STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

April 29, 2011

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

ATTN: Ms. Sarah Elizabeth Hair
NCDOT Coordinator

Dear Madam:

Subject: **Application for an Individual Section 404 Permit and Section 401 Water Quality Certification** for the I-485 (Charlotte Outer Loop) from east of I-77 to West I-85 in Mecklenburg County. Federal Aid Project No. NHF-04GS(27), Division 10, TIP R-2248E. Debit $570 from WBS 34410.3.GV2.

The North Carolina Department of Transportation (NCDOT) proposes to construct new location freeway (I-485) between NC 115 and I-85 in Mecklenburg County. The R-2248 E section will extend I-485 from NC 115 to Mallard Creek Road/Odell School Road. The proposed project is approximately 5.7 miles in length and is the final new location segment for the planned I-485 urban loop around the City of Charlotte. The project includes construction of a new split diamond interchange with Prosperity Church Road and a diverging diamond interchange with Mallard Creek Road/Odell School Road. Additionally, the project would complete construction of the I-485/NC 115 interchange by adding interchange ramps to accommodate travel from NC 115 to eastbound I-485 and westbound I-485 to NC 115.

Please see the enclosed ENG 4345, Ecosystem Enhancement Program (EEP) mitigation acceptance letter, permit drawing review minutes (CP 4B and 4C), State Stormwater Management Plan (SMP), permit drawings, and design plans, for the above referenced project.

MAILING ADDRESS:
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LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610-4328

Purpose and Need:
The primary purpose of R-2248E is to complete the Charlotte Outer Loop. Although both projects have independent utility, R-2248E in conjunction with R-2123CE (I-85/I-485 interchange modification), will provide a high-speed, freeway connection between I-77 and I-85 in Northern Mecklenburg County. R-2248E will enable drivers to travel across Northern Charlotte more efficiently by providing motorists with an alternative route to NC 24 (Harris Boulevard). The construction of R-2248E will also allow through traffic to bypass the congested sections of I-77 and I-85 adjacent to Uptown Charlotte. Modifications to the I-485/I-85 interchange will be constructed under a separate project (R-2123CE).

Summary of Jurisdictional Impacts:
The project will permanently impact 7.30 acres of wetlands and 8,156 linear feet of streams. The project will temporarily impact 0.05 acre of wetlands and 0.08 acre of streams.

Summary of Utility Impacts:
There will be no temporary or permanent impacts to jurisdictional resources due to utility relocations on R-2248E.

Summary of Mitigation:
The project has been designed to avoid and minimize impacts to jurisdictional areas throughout the National Environmental Policy Act (NEPA) and design processes. However, project impacts will necessitate compensatory mitigation for the unavoidable impacts. Detailed descriptions of these actions are presented in the mitigation portion of this application. The EEP will provide compensatory mitigation for 6.81 acres of wetland impacts and 7,351 linear feet of stream impacts. The remainder of the stream and wetland impacts requiring mitigation for this project were previously compensated for under project R-2248D; details of the previously permitted sites are provided in Tables 1A, 1B, 1C, 2A, 2B, 2C, individual Permit Site descriptions, and Mitigation Options: Compensation section below.

NEPA DOCUMENT STATUS

The Final Environmental Impact Statement (FEIS) for the North Charlotte Outer Loop (I-485) was approved on January 29, 1992 under R-2248B. As part of the FEIS and Record of Decision (ROD), the original design included a conventional diamond interchange with Prosperity Church Road. However, based on local planning efforts, a split-diamond interchange was identified as an option to better accommodate access requirements and proposed traffic volumes in the area. As a result, the proposed interchange configuration was re-evaluated as a Categorical Exclusion (CE). The I-485 and Prosperity Church Road Interchange Study CE was approved by the Federal Highway Administration in May 2006. Based on the analyses contained within the CE, the split-diamond interchange configuration was identified as the Preferred Alternative. As part of the CE, an assessment of potential indirect and cumulative impacts (ICI) was also completed for the two interchange configurations under consideration. An Indirect Screening and Land Use Scenario Assessment was prepared for R-2248E in July 2009. Additional copies of these documents will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Points 4B and 4C were reached for R2248-E on October 13, 2010 and March 9, 2011, respectively.

INDEPENDENT UTILITY

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

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

RESOURCE STATUS

STIP Project R-2248E is located within sub-basin (03-07-11) of the Yadkin Pee Dee River Watershed, Rocky River Basin (HUC 03040105) and sub-basins (03-08-33; 03-08-34) of the Catawba River Watershed, Upper Catawba Basin (HUC 03050101). The project is located within one mile of a Water Supply Watershed, however none of the streams in the project area will drain into the Water Supply Watershed. All streams within the project area are classified as DWQ Class C waters. No designated Outstanding Resource Waters (ORW), or High Quality Waters (HQW) occur within the project area.

<u>303(d) Impaired Waters</u>:
Clarks Creek, Stony Creek, and Rocky River are listed on the North Carolina Department of Environment and Natural Resources (NCDENR's) 2010 Final 303(d) List. Clarks Creek is listed as having impaired biologic integrity from its source to Mallard Creek. Stony Creek is also listed as having impaired biologic integrity from its source to Mallard Creek. The section of Rocky River from its source to the mouth of Reedy Creek is listed as having impaired biological integrity and violating standards for turbidity and fecal coliform.

Wetland and stream determinations within R-2248E were conducted using the field delineation method outlined in the 1987 Corps of Engineers Wetland Delineation Manual. Ms. Liz Hair of the U.S. Army Corps of Engineers and Ms. Polly Lespinasse of the North Carolina Division of Water Quality field verified the wetlands and surface waters on June 23, 2010. This Individual Permit Application includes a request for a final approval Jurisdictional Determination of the resources included in the R-2248E project area.

IMPACTS TO WATERS OF THE U.S.

Tables 1A, 1B, 1C, 2A, 2B and 2C summarize the impacts to jurisdictional water resources. Site numbers correspond with the permit (hydraulic) drawings included in this application. The stream and wetland numbers correspond to the Rapanos jurisdictional determination forms included in this application. A brief description of each impact site will follow the tables.

Table 1A. Impacts to jurisdictional wetlands in Catawba River Basin (HUC 03050101)

Site No.	Wetland Name *	Wetland Size (acre)	Permanent Fill in Wetlands (acre)	Mechanized Clearing (acre)	Temporary Fill (acre)	Mitigation Required (acre) **
1	WZ	0.850	0.385	0.020	0	0.11 **
2	WAA	0.643	0.222	0.028	0	0.06 **
Total Temporary Impacts:			--	--	0	0
Total Permanent Impacts:			0.607	0.048	--	--
Permanent Impacts Requiring Mitigation:			0.607	0.048	--	--
Previously acquired mitigation under R-2248D at Site 1:			-0.267	-0.030	--	--
Previously acquired mitigation under R-2248D at Site 2:			-0.156	-0.030	--	--
Total Mitigation Requested:			0.184	-0.012	--	**0.17**

* Denotes non-riparian wetlands.

** Wetland impacts permitted and mitigated under R-2248D were subtracted from impacts subject to mitigation in the current project. Details are provided in site descriptions for Permit Site 1 and Permit Site 2 below.

Table 1B. Impacts to jurisdictional wetlands in Yadkin-Pee Dee River Basin (HUC 03040105)

Site No.	Wetland Name *	Wetland Size (acre)	Permanent Fill in Wetlands (acre)	Mechanized Clearing (acre)	Temporary Fill (acre)	Mitigation Required (acre)
3	WAD	0.06	0.02	0.01	0	0.03
4	WN	1.42	0.55	0.08	0	0.63
5	WM	0.12	0.12	0	0	0.12
6	N/A (stream only)			--	--	--
7	WFG	0.28	0.28	0	0	1.78
	WH	1.42	0.97	0.06	0	
	WI	0.15	0.15	0	0	
	WJ	0.32	0.32	0	0	
8	WB	0.73	0.73	0	0	1.06
	WC	0.33	0.33	0	0	
9	N/A (stream only)			--	--	--
10	N/A (stream only)			--	--	--
11	WT	0.14	0.14	0	0	0.14
12	W109*	0.05	0.05	0	0	1.80
	WBA	5.37	1.59	0.16	0.05	
13	WL*	0.11	0.11	0	0	0.34
	WO*	0.40	0.13	0.03	0	
	WP*	0.07	0.07	0	0	
14	W101	0.02	0.02	0	0	0.62
	WQ	0.60	0.60	0	0	
15	WK	0.40	0.08	0.01	0	0.09
16	W115*	0.03	0.03	0	0	0.03
Total Temporary Impacts:			--	--	0.05	--
Total Permanent Impacts:			6.29	0.35	--	--
Permanent Impacts Requiring Mitigation:			6.29	0.35	--	--
Total Mitigation Requested:			6.29	0.35	--	**6.64**

* Denotes non-riparian wetlands, all other wetlands are riparian.

Table 1C. Total impacts to jurisdictional wetlands in both Catawba (HUC 03050101) & Yadkin-Pee Dee River Basin (HUC 03040105)

	Permanent Fill in Wetlands (acre)	Mechanized Clearing (acre)	Temporary Fill (acre)	Mitigation Required (acre) **
Total Temporary Impacts	--	--	0.05	--
Total Permanent Impacts:	6.90	0.40	--	--
Permanent Impacts Requiring Mitigation:	6.90	0.40	--	--
Previously acquired mitigation under R-2248D at Site 1:	-0.27	-0.03	--	--
Previously acquired mitigation under R-2248D at Site 2:	-0.16	-0.03	--	--
Total Mitigation Requested:	6.47	0.34	--	**6.81**

** Wetland impacts permitted and mitigated under R-2248D were subtracted from impacts subject to mitigation in the current project. Details are provided in site descriptions for Permit Site 1 and Permit Site 2 below.

Table 2A. Impacts to jurisdictional streams in Catawba River Basin (HUC 03050101)

Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet)	Temporary Impact (acre)	Mitigation Requirement (linear feet)
1	UT to Dixon Branch	S4	Perm. fill	297	0	USACE & DWQ
2	UT to Dixon Branch	S3, S3.5	Perm. fill	602	0	USACE & DWQ
Total Permanent Impacts:				899	--	--
Permanent Impacts Requiring Mitigation (2:1):				899	--	--
Previously acquired mitigation under R-2248D at Site 1:				-118	--	--
Previously acquired mitigation under R-2248D at Site 2:				-230	--	--
Total Impacts Requiring Mitigation (2:1):				551	--	**1,102**[+]

[+] Mitigation proposed by NCDOT (based on mitigation required by the USACE exceeding the amount required by DWQ).

Table 2B. Impacts to jurisdictional streams in Yadkin-Pee Dee Basin (HUC 03040105)

Site No.	Stream Name	Stream JD Reference	Impact Type	Impact Length (linear feet)	Temporary Impacts (acre)	Mitigation Requirement
3	UT1 to Clark's Creek	S4.5	Perm. fill	48	--	USACE
			Bank Stabilization	24 [c/]	--	--[c/]
			Temp. fill	--	<0.01	--
4	UT1 to Clark's Creek	S5	Perm. fill	428	--	USACE & DWQ
			Bank Stabilization	69	--	DWQ
			Temp. fill	--	<0.01	--
5	UT1 to Clark's Creek	S6	Perm. fill	489	--	USACE & DWQ
			Bank Stabilization	56	--	DWQ
			Temp. fill	--	0.01	--
6	Clarks Creek	S7	Perm. fill	276	--	USACE & DWQ
			Bank stabilization	36	--	DWQ
			Temp. fill	--	<0.01	--
7	UT to Clarks Creek	S8, S9	Permanent fill	1,561	--	USACE & DWQ
			Bank Stabilization	21	--	DWQ
			Temporary fill	--	0.01	--
8	UT to Stony Creek	S11, S13	Permanent fill	2,497	--	USACE & DWQ
			Bank Stabilization	28	--	DWQ
			Temporary fill	--	<0.01	--
9	UT to Stony Creek	S15	Permanent fill	81	--	USACE
			Bank Stabilization	37 [c/]	--	--[c/]
			Temporary fill	--	<0.01	--
10	UT to Stony Creek	S16	Permanent fill	44	--	USACE
			Bank Stabilization	51[c/]	--	--[c/]
			Temporary fill	--	<0.01	--
11	UT to Stony Creek	S18	Permanent fill	138	--	USACE
			Temporary fill	--	<0.01	--
12 & 13		n/a wetland only		--	--	--
14	UT to Stony Creek	S101, S19	Permanent fill	803	--	USACE & DWQ
			Bank Stabilization	35	--	DWQ
			Temporary fill	--	0.01	--
15	UT to Rocky River	S20, S20-2	Permanent fill	295	--	USACE & DWQ
			Bank Stabilization	50	--	DWQ
			Temporary fill	--	<0.01	--
16	UT to Stony Creek	S103	Permanent fill	190	--	USACE & DWQ
			Temporary fill	--	--	--
Total Temporary Impacts:				--	0.08 [b/]	--
Total Permanent Impacts (Perm. Fill + Bank Stabilization):				7,257	--	--
Permanent Impacts Requiring DWQ Mitigation (1:1):				6,834	--	--
Permanent Impacts Requiring USACE Mitigation (2:1):				6,850	--	--
Stream Day Lighting at Site 14:				-50	--	--
Total Impacts Requiring Mitigation (2:1):				6,800	--	**13,600[+]**

[a/] Mitigation for bank stabilization impact required by DWQ – not required by USACE.
[b/] Value based on rounding, due to some of the individual impacts being <0.01 acre.
[c/] Permanent impact <150' therefore mitigation for bank stabilization impact not required by DWQ.
[+] Mitigation proposed by NCDOT (based on mitigation required by the USACE exceeding the amount required by DWQ).

Table 2C. Total impacts to jurisdictional streams in both Catawba (HUC 03050101) & Yadkin-Pee Dee River Basin (HUC 03040105)

	Impact Length (linear feet)	Temporary Impacts (acre)	Mitigation Requirement
Total Temporary Impacts:	--	0.08 [b/]	--
Total Permanent Impacts (Perm. Fill + Bank Stabilization):	8,156	--	--
Permanent Impacts Requiring DWQ Mitigation (1:1):	--	--	6,834
Permanent Impacts Requiring USACE Mitigation (2:1):	7,749	--	--
Previously acquired mitigation under R-2248D at Site 1:	-118	--	--
Previously acquired mitigation under R-2248D at Site 2:	-230	--	--
Stream Day Lighting at Site 14:	-50	--	--
Total Impacts Requiring Mitigation (2:1):	7,351	--	**14,702[+]**

[b/] Value based on rounding, due to some of the individual impacts being <0.01 acre.

[+] Mitigation proposed by NCDOT (based on mitigation required by the USACE exceeding the amount required by DWQ).

Permit Site 1: Stream S4 is an intermittent stream that originates in wetland WZ. Flow from the upper portions of S4 will be placed into a 24" RCP, whereas the lower portion will be placed into a 42" RCP. Part of wetland WZ will also be filled. The remaining portions of wetland WZ and stream S4 will receive flow from a 42" RCP via a standard Class I rip rap pad for outlet protection. Two dry detention basins will be used to attenuate peak flows resulting from the new impervious area. The new roadway, ramp, and associated slopes will result in 0.385 acre of permanent fill in wetlands, 0.020 acre of mechanical clearing in wetlands, and 297 linear feet of permanent stream impacts. This site (R-2248E Permit Site 1) was previously included under the permit for project R-2248D (Sites 25, 26 and 27) for 118 feet of permanent stream impacts, 0.267 acre of permanent fill in wetlands, and 0.030 acre of mechanized clearing in wetlands.

Permit Site 2: Stream S3 is an intermittent stream that currently flows through a 30" RCP under Alexanderana Road, and is then joined by another intermittent stream (S3.5) before flowing through wetland WAA. Flow from S3 and S3.5 will be conveyed via 48" and 42" RCP's, respectively. A dry detention basin is located upstream to attenuate peak flows in the 48" pipe system. A 60" RCP will deliver this flow to a 4' base lateral ditch before rejoining the stream channel of S3 at a non-erosive velocity. The new roadway, ramp, and associated slope will result in 0.222 acre of permanent fill in wetlands, 0.028 acre of mechanical clearing in wetlands, and 602 linear feet of permanent stream impacts. This site (R-2248E Permit Site 2) was previously included under the permit for project R-2248D (Site 28) for 230 feet of permanent stream impacts, 0.156 acre of permanent fill in wetlands, and 0.030 acre of mechanized clearing in wetlands.

Permit Site 3: Stream S4.5 is a perennial stream that originates within a small wetland (WAD) before it flows under Eastfield Road. The widening of Eastfield Road and associated slopes will require the existing 36" RCP (61 linear feet) to be removed and replaced with a longer, 54" RCP (109 linear feet, increase of 48 linear feet of pipe). Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. Road widening and grade increase in this section will result in 72 linear feet of permanent stream impacts (24 of which are bank stabilization), 0.02 acre of permanent fill in wetlands, and 0.01 acre of mechanized clearing in wetlands.

Permit Site 4: Stream S5 is a perennial stream with associated riparian wetland (WN). A pond is located near the origin of S5, adjacent to the wetland on the north side of the new roadway and fill slope. The pond will be retained; a 1.75:1 reinforced fill slope will be used adjacent to the pond to avoid temporary draining of the pond during construction. A 4' base ditch was added to serve as an emergency spillway for the pond during high flow events. S5 will be conveyed by an 84" RCP; adjacent portions of WN will be filled. The 84" RCP will also receive treated stormflow from ditches and pipes adjacent to the roadway before flowing into the S5 channel. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway and associated slopes will result in 0.51 acre of permanent fill in wetlands, 0.04 acre of excavation in wetlands, and 0.08 acre of mechanized clearing in wetlands. Stream impacts at this site will consist of 497 linear feet of permanent stream impacts (69 of which are bank stabilization).

Permit Site 5: Stream S6 is a perennial stream with small associated riparian wetland (WM). The new roadway and slopes will result in filling the wetland (total take) and S6 will be conveyed by a 8' x 7' RCBC, which will also receive stormflow from the roadway and shoulders. The majority of the stormflow conveyed to the 8' x 7' RCBC will be treated stormflow. The outlet of this RCBC will also require bank stabilization to a portion of S6. Temporary stream impacts of 0.01 acre will result from dewatering methods during pipe installation. The new roadway and associated slopes will result in 0.12 acre of permanent fill in wetlands, and 545 linear feet of permanent stream impacts (56 of which are bank stabilization).

Permit Site 6: Stream S7 (Clarks Creek) will be conveyed by 9' x 7' RCBC. The outlet of this RCBC will require bank stabilization to S7. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway and associated slopes will result in 312 linear feet of permanent stream impacts (36 of which are bank stabilization), and <0.01 acre of temporary stream impacts.

Permit Site 7: Streams S8 (intermittent) and S9 (perennial) are associated with a riparian wetland complex (wetlands WFG, WH, WI, WJ). The new roadway and slopes will result in filling much of the wetland complex. Fill in WFG (0.28 acre), WI (0.15 acre), and WJ (0.32 acre) will result in a total take of these wetlands; fill will result in loss of 0.97 acre of WH. Flow from S8, S9, and associated wetlands will be directed through several pipes, and will ultimately drain back to S9 via a 84" RCP. Two dry detention basins were used to attenuate flow from as much of the interchange as possible. A lateral "V" ditch, lateral 4' base ditch, and the outlet of the 84" RCP will result in 21 linear feet of bank stabilization at the point they enter S9. Temporary stream impacts of 0.01 acre will result from dewatering methods during pipe installation. The new roadway and associated slopes will result in 1.72 acres of permanent fill in wetlands, 0.06 acre of mechanized clearing in wetlands, and 1,582 linear feet of permanent stream impacts due to fill and relocation to lateral base ditch; 21 feet of these stream impacts will result from bank stabilization.

Permit Site 8: Streams S11 (perennial) and S13 (intermittent) are associated with a riparian wetland complex (wetlands WB, WC). Two isolated ponds are also located near the origin of S13; one additional pond is located adjacent to WB. The new roadway and slopes will result in filling the 3 ponds, as well as wetlands WB (0.73 acre, total take) and WC (0.33 acre, total take). Flow from S13, S11 and the wetland complex will be directed through several pipes, a lateral base ditch on the north side of the roadway and a lateral base ditch on the south side of the roadway. Flow from the ditch on the south side of the roadway will be conveyed via a 66" RCP to the ditch on the north side. The ditch on the north side will then be conveyed under Service Road A via a 8' x 9' RCBC before joining the stream channel of S11, where it will require bank stabilization. Three dry detention basins are located within the split diamond interchange and will be used to attenuate peak flows. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway, service road, and associated slopes will result in 1.06 acres of permanent fill in wetlands, and of 2,525 linear feet of permanent stream impacts due to fill and relocation to lateral base ditch; 28 feet of these stream impacts will result from bank stabilization..

Permit Site 9: Stream S15 is an intermittent stream that originates under the new roadway, service road, and associated fill slopes. Flow to S15 will be conveyed by a 42" RCP before rejoining the stream channel of S15. One dry detention basin will be used to attenuate peak flows. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway, service road, and associated slope will result in 118 linear feet of permanent stream impacts (37 of which are bank stabilization).

Permit Site 10: Stream S16 is an intermittent stream that originates under the new roadway, service road, and associated fill slopes. Flow to S16 will be placed into a 54" and a 60" RCP that also receives stormflow from a series of pipes. One dry detention basin will be used to attenuate peak flows. This 60" RCP will convey flow to S16. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway, service road, and associated slope will result in 95 linear feet of permanent stream impacts (51 of which are bank stabilization).

Permit Site 11: Stream S18 is a perennial stream with small associated riparian wetland (WT) located near the confluence of S18 and S11. The new roadway will not impact S11 at this location due to a bridge on the –L- line. The new roadway and slopes will result in filling WT (total take); S18 will be conveyed under the new roadway via a 66" RCP, which will also receive stormflow from the roadway and shoulders. This 66" RCP will flow into a 5' base ditch and before flowing into stream S11. Temporary stream impacts of <0.01acre are a result of dewatering methods during pipe installation. The new roadway and associated slopes will result in 0.14 acre of permanent fill in wetlands, and 138 linear feet of permanent stream impacts.

Permit Site 12: Wetland WBA and W109 are riparian wetlands associated with Stream S11. The -Y22- bridge over S11 at this crossing will result in no impacts to S11, but roadway fill, a temporary work bridge, interior bents for the bridge, and splash pads will result in impacts to WBA and W109 (total take W109, 0.05 acre). Two 36" equalizer pipes will be installed to retain hydrologic connectivity on either side of the roadway fill in WBA. The new roadway fill and bridge construction will result in 1.64 acres of permanent fill in wetlands (1.61 roadway fill, 0.01 for interior bents, 0.02 for splash pads), 0.16 acre of mechanized clearing in wetlands, and 0.61 acre of hand clearing in wetlands. Construction of a temporary work bridge will result in 0.05 acre of temporary wetland impact.

Permit Site 13: Wetlands WL, WO, and WP form a wetland complex near the current intersection of Ridge Road and Beard Road, and future location of Mallard Creek Road. As a result of roadway and fill slopes in this area, WL (0.11 acre) and WP (0.07 acre) will be filled completely; WO will partially filled (0.13 acre). A 18" RCP will be installed at the location of wetland WL to serve as an amphibian crossing under the new intersection of Ridge Road and Beard Road. The new intersection and roadway fill will result in 0.31 acre of permanent fill in wetlands and 0.03 acre of mechanized clearing in wetlands. Special roadway cut ditch grades will be utilized on the north side of -Y20- to avoid additional encroachment to the Conservancy Site parcel.

Permit Site 14: Wetland WQ is a riparian wetland associated with the headwaters of intermittent stream S19; wetland W101 is a riparian wetland associated with the headwaters of intermittent stream S101. Both of these wetlands and their associated streams will be impacted by fill from the roadway and slopes. Fill in W101 and WQ will result in a total take of these wetlands. The flow from W101 and S101 will be directed to a dry detention basin prior to discharging into S19 via an existing roadway ditch on Ridge Road. The flow from WQ and S19 will be placed into a 36" and 42" RCP before re-entering S19 via an energy dissipater. The 24" RCP at the crossing of S19 and Ridge Road will be removed, resulting in daylighting 50 linear feet of S19. The existing corrugated steel arch pipe at the S11 / Mallard Creek Road will be replaced with a 2 @ 7' x 8' RCBC with a low-flow sill in one barrel. Temporary stream impacts of 0.01 acre will result from dewatering methods during pipe installation. The new roadway fill will result in 0.60 acre of permanent fill in wetlands, and 803 linear feet of permanent stream impacts. Culvert replacement on Mallard Creek Road will result in 0.02 acre of permanent fill in wetlands, 35 feet of permanent stream impacts (for bank stabilization), and 0.01 acre of temporary stream impacts (associated with fill slope and energy dissipater construction at this location). Pipe removal at the current Ridge Road/S19 crossing will not result in stream impacts but will result in daylighting 50 linear feet of stream.

Permit Site 15: Wetland WK is a riparian wetland associated with the headwaters of perennial stream S20; S20 is joined by intermittent stream S20-2 a short distance downstream of WK. The new alignment of Odell School Road will result in partial fill of WK and will impact S20 and S20-2 at their confluence. Flow from WK and S20 will be conveyed by a 72" RCP; flow from S20-2 will be conveyed by a 48" RCP. One dry detention basin attenuates flow from a large portion of the relocation of Odell School Road from the west. Additional ROW was purchased for this detention basin. Temporary stream impacts of <0.01 acre will result from dewatering methods during pipe installation. The new roadway fill will result in 0.08 acre of permanent fill in wetlands, 0.01 acre of mechanized clearing in wetlands and 345 linear feet of permanent stream impacts (50 of which are bank stabilization).

Permit Site 16: There is an isolated pond located near the eastern terminus of R-2248E; wetland W115 is located downslope of the pond. An intermittent stream (S103) originates approximately 200 feet downslope of the wetland. The pond will be drained and conveyed under the roadway fill via a 48" RCP before entering the channel of S103 near its origin. Roadway drainage from the west will drain to a dry detention basin south of the roadway and will discharge to S103 through a 4' base lateral ditch. The new roadway and associated slopes will result in 0.03 acre of permanent fill in wetland W115 (total take), and 190 linear feet of permanent stream impacts due to stabilization of the existing, eroded channel.

MORATORIUM

No moratoriums are required by the U.S. Fish and Wildlife Service (USFWS) or were proposed by the North Carolina Wildlife Resources Commission (NCWRC).

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 September 22, 2010 the USFWS lists four federally protected species for Mecklenburg County (Table 3).

The original R-2248E project area was surveyed for federally listed species in 2004. These surveys were updated for the original R-2248E project area, and additional R-2248E areas were added in surveys conducted in 2008. No Michaux's sumac or smooth coneflower plants, or Carolina heelsplitter mussels were found within the R-2248E project area during the survey efforts. One population of Schweinitz's sunflower (EO# 27040) was found in the vicinity of Creek Breeze Road and the proposed location of R-2248E Service Road A. The location of Service Road A and associated cut/fill slopes have been designed to avoid any direct impact to the Schweinitz's sunflower population at this location. To further protect this population throughout construction of the project, the population has been surrounded with orange safety fencing and has been clearly marked on the plans. Upon completion of the project, 50 feet of woven wire fence, centered about the Sunflower population, will be installed to separate the population from the adjacent property lines. USFWS concurrence for this project was received in a letter dated August 25, 2009.

Table 3 – Federally protected species listed for Mecklenburg County.

Scientific Name	Common Name	Federal Status	Habitat Present	Biological Conclusion
Helianthus schweinitzii	Schweinitz's sunflower	E	Yes	May Affect, Not Likely to Adversely Affect
Rhus michauxii	Michaux's sumac	E	Yes	No Effect
Echinacea laevigata	Smooth coneflower	E	Yes	No Effect
Lasmigona decorata	Carolina heelsplitter	E	No	No Effect

E - Endangered

INDIRECT CUMULATIVE IMPACT ANALYSIS

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

An Indirect and Cumulative Effects Assessment (ICE) was prepared for the current project and entitled: *STIP Project R-2248E, I-485 from NC 115 to I-85 North in Mecklenburg County, Indirect Screening and Land Use Scenario Assessment, July 9, 2009.* Copies of this report are available upon request. This report concluded the following:

Indirect and Cumulative Effects to the Human Environment

Land Use/Development

There are three sub-areas identified as probable development areas: the NC 115 interchange area, the Prosperity Church Road interchange area, and the Mallard Creek Road/Odell School Road interchange area. The construction of STIP Project R-2248E has the potential to influence the timing and intensity of planned development within the Future Land Use Study Area.

Further study area development and eventual build-out is likely with or without the project. The project is likely to have the greatest impact on location decisions made by industry, specifically warehousing and distribution related industries. Some of these industries may locate within the study area.

The Prosperity Church Road interchange ICI assessment concluded that development within the ICI study area has preceded the construction of STIP Project R-2248E. Development trends throughout Mecklenburg County would suggest that further infill development in the ICI study area and new development in the areas north of Eastfield Road would continue regardless of whether the proposed interchange at Prosperity Church Road were constructed. However, the ICI concluded that construction of the interchange will inevitably accelerate the timeline for development in these areas.

Commerce

Ultimately, the project is likely to facilitate intrastate and interstate commerce by increasing the efficiency of the I-485 corridor.

Travel Patterns

The completion of the I-485 corridor and associated interchanges will improve traffic flow, reduce congestion, and decrease travel time along the corridor. This will improve access and traffic flow at this interchange and the surrounding access points in and near Charlotte.

Indirect and Cumulative Effects to the Natural Environment

Encroachment-alteration and induced growth effects to natural resources associated with the project are anticipated to be low. Specific impacts to natural resources in the study area are discussed below.

Water Resources

Potential effects to water quality as a result of already planned development will be tempered by existing land use controls and development regulations covering watershed protection, stream buffers, erosion and sedimentation control, and postconstruction runoff. Given the minimal indirect effects of the project, any contribution of the project to cumulative effects resulting from current and planned development patterns should be minimal. For these reasons, potential indirect and cumulative effects to downstream water quality should be minimal.

Wetlands
Unavoidable direct wetland impacts will be mitigated and efforts will be made to replace wetlands in-kind within the same watershed as the impacted site. Increased development is expected because of current development trends and could possibly result in negative impacts to study area wetlands. Development induced specifically by this project is likely to have minimal effects on wetlands.

CULTURAL RESOURCES

Historical Structures:
This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, and implemented by the Advisory Council on Historic Preservation's Regulations for Compliance with Section 106, codified at 36 CFR Part 800. Section 106 requires Federal agencies to take into account the effect of their undertakings (federally-funded, licensed, or permitted) on properties included in or eligible for inclusion in the National Register of Historic Places (NRHP) and to afford the Advisory Council a reasonable opportunity to comment on such undertakings.

NCDOT conducted a Historic Property Survey in 2004 and determined that the following properties are eligible for National Register Listing:

- Filling Station #2 (MK 1542)
- Bethesda School (MK 2325)
- Oehler Log House (MK 2496)
- Edgewood Plantation (MK 1541)

In September 2004 NCDOT, NCHPO, and FHWA concurred with the following finding of effects:

- Filling Station #2 (MK 1542)-No Adverse Effect
- Bethesda School (MK 2325) -No Adverse Effect with Landscape Commitments
- Oehler Log House (MK 2496)-No Adverse Effect

Since that time Bethesda School has been relocated to Rural Hall, outside the APE, and Filling Station #2 has been destroyed.

Edgewood Plantation is a Local Landmark. In October 2010 NCDOT, NCHPO, and FHWA concurred that this project will have no adverse effect on the property. However since it is designated a Local Landmark, NCDOT must obtain a Certificate of Appropriateness (COA) from the Charlotte-Mecklenburg Historic Landmarks Commission prior to construction. NCDOT awaits ROW to contact the property owners prior to submission of a COA application to the landmarks commission.

Archaeology:
Per a memo sent from the North Carolina Department of Cultural Resources (dated July 21, 2006), they conducted a review of the proposed undertaking and are aware of no historic resources which would be affected by the project.

In the course of construction, all construction inspectors will have the responsibility to monitor the project area for potential archaeological remains throughout the construction

process. If potential archaeological remains (such as foundations, fireplaces, bones, stone tools, pottery, etc.) are identified, the inspector will immediately notify the Construction Supervisor (CS) who will immediately halt work in the vicinity of the potential find. At this point, the CS will notify the NCDOT and the North Carolina Office of State Archaeology (NCOSA) to determine the appropriate course of action, as per the requirements of Section 106 of the National Historic Preservation Act.

SECTION 4(f)

Section 4(f) and *de minimis*

Section 4(f) of the Department of Transportation Act of 1966, as amended, (23 U.S.C. 138) states that the U.S. Department of Transportation "may not approve the use of land from a significant publicly-owned park, recreation area, or wildlife and waterfowl refuge, or any significant historic site unless a determination is made that: (i) there is no feasible and prudent alternative to the use of land from the property; and (ii) the action includes all possible planning to minimize harm to the property resulting from such use." For Section 4(f), a "use" is defined as one of the following:

- Direct use – property is permanently incorporated into the right-of-way of the transportation project;
- Temporary use – property is temporarily occupied in a way that is adverse to the property's purpose; or
- Constructive use – a use that occurs when the "the transportation project does not incorporate land from a Section 4(f) property, but the project's proximity impacts are so severe that the property activities, features, or attributes that qualify the property for protection under Section 4(f) are substantially impaired. Substantial impairment occurs only when the protected activities, features, or attributes of the property are substantially diminished." (23 CFR 774.15(a)).

In 2005, Congress amended Section 4(f) in its passage of the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU), specifically in Section 6009(a). An important change was the introduction of the *de minimis* procedures for processing minor impacts to Section 4(f) resources. Subsequent to the passage of SAFETEALU, FHWA amended the Section 4(f) regulations (23 CFR 774.3(b), 23 CFR 774.5(b) and 23 CFR 774.17) and issued guidance for determining *de minimis* findings (*Guidance for Determining de minimis Impacts for Section 4(f) Resources)*. Based on these regulations and guidance documents, the use of land from a publicly-owned park, recreation area, or wildlife and waterfowl refuge may be determined to be *de minimis* if:

1. The transportation use of the park, together with any impact, avoidance, minimization, and mitigation or enhancement measures do not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f).
2. The official(s) with jurisdiction over the property is informed of FHWA's intent to make the *de minimis* impact finding, based on his/her written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f).

3. The public has been afforded an opportunity to review and comment on the effects of the project on the proposed activities, features, and attributes of the Section 4(f) resource.

According to the provisions set forth in Section 6009(a) of SAFETEA-LU, once the US Department of Transportation determines that a transportation use of property from a Section 4(f) resource constitutes a *de minimis* impact, analysis of avoidance alternatives is not required and the Section 4(f) evaluation process is complete.

Potential Section 4(f) resources were identified within the *Future Land Use Study Area* of the document entitled *STIP Project R-2248E, I-485 from NC 115 to I-85 North in Mecklenburg County, Indirect Screening and Land Use Scenario Assessment, July 9, 2009.* These resources were subsequently evaluated for Section 4(f) applicability. It was concluded that the proposed 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 90-542, 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 full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

Avoidance and Minimization:
NCDOT has avoided impacting many wetlands and streams and reduced impacts to wetlands and streams to the greatest extent practicable. Wetland impacts have been kept to a minimum by avoiding ditching and channelization through wetlands where possible. Existing drainage patterns to the wetlands have been kept to maintain the hydrology feeding the wetlands. Other specific examples of avoidance and minimization measures are listed below.

Avoidance and Minimization Measures used throughout the project:

- Rip rap will be used for stream bank stabilization at outfalls. Where the channel is wide enough that keyed-in rip rap bank stabilization can be utilized it will be used in order to maintain a natural stream bottom. In streams where the base width is too narrow, rip rap will also be placed in the stream bed.

- Energy dissipators will be utilized to diffuse the concentrated flow from storm drain outlet pipes into non-erosive sheet flow to surrounding wetlands.
- Pavement runoffs will be treated through roadside grass swales, median swales, lateral swales, tail swales or existing natural swale before entering wetlands with non erosive sheet flow (see SMP) .
- Grass swales will also be utilized in multiple locations (see SMP) to reduce water velocity, promote infiltration and provide treatment for discharge before runoff enters streams. A total of 60, 220 LF of grass swale treatment will be utilized in this project.
- Sixteen dry detention basins will be used to attenuate peak flow rates into receiving waters. Total detention storage volume for the project is 7.57 AC-FT.
- Several pipe culverts will utilize junction boxes in order to provide flatter pipe slopes to dissipate energy and provide a non-erosive outlet velocity to the stream bed and bank.
- Where possible, grade was adjusted in final design and 2:1 fill slopes were utilized to minimize impacts to wetlands.

Avoidance and Minimization Measures used for individual sites:

- Sites 1 and 2 - Three dry detention basins will be used to attenuate peak flow rates into receiving waters.
- Site 4 - Due to the hydrologic connectivity between the pond and riparian wetland at Site 4, a 1.75:1 reinforced fill slope will be used adjacent to the pond to avoid the need for temporarily draining the pond. Lateral ditches through the wetlands on the south side of the roadway were eliminated by the addition of a junction box in the stormwater system, reduction in pipe slope, and use of a natural rock energy dissipater to reduce outlet velocity sufficiently to allow for sheet flow into the wetland.
- Site 7- Two dry detention basins will be used to attenuate peak flow rates into receiving waters.
- Site 8 - Three dry detention basins will be used to attenuate peak flow rates into receiving waters.
- Site 9 - One dry detention basin will be used to attenuate peak flow rates into receiving waters.
- Site 10 - One dry detention basin will be used to attenuate peak flow rates into receiving waters.
- Site 11 - The current design eliminated the need for a ramp located south of the current -L- line, and reduced impacts to Stream 18, and Wetland WBA, while eliminating impacts to Wetland 108.
- Site 12 - The current design lowered the grade and shifted the alignment of the -Y22- to the north. This shift allowed more acreage of WBA to be retained, south of the -Y22- embankment, and allowed for the use of a 2:1 grassed fill slope in this area instead of the 1.5:1 rip rapped slope in the previous design. Two 36-inch equalizer pipes were also added under the embankment in this area to ensure hydrologic connectivity between the portions of Wetland WBA located on the northern and southern side of the bridge and roadway at this location.
- Site 13 - A 18" RCP will be installed at the location of wetland WL to serve as an amphibian crossing under the new intersection of Ridge Road and Beard Road.

Special roadway cut ditch grades were utilized on the north side of -Y20- to avoid additional encroachment to the Conservancy Site.

- Sites 12, 13, 14 - The Single Point Urban Interchange (SPUI) at this location was changed to a Diverging Diamond Interchange (DDI). This resulted in a reduced footprint for the interchange, including a reduction of stream and wetland impacts at this location. Two dry detention basins will be used at this location to attenuate peak flow rates into receiving waters.
- Site 14 - A low-flow sill in one barrel of the 2 @ 7' x 8' RCBC will be used to simulate natural stream width.
- Site 15 - One dry detention basin will be used to attenuate peak flow rates into receiving waters.
- Site 16 - Additional ROW was purchased to accommodate a dry detention basin to the right of the -L- line at this site.

Compensation:

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. This project will permanently impact 7.30 acres of wetlands (0.66 acre in Catawba River Basin, 6.64 acres in Yadkin River Basin) and temporarily impact 0.05 acre of wetlands (Yadkin River Basin). This project will also permanently impact 8,156 linear feet of streams (899 feet Catawba River Basin, 7,257 feet Yadkin River Basin), and temporarily impact 0.08 acre (Yadkin River Basin) of streams.

Of the 7.30 acres of permanent wetlands impacts, impacts to 0.48 acre were previously permitted and mitigated under project R-2248D (Catawba River Basin). The NCDOT does not propose mitigation for previously mitigated impacts or temporary impacts.

- Total wetlands impacts = 7.30 acres
- Previously mitigated wetlands impacts = 0.48 acre

Of the 8,156 linear feet of stream impacts, 348 linear feet were previously permitted and mitigated for under project R-2248D (Catawba River Basin), and 407 linear feet are impacts from bank stabilization on several streams. The NCDWQ requires that any bank stabilization impact be mitigated for a 1:1 ratio if the total permanent impact at the site is over 150 linear feet. However, the 2:1 mitigation ratio will exceed the amount of 1:1 mitigation NCDWQ requires for this impact.

- Total stream impacts = 8,156 linear feet
- Previously mitigated stream impacts = 348 linear feet
- Bank stabilization impacts = 407 linear feet
- Culvert removal, stream daylighting = 50 linear feet

Therefore, the total impacts requiring mitigation are 6.81 acres of wetlands and 7,351 linear feet of stream. Mitigation for these impacts will be provided by EEP (see attached mitigation acceptance letter).

PROJECT SCHEDULE

R-2248E calls for construction to start during Summer 2011, with anticipated completion December 2014. This application provides final design and impacts for the project.

REGULATORY APPROVALS

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

Section 401: We are hereby requesting a 401 Water Quality Certification from the N. C. Division of Water Quality. We are providing five (5) copies of this application to the NCDWQ for their review and approval.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Michael Turchy at maturchy@ncdot.gov or (919) 707-6157. A copy of this permit application and its distribution list will be posted on the NCDOT website at http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html.

Sincerely,

E. L. Lusk

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

cc:
NCDOT Permit Application Standard Distribution List

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires December 31, 2004

Public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes 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 this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. 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

Authority: Rivers and Harbors Act, Section 10, 33 USC 403: Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. 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. 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 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 COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME North Carolina Department of Transportation Project Development & Environmental Analysis	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
6. APPLICANT'S ADDRESS 1548 Mail Service Center Raleigh, NC 27699-1548	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOs. W/AREA CODE a. Residence b. Business 919-707-6157	10. AGENT'S PHONE NOs. W/AREA CODE a. Residence b. Business

11. **STATEMENT OF AUTHORIZATION**

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.

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions)
R-2248E

13. NAME OF WATERBODY, IF KNOWN (if applicable)
UT's to Dixon Branch, UT's to Clarks Creek,
UT's to Stony Creek, and UT's to Rocky River

14. PROJECT STREET ADDRESS (if applicable)

15. LOCATION OF PROJECT

Mecklenburg — COUNTY
NC — STATE

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **Section, Township, Range, Lat/Lon, and/or Accessors's Parcel Number, for example.**

17. DIRECTIONS TO THE SITE
Please see attached vicinity map and cover letter.

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

STIP Project R-2248E is a proposed new location freeway (I-485) between NC 115 and I-85 in Mecklenburg County. The proposed project is approximately 5.1 miles in length and is the final new location segment for the planned I-485 urban loop around the City of Charlotte.

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

The primary purpose of STIP R-2248E is to complete the Charlotte Outer Loop. Once completed, STIP Project R-2248E in conjunction with STIP Project R-2123CE (I-85/I-485 interchange modification), will provide a high-speed, freeway connection between I-77 and I-85 in Northern Mecklenburg County.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Impacts will result from constructing new location freeway and associated shoulders, new interchanges and ramps, hydraulic structures, and three new bridges.

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

See attached cover letter.

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

See attached cover letter.

23. Is Any Portion of the Work Already Complete? Yes ___ No _X_ IF YES, DESCRIBE THE COMPLETED WORK

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

Please see adjacent property landowners page in the permit drawing package.

25. List of Other Certifications 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

26. Application is hereby made for a permit or permits to authorize the work described in this application. I certify that the 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. Lusk for Gregory J. Thorpe, PhD April 27, 2011

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 Enhancement PROGRAM

April 21, 2011

Mr. Greg Thorpe, Ph.D.
Environmental Management Director
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Mr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

R-2248E, I-485 (Charlotte Outer Loop) from NC 115 to I-85 North of Charlotte, Mecklenburg County; Catawba and Yadkin River Basins

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 unavoidable impact associated with the above referenced project. Based on the information supplied by you on April 15, 2011, the impacts are located in CU 03050101 of the Catawba River Basin and 03040105 of the Yadkin River Basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

IMPACTS / MITIGATION UNITS	Stream			Wetlands			Buffer	
	Cold	Cool	Warm	RW	NRW	CM	Zone 1	Zone 2
Impacts - Catawba 03050101 (SP)			551	0.17				
Mitigation Units Catawba 03050101 (up to 2:1)			1,102	0.34				
Impacts - Yadkin 03040105 (SP)			6,800	6.22	0.42			
Mitigation Units - Yadkin 03040105 (up to 2:1)			13,600	13.28				
Impacts – Total Project			7,351	6.39	0.42			
Mitigation Units – Total Project (up to 2:1)			14,702	13.62				

This mitigation acceptance letter replaces the mitigation acceptance letter issued on March 29, 2010. EEP understand this project will be completed under the Design Build process and additional impact information may be forthcoming. In accordance with the directive from the February 8, 2011 IRT meeting, non-riparian wetland impacts located in the mountains and piedmont areas of North Carolina will be accepted as requested but mitigated utilizing riparian wetland mitigation credits. EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project 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 919-715-1929.

Sincerely,

James B. Stanfill for

William D. Gilmore, P.E.
EEP Director

cc: Ms. Liz Hair, USACE – Asheville Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
File: R-2248E Revised

Minutes of the Interagency 30% Hydraulic Design Review "4B-Revisited" Meeting October 13, 2010

R-2248E

State Project 34410.3.GV2
F.A. Project No. NHF-04GS(27)
I-485 (Charlotte Outer Loop) From East of I-77 to West I-85

Team Members:
Liz Hair, USACE (present)
Marella Buncick, USFWS (present via phone)
Marla Chambers, NCWRC (present)
Polly Lespinasse, NCDWQ (present)
Chris Militscher, USEPA (present)
Renee Gledhill-Early, DCR/SHPO (present)

Participants:
Jay Twisdale, NCDOT Hydraulics
Michael Turchy, NCDOT (NEU)
Elizabeth Lusk, NCDOT (NEU)
Rodger Rochelle, NCDOT (TPMU)
Timothy McFadden, NCDOT (TPMU)
Rick Baucom, NCDOT (Div-10)
Larry Thompson, NCDOT (Div-10)
Gary Eudy, NCDOT (Div-10)
Brian Webb, Blythe Construction
Tom Harris, WSA (Structures)
Stephanie Roten, WSA
Ben Laseter, Fish and Wildlife Assoc. (Permitting)
Max Price, WEI (Hydraulics)
Shannon Irwin, WEI (Hydraulics)

A 2nd 30% Hydraulic Design "4B" (or 4B-Revisited) Meeting was held on Tuesday, October 13, 2010 in the Board Room in the NCDOT Highway Building, Raleigh.

Max Price began the meeting by requesting that if there were no objections that instead of the usual practice of going through the project page by page from the beginning to the end, he would prefer to cover the areas of the project that had changed since the previous 4B meeting held on 7/25/07. There were no objections.

Sheet 20: The previous design consisted of a Single Point Urban Interchange (SPUI) at this location. The current design has been changed to a Diverging Diamond Interchange (DDI). The result of this change resulted in a reduced footprint for the interchange which reduced impacts in this area.

In quadrant D of the interchange the impact to Stream 19 (left of -RPDY22- Sta. 24+50+/-) was reduced by approximately 105 feet. Wetland Q at this location would be a total take in the current and the previous design.

In quadrants C and D of the interchange the proposed stormwater detention basins and their Built upon areas and storage volumes were pointed out.

Sheet 19: The previous interchange design required a ramp –RPCY22- which was located approx. 280' south of the current –L- line. The proposed design eliminated this ramp and reduced the impact to Stream 18 (right of –L- Sta. 1463+50) by approximately 177 feet. Impacts of 0.036 acres to Wetland 108 at this location were also avoided. Right of –L- Sta. 1475+00 impacts to wetland WBA were also avoided.

Sheet 33: In the previous design the –Y22- bridge crossing over Stony Fork Creek Tributary (Stream 11) was lengthened from the from the 2A meeting preliminary estimate length of 265 feet to 374 feet. With the previous design the bridge length was controlled by the FEMA floodway width, which is part of the detailed flood study. The fill slope in the wetlands to the right of –Y22- was a 1.5 to 1 rip rapped fill in order to minimize the encroachment into the FEMA floodway.

In the current design our team was able to lower the grade of –Y22- by approximately 10 feet, and shift the alignment of –Y22- to the northwest and away from the stream on the right by approximately 35 feet.

Our design replaces the existing arch pipe crossing on Mallard Creek Road downstream of –Y22- with a 2@ 7' X 8' RCBC. This structure is currently overtopped by the 100 year flood event. The proposed box culvert will not overtop in the 100 year flood event and will keep the access to a nearby subdivision open during that storm event.

As a result of the lower headwater from the replacement of the arch pipe, the lower grade and shift of –Y22-, our design is able to shorten the –Y22- bridge length to 250 feet and still satisfy the FEMA requirements. The current design also includes two 36 inch RCP equalizer pipes to the north of the proposed bridge.

The change in wetland impacts to Wetland WBA will be an increase of 0.103 acres over the impacts from the previous 374 foot bridge design.

Marla Chambers expressed a concern that this was going in the opposite direction of avoidance and minimization and that the current design was impacting more wetlands than were impacted to start with. Max Price explained that the design did provide avoidance and minimization when compared to the original 265 bridge and that the 0.103 increases in impacts were in comparison to the 374 foot bridge.

Marla Chambers ask how large that wetland is currently. The acreage was not know at that time but has since been determined to be 5.369 acres. Max Price commented that the wetland was now larger than what was on the plans at the previous 4B meeting, and that beaver activity was present at the site.

Marla Chambers inquired as to what the wetland rating was. Michael Turchy replied that the DWQ rating was 91 from the wetland rating worksheet from 8/19/2004.

Polly Lespinasse asked could the fill slope be steepened to a 1.5 to 1 rip rapped slope, and how high the fill was. Max Price replied that a 1.5 to 1 rip rapped slope would eliminate the 0.103 acres of wetland impact. The fill height in this vicinity is 30 to 35 feet. It was stated by Polly and Max that the grassed slope was preferred over the rip rapped slope.

Chris Militscher asks what the current design's total impact to Wetland WBA was. Max Price replied that the total impact to Wetland WBA was 1.45 acres with the previous 374 foot bridge, and is 1.553 acres with the current design.

Chris Militscher ask how much wetland was left on each side of the embankment and expressed a concern that if to small an area on either side of the embankment was left that the hydraulic conductivity could be compromised. Max Price explained that the shift in the embankment away from the stream, and the lowering of the grade will provide more area (+/- 50 feet wider) of wetland on the southeast side between the embankment and the stream than the previous design.

Marella Buncick ask for clarification on the above discussions "without hand motions" since she was participating by telephone. Max Price attempted to describe the improved condition.

Marla Chambers ask what the cost savings was between the previous 374 foot bridge and the current 250 foot bridge and how did that compare to wetland mitigation cost. It was determined that 174 feet of dual bridges would be $ 1.25 million+/-. The mitigation for 0.1 acres would be $6000+/-.

Sheet 12: Wetland J to the left of –L- Station 1365+50 in the previous design was partially avoided by using 2:1 fill slope on –WBFR-. The discussion about this site was to determine if Wetland J would have been considered a total take in the previous design since it was inside the interchange and because the offsite hydrology had been eliminated. It was determined that it should be considered a total take in the previous and present designs.

The proposed stormwater detention basin right of –L- Sta. 1357+50, it's built upon area and storage volume was pointed out and discussed as to how it should offset the loss of Wetland J's stormwater treatment function.

The 84" RCP at –L- Sta. 1354+35 that was previously an 8' X 8' RCBC was discussed. The original 8' X8' RCBC was required in order to be able to bring the 60" RCP system into it. The current design removes 17.75 acres of drainage area from the 84" pipe and directs it to the proposed storm water detention basin. This reduction in drainage area, and the use junction boxes allowed the 8' X8' RCBC to be replaced with the 84" RCP while still maintaining a similar outlet condition.

Sheets 14, 15, 16: As a result of the requirement to provide provision for a future road by the City of Charlotte that will connect Johnston Oehler Road south of the project to Ridge Road north of the project, changes to the design occurred on these pages. In order to provide alternates for future location of this road, our team chose to raise -SERVA- grade so that the future road could go over –L- instead of under it. In order for the future road to go under –L-, bridges would have to be constructed during this project and their location would have eliminated future alternative road locations.

The result of the change in grade of –SERVA- was approximately 90 feet of additional stream impact to Stream 11, left of –SERVA- Sta. 21+00. And approximately 80 feet of additional stream impact to Stream 15 left of –SERVA- Sta. 28+50. The higher grade of –SERVA-resulted in a change in the location of the proposed 8'X 9' RCBC under –SERVA- Sta. 16+30 +/-. The bend in the RCBC will most likely be eliminated in final design.

Chris Militscher expressed his concern with increasing jurisdictional impacts with a change in design to accommodate a future project which may have not been addressed in the NEPA document, and may or may not ever be built or funded. With that being said he stated that he was ok with the change since the overall project stream impacts were less than originally proposed.

Rodger Rochelle offered the additional information that the City of Charlotte has funding for the construction of dual bridges on the -L- line and that they are anticipating using that funding very quickly to construct this overpass. There is currently discussion as to environmental consultation that will be need for the future road.

Liz Hair stated that from the USACE perspective that she agreed with Chris and that she would request as much documentation as could be provided.

Rodger Rochelle replied that it is conceivable that if the environmental documentation process can be handled to meet federal guidelines and the public involvement can be done that the road can be built as part of this project.

Sheet 11: Gary Eudy discussed that the City of Charlotte and the Parks and Recreation Department are attempting to come up with a plan to eliminate the pedestrian tunnel and combine the two streams into one bridge crossing and are trying to find funding.

Sheet 8: The discussion on this page centered on the lateral ditches through Wetland N, Stream 5, and the 84 inch RCP at –L- Sta. 1298+00. At the time of the previous design Wetland N was considerably smaller and was located entirely under the proposed fill. Based on the steep topography at the site it will be difficult to eliminate the lateral ditches and avoid possible erosion along the proposed toe of fills.

After discussing the site it was agreed upon that it should be possible to eliminate the lateral ditch right of –L Sta. to the outlet of the pipe by piping the 30 CS pipe to a junction box on the 84 inch RCP. The addition of this junction box should also allow improvement to the outlet condition of the 84 inch pipe by a reduction in the pipe slope for the last section of the pipe, a better outlet angle in relation to the receiving channel, and by dissipation of energy in the junction box. It was also discussed that it may be possible to construct a natural rock energy dissipater at the outlet end of the 42 inch pipe right of –L- Sta. 1301+50 and reduce the outlet velocity sufficiently to allow for a sheet flow into Wetland N right of –L- Sta. 1300+50. Both of these options will be further assessed during final hydraulic design. It may not be practical to eliminate the lateral ditches left of –L- due to the steep topography; however this will be looked at further also during final design.

As requested by Liz Hair, and Polly Lespinasse at the close of the meeting, attached is a table of wetland and stream impact comparisons between previous and current designs.

Final Minutes of the Interagency Hydraulic Design Review "4C" Meeting March 9, 2011

R-2248E

State Project 34410.3.GV2
F.A. Project No. NHF-04GS(27)
I-485 (Charlotte Outer Loop) From East of I-77 to West I-85

Team Members:
Liz Hair,USACE (absent)
Marella Buncick, USFWS (present)
Marla Chambers, NCWRC (present)
Polly Lespinasse, NCDWQ (present)
Chris Militscher, USEPA (present)
Donnie Brew, FHWA

Participants:
Jay Twisdale, NCDOT Hydraulics
Michael Turchy, NCDOT (NEU)
Elizabeth Lusk, NCDOT (NEU)
Carla Dagnino, NCDOT (NEU)
Timothy McFadden, NCDOT (TPMU)
Laura Sutton, NCDOT (TPMU)
Jamal Alavi, NCDOT (TPMU)
Eric Hunter, NCDOT (Div-10)
Mark Staley, NCDOT (Div-10)
LeAnna Young, NCDOT (Utilities)
Brian Webb, Blythe Construction
Wayne Ramsey, Blythe Construction
Tom Harris, WSA (Structures)
Stephanie Roten, WSA
David Wilver, WSA
Ben Laseter, Fish and Wildlife Assoc. (Permitting)
Max Price, WEI (Hydraulics)
Joe Dudeck, WEI (Hydraulics)

A Hydraulic Design "4C" Meeting was held on Wednesday, March 9, 2011 in the Hydraulics Conference Room in the NCDOT Century Center, Raleigh.

Max Price began the meeting at 10:30am.

Donnie Brew noted that Liz Hair, USACE was not present, and asked if anyone knew if she was planning on attending. It was stated that she had a conflict and was not going to attend. Max Price asked if this was going to be a problem. Donnie Brew asked had anyone received any comments from Liz Hair on the 4C information that was sent out prior to the meeting. No one stated that they had received any comments prior to the meeting. It was also noted that Marla Chambers NCWRC was also not present. Jay Twisdale went to call and see if Marla was planning on attending, she joined the meeting around 11am.

Sheet 6, 6A, 7 (Sites 1 & 2):
It was noted portions of the stream and wetland impacts which were permitted and mitigated for with previous R-2248 D project are now being constructed under this project. Chris Militscher wanted to know the difference in impacts from the previous R-2248 D project. Max Price explained that the wetlands delineations had changed since the previous R-2248 D permit. It was explained that the Wetland Permit Impact Summary Table shows the wetland and stream impacts for previous R-2248D project with *** 25, 26, 27 and 28 as the site numbers with negative values on the table. It was pointed out that the R-2248 E impact values are the impact as currently delineated.

The two dry detention basins that will attenuate flow resulting from the increase in impervious area were discussed.

Polly Lespinasse expressed the possible need of a spring box in the wetland under roadway fill. If during project construction springs are discovered in the wetland locations spring boxes and the associated pipe will be installed.

Rip rap stream bank stabilization at outfalls was discussed. Everywhere the channel is wide enough that keyed in rip rap bank stabilization can be utilized it will be used in order to maintain a natural stream bottom. In streams where the base width is too narrow, rip rap will be placed in the bed also. Details have now been included in the permit package to help in identification of these locations.

Sheet 7, 7A (Site 3):
The dry detention basin that is part of the storm drain system draining to the outfall in Site 2 was discussed. It was pointed out that the drainage design is not conventional in order to direct as much flow as possible to the detention basins.

Marella Buncick asks Max Price about the pre and post flow at outlet of site 2. Max explained the increase in flow and stressed why it is important to have the detention basins that have been designed on this project.

Chris Militscher asks about the ten year flow at the outlet of Site 2. This information as well as the expected outlet velocities was discussed.

Marella and Polly inquired as to whether the rip rap at outlet of Site 2 was accounted for in permanent impacts. The rip rap has been accounted for and it was pointed out that the stream width was not wide enough to avoid placing rip rap in the bed.

Polly Lespinasse- pointed out that the short section of stream 3.5 remaining above the rip rapped lateral ditch be shown as a permanent impact. This has now been included in the impact table.

Marella Buncick asked to make sure the outlet protection is sufficient length to avoid erosion even if that means additional impacts. The rip rap has now been extended 15 feet and the impact accounted for in the summary table.

Polly Lespinasse pointed out that a portion of the wetland boundary line at Site 3 does not show up. Michael Turchy said that he will look into the file. Polly also asked about the slope of this cross pipe at permit Site 3 and noted that class I rip rap should be used for bank stabilization. Max stated that the pipe matched the existing bed slope and would be buried.

Sheet 8 (Site4):
Max Price discussed the existing pond at the North quadrant of permit Site 4 is not being drained. He also pointed out that that a 1.75:1 reinforced fill slope was being used adjacent to the pond to avoid the need for temporarily draining the pond. The elimination of the lateral ditches on the downstream side of the project that were recommended during the 4B meeting was discussed. Max pointed out that the lateral ditch on upstream side of the project could not be eliminated due to the amount of offsite drainage area and the steepness of the terrain.

Polly Lespinasse pointed out that the label for the outlet rip rap should show class I rip rap. Polly also discussed that a downstream property owner in the cul-de-sac having concerns about the beaver dams causing this wetland and worried about their property flooding. Max stated he did not feel the concerns were an issue due to the fact that the property was +/- 8 feet above the stream bed. The rip rap label has now been corrected to show Class I rip rap.

Polly Lespinasse requested that bank stabilization be added to the inlet end of the 84" pipe at Site 4. This has now been added to the plans and details provided.

Sheet 11, 12 (Site 5 &6):
Marla Chambers asked about the stream name. Max Price responded that Site 5 was an unnamed tributary to Clarks Creek and that Site 6 was Clarks Creek.

Polly Lespinasse asked that coir fiber matting be added to the inlet channel detail for both the culverts at permit Site 5 and 6. This has been added to the plans and details provided.

Marla Chambers asked about the possibility of this area being bridged as discussed in the 4B meeting. Max Price responded that as of now this would be the design but that the City of Charlotte was looking into the funding and the design may still change in the future but it appeared unlikely.

Polly Lespinasse asked about the temporary impacts at permit Sites 5 and 6. Max Price responded that they were- due to the need for temporary diversions to construct the culverts in the dry. He also pointed out that this was the case for all pipes that are 48" and greater.

Marla Chambers asked about the possibility of placing baffles within the long culvert at permit Site 5. This had previously been discussed at the original 4B meeting. It was pointed out that the culvert has a proposed slope of 1.37% and- Jay Twisdale pointed that the culvert will be buried. No final consensus was reached.

Marla Chambers asked about the size of the stream at permit Site 5. Max Price responded that the existing channel was 12 foot top of bank to top of bank, 4 to 5 foot base, 4 feet deep.

Sheet 12, 12A, 12B (Site 7):
Chris Mililtscher asked about what portion of the spit diamond interchange was in the fill versus cut. Max Price responded with locations.

Polly Lespinasse inquired about storm drain design and how water gets to outfall for Site 7. Max Price explained system layout and location of 2 detention basins.

Sheet 13, 13A, 13B (Site 8):
Max Price explained storm drainage layout and location of 2 detention basins, and pointed out the 3 ponds that are being filled.

Sheet 14 (Site 8):
Polly Lespinasse asks if the small stream draining from the wetland in the middle of the page toward the entrance of the proposed box culvert is a jurisdictional stream. Max Price stated that it is not.

Marla Chambers asks about the stream name at permit Site 8. Max Price explains this is an unnamed Tributary to Stony Creek. Marla expressed a concern that the state had- listed mussels found on a Stony Creek. Marla also expressed interest in knowing if the stream had been surveyed for endangered fish here. Marella Buncick explained that this stream had been surveyed during previous studies. Mussels were found at a downstream project (Proposed I- 85 interchange). Marella explained that if mussels were found in waters downstream that the survey would have continued upstream until no signs of the species were found. Marella goes on to explain that the stream area has been surveyed many times. Michael Turchy provided Marla with a copy of the survey information.

Sheet 15 & 16 (Site 9& 10):
Max pointed out the beginning of jurisdiction streams left of Service Road A, class I rip rap bank stabilization, and location of 2 proposed detention basins.

Sheet 19 (Site 11):
Polly Lespinasse asked why drainage at permit Site 11 is discharging at upstream side of bridge instead of downstream. Max Price and Jay Twisdale explained that it is due to the steep topography at the downstream side of the bridge. The upstream side has flatter topography and thus the outfall is easier to stabilize.

Polly Lespinasse asked why the 54" cross pipe did not have impacts. Max Price explained that this is not a jurisdictional stream.

Polly Lespinasse asked to include existing pond impacts to permits. Max Price agreed that this should be added to impacts. It has now been added.

Sheet 20, 20A, 33 (Site 12):
-Polly Lespinasse asked what size of rock will be used in the energy dissipater at Site 12. Max Price replied that detail M22 shows native stone or shot rock, approximately. 0.75 feet to 2.0 feet in size and angular, with an approximate d50 size of 1.0 feet.

Marla Chambers asked if the final bridge length at permit Site 12 will be 250 feet and where the bents will be located. Max Price explained the bridge spans, bents, splash pads, and the work bridge that would be required.

Sheet 20, 20B, 31 and 34 (Site 13):
-Polly Lespinasse wanted to know if the Army Corps concurred that these were isolated wetlands at Site 13. Michael Turchy confirmed that these were isolated wetlands. On sheet 34 Max pointed out that the jurisdictional stream begins just below the rip rap outlet protection for the 36" pipe under –CONN-.

Sheet 20, 20C, 33: (Site 14)
Max Price explained the drainage design and dry detention basin location at this site. Polly Lespinasse inquired as to why the energy dissipater in the stream at the pipe outlet was required, and why there was an opening in the cross pipe between the –L- line and –RPDY22-. Max explained that the energy dissipater was required to reduce the outlet velocity because the slope of the pipe. He also explained that the opening in the cross pipe was required to provide an emergency spillway outlet for the dry detention basin during flood events.

Polly Lespinasse asked if the proposed 2 @ 7' X 8' had low flow sills and a low flow bench in the inlet and outlet channel. Max Price responded by saying that the inlet and outlet channel has a low flow bench and in the left barrel (looking down stream). Polly asked that the coir fiber matting be utilized on the channel and benches where rip rap was not called for in order to stabilize them until vegetation is established. The detail has been changed to include the coir fiber matting.

Sheet 35 (Site 15):
Max Price pointed out that a dry detention basin has been designed to the right of –Y22- at this site to attenuate the increase in flow that results from the additional impervious area draining to this site. Class I rip rap outlet protection has been used for bank stabilization.

Polly Lespinasse wanted to know if the two streams at Site 15 still confluence at the same point as before. Max Price responded that the streams have the same confluence and that the proposed 72" pipe and the 48" pipe will share the same headwall on the downstream end.

Sheet 22 (Site 16):
Max Price pointed out that the pond to the left of –L- at this site will be drained. And that a dry detention basin has been designed right of –L- to attenuate the increase in flow that results from the additional impervious area draining to this site. He pointed out that the existing stream at the outfall has only a 3 foot base so bank stabilization on the banks only was not possible.

At the end of the meeting Carla Dagnino asked what the Design Build Teams expectation/schedule was for obtaining the permit. Please see the following time table for permit acquisition.

4C Meeting	09-Mar-11
Submit Meeting Minutes to Agencies for review/comment	14-Mar-11
Agency Meeting Minutes Review Complete	18-Mar-11
Revisions/Details to Permit Drawings /Plans/Forms Complete	25-Mar-11
Submit Permit Application Package to Agencies	28-Mar-11
Agency Review (90 calendar days)	26-Jun-11
Observed Holidays (Memorial Day/Good Friday)	28-Jun-11
Permit Granted	29-Jun-11

Highway Stormwater Program
Released: July 2010 (DRAFT)

North Carolina Department of Transportation
Highway Stormwater Program
STORMWATER MANAGEMENT PLAN

Version 1.1

Page of

General Project Information

Project No.:	R-2248E 34410.3GV2		Date:	12/29/2010			
City/Town:	Concord		Designer:				
County(ies):	Mecklenburg County		Project Manager:	Max Price PE			
River Basin(s):	Yadkin-Pee Dee		CAMA County?	no	TVA County?	no	
Primary Receiving Water:	Clarks Creek & Stony Fork Creek Trib.		NCDWQ Stream Index:				
NCDWQ Surface Water Classification for Primary Receiving Water		Primary:	Class C				
		Supplemental:					
Other Stream Classification:							
303(d) Stream?	no	Type(s) of Impairment:					
State Stormwater Permit Required?	no	If yes, why?					
Could the Project Impact Threatened or Endangered Species?			yes				
Description:	Schweinitz's Sunflower population located at the proposed intersection of Creek Breeze Road and Service Road A will be marked with tree protection fence and disturbance of population shall be prohibited, including disturbance by utility relocation/ construction.						
Anadromous Fish Present?	no						
Description:							
Buffer Rules in Effect?	no		Buffer Rules:				

Existing Site

Description of Existing Project Area:	Northwest corner of Mecklenburg County near Cabarrus County line
Average Daily Traffic (existing):	N/A
Existing Cross Section:	N/A
Surrounding Land Use:	Wooded/Residential
General Comments:	

Project Description

Description of Proposed Project:	I-485 (Charlotte Outer Loop) From East of US 21 to West I-85		
Average Daily Traffic (proposed):	79,200 (2011) 161,600 (2035)		
Proposed Cross-Section:	Multi-lane divided highway with grass median		
Interchange Modification:	no	Median Type:	46' grass median
West Terminus:	Exist I-485 at NC 115 Interchange		
East Terminus:	West of I-85		
Project Length (lin. miles/feet):	5.715 miles	Added Impervious Area (ac.):	158 acres
General Comments:	20,250 LF OF GRASS SWALE TREATMENT (DRN-1) 16,230 LF OF GRASS SWALE TREATMENT (DRN-2) 23,740LF OF GRASS SWALE TREATMENT (DRN-3) 60,220 LF OF GRASS SWALE TREATMENT TOTAL PROJECT	EQUIVALENT DEPTH OF WATER FOR OVERALL PROJECT - 0.57 IN TOTAL DETENTION STORAGE VOLUME = 7.57 AC-FT	

Highway Stormwater

Released: July 2010 (DRAFT)

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

Version 1.1

Environmental Summary

Riparian Buffer and Jurisdictional Stream Impacts and Associated SCMs

Station	Stream Name	Stream Type	Jurisdict. Stream	Buffer?	Classific-ation?	Proposed Structure	SCM Type	Checklist Complete?	DA (ac.)	Q_2 (ft^3/s)	Q_{10} (ft^3/s)	WQv^c (ft^3)
21+48 -RP3A- LT.	STREAM 1 UT TO DIXON BRANCH	Intermittent		No	Class C	N/A	dry detention basin	yes	7.6	0.8	8.5	8,966
Sta. 65+85 -Y10- Lt.&Rt.	Stream 4.5 UT to Clarks Creek	Perennial		No	Class C	54" Cl. III RCP	no	no				
14+76 -RP3A- RT.	Stream 4 UT to Dixon Branch	Intermittent		No	Class C	N/A	dry detention basin	yes	4.1	0.4	4.0	9311
19+36 -RP3D- Lt.	Stream 4 UT to Dixon Branch	Intermittent		No	Class C	42" Cl. III RCP	swale	no				
19+47 -RP3D- RT.	Stream 4 UT to Dixon Branch	Intermittent		No	Class C	N/A	dry detention basin	yes	9.9	3.2	15.3	18622
12+18 -RP3D- Lt.	Stream 3 UT to Dixon Branch	Intermittent		No	Class C	60" Cl. III RCP	swale	no				
50+69 -Y10- RT.	Stream 3 UT to Dixon Branch	Intermittent		No	Class C	N/A	dry detention basin	yes	7.0	0.3	0.3	9311
1299+31 -L- Rt.	Stream 5 UT to Clarks Creek	Perennial		No	Class C	84" Cl. V RCP	swale	no				
1341+20 -L- CL	Stream 6 UT to Clarks Creek	Perennial		No	Class C	8'x7' RCBC	no	no				
1345+31 -L- CL	Stream 7 Clarks Creek	Perennial		No	Class C	9'x7' RCBC	no	no				
16+89 RPCY17A RT.	Stream's 8&9 UT to Clarks Creek	Perennial		No	Class C	84" CL. IV RCP, 30" CL. IV RCP & 15" CSP	swale	no				
19+83 RPCY17A LT.	Stream's 8&9 UT to Clarks Creek	Perennial		No	Class C	N/A	dry detention basin	yes	10	3.3	14	14,898
1364+00 -L- RT.	Stream's 8&9 UT to Clarks Creek	Perennial		No	Class C	N/A	dry detention basin	yes	7.2	0.6	4.7	7,242
1374+00 -L- RT.	STREAM 11 UT to Stony Creek	Perennial		No	Class C	N/A	dry detention basin	yes	6.1	0.3	2.4	6,690
1374+00 -L- LT.	STREAM 11 UT to Stony Creek	Perennial		No	Class C	N/A	dry detention basin	yes	4.1	0.2	0.3	4,483
1387+00 -L- RT.	STREAM 11 UT to Stony Creek	Perennial		No	Class C	N/A	dry detention basin	yes	20.3	12.3	21.7	24,140
21+45 -SERVA-	STREAM 11 UT to Stony Creek	Perennial		No	Class C	8' x 7' RCBC, 36" CL. IV RCP	no	no				
24+81 -SERVA- RT.	STREAM 11 UT to Stony Creek	Perennial		No	Class C	N/A	dry detention basin	yes	6	0.1	0.2	2,312
18+49 -RPCY22- LT.	UT to Stony Creek (Stream 11)	Perennial		No	Class C	N/A	dry detention basin	yes	5.9	1.0	5.7	11,725
Sta. 23+23 -Y25- LT. &Rt.	UT to Stony Creek (Stream 11)	Perennial		No	Class C	2 @ 7'x8' RCBC	no	no				
29+34 -SERVA- RT.	STREAM 15 UT TO STONY CREEK	Intermittent		No	Class C	42" Cl. V RCP	no	no				
29+34 -SERVA- RT.	STREAM 15 UT TO STONY CREEK	Intermittent		No	Class C	N/A	dry detention basin	yes	14.4	3.6	16.5	7,500
49+32 -SERVA-	STREAM 16 UT to Stony Creek	Intermittent		No	Class C	60" CL. III RCP	swale	no				
1440+41 -L- Lt.	STREAM 16 UT to Stony Creek	Intermittent		No	Class C	N/A	dry detention basin	yes	35.2	0	3.3	14,939
Sta. 1465+52 -L- Lt.	UT to Stony Creek (Stream 18)	Perennial		No	Class C	66" Cl. III RCP & 18" CSP	swale	no				
Sta. 1471+65 -L- Lt.	UT to Stony Creek (Stream 11)	Perennial		No	Class C	54" Cl. IV RCP	swale	no				
Sta. 1490+28 -L- Rt.	Stream S-101 UT to Stony Creek	Intermittent		No	Class C	24" Cl. III RCP	no	no				
26+53 -RPDY22- RT.	UT to Stony Creek (Stream 19)	Intermittent		No	Class C	N/A	dry detention basin	yes	10.5	0.2	0.2	16,553
Sta. 24+66 -RPDY22- Rt.	UT to Stony Creek (Stream 19)	Intermittent		No	Class C	42" Cl. IV RCP	swale	no				
Sta. 12+73 -Y26- Lt. (See Addl. Comments Section)	UT to Rocky River (Stream 20)	Intermittent		No	Class C	72" CL. IV RCP	no	no				
Sta. 12+73 -Y26- Lt.	UT to Rocky River (Stream 20-2)	Intermittent		No	Class C	48" CL. IV RCP	no	no				
Sta. 86+00 -Y22- Rt.	UT to Rocky River (Stream 20)	Intermittent		No	Class C	N/A	dry detention basin	yes	7.4	4.7	9.6	14,829
1525+00 -L- RT.	STREAM S-103 UT to Stony Creek	Intermittent		No	Class C	N/A	dry detention basin	yes	23.1	42.1	64.5	38,623

General Comments: STATIONS FOR STREAM CROSSING STRUCTURES ARE AT OUTLETS

STATIONS FOR DRY DETENTION BASINS ARE FOR THE CONTROL STRUCTURES

Stream Relocation

Station	Stream Name	Stream Length (ft)	Additional Information
General Comments:			

Jurisdictional Wetlands

Station	Type of Impact	Minimization of Impact
19+40 -RP3D-	Fill in wetlands (Wetland Z)	Adjusted grade in final design and utilized 2:1 fill slopes
13+80 -RP3D-	Fill in wetlands (Wetland AA)	Adjusted grade in final design and utilized 2:1 fill slopes
65+57 -Y10- Lt.	Fill in Wetlands (Wetland AD)	Utilized 2:1 fill slopes
70+79 -L-	Fill in Wetlands (Wetland N)	Adjusted grade in final design and utilized 2:1 fill slopes
Sta. 1343+00 -L- Rt.	Fill in wetlands (Wetland M)	Total Take
Sta. 1357+00 -L- Rt.	Fill in wetlands (Wetland F & G)	Total Take
Sta. 1356+00 -L- Lt.	Fill in wetlands (Wetland H)	Utilized 2:1 fill slopes
Sta. 49+45 -Y17A-	Fill in Wetlands (Wetland I)	Total Take
Sta. 1365+50 -L- Lt.	Fill in wetlands (Wetland J)	Total Take
Sta. 1400+00 -L- Rt.	Fill in wetlands (Wetland B)	Total Take
Sta. 1404+50 -L-	Fill in wetlands (Wetland C)	Total Take
Sta. 1465+56 -L- Rt.	Fill in wetlands (Wetland T)	Total Take
Sta. 60+00 -Y22- Rt.	Fill in wetlands (Wetland W-109)	Total Take
Sta. 57+66 Y22 CL	Fill in Wetlands (Wetland WBA)	Utilized 2:1 fill slopes;Lowered & Shifted Y22 Grade & Alignment
Sta. 23+00 RPDY22	Fill in Wetlands (Wetland Q)	Total Take
Sta. 46+00 Y20 Lt	Fill in Wetlands (Wetland O)	Utilized 2:1 fill slopes
Sta. 70+78 Y22 Lt	Fill in Wetlands (Wetland P)	Utilized 2:1 fill slopes & adjusted grade
Sta. 41+50 Y20	Fill in Wetlands (Wetland L)	Utilized 2:1 fill slopes & adjusted grade
Sta. 52+53 Y22 Lt	Fill in Wetlands (Wetland K)	Utilized 2:1 fill slopes & adjusted grade
Sta. 32+42 RPAY22 Lt	Fill in Wetlands (Wetland W-101)	Total take
Sta. 1526+33 -L- CL	Fill in Wetlands (Wetland W-115)	Total take

General Comments:

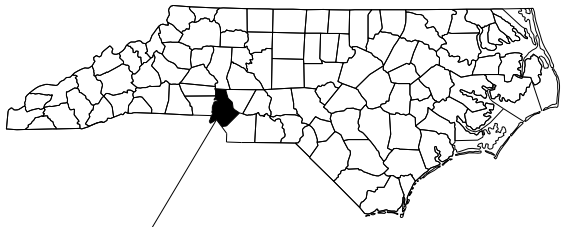
Additional Comments

-SERVA- 21+45 Lt.

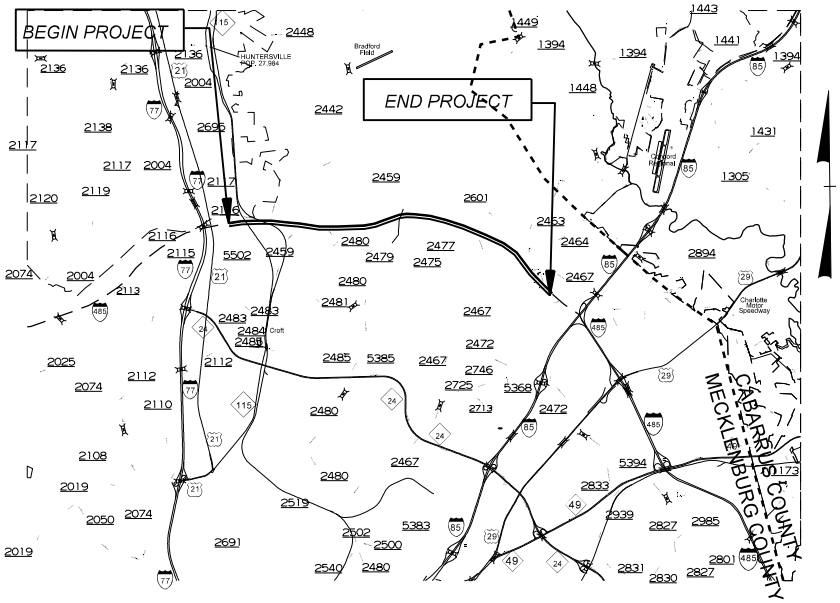
Although there is significant % increase in discharge at this location, the majority of the runoff is from large off-site areas. The extensive storm drainage system along the -L- line that drains 25.3 acres of pavement and R/W and discharges at Sta. 1398+54 Lt. has a Tc of 23 minutes. Runoff from this additional impervious area will have peaked and passed before runoff from the off-site areas reaches the outfall.

References

NORTH CAROLINA



MECKLENBURG COUNTY



NCDOT

DIVISION OF HIGHWAYS
MECKLENBURG COUNTY
PROJECT: C202521 (R–2248E)

VICINITY MAPS

I–485 (CHARLOTTE OUTER LOOP)
FROM EAST OF I–77 TO
WEST I–85

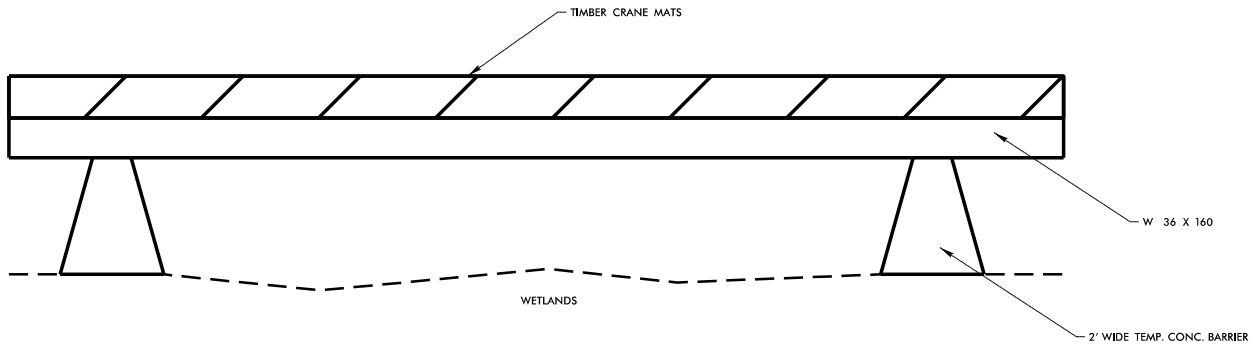
Permit Drawing
Sheet 1 of 108

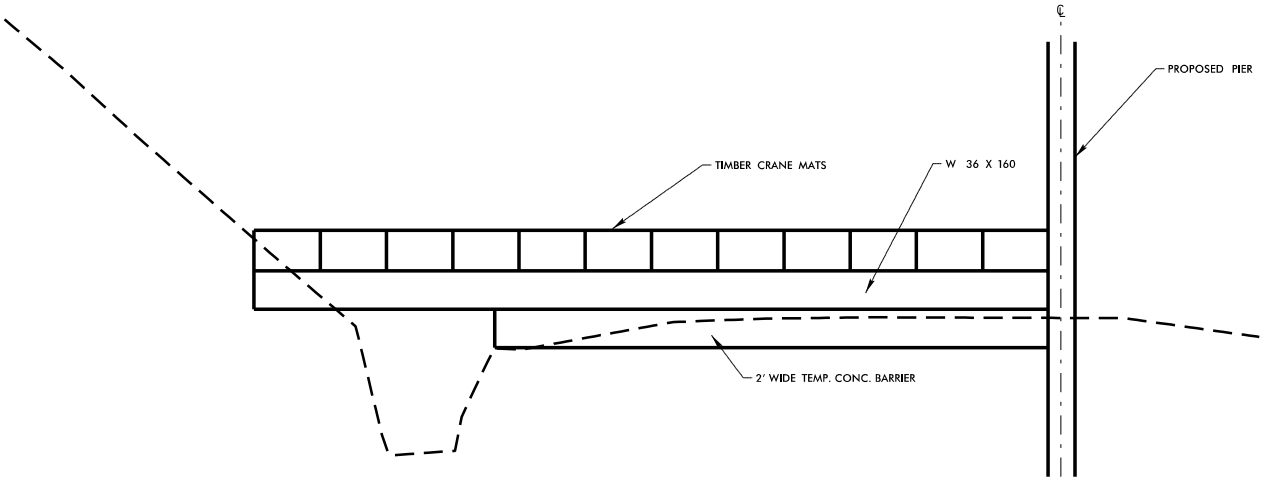
WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- (1259+00/1260+50)	Roadway Fill	0.385			0.020		0.02		297		
2	-L- (1266+00/1266+50)	Roadway Fill	0.222			0.028		0.05		602		
3	-Y10- (65+50)	54" Pipe	0.015			0.011		<0.01	<0.01	48	38	
3		Bank Stabilization								24		
4	-L- (1297+00/1299+50)	84" Pipe	0.507		0.042	0.079		0.08	<0.01	428	8	
4		Bank Stabilization								69		
5	-L- (1342+00/1343+00)	8'x7' RCBC	0.116					0.04	0.01	489	184	
5		Bank Stabilization								56		
6	-L- (1345+00)	9'X7' RCBC						0.02	<0.01	276	96	
6		Bank Stabilization								36		
7	-L- (1355+00/1367+00)	Roadway Fill	1.723			0.061		0.09	0.01	1561	127	
7		Bank Stabilization								21		
8	-L- (1390+00/1415+00)	Roadway Fill	1.060					0.22	<0.01	2497	56	
8		Bank Stabilization								28		
9	-L- (1421+00)	42" Pipe						<0.01	<0.01	81	8	
9		Bank Stabilization								37		
10	-L- (1441+00)	60" Pipe						<0.01	<0.01	44	18	
10		Bank Stabilization								51		
11	-L- (1465+00/1476+00)	Roadway Fill	0.144					<0.01	<0.01	138	48	
12	-Y22- (54+00/60+00)	Roadway Fill	1.609			0.164						
12		Temp. Wrk. Br.		0.051								
12		Bridge/Int. Bents	0.010				0.612					
12		Bridge/Splash Pads	0.017									
13	-Y20- (41+00/48+00)	Roadway Fill	0.311			0.030						
14	-L- (1486+00/1495+00)	Roadway Fill	0.596					0.40	<0.01	803	34	
14	-Y25- (23+23)	2 @ 7' x 8' RCBC	0.021					0.01	0.01		57	
14		Bank Stabilization								35		
15	-Y22- (86+00/90+00)	72" Pipe	0.080			0.012		0.03	<0.01	295	21	
15		Bank Stabilization								50		
16	-L- (1526+20/1526+45)	48" Pipe	0.031					0.01		190		
TOTALS:			6.85	0.05	0.04	0.41	0.61	1.00	0.08	8156	695	0

Site 8 - 1.556 ac. Perm. Surface Water Impact - Fill in Isolated Pond
Site 11 - 0.128 ac. Perm. Surface Water Impact - Fill in Isolated Pond
Site 14 - 50 lf of 24" rcp Pipe Removal
Site 16 - 0.667 ac. Perm. Surface Water Impact - Drained Isolated Pond

STA. 52 + 90 -Y22- WORK BRIDGE TYPICAL
2 - 90' X 36' TIMBER WORK BRIDGES





NCDOT

DIVISION OF HIGHWAYS
MECKELNBURG COUNTY
PROJECT: C202521 (R-2248E)

I-485 (CHARLOTTE OUTER LOOP)
FROM EAST OF I-77 TO
WEST OF I-85

09/08/99

TIP PROJECT: R-2248E

CONTRACT: C202521

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2248E	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34410.3.GV2	NHF-04GS(27)	PE

MECKLENBURG COUNTY

WETLAND & STREAM IMPACT PERMIT DRAWINGS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM EAST OF I-77 TO WEST I-85

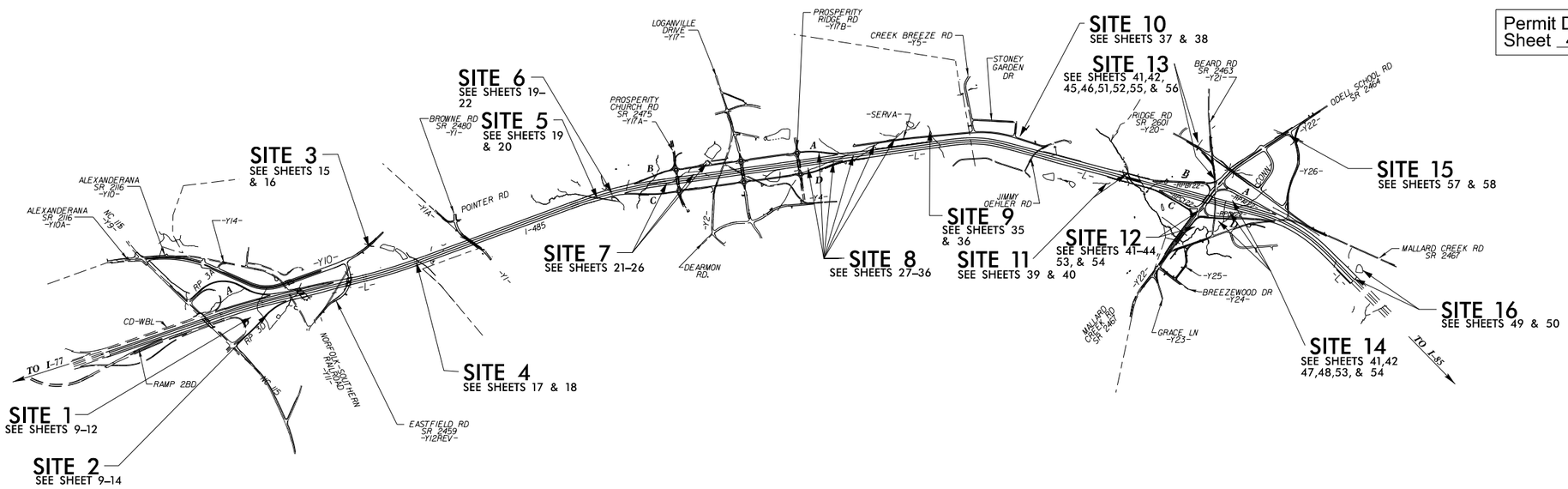
TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, NOISE WALLS, RETAINING WALLS, SIGNING AND SIGNALS

BLYTHE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 4 of 108



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF CHARLOTTE AND THE TOWN OF HUNTERSVILLE

THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

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 2006 = 62,000
ADT 2035 = 161,600
DHV = 10 %
D = 55 %
T = 15 % *
V = 70 mph
* TTST 10% DUAL 5%
FUNCTIONAL CLASSIFICATION
FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2248E = 5.594 miles

LENGTH STRUCTURES TIP PROJECT R-2248E = 0.121 miles

TOTAL LENGTH OF TIP PROJECT R-2248E = 5.715 miles

Prepared In the Office of:
WILBUR SMITH ASSOCIATES
421 Fayetteville Street, Suite 1303, Raleigh, NC 27601 Phone (919) 755-0583

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

LETTING DATE:

DAVID L. WILVER, P.E.
PROJECT ENGINEER

PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

STATE OF NORTH CAROLINA • DEPARTMENT OF TRANSPORTATION

P.E.
STATE HIGHWAY DESIGN ENGINEER

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\r2248e_rdy_tsh_01.dgn
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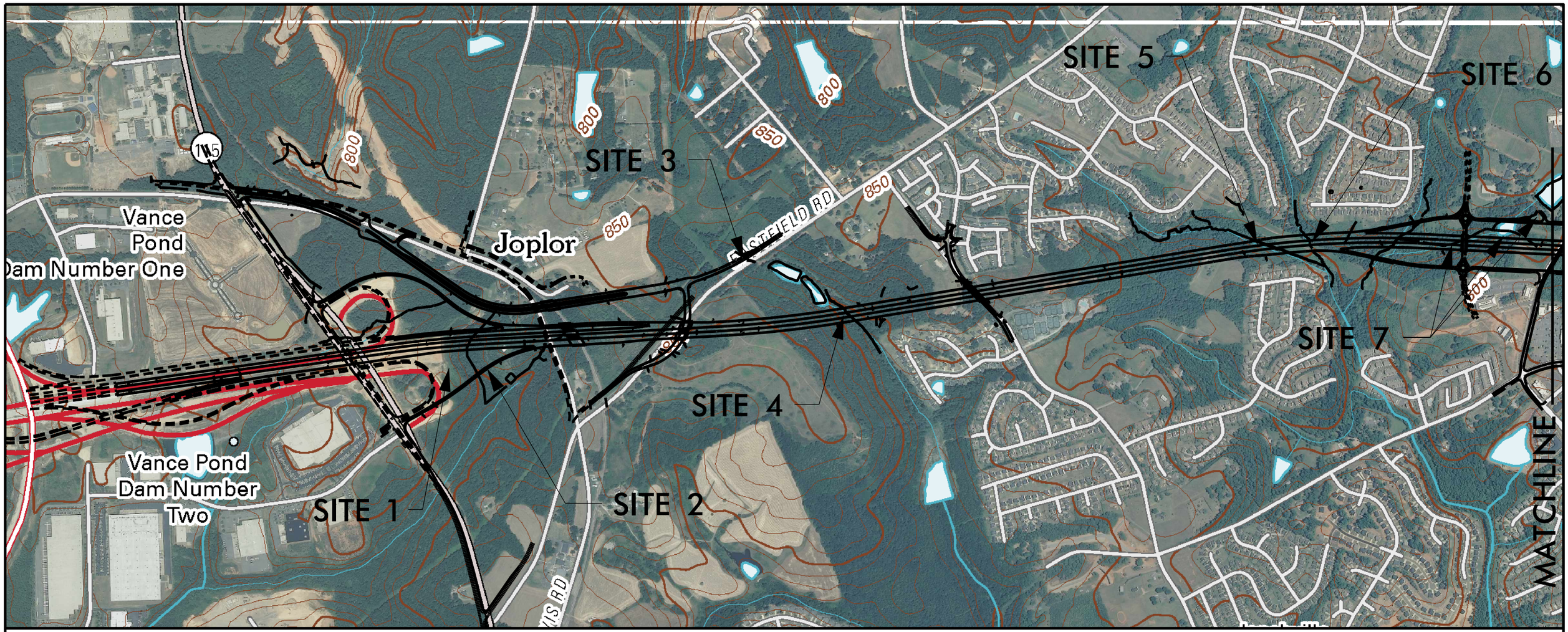


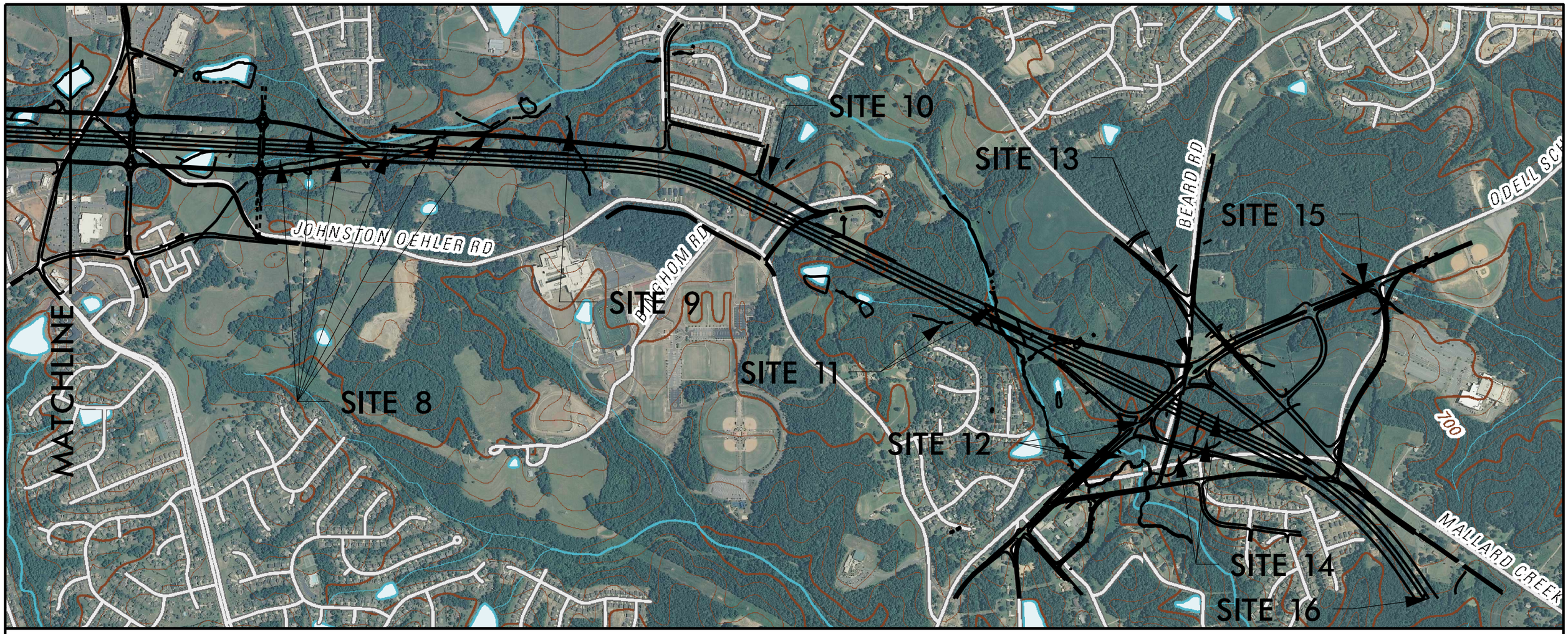
VICINITY MAPS

Permit Drawing
Sheet 5 of 108

NCDOT

DIVISION OF HIGHWAYS
MECKLENBURG COUNTY
PROJECT: C202521 (R–2248E)

I–485 (CHARLOTTE OUTER LOOP)
FROM EAST OF I–77 TO
WEST I–85



VICINITY MAPS

Permit Drawing
Sheet 6 of 108

NCDOT

DIVISION OF HIGHWAYS
MECKLENBURG COUNTY
PROJECT: C202521 (R–2248E)

I–485 (CHARLOTTE OUTER LOOP)
FROM EAST OF I–77 TO
WEST I–85

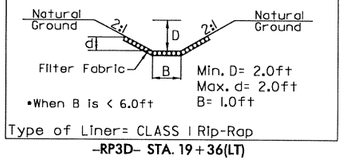
PROJECT REFERENCE NO.	SHEET NO.
R /W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing Sheet 7 of 108

Revised 8-18-11

SITE 1

DETAIL M38
OUTLET CHANNEL DETAIL
(Not to Scale)

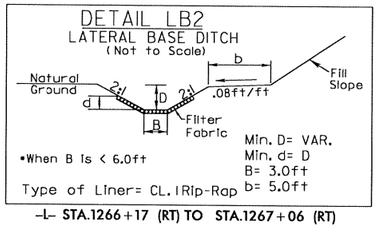


Type of Liner= CLASS I Rip-Rap

-RP3D- STA. 19+36(LT)

SITE 2

DETAIL LB2
LATERAL BASE DITCH
(Not to Scale)

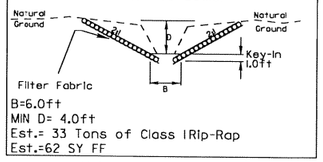


Type of Liner= CL. I Rip-Rap

-L- STA.1266+17 (RT) TO STA.1267+06 (RT)

SITE 3

DETAIL M39
OUTLET CHANNEL DETAIL
(Not to Scale)

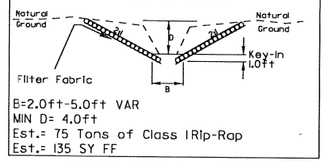


B=6.0ft
MIN D= 4.0ft
Est.= 33 Tons of Class I Rip-Rap
Est.=62 SY FF

-Y10- STA. 66+11 (RT)

SITE 4&7

DETAIL M14
OUTLET CHANNEL DETAIL
(Not to Scale)

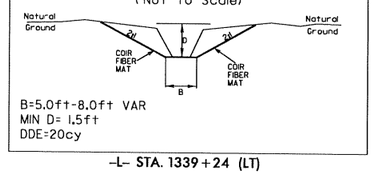


B=2.0ft-5.0ft VAR
MIN D= 4.0ft
Est.= 75 Tons of Class I Rip-Rap
Est.= 135 SY FF

-RPCY17A- STA. 16+89 (RT)
-L- STA. 1299+41 (RT)

SITE 5

DETAIL M9
INLET CHANNEL DETAIL
(Not to Scale)

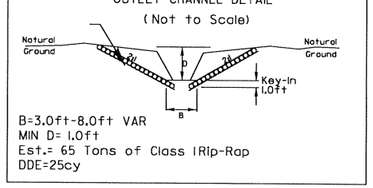


B=5.0ft-8.0ft VAR
MIN D= 1.5ft
DDE=20cy

-L- STA. 1339+24 (LT)

SITE 5

DETAIL M10
OUTLET CHANNEL DETAIL
(Not to Scale)

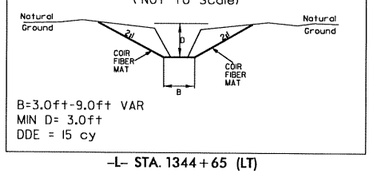


B=3.0ft-8.0ft VAR
MIN D= 1.0ft
Est.= 65 Tons of Class I Rip-Rap
DDE=25cy

-L- STA. 1343+50 (RT)

SITE 6

DETAIL M12
INLET CHANNEL DETAIL
(Not to Scale)

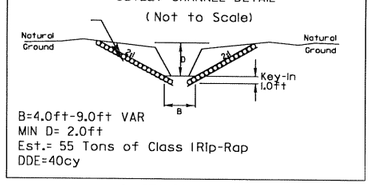


B=3.0ft-9.0ft VAR
MIN D= 3.0ft
DDE = 15 cy

-L- STA. 1344+65 (LT)

SITE 6

DETAIL M13
OUTLET CHANNEL DETAIL
(Not to Scale)

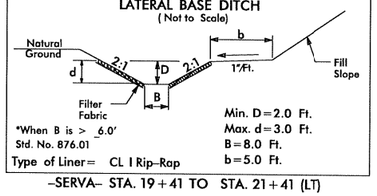


B=4.0ft-9.0ft VAR
MIN D= 2.0ft
Est.= 55 Tons of Class I Rip-Rap
DDE=40cy

-L- STA. 1345+32 (RT)

SITE 8

DETAIL LB31
LATERAL BASE DITCH
(Not to Scale)

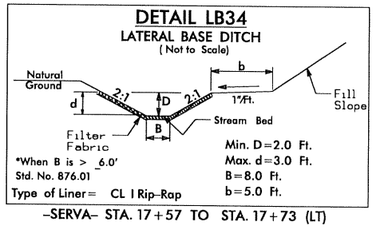


Std. No. 876.01
Type of Liner= CL I Rip-Rap

-SERVA- STA. 19+41 TO STA. 21+41 (LT)

SITE 8

DETAIL LB34
LATERAL BASE DITCH
(Not to Scale)

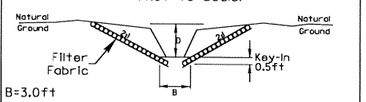


Std. No. 876.01
Type of Liner= CL I Rip-Rap

-SERVA- STA. 17+57 TO STA. 17+73 (LT)

SITE 9

DETAIL M35
OUTLET CHANNEL DETAIL
(Not to Scale)

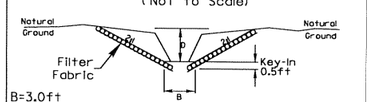


B=3.0ft
MIN D= 2.0ft
Est.= 25 Tons of Class I Rip-Rap
DDE=6cy
Est.= 45 SY FF

-SERVA- STA. 28+32 (LT)

SITE 10

DETAIL M36
OUTLET CHANNEL DETAIL
(Not to Scale)

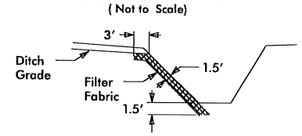


B=3.0ft
MIN D= 3.0ft
Est.= 45 Tons of Class I Rip-Rap
DDE=17cy
Est.= 90 SY FF

-SERVA- STA. 49+32 (LT)

SITE 11

DETAIL M21
RIP RAP AT EMBANKMENT
(Not to Scale)

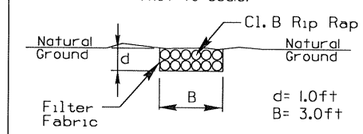


Type of Liner= 75 TONS,CL II Rip-Rap
Filter Fabric= 100 sy

-L- STA. 1465+60 (LT)

SITE 12

DETAIL M29
SPLASH PAD
(Not to Scale)

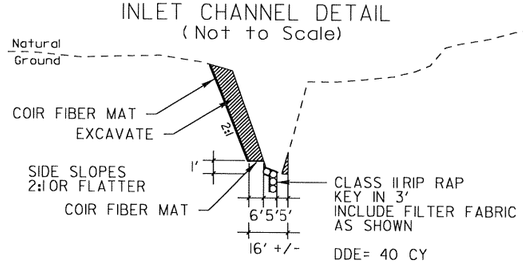


ALIGN UNDER DECK DRAINS

DETAIL M29:
-L- STA. 1465+56 TO STA. 1466+38 & STA. 1466+74 TO STA. 1468+75 WB LT
-L- STA. 1466+59 TO STA. 1467+09 & STA. 1467+39 TO STA. 1469+64 WB RT
-L- STA. 1466+79 TO STA. 1467+23 & STA. 1467+50 TO STA. 1469+84 EB LT
-L- STA. 1467+62 TO STA. 1468+10 & STA. 1468+69 TO STA. 1470+75 EB RT
-Y22- STA. 52+33 TO STA. 52+61 & STA. 53+01 TO STA. 54+25 LT
-Y22- STA. 52+30 TO STA. 52+61 & STA. 53+01 TO STA. 54+25 RT

SITE 14

DETAIL M31
INLET CHANNEL DETAIL
(Not to Scale)

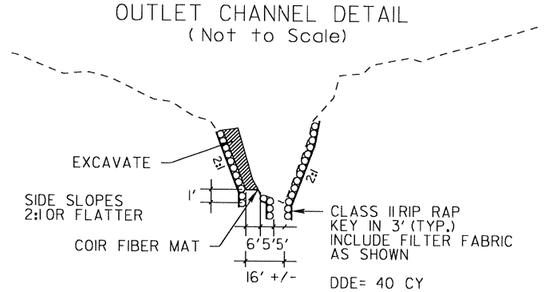


DDE= 40 CY

-Y25- STA. 23+23 (LT)

SITE 14

DETAIL M32
OUTLET CHANNEL DETAIL
(Not to Scale)



DDE= 40 CY

-Y25- STA. 23+23 (RT)

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

Permit Drawing
Sheet 8 of 108

Revised 8-18-11

SITE 14

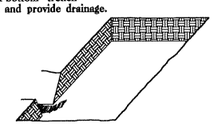
DETAIL S46

PLANTING DETAILS

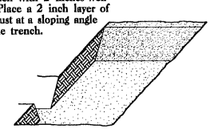
SEEDLING / LINER BAREROOT PLANTING DETAIL

HEALING IN

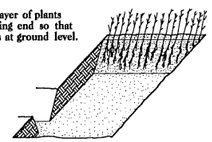
1. Locate a healing-in site in a shady, well protected area.
2. Excavate a flat bottom trench 12 inches deep and provide drainage.



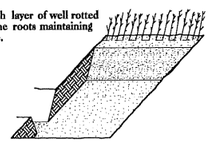
3. Backfill the trench with 2 inches well rotted sawdust. Place a 2 inch layer of well rotted sawdust at a sloping angle at one end of the trench.



4. Place a single layer of plants against the sloping end so that the root collar is at ground level.



5. Place a 2 inch layer of well rotted sawdust over the roots maintaining a sloping angle.

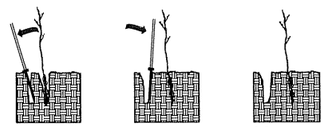


6. Repeat layers of plants and sawdust as necessary and water thoroughly.

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:

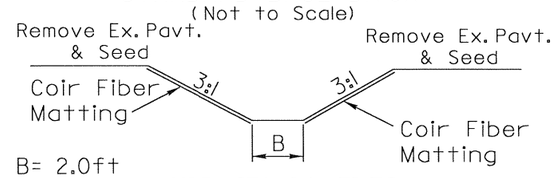
PLANTING BAG
During planting, seedlings shall be kept in a moist canvas bag or similar container to prevent the root systems from drying.

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.

STANDARD BASE DITCH

(Not to Scale)



-Y25- STA. 24+71 TO STA. 25+21 (LT) (DDE=22CY)

☐ TREE REFORESTATION SHALL BE PLANTED 6 FT. TO 10 FT. ON CENTER, RANDOM SPACING, AVERAGING 8 FT. ON CENTER, APPROXIMATELY 680 PLANTS PER ACRE.

☐ USE NATIVE HERBACEOUS RIPARIAN SEED MIXTURE FOR THE RIPARIAN BUFFER.

REFORESTATION

MIXTURE, TYPE, SIZE, AND FURNISH SHALL CONFORM TO THE FOLLOWING:		
25% PLATANUS OCCIDENTALIS	AMERICAN SYCAMORE	12 in - 18 in BR
25% ACER NEGUNDO	BOXELDER	12 in - 18 in BR
25% PRUNUS SEROTINA	BLACK CHERRY	12 in - 18 in BR
25% SALIX NIGRA	BLACK WILLOW	12 in - 18 in BR

REFORESTATION DETAIL

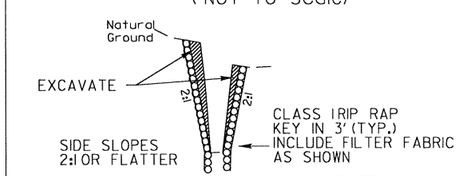
N.C.D.O.T. - ROADSIDE ENVIRONMENTAL UNIT

SITE 15

DETAIL M33

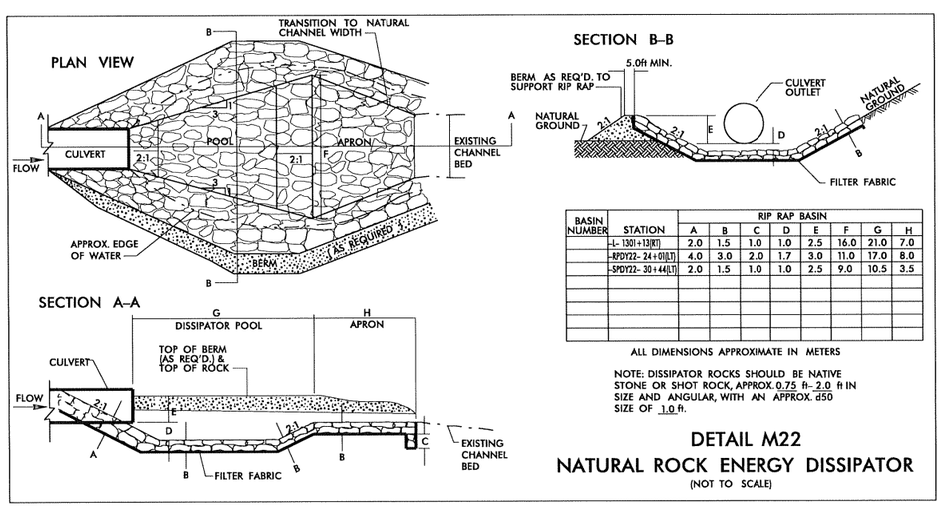
OUTET CHANNEL DETAIL

(Not to Scale)



-Y26- STA. 12+51 (LT)

SITE 14



BASIN NUMBER	STATION	RIP RAP BASIN							
		A	B	C	D	E	F	G	H
	-L- 1301+13(RT)	2.0	1.5	1.0	1.0	2.5	16.0	21.0	7.0
	-RPDY22- 24+01(LT)	4.0	3.0	2.0	1.7	3.0	11.0	17.0	8.0
	-SPDY22- 30+44(LT)	2.0	1.5	1.0	1.0	2.5	9.0	10.5	3.5

ALL DIMENSIONS APPROXIMATE IN METERS

NOTE: DISSIPATOR ROCKS SHOULD BE NATIVE STONE OR SHOT ROCK, APPROX. 0.75 ft- 2.0 ft IN SIZE AND ANGULAR, WITH AN APPROX. d50 SIZE OF 1.0 ft.

DETAIL M22

NATURAL ROCK ENERGY DISSIPATOR

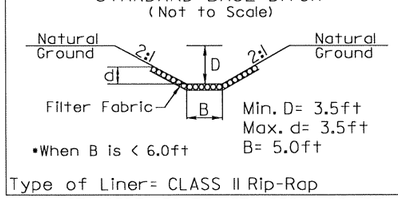
(NOT TO SCALE)

SITE 16

DETAIL S29

STANDARD BASE DITCH

(Not to Scale)



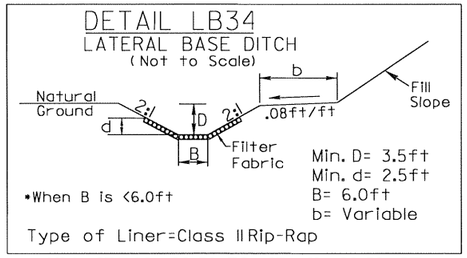
-L- STA. 1527+50 TO STA. 1528+38 (RT)

SITE 15

DETAIL LB34

LATERAL BASE DITCH

(Not to Scale)



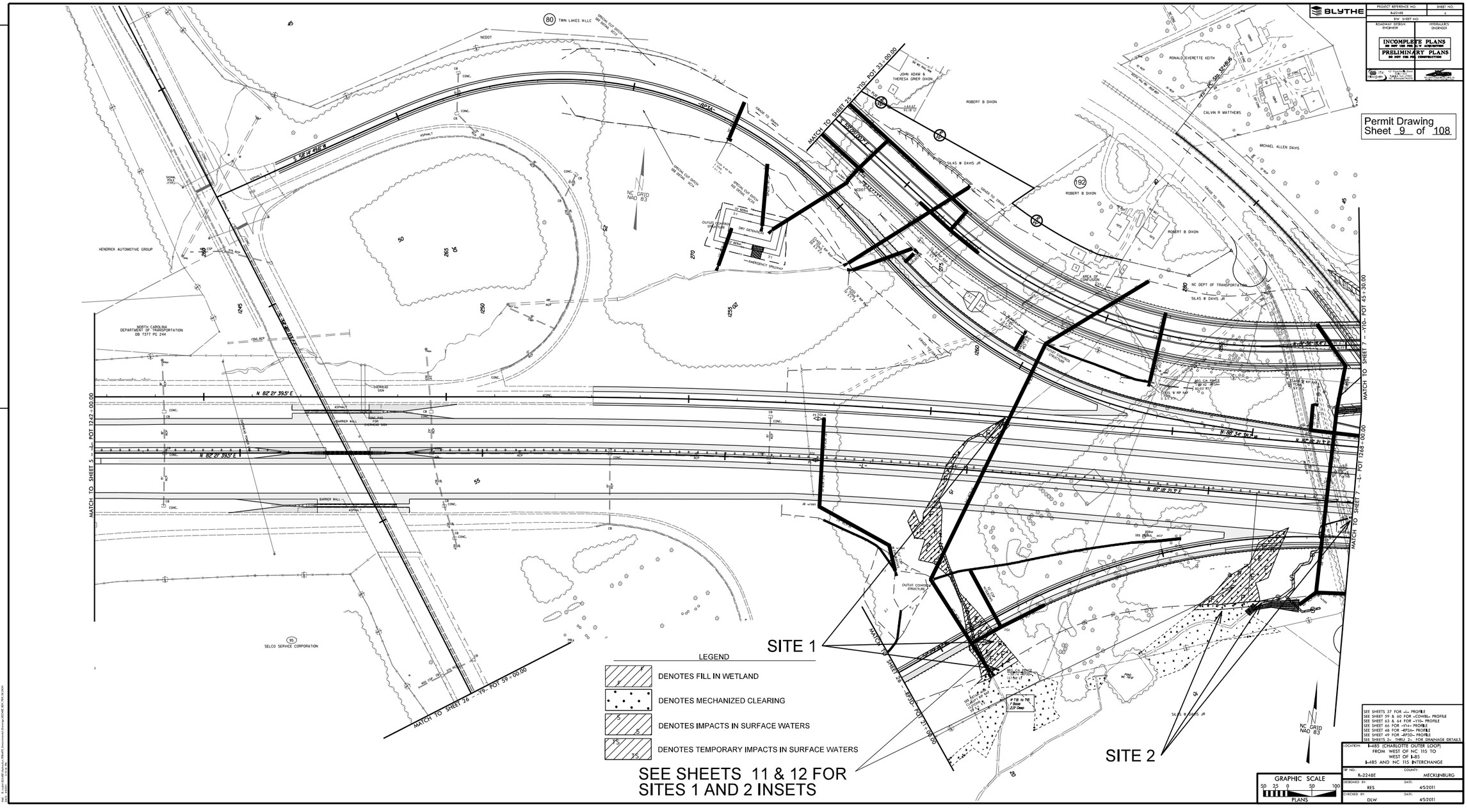
-Y26- STA. 10+83.50 TO STA. 11+32.50 (RT)

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248BE	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

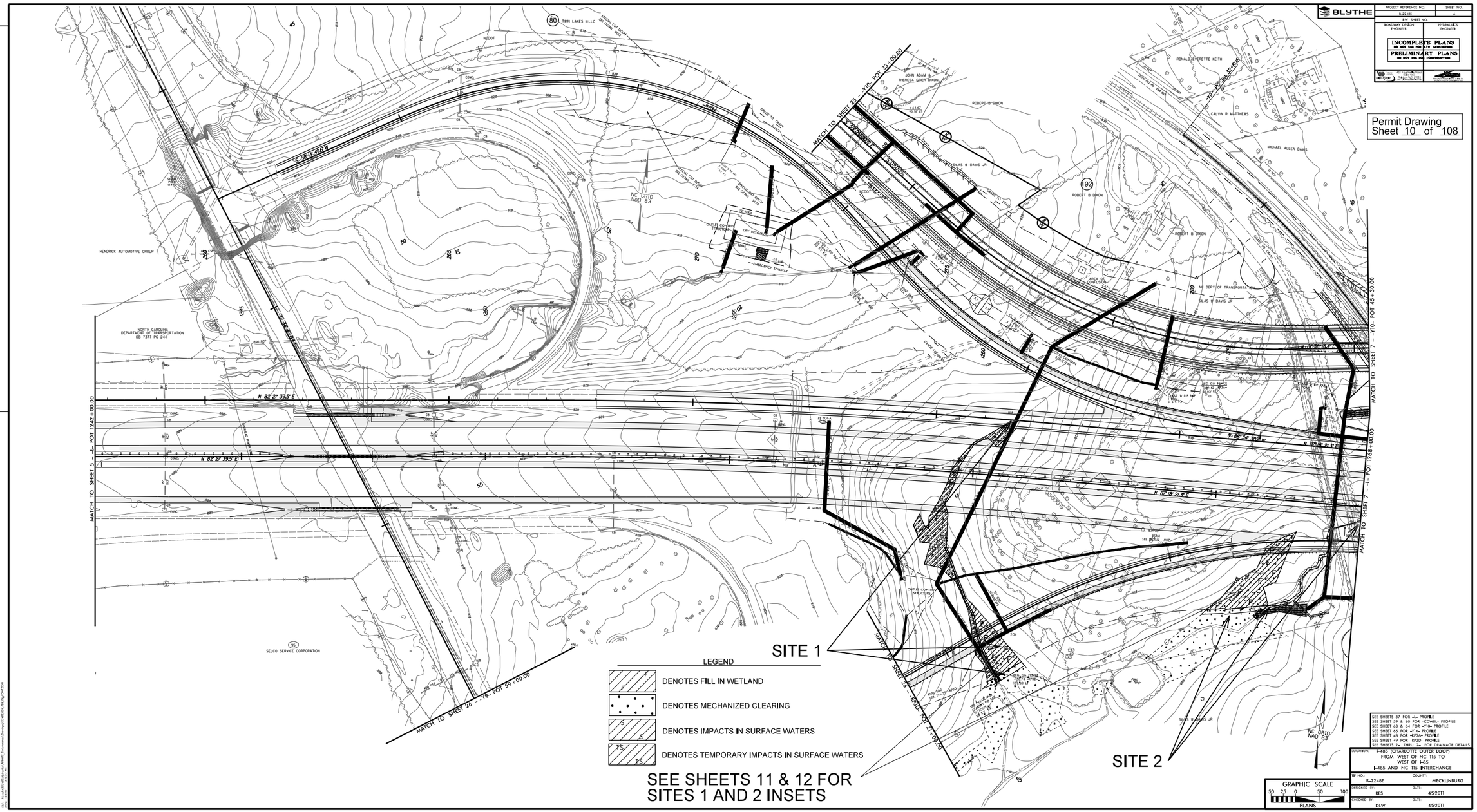
INCOMPLETE PLANS
DO NOT USE FOR RIGHT OF WAY CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 9 of 108



SEE SHEETS 37 FOR -L- PROFILE
SEE SHEET 59 & 60 FOR -CDWBL- PROFILE
SEE SHEET 63 & 64 FOR -Y10- PROFILE
SEE SHEET 66 FOR -Y14- PROFILE
SEE SHEET 48 FOR -RP3A- PROFILE
SEE SHEET 49 FOR -RP3D- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 I-485 AND NC 115 INTERCHANGE	
TIP NO.: R-2248BE	COUNTY: MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011


BLYTHE
PROJECT REFERENCE NO.
R-2248E
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 10 of 108
MATCH TO SHEET 25 -YIO- POT 33+00.00
MATCH TO SHEET 5 -L1- POT 17+72.00
MATCH TO SHEET 7 -L- POT 43+30.00
MATCH TO SHEET 7 -L- POT 1268+00.00
MATCH TO SHEET 26 -YS- POT 59+00.00
MATCH TO SHEET 26 -YRAMP- POT 21+00.00
TWIN LAKES MLLC
HENDRICK AUTOMOTIVE GROUP
NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DB 7377 PG 244
SELCO SERVICE CORPORATION
JOHN ADAM & THERESA GREER DIXON
ROBERT B DIXON
RONALD EVERETTE KEITH
CALVIN R MATTHEWS
MICHAEL ALLEN DAVIS
NC DEPT OF TRANSPORTATION
SILAS B DAVIS JR
OUTLET CONTROL STRUCTURE
DRY DETENTION
EMERGENCY SPILLWAY
NC GRID NAD 83
SITE 1
SITE 2
LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
SEE SHEETS 11 & 12 FOR SITES 1 AND 2 INSETS
SEE SHEETS 37 FOR -L- PROFILE
SEE SHEET 59 & 60 FOR -CDWBL- PROFILE
SEE SHEET 63 & 64 FOR -YIO- PROFILE
SEE SHEET 66 FOR -YIc- PROFILE
SEE SHEET 48 FOR -RP3A- PROFILE
SEE SHEET 49 FOR -RP3D- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 I-485 AND NC 115 INTERCHANGE
TIP NO.: R-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011
GRAPHIC SCALE
50 25 0 50 100
PLANS

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	6A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

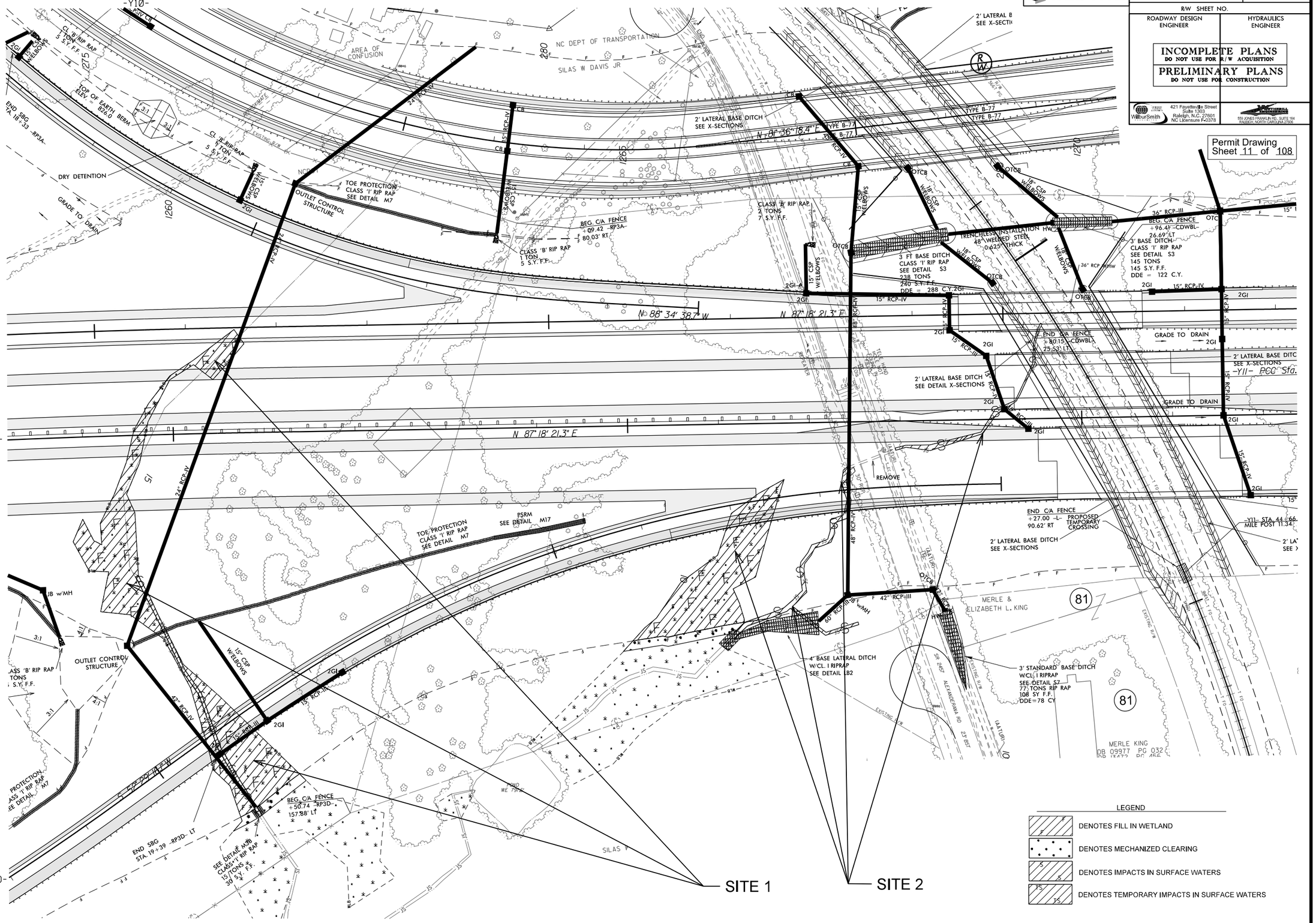
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 11 of 108



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

REVISIONS

FILE: R:\Hydro\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PH_6A_SITE 1&2.DGN
DATE: 4/5/2011 5:16:09 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	6A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

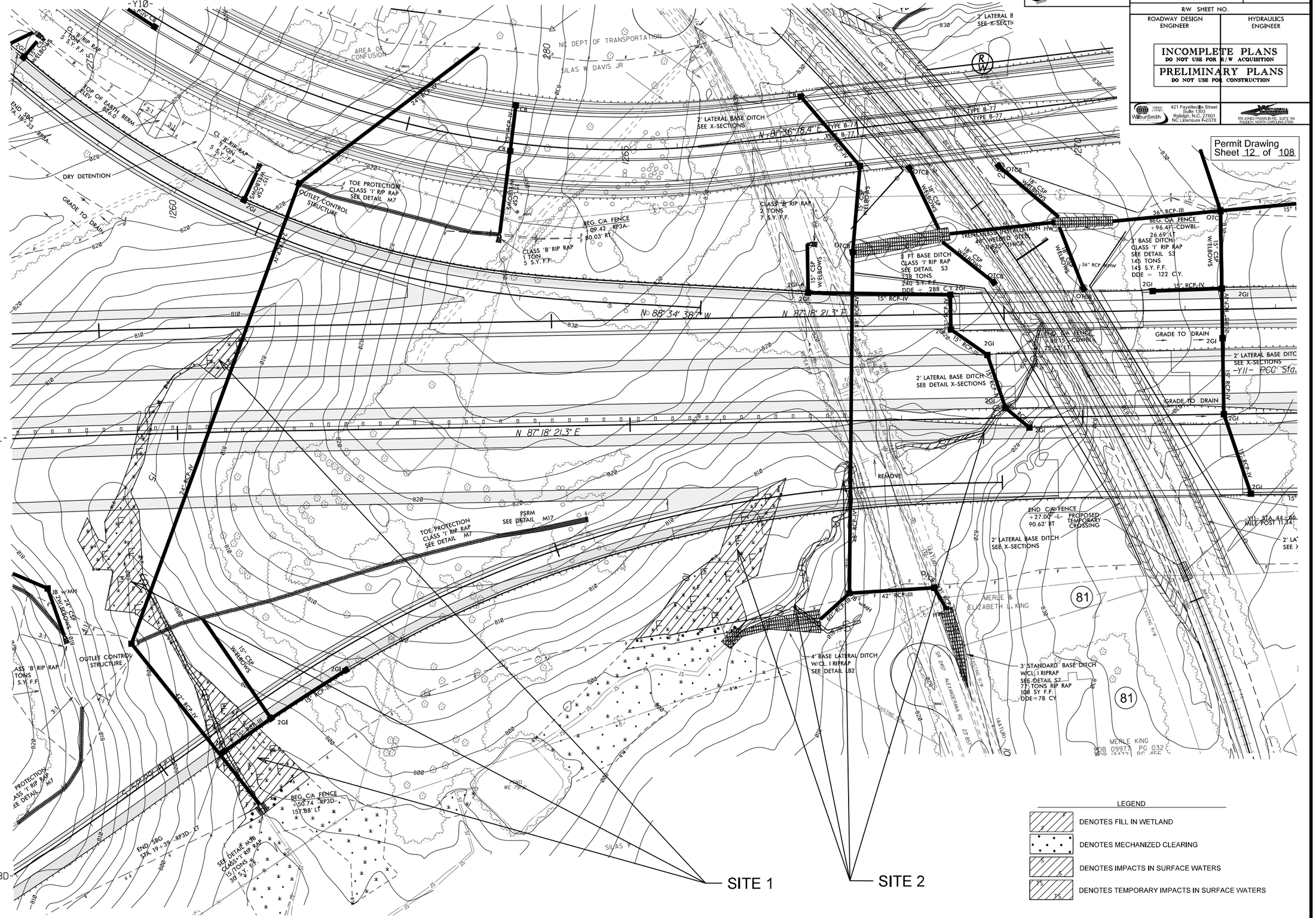
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

MOTTAGRAY & ASSOCIATES, P.A.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 12 of 108



REVISIONS

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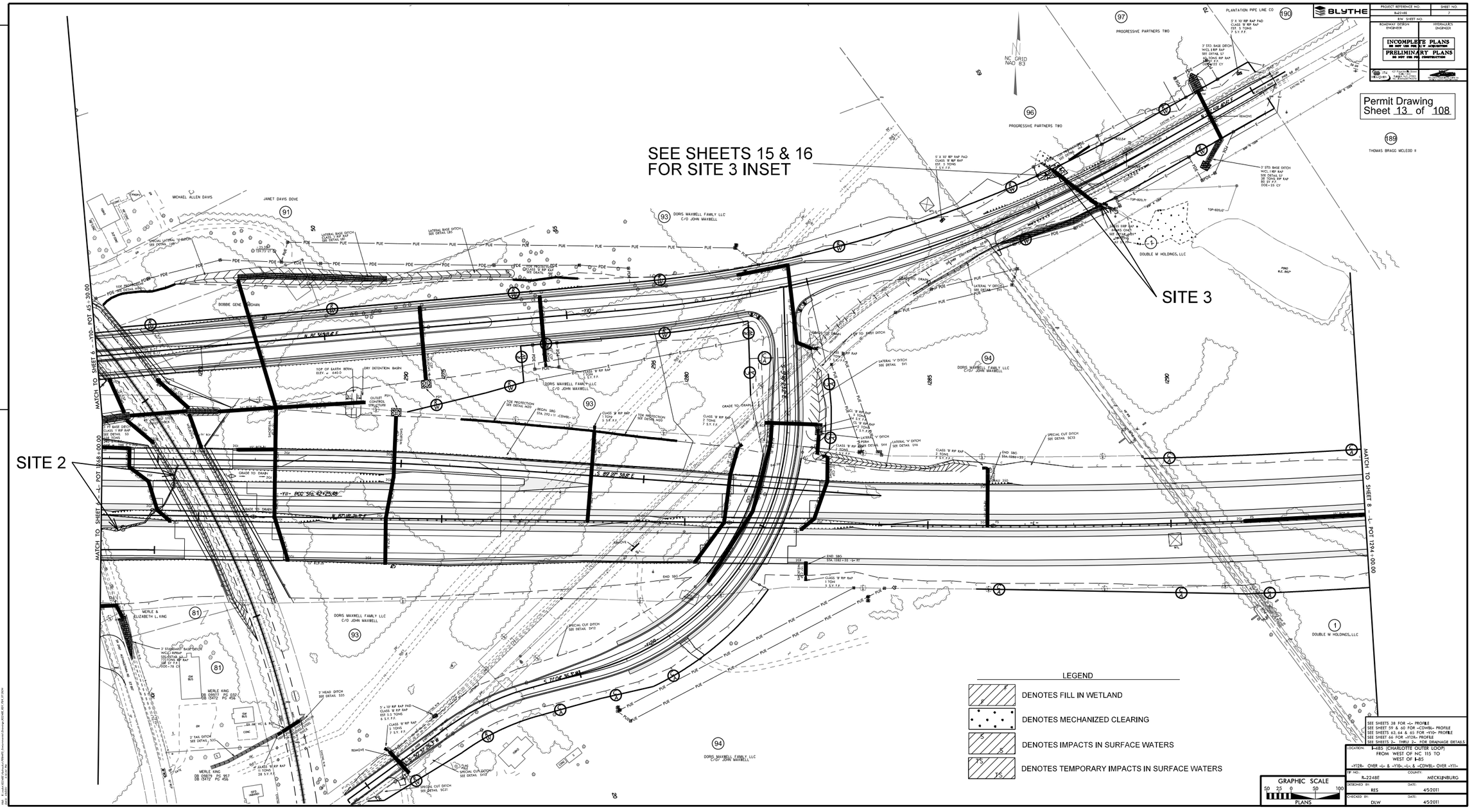
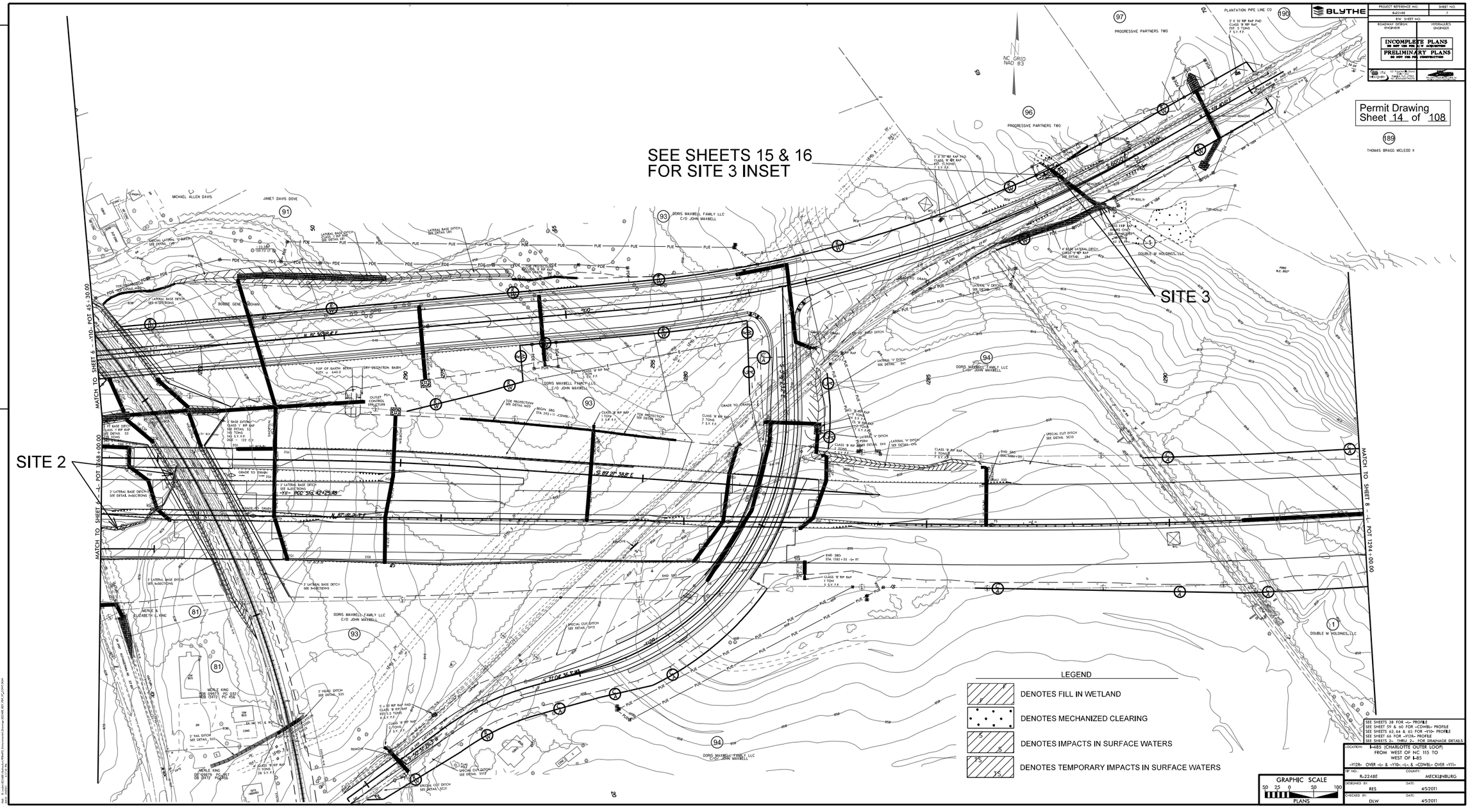


SEE SHEETS 38 FOR -L- PROFILE
SEE SHEET 59 & 60 FOR -CDWBL- PROFILE
SEE SHEETS 63, 64 & 65 FOR -Y110- PROFILE
SEE SHEET 66 FOR -Y128- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 -Y128- OVER -L- & -Y110- -L- & -CDWBL- OVER -Y11-	
TIP NO.: R-2248E	COUNTY: MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011


SEE SHEETS 15 & 16
FOR SITE 3 INSET
SITE 3
SITE 2
Permit Drawing
Sheet 14 of 108
MATCH TO SHEET 6 -L- POT 45+30.00
MATCH TO SHEET 8 -L- POT 12+94.00
MATCH TO SHEET 7 -L- POT 17+48.00
NC GRID
NAD 83
PROGRESSIVE PARTNERS TWO
PLANTATION PIPE LINE CO
THOMAS BRAGG MCLEOD II
DORIS MAXWELL FAMILY LLC
C/O JOHN MAXWELL
DOUBLE M HOLDINGS, LLC
MICHAEL ALLEN DAVIS
JANET DAVIS DOVE
BOBBIE GENE BOHAN
MERLE & ELIZABETH C. KING
LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
GRAPHIC SCALE
50 25 0 50 100
PLANS
BLYTHE
INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
7
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
SEE SHEETS 38 FOR -L- PROFILE
SEE SHEET 59 & 60 FOR -CDWBL- PROFILE
SEE SHEETS 63, 64 & 65 FOR -Y10- PROFILE
SEE SHEET 66 FOR -Y12R- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85
-Y12R- OVER -L- & -Y10- -L-, & -CDWBL- OVER -Y11-
TIP NO. R-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	7A
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

BLYTHE

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 15 of 108

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

NC GRID
NAD 83

-Y10- PT Sta. 67+62.17

96

PROGRESSIVE PARTNERS TWO

SITE 3

5' X 10' RIP RAP PAD
CLASS 'B' RIP RAP
EST. 5 TONS
7 S.Y. F.F.

