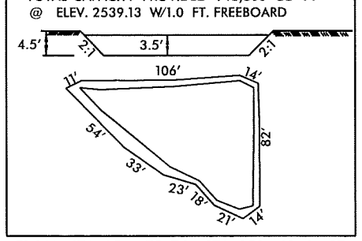
FROM STA. 59+05 TO STA. 60+00 -L- RT

DETAIL 'U'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



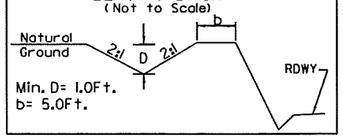
FROM STA. 9+85 TO STA. 13+00 -Y4- RT

DETAIL 'V'
DRY DETENTION BASIN
TOTAL CAPACITY REQUIRED : 14,700 CU FT
TOTAL CAPACITY PROVIDED : 18,300 CU FT
@ ELEV. 2539.13 W/1.0 FT. FREEBOARD



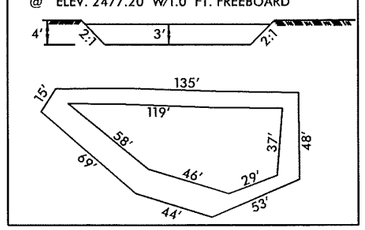
FROM STA. 250+75 TO STA. 252+01 -L- RT

DETAIL 'W'
BERM 'V' DITCH
(Not to Scale)



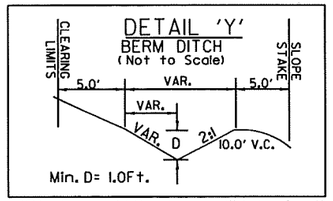
FROM STA. 194+50 TO STA. 195+80 -L- RT
FROM STA. 216+50 TO STA. 219+00 -L- RT
FROM STA. 227+50 TO STA. 232+50 -L- LT
FROM STA. 235+57 TO STA. 240+00 -L- LT
FROM STA. 296+50 TO STA. 298+00 -L- LT
FROM STA. 10+50 TO STA. 12+00 -Y20- LT
FROM STA. 258+00 TO STA. 259+00 -L- LT
FROM STA. 284+40 TO STA. 285+20 -L- LT

DETAIL 'X'
DRY DETENTION BASIN
TOTAL CAPACITY REQUIRED : 8792 CU FT
TOTAL CAPACITY PROVIDED : 11505 CU FT
@ ELEV. 2477.20 W/1.0 FT. FREEBOARD



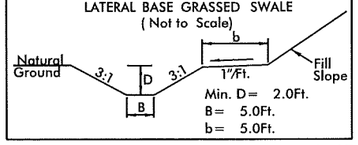
FROM STA. 83+00 TO STA. 84+50 -L- RT

DETAIL 'Y'
BERM DITCH
(Not to Scale)



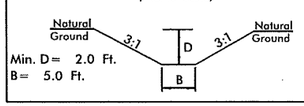
FROM STA. 91+50 TO STA. 95+00 -L- RT
FROM STA. 410+00 TO STA. 412+50 -L- LT
FROM STA. 11+50 TO STA. 12+00 -Y8- LT

DETAIL 'Z'
LATERAL BASE GRASSED SWALE
(Not to Scale)



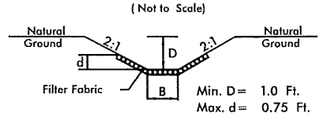
FROM STA 111+50-L- TO STA 119+00 -L- RT
FROM STA 319+62-L- TO STA 321+84 -L- LT

DETAIL 'AA'
STANDARD BASE DITCH
(Not to Scale)



FROM STA. 119+50 TO STA. 121+50 -L- RT

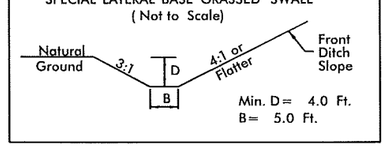
DETAIL 'AB'
STANDARD BASE DITCH
(Not to Scale)



Type of Liner= CLASS II Rip-Rap

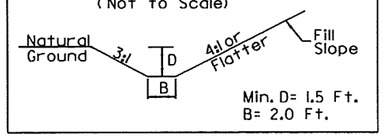
FROM STA. 121+50 TO STA. 121+75 -L- RT

DETAIL 'AC'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 124+50 TO STA.127+00 -L- RT

DETAIL 'AD'
SPECIAL LATERAL BASE GRASSED SWALE
(Not to Scale)



FROM STA. 135+75 TO STA. 139+00 -L- LT
FROM STA. 350+50 TO STA. 354+50 -L- RT

REVISIONS

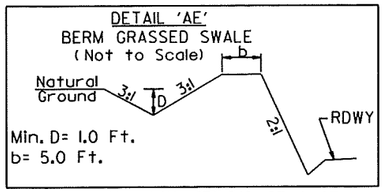
8/17/99

23-JAN-2013 09:46
R:\Roadway\Proj\r2519b_RDY_psh_HYD_detail.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

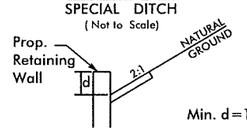
DETAIL 'AE'
BERM GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
b= 5.0 Ft.

FROM STA. 146+25 TO STA. 148+37 –L– LT

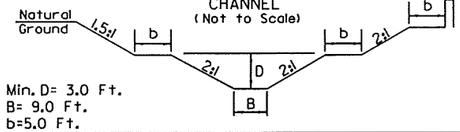
DETAIL 'AF'
SPECIAL DITCH
(Not to Scale)



Min. d=1.0 FT
Type of Liner= PAVED CONCRETE

FROM STA. 198+00 TO STA. 201+50 –L– LT

DETAIL 'AG'
CHANNEL
(Not to Scale)

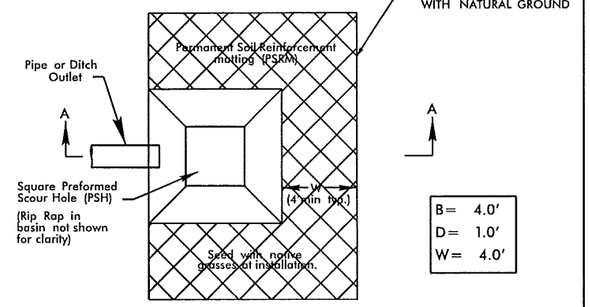


Min. D= 3.0 Ft.
B= 9.0 Ft.
b=5.0 Ft.

FROM STA. 125+75 TO STA. 127+20 –L– LT

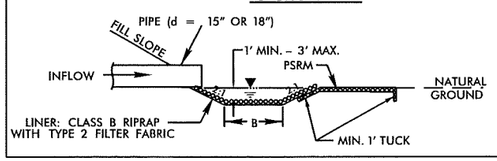
PREFORMED SCOUR HOLE
DETAIL 'AH'
*NOT TO SCALE

PLAN VIEW



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

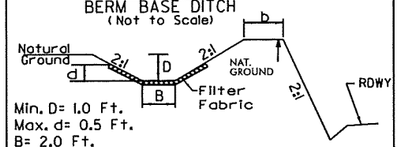
SECTION A–A



308

STA. 246+30 –L– LT
STA. 337+90 –L– LT

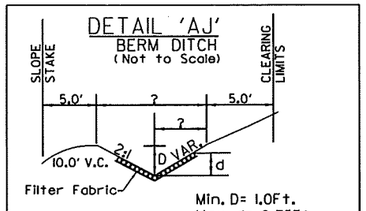
DETAIL 'AI'
BERM BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 2.0 Ft.
b= 5.0Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 169+50 TO STA. 172+50 –L– RT
FROM STA. 10+50 TO STA. 11+60 –DR10– LT

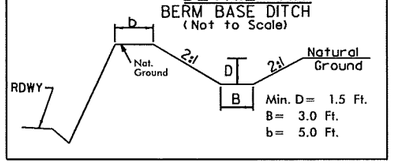
DETAIL 'AJ'
BERM DITCH
(Not to Scale)



Min. D= 1.0Ft.
Max. d= 0.75Ft.
Type of Liner= CLASS B RIP RAP

FROM STA. 172+50 TO STA. 176+25 –L– RT

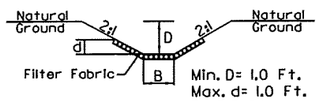
DETAIL 'AK'
BERM BASE DITCH
(Not to Scale)



Min. D= 1.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

FROM STA. 177+00 TO STA. 179+00 –L– RT
FROM STA. 195+80 TO STA. 198+00 –L– RT

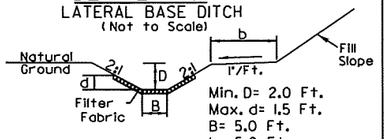
DETAIL 'AL'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 3.0 Ft.
Type of Liner= CLASS B Rip-Rap

STA. 183+88 –L– RT
STA. 10+50 –DR15– RT

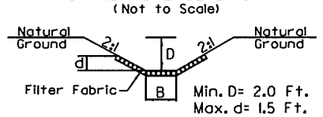
DETAIL 'AM'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.
b= 5.0 Ft.
Type of Liner= CLASS II RIP RAP

FROM STA. 212+50 TO STA. 214+00–L–RT

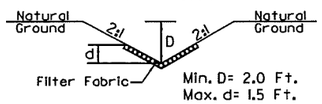
DETAIL 'AN'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.
Type of Liner= CLASS II Rip-Rap

STA. 214+08–L–RT
STA. 10+88 –Y21– LT
FROM STA 123+00 TO STA 123+50 –L– RT

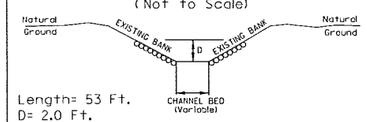
DETAIL 'AO'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 23+90 –L– TO STA. 25+00 –L– LT

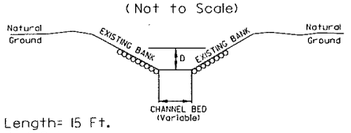
DETAIL 'AP'
PIPE OUTLET CHANNEL
(Not to Scale)



Length= 53 Ft.
D= 2.0 Ft.
Est.= 75 Tons of Class I Rip-Rap, 150 SY FF

STA 205+69–L–LT

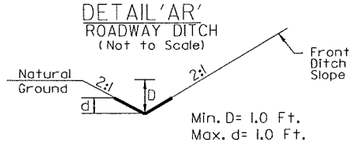
DETAIL 'AQ'
18" PIPE OUTLET CHANNEL
(Not to Scale)



Length= 15 Ft.
D= 2.0 Ft.
Est.= 7 Tons of Class I Rip-Rap, 11 SY FF

STA 206+50–L–LT

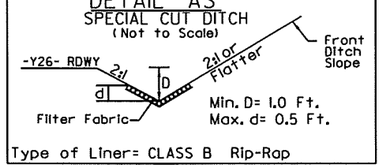
DETAIL 'AR'
ROADWAY DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= PSRM

FROM STA. 10+00 TO STA. 13+50–Y24–RT

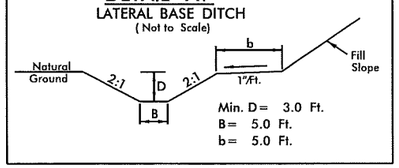
DETAIL 'AS'
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 300+00 TO STA. 301+50–L–LT

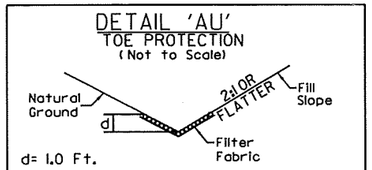
DETAIL 'AT'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 3.0 Ft.
B= 5.0 Ft.
b= 5.0 Ft.

FROM STA. 302+05 TO STA. 302+50–L– LT

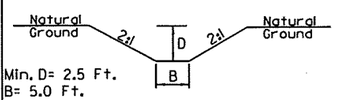
DETAIL 'AU'
TOE PROTECTION
(Not to Scale)



d= 1.0 Ft.
Type of Liner= CLASS I Rip-Rap

FROM STA. 301+50 TO STA. 302+00–L–LT

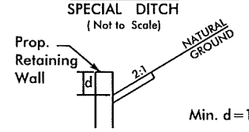
DETAIL 'AV'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.5 Ft.
B= 5.0 Ft.

FROM STA. 299+30 TO STA. 300+30 –L– RT

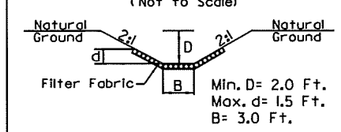
DETAIL 'AX'
SPECIAL DITCH
(Not to Scale)



Min. d=1.5 FT
Type of Liner= PAVED CONCRETE

FROM STA. 305+00 TO STA. 308+50 –L– RT

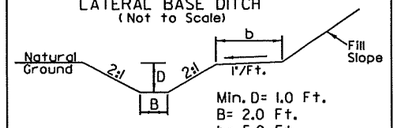
DETAIL 'AY'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 3.0 Ft.
Type of Liner= CLASS I Rip-Rap

FROM STA. 11+80 TO STA. 12+10–Y30–LT
STA. 230+67–L–RT
FROM STA. 348+64 TO STA. 349+43 –L– RT

DETAIL 'AZ'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
B= 2.0 Ft.
b= 5.0 Ft.

FROM STA. 316+50 TO STA. 319+50 –L– RT

REVISIONS

8/17/99

23-JAN-2013 09:46
R:\Roadway\Proj\r2519b_RDY_psh_HYD_detail.dgn
$$$$USERNAME$$$$

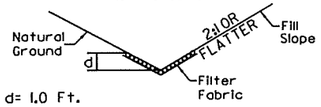
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

REVISIONS

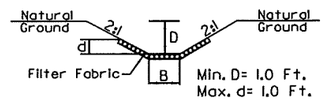
DETAIL 'BB'
TOE PROTECTION
(Not to Scale)



d= 1.0 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 344+00 TO STA. 345+00 -L- RT
FROM STA. 368+10 TO STA. 369+00 -L- LT
FROM STA. 409+00 TO STA. 410+88 -L- RT
FROM STA. 413+76 TO STA. 414+87 -L- RT

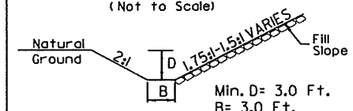
DETAIL 'BC'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
B= 2.0 Ft.
•When B is < 6.0'
Type of Liner= CLASS I Rip-Rap

FROM STA. 241+00 TO STA. 241+80 -L- RT
FROM STA. 347+16 TO STA. 347+39 -L- LT

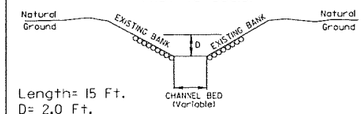
DETAIL 'BD'
SPECIAL LATERAL BASE DITCH
(Not to Scale)



Min. D= 3.0 Ft.
B= 3.0 Ft.
Type of Liner= CLASS II RIP RAP

FROM STA. 179+50 TO STA. 180+00-L-LT

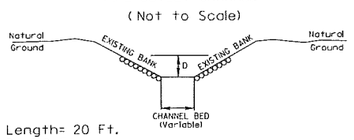
DETAIL 'BE'
PIPE OUTLET CHANNEL
(Not to Scale)



Length= 15 Ft.
D= 2.0 Ft.
Est.= 15 Tons of Class I Rip-Rap, 30 SY FILTER FABRIC

STA. 357+89-L-RT

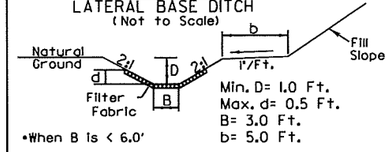
DETAIL 'BF'
PIPE OUTLET CHANNEL
(Not to Scale)



Length= 20 Ft.
D= 6.0 Ft.
Est.= 20 Tons of Class I Rip-Rap, 39 SY FF

STA. 366+54-L-RT

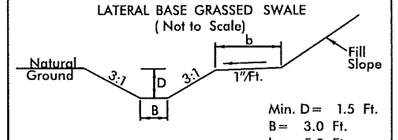
DETAIL 'BG'
LATERAL BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.
•When B is < 6.0'
Type of Liner= CLASS I Rip-Rap

FROM STA. 369+10 TO STA.370+00 -L- LT

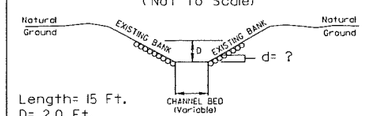
DETAIL 'BH'
LATERAL BASE GRASSED SWALE
(Not to Scale)



Min. D= 1.5 Ft.
B= 3.0 Ft.
b= 5.0 Ft.

FROM STA. 379+00 TO STA. 381+50-L-RT

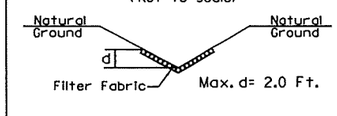
DETAIL 'BI'
PIPE OUTLET CHANNEL
(Not to Scale)



Length= 15 Ft.
D= 2.0 Ft.
Est.= 7 Tons of Class I Rip-Rap, 15 SY FILTER FABRIC

STA. 383+79 -L- RT

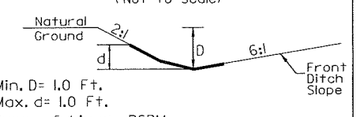
DETAIL 'BK'
EXISTING DITCH
(Not to Scale)



Max. d= 2.0 Ft.
Type of Liner= CLASS B Rip-Rap

STA. 388+40-L-RT

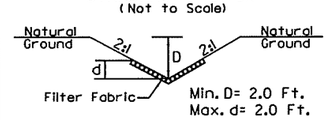
DETAIL 'BL'
ROADWAY DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= PSRM

FROM STA. 410+00 TO STA. 418+24-L-LT
FROM STA 420+10 TO STA 424+00-L-LT
FROM STA 425+50 TO STA 427+90-L-RT

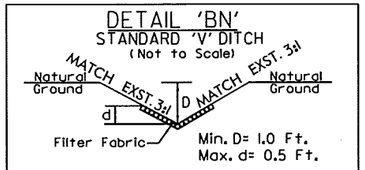
DETAIL 'BM'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 2.0 Ft.
Type of Liner= CLASS I Rip-Rap

FROM STA. 281+50 TO STA. 282+00-L-RT

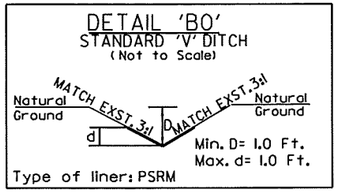
DETAIL 'BN'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
Type of Liner= CLASS B RIP RAP

FROM STA. 427+75 TO STA. 428+74-L-LT
FROM STA. 427+90 TO STA. 429+05-L-LT

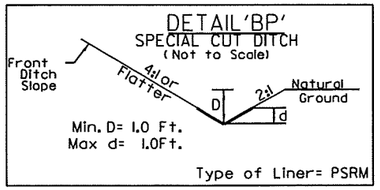
DETAIL 'BO'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of liner: PSRM

FROM STA. 429+10 TO STA. 430+30-L-LT

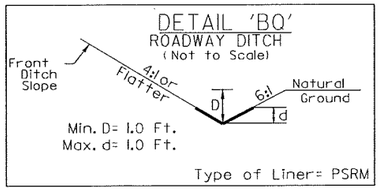
DETAIL 'BP'
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max d= 1.0Ft.
Type of Liner= PSRM

FROM STA. 423+00 TO STA. 424+00-L-RT
FROM STA. 15+00 TO STA. 15+60-Y38-RT

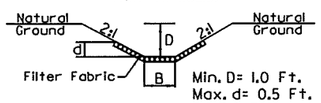
DETAIL 'BQ'
ROADWAY DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 1.0 Ft.
Type of Liner= PSRM

FROM STA. 14+37 TO STA. 15+00-Y38-RT

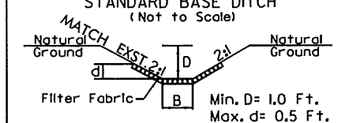
DETAIL 'BR'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 3.0 Ft.
•When B is < 6.0'
Type of Liner= CLASS IRIP RAP

FROM STA. 427+90 TO STA. 429+60-L-RT

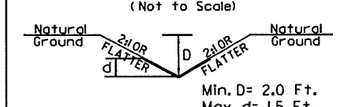
DETAIL 'BS'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5 Ft.
B= 5.0 Ft.
•When B is < 6.0'
Type of Liner= CLASS IRIP RAP

FROM STA. 429+60 TO STA. 431+30 -L- RT

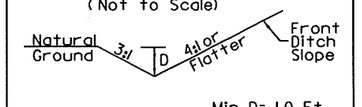
DETAIL 'BT'
STANDARD 'V' DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
Type of Liner= PSRM

STA. 359+00-L-LT

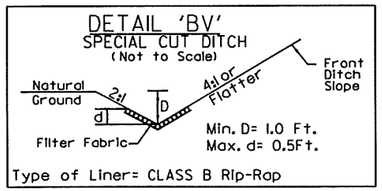
DETAIL BU'
SPECIAL CUT GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.

FROM STA. 331+50 TO STA. 332+50-L-LT

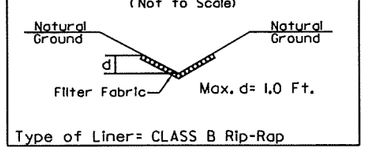
DETAIL 'BV'
SPECIAL CUT DITCH
(Not to Scale)



Min. D= 1.0 Ft.
Max. d= 0.5Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 330+78 TO STA. 331+50-L-LT

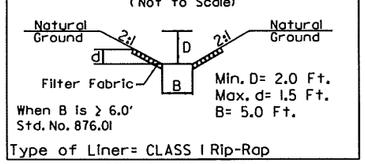
DETAIL 'BW'
EXISTING DITCH
(Not to Scale)



Max. d= 1.0 Ft.
Type of Liner= CLASS B Rip-Rap

FROM STA. 330+50 TO STA. 330+78-L-LT
FROM STA. 222+75 TO STA. 223+00-L-RT

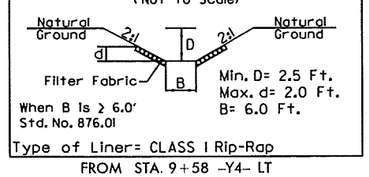
DETAIL 'BX'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.0 Ft.
Max. d= 1.5 Ft.
B= 5.0 Ft.
When B is ≥ 6.0'
Std. No. 876.01
Type of Liner= CLASS I Rip-Rap

STA. 214+20 -L- LT

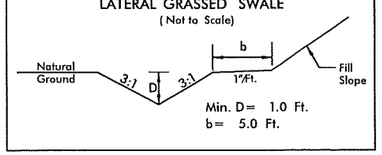
DETAIL 'BY'
STANDARD BASE DITCH
(Not to Scale)



Min. D= 2.5 Ft.
Max. d= 2.0 Ft.
B= 6.0 Ft.
When B is ≥ 6.0'
Std. No. 876.01
Type of Liner= CLASS I Rip-Rap

FROM STA. 9+58 -Y4- LT

DETAIL 'CA'
LATERAL GRASSED SWALE
(Not to Scale)



Min. D= 1.0 Ft.
b= 5.0 Ft.

FROM STA. 57+60 TO STA. 58+50 L RT

23-JAN-2013 09:46
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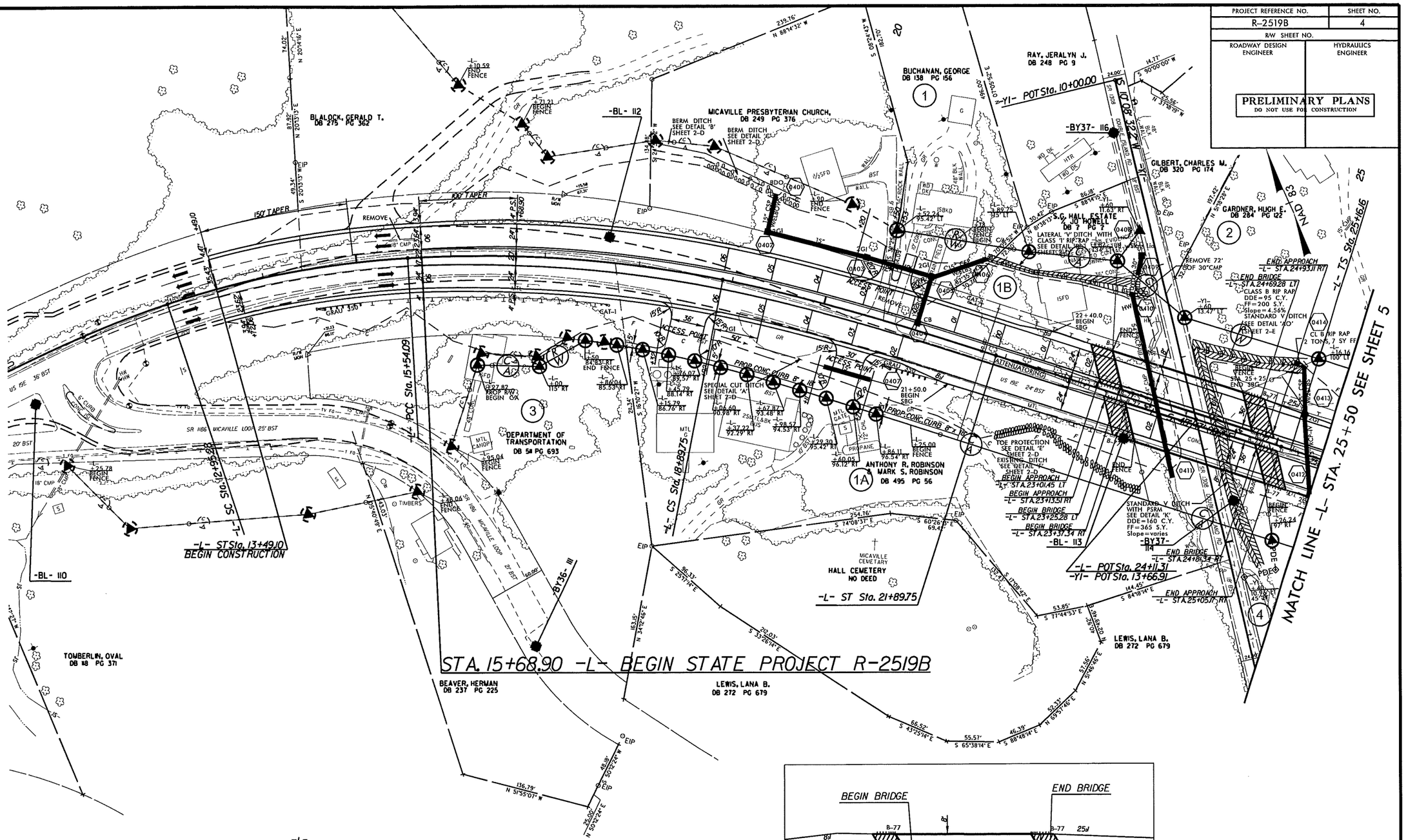
$$$$USERNAME$$$$

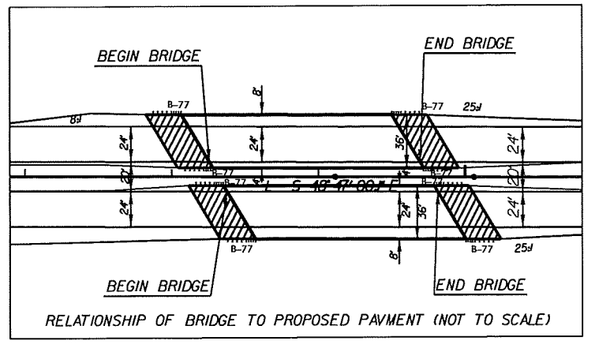
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L-

PIs Sta 11+97.08	PI Sta 14+25.43	PI Sta 17+22.82	PIs Sta 19+89.87	PIs Sta 27+16.47
Θs = 8° 35' 39.7"	Δ = 15° 03' 58.9" (RT)	Δ = 14° 27' 36.1" (RT)	Θs = 6° 27' 42.9"	Θs = 9° 45' 58.8"
Ls = 295.28'	D = 5° 49' 16.5"	D = 4° 18' 28.6"	Ls = 300.00'	Ls = 300.00'
LT = 197.08'	L = 258.82'	L = 335.66'	LT = 200.13'	LT = 200.31'
ST = 98.64'	T = 130.16'	T = 168.73'	ST = 100.12'	ST = 100.28'
	R = 984.25'	R = 1,330.00'		
	SE = .06	SE = .06		



RELATIONSHIP OF BRIDGE TO PROPOSED PAVMENT (NOT TO SCALE)

FOR -L- PROFILE SEE SHEET 35
FOR -Y1- PROFILE SEE SHEET 55

R/W REVISION: UPDATED RIGHT OF WAY ON PARCEL 1A. 2/12/2013 AJF

8/17/99

12-FEB-2013 08:49
r:\hydraulics\projects\2519b_rdy_psh_s04.dgn
$$$$USERNAME$$$$

**DESIGN EXCEPTION REQUIRED FOR MINIMUM HORIZONTAL CURVE RADIUS (50 MPH).

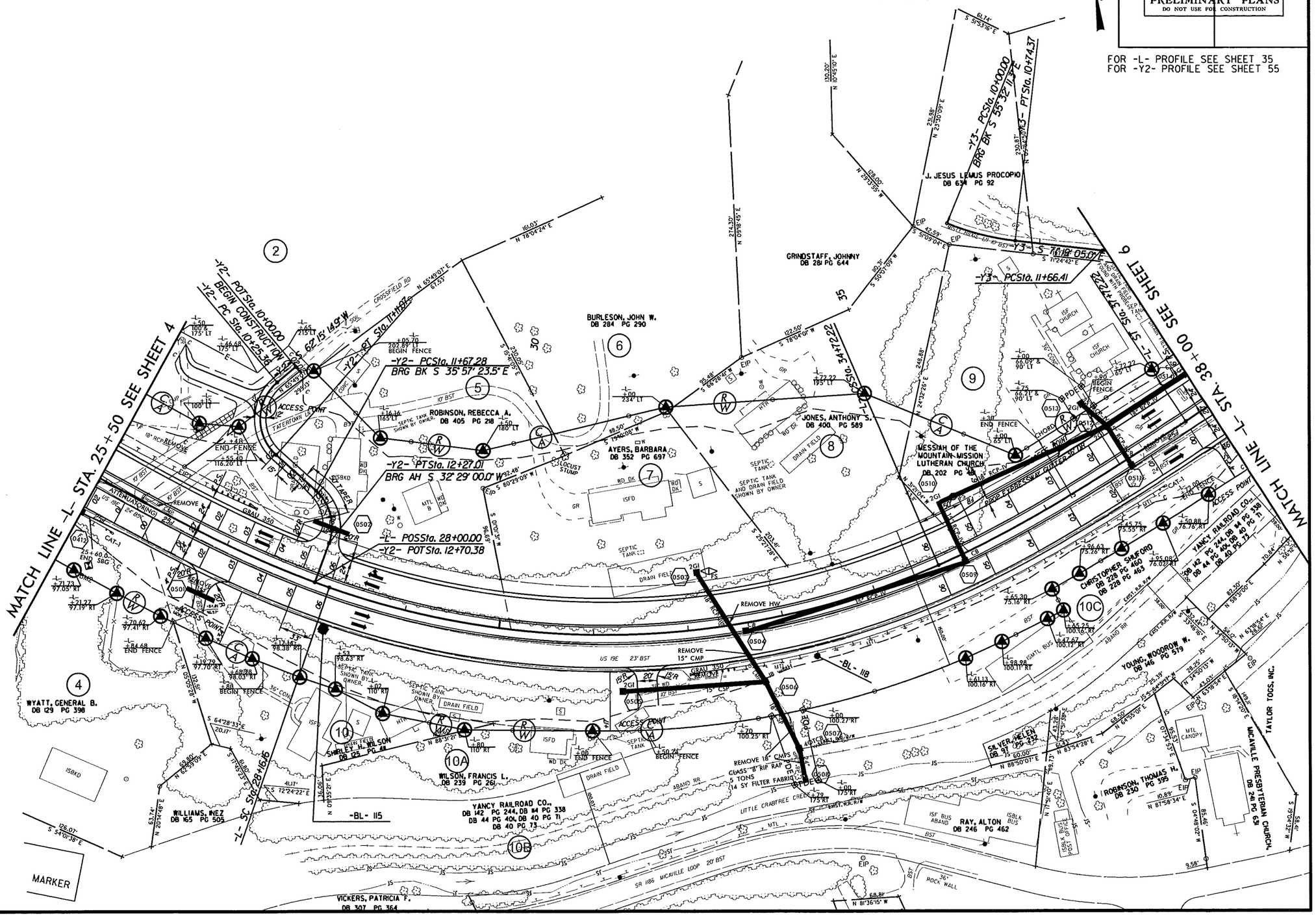
-Y2-		-Y3-		-L-		
PI Sta 10+83.09	PI Sta 12+01.29	PI Sta 10+37.42	PI Sta 12+00.12	PIs Sta 27+16.47	PI Sta 31+60.28	PIs Sta 35+72.50
Δ = 98° 12' 38.4" (LT)	Δ = 68° 26' 23.5" (RT)	Δ = 15° 46' 53.7" (LT)	Δ = 35° 17' 12.4" (RT)	θs = 9° 45' 58.8"	Δ = 42° 42' 55.0" (LT)	θs = 9° 45' 58.8"
D = 114° 35' 29.6"	D = 114° 35' 29.6"	D = 21° 13' 14.4"	D = 54° 03' 09.4"	Ls = 300.00'	D = 6° 30' 39.2"	Ls = 300.00'
L = 85.70'	L = 59.73'	L = 74.37'	L = 65.28'	LT = 200.31'	L = 656.06'	LT = 200.31'
T = 57.73'	T = 34.01'	T = 37.42'	T = 33.71'	ST = 100.28'	T = 344.12'	ST = 100.28'
R = 50.00'	R = 50.00'	R = 270.00'	R = 106.00'		R = 880.00'	
SE = NC	SE = 05		SE = 02		SE = .06	
					**V = 50 mph	

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 35
FOR -Y2- PROFILE SEE SHEET 55



R/W REVISION; UPDATED PROPERTY INFORMATION ON PARCEL 10C. 4/17/2013 AJF

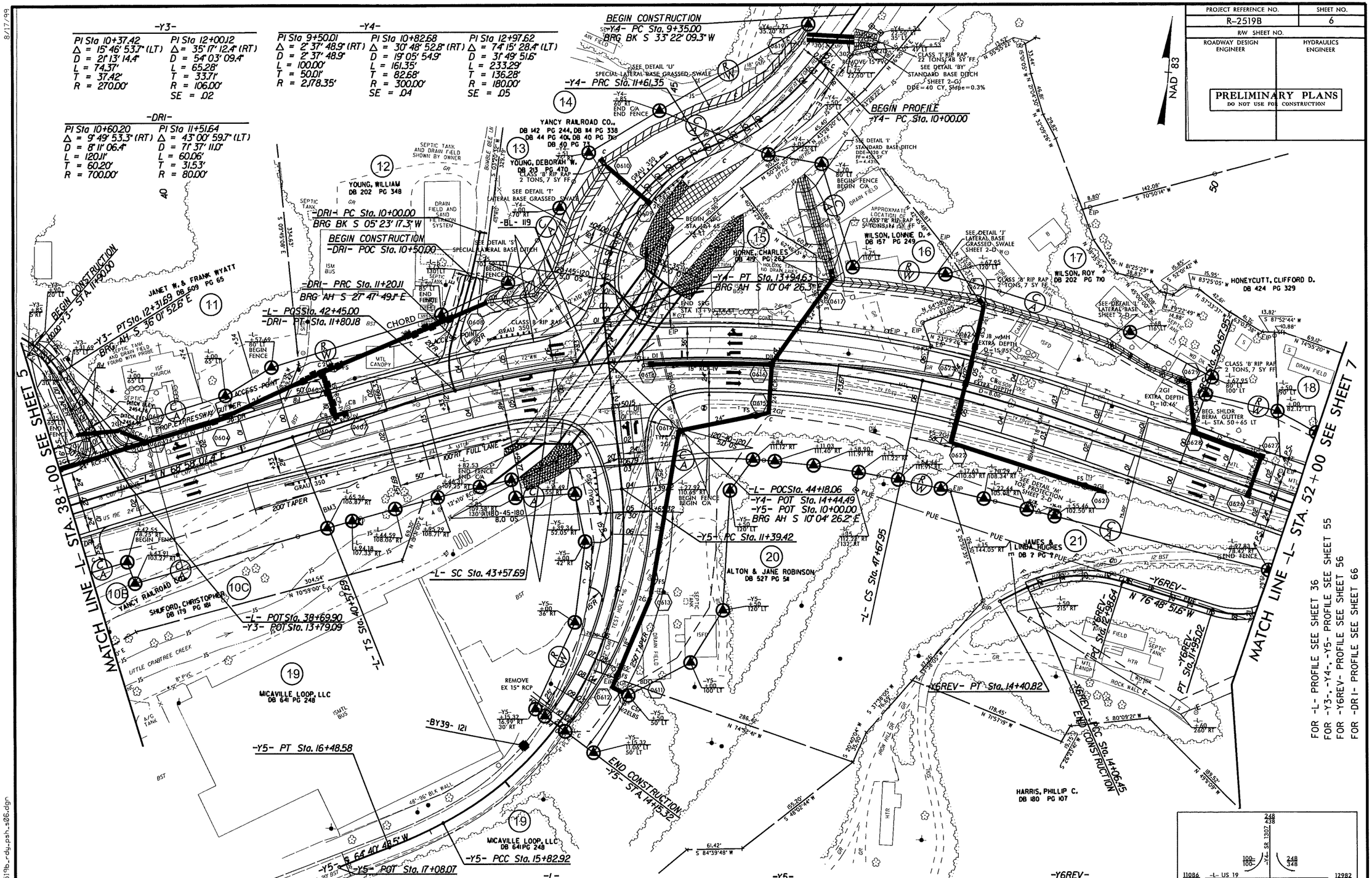
17-APR-2013 15:33
R:\Roadway\Proj\2519b_rdy_psh_s05.dgn
$$$$USERNAME$$$$

