



PAT McCrory
Governor

NICHOLAS J. TENNYSON
Secretary

January 12, 2016

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

ATTN: Mr. Eric Alsmeyer
NCDOT Division 5 Project Coordinator

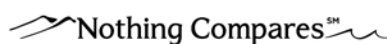
SUBJECT: **Application for Section 404 Individual Permit and Section 401 Water Quality Certification** for the proposed interchange at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road, Wake County, Division 5. STIP No. R-2635D. Debit \$570.00 from WBS Element No. 35520.3.S5

Dear Sir:

The North Carolina Department of Transportation (NCDOT) proposes to convert the existing grade separation at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The project also includes conversion of the existing outside shoulders along the Triangle Expressway – between NC 55 Bypass and US 1- to auxiliary lanes and the construction of new shoulders. In addition to this cover letter, the application package consists of an ENG Form 4345, NCEEP acceptance letter, Interagency Hydraulic Design Review meeting minutes (Concurrence Points 4B and 4C), Stormwater Management Plan, permit drawings, and half-size roadway plan sheets. The project was let on June 26, 2015 as a Design Build contract.

PURPOSE AND NEED

The purpose and need for this project is based on providing adequate access for planned and anticipated growth in southern Apex by providing a direct link between the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153). The proposed action is included in the NCDOT's 2012-2018 STIP, the 2040 Metropolitan Transportation Plan (Capital Area Metropolitan Planning Organization, 2013), the Apex Transportation Plan (Town of Apex, 2011) and the Holly Springs Comprehensive Transportation Plan (Town of Holly Springs, 2013). Due to the current deficiency in roadway linkage, motorists desiring to access the Triangle Expressway from Old Holly Springs-Apex Road have to travel 4.5 to 5.5 miles to gain access. The proposed interchange would offer enhanced roadway connectivity by providing improved access to the Triangle Expressway to accommodate planned and anticipated residential and commercial growth.



NEPA DOCUMENT STATUS

An Environmental Assessment (EA) and Finding of No Significant Impact (FONSI) for R-2635D was completed in March 2015 and has been provided to the appropriate agencies. The EA and FONSI are available on the NCDOT website at:

<https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx>, under *Quick Links > Environmental Documents*.

INDEPENDENT UTILITY

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

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

RESOURCE STATUS

Wetland delineations within the R-2635D project study area followed the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (USACE, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0)* (USACE, 2012). Stream identification and classification followed the *Methodology for the Identification of Intermittent and Perennial Streams and Their Origins* (NC Division of Water Resources [NCDWR], 2010 and 2005).

Jurisdictional features identified in the project study area were verified by USACE Regulatory Specialist Eric Alsmeyer on October 24, 2013. A Preliminary Jurisdictional Determination (Pre-JD) will be requested in conjunction with Section 404 permitting.

This project lies within the Piedmont Physiographic Province in the Cape Fear River Basin (Hydrologic Unit Code 03030004). Jurisdictional features within the project study area that will be impacted include four unnamed tributaries (UT) to Little Branch (NCDWR Classification C; NCDWR Index No. 18-7-6-1-1), one pond, and two riparian wetlands.

There are no designated Outstanding Resource Waters (ORW), designated High Quality Waters (HQW), Water Supply I (WS-I), Water Supply II (WS-II) waters, or waters listed on the 2014 303(d) Final List of Impaired Waters within the project study area or within 1.0 mile of the project area.

IMPACTS TO WATERS OF THE UNITED STATES

Surface Waters

Total surface water impacts for the project study area are 599 linear feet of permanent stream impacts, 70 linear feet of temporary linear stream impacts, and 2.43 acres of surface water impacts. The jurisdictional stream impacts are summarized below in Table 1. Surface water impacts include the pond and are summarized below in Table 2. There will be no impacts to surface waters from utilities for the project study area.

Table 1. R-2635D Stream Impacts

Permit Site No.	Stream Name/JD Packet ID	I/P Flow Status	Impact Type	Permanent Impacts (ft)	Impacts requiring USACE mitigation (ft) ²	USACE Mitigation Ratio ¹	Impacts requiring NCDWR mitigation ³ (ft)	Temp Impacts (ft)
1	UT to Little Branch/SC	P	Fill	18	18	2:1	0	20
			BS	55	0	-	0	0
2	UT to Little Branch/SD	P	Fill	117	117	2:1	0	35
4	UT to Little Branch/SE	I	Fill	275	0	-	0 ⁴	20
			BS	46	0	-	0	0
5	UT to Little Branch/SE	I	Fill	74	0	-	0	10
			BS	14	0	-	0	0
TOTALS (ft)				599	135		0	85

Notes: P = Perennial; I = Intermittent; BS = Bank Stabilization. ¹Determined from USACE during 4C Concurrence Meeting on December 17, 2015. ²Mitigation for bank stabilization not required by USACE. ³Mitigation not required by NCDWR (less than 150 linear feet of perennial stream). ⁴NCDWR mitigation not required for intermittent stream impacts per recent regulatory policy change.

Table 2. R-2635D Open Water Impacts

Permit Site No.	JD Package ID	Permanent Fill (ac)	Temporary Fill (ac)	Mechanized Clearing (ac)	Total Impacts (ac)
6	OWA	2.34	0	0	2.34
TOTALS (ac)		2.34	0	0	2.34

Notes: Totals are rounded based upon sum of actual impacts.

Wetlands

There will be a total of 0.05 acre of permanent riparian wetland impacts associated with this section. These impacts will result from 0.03 acre of permanent fill and 0.02 acre of mechanized clearing. Less than 0.01 acre of temporary fill will occur as a result of tying in a proposed culvert into a ditch. The wetland area that will be temporarily impacted is currently filled with rip-rap. Permanent wetland impacts are summarized below in Table 3.

Table 3. R-2635D Wetland Impacts

Permit Site No.	JD Package ID	Permanent Fill (ac)	Temporary Fill (ac)	Mechanized Clearing (ac)
3	WA	0.03	0	0.02
7	WD	0	<0.01	0
TOTALS (ac)		0.03	<0.01	0.02

Notes: Totals are rounded based upon sum of actual impacts.

MITIGATION OPTIONS

The USACE has adopted, through the Council on Environmental Quality (CEQ), a wetland mitigation policy that embraces the concept of “no net loss of wetlands” and sequencing. The purpose of this policy is to restore and maintain the chemical, biological, and physical integrity of the waters of the United States. CEQ has defined mitigation of wetland and surface water impacts to include: avoiding impacts, minimizing impacts, rectifying impacts, reducing impacts over time, and compensating for impacts (40 CFR 1508.20).

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning phase and minimization measures were incorporated as part of the project design. Minimization includes the examination of appropriate and practicable steps to reduce the adverse impacts.

Avoidance and Minimization

Avoidance and minimization has been employed in the project area to the maximum extent practicable. The following measures were implemented for the project:

R-2635D Minimization Measures

- NCDOT’s Best Management Practices (BMPs) for the Protection of Surface Waters will be enforced;
- Impacts to wetlands, streams, and open waters were avoided and/or minimized by adjusting alignments and slopes;
- 2:1 slopes or less are used in most wetland areas;
- All storm drainage will be diffused and designed for non-erosive velocities before entering stream and wetland areas to the maximum extent practicable;
- Rip rap stabilization on banks of jurisdictional streams will be implemented to prevent erosion;

Proposed stream impacts (599 linear feet) for R-2635D decreased from the impacts calculated for the FONSI (738 linear feet). This decrease is due to the preliminary nature of the FONSI and the assumption of 25 linear feet of impact beyond the slope stakes which have been reduced during final design. In addition, grades were optimized during design to reduce the impacts to Stream SE (UT to Little Branch) to 409 linear feet as opposed to the 540 linear feet estimated in the FONSI.

Final proposed wetland impacts (0.05 acre) for R-2635D decreased from the impacts calculated from the FONSI (0.12 acres). This decrease is due to the preliminary nature of the FONSI and the assumption of 25 linear feet of impact beyond the slope stakes which have been reduced during final design. In addition, the avoidance of Wetlands WD and WE (temporary impacts only) in the final design of the project has reduced proposed wetland impacts.

Compensatory Mitigation

Compensatory mitigation requirements for R-2635D are summarized below in Table 4. This project will permanently impact 599 feet of warm water streams. Of these 599 feet, there is 115 feet of bank stabilization that does not require mitigation by the USACE. Of the remaining 484 feet of stream impacts, 349 feet of the impacts are to intermittent streams not requiring USACE or NCDWR mitigation, with a balance of 135 feet of perennial stream impacts requiring mitigation.

The USACE is requiring 2:1 mitigation for 135 feet of perennial stream impacts. The mitigation requirements of 270 feet of permanent warm water stream impacts will be provided by the NCDMS for R-2635D (Table 4).

This project will also permanently impact 0.05 acre of wetlands. Although the USACE's 0.10 acre mitigation threshold is not applicable for Individual Section 404 permits, due to the minor amount of wetland impacts; wetland mitigation will not be required for the project. In addition, the USACE does not require mitigation for open water/pond impacts.

Table 4. R-2635D Required Compensatory Mitigation Summary

	Stream Impacts (ft)	Wetland Impacts (ac)
Impacts Requiring Mitigation	135	0.00
Required DMS Mitigation	135 @ 2:1	0.00
Total DMS Mitigation	270	0.00

FEDERALLY PROTECTED SPECIES

Plants and animals with a Federal classification of Endangered (E) or Threatened (T) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act (ESA) of 1973, as amended. As of April 2, 2015, the U.S. Fish and Wildlife Service (USFWS) lists four federally protected species for Wake County: red-cockaded woodpecker (*Picoides borealis*), dwarf wedgemussel (*Alasmidonta heterodon*), Michaux's sumac (*Rhus michauxii*), and northern long-eared bat (*Myotis septentrionalis*).

No habitat exists within the project study area for red-cockaded woodpecker and dwarf wedgemussel. The most recent survey for Michaux's sumac were conducted by NCDOT biologists on October 6, 2015 in areas of suitable habitat. No individuals of Michaux's sumac

were found in the project study area. The biological conclusion of “No Effect” still remains valid for the red-cockaded woodpecker, dwarf wedgemussel, and Michaux’s sumac.

The US Fish and Wildlife Service has developed a programmatic biological opinion (PBO) in conjunction with the Federal Highway Administration (FHWA), the US Army Corps of Engineers (USACE), and NCDOT for the northern long-eared bat (NFLEB) in eastern North Carolina. The PBO covers the entire NCDOT program in Divisions 1-8, including all NCDOT projects and activities. The programmatic determination for NLEB for the NCDOT program is “May Affect, Likely to Adversely Affect”. The PBO provides incidental take coverage for NLEB and will ensure compliance with Section 7 of the Endangered Species Act for five years for all NCDOT projects with a federal nexus in Divisions 1-8, which includes Wake County, where R-2635D is located.

CULTURAL RESOURCES

No historic resources are located within the project study area; therefore, the project would not affect any historic architectural resources eligible for or listed on the National Register of Historical Places.

Archaeological investigations completed in 2001 within the Area of Potential Effects of the project did not identify any archaeological resources eligible for or listed on the National Register of Historic Places; therefore, the project would not affect any archaeological resources eligible for or listed on the National Register of Historic Places.

FEMA COMPLIANCE

There are no streams within the project limits that are within Federal Emergency Management Agency (FEMA)-designated flood zones. Therefore, coordination between the NCDOT Hydraulics Unit and FEMA will not be required.

INDIRECT AND CUMULATIVE EFFECTS

An Indirect and Cumulative Effects (ICE) Screening report for R-2635D was completed in July, 2014. The indirect land use effects of the project will be largely dependent upon several key variables including: the future local economy for development, public infrastructure expansion projects, the completion of other transportation improvements in the area, the construction of the mixed-use Veridea development which would have an important impact on the population and job market within the project vicinity. Due to relatively economical housing prices when compared to surrounding areas, expected continued moderate to brisk population growth, anticipated growth of local jobs in the area, planned extension of existing transportation facilities, and the desire by local municipalities to expand water and sewer service throughout the study area, the local market for development is relatively robust at present. Future land use plans of Apex and Holly Springs recognize the potential for future growth in the project area and have incorporated both R-2635D as well as the Veridea project, indicating a desire of rezoning the land near the project as primarily mixed use with specific pockets of industrial use.

The project area is poised to undergo considerable growth by 2035, and Apex and Holly Springs have worked to develop and implement land use and infrastructure plans to accommodate this growth. These plans include a comprehensive plan that addresses growth, land use, and transportation-specific small area plans; and a comprehensive transportation plan. In some cases local ordinances for environmental protection, such as the Town of Apex's *Secondary and Cumulative Impacts Master Mitigation Plan*, and the Town of Holly Springs's *Natural Resources Implementation Program*, exceed state and federal requirements. The proposed project has the potential for moderate indirect and cumulative effects because the project would create a new transportation link and a land use node that would reduce travel times, change travel patterns, and expose properties to greater traffic volumes; however, the proposed project is consistent with local land use and transportation plans.

Comprehensive planning efforts by Apex and Holly Springs have put the policies and procedures in place that show the vision and intent for development in the area of the project, to provide adequate infrastructure to support this growth, and to protect the natural and human environment during the growth. Both Apex and Holly Springs have developed a *Secondary and Cumulative Impacts (SCI) Master Mitigation Plan* in cooperation with the North Carolina Department of Environment and Natural Resources (NCDENR) to provide a holistic review of the environmental impacts and identified mitigation programs associated with planned infrastructure projects deemed necessary by their Town Councils.

The cumulative effect of this project when considered in the context of other past, present, and future actions, and the resulting impact on the notable human and natural features, is expected to be minimal. Forecast development would be the predominant contributor to cumulative effects. Development is already occurring in the area and that development is anticipated to continue. The conclusion of the July 2014 ICE report state that the projected ICE of R-2635D did not warrant a Land Use Scenario Assessment (LUSA) or other further studies of water quality impacts. Mr. Rob Ridings of NCDWR concurred with this determination on May 29, 2015.

WILD AND SCENIC RIVERS

This project will not impact any designated Wild and Scenic Rivers or any rivers included in the list of study rivers (Public Law 90-542, as amended) or North Carolina Natural and Scenic Rivers.

ESSENTIAL FISH HABITAT

The project will not impact any essential fish habitat afforded protection under the Magnuson-Stevens Act of 1996 (16 U.S.C 1801 *et seq.*).

REGULATORY APPROVALS

Application is hereby made for a Department of the Army Section 404 Individual Permit as required for the above-described activities for the proposed T.I.P. Project R-2635D. We are also hereby requesting a Section 401 Water Quality Certification from NCDWR. In compliance with Section 143-215.3D (e) of the NCAC, we will provide \$570.00 to act as payment for processing the Section 401 permit.

A copy of this permit application and its distribution list will be posted on the NCDOT website at <https://connect.ncdot.gov/resources/Environmental/Pages/default.aspx>. Thank you for your time and assistance with this project. Please contact John Merritt at either jsmerritt@ncdot.gov or (919) 707-6140 if you have any questions or need additional information.

Sincerely,



for

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

cc: NCDOT Permit Application Standard Distribution List

**U.S. ARMY CORPS OF ENGINEERS
APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT**

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

**Form Approved -
OMB No. 0710-0003
Expires: 30-SEPTEMBER-2015**

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

PRIVACY ACT STATEMENT

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

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

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETE
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(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME First - Richard Middle -W Last - Hancock Company - NCDOT- PDEA E-mail Address - rwhancock@ncdot.gov		8. AUTHORIZED AGENT'S NAME AND TITLE (agent is not required) First - Middle - Last - Company - E-mail Address -	
6. APPLICANT'S ADDRESS: Address- 1598 Mail Service Center City - Raleigh State - NC Zip - 27699 Country - USA		9. AGENT'S ADDRESS: Address- City - State - Zip - Country -	
7. APPLICANT'S PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax n/a 919-707-6000 919-250-4224		10. AGENTS PHONE NOS. w/AREA CODE a. Residence b. Business c. Fax n/a n/a	

STATEMENT OF AUTHORIZATION

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

SIGNATURE OF APPLICANT

DATE

NAME, LOCATION, AND DESCRIPTION OF PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions) R-2635D/ Access 540			
13. NAME OF WATERBODY, IF KNOWN (if applicable) Cape Fear River Basin (HUC 03030004)		14. PROJECT STREET ADDRESS (if applicable) Address NC 540 and Old Holly Spring-Apex Road	
15. LOCATION OF PROJECT Latitude: °N 35.689172 Longitude: °W -78.861912		City - Apex State- NC Zip-	
16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) State Tax Parcel ID n/a Municipality Town of Apex Section - n/a Township - n/a Range - n/a			

17. DIRECTIONS TO THE SITE

Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) in southern Apex, western Wake County.

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

The Project is the conversion of the grade separation at the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153) to an interchange. The Project also includes the conversion of the existing outside shoulders along the Triangle Expressway - between NC 55 Bypass and US 1- to auxiliary lanes and the construction of new shoulders.

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

The purpose and need for this project is based on providing adequate access for planned and anticipated growth in southern Apex by providing a direct link between the Triangle Expressway (Toll NC 540) and Old Holly Springs-Apex Road (SR 1153). The proposed action is included in the NCDOT's 2012-2018 STIP, the 2040 Metropolitan Transportation Plan (Capital Area Metropolitan Planning Organization, 2013), the Apex Transportation Plan (Town of Apex, 2011) and the Holly Springs Comprehensive Transportation Plan (Town of Holly Springs, 2013). Due to the current deficiency in roadway linkage, motorists desiring to access the Triangle Expressway from Old Holly Springs-Apex Road have to travel 4.5 to 5.5 miles to gain access. This new access would enhance the interconnectedness of the roadway systems and provide additional transportation options.

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

20. Reason(s) for Discharge

Impacts will result from the construction of the interchange ramps, shoulders, and associated hydraulic structures, as well as and the lengthening of existing hydraulic structures and construction of roadside ditches.

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

Type Amount in Cubic Yards	Type Amount in Cubic Yards	Type Amount in Cubic Yards
Wetland fill - 163 CY	Streams - 271 CY	Open Water/Pond - 18,775 CY

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

Acres See attached cover letter
or
Linear Feet

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

See attached cover letter

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

n/a

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

a. Address- (see attached list)

City - State - Zip -

b. Address-

City - State - Zip -

c. Address-

City - State - Zip -

d. Address-

City - State - Zip -

e. Address-

City - State - Zip -

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

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED
NCDOT/NC Turnpike	EA/FONSI			3-18-2015	

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

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

 01-08-2016
SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE
Mr. RICHARD W. HANCOCK

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

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

R-2635D Property Owner Addresses

Low Ridge LLC
c/o Paul D Satterwhite
3708 Old Holly Springs-Apex Road
Apex, NC 27539-9146

Wake County
PO Box 550
Raleigh, NC 27602-0550

William and Sheryl Sowter
4801 Louis Stephens Drive
Morrisville, NC 27560-8677

HH Trinity Apex Investments, LLC
PO Box 1166
Zebulon, NC 27597-1166

Veridea Holdings LLC
PO Box 1166
Zebulon, NC 27597-1166

Brenda P. Whitehouse
3109 Old Holly Springs-Apex Road
Apex, NC 27539-9144

Roger and Glenda Bushee
3137 Old Holly Springs-Apex Road
Apex, NC 27539-9144



May 4, 2010

Mr. Steve DeWitt, P.E.
Chief Engineer
North Carolina Turnpike Authority
5400 Glenwood Avenue, Suite 400
Raleigh, North Carolina 27612

Dear Mr. DeWitt:

Subject: EEP Mitigation Acceptance Letter:

R-2635, Western Wake Expressway, Wake County; Cape Fear River Basin

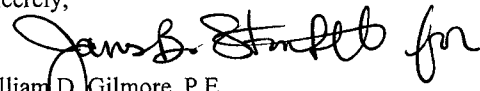
The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the unavoidable impact associated with the above referenced project. Based on the information supplied by you on May 3, 2010, the impacts are located in CU 03030002 and 03030004 of the Cape Fear River Basin in the Central Piedmont (CP) Eco-Region, and are as follows:

IMPACTS / MITIGATION UNITS	Stream			Wetlands			Buffer	
	Cold	Cool	Warm	RW	NRW	CM	Zone 1	Zone 2
Impacts – Cape Fear 03030002 (CP)			6,485	13.78				
Mitigation Units Cape Fear 03030002 (up to 2:1)			12,970	27.56				
Impacts – Cape Fear 03030004 (CP)			5,238	5.24				
Mitigation Units–Cape Fear 03030004 (up to 2:1)			10,476	10.48				
Impacts – Total Project			11,723	19.02				
Mitigation Units – Total Project (up to 2:1)			23,446	38.04				

This mitigation acceptance letter replaces the mitigation acceptance letter issued on August 1, 2008. EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the final permitted impacts associated with this project by the end of the MOA Year in which this project is permitted, in accordance with Section X of the Amendment No. 2 to the Memorandum of Agreement between the North Carolina Department of Environment and Natural Resources, the North Carolina Department of Transportation, and the U. S. Army Corps of Engineers, fully executed on March 8, 2007. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

If you have any questions or need additional information, please contact Ms. Beth Harmon at 919-715-1929.

Sincerely,


William D. Gilmore, P.E.
EEP Director

cc: Mr. Eric Alsmeyer, USACE – Raleigh Regulatory Field Office
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit
Mr. Shannon Switzer, P.E., NCTA
Ms. Jennifer Harris, P.E., NCTA
Mr. Peter Graf, P.E., LPA Group
Mr. Phillip Todd, SEPI Engineering
Ms. Linda Fitzpatrick, NCDOT – PDEA

Restoring... Enhancing... Protecting Our State



MEMORANDUM OF MEETING

SUBJECT: R-2635D – Access 540
Triangle Expressway (Toll NC 540) / OHSA Road (SR 1153) Interchange
Wake County

Concurrence Point 4B Meeting

DATE: October 22, 2015

ATTENDEES:

The following persons attended in person:

NAME:	UNIT/COMPANY	EMAIL ADDRESS
Dennis Jernigan	NCDOT Division 5	dwjernigan@ncdot.gov
Alan Shapiro	NCDOT Division 5	awshapiro@ncdot.gov
Chris Murray	NCDOT Division 5	cmurray@ncdot.gov
Karen McCauley	NCDOT Design-Build	kmccauley@ncdot.gov
Matt Lauffer	NCDOT Hydraulics	mslauffer@ncdot.gov
Bill Elam	NCDOT Hydraulics	belam@ncdot.gov
Linda Johns	NCDOT Hydraulics	lmjohns@ncdot.gov
Mark Staley	NCDOT REU	mstaley@ncdot.gov
Rupal Desai	NCDOT TPB	rpdesai@ncdot.gov
Tracy Roberts	HNTB	teroberts1@ncdot.gov
Rob Ridings	DWR	rob.ridings@ncdenr.gov
Gary Jordan	USFWS	gary_jordan@fws.gov
Eric Alsmeyer	USACE	eric.c.alsmeyer@usace.army.mil
Matt Adams	Blythe Construction	matt.adams@blytheconstruction.com
Jeff Moore	Kimley-Horn (KH)	jeff.moore@kimley-horn.com
Beth Reed	KH	beth.reed@kimley-horn.com
Dan Robinson	KH	dan.robinson@kimley-horn.com
Bryan Vickery	KH	bryan.vickery@kimley-horn.com

The following persons attended by phone:

Cynthia Van Der Wiele	USEPA	vanderwiele.cynthia@epa.gov
Travis Wilson	NCWRC	travis.wilson@ncwildlife.org

The Concurrence Point 4B Meeting was held on October 22, 2015 in the Structures Conference Room for the above referenced project. The following project specific items were discussed:

Bill Elam opened the meeting with introductions.

Dan Robinson began discussing features sheet by sheet using the overhead projection of each sheet and photographs.

Sheet 4

- 1) -L- Station 60+00 – The existing 24” RCP cross pipe is not proposed to be extended as part of the project and does not impact the Jurisdictional Stream (JS).
- 2) -L- Station 63+00 – The existing 10’x9’ RCBC is proposed to be extended 7 feet on the upstream side and 12 feet on the downstream side into the JS.

Rip rap exists at the base of the channel and the existing banks are armored. Class II rip rap is proposed as necessary during construction to armor the banks further.

Chris Murray asked if there will be a stream diversion to construct the extensions. Dan Robinson responded that an impervious dike would be constructed as part of the erosion control design, but no stream diversion is proposed since it is an existing facility.

This culvert does not contain a sill and no sill is proposed. The existing culvert grade is 1.3%. Therefore, a sill is not warranted based on grade or field conditions.

No other issues or questions were discussed regarding this sheet.

Sheet 5

- 3) -L- Station 74+00 – The existing 2@11’x9’ RCBC is proposed to be extended 12 feet on the upstream side and 13 feet on the downstream side into the JS.

A concrete sill exists on the upstream side of the east barrel. Mother Nature has decided to silt up the west barrel rather than the east barrel. Our design will incorporate a new sill in the culvert extension on the upstream side only in the west barrel.

Class II rip rap is proposed to armor the banks.

Blythe will ensure that the existing banks are stable during construction. If banks are stable, then existing rip rap can be retained.

- 4) -L- Station 76+00 LT – The existing blue-line feature is located outside of the Right-of-way limits and is not impacted by the project.
- 5) -L- Station 76+25 – The existing 48” RCP needs to be extended to the downstream side due to the widening. This pipe serves as an overflow structure for the dual RCBCs.

A lateral 'V' ditch is proposed on the right side and bypasses the entrance to the existing 48" overflow pipe. This ditch handles the off-site drainage and directs flow to the entrance of the 2@11'x9' RCBC. Once enough headwater builds up during a large storm event, the 48" RCP is activated.

- 6) -L- Station 80+00 RT – The existing wetland will be impacted by the fill slope, but a proposed ditch will **not** be cut through the wetland.

Class I rip rap is proposed in the lateral base ditch leading up to the wetland to reduce velocities to non-erosive levels (velocity entering wetland = 1.55 fps). The ditch grade is flat (0.3%) approaching the wetland and stops just prior to the wetland. The wetland will provide stormwater treatment.

No issues or questions were discussed regarding this sheet.

Sheet 6

NCDOT had recently provided a revised wetland (WET) DGN file to KH since the CP 4B package was submitted. There were minor revisions and Dan was presenting from sheets that were based on the revised WET file. The minor revisions did not require any changes to the drainage design.

- 7) -L- Station 99+50 – The existing 42" RCP across NC 540 will not be extended to the upstream side, but is proposed to be extended to the downstream side with a 48" RCP and TBJB. The 48" RCP is necessary because of the additional drainage tying into it from an adjacent system from the gore area.

The jurisdictional surface feature (pond) upstream of the existing 42" RCP will be drained as part of the project.

Rip rap exists at the inlet end of the 42" RCP. That rip rap is proposed to be retained if found stable during construction.

There is not a defined drainage ditch or system between the rip rap at the entrance of the 42" cross pipe and the jurisdictional pond.

The issue with the existing 42" RCP is that the existing pipe does not have enough cover over the entrance to allow the normal design headwater to stage up without getting onto the shoulder of the road.

- 8) Proposed Detention Pond – KH has laid out two detention pond options to correct this pipe/cover deficiency that are still under evaluation by NCDOT.

Option 1 would consist of a dry detention pond in Quadrant A.

Option 2 would consist of a detention pond in the lower extremities of the existing jurisdictional surface feature that will be drained with the project.

Proposed development of the Veridea site would preclude Option 2.

Option 1 was described as the preferred option by the attendees from NCDOT.

Dan stated that the dry detention pond was not included in the original bid set. Therefore, the options had not been fully designed at this point.

KH will add rip rap to the outlet of the 18" RCP under the berm of the dry detention pond.

Eric Alsmeyer did not believe that the dry detention pond was an issue due to the proposed flat grade of the pond.

Chris asked if the pre-construction and post-construction runoffs were the same to the proposed pond. Dan stated that runoffs were not the same based on proposed impervious areas and re-routing of roadside ditches into systems that drain to the pond. Linda Johns stated that 21 acres of drainage area flows to the 42" RCP under NC 540 and approximately 9 acres flows to the proposed 36" under -Y3RPD-.

Chris expressed concern regarding the potential scour below the ditch section downstream of the 18" RCP pond outlet. Stabilization and vegetation of this area will be challenging.

-Y3- Station 39+00 RT – The proposed system will drain into the dry detention pond. The Division expressed concern regarding the potential for pond water staging into the -Y3- system. KH will consider lowering the proposed 24" RCP and flattening this ditch to eliminate the need for rip rap, but also design it to not allow ponding water into the 24" pipe system. KH will add rip rap embankment stabilization at the end of this ditch as it outfalls into proposed pond.

KH has not designed the emergency spillway of the proposed pond in detail at this point. KH will consider showing rip rap of the entire ditch/area between the tail ditch from the pond's 18" RCP outlet and existing rip rap at the inlet to the existing 42" RCP.

Hydraulics Unit does not desire standing water in the dry detention pond. KH plans to set the pipe invert at the base of the pond to keep the pond dry.

KH has not designed a forebay at this point.

Matt Lauffer asked whether we have enough elevation to use a riser/barrel configuration outlet structure and possibly eliminate the emergency spillway through the natural topography. The required barrel would be a lot larger with a riser structure to minimize pressure flow.

Division stated that their preference would be to keep an emergency spillway due to easier maintenance among other factors.

KH will line the 10-foot wide berm with rip rap.

The pond will be designed for a 50-year storm. Storms above the 50-year frequency would head up and exit the pond via the emergency spillway.

KH to work closely with the hydraulics unit to determine the appropriate riser/barrel configuration, location (preferably not through the constructed berm), emergency spillway, and water quality drawdown features (if any) related to the proposed pond. Chris recommended a rip rap ditch from the proposed 18" RCP outlet pipe to the existing 42" RCP under NC 540. KH proposes to retain the existing rip rap pad at the 42" RCP inlet if stable.

Chris expressed concern over whether that rip rap is lined. KH to investigate during their next site visit. After discussion, Chris agreed to retain the existing rip rap for now.

It was concluded that more coordination, discussion, and design would be necessary before the dry detention pond would be finalized.

9) -Y3RPD- Station 22+75 – A 60" RCP is proposed will be buried one foot.

On both ends of the 60" pipe, Class II rip rap embankment protection is proposed to receive ditch flow from -Y3- from the west.

According to our field reconnaissance, the existing banks are stable.

Triassic rock is prevalent in the interchange area based on the geotechnical borings.

Beth Reed said that the stream to the north of the proposed 60" RCP is more intermittent.

Chris expressed concern that burying the entrance of the 60" pipe 1' may result in a head cut upstream of the proposed pipe.

Chris discussed the use of a concrete sill.

KH was directed to show a 1-foot concrete sill at the 60" RCP inlet. NCDOT hydraulics unit will provide KH with an example detail where a concrete sill has been constructed at the entrance of a large diameter pipe.

10) -L- Station 108+00 – There are dual 36" RCPs that will be extended on the upstream side.

No extension is proposed on the downstream side. The inlet and outlet ends of this pipe are already armored with rip rap and any impacts to this feature would not require mitigation.

The pond on the downstream side of the outlet is jurisdictional according to the JD map prepared by the Veridea developer.

On the downstream side of the dual pipes, the wetland limits changed per the recently provided WET file. The footprint of the wetland was minimized, but this did not modify the drainage

design. The new limits of the wetland will be incorporated into the permit drawings. KH to adjust proposed 15" RCP outlet (0604) to match the existing outlet location of the 15" RCP that was removed due to widening.

Rip rap at 0602 pipe outlet is not proposed since the outlet area has existing riprap (inside wetland limits) and will be retained.

No additional issues or questions were discussed regarding this sheet.

Sheet 7

11) -L- Station 115+00 – This pipe crossing is not located on a jurisdictional stream.

12) -L- Station 122+00 RT – This wetland feature is not impacted by the project.

Sheet 8

13) -L- Station 122+50 RT – The existing 48" RCP is not proposed to be extended with the project. Therefore, there is no impact to the wetland or JS.

14) -L- Station 129+00 – The existing 8'x9' RCBC is not proposed to be extended with the project. Therefore, there is no impact to the JS.

Sheet 9

No features are included on this sheet.

Sheet 10

15) -Y3- Station 19+00 – The existing 30" RCP will be extended, but this is not a JS.

Sheet 11

The existing jurisdictional surface feature (pond) Station 43+00 on the right or east side of -Y3- will be drained with the project.

NCDOT does not intend to drain the non-jurisdictional pond Station 45+00 on the left or west side of -Y3-. However, TDE has been added around the pond in case corrective measures are necessary during construction.

The second (non-jurisdictional) pond Station 50+00 on the right or east side will be drained as part of the project.

Sheet 12

No features are included on this sheet.

General

Dan asked if there were any further questions and none were offered.

NCDOT expects to provide 100% Hydraulic Design comments by October 23rd.

KH will work through the dry detention pond using Option 1 within Quadrant A.

The Concurrence Point 4C meeting will be held on December 17, 2015. NCDOT will provide the 4C package including permit drawings to the agencies on or before December 3, 2015.

Meeting adjourned.

MEMORANDUM OF MEETING

SUBJECT: R-2635D – Access 540
Triangle Expressway (Toll NC 540) / OHSA Road (SR 1153) Interchange
Wake County

Concurrence Point 4C Meeting

DATE: December 17, 2015

ATTENDEES:

The following persons attended in person:

NAME:	UNIT/COMPANY	EMAIL ADDRESS
Dennis Jernigan	NCDOT Division 5	dwjernigan@ncdot.gov
Alan Shapiro	NCDOT Division 5	awshapiro@ncdot.gov
Chris Murray	NCDOT Division 5	cmurray@ncdot.gov
Karen McCauley	NCDOT Design-Build	kmccauley@ncdot.gov
Tim McFadden	NCDOT Design-Build	tmcfadden@ncdot.gov
John Merritt	NCDOT NES	jsmerritt@ncdot.gov
Matt Lauffer	NCDOT Hydraulics	mslauffer@ncdot.gov
Bill Elam	NCDOT Hydraulics	belam@ncdot.gov
Linda Johns	NCDOT Hydraulics	lmjohns@ncdot.gov
Samuel Megahed	NCDOT Hydraulics	smegahed@ncdot.gov
Mark Staley	NCDOT REU	mstaley@ncdot.gov
Jason Hedley	NCDOT L&S	jchedley@ncdot.gov
Kat Bukowy	HNTB/NCTA	kbukowy@hntb.gov
Rob Ridings	DWR	rob.ridings@ncdenr.gov
Eric Alsmeyer	USACE	eric.c.alsmeyer@usace.army.mil
Jeff Moore	Kimley-Horn (KH)	jeff.moore@kimley-horn.com
Beth Reed	KH	beth.reed@kimley-horn.com
Dan Robinson	KH	dan.robinson@kimley-horn.com
Bryan Vickery	KH	bryan.vickery@kimley-horn.com

The following person attended by phone:

Travis Wilson	NCWRC	travis.wilson@ncwildlife.org
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The Concurrence Point 4C Meeting was held on December 17, 2015 in the Structures Conference Room for the above referenced project. The following project specific items were discussed:

Bill Elam opened the meeting with introductions.

Dan Robinson began discussing features sheet by sheet using the overhead projection of each sheet and photographs.

Sheets 2D-1 and 2D-2

On the drainage details, Chris Murray requested that KH show geotextile fabric on Detail 13 (special rock check dam). The fabric should be keyed 6 inches into the rock check and placed within the footprint of the rock.

Chris also requested that KH replace all PSRM callouts on the project with excelsior matting due to comments from the Roadside Environmental Unit (REU).

For slopes from 0% to 2%, KH is to continue to show grass. For slopes from 2% to 4%, KH is to use excelsior matting and greater than 4%, use Class B rip rap with geotextile fabric liner. KH to ensure that any proposed rip rap is not inside the roadway clear zone.

Sheet 2D-3

This detail for the reinforced concrete endwall sill was added based on comments from the 4B meeting.

Sheet 4

Site 1

-LA- Stations 63+00 RT and 64+50 LT consists of extending the existing 10'x9' RCBC on both sides.

On the upstream side, KH has shown rip rap as discussed in the 4B meeting.

18 feet of permanent impacts are proposed upstream (11 feet) and downstream (7 feet) as a result of the culvert extensions.

55 feet of permanent impacts are proposed as a result of bank stabilization.

KH to move the Site 1 leader outside of the hydraulic labels.

This is a perennial stream. Eric Alsmeyer stated that there would be no mitigation for the 55 feet of bank stabilization and the 18 feet of permanent impact would be subject to 2:1 mitigation.

Sheet 5

Site 2

-LA- Stations 73+25 RT and 75+50 LT consists of extending the existing 2@11'x9' RCBC 13 feet on the downstream side and 12 feet on the upstream side.

On the downstream side, the channel will be relocated slightly due to the bend.

The design incorporates a rock lined floodplain bench with Class II rip rap in accordance with comments from the 4B meeting.

On the upstream side, the design incorporates a new sill in the west barrel rather than in the east barrel to match the existing sediment conditions.

117 feet of total permanent impacts are proposed.

This is a perennial stream. Eric stated that there would be no mitigation for the bank stabilization and the 117 feet of permanent impact would be subject to 2:1 mitigation.

It was noted to extend the temporary stream impacts on the upstream side to the ROW limits.

Site 3

-L- Station 80+00 RT consists of an isolated wetland that will be impacted by the fill slope, but the proposed ditch will not be cut through the wetland.

The fill results in a permanent fill in wetlands impact of 0.03 acres and 0.2 acres of mechanized clearing in wetlands.

Rip rap is proposed at the end of the lateral base ditch to slow down the water at the entrance to the wetland. A 40' long grass swale has been incorporated into the design just upstream of the Rip Rap Pad at the end of the conveyance.

Sheet 6

Site 4

-Y3RPD- Station 22+75 includes a 60" RCP buried one foot.

275 feet of total permanent impacts are proposed associated with the proposed pipe.

10 feet of temporary impacts are included on either side of the bank stabilization.

46 feet of bank stabilization is proposed and is measured from the outlet of the pipe to the end of the bank stabilization (total for both upstream and downstream). The design shows uneven riprap limits on either side of the stream to account for proposed ditch tie-ins. KH was advised to even out the riprap limits on both sides of the stream. This would not change the impact lengths, but rather increase the quantity of riprap.

This is an intermittent stream. Eric stated that mitigation would not be required for the 275 feet of impact since it is an intermittent stream.

Rob Ridings stated that the DWR does not require mitigation for intermittent streams anymore based on recent policy change.

KH used the contours (DTM) rather than the Jurisdictional Stream (JS) lines to establish the pipe outlet location since the JS points did not match the contours and the points taken in the field.

Site 5

-L- Station 99+50 LT consists of extending the existing 42-inch RCP under NC 540 to the downstream side with a 48-inch RCP and TBJB. The 48-inch size is necessary because of the additional drainage tying into it from the adjacent 30-inch system.

88 feet of permanent impacts to surface waters were proposed as a result of the pipe extension, but will be revised to not include the length associated with the countersunk riprap pad (per Eric). The revised permanent existing channel impacts is 74 feet.

The design incorporates a counter sunk rip rap pad as discussed in the 4B meeting. This counter sunk outlet pad (14 LF) was recommended to be broken out in to a separate line item “Bank Stabilization”.

No mitigation would be required from either DWR or USACE for this intermittent stream.

10 feet of temporary stream impact was shown and would remain the same.

BMP (Proposed Dry Detention Basin)

KH has developed a final conceptual design for the dry detention pond to correct the pipe/cover deficiency at the existing 42-inch RCP under NC 540. This pond is not subject to permitting on this project.

As KH finalizes the pond design, Matt Lauffer stated that he wants to review the outlet control structure and orifice configuration.

KH to provide the final pond design and details to Hydraulics Unit for review.

Matt requested that KH provide oversight for the pond during construction especially the clay core.

Site 6

The Outstanding Surface Water (OSW) will be drained as a part of the project and is encompassed within a Temporary Drainage Easement for that purpose.

2.34 acres of permanent surface water impacts is proposed for the draining of the existing pond located north of Ramp A. The pond is encompassed within a Temporary Drainage Easement for that purpose.

No mitigation would be required from either DWR or USACE for the permanent surface water impacts associated with draining the pond.

Site 7

-L- Station 108+00 consists of dual 36-inch RCPs under NC 540 that will be extended on the upstream side. No extension is proposed on the downstream side. The inlet and outlet ends of this pipe are already armored with rip rap and any impacts to this feature would not require mitigation.

The pipe extension and headwall construction has a very small impact to the wetland. This work was quantified as excavation in wetlands.

Less than 0.01 of temporary wetland impacts is proposed. Less than 0.01 of permanent wetland impacts is proposed.

Eric stated that the 0.1 acre minimum threshold does not apply to an individual permit. However, for this project USACE would not require mitigation for the wetland impacts since they are so minor.

KH to include the square feet of impacts in the notes portion of the summary table when the impacts are less than 0.01 acres.

Schedule

KH plans to submit the revised permit drawings and permit application on December 21, 2015 for review by NCDOT. KH will submit directly to John Merritt as discussed in yesterday's progress meeting. John will endeavor to review the application over the holidays and provide comments earlier than the 10 business day review time. KH hopes that the permit applications can be submitted to the agencies on or before January 8, 2016.

Post 4C Meeting

After the 4C meeting, Mark Staley, Linda Johns, Dan Robinson, and Bryan Vickery discussed that the temporary impacts at Site 2 should be extended to the right-of-way and easement lines on either side of the culvert.



North Carolina Department of Transportation

Highway Stormwater Program
STORMWATER MANAGEMENT PLAN
FOR NCDOT PROJECTS

(Version 2.04; Released November 2015)

WBS Element:		TIP No.: R-2635D		County(ies): Wake		Page 1 of 5	
General Project Information							
WBS Element:		TIP Number: R-2635D		Project Type: Roadway Widening		Date: 12/21/2015	
NCDOT Contact:		Bill Elam, P.E.		Contractor / Designer:			
Address:		NCDOT Hydraulics Unit 1020 Birch Ridge Dr. Raleigh, NC 27610		Address:			
Phone:		919-707-6718		Phone:			
Email:		belam@ncdot.gov		Email:			
City/Town:		Apex		County(ies):		Wake	
River Basin(s):		Cape Fear		CAMA County?		No	
Wetlands within Project Limits?		Yes					
Project Description							
Project Length (lin. miles or feet):		1.372 Miles		Surrounding Land Use:		Residential/Commercial/Industrial	
		Proposed Project		Existing Site			
Project Built-Up Area (ac.)		33.5 ac.		22.2 ac.			
Typical Cross Section Description:		I-540 (LA): 8 @ 12' wide lanes with 12' paved shoulders and 42' wide grass median. Shoulder Berm Gutter as necessary throughout with sideslopes that vary from 2:1 or flatter. Old Holly Springs Apex Road (Y3): 3 @ 12' wide lanes with 2'-6" Curb and Gutter on both sides. Ultimate condition roadway width of 108' to be constructed around bridge. Side slopes of 2:1 or flatter throughout.		I-540 (LA): 6 @ 12' wide lanes with 12' paved shoulders and 54' wide grass median. Shoulder Berm Gutter as necessary throughout with sideslopes that vary from 2:1 or flatter. Old Holly Springs Apex Road (Y3): 2 @ 12' wide lanes with 4'-5' paved shoulders and side slopes that vary from 2:1 or flatter.			
Annual Avg Daily Traffic (veh/hr/day):		Design/Future: 72400 Year: 2035		Existing: 37530		Year: 2015	
General Project Narrative: (Description of Minimization of Water Quality Impacts)		Widening of I-540 (LA), Old Holly Springs Apex Road (Y3) and Bridge #1278 over I-540. Work includes widening of existing facilities as well as new location interchange ramps/loops. Project also includes extensions of two box culverts under I-540. Existing outfall locations and drainage patterns were maintained as much as possible. There are ten NCDWR classified streams within the project boundary (3 impacted) and approximately half of the runoff ultimately flows to Little Branch and half of the runoff ultimately flows to Big Branch. Grass Swales were used throughout the project to provide treatment. A dry detention basin is located in the loop gore of Quadrant A. This was provided to reduce the peak runoff and to treat new built upon area.					
Waterbody Information							
Surface Water Body (1):		UT to Little Branch		NCDWR Stream Index No.:		18-7-6-1-1	
NCDWR Surface Water Classification for Water Body		Primary Classification:		Class C			
		Supplemental Classification:		None			
Other Stream Classification:		None					
Impairments:		None					
Aquatic T&E Species?		No		Comments:			
NRTR Stream ID:		SC		Buffer Rules in Effect:		N/A	
Project Includes Bridge Spanning Water Body?		No		Deck Drains Discharge Over Buffer?		N/A	
Deck Drains Discharge Over Water Body?		N/A		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)	
		(If yes, provide justification in the General Project Narrative)					



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



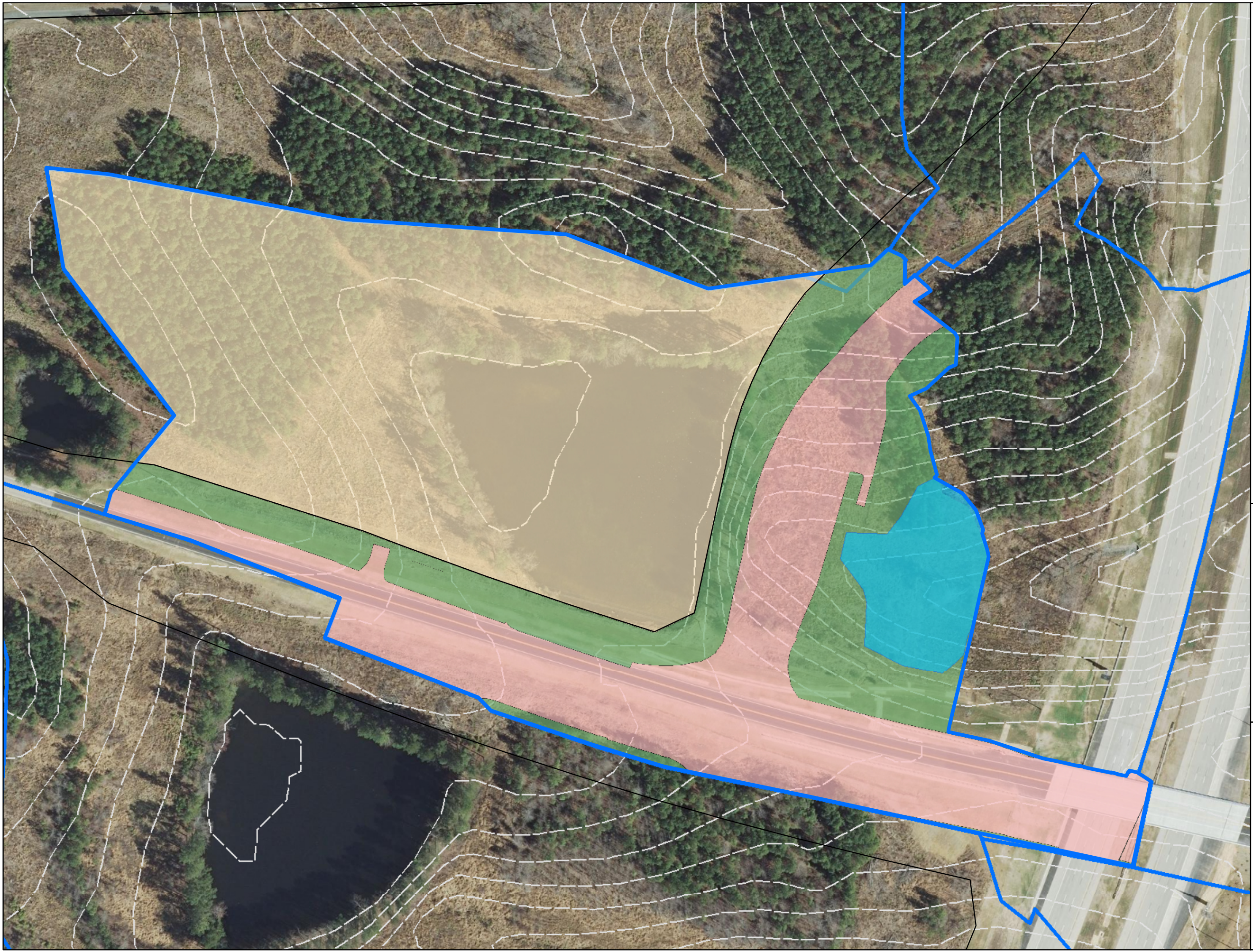
(Version 2.04; Released November 2015)

WBS Element:	TIP No.:	R-2635D	County(ies):	Wake	Page	2	of	5
Additional Waterbody Information								
Surface Water Body (2):	UT to Little Branch		NCDWR Stream Index No.:	18-7-6-1-1				
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C					
		Supplemental Classification:	None					
Other Stream Classification:	None							
Impairments:	None							
Aquatic T&E Species?	No		Comments:					
NRTR Stream ID:	SD				Buffer Rules in Effect:	N/A		
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?	N/A	
Deck Drains Discharge Over Water Body?	N/A		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
		(If yes, provide justification in the General Project Narrative)						
Surface Water Body (3):	UT to Little Branch		NCDWR Stream Index No.:	18-7-6-1-1				
NCDWR Surface Water Classification for Water Body		Primary Classification:	Class C					
		Supplemental Classification:	None					
Other Stream Classification:	None							
Impairments:	None							
Aquatic T&E Species?	No		Comments:					
NRTR Stream ID:	SE				Buffer Rules in Effect:	N/A		
Project Includes Bridge Spanning Water Body?	No		Deck Drains Discharge Over Buffer?	N/A		Dissipator Pads Provided in Buffer?	N/A	
Deck Drains Discharge Over Water Body?	N/A		(If yes, provide justification in the General Project Narrative)		(If yes, describe in the General Project Narrative; if no, justify in the General Project Narrative)			
		(If yes, provide justification in the General Project Narrative)						

Slope of swale @ -L- 64+00 RT is the effective slope generated by the rock checks.

