STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

ROY COOPER
GOVERNOR

JAMES H. TROGDON, III
SECRETARY

March 10, 2017

Wilmington Regulatory Field Office
US Army Corps of Engineers
69 Darlington Avenue
Wilmington, North Carolina 28403

ATTN: Ms. Liz Hair
NCDOT Coordinator

Subject: **Request for Modification to Individual Section 404 and Section 401 Water Quality Certification** for Fayetteville Outer Loop from I-95 South of Fayetteville to NC 24-87, Cumberland, Hoke, and Robeson Counties. Federal Aid Project No. NHP-0620(031), State Project No. 34817.3.13, TIP Nos. X-0002 B & C, and U-2519 AA, AB, BA, BB, CA, CB, DA, & E.
Debit $570 from WBS 34817.3.13

References: Section 404 and 401 Individual Permit Application requested April 25, 2008
Section 404 Individual Permit issued October 23, 2008 (SAW-2008-01413)
Section 401 Water Quality Certification issued October 6, 2008 (20080737)
Section 404 and 401 Modification requested May 21, 2010
Section 401 Modification issued June 3, 2010 (20080737 v.2)
Section 404 and 401 Modification requested October 7, 2010
Section 401 Modification issued December 16, 2010 (20080737 v.3)
Section 404 Modification issued December 21, 2010 (SAW-2008-01413)
Section 401 Modification issued May 22, 2014 (20080737 v.4)
Section 404 Modification issued June 24, 2014 (SAW-2008-01413)
Section 401 Modification issued January 19, 2017 (20080737 v.5)

Dear Madam:

The purpose of this modification request is to provide final design and impact calculations for U-2519 CA which was in preliminary design when the original permit was requested in 2008. As you are aware, several sections of X-0002 B & C and U-2519 are constructed or currently under construction. U-2519 CA is an approximately 3.2 mile section of the Fayetteville Outer Loop that begins south of US 401 (Raeford Road) and extends to south of SR 1400 (Cliffdale Road). The attached drawings also illustrate the B-5516 project which is the replacement of Bridge No. 14 on SR 3569 (Raeford Road) over the Lake Rim Runoff. Construction of B-5516 is currently underway and did not require Sections 404 and 401 permits.

Mailing Address:
NC DEPARTMENT OF TRANSPORTATION
PROJECT DEVELOPMENT AND
ENVIRONMENTAL ANALYSIS
1548 MAIL SERVICE CENTER
RALEIGH, NC 27699-1548

Telephone: (919) 707-6000
Fax: (919) 250-4224
Customer Service: 1-877-368-4968

Website: www.ncdot.gov

Location:
1000 BIRCH RIDGE DRIVE
RALEIGH, NC 27610

There will be 1,038 linear feet of permanent stream impact and 174 linear feet of temporary stream impact associated with construction of the U-2519 CA project. Permanent impacts to wetlands total 3.98 acres due to fill, excavation, and mechanized clearing on the project. A total of <0.01 acre of temporary wetland impacts and 6.53 acres of hand clearing will occur due to project construction.

Please see the enclosed 4B & 4C Merger Meeting minutes, borrow site vicinity map, Stormwater Management Plan, permit drawings, utility drawings, roadway plans, and a revised Privateer Wetland and Stream Mitigation Site Debit Ledger for section U-2519 CA.

Surveys for all federally-protected species listed for Cumberland County were updated in August 2016. A biological conclusion of "no effect" remains current for all species except the red-cockaded woodpecker (RCW). A Biological Opinion was issued on April 28, 2005; however, the 2016 report for the U-2519 CA states that "no RCW cavity trees will be impacted or 'taken' by the project."

Table 1. U-2519 CA Wetlands Impacts

Permit Site Number	FEIS Site ID	Riverine or Non-Riverine	Permanent Impacts (ac.) *	Temporary Impacts (ac.)	Mitigation Required**
1	Z7	Riverine	1.62	<0.01	Yes
2	Z6	Riverine	0.49	<0.01	Yes
3	Z6	Non-riverine	0.71	0	Yes
4	Z5	Riverine	<0.01	0	Yes
5	Z4	Riverine	0.47	0	Yes
6	Z3	Non-riverine	0.18	0	Yes
8	Z2	Non-riverine	0.07	0	Yes
9	Z1	Non-riverine	0.05	0	Yes
10	Z6	Riverine	0.38	0	Yes
		Total:	**3.98**	**<0.01**	

Notes: Rounded totals are sum of actual impacts
* Includes fill, excavation, and mechanized clearing. ** For permanent impacts.
Hand clearing: Site 1 - 1.62 ac., Site 2 - 4.46 ac., Site 4 - 0.43 ac., and Site 10 - 0.02 ac.

Table 2. U-2519 CA Surface Water Impacts and Descriptions

Permit Site Number	Waterbody	Permanent		Temporary		Type of Stream	Mitigation Required**
		lf.	ac.	lf.	ac.		
1	Little Rockfish Creek (Z7)	10	<0.01	31	<0.01	Perennial	Yes
2	Bones Creek (BC)	12	<0.01	12	<0.01	Perennial	Yes
5	UT to Bones Creek (Z4)	541	0.13	12	<0.01	Intermittent	Yes
7	UT to Bones Creek (Z2)	318	0.05	10	<0.01	Perennial	Yes
7*	UT to Bones Creek (Z2)	23	<0.01	0	0	Perennial	Yes
10	Bones Creek (BC)	82	0.05	109	0.09	Perennial	Yes
10*	Bones Creek (BC)	52	0.01	0	0	Perennial	No
	Total:	**1,038**	**0.24**	**174**	**0.10**		

Notes: * Denotes bank stabilization; when necessary, mitigation required by the USACE exceeds the amount required NCDWR
** For permanent impacts

The final design impacts for U-2519 CA were greater than previously estimated by 1.54 acres of riparian wetland, 0.79 acre of non-riparian wetland, and 568 linear feet of stream. The increase in impacts was largely in part to sites being excluded from the early planning documents and Approved Jurisdictional Determination as well as a slight change in the limits of the CA portion of the project which was previously included in the BB section.

Compensatory Mitigation

Compensatory mitigation for the 4.08 acres of permanent wetland impacts will be debited from the Privateer Wetland and Stream Mitigation Site. This brings total project wetland impacts to 50.92 acres. The 963 linear feet of stream impacts requiring mitigation will also be debited from the Privateer Wetland and Stream Mitigation Site, bringing the total project stream impacts to 13,010 linear feet. A revised debit ledger for the Privateer Wetland and Stream Mitigation Site is attached to this modification request.

Utility Impacts

Utility relocation impacts are included at Site 2 for <0.01 acre and Site 3 for 0.09 acre of temporary excavation impacts within the permanent utility easement. Please see the attached drawings for illustration of the utility impacts.

Borrow Site Locations

Three borrow locations have been identified for the project. The sites are all on the Barker property adjacent to the project alignment. Two of the sites will be borrow pits and one will be a grade to drain site. None of the borrow sources are anticipated to have impacts to jurisdictional resources. Using the "Skaggs Method for Determining Lateral Effects of a Borrow Pit on Adjacent Wetlands" (Skaggs et al), sites were evaluated and buffers were calculated to determine no impacts to the jurisdictional resources adjacent to the borrow pit sites. A map illustrating the borrow site locations is included.

Regulatory Approvals

The design-build let date for the U-2519 CA project was June 21, 2016. Final completion is anticipated in July 2021.

Section 404: We are hereby requesting the modifications described above and an expiration date of July 1, 2021 for the USACE Individual 404 Permit signed October 23, 2008 (SAW-2008-01413), for the above-described activities.

Section 401: We are hereby requesting a modification to the 401 Water Quality Certification from the NCDWR issued October 6, 2008 (DWQ No. 003278). In compliance with Section 143-215.3D(e) of the NCAC, please debit $570.00 from WBS 34817.3.13 for processing the Section 401 permit modification.

A copy of this modification request and its distribution list will be posted on the NCDOT website at: https://connect.ncdot.gov/resources/Environmental.

Thank you for your assistance with this project. If you have any questions or need additional information, please contact Tyler Stanton at 919-707-6156 or tstanton@ncdot.gov.

Sincerely,

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

cc:
NCDOT Permit Application Standard Distribution List.

Environmental Quality

ROY COOPER
Governor

March 10, 2017

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

Dear Mr. Harris:

Subject: Mitigation Acceptance Letter:

U-2519CA, Fayetteville – Outer Loop from South of US 401 to South of SR 1400 (Cliffdale Road), Cumberland County

The purpose of this letter is to notify you that the Division of Mitigation Services (DMS) will provide the compensatory stream and wetland mitigation for the subject project. Based on the information supplied by you on March 9, 2017, the impacts are located in CU 03030004 of the Cape Fear River basin in the Southern Inner Coastal Plain (SICP) Eco-Region, and are as follows:

Cape Fear 03030004 SICP	Stream			Wetlands			Buffer (Sq. Ft.)	
	Cold	Cool	Warm	Riparian	Non-Riparian	Coastal Marsh	Zone 1	Zone 2
Impacts (feet/acres)	0	0	963.0	2.98	1.10	0	0	0

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

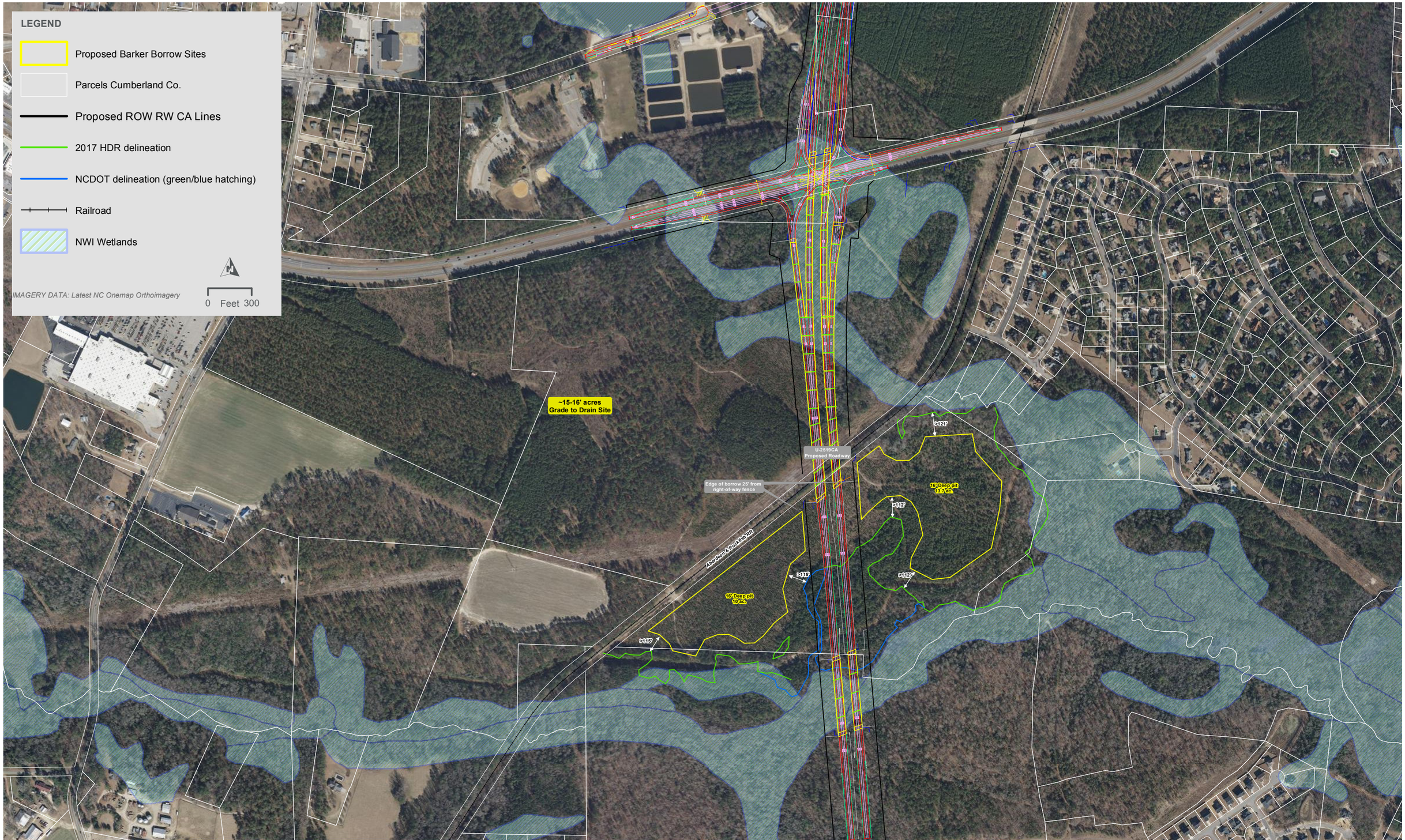
The impacts and associated mitigation needs were under projected by the NCDOT in the 2017 impact data. DMS will commit to implement sufficient compensatory stream and wetland mitigation credits to offset the impacts associated with this project as determined by the regulatory agencies using the delivery timeline listed in Section F.3.c.iii of the In-Lieu Fee Instrument dated July 28, 2010. **The NCDOT has requested that mitigation necessary for the stream and wetland impacts come from the Privateer Mitigation Site located in Cape Fear 03030005. DMS intends to utilize credits from the Privateer Mitigation Site to meet the stream, riparian and non-riparian mitigation requirements. DMS will utilize riparian wetland credits from the Privateer Mitigation Site to meet the non-riparian wetland requirements.** 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 DMS.

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

Sincerely,

James B. Stanfill
Credit Management Supervisor

cc: Ms. Liz Hair, USACE – Wilmington Regulatory Field Office
Ms. Amy Chapman, NCDWR
File: U-2519CA



BARKER BORROW SITES VICNITY MAP

FIGURE 1

TO: **Paul Atkinson, PE**
NCDOT Hydraulics Unit

FROM: **James R. Rice, PE**

DATE: **December 21, 2016**

SUBJECT: **STIP U-2519CA/B-5516 Fayetteville Outer Loop**
Cumberland County, North Carolina
Future I-295 from south of US 401 to south of SR 1400 (Cliffdale Road); and Replacement of Bridge No. 14 on SR 3569 (Raeford Road) over Bones Creek (Lake Rim Runoff)

4B Meeting Minutes

Meeting Date: December 14, 2016

Merger Team Attendees:

Travis Wilson	NC Wildlife Resources Commission
Gary Jordan	US Fish and Wildlife Service
Dr. Cynthia Van Der Wiele	US Environmental Protection Agency (via phone)
Liz Hair	US Army Corps of Engineers (via phone)
Joanne Steenhuis	NC Department of Environmental Quality
Ron Lucas	FHWA (absent)

Support Staff and Meeting Attendees:

Brook Anderson	NCDOT-Hydraulics
Paul Atkinson	NCDOT-Hydraulics
Mark Staley	NCDOT-REU
Jim Rerko	NCDOT- Division 6 Division Environmental Officer
Tyler Stanton	NCDOT- Natural Environmental Section
Michael Penney	NCDOT-Design Build
Michael Taylor	Barnhill Contracting
Sara Easterly	HDR
Eric Reardon	HDR
Josh Massrock	HDR
James Rice	HDR
Paul Meehan	HDR
Brian Watson	HDR
Phillip Rogers	HDR

The meeting was opened with introductions and the following agenda items were discussed with James Rice facilitating the 4B merger meeting. The PDF drawings were projected on the screen and the following agenda items were presented to all in attendance.

The *italicized* text indicates notes from the meeting discussion.

General

- Introductions and sign-in sheet
- Future I-295- Fayetteville Outer Loop from South of US 401 to South of SR 1400 (Cliffdale Rd). Approx. 3.2 miles of a four lane divided highway in new location.
- 1 major interchange: US 401/ I-295.
- 3 proposed bridges: I-295 over Little Rockfish Creek, I-295 over Bones Creek, and I-295 over Tributary to Lake Rim
- Bridge replacement: Bridge 14 on SR 3569 over Bones Creek (B-5516 project)
- Culvert Extension: Extending Triple 10' x 10' RCBC under US 401 for Bones Creek
- Due to anticipated development around the project corridor drainage systems have been sized using urban discharge methods.

PSH 4

- No impacts to jurisdictional features
  - Proposed location of Dry Detention Basin #1
    - Received boring logs and water table was found to be approx. 2' below ground elevation. DDB requirement not met.

PSH 5

- Jurisdictional stream – Little Rockfish Creek
  - Bridge over Little Rockfish Creek
    - Temporary work bridge being used for construction method
    - 6" Vertical Deck drains over wetlands (No drains over open water or bridge abutments)
- Wetland (Z7)
  - Bridge and roadway impacts
    - 3:1 side slopes w/ guardrail used to minimize impacts
    - Minimum 15' offset from wetland boundary to toe of slope
  - Proposed location of Dry Detention Basin #2
    - Consider taking outlet ditch all the way to Little Rock Fish Creek
    - Received boring logs and water table was found to be approx. 2' below ground elevation. DDB requirement not met.
  - Impacts due to 36" steel encasement for sanitary sewer line

James Rice mentioned that all of the dry detention basins had high ground water present based on recent geotechnical investigations and other alternatives would be explored for these outfalls. It was also mentioned that due to the wetland boundary elevation at the south east side of bridge site 1; the DB Team would prefer to ditch to the stream bank rather than stopping at the wetland boundary to minimize future ditch or wetland instability and erosion. There was also discussion that the steep topography could result in channels being lined with rip rap in the wetlands; the DB Team will try to minimize the use of rip rap lined ditches in the wetlands without jeopardizing channel stability.

The question was asked if the team could relocate the ditch to a small swale. The team will visit the site to see if the existing swale can be located in the field and check for stability.

PSH 6

- Jurisdictional stream – Bones Creek
  - Bridge over Bones Creek and Wetland Z6
    - Temporary work bridge being used for construction method
    - 6" Vertical Deck drains over wetlands (No drains over open water, railroad RW, or bridge abutments)
    - Raised footings at specific bents in wetland areas

No questions or comments on this page.

PSH 7

- Jurisdictional stream – Bones Creek
  - Bridge over Bones Creek and Wetland Z6
    - Temporary work bridge being used for construction method
    - 6" Vertical Deck drains over wetlands (No drains over open water or bridge abutments)
    - Special foundation design to eliminate footings in the stream
      - Proposing "Hammerhead" bent design at select locations near Bones Creek to avoid additional Stream Impacts
- Wetland (Z6)
  - Proposed location of Dry Detention Basin #3
    - Received boring logs and water table was found to be approx. 2' below ground elevation. DDB requirement not met.
  - Raised footings at select locations over wetlands
  - Roadway Fill- 3:1 slopes and guardrail being proposed
    - Bridge abutment slope = 1.5:1 and is armored to the 2.75:1
  - 30" Sewer Relocation- Open cut through wetland
  - Energy Dissipator Basin @ outlet of 48" RCP
  - Area being excavated for Bones Creek CLOMR

The question was asked if the DB Team had the work bridge layout. Preliminary work bridge sketches were shown to the attendees. The bridge layout will be finalized for the 4C meeting.

The topic of clearance between the wetland surface and the bottom of the raised footings was discussed. The Team brought up the benefits of having the footing as low to the wetland surface as possible without having to excavate. It was also mentioned that the exposed H-pile foundation raises concerns of blockage and scour therefore the lower the footing to the ground the better. The Team will see if there is any guidance on minimum clearances for the footings.

Travis Wilson asked if the Team had enough ROW to tie excavated area back within limits shown on plans. The Team is able to acquire additional easement to tie excavation back using 3:1 slopes; this easement (if needed) will be added to plans.

PSH 8

- Jurisdictional Stream – UT to Bones Creek
  - Bridge over UT to Bones Creek and Wetland Z5
    - 6" Vertical Deck drains over wetlands
    - Minimum 15' offset from wetland boundary to toe of slope
  - Future Greenway (Const. by Others) adjacent to south bridge abutment
    - 15' Wide located adjacent to abutment
    - 5' offset from wetland boundary
- Wetlands (Z5)
  - Bridge bent impacts
  - RR pad from 42" RCP under greenway
    - Cannot discharge outside the wetland
  - RR pad from 24" RCP
    - Need to discharge at bottom of slope (inside wetland) for stability

No questions or comments on this page.

PSH 9

- Jurisdictional stream – UT to Bones Creek
  - JS line was extended beyond RW limits. Provided WET file shows it stopping inside wetland boundary
    - 60" RCP-IV Buried 1'
  - Roadway fill in Wetland Z4

It was stated that the JS line depicted on the 4B plans was extended beyond the limits shown in the WET file by the DB Team under the assumption the JS line continued through the project limits. The topic of extending the JS beyond the ROW limits was discussed and it was decided that the JS likely dissipates before the ROW limit as shown by the provided wetland file. The Team will utilize the JS line in the WET file for this crossing.

UPDATE: Tyler Stanton looked into the JS line break for this site and concluded that it was likely a terrain break exists severing the JS connection and that more than likely the channel goes underground at the wetland boundary as depicted in the WET file.

PSH 10

- No impacts to jurisdictional features

No questions or comments on this page.

PSH 11

- Jurisdictional stream – UT to Bones Creek
  - 66" RCP-IV Buried 1'

- JS stream and wetland boundary are conflicting

Travis Wilson inquired about the need to place rip rap at the pipe outlet since the Team is calling for the pipe to be buried. James indicated that the plans are showing the rip rap in the channel to prevent scour in the stream since these are larger pipes that convey large flows through the project and that the rip rap would be placed flush with the natural stream bed. The Team was asked to provide a detail; this will be included in the 4C concurrence meeting plans for the project.

UPDATE: Tyler Stanton followed up with the design-build team that based on his information, the jurisdictional stream line was an error and it should just be a wetland boundary line, since the site is no longer a JS the DB Team will not propose to bury the pipe. The design-build team will work with NCDOT to get the files updated accordingly.

PSH 12

- No impacts to jurisdictional features

No questions or comments on this page.

PSH 13

- Jurisdictional stream – UT to Bones Creek
  - 54" RCP III Buried 1'
  - Bank Stabilization on streams banks to stabilize 2' Base Lateral Ditch confluence
- Wetland Z2 – 71+80 LT
  - Roadway fill

James pointed out that this was another case on the project where the JS stopped just beyond the fill limit.

UPDATE: Tyler Stanton suggested using what is being shown in the final survey since this is still the active JD.

PSH 14

- No impacts to jurisdictional features

No questions or comments on this page.

PSH 15

- Wetland Z1
  - Roadway Fill
  - 4' Base Special Cut Ditch 90+75 –SR1- LT widened to 10' base to reduce velocity before entering wetland
- Tie in to U-2519CB Project-Paving only beyond Sta. 745+08.65 –L-

No questions or comments on this page.

PSH 16 (U-2519CB Project)

- No impacts to jurisdictional features
- Paving only

No questions or comments on this page.

PSH 17

- Bones Creek
  - Triple 10' x 10' Culvert extension
- Wetland Z6
  - Roadway Fill and Proposed Lateral Ditch Impact
    - Replacing existing ditch

Liz asked the DB Team to explore other options besides ditching through wetlands for the lateral ditch on the south side of US 401; if ditching through the wetlands is unavoidable than the DB Team will explain this in the SMP. James indicated that the team is proposing to relocate the existing ditch due to the roadway widening and the existing ditch flows to the stream bank. The proposed ditch is located in steep terrain and requires rip rap to stabilize the ditch based on velocity calculations. The team has flattened the last section of the ditch to eliminate the need for rip rap in the wetland and reduce velocities. An additional benefit for ditching to the stream is to reduce the concern that the steep terrain would cause unintended erosion of the wetland if the ditch stopped at the wetland boundary.

PSH 18

- No impacts to jurisdictional features

No questions or comments on this page.

PSH 19 (U-2519CB Project)

- No impacts to jurisdictional features
- Paving only

No questions or comments on this page.

PSH 20 (U-2519CB Project)

- No impacts to jurisdictional features
- Paving only

No questions or comments on this page.

PSH 4 (B-5516 Project)

- Bridge 14 Replacement over Bones Creek

- No impacts to jurisdictional features

No questions or comments on this page.

Design Considerations/ Additional Information

- CA fence limits to address roadway comments
  - Clearing and installation impacts for installing fence parallel along mainline through wetlands form beginning of project to US 401 and I-295 interchange.
- Borrow pit investigations to begin in January

A discussion was opened up about addressing the roadway comment involving running CA fence parallel to bridge crossings. It was mentioned by the attendees that standard practice was to tie the CA fence to the bridge abutments to avoid additional environmental impacts, blockage of wildlife passage, and issues with debris blockage in the floodplain. Everyone in attendance unanimously agreed that the CA fence should be tied into the bridge abutments.

The DB Team was asked if we had identified potential borrow area and how far away the pits are from the project. The Team stated that the likely borrow location is directly adjacent to the project and identified this area on plan sheets 5 and 6.

4C will tentatively be held in February of 2017

*****ACTON ITEM: James Rice asked that all parties investigate the required minimum clearance between the bottom of the raised footings and the wetland surface. The current minimum clearance is 3 feet, but the team would like to investigate constructing footings outside the standing water flush with the existing ground to limit floodplain impacts due to the footings. If anyone has any objections, please comment on the minutes. After minutes are finalized, the team will begin investigations on clearances for each individual footing based on field conditions. A summary of footings and clearances will be presented at 4C.***

TO: **Paul Atkinson, PE**
NCDOT Hydraulics Unit

FROM: **James R. Rice, PE - HDR**

DATE: **Meeting held: February 15, 2017**
Minutes finalized March 7, 2017

SUBJECT: **U-2519CA/B-5516 Fayetteville Outer Loop**
Cumberland County, NC

Final 4C Meeting Minutes

Merger Team Attendees:

Travis Wilson	NC Wildlife Resources Commission (via phone)
Gary Jordan	US Fish and Wildlife Service (absent)
Dr. Cynthia Van Der Wiele	US Environmental Protection Agency (via phone)
Liz Hair	US Army Corps of Engineers (via phone)
Joanne Steenhuis	NC Department of Environmental Quality
Ron Lucas	FHWA (absent)

Support Staff and Meeting Attendees:

Brook Anderson	NCDOT - Hydraulics
Paul Atkinson	NCDOT - Hydraulics
Jay McInnis	NCDOT - PDEA
Mark Staley	NCDOT - REU
David Stutts	NCDOT - Structures
Gary Lovering	NCDOT - Roadway Design
Jim Rerko	NCDOT - Division 6 Division Environmental Officer
Chris Rivenbark	NCDOT - Natural Environment Section
Colin Mellor	NCDOT - Natural Environment Section
Michael Penney	NCDOT - Design Build (via phone)
Alena Cook	NCDOT - Transportation Planning Branch (via phone)
Michael Taylor	Barnhill Contracting
Randall Gattis	Sanford Contractors
Chris Brown	Sanford Contractors
Vickie Miller	HDR
Josh Massrock	HDR
James Rice	HDR
Paul Meehan	HDR
Brian Watson	HDR

The meeting was opened with introductions and turned over to James Rice. The PDF drawings were projected on the screen and the following agenda items were presented to all in attendance.

The *italicized* text indicates notes from the meeting discussion.

General

- Future I-295- Fayetteville Outer Loop from South of US 401 to South of SR 1400 (Cliffdale Rd). Approx. 3.2 miles of a four lane divided highway in new location.
- 1 major interchange: US 401/ I-295.
- 3 proposed bridges: I-295 over Little Rockfish Creek, I-295 over Bones Creek, and I-295 over Tributary to Lake Rim
- Bridge replacement: Bridge 14 on SR 3569 over Bones Creek (B-5516 project)
- Culvert Extension: Extending Triple RCBC under US 401 for Bones Creek
- Due to anticipated development around the project corridor drainage systems have been sized using urban discharge methods.

SMP

No Comments

PSH 5

Permit Site 1 - Little Rockfish Creek/Wetland Z7

- The work bridge is shown in gray on the plan sheets and includes pile locations.
- Temporary surface water and temporary fill in wetland impacts were taken due to the temporary work bridge piles. These impacts were estimated as the sum of the individual H piles needed for the work bridge. Each H pile was estimated as 1 sq. ft. A note has been added to the impact summary sheet to document this.
- Hand clearing is shown under the bridge plus an additional 25' on either side.
- Permanent wetland impacts were taken for interior bridge piles. Impacts were estimated for 9 – 30" piles at each bent for a total of 54 piles. A note has been added to the impact summary sheet.
- Fill is shown in wetlands and mechanized clearing for proposed roadway impacts.
- Fill is shown in wetlands and mechanized clearing for the 24" sanitary sewer line. The sewer line will be installed using open cut methodologies for both the sewer line and encasement line.
- A 4' Base Ditch lined with Class 'I' Rip Rap is located at 591+88 –L- RT with the ditch tying at the bottom of the slope. Mechanized clearing is shown for rip rap installation.
- A 4' Base Ditch lined with Class 'I' Rip Rap is located at 588+00 –L- LT. Rip Rap Embankment was added to the end of ditch and a detail has been added. Due to the quantity of water we are discharging and the steepness of the terrain the design takes the ditch all the way to the stream.

Jim Rerko stated that 25 ft. of hand clearing beyond the bridge footprint was good and that they had to go back and do additional clearing on other sections of the highway where they had proposed less. Having the 25 ft. of clearing here should avoid those future issues.

Joanne Steenhuis asked if we would pull the ditch back from the stream rather than tying in directly to the stream on southwest side of the bridge (Sta. 588+00).
Jim Rerko stated that the contours would create a problem in the future so putting in the stable ditch at this time was a good solution.

Joanne Steenhuis then asked if the angle of the ditch could be reevaluated for a better tie. James Rice stated that we would look at a better tie in of the ditch to the stream

A discussion was started based on the mechanized clearing shown outside ditches and rip rap between Jim Rerko, Chris Rivenbark, and James Rice. At the conclusion of the conversation, all parties agreed that there was no need for mechanized clearing outside the ditch or rip rap limits, and that this would be shown as hand clearing. The D-B team will look at each of the areas of mechanized clearing to see if there are other locations along the project that could be hand clearing as well.

PSH 6

Permit Site 2 - Bones Creek/Wetland Z6

- The work bridge is shown in gray on the plan sheets and includes pile locations.
- Temporary surface water and temporary fill in wetland impacts were taken due to the temporary work bridge piles. These impacts were estimated as the sum of the individual H piles needed for the work bridge. Each H pile was estimated as 1 sq. ft. A note has been added to the impact summary sheet.
- Hand clearing is shown under the bridge plus an additional 25' on either side.
- Permanent impacts were taken based on pile cap size and based on the entire foundation area. Foundations outside wetlands will be poured on top of the ground or buried as applicable. Foundations inside wetlands where site conditions allow will be poured on top of the ground.
- There are a few locations we are proposing to pour on the ground at this point based on current existing site conditions. These locations may change if site conditions change. An evaluation will be made closer to construction.
- Foundations that fall inside the wetland where site conditions do not work for pouring on the ground will be elevated above the natural ground.

Jim Rerko asked about the small work bridges illustrated on the plans at the fingers rather than mats. Randall Gattis stated that the Team intends to use the work bridges and not mats. He also stated that they, Sanford Contractors, have acquired a larger crane and that some of these work bridges may later be eliminated due to the reach of the crane; however, we, the Design-Build Team, are showing a conservative approach at this time.

Jim Rerko asked about access. Randall Gattis answered that deliveries will be coming in from Raeford Road.

A discussion about ground pouring the pile foundations was initiated. Joanne Steenhuis stated that the agencies are fine with ground pouring with minor excavation for the foundation as long as the impact is accounted for and there is no side casting of materials into wetlands or placement of fill beyond the permitted footprint.

PSH 7

Permit Site 2 - Bones Creek/Wetland Z6

- The work bridge is shown in gray on the plan sheets and includes pile locations.

- Temporary surface water and temporary fill in wetland impacts were taken due to temporary work bridge piles. These impacts were estimated as the sum of the individual H piles needed for the work bridge. Each H pile was estimated as 1 sq. ft. A note has been added to the impact summary sheet
- Hand clearing is shown under the bridge plus an additional 25' on either side. Additional hand clearing for the temporary work bridge on the East side of Ramp C is also shown.
- Permanent impacts were taken based on actual pile cap size.
- The excavation area for the Bones Creek CLOMR is shown for grading to elevation 145 ft. There will not be any grading within the wetland boundaries. A grading detail has been added.
- The 30" sanitary sewer line in encasement as illustrated on the planset may be changed due to a request by PWC due to sharp angle (90°). The Team is working with the utility designer to try to avoid any impacts to the wetlands due to the sewer line and access road at this location.

Permit Site 3 - Wetland Z6

- Fill in wetland impacts are shown for roadway impacts and mechanized clearing 10' beyond fill slope.
- Mechanized clearing impacts are shown through the PUE for installation of the 30" sanitary sewer line. An additional construction easement was added outside of wetland boundary for stockpiling to avoid additional wetland impacts.

No comments

PSH 8

Permit Site 4 – UT to Bones Creek/ Wetland Z5

- Hand clearing is shown under the bridge plus an additional 25' on either side.
- Permanent wetland impacts are shown for interior bridge piles. These impacts were estimated for 8 – 18" piles at each bent on the left bridge and 10 – 18" piles at each bent on the right bridge for a total of 36 -18" piles. A note has been added to the impact summary sheet.
- Fill in wetland and mechanized clearing impacts are illustrated for the rip rap pads that are installed in wetlands.
- The discharge locations were placed at bottom of slope (inside the wetland) for stability.

James Rice stated the mechanized clearing currently shown at this location will be changed to hand clearing.

Jim Rerko asked about the greenway trail and whether there is enough room for installation. James Rice answered that development of the trail plans was not on the D-B Team and that parameters for distance offsets were provided to the Team during the project pursuit.

PSH 9

Permit Site 5 – UT to Bones Creek/ Wetland Z4

- Permanent wetland and stream impacts were taken for installation of the 60" RCP-IV shown on the plans. The pipe is shown to be buried 1-foot; however, the pipe is over 315 feet in length with a 2.25% slope. The JS lines stops short of the proposed outlet.

Discussion about burying the pipe was opened up to the room. Joanne Steenhuis asked about a potential sill at the outlet of the pipe; however, it was noted that the concern was potential head cutting upstream due to the slope. Joanne Steenhuis asked the Team to explain the reasoning for not burying the pipe in the permit application.

PSH 11

Permit Site 6 – Wetland Z3

- Permanent wetland impacts were for taken for the 60" RCP-III and roadway fill. This area had previously been shown as a JS due to a survey file error. This has been corrected.
- The pipe is not buried due to this being a wetland impact rather than a stream impact.

Paul Atkinson asked if hand clearing is needed here and additional PDE.
James Rice stated that he didn't think it was needed at this location.
Joanne Steenhuis asked if rip rap was needed in the channel bed.
James Rice said that the rip rap was needed to reduce pipe outlet velocities and reduce scour potential.

PSH 13

Permit Site 7 – UT to Bones Creek

- Permanent surface water impacts are shown for the 54" RCP III which will be buried 1'. A detail has been added showing the rip rap as being embedded and therefore not blocking stream passage. Bank stabilization has been included to stabilize the 4' Base Lateral Ditch confluence.

Permit Site 8 – Wetland Z2

- Wetland impacts are shown due to roadway fill.

No Comments

PSH 15

Permit Site 9 – Wetland Z1

- Wetland impacts are shown due to roadway fill.
- The 4' Base Special Cut Ditch at Sta. 90+75 –SR1- LT was widened to an 8' base to reduce velocity before entering the wetland.

No Comments

PSH 17

Permit Site 10 - Bones Creek

- Permanent surface water impacts were illustrated for the culvert extension and temporary surface water impacts are shown for construction and dewatering of the culvert. Bank stabilization is also shown on the outlet end of the culvert.

Permit Site 10 - Wetland Z6

- Permanent fill in wetland impacts were taken for the roadway.
- Excavation impacts in the wetland for the installation of the 2'Lateral Base Ditch. The Team investigated eliminating the ditch through the wetland but ultimately there was too much water going down the steep slope to end the ditch at the edge of the wetland. A statement has been added to the stormwater management plan to address this.
- Mechanized clearing impacts were shown to the limits of PDE on the south side of US 401 and hand clearing impacts are shown to the limits of TDE on the north side of US 401.

Mark Staley noted that the hand clearing in front of the wing wall on the north side of US 401 needs to be updated to mechanized clearing due to the construction of the wing wall.

Borrow Pits/ Haul Roads

The Barker Property will be used adjacent to the project alignment. The plan is to grade to drain a portion of the property south of US 401 and north of the railroad alignment. The existing entrance to the property at 401 will be used for access of on road trucks. Two additional pits will be dug to the south of the railroad and on the east and west sides of the alignment. Off road trucks will be used from this location with access directly to the alignment.

Jim Rerko noted that Liz Hair would be needed to verify the wetland boundaries.

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34817.3.13	**TIP No.:**	U-2519CA/B-5516	**County(ies):**	Cumberland	**Page**	1	**of**	2

General Project Information

WBS Element:	34817.3.13	**TIP Number:**	U-2519CA/B-5516	**Project Type:**	New Location	**Date:**	1/13/2017
NCDOT Contact:	Paul Atkinson			**Contractor / Designer:**	James R. Rice		
Address:	1020 Birch Ridge Dr. Raleigh, NC 27610			**Address:**	555 Fayetteville St., Suite 900 Raleigh, NC 27601		
Phone:	919-707-6707			**Phone:**	919-232-6621		
Email:	patkinson@ncdot.gov			**Email:**	James.Rice@hdrinc.com		
City/Town:	Fayetteville			**County(ies):**	Cumberland		
River Basin(s):	Cape Fear			**CAMA County?**	No		
Wetlands within Project Limits?	Yes						

Project Description

Project Length (lin. miles or feet):	3.3 miles	**Surrounding Land Use:**	Rural/Residential				
	Proposed Project			**Existing Site**			
Project Built-Upon Area (ac.)	64.9	ac.		3.4	ac.		
Typical Cross Section Description:	4 lane divided facility with a 70' depressed median: 14' outside, usable shoulders with 12' full depth pavement, 6' inside, usable shoulders with 4' full depth pavement			N/A - new alignment			
Annual Avg Daily Traffic (veh/hr/day):	Design/Future:	47,700	Year: 2040	Existing:	36,000	Year:	2015

General Project Narrative: (Description of Minimization of Water Quality Impacts)

Project Description: The proposed project (U-2519CA/B-5516) will replace Bridge No.14 on SR 3569 (Raeford Road) over Bones Creek (Lake Rim Runoff) and construct 3.3 miles of a fully controlled access, four lane divided facility that extends Future I-295 (Fayetteville Outer Loop) from south of US 401 to south of SR 1400 (Cliffdale Road) in Cumberland County. The project includes four bridge crossings and a triple barrel culvert extension for the two major stream crossings, Little Rockfish Creek and Bones Creek. Little Rockfish Creek and Bones Creek are FEMA regulated streams with associated regulated floodplains. Pipe culverts will be used to convey all other jurisdictional stream crossings through the project. Wetlands are also located throughout the length of the entire project.

Impact minimization efforts: The three bridge locations along the main line of the project have been extended to span the streams as well as the surrounding wetlands bordering these streams. The extended bridge length also accounts for a 15 foot buffer between the bridge toe of slope and the wetland boundary to minimize wetland disturbance. Wetland impacts were also minimized by using guardrail with 3:1 side slopes in areas where roadway fill impacted wetlands. Temporary work bridges will be used during construction where top down construction is not feasible in wetland areas and over streams. Ditches and pipes that outlet adjacent to wetlands have been designed to have non-erosive velocities to help protect the exisitng wetlands. The DB Team has proposed ditching through wetlands to the jurisdictional stream in a few areas along the project, this was done in areas where proposed ditches could not be designed so that the exit velocity was non-erosive or in areas of steep terrain that may cause more severe wetland erosion if the ditch were to stop at the wetland boundary allowing the ditch to naturally cut through the wetland to the stream.

Stormwater BMP Measures: Stormwater control measures such as detention basins with media filters were proposed at specific locations along the project but were ruled out due to the high water table in the surrounding area. The Design Build Team has designed ditches to acheive grass swale credit to the maximum extent practical throughout the project.

Waterbody Information

Surface Water Body (1):	Little Rockfish Creek		**NCDWR Stream Index No.:**	18-31-24-(1)			
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C				
		Supplemental Classification:	None				
Other Stream Classification:	None						
Impairments:	mercury (Hg)						
Aquatic T&E Species?	No	Comments:					
NRTR Stream ID:	NA			**Buffer Rules in Effect:**	N/A		
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A		
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
(If yes, provide justification in the General Project Narrative)							

North Carolina Department of Transportation

Highway Stormwater Program

STORMWATER MANAGEMENT PLAN

FOR NCDOT PROJECTS

(Version 2.07; Released October 2016)

WBS Element:	34817.3.13	**TIP No.:**	U-2519CA/B-5516	**County(ies):**	Cumberland	**Page**	**2**	**of**	**2**

Additional Waterbody Information

Surface Water Body (2):	Bones Creek		**NCDWR Stream Index No.:**	18-31-24-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	mercury (Hg)					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	NA			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

Surface Water Body (3):	Tributary to Lake Rim (Bones Creek)		**NCDWR Stream Index No.:**	18-31-24-2		
NCDWR Surface Water Classification for Water Body		**Primary Classification:**	Class C			
		Supplemental Classification:	None			
Other Stream Classification:	None					
Impairments:	mercury (Hg)					
Aquatic T&E Species?	No	Comments:				
NRTR Stream ID:	NA			**Buffer Rules in Effect:**	N/A	
Project Includes Bridge Spanning Water Body?	Yes	**Deck Drains Discharge Over Buffer?**	N/A	**Dissipator Pads Provided in Buffer?**	N/A	
Deck Drains Discharge Over Water Body?	No	(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)		
(If yes, provide justification in the General Project Narrative)						

CONTRACT: C203759 TIP PROJECT: U-2519CA & B-5516

09/08/99

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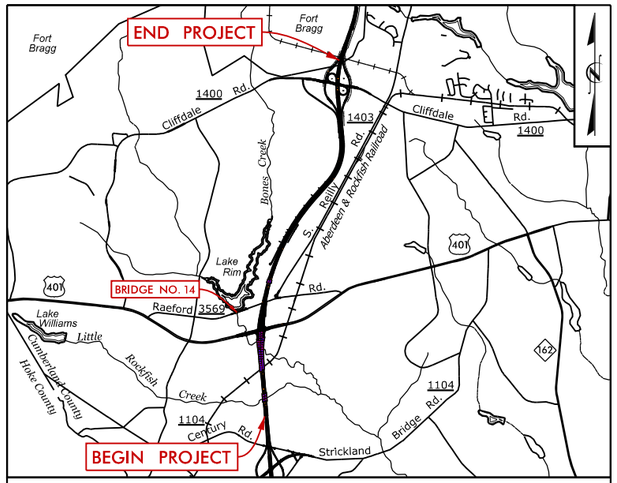
STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519CA & B-5516	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.3.13	NHP-0620(031)	

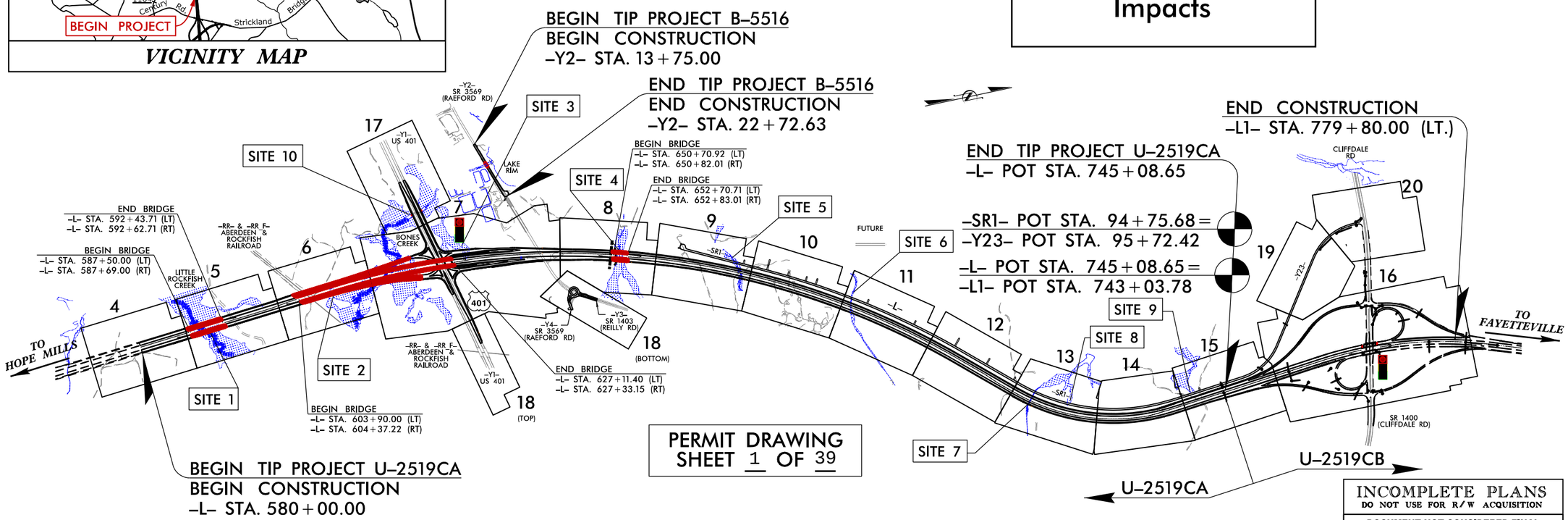


VICINITY MAP

LOCATION: FUTURE I-295 – FAYETTEVILLE OUTER LOOP FROM SOUTH OF US 401 TO SOUTH OF SR 1400 (CLIFFDALE ROAD).

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, STRUCTURES & SIGNALS

Wetland & Stream Impacts



PERMIT DRAWING
SHEET 1 OF 39

INCOMPLETE PLANS
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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.
A PORTION OF THIS PROJECT IS LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE

PROPOSED TRAFFIC SIGNAL

BARNHILL CONTRACTING COMPANY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 36,000
ADT 2040 = 47,700
DHV = 8%
D = 55%
*T = 12%
V = 70 MPH
*(TTST 4% + DUALS 8%)
FUNC CLASS = FREEWAY / INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519CA = 2.562 MILES
LENGTH STRUCTURE TIP PROJECT U-2519CA = 0.565 MILE
TOTAL LENGTH TIP PROJECT U-2519CA = 3.127 MILES
LENGTH ROADWAY TIP PROJECT B-5516 = 0.157 MILE
LENGTH STRUCTURE TIP PROJECT B-5516 = 0.013 MILE
TOTAL LENGTH TIP PROJECT B-5516 = 0.170 MILE

NCDOT CONTACT: K. ZAK HAMIDI, PE
DESIGN-BUILD UNIT – PROJECT ENGINEER

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

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 21, 2016
LETTING DATE: JUNE 21, 2016

PAUL A. MEEHAN, PE
PROJECT ENGINEER

PHILLIP E. ROGERS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
JAMES A. RICE, PE

ROADWAY DESIGN ENGINEER
ANTHONY G. THOMPSON, PE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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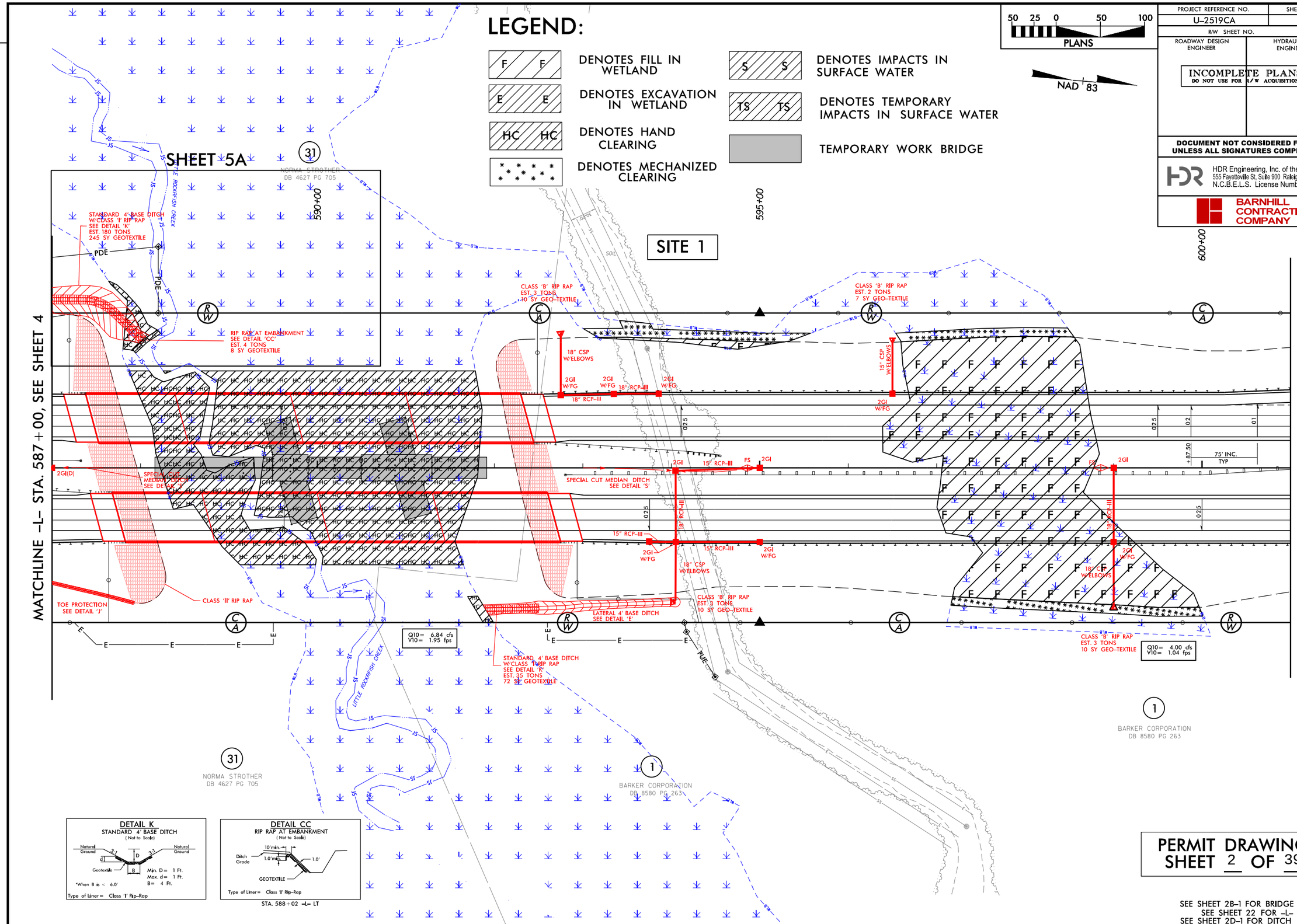
50 25 0 50 100
PLANS

NAD 83

LEGEND:

- F F — DENOTES FILL IN WETLAND
- E E — DENOTES EXCAVATION IN WETLAND
- HC HC — DENOTES HAND CLEARING
- DENOTES MECHANIZED CLEARING
- S S — DENOTES IMPACTS IN SURFACE WATER
- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE



PERMIT DRAWING
SHEET 2 OF 39

SEE SHEET 2B-1 FOR BRIDGE SKETCH
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	5
R/W SHEET NO.	
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PLANS

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- TS TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE

SITE 1

MATCHLINE -L- STA. 587+00, SEE SHEET 4

MATCHLINE -L- STA. 601+00, SEE SHEET 6

590+00

595+00

600+00

STANDARD 4' BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL 'K' EST. 180 TONS 245 SY GEOTEXTILE

PDE

RIP RAP AT EMBANKMENT SEE DETAIL 'CC' EST. 4 TONS 8 SY GEOTEXTILE

CLASS 'B' RIP RAP EST. 2 TONS 7 SY GEO-TEXTILE

CLASS 'B' RIP RAP EST. 3 TONS 10 SY GEO-TEXTILE

18" CSP W/ELBOWS

15" CSP W/ELBOWS

2GI W/FG

18" RCP-III

15" RCP-III

2GI(D)

SPECIAL CUT MEDIAN DITCH SEE DETAIL 'S'

FS

75' INC. TYP

TOE PROTECTION SEE DETAIL 'J'

CLASS 'I' RIP RAP

LATERAL 4' BASE DITCH SEE DETAIL 'E'

Q10= 6.84 cfs
V10= 1.95 fps

STANDARD 4' BASE DITCH W/CLASS 'I' RIP RAP SEE DETAIL 'K' EST. 35 TONS 72 SY GEOTEXTILE

PUE

Q10= 4.00 cfs
V10= 1.04 fps

LITTLE ROCKFISH CREEK

31 NORMA STROTHER DB 4627 PG 705

1 BARKER CORPORATION DB 8580 PG 263

DETAIL K
STANDARD 4' BASE DITCH
(Not to Scale)

Natural Ground — 3:1 — D — 3:1 — Natural Ground; d; Geotextile; B

Min. D = 1 Ft.
Max. d = 1 Ft.
B = 4 Ft.
*When B is < 6.0'

Type of Liner = Class 'I' Rip-Rap

DETAIL CC
RIP RAP AT EMBANKMENT
(Not to Scale)

10' min.; 1.0' min.; Ditch Grade; 1.0'; GEOTEXTILE

Type of Liner = Class 'I' Rip-Rap

STA. 588+02 -L- LT

PERMIT DRAWING
SHEET 3 OF 39

SEE SHEET 2B-1 FOR BRIDGE SKETCH
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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

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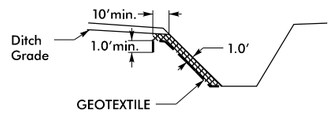
BARNHILL CONTRACTING COMPANY

DETAIL CC
RIP RAP AT EMBANKMENT
(Not to Scale)



Type of Liner= Class 'I' Rip-Rap

STA. 588+02 -L- LT

LEGEND:

- E / E — DENOTES EXCAVATION IN WETLAND
- HC / HC — DENOTES HAND CLEARING
- S / S — DENOTES IMPACTS IN SURFACE WATER
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER

NAD 83

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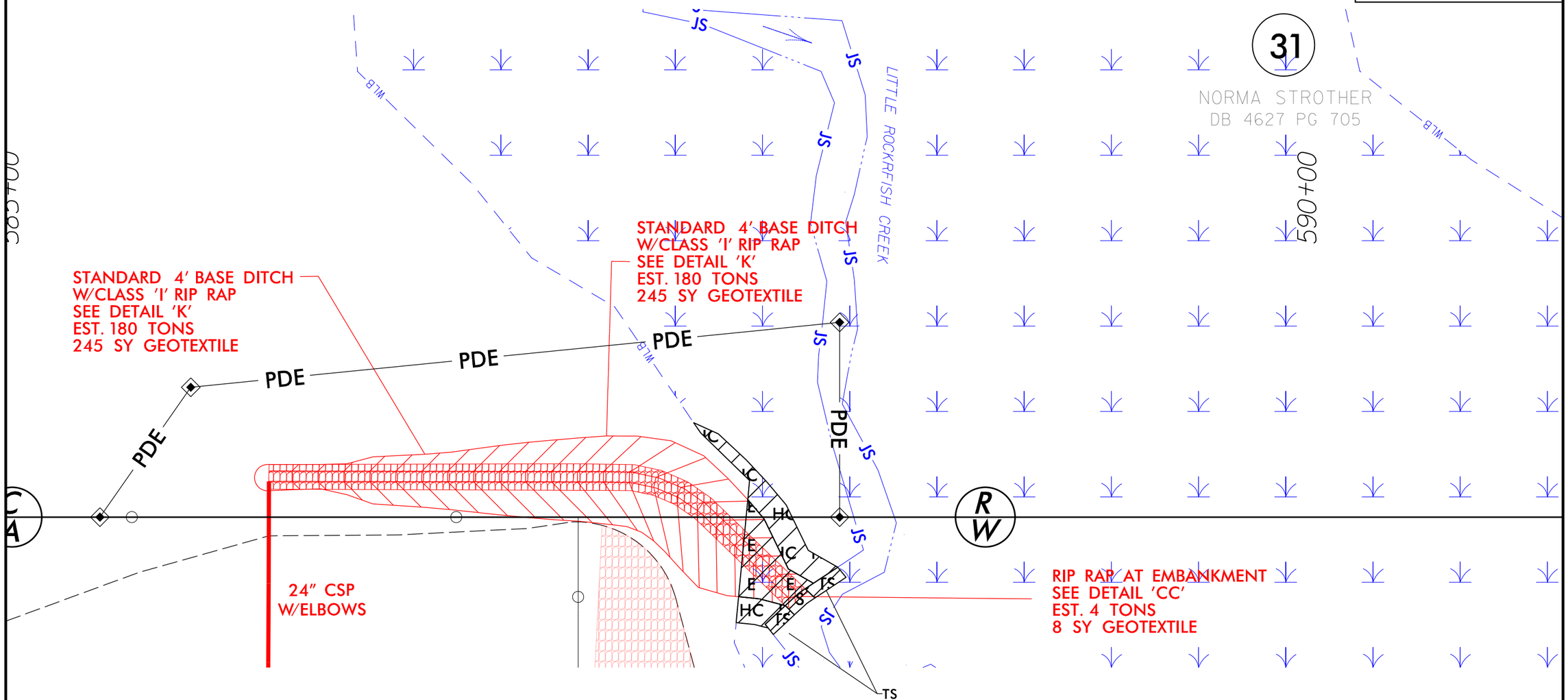
PLANS



PERMIT DRAWING
SHEET 4 OF 39

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 1

GRADEPOINT PROFILE (LLT) – PROPOSED BRIDGE

587+00 588+00 589+00 590+00 591+00 592+00 593+00 594+00

PERMIT DRAWING
SHEET 5 OF 39

REVISIONS 5/14/99

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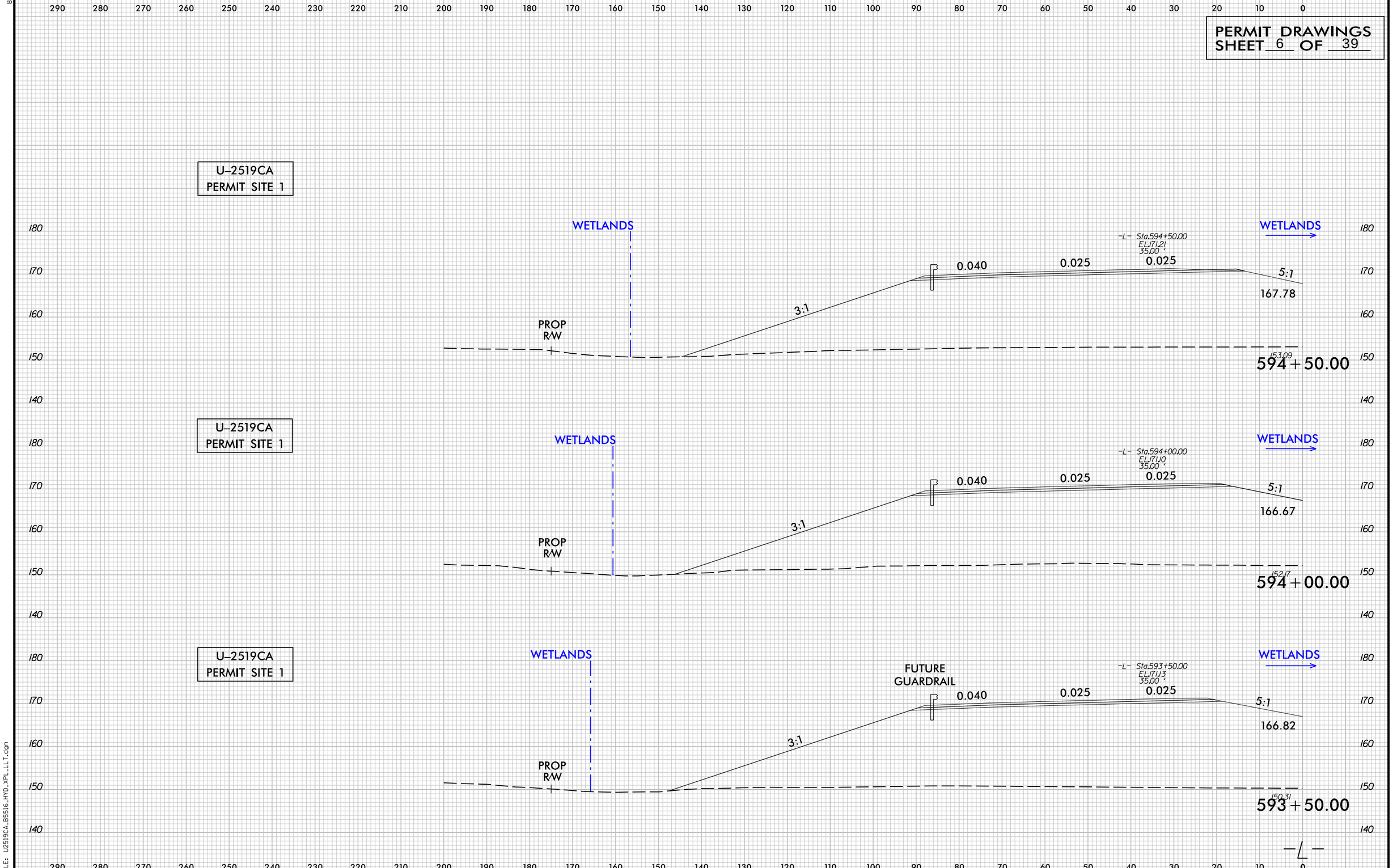
U-2519CA	X-10

PERMIT DRAWINGS
SHEET 6 OF 39



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

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BARNHILL CONTRACTING COMPANY

50 25 0 50 100
PLANS

NAD 83

SITE 2

MATCHLINE -L- STA. 601+00, SEE SHEET 5

MATCHLINE -L- STA. 615+00, SEE SHEET 7

BARKER CORPORATION
DB 8580 PG 263

-L- POT Sta. 605+59.79 =
-RR- POT Sta. 18+92.72

-L- POT Sta. 605+41.64 =
-RR_F- POT Sta. 18+83.04

-YIRPB- POT Sta. 10+00.00 =
-L- Sta. 609+74.87, 71.00' LT

-YIRPC- PC Sta. 10+00.00 =
-L- Sta. 606+85.56, 59.00' RT

-RR- POT Sta. 20+57.77

-L- PC Sta. 609+74.87

-RR_F- POT Sta. 20+62.81

15" RCP-III
18" RCP-III
18" CSP W/ BOXING
2GI W/FG
FS
CLASS 'B' RIP RAP
EST. 3 TONS
10 SY GEO-TEXTILE

BONE'S CREEK

ABERDEEN - ROCKFISH RR

LEGEND:

- F F — DENOTES FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING
- S S — DENOTES IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE

PERMIT DRAWING
SHEET 7 OF 39

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 40 FOR -Y1RPB- PROFILE
SEE SHEET 41 FOR -Y1RPC- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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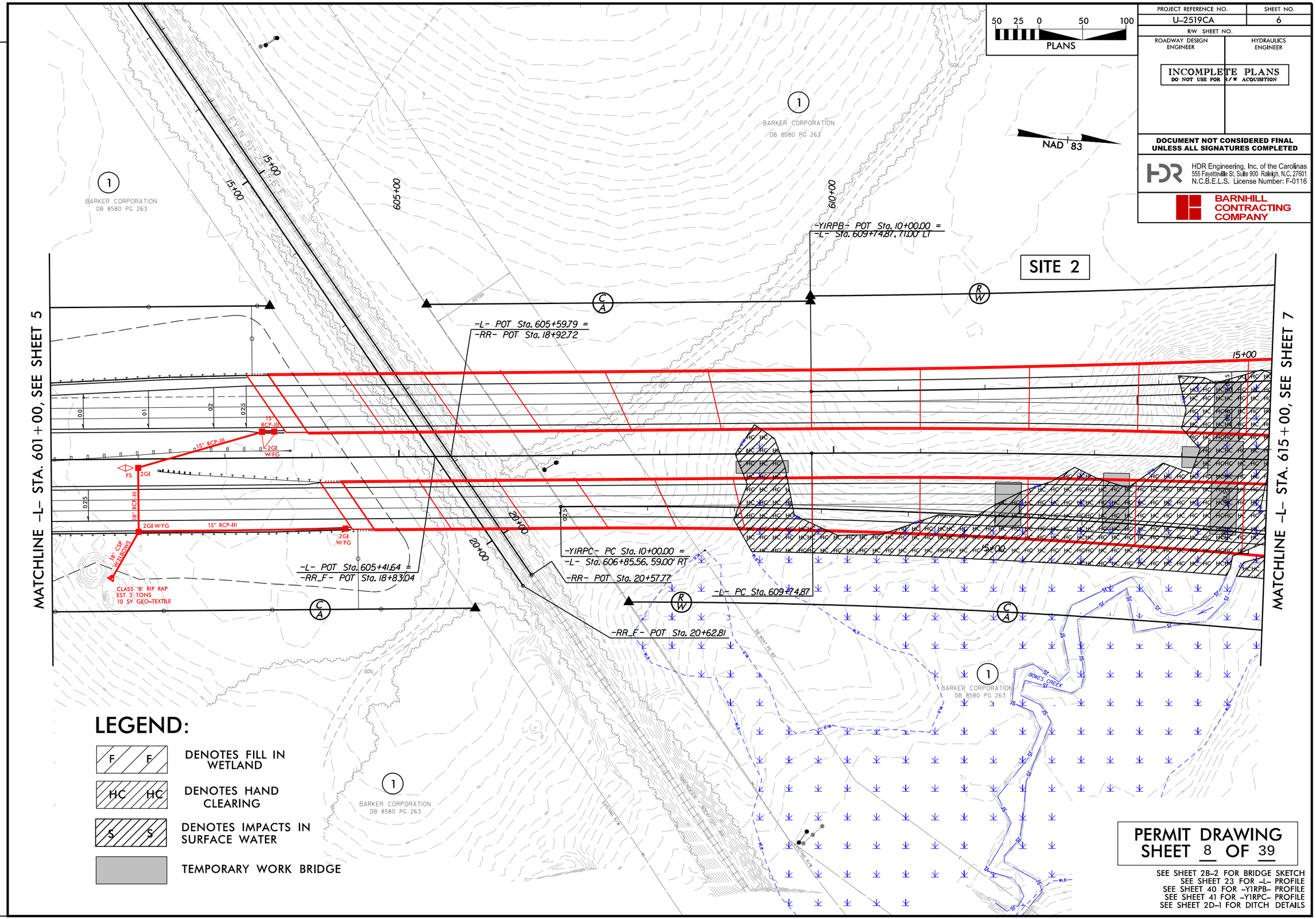
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



LEGEND:

- F / F — DENOTES FILL IN WETLAND
- HC / HC — DENOTES HAND CLEARING
- S / S — DENOTES IMPACTS IN SURFACE WATER
- TEMPORARY WORK BRIDGE

PERMIT DRAWING
SHEET 8 OF 39

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 40 FOR -Y1RPB- PROFILE
SEE SHEET 41 FOR -Y1RPC- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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REVISIONS

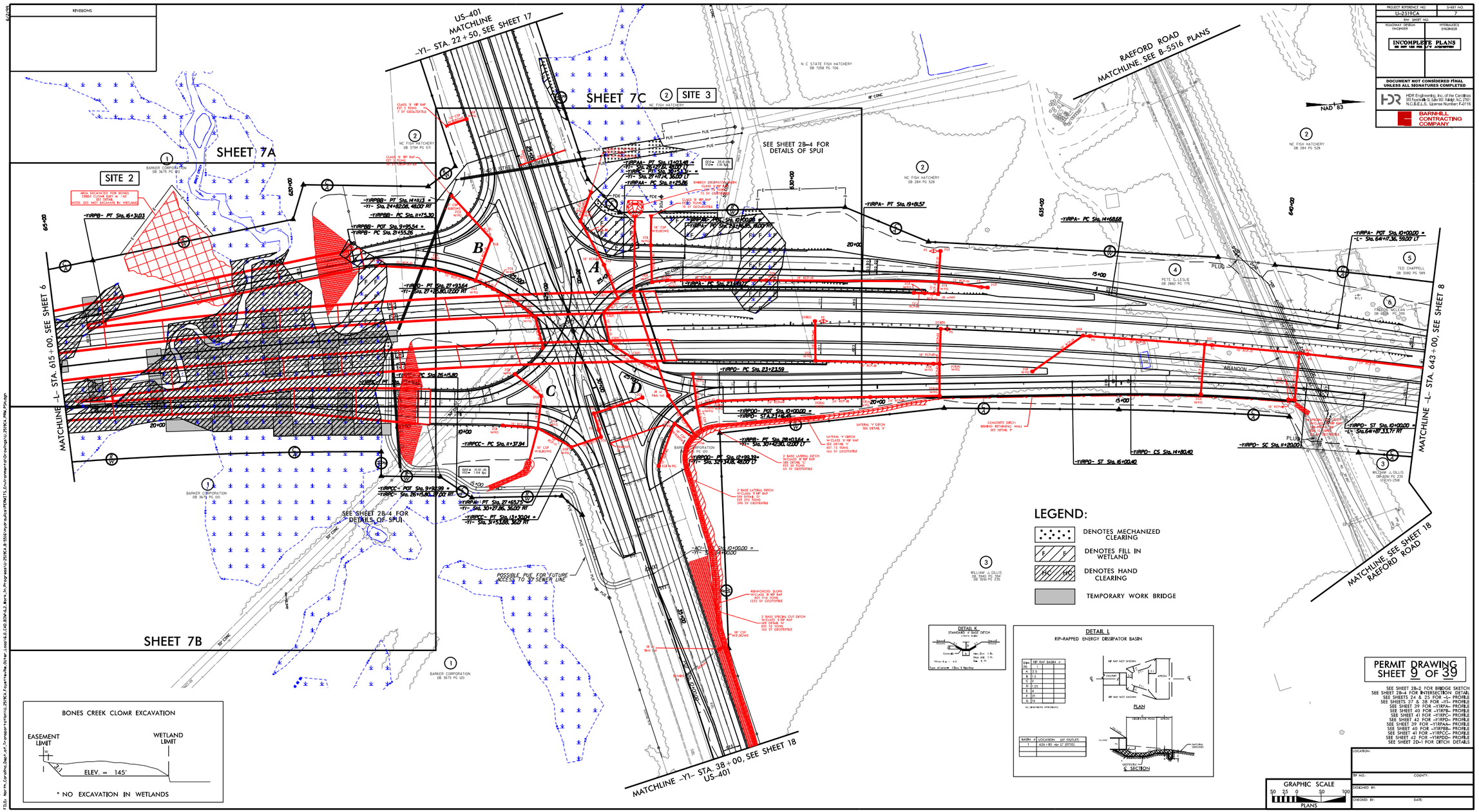
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineers, Inc. of the Carolinas
3511 Paramount Pkwy. Suite 100 Raleigh, N.C. 27609
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 9 OF 39

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2B-4 FOR INTERSECTION DETAIL
SEE SHEETS 24 & 25 FOR -L- PROFILE
SEE SHEETS 37 & 38 FOR -Y1- PROFILE
SEE SHEET 39 FOR -YIRPA- PROFILE
SEE SHEET 40 FOR -YIRPB- PROFILE
SEE SHEET 41 FOR -YIRPC- PROFILE
SEE SHEET 42 FOR -YIRPD- PROFILE
SEE SHEET 39 FOR -YIRPAA- PROFILE
SEE SHEET 40 FOR -YIRPBB- PROFILE
SEE SHEET 41 FOR -YIRPCC- PROFILE
SEE SHEET 42 FOR -YIRPDD- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

GRAPHIC SCALE
50 25 0 50 100
PLANS

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TIME: Include All
DATE: 7/27/2007

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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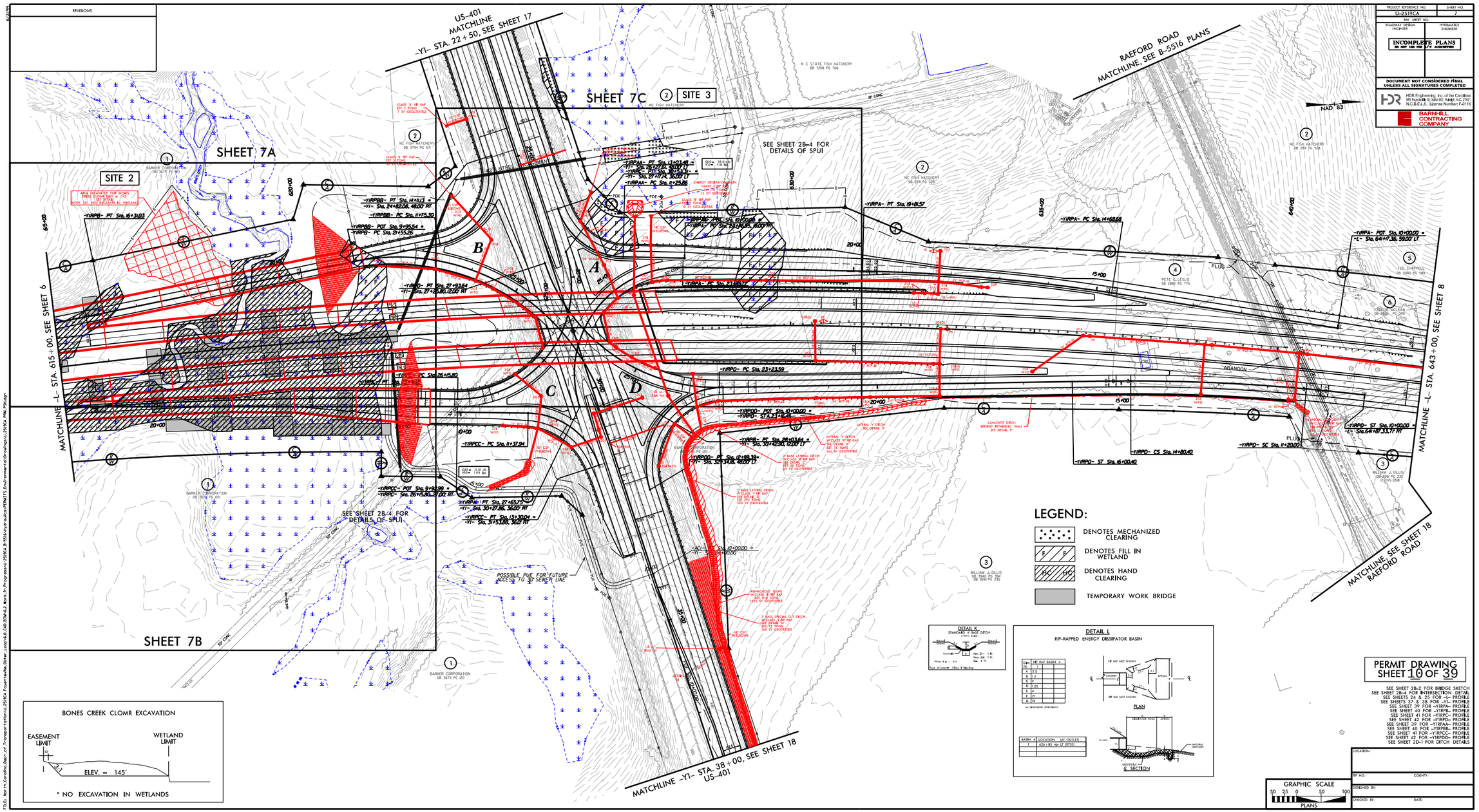
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

REVISIONS



PERMIT DRAWING
SHEET 10 OF 39

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2B-4 FOR INTERSECTION DETAIL
SEE SHEETS 24 & 25 FOR -L- PROFILE
SEE SHEETS 37 & 38 FOR -Y1- PROFILE
SEE SHEET 39 FOR -Y1RPA- PROFILE
SEE SHEET 40 FOR -Y1RPB- PROFILE
SEE SHEET 41 FOR -Y1RPC- PROFILE
SEE SHEET 42 FOR -Y1RPD- PROFILE
SEE SHEET 39 FOR -Y1RPAA- PROFILE
SEE SHEET 40 FOR -Y1RPBB- PROFILE
SEE SHEET 41 FOR -Y1RPCC- PROFILE
SEE SHEET 42 FOR -Y1RPDD- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

GRAPHIC SCALE
50 25 0 50 100
PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

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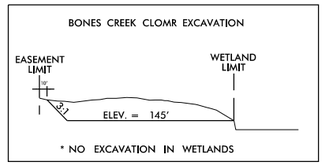
LEGEND:

- HC / HC — DENOTES HAND CLEARING
- DENOTES MECHANIZED CLEARING
- F / F — DENOTES FILL IN WETLAND
- TEMPORARY WORK BRIDGE



50 25 0 50 100
PLANS

NAD 83

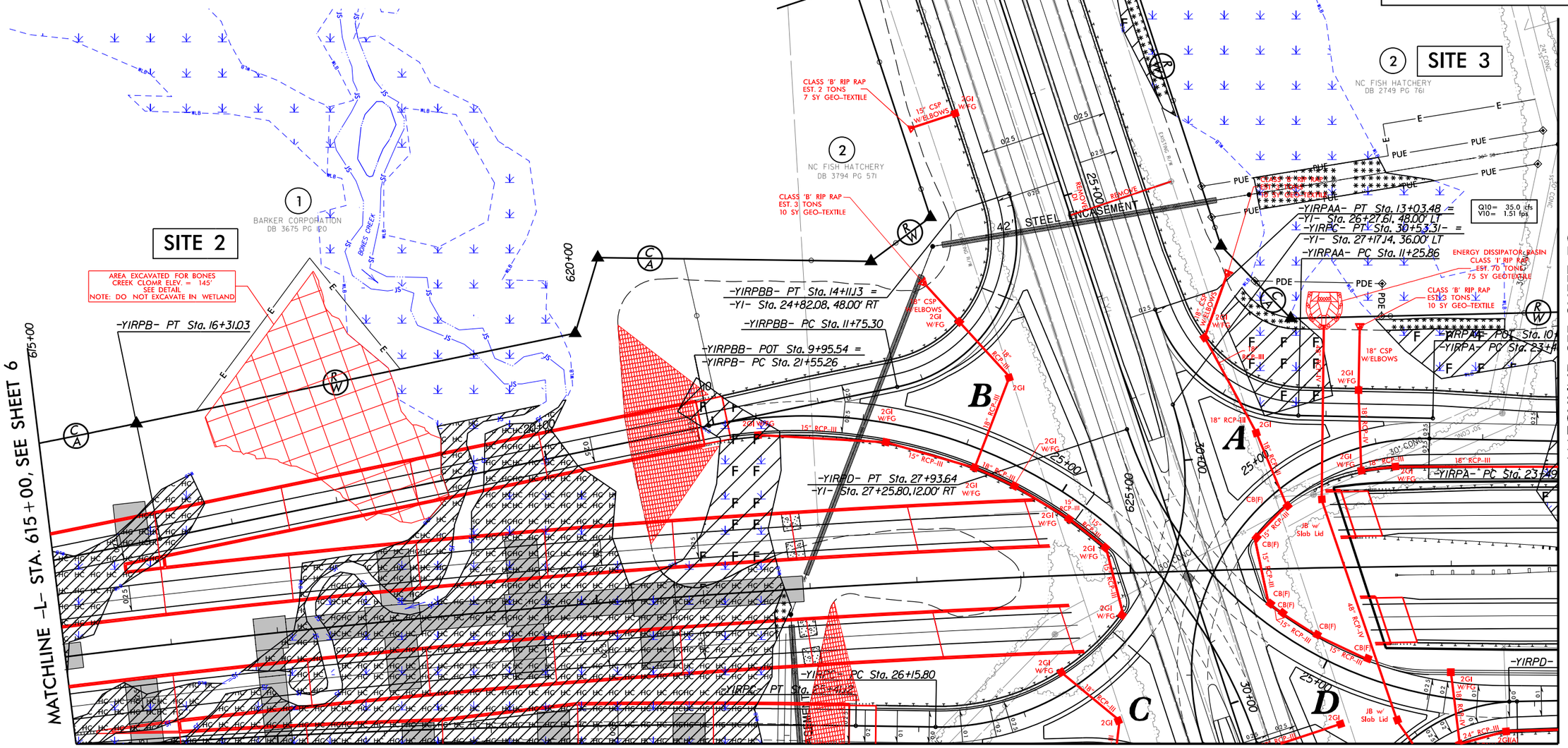
BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	7A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116



PERMIT DRAWING
SHEET 11 OF 39

REVISIONS

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LEGEND:

- F F — DENOTES FILL IN WETLAND
- HC HC — DENOTES HAND CLEARING
- TEMPORARY WORK BRIDGE

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

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

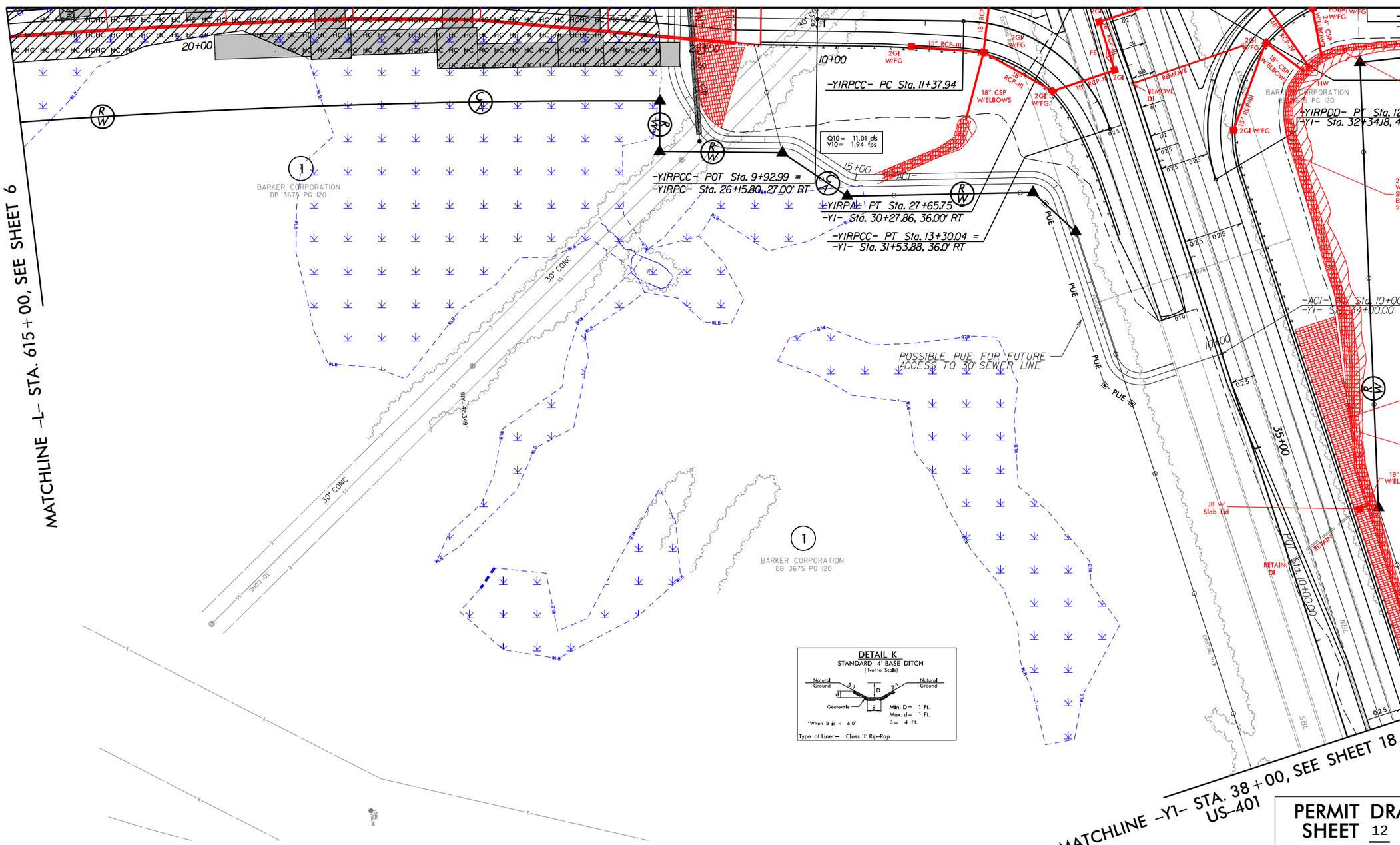
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