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83



FOR -L- PROFILE SEE SHEET 36
FOR -Y3-, -Y4-, -Y5- PROFILE SEE SHEET 55
FOR -Y6REV- PROFILE SEE SHEET 56
FOR -DRI- PROFILE SEE SHEET 66

-Y3-

PI Sta 10+37.42	PI Sta 12+00.12
Δ = 15° 46' 53.7" (LT)	Δ = 35° 17' 12.4" (RT)
D = 21° 13' 14.4"	D = 54° 03' 09.4"
L = 74.37'	L = 65.28'
T = 37.42'	T = 33.71'
R = 270.00'	R = 106.00'
	SE = .02

-Y4-

PI Sta 9+50.01	PI Sta 10+82.68	PI Sta 12+97.62
Δ = 2° 37' 48.9" (RT)	Δ = 30° 48' 52.8" (RT)	Δ = 74° 15' 28.4" (LT)
D = 2° 37' 48.9"	D = 19° 05' 54.9"	D = 31° 49' 51.6"
L = 100.00'	L = 161.35'	L = 233.29'
T = 50.01'	T = 82.68'	T = 136.28'
R = 2,178.35'	R = 300.00'	R = 180.00'
	SE = .04	SE = .05

-DRI-

PI Sta 10+60.20	PI Sta 11+51.64
Δ = 9° 49' 53.3" (RT)	Δ = 43° 00' 59.7" (LT)
D = 8° 11' 06.4"	D = 71° 37' 11.0"
L = 120.11'	L = 60.06'
T = 60.20'	T = 31.53'
R = 700.00'	R = 80.00'

-L-

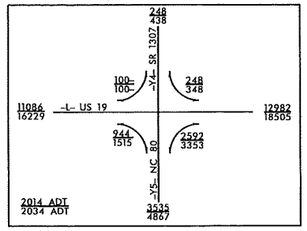
PIs Sta 42+57.89	PI Sta 45+65.23	PIs Sta 48+68.12	PIs Sta 52+68.08
θs = 7° 48' 47.0"	Δ = 21° 22' 07.9" (RT)	θs = 7° 48' 47.0"	θs = 6° 27' 42.9"
Ls = 300.00'	D = 5° 12' 31.3"	Ls = 300.00'	Ls = 300.00'
LT = 200.20'	L = 410.25'	LT = 200.20'	LT = 200.13'
ST = 100.18'	T = 207.54'	ST = 100.18'	ST = 100.12'
	R = 1,100.00'		
	SE = .06		
	V = 55 mph		

-Y5-

PI Sta 13+92.18	PI Sta 16+15.78
Δ = 68° 40' 40.9" (RT)	Δ = 6° 04' 33.8" (RT)
D = 15° 29' 07.2"	D = 9° 15' 12.4"
L = 443.50'	L = 65.66'
T = 252.77'	T = 32.86'
R = 370.00'	R = 619.18'
SE = .06	
RUNOFF = 150'	

-Y6REV-

PI Sta 14+23.65	PI Sta 13+54.99
Δ = 4° 55' 23.2" (LT)	Δ = 41° 10' 45.0" (LT)
D = 14° 19' 26.2"	D = 38° 11' 49.9"
L = 34.37'	L = 107.81'
T = 17.20'	T = 56.35'
R = 400.00'	R = 150.00'



8/17/99

R/W REVISION: UPDATED PROPERTY INFORMATION ON PARCEL 10C. 4/17/2013 AJF

17-APR-2013 15:33
R:\Hydro\Projects\r2519b_rdy_psh_s06.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 36
FOR -Y6REV- PROFILE SEE SHEET 56
FOR -DR2- PROFILE SEE SHEET 66

NAD 83

-L-

PIs Sta 52+68.08
Θs = 6° 27' 42.9"
Ls = 300.00'
LT = 200.13'
ST = 100.12'

PI Sta 56+16.41
Δ = 21° 09' 47.6" (LT)
D = 4° 18' 28.6"
L = 491.26'
T = 248.46'
R = 1,330.00'
SE = .06

PIs Sta 59+59.33
Θs = 6° 27' 42.9"
Ls = 300.00'
LT = 200.13'
ST = 100.12'

PIs Sta 65+42.24
Θs = 2° 33' 28.3"
Ls = 250.00'
LT = 166.68'
ST = 83.35'

MATCH LINE -L- STA. 52+00 SEE SHEET 6

MATCH LINE -L- STA. 66+00 SEE SHEET 8

-L- POC Sta. 57+30.00
-DR2- POT Sta. 10+00.00
BRG AH S 6° 05' 43.4" E

-L- POS Sta. 52+50.00
-Y6REV- POT Sta. 10+00.00
BRG AH S 13° 35' 02.3" W

-Y6REV- PC Sta. 10+38.64

-DR2- PC Sta. 10+55.03

-DR2- PC Sta. 13+25.31

-DR2- S 79° 03' 14.4" W

-DR2- PT Sta. 11+81.35

-DR2- PT Sta. 13+74.53
END CONSTRUCTION

-L- PC Sta. 58+59.20

-L- ST Sta. 61+59.20

-L- TS Sta. 63+75.56

HONEYCUTT, CLIFFORD D.
DB 424 PG 329
-BL- 122

RUSSELL, LINDA H.
DB 468 PG 623

JAMES & JUNE WOODY
DB 639 PG 396

BUCHANAN, DAN
DB 237 PG 272

KEITH & MICHELE PRESNELL
& BRENT & HEATHER LEDFORD
(EACH 1/2 DIVIDED INTEREST)
DB 551 PG 381
-BL- 134

ROBINSON, JIMMY D.
DB 184 PG 773

YOUNG, ROGER L.
DB 213 PG 470
DB 148 PG 198

BOONE & WOODY MINING INC.
DB 593 PG 423

BOONE & WOODY MINING
DB 497 PG 286

MORNING STAR
BAPTIST CHURCH
DB 146 PG 77

-Y6REV-

PI Sta 11+37.95
Δ = 89° 36' 06.1" (RT)
D = 57° 17' 44.8"
L = 156.38'
T = 99.31'
R = 100.00'
SE = .05

-DR2-

PI Sta 11+33.12
Δ = 85° 08' 47.8" (RT)
D = 67° 24' 24.5"
L = 126.32'
T = 78.09'
R = 85.00'

PI Sta 13+53.53
Δ = 70° 47' 59.5" (LT)
D = 143° 14' 22.0"
L = 49.43'
T = 28.43'
R = 40.00'

R/W REVISION: REVISED DRIVEWAY WIDTH ON PARCEL 26. 5/29/2013 TFD

8/17/99

23-MAY-2013 13:06
R:\Roadway\Proj\r2519b_rdy_psh_s07.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

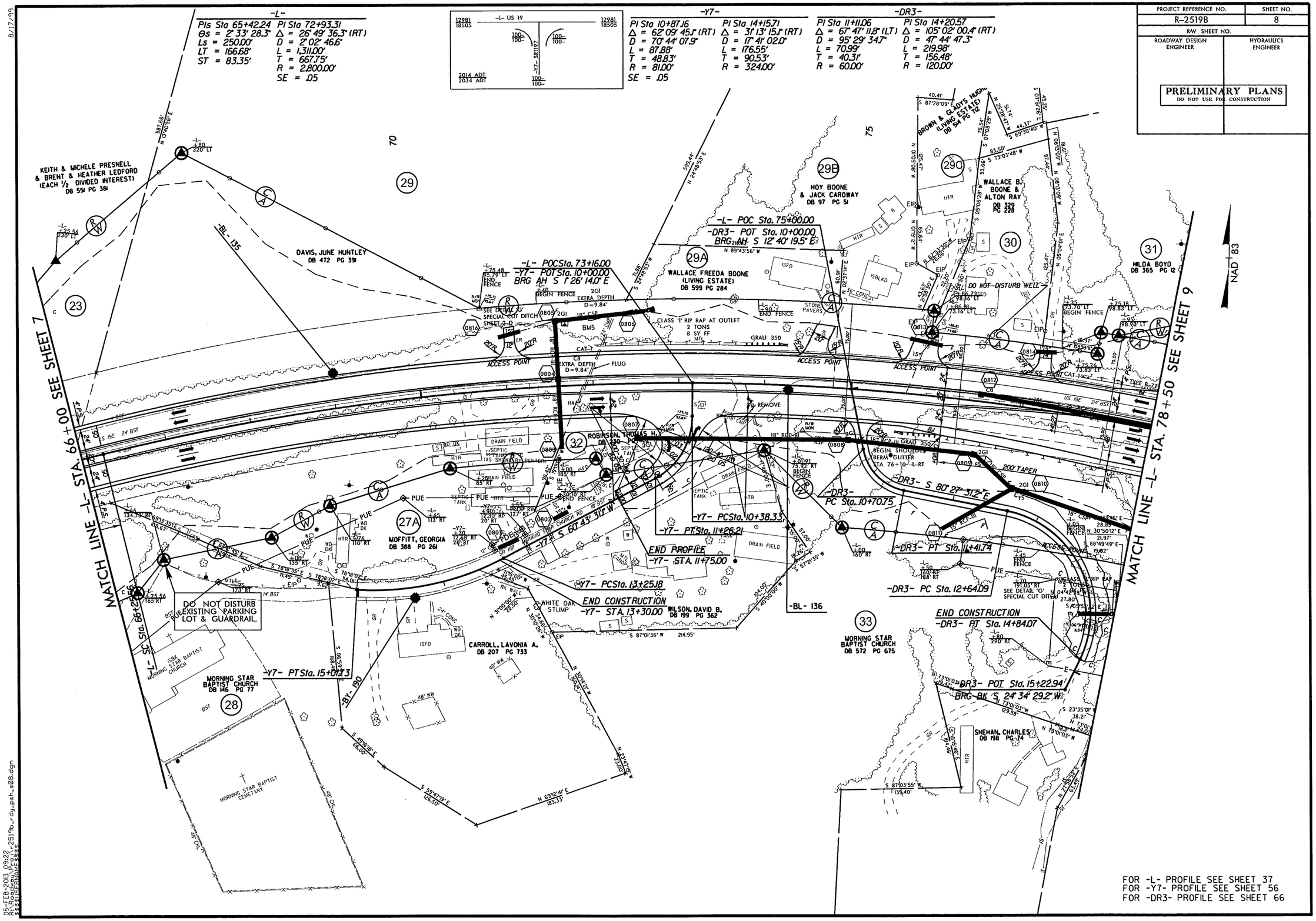
PIs Sta 65+42.24	PI Sta 72+93.31
Θs = 2° 33' 28.3"	Δ = 26° 49' 36.3" (RT)
Ls = 250.00'	D = 2° 02' 46.6"
LT = 166.68'	L = 1,311.00'
ST = 83.35'	T = 667.75'
	R = 2,800.00'
	SE = .05

-Y7-

PI Sta 10+87.16	PI Sta 14+15.71
Δ = 62° 09' 45.1" (RT)	Δ = 31° 13' 15.1" (RT)
D = 70° 44' 07.9"	D = 17° 41' 02.0"
L = 87.88'	L = 176.55'
T = 48.83'	T = 90.53'
R = 81.00'	R = 324.00'
SE = .05	

-DR3-

PI Sta 11+11.06	PI Sta 14+20.57
Δ = 67° 47' 11.8" (LT)	Δ = 105° 02' 00.4" (RT)
D = 95° 29' 34.7"	D = 47° 44' 47.3"
L = 70.99'	L = 219.98'
T = 40.31'	T = 156.48'
R = 60.00'	R = 120.00'



FOR -L- PROFILE SEE SHEET 37
FOR -Y7- PROFILE SEE SHEET 56
FOR -DR3- PROFILE SEE SHEET 66

8/17/99

R/W REVISION: UPDATING PROPERTY LINES ON PARCEL 27A AND 28. 2/5/2013 TFD

05-FEB-2013 09:22
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	9
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 37
FOR -Y8-, -Y9- PROFILE SEE SHEET 56
FOR -Y19- PROFILE SEE SHEET 70

-L-

PI Sta 72+93.31
Δ = 26° 49' 36.3" (RT)
D = 2° 02' 46.6"
L = 1,311.00'
T = 667.75'
R = 2,800.00'
SE = .05

PIs Sta 80+19.91
Θs = 2° 33' 28.3"
Ls = 250.00'
LT = 166.68'
ST = 83.35'

PI Sta 95+03.34
Δ = 13° 23' 37.1" (RT)
D = 1° 14' 44.0"
L = 1,075.31'
T = 540.12'
R = 4,600.00'
SE = .03
RUNOFF = 160'

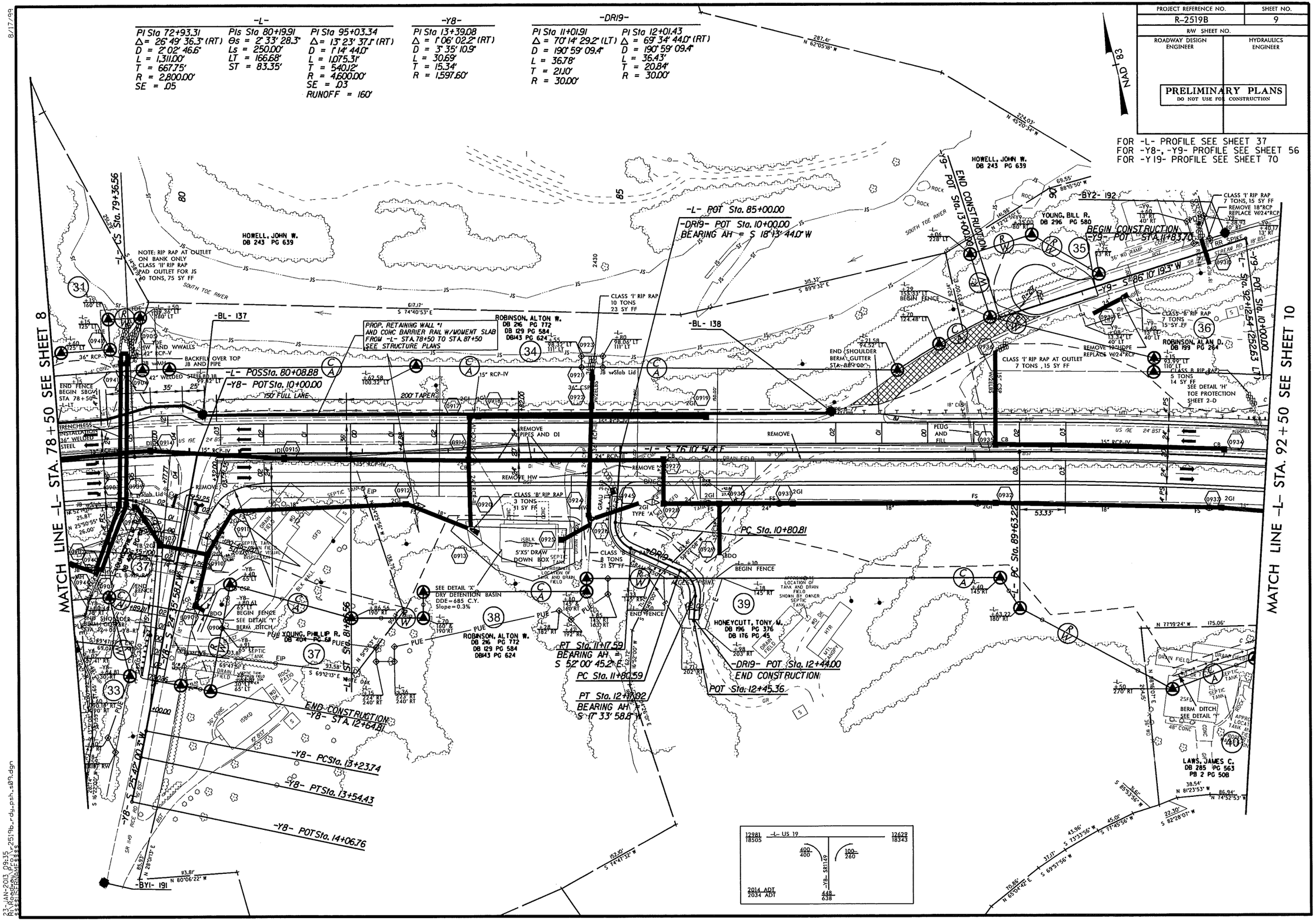
-Y8-

PI Sta 13+39.08
Δ = 1° 06' 02.2" (RT)
D = 3° 35' 10.9"
L = 30.69'
T = 15.34'
R = 1,597.60'

-DR19-

PI Sta 11+01.91
Δ = 70° 14' 29.2" (LT)
D = 190° 59' 09.4"
L = 36.78'
T = 21.10'
R = 30.00'

PI Sta 12+01.43
Δ = 69° 34' 44.0" (RT)
D = 190° 59' 09.4"
L = 36.43'
T = 20.84'
R = 30.00'



R/W REVISION: REVISED PERMANENT DRAINAGE EASEMENT ON PARCEL 35. 9/25/2012 TFD

8/17/99

23-JAN-2013 09:35
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-
PI Sta 95+03.34
Δ = 13° 23' 37.1" (RT)
D = 1° 14' 44.0"
L = 1,075.31'
T = 540.12'
R = 4,600.00'
SE = .03
RUNOFF = 160'

-Y10-
PI Sta 12+74.01
Δ = 8° 16' 06.6" (LT)
D = 11° 27' 33.0"
L = 72.16'
T = 36.14'
R = 500.00'

NAD 83

MATCH LINE -L- STA. 92+50 SEE SHEET 9

MATCH LINE -L- STA. 106+50 SEE SHEET 11

YOUNG, BOBBY R.
DB 220 PG 460

ROBINSON, ALAN D.
DB 199 PG 264

DALE & WEDIE ROBINSON
DB 308 PG 398

TERRY & TONYA LEDOFRD
MARTIN & RHONDA LEDOFORD
(1/2 DIVIDED INTEREST)
DB 629 PG 690

LARRY & DARLENE BROWN
DB 621 PG 297

DARRELL D. & NANCY H. FORBES
DB 68 PG 31

FORBES, NANCY H.
DB 414 PG 267
DB 280 PG 271

HODGE, HENRY C.
DB 224 PG 167

JANET W. WYAT
C/O ROBERT CHARLES
DB 325 PG 699

DB 281 PG 37
BURLESON, CHARLES T.

NEWDALE VOLUNTEER FIRE DEPT.
DB 158 PG 287
DB 194 PG 53
DB 646 PG 613

HONEYCUTT, TONY M.
DB 196 PG 376
DB 176 PG 45

PATTI PETERSON
DB 553 PG 60

DB 543 PG 239

MCMAHAN, MARVIN
DB 196 PG 522 WITH
PB 2 PG 508

NEWDALE VOLUNTEER FIRE DEPT.
DB 432 PG 569

BRENT PATRICK LEDFORD
DB 647 PG 458

TAYLOR, CARLTON
DB 285 PG 129
DB 198 PG 757
PB 2 PG 668

-BL- 139
-BL- 140
-BL- 141

-L- PT Sta. 100+38.53
-L- PIC Sta. 98+34.69
-Y10- POT Sta. 10+00.00
-Y10- PC Sta. 12+37.87
BRG BK S 24° 40' 25.4" W
-Y10- PT Sta. 13+10.03
-Y10- POT Sta. 13+60.81
END CONSTRUCTION
-Y10- STA. 13+00.00

CLASS 'I' RIP RAP
15 TONS
30 SY FF

PROP. DEPRESSED CONC ISLAND

PLUG AND FILL WITH FLOWABLE MATERIAL

REMOVE EX. DI AND REPLACE

LOT LINE REVISION AS REQUESTED R/W AGENT

APPROXIMATE LOCATION OF SEPTIC TANK, DRAIN FIELD AND PUMP SYSTEM SHOWN BY PROPERTY OWNER

APPROXIMATE LOCATION OF TANK AND DRAIN FIELD PROPERTY OWNER MARKED ON GROUND

LOCATED SEPTIC TANK AND DRAIN LINES WITH PROBE

BERM DITCH SEE DETAIL 'Y'

FOR -L- PROFILE SEE SHEET 38
FOR -Y10- PROFILE SEE SHEET 57

R/W REVISION: UPDATED RIGHT OF WAY OFFSETS ON PARCEL 41 AND 42, AND PROPERTY INFORMATION ON PLAN SHEET. 8/14/2012 AJF

8/17/99

33-JAN-2013 09:35
R:\Roadway\Proj\r2519b_rdy_psh_s10.dgn
$$$$USERNAME$$$$

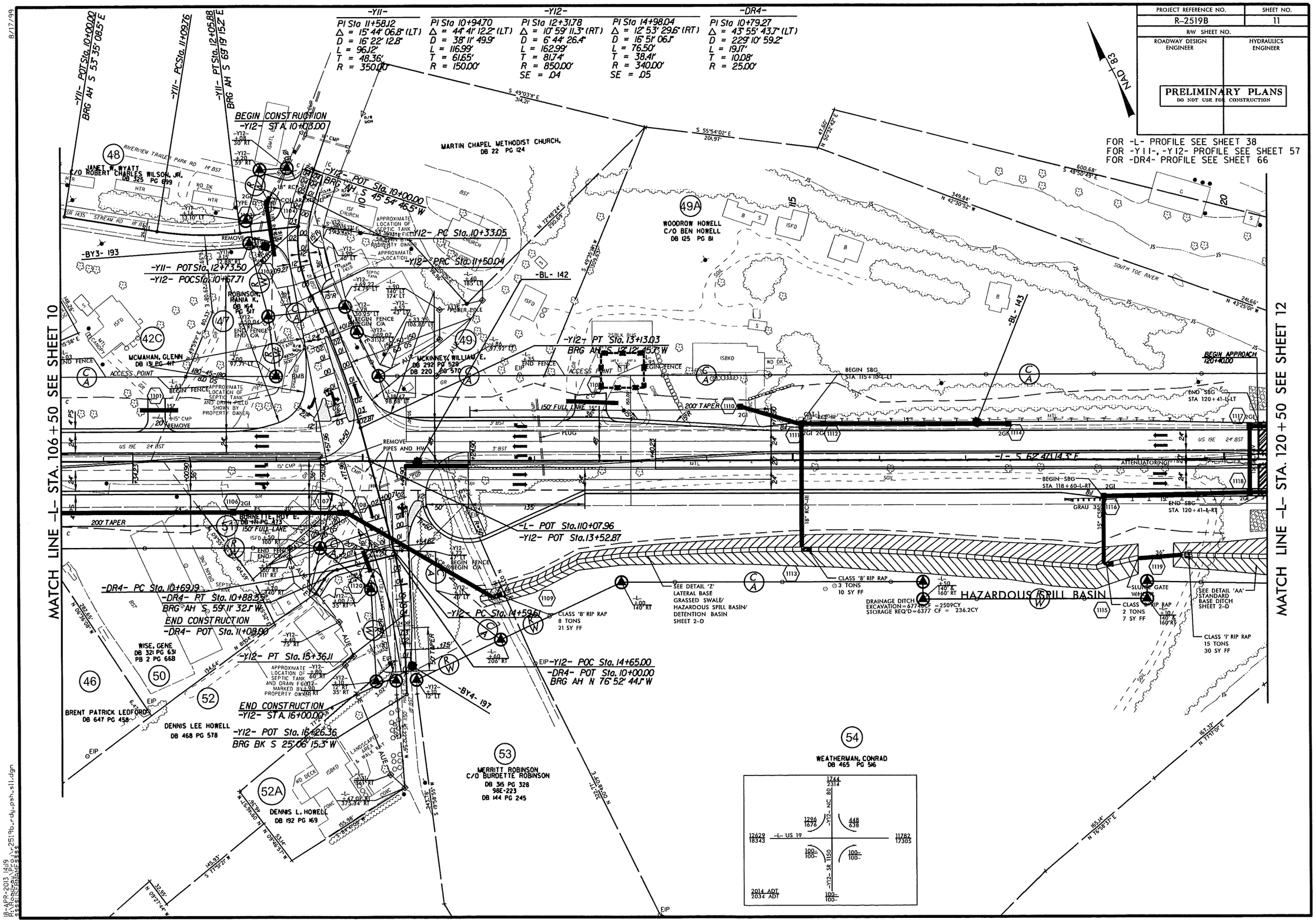
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 38
FOR -Y11-, -Y12- PROFILE SEE SHEET 57
FOR -DR4- PROFILE SEE SHEET 66

NAD 83

-Y11-	-Y12-		-DR4-
PI Sta 11+58.12	PI Sta 10+94.70	PI Sta 12+31.78	PI Sta 14+98.04	PI Sta 10+79.27
Δ = 15° 44' 06.8" (LT)	Δ = 44° 41' 12.2" (LT)	Δ = 10° 59' 11.3" (RT)	Δ = 12° 53' 29.6" (RT)	Δ = 43° 55' 43.7" (LT)
D = 16° 22' 12.8"	D = 38° 11' 49.9"	D = 6° 44' 26.4"	D = 16° 51' 06.1"	D = 229° 10' 59.2"
L = 96.12'	L = 116.99'	L = 162.99'	L = 76.50'	L = 19.17'
T = 48.36'	T = 61.65'	T = 81.74'	T = 38.41'	T = 10.08'
R = 350.00'	R = 150.00'	R = 850.00'	R = 340.00'	R = 25.00'
		SE = .04	SE = .05	



R/W REVISION: UPDATED SURVEY INFORMATION WHICH DIVIDED PARCEL 52 INTO PARCEL 52 AND 52A. 4/17/2013 TFD

R/W REVISION: UPDATED PROPERTY LINE ON PARCEL 49. 4/18/2013 TFD

8/17/99

18-APR-2013 16:19
R:\Roadway\Proj\2519b_rdy_psh_sll.dgn
$$$$USERNAME$$$$

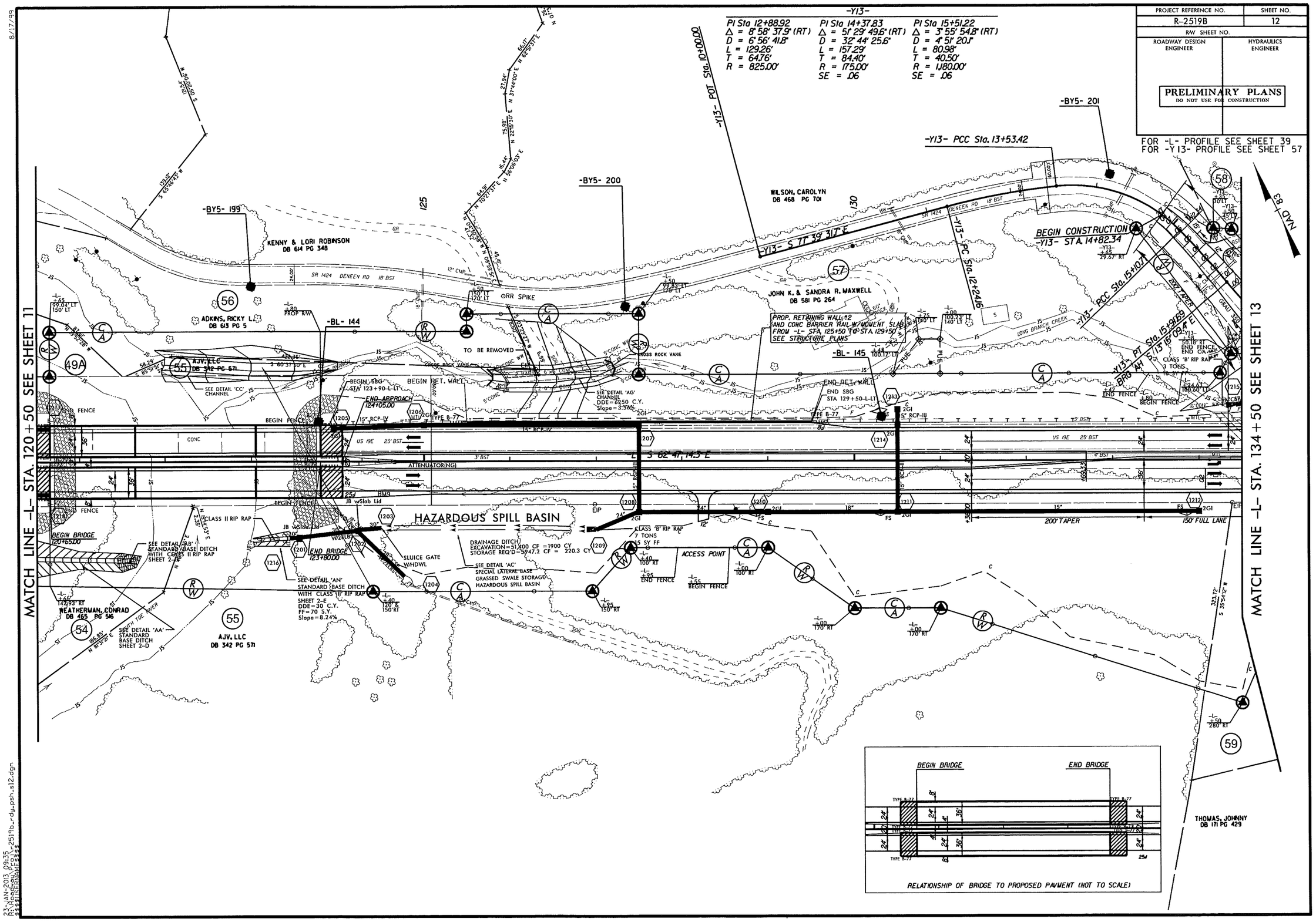
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	12
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 39
FOR -Y13- PROFILE SEE SHEET 57

-Y13-

PI Sta 12+88.92	PI Sta 14+37.83	PI Sta 15+51.22
Δ = 8° 58' 37.9" (RT)	Δ = 51° 29' 49.6" (RT)	Δ = 3° 55' 54.8" (RT)
D = 6° 56' 41.8"	D = 32° 44' 25.6"	D = 4° 51' 20.1"
L = 129.26'	L = 157.29'	L = 80.98'
T = 64.76'	T = 84.40'	T = 40.50'
R = 825.00'	R = 175.00'	R = 1,180.00'
	SE = .06	SE = .06



R/W REVISION: UPDATED RIGHT OF WAY OFFSETS ON PARCEL 49A, 57, AND 58. PROPERTY INFORMATION ON PLAN SHEET, AND ADDED PUE ON PARCEL 57. 8/14/2012 AJF

8/17/99

23-JAN-2013 09:35
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 40
FOR -Y13- PROFILE SEE SHEET 57
FOR -Y14-, -Y15- PROFILE SEE SHEET 58
FOR -Y16- PROFILE SEE SHEET 59

NAD 83

-Y13-
PI Sta 17+21.51
Δ = 25° 26' 50.6" (RT)
D = 19° 05' 54.9"
L = 133.24'
T = 67.74'
R = 300.00'
SE = .05

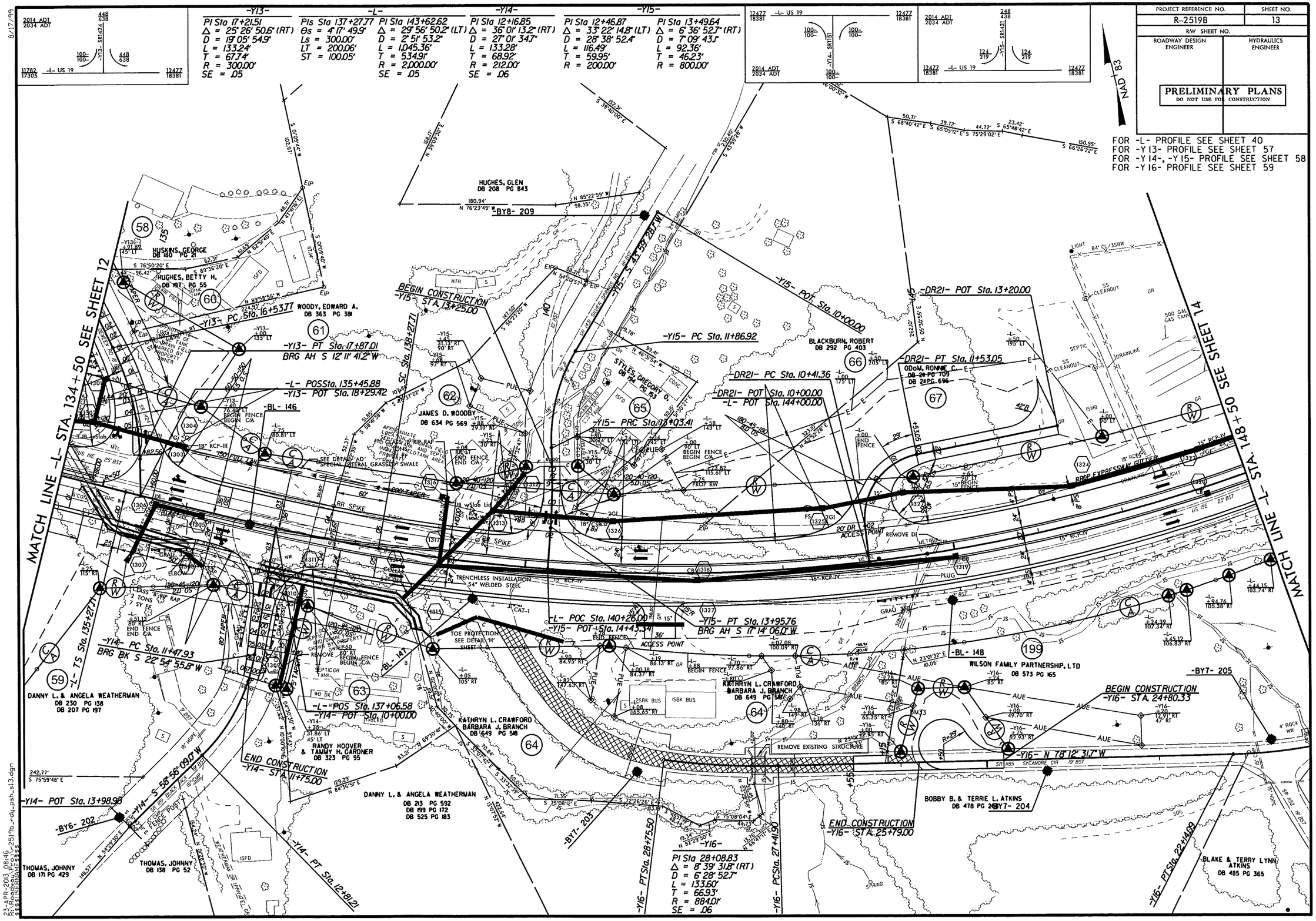
-L-
PIs Sta 137+27.77
Θs = 4° 17' 49.9"
Ls = 300.00'
LT = 200.06'
ST = 100.05'

PI Sta 143+62.62
Δ = 29° 56' 50.2" (LT)
D = 2° 51' 53.2"
L = 1,045.36'
T = 534.91'
R = 2,000.00'
SE = .05

-Y14-
PI Sta 12+16.85
Δ = 36° 01' 13.2" (RT)
D = 27° 01' 34.7"
L = 133.28'
T = 68.92'
R = 212.00'
SE = .06

-Y15-
PI Sta 12+46.87
Δ = 33° 22' 14.8" (LT)
D = 28° 38' 52.4"
L = 116.49'
T = 59.95'
R = 200.00'

PI Sta 13+49.64
Δ = 6° 36' 52.7" (RT)
D = 7° 09' 43.5"
L = 92.36'
T = 46.23'
R = 800.00'



R/W REVISION-UPDATED SURVEY INFORMATION ON PARCEL 64. ELIMINATED PARCEL 64A.
ADDED A DRIVE OFF OF CUL-DE-SAC. AND REVISED PERMANENT UTILITY EASEMENT TO AERIAL UTILITY EASEMENT.