Additional Comments

Page 5 of 5



LEGENDS AND SYMBOLS

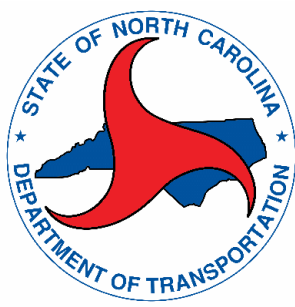
- 2' Contours
- Wake County Parcels (2015)
- Proposed Dry Detention
- Newly Built-Upon Area (4.8 ac.)
- Open Space Fair
- Future Development
- Pond Drainage Area (17.5 ac.)



0 125 250 Feet

Pond Drainage
Area Map

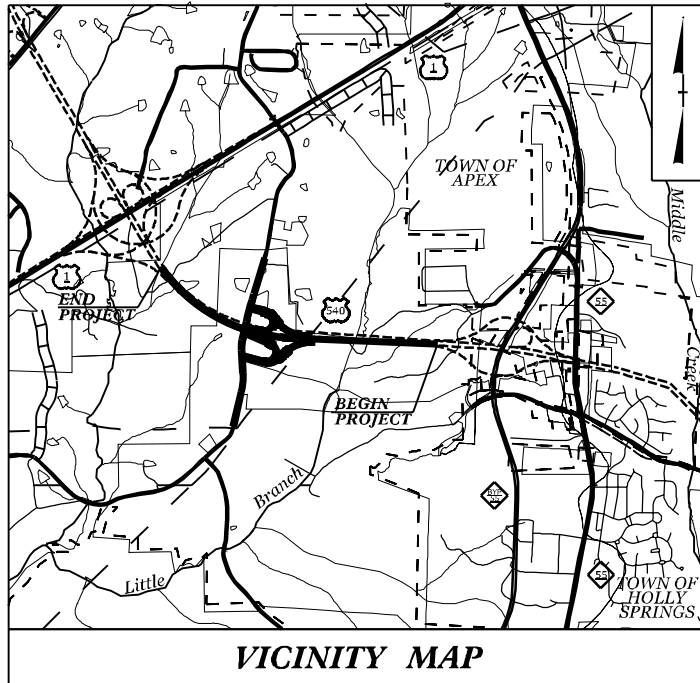
FIGURE 1



PROJECT: R-2635D

CONTRACT: C203635

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



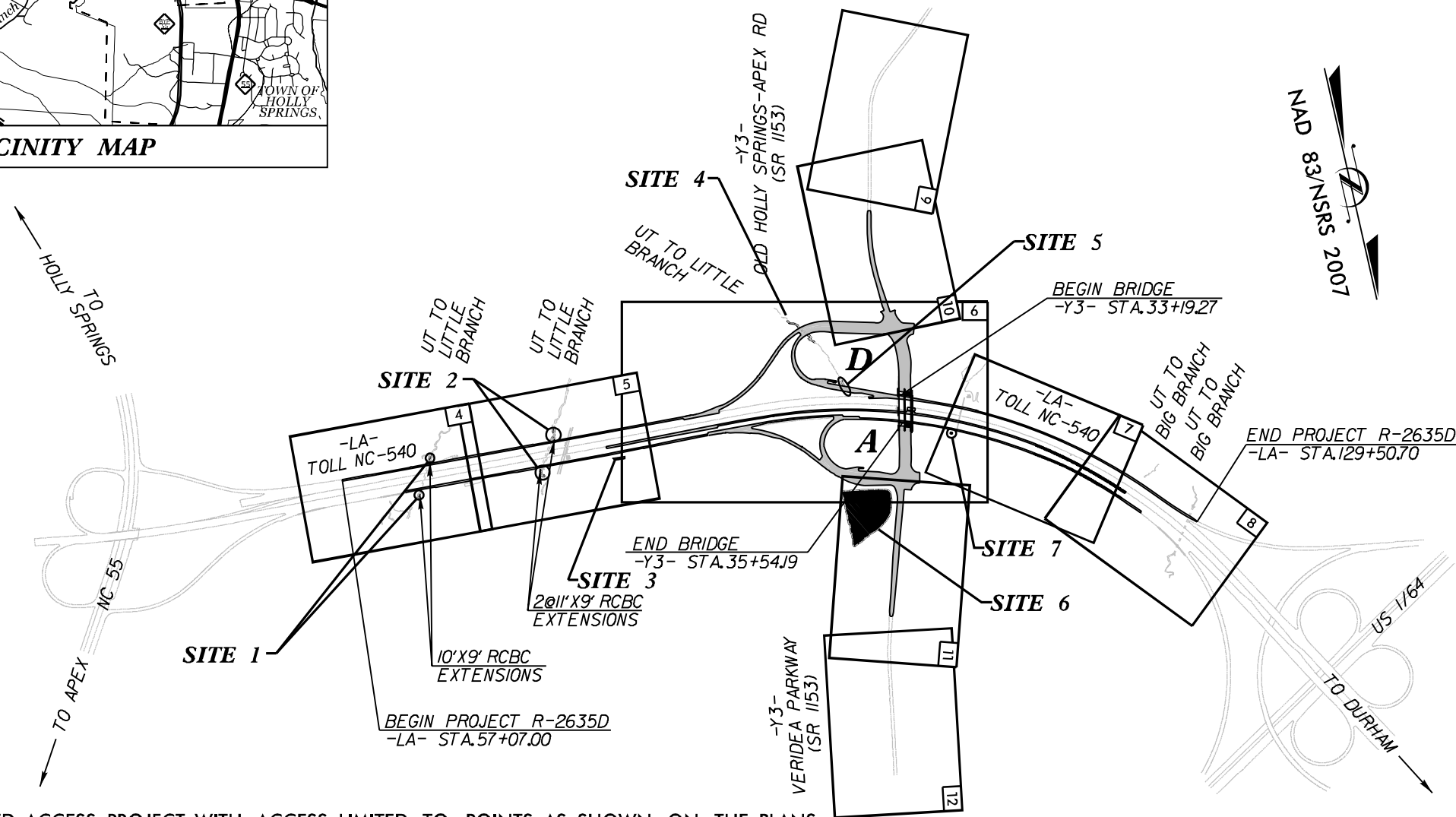
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS
WAKE COUNTY

WETLAND AND SURFACE WATER IMPACTS PERMIT

LOCATION: TRIANGLE EXPRESSWAY (TOLL NC-540) /
VERIDEA PARKWAY (SR 1153) INTERCHANGE

TYPE OF WORK: GRADING, PAVING, GUARDRAIL, DRAINAGE, STRUCTURE, WALLS,
CULVERT EXTENSIONS, SIGNING, AET INFRASTRUCTURE, & ITS



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2635D	1	
STATE PROJ. NO.	P.A. PROJ. NO.	DESCRIPTION	
35520.1.S5		P.E.	
35520.2.S5		RIGHT-OF-WAY	
35520.2.S5		UTILITIES	
35520.3.S5		CONSTRUCTION	



Kimley»Horn

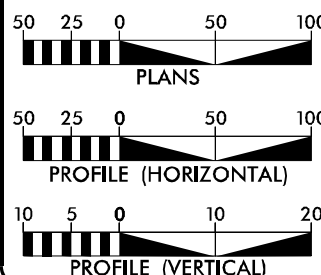
FINAL ROADWAY PLANS

PROJECT # R-2635D
SUBMITTAL # S-024R3
SUBMITTAL DATE: 16/2016

PERMIT DRAWING
SHEET 1 OF 17

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 37,500
ADT 2035 = 72,400
DHV = 10 %
D = 65 %
T = 18 % *
V = 70 MPH
* TTST = 12% DUAL = 6%
FUNC CLASS =
URBAN FREEWAY
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT R-2635D = 1.372 MILES
TOTAL LENGTH OF PROJECT R-2635D = 1.372 MILES

PLANS PREPARED FOR
THE NCDOT BY:

Kimley»Horn
© 2015
Post Office Box 55068
Raleigh, North Carolina 27626
PE NO. 142102

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
JUNE 26, 2015

LETTING DATE:
JUNE 26, 2015

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

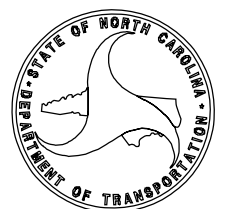
CHADWICK W. BECK, P.E.
PROJECT DESIGN ENGINEER

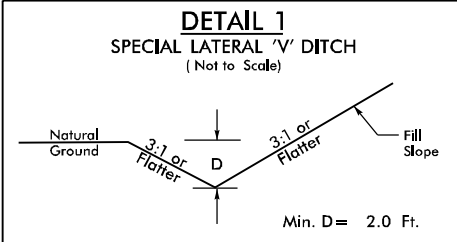
K. ZAK HAMIDI, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER

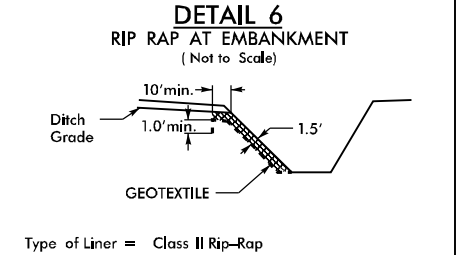
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ROADWAY DESIGN ENGINEER

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P.E.

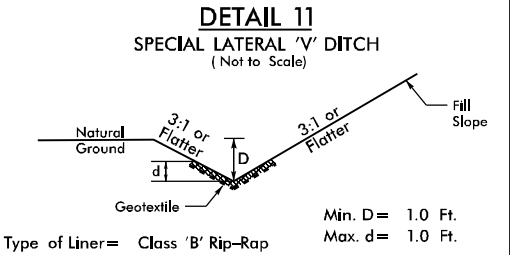




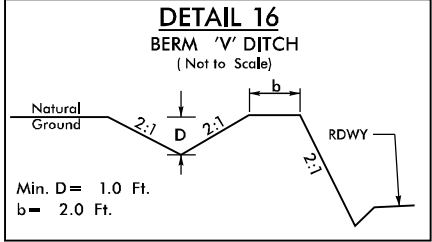
FROM STA. 59+70 TO STA. 61+50 -LA- (LT)



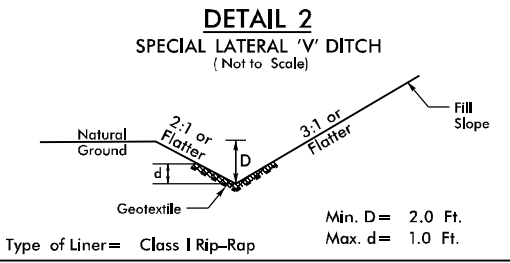
STA. 22+30 -Y3RPD- (LT)
STA. 23+50 -Y3RPD- (RT)



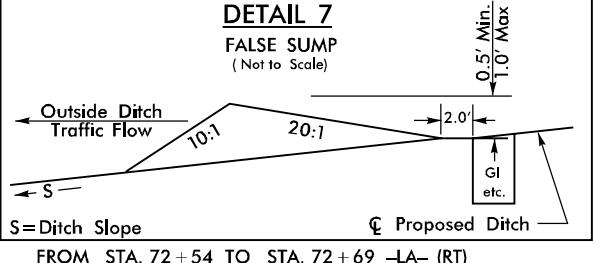
FROM STA. 113+50 TO STA. 114+50 -LA- (LT)
FROM STA. 24+50 TO STA. 27+50 -Y3RPD- (LT)
FROM STA. 19+23 TO STA. 21+00 -Y3- (RT)
FROM STA. 17+74 TO STA. 21+50 -Y3- (LT)



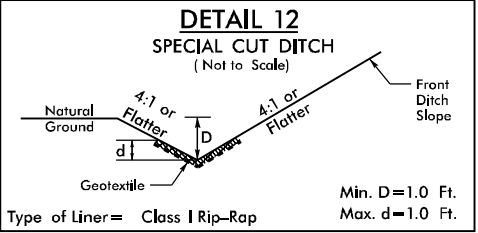
FROM STA. 14+00 TO STA. 15+00 -Y3RPA- (RT)



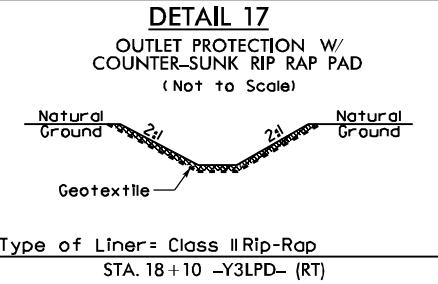
FROM STA. 62+90 TO STA. 63+50 -LA- (LT)
FROM STA. 81+77 TO STA. 83+00 -LA- (RT)
FROM STA. 23+00 TO STA. 24+50 -Y3RPD- (LT)
FROM STA. 23+50 TO STA. 29+50 -Y3RPD- (RT)
FROM STA. 11+00 TO STA. 11+50 -Y3RPD- (LT)



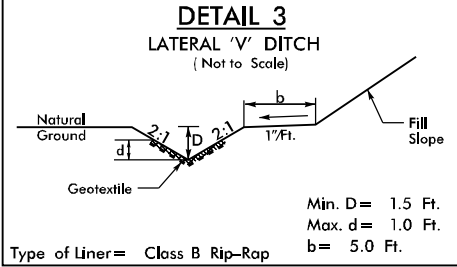
FROM STA. 72+54 TO STA. 72+69 -LA- (RT)
FROM STA. 120+04 TO STA. 120+19 -LA- (RT)
FROM STA. 109+31 TO STA. 109+46 -LA- (LT)
FROM STA. 18+54 TO STA. 18+69 -Y3LPD- (LT)
FROM STA. 22+04 TO STA. 22+19 -Y3LPD- (LT)
FROM STA. 23+42 TO STA. 23+57 -Y3LPD- (RT)
FROM STA. 12+80 TO STA. 12+95 -Y3LPA- (RT)
FROM STA. 13+56 TO STA. 13+71 -Y3LPA- (RT)
FROM STA. 14+56 TO STA. 14+71 -Y3LPA- (LT)
FROM STA. 15+81 TO STA. 15+96 -Y3LPA- (LT)
FROM STA. 11+81 TO STA. 11+96 -Y3RPD- (LT)



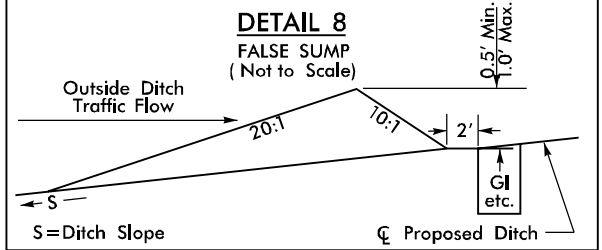
FROM STA. 19+50 TO STA. 20+00 -Y3RPD- (RT)
FROM STA. 23+00 TO STA. 23+38 -Y3LPD- (LT)



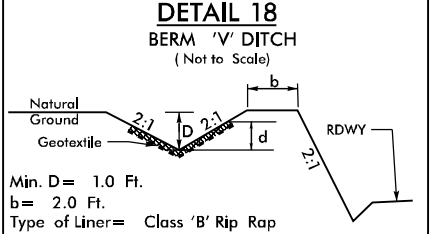
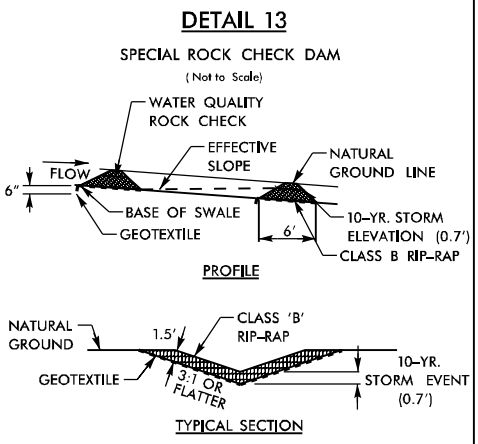
STA. 18+10 -Y3LPD- (RT)



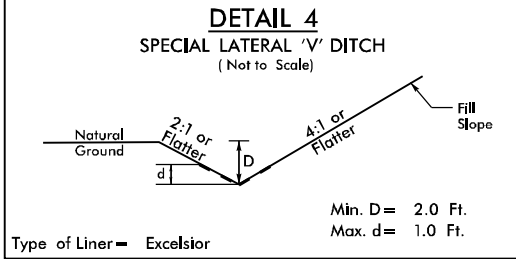
FROM STA. 73+45 TO STA. 75+00 -LA- (RT)
FROM STA. 81+50 TO STA. 85+38.23 -LA- (LT)
FROM STA. 10+00 TO STA. 11+00 -Y3RPD- (LT)



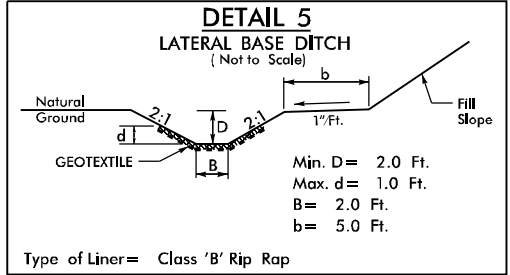
FROM STA. 73+04 TO STA. 73+19 -LA- (LT)
FROM STA. 83+31 TO STA. 83+46 -LA- (RT)
FROM STA. 96+49 TO STA. 96+64 -LA- (RT)
FROM STA. 108+31 TO STA. 108+46 -LA- (RT)
FROM STA. 20+04 TO STA. 20+19 -Y3RPD- (LT)
FROM STA. 18+54 TO STA. 18+69 -Y3RPD- (LT)
FROM STA. 15+56 TO STA. 15+71 -Y3RPA- (RT)
FROM STA. 17+06 TO STA. 17+21 -Y3RPA- (RT)
FROM STA. 17+06 TO STA. 17+21 -Y3RPA- (LT)
FROM STA. 20+27 TO STA. 20+45 -Y3RPA- (RT)



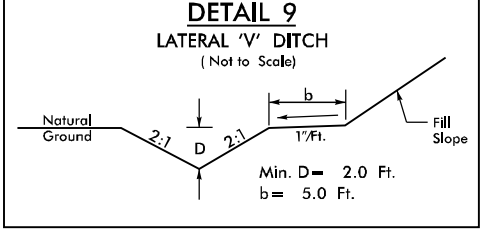
FROM STA. 15+00 TO STA. 17+25 -Y3RPA- (RT)
FROM STA. 17+25 TO STA. 19+00 -Y3RPA- (RT)



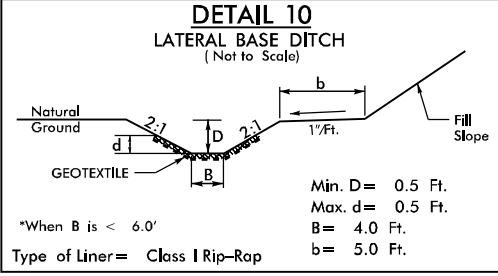
FROM STA. 72+50 TO STA. 73+00 -LA- (LT)
FROM STA. 17+74 TO STA. 19+23 -Y3- (RT)



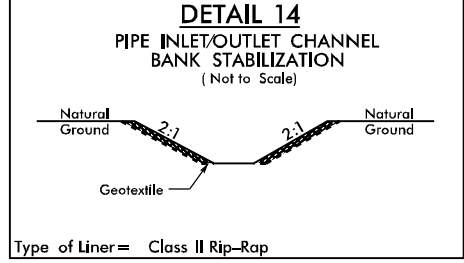
FROM STA. 73+50 TO STA. 74+75 -LA- (LT)



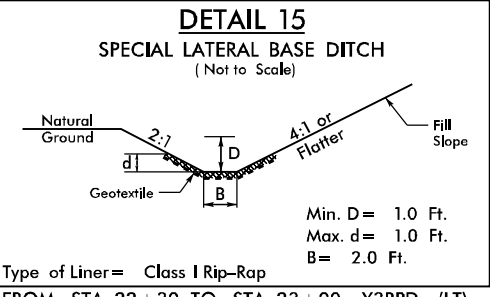
FROM STA. 75+00 TO STA. 79+00 -LA- (RT)



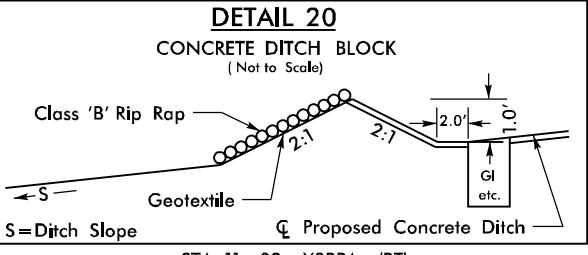
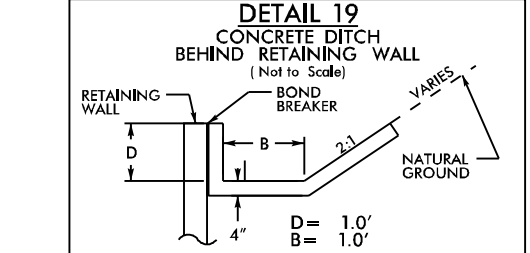
FROM STA. 80+75 TO STA. 81+77 -LA- (RT)



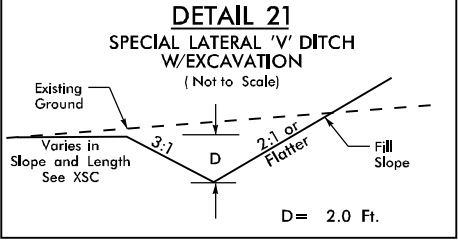
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STA. 25+92 -Y3LPD- (RT)



FROM STA. 22+30 TO STA. 23+00 -Y3RPD- (LT)



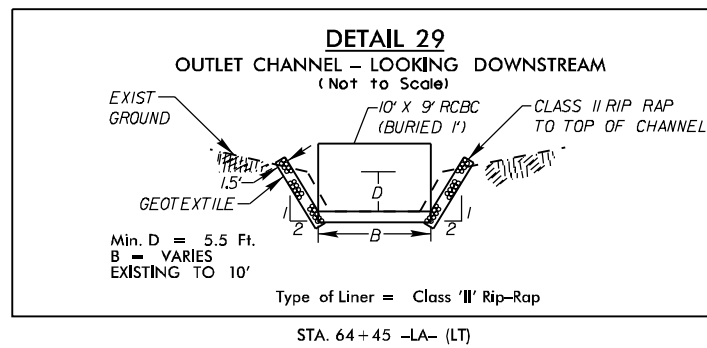
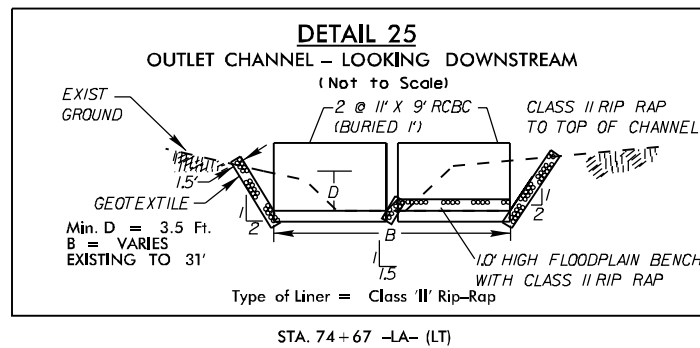
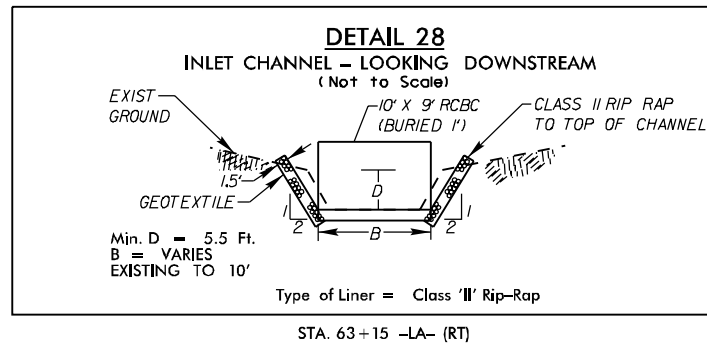
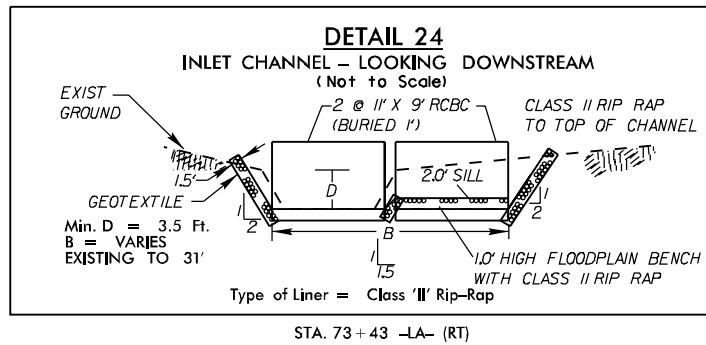
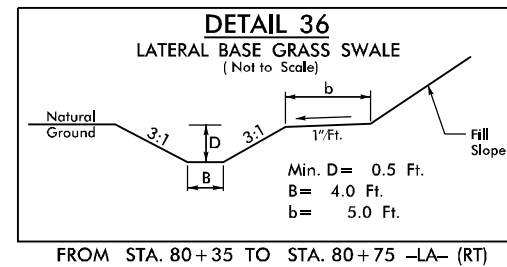
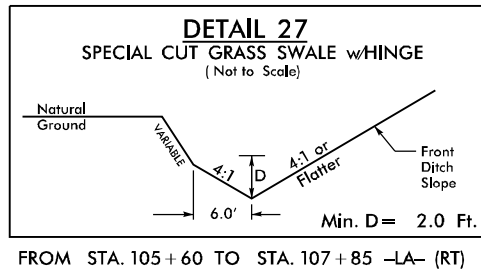
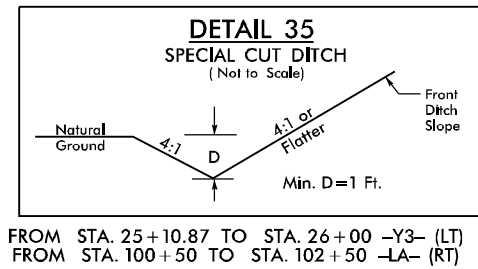
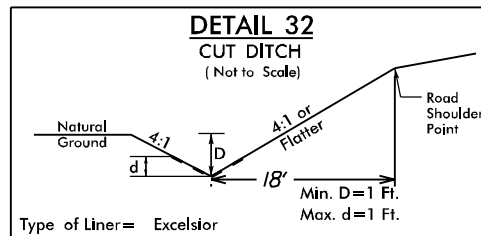
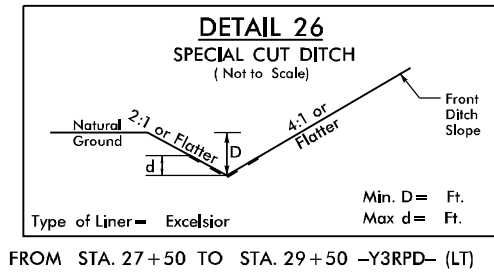
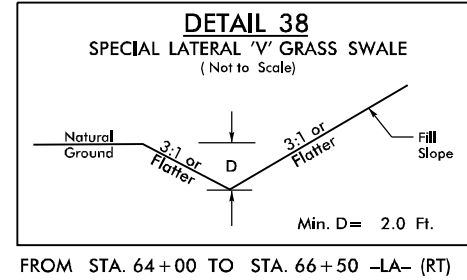
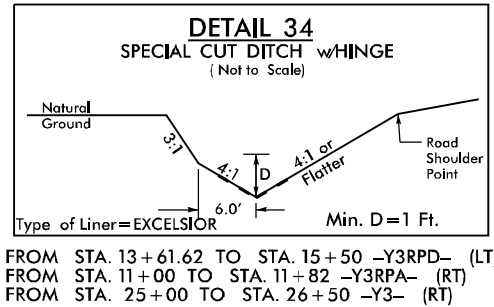
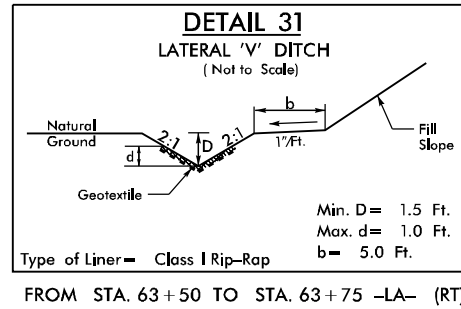
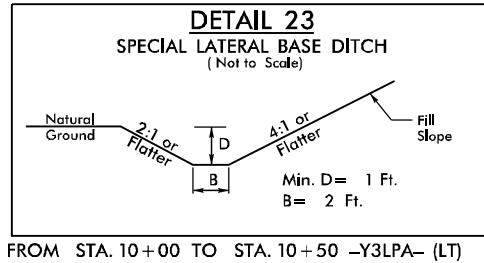
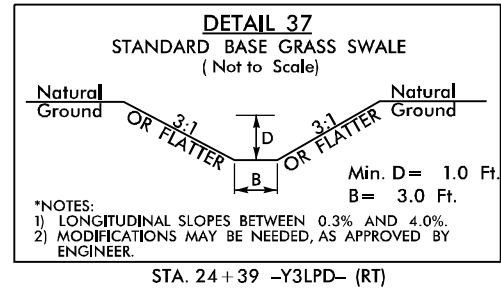
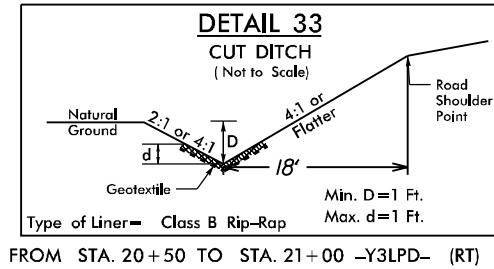
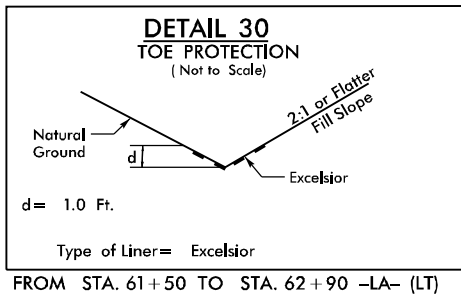
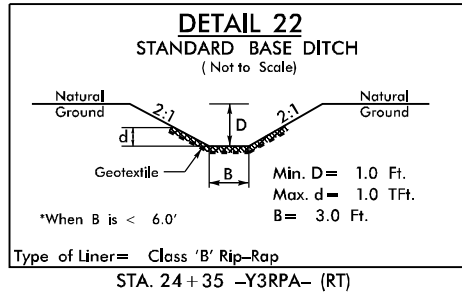
STA. 11+82 -Y3RPA- (RT)
STA. 13+56 -Y3RPA- (RT)



FROM STA. 28+70 TO STA. 31+00 -Y3- (RT)

K:\RAL_Roadway\012593013 - R-2635D - Access 540\Hydraulics\PERMITS - Environmental\Drawings\R-2635D.hyd.prm_wet_hydro_details.dgn 12/17/2015

FINAL ROADWAY PLANS	PROJECT REFERENCE NO.		SHEET NO.	
	R-2635D		2D-2	
	ROADWAY DESIGN ENGINEER		HYDRAULIC DESIGN ENGINEER	
	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
				
				
		PERMIT DRAWING SHEET 3 OF 17		





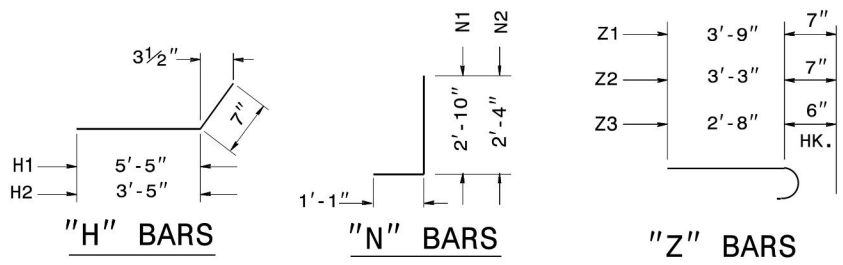
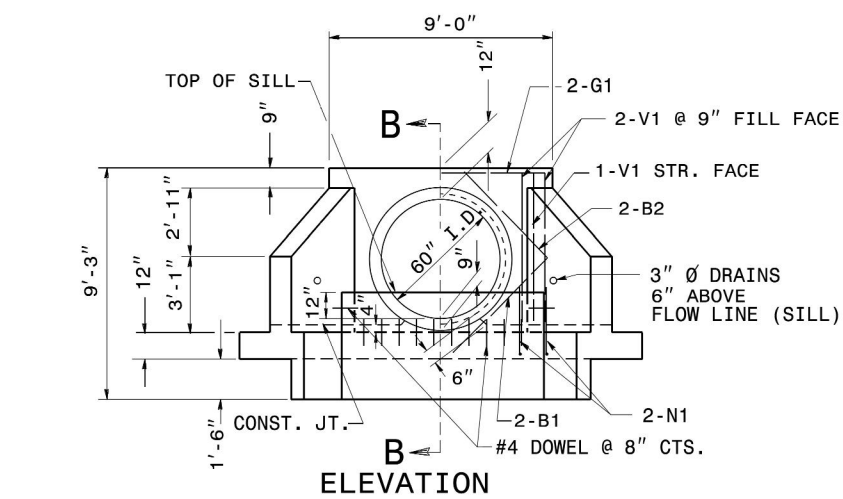
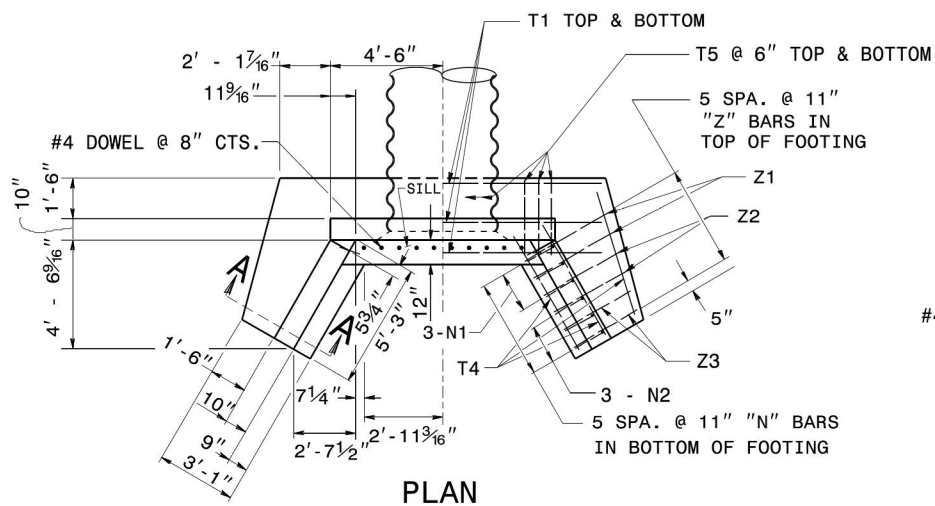
**DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED**

PERMIT DRAWING
SHEET 4 OF 17

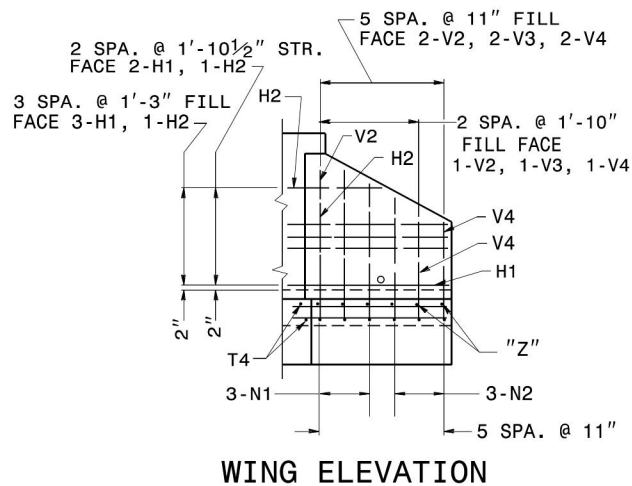
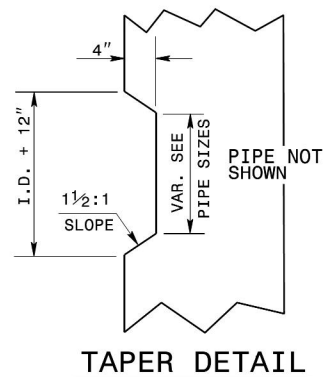
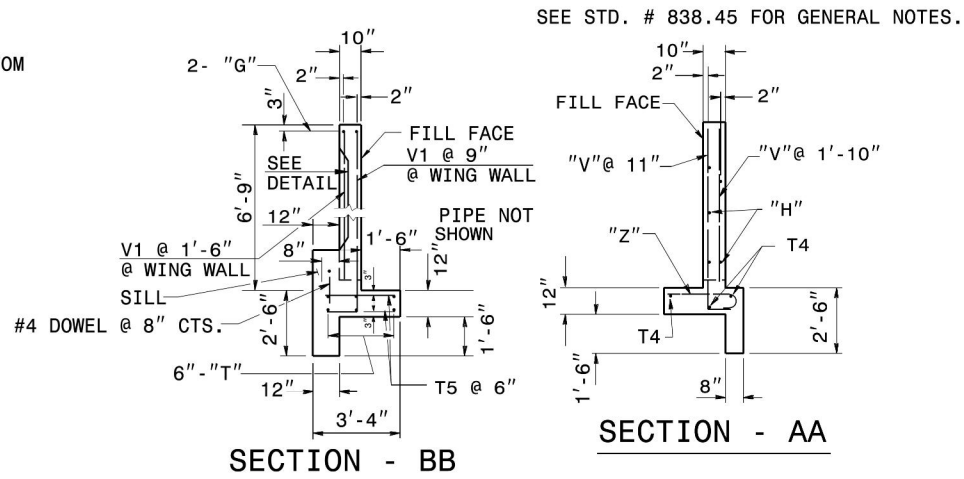
STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL SILL
FOR SINGLE 60" PIPE - 90° SKEW

SHEET 1 OF 1
838D27



"H", "N", & "Z" BAR DIMENSIONS
ARE OUT TO OUT.



BILL OF MATERIAL FOR ENDWALL				
REINF. STEEL			1 PIPE	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-8"	2	35
H1	#4	6'-0"	10	40
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14

T1	#4	12' - 8"	6	51
T4	#4	5' - 6"	6	22
T5	#4	2' - 6"	36	60
V1	#4	6' - 3"	6	25
V2	#4	5' - 1"	6	20
V3	#4	3' - 11"	6	16
V4	#4	2' - 9"	6	11
Z1	#5	4' - 4"	4	18
Z2	#4	3' - 10"	4	10
Z3	#4	3' - 2"	4	8
DOWEL	#4	1' - 0"	12	8

REINF. STEEL LBS.	 	417
CON./C.S. CU. YDS	6.5	

1-02 STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

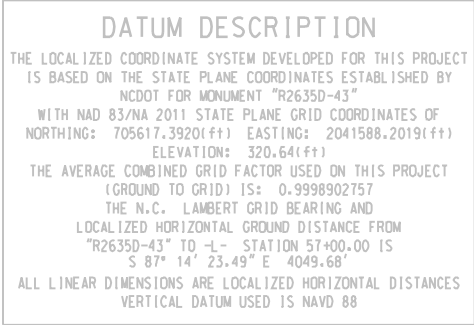
ENGLISH STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL SILL
FOR SINGLE 60" PIPE - 90° SKEW

SHEET 1 OF 1
838D27

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

DETAIL OF REINFORCED CONCRETE ENDWALL SILL

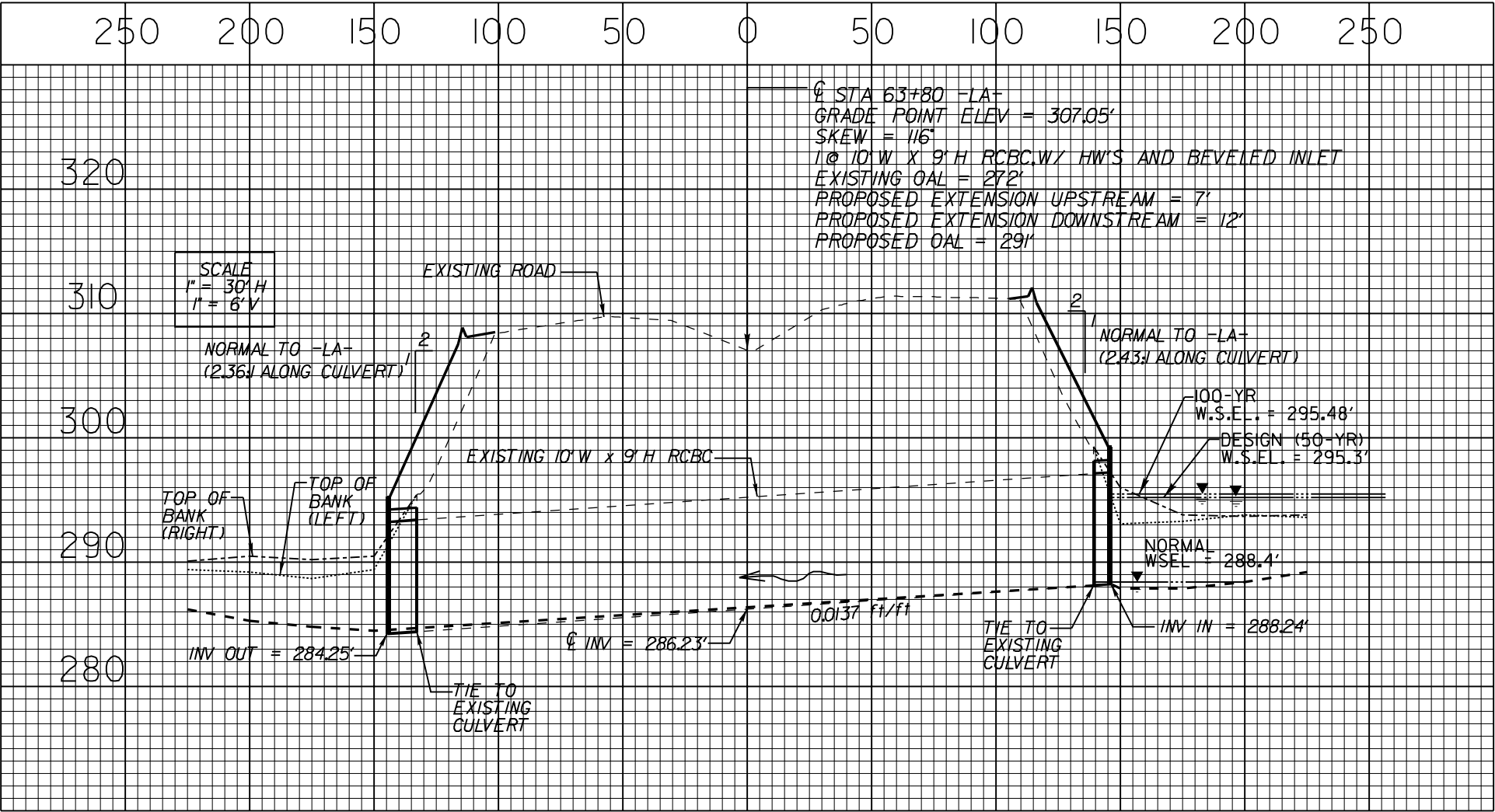
ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 08-25-05
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/rural/r3421ccconcdwallsill.dg



 DENOTES TEMPORARY IMPACTS IN SURFACE WATER

 DENOTES IMPACTS IN SURFACE WATER

SEE SHEET 13 FOR -LA- PROFILE



 NAD 83/NSRS 2007	FINAL ROADWAY PLANS	
	PROJECT REFERENCE NO.	
	R-2635D	SHEET NO. 5
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
		
Kimley»Horn		
CLASS 'B' RIP RAP		PERMIT DRAWING SHEET 8 OF 17



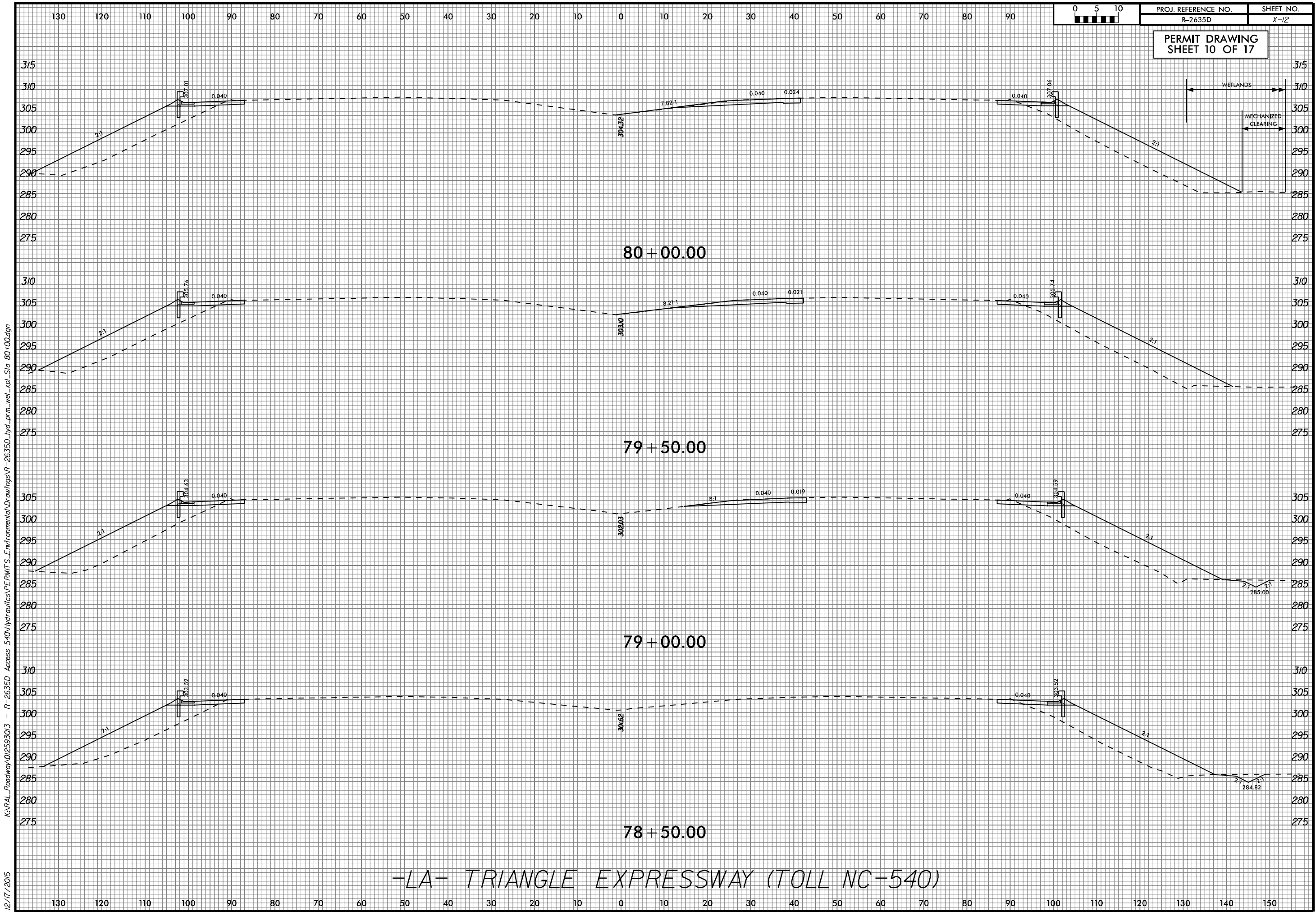
FINAL ROADWAY PLANS	PROJECT REFERENCE NO.		SHEET NO.	
	R-2635D		5	
	ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED				
				
Kimley»»Horn				
			PERMIT DRAWING SHEET 9 OF 17	





PROJ. REFERENCE NO.	SHEET NO.
R-2635D	X-12

PERMIT DRAWING
SHEET 10 OF 17



-LA- TRIANGLE EXPRESSWAY (TOLL NC-540)

K:\PAL_Roadway\012593013 - R-2635D Access 540-Hydraulics\PERMITS\Environmental\Drawings\R-2635D_hyd_perm_wet_xpl_Sla 80+00.dgn

12/17/2015

K:\RAL_Roadway\012593013 - R-2635D Access 540\Hydraulics\PERMITS_Environmental\Drawings\R-2635D_hyd_drm_74+00.dgn 12/17/2015

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.