NAD 83

50 25 0 50 100
PLANS

MATCHLINE, SEE SHEET 7A



PERMIT DRAWING
SHEET 12 OF 39

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	7C
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

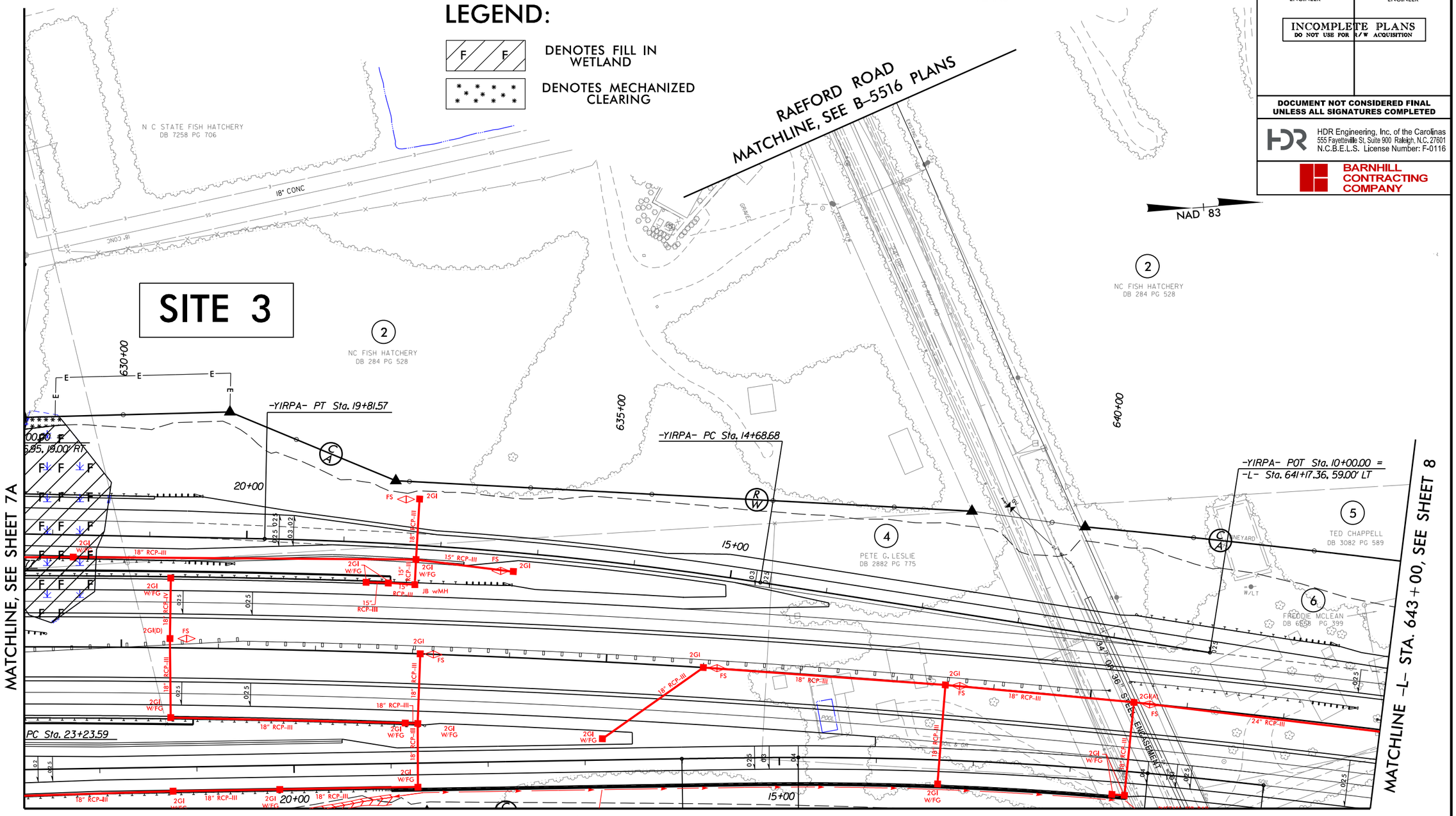
BARNHILL CONTRACTING COMPANY

50 25 0 50 100
PLANS

LEGEND:

F F — DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING



PERMIT DRAWING
SHEET 13 OF 39

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REVISIONS

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N.C.B.E.L.S. License Number: F-0116

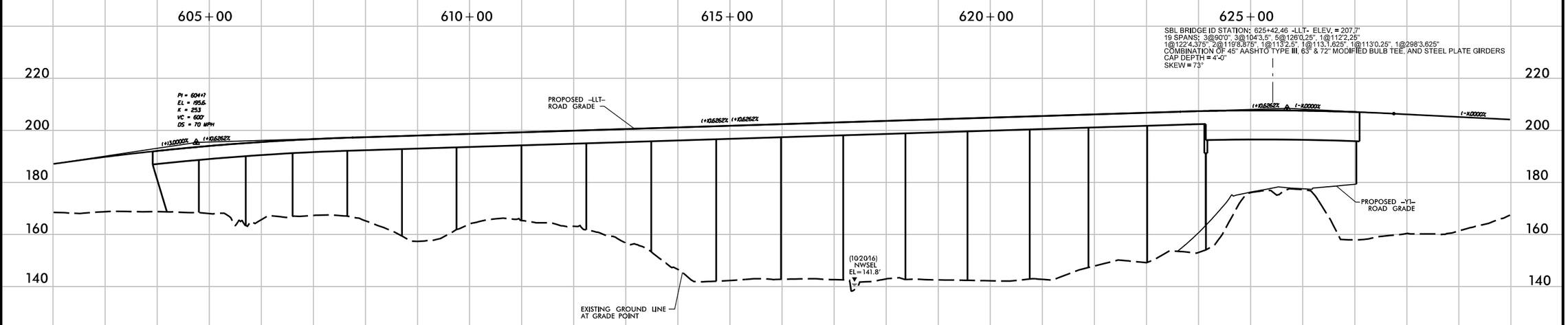
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 200' HORIZONTAL
1" = 40' VERTICAL

SITE 2



GRADEPOINT PROFILE (LLT) – PROPOSED BRIDGE

PERMIT DRAWING
SHEET 14 OF 39

REVISIONS

5/14/99

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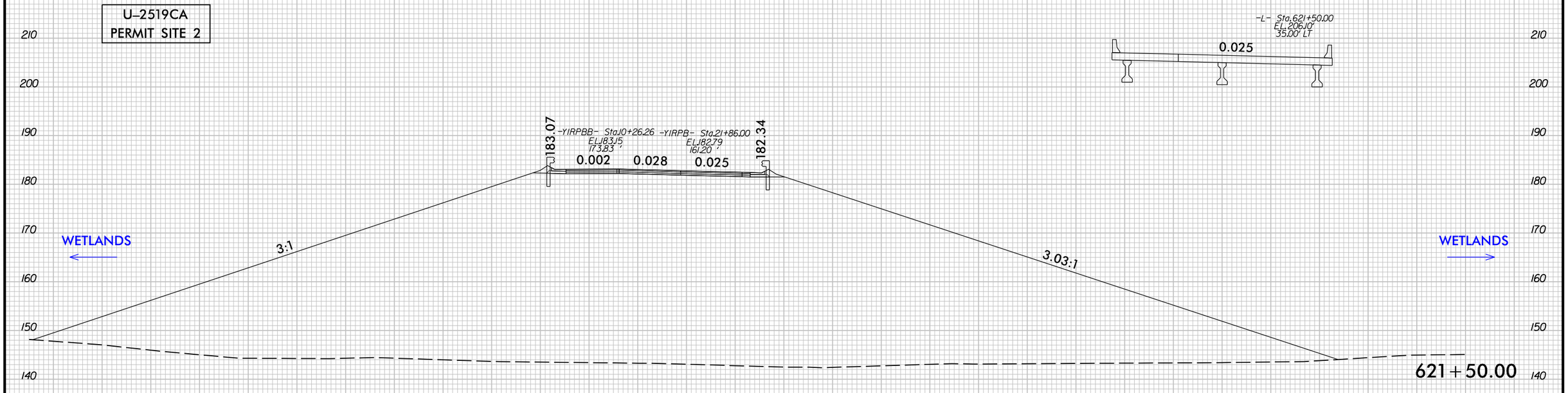
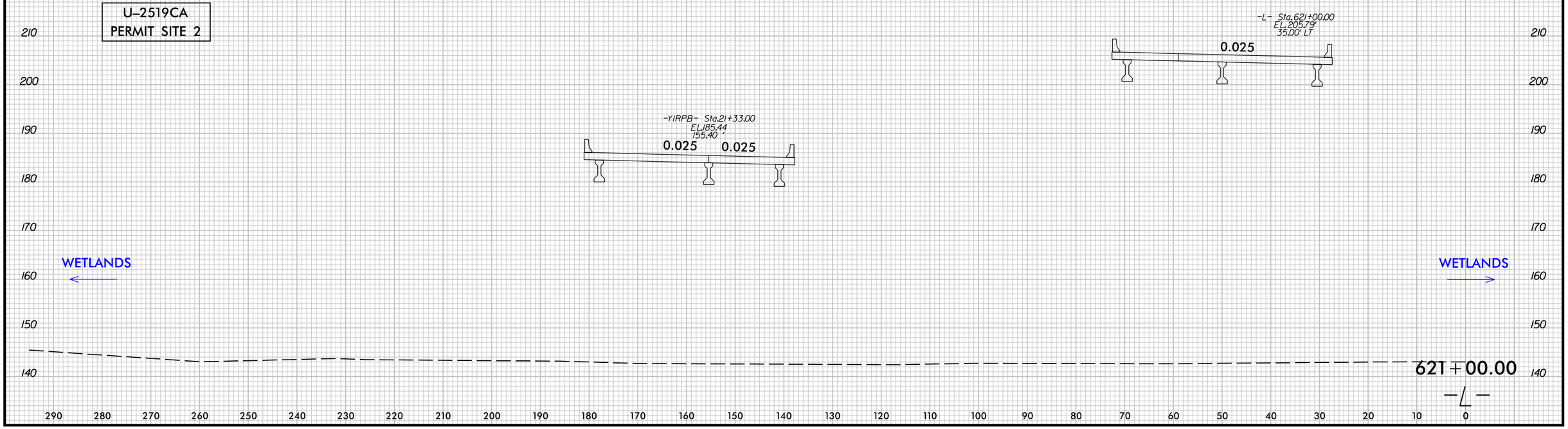
	U-2519CA	X-33

PERMIT DRAWINGS
SHEET 15 OF 39

U-2519CA
PERMIT SITE 2



U-2519CA
PERMIT SITE 2



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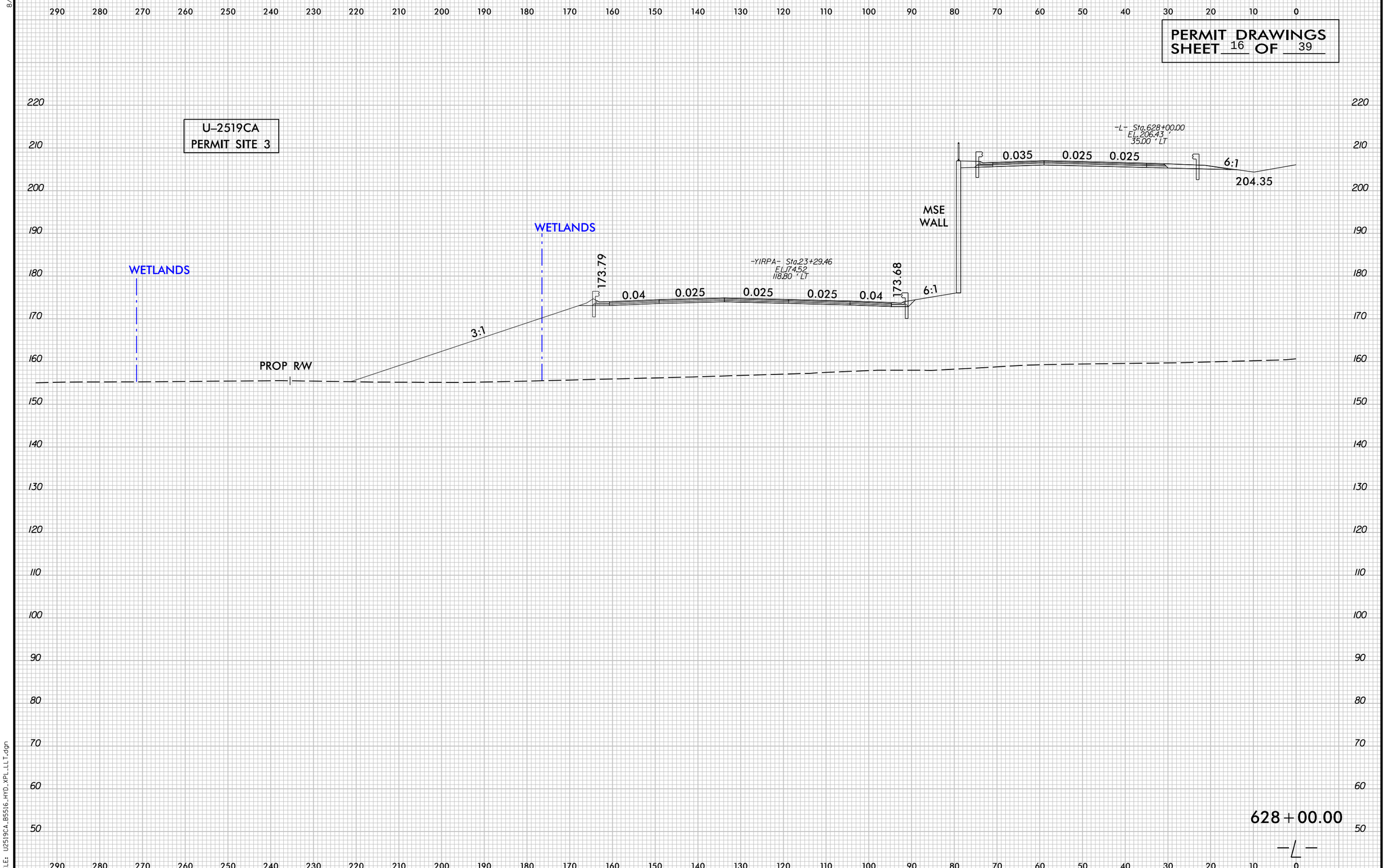
PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	X-40

PERMIT DRAWINGS
SHEET 16 OF 39



8/23/99

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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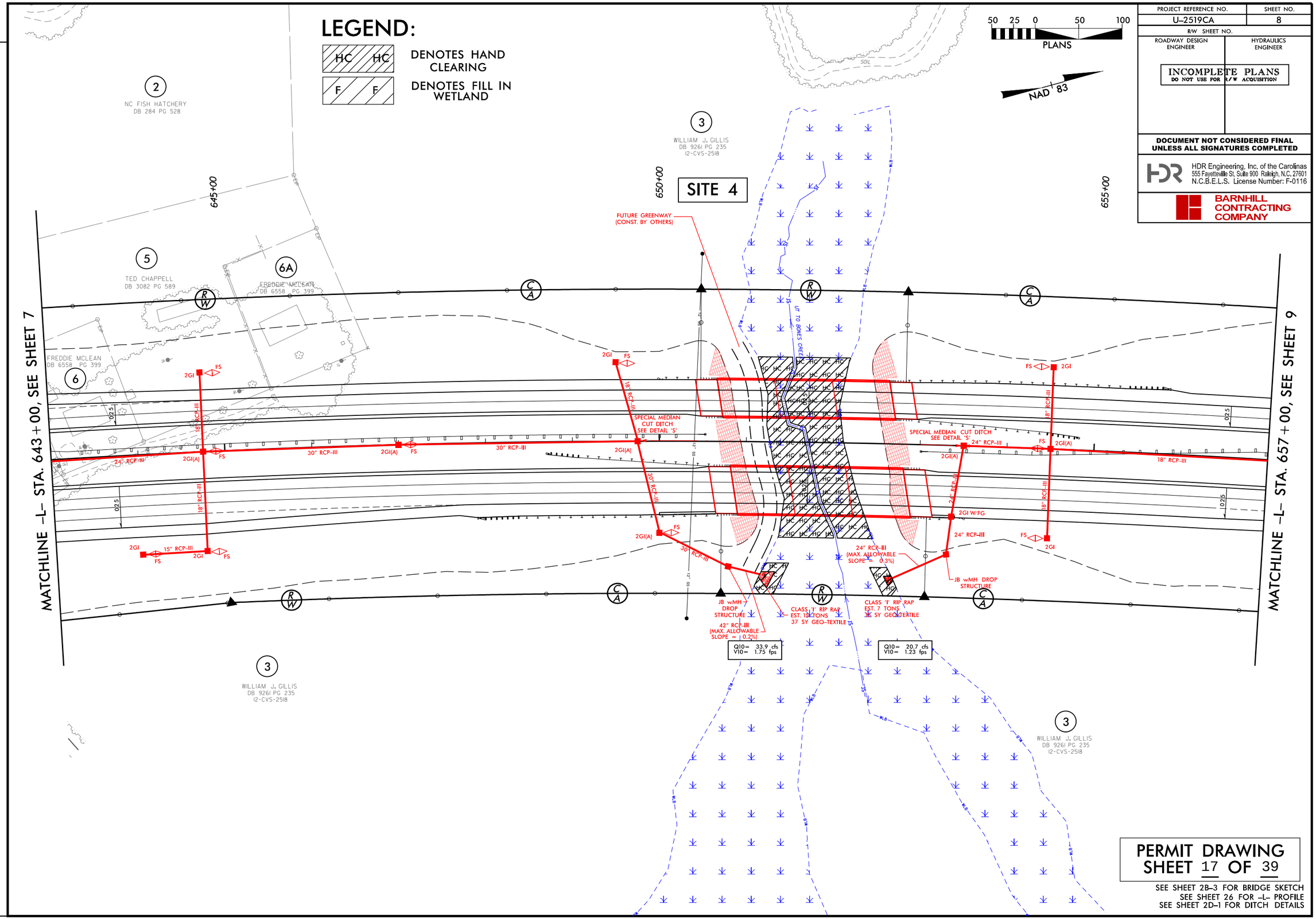
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 17 OF 39

SEE SHEET 2B-3 FOR BRIDGE SKETCH
SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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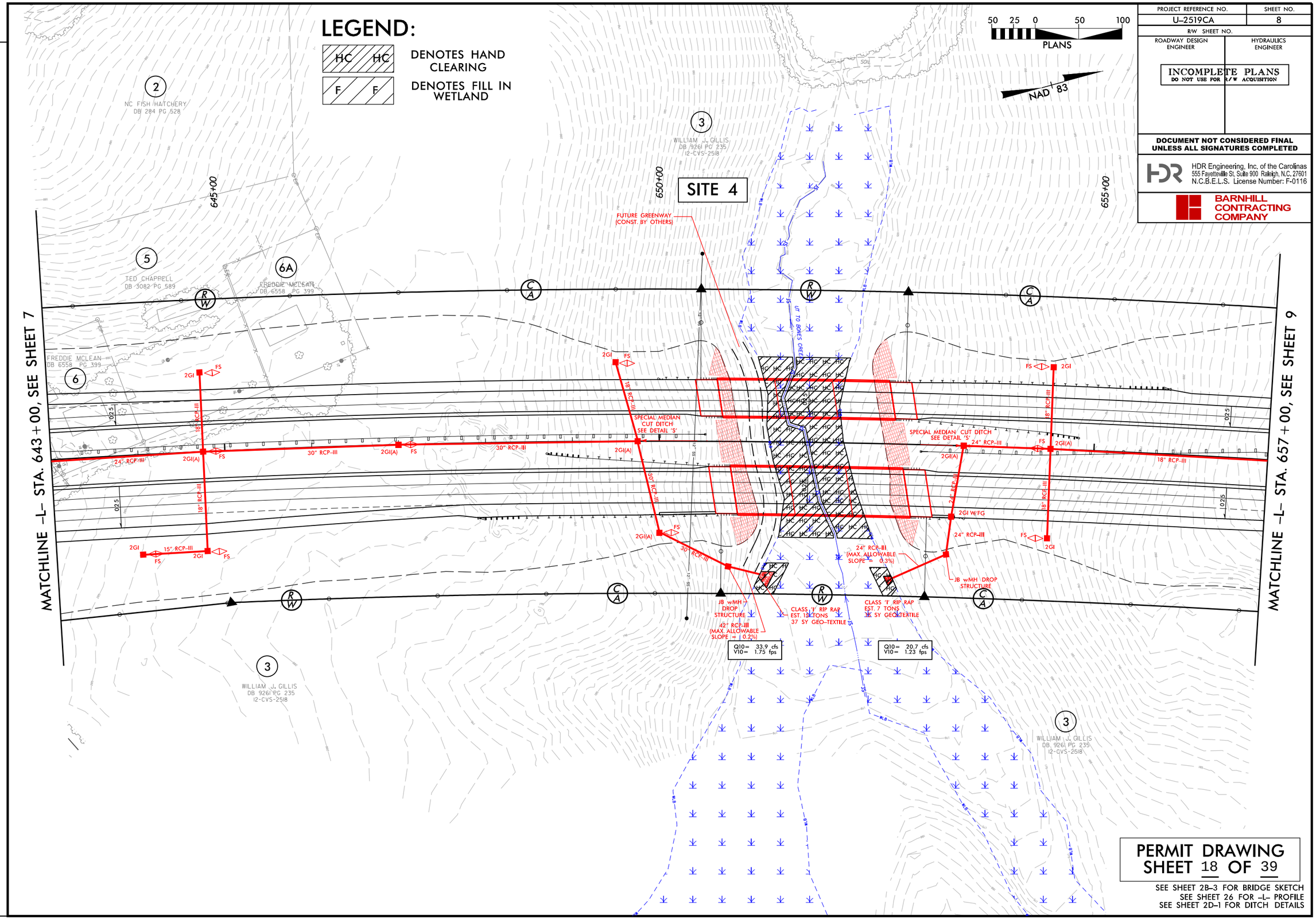
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 18 OF 39

SEE SHEET 2B-3 FOR BRIDGE SKETCH
SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

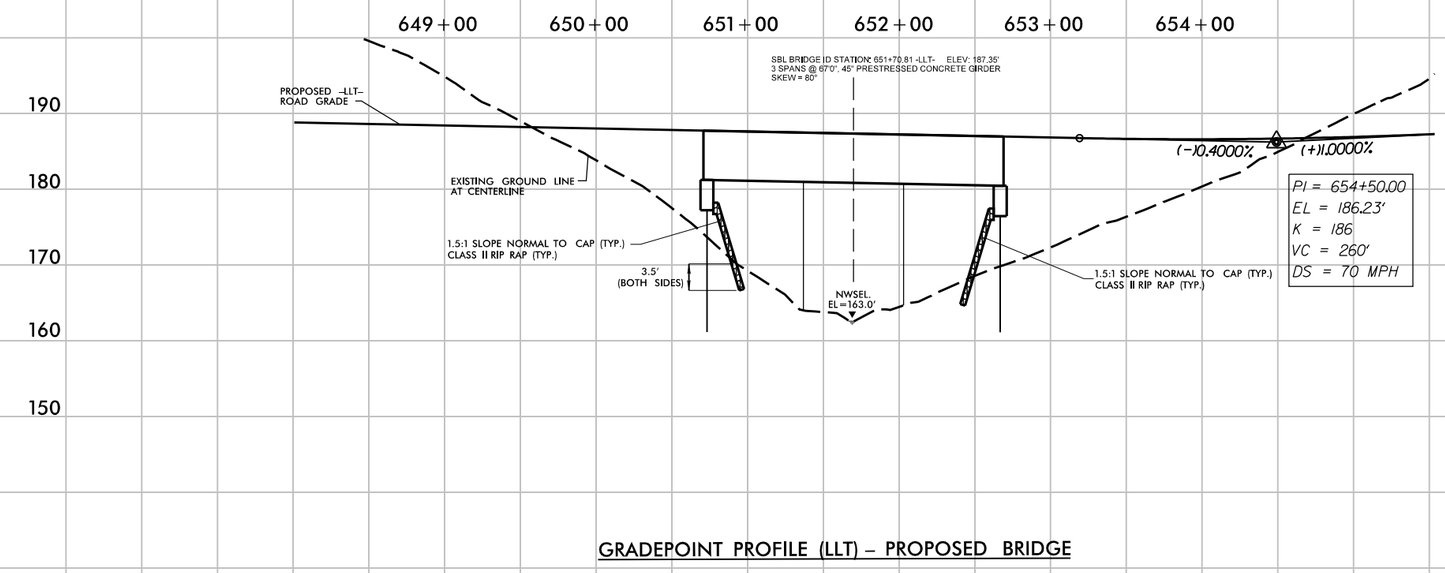
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 100' HORIZONTAL
1" = 20' VERTICAL

SITE 4



GRADEPOINT PROFILE (LLT) – PROPOSED BRIDGE

649+00 650+00 651+00 652+00 653+00 654+00

PERMIT DRAWING
SHEET 19 OF 39

REVISIONS

5/14/99

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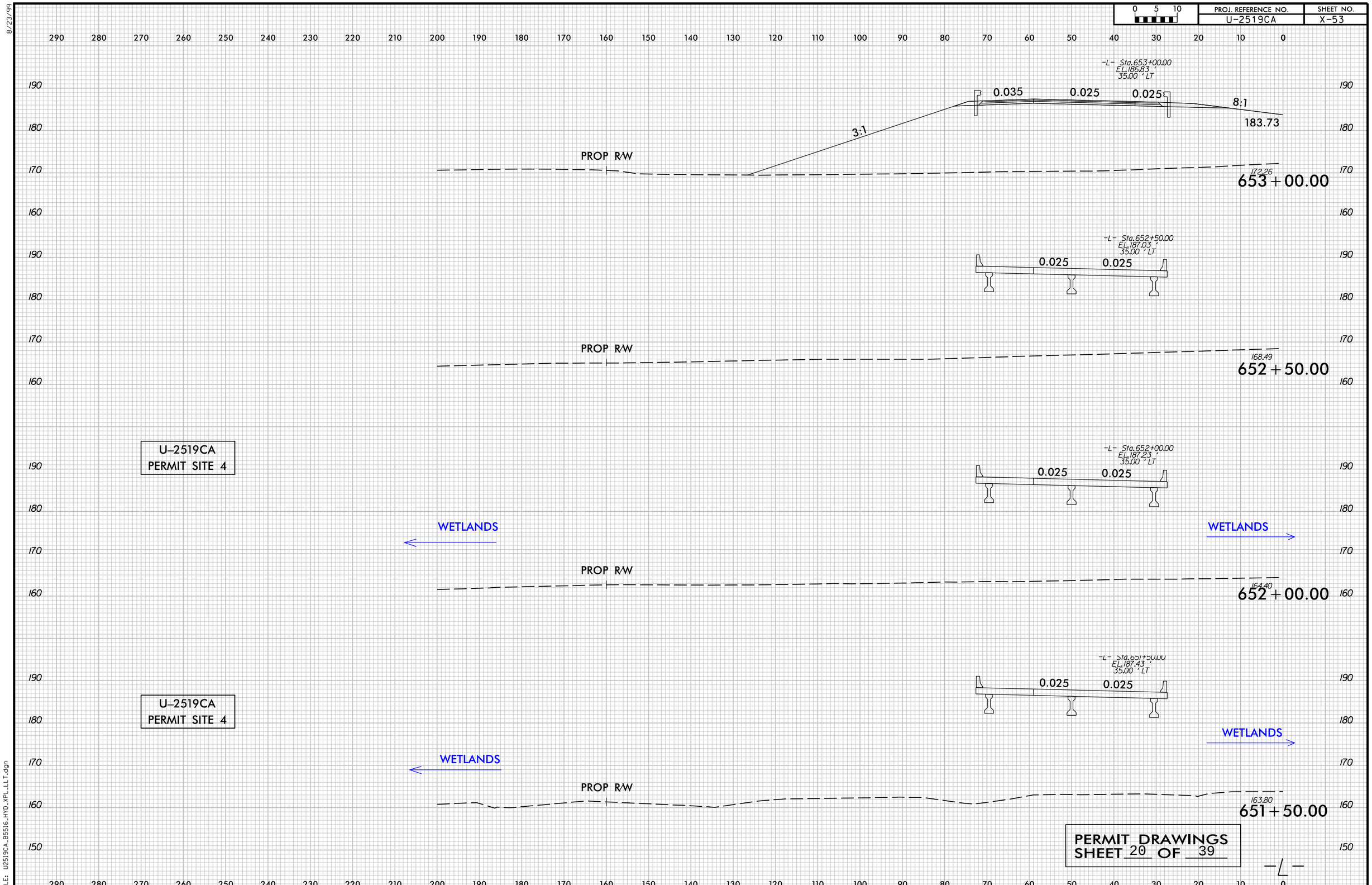

8/23/99

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TIME: 8:09:02 AM

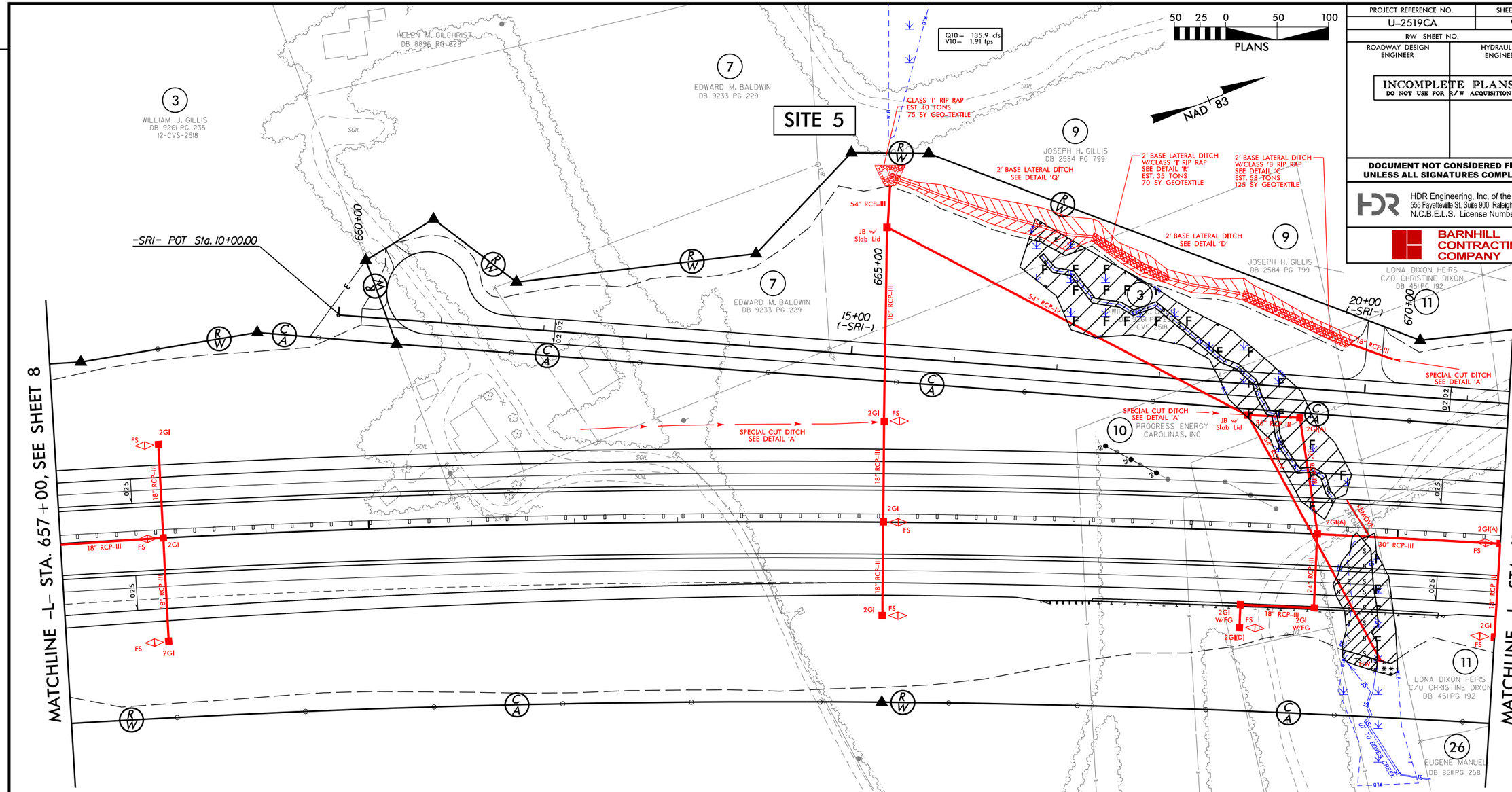
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



LEGEND:

E E	DENOTES EXCAVATION IN WETLAND
TS TS	DENOTES TEMPORARY IMPACTS IN SURFACE WATER
* * * *	DENOTES MECHANIZED CLEARING
F F	DENOTES FILL IN WETLAND
S S	DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 21 OF 39

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 47 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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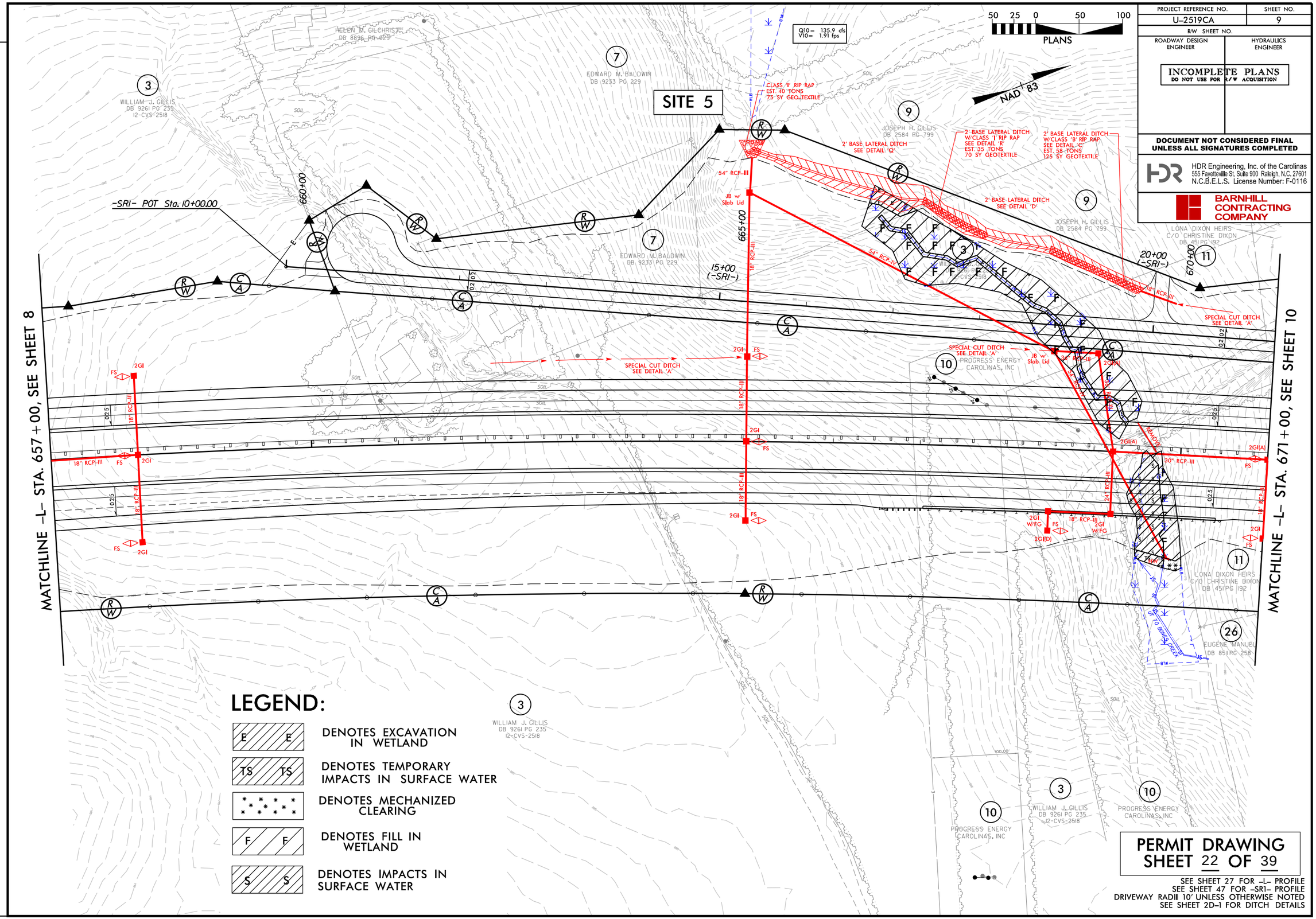
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



LEGEND:

- E / E — DENOTES EXCAVATION IN WETLAND
- TS / TS — DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- F / F — DENOTES FILL IN WETLAND
- S / S — DENOTES IMPACTS IN SURFACE WATER

PERMIT DRAWING
SHEET 22 OF 39

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 47 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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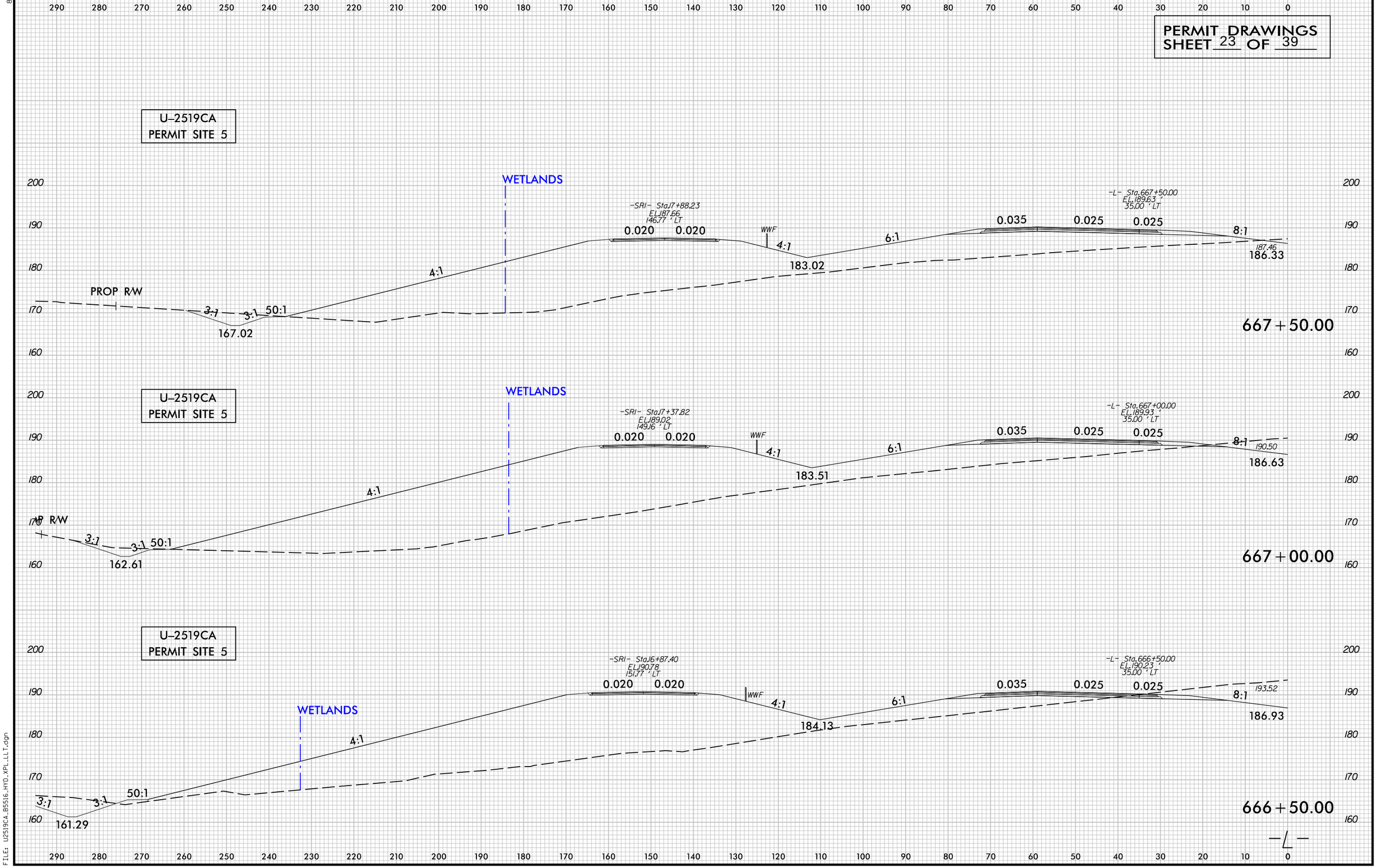
PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	X-61

PERMIT DRAWINGS
SHEET 23 OF 39



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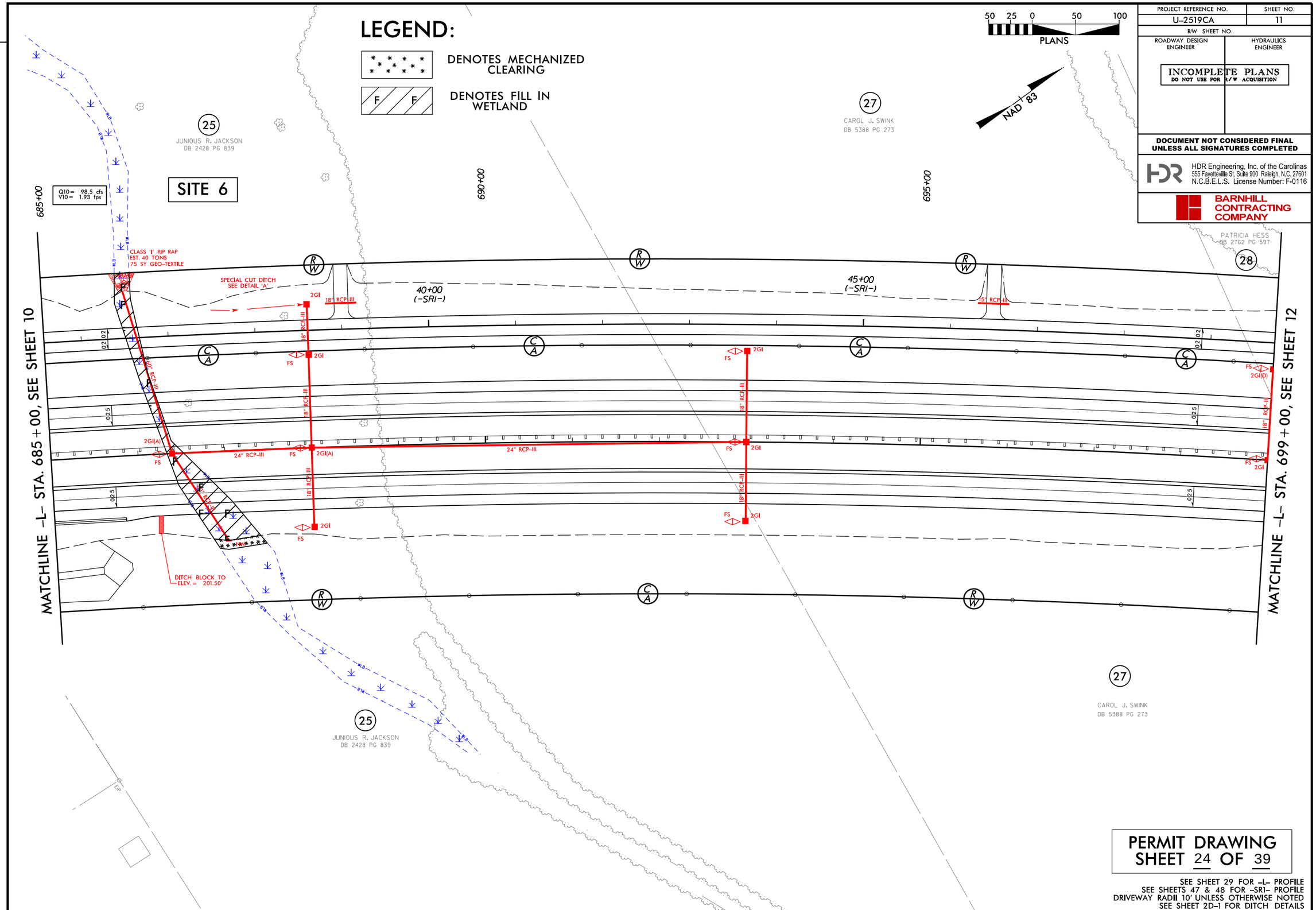
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 24 OF 39

SEE SHEET 29 FOR -L- PROFILE
SEE SHEETS 47 & 48 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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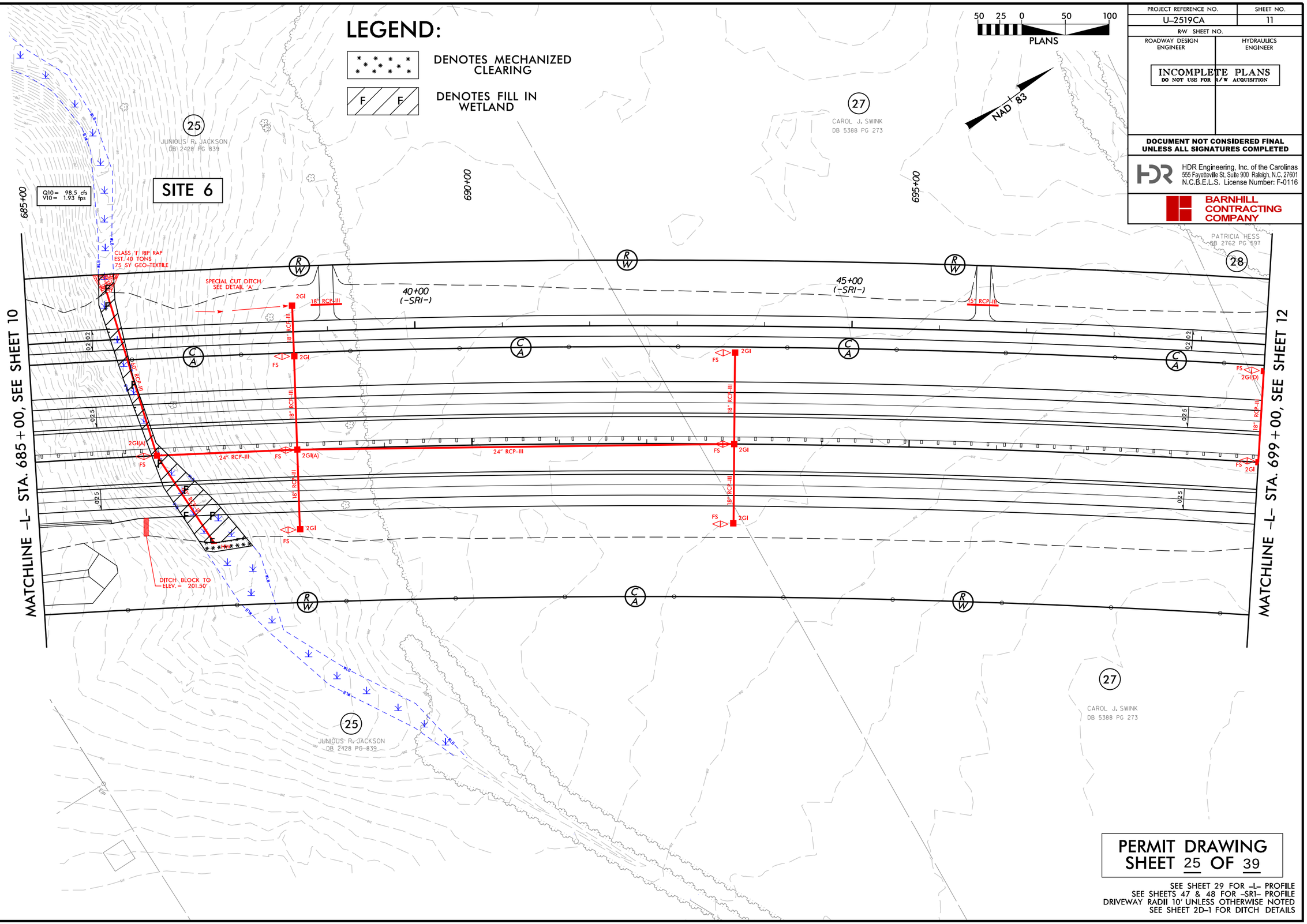

PERMIT DRAWING
SHEET 25 OF 39

SEE SHEET 29 FOR -L- PROFILE
SEE SHEETS 47 & 48 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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HDR Engineering, Inc. of the Carolinas
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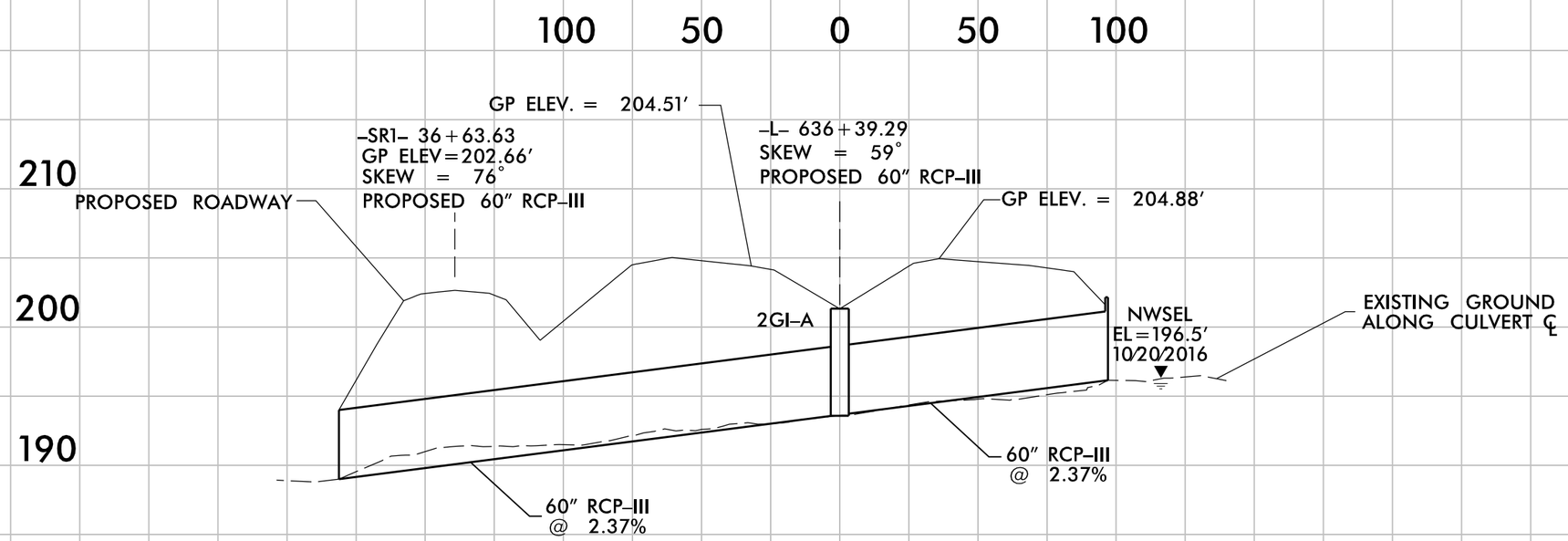
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

SCALE:
1" = 25' HORIZONTAL
1" = 5' VERTICAL

SITE 6



PROFILE ALONG ℄ OF PROPOSED 60" RCP-III

PERMIT DRAWING
SHEET 26 OF 39

REVISIONS

5/14/99

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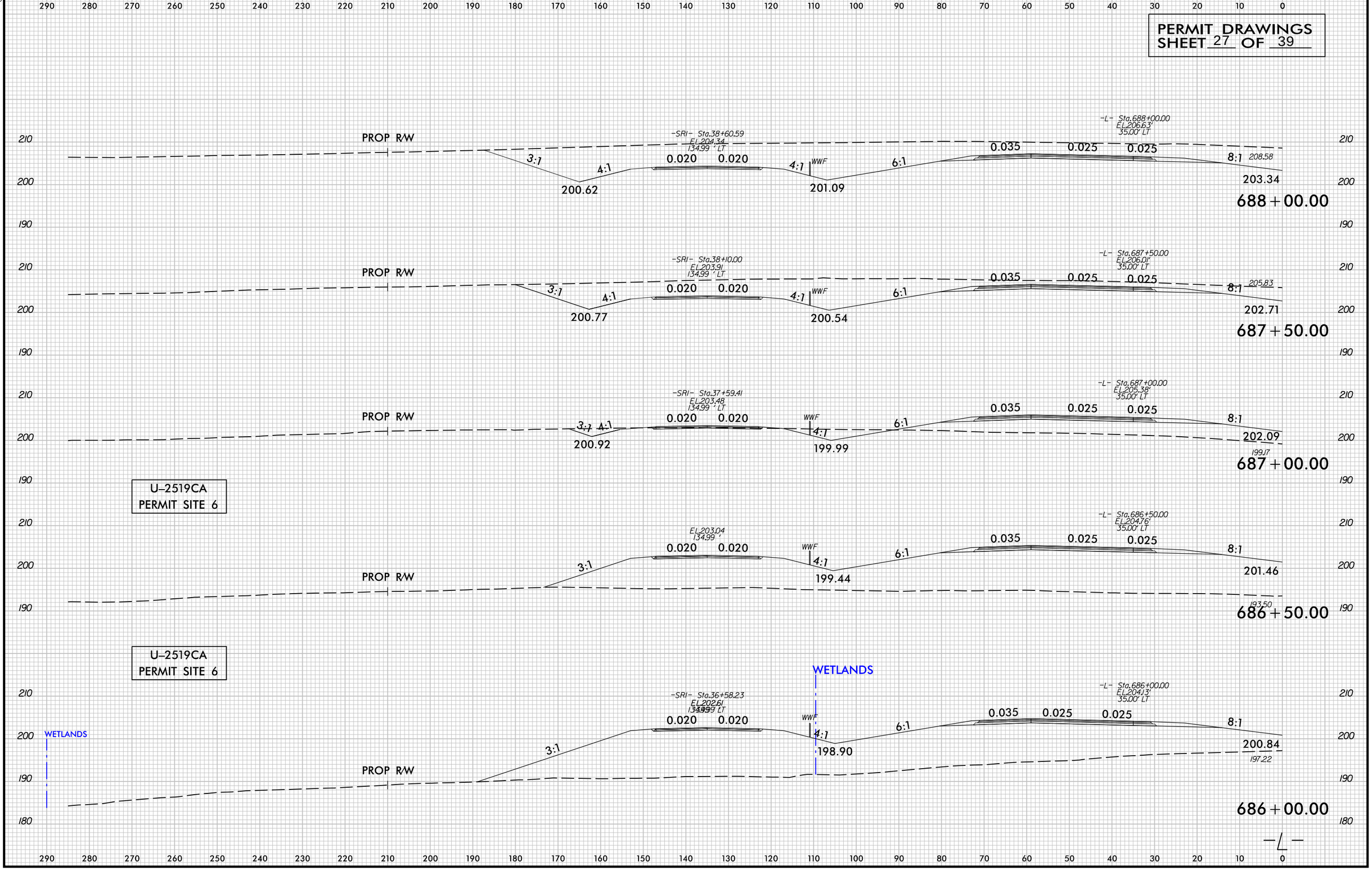
	U-2519CA	X-70

PERMIT DRAWINGS
SHEET 27 OF 39



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8/23/99

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

INCOMPLETE PLANS
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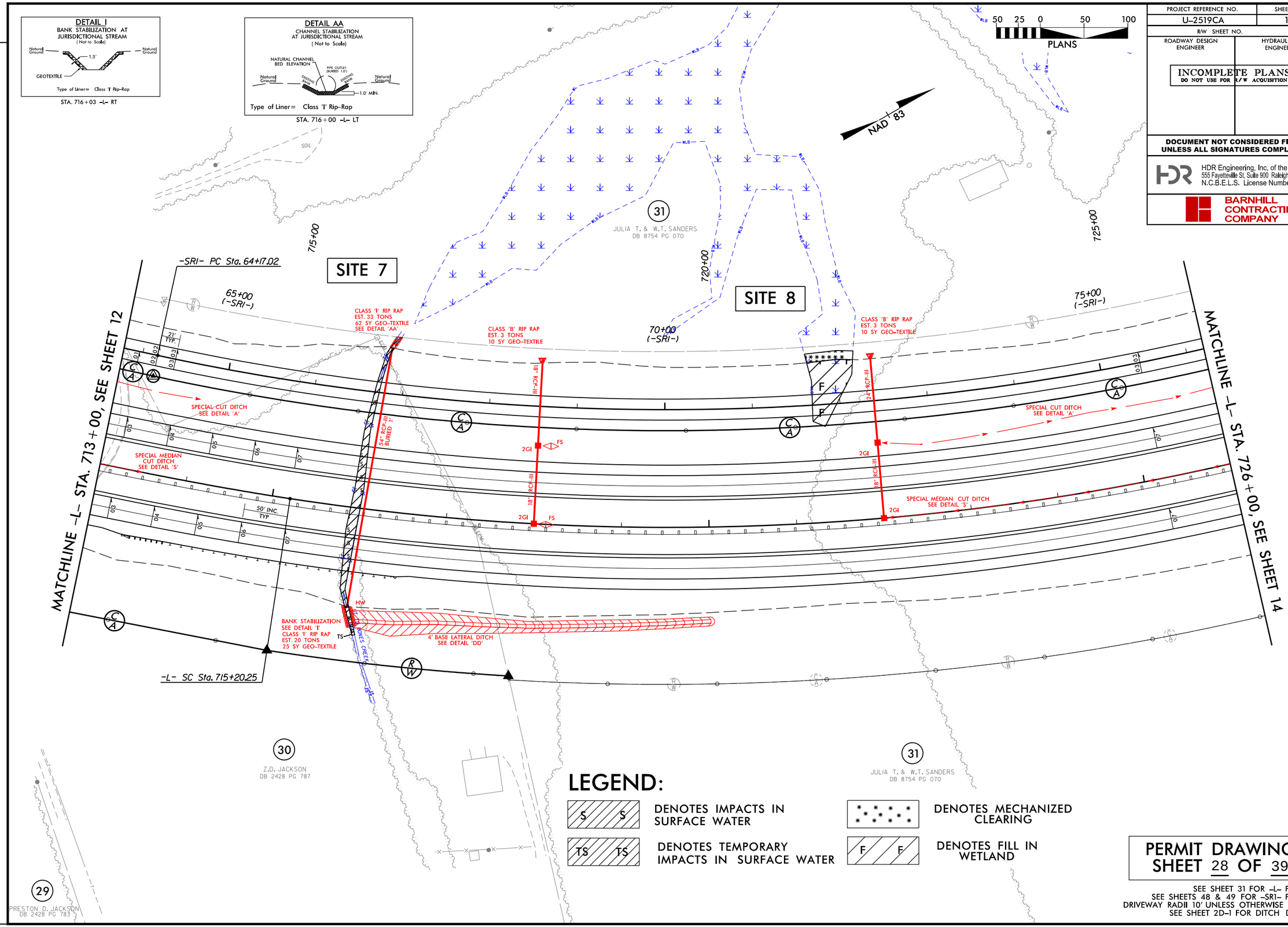
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 28 OF 39

SEE SHEET 31 FOR -L- PROFILE
SEE SHEETS 48 & 49 FOR -SRI- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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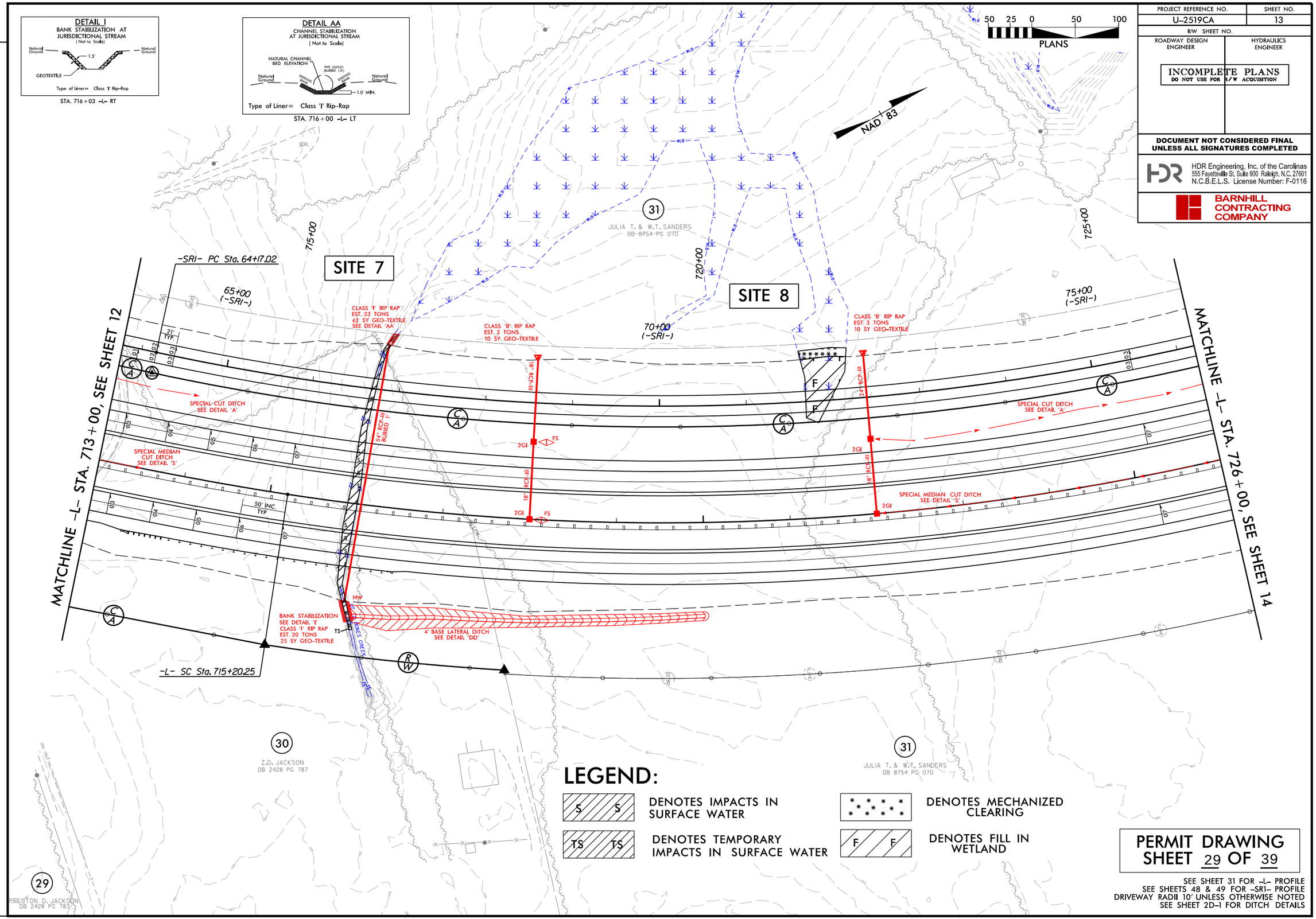
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING
SHEET 29 OF 39

SEE SHEET 31 FOR -L- PROFILE
SEE SHEETS 48 & 49 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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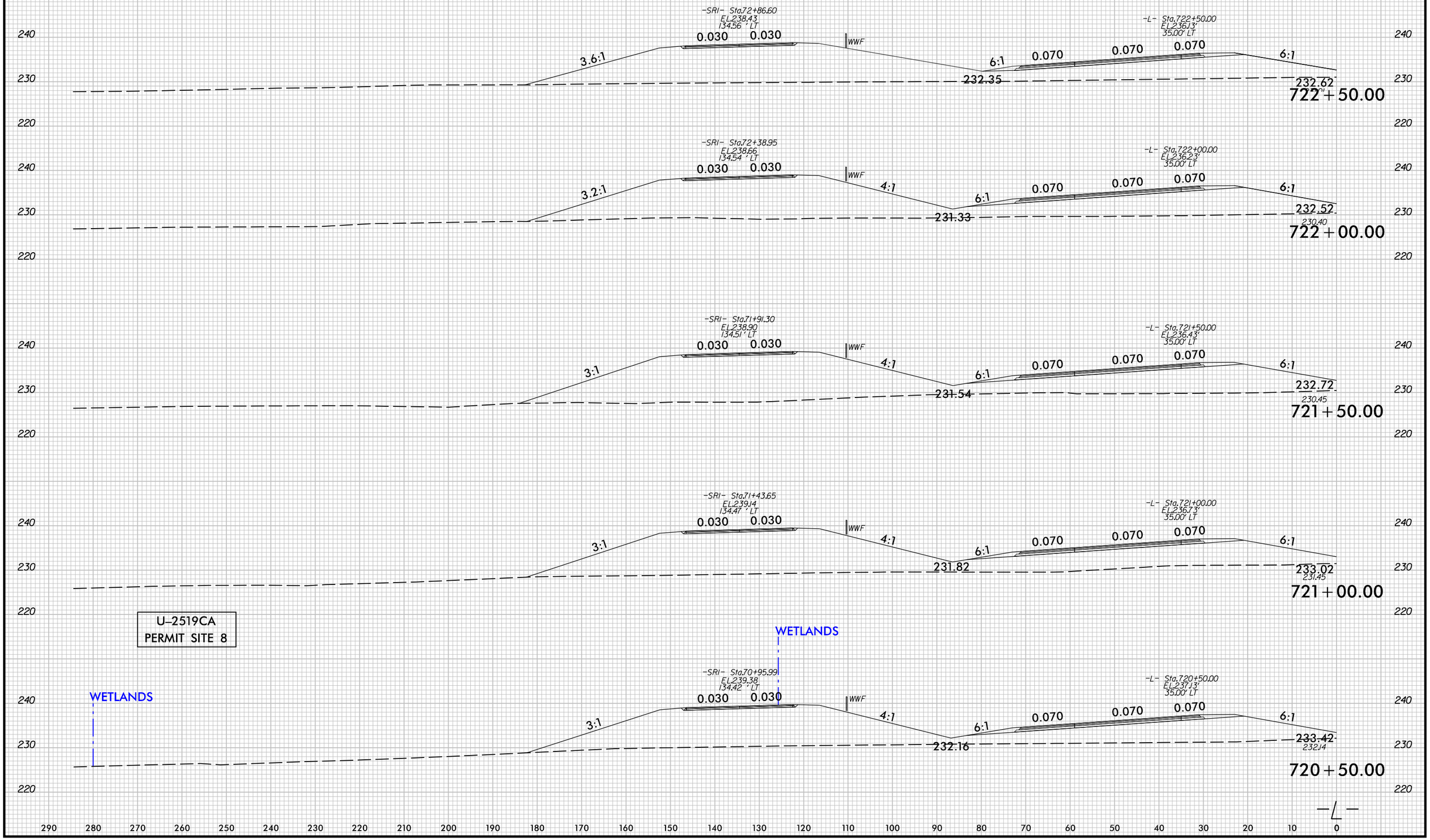
PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	X-83

PERMIT DRAWINGS
SHEET 30 OF 39



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8/23/99

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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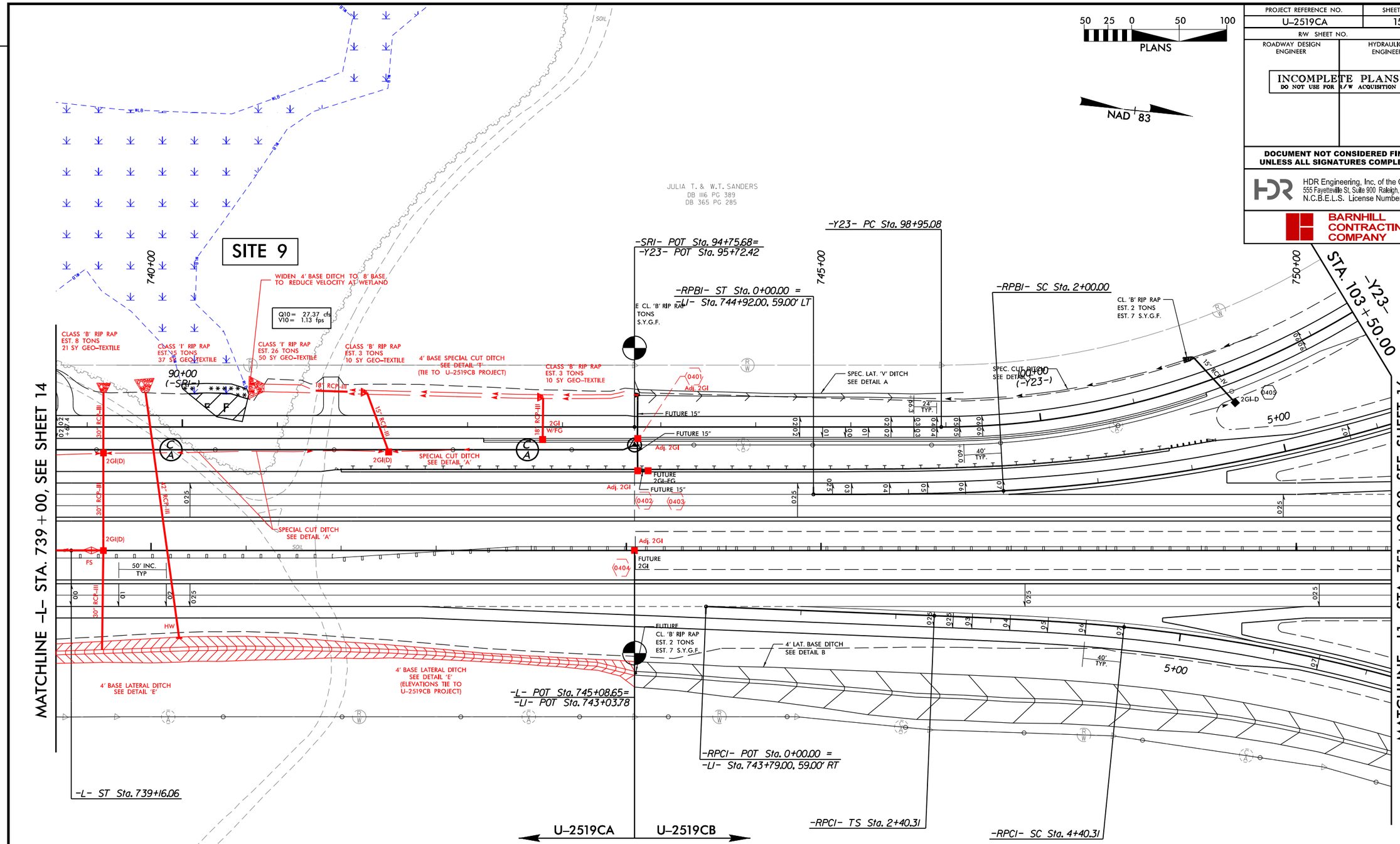
50 25 0 50 100
PLANS

NAD 83



LEGEND:

DENOTES MECHANIZED CLEARING

DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 31 OF 39

SEE SHEET 33 FOR -L- PROFILE
SEE SHEET 45 FOR -RPB1- PROFILE
SEE SHEET 46 FOR -RPC1- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE
SEE SHEET 50 FOR -Y23- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt PENTABLE: NCDOT_permits_NOCON.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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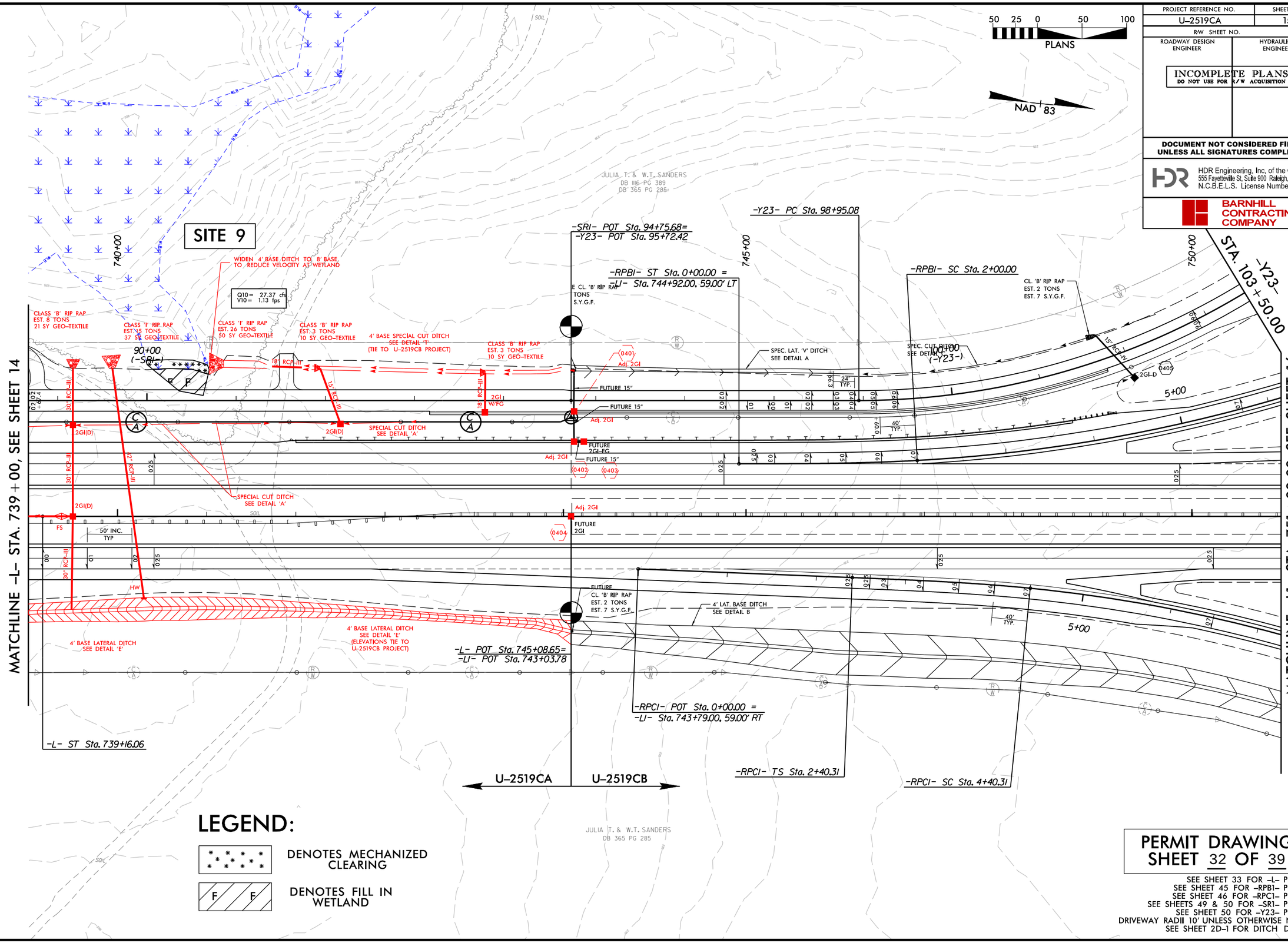
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



LEGEND:

- DENOTES MECHANIZED CLEARING
- F F — DENOTES FILL IN WETLAND

PERMIT DRAWING
SHEET 32 OF 39

SEE SHEET 33 FOR -L- PROFILE
SEE SHEET 45 FOR -RPB1- PROFILE
SEE SHEET 46 FOR -RPC1- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE
SEE SHEET 50 FOR -Y23- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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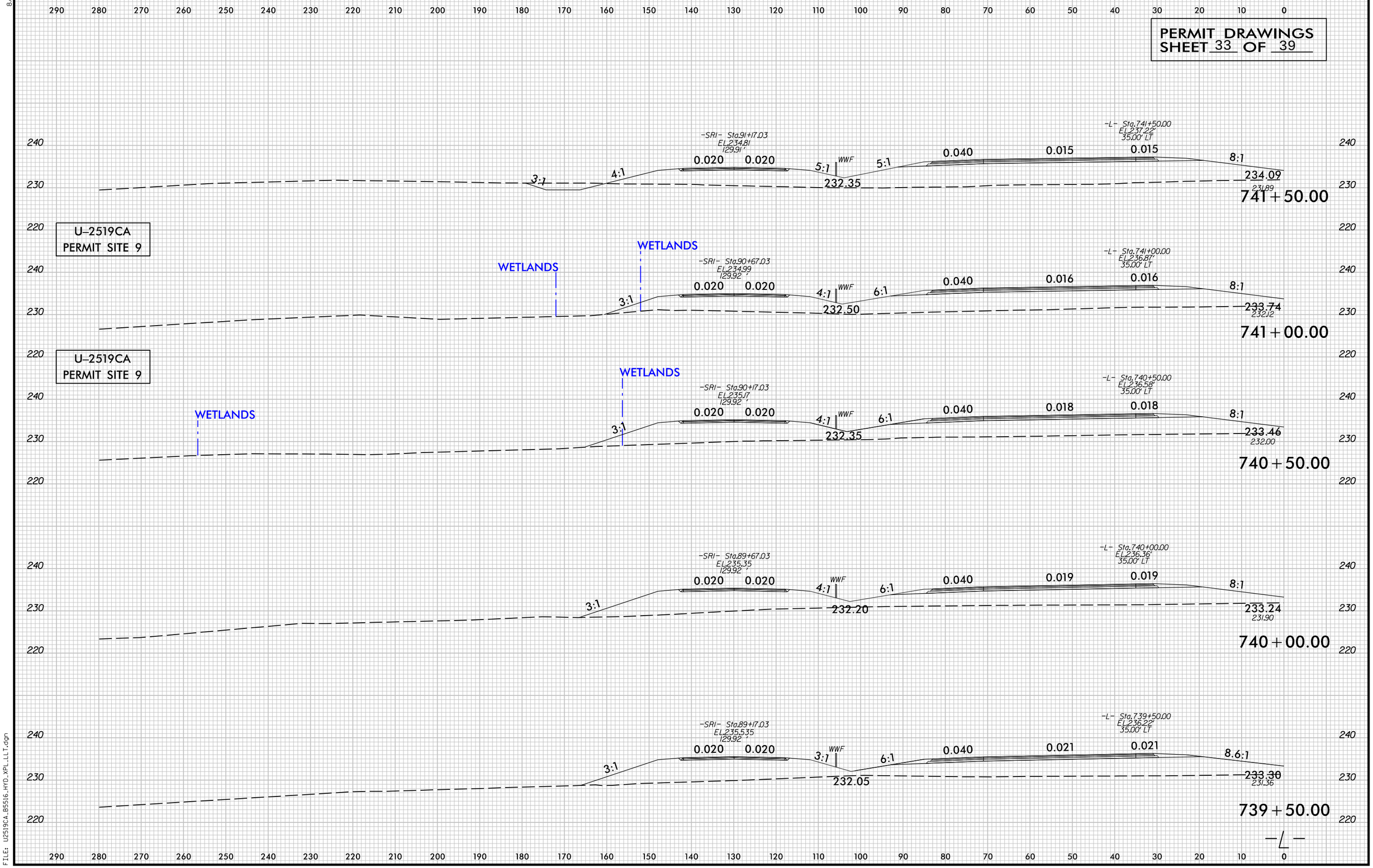
PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	X-90

PERMIT DRAWINGS
SHEET 33 OF 39



8/23/99

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

INCOMPLETE PLANS
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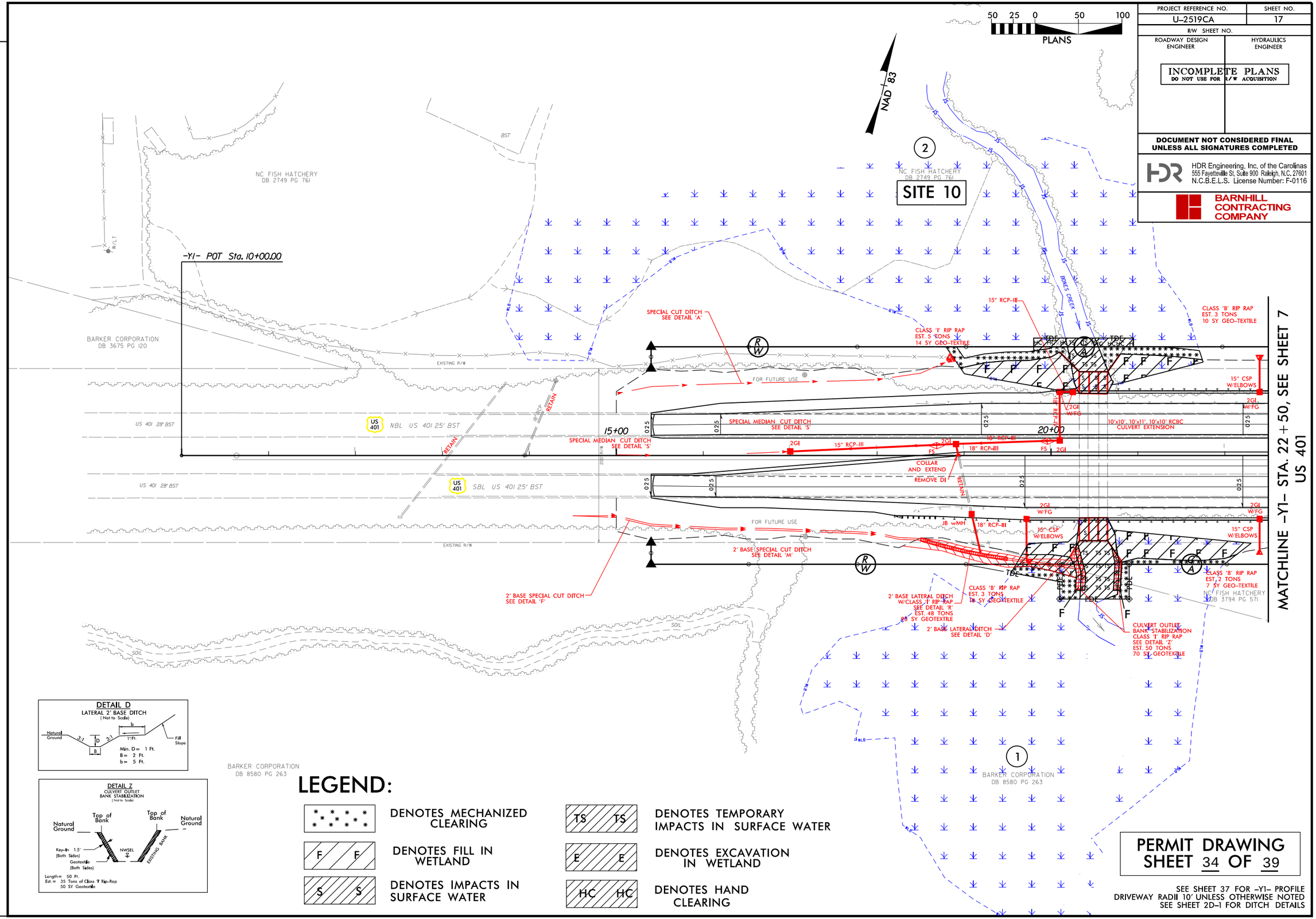
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



DETAIL D
LATERAL 2' BASE DITCH
(Not to Scale)

DETAIL 7
CULVERT OUTLET
BANK STABILIZATION
(Not to Scale)

LEGEND:

- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES EXCAVATION IN WETLAND
- DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 34 OF 39

SEE SHEET 37 FOR -Y1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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

INCOMPLETE PLANS
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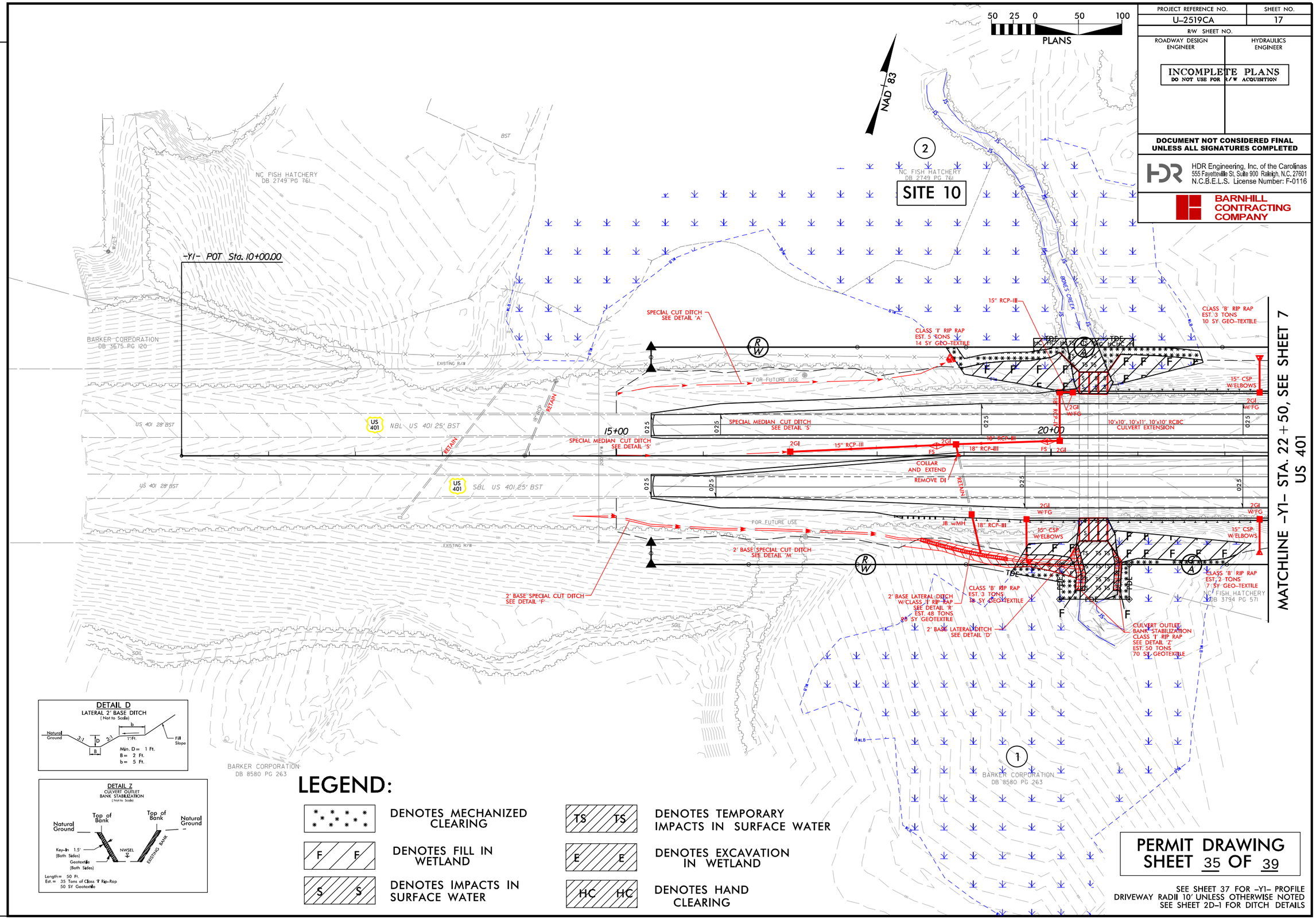
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



DETAIL D
LATERAL 2' BASE DITCH
(Not to Scale)

Natural Ground; 3:1; D; 3:1; b; 1:1 Ft.; B; Fill Slope

Min. D = 1 Ft.
B = 2 Ft.
b = 5 Ft.