8/17/99

23-APR-2013 08:46
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$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

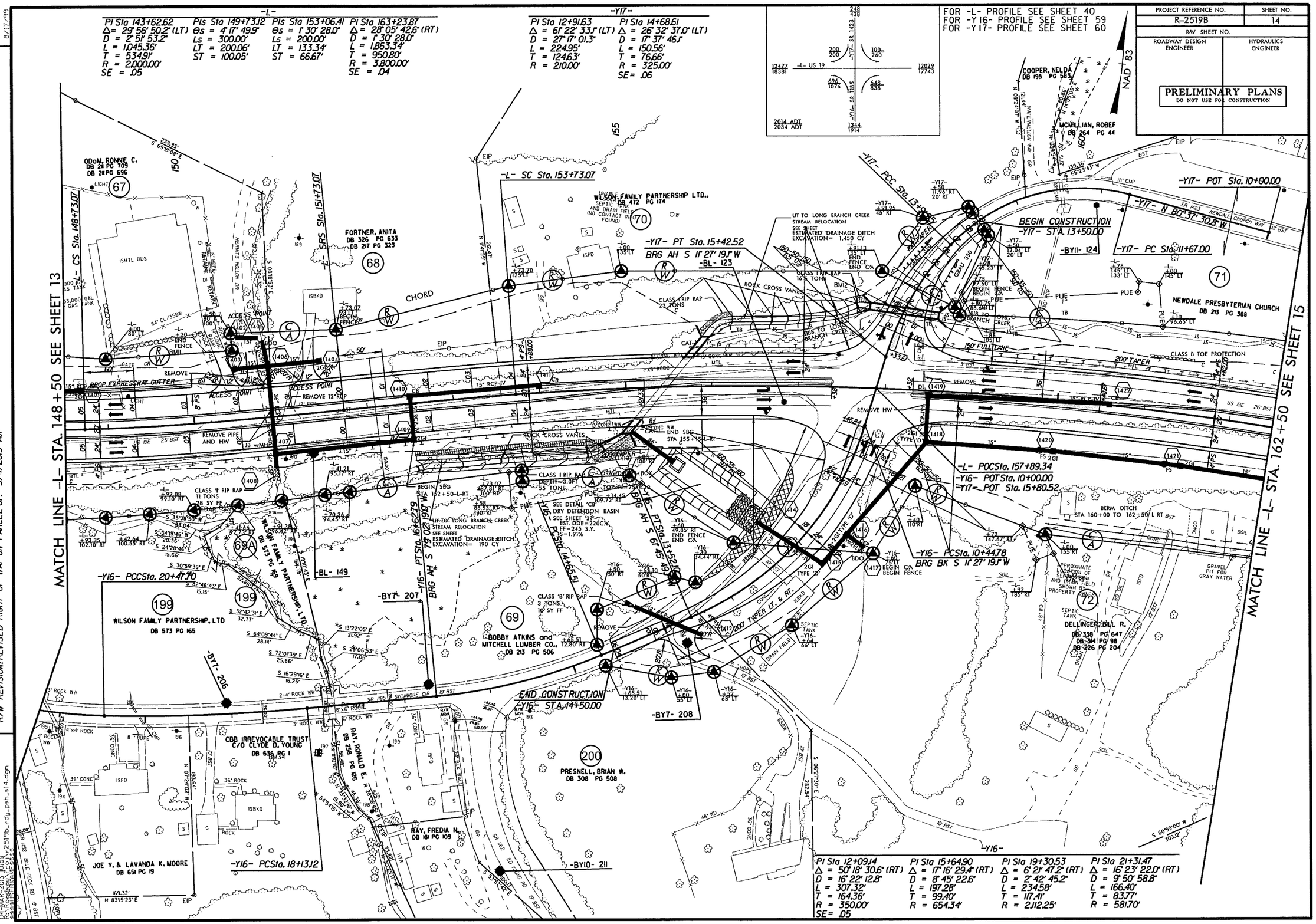
FOR -L- PROFILE SEE SHEET 40
FOR -Y16- PROFILE SEE SHEET 59
FOR -Y17- PROFILE SEE SHEET 60

-L-

PI Sta 143+62.62	PIs Sta 149+73.12	PIs Sta 153+06.41	PI Sta 163+23.87
Δ = 29° 56' 50.2" (LT)	θs = 4° 17' 49.9"	θs = 1° 30' 28.0"	Δ = 28° 05' 42.6" (RT)
D = 2° 51' 53.2"	Ls = 300.00'	Ls = 200.00'	D = 1° 30' 28.0"
L = 1,045.36'	LT = 200.06'	LT = 133.34'	L = 1,863.34'
T = 534.91'	ST = 100.05'	ST = 66.67'	T = 950.80'
R = 2,000.00'			R = 3,800.00'
SE = .05			SE = .04

-Y17-

PI Sta 12+91.63	PI Sta 14+68.61
Δ = 61° 22' 33.1" (LT)	Δ = 26° 32' 37.0" (LT)
D = 27° 17' 01.3"	D = 17° 37' 46.1"
L = 224.95'	L = 150.56'
T = 124.63'	T = 76.66'
R = 210.00'	R = 325.00'
	SE = .06



PI Sta 12+09.14	PI Sta 15+64.90	PI Sta 19+30.53	PI Sta 21+31.47
Δ = 50° 18' 30.6" (RT)	Δ = 17° 16' 29.4" (RT)	Δ = 6° 21' 47.2" (RT)	Δ = 16° 23' 22.0" (RT)
D = 16° 22' 12.8"	D = 8° 45' 22.6"	D = 2° 42' 45.2"	D = 9° 50' 58.8"
L = 307.32'	L = 197.28'	L = 234.58'	L = 166.40'
T = 164.36'	T = 99.40'	T = 117.41'	T = 83.77'
R = 350.00'	R = 654.34'	R = 2,112.25'	R = 581.70'
SE = .05			

REVISIONS
R/W REVISION: REVISED RIGHT OF WAY ON PARCEL 67. 3/4/2013 AJF
8/17/99

24-MAR-2013 10:59
r:\hydra\proj\2519b_rdy_psh_s14.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

FOR -L- PROFILE SEE SHEET 41

MATCH LINE -L- STA. 162+50 SEE SHEET 14

MATCH LINE -L- STA. 176+50 SEE SHEET 16

-BYII- 213
-BYII- 212
-BYII- 214
-BYII- 215
-BL- 150
-BL- 151

DANNY & ANGELA WEATHERMAN
DB 623 PG 22

HOWELL, ROYCE D.
DB 393 PG 49

JEWEL PRESNELL HYATT
DB? PG?

ROBINSON, CHRISTOPHER
DB 217 PG 808

LISTER, DONALD
DB 304 PG 41

LUCILLE WILLIS
DB 623 PG 16

MADGE EDGE DAVENPORT (LIVING ESTATE)
PHILLIP & WANDA DAVENPORT
DB 451 PG 120

CLARENCE & DORIS DEYTON
DB 571 PG 683

MANN DAVIS BROWN
DB 590 PG 642

MCCANDLESS, BURKE A.
DB 258 PG 671
DB 258 PG 674

DELLINGER, BILL R.
DB 338 PG 647
DB 314 PG 98
DB 226 PG 204

BILLY & LUCY DELLINGER
DB 559 PG 199

JERRY MCKINNEY & NORMA FAYE MCKINNEY
DB 297 PG 87

CLASS 'B' RIP RAP
3 TONS
10 SY FF

CLASS 'B' RIP RAP
5 TONS
14 SY FF

CLASS 'B' RIP RAP
5 TONS, 10 SY FF

CLASS 'I' RIP RAP
3 TONS
7 SY FF

REMOVE HW

PLUG

REMOVE

REMOVE EX. 24" CMP AND HW

BEGIN JOB
STA 175+00-L-LT

-L- S 70°13'05.5" E

-L- CS Sta. 172+36.41

-L- ST Sta. 174+36.41

SEE DETAIL 'A1' BERM BASE DITCH SHEET 2-E

CLASS B RIP RAP

-L-

PI Sta 163+23.87	PIs Sta 173+03.08
Δ = 28° 05' 42.6" (RT)	Θs = 1° 30' 28.0"
D = 1° 30' 28.0"	Ls = 200.00'
L = 1,863.34'	LT = 133.34'
T = 950.80'	ST = 66.67'
R = 3,800.00'	
SE = .04	

R/W REVISION: UPDATED RIGHT OF WAY AND RIGHT OF WAY OFFSETS ON PARCEL 74A,75A,AND 75B, PROPERTY INFORMATION ON PLAN SHEET, AND ADDED PARCEL 71C. 8/14/2012 AJF

8/17/99

R31 JAN-2013 09:36
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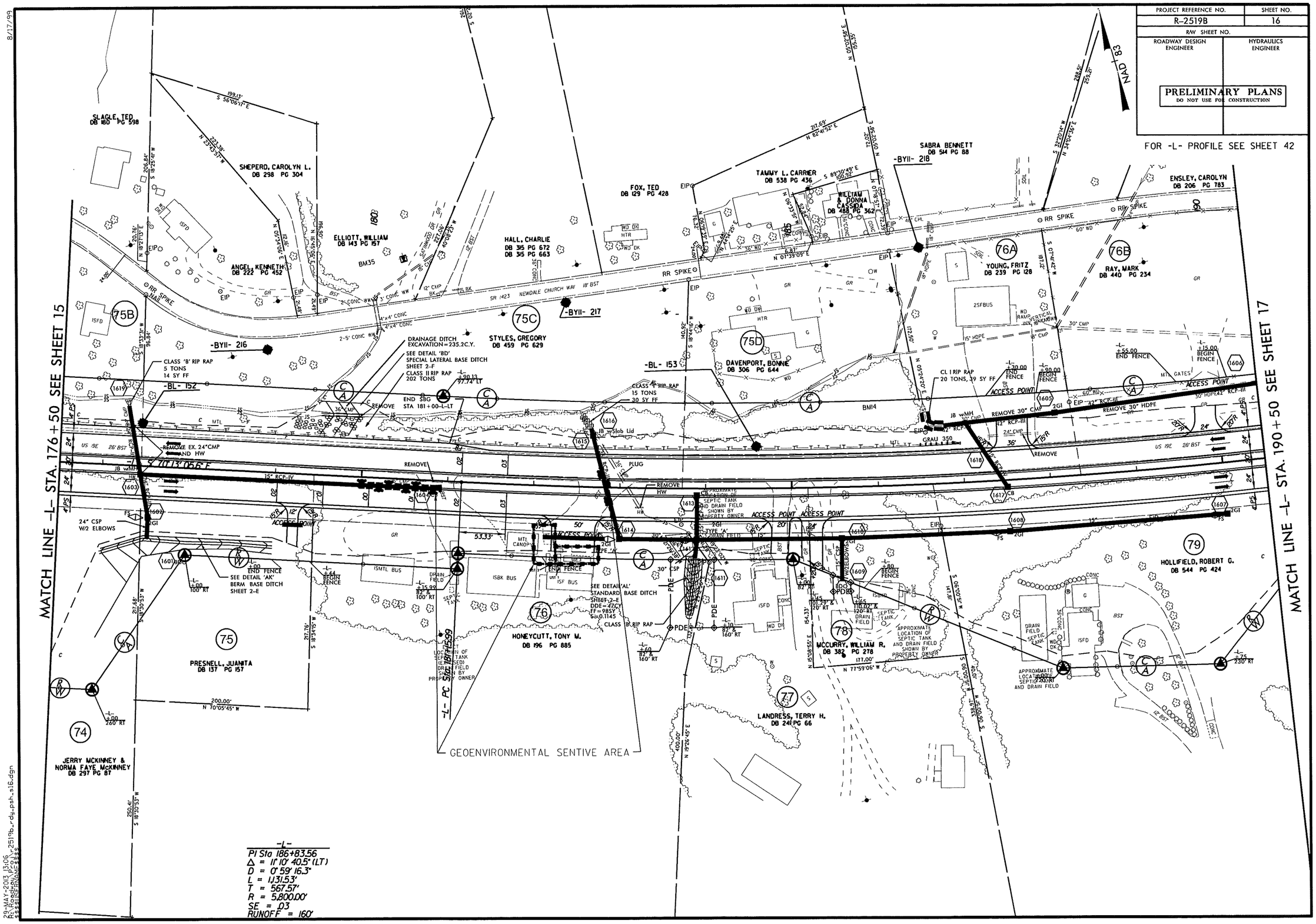
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 42



R/W REVISION: REVISED DRIVEWAY WIDTH ON PARCEL 76. 5/29/2013 TFD

8/17/99

29-MAY-2013 13:06
R:\Roadway\Proj\r2519b_rdy_psh_s16.dgn
$$$$USERNAME$$$$

8/17/99

2014 ADT
2034 ADT

-L- US 19 — 12029 / 17743 — 400 / 400 — -Y18- SR1423 — 200 / 200 — 200 / 200 — 12029 / 17743

-L-	
PI Sta 186+83.56	PI Sta 201+22.52
Δ = 11° 10' 40.5" (LT)	Δ = 2° 24' 41.7" (LT)
D = 0° 59' 16.3"	D = 0° 42' 39.1"
L = 1,131.53'	L = 339.25'
T = 567.57'	T = 169.65'
R = 5,800.00'	R = 8,060.00'
SE = .03	SE = .02
RUNOFF = 160'	RUNOFF = 100'

-Y18-	
PI Sta 11+12.30	PI Sta 14+12.48
Δ = 14° 13' 29.9" (RT)	Δ = 66° 55' 58.5" (RT)
D = 6° 21' 58.3"	D = 38° 11' 49.9"
L = 223.45'	L = 175.23'
T = 112.30'	T = 99.16'
R = 900.00'	R = 150.00'
SE = .04	

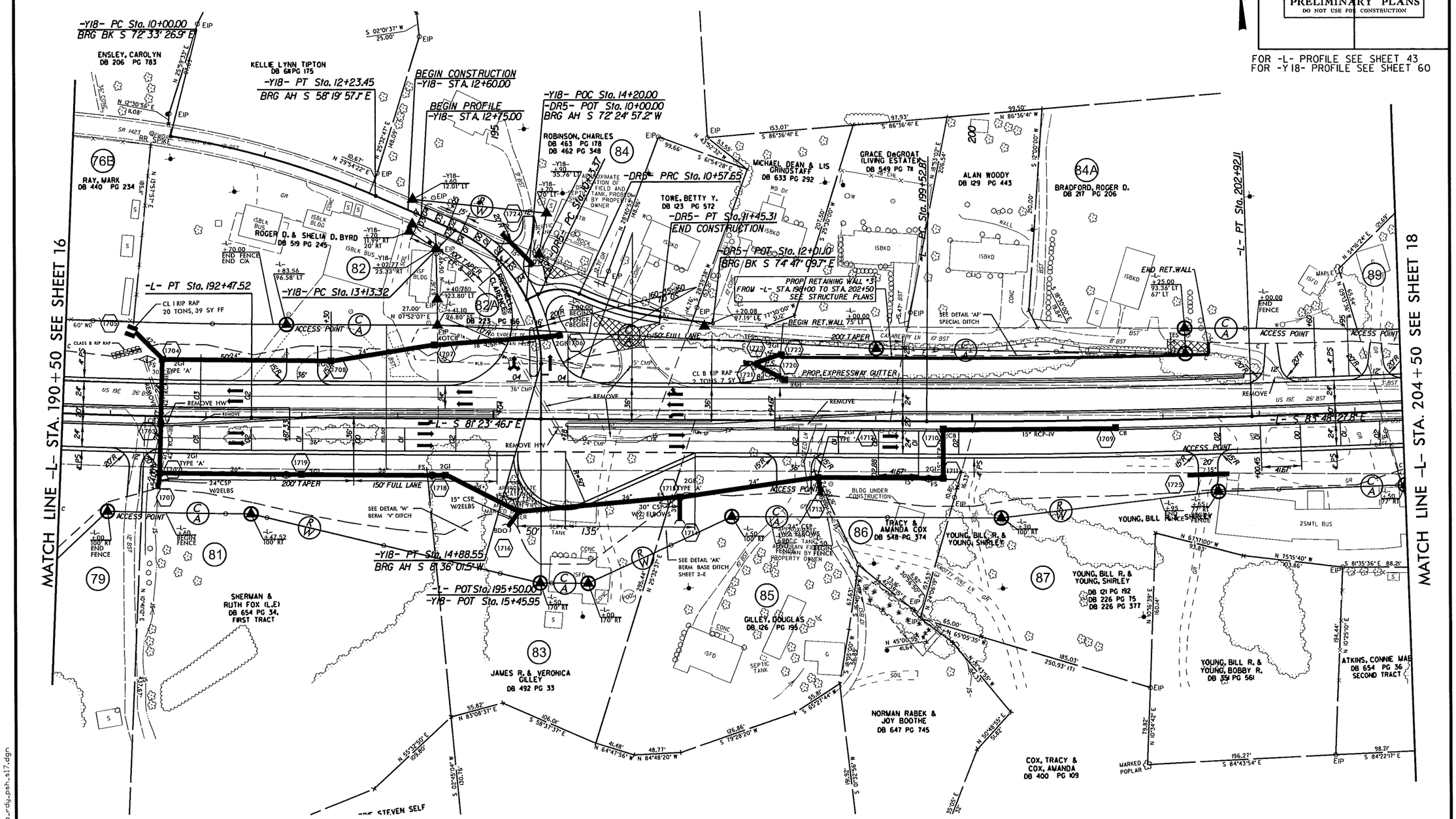
-DR5-	
PI Sta 10+37.08	PI Sta 11+01.84
Δ = 50° 44' 12.2" (RT)	Δ = 17° 56' 19.1" (LT)
D = 114° 35' 29.6"	D = 20° 27' 46.0"
L = 44.28'	L = 87.66'
T = 23.71'	T = 44.19'
R = 50.00'	R = 280.00'

NAD 83

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 43
FOR -Y18- PROFILE SEE SHEET 60



R/W REVISION: REVISING PROPERTY INFORMATION ON PARCEL 81. 12/20/2012 RWB

23-JAN-2013 09:36
R:\Roadway\Proj\r2519b_rdy_psh_s17.dgn
$$$$USERNAME$$$$

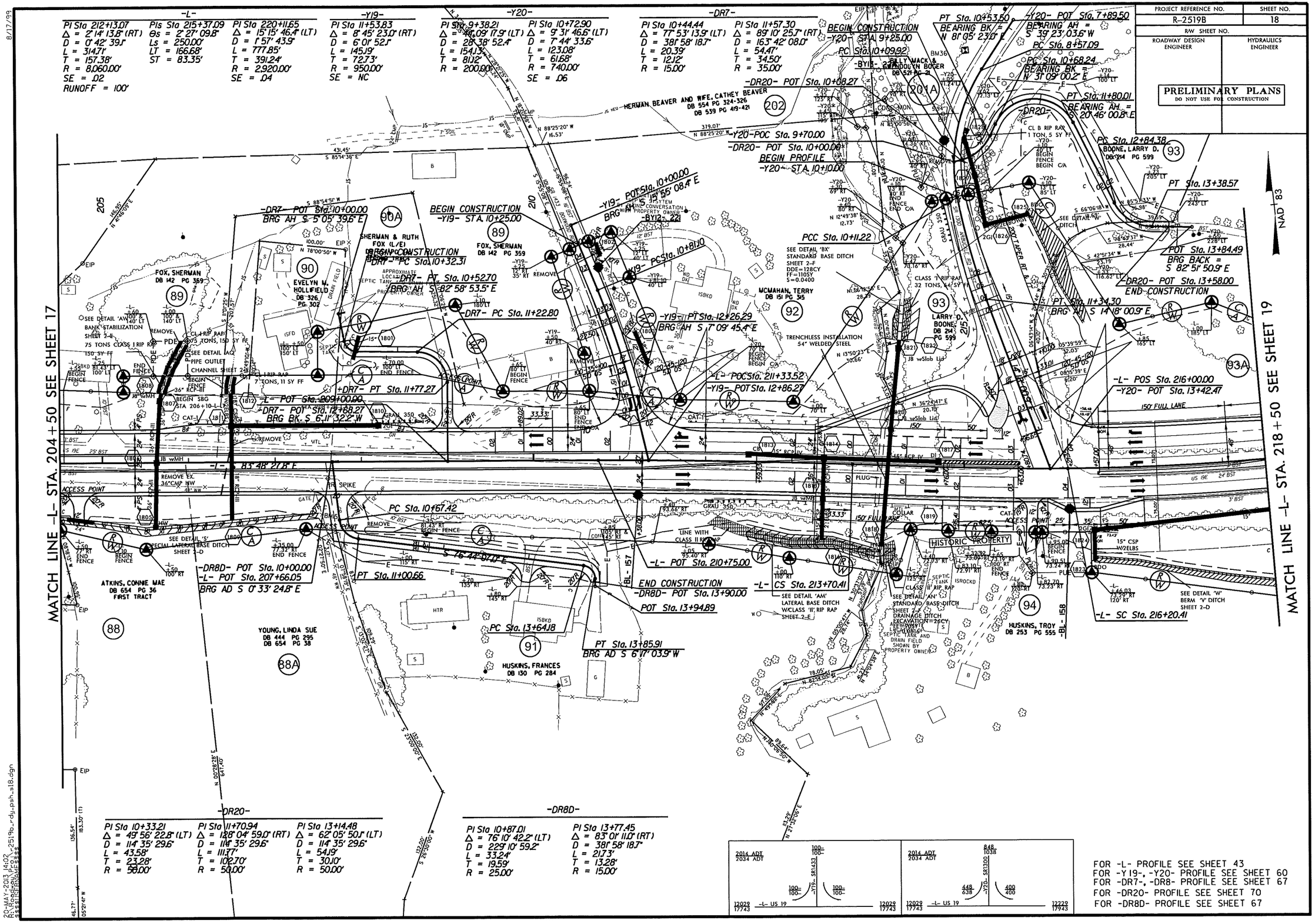
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

8/17/99

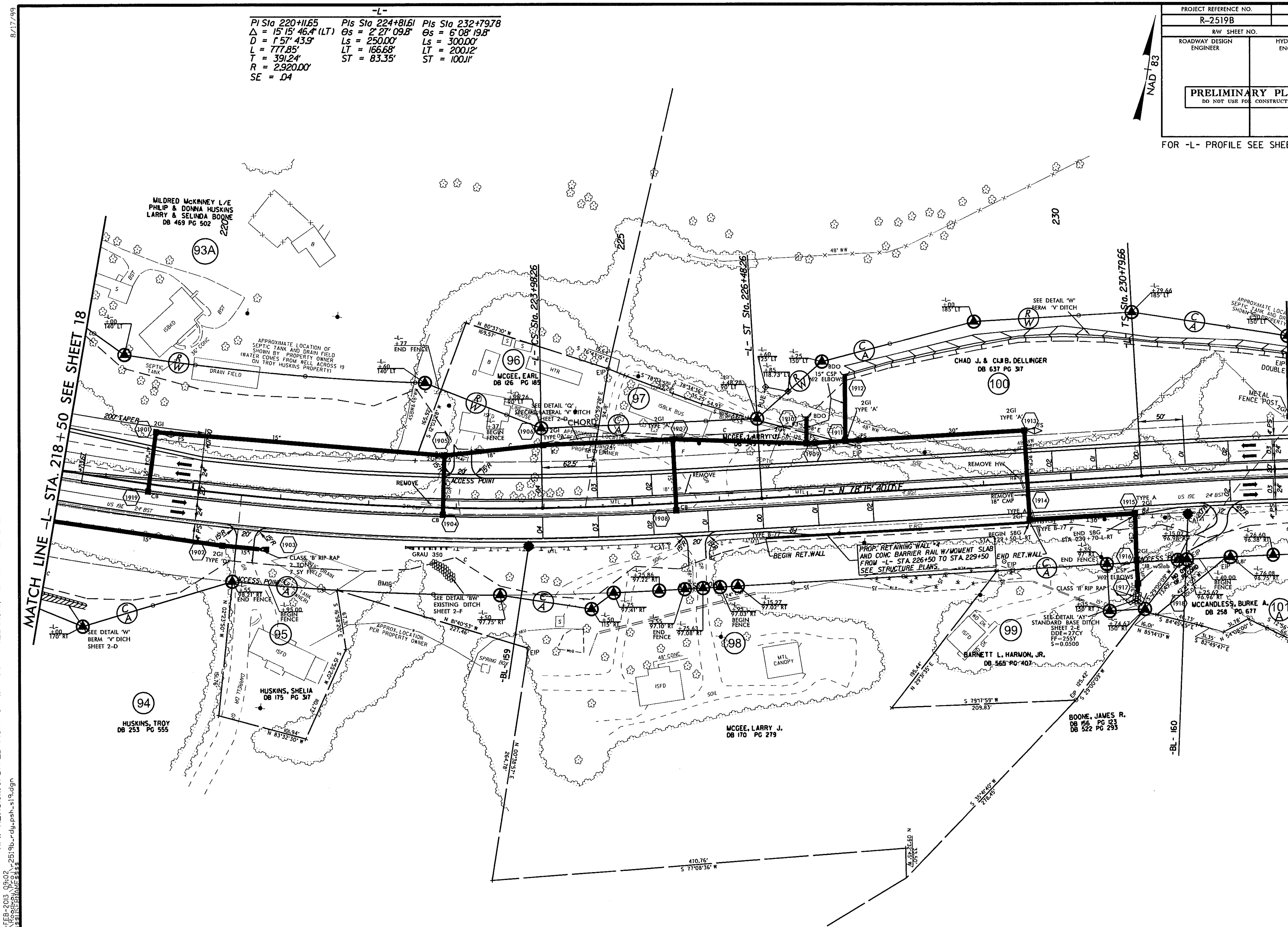
R/W REVISION: RENUMBERED PARCEL 201 TO PARCEL 201A 5/20/2013 TFD

20-MAY-2013 14:02
R:\Roadway\Proj\r2519b_rdy_psh_u18.dgn
$$$$USERNAME$$$$



FOR -L- PROFILE SEE SHEET 43
FOR -Y19-, -Y20- PROFILE SEE SHEET 60
FOR -DR7-, -DR8- PROFILE SEE SHEET 67
FOR -DR20- PROFILE SEE SHEET 70
FOR -DR8D- PROFILE SEE SHEET 67

8/17/99



R/W REVISION: UPDATED RIGHT OF WAY ON PARCEL 98,99,AND 100A. 2/12/2013 AJF

12-FEB-2013 09:02
R:\Roadway\Proj\r2519b_rdy_psh_s19.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 44
FOR -Y21- PROFILE SEE SHEET 61
FOR -DR8A- PROFILE SEE SHEET 67
FOR -DR8B- PROFILE SEE SHEET 67

NAD 83

-L-
PI Sta 232+79.78
Θs = 6° 08' 19.8"
Ls = 300.00'
LT = 200.12'
ST = 100.11'

PI Sta 235+40.37
Δ = 13° 05' 49.2" (RT)
D = 4° 05' 33.2"
L = 320.02'
T = 160.71'
R = 1,400.00'
SE = .06

PI Sta 237+99.79
Θs = 6° 08' 19.8"
Ls = 300.00'
LT = 200.12'
ST = 100.11'

-DR8B-
PI Sta 11+07.24
Δ = 44° 24' 04.3" (LT)
D = 57° 17' 44.8"
L = 77.49'
T = 40.81'
R = 100.00'

-Y21-
PI Sta 10+91.79
Δ = 16° 06' 30.6" (RT)
D = 28° 38' 52.4"
L = 56.23'
T = 28.30'
R = 200.00'

PI Sta 12+28.28
Δ = 3° 24' 37.5" (LT)
D = 4° 46' 28.7"
L = 71.43'
T = 35.72'
R = 1,200.00'

PI Sta 13+16.16
Δ = 30° 57' 45.5" (LT)
D = 30° 24' 47.7"
L = 101.81'
T = 52.18'
R = 188.39'

-DR8A-
PI Sta 10+56.35
Δ = 40° 34' 58.5" (LT)
D = 143° 14' 22.0"
L = 28.33'
T = 14.79'
R = 40.00'

-DR8B- POT Sta. 10+00.00
BRG AH S 58° 02' 13.0" W
BEGIN CONSTRUCTION
-DR8B- Sta. 10+25.00
-DR8B- PC Sta. 10+66.43
-DR8B- PT Sta. 11+43.93
-L- POT Sta. 243+75.00
-DR8B- POT Sta. 11+87.30
BRG BK S 13° 38' 08.7" W
-L- POT Sta. 243+43.00
-Y21- POT Sta. 10+08.00
BRG AH S 28° 38' 04.0" W
-Y21- PC Sta. 10+63.49
-DR8A- POT Sta. 10+94.66
BRG BK N 75° 50' 23.9" W
END CONSTRUCTION
-DR8A- Sta. 10+77.35
-DR8A- Sta. 10+69.90
-DR8A- PC Sta. 10+41.56
-Y21- PT Sta. 11+19.72
BRG AH S 44° 44' 34.6" W
-Y21- POT Sta. 11+50.00
BRG AH N 35° 15' 25.4" W
-Y21- PCC Sta. 12+63.98
-BY14- 225
END CONSTRUCTION
-Y21- STA. 13+00.00
-Y21-PT Sta. 13+65.79
BRG AH S 10° 22' 11.7" W
-Y21- POT Sta. 14+20.38

MATCH LINE -L- STA. 232+50 SEE SHEET 19
MATCH LINE -L- STA. 246+50 SEE SHEET 21

USTER & FLORENCE PETERSON DB 169 PG 323
STAFFORD, ROGER DB 163 PG 607
CHAD J. & CLAB. DELLINGER DB 637 PG 317
GLADYS BUCHANNAN REMAINING PORTION OF DB 121 PG 283 ALSO SEE EXCEPTION TO DB 637 PG 317
STAFFORD, PHILLIP R. DB 250 PG 570 PB 2 PG 186 B,C,D DB 629 PG 546
CHEVER & GWINNITH MCGALE DB 583 PG 509 PB 2 PG 186
CHARTER COMMUNICATIONS II, L.P., DB 269 PG 50
MCCANDLESS, BURKE A. DB 258 PG 680 PB 2 PG 186 B,C,D
MCCANDLESS, BURKE A. DB 258 PG 677
CRABTREE BAPTIST CHURCH DB 288 PG 312
BOONE, JAMES R. DB 156 PG 123 DB 522 PG 293
RENFRO, JERRY D. DB 219 PG 149
ROBERTS, TONY DB 246 PG 606 DB 204 PG 668 DB 178 PG 605
ROBERT ABEEL BREWSTER & BRENDA BENNET DB 657 PG 525

R/W REVISION: REVISED PARCEL 101 TO PARCEL 101B. 4/18/2013 AJF

8/17/99

18-APR-2013 16:21
C:\PW_WORKING\dot\r2519b_rdy_psh_s20.dgn
$$$$USERNAME$$$$

R/W REVISION: UPDATED RIGHT OF WAY OFFSETS ON PARCEL 107A, 110, 111, 111A, 112, AND 115, AND ADDED PUE ON PARCEL 107A, 110, 111, AND 112. 8/14/2012 AJF

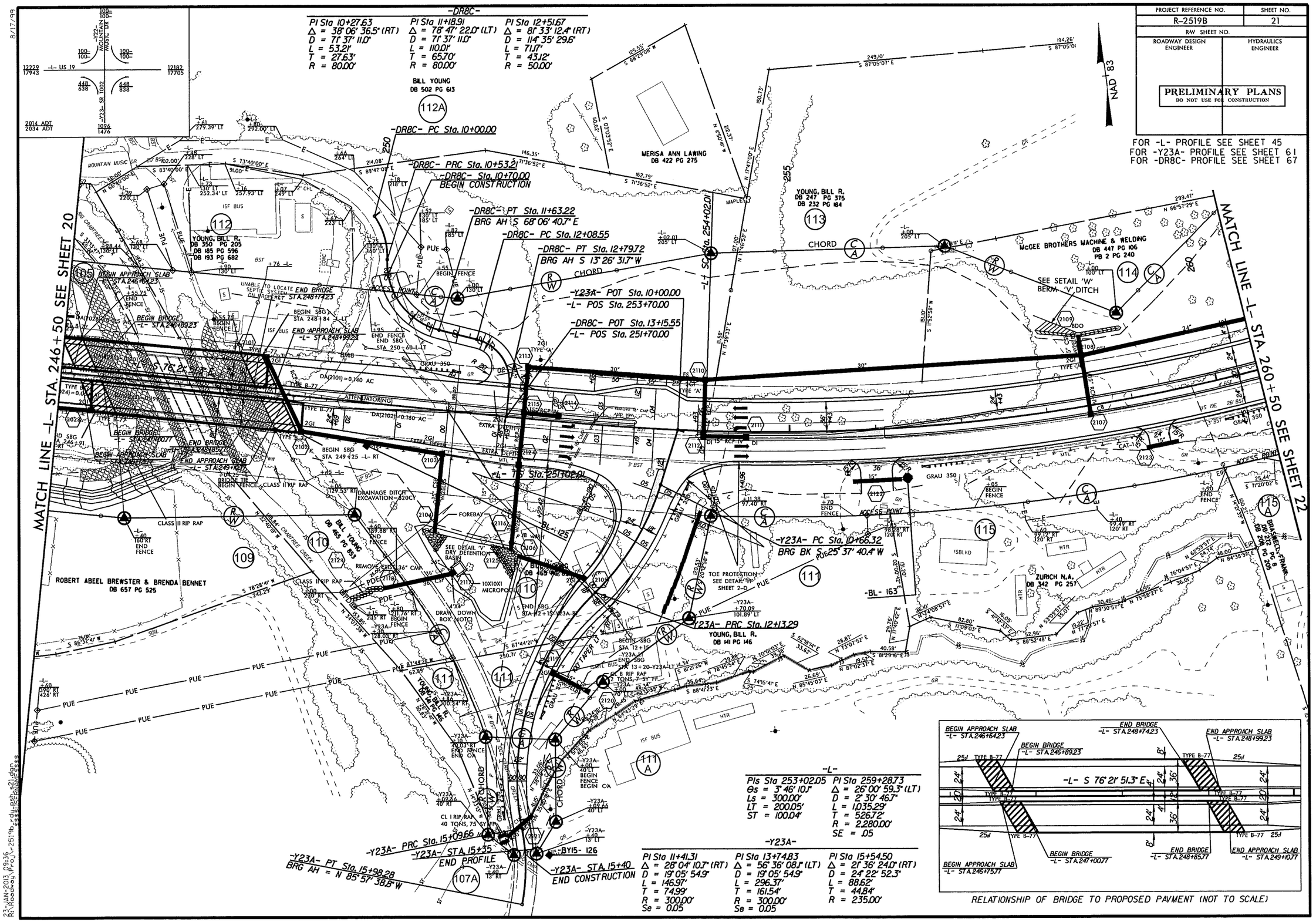
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 45
FOR -Y23A- PROFILE SEE SHEET 61
FOR -DR8C- PROFILE SEE SHEET 67

NAD 83



RELATIONSHIP OF BRIDGE TO PROPOSED PAVMENT (NOT TO SCALE)

23-JAN-2013 09:36
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$$$$USERNAME$$$$

-L-			
PI Sta 259+28.73	PIs Sta 265+37.33	PIs Sta 270+37.62	PI Sta 273+91.51
Δ = 26° 00' 59.3" (LT)	Θs = 3° 46' 10.1"	Θs = 6° 27' 42.9"	Δ = 21° 37' 34.1" (RT)
D = 2° 30' 46.7"	Ls = 300.00'	Ls = 300.00'	D = 4° 18' 28.6"
L = 1,035.29'	LT = 200.05'	LT = 200.13'	L = 502.00'
T = 526.72'	ST = 100.04'	ST = 100.12'	T = 254.03'
R = 2,280.00'			R = 1,330.00'
SE = .05			SE = .06

-DR9-		
PI Sta 10+74.93	PI Sta 12+26.05	PI Sta 15+35.79
Δ = 28° 00' 06.7" (LT)	Δ = 45° 56' 45.9" (LT)	Δ = 59° 00' 25.8" (RT)
D = 57° 17' 44.8"	D = 19° 05' 54.9"	D = 57° 17' 44.8"
L = 48.87'	L = 240.57'	L = 102.99'
T = 24.93'	T = 127.18'	T = 56.59'
R = 100.00'	R = 300.00'	R = 100.00'

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

FOR -L- PROFILE SEE SHEET 46
FOR -DR9- PROFILE SEE SHEET 68
WALL No. 5 & 6 HAVE BEEN ELIMINATED

-DR9- POT Sta. 10+00.00
BRG AH S 18° 05' 27.9" E

BEGIN CONSTRUCTION
-DR9- PC Sta. 10+50.00

-DR9- PCC Sta. 10+98.87

-DR9- PT Sta. 13+39.45

-DR9- PC Sta. 14+79.21

-L- CS Sta. 264+37.29

-DR9- N 81° 57' 39.5" E

-DR9- PT Sta. 15+82.20
BRG AH S 35° 01' 54.7" E

-L- POS Sta. 265+25.00

-DR9- POT Sta. 16+36.93

-L- TS Sta. 268+37.49

-L- SC Sta. 271+37.49

-L- Sta. 267+37.29

-BL- 166

-BL- 165

MATCH LINE -L- STA. 260+50 SEE SHEET 21

MATCH LINE -L- STA. 274+50 SEE SHEET 23

PROP. RETAINING WALL #7 AND CONC BARRIER RAIL W/MOVEMENT SLAB FROM -L- STA. 274+00 TO STA. 277+00 SEE STRUCTURE PLANS

LEDFORD, JOHN A.
DB 258 PG 42

HUSKINS, KENNETH L.
DB 260 PG 401

HUSKINS, BARBARA
DB 15 PG 368

PLEMMONS, JM
DB 383 PG 493

McGEE BROTHERS MACHINE & WELDING
DB 447 PG 106
PB 2 PG 240

HOWELL, RAY
DB 160 PG 150

PRESNELL, MARK
DB 470 PG 691

RICHARDSON, JR., GEORGE E.
DB 322 PG 46

BRASWELL, FRANK
DB 272 PG 8
DB 208 PG 205

BAILEY, BROOKS A.
DB 415 PG 6

EASTATOE CHURCH OF GOD
DB 209 PG 668

ATKINS, PAUL J.
DB 250 PG 129

RATHBONE, RICHARD
DB 169 PG 209

DARREL E. ATKINS
DB 514 PG 220

R/W REVISION. ADDED DRIVE ON PARCEL 118 AND REVISED THE FENCE. 5/29/2013 TFD

8/17/99

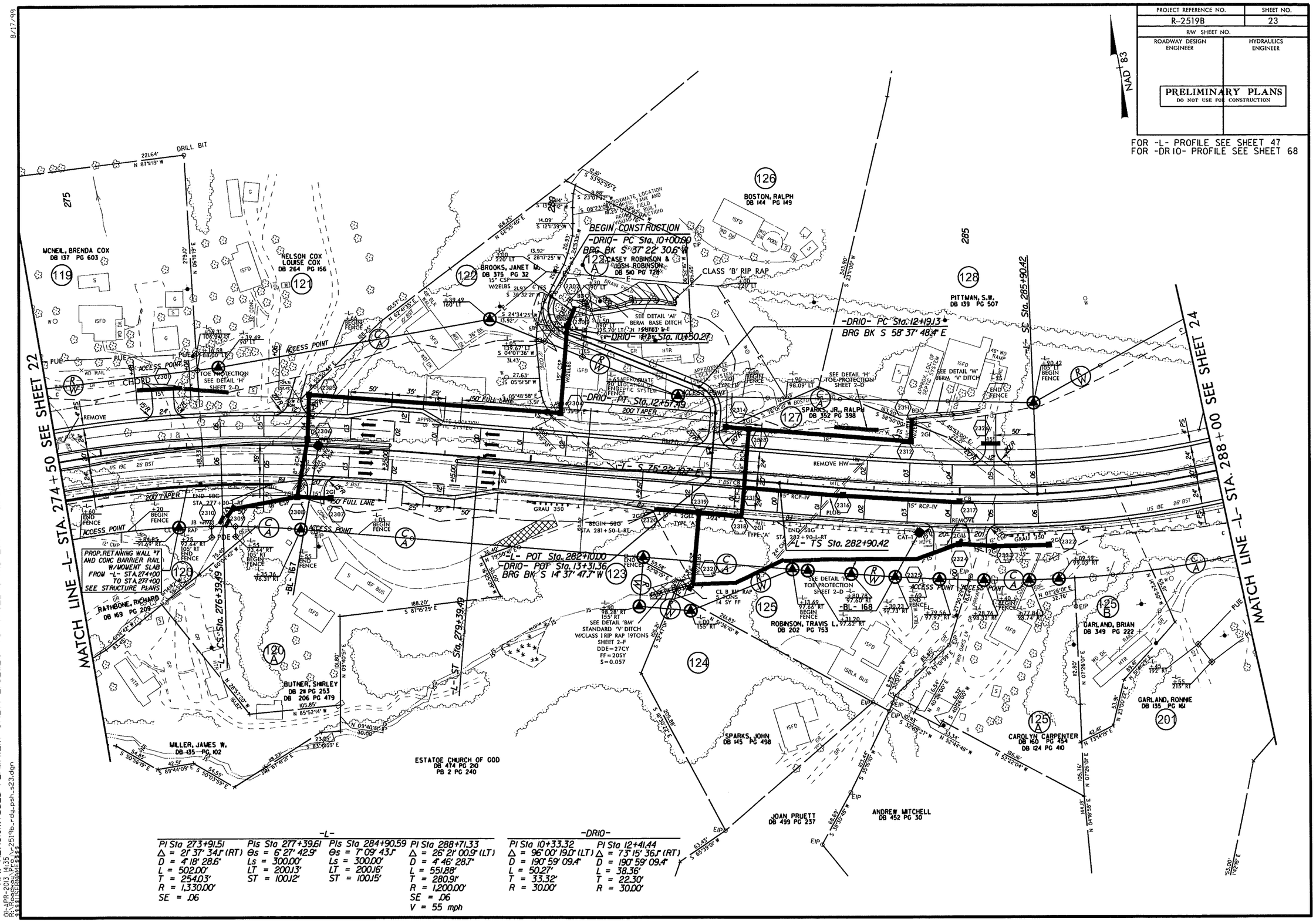
29-MAY-2013 13:06
R:\Roadway\Proj\r2519b_rdy_psh_s22.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	23
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