TOE PROTECTION
SEE DETAIL M4

TOP=822.54'

TOP=820.71'

TOP=820.12'

24" RCP-III

36" RCP

CLASS I RIP RAP
BANKS ONLY
SEE DETAIL M39
33 TONS
62 SY FF

4' BASE LATERAL DITCH
CLASS 'I' RIP RAP
SEE DETAIL LB4

LATERAL 'V' DITCH
SEE DETAIL SV1

+12.30
104.42' RT

+90.54
131.38' RT

+37.97
83.03' RT

DOUBLE M HOLDINGS, LLC

EXISTING R/W

(AATUR)

LEVEL 3

26" G

DUCT

14" FO

MTL

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E RDY_PLN_7A_SITE 3.DGN
DATE: 4/5/2011 5:37:37 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	7A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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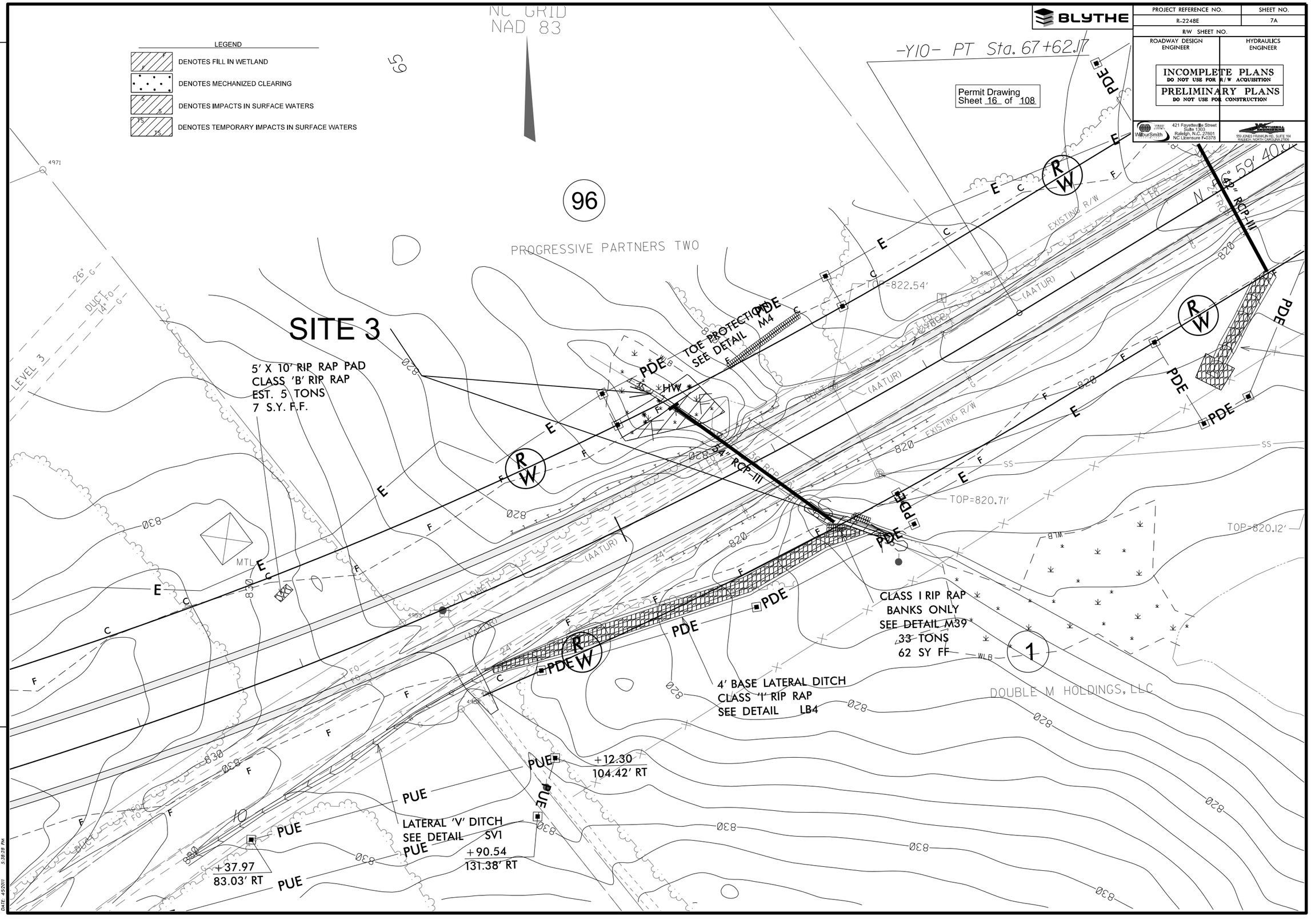
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

Permit Drawing
Sheet 16 of 108



REVISIONS

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DATE: 4/5/2011 5:38:28 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

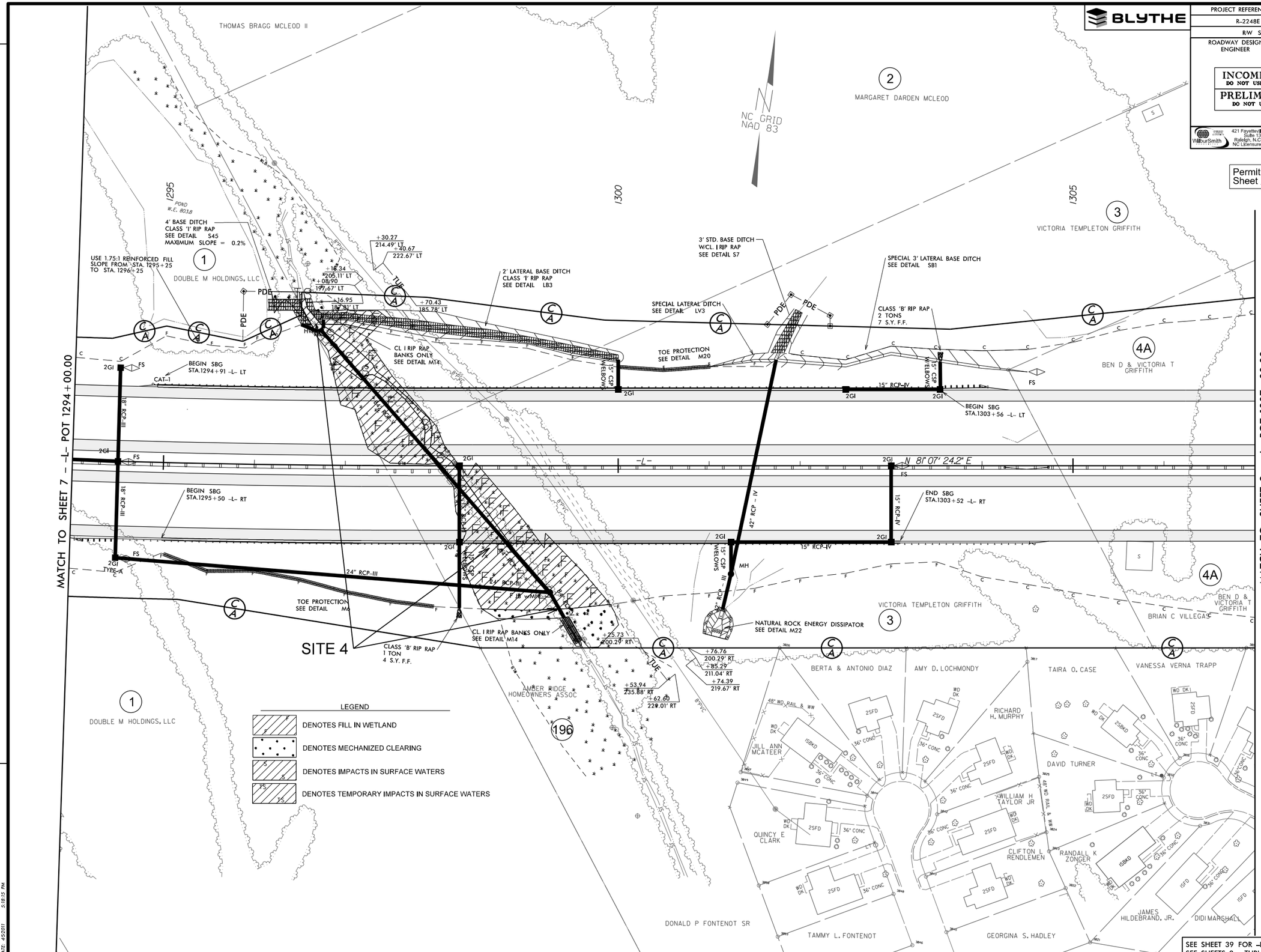
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 17 of 108



SEE SHEET 39 FOR –L– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PLN_08.DGN
DATE: 4/5/2011 5:18:15 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

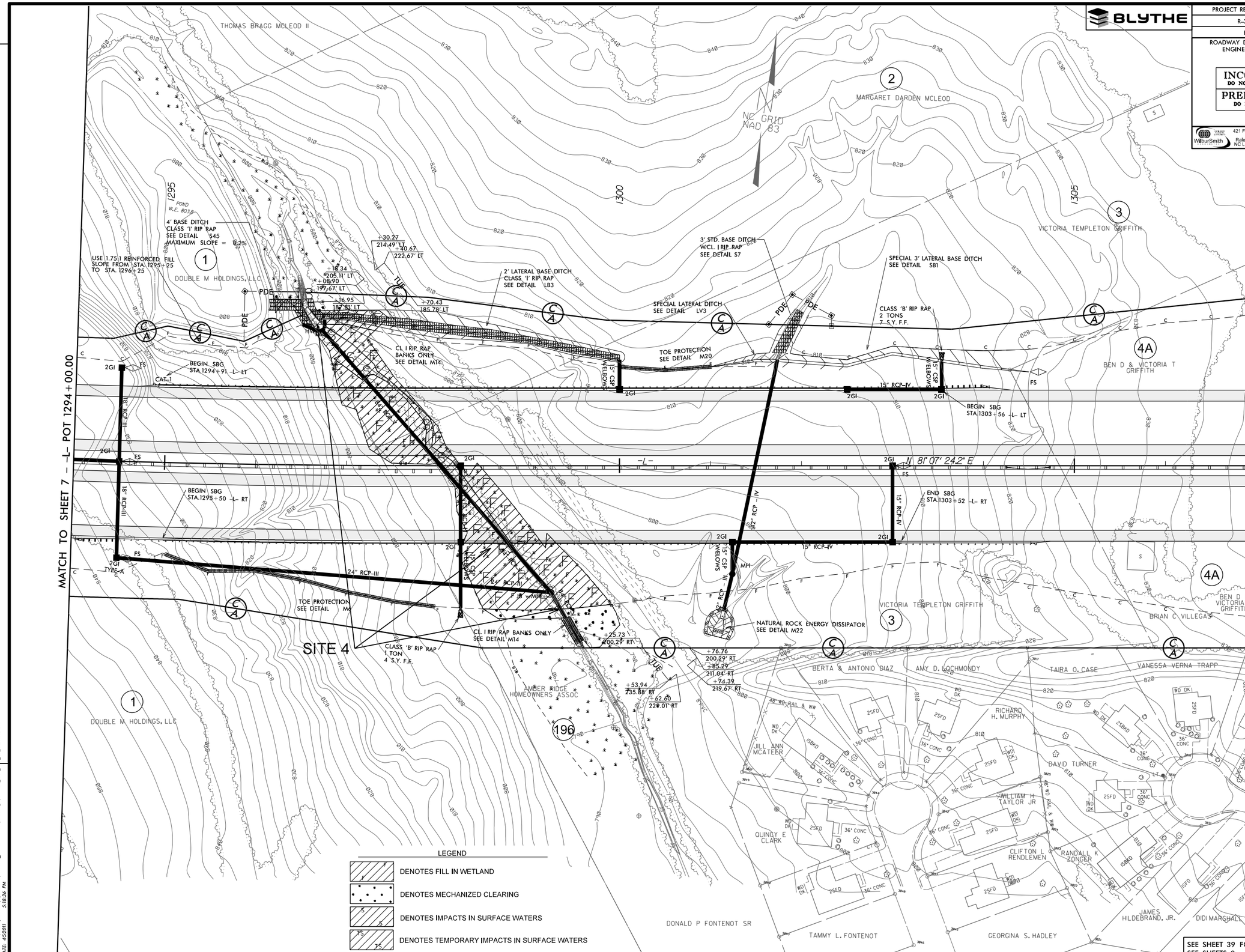
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 18 of 108



SEE SHEET 39 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PER_08_CONT.DGN
DATE: 4/5/2011 5:18:36 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

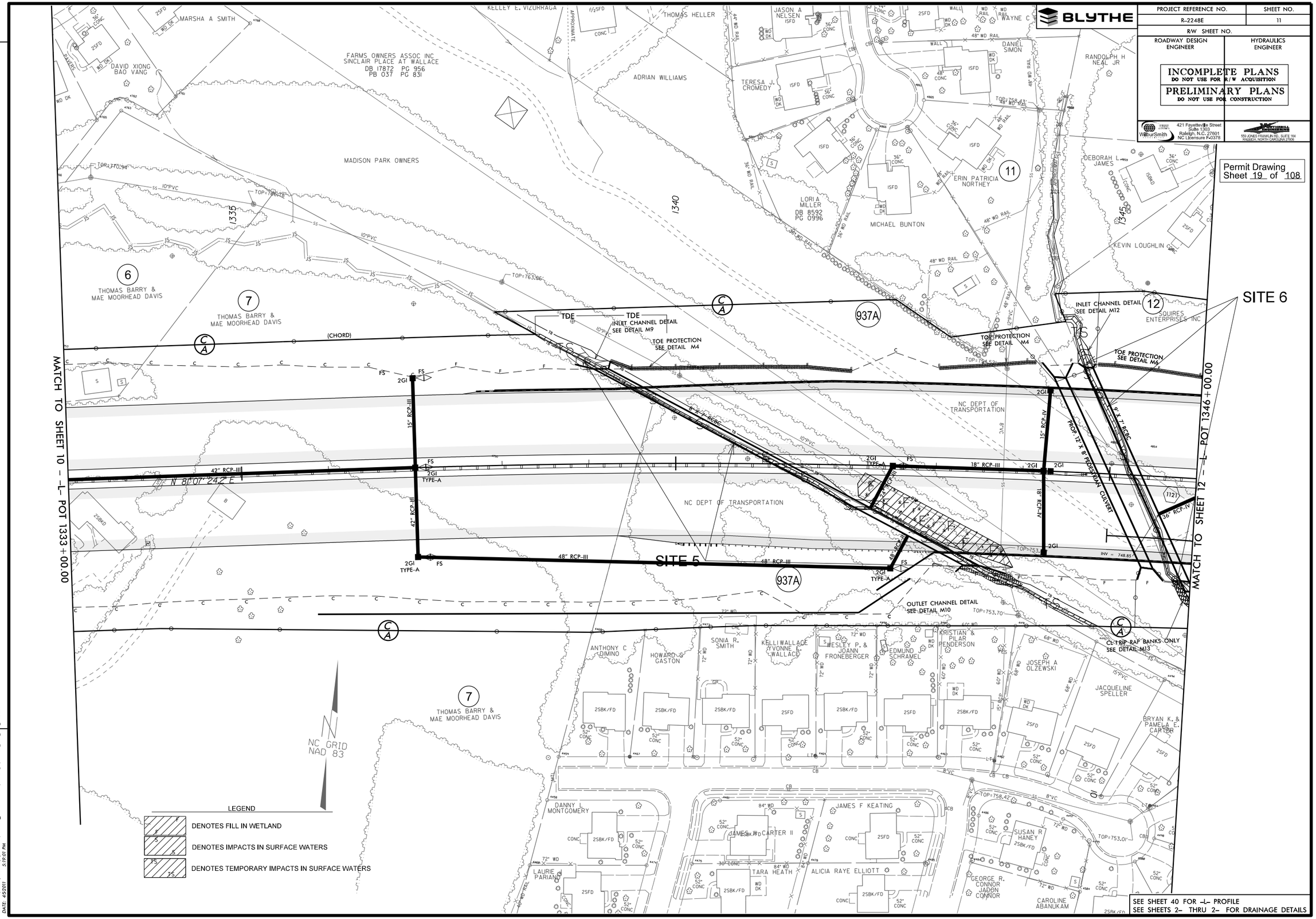
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 19 of 108



SEE SHEET 40 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\indot\R2248E\Hydraulics\PERMITS_Environmental Drawings\R2248E_RDY_PER_11.DGN
DATE: 4/5/2011 5:19:01 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

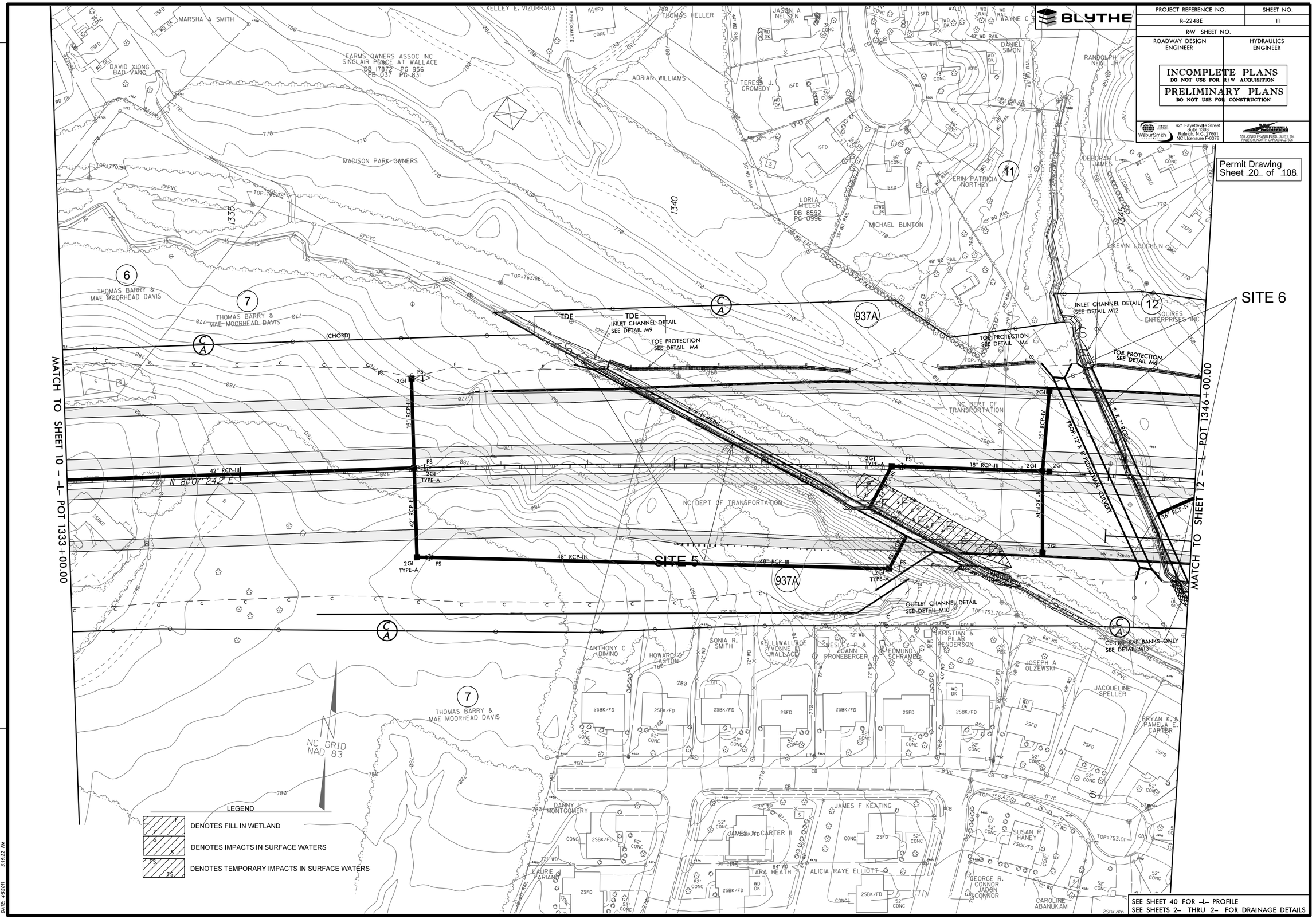
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

559 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 20 of 108



REVISIONS

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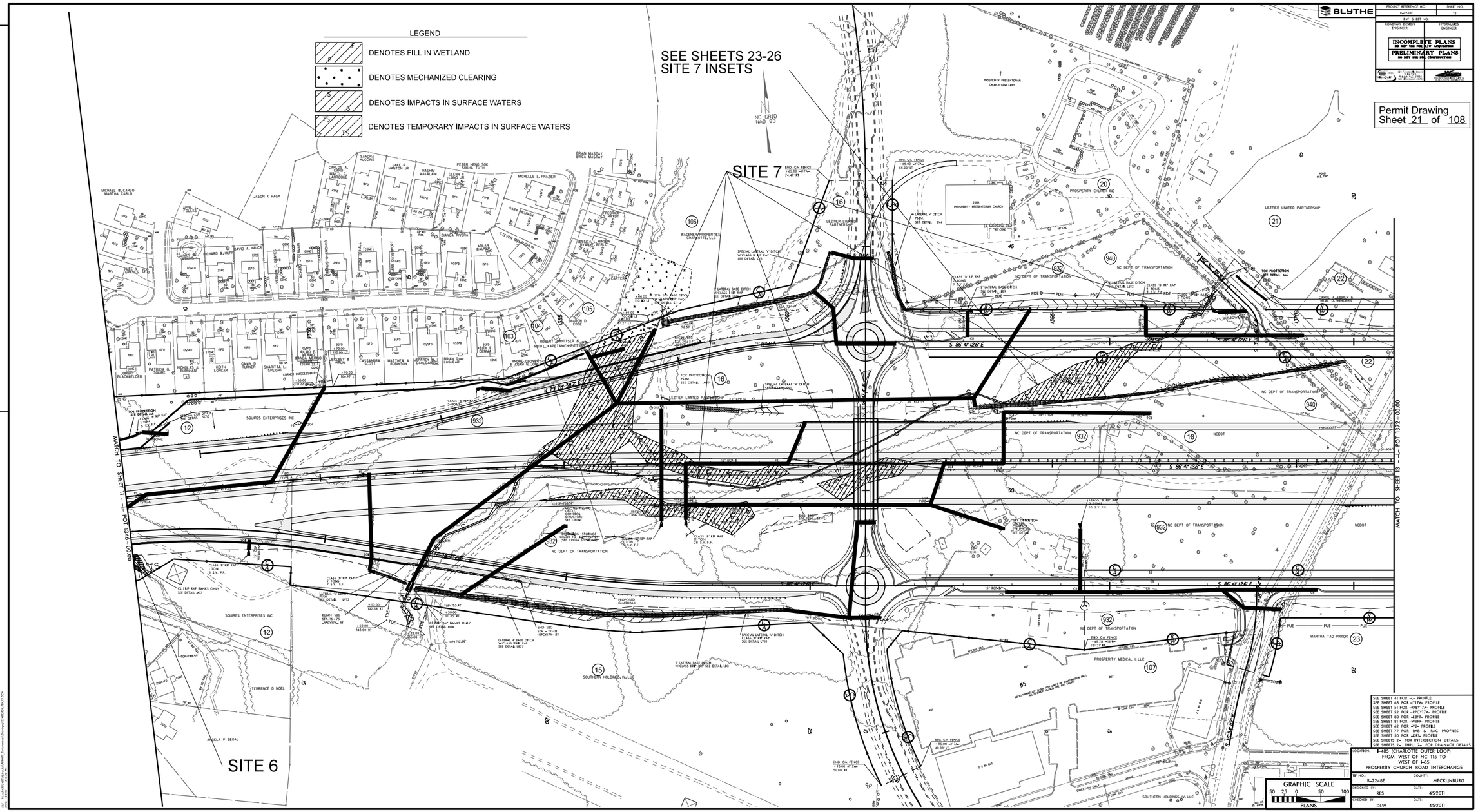


BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	73
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

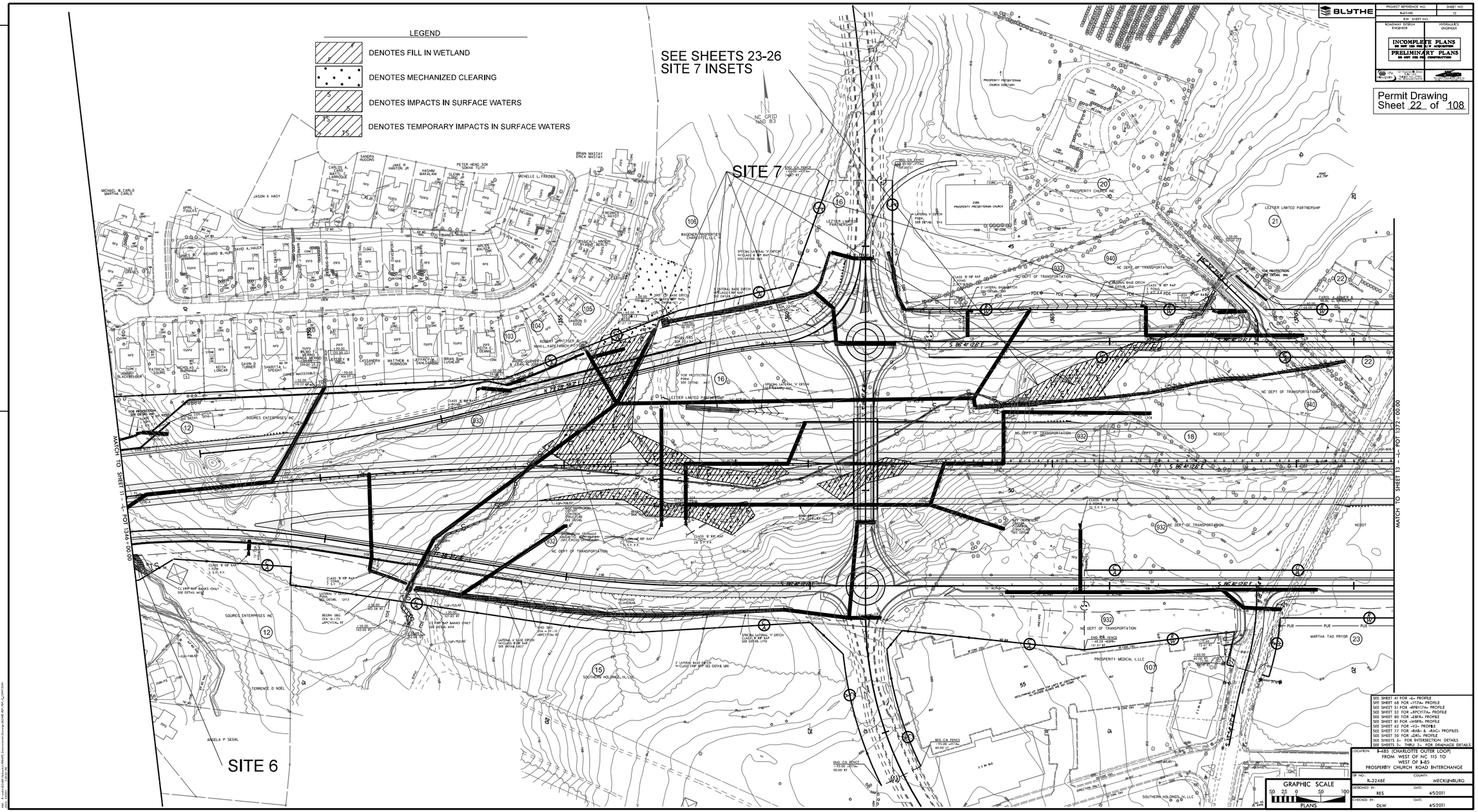
Permit Drawing
Sheet 21 of 108

SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 68 FOR -Y17A- PROFILE
SEE SHEET 51 FOR -PBY17A- PROFILE
SEE SHEET 53 FOR -BFC17A- PROFILE
SEE SHEET 80 FOR -LBF- PROFILE
SEE SHEET 81 FOR -WBF- PROFILE
SEE SHEET 62 FOR -Y2- PROFILE
SEE SHEET 77 FOR -RAB- & -RAC- PROFILES
SEE SHEET 50 FOR -DRL- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 7- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO.	COUNTY:
R-2248E	MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011

GRAPHIC SCALE
50 25 0 50 100
PLANS



BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	72
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 22 of 108

SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 68 FOR -V17A- PROFILE
SEE SHEET 51 FOR -PRV17A- PROFILE
SEE SHEET 53 FOR -RPCV17A- PROFILE
SEE SHEET 80 FOR -LBFR- PROFILE
SEE SHEET 81 FOR -VHSFR- PROFILE
SEE SHEET 62 FOR -Y2- PROFILE
SEE SHEET 77 FOR -RA8- & -RA2- PROFILES
SEE SHEET 50 FOR -DR1- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 7- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO.	COUNTY:
R-2248E	MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

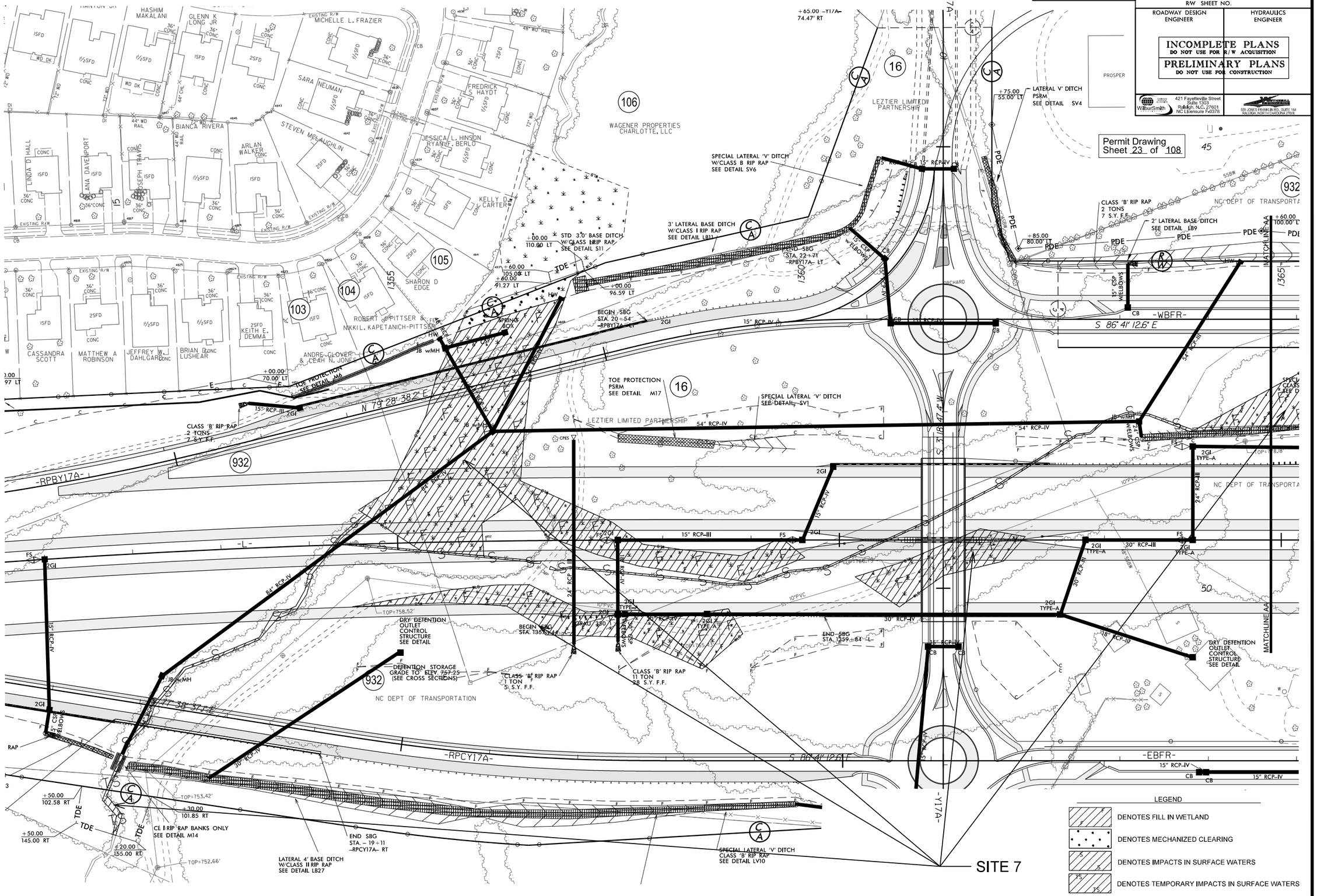
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, NC 27601, NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC. — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS

Permit Drawing
Sheet 23 of 108



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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	12A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

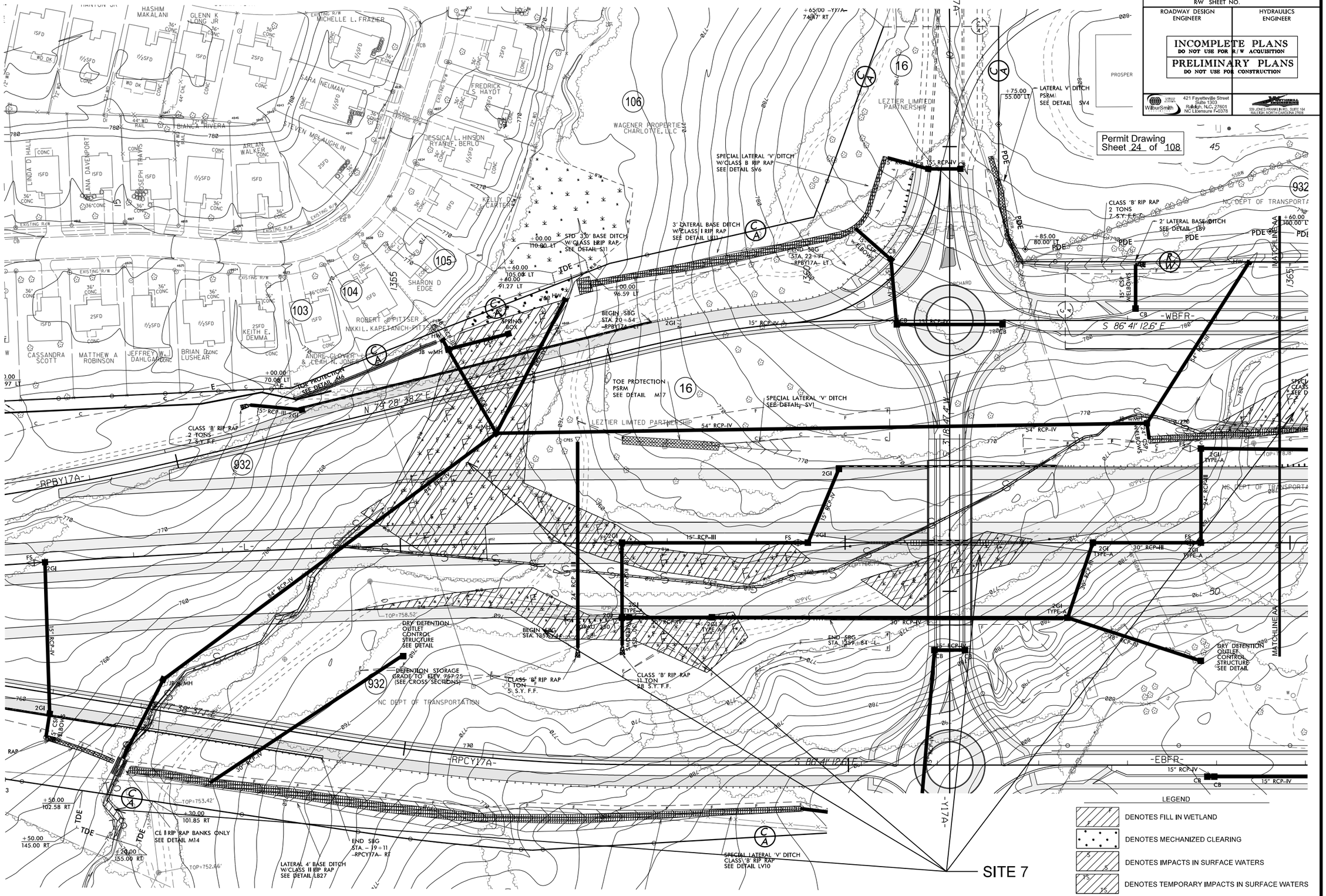
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, NC 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 24 of 108



REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	12B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

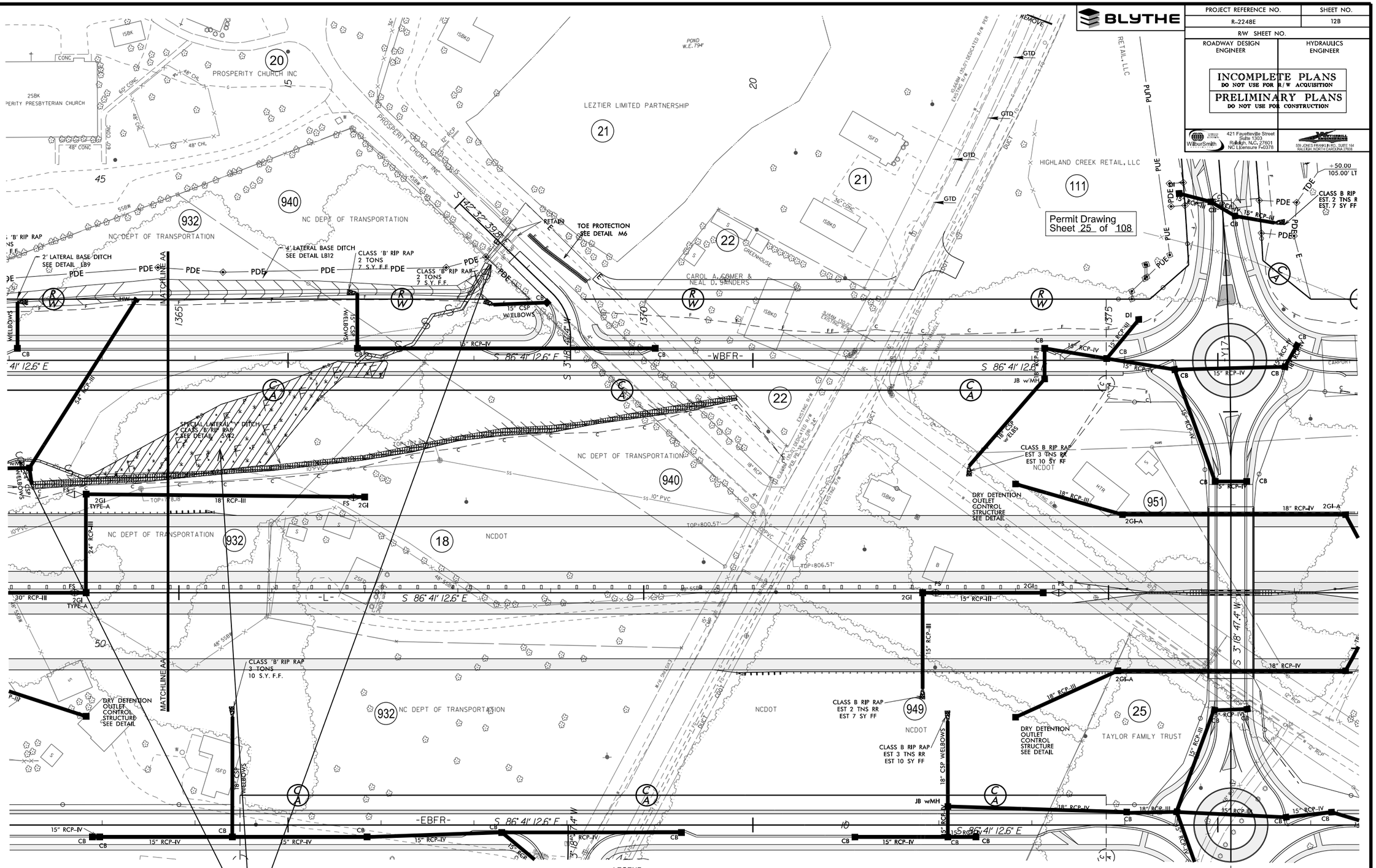
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, NC 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH NORTH CAROLINA 27606

Permit Drawing
Sheet 25 of 108



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

REVISIONS

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BLYTHE

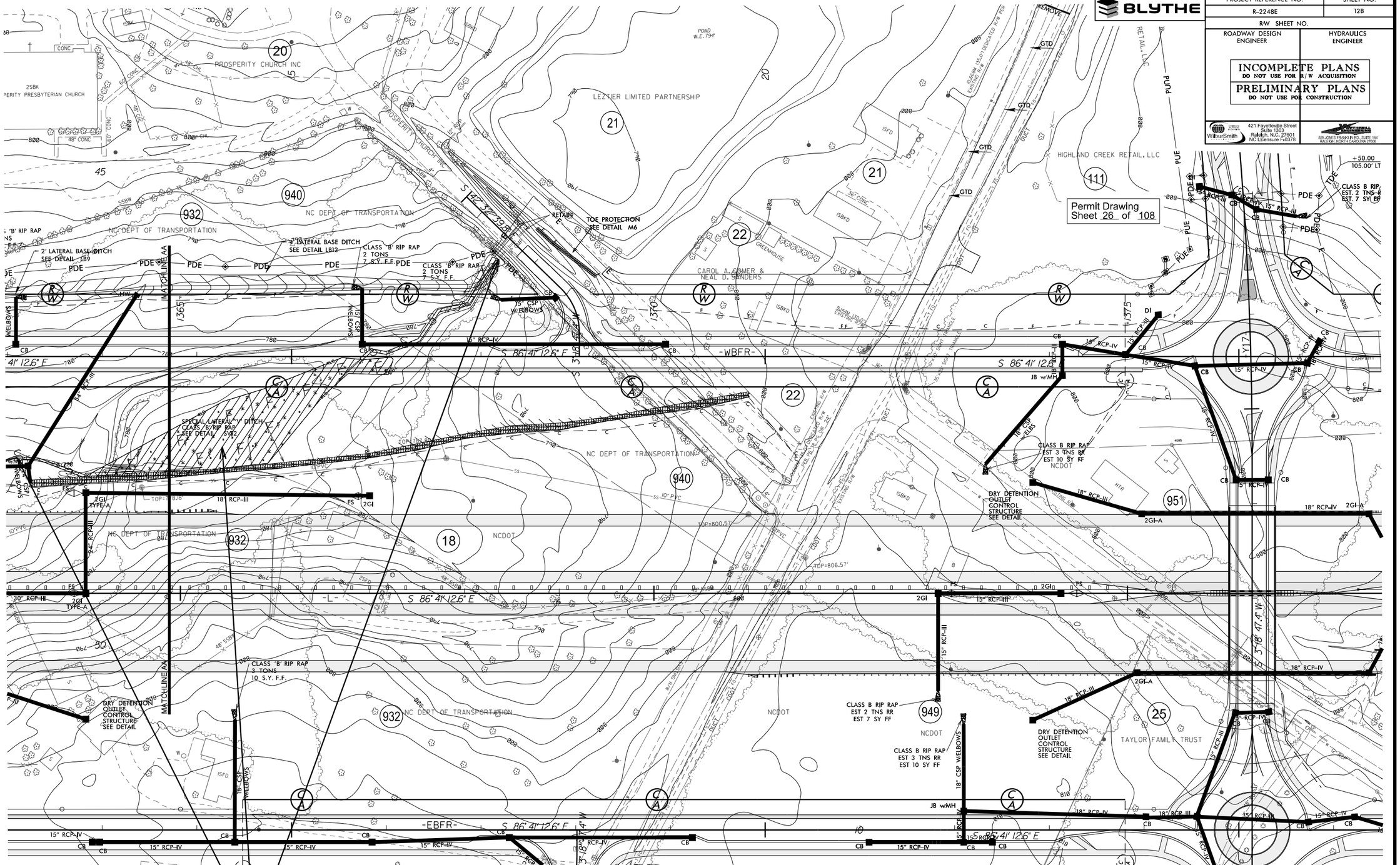
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	12B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, NC 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

REVISIONS

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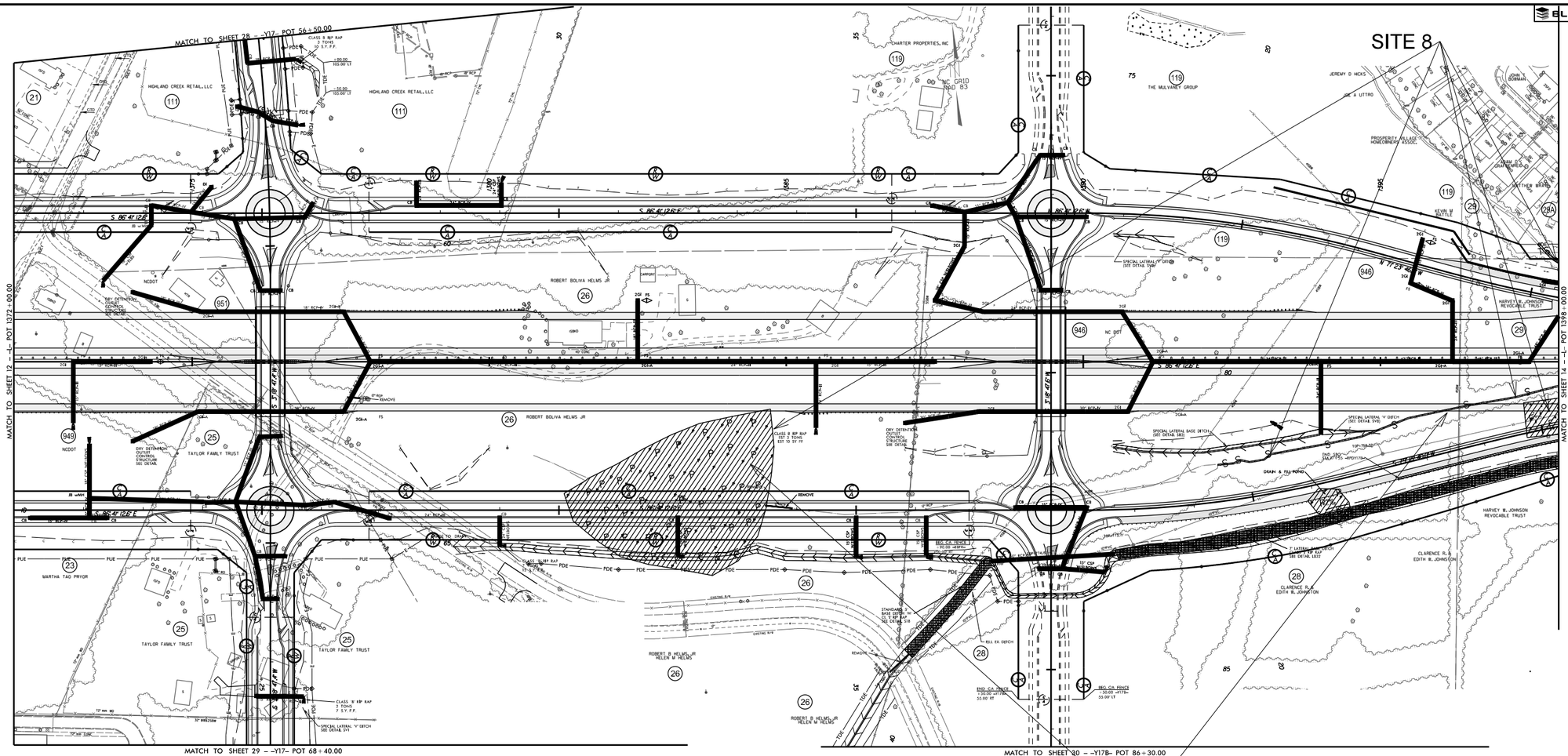


SEE SHEETS 29-32
FOR SITE 8 INSETS

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
- DENOTES IMPACTS IN SURFACE WATERS (POND)

SEE SHEETS 42 FOR -L- PROFILE
SEE SHEET 67 & 68 FOR -Y17- PROFILE
SEE SHEET 69 FOR -Y17B- PROFILE
SEE SHEETS 80 FOR -LEBF6- PROFILE
SEE SHEETS 81 FOR -LWBF6- PROFILE
SEE SHEET 51 FOR -RPA1178- PROFILE
SEE SHEET 53 FOR -RPD1178- PROFILE
SEE SHEET 77 FOR -RA4-, -RA5-, -RA6-, -RA7-, AND -RA8- PROFILES
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO. R-2248E | COUNTY: MECKLENBURG
DESIGNED BY: RES | DATE: 4/5/2011
CHECKED BY: DLW | DATE: 4/5/2011

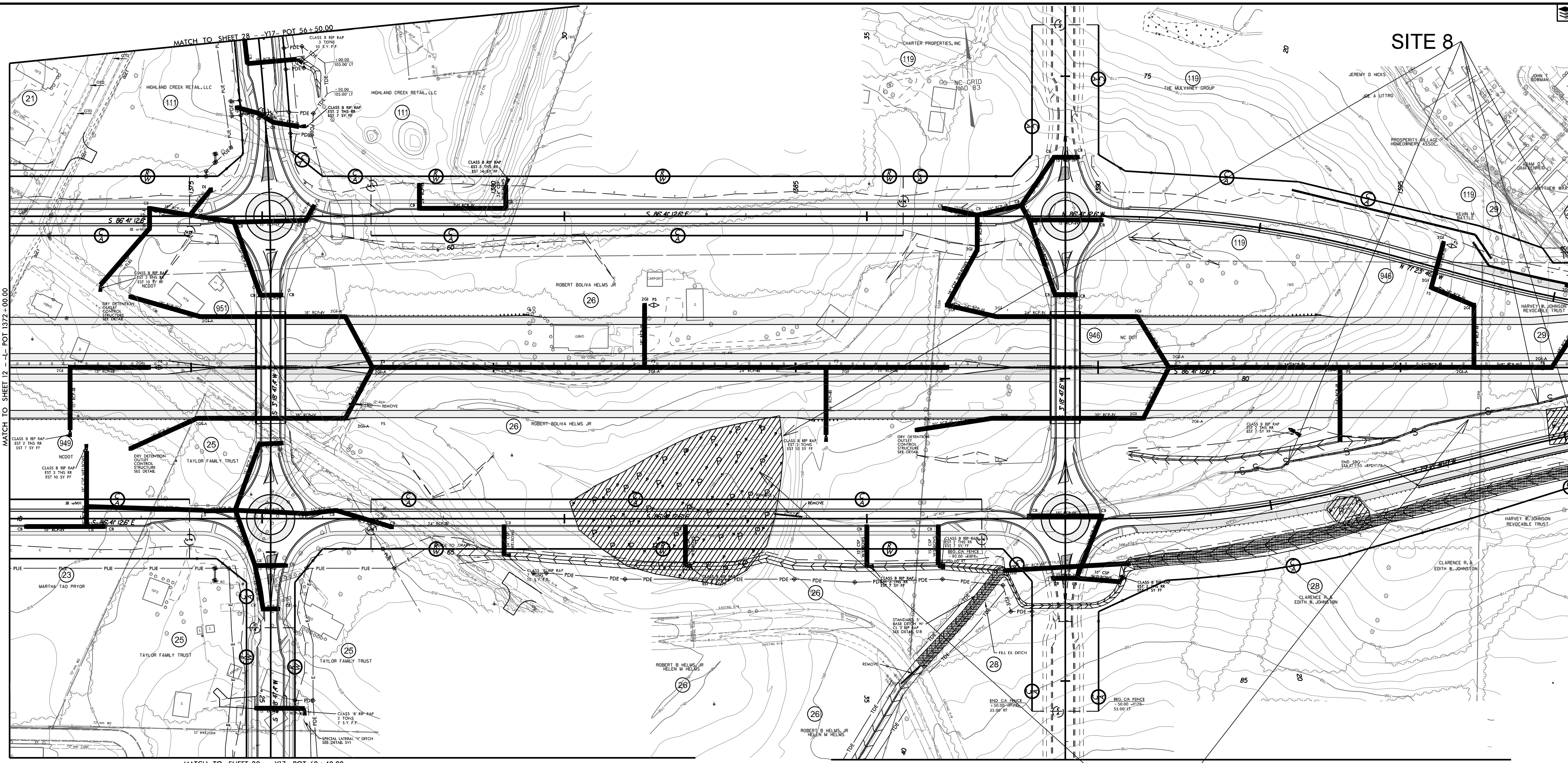
ELYTHE

PROJECT REFERENCE NO. R-2248E | SHEET NO. 13
R/W SHEET NO.
ROADWAY DESIGN ENGINEER | HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR RIGHT OF WAY CONSTRUCTION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 27 of 108

Permit Drawing
Sheet 28 of 108



LEGEND

F	DENOTES FILL IN WETLAND
S	DENOTES IMPACTS IN SURFACE WATERS
TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
P	DENOTES IMPACTS IN SURFACE WATERS (POND)

SEE SHEETS 29-32
FOR SITE 8 INSETS

SEE SHEETS 42 FOR –L– PROFILE
SEE SHEET 67 & 68 FOR –Y17– PROFILE
SEE SHEET 69 FOR –Y17B– PROFILE
SEE SHEETS 80 FOR –EBFR– PROFILE
SEE SHEETS 81 FOR –WBFR– PROFILE
SEE SHEET 51 FOR –RPAY17B– PROFILE
SEE SHEET 53 FOR –RPDY17B– PROFILE
SEE SHEET 77 FOR –RAA–, –RAD–, –RAE–, AND –RAF– PROFILES
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

Wilbur Smith, 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85
PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO.: R-2248E	COUNTY: MECKLINBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011

GRAPHIC SCALE
50 25 0 50 100
PLANS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Enviornmental\Drawings\R2248E_RDY_PSH_13_CONT.DGN
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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

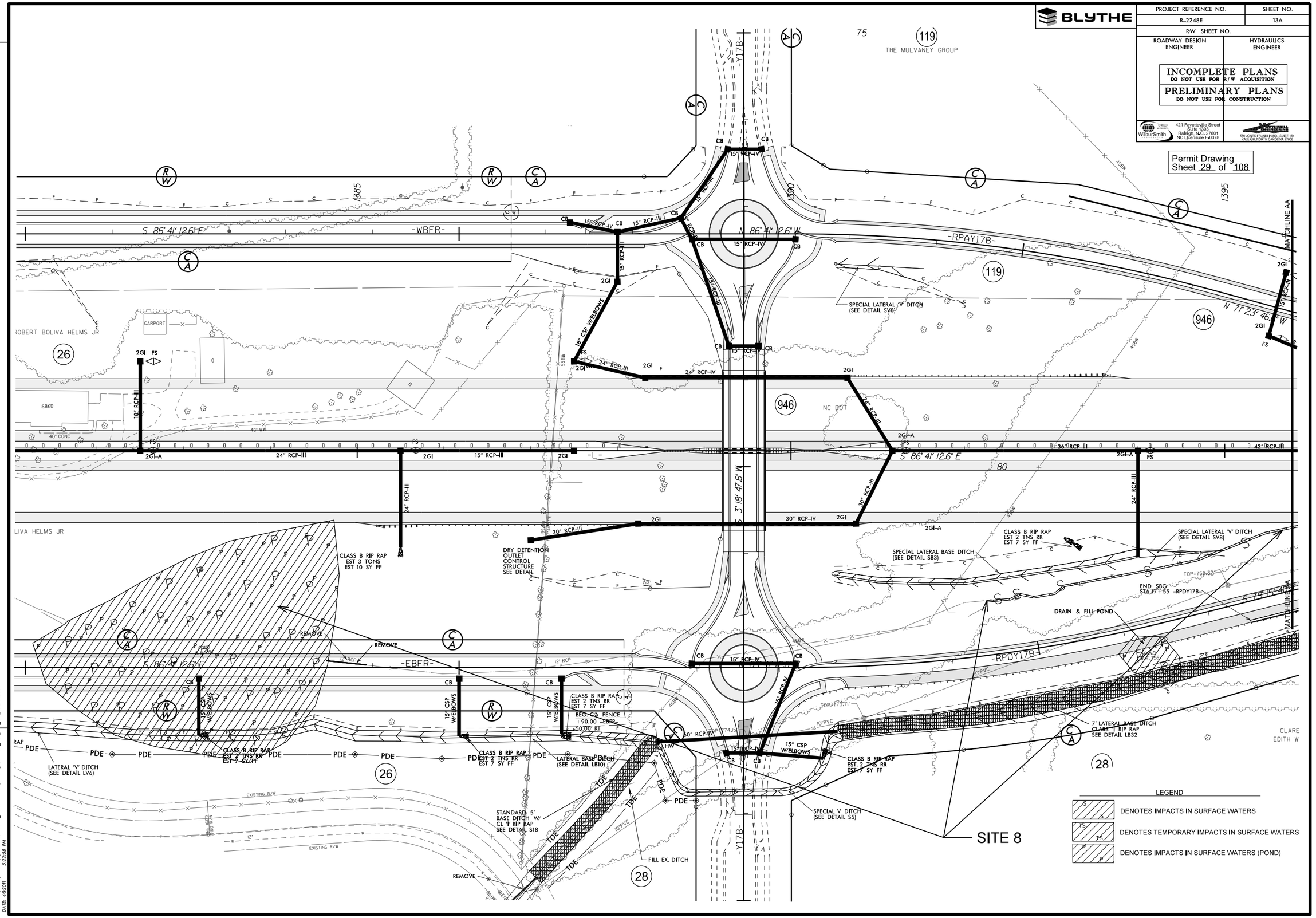
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 29 of 108



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

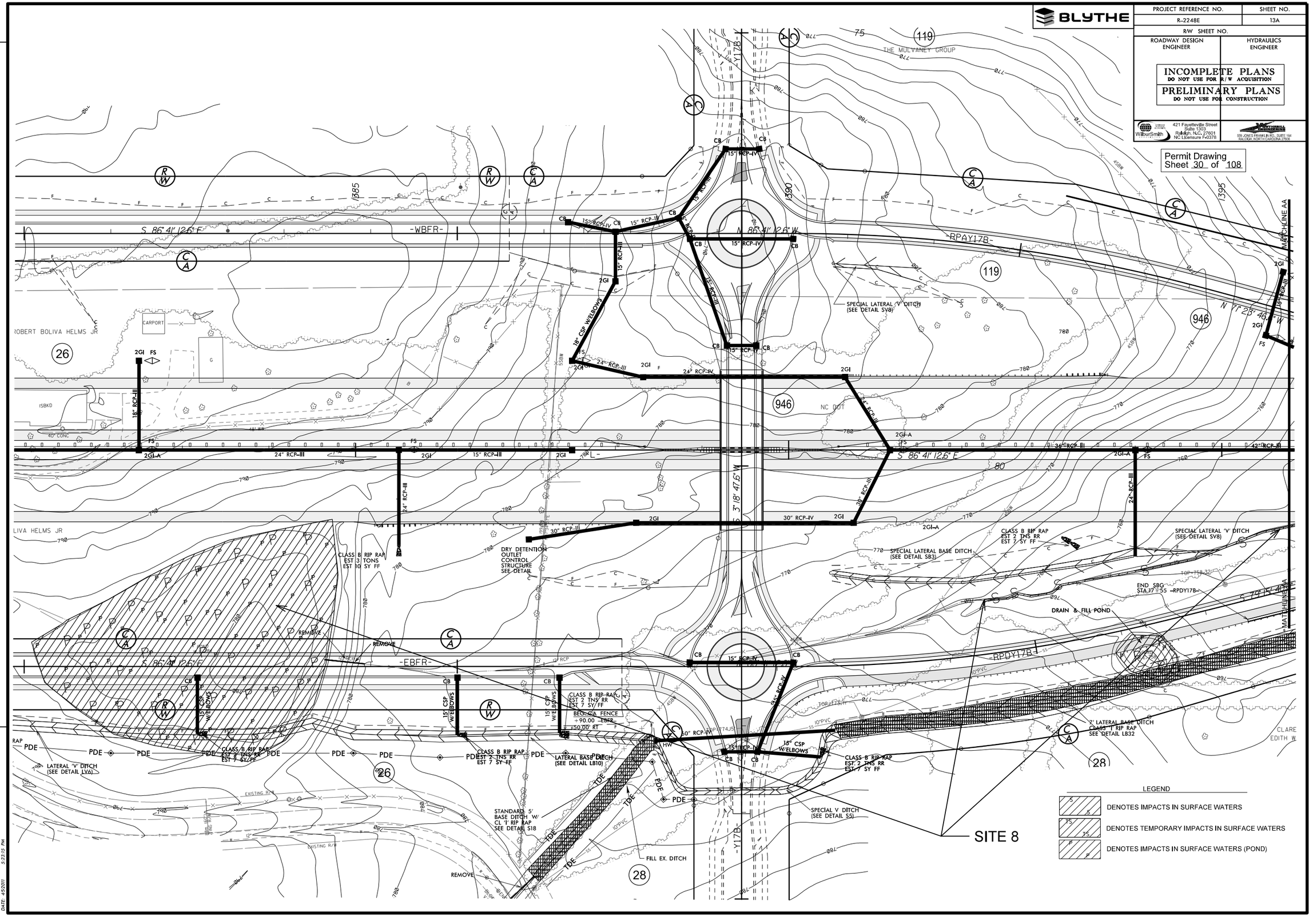
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KITTELMAN & ASSOCIATES
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 30 of 108

REVISIONS



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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

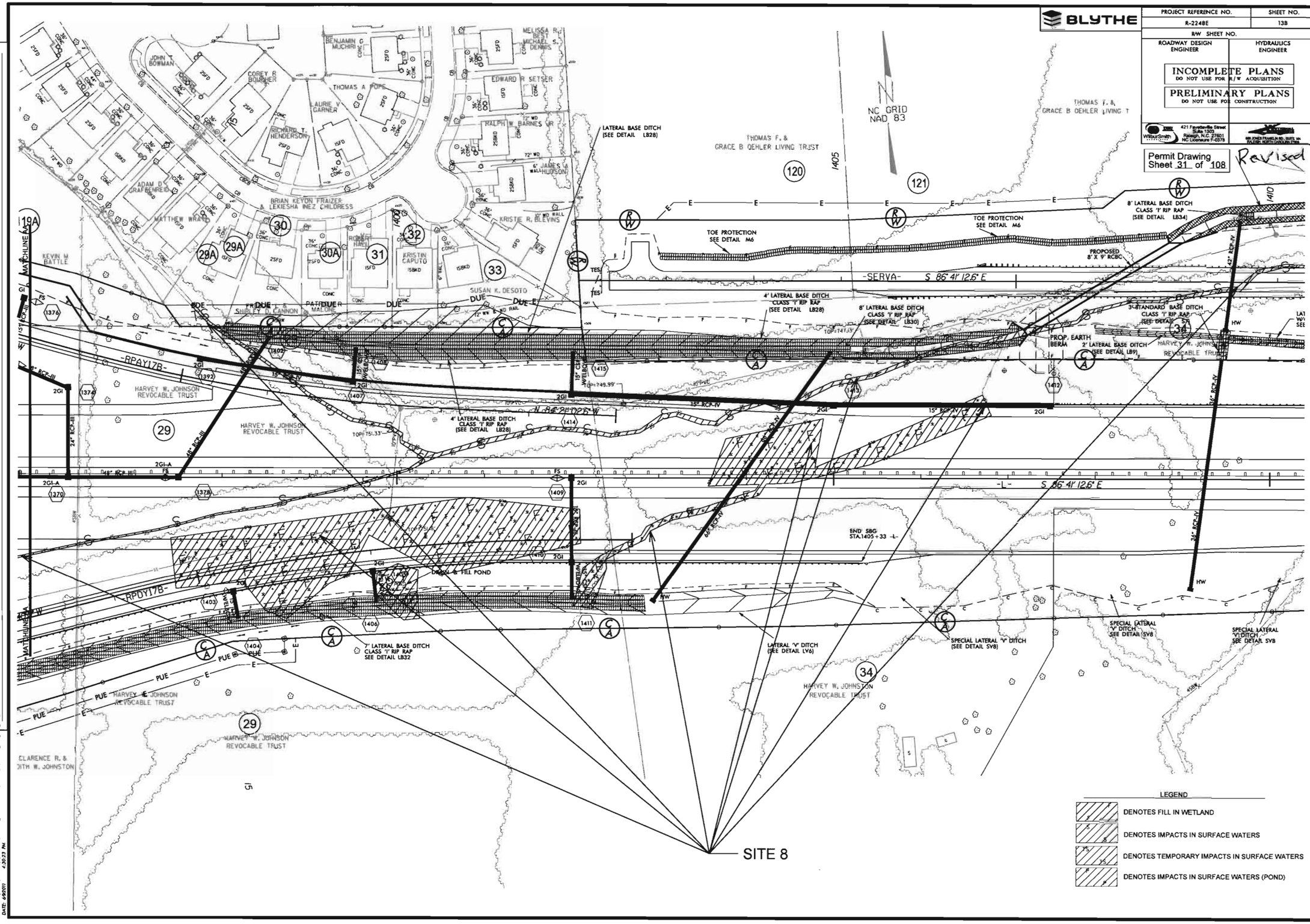
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601 NC Licensure F-0378

Permit Drawing
Sheet 31 of 108

Revised 6-9-2011



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

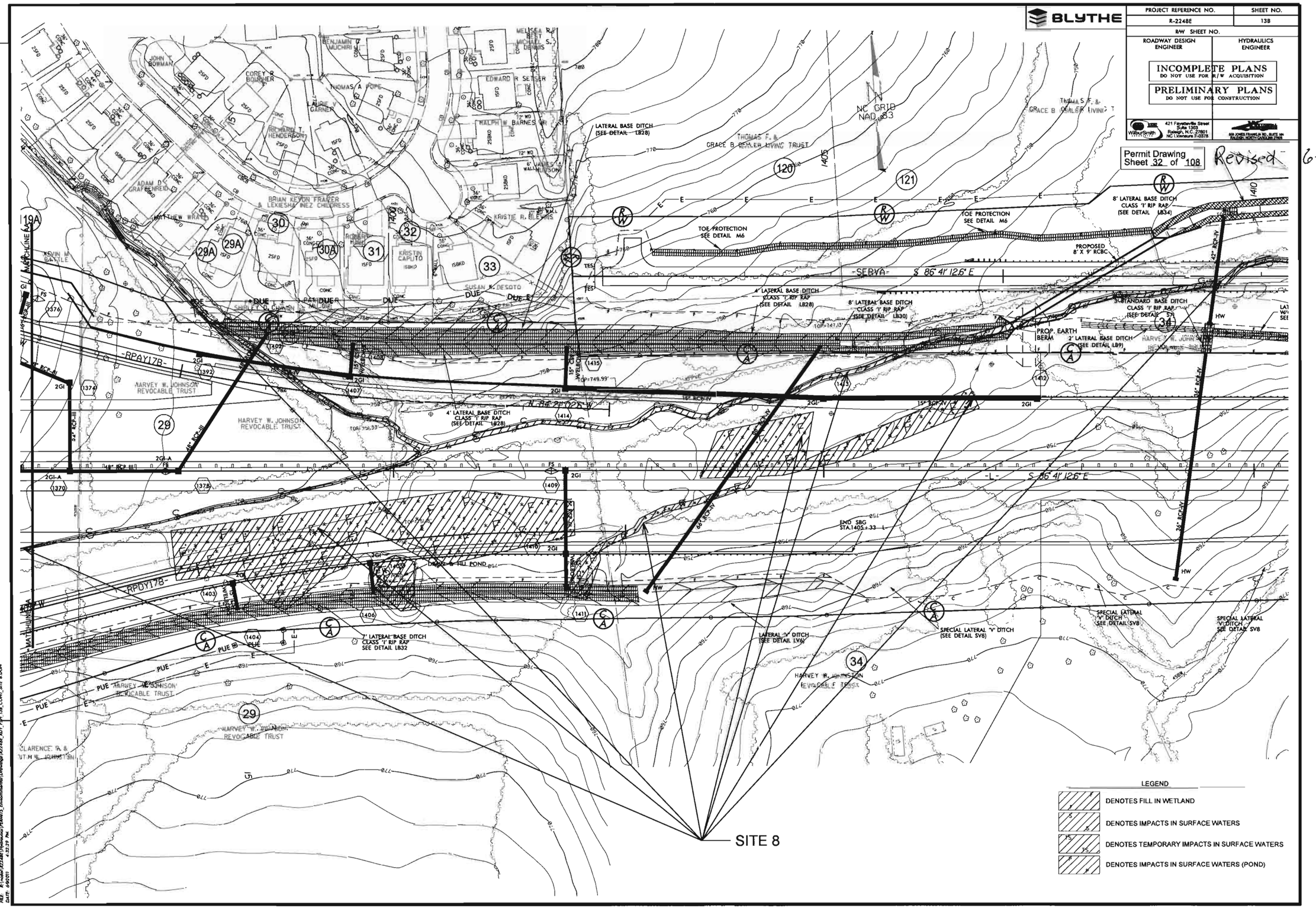
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

HDR — 800 JONES FRANKLIN RD., SUITE 100, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 32 of 108

Revised 6-9-2011



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
- DENOTES IMPACTS IN SURFACE WATERS (POND)

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

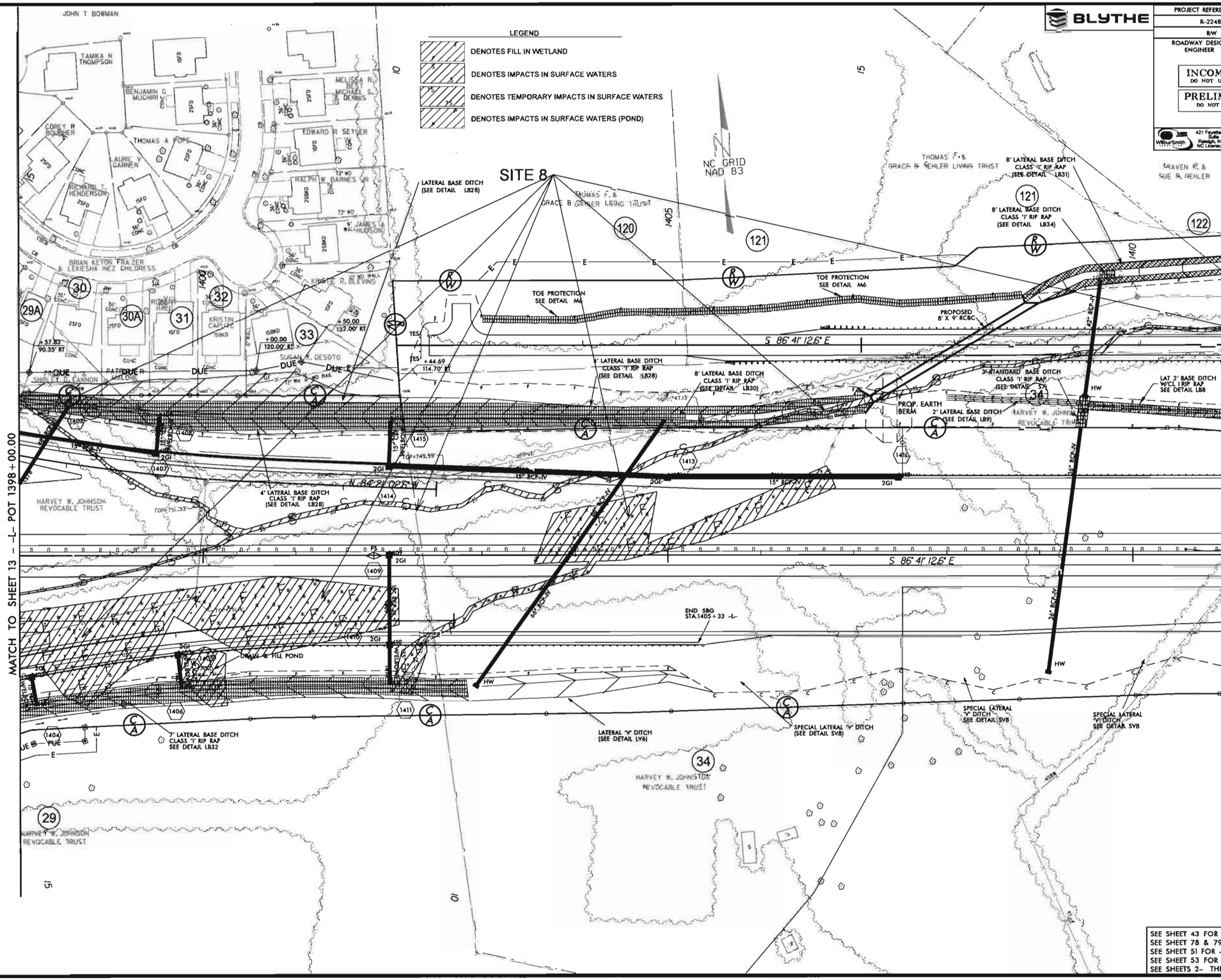
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MICHAEL BAKER JR., INC. — 8000 JONES BRANCH DR., SUITE 100, MCLEAN, NORTH CAROLINA 22102

Permit Drawing
Sheet 33 of 108

Revised
6-9-2011



SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 78 & 79 FOR -SERVA- PROFILE
SEE SHEET 51 FOR -RPAY17B- PROFILE
SEE SHEET 53 FOR -RPDY17B- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

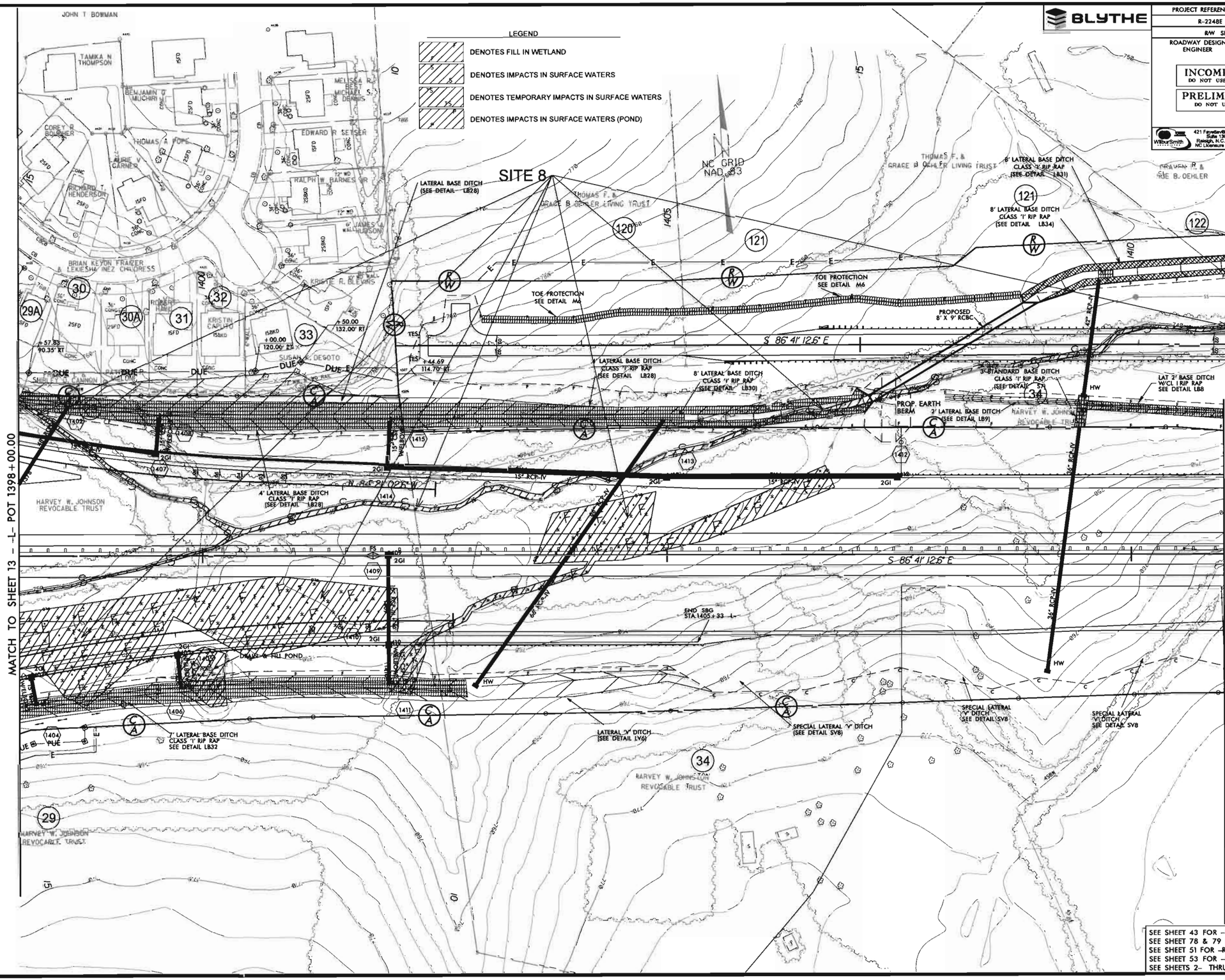
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith Associates — 421 Fayetteville Street, Suite 1300, Raleigh, N.C. 27601, NC Licensure F-0378

MK JOHN FRANKLIN RD., SUITE 144, RALEIGH, NORTH CAROLINA 27603

Permit Drawing
Sheet 34 of 108

Revised
6-9-2011



SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 78 & 79 FOR -SERVA- PROFILE
SEE SHEET 51 FOR -RPAY17B- PROFILE
SEE SHEET 53 FOR -RPDY17B- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

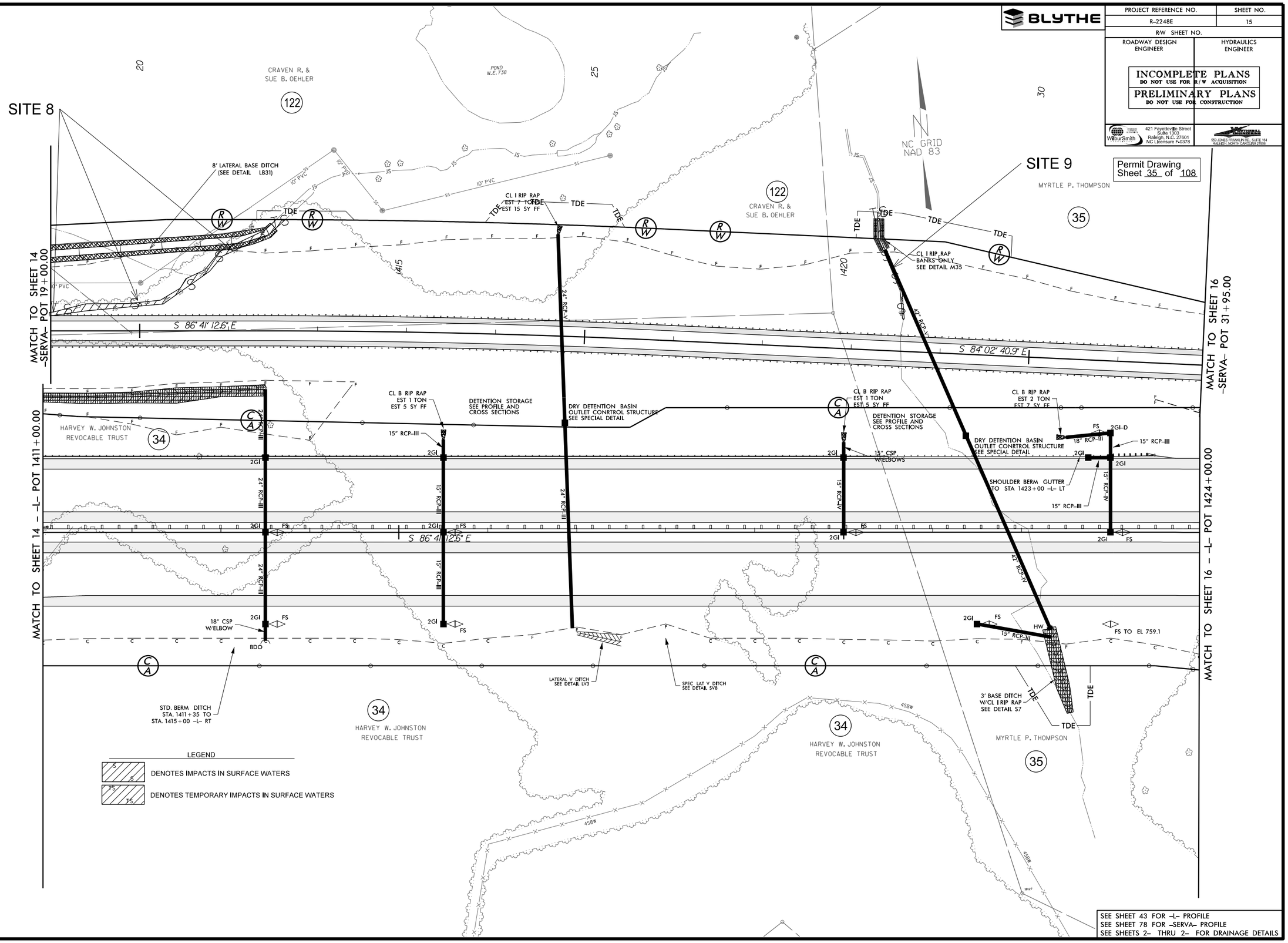
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 35 of 108



SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 78 FOR -SERVA- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

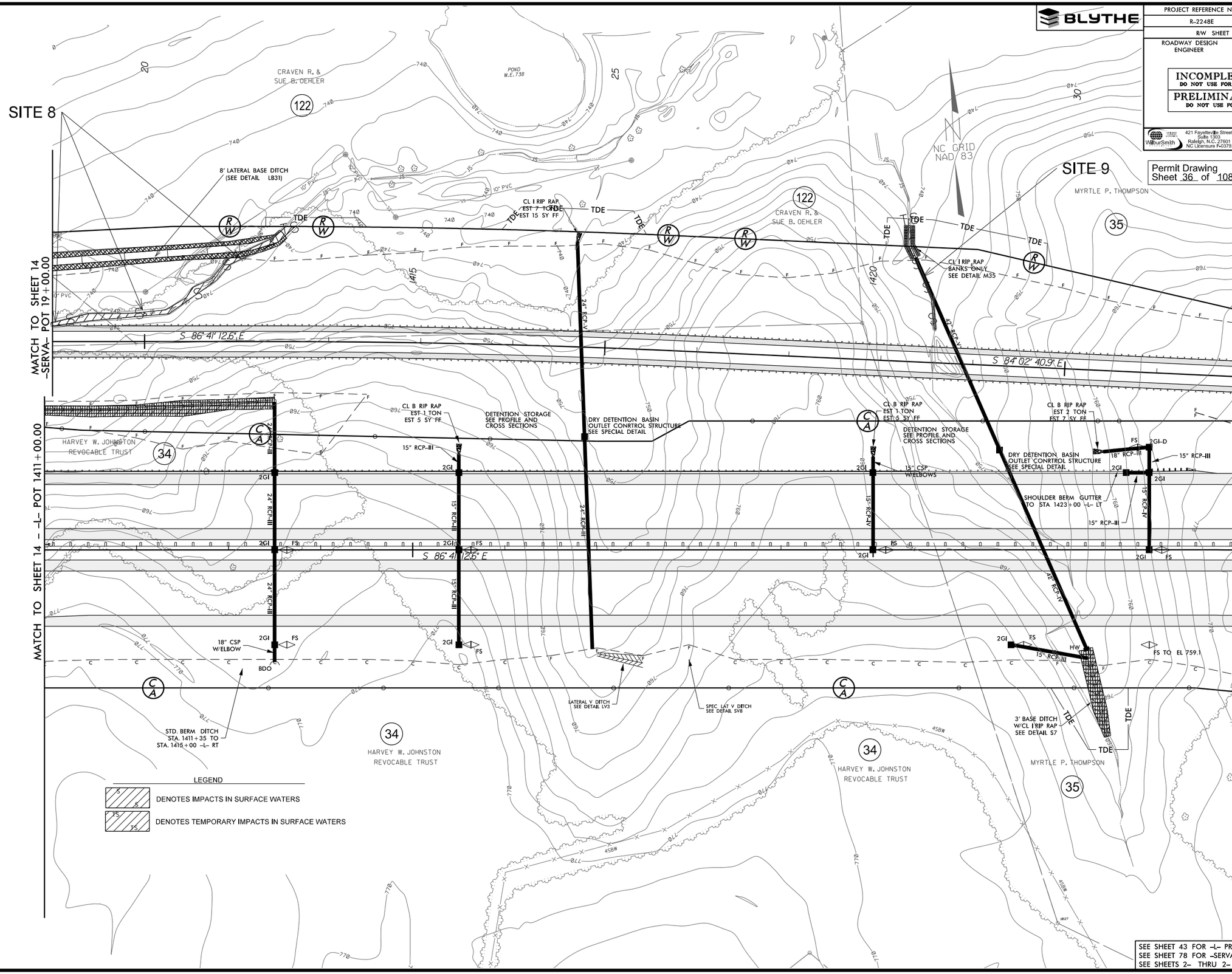
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 36 of 108



SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 78 FOR -SERVA- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Enviornmental\Drawings\R2248E_RDY_PRM_15_CONT.DGN
DATE: 4/5/2011 5:25:01 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

Permit Drawing
Sheet 37 of 108

LEGEND

DENOTES IMPACTS IN SURFACE WATERS

DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

SITE 10

MATCH TO SHEET 16 -SERVA- POT 45+68.00

MATCH TO SHEET 16 - -L- POT 1437+00.00

MATCH TO SHEET 18 - -L- POT 1450+00.00

S 60° 43' 35.7" E

S 63° 50' 46.6" E

N 83° 32' 27.1" E

S 17° 17' 37.1" W

NC GRID NAD 83

BENJAMIN MICHAEL OEHLER

JAY MACK OEHLER
CONSTANCE J OEHLER (REV/TST)

JAY MACK &
CONSTANCE J. OEHLER

JASON ROBERT OEHLER

JOSHUA DANIEL OEHLER

JAY MACK OEHLER

JEFFREY F MEYER &
CATHERINE R. MOWRY

VALERIE C GRAY

GENE SMITH

RHONDA B NIXON

WALLACE RIDGE LAND TRUST

GREGORY L THOMAS

SARAH BATISTA

DAVID M & JOANI L. YERTY

O. THOMPSON JR

COHEEN PROPERTIES, INC

CLARENCE ROSS RITCHIE III
& YVONNE POOLE RITCHIE

SPEC LAT V DITCH W/PSRM SEE DETAIL SV20

CL I RIP RAP BANKS ONLY SEE DETAIL M36

TOE PROTECTION SEE DETAIL M34

CL B RIP RAP EST 2 TON EST 7 SY FF

CL B RIP RAP EST 1 TON EST 5 SY FF

DRY DETENTION BASIN OUTLET CONTROL STRUCTURE SEE SPECIAL DETAIL

4' BASE DITCH W/CL I RIP RAP SEE DETAIL S45

SPECIAL BERM SEE DETAIL M37

CL B RIP RAP EST 5 TONS EST 16 SY FF

SHOULDER BERM GUTTER STA 1440+00 TO 1442+00 -L- LT

24" CSP W/ELBOW

STD. BERM DITCH STA. 1435+35 TO STA. 1438+00 -L- RT

SPECIAL DITCH GRADE FROM STA 1433+50 TO STA 1438+00 -L- RT SEE PROFILE FOR GRADE

SPECIAL DITCH GRADE STA 1444+50 TO STA 1446+50 -L- RT SEE PROFILE FOR GRADE

SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 79 FOR -SERVA- PROFILE
SEE SHEET 65 FOR -Y6- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\indot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PSH_17.DGN
DATE: 4/5/2011 5:25:15 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	17
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 38 of 108

LEGEND

DENOTES IMPACTS IN SURFACE WATERS

DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

SITE 10

MATCH TO SHEET 16 -SERVA- POT 45+68.00

MATCH TO SHEET 16 - -L- POT 1437+00.00

MATCH TO SHEET 18 - -L- POT 1450+00.00

S 60° 43' 35.7" E

S 63° 50' 46.6" E

N 83° 32' 27.1" E

S 17° 17' 37.1" W

SPEC LAT V-DITCH W/PSRM SEE DETAIL SV20

CL I RIP RAP BANKS ONLY SEE DETAIL M36

TOE PROTECTION SEE DETAIL M34

CL B RIP RAP EST 2 TON EST 7 SY FF

CL B RIP RAP EST 1 TON EST 5 SY FF

DRY DETENTION BASIN OUTLET CONTROL STRUCTURE SEE SPECIAL DETAIL

4' BASE DITCH W/CL I RIP RAP SEE DETAIL S45

SPECIAL BERM SEE DETAIL M37

CL B RIP RAP EST 5 TONS EST 16 SY FF

SHOULDER BERM GUTTER STA 1440+00 TO 1442+00 -L- LT

STD BERM DITCH STA. 1435+35 TO STA. 1438+00 -L- RT

SPECIAL DITCH GRADE FROM STA 1433+50 TO STA 1438+00 -L- RT SEE PROFILE FOR GRADE

SPECIAL DITCH GRADE STA 1444+50 TO STA 1446+50 -L- RT SEE PROFILE FOR GRADE

SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 79 FOR -SERVA- PROFILE
SEE SHEET 65 FOR -Y6- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PSH_17_CONT.DGN
DATE: 4/5/2011 5:25:31 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E R-2248E	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

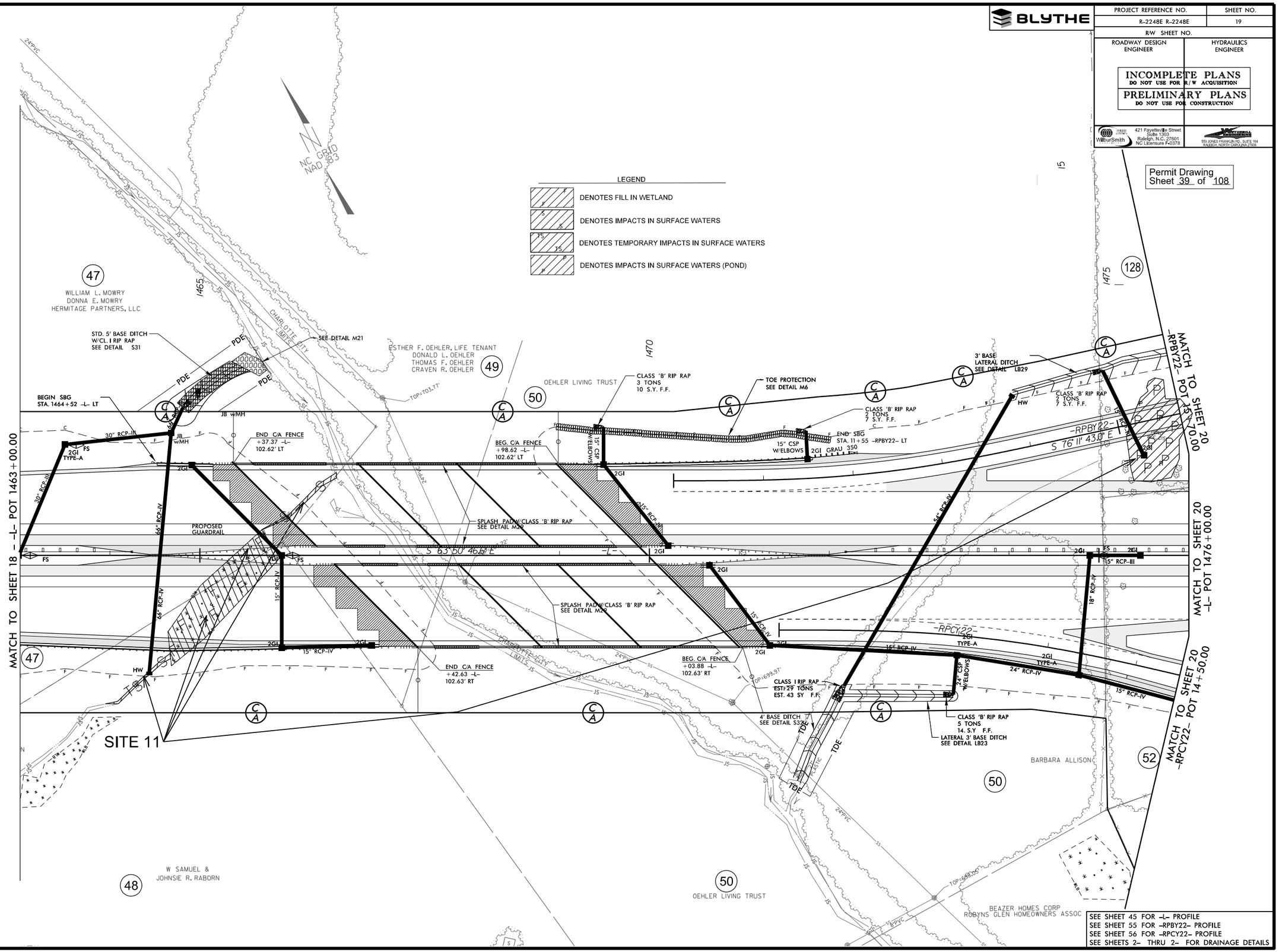
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 39 of 108



SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -RPBY22- PROFILE
SEE SHEET 56 FOR -RPCY22- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\mcfol\R2248E\Hydraulics\PERMITS_Environmental Drawings\R2248E_RDY_PLH_19.DGN
DATE: 4/5/2011 5:25:48 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E R-2248E	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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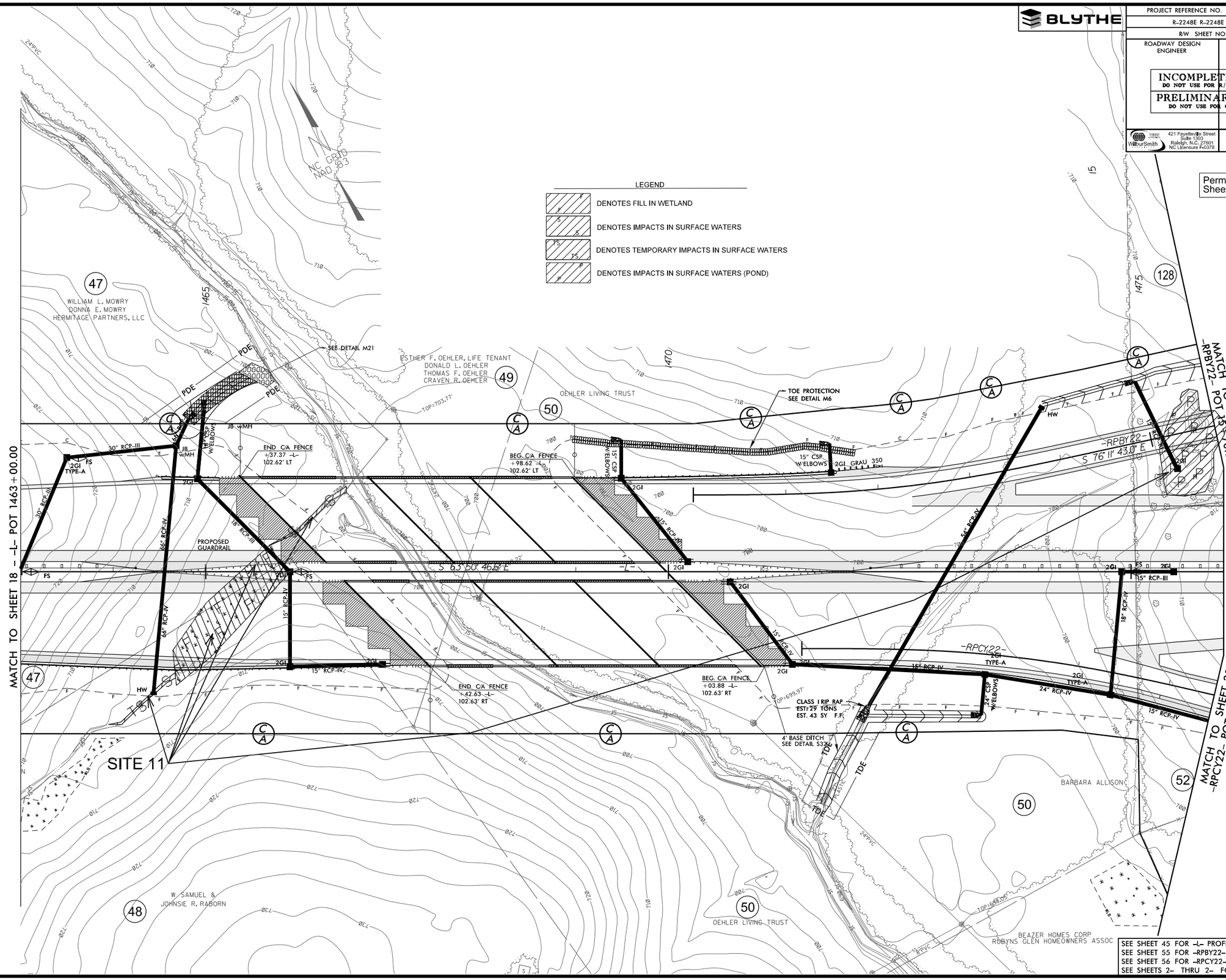
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 40 of 108

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
- DENOTES IMPACTS IN SURFACE WATERS (POND)



SEE SHEET 45 FOR -L- PROFILE
SEE SHEET 55 FOR -RPBY22- PROFILE
SEE SHEET 56 FOR -RPCY22- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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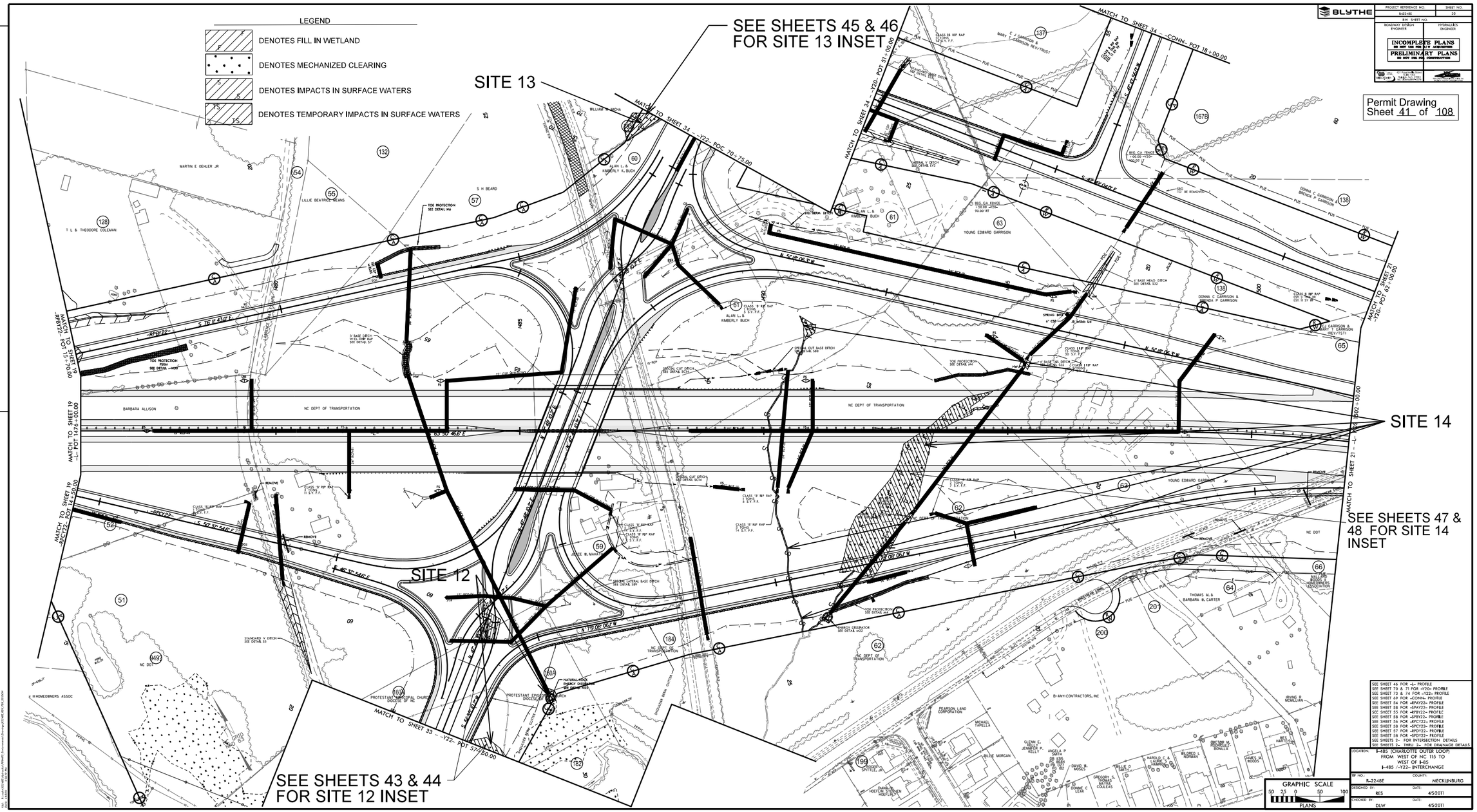
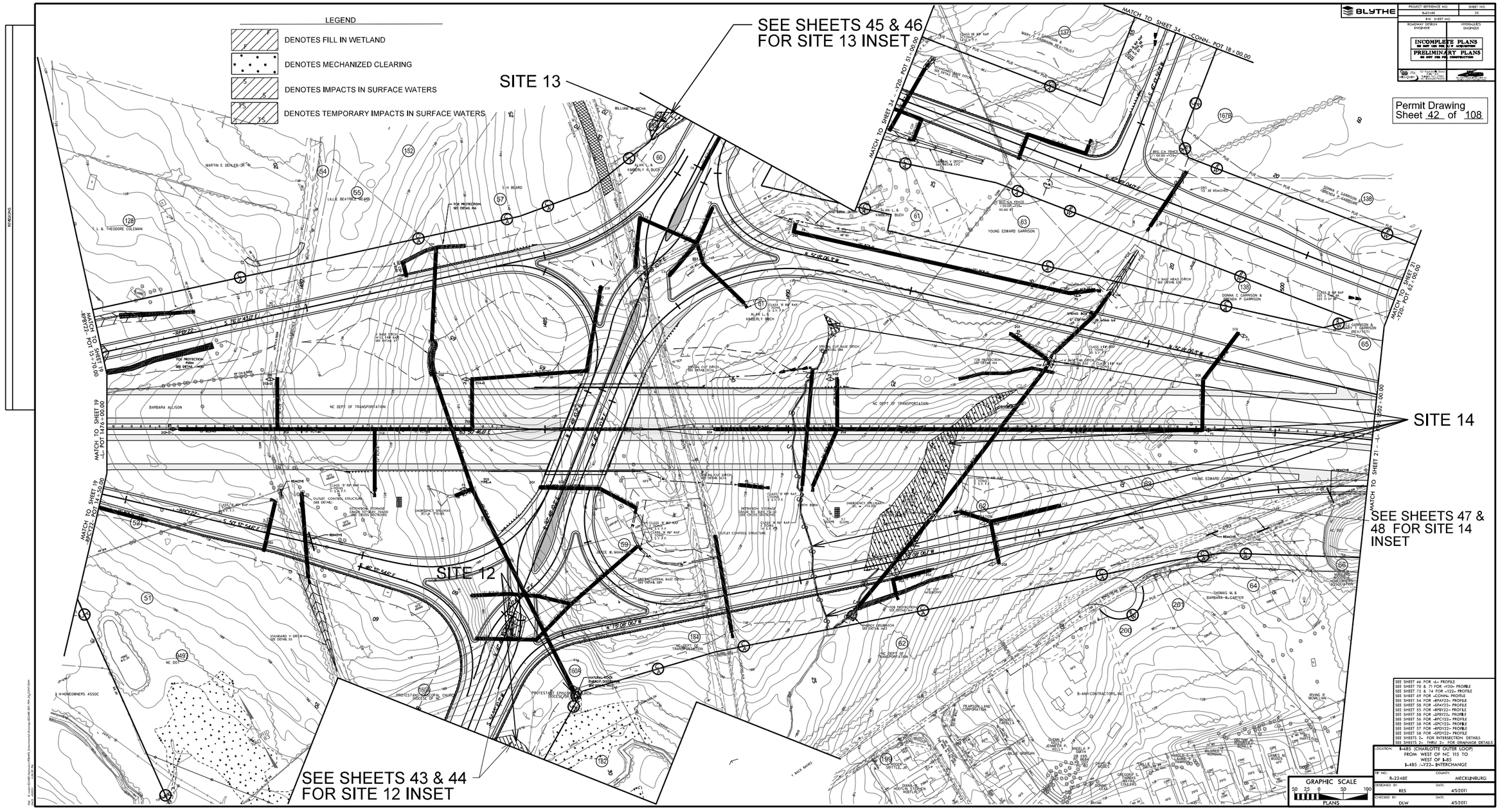

LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
SEE SHEETS 45 & 46 FOR SITE 13 INSET
SITE 13
SITE 14
SITE 12
SEE SHEETS 47 & 48 FOR SITE 14 INSET
SEE SHEETS 43 & 44 FOR SITE 12 INSET
MATCH TO SHEET 34 -Y2D- POT 52+00.00
MATCH TO SHEET 34 -CONN- POT 18+00.00
MATCH TO SHEET 34 -Y2T- POT 20+75.00
MATCH TO SHEET 21 -Y2R- POT 0+00.00
MATCH TO SHEET 19 -L- POT 1476+00.00
MATCH TO SHEET 19 -RPRY22- POT 15+70.00
MATCH TO SHEET 19 -RPRY22- POT 14+25.00
MATCH TO SHEET 33 -Y2- POT 57+50.00
MATCH TO SHEET 21 -L- POT 1602+00.00
BLYTHE
INCOMPLETE PLANS
PRELIMINARY PLANS
Permit Drawing
Sheet 41 of 108
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 70 & 71 FOR -Y2D- PROFILE
SEE SHEET 73 & 74 FOR -Y2T- PROFILE
SEE SHEET 69 FOR -CONN- PROFILE
SEE SHEET 54 FOR -RPAY22- PROFILE
SEE SHEET 58 FOR -SPAY22- PROFILE
SEE SHEET 55 FOR -RPBY22- PROFILE
SEE SHEET 58 FOR -SPBY22- PROFILE
SEE SHEET 56 FOR -RPCY22- PROFILE
SEE SHEET 58 FOR -SPCY22- PROFILE
SEE SHEET 57 FOR -RPDY22- PROFILE
SEE SHEET 58 FOR -SPDY22- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85
I-485 -Y2T- INTERCHANGE
TIP NO: R-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011
GRAPHIC SCALE
50 25 0 50 100
PLANS


LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
SEE SHEETS 45 & 46 FOR SITE 13 INSET
SITE 13
SITE 14
SITE 12
SEE SHEETS 47 & 48 FOR SITE 14 INSET
SEE SHEETS 43 & 44 FOR SITE 12 INSET
MATCH TO SHEET 34 -CONN. POT 18+00.00
MATCH TO SHEET 19 -RPB/22- POT 1+70.00
MATCH TO SHEET 19 -L- POT 1476+00.00
MATCH TO SHEET 19 -RPC/22- POT 1+00.00
MATCH TO SHEET 21 -Y2D- POT 6+00.00
MATCH TO SHEET 21 -L- POT 1502+00.00
BLYTHE
INCOMPLETE PLANS
DO NOT USE FOR ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
Permit Drawing
Sheet 42 of 108
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 70 & 71 FOR -Y2D- PROFILE
SEE SHEET 73 & 74 FOR -Y22- PROFILE
SEE SHEET 69 FOR -CONN- PROFILE
SEE SHEET 54 FOR -RPAY22- PROFILE
SEE SHEET 55 FOR -RPBY22- PROFILE
SEE SHEET 56 FOR -RPCY22- PROFILE
SEE SHEET 57 FOR -RPDY22- PROFILE
SEE SHEET 58 FOR -RPEY22- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 I-485 /-Y22- INTERCHANGE
TIP NO. R-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011
GRAPHIC SCALE
50 25 0 50 100
PLANS

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

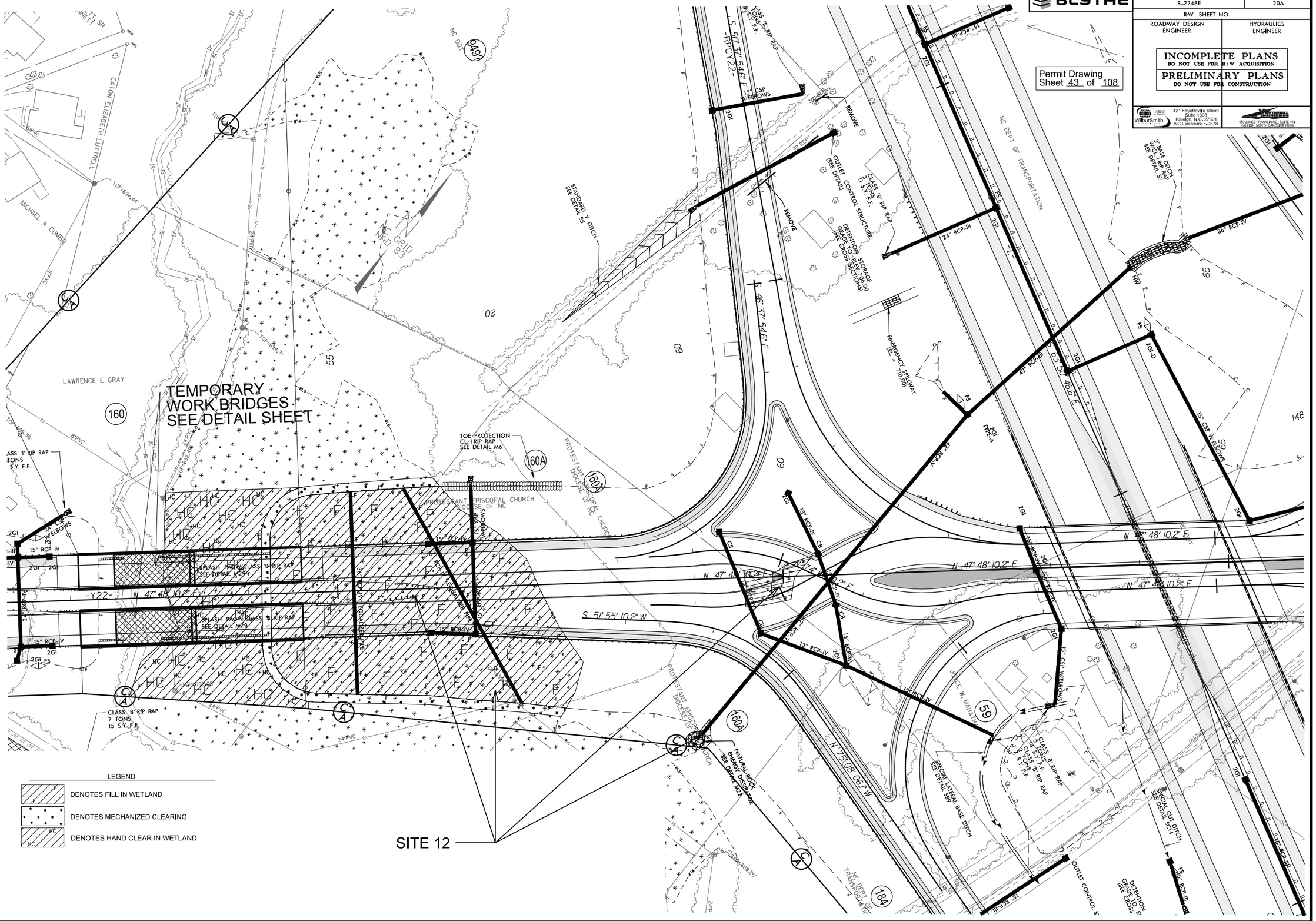
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 43 of 108



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

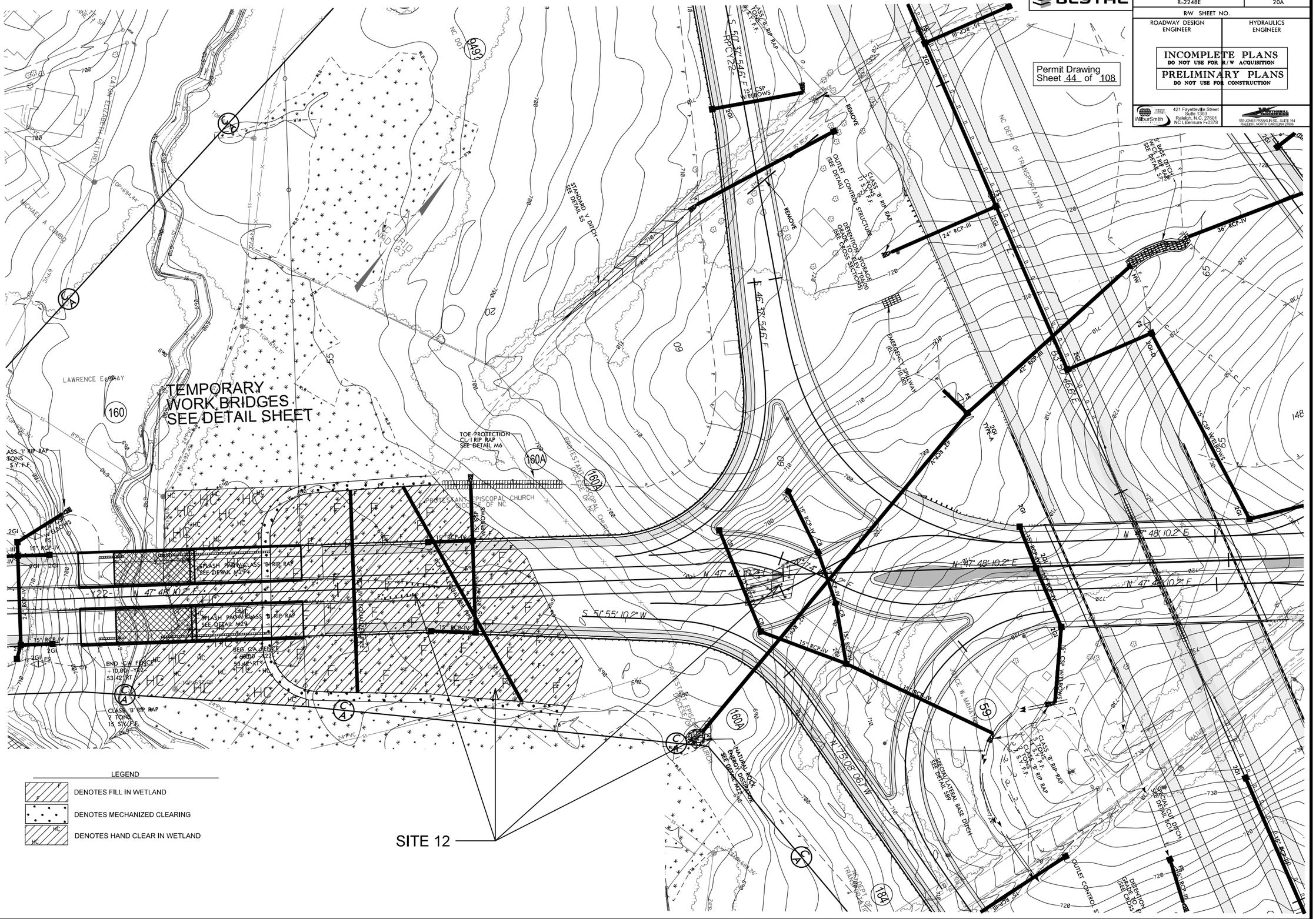
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 44 of 108



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

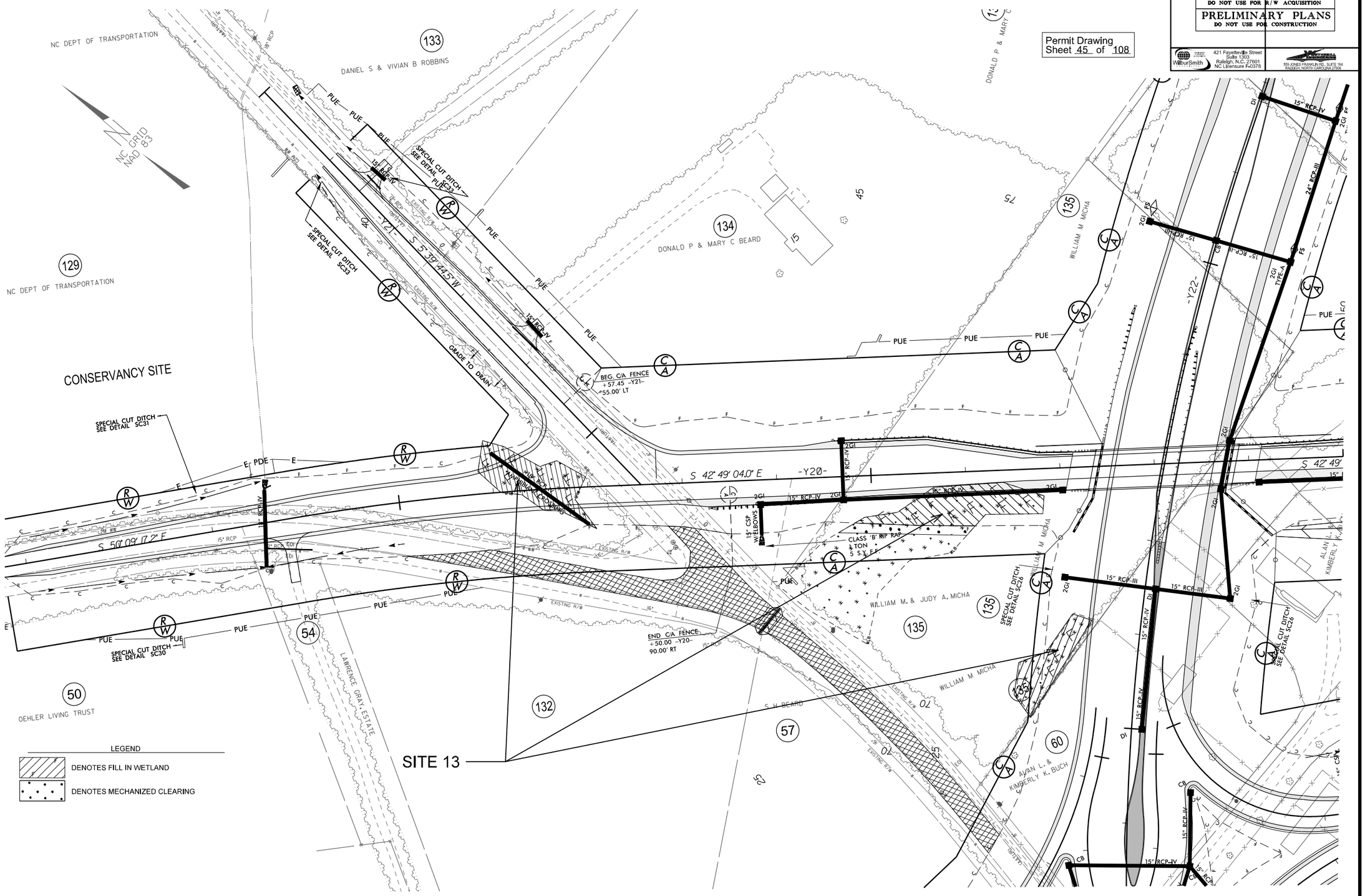
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 45 of 108



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

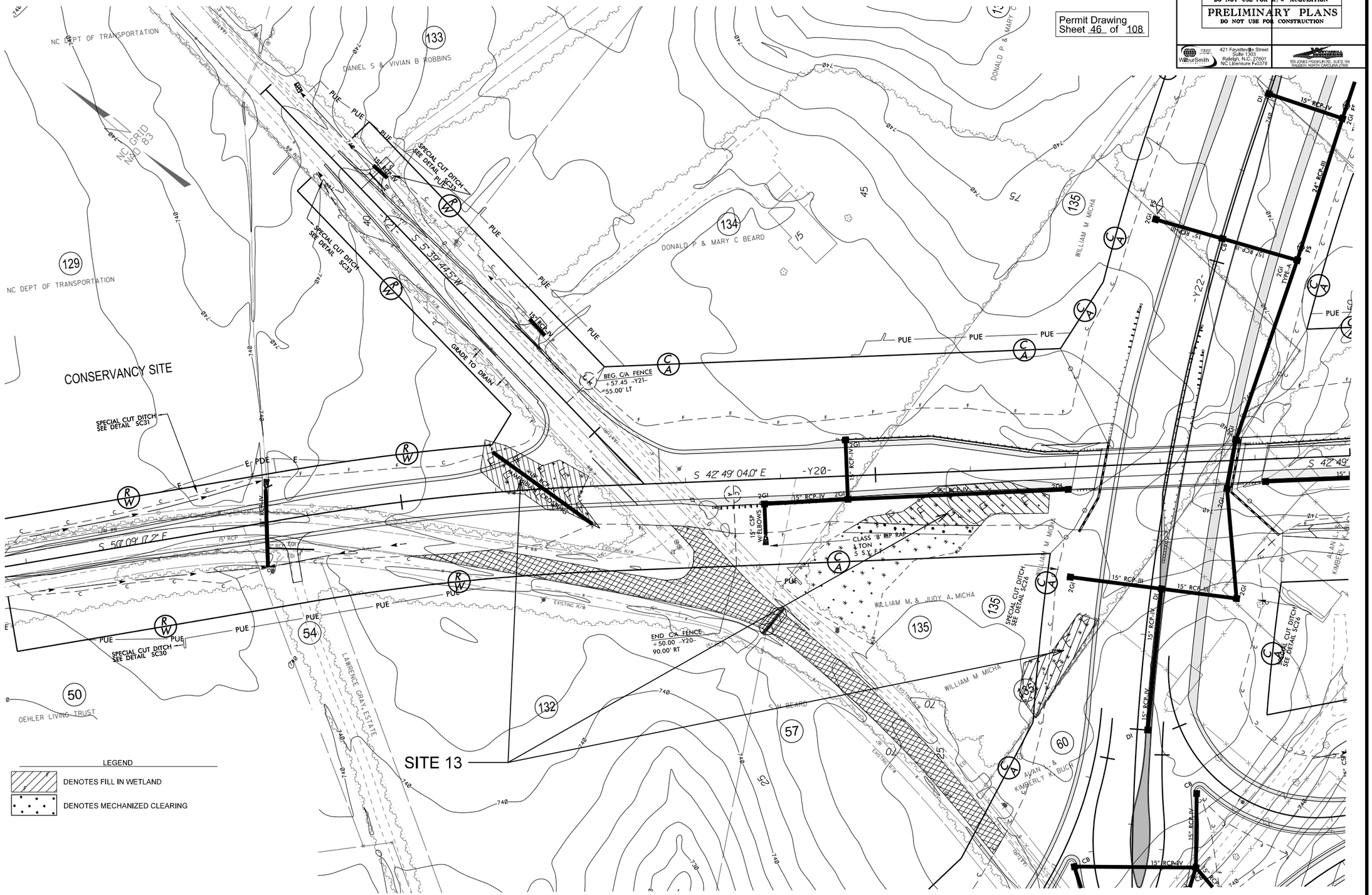
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 46 of 108



REVISIONS

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BLYTHE

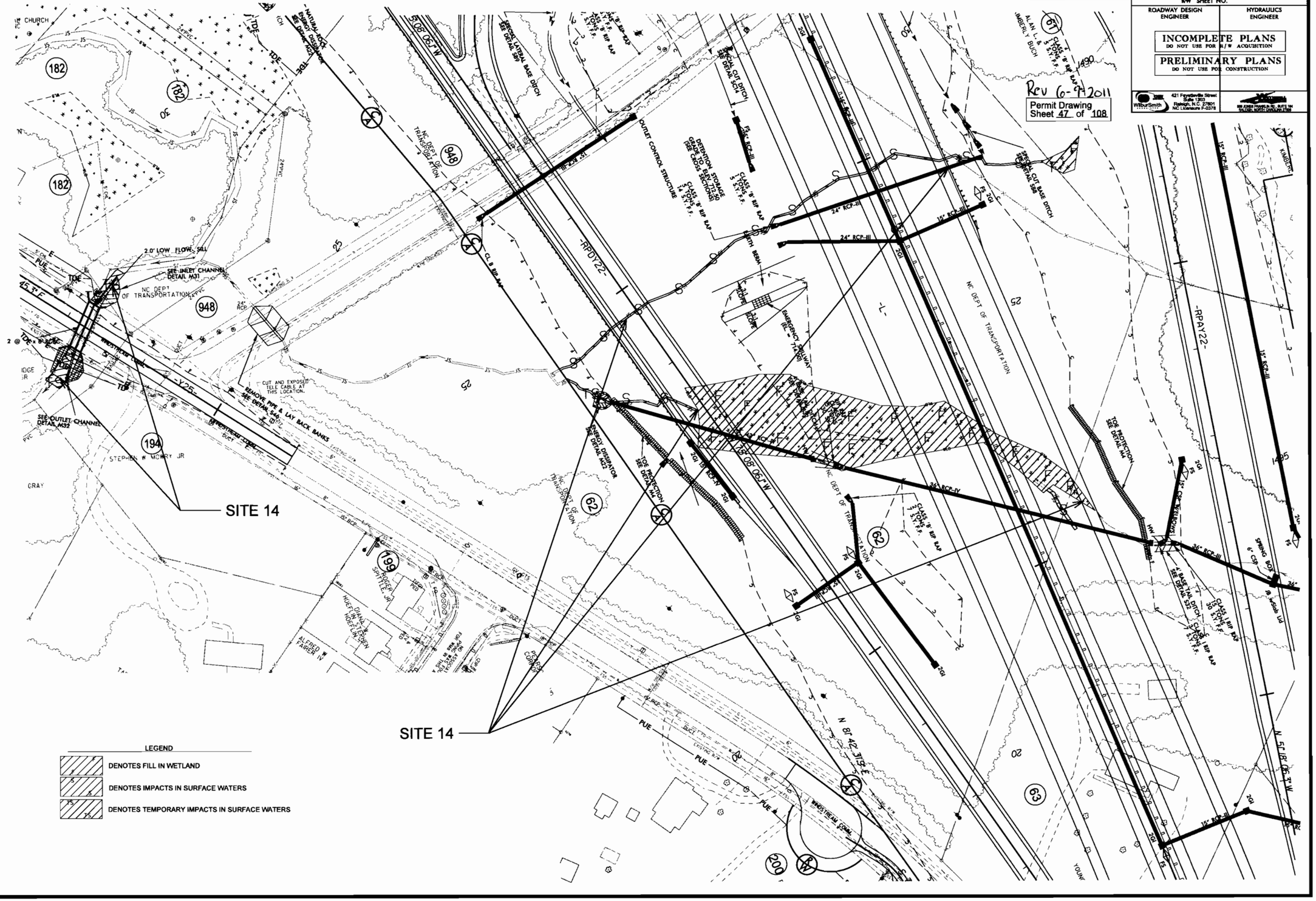
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith
421 Fayetteville Street
Suite 1903
Raleigh, N.C. 27601
NC Licensure F-0378

Rev 6-9-2011
Permit Drawing
Sheet 47 of 108



REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	20C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

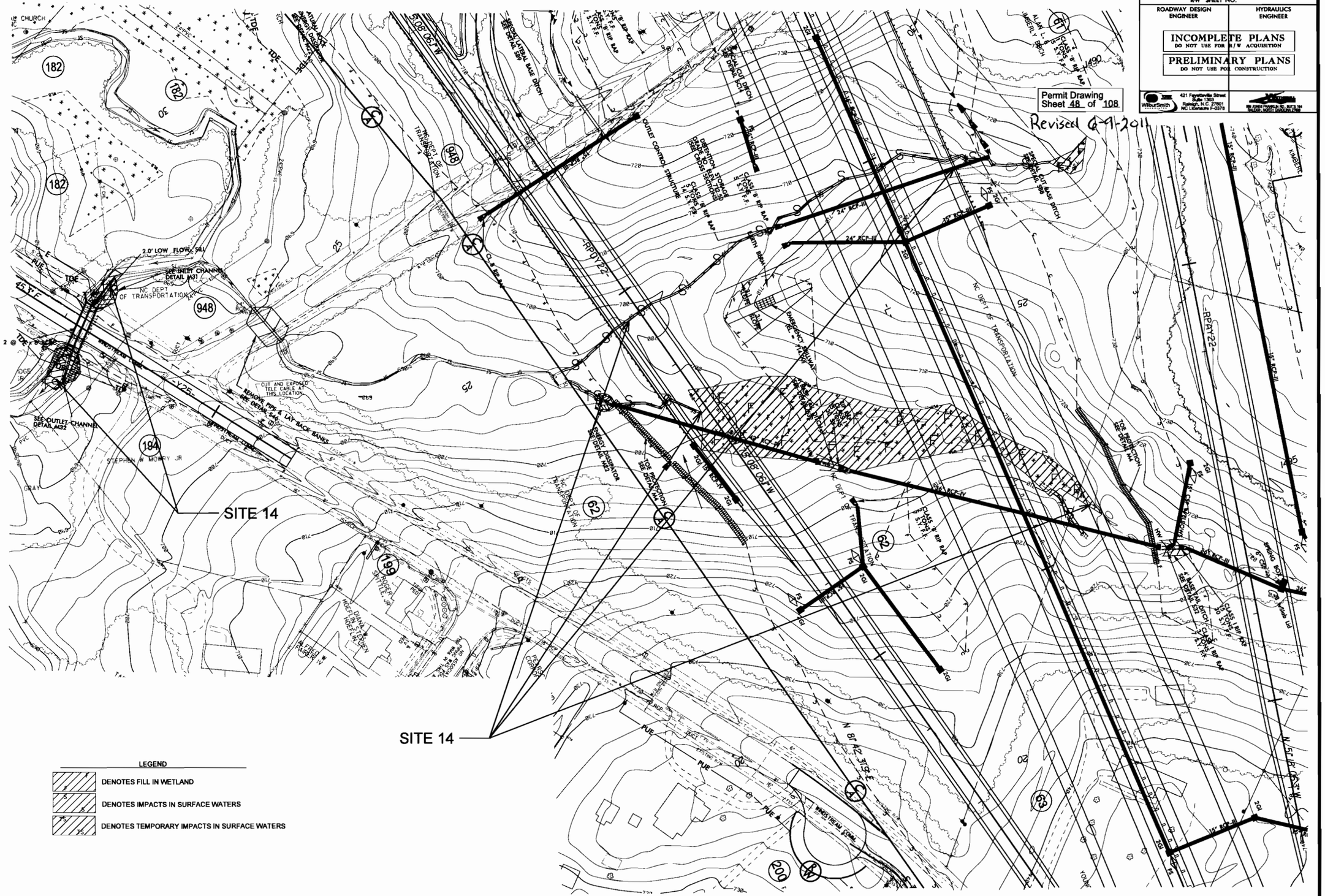
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC LICENSURE F-0378

RM JONES FRANKLIN RD., SUITE 154
RALEIGH, NORTH CAROLINA 27609

Permit Drawing
Sheet 48 of 108

Revised 6-9-2011



LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	22
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 49 of 108

SITE 16

HICKORY GROVE BAPTIST CHURCH

WINDSTREAM COMM

MALLARD CREEK RD (SR 2467)

S 64° 31' 31.0" E

MATCH TO SHEET 21 – -Y20- POT 75+60.00

MATCH TO SHEET 21 – -L- POS 1515+00.00

NATHANIEL HICKLEN, SR
SHIRLEY H. HICKLEN

ARTHUR L. BEST

JOHN C. & SYLVIA K. FOSTER

BOBBY EUGENE BOST
ELIZABETH W. BOST

FRED SMITH
CLARA C. SMITH

NCDOT

KATRINA H. FRAZIER

SHERMAN CELESTER HARRIS
SYLVIA L. HARRIS

MAHMOUD ALQOLAQ

THE FAMILY TRUST UNDER
THE MAIZIE GRAHAM TAYLOR
REVOCABLE TRUST

NC GRID NAD 83

BREACH POND DAM & DRAIN POND
SEE DETAIL M23

4' BASE HEAD DITCH
CLASS I RIP RAP
SEE DETAIL M23

STD. BERM DITCH
STA. 1521+00 TO 1522+50 –L– LT

BEGIN
SBG
STA. 1521+00 –L– RT.

