



STATE OF NORTH CAROLINA  
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY  
GOVERNOR

LYNDO TIPPETT  
SECRETARY

September 24, 2008

US Army Corps of Engineers  
Wilmington Regulatory Field Office  
P.O. Box 1890  
Wilmington, NC 28402-1890

Attention: Richard Spencer  
NCDOT Coordinator

Subject: **Application for Section 404 Individual Permit** for the proposed widening of SR 1003 (Camden Rd) from NC 59 (Hope Mills Rd) to Owen Drive (SR 1007) in Cumberland County. Federal Aid. No. STP-1003(22), State Project No. 82442601, TIP No. U-2810. WBS 34866.1.1

The North Carolina Department of Transportation (NCDOT) proposes to widen Camden Road (SR 1003) to a multi-lane facility from NC 59 (Hope Mills Road) to Owen Drive (SR 1007) in Fayetteville, Cumberland County, North Carolina. The proposed action will widen the existing two-lane facility to a four-lane, 78-foot curb and gutter section, with a 22-foot raised grass median. U-2810 is represented by three Sections (A, B, & C). All sections have final design; however, each has a different scheduled Let Date (See Sec. 4 below). This application package consists of the cover letter, ENG Form 4345, half size plan sheets, permit drawings, utility permit drawings, the Ecosystem Enhancement Program (EEP) confirmation letter, and Hydraulic Design (Concurrence Points 4B & 4C) meeting minutes.

### 1.0 PURPOSE AND NEED

The purpose of the project is to increase the travel carrying capacity of Camden Road from Owen Drive to NC 59, thereby improving the levels of service for Camden Road and adjacent facilities. The proposed widening of Camden Road will aid in the improvements of the local travel network.

### 2.0 SUMMARY OF IMPACTS

The project lies within the Inner Coastal Plain region of North Carolina's Coastal Plain physiographic province and within the Cape Fear River Basin. U-2810 is in HUC 03030004, Sub-Basin 03-06-15. Permanent and temporary impacts to jurisdictional areas of the proposed project are summarized in Table 2 for wetlands and Table 3A-B for surface waters.

### 3.0 SUMMARY OF MITIGATION

The proposed construction of U-2810 will impact 0.9 ac. of jurisdictional riparian wetlands and 273 linear feet of stream, that will require mitigation within the Cape Fear River Basin. The North Carolina Department of Environment and Natural Resources Ecosystem Enhancement Program (EEP) will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the unavoidable permanent impacts to 0.9 ac. of impacts to wetland and the 273 linear feet of stream.

**MAILING ADDRESS:**  
NC DEPARTMENT OF TRANSPORTATION  
PROJECT DEVELOPMENT AND ENVIRONMENTAL ANALYSIS  
1598 MAIL SERVICE CENTER  
RALEIGH NC 27699-1598

TELEPHONE: 919-715-1500  
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**WEBSITE:** [WWW.NCDOT.ORG](http://WWW.NCDOT.ORG)

**LOCATION:**  
2728 CAPITAL BLVD  
PLB SUITE 168  
RALEIGH, NC 27604

#### 4.0 PROJECT SCHEDULE

For construction purposes, U-2810 has been broken down into three sections. Table 1 reflects the project breakdown and section termini. Permit drawings for the proposed U-2810 project has been prepared for all three sections.

**Table 1. Project Sections and Scheduling**

Section	Project Termini	Scheduled Let Date	Design Phase
U-2810 A	NC 59 (Hope Mills Rd) To South Of SR 3019 (Midland Court)	February 17, 2009	Final
U-2810 B	SR 3019 (Midland Court) To SR 1290 (King Charles Road)	November 17, 2009	Final
U-2810 C	SR 1290 (King Charles Road) To SR 1007 (Owen Road)	October 21, 2014	Final

#### 5.0 NEPA DOCUMENT STATUS

The Final Environmental Assessment (FEA) and the Finding of No Significant Impact (FONSI) were approved by the Federal Highway Administration (FHWA) on January 30, 2002 and December 30, 2003 respectively, for U-2810 and circulated to the appropriate agencies. A FHWA Right-of-Way Consultation was approved March 2, 2006.

#### 6.0 INDEPENDENT UTILITY

The subject project complies 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.

#### 7.0 RESOURCE STATUS

Wetland and stream determination and delineations within U-2810 (all sections) for the Preferred Alternative corridor were conducted in 1999 and revised in 2003 by NCDOT using the field delineation method outlined in the *1987 Corps of Engineers Wetland Delineation Manual* (Environmental Laboratory, 1987). The North Carolina Division of Water Quality's (DWQ) *Identification Methods for the Origins of Intermittent and Perennial Streams* was used to make stream determinations. A Jurisdictional Determination was issued on November 13, 2003.

NCDOT does not request the Corps to evaluate our site using the Rapanos guidance. Instead, we are satisfied with the delineation as reviewed and approved prior to 6/5/2007, and ask that you evaluate this permit verification based on that review.

## 8.0 IMPACTS TO JURISDICTIONAL RESOURCES

Impacts to jurisdictional resources are only associated with U-2810 A. No jurisdictional resources occur in the project area of U-2810 B or C. Final impacts to jurisdictional wetlands and surface waters for U-2810 are summarized below in Tables 2-3A-B.

**Table 2. U-2810 Wetland Impacts and Descriptions**

Permit Site No.	EA Site ID	Riparian or Non-Riparian	Cowardin Description	Permanent (ac.)	Temporary (ac.)	Mitigation Required
<b>HUC 03030004</b>						
2	3	Riparian	PFO1C	0.88	0.00	Yes
4	2	Riparian	PEM1B	0.02	0.01	Yes
<b>Total</b>				0.90	0.01	

Key: PFO1C – Palustrine, Forested, Broad-leaved Deciduous Seasonally Flooded; PEM1B – Palustrine, Emergent, Persistent, Saturated

**Table 3A. U-2810 Stream Impacts**

Permit Site No.	EA Site ID	Permanent (ft)	Temporary (ft)	Permanent (ac.)	Temporary (ac.)	Mitigation Required
<b>HUC 03030004</b>						
1	UT3	96	20	0.03	0.01	Yes
4	UT1	98	20	0.03	0.01	Yes
5	UT2	79	20	0.02	0.01	Yes
<b>Total</b>		273	60	0.08	0.03	

**Table 3B. U-2810 Stream Descriptions**

Permit Site No.	EA Site ID	Stream Name	Type of Stream	Stream Index No.	Sub-basin	Best Usage Classification
<b>HUC 03030004</b>						
1	UT3	UT to Little Rockfish Creek	Perennial	18-31-24-(4)	03-06-15	C
4	UT1	UT to Buckhead Creek	Perennial	18-31-24-6	03-06-15	C
5	UT2	UT to Buckhead Creek	Perennial	18-31-24-6	03-06-15	C

### 8.1 Permanent Impacts

The total permanent wetland impact for U-2810 is 0.9 ac. Proposed permanent impacts include 0.63 ac. of fill and 0.27 ac. of mechanized clearing in riparian wetlands. In addition, there are 273 ft. of proposed stream impacts (0.08 ac. of fill in surface waters). This includes 96 ft. due to the pipe installation in UT3, 98 ft. due to the culvert installation at UT1, and 79 ft. due to the pipe installation at UT2.

### 8.2 Temporary Impacts

There are 0.03 ac. of proposed temporary stream impacts associated with U-2810. This includes 0.01 ac. due to the pipe installation in UT3, 0.01 ac. due to the culvert installation at UT1, and 0.01 ac. due to the pipe installation at UT2. Proposed temporary fill due to bridge pier construction at Little Rockfish Creek is < 0.01 ac.

### **8.3 Hand Clearing**

There will be 0.08 ac. of hand clearing in wetlands.

### **8.4 Utility Impacts**

There will be a total of 0.01ac of temporary impacts to jurisdictional resources resulting from utility relocations for U-2810 (see utility permit drawings).

#### **8.4.1 Sanitary Sewer**

The existing 12-inch sanitary sewer line will be in conflict with the proposed 8 x 11-foot box culvert at UT2. To clear the conflict a new sanitary sewer line will be constructed as shown on the Utility permit drawings (Sheet 2) and profile sheet. To meet the existing elevations of the sanitary sewer line, the pipeline construction will be by open cut at minimum grade. The new alignment will go through a portion of the wetland (Site 4), temporarily disturbing 0.01 ac. After installation of the sanitary sewer line, the trench will be back filled to its original elevation. Once work has been completed on the new sanitary sewer line the old line will be abandoned by filling with flowable fill or removed where the contractor needs to excavate below the existing sewer line.

#### **8.4.2 Overhead Power lines**

Existing power line poles will be moved to the areas indicated on the utility by others permit drawings. They will be installed in permanent locations manly along the north side of the roadway. At the bridge locations temporary pole and lines will be installed on the south side of the roadway until the new bridges are constructed. Once the bridges are built, the permanent poles will be placed, the permanent lines will be installed and the temporary poles and lines will be removed. The poles and guy wires located in wetlands just beyond the roadway fill slope stakes will be set from equipment that are on mats or with low ground pressure track equipment and located within the roadway footprint. Removal of the temporary poles will be accomplished in a similar manner. All necessary clearing will be done by hand with no disturbance of the root mat. Spoil material and debris will be removed from the area.

#### **8.4.3 Utilities Not Shown on Plans**

Fayetteville Public Utility Commission will have a 12-inch water line constructed as part of the contract. The line will be installed from the end of the existing line (Sta. 19+00-L-) to the end of the project (Sta. 59+89-L-). It will be located on the southern side of the roadway under the footprint of the roadway section. At the stream crossings, it will be installed on piles. These piles will be the standard HP 12 x 53 steel piles (normally used for bridge construction) configured to secure the pipe located on approximately 18-foot spacing.

## **9.0 PROTECTED SPECIES**

The United States Fish and Wildlife Service list seven federally protected species for Cumberland County as of the January 31, 2008 listing (Table 4).

**Table 4. Federally Protected Species in Cumberland County**

Common Name	Scientific Name	Federal Status	Habitat Present	Biological Conclusion
American alligator	<i>Alligator mississippiensis</i>	T (S/A)	N/A	N/A
Red-cockaded woodpecker	<i>Picoides borealis</i>	E	Yes	No Effect
Saint Francis' satyr butterfly	<i>Neonympha mitchellii francisci</i>	E	No	No Effect
American chaffseed	<i>Schwalbea americana</i>	E	Yes	No Effect
Michaux's sumac	<i>Rhus michauxii</i>	E	Yes	No Effect
Pondberry	<i>Lindera melissifolia</i>	E	Yes	No Effect
Rough leaved loosestrife	<i>Lysimachia sperulaefolia</i>	E	Yes	No Effect

### 9.1 American alligator

The federal listing for the alligator is due to “Similarity of Appearance” and does not afford it any special protection. However, no habitat is present within the project study area.

### 9.2 Red-cockaded woodpecker

A field survey for the presence of suitable habitat was conducted on August 15, 2006. Guidelines for Surveys to Assess Potential Project Impacts to Red-cockaded Woodpecker (RCW) Nesting and/or Foraging Habitat from the 2003 USFWS Recovery Plan were followed. Prior to the field survey a review of NHP data indicated one historic record and one record from 1977 were within three miles of the project study area. The closest “known” active cluster is approximately 15 miles from the project area. Aerial photos were then evaluated to identify pine-dominate forested or woodland areas.

During the field survey, it was determined that the majority of the pine-dominated tracts within the project area that met the minimum criteria for suitable habitat had significant hardwood encroachment due to the absence of disturbance. However, one tract adjacent to the project area was identified as having characteristics of suitable nesting habitat. This tract is approximately 10.6 ac. (however, less than 0.3 ac. has potential to be impacted by the proposed project). The tract is virtually a homogenous stand of longleaf pine (*Pinus palustris*). The mid and understories have been eliminated by mechanical means and the herbaceous layer is dominated by cool-season grasses and various forbs typical of poor sites and waste places. Use of an increment borer determined the approximate age of the stand to be 75 years. Accordingly, line transects, as recommended in the guidelines, were implemented and each tree was inspected for signs of RCW use. No evidence of RCW use (past or present) was identified in the stand. Based on this and the highly fragmented and urbanized surrounding area, it was determined the project will have no effect on RCW.

### 9.3 Saint Francis' satyr butterfly

A field survey for the presence of suitable habitat was conducted on March 13, 2006. Suitable habitat in the form of wet meadows dominated by a high diversity of sedges and other wetland graminoids or pitcher plant swales does not exist within the project area. NHP data did not indicate any records within three miles of the study area.

### 9.4 American chaffseed

Plant communities often associated with American chaffseed, such as pine flatwoods, fire maintained savannas, and open grass-sedge systems do not occur within the project area. However, open ecotones between peaty wetlands and xeric sandy soils are found in a few locations in or adjacent to the project area. Due to the urbanized surrounding area, fire suppression has been prevalent for many years and these areas are likely only maintained through mechanical means. Plant-by-plant surveys of these marginally suitable sites

were conducted on June 1, 2006. No specimens were identified during the survey, and a search of the NHP data did not indicate any known occurrences within three miles of the project area.

### **9.5 Michaux's sumac**

Suitable habitat is found within or adjacent to the project area in the form of sandy open woods, highway rights-of way, and edges of artificially maintained clearings. Plant-by-plant surveys of these sites were conducted on June 1, 2006. No specimens were identified during the survey, and a search of the NHP data did not indicate any known occurrences within three miles of the project area.

### **9.6 Pondberry**

Suitable habitat for pondberry is available in the cypress-gum swamp associated with Little Rockfish Creek. A plant-by-plant survey was conducted on March 13, 2006 to determine if pondberry is present within the project area. On the day of the survey, a known population of pondberry was visited to determine the flowering status of the species in the region. It was concluded the species was in-flower and therefore the survey proceeded. The project limits within the wetland and approximately 100 feet beyond were thoroughly inspected. No specimens of pondberry were identified. Though other wetlands within the project area do not provide ideal habitat conditions, all wetlands were surveyed for pondberry to rule out presence within these marginal areas. No specimens were identified within or adjacent to the project limits. In addition, NHP data does not indicate pondberry occurs within three miles of the project area.