NAD 83

FOR -L- PROFILE SEE SHEET 47
FOR -DRIO- PROFILE SEE SHEET 68



-L-			
PI Sta 273+91.51	PIs Sta 277+39.61	PIs Sta 284+90.59	PI Sta 288+71.33
Δ = 21° 37' 34.1" (RT)	Θs = 6° 27' 42.9"	Θs = 7° 09' 43.1"	Δ = 26° 21' 00.9" (LT)
D = 4° 18' 28.6"	Ls = 300.00'	Ls = 300.00'	D = 4° 46' 28.7"
L = 502.00'	LT = 200.13'	LT = 200.16'	L = 551.88'
T = 254.03'	ST = 100.12'	ST = 100.15'	T = 280.91'
R = 1,330.00'			R = 1,200.00'
SE = .06			SE = .06
			V = 55 mph

-DRIO-	
PI Sta 10+33.32	PI Sta 12+41.44
Δ = 96° 00' 19.0" (LT)	Δ = 73° 15' 36.1" (RT)
D = 190° 59' 09.4"	D = 190° 59' 09.4"
L = 50.27'	L = 38.36'
T = 33.32'	T = 22.30'
R = 30.00'	R = 30.00'

8/17/99

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 119 AND 201. 4/1/2013 AJF

01-APR-2013 14:35
R:\Roadway\Proj\r2519b_rdy_psh_s23.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

PI Sta 288+71.33	PIs Sta 292+42.45	PIs Sta 297+88.55	PI Sta 301+31.86
Δ = 26° 21' 00.9" (LT)	θs = 7° 09' 43.1"	θs = 6° 27' 42.9"	Δ = 20° 44' 41.8" (RT)
D = 4° 46' 28.7"	Ls = 300.00'	Ls = 300.00'	D = 4° 18' 28.6"
L = 551.88'	LT = 200.16'	LT = 200.13'	L = 481.55'
T = 280.91'	ST = 100.15'	ST = 100.12'	T = 243.44'
R = 1,200.00'			R = 1,330.00'
SE = .06			SE = .06
V = 55 mph			

-Y25-

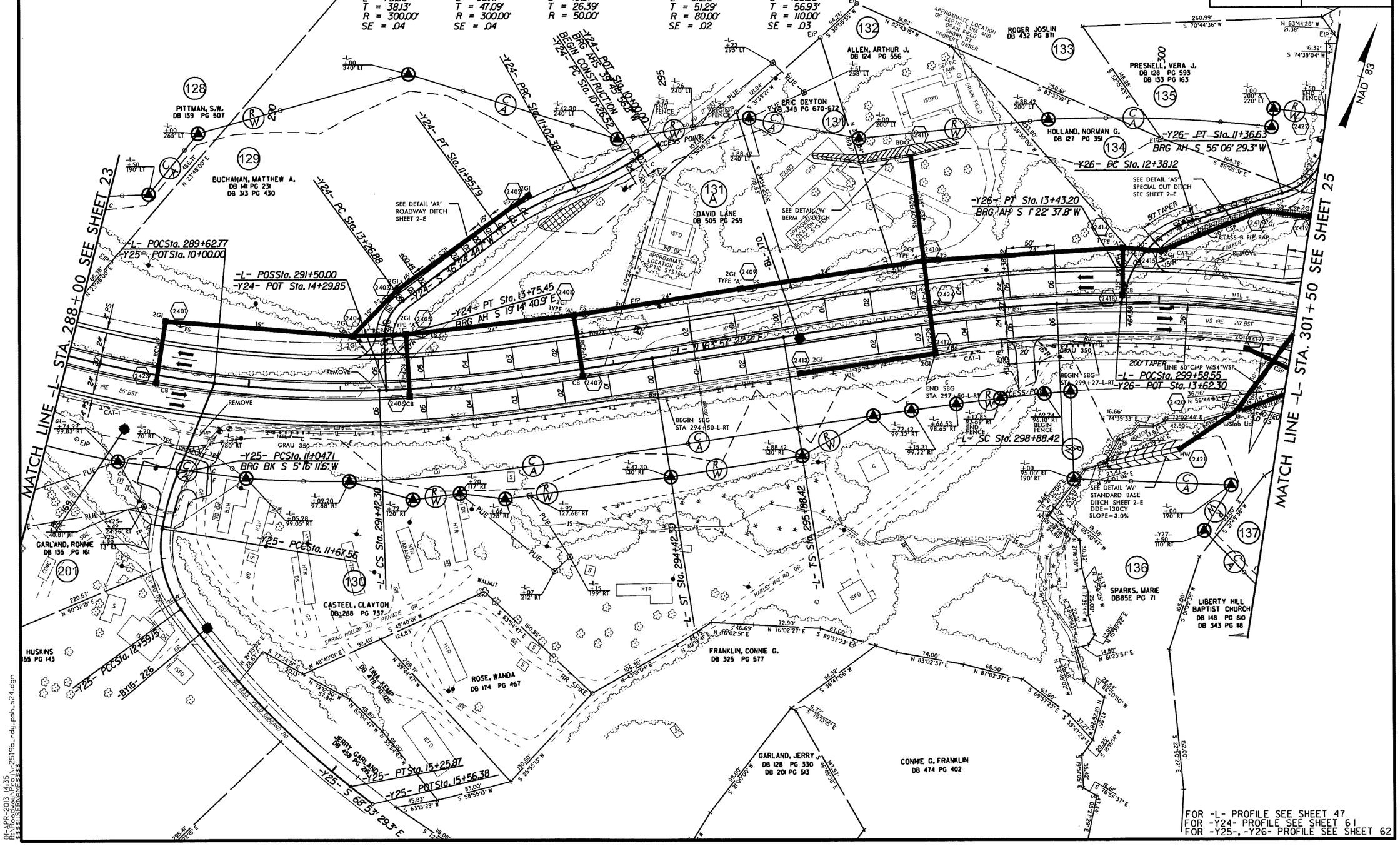
PI Sta 11+36.26	PI Sta 12+15.90	PI Sta 13+93.40
Δ = 12° 39' 25.7" (LT)	Δ = 45° 20' 15.8" (LT)	Δ = 16° 09' 59.4" (LT)
D = 20° 08' 23.4"	D = 49° 29' 58.5"	D = 6° 03' 40.3"
L = 62.85'	L = 91.59'	L = 266.72'
T = 31.55'	T = 48.35'	T = 134.25'
R = 284.49'	R = 115.75'	R = 945.29'

-Y24-

PI Sta 10+64.65	PI Sta 11+49.47	PI Sta 13+53.27
Δ = 14° 29' 14.9" (RT)	Δ = 17° 50' 27.0" (LT)	Δ = 55° 39' 25.6" (LT)
D = 19° 05' 54.9"	D = 19° 05' 54.9"	D = 114° 35' 29.6"
L = 75.86'	L = 93.41'	L = 48.57'
T = 38.13'	T = 47.09'	T = 26.39'
R = 300.00'	R = 300.00'	R = 50.00'
SE = .04	SE = .04	

-Y26-

PI Sta 10+96.70	PI Sta 12+95.05
Δ = 65° 20' 00.3" (RT)	Δ = 54° 43' 51.5" (LT)
D = 71° 37' 11.0"	D = 52° 05' 13.5"
L = 91.22'	L = 105.08'
T = 51.29'	T = 56.93'
R = 80.00'	R = 110.00'
SE = .02	SE = .03



8/17/99

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 129, 130, 131, AND 131A. 4/1/2013 AJF

04-APR-2013 14:35
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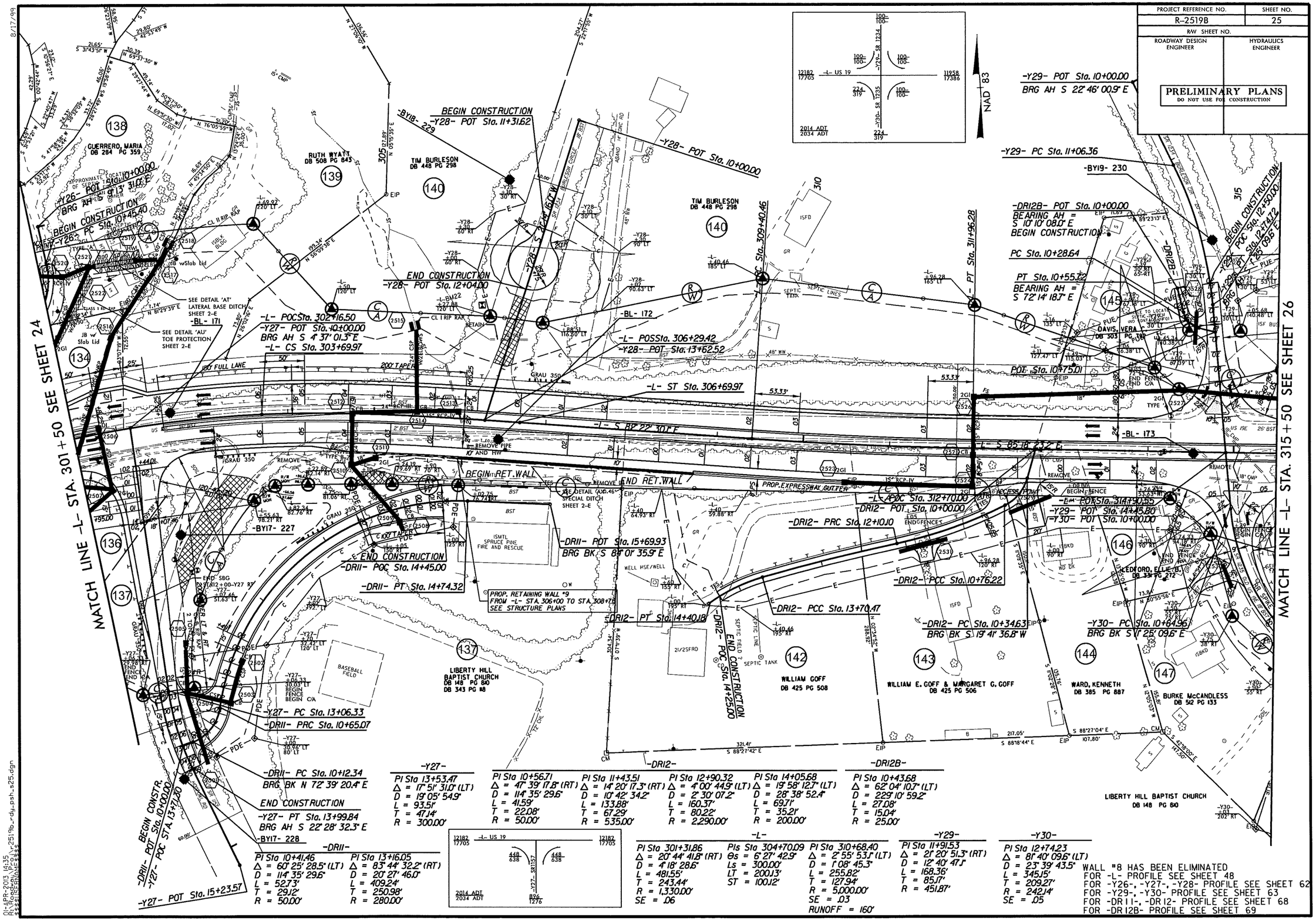
$$$$RICEPRNME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	25
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



WALL #8 HAS BEEN ELIMINATED
FOR -L- PROFILE SEE SHEET 48
FOR -Y26-, -Y27-, -Y28- PROFILE SEE SHEET 62
FOR -Y29-, -Y30- PROFILE SEE SHEET 63
FOR -DRII-, -DRI2- PROFILE SEE SHEET 68
FOR -DRI2B- PROFILE SEE SHEET 69

8/17/99

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 145 AND 150. 4/1/2013 AJF

01-APR-2013 14:35
R:\Roadway\Proj\r2519b_rdy_psh_s25.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	26
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 48
FOR -Y30- PROFILE SEE SHEET 63
FOR -Y31-, -Y32- PROFILE SEE SHEET 64

NAD '83

-Y31-
PI Sta 12+08.09
Δ = 20° 44' 23.9" (LT)
D = 11° 27' 33.0"
L = 180.99'
T = 91.50'
R = 500.00'
SE = .04

PI Sta 14+10.07
Δ = 41° 06' 29.7" (RT)
D = 19° 05' 54.9"
L = 215.24'
T = 112.49'
R = 300.00'
SE = .05

-Y32-
PI Sta 11+02.45
Δ = 14° 42' 17.4" (LT)
D = 16° 14' 34.0"
L = 90.53'
T = 45.52'
R = 352.75'

PI Sta 11+84.65
Δ = 31° 43' 43.2" (LT)
D = 43° 47' 21.2"
L = 72.46'
T = 37.18'
R = 130.84'

-Y30-
PI Sta 14+56.35
Δ = 5° 48' 00.2" (LT)
D = 6° 16' 35.2"
L = 92.41'
T = 46.24'
R = 912.87'

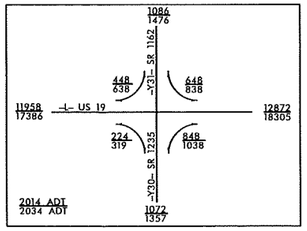
PI Sta 17+56.12
Δ = 13° 14' 51.4" (LT)
D = 3° 46' 46.7"
L = 41.69'
T = 20.94'
R = 180.29'

PI Sta 19+34.22
Δ = 15° 22' 46.1" (LT)
D = 9° 10' 02.4"
L = 167.76'
T = 84.39'
R = 625.00'
SE = .04

PI Sta 20+75.55
Δ = 57° 47' 26.9" (LT)
D = 54° 34' 02.7"
L = 105.91'
T = 57.95'
R = 105.00'
SE = .06

-L-
PI Sta 325+74.59
Δ = 1° 44' 36.6" (RT)
D = 1° 08' 45.3"
L = 152.15'
T = 76.08'
R = 5,000.00'
SE = .03
RUNOFF = 160'

PI Sta 328+95.94
Δ = 3° 29' 10.2" (LT)
D = 0° 42' 39.1"
L = 490.41'
T = 245.28'
R = 8,060.00'
SE = .02
RUNOFF = 106'



MATCH LINE -L- STA. 315+50 SEE SHEET 25

MATCH LINE -L- STA. 329+50 SEE SHEET 27

-Y31- POT Sta. 10+00.00
BEGIN CONSTRUCTION -Y31- PC Sta. 11+16.59
-Y31- S 15° 40' 29.7" E
-BY21- 235
-Y31- PRC Sta. 12+97.58
-BL- 174
-L- POT Sta. 323+65.42
-Y30- PT Sta. 22+01.88
-Y31- PT Sta. 15+12.82
-BY22- 236
END CONSTRUCTION -Y32- PCC Sta. 11+47.47
-Y32- PT Sta. 12+19.93
BRG AH S 39° 22' 56.2" W
BEGIN CONSTRUCTION -Y32- PC Sta. 10+56.85
-Y32- POT Sta. 10+40.00
BRG AH S 85° 48' 58.7" W
-Y30- PT Sta. 21+23.50
BRG AH N 4° 41' 36.2" E
-Y30- PT Sta. 17+16.81
BRG AH N 77° 51' 49.2" E
-Y30- PC Sta. 18+49.83
-Y30- S 88° 53' 19.4" E
-Y30- POC STA. 12+85.00
END CONSTRUCTION
-Y30- PCC Sta. 14+10.31
-Y30- PT Sta. 15+02.52
-Y30- PC Sta. 17+35.19
-BY20- 232
-BY20- 231
BEGIN CONSTRUCTION -Y30- POC Sta. 19+22.00
-Y30- PCC Sta. 20+17.60
-L- PC Sta. 324+98.51
-L- PRC Sta. 326+50.66
-L- POC Sta. 326+81.23
-Y32- POT Sta. 13+27.07
-BY20- 233
-BY20- 234
-L- 150' FULL LANE
200' TAPER
150' FULL LANE
200' TAPER
US 19E 26' BST
US 19E 24' BST
SR 1235 18' BST
JERRY & CRYSTAL ROBINSON WILLIS DB 451 PG 980
KENNETH S. WILLER DB 504 PG 832
JONES, CHARLES R. DB 124 PG 524
DEW CONSTRUCTION CO. DB 180 PG 355
KENNETH WILLER DB 150 PG 151 DB 275 PG 254
APRIL PITTMAN SPARKS DB 506 PG 846
FOX, MICHAEL L. DB 345 PG 723
UT TO BRUSHY CREEK STREAM RELOCATION SEE SHEET
EST. DRAINAGE DITCH EXCAVATION= 1,490 CY
SEE DETAIL 'G' SPECIAL CUT DITCH
SEE DETAIL 'Z' LATERAL GRASSED SWALE
CL B RIP RAP 8 TONS, 21 SY FF
CLASS II RIP RAP 62 TONS
CLASS I RIP RAP 70 TONS
CLASS II RIP RAP 75 TONS
CL B RIP RAP 55 TONS 14 SY FF
COLLAR AND EXTEND ACCESS POINT
TOE PROTECTION
TRENCHLESS INSTALLATION 30" WELDED STEEL
SEE DETAIL 'AY' STANDARD BASE DITCH SHEET 2-E
SEE DETAIL 'AZ' LATERAL BASE DITCH SHEET 2-E
KENNETH WINTERS DB 501 PG 263
HOUSTON, JR., ROBERT V. DB 270 PG 436 DB 324 PG 210 DB 428 PG 187
MY WIFE LLC DB 406 PG 459
BUCHANAN, GEORGE L. DB 320 PG 22
DICKS, FRANCIS DB 159 PG 581
JOHN REMICK III DB 473 PG 863
FANNIE MAE DB 500 PG 270
JOHN & LINDA HONEYCUTT DB 417 PG 818
W. EARL & LUCINDA A. WINSPEAR DB 462 PG 41
BILLY WOODBY DB 474 PG 577
REMOVE PIPE AND DI
REMOVE STRUCTURE
CLASS I RIP RAP 2 TONS, 7 SY FF
ACCESS POINT
EST. DRAINAGE DITCH EXCAVATION= 350 CY
PSH

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 150, 155, AND 156. 4/1/2013 AJF

8/17/99

DI-LPR-2013 14:35
R:\Roadway\Proj\r2519b_rdy_psh_s26.dgn
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 49
FOR -Y33- PROFILE SEE SHEET 64

NAD 83

MATCH LINE -L- STA. 329+50 SEE SHEET 26

MATCH LINE -L- STA. 343+50 SEE SHEET 28

GREG JOHNSON DB 482 PG 753
DEBRA BOONE DB 481 PG 703
DEYTON, SR., CLARENCE S. DB 272 PG 651 DB 284 PG 135
DEYTON, SR., CLARENCE S. DB 322 PG 401
DEYTON, SR., CLARENCE S. DB 284 PG 135
SHEPARD, LINDA W. DB 340 PG 558
DEBORAH S. BOONE DB 481 PG 703
STEVEN DEYTON DB 389 PG 187
STEVEN C. DEYTON DB 284 PG 624
JOHNSON, JAMES DB 348 PG 104
HOWARD FORBES DB 390 PG 441
SPARKS, MIKE L. DB 134 PG 553
SPARKS, MARIE DB 852 PG 71
MILLER, MEARL H. DB 256 PG 174 DB 140 PG 228
SIX KIDS LIMITED DB 548 PG 24
NATALIE & NINA SPARKS DB 192 PG 339
EDWARD BROUGHAN DB 466 PG 633
EDWARD BROUGHAN DB 439 PG 483
KEEN, JOHN E. DB 322 PG 401
CROWDER, TONY R. DB 152 PG 439
STEVENS, JR., BOBBY L. DB 307 PG 767
JOHN RENICK III DB 1413 PG 383
WILLIAMS, JAMES Z. DB 130 PG 623
HOLLIFIELD, MATTHEW DB 348 PG 800
BEVERLY K. WILLIAMS WOODY & JUSTIN JAMES WOODY DB 410 PG 740
SPARKS, JR., RALPH DB 150 PG 18
HENLINE, KENNETH DB 138 PG 581
BOONE, DONALD DB 237 PG 559

-BY22- 239
-BY22- 237
-BL- 176
-BL- 175
-L- PT Sta. 332+92.24
-L- PT Sta. 340+62.81
-L- SC Sta. 343+62.81
-L- S 85°18'23.2" E
-Y33- S 69°54'57.9" W
-Y33- PT Sta. 11+59.61
-Y33- PC Sta. 13+94.18

END CONSTRUCTION
-Y33- PT Sta. 14+72.94
BRG AH S 9°44'59.3" W

ACCESS POINT
REMOVE PIPE AND HW
REMOVE PIPE, DI AND HW
REMOVE
CL B RIP RAP 2 TONS
REMOVE DI SEE DETAIL 'BU' SPECIAL CUT GRASSED SWALE SHEET 2-E
CLASS B RIP RAP SEE DETAIL 'BV' SPECIAL CUT DITCH SHEET 2-E
PSH SEE DETAIL 'AH' SHEET 2-E
BEGIN SBG STA 341+12-L-LT
END SBG STA 11+50-Y33-RT
BEGIN SBG STA 14+40-Y33-RT

-L-

PI Sta 328+95.94	PI Sta 332+17.11	PIs Sta 342+29.49	PI Sta 346+08.27
Δ = 3° 29' 10.2" (LT)	Δ = 1° 44' 33.6" (RT)	Θs = 2° 45' 16.6"	Δ = 12° 57' 59.3" (LT)
D = 0° 42' 39.1"	D = 1° 08' 45.3"	Ls = 250.00'	D = 2° 12' 13.3"
L = 490.41'	L = 152.08'	LT = 166.69'	L = 588.40'
T = 245.28'	T = 76.04'	ST = 83.35'	T = 295.46'
R = 8,060.00'	R = 5,000.00'		R = 2,600.00'
SE = .02	SE = .03		SE = .05
RUNOFF = 106'	RUNOFF = 160'		

-Y33-

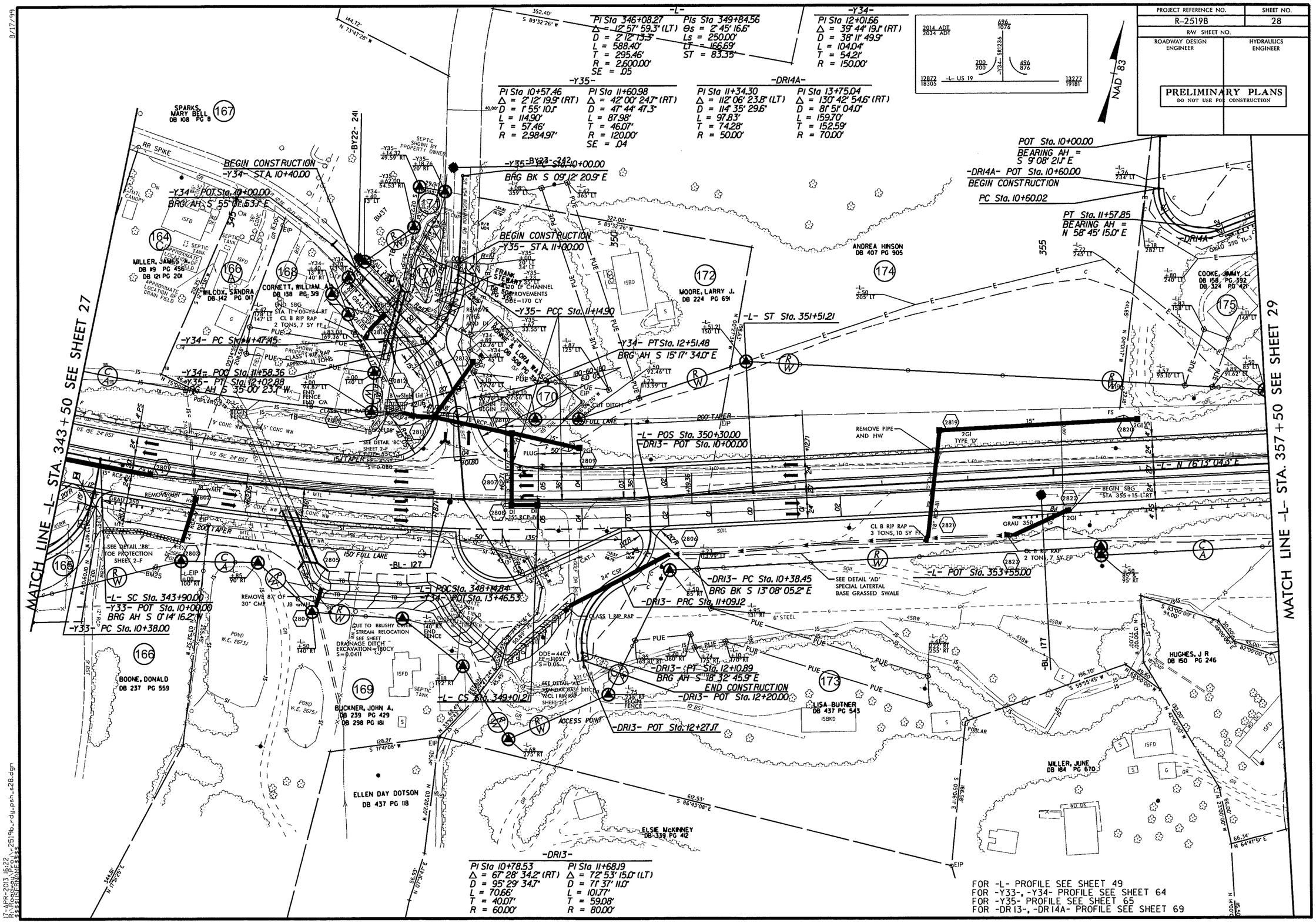
PI Sta 11+07.60	PI Sta 14+37.63
Δ = 69° 40' 41.7" (RT)	Δ = 60° 09' 58.6" (LT)
D = 57° 17' 44.8"	D = 76° 23' 39.7"
L = 121.61'	L = 78.76'
T = 69.60'	T = 43.45'
R = 100.00'	R = 75.00'

R/W REVISION: UPDATED RIGHT OF WAY ON PARCEL 164A AND 164B. 2/12/2013 AJF

12-FEB-2013 08:50
C:\TEMP\acpublish_25196_rdy_psh_s27.dgn
$$$$$$$$DRAWINGS$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	28
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



FOR -L- PROFILE SEE SHEET 49
FOR -Y33-, -Y34- PROFILE SEE SHEET 64
FOR -Y35- PROFILE SEE SHEET 65
FOR -DRI3-, -DRI4A- PROFILE SEE SHEET 69

8/17/99

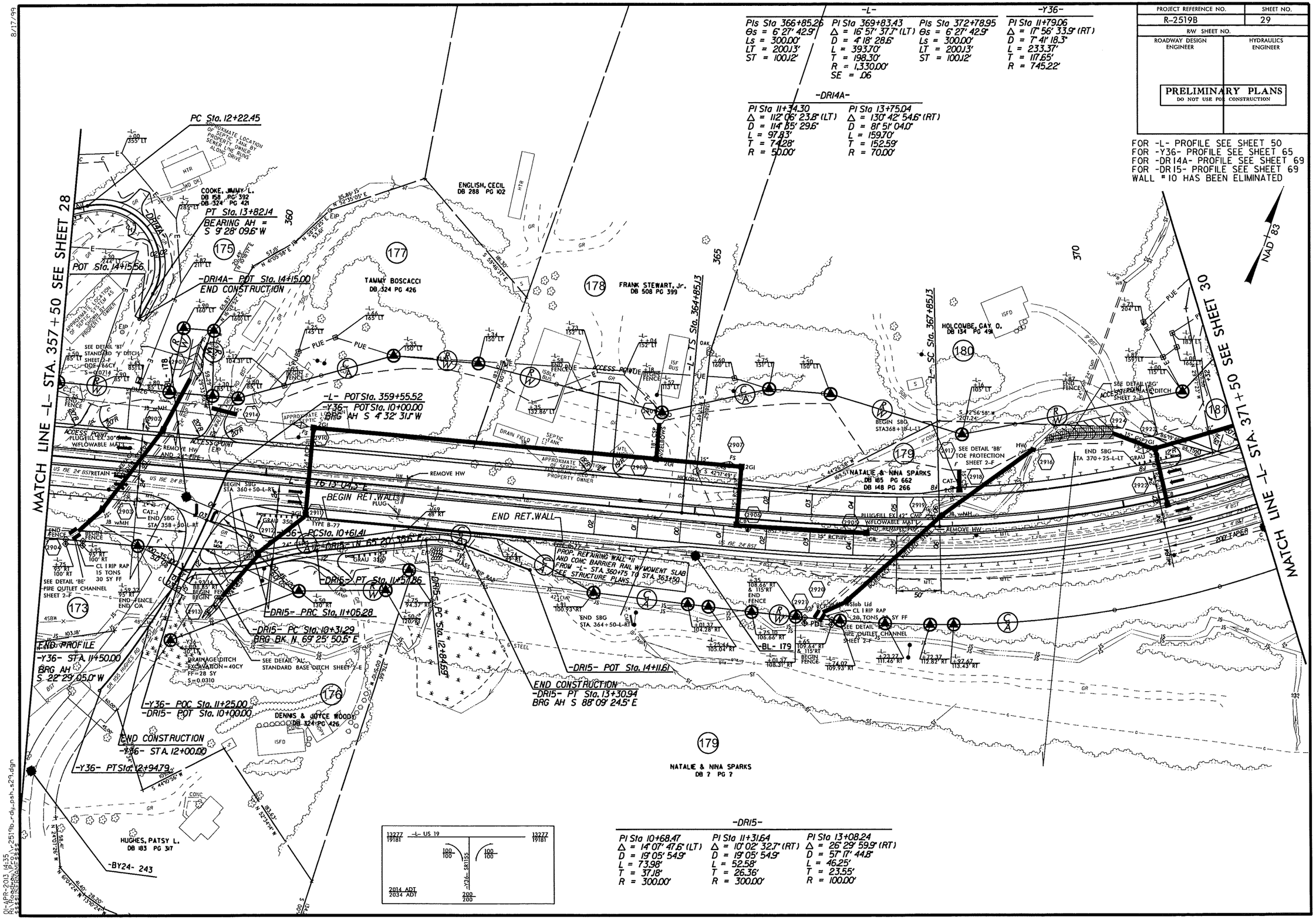
R/W REVISION: REDUCED RIGHT OF WAY ON PARCEL 168 IN ORDER TO MISS A WELL. 4/17/2013 AJF

17-APR-2013 16:22
R:\Roadway\Proj\r2519b_rdy_psh_s28.dgn
$$$$$$REPRODUCE$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	29
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 50
FOR -Y36- PROFILE SEE SHEET 65
FOR -DR14A- PROFILE SEE SHEET 69
FOR -DR15- PROFILE SEE SHEET 69
WALL #10 HAS BEEN ELIMINATED



R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 177, 178, AND 180. 4/1/2013 AJF

8/17/99

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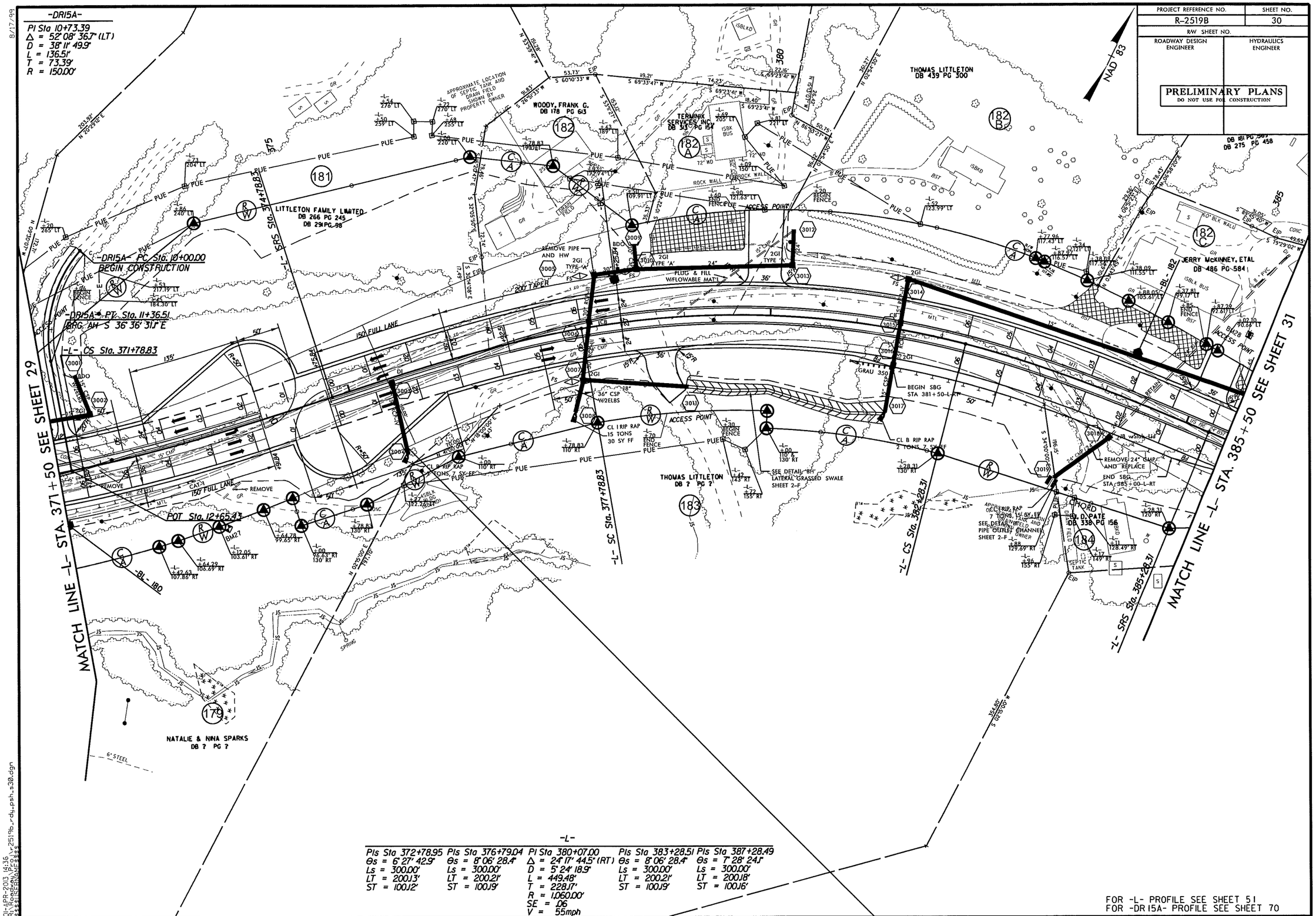
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	30
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L-