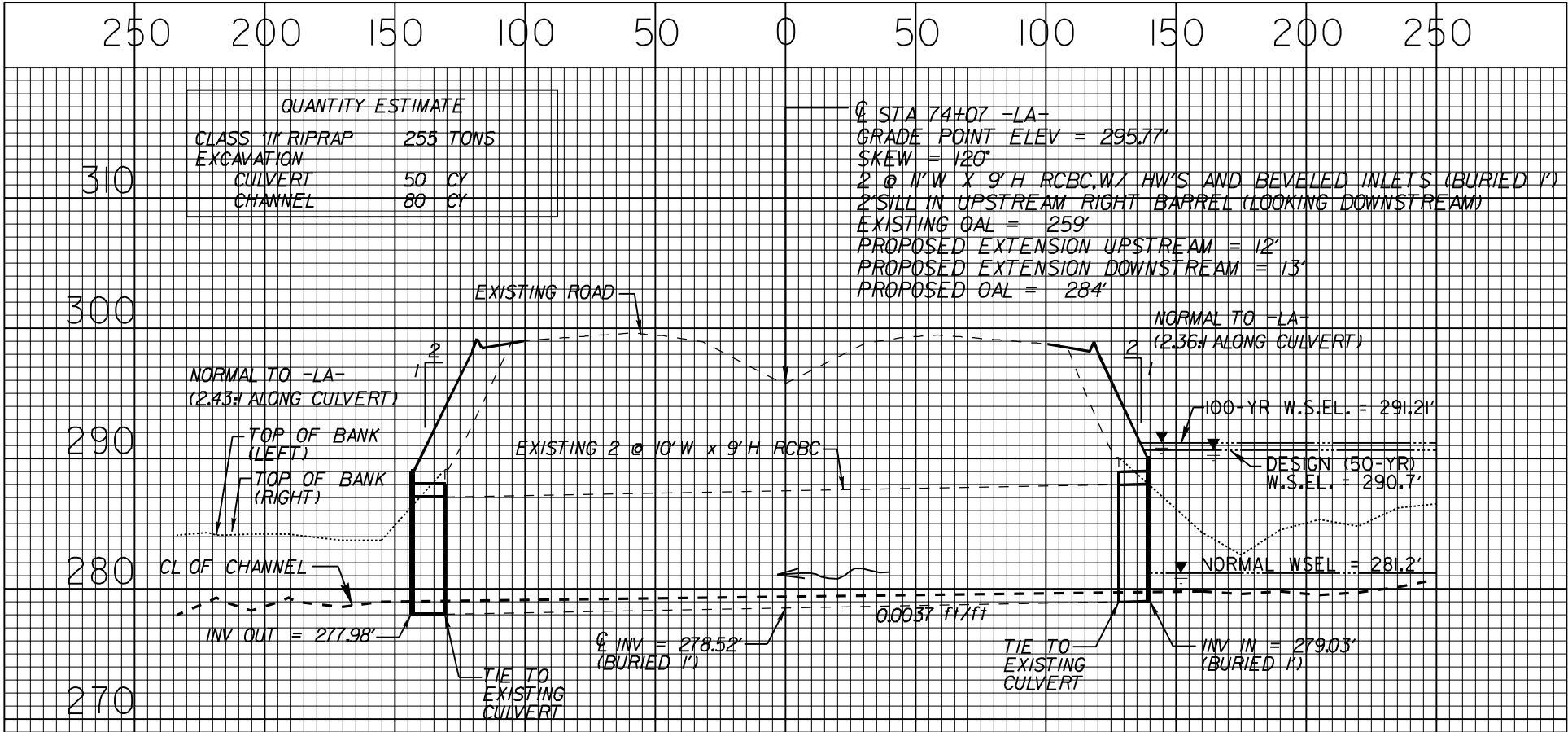
ROADWAY DESIGN
ENGINEER

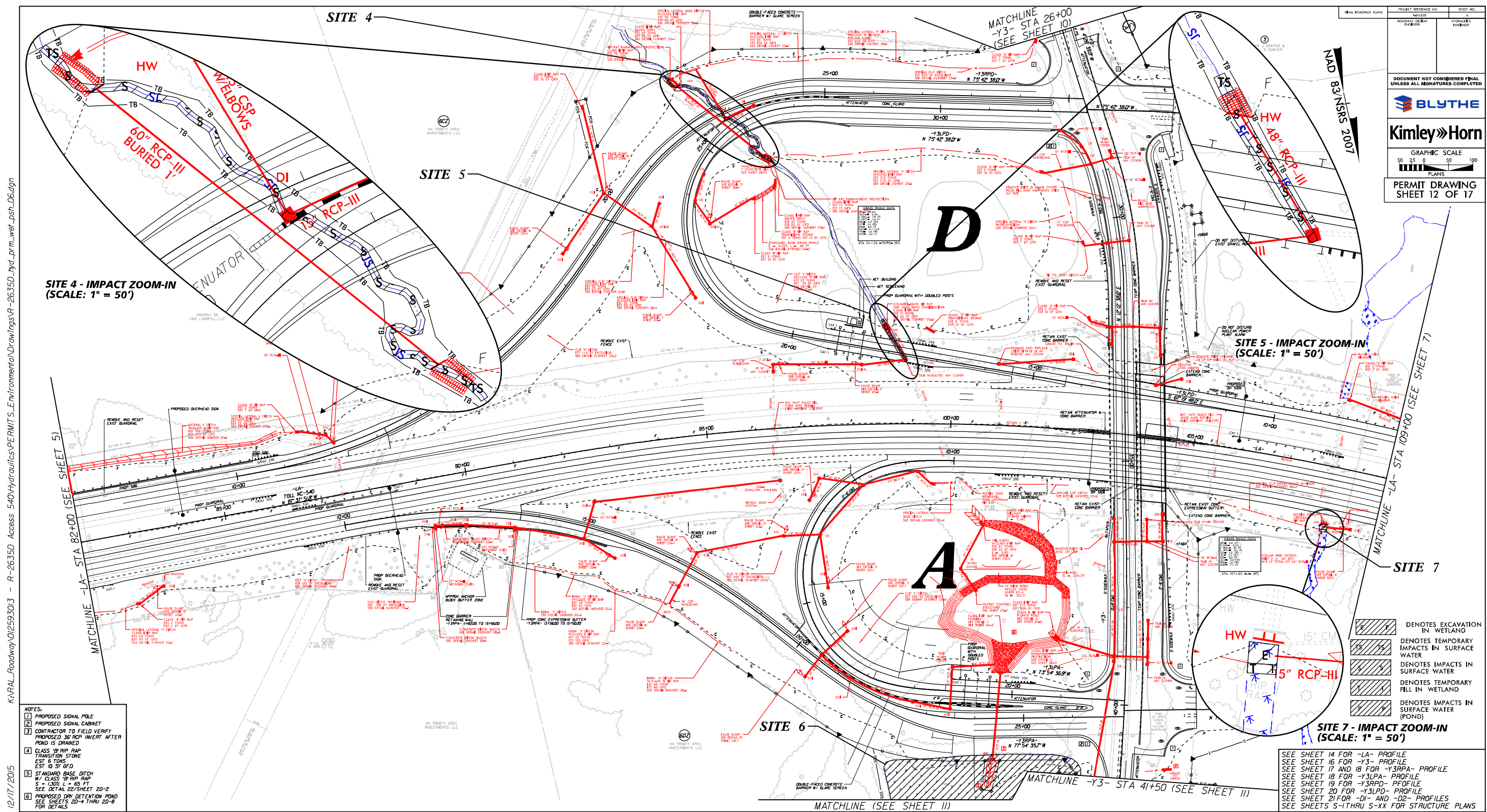
HYDRAULICS
ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



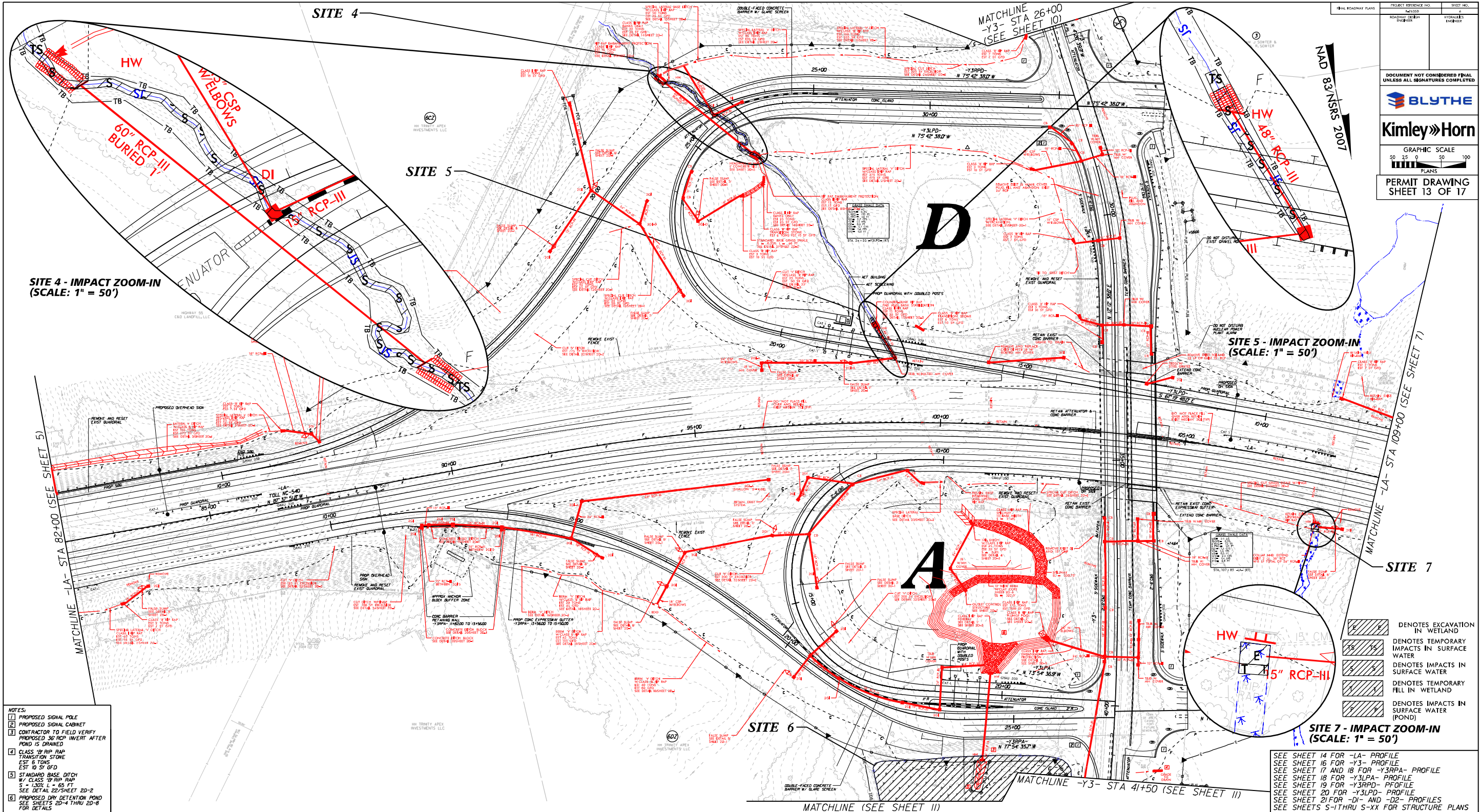






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12/17/2015





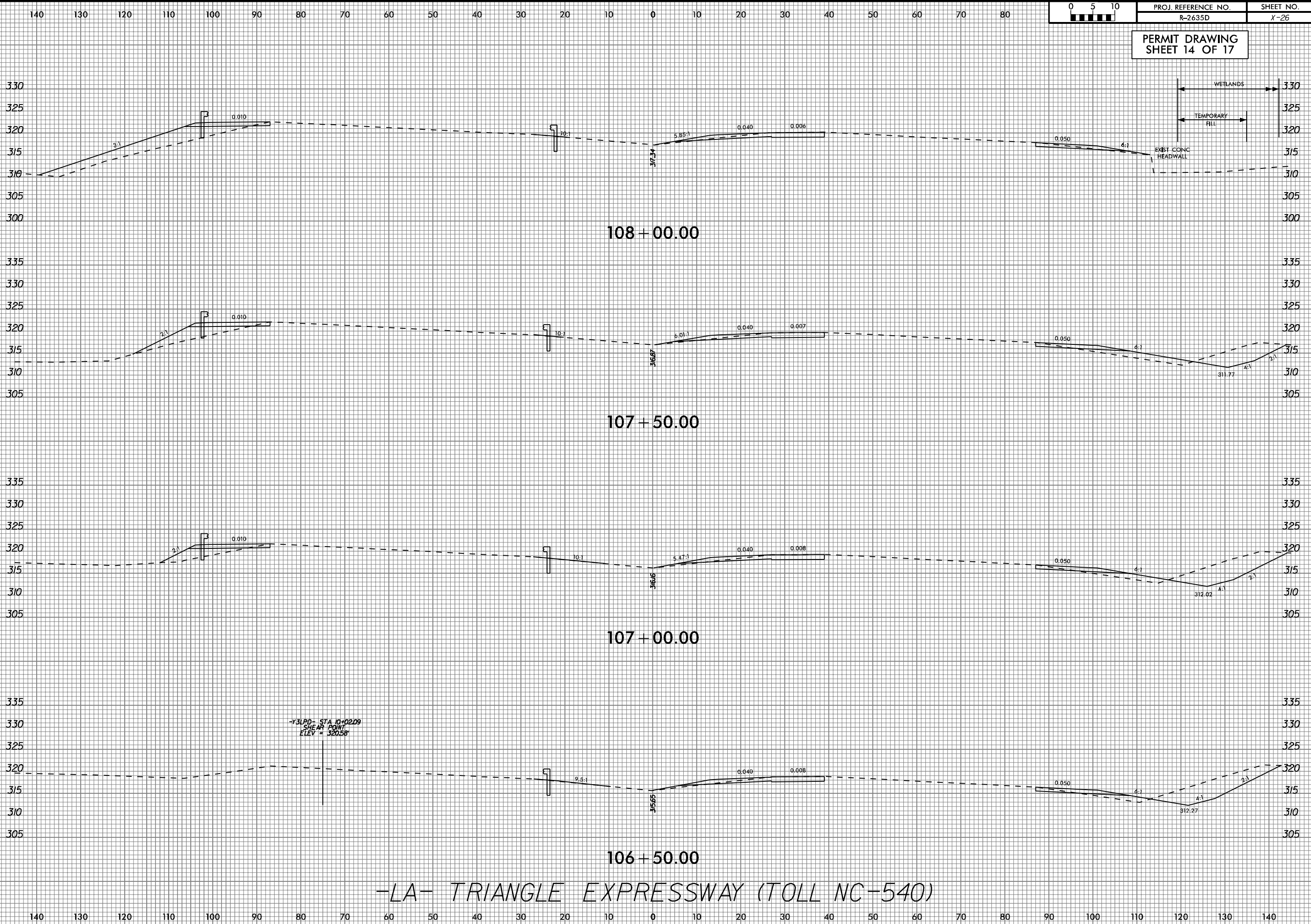
PROJ. REFERENCE NO.
R-2635D

SHEET NO.
X-26

PERMIT DRAWING
SHEET 14 OF 17

K:\PAL_Roadway\012593013 - R-2635D Access 540-Hydraulics\PERMITS-Environmental\Drawings\R-2635D_hyd_prm_wet_xpl_Sla 108+100.dgn

12/17/2015



-LA- TRIANGLE EXPRESSWAY (TOLL NC-540)

WETLAND PERMIT IMPACT SUMMARY												
			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	62+88/64+72 -LA-	10'x9' RCBC						< 0.01	< 0.01	18	20	
1	62+88/64+72 -LA-	Bank Stabilization						0.01		55		
2	73+21/74+99 -LA-	2 @ 11'x9' RCBC						0.03	0.01	117	35	
3	79+29/80+34 -LA-	Fill Slope	0.03			0.02						
4	22+23/23+61 -Y3RPD-	60" RCP Buried 1'						0.03	< 0.01	275	20	
4	22+23/23+61 -Y3RPD-	Bank Stabilization						< 0.01		46		
5	17+60/18+27 -Y3LPD-	48" RCP						< 0.01	< 0.01	74	10	
5	17+60/18+27 -Y3LPD-	Bank Stabilization						< 0.01		14		
6	41+10/45+94 -Y3-	Pond						2.34				
7	107+85/108+03 -LA-	Excavation		< 0.01	< 0.01							
TOTALS*:			0.03	< 0.01	< 0.01	0.02		2.43	0.02	599	85	0

*Rounded totals are sum of actual impacts

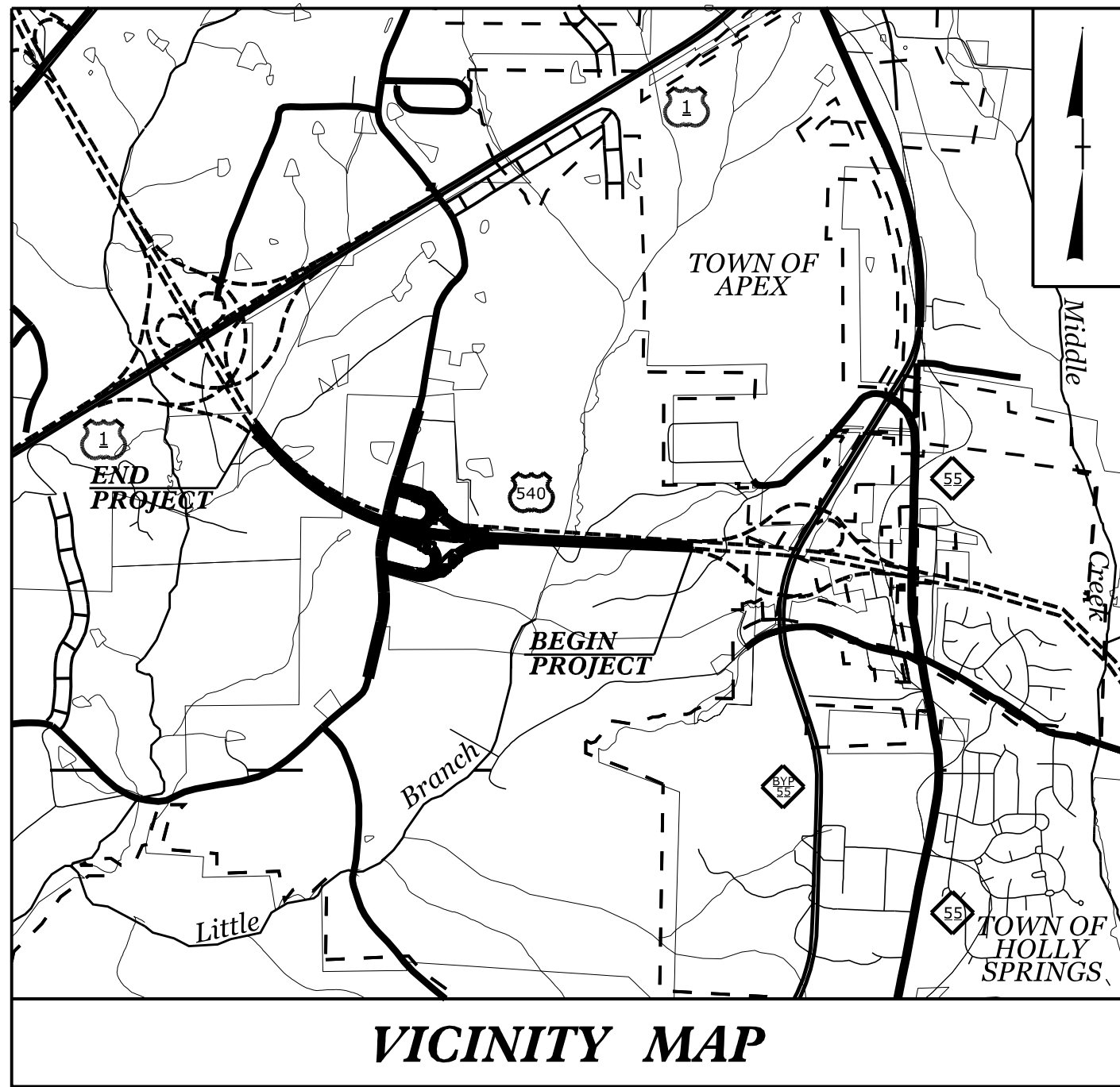
NOTES:
Wetland Impact Totals in SF:
Permanent Fill in Wetlands - 1198 SF
Temporary Fill in Wetlands - 75 SF
Excavation in Wetlands - 158 SF
Mechanized Clearing in Wetlands - 877 SF

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS
12-21-2015
WAKE COUNTY
R-2635D

PROJECT: R-2635D

CONTRACT: C203635

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



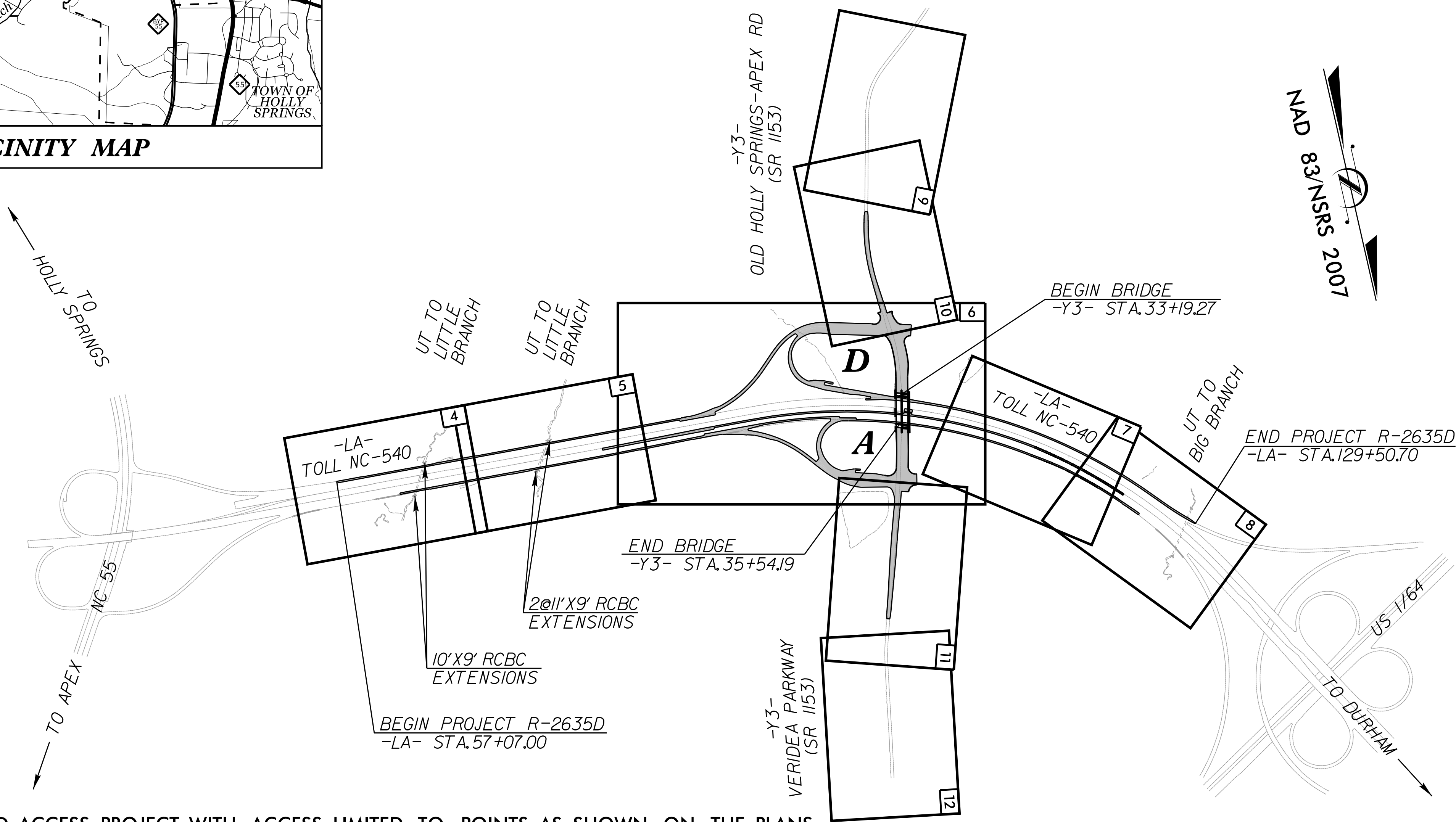
VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

WAKE COUNTY

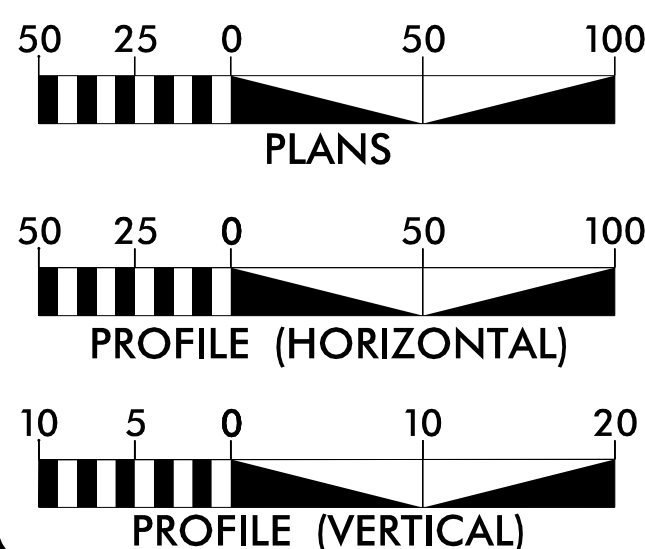
LOCATION: TRIANGLE EXPRESSWAY (TOLL NC-540) /
VERIDEA PARKWAY (SR 1153) INTERCHANGE

TYPE OF WORK: GRADING, PAVING, GUARDRAIL, DRAINAGE, STRUCTURE, WALLS,
CULVERT EXTENSIONS, SIGNING, AET INFRASTRUCTURE, & ITS



THIS IS A CONTROLLED-ACCESS PROJECT WITH ACCESS LIMITED TO POINTS AS SHOWN ON THE PLANS

GRAPHIC SCALES



DESIGN DATA

ADT 2015 = 37,500
ADT 2035 = 72,400
DHV = 10 %
D = 65 %
T = 18 % *
V = 70 MPH
* TTST = 12% DUAL = 6%
FUNC CLASS =
URBAN FREEWAY
REGIONAL TIER

PROJECT LENGTH

LENGTH OF ROADWAY PROJECT R-2635D = 1.372 MILES
TOTAL LENGTH OF PROJECT R-2635D = 1.372 MILES

PLANS PREPARED FOR
THE NCDOT BY:

Kimley»Horn
© 2015
Post Office Box 33068
Raleigh, North Carolina 27636
PE NO. F-0102

2012 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:

JUNE 26, 2015

LETTING DATE:

JUNE 26, 2015

JEFFREY W. MOORE, P.E.
PROJECT ENGINEER

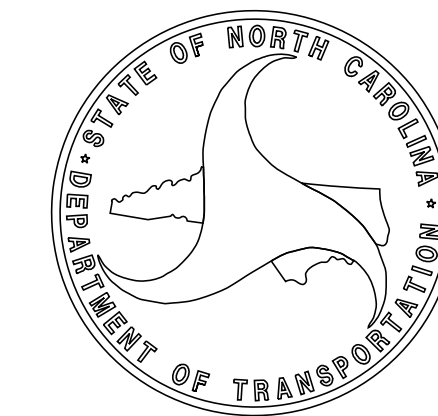
CHADWICK W. BECK, P.E.
PROJECT DESIGN ENGINEER

K. ZAK HAMIDI, P.E.
NCDOT CONTACT

HYDRAULICS ENGINEER

SIGNATURE: P.E.
ROADWAY DESIGN ENGINEER

SIGNATURE: P.E.



STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	R-2635D	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
35520.1.S5		P.E.	
35520.2.S5		RIGHT-OF-WAY	
35520.2.S5		UTILITIES	
35520.3.S5		CONSTRUCTION	



Kimley»Horn

FINAL ROADWAY PLANS

PROJECT # R-2635D
SUBMITTAL # S-041
SUBMITTAL DATE: 12/17/2015

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

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12/17/2015

STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS			FINAL ROADWAY PLANS		PROJECT REFERENCE NO.	SHEET NO.
					R-2635D	1-A
					ROADWAY DESIGN ENGINEER	
					DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
						
						
R-2635D WAKE COUNTY			GENERAL NOTES		EFF. 01-17-2012 REV. 10-30-2012	
			2012 SPECIFICATIONS		2012 ROADWAY ENGLISH STANDARD DRAWINGS	
			EFFECTIVE: 01-17-12 REVISED: 07/30/12		The following Roadway Standards as appear in "Roadway Standard Drawings" Highway Design Branch - N. C. Department of Transportation - Raleigh, N. C., Dated January, 2012 are applicable to this project and by reference hereby are considered a part of these plans:	
			GRADE LINE: GRADING AND SURFACING:		STD.NO. TITLE	
			THE GRADE LINES SHOWN DENOTE THE FINISHED ELEVATION OF THE PROPOSED SURFACING AT GRADE POINTS SHOWN ON THE TYPICAL SECTIONS. GRADE LINES MAY BE ADJUSTED AT THEIR BEGINNING AND ENDING AND AT STRUCTURES AS DIRECTED BY THE ENGINEER IN ORDER TO SECURE A PROPER TIE-IN.		DIVISION 2 - EARTHWORK 200.03 Method of Clearing - Method III 225.01 Guide for Grading Subgrade - Interstate and Freeway 225.02 Guide for Grading Subgrade - Secondary and Local 225.03 Deceleration and Acceleration Lanes 225.04 Method of Obtaining Superelevation - Two Lane Pavement 225.05 Method of Obtaining Superelevation - Divided Highways 225.06 Method of Grading Sight Distance at Intersections 240.01 Guide for Berm Ditch Construction	
			CLEARING:		DIVISION 3 - PIPE CULVERTS 300.01 Method of Pipe Installation	
			CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III. IN AREAS WITH PERMANENT UTILITY EASEMENTS, CLEARING SHALL EXTEND TO THE RIGHT-OF-WAY LIMITS.		DIVISION 4 - MAJOR STRUCTURES 422.10 Reinforced Bridge Approach Fills	
			SUPERELEVATION:		DIVISION 5 - SUBGRADE, BASES AND SHOULDERS 560.02 Method of Shoulder Construction - High Side of Superelevated Curve - Method II	
			ALL CURVES ON THIS PROJECT SHALL BE SUPERELEVATED IN ACCORDANCE WITH STD. NO. 225.04 AND/OR 225.05 USING THE RATE OF SUPERELEVATION AND RUNOFF SHOWN ON THE PLANS. SUPERELEVATION IS TO BE REVOLVED ABOUT THE GRADE POINTS SHOWN ON THE TYPICAL SECTIONS.		DIVISION 6 - ASPHALT BASES AND PAVEMENTS 610.02 Guide for Paving Shoulders Under Bridges - Method II 665.01 Asphalt Shoulders - Milled Rumble Strips	
			DRIVEWAYS:		DIVISION 7 - CONCRETE PAVEMENTS AND SHOULDERS 720.01 Concrete Shoulders - Stamped or Rolled Rumble Strips, Milled Rumble Strips	
			DRIVEWAYS SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. 848.02 USING 3' RADI OR RADII AS SHOWN ON THE PLANS. LOCATIONS OF DRIVES WILL BE AS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.		DIVISION 8 - INCIDENTALS 806.01 Concrete Right-of-Way Marker 816.01 Concrete Pads - for Shoulder Drain Installation 816.02 Aggregate Shoulder Drain 838.01 Concrete Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew 838.11 Brick Endwall for Single and Double Pipe Culverts - 15" thru 48" Pipe 90 Skew 838.27 Reinforced Concrete Endwall - for Single 60" Pipe 90 Skew 838.45 Notes for Reinforced Concrete Endwall - Std. Dwg 838.21 thru 838.40 838.57 Reinforced Brick Endwall - for Single 60" Pipe 90 Skew 838.75 Notes for Reinforced Brick Endwall - Std. Dwg 838.51 thru 838.70 838.80 Precast Endwalls - 12" thru 72" Pipe 90 Skew 840.00 Concrete Base Pad for Drainage Structures 840.01 Brick Catch Basin - 12" thru 54" Pipe 840.02 Concrete Catch Basin - 12" thru 54" Pipe 840.03 Frame, Grates and Hood - for Use on Standard Catch Basin 840.14 Concrete Drop Inlet - 12" thru 30" Pipe 840.15 Brick Drop Inlet - 12" thru 30" Pipe 840.16 Drop Inlet Frame and Grates - for use with Std. Dwg 840.14 and 840.15 840.17 Concrete Grated Drop Inlet Type 'A' - 12" thru 72" Pipe 840.18 Concrete Grated Drop Inlet Type 'B' - 12" thru 36" Pipe 840.19 Concrete Grated Drop Inlet Type 'D' - 12" thru 36" Pipe 840.22 Frames and Wide Slot Sag Grates 840.24 Frames and Narrow Slot Sag Grates 840.25 Anchorage for Frames - Brick or Concrete or Precast 840.26 Brick Grated Drop Inlet Type 'A' - 12" thru 72" Pipe 840.27 Brick Grated Drop Inlet Type 'B' - 12" thru 36" Pipe 840.28 Brick Grated Drop Inlet Type 'D' - 12" thru 36" Pipe 840.29 Frames and Narrow Slot Flat Grates 840.31 Concrete Junction Box - 12" thru 66" Pipe 840.32 Brick Junction Box - 12" thru 66" Pipe 840.34 Traffic Bearing Junction Box - for Use with Pipes 42" and Under 840.35 Traffic Bearing Grated Drop Inlet - for Cast Iron Double Frame and Grates 840.36 Traffic Bearing Grated Drop Inlet - for Steel (840.37) Double Frame and Grates 840.37 Steel Grate and Frame 840.45 Precast Drainage Structure 840.54 Manhole Frame and Cover 840.66 Drainage Structure Steps 840.71 Concrete and Brick Pipe Plug 840.72 Pipe Collar 846.01 Concrete Curb, Gutter and Curb & Gutter 846.02 Drop Inlet Installation in Expressway Gutter 846.04 Drop Inlet Installation in Shoulder Berm Gutter 848.01 Concrete Sidewalk 848.02 Driveway Turnout - Radius Type 848.05 Curb Ramp - Proposed Curb & Gutter 850.01 Concrete Paved Ditches 850.10 Guide for Berm Drainage Outlet - 15" and 18" Pipe 852.01 Concrete Islands 852.06 Method for Placement of Drop Inlets in Concrete Islands 854.02 Double Faced Concrete Barrier - Types 'T', 'T1' and 'T2' 857.01 Precast Reinforced Concrete Barrier - 41" Single Faced 862.01 Guardrail Placement 862.02 Guardrail Installation 862.03 Structure Anchor Units 862.04 Anchoring End of Guardrail - B-77 and B-83 Anchor Units 866.01 Chain Link Fence - 4', 5' and 6' High Fence 866.05 Glare Screen - Chain Link Fabric/Guardrail Mounted 876.01 Rip Rap in Channels 876.02 Guide for Rip Rap at Pipe Outlets 876.04 Drainage Ditches with Class 'B' Rip Rap	
			SHOULDER CONSTRUCTION:			
			ASPHALT, EARTH, AND CONCRETE SHOULDER CONSTRUCTION ON THE HIGH SIDE OF SUPERELEVATED CURVES SHALL BE IN ACCORDANCE WITH STD. NO. 560.02.			
			BERM DITCHES:			
			BERM DITCHES SHALL BE CONSTRUCTED IN ACCORDANCE WITH STD. NO. 240.01 AT LOCATIONS SHOWN ON THE PLANS OR AS DIRECTED BY THE ENGINEER.			
			GUARDRAIL:			
			THE GUARDRAIL LOCATIONS SHOWN ON THE PLANS MAY BE ADJUSTED DURING CONSTRUCTION AS DIRECTED BY THE ENGINEER. THE CONTRACTOR SHOULD CONSULT WITH THE ENGINEER PRIOR TO ORDERING GUARDRAIL MATERIAL.			
			END BENTS:			
			THE ENGINEER SHALL CHECK THE STRUCTURE END BENT PLANS, DETAILS, AND CROSS-SECTION PRIOR TO SETTING OF THE SLOPE STAKES FOR THE EMBANKMENT OR EXCAVATION APPROACHING A BRIDGE.			
			UTILITIES:			
			UTILITY OWNERS ON THIS PROJECT ARE: DUKE ENERGY PROGRESS AT&T TIME WARNER CABLE NORTH CAROLINA DEPARTMENT OF TRANSPORTATION DIXIE PIPELINE PSNC ENERGY TOWN OF APEX			
			ANY RELOCATION OF EXISTING UTILITIES WILL BE ACCOMPLISHED BY OTHERS.			
			CURB RAMPS:			
			CURB RAMPS ARE SHOWN ON THE PLANS AT APPROXIMATE LOCATIONS. CONSTRUCT ALL CURB RAMPS IN ACCORDANCE WITH STD. NO. 848.05 AND/OR DETAILS IN THE PLANS.			
			THE CONTRACTOR'S ATTENTION IS DIRECTED TO SECTION 840 OF THE 2012 STANDARD SPECIFICATIONS. PROVIDE A FRAME AND COVER WITH THE COVER BOLTED INTO THE FRAME. PROVIDE 2⅝" STAINLESS STEEL BOLTS FOR EACH FRAME WITH COVER THAT MEET THE REQUIREMENTS OF SEC. 1072-5 OF THE 2012 STANDARD SPECIFICATIONS.			

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	
Property Corner	
Property Monument	
Parcel/Sequence Number	
Existing Fence Line	
Proposed Woven Wire Fence	
Proposed Chain Link Fence	
Proposed Barbed Wire Fence	
Existing Wetland Boundary	
Proposed Wetland Boundary	
Existing Endangered Animal Boundary	
Existing Endangered Plant Boundary	
Existing Historic Property Boundary	
Known Contamination Area: Soil	
Potential Contamination Area: Soil	
Known Contamination Area: Water	
Potential Contamination Area: Water	
Contaminated Site: Known or Potential	

BUILDINGS AND OTHER CULTURE:

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

HYDROLOGY:

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

RAILROADS:

Standard Gauge	
RR Signal Milepost	
Switch	
RR Abandoned	
RR Dismantled	

RIGHT OF WAY:

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

ROADS AND RELATED FEATURES:

Existing Edge of Pavement	
Existing Curb	
Proposed Slope Stakes Cut	
Proposed Slope Stakes Fill	
Proposed Curb Ramp	
Existing Metal Guardrail	
Proposed Guardrail	
Existing Cable Guiderail	
Proposed Cable Guiderail	
Equality Symbol	
Pavement Removal	

VEGETATION:

Single Tree	
Single Shrub	
Hedge	
Woods Line	

Orchard	
Vineyard	

EXISTING STRUCTURES:

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

UTILITIES:

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

TELEPHONE:

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

WATER:

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

TV:

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

GAS:

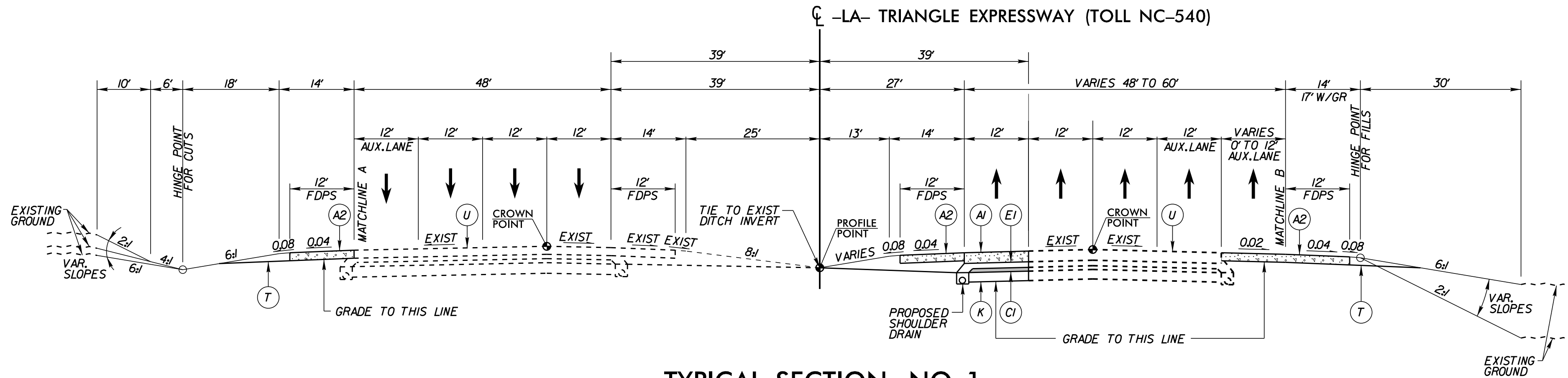
Gas Valve	
Gas Meter	
U/G Gas Line LOS B (S.U.E.*)	
U/G Gas Line LOS C (S.U.E.*)	
U/G Gas Line LOS D (S.U.E.*)	
Above Ground Gas Line	

SANITARY SEWER:

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

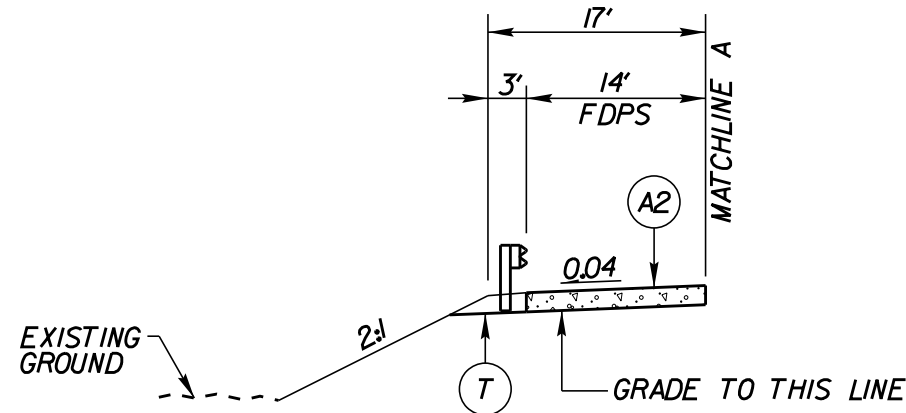
MISCELLANEOUS:

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

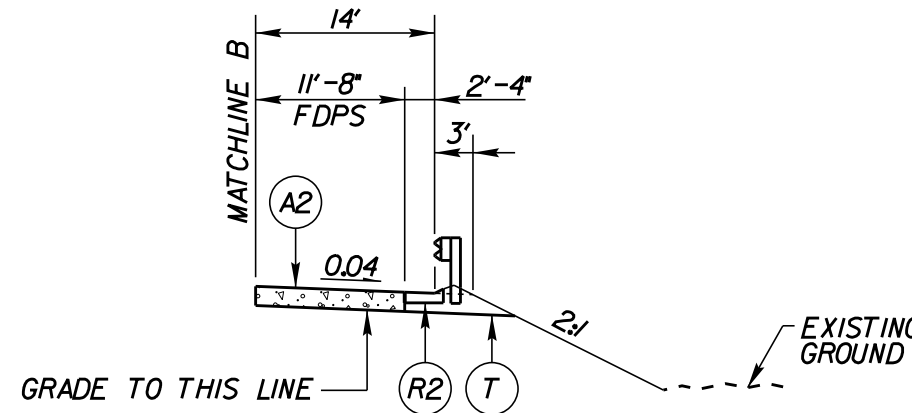


TYPICAL SECTION NO. 1

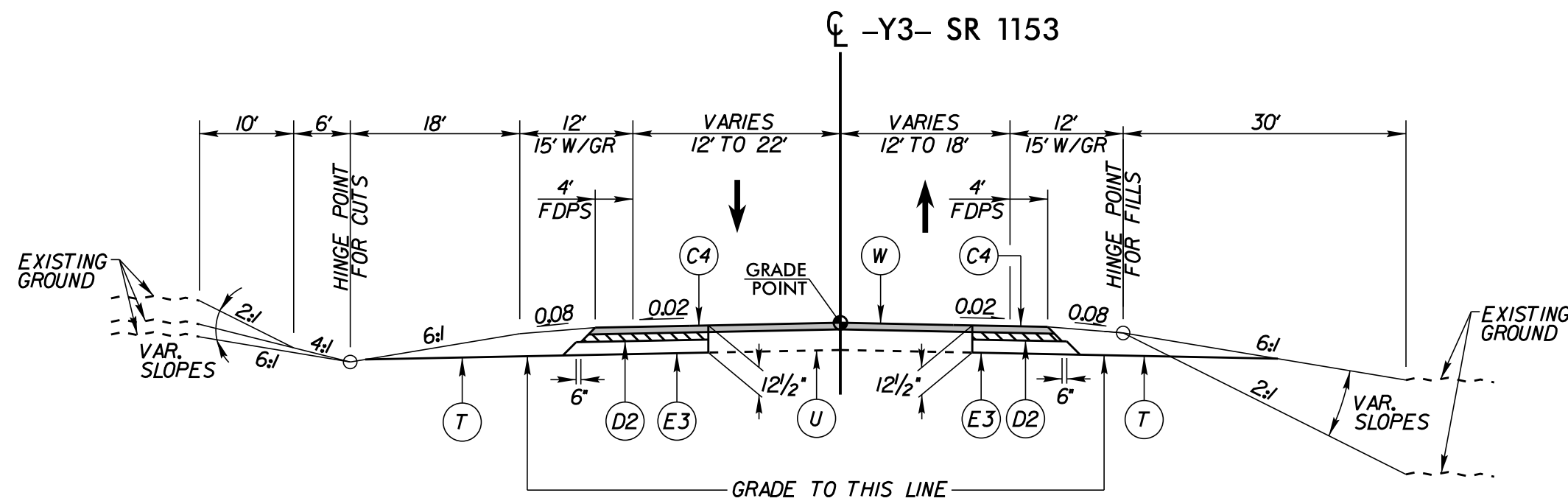
-LA- STA 57+07.00 TO STA 129+50.70 (LT)
-LA- STA 62+00.00 TO STA 125+42.13 (RT)