### **9.7 Rough-leaved loosestrife**

A search of the NHP data did indicate a known occurrence is in close proximity to the project area. The population is in a maintained power-line corridor that passes through a low pocosin just east of Buckhead Creek and south of the project area. This site will not be impacted by the proposed project. Approximately 350 feet of forested buffer exists between the proposed clearing limits and the power-line corridor. On the day of the field survey, this site was visited to determine the flowering status of the species in the region. It was concluded the species was in-flower and therefore the survey proceeded. Plant-by-plant surveys of these marginally suitable sites were conducted on June 1, 2006. Marginally suitable habitats are found in a few locations in or adjacent to the project area. Due to the urbanized surrounding area, fire suppression has been prevalent for many years and these areas are likely only maintained through mechanical means. No specimens were identified during the survey.

## **10.0 CULTURAL RESOURCES**

### **10.1 Archaeological Resources**

This project is subject to compliance with Section 106 of the National Historic Preservation Act of 1966, as amended, implemented by the Advisory Council on Historic Preservation's Regulations for compliance with Section 106, codified at 36 CFR Part 800. Section requires that if a federally-funded, licensed, or permitted project has an effect on a property listed on or eligible for the National Register of Historic Places, the Advisory Council on Historic Preservation be given an opportunity to comment.

There are no known archaeological sites within the proposed project area. Based on present knowledge of the area, it is unlikely that any archaeological resources, which may be eligible for inclusion in the National Register of Historic Places, will be affected by the project construction

## **10.2 Architectural Resources**

As part of the process for identifying significant historic architectural resources located in the APE, the State Historic Preservation Office (SHPO) was consulted. In a letter dated July 18, 1997, it was stated that there were no structures of historical or architectural importance located within the planning area.

## **11.0 FEMA COMPLIANCE**

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

## **12.0 MITIGATION OPTIONS**

The NCDOT is committed to incorporating all reasonable and practicable design features to avoid and minimize jurisdictional impacts, and to provide full compensatory mitigation of all remaining, unavoidable jurisdictional impacts. Avoidance measures were taken during the planning and NEPA compliance stages; minimization measures were incorporated as part of the project design.

### **12.1 Avoidance and Minimization**

All jurisdictional features were delineated, field verified and surveyed within the corridor for U-2810. Using these surveyed features, preliminary designs were adjusted to avoid and / or minimize impacts to jurisdictional areas. NCDOT employs many strategies to avoid and minimize impacts to jurisdictional areas in all of its designs. Many of these strategies have been incorporated into BMP documents that have been reviewed and approved by the resource agencies and which will be followed throughout construction. All wetland areas not affected by the project will be protected from unnecessary encroachment. Individual avoidance and minimization items are as follows:

- No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.
- The project was designed to avoid or minimize disturbance to aquatic life movements.
- NCDOT will minimize long-term water quality impacts using the most recent Best Management Practices for Protection of Surface Waters, as identified in the Federal Aid Highway Program (FHPM) and North Carolina Administrative Code, Chapter 4.
- NCDOT and its contractors will not excavate, fill, or perform land clearing activities within Waters of the U.S. or any areas under the jurisdiction of the USACE, except as authorized by the USACE. To ensure that all borrow and waste activities occur on high ground, except as authorized by permit, the NCDOT shall require its contractors to identify all areas to be used to borrow material, or to dispose of dredged, fill or waste material. Documentation of the location and characteristics of all borrow and disposal sites associated with the project will be available to the USACE on request.
- The use of Temporary Work Bridges where practicable
- The use of Preformed Scour Holes.
- The use of 3:1 fill slopes in jurisdictional areas where practicable.
- The use of bridges verses culverts at two crossings.
- The use of hand clearing in wetlands where practicable.

### **12.2 Compensation**

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent possible as described above. The unavoidable impacts to jurisdictional wetlands and streams will be offset by compensatory mitigation provided by off-site mitigation. The proposed construction of U-2810 will impact 0.9 ac. of jurisdictional riparian wetlands and 273 linear feet of stream, that will require mitigation within the Cape Fear River Basin. The North Carolina Department of Environment and Natural Resources Ecosystem

Enhancement Program (EEP) will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the unavoidable impacts to 0.9 ac. of impacts to wetland and the 273 linear feet of stream. A copy of the EEP Acceptance Letter is included with this application.

### 13.0 REGULATORY APPROVALS

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

Section 401: Under separate cover NCDOT will submit a request for a Section 401 Water Quality Certification from the N. C. Division of Water Quality when an updated summary of the ICE of this project is completed.

A copy of this permit application will be posted on the DOT website at:  
<http://www.ncdot.org/doh/preconstruct/pe/neu/permit.html>.

If you have any questions or need additional information, please contact Tyler Stanton at (919) 715-1439 or [tstanton@ncdot.gov](mailto:tstanton@ncdot.gov).

Sincerely,



for

Gregory J. Thorpe, Ph.D.  
Environmental Management Director, PDEA Branch

Cc:

W/attachment

Ms. Kathy Matthews, USEPA

W/o attachment (see website for attachments)

Dr. David Chang, P.E., Hydraulics

Mr. Greg Perfetti, P.E., Structure Design

Mr. Victor Barbour, P.E., Project Services Unit

Mr. Mark Staley, Roadside Environmental

Mr. Terry Gibson, P.E, Division 6 Engineer

Mr. Jim Rerko, Division 6 Environmental Officer

Mr. Jay Bennett, P.E., Roadway Design

Mr. Majed Alghandour, P. E., Programming and TIP

Mr. Art McMillan, P.E., Highway Design

Mr. Scott McLendon, USACE, Wilmington

Mr. Travis Wilson, NCWRC

Mr. Gary Jordan, USFWS

Ms. Anne Deaton, NCDMF

Mr. Ron Sechler, NMFS

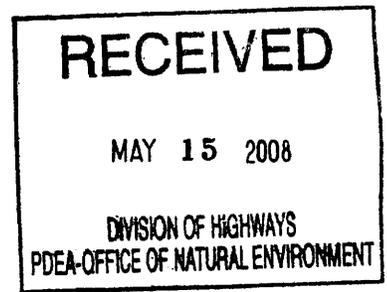
Mr. Charles Cox, P.E., PDEA

Ms. Beth Harmon, EEP

Mr. Todd Jones, NCDOT External Audit Branch

Mr. Drew Joyner, P.E., Human Environment Unit Head

Mr. Clarence W. Coleman, P.E., FHWA



May 14, 2008

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

Dear Dr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

**U-2810A**, SR 1003 (Camden Road) Widening from NC 59 (Hope Mills Road) to South of SR 3019 (Midland Court), Cumberland County

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the subject project. Based on the information supplied by you on May 5, 2008, the impacts are located in CU 03030004 of the Cape Fear River Basin in the Southern Inner Central Piedmont (SICP) Eco-Region, and are as follows:

Warm Stream: 273 feet

Riparian Wetland: 0.90 acres

EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation to offset the 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.

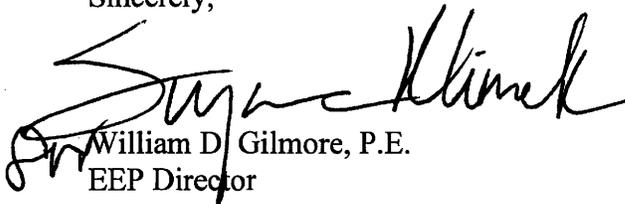
*Restoring... Enhancing... Protecting Our State*

North Carolina Ecosystem Enhancement Program, 1652 Mail Service Center, Raleigh, NC 27699-1652 / 919-715-0476 / [www.nceep.net](http://www.nceep.net)



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

Sincerely,

A handwritten signature in black ink, appearing to read "W. D. Gilmore". The signature is fluid and cursive, with a large initial "W" and "D".

William D. Gilmore, P.E.  
EEP Director

cc: Mr. Richard Spencer, USACE – Wilmington Regulatory Field Office  
Mr. Brian Wrenn, Division of Water Quality, Wetlands/401 Unit  
File: U-2810A

**FINAL MINUTES OF INTERAGENCY 4C MEETING  
MEETING FOR PROJECT U-2810, CUMBERLAND COUNTY  
HELD ON 8/22/07**

Team Members:	Andrew Nottingham	NCDOT Hydraulics (Present)
	Richard Spencer	USACE (Present)
	Gary Jordan	USFWS (Absent)
	Travis Wilson	NCWRC (Absent)
	Rob Ridings	NCDWQ (Present)
	Kathy Matthews	EPA (Present)
	Donnie Brew	FHWA (Present)
	Roger Thomas	NCDOT Roadway (Present)
	Tyler Stanton for Elizabeth Lusk	NEU (Present)
	Charles Cox for Undrea Major	PDEA (Present)
	Tracey Pittman	Division 6 (Present)

Participants:

John Frye	NCDOT Structures
Amy Billings	NCDOT Hydraulics
Phil Harris	NCDOT-PDEA/NEU
Mark Staley	NCDOT-REU
Lee Puckett	NCDOT-Bridge Construction
Jim Rerko	NCDOT-DIV 6 DEO

DOT began the meeting at 2:00 P.M. with an overview of the project. Since the last 4B meeting held on 6/15/07, there have been several changes and adjustments to the project, especially the bridges.

Hydraulics reviewed the Stormwater Management Plan included with the permit package.

Hydraulics discussed Site 1 on sheet 4 of the plans. The existing 42" RCP shown at Sta 21+70 -L- (Rt) (Unnamed Tributary 3) will be extended by approximately 96 LF. On this plan sheet, there is also an outlet from the storm drain system to a grass swale to the northwest to obtain treatment before discharging into the channel. USACE would like the work to be done (ex. Extending existing 42" RCP) indicated clearly on the permit plan sheet as well as the length of the extension. They would also like a scale on each permit plan sheet. USACE indicated that this was standard practice as indicated in their permit application instructions. Hydraulics said this could be done. Hydraulics noted that the scale was shown on the permit drawing title sheet, the type and size of pipe was labeled on the wetland permit impact summary sheet and the pipe size and extension was labeled on the permit drawings.

Hydraulics explained that the small wetland area shown on Sheet 4 was actually included on Site 2. USACE wanted to have more stars added to the shaded area of mechanized

clearing. Sheet 4 also needs the level for "Wetland Boundary" shown on the plans. The easement indicated on the right side of sheet 4 may be removed. At one time in the past, the storm drain system did outlet in this area, however, the wetland boundary has been revised and now the system is draining into the upland area between the wetlands. (See sheet 5)

Hydraulics moved to Site 2 on sheet 5 of the plans and gave a brief history of this location. The design used to be 2 bridges at this location. Now the 2 bridges have been squeezed together to form one very wide bridge. The original design was cored slab with top down construction. However, since it is now 84' wide, cored slab is no longer feasible. Due to flooding issues at this location, the grade had to be raised. The current design is a 36" pre-stressed concrete girder bridge. This bridge is in a detailed Flood Insurance Study and the design is required to have no rise in the 100-year flood. Therefore, the bridge opening had to be made longer (230'). Since it is now a concrete girder, top down construction is no longer feasible.

A temporary work bridge will be used during construction and hand clearing will be done under the bridge. There are still 3 overflow pipes at 66" each and they are spaced further apart than the original design (as requested by USACE). There are no deck drains except on the last span on the right side of the bridge. These deck drains have rip rap underneath the bridge to prevent erosion. Impacts to the wetlands due to this rip rap need to be shown on the permit drawings. Catch basins will be picking up deck drainage from either side of the bridge.

Hydraulics reviewed the "Wetland Restoration" area indicated on the permit drawings under the proposed bridge. USACE questioned the height of the bridge over this area. Hydraulics indicated it was approximately 6'. USACE indicated that there would not be adequate sunlight for vegetation and vegetation is one of the 3 parameters required for wetland restoration. The wetland restoration area would also require monitoring and the area was considered too small to waste time and money on monitoring. DWQ also considered the area to not be cost effective. NEU agreed that the area was too small to spend resources on monitoring.

Division 6 noted that they have had scour problems with interior bents located near the stream banks when H piles are used and it would be better to use pipe piles. USACE questioned a need to armor the piles in the active channel. Structure Design responded that we do not armor piles with DOT bridge design. If we prefer pipe piles, Structure Design suggested Hydraulics and Structures talk to the Geotech Unit and tell them that pipe piles are the preferred alternative rather than H piles.

At Site 2, USACE asked about the rip rap at the outlet of the three 66" RCPs shown on sheet 5. USACE was concerned about a channel developing beyond the outlet of the pipes. Hydraulics indicated that hydraulics warrant the use of rip rap. USACE wanted the rip rap kept to a minimum. Hydraulics indicated that what was shown on the plans were the minimum dimensions required for rip rap at the outlet of 66" RCPs. USACE

requested that the rip rap be assessed as impacts and added to the total impacts at that site.

Hydraulics moved on to Site 3 (Buckhead Creek). This location consists of a bridge being replaced by a bridge. There are no surface water impacts at this location. Storm drainage system drainage was taken against the grade to provide treatment from a grass swale in the north west area of the bridge. This prevented direct discharge into the stream. USACE was concerned about the existing piles under the existing bridge. They are timber piles. NCDOT asked USACE how they would like them to be removed. If they are cut, they would like them cut 1 foot below the bed. Another option is to vibrate them and pull them out. USACE did not want the timber piles to remain in place. These 2 options should be indicated in the permit application.

Hydraulics moved on to Site 4. At this location, an existing 24" RCP is being replaced by an 8'x6' RCBC. Project U-620 (Hope Mills Bypass) (upstream of this project) has rerouted drainage through an old channel. This is part of the mitigation on the U-620 project. USACE requested that NCDOT show how the wetlands connect to Buckhead Creek. The quad map (a portion included with the permit package) does show how this channel is connected to Buckhead Creek.

Hydraulics moved on to Site 5. This location has a 30" RCP being removed and replaced with dual 30" RCPs. USACE would like the length of pipe shown on the permit plan sheet.

Hydraulics moved on to Site 6 at the railroad crossing. There is a stream on either side of the tracks. Photos of the stream shown on the U-620 project were distributed. NEU would like USACE to look at this location to determine if it is a jurisdictional stream. NCDOT indicated that a crossing would be required to set the girders of the bridge. USACE indicated that the railroad would be a bigger hurdle in permitting than the USACE at this location. The group questioned what was done on the Hope Mills Bypass project downstream of this location. At that location, they were able to set up on one side of the tracks where there was no stream. USACE would prefer using mats. At this location there are banks on both sides of the tracks. This location has a bridge length of 208' with concrete slope protection. Structure Design commented that the concrete slope protection could be pulled back a little to avoid the stream. The natural slopes are close to 2:1 at this location. Structure Design commented that they should be able to pick a location where a crane can place girders and back out as they place them. Therefore, only one corner of one side of the tracks will be impacted. The total impact will probably be 1/4 of what is shown on the permit plans. The west side of the tracks is the flattest side. NCDOT will coordinate to determine what type of construction access will be required at this location.