CLASS I RIP RAP
EST 10 TNS RR
EST 23 SY FF

END
SBG
STA. 1525+52 –L– RT.

EMERGENCY SPILLWAY
(EL. = 688.50)

OUTLET CONTROL STRUCTURE

DETENTION STORAGE
(SEE CROSS SECTIONS)

4' LATERAL BASE DITCH
W/CLASS II RIP RAP
SEE DETAIL LB6

5' STANDARD BASE DITCH
W/CLASS II RIP RAP
SEE DETAIL S29

S 33° 09' 16.6" E

36" RCP-III
18" RCP-III
15" RCP-II
30" RCP-III
15" RCP-IV
48" RCP-IV
42" RCP-III
24" CSP W/ELBS
18" CSP W/ELBS
2GI TYPE-A
2GI TYPE-D
GRAU 350

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATERS
- DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
- DENOTES IMPACTS IN SURFACE WATERS (POND)

SEE SHEET 47 FOR –L– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

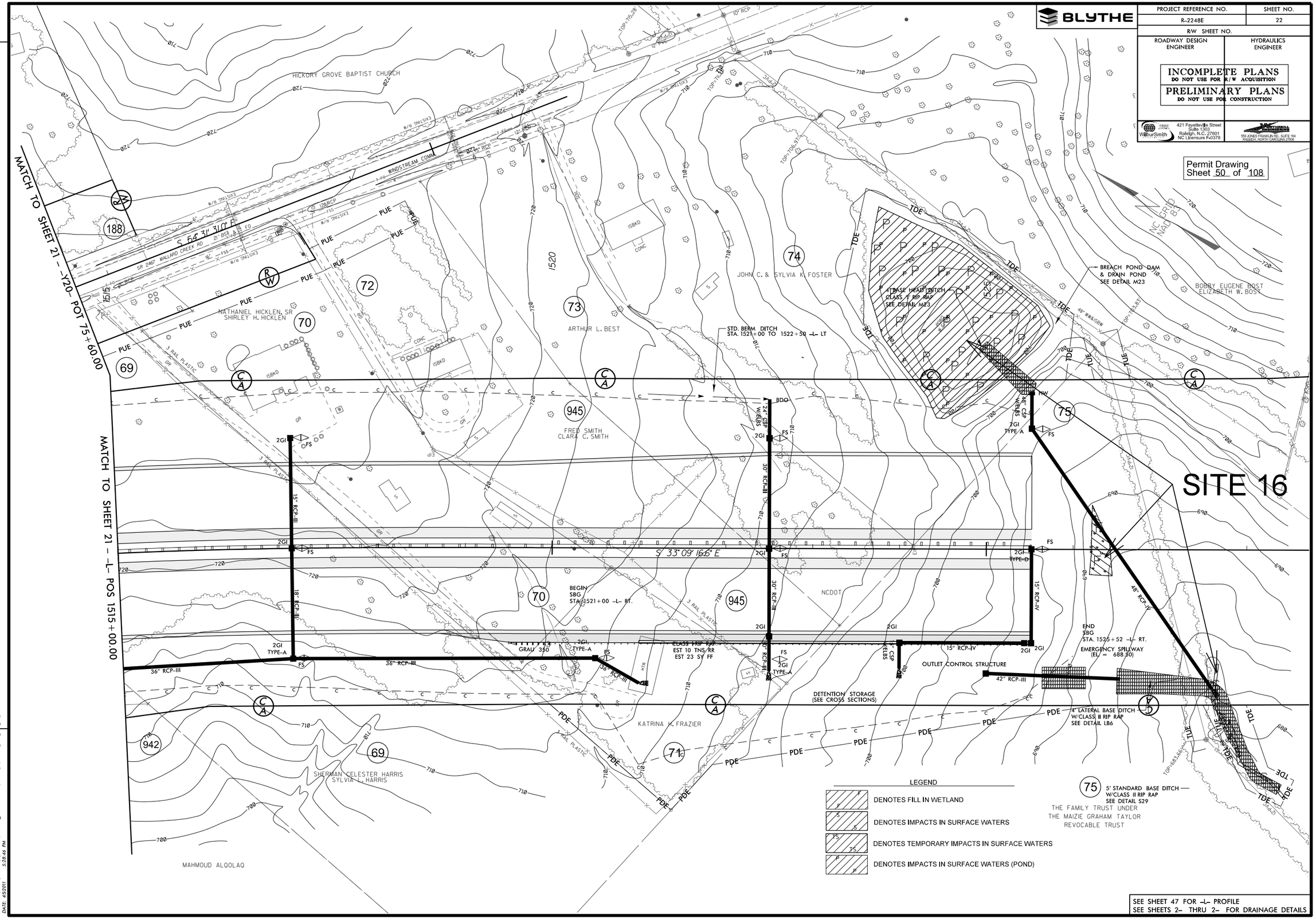
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ARCHITECTURE AND DESIGN
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 50 of 108



SEE SHEET 47 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

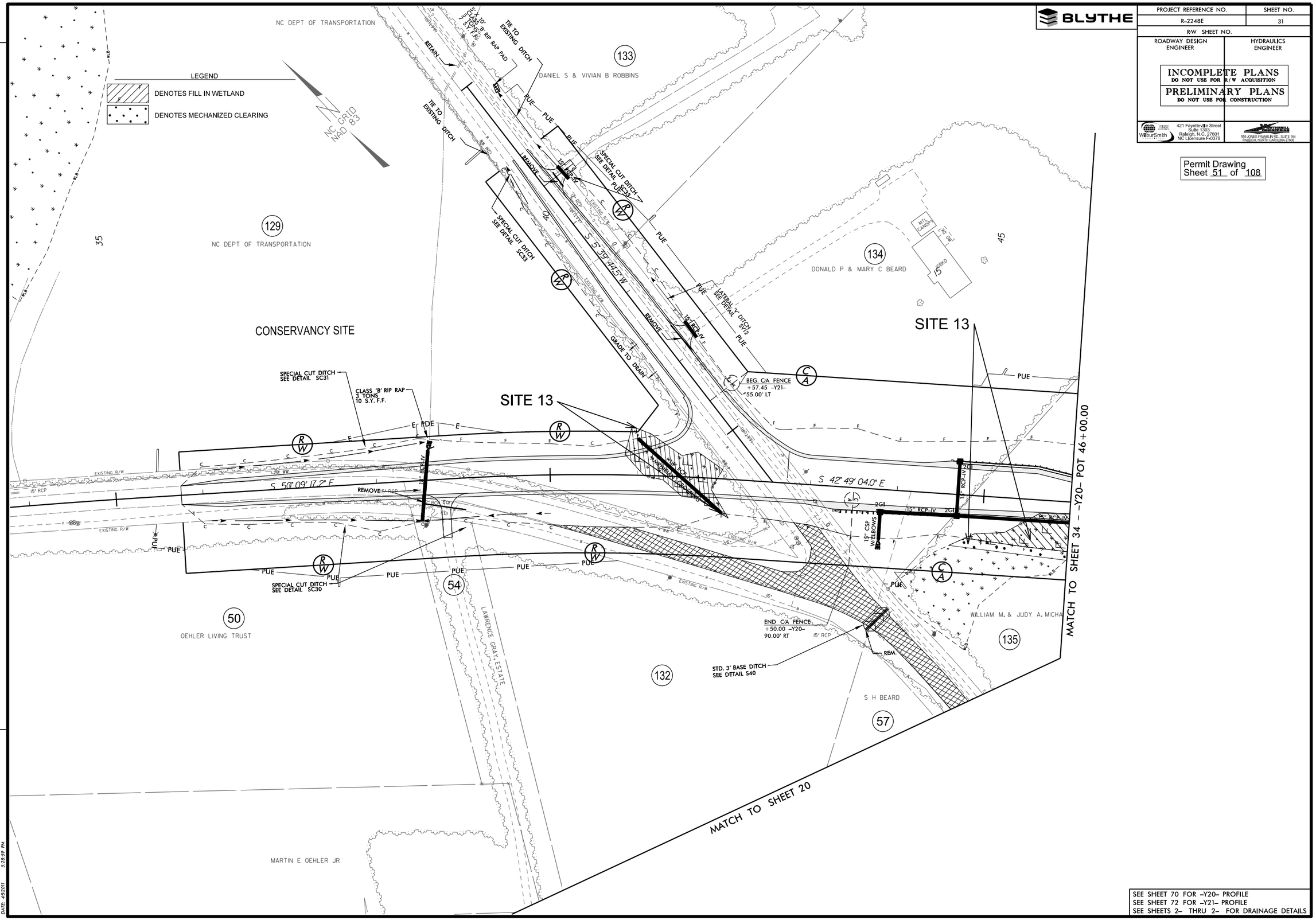
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 51 of 108



SEE SHEET 70 FOR -Y20- PROFILE
SEE SHEET 72 FOR -Y21- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PM_31.DGN
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

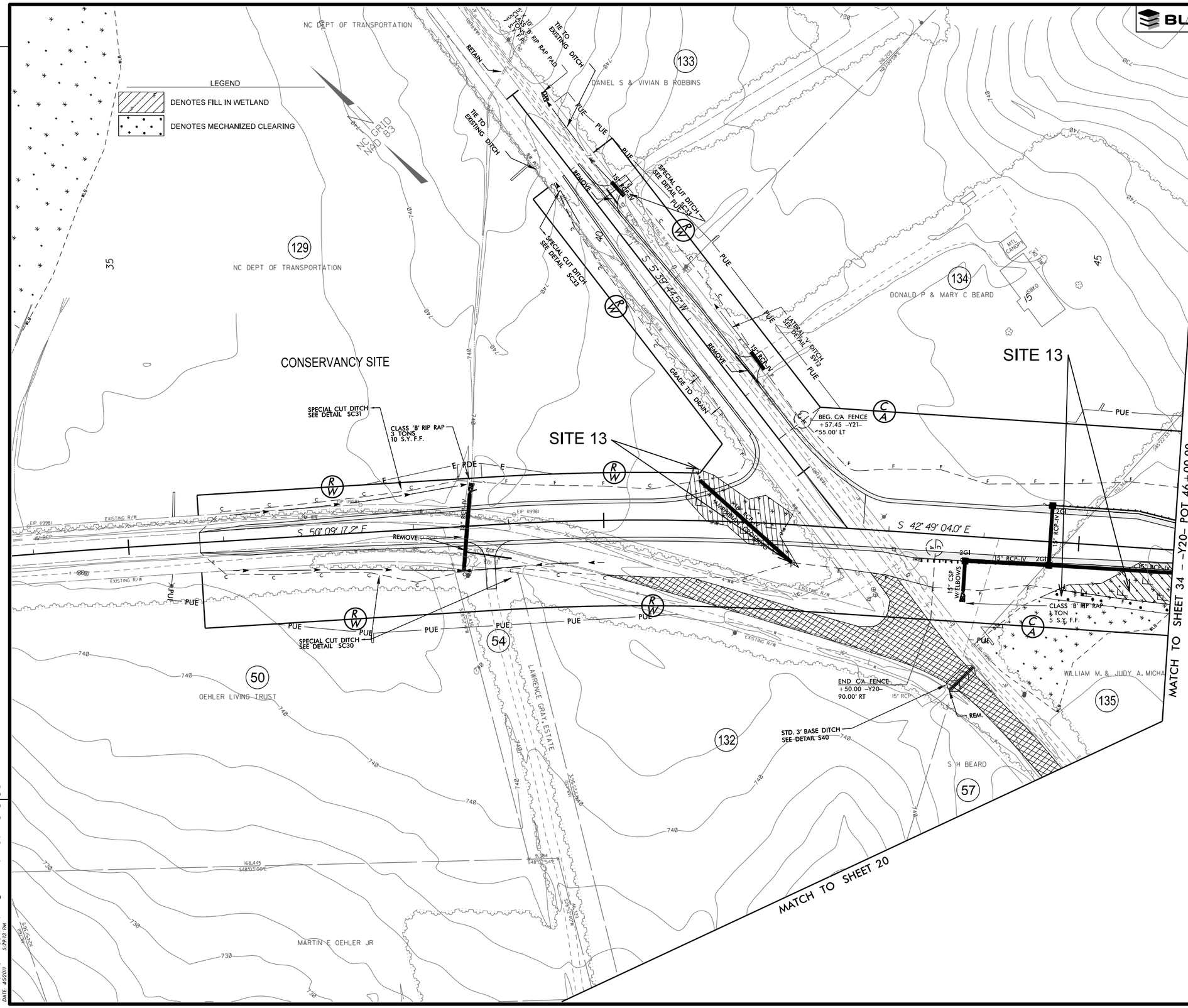
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 52 of 108



SEE SHEET 70 FOR -Y20- PROFILE
SEE SHEET 72 FOR -Y21- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
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

Wilbur Smith Associates
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

SITE 12

TEMPORARY WORK BRIDGES SEE DETAIL SHEET

SITE 14

MATCH TO SHEET 32 – –Y22– POT STA. 47+50.00

MATCH TO SHEET 20– –Y22– POT STA. 57+50.00

MATCH TO SHEET 32 – –Y25– POT STA. 12+70.00

Permit Drawing
Sheet 53 of 108

Revised
6-9-2011

REVISIONS

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- DENOTES HAND CLEAR IN WETLAND

SEE SHEET 73 FOR –Y22– PROFILE
SEE SHEET 75 FOR –Y25– PROFILE
SEE SHEETS 2-_ THRU 2-_ FOR DRAINAGE DETAILS

FILE: R:\roadw\R2248E\Hydraulics\RSMu72_Environmental\Drawings\R2248E_RDY_PRP_33.DGN
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
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

WilburSmith ASSOCIATES — 421 Fayetteville Street Suite 1300 Raleigh, N.C. 27601 NC Licensure F-0378

BLYTHE — 8B JONES FRANKLIN RD. SUITE 104 RALEIGH, NORTH CAROLINA 27606

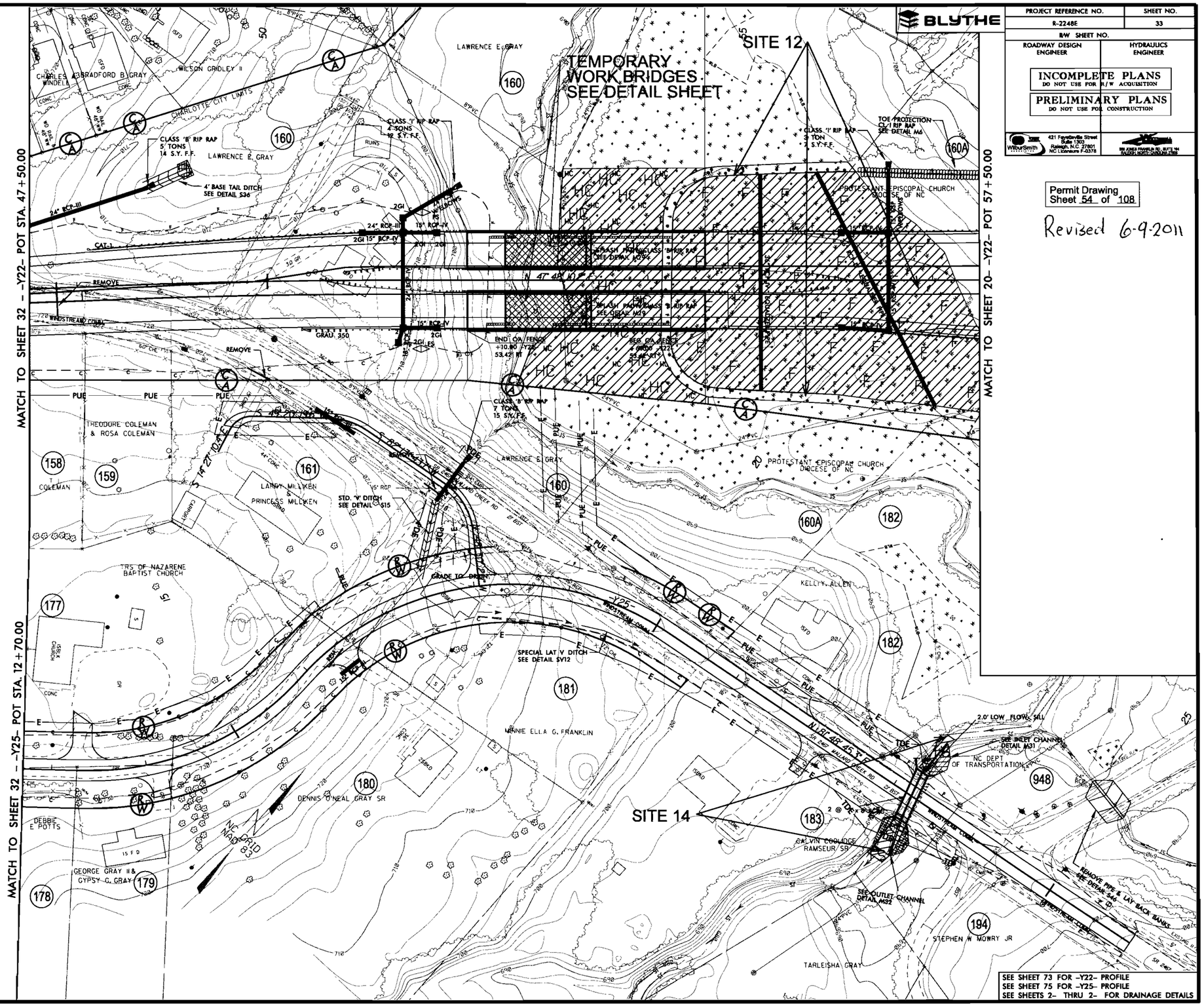
Permit Drawing
Sheet 54 of 108

Revised 6-9-2011

REVISIONS

LEGEND

- DENOTES FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- HC — DENOTES HAND CLEAR IN WETLAND



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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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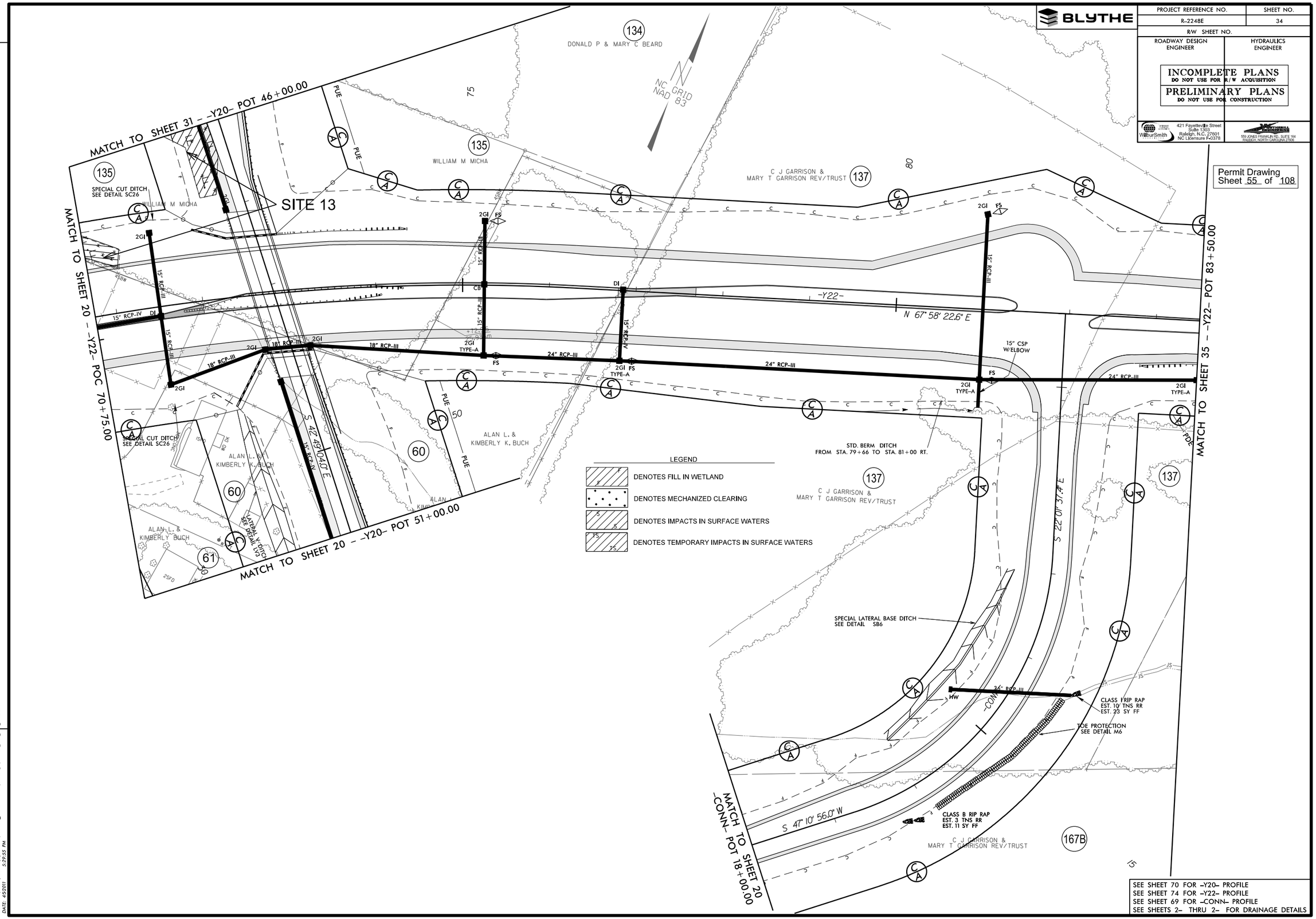
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 55 of 108



SEE SHEET 70 FOR –Y20– PROFILE
SEE SHEET 74 FOR –Y22– PROFILE
SEE SHEET 69 FOR –CONN– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PMY_34.DGN
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	34
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

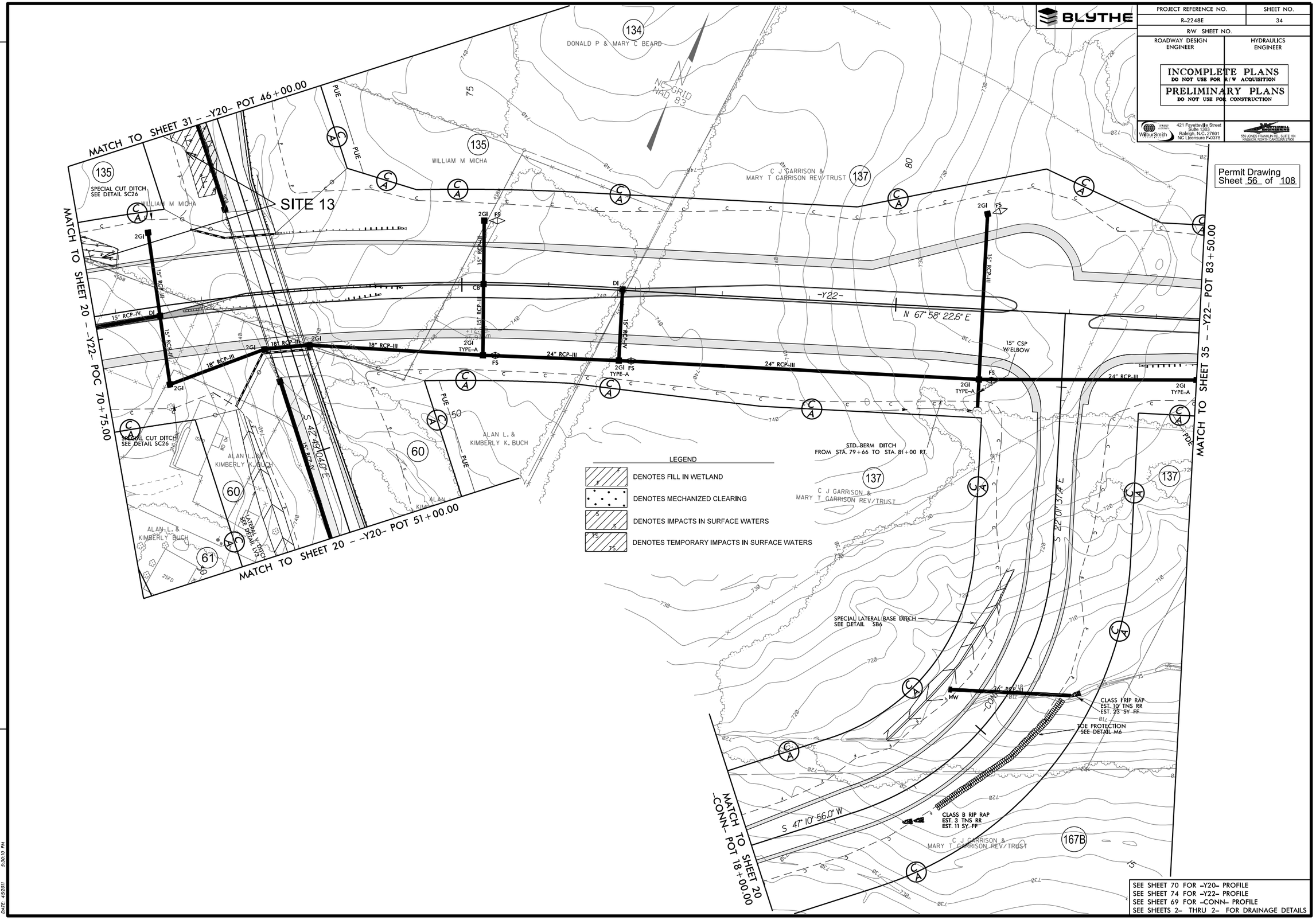
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 56 of 108



SEE SHEET 70 FOR –Y20– PROFILE
SEE SHEET 74 FOR –Y22– PROFILE
SEE SHEET 69 FOR –CONN– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_BDY_PH_34_CONT.DGN
DATE: 4/5/2011 5:30:10 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

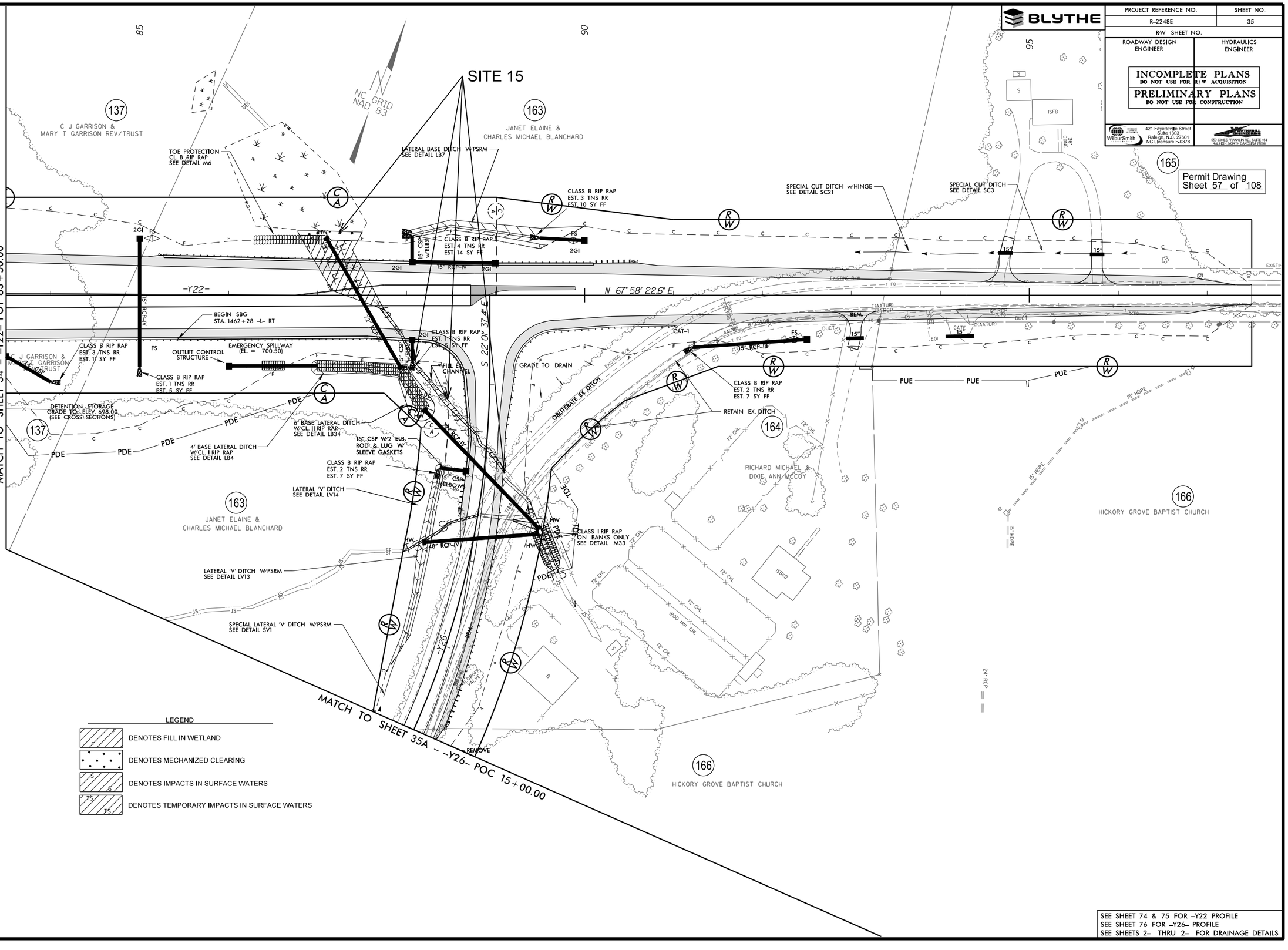
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing Sheet 57 of 108



SEE SHEET 74 & 75 FOR –Y22 PROFILE
SEE SHEET 76 FOR –Y26– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Hydraulics\PERMITS_Environmental\Drawings\R2248E_RDY_PH_35.DGN
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	35
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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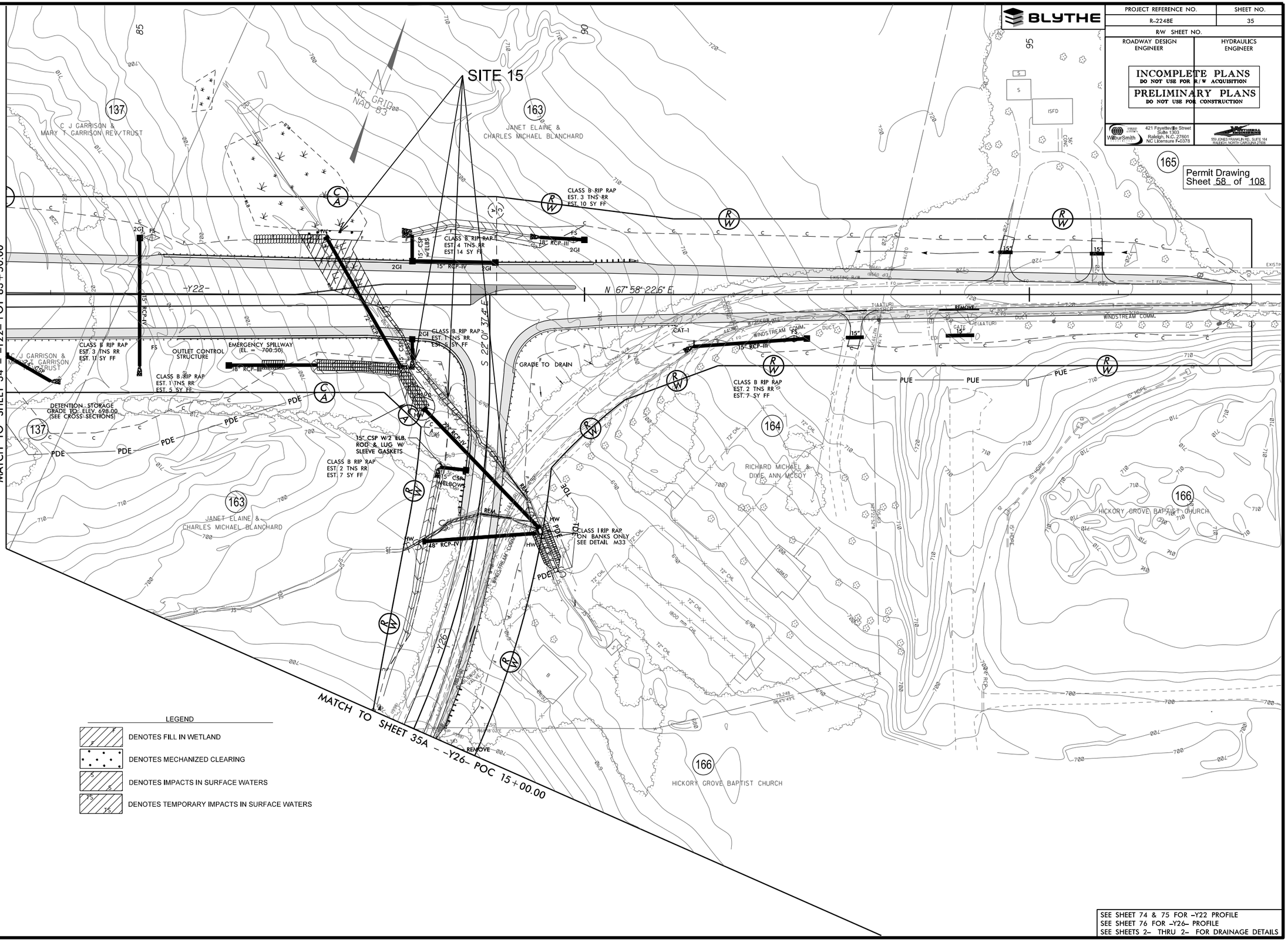
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing Sheet 58 of 108



SEE SHEET 74 & 75 FOR –Y22 PROFILE
SEE SHEET 76 FOR –Y26– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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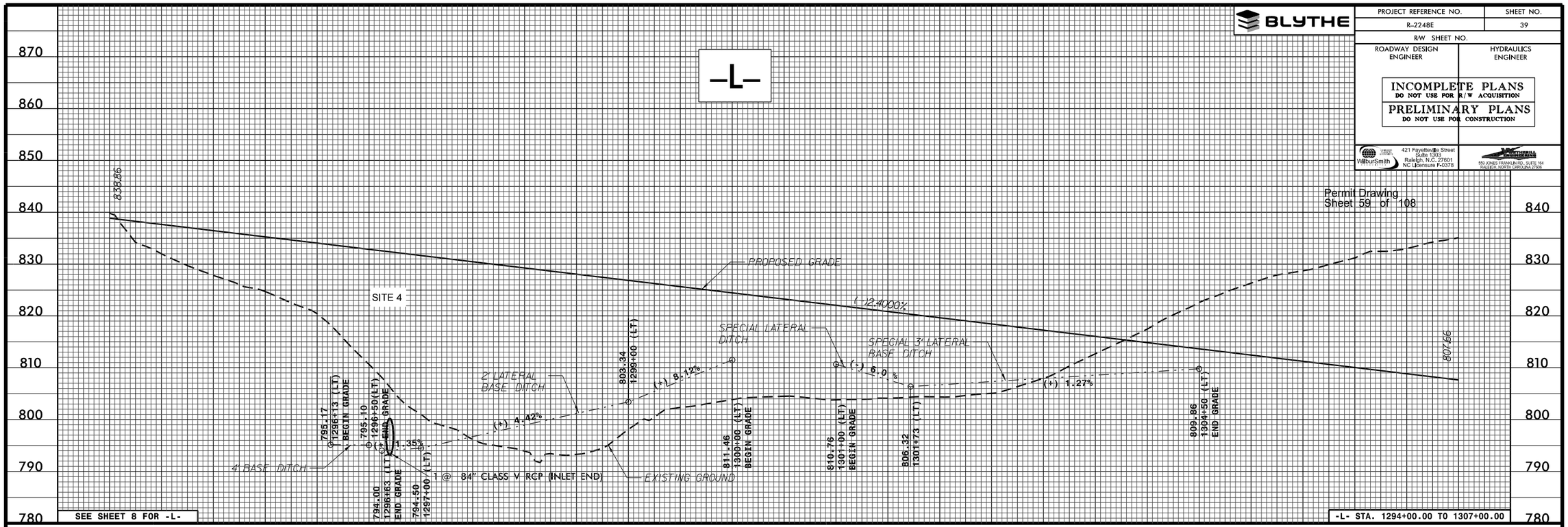
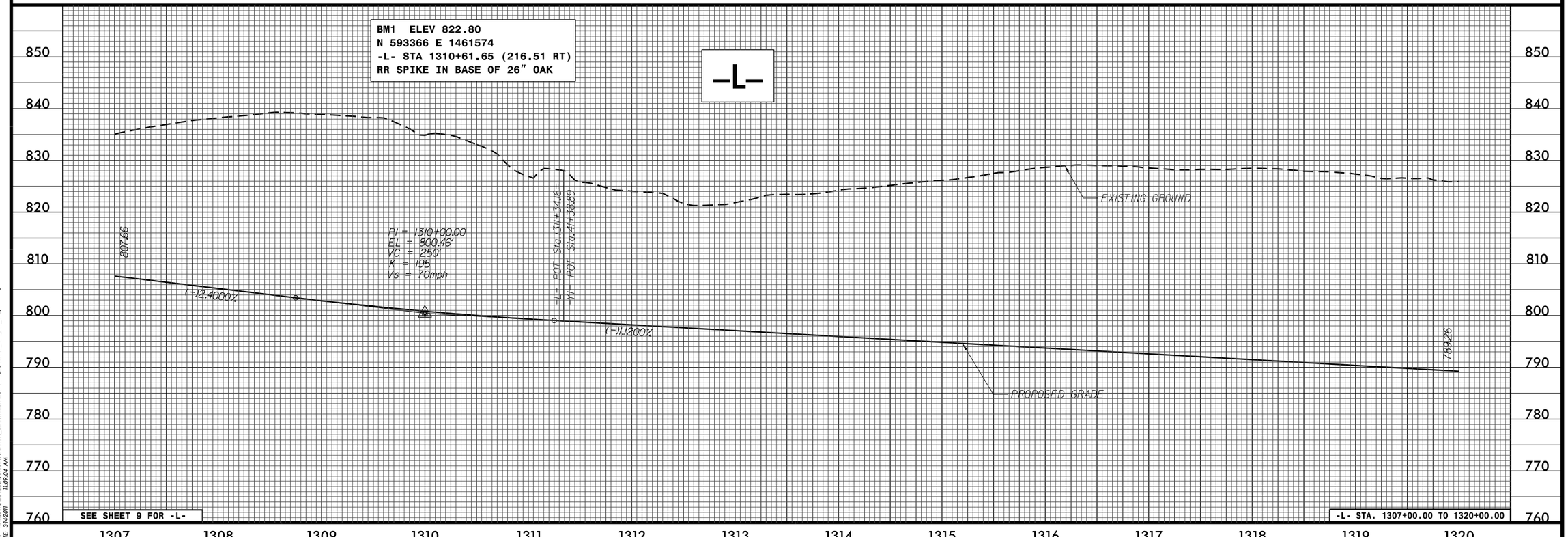
MOTSINGER BEAVER — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 59 of 108





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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Raleigh, N.C. 27601
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RALEIGH, NORTH CAROLINA 27606

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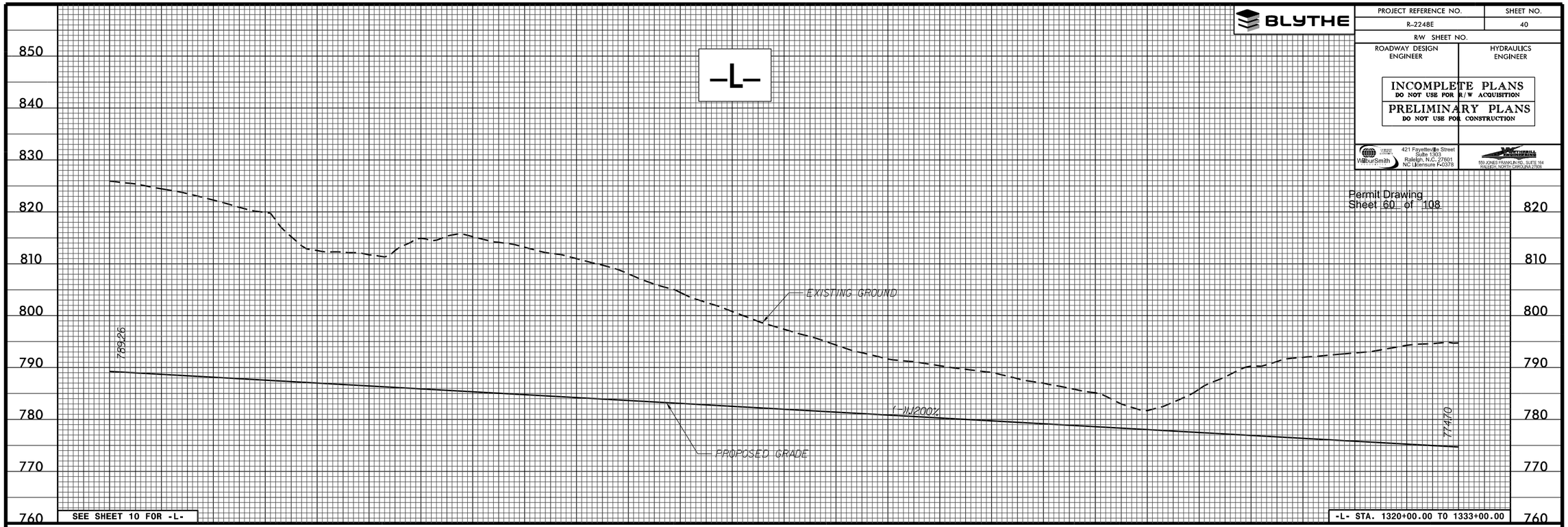
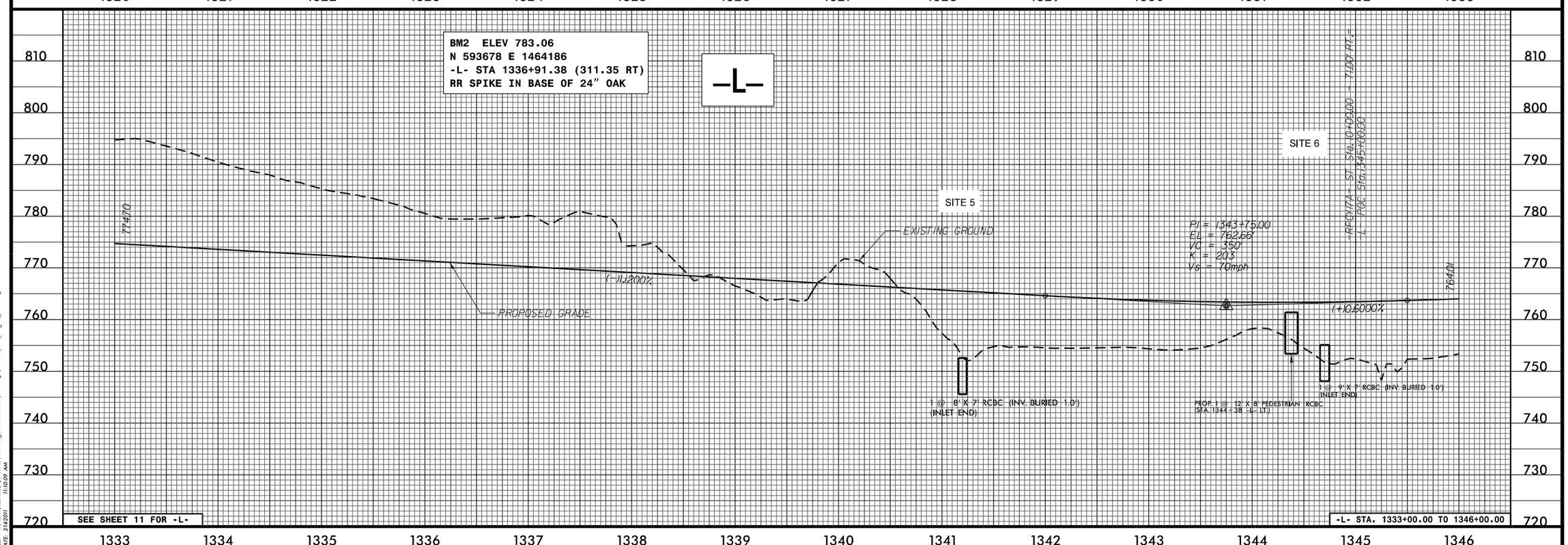
Sheet 60 of 108





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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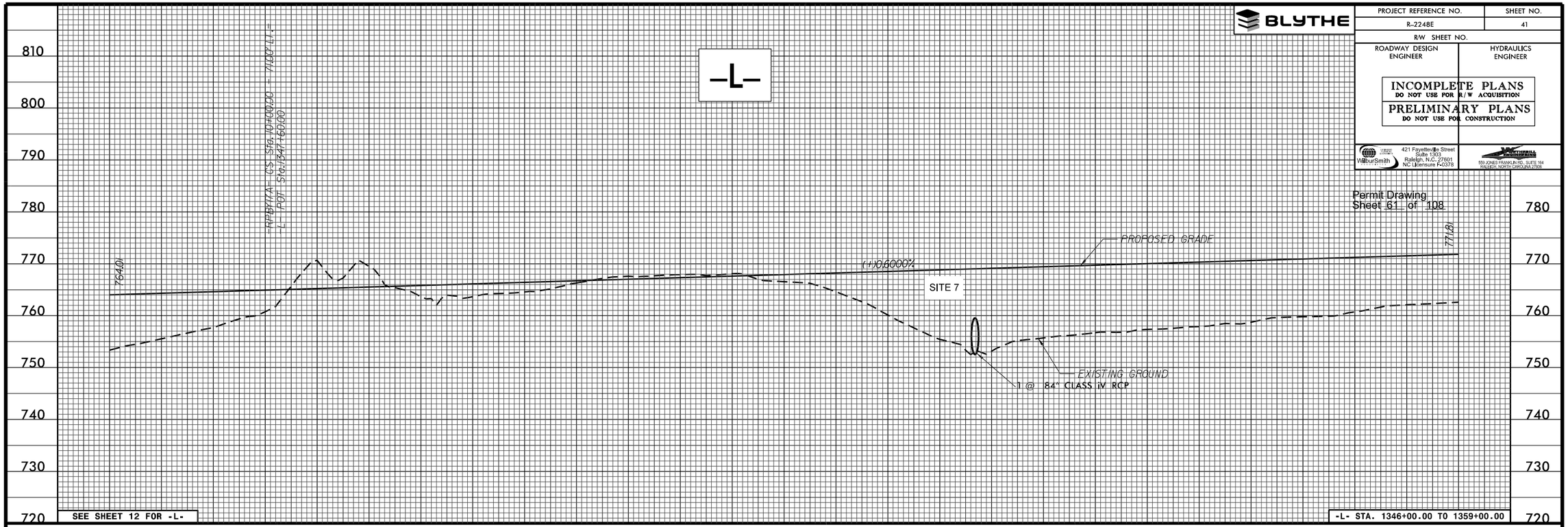
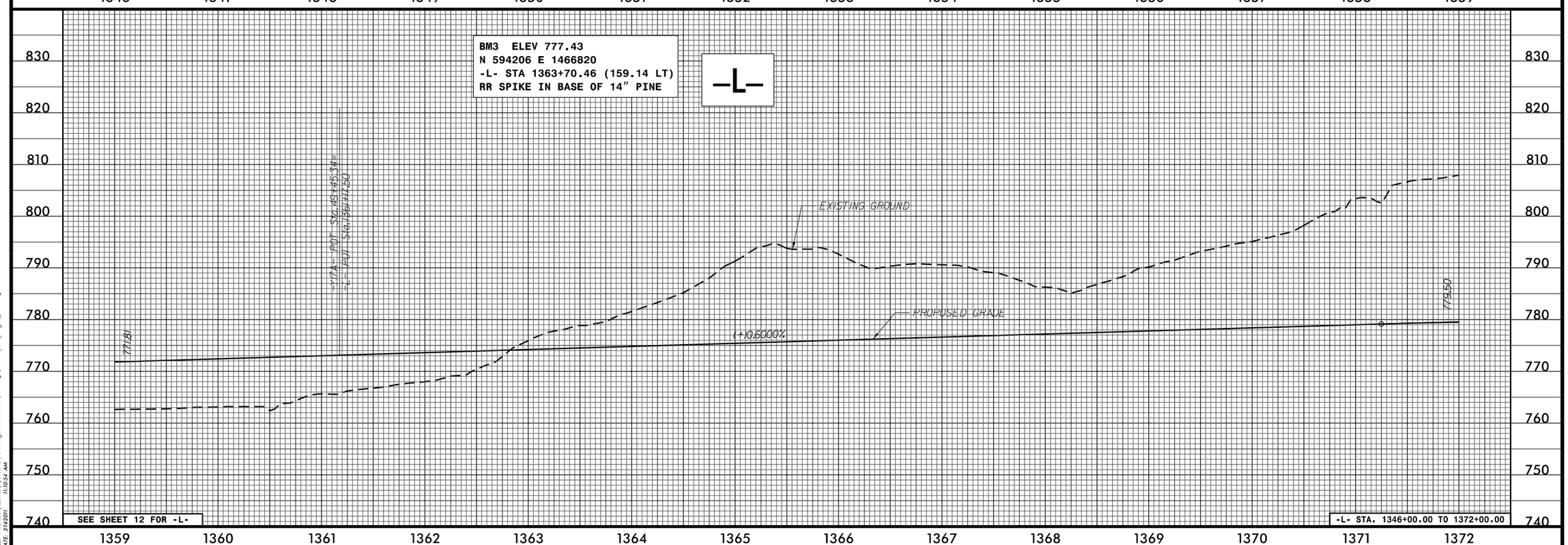
Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 61 of 108





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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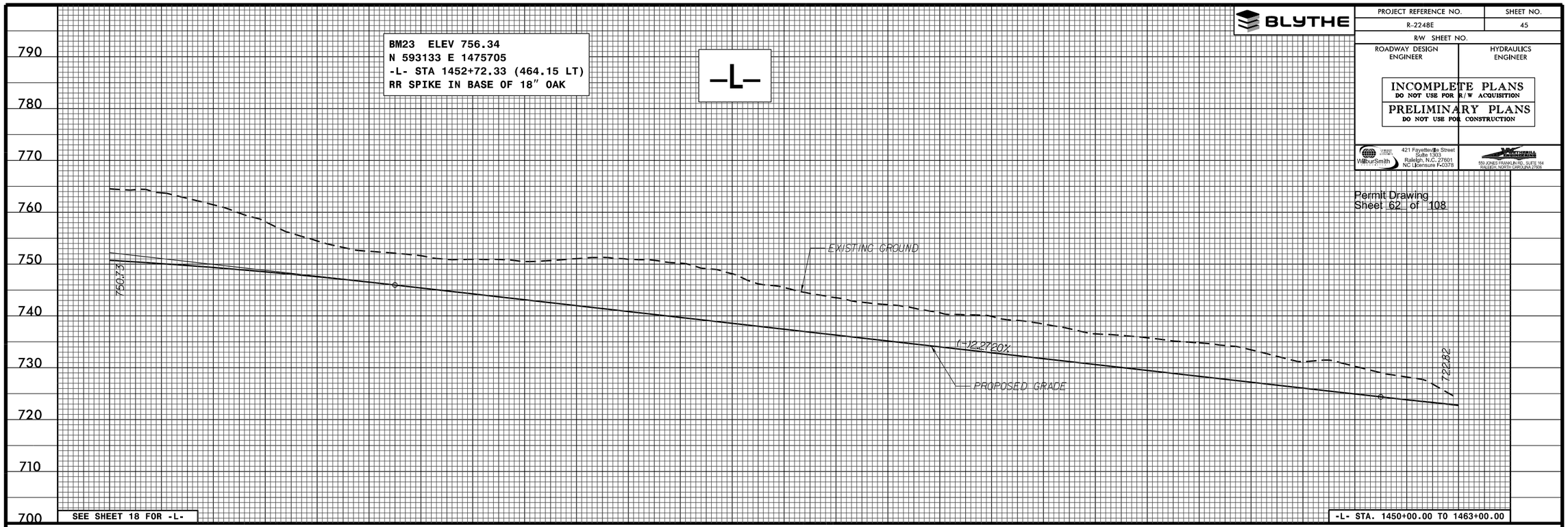
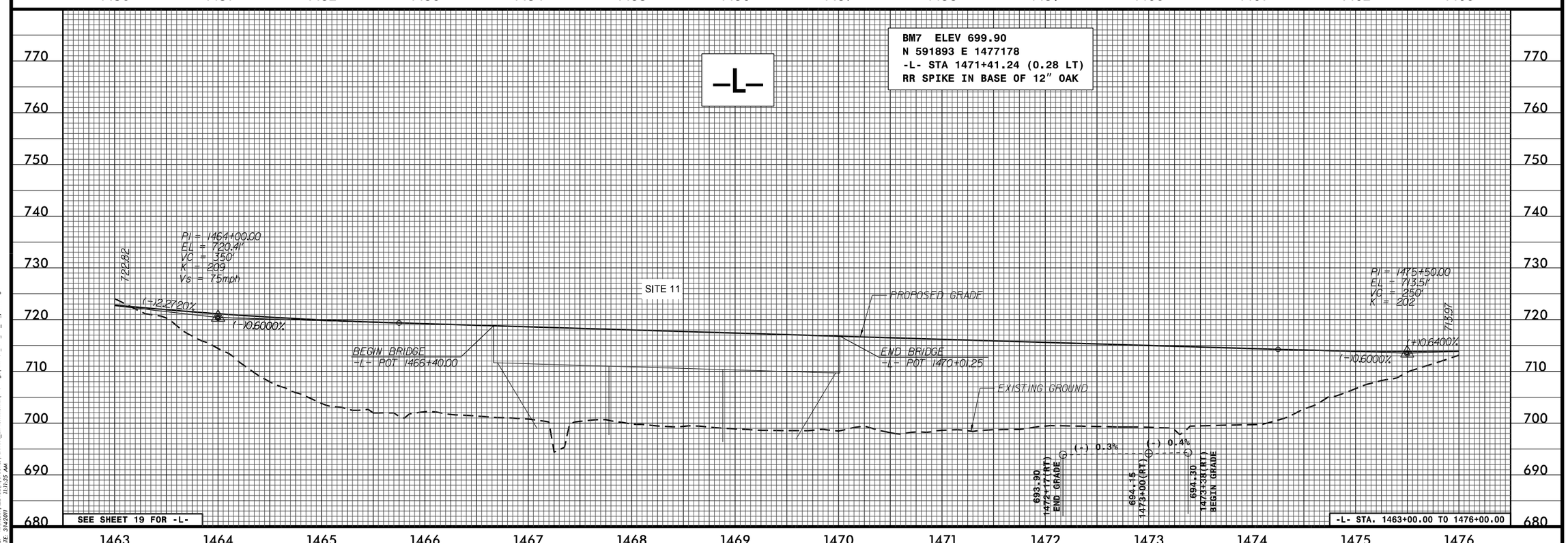
MATTHEWS — 559 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 62 of 108





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	73
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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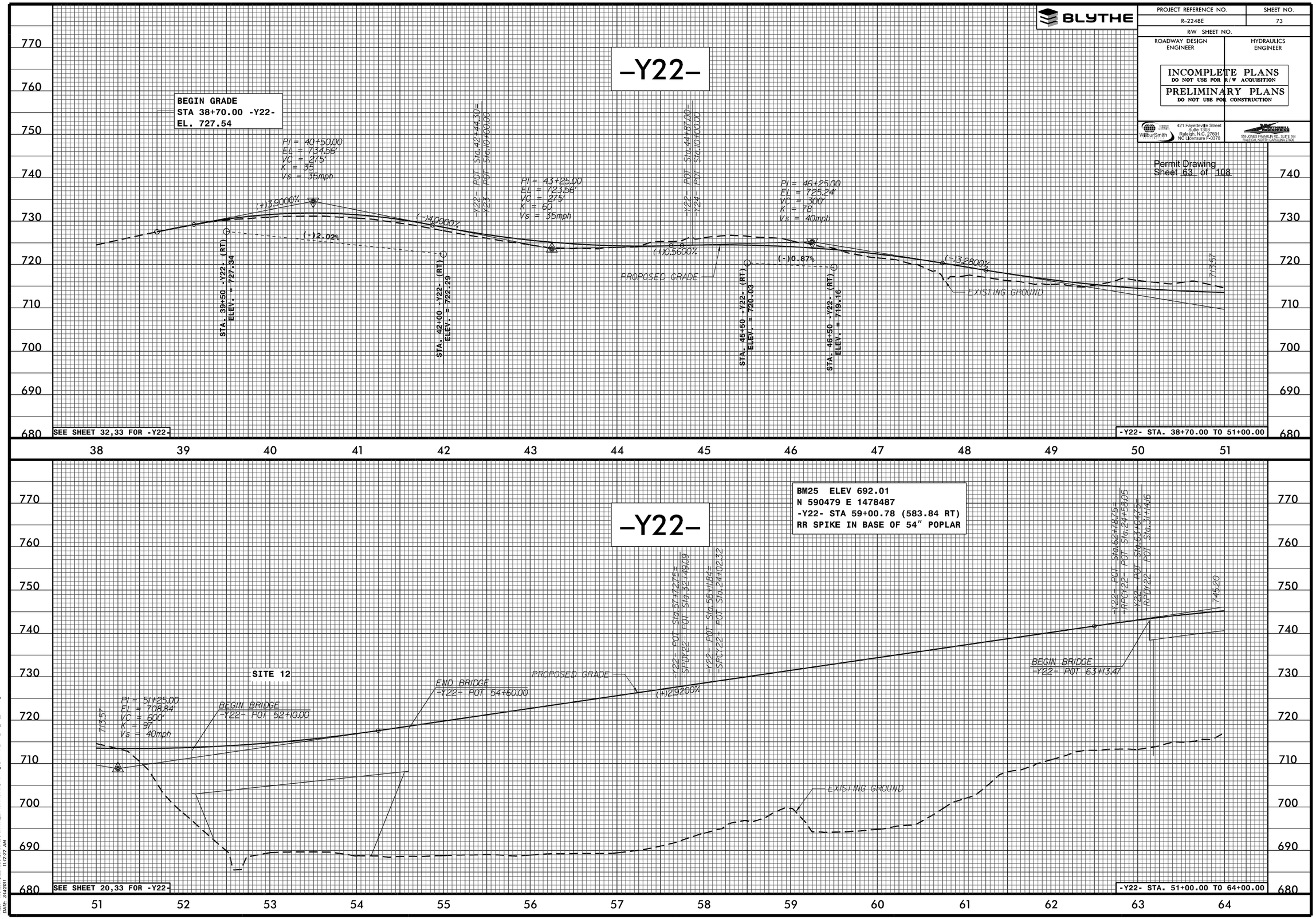
MATTHEWS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 63 of 108



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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	75
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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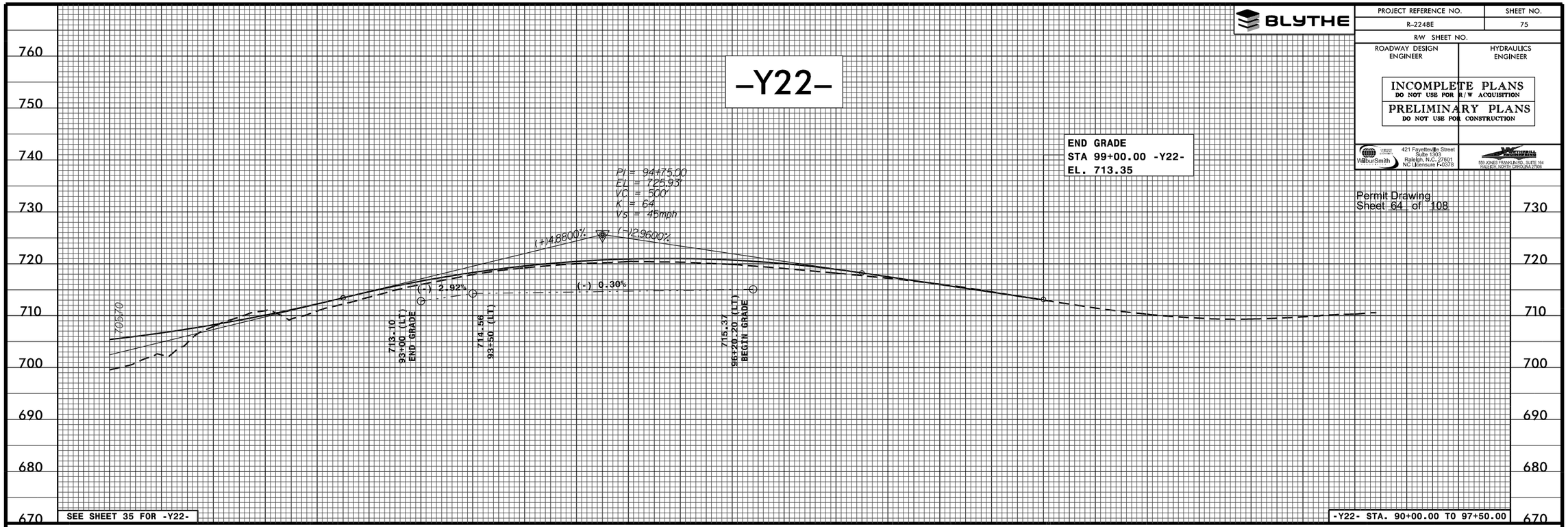
KIMLEY-HORN AND ASSOCIATES — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 64 of 108

-Y22-



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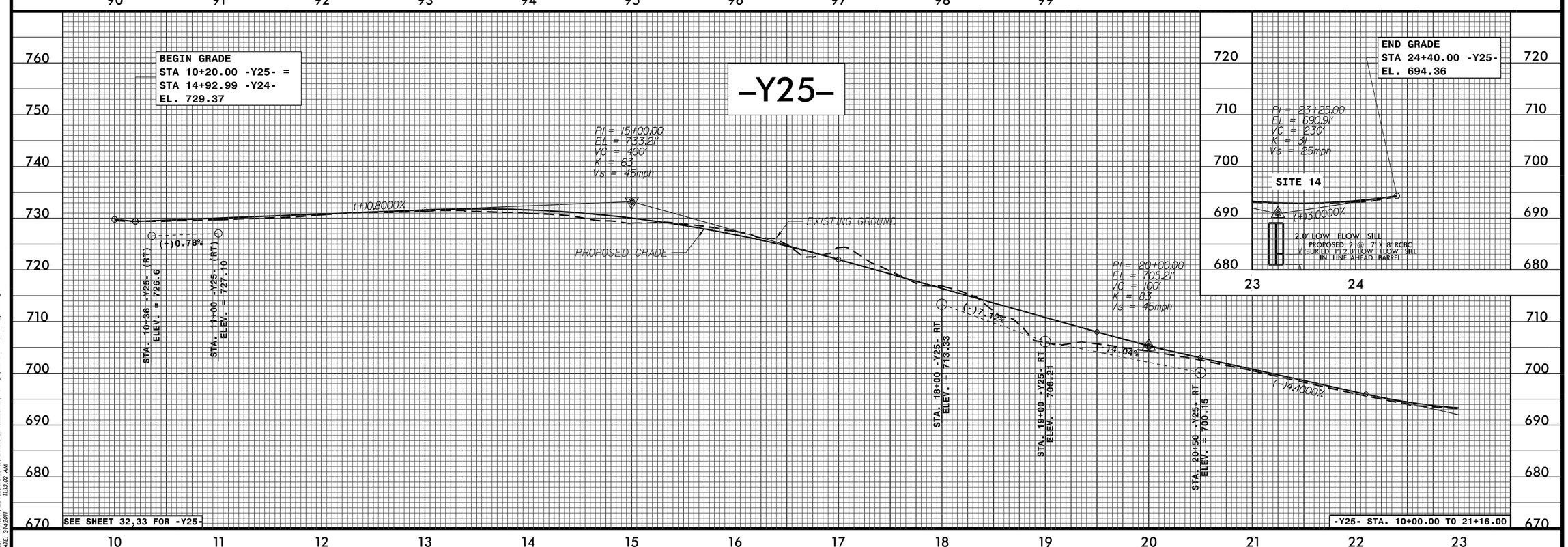

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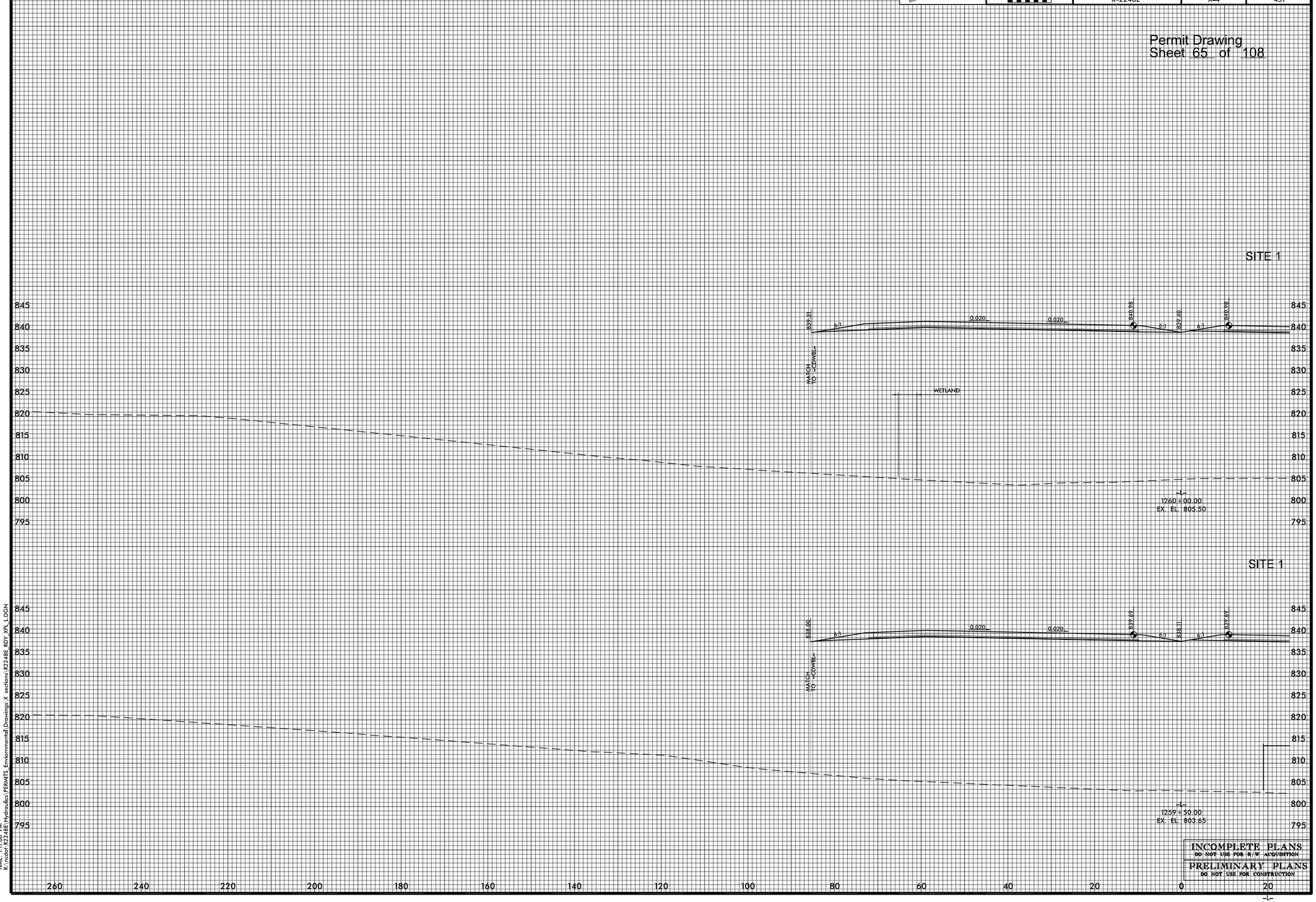
Permit Drawing
Sheet 65 of 108



INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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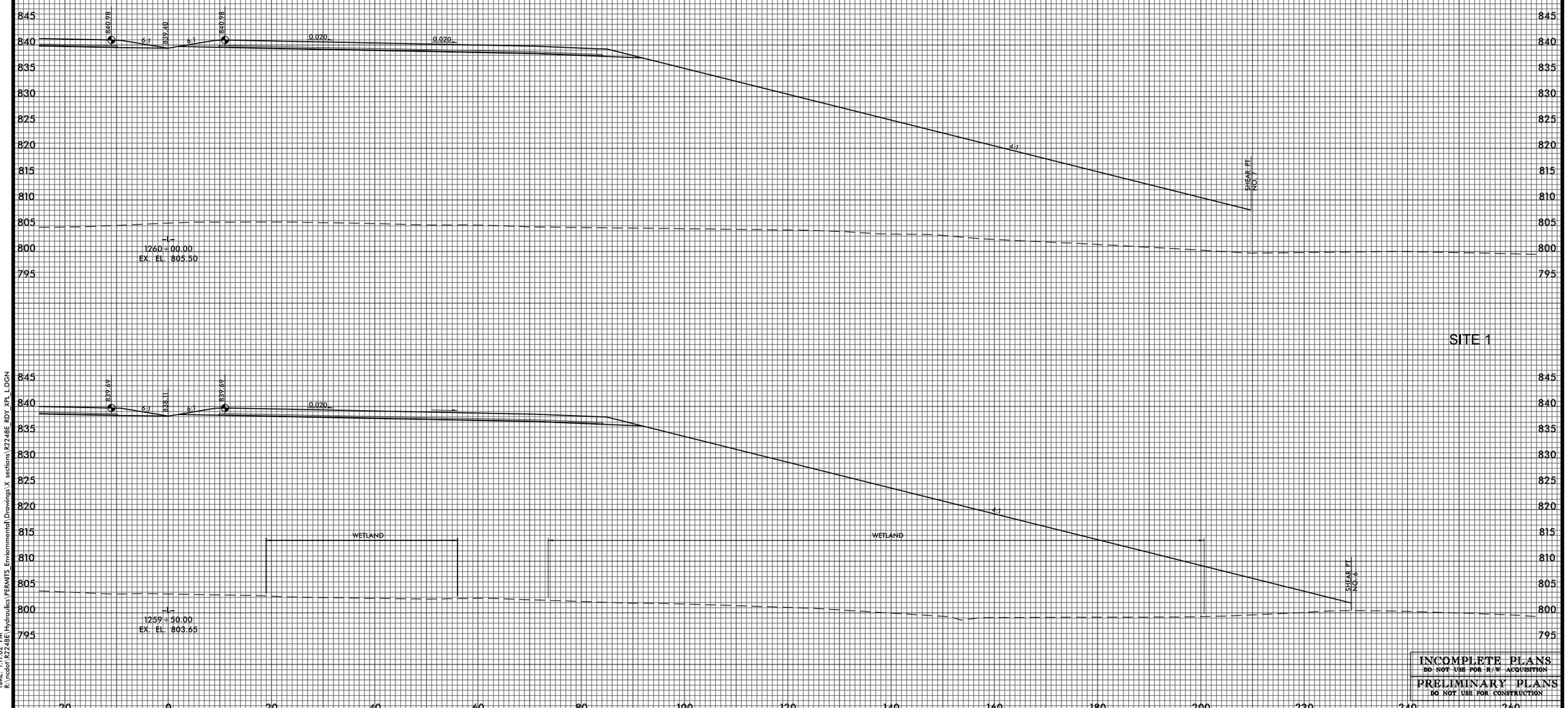
Permit Drawing
Sheet 66 of 108



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DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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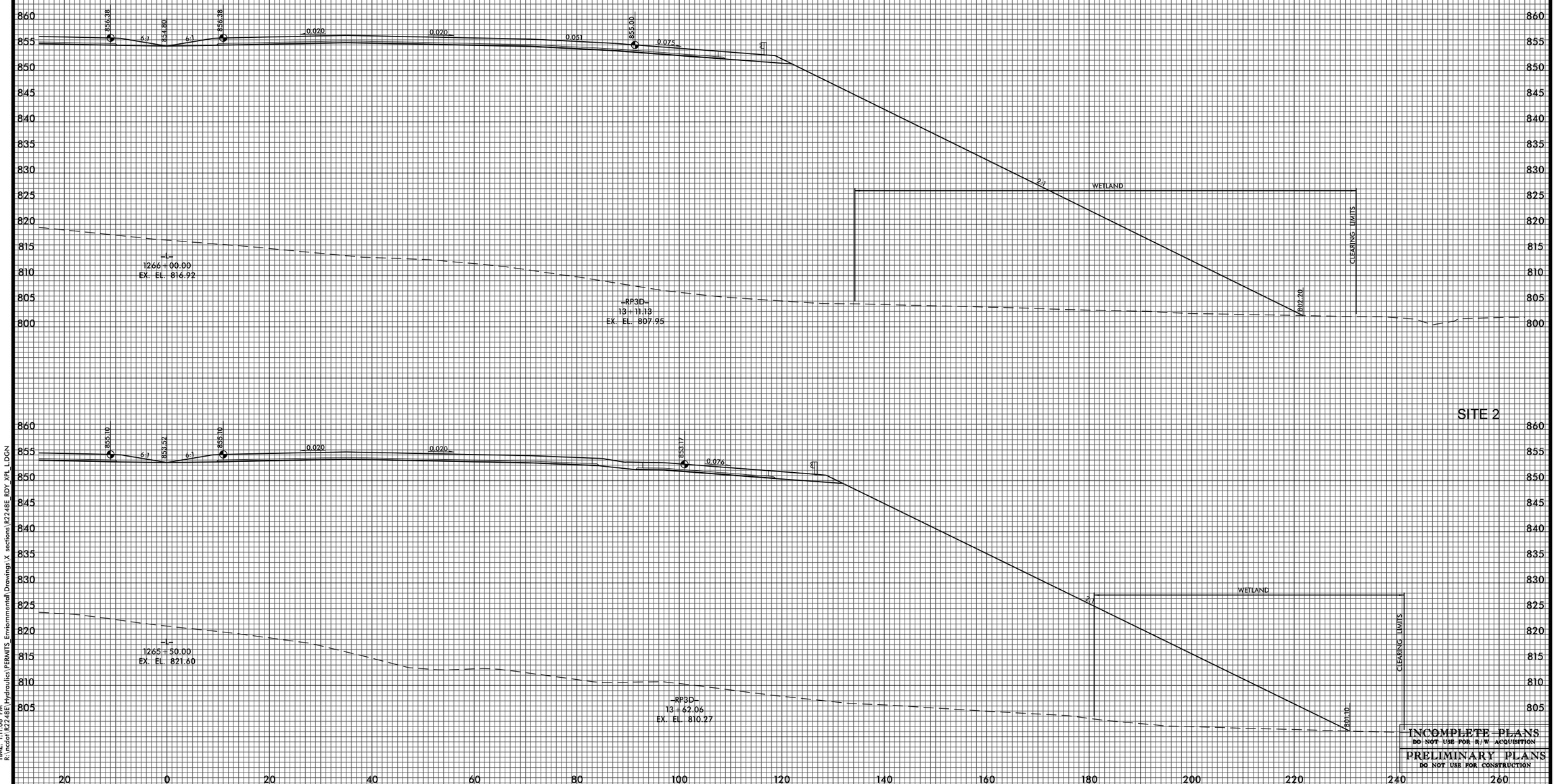
Permit Drawing
Sheet 67 of 108

SITE 2



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PRELIMINARY PLANS
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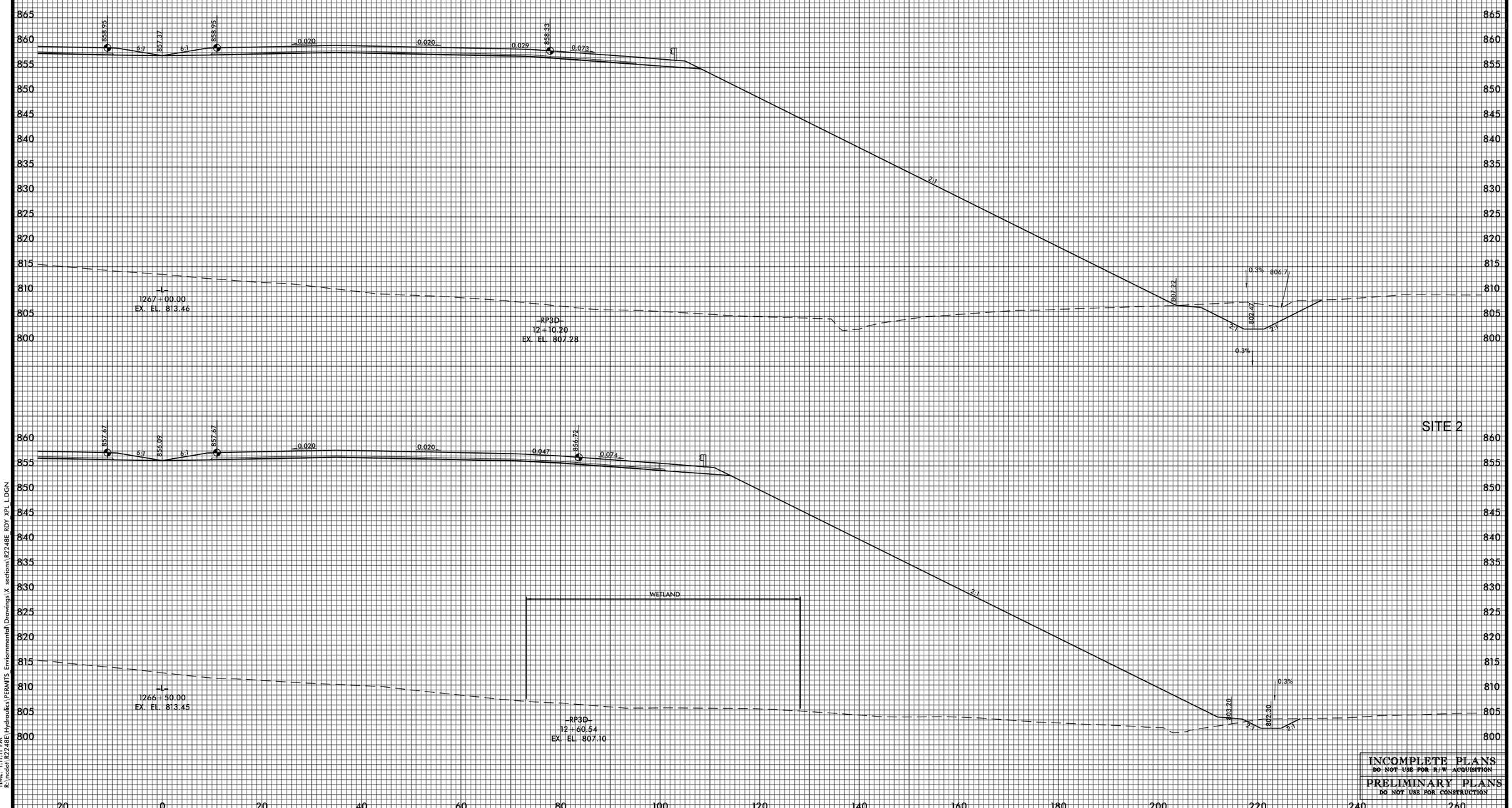
Permit Drawing
Sheet 68 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-31	457

Permit Drawing
Sheet 69 of 108

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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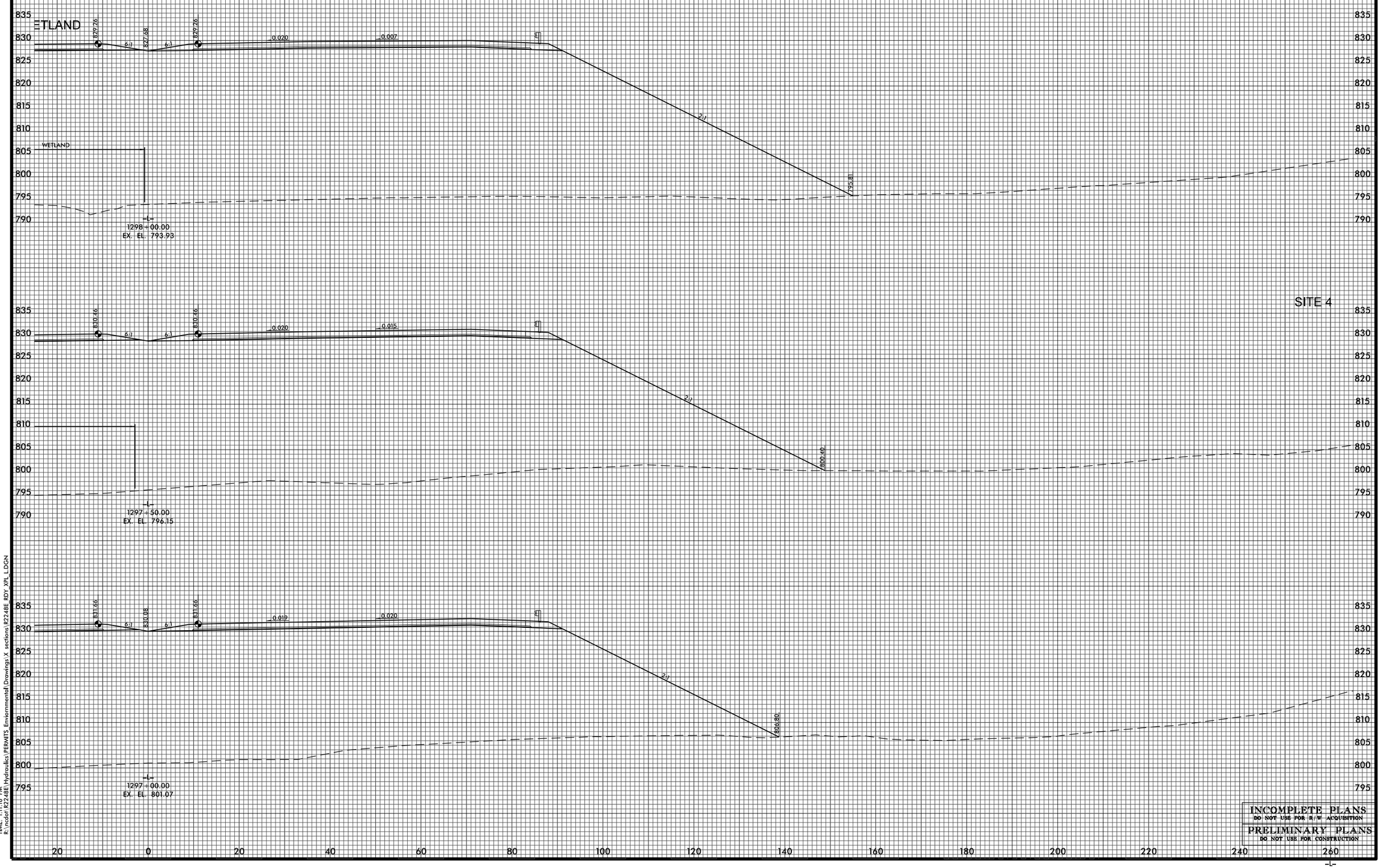
Permit Drawing
Sheet 70 of 108



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PRELIMINARY PLANS
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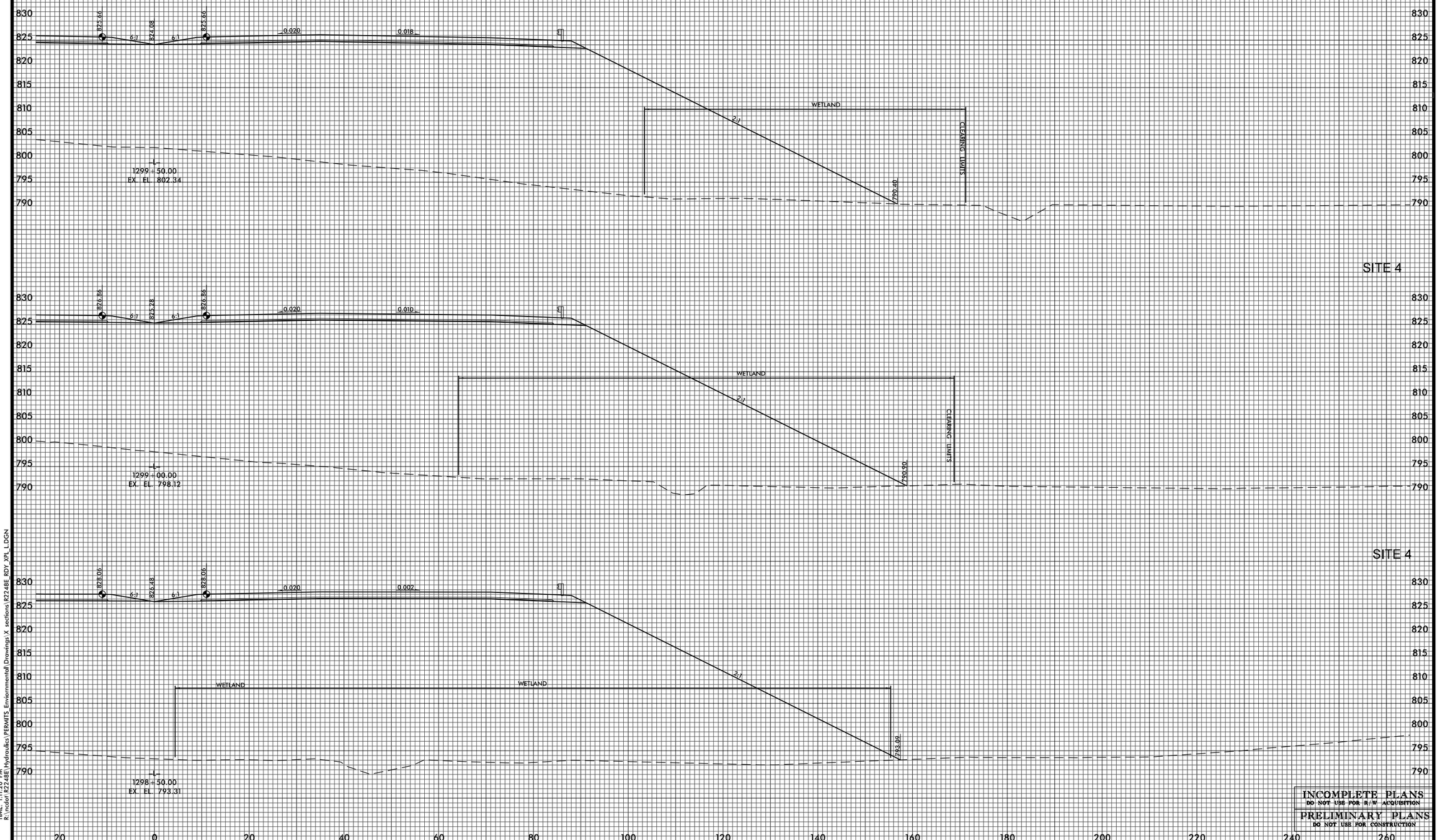
Permit Drawing
Sheet 71 of 108



INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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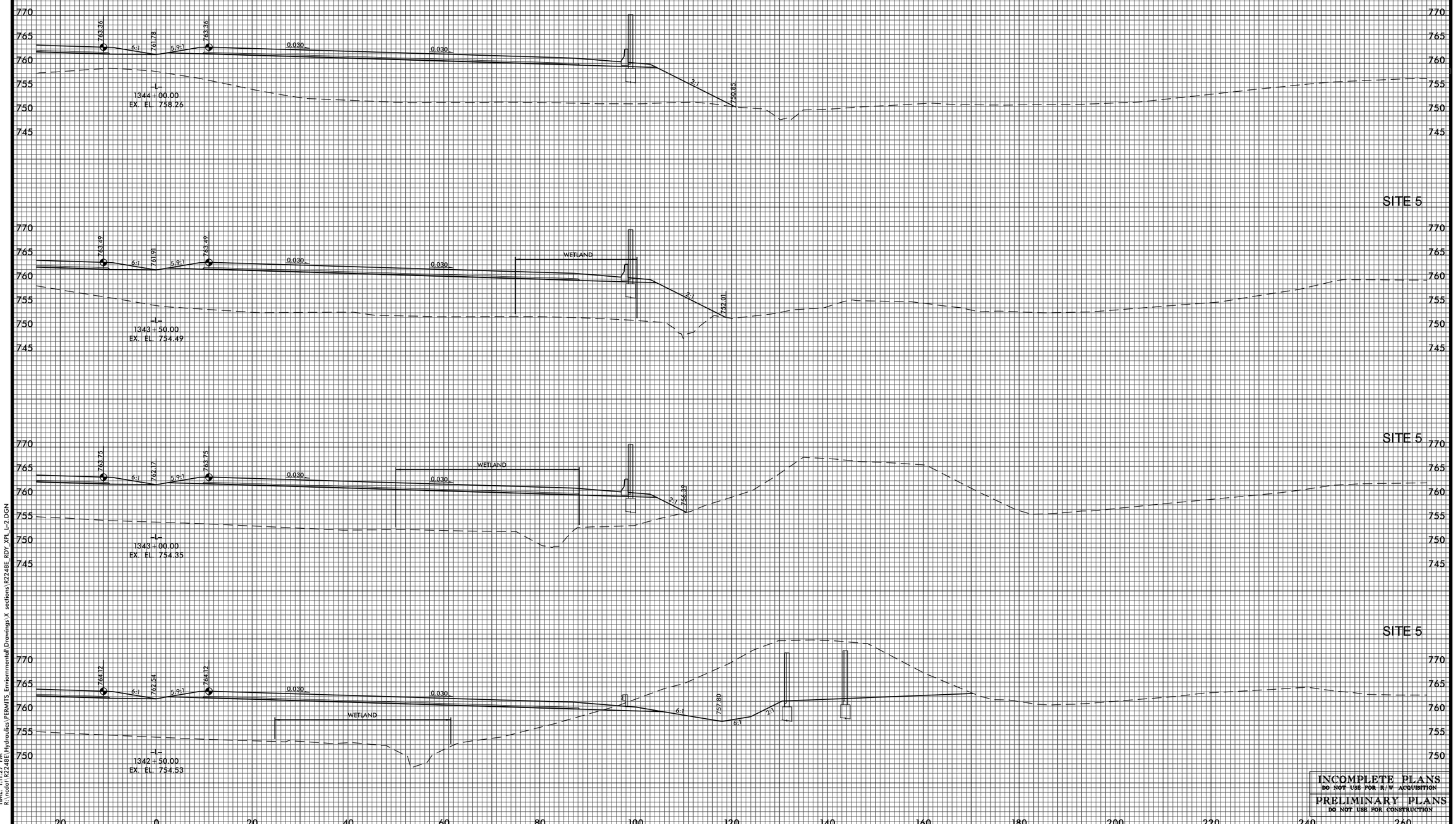
Permit Drawing
Sheet 72 of 108



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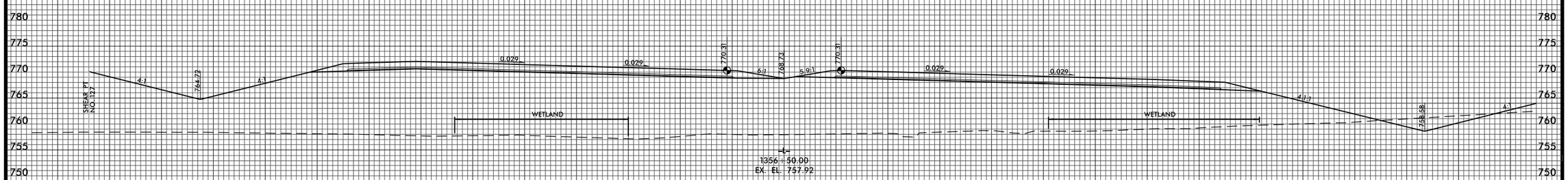
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-65	457

Permit Drawing
Sheet 73 of 108

SITE 7



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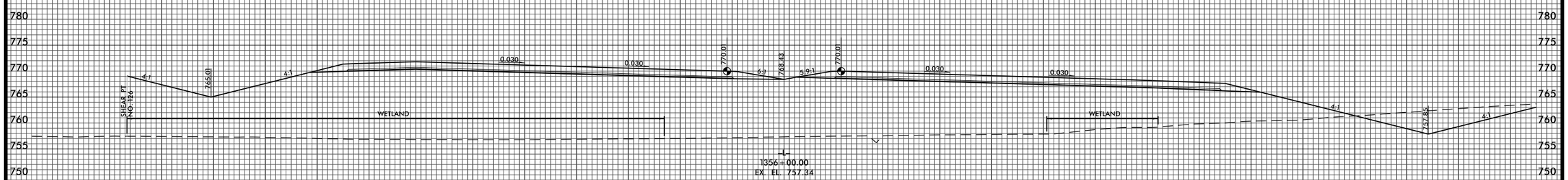

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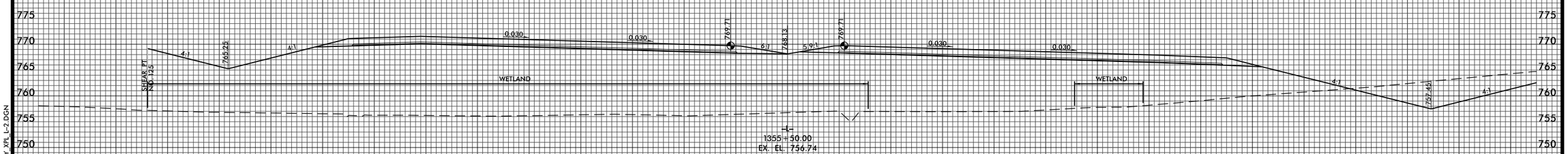

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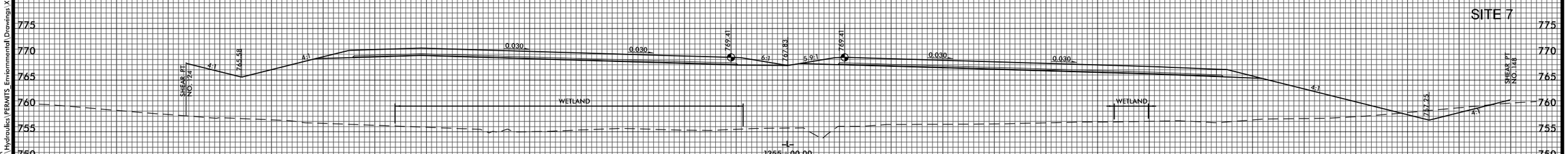

INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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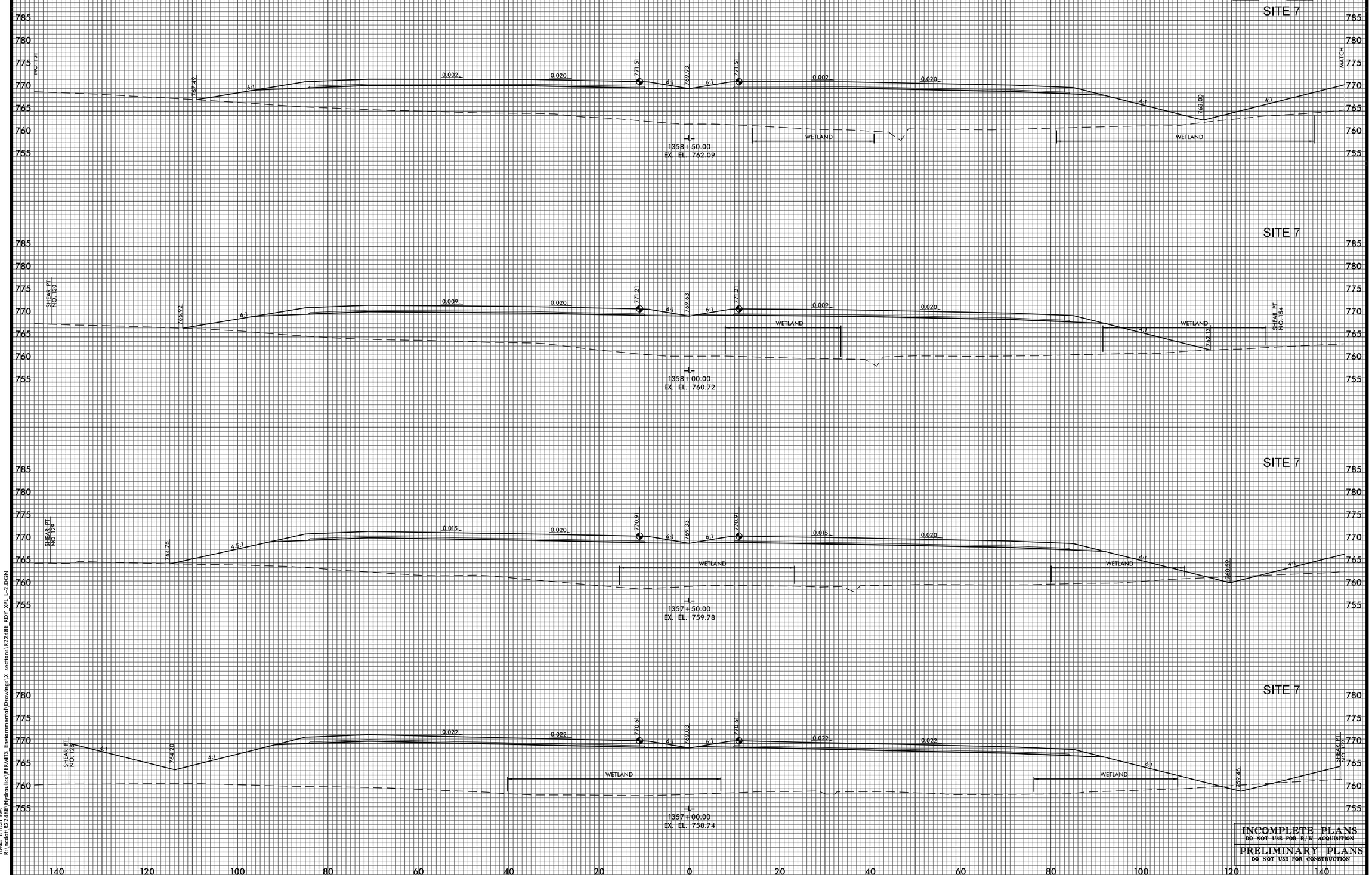
Permit Drawing
Sheet 74 of 108



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INCOMPLETE PLANS
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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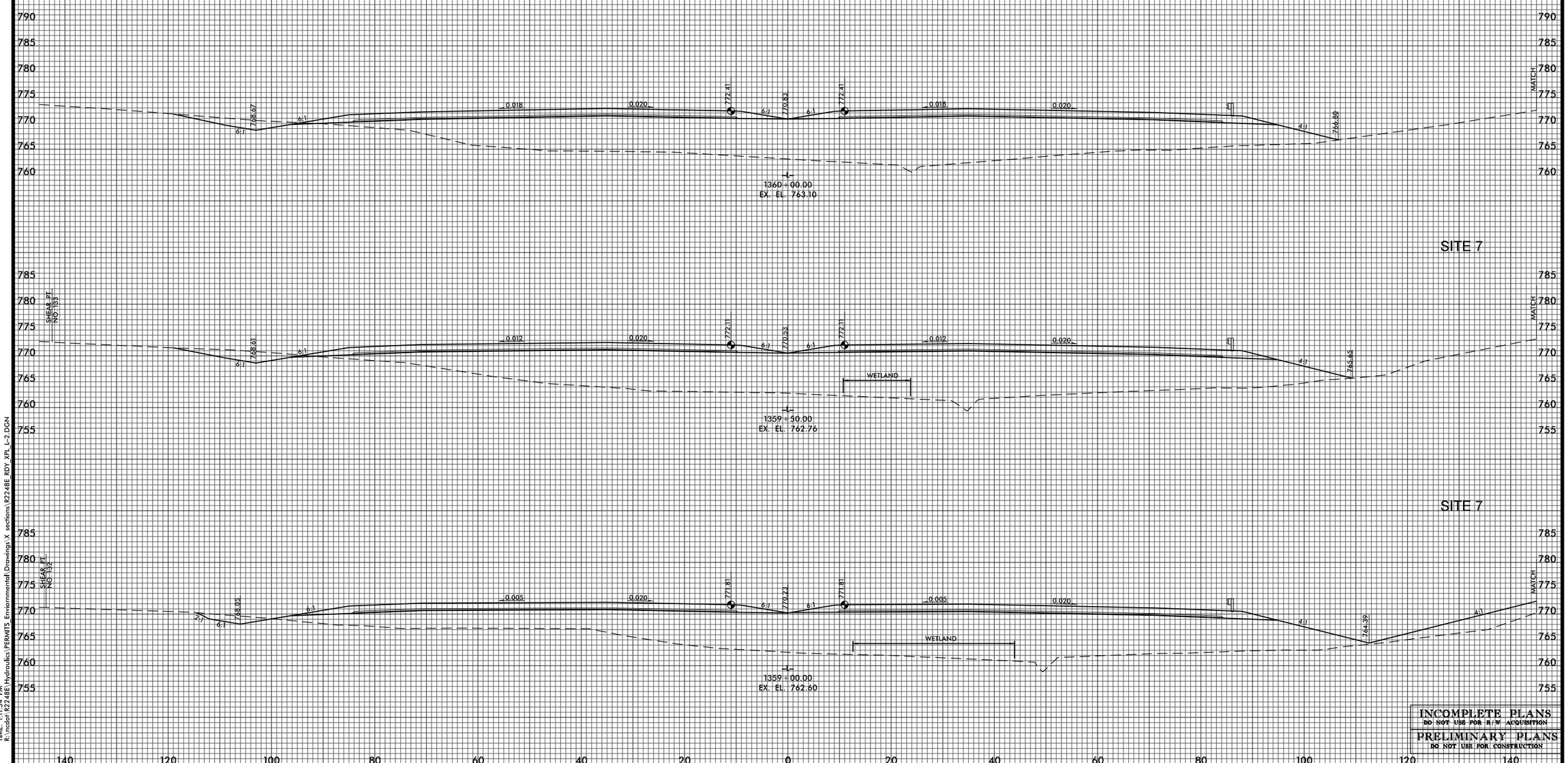
Permit Drawing
Sheet 75 of 108



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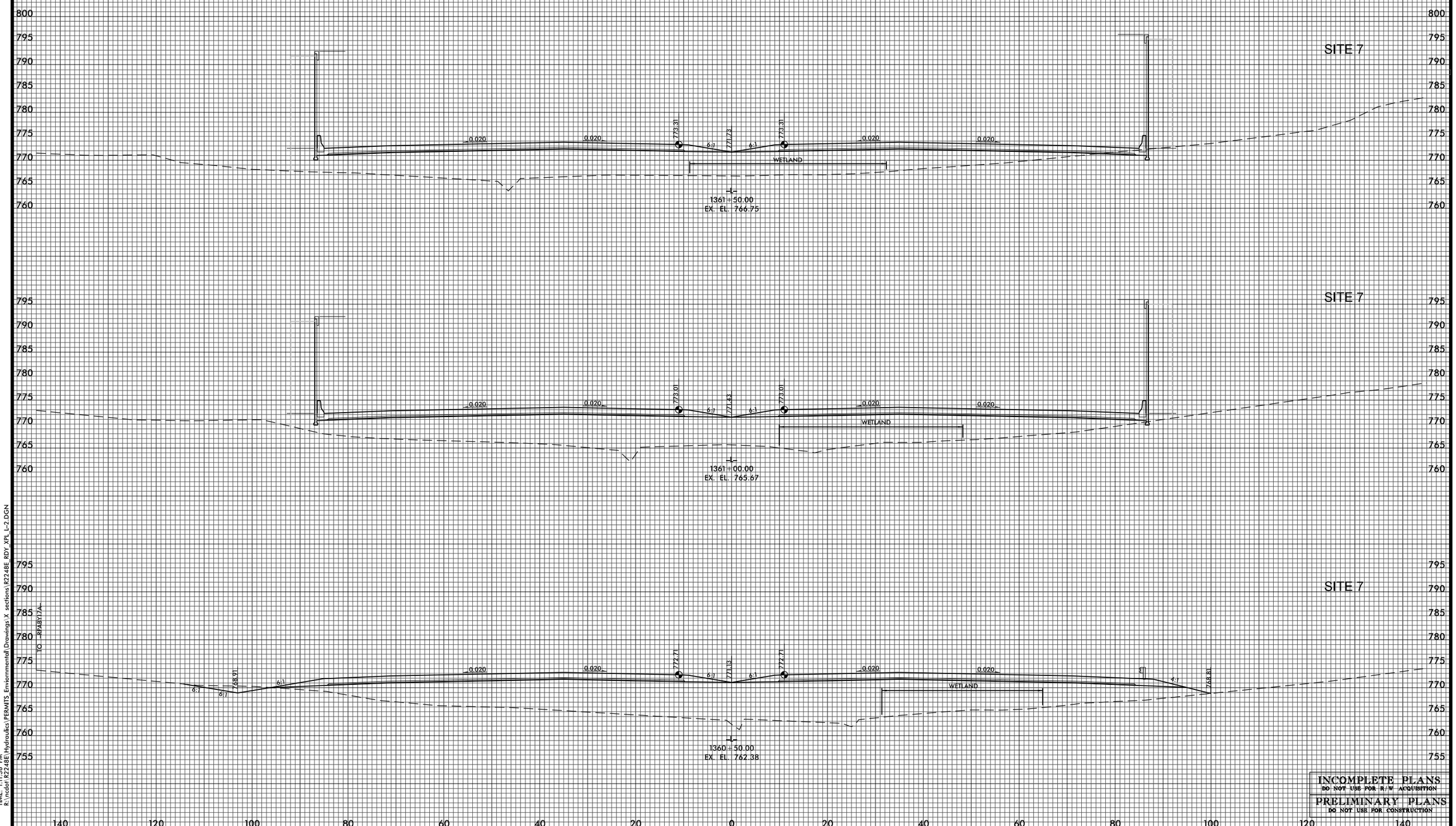
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-68	457

Permit Drawing
Sheet 76 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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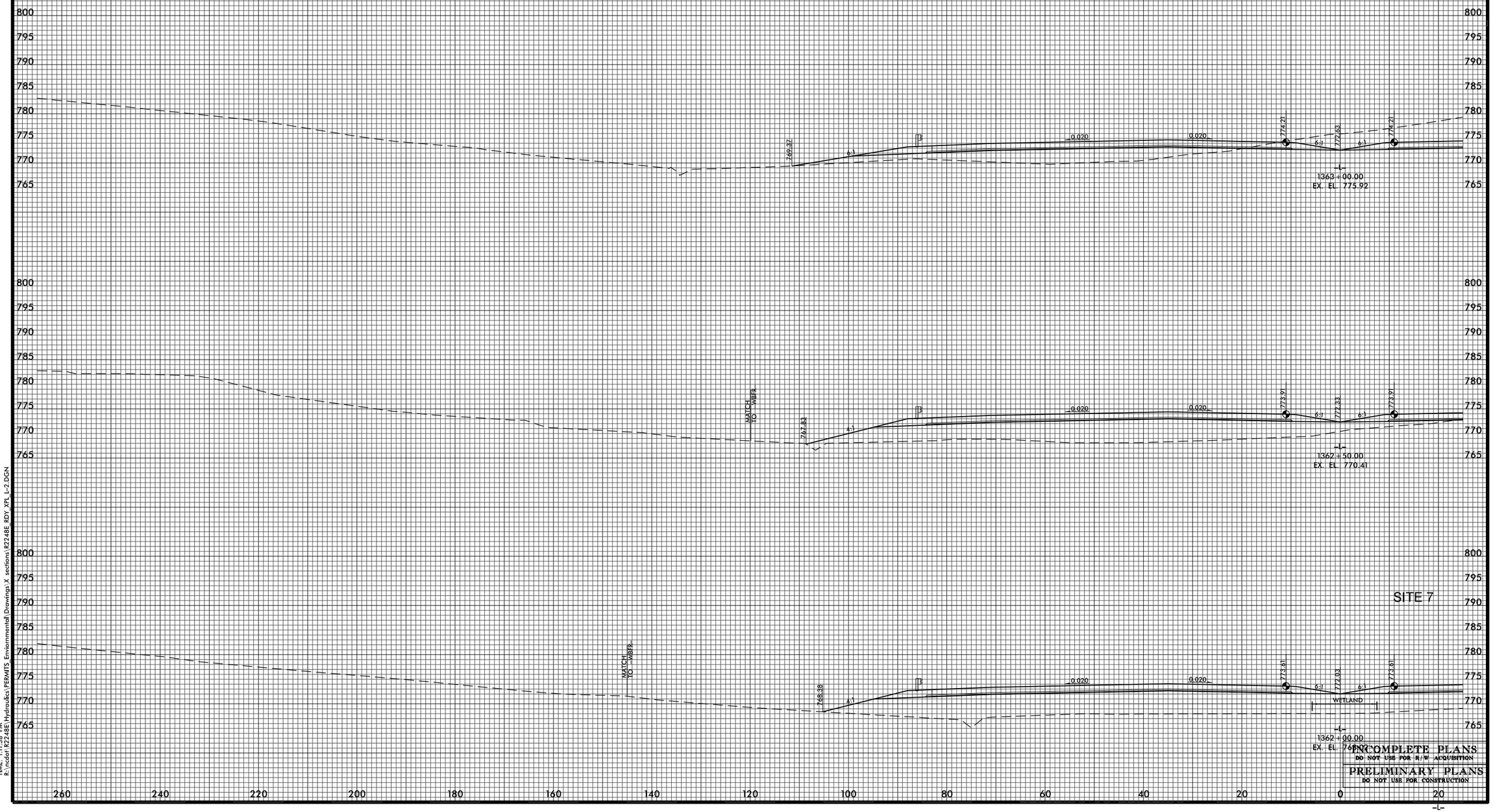
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-69	457