TYPICAL SECTION NO. 1A

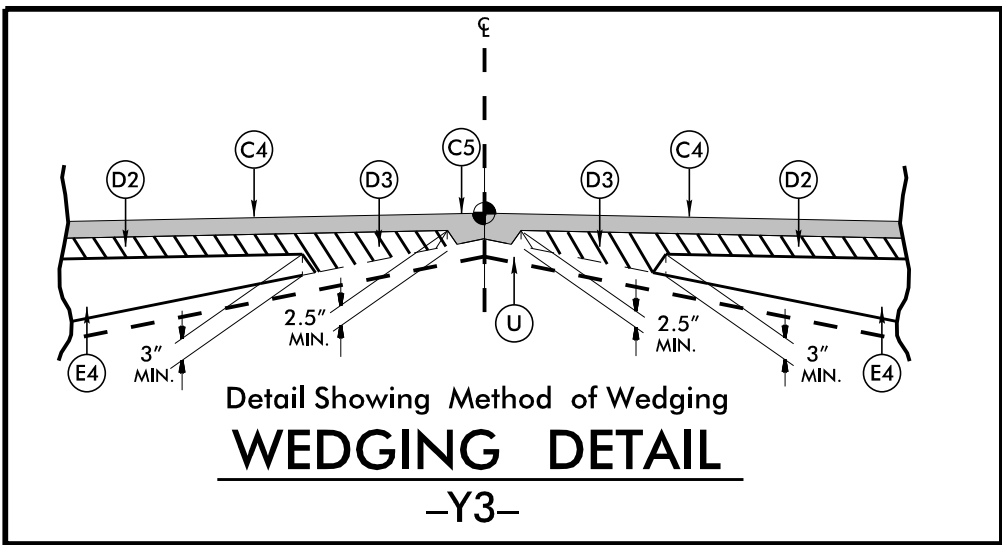


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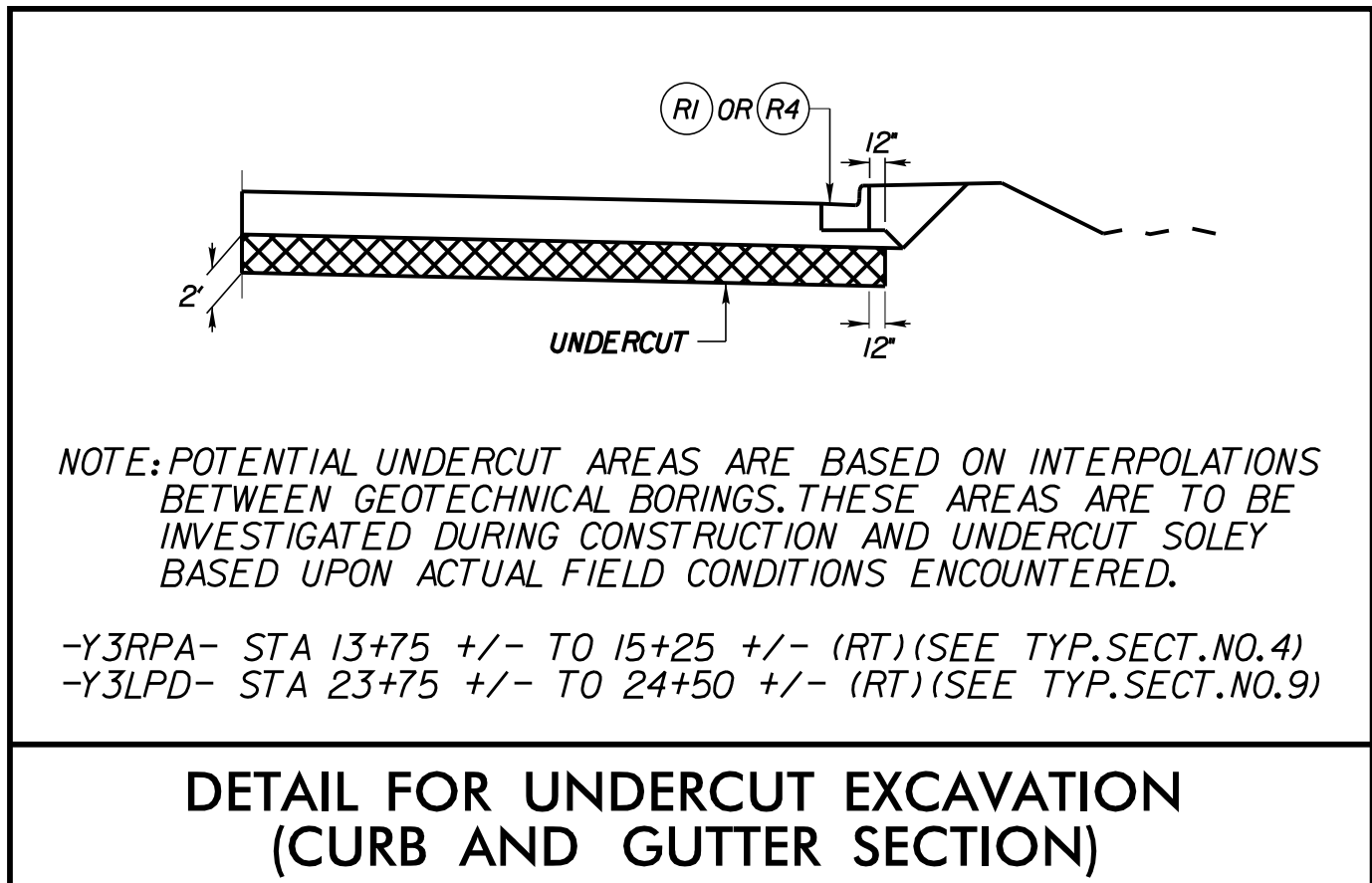


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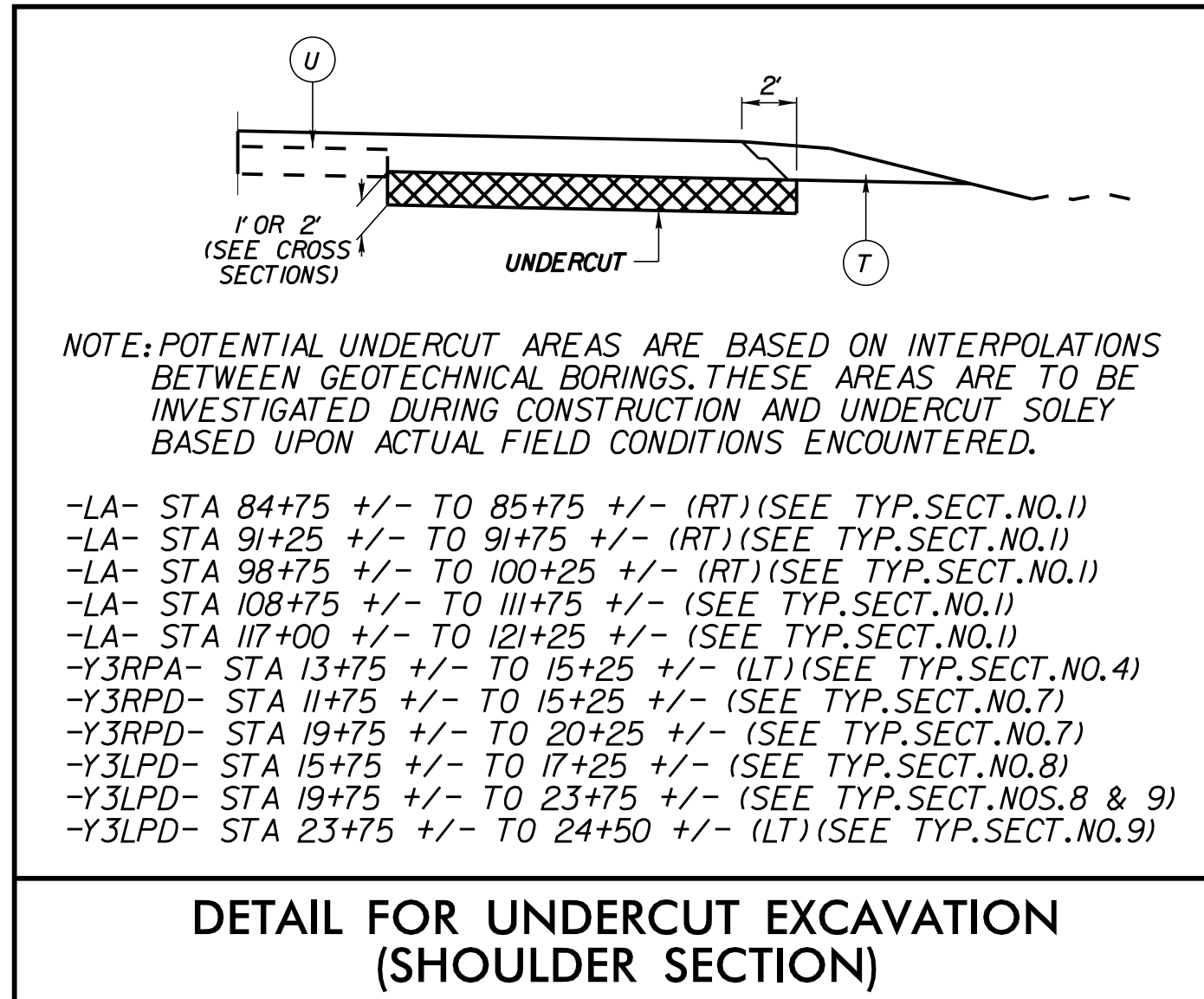
-Y3- STA 17+74.00 TO STA 26+06.54
-Y3- STA 40+98.74 TO STA 51+48.00



- NOTES:
- USE 4:1 SLOPES INSIDE INTERCHANGE
 - SEE PLANS FOR SUPERELEVATION, TURN LANES, AUXILIARY LANE, MONOLITHIC ISLAND, EXPRESSWAY GUTTER, CURB AND GUTTER AND LANE TAPER LOCATIONS
 - FOR CUT SLOPE HEIGHT > 10', USE 3:1 SLOPES
FOR CUT SLOPE HEIGHT ≤ 10', USE 2:1 SLOPES
 - PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE



DETAIL FOR UNDERCUT EXCAVATION
(CURB AND GUTTER SECTION)



NOTE: POTENTIAL UNDERCUT AREAS ARE BASED ON INTERPOLATIONS BETWEEN GEOTECHNICAL BORINGS. THESE AREAS ARE TO BE INVESTIGATED DURING CONSTRUCTION AND UNDERCUT SOLELY BASED UPON ACTUAL FIELD CONDITIONS ENCOUNTERED.

-LA- STA 84+75 +/- TO 85+75 +/- (RT) (SEE TYP. SECT. NO. 1)
-LA- STA 91+25 +/- TO 91+75 +/- (RT) (SEE TYP. SECT. NO. 1)
-LA- STA 98+75 +/- TO 100+25 +/- (RT) (SEE TYP. SECT. NO. 1)
-LA- STA 108+75 +/- TO 111+75 +/- (SEE TYP. SECT. NO. 1)
-LA- STA 117+00 +/- TO 121+25 +/- (SEE TYP. SECT. NO. 1)
-Y3RPA- STA 13+75 +/- TO 15+25 +/- (LT) (SEE TYP. SECT. NO. 4)
-Y3RPD- STA 11+75 +/- TO 15+25 +/- (SEE TYP. SECT. NO. 7)
-Y3RPD- STA 19+75 +/- TO 20+25 +/- (SEE TYP. SECT. NO. 7)
-Y3LPD- STA 15+75 +/- TO 17+25 +/- (SEE TYP. SECT. NO. 8)
-Y3LPD- STA 19+75 +/- TO 23+75 +/- (SEE TYP. SECT. NOS. 8 & 9)
-Y3LPD- STA 23+75 +/- TO 24+50 +/- (LT) (SEE TYP. SECT. NO. 9)

DETAIL FOR UNDERCUT EXCAVATION
(SHOULDER SECTION)

PAVEMENT SCHEDULE	
A1	13.5' PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS
A2	10.5' PORTLAND CEMENT CONCRETE PAVEMENT
C1	PROP. APPROX. 1 1/4" ASPHALT CONCRETE SURFACE COURSE, TYPE SF9.5A, AT AN AVERAGE RATE OF 136 LBS. PER SQ. YD.
C2	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C3	PROP. APPROX. 2" ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 224 LBS. PER SQ. YD.
C4	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.
C5	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE 119.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D2	PROP. APPROX. 4" ASPHALT CONCRETE INTERMEDIATE COURSE TYPE 119.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 2 1/2" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 3" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 342 LBS. PER SQ. YD.
E2	PROP. APPROX. 5" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 570 LBS. PER SQ. YD.
E3	PROP. APPROX. 5 1/2" ASPHALT CONCRETE BASE COURSE TYPE B25.0B, AT AN AVERAGE RATE OF 620 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONCRETE BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH, TO BE PLACED IN LAYERS NOT LESS THAN 3" IN DEPTH OR GREATER THAN 5 1/2" IN DEPTH.
J1	PROPOSED 6" AGGREGATE BASE COURSE
J2	PROPOSED 8" AGGREGATE BASE COURSE
J3	PROPOSED 10" AGGREGATE BASE COURSE
K	CLASS IV SUBGRADE STABILIZATION
P	PRIME COAT AT THE RATE OF 0.35 GAL. PER SQ. YD.
R1	2'-6" CONCRETE CURB AND GUTTER
R2	SHOULDER BERM GUTTER
R3	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXIST PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL, THIS SHEET)

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
2A-2

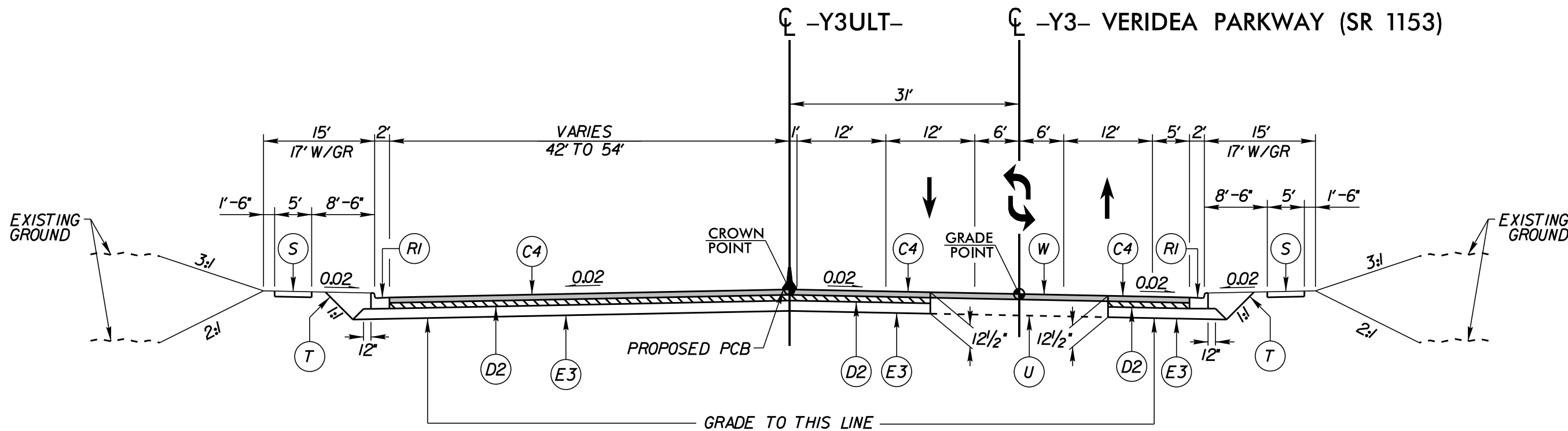
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

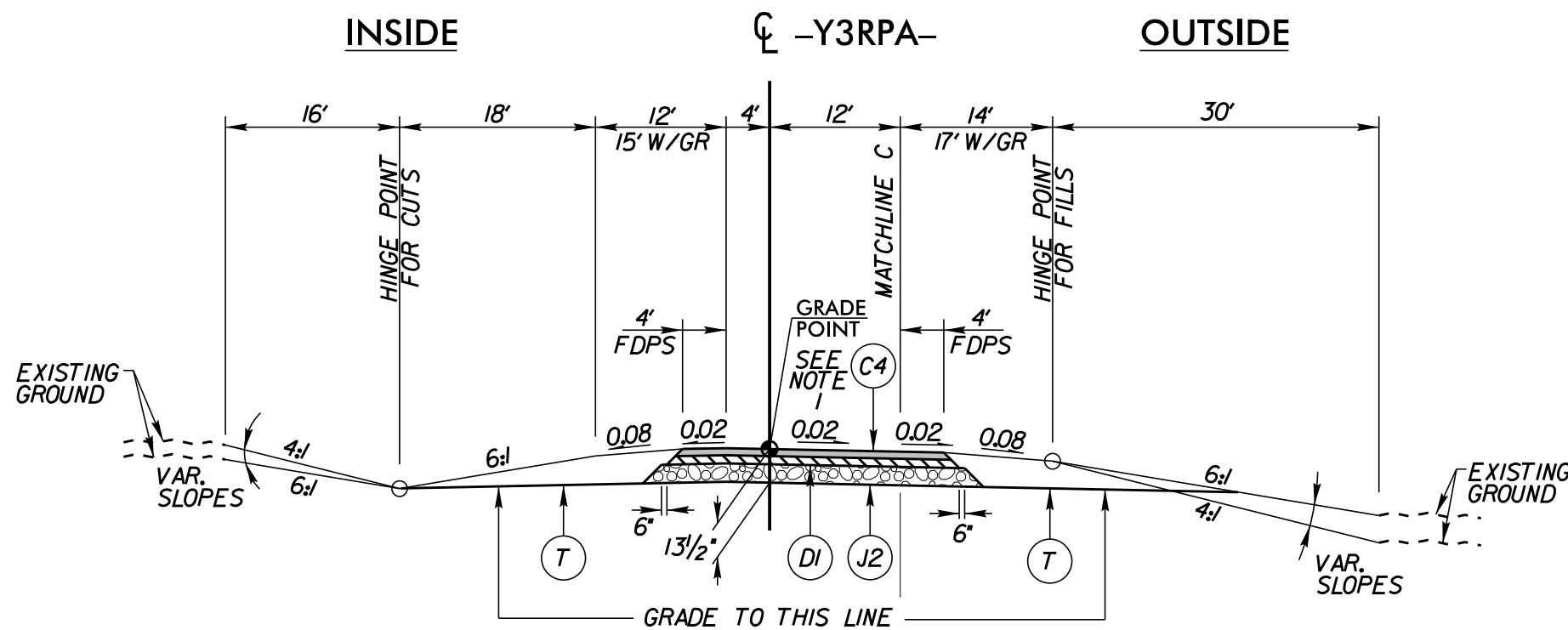
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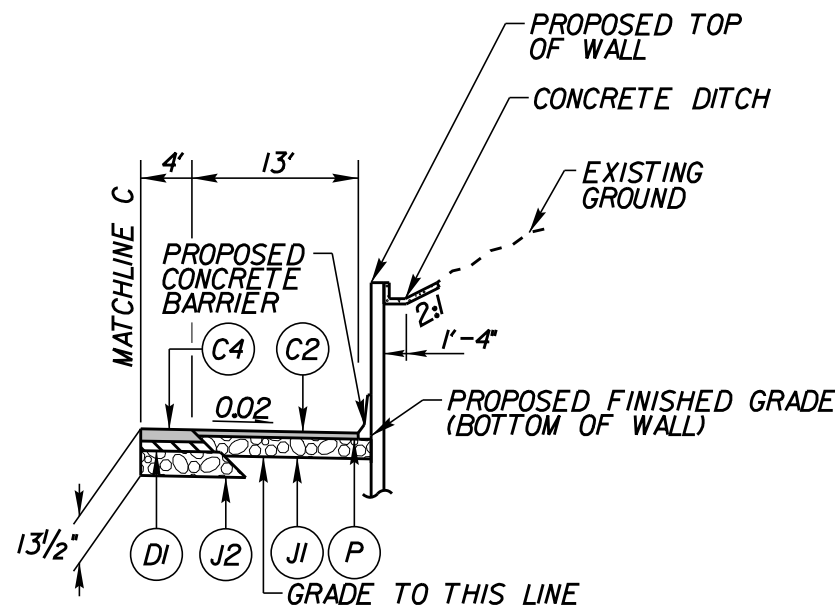




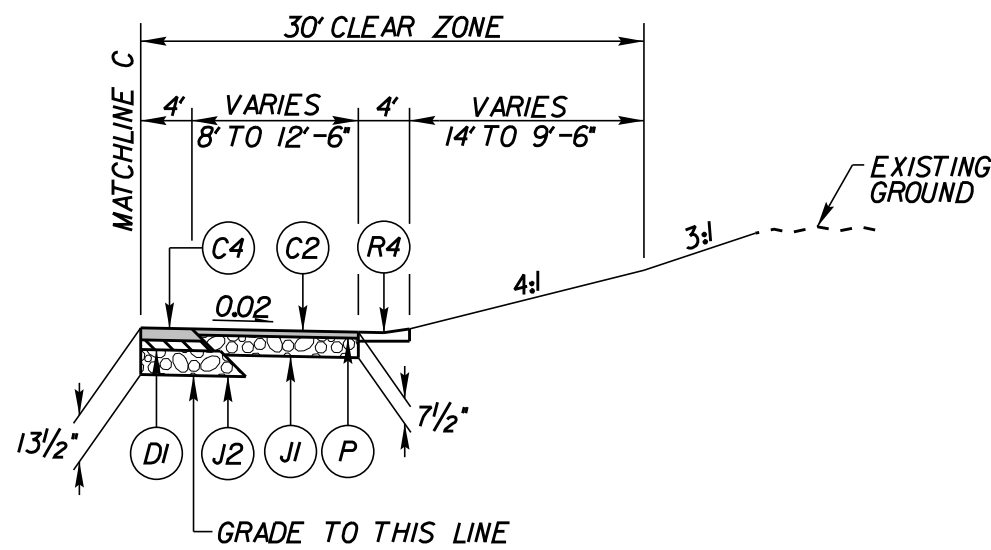
TYPICAL SECTION NO. 3
-Y3- STA 26+06.54 TO STA 33+19.27 (BEGIN BRIDGE)
-Y3- STA 35+54.19 (END BRIDGE) TO STA 40+98.74



TYPICAL SECTION NO. 4
-Y3RPA- STA 10+00.00 TO STA 21+97.80



TYPICAL SECTION NO. 4A
-Y3RPA- STA 11+82.00 TO STA 13+56.00 (RT)



TYPICAL SECTION NO. 4B
-Y3RPA- STA 13+56.00 TO STA 15+50.00 (RT)

- NOTES:
- USE A1 TO THE BACK OF THE GORE (-Y3RPA- STA 13+62.56)
 - USE 4:1 SLOPES INSIDE INTERCHANGE
 - SEE PLANS FOR SUPERELEVATION, TURN LANES, AUXILIARY LANE, MONOLITHIC ISLAND, EXPRESSWAY GUTTER, CURB AND GUTTER AND LANE TAPER LOCATIONS
 - FOR CUT SLOPE HEIGHT > 10', USE 3:1 SLOPES
 - FOR CUT SLOPE HEIGHT ≤ 10', USE 2:1 SLOPES
 - PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

PAVEMENT SCHEDULE	
A1	13.5" PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS
A2	10.5" PORTLAND CEMENT CONCRETE PAVEMENT
C1	1 1/4" SF9.5A
C2	1 1/2" S9.5B
C3	2" S9.5B
C4	3" S9.5B
C5	VAR. DEPTH S9.5B
D1	2 1/2" 119.0B
D2	4" 119.0B
D3	VAR. DEPTH 119.0B
E1	3" B25.0B
E2	5" B25.0B
E3	5 1/2" B25.0B
E4	VAR. DEPTH B25.0B
J1	6" AGGREGATE BASE COURSE
J2	8" AGGREGATE BASE COURSE
J3	10" AGGREGATE BASE COURSE
K	CLASS IV SUBGRADE STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB AND GUTTER
R2	SHOULDER BERM GUTTER
R3	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXIST PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
2A-3

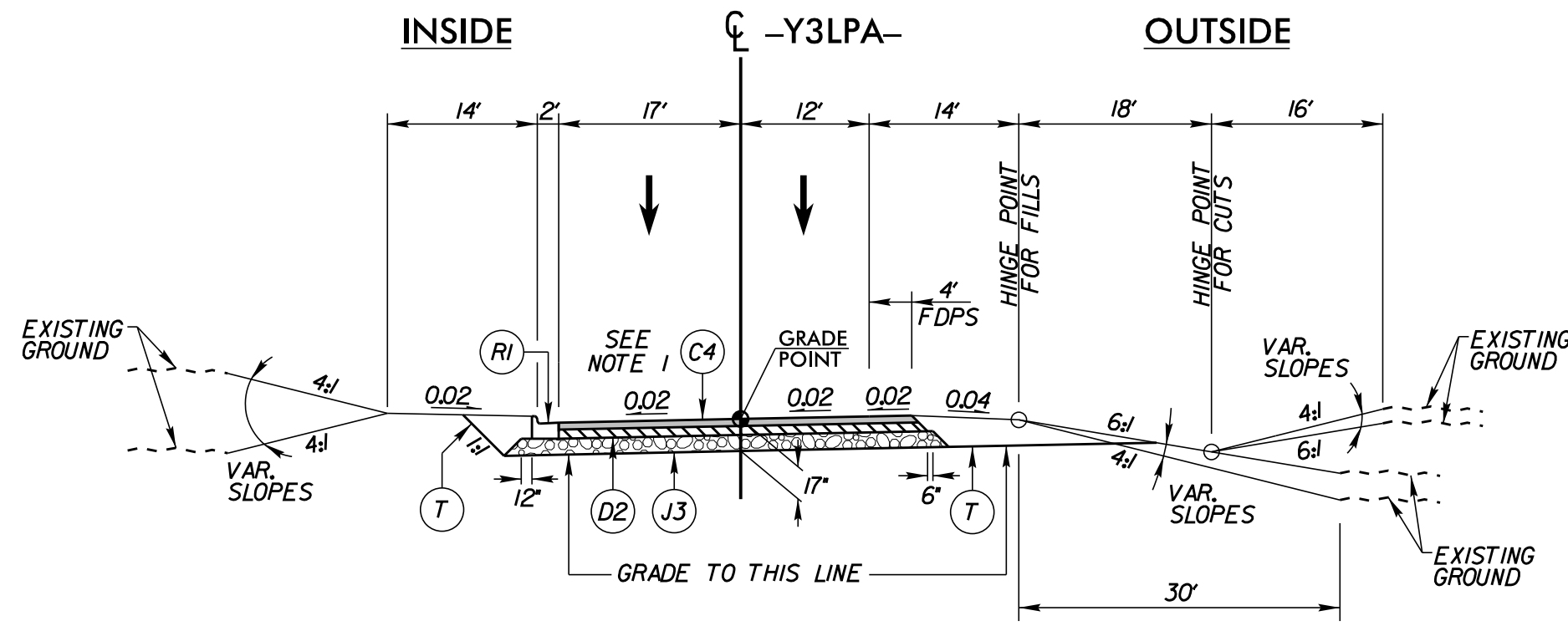
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

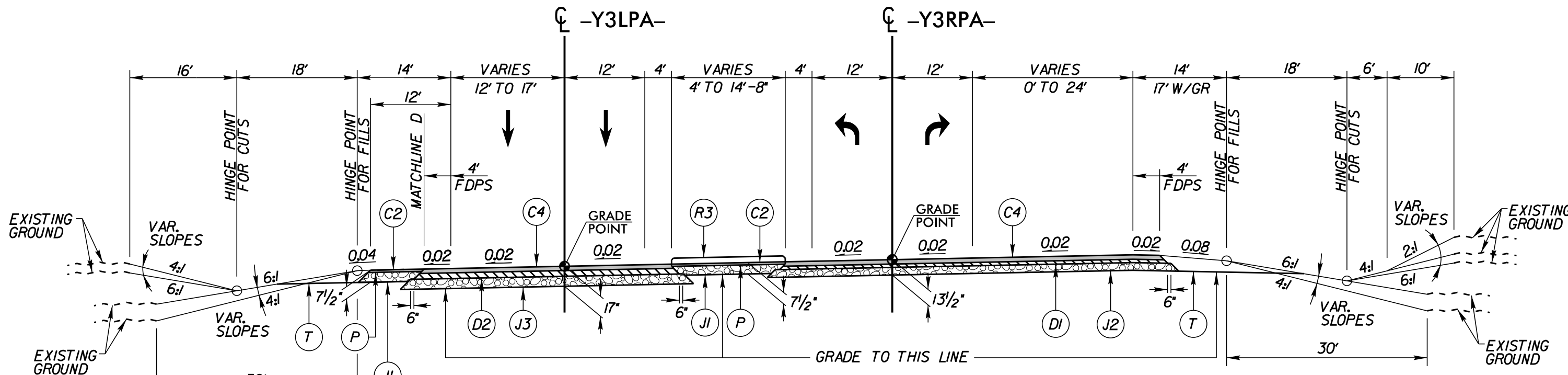
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



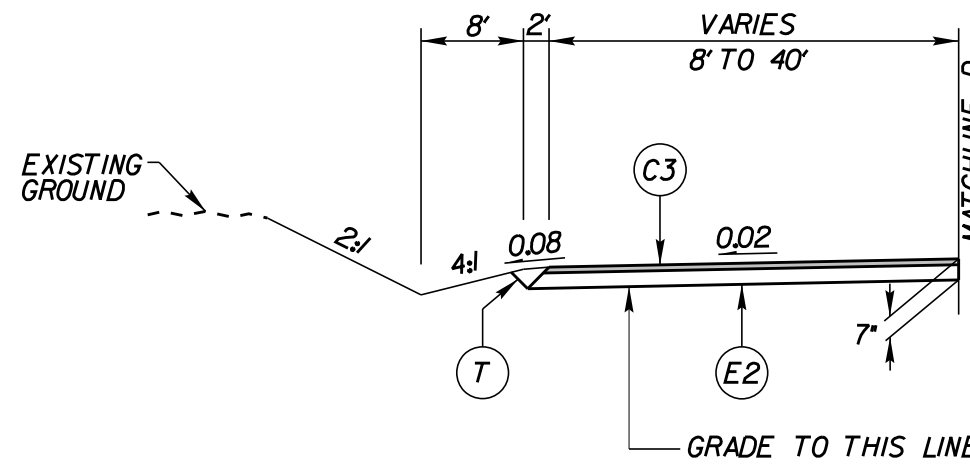
Kimley»Horn



TYPICAL SECTION NO. 5
-Y3LPA- STA 10+00.00 TO STA 14+63.41



TYPICAL SECTION NO. 6
-Y3RPA- STA 21+97.80 TO STA 26+82.11
-Y3LPA- STA 14+63.41 TO STA 22+07.67

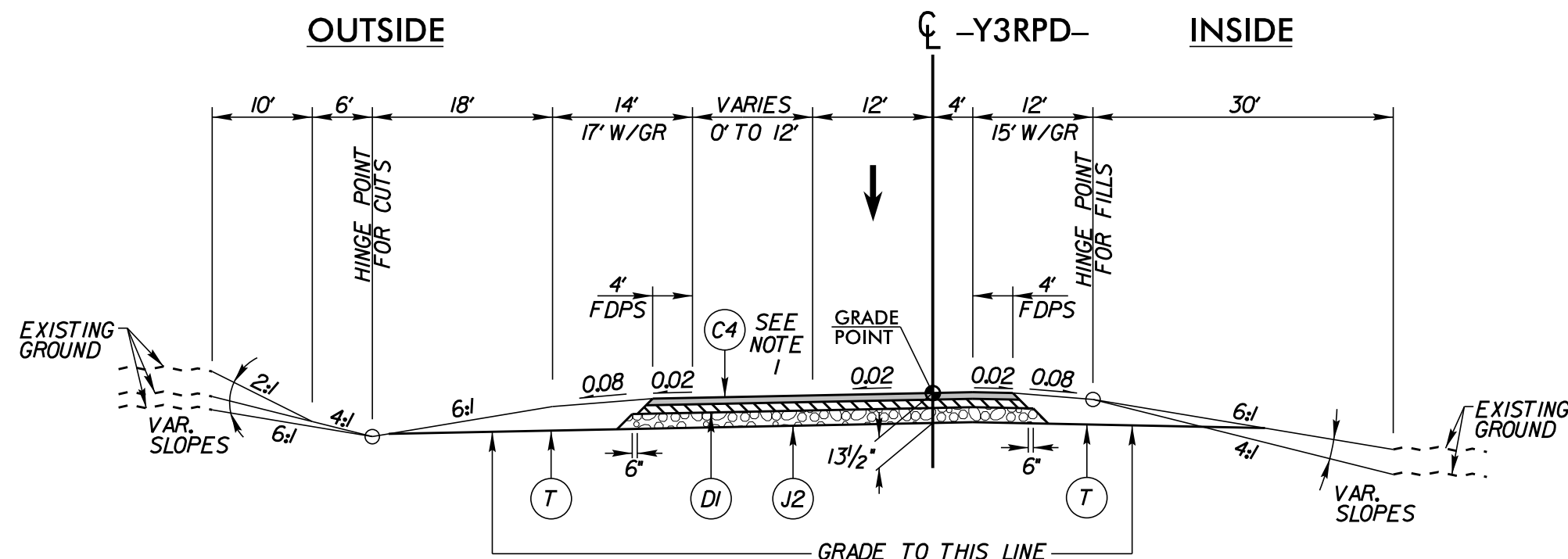


TYPICAL SECTION NO. 6A
-Y3LPA- STA 17+63.41 TO STA 18+77.76 (LT)

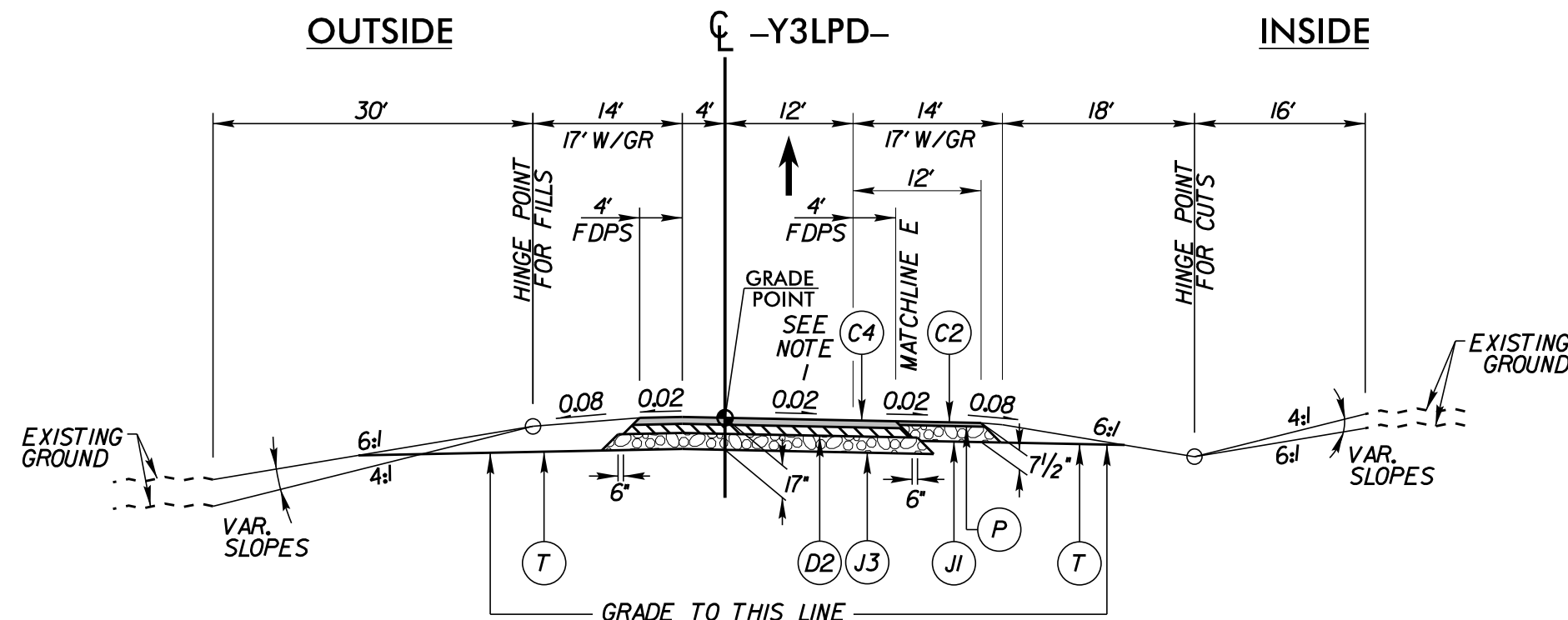
- NOTES:
- USE A1 TO THE BACK OF THE GORE (-Y3LPA- STA 12+09.86)
 - USE 4:1 SLOPES INSIDE INTERCHANGE
 - SEE PLANS FOR SUPERELEVATION, TURN LANES, AUXILIARY LANE, MONOLITHIC ISLAND, EXPRESSWAY GUTTER, CURB AND GUTTER AND LANE TAPER LOCATIONS
 - FOR CUT SLOPE HEIGHT > 10', USE 3:1 SLOPES
FOR CUT SLOPE HEIGHT ≤ 10', USE 2:1 SLOPES
 - PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

PAVEMENT SCHEDULE	
A1	13.5" PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS
A2	10.5" PORTLAND CEMENT CONCRETE PAVEMENT
C1	1 1/4" SF9.5A
C2	1 1/2" S9.5B
C3	2" S9.5B
C4	3" S9.5B
C5	VAR. DEPTH S9.5B
D1	2 1/2" 119.0B
D2	4" 119.0B
D3	VAR. DEPTH 119.0B
E1	3" B25.0B
E2	5" B25.0B
E3	5 1/2" B25.0B
E4	VAR. DEPTH B25.0B
J1	6" AGGREGATE BASE COURSE
J2	8" AGGREGATE BASE COURSE
J3	10" AGGREGATE BASE COURSE
K	CLASS IV SUBGRADE STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB AND GUTTER
R2	SHOULDER BERM GUTTER
R3	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXIST PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT

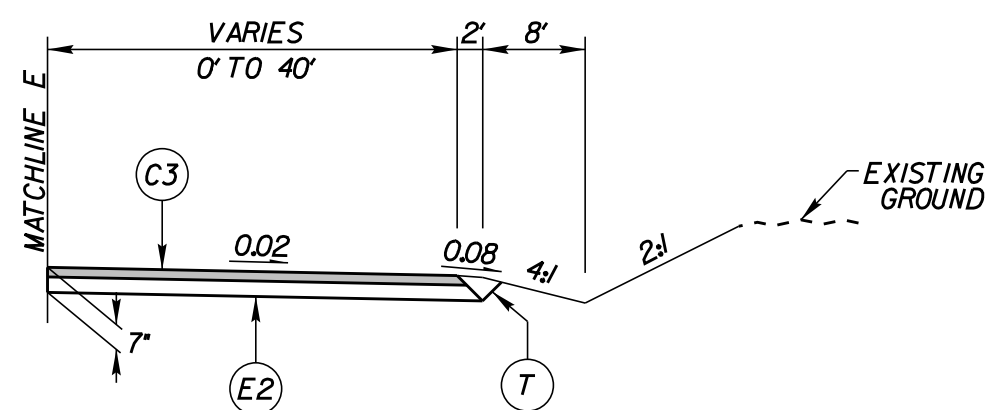
FINAL ROADWAY PLANS	PROJECT REFERENCE NO.		SHEET NO.	
	R-2635D		2A-4	
	ROADWAY DESIGN ENGINEER		PAVEMENT DESIGN ENGINEER	
	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
	 BLYTHE			
Kimley»»Horn				



TYPICAL SECTION NO. 7
-Y3RPD- STA 10+00.00 TO STA 24+92.17



TYPICAL SECTION NO. 8
-Y3LPD- STA 10+00.00 TO STA 21+02.40



TYPICAL SECTION NO. 8A
-Y3LPD- STA 19+31.00 TO STA 20+74.00 (RT)

- NOTES:
1. USE A1 TO THE BACK OF THE GORE (-Y3RPD- STA 13+20.37 AND -Y3LPD- STA 15+43.52)
 2. USE 4:1 SLOPES INSIDE INTERCHANGE
 3. SEE PLANS FOR SUPERELEVATION, TURN LANES, AUXILIARY LANE, MONOLITHIC ISLAND, EXPRESSWAY GUTTER, CURB AND GUTTER AND LANE TAPER LOCATIONS
 4. FOR CUT SLOPE HEIGHT > 10', USE 3:1 SLOPES
FOR CUT SLOPE HEIGHT ≤ 10', USE 2:1 SLOPES
 5. PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

PAVEMENT SCHEDULE	
A1	13.5' PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS
A2	10.5' PORTLAND CEMENT CONCRETE PAVEMENT
C1	1 1/4' SF9.5A
C2	1 1/2' S9.5B
C3	2' S9.5B
C4	3' S9.5B
C5	VAR. DEPTH S9.5B
D1	2 1/2' 119.0B
D2	4' 119.0B
D3	VAR. DEPTH 119.0B
E1	3' B25.0B
E2	5' B25.0B
E3	5 1/2' B25.0B
E4	VAR. DEPTH B25.0B
J1	6' AGGREGATE BASE COURSE
J2	8' AGGREGATE BASE COURSE
J3	10' AGGREGATE BASE COURSE
K	CLASS IV SUBGRADE STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB AND GUTTER
R2	SHOULDER BERM GUTTER
R3	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
S	4' CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXIST PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
2A-5

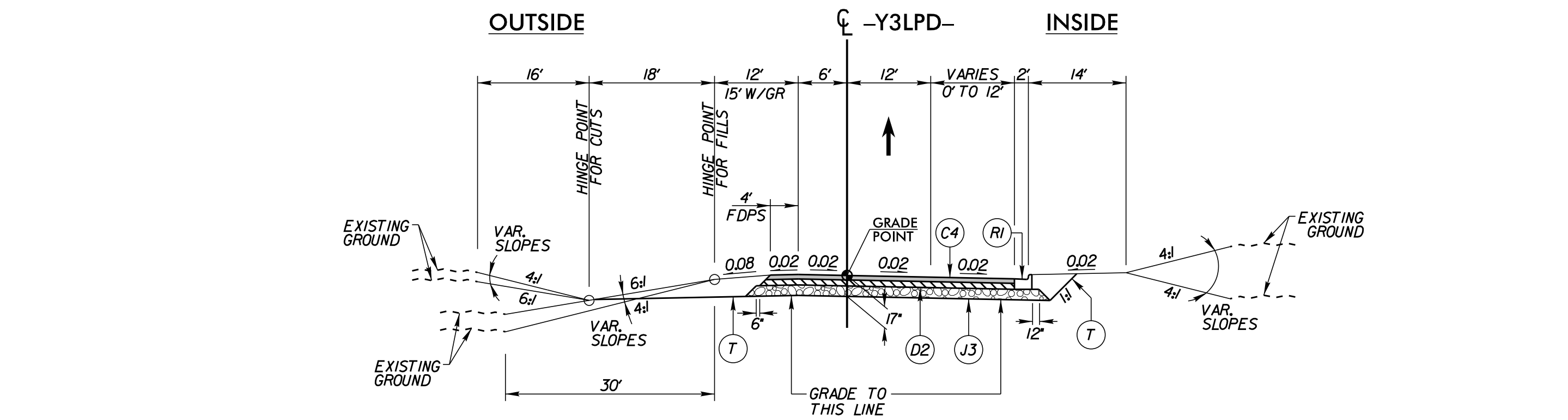
ROADWAY DESIGN ENGINEER

PAVEMENT DESIGN ENGINEER

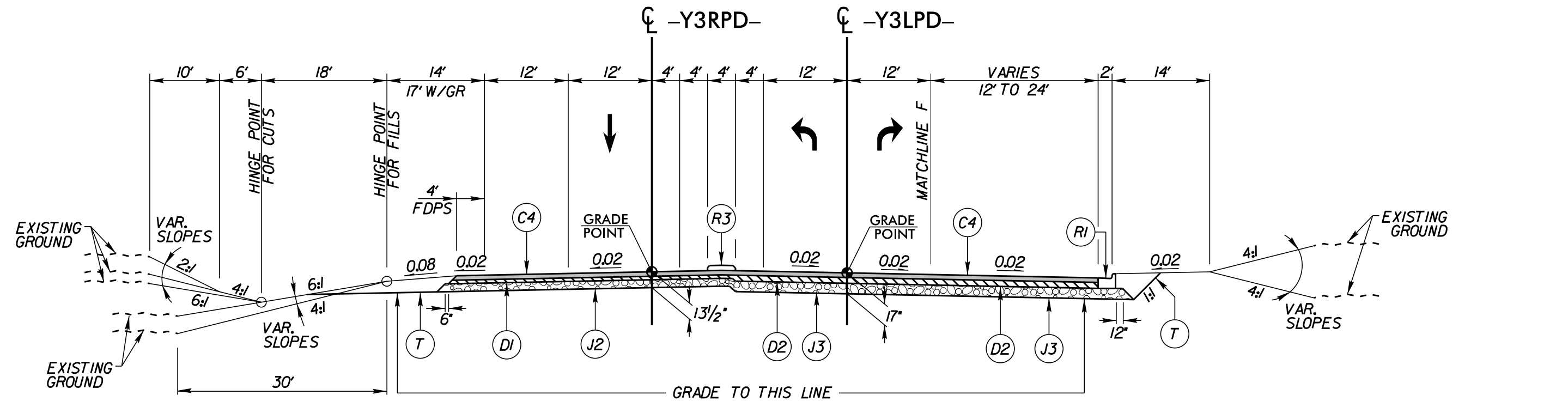
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



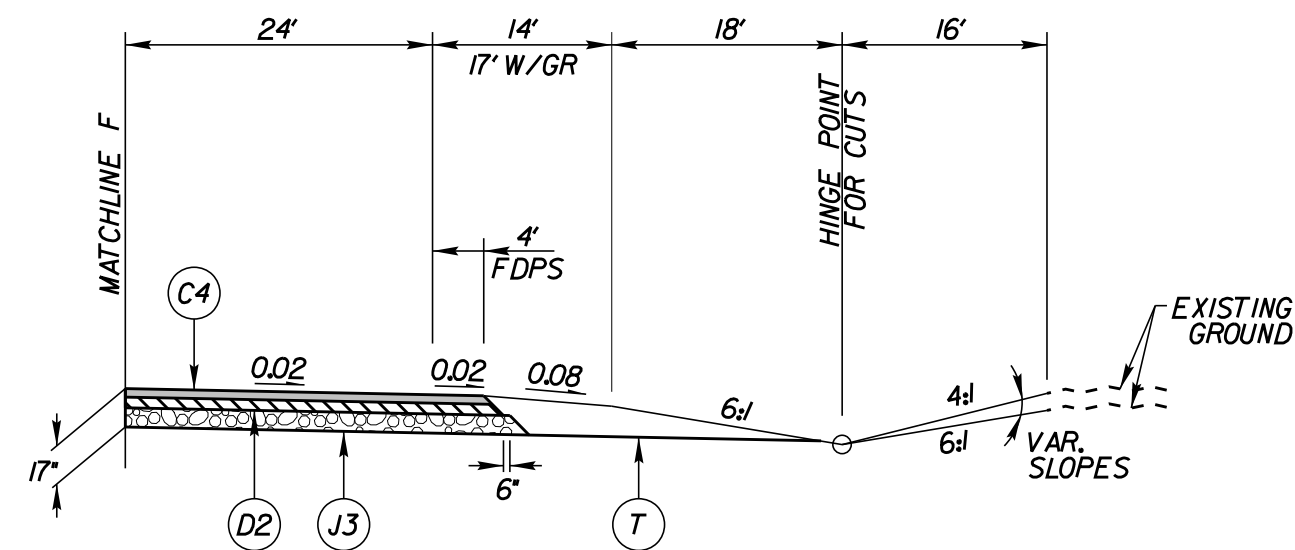
Kimley»Horn



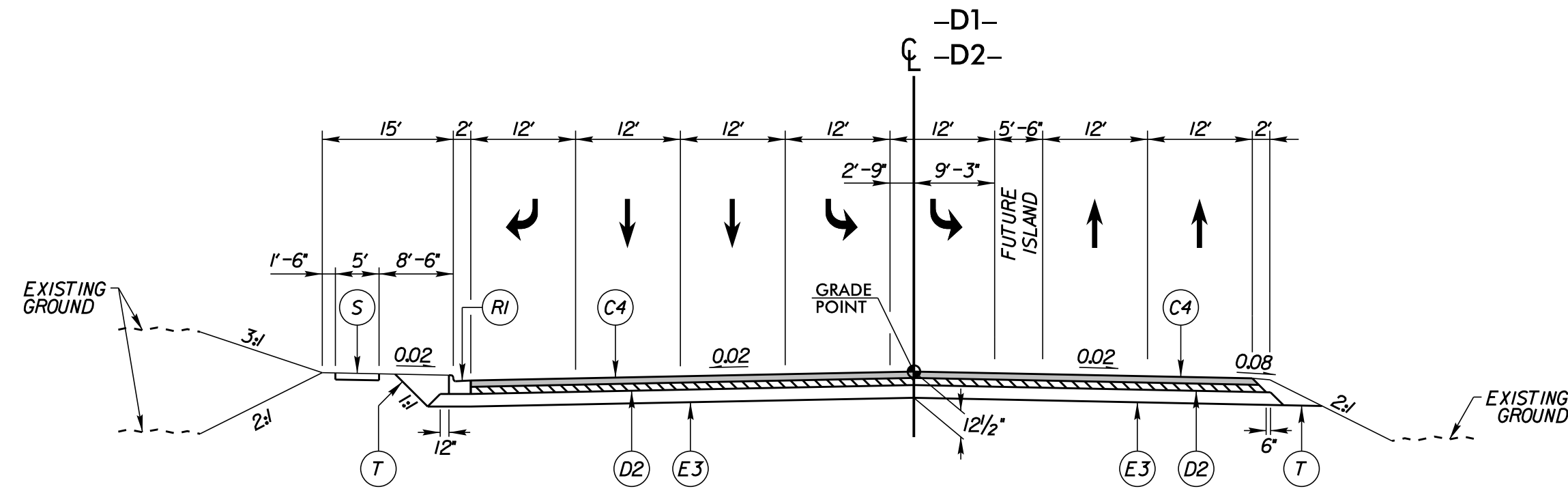
TYPICAL SECTION NO. 9
-Y3LPD- STA 21+02.40 TO STA 26+41.32