At Site 6, the slope stakes have been adjusted to avoid impacts to the stream. The bridge length has been reduced by 20', therefore the girders can be set from one side of the bridge and there will be no impact to the stream.

The meeting was adjourned at approximately 3:00 p.m.

**FINAL MINUTES OF INTERAGENCY 4B MEETING  
MEETING FOR PROJECT U-2810, CUMBERLAND COUNTY  
HELD ON 6/15/05**

Team Members:	Andrew Nottingham	NCDOT Hydraulics (Present)
	Richard Spencer	USACE (Present)
	Gary Jordan	USFWS (Absent)
	Travis Wilson	NCWRC (Present)
	Brian Wrenn	NCDWQ (Present)
	Chris Militscher	EPA (Present)
	Rob Ayers	FHWA (Absent)
	Roger Thomas	NCDOT Roadway (Present)
	Elizabeth Lusk	ONE (Absent)
	Undrea Major	PDEA (Absent)
	Tracey Pittman	Division 6 (Present)

**Participants:**

John Frye	NCDOT Structures
Brian Hanks	NCDOT Structures
Amy Billings	NCDOT Hydraulics
Sam St. Clair	NCDOT Roadway
Charles Cox	PDEA
Deanna Riffey	NCDOT-ONE
Felix Davila	FHWA

DOT began the meeting at 1:00 P.M. with an overview of the project.

Andrew discussed sheet 4 of the plans. The existing 42" RCP shown at Sta 21+70 -L- (Rt) (Unnamed Tributary 3) will be extended by approximately 90 LF. This area drains to Little Rockfish Creek. There will be temporary impacts due to dewatering at this site. Richard Spencer (USACE) questioned the slope of the pipe extension and Andrew replied that it is approximately the same slope as existing. At this location there is a possibility to outlet to a grass swale to the northwest to obtain some treatment rather than outletting directly into the channel. Richard preferred this option of treatment before outletting to the channel. Richard stated that the permit should indicate what type of temporary diversion and what type of dewatering are being used during construction. Some examples included pumping around, using a coffer dam, sheet pile, etc. It is acceptable to list options for the contractor on the permit. This would help avoid permit modifications at a later date. The USACE will look at all the options and authorize all of the options within reason. References can be taken out of the BMP Manual.

Andrew moved to sheet 5 of the plans. The existing 120' bridge over Little Rockfish Creek will be replaced with 200' long dual bridges. This bridge is in a detailed Flood Insurance Study and the design is required to have no rise in the 100-year flood. Hydraulics has designed a 200' long bridge with 3 wetland equalizer pipes at this

location. The design required raising the grade approximately 4 feet on the west side and 3 feet on the east side. There is a long history of flooding problems at this location and extensive repairs have been made to this bridge. Raising the grade would also involve some wetland restoration of 0.102 acres on the east side of the bridge when the existing abutment is removed. Looking at the footprint of the raised grade increases the wetland impact by 0.20 acres. (The original design had a total impact of 0.84 acres.) The planning document indicates a total impact of 1.02 acres at this location. Raising the grade will have an impact of 1.05 acres. The proposed design is a 21" cored slab superstructure with 4 spans (2 spans at 55' and 2 spans at 45'). This bridge is located at a tangent section of the project alignment and is in full superelevation of .02 all the way across the 2 structures. During construction traffic should be maintained on the existing structure. The USACE would like to see the equalizer pipes more spread out than that shown on the plans. Richard would also like to see the equalizer pipes moved to the first terrace location (see natural ground). Richard indicated that equalizer pipes that were buried 1' were starting to cut therefore he preferred the equalizer pipes **not** be buried 1' and place them at grade. There is also a storm drainage system that is taking water off the bridge that may be tied into the equalizer pipes. Richard did not like the idea, however he said he would look at the calculations at that location to see the quantity of flow involved.

Chris Militscher (EPA) wanted to know if the dual bridges could be squeezed together to reduce the impact to the wetlands. He also wanted to know if they could be made into a single structure. Roger Thomas (NCDOT Roadway) indicated that it could be evaluated, but not easily done. In order to have constructability, a minimum of 10' would be required between the bridges. There would also have to be a transition from a grass median to a barrier, which has not been done with great success. Another issue is maintaining traffic. John Frye (NCDOT Structures) indicated that there is no easy way to transition from a median to a barrier. Guardrail would be involved and there is usually insufficient room for a safe transition system. This location on this project also has a turn lane involved. The USACE wants it investigated and would like to know the reasons why we can or cannot build it. Chris (EPA) would like the wetland avoidance minimization well documented. Richard (USACE) discussed pile driving and construction methods. John Frye (Structures) said the type of construction depends on the type of structure we are designing. Right now we are looking at using top down construction with the cored slab up to 55' in length if there are steel piles. We will not be able to do top down construction with concrete piles. We need to decide what type of structure will be built before the permit is drawn up. The proposed design should be backed up with the permit and design methods and construction personnel. Tracey Pittman (Division 6) mentioned that we do not want obligations made before the type of structure is decided upon. John Frye (Structures) said that steel piles should work based on the preliminary information from the NCDOT Geotechnical Unit. The proposed bridge can be built with all top down construction with 3 spans being built from the north and 1 span being built from the south. However, we do not have final foundation recommendations and it may change. Construction methods as well as various options should be indicated on the permit. Permit modifications are holding up construction and some sites have been cleared and grubbed and have had erosion problems while the

contractor is waiting for permit modifications to be approved. Brian Wrenn (DWQ) wanted to know if a bridge could span the stream. John Frye (Structures) indicated that it would involve a deeper superstructure and a work bridge. Brian (DWQ) was concerned with erosion inside of the channel and wanted to avoid having interior piers inside of the channel. Travis Wilson (NCWRC) emphasized that no work bridges be used on this project. Andrew mentioned that another option available would be to look at a 27" box beam design. Richard (USACE) would also like to look at the option of staggering the 2 bridges. Andrew mentioned that there are debris issues that need to be considered. Roger Thomas (Roadway) mentioned that moving the bridge might also push it into the horizontal curve. Richard (USACE) preferred the piles be removed from the channel, the bridge be shifted, and top down construction methods be used. Andrew concluded that we would look at shifting the bridge, using longer spans but still maintaining top down construction, shifting overflow pipes, and removing interior piles from the channel.

Andrew moved on to sheet 6 of the plans and discussed Buckhead Creek. This location has the grade raised 3' for the hydraulic analysis. Two alternatives were investigated. The first one was a triple 14'x10' RCBC with 3' sills on the outer barrels. The second alternative was a 2 span bridge with a total length of 100'. This would most likely be a single bridge rather than dual bridges like those used on Little Rockfish Creek. The construction would be staged. The proposed design is a 21" cored slab bridge with a 40' span and a 60' span. All agencies preferred the bridge. John Frye (Structures) noted that the 60' span may be too long for a cored slab bridge. Andrew said he would see if a 27" box beam would work.

On sheet 6, Andrew described the diversions from project U-620 just upstream of project U-2810. At unnamed tributary 1, the proposed design is a single 8'x6' RCBC (upstream is a single 8'x5' RCBC). At unnamed tributary 2, the proposed design is 2 - 36" RCPs. Richard (USACE) wanted to know how the construction would be phased. He would like to see a sequence of the construction and method of dewatering. He would also like us to look at the slopes through the structures. Richard would also like to see the flare in the wingwall reduced to reduce the impact to the wetlands. Since it is a live stream it is ok to bury the pipe. Travis (NCWRC) likes to see the culverts buried and backfilled for animal passage where this is a concern. Sheet 6 will also have swales between the 8'x6' RCBC and the double 36" RCPs.

On sheet 10, Andrew pointed out that we would not be impacting the wetland. There will be a 10' clearing zone. Richard (USACE) emphasized the importance of adequate sediment and erosion control at this location. Richard also mentioned that the method of clearing should be indicated especially with PDEs. Sometimes it is possible to hand clear instead of using mechanized clearing. It is also advisable to hand clear and not grub until the contractor is ready to start the culvert construction. This is important with steep slopes too.

The meeting adjourned at 2:30 p.m.

# **STORMWATER MANAGEMENT PLAN**

**U-2810, WBS No. 34866.1.1**

**CUMBERLAND COUNTY**

**Hydraulics Project Manager: Andrew Nottingham, PE**

**Date 12/14/08**

## **ROADWAY DESCRIPTION**

The project involves the widening of SR 1003 (Camden Rd.) in Fayetteville from NC 59 (Hope Mills Rd.) to SR 1007 (Owen Dr.). The overall length of the project is 4.12 miles. The proposed improvements will widen the existing two-lane facility to a four-lane (78') curb and gutter section with a 22-foot raised grass median from Hope Mills Road (NC 59) to Crystal Springs Road (SR 1137). A five lane (68') curb and gutter section is proposed for the remainder of the project from Crystal Springs Road (SR 1137) to Owen Drive (SR 1007).

## **ENVIRONMENTAL DESCRIPTION**

The project is located in the Cape Fear River Basin. There are 3 major stream crossings on this project. The first one is located at Little Rockfish Creek which is classified as Class 'B' water. The existing bridge will be replaced with a new bridge. The second crossing is located at Buckhead Creek which is classified as Class 'C' water. The existing bridge will be replaced with a new bridge. The third crossing is located at Station 45+85 +/- and is an Unnamed Tributary to Buckhead Creek.

Approximately 273 feet of existing stream will be impacted due to the project.  
Approximately 0.63 acre of wetlands will be impacted.

## **BEST MANAGEMENT PRACTICES AND MAJOR STRUCTURES**

Best Management Practices (BMPs) and measures used on the project are an attempt to reduce the stormwater impacts to the receiving streams due to erosion and runoff. Grassed swales and preformed scour holes were used where practicable to treat stormwater runoff prior to entering the streams. Bridge deck drainage will not be allowed to directly discharge into the water. There are three major stream crossings consisting of a new replacement bridge at Little Rockfish Creek, a new replacement bridge at Buckhead Creek, and a new culvert replacing a 24" RCP at an Unnamed Tributary to Buckhead Creek.

## **GRASSED SWALES**

- L- STA 19+50 TO STA 21+70
- L- STA 37+00 TO STA 39+50
- L- STA 38+75 TO STA 39+90
- L- STA 45+40 TO STA 45+75
- L- STA 49+25 TO STA 51+00

## **PREFORMED SCOUR HOLES**

- L- STA 46+40
- L- STA 117+03

## **BRIDGES**

- L- STA 27+70 Replace existing bridge over Little Rockfish Creek. This includes a temporary work bridge.
- L- STA 39+86 Replace existing bridge over Buckhead Creek.

## **CULVERTS**

- L- 45+86 Replace existing 24" RCP with 8'x6' RCBC (buried 1' below streambed).

## **PIPE EXTENSIONS**

- L- 21+70 Extend existing 42" RCP with 96' of 42" RCP.

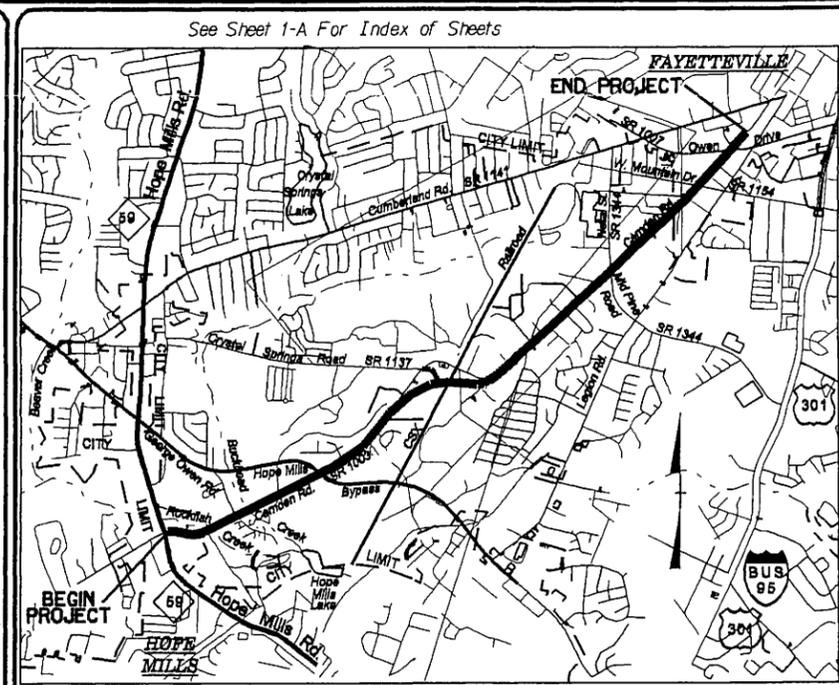
## **PIPE REPLACEMENTS**

- L- 49+66 Replace existing 30" RCP with 2 @ 30" RCPs.