Permit Drawing
Sheet 77 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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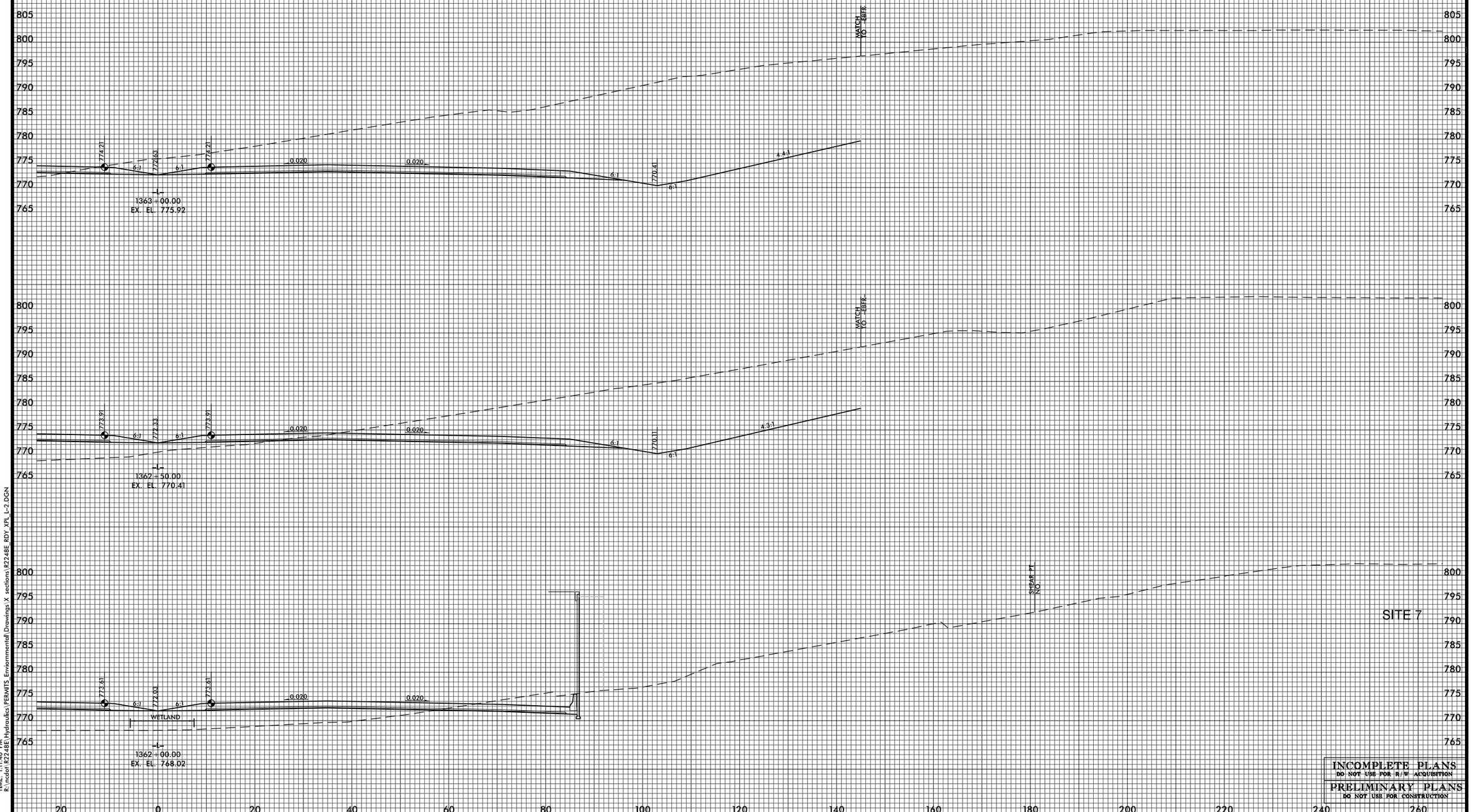
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-69A	457

Permit Drawing
Sheet 78 of 108



INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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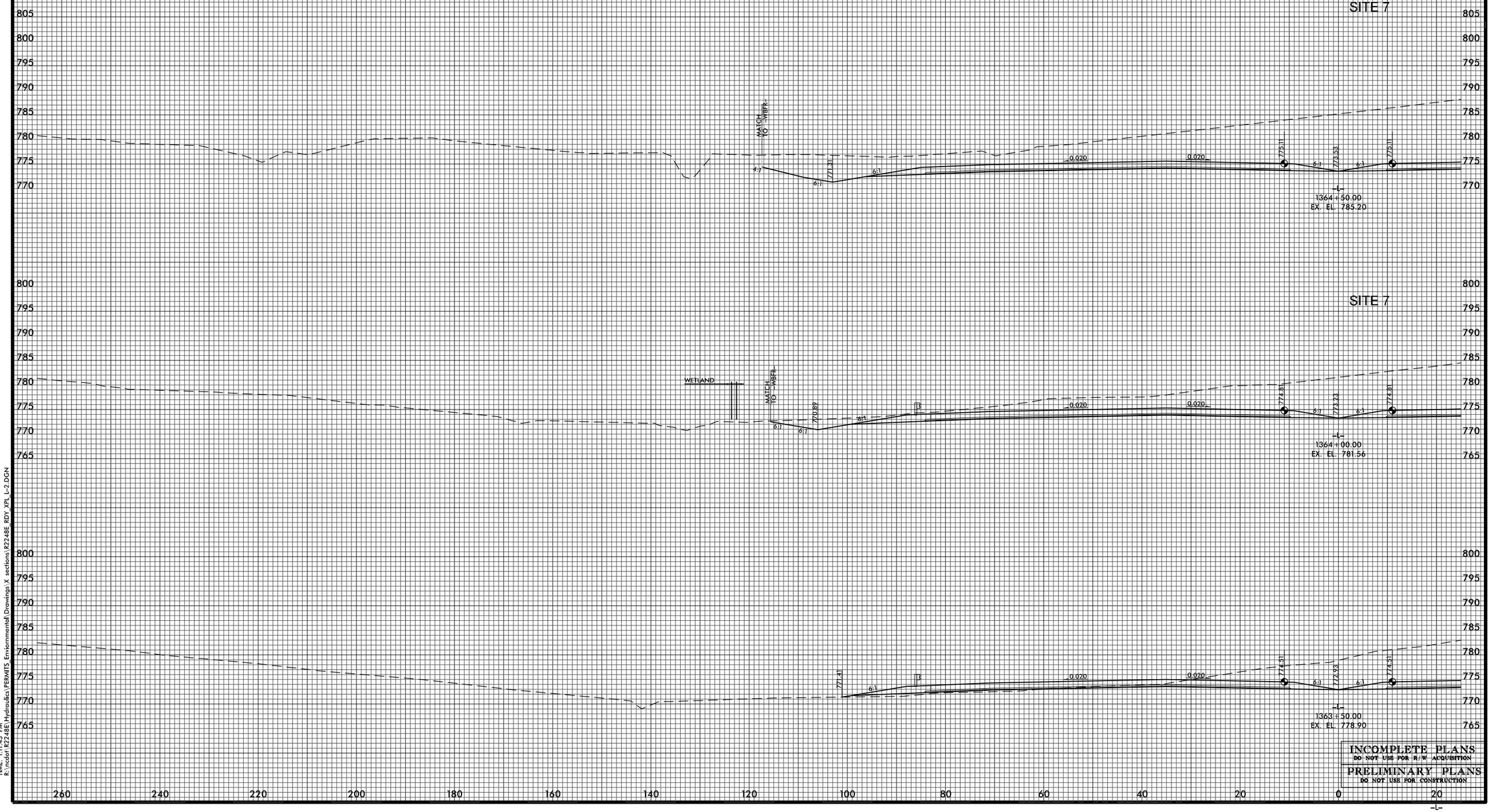
Permit Drawing
Sheet 79 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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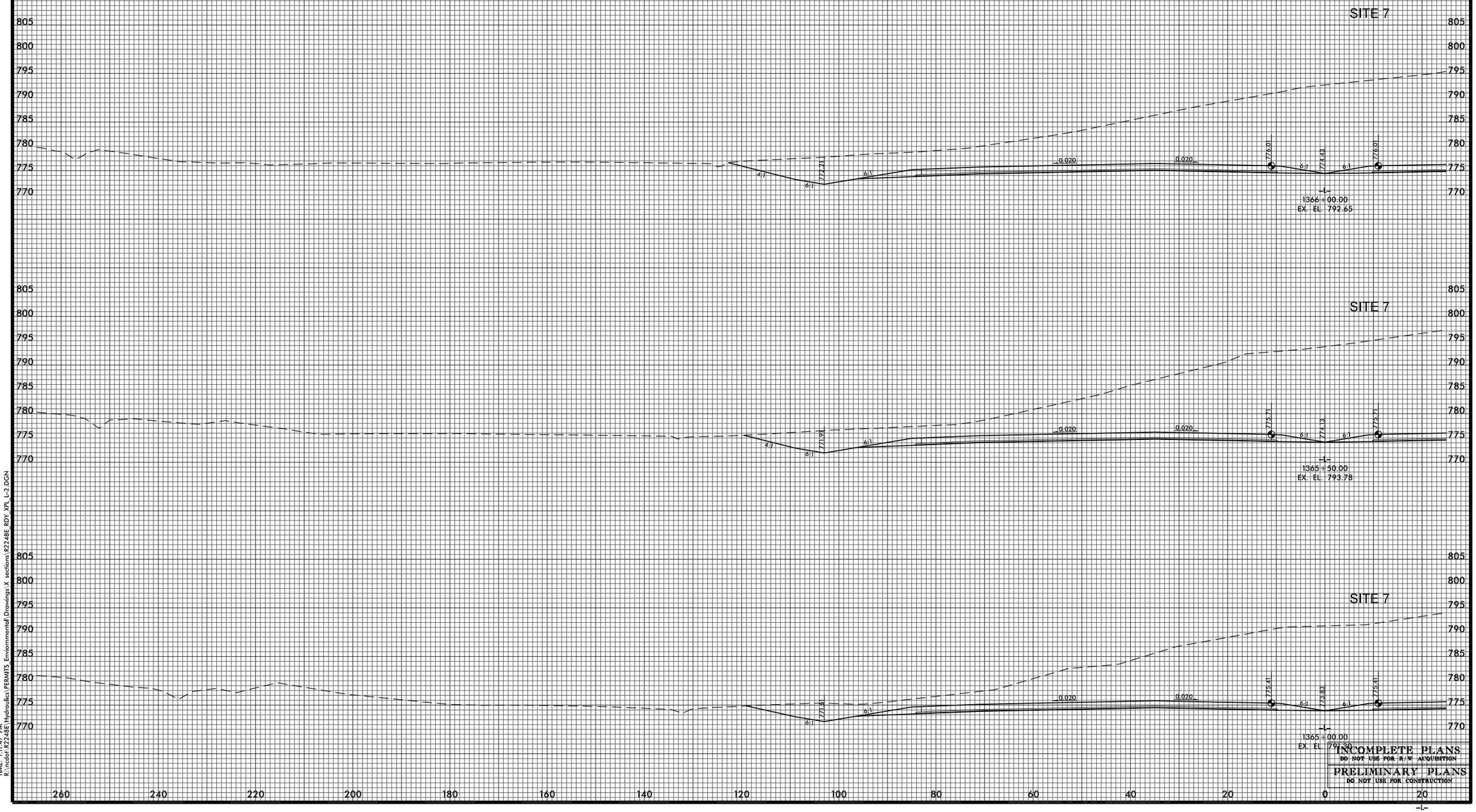
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-71	457

Permit Drawing
Sheet 80 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
TIME: 1:11:47 PM
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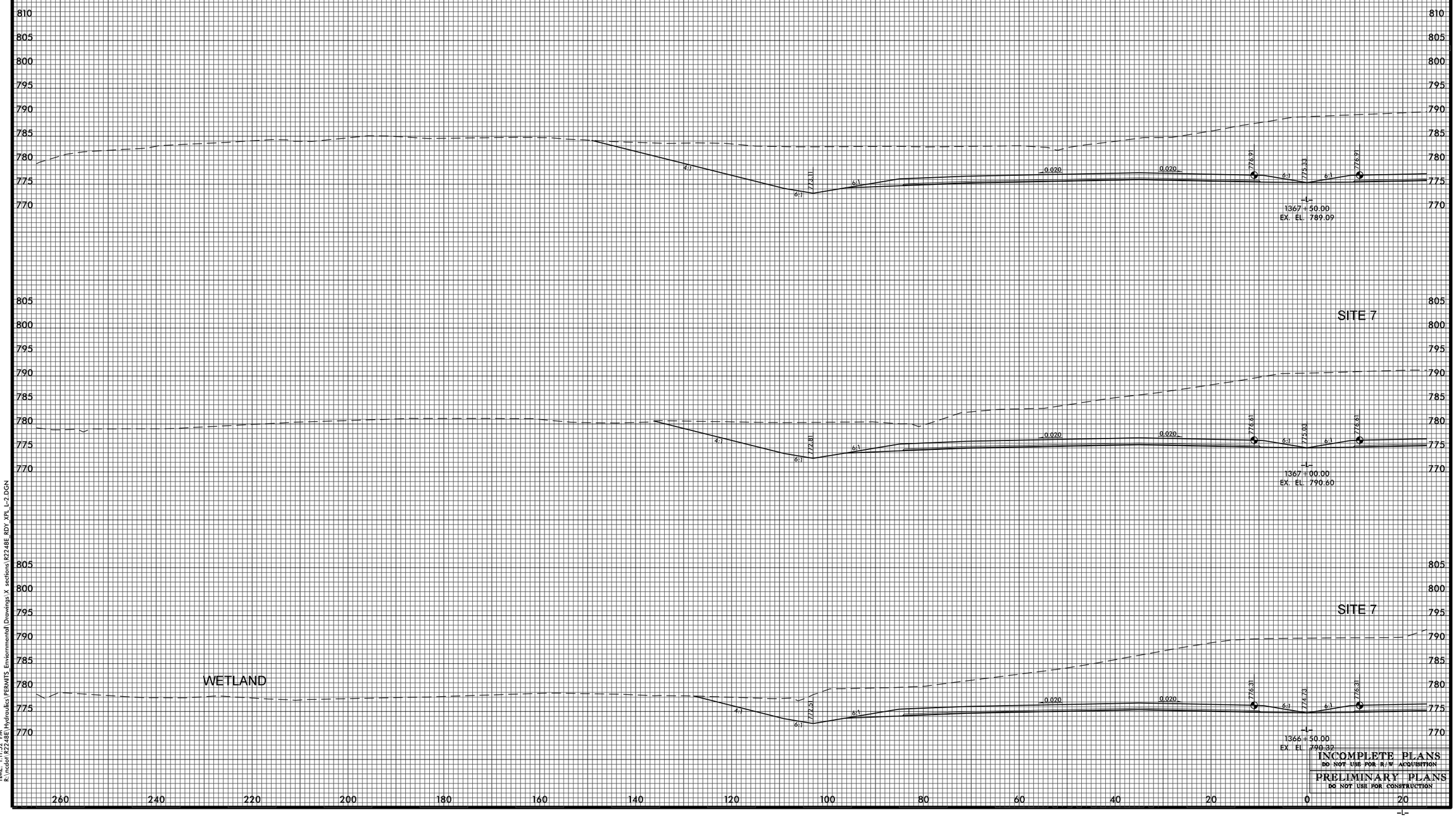
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-72	457

Permit Drawing
Sheet 81 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/4/2011
TIME: 1:11:52 PM
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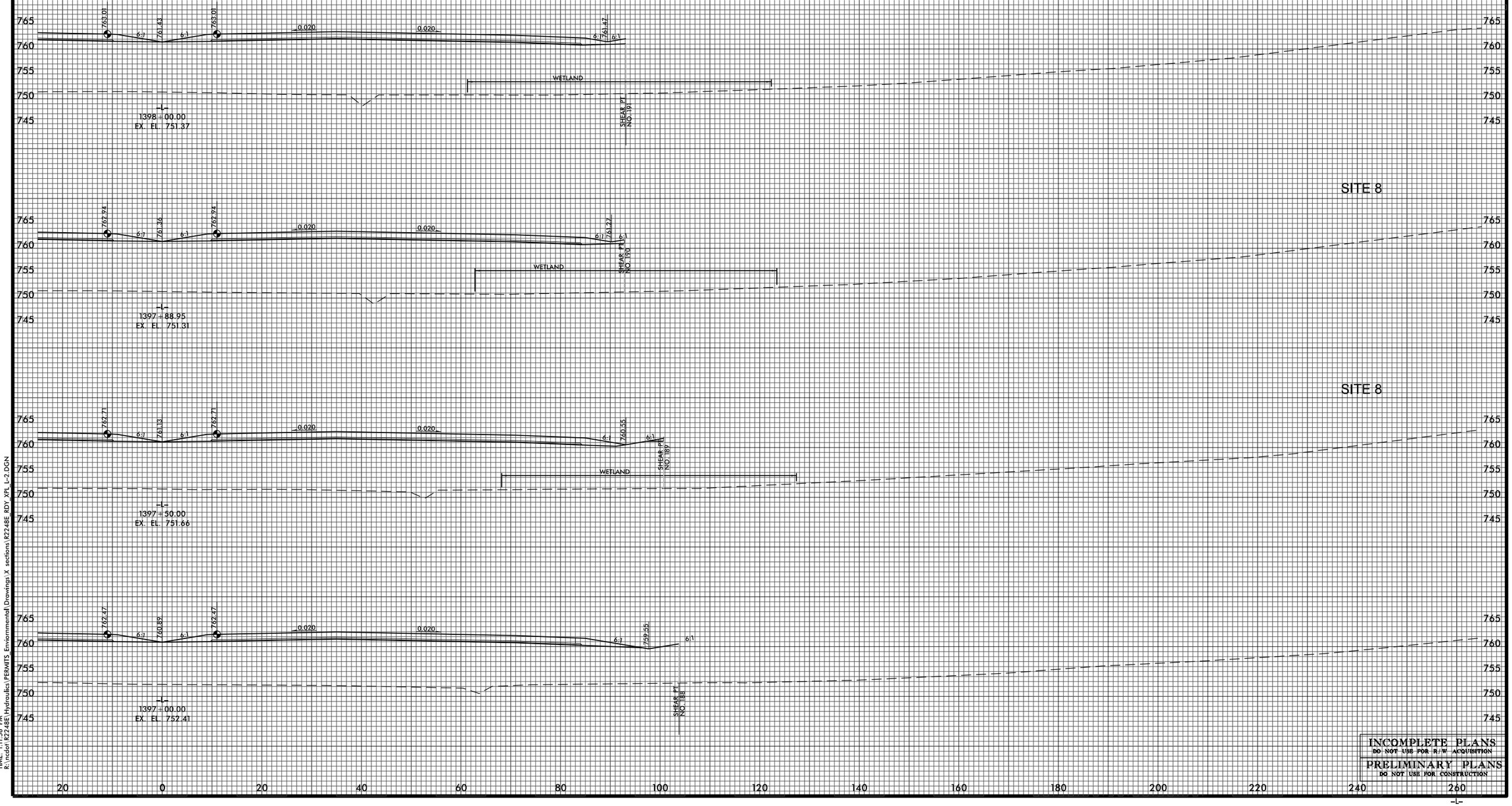
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-91A	457

Permit Drawing
Sheet 82 of 108



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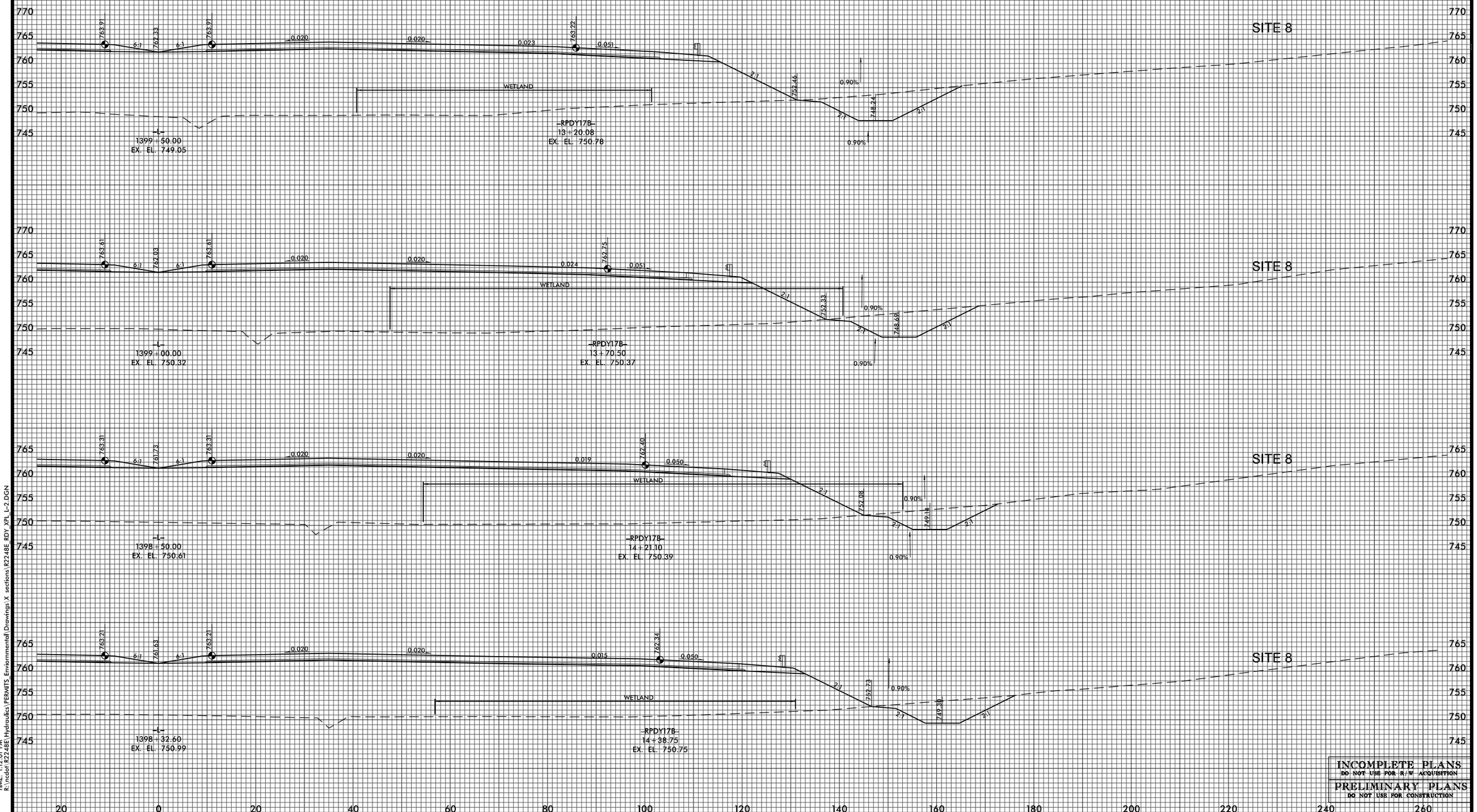
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-92A	457

Permit Drawing
Sheet 83 of 108



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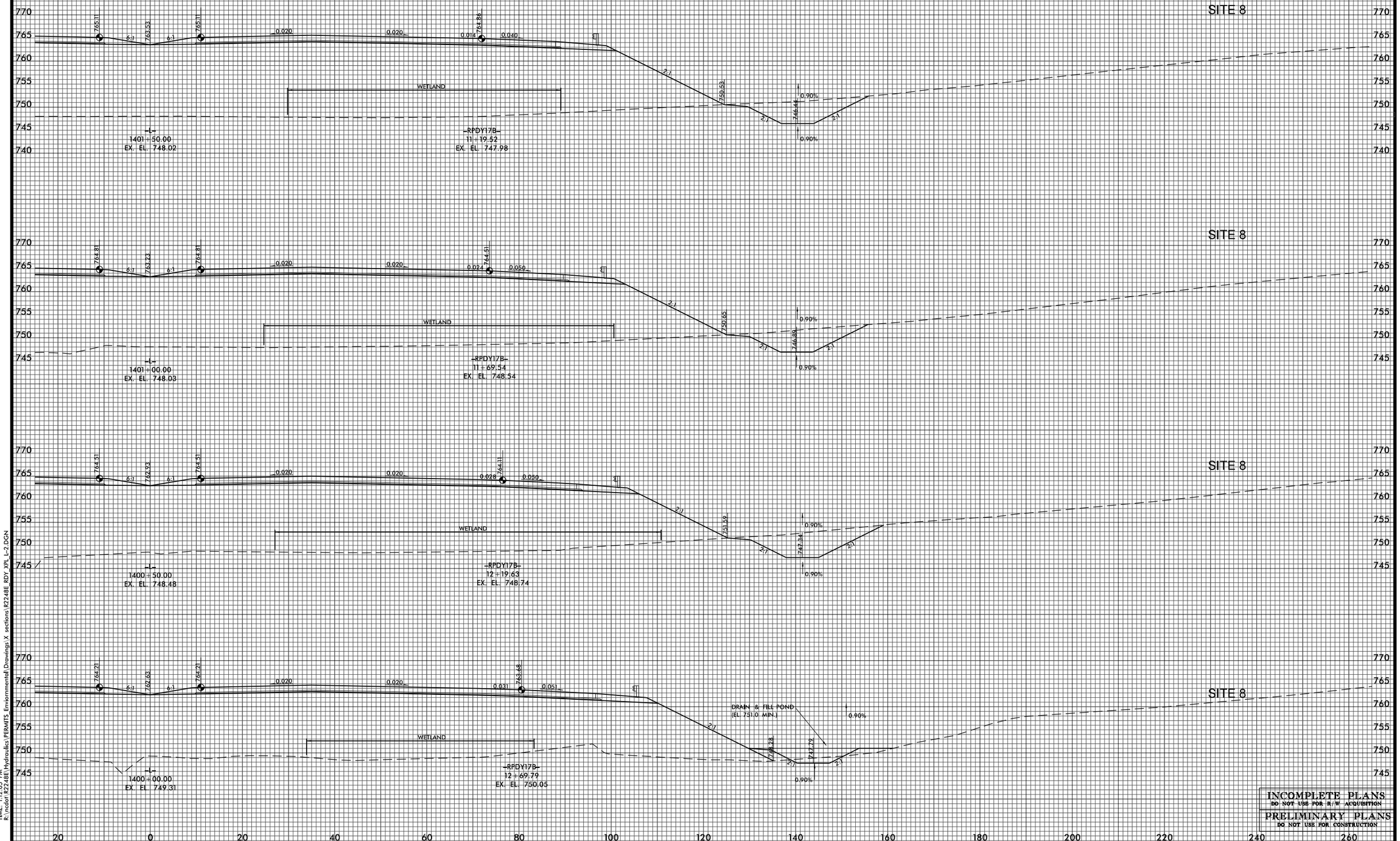
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-93A	457

Permit Drawing
Sheet 84 of 108



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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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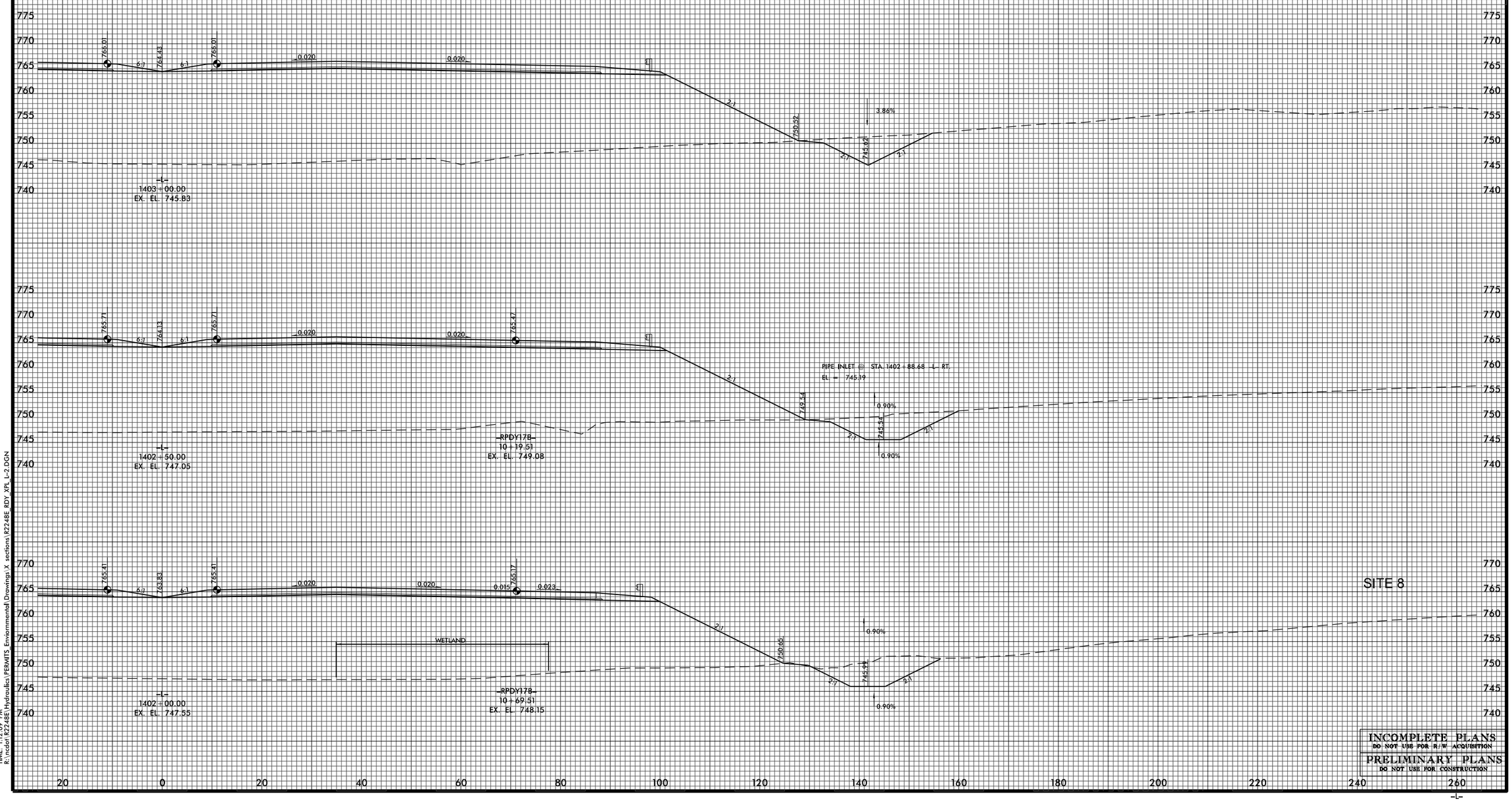
Permit Drawing
Sheet 85 of 108



INCOMPLETE PLANS
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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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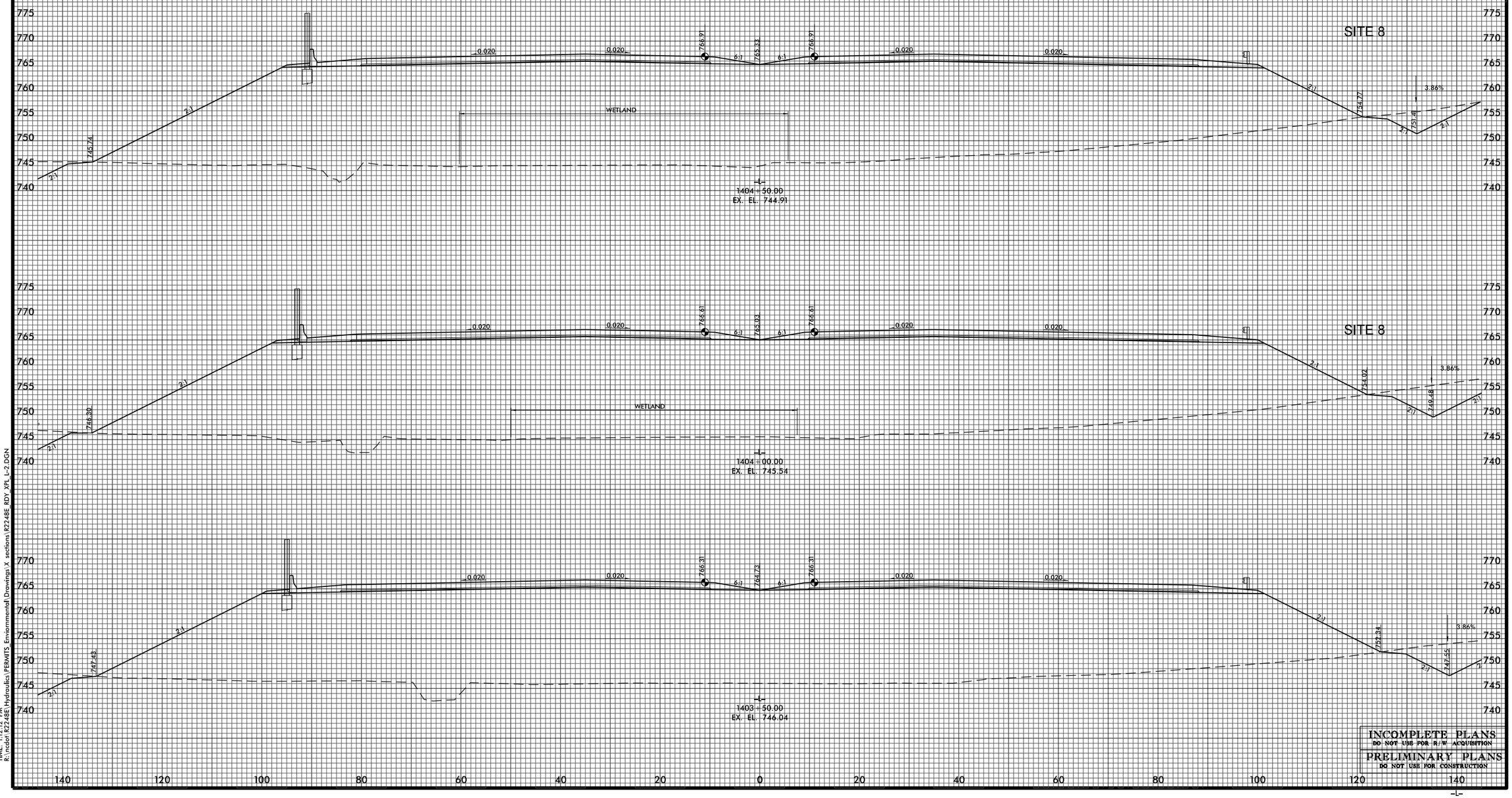
Permit Drawing
Sheet 86 of 108



INCOMPLETE PLANS
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DO NOT USE FOR CONSTRUCTION

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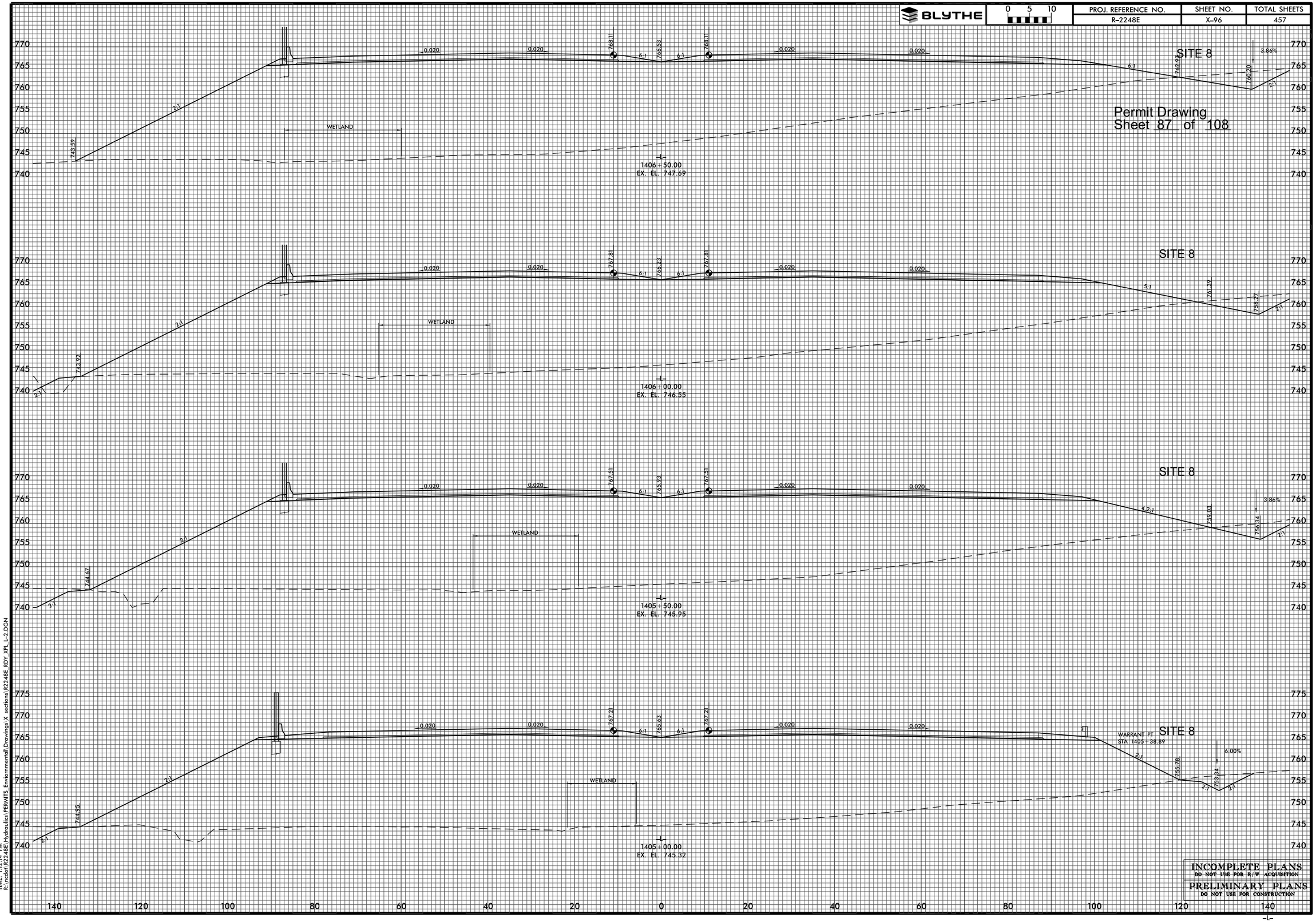

Permit Drawing
Sheet 87 of 108

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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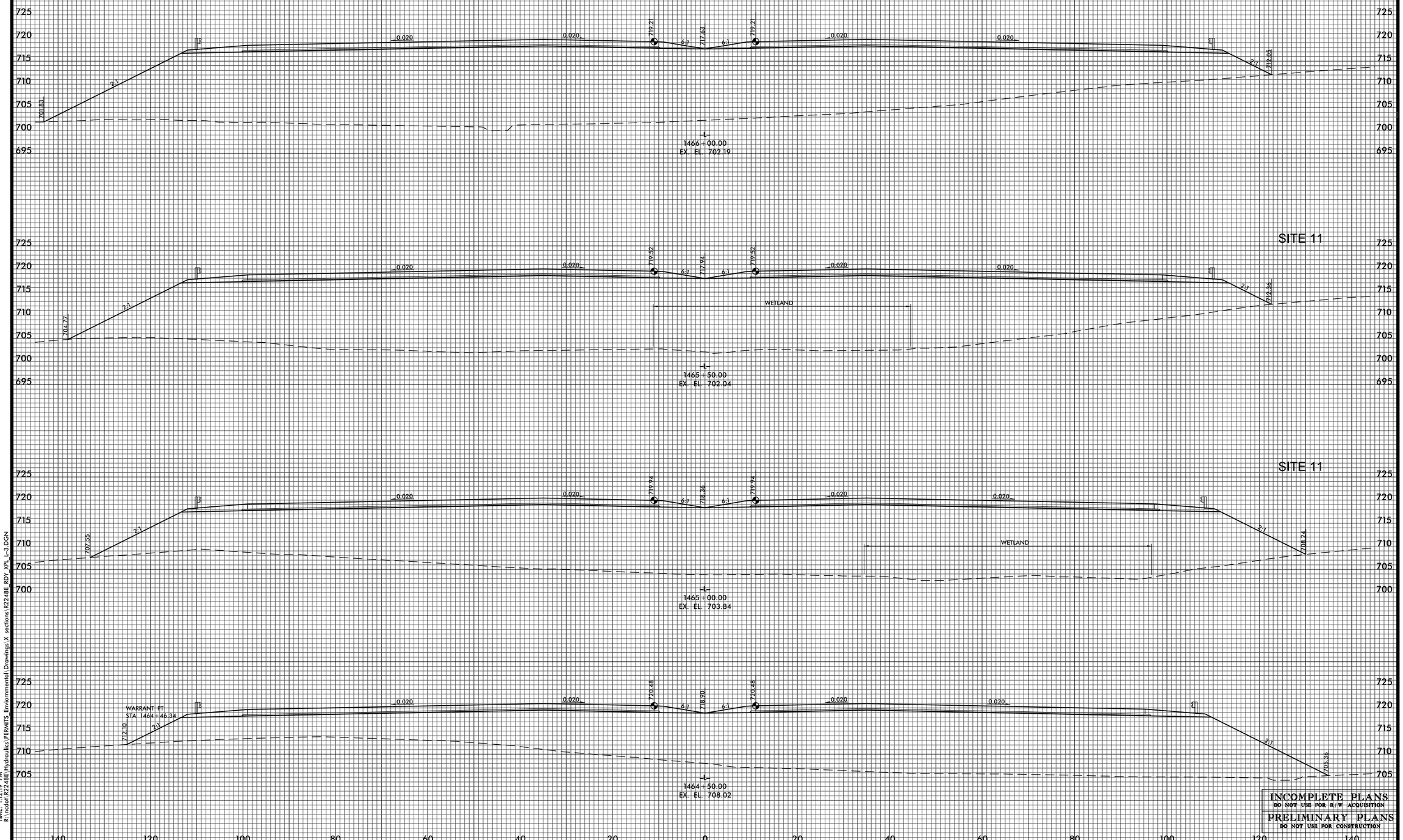
Permit Drawing
Sheet 88 of 108



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INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

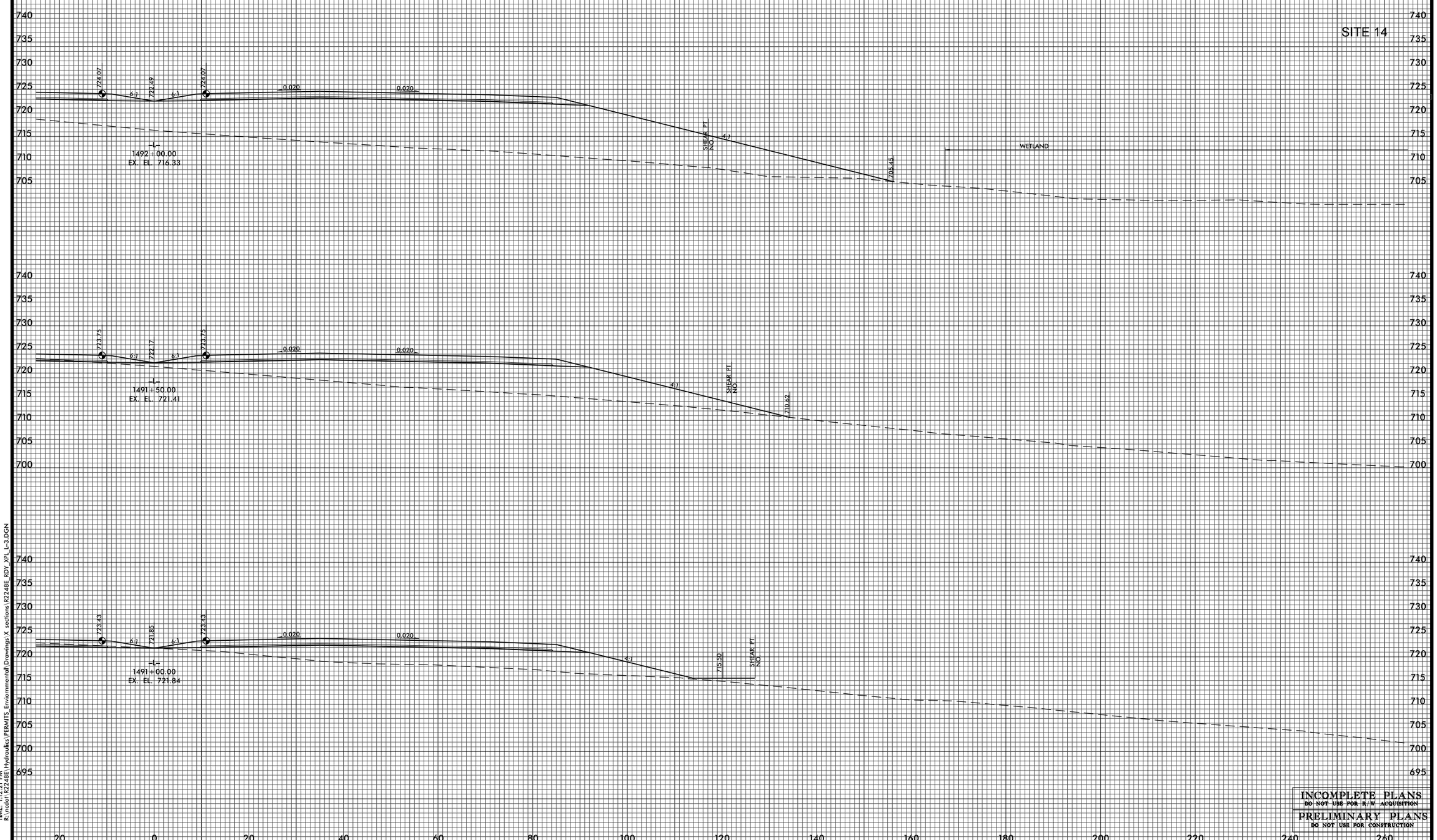
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-141A	457

Permit Drawing
Sheet 89 of 108

SITE 14



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/4/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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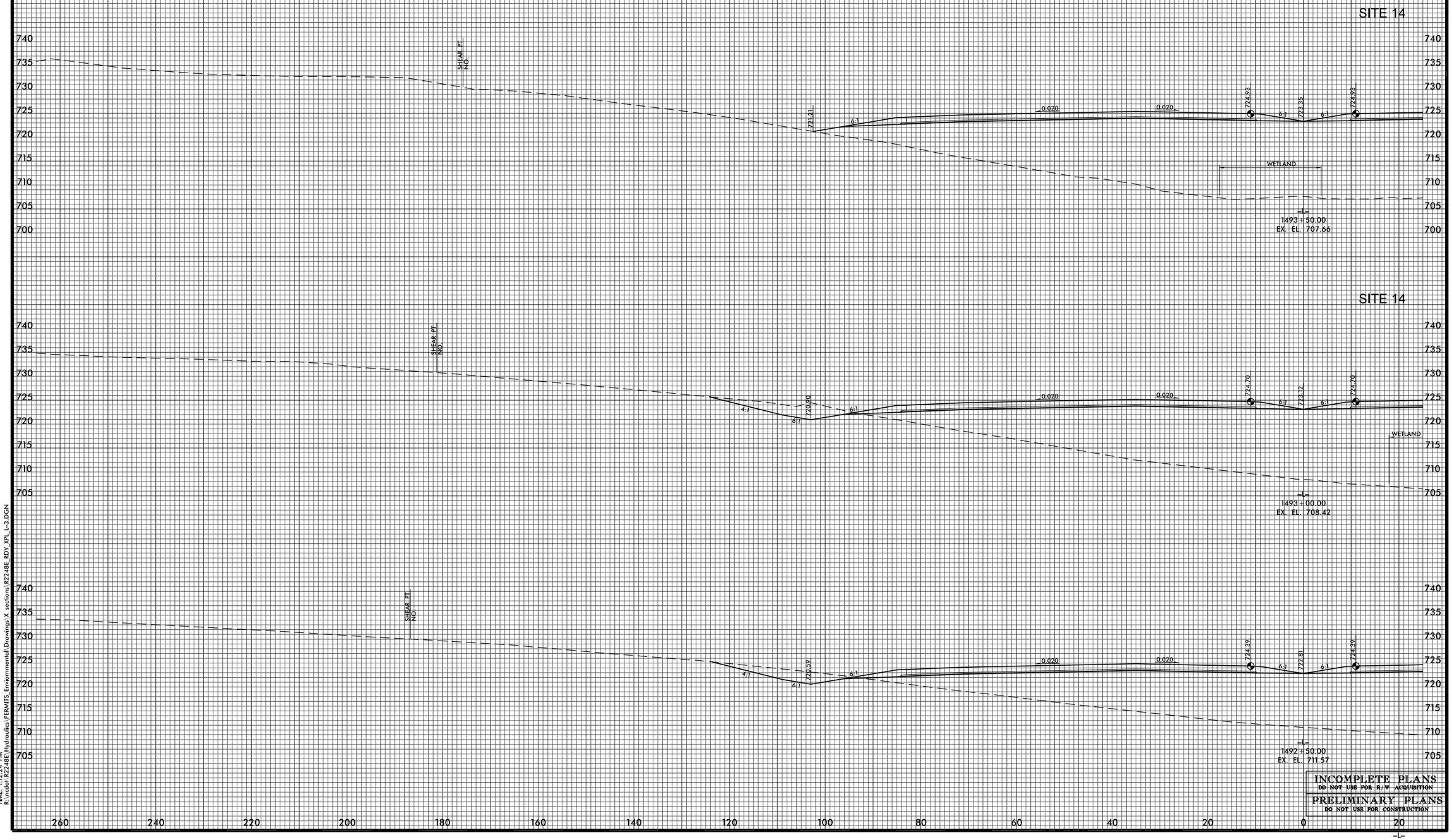
Permit Drawing
Sheet 90 of 108



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PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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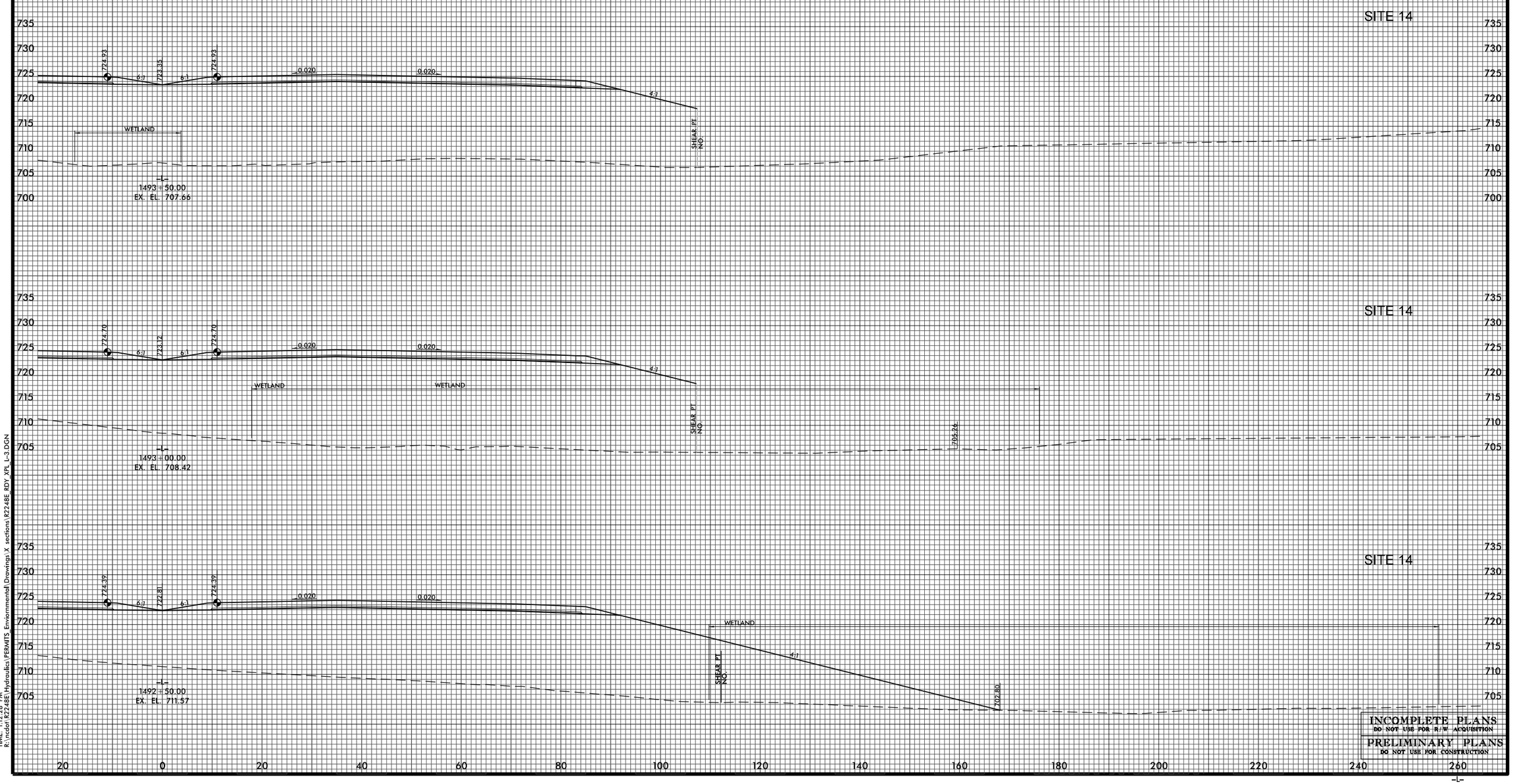
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-142A	457

Permit Drawing
Sheet 91 of 108



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DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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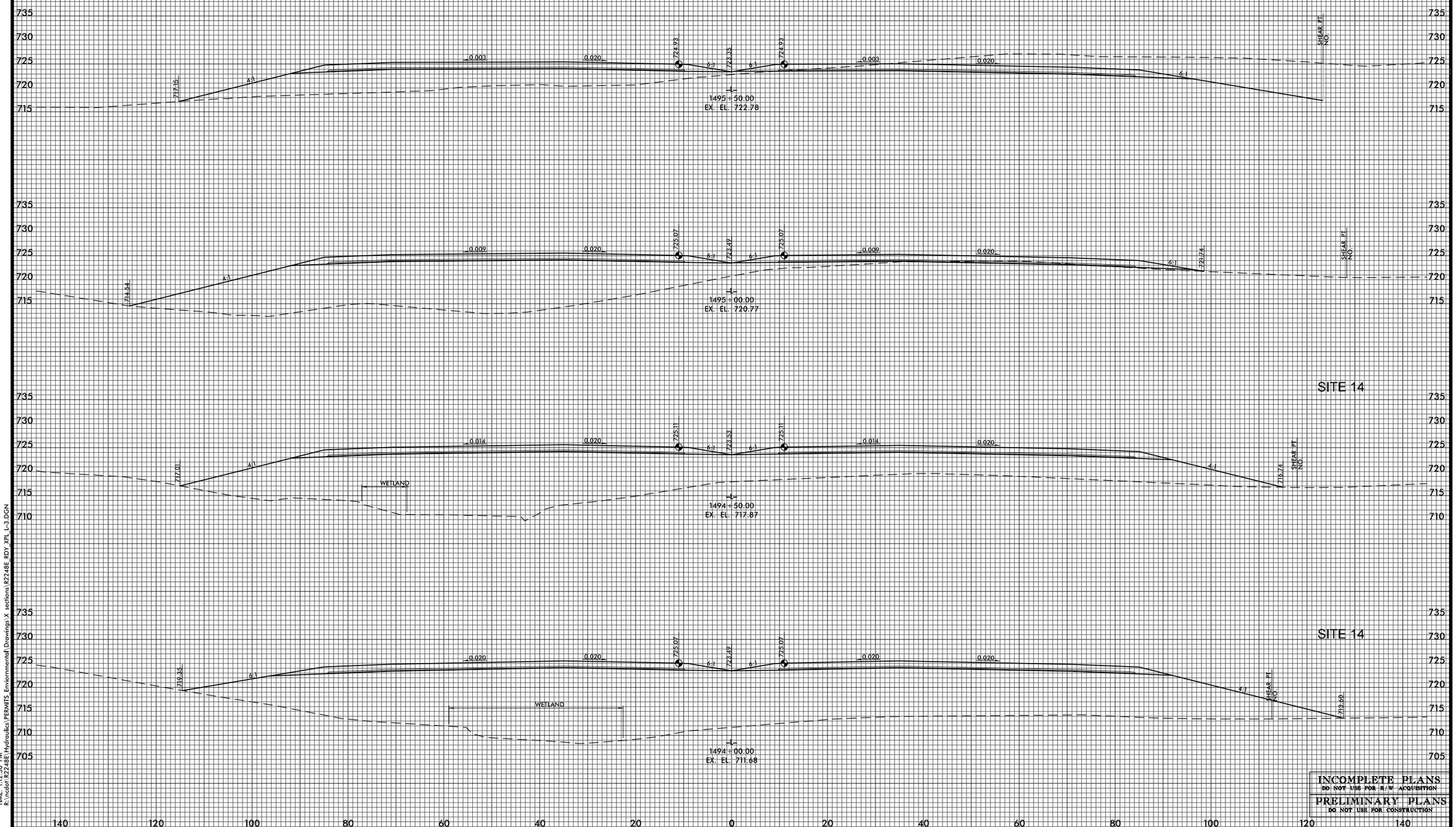
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-143	457

Permit Drawing
Sheet 92 of 108



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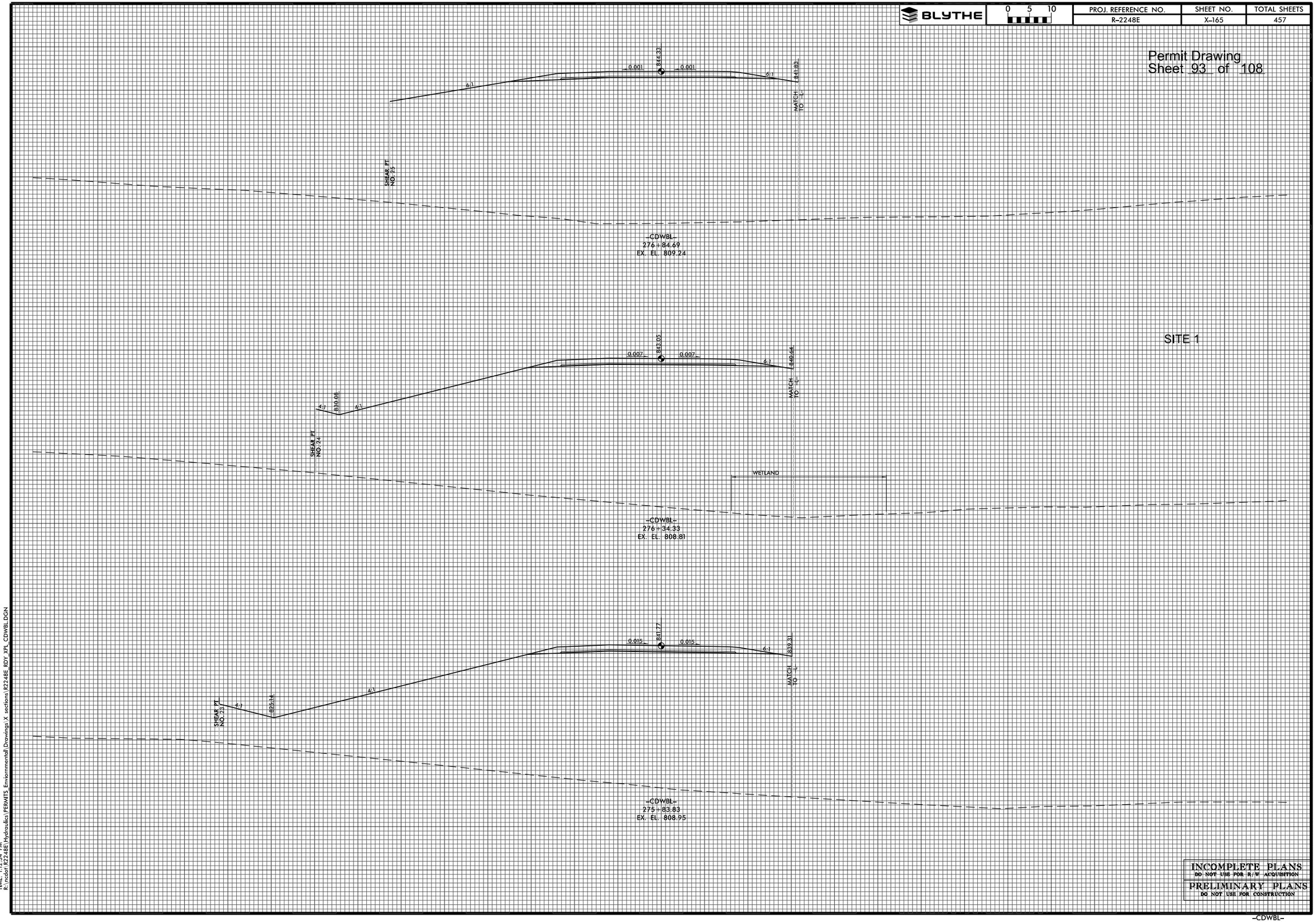
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-

Permit Drawing
Sheet 93 of 108



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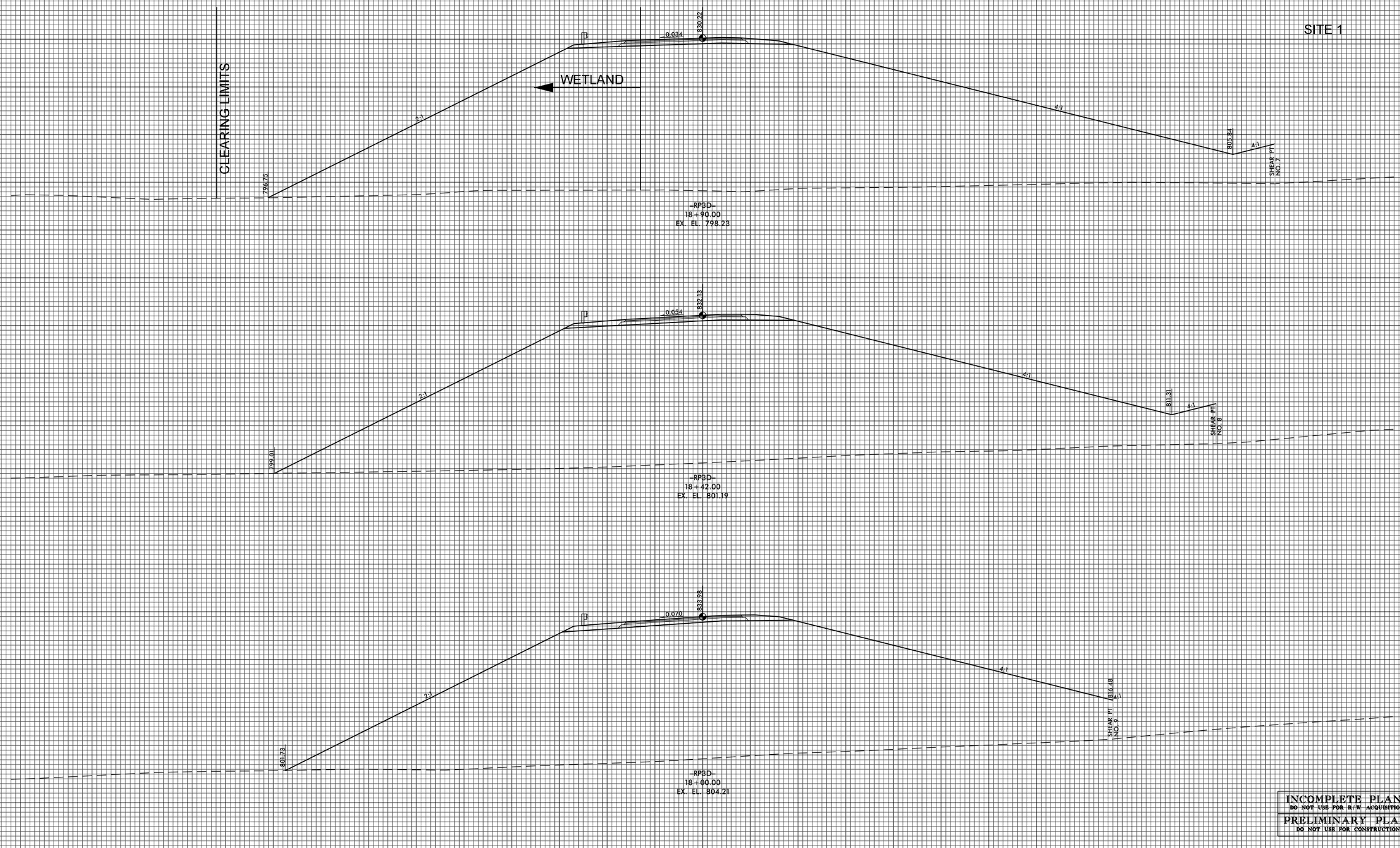
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-191	457

Permit Drawing
Sheet 94 of 108

SITE 1



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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-RP3D-

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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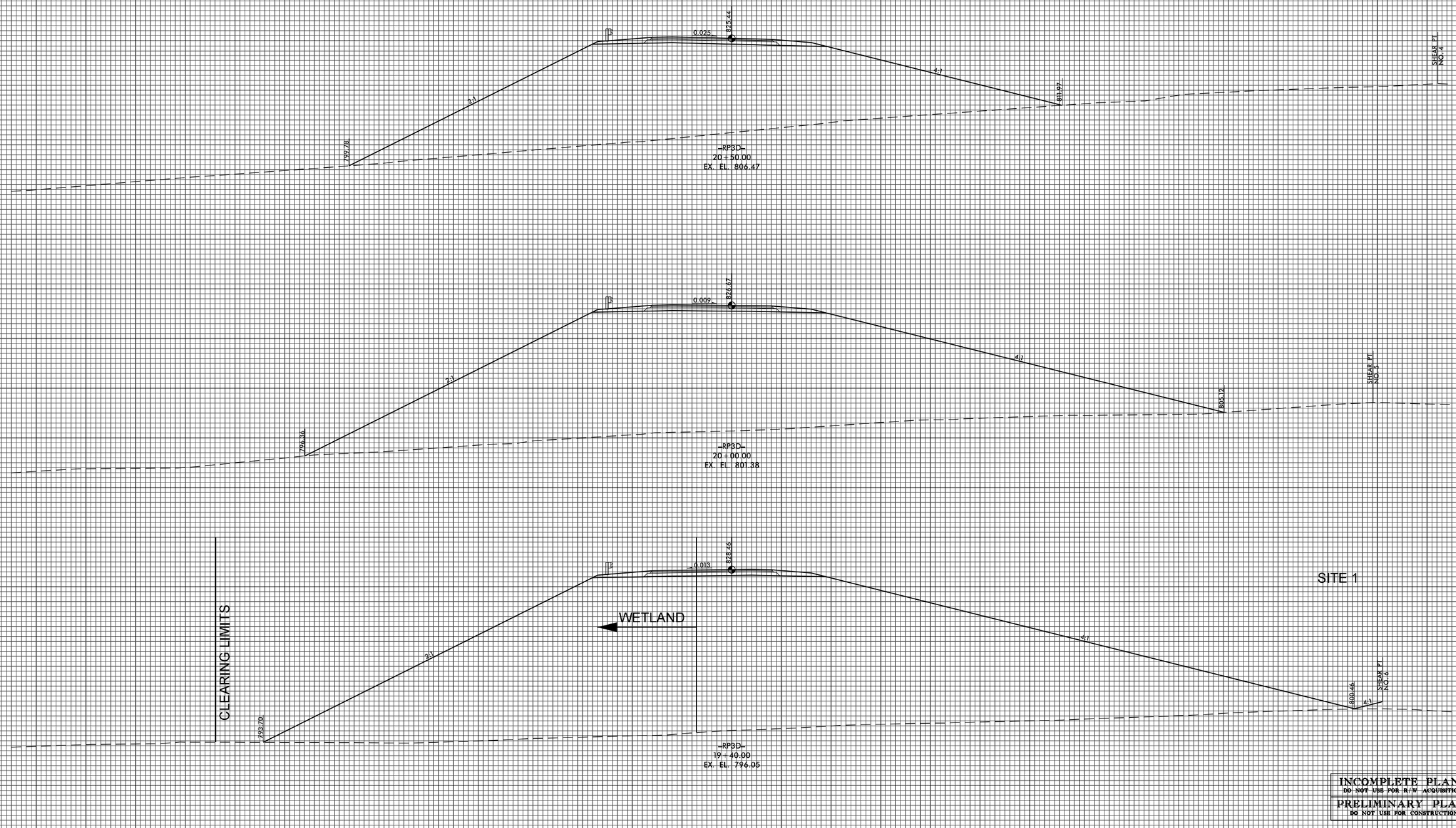
Permit Drawing
Sheet 95 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/4/2011
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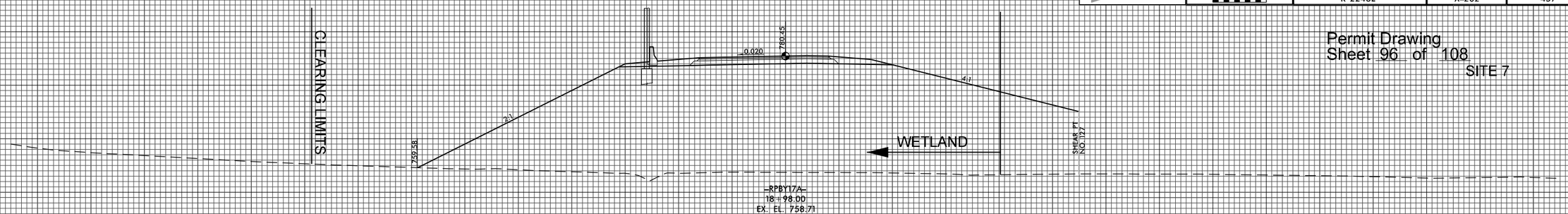
-RP3D-

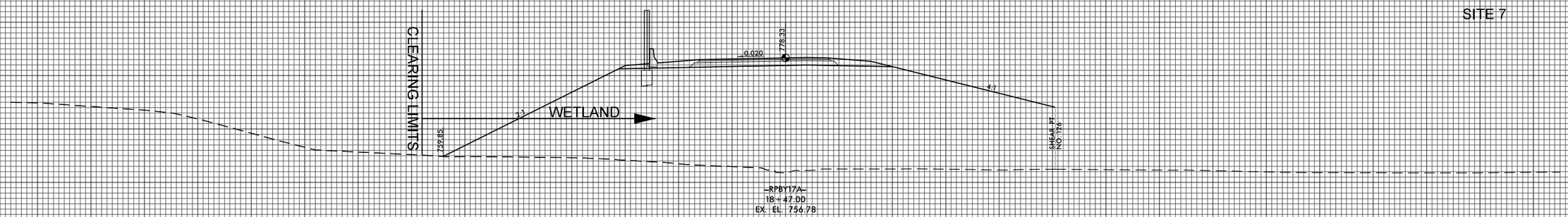
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-202	457

Permit Drawing
Sheet 96 of 108

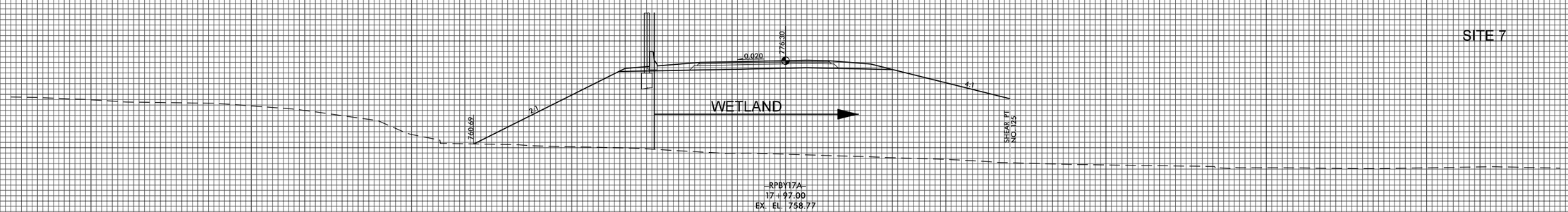
SITE 7

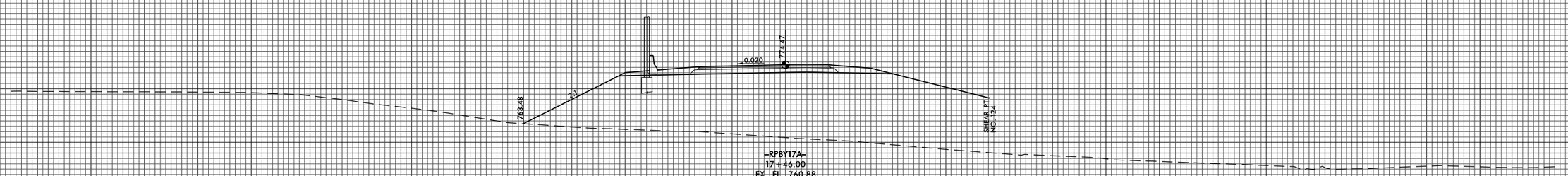


SITE 7



SITE 7





INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
TIME: 1:12:42 PM
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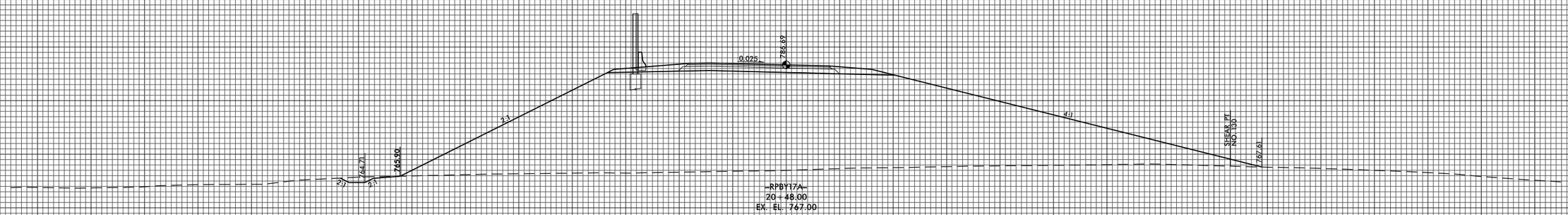
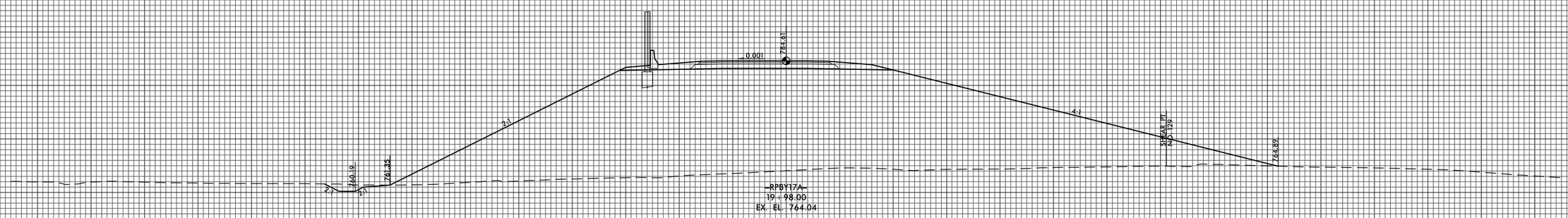
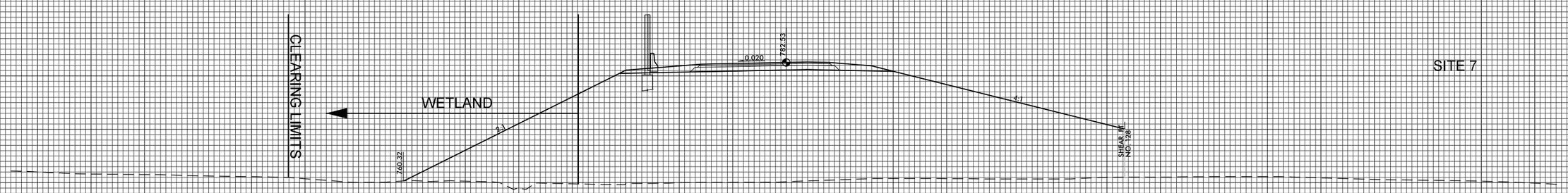
Permit Drawing
Sheet 97 of 108







SITE 7

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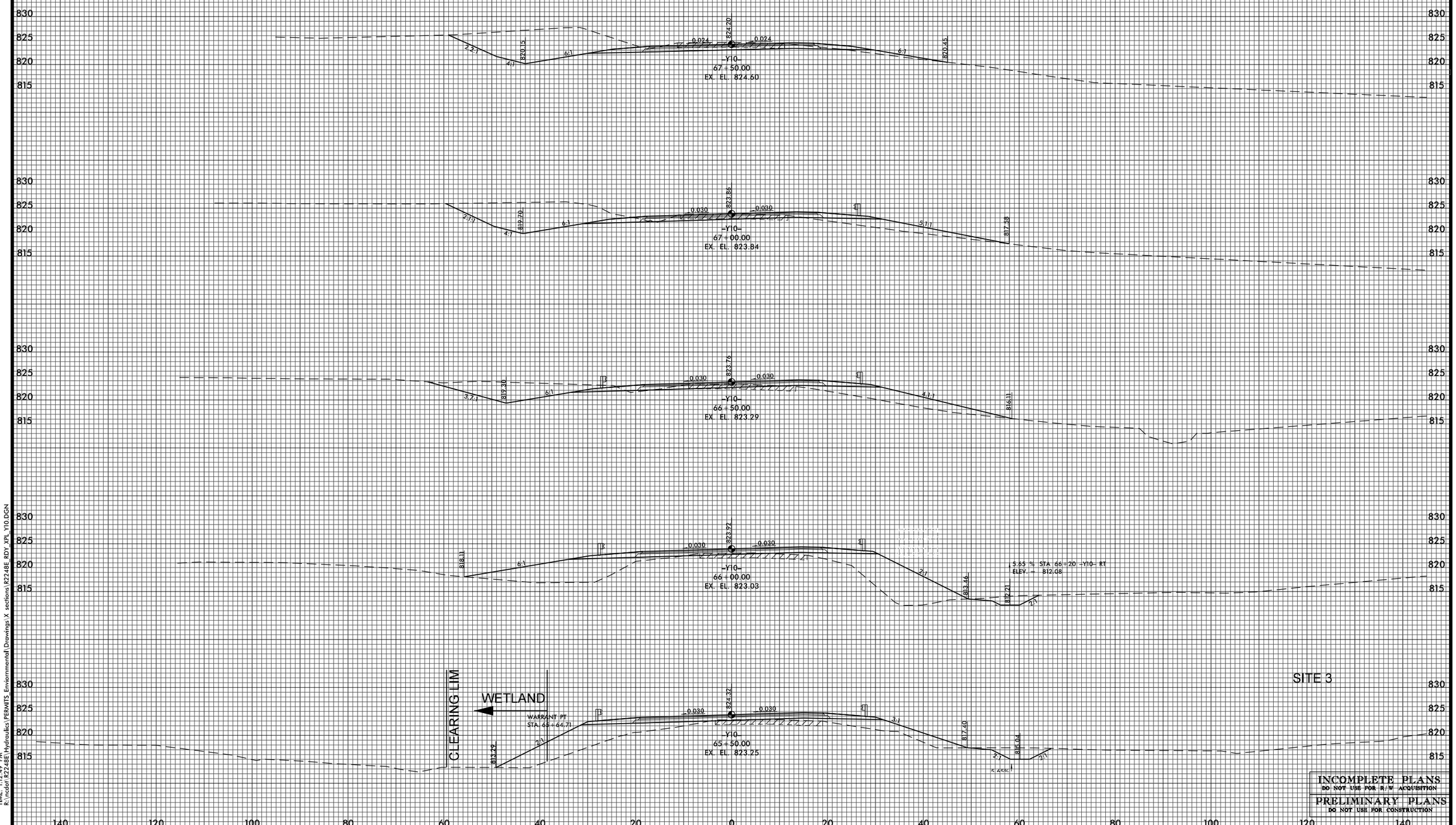
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 98 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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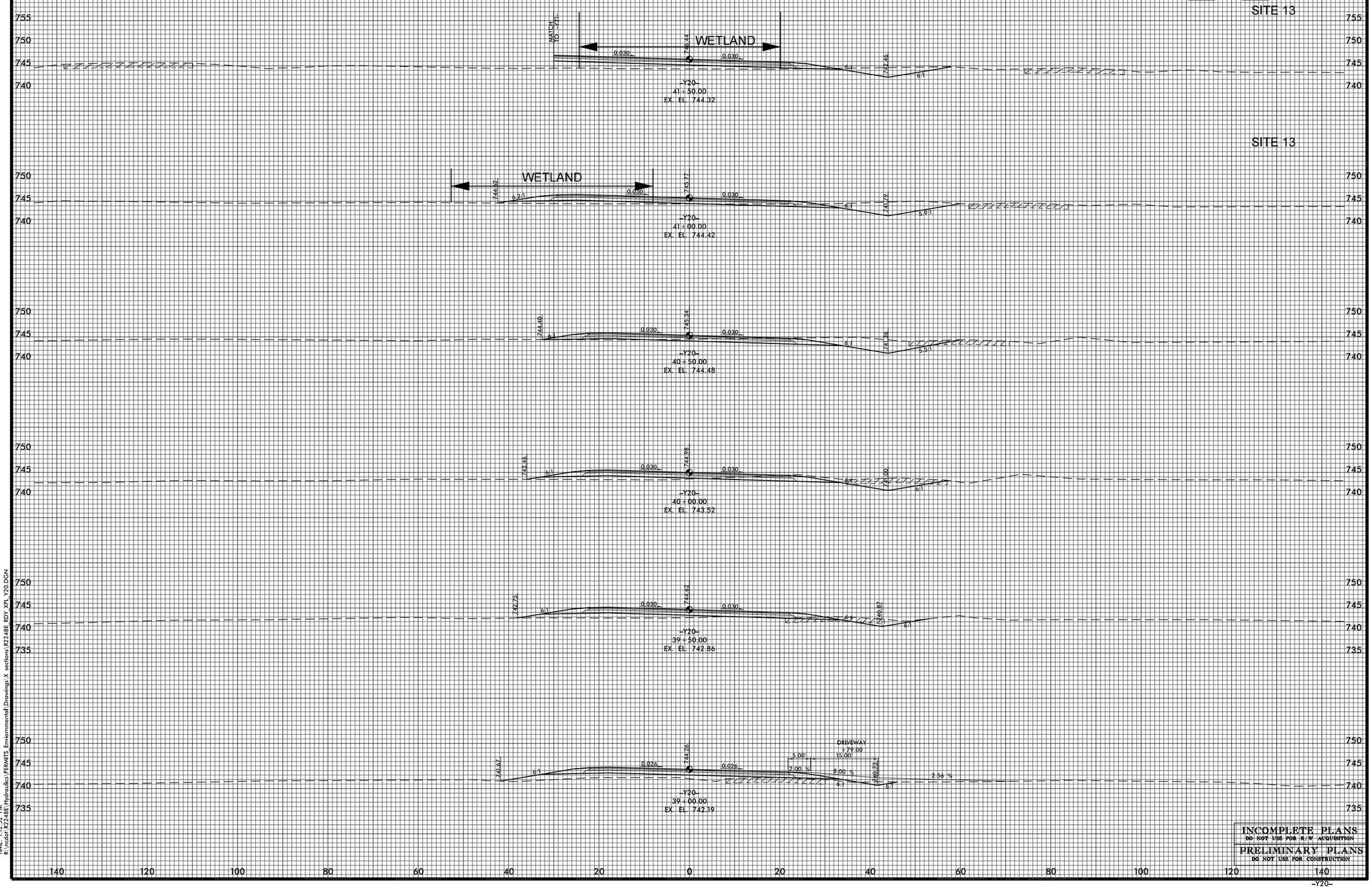
Permit Drawing
Sheet 99 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/4/2011
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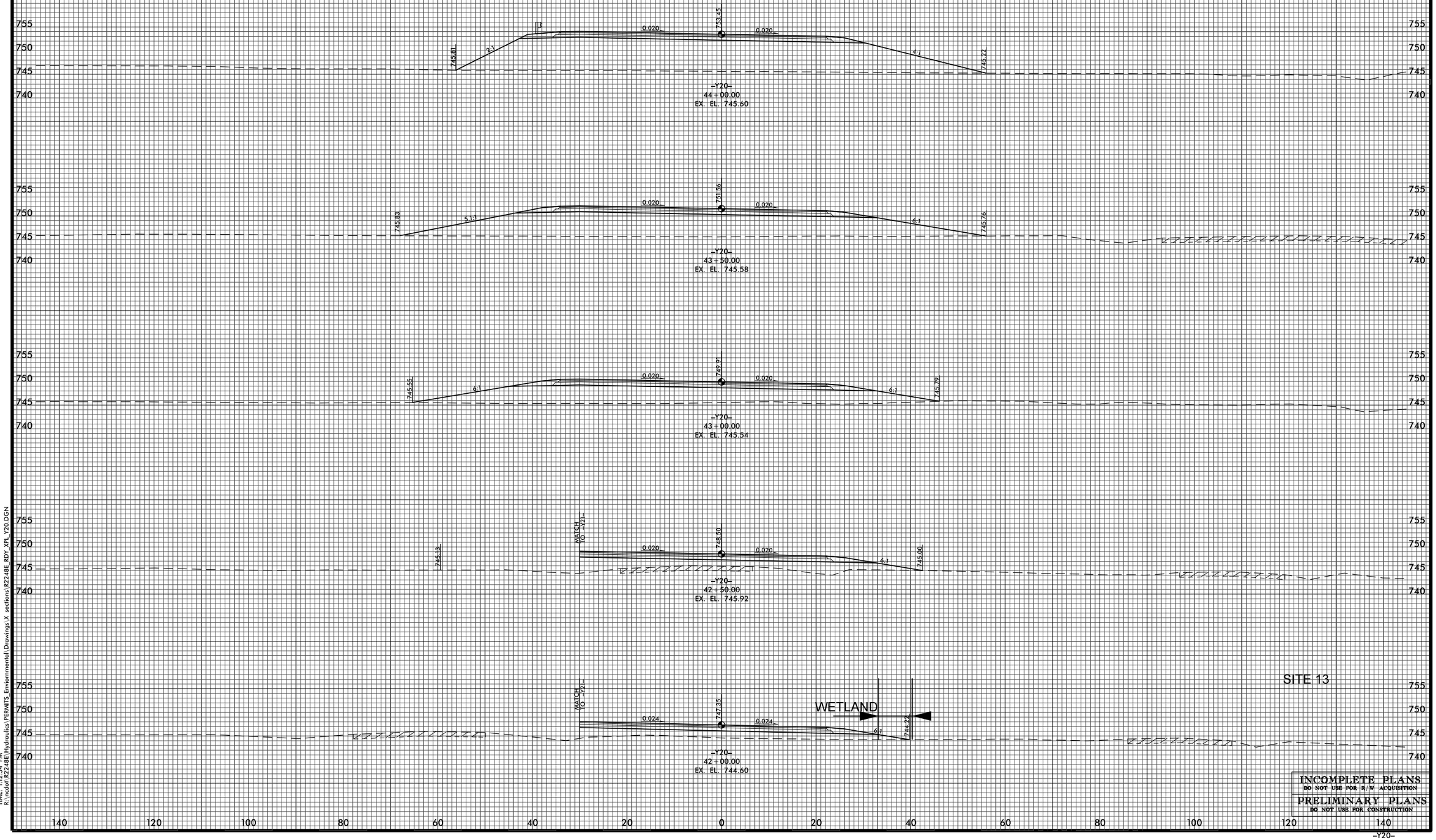
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-364	457

Permit Drawing
Sheet 100 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/4/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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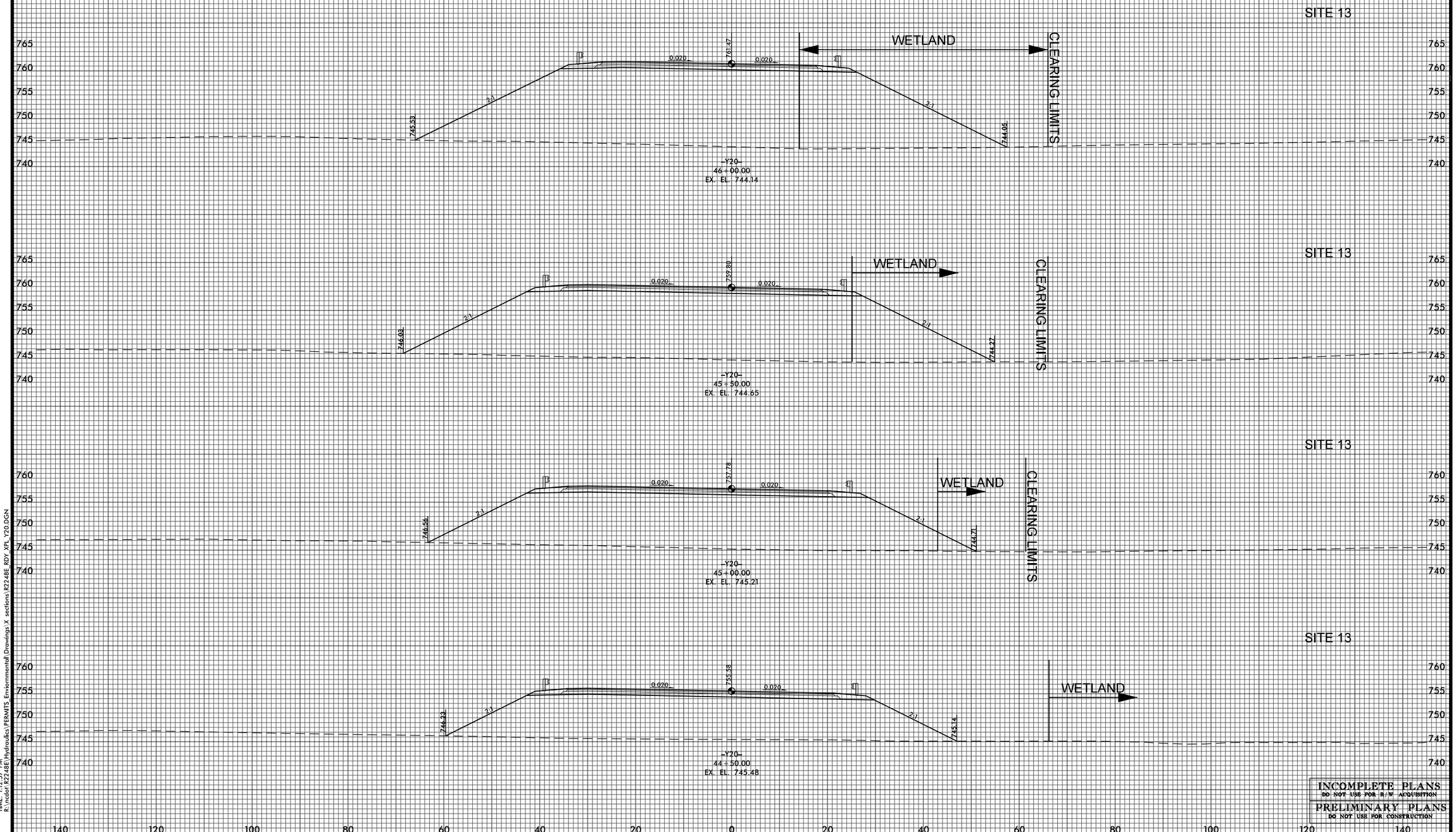
Permit Drawing
Sheet 101 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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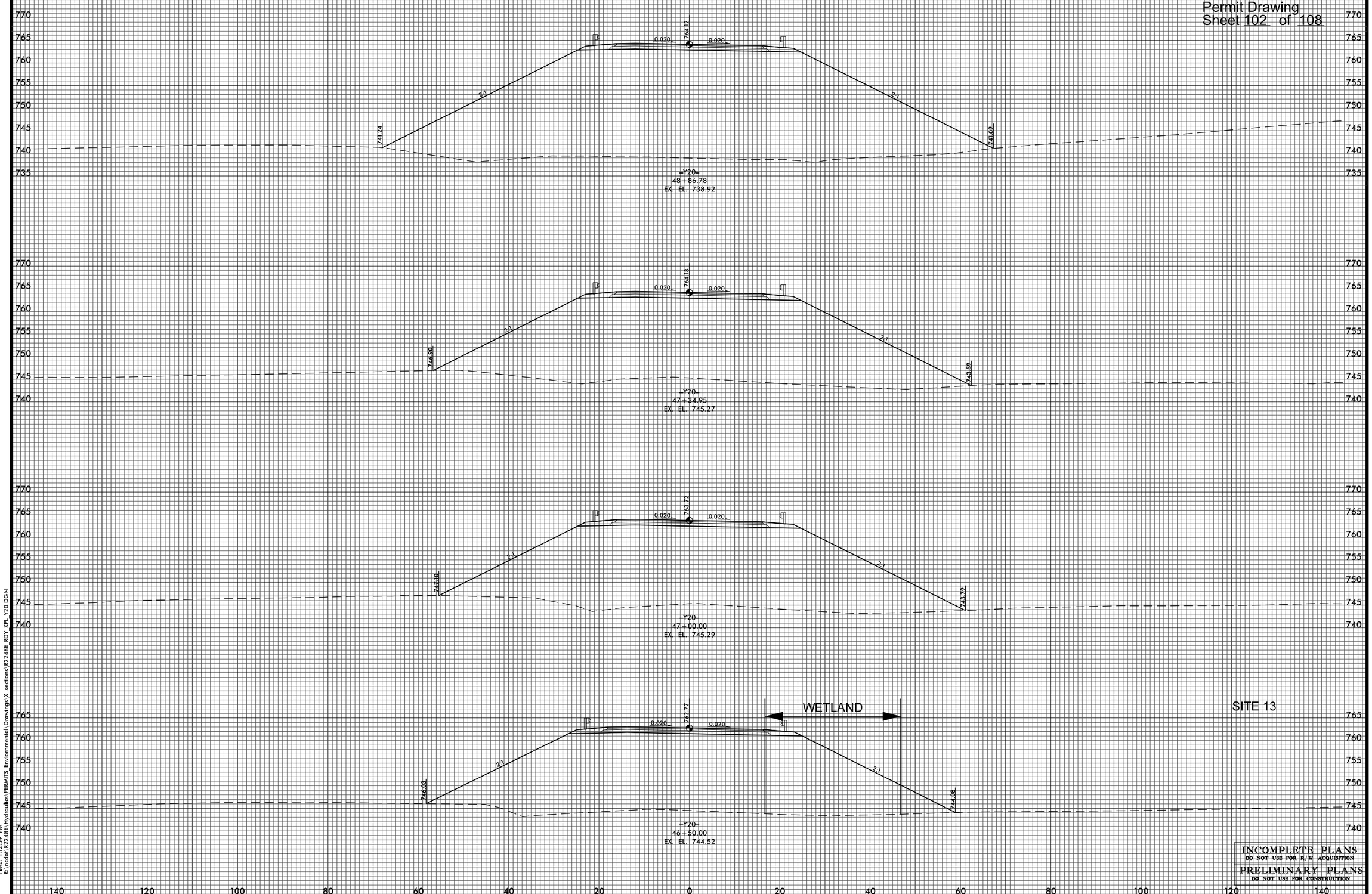
Permit Drawing
Sheet 102 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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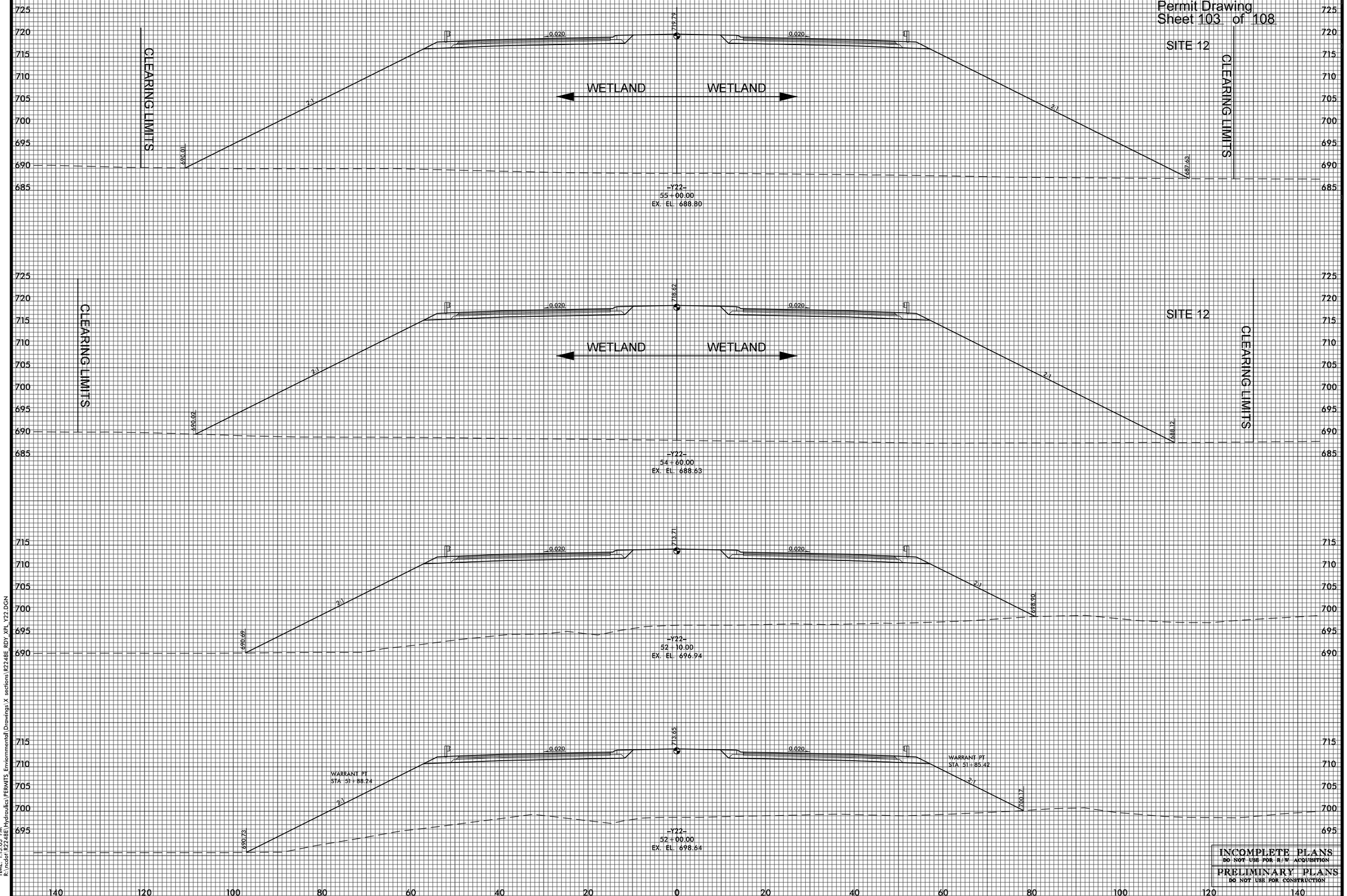
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-387	457

Permit Drawing
Sheet 103 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
TIME: 1:13:03 PM
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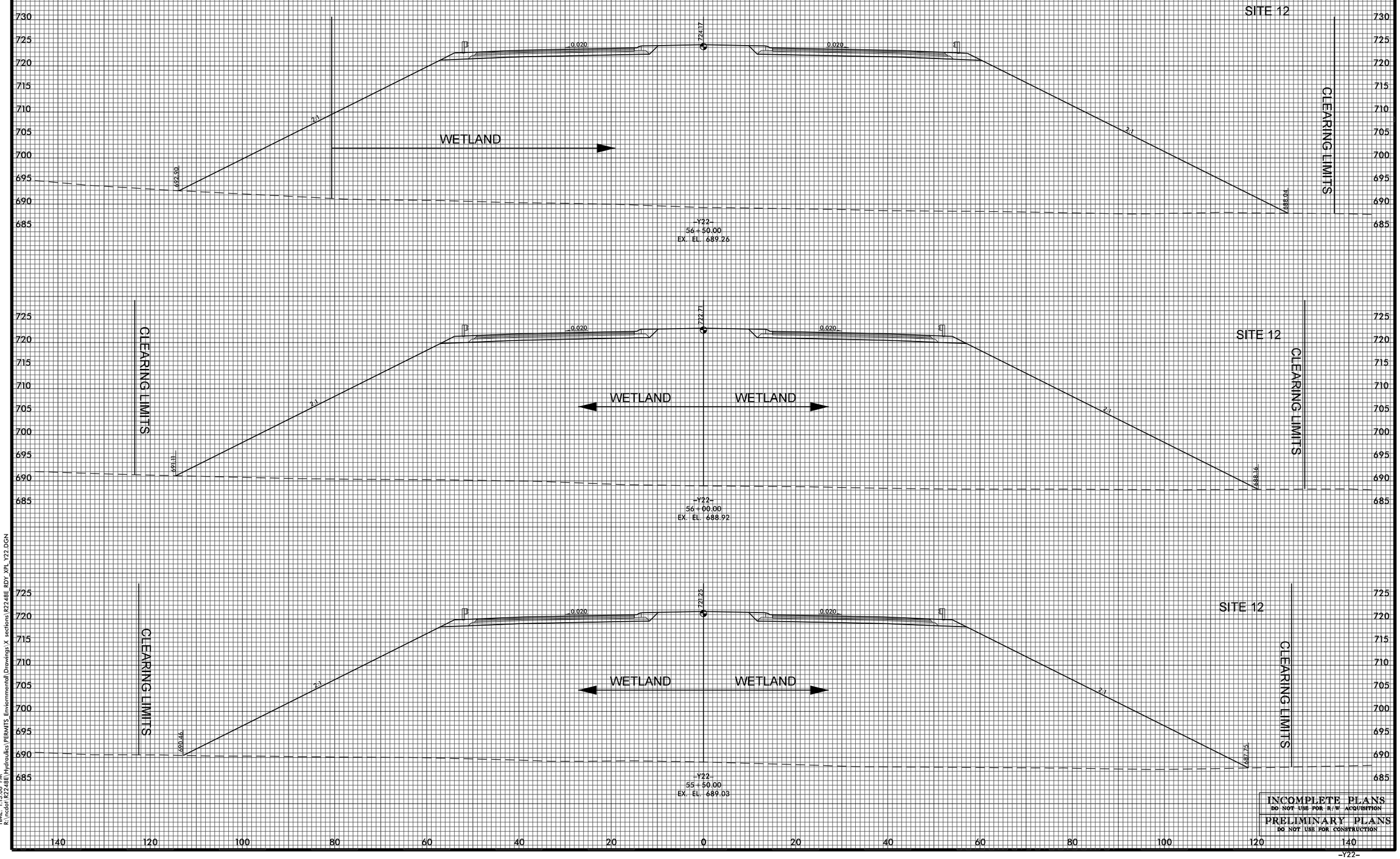
BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-388	457

Permit Drawing
Sheet 104 of 108



INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

DATE: 3/14/2011
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BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
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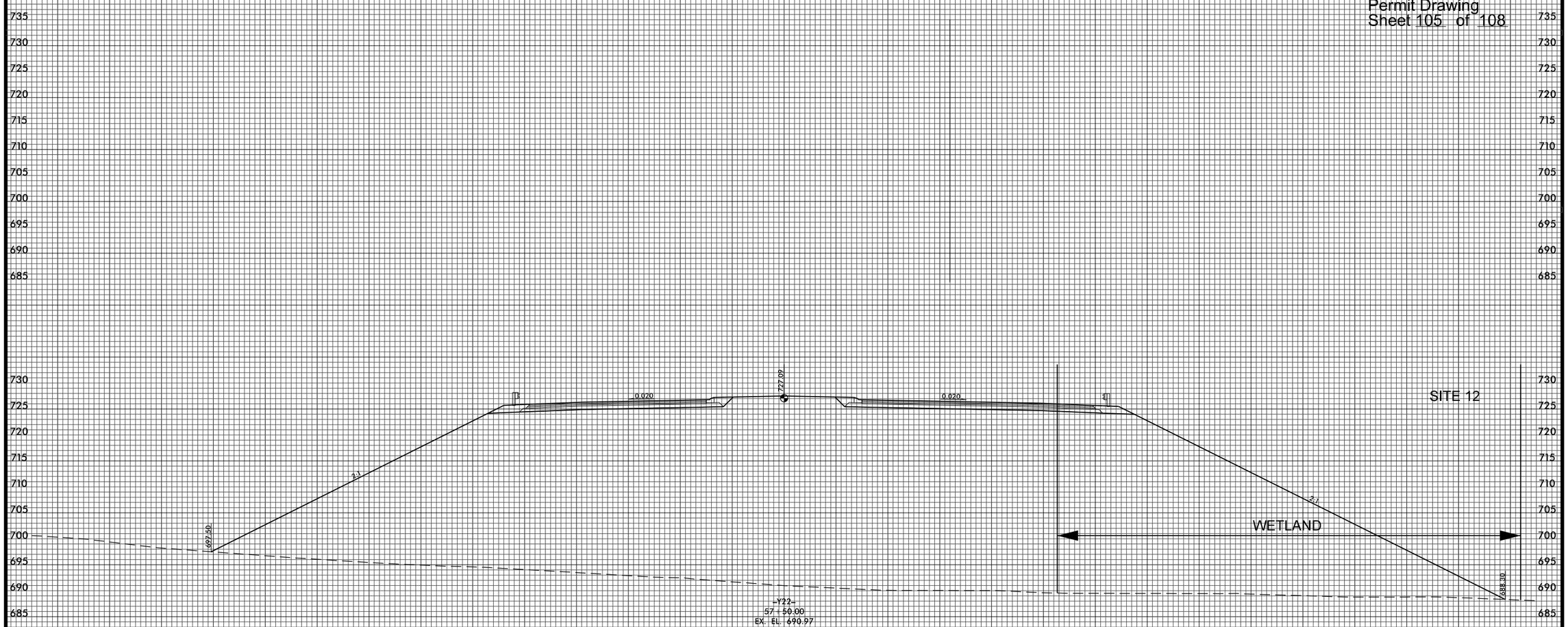
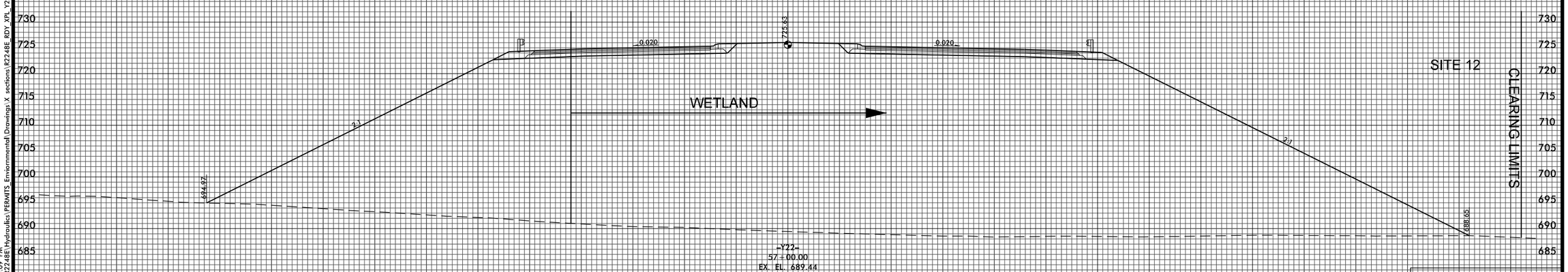
Permit Drawing
Sheet 105 of 108





INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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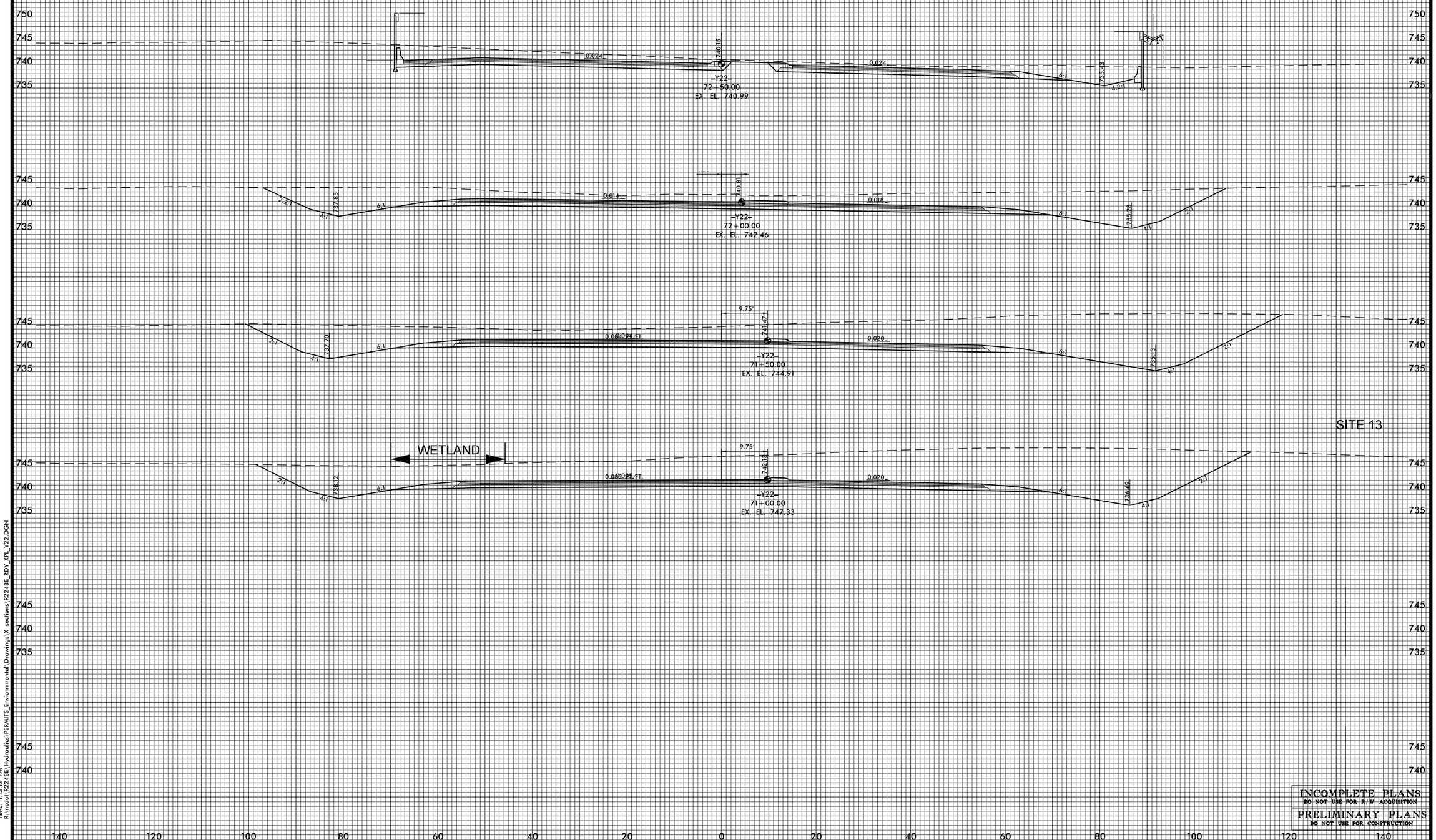
-Y22-

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-397	457

Permit Drawing
Sheet 106 of 108



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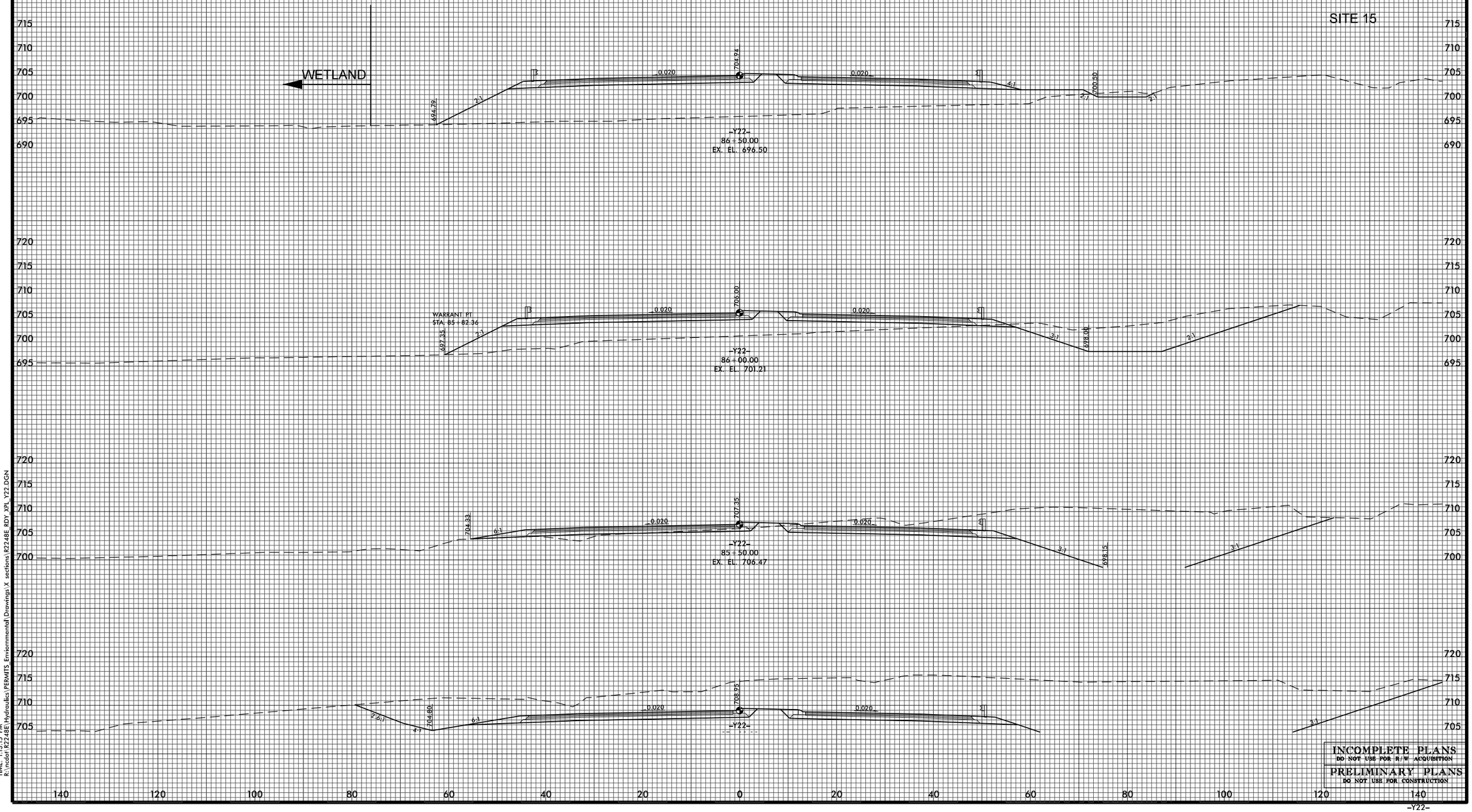
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-402	457

Permit Drawing
Sheet 107 of 108

SITE 15



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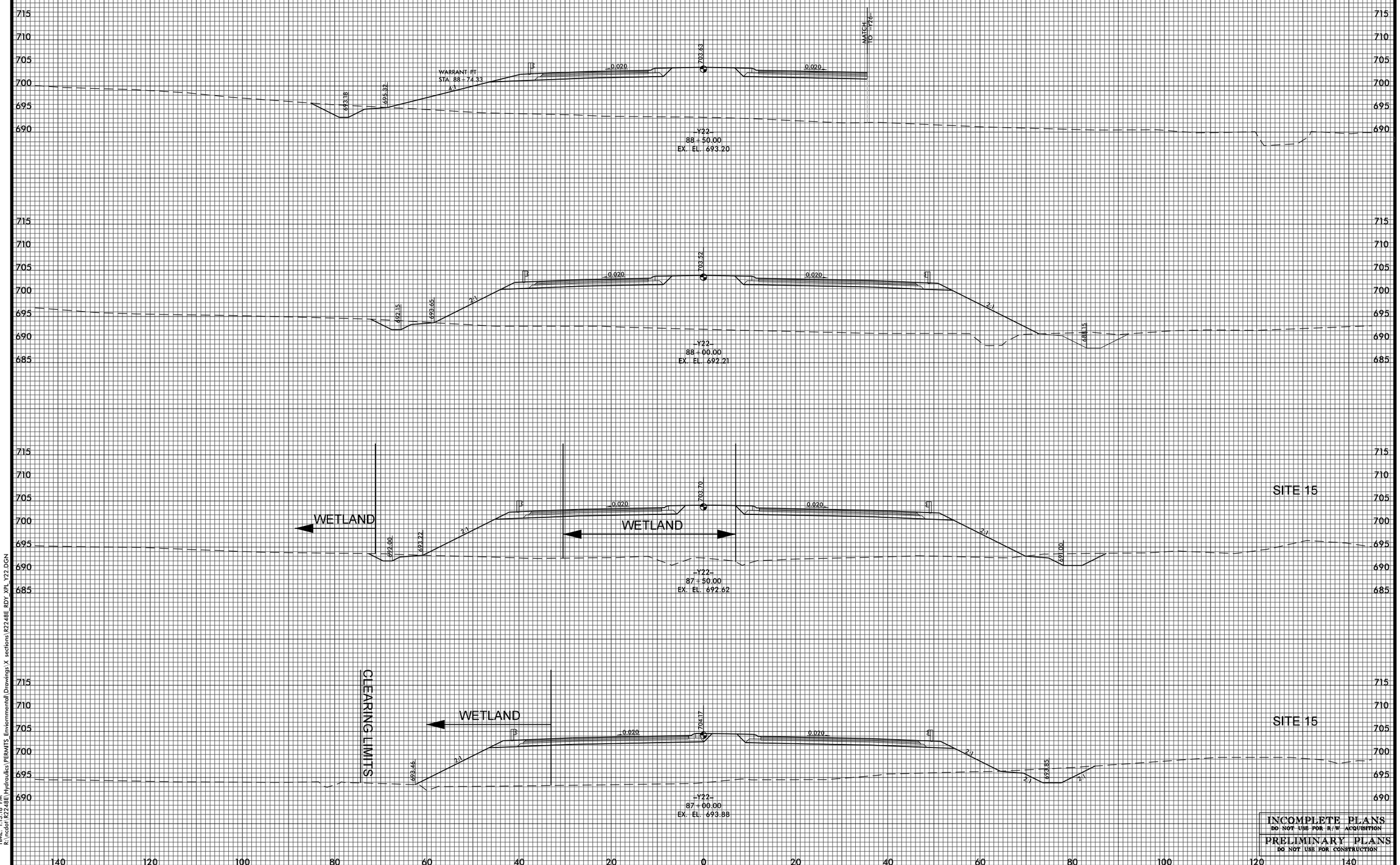
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-Y22-

BLYTHE	0 5 10	PROJ. REFERENCE NO.	SHEET NO.	TOTAL SHEETS
		R-2248E	X-403	457

Permit Drawing
Sheet 108 of 108



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

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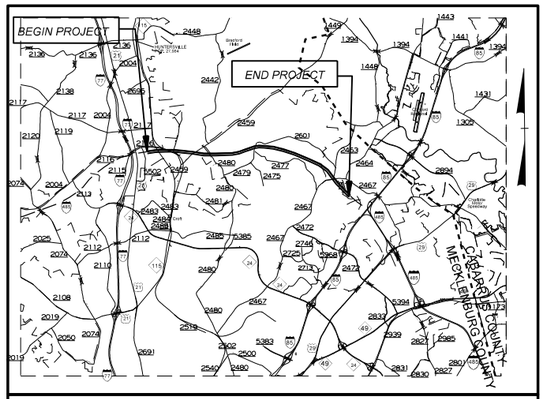
09/08/99

TIP PROJECT: R-2248E

CONTRACT: C202521

See Sheet 1-A For Index of Sheets



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

MECKLENBURG COUNTY

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM EAST OF I-77 TO WEST I-85

TYPE OF WORK: GRADING, DRAINAGE, PAVING, STRUCTURES, CULVERTS, NOISE WALLS, RETAINING WALLS, SIGNING AND SIGNALS

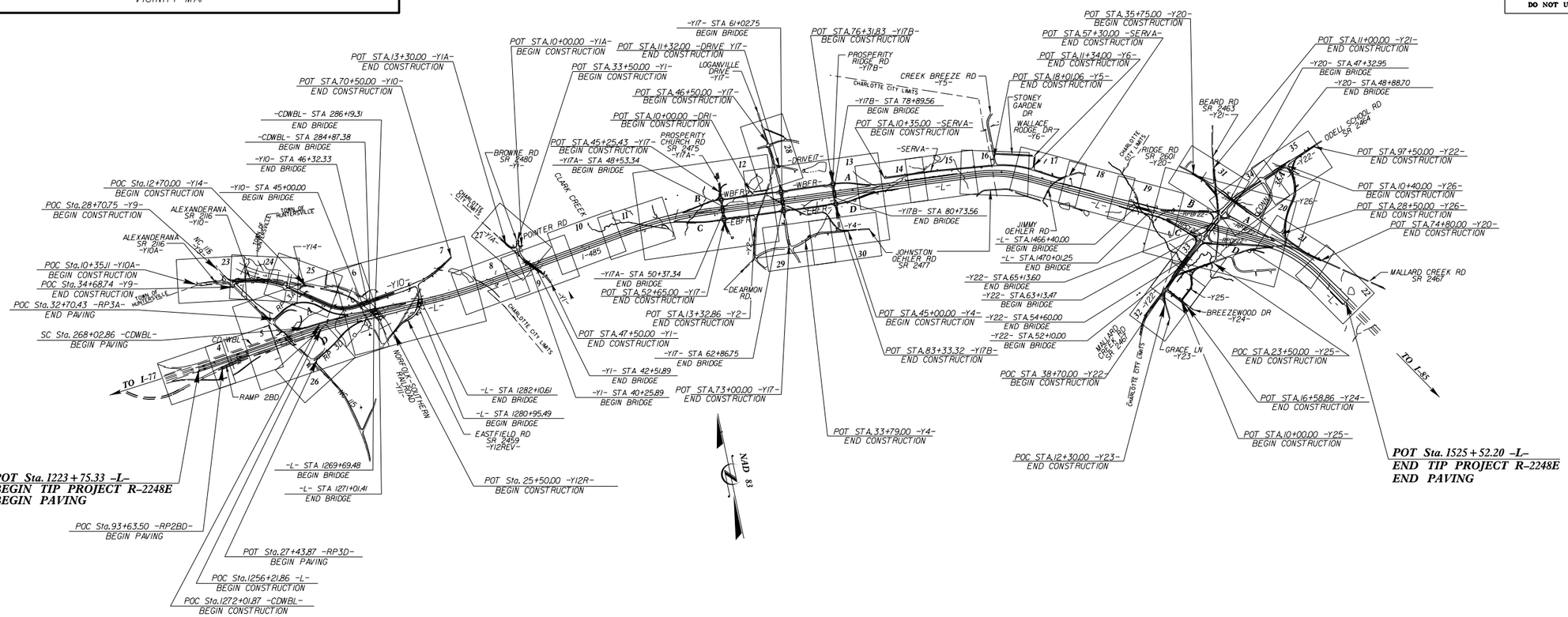
STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2248E	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34410.3.GV2	NHF-0485(27)	CONST.

BLYTHE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



A PORTION OF THIS PROJECT IS WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF CHARLOTTE AND THE TOWN OF HUNTERSVILLE

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III
THIS IS A CONTROLLED ACCESS PROJECT WITH ACCESS BEING LIMITED TO INTERCHANGES.

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 2006	=	62,000
ADT 2035	=	161,600
DHV	=	10 %
D	=	55 %
T	=	15 % *
V	=	70 m/h

* TTST 10% DUAL 5%

FUNCTIONAL CLASSIFICATION
FREEWAY

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT R-2248E = 5.594 miles

LENGTH STRUCTURES TIP PROJECT R-2248E = 0.121 miles

TOTAL LENGTH OF TIP PROJECT R-2248E = 5.715 miles

Prepared in the Office of:
WILBUR SMITH ASSOCIATES
421 Fayetteville Street, Suite 1303, Raleigh, NC 27601 Phone (919) 755-0583

2006 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
MAY 3, 2011

LETTING DATE:
MAY 21, 2011

DAVID L. WILVER, P.E.
PROJECT ENGINEER

TODD H. BUCKNER, P.E.
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER

SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA

P.E.
STATE HIGHWAY DESIGN ENGINEER

FILE: R:\indot\R2248E\Roadway\Proj\r2248e_rdy_tsh_01.dgn
DATE: 4-5-2011 5:10:38 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

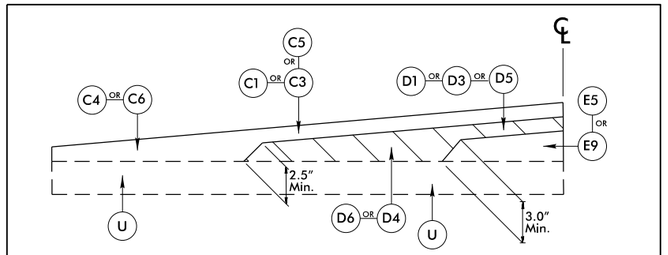
PRELIMINARY PAVEMENT SCHEDULE

A1	13″ JOINTED CONCRETE PAVEMENT WITH DOWELS.	J1	PROP. 8″ AGGREGATE BASE COURSE.
A2	CONCRETE SHOULDER ADJACENT TO 13″ PAVEMENT WITH DOWELS	J2	PROP. 10″ AGGREGATE BASE COURSE.
C1	PROP. APPROX. 1.25″ ASPHALT CONC. SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 137.5 LBS/SY.	J3	PROP. VAR. DEPTH AGGREGATE BASE COURSE.
C2	PROP. APPROX. 3″ ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS/SY IN EACH OF TWO LAYERS.		
C3	PROP. APPROX. 3″ ASPHALT CONC. SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS/SY IN EACH OF TWO LAYERS.	K	SUBGRADE STABILIZATION
		P	PRIME COAT
D1	PROP. APPROX. 3″ ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 342 LBS/SY.	R1	1′-6″ CONCRETE CURB AND GUTTER.
D2	PROP. APPROX. 4″ ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS/SY.	R2	2′-6″ CONCRETE CURB AND GUTTER.
D3	PROP. APPROX. 4″ ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0C AT AN AVERAGE RATE OF 456 LBS/SY.		
		R4	12″ CONCRETE ISLAND COVER.
E1	PROP. APPROX. 3″ ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS/SY.	R5	STANDARD CONC BARRIER (SINGLE FACED)
E2	PROP. APPROX. 4″ ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS/SY.	R6	6″ CONCRETE DRIVEWAY
E3	PROP. APPROX. 5.5″ ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS/SY.	R7	2′-9″ CONCRETE CURB AND GUTTER.
E4	PROP. APPROX. 4″ ASPHALT CONC. BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 456 LBS/SY.	R8	SHOULDER BERM GUTTER
		S	4″ CONCRETE SIDEWALK.
		T	EARTH MATERIAL.
		U	EXISTING PAVEMENT.
		V1	RETAINING WALL
		V2	NOISE WALL
		W	VARIABLE DEPTH ASPHALT PAVEMENT. (SEE STANDARD WEDGING DETAIL SHEET No. 2)
		X	PROP. APPROX. 3″ PERMEABLE ASPHALT DRAINAGE COURSE (PADC) TYPE P-57 AT AN AVERAGE RATE OF 270 LBS/SY.
		Y	MILLED RUMBLE STRIPS
		Z	THERMOPLASTIC RUMBLE STRIPS (SEE DETAIL SHEET _)

NOTES:

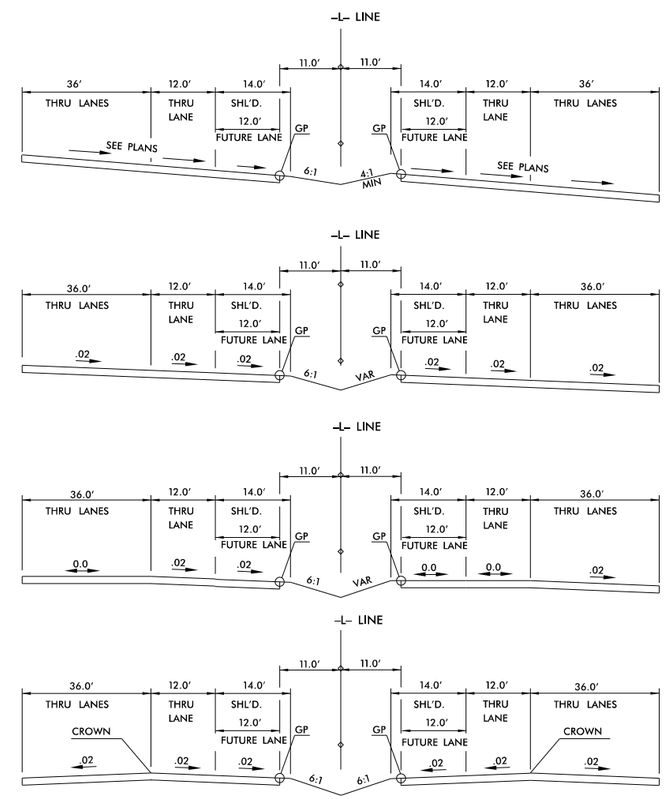
PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

SHOULDERS TO BE PAVED TO FACE OF GUARDRAIL.