TYPICAL SECTION NO. 10
-Y3RPD- STA 24+92.17 TO STA 30+05.61
-Y3LPD- STA 26+41.32 TO STA 32+77.38



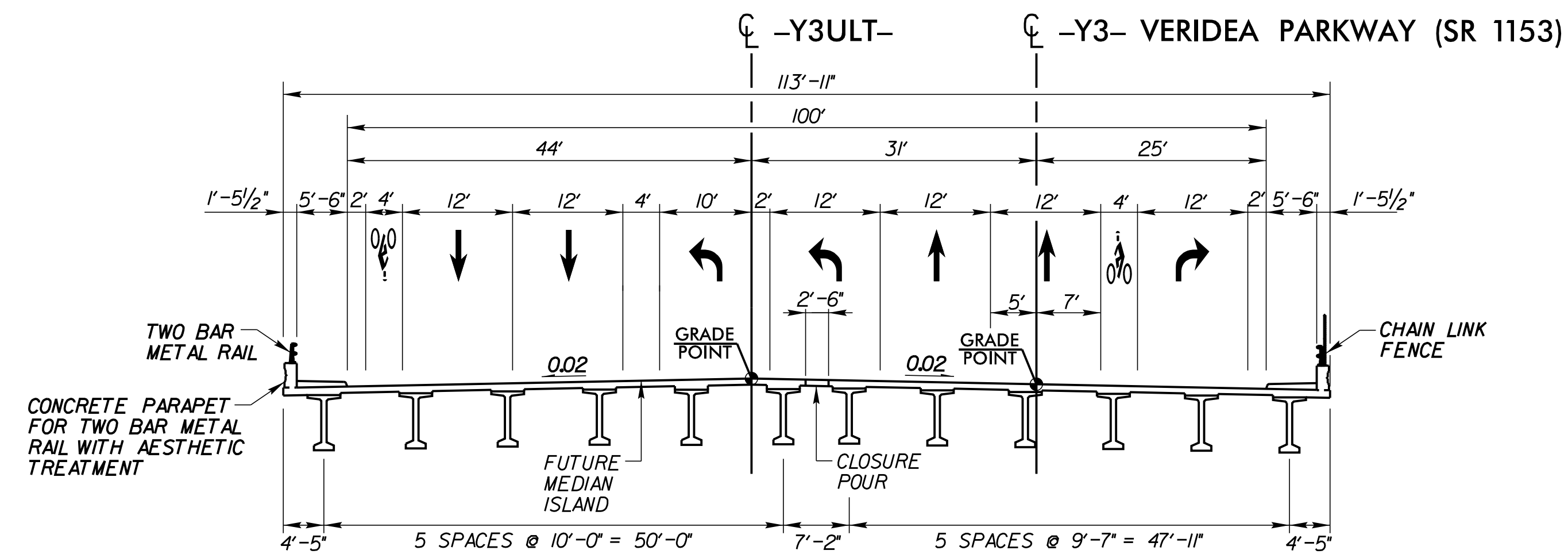
TYPICAL SECTION NO. 10A
-Y3LPD- STA 27+91.32 TO STA 32+27.87 (RT)



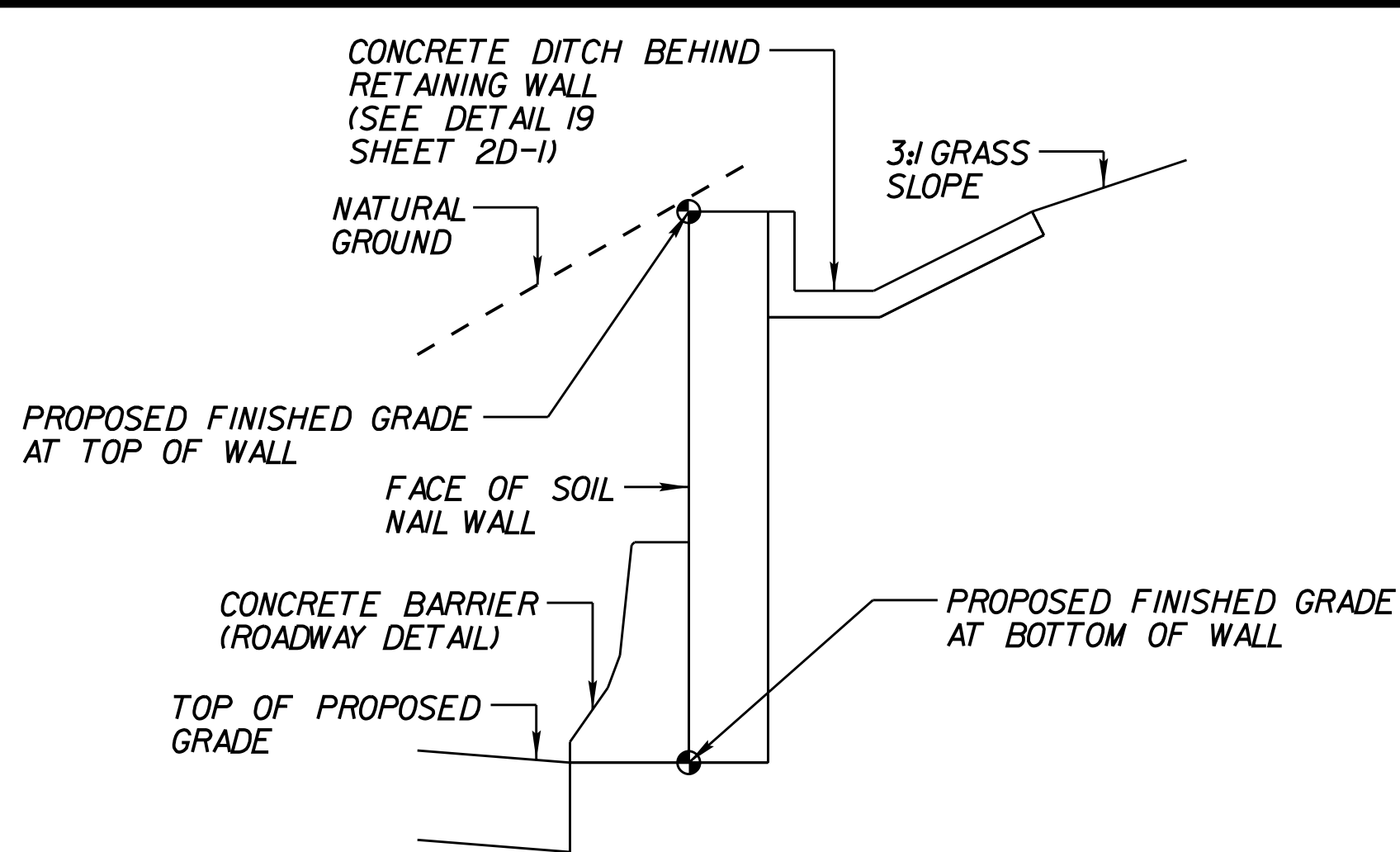
TYPICAL SECTION NO. 11
-D1- STA 10+86.79 TO STA 11+76.12
-D2- STA 10+73.12 TO STA 11+47.97

- NOTES:
- USE 4:1 SLOPES INSIDE INTERCHANGE
 - SEE PLANS FOR SUPERELEVATION, TURN LANES, AUXILIARY LANE, MONOLITHIC ISLAND, EXPRESSWAY GUTTER, CURB AND GUTTER AND LANE TAPER LOCATIONS
 - FOR CUT SLOPE HEIGHT > 10', USE 3:1 SLOPES
FOR CUT SLOPE HEIGHT ≤ 10', USE 2:1 SLOPES
 - PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE

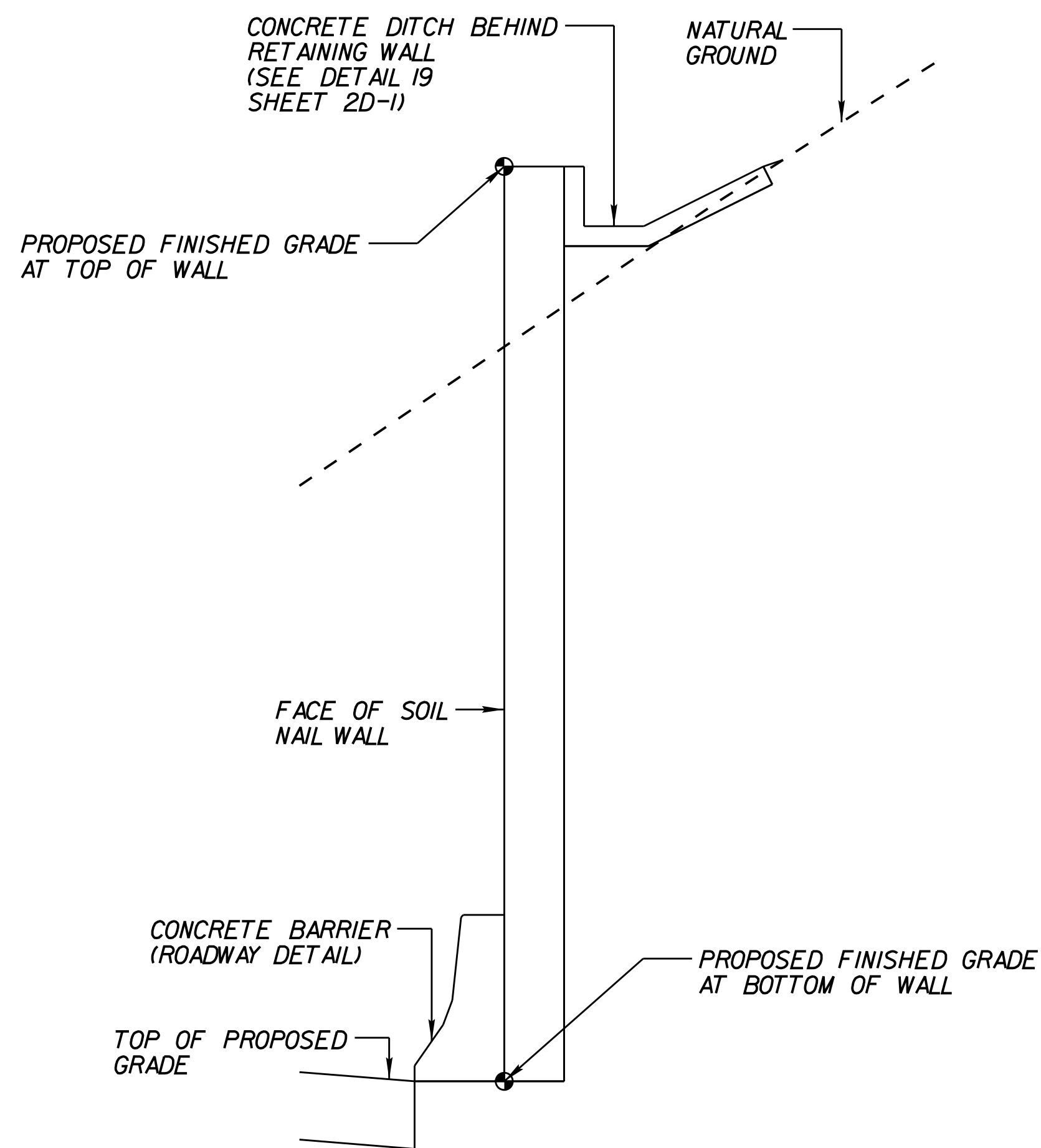
PAVEMENT SCHEDULE	
A1	13.5" PORTLAND CEMENT CONCRETE PAVEMENT WITH DOWELS
A2	10.5" PORTLAND CEMENT CONCRETE PAVEMENT
C1	1/4" SF9.5A
C2	1 1/2" S9.5B
C3	2" S9.5B
C4	3" S9.5B
C5	VAR. DEPTH S9.5B
D1	2 1/2" 119.0B
D2	4" 119.0B
D3	VAR. DEPTH 119.0B
E1	3" B25.0B
E2	5" B25.0B
E3	5 1/2" B25.0B
E4	VAR. DEPTH B25.0B
J1	6" AGGREGATE BASE COURSE
J2	8" AGGREGATE BASE COURSE
J3	10" AGGREGATE BASE COURSE
K	CLASS IV SUBGRADE STABILIZATION
P	PRIME COAT
R1	2'-6" CONCRETE CURB AND GUTTER
R2	SHOULDER BERM GUTTER
R3	5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)
R4	CONCRETE EXPRESSWAY GUTTER
S	4" CONCRETE SIDEWALK
T	EARTH MATERIAL
U	EXIST PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT



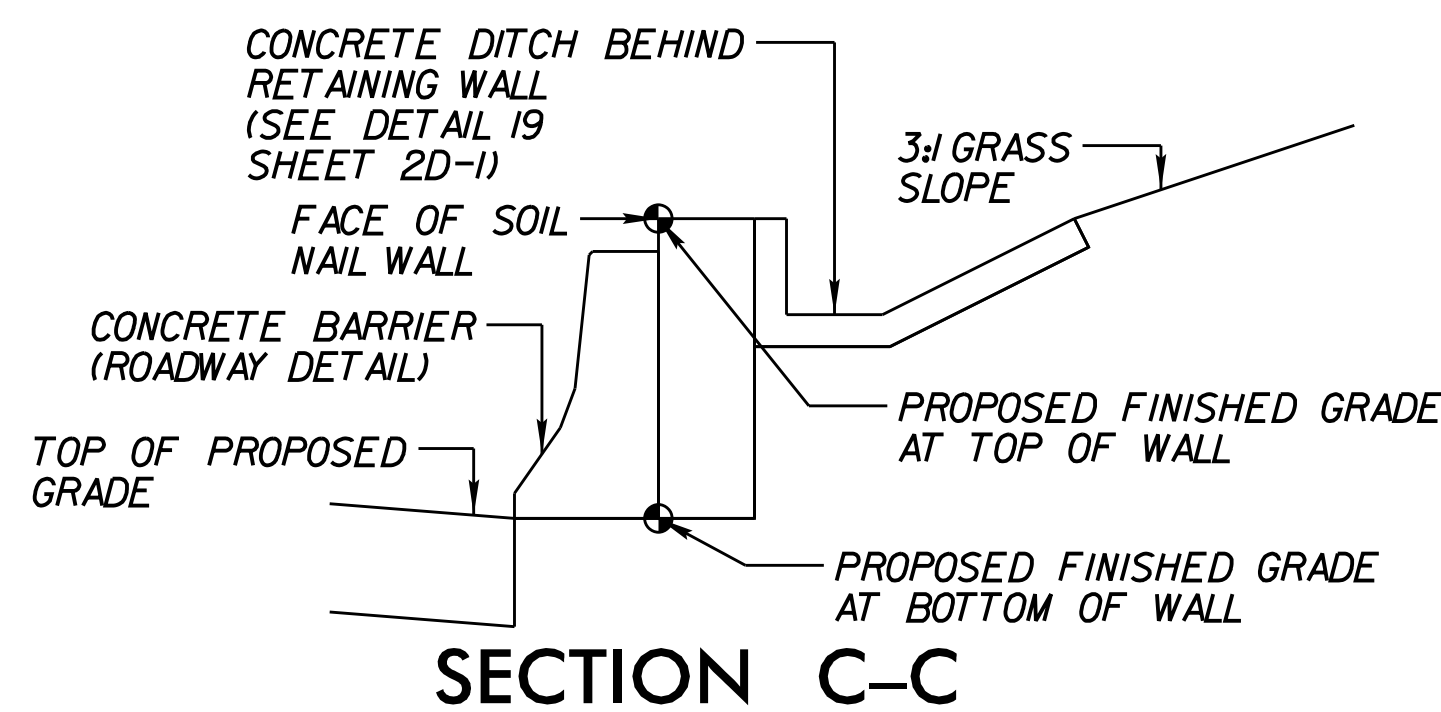
BRIDGE TYPICAL SECTION



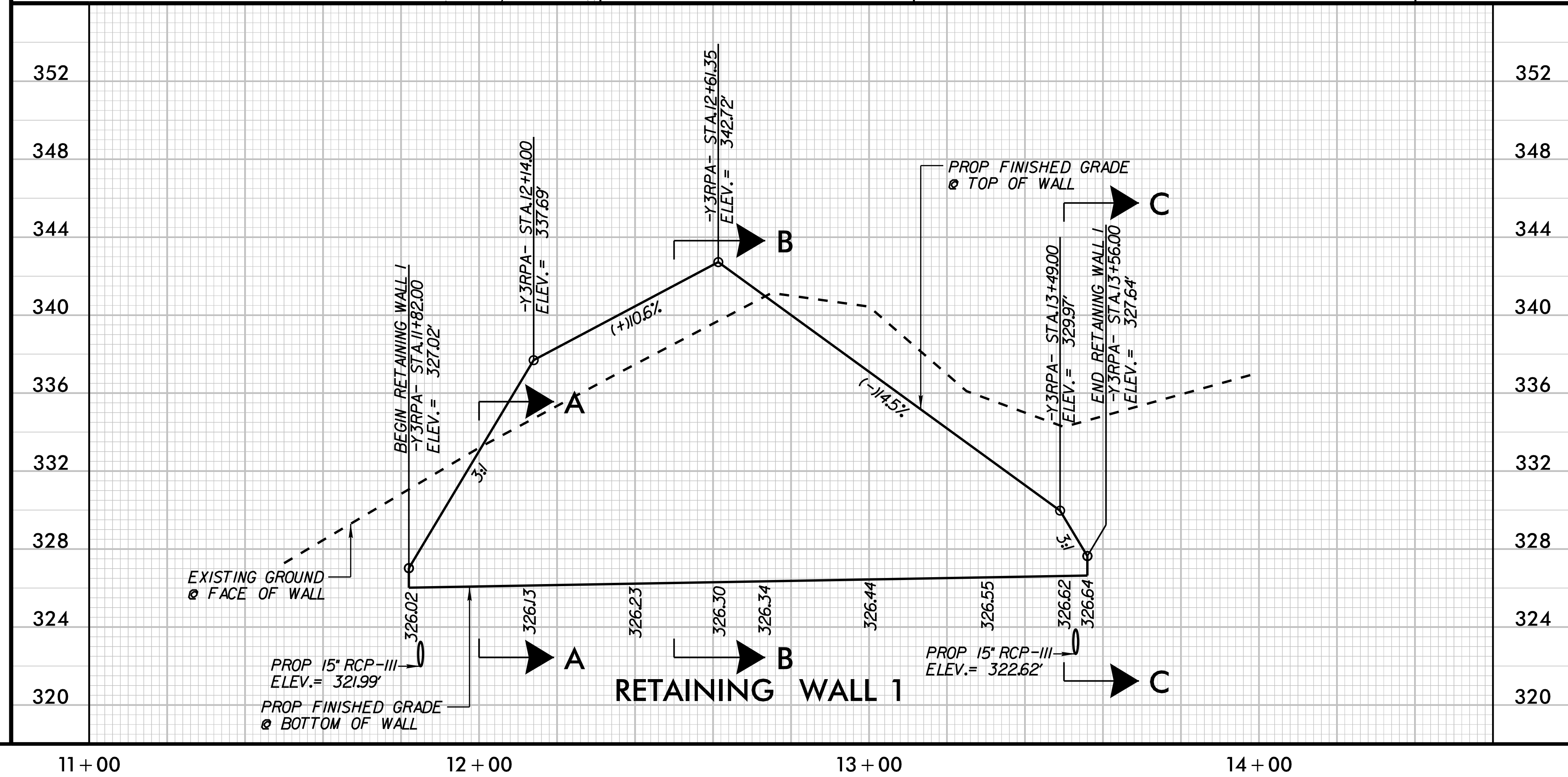
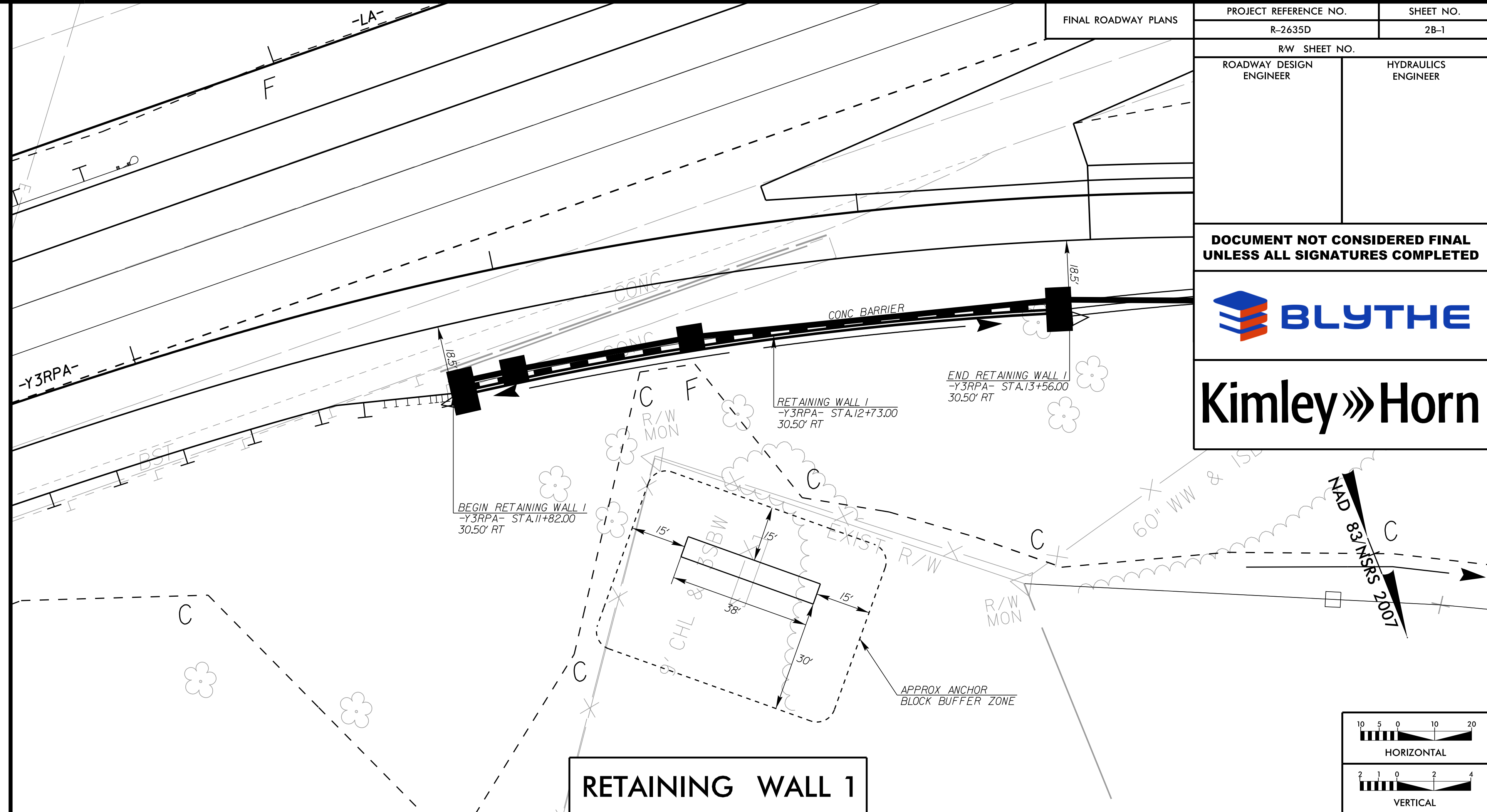
SECTION A-A

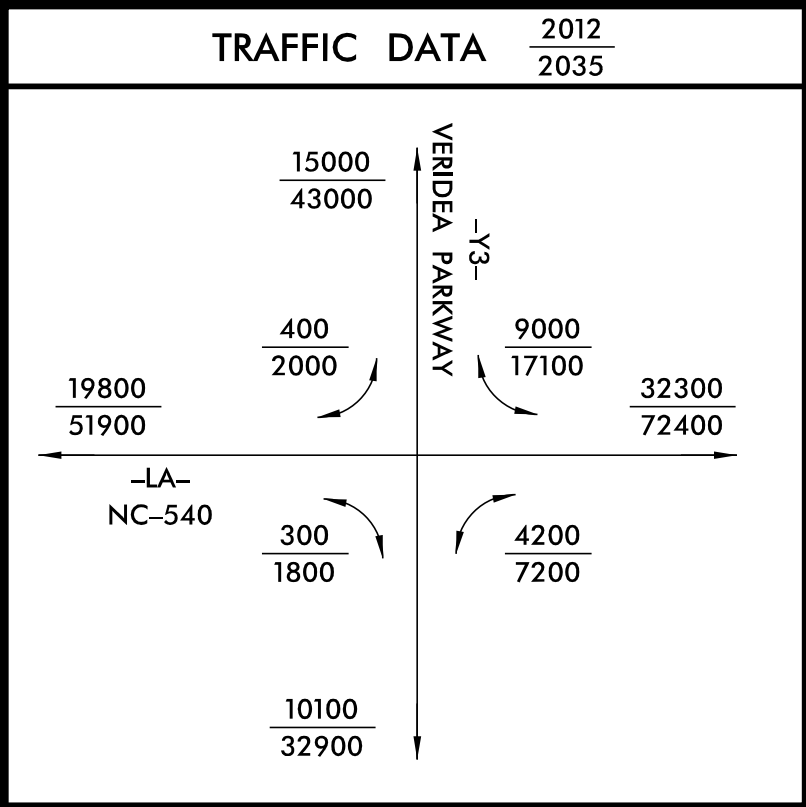


SECTION B-B

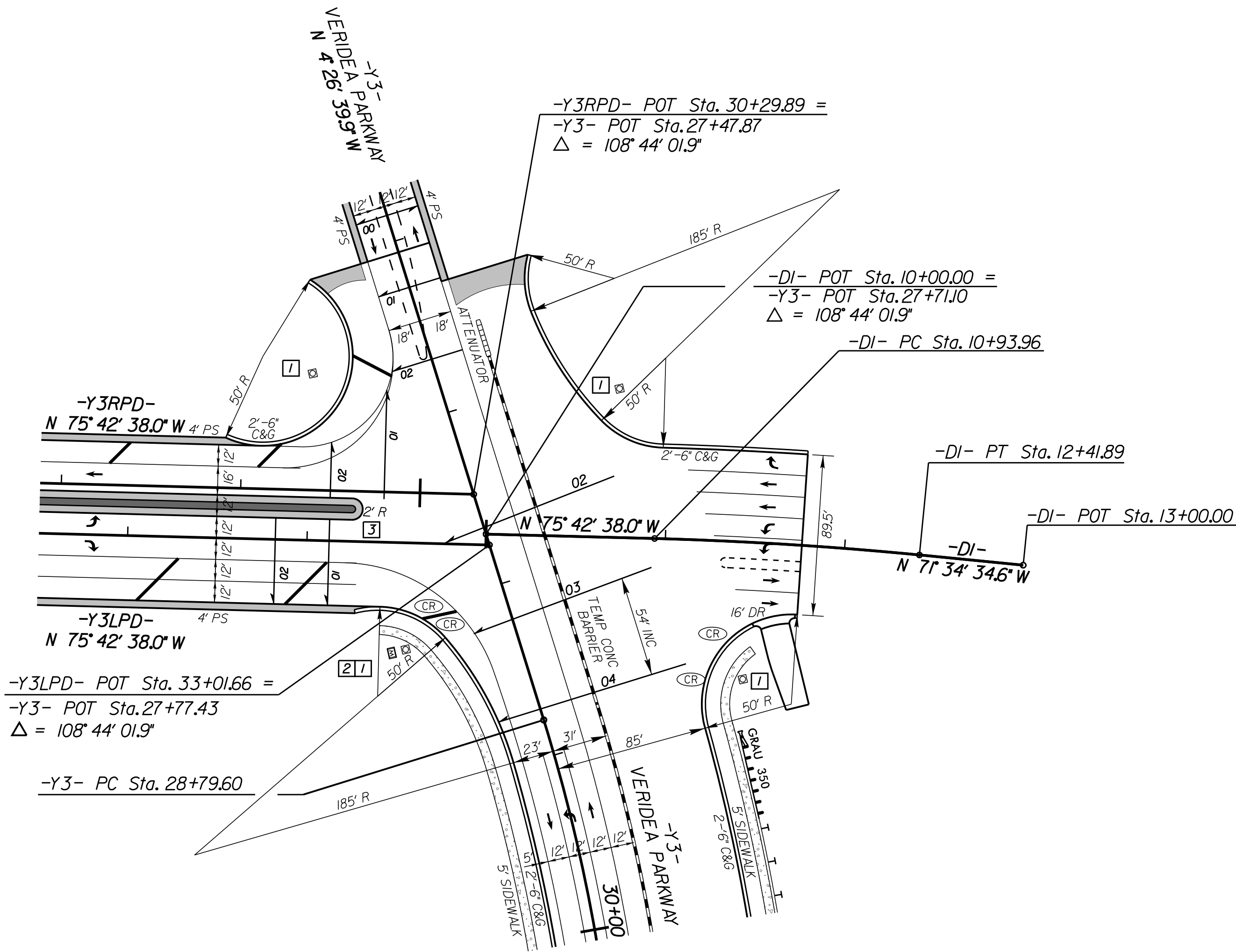


SECTION C-C

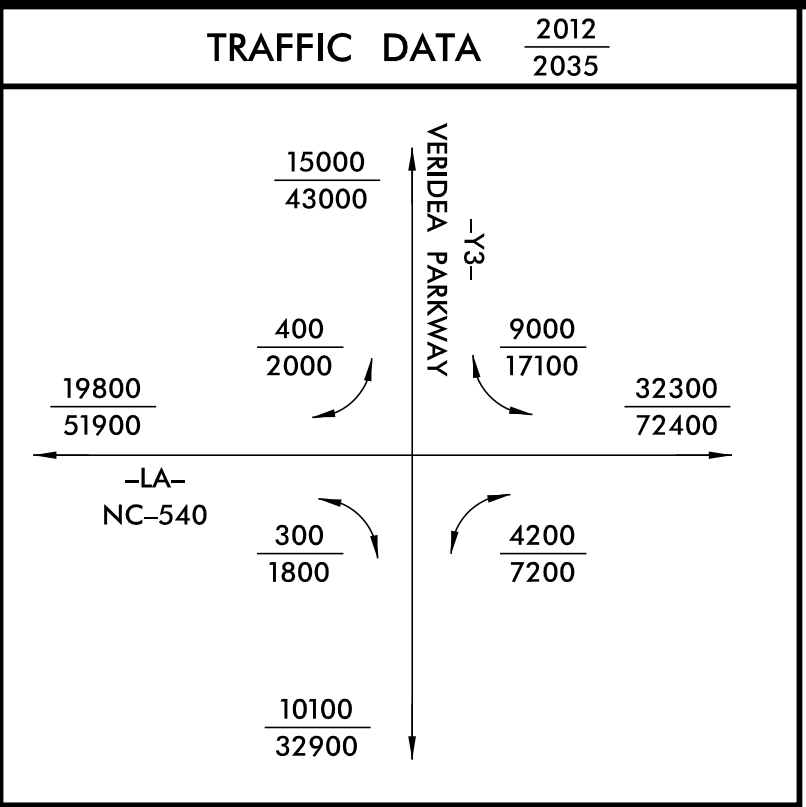




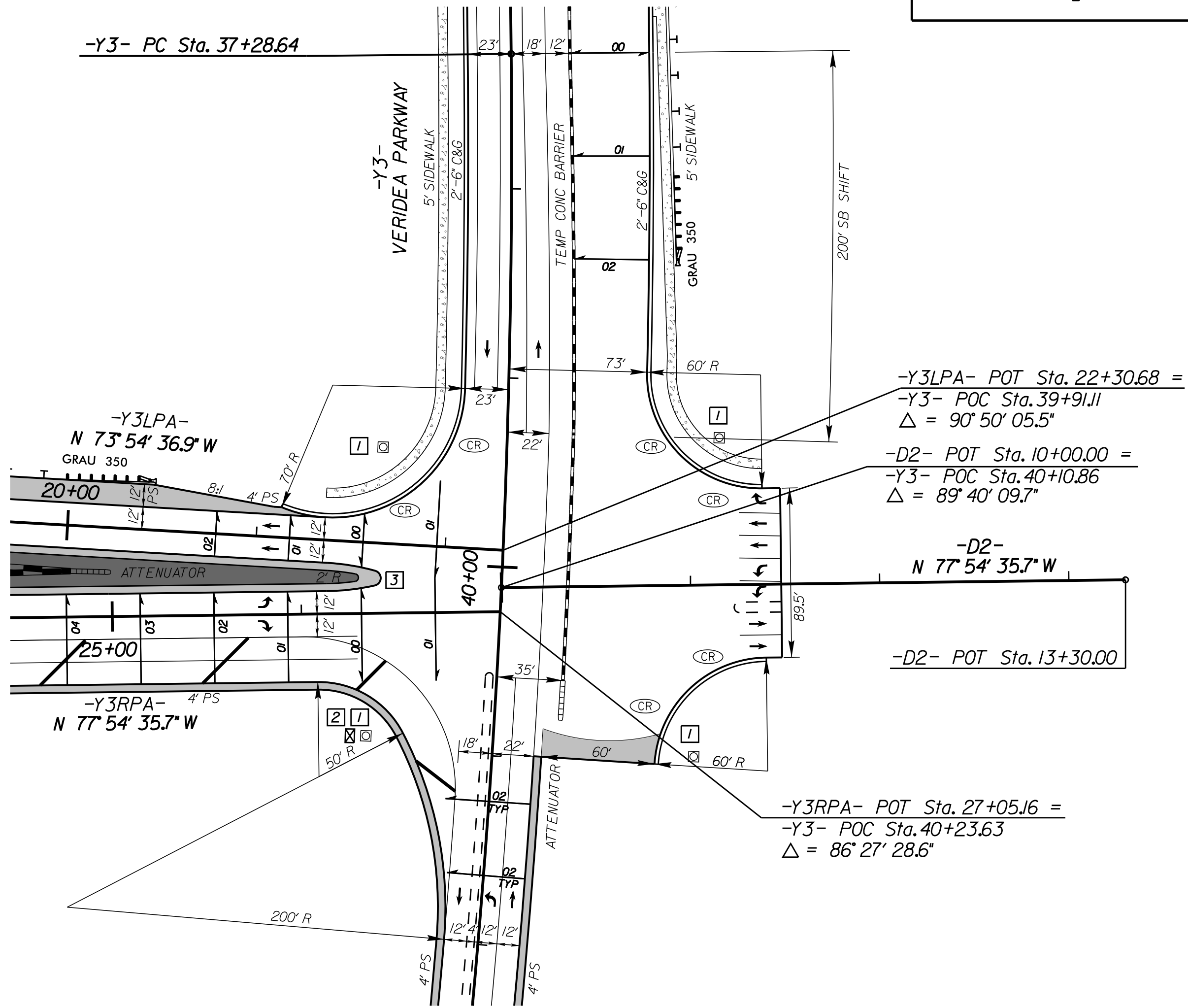
NAD 83/NSRS 2007



-Y3-/-Y3RPD-/-Y3LPD-/-DI-
SEE SHEET NO. 6 FOR PLAN



NAD 83/NSRS 2007

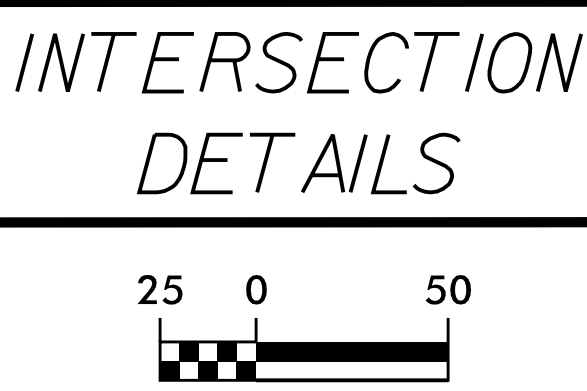


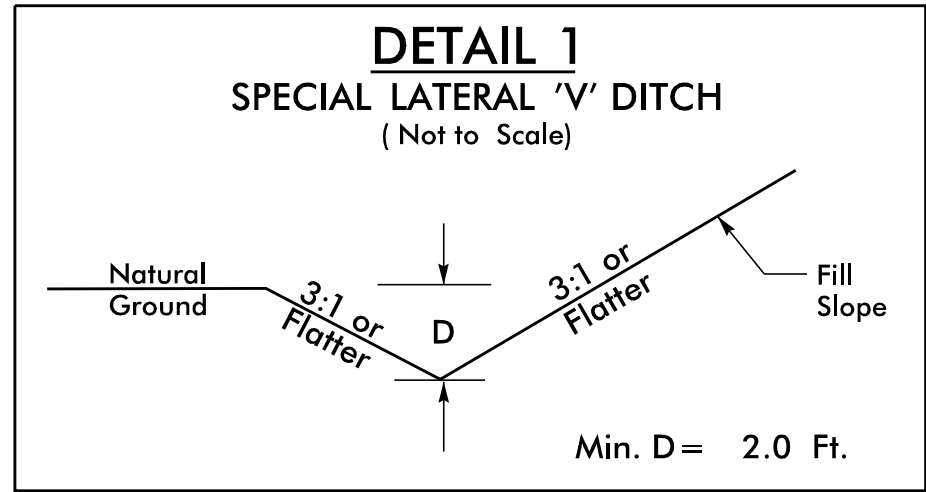
-Y3-/-Y3RPA-/-Y3LPA-/-D2-
SEE SHEET NO. 6 FOR PLAN

K:\RAL_Roadway\012593013 - R-2635D - Access 540\Roadway\Proj\R-2635D_rdy-Intersection01.dgn

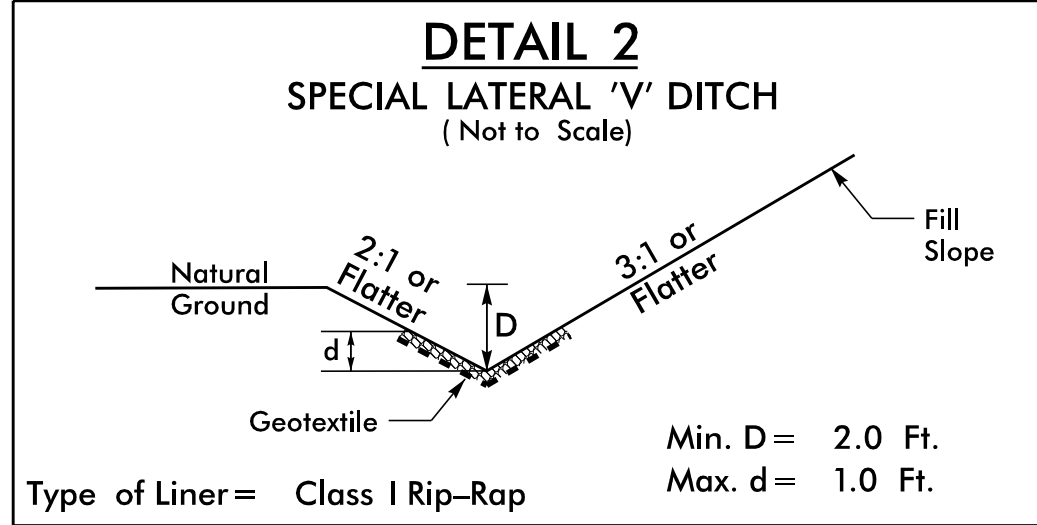
NOTES:
1 PROPOSED SIGNAL POLE
2 PROPOSED SIGNAL CABINET
3 5' MONOLITHIC CONCRETE ISLAND (KEYED-IN)

FINAL ROADWAY PLANS	PROJECT REFERENCE NO. R-2635D	SHEET NO. 2B-3
	ROADWAY DESIGN ENGINEER	
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED		

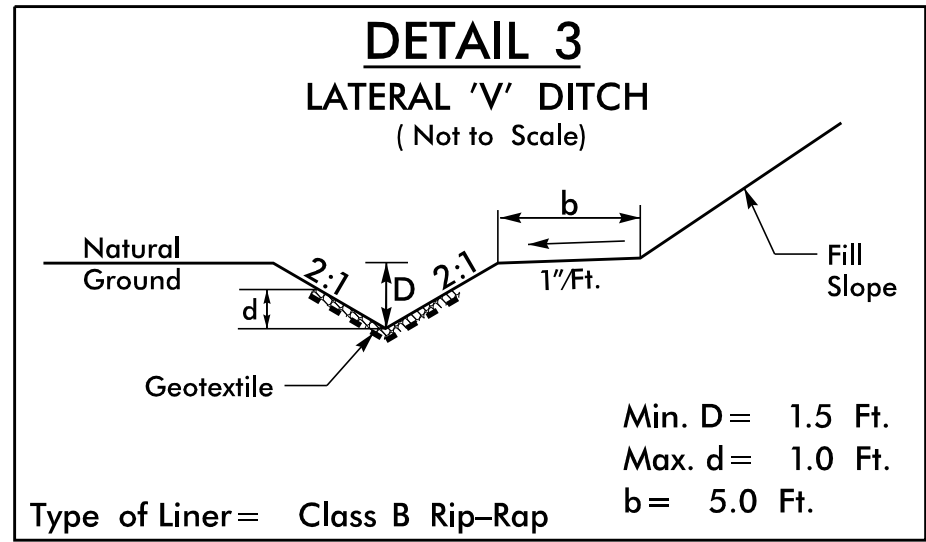




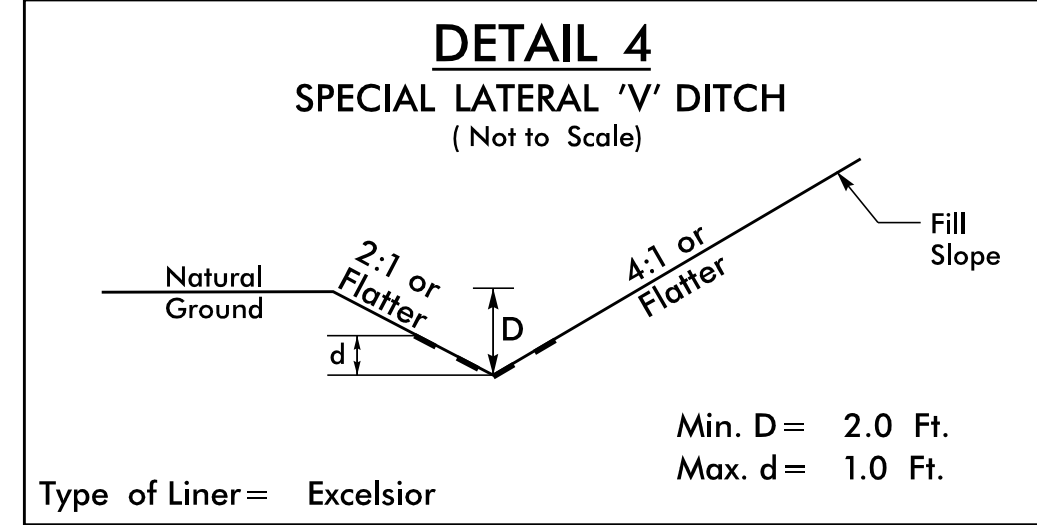
FROM STA. 59+70 TO STA. 61+50 -LA- (LT)



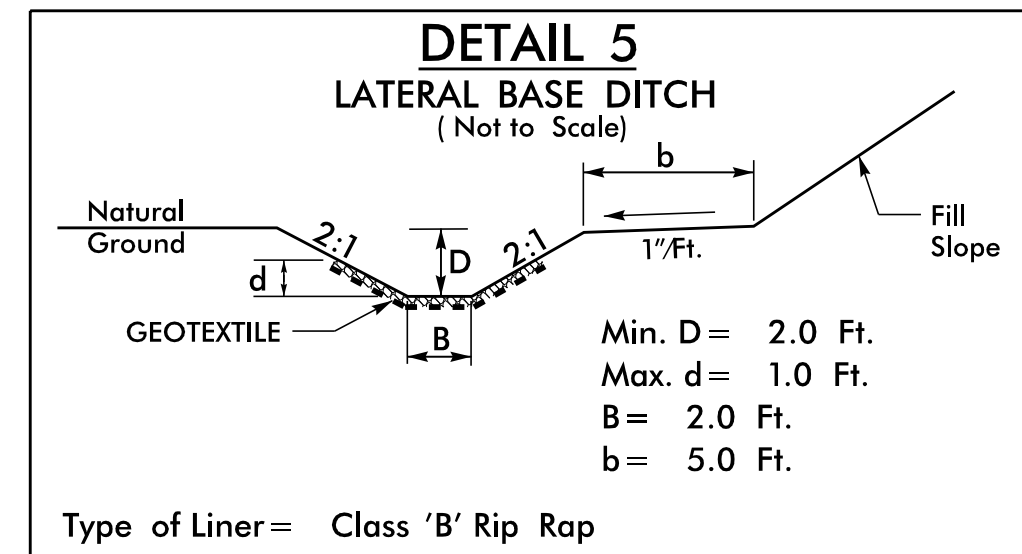
FROM STA. 62+90 TO STA. 63+50 -LA- (LT)
FROM STA. 81+77 TO STA. 83+00 -LA- (RT)
FROM STA. 23+00 TO STA. 24+50 -Y3RPD- (LT)
FROM STA. 23+50 TO STA. 29+50 -Y3RPD- (RT)
FROM STA. 11+00 TO STA. 11+50 -Y3RPD- (LT)



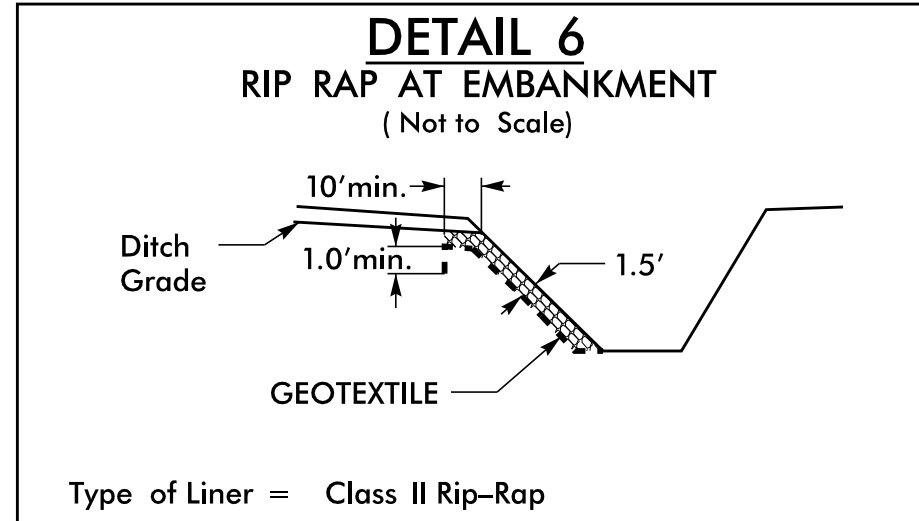
FROM STA. 73+45 TO STA. 75+00 -LA- (RT)
FROM STA. 81+50 TO STA. 85+38.23 -LA- (LT)
FROM STA. 10+00 TO STA. 11+00 -Y3RPD- (LT)