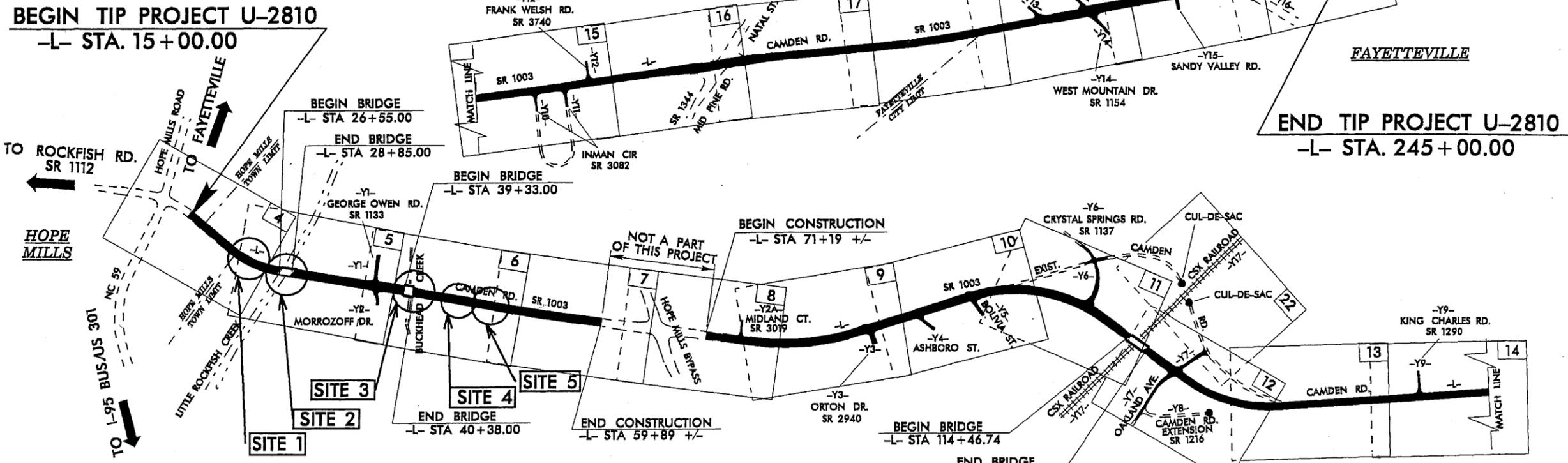
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**TIP PROJECT: U-2810**

**CONTRACT:**



**VICINITY MAP**



PORTIONS OF THIS PROJECT ARE WITHIN THE MUNICIPAL BOUNDARIES OF HOPE MILLS AND FAYETTEVILLE  
 NOTES: CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II

STATE OF NORTH CAROLINA  
 DIVISION OF HIGHWAYS

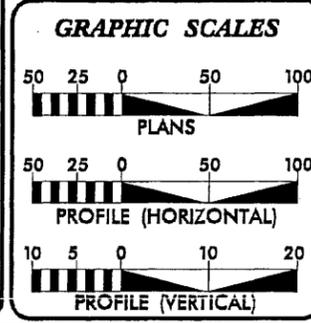
**CUMBERLAND COUNTY**

LOCATION: FAYETTEVILLE - SR 1003 (CAMDEN RD.) FROM  
 NC 59 (HOPE MILLS RD.) TO NORTH OF SR 1007 (OWEN DR.)

**WETLAND /SURFACE WATER PERMIT**

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2810	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34866.1.1	STP-1003(22)	P.E.	
34866.2.2	STP-1003(22)	RW & UTIL	

Permit Drawing  
 Sheet 1 of 20  
 PRELIMINARY PLANS  
 DO NOT USE FOR CONSTRUCTION



**DESIGN DATA**

ADT 2004 =	15,400
ADT 2030 =	26,800
DHV =	10 %
D =	60 %
T =	5 % *
V =	50 MPH
* TTST 1%	DUAL 4%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJ. U-2810 =	4.022 MILES +/-
LENGTH STRUCTURES TIP PROJ. U-2810 =	0.101 MILES +/-
TOTAL LENGTH OF TIP PROJ. U-2810 =	4.123 MILES +/-

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

2006 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: SEPTEMBER 29, 2006	ROGER D. THOMAS, P.E. PROJECT ENGINEER
LETTING DATE: N/A	SAMUEL L. ST. CLAIR PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

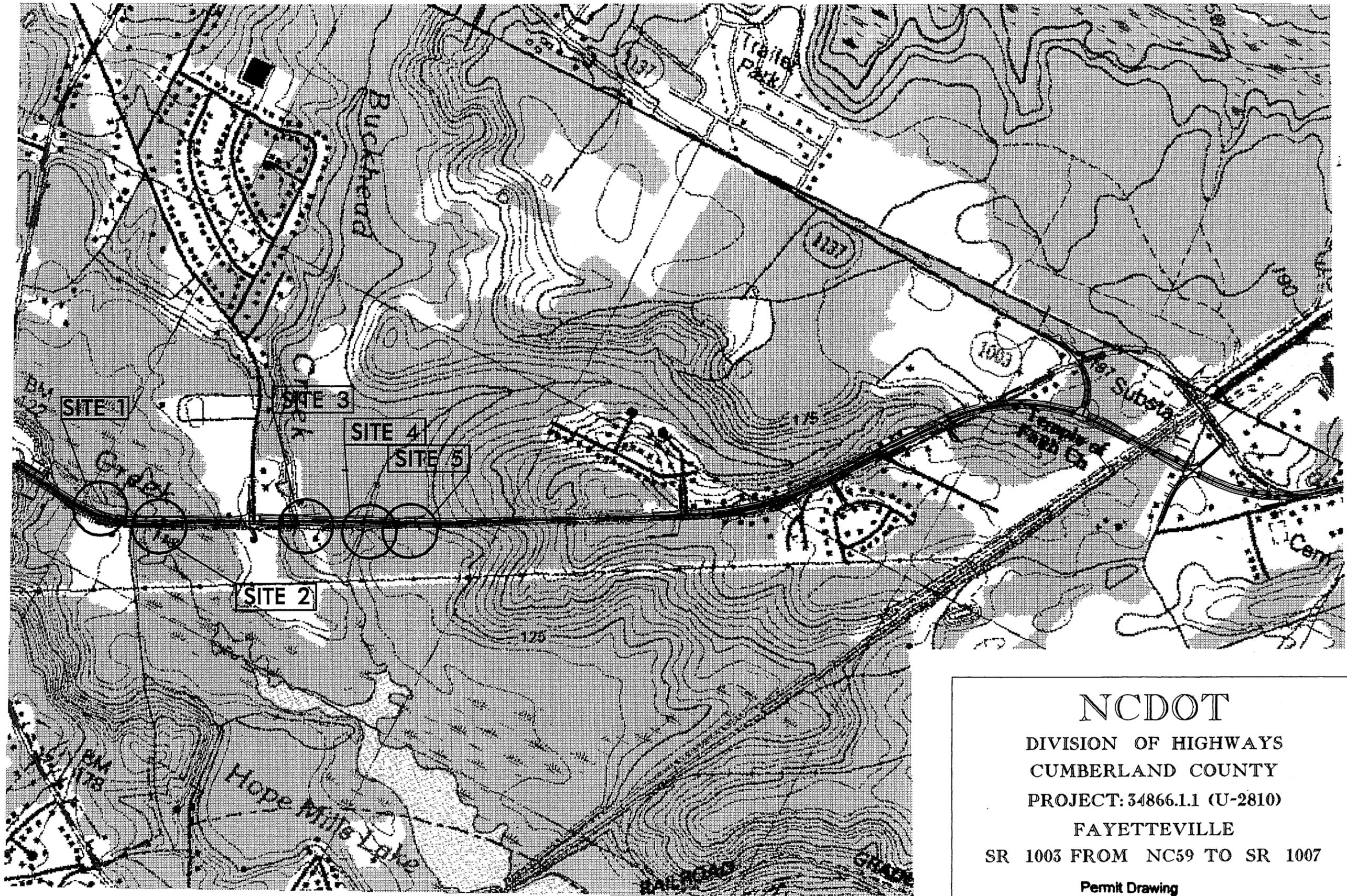
**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**DIVISION OF HIGHWAYS  
 STATE OF NORTH CAROLINA**

STATE HIGHWAY DESIGN ENGINEER

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NOT TO SCALE PLAN VIEW

NCDOT  
 DIVISION OF HIGHWAYS  
 CUMBERLAND COUNTY  
 PROJECT: 34866.1.1 (U-2810)  
 FAYETTEVILLE  
 SR 1003 FROM NC59 TO SR 1007  
 Permit Drawing  
 Sheet 2 of 20  
 SHEET OF 1/14/08

PROPERTY OWNERS  
NAMES AND ADDRESSES

PARCEL NO.	NAMES	ADDRESSES
4	NEIL SMITH	5301 CAMDEN ROAD, FAYETTEVILLE, NC 28306
5	NEIL SMITH	5301 CAMDEN ROAD, FAYETTEVILLE, NC 28306
6	NEIL SMITH	5301 CAMDEN ROAD, FAYETTEVILLE, NC 28306
7	BEVERLY MATTHEWS	PO BOX 39, HOPE MILLS, NC 28348
11	KATHERINE WARD	PO BOX 747, FAYETTEVILLE, NC 28302
12	MARY ALMA GILLIS	8621 CALATIA CHURCH RD. FAYETTEVILLE, NC 28306

Permit Drawing  
Sheet 3 of 20

NCDOT  
DIVISION OF HIGHWAYS  
CUMBERLAND COUNTY  
PROJECT: 34866.1.1 (U-2810)  
FAYETTEVILLE  
SR 1003 FROM  
NC 59 TO NORTH OF SR 1007

**WETLAND PERMIT IMPACT SUMMARY**

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS					
			Permanent Fill in Wetlands (ac)	Temp. Fill in Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)	
1	21+70 -L-	42" RCP							0.03	0.01	96	20	
2	27+70 -L-	BRIDGE LITTLE ROCKFISH L=230' 36" PRE GIRDER	0.62			0.26	0.08		0.00				
3	39+85.50-L-	BRIDGE BUCKHEAD CREEK L=105' 36" PRE GIRDER	0.00						0.00				
4	45+86 -L-	CULVERT 8'X6' BOX	0.01			0.01			0.03	0.01	98	20	
5	49+66 -L-	2 @ 30" RCP							0.02	0.01	79	20	
<b>TOTALS:</b>			<b>0.63</b>	<b>0.00</b>	<b>0.00</b>	<b>0.27</b>	<b>0.08</b>	<b>0.08</b>	<b>0.08</b>	<b>0.03</b>	<b>273</b>	<b>60</b>	

SITE 2 PERMANENT IMPACT AREA DUE TO BENT LOCATIONS IS 70 SF

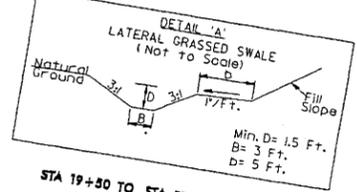
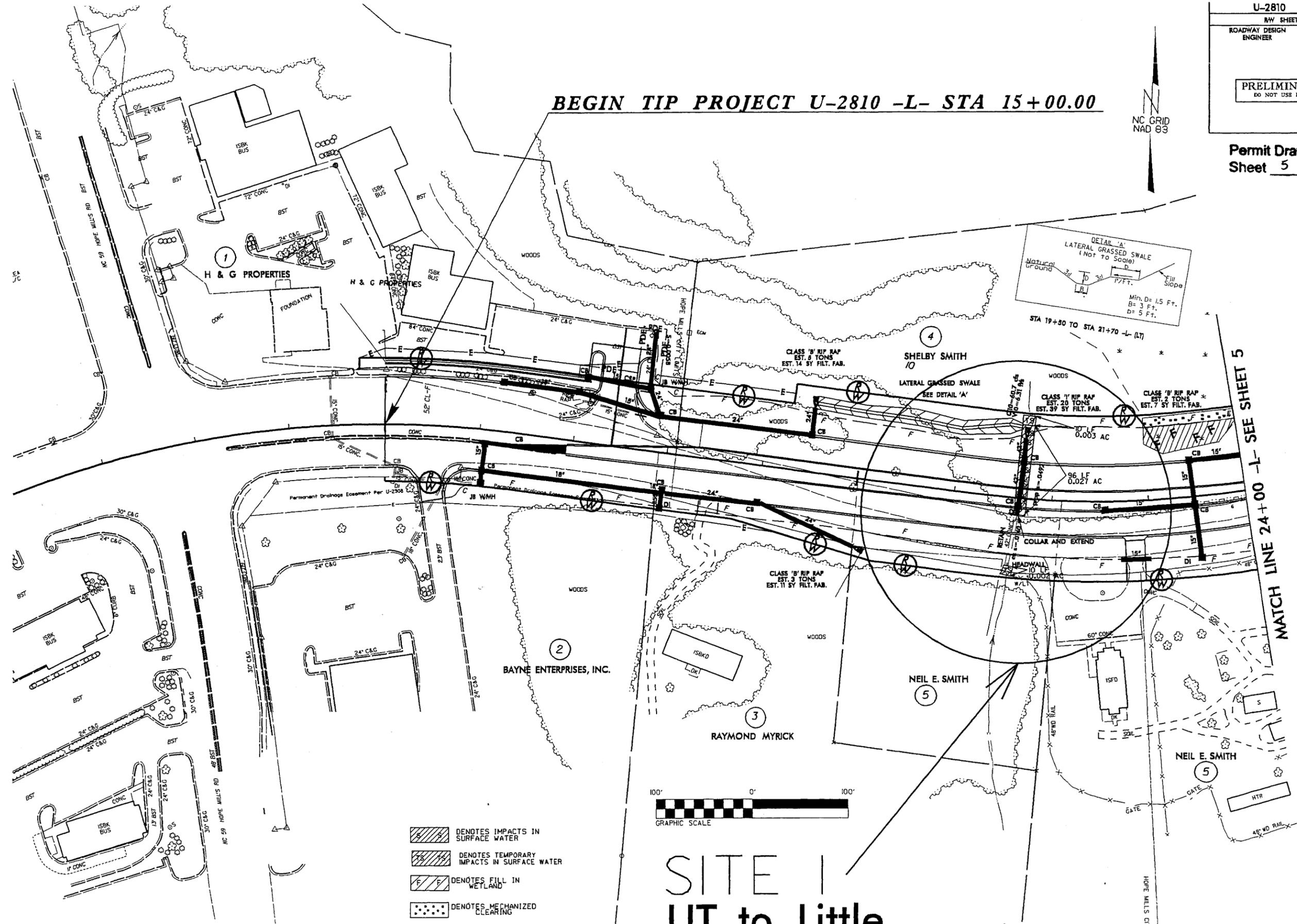
NC DEPARTMENT OF TRANSPORTATION  
DIVISION OF HIGHWAYS  
CUMBERLAND COUNTY  
WBS - 34866.1.1 (U-2810)

RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

Permit Drawing Sheet 5 of 20

### BEGIN TIP PROJECT U-2810 -L- STA 15+00.00

NC GRID NAD 83



STA 19+50 TO STA 21+70 -L- (LT)

MATCH LINE 24+00 -L- SEE SHEET 5

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



# SITE 1 UT to Little Rockfish Creek

SEE SHEET 2-F FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 23 FOR -L- PROFILE  
 SEE SHEET 23 FOR -DR1- PROFILE