DETAIL Z
CULVERT OUTLET BANK STABILIZATION
(Not to Scale)

Natural Ground; Top of Bank; Top of Bank; Natural Ground; Key-In 1.5' (Both Sides); Geotextile (Both Sides); NWSEL; EXISTING BANK

Length = 50 Ft.
Est. = 35 Tons of Class 'I' Rip-Rap
50 SY Geotextile

LEGEND:

- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES EXCAVATION IN WETLAND
- DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 35 OF 39

SEE SHEET 37 FOR -Y1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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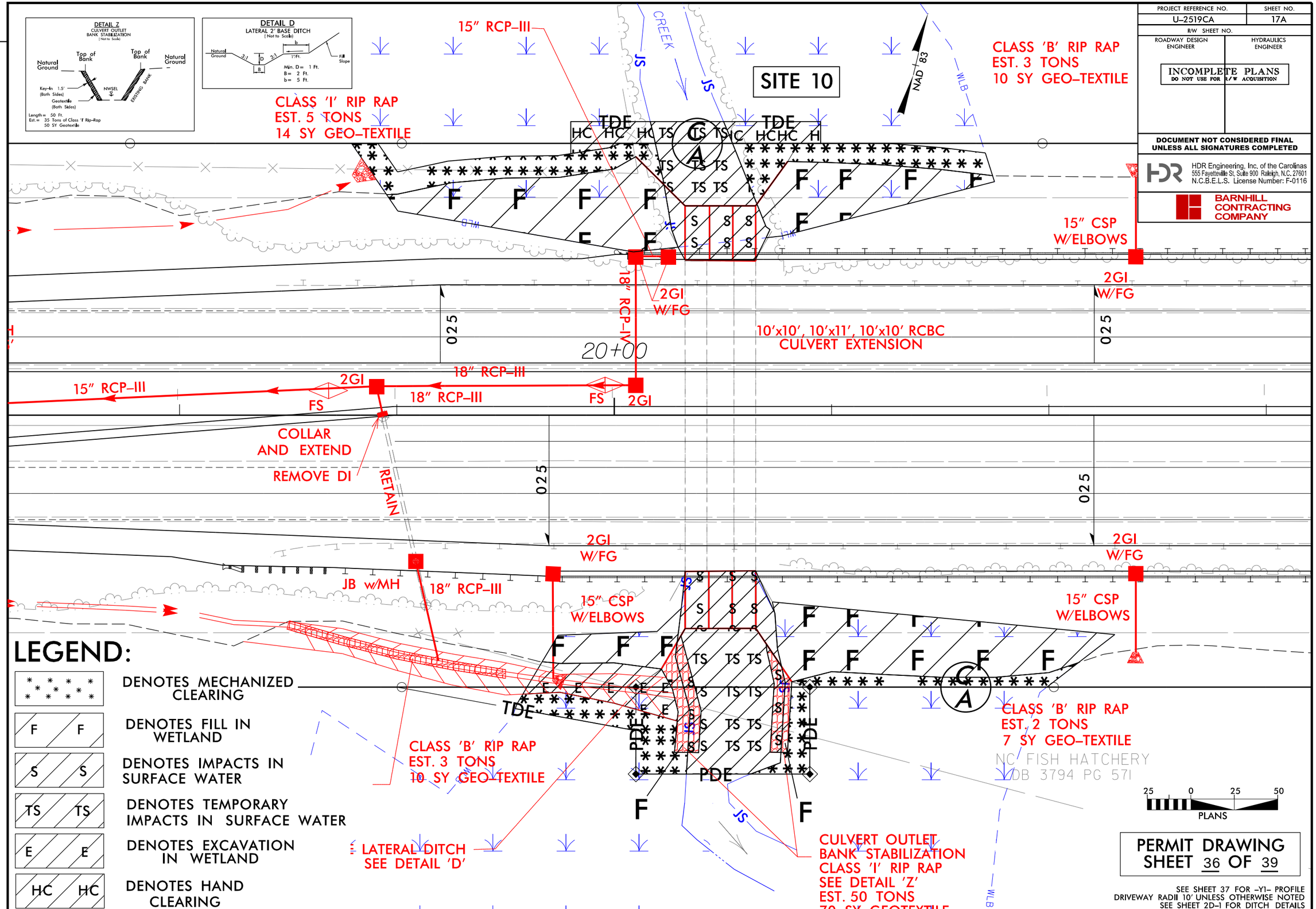
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	17A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



LEGEND:

- DENOTES MECHANIZED CLEARING
- DENOTES FILL IN WETLAND
- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER
- DENOTES EXCAVATION IN WETLAND
- DENOTES HAND CLEARING

PERMIT DRAWING
SHEET 36 OF 39

SEE SHEET 37 FOR -Y1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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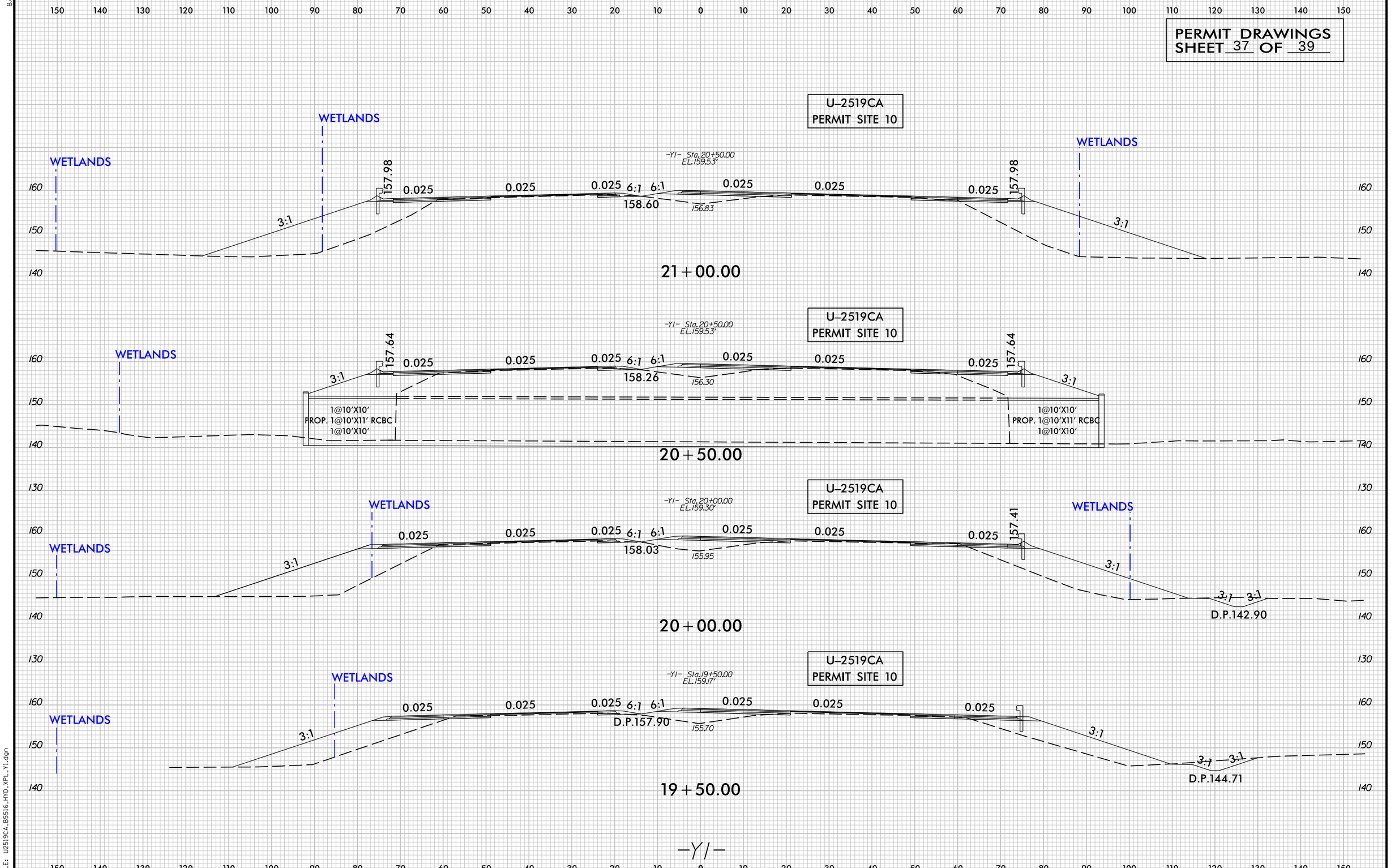
0 5 10	PROJ. REFERENCE NO.	SHEET NO.
	U-2519CA	X-221

PERMIT DRAWINGS
SHEET 37 OF 39



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TIME: 11:42:54 AM
8/23/99

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

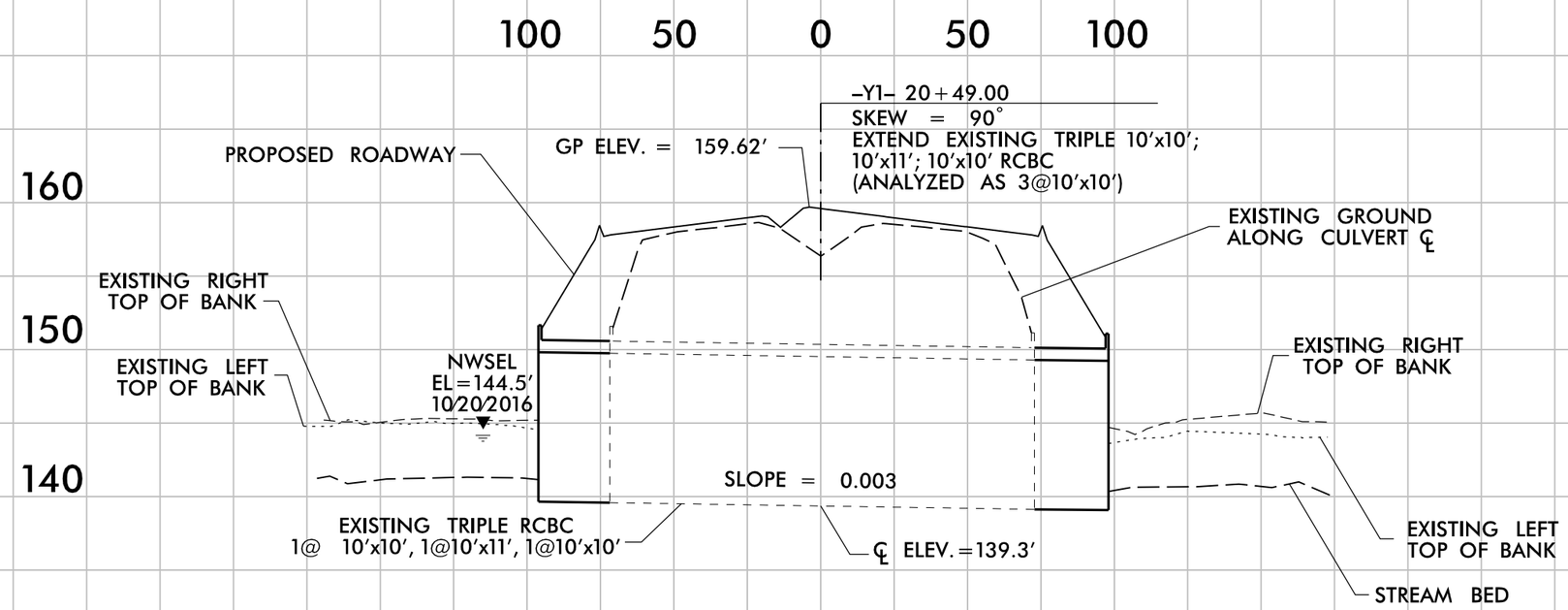
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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

SITE 10



PROFILE ALONG ℄ OF CULVERT

PERMIT DRAWING
SHEET 38 OF 39

REVISIONS

5/14/99

PLOT DRIVER: NCDOT_pdf_color_eng_100.plt
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WETLAND AND SURACE WATER IMPACTS 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	587+63/598+50 -L-	Bridge	< 0.01				1.59					
		Temporary Work Bridge		< 0.01					< 0.01		5	
		4' Base Ditch (588+00 -L- LT)			0.01		0.02	< 0.01	< 0.01	10	26	
		Roadway Fill	1.44			0.17						
		4' Base Ditch (591+88 -L- RT)					< 0.01					
2	608+87/621+81 -L-	Bridge/Roadway	0.49				4.46	< 0.01		12		
		Temporary Work Bridge		< 0.01					< 0.01		12	
3	625+97/629+35 -L-	Roadway Fill	0.63			0.08						
4	651+14/652+83 -L-	Bridge	< 0.01				0.43					
5	666+28/670+08 -L-	54" RCP	0.45		0.02	< 0.01		0.13	< 0.01	541	12	
6	685+82/687+53 -L-	66" RCP/Roadway Fill	0.17			0.01						
7	715+96 -L-	54" RCP (Buried 1')						0.05	< 0.01	318	10	
		Bank Stabilization						< 0.01		23		
8	721+22/721+78 -L-	Roadway Fill	0.06			0.01						
9	740+30/741+03 -L-	Roadway Fill	0.03			0.02						
10	19+00/24+51 -Y1-	RCBC/Roadway Fill	0.24		0.03	0.11	0.02	0.05	0.09	82	109	
		Bank Stabilization						0.01		52		
TOTALS*:			3.51	< 0.01	0.06	0.41	6.53	0.24	0.10	1038	174	0

*Rounded totals are sum of actual impacts

NOTES:
-Work bridge impacts were calculated from the sum of the individual H-piles that are being installed for the work bridge substructure. The H-piles have been conservatively estimated as one square foot per pile.
-Site 1: Permanent impacts due to bents in wetlands: 265 sf (0.0061 ac.). Impacts are included in the total impacts above.
-Site 2: Permanent impacts due to bents in wetlands: 21471 sf (0.4929 ac.) Impacts are included in the total impacts above.
-Site 4: Permanent impacts due to bents in wetlands: 64 sf (0.0015 ac.) Impacts are included in the total impacts above.

Revised 2016 09 09

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
3/07/2017
Cumberland County
U-2519CA_B-5516
34817.3.13

CONTRACT: C203759 TIP PROJECT: U-2519CA & B-5516

09/08/99

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STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

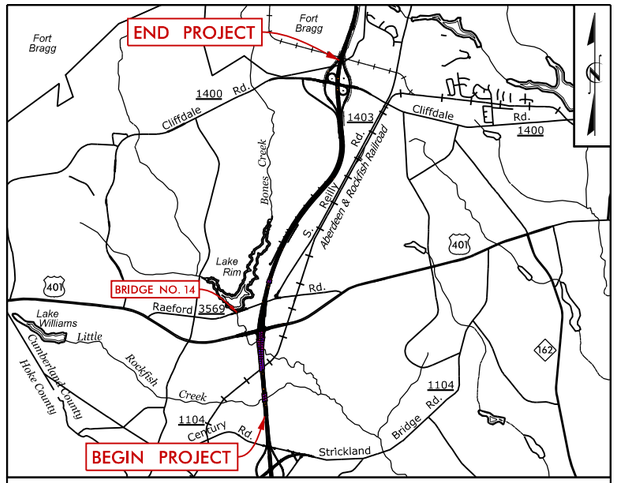
CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519CA & B-5516	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.3.13	NHP-0620(031)	

LOCATION: FUTURE I-295 – FAYETTEVILLE OUTER LOOP FROM SOUTH OF US 401 TO SOUTH OF SR 1400 (CLIFFDALE ROAD).

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, STRUCTURES & SIGNALS



VICINITY MAP

Utility Wetland & Stream Impacts

BEGIN TIP PROJECT B-5516
BEGIN CONSTRUCTION
-Y2- STA. 13+75.00

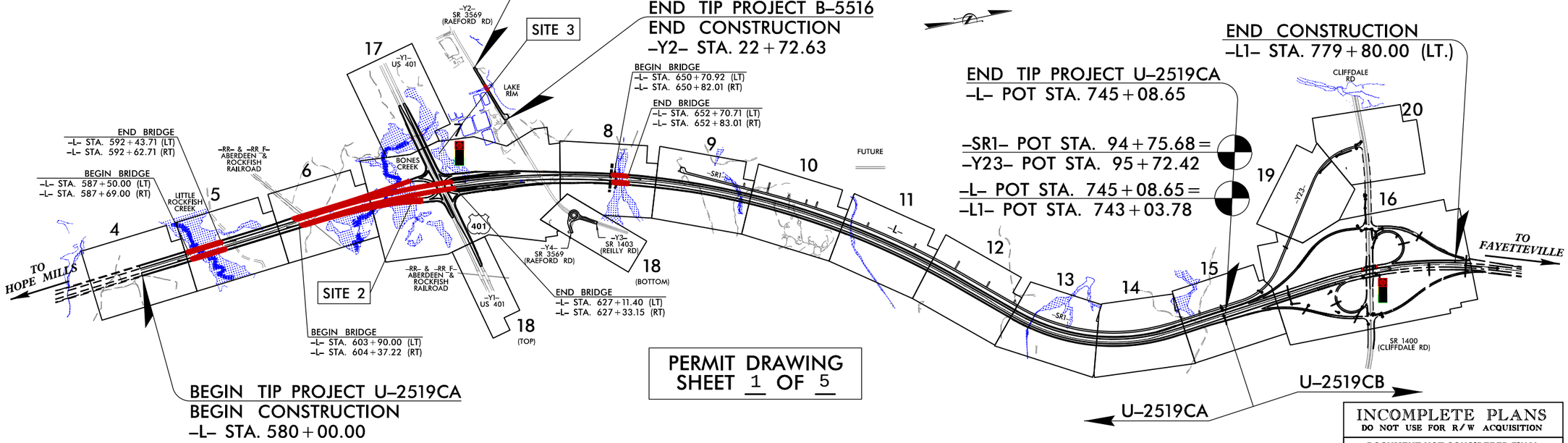
END TIP PROJECT B-5516
END CONSTRUCTION
-Y2- STA. 22+72.63

END CONSTRUCTION
-L1- STA. 779+80.00 (LT.)

END TIP PROJECT U-2519CA
-L- POT STA. 745+08.65

-SR1- POT STA. 94+75.68 =
-Y23- POT STA. 95+72.42

-L- POT STA. 745+08.65 =
-L1- POT STA. 743+03.78



BEGIN TIP PROJECT U-2519CA
BEGIN CONSTRUCTION
-L- STA. 580+00.00

PERMIT DRAWING SHEET 1 OF 5

U-2519CA

U-2519CB

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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.
A PORTION OF THIS PROJECT IS LOCATED WITHIN THE MUNICIPAL BOUNDARIES OF THE CITY OF FAYETTEVILLE

PROPOSED TRAFFIC SIGNAL

BARNHILL CONTRACTING COMPANY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2015 = 36,000
ADT 2040 = 47,700
DHV = 8%
D = 55%
*T = 12%
V = 70 MPH
*(TTST 4% + DUALS 8%)
FUNC CLASS = FREEWAY / INTERSTATE
STATEWIDE TIER

PROJECT LENGTH

LENGTH ROADWAY TIP PROJECT U-2519CA = 2.562 MILES
LENGTH STRUCTURE TIP PROJECT U-2519CA = 0.565 MILE
TOTAL LENGTH TIP PROJECT U-2519CA = 3.127 MILES
LENGTH ROADWAY TIP PROJECT B-5516 = 0.157 MILE
LENGTH STRUCTURE TIP PROJECT B-5516 = 0.013 MILE
TOTAL LENGTH TIP PROJECT B-5516 = 0.170 MILE

NCDOT CONTACT: K. ZAK HAMIDI, PE
DESIGN-BUILD UNIT – PROJECT ENGINEER

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

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE: JUNE 21, 2016

LETTING DATE: JUNE 21, 2016

PAUL A. MEEHAN, PE
PROJECT ENGINEER

PHILLIP E. ROGERS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
JAMES A. RICE, PE

ROADWAY DESIGN ENGINEER
ANTHONY G. THOMPSON, PE

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

REVISIONS

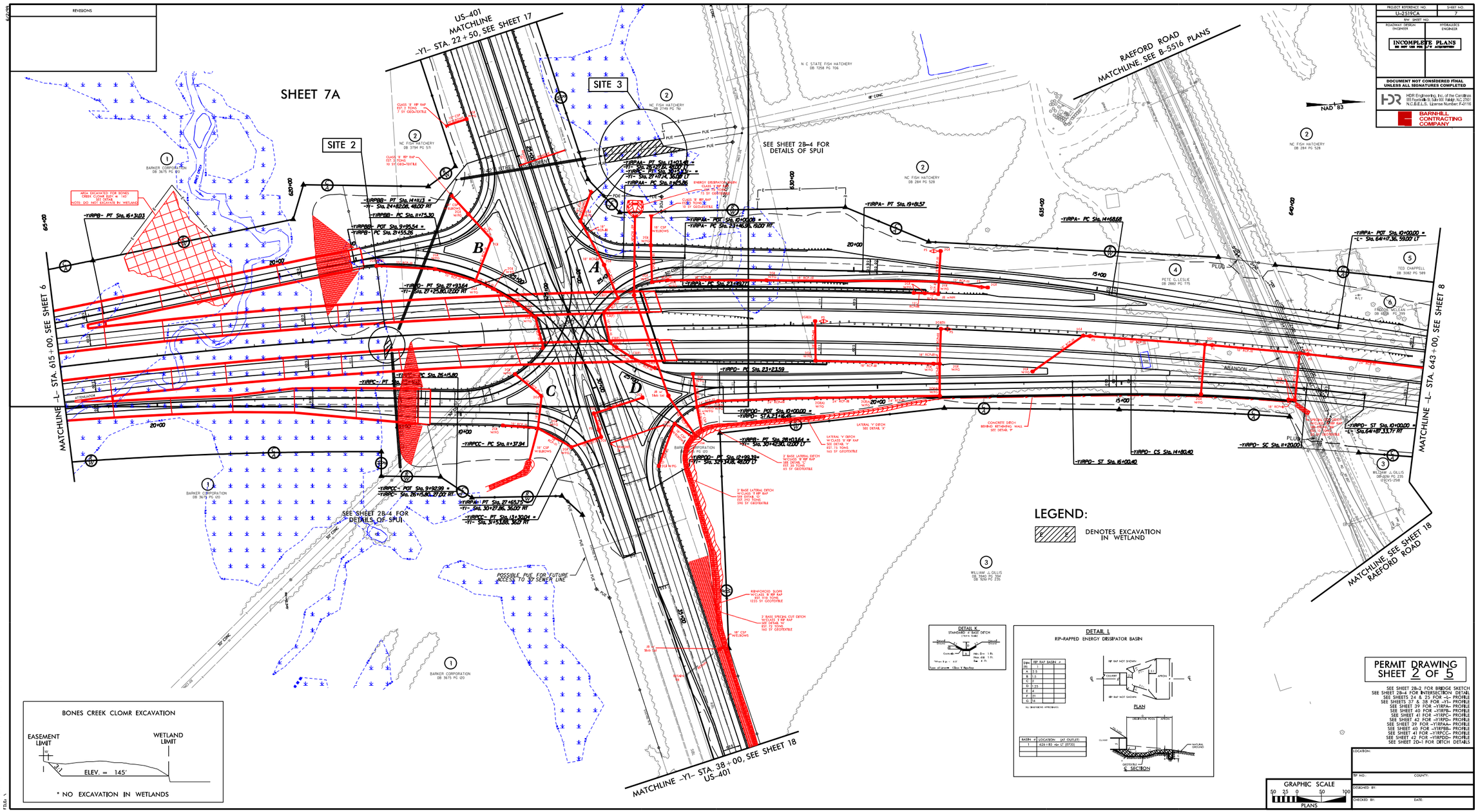
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineers, Inc. of the Carolinas
3511 Fairville Rd. | Suite 100 | Raleigh, N.C. 27610
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



REVISIONS

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

INCOMPLETE PLANS
DO NOT USE FOR CONSTRUCTION

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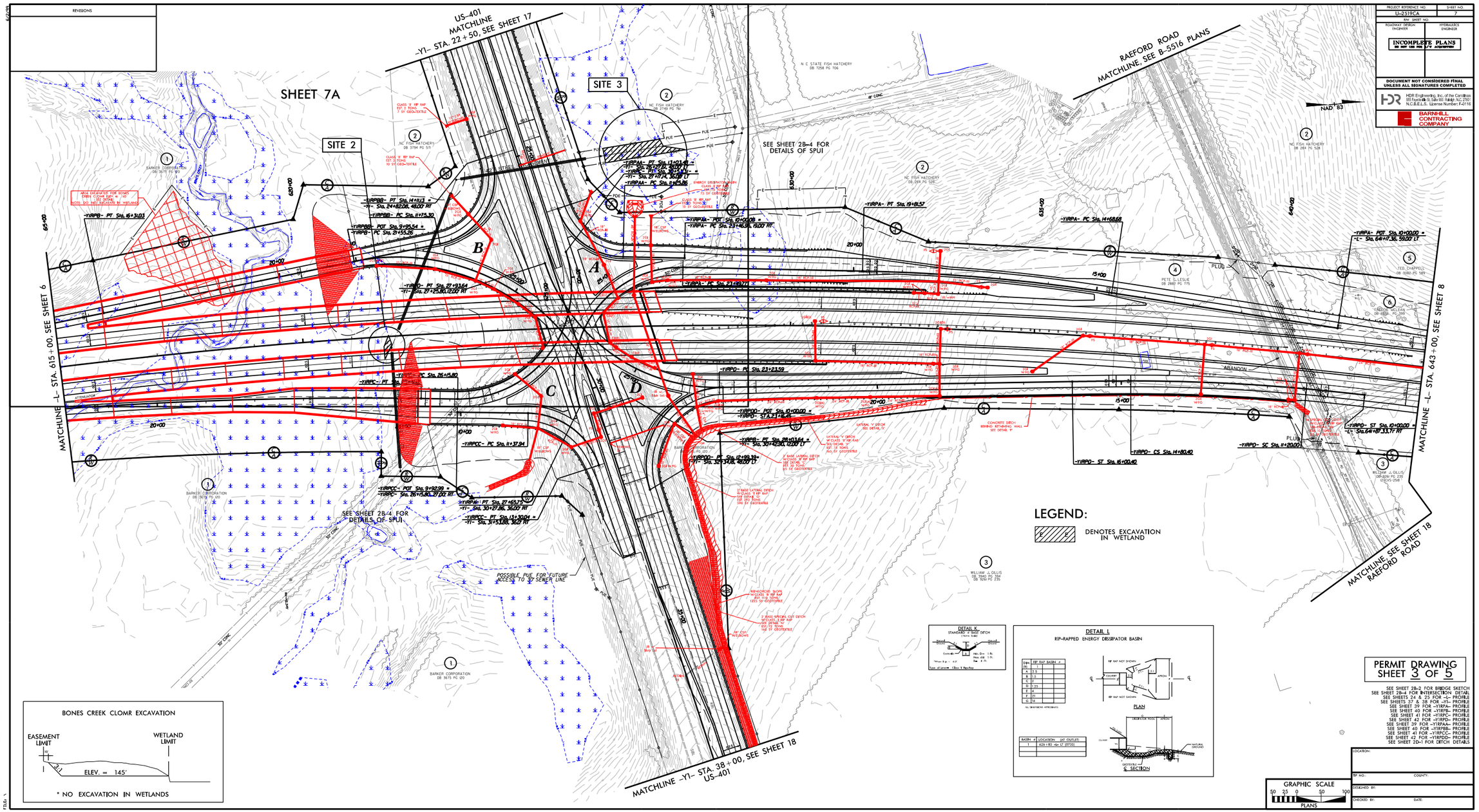
HDR Engineers, Inc. of the Carolinas
3511 Paramount Pkwy. Suite 100 Raleigh, N.C. 27609
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



PERMIT DRAWING SHEET 3 OF 5

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2B-4 FOR INTERSECTION DETAIL
SEE SHEETS 24 & 25 FOR -L- PROFILE
SEE SHEETS 37 & 38 FOR -Y1- PROFILE
SEE SHEET 39 FOR -YIRPA- PROFILE
SEE SHEET 40 FOR -YIRPB- PROFILE
SEE SHEET 41 FOR -YIRPC- PROFILE
SEE SHEET 42 FOR -YIRPD- PROFILE
SEE SHEET 39 FOR -YIRPAA- PROFILE
SEE SHEET 40 FOR -YIRPBB- PROFILE
SEE SHEET 41 FOR -YIRPCC- PROFILE
SEE SHEET 42 FOR -YIRPDD- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

PLOT DRIVER: MODOT.pdf.pltcfg
USER: JAKASSOC
FILE:
PENTABLE: MODOT.pen-mtra.CTB
DATE: 7/8/2021
TIME: 12:42:24 PM

LEGEND:

E E — DENOTES EXCAVATION IN WETLAND

50 25 0 50 100
PLANS

BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	7A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
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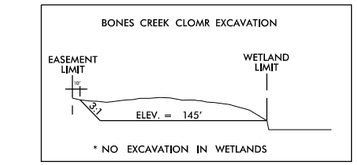

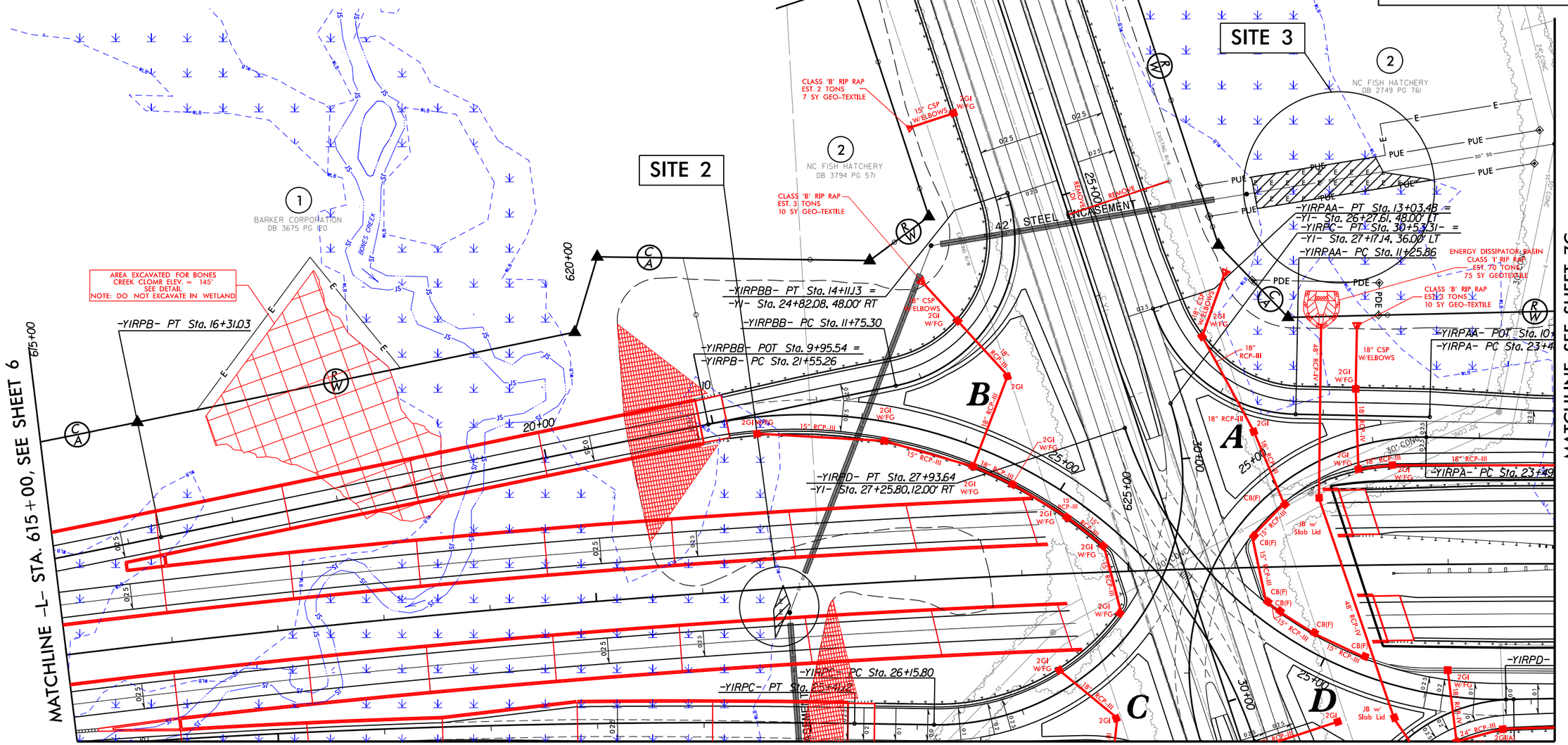

REVISIONS

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FILE: \
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TIME: 2:22:17 PM

PERMIT DRAWING
SHEET 4 OF 5

WETLAND AND SURACE WATER IMPACTS 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)
2	621+65/621+81 -L-	30" Sewer Relocation			< 0.01							
3	25+39/25+69 -Y1-	30" Sewer Relocation			0.09							
TOTALS*:					0.10					0	0	0

*Rounded totals are sum of actual impacts

NOTES:

**Temporary Excavation - the sewer line will be backfilled with material excavated from the wetland and returned to the natural ground elevation.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
3/8/2017
Cumberland County
U-2519CA_B-5516
34817.3.13

Revised 2016 09 09

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

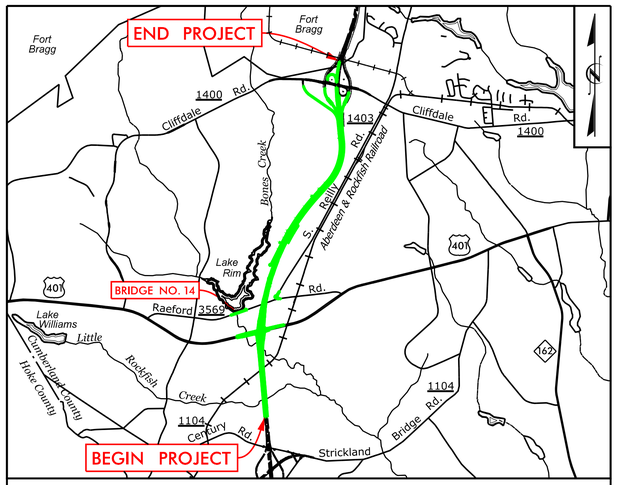
CUMBERLAND COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2519CA & B-5516	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34817.3.13	NHP-0602(031)	

LOCATION: FUTURE I-295 – FAYETTEVILLE OUTER LOOP FROM SOUTH OF US 401 TO SOUTH OF SR 1400 (CLIFFDALE ROAD).

TYPE OF WORK: GRADING, PAVING, DRAINAGE, RETAINING WALLS, STRUCTURES & SIGNALS



VICINITY MAP

RIGHT-OF-WAY / 60% PLAN SUBMITTAL

RIGHT-OF-WAY
60% PLANS
SUBMITTED: 02-17-17

SUBMITTAL #S-035

BEGIN TIP PROJECT B-5516
BEGIN CONSTRUCTION
-Y2- STA. 13+75.00

END TIP PROJECT B-5516
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-L- POT STA. 745+08.65

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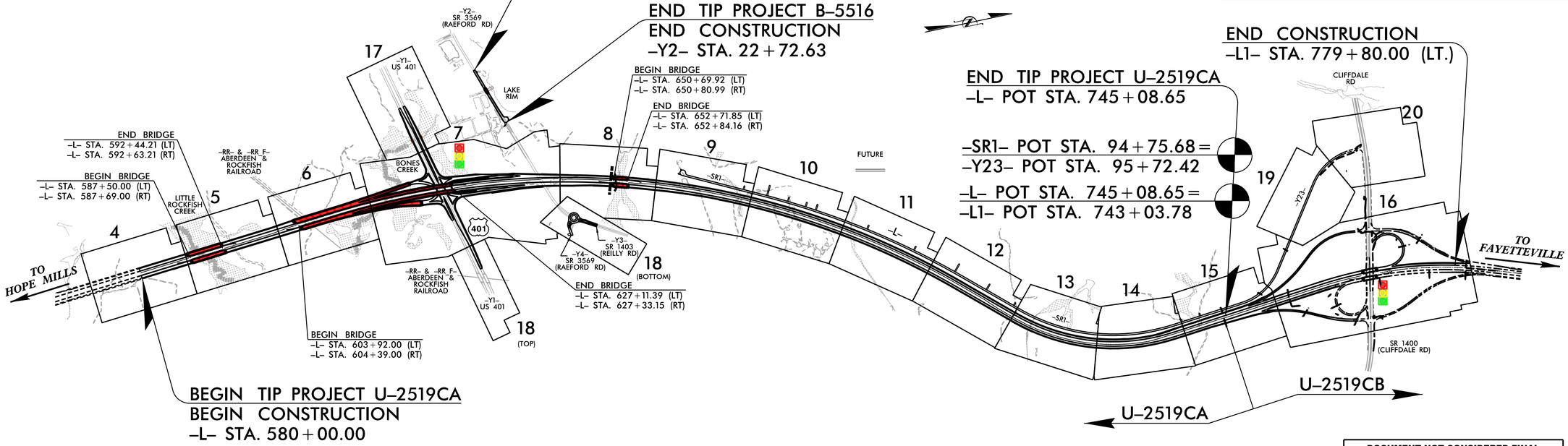

BEGIN TIP PROJECT U-2519CA
BEGIN CONSTRUCTION
-L- STA. 580+00.00

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PROPOSED TRAFFIC SIGNAL

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BARNHILL CONTRACTING COMPANY

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

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PLANS

50 25 0 50 100
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PROFILE (VERTICAL)

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V = 70 MPH
*(TTST 4% + DUALS 8%)

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STATEWIDE TIER

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NCDOT CONTACT: K. ZAK HAMIDI, PE
DESIGN-BUILD UNIT – PROJECT ENGINEER

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

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 21, 2016

LETTING DATE:
JUNE 21, 2016

PAUL A. MEEHAN, PE
PROJECT ENGINEER

PHILLIP E. ROGERS, PE
PROJECT DESIGN ENGINEER

HYDRAULICS ENGINEER
JOSHUA J. MASSROCK, PE
SIGNATURE: *P.E.*

ROADWAY DESIGN ENGINEER
ANTHONY G. THOMPSON, PE
SIGNATURE: *P.E.*

STATE OF NORTH CAROLINA DEPARTMENT OF TRANSPORTATION

CONTRACT: C203759 TIP PROJECT: U-2519CA & B-5516

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09/08/99

04/06/15

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	1A

STATE OF NORTH CAROLINA, DIVISION OF HIGHWAYS

CONVENTIONAL PLAN SHEET SYMBOLS

Note: Not to Scale **S.U.E. = Subsurface Utility Engineering*

BOUNDARIES AND PROPERTY:

- State Line
- County Line
- Township Line
- City Line
- Reservation Line
- Property Line
- Existing Iron Pin — EIP
- Property Corner
- Property Monument — ECM
- Parcel/Sequence Number — 123
- Existing Fence Line
- Proposed Woven Wire Fence
- Proposed Chain Link Fence
- Proposed Barbed Wire Fence
- Existing Wetland Boundary — WLB
- Proposed Wetland Boundary — WLB
- Existing Endangered Animal Boundary — EAB
- Existing Endangered Plant Boundary — EPB
- Existing Historic Property Boundary — HPB
- Known Contamination Area: Soil
- Potential Contamination Area: Soil
- Known Contamination Area: Water
- Potential Contamination Area: Water
- Contaminated Site: Known or Potential

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

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

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

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

VEGETATION:

- Single Tree
- Single Shrub
- Hedge
- Woods Line
- Orchard
- Vineyard — Vineyard

EXISTING STRUCTURES:

MAJOR:

- Bridge, Tunnel or Box Culvert — CONC
- Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR:

- Head and End Wall — CONC HW
- Pipe Culvert
- Footbridge
- Drainage Box: Catch Basin, DI or JB — CB
- Paved Ditch Gutter
- Storm Sewer Manhole — S
- Storm Sewer — S

UTILITIES:

POWER:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

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

SANITARY SEWER:

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

MISCELLANEOUS:

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

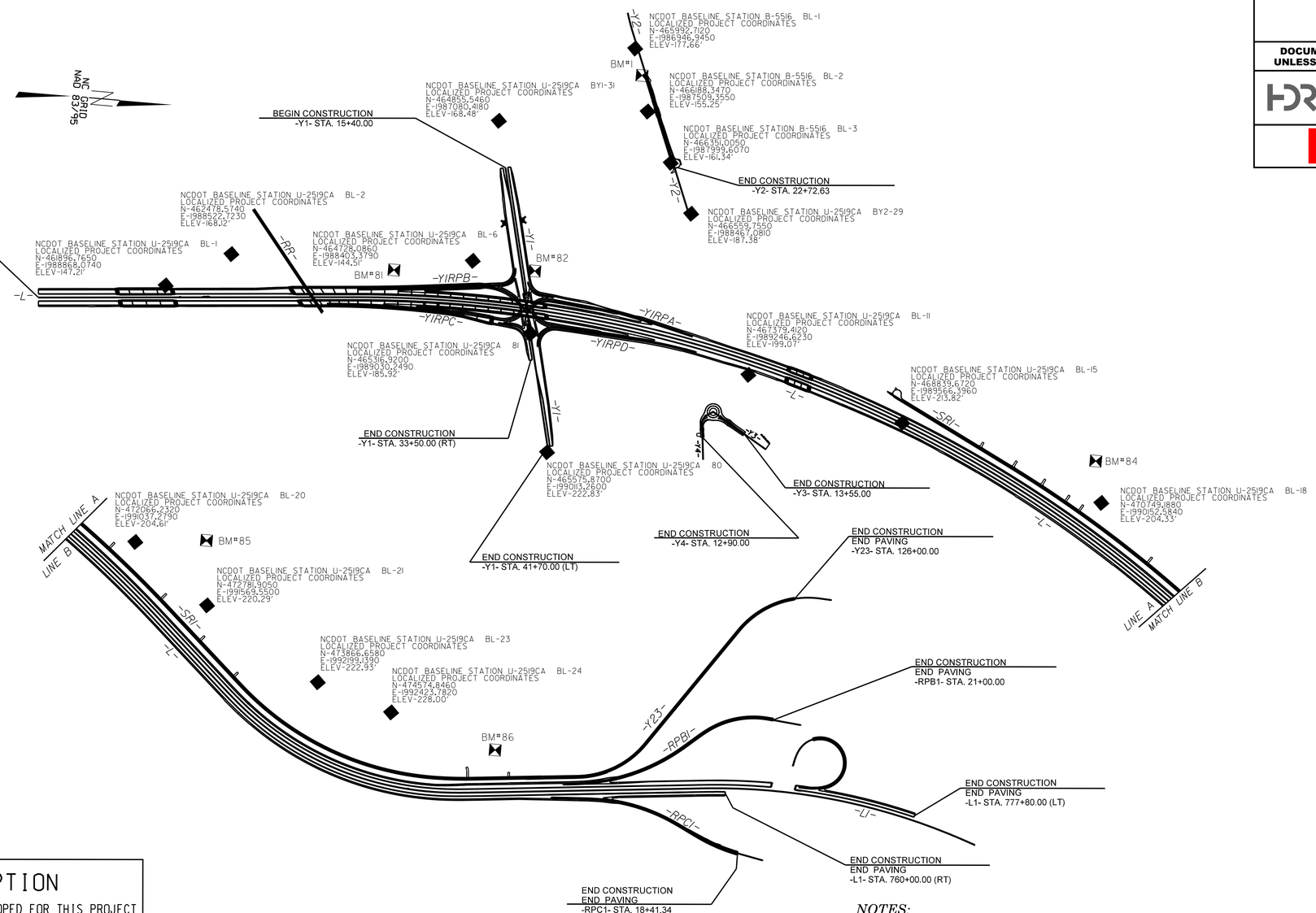
SURVEY CONTROL SHEET U-2519CA

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	1C-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT ""BREEZE""
WITH NAD 83/95 STATE PLANE GRID COORDINATES OF
NORTHING: 455401.4875 (ft) EASTING: 2024426.7025(ft)
ELEVATION: 218.08(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988000
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM ""BREEZE"" TO -L- STATION 537+60.35 IS
N88°12'13.88"W 34,996.14'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

NOTE: DRAWING NOT TO SCALE

NOTES:

⬡ *INDICATES GEODETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL AND VERTICAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT. PROJECT CONTROL ESTABLISHED USING GNSS (GLOBAL NAVIGATION SATELLITE SYSTEM).*

THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:
HTTPS://CONNECT.NCDOT.GOV/RESOURCES/LOCATION/

THE FILES TO BE FOUND ARE AS FOLLOWS:
U-2519CA_LS_CONTROL.TXT

SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT. IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.

REVISIONS

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6/2/99

2/17/2017 U2519CA_B5516_LS_1C-1.DGN 9:57:28 AM

SURVEY CONTROL SHEET U–2519CA

PROJECT REFERENCE NO.	SHEET NO.
U–2519CA	1C–2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

L

TYPE	STATION	NORTH	EAST
POT	537·60.35	456498.3884	1989447.7632
PC	609·74.87	463686.3923	1988829.8148
PT	703·59.09	472336.6970	1991732.0511
TS	711·70.25	472939.4329	1992274.9000
SC	715·20.25	473204.1740	1992503.7483
CS	735·66.06	475108.2422	1993124.2326
ST	739·16.06	475456.9863	1993095.3026
TS	759·16.67	477446.9653	1992889.3517
SC	761·16.67	477646.0165	1992869.9208
CS	784·07.54	479906.8286	1993129.3326
ST	786·07.54	480096.3054	1993193.3441
POT	786·07.55	480096.3082	1993193.3451

Y1

TYPE	STATION	NORTH	EAST
POT	10·00.00	464828.2985	1986985.0030
POT	42·16.34	465575.8700	1990113.2600

Y2

TYPE	STATION	NORTH	EAST
PC	7·57.46	465909.7990	1986614.0285
PT	9·51.43	465964.2736	1986800.1312
POT	27·36.47	466540.0766	1988489.7477

Y3

TYPE	STATION	NORTH	EAST
POT	10·00.00	467075.0189	1989613.6110
POT	16·00.00	467590.7107	1989920.3063

Y4

TYPE	STATION	NORTH	EAST
POT	10·00.00	467075.0189	1989613.6110
PC	10·60.67	467023.8585	1989646.2254
PT	11·79.48	466979.3165	1989748.9235
PC	11·79.48	466979.3165	1989748.9235
PT	12·81.35	466994.4029	1989849.6456
POT	15·00.00	467018.9612	1990066.9158

SR1

TYPE	STATION	NORTH	EAST
POT	10·00.00	468678.2644	1989289.8058
PC	23·09.77	469849.9307	1989875.2094
PT	54·38.05	472427.0428	1991631.7384
PC	64·17.02	473154.4746	1992286.8936
PT	84·21.44	474983.0515	1992993.4613
PC	84·21.44	474983.0515	1992993.4613
PT	87·97.39	475358.3665	1992974.8994
PC	97·98.34	476353.9970	1992871.8599
PT	105·19.67	476955.3990	1992515.3881
PC	118·91.80	477734.4575	1991385.8767
PT	127·46.31	478468.8609	1991026.2951
POT	128·44.82	478567.2121	1991031.8451

Y23

TYPE	STATION	NORTH	EAST
POT	95·72.42	476033.0498	1992905.0753
PC	98·95.08	476353.9970	1992871.8599
PT	106·16.41	476955.3990	1992515.3881
PC	119·88.54	477734.4575	1991385.8767
PT	128·43.05	478468.8609	1991026.2951
POT	129·41.56	478567.2121	1991031.8451

RPB1

TYPE	STATION	NORTH	EAST
TS	0·00.00	476227.5701	1992956.2368
SC	2·00.00	476426.0648	1992931.9700
CS	11·06.58	477248.5649	1992573.9810
TS	13·06.58	477401.5920	1992445.2497
SC	15·06.58	477557.4702	1992320.1638
PT	20·57.88	478081.3449	1992187.3236
POT	23·61.09	478383.1520	1992216.4545

RPC1

TYPE	STATION	NORTH	EAST
POT	0·00.00	476127.3180	1993085.2430
TS	2·40.31	476367.1480	1993070.1190
SC	4·40.31	476566.9292	1993061.4489
CS	11·28.01	477236.5978	1993195.8822
TS	13·28.01	477417.5547	1993280.9840
SC	15·48.01	477617.0406	1993373.6243
PT	18·41.34	477897.8253	1993456.8322
POT	20·83.25	478135.3714	1993502.5966

Y1RPA

TYPE	STATION	NORTH	EAST
POT	10·00.00	466825.9738	1988932.6781
PC	14·68.68	466370.4036	1988822.6177
PT	19·81.57	465865.2732	1988735.9537
PC	23·49.77	465499.0148	1988698.1765
PT	27·65.75	465264.6185	1988965.6956

RR

TYPE	STATION	NORTH	EAST
POT	9·00.00	462653.3302	1988089.6723
POT	20·57.77	463375.8410	1988994.3377

Y1RPB

TYPE	STATION	NORTH	EAST
POT	10·00.00	463680.3109	1988759.0757
PC	10·00.00	463680.3109	1988759.0757
PT	16·31.03	464307.9424	1988694.0180
PC	21·55.26	464828.3532	1988630.8366
PT	28·03.64	465314.7984	1988969.1618

Y1RPC

TYPE	STATION	NORTH	EAST
PC	10·00.00	463403.1980	1988913.3785
PT	25·41.12	464942.1499	1988921.9040
PC	26·15.80	465016.4857	1988929.1251
PT	30·53.31	465262.4247	1988646.7440

Y1RPD

TYPE	STATION	NORTH	EAST
CS	10·00.00	466869.8799	1989073.6126
SC	11·20.00	466751.9503	1989051.4300
CS	14·80.40	466394.6037	1989005.5963
ST	16·00.40	466274.9069	1988997.0886
PC	23·23.59	465553.2851	1988949.5254
PT	27·93.64	465217.7526	1988666.3253

BL

POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
1	U-2519CA BL-1	461896.7650	1988868.0740	147.21	591·88.54	115.17 LT
2	U2519CA BL-2	462478.5740	1988522.7230	168.12	597·97.79	409.42 LT
3	U2519CA BL-3	463020.8880	1988566.8990	167.90	603·34.33	318.95 LT
4	U2519CA BL-4	463521.6270	1988457.3010	182.60	608·42.62	385.26 LT
5	U2519CA BL-5	464219.0720	1988371.7380	169.62	615·24.68	424.44 LT
6	U2519CA BL-6	464728.0860	1988403.3790	144.51	620·15.81	384.48 LT
7	U2519CA BL-7	465220.5360	1988579.1470	168.68	624·99.93	221.64 LT
8	U2519CA BL-8	465622.8790	1988638.6980	156.67	628·98.18	188.22 LT
9	U2519CA BL-9	466143.4720	1988833.2990	207.46	634·30.88	49.39 LT
10	U2519CA BL-10	466728.6170	1989097.5430	209.83	640·51.93	121.00 RT
11	U2519CA BL-11	467379.4120	1989246.6230	199.07	647·27.01	129.66 RT
12	U2519CA BL-12	467620.9440	1989294.7570	188.57	649·75.57	115.92 RT
13	U2519CA BL-13	467971.9150	1989346.2370	177.31	653·30.03	68.81 RT
14	U2519CA BL-14	468461.1670	1989429.0990	217.02	658·22.24	4.38 LT
15	U2519CA BL-15	468839.6720	1989566.3960	213.82	662·24.69	7.14 LT
16	U2519CA BL-16	469251.5030	1989594.7060	181.20	666·14.01	137.30 LT
17	U2519CA BL-17	470065.6450	1989797.4970	205.53	674·21.42	302.00 LT
18	U2519CA BL-18	470749.1880	1990152.5840	204.33	681·70.95	325.42 LT
19	U2519CA BL-19	471333.2710	1990515.7960	207.26	688·39.49	335.78 LT
20	U2519CA BL-20	472066.2320	1991037.2790	204.61	697·12.78	354.04 LT
21	U2519CA BL-21	472781.9050	1991569.5500	220.29	705·81.16	418.69 LT
22	U2519CA BL-22	473245.9150	1991861.2060	236.27	711·21.13	512.50 LT
23	U2519CA BL-23	473866.6580	1992199.1390	222.93	719·42.56	626.56 LT
24	U2519CA BL-24	474574.8460	1992423.7820	228.00	729·04.85	663.89 LT
25	U2519CA BL-25	475239.3410	1992600.8370	230.67	737·42.78	513.44 LT
118	U2519CB BL-18	475913.3070	1992778.3240	232.78	744·02.59	268.32 LT

BY

POINT	DESC.	NORTH	EAST	ELEVATION	RR STATION	OFFSET
26	U2519CA BY-26	462775.6900	1988228.2300	171.16	10·84.63	9.14 LT
27	U2519CA BY-27	463319.2940	1988895.0510	164.23	19·44.91	17.78 LT

BY1

POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
31	U2519CA BY1-31	464855.5460	1987080.4180	168.48	10·99.14	4.32 LT
28	U2519CA BY1-28	465089.5630	1988042.8820	157.76	20·89.63	8.23 LT
81	U2519 - 81	465316.9200	1989030.2490	185.92	31·02.80	0.13 RT
80	U2519 - 80	465575.8700	1990113.2600	222.83	42·16.34	0.00

BY2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
29	U2519CA BY2-29	466559.7550	1988467.0810	187.38	27·21.36	25.94 LT
70	NCGS REILLY	466977.4800	1989682.6460	206.45	OUTSIDE PROJECT LIMITS	

BL2

POINT	DESC.	NORTH	EAST	ELEVATION	Y2 STATION	OFFSET
633	B-5516 GPS 3	465860.3670	1986455.0000	189.37	OUTSIDE PROJECT LIMITS	
601	B-5516 BL-1 SHI	465992.7120	1986946.9450	177.66	10·99.57	20.44 RT
602	B-5516 BL-2 SHI	466188.3470	1987509.3550	155.25	16·95.03	16.68 RT
603	B-5516 BL-3 SHI	466351.0050	1987999.6070	161.34	22·11.54	20.86 RT
629	U2519CA BY2-29	466559.7550	1988467.0810	187.38	27·21.36	25.94 LT

BM80 ELEVATION = 168.31
N 462856 E 1988410
L STATION 601·84.00 489 LEFT
BM80

BM81 ELEVATION = 173.04
N 464000 E 1988548
L STATION 613·05.00 258 LEFT
BM81

BM82 ELEVATION = 158.71
N 465308 E 1988447
L STATION 625·79.00 358 LEFT
BM82

BM83 ELEVATION = 208.65
N 466756 E 1988798
L STATION 640·25.00 178 LEFT
BM83

BM84 ELEVATION = 193.94
N 470664 E 1989769
L STATION 679·14.00 613 LEFT
BM84

BM85 ELEVATION = 209.86
N 472722 E 1990971
L STATION 701·51.00 826 LEFT
BM85

BM86 ELEVATION = 219.14
N 475568 E 1992689
L STATION 740·68.00 393 LEFT
BM86

BM1 ELEVATION = 170.13
N 466060 E 1987194
Y2 STATION 13·56.00 37 RIGHT
BM 1 B-5516

NOTE: DRAWING NOT TO SCALE

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 9:57:40 AM
FILE: North_Carolina_Dept_of_Transportation\U_2519CA_Fayetteville_Outer_Loop\6.0_CAD_BIM\6.2_Work_In_Progress\U-2519CA_B-5516\Roadway\Proj\U2519CA_B5516_LS_1C-2.DGN

6/2/99

2/17/2017
1:26:00 PM
U2519CA_B5516_LS_1C-2.DGN
9:57:40 AM

PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	1D-1

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
1	L	580+00.00	460722.4559	1989084.6226
2	L	581+00.00	460822.0884	1989076.0573
3	L	582+00.00	460921.7209	1989067.4919
4	L	583+00.00	461021.3534	1989058.9266
5	L	584+00.00	461120.9859	1989050.3612
6	L	585+00.00	461220.6184	1989041.7959
7	L	586+00.00	461320.2509	1989033.2306
8	L	587+00.00	461419.8834	1989024.6652
9	L	588+00.00	461519.5159	1989016.0999
10	L	589+00.00	461619.1484	1989007.5345
11	L	590+00.00	461718.7809	1988998.9692
12	L	591+00.00	461818.4133	1988990.4038
13	L	592+00.00	461918.0458	1988981.8385
14	L	593+00.00	462017.6783	1988973.2731
15	L	594+00.00	462117.3108	1988964.7078
16	L	595+00.00	462216.9433	1988956.1424
17	L	596+00.00	462316.5758	1988947.5771
18	L	597+00.00	462416.2083	1988939.0117
19	L	598+00.00	462515.8408	1988930.4464
20	L	599+00.00	462615.4733	1988921.8811
21	L	600+00.00	462715.1058	1988913.3157
22	L	601+00.00	462814.7383	1988904.7504
23	L	602+00.00	462914.3708	1988896.1850
24	L	603+00.00	463014.0033	1988887.6197
25	L	604+00.00	463113.6358	1988879.0543
26	L	605+00.00	463213.2683	1988870.4890
27	L	606+00.00	463312.9008	1988861.9236
28	L	607+00.00	463412.5333	1988853.3583
29	L	608+00.00	463512.1658	1988844.7929
30	L	609+00.00	463611.7983	1988836.2276
31	L	610+00.00	463711.4332	1988827.6897
32	L	611+00.00	463811.1194	1988819.7778
33	L	612+00.00	463910.8708	1988812.7361
34	L	613+00.00	464010.6799	1988806.5652
35	L	614+00.00	464110.5391	1988801.2654
36	L	615+00.00	464210.4407	1988796.8373
37	L	616+00.00	464310.3771	1988793.2812
38	L	617+00.00	464410.3407	1988790.5973
39	L	618+00.00	464510.3240	1988788.7859
40	L	619+00.00	464610.3193	1988787.8470
41	L	620+00.00	464710.3190	1988787.7807
42	L	621+00.00	464810.3154	1988788.5872
43	L	622+00.00	464910.3010	1988790.2662
44	L	623+00.00	465010.2681	1988792.8177
45	L	624+00.00	465110.2092	1988796.2414
46	L	625+00.00	465210.1165	1988800.5372
47	L	626+00.00	465309.9826	1988805.7046
48	L	627+00.00	465409.7998	1988811.7433
49	L	628+00.00	465509.5605	1988818.6529
50	L	629+00.00	465609.2571	1988826.4327
51	L	630+00.00	465708.8820	1988835.0823
52	L	631+00.00	465808.4276	1988844.6009
53	L	632+00.00	465907.8864	1988854.9879
54	L	633+00.00	466007.2507	1988866.2423
55	L	634+00.00	466106.5131	1988878.3635
56	L	635+00.00	466205.6659	1988891.3504
57	L	636+00.00	466304.7016	1988905.2021
58	L	637+00.00	466403.6126	1988919.9175
59	L	638+00.00	466502.3915	1988935.4954
60	L	639+00.00	466601.0306	1988951.9348
61	L	640+00.00	466699.5226	1988969.2343
62	L	641+00.00	466797.8598	1988987.3927
63	L	642+00.00	466896.0348	1989006.4085
64	L	643+00.00	466994.0402	1989026.2804
65	L	644+00.00	467091.8684	1989047.0067
66	L	645+00.00	467189.5120	1989068.5859
67	L	646+00.00	467286.9635	1989091.0164
68	L	647+00.00	467384.2157	1989114.2965
69	L	648+00.00	467481.2609	1989138.4243
70	L	649+00.00	467578.0919	1989163.3981
71	L	650+00.00	467674.7013	1989189.2159
72	L	651+00.00	467771.0818	1989215.8759
73	L	652+00.00	467867.2259	1989243.3758
74	L	653+00.00	467963.1263	1989271.7138
75	L	654+00.00	468058.7758	1989300.8875
76	L	655+00.00	468154.1671	1989330.8948
77	L	656+00.00	468249.2929	1989361.7334
78	L	657+00.00	468344.1460	1989393.4010
79	L	658+00.00	468438.7191	1989425.8950
80	L	659+00.00	468533.0050	1989459.2132
81	L	660+00.00	468626.9966	1989493.3528
82	L	661+00.00	468720.6867	1989528.3114
83	L	662+00.00	468814.0682	1989564.0863
84	L	663+00.00	468907.1339	1989600.6746
85	L	664+00.00	468999.8768	1989638.0738
86	L	665+00.00	469092.2897	1989676.2808
87	L	666+00.00	469184.3658	1989715.2928
88	L	667+00.00	469276.0979	1989755.1068
89	L	668+00.00	469367.4791	1989795.7199
90	L	669+00.00	469458.5024	1989837.1288
91	L	670+00.00	469549.1608	1989879.3304
92	L	671+00.00	469639.4476	1989922.3216
93	L	672+00.00	469729.3557	1989966.0990
94	L	673+00.00	469818.8784	1990010.6594
95	L	674+00.00	469908.0088	1990055.9993
96	L	675+00.00	469996.7402	1990102.1152
97	L	676+00.00	470085.0657	1990149.0038
98	L	677+00.00	470172.9787	1990196.6613
99	L	678+00.00	470260.4725	1990245.0841
100	L	679+00.00	470347.5404	1990294.2687
101	L	680+00.00	470434.1758	1990344.2112
102	L	681+00.00	470520.3720	1990394.9077
103	L	682+00.00	470606.1226	1990446.3546
104	L	683+00.00	470691.4209	1990498.5478
105	L	684+00.00	470776.2605	1990551.4834
106	L	685+00.00	470860.6350	1990605.1573
107	L	686+00.00	470944.5378	1990659.5655
108	L	687+00.00	471027.9627	1990714.7038
109	L	688+00.00	471110.9032	1990770.5680
110	L	689+00.00	471193.3530	1990827.1538
111	L	690+00.00	471275.3059	1990884.4570
112	L	691+00.00	471356.7557	1990942.4732
113	L	692+00.00	471437.6960	1991001.1979
114	L	693+00.00	471518.1208	1991060.6268
115	L	694+00.00	471598.0240	1991120.7552
116	L	695+00.00	471677.3994	1991181.5786
117	L	696+00.00	471756.2409	1991243.0923
118	L	697+00.00	471834.5427	1991305.2917
119	L	698+00.00	471912.2987	1991368.1721
120	L	699+00.00	471989.5031	1991431.7286
121	L	700+00.00	472066.1498	1991495.9564
122	L	701+00.00	472142.2332	1991560.8506
123	L	702+00.00	472217.7473	1991626.4063
124	L	703+00.00	472292.6865	1991692.6185
125	L	704+00.00	472367.0940	1991759.4279
126	L	705+00.00	472441.3997	1991826.3507
127	L	706+00.00	472515.7054	1991893.2735
128	L	707+00.00	472590.0111	1991960.1963
129	L	708+00.00	472664.3169	1992027.1191
130	L	709+00.00	472738.6226	1992094.0419
131	L	710+00.00	472812.9283	1992160.9647
132	L	711+00.00	472887.2340	1992227.8875
133	L	712+00.00	472961.5426	1992294.8071
134	L	713+00.00	473036.0877	1992361.4627
135	L	714+00.00	473111.4883	1992427.1474
136	L	715+00.00	473188.3726	1992491.0861
137	L	716+00.00	473267.2644	1992552.5277
138	L	717+00.00	473348.2517	1992611.1796
139	L	718+00.00	473431.2366	1992666.9694
140	L	719+00.00	473516.1179	1992719.8290
141	L	720+00.00	473602.7923	1992769.6941
142	L	721+00.00	473691.1542	1992816.5040
143	L	722+00.00	473781.0959	1992860.2016
144	L	723+00.00	473872.5078	1992900.7336
145	L	724+00.00	473965.2786	1992938.0507
146	L	725+00.00	474059.2952	1992972.1074
147	L	726+00.00	474154.4431	1993002.8623
148	L	727+00.00	474250.6064	1993030.2778
149	L	728+00.00	474347.6679	1993054.3205
150	L	729+00.00	474445.5093	1993074.9612
151	L	730+00.00	474544.0115	1993092.1747
152	L	731+00.00	474643.0544	1993105.9401
153	L	732+00.00	474742.5174	1993116.2405
154	L	733+00.00	474842.2793	1993123.0634
155	L	734+00.00	474942.2185	1993126.4005
156	L	735+00.00	475042.2133	1993126.2478
157	L	736+00.00	475142.1422	1993122.6119
158	L	737+00.00	475241.9121	1993115.8761
159	L	738+00.00	475341.5155	1993106.9919
160	L	739+00.00	475441.0104	1993096.9553
161	L	740+00.00	475540.4792	1993086.6616
162	L	741+00.00	475639.9479	1993076.3672
163	L	742+00.00	475739.4166	1993066.0728
164	L	743+00.00	475838.8853	1993055.7783
165	L	744+00.00	475938.3540	1993045.4839
166	L	745+00.00	476037.8228	1993035.1895
167	L	745+08.65	476046.4240	1993034.3000
168	L1	744+00.00	476142.1327	1993024.3941
169	L1	745+00.00	476241.6014	1993014.0996
170	L1	746+00.00	476341.0701	1993003.8052
171	L1	747+00.00	476440.5388	1992993.5108
172	L1	748+00.00	476540.0075	1992983.2164
173	L1	749+00.00	476639.4762	1992972.9220
174	L1	750+00.00	476738.9449	1992962.6276
175	L1	751+00.00	476838.4136	1992952.3331
176	L1	752+00.00	476937.8824	1992942.0387
177	L1	753+00.00	477037.3511	1992931.7443
178	L1	754+00.00	477136.8198	1992921.4499
179	L1	755+00.00	477236.2885	1992911.1555
180	L1	756+00.00	477335.7572	1992900.8611
181	L1	757+00.00	477435.2259	1992890.5666
182	L1	758+00.00	477534.7048	1992880.3715
183	L1	759+00.00	477634.2587	1992870.9426
184	L1	760+00.00	477733.9455	1992863.0505
185	L1	761+00.00	477833.7549	1992856.8991
186	L1	762+00.00	477933.6564	1992852.4906
187	L1	763+00.00	478033.6196	1992849.8262
188	L1	764+00.00	478133.6141	1992848.9069
189	L1	765+00.00	478233.6094	1992849.7329
190	L1	766+00.00	478333.5751	1992852.3038
191	L1	767+00.00	478433.4807	1992856.6191
192	L1	768+00.00	478533.2957	1992862.6773
193	L1	769+00.00	478632.9898	1992870.4765
194	L1	770+00.00	478732.5327	1992880.0145
195	L1	771+00.00	478831.8939	1992891.2883
196	L1	772+00.00	478931.0432	1992904.2944
197	L1	773+00.00	479029.9504	1992919.0290
198	L1	774+00.00	479128.5854	1992935.4875
199	L1	775+00.00	479226.9181	1992953.6649
200	L1	776+00.00	479324.9187	1992973.5557
201	L1	777+00.00	479422.5571	1992995.1538
202	L1	778+00.00	479519.8038	1993018.4527
203	L1	779+00.00	479616.6290	1993043.4451
204	L1	780+00.00	479713.0033	1993070.1236
205	L1	781+00.00	479808.8973	1993098.4800
206	L1	782+00.00	479904.2818	1993128.5057
207	L1	783+00.00	479999.1707	1993160.0645
208	L1	784+00.00	480093.7735	1993192.4724
209	L1	784+02.68	480096.3054	1993193.3441
210	Y1	10+00.00	464828.2985	1986985.0030
211	Y1	11+00.00	464851.5414	1987082.2643
212	Y1	12+00.00	464874.7843	1987179.5256
213	Y1	13+00.00	464898.0272	1987276.7870
214	Y1	14+00.00	464921.2701	1987374.0483
215	Y1	15+00.00	464944.5130	1987471.3096
216	Y1	16+00.00	464967.7559	1987568.5710
217	Y1	17+00.00	464990.9988	1987665.8323
218	Y1	18+00.00	465014.2418	1987763.0936
219	Y1	19+00.00	465037.4847	1987860.3550
220	Y1	20+00.00	465060.7276	1987957.6163
221	Y1	21+00.00	465083.9705	1988054.8776
222	Y1	22+00.00	465107.2134	1988152.1390
223	Y1	23+00.00	465130.4563	1988249.4003
224	Y1	24+00.00	465153.6992	1988346.6616
225	Y1	25+00.00	465176.9421	1988443.9230
226	Y1	26+00.00	465200.1851	1988541.1843
227	Y1	27+00.00	465223.4280	1988638.4456
228	Y1	28+00.00	465246.6709	1988735.7070
229	Y1	29+00.00	465269.9138	1988832.9683
230	Y1	30+00.00	465293.1567	1988930.2296
231	Y1	31+00.00	465316.3996	1989027.4910
232	Y1	32+00.00	465339.6425	1989124.7523
233	Y1	33+00.00	465362.8854	1989222.0136
234	Y1	34+00.00	465386.1283	1989319.2750
235	Y1	35+00.00	465409.3713	1989416.5363
236	Y1	36+00.00	465432.6142	1989513.7976
237	Y1	37+00.00	465455.8571	1989611.0590
238	Y1	38+00.00	465479.1000	1989708.3203
239	Y1	39+00.00	465502.3429	1989805.5816
240	Y1	40+00.00	465525.5858	1989902.8430
241	Y1	41+00.00	465548.8287	1990000.1043
242	Y1	42+00.00	465572.0716	1990097.3656
243	Y1	42+16.34	465575.8700	1990113.2600
244	Y1RPA	10+00.00	466825.9738	1988932.6781
245	Y1RPA	11+00.00	466728.7702	1988909.1949
246	Y1RPA	12+00.00	466631.5666	1988885.7116
247	Y1RPA	13+00.00	466534.3630	1988862.2284
248	Y1RPA	14+00.00	466437.1594	1988838.7451
249	Y1RPA	15+00.00	466339.9260	1988815.3868
250	Y1RPA	16+00.00	466242.2473	1988793.9787
251	Y1RPA	17+00.00	466144.0418	1988775.1346
252	Y1RPA	18+00.00	466045.3766	1988758.8676
253	Y1RPA	19+00.00	465946.3195	1988745.1887
254	Y1RPA	20+00.00	465846.9427	1988734.0631
255	Y1RPA	21+00.00	465747.4705	1988723.8031
256	Y1RPA	22+00.00	465647.9982	1988713.5432
257	Y1RPA	23+00.00	465548.5259	1988703.2832
258	Y1RPA	24+00.00	465448.9035	1988698.7988
259	Y1RPA	25+00.00	465356.0269	1988733.4372
260	Y1RPA	26+00.00	465288.0895	1988805.6202
261	Y1RPA	27+00.00	465259.1378	1988900.4235
262	Y1RPA	27+65.75	465264.6185	1988965.6956
263	Y1RPAA	10+00.00	465503.7703	1988679.5662
264	Y1RPAA	11+00.00	465404.2980	1988669.3062
265	Y1RPAA	12+00.00	465309.9556	1988640.8106
266	Y1RPAA	13+00.00	465254.1377	1988560.2570
267	Y1RPAA	13+03.48	465253.2880	1988556.8823
268	Y1RPB	10+00.00	463680.3109	1988759.0757
269	Y1RPB	11+00.00	463779.9191	1988750.2337
270	Y1RPB	12+00.00	463879.4767	1988740.8384
271	Y1RPB	13+00.00	463978.9805	1988730.8901
272	Y1RPB	14+00.00	464078.4275	1988720.3892
273	Y1RPB	15+00.00	464177.8146	1988709.3360
274	Y1RPB	16+00.00	464277.1388	1988697.7308
275	Y1RPB	17+00.00	464376.4130	1988685.7052
276	Y1RPB	18+00.00	464475.6841	1988673.6530
277	Y1RPB	19+00.00	464574.9552	1988661.6008
278	Y1RPB	20+00.00	464674.2262	1988649.5486
279	Y1RPB	21+00.00	464773.4973	1988637.4964
280	Y1RPB	22+00.00	464872.9644	1988627.6842
281	Y1RPB	23+00.00	464972.3314	1988636.8605
282	Y1RPB	24+00.00	465067.1551	1988667.9483
283	Y1RPB	25+00.00	465152.6673	1988719.3842
284	Y1RPB	26+00.00	465224.5678	1988788.5817
285	Y1RPB	27+00.00	465279.2411	1988872.0612
286	Y1RPB	28+00.00	465313.9378	1988965.6247
287	Y1RPB	28+03.64	465314.7984	1988969.1618
288	Y1RPBB	10+00.00	464832.7820	1988630.2989
289	Y1RPBB	11+00.00	464932.0530	1988618.2467
290	Y1RPBB	12+00.00	465030.9350	1988604.0517
291	Y1RPBB	13+00.00	465108.5991	1988544.4673
292	Y1RPBB	14+00.00	465128.2466	1988448.5717
293	Y1RPBB	14+11.13	465126.0921	1988437.6524
294	Y1RPC	10+00.00	463403.1980	1988913.3785
295	Y1RPC	11+00.00	463502.8789	1988905.4035
296	Y1RPC	12+00.00	463602.6473	1988898.6102
297	Y1RPC	13+00.00	463702.4892	1988892.9994
298	Y1RPC	14+00.00	463802.3906	1988888.5720
299	Y1RPC	15+00.00	463902.3374	1988885.3285
300	Y1RPC	16+00.00	464002.3156	1988883.2693
301	Y1RPC	17+00.00	464102.3112	1988882.3949
302	Y1RPC	18+00.00	464202.3101	1988882.7053
303	Y1RPC	19+00.00	464302.2983	1988884.2005
304	Y1RPC	20+00.00	464402.2618	1988886.8802
305	Y1RPC	21+00.00	464502.1866	1988890.7442
306	Y1RPC	22+00.00	464602.0585	1988895.7917
307	Y1RPC	23+00.00	464701.8637	1988902.0222
308	Y1RPC	24+00.00	464801.5880	1988909.4348
309	Y1RPC	25+00.00	464901.2174	1988918.0283
310	Y1RPC	26+00.00	465000.7585	1988927.5973
311	Y1RPC	27+00.00	465099.9041	1988921.9164
312	Y1RPC	28+00.00	465187.6007	1988875.5185
313	Y1RPC	29+00.00	465247.5948	1988796.4984
314	Y1RPC	30+00.00	465268.7228	1988699.5599
315	Y1RPC	30+53.31	465262.4247	1988646.7440
316	Y1RPCC	10+00.00	465020.8506	1988956.6762
317	Y1RPCC	11+00.00	465120.3821	1988966.3449
318	Y1RPCC	12+00.00	465217.0906	1988988.0579
319	Y1RPCC	13+00.00	465284.1473	1989059.9001
320	Y1RPCC	13+30.04	465293.9081	1989088.2600
321	Y1RPD	10+00.00	466869.8799	1989073.6126
322	Y1RPD	11+00.00	466771.6400	1989054.9390
323	Y1RPD	12+00.00	466673.0199	1989038.4000
324	Y1RPD	13+00.00	466574.0076	1989024.3995
325	Y1RPD	14+00.00	466474.6682	1989012.9487
326	Y1RPD	15+00.00	466375.0674	1989004.0525
327	Y1RPD	16+00.00	466275.3089	1988997.1151
328	Y1RPD	17+00.00	466175.5254	1988990.5382
329	Y1RPD	18+00.00	466075.7419	1988983.9613
330	Y1RPD	19+00.00	465975.9584	1988977.3845
331	Y1RPD	20+00.00	465876.1749	1988970.8076
332	Y1RPD	21+00.00	465776.3914	1988964.2307
333	Y1RPD	22+00.00	465676.6079	1988957.6538
334	Y1RPD	23+00.00	465576.8244	1988951.0769
335	Y1RPD	24+00.00	465478.0988	1988936.6910
336	Y1RPD	25+00.00	465386.5651	1988897.1833
337	Y1RPD	26+00.00	465308.9024	1988834.6710
338	Y1RPD	27+00.00	465250.7493	1988753.6927
339	Y1RPD	27+93.64	465217.7526	1988666.3253
340	Y1RPDD	10+00.00	465560.4130	1988949.9952
341	Y1RPDD	11+00.00	465465.0109	1988974.0187
342	Y1RPDD	12+00.00	465401.6994	1989049.3203
343	Y1RPDD	12+99.39	465394.2719	1989146.8375
344	Y1RPAAF	10+00.00	465503.7703	1988679.5662
345	Y1RPAAF	11+00.00	465404.2980	1988669.3062
346	Y1RPAAF	12+00.00	465312.5762	1988634.3033
347	Y1RPAAF	12+90.76	465265.9377	1988558.1870
348	Y1RPBBF	10+00.00	464832.7819	1988630.2989
349	Y1RPBBF	11+00.00	464932.0530	1988618.2467
350	Y1RPBBF	12+00.00	465030.8584	1988603.7250
351	Y1RPBBF	13+00.00	465105.3346	1988540.7184
352	Y1RPBBF	13+93.42	465116.7070	1988450.0087
353	Y1RPCCF	10+00.00	465020.8506	1988956.6762
354	Y1RPCCF	11+00.00	465120.3821	1988966.3449
355	Y1RPCCF	12+00.00	465215.3531	1988993.3338
356	Y1RPCCF	13+00.00	465276.3101	1989070.4192
357	Y1RPCCF	13+17.35	465281.2775	1989087.0323
358	Y1RPDDF	10+00.00	465553.4869	1988949.5387
359	Y1RPDDF	11+00.00	465459.0836	1988975.9598
360	Y1RPDDF	12+00.00	465403.0641	1989056.4067
361	Y1RPDDF	12+72.21	465402.0324	1989127.8684
362	Y2	8+00.00	465920.3498	1986655.2370
363	Y2	9+00.00	465948.2476	1986751.2579
364	Y2	10+00.00	465979.9394	1986846.1002
365	Y2	11+00.00	466012.1966	1986940.7547
366	Y2	12+00.00	466044.4538	1987035.4092
367	Y2	13+00.00	466076.7111	1987130.0637
368	Y2	14+00.00	466108.9683	1987224.7182
369	Y2	15+00.00	466141.2255	1987319.3727
370	Y2	16+00.00	466173.4827	1987414.0272
371	Y2	17+00.00	466205.7399	1987508.6816
372	Y2	18+00.00	466237.9972	1987603.3361
373	Y2	19+00.00	466270.2544	1987697.9906
374	Y2	20+00.00	466302.5116	1987792.6451
375	Y2	21+00.00	466334.7688	1987887.2996
376	Y2	22+00.00	466367.0261	1987981.9541
377	Y2	23+00.00	466399.2833	1988076.6086
378	Y2	24+00.00	466431.5405	1988171.2630
379	Y2	25+00.00	466463.7977	1988265.9175
380	Y2	26+00.00	466496.0549	1988360.5720
381	Y2	27+00.00	466528.3122	1988455.2265
382	Y2	27+36.47	466540.0766	1988489.7477
383	Y3	10+00.00	467075.0189	1989613.6110
384	Y3	11+00.00	467160.9676	1989664.7269
385	Y3	12+00.00	467246.9162	1989715.8428
386	Y3	13+00.00	467332.8648	1989766.9587
387	Y3	14+00.00	467418.8135	1989818.0746
388	Y3	15+00.00	467504.7621	1989869.1904
389	Y3	16+00.00	467590.7107	1989920.3063
390	Y3RA	10+00.00	467122.2907	1989641.7248
391	Y3RA	11+00.00	467036.1857	1989652.5594
392	Y3RA	12+00.00	467046.7654	1989566.4227
393	Y3RA	13+00.00	467127.6891	1989597.7726

PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	1D-2

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CENTERLINE COORDINATE LIST

Point #	Chain	Station	Northing (Y)	Easting (X)
394	Y3RA	13+45.58	467122.2907	1989641.7248
395	Y4	10+00.00	467075.0189	1989613.6110
396	Y4	11+00.00	466995.6481	1989673.2630
397	Y4	12+00.00	466982.9403	1989769.1219
398	Y4	13+00.00	466996.4980	1989868.1808
399	Y4	14+00.00	467007.7296	1989967.5481
400	Y4	15+00.00	467018.9612	1990066.9153
401	RR	9+00.00	462653.3303	1988089.6723
402	RR	10+00.00	462715.7354	1988167.8106
403	RR	11+00.00	462778.1405	1988245.9489
404	RR	12+00.00	462840.5457	1988324.0872
405	RR	13+00.00	462902.9508	1988402.2256
406	RR	14+00.00	462965.3560	1988480.3639
407	RR	15+00.00	463027.7611	1988558.5022
408	RR	16+00.00	463090.1663	1988636.6405
409	RR	17+00.00	463152.5714	1988714.7789
410	RR	18+00.00	463214.9765	1988792.9172
411	RR	19+00.00	463277.3817	1988871.0555
412	RR	20+00.00	463339.7868	1988949.1938
413	RR	20+57.77	463375.8410	1988994.3378
414	RR_F	9+00.00	462641.4058	1988098.6925
415	RR_F	10+00.00	462703.7988	1988176.8405
416	RR_F	11+00.00	462766.1918	1988254.9886
417	RR_F	12+00.00	462828.5848	1988333.1366
418	RR_F	13+00.00	462890.9778	1988411.2846
419	RR_F	14+00.00	462953.3708	1988489.4326
420	RR_F	15+00.00	463015.7638	1988567.5807
421	RR_F	16+00.00	463078.1568	1988645.7287
422	RR_F	17+00.00	463140.5498	1988723.8767
423	RR_F	18+00.00	463202.9428	1988802.0247
424	RR_F	19+00.00	463265.3358	1988880.1728
425	RR_F	20+00.00	463327.7288	1988958.3208
426	RR_F	20+62.81	463366.9202	1989007.4085
427	BERM	10+00.00	469839.9963	1990188.2688
428	BERM	11+00.00	469929.1797	1990233.5051
429	BERM	12+00.00	470018.3631	1990278.7414
430	BERM	13+00.00	470106.1896	1990326.5211
431	BERM	14+00.00	470191.8509	1990378.1135
432	BERM	15+00.00	470278.7954	1990427.5088
433	BERM	16+00.00	470367.0521	1990474.5244
434	BERM	17+00.00	470455.5043	1990521.1740
435	BERM	18+00.00	470542.3203	1990570.7766
436	BERM	19+00.00	470627.2745	1990623.5269
437	BERM	20+00.00	470713.1021	1990674.8425
438	BERM	21+00.00	470799.9388	1990724.4314
439	BERM	22+00.00	470887.6611	1990772.4382
440	BERM	22+85.02	470962.3700	1990813.0111
441	SR1	10+00.00	468678.2644	1989289.8058
442	SR1	11+00.00	468767.7202	1989334.5009
443	SR1	12+00.00	468857.1761	1989379.1960
444	SR1	13+00.00	468946.6319	1989423.8911
445	SR1	14+00.00	469036.0877	1989468.5862
446	SR1	15+00.00	469125.5436	1989513.2814
447	SR1	16+00.00	469214.9994	1989557.9765
448	SR1	17+00.00	469304.4552	1989602.6716
449	SR1	18+00.00	469393.9111	1989647.3667
450	SR1	19+00.00	469483.3669	1989692.0618
451	SR1	20+00.00	469572.8227	1989736.7570
452	SR1	21+00.00	469662.2786	1989781.4521
453	SR1	22+00.00	469751.7344	1989826.1472
454	SR1	23+00.00	469841.1902	1989870.8423
455	SR1	24+00.00	469930.4883	1989915.8511
456	SR1	25+00.00	470019.3968	1989961.6248
457	SR1	26+00.00	470107.9071	1990008.1635
458	SR1	27+00.00	470196.0128	1990055.4639
459	SR1	28+00.00	470283.7072	1990103.5225
460	SR1	29+00.00	470370.9839	1990152.3357
461	SR1	30+00.00	470457.8363	1990201.8997
462	SR1	31+00.00	470544.2579	1990252.2111
463	SR1	32+00.00	470630.2425	1990303.2659
464	SR1	33+00.00	470715.7835	1990355.0605
465	SR1	34+00.00	470800.8746	1990407.5909
466	SR1	35+00.00	470885.5094	1990460.8533
467	SR1	36+00.00	470969.6817	1990514.8436
468	SR1	37+00.00	471053.3853	1990569.5579
469	SR1	38+00.00	471136.6138	1990624.9922
470	SR1	39+00.00	471219.3611	1990681.1422

Point #	Chain	Station	Northing (Y)	Easting (X)
471	SR1	40+00.00	471301.6210	1990738.0038
472	SR1	41+00.00	471383.3874	1990795.5727
473	SR1	42+00.00	471464.6543	1990853.8448
474	SR1	43+00.00	471545.4156	1990912.8156
475	SR1	44+00.00	471625.6652	1990972.4808
476	SR1	45+00.00	471705.3973	1991032.8359
477	SR1	46+00.00	471784.6058	1991093.8765
478	SR1	47+00.00	471863.2849	1991155.5979
479	SR1	48+00.00	471941.4287	1991217.9957
480	SR1	49+00.00	472019.0314	1991281.0651
481	SR1	50+00.00	472096.0873	1991344.8015
482	SR1	51+00.00	472172.5906	1991409.2001
483	SR1	52+00.00	472248.5357	1991474.2562
484	SR1	53+00.00	472323.9168	1991539.9648
485	SR1	54+00.00	472398.7283	1991606.3212
486	SR1	55+00.00	472473.0758	1991673.1976
487	SR1	56+00.00	472547.3815	1991740.1204
488	SR1	57+00.00	472621.6872	1991807.0432
489	SR1	58+00.00	472695.9929	1991873.9660
490	SR1	59+00.00	472770.2986	1991940.8888
491	SR1	60+00.00	472844.6043	1992007.8116
492	SR1	61+00.00	472918.9100	1992074.7344
493	SR1	62+00.00	472993.2157	1992141.6572
494	SR1	63+00.00	473067.5214	1992208.5800
495	SR1	64+00.00	473141.8272	1992275.5028
496	SR1	65+00.00	473216.9613	1992341.4870
497	SR1	66+00.00	473294.4107	1992404.7364
498	SR1	67+00.00	473374.1084	1992465.1282
499	SR1	68+00.00	473455.9490	1992522.5826
500	SR1	69+00.00	473539.8243	1992577.0237
501	SR1	70+00.00	473625.6234	1992628.3795
502	SR1	71+00.00	473713.2329	1992676.5820
503	SR1	72+00.00	473802.5368	1992721.5676
504	SR1	73+00.00	473893.4172	1992763.2767
505	SR1	74+00.00	473985.7539	1992801.6542
506	SR1	75+00.00	474079.4248	1992836.6495
507	SR1	76+00.00	474174.3060	1992868.2161
508	SR1	77+00.00	474270.2721	1992896.3124
509	SR1	78+00.00	474367.1963	1992920.9012
510	SR1	79+00.00	474464.9503	1992941.9500
511	SR1	80+00.00	474563.4049	1992959.4310
512	SR1	81+00.00	474662.4300	1992973.3210
513	SR1	82+00.00	474761.8946	1992983.6018
514	SR1	83+00.00	474861.6671	1992990.2596
515	SR1	84+00.00	474961.6158	1992993.2858
516	SR1	85+00.00	475061.6115	1992992.9167
517	SR1	86+00.00	475161.5555	1992989.6732
518	SR1	87+00.00	475261.3660	1992983.5759
519	SR1	88+00.00	475360.9618	1992974.6308
520	SR1	89+00.00	475460.4305	1992964.3366
521	SR1	90+00.00	475559.8992	1992954.0424
522	SR1	91+00.00	475659.3680	1992943.7482
523	SR1	92+00.00	475758.8367	1992933.4540
524	SR1	93+00.00	475858.3054	1992923.1599
525	SR1	94+00.00	475957.7742	1992912.8657
526	SR1	94+75.68	476033.0498	1992905.0753
527	Y23	96+00.00	476060.4832	1992902.2361
528	Y23	97+00.00	476159.9520	1992891.9420
529	Y23	98+00.00	476259.4207	1992881.6478
530	Y23	99+00.00	476358.8879	1992871.3392
531	Y23	100+00.00	476457.4061	1992854.5399
532	Y23	101+00.00	476553.2116	1992826.0905
533	Y23	102+00.00	476644.9319	1992786.3986
534	Y23	103+00.00	476731.2530	1992736.0328
535	Y23	104+00.00	476810.9384	1992675.7146
536	Y23	105+00.00	476882.8466	1992606.3080
537	Y23	106+00.00	476945.9474	1992528.8074
538	Y23	107+00.00	477002.8571	1992446.5815
539	Y23	108+00.00	477059.6345	1992364.2631
540	Y23	109+00.00	477116.4120	1992281.9447
541	Y23	110+00.00	477173.1895	1992199.6263
542	Y23	111+00.00	477229.9670	1992117.3080
543	Y23	112+00.00	477286.7445	1992034.9896
544	Y23	113+00.00	477343.5220	1991952.6712
545	Y23	114+00.00	477400.2995	1991870.3528
546	Y23	115+00.00	477457.0770	1991788.0344
547	Y23	116+00.00	477513.8545	1991705.7161
548	Y23	117+00.00	477570.6320	1991623.3977
549	Y23	118+00.00	477627.4095	1991541.0793
550	Y23	119+00.00	477684.1870	1991458.7609
551	Y23	120+00.00	477741.0291	1991376.4875

Point #	Chain	Station	Northing (Y)	Easting (X)
552	Y23	121+00.00	477803.6690	1991298.6139
553	Y23	122+00.00	477875.1641	1991228.7820
554	Y23	123+00.00	477954.4903	1991167.9921
555	Y23	124+00.00	478040.5111	1991117.1151
556	Y23	125+00.00	478131.9943	1991076.8798
557	Y23	126+00.00	478227.6293	1991047.8625
558	Y23	127+00.00	478326.0461	1991030.4791
559	Y23	128+00.00	478425.8349	1991024.9784
560	Y23	129+00.00	478525.7195	1991029.5037
561	Y23	129+41.56	478567.2121	1991031.8451
562	LPA1	0+00.00	478410.5622	1992796.4078
563	LPA1	1+00.00	478510.5094	1992799.0768
564	LPA1	2+00.00	478609.8893	1992789.3544
565	LPA1	3+00.00	478703.5858	1992755.5811
566	LPA1	4+00.00	478778.4650	1992690.4295
567	LPA1	5+00.00	478819.1510	1992599.9414
568	LPA1	6+00.00	478817.9369	1992500.7346
569	LPA1	7+00.00	478775.0485	1992411.2693
570	LPA1	8+00.00	478698.4664	1992348.1928
571	LPA1	9+00.00	478602.4408	1992323.2422
572	LPA1	10+00.00	478504.8397	1992341.0603
573	LPA1	11+00.00	478423.8244	1992398.3315
574	LPA1	12+00.00	478373.1196	1992483.8255
575	LPA1	13+00.00	478347.2372	1992580.2969
576	LPA1	13+25.98	478342.2603	1992605.7930
577	RPB1	0+00.00	476227.5701	1992956.2368
578	RPB1	1+00.00	476326.9892	1992945.4815
579	RPB1	2+00.00	476426.0648	1992931.9700
580	RPB1	3+00.00	476524.3187	1992913.4337
581	RPB1	4+00.00	476621.3918	1992889.4703
582	RPB1	5+00.00	476716.9845	1992860.1536
583	RPB1	6+00.00	476810.8018	1992825.5742
584	RPB1	7+00.00	476902.5543	1992785.8388
585	RPB1	8+00.00	476991.9589	1992741.0699
586	RPB1	9+00.00	477078.7396	1992691.4057
587	RPB1	10+00.00	477162.6288	1992636.9995
588	RPB1	11+00.00	477243.3675	1992578.0191
589	RPB1	12+00.00	477320.9491	1992514.9357
590	RPB1	13+00.00	477396.6346	1992449.5791
591	RPB1	14+00.00	477472.5070	1992384.4429
592	RPB1	15+00.00	477552.0268	1992323.8637
593	RPB1	16+00.00	477637.8125	1992272.6015
594	RPB1	17+00.00	477729.3198	1992232.4344
595	RPB1	18+00.00	477825.1209	1992203.9893
596	RPB1	19+00.00	477923.7210	1992187.7101
597	RPB1	20+00.00	478023.5814	1992183.8508
598	RPB1	21+00.00	478123.2696	1992191.3703
599	RPB1	22+00.00	478222.8070	1992200.9778
600	RPB1	23+00.00	478322.3444	1992210.5853
601	RPB1	23+61.09	478383.1520	1992216.4545
602	RPC1	0+00.00	476127.3180	1993085.2430
603	RPC1	1+00.00	476227.1197	1993078.9494
604	RPC1	2+00.00	476326.9215	1993072.6557
605	RPC1	3+00.00	476426.7296	1993066.4662
606	RPC1	4+00.00	476526.6282	1993062.0620
607	RPC1	5+00.00	476626.6144	1993062.2489
608	RPC1	6+00.00	476726.4178	1993068.2815
609	RPC1	7+00.00	476825.6939	1993080.1710
610	RPC1	8+00.00	476924.0994	1993097.8764
611	RPC1	9+00.00	477021.2938	1993121.3364
612	RPC1	10+00.00	477116.9408	1993150.4699
613	RPC1	11+00.00	477210.7097	1993185.1760
614	RPC1	12+00.00	477302.3523	1993225.1685
615	RPC1	13+00.00	477392.4372	1993268.5765
616	RPC1	14+00.00	477482.1656	1993312.7212
617	RPC1	15+00.00	477572.8308	1993354.8956
618	RPC1	16+00.00	477665.5327	1993392.3513
619	RPC1	17+00.00	477760.5051	1993423.6008
620	RPC1	18+00.00	477857.3483	1993448.4542
621	RPC1	19+00.00	477955.4298	1993467.9300
622	RPC1	20+00.00	478053.6241	1993486.8476
623	RPC1	20+83.25	478135.3714	1993502.5966

Point #	Chain	Station	Northing (Y)	Easting (X)

Point #	Chain	Station	Northing (Y)	Easting (X)

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

PAVEMENT SCHEDULE

C1	PROP. APPROX. 1.5″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	E4	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5″ IN DEPTH OR LESS THAN 3″ IN DEPTH
C2	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	J1	PROP. 3″ AGGREGATE BASE COURSE(ABC)
C3	PROP. APPROX. 3″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5C, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	J2	PROP. VARIABLE AGGREGATE BASE COURSE (ABC)
C4	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS.	R1	1′-6″ CONCRETE CURB AND GUTTER
C5	PROP. APPROX. 2″ ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.	R2	2′-6″ CONCRETE CURB AND GUTTER
D1	PROP. APPROX. 2.5″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	R3	CONCRETE SHOULDER BERM GUTTER
D2	PROP. APPROX. 4″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	R4	SINGLE FACED CONCRETE BARRIER
D3	PROP. APPROX. 3.5″ ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0C, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.	R5	5″ MONOLITHIC ISLAND
D4	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2.5″ IN DEPTH OR GREATER THAN 4″ IN DEPTH.	R6	EXPRESSWAY GUTTER
E1	PROP. APPROX. 4″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.	T	EARTH MATERIAL
E2	PROP. APPROX. 5.5″ ASPHALT CONCRETE BASE COURSE, TYPE B25.0C, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.	U	EXISTING PAVEMENT
E3	PROP. VARIABLE DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1″ DEPTH, TO BE PLACED IN LAYERS NOT GREATER THAN 5.5″ IN DEPTH OR LESS THAN 3″ IN DEPTH	V	MILLED RUMBLE STRIPS
		W	VAR. DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAILS)

ALL PAVEMENT SLOPES ARE 1:1 UNLESS OTHERWISE NOTED.

REVISIONS

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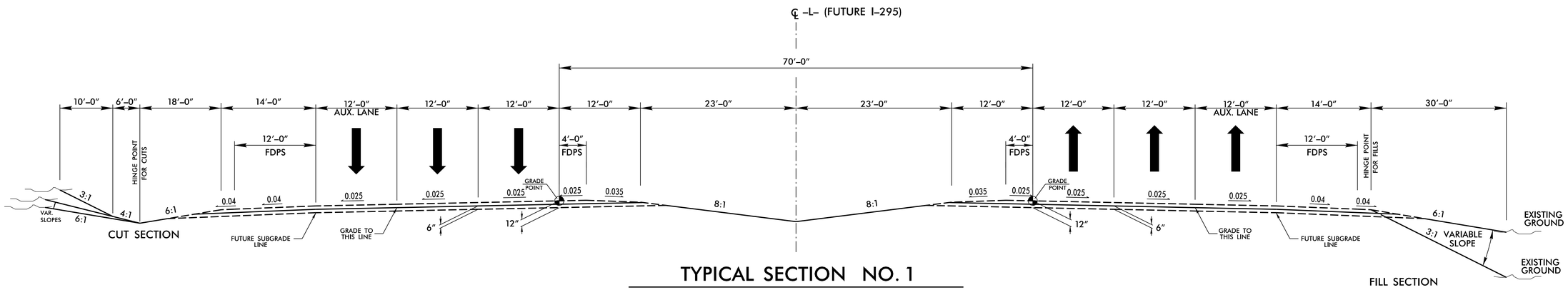
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



TYPICAL SECTION NO. 1

-L- STA. 580+00.00 TO 587+59.50 (BEGIN BRIDGE) (GRADING ONLY)
-L- STA. 592+53.71 (END BRIDGE) TO 604+13.61 (GRADING ONLY)

NOTE: PER U-2519BB/CA COORDINATION MEETING 2/16/2017, BEGIN PROJECT LIMITS TO BE REVISED TO -L- STA. 575+50. R.O.W. CORRIDOR TO REMAIN CONSITENT 350' (175' LT & RT), PAVING LIMITS WILL BE EXTENDED TO THE FULL LENGTH OF THE PROJECT LIMTS.

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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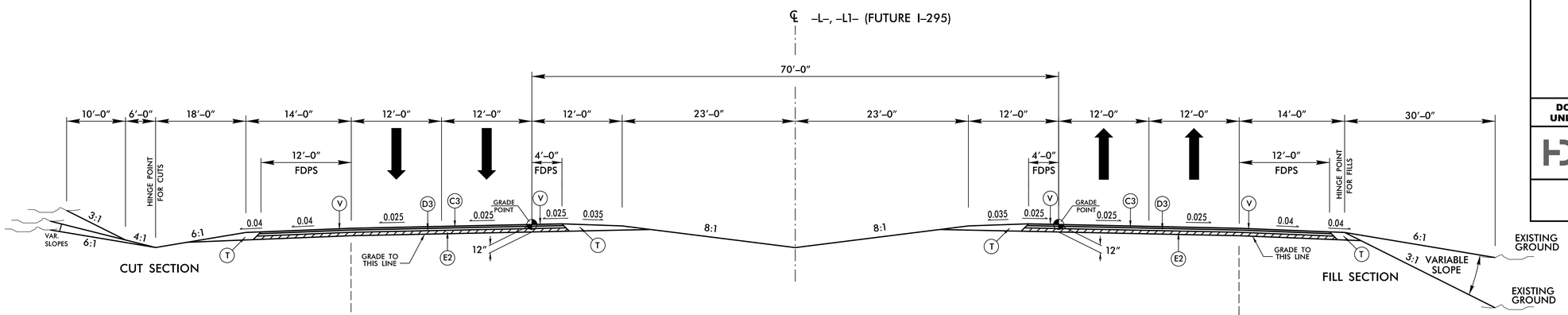
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

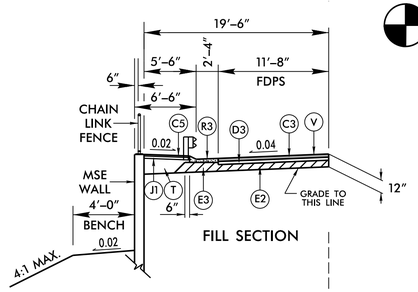
BARNHILL CONTRACTING COMPANY



TYPICAL SECTION NO. 2

-L- STA. 627+22.27 (END BRIDGE) TO 650+75.45 (BEGIN BRIDGE)
-L- STA. 652+78.00 (END BRIDGE) TO 745+08.65

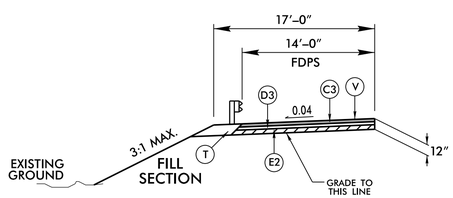
-L1- STA. 743+03.78 TO 777+80.00 (U-2519CB - PAVING ONLY, LT)
-L1- STA. 743+03.78 TO 760+00.00 (U-2519CB - PAVING ONLY, RT)



TYPICAL SECTION NO. 2A

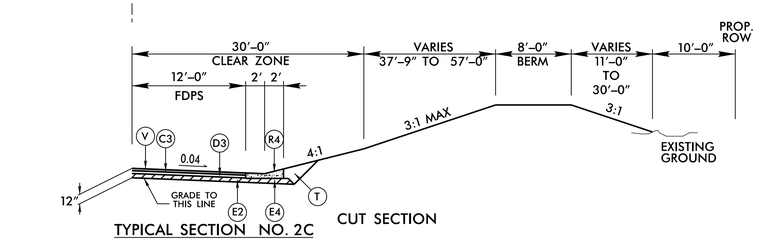
FILL RETAINING WALL DETAIL

-L- STA. 626+92.00 +/- (LT) TO 632+75.00 (LT)
-L- STA. 627+38.62 +/- (RT) TO 630+75.00 (RT)



TYPICAL SECTION NO. 2B

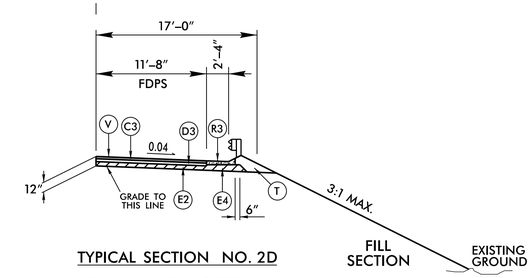
GUARDRAIL WIDENING &
FULL-DEPTH PAVED SHOULDERS
(SEE PLANS FOR LOCATIONS)



TYPICAL SECTION NO. 2C

NOISE BERM DETAIL

-L- APPROX. STA. 674+50.00 (RT) TO APPROX. 685+85.00(RT)



TYPICAL SECTION NO. 2D

SHOULDER BERM GUTTER &
FULL-DEPTH PAVED SHOULDERS
(SEE PLANS FOR SBG LOCATIONS)

PAVEMENT SCHEDULE

C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

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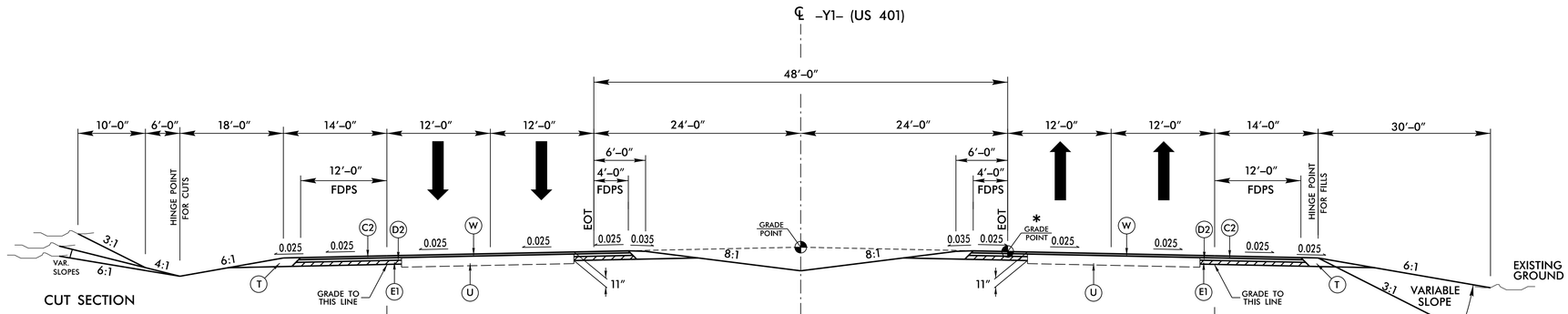
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

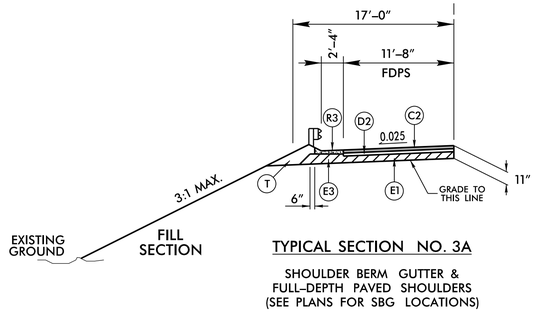
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



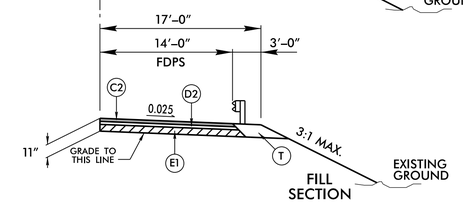
TYPICAL SECTION NO. 3

-Y1- STA. 15+40.00 TO 33+50.00
*-Y1- STA. 29+90.00 TO 33+50.00 (RT)



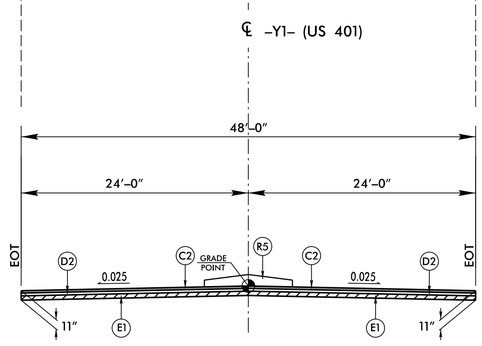
TYPICAL SECTION NO. 3A

SHOULDER BERM GUTTER & FULL-DEPTH PAVED SHOULDERS (SEE PLANS FOR SBG LOCATIONS)



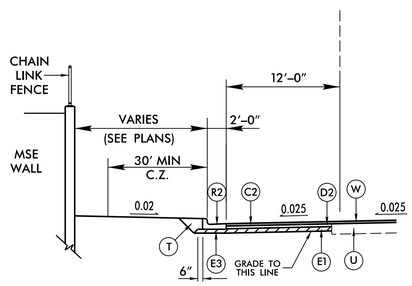
TYPICAL SECTION NO. 3B

GUARDRAIL WIDENING & FULL-DEPTH PAVED SHOULDERS (SEE PLANS FOR GUARDRAIL LOCATIONS)



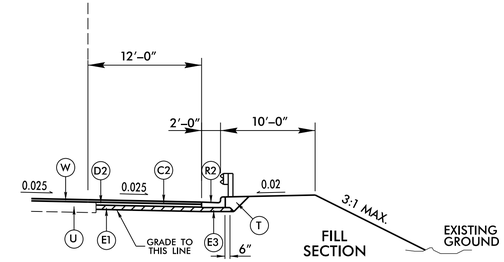
TYPICAL SECTION NO. 3E

LEFT TURN SPUI LOCATION
-Y1- STA. 27+42.93 TO 30+05.03
(SEE PLANS FOR ISLAND LOCATIONS)



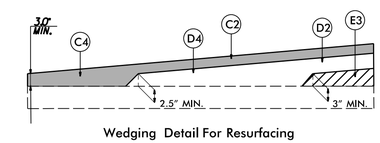
TYPICAL SECTION NO. 3C

CURB & GUTTER
FULL-DEPTH PAVED SHOULDERS
(SEE PLANS FOR C&G LOCATIONS)



TYPICAL SECTION NO. 3D

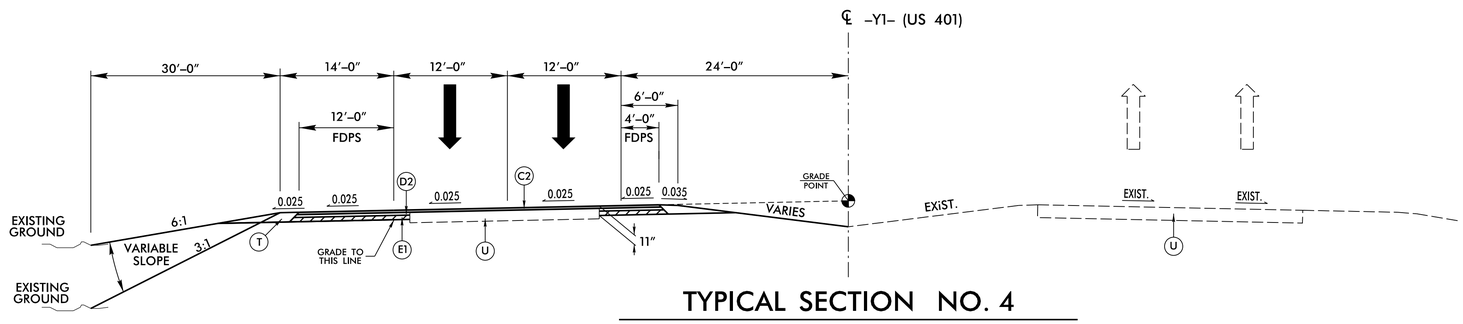
CURB & GUTTER w/GUARDRAIL
FULL-DEPTH PAVED SHOULDERS
(SEE PLANS FOR C&G LOCATIONS)



Wedging Detail For Resurfacing

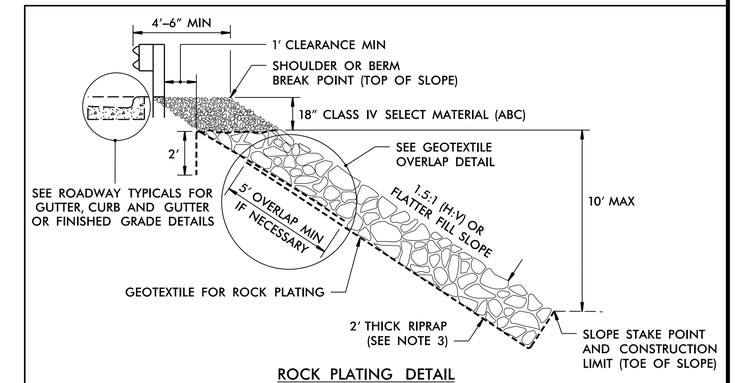
PAVEMENT SCHEDULE

C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING



TYPICAL SECTION NO. 4

US 401
-Y1- STA. 33+50.00 TO 41+70.00 (LT)



ROCK PLATING DETAIL

(SEE PLANS FOR ROCK PLATING LOCATIONS)
-Y1- STA. 34+00 TO 39+50 (LT)

REVISIONS

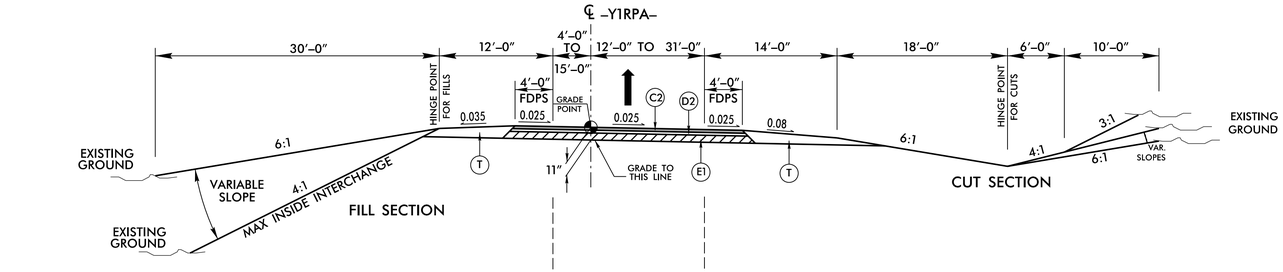
PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 10:46:19 AM
FILE: North_Carolina_Dept_of_Transportation\U_2519CA_Fayetteville_Outer_Loop\6.0_CAD_BIM\6.2_Work_in_Progress\U-2519CA_B-5516\Roadway\Proj\U2519CA_B5516_RDY_TYP.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

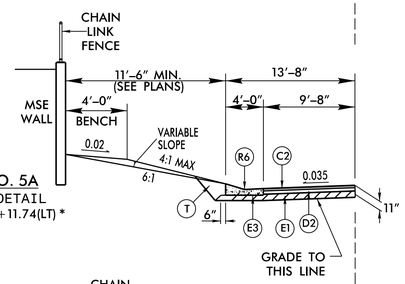
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

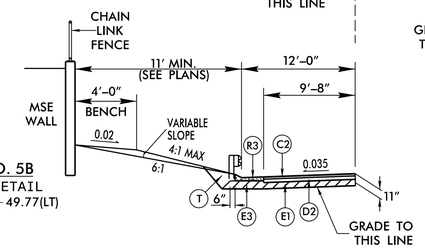


TYPICAL SECTION NO. 5

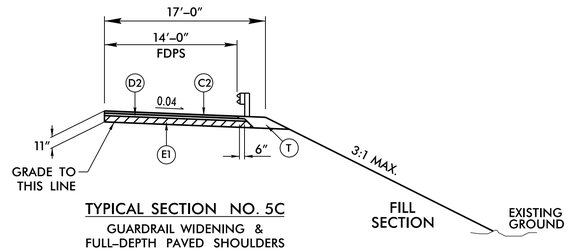
-Y1RPA- STA. 14+68.68 TO 23+49.77



TYPICAL SECTION NO. 5A
FILL RETAINING WALL DETAIL
-Y1RPA STA. 17+74.91 (LT) 20+11.74(LT) *

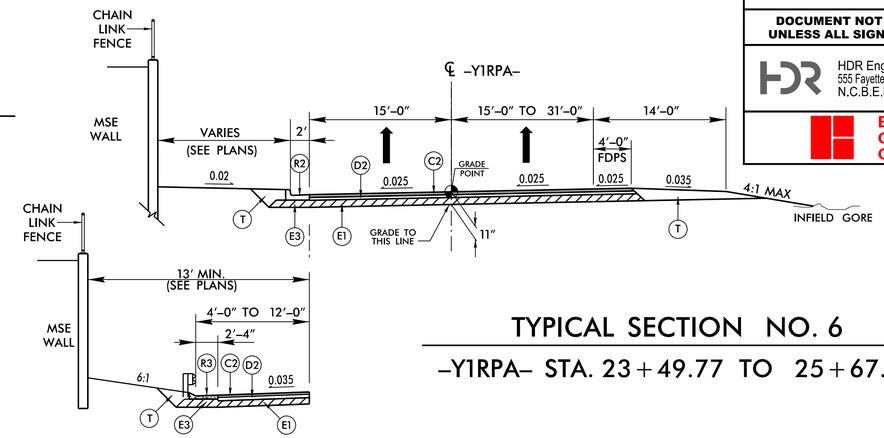


TYPICAL SECTION NO. 5B
FILL RETAINING WALL DETAIL
-Y1RPA STA. *20+11.74 (LT) 23+49.77(LT)



TYPICAL SECTION NO. 5C
GUARDRAIL WIDENING & FULL-DEPTH PAVED SHOULDERS

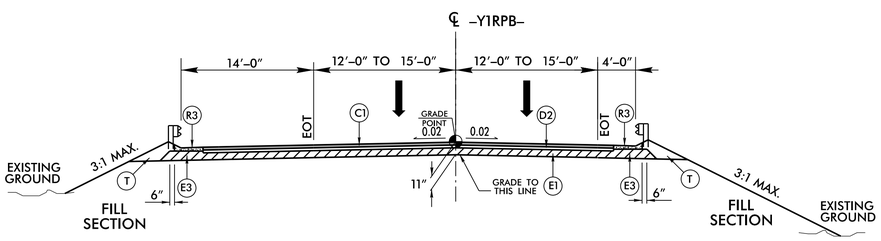
*SEE STD. 846.01 FOR TRANSITION BETWEEN EXPRESSWAY GUTTER AND SHOULDER BERM GUTTER



TYPICAL SECTION NO. 6

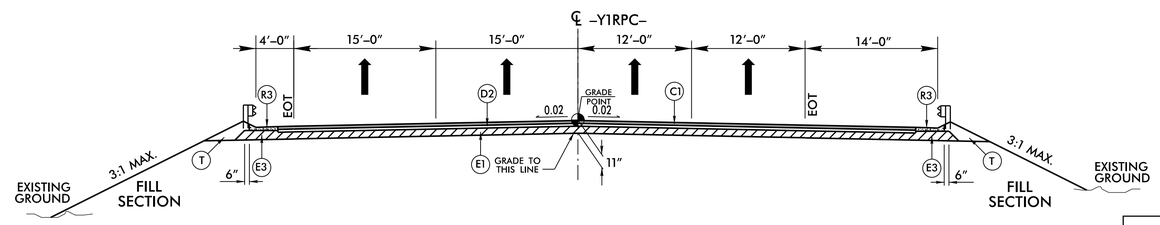
-Y1RPA- STA. 23+49.77 TO 25+67.25

TYPICAL SECTION NO. 6A
FILL RETAINING WALL DETAIL
-Y1RPA STA. 23+49.77 (LT) 24+68.20(LT)
NOTE: TRANSITION SBG TO C&G. SEE SPECIAL DETAIL 2C-?.



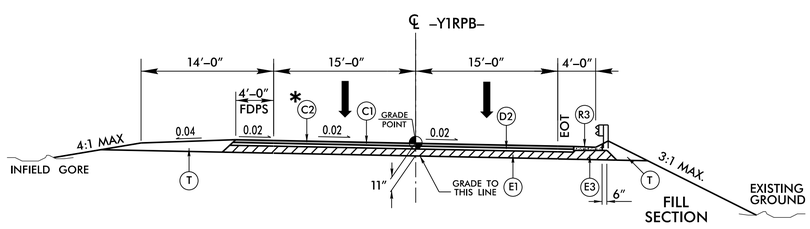
TYPICAL SECTION NO. 7

-Y1RPB- STA. 21+48.49 TO 23+05.26



TYPICAL SECTION NO. 8

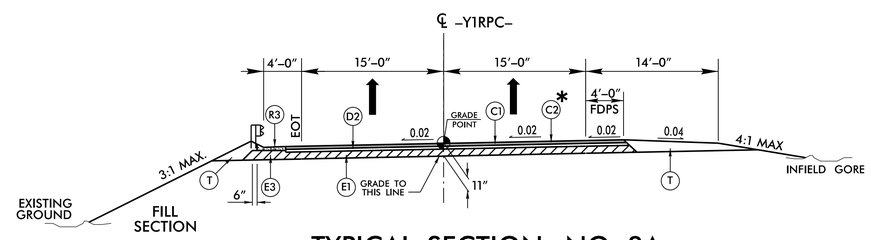
-Y1RPC- STA. 25+34.66 TO 26+16.25



TYPICAL SECTION NO. 7A

-Y1RPB- STA. 23+05.26 TO 25+25.44

* -Y1RPB- STA. 25+25.44 TO 25+69.88



TYPICAL SECTION NO. 8A

-Y1RPC- STA. 26+16.25 TO 28+16.03

* -Y1RPC- STA. 26+16.25 TO 26+50.20

PAVEMENT SCHEDULE

C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

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USER: tbedenba DATE: 2/17/2017 TIME: 10:46:20 AM
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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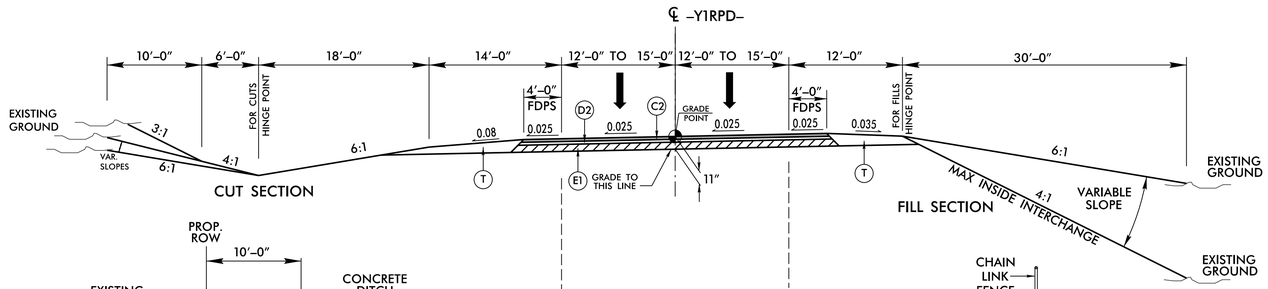
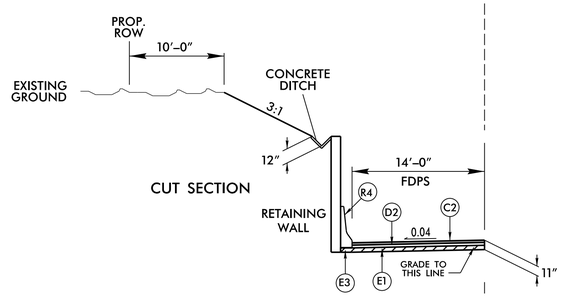
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



CUT SECTION

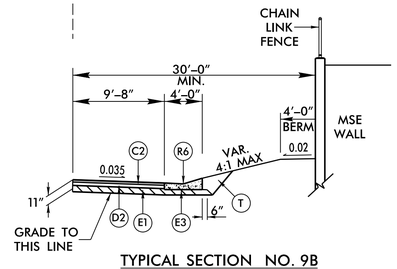
FILL SECTION



CUT SECTION

RETAINING WALL

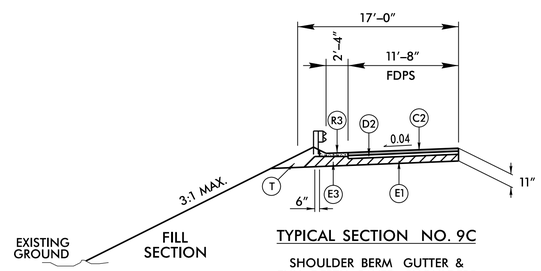
TYPICAL SECTION NO. 9A
CUT RETAINING WALL DETAIL
-Y1RPD- APPROX. STA. 11+40.00 (LT) TO
APPROX. 19+00.00 (LT)



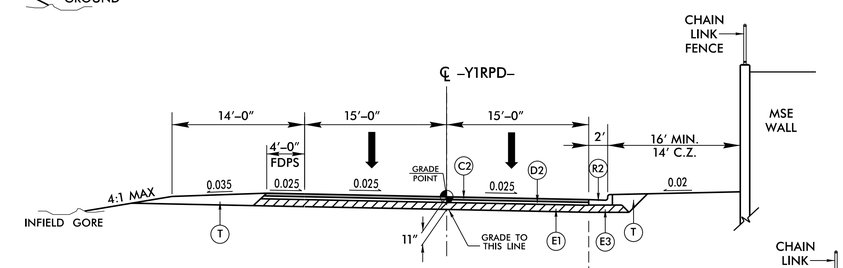
TYPICAL SECTION NO. 9B
FILL RETAINING WALL DETAIL
-Y1RPD- STA. 19+50.00(RT) TO 23+32.20(RT)

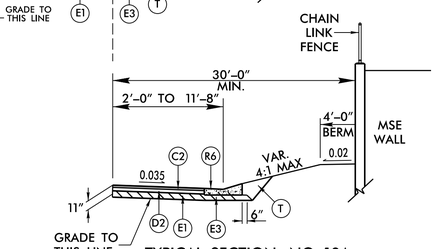
TYPICAL SECTION NO. 9

-Y1RPD- STA. 16+51.10 TO 23+32.20



TYPICAL SECTION NO. 9C
SHOULDER BERM GUTTER &
FULL-DEPTH PAVED SHOULDERS
-Y1RPD- STA. 19+50.00 TO 23+23+16.45

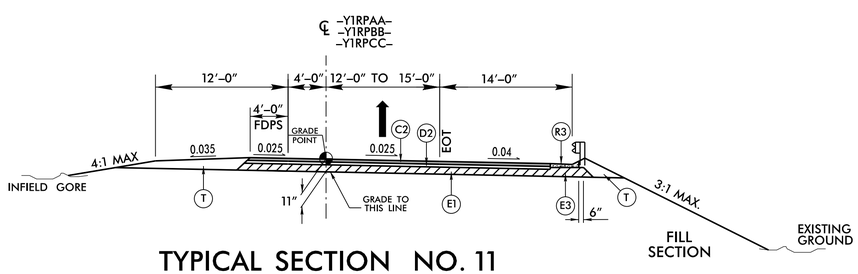




TYPICAL SECTION NO. 10A
FILL RETAINING WALL DETAIL
-Y1RPD- STA. 23+32.20(RT) TO 24+02.81(RT)*
*SEE STD. 846.01 FOR TRANSITION BETWEEN
EXPRESSWAY GUTTER AND 2'-6" CURB AND GUTTER

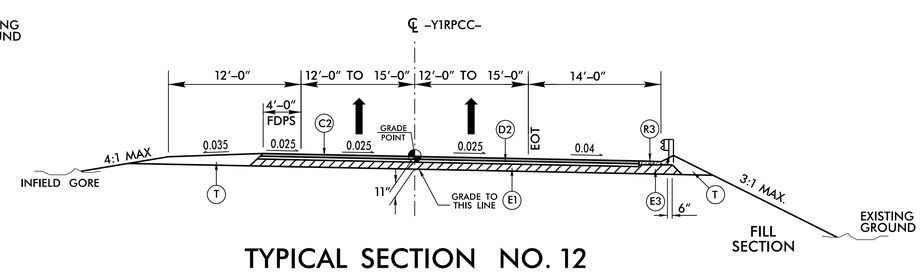
TYPICAL SECTION NO. 10

-Y1RPD- STA. 23+32.20 TO 25+79.97



TYPICAL SECTION NO. 11

-Y1RPAA- STA. 10+00.00 TO 13+03.48
-Y1RPBB- STA. 11+08.93 TO 14+05.49
-Y1RPDD- STA. 10+60.86 TO 12+84.73



TYPICAL SECTION NO. 12

-Y1RPCC- STA. 9+92.99 TO 13+30.04

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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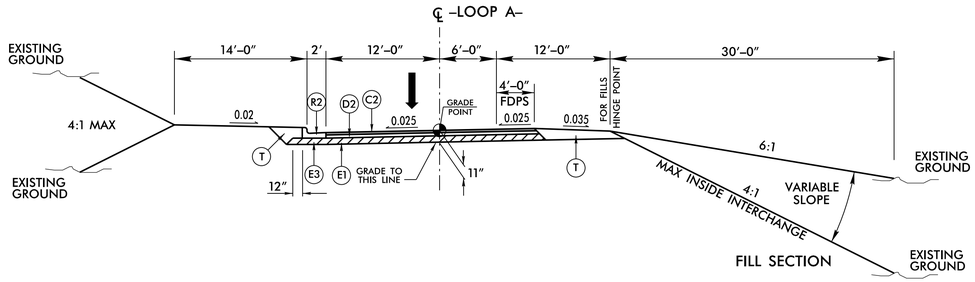
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

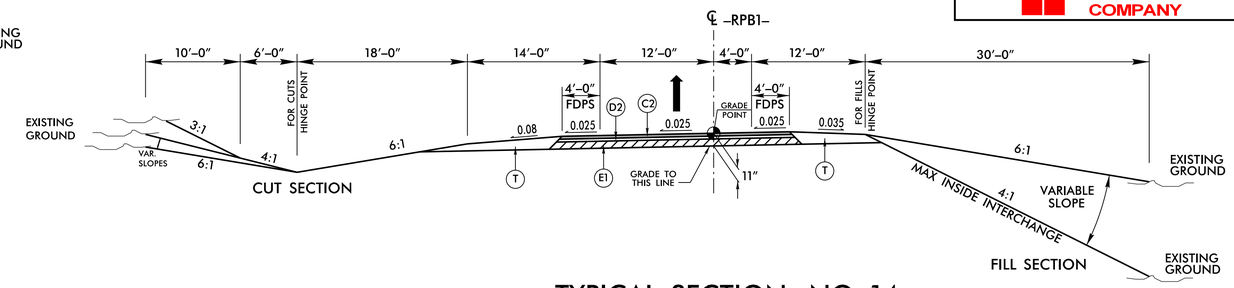
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



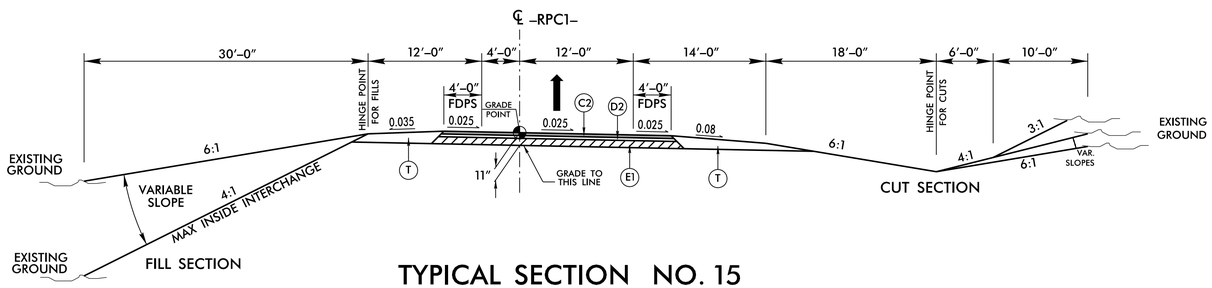
TYPICAL SECTION NO. 13

-LPA1- STA. 0+00.00 TO 9+97.84
(U-2519CB - PAVING ONLY)



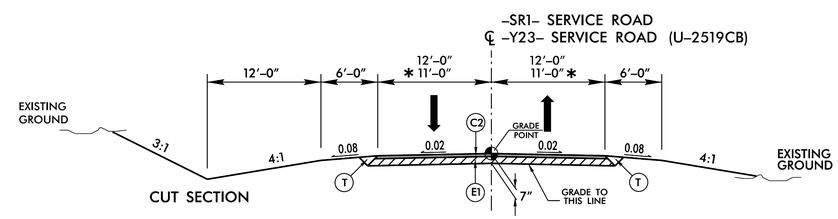
TYPICAL SECTION NO. 14

-RPB1- STA. 0+00.00 TO 21+00.00
(U-2519CB - PAVING ONLY)



TYPICAL SECTION NO. 15

-RPC1- STA. 0+00.00 TO 18+41.34
(U-2519CB - PAVING ONLY)



TYPICAL SECTION NO. 17

-SR1- STA. 10+10.00 TO 94+75.68
* -Y23- STA. 95+72.42 TO 126+00.00 (U-2519CB - PAVING ONLY)

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

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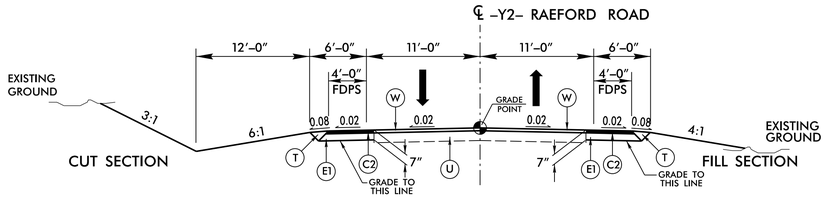
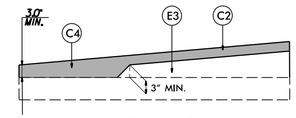
HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



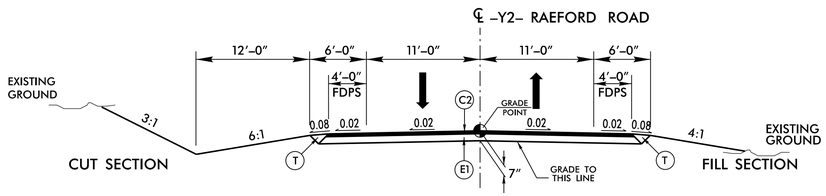
TYPICAL SECTION NO. 1

-Y2- STA. 13+75.00 TO 16+40.00
-Y2- STA. 18+10.00 TO 22+72.63



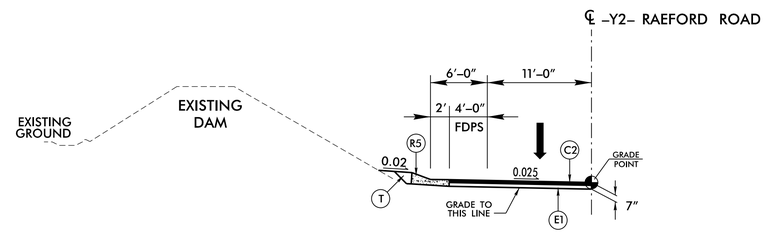
Wedging Detail for Resurfacing

(-Y2-) RAEFORD ROAD		
2015 ADT	12,500	TTST = 1%
2040 ADT	1,800	DUALS = 2%
		DHV = 11%
		DIR = 55%



TYPICAL SECTION NO. 2

-Y2- STA. 16+40.00 TO 16+87.88 (BEGIN BRIDGE)
-Y2- STA. 17+60.13 (END BRIDGE) TO 18+10.00



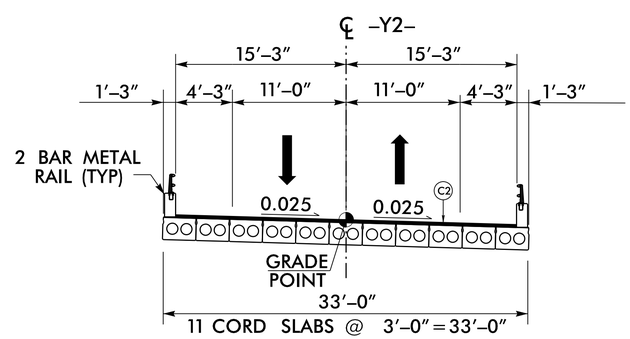
DETAIL NO. 1A

EXPRESSWAY GUTTER DETAIL

USE IN CONJUNCTION WITH TYPICAL No.1 & 2

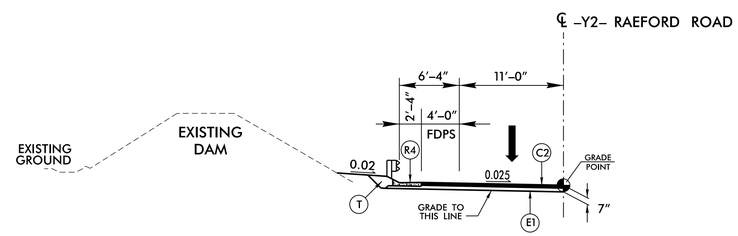
-Y2- STA. 15+20.00+/- TO 15+68.00+/- (LT)*
-Y2- STA. 18+80.00+/- TO 21+87.50+/- (LT)

RAEFORD RD OVER BONES CREEK / LAKE RIM DAM SPILLWAY



TYPICAL SECTION NO. 3

-Y2- FUNCTIONAL CLASS. = SUB-REGIONAL TIER
CORED SLAB BRIDGE
-Y2- STA. 16+87.88 TO 17+60.13



DETAIL NO. 1B

SHOULDER BERM GUTTER DETAIL

USE IN CONJUNCTION WITH TYPICAL No.1 & 2

-Y2- STA. 16+08.00+/- TO 16+76.88+/- (LT)
-Y2- STA. 17+71.13+/- TO 18+40.00+/- (LT)*
-Y2- STA. 16+58.00+/- TO 16+76.88+/- (RT)
-Y2- STA. 17+71.13+/- TO 17+90.00+/- (RT)

*SEE STD. 846.01 FOR TRANSITION BETWEEN EXPRESSWAY GUTTER AND SHOULDER BERM GUTTER

PAVEMENT SCHEDULE	
C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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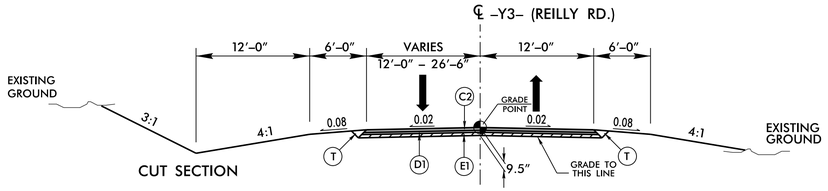
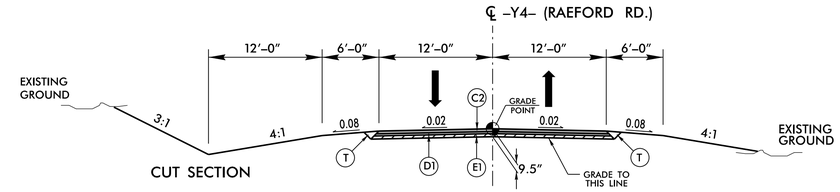


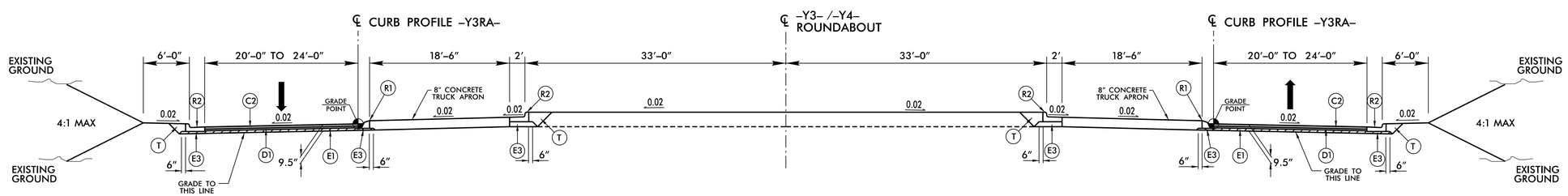
TYPICAL SECTION NO. 18

-Y3- STA. 10+55.00 TO 13+55.00



TYPICAL SECTION NO. 19

-Y4- STA. 10+55.00 TO 12+90.00



TYPICAL SECTION NO. 20

RAEFORD RD./REILLY RD. ROUNDABOUT
INTERSECTION OF -Y3- & -Y4-

PAVEMENT SCHEDULE

C1	1.5" S9.5B
C2	3" S9.5B
C3	3" S9.5C
C4	VAR. S9.5B
C5	2" S9.5B
D1	2.5" I19.0B
D2	4" I19.0B
D3	3.5" I19.0C
D4	VAR. I19.0B
E1	4" B25.0B
E2	5.5" B25.0C
E3	VAR. B25.0B
E4	VAR. B25.0C
J1	3" ABC
J2	VAR. ABC
R1	1'- 6" C & G
R2	2'- 6" C & G
R3	CONC. SBG
R4	SINGLE FACED CONC. BARRIER
R5	MONOLITHIC ISLAND
R6	EXPRESSWAY GUTTER
T	EARTH MATERIAL
U	EXISTING PAVEMENT
V	MILLED RUMBLE STRIPS
W	WEDGING

REVISIONS

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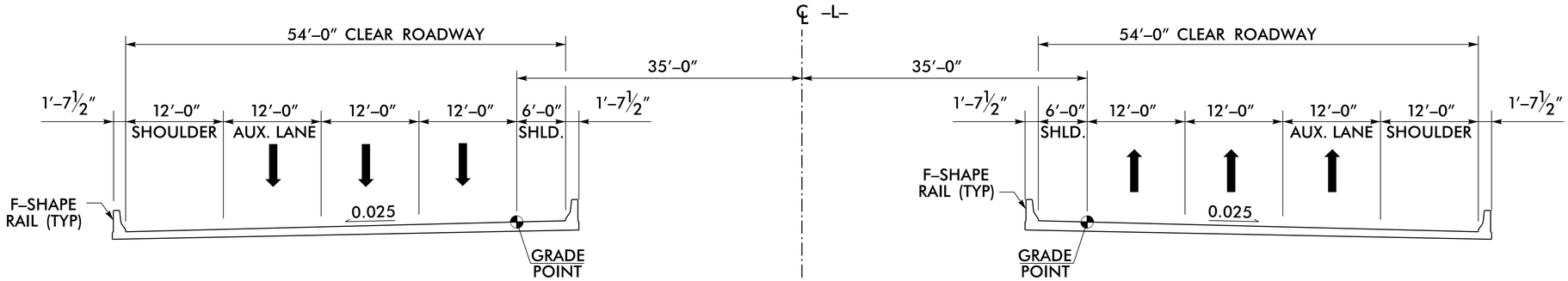
I–295 OVER LITTLE ROCKFISH CREEK



SITE #1 – TYPICAL SECTION NO. 1

–L– FUNCTIONAL CLASS. = FREEWAY/INTERSTATE
MINIMUM VERTICAL CLEARANCE BASED ON HYDRAULICS

(–L–) FUTURE I–295		
2015 ADT	36,000	TTST = 4%
2040 ADT	47,700	DUALS = 8%
		DHV = 8%
		DIR = 55%

SEE SHEET 2B–1 FOR BRIDGE SKETCH
SEE SHEET 2A–2 FOR APPROACH ROADWAY TYPICAL

PROJECT REFERENCE NO.	SHEET NO.
U–2519CA	2A–10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

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REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

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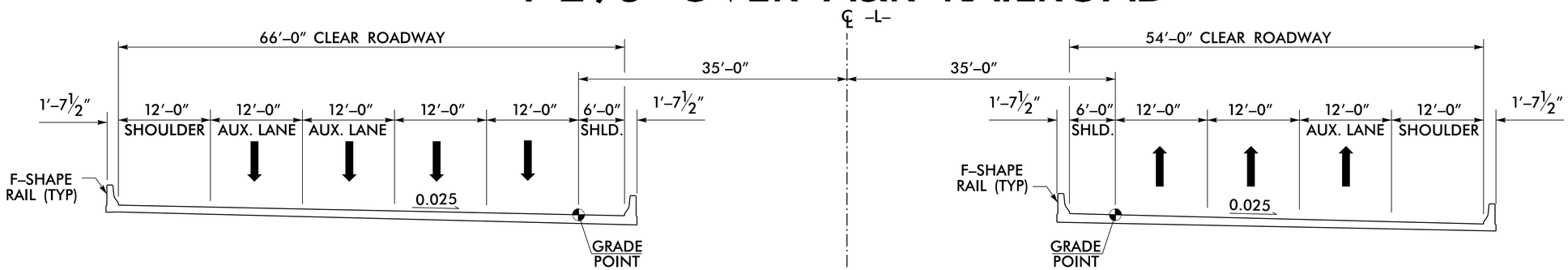
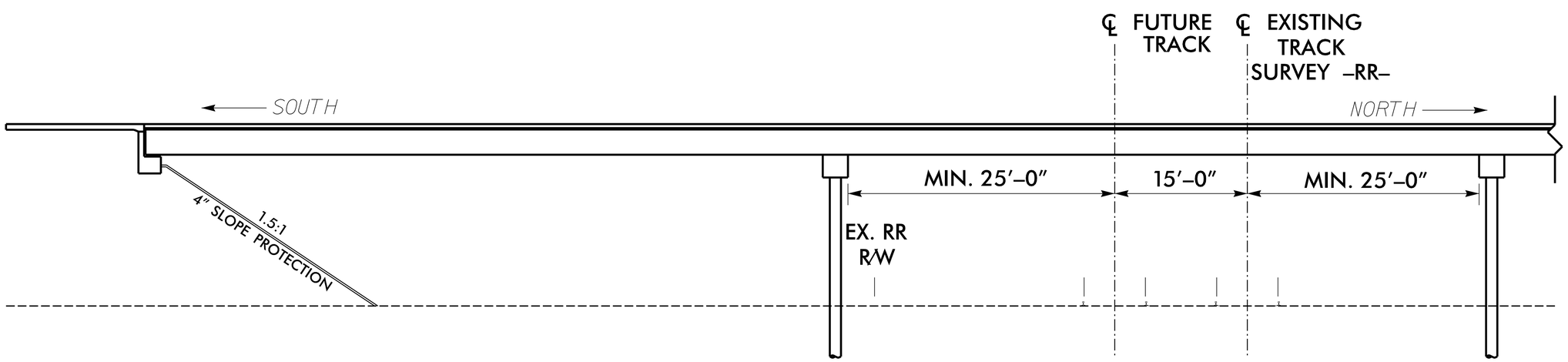
I-295 OVER A&R RAILROAD



SITE #2 – TYPICAL SECTION NO. 1

-L- FUNCTIONAL CLASS. = FREEWAY/INTERSTATE

(-L-) FUTURE I-295		
2015 ADT	36,000	TTST = 4%
2040 ADT	47,700	DUALS = 8%
		DHV = 8%
		DIR = 55%



SITE #2 – TYPICAL SECTION NO.2

ABERDEEN-ROCKFISH RR UNDER
PROPOSED I-295
MINIMUM VERTICAL CLEARANCE = 23'-0" (FUTURE & ACTUAL)
-L- FUNCTIONAL CLASS. = FREEWAY/INTERSTATE

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2A-2 FOR APPROACH ROADWAY TYPICAL

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

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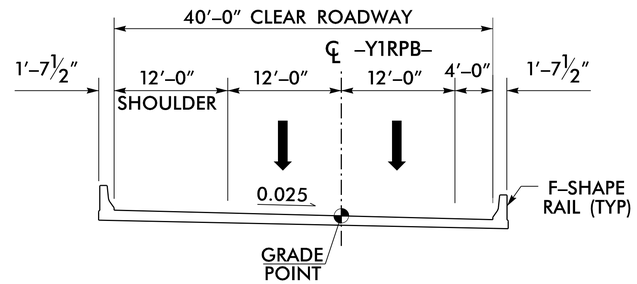
US 401 RAMPS OVER BONES CREEK

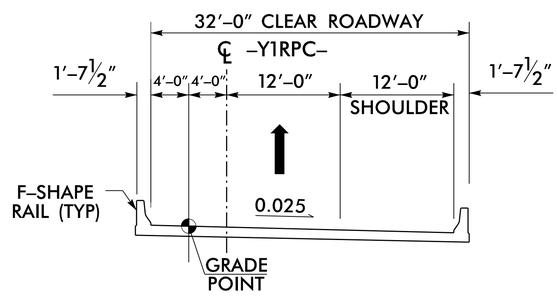


(-Y1RPB-) US 401 RAMP B	
2015 ADT	8,400
2040 ADT	13,100

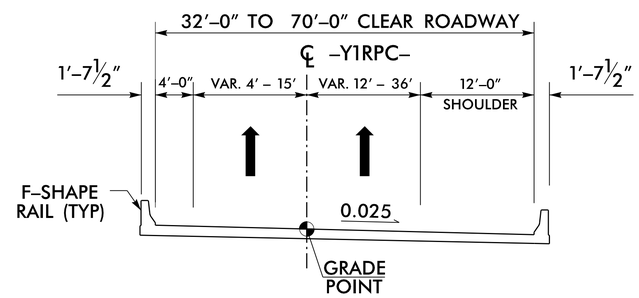
SITE #2 – TYPICAL SECTION NO. 3

-Y1RPB- FUNCTIONAL CLASS. = RAMP

MINIMUM VERTICAL CLEARANCE BASED ON HYDRAULICS



(-Y1RPC-) US 401 RAMP C	
2015 ADT	9,100
2040 ADT	13,600



SITE #2 – TYPICAL SECTION NO. 4

-Y1RPC- FUNCTIONAL CLASS. = RAMP

MINIMUM VERTICAL CLEARANCE BASED ON HYDRAULICS

SITE #2 – TYPICAL SECTION NO. 5

-Y1RPC- FUNCTIONAL CLASS. = RAMP

MINIMUM VERTICAL CLEARANCE BASED ON HYDRAULICS

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2A-5 FOR APPROACH ROADWAY TYPICAL

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2A-13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

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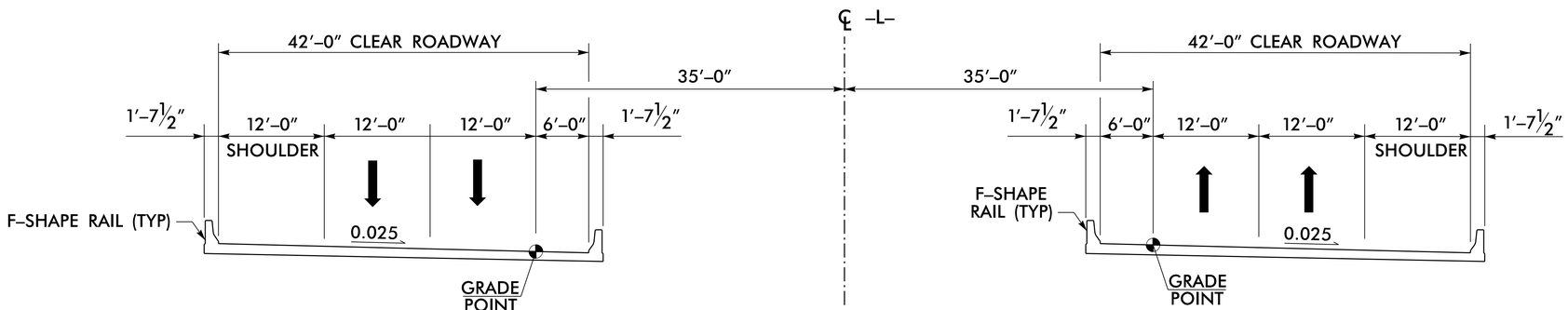
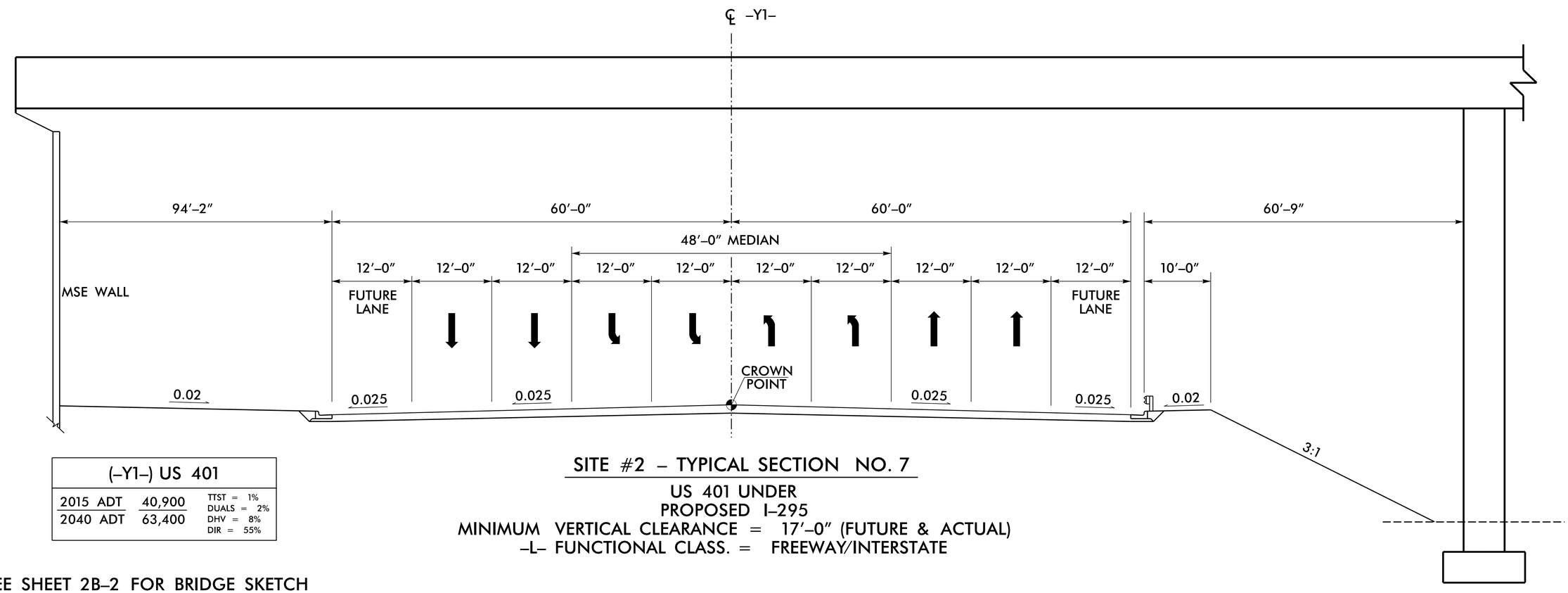
I-295 OVER US 401



SITE #2 – TYPICAL SECTION NO. 6

-L- FUNCTIONAL CLASS. = FREEWAY/INTERSTATE

(-L-) FUTURE I-295		
2015 ADT	36,000	TTST = 4%
2040 ADT	47,700	DUALS = 8%
		DHV = 8%
		DIR = 55%



(-Y1-) US 401		
2015 ADT	40,900	TTST = 1%
2040 ADT	63,400	DUALS = 2%
		DHV = 8%
		DIR = 55%

SITE #2 – TYPICAL SECTION NO. 7

US 401 UNDER
PROPOSED I-295
MINIMUM VERTICAL CLEARANCE = 17'-0" (FUTURE & ACTUAL)
-L- FUNCTIONAL CLASS. = FREEWAY/INTERSTATE

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2A-3 FOR APPROACH ROADWAY TYPICAL

REVISIONS

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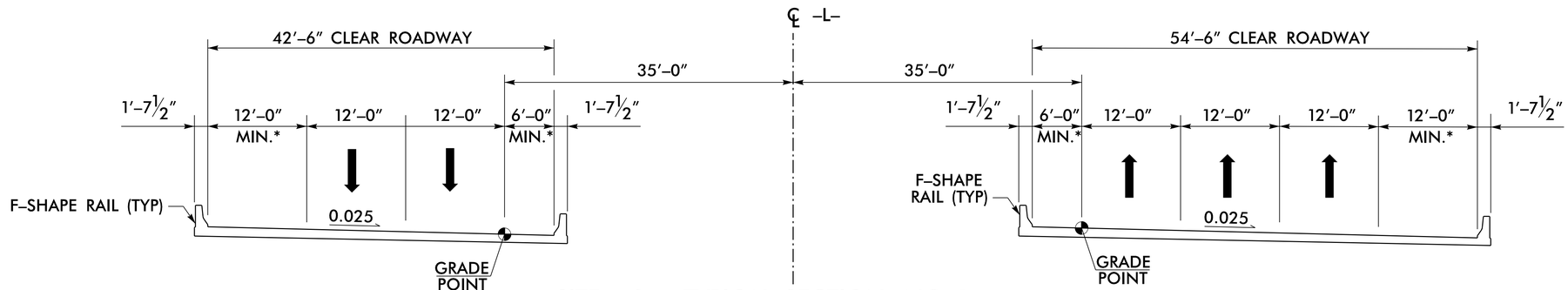
I–295 OVER TRIBUTARY TO LAKE RIM (BONES CREEK)



SITE #3 – TYPICAL SECTION NO. 1

–L– FUNCTIONAL CLASS. = FREEWAY/INTERSTATE
MINIMUM VERTICAL CLEARANCE BASED ON HYDRAULICS
* VARIABLE SHOULDER WIDTH ACCOMMODATES TANGENT BRIDGE CONSTRUCTION

(–L–) FUTURE I–295		
2015 ADT	36,000	TTST = 4%
2040 ADT	47,700	DUALS = 8%
		DHV = 8%
		DIR = 55%

PROJECT REFERENCE NO.	SHEET NO.
U–2519CA	2A–14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	

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BARNHILL CONTRACTING COMPANY

REVISIONS

SEE SHEET 2B–3 FOR BRIDGE SKETCH
SEE SHEET 2A–3 FOR APPROACH ROADWAY TYPICAL

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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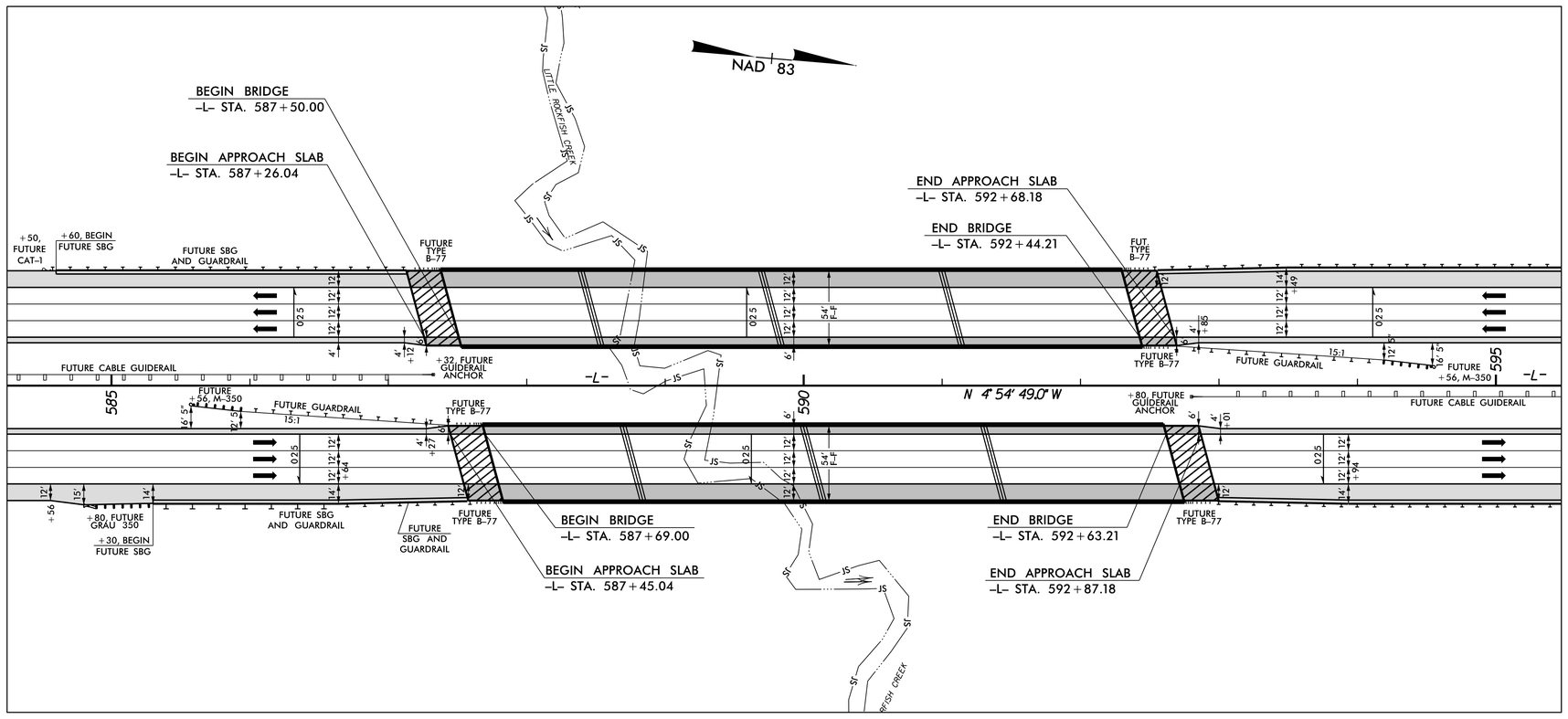

STRUCTURE SITE 1: -L- OVER LITTLE ROCKFISH CREEK (SEE PLAN SHEET 5)