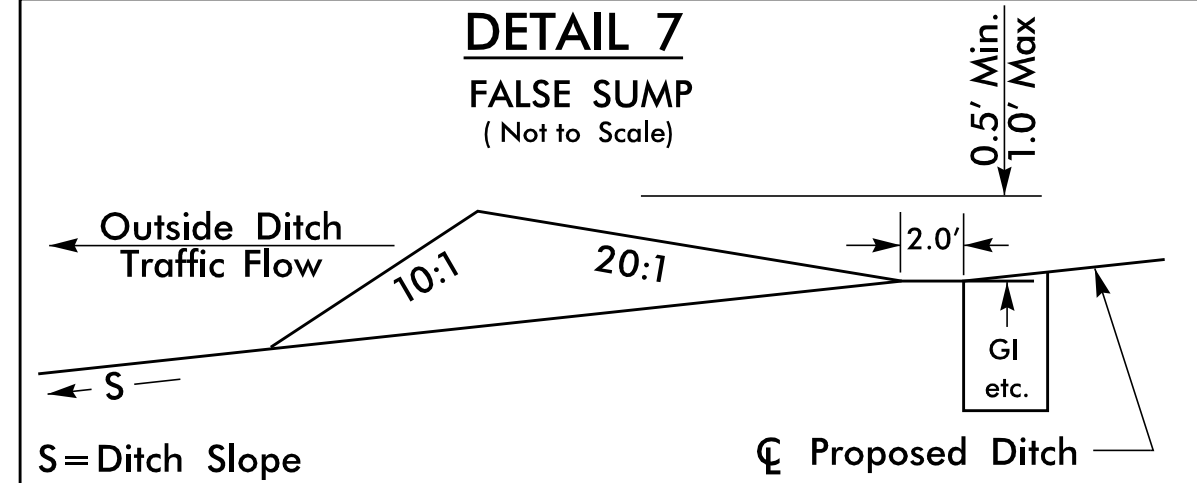
FROM STA. 72+50 TO STA. 73+00 -LA- (LT)
FROM STA. 17+74 TO STA. 19+23 -Y3- (RT)



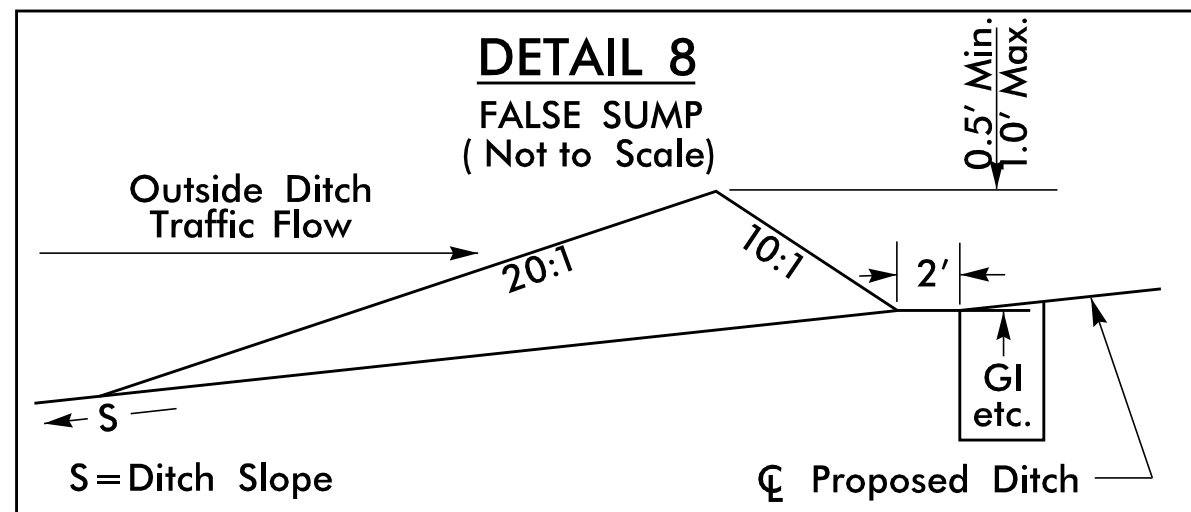
FROM STA. 73+50 TO STA. 74+75 -LA- (LT)



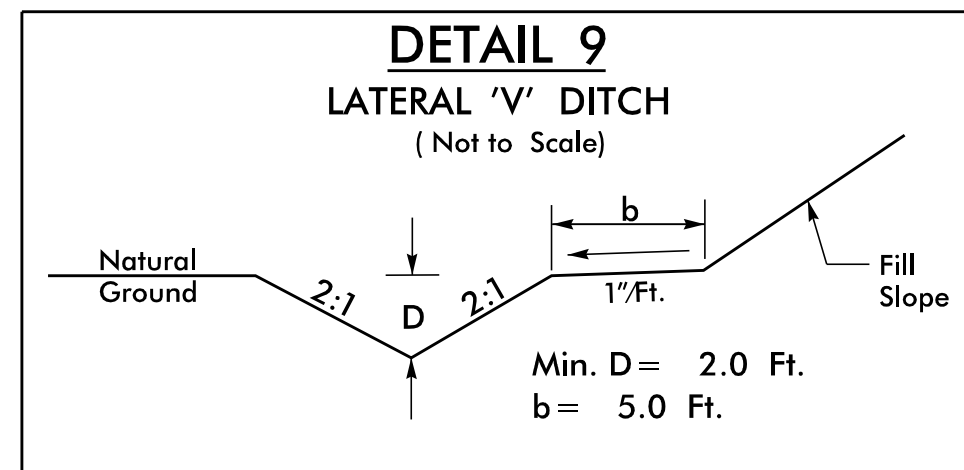
STA. 22+30 -Y3RPD- (LT)
STA. 23+50 -Y3RPD- (RT)



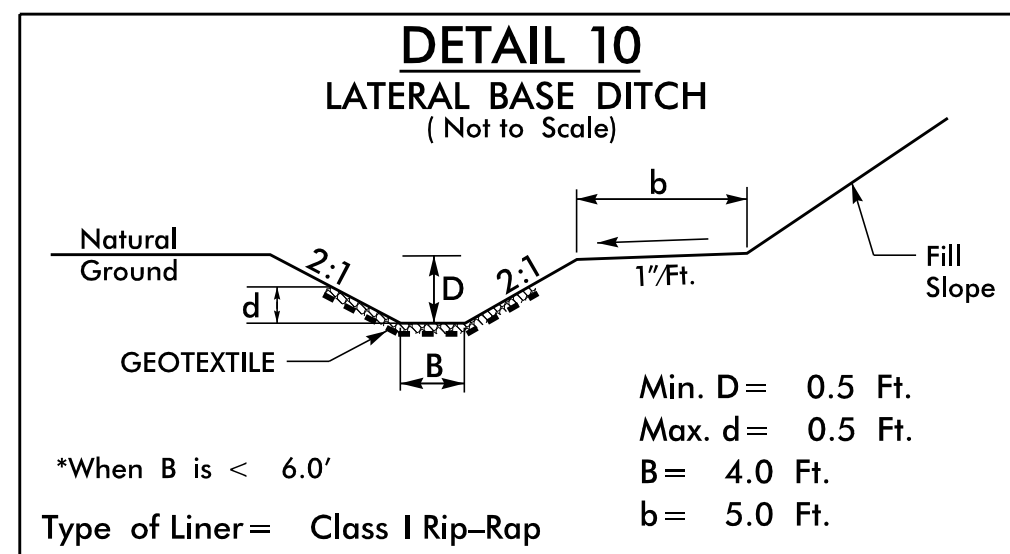
FROM STA. 72+54 TO STA. 72+69 -LA- (RT)
FROM STA. 120+04 TO STA. 120+19 -LA- (RT)
FROM STA. 109+31 TO STA. 109+46 -LA- (LT)
FROM STA. 18+54 TO STA. 18+69 -Y3LPD- (LT)
FROM STA. 22+04 TO STA. 22+19 -Y3LPD- (LT)
FROM STA. 23+42 TO STA. 23+57 -Y3LPD- (RT)
FROM STA. 12+80 TO STA. 12+95 -Y3LPA- (RT)
FROM STA. 13+56 TO STA. 13+71 -Y3LPA- (RT)
FROM STA. 14+56 TO STA. 14+71 -Y3LPA- (LT)
FROM STA. 15+81 TO STA. 15+96 -Y3LPA- (LT)
FROM STA. 11+81 TO STA. 11+96 -Y3RPD- (LT)



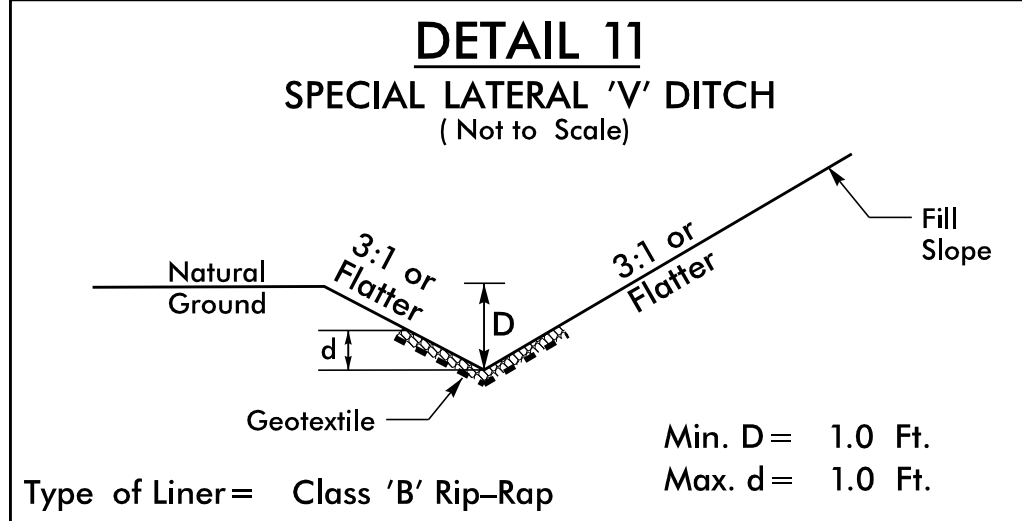
FROM STA. 73+04 TO STA. 73+19 -LA- (LT)
FROM STA. 83+31 TO STA. 83+46 -LA- (RT)
FROM STA. 96+49 TO STA. 96+64 -LA- (RT)
FROM STA. 108+31 TO STA. 108+46 -LA- (RT)
FROM STA. 20+04 TO STA. 20+19 -Y3RPD- (LT)
FROM STA. 18+54 TO STA. 18+69 -Y3RPD- (LT)
FROM STA. 15+56 TO STA. 15+71 -Y3RPA- (RT)
FROM STA. 17+06 TO STA. 17+21 -Y3RPA- (RT)
FROM STA. 17+06 TO STA. 17+21 -Y3RPA- (LT)
FROM STA. 20+27 TO STA. 20+45 -Y3RPA- (RT)



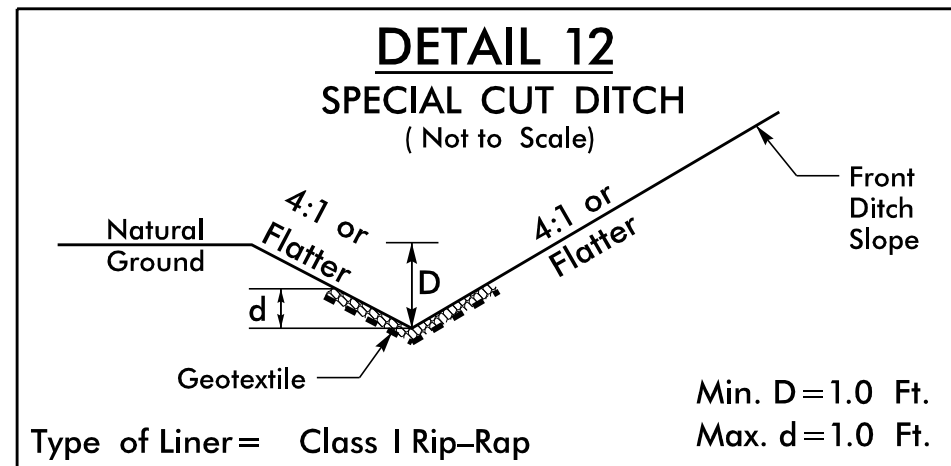
FROM STA. 75+00 TO STA. 79+00 -LA- (RT)



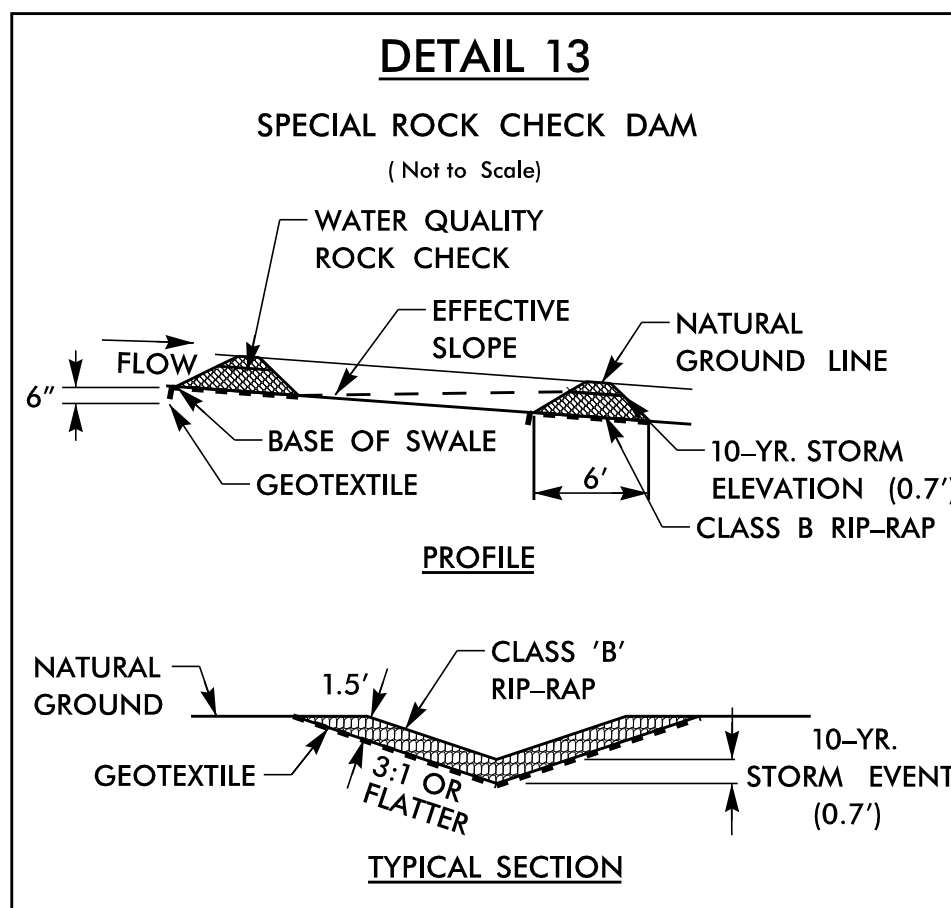
FROM STA. 80+75 TO STA. 81+77 -LA- (RT)



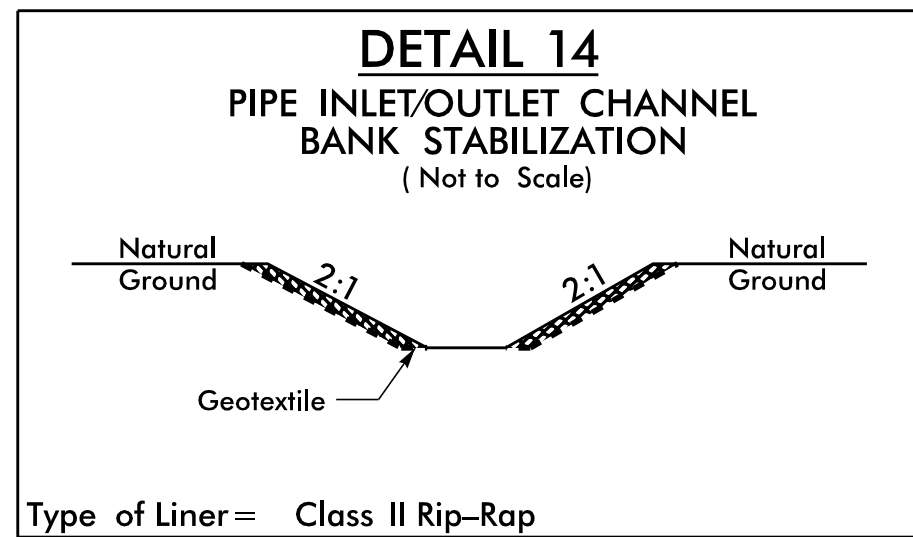
FROM STA. 113+50 TO STA. 114+50 -LA- (LT)
FROM STA. 24+50 TO STA. 27+50 -Y3RPD- (LT)
FROM STA. 19+23 TO STA. 21+00 -Y3- (RT)
FROM STA. 17+74 TO STA. 21+50 -Y3- (LT)



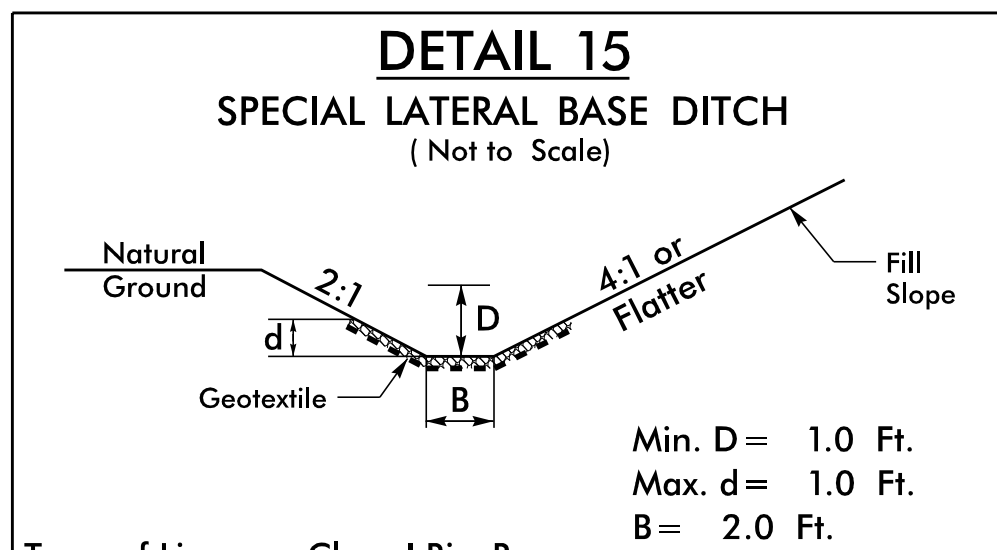
FROM STA. 19+50 TO STA. 20+00 -Y3RPD- (RT)
FROM STA. 23+00 TO STA. 23+38 -Y3LPD- (LT)



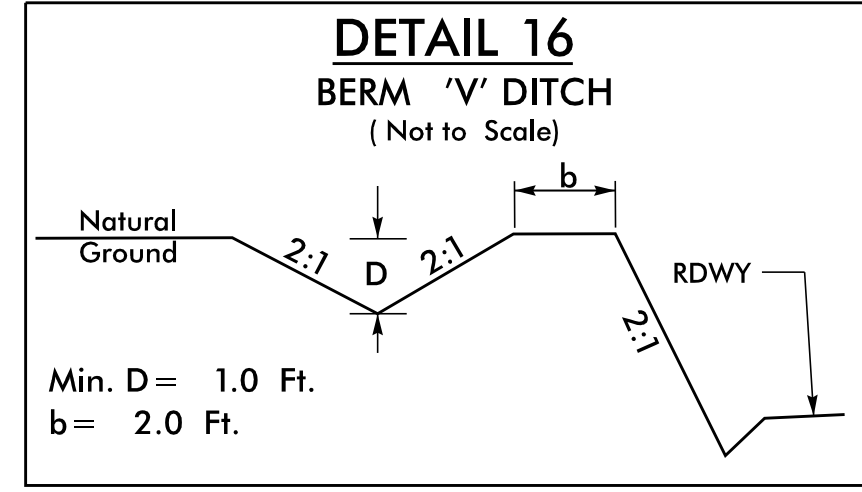
FROM 64+00 TO STA 66+00 -LA- (RT)



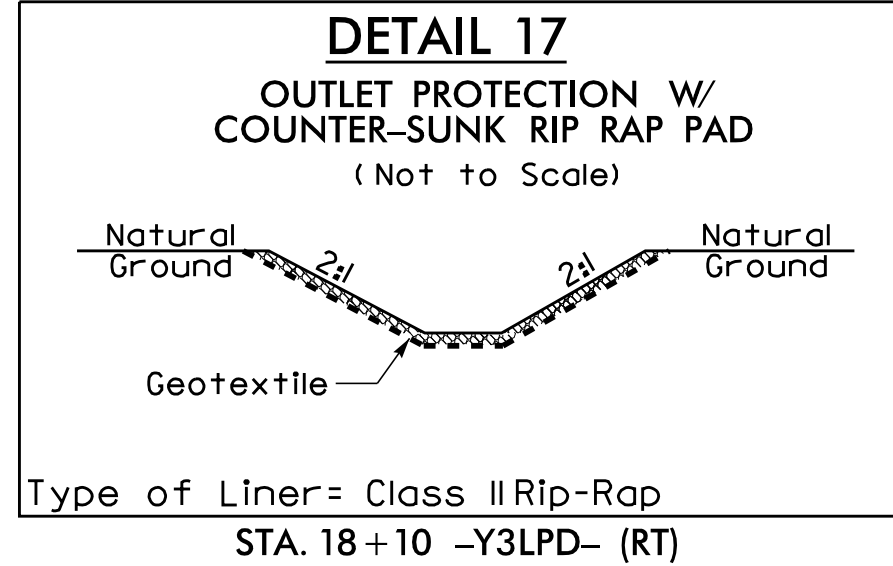
STA. 22+45 -Y3RPD- (LT)
STA. 25+92 -Y3LPD- (RT)



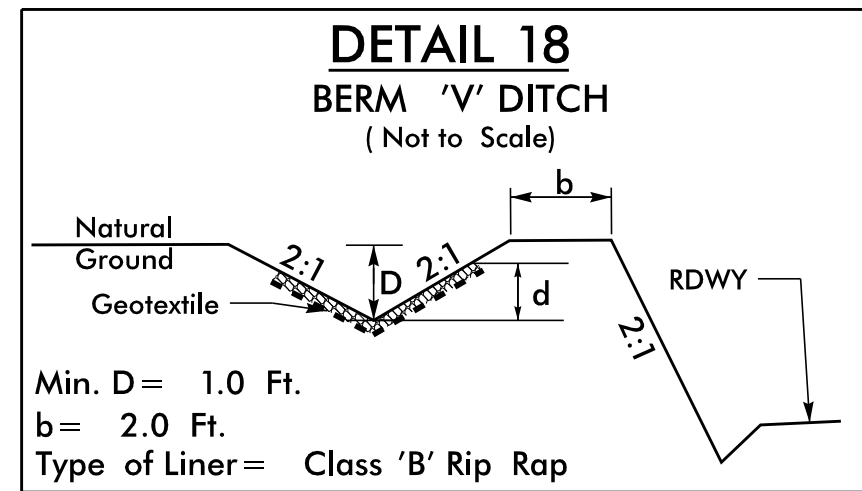
FROM STA. 22+30 TO STA. 23+00 -Y3RPD- (LT)



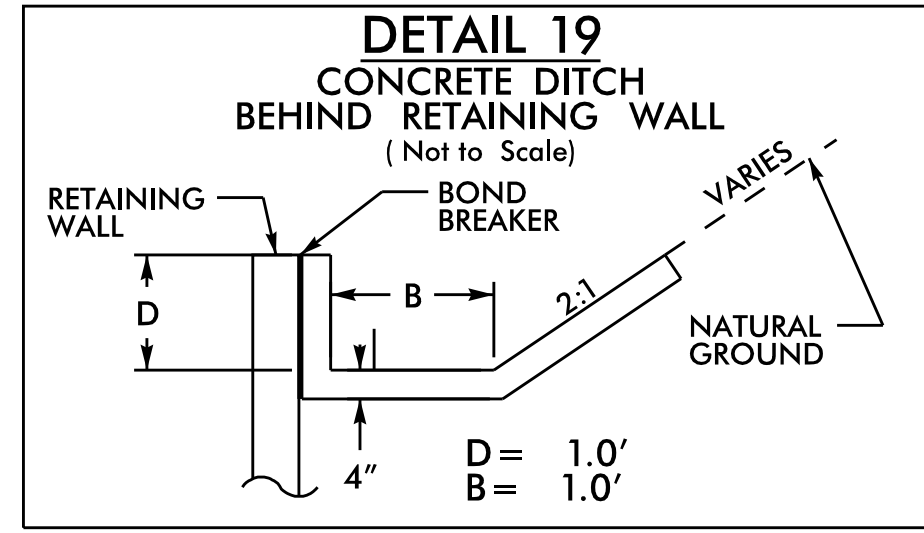
FROM STA. 14+00 TO STA. 15+00 -Y3RPA- (RT)



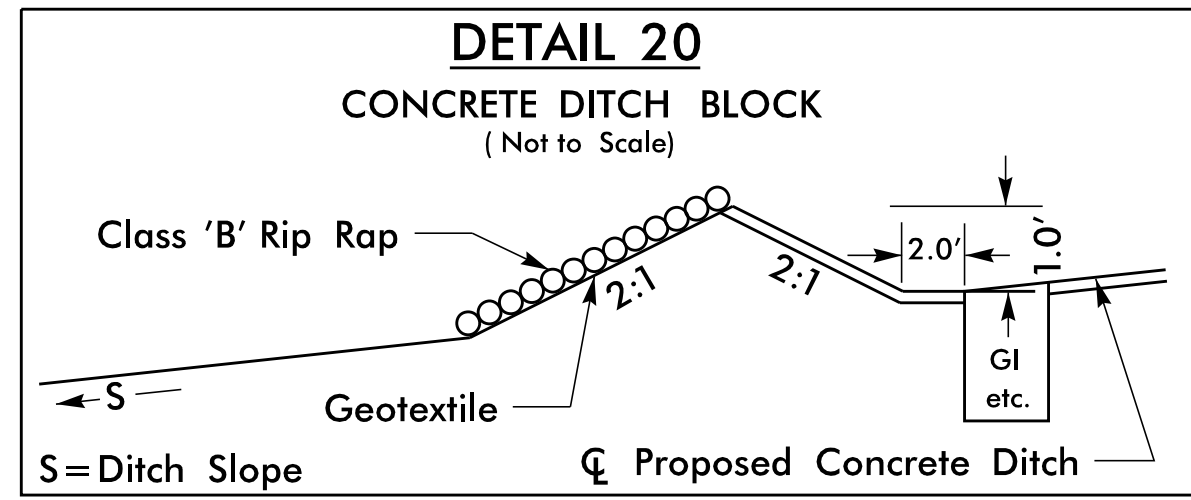
STA. 18+10 -Y3LPD- (RT)



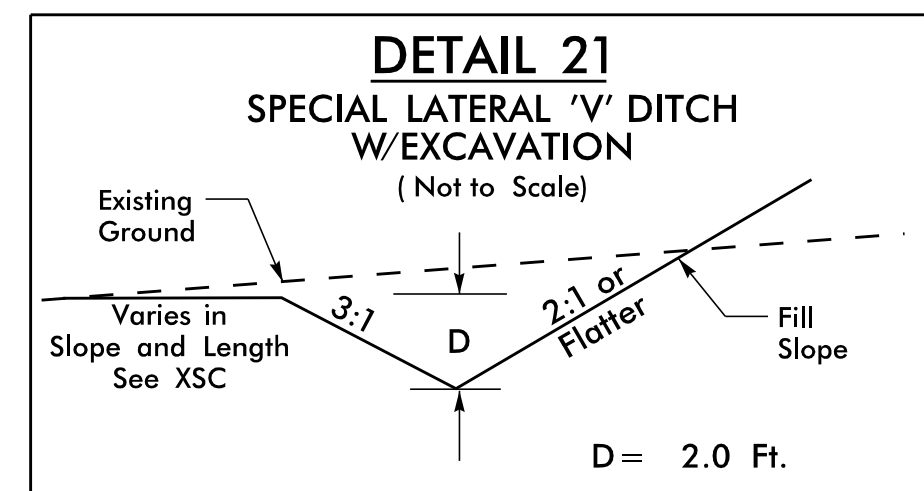
FROM STA. 15+00 TO STA. 17+25 -Y3RPA- (RT)
FROM STA. 17+25 TO STA. 19+00 -Y3RPA- (RT)



FROM STA. 11+82 TO STA. 13+56 -Y3RPA- (RT)

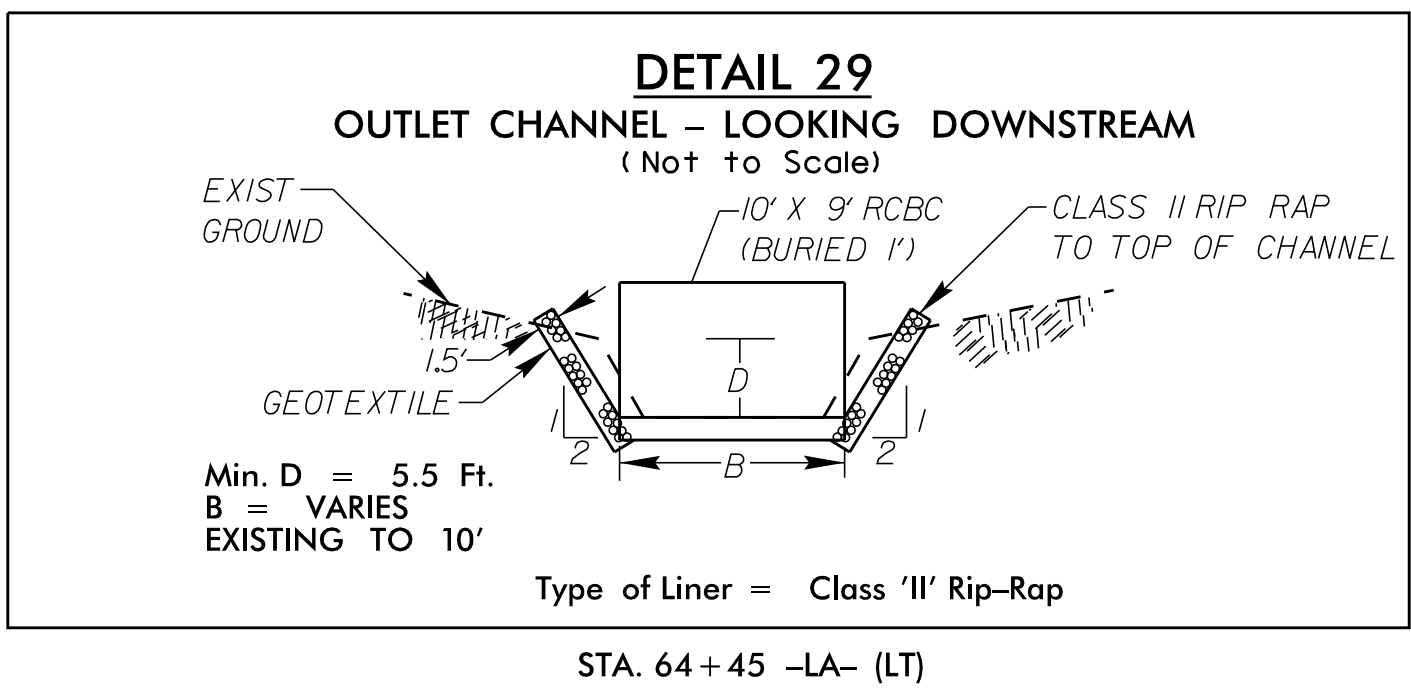
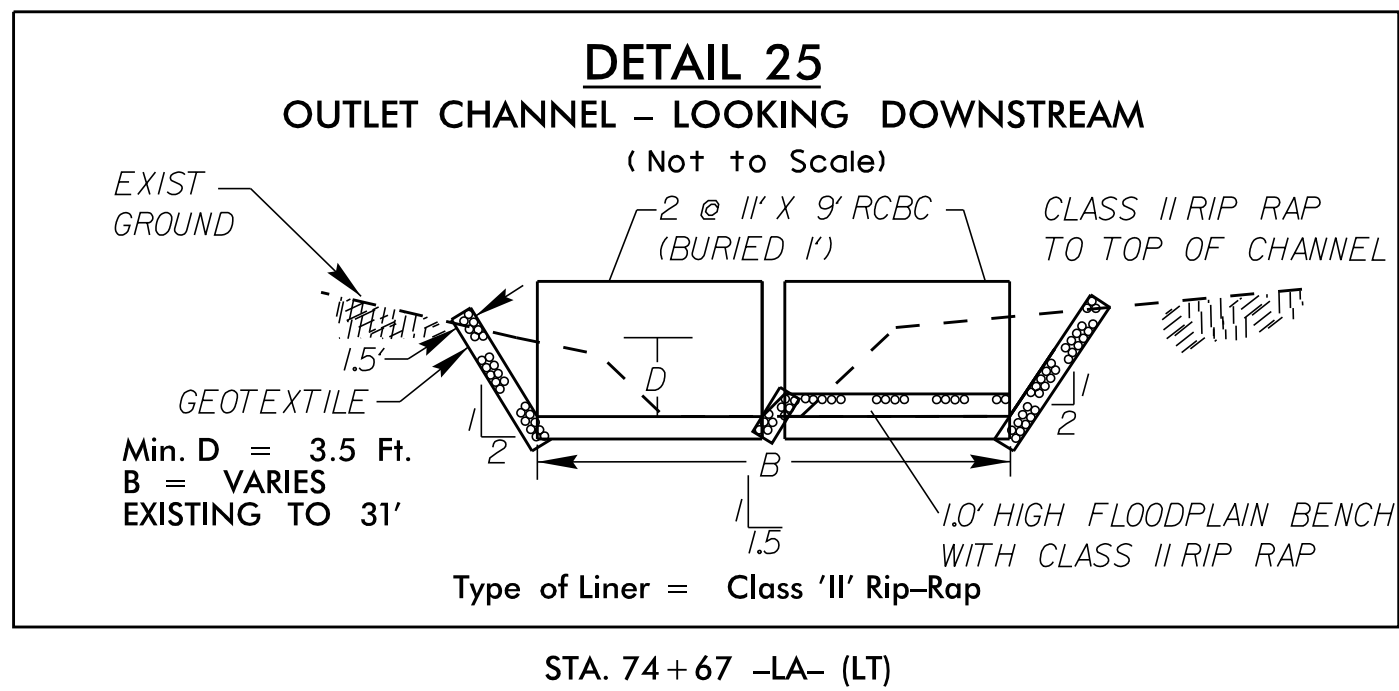
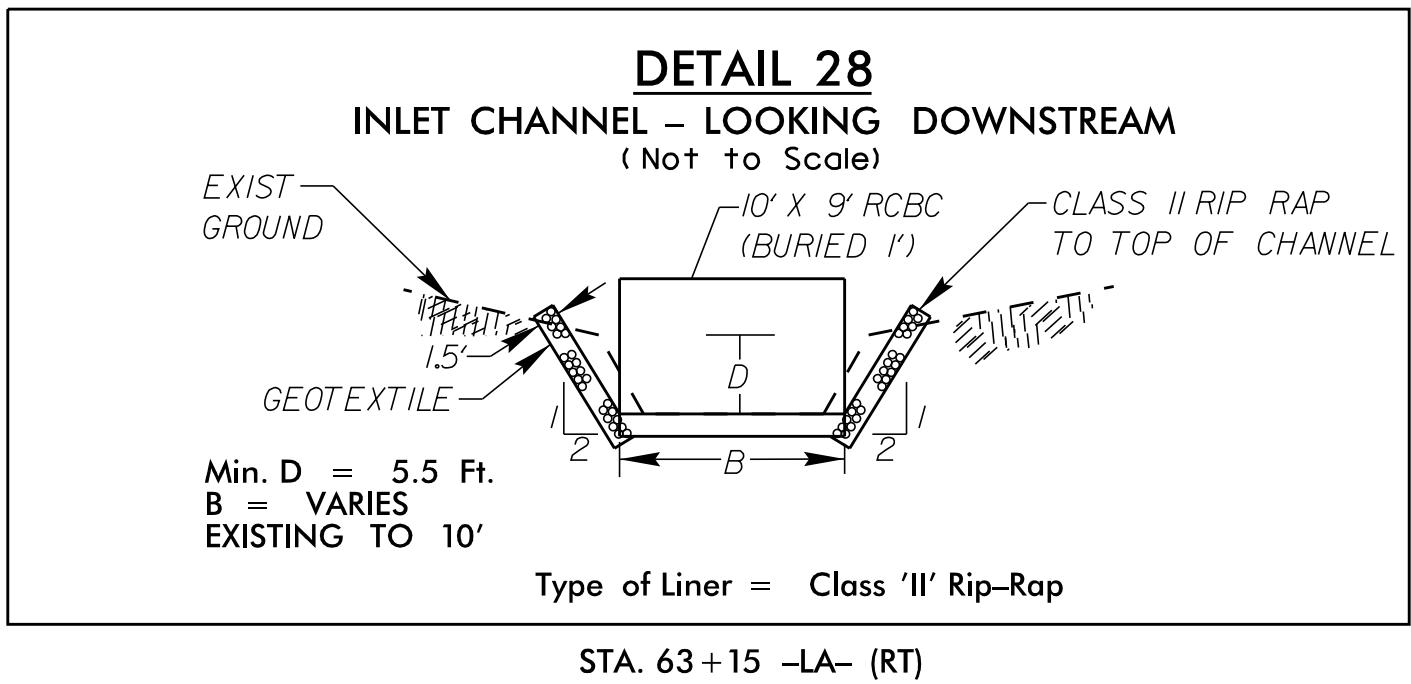
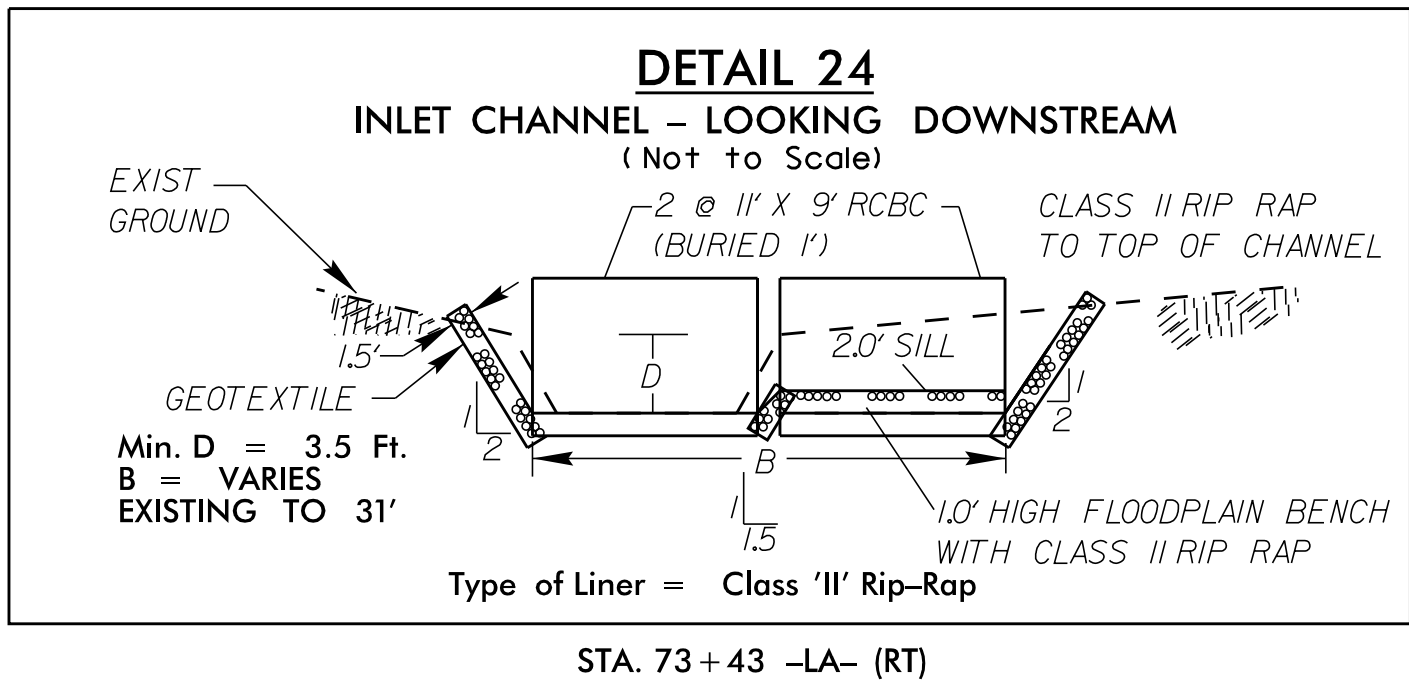
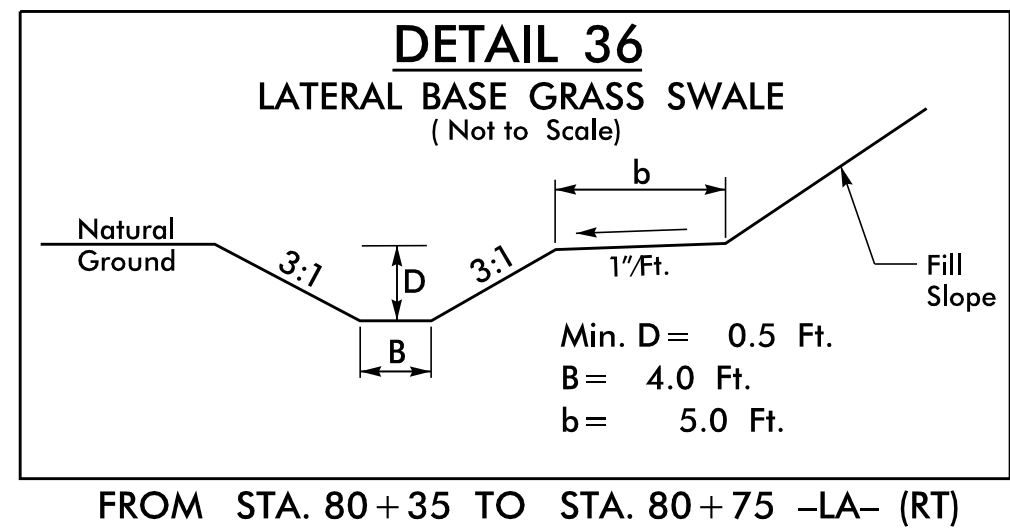
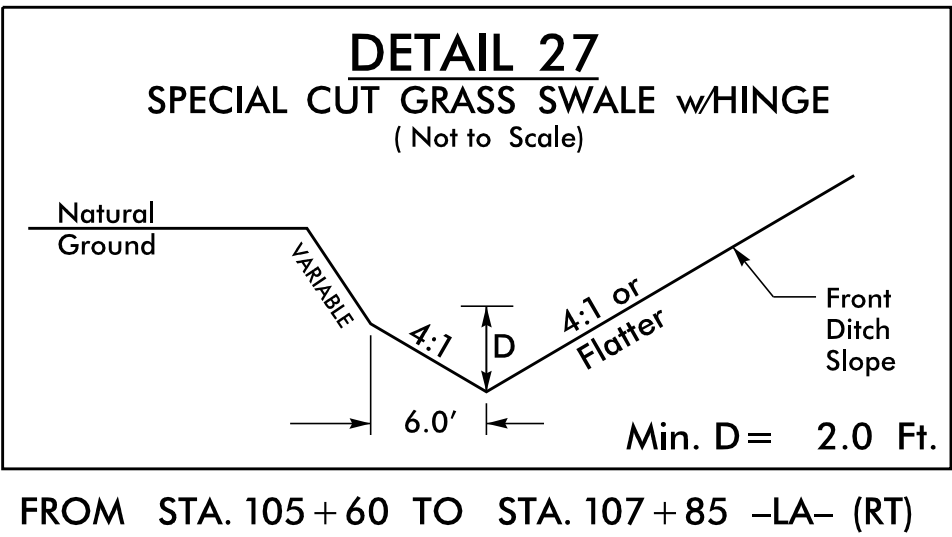
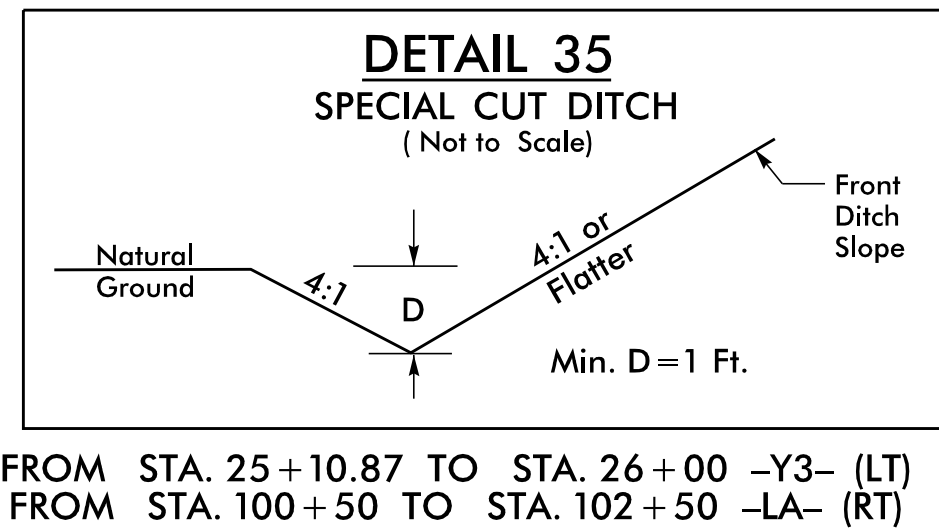
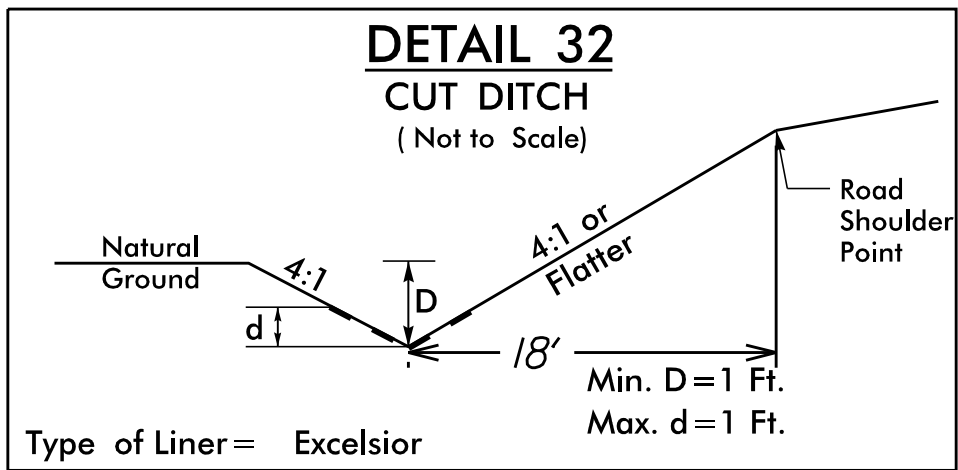
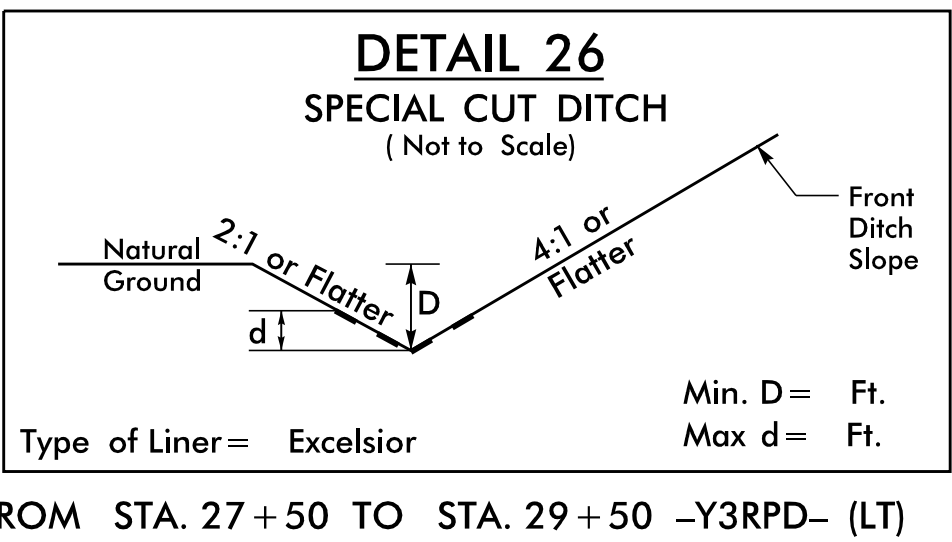
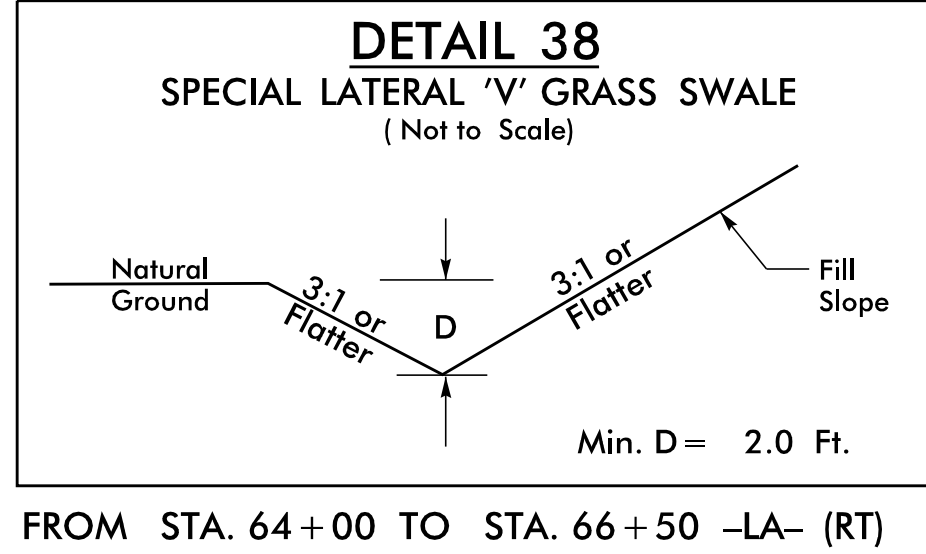
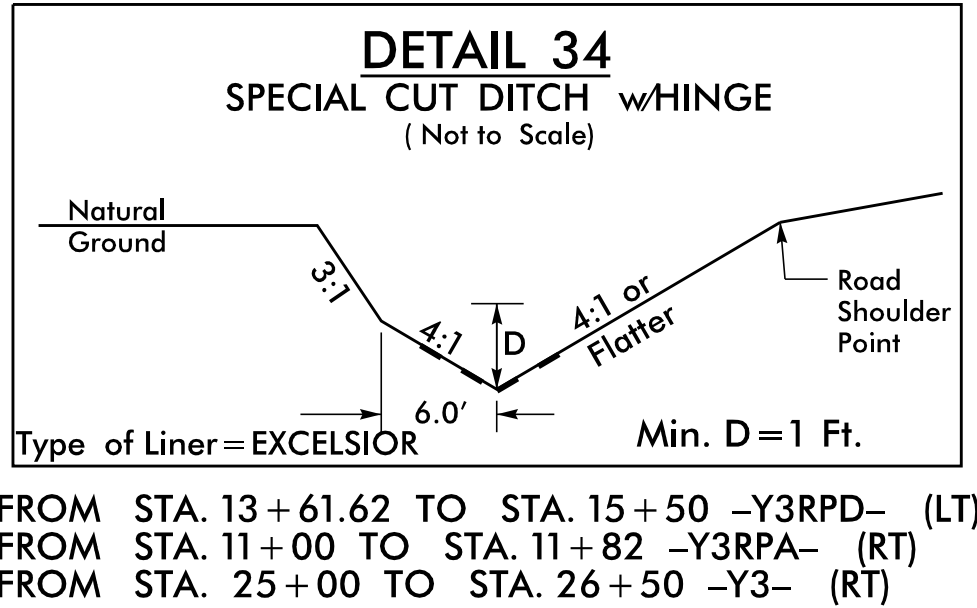
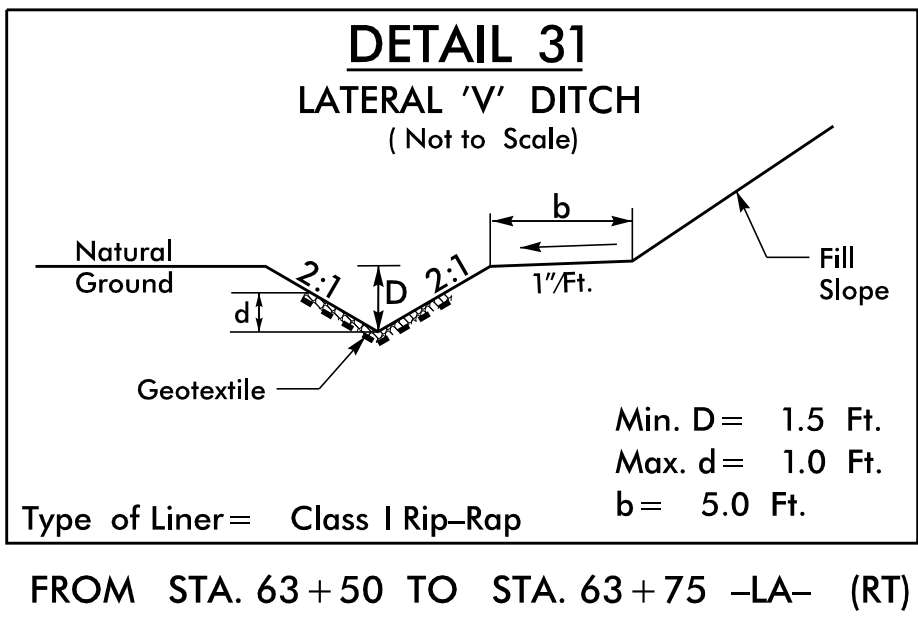
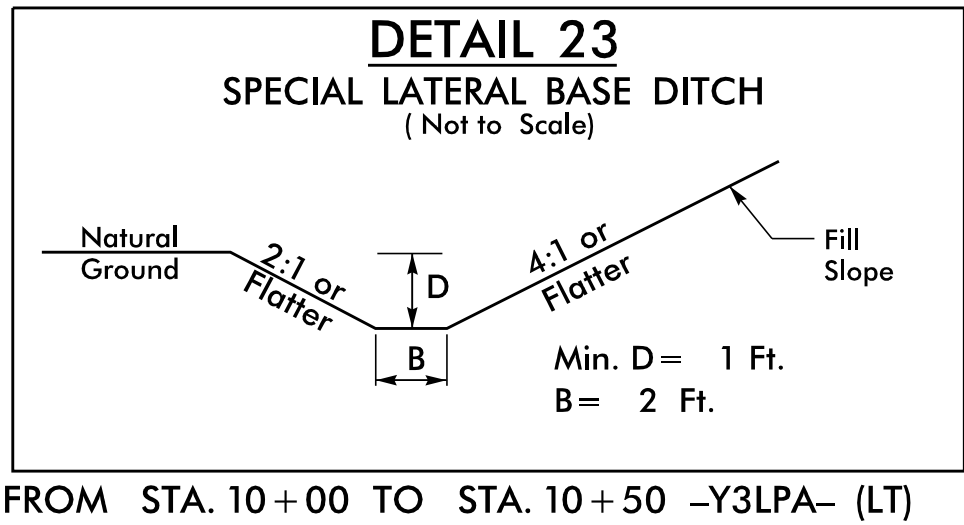
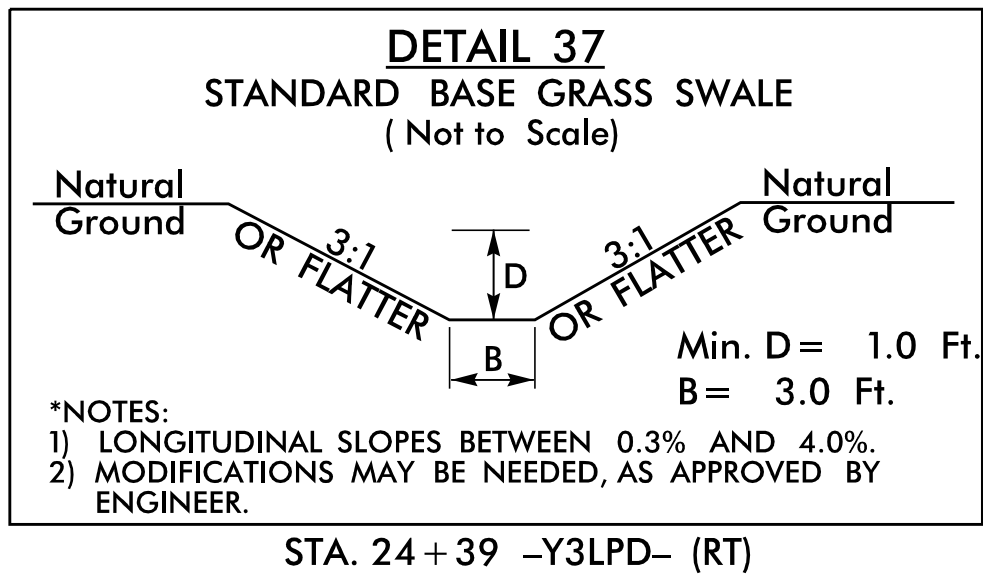
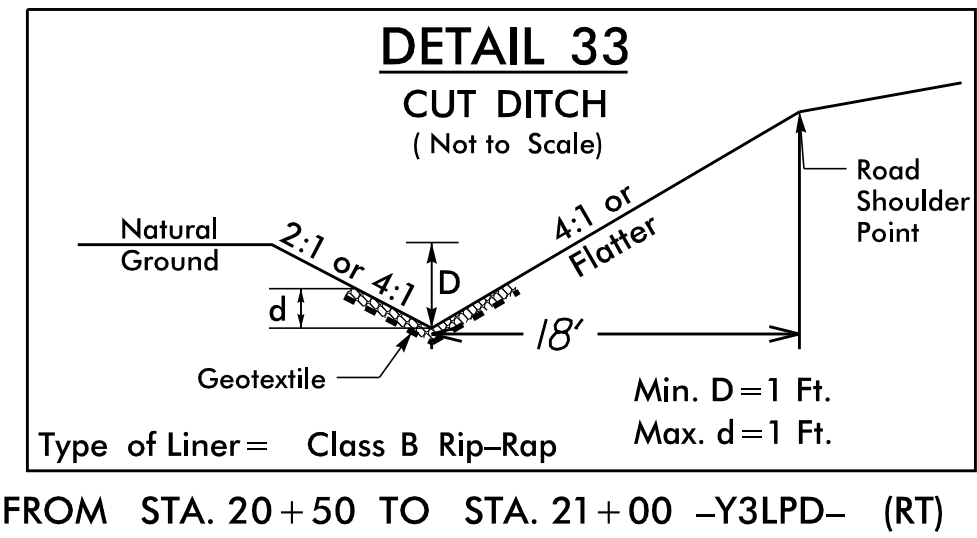
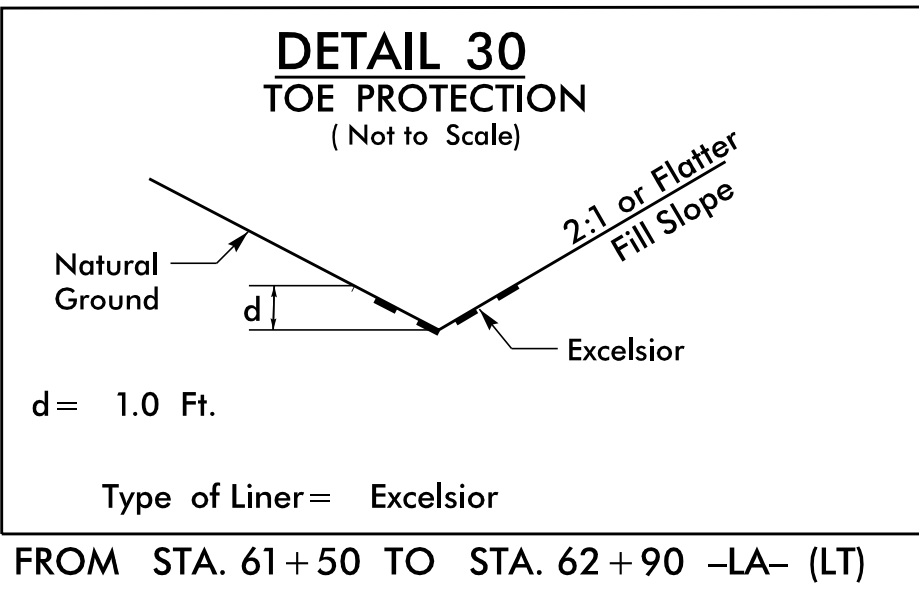
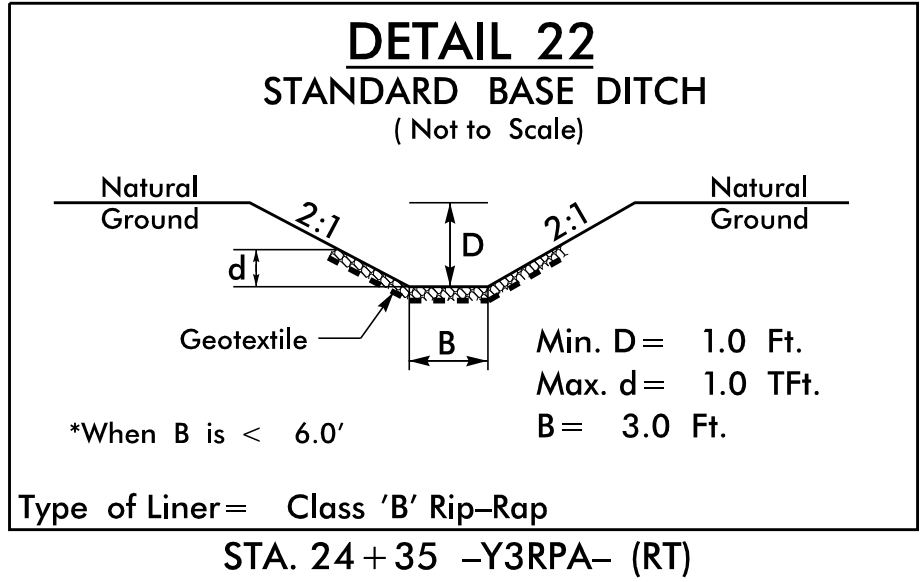