LINE	SURFACE				INTERMEDIATE					BASE				
	C3	C4	C5	C6	D1	D3	D4	D5	D6	E3	E5	E6	E7	E9
Y10 (USE WITH TYP. SECTION 12& 16)	X	X				X	X				X			
Y17 (USE WITH TYP. SECTION 20)	X	X				X	X				X			
Y20 (USE WITH TYP. SECTION 23)			X	X				X	X			X		X
Y21 (USE WITH TYP. SECTION 25)			X	X				X	X			X		X
Y22 (USE WITH TYP. SECTION 27)			X	X				X	X				X	X
Y4 (USE WITH TYP. SECTION 33)	X	X			X		X				X			
Y23&Y25 (USE WITH TYP. SECTION 37)	X	X								X	X			
Y24 (USE WITH TYP. SECTION 38)	X	X								X	X			
Y26 (USE WITH TYP. SECTION 40)	X	X			X		X			X	X			

DETAIL SHOWING METHOD OF WEDGING



METHOD OF OBTAINING SUPER ELEVATIONS

(NOT TO SCALE)

PAVEMENT SCHEDULE & WEDGING DETAIL

REVISIONS

FILE: R:\rndot\R2248E\Roadway\Proj\R2248E_RDY_TYP_2.dgn
DATE: 4/5/2011 5:10:51 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

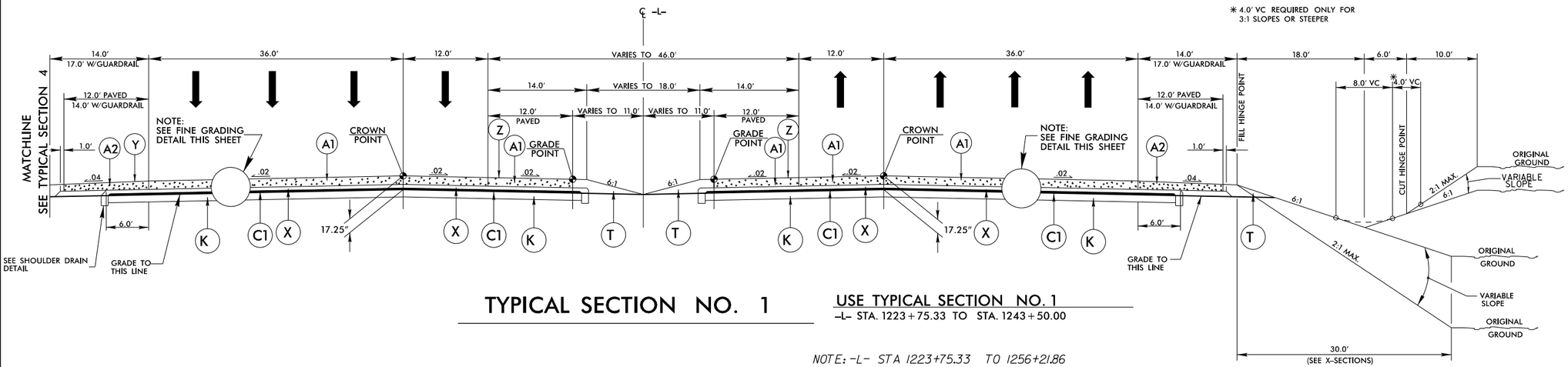
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

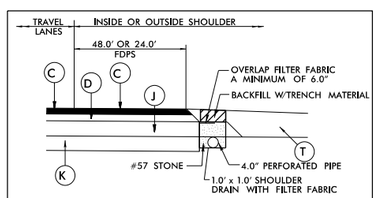
REVISIONS



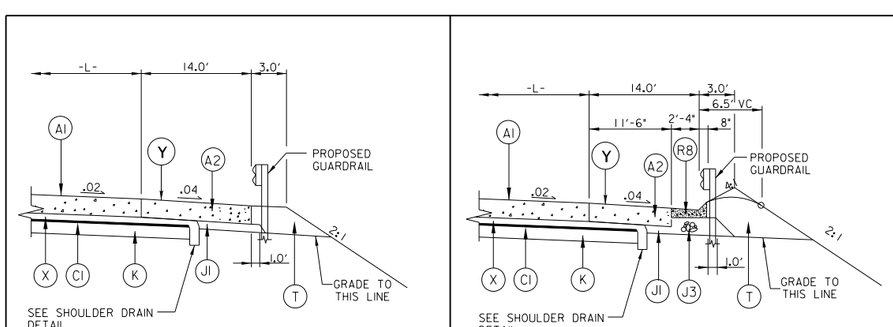
TYPICAL SECTION NO. 1

USE TYPICAL SECTION NO. 1
-L- STA. 1223+75.33 TO STA. 1243+50.00

NOTE: -L- STA 1223+75.33 TO 1256+21.86
HAS BEEN GRADED UNDER PREVIOUS CONTRACT.
SEE FINE GRADING DETAIL THIS SHEET



SHOULDER DRAIN DETAIL
USE IN CONJUNCTION WITH TYPICAL SECTION NO 1 & 2



INSERT "A"
-L- SHOULDER
WHEN GUARDRAIL IS REQUIRED
(USE IN CONJUCTION W/ TS NO.1& 2)

INSERT "B"
GUARDRAIL WITH SHOULDER BERM GUTTER IS REQUIRED
(USE IN CONJUCTION W/ TS NO.1& 2)

INSERT "C"
PAVED MEDIAN - PIER PROTECTION
(USE IN CONJUNCTION W/ TS NO.1, 2 & 3)

FINE GRADING DETAIL
USE WITH TYPICAL SECTION 1, 3, 4 AND 7

PAVEMENT SCHEDULE

A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING
X	3" PADL
Y	MILLED RUMBLE STRIPS
Z	THERMOPLASTIC RUMBLE STRIPS

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-L- TYPICAL SECTIONS & MISC. DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2B
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

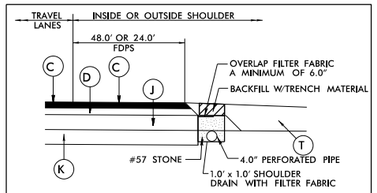
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

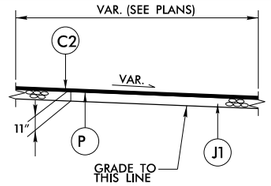
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

REVISIONS

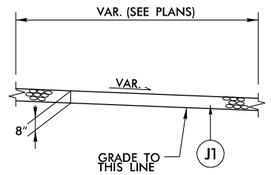


SHOULDER DRAIN DETAIL

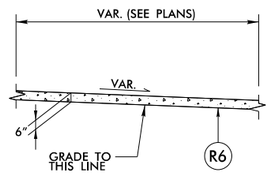
USE IN CONJUNCTION WITH TYPICAL SECTION NO 1 & 2



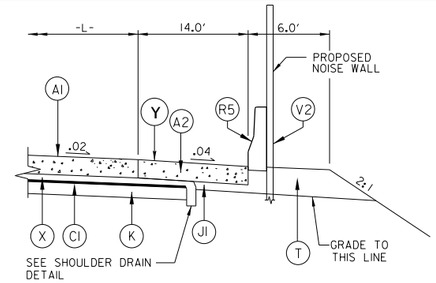
ROADWAY	REMARKS
MISC. PAVED PRIVATE DRIVES	SEE PLANS FOR LOCATIONS
TURNAROUNDS	SEE PLANS FOR LOCATIONS



ROADWAY	REMARKS
MISC. UNPAVED PRIVATE DRIVES	SEE PLANS FOR LOCATIONS



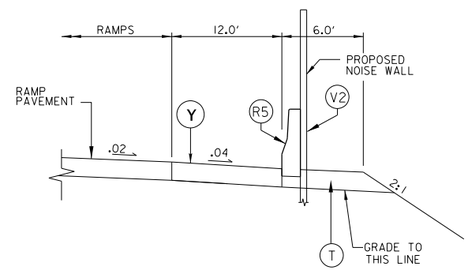
ROADWAY	REMARKS
MISC. CONC PRIVATE DRIVES	SEE PLANS FOR LOCATIONS



DETAIL SHOWING PLACEMENT OF NOISE WALL ON SHOULDERS

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2

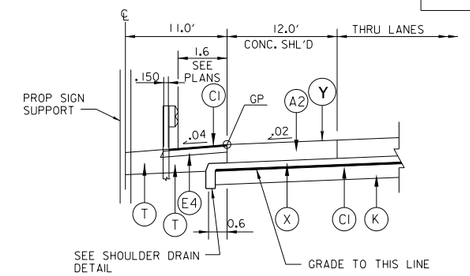
-L- STA. 1337+93.000 TO STA. 1347+60.000 LT.
-L- STA. 1335+82.022 TO STA. 1345+00.000 RT.
-L- STA. 1402+51.000 TO STA. 1407+52.350 LT.



DETAIL SHOWING PLACEMENT OF NOISE WALL ON SHOULDERS

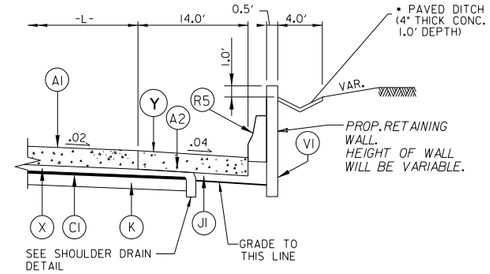
USE IN CONJUNCTION WITH TYPICAL SECTION NO. 4

-RPAY17B- STA. 10+00.000 TO STA. 19+58.654 RT.
-RPBY17A- STA. 10+00.000 TO STA. 20+54.065 LT.
-RPCY17A- STA. 10+00.000 TO STA. 16+75.650 RT.



INSERT "D"

PAVED MEDIAN - OVERHEAD SIGN PROTECTION
(USE IN CONJUNCTION W/ TS NO. 1, 2 & 3)

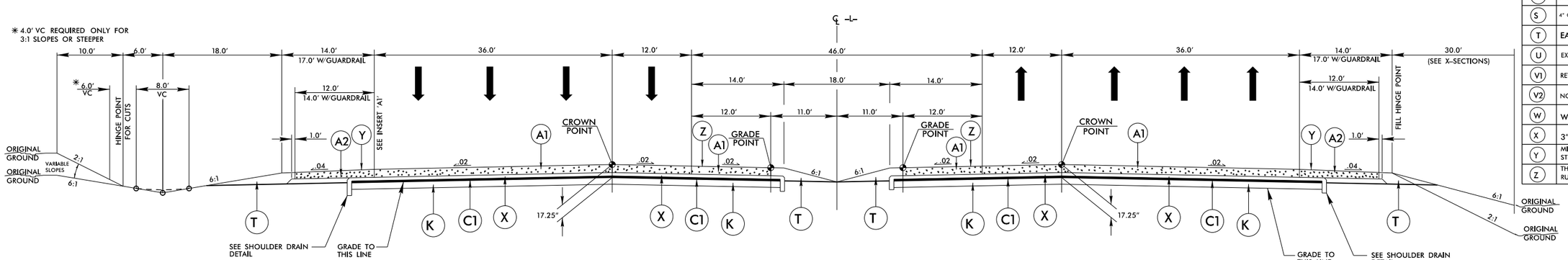


DETAIL SHOWING PLACEMENT OF RETAINING WALL

USE IN CONJUNCTION WITH TYPICAL SECTION NO. 2
SEE PLANS FOR LOCATIONS

* SEE STD. 850.01 FOR 4" CONC. PAVED DITCH GENERAL NOTES
-L- UNDER -Y22-

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING
X	3" PADL
Y	MILLED RUMBLE STRIPS
Z	THERMOPLASTIC RUMBLE STRIPS



TYPICAL SECTION NO. 2

USE TYPICAL SECTION NO. 2

-L- STA. 1243+50.00 TO STA. 1269+69.12 (BEG. BRIDGE)
-L- STA. 1271+01.77 (END BRIDGE) TO STA. 1280+95.49 (BEG. BRIDGE)
-L- STA. 1282+10.61 (END BRIDGE) TO STA. 1466+40.00 (BEG. BRIDGE)
-L- STA. 1470+01.25 (END BRIDGE) TO STA. 1525+52.20

-L- TYPICAL SECTIONS & MISC. DETAILS

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_TYP_2B.dgn
DATE: 4/5/2011 5:11:01 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

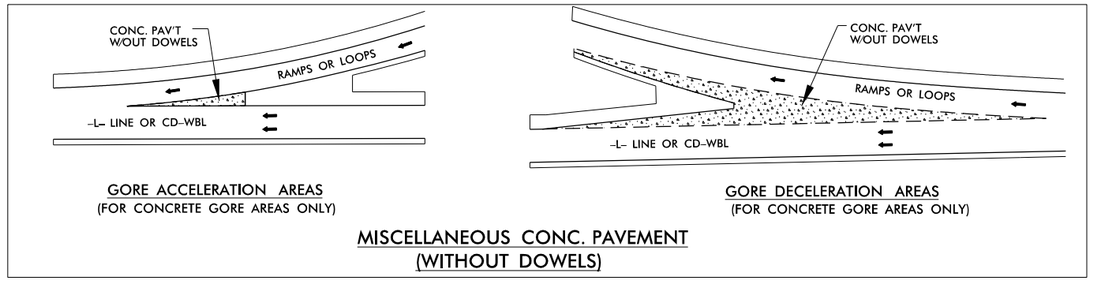
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1593 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

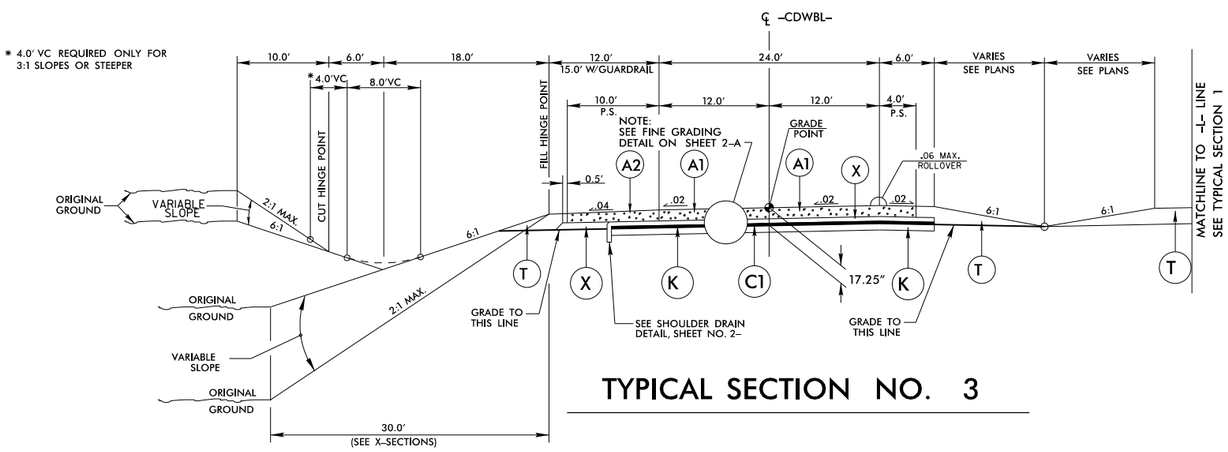
REVISIONS



GORE ACCELERATION AREAS
(FOR CONCRETE GORE AREAS ONLY)

GORE DECELERATION AREAS
(FOR CONCRETE GORE AREAS ONLY)

MISCELLANEOUS CONC. PAVEMENT (WITHOUT DOWELS)

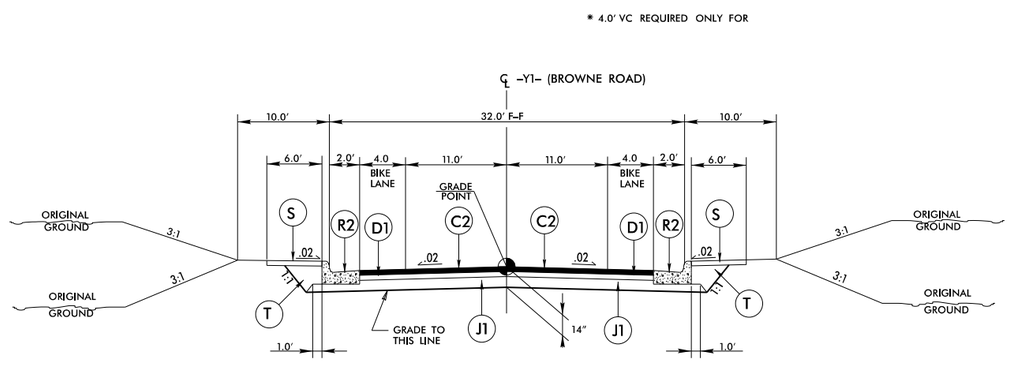


TYPICAL SECTION NO. 3

USE TYPICAL SECTION NO. 3

NOTE: -CDWBL- STA.268+02.86 TO STA.272+01.87 HAS BEEN GRADED UNDER PREVIOUS CONTRACT, SEE FINE GRADING DETAIL SHEET 2-A.

-CDWBL- STA. 268+02.86 TO STA. 284+87.38 (BEGIN BRIDGE)
-CDWBL- STA. 286+19.31 (END BRIDGE) TO STA. 292+55.08



TYPICAL SECTION NO. 4

USE TYPICAL SECTION NO. 4

-Y1- STA. 33+50.000 TO STA. 35+17.54, TRANSITION FROM EXISITING TO T.S. 8

-Y1- STA. 35+17.54 TO STA. 40+25.99 (BEG. BRIDGE)

-Y1- STA. 42+51.79 (END BRIDGE) TO STA. 45+25.00

PAVEMENT SCHEDULE

A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING
X	3" PADL

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TYPICAL SECTIONS
-CDWBL-
RAMPS & -Y1-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-D
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

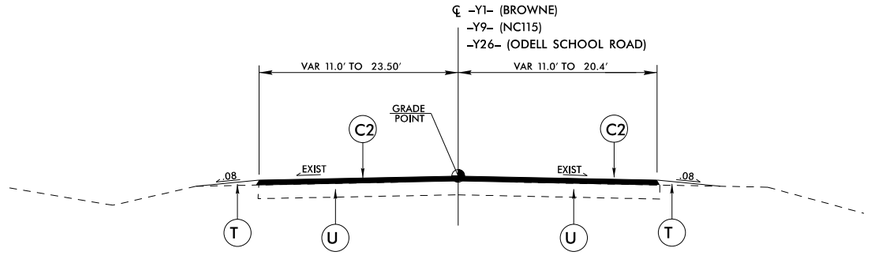
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

BLYTHE

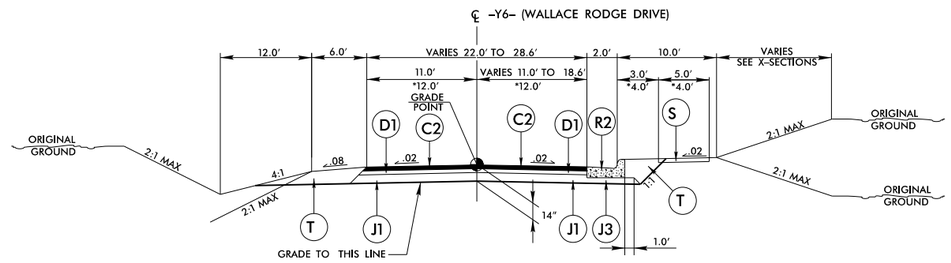
REVISIONS



TYPICAL SECTION NO. 5

USE TYPICAL SECTION NO. 5

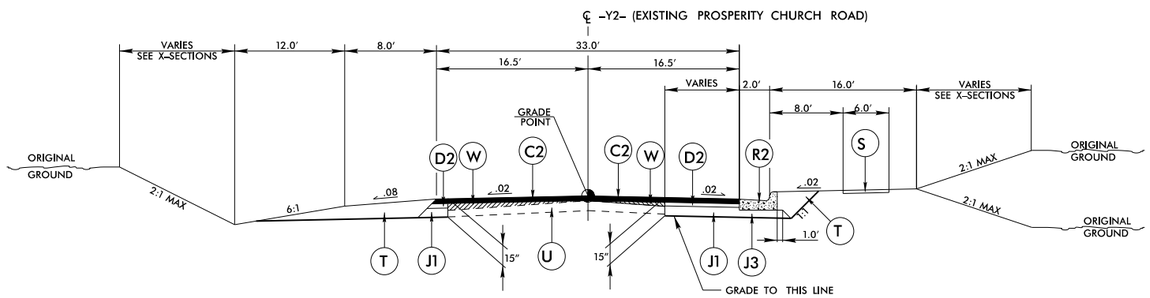
-Y1- STA. 45+25.00 TO STA. 47+50.000
-Y9- STA. 33+27.42 TO STA. 34+68.74
-Y26- STA. 16+80.00 TO STA. 25+40.00



TYPICAL SECTION NO. 6

USE TYPICAL SECTION NO. 6

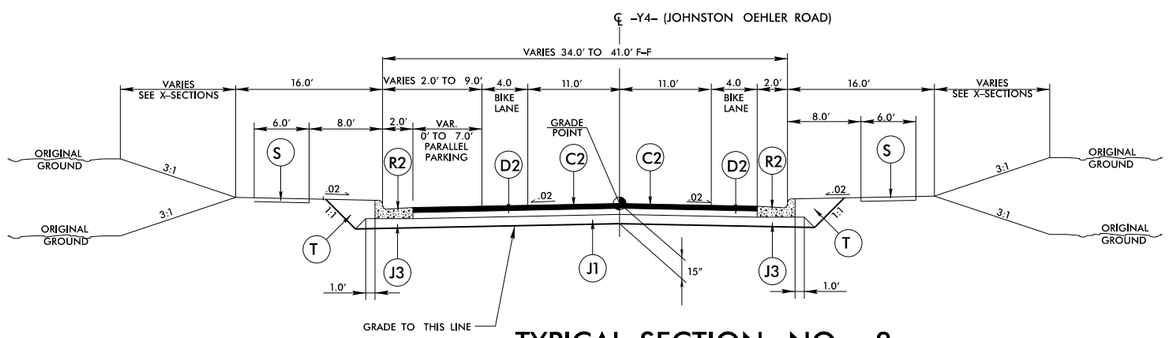
-Y1A- STA. 10+20.05 TO STA. 12+46.28
-Y1A- STA. 12+46.28 TO STA. 13+30.00, TRANSITION FROM T.S. 6 TO EXISTING
*-Y6- STA. 11+34.00 TO STA. 12+25.37



TYPICAL SECTION NO. 7

USE TYPICAL SECTION NO. 7

-Y2- STA. 10+50.19 TO STA. 13+30.00



TYPICAL SECTION NO. 8

USE TYPICAL SECTION NO. 8

-Y4- STA. 33+79.00 TO STA. 42+00.00

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

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TYPICAL SECTIONS

-Y1-, -Y1A-,
-Y2-, -Y4-, & -Y26-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-E
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
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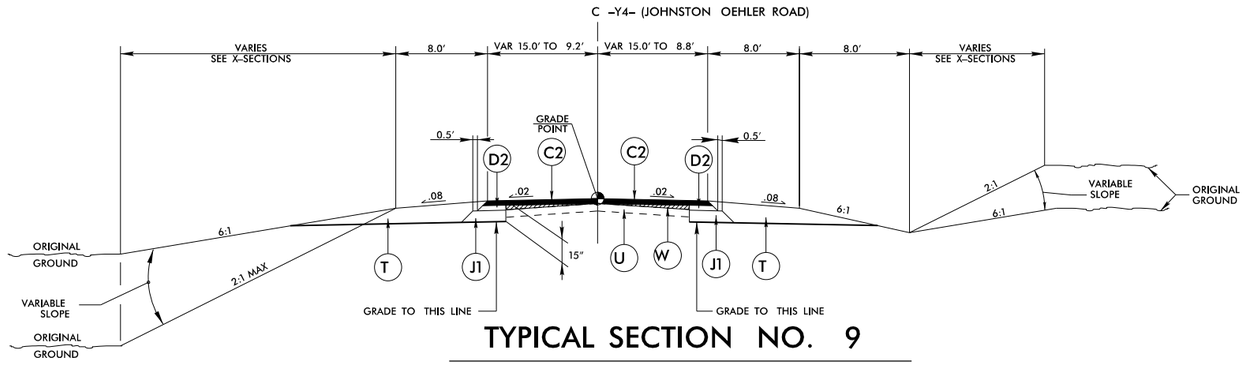
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

REVISIONS

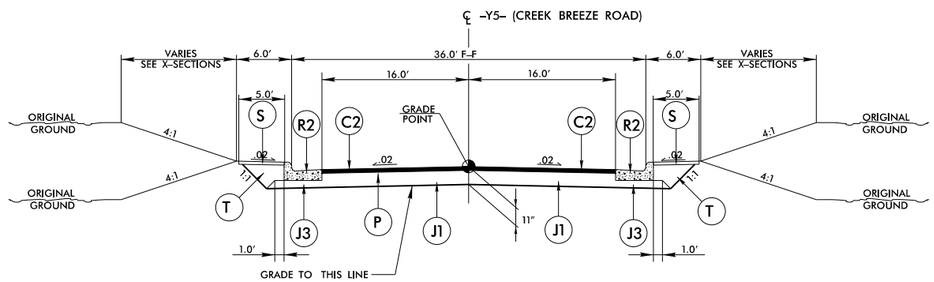


TYPICAL SECTION NO. 9

USE TYPICAL SECTION NO. 9

-Y4- STA. 42+00.00 TO STA. 43+96.00, TRANSITION FROM T.S. 8 TO T.S. 9

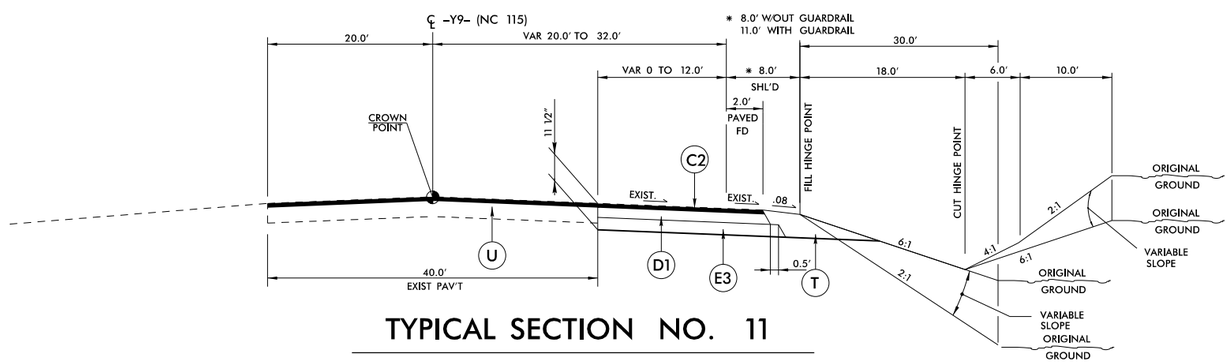
-Y4- STA. 43+96.00 TO STA. 45+00.00



TYPICAL SECTION NO. 10

USE TYPICAL SECTION NO. 10

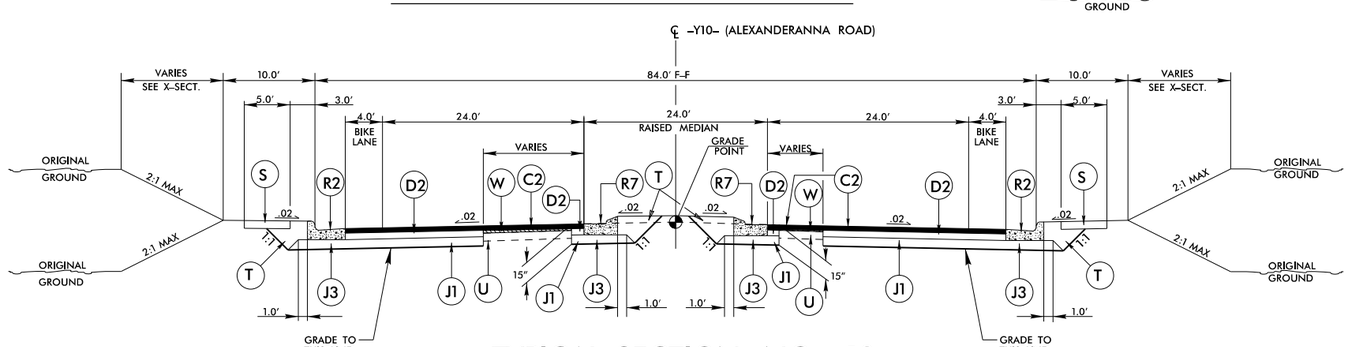
-Y5- STA. 18+00.00 TO STA. 19+30.91



TYPICAL SECTION NO. 11

USE TYPICAL SECTION NO. 11

-Y9- STA. 28+70.75 TO STA. 30+97.03



TYPICAL SECTION NO. 12

USE TYPICAL SECTION NO. 12

-Y10- STA. 10+63.41 TO STA. 19+85.00

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

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TYPICAL SECTIONS
-Y4-, -Y5-,
-Y9- & -Y10-

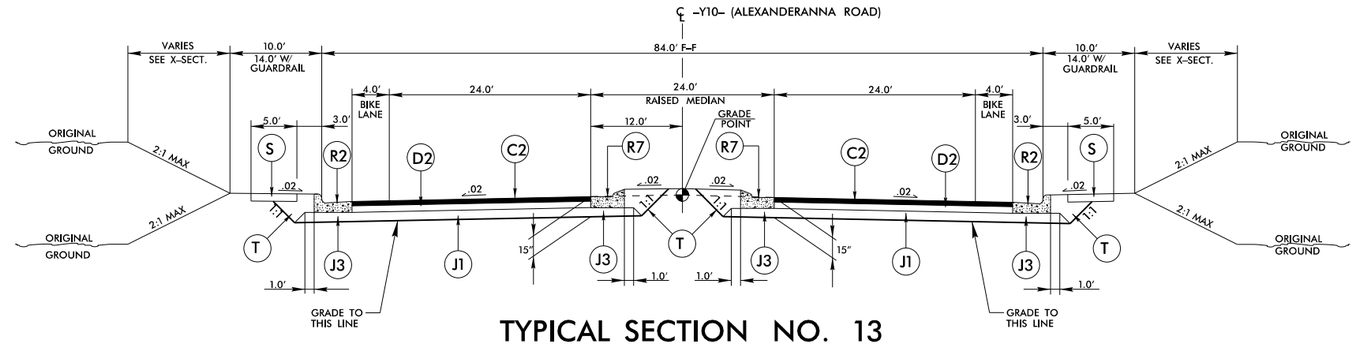
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-F
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

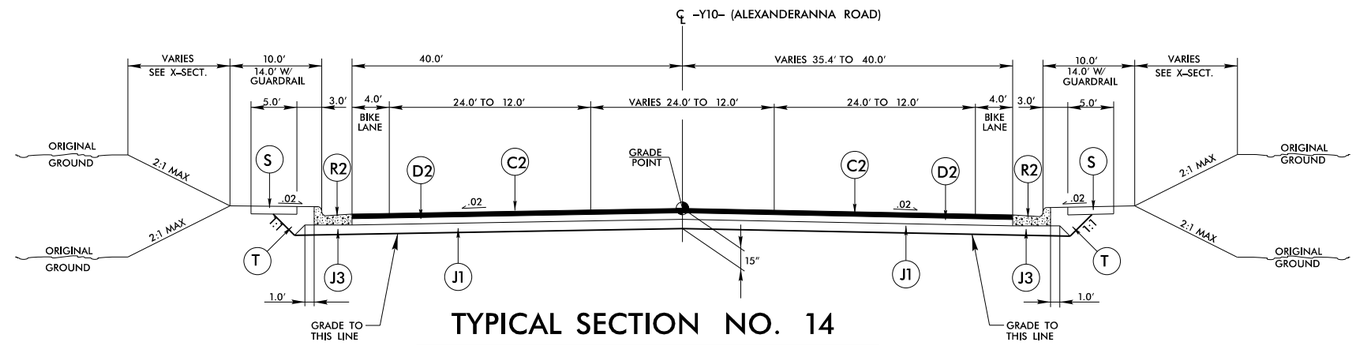
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

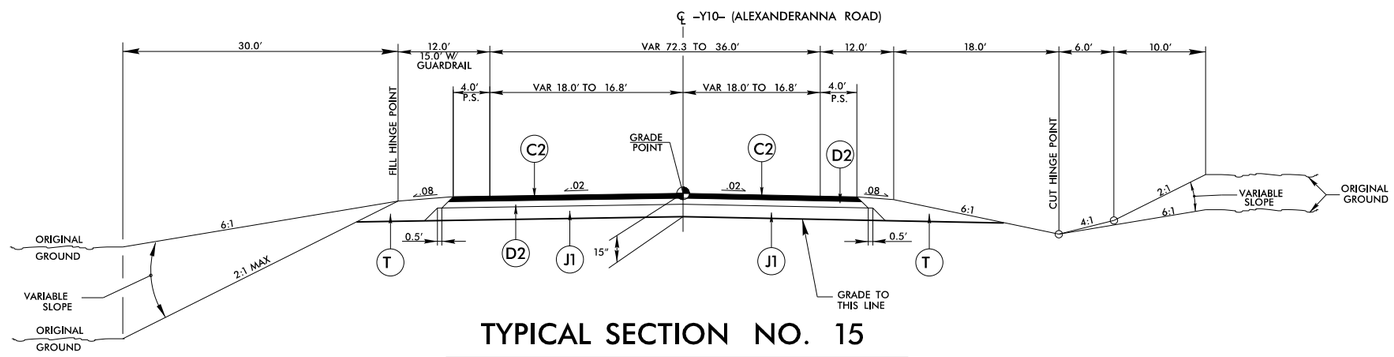
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



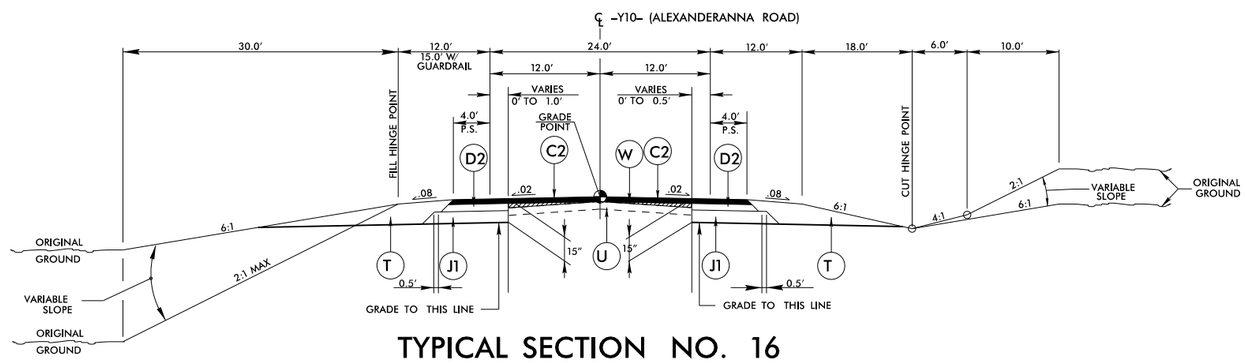
TYPICAL SECTION NO. 13



TYPICAL SECTION NO. 14



TYPICAL SECTION NO. 15



TYPICAL SECTION NO. 16

USE TYPICAL SECTION NO. 13

-Y10- STA. 19+85.00 TO STA. 45+00.00 (BEG. BRIDGE)
-Y10- STA. 46+32.33 (END BRIDGE) TO STA. 53+46.22

USE TYPICAL SECTION NO. 14

-Y10- STA. 53+46.22 TO STA. 60+00

USE TYPICAL SECTION NO. 15

-Y10- STA. 60+00 TO STA. 60+70, TRANSITION FROM T.S. 14 TO T.S. 15

-Y10- STA. 60+70.00 TO STA. 62+50.00

USE TYPICAL SECTION NO. 16

-Y10- STA. 62+50.00 TO STA. 68+50.00, TRANSITION FROM T.S. 15 TO T.S. 16

-Y10- STA. 68+50.00 TO STA. 70+00.00

-Y10- STA. 70+00.00 TO STA. 70+50.00, TRANSITION FROM T.S. 16 TO EXISTING

PAVEMENT SCHEDULE

A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

REVISIONS

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TYPICAL SECTIONS
-Y10-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-G
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

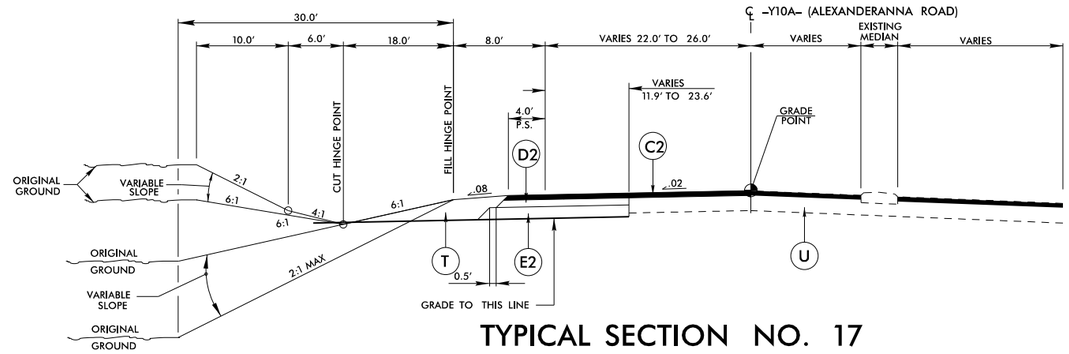
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

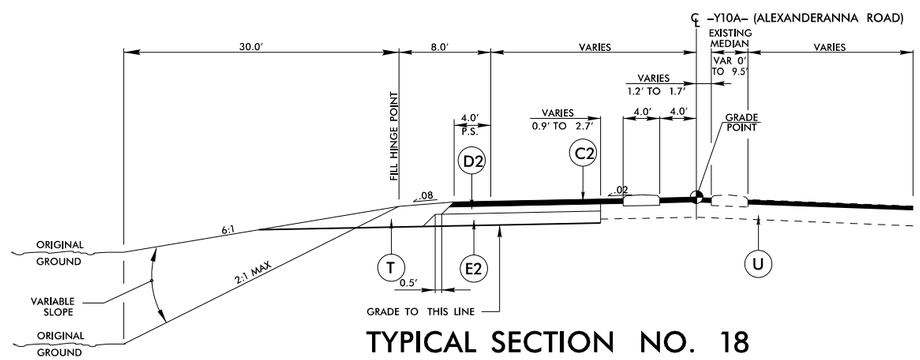
WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

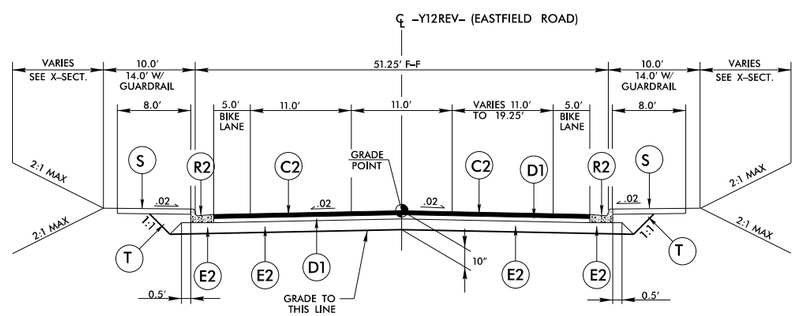
REVISIONS



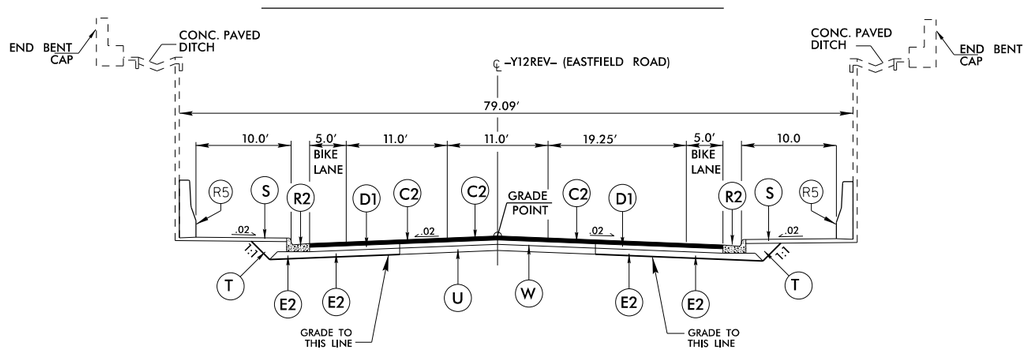
TYPICAL SECTION NO. 17



TYPICAL SECTION NO. 18



TYPICAL SECTION NO. 19



TYPICAL SECTION NO. 20

USE TYPICAL SECTION NO. 17

-Y10A- STA. 10+35.00 TO STA. 12+60.36

USE TYPICAL SECTION NO. 18

-Y10A- STA. 12+60.36 TO STA. 14+50.00
TRANSITION FROM T.S. 17 TO T.S. 18

-Y10A- STA. 14+50.00 TO STA. 17+81.72

USE TYPICAL SECTION NO. 19

-Y12REV- STA. 11+24.44 TO STA. 13+46.94
-Y12REV- STA. 16+57.26 TO STA. 19+05.00

USE TYPICAL SECTION NO. 20

-Y12REV- STA. 13+46.94 TO STA. 16+57.26

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

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TYPICAL SECTIONS
-Y10A- & -Y12REV-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-H
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

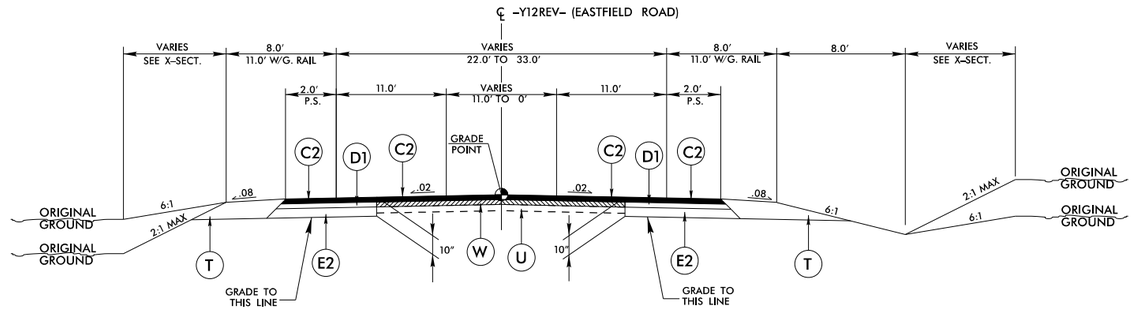
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

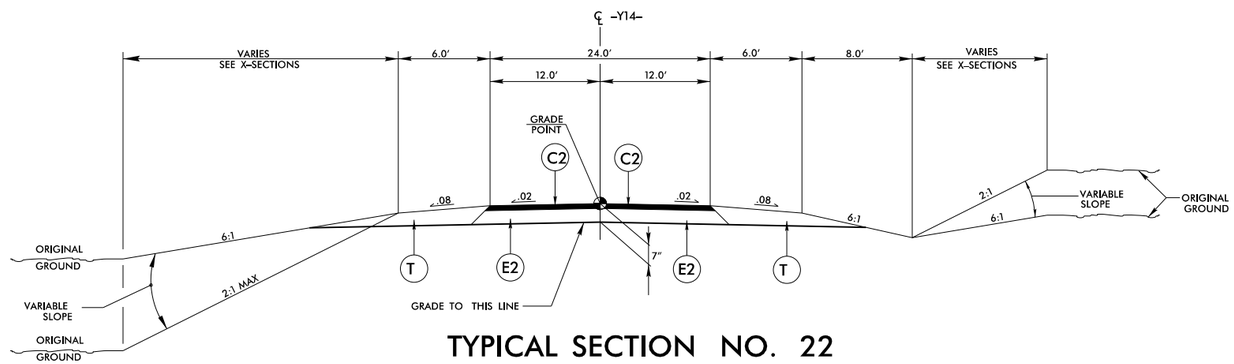
REVISIONS



TYPICAL SECTION NO. 21

USE TYPICAL SECTION NO. 21

-Y12REV- STA. 19+05.00 TO STA. 22+51.25, TRANSITION FROM T.S. 19 TO T.S. 21



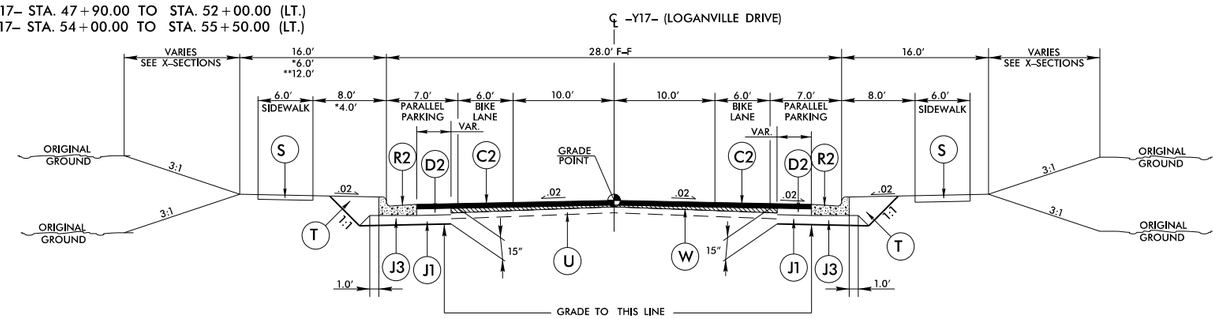
TYPICAL SECTION NO. 22

USE TYPICAL SECTION NO. 22

NOTE: -Y14- STA. 12+70.00 TO STA. 12+81.14, TRANSITION FROM EXISTING TO T.S. 22

-Y14- STA. 12+81.14 TO STA. 14+69.44

*-Y17- STA. 47+90.00 TO STA. 52+00.00 (LT.)
**-Y17- STA. 54+00.00 TO STA. 55+50.00 (LT.)

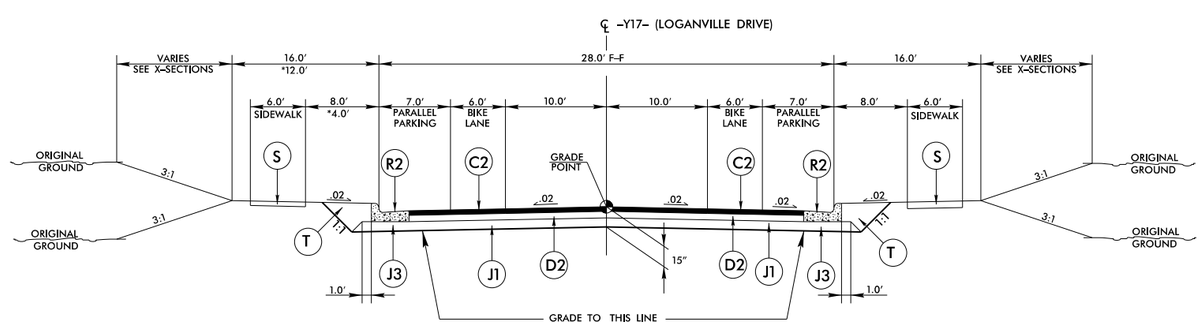


TYPICAL SECTION NO. 23

USE TYPICAL SECTION NO. 23

-Y17- STA. 47+90.00 TO STA. 52+48.00

-Y17- STA. 46+50.00 TO STA. 47+90.00, TRANSITION FROM EXISTING TO T.S. 23



TYPICAL SECTION NO. 24

USE TYPICAL SECTION NO. 24

-Y17- STA. 52+48.00TO STA. 56+93.04

-Y17- STA. 56+93.04 TO STA. 59+44.74, TRANSITION FROM T.S. 24 TO T.S. 25

-Y17- STA. 59+44.74 TO STA. 60+73.07, TRANSITION FROM T.S. 25 TO T.S. 24

-Y17- STA. 63+16.436 TO STA. 64+44.75, TRANSITION FROM T.S. 24 TO T.S. 25

-Y17- STA. 64+44.75 TO STA. 66+44.89, TRANSITION FROM T.S. 25 TO T.S. 24

-Y17- STA. 66+44.89 TO STA. 71+73.00

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

TYPICAL SECTIONS
-Y12REV-, -Y14-
& -Y17-

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_TYP_2H.dgn
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-I
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

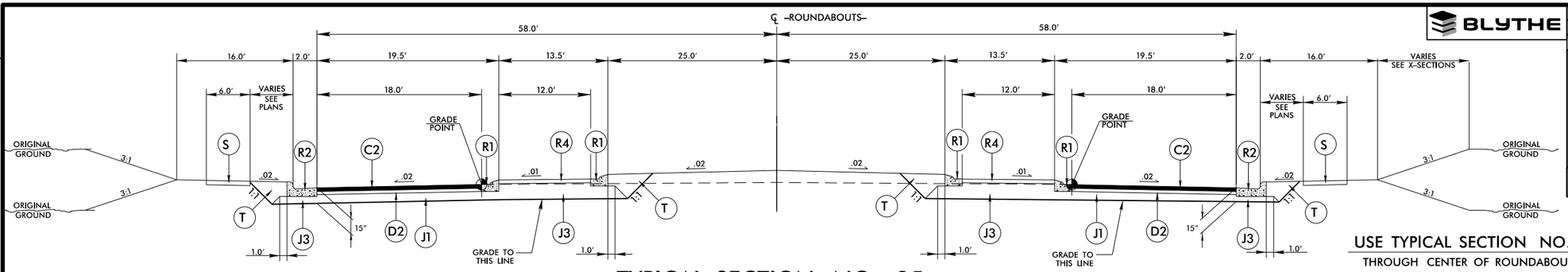
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

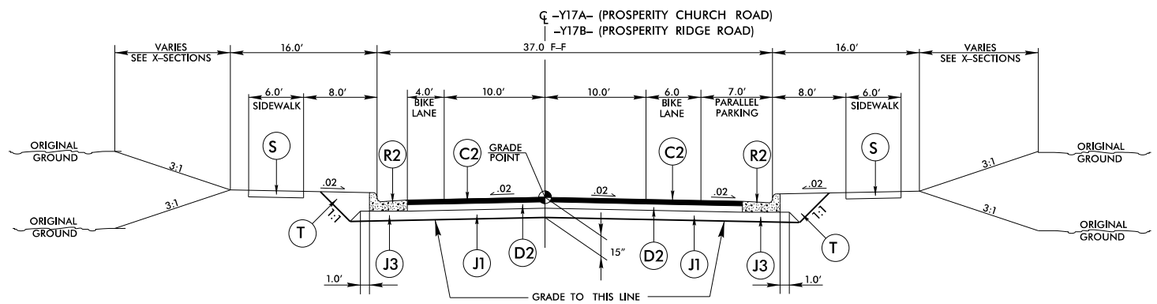


TYPICAL SECTION NO. 25

USE TYPICAL SECTION NO. 25

THROUGH CENTER OF ROUNDABOUT

–Y17– STA. 59+44.74 (RAE)
–Y17– STA. 64+44.75 (RAF)
–Y17A– STA. 46+95.34 (RAB)
–Y17A– STA. 51+95.34 (RAC)
–Y17B– STA. 77+31.56 (RAA)
–Y17B– STA. 82+31.56 (RAD)



TYPICAL SECTION NO. 26

USE TYPICAL SECTION NO. 26

–Y17A– STA. 45+10.49 TO STA. 46+95.34, TRANSITION
FROM T.S. 26 TO T.S. 25

–Y17A– STA. 46+95.34 TO STA. 48+23.66 TRANSITION
FROM T.S. 26 TO T.S. 25

–Y17A– STA. 50+67.03 TO STA. 51+95.34, TRANSITION
FROM T.S. 26 TO T.S. 26

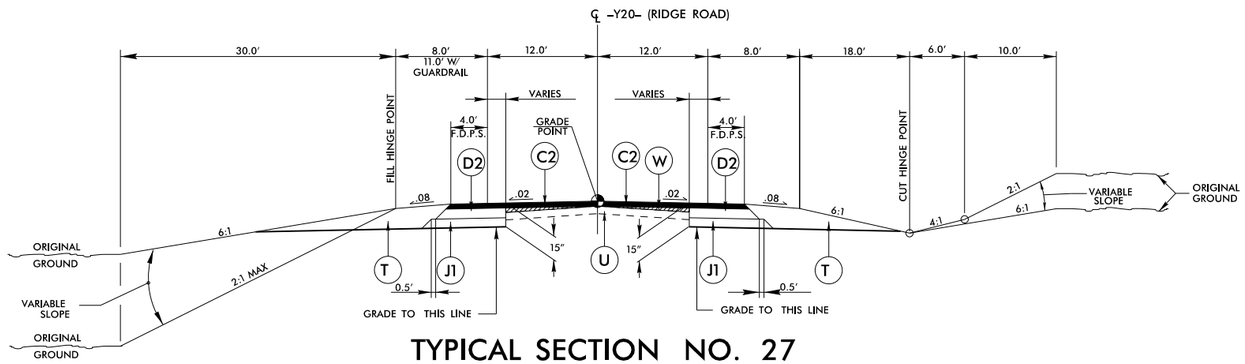
–Y17A– STA. 51+95.34 TO STA. 52+65.00, TRANSITION
FROM T.S. 25 TO T.S. 26

–Y17B– STA. 76+31.83 TO STA. 77+31.56, TRANSITION
FROM T.S. 26 TO T.S. 25

–Y17B– STA. 77+31.56 TO STA. 78+59.88
FROM T.S. 25 TO T.S. 26

–Y17B– STA. 81+03.25+/– TO STA. 82+31.56, TRANSITION
FROM T.S. 26 TO T.S. 25

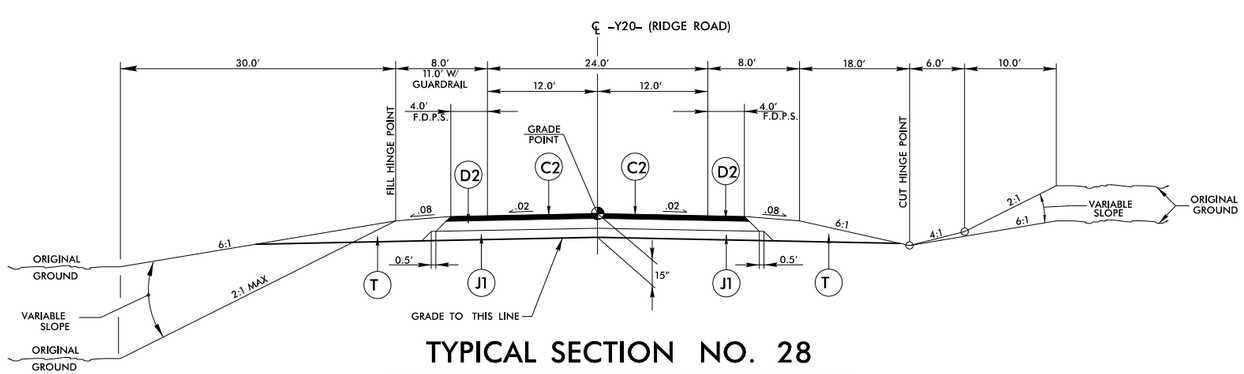
–Y17B– STA. 82+31.56 TO STA. 83+33.32, TRANSITION
FROM T.S. 25 TO T.S. 26



TYPICAL SECTION NO. 27

USE TYPICAL SECTION NO. 27

–Y20– STA. 35+75.00 TO STA. 39+37.00
–Y20– STA. 70+86.65 TO STA. 74+40.00
–Y20– STA. 74+40.00 TO STA. 74+80.00,
OVERLAY EXISTING PAVEMENT ONLY



TYPICAL SECTION NO. 28

USE TYPICAL SECTION NO. 28

–Y20– STA. 39+37.00 TO STA. 47+34.95(BEG. BRIDGE)
–Y20– STA. 48+86.78 (END BRIDGE) TO STA. 70+86.65

PAVEMENT SCHEDULE	
A1	13″ CONC
A2	CONC SHL'D
C1	1.25″ SF9.5A
C2	3″ S9.5B
C3	3″ S9.5C
D1	3″ I19.0B
D2	4″ I19.0B
D3	4″ I19.0C
E1	3″ B25.0B
E2	4″ B25.0B
E3	5.5″ B25.0B
E4	4″ B25.0C
J1	8″ ABC
J2	10″ ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1′–6″ C&G
R2	2′–6″ C&G
R4	12″ CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6″ CONC. DRIVEWAY
R7	2′–9″ C&G
R8	SHLD BERM GUTTER
S	4″ CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

REVISIONS

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TYPICAL SECTIONS
ROUNDABOUTS, –Y17A–,
–Y17B– & –Y20–

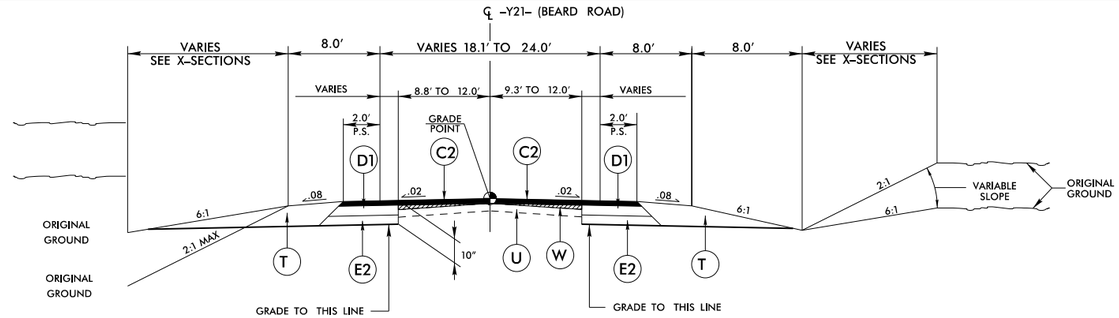
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-J
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

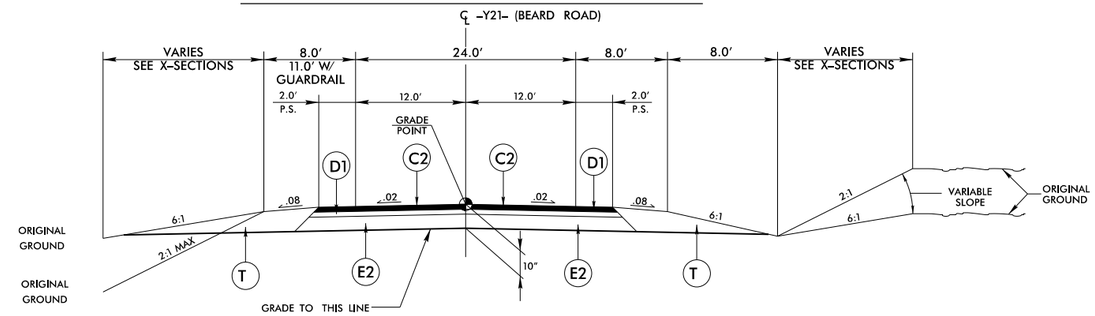
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



TYPICAL SECTION NO. 29

USE TYPICAL SECTION NO. 29

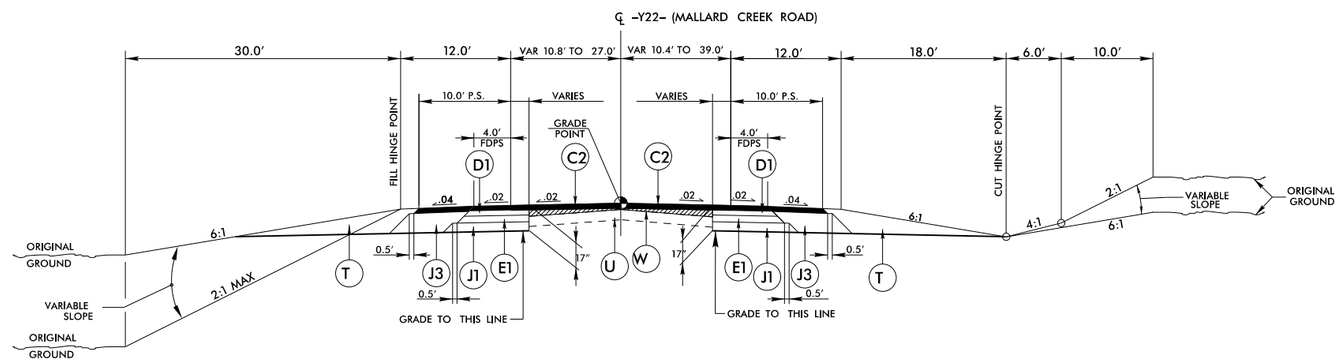
-Y21- STA. 11+00.00 TO STA. 13+28.00



TYPICAL SECTION NO. 30

USE TYPICAL SECTION NO. 30

-Y21- STA. 13+28.00 TO STA. 15+35.64

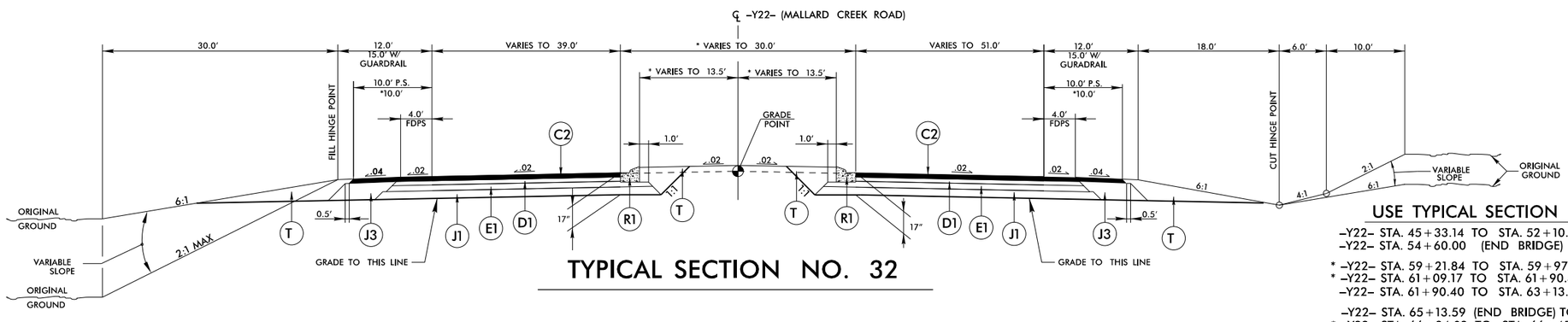


TYPICAL SECTION NO. 31

USE TYPICAL SECTION NO. 31

-Y22- STA. 38+49.51 TO STA. 45+33.14

-Y22- STA. 92+70.00 TO STA. 97+50.00



TYPICAL SECTION NO. 32

USE TYPICAL SECTION NO. 32

-Y22- STA. 45+33.14 TO STA. 52+10.00 (BEGIN BRIDGE)
-Y22- STA. 54+60.00 (END BRIDGE) TO STA. 59+21.84

* -Y22- STA. 59+21.84 TO STA. 59+97.31
* -Y22- STA. 61+09.17 TO STA. 61+90.40
-Y22- STA. 61+90.40 TO STA. 63+13.48 (BEGIN BRIDGE)

-Y22- STA. 65+13.59 (END BRIDGE) TO STA. 66+34.02
* -Y22- STA. 66+34.02 TO STA. 66+45.52
* -Y22- STA. 68+16.16 TO STA. 69+28.60

-Y22- STA. 69+28.60 TO STA. 88+72.09

PAVEMENT SCHEDULE

A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

REVISIONS

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TYPICAL SECTIONS
-Y21- & -Y22-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-K
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

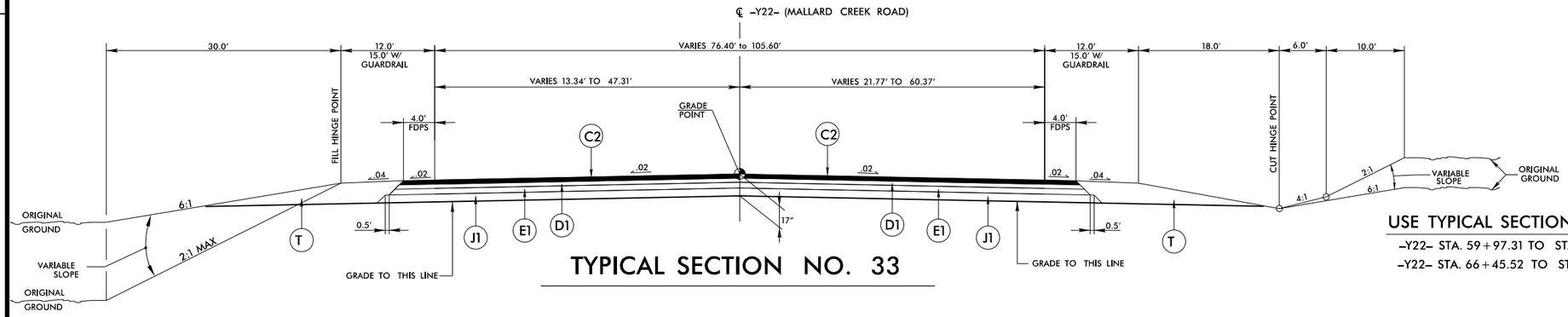
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

REVISIONS

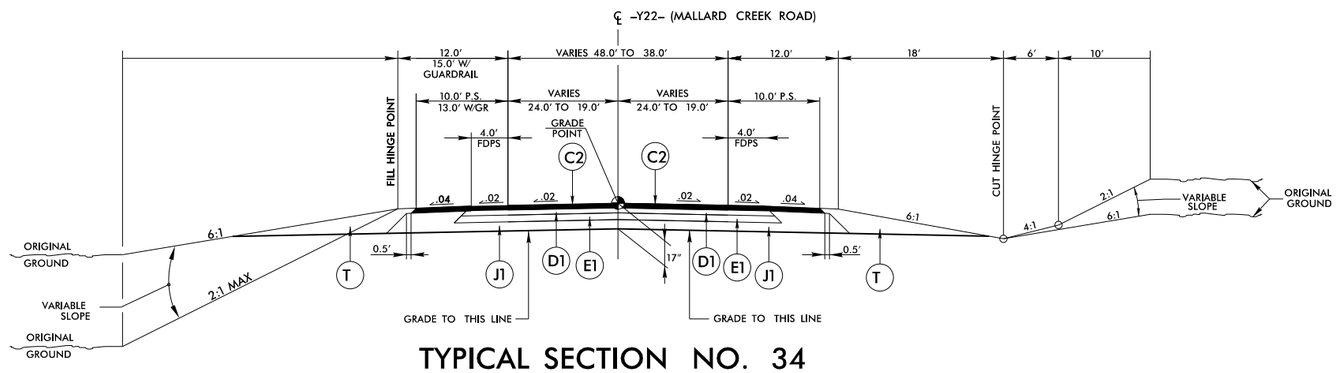


TYPICAL SECTION NO. 33

USE TYPICAL SECTION NO. 33

-Y22- STA. 59+97.31 TO STA. 61+09.17

-Y22- STA. 66+45.52 TO STA. 68+16.16

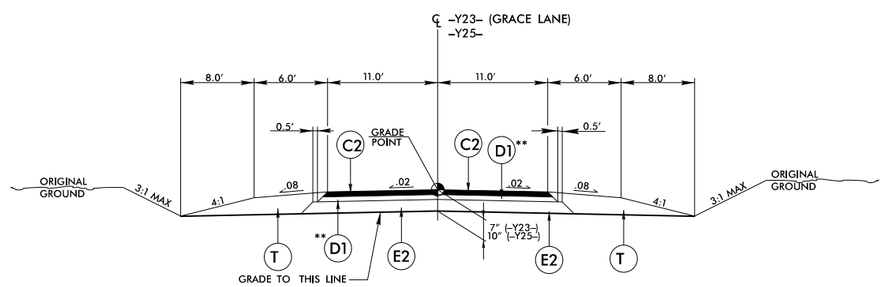


TYPICAL SECTION NO. 34

USE TYPICAL SECTION NO. 34

-Y22- STA. 88+72.09 TO STA. 90+20.00, TRANSITION FROM T.S. 32 TO T.S. 34

-Y22- STA. 90+20.00 TO STA. 92+70.00



TYPICAL SECTION NO. 35

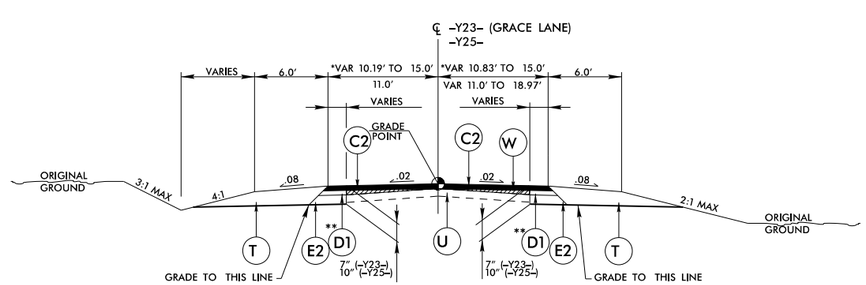
USE TYPICAL SECTION NO. 35

-Y23- STA. 10+40.00 TO STA. 11+41.00

NOTE: -Y23- STA. 11+41.00 TO STA. 12+30.00, TRANSITION FROM T.S. 35 TO T.S. 36

*-Y25- STA. 10+80.50 TO STA. 19+00.00

** OMIT D1 PAVEMENT LAYER FROM Y23



TYPICAL SECTION NO. 36

USE TYPICAL SECTION NO. 36

-Y23- STA. 12+24.89 TO STA. 12+30.00

*-Y25- STA. 19+00.00 TO STA 21+16.00

**OMIT D1 PAVEMENT LAYER FROM Y23

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

TYPICAL SECTIONS -Y22-, -Y23- & -Y25-

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-L
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
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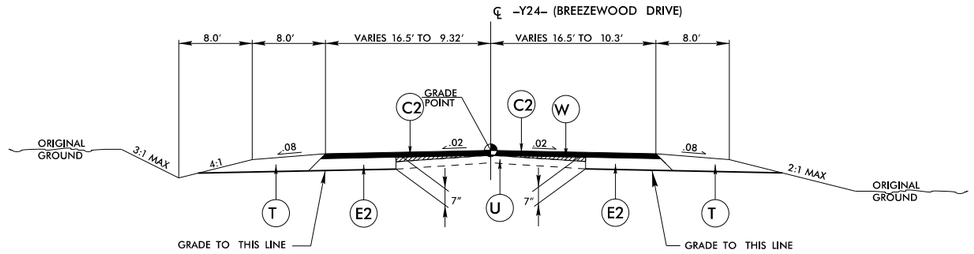
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

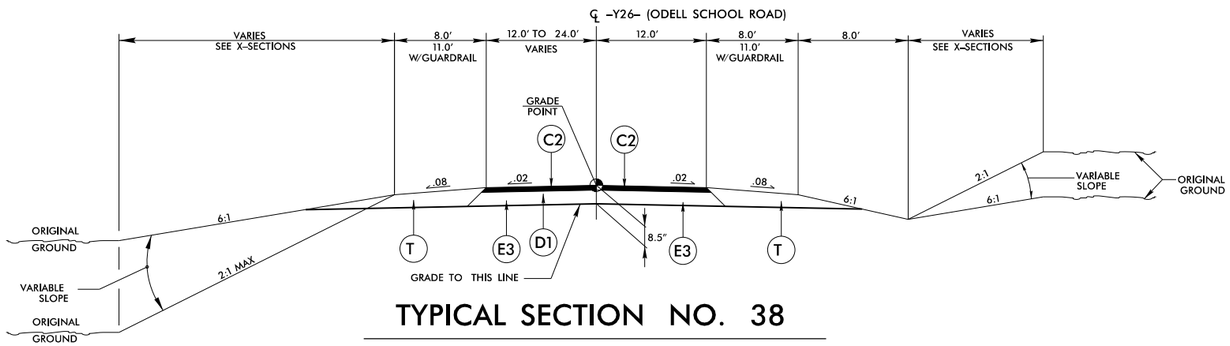


TYPICAL SECTION NO. 37

USE TYPICAL SECTION NO. 37

-Y24- STA. 10+40.00 TO STA. 15+23.00

-Y24- STA. 15+23.00 TO STA. 16+58.86, TRANSITION FROM T.S. 37 TO EXISTING

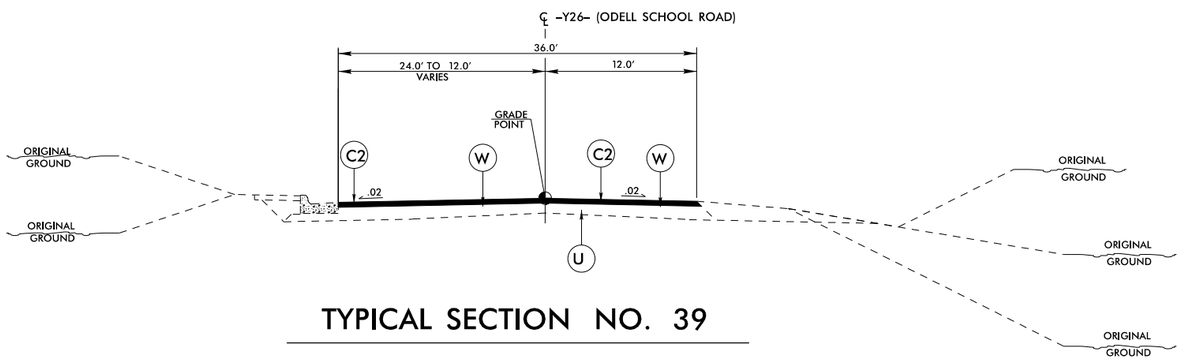


TYPICAL SECTION NO. 38

USE TYPICAL SECTION NO. 38

-Y26- STA. 10+40.00 TO STA. 15+12.79

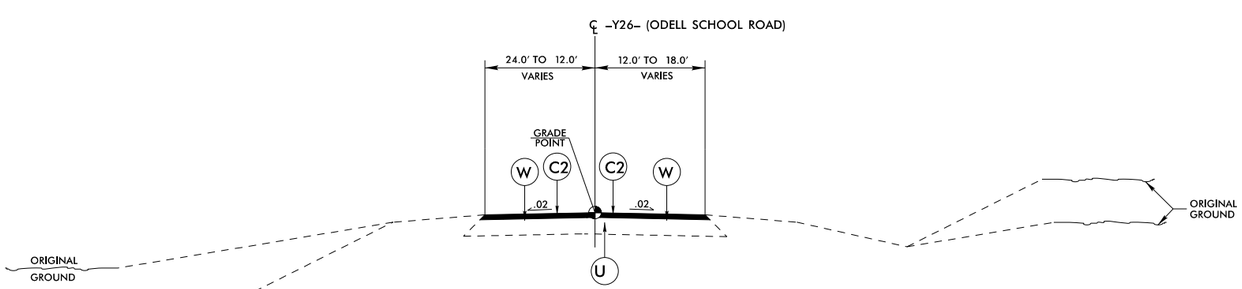
-Y26- STA. 25+40.00 TO STA. 28+58.29



TYPICAL SECTION NO. 39

USE TYPICAL SECTION NO. 39

-Y26- STA. 15+12.79 TO STA. 20+75.20



TYPICAL SECTION NO. 40

USE TYPICAL SECTION NO. 40

-Y26- STA. 20+75.20 TO STA. 25+40.00

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

REVISIONS

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TYPICAL SECTIONS
-Y24- & -Y26-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-M
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

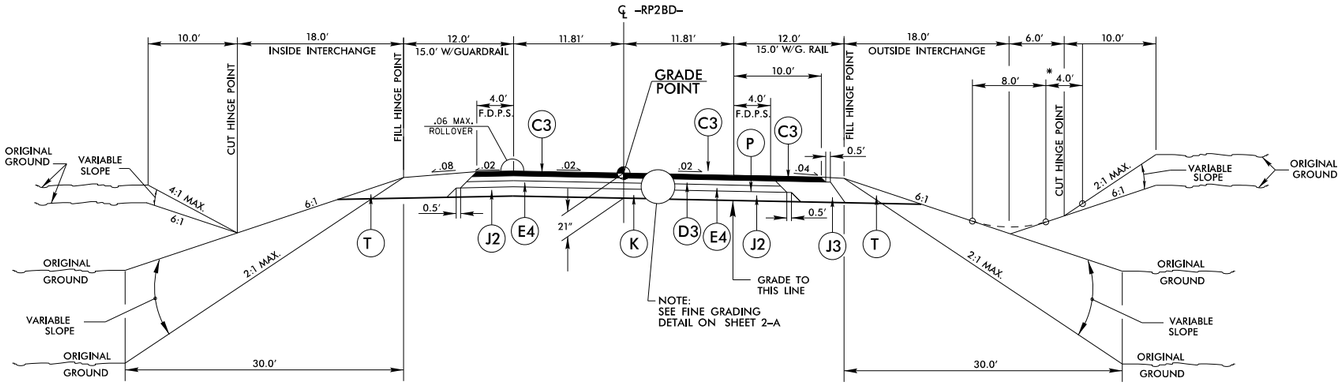
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

REVISIONS

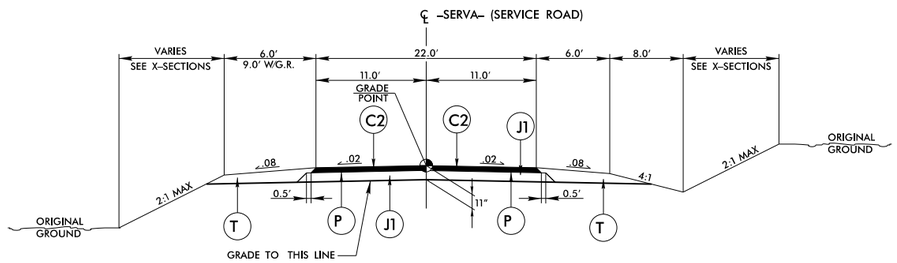


TYPICAL SECTION NO. 41

USE TYPICAL SECTION NO. 41

NOTE: -RP2BD- STA.93+63.50 TO STA.97+86.89
HAS BEEN GRADED UNDER PREVIOUS CONTRACT,
SEE FINE GRADING DETAIL SHEET 2-A.

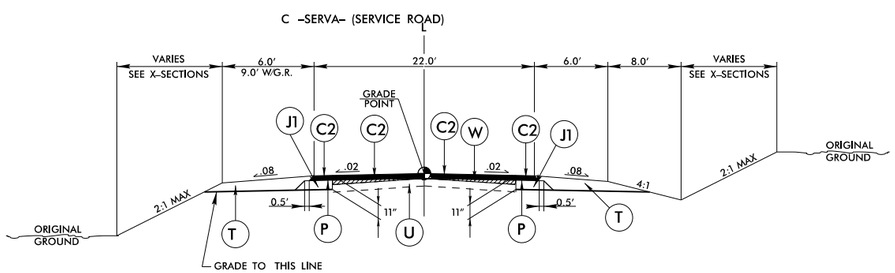
-RP2BD- STA. 93+63.50 TO STA. 97+86.89



TYPICAL SECTION NO. 42

USE TYPICAL SECTION NO. 42

-SERVA- STA. 10+35.00 TO STA. 55+93.17

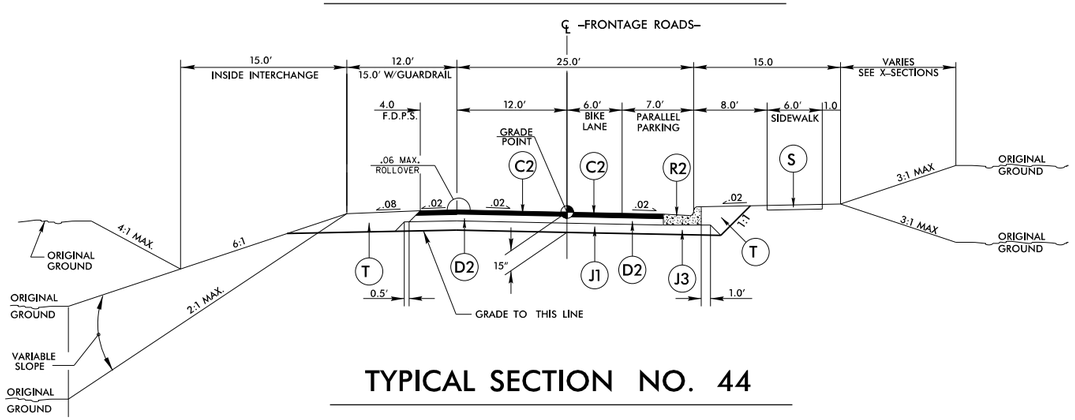


TYPICAL SECTION NO. 43

USE TYPICAL SECTION NO. 43

-SERVA- STA. 55+93.17 TO STA. 56+79.35

-SERVA- STA. 56+79.35 TO STA. 57+30.00, TRANSITION
FROM T.S. 43 TO EXISTING



TYPICAL SECTION NO. 44

USE TYPICAL SECTION NO. 44

-EBFR- STA. 11+14.47 TO STA. 23+88.70
-EBFR- STA. 26+28.60 TO STA. 37+02.69
-WBFR- STA. 11+25.42 TO STA. 24+01.01 (REVERSE)
-WBFR- STA. 26+41.29 TO STA. 37+13.64 (REVERSE)

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

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TYPICAL SECTIONS
-RP2B2-, -SERVA-
& FRONTAGE ROADS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-N
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

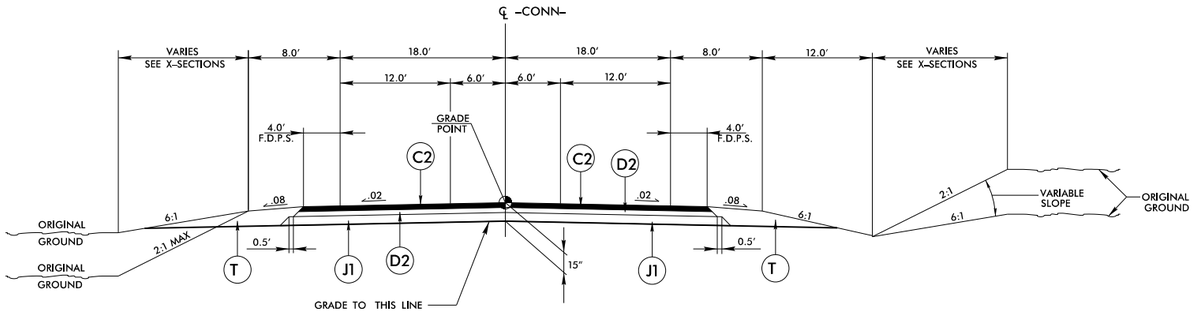
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

BLYTHE

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593

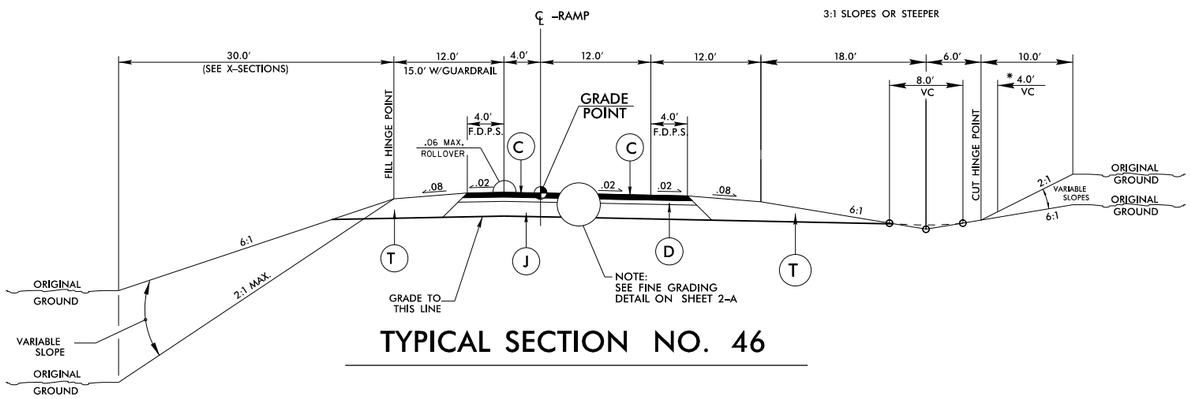
REVISIONS



TYPICAL SECTION NO. 45

USE TYPICAL SECTION NO. 45

-CONN- STA. 10+00.00 TO 21+29.95



TYPICAL SECTION NO. 46

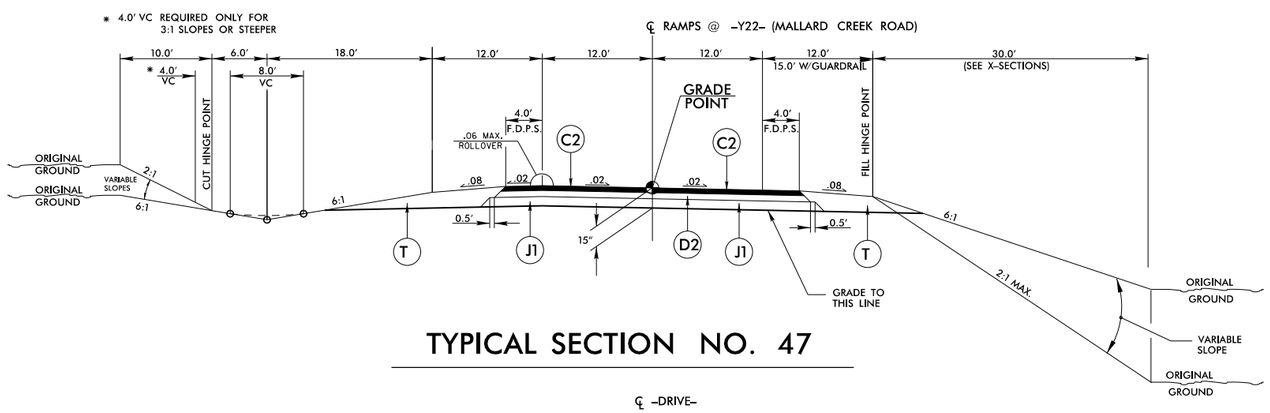
USE TYPICAL SECTION NO. 46

RAMP PAVEMENT SCHEDULE

ROADWAY	FROM STATION	TO STATION	C	D	E	J	PRIME	DEPTH	COMMENT
-RP3A-	13+23.91	32+70.43	C2	D1		J1		14"	
-RP3D-	13+70.52	27+43.87	C2	D1		J1		14"	REVERSE
-RPA Y17B-	14+62.49	22+08.77	C2	D2		J1		15"	
-RPB Y17A-	14+89.17	22+45.26	C2	D2		J2		15"	REVERSE
-RPC Y17A-	14+29.57	24+96.89	C2	D2		J2		15"	
-RPD Y17B-	14+37.35	22+32.09	C2	D2		J1		15"	REVERSE
-SPURA- Y22	25+73.26	29+79.60	C2	D2		J1		15"	
-SPURB- Y22	23+58.26	27+50.87	C2	D2		J1		15"	REVERSE
-SPURC- Y22	19+95.00	23+37.14	C2	D2		J1		15"	
-SPURD- Y22	27+02.67	30+78.89	C2	D2		J1		15"	REVERSE

NOTE: -RP3D- STA.23+54.03 TO STA 27+43.87 HAS BEEN GRADED UNDER PREVIOUS CONTRACT, SEE FINE GRADING DETAIL SHEET 2-A.

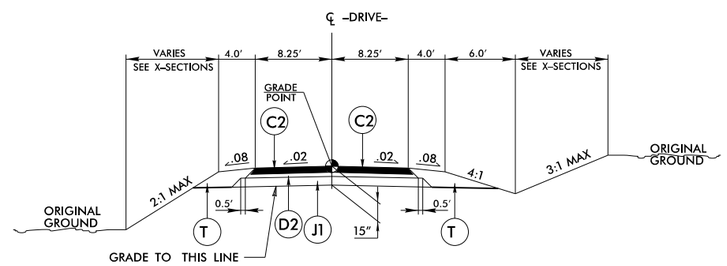
-RP3A- STA.26+18.49 TO STA.32+70.43 HAS BEEN GRADED UNDER PREVIOUS CONTRACT, SEE FINE GRADING DETAIL SHEET 2-A.



TYPICAL SECTION NO. 47

USE TYPICAL SECTION NO. 47

-RPAY22- STA. 10+00.00 TO STA. 30+61.32
-RPBY22- STA. 10+00.00 TO STA. 27+07.81 (REVERSE)
-RPCY22- STA. 10+00.00 TO STA. 23+77.99
-RPDY22- STA. 10+00.00 TO STA. 30+87.06 (REVERSE)



TYPICAL SECTION NO. 48

USE TYPICAL SECTION NO. 48

-DRIVE- STA. 10+82.00 TO STA. 11+38.48

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

TYPICAL SECTION
-CONN-, RAMPS &
-DRIVE-

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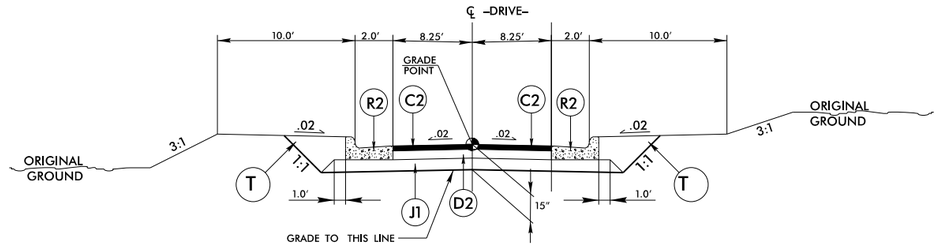
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	2-O
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

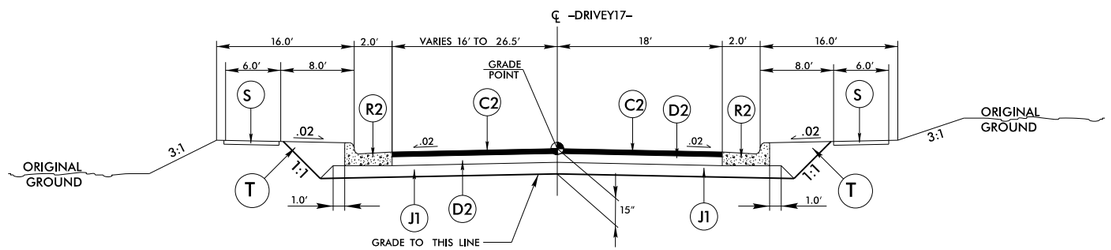
NC DEPARTMENT OF TRANSPORTATION
PAVEMENT MANAGEMENT UNIT
1592 MAIL SERVICE CENTER
RALEIGH, NC 27699-1593



TYPICAL SECTION NO. 49

USE TYPICAL SECTION NO. 49

-DRIVE- STA. STA. 11+38.48 TO STA. 11+81.31



TYPICAL SECTION NO. 50

USE TYPICAL SECTION NO. 50

-DRIVEY17- STA. 11+03.59 TO 11+32.00

PAVEMENT SCHEDULE	
A1	13" CONC
A2	CONC SHL'D
C1	1.25" SF9.5A
C2	3" S9.5B
C3	3" S9.5C
D1	3" I19.0B
D2	4" I19.0B
D3	4" I19.0C
E1	3" B25.0B
E2	4" B25.0B
E3	5.5" B25.0B
E4	4" B25.0C
J1	8" ABC
J2	10" ABC
J3	VAR. ABC
K	STABILIZATION
P	PRIME COAT
R1	1'-6" C&G
R2	2'-6" C&G
R4	12" CONCRETE ISLAND COVER
R5	STD. CONC BARRIER (SINGLE FACED)
R6	6" CONC. DRIVEWAY
R7	2'-9" C&G
R8	SHLD BERM GUTTER
S	4" CONC SIDEWALK
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V1	RETAINING WALL
V2	NOISE WALL
W	WEDGING

REVISIONS

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TYPICAL SECTION
-DRIVE- & -DRIVEY17-

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

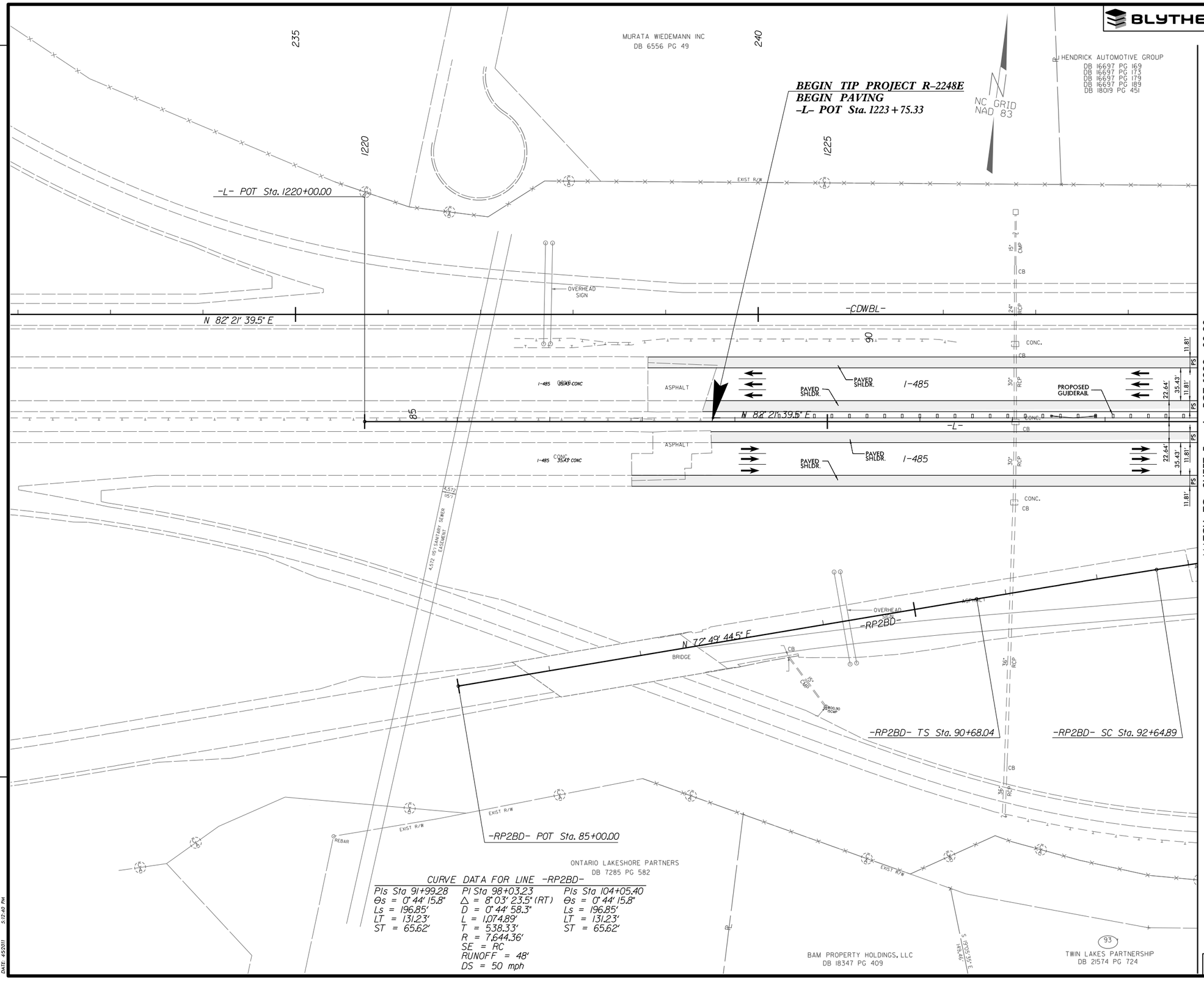
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

REVISIONS



CURVE DATA FOR LINE -RP2BD-

PIs Sta 91+99.28	PI Sta 98+03.23	PIs Sta 104+05.40
Θs = 0° 44' 15.8"	Δ = 8° 03' 23.5" (RT)	Θs = 0° 44' 15.8"
Ls = 196.85'	D = 0° 44' 58.3"	Ls = 196.85'
LT = 131.23'	L = 1,074.89'	LT = 131.23'
ST = 65.62'	T = 538.33'	ST = 65.62'
	R = 7,644.36'	
	SE = RC	
	RUNOFF = 48'	
	DS = 50 mph	

SEE SHEET 36 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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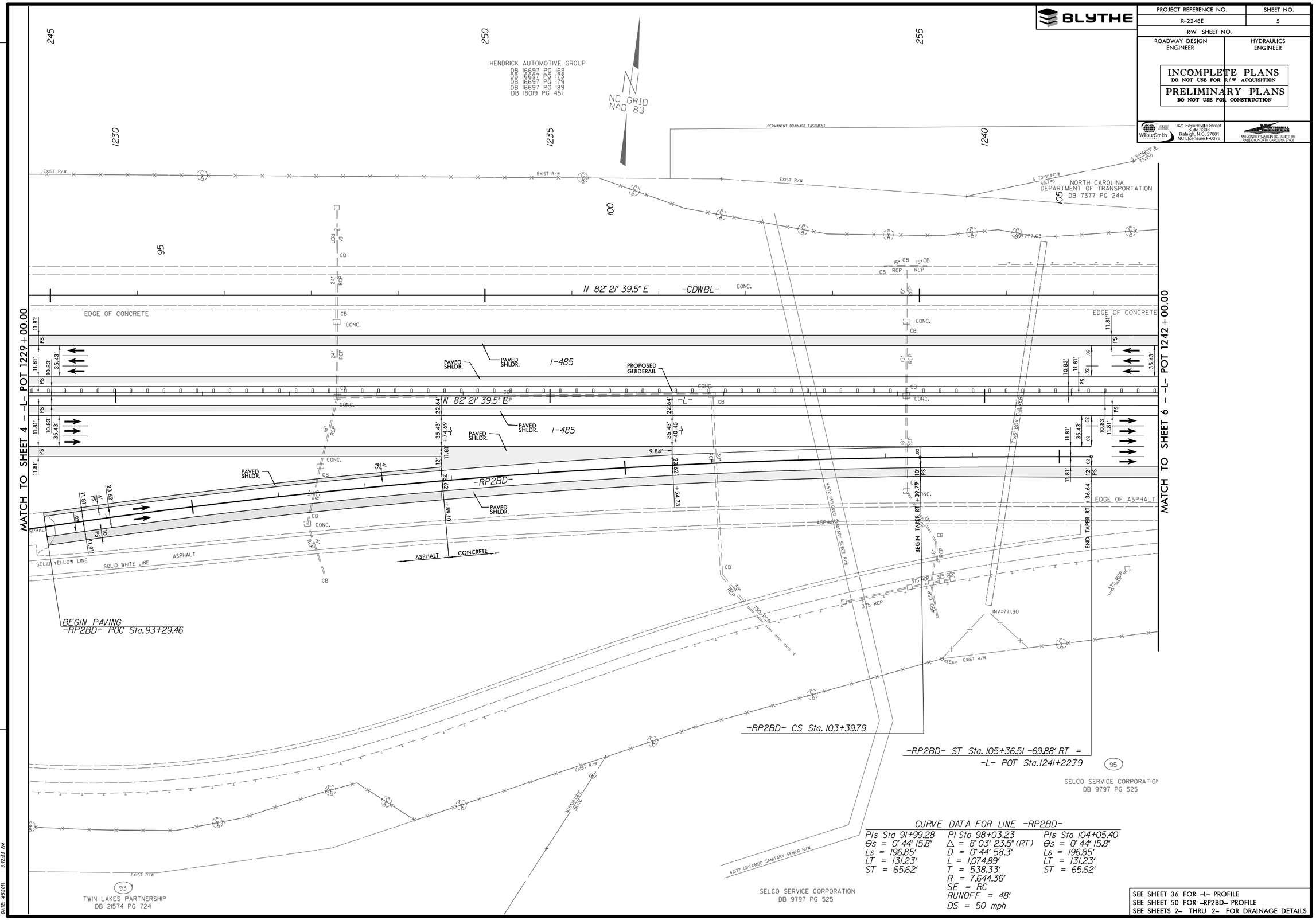
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606



CURVE DATA FOR LINE -RP2BD-

PIs Sta 91+99.28	PI Sta 98+03.23	PIs Sta 104+05.40
Θs = 0° 44' 15.8"	Δ = 8° 03' 23.5" (RT)	Θs = 0° 44' 15.8"
Ls = 196.85'	D = 0° 44' 58.3"	Ls = 196.85'
LT = 131.23'	L = 1,074.89'	LT = 131.23'
ST = 65.62'	T = 538.33'	ST = 65.62'
	R = 7,644.36'	
	SE = RC	
	RUNOFF = 48'	
	DS = 50 mph	

SEE SHEET 36 FOR -L- PROFILE
SEE SHEET 50 FOR -RP2BD- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

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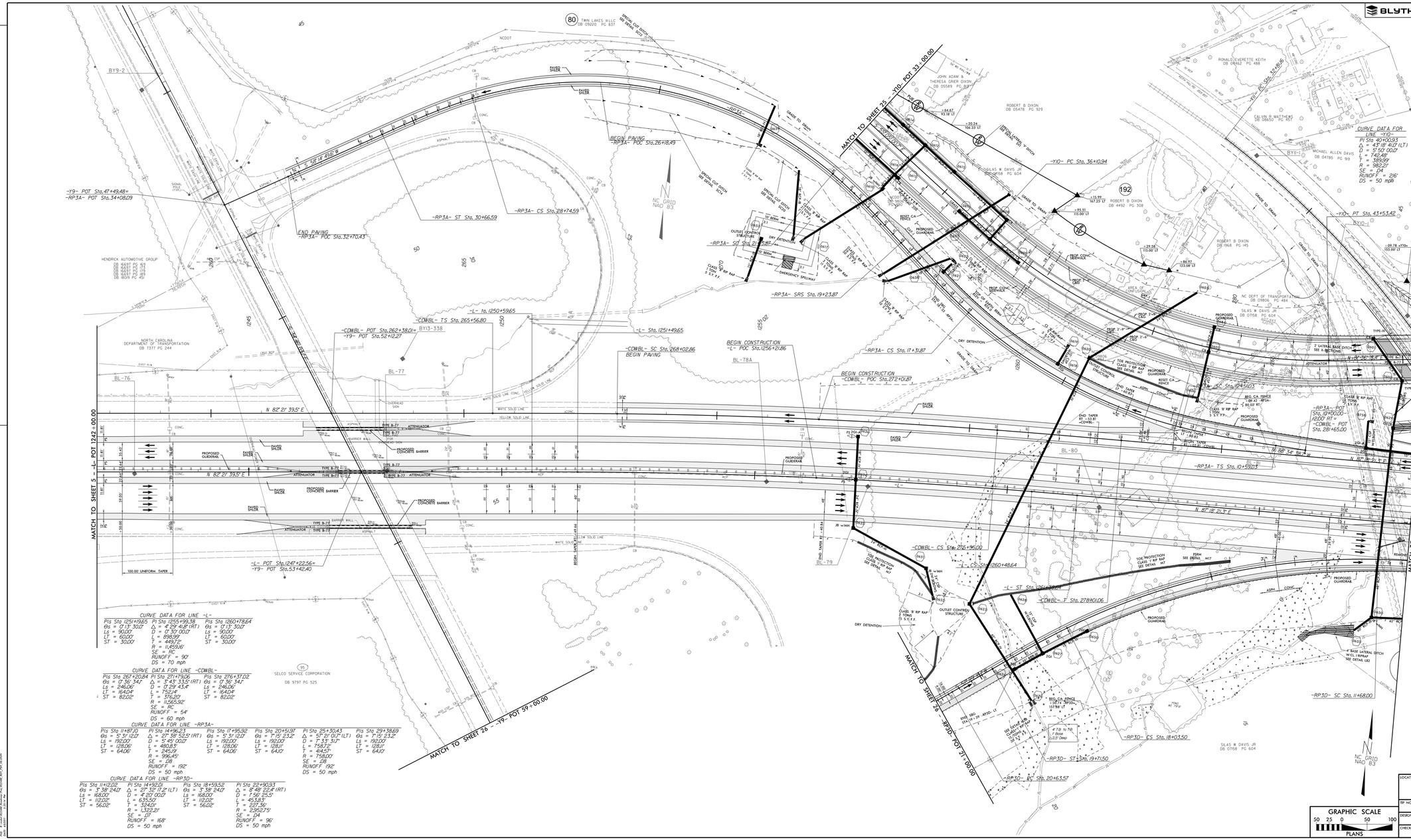


BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

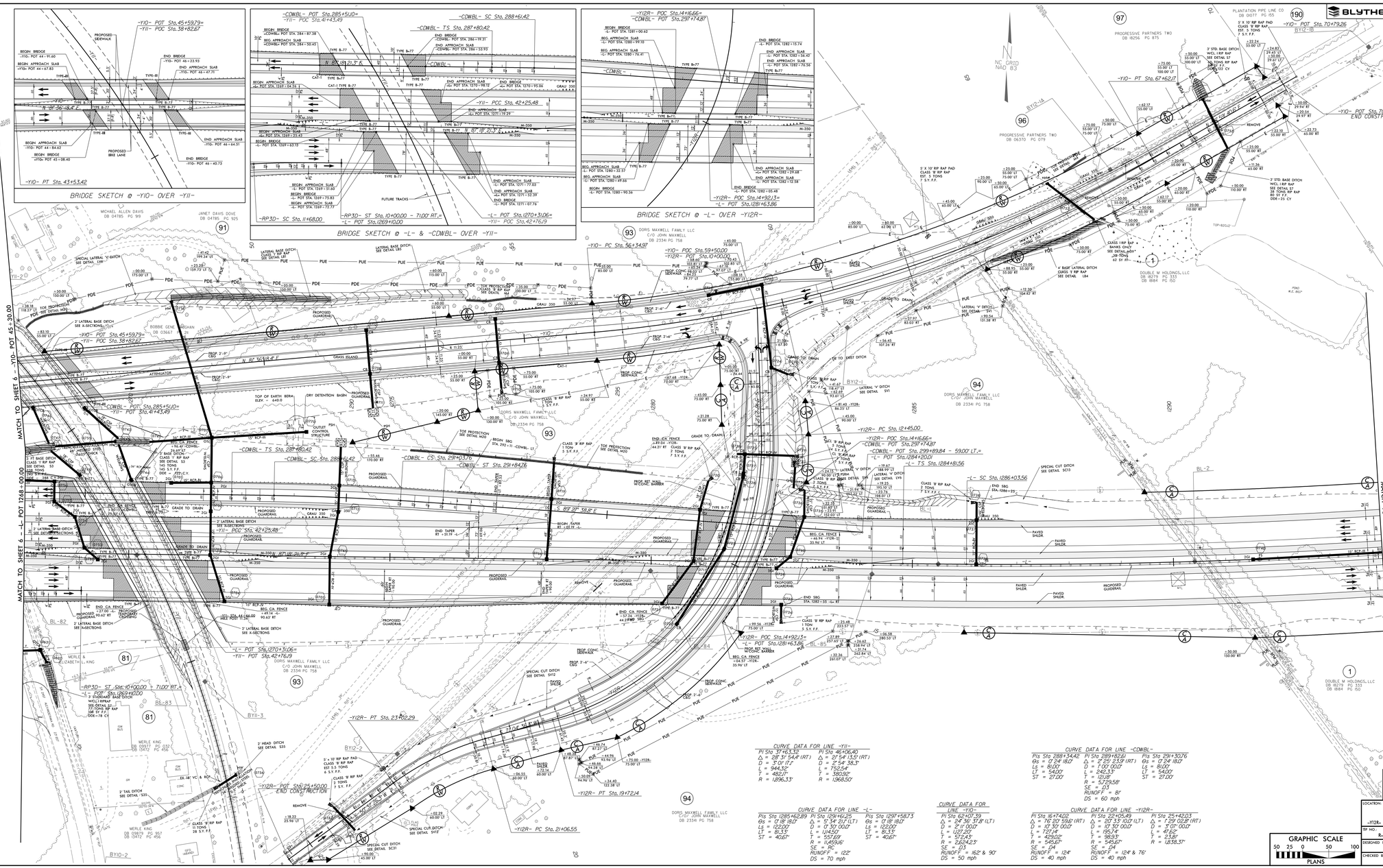
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

1256 Westbrook Plaza Drive, Winston-Salem, NC 27103 Phone: (336) 759-1200

LICENSED PROFESSIONAL ENGINEER SEAL

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 I-485 AND NC 115 INTERCHANGE

TIP NO.: R-2248E	COUNTY: MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011



CURVE DATA FOR LINE -Y11-

PI Sta 37+63.32	PI Sta 46+06.40
Δ = 28° 31' 54.4" (RT)	Δ = 21° 54' 13.5" (RT)
D = 1° 01' 17.1"	D = 1° 00' 38.3"
L = 944.32'	L = 752.54'
T = 482.17'	T = 380.92'
R = 1,896.33'	R = 1,968.50'

CURVE DATA FOR LINE -CDWBL-

Pis Sta 288+34.42	PI Sta 289+82.61	PI Sta 291+30.76
Δs = 17° 24' 18.2"	Δ = 21° 25' 23.9" (RT)	Δs = 17° 24' 18.2"
Ls = 81.00'	D = 1° 00' 00.0"	Ls = 81.00'
LT = 54.00'	L = 242.33'	LT = 54.00'
ST = 27.00'	T = 121.18'	ST = 27.00'
	R = 5,729.58'	
	SE = .03'	
	RUNOFF = 81'	
	DS = 60 mph	

CURVE DATA FOR LINE -L-

Pis Sta 1285+62.89	PI Sta 1291+61.25	Pis Sta 1297+58.73
Δs = 17° 18' 18.0"	Δ = 5° 54' 21.7" (LT)	Δs = 17° 18' 18.0"
Ls = 122.00'	D = 0° 30' 00.0"	Ls = 122.00'
LT = 61.33'	L = 1,143.50'	LT = 61.33'
ST = 40.67'	T = 572.69'	ST = 40.67'
	R = 11,459.16'	
	SE = .16'	
	RUNOFF = 122'	
	DS = 70 mph	

CURVE DATA FOR LINE -Y10-

PI Sta 62+07.39
Δ = 24° 36' 57.8" (LT)
D = 2° 11' 00.0"
L = 1,127.20'
T = 572.43'
R = 2,624.23'
SE = .03'
RUNOFF = 162' & 90'
DS = 50 mph

CURVE DATA FOR LINE -Y12R-

PI Sta 16+74.02	PI Sta 22+05.49	PI Sta 25+42.03
Δ = 76° 30' 59.6" (RT)	Δ = 20° 33' 00.0" (LT)	Δ = 1° 29' 02.8" (RT)
D = 10° 30' 00.0"	D = 10° 30' 00.0"	D = 5° 01' 00.0"
L = 727.14'	L = 195.74'	L = 47.62'
T = 429.02'	T = 98.93'	T = 23.81'
R = 545.67'	R = 545.67'	R = 1,838.37'
SE = .04	SE = .04	
RUNOFF = 124'	RUNOFF = 124' & 76'	
DS = 40 mph	DS = 40 mph	

SEE SHEETS 3B FOR -L- PROFILE
SEE SHEET 59 & 60 FOR -CDWBL- PROFILE
SEE SHEETS 63, 64 & 65 FOR -Y10- PROFILE
SEE SHEET 66 FOR -Y12R- PROFILE
SEE SHEET 2-8 FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

LOCATION:	I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 -Y12R- OVER -L- & -Y10-, -L- & -CDWBL- OVER -Y11-
TIP NO: R-2248E	COUNTY: MECKLINBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

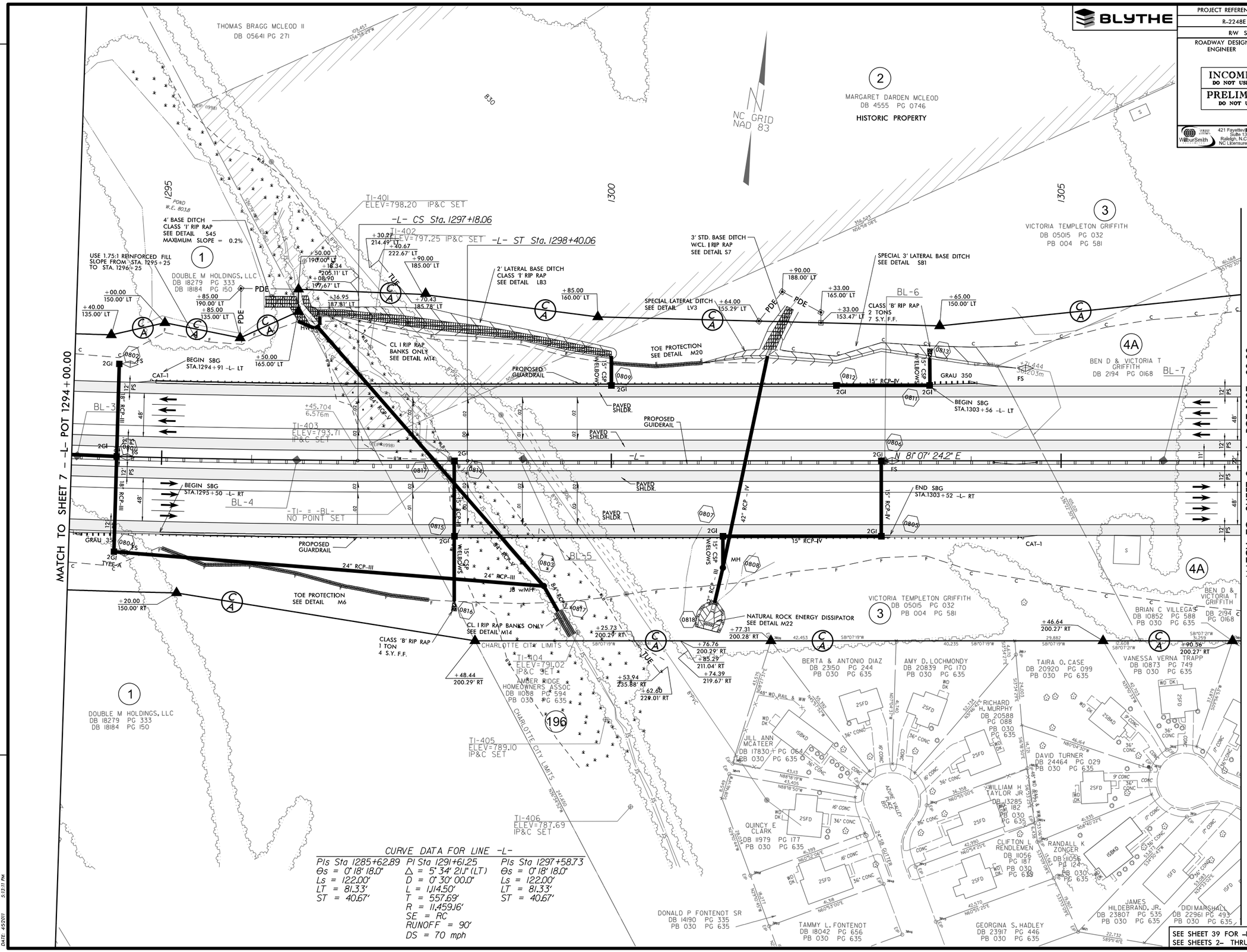
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 39 FOR –L– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

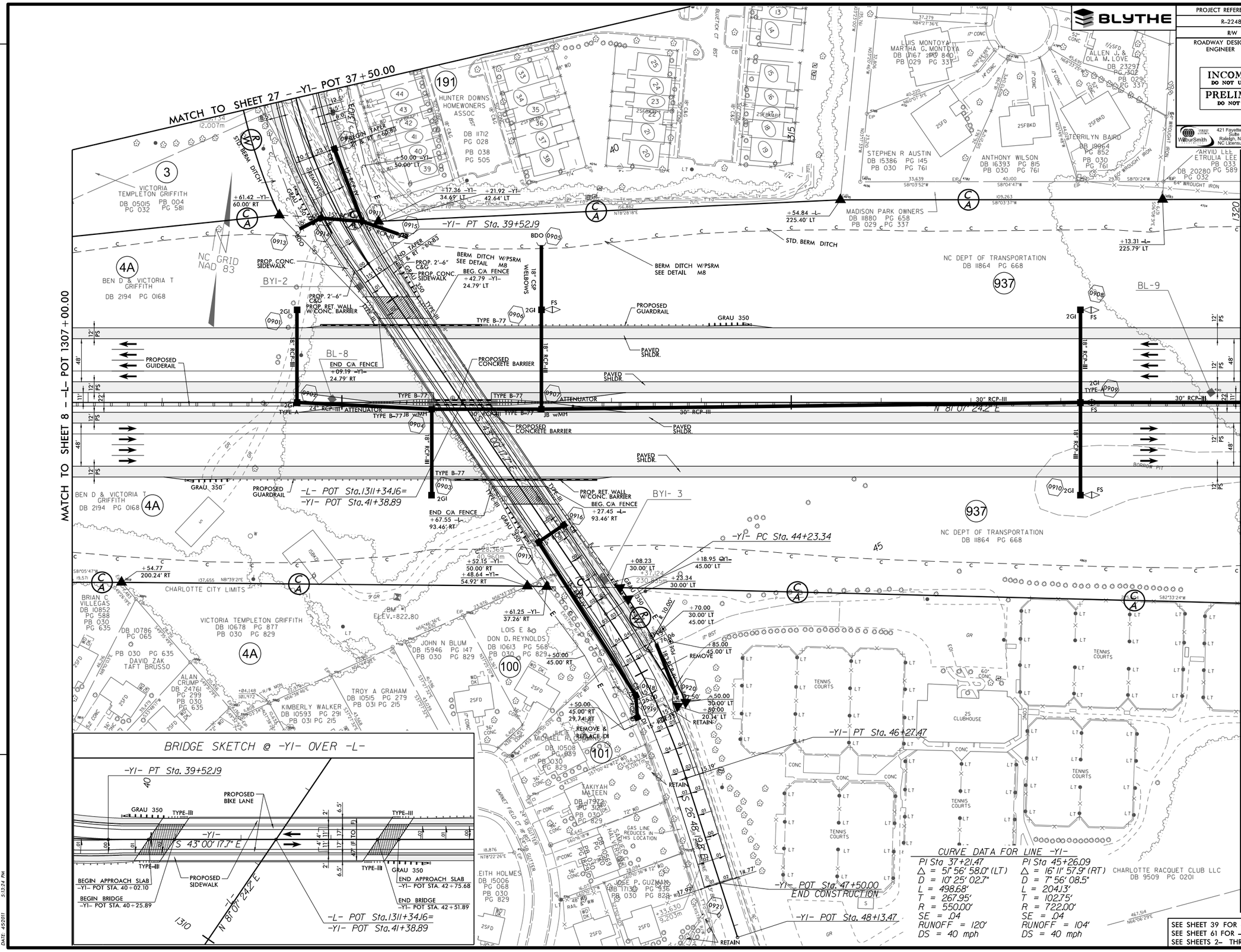
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC. — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 39 FOR -L- PROFILE
SEE SHEET 61 FOR -Y1 PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

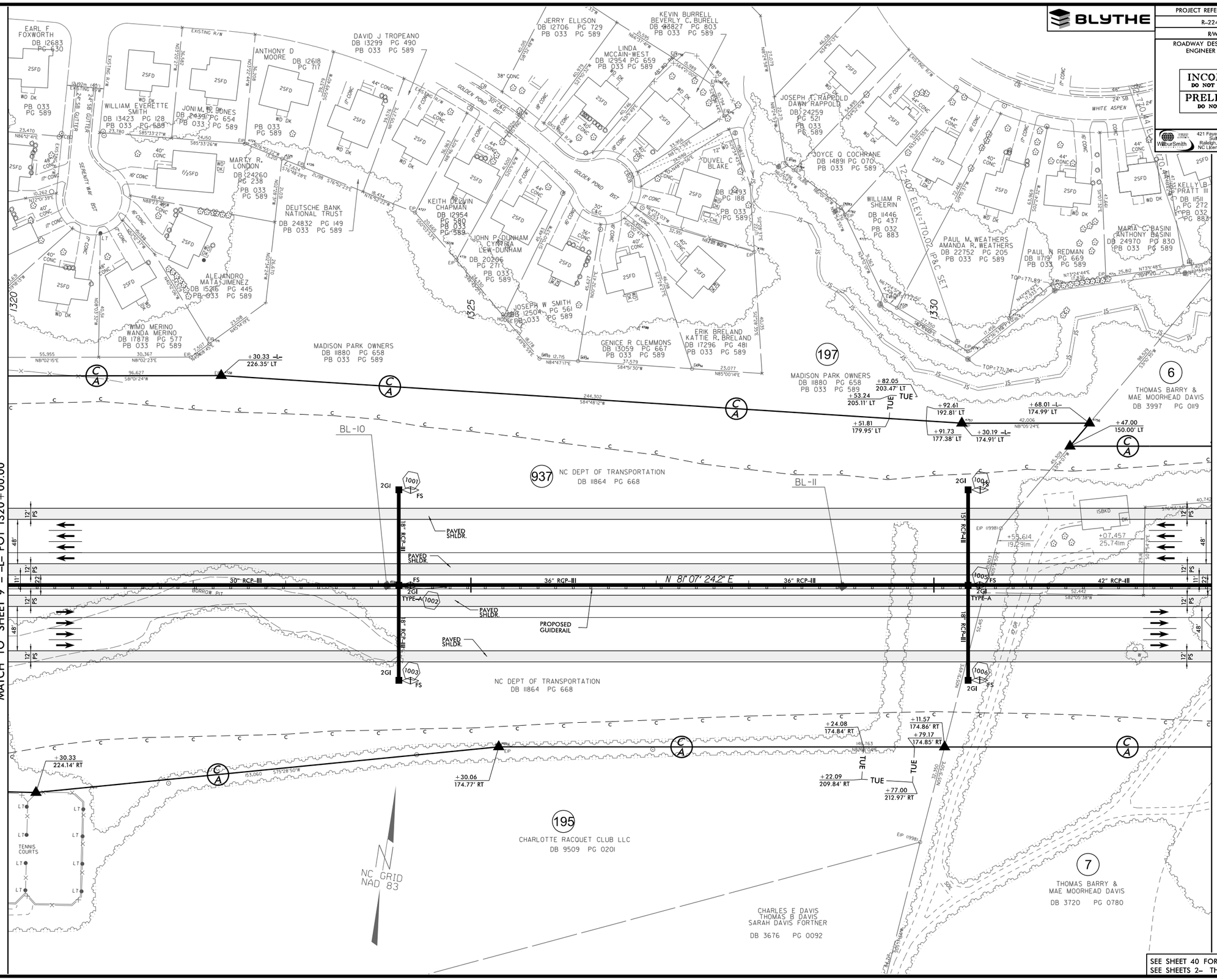
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 40 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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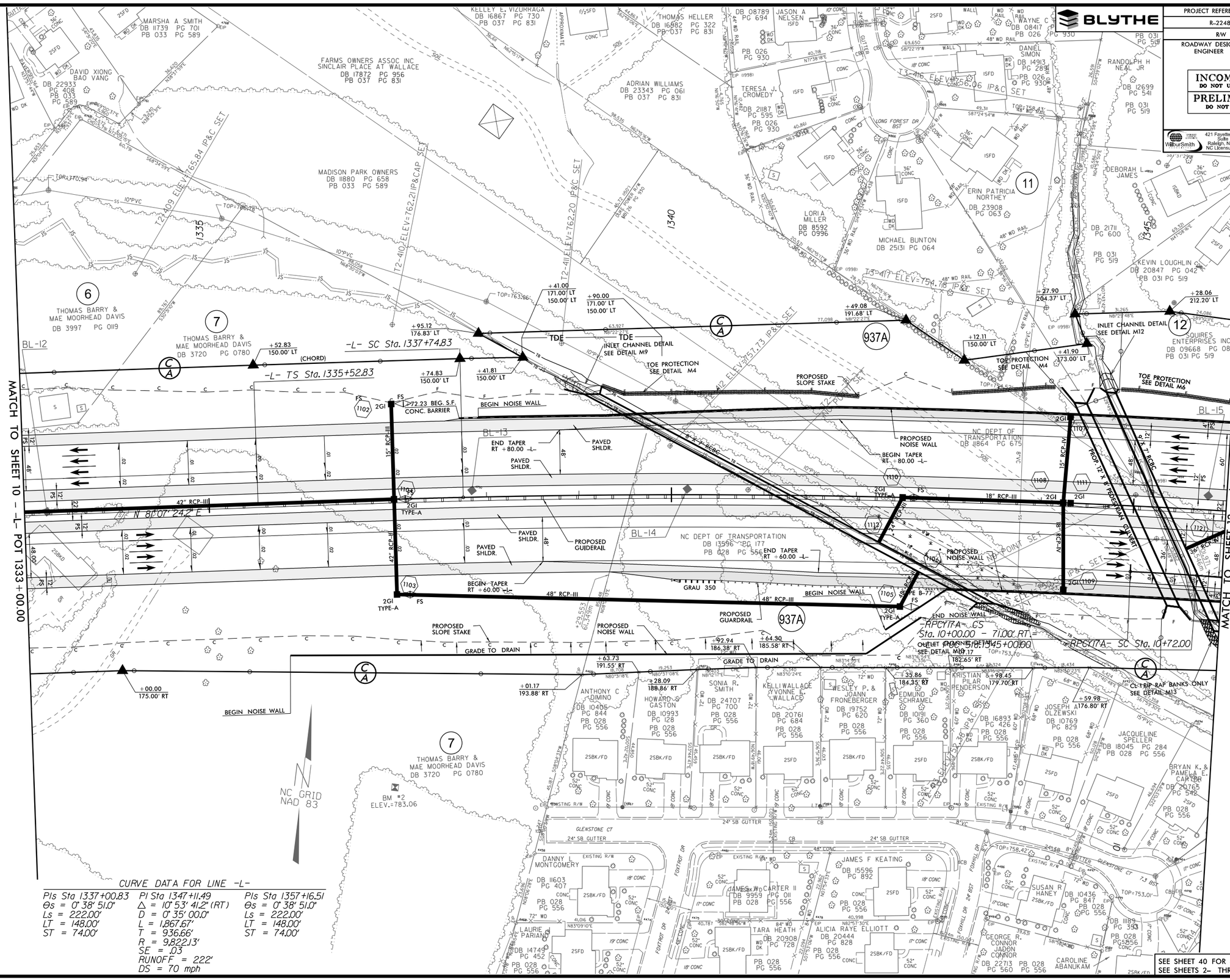
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KITTELMON/BRUNDAGE PLLC
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606