REVISIONS

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

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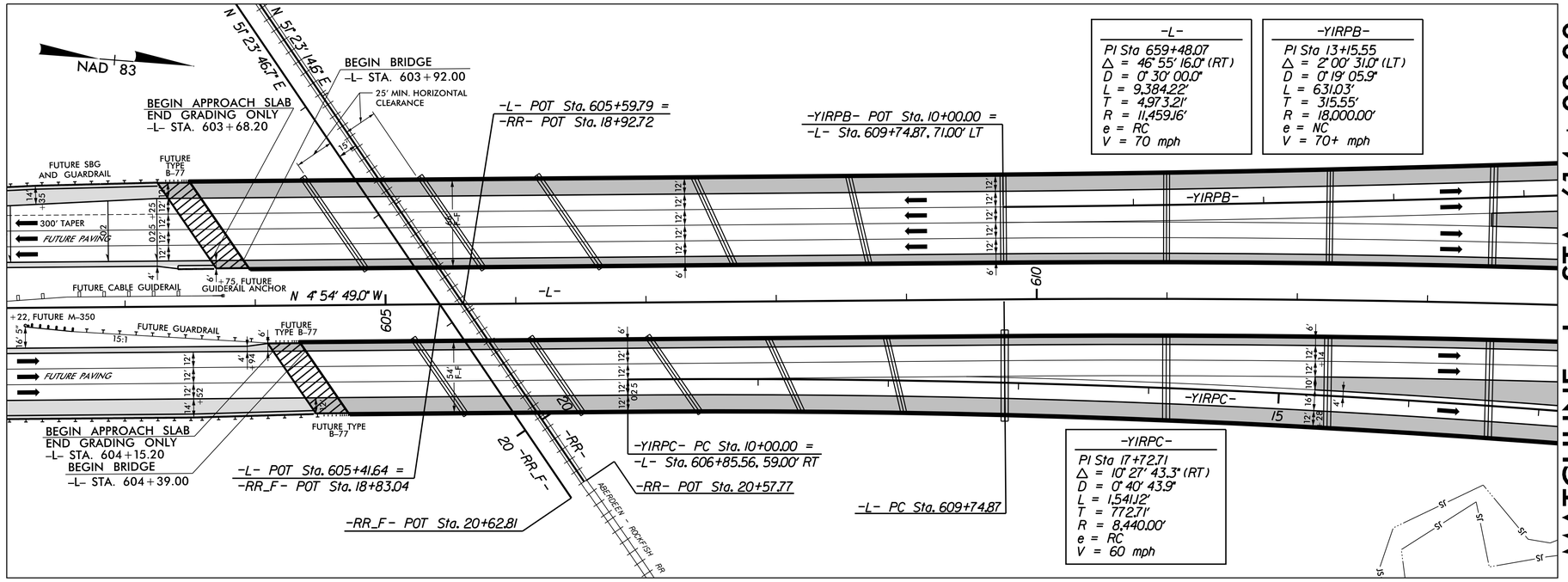
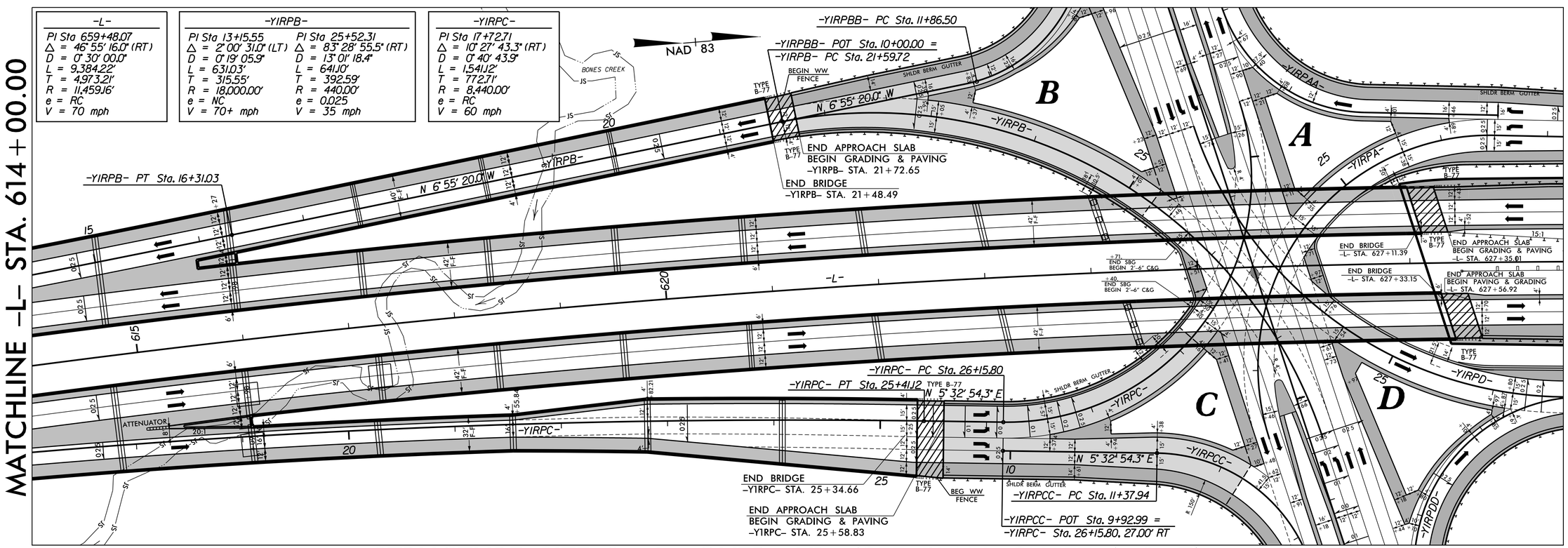


STRUCTURE SITE 2: -L- OVER A&R RAILROAD (SEE PLAN SHEET 6 & 7)



STRUCTURE SITE 2: -L- OVER -Y1- (SEE PLAN SHEET 6 & 7)

REVISIONS

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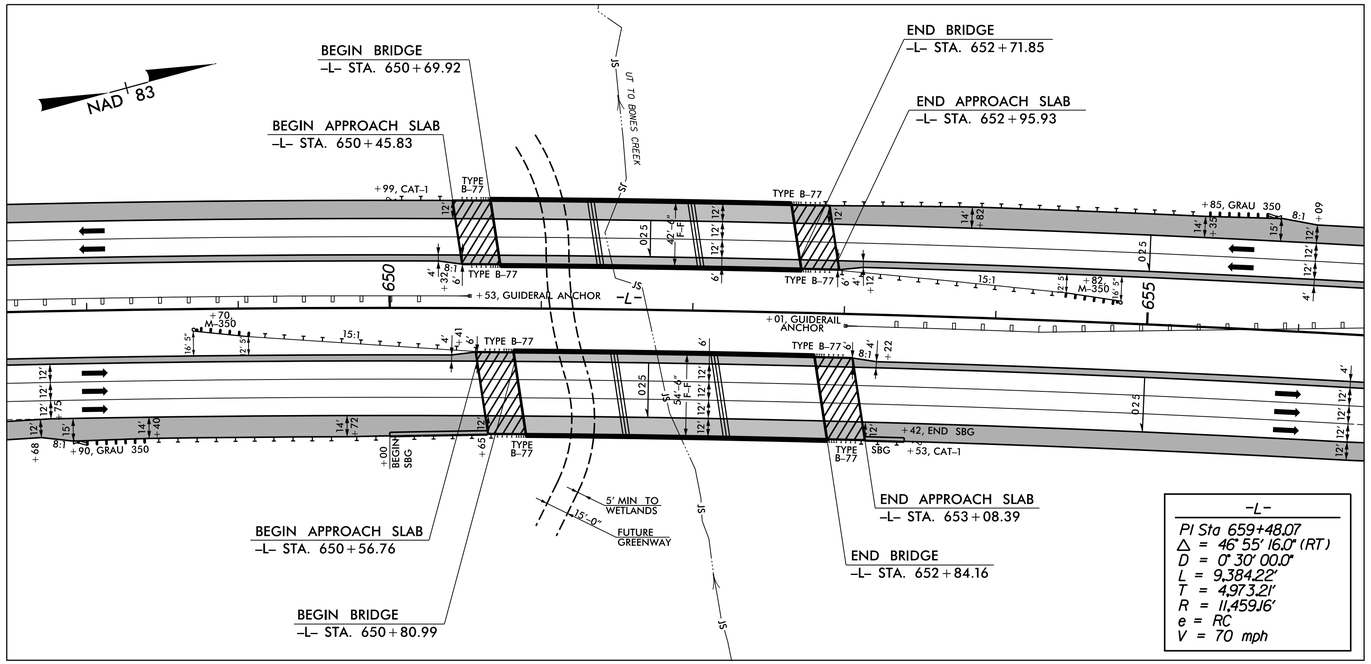

STRUCTURE SITE 3: –L– OVER BONES CREEK (SEE PLAN SHEET 8)

PROJECT REFERENCE NO.	SHEET NO.
U–2519CA	2B–3
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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REVISIONS

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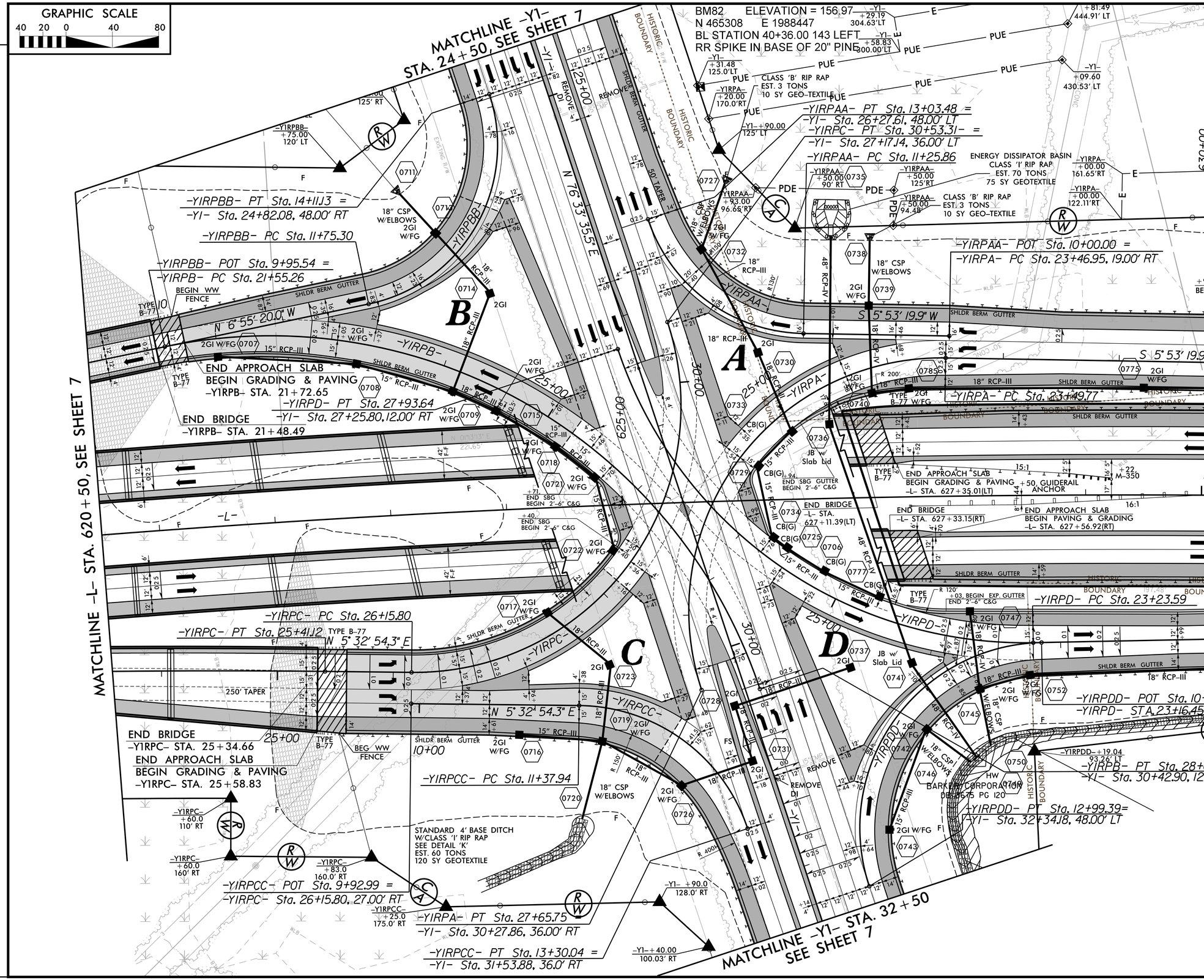

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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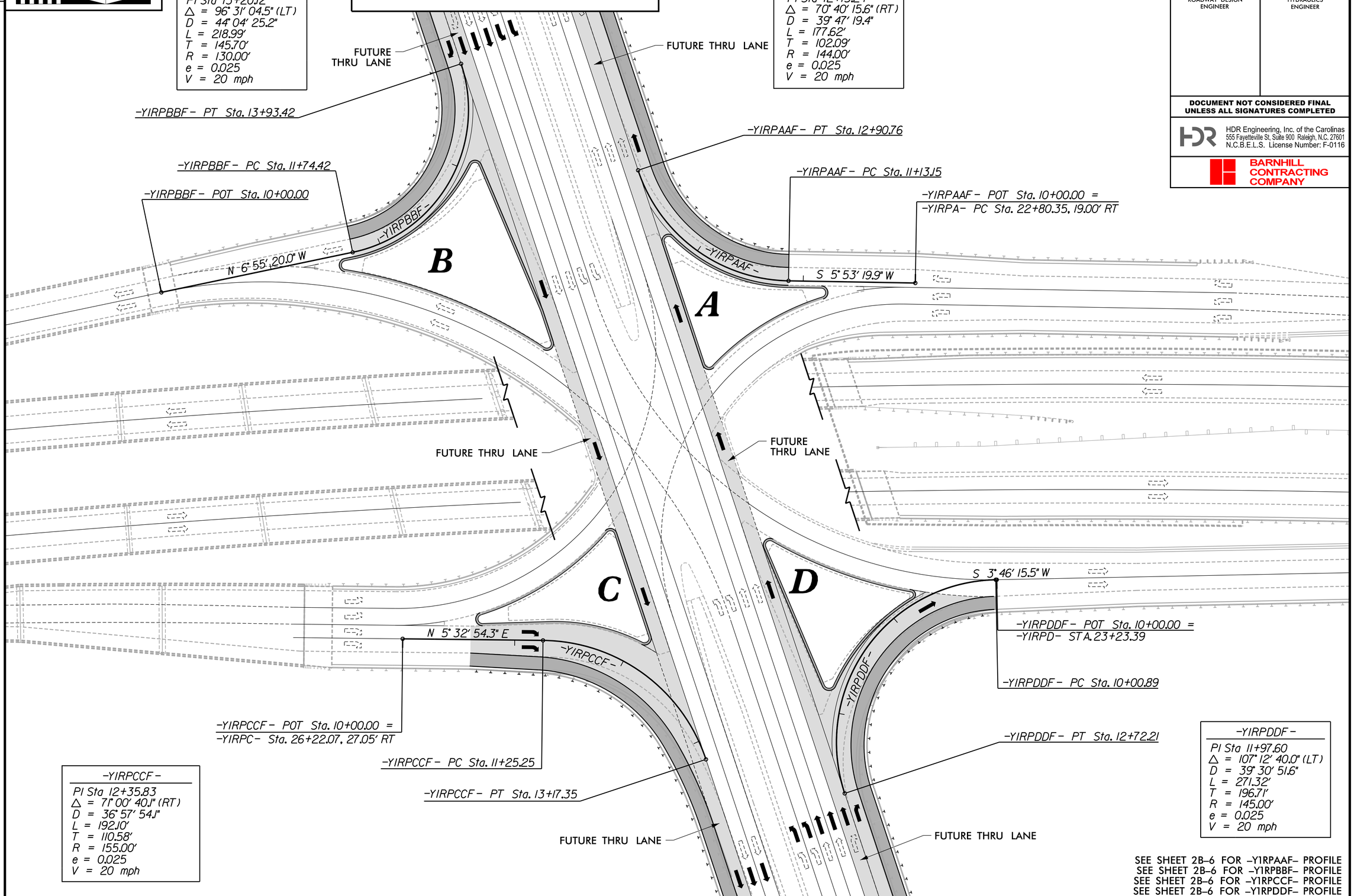
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

FUTURE SPUI ALIGNMENTS

GRAPHIC SCALE
40 20 0 40 80



SEE SHEET 2B-6 FOR -Y1RPAAF- PROFILE
SEE SHEET 2B-6 FOR -Y1RPBBF- PROFILE
SEE SHEET 2B-6 FOR -Y1RPCCF- PROFILE
SEE SHEET 2B-6 FOR -Y1RPDDF- PROFILE

REVISIONS

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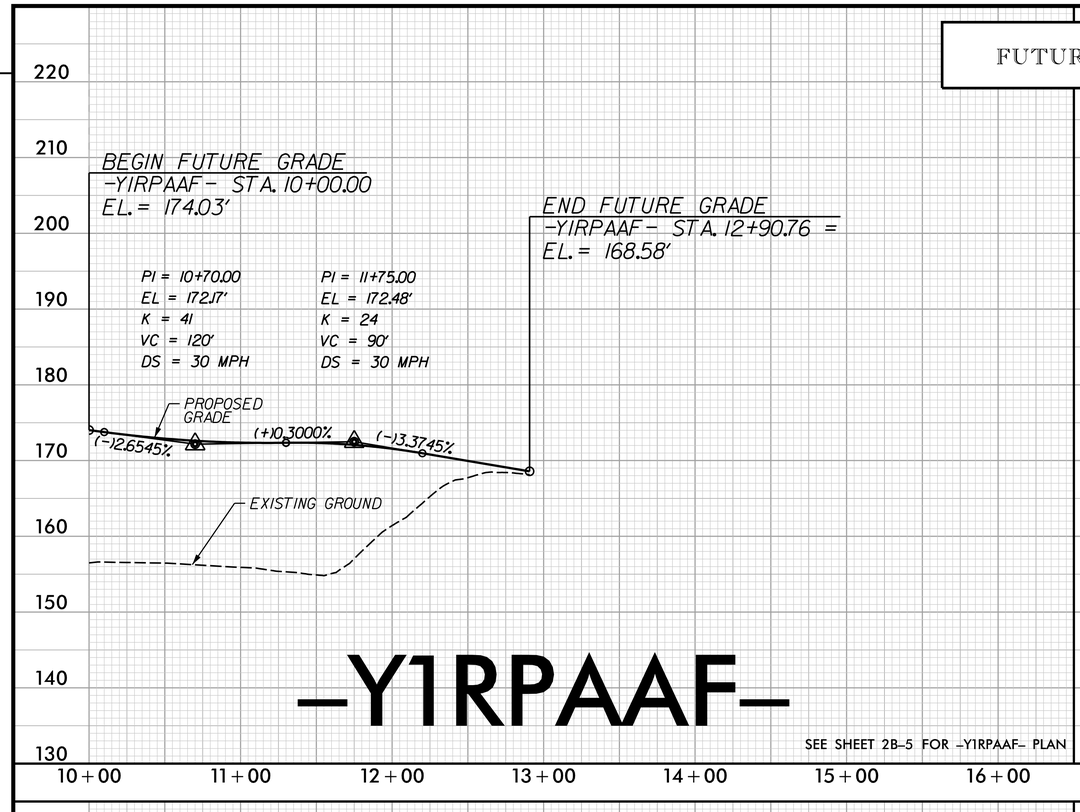
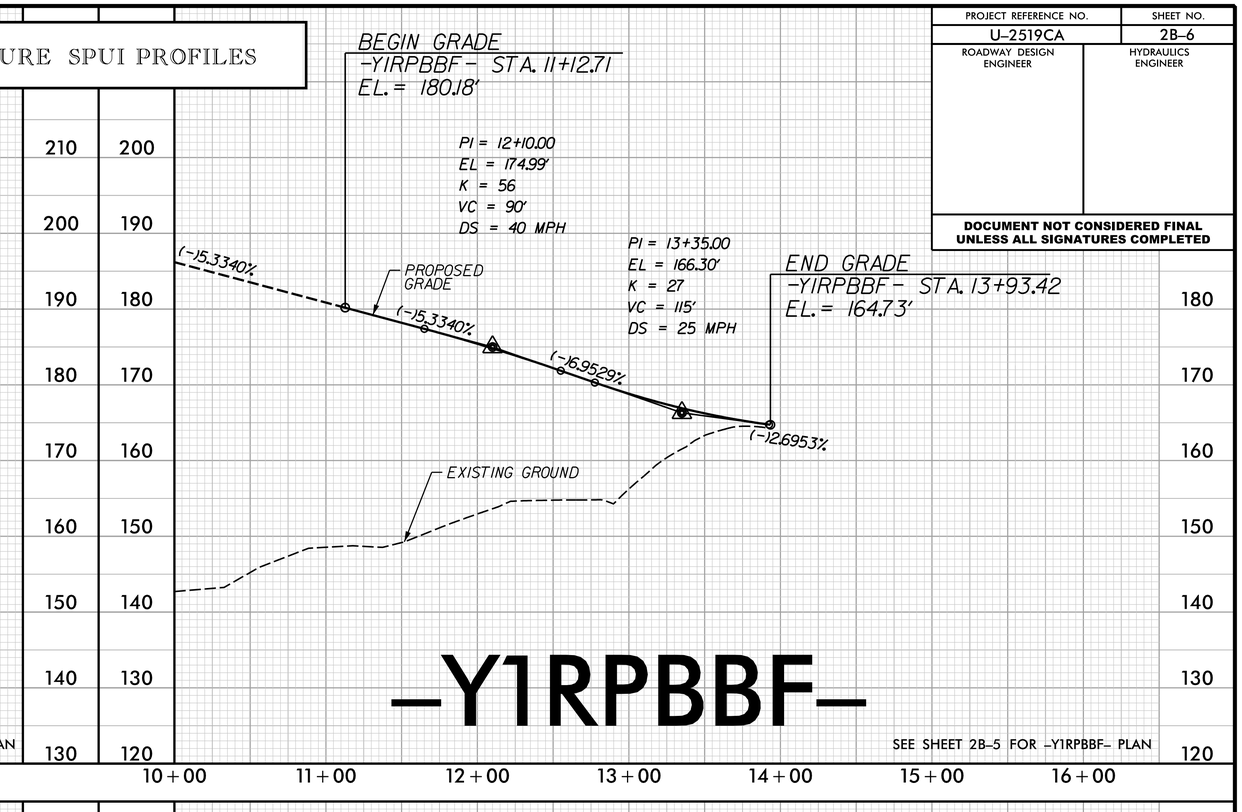
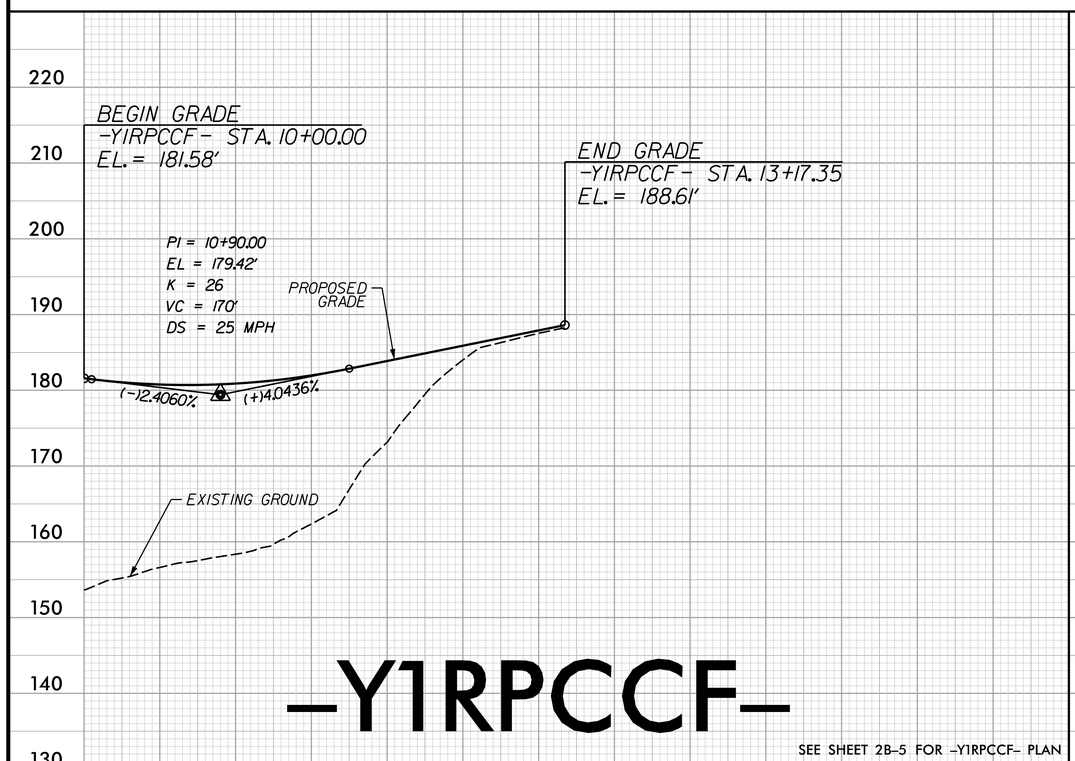
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

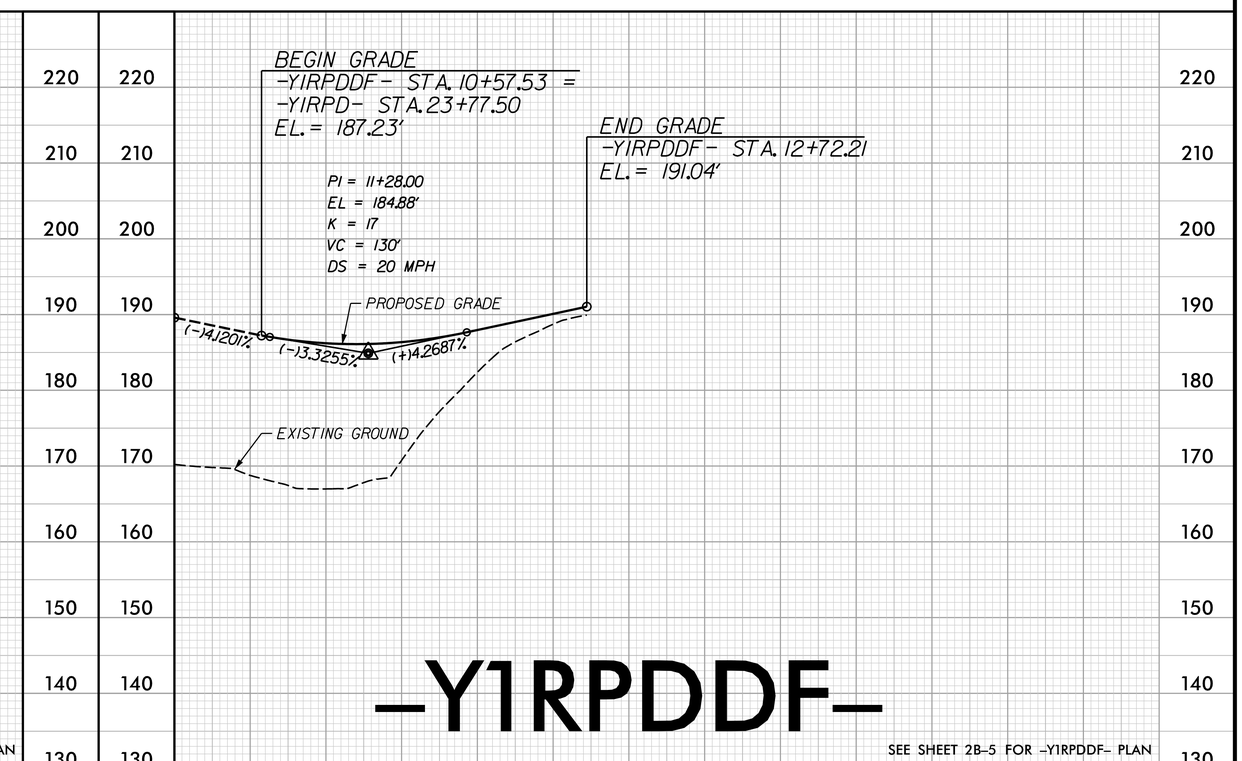
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

FUTURE SPUI PROFILES









REVISIONS

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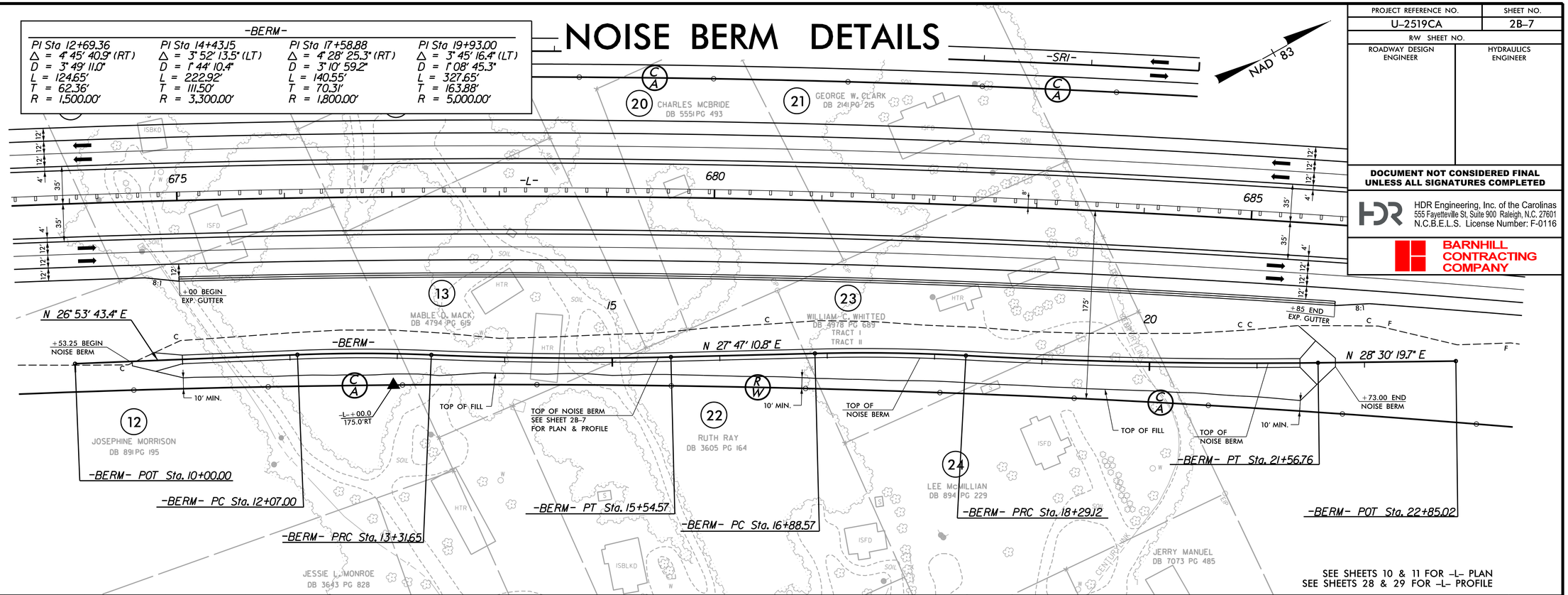
NOISE BERM DETAILS

-BERM-			
PI Sta 12+69.36	PI Sta 14+43.15	PI Sta 17+58.88	PI Sta 19+93.00
Δ = 4° 45' 40.9" (RT)	Δ = 3° 52' 13.5" (LT)	Δ = 4° 28' 25.3" (RT)	Δ = 3° 45' 16.4" (LT)
D = 3° 49' 11.0"	D = 1° 44' 10.4"	D = 3° 10' 59.2"	D = 1° 08' 45.3"
L = 124.65'	L = 222.92'	L = 140.55'	L = 327.65'
T = 62.36'	T = 111.50'	T = 70.31'	T = 163.88'
R = 1,500.00'	R = 3,300.00'	R = 1,800.00'	R = 5,000.00'



PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

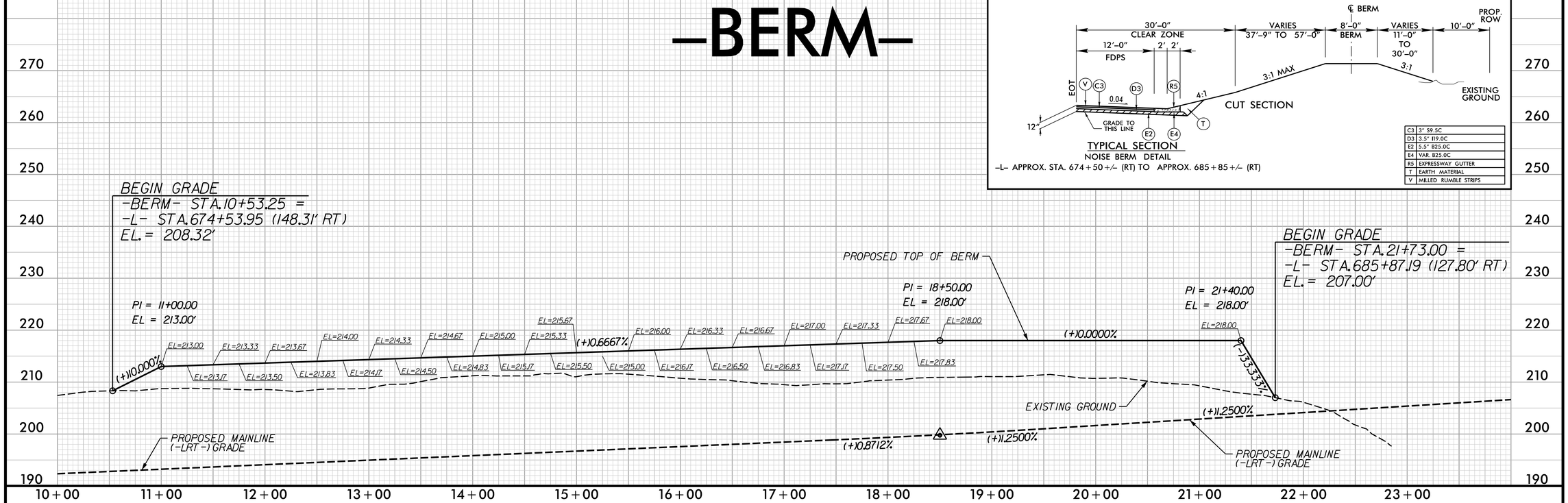
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

-BERM-

C3	3" S9.5C
D3	3.5" I19.0C
E2	5.5" B25.0C
E4	VAR. B25.0C
R5	EXPRESSWAY GUTTER
T	EARTH MATERIAL
V	MILLED RUMBLE STRIPS



REVISIONS

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8/17/99

MSE WALL DETAILS
–L_W_LT–

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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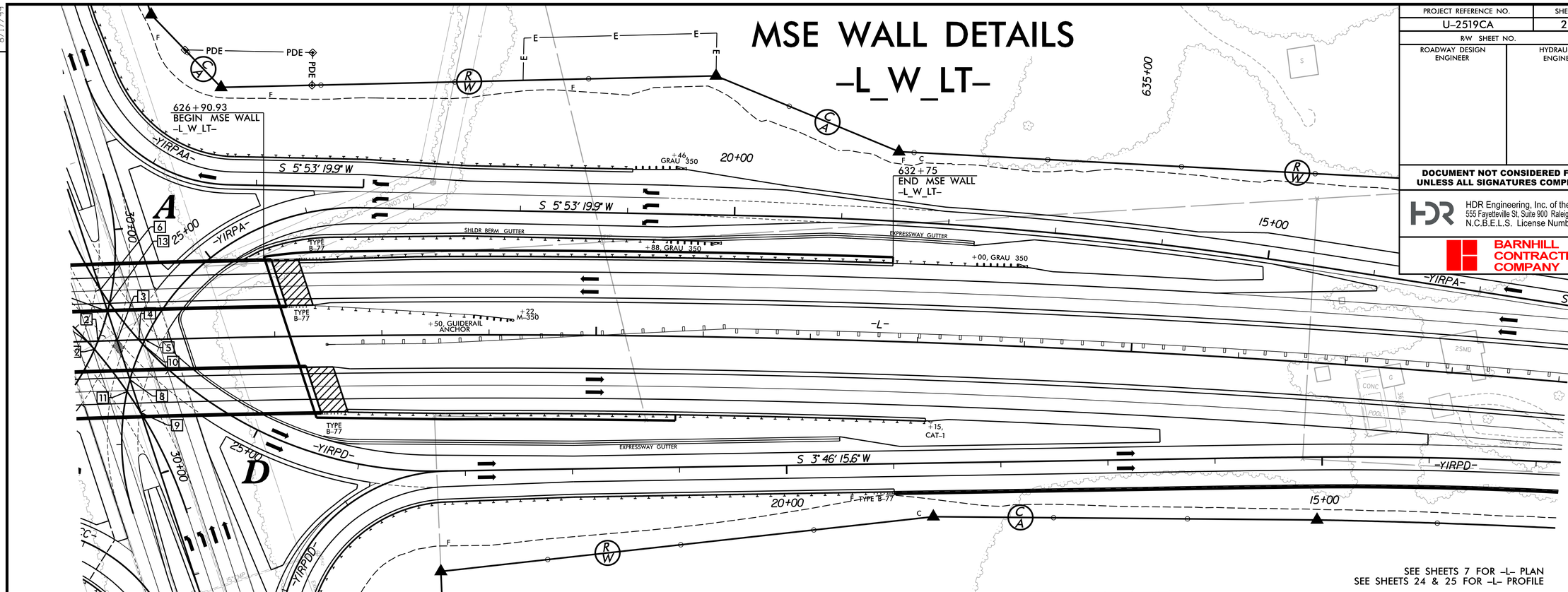
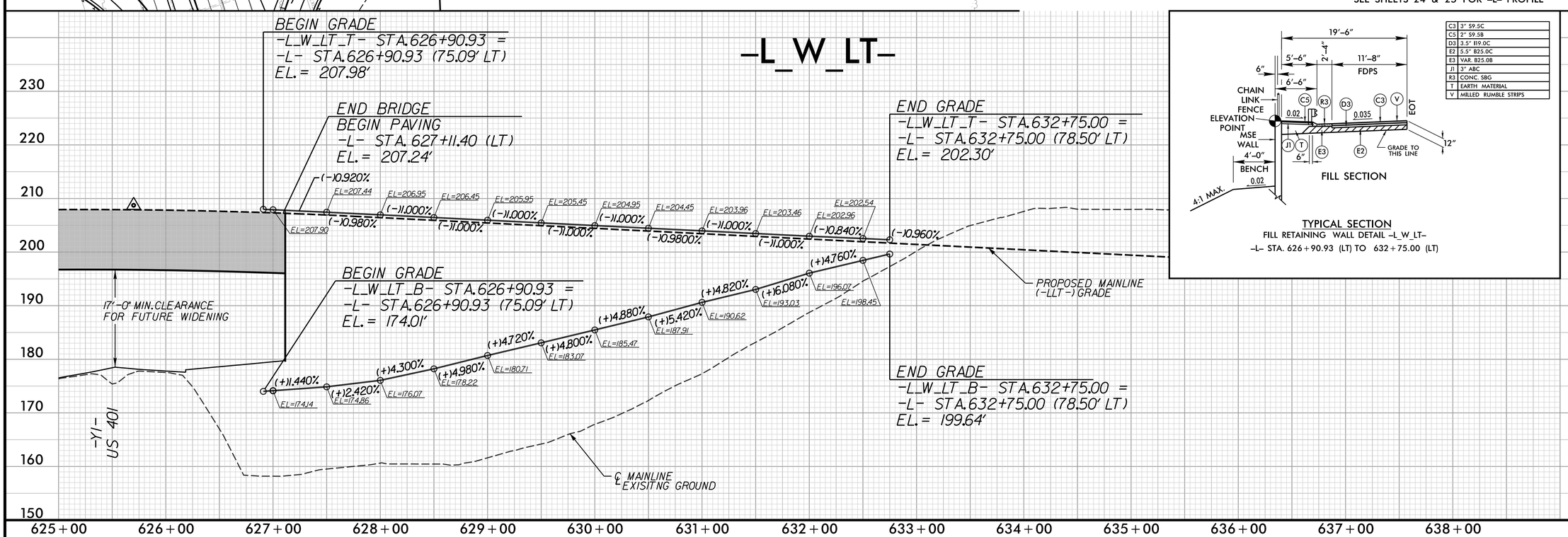
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEETS 7 FOR –L– PLAN
SEE SHEETS 24 & 25 FOR –L– PROFILE



C3	3" S9.5C
C5	2" S9.5B
D3	3.5" I19.0C
E2	5.5" B25.0C
E3	VAR. B25.0B
J1	3" ABC
R3	CONC. SBG
T	EARTH MATERIAL
V	MILLED RUMBLE STRIPS

TYPICAL SECTION
FILL RETAINING WALL DETAIL –L_W_LT–
–L– STA. 626+90.93 (LT) TO 632+75.00 (LT)

REVISIONS

8/17/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 10:10:43 AM
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MSE WALL DETAILS
–L_W_RT–

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2B-9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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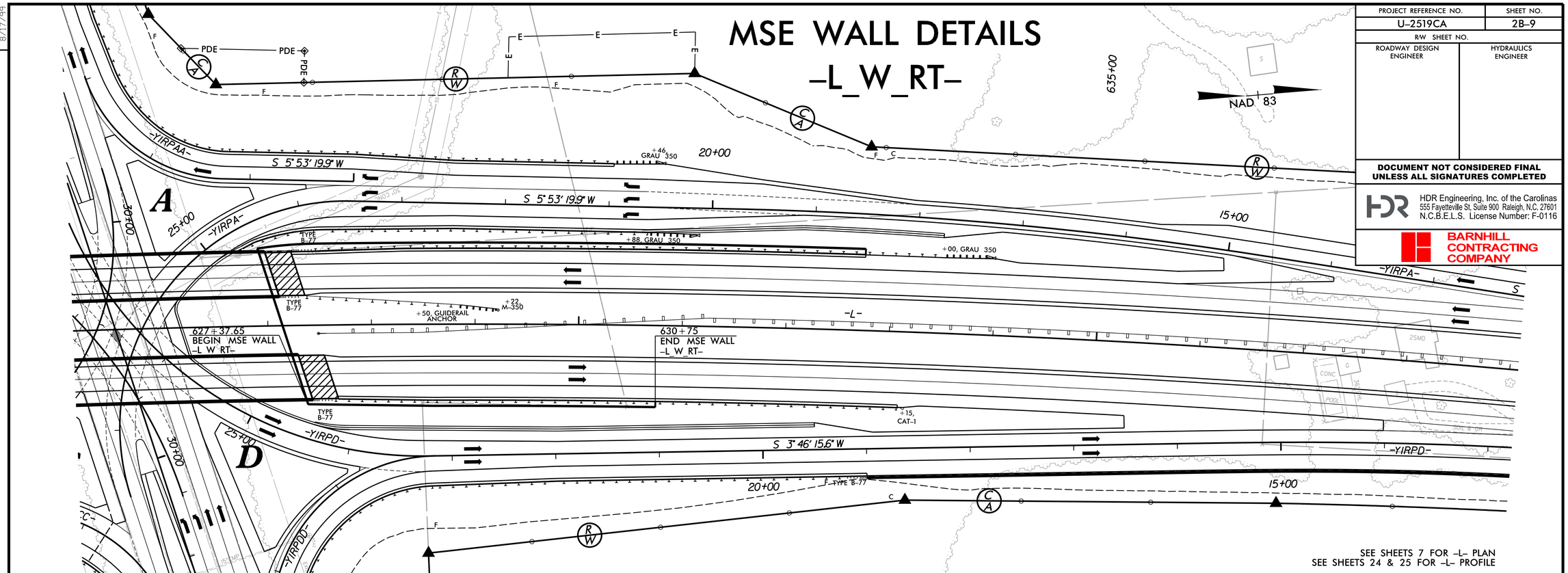
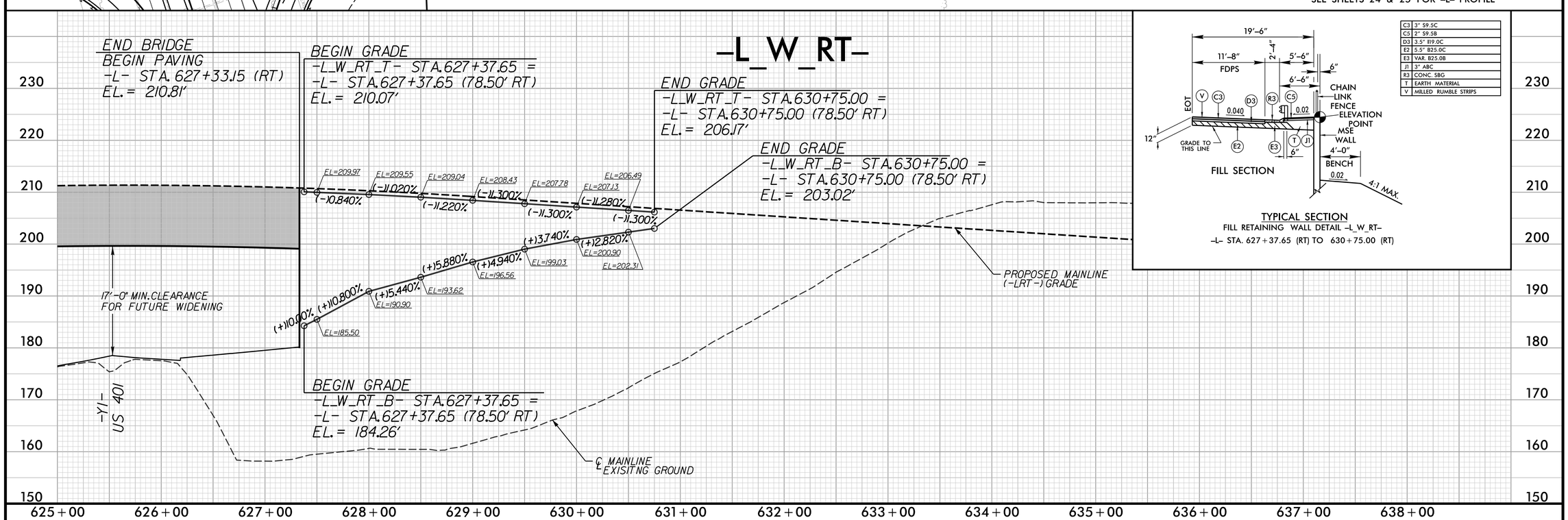
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY





C3	3" S9.5C
C5	2" S9.5B
D3	3.5" I19.0C
E2	5.5" B25.0C
E3	VAR. B25.0B
J1	3" ABC
R3	CONC. SBG
T	EARTH MATERIAL
V	MILLED RUMBLE STRIPS

TYPICAL SECTION
FILL RETAINING WALL DETAIL –L_W_RT–
–L– STA. 627+37.65 (RT) TO 630+75.00 (RT)

REVISIONS

8/17/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 10:10:58 AM
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MSE WALL DETAILS
–Y1RPD_W_LT–

PROJECT REFERENCE NO.	SHEET NO.
U–2519CA	2B–10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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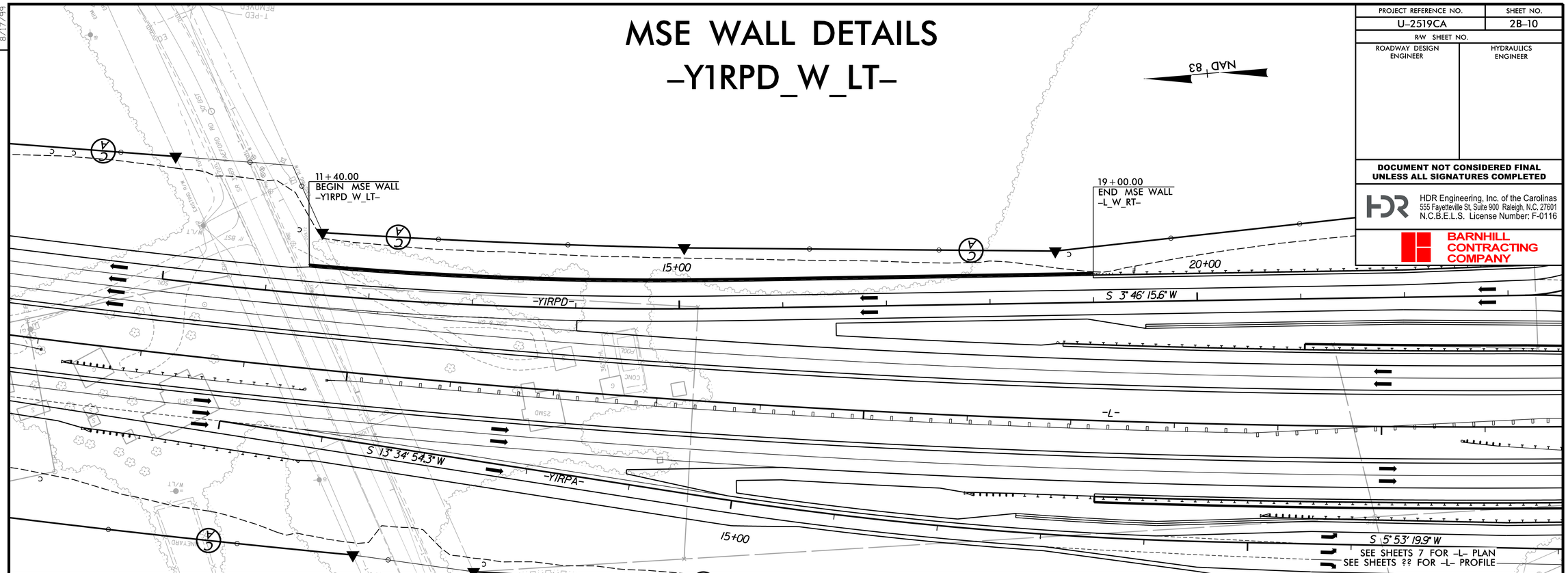
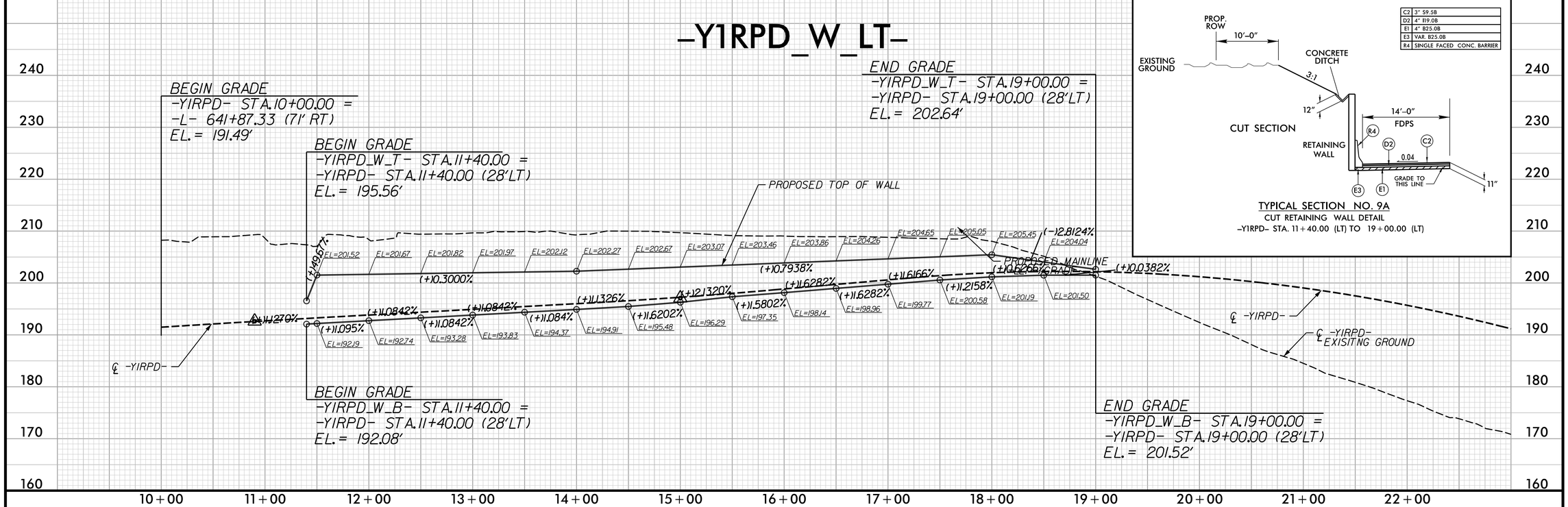
BARNHILL CONTRACTING COMPANY



–Y1RPD_W_LT–



C2	3" S9.5B
D2	4" I19.0B
E1	4" B25.0B
E3	VAR. B25.0B
R4	SINGLE FACED CONC. BARRIER

TYPICAL SECTION NO. 9A
CUT RETAINING WALL DETAIL
–Y1RPD– STA. 11+40.00 (LT) TO 19+00.00 (LT)

REVISIONS

8/17/99

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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BARNHILL CONTRACTING COMPANY

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	2D-1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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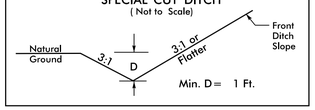
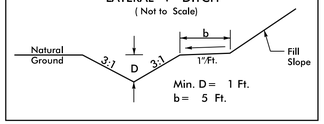
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

DETAIL A
SPECIAL CUT DITCH
(Not to Scale)



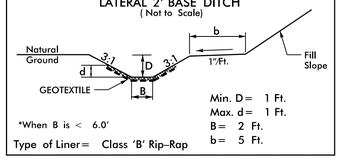
FROM STA. 662+00 –L– TO STA. 664+50 –L– LT
FROM STA. 668+00 –L– TO STA. 669+00 –L– LT
FROM STA. 20+00 –SR1– TO STA. 20+90 –SR1– LT
FROM STA. 37+50 –SR1– TO STA. 38+61 –SR1– LT
FROM STA. 712+00 –L– TO STA. 714+00 –L– LT
FROM STA. 722+00 –L– TO STA. 732+00 –L– LT
FROM STA. 735+00 –L– TO STA. 736+00 –L– LT
FROM STA. 739+00 –L– TO STA. 743+40 –L– LT
FROM STA. 15+00 –Y1– TO STA. 18+00 –Y1– LT
FROM STA. 10+70 –Y3– TO STA. 12+75 –Y3– LT
FROM STA. 11+70 –Y3RA– TO STA. 13+05 –Y3RA– LT
FROM STA. 10+65 –Y4– TO STA. 11+75 –Y4– RT

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



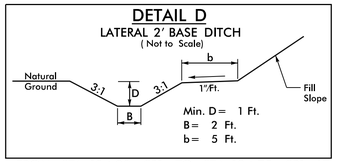
FROM STA. 57+79 –SR1– TO STA. 58+40 –SR1– LT

DETAIL C
LATERAL 2' BASE DITCH
(Not to Scale)



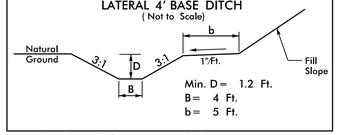
FROM STA. 17+25 –SR1– TO STA. 18+00 –SR1– LT
FROM STA. 18+75 –SR1– TO STA. 20+00 –SR1– LT
FROM STA. 10+00 –Y1RPDD– TO STA. 11+20 –Y1RPDD– LT
FROM STA. 18+50 –Y1– TO STA. 19+50 –Y1– RT

DETAIL D
LATERAL 2' BASE DITCH
(Not to Scale)



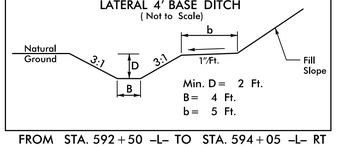
FROM STA. 18+00 –SR1– TO STA. 18+75 –SR1– LT
FROM STA. 700+00 –L– TO STA. 704+00 –L– RT
FROM STA. 52+77 –SR1– TO STA. 57+79 –SR1– LT
FROM STA. 19+50 –Y1– TO STA. 20+25 –Y1– RT

DETAIL DD
LATERAL 4' BASE DITCH
(Not to Scale)



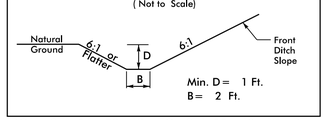
FROM STA. 716+00 –L– TO STA. 720+00 –L– RT

DETAIL E
LATERAL 4' BASE DITCH
(Not to Scale)



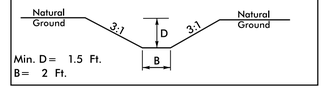
FROM STA. 592+50 –L– TO STA. 594+05 –L– RT
FROM STA. 737+50 –L– TO STA. 745+09 –L– RT

DETAIL F
SPECIAL CUT BASE DITCH
(Not to Scale)



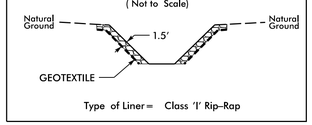
FROM STA. 14+50 –Y1– TO STA. 15+40 –Y1– RT

DETAIL G
STANDARD 2' BASE DITCH
(Not to Scale)



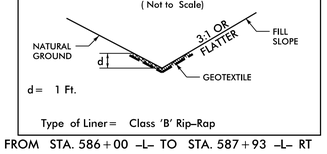
FROM STA. 49+86 –SR1– TO STA. 50+75 –SR1– LT

DETAIL I
BANK STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)



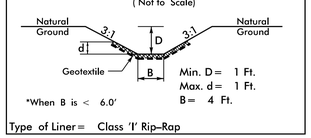
STA. 716+20 –L– LT

DETAIL J
TOE PROTECTION
(Not to Scale)



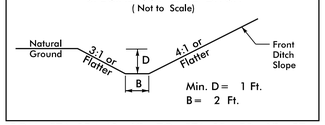
FROM STA. 586+00 –L– TO STA. 587+93 –L– RT

DETAIL K
STANDARD 4' BASE DITCH
(Not to Scale)



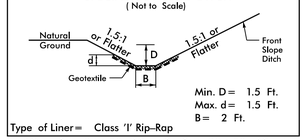
FROM STA. 586+00 –L– TO STA. 588+10 –L– LT
FROM STA. 591+88 –L– TO STA. 592+50 –L– RT
FROM STA. 623+68 –L– TO STA. 624+54 –L– RT

DETAIL M
SPECIAL CUT BASE DITCH
(Not to Scale)



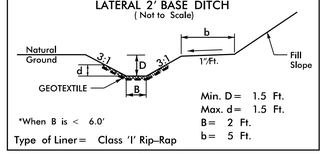
FROM STA. 15+40 –Y1– TO STA. 18+50 –Y1– RT

DETAIL N
SPECIAL CUT BASE DITCH
(Not to Scale)



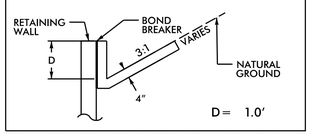
FROM STA. 34+50 –Y1– TO STA. 38+50 –Y1– LT

DETAIL O
LATERAL 2' BASE DITCH
(Not to Scale)



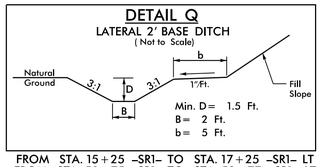
FROM STA. 11+20 –Y1RPDD– TO STA. 12+99 –Y1RPDD– LT
FROM STA. 32+34 –Y1– TO STA. 34+50 –Y1– LT

DETAIL P
CONCRETE DITCH BEHIND RETAINING WALL
(Not to Scale)



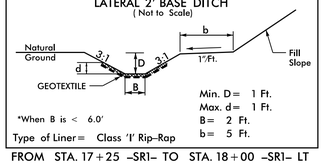
FROM STA. 632+83 –L– TO STA. 640+47 –L– RT

DETAIL Q
LATERAL 2' BASE DITCH
(Not to Scale)



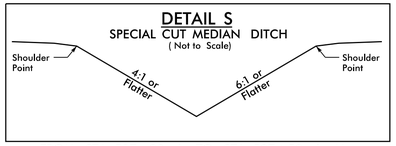
FROM STA. 15+25 –SR1– TO STA. 17+25 –SR1– LT
FROM STA. 50+75 –SR1– TO STA. 52+77 –SR1– LT
FROM STA. 735+50 –L– TO STA. 737+50 –L– RT

DETAIL R
LATERAL 2' BASE DITCH
(Not to Scale)



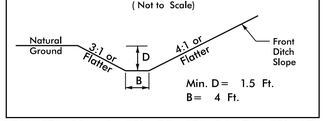
FROM STA. 17+25 –SR1– TO STA. 18+00 –SR1– LT

DETAIL S
SPECIAL CUT MEDIAN DITCH
(Not to Scale)



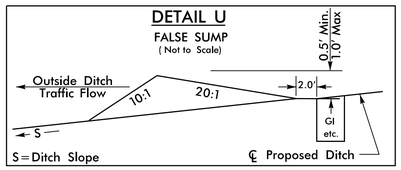
FROM STA. 587+00 –L– TO STA. 587+50 –L– M
FROM STA. 593+00 –L– TO STA. 595+00 –L– M
FROM STA. 649+75 –L– TO STA. 650+50 –L– M
FROM STA. 653+00 –L– TO STA. 654+50 –L– M
FROM STA. 712+50 –L– TO STA. 713+50 –L– M
FROM STA. 722+00 –L– TO STA. 726+41 –L– M
FROM STA. 730+00 –L– TO STA. 732+00 –L– M
FROM STA. 735+75 –L– TO STA. 739+50 –L– M
FROM STA. 15+00 –Y1– TO STA. 15+40 –Y1– M
FROM STA. 16+50 –Y1– TO STA. 20+10 –Y1– M

DETAIL T
SPECIAL CUT BASE DITCH
(Not to Scale)

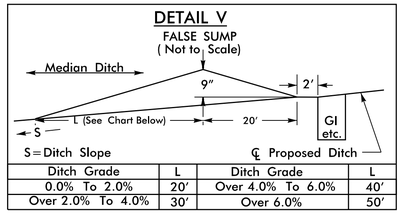


FROM STA. 90+69 –SR1– TO STA. 94+76 –SR1– LT

DETAIL U
FALSE SUMP
(Not to Scale)

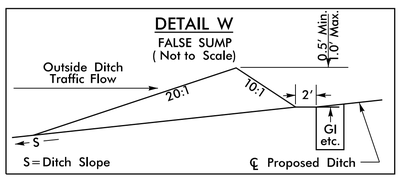


DETAIL V
FALSE SUMP
(Not to Scale)

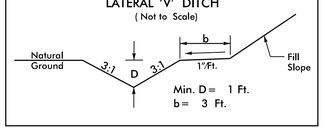


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

DETAIL W
FALSE SUMP
(Not to Scale)

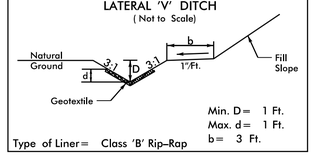


DETAIL X
LATERAL 'V' DITCH
(Not to Scale)



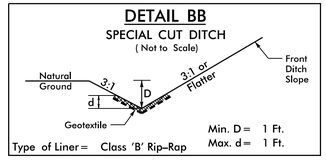
FROM STA. 19+00 –Y1RPD– TO STA. 21+10 –Y1RPD– LT

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



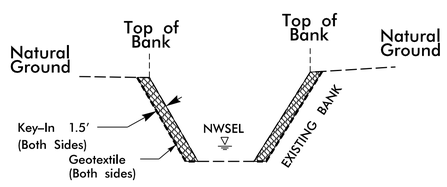
FROM STA. 21+10 –Y1RPD– TO STA. 23+16 –Y1RPD– LT

DETAIL BB
SPECIAL CUT DITCH
(Not to Scale)



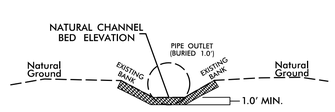
FROM STA. 640+47 –L– TO STA. 641+00 –L– RT

DETAIL Z
CULVERT OUTLET BANK STABILIZATION
(Not to Scale)



Length = 50 Ft.
Est. = 50 Tons of Class 'I' Rip-Rap
70 SY Geotextile

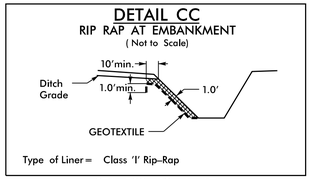
DETAIL AA
CHANNEL STABILIZATION AT JURISDICTIONAL STREAM
(Not to Scale)



Type of Liner = Class 'I' Rip-Rap

STA. 716+00 –L– LT

DETAIL CC
RIP RAP AT EMBANKMENT
(Not to Scale)

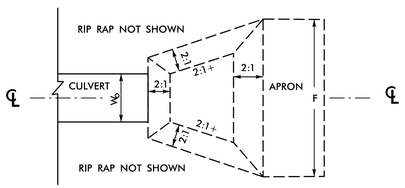


STA. 588+12 –L– LT

DETAIL L
RIP-RAPPED ENERGY DISSIPATOR BASIN

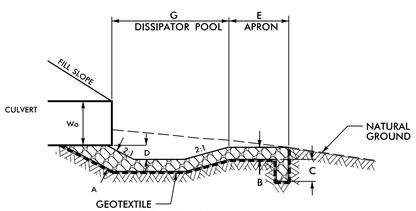
DIM. (ft)	RIP RAP BASIN # 1		
A	2.4		
B	1.6		
C	2		
D	1.25		
E	4		
F	21		
G	16		

ALL DIMENSIONS APPROXIMATE



PLAN

BASIN #	LOCATION (AT OUTLET)
1	626+85 –L– LT (0735)



℄ SECTION

REVISIONS

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PROJ. REFERENCE NO.	SHEET NO.
U-2519CA	3P-1

HDR Engineering, Inc. of the Carolinas
3733 National Drive, Suite 207 Raleigh, N.C. 27612
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

PARCEL INDEX SHEET

PARCEL No.	SHEET No.	PROPERTY OWNER NAME
1	5,6,7,17	BARKER CORPORATION
2	7,8,17	NC FISH HATCHERY
3	7,8,9,18	WILLIAM J. GILLIS
4	7	PETE G. LESLIE
5	7,8	TED CHAPPELL
6	7,8	FREDDIE MCLEAN
6A	8	FREDDIE MCLEAN
7	9	EDWARD M. BALDWIN
9	9	JOSEPH H. GILLIS
10	9,10	PROGRESS ENERGY CAROLINAS, INC
11	9,10	LONA DIXON HEIRS C/O CHRISTINE DIXON
12	10	JOSEPHINE MORRISON
13	10	MABLE D. MACK
14	10	SONITA MCDANIEL
15	10	ROY MACK
16	10	VERNA MACK
17	10	BEATRICE MCNEILL
18	10	SPURGEON D. WATSON
19	10	CASSANDRA B. WATTS
20	10	CHARLES MCBRIDE
21	10	GEORGE W. CLARK
22	10	RUTH RAY
23	10	WILLIAM C. WHITTED
24	10	LEE McMILLIAN
25	10,11	JUNIOUS R. JACKSON
26	9,10	EUGENE MANUEL
27	11,12	CAROL J. SWINK
28	11,12	PATRICIA HESS
29	12	PRESTON D. JACKSON
30	12,13	Z.D. JACKSON
31	4,5	NORMA STROTHER

PARCEL No.	SHEET No.	PROPERTY OWNER NAME

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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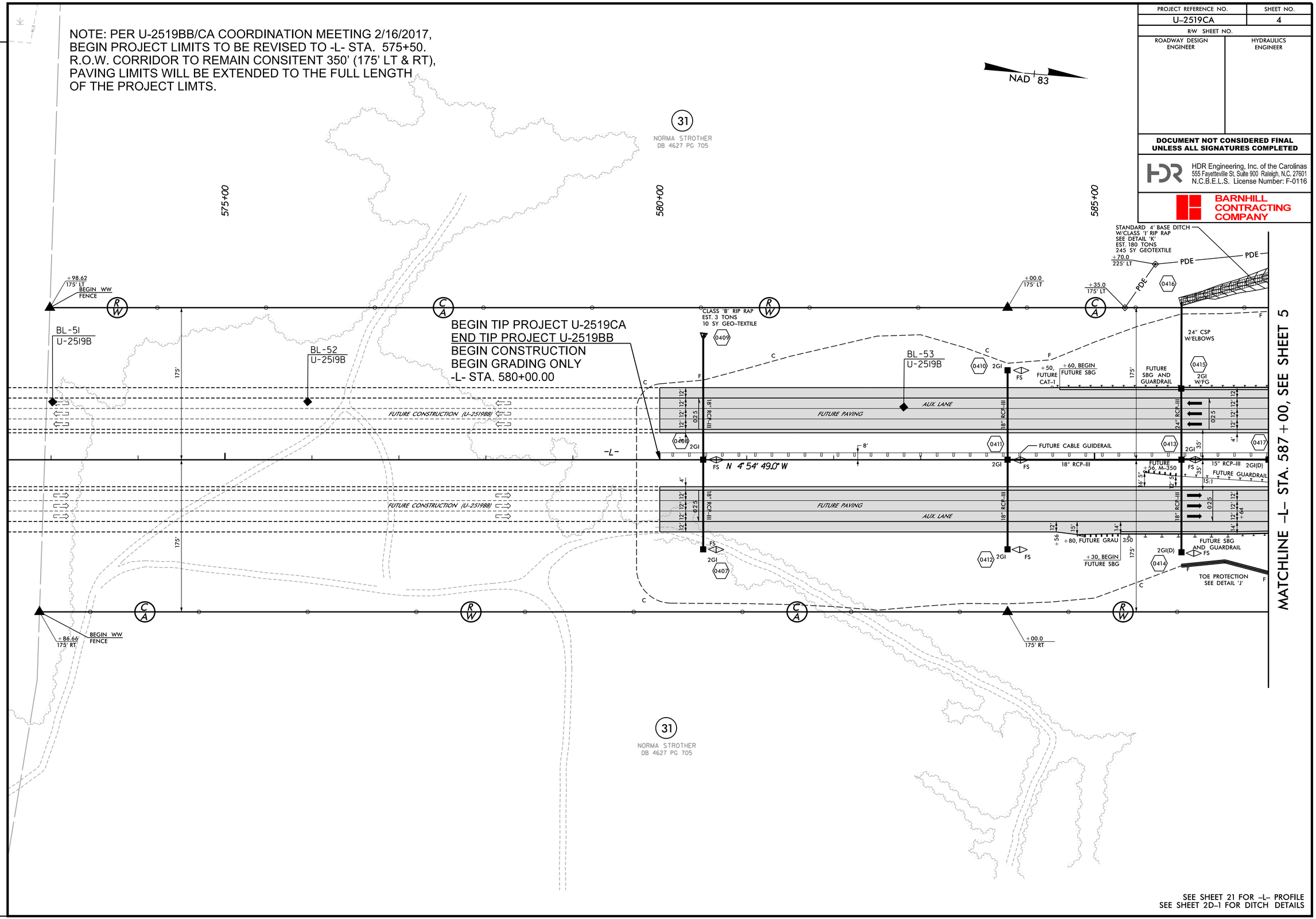
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

NOTE: PER U-2519BB/CA COORDINATION MEETING 2/16/2017, BEGIN PROJECT LIMITS TO BE REVISED TO -L- STA. 575+50. R.O.W. CORRIDOR TO REMAIN CONSITENT 350' (175' LT & RT), PAVING LIMITS WILL BE EXTENDED TO THE FULL LENGTH OF THE PROJECT LIMTS.



SEE SHEET 21 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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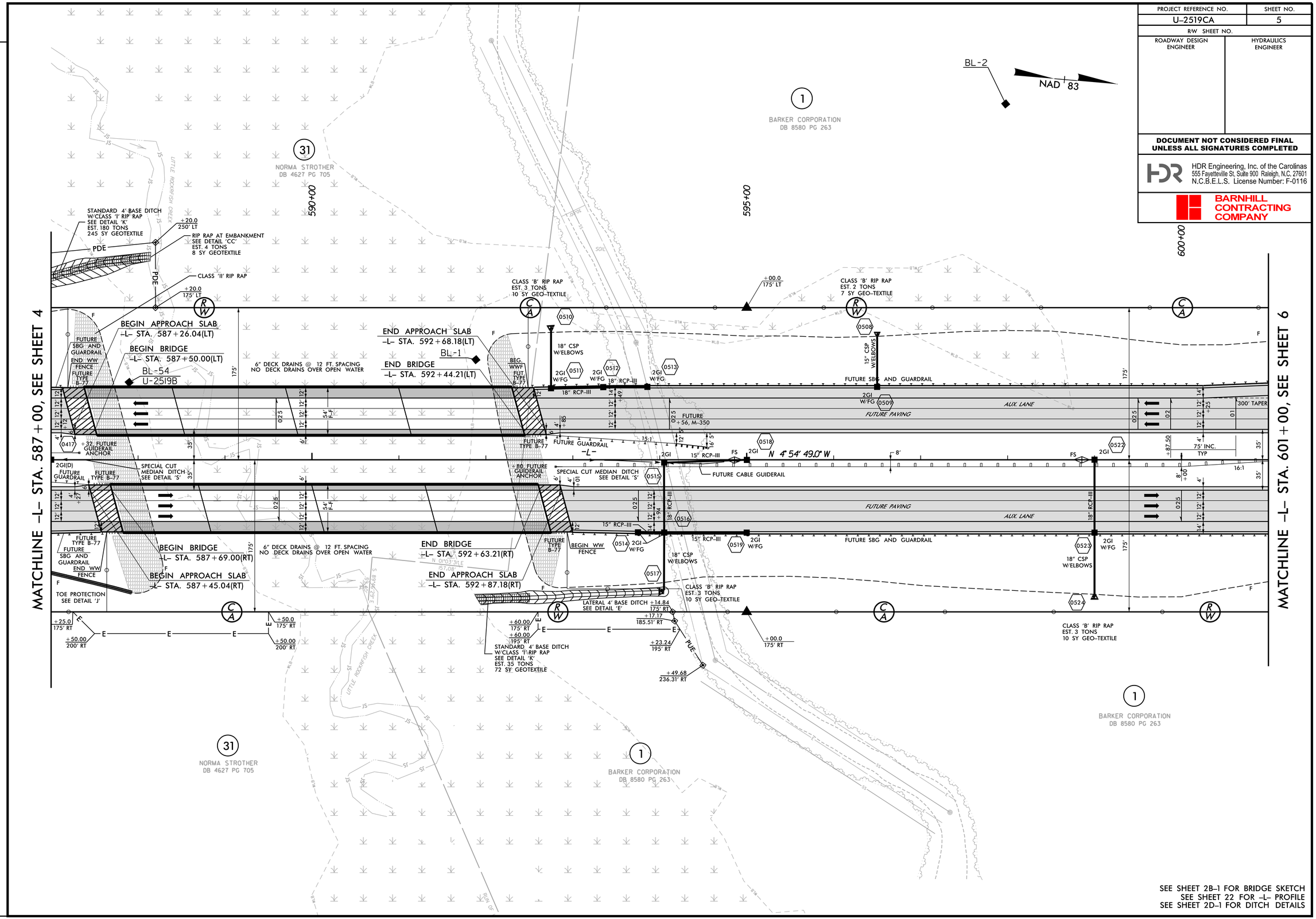

SEE SHEET 2B-1 FOR BRIDGE SKETCH
SEE SHEET 22 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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

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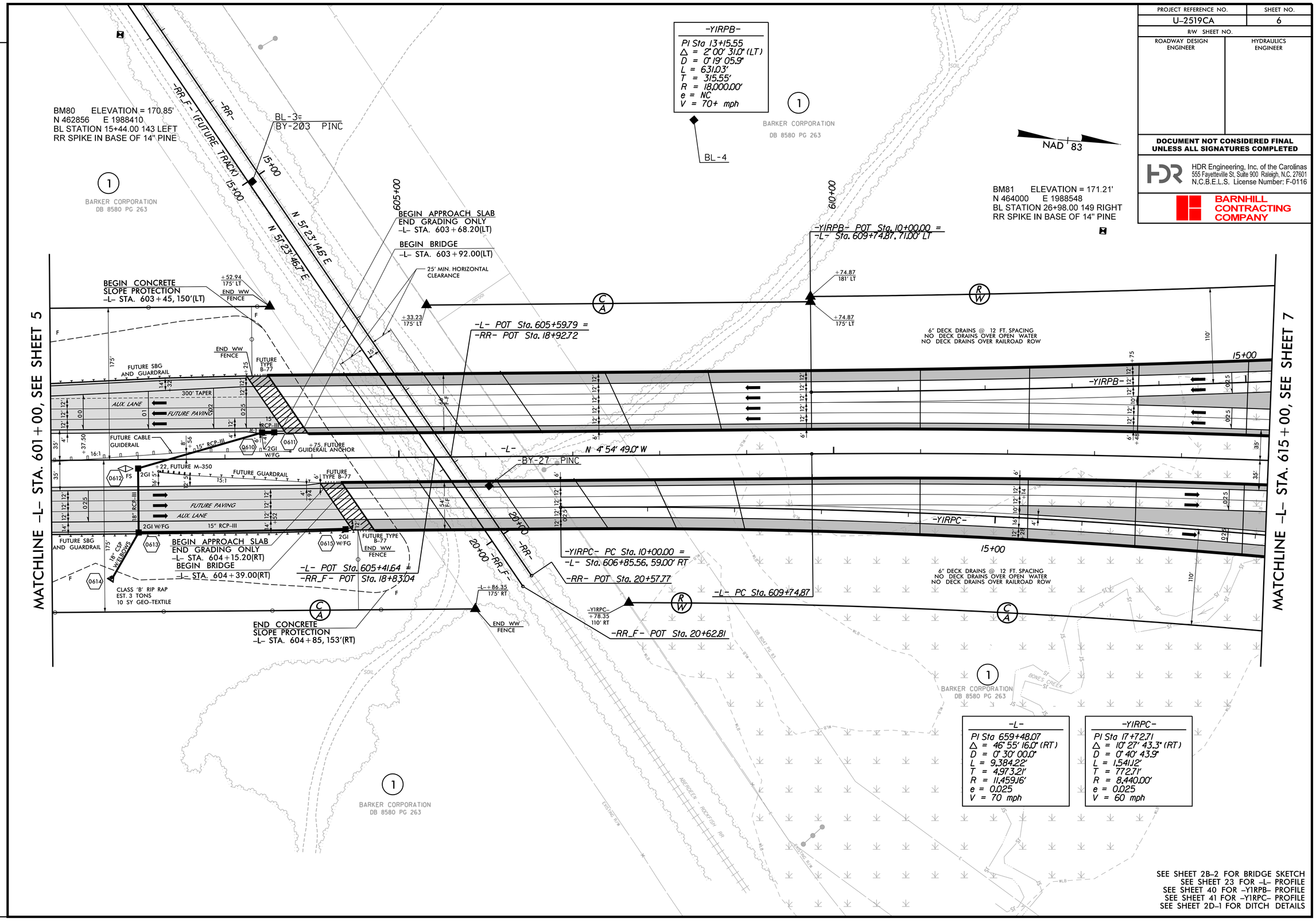
BARNHILL CONTRACTING COMPANY



SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 23 FOR -L- PROFILE
SEE SHEET 40 FOR -Y1RPB- PROFILE
SEE SHEET 41 FOR -Y1RPC- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

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REVISIONS

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

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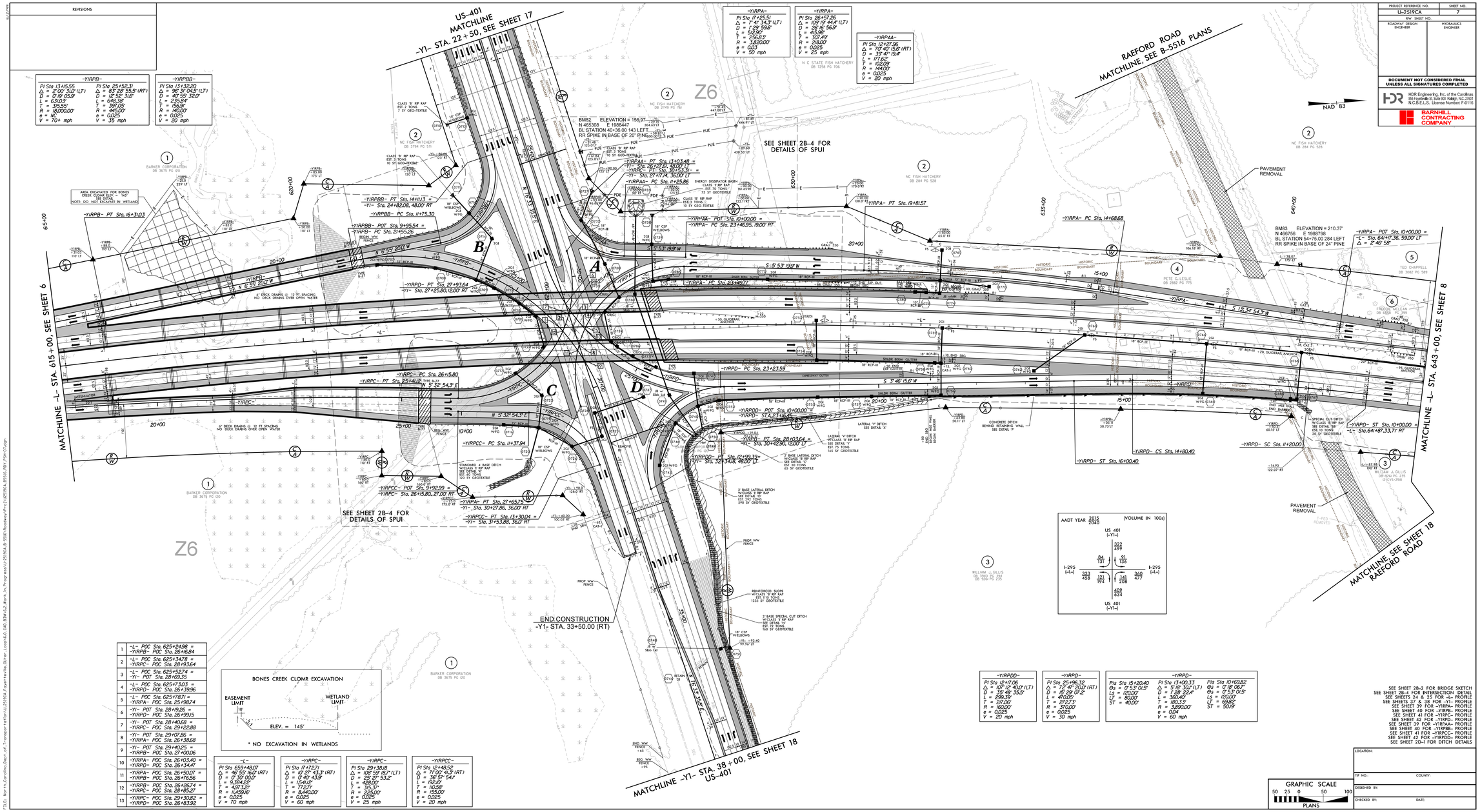
550 Pylon Drive, Suite 100, Raleigh, N.C. 27603
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



1	-L- POC Sta. 625+24.38 = -YIRPB- POC Sta. 26+16.84
2	-L- POC Sta. 625+34.78 = -YIRPC- POC Sta. 28+93.64
3	-L- POC Sta. 625+52.74 = -Y1- POT Sta. 28+69.35
4	-L- POC Sta. 625+73.03 = -YIRPD- POC Sta. 26+39.96
5	-L- POC Sta. 625+77.71 = -YIRPA- POC Sta. 25+98.74
6	-Y1- POT Sta. 28+19.26 = -YIRPD- POC Sta. 26+99.15
7	-Y1- POT Sta. 28+40.68 = -YIRPC- POC Sta. 29+22.88
8	-Y1- POT Sta. 29+07.86 = -YIRPA- POC Sta. 26+38.68
9	-Y1- POT Sta. 29+40.25 = -YIRPB- POC Sta. 27+00.06
10	-YIRPA- POC Sta. 26+03.40 = -YIRPD- POC Sta. 26+34.41
11	-YIRPA- POC Sta. 26+50.07 = -YIRPB- POC Sta. 26+76.56
12	-YIRPB- POC Sta. 26+26.74 = -YIRPC- POC Sta. 28+85.27
13	-YIRPC- POC Sta. 29+30.82 = -YIRPD- POC Sta. 26+83.92

BONES CREEK CLOMR EXCAVATION

EASEMENT LIMIT — WETLAND LIMIT — 10' — 3' — ELEV. = 145'