STA. 11+82 -Y3RPA- (RT)
STA. 13+56 -Y3RPA- (RT)



FROM STA. 28+70 TO STA. 31+00 -Y3- (RT)

FINAL ROADWAY PLANS	PROJECT REFERENCE NO.		SHEET NO.	
	R-2635D		2D-2	
	ROADWAY DESIGN ENGINEER		HYDRAULIC DESIGN ENGINEER	
	DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
	BLYTHE			
Kimley»»Horn				





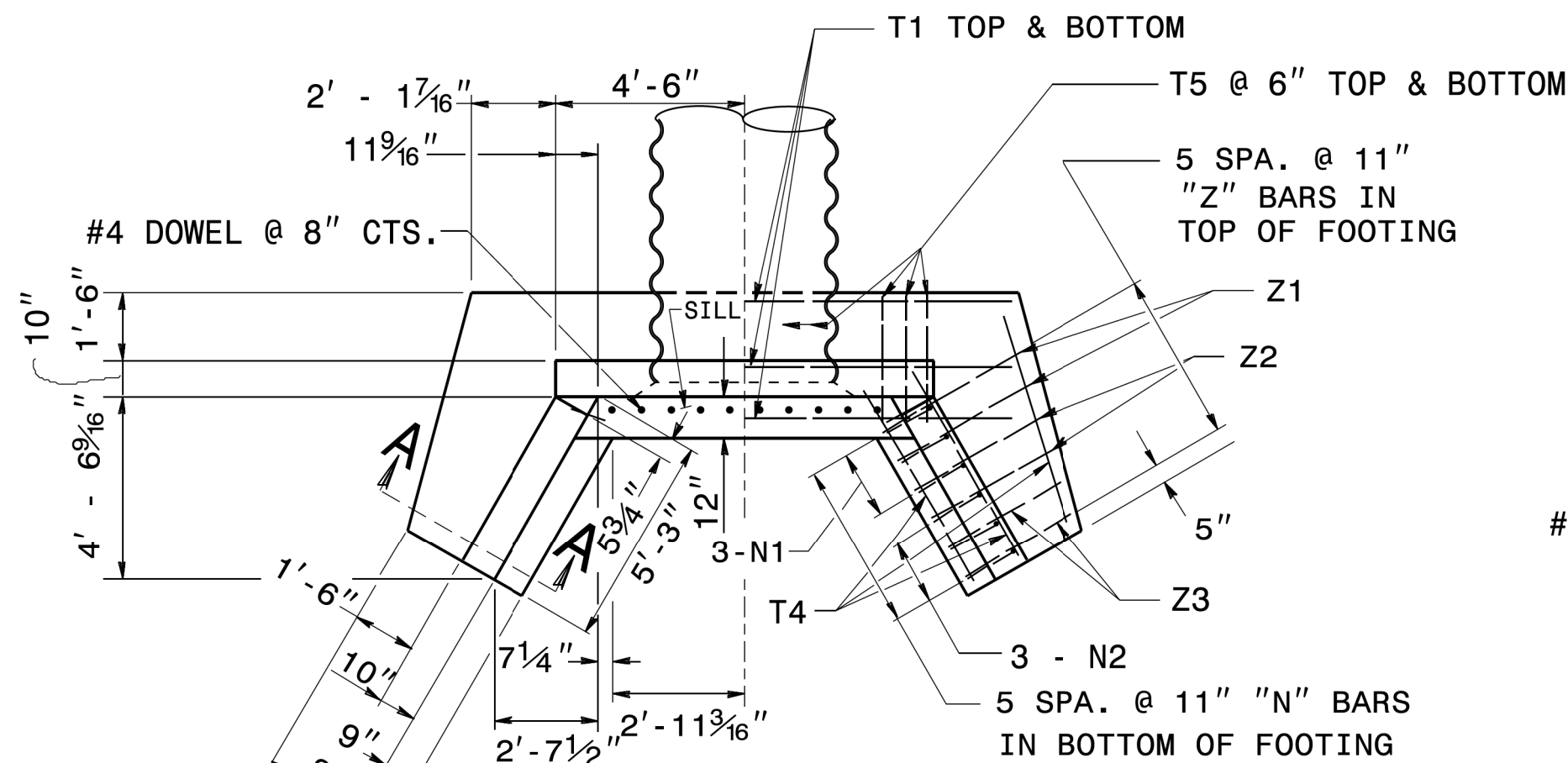
Kimley»Horn

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

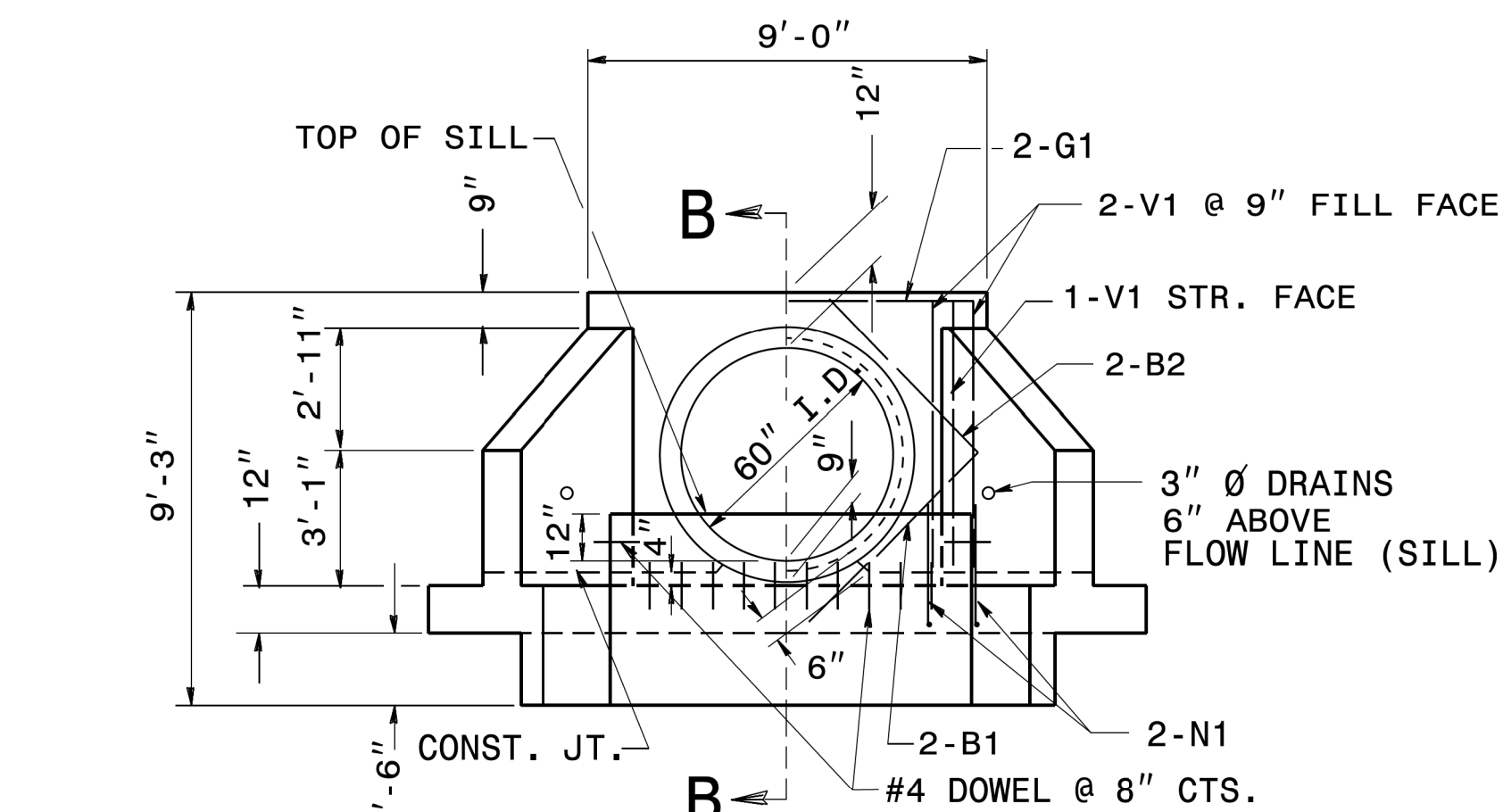
1-02

ENGLISH STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL SILL
FOR SINGLE 60" PIPE - 90° SKEW

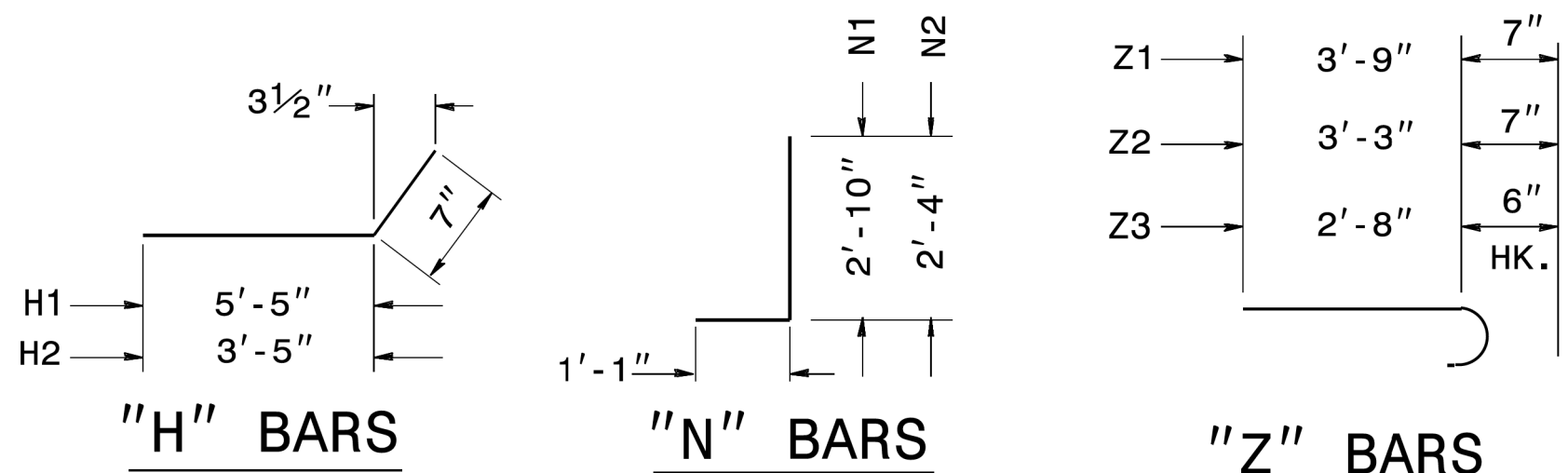
SHEET 1 OF 1
838D27



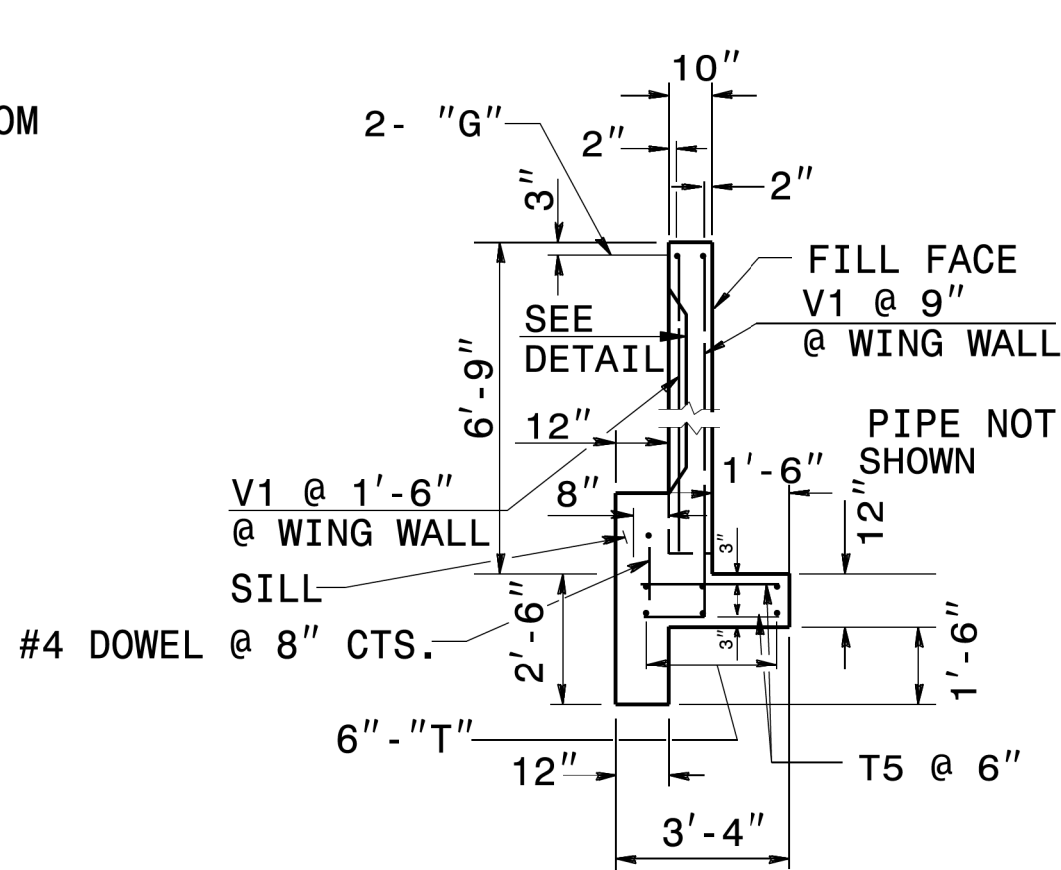
PLAN



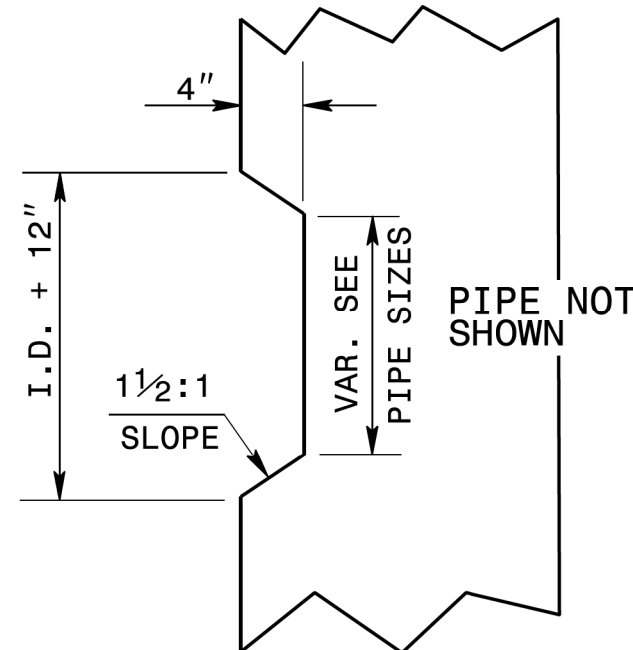
ELEVATION



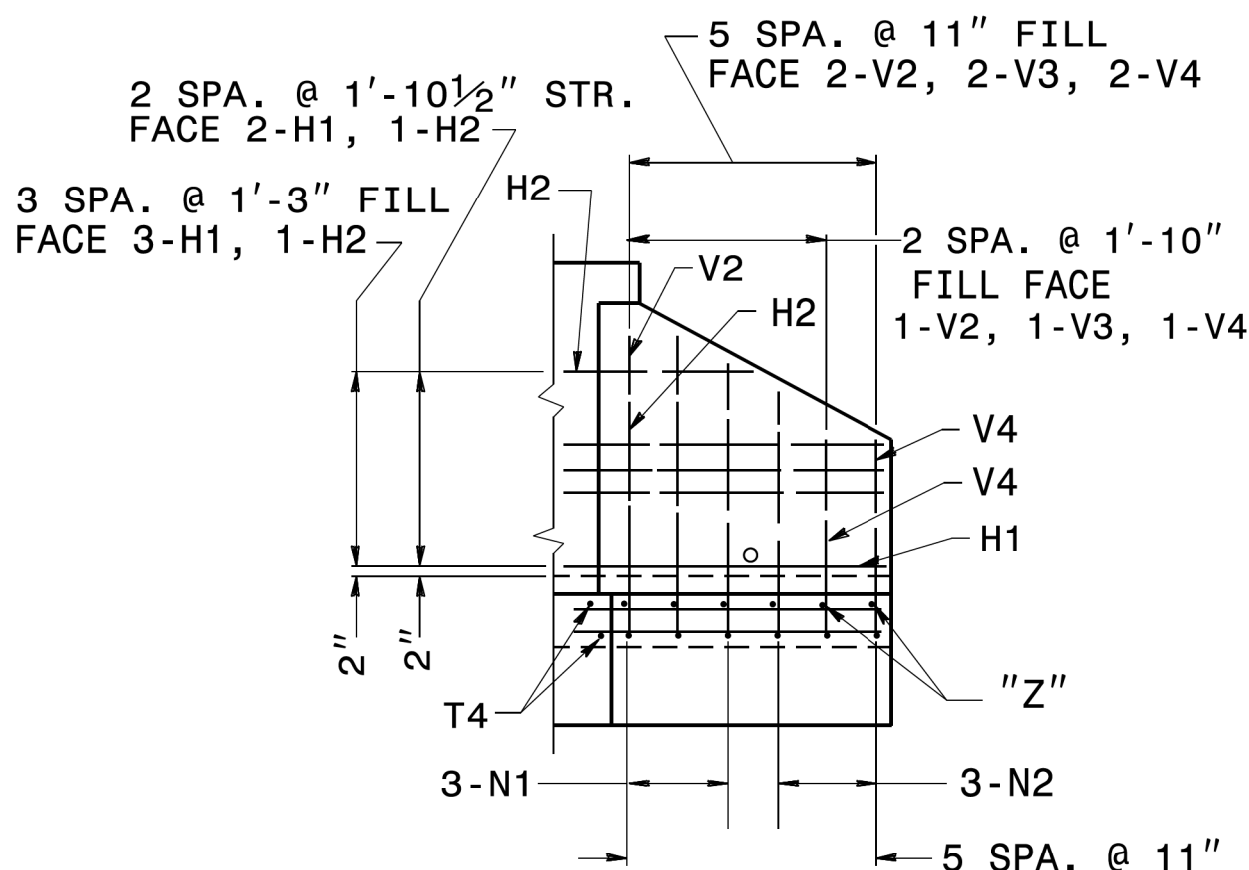
"H", "N", & "Z" BAR DIMENSIONS
ARE OUT TO OUT.



SECTION - BB

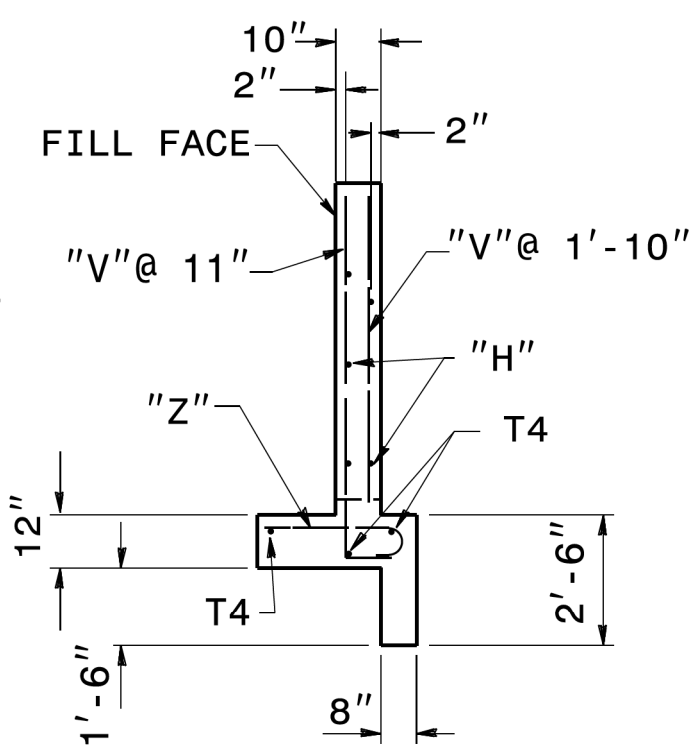


TAPER DETAIL



WING ELEVATION

SEE STD. # 838.45 FOR GENERAL NOTES.



SECTION - AA

BILL OF MATERIAL FOR ENDWALL				
REINF. STEEL			1 PIPE	
BAR	SIZE	LENGTH	NO.	WEIGHT
B1	#4	5'-6"	4	15
B2	#4	4'-6"	4	12
G1	#7	8'-8"	2	35
H1	#4	6'-0"	10	40
H2	#4	4'-0"	4	11
N1	#5	3'-11"	10	41
N2	#4	3'-5"	6	14

T1	#4	12'-8"	6	51
T4	#4	5'-6"	6	22
T5	#4	2'-6"	36	60
V1	#4	6'-3"	6	25
V2	#4	5'-1"	6	20
V3	#4	3'-11"	6	16
V4	#4	2'-9"	6	11
Z1	#5	4'-4"	4	18
Z2	#4	3'-10"	4	10
Z3	#4	3'-2"	4	8
DOWEL #4		1'-0"	12	8

REINF. STEEL LBS.	417
CON./C.S. CU. YDS	6.5

1-02

STATE OF
NORTH CAROLINA
DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
RALEIGH, N.C.

ENGLISH STANDARD DRAWING FOR
REINFORCED CONCRETE ENDWALL SILL
FOR SINGLE 60" PIPE - 90° SKEW

SHEET 1 OF 1
838D27

CONTRACT STANDARDS & DEVELOPMENT UNIT
STANDARDS AND SPECIAL DESIGN
Office 919-250-4128 FAX 919-250-4119

**DETAIL OF REINFORCED
CONCRETE ENDWALL SILL**

ORIGINAL BY: _____ DATE: _____
MODIFIED BY: nbritt DATE: 08-25-05
CHECKED BY: _____ DATE: _____
FILE SPEC.: details/nbritt/english/rural/r3421ccconcendwallsill.dgn

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
3B-1

ROADWAY DESIGN
ENGINEER



DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

"N" = DISTANCE FROM EDGE OF LANE TO FACE OF GUARDRAIL.
TOTAL SHOULDER WIDTH = DISTANCE FROM EDGE OF TRAVEL LANE TO SHOULDER BREAK POINT.
FLARE LENGTH = DISTANCE FROM LAST SECTION OF PARALLEL GUARDRAIL TO END OF GUARDRAIL.
W = TOTAL WIDTH OF FLARE FROM BEGINNING OF TAPER TO END OF GUARDRAIL.
G = GATING IMPACT ATTENUATOR TYPE 350
NG = NON-GATING IMPACT ATTENUATOR TYPE 350

GUARDRAIL SUMMARY

SURVEY LINE	BEG. STA.	END STA.	LOCATION	LENGTH			WARRANT POINT		"N" DIST. FROM E.O.L.	TOTAL SHOULDER WIDTH	FLARE LENGTH		W		ANCHORS										IMPACT ATTENUATOR TYPE 350			TERMINAL SECTIONS	REMOVE AND RESET EXISTING GUARDRAIL	REMOVE EXISTING GUARDRAIL	REMARKS
				STRAIGHT	SHOP CURVED	DOUBLE FACED	APPROACH END	TRAILING END			APPROACH END	TRAILING END	APPROACH END	TRAILING END	XI MOD	B-77	GRAU 350	TEMP GRAU 350	TYPE III	CAT-1	VI MOD	BIC	AT-1	EA	G	NG					
-LA-	57 + 07.00	59 + 19.50	LT	212.50				56 + 95.41	14'	17'	50		1				1									162.50	53				
-LA-	62 + 21.00	67 + 39.75	RT	518.75					14'	17'									1							412.50	108	100' DOUBLED POSTS			
-LA-	62 + 88.75	65 + 20.00	LT	231.25					14'	17'									1							225.00	10				
-LA-	66 + 35.75	68 + 67.00	LT	231.25					14'	17'	50		1				1		1							75.00	140	100' DOUBLED POSTS			
-LA-	71 + 30.00	82 + 48.75	RT	1118.75					14'	17'	50		1				1		1							1062.50	56				
-LA-	73 + 10.00	86 + 28.75	LT	1318.75					14'	17'	50		1				1		1							1262.50	159				
-LA-	83 + 91.25	86 + 10.00	MED (LT)	218.75				84 + 15.00	14'	17'	50		1				1		1												
-LA-	86 + 38.00	88 + 56.75	MED (RT)	218.75				88 + 41.00	14'	17'	50		1				1		1												
-LA-	86 + 47.35	89 + 16.10	RT	268.75				88 + 41.00	14'	17'	50		1			1	1									175.00	65				
-LA-	100 + 99.58	103 + 30.83	RT	231.25				102 + 92.00	12'	15'	50		1			1	1									125.00	72				
-LA-	102 + 09.75	102 + 87.00	MED (LT)	77.25				102 + 92.00	VARIES	VARIES						1							1		1						
-LA-	102 + 30.75	102 + 87.00	MED (RT)	56.25				102 + 92.00	VARIES	VARIES						1															
-LA-	104 + 42.28	109 + 61.03	LT	518.75				105 + 90.00	14'	17'	50		1			1	1														
-LA-	104 + 45.00	105 + 22.25	MED (LT)	77.25			104 + 45.00		VARIES	VARIES						1							1		1						
-LA-	104 + 45.00	105 + 01.25	MED (RT)	56.25				104 + 45.00	VARIES	VARIES						1															
-LA-	105 + 73.75	108 + 05.00	MED (LT)	231.25				105 + 90.00	14'	17'	50		1				1		1												
-LA-	121 + 42.13	125 + 42.13	RT	400.00					14'	17'	50		1				1									187.50	58				
-LA-	122 + 38.07	128 + 94.32	LT	656.25				122 + 70.00	14'	17'									1							650.00	13				
-Y3-	26 + 55.70	26 + 76.70	LT	21.00				26 + 76.70	11'-9"	N/A													1		1						
-Y3-	28 + 87.93	32 + 81.68	LT	393.75			32 + 81.68		VARIES	VARIES		50		1			1		1							325.00	121				
-Y3-	30 + 47.63	32 + 66.38	RT	218.75				32 + 66.38	7'	17'	50		1				1		1							150.00	173				
-Y3-	36 + 22.78	38 + 41.53	LT	218.75			36 + 22.78		VARIES	VARIES	50		1				1		1							150.00	416	REMOVAL LT & RT			
-Y3-	40 + 58.15	40 + 79.15	LT	21.00				40 + 58.15	11'-9"	N/A												1		1							
-Y3RPA-	19 + 81.30	20 + 02.30	LT	21.00				20 + 02.30	VARIES	N/A													1		1						
-Y3LPA-	18 + 77.76	20 + 46.51	LT	168.75				19 + 53.00	12'	15'							1		1										112.50' DOUBLED POSTS		
-Y3LPA-	20 + 03.00	20 + 24.00	RT	21.00				20 + 03.00	VARIES	VARIES													1		1						
-Y3RPD-	25 + 29.05	25 + 50.05	RT	21.00				25 + 29.05	VARIES	N/A													1		1						
-Y3LPD-	17 + 06.00	19 + 24.75	LT	218.75				18 + 56.00	12'	15'	50		1				1		1										162.50' DOUBLED POSTS		
-Y3LPD-	17 + 06.00	19 + 24.75	RT	218.75				18 + 56.00	12'	15'	50		1				1		1												
-Y3LPD-	25 + 39.79	25 + 60.79	RT	21.00			25 + 60.79		4'-9"	N/A													1		1				162.50' DOUBLED POSTS		
			SUBTOTAL	8205.50													7	17		3	11				8		8		4962.50	1444	
	LESS ANCHOR DEDUCTIONS																														
	GRAU 350	17 @ 50'	=	850.00																											
	B-77	7 @ 18.75'	=	131.25																											
	TYPE III	3 @ 18.75'	=	56.25																											
	CAT-1	12 @ 6.25'	=	75.00																											
	I. A. 350	8 @ 21'	=	168.00																											
	LESS RESET GUARDRAIL			=	4962.50																										
			TOTAL	1962.50																											
			SAY	1975																											

ADDITIONAL GUARDRAIL POSTS = 10 EA

PROJ. REFERENCE NO.	SHEET NO.
R-2635D	3P-1

[illegible][illegible]

STATE OF NORTH CAROLINA

DIVISION OF HIGHWAYS

RIGHT OF WAY DATA SHEET

PARCEL NO.	PROPERTY OWNER NAME	TOTAL ACREAGE	ROW AREA TAKEN	C/A AREA TAKEN	AREA REMAINING RIGHT	AREA REMAINING LEFT	CONSTR. EASEMENT	PERMANENT DRAINAGE EASEMENT	TEMPORARY DRAINAGE EASEMENT	PERMANENT UTILITY EASEMENT
1	LOW RIDGE LLC	25.51 AC	1.85 AC			23.66 AC				668 SF
2	WAKE COUNTY	21.82 AC	2.11 AC		19.71 AC					0.41 AC
3	WILLIAM J SOWTER & SHERYL R. SOWTER	29.61 AC	0.19 AC	1.22 AC		28.20 AC				
4Z	HH TRINITY APEX INVESTMENTS,LLC	22.76 AC	529 SF	2433 SF	22.69 AC					0.14 AC
5Z	HH TRINITY APEX INVESTMENTS,LLC	22.43 AC								4296 SF
6AZ	HH TRINITY APEX INVESTMENTS,LLC	17.39 AC					0.17 AC			2147 SF
6BZ	HH TRINITY APEX INVESTMENTS,LLC	32.25 AC					0.79 AC		2.77 AC	2580 SF
6CZ	HH TRINITY APEX INVESTMENTS,LLC	7.32 AC						2252 SF		
6DZ	HH TRINITY APEX INVESTMENTS,LLC	27.26 AC						4338 SF	3.87 AC	0.59 AC
7	VERIDEA HOLDINGS LLC	13.00 AC	0.43 AC			12.57 AC				0.13 AC
8	BRENDA P. WHITEHOUSE	27.59 AC	0.26 AC		27.33 AC			1161 SF		838 SF
9	ROGER W.BUSHEE & GLENDA K.BUSHEE	3.00 AC	0.23 AC		2.77 AC					237 SF
10	HH TRINITY APEX INVESTMENTS,LLC	57.27 AC					419 SF			
11	HH TRINITY APEX INVESTMENTS,LLC	41.27 AC					803 SF			

NAD 83/NSRS 2007

BEGIN TIP PROJECT R-2635D
BEGIN CONSTRUCTION
-LA- POT Sta.57+07.00
TIE TO EXIST GUARDRAIL



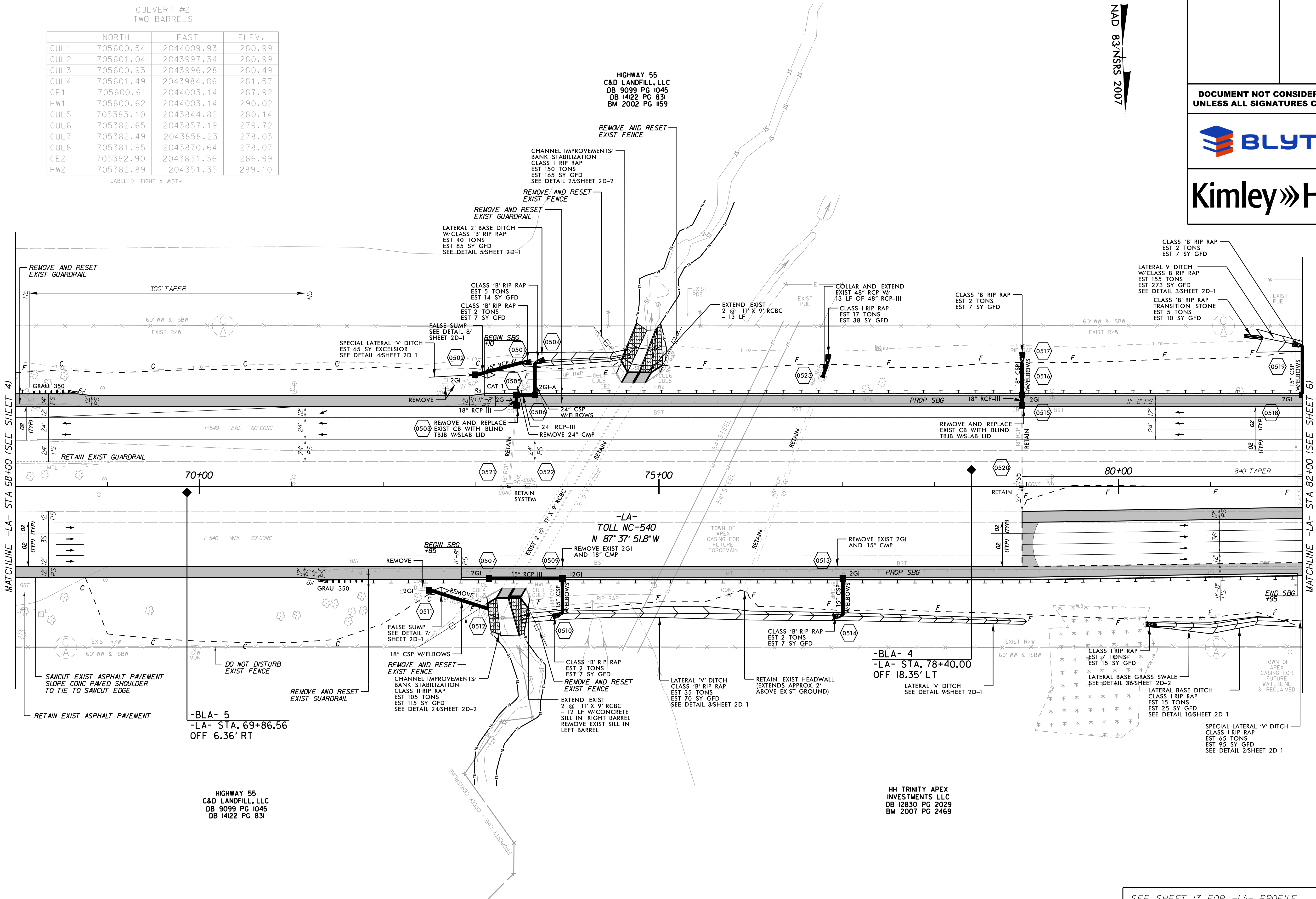
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT
IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY
NCDOT FOR MONUMENT "R2635D-43"
WITH NAD 83/NA 2011 STATE PLANE GRID COORDINATES OF
NORTHING: 705617.3920(ft) EASTING: 2041588.2019(ft)
ELEVATION: 320.64(ft)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT
(GROUND TO GRID) IS: 0.9998902757
THE N.C. LAMBERT GRID BEARING AND
LOCALIZED HORIZONTAL GROUND DISTANCE FROM
"R2635D-43" TO L- STATION 57+00.00 IS
S 87° 14' 23.49" E 4049.68'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NAVD 88