REVISIONS

CURVE DATA FOR LINE -L-

PIs Sta 1337+00.83	PI Sta 1347+11.49	PIs Sta 1357+16.51
Θs = 0° 38' 51.0"	Δ = 10° 53' 41.2" (RT)	Θs = 0° 38' 51.0"
Ls = 222.00'	D = 0° 35' 00.0"	Ls = 222.00'
LT = 148.00'	L = 1,867.67'	LT = 148.00'
ST = 74.00'	T = 936.66'	ST = 74.00'
	R = 9,822.13'	
	SE = .03	
	RUNOFF = 222'	
	DS = 70 mph	

SEE SHEET 40 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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CURVE DATA FOR LINE -RPBY17A-			
PI Sta 10+30.00	PI Sta 11+70.00	PI Sta 13+41.67	PI Sta 15+13.13
Δ = 17°15' 38.2"	Δ = 5°42' 03.8" (LT)	Δ = 7°18' 00.0"	Δ = 7°18' 00.0"
D = 9°00' 00.0"	D = 2°10' 00.0"	D = 2°10' 00.0"	D = 2°10' 00.0"
Ls = 90.00'	Ls = 120.00'	L = 263.33'	L = 263.33'
LT = 60.00'	LT = 80.00'	T = 133.67'	T = 133.67'
ST = 30.00'	ST = 40.00'	R = 636.62'	R = 636.62'
		SE = .04	SE = .04
		RUNOFF = 120'	RUNOFF = 120'
		DS = 50 mph	DS = 50 mph

CURVE DATA FOR LINE -RPBY17A-			
PI Sta 20+50.79	PI Sta 21+83.28	PI Sta 23+56.78	PI Sta 25+29.27
Δ = 2°05' 24.0"	Δ = 11°44' 45.2" (RT)	Δ = 11°44' 45.2" (RT)	Δ = 11°44' 45.2" (RT)
D = 2°10' 00.0"	D = 5°30' 00.0"	D = 5°30' 00.0"	D = 5°30' 00.0"
Ls = 120.00'	L = 213.56'	L = 213.56'	L = 213.56'
LT = 50.62'	T = 107.16'	T = 107.16'	T = 107.16'
ST = 25.34'	R = 1041.74'	R = 1041.74'	R = 1041.74'
	SE = .04	SE = .04	SE = .04
	RUNOFF = 76' & 68'	RUNOFF = 76' & 68'	RUNOFF = 76' & 68'
	DS = 30 & 20 mph	DS = 30 & 20 mph	DS = 30 & 20 mph

CURVE DATA FOR LINE -RPCY17A-			
PI Sta 10+44.55	PI Sta 12+49.31	PI Sta 14+73.26	PI Sta 19+67.22
Δ = 17°12' 41.5"	Δ = 12°21' 49.5" (RT)	Δ = 2°31' 12.0"	Δ = 7°39' 00.0"
D = 9°00' 00.0"	D = 3°30' 00.0"	D = 2°11' 00.0"	D = 2°00' 00.0"
Ls = 90.00'	L = 353.25'	L = 354.50'	L = 382.50'
LT = 44.55'	T = 177.31'	T = 177.52'	T = 191.25'
ST = 22.45'	R = 1637.02'	R = 2626.23'	R = 2626.23'
	SE = .06	SE = .03	SE = .03
	RUNOFF = 144'	RUNOFF = 60	RUNOFF = 60
	DS = 50 mph	DS = 50 mph	DS = 50 mph

CURVE DATA FOR LINE -RPCY17A-			
PI Sta 21+41.73	PI Sta 22+56.07	PI Sta 13+37.+00.83	PI Sta 13+47.+11.49
Δ = 5°44' 55.5" (LT)	Δ = 7°39' 00.0"	Δ = 17°53' 45.2" (RT)	Δ = 17°53' 45.2" (RT)
D = 2°45' 00.0"	D = 2°00' 00.0"	D = 17°35' 00.0"	D = 17°35' 00.0"
L = 208.84'	L = 382.50'	L = 1867.67'	L = 1867.67'
T = 104.51'	T = 191.25'	T = 936.66'	T = 936.66'
R = 2083.48'	R = 2626.23'	R = 3182.23'	R = 3182.23'
SE = .05	SE = .03	SE = .04	SE = .04
RUNOFF = 120'	RUNOFF = 60	RUNOFF = 222'	RUNOFF = 222'
DS = 50 mph	DS = 50 mph	DS = 70 mph	DS = 70 mph

CURVE DATA FOR LINE -L-		
PI Sta 13+57.+16.51	PI Sta 11+50.70	PI Sta 13+57.+16.51
Δ = 17°38' 51.0"	Δ = 81°59' 16.20" (RT)	Δ = 17°38' 51.0"
Ls = 222.00'	D = 30°59' 22.98"	Ls = 222.00'
LT = 148.00'	L = 264.58'	LT = 148.00'
ST = 74.00'	T = 160.70'	ST = 74.00'
	R = 184.89'	
	SE = .03	
	RUNOFF = 5'	
	DS = 25 mph	

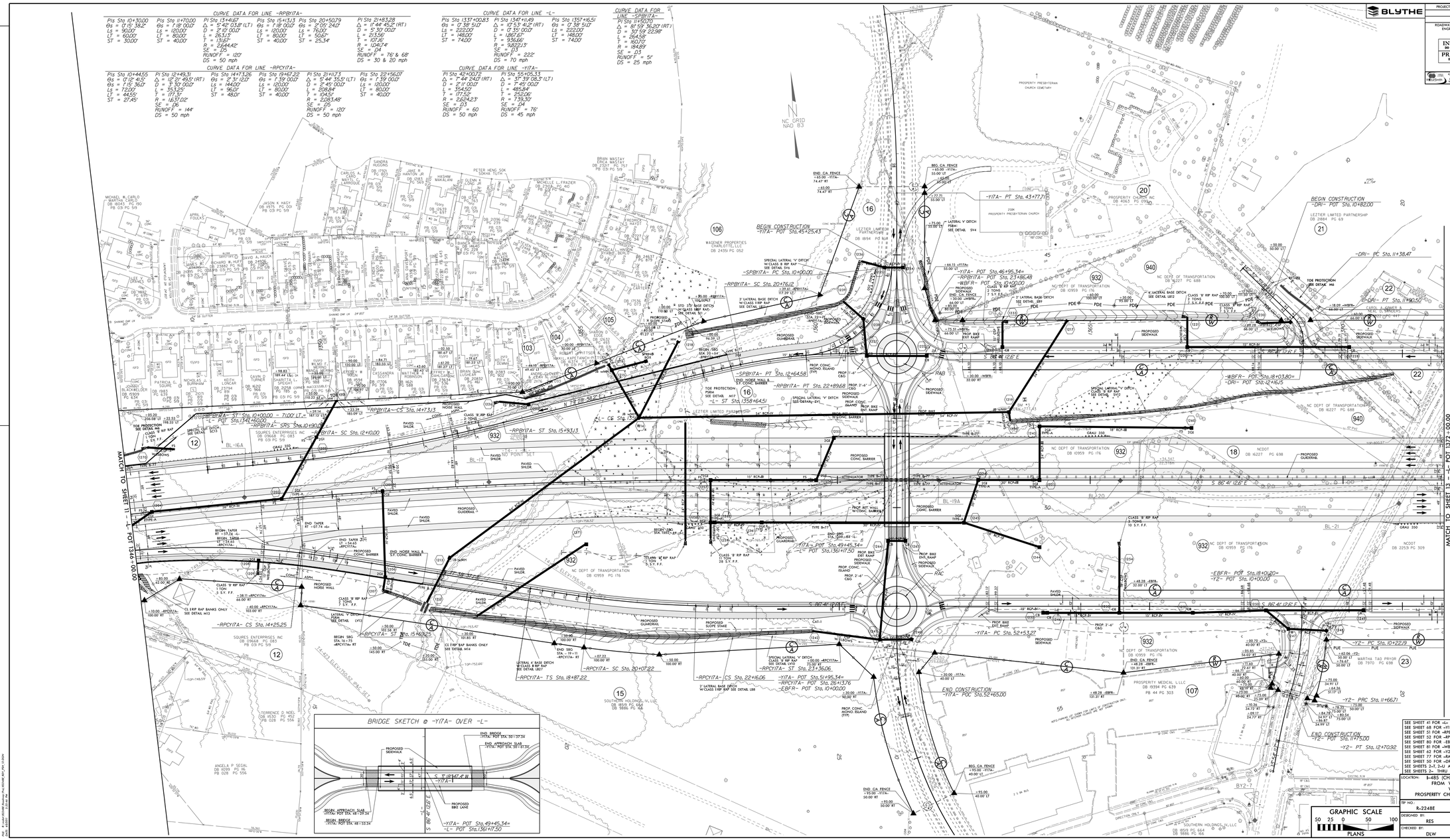
CURVE DATA FOR LINE -Y17A-			
PI Sta 42+00.72	PI Sta 55+09.13		
Δ = 7°44' 24.0" (RT)	Δ = 37°39' 08.3" (LT)		
D = 2°11' 00.0"	D = 7°45' 00.0"		
L = 354.50'	L = 485.84'		
T = 177.52'	T = 252.06'		
R = 2626.23'	R = 739.30'		
SE = .03	SE = .04		
RUNOFF = 60	RUNOFF = 76'		
DS = 50 mph	DS = 45 mph		

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

1200 Harrison Oaks Blvd. Suite 350 Cary, NC 27513 Phone: (919) 677-2050 Fax: (919) 677-2055
BLYTHE CONSTRUCTION, INC. P-0843 CORPORATE LICENSE



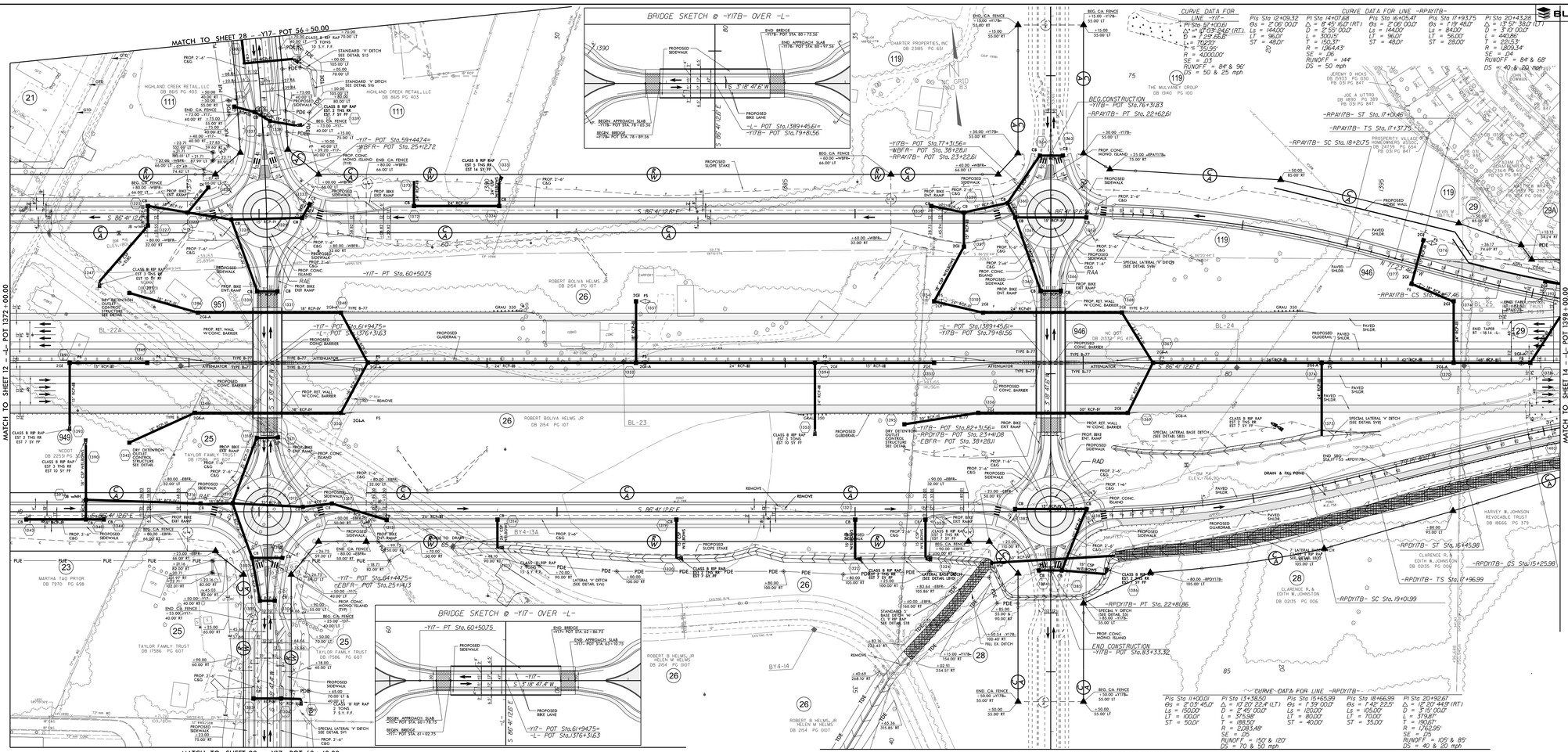
SEE SHEET 41 FOR -L- PROFILE
SEE SHEET 68 FOR -Y17A- PROFILE
SEE SHEET 51 FOR -RPBY17A- PROFILE
SEE SHEET 52 FOR -RPCY17A- PROFILE
SEE SHEET 80 FOR -EBFR- PROFILE
SEE SHEET 81 FOR -WBFR- PROFILE
SEE SHEET 62 FOR -Y2- PROFILE
SEE SHEET 77 FOR -BAR- & -RAC- PROFILES
SEE SHEET 50 FOR -DRI- PROFILE
SEE SHEETS 2-2, 2-41 AND 2-7 FOR INTERSECTION DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO.: R-2248E	COUNTY: MECKLENBURG
DESIGNED BY: RES	DATE: 4/5/2011
CHECKED BY: DLW	DATE: 4/5/2011

GRAPHIC SCALE
50 25 0 50 100
PLANS

File: R:\radar\R2248E\Roadway\Plans\R2248E_RPY_PlAn_12.DGN
Date: 4/5/2011 2:17:06 PM



BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

431 Fairville Street
Charlotte, NC 28203
704.333.1112
NC Firm Lic. # C-0832
BLYTHE DESIGN GROUP

SEE SHEETS 42 FOR -L- PROFILE
SEE SHEET 67 & 68 FOR -Y17- PROFILE
SEE SHEET 69 FOR -Y17B- PROFILE
SEE SHEETS 80 FOR -EBFR- PROFILE
SEE SHEETS 81 FOR -WBFR- PROFILE
SEE SHEET 51 FOR -RPAY17B- PROFILE
SEE SHEET 53 FOR -RPDY17B- PROFILE
SEE SHEET 77 FOR -RAA-, -RAD-, -RAE-, AND -RAF- PROFILES
SEE SHEETS 2-5, 2-V, 2-W, AND 2-Y FOR INTERSECTION DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE

TIP NO.: R-2248E
COUNTY: MECKLINBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011

GRAPHIC SCALE
50 25 0 50 100
PLANS

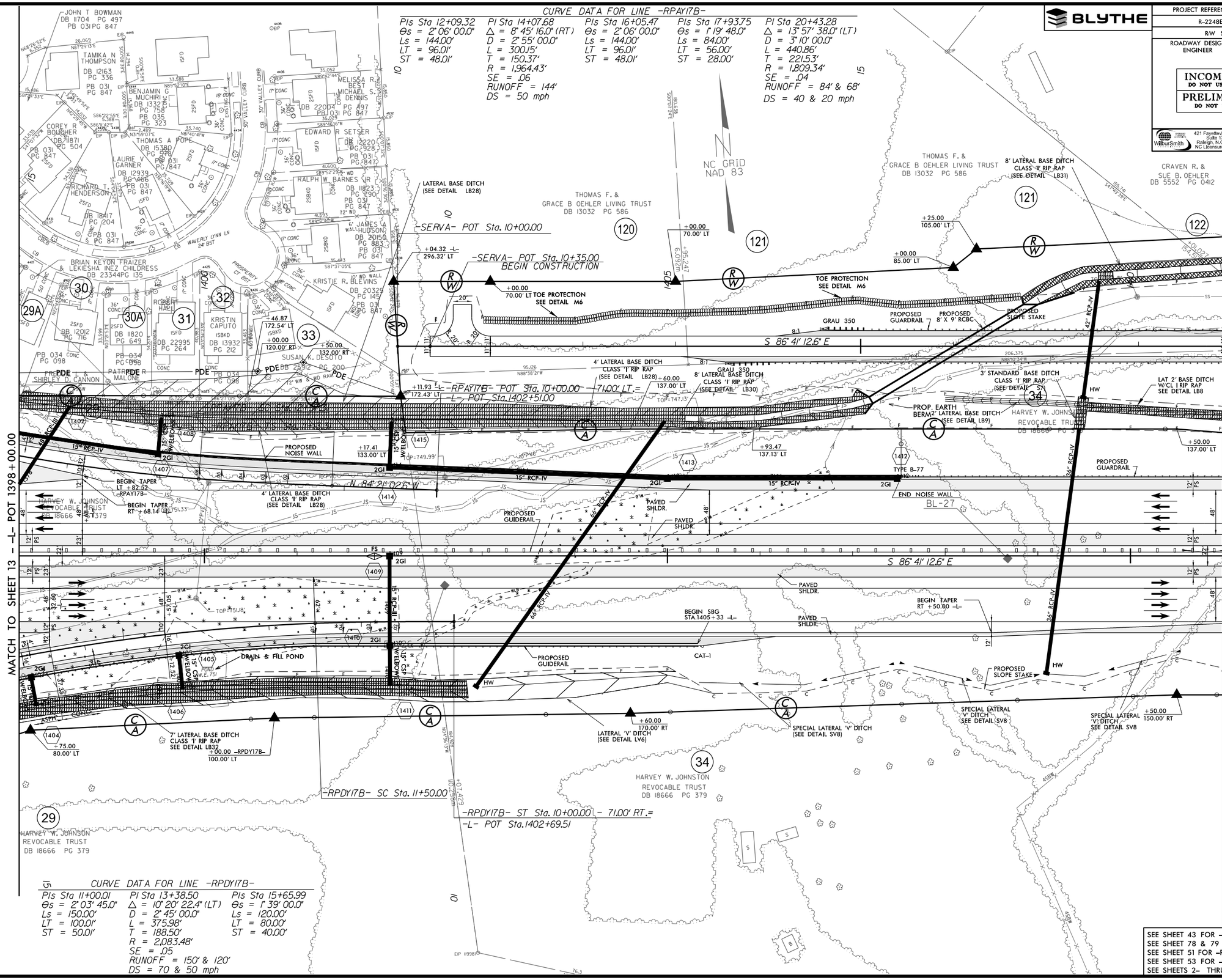
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



REVISIONS

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DATE: 4/5/2011 5:14:53 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

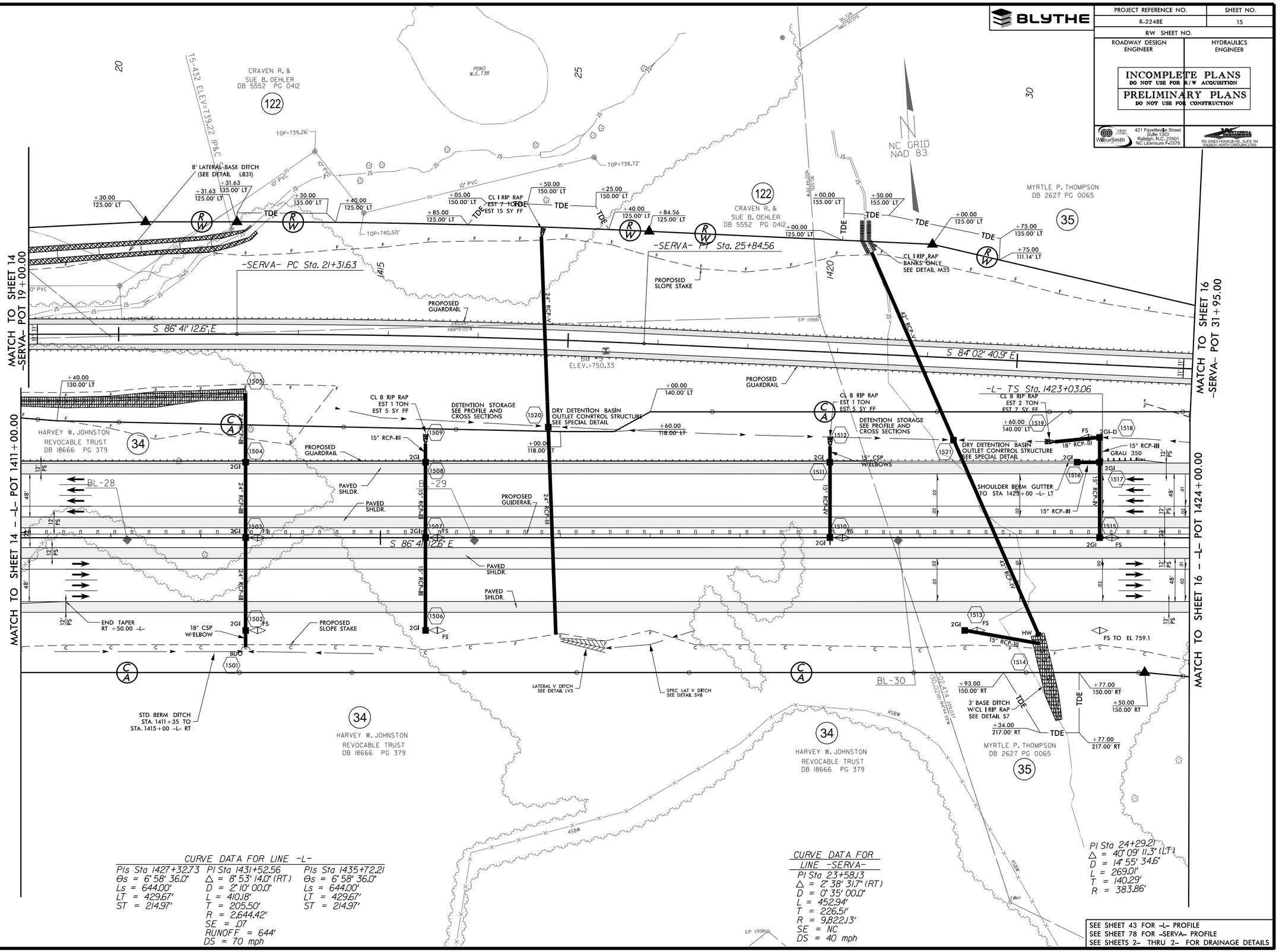
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



CURVE DATA FOR LINE -L-

PIs Sta 1427+32.73	PI Sta 1431+52.56	PIs Sta 1435+72.21
Θs = 6° 58' 36.0"	Δ = 8° 53' 14.0" (RT)	Θs = 6° 58' 36.0"
Ls = 644.00'	D = 2° 10' 00.0"	Ls = 644.00'
LT = 429.67'	L = 410.18'	LT = 429.67'
ST = 214.97'	T = 205.50'	ST = 214.97'
	R = 2,644.42'	
	SE = .07	
	RUNOFF = 644'	
	DS = 70 mph	

CURVE DATA FOR LINE -SERVA-

PI Sta 23+58.13
Δ = 2° 38' 31.7" (RT)
D = 0° 35' 00.0"
L = 452.94'
T = 226.51'
R = 9,822.13'
SE = NC
DS = 40 mph

PI Sta 24+29.21
Δ = 40° 09' 11.3" (LT)
D = 14° 55' 34.6"
L = 269.01'
T = 140.29'
R = 383.86'

SEE SHEET 43 FOR -L- PROFILE
SEE SHEET 78 FOR -SERVA- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\roadwy\R2248E\Roadway Proj\R2248E_RDY_PSH_15.DGN
DATE: 4/5/2011 5:15:08 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

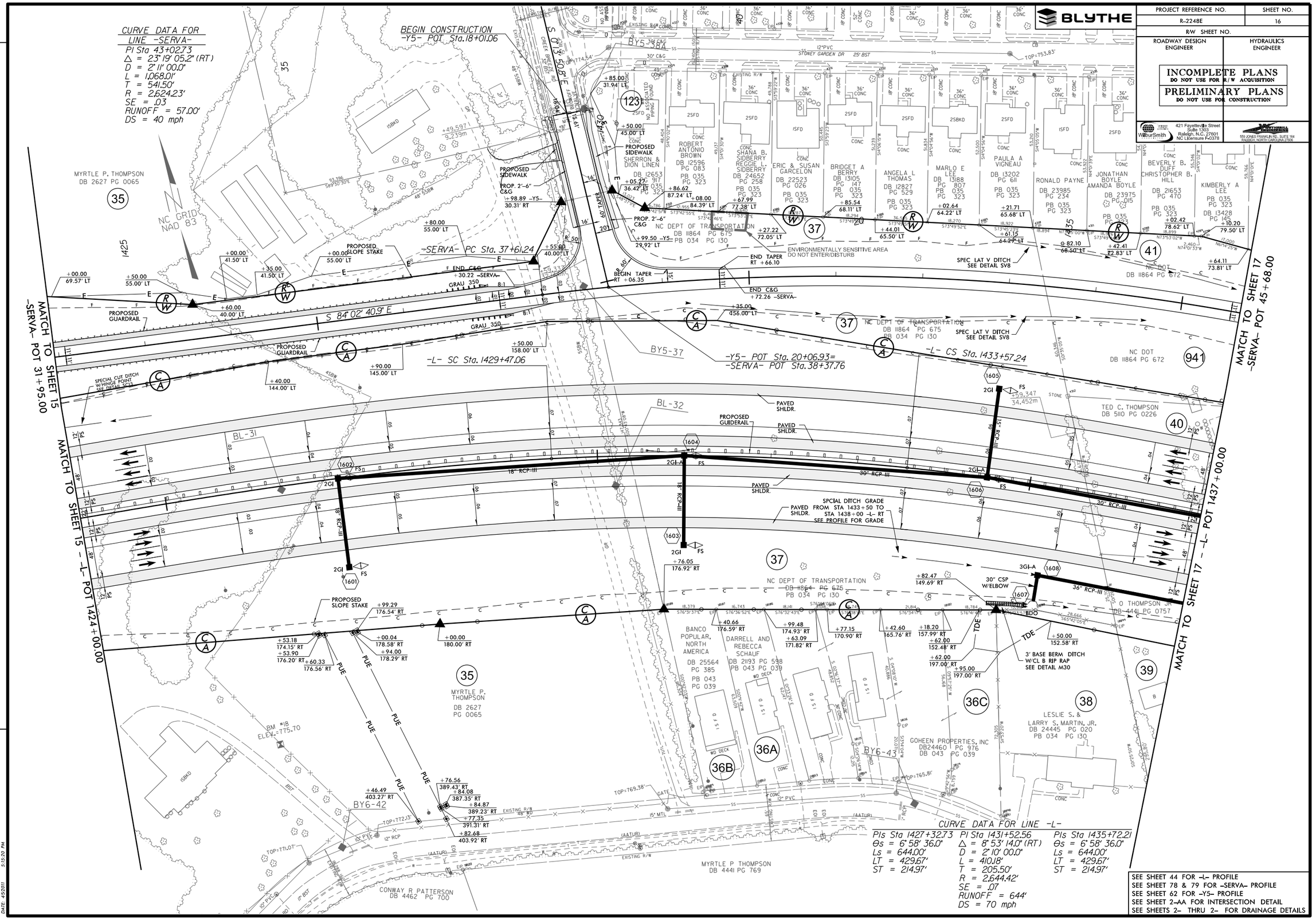
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 78 & 79 FOR -SERVA- PROFILE
SEE SHEET 62 FOR -Y5- PROFILE
SEE SHEET 2-AA FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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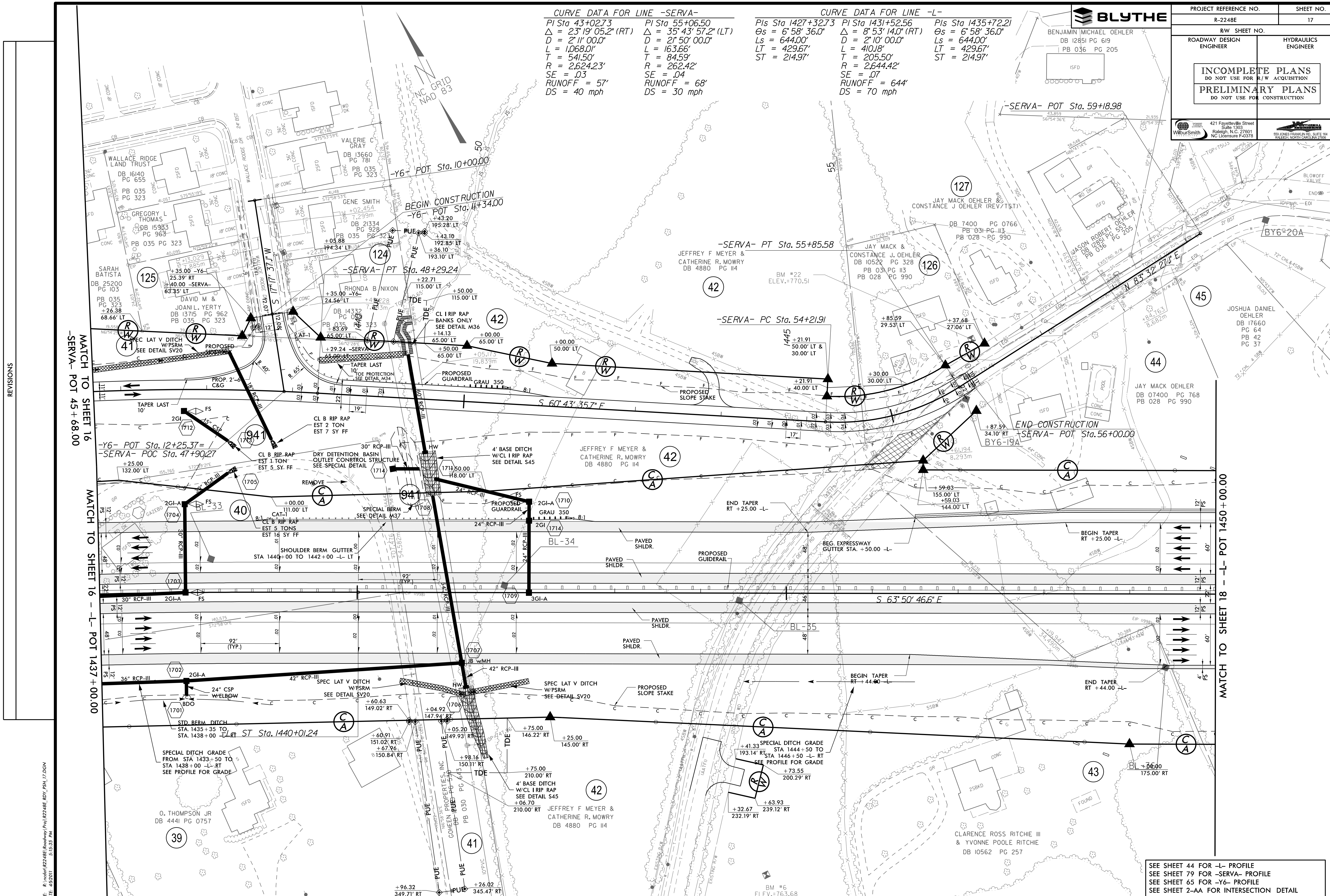

BLYTHE
PROJECT REFERENCE NO. R-2248E
SHEET NO. 17
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
WilburSmith
421 Fayetteville Street Suite 1303 Raleigh, N.C. 27601 NC Licensure F-0378
559 JONES FRANKLIN RD., SUITE 164 RALEIGH, NORTH CAROLINA 27606
CURVE DATA FOR LINE -SERVA-
PI Sta 43+02.73
Δ = 23° 19' 05.2" (RT)
D = 2° 11' 00.0"
L = 1,068.01'
T = 541.50'
R = 2,624.23'
SE = .03
RUNOFF = 57'
DS = 40 mph
PI Sta 55+06.50
Δ = 35° 43' 57.2" (LT)
D = 21° 50' 00.0"
L = 163.66'
T = 84.59'
R = 262.42'
SE = .04
RUNOFF = 68'
DS = 30 mph
CURVE DATA FOR LINE -L-
PIs Sta 1427+32.73
Θs = 6° 58' 36.0"
Ls = 644.00'
LT = 429.67'
ST = 214.97'
PI Sta 1431+52.56
Δ = 8° 53' 14.0" (RT)
D = 2° 10' 00.0"
L = 410.18'
T = 205.50'
R = 2,644.42'
SE = .07
RUNOFF = 644'
DS = 70 mph
PIs Sta 1435+72.21
Θs = 6° 58' 36.0"
Ls = 644.00'
LT = 429.67'
ST = 214.97'
NC GRID NAD 83
REVISIONS
MATCH TO SHEET 16 -SERVA- POT 45+68.00
MATCH TO SHEET 16 -L- POT 1437+00.00
MATCH TO SHEET 18 -L- POT 1450+00.00
-Y6- POT Sta. 10+00.00
BEGIN CONSTRUCTION -Y6- POT Sta. 11+34.00
-SERVA- PT Sta. 48+29.24
-SERVA- PT Sta. 55+85.58
-SERVA- PC Sta. 54+21.91
-SERVA- POT Sta. 59+18.98
END CONSTRUCTION -SERVA- POT Sta. 56+00.00
-Y6- POT Sta. 12+25.37 = -SERVA- POC Sta. 47+90.27
-L- ST Sta. 1440+01.24
S 60° 43' 35.7" E
S 63° 50' 46.6" E
N 83° 32' 27.1" E
WALLACE RIDGE LAND TRUST DB 16140 PG 655 PB 035 PG 323
GREGORY L THOMAS DB 15933 PG 963 PB 035 PG 323
SARAH BATISTA DB 25200 PG 103 PB 035 PG 323
DAVID M & JOANI L. YERTY DB 13715 PG 962 PB 035 PG 323
VALERIE C GRAY DB 13660 PG 781 PB 035 PG 323
GENE SMITH DB 21334 PG 928 PB 035 PG 323
RHONDA B NIXON DB 14332 PG 0 PB 035 PG 323
JEFFREY F MEYER & CATHERINE R. MOWRY DB 4880 PG 114
JAY MACK & CONSTANCE J. OEHLER DB 10522 PG 328 PB 031 PG 113 PB 028 PG 990
JAY MACK OEHLER & CONSTANCE J OEHLER (REV/TST) DB 7400 PG 0766 PB 031 PG 113 PB 028 PG 990
BENJAMIN MICHAEL OEHLER DB 12851 PG 619 PB 036 PG 205
JASON ROBERT OEHLER DB 12851 PG 553 PB 036 PG 205
JOSHUA DANIEL OEHLER DB 17660 PG 64 PB 42 PG 37
JAY MACK OEHLER DB 07400 PG 768 PB 028 PG 990
O. THOMPSON JR DB 4441 PG 0757
GOHEEN PROPERTIES, INC DB 1802 PG 530 PB 030 PG 643
CLARENCE ROSS RITCHIE III & YVONNE POOLE RITCHIE DB 10562 PG 257
BM #22 ELEV.=770.51
BM #6 ELEV.=763.68
BY6-20A
BY6-19A
BL-33
BL-34
BL-35
BL-36
SPEC LAT V DITCH W/PSRM SEE DETAIL SV20
PROPOSED SIDEWALK
PROP. 2'-6" C&G
TAPER LAST 10'
TOE PROTECTION SEE DETAIL M34
CL I RIP RAP BANKS ONLY SEE DETAIL M36
PROPOSED GUARDRAIL
GRAU 350
PROPOSED SLOPE STAKE
CL B RIP RAP EST 2 TON EST 7 SY FF
CL B RIP RAP EST 1 TON EST 5 SY FF
CL B RIP RAP EST 5 TONS EST 16 SY FF
DRY DETENTION BASIN OUTLET CONRTROL STRUCTURE SEE SPECIAL DETAIL
4' BASE DITCH W/CL I RIP RAP SEE DETAIL S45
SPECIAL BERM SEE DETAIL M37
REMOVE
SHOULDER BERM GUTTER STA 1440+00 TO 1442+00 -L- LT
PAVED SHLDR.
PROPOSED GUIDERAIL
END TAPER RT +25.00 -L-
BEG. EXPRESSWAY GUTTER STA. +50.00 -L-
BEGIN TAPER RT +25.00 -L-
BEGIN TAPER RT +44.00 -L-
END TAPER RT +44.00 -L-
JB w/MH
24" CSP W/ELBOW
STD. BERM DITCH STA. 1435+35 TO STA. 1438+00 -L- RT
SPECIAL DITCH GRADE FROM STA 1433+50 TO STA 1438+00 -L- RT SEE PROFILE FOR GRADE
SPECIAL DITCH GRADE STA 1444+50 TO STA 1446+50 -L- RT SEE PROFILE FOR GRADE
SEE SHEET 44 FOR -L- PROFILE
SEE SHEET 79 FOR -SERVA- PROFILE
SEE SHEET 65 FOR -Y6- PROFILE
SEE SHEET 2-AA FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_17.DGN
DATE: 4/5/2011 5:15:35 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

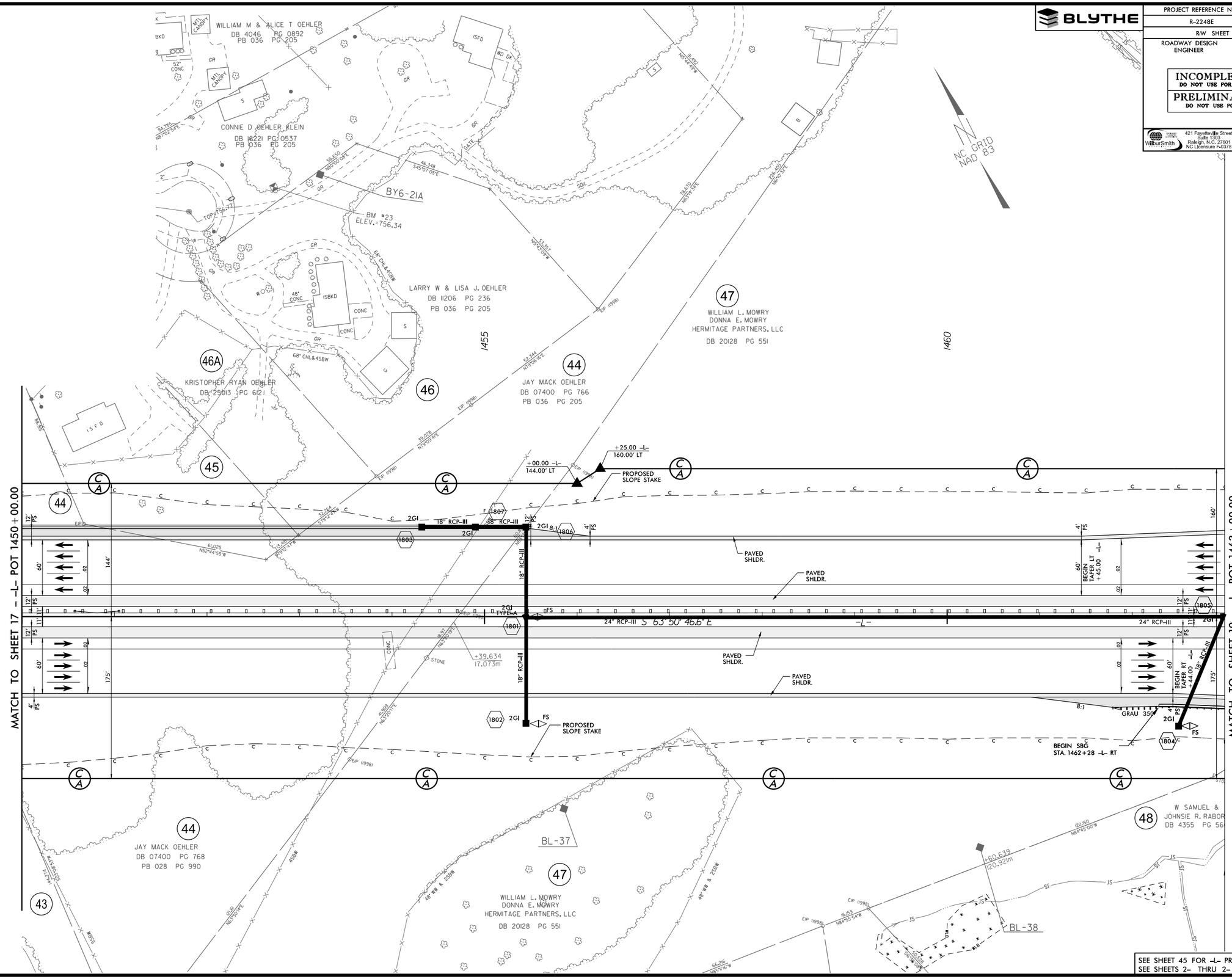
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 45 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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DATE: 4/5/2011 5:16:22 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E R-2248E	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

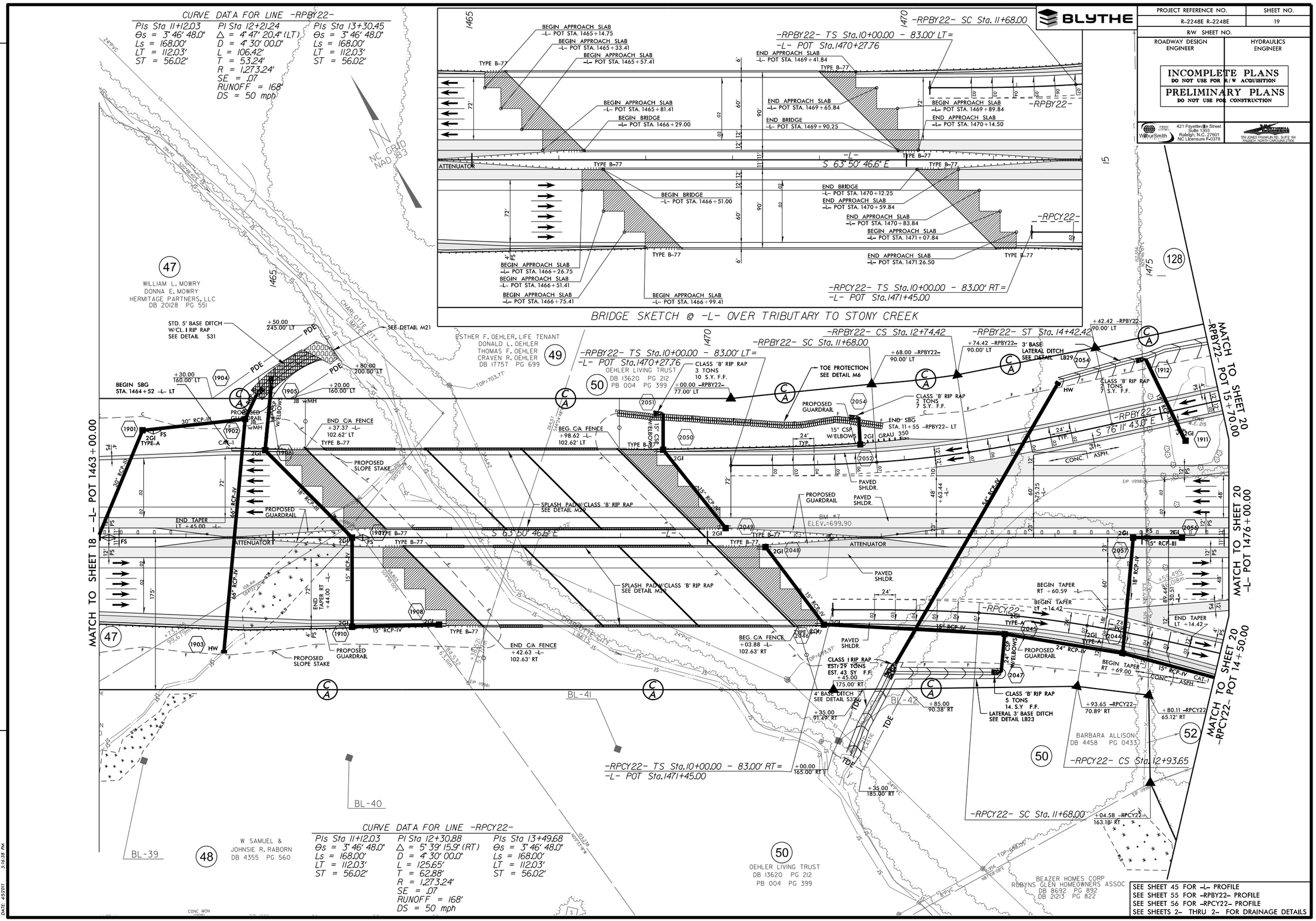
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



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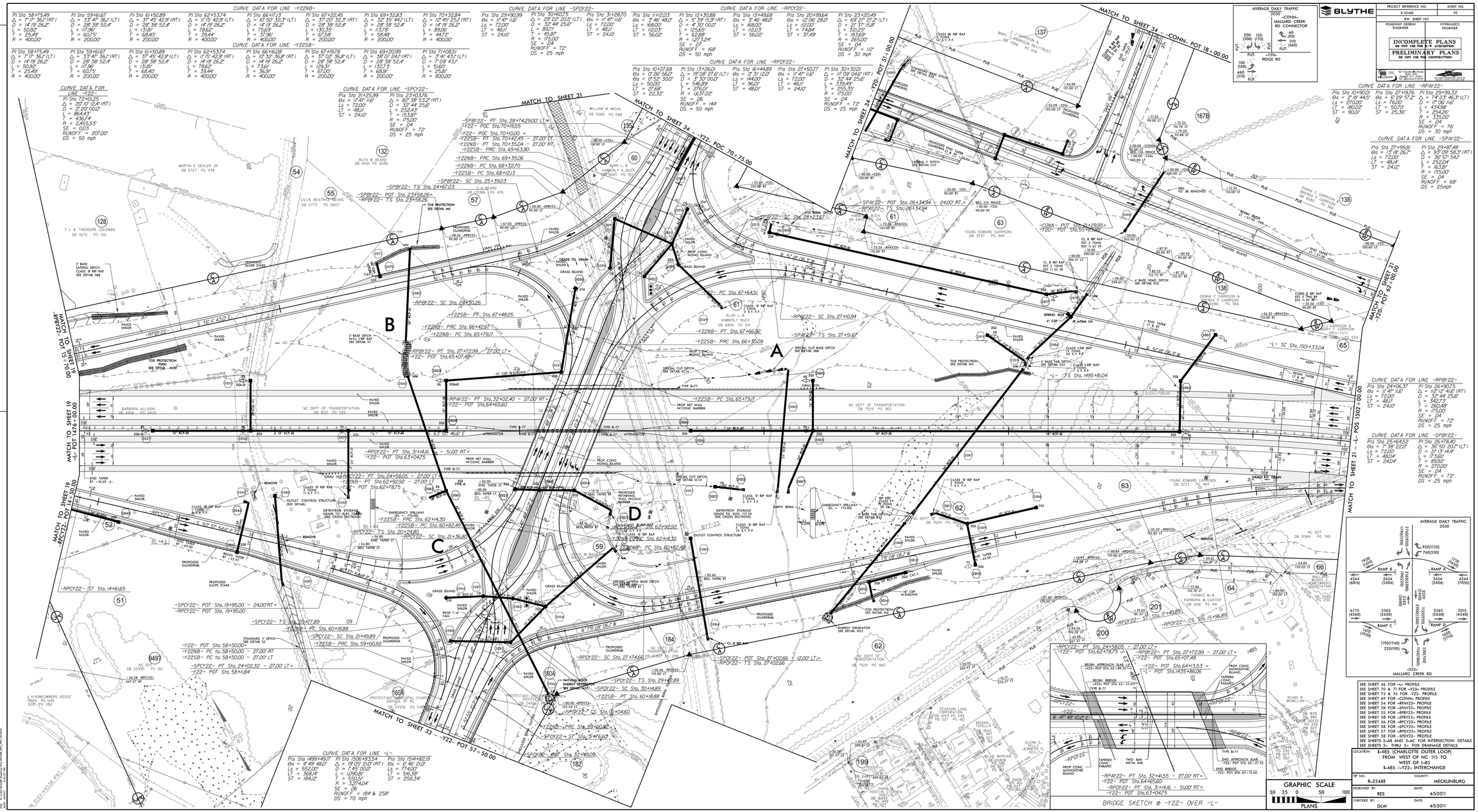
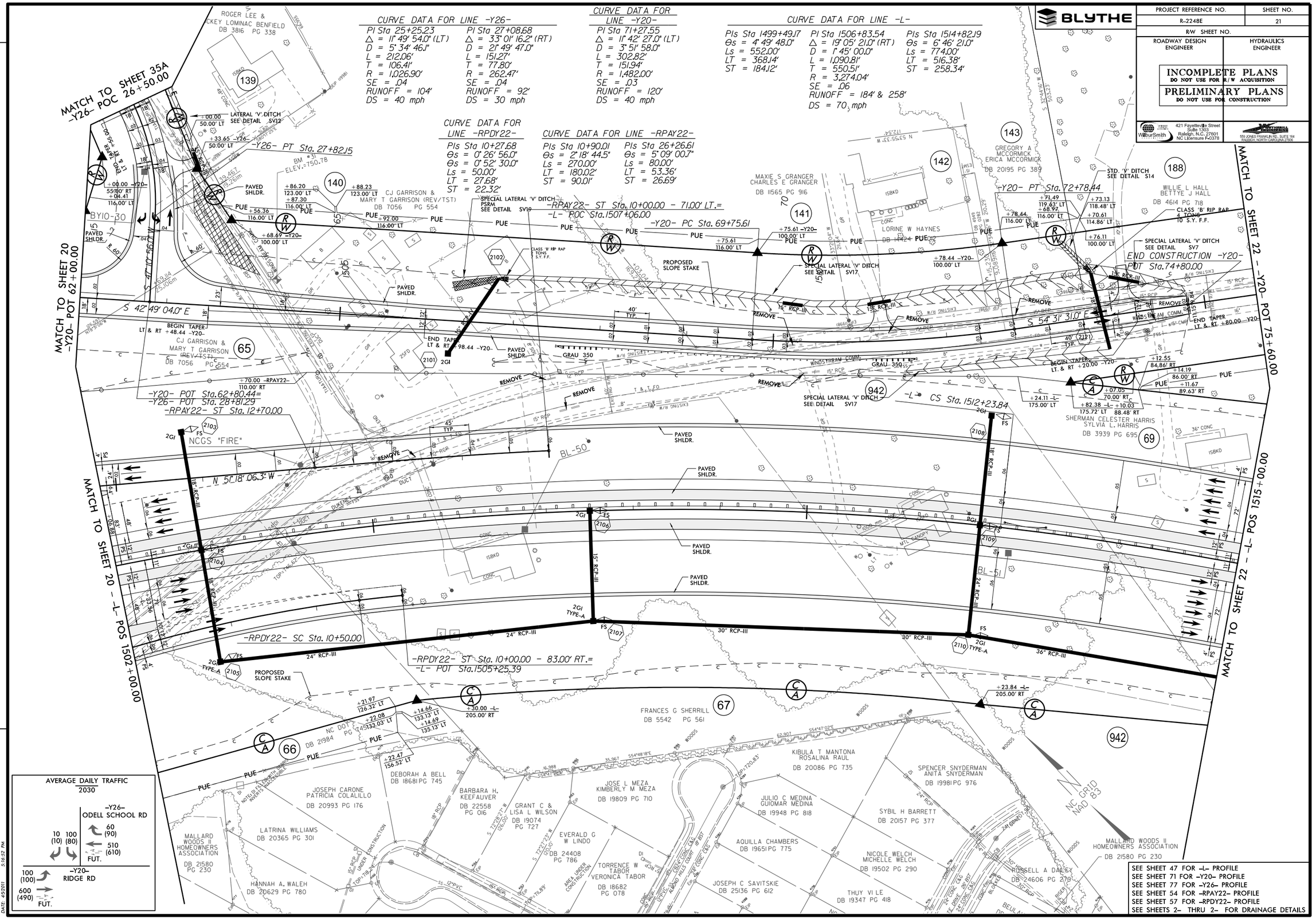

BLYTHE
PROJECT REFERENCE NO.
SHEET NO.
R-2248E
20
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
AVERAGE DAILY TRAFFIC 2030
-CONN- MALLARD CREEK RD CONNECTOR
-Y20- RIDGE RD
MATCH TO SHEET 34 -CONN- POT 18+00.00
MATCH TO SHEET 31
MATCH TO SHEET 34 -Y20- POT 61+00.00
MATCH TO SHEET 21 -Y20- POT 62+00.00
MATCH TO SHEET 19 -L- POT 17+00.00
MATCH TO SHEET 19 -RPCY22- POT 14+50.00
MATCH TO SHEET 21 -L- POS 1502+00.00
MATCH TO SHEET 33 -Y22- POT 57+50.00
CURVE DATA FOR LINE -Y22NB-
CURVE DATA FOR LINE -SPDY22-
CURVE DATA FOR LINE -RPCY22-
CURVE DATA FOR LINE -RPDY22-
CURVE DATA FOR LINE -RPBY22-
CURVE DATA FOR LINE -SPAY22-
CURVE DATA FOR LINE -SPCY22-
CURVE DATA FOR LINE -L-
BRIDGE SKETCH @ -Y22- OVER -L-
GRAPHIC SCALE
PLANS
SEE SHEET 46 FOR -L- PROFILE
SEE SHEET 70 & 71 FOR -Y20- PROFILE
SEE SHEET 73 & 74 FOR -Y22- PROFILE
SEE SHEET 69 FOR -CONN- PROFILE
SEE SHEET 54 FOR -RPAY22- PROFILE
SEE SHEET 58 FOR -SPAY22- PROFILE
SEE SHEET 55 FOR -RPBY22- PROFILE
SEE SHEET 58 FOR -SPBY22- PROFILE
SEE SHEET 56 FOR -RPCY22- PROFILE
SEE SHEET 58 FOR -SPCY22- PROFILE
SEE SHEET 57 FOR -RPDY22- PROFILE
SEE SHEET 58 FOR -SPDY22- PROFILE
SEE SHEETS 2-A/B AND 2-AC FOR INTERSECTION DETAILS
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 I-485 /-Y22- INTERCHANGE
TIP NO.: R-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 4/5/2011
CHECKED BY: DLW
DATE: 4/5/2011


BLYTHE
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
21
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
WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606
CURVE DATA FOR LINE -Y26-
PI Sta 25+25.23
Δ = 11° 49' 54.0" (LT)
D = 5° 34' 46.1"
L = 212.06'
T = 106.41'
R = 1,026.90'
SE = .04
RUNOFF = 104'
DS = 40 mph
PI Sta 27+08.68
Δ = 33° 01' 16.2" (RT)
D = 21° 49' 47.0"
L = 151.27'
T = 77.80'
R = 262.47'
SE = .04
RUNOFF = 92'
DS = 30 mph
CURVE DATA FOR LINE -Y20-
PI Sta 71+27.55
Δ = 11° 42' 27.0" (LT)
D = 3° 51' 58.0"
L = 302.82'
T = 151.94'
R = 1,482.00'
SE = .03
RUNOFF = 120'
DS = 40 mph
CURVE DATA FOR LINE -L-
PIs Sta 1499+49.17
Θs = 4° 49' 48.0"
Ls = 552.00'
LT = 368.14'
ST = 184.12'
PIs Sta 1506+83.54
Δ = 19° 05' 21.0" (RT)
D = 1° 45' 00.0"
L = 1,090.81'
T = 550.51'
R = 3,274.04'
SE = .06
RUNOFF = 184' & 258'
DS = 70 mph
PIs Sta 1514+82.19
Θs = 6° 46' 21.0"
Ls = 774.00'
LT = 516.38'
ST = 258.34'
CURVE DATA FOR LINE -RPDY22-
PIs Sta 10+27.68
Θs = 0° 26' 56.0"
Θs = 0° 52' 30.0"
Ls = 50.00'
LT = 27.68'
ST = 22.32'
CURVE DATA FOR LINE -RPAY22-
PIs Sta 10+90.01
Θs = 2° 18' 44.5"
Ls = 270.00'
LT = 180.02'
ST = 90.01'
PIs Sta 26+26.61
Θs = 5° 09' 00.7"
Ls = 80.00'
LT = 53.36'
ST = 26.69'
MATCH TO SHEET 35A -Y26- POC 26+50.00
MATCH TO SHEET 20 -Y20- POT 62+00.00
MATCH TO SHEET 22 -Y20- POT 75+60.00
MATCH TO SHEET 20 -L- POS 1502+00.00
MATCH TO SHEET 22 -L- POS 1515+00.00
-Y26- PT Sta. 27+82.15
-Y20- PT Sta. 72+78.44
-Y20- PC Sta. 69+75.61
-L- POC Sta.1507+06.00
-RPAY22- ST Sta. 10+00.00 - 71.00' LT.=
END CONSTRUCTION -Y20-
POT Sta.74+80.00
-Y20- POT Sta.62+80.44=
-Y26- POT Sta. 28+81.29
-RPAY22- ST Sta. 12+70.00
-L- CS Sta. 1512+23.84
-RPDY22- SC Sta. 10+50.00
-RPDY22- ST Sta. 10+00.00 - 83.00' RT.=
-L- POT Sta.1505+25.39
S 42° 49' 04.0" E
S 54° 31' 31.0" E
N 51° 18' 06.3" W
NCGS "FIRE"
BL-50
BL-51
ROGER LEE & CKEY LOMINAC BENFIELD DB 3816 PG 338
CJ GARRISON & MARY T GARRISON (REV/TST) DB 7056 PG 554
MAXIE S GRANGER CHARLES E GRANGER DB 11565 PG 916
LORINE W HAYNES DB 14424
GREGORY A MCCORMICK ERICA MCCORMICK DB 20195 PG 389
WILLIE L HALL BETTYE J HALL DB 4614 PG 718
SHERMAN CELESTER HARRIS SYLVIA L. HARRIS DB 3939 PG 695
FRANCES G SHERRILL DB 5542 PG 561
NC DOT PG 745 DB 21984
JOSEPH CARONE PATRICIA COLALILLO DB 20993 PG 176
DEBORAH A BELL DB 18681 PG 745
BARBARA H. KEEFAUVER DB 22558 PG 016
GRANT C & LISA L WILSON DB 19074 PG 727
JOSE L MEZA KIMBERLY M MEZA DB 19809 PG 710
KIBULA T MANTONA ROSALINA RAUL DB 20086 PG 735
SPENCER SNYDERMAN ANITA SNYDERMAN DB 19981 PG 976
JULIO C MEDINA GUIOMAR MEDINA DB 19948 PG 818
SYBIL H BARRETT DB 20157 PG 377
MALLARD WOODS II HOMEOWNERS ASSOCIATION DB 21580 PG 230
LATRINA WILLIAMS DB 20365 PG 301
EVERALD G W LINDO DB 24408 PG 786
TORRENCE W TABOR VERONICA TABOR DB 18682 PG 078
AQUILLA CHAMBERS DB 19651 PG 775
NICOLE WELCH MICHELLE WELCH DB 19502 PG 290
HANNAH A. WALEH DB 20629 PG 780
JOSEPH C SAVITSKIE DB 25136 PG 612
THUY VI LE DB 19347 PG 418
RUSSELL A DALEY DB 24606 PG 279
NC GRID NAD 83
AVERAGE DAILY TRAFFIC
2030
-Y26- ODELL SCHOOL RD
60 (90)
510 (610)
10 (10)
100 (80)
FUT.
-Y20- RIDGE RD
100 (100)
600 (490)
FUT.
SEE SHEET 47 FOR -L- PROFILE
SEE SHEET 71 FOR -Y20- PROFILE
SEE SHEET 77 FOR -Y26- PROFILE
SEE SHEET 54 FOR -RPAY22- PROFILE
SEE SHEET 57 FOR -RPDY22- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS
REVISIONS
FILE: R:\rcdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_21.DGN
DATE: 4/5/2011 5:16:52 PM

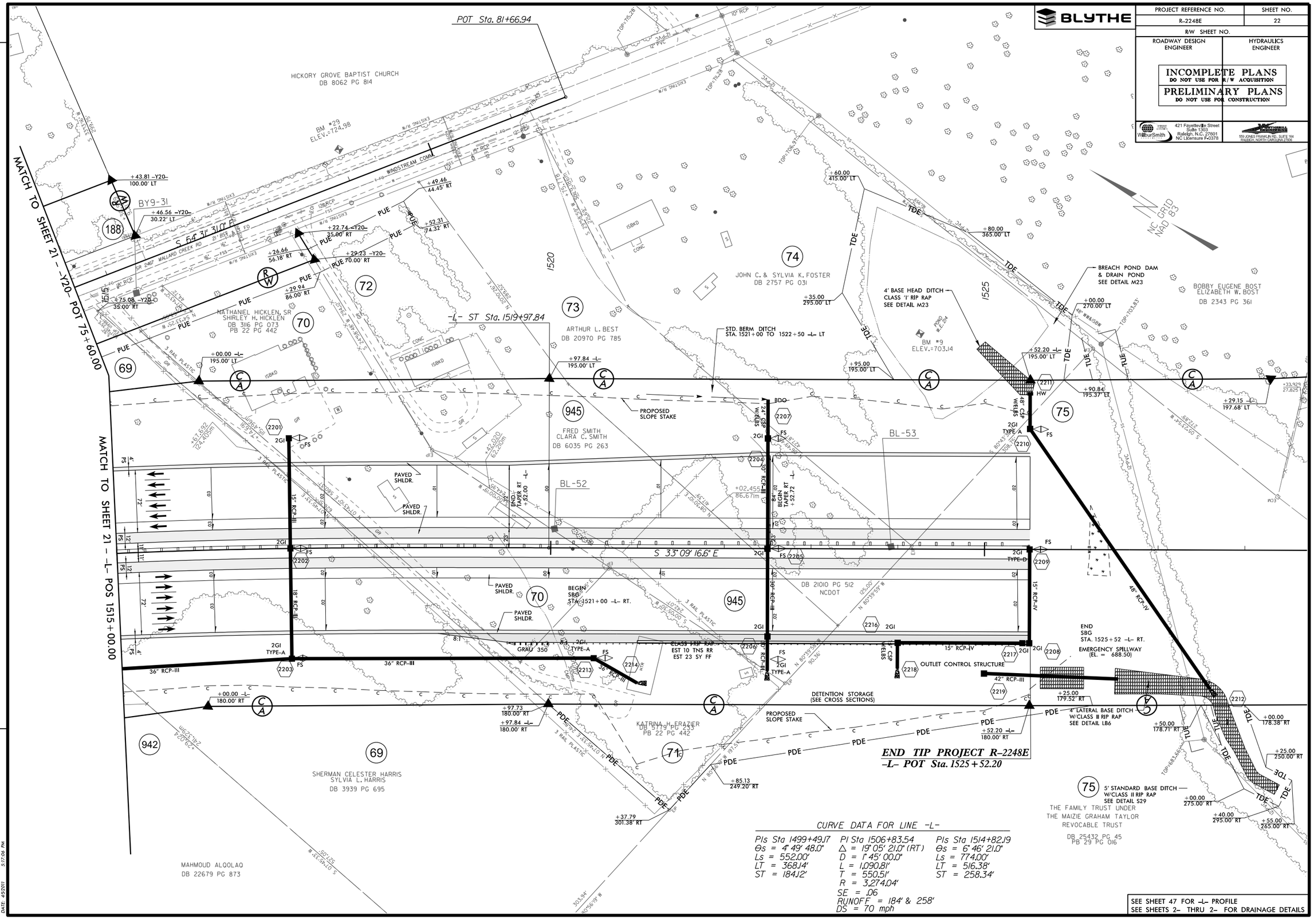
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



CURVE DATA FOR LINE -L-

PIs Sta 1499+49.17	PI Sta 1506+83.54	PIs Sta 1514+82.19
Θs = 4° 49' 48.0"	Δ = 19° 05' 21.0" (RT)	Θs = 6° 46' 21.0"
Ls = 552.00'	D = 1° 45' 00.0"	Ls = 774.00'
LT = 368.14'	L = 1,090.81'	LT = 516.38'
ST = 184.12'	T = 550.51'	ST = 258.34'
	R = 3,274.04'	
	SE = .06	
	RUNOFF = 184' & 258'	
	DS = 70 mph	

SEE SHEET 47 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_22.DGN
DATE: 4/5/2011 5:17:06 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

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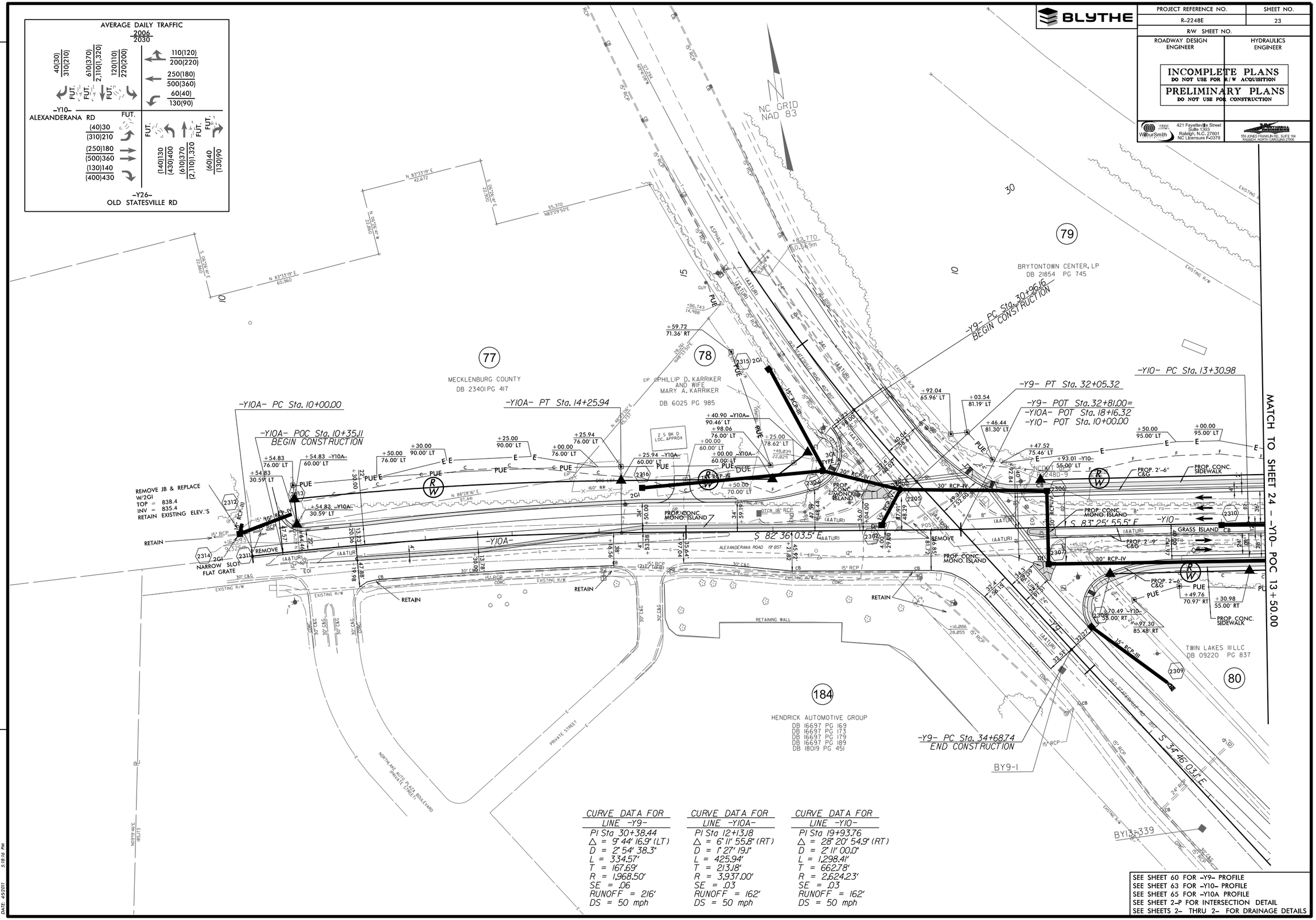
REVISIONS



CURVE DATA FOR LINE -Y9-	CURVE DATA FOR LINE -Y10A-	CURVE DATA FOR LINE -Y10-
PI Sta 30+38.44	PI Sta 12+13.18	PI Sta 19+93.76
Δ = 9° 44' 16.9" (LT)	Δ = 6° 11' 55.8" (RT)	Δ = 28° 20' 54.9" (RT)
D = 2° 54' 38.3"	D = 1° 27' 19.1"	D = 2° 11' 00.0"
L = 334.57'	L = 425.94'	L = 1,298.41'
T = 167.69'	T = 213.18'	T = 662.78'
R = 1,968.50'	R = 3,937.00'	R = 2,624.23'
SE = .06	SE = .03	SE = .03
RUNOFF = 216'	RUNOFF = 162'	RUNOFF = 162'
DS = 50 mph	DS = 50 mph	DS = 50 mph

SEE SHEET 60 FOR -Y9- PROFILE
SEE SHEET 63 FOR -Y10- PROFILE
SEE SHEET 65 FOR -Y10A PROFILE
SEE SHEET 2-P FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\indot\R2248E\Roadway\Prop\R2248E_RDY_PSH_23.DGN
DATE: 4/5/2011 5:18:16 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	24
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

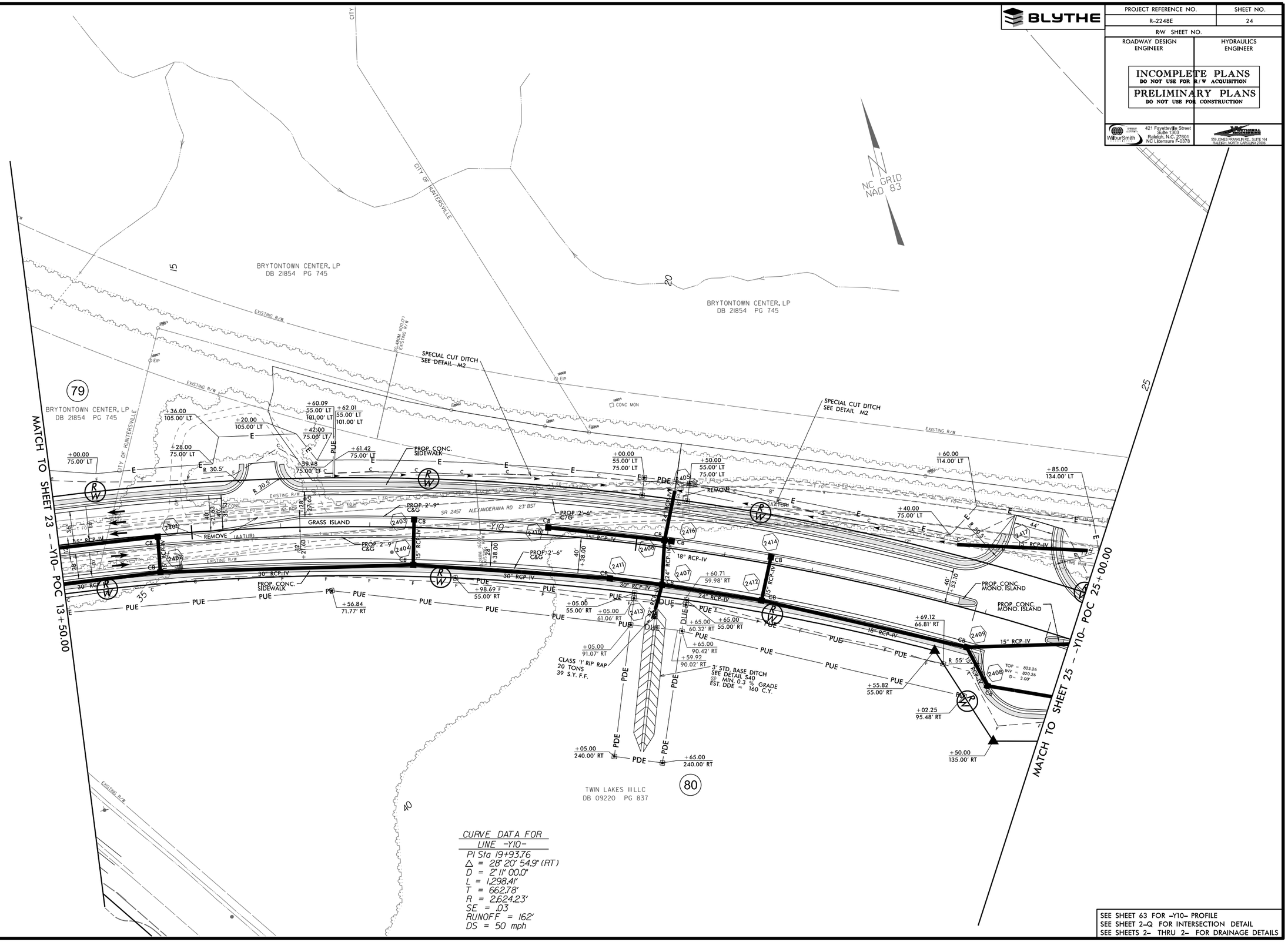
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 63 FOR –Y10– PROFILE
SEE SHEET 2-Q FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\rcobb\R2248E\Roadway\Proj\R2248E_RDY_PSH_24.DGN
DATE: 4/5/2011 5:18:32 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	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

BLYTHE

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

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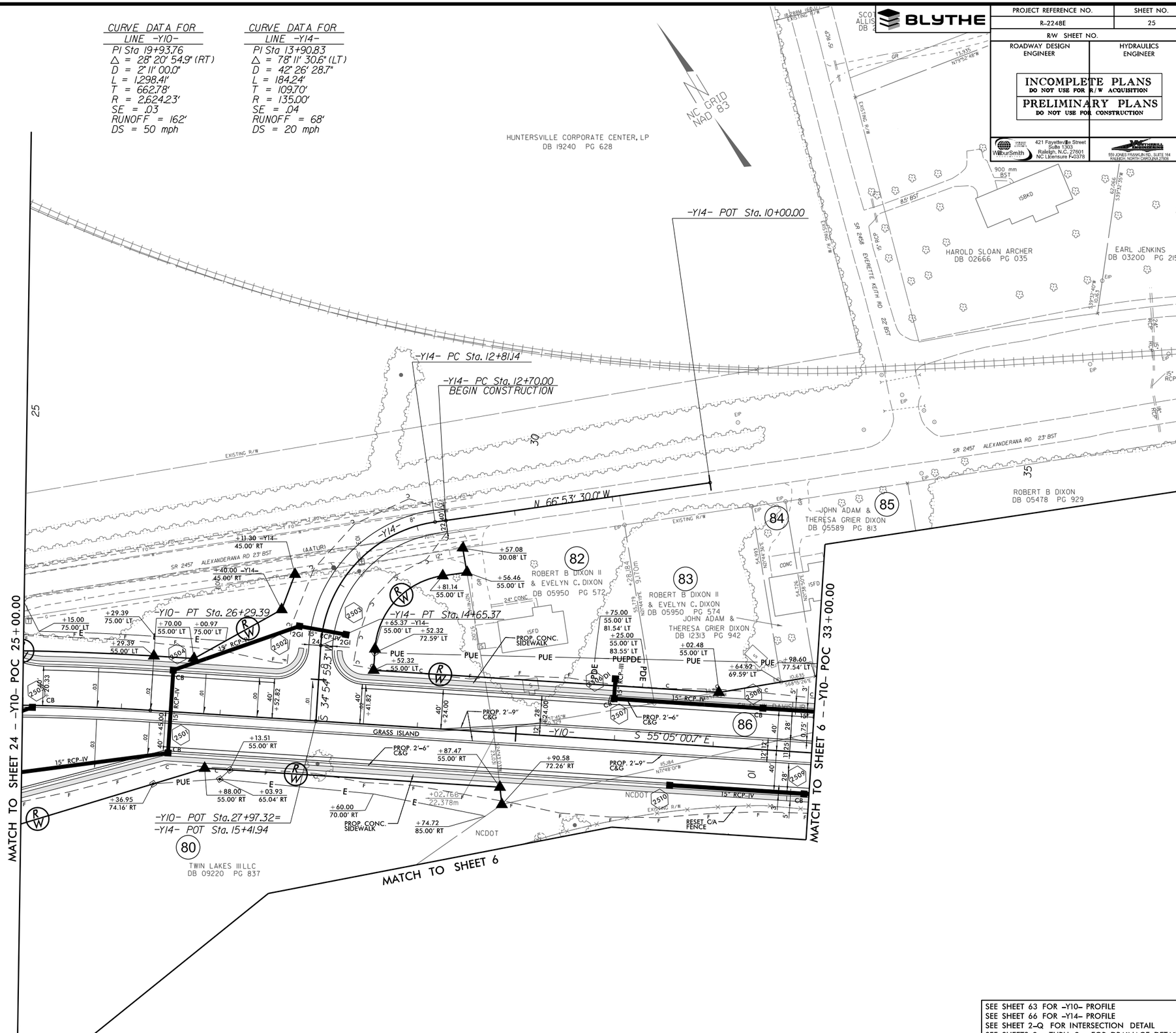
REVISIONS

CURVE DATA FOR LINE -Y10-
PI Sta 19+93.76
Δ = 28° 20' 54.9" (RT)
D = 2° 11' 00.0"
L = 1,298.41'
T = 662.78'
R = 2,624.23'
SE = .03
RUNOFF = 162'
DS = 50 mph

CURVE DATA FOR LINE -Y14-
PI Sta 13+90.83
Δ = 78° 11' 30.6" (LT)
D = 42° 26' 28.7"
L = 184.24'
T = 109.70'
R = 135.00'
SE = .04
RUNOFF = 68'
DS = 20 mph



SEE SHEET 63 FOR -Y10- PROFILE
SEE SHEET 66 FOR -Y14- PROFILE
SEE SHEET 2-Q FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\ncdot\R2248E\Roadway\Prop\R2248E_RDY_PSH_25.DGN
DATE: 4/5/2011 5:18:44 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	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

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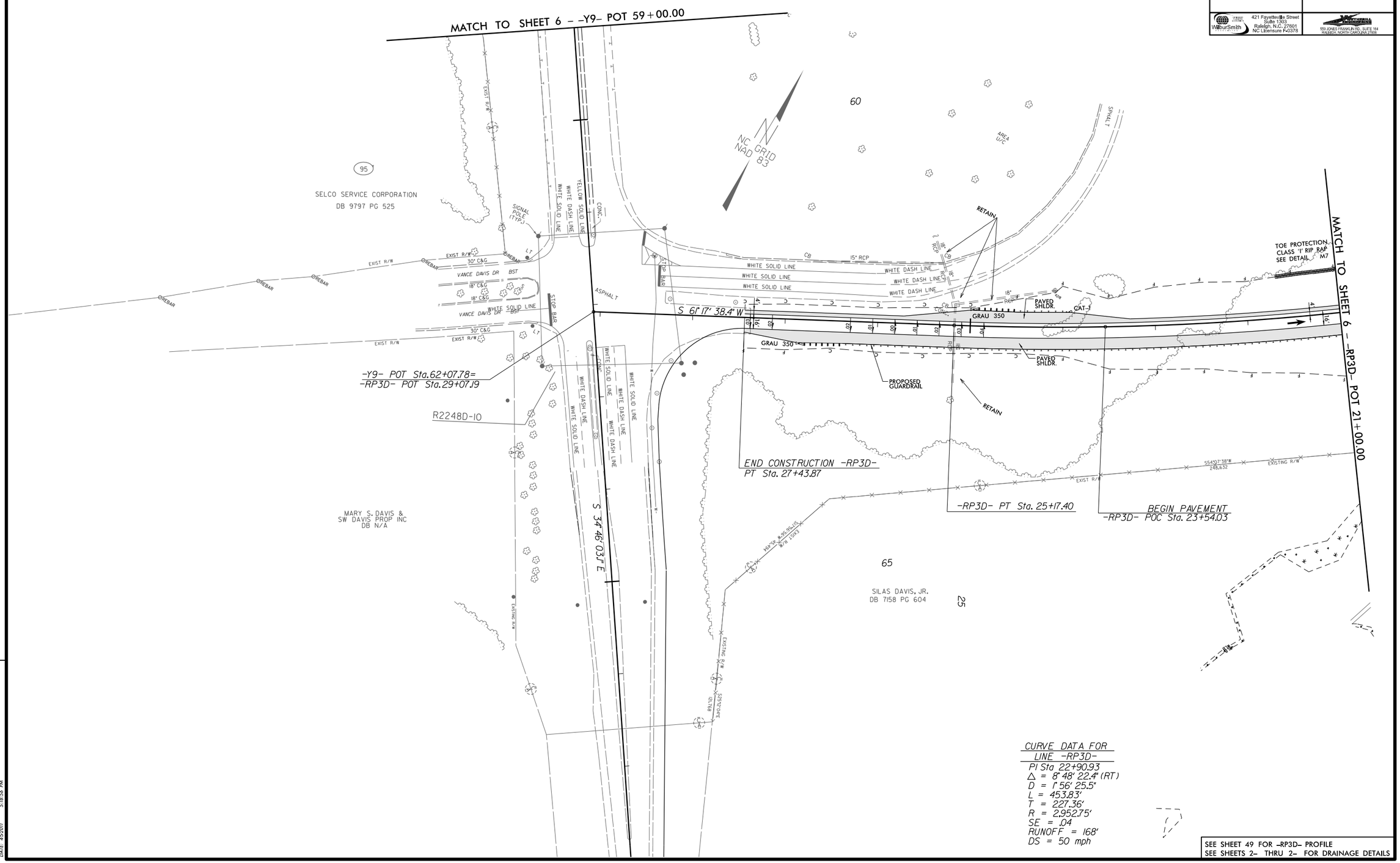
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



CURVE DATA FOR
LINE -RP3D-

PI Sta 22+90.93
△ = 8° 48' 22.4" (RT)
D = 1° 56' 25.5"
L = 453.83'
T = 227.36'
R = 2,952.75'
SE = .04
RUNOFF = 168'
DS = 50 mph

SEE SHEET 49 FOR -RP3D- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\radar\R2248E\Roadway\Proj\R2248E_RDY_PSH_26.DGN
DATE: 4/5/2011 5:18:56 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	27
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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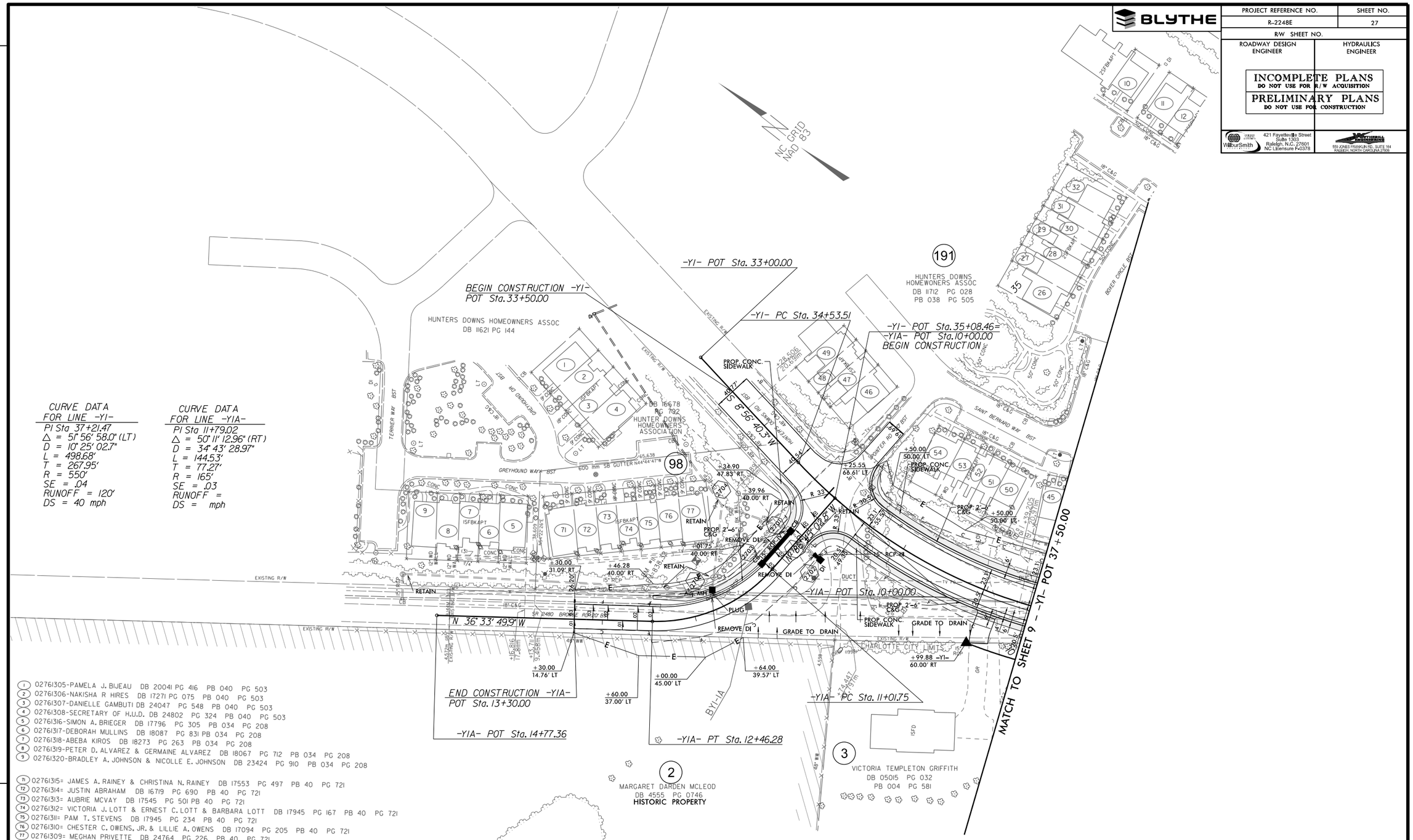
REVISIONS



CURVE DATA
FOR LINE -Y1-
PI Sta 37+21.47
△ = 51° 56' 58.0" (LT)
D = 10° 25' 02.7"
L = 498.68'
T = 267.95'
R = 550'
SE = .04
RUNOFF = 120'
DS = 40 mph

CURVE DATA
FOR LINE -Y1A-
PI Sta 11+79.02
△ = 50° 11' 12.96" (RT)
D = 34° 43' 28.97"
L = 144.53'
T = 77.27'
R = 165'
SE = .03
RUNOFF =
DS = mph

(1) 02761305-PAMELA J. BIJEAU DB 20041 PG 416 PB 040 PG 503
(2) 02761306-NAKISHA R HIRES DB 17271 PG 075 PB 040 PG 503
(3) 02761307-DANIELLE GAMBUTI DB 24047 PG 548 PB 040 PG 503
(4) 02761308-SECRETARY OF H.U.D. DB 24802 PG 324 PB 040 PG 503
(5) 02761316-SIMON A. BRIEGER DB 17796 PG 305 PB 034 PG 208
(6) 02761317-DEBORAH MULLINS DB 18087 PG 831 PB 034 PG 208
(7) 02761318-ABEBA KIROS DB 18273 PG 263 PB 034 PG 208
(8) 02761319-PETER D. ALVAREZ & GERMAINE ALVAREZ DB 18067 PG 712 PB 034 PG 208
(9) 02761320-BRADLEY A. JOHNSON & NICOLLE E. JOHNSON DB 23424 PG 910 PB 034 PG 208

(71) 02761315= JAMES A. RAINEY & CHRISTINA N. RAINEY DB 17553 PG 497 PB 40 PG 721
(72) 02761314= JUSTIN ABRAHAM DB 16719 PG 690 PB 40 PG 721
(73) 02761313= AUBRIE MCVAY DB 17545 PG 501 PB 40 PG 721
(74) 02761312= VICTORIA J. LOTT & ERNEST C. LOTT & BARBARA LOTT DB 17945 PG 167 PB 40 PG 721
(75) 02761311= PAM T. STEVENS DB 17945 PG 234 PB 40 PG 721
(76) 02761310= CHESTER C. OWENS, JR. & LILLIE A. OWENS DB 17094 PG 205 PB 40 PG 721
(77) 02761309= MEGHAN PRIVETTE DB 24764 PG 226 PB 40 PG 721

(41) 02761484= RICHARD FORD JR DB 15955 PG 299 PB 035 PG 453
(42) 02761485= LINDSEY M. HARGETT DB 22875 PG 982 PB 035 PG 453
(43) 02761486= THERESA J PSQUALE DB 13035 PG 567 PB 035 PG 453
(44) 02761487= MISTY D MARTIN DB 15597 PG 018 PB 035 PG 453
(45) 02761488= SARA L CHRISTIANSEN DB 12478 PG 274 PB 035 PG 453
(46) 02761489= VENECIA D. ROCK DB 20237 PG 375 PB 034 PG 212
(47) 02761490= KATHRYN W MOODY DB 12664 PG 033 PB 034 PG 212
(48) 02761491= MICHAEL D WARFEL DB 11712 PG 033 PB 034 PG 212
(49) 02761492= SUSAN A TUCKER DB 11745 PG 923 PB 034 PG 212
(50) 02761494= ELIZABETH D DIMAIO DB 12368 PG 112 PB 034 PG 677
(51) 02761495= DONNA J HADLEY DB 12059 PG 101 PB 034 PG 677
(52) 02761496= PATTERSON LAURORE DB 19749 PG 329 PB 034 PG 677
(53) 02761497= SECRETARY OF H.U.D. DB 25139 PG 261 PB 034 PG 677
(54) 02761498= GABRIEL MEDINA DB 12294 PG 061 PB 034 PG 677

FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_27.DGN
DATE: 4/5/2011 5:19:07 PM

SEE SHEET 61 FOR -Y1- PROFILE
SEE SHEET 61 FOR -Y1A- PROFILE
SEE SHEET 2-R FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	28
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS

NC GRID NAD 83

BARBARA A. H. REITZEL
DB 23654 PG 542
PB 003 PG 551

THE GULLEDGE FAMILY, LLC
DB 11049 PG 0572

MARK OIL COMPANY INC
DB 8919 PG 0555

PACOLET MILLIKEN ENTERPRISES, INC.
DB 25879 PG 615
PB 028 PG 102

FIRST CITIZENS BANK & TRUST CO.
DB 18238 PG 868

DANIEL VARTABEDIAN
DB 21749 PG 854

N. RUTH TESH
DB 7132 PG 534

JUDY R. EASON
DB 12670 PG 127
PB 039 PG 980

SUPERTEK BODY & PAINT INC
DB 15405 PG 800
PB 038 PG 081

ALDI (NC) LLC
DB 15721 PG 786
PB 039 PG 980

JUDY REITZEL EASON
DB 806 PG 561

JIMMIE R REITZEL
DB 16264 PG 882
PB 039 PG 308

HIGHLAND CREEK RETAIL, LLC
DB 8615 PG 403

BM #12
ELEV.=818.74

S 6° 44' 37.2" E

N 83° 15' 22.8" E

S 67° 38' 20.9" E

BEGIN CONSTRUCTION -Y17-
POT Sta. 46+50.00

-Y17- POT Sta. 53+14.27=
-DRIVE Y17-
POT Sta. 10+00.00

-Y17- PC Sta. 53+48.65

END CONSTRUCTION
-DRIVE Y17-
PT Sta. 11+32.00

-DRIVE Y17-
PT Sta. 10+94.54

-DRIVE Y17-
POT Sta. 12+83.08

-DRIVE Y17-
PC Sta. 10+10.72

MATCH TO SHEET 13 - -Y17- POT 56+50.00

R2248E-I5

PROPOSED SIDEWALK

PROP. 2'-6" C&G

BY2-5A

BY2-6A

111A 111B 108 109 110 111

CURVE DATA FOR
LINE -DRIVE Y17-
PI Sta 10+53.56
Δ = 29° 06' 16.3" (RT)
D = 3°41' 43' 29.0"
L = 83.82'
T = 42.83'
R = 165'

CURVE DATA FOR
LINE -Y17-
PI Sta 57+00.61
Δ = 10° 03' 24.6" (RT)
D = 1° 25' 56.6'
L = 702.10'
T = 351.95'
R = 4,000.00'
SE = .03
RUNOFF = 84'
DS = 50 mph

SEE SHEET 67 FOR -Y17- PROFILE
SEE SHEET 50 FOR -DRIVE Y17- PROFILE
SEE SHEET 2-Z FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\indot\R2248E\Roadway\Prod\R2248E_RDY_PSH_28.DGN
DATE: 4/5/2011 5:19:24 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	29
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

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

BLYTHE

MATCH TO SHEET 13 - -Y17- POT 68+40.00

MATCH TO SHEET 30 - -Y4- POT 38+40.00

CURVE DATA FOR LINE -Y17-

PI Sta 73+56.79
△ = 28° 45' 46.9" (LT)
D = 6° 56' 41.8"
L = 414.16'
T = 211.54'
R = 825.00'
SE = .04
RUNOFF = 164'
DS = 45 mph

PI Sta 79+94.97
△ = 66° 53' 08.9" (RT)
D = 11° 27' 33.0"
L = 583.69'
T = 330.23'
R = 500.00'

CURVE DATA FOR LINE -Y4-

PI Sta 37+04.44
△ = 30° 27' 06.8" (RT)
D = 8° 07' 00.0"
L = 375.18'
T = 192.13'
R = 705.90'
SE = .04
RUNOFF = 104'
DS = 40 mph

-Y4- PC Sta. 35+12.31

-Y4- POT Sta. 33+00.00

BEGIN CONSTRUCTION -Y4-
POT Sta. 33+79.00

-Y17- PC Sta. 71+45.25

END CONSTRUCTION -Y17-
POC Sta. 73+00.00

-Y17- PT Sta. 75+59.41

-Y17- PC Sta. 76+64.74

S 05° 26' 59.5" E

N 66° 21' 44.3" E

NC GRID NAD 83

REVISIONS

FILE: R:\indot\R2248E\Roadway\Prelim\R2248E_RDY_PSH_29.DGN
DATE: 4/5/2011 5:19:39 PM

SEE SHEET 62 FOR -Y4- PROFILE
SEE SHEET 68 FOR -Y17- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	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

BLYTHE

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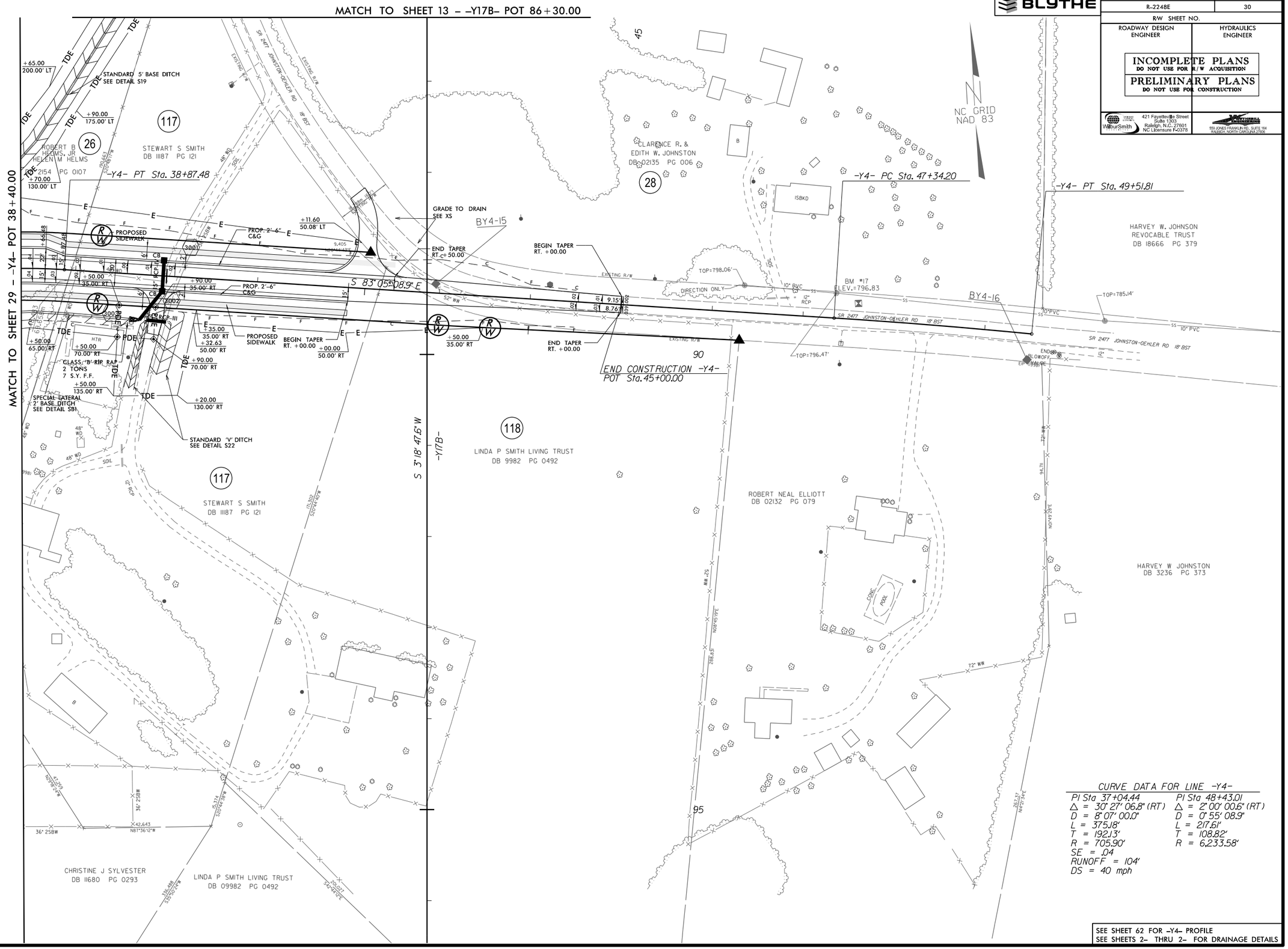

CURVE DATA FOR LINE –Y4–

PI Sta 37+04.44	PI Sta 48+43.01
Δ = 30° 27' 06.8" (RT)	Δ = 2° 00' 00.6" (RT)
D = 8° 07' 00.0"	D = 0° 55' 08.9"
L = 375.18'	L = 217.61'
T = 192.13'	T = 108.82'
R = 705.90'	R = 6,233.58'
SE = .04	
RUNOFF = 104'	
DS = 40 mph	

SEE SHEET 62 FOR –Y4– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\radar\R2248E\Roadway\Proj\R2248E_RDY_PSH_30.DGN
DATE: 4/5/2011 5:19:58 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	31
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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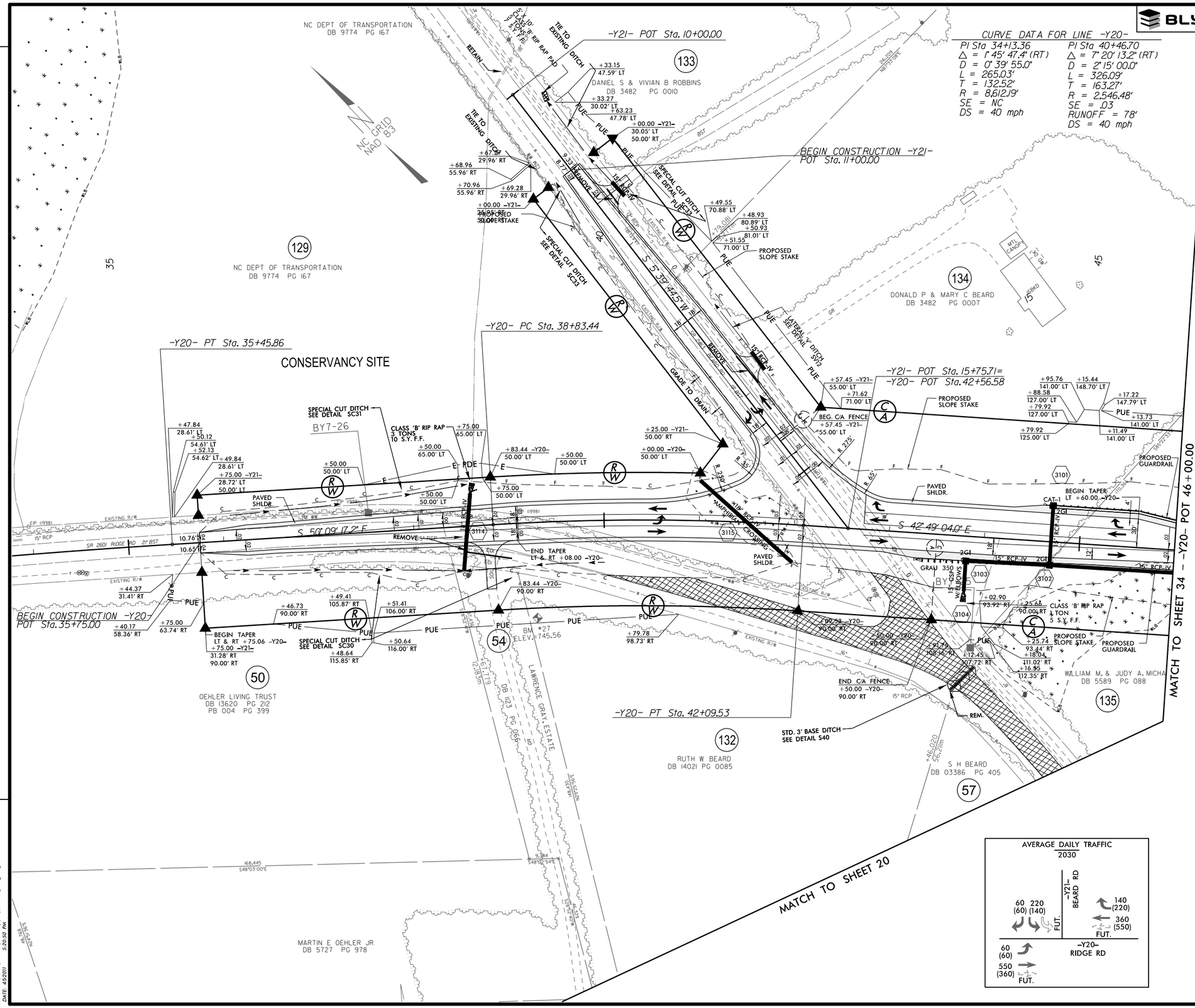
MUNICIPAL ENGINEERS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS

CURVE DATA FOR LINE -Y20-

PI Sta 34+13.36	PI Sta 40+46.70
Δ = 1° 45' 47.4" (RT)	Δ = 1° 20' 13.2" (RT)
D = 0° 39' 55.0"	D = 2° 15' 00.0"
L = 265.03'	L = 326.09'
T = 132.52'	T = 163.27'
R = 8,612.19'	R = 2,546.48'
SE = NC	SE = .03
DS = 40 mph	RUNOFF = 78'
	DS = 40 mph



SEE SHEET 70 FOR -Y20- PROFILE
SEE SHEET 72 FOR -Y21- PROFILE
SEE SHEET 2-AG FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\roadw\R2248E\Roadway\Proj\R2248E_RDY_PSH_31.DGN
DATE: 4/5/2011 5:20:50 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	32
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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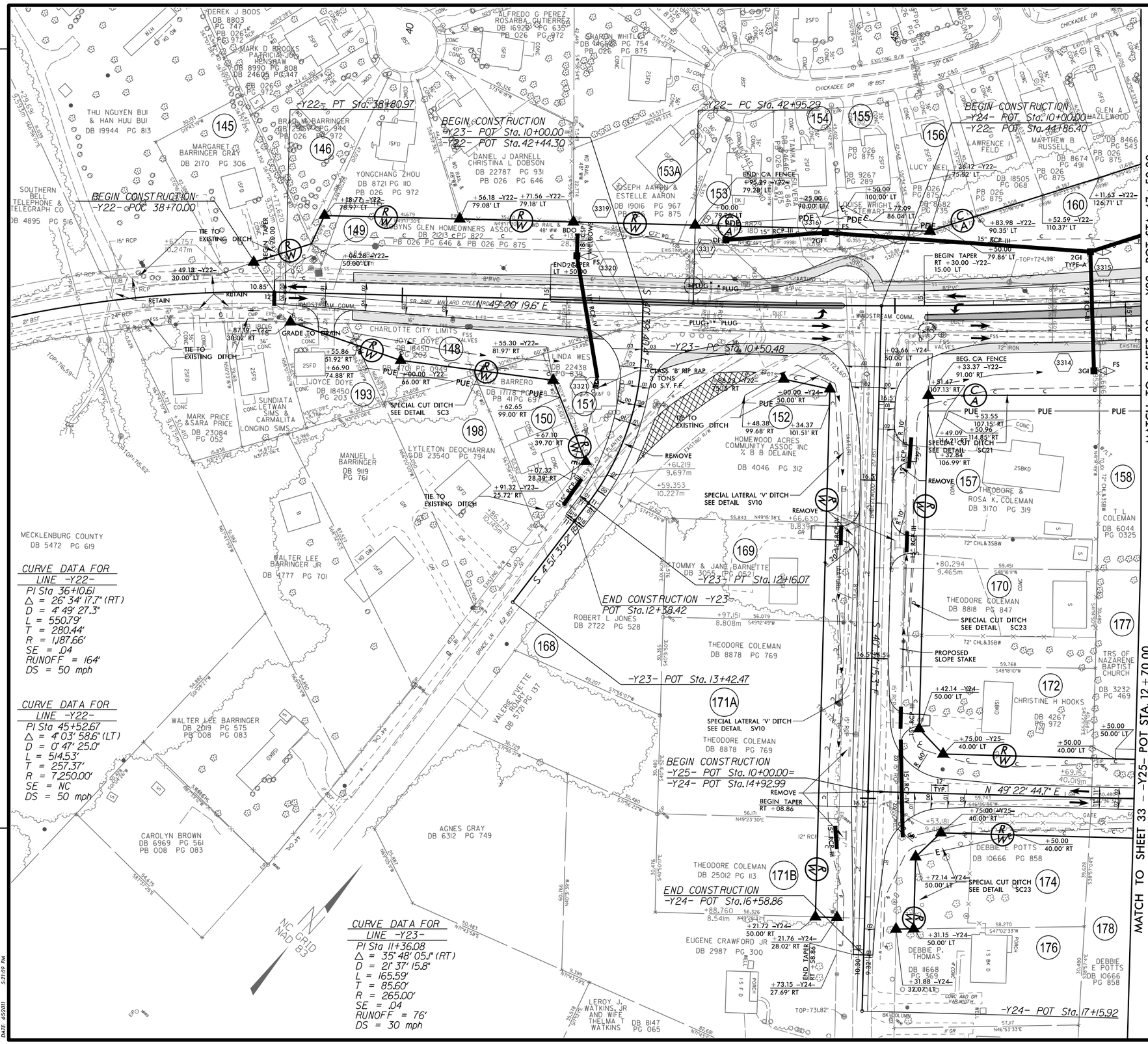
KIMLEY-HORN — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS



CURVE DATA FOR LINE -Y22-
PI Sta 36+10.61
Δ = 26° 34' 17.7" (RT)
D = 4° 49' 27.3"
L = 550.79'
T = 280.44'
R = 1,187.66'
SE = .04
RUNOFF = 164'
DS = 50 mph

CURVE DATA FOR LINE -Y22-
PI Sta 45+52.67
Δ = 4° 03' 58.6" (LT)
D = 0° 47' 25.0"
L = 514.53'
T = 257.37'
R = 7,250.00'
SE = NC
DS = 50 mph

CURVE DATA FOR LINE -Y23-
PI Sta 11+36.08
Δ = 35° 48' 05.1" (RT)
D = 21° 37' 15.8"
L = 165.59'
T = 85.60'
R = 265.00'
SE = .04
RUNOFF = 76'
DS = 30 mph

SEE SHEET 73 FOR -Y22- PROFILE
SEE SHEET 72 FOR -Y23- PROFILE
SEE SHEET 72 FOR -Y24- PROFILE
SEE SHEET 75 FOR -Y25- PROFILE
SEE SHEET 2-AD AND 2-AF FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

FILE: R:\rcdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_32.DGN
DATE: 4/5/2011 5:21:09 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

BLYTHE — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

REVISIONS

MATCH TO SHEET 32 – –Y22– POT STA. 47+50.00

MATCH TO SHEET 20– –Y22– POT 57+50.00

MATCH TO SHEET 32 – –Y25– POT STA. 12+70.00

–Y22– PT Sta. 51+30.00

–Y22– PRC Sta. 48+09.82

–Y25– PC Sta. 13+33.61

–Y25– PRC Sta. 15+69.84

–Y25– PT Sta. 20+13.22

–Y25– POT Sta. 24+42.07

END CONSTRUCTION –Y25–
POT Sta. 23+50.00

N 47° 48' 10.2" E

R-2248E-19

CHARLOTTE CITY LIMITS

CURVE DATA FOR LINE –Y25–

PI Sta 14+70.42	PI Sta 18+47.21
Δ = 49° 43' 10.9" (LT)	Δ = 82° 09' 11.5" (RT)
D = 19° 24' 15.2"	D = 19° 24' 15.2"
L = 256.23'	L = 423.38'
T = 136.81'	T = 257.37'
R = 295.27'	R = 295.27'
SE = .04	SE = .04
RUNOFF = 68'	RUNOFF = 68'
DS = 30 mph	DS = 30 mph

BRIDGE SKETCH @ –Y22– OVER TRIBUTARY TO STONY CREEK

SEE SHEET 73 FOR –Y22– PROFILE
SEE SHEET 75 FOR –Y25– PROFILE
SEE SHEETS 2– THRU 2– FOR DRAINAGE DETAILS

FILE: R:\roofs\R2248E\Roadway\Prod\R2248E_RDY_PSH_33.DGN
DATE: 4/5/2011 5:21:24 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	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

BLYTHE

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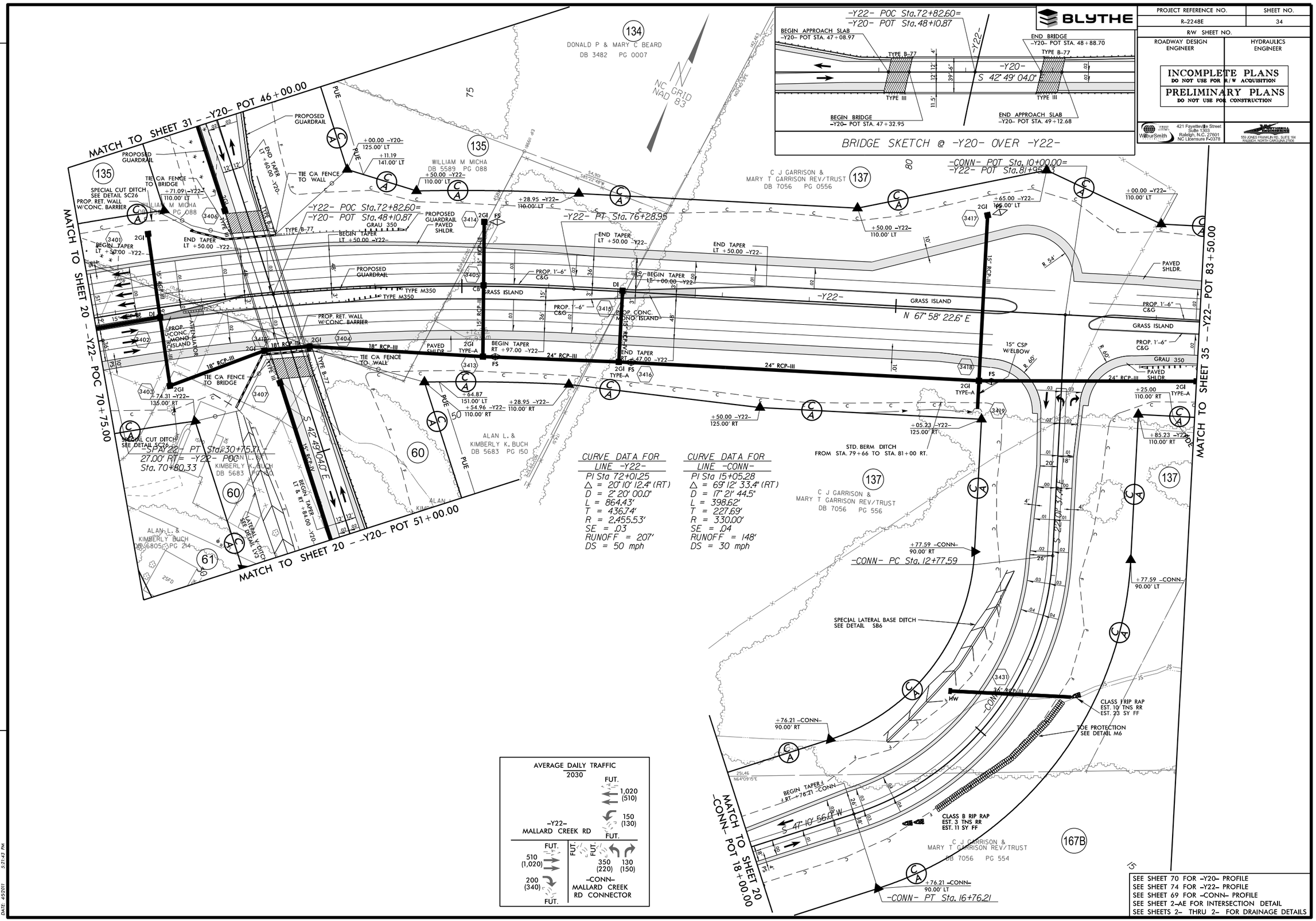
MATTHEWS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



SEE SHEET 70 FOR -Y20- PROFILE
SEE SHEET 74 FOR -Y22- PROFILE
SEE SHEET 69 FOR -CONN- PROFILE
SEE SHEET 2-AE FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_34.DGN
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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	35
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

BLYTHE

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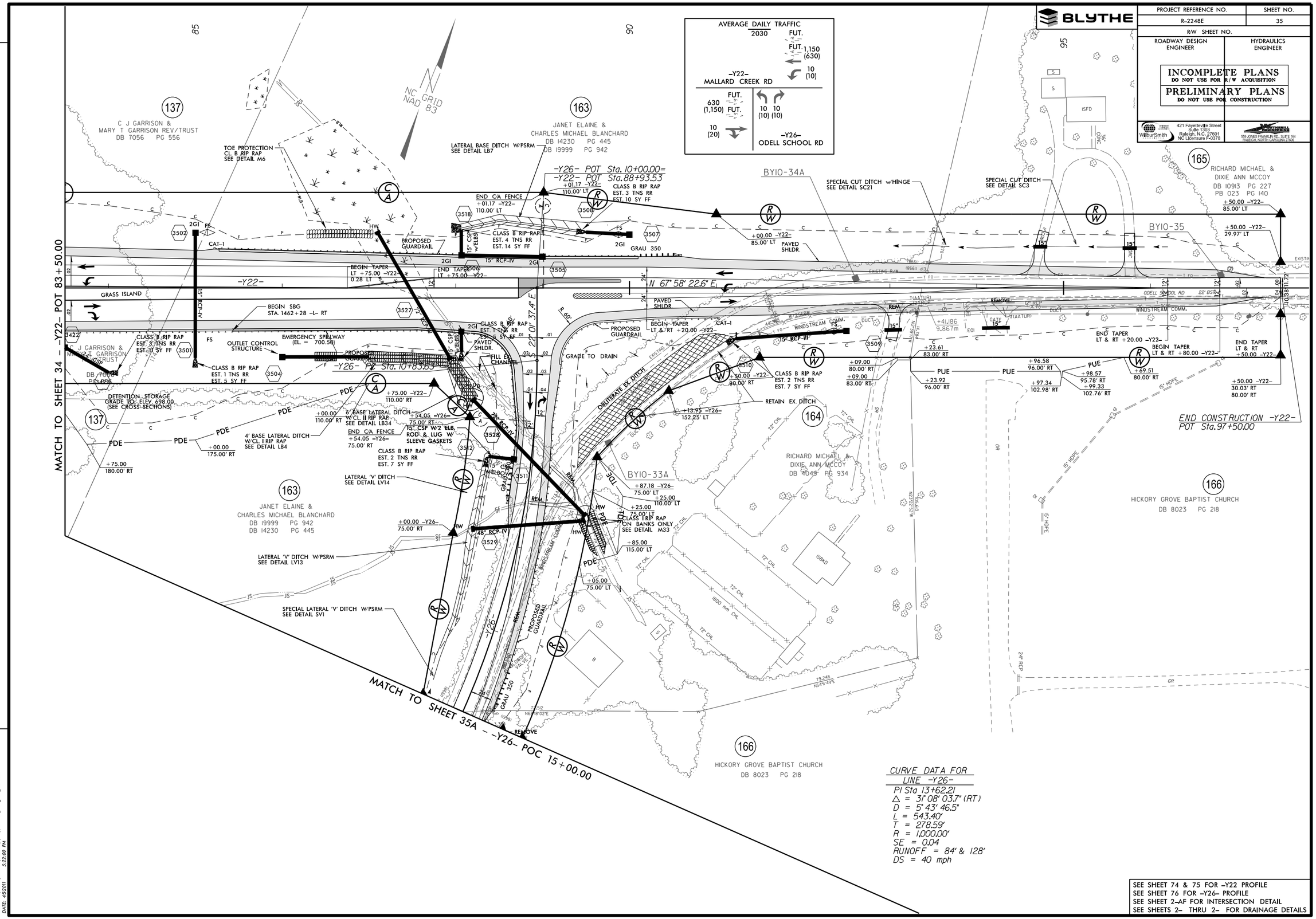
555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



SEE SHEET 74 & 75 FOR -Y22 PROFILE
SEE SHEET 76 FOR -Y26- PROFILE
SEE SHEET 2-AF FOR INTERSECTION DETAIL
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

REVISIONS

FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PSH_35.DGN
DATE: 4/5/2011 5:22:00 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	35A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

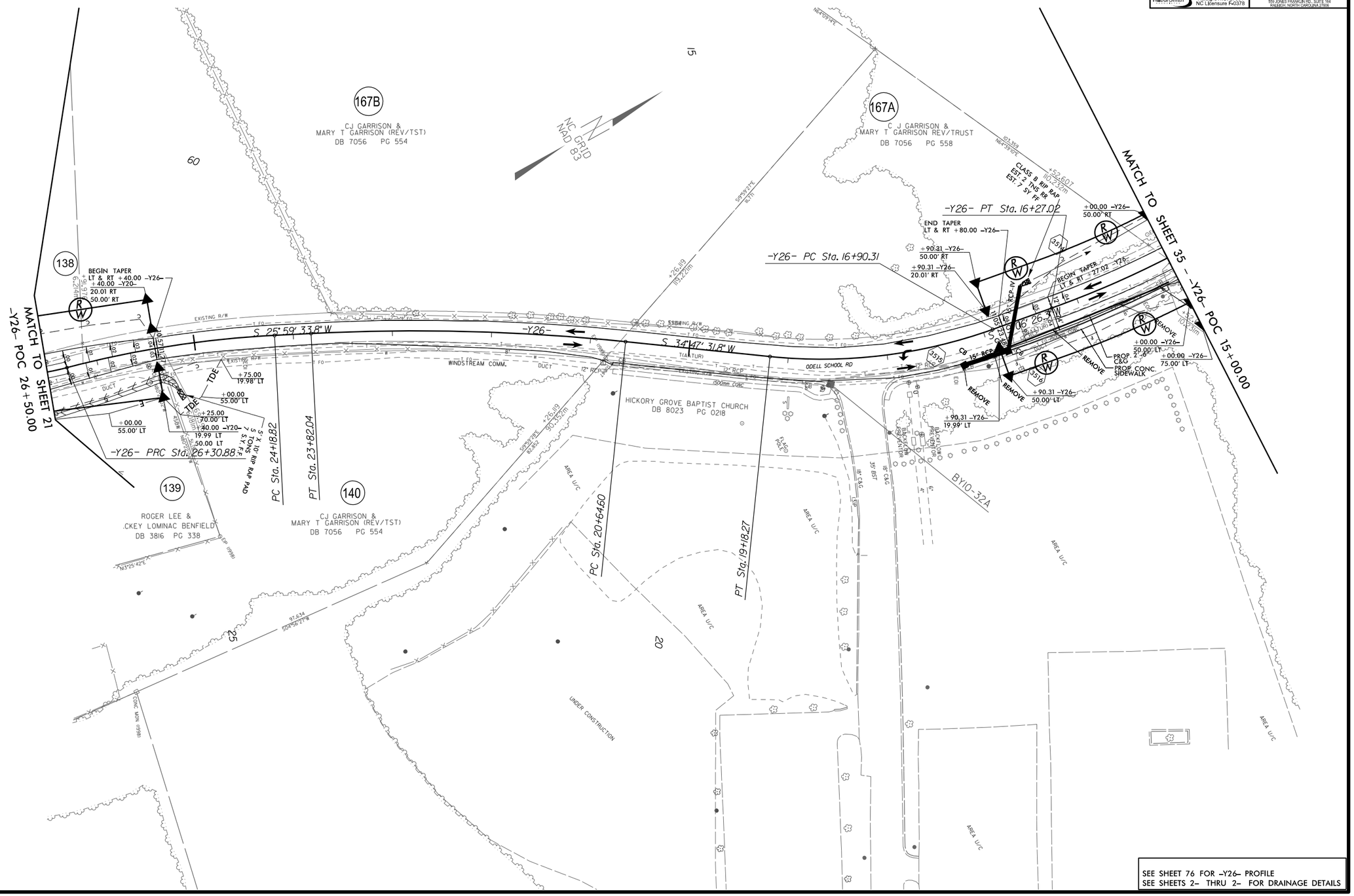
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

MOTTSMITH CONSULTING ENGINEERS
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

REVISIONS



SEE SHEET 76 FOR -Y26- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	36
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

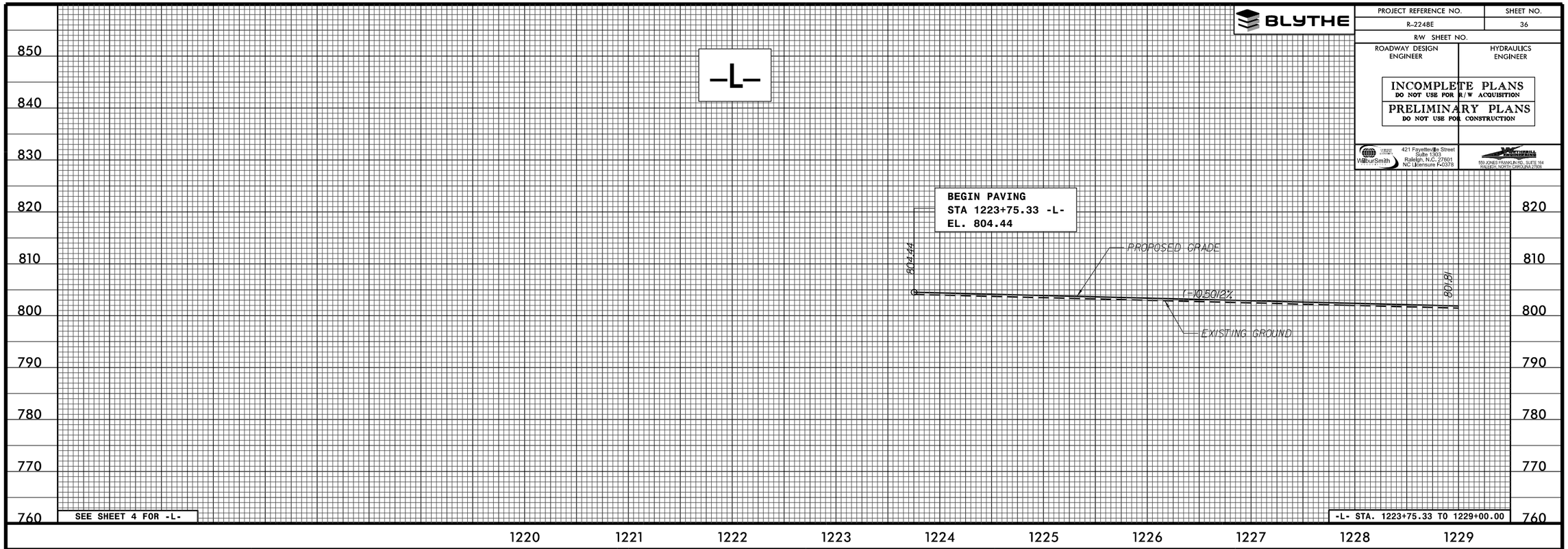
BLYTHE

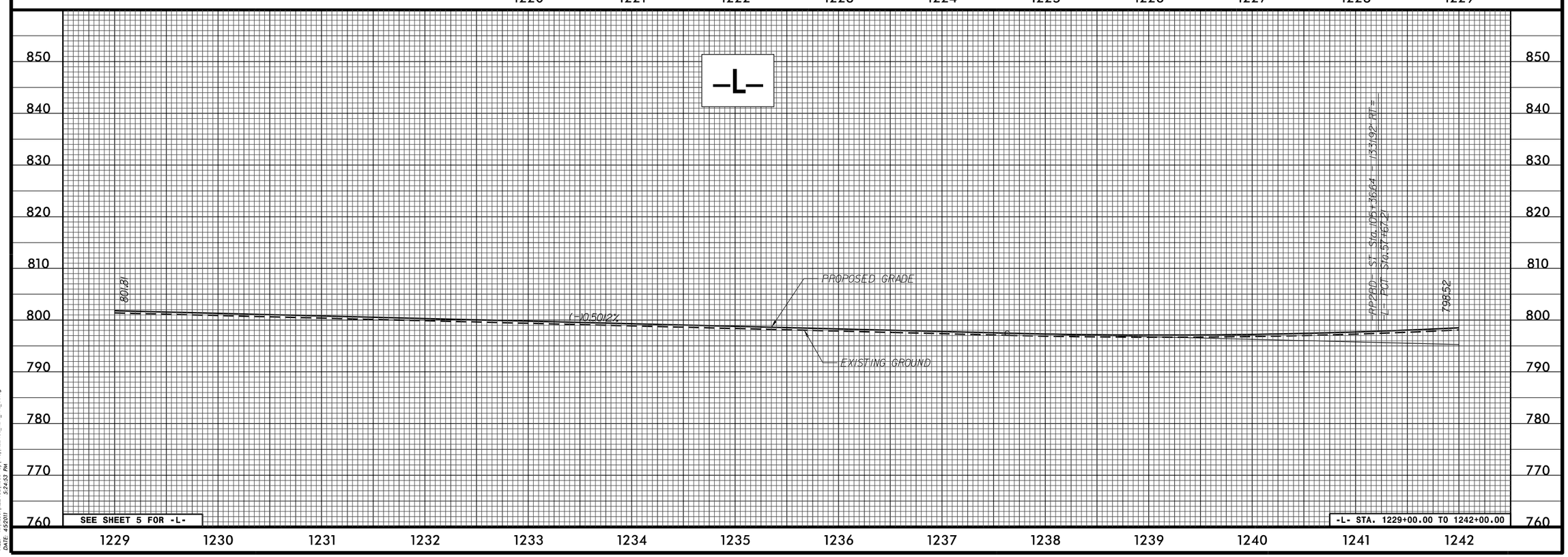
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