PIs Sta 372+78.95	PIs Sta 376+79.04	PI Sta 380+07.00	PIs Sta 383+28.51	PIs Sta 387+28.49
Θs = 6° 27' 42.9"	Θs = 8° 06' 28.4"	Δ = 24° 17' 44.5" (RT)	Θs = 8° 06' 28.4"	Θs = 7° 28' 24.1"
Ls = 300.00'	Ls = 300.00'	D = 5° 24' 18.9"	Ls = 300.00'	Ls = 300.00'
LT = 200.13'	LT = 200.21'	L = 449.48'	LT = 200.21'	LT = 200.18'
ST = 100.12'	ST = 100.19'	T = 228.17'	ST = 100.19'	ST = 100.16'
		R = 1,060.00'		
		SE = .06		
		V = 55mph		

FOR -L- PROFILE SEE SHEET 51
FOR -DR15A- PROFILE SEE SHEET 70

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

Pls Sta 387+28.49
Θs = 7° 28' 24.1"
Ls = 300.00'
LT = 200.18'
ST = 100.16'

Pl Sta 392+12.82
Δ = 36° 58' 31.3" (LT)
D = 4° 58' 56.1"
L = 742.14'
T = 384.51'
R = 1150.00'
SE = .06
V = 55 mph

Pls Sta 396+70.62
Θs = 7° 28' 24.1"
Ls = 300.00'
LT = 200.18'
ST = 100.16'

-DR16-

Pl Sta 11+45.00
Δ = 81° 57' 37.2" (RT)
D = 57° 17' 44.8"
L = 143.05'
T = 86.87'
R = 100.00'

NAD 83

MATCH LINE -L- STA. 385+50 SEE SHEET 30

MATCH LINE -L- STA. 399+50 SEE SHEET 32

-L- POC Sta. 393+00.00
-DR16- POT Sta. 10+00.00
BRG AH S 34°07' 43.9" E

-DR16- PC Sta. 10+58.13

END CONSTRUCTION
-DR16- PT Sta. 12+01.18

MCMAHAN, DENNIS J.
DB 23 PG 286
DB 181 PG 569
DB 275 PG 458

PENDLEY, BOBBY R.
DB 223 PG 156
DB 130 PG 237
DB 239 PG 263

COMMUNITIES OF PENLAND, LLC.,
DB 365 PG 442

COOK, JAMES R.
DB 279 PG 608

BENJAMIN CARCAMO
DB 426 PG 547
PB 2 PG 391

LUTHER ELLIS, III
DB 426 PG 535
PB 2 PG 391

STEWART, JENNIE R.
DB 282 PG 62

POTEAT PROPERTIES LLC
DB 452 PG 538

SMITH, JERRY
DB 350 PG 266

SEE Y-SEC FOR GRADE
STA -L- 388+00

FLUSH OUT DITCH
STA 388+00 TO 388+50-L-RT

CLASS I RIP RAP

SEE DETAIL 'BK'
EXISTING DITCH
SHEET 2-F

APPROXIMATE LOCATION OF SEPTIC TANK AND DRAIN FIELD ON PROPERTY OF BOBBY PENDLEY

ACCESS POINT

REMOVE HW

REMOVE

PLUG & FILL W/FLOWABLE MAT'L

GRAU 350

SPRING

BEGIN FENCE

END FENCE

CLASS I RIP RAP
7 TONS, 14 SY FF

JB w/slab lid

CHORD

FOR -L- PROFILE SEE SHEET 52
FOR -DR16- PROFILE SEE SHEET 70

8/17/99

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 188, 189, AND 190. 4/1/2013 AJF

01-APR-2013 14:36
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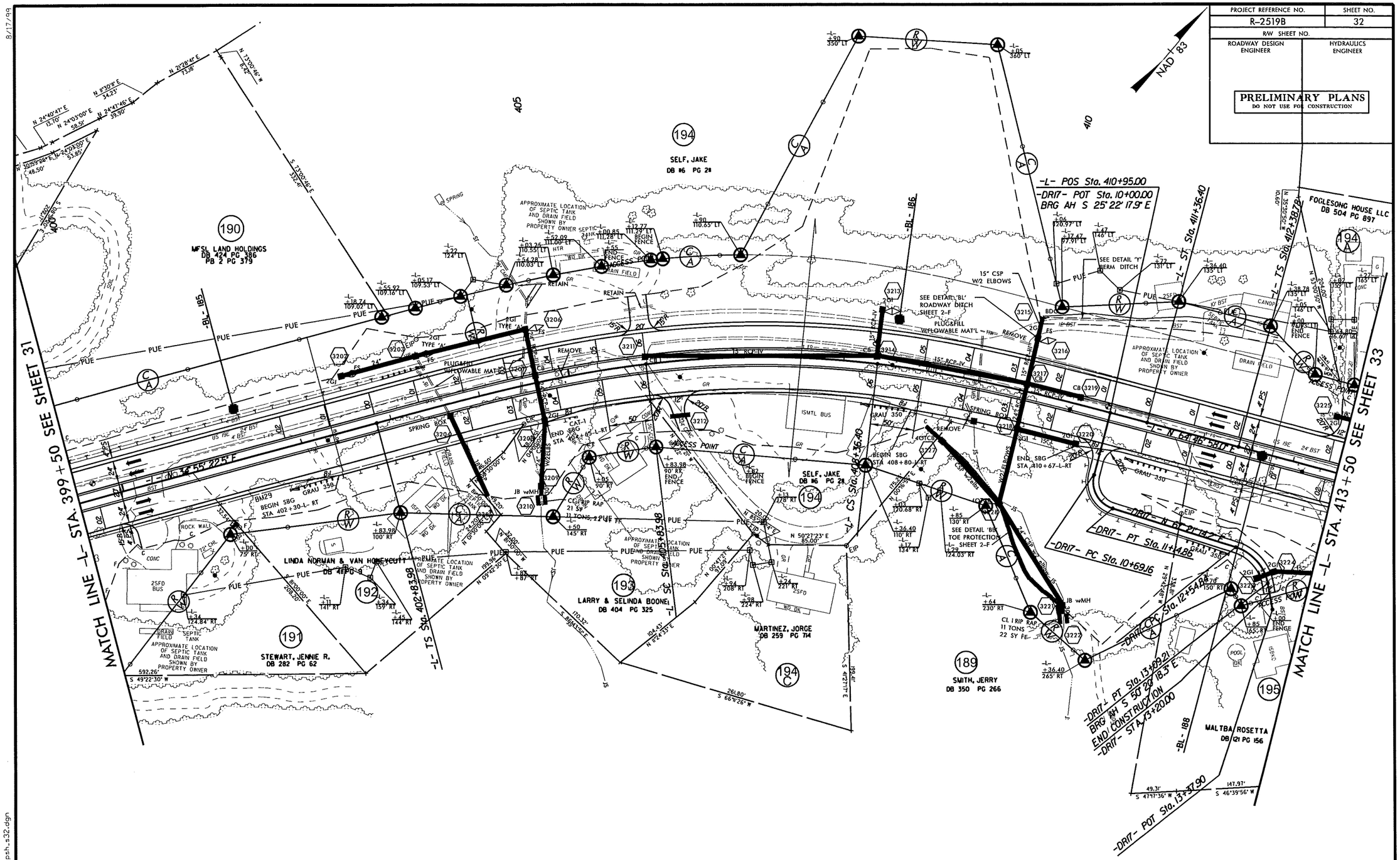
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



-L-			
PIs Sta 404+84.19	PI Sta 407+10.79	PIs Sta 409+36.59	PIs Sta 414+05.47
Θs = 8° 06' 28.4"	Δ = 13° 38' 38.6" (RT)	Θs = 8° 06' 28.4"	Θs = 3° 02' 51.5"
Ls = 300.00'	D = 5° 24' 18.9"	Ls = 300.00'	Ls = 250.00'
LT = 200.21'	L = 252.42'	LT = 200.21'	LT = 166.69'
ST = 100.19'	T = 126.81'	ST = 100.19'	ST = 83.36'
	R = 1,060.00'		
	SE = .06		
	V = 55 mph		

-DRI7-	
PI Sta 10+97.77	PI Sta 12+85.06
Δ = 87° 16' 28.0" (LT)	Δ = 62° 18' 27.5" (RT)
D = 190° 59' 09.4"	D = 114° 35' 29.6"
L = 45.70'	L = 54.37'
T = 28.61'	T = 30.23'
R = 30.00'	R = 50.00'

FOR -L- PROFILE SEE SHEET 52
FOR -DRI7- PROFILE SEE SHEET 70

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 190, 191, 192, 193, 194, 194A, AND 194C. 4/1/2013 AJF

01-APR-2013 14:36
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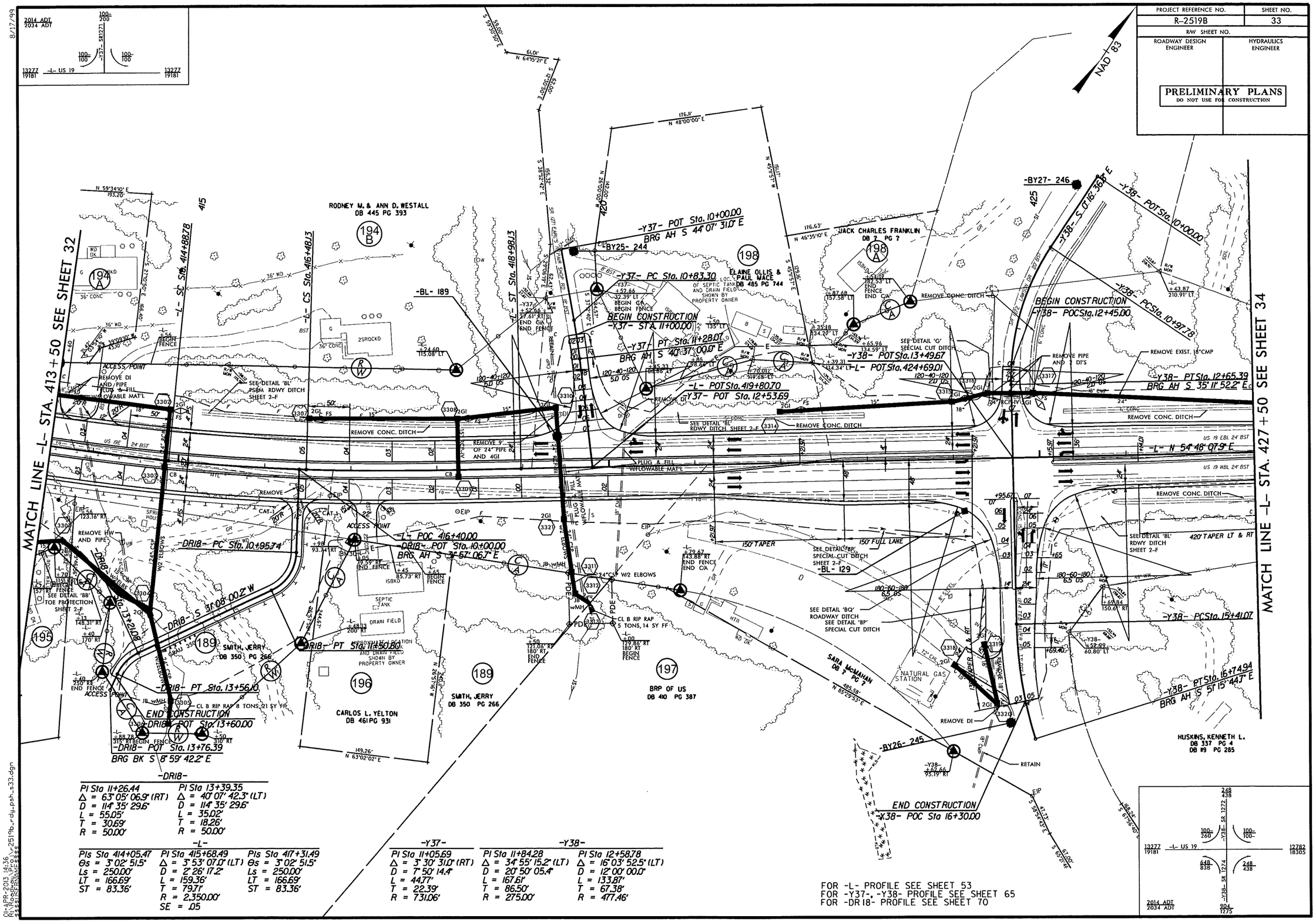
8/17/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



8/17/99

R/W REVISION: ADDED PERMANENT UTILITY EASEMENT TO PARCEL 189 AND 195. 4/1/2013 AJF

01-APR-2013 14:36
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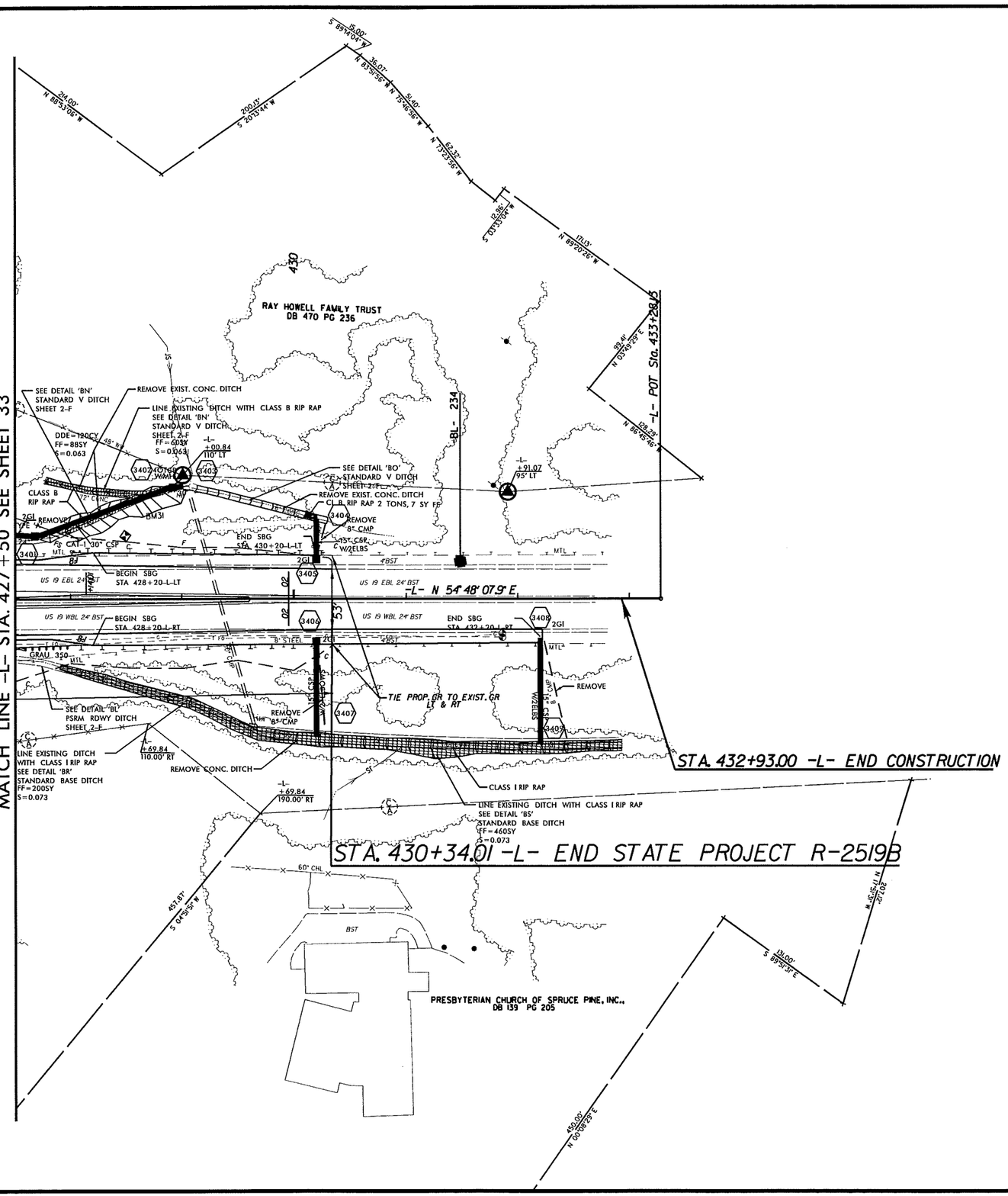
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

FOR -L- PROFILE SEE SHEET 54



R/W REVISION: ADDED RIGHT OF WAY MARKER AT -L- STATION 431+91.07 95' LEFT OF THE CENTER LINE, AND UPDATED PROPERTY INFORMATION ON PLAN SHEET. 8/14/2012 AJF

8/17/99

23-JAN-2013 09:38
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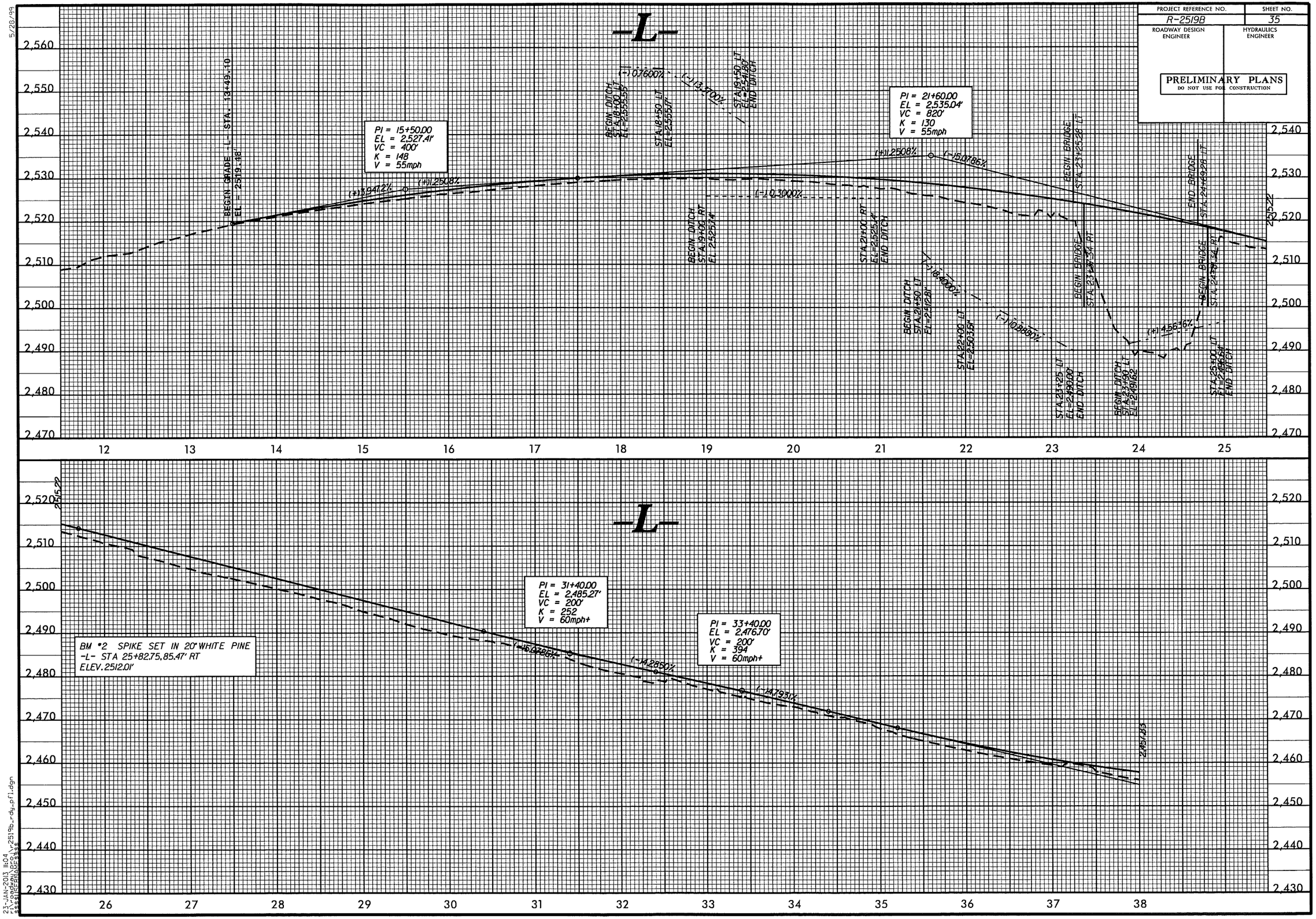
$$$$$$REPRAVE$$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



5/28/99

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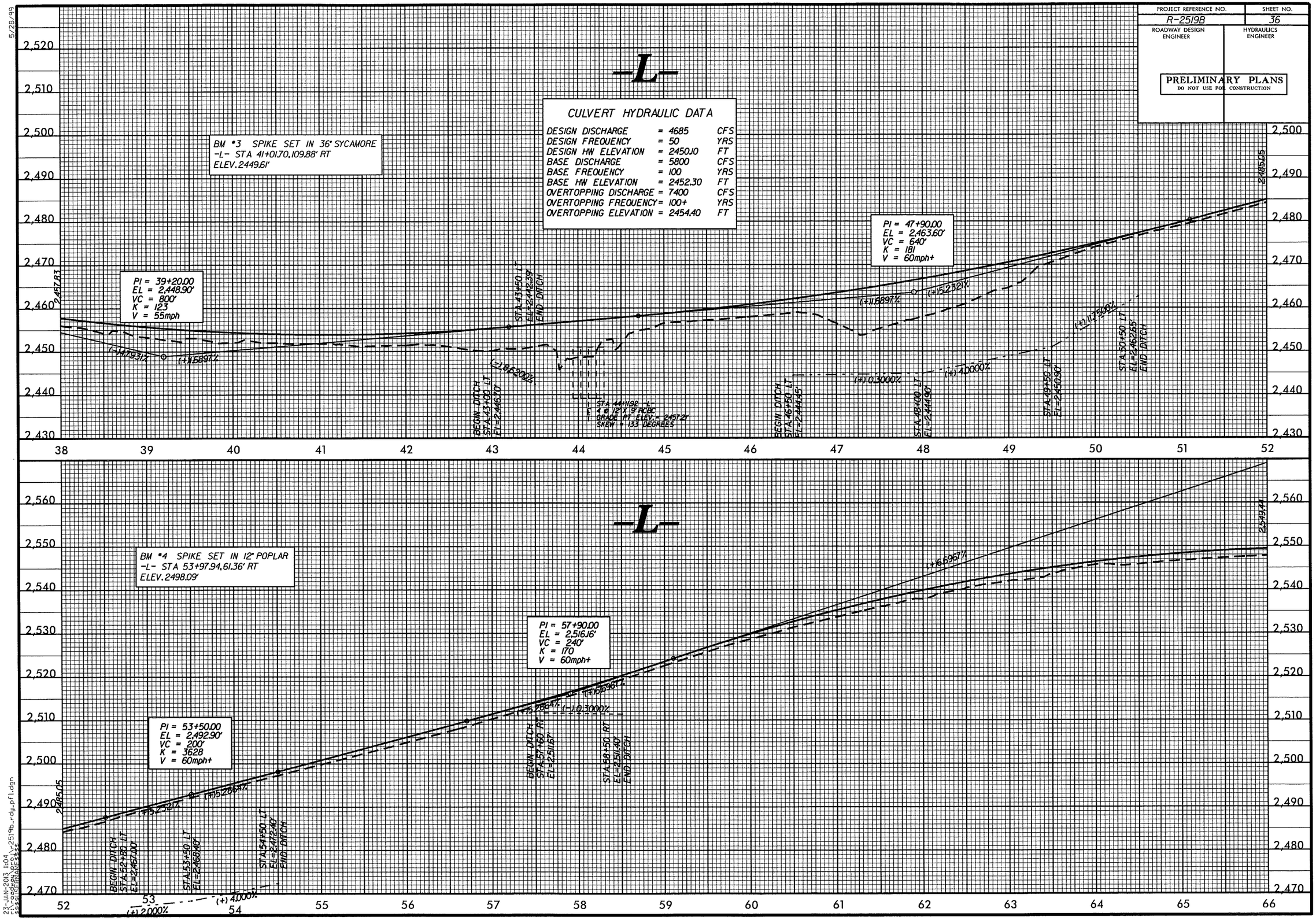
5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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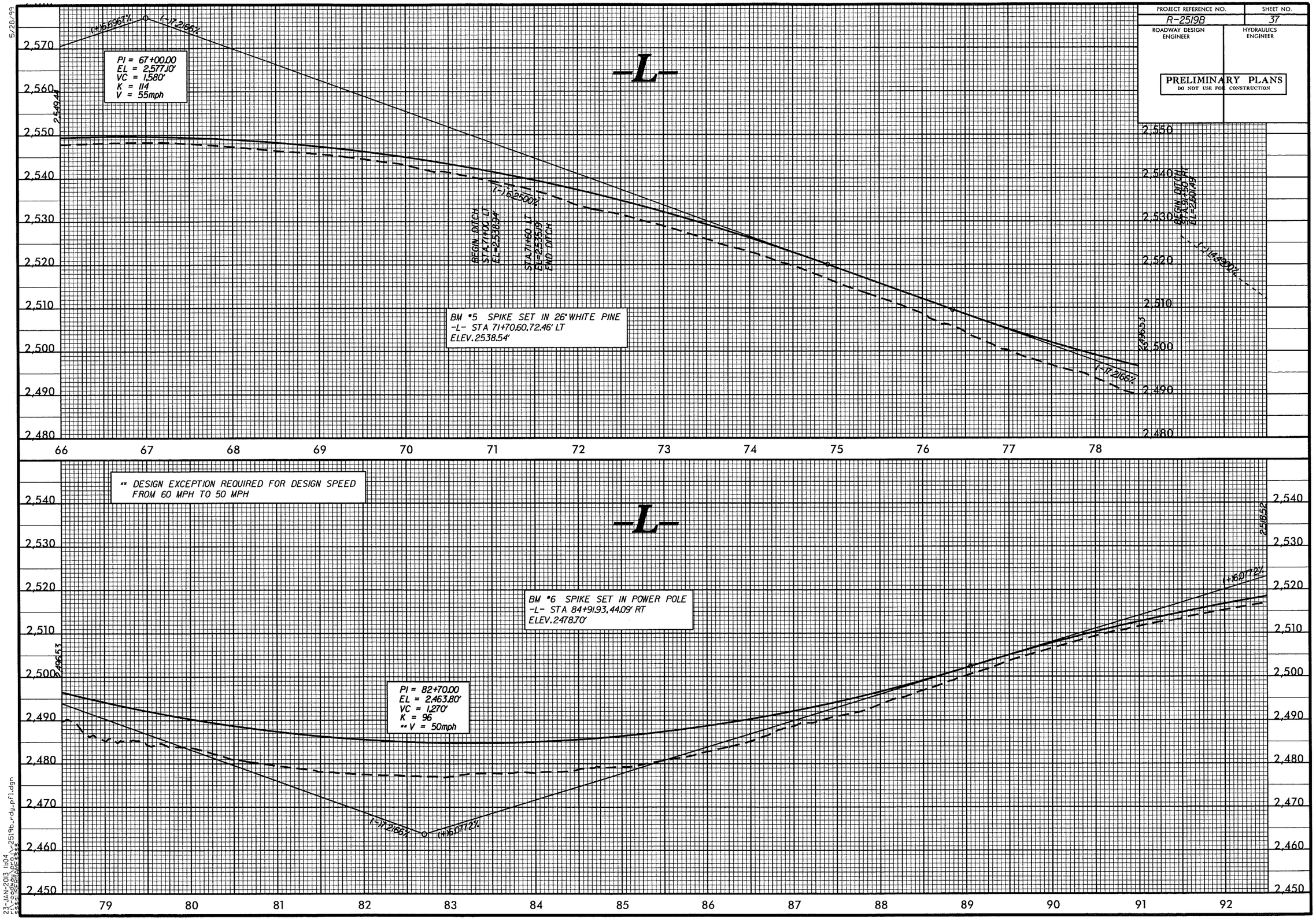
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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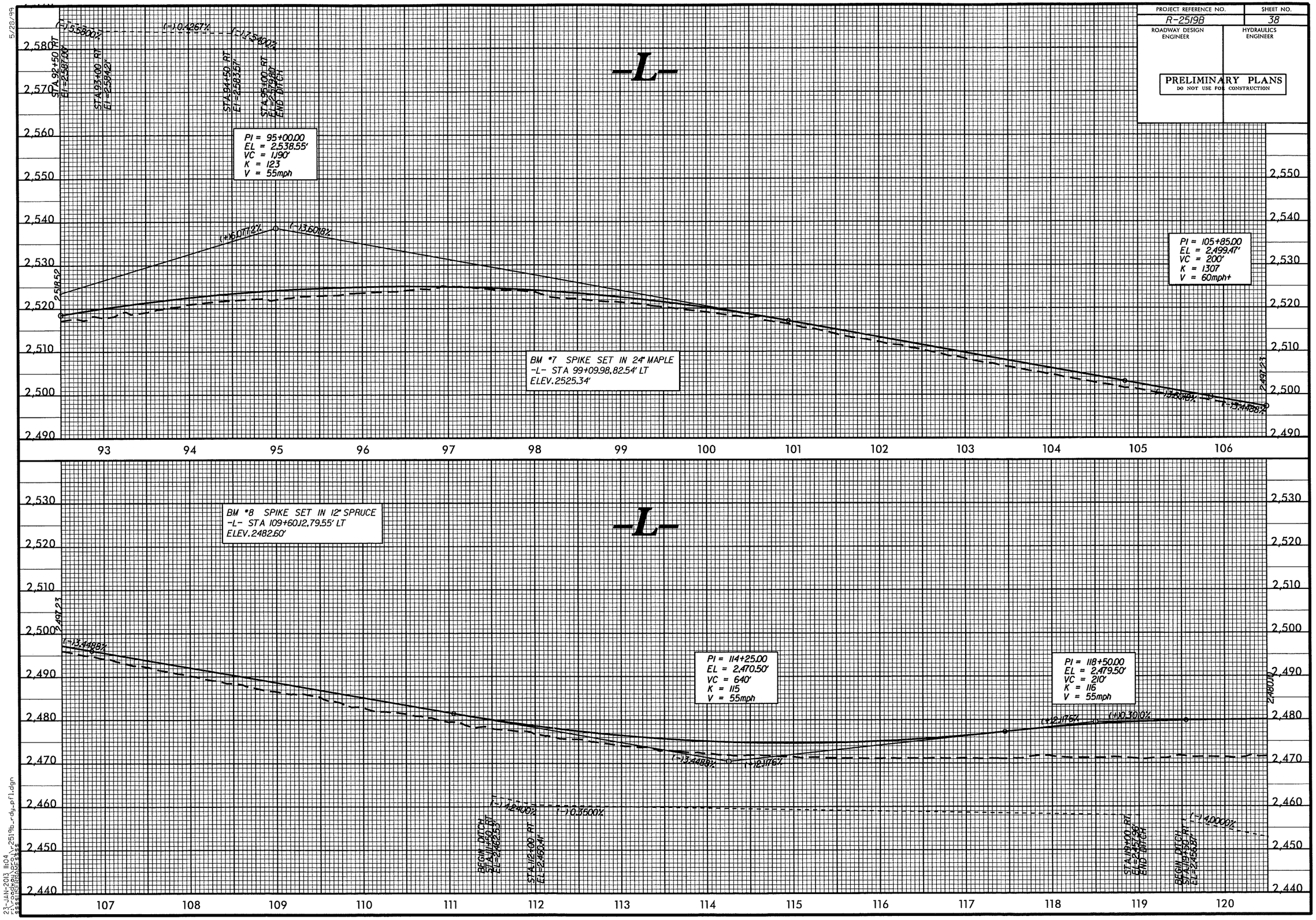
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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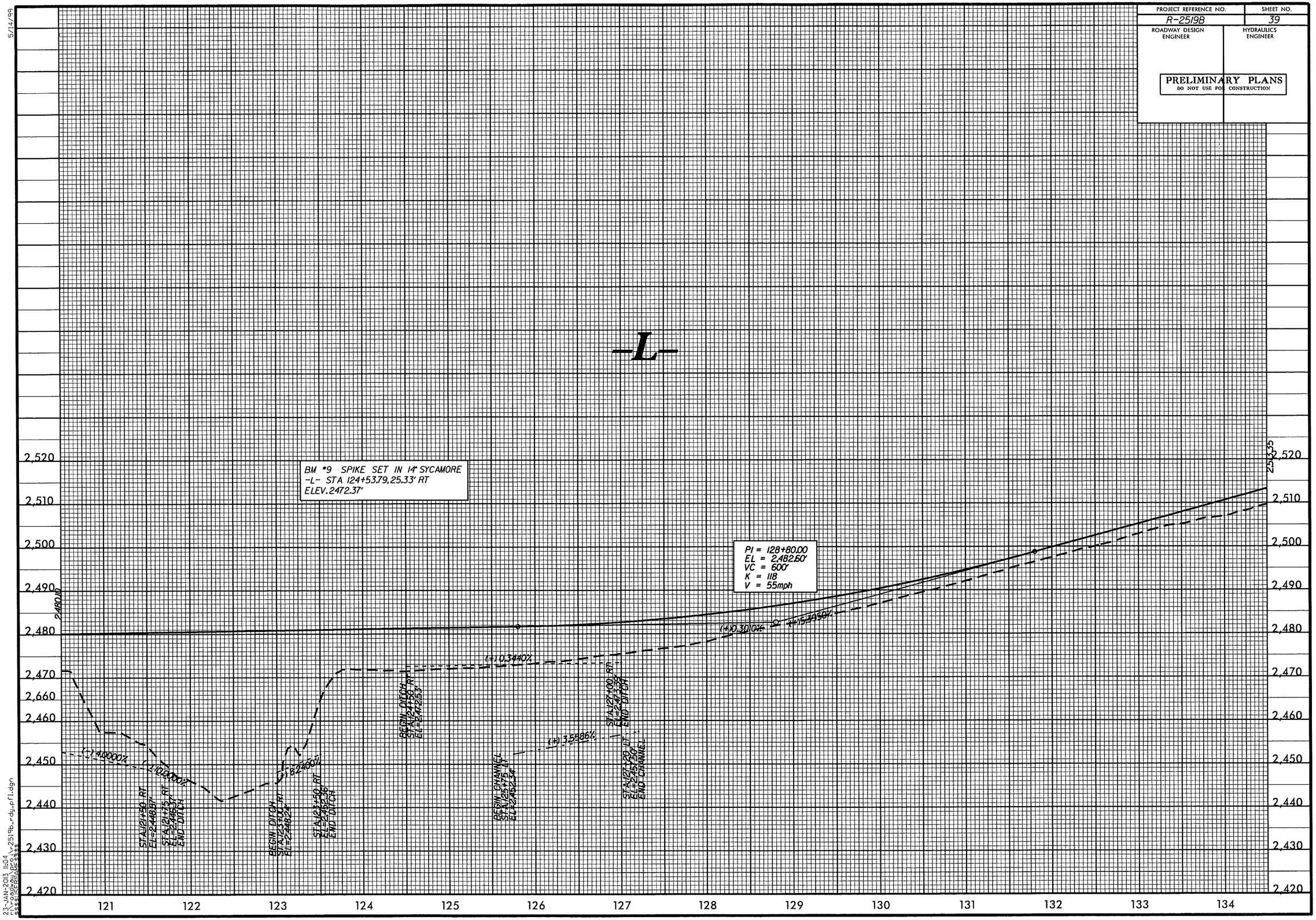
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