REVISIONS  
R/W REV. (8/11/07) ELIMINATED PROPOSED TCE AND PDE ON PARCEL 2. REDUCED TCE ON PARCEL 3. -SIS

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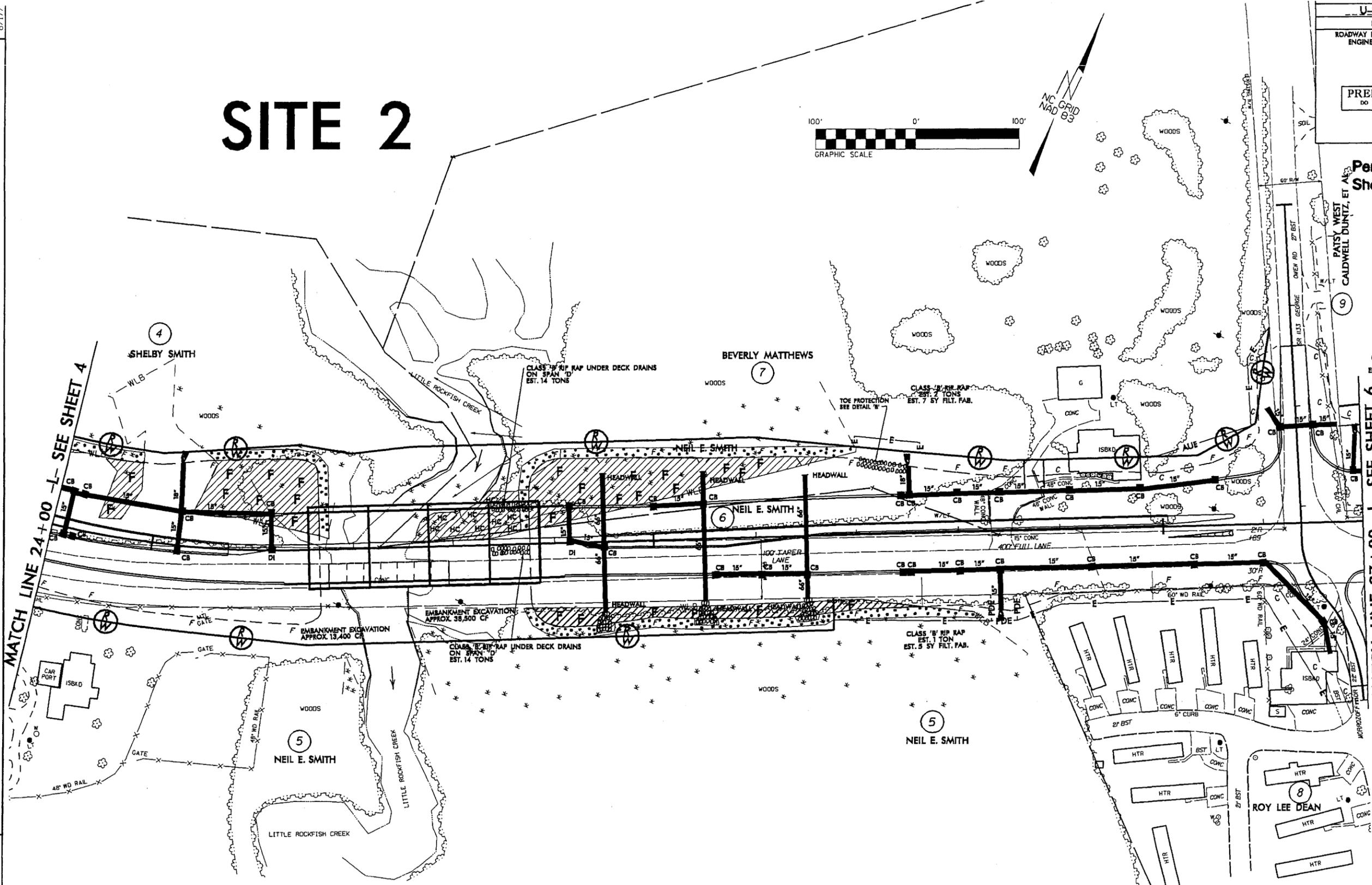
8/17



# SITE 2

U-2810		5
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

Permit Drawing Sheet 7 of 20



- DENOTES FILL IN WETLAND
- DENOTES HAND CLEARING
- DENOTES RESTORED WETLANDS
- DENOTES MECHANIZED CLEARING

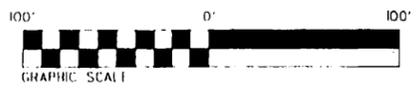
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT S- FOR STRUCTURE PLANS

REVISIONS  
 B.W. REV. (5/22/07) - CHANGED PROPERTY OWNER NAME ON PARCEL 9.618

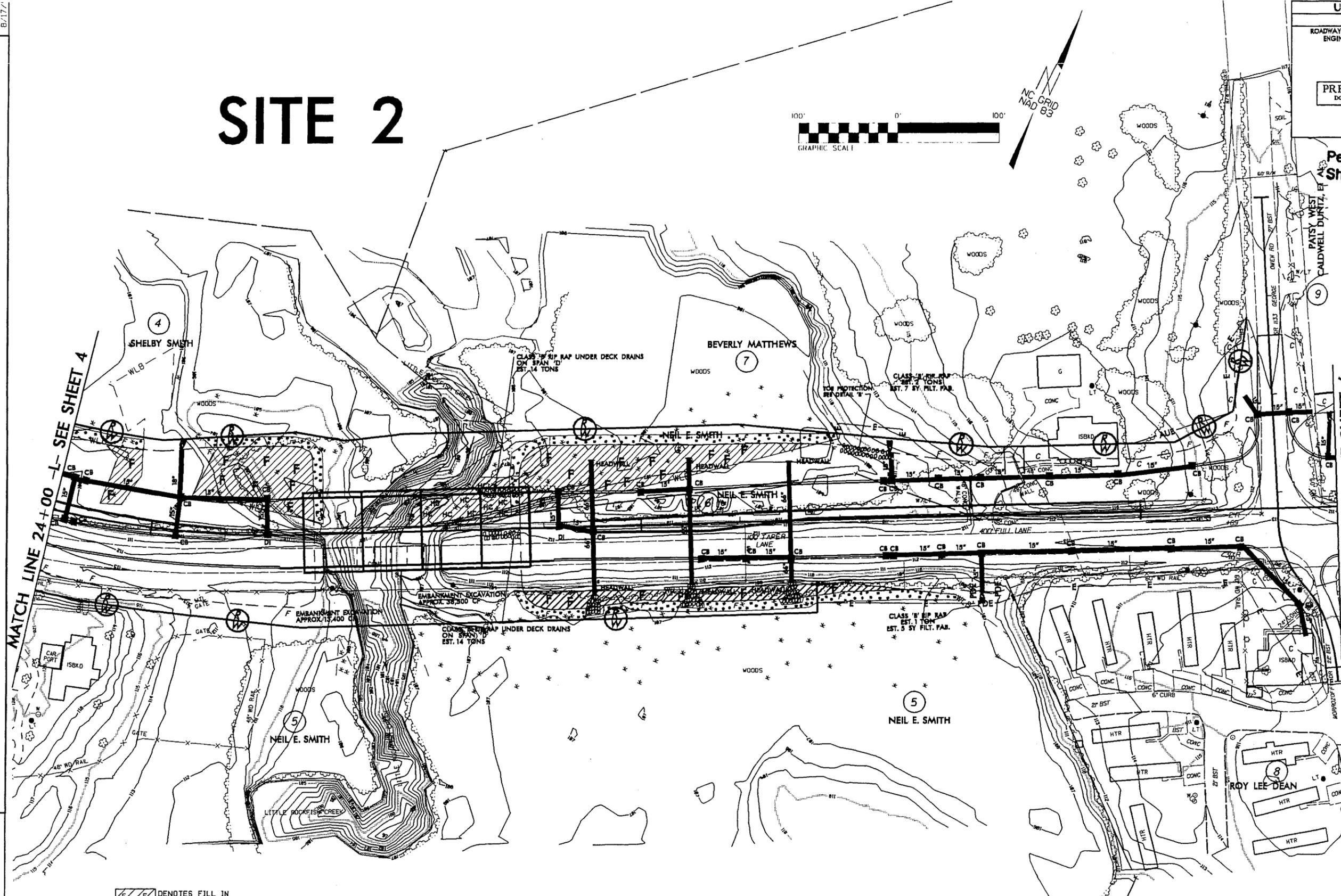
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U-2810		5
NW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS		
DO NOT USE FOR CONSTRUCTION		

# SITE 2



Permit Drawing Sheet 8 of 20



MATCH LINE 24+00 -L- SEE SHEET 4

MATCH LINE 37+00 -L- SEE SHEET 6

- DENOTES FILL IN WETLAND
- DENOTES HAND CLEARING
- DENOTES RESTORED WETLANDS
- DENOTES MECHANIZED CLEARING

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT S- FOR STRUCTURE PLANS

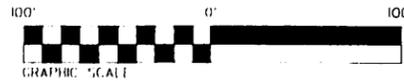
R/W REV. (5/22/07) - CHANGED PROPERTY OWNER NAME ON PARCEL 9.sis

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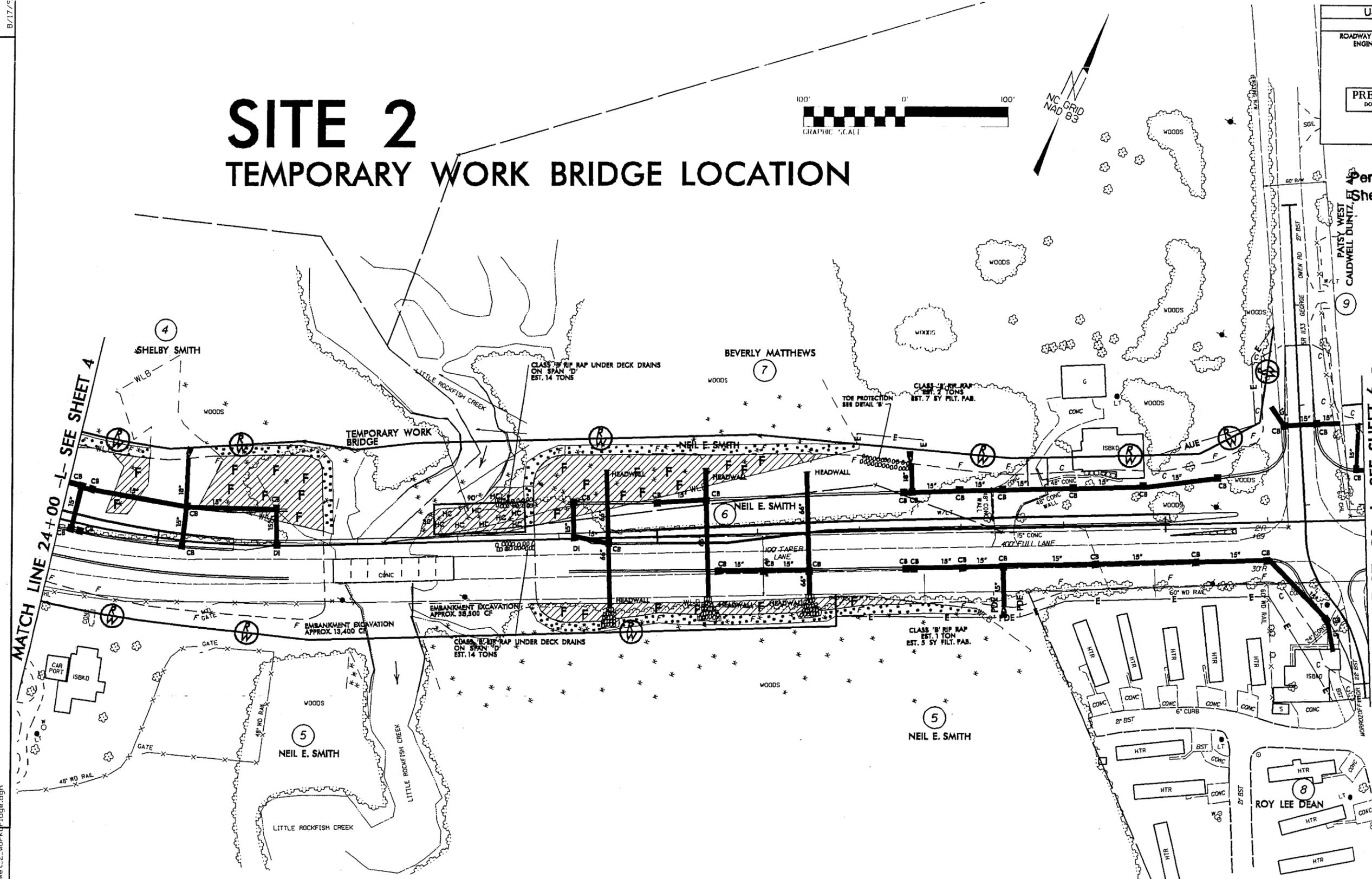
B.17.1

# SITE 2

## TEMPORARY WORK BRIDGE LOCATION



Permit Drawing  
Sheet 9 of 20



REVISIONS  
R/W REV. 5/22/07 - CHANGED PROPERTY OWNER NAME ON PARCEL 9.sis

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

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT S- FOR STRUCTURE PLANS

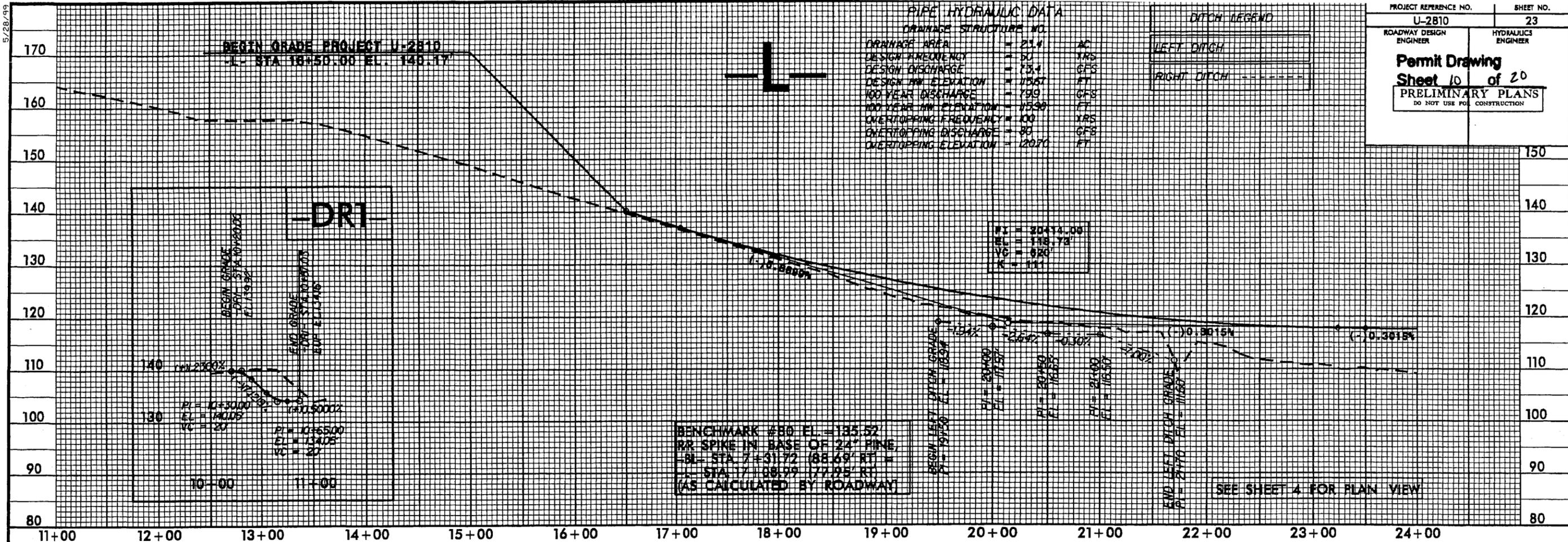
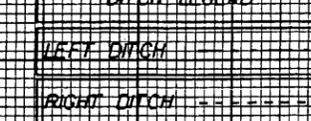
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PROJECT REFERENCE NO. U-2810	SHEET NO. 23
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>Permit Drawing</b>	
Sheet 10 of 20	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

### PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.		
DRAINAGE AREA	= 23.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 75.4	GFS
DESIGN HW ELEVATION	= 115.67	FT
100 YEAR DISCHARGE	= 79.9	GFS
100 YEAR HW ELEVATION	= 115.99	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 80	GFS
OVERTOPPING ELEVATION	= 120.70	FT

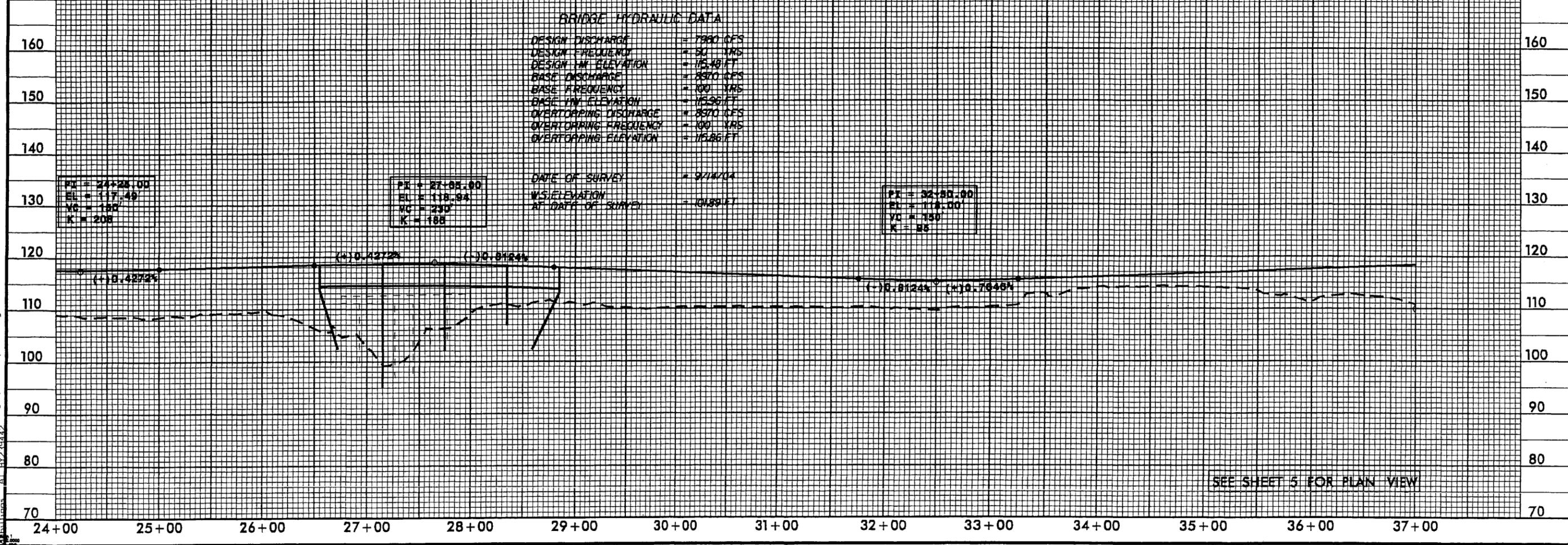
### DITCH LEGEND



### BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 7960	GFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 115.49	FT
BASE DISCHARGE	= 8970	GFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 115.96	FT
OVERTOPPING DISCHARGE	= 8970	GFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 115.86	FT

DATE OF SURVEY = 9/14/04  
WS ELEVATION AT DATE OF SURVEY = 101.89



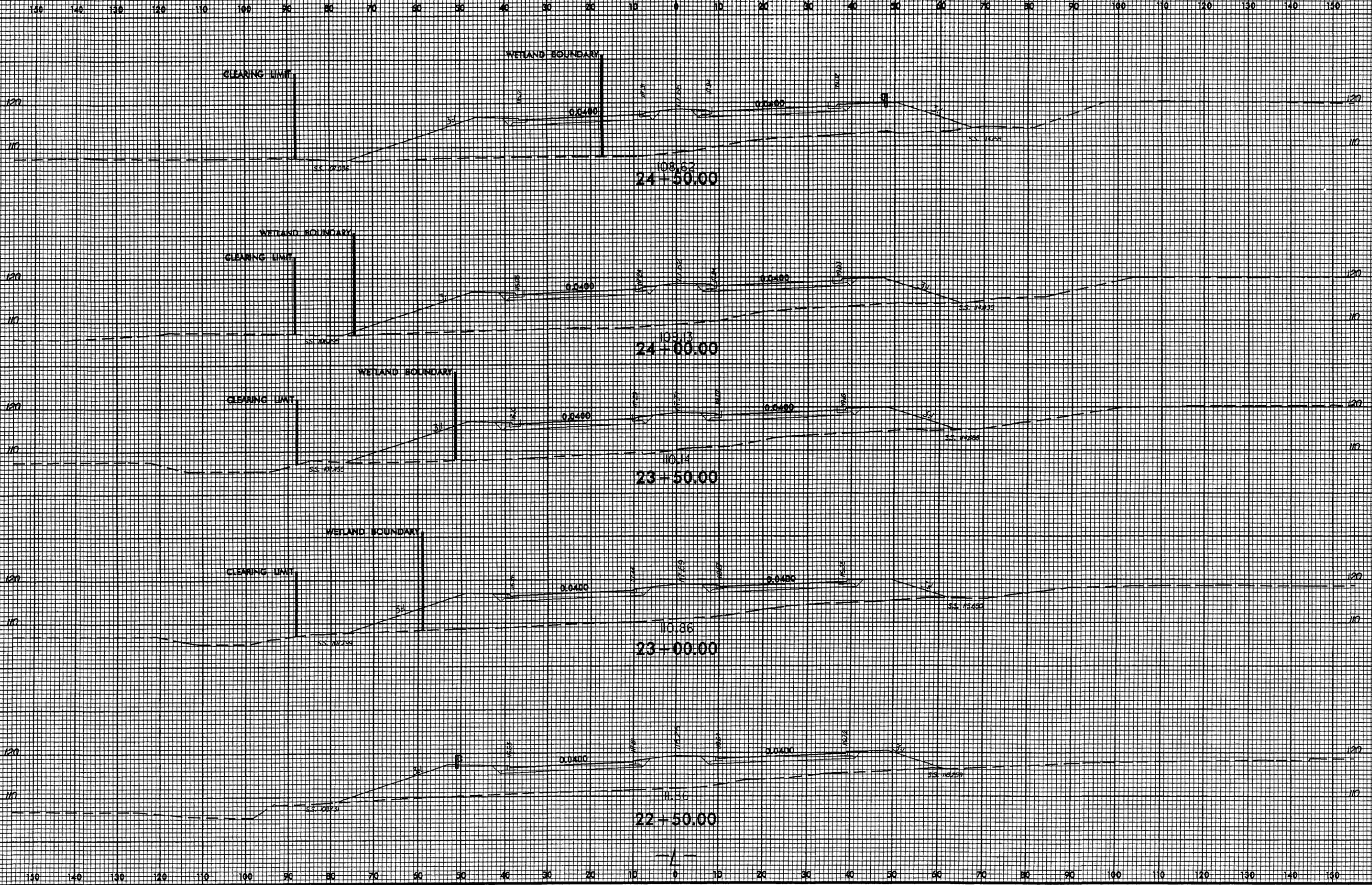
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8/23/99



PROJ. REFERENCE NO.  
U-2810

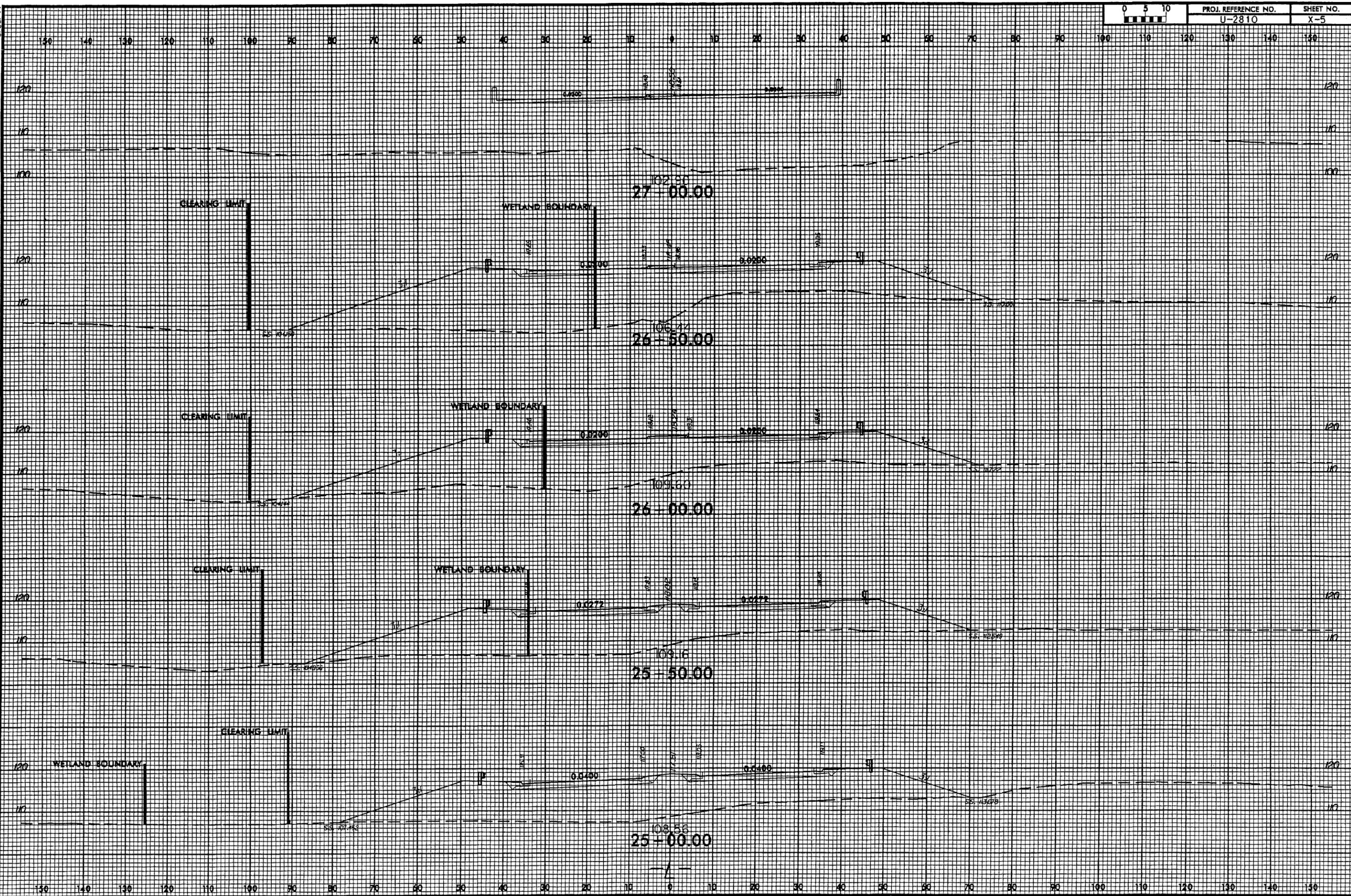
SHEET NO.  
X-4



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Permit Drawing  
Sheet 11 of 20