CONTINENTAL
559 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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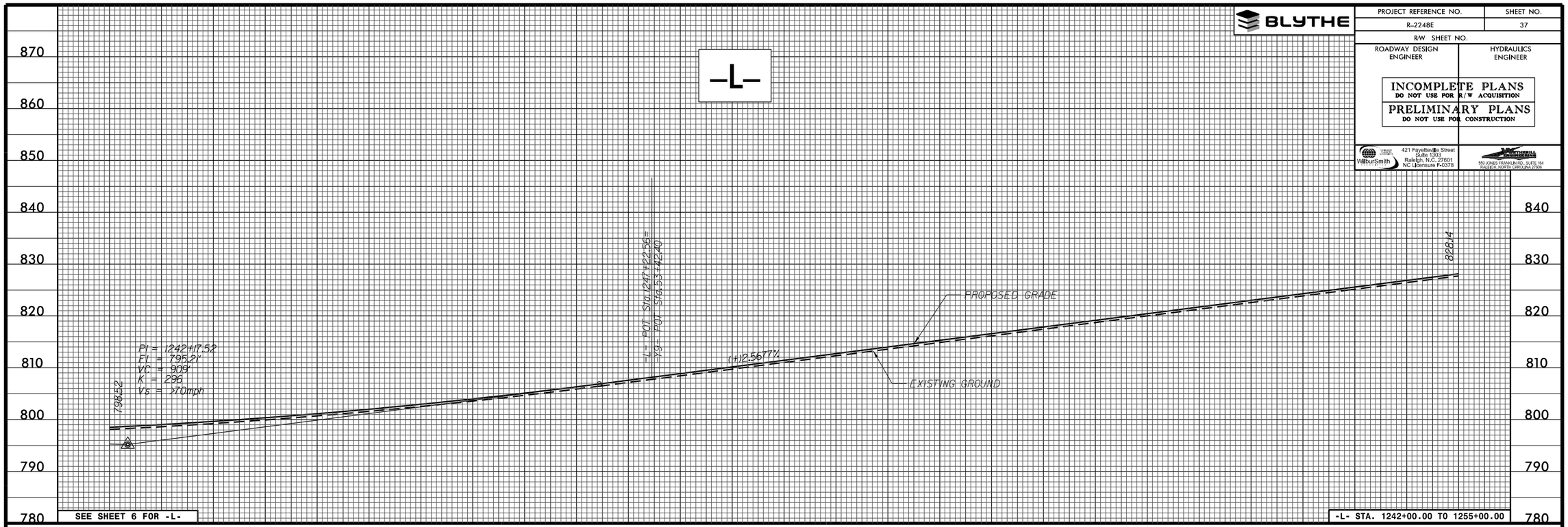
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	37
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

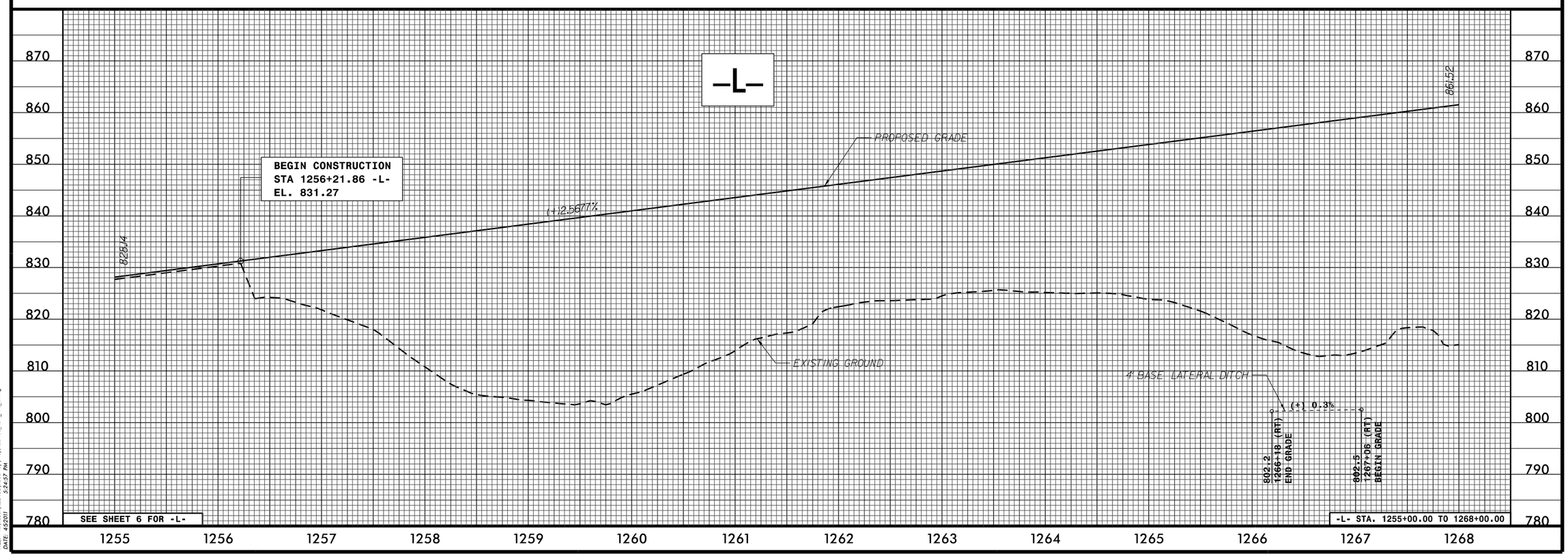
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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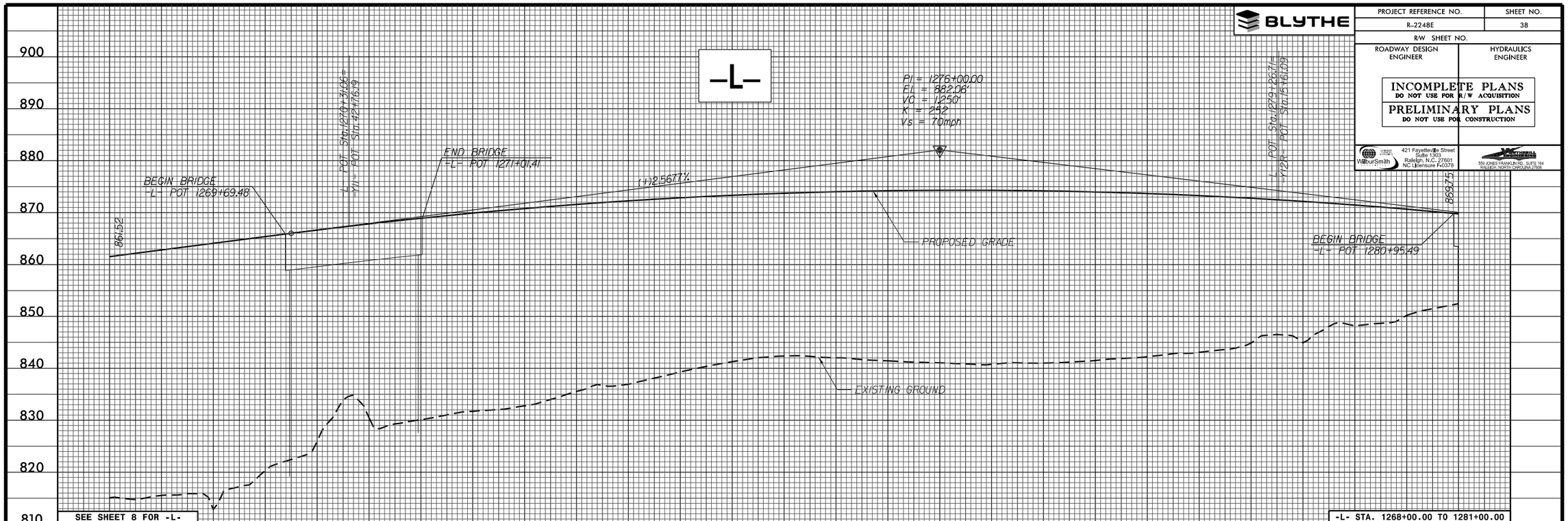
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	38
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

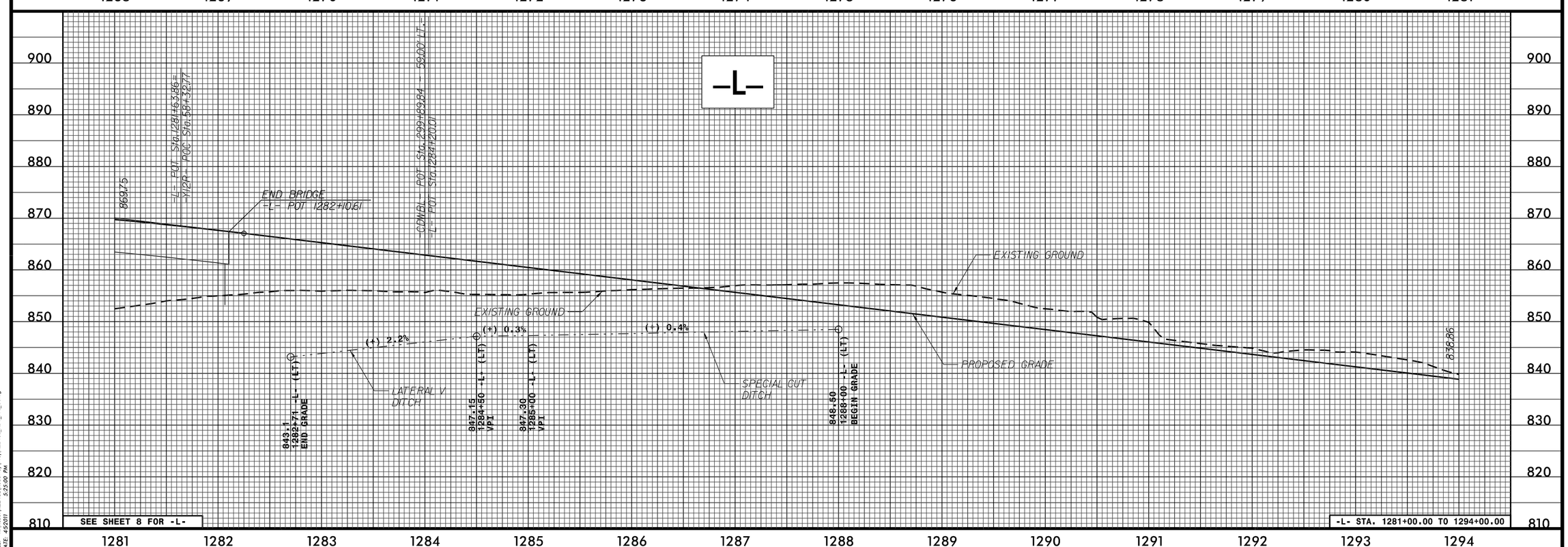
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

CONTINUUM
559 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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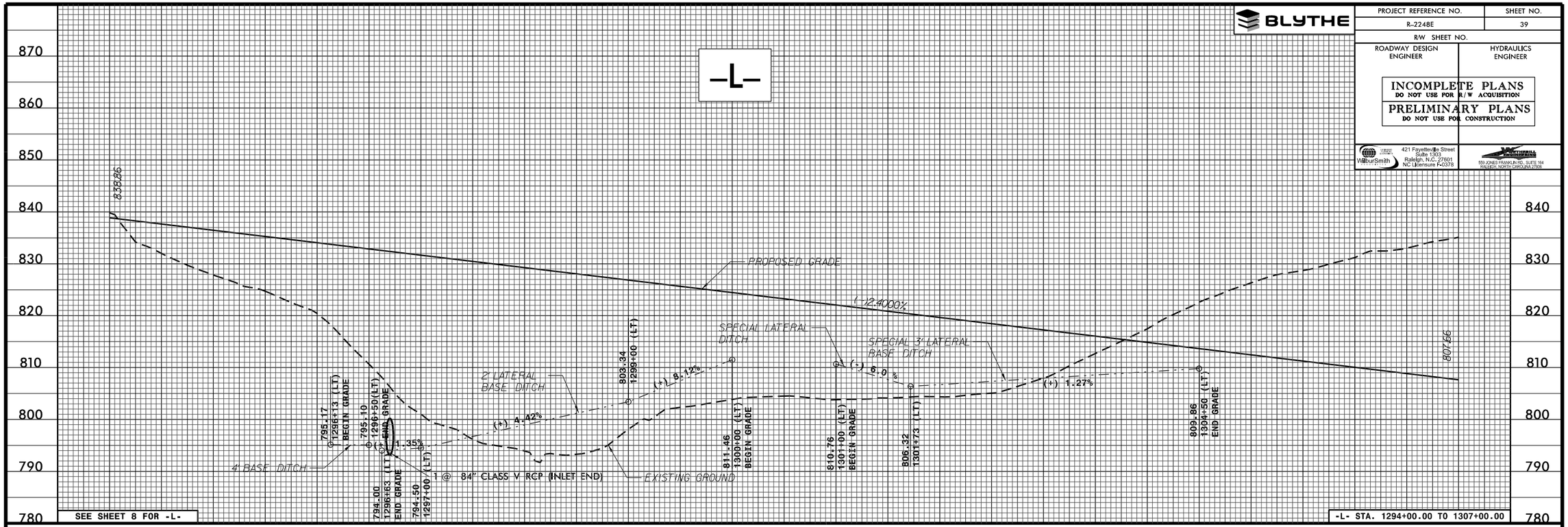
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	39
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

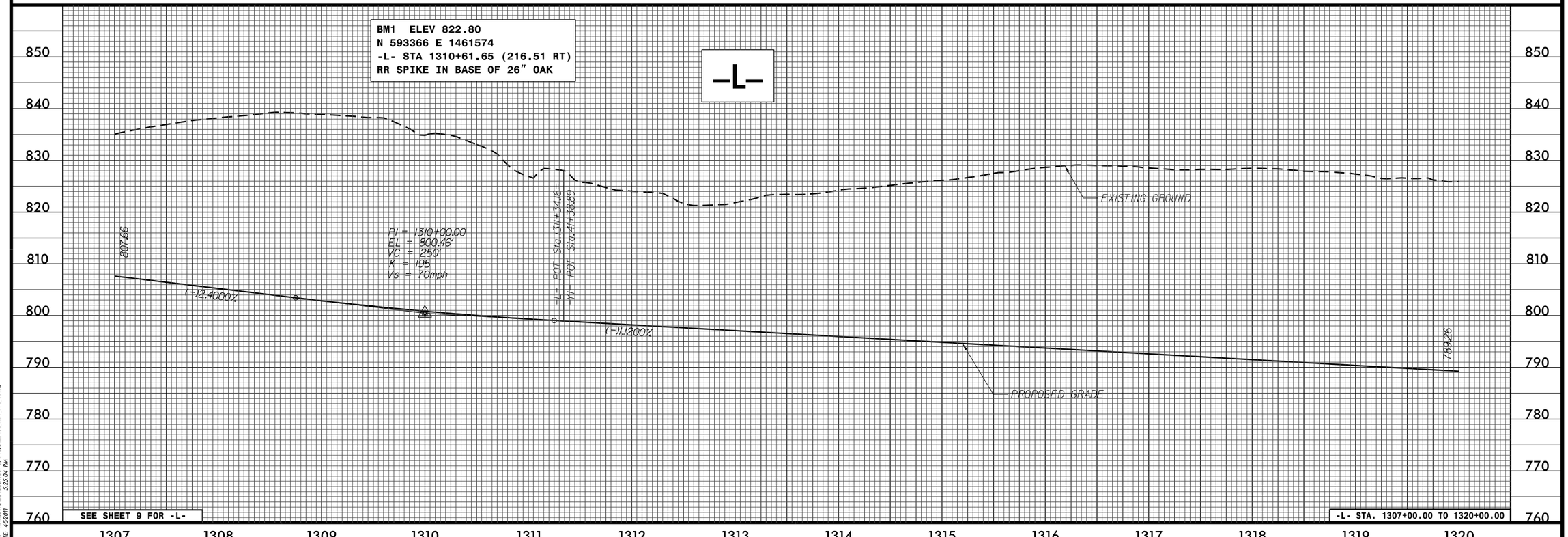
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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BLYTHE

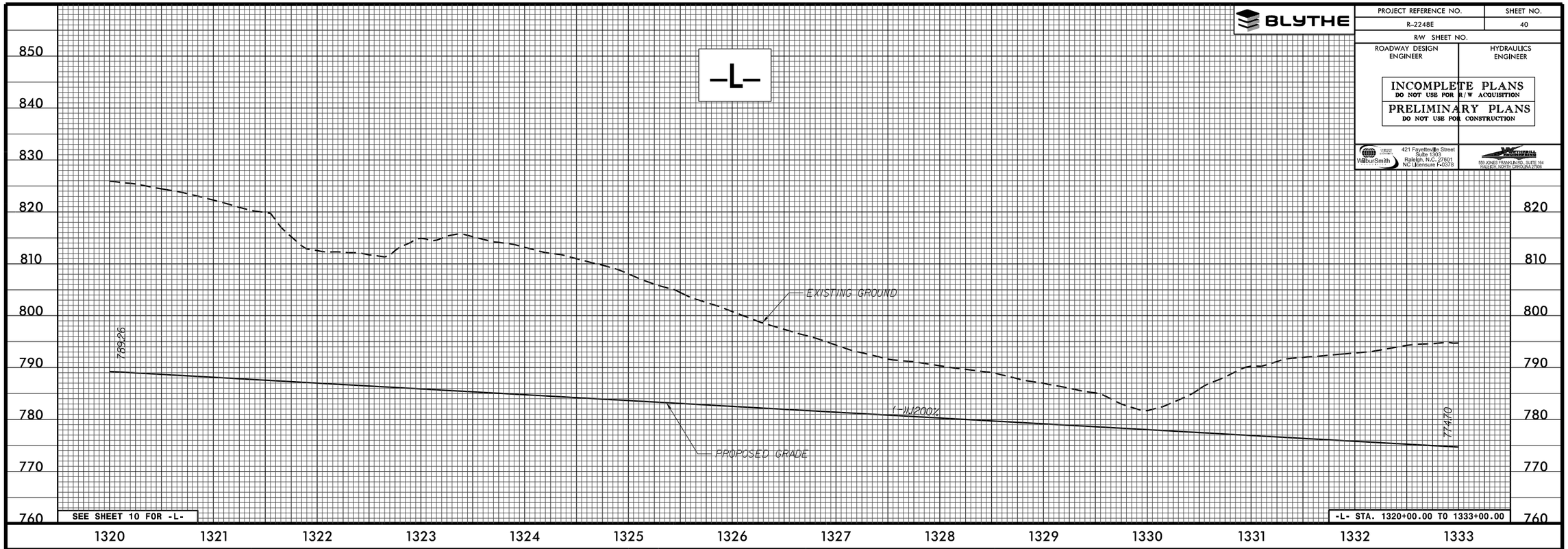
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	40
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

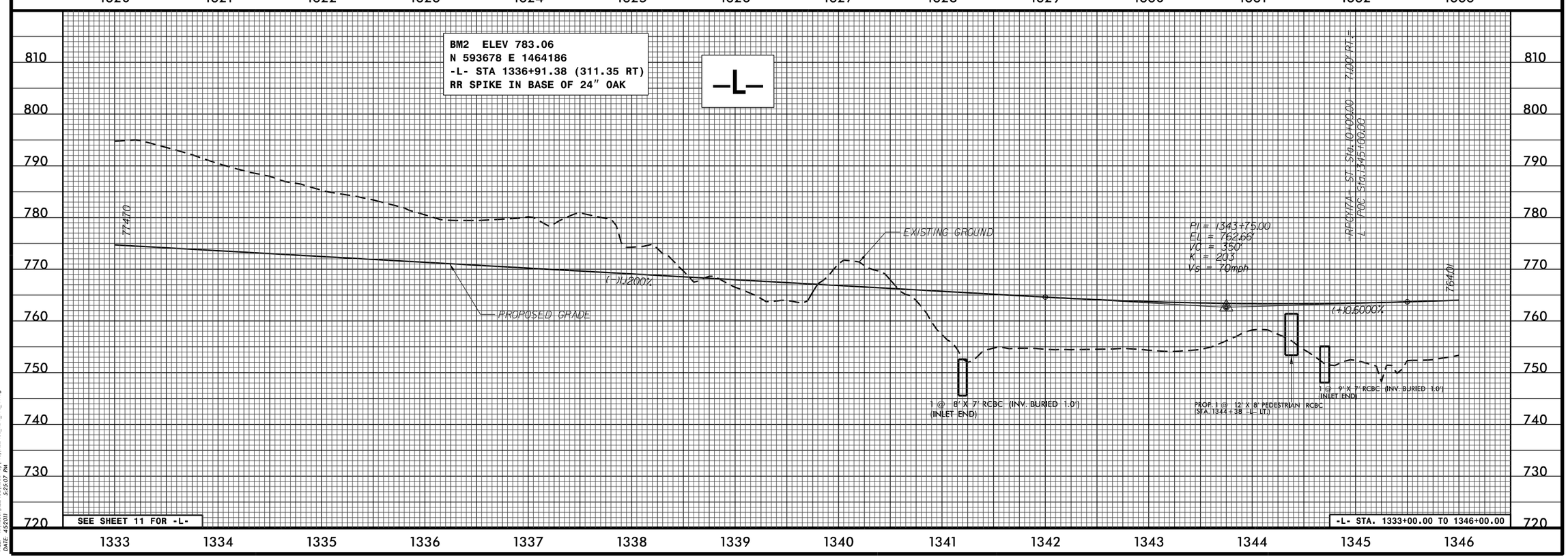
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

HYDRAULICS ENGINEERING
559 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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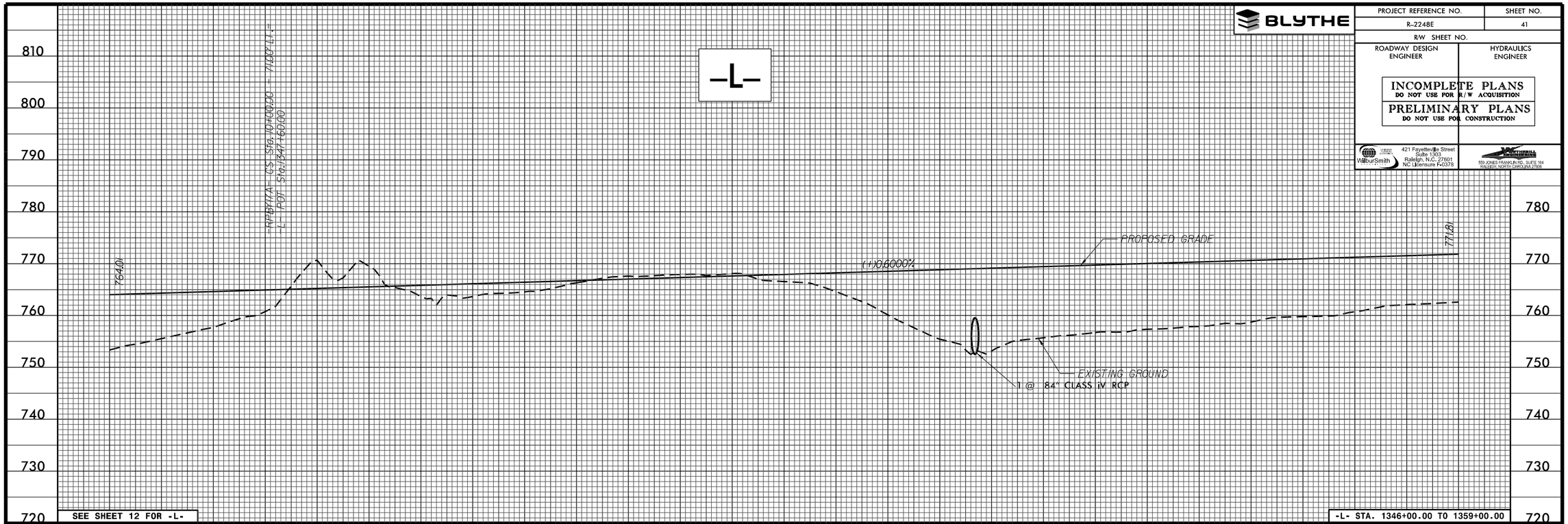
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	41
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

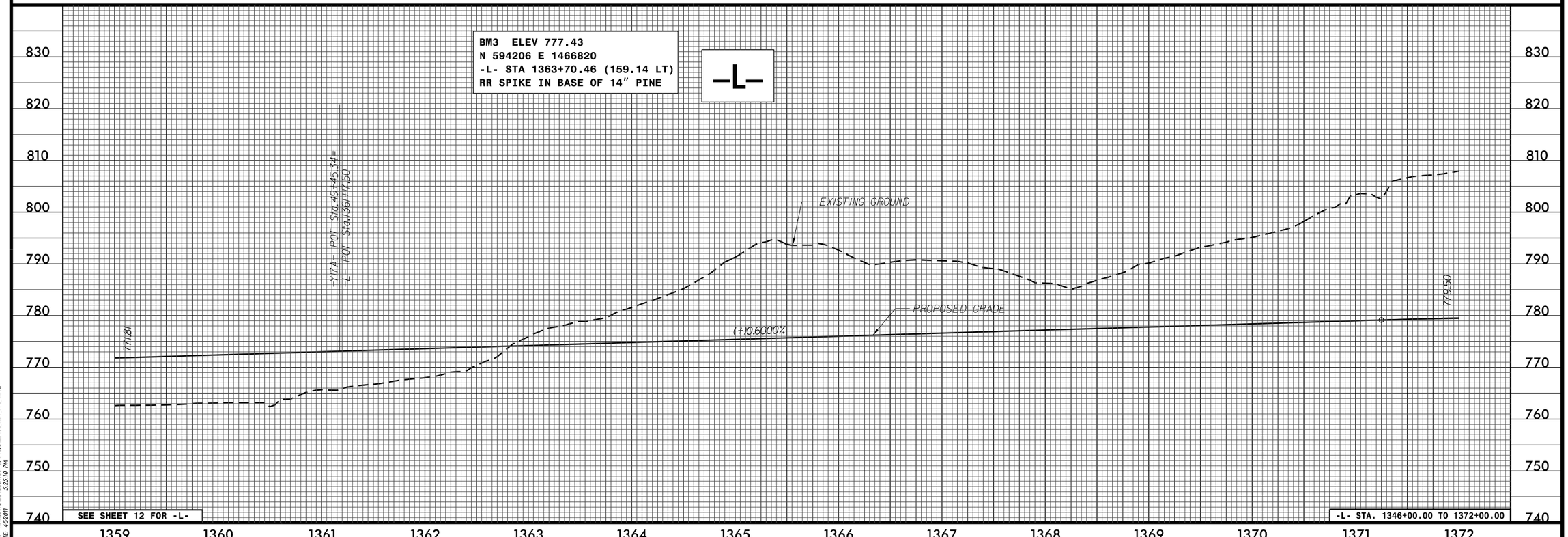
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS CONSULTING ENGINEERS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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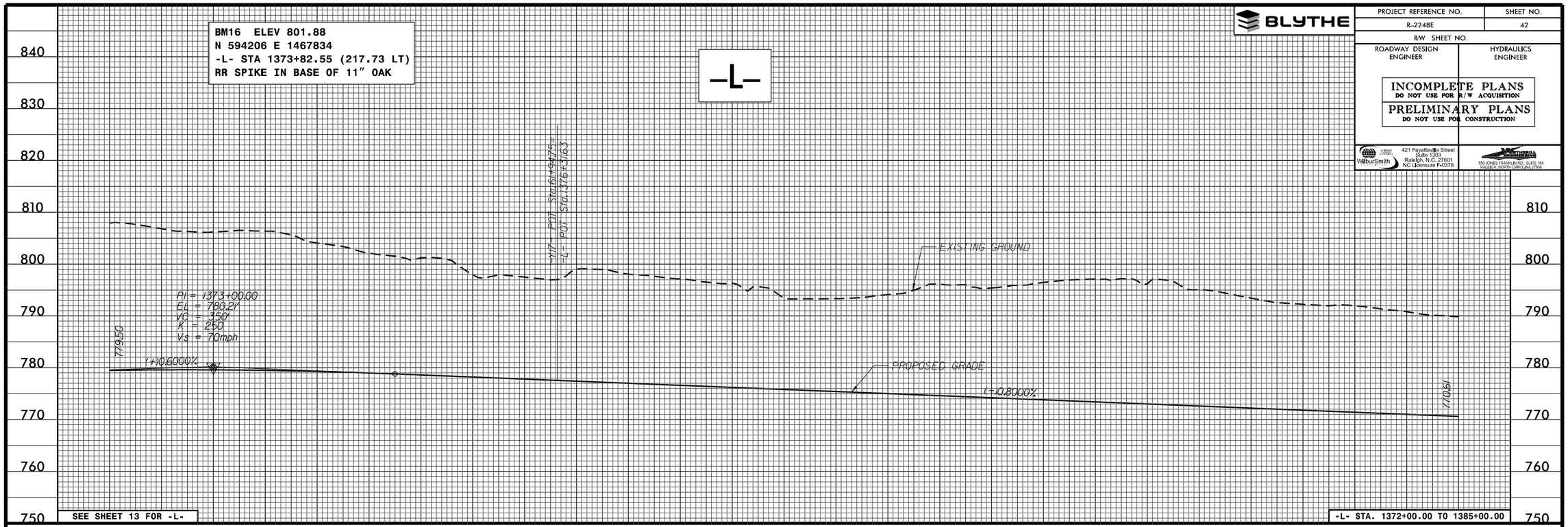
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	42
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

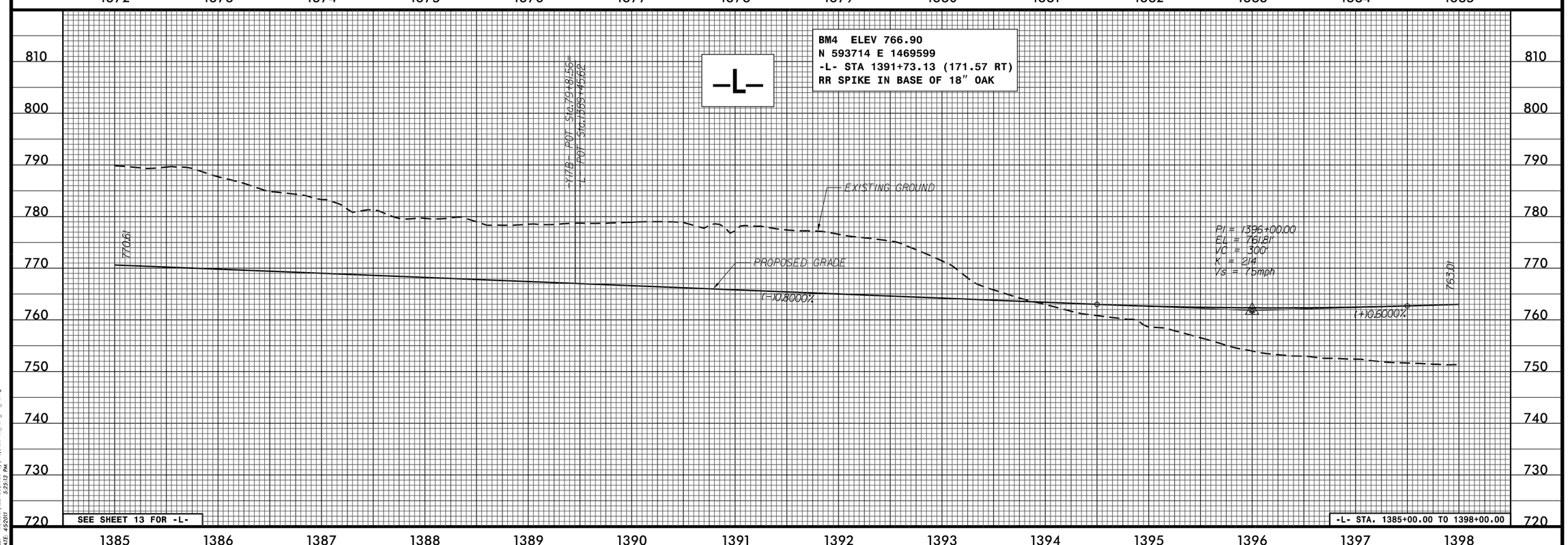
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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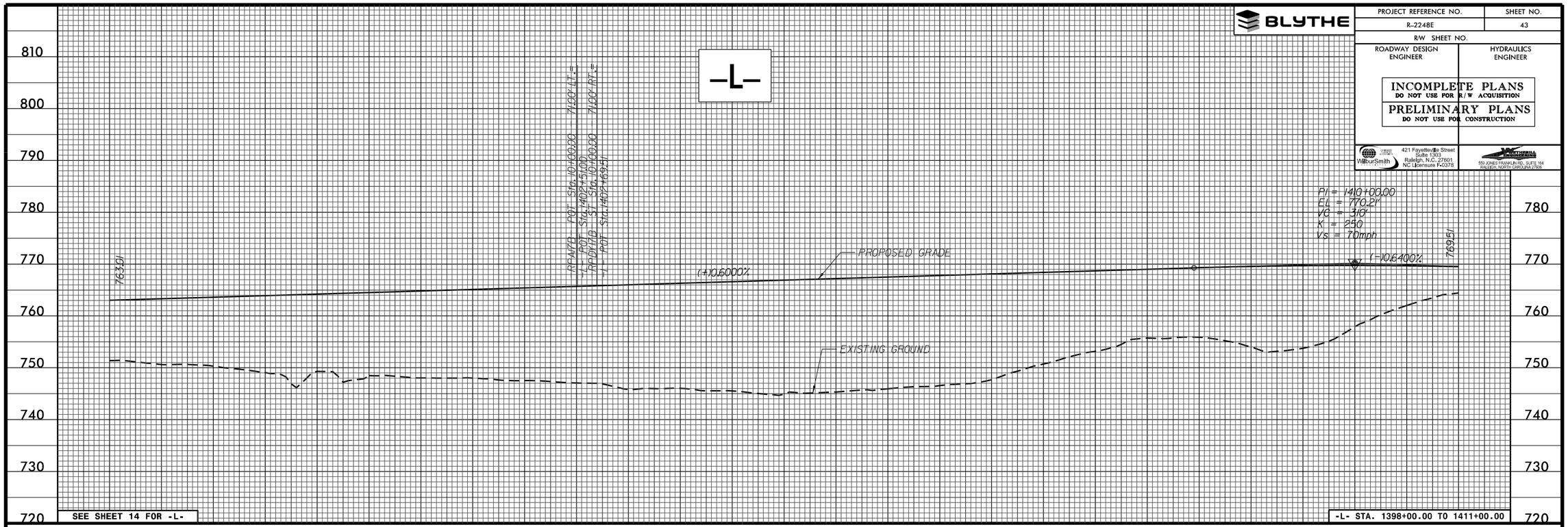
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	43
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

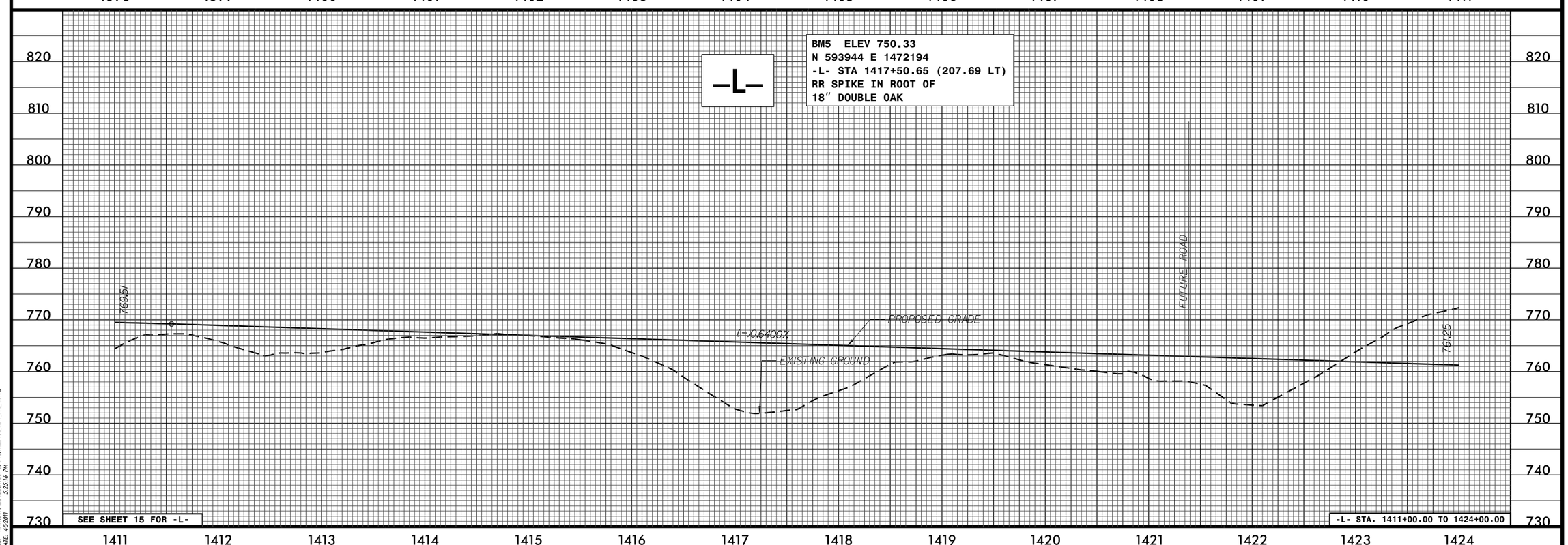
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

CONTINUUM — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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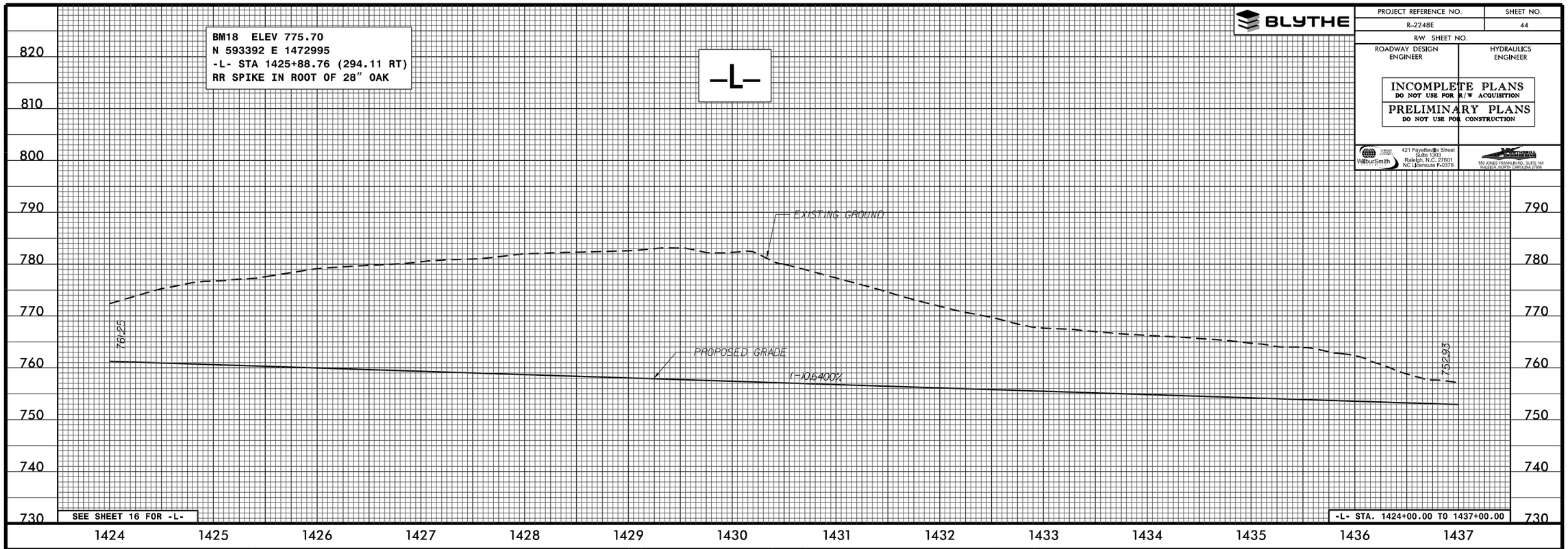
DATE: 4/5/2011 5:25:16 PM

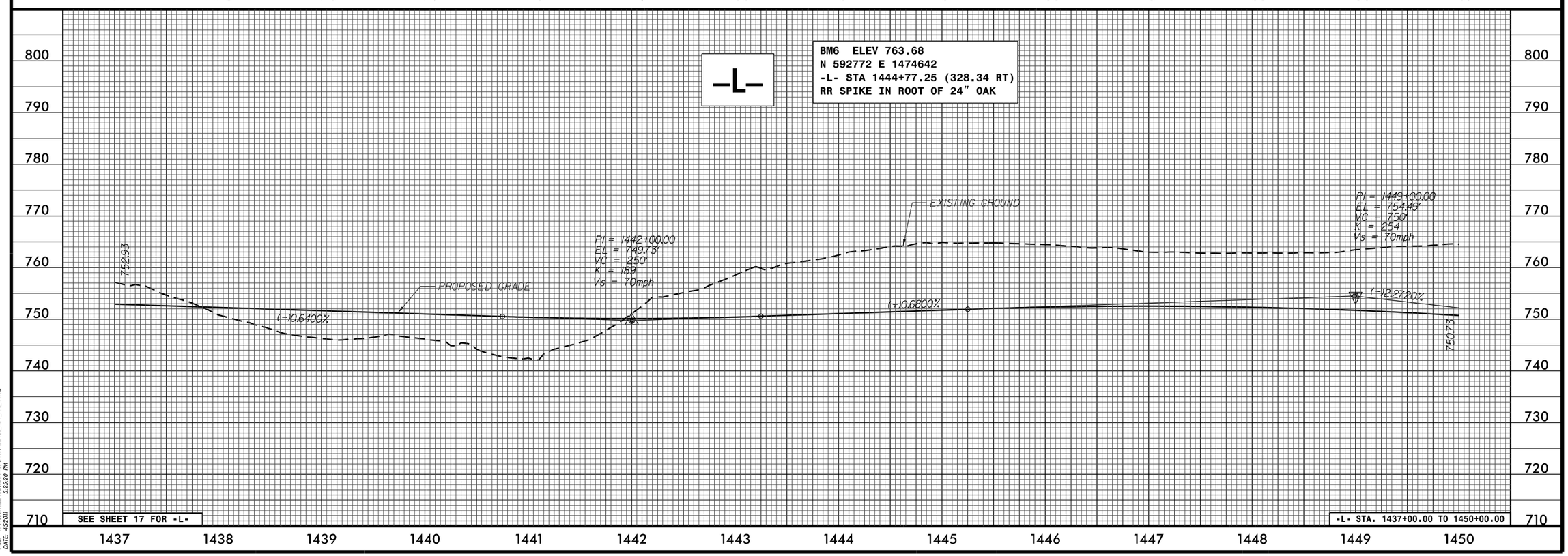
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	44
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC License F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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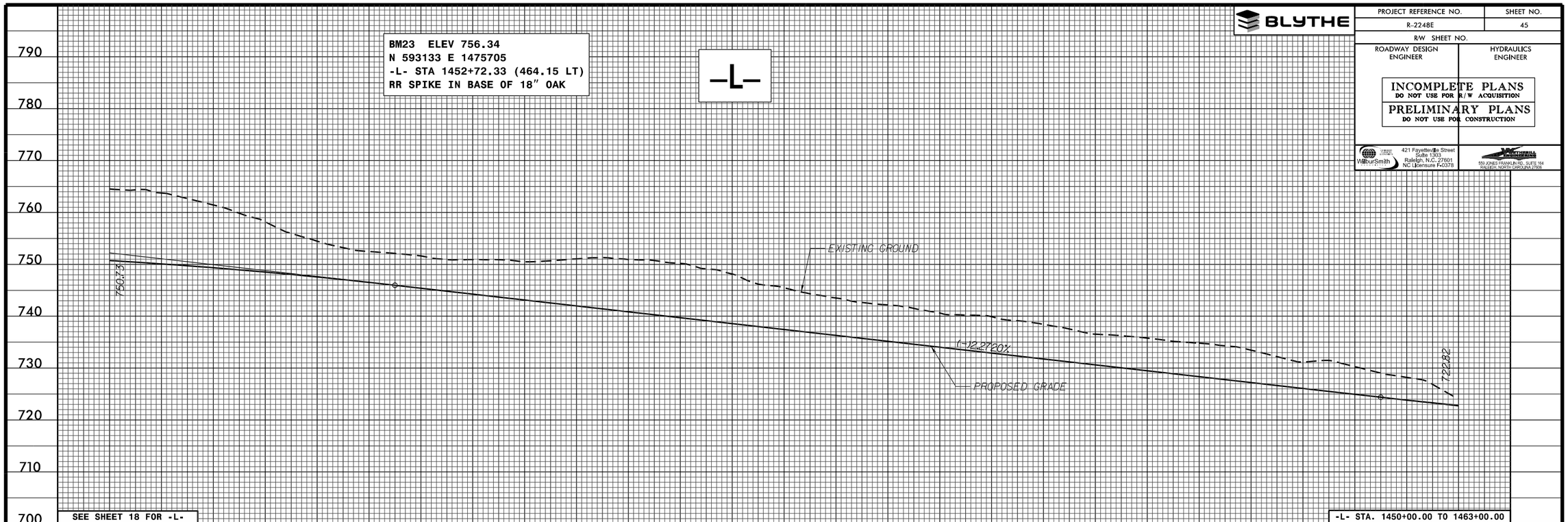
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	45
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

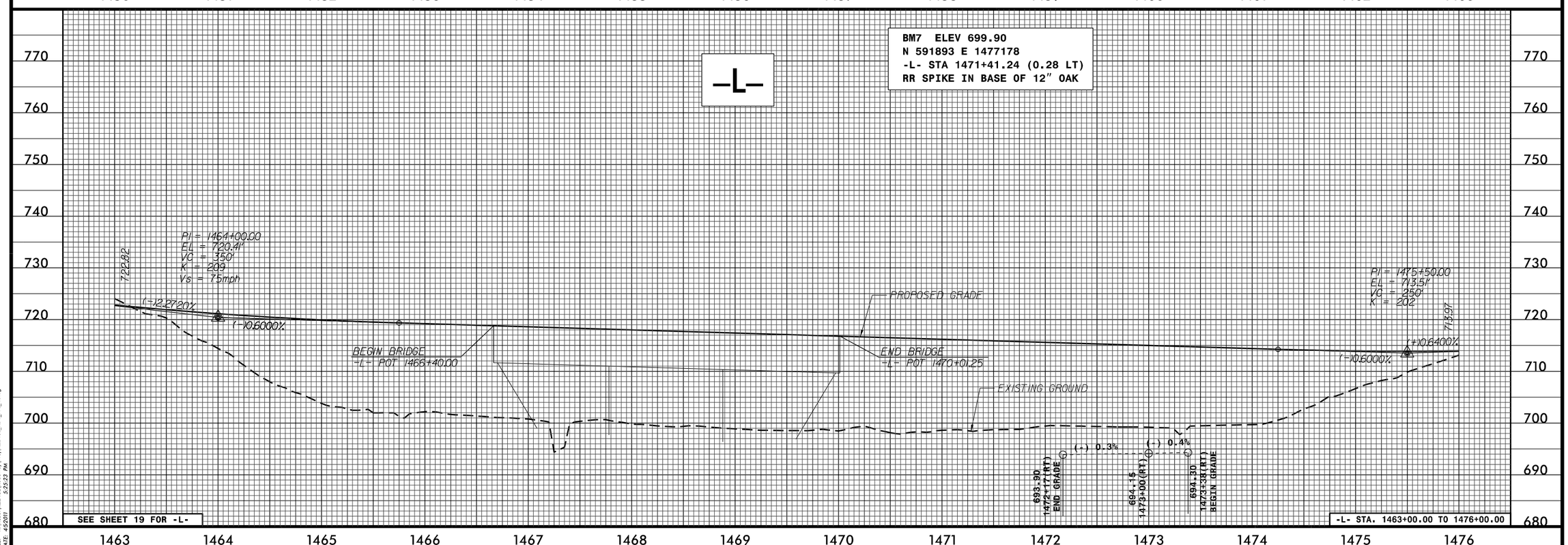
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS — 559 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE





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BLYTHE

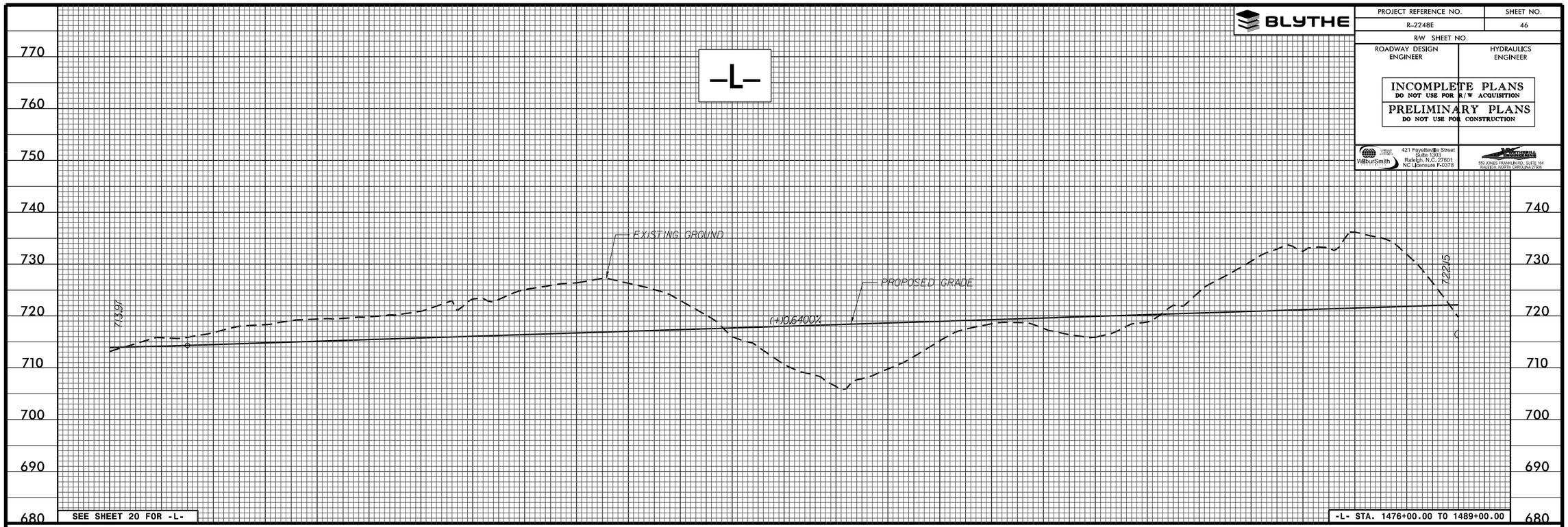
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	46
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

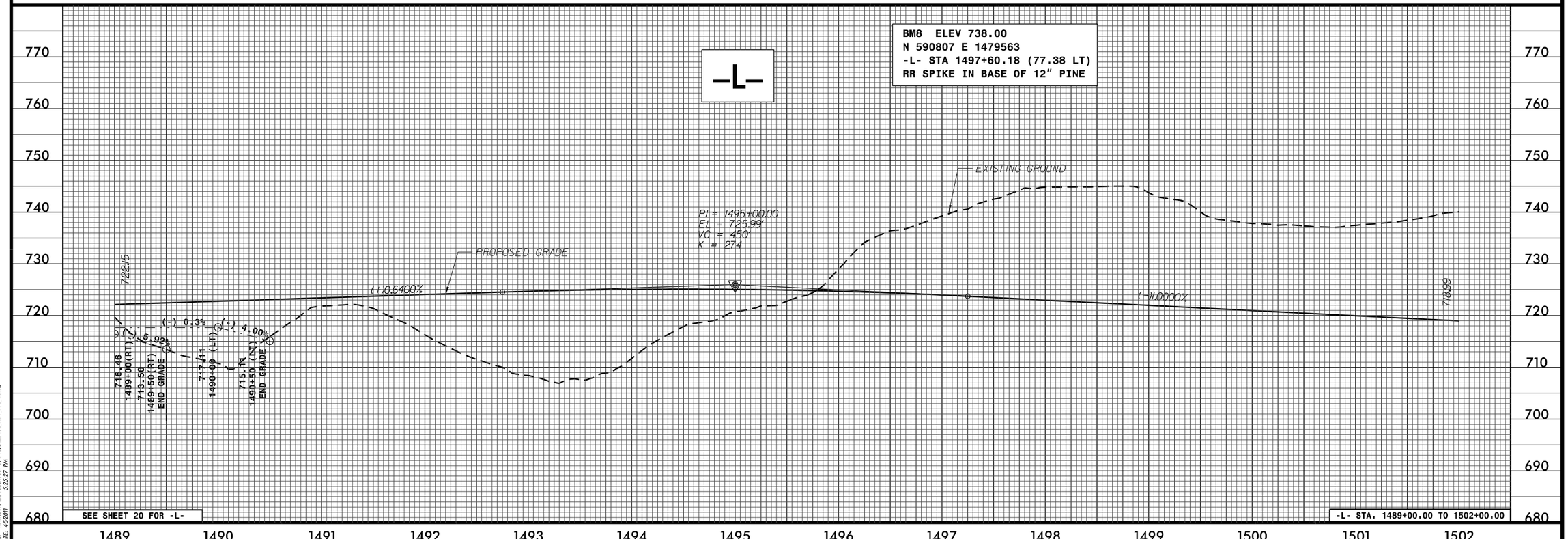
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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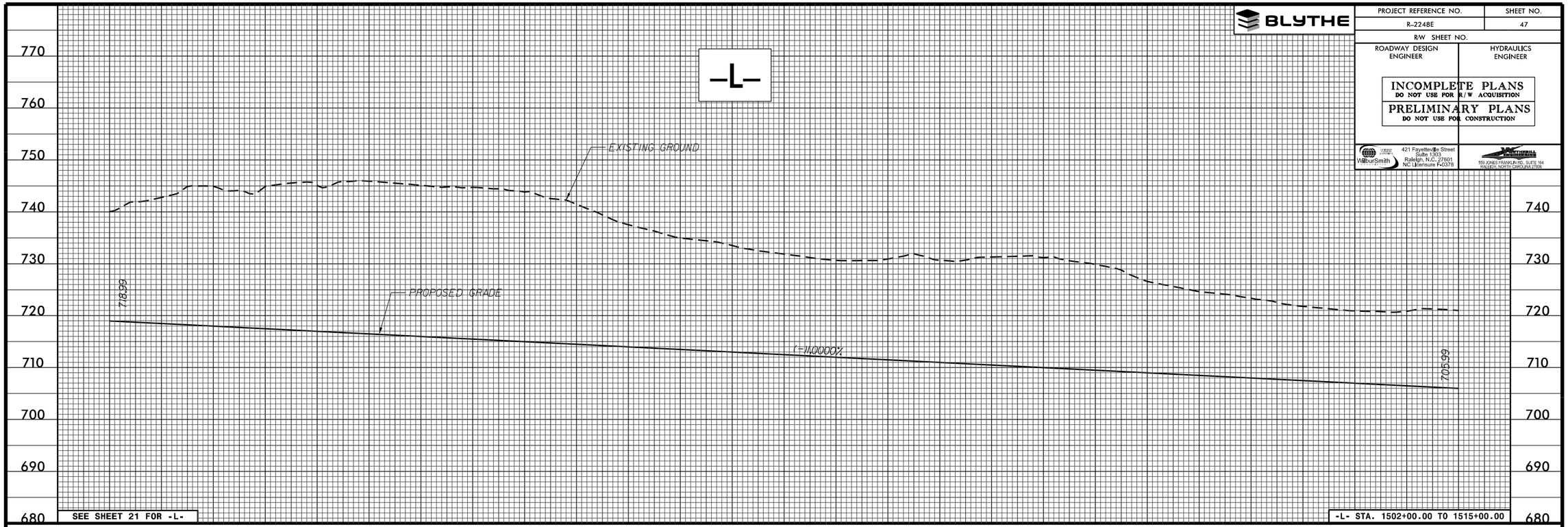
DATE: 4/5/2011 5:25:27 PM

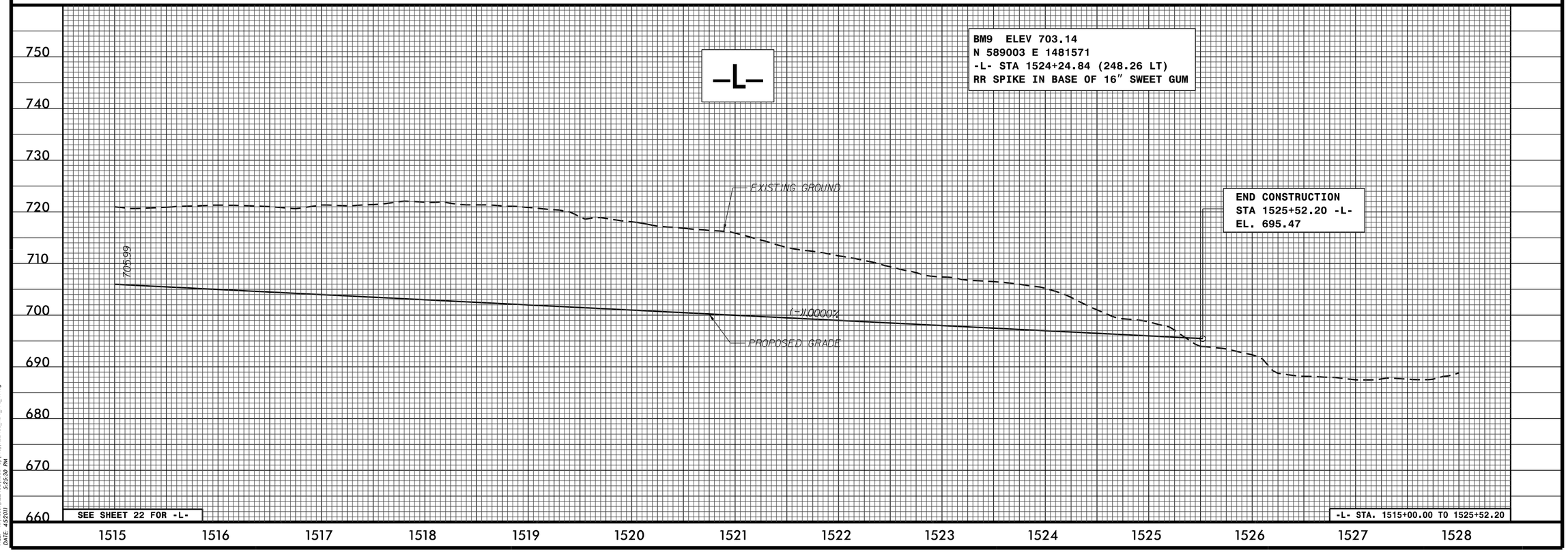
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	47
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

CONTINUUM
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/2011 5:25:30 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	48
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

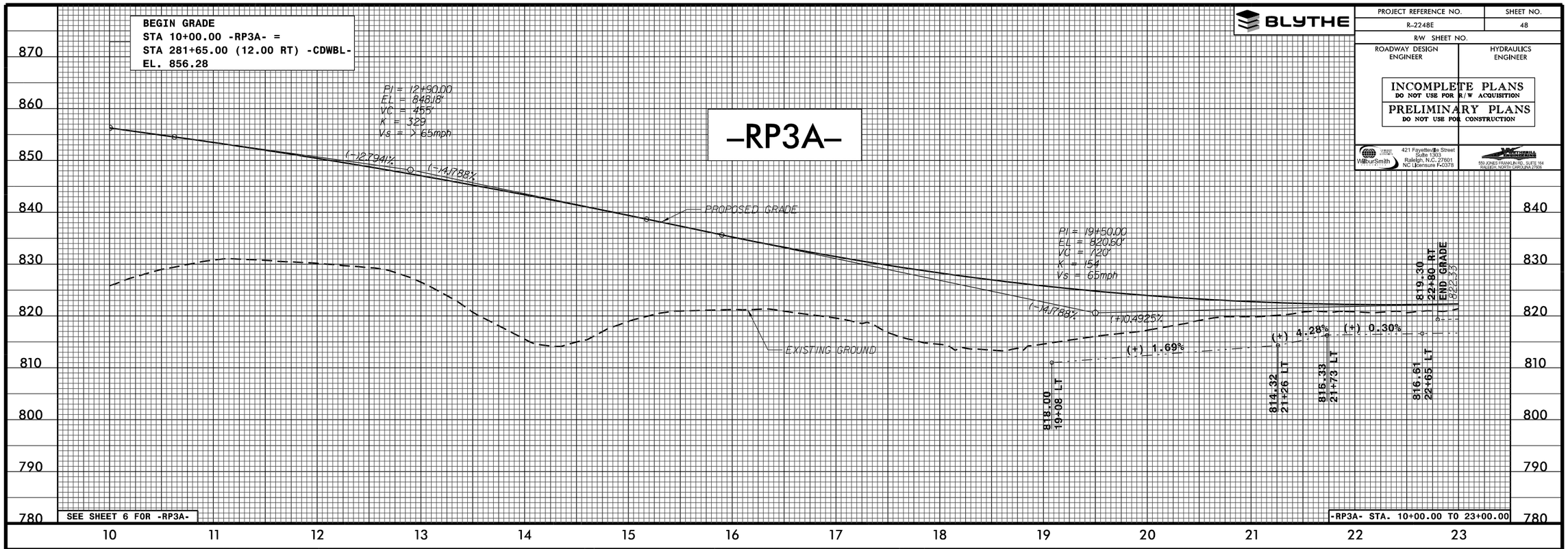
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

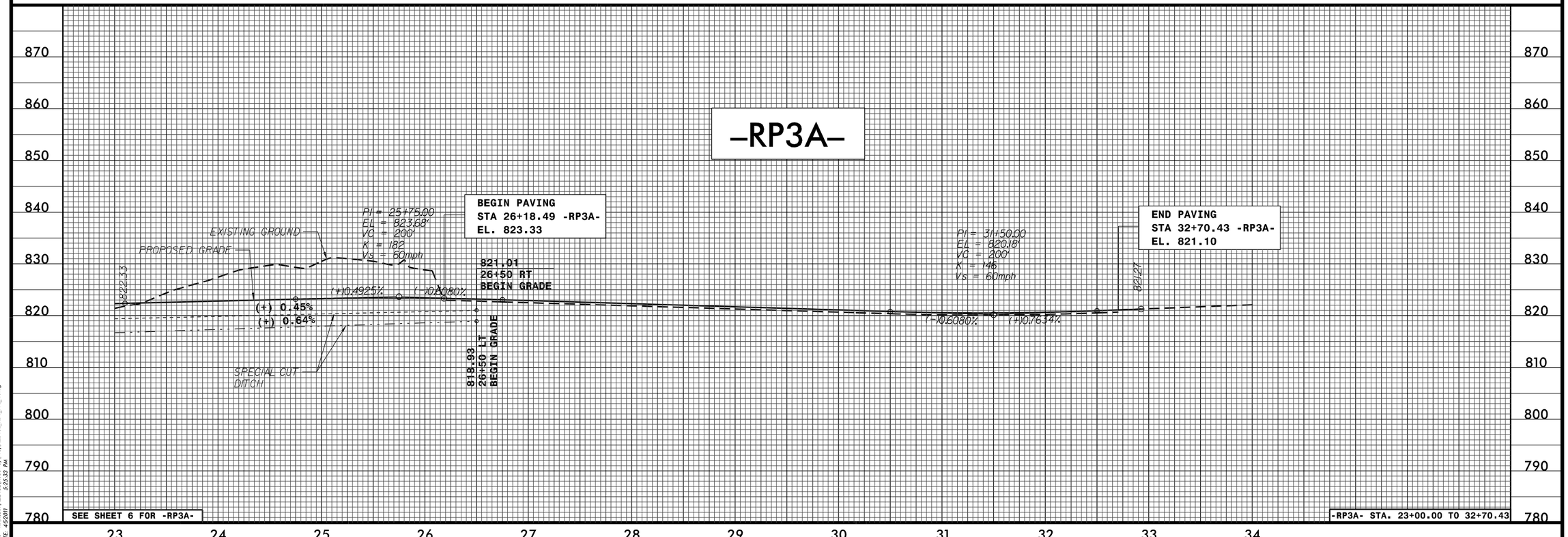
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTSINGER BEARD — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	49
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

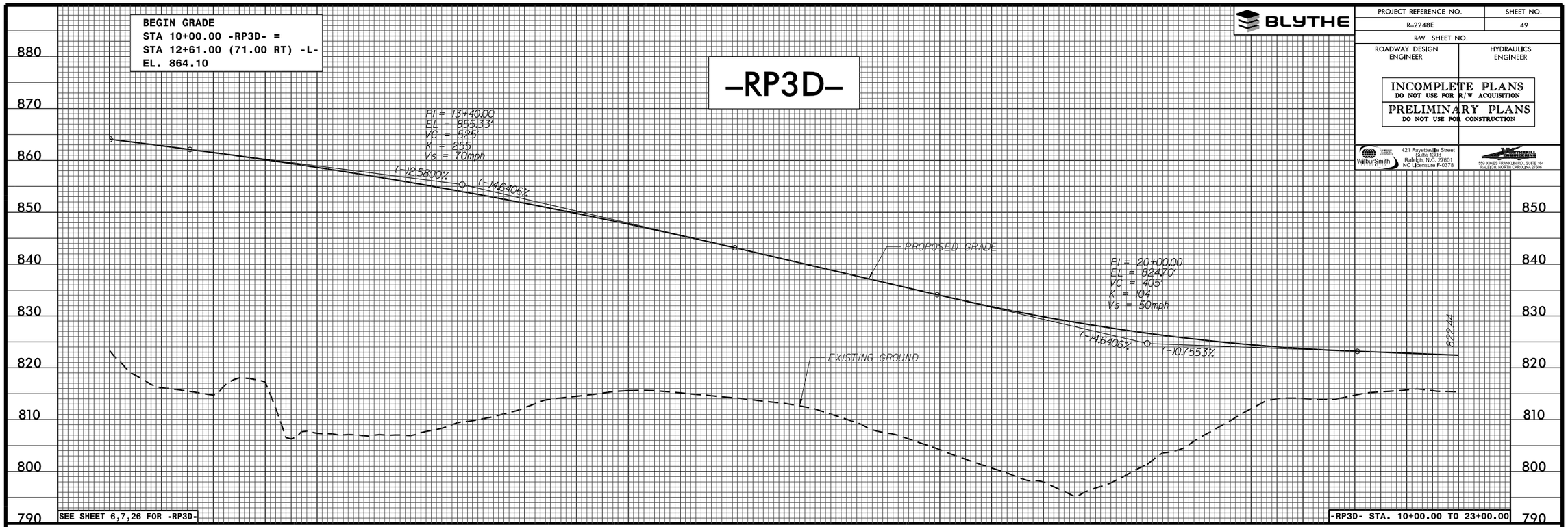
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

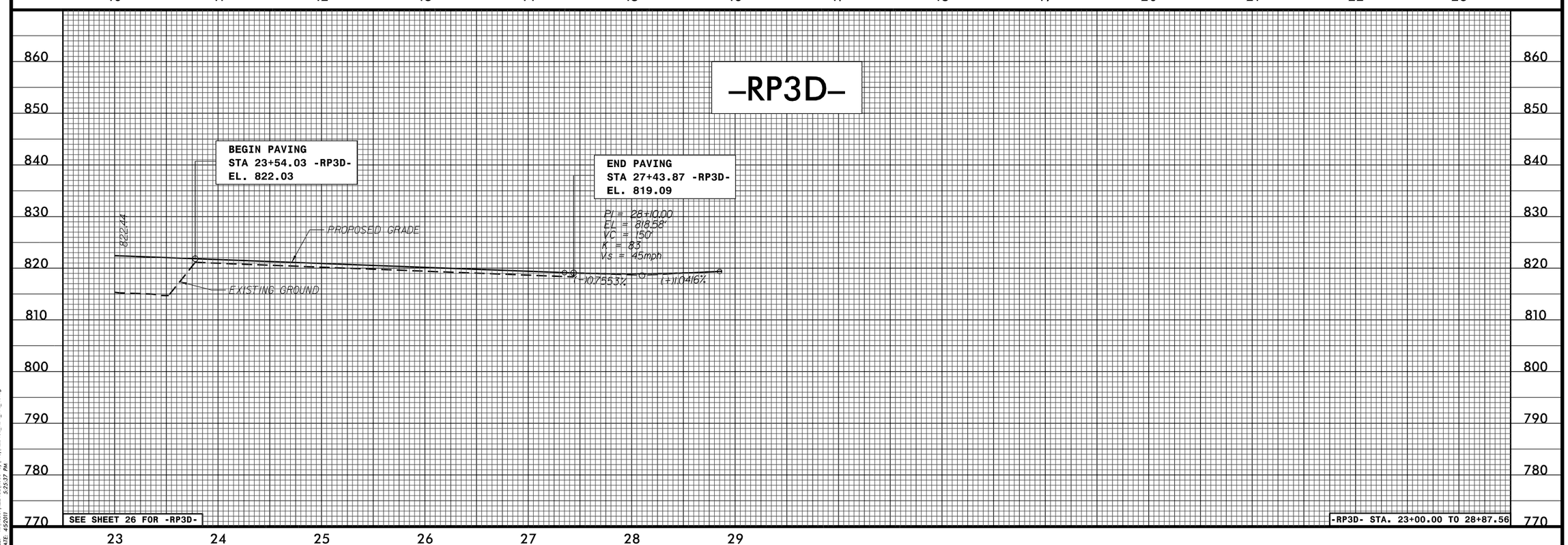
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE





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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	50
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

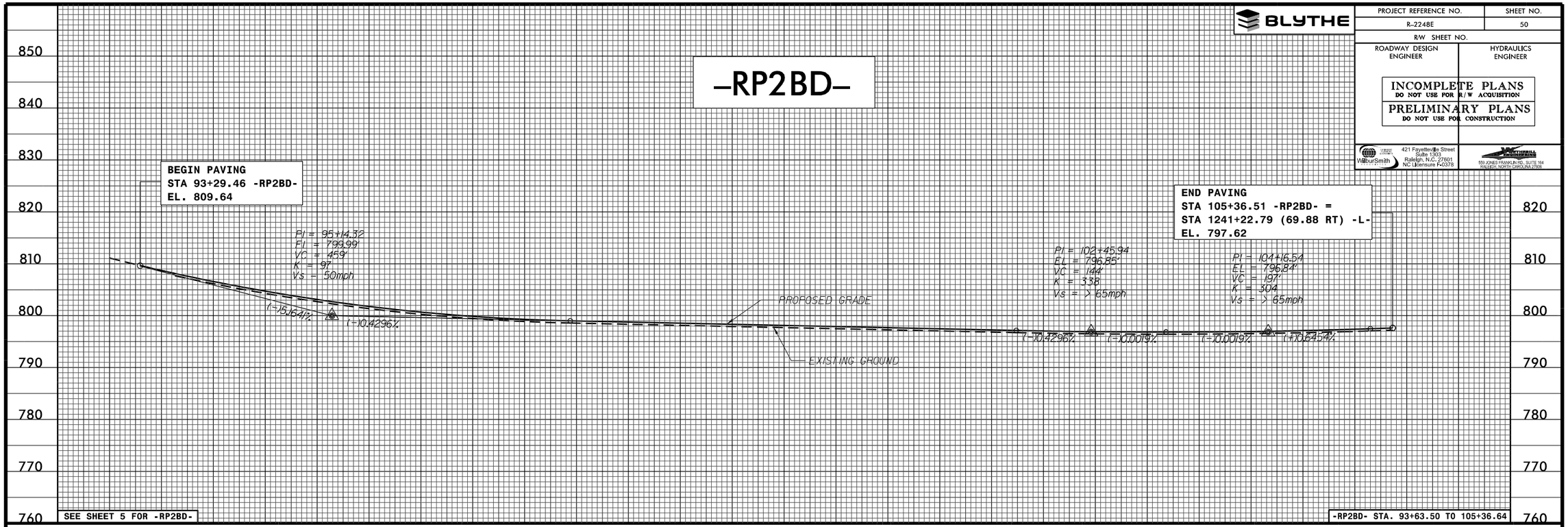
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

MOTSINGER CONSULTING ENGINEERS
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

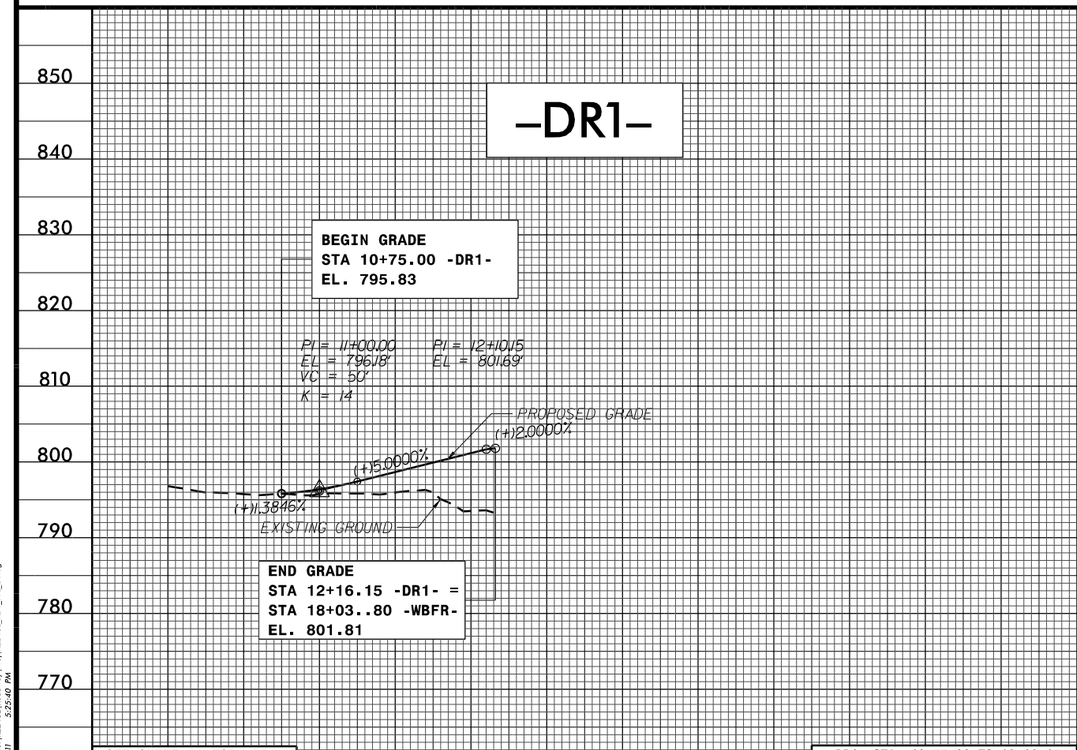
–RP2BD–



SEE SHEET 5 FOR -RP2BD-

-RP2BD- STA. 93+63.50 TO 105+36.64

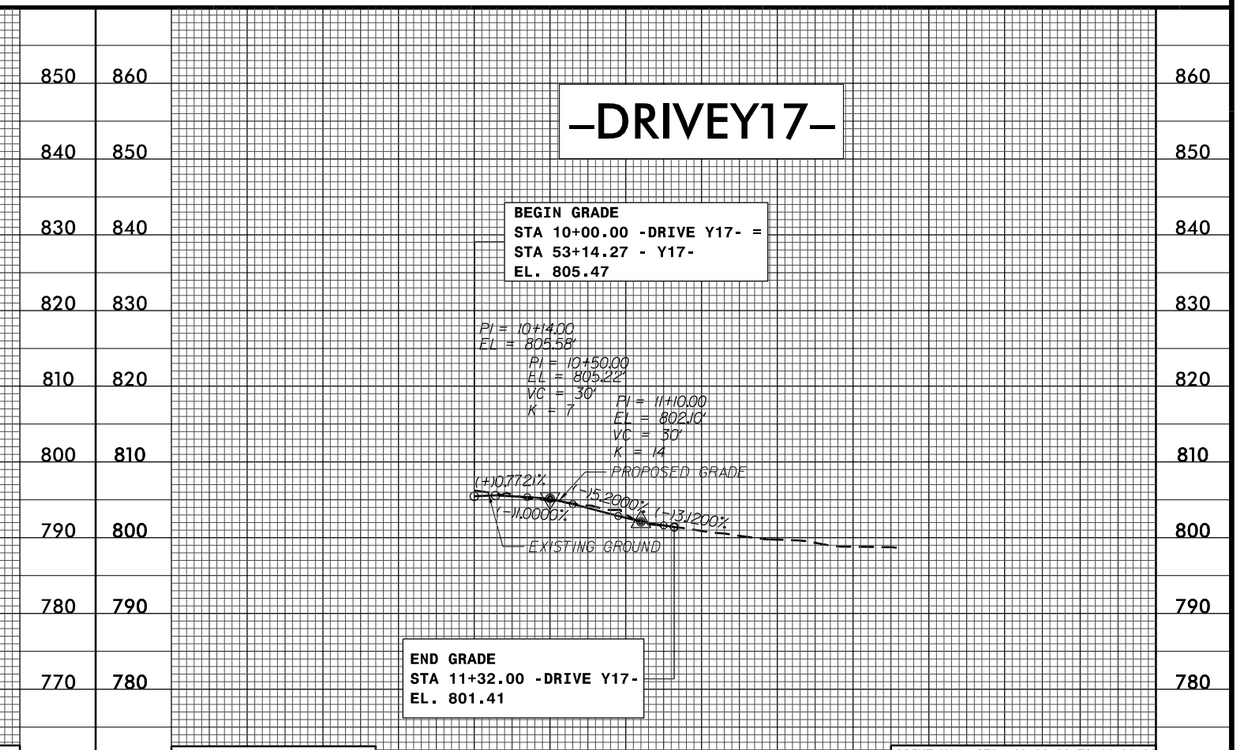
–DR1–



SEE SHEET 12 FOR -DR1-

-DR1- STA. 10+75.00 TO 12+16.15

–DRIVEY17–



SEE SHEET 28 FOR -DRIVE Y17-

-DRIVE Y17- STA. 10+00.00 TO 11+32.00

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	51
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

BLYTHE

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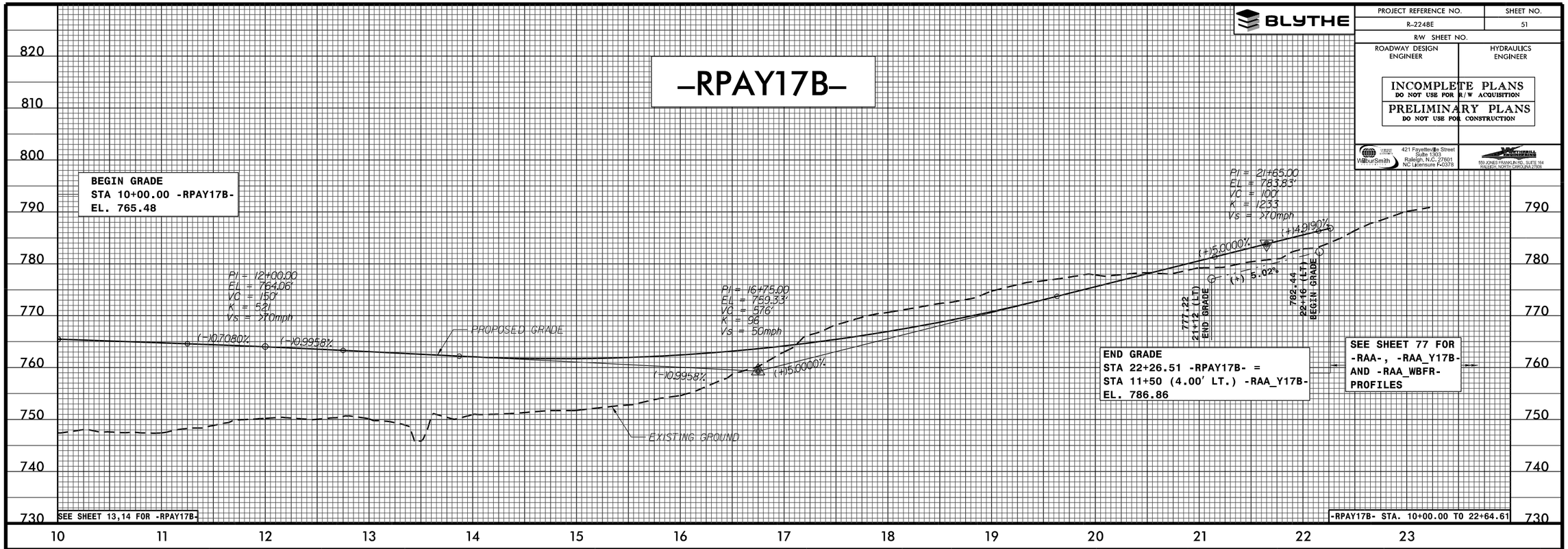
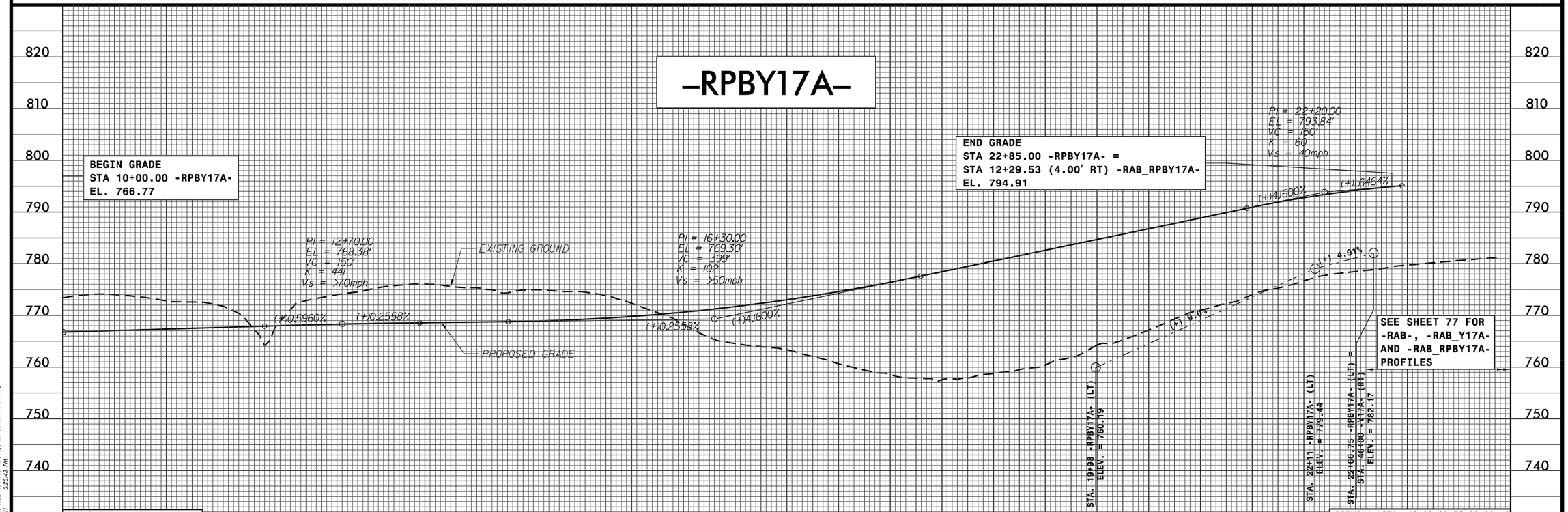
MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

-RPAY17B-



-RPBY17A-



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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	52
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

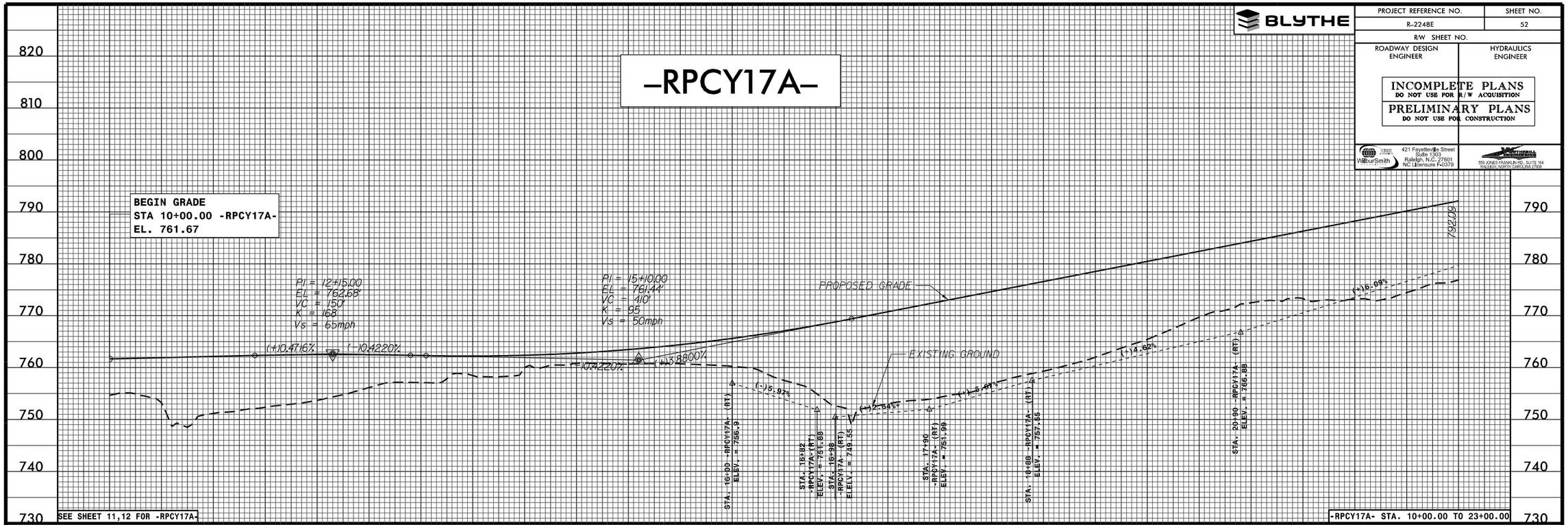
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

-RPCY17A-



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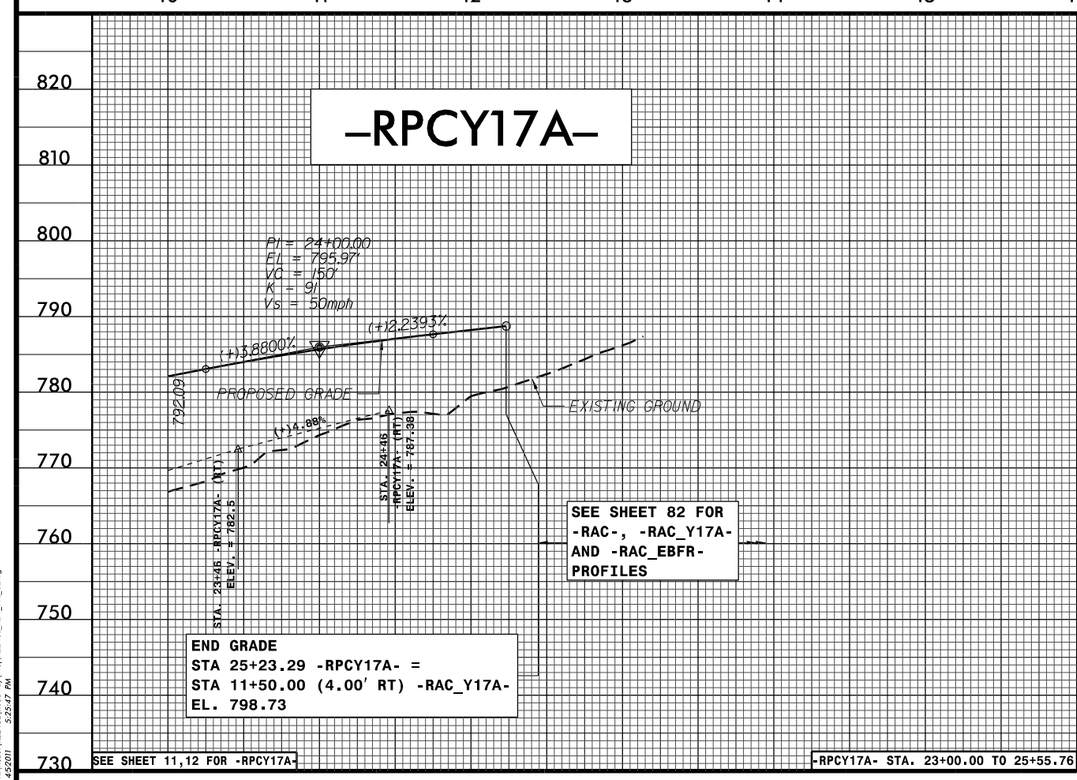
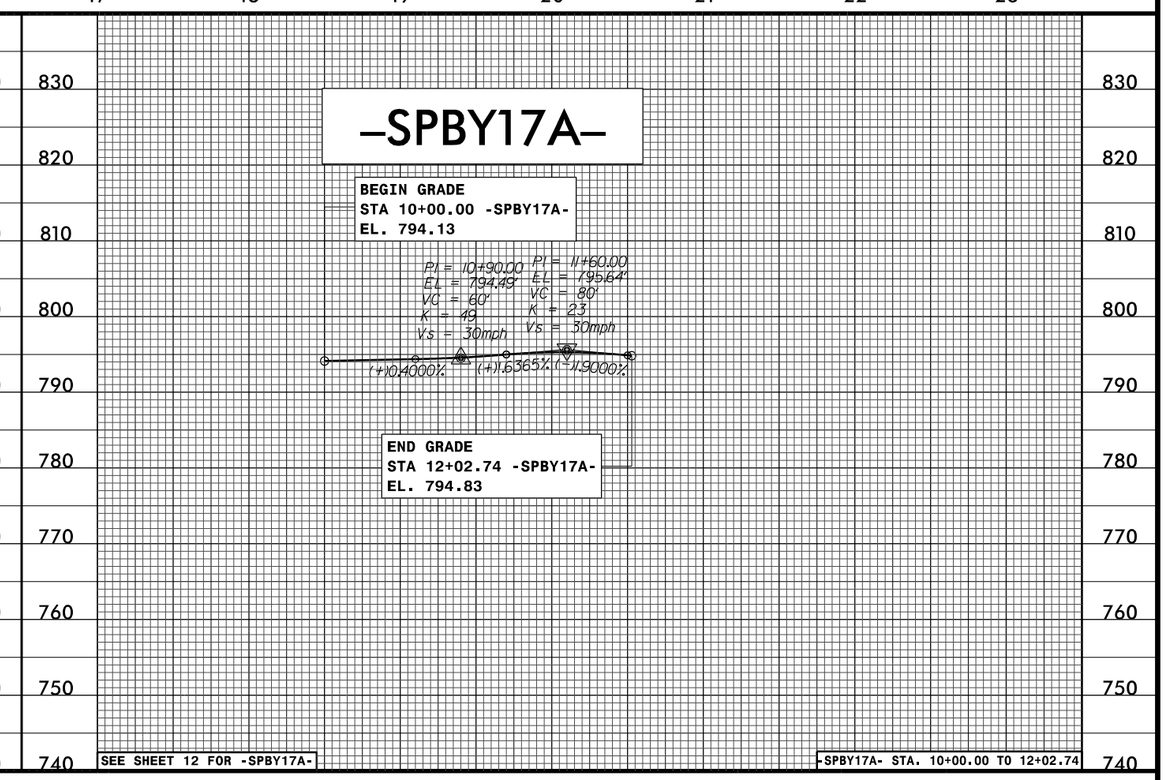


-SPBY17A-



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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	53
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

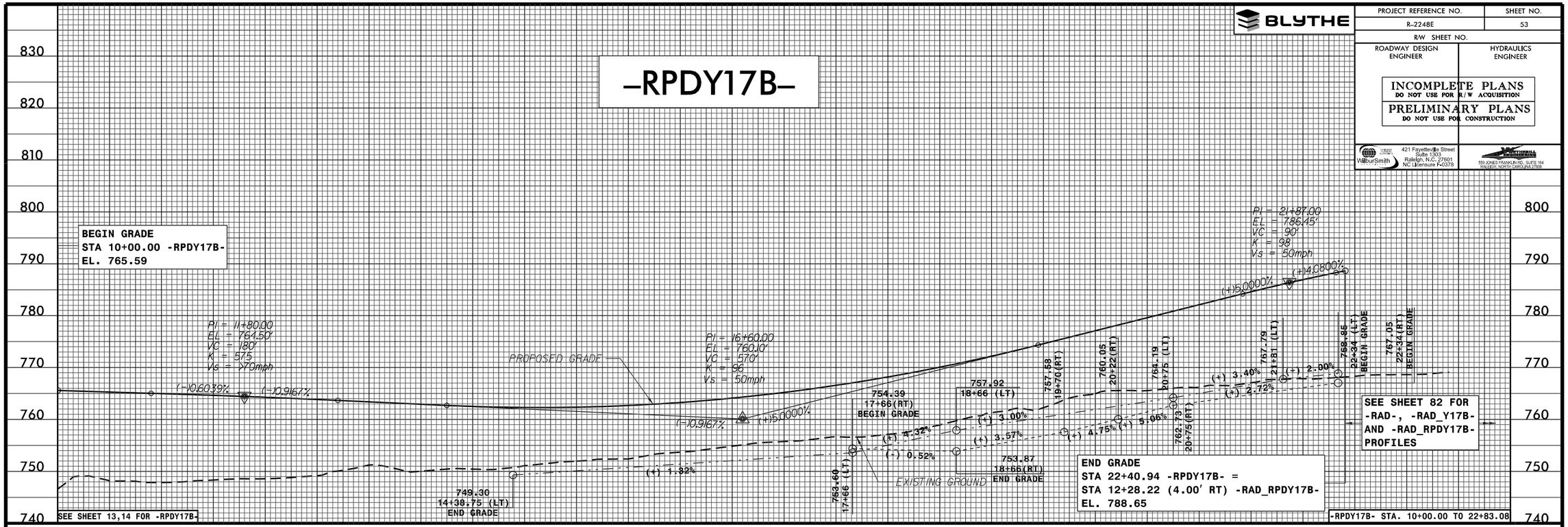
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTSINGER CONSULTING ENGINEERS — 550 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

-RPDY17B-



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BLYTHE

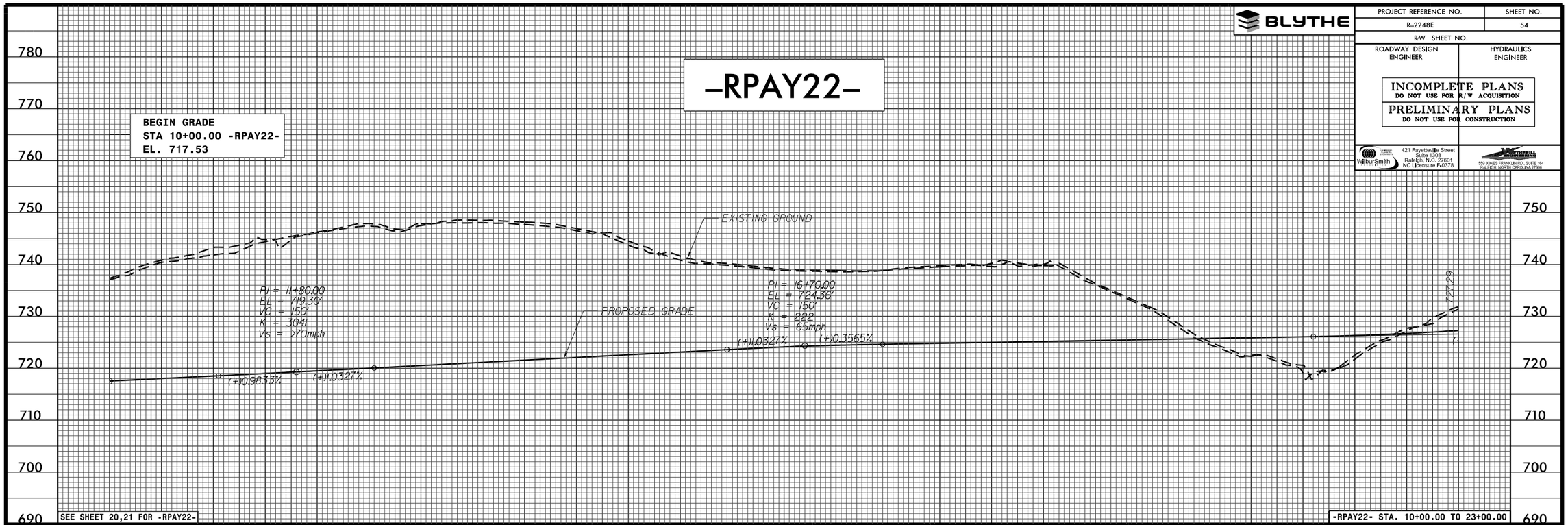
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	54
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

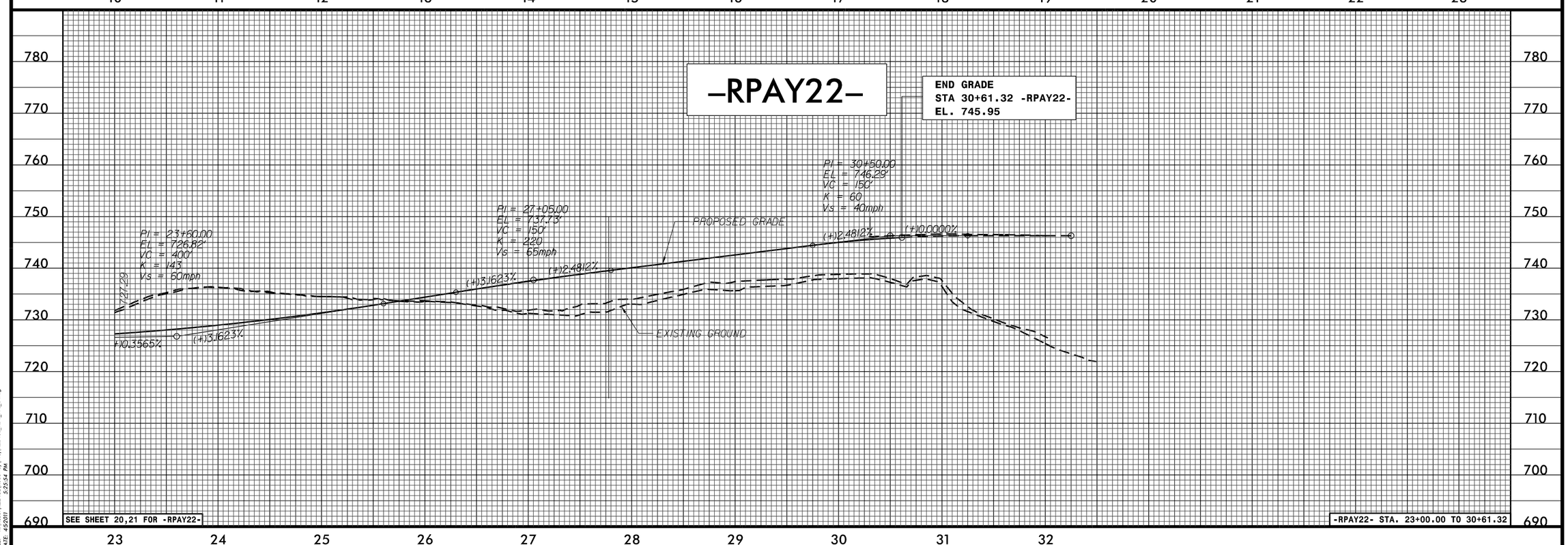
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC License F-0378

CONTINENTAL
559 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	55
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

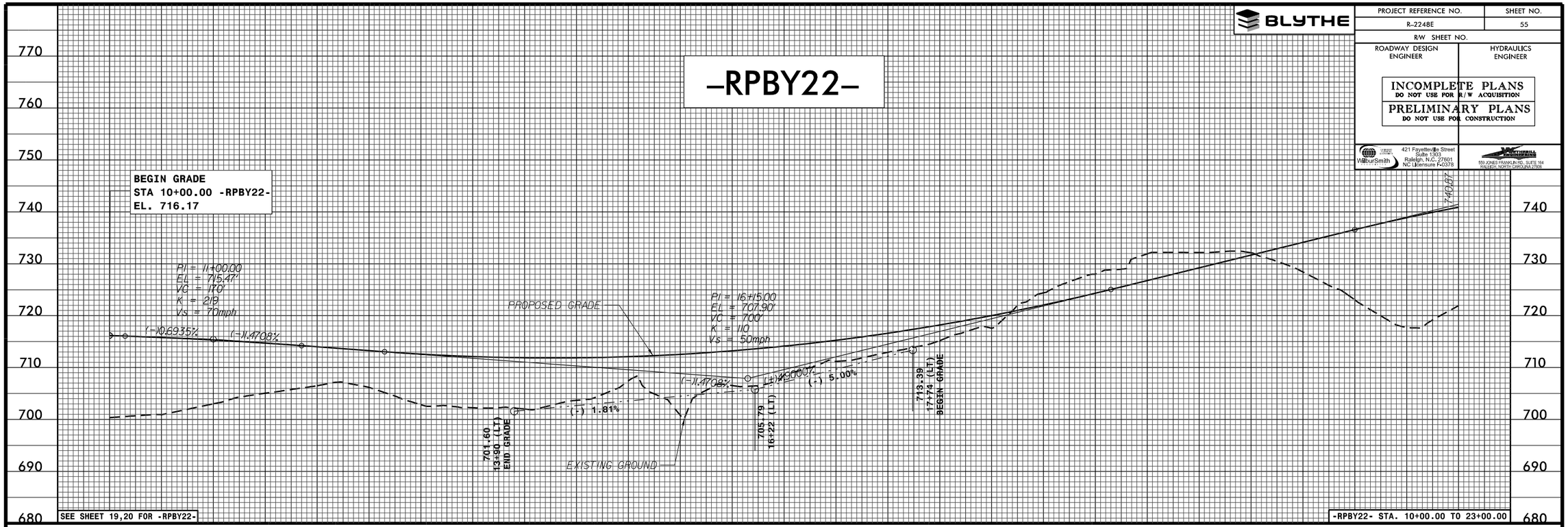
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

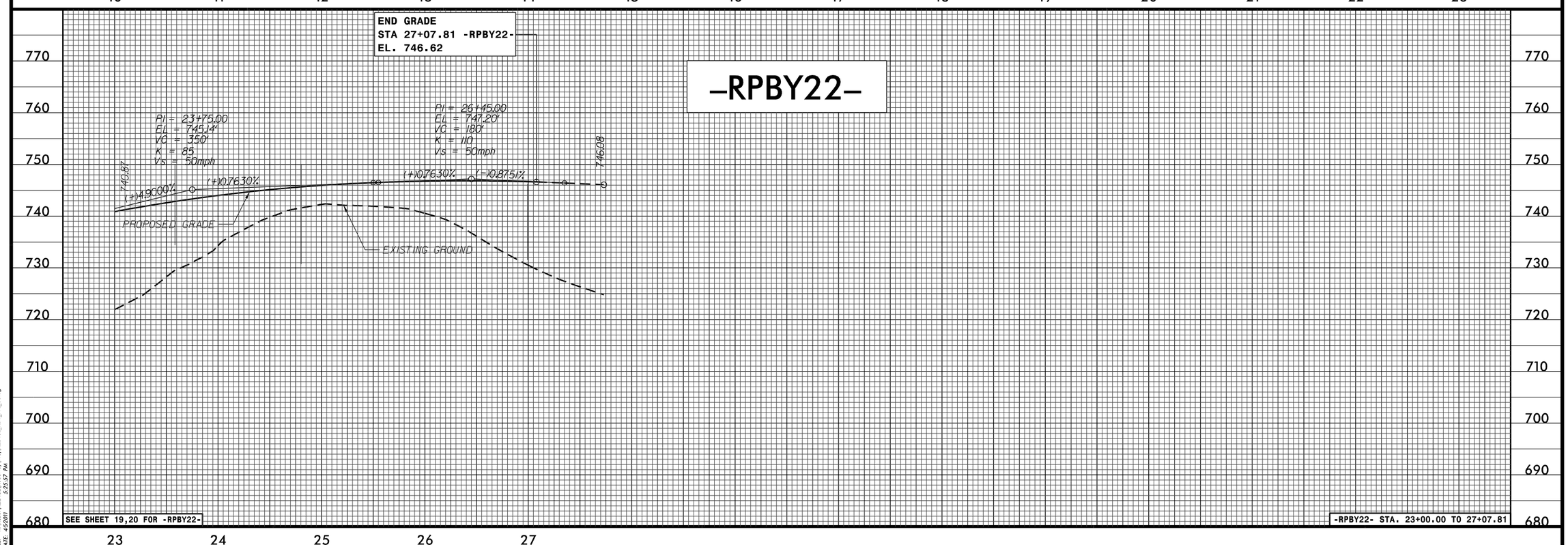
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	56
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

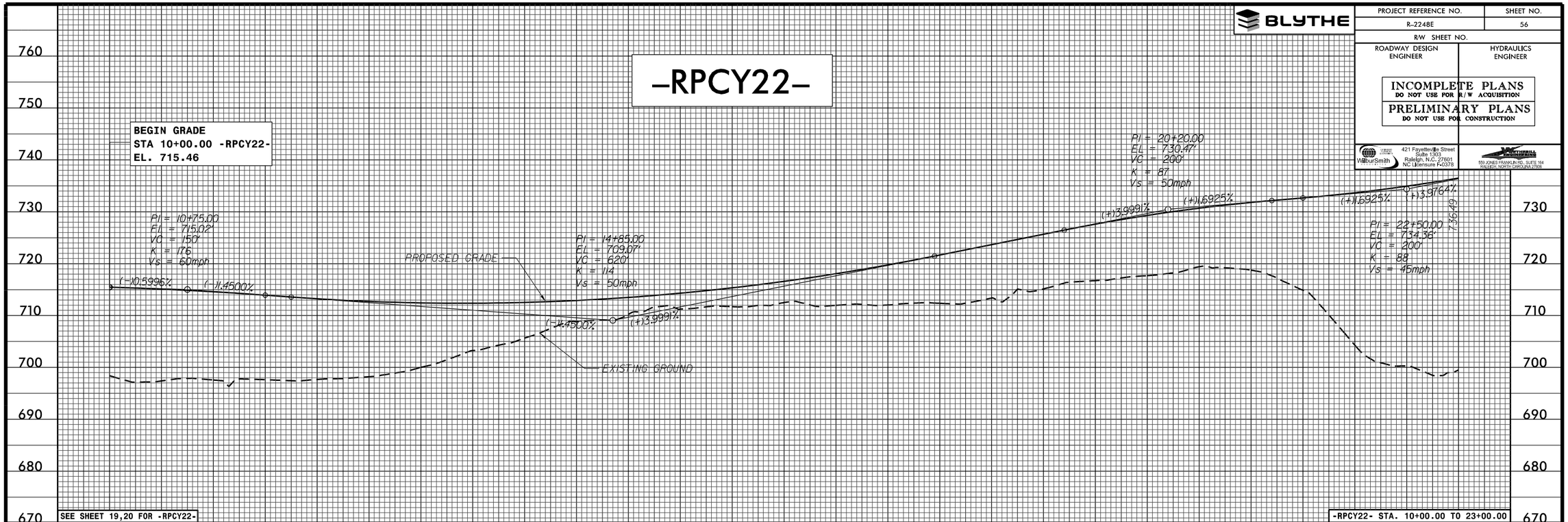
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

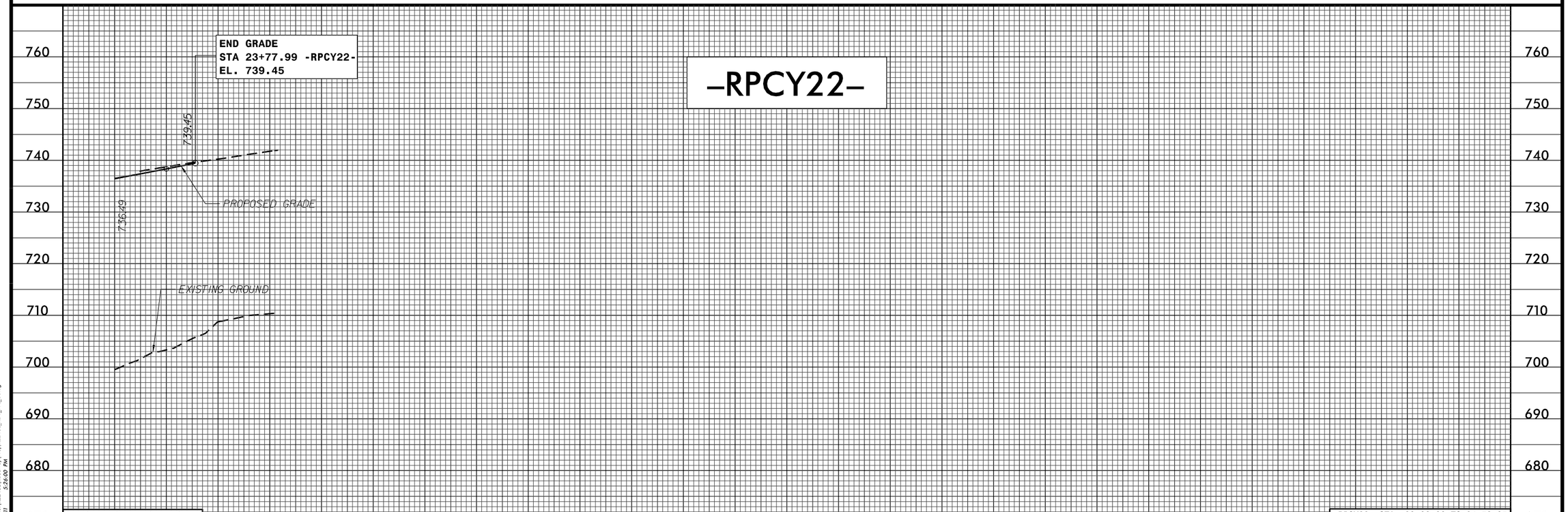
Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

-RPCY22-



-RPCY22-



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DATE: 4/5/2011 5:26:00 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	57
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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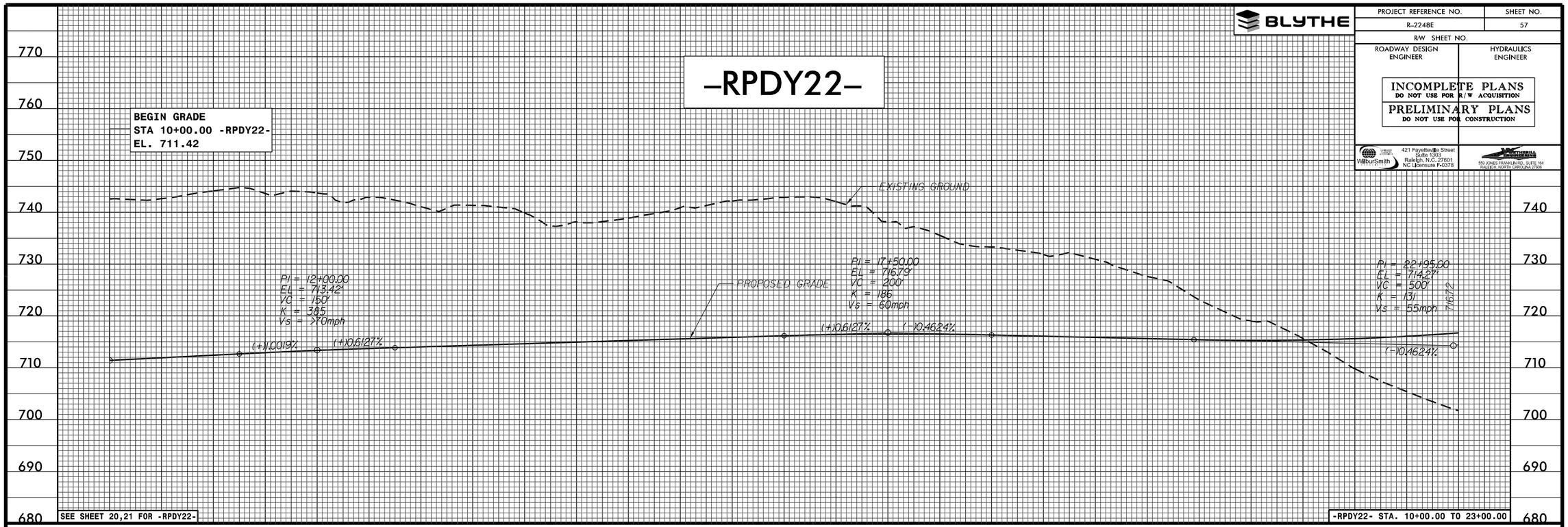
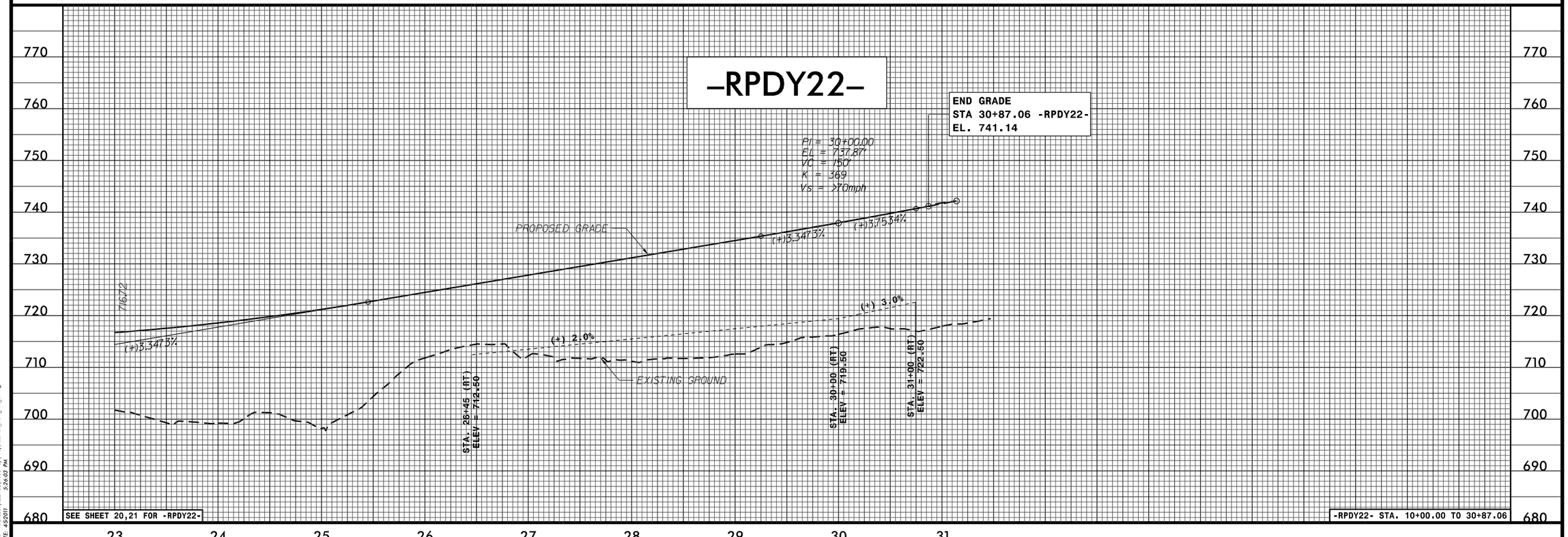
MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	58
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

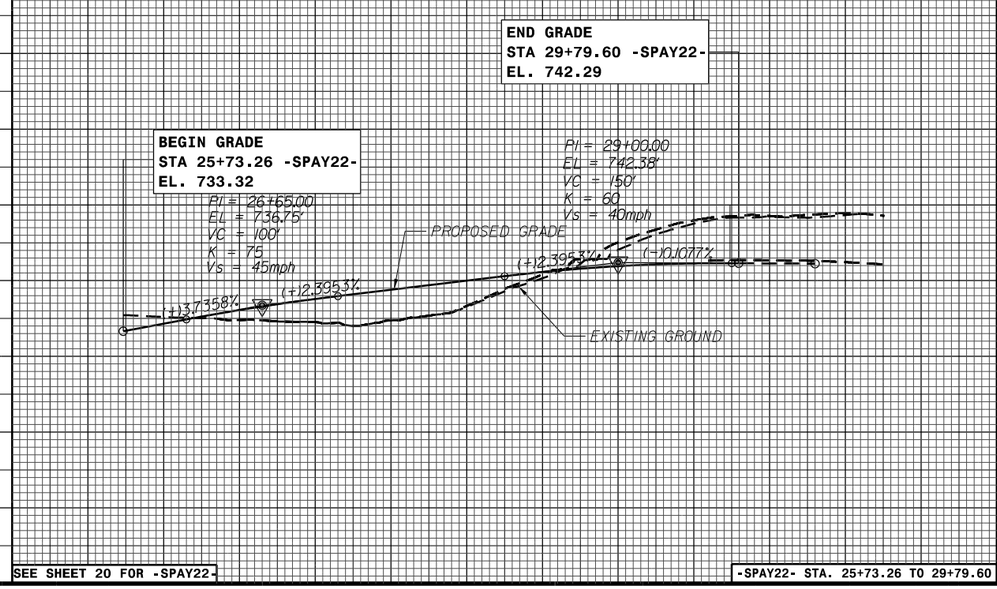
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

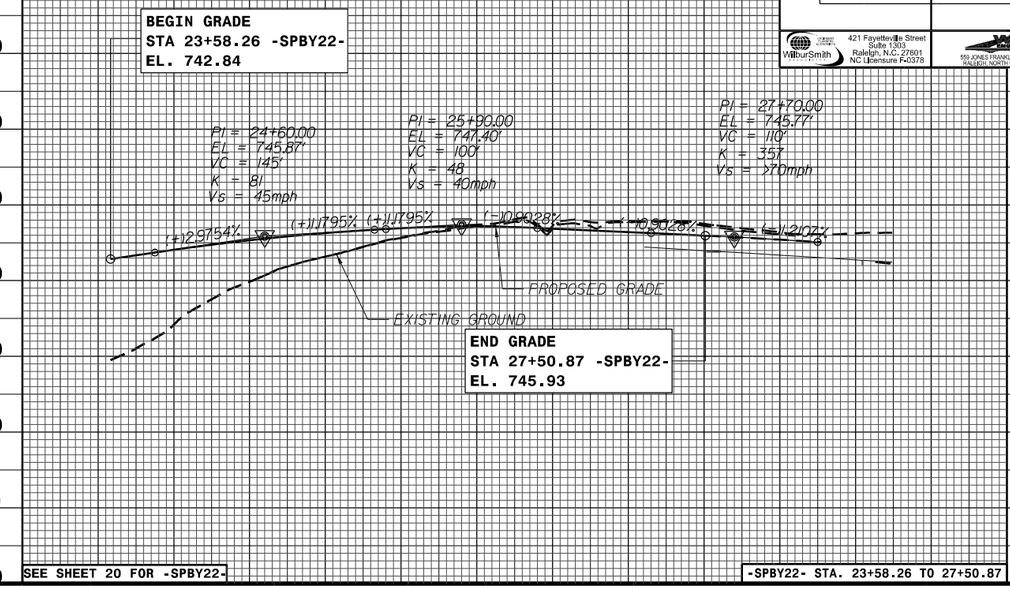
–SPAY22–



SEE SHEET 20 FOR -SPAY22-

-SPAY22- STA. 25+73.26 TO 29+79.60

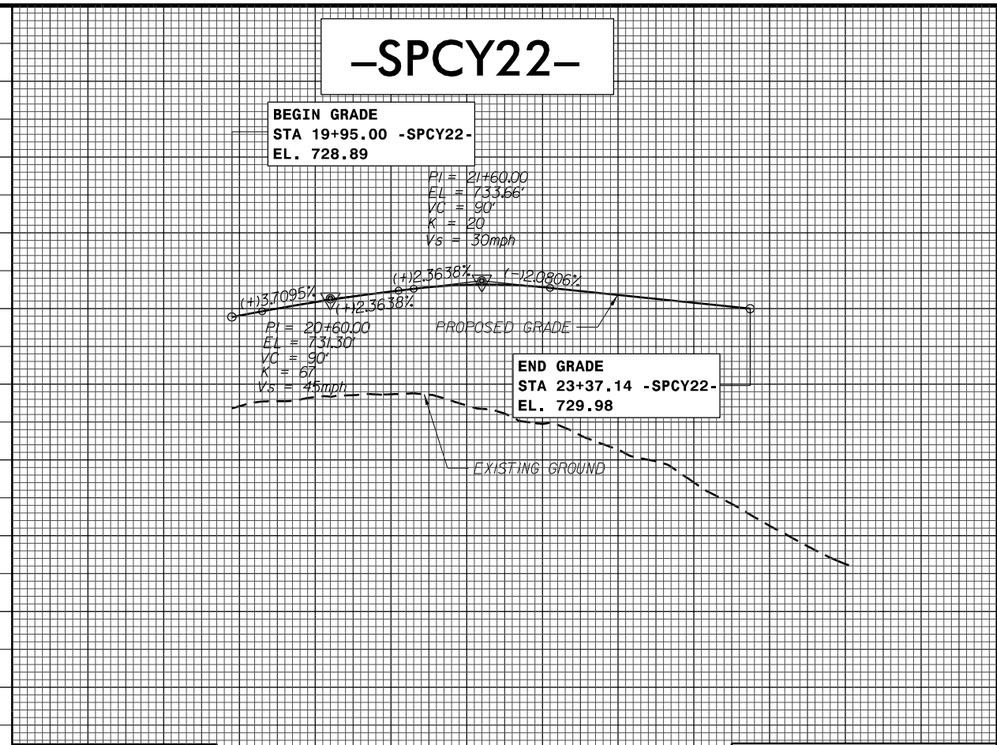
–SPBY22–



SEE SHEET 20 FOR -SPBY22-

-SPBY22- STA. 23+58.26 TO 27+50.87

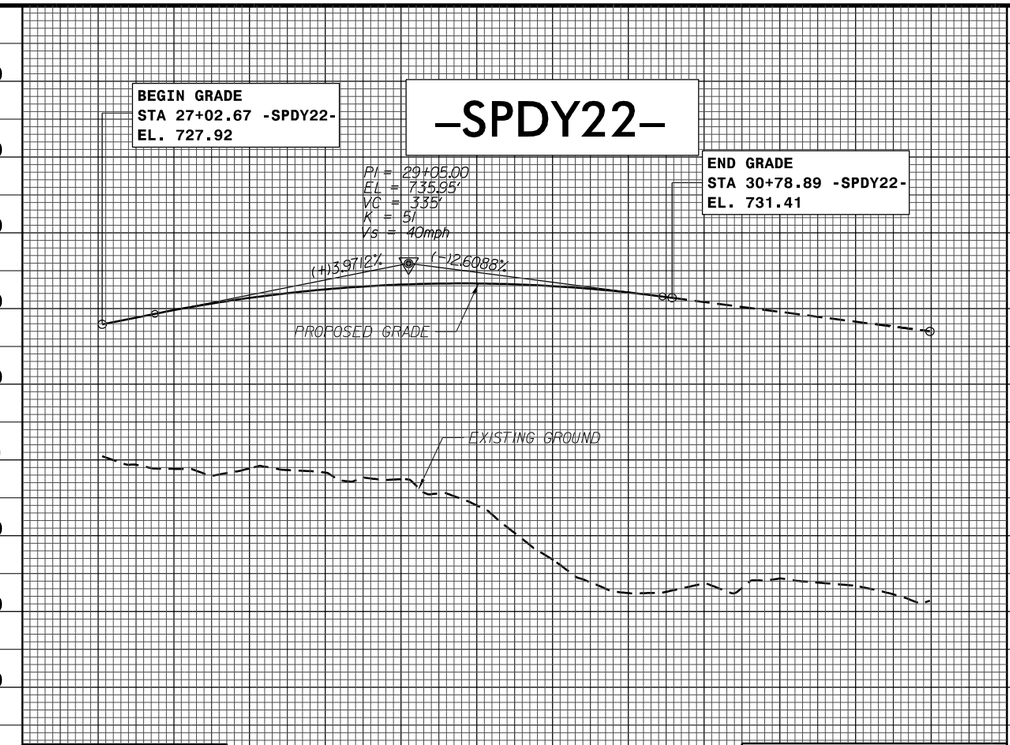
–SPCY22–



SEE SHEET 20 FOR -SPCY22-

-SPCY22- STA. 19+95.00 TO 23+37.14

–SPDY22–



SEE SHEET 20 FOR -SPDY22-

-SPBY22- STA. 27+02.66 TO 30+78.89

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	59
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