* NO EXCAVATION IN WETLANDS

SEE SHEET 2B-2 FOR BRIDGE SKETCH
SEE SHEET 2B-4 FOR INTERSECTION DETAIL
SEE SHEETS 24 & 25 FOR -L- PROFILE
SEE SHEETS 37 & 38 FOR -Y1- PROFILE
SEE SHEET 39 FOR -YIRPA- PROFILE
SEE SHEET 40 FOR -YIRPB- PROFILE
SEE SHEET 41 FOR -YIRPC- PROFILE
SEE SHEET 42 FOR -YIRPD- PROFILE
SEE SHEET 39 FOR -YIRPAA- PROFILE
SEE SHEET 40 FOR -YIRPBB- PROFILE
SEE SHEET 41 FOR -YIRPCC- PROFILE
SEE SHEET 42 FOR -YIRPDD- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

GRAPHIC SCALE 50 25 0 50 100 PLANS

LOCATION:
TIP NO.: COUNTY:
DESIGNED BY:
CHECKED BY: DATE:

PLOT DRIVER: MODOT.pdt.color.eng.100.pc4
USER: dwatner
FILE: Non-Proprietary Dept of Transport Projects\U2519CA_Raeford Rd Corridor Study\B-5516\Roadway\Rdwy\U2519CA_B5516_R01_PSH-07.dgn
PERTABLE: MODOT.pltmt4.tbl
DATE: 2/17/2017 TIME: 2:49:03 PM

PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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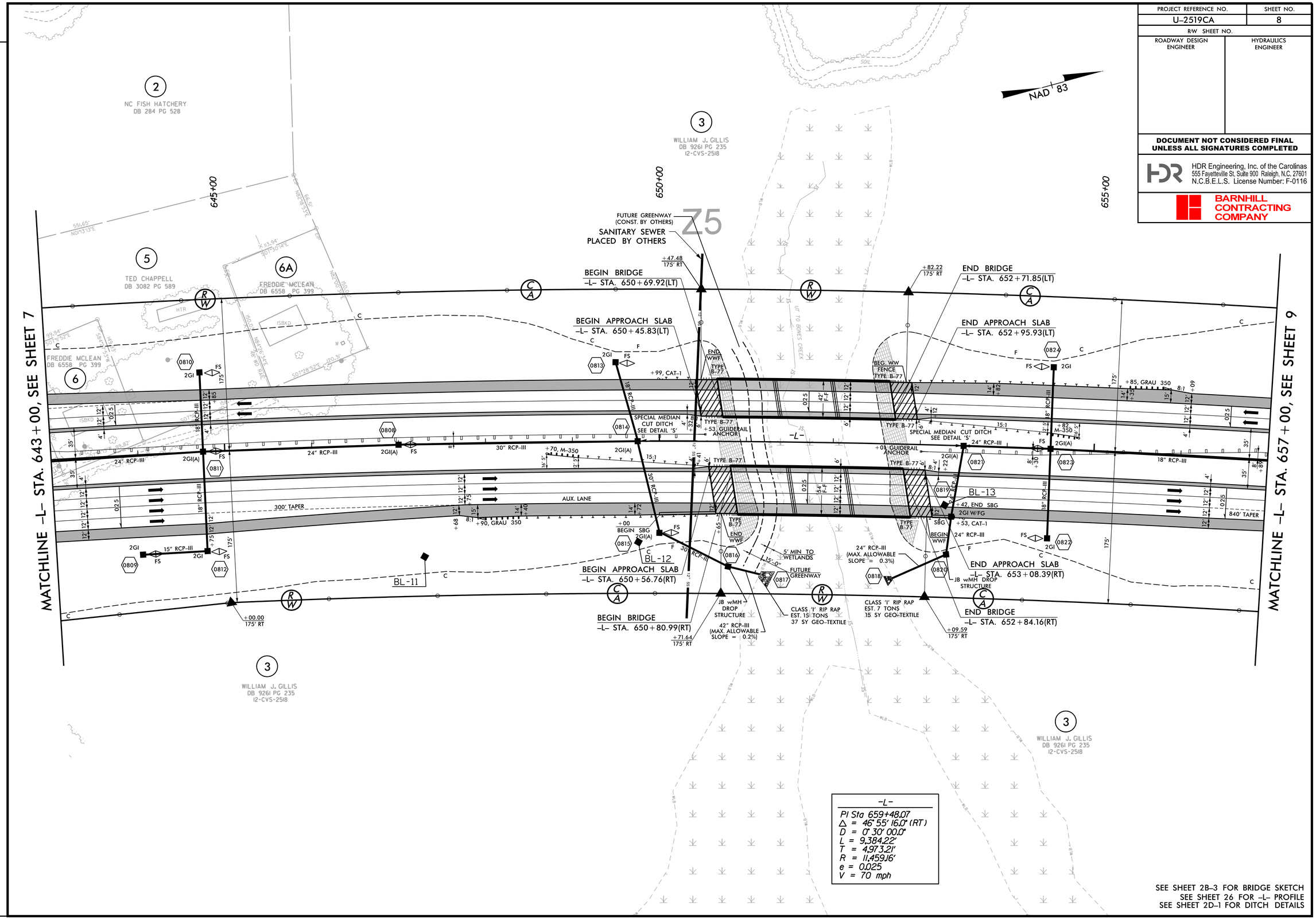
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



-L-
PI Sta 659+48.07
Δ = 46° 55' 16.0" (RT)
D = 0° 30' 00.0"
L = 9,384.22'
T = 4,973.21'
R = 11,459.16'
e = 0.025
V = 70 mph

SEE SHEET 2B-3 FOR BRIDGE SKETCH
SEE SHEET 26 FOR -L- PROFILE
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	9
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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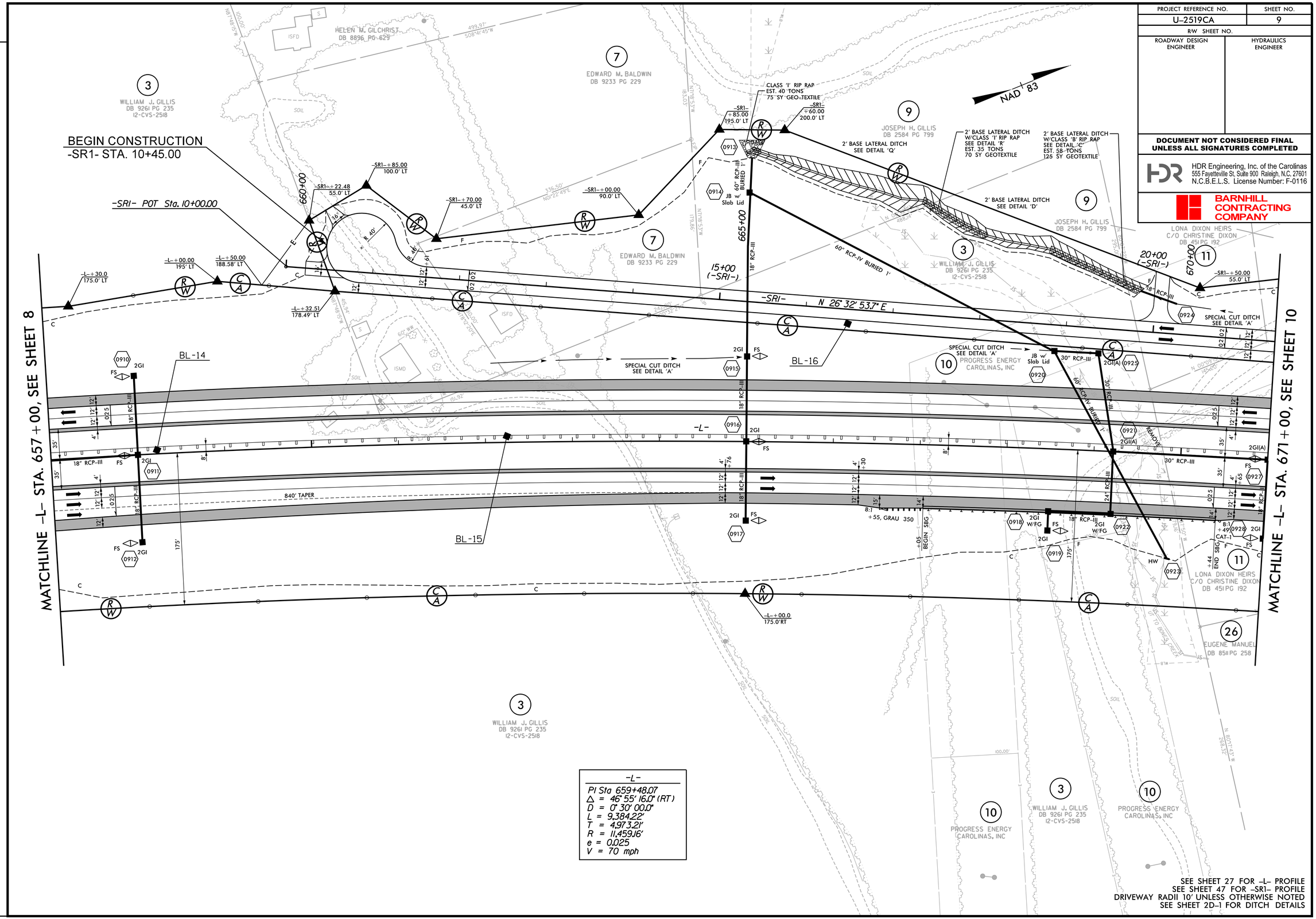
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



-L-
PI Sta 659+48.07
Δ = 46° 55' 16.0" (RT)
D = 0° 30' 00.0"
L = 9,384.22'
T = 4,973.21'
R = 11,459.16'
e = 0.025
V = 70 mph

SEE SHEET 27 FOR -L- PROFILE
SEE SHEET 47 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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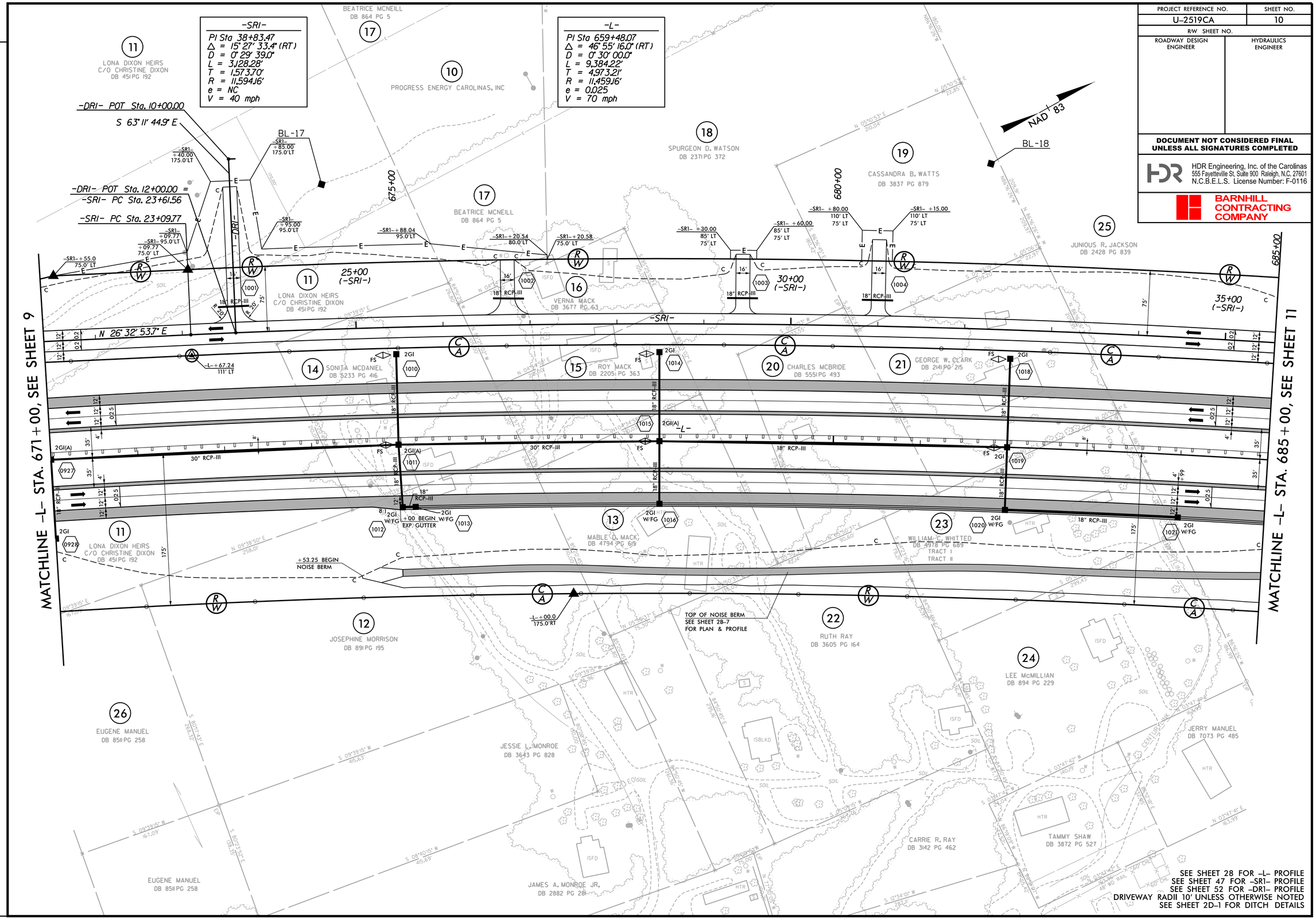
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEET 28 FOR -L- PROFILE
SEE SHEET 47 FOR -SR1- PROFILE
SEE SHEET 52 FOR -DR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	11
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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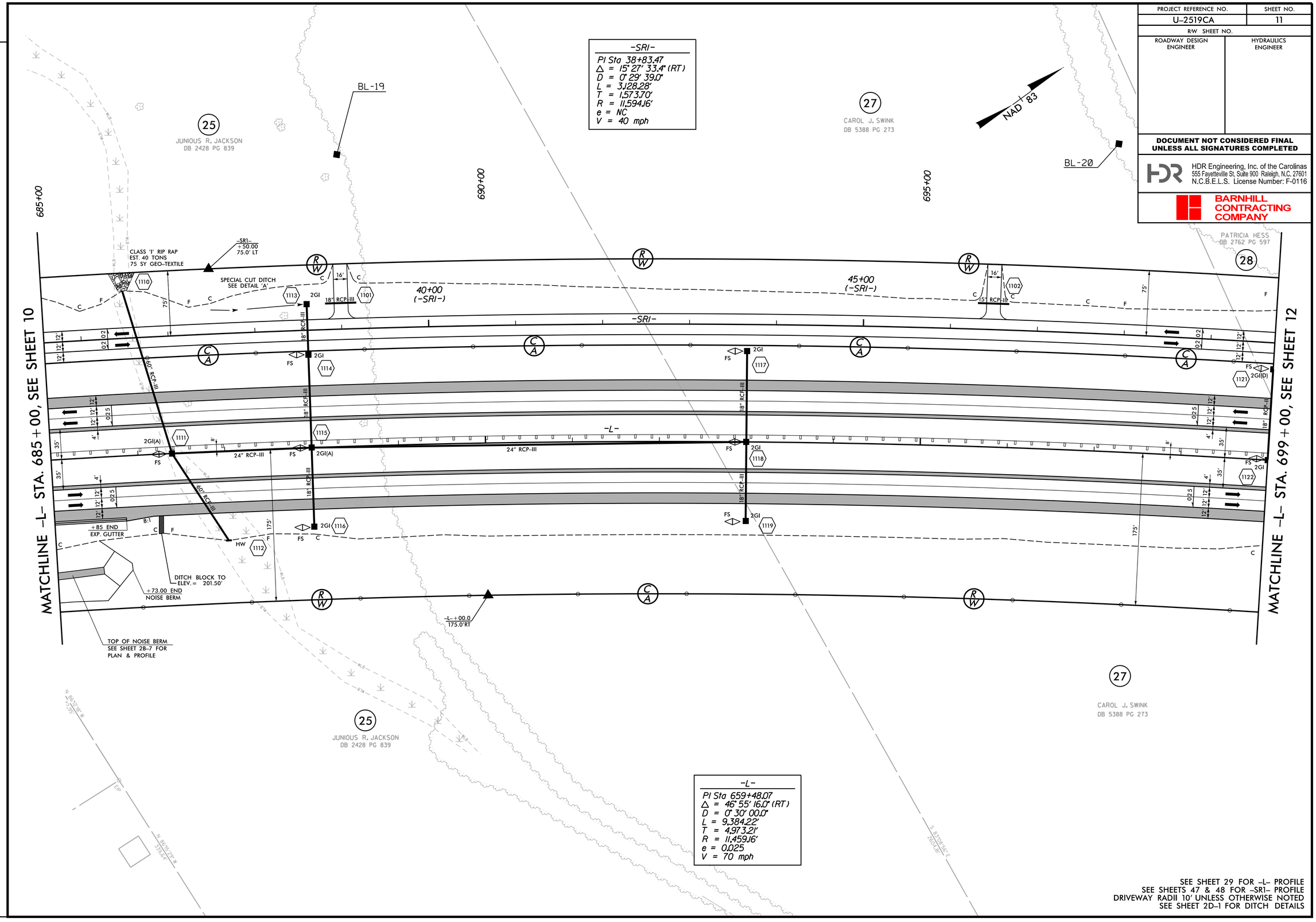
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEET 29 FOR -L- PROFILE
SEE SHEETS 47 & 48 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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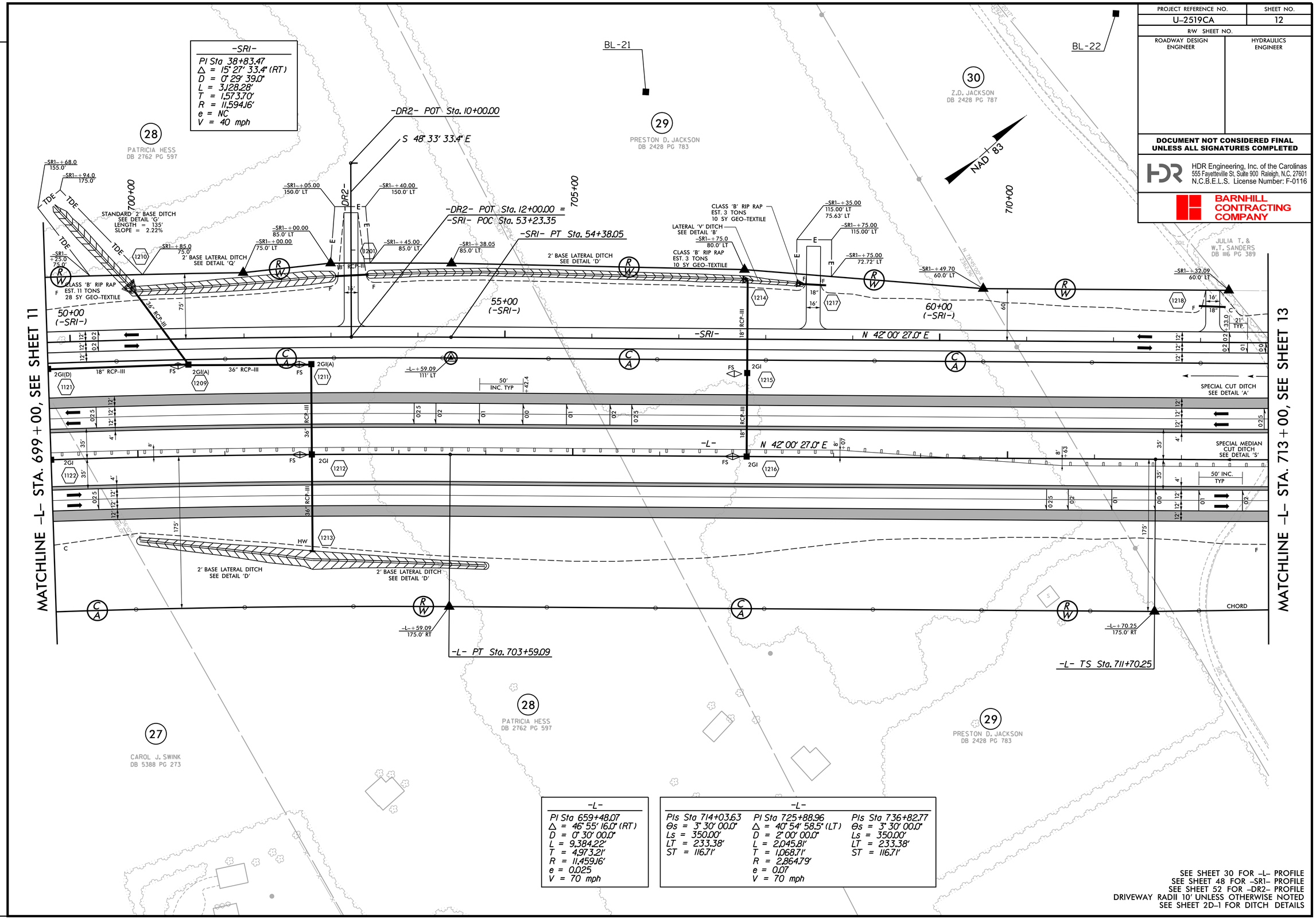
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



-L-
PI Sta 659+48.07
Δ = 46° 55' 16.0" (RT)
D = 0° 30' 00.0"
L = 9,384.22'
T = 4,973.21'
R = 11,459.16'
e = 0.025
V = 70 mph

-L-		
PIs Sta 714+03.63	PI Sta 725+88.96	PIs Sta 736+82.77
Θs = 3° 30' 00.0"	Δ = 40° 54' 58.5" (LT)	Θs = 3° 30' 00.0"
Ls = 350.00'	D = 2° 00' 00.0"	Ls = 350.00'
LT = 233.38'	L = 2,045.81'	LT = 233.38'
ST = 116.71'	T = 1,068.71'	ST = 116.71'
	R = 2,864.79'	
	e = 0.07	
	V = 70 mph	

SEE SHEET 30 FOR -L- PROFILE
SEE SHEET 48 FOR -SR1- PROFILE
SEE SHEET 52 FOR -DR2- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	13
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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N.C.B.E.L.S. License Number: F-0116

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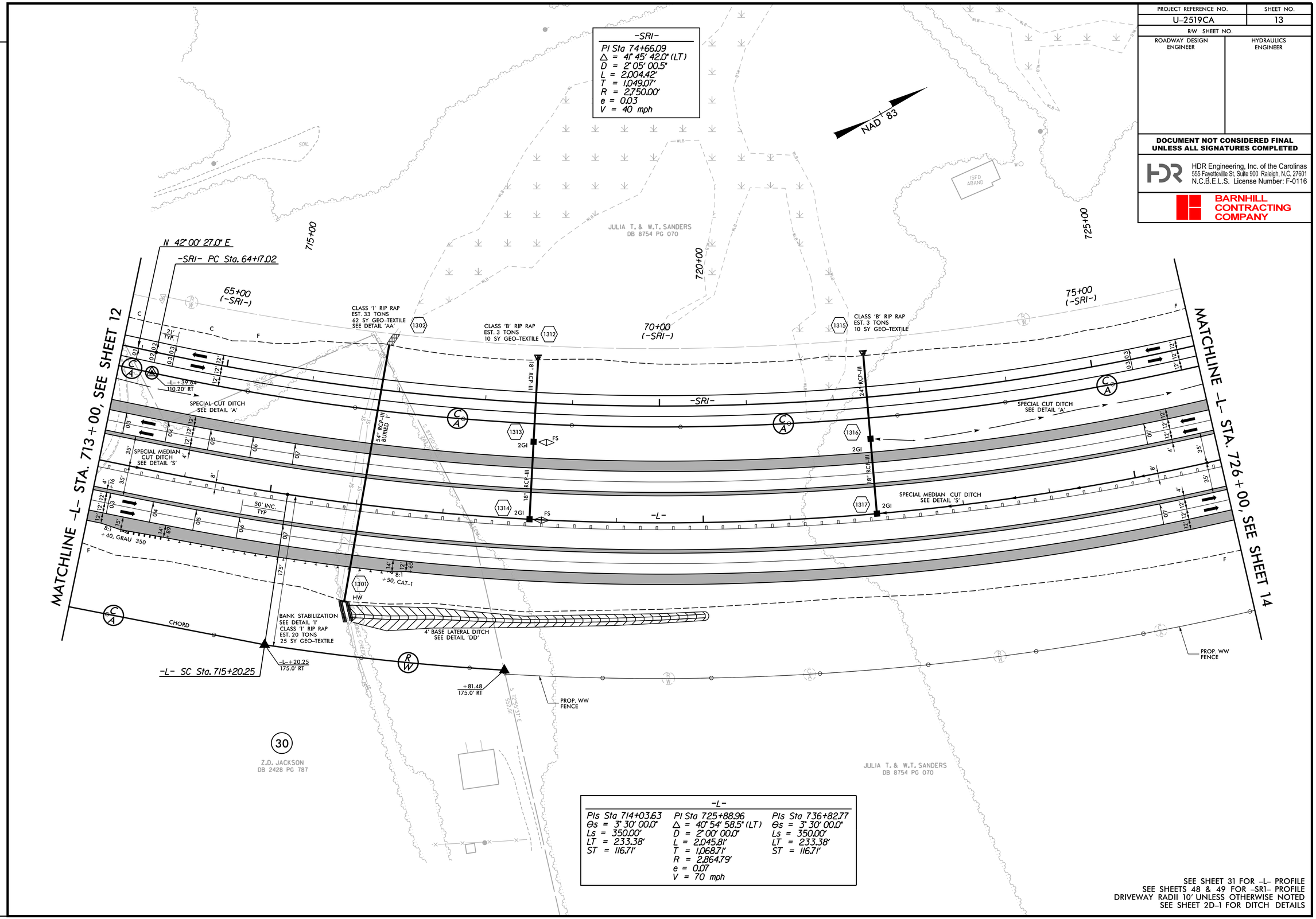


-L-		
PIs Sta 714+03.63	PI Sta 725+88.96	PIs Sta 736+82.77
Θs = 3° 30' 00.0"	Δ = 40° 54' 58.5" (LT)	Θs = 3° 30' 00.0"
Ls = 350.00'	D = 2° 00' 00.0"	Ls = 350.00'
LT = 233.38'	L = 2,045.81'	LT = 233.38'
ST = 116.71'	T = 1,068.71'	ST = 116.71'
	R = 2,864.79'	
	e = 0.07	
	V = 70 mph	

SEE SHEET 31 FOR -L- PROFILE
SEE SHEETS 48 & 49 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenbo DATE: 2/17/2017 TIME: 10:22:44 AM
FILE: North_Carolina_Dept_of_Transportation\U_2519CA_Fayetteville_Outer_Loop\6.0_CAD_BIM\6.2_Work_in_Progress\U-2519CA_B-5516\Roadway\Proj\U2519CA_B5516_RDY_PSH-13.dgn

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

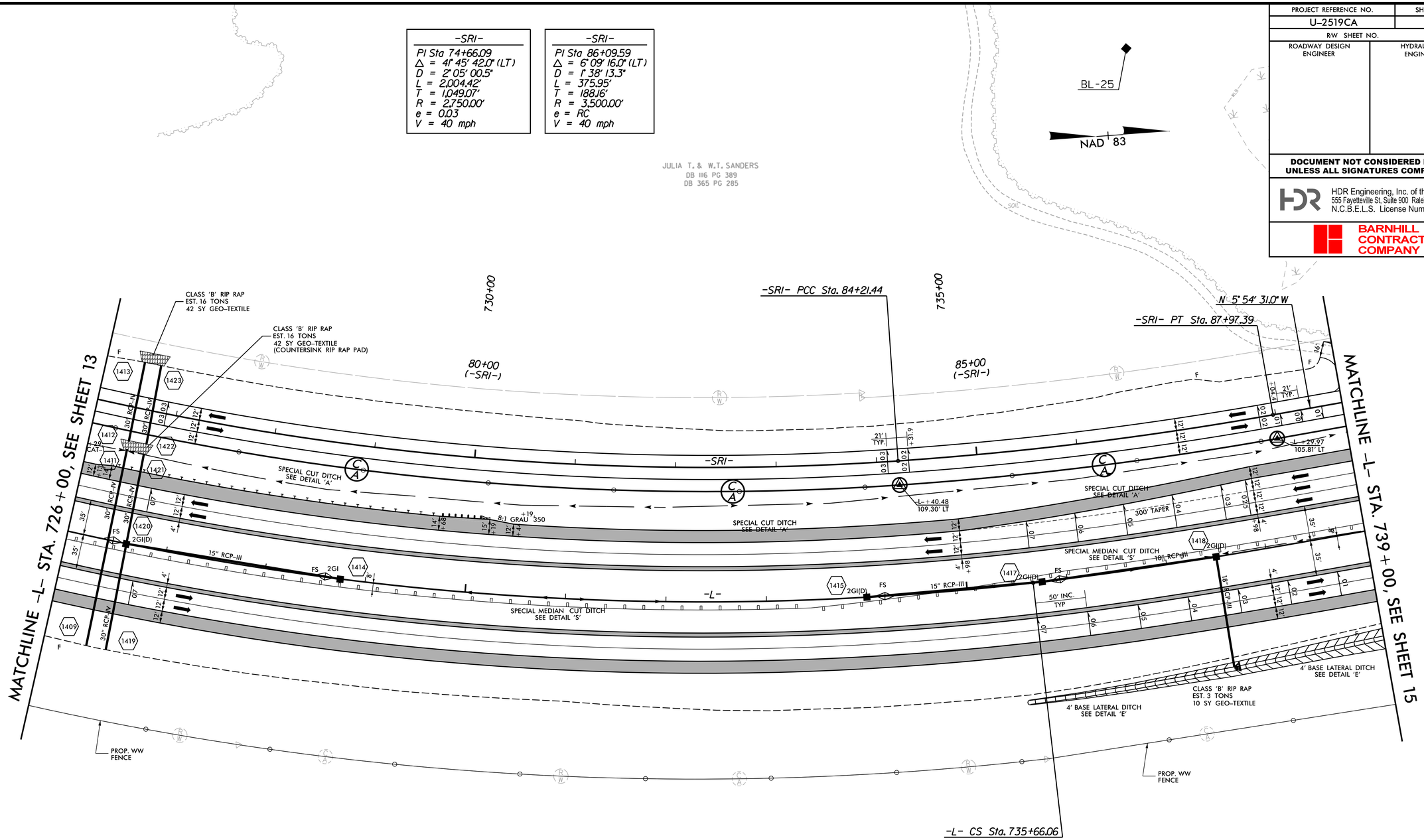
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

HDR Engineering, Inc. of the Carolinas
555 Fayetteville St, Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

-SRI-
PI Sta 74+66.09
Δ = 41° 45' 42.0" (LT)
D = 2° 05' 00.5"
L = 2,004.42'
T = 1,049.07'
R = 2,750.00'
e = 0.03
V = 40 mph

-SRI-
PI Sta 86+09.59
Δ = 6° 09' 16.0" (LT)
D = 1° 38' 13.3"
L = 375.95'
T = 188.16'
R = 3,500.00'
e = RC
V = 40 mph



-L-		
PIs Sta 714+03.63	PI Sta 725+88.96	PIs Sta 736+82.77
Θs = 3° 30' 00.0"	Δ = 40° 54' 58.5" (LT)	Θs = 3° 30' 00.0"
Ls = 350.00'	D = 2° 00' 00.0"	Ls = 350.00'
LT = 233.38'	L = 2,045.81'	LT = 233.38'
ST = 116.71'	T = 1,068.71'	ST = 116.71'
	R = 2,864.79'	
	e = 0.07	
	V = 70 mph	

SEE SHEET 32 FOR -L- PROFILE
SEE SHEET 49 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 12:10:05 PM
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	15
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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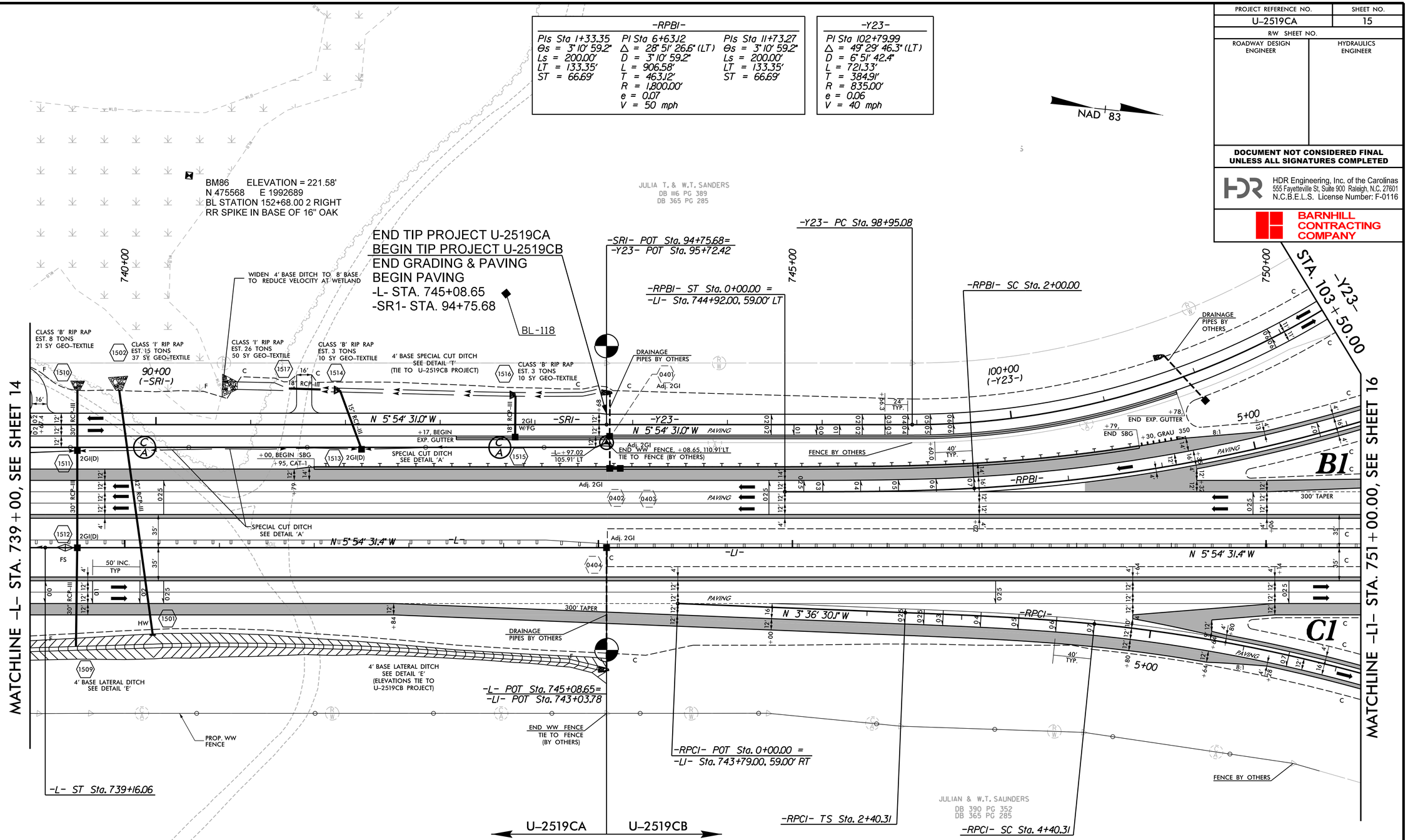
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

-RPBI-		
PIs Sta 1+33.35	PI Sta 6+63.12	PIs Sta 11+73.27
Θs = 3° 10' 59.2"	Δ = 28° 51' 26.6" (LT)	Θs = 3° 10' 59.2"
Ls = 200.00'	D = 3° 10' 59.2"	Ls = 200.00'
LT = 133.35'	L = 906.58'	LT = 133.35'
ST = 66.69'	T = 463.12'	ST = 66.69'
	R = 1,800.00'	
	e = 0.07	
	V = 50 mph	

-Y23-
PI Sta 102+79.99
Δ = 49° 29' 46.3" (LT)
D = 6° 51' 42.4"
L = 721.33'
T = 384.91'
R = 835.00'
e = 0.06
V = 40 mph



-RPCI-		
PIs Sta 3+73.66	PI Sta 7+88.93	PIs Sta 11+94.70
Θs = 3° 22' 13.2"	Δ = 23° 10' 41.2" (RT)	Θs = 3° 22' 13.2"
Ls = 200.00'	D = 3° 22' 13.2"	Ls = 200.00'
LT = 133.36'	L = 687.71'	LT = 133.36'
ST = 66.69'	T = 348.62'	ST = 66.69'
	R = 1,700.00'	
	e = 0.07	
	V = 55 mph	

SEE SHEET 33 FOR -L- PROFILE
SEE SHEET 45 FOR -RPB1- PROFILE
SEE SHEET 46 FOR -RPC1- PROFILE
SEE SHEETS 49 & 50 FOR -SR1- PROFILE
SEE SHEET 50 FOR -Y23- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 10:23:30 AM
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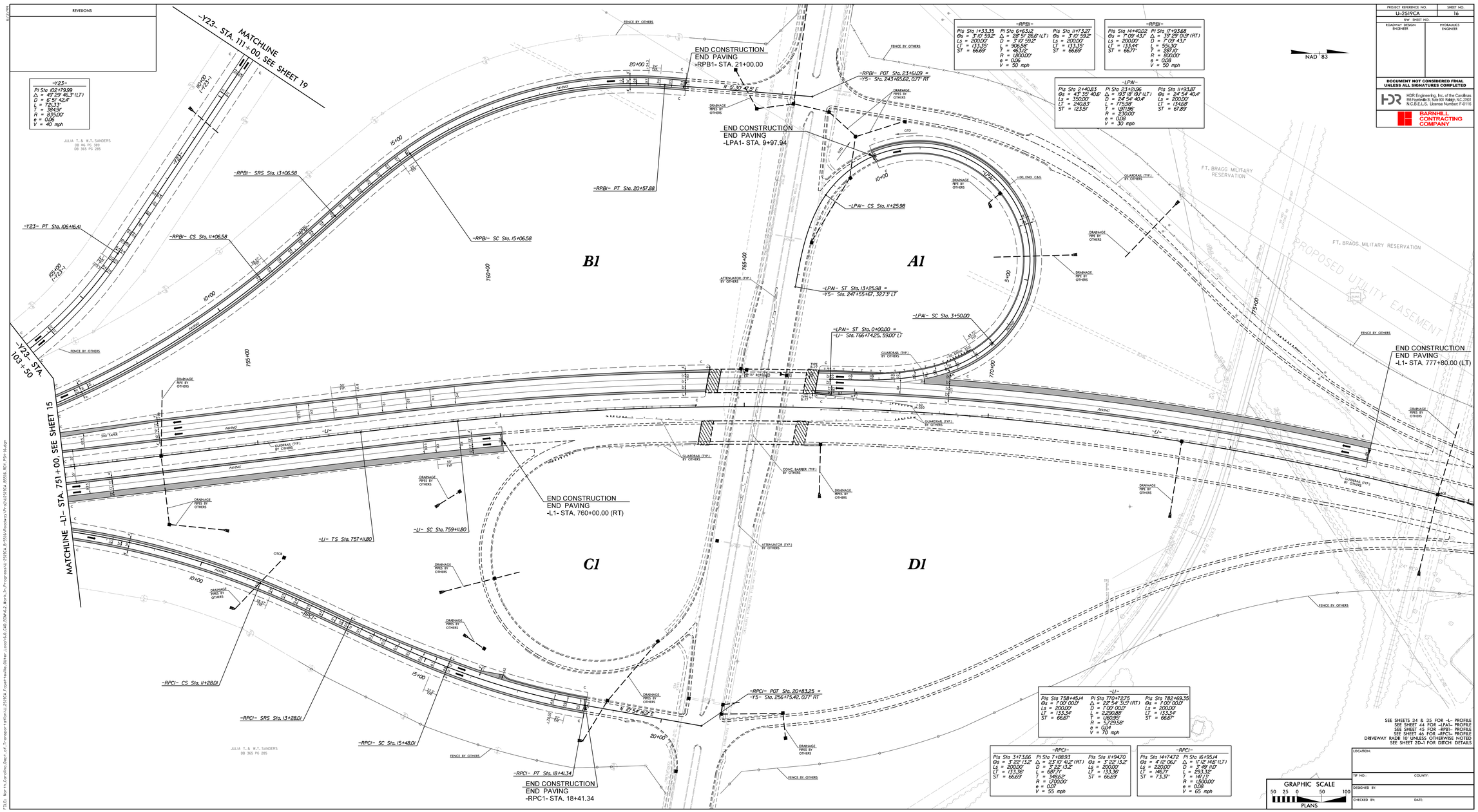
REVISIONS



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

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555 Fayetteville St. Suite 900 Raleigh, N.C. 27601
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY

SEE SHEETS 34 & 35 FOR -L- PROFILE
SEE SHEET 44 FOR -LPA1- PROFILE
SEE SHEET 45 FOR -RPB1- PROFILE
SEE SHEET 46 FOR -RPC1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

LOCATION:

TIP NO.: COUNTY:

DESIGNED BY:

CHECKED BY: DATE:

PLOT DRIVER: ROOT.pltf color.pmp,100ppi
USER: dwarner
FILE: N:\Projects\U-2519CA_R-5510A-Wayne\Proj\U2519CA_R5510A_R01_PS16-16.dgn

PERTABLE: ROOT.pltmp4.tbl
DATE: 7/17/2017
TIME: 2:45:15 PM

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

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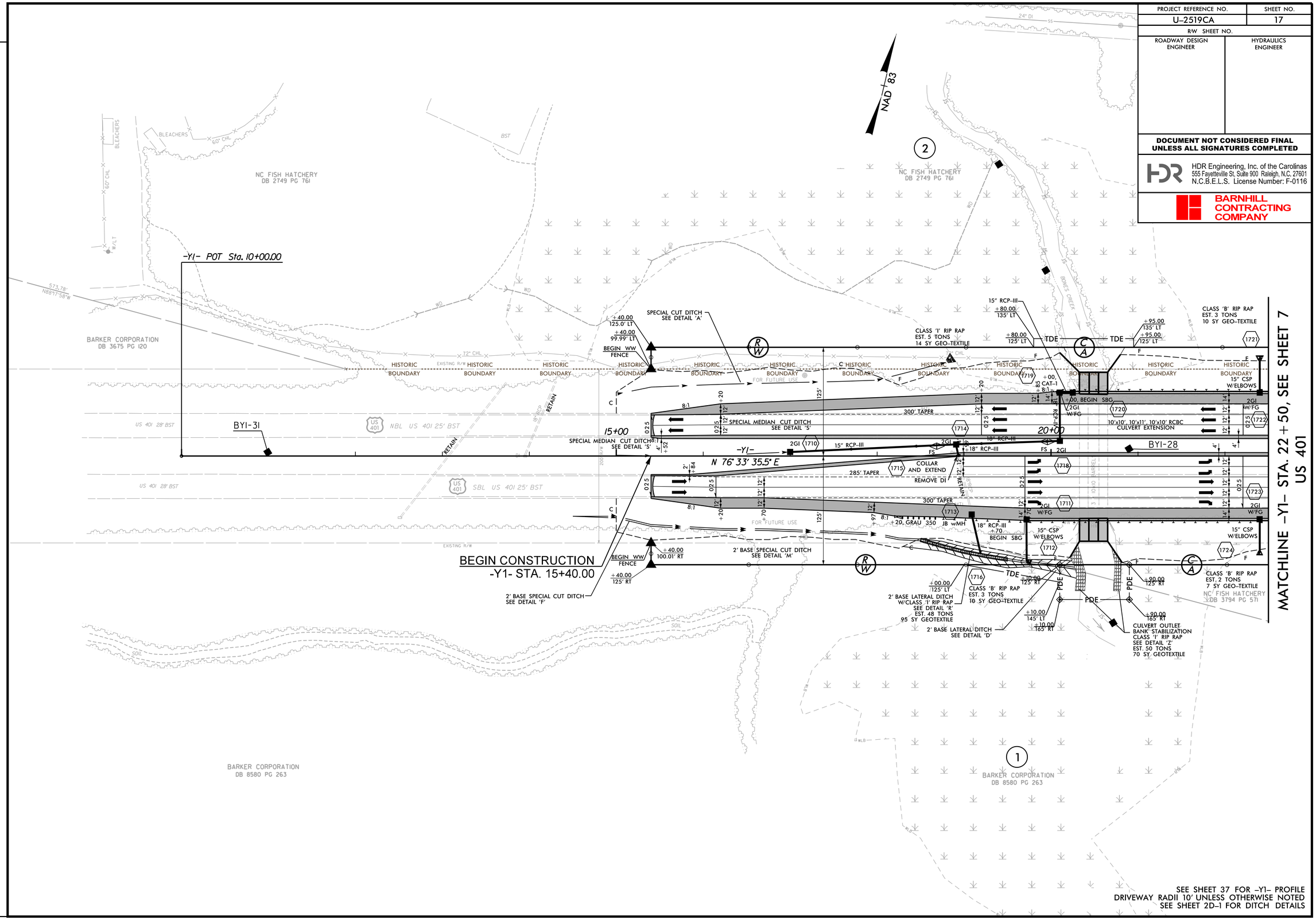
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEET 37 FOR -Y1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: tbedenba DATE: 2/17/2017 TIME: 10:24:33 AM
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

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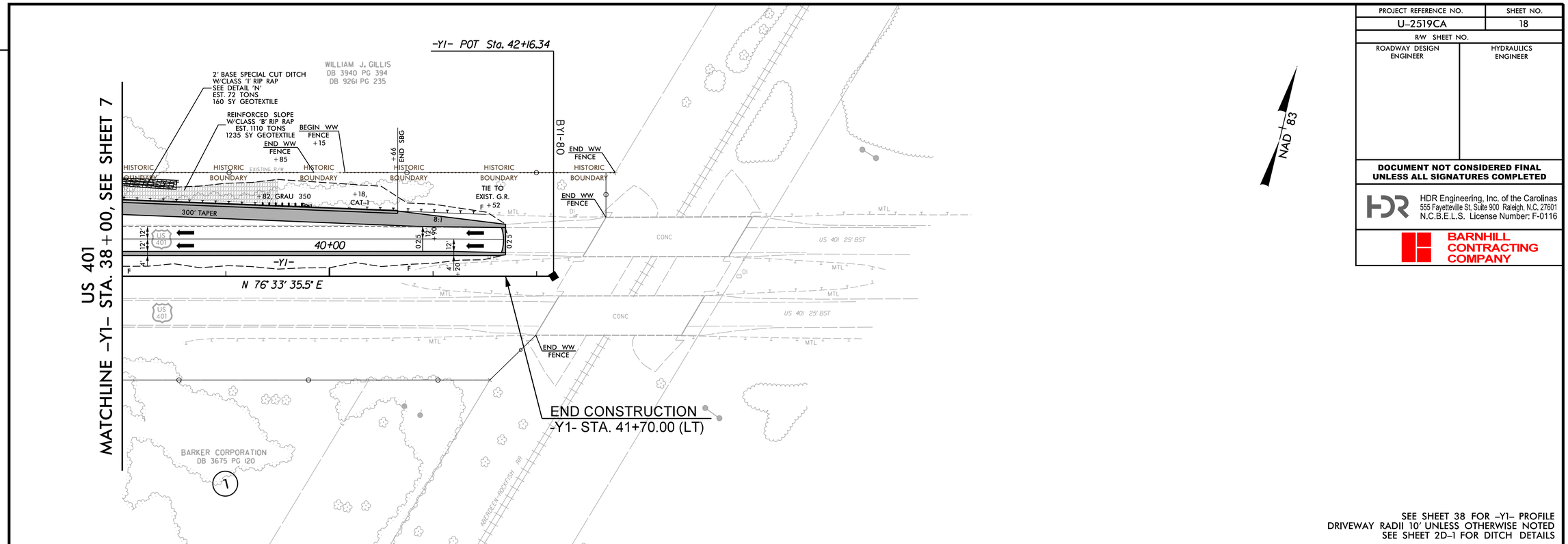
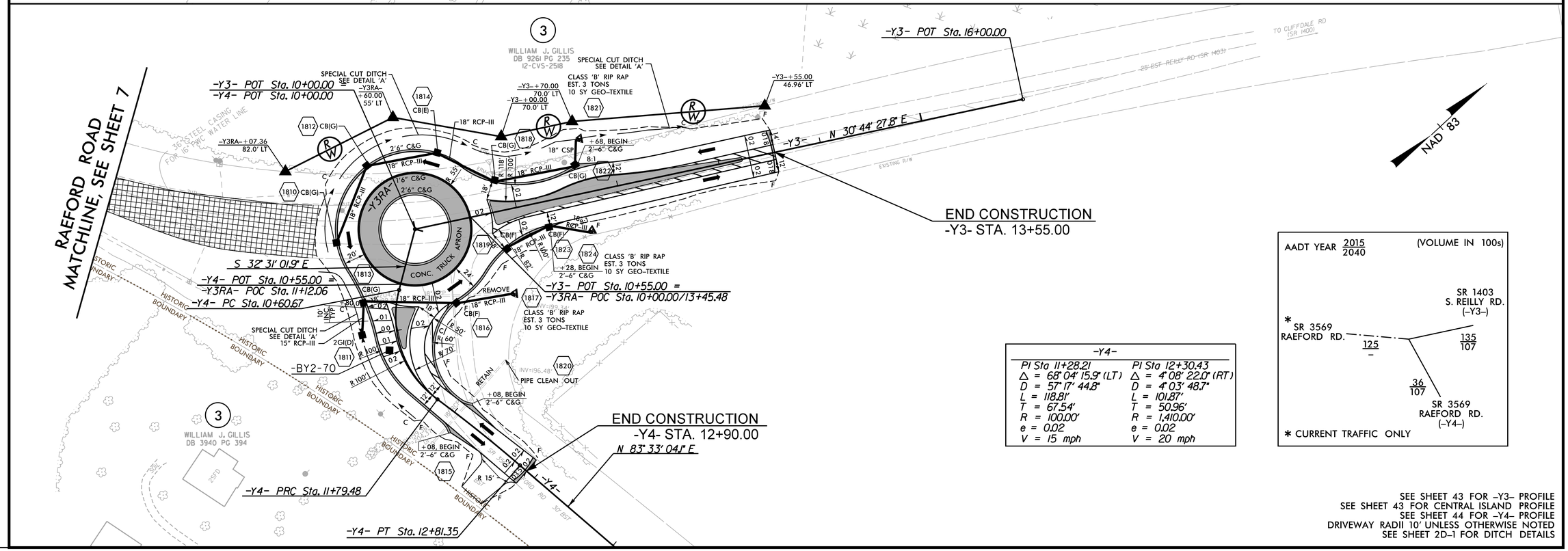
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEET 38 FOR -Y1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS



-Y4-	
PI Sta 11+28.21	PI Sta 12+30.43
Δ = 68° 04' 15.9" (LT)	Δ = 4° 08' 22.0" (RT)
D = 57° 17' 44.8"	D = 4° 03' 48.7"
L = 118.81'	L = 101.87'
T = 67.54'	T = 50.96'
R = 100.00'	R = 1,410.00'
e = 0.02	e = 0.02
V = 15 mph	V = 20 mph

SEE SHEET 43 FOR -Y3- PROFILE
SEE SHEET 43 FOR CENTRAL ISLAND PROFILE
SEE SHEET 44 FOR -Y4- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
USER: dwainwri DATE: 2/17/2017 TIME: 2:51:38 PM
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	19
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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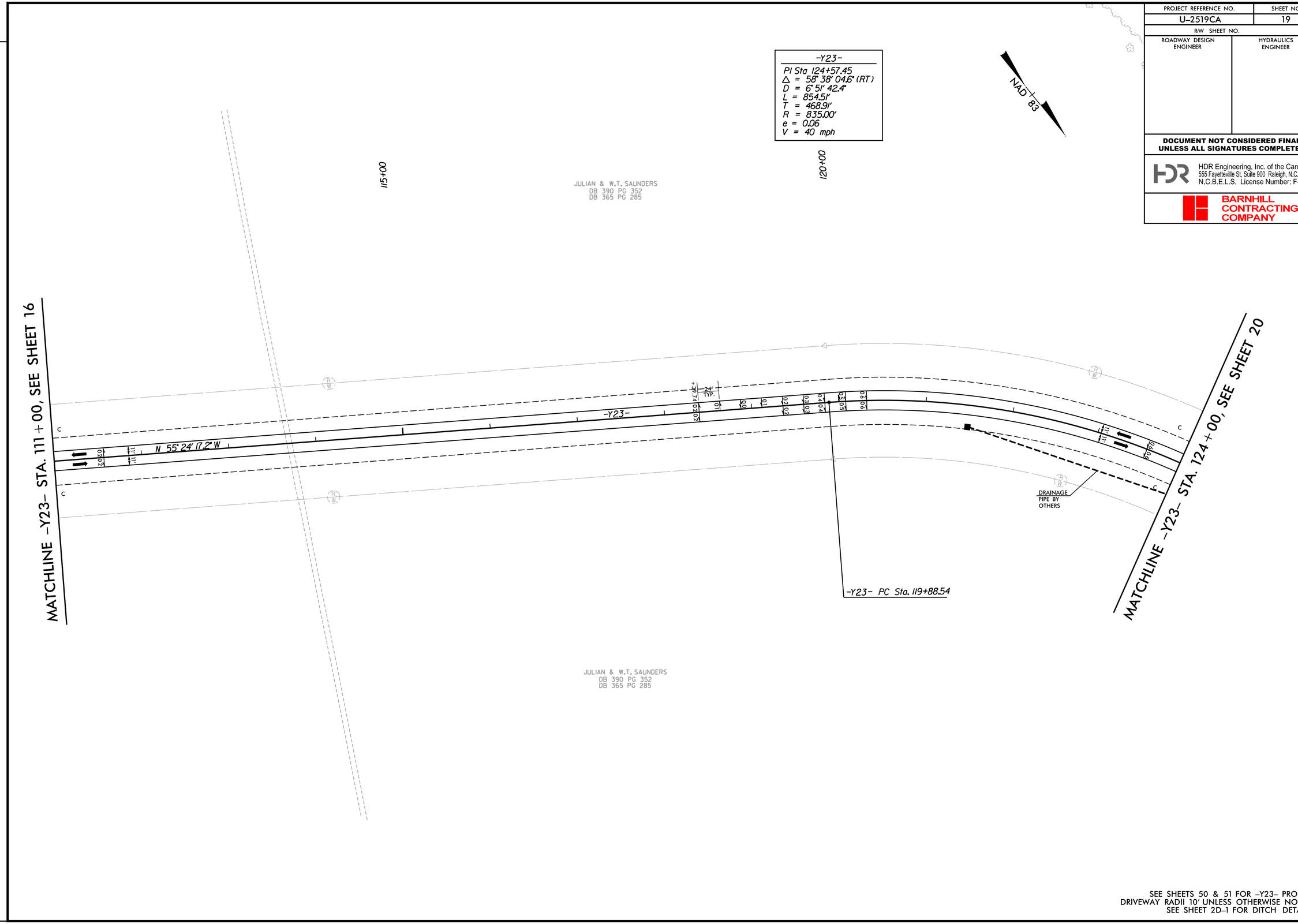
BARNHILL CONTRACTING COMPANY



SEE SHEETS 50 & 51 FOR -Y23- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	20
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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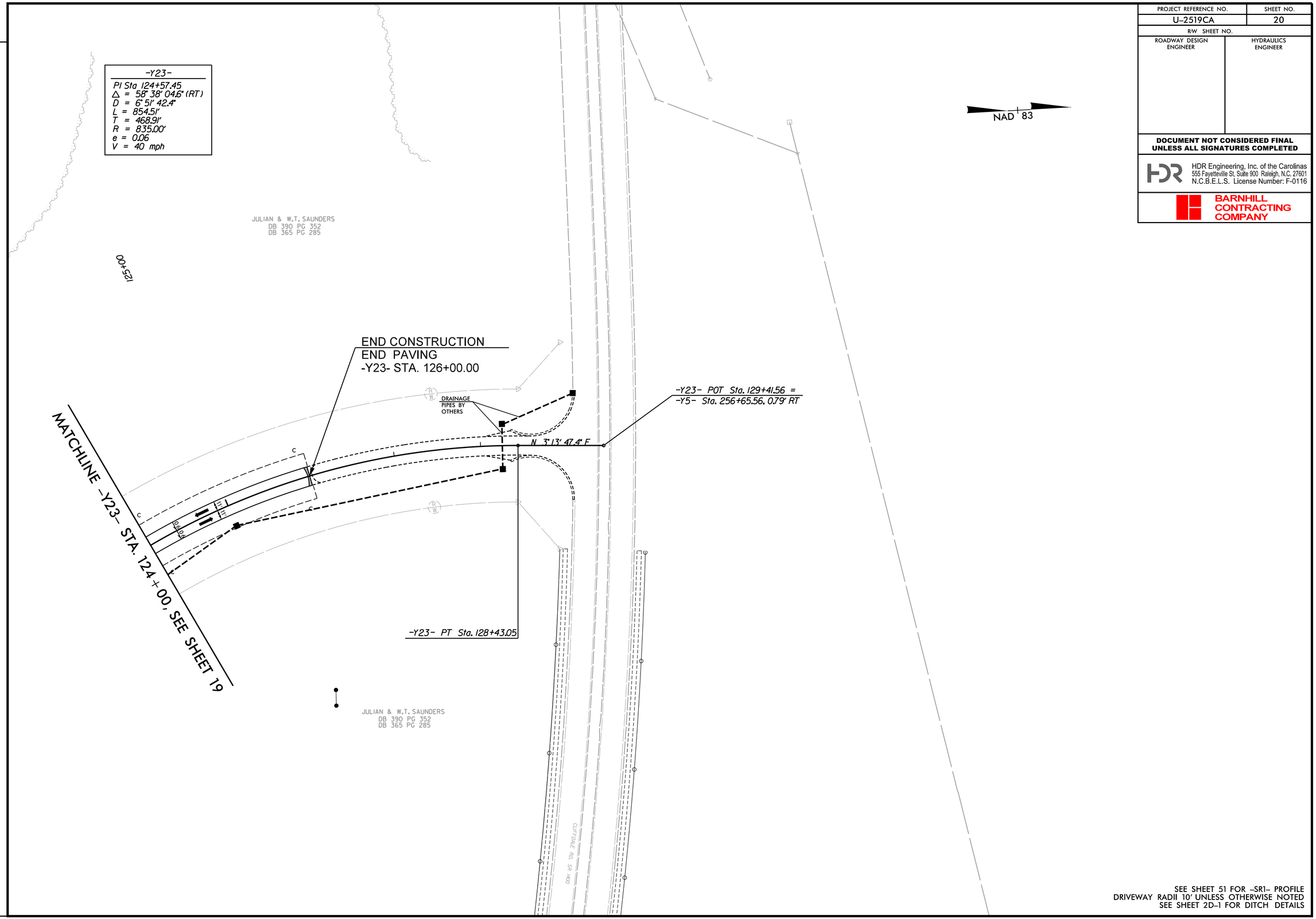
N.C.B.E.L.S. License Number: F-0116

BARNHILL CONTRACTING COMPANY



SEE SHEET 51 FOR -SR1- PROFILE
DRIVEWAY RADII 10' UNLESS OTHERWISE NOTED
SEE SHEET 2D-1 FOR DITCH DETAILS

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshp.fl.tbl
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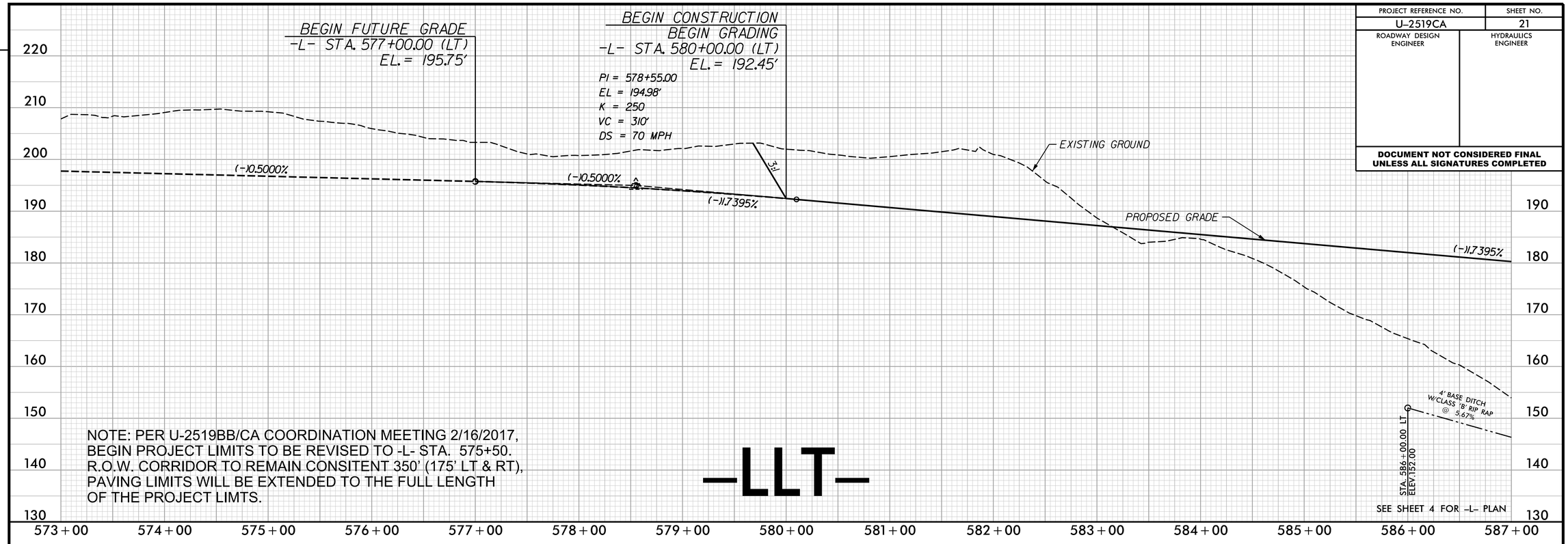
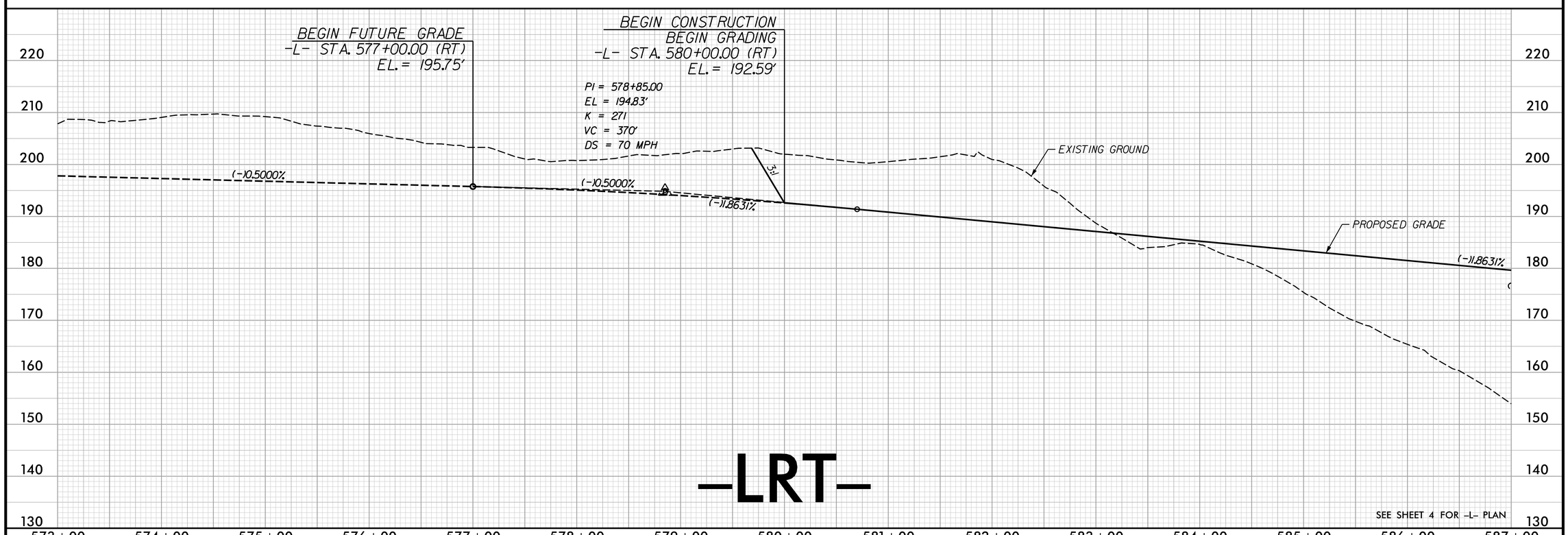
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



NOTE: PER U-2519BB/CA COORDINATION MEETING 2/16/2017, BEGIN PROJECT LIMITS TO BE REVISED TO -L- STA. 575+50. R.O.W. CORRIDOR TO REMAIN CONSITENT 350' (175' LT & RT), PAVING LIMITS WILL BE EXTENDED TO THE FULL LENGTH OF THE PROJECT LIMTS.

SEE SHEET 4 FOR -L- PLAN



SEE SHEET 4 FOR -L- PLAN

REVISIONS

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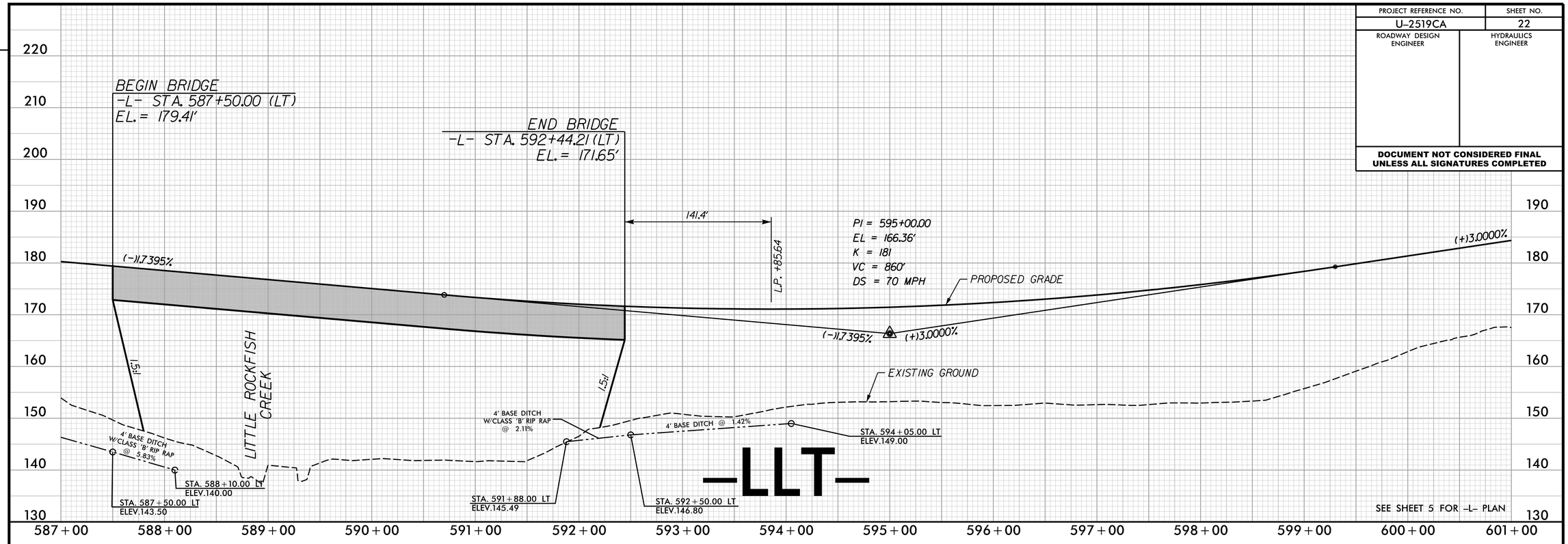
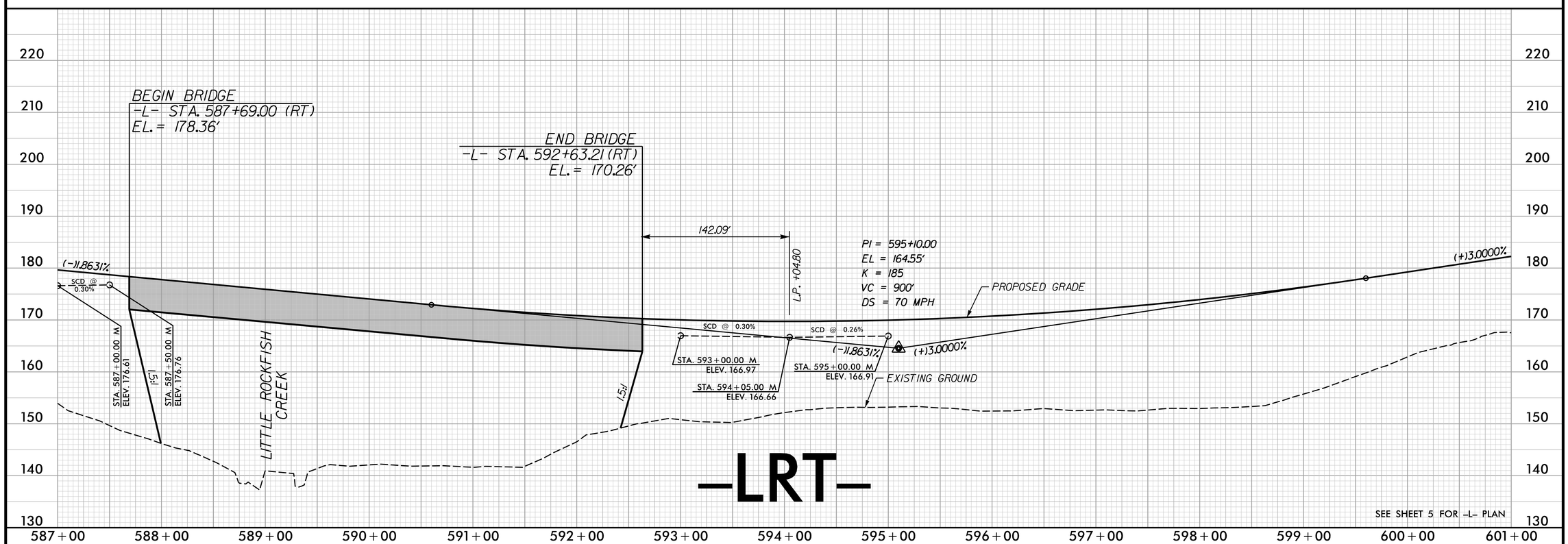
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	22
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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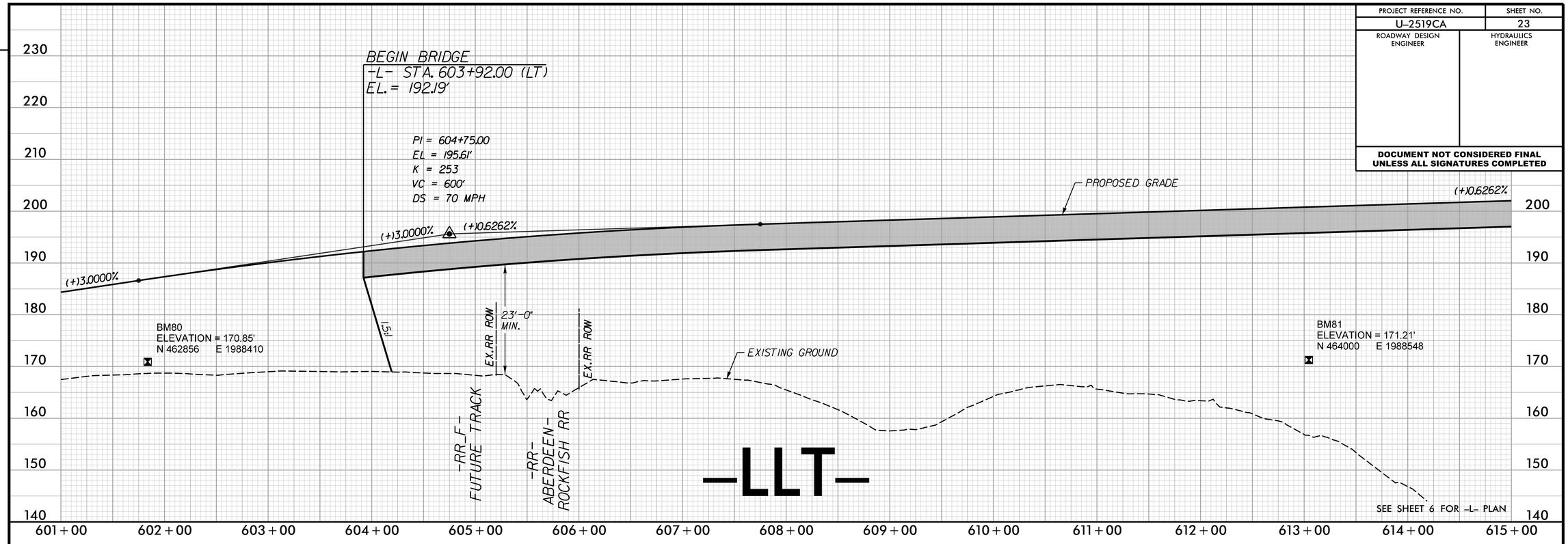
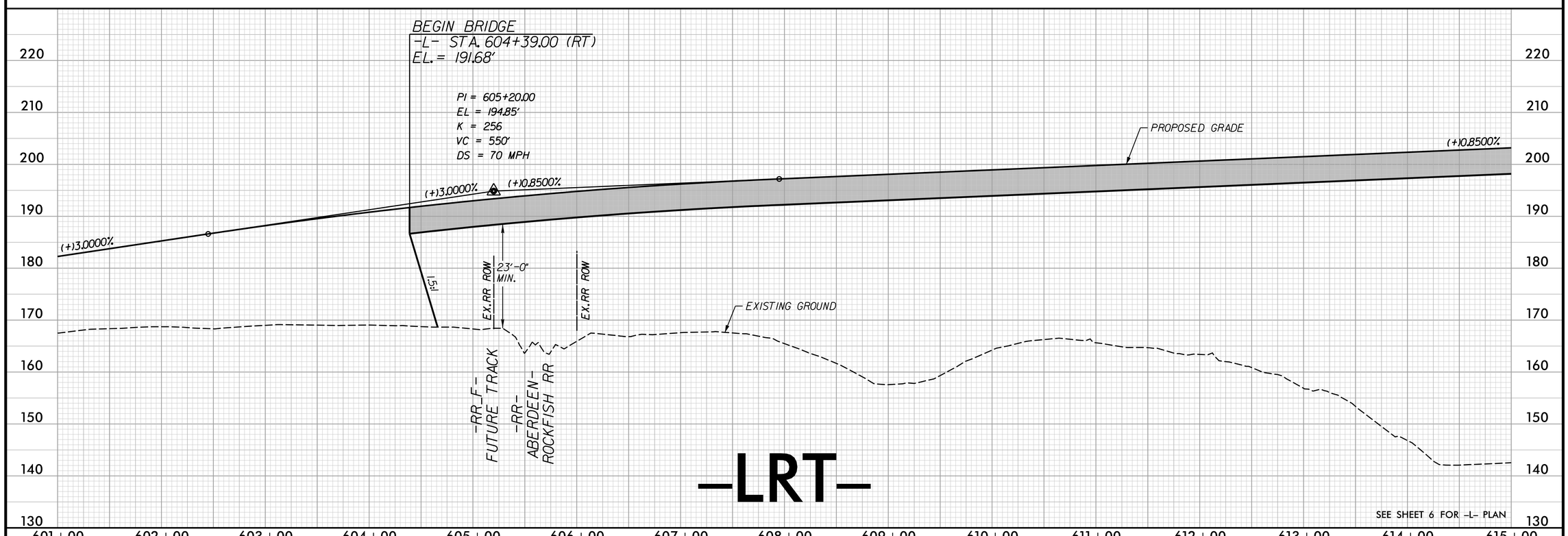
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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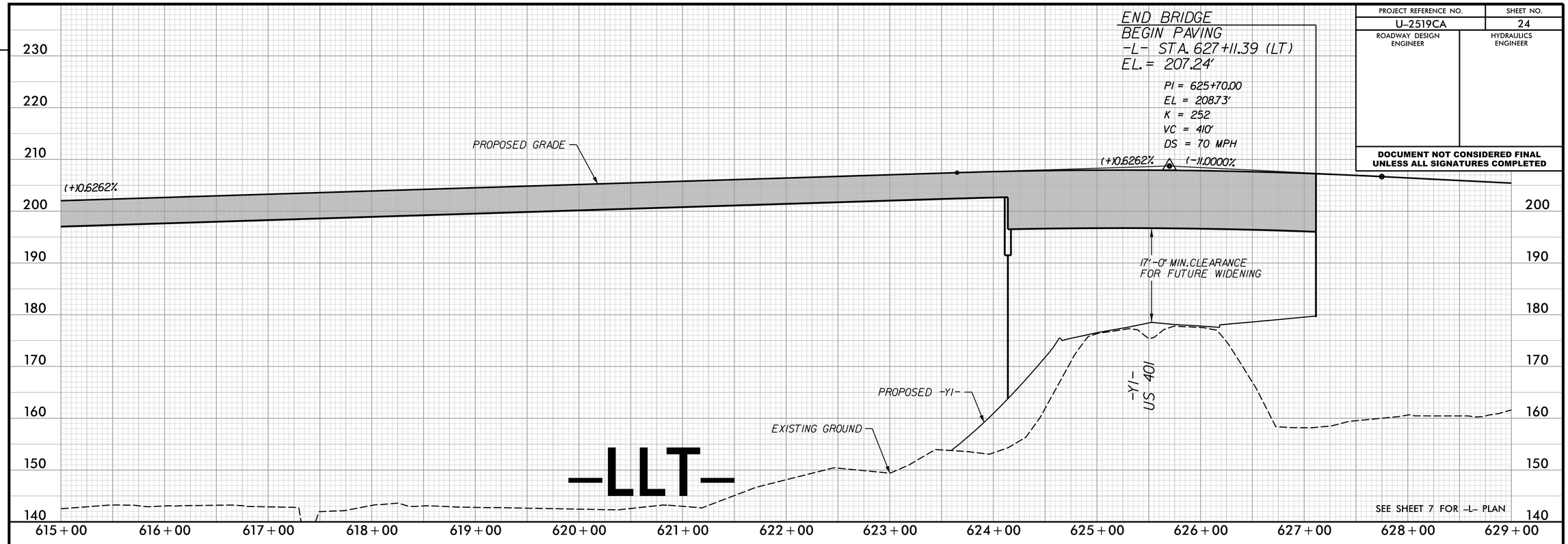
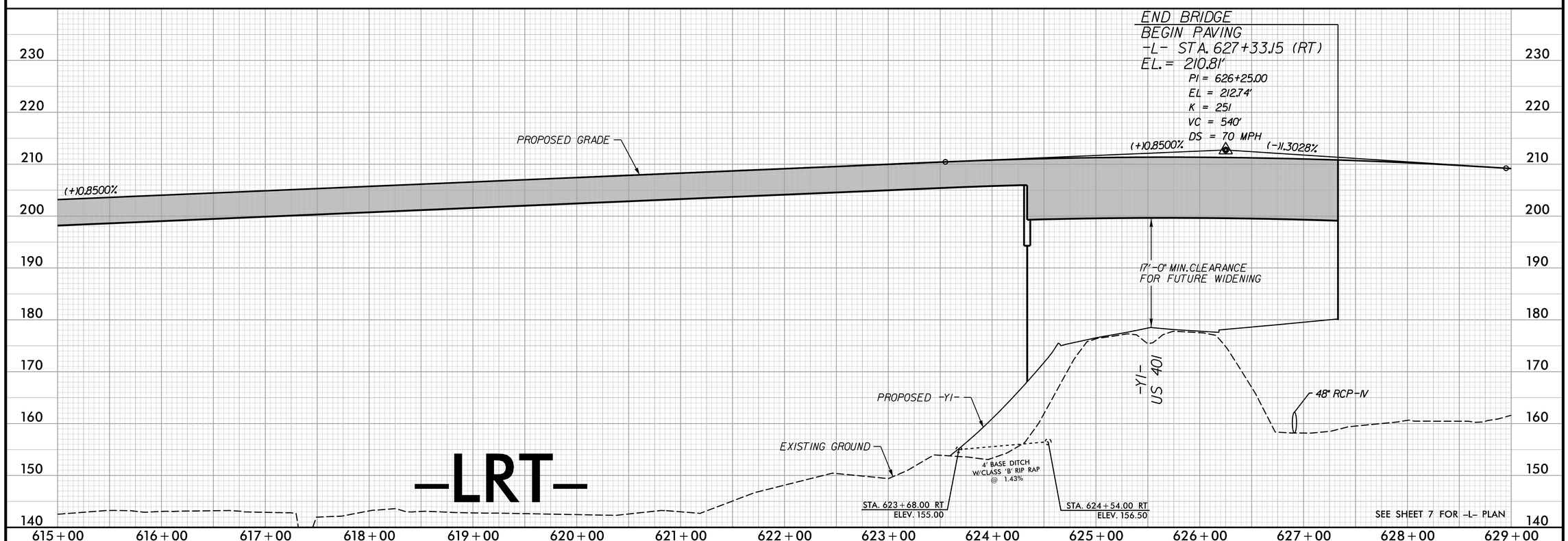
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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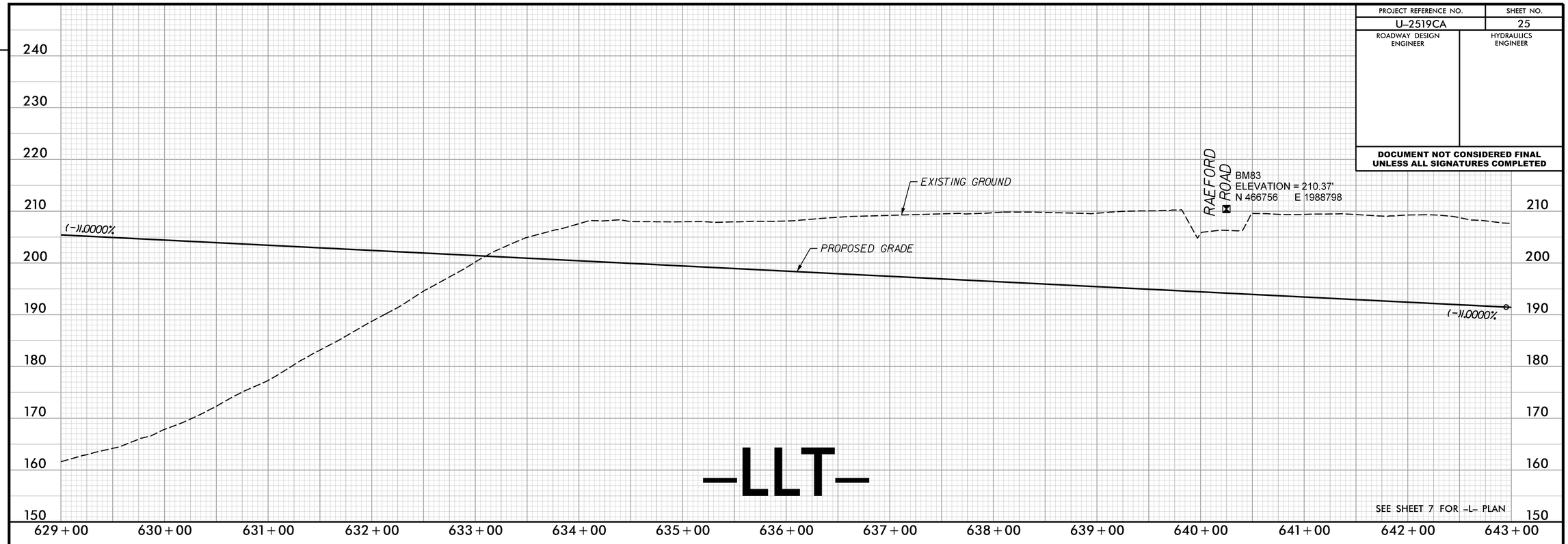
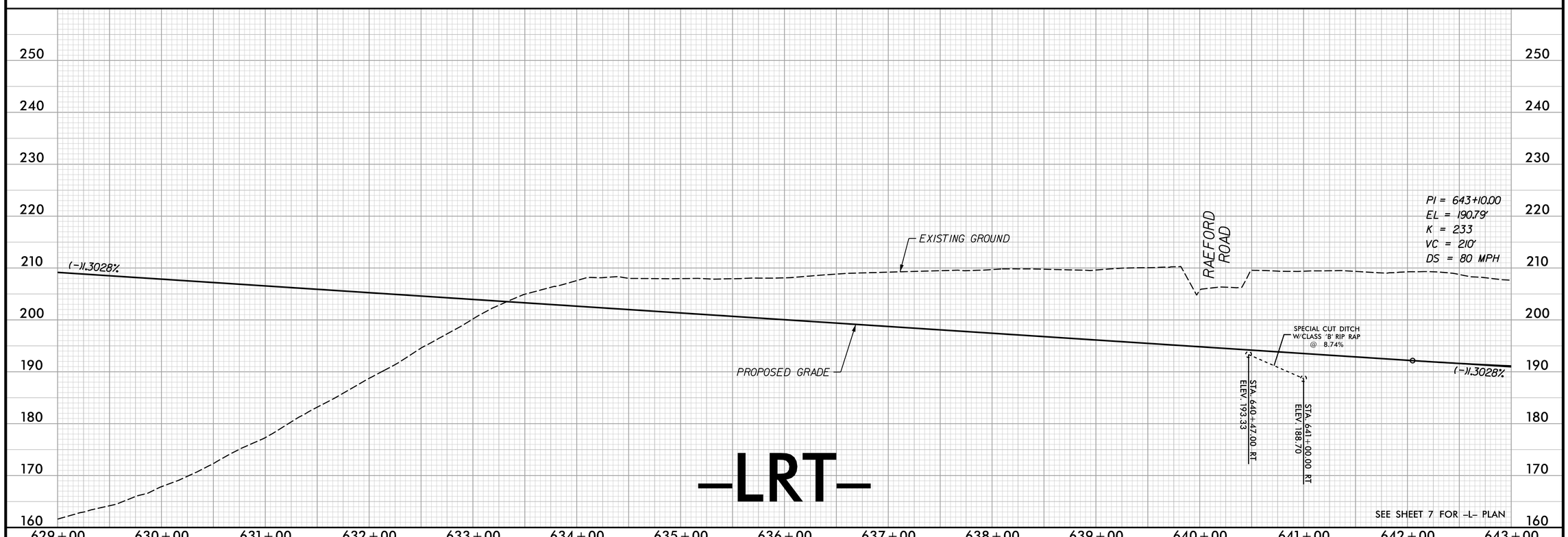
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	25
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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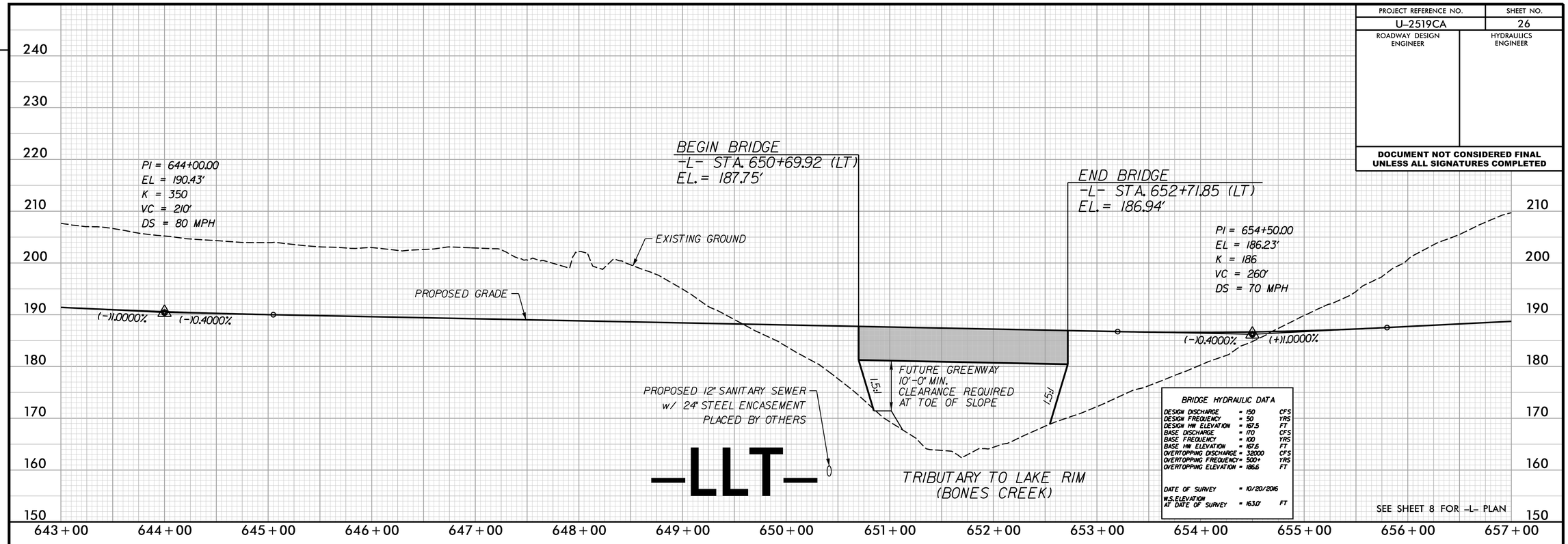
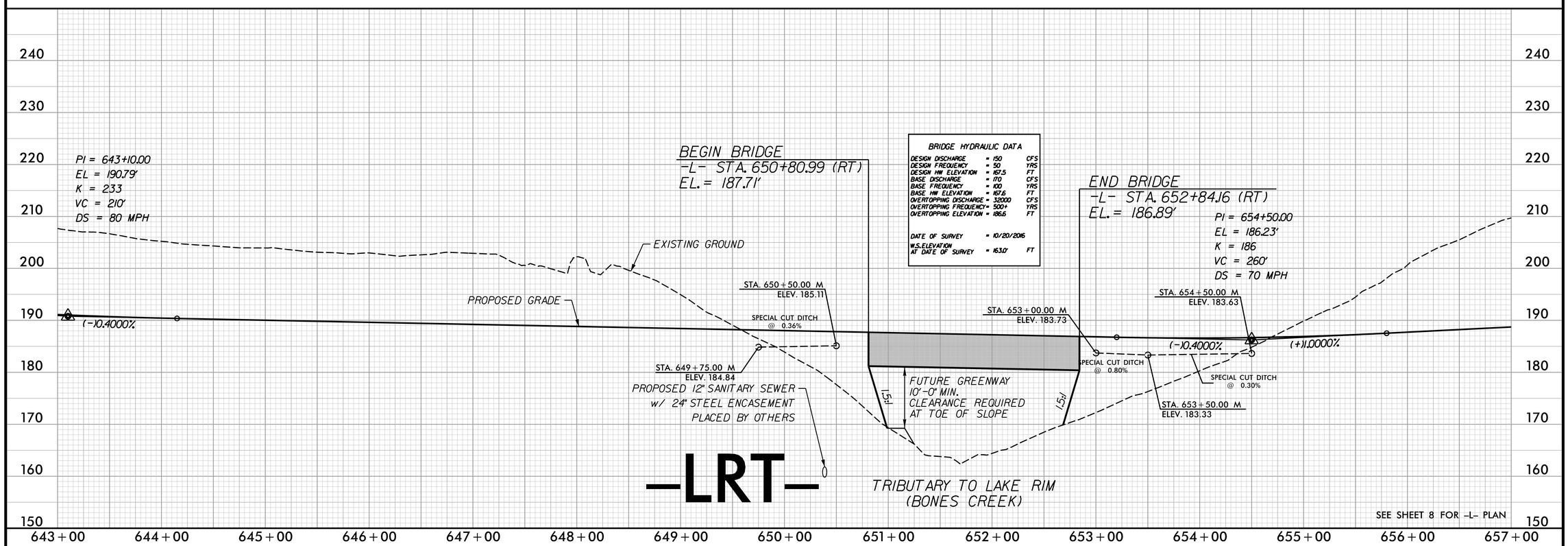
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt
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DATE: 2/17/2017
PENTABLE: NCDOT_pshpfl.tbl
TIME: 10:29:22 AM
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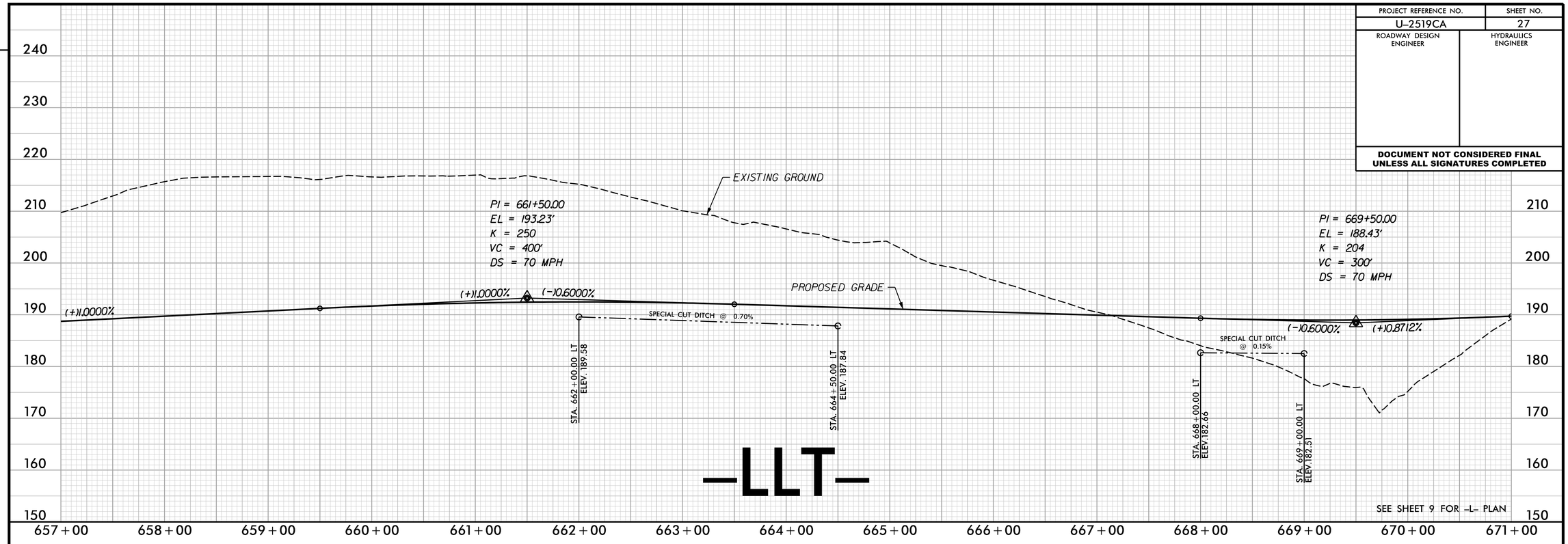
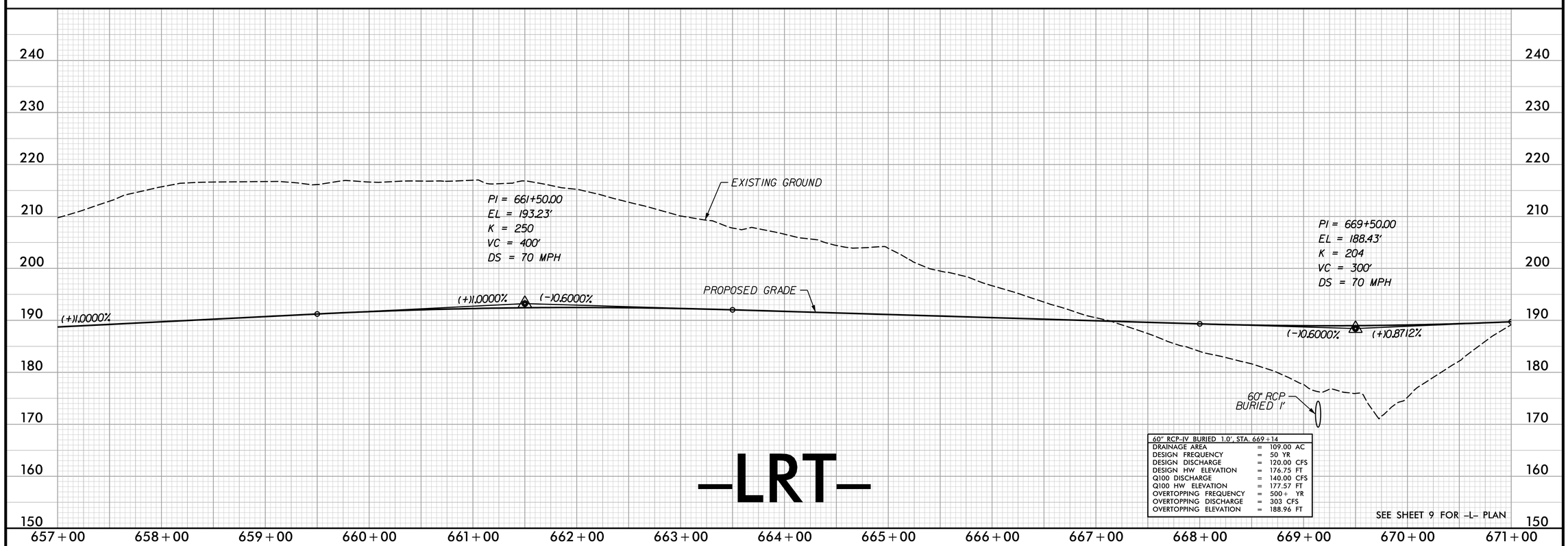
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	27
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