8/23/95

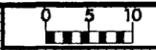


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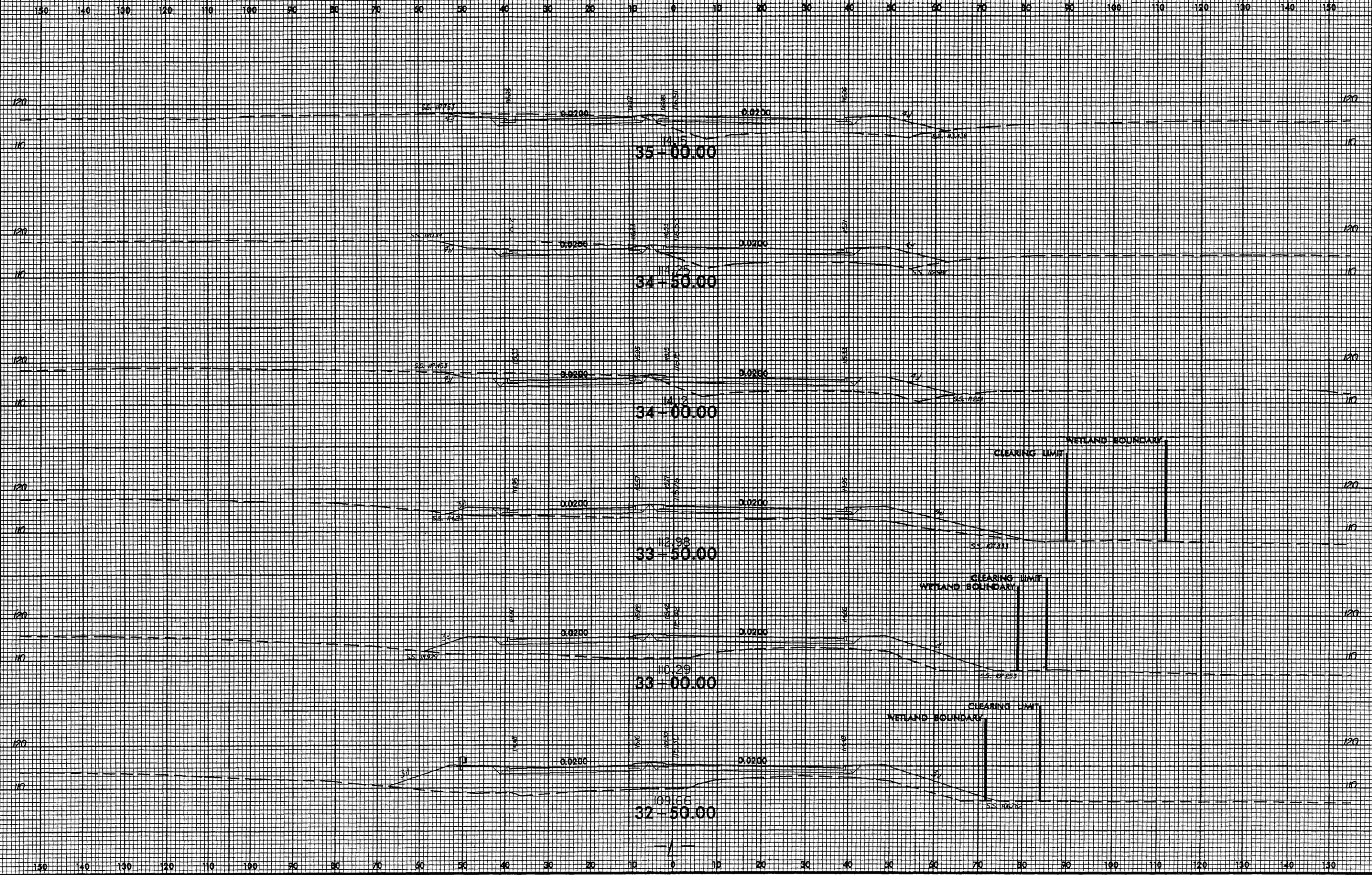




B/23/98



PROJ. REFERENCE NO. U-2810  
SHEET NO. X-8



06-AUG-2007 11:25  
\\server\projects\permit\sections\1.xpl.shd.dgn

Permit Drawing  
Sheet 15 of 20

HW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

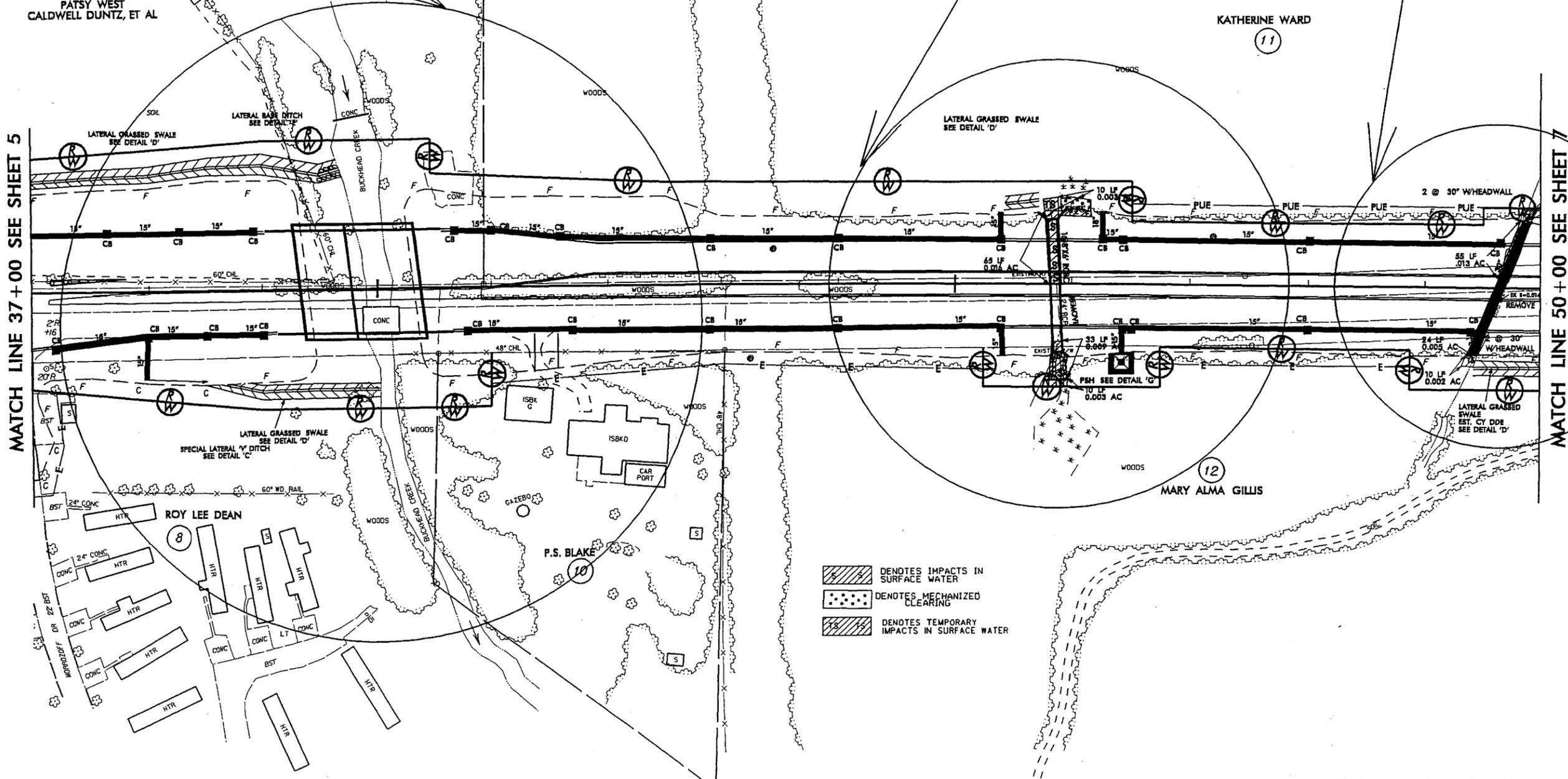
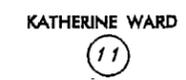
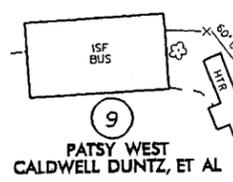


# SITE 3

# UT TO BUCKHEAD CK SITE 4

# UT TO BUCKHEAD CK SITE 5

Permit Drawing  
Sheet 16 of 20



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

MATCH LINE 37+00 SEE SHEET 5

MATCH LINE 50+00 SEE SHEET 7

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 2-G & 2-I FOR BRIDGE SKETCHES  
 SEE SHT 24 FOR -L- PROFILE  
 SEE SHT S- FOR STRUCTURE PLANS  
 SEE SHT C- FOR CULVERT PLANS

REVISED PROPERTY OWNER NAME ON PARCEL 9, 11 & 12

OR-JAN-2008 16:27  
 HYDRAULICS  
 HY 2810.dwg  
 3.dgn  
 1/23/08

REVISIONS

B/177

U-2810		6
RW SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS		
DO NOT USE FOR CONSTRUCTION		

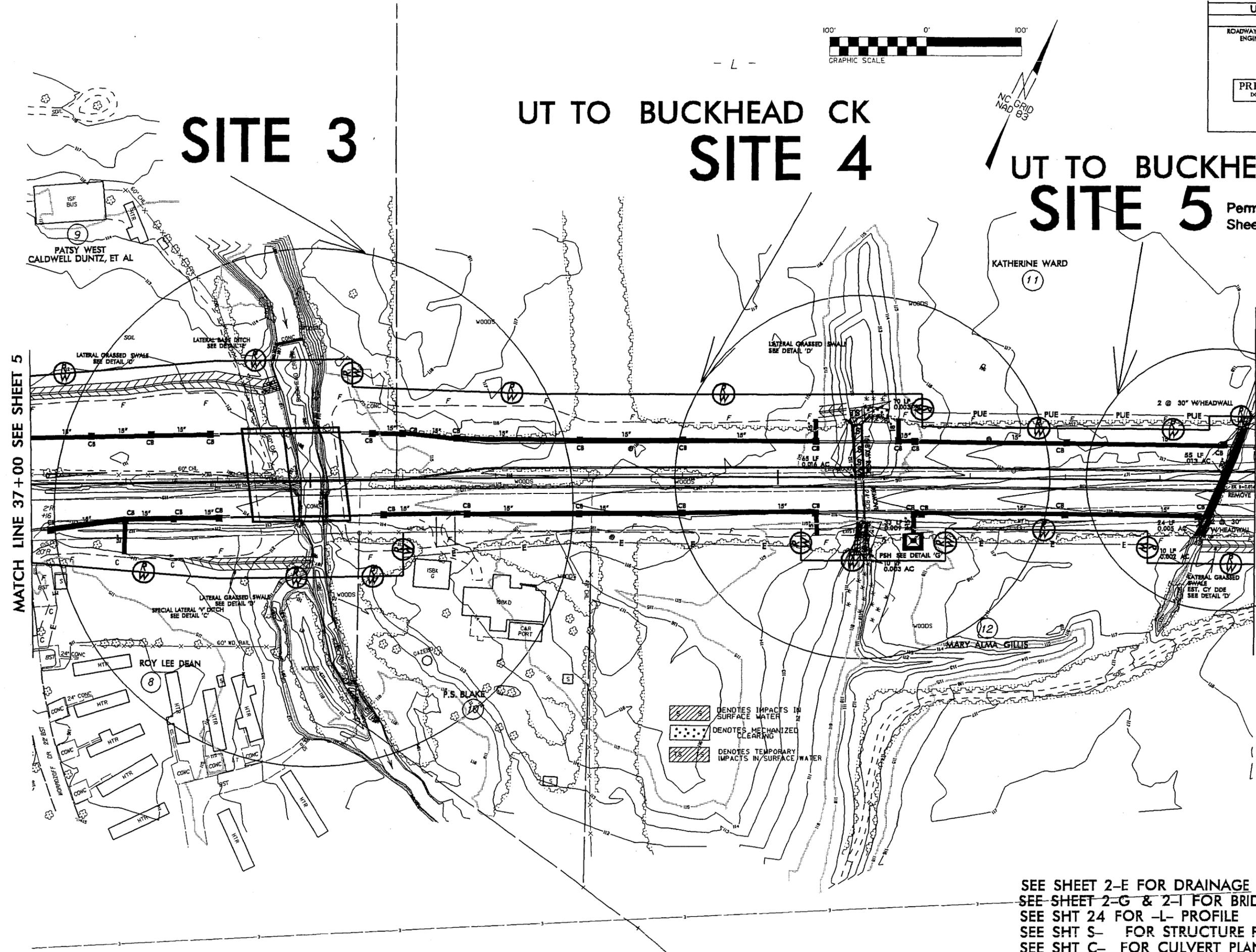


**SITE 3**

UT TO BUCKHEAD CK  
**SITE 4**

UT TO BUCKHEAD CK  
**SITE 5**

Permit Drawing  
Sheet 17 of 20



MATCH LINE 37+00 SEE SHEET 5

MATCH LINE 50+00 SEE SHEET 7

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

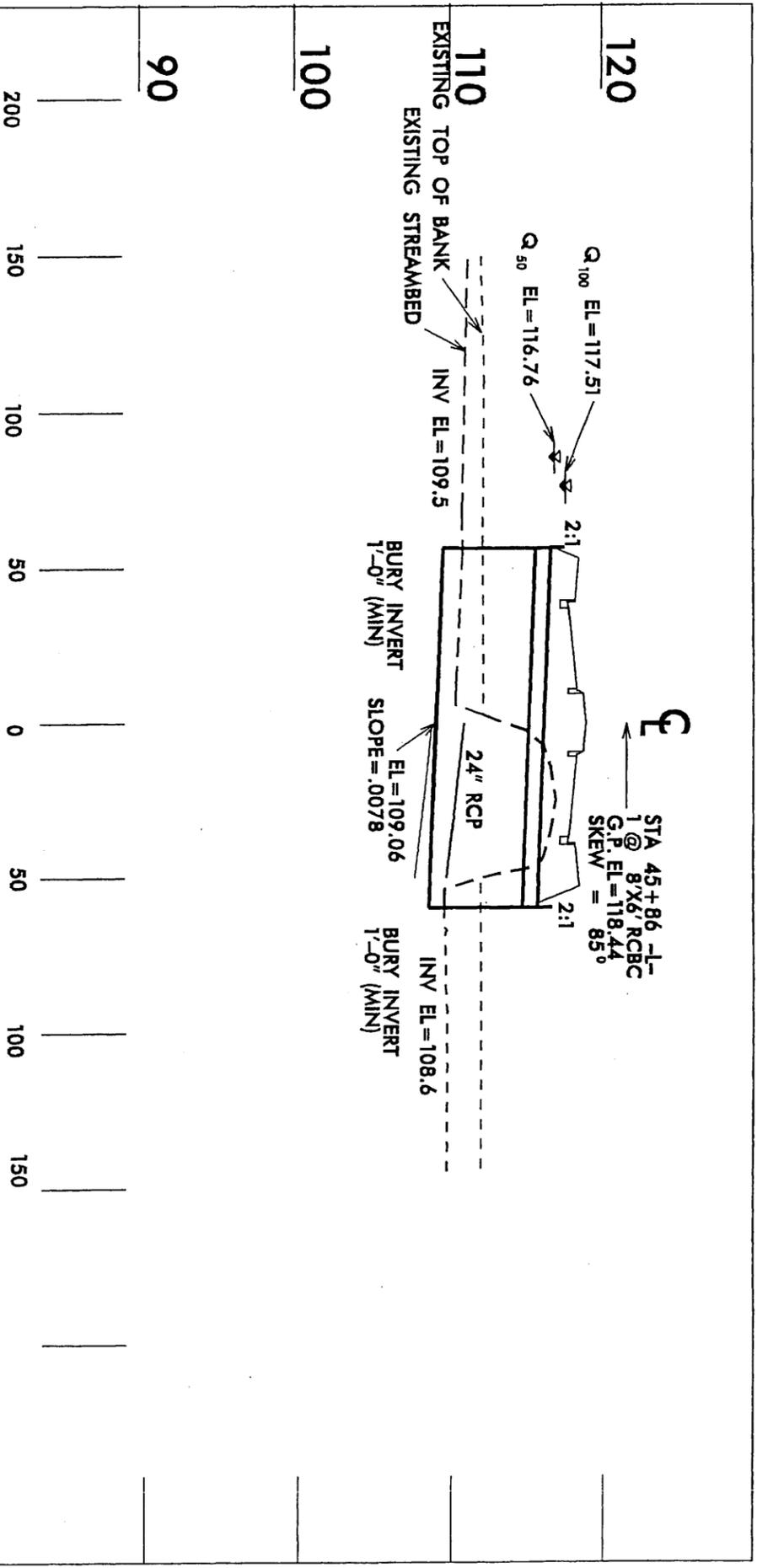
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 2-G & 2-I FOR BRIDGE SKETCHES  
 SEE SHT 24 FOR -L- PROFILE  
 SEE SHT S- FOR STRUCTURE PLANS  
 SEE SHT C- FOR CULVERT PLANS