SEE SHEET 13 FOR -LA- PROFILE
SEE SHEETS C-1THRU C-X FOR CULVERT PLANS

CULVERT #2
TWO BARRELS

	NORTH	EAST	ELEV.
CUL1	705600.54	2044009.93	280.99
CUL2	705601.04	2043997.34	280.99
CUL3	705600.93	2043996.28	280.49
CUL4	705601.49	2043984.06	281.57
CE1	705600.61	2044003.14	287.92
HW1	705600.62	2044003.14	290.02
CUL5	705383.10	2043844.82	280.14
CUL6	705382.65	2043857.19	279.72
CUL7	705382.49	2043858.23	278.03
CUL8	705381.95	2043870.64	278.07
CE2	705382.90	2043851.36	286.99
HW2	705382.89	204351.35	289.10

LABELLED HEIGHT X WIDTH

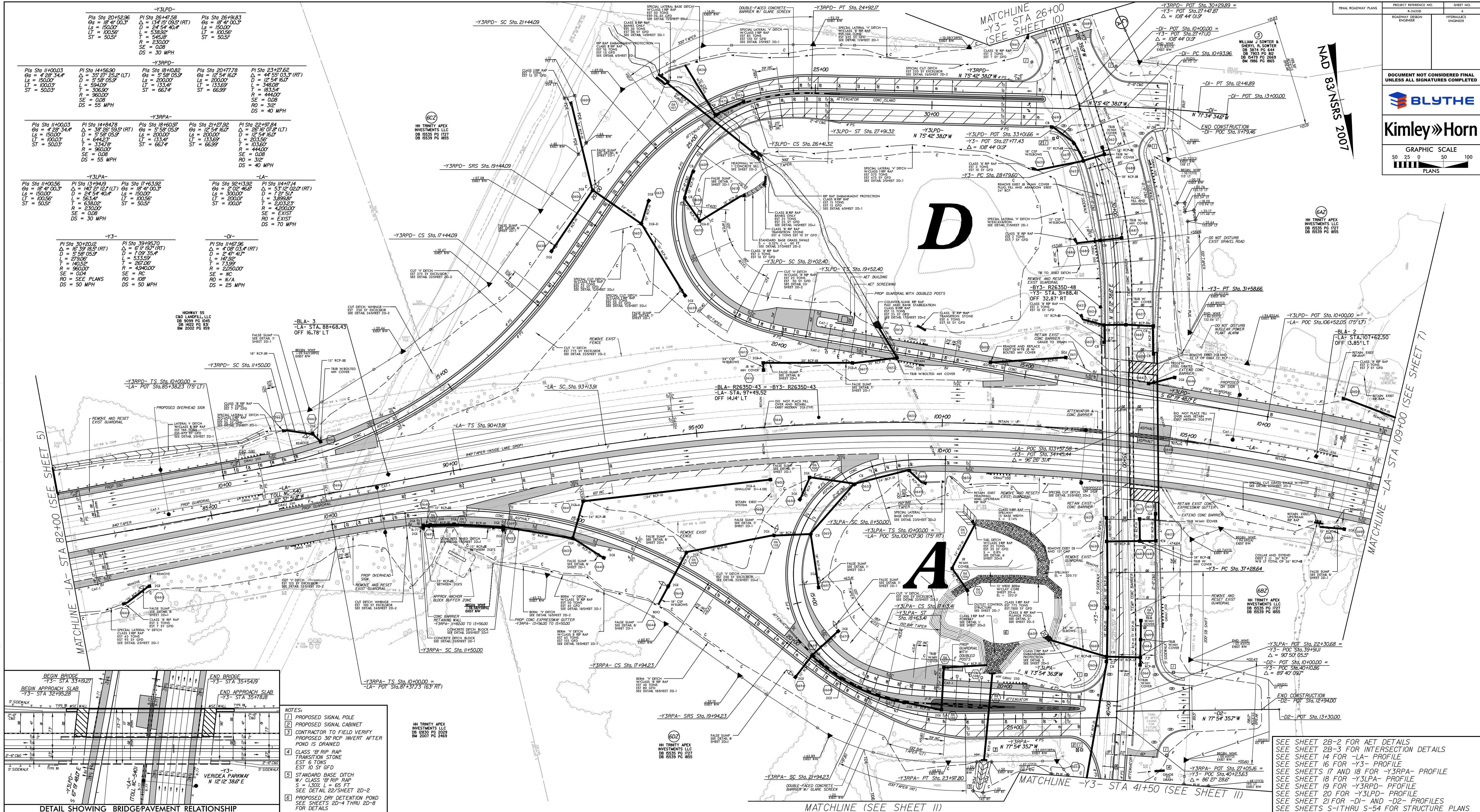


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12/17/2015

K:\VIAL_Roadway\012593013 - R-2635D_Access 540.Roadway\Proj\R-2635D_rdy_psh_06.dgn

12/17/2015



PROJECT REFERENCE NO.	SHEET NO.
R-2635D	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED	
BLYTHE	
Kimley»Horn	
GRAPHIC SCALE 50 25 0 50 100 PLANS	

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
7

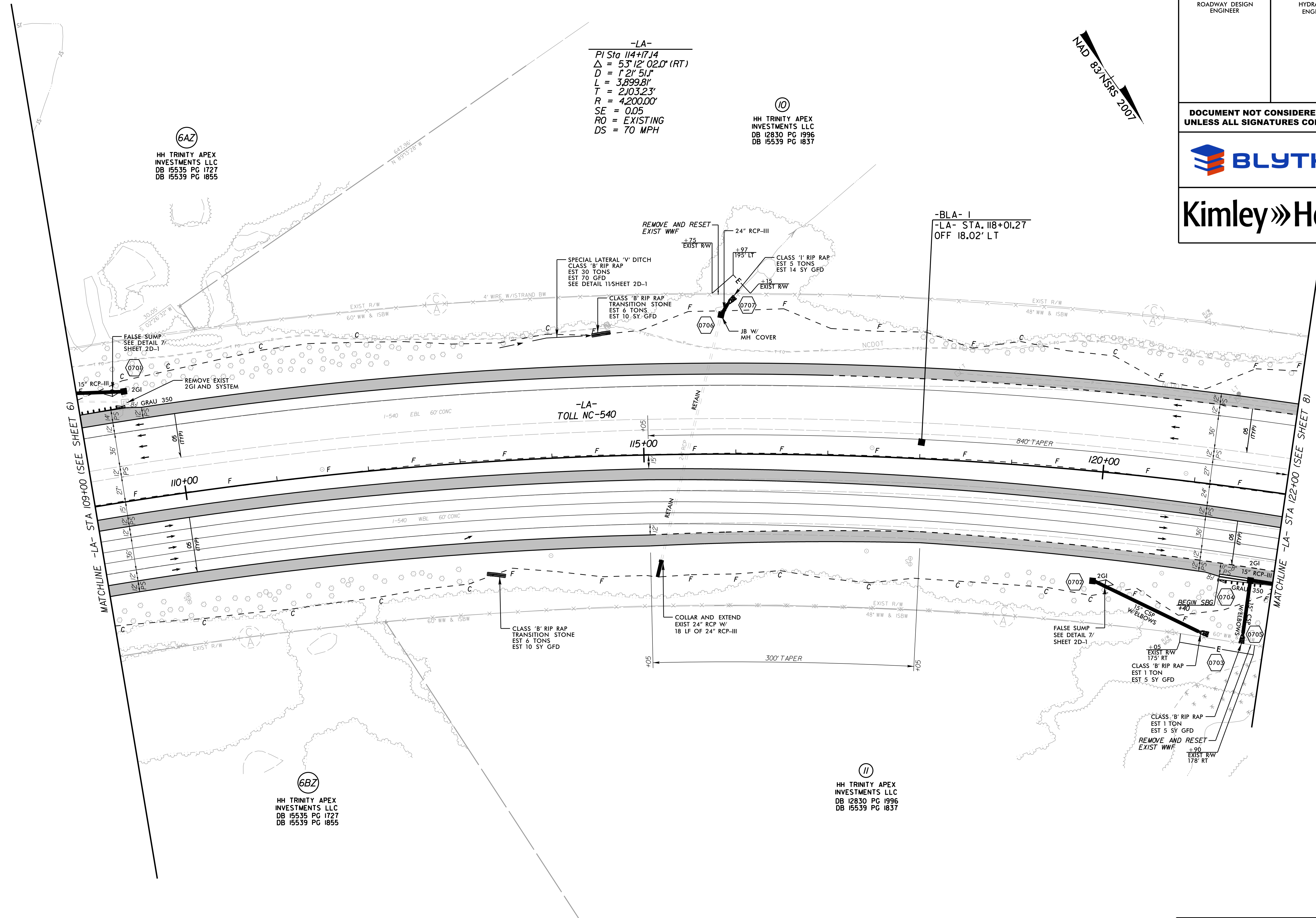
ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



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SEE SHEET 15 FOR -LA- PROFILE

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



Kimley»»Horn

~~NAD 83/NSRS 2007~~

-LA-	
PI Sta 114+17.14	Pls Sta 133+13.73
$\Delta = 53^{\circ}12'02.0''$ (RT)	$\Theta_s = 2^{\circ}02'46.6''$
$D = 1^{\circ}21'51''$	$L_s = 300.00'$
$L = 3,899.81'$	$LT = 200.01'$
$R = 4,200.00'$	$ST = 100.01'$
$SE = 0.05$	
$RO = \text{EXISTING}$	
$DS = 70 \text{ MPH}$	

END TIP PROJECT R-2635D
END CONSTRUCTION
-LA- Sta. 129+50.70

HH TRINITY APEX
INVESTMENTS LLC
DB 12830 PG 1996
DB 15539 PG 1837

— DO NOT PLACE FILL
OVER EXIST MEDIAN
2GI (TYP)

PROPOSED
OH SIGN

REMOVE & RESET
EXIST GUARDRAIL

TIE TO EXIST GUARDRAIL

-LA-
TOLL NC-540

-LA- CS Sta. 132+13.72

-LA- ST Sta. 135+13.72

-BLA- R2635D-42
-LA- STA. 129+48.06
OFF 14.73' RT

END WIDENING
-LA- STA 125+42.13
TIE TO EXIST GUARDRAIL

REMOVE & RESET
EXIST GUARDRAIL

STA 122+00 (SEE SHEET 7)

CULVERT #1
ONE BARREL

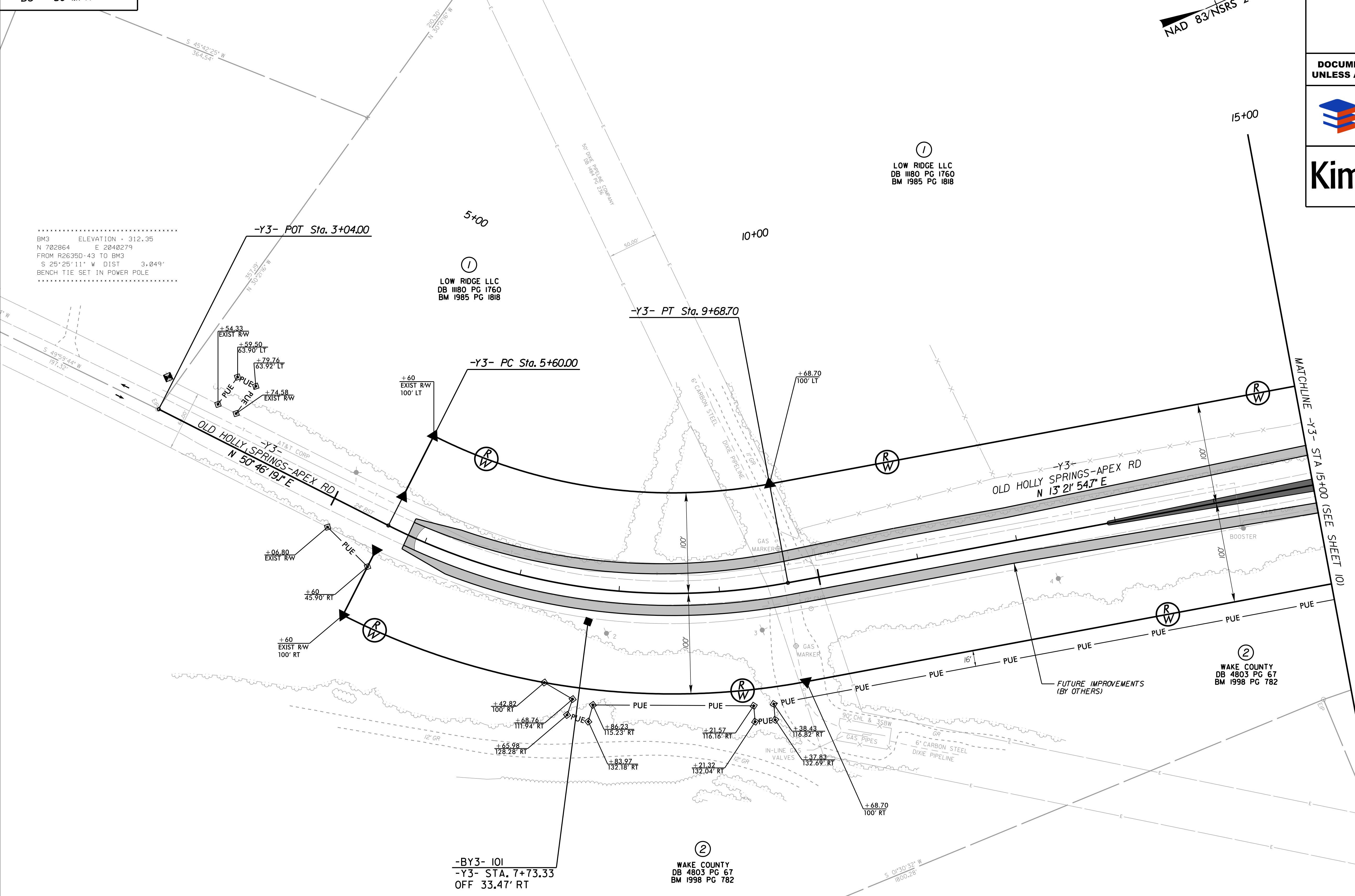
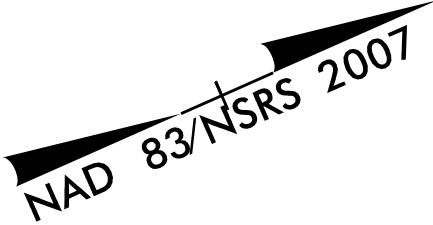
	NORTH	EAST	
CUL1	707431.13	2039085.04	287.5
CUL2	707439.75	2039078.76	287.48
CUL3	707088.07	2038848.63	283.12
CUL4	707095.88	2038842.33	283.18
CE1	707435.89	2039081.34	295.51
CE2	707091.67	2038845.98	291.08
HW1	707435.91	2039081.34	298.24
HW2	707091.89	2038845.79	293.83

HH TRINITY APEX
INVESTMENTS LLC
DB 12830 PG 1996
DB 15539 PG 1837

-Y3-
PI Sta 7+71.93
 $\Delta = 37^{\circ}24'24.3"$ (LT)
 $D = 9^{\circ}09'09.6"$
 $L = 408.70'$
 $T = 211.93'$
 $R = 626.00'$
 $DS = 50$ MPH

THIS SHEET IS
FOR RW ONLY

FINAL ROADWAY PLANS		PROJECT REFERENCE NO. R-2635D	SHEET NO. 9
		ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
DOCUMENT NOT CONSIDERED FINAL UNLESS ALL SIGNATURES COMPLETED			
			
Kimley»Horn			



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12/17/2015

PROJECT REFERENCE NO.		SHEET NO.
R-2635D		11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

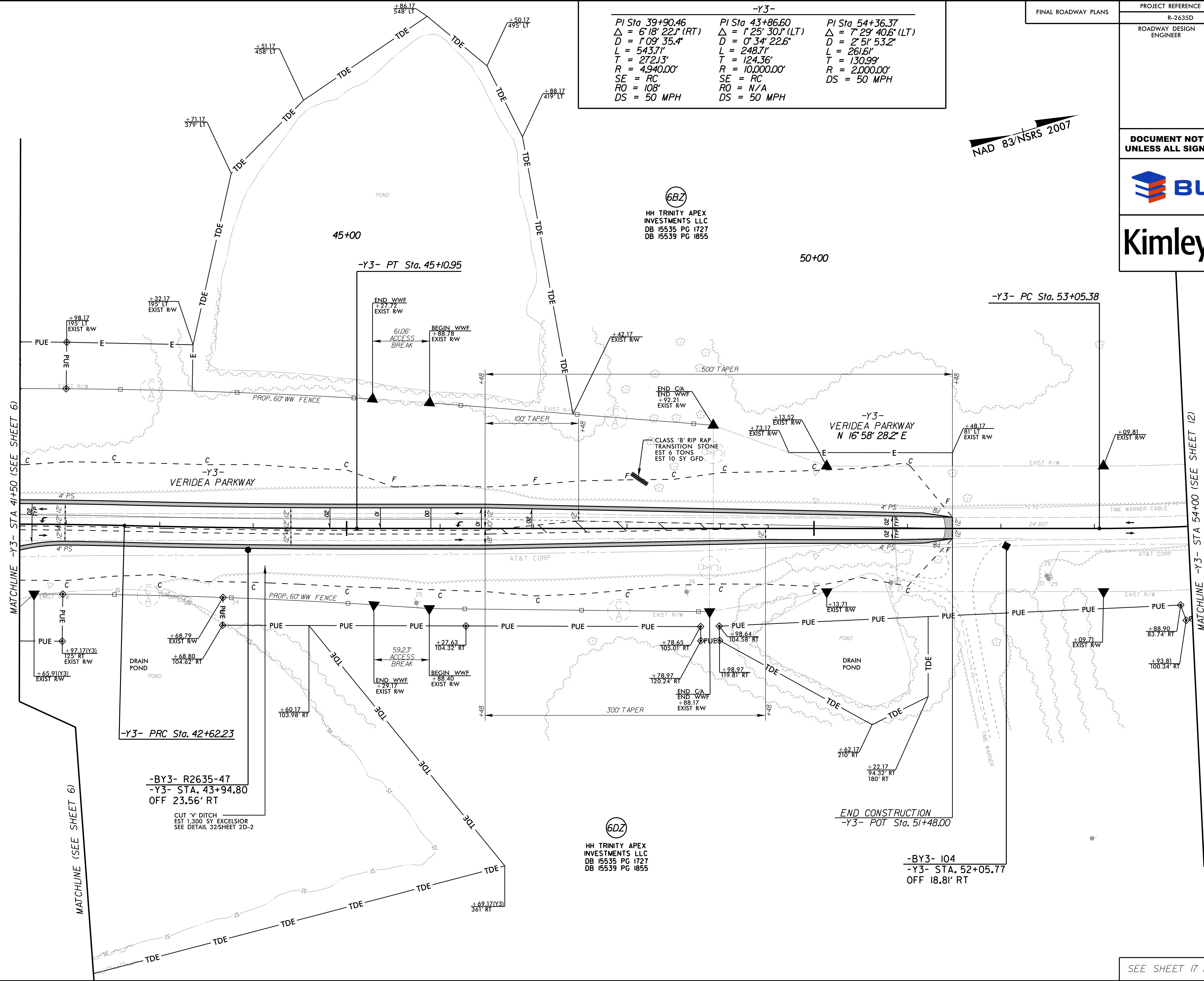
DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED



Kimley»Horn

NAD 83/NSRS 2007

-Y3-		
PI Sta 39+90.46 $\Delta = 6^{\circ}18'22.1^{\circ}$ (RT) $D = 1^{\circ}09'35.4^{\circ}$ $L = 543.71'$ $T = 272.13'$ $R = 4,940.00'$ $SE = RC$ $RO = 108'$ $DS = 50$ MPH	PI Sta 43+86.60 $\Delta = 1^{\circ}25'30.1^{\circ}$ (LT) $D = 0^{\circ}34'22.6^{\circ}$ $L = 248.71'$ $T = 124.36'$ $R = 10,000.00'$ $SE = RC$ $RO = N/A$ $DS = 50$ MPH	PI Sta 54+36.37 $\Delta = 7^{\circ}29'40.6^{\circ}$ (LT) $D = 2^{\circ}51'53.2^{\circ}$ $L = 261.61'$ $T = 130.99'$ $R = 2,000.00'$ $DS = 50$ MPH



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12/17/2015

SEE SHEET 17 FOR -Y3- PROFILE

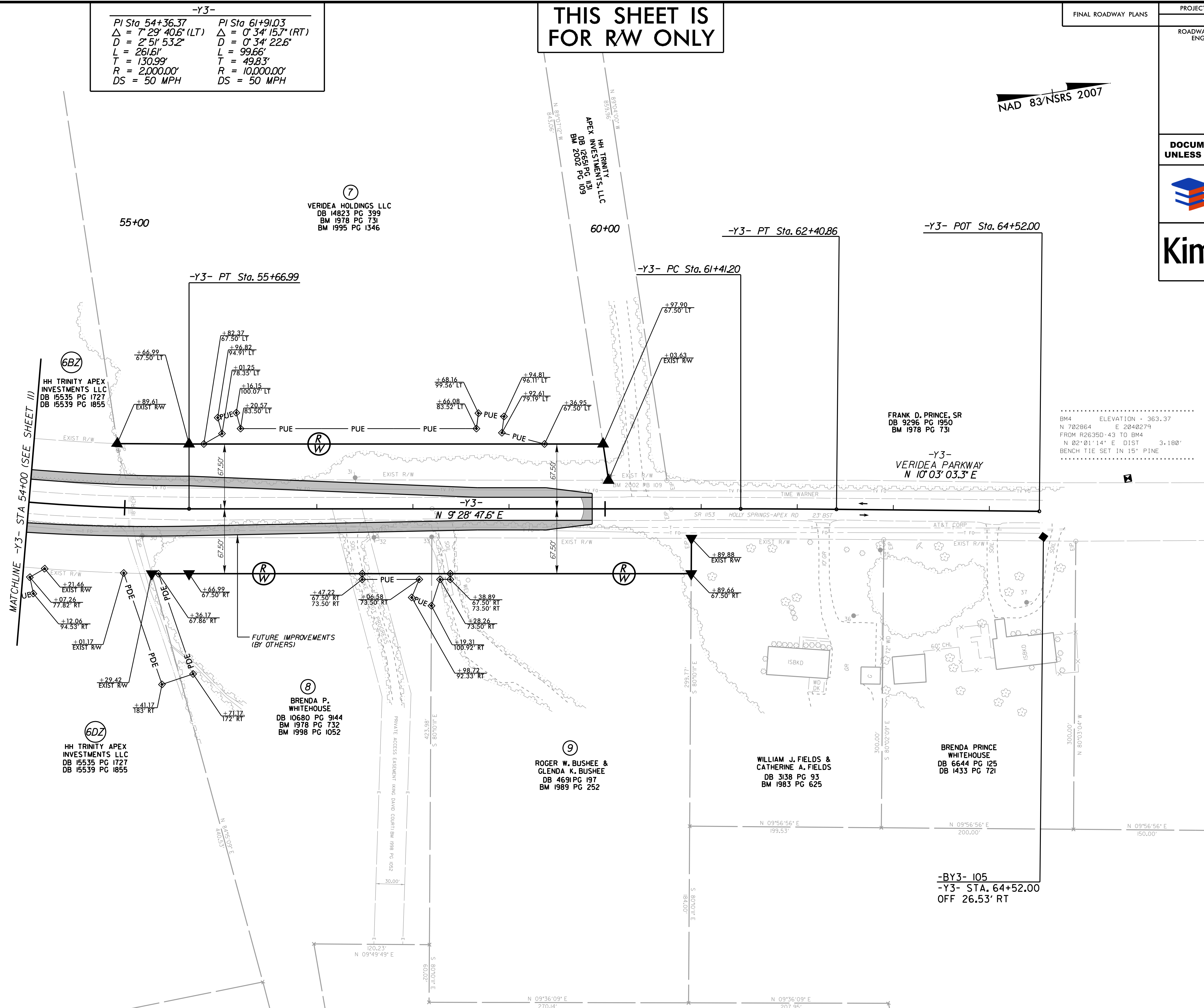
**THIS SHEET IS
FOR RW ONLY**

FINAL ROADWAY PLANS	PROJECT REFERENCE NO.	SHEET NO.
	R-2635D	12
	ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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



Kimley»»Horn



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12/17/2015

FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

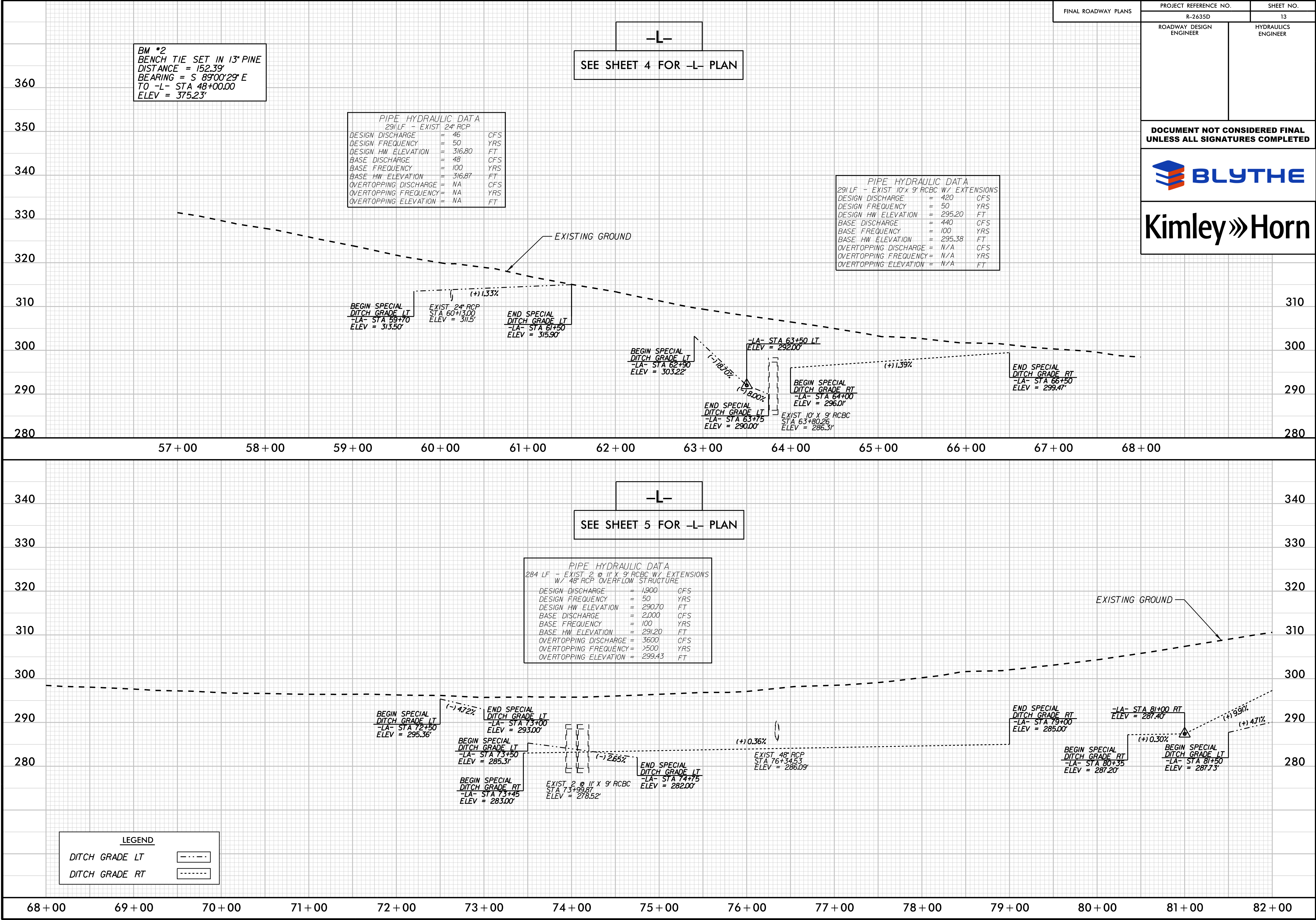
ROADWAY DESIGN ENGINEER

SHEET NO.
13

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

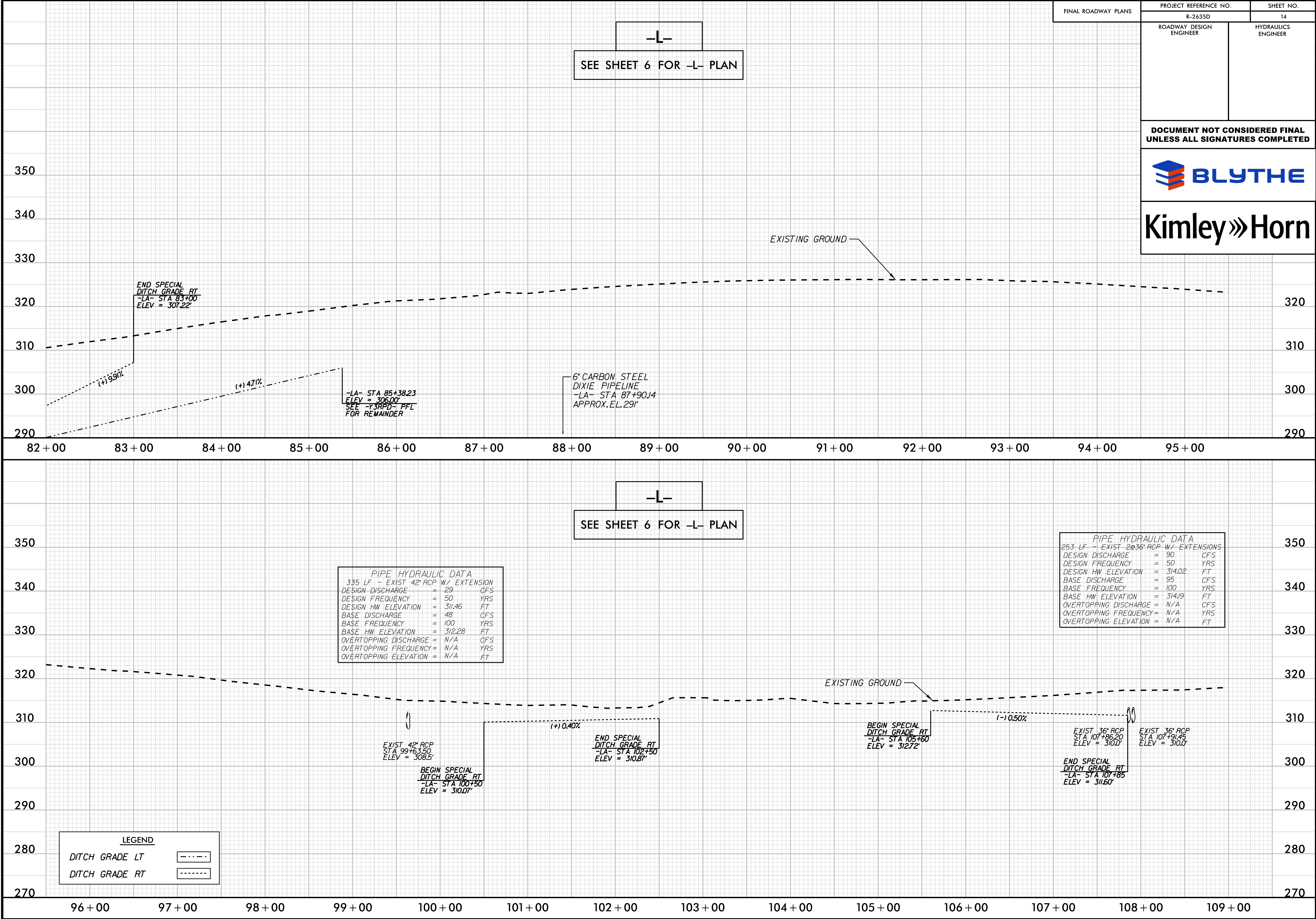


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12/17/2015



5/28/99

LEGEND

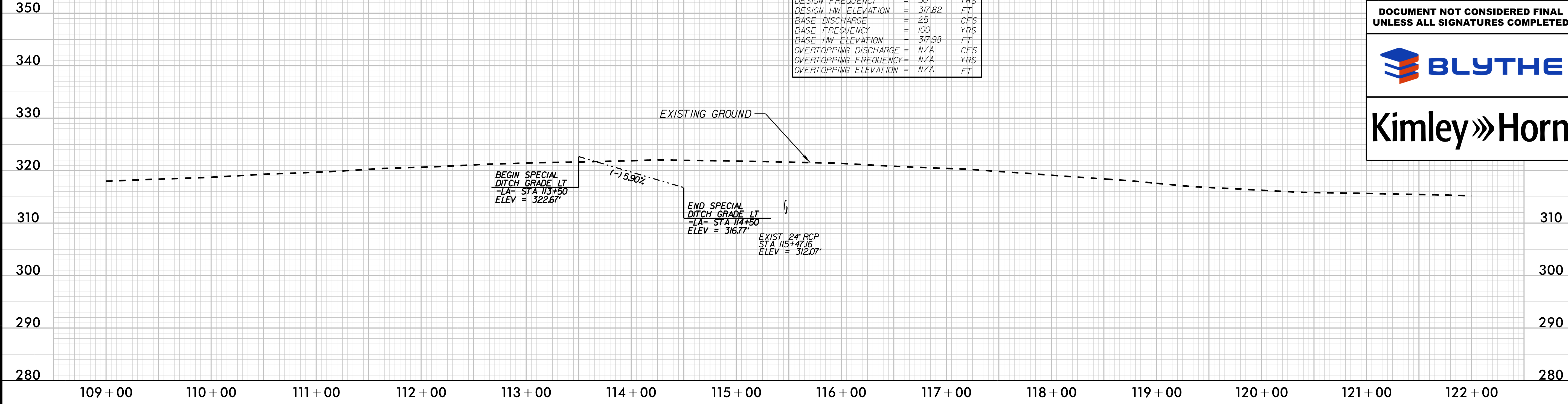
DITCH GRADE LT

DITCH GRADE RT

-L-

SEE SHEET 7 FOR -L- PLAN

PIPE HYDRAULIC DATA		
308 LF - EXIST 24" RCP W/ EXTENSIONS		
DESIGN DISCHARGE	=	24 CFS
DESIGN FREQUENCY	=	50 YRS
DESIGN HW ELEVATION	=	317.82 FT
BASE DISCHARGE	=	25 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	317.98 FT
OVERTOPPING DISCHARGE	=	N/A CFS
OVERTOPPING FREQUENCY	=	N/A YRS
OVERTOPPING ELEVATION	=	N/A FT



FINAL ROADWAY PLANS

PROJECT REFERENCE NO.
R-2635D

SHEET NO.
15

ROADWAY DESIGN ENGINEER

HYDRAULICS ENGINEER

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED





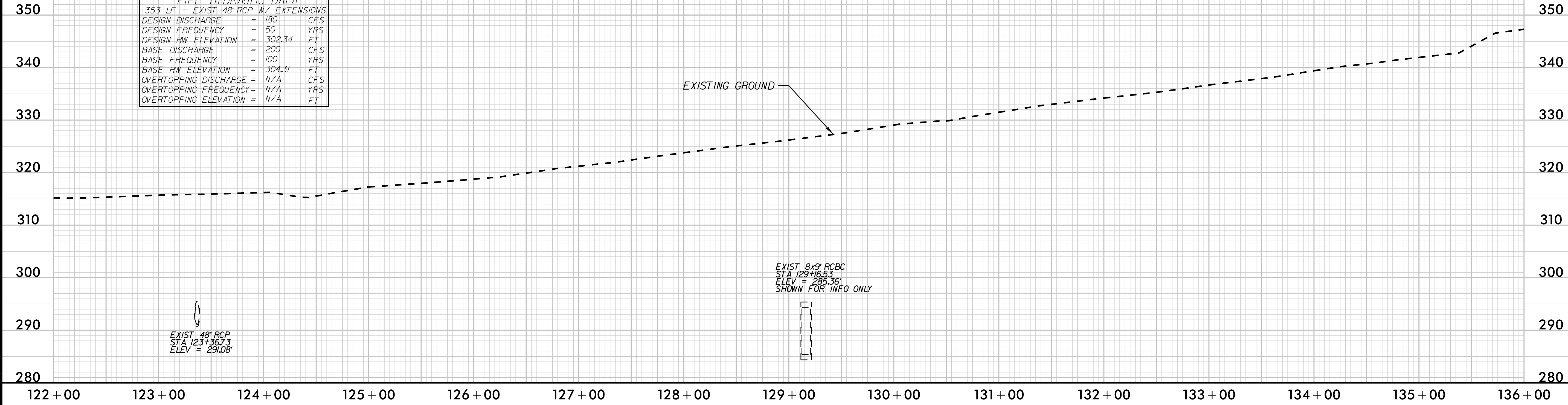
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BM *1
SQUARE CHISLED IN CORNER OF BRIDGE
DISTANCE = 23.30'
BEARING = S 51°05'51" W
TO -L- STA 139+40.58
ELEV = 354.68'

PIPE HYDRAULIC DATA		
353 LF - EXIST 48" RCP W/ EXTENSIONS		
DESIGN DISCHARGE	=	180 CFS
DESIGN FREQUENCY	=	50 YRS
DESIGN HW ELEVATION	=	302.34 FT
BASE DISCHARGE	=	200 CFS
BASE FREQUENCY	=	100 YRS
BASE HW ELEVATION	=	304.31 FT
OVERTOPPING DISCHARGE	=	N/A CFS
OVERTOPPING FREQUENCY	=	N/A YRS
OVERTOPPING ELEVATION	=	N/A FT

-L-

SEE SHEET 8 FOR -L- PLAN



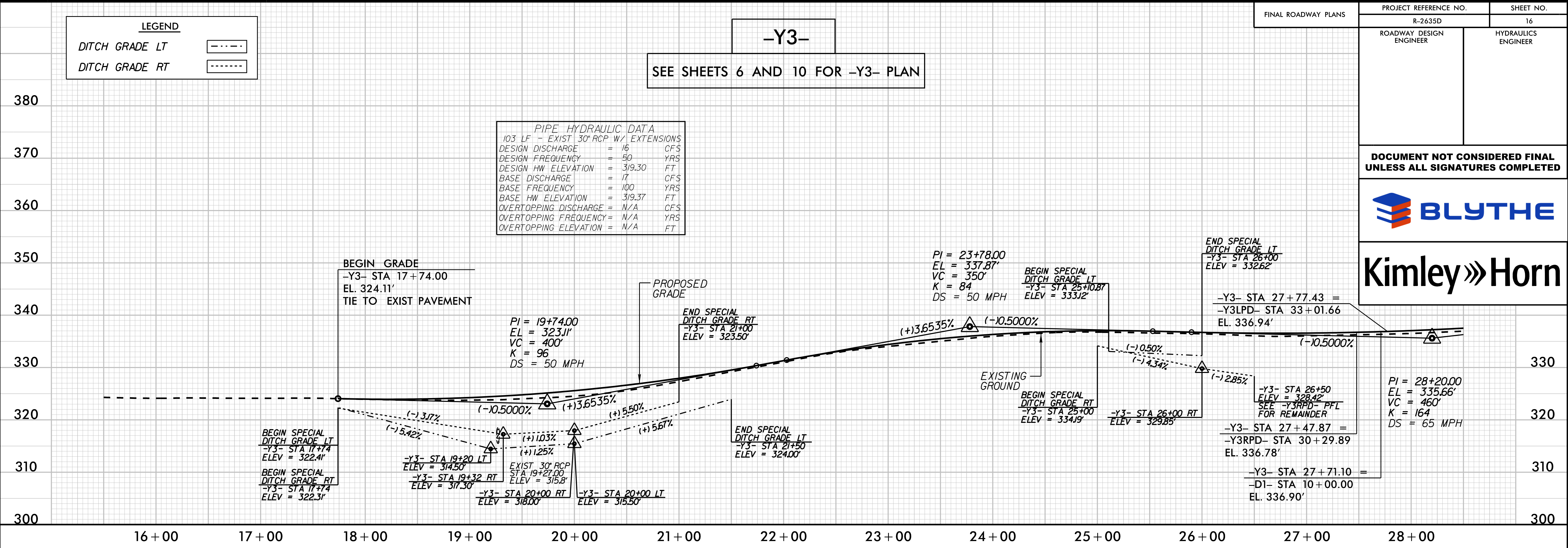
12/17/2015

5/28/99

LEGEND	
DITCH GRADE LT	----
DITCH GRADE RT	-----

-Y3-
SEE SHEETS 6 AND 10 FOR -Y3- PLAN

PIPE HYDRAULIC DATA	
103 LF - EXIST 30" RCP W/ EXTENSIONS	
DESIGN DISCHARGE = 16	CFS
DESIGN FREQUENCY = 50	YRS
DESIGN HW ELEVATION = 319.30	FT
BASE DISCHARGE = 17	CFS
BASE FREQUENCY = 100	YRS
BASE HW ELEVATION = 319.37	FT
OVERTOPPING DISCHARGE = N/A	CFS
OVERTOPPING FREQUENCY = N/A	YRS
OVERTOPPING ELEVATION = N/A	FT



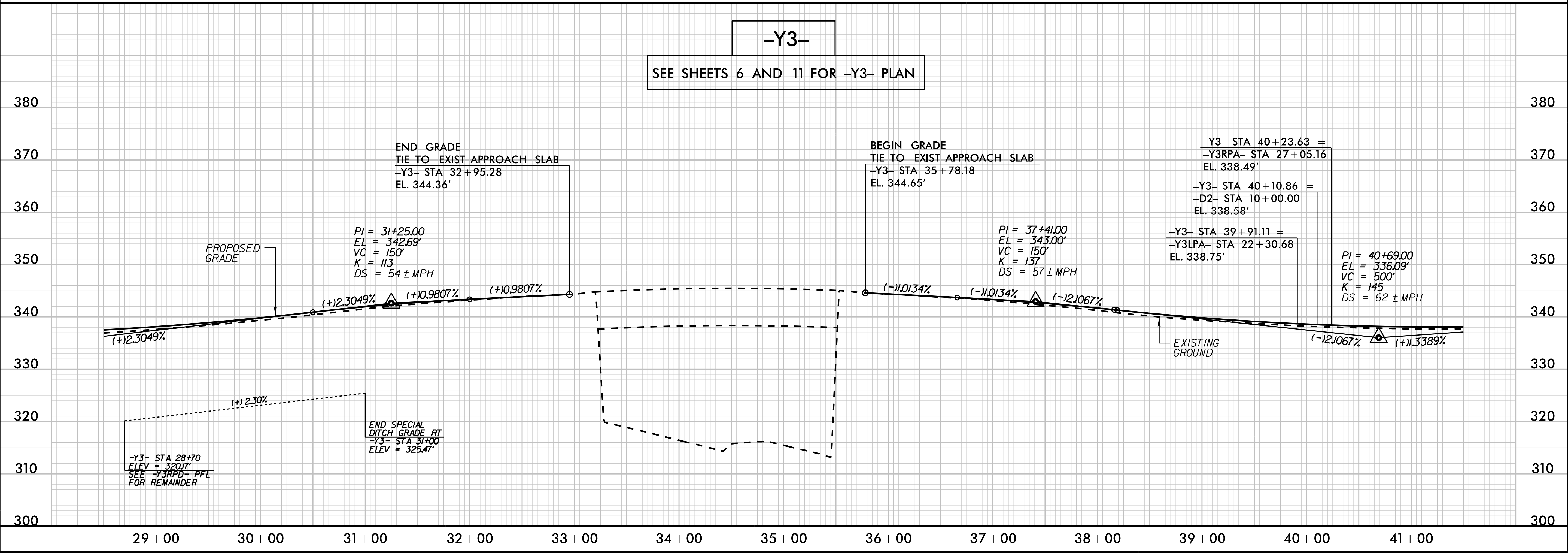
Kimley»Horn

DOCUMENT NOT CONSIDERED FINAL
UNLESS ALL SIGNATURES COMPLETED

PROJECT REFERENCE NO.		SHEET NO.
R-2635D		16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	

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-Y3-
SEE SHEETS 6 AND 11 FOR -Y3- PLAN

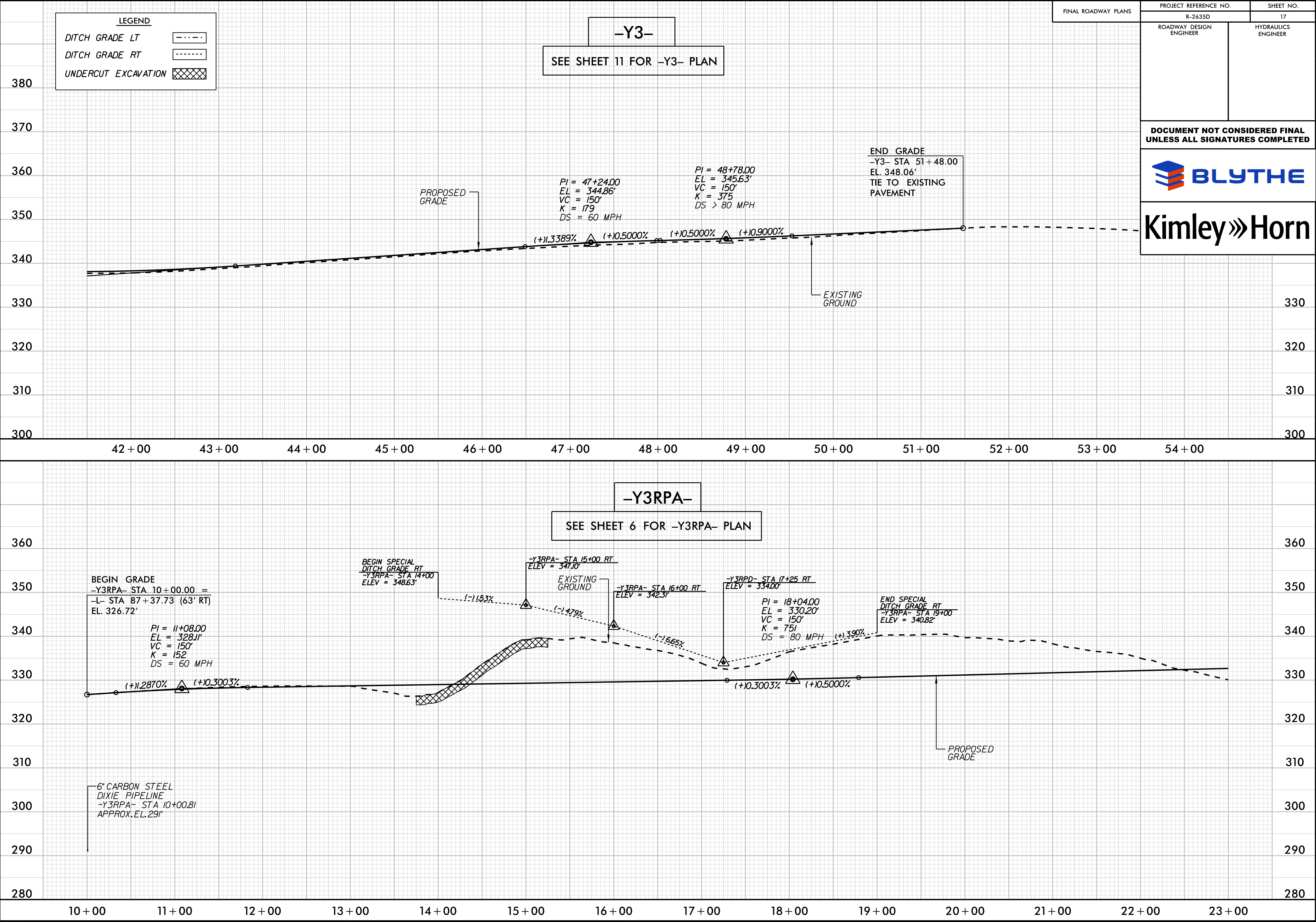


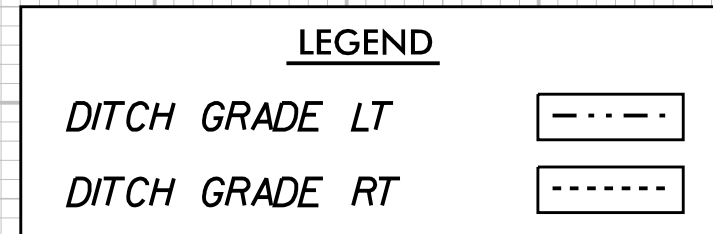
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12/17/2015