5/14/99

23-JAN-2013 11:04
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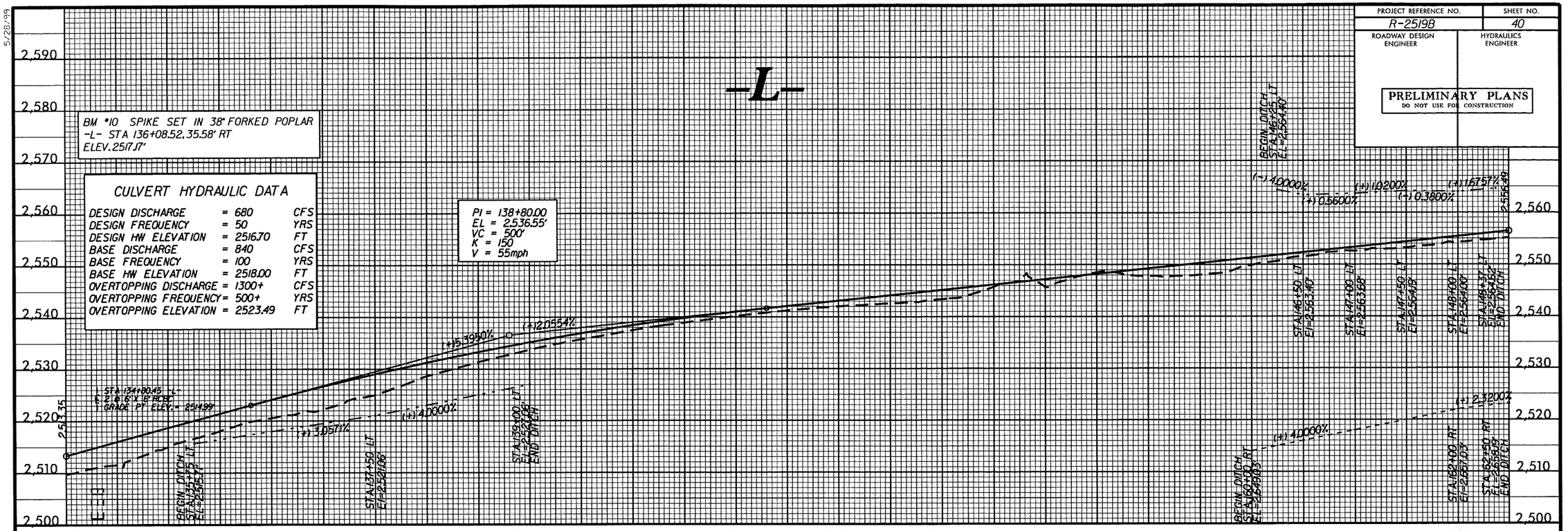
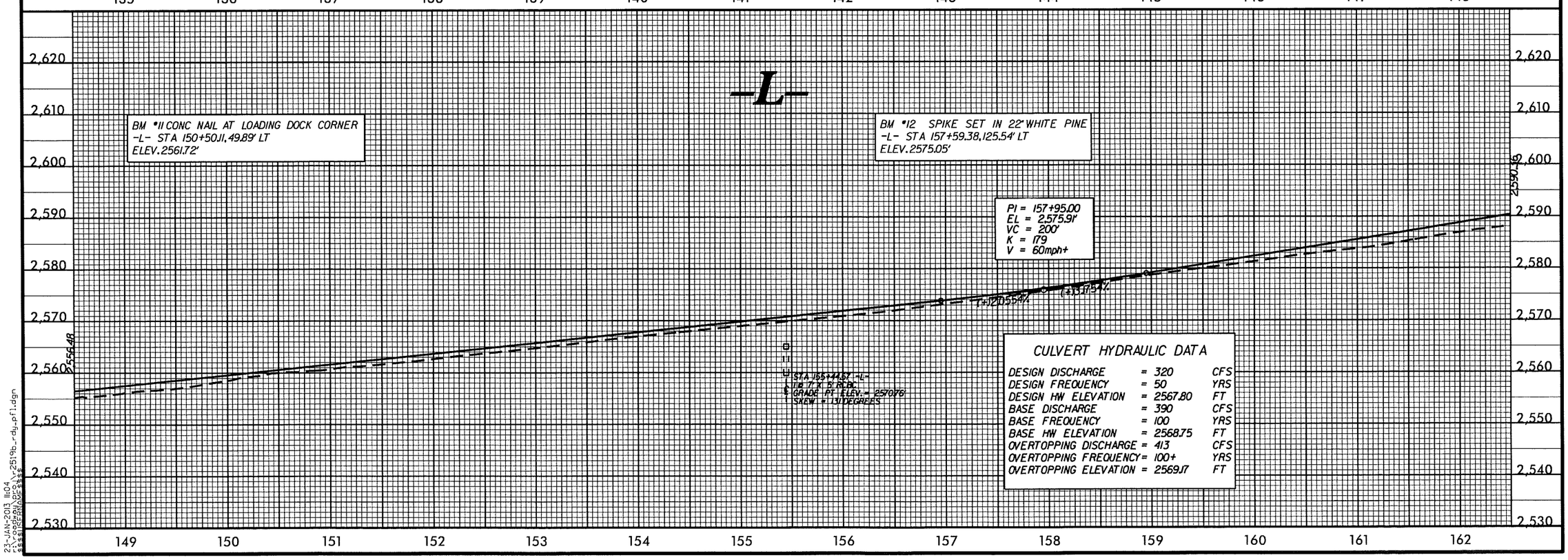
$$$$$$REBAR$$$$$$

5/28/99

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION





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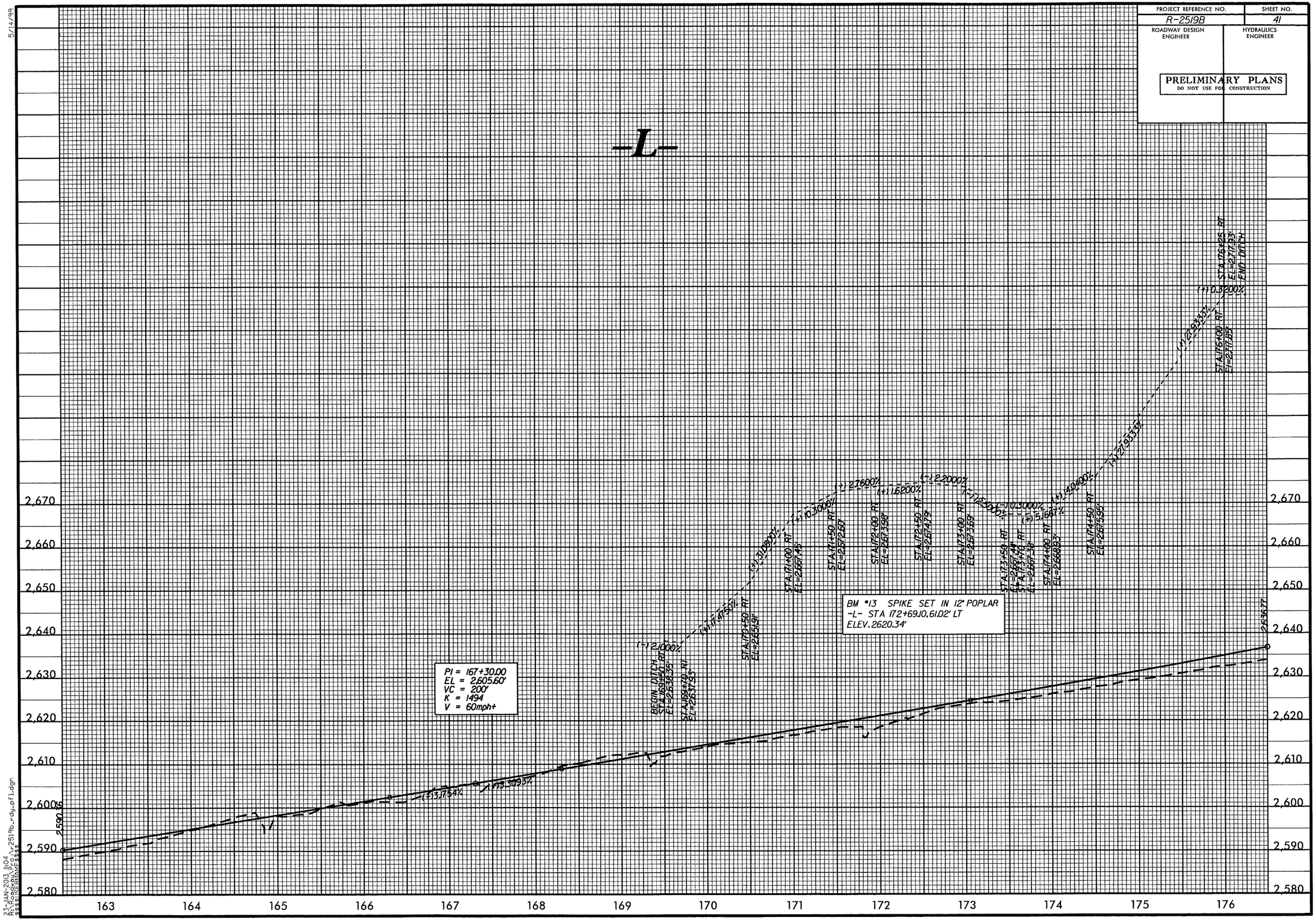
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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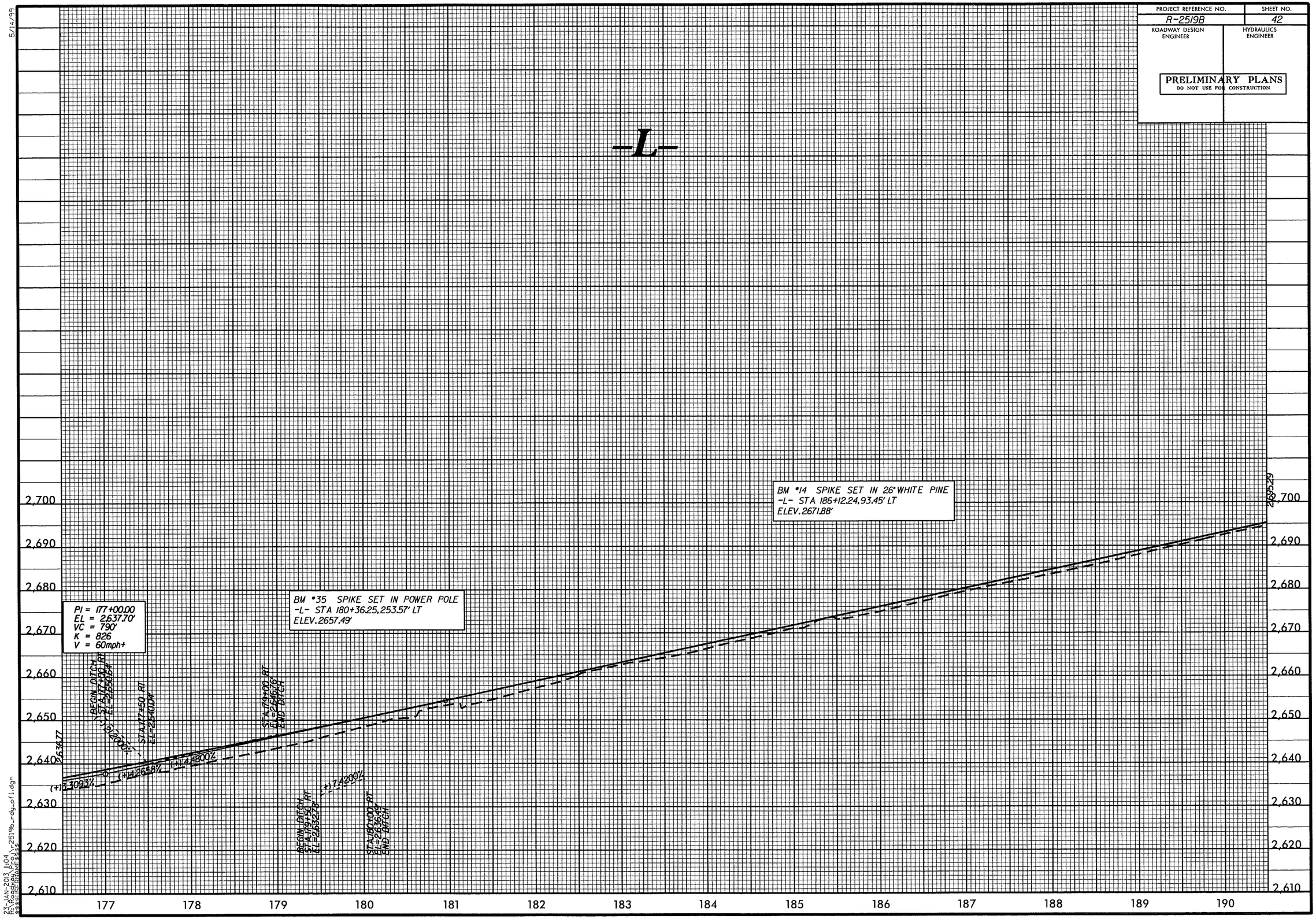
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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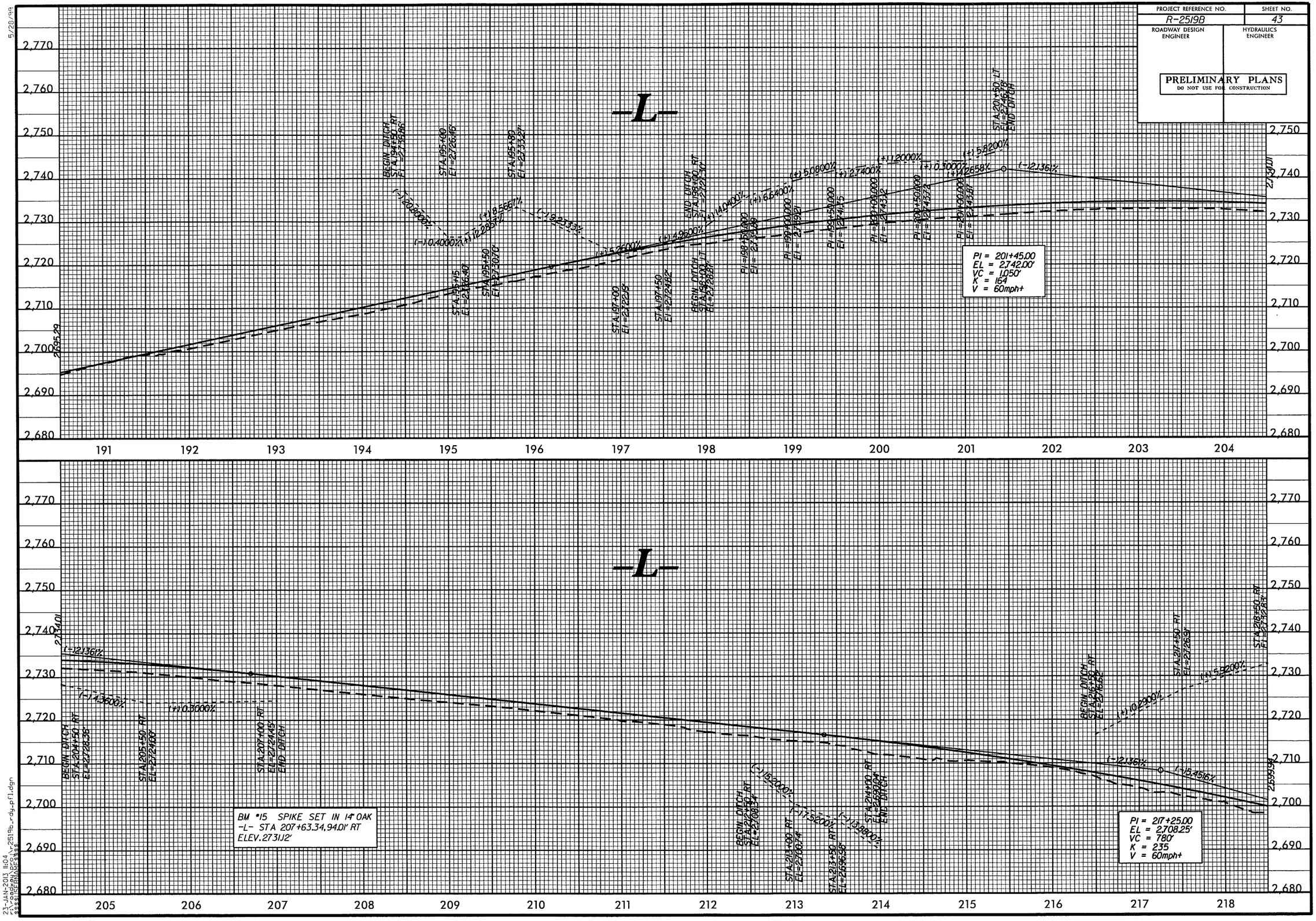
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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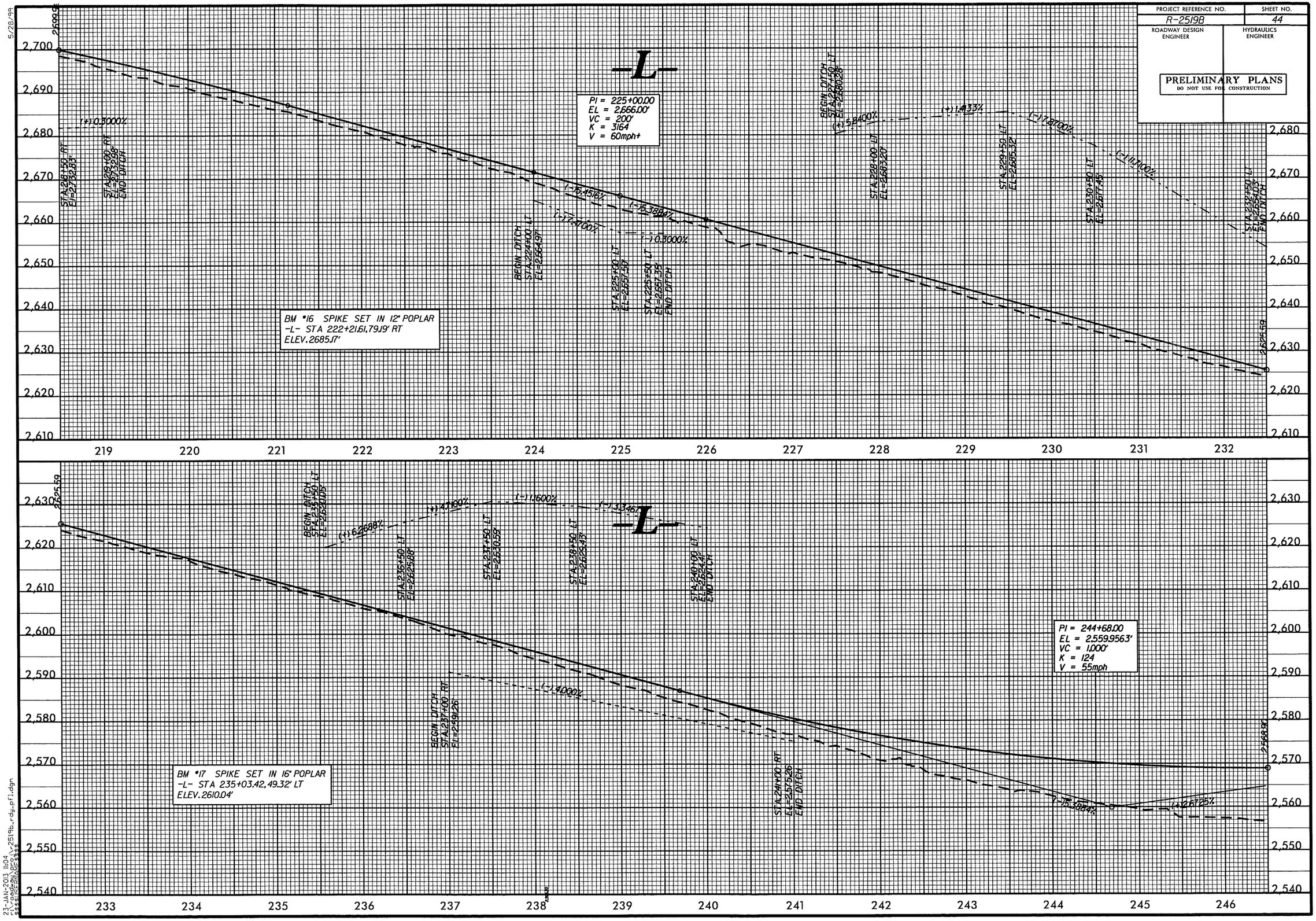
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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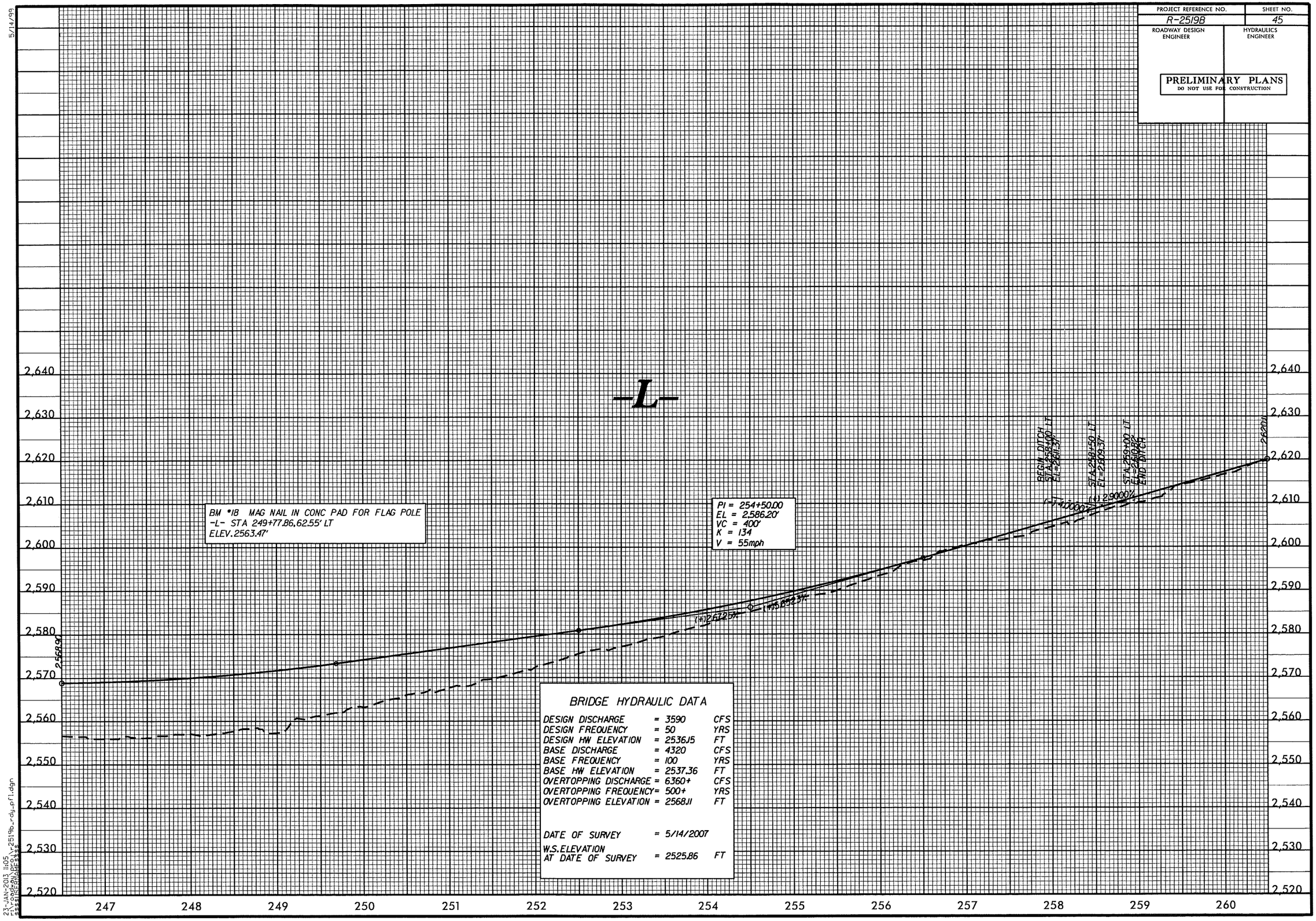
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 3590	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 2536.15	FT
BASE DISCHARGE	= 4320	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 2537.36	FT
OVERTOPPING DISCHARGE	= 6360+	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 2568.11	FT
DATE OF SURVEY	= 5/14/2007	
W.S. ELEVATION AT DATE OF SURVEY	= 2525.86	FT

5/14/99

23-JAN-2013 11:05
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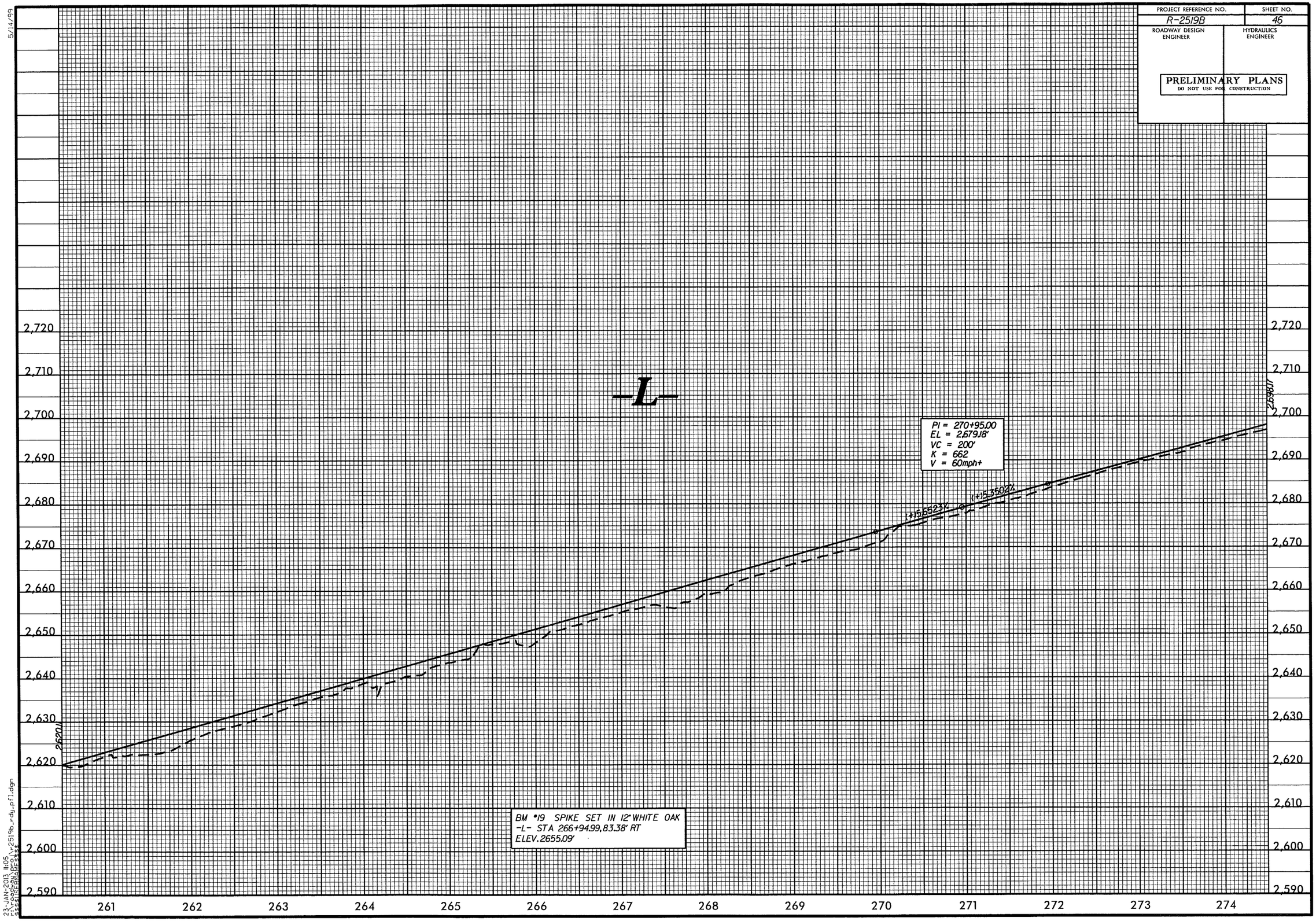
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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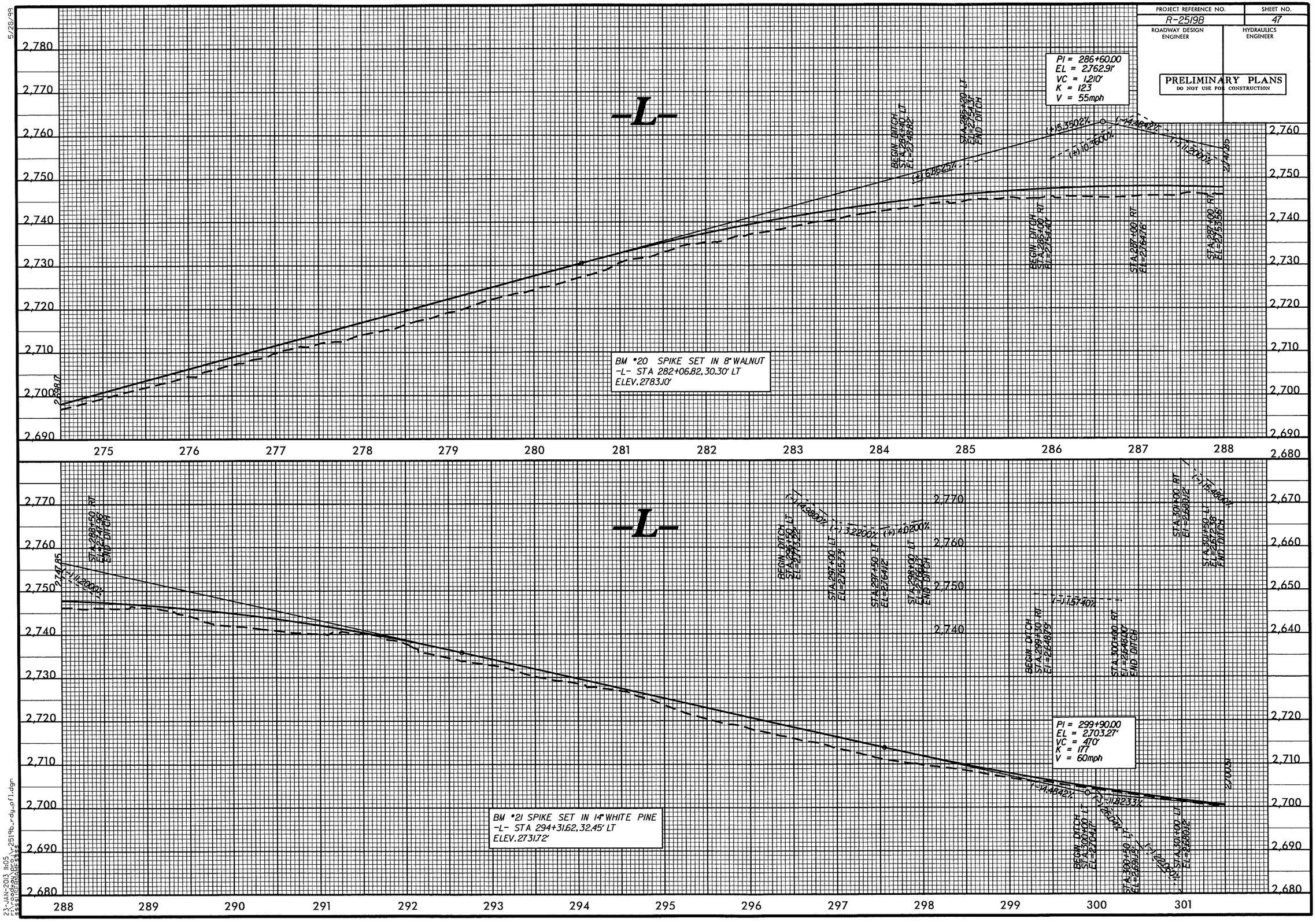
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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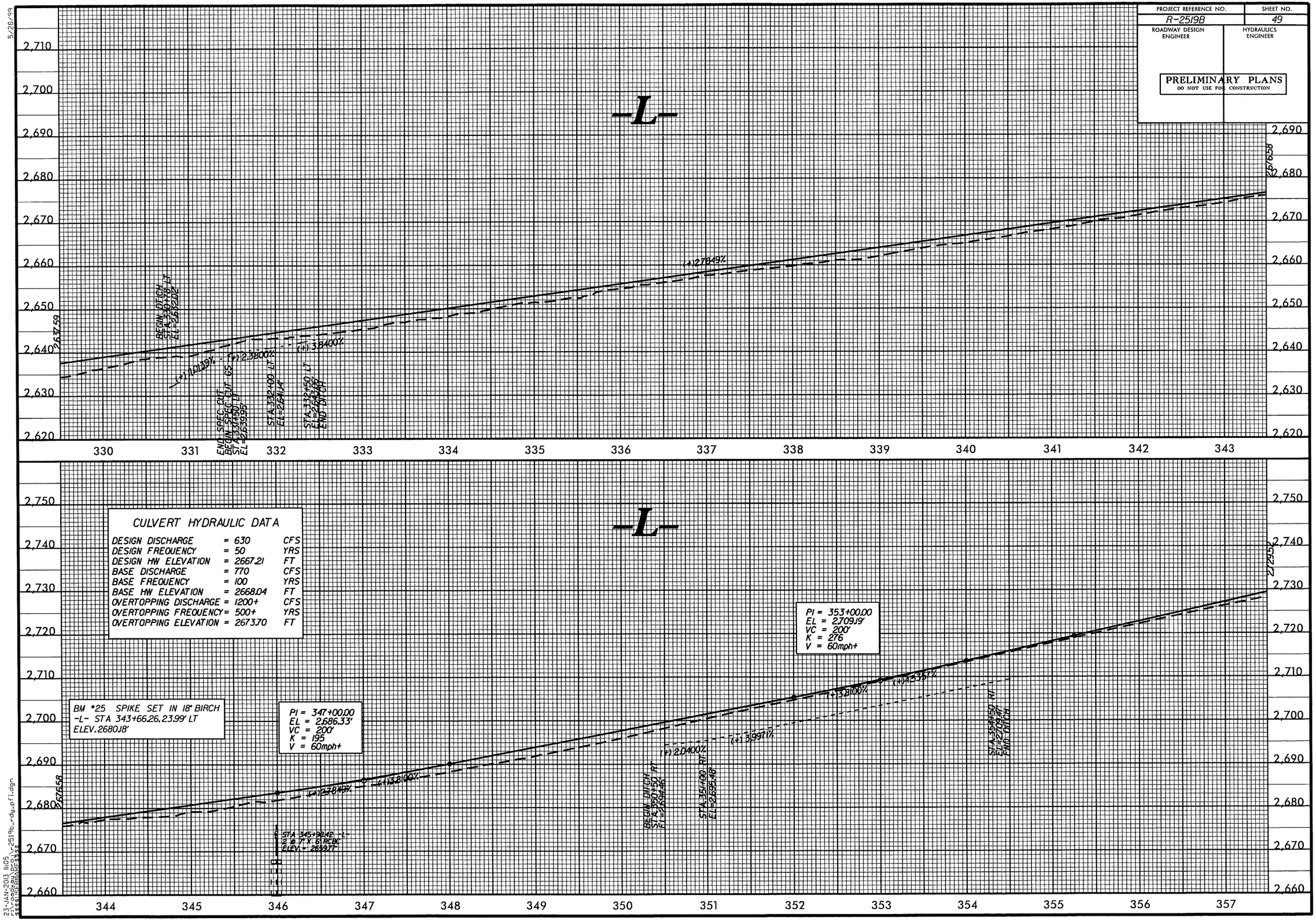
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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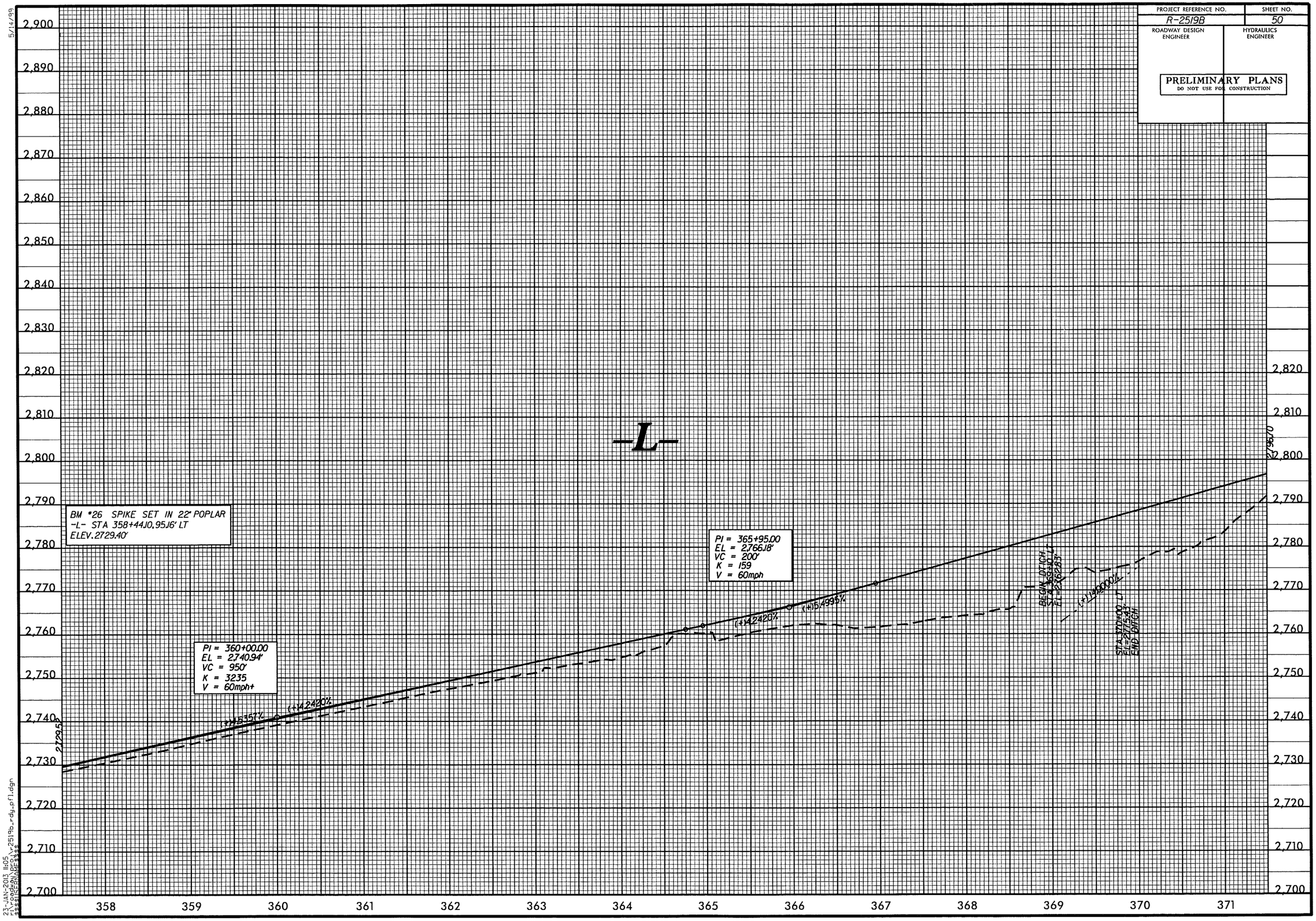
$$$$USERNAME$$$$