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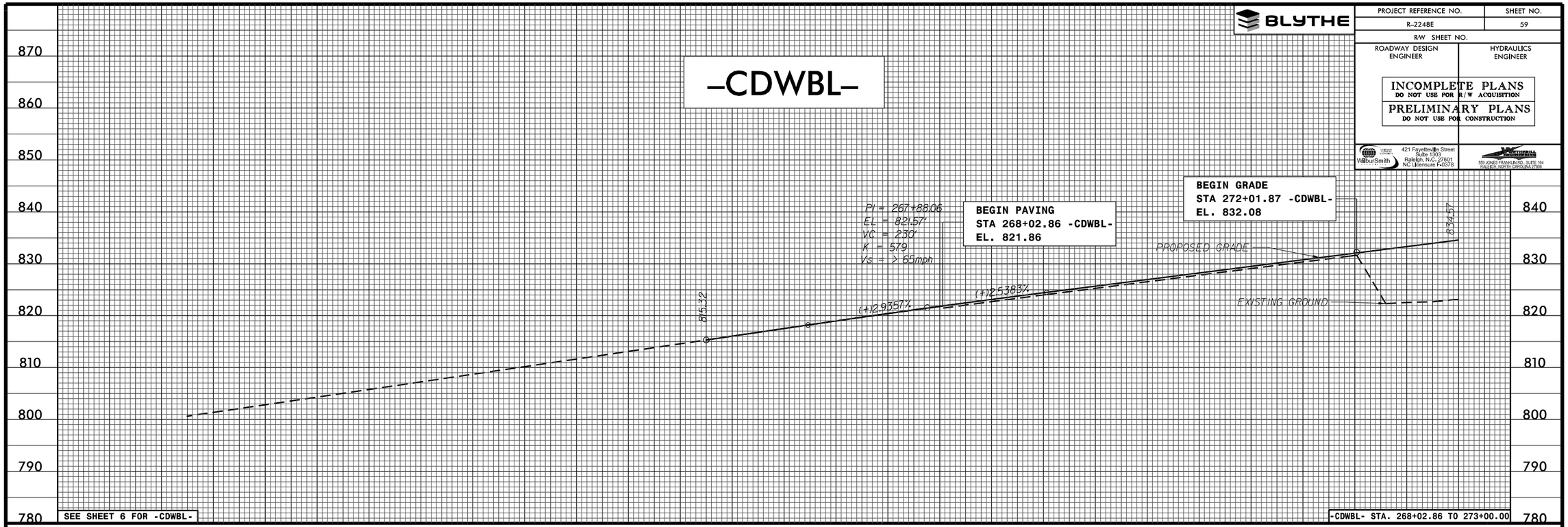
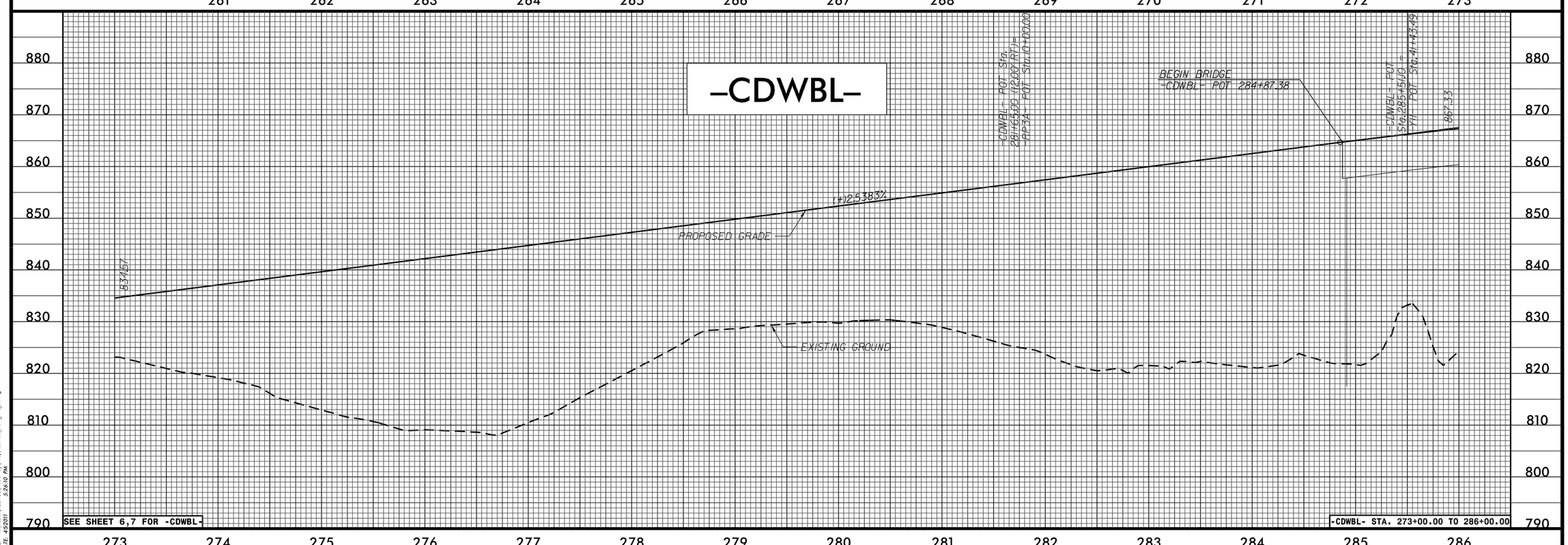
559 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	60
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

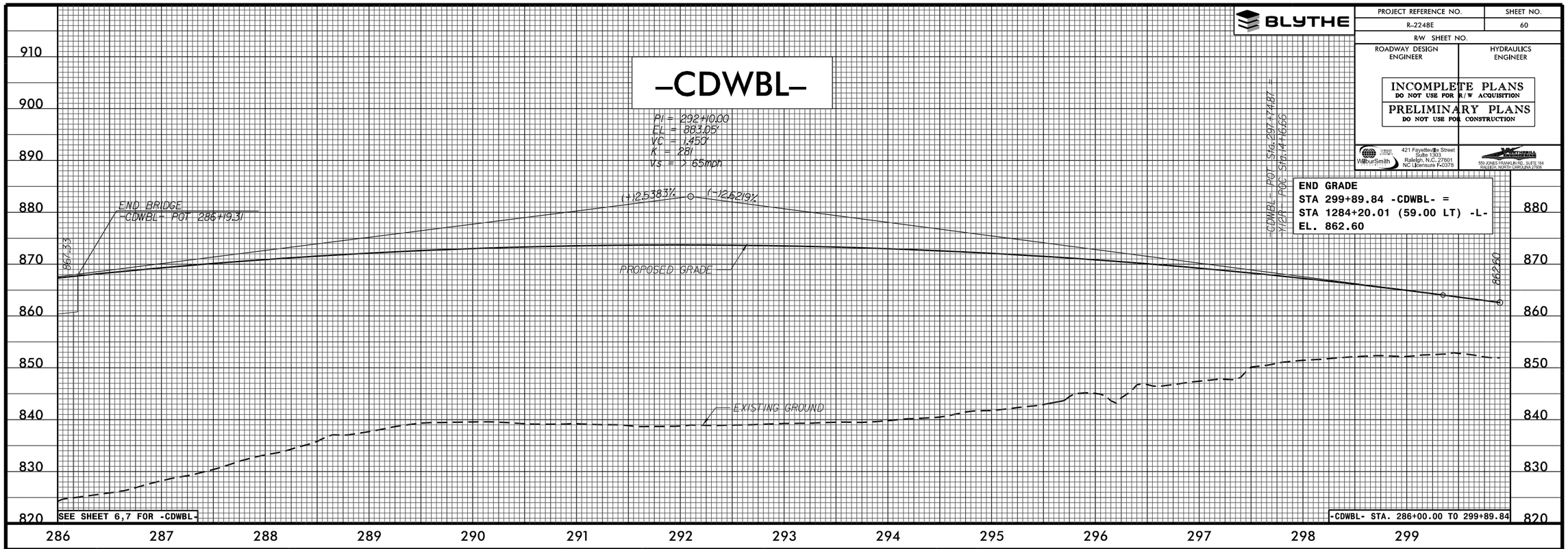
BLYTHE

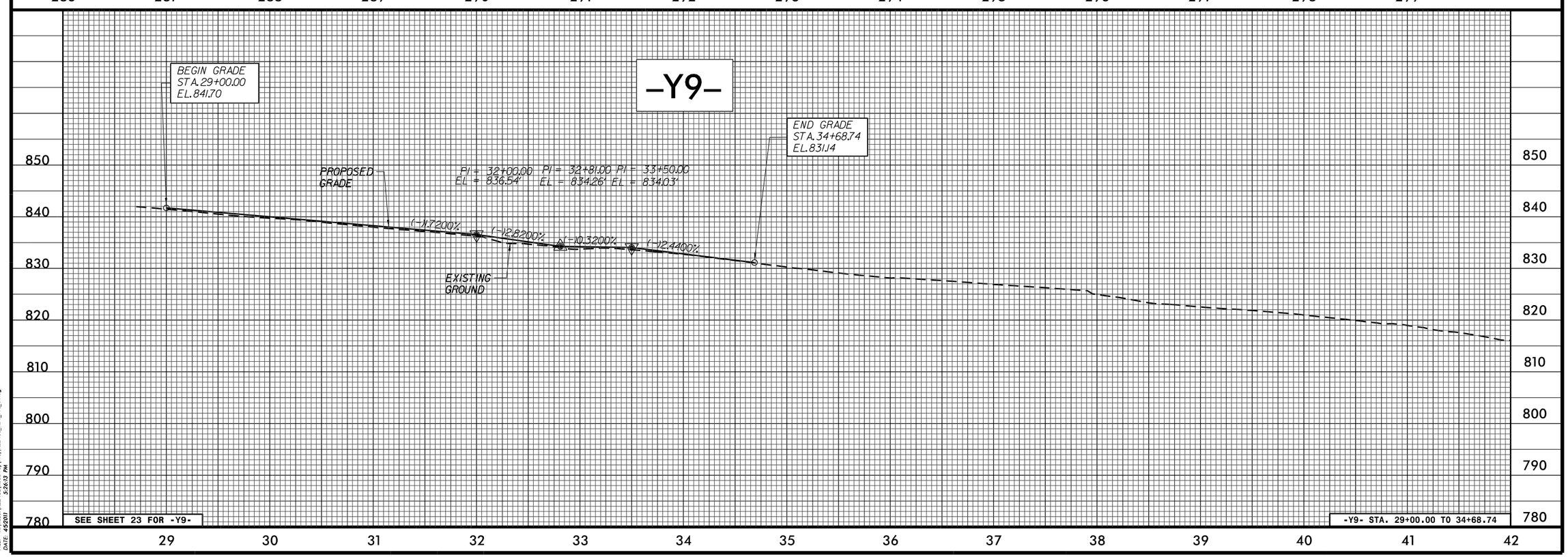
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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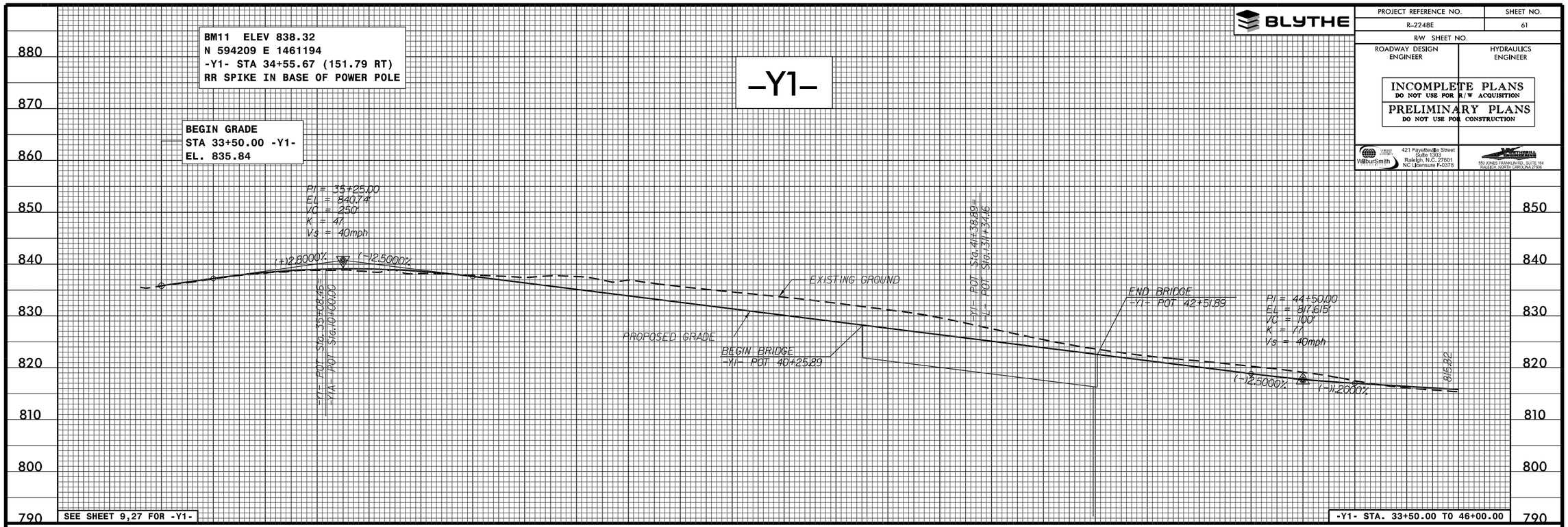
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	61
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



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DATE: 4/5/011 5:26:17 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	62
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

-Y4-

BM17 ELEV 796.83
N 592910 E 1469799
-Y4- STA 47+59.87 (17.78 LT)
RR SPIKE IN ROOT OF
50" OAK STUMP

BEGIN GRADE
STA 33+79.00 -Y4-
EL. 792.67

END GRADE
STA 45+00.00 -Y4-
EL. 798.66

PI = 35+90.00
EL = 799.29'
VC = 80'
K = 48
Vs = 40mph

PI = 39+00.00
EL = 781.61'
VC = 500'
K = 64
Vs = 40mph

PI = 42+80.00
EL = 800.61'
VC = 260'
K = 44
Vs = 40mph

(-)11.300%
(-)2.8000%
(+)1.6%
(-)1.90%
(-)5.72%
(-)2.8000%
(+)5.0000%
(-)0.90%
(+)5.0000%
(-)0.8857%
(-)1.0.3%
PROPOSED GRADE
EXISTING GROUND
784.40
36+50 LT
786.00
35+50 LT
BEGIN GRADE
783.92
36+30 RT
BEGIN GRADE
781.80
37+40 RT
END GRADE
778.82
38+00 LT
END GRADE
784.23
39+8 RT
BEGIN GRADE
795.06
42+50 LT
BEGIN GRADE
794.31
45+00 LT

SEE SHEET 29,30 FOR -Y4-

-Y4- STA. 33+79.00 TO 45+00.00

-Y2-

BEGIN GRADE
STA 10+00.00 -Y2- =
STA 18+01.20 -EBFR-
EL. 804.50

END GRADE
STA 11+75.00-Y2-
EL. 810.86

PI = 10+06.00
EL = 804.62'
K = 44

PI = 11+05.00
EL = 809.57'
VC = 140'

804.50
(+)2.0000%
(+)5.0000%
(+)1.8400%
EXISTING GROUND
PROPOSED GRADE

SEE SHEET 12 FOR -Y2-

-Y2- STA. 10+00.00 TO 12+70.92

-Y5-

BEGIN GRADE
STA 18+01.06 -Y5-
EL. 779.31

PI = 19+45.00
EL = 783.63'
VC = 90'
K = 21
Vs = 30mph

PI = 19+90.51
EL = 783.04'

(+)3.0000%
(-)1.2815%
(-)3.0025%
PROPOSED GRADE
EXISTING GROUND

BEGIN GRADE
STA 20+06.93 -Y5- =
STA 38+37.76 -SERVA-
EL. 782.54

SEE SHEET 16 FOR -Y5-

-Y5- STA. 18+01.06 TO 20+06.93

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_62.dgn
DATE: 4/5/011 5:26:20 PM

BLYTHE

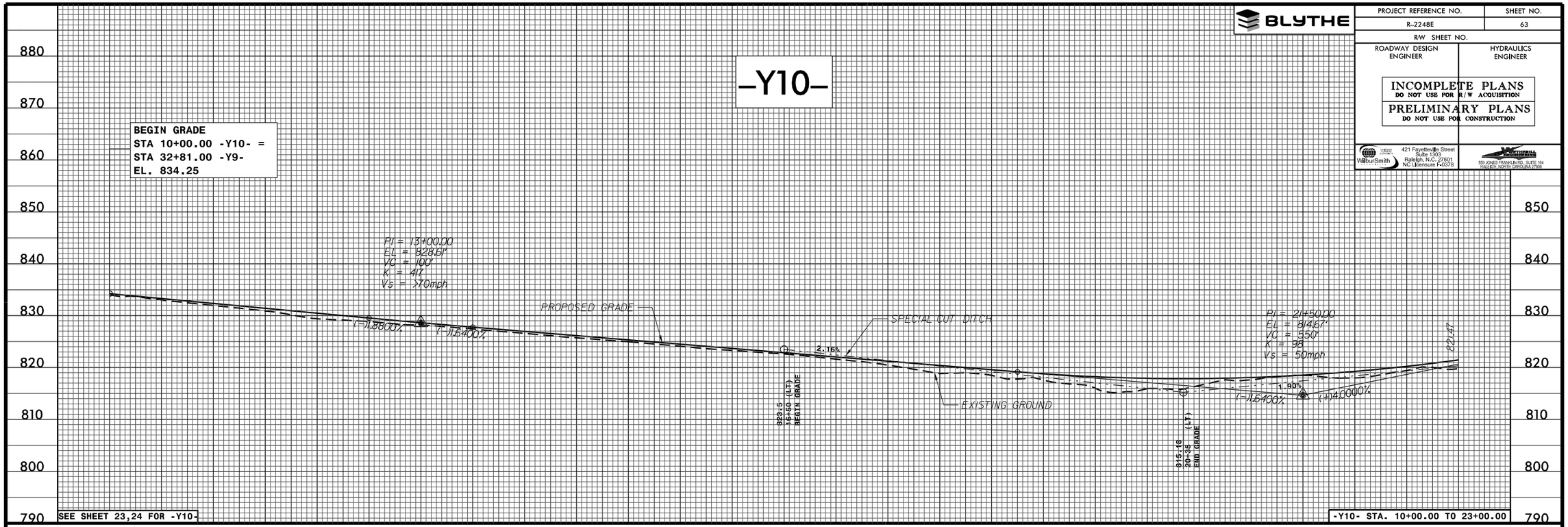
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	63
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

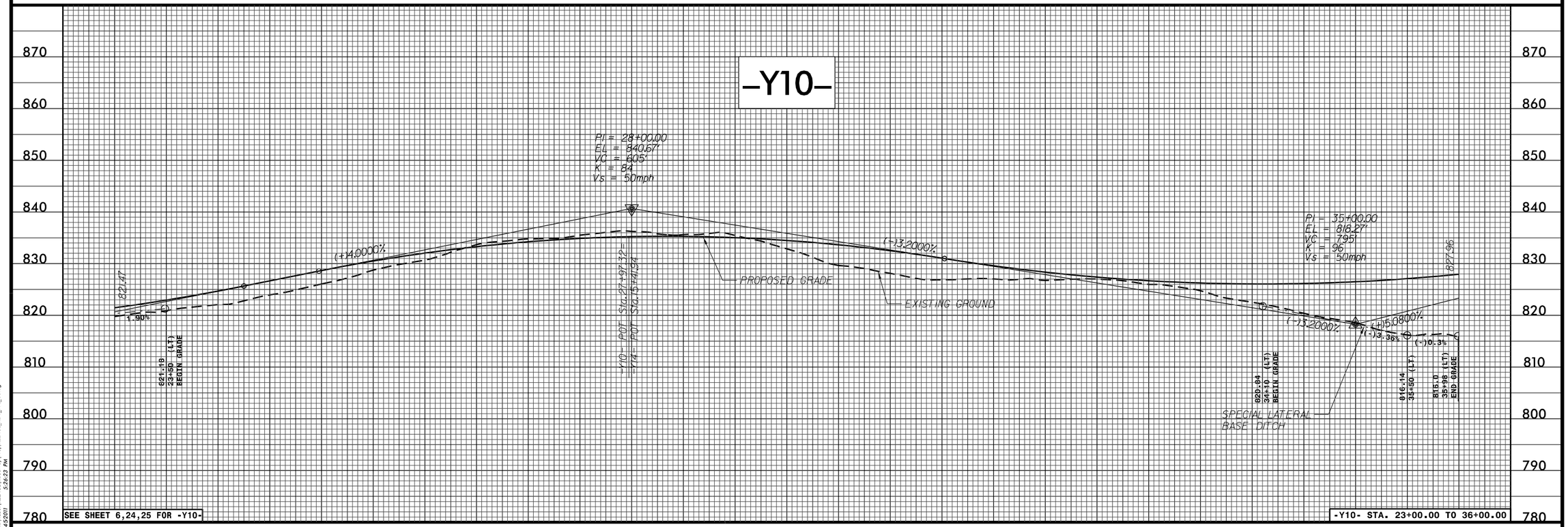
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/2011 5:26:23 PM

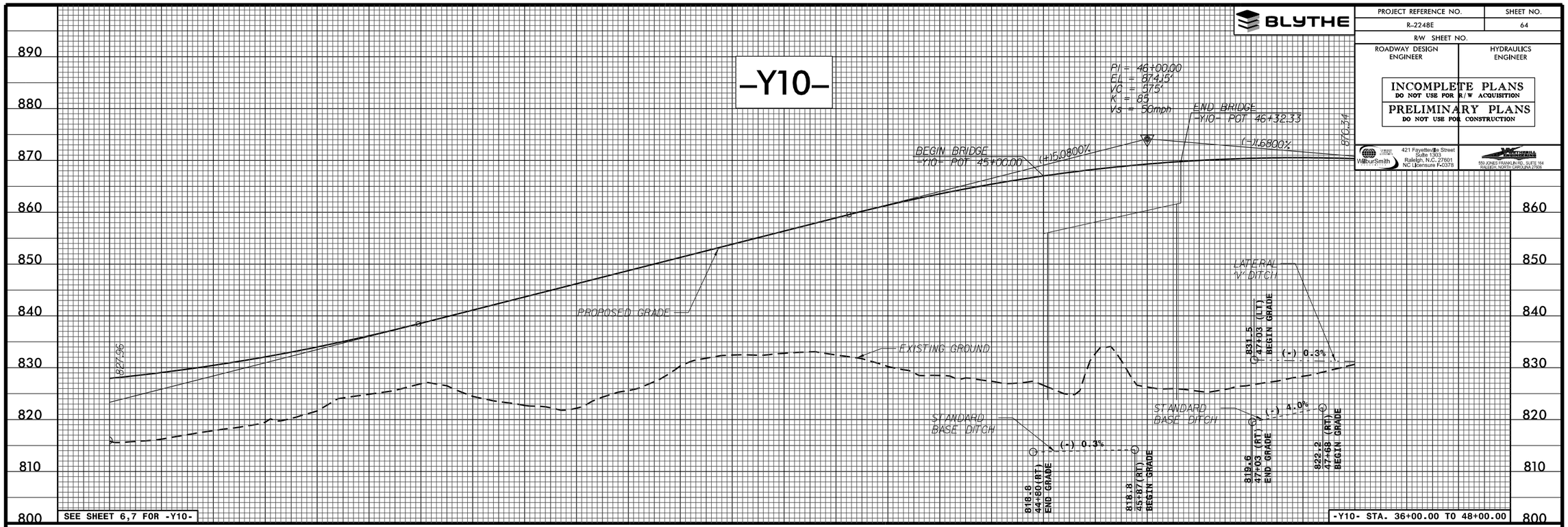
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	64
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

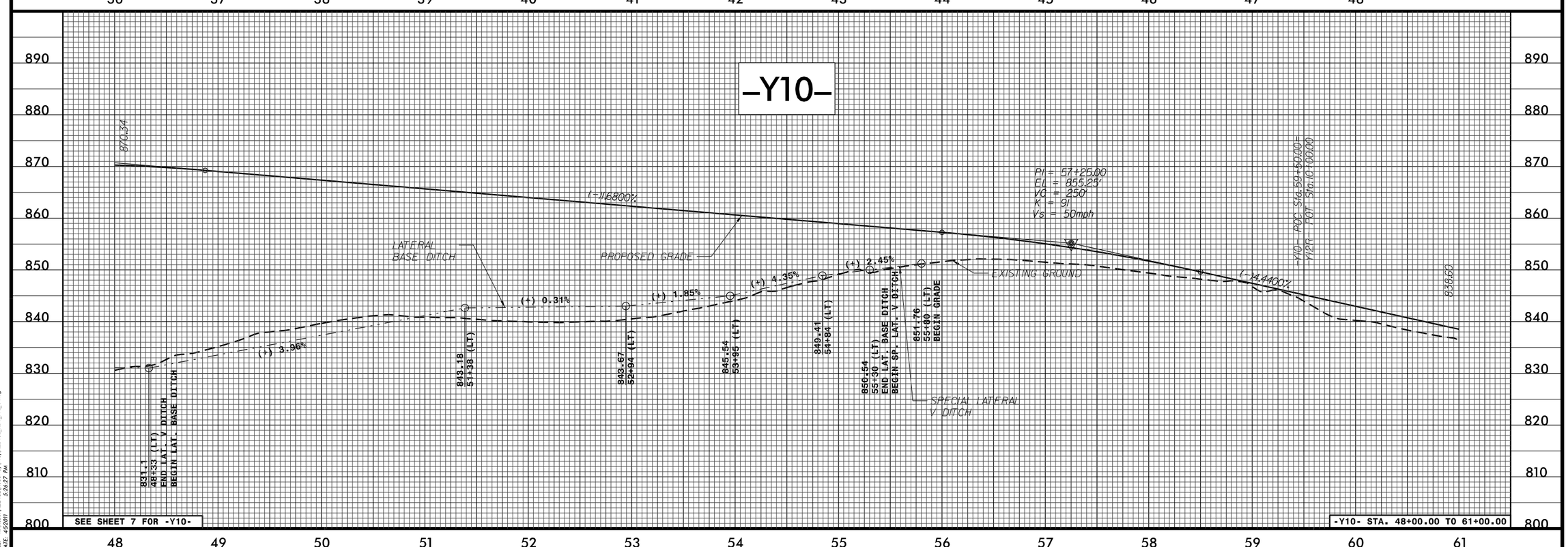
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

MATTHEWS DESIGN GROUP
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/011 5:26:27 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	65
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

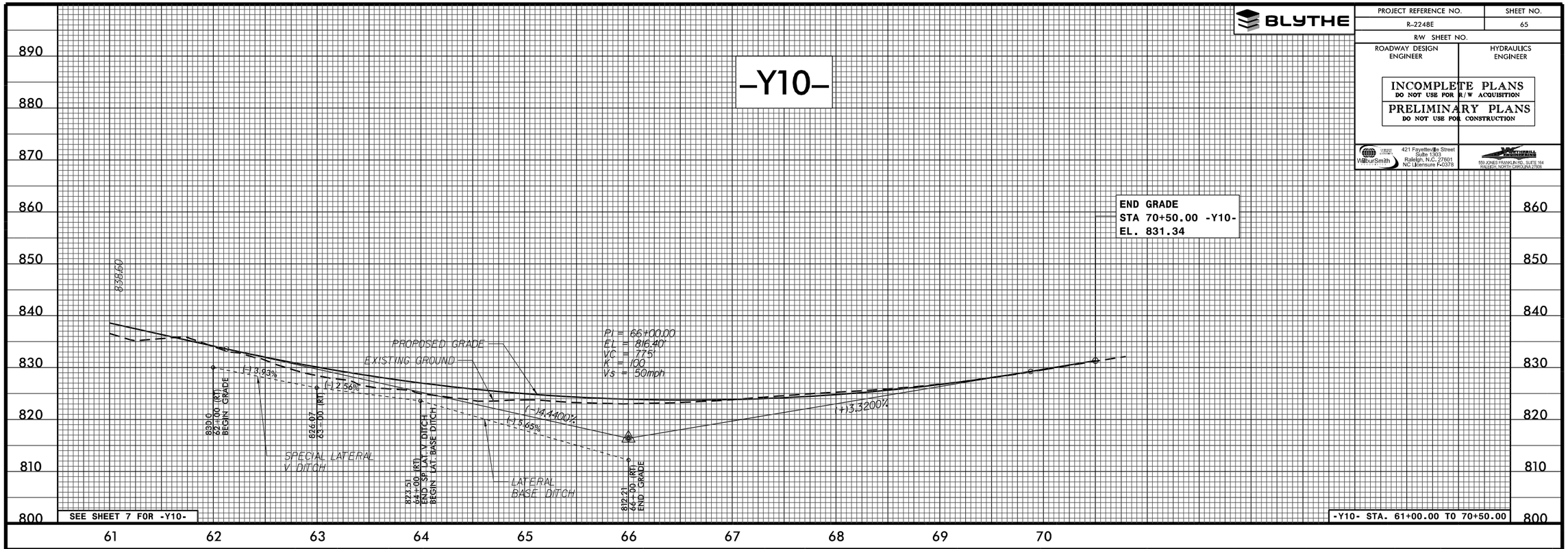
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

-Y10-



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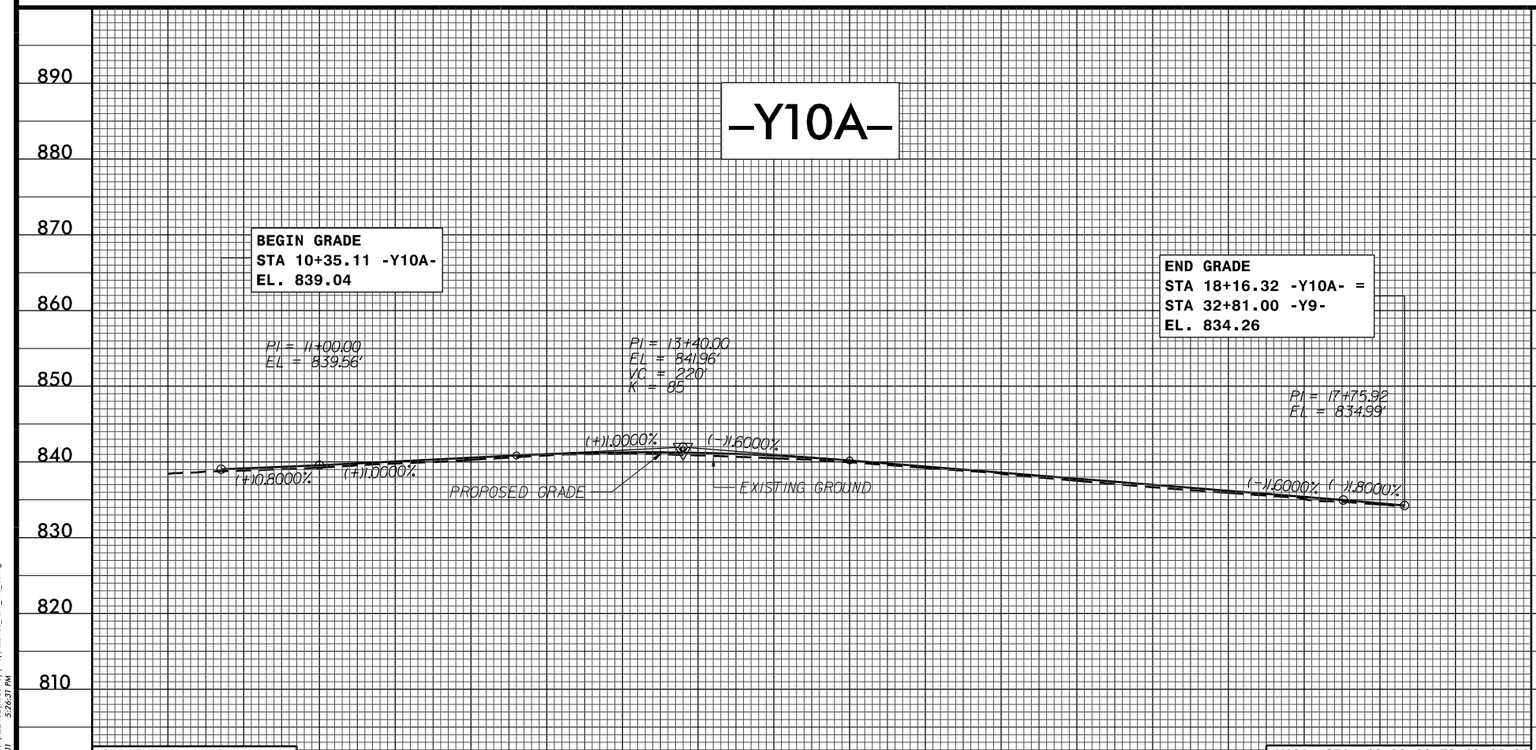
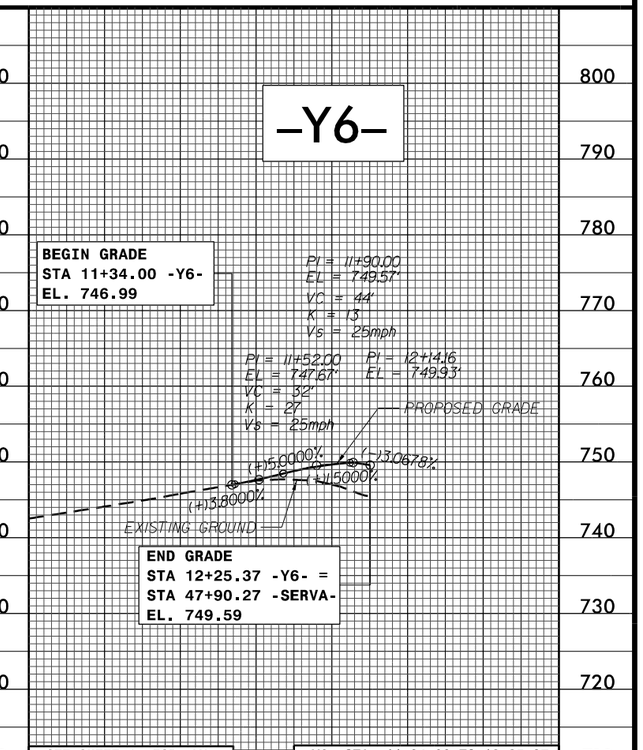


-Y6-



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DATE: 4/5/2011 5:26:31 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	66
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

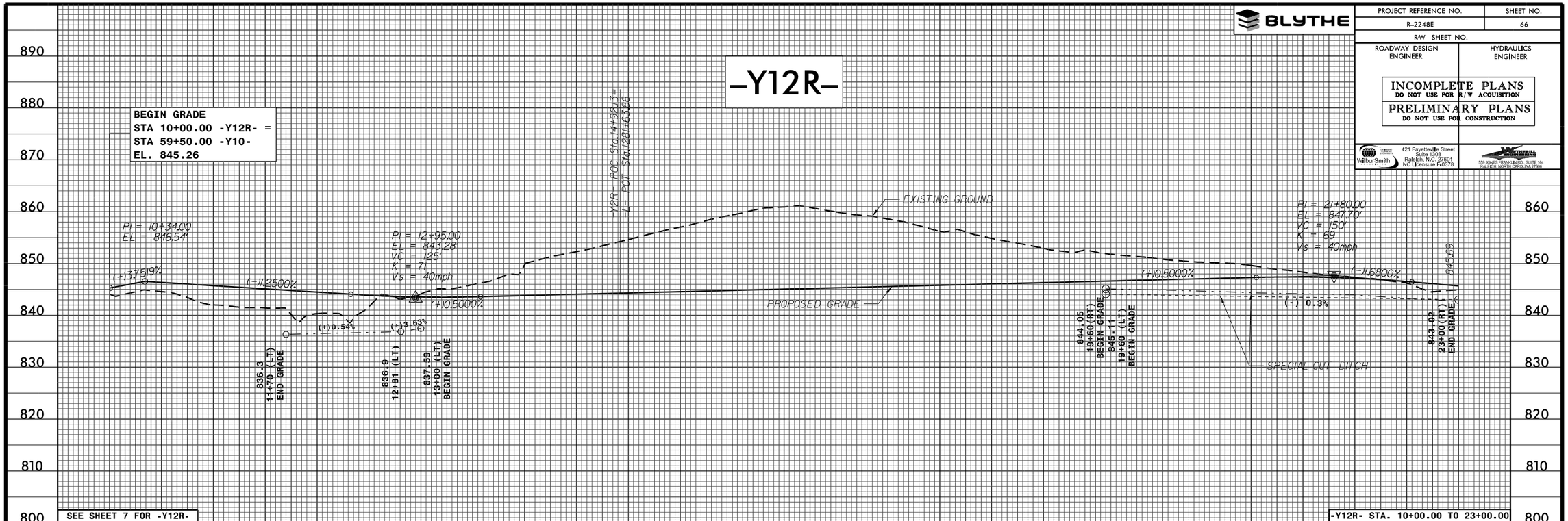
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

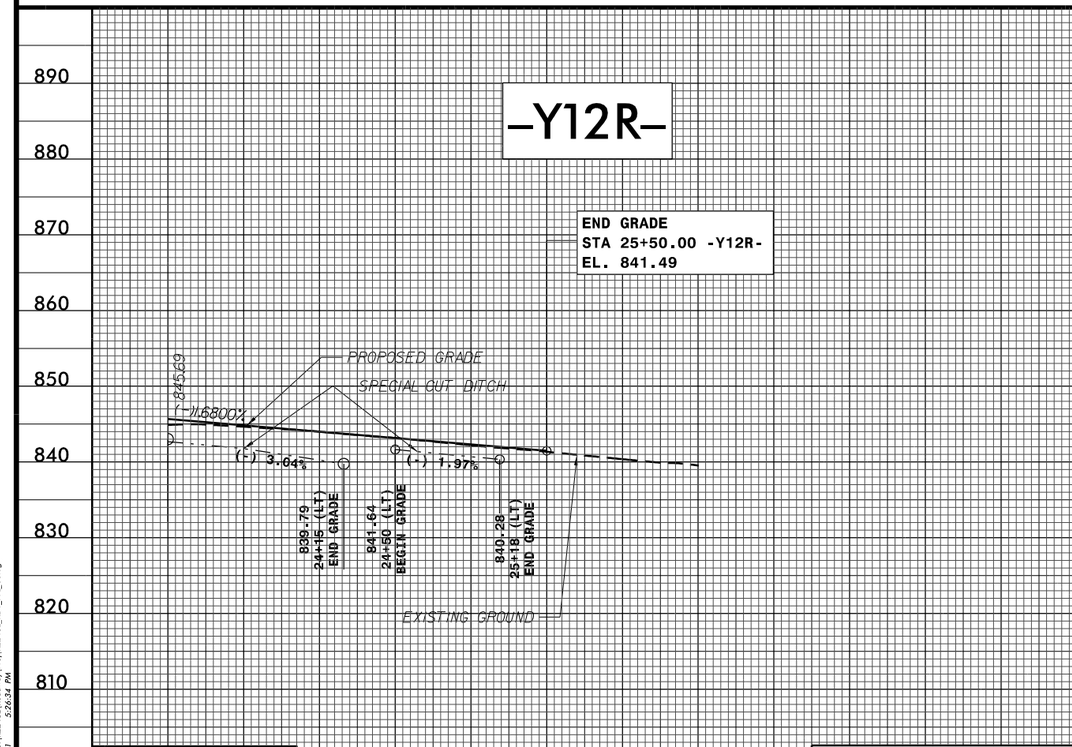
WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

-Y12R-



-Y12R-



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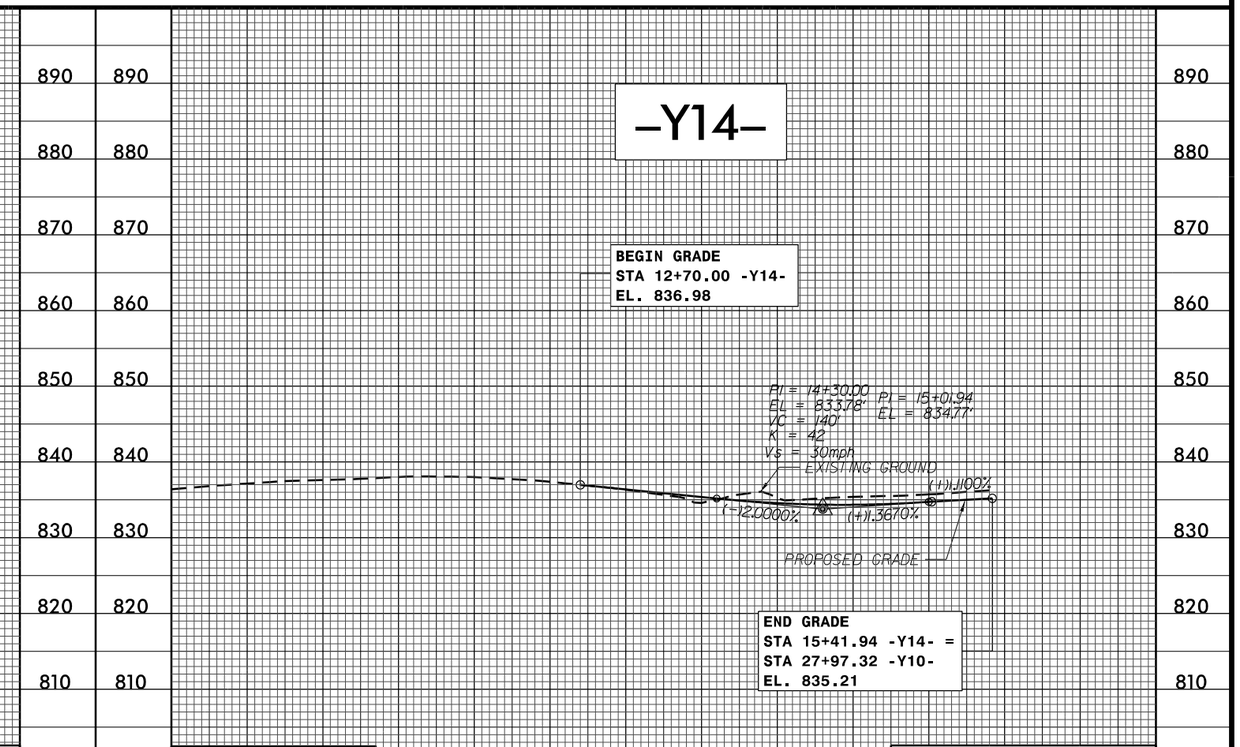

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DATE: 4/5/2011 5:26:34 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	67
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

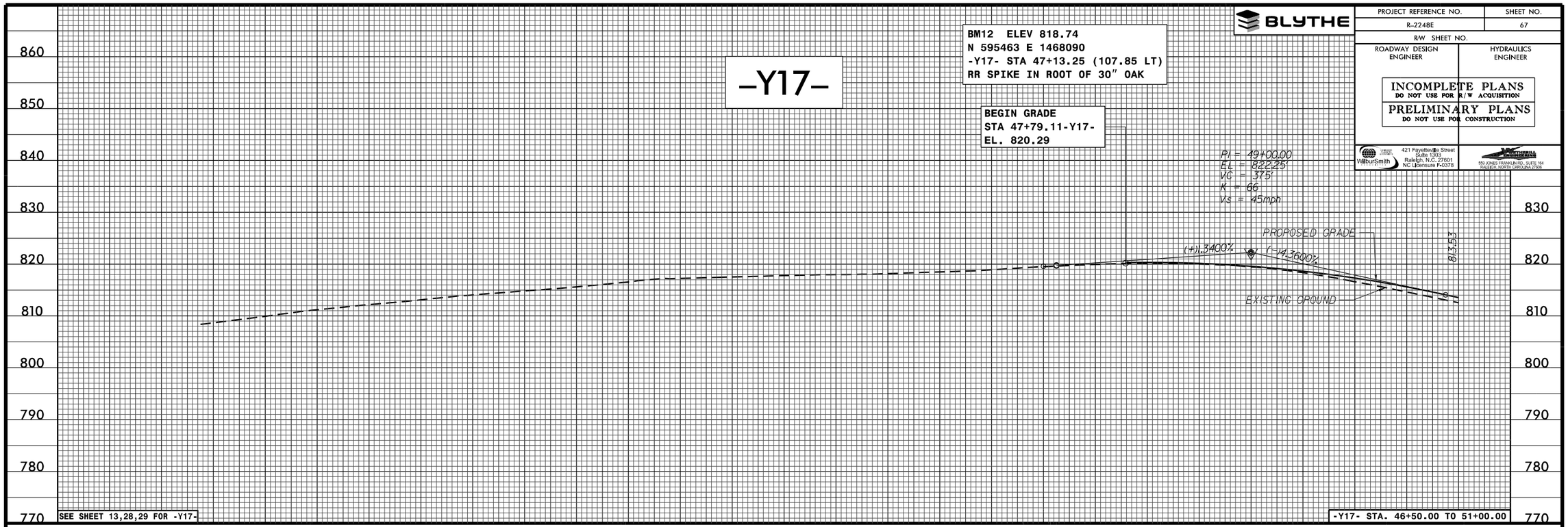
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

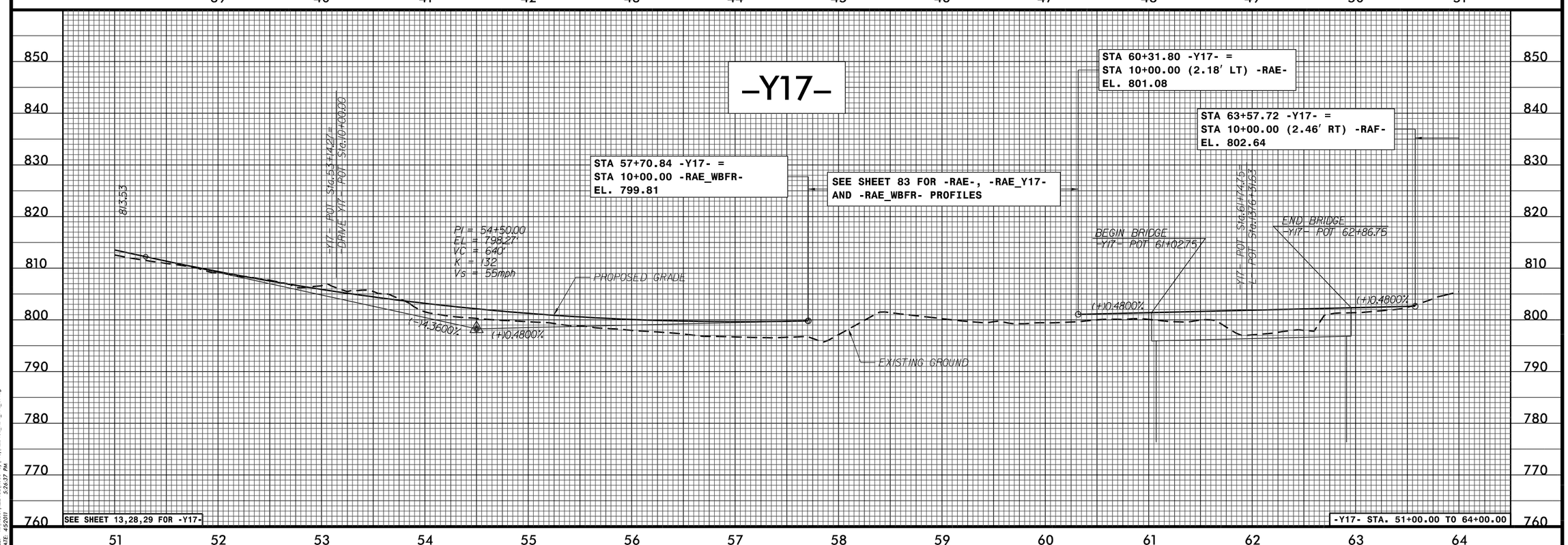
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE





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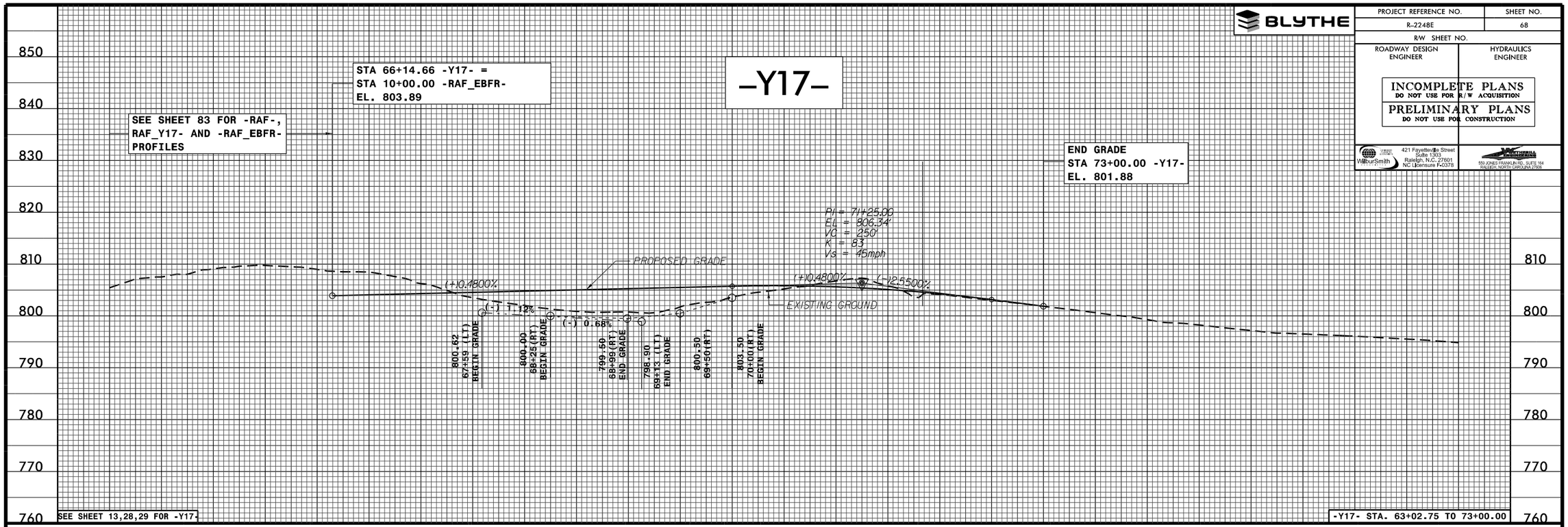
DATE: 4/5/2011 5:26:37 PM

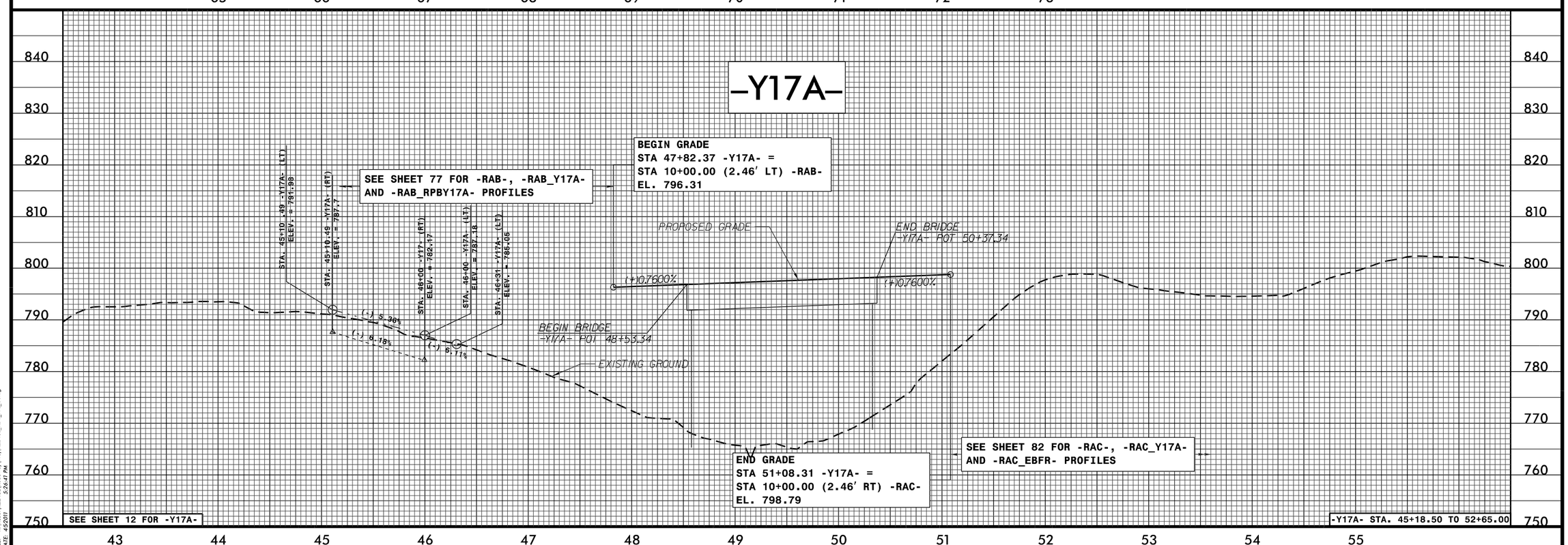
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	68
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

BLYTHE — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/2011 5:26:41 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	69
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

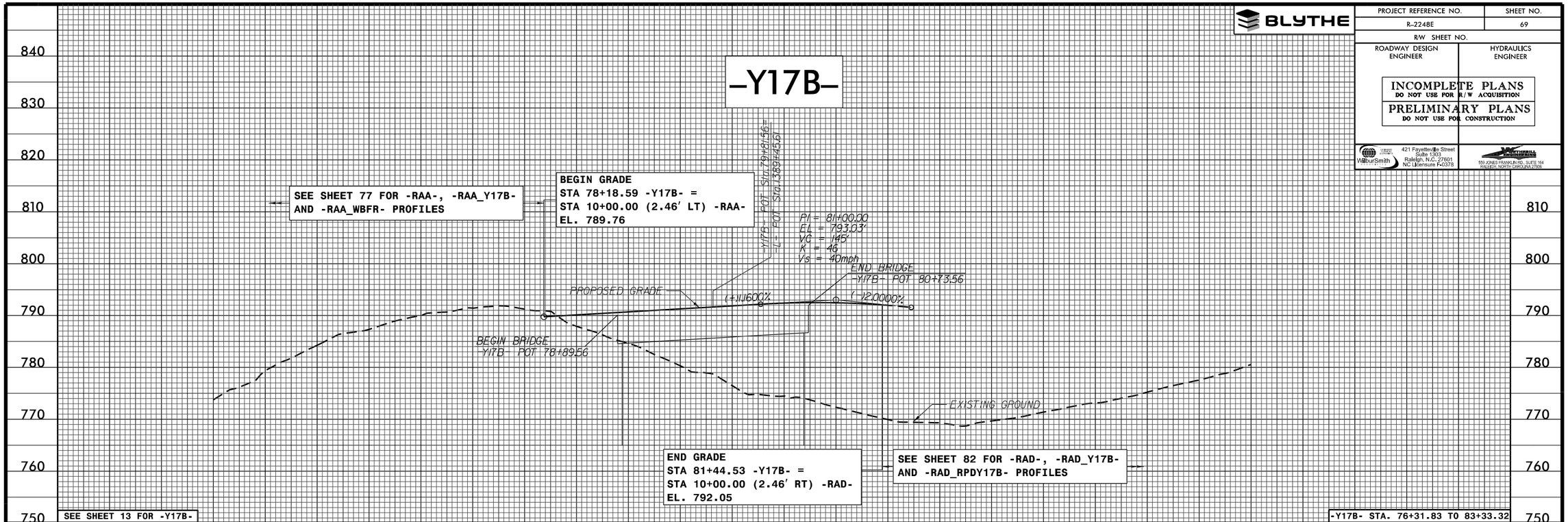
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

CONTINUUM — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

-Y17B-



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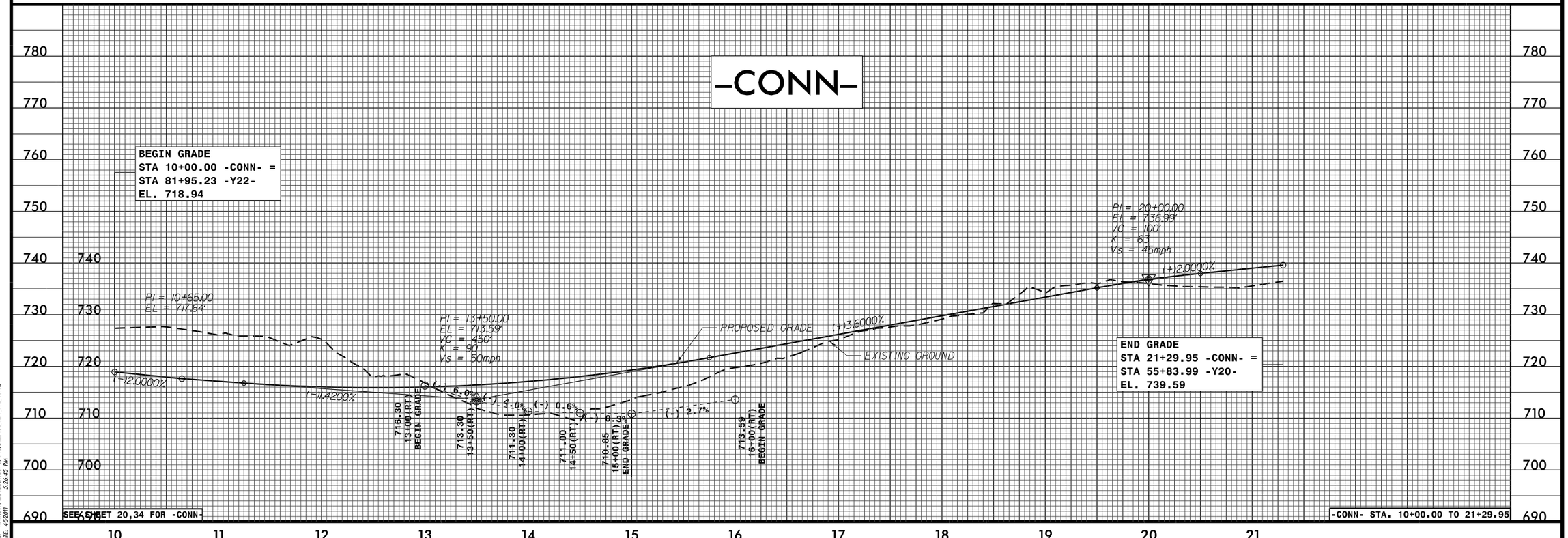

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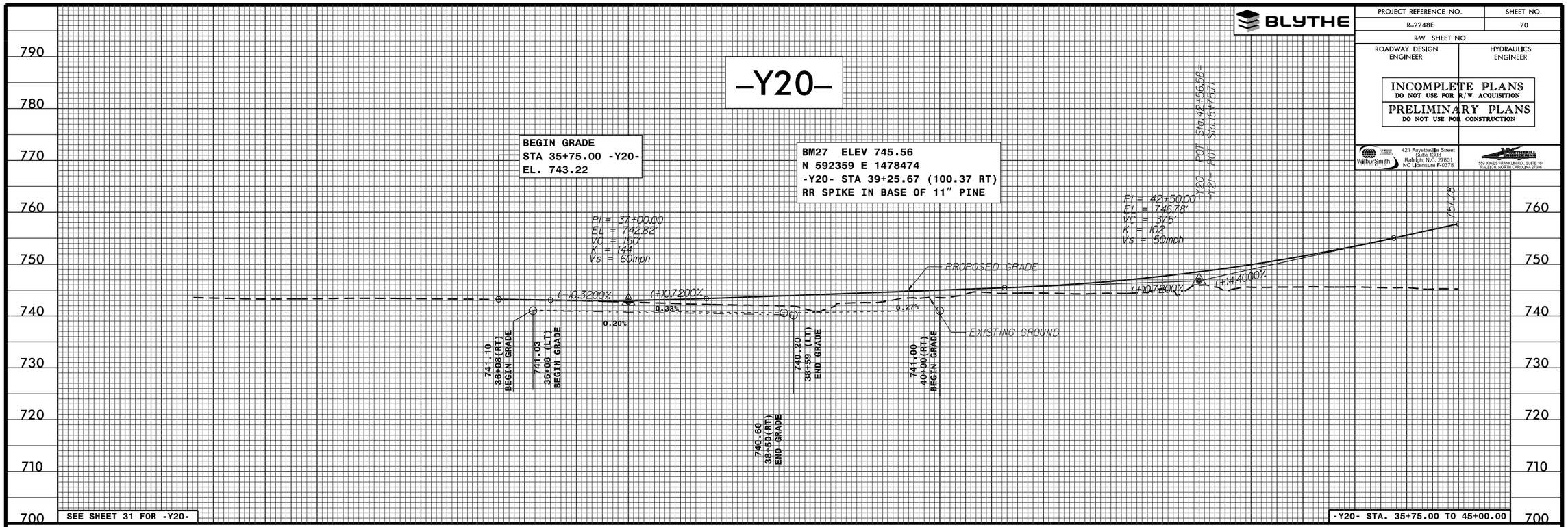
DATE: 4/5/2011 5:26:45 PM

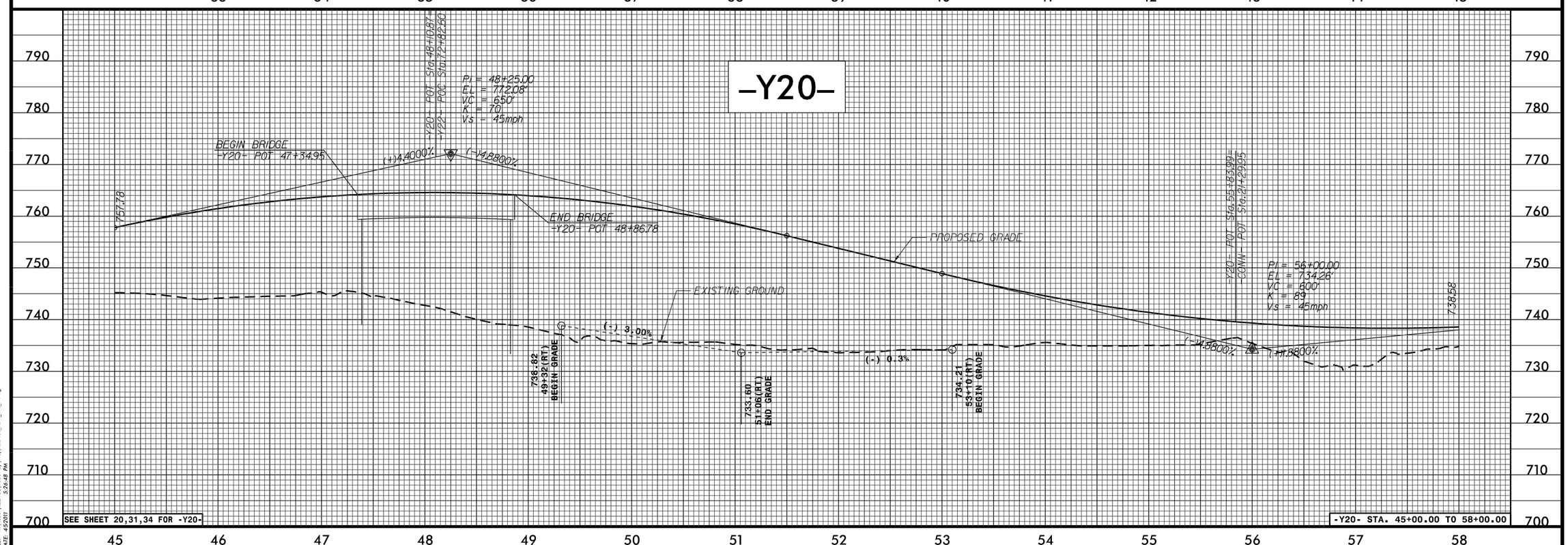
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	70
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/011 5:26:48 PM

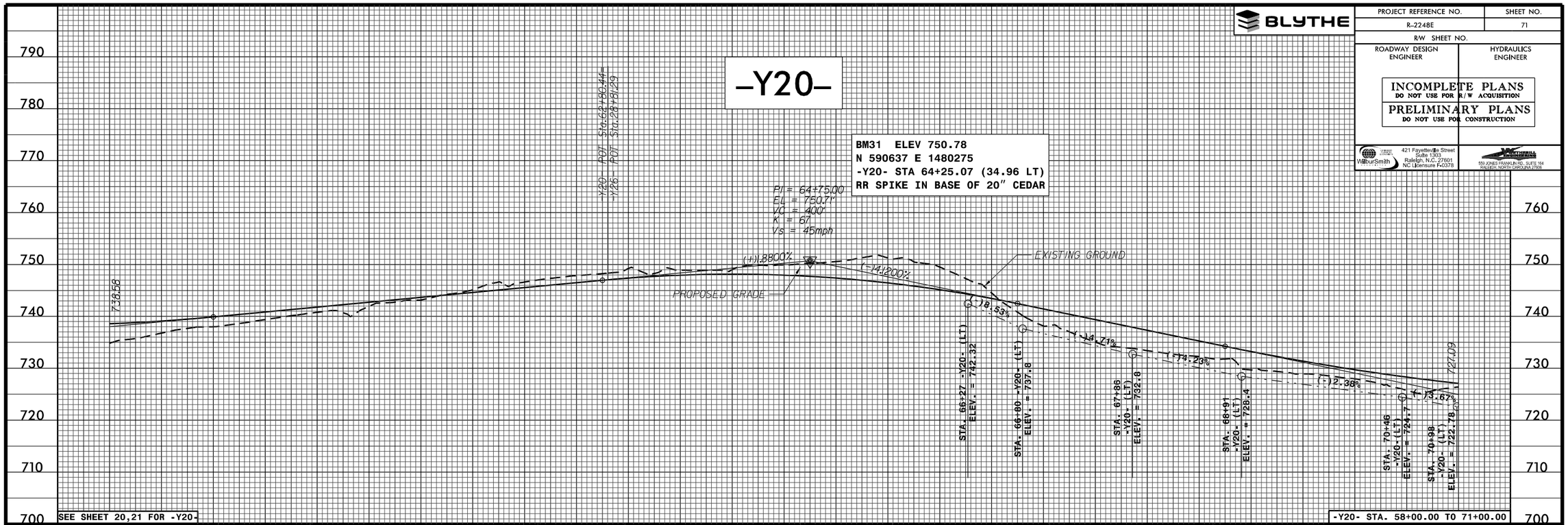
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	71
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

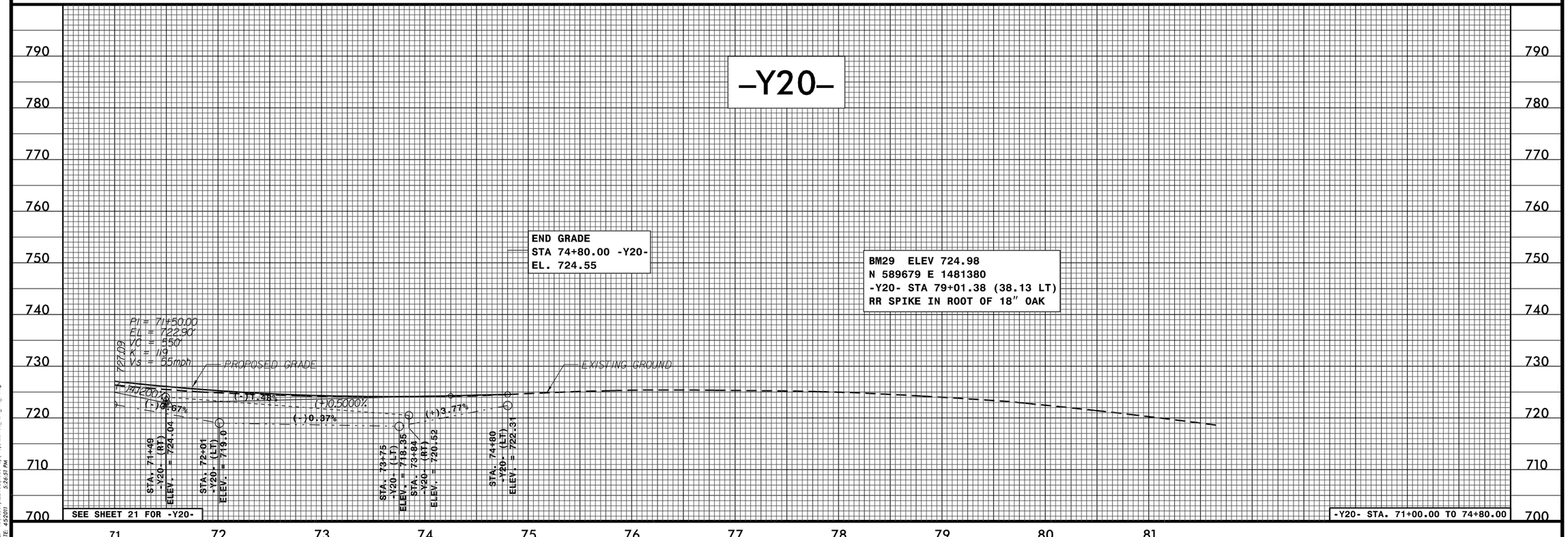
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





FILE: R:\ncdot\R2248E\Roadway\Proj\R2248E_RDY_PFL_71.dgn
DATE: 4/5/011 5:26:31 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	72
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

-Y21-

BEGIN GRADE
STA 11+00.00 -Y21-
EL. 739.62

END GRADE
STA 15+35.64 -Y21- =
STA 42+30.02 -Y20-
EL. 748.61

PI = 13+00.00
EL = 745.22'
VC = 150'
K = 110
Vs = 50mph

PROPOSED GRADE
EXISTING GROUND

(+)0.50% (+)0.9% (+)2.00% (+)2.8000% (+)1.4400% (+)2.12% (+)1.4400% (+)0.1600%

10+27 -Y21- (LT) ELEV. = 736.19
11+00 -Y21- (LT) ELEV. = 737.22
11+00 -Y21- (RT) ELEV. = 736.13
11+50 -Y21- (LT) ELEV. = 737.27
11+50 -Y21- (RT) ELEV. = 738.28
13+00 -Y21- (LT) ELEV. = 742.08
14+00 -Y21- (LT) ELEV. = 744.20

SEE SHEET 31 FOR -Y21-

-Y21- STA. 11+00.00 TO 15+35.64

-Y23-

BEGIN GRADE
STA 10+40.00 -Y23- =
STA 42+44.30 -Y22-
EL. 726.26

END GRADE
STA 12+38.42 -Y23-
EL. 719.14

PI = 11+20.00
EL = 720.66'
VC = 100'
K = 17
Vs = 25mph

PROPOSED GRADE
EXISTING GROUND

(-)17.0000% (-)1.2800%

SEE SHEET 32 FOR -Y23-

-Y23- STA. 10+40.00 TO 12+38.42

-Y24-

BEGIN GRADE
STA 10+40.00 -Y24- =
STA 44+86.40 -Y22-
EL. 723.74

END GRADE
STA 16+58.86 -Y24-
EL. 732.81

-Y24- POT STA 14+92.99 =
-Y25- POT STA 10+00.00

PI = 11+75.00
EL = 723.74
VC = 80'
K = 91
Vs = 50mph

PI = 13+75.00
EL = 726.94'
VC = 125'
K = 69
Vs = 40mph

PI = 16+00.00
EL = 732.34'
VC = 100'
K = 63
Vs = 45mph

PROPOSED GRADE
EXISTING GROUND

(-)2.0000% (+)1.4800% (+)0.36% (+)0.41% (+)0.6000% (+)0.76% (+)3.42% (+)0.68% (+)2.50% (+)2.30% (+)2.4000% (+)10.8000%

STA. 10+51 -Y24- (RT) ELEV. = 720.83
STA. 11+00 -Y24- (LT) ELEV. = 722.19
STA. 11+50 -Y24- (LT) ELEV. = 722.37
STA. 12+00 -Y24- (LT) ELEV. = 722.91
STA. 13+00 -Y24- (RT) ELEV. = 721.86
STA. 14+00 -Y24- (RT) ELEV. = 725.28
STA. 14+00 -Y24- (LT) ELEV. = 724.42
STA. 14+50 -Y24- (RT) ELEV. = 725.77
STA. 15+00 -Y24- (LT) ELEV. = 726.92
STA. 16+00 -Y24- (LT) ELEV. = 729.22

SEE SHEET 32 FOR -Y24-

-Y23- STA. 10+40.00 TO 16+58.86

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_72.dgn
DATE: 4/5/2011 5:26:54 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	73
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

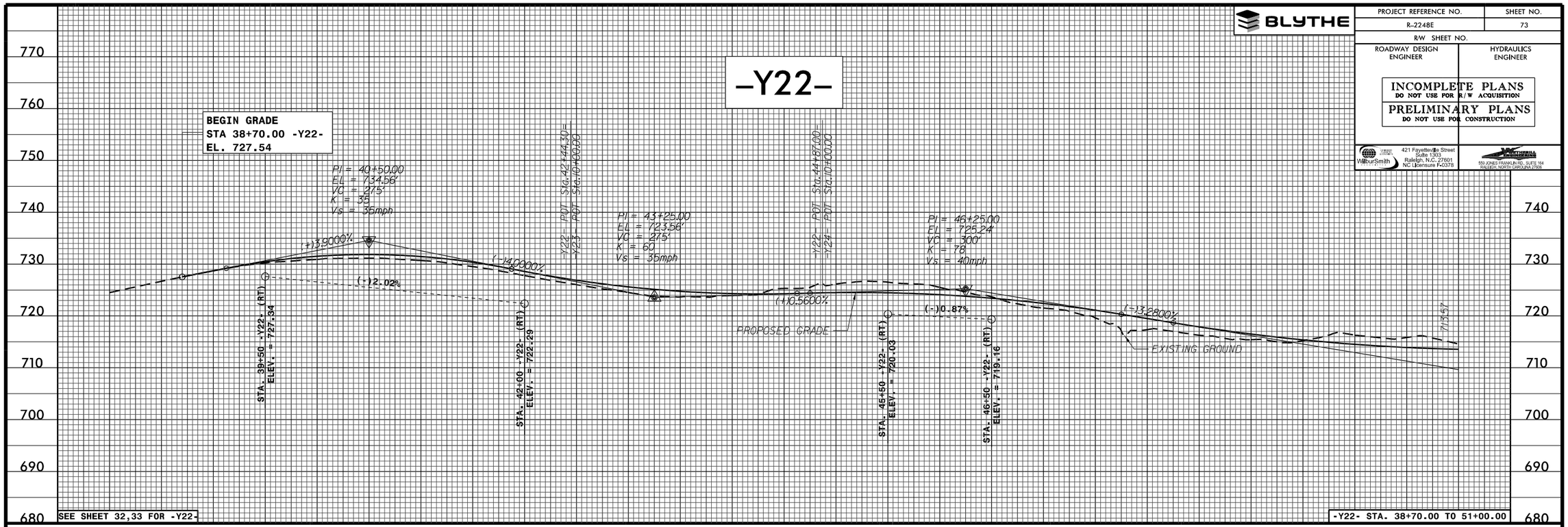
BLYTHE

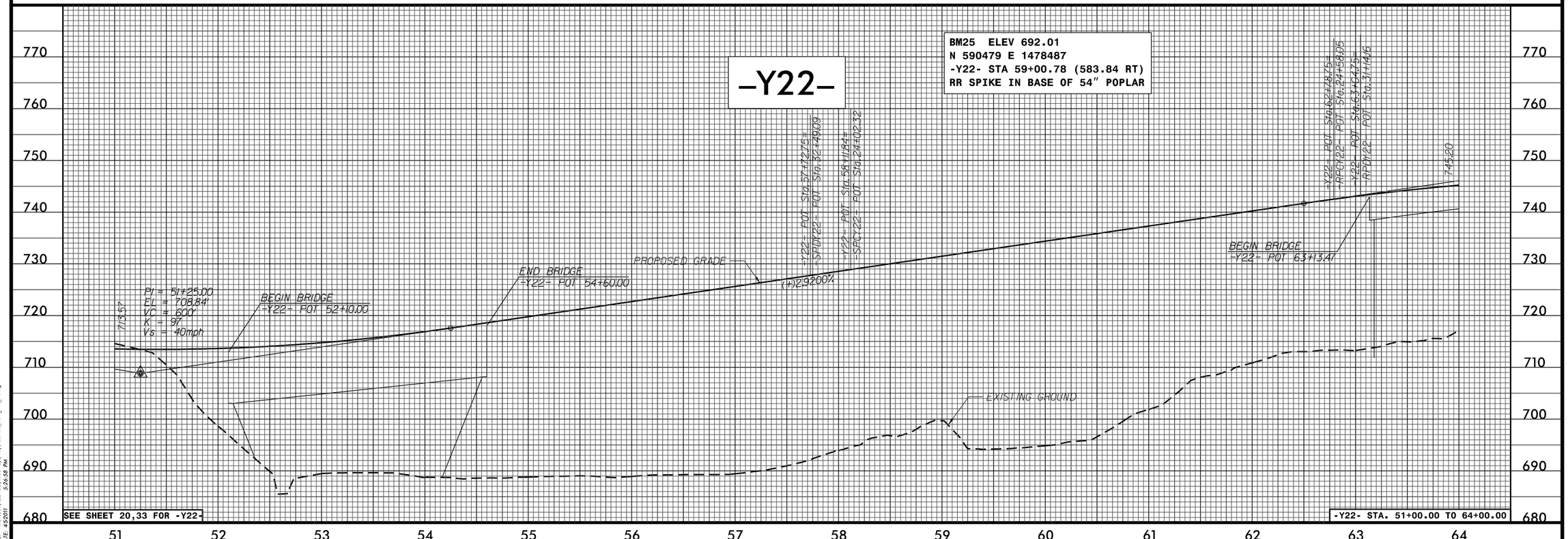
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/2011 5:26:58 PM

BLYTHE

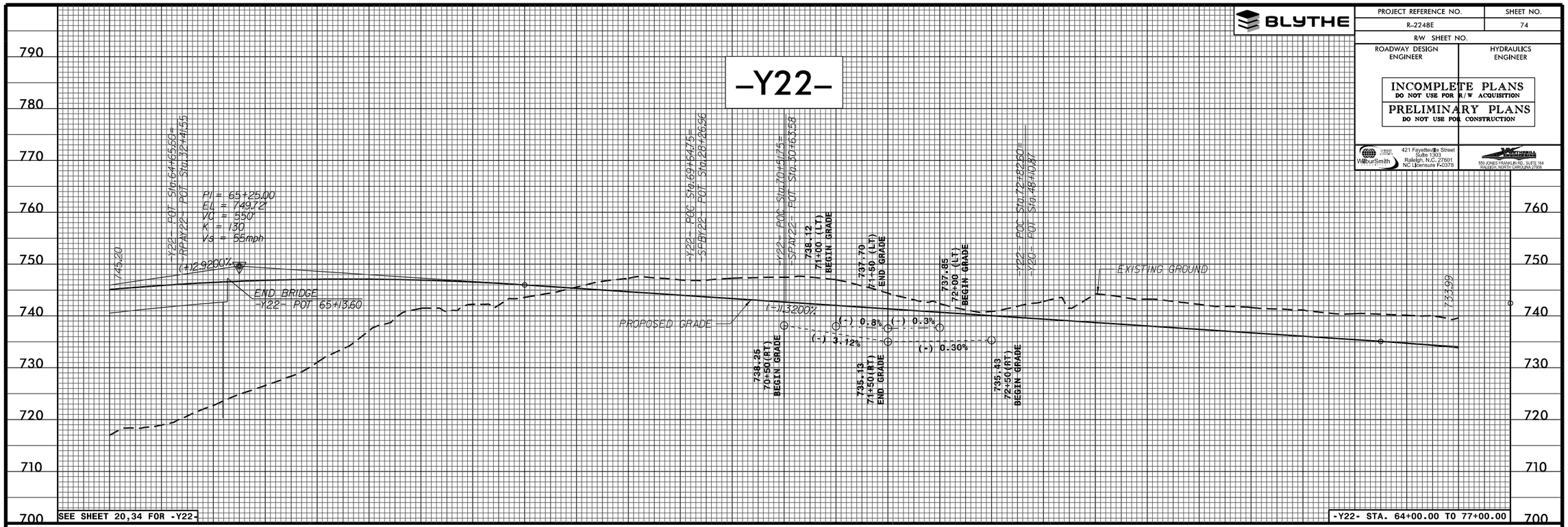
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	74
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

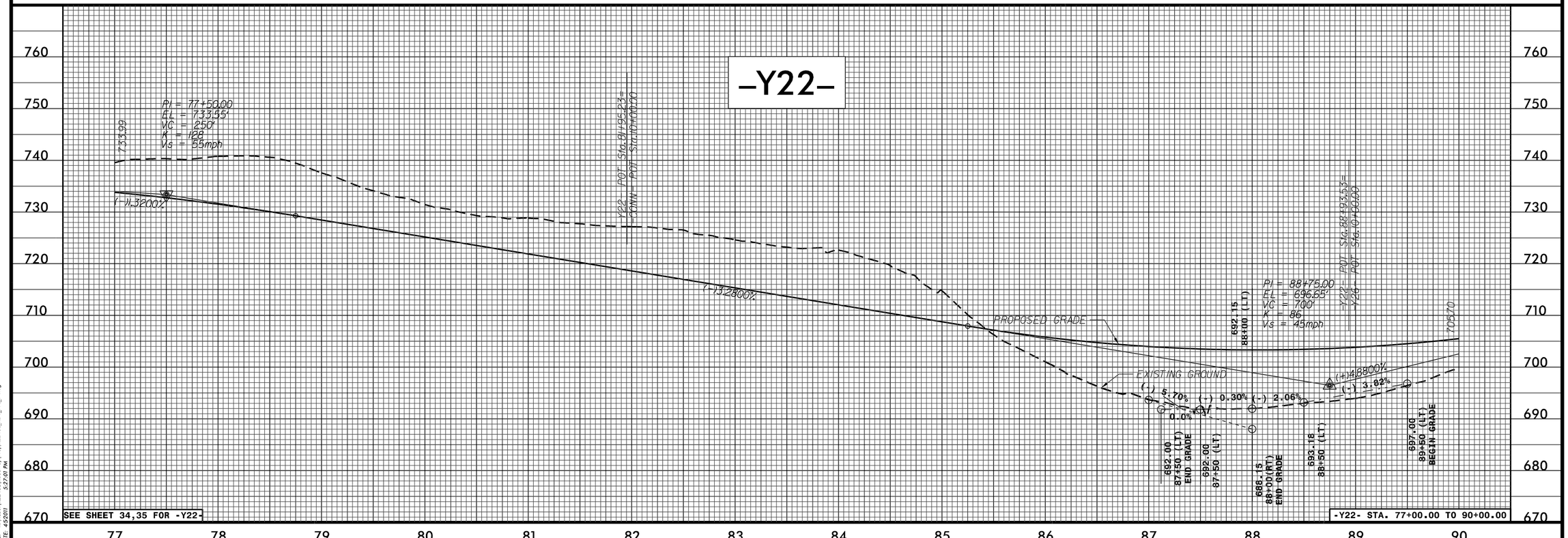
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS CONSULTING — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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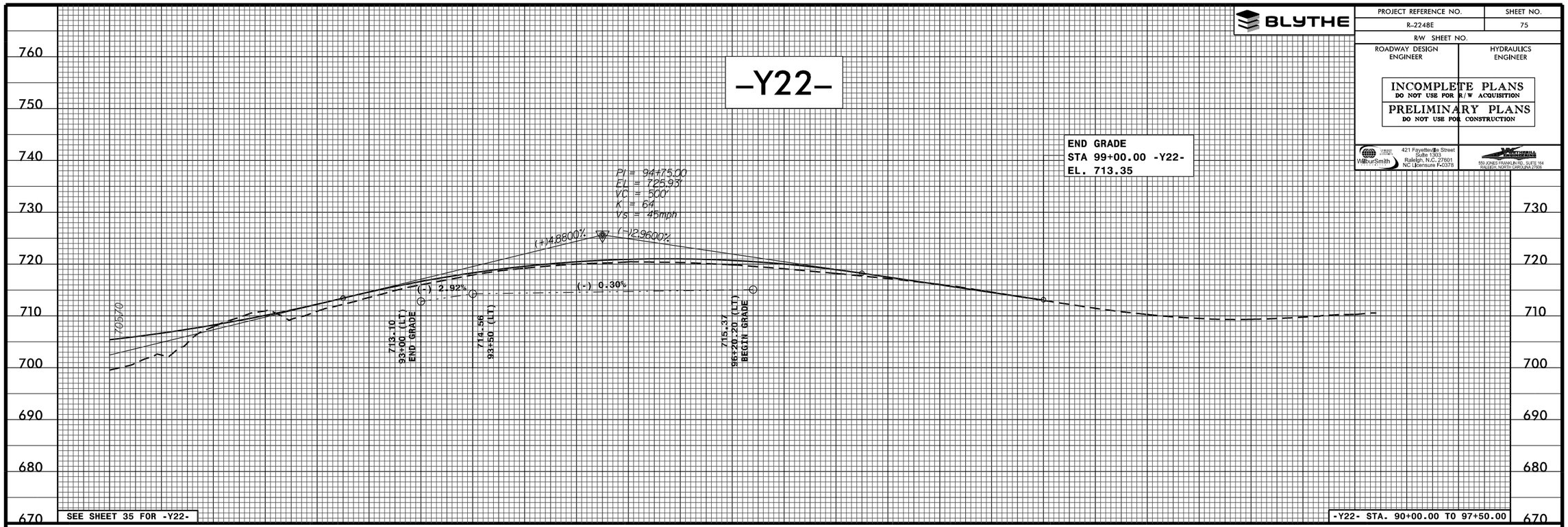
DATE: 4/5/011 5:27:01 PM

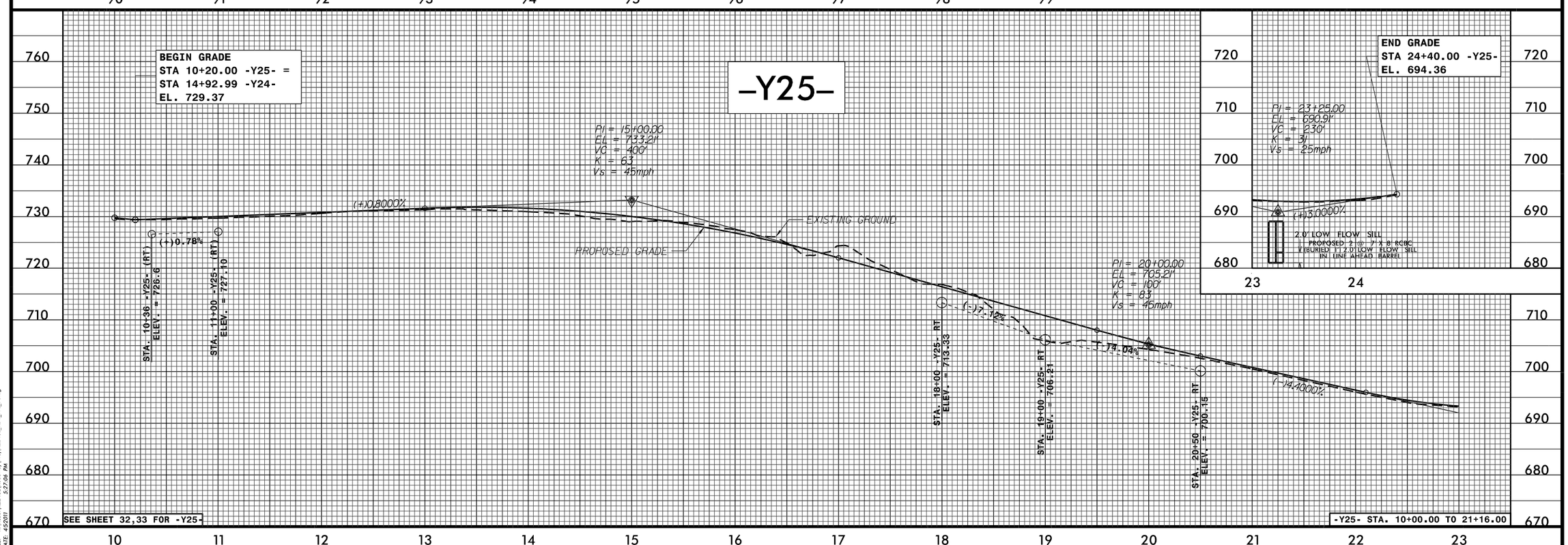
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	75
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/011 5:27:06 PM

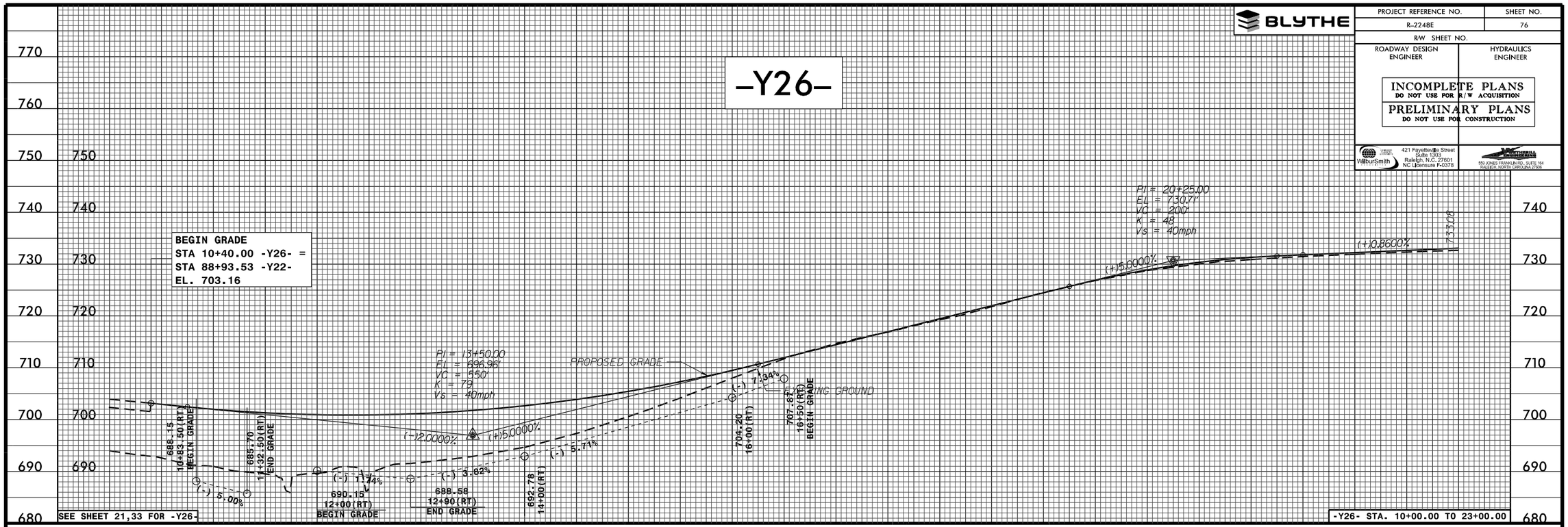
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	76
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

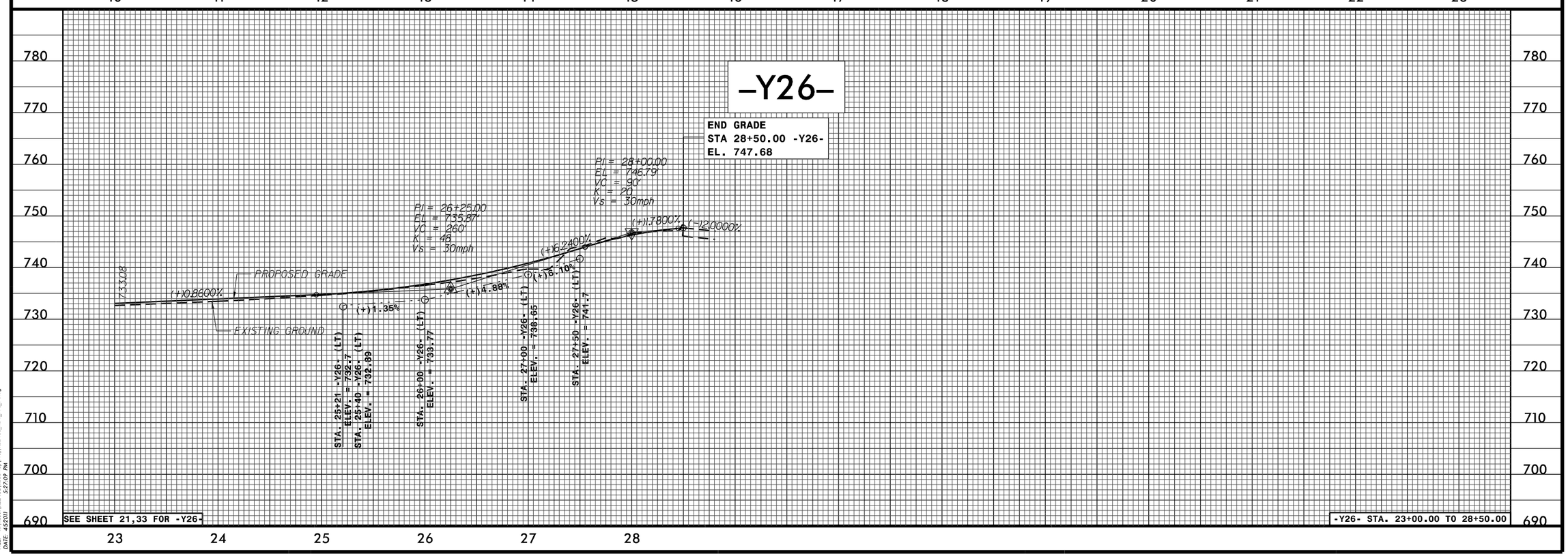
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606





FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_76.dgn
DATE: 4/5/011 5:27:09 PM

BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	77
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

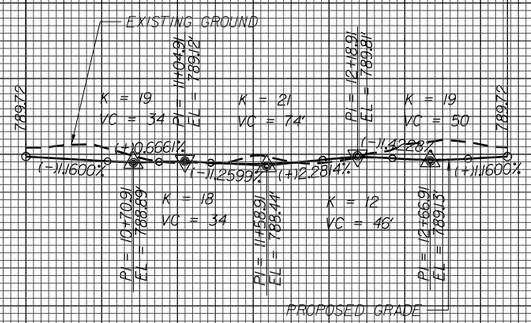
WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

-RAA-

BEGIN GRADE
STA 10+00.00 (2.46' LT.) -RAA-=
STA 78+18.59 -Y17B-
EL. 789.72

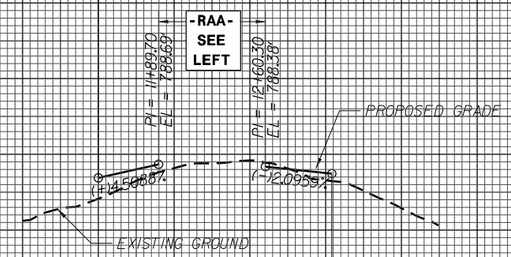
END GRADE
STA 13+17.82 (2.46' RT.) -RAA-=
STA 78+18.59 -Y17B-
EL. 789.72



SEE SHEET 12,13 FOR PLAN

-RAA_Y17B-

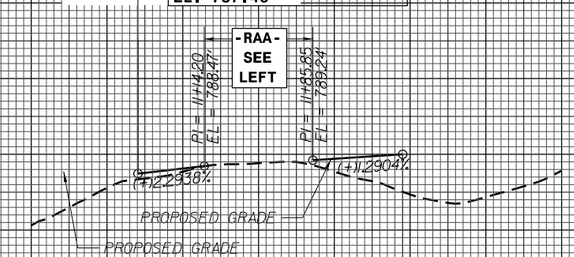
BEGIN GRADE
STA 11+50.00 (4.00' LT.) -RAA_Y17B-=
STA 22+26.51 -RPAY17B-
EL. 786.90



END GRADE
STA 13+04.09 -RAA_Y17B-=
STA 76+31.83 -Y17B-
EL. 787.46

-RAA_WBFR-

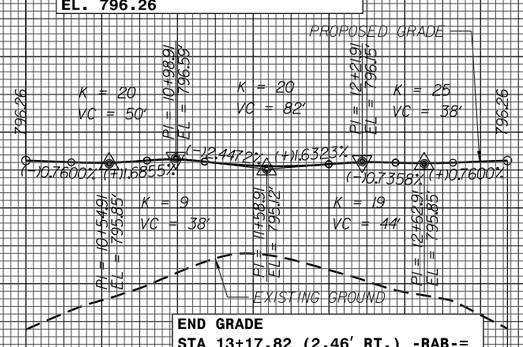
BEGIN GRADE
STA 10+70.40 -RAA_WBFR-=
STA 76+31.83 -Y17B-
EL. 787.46



END GRADE
STA 12+45.15 (12.00' RT.) -RAA_WBFR-=
STA 37+13.64 -WBFR-
EL. 790.00

-RAB-

BEGIN GRADE
STA 10+00.00 (2.46' LT.) -RAB-=
STA 47+82.37 -Y17A-
EL. 796.26

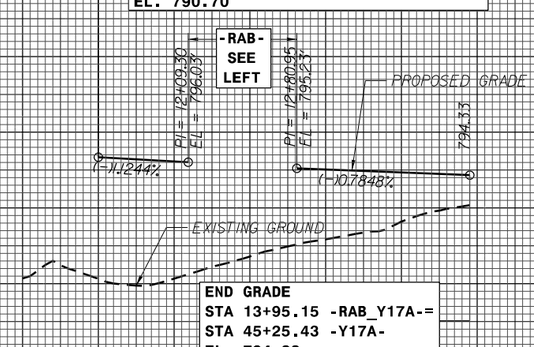


END GRADE
STA 13+17.82 (2.46' RT.) -RAB-=
STA 47+82.37 -Y17A-
EL. 796.26

SEE SHEET 12,13 FOR PLAN

-RAB_Y17A-

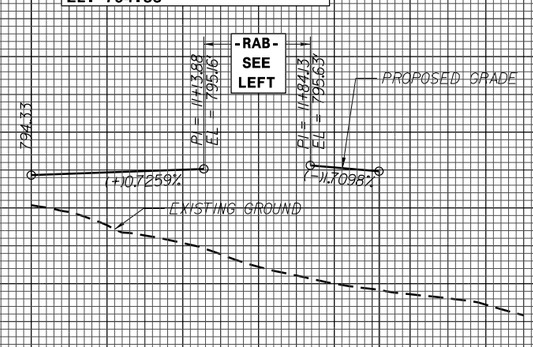
BEGIN GRADE
STA 11+50.00 (12.00' RT.) -RAB_Y17A-=
STA 11+14.47 -WBFR-
EL. 790.70



END GRADE
STA 13+95.15 -RAB_Y17A-=
STA 45+25.43 -Y17A-
EL. 794.33

-RAB_PRBY17A-

BEGIN GRADE
STA 10+00.00 -RAB_RPBY17A-=
STA 45+25.43 -Y17A-
EL. 794.33



END GRADE
STA 12+29.53 (4.00' RT.) -RAB_RPBY17A-=
STA 22+85.00 -RPBY17B-
EL. 794.85

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_77.dgn
DATE: 4/5/011 5:27:21 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	78
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MOTTSMITH — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

BLYTHE

–SERVA–

BEGIN GRADE
STA 10+35.00 -SERVA-
EL. 761.76

PROPOSED GRADE

PI = 15+00.00
EL = 753.76'
VC = 500'
K = 99
Vs = 50mph

(-)1.7200% (+)3.3200%

EXISTING GROUND

742.97
15+91(RT)
END GRADE

741.45
17+41(RT)
BEGIN GRADE

STA. 17+00
-SERVA- (LT)
ELEV. = 737.75

741.90
18+91(RT)

743.40
19+41(RT)

STA. 19+41
-SERVA- (LT)
ELEV. = 736.8

745.70
19+91(RT)

754.60
21+41(RT)
END GRADE

STA. 21+41
-SERVA- (LT)
ELEV. = 736.2

(+) 0.30% (+) 3.80% (+) 4.60% (+) 6.07%

(-)0.40% (-)0.30%

760.32

SEE SHEET 14,15 FOR -SERVA-

-SERVA- STA. 10+35.00 TO 23+00.00

–SERVA–

PI = 26+00.00
EL = 790.28'
VC = 350'
K = 89
Vs = 50mph

(+)3.3200% (-)10.6200%

780.32

PROPOSED GRADE

EXISTING GROUND

784.08

SEE SHEET 15,16 FOR -SERVA-

-SERVA- STA. 23+00.00 TO 36+00.00

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_78.dgn
DATE: 4/5/01 5:27:24 PM

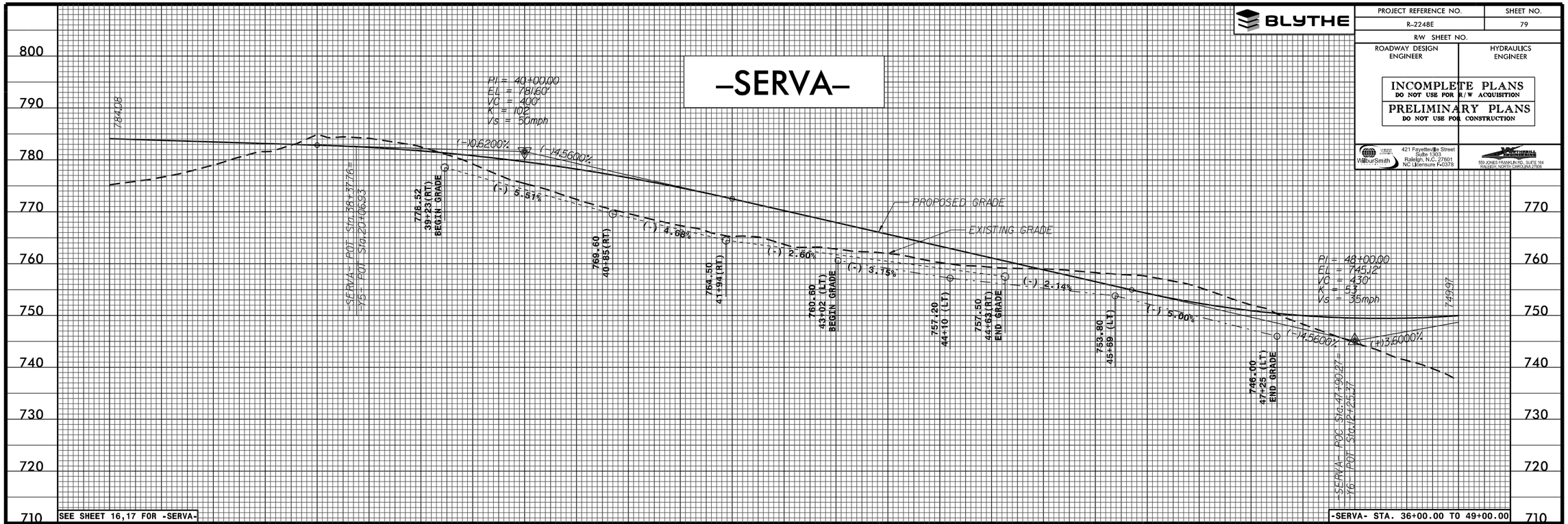
PROJECT REFERENCE NO.	SHEET NO.
R-2248E	79
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

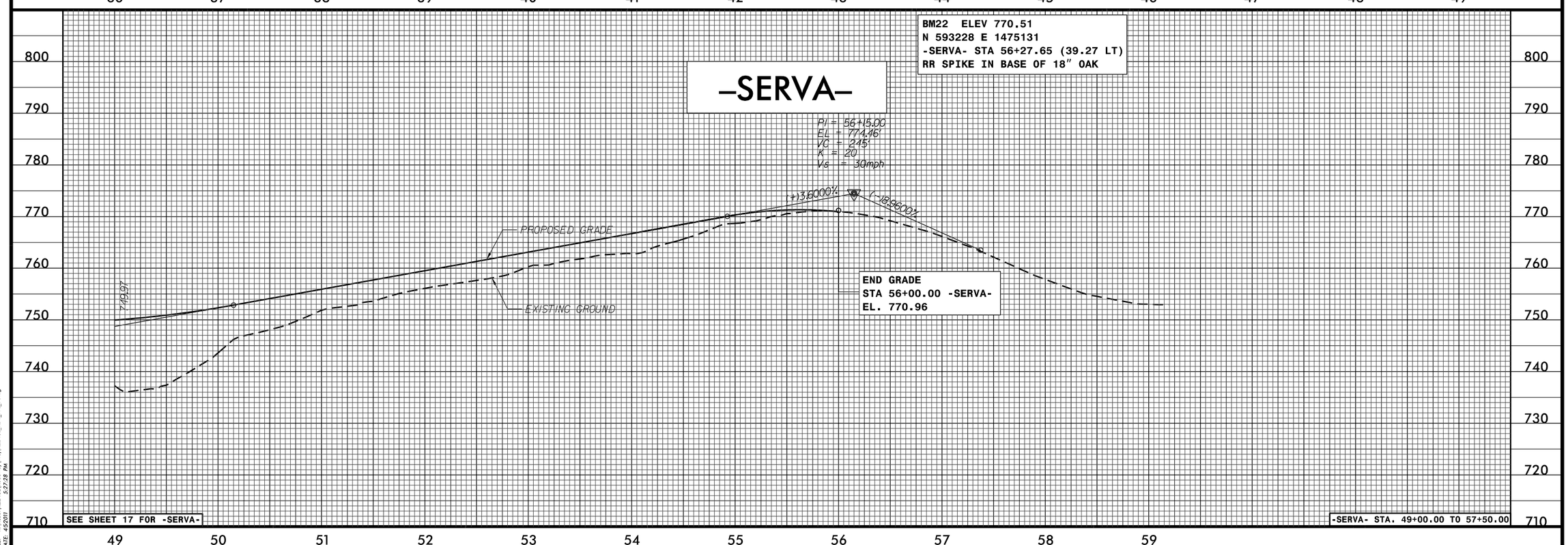
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
555 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606





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DATE: 4/5/2011 5:27:28 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	80
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

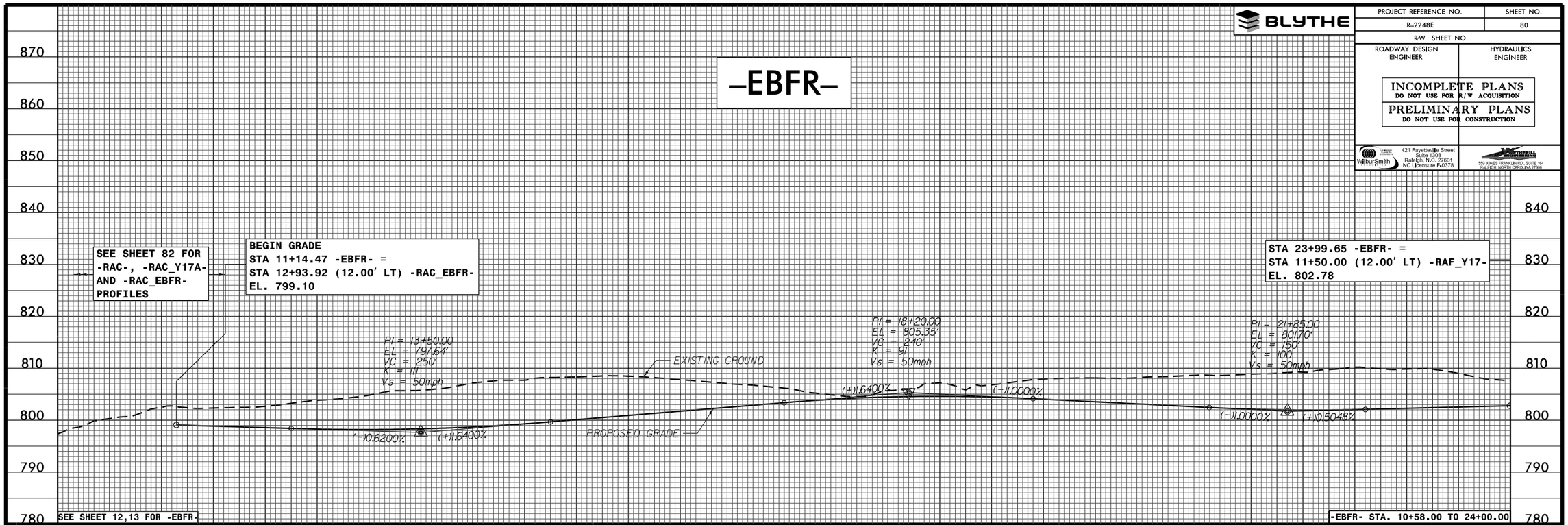
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

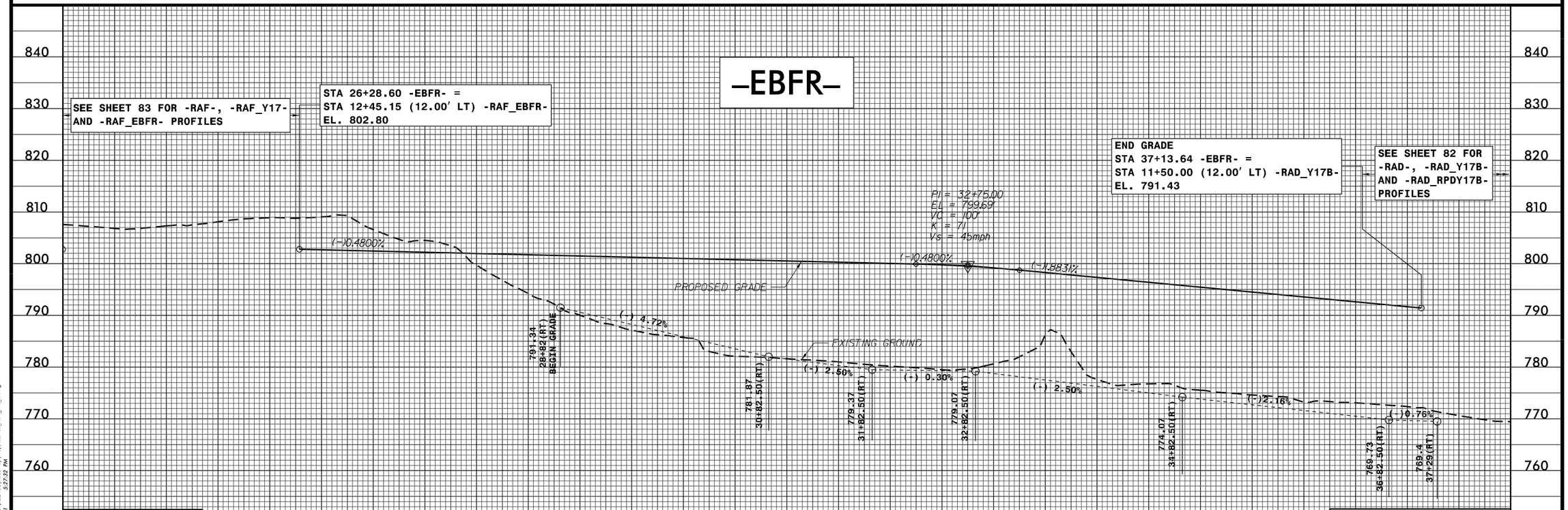
WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC License F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

-EBFR-



-EBFR-



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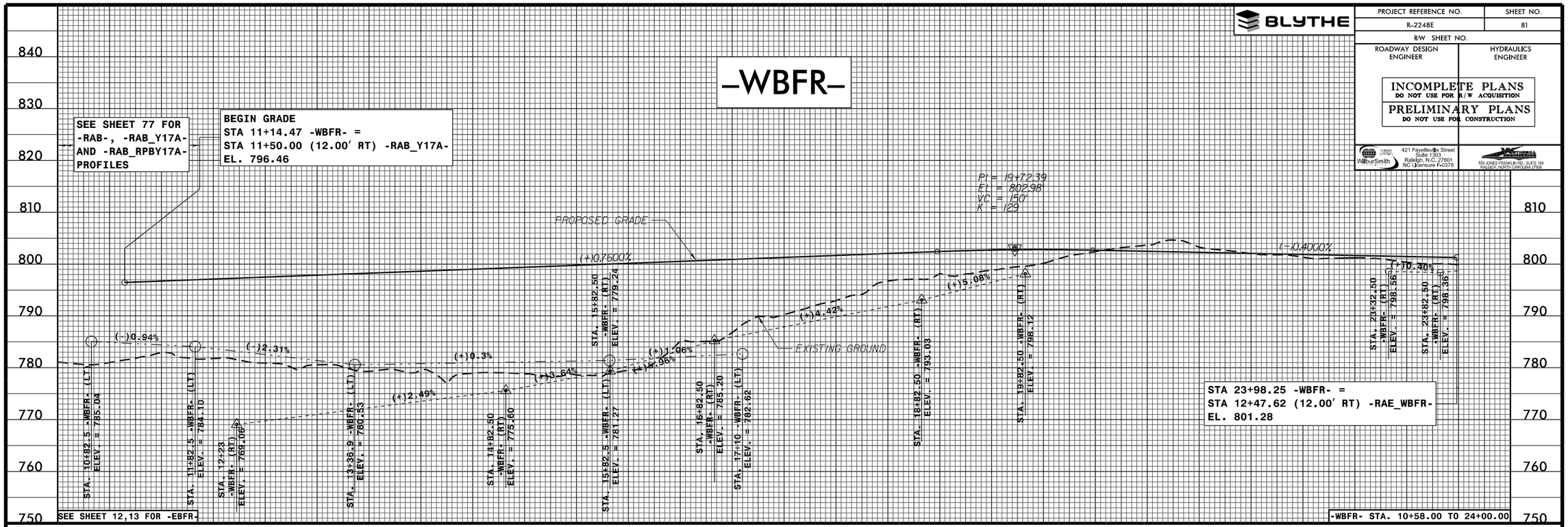
DATE: 4/5/2011 5:27:32 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	81
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

WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606



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DATE: 4/5/2011 5:27:35 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	82
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

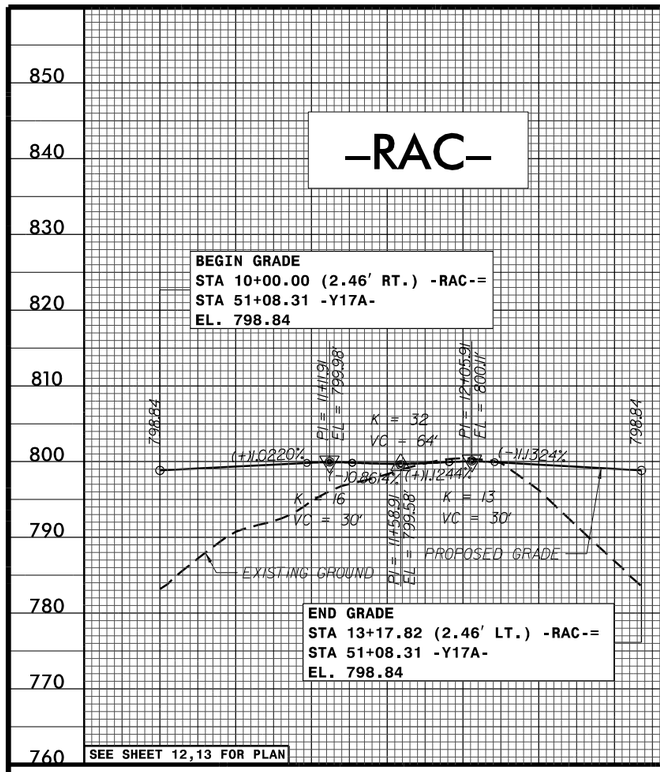
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

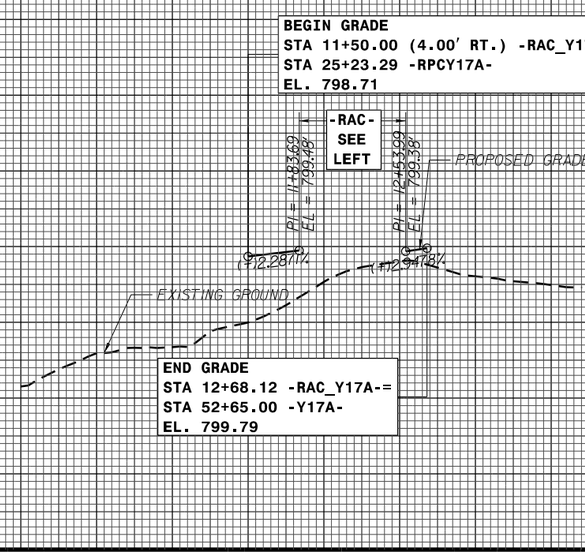
WilburSmith — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

Kimley-Horn and Associates — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

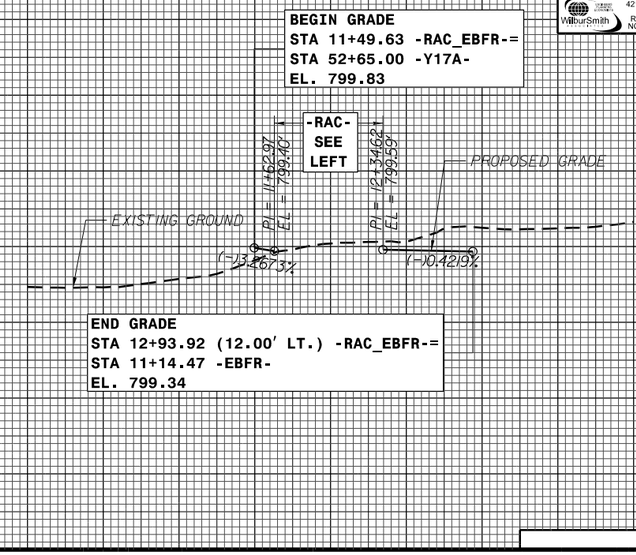
-RAC-



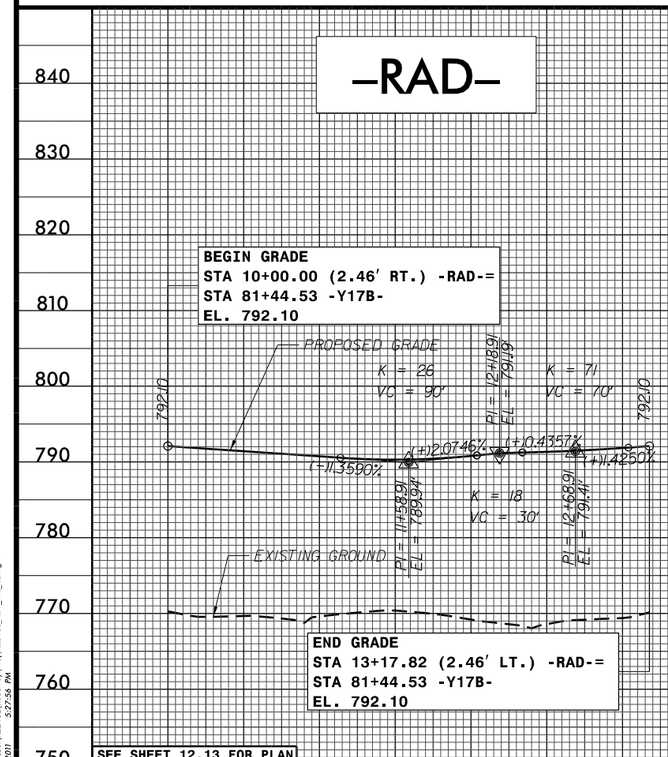
-RAC_Y17A-



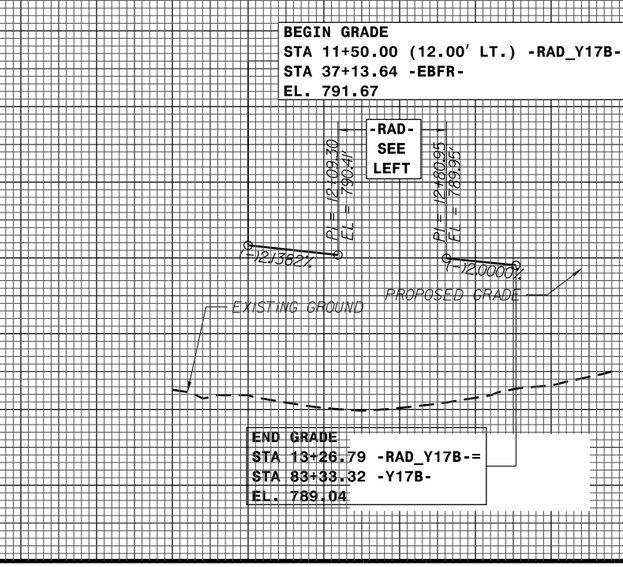
-RAC_EBFR-



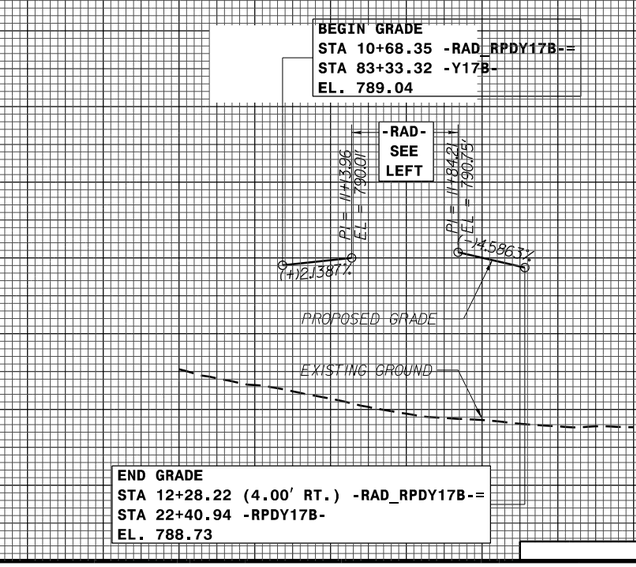
-RAD-



-RAD_Y17B-



-RAD_RPDY17B-



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DATE: 4/5/2011 5:27:56 PM

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	83
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

BLYTHE

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

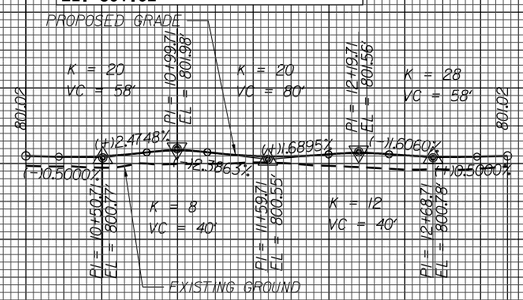
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

WilburSmith ASSOCIATES — 421 Fayetteville Street, Suite 1303, Raleigh, N.C. 27601, NC Licensure F-0378

MATTHEWS DESIGN GROUP — 555 JONES FRANKLIN RD., SUITE 164, RALEIGH, NORTH CAROLINA 27606

–RAE–

BEGIN GRADE
STA 10+00.00 (2.18′ LT.) -RAE-=
STA 60+31.80 -Y17-
EL. 801.02

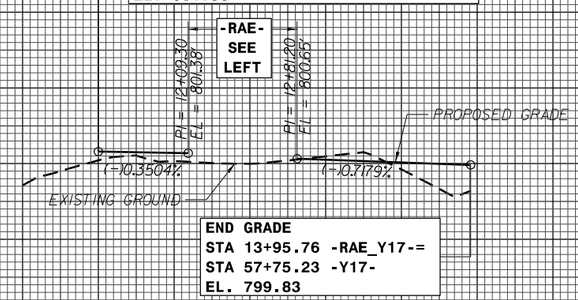


END GRADE
STA 13+17.90 (2.73′ RT.) -RAE-=
STA 60+31.83 -Y17-
EL. 801.02

SEE SHEET 12,13 FOR PLAN

–RAE_Y17–

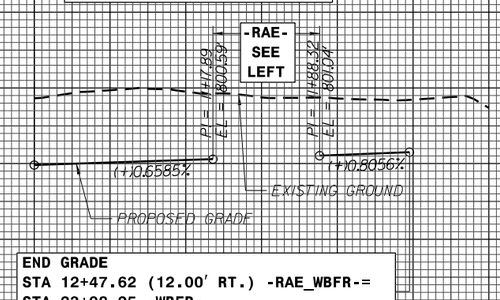
BEGIN GRADE
STA 11+50.00 (12.00′ RT.) -RAE_Y17-=
STA 26+29.58 -WBFR-
EL. 801.58



END GRADE
STA 13+95.76 -RAE_Y17-=
STA 57+75.23 -Y17-
EL. 799.83

–RAE_WBFR–

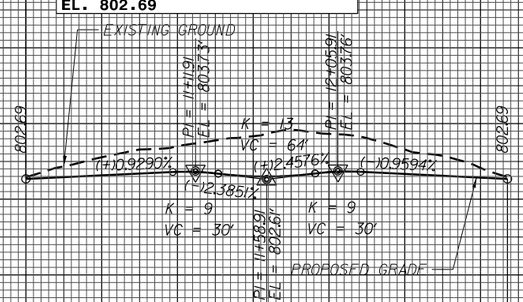
BEGIN GRADE
STA 10+00.00 -RAE_WBFR-=
STA 57+70.84 -Y17-
EL. 799.81



END GRADE
STA 12+47.62 (12.00′ RT.) -RAE_WBFR-=
STA 23+98.25 -WBFR-
EL. 801.52

–RAF–

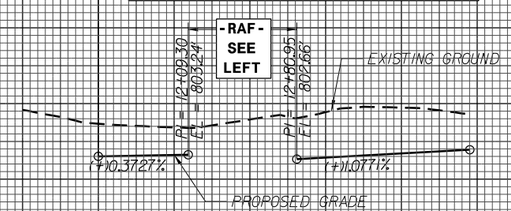
BEGIN GRADE
STA 10+00.00 (2.46′ RT.) -RAF-=
STA 63+57.72 -Y17-
EL. 802.69



END GRADE
STA 13+17.82 (2.46′ LT.) -RAF-=
STA 63+57.72 -Y17-
EL. 802.69

–RAF_Y17–

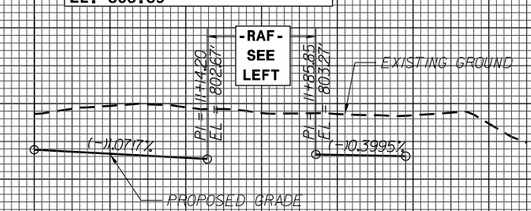
BEGIN GRADE
STA 11+50.00 (12.00′ LT.) -RAF_Y17-=
STA 23+99.65 -EBFR-
EL. 803.02



END GRADE
STA 13+95.15 -RAF_Y17-=
STA 66+14.66 -Y17-
EL. 803.89

–RAF_EBFR–

BEGIN GRADE
STA 10+00.00 -RAF_EBFR-=
STA 66+14.66 -Y17-
EL. 803.89



END GRADE
STA 12+45.15 (12.00′ LT.) -RAF_EBFR-=
STA 26+28.60 -EBFR-
EL. 803.04

SEE SHEET 12,13 FOR PLAN

FILE: R:\ncdot\R2248E\Roadway\Prod\R2248E_RDY_PFL_83.dgn
DATE: 4/5/2011 5:28:07 PM