60" RCP-IV BURIED 1.0', STA. 669+14		
DRAINAGE AREA	=	109.00 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	120.00 CFS
DESIGN HW ELEVATION	=	176.75 FT
Q100 DISCHARGE	=	140.00 CFS
Q100 HW ELEVATION	=	177.57 FT
OVERTOPPING FREQUENCY	=	500+ YR
OVERTOPPING DISCHARGE	=	303 CFS
OVERTOPPING ELEVATION	=	188.96 FT

REVISIONS

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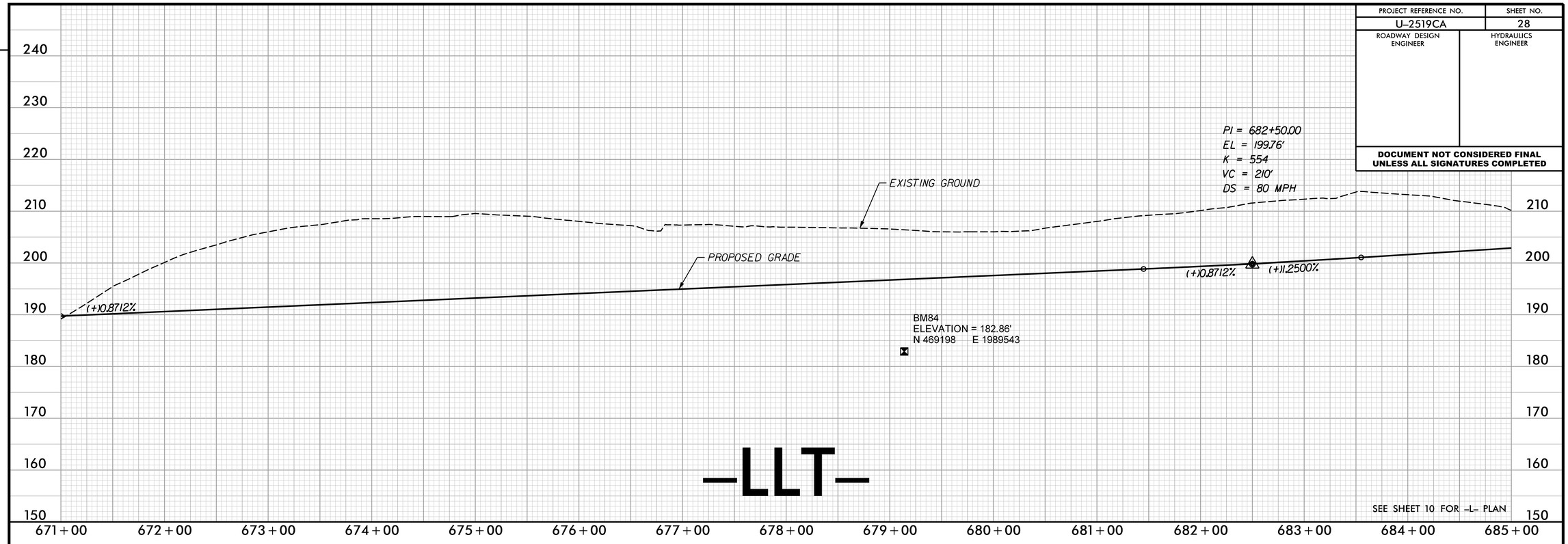
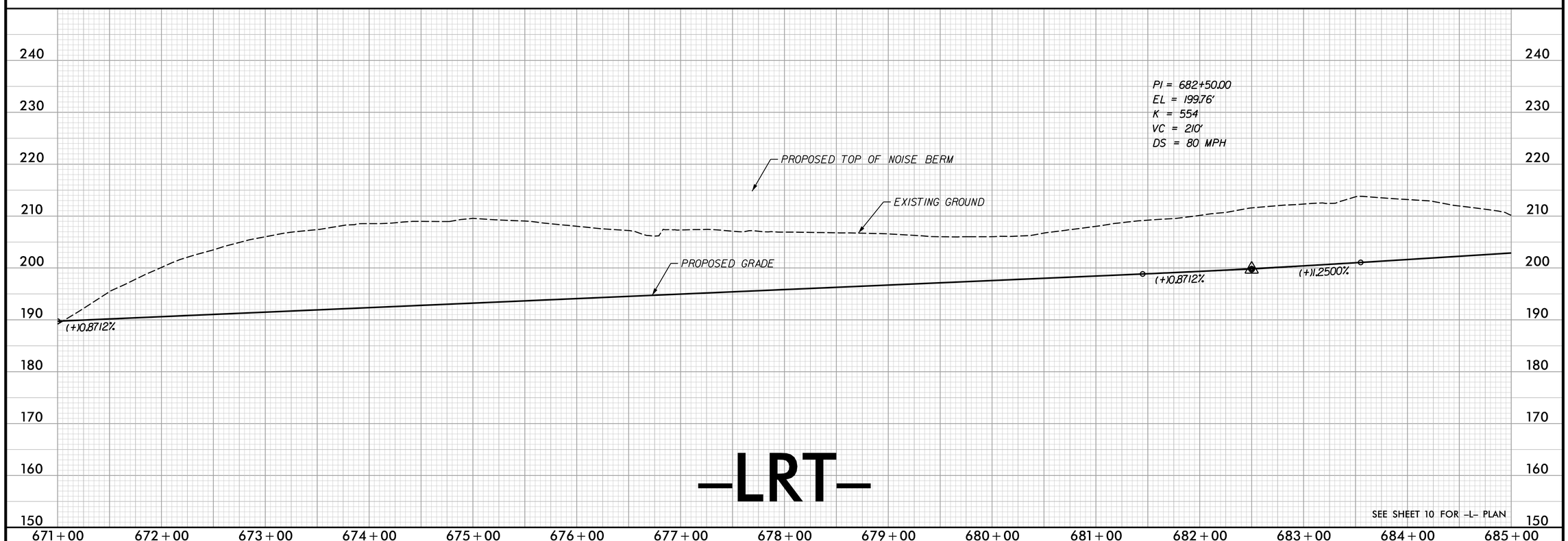
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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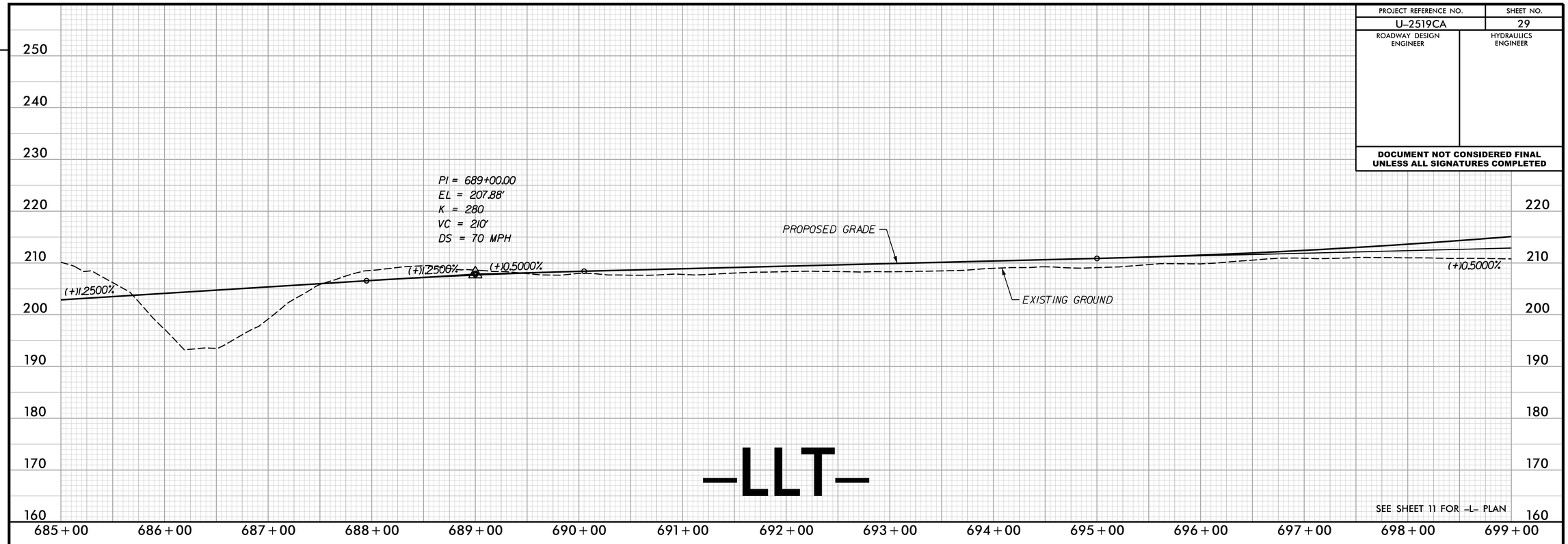
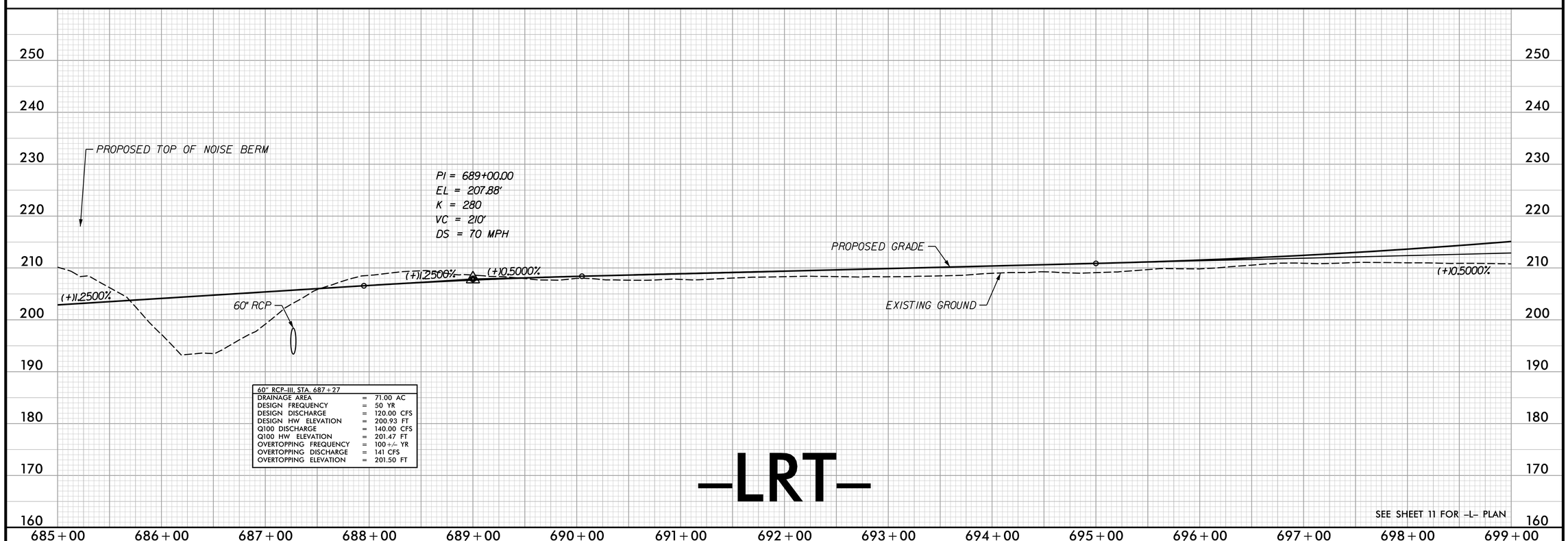
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	29
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





60" RCP-III, STA. 687+27		
DRAINAGE AREA	=	71.00 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	120.00 CFS
DESIGN HW ELEVATION	=	200.93 FT
Q100 DISCHARGE	=	140.00 CFS
Q100 HW ELEVATION	=	201.47 FT
OVERTOPPING FREQUENCY	=	100+/- YR
OVERTOPPING DISCHARGE	=	141 CFS
OVERTOPPING ELEVATION	=	201.50 FT

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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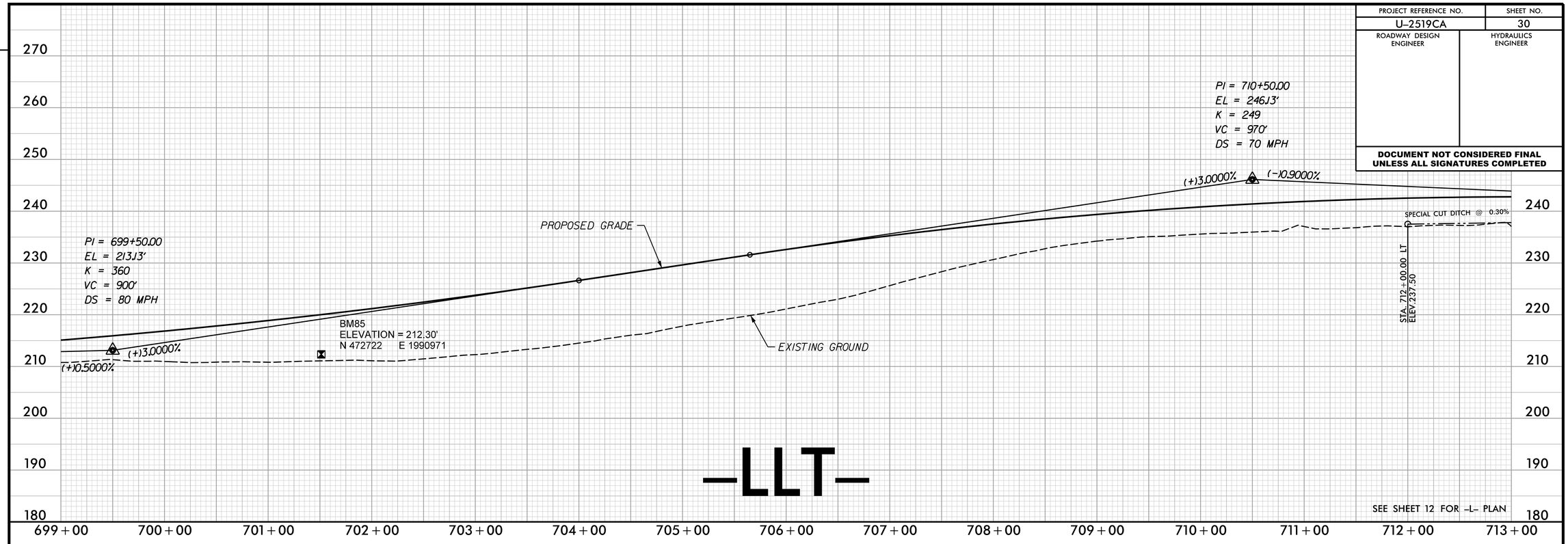
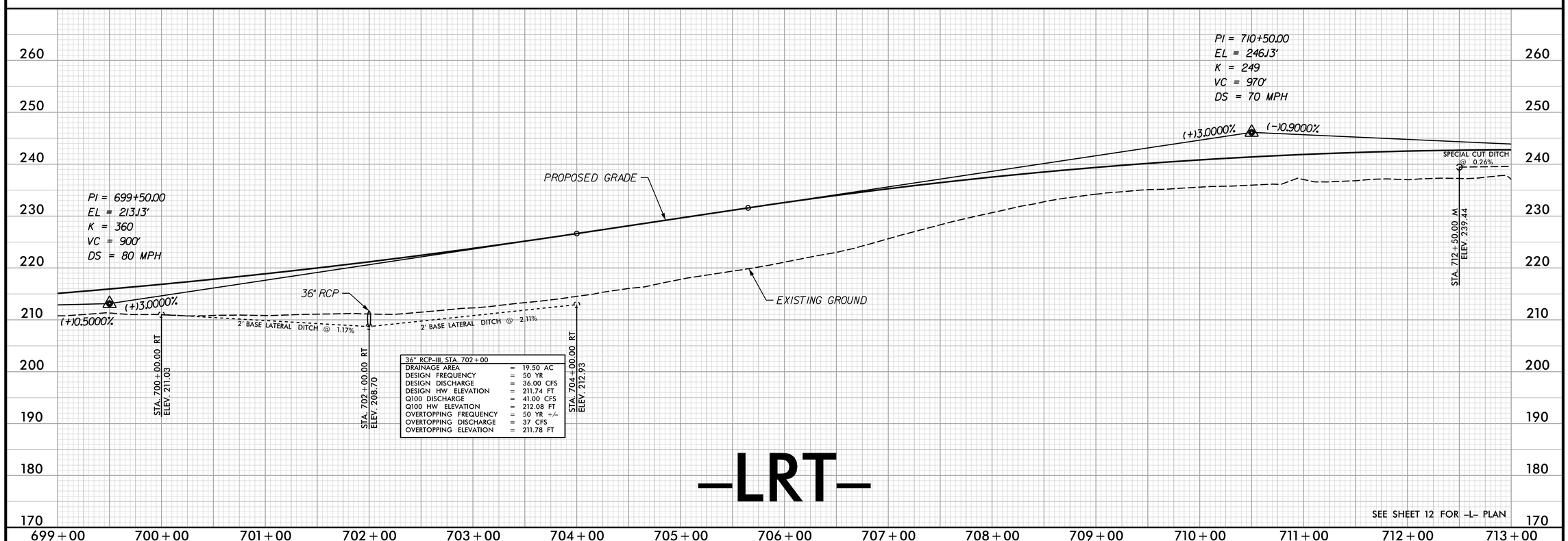
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	30
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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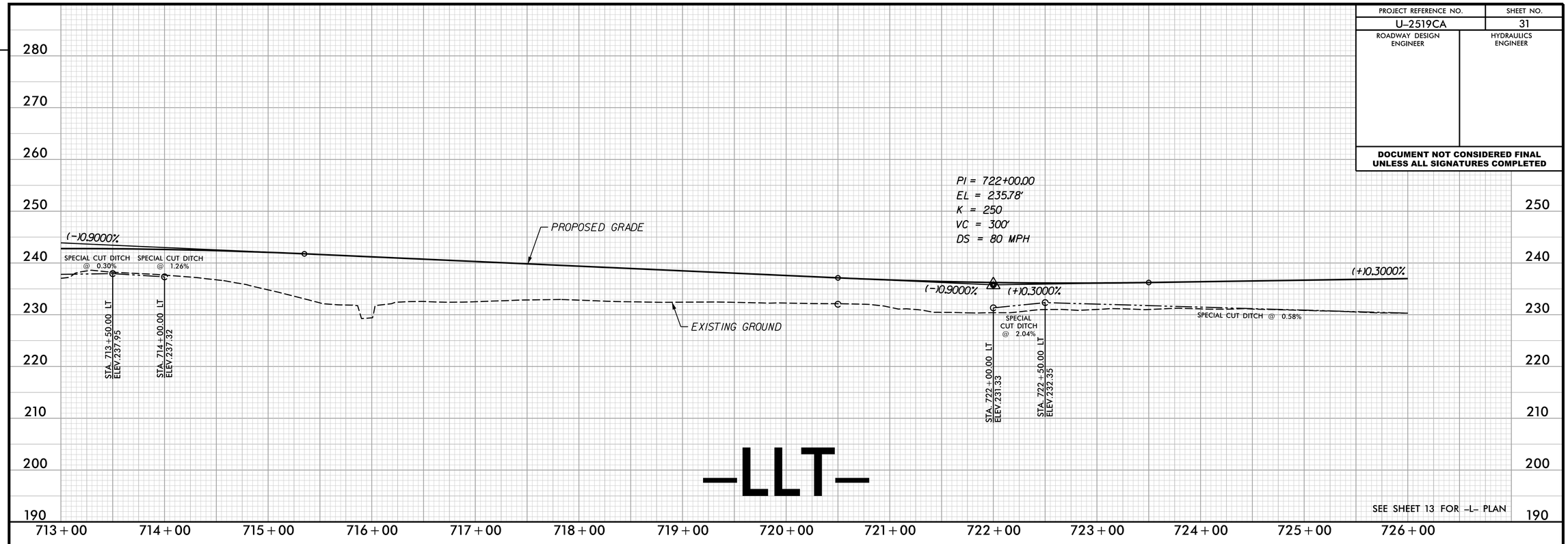
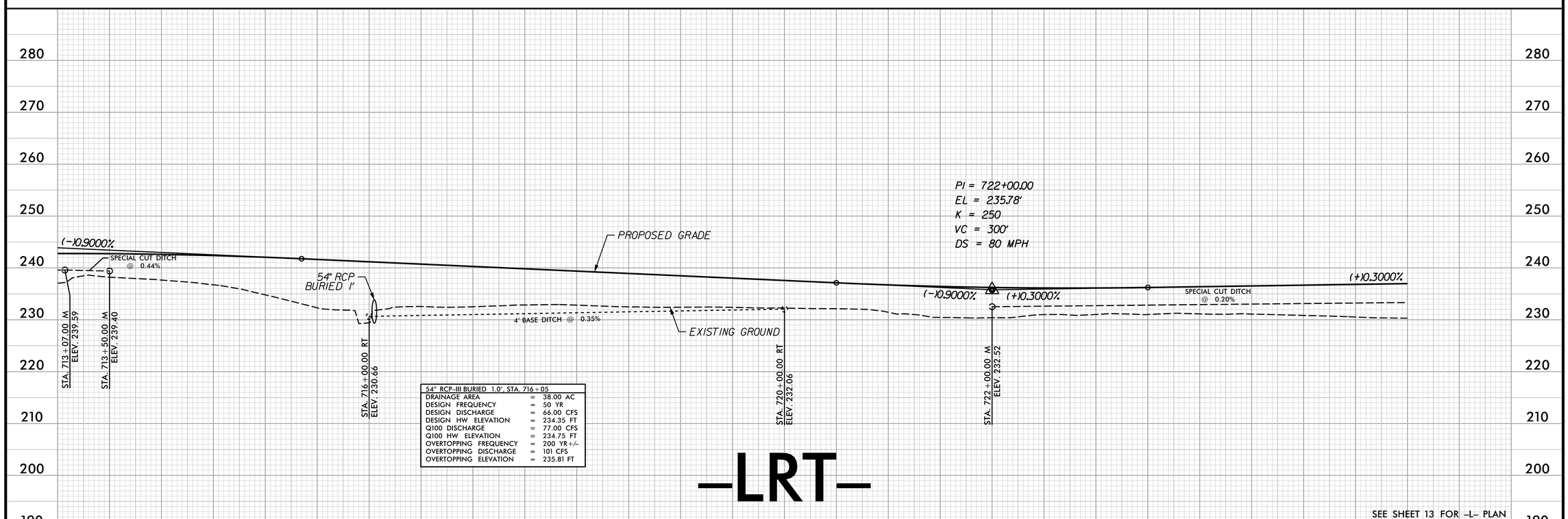
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	31
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





54" RCP-III BURIED 1.0', STA. 716+05		
DRAINAGE AREA	=	38.00 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	66.00 CFS
DESIGN HW ELEVATION	=	234.35 FT
Q100 DISCHARGE	=	77.00 CFS
Q100 HW ELEVATION	=	234.75 FT
OVERTOPPING FREQUENCY	=	200 YR+/-
OVERTOPPING DISCHARGE	=	101 CFS
OVERTOPPING ELEVATION	=	235.81 FT

REVISIONS

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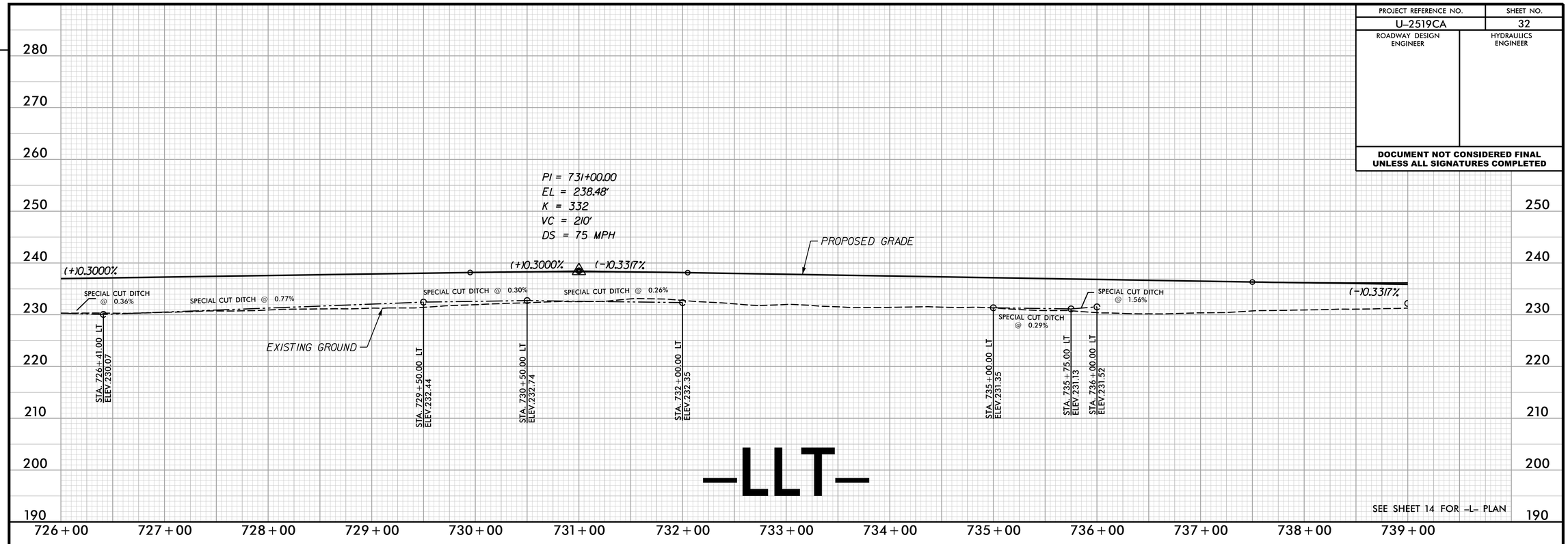
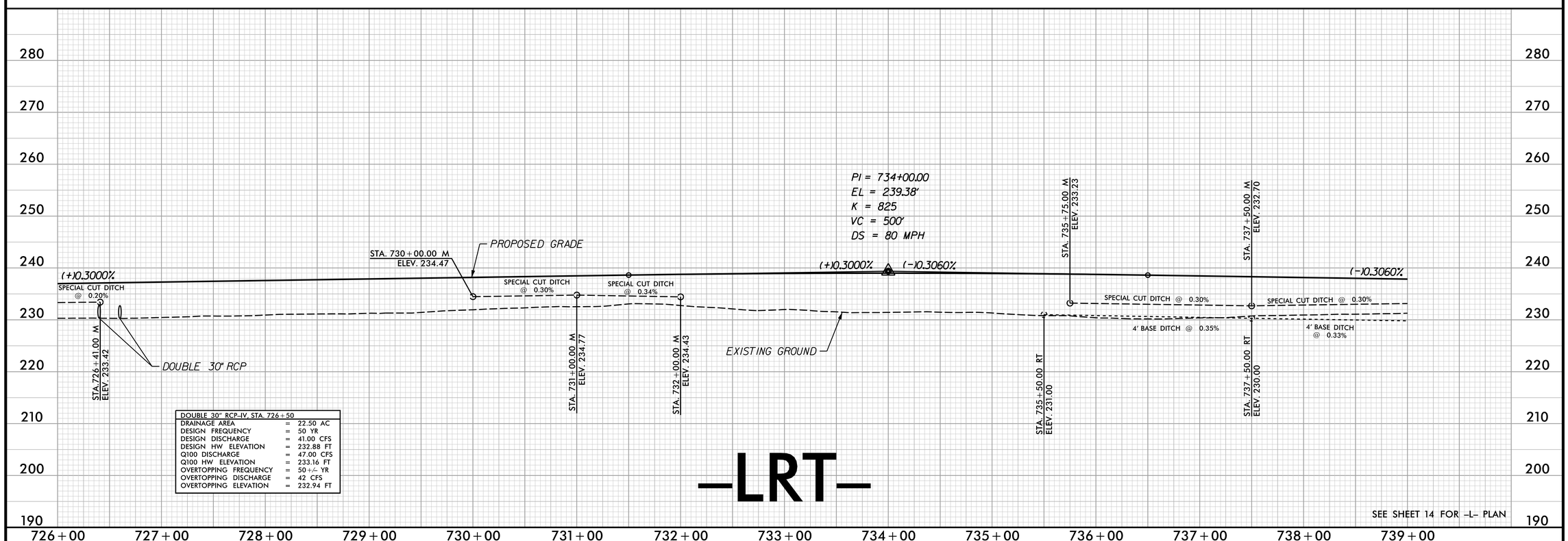
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	32
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





DOUBLE 30" RCP-IV, STA. 726+50		
DRAINAGE AREA	=	22.50 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	41.00 CFS
DESIGN HW ELEVATION	=	232.88 FT
Q100 DISCHARGE	=	47.00 CFS
Q100 HW ELEVATION	=	233.16 FT
OVERTOPPING FREQUENCY	=	50+/- YR
OVERTOPPING DISCHARGE	=	42 CFS
OVERTOPPING ELEVATION	=	232.94 FT

REVISIONS

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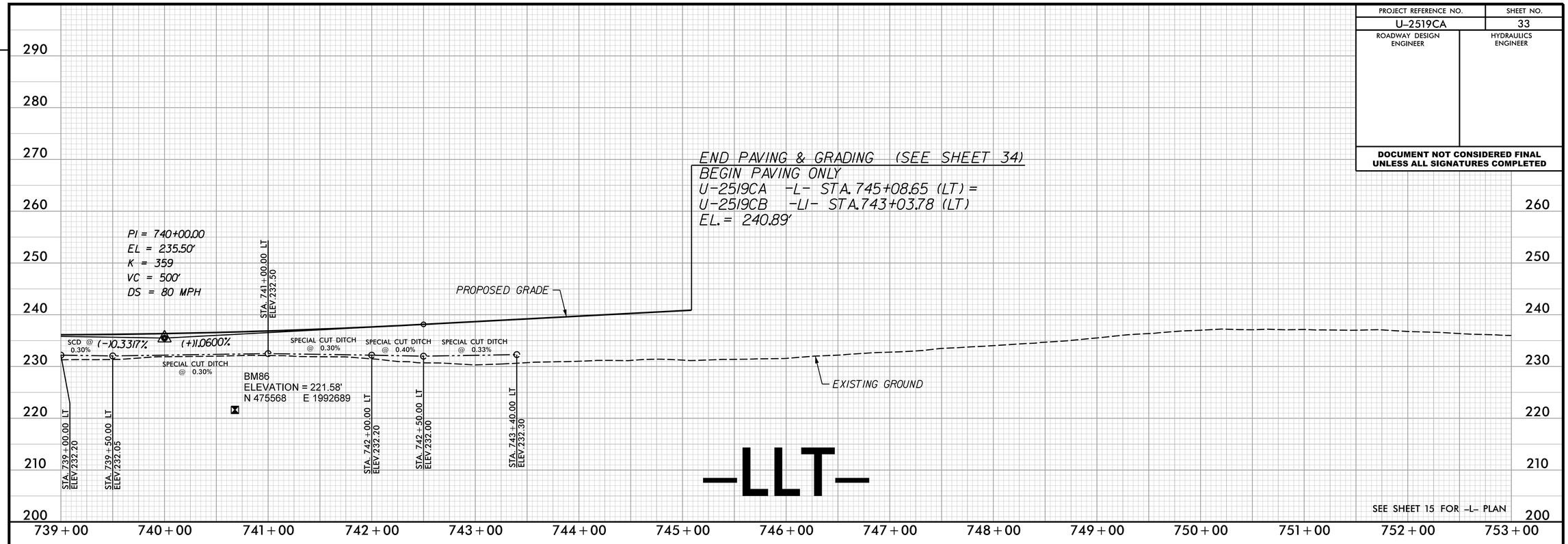
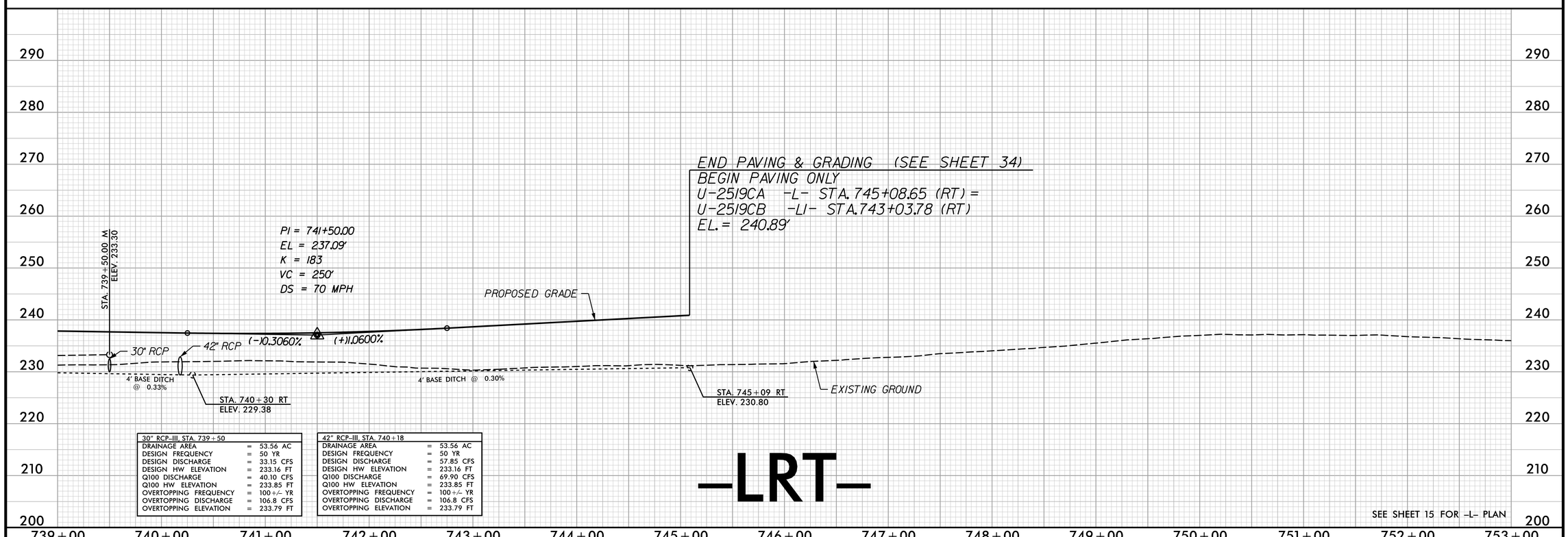
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





30" RCP-III, STA. 739+50		
DRAINAGE AREA	=	53.56 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	33.15 CFS
DESIGN HW ELEVATION	=	233.16 FT
Q100 DISCHARGE	=	40.10 CFS
Q100 HW ELEVATION	=	233.85 FT
OVERTOPPING FREQUENCY	=	100+/- YR
OVERTOPPING DISCHARGE	=	106.8 CFS
OVERTOPPING ELEVATION	=	233.79 FT

42" RCP-III, STA. 740+18		
DRAINAGE AREA	=	53.56 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	57.85 CFS
DESIGN HW ELEVATION	=	233.16 FT
Q100 DISCHARGE	=	69.90 CFS
Q100 HW ELEVATION	=	233.85 FT
OVERTOPPING FREQUENCY	=	100+/- YR
OVERTOPPING DISCHARGE	=	106.8 CFS
OVERTOPPING ELEVATION	=	233.79 FT

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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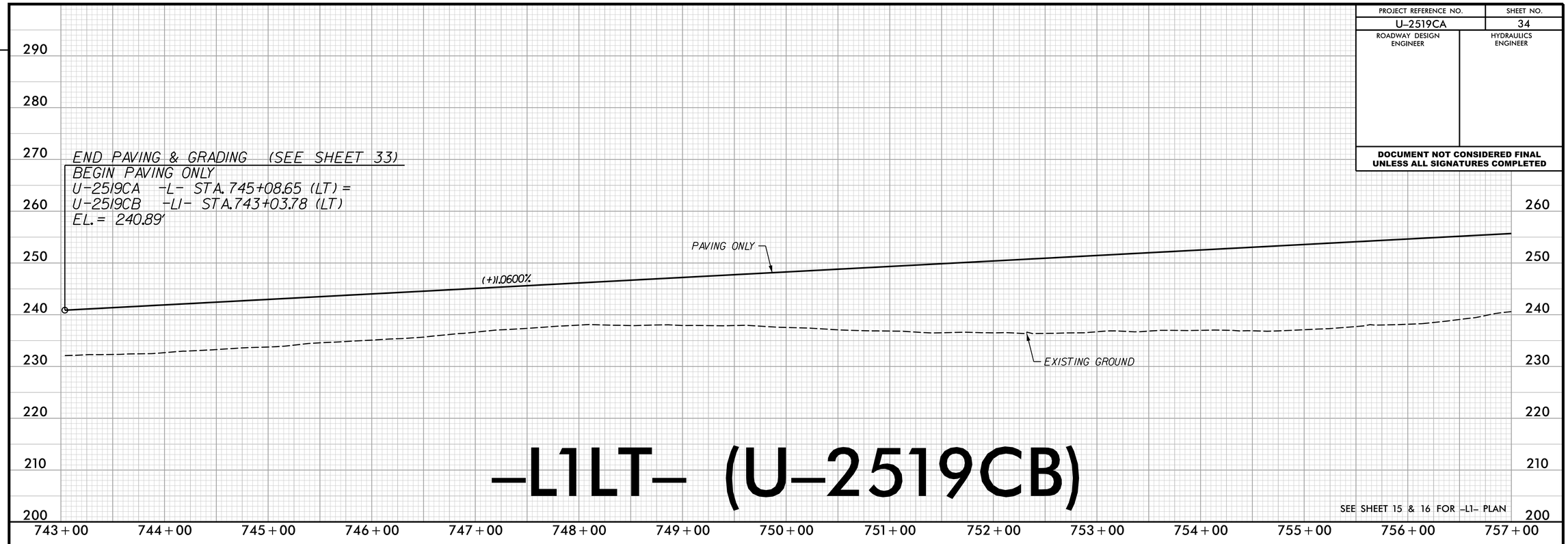
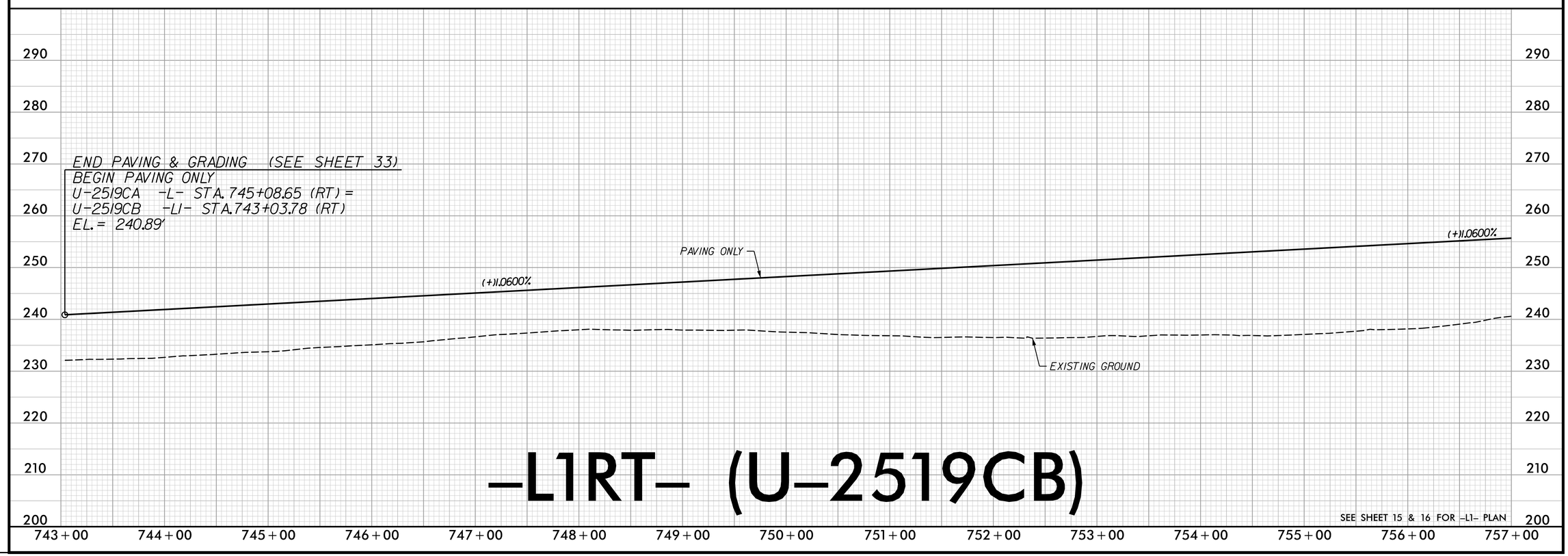
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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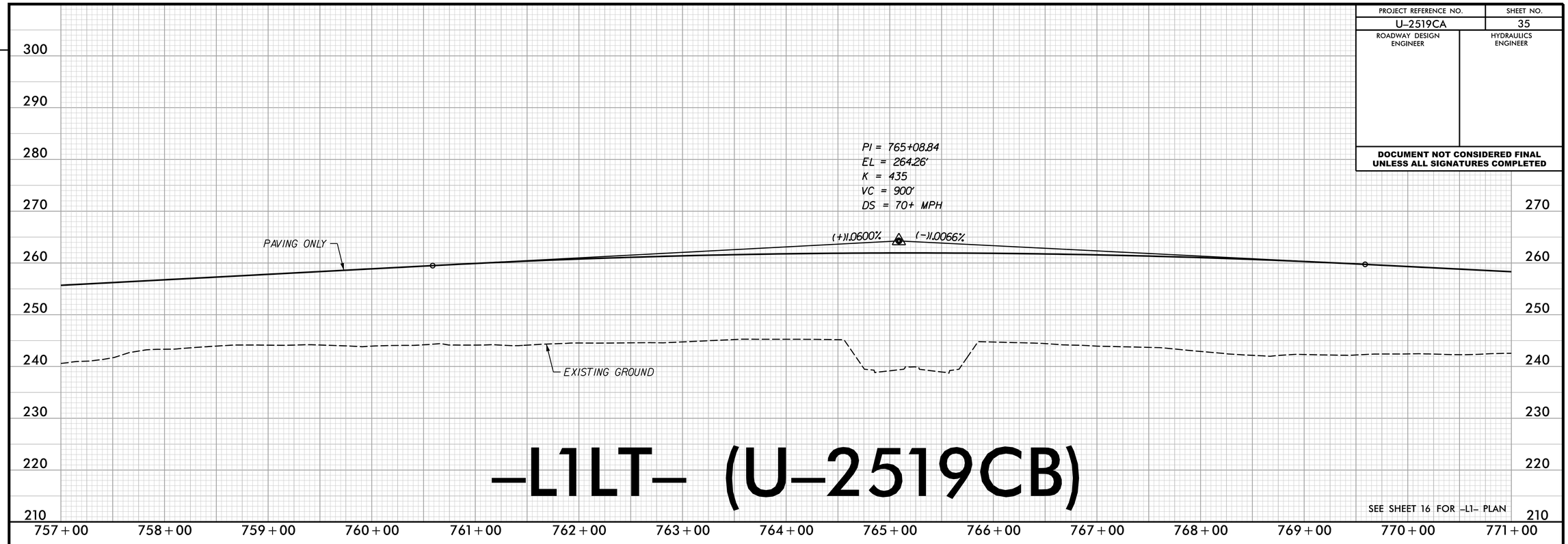
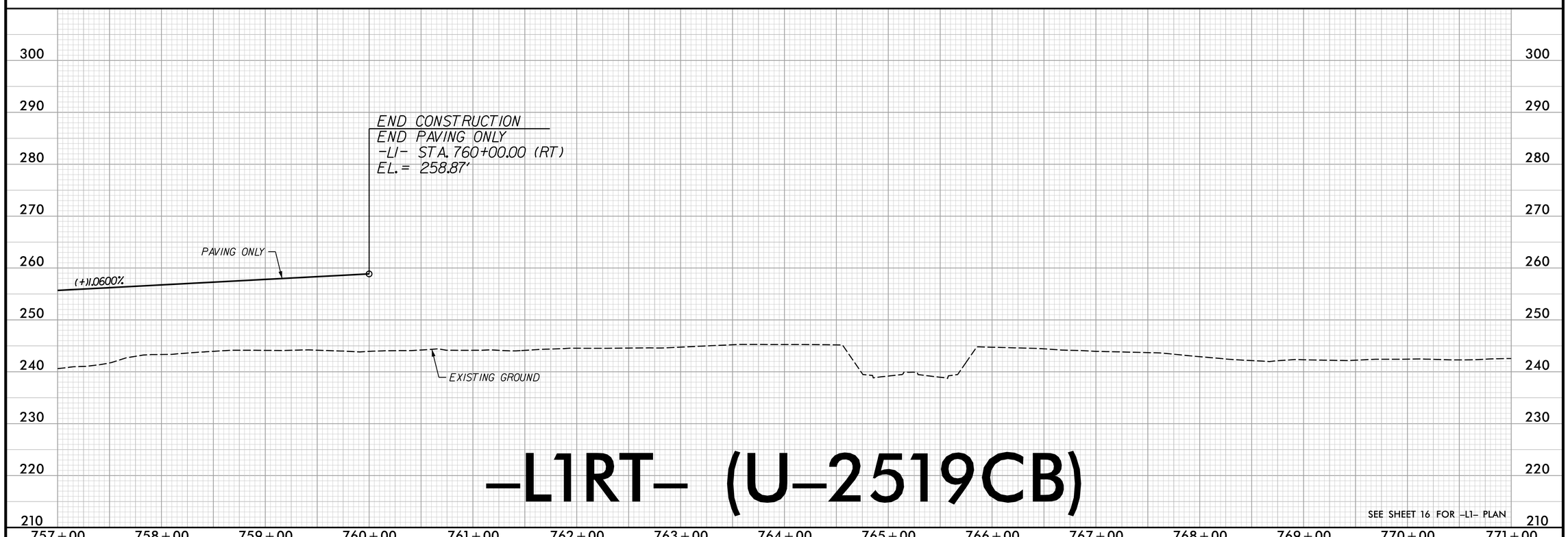
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	35
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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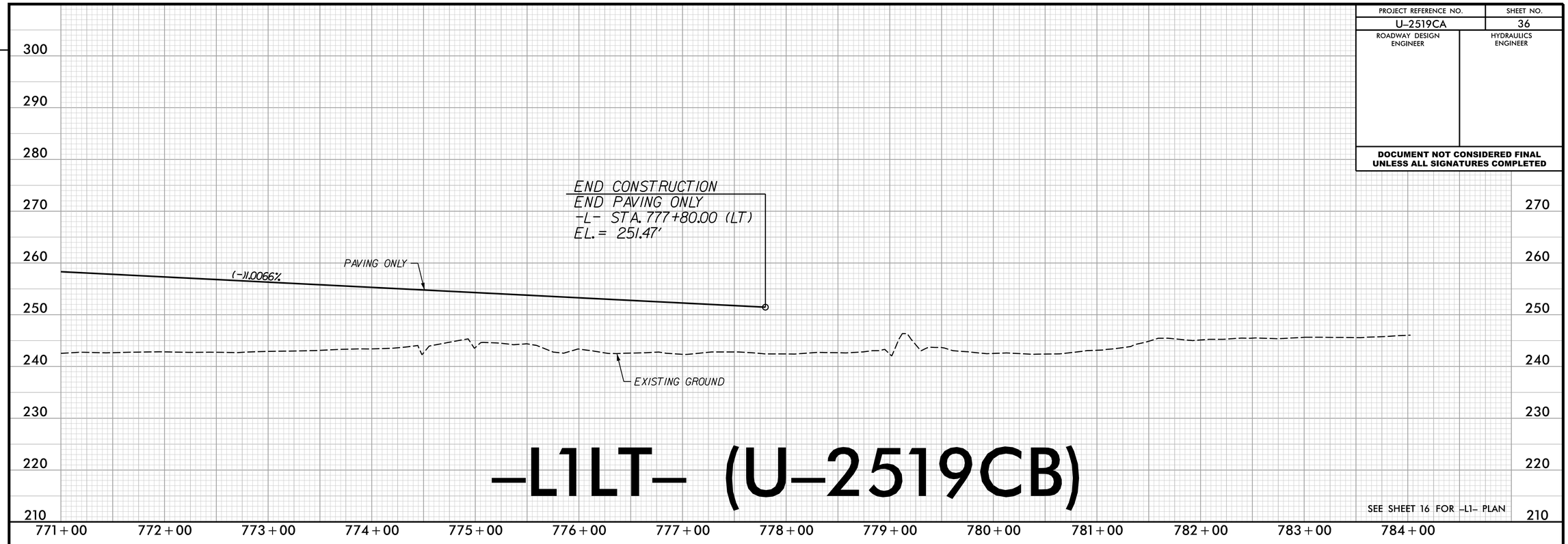
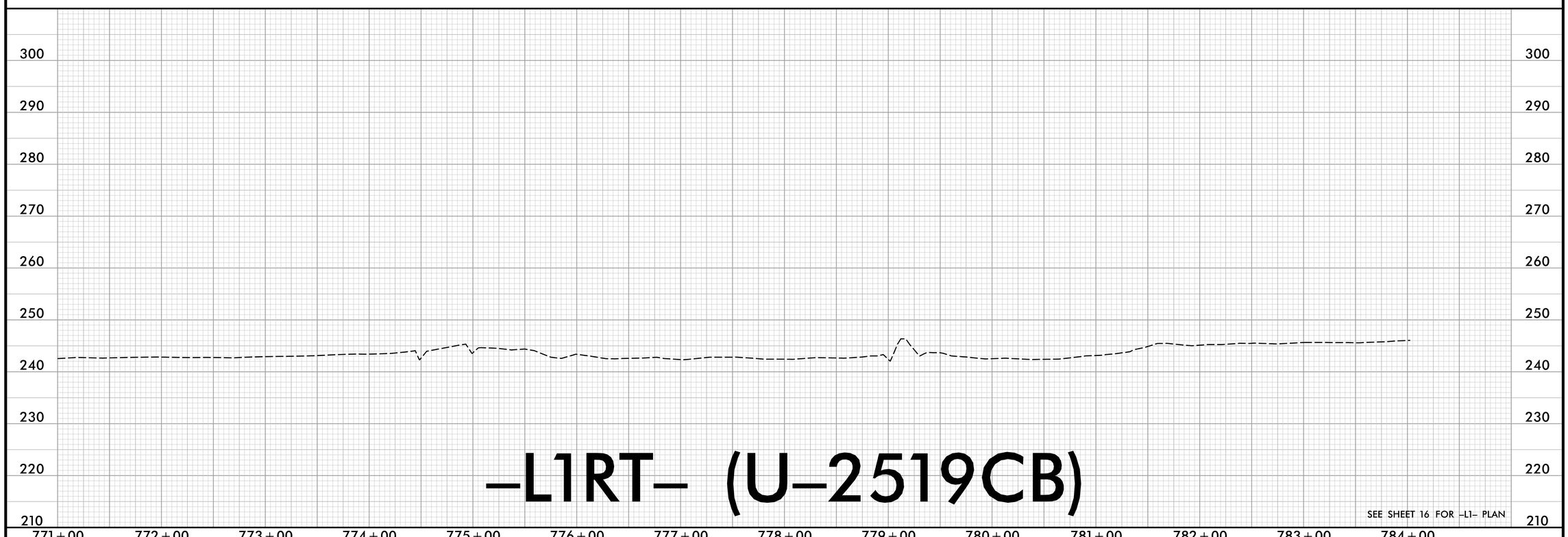
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	36
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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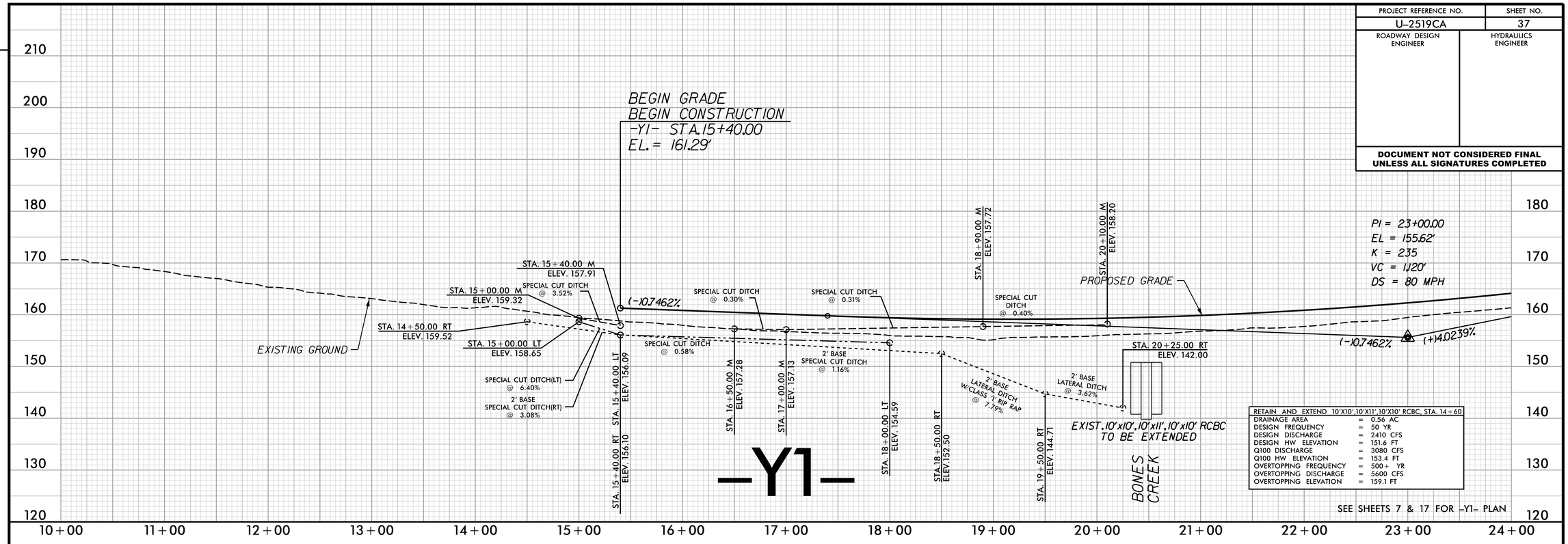
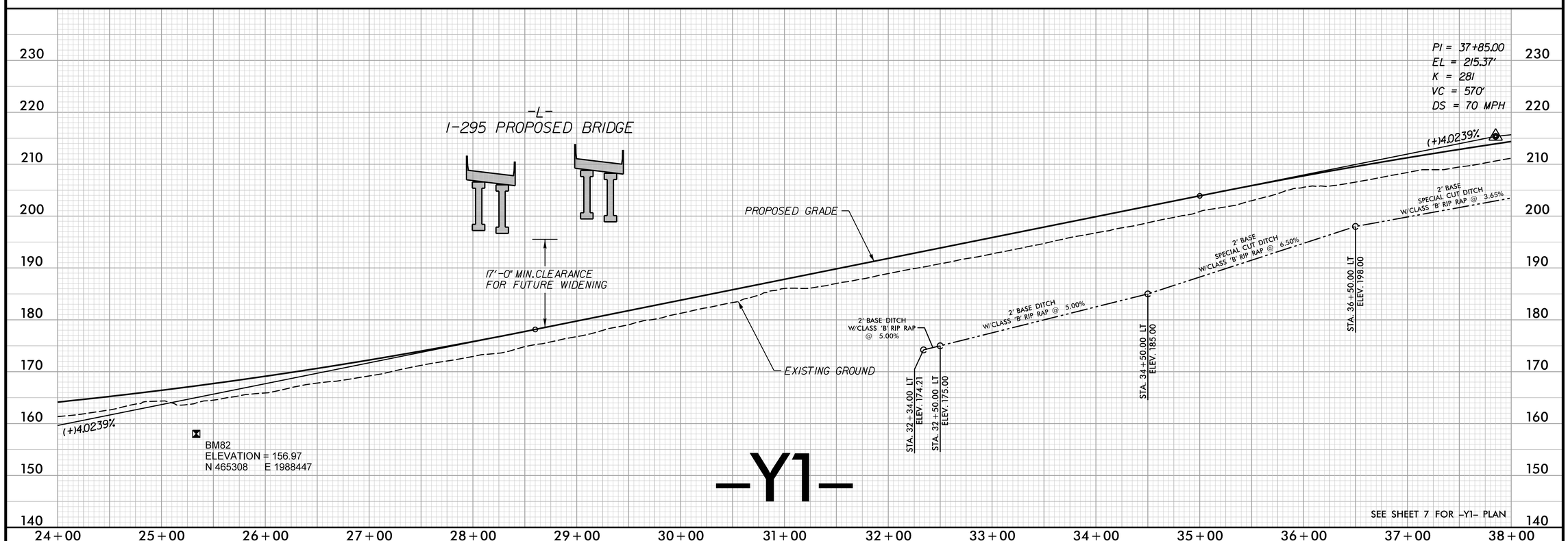
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	37
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



RETAIN AND EXTEND 10'X10',10'X11',10'X10' RCBC, STA. 14+60		
DRAINAGE AREA	=	0.56 AC
DESIGN FREQUENCY	=	50 YR
DESIGN DISCHARGE	=	2410 CFS
DESIGN HW ELEVATION	=	151.6 FT
Q100 DISCHARGE	=	3080 CFS
Q100 HW ELEVATION	=	153.4 FT
OVERTOPPING FREQUENCY	=	500+ YR
OVERTOPPING DISCHARGE	=	5600 CFS
OVERTOPPING ELEVATION	=	159.1 FT



REVISIONS

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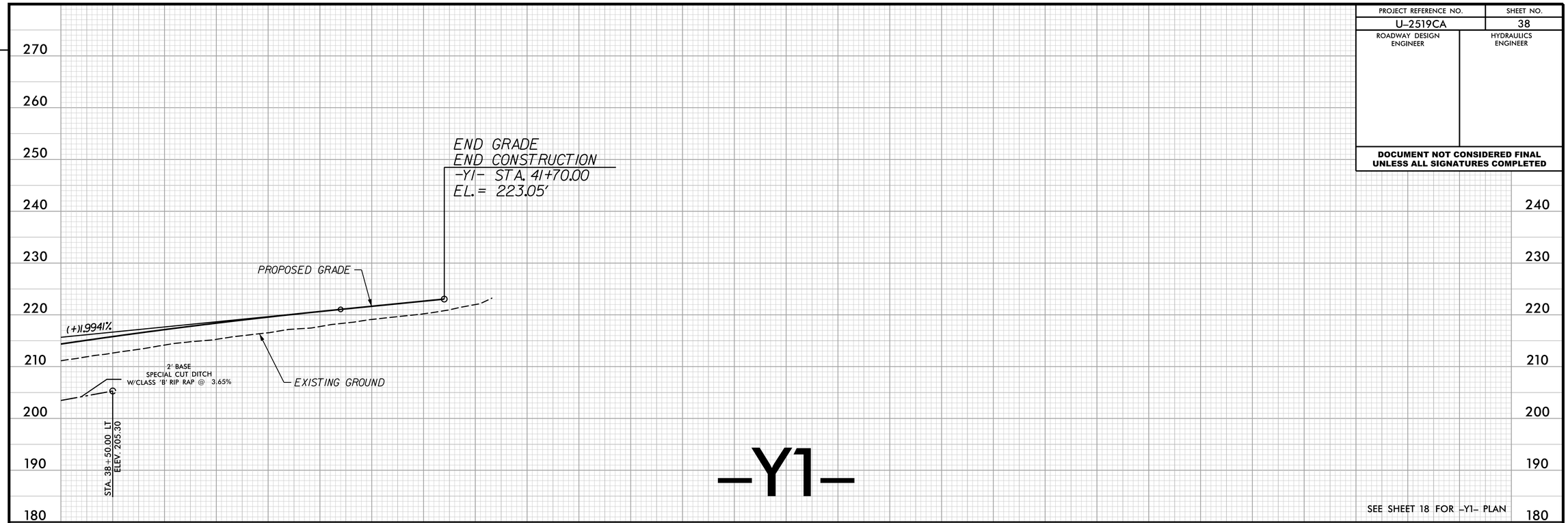
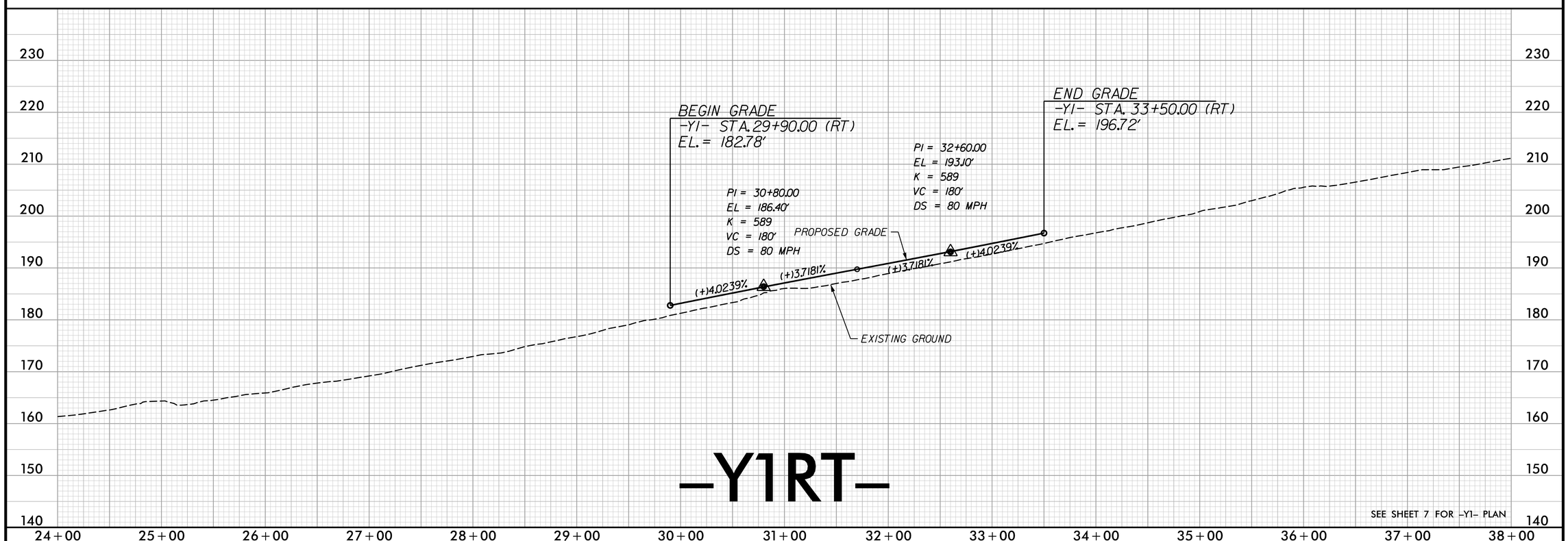
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	38
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 18 FOR -Y1- PLAN



SEE SHEET 7 FOR -Y1- PLAN

REVISIONS

PLOT DRIVER: NCDOT_pdf_color_eng_50.plt PENTABLE: NCDOT_pshpfl.tbl
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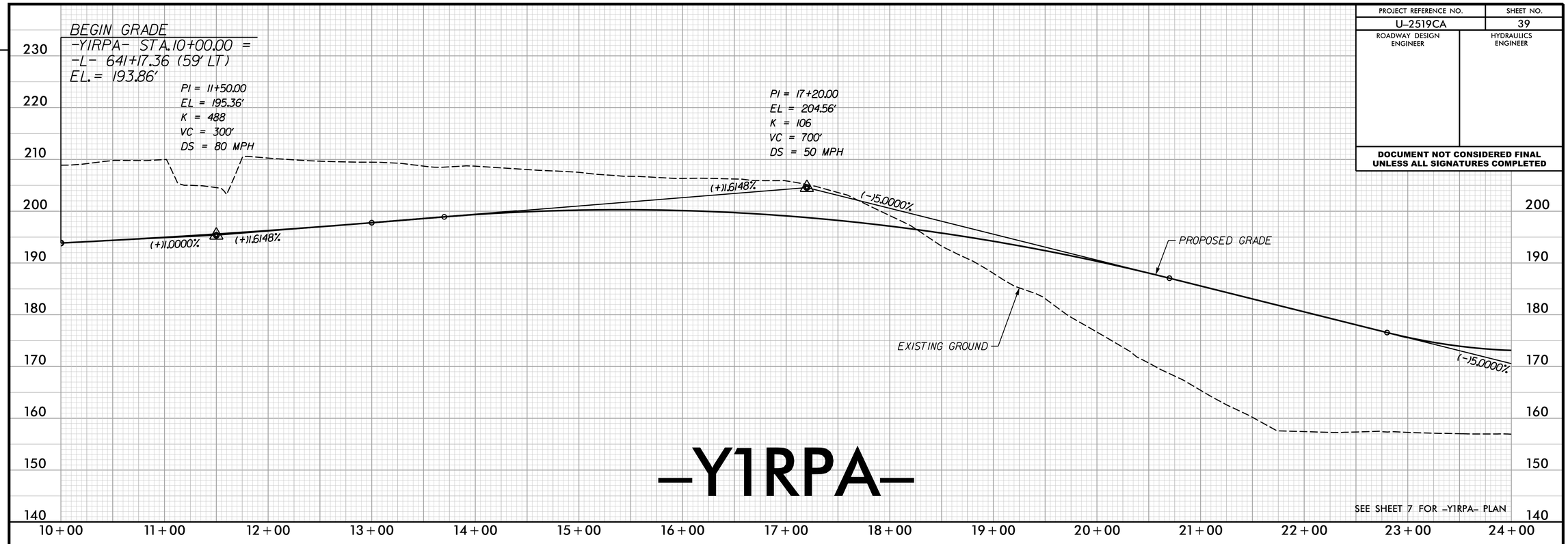
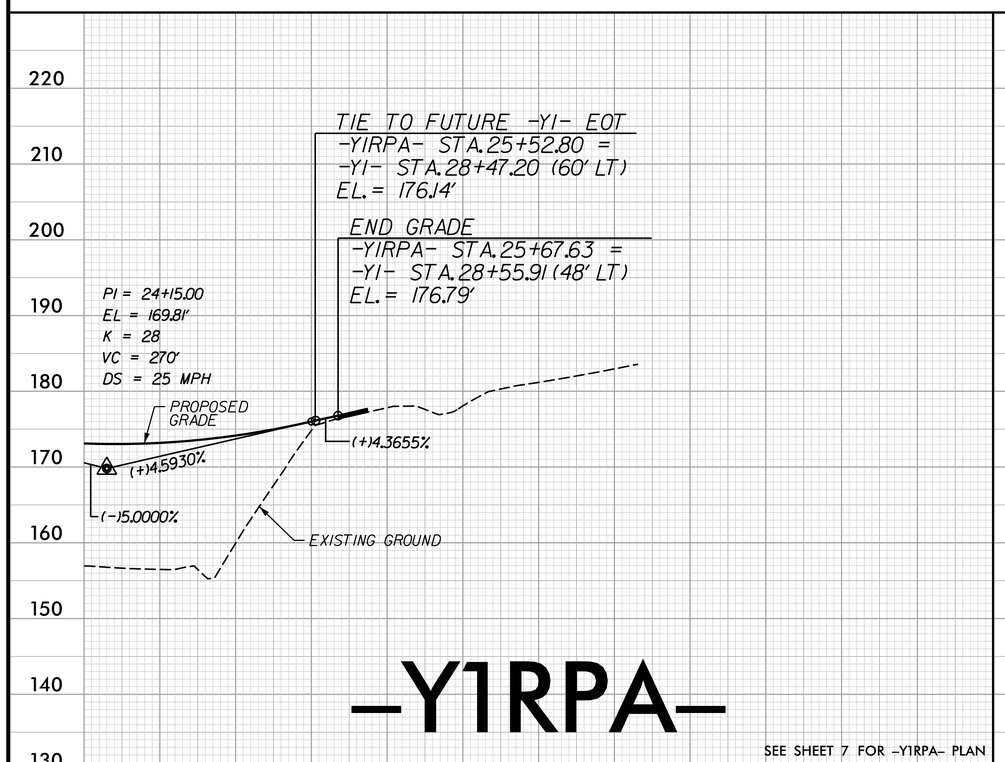
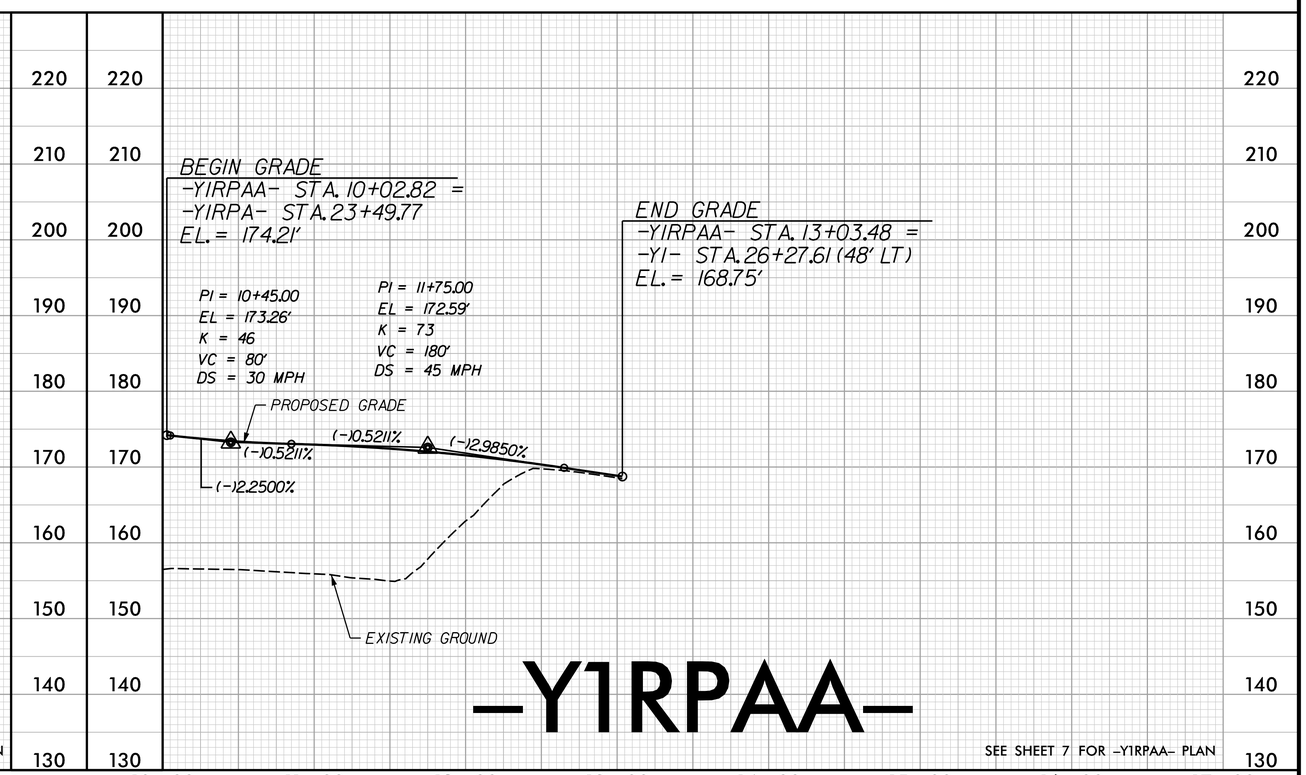
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	39
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED







REVISIONS

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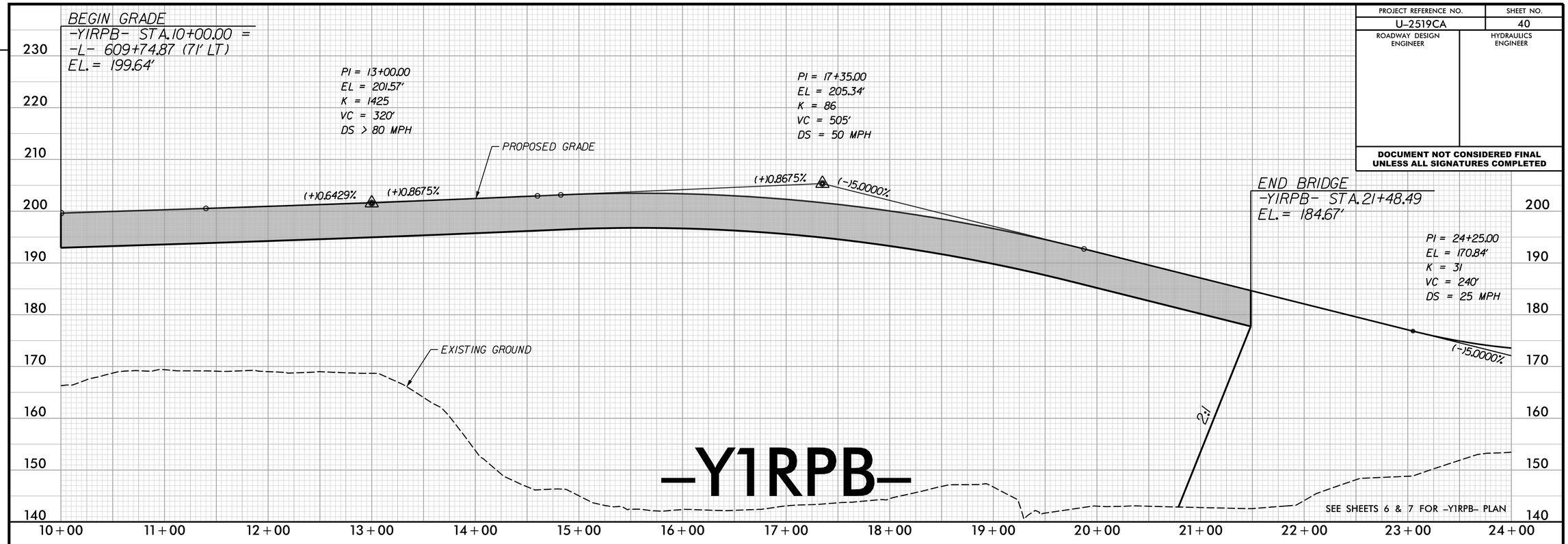
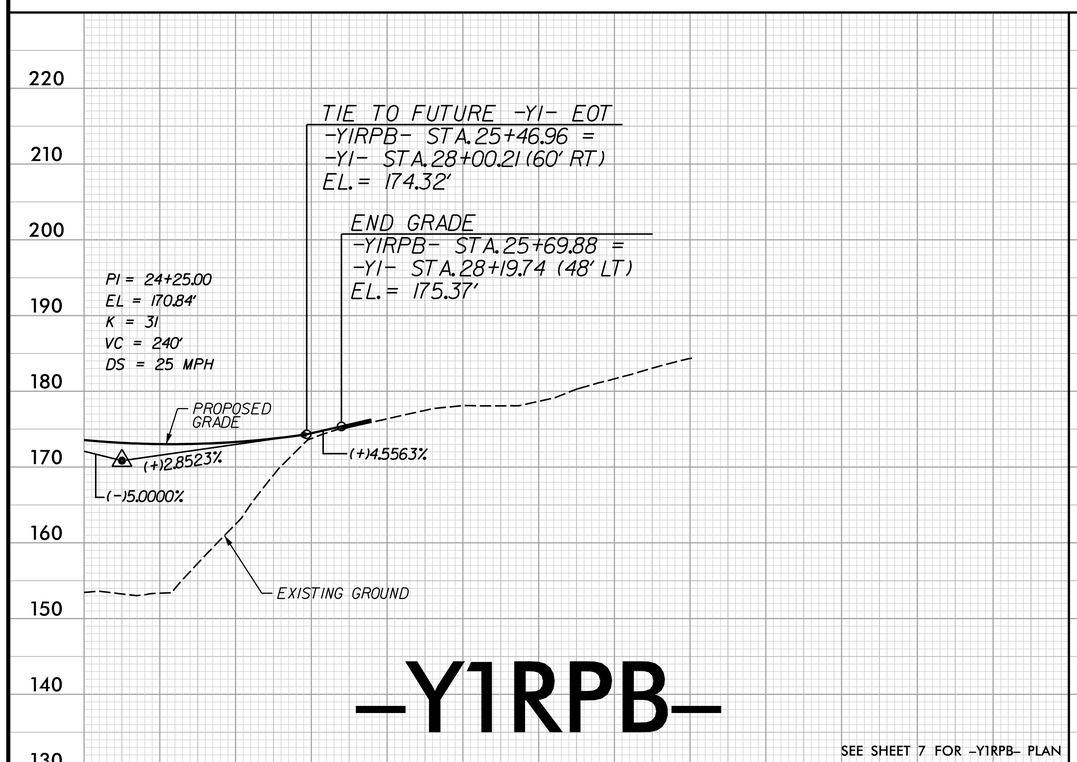
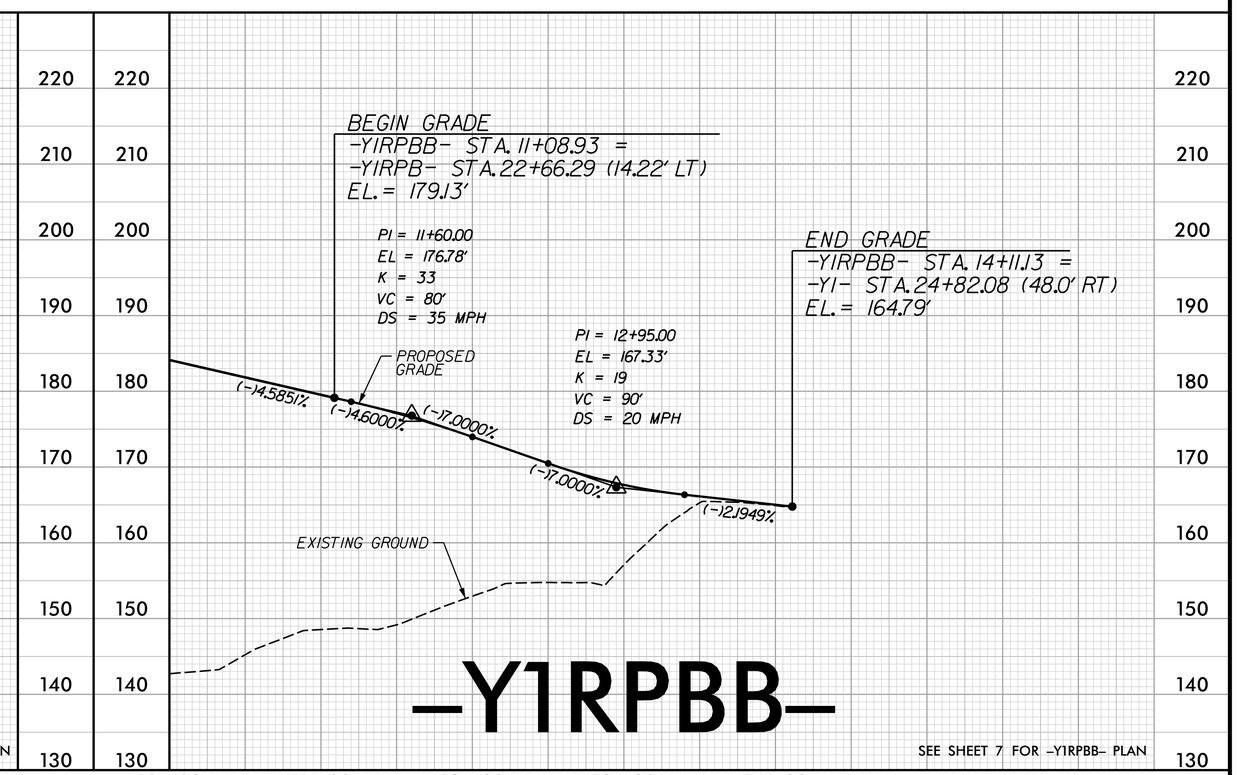
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	40
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED







REVISIONS

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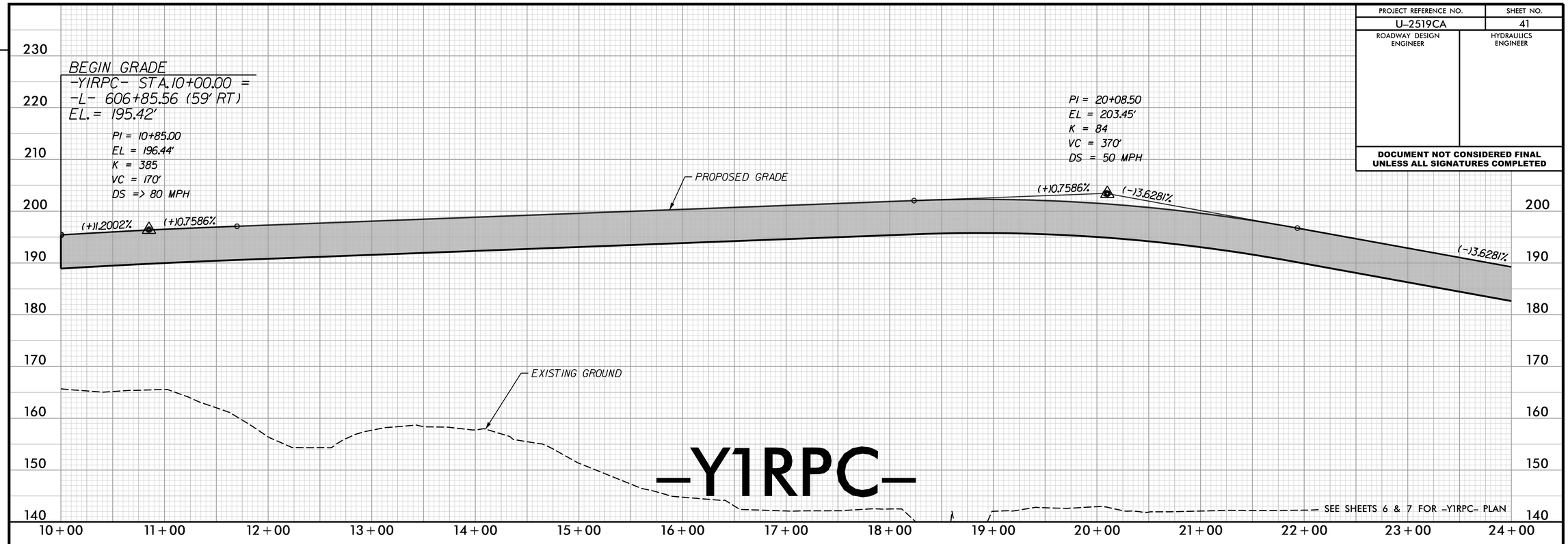
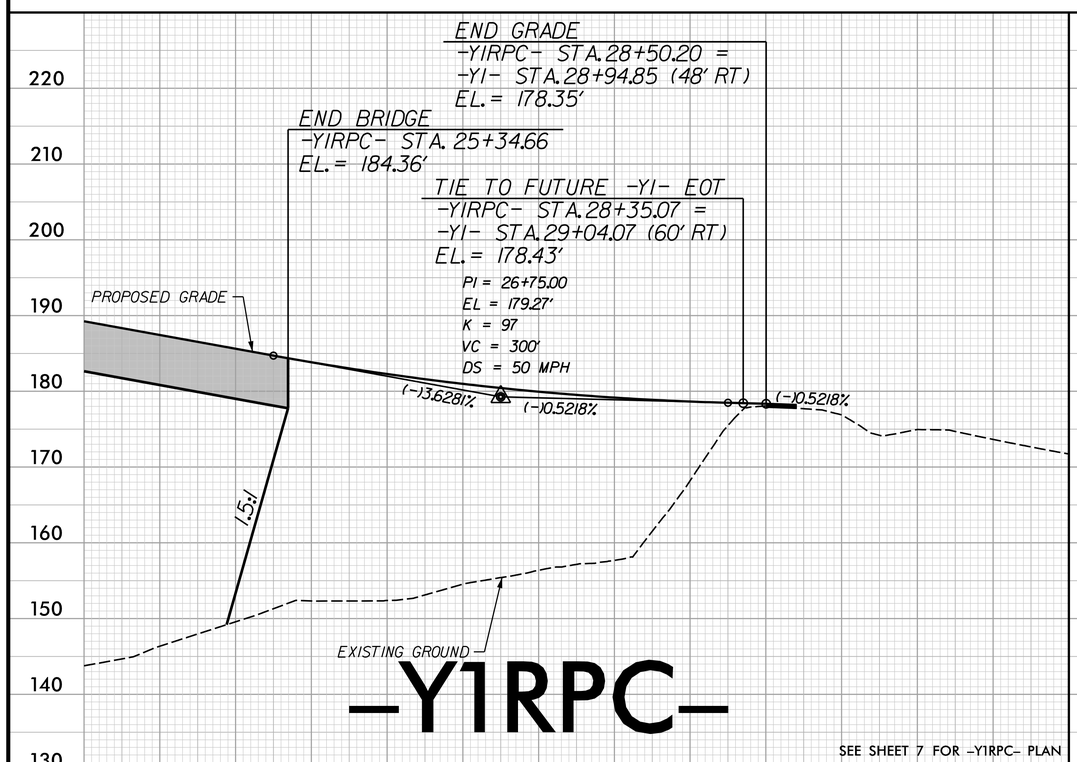
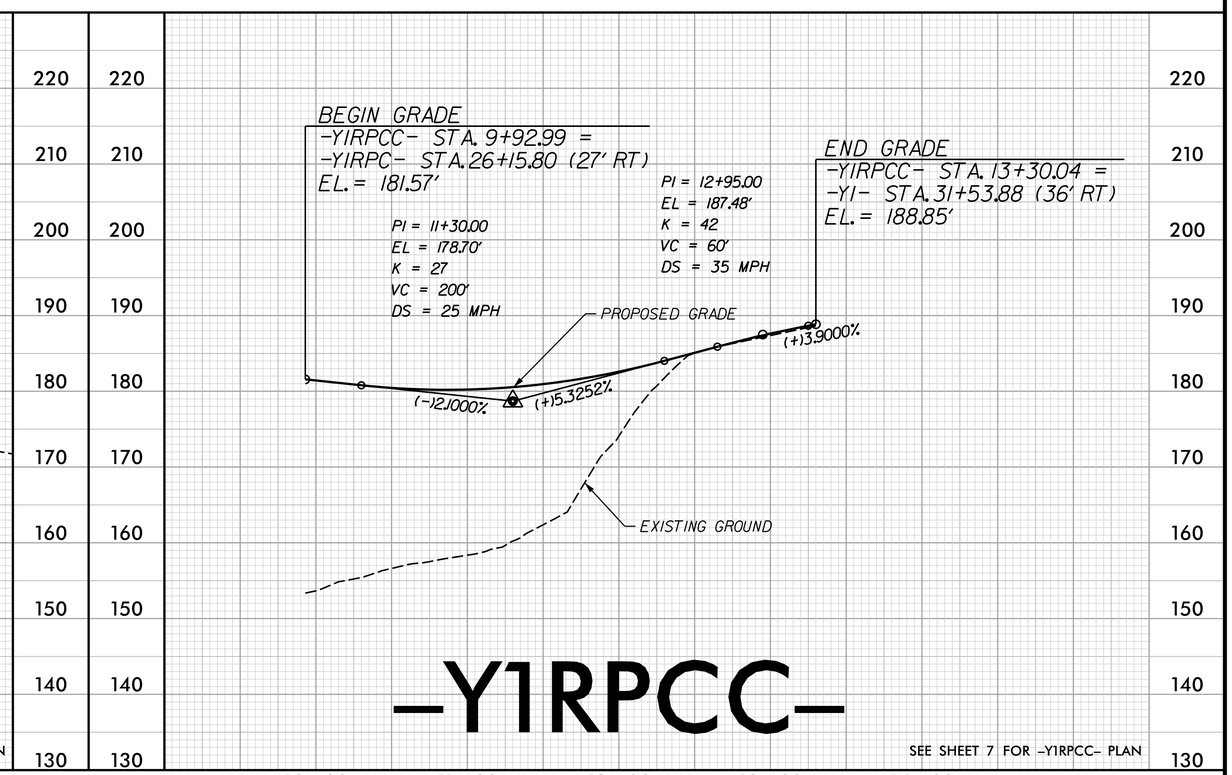
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	41
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED







REVISIONS

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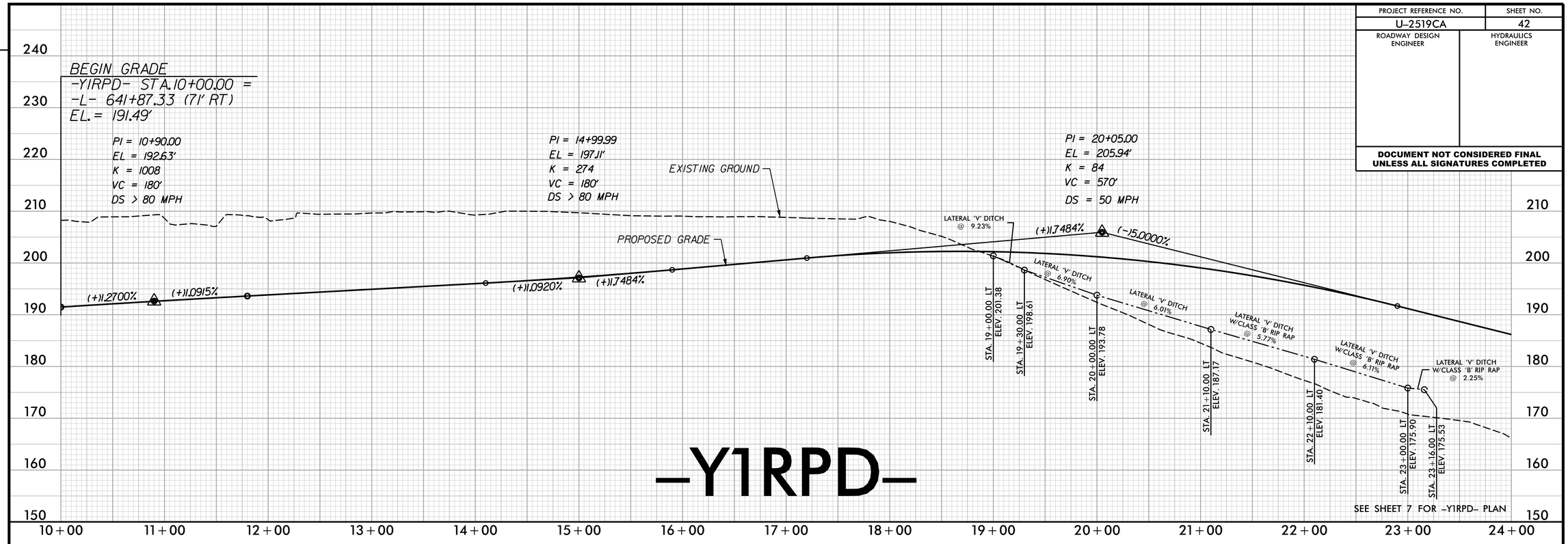
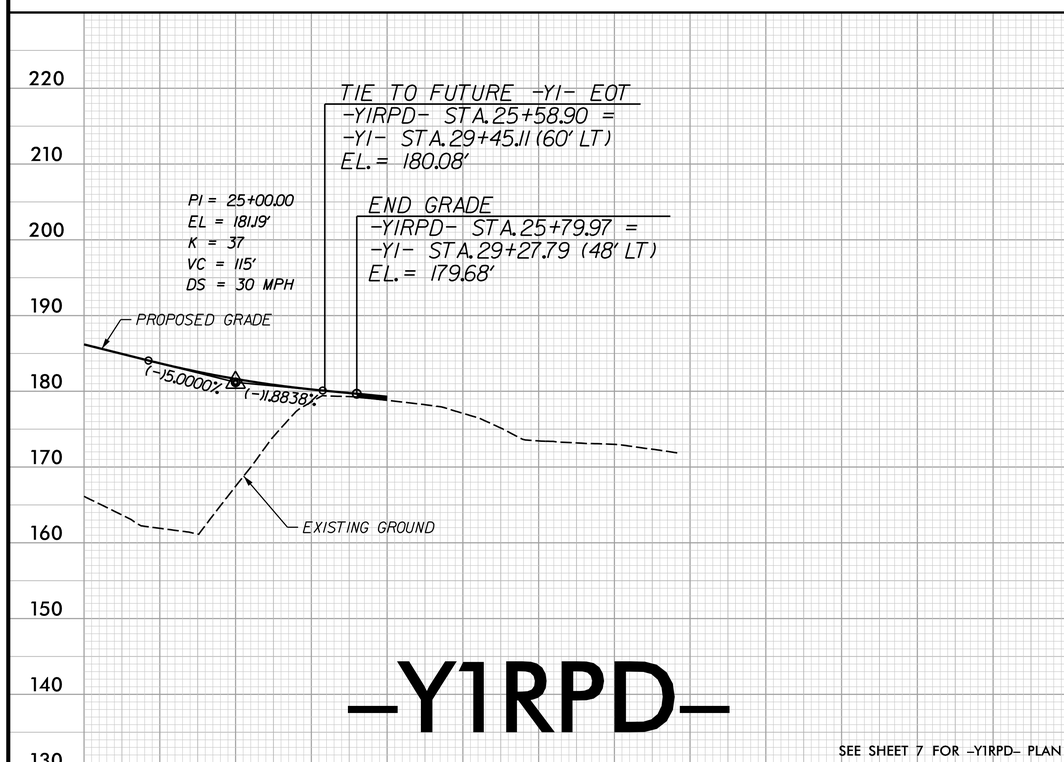
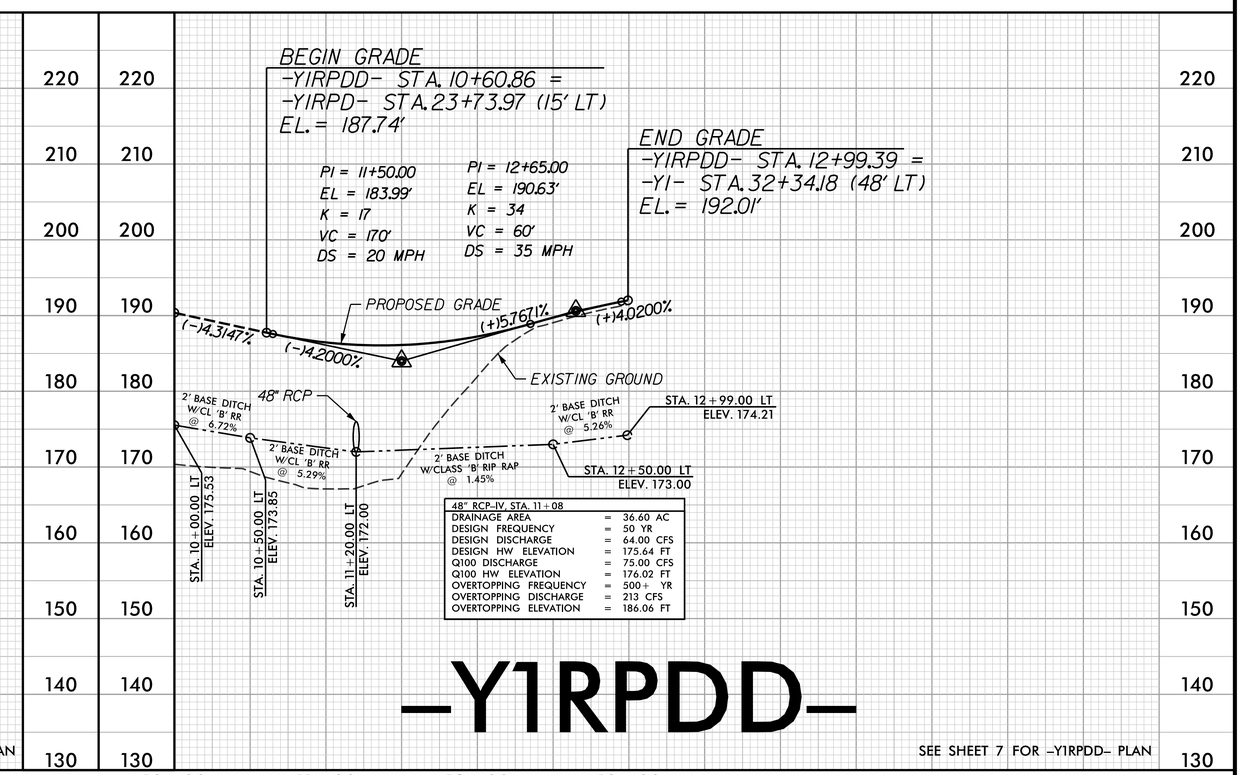
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	42
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED







REVISIONS

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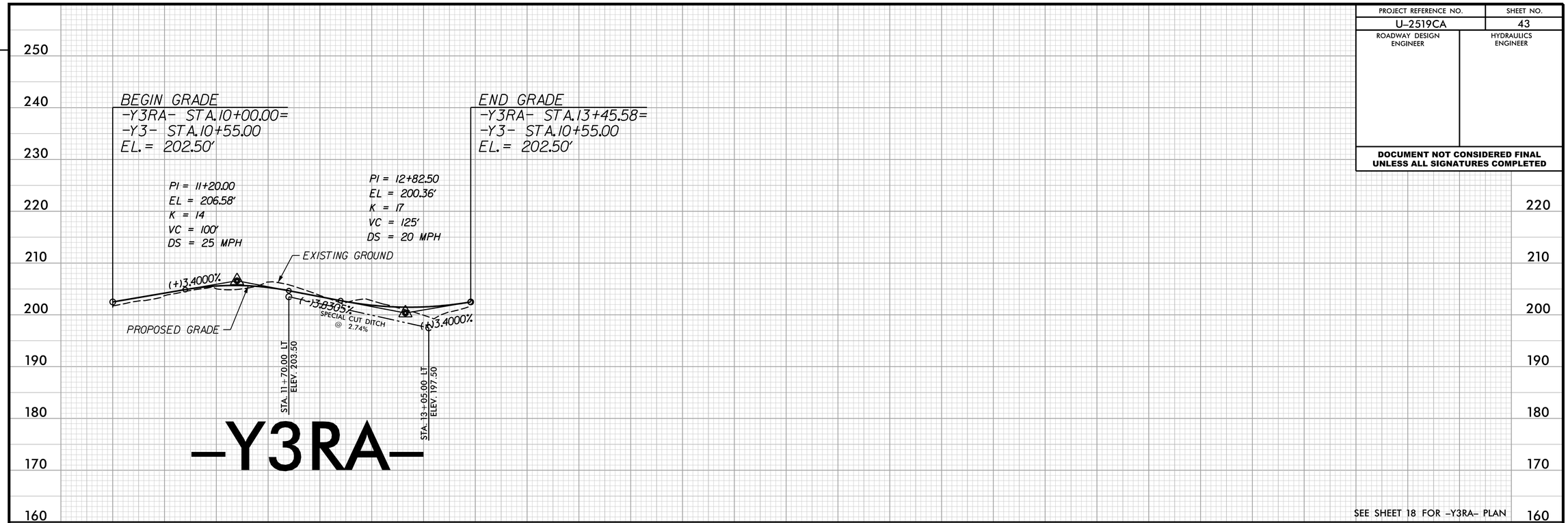
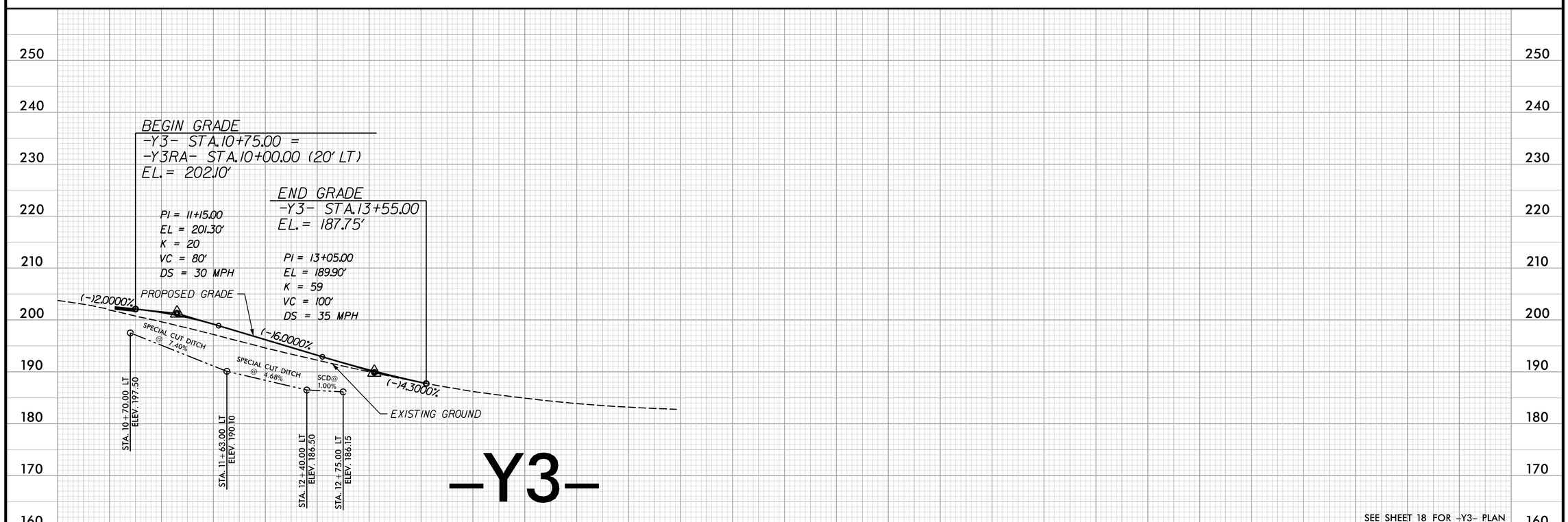
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	43
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 18 FOR -Y3RA- PLAN



SEE SHEET 18 FOR -Y3- PLAN

REVISIONS

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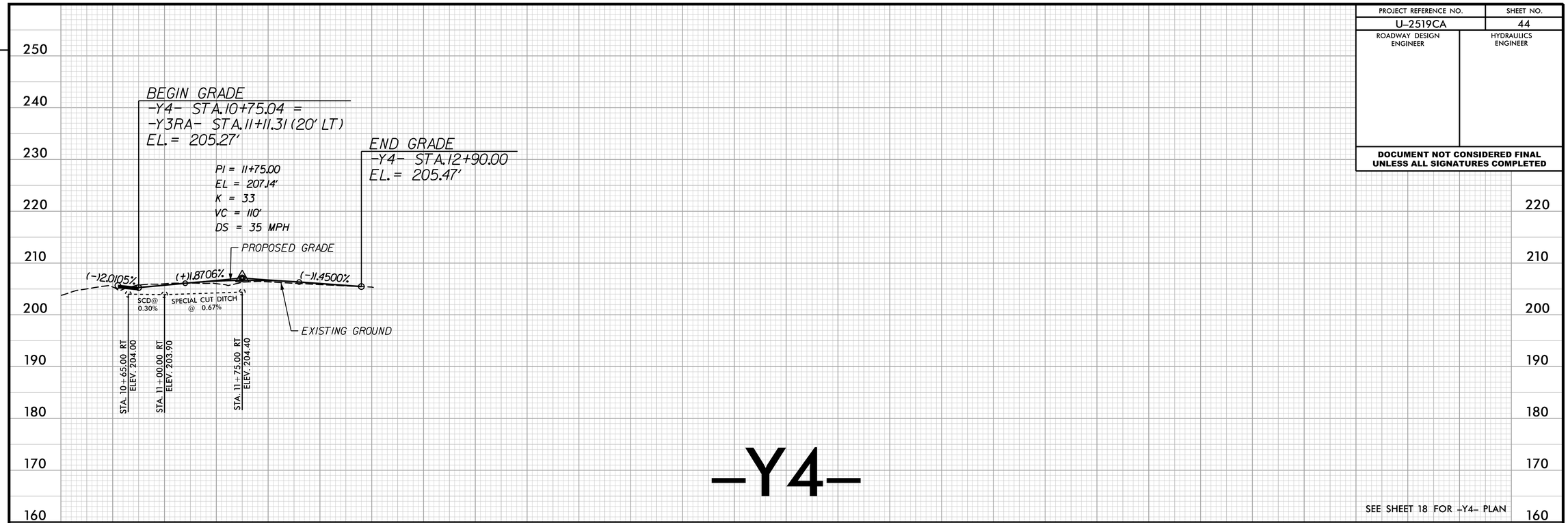
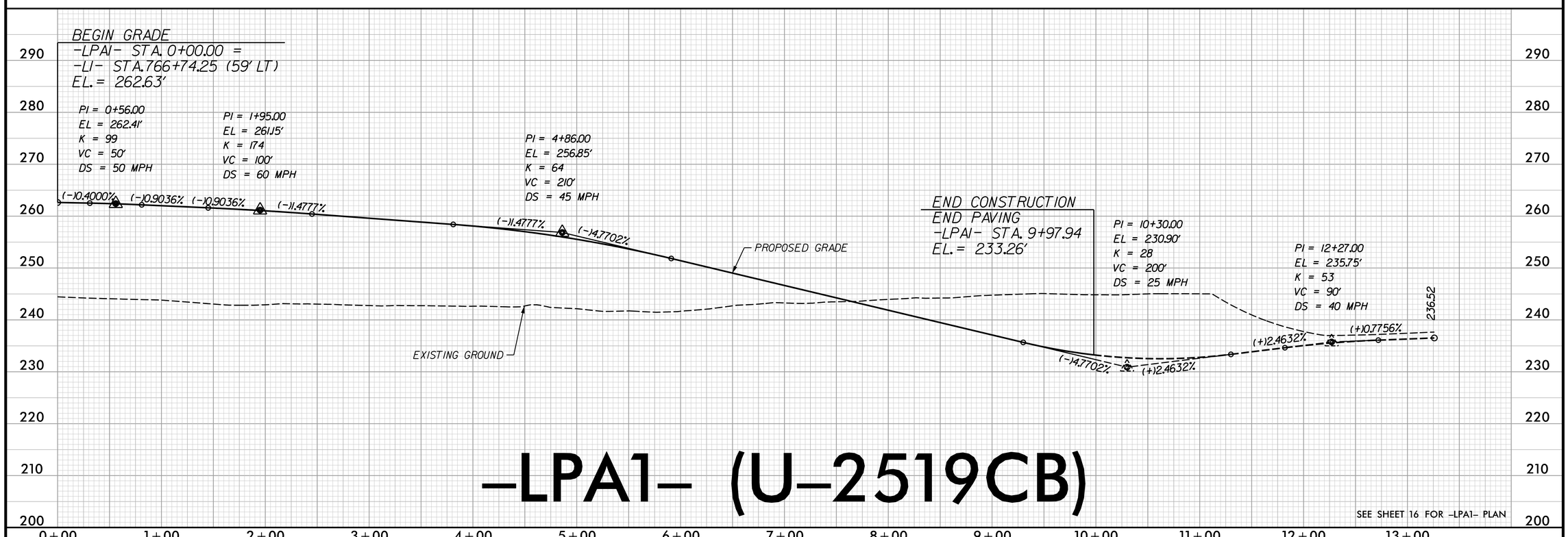
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	44
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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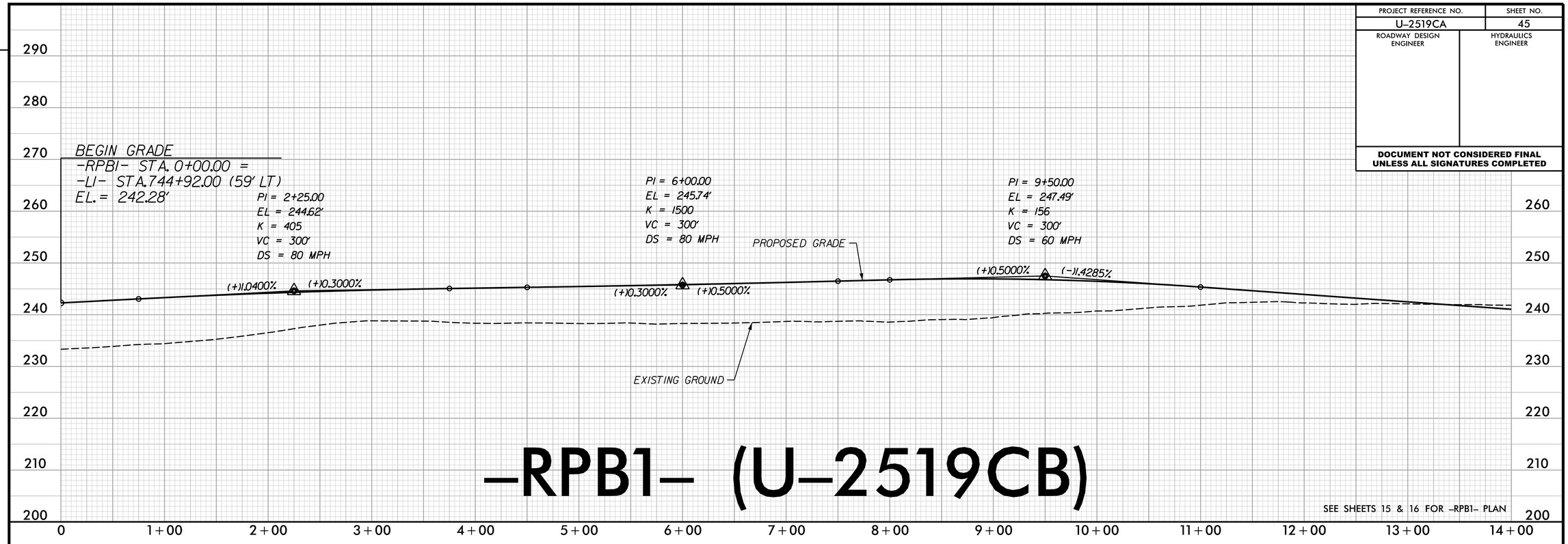
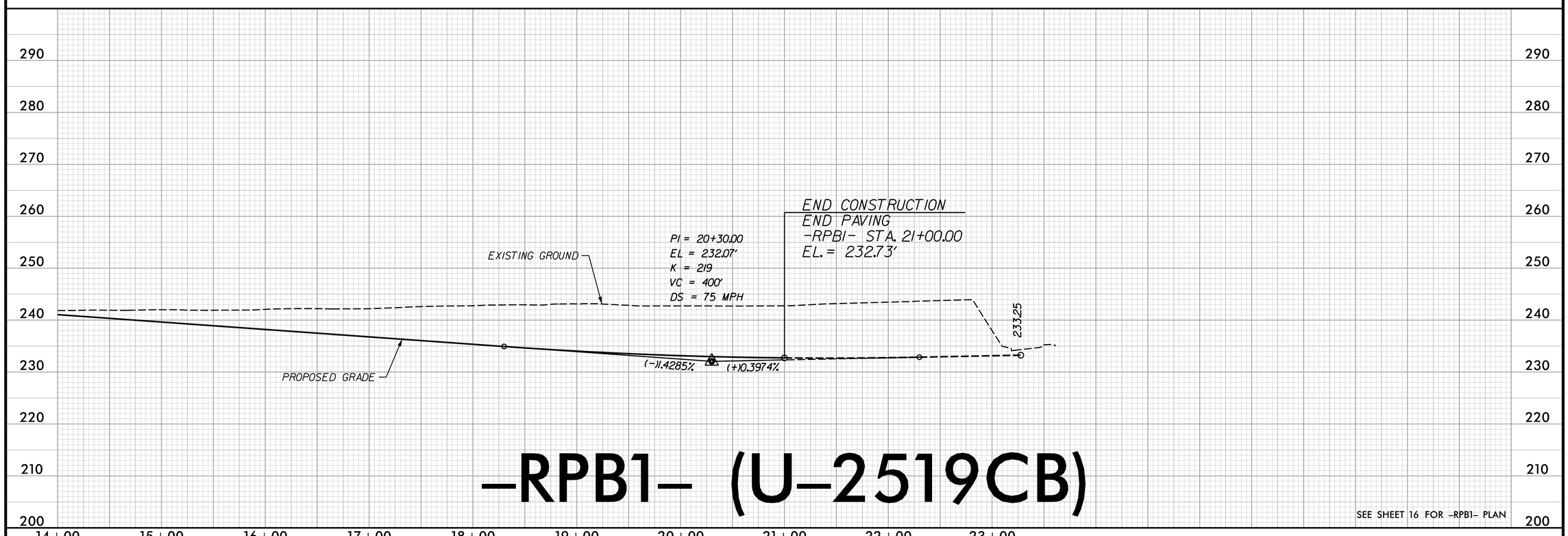
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	45
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-RPB1- (U-2519CB)

SEE SHEETS 15 & 16 FOR -RPB1- PLAN



-RPB1- (U-2519CB)

SEE SHEET 16 FOR -RPB1- PLAN

REVISIONS

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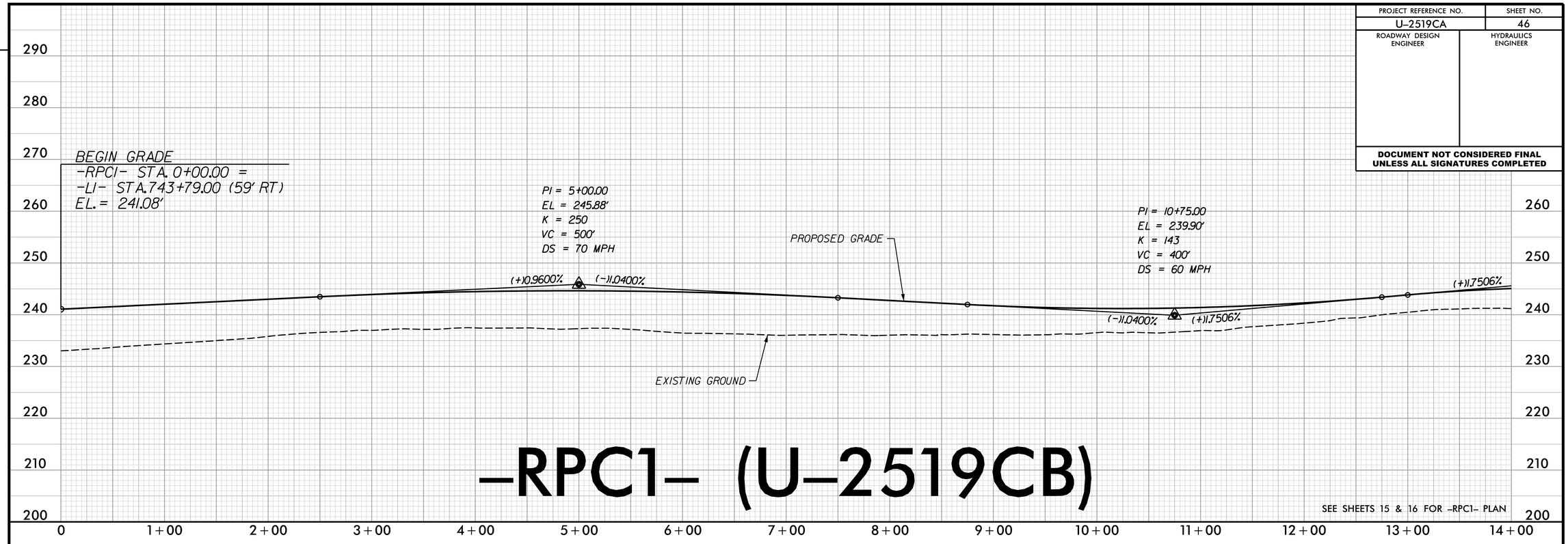
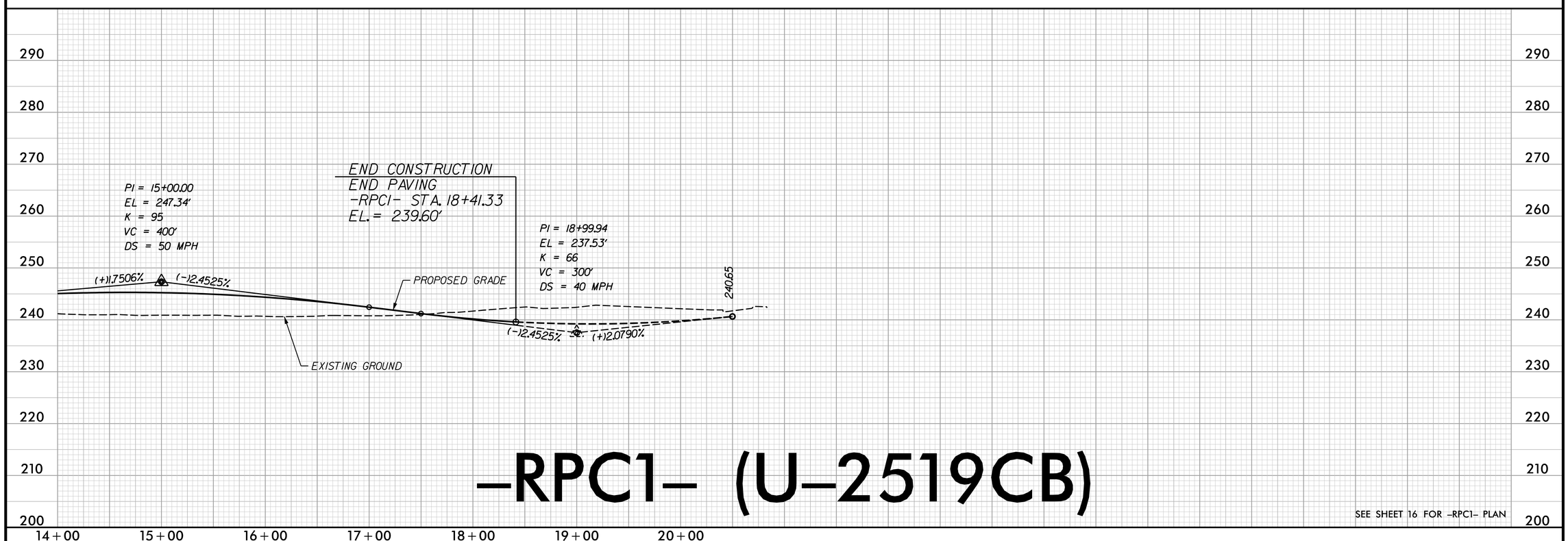
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	46
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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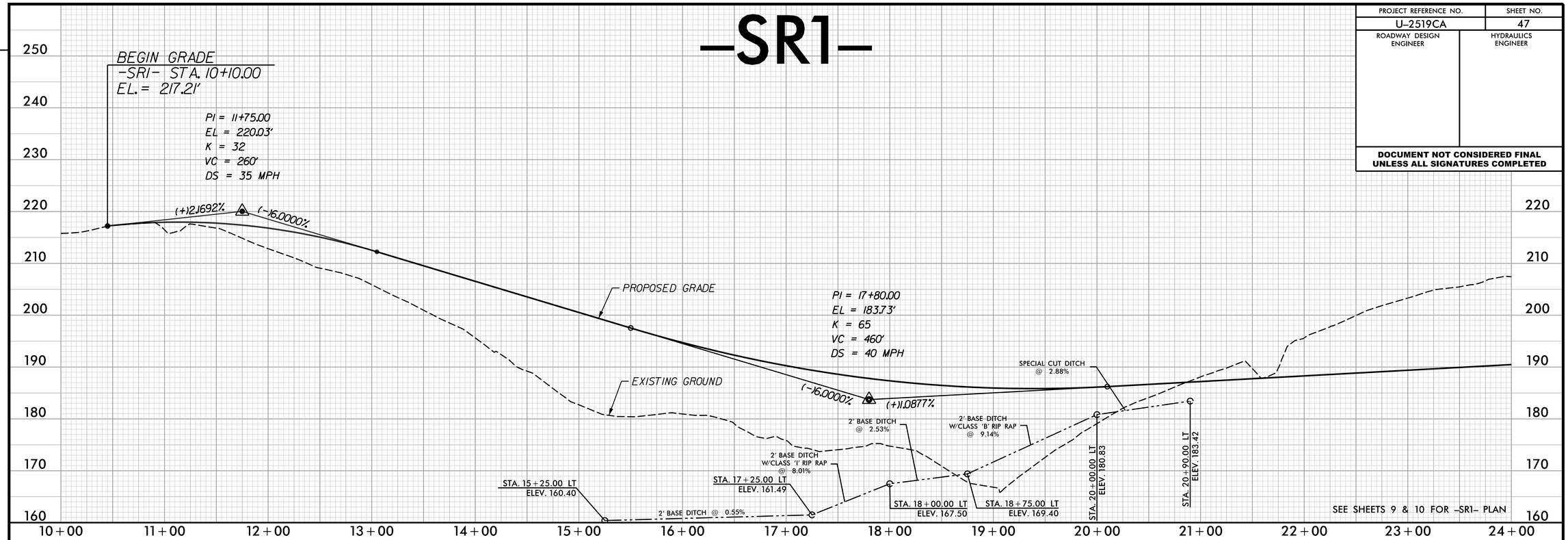
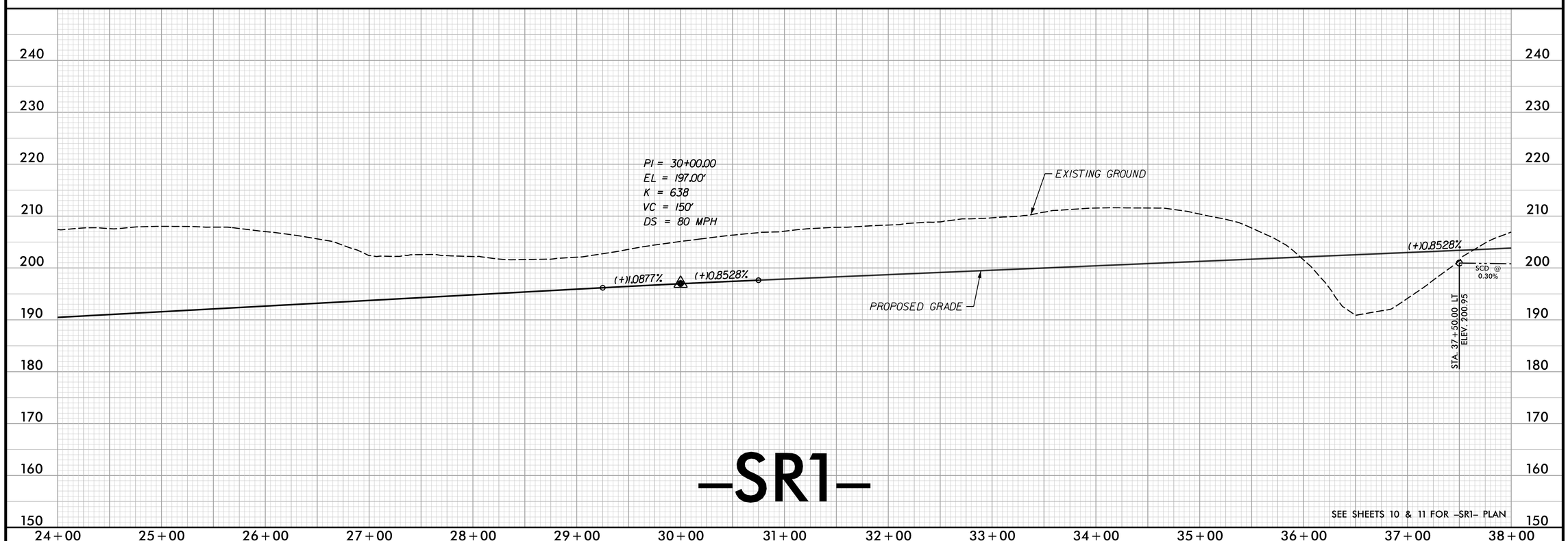
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	47
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED

-SR1-





-SR1-

REVISIONS

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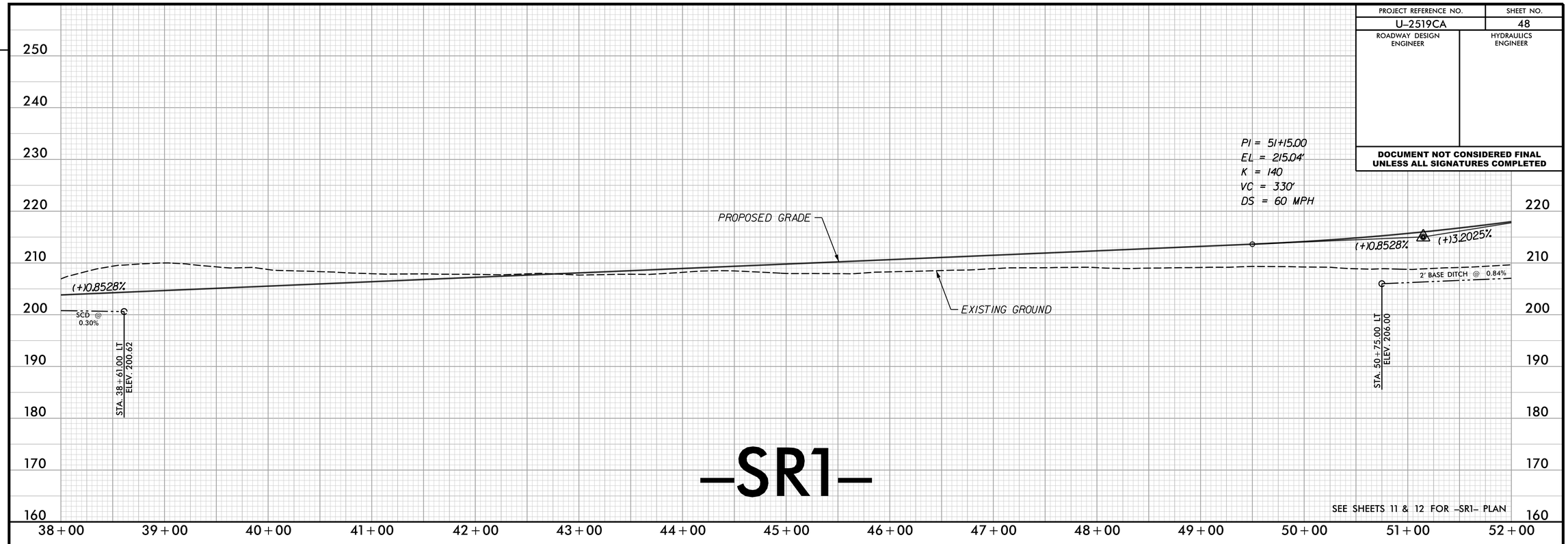
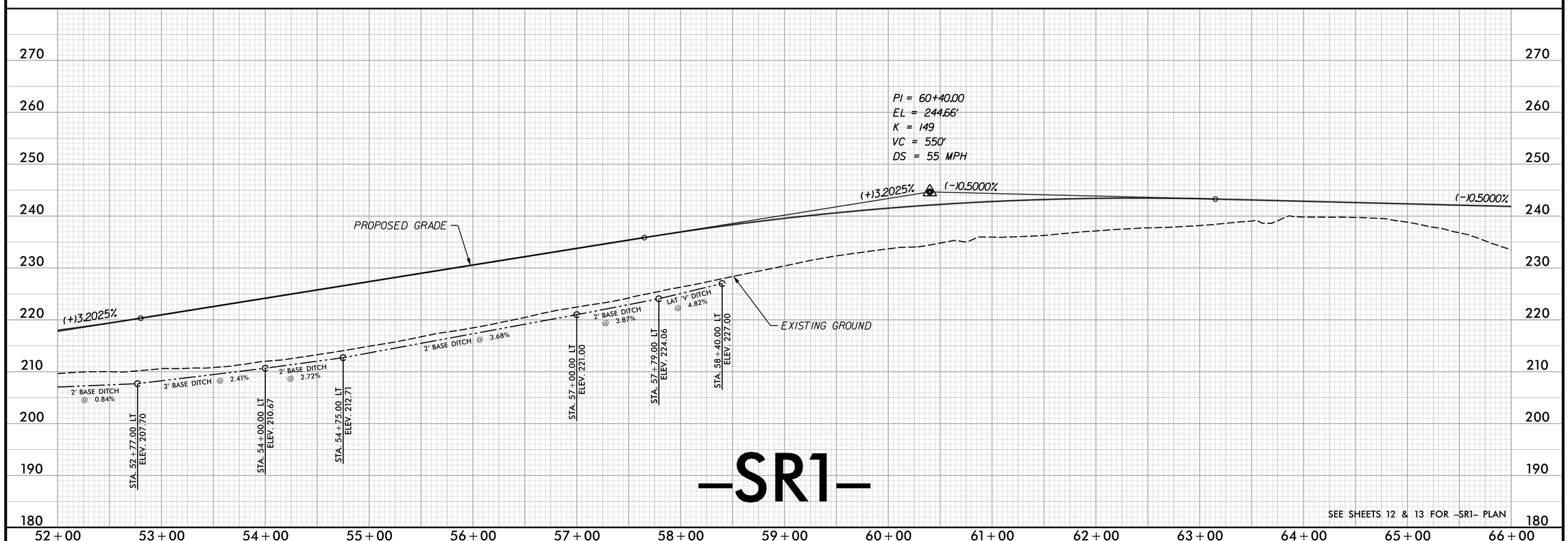
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	48
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED





REVISIONS

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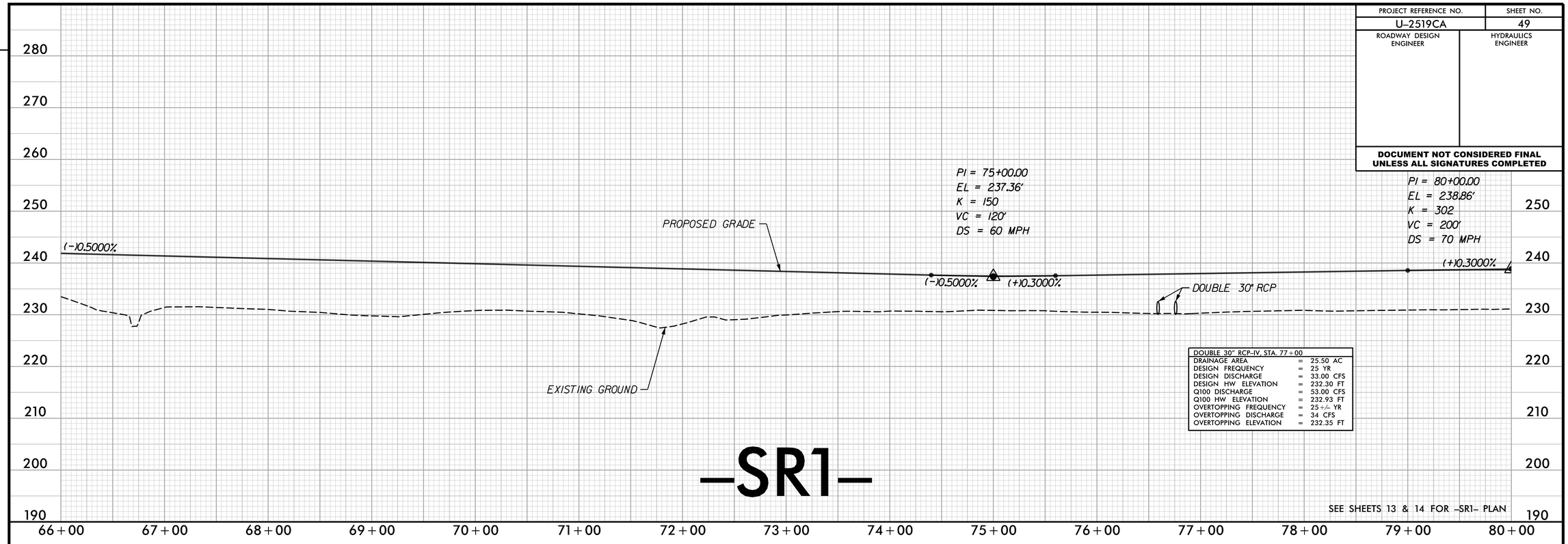
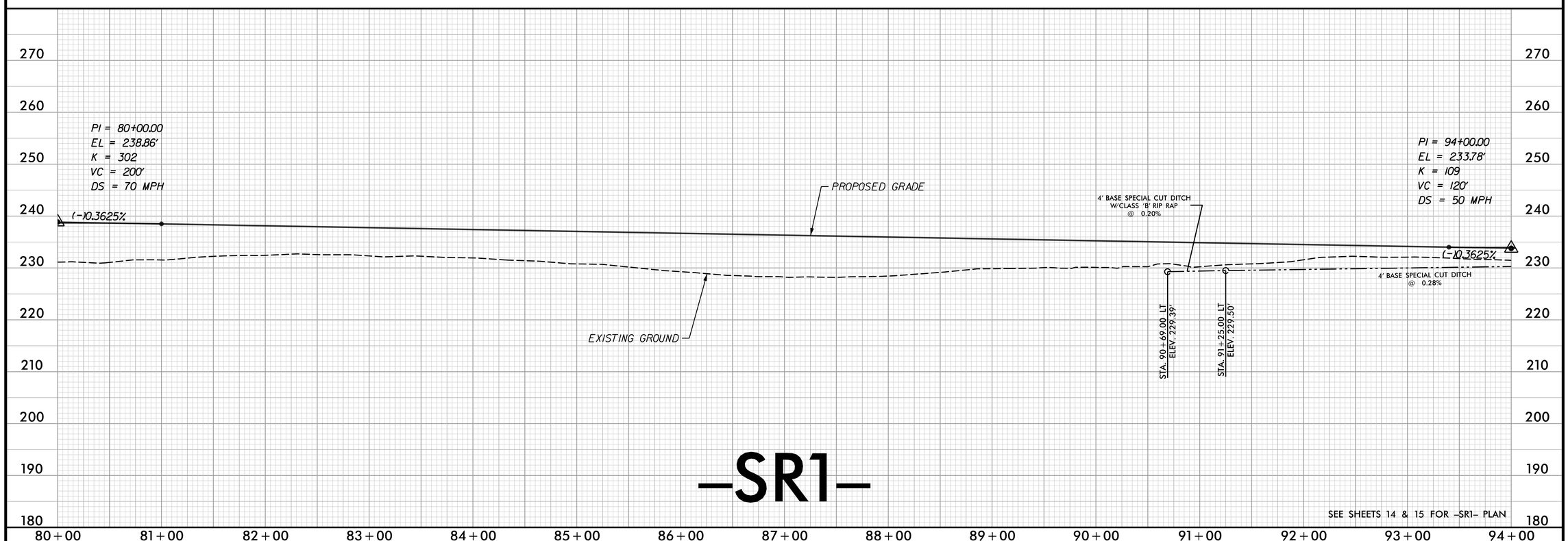
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	49
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



DOUBLE 30" RCP-IV, STA. 77+00		
DRAINAGE AREA	=	25.50 AC
DESIGN FREQUENCY	=	25 YR
DESIGN DISCHARGE	=	33.00 CFS
DESIGN HW ELEVATION	=	232.30 FT
Q100 DISCHARGE	=	53.00 CFS
Q100 HW ELEVATION	=	232.93 FT
OVERTOPPING FREQUENCY	=	25 +/- YR
OVERTOPPING DISCHARGE	=	34 CFS
OVERTOPPING ELEVATION	=	232.35 FT



REVISIONS

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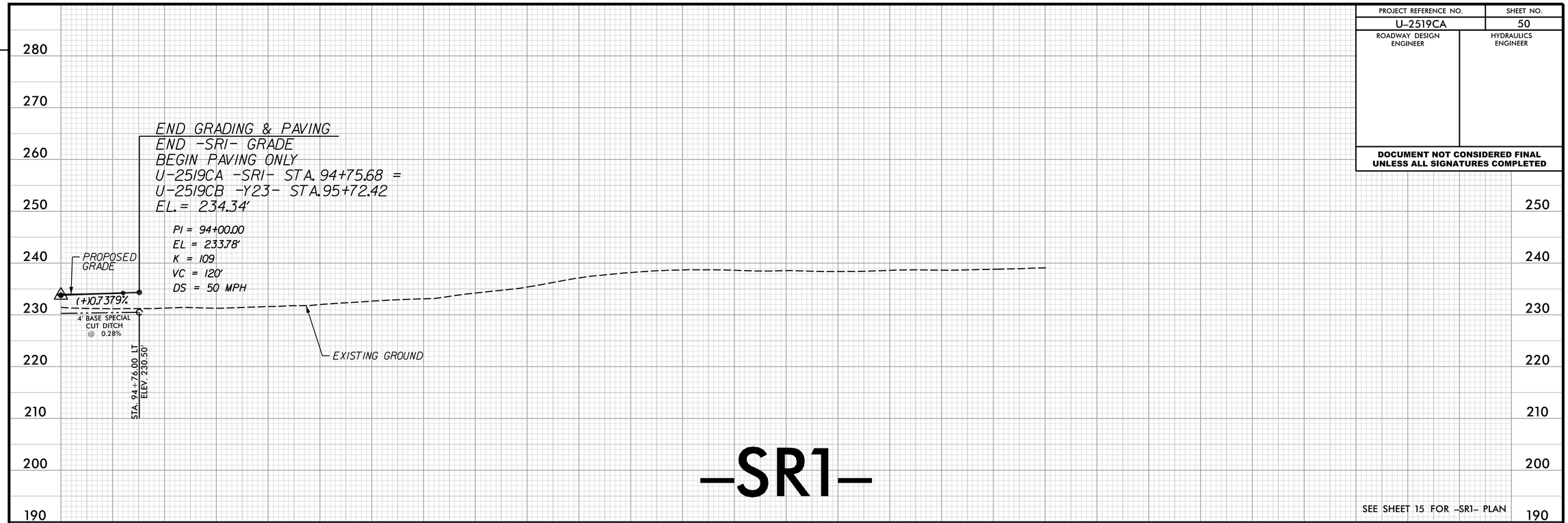
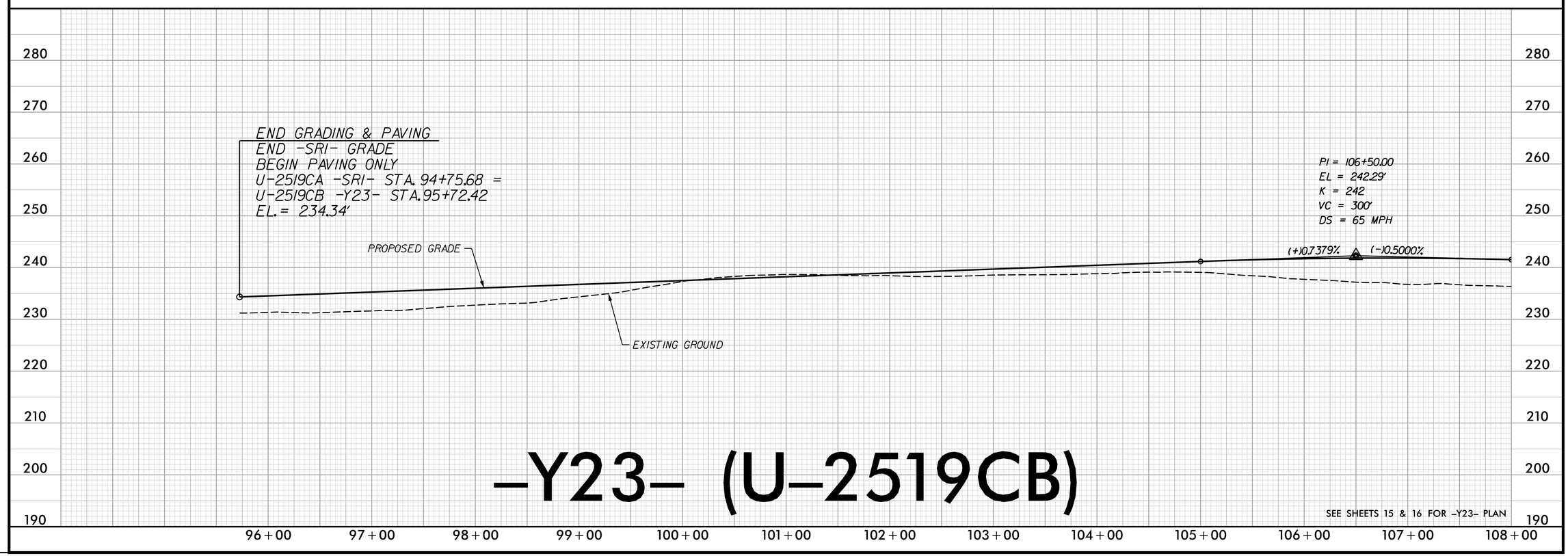
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	50
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 15 FOR -SR1- PLAN



SEE SHEETS 15 & 16 FOR -Y23- PLAN

REVISIONS

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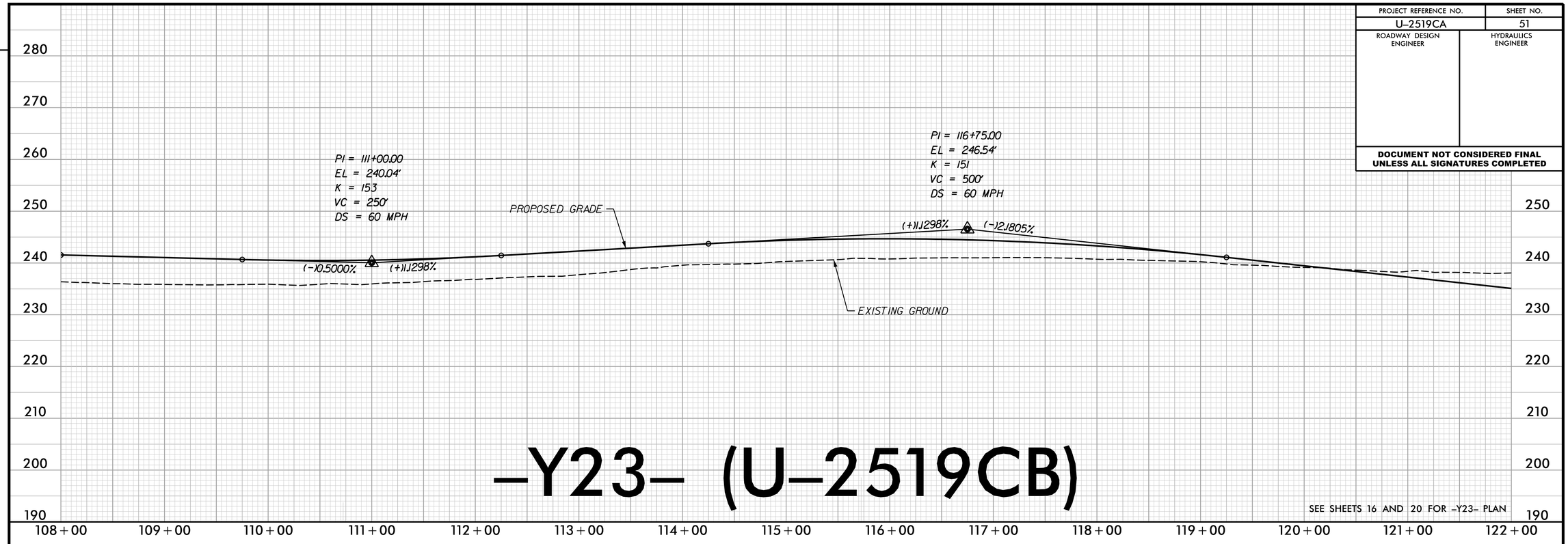
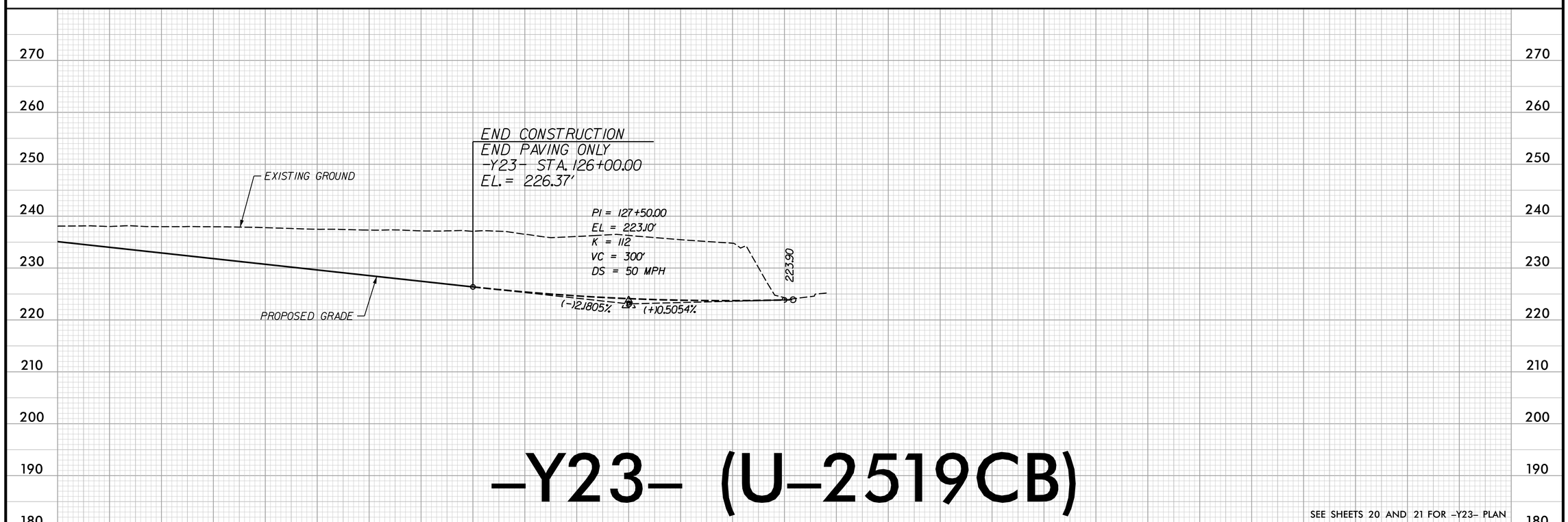
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	51
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



-Y23- (U-2519CB)

SEE SHEETS 16 AND 20 FOR -Y23- PLAN



-Y23- (U-2519CB)

SEE SHEETS 20 AND 21 FOR -Y23- PLAN

REVISIONS

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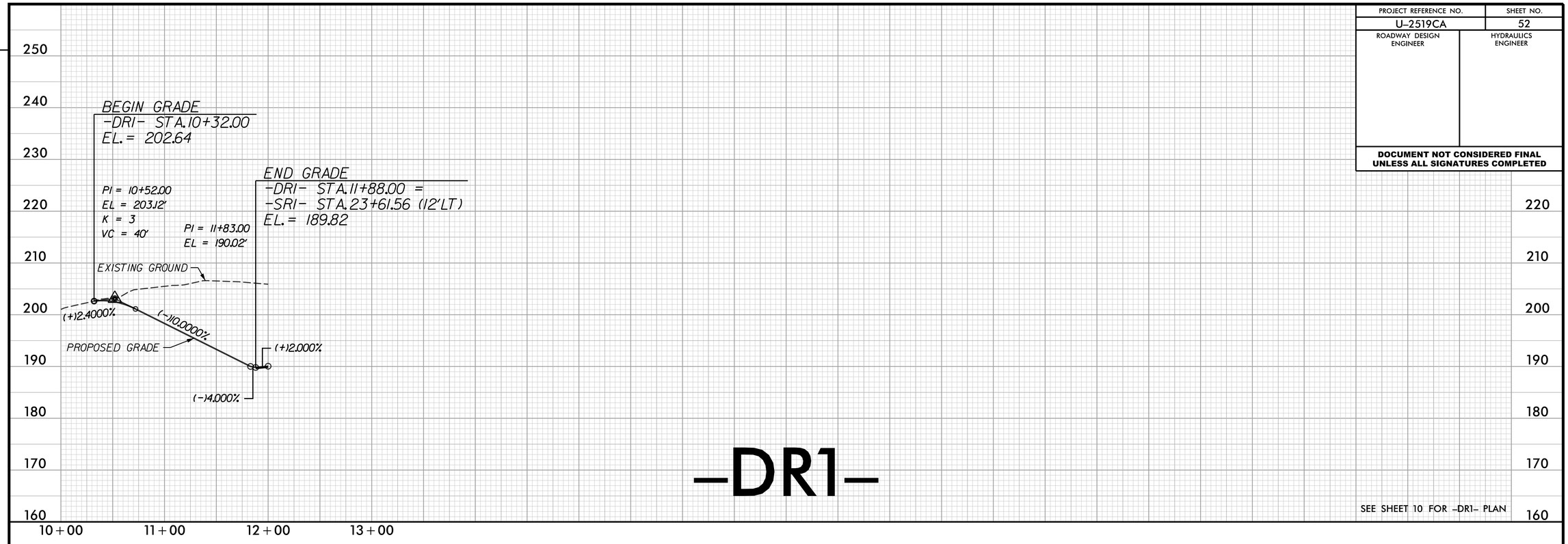
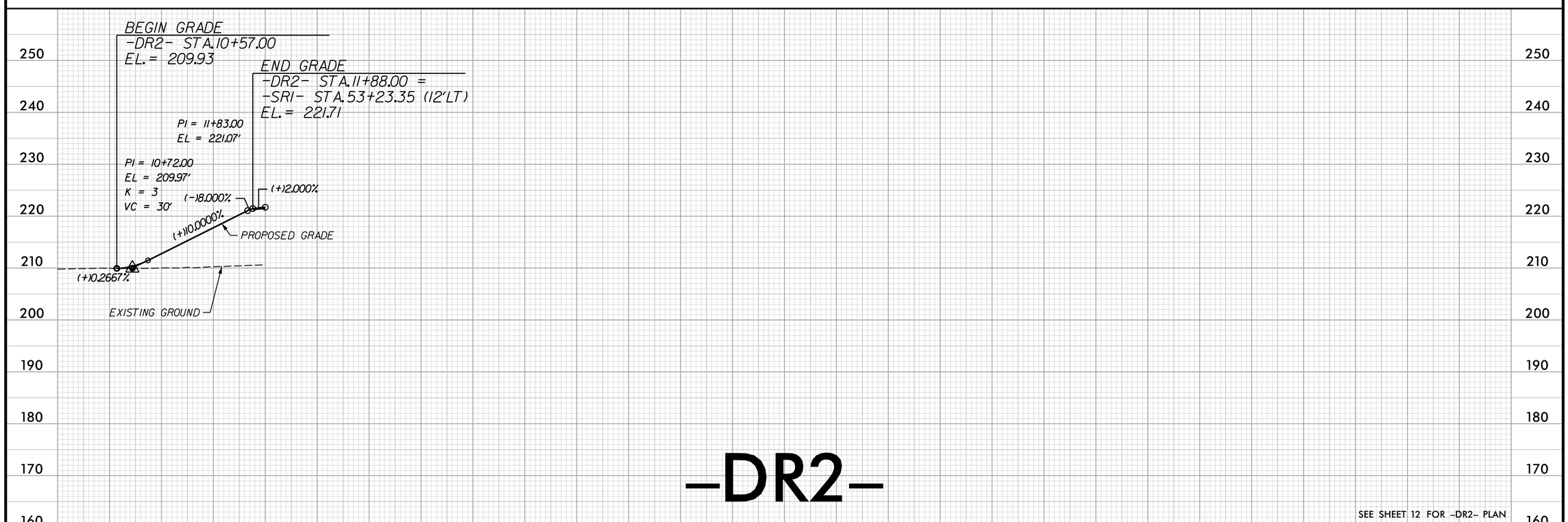
PROJECT REFERENCE NO.	SHEET NO.
U-2519CA	52
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED



SEE SHEET 10 FOR -DR1- PLAN



SEE SHEET 12 FOR -DR2- PLAN

REVISIONS

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