PROJECT REFERENCE NO.	SHEET NO.
R-2519B	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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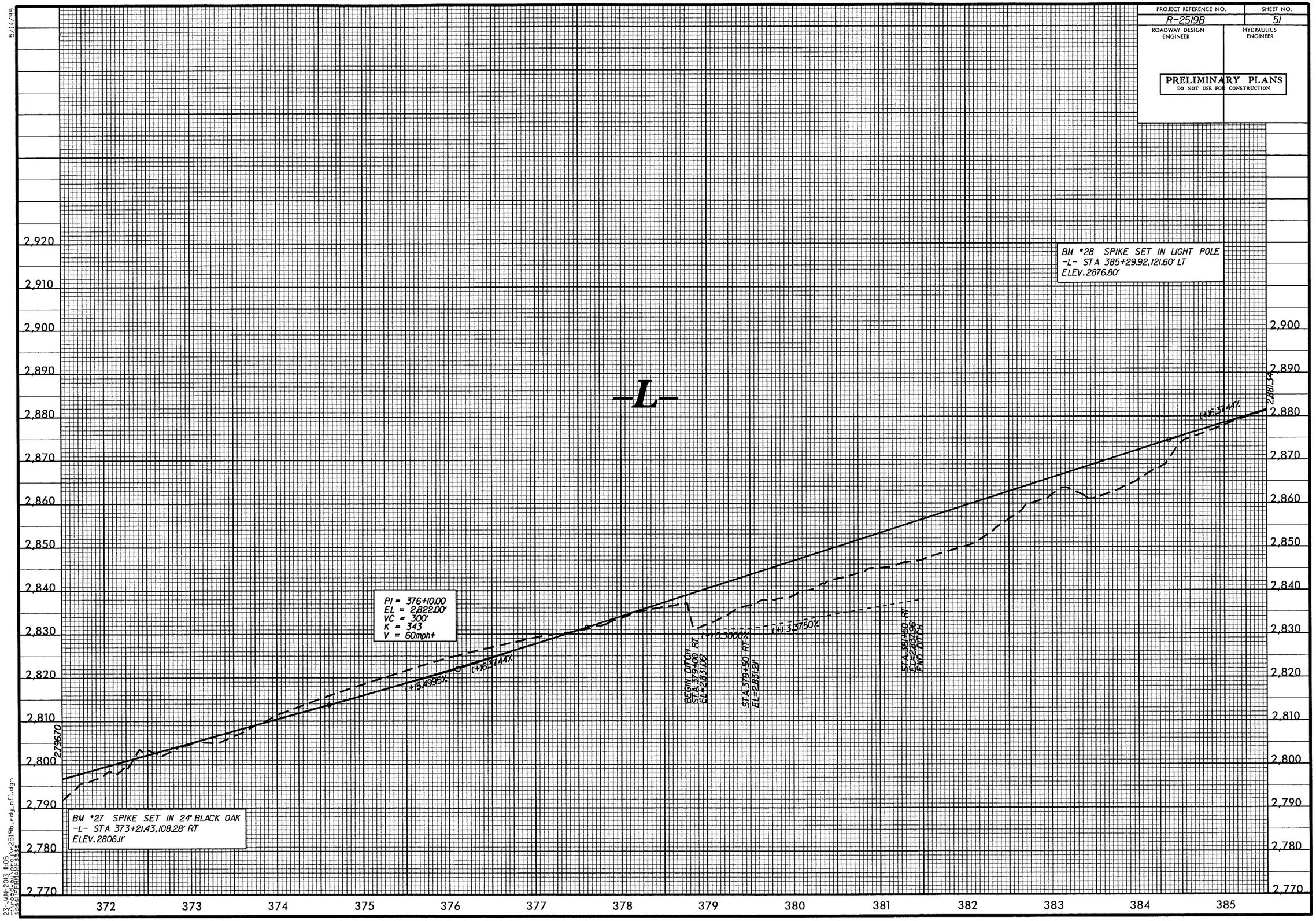
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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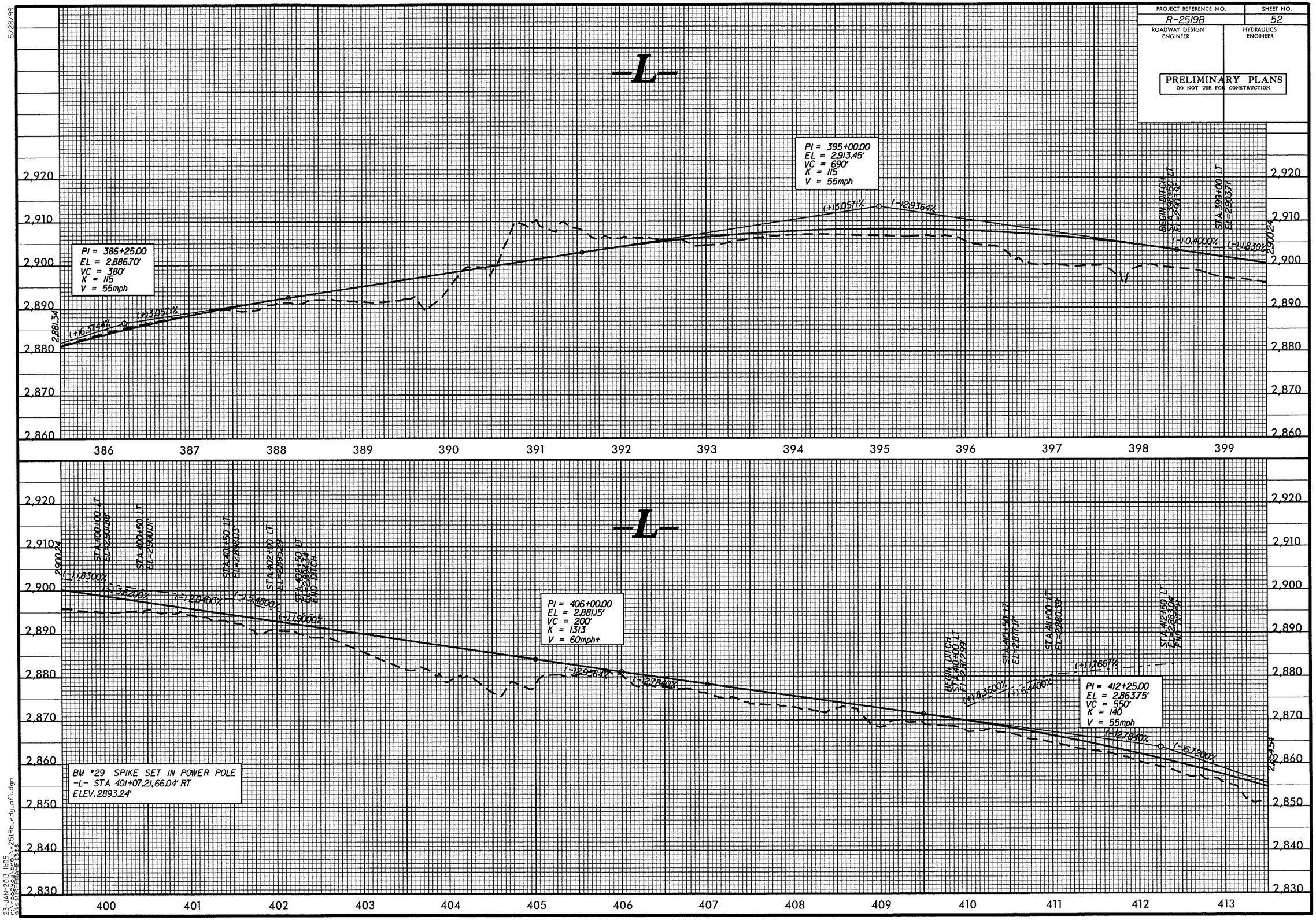
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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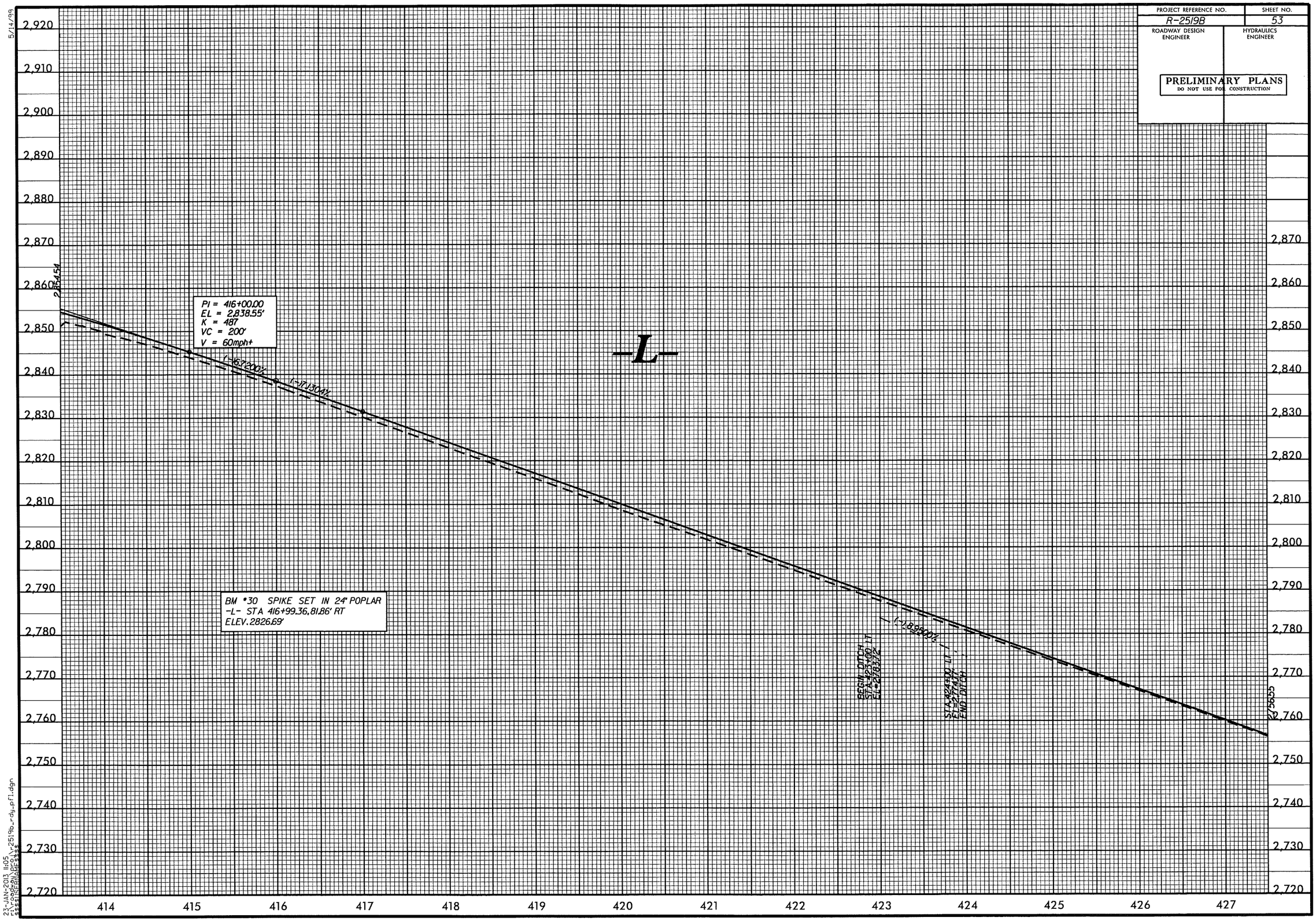
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	53
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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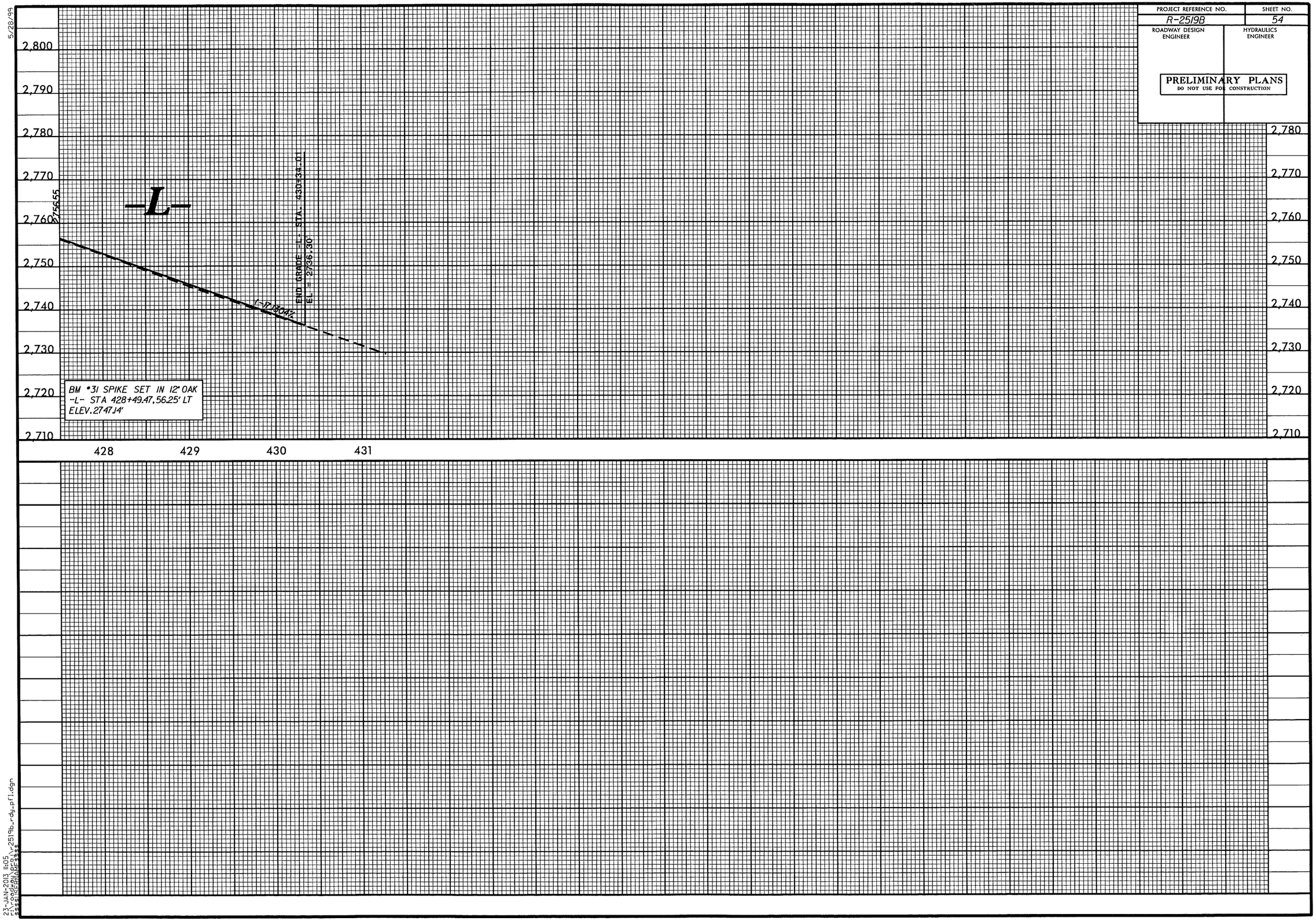
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	54
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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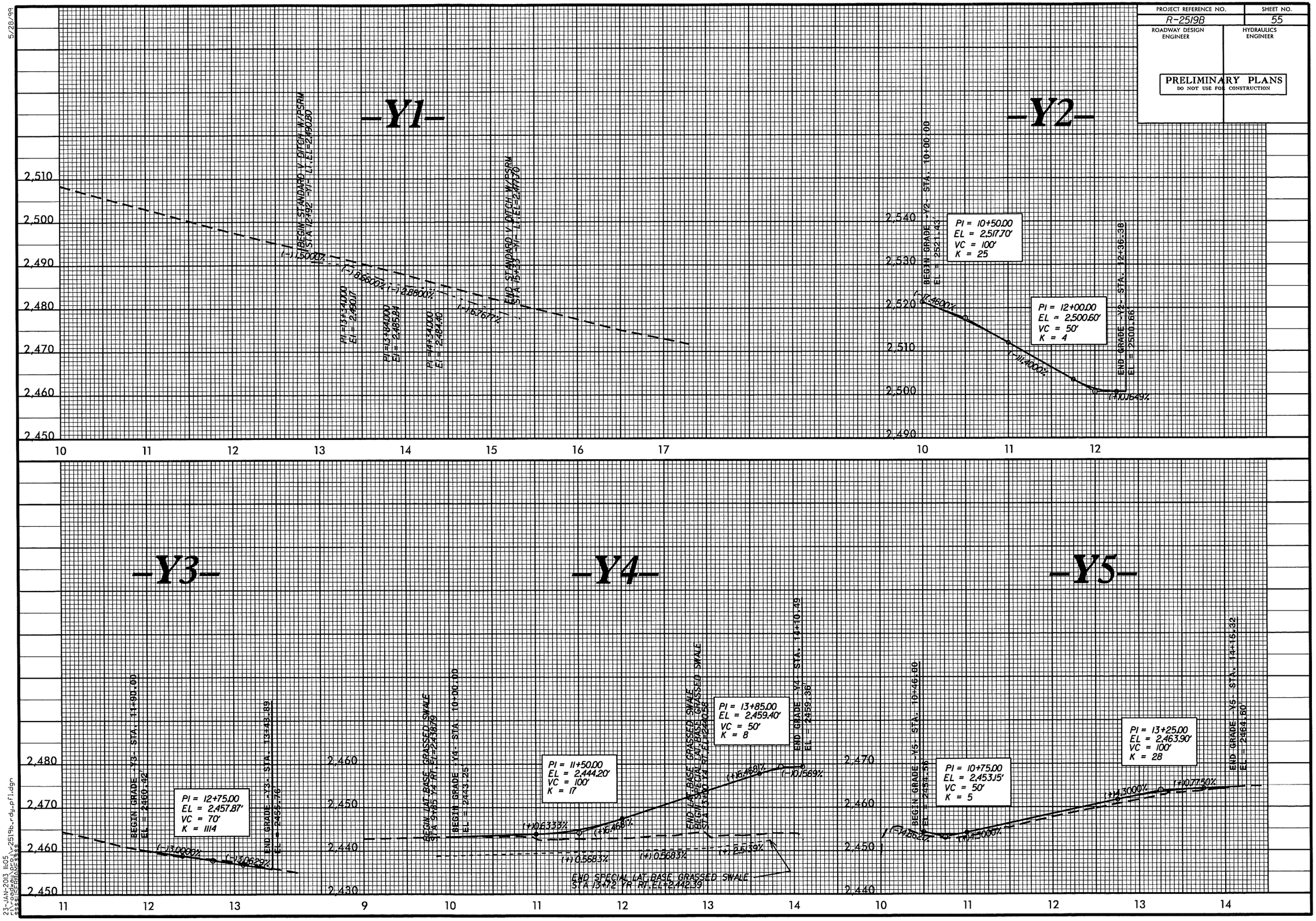
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	55
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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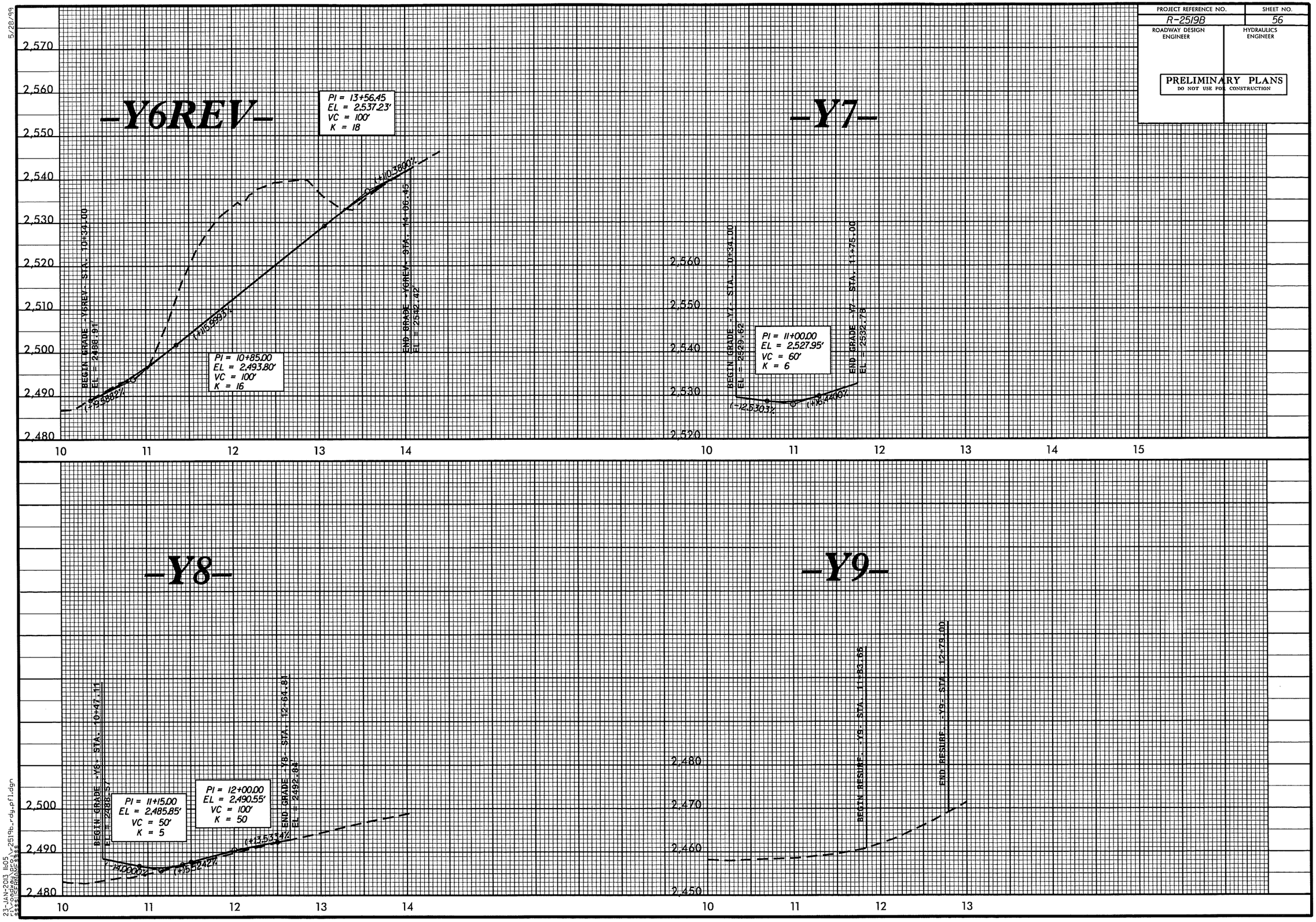
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	56
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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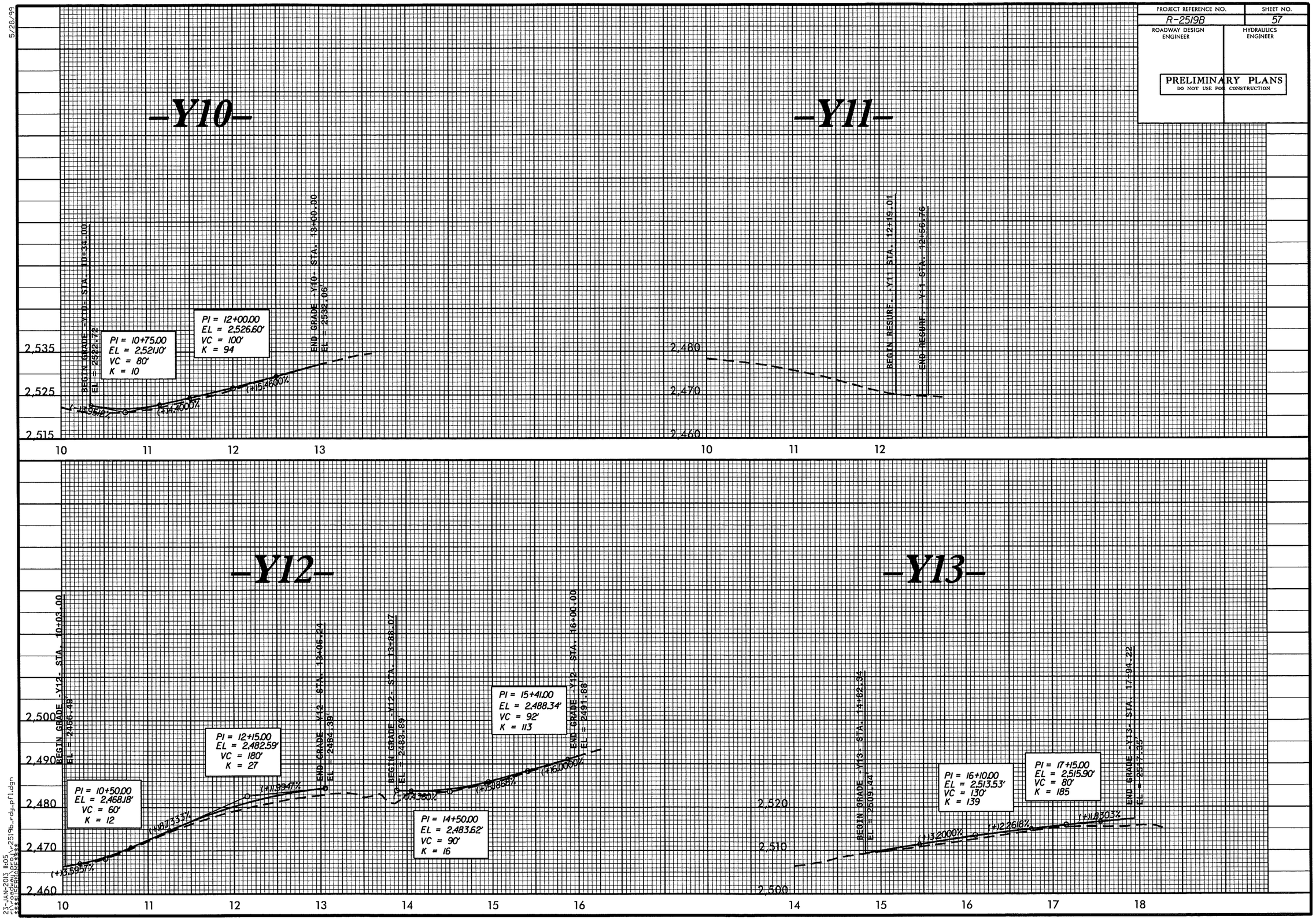
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	57
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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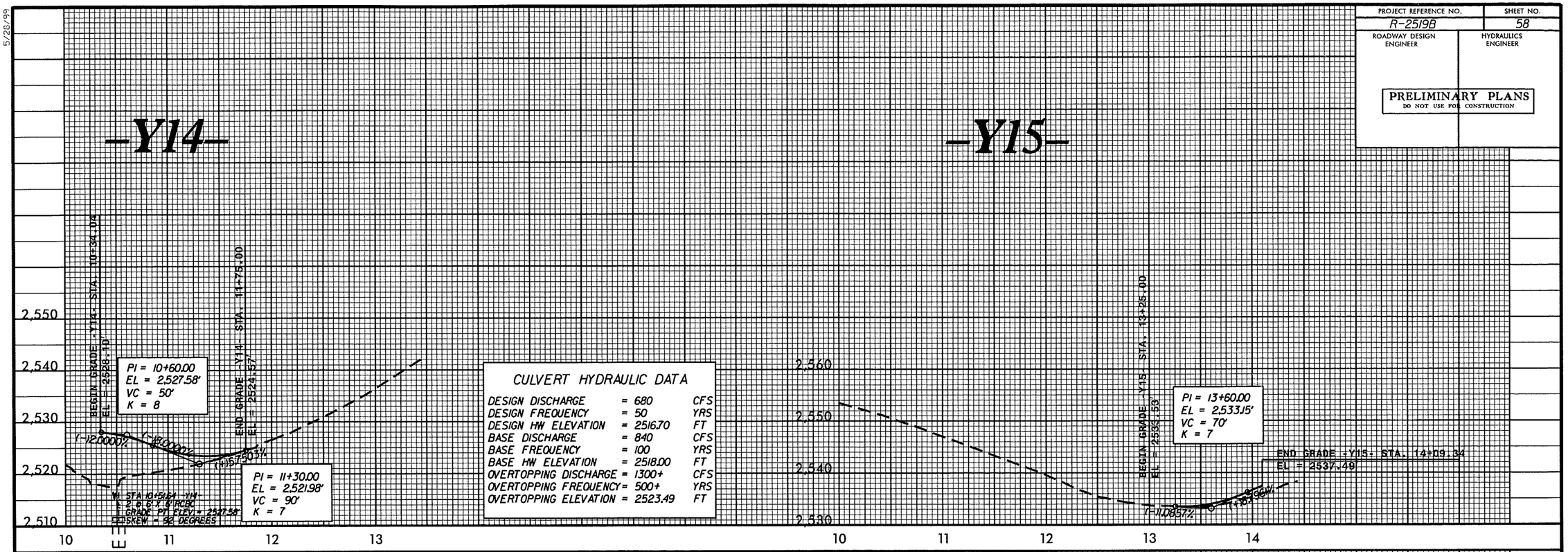
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	58
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	680	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2516.70	FT
BASE DISCHARGE	=	840	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2518.00	FT
OVERTOPPING DISCHARGE	=	1300+	CFS
OVERTOPPING FREQUENCY	=	500+	YRS
OVERTOPPING ELEVATION	=	2523.49	FT

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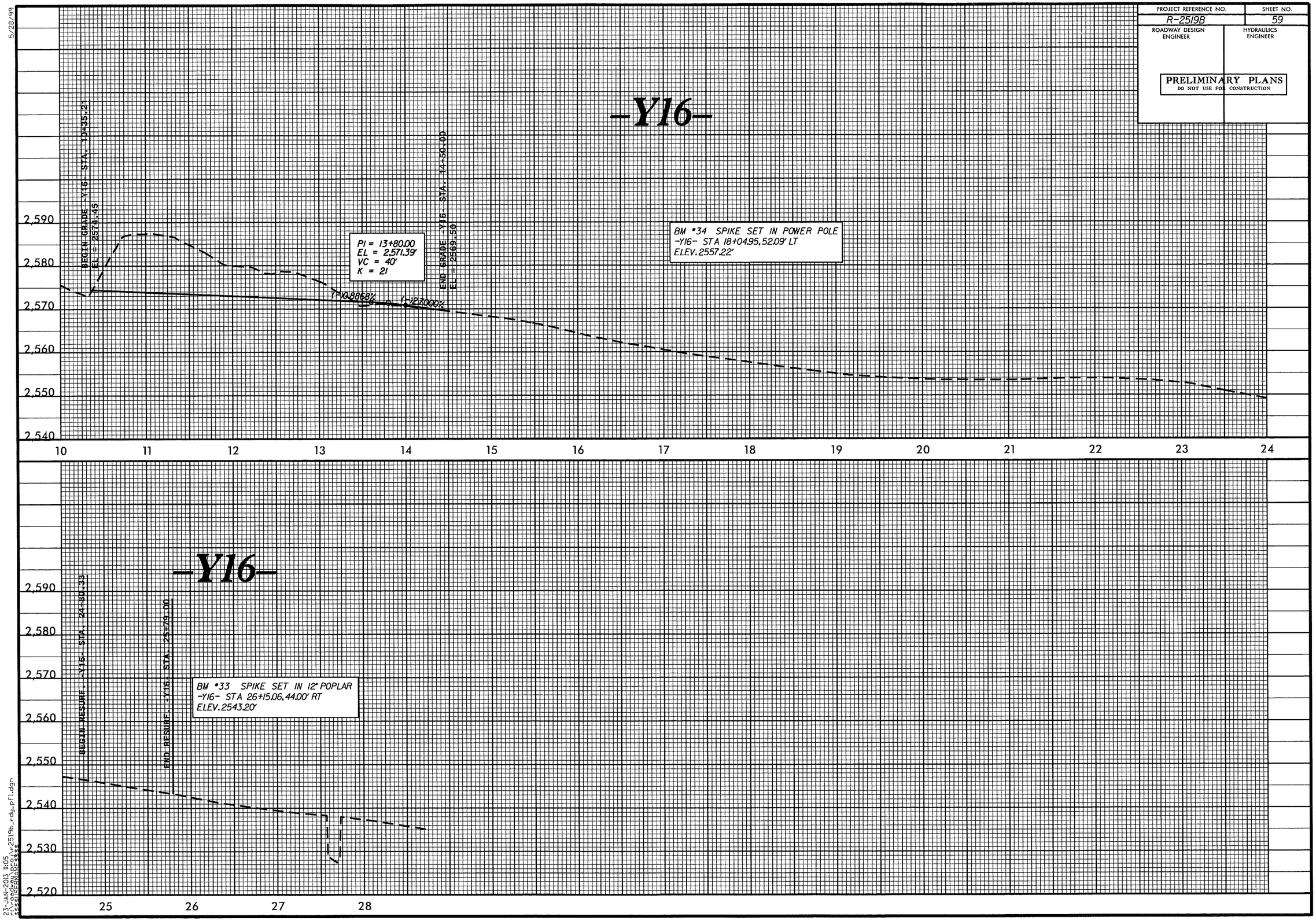
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	59
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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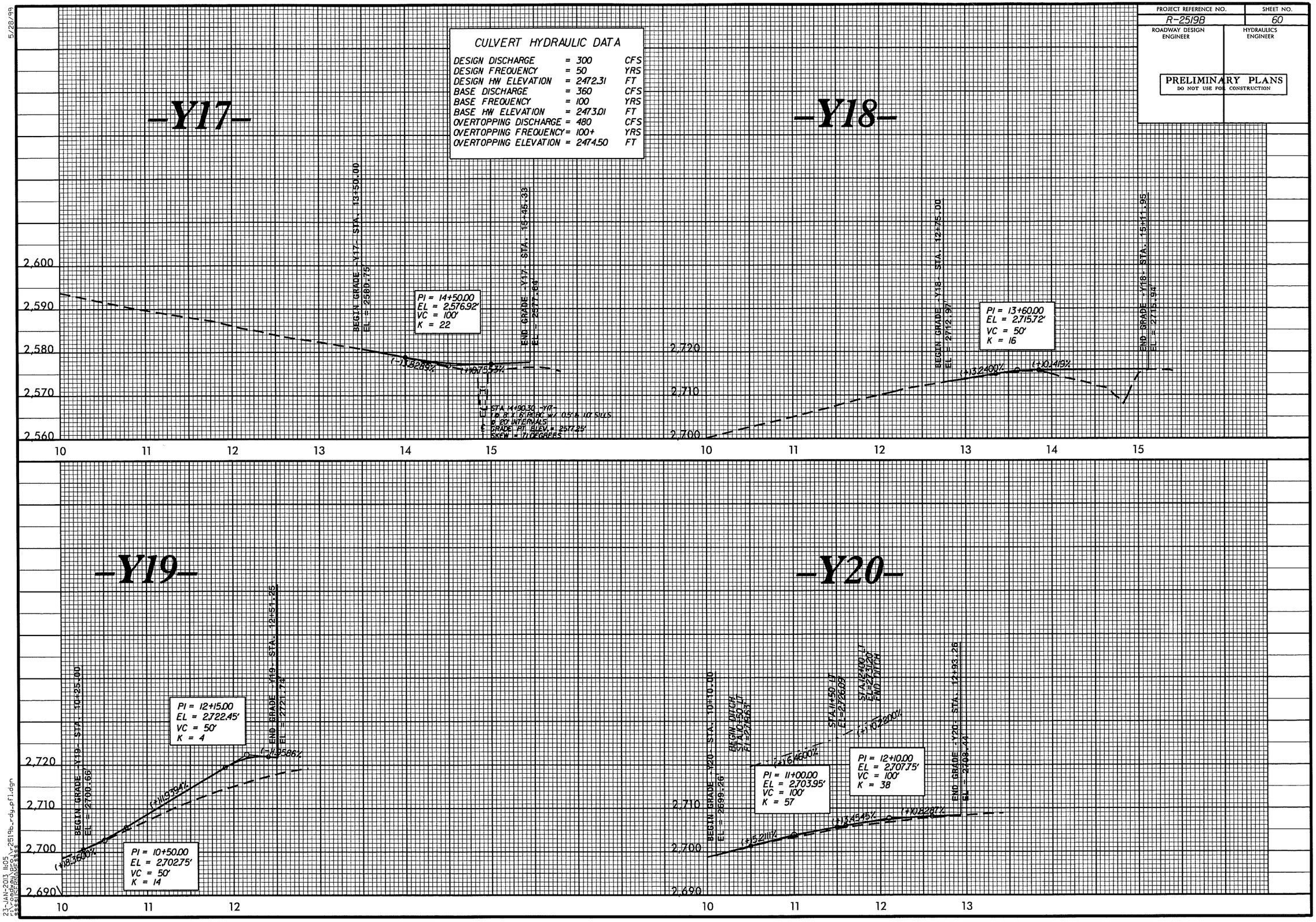
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	60
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	300	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2472.31	FT
BASE DISCHARGE	=	360	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2473.01	FT
OVERTOPPING DISCHARGE	=	480	CFS
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING ELEVATION	=	2474.50	FT



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PROJECT REFERENCE NO.	SHEET NO.
R-2519B	61
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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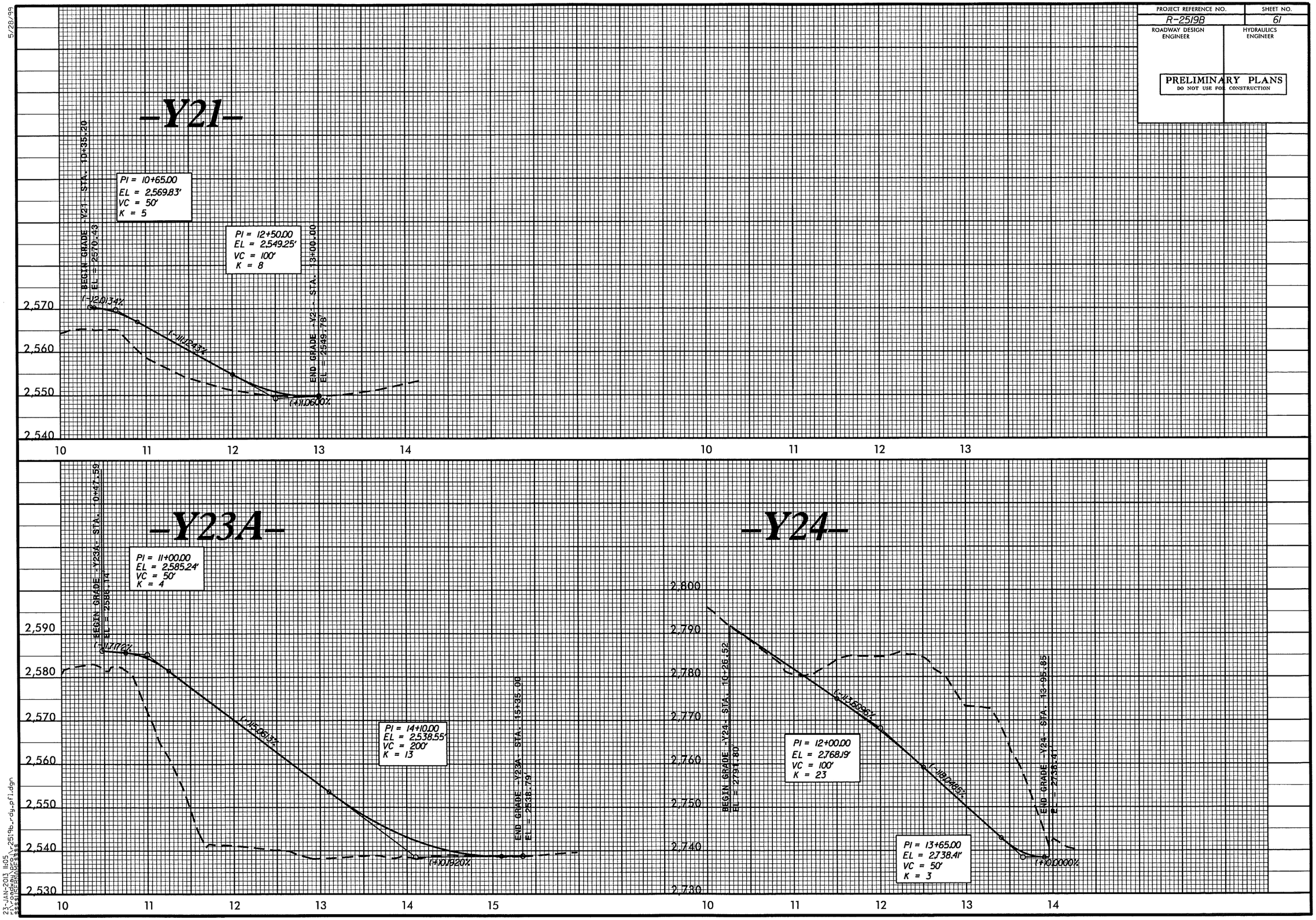

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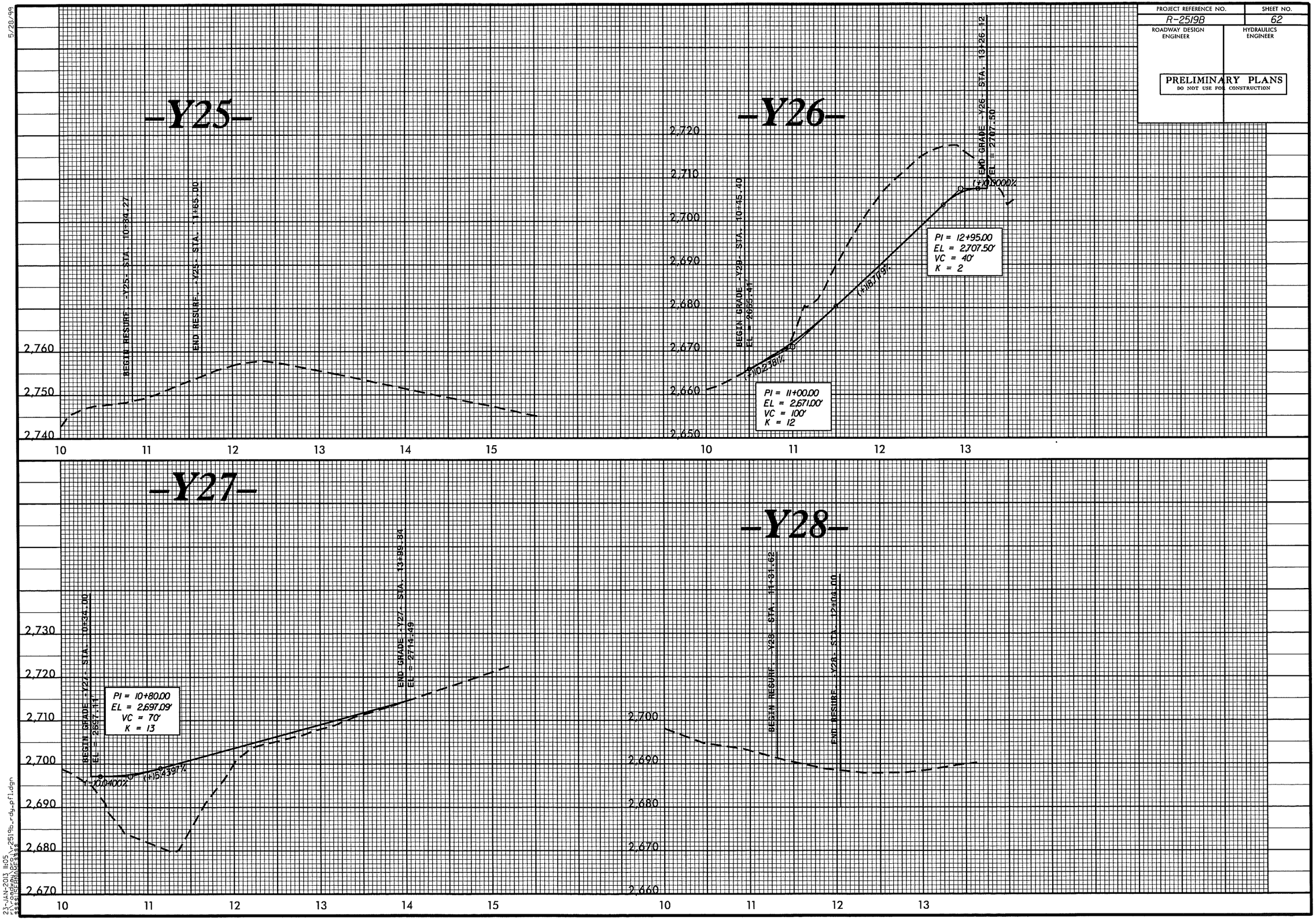
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	62
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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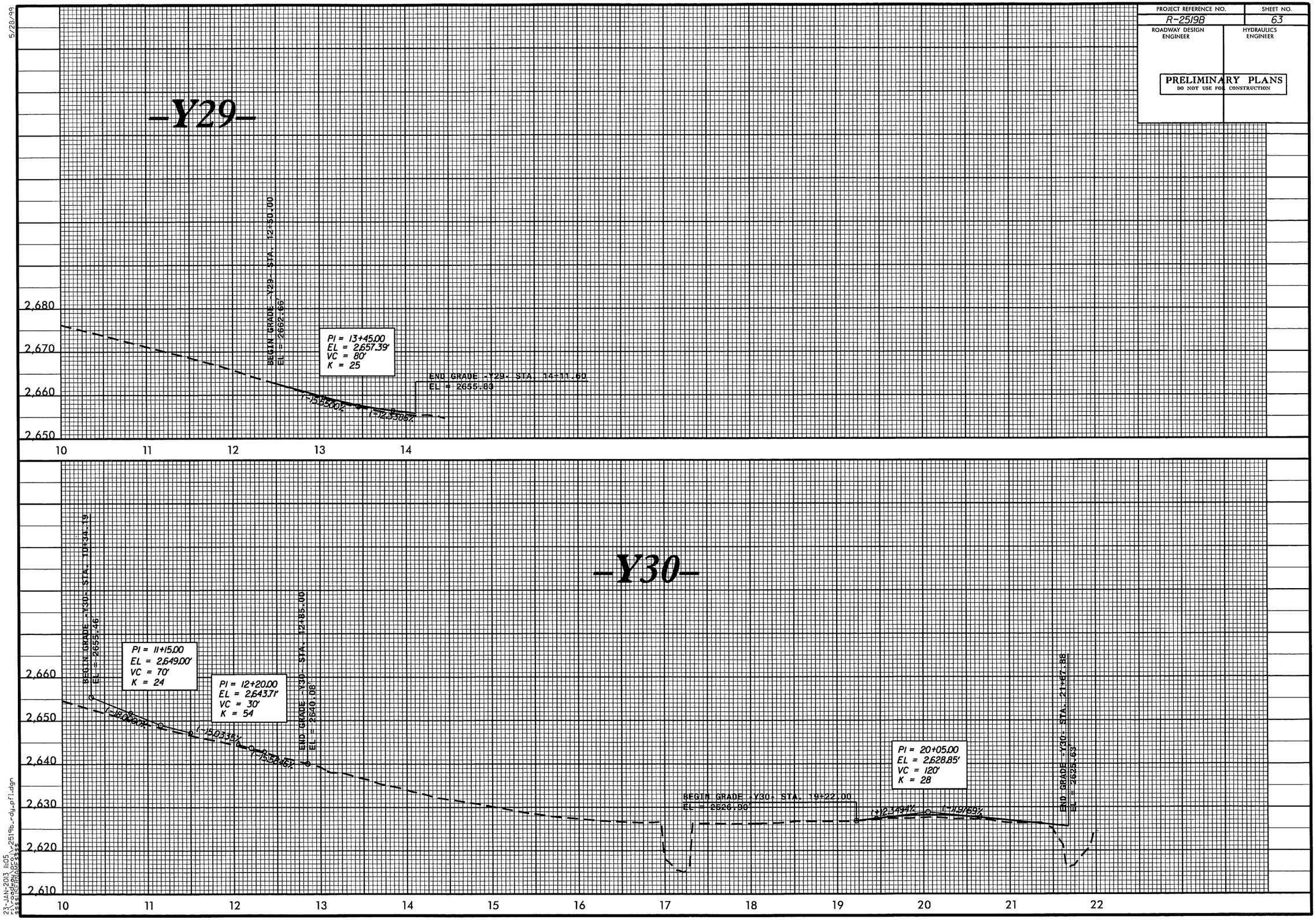
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	63
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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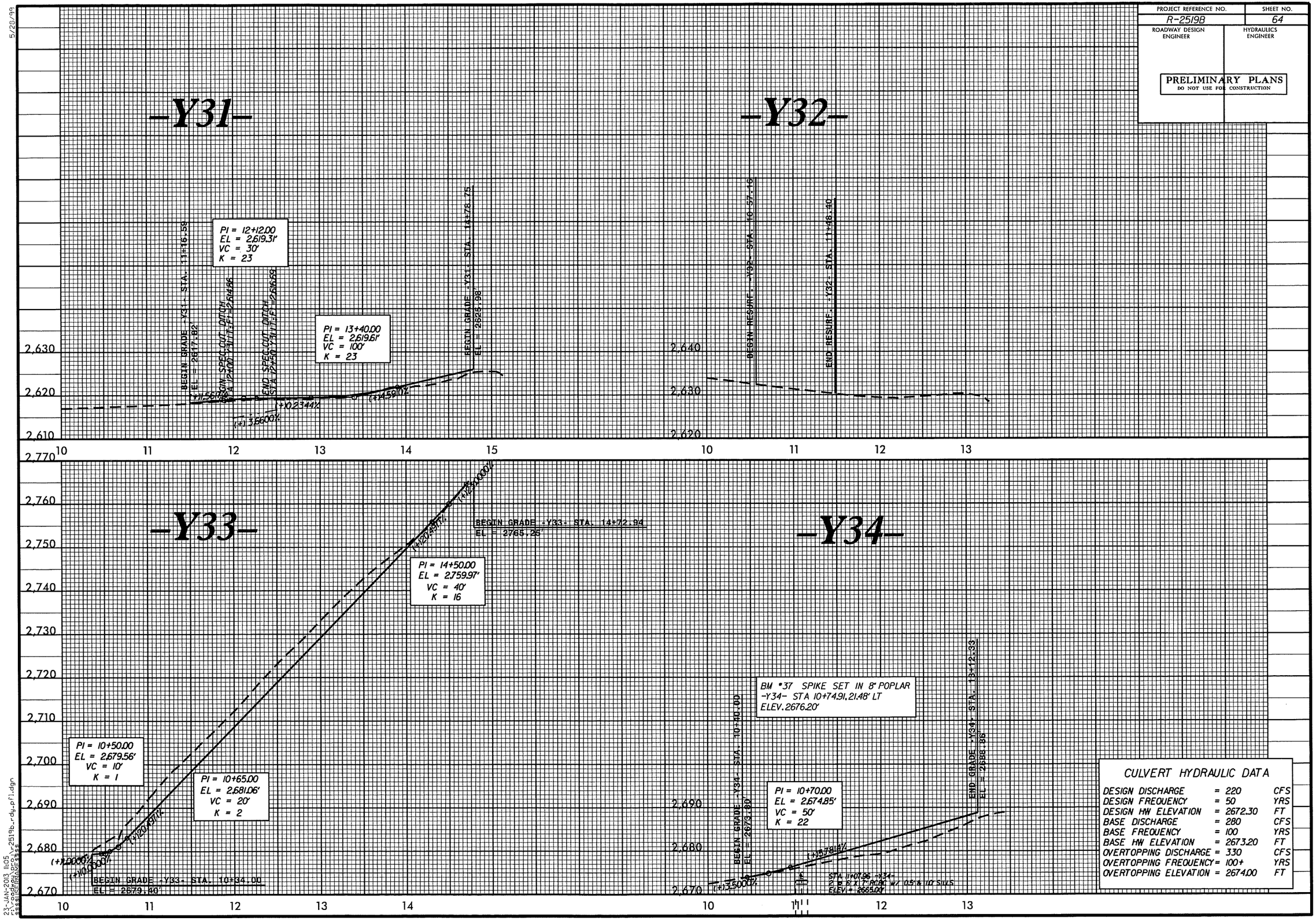
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	64
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



CULVERT HYDRAULIC DATA

DESIGN DISCHARGE	=	220	CFS
DESIGN FREQUENCY	=	50	YRS
DESIGN HW ELEVATION	=	2672.30	FT
BASE DISCHARGE	=	280	CFS
BASE FREQUENCY	=	100	YRS
BASE HW ELEVATION	=	2673.20	FT
OVERTOPPING DISCHARGE	=	330	CFS
OVERTOPPING FREQUENCY	=	100+	YRS
OVERTOPPING ELEVATION	=	2674.00	FT

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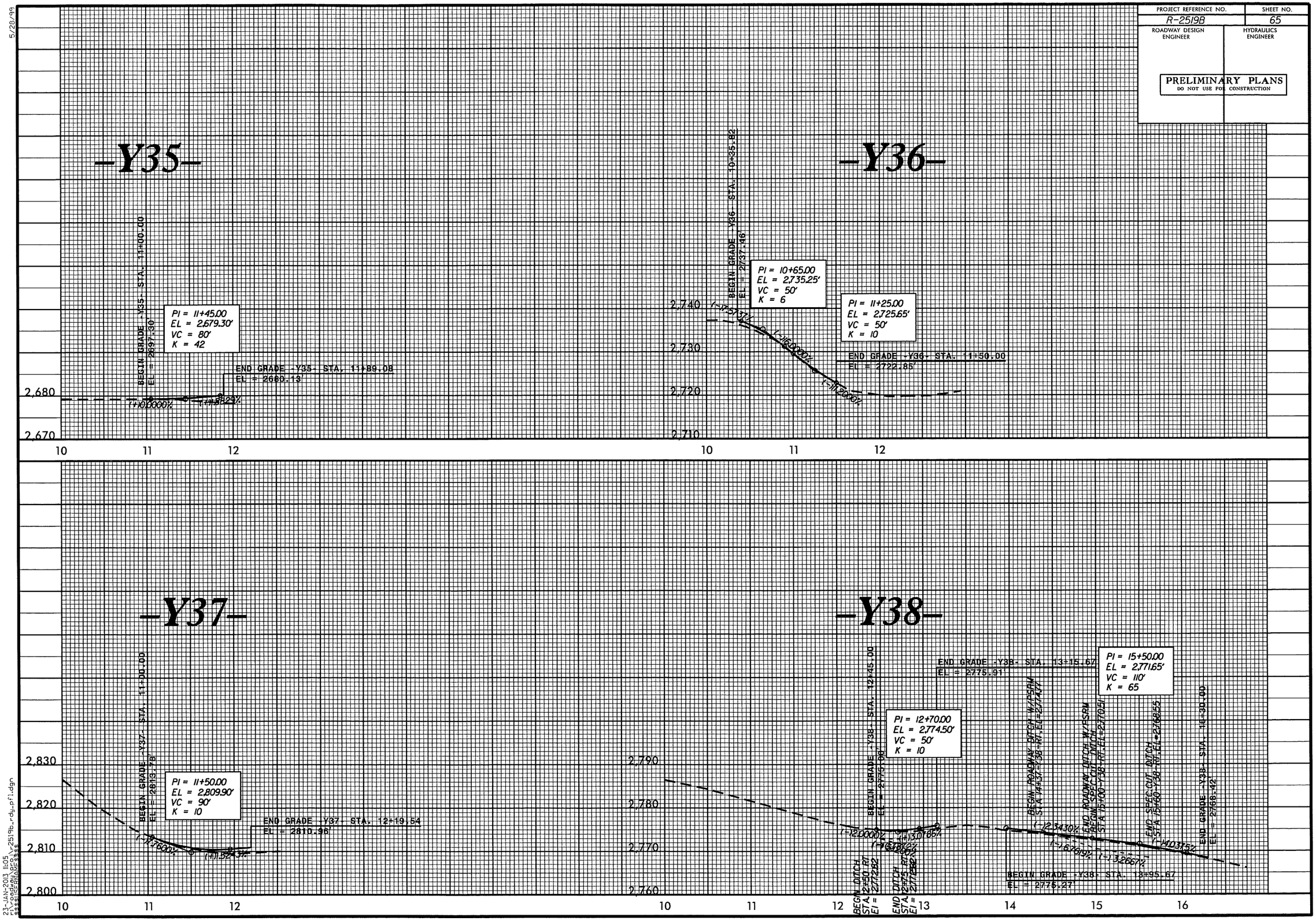
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	65
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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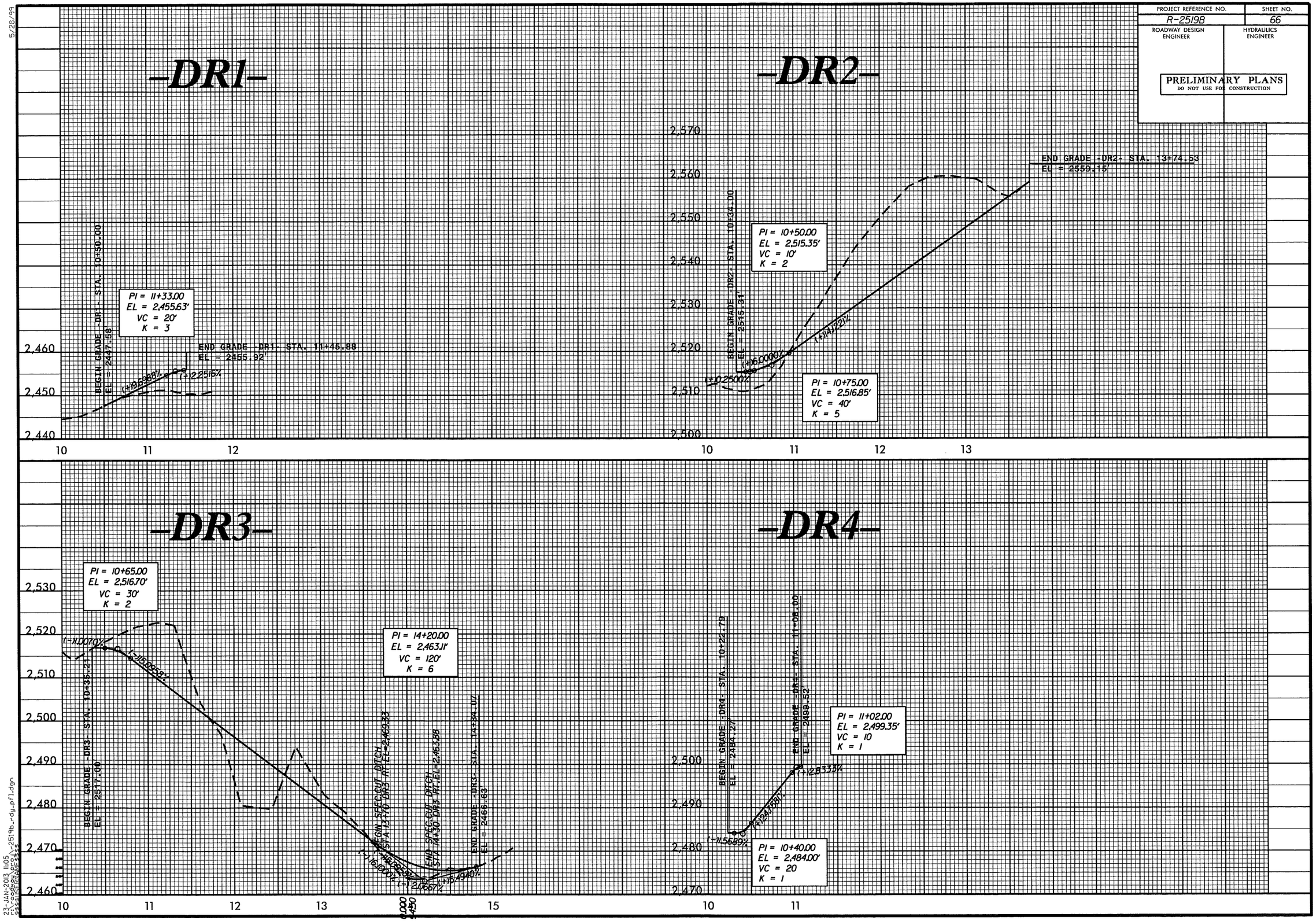
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	66
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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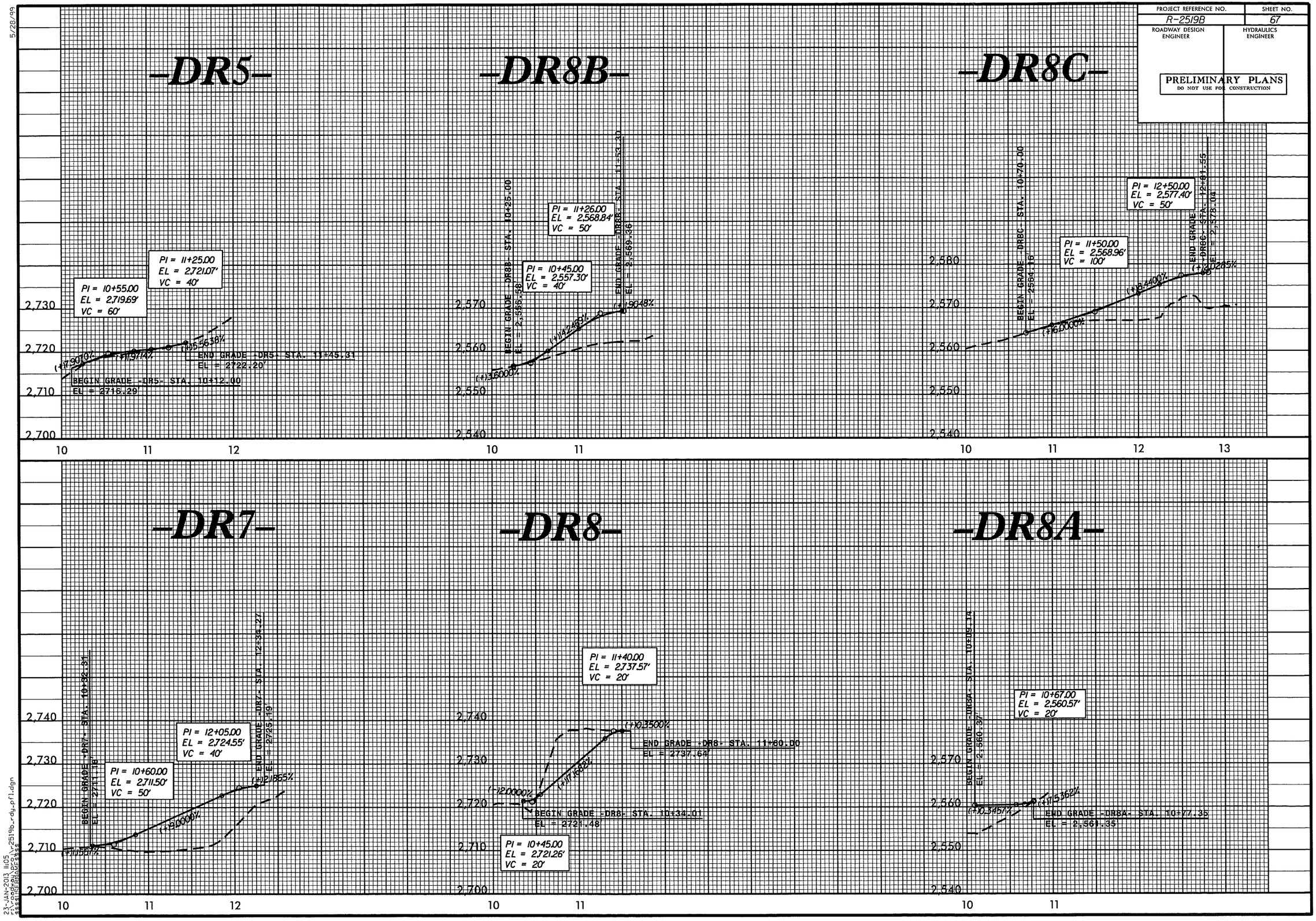
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	67
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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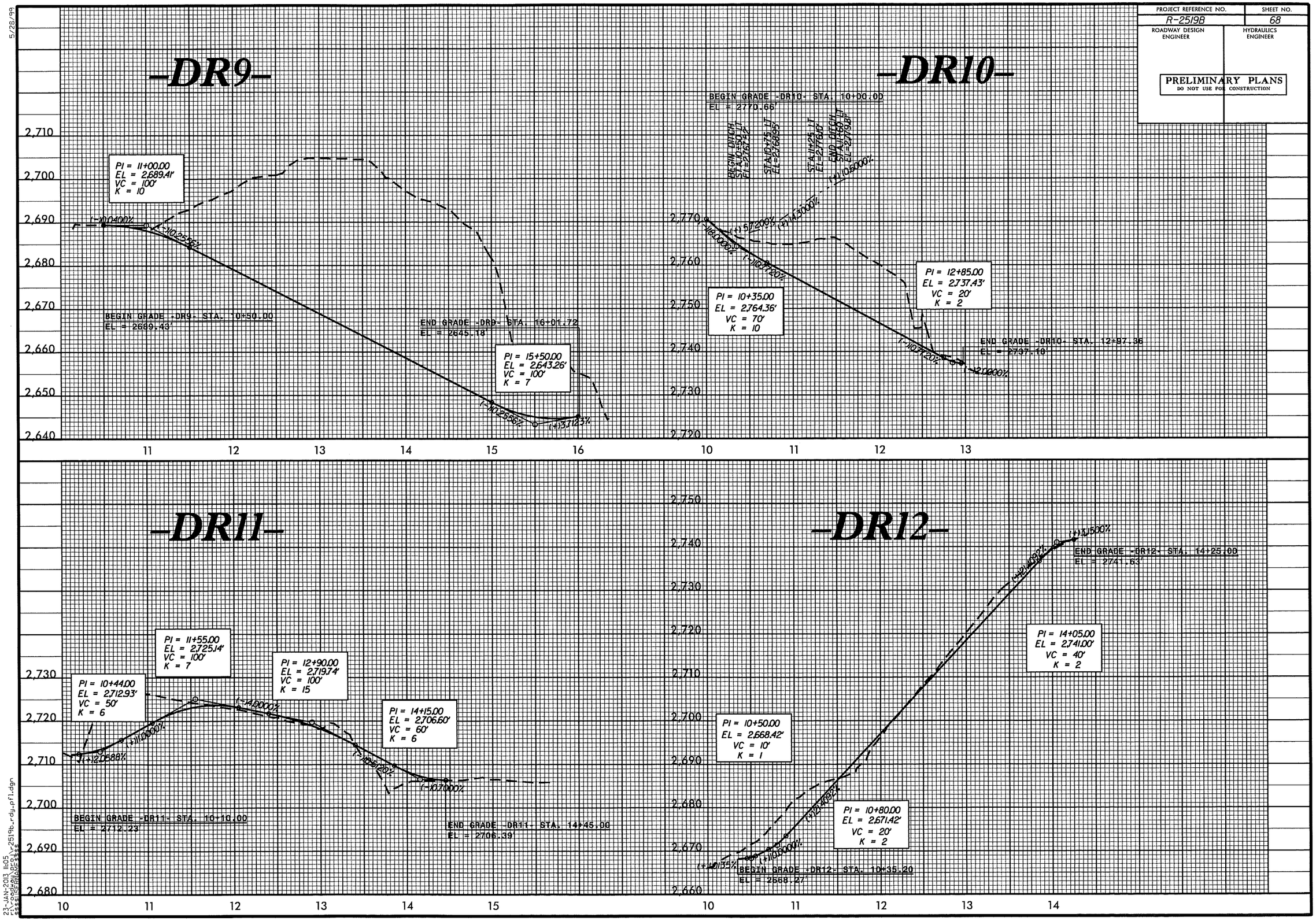
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	68
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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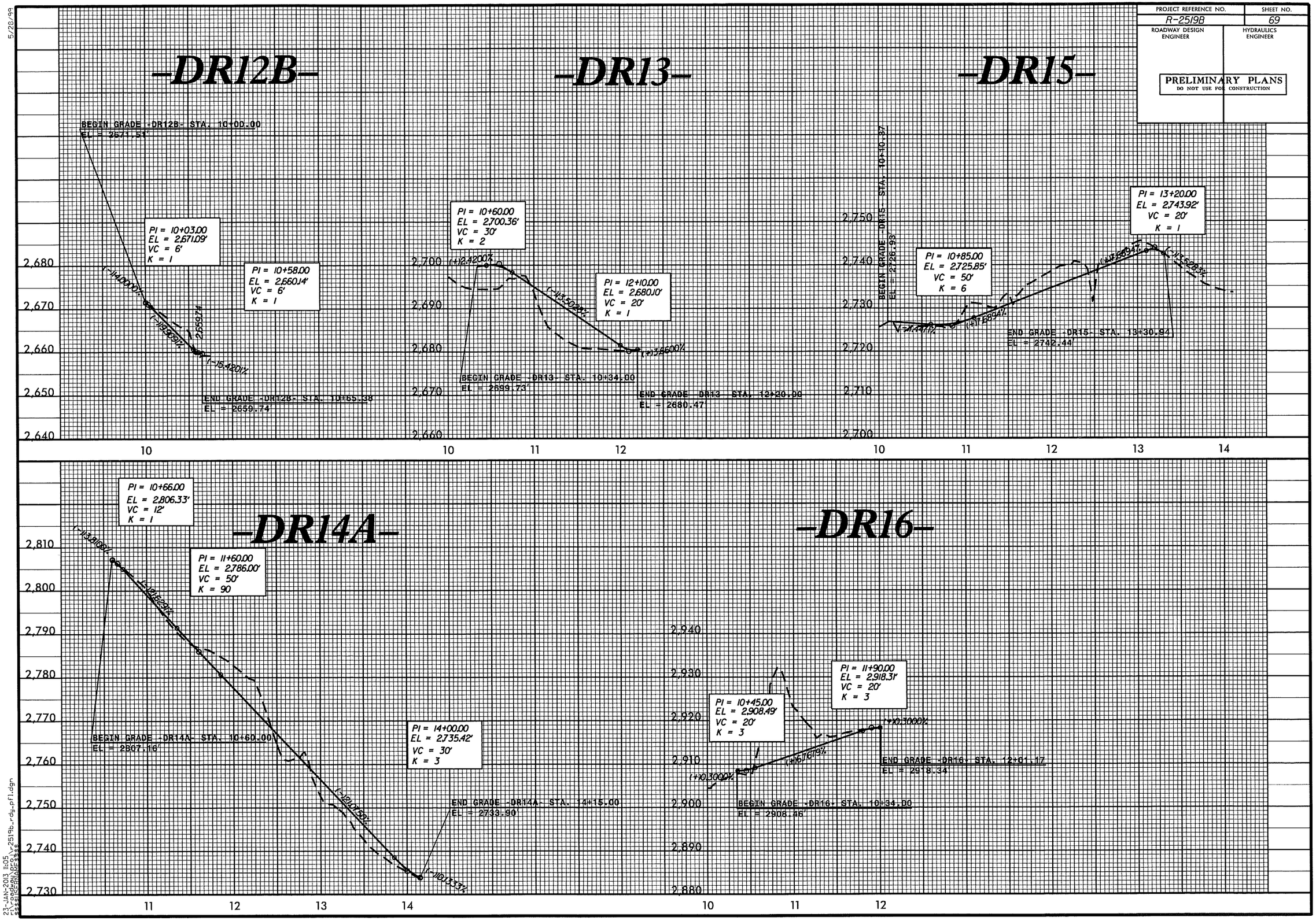
PROJECT REFERENCE NO.	SHEET NO.
R-2519B	69
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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PROJECT REFERENCE NO.	SHEET NO.
R-2519B	70
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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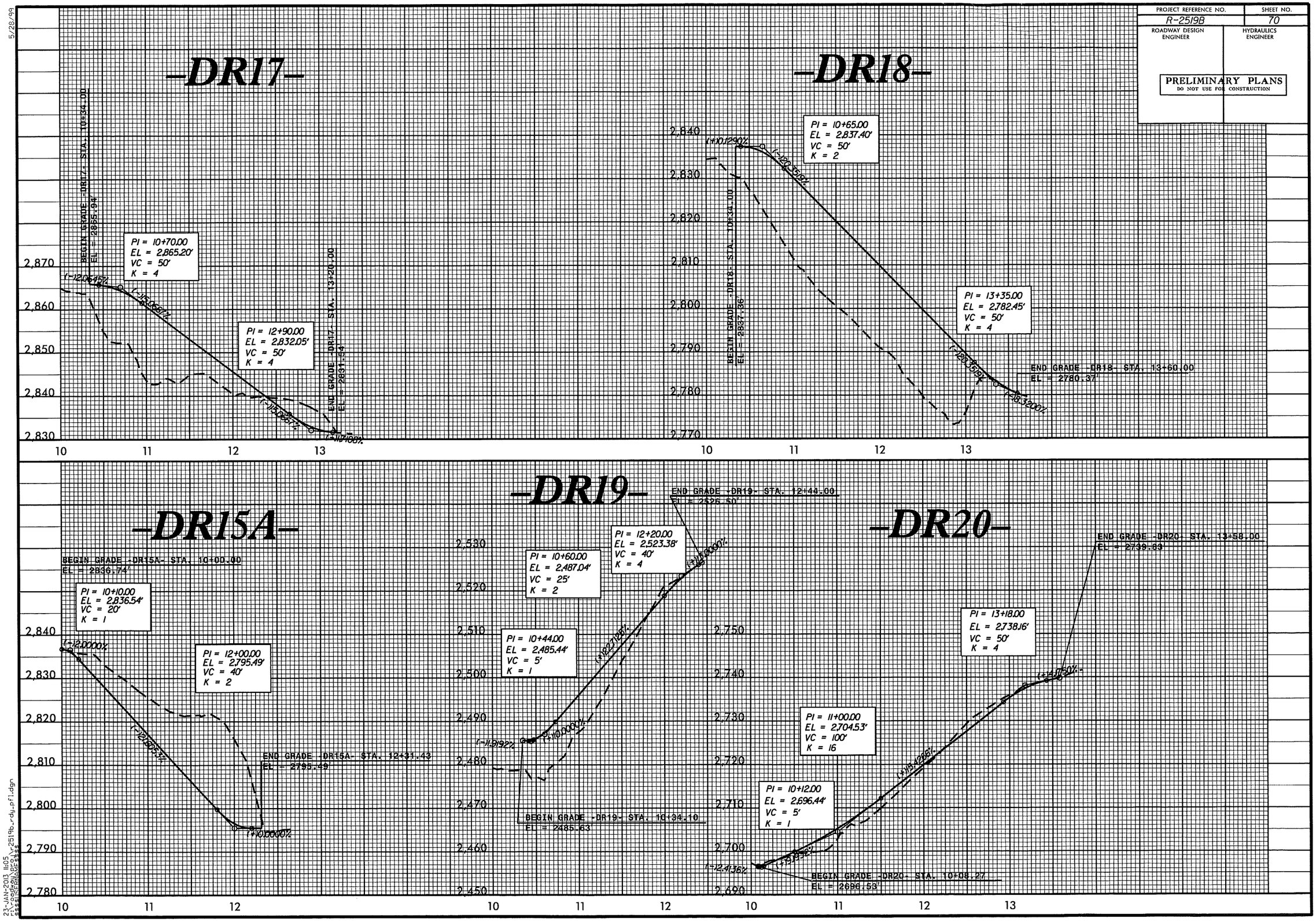

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