REVISIONS

R/W REV. 15/22/07 - CHANGED PROPERTY OWNER NAME ON PARCEL 9.916

08-JAN-2008 6:27  
 r:\hydraulic\permits\2810\_hyd-pr-m-we.t\_3.dgn  
 acb\lloga - R1123942

B/17



PROFILE  
 SITE 4

NCDOT

DIVISION OF HIGHWAYS  
 CUMBERLAND COUNTY  
 PROJECT: 34866.11 (C-2810)  
 SR 1003 (CAMDEN RD.) FROM  
 NC 59 (HOPE MILLS RD.)  
 TO NORTH OF SR 1007 (OWEN DR)

5/28/1

02-AUG-2007 08:18 V:\PERMIT\22810\_hyd.pfl.a24\_permit.dgn

### BRIDGE HYDRAULIC DATA

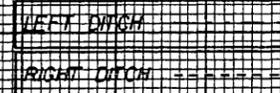
DESIGN DISCHARGE = 2230 CFS  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN HW ELEVATION = 116.79 FT  
 BASE DISCHARGE = 2500 CFS  
 BASE FREQUENCY = 100 YRS  
 BASE HW ELEVATION = 116.93 FT  
 OVERTOPPING DISCHARGE = 3250 CFS  
 OVERTOPPING FREQUENCY = 500 YRS  
 OVERTOPPING ELEVATION = 117.15 FT

DATE OF SURVEY =  
 WS ELEVATION AT DATE OF SURVEY = 106.80 FT

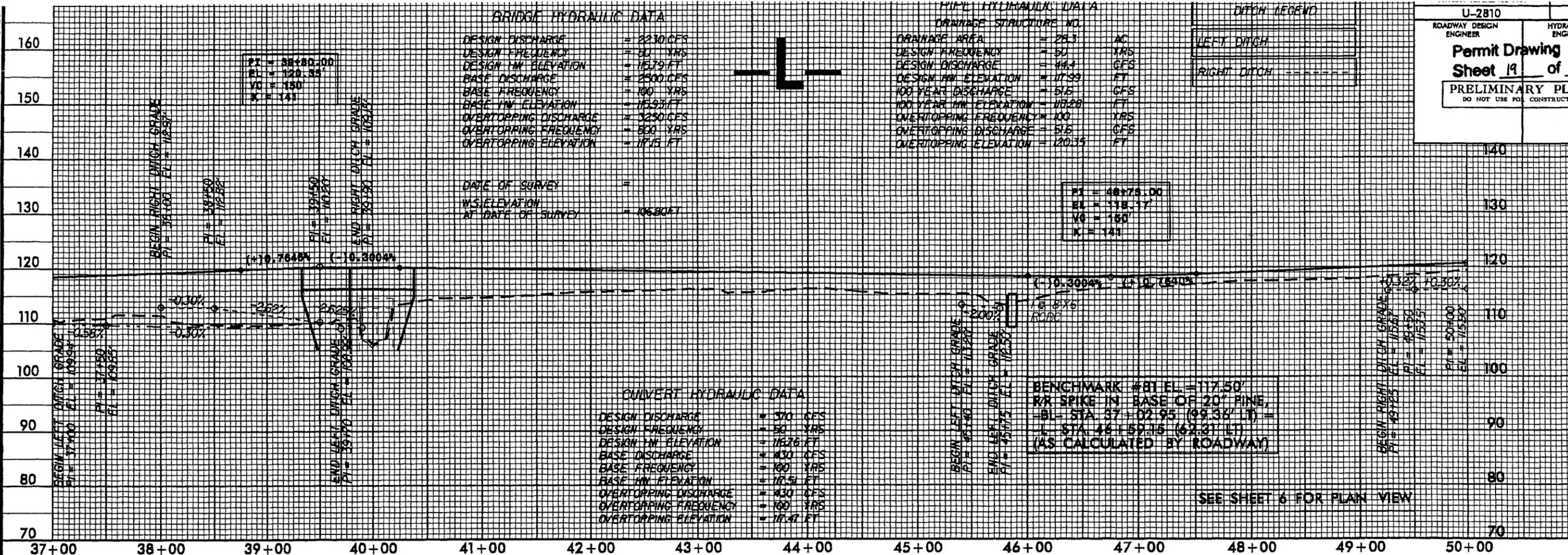
### PIPE HYDRAULIC DATA

ORAINAGE STRUCTURE NO. =  
 DRAINAGE AREA = 25.3 AC  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN DISCHARGE = 44.4 CFS  
 DESIGN HW ELEVATION = 117.99 FT  
 100 YEAR DISCHARGE = 51.6 CFS  
 100 YEAR HW ELEVATION = 118.28 FT  
 OVERTOPPING FREQUENCY = 100 YRS  
 OVERTOPPING DISCHARGE = 51.6 CFS  
 OVERTOPPING ELEVATION = 120.35 FT

### DITCH LEGEND



U-2810	24
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>Permit Drawing</b>	
<b>Sheet 19 of 20</b>	
<b>PRELIMINARY PLANS</b>	
<small>DO NOT USE FOR CONSTRUCTION</small>	

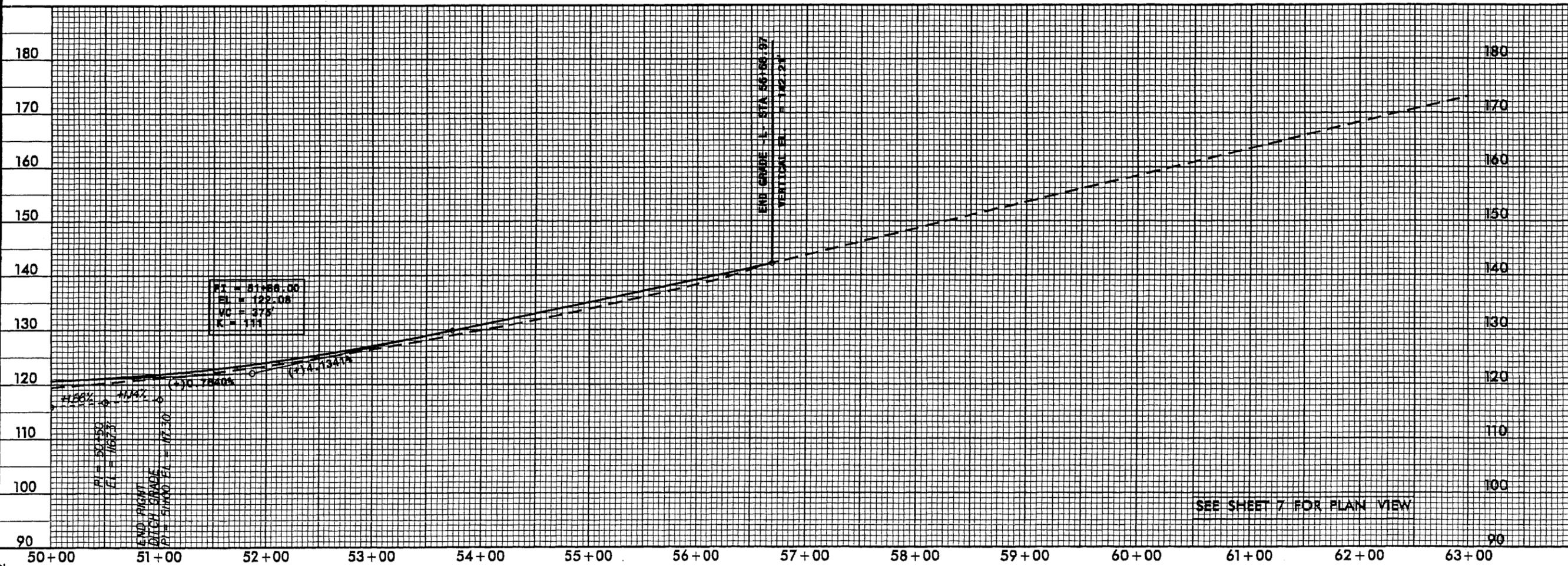


### QUIVERT HYDRAULIC DATA

DESIGN DISCHARGE = 370 CFS  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN HW ELEVATION = 116.76 FT  
 BASE DISCHARGE = 430 CFS  
 BASE FREQUENCY = 100 YRS  
 BASE HW ELEVATION = 117.51 FT  
 OVERTOPPING DISCHARGE = 430 CFS  
 OVERTOPPING FREQUENCY = 100 YRS  
 OVERTOPPING ELEVATION = 117.47 FT

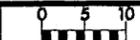
BENCHMARK #81 EL = 117.50  
 RR SPIKE IN BASE OF 20" PINE  
 -BL- STA 37+02.95 (99.38 FT)  
 -L- STA 46+59.18 (62.31 FT)  
 (AS CALCULATED BY ROADWAY)

SEE SHEET 6 FOR PLAN VIEW



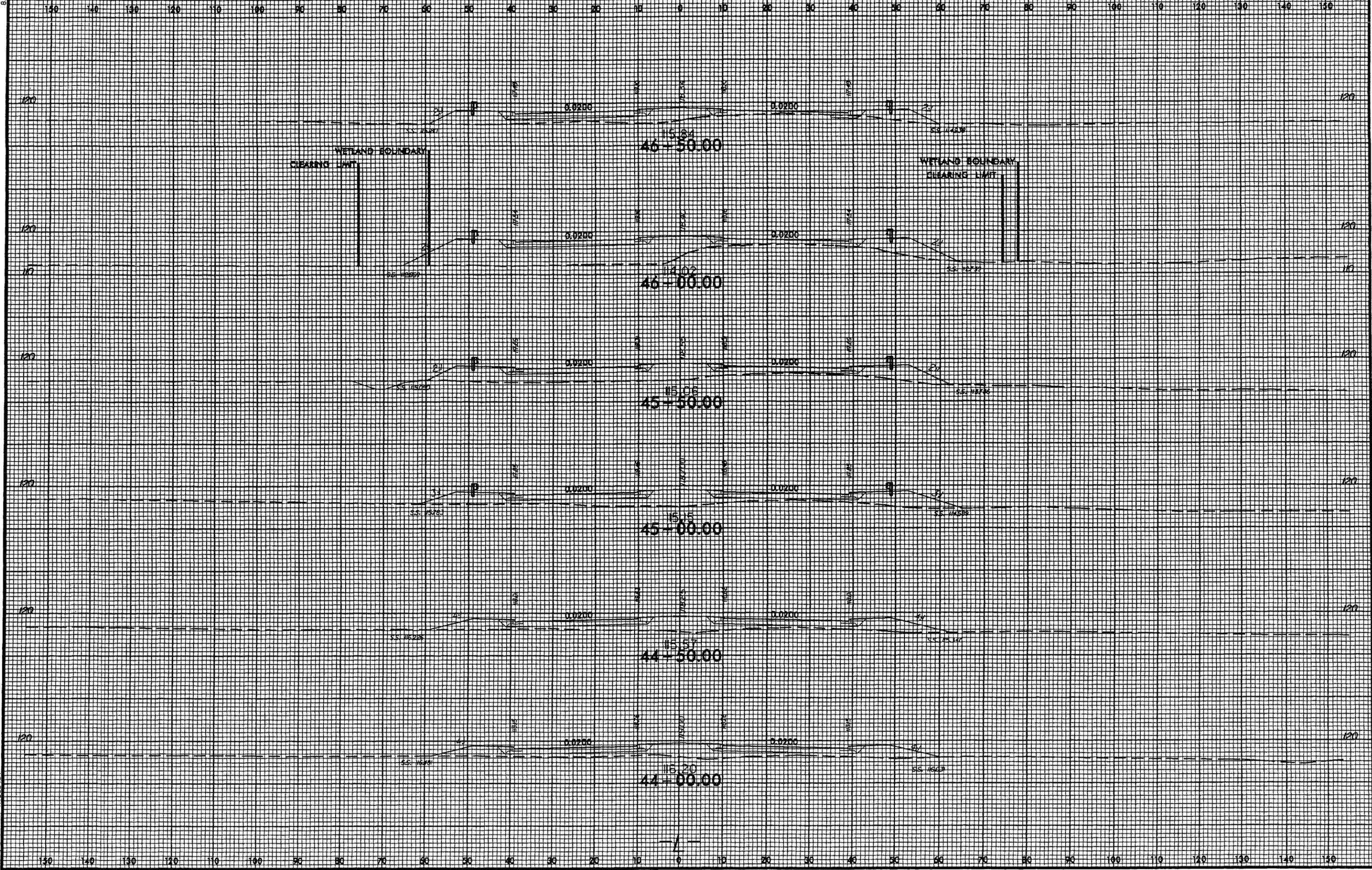
SEE SHEET 7 FOR PLAN VIEW

8/23/05



PROJ. REFERENCE NO.  
U-2810

SHEET NO.  
X-12



C:\hyd\ulies\perm\sections\...\_xpl\_sht4.dgn  
AT 11/28/05 12:53

Permit Drawing  
Sheet 20 of 20

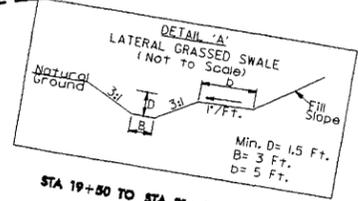


PROJECT REFERENCE NO.		SHEET NO.	
U-2810		4	
HW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

Utility Permit Drawing  
Sheet 2 of 5

BEGIN TIP PROJECT U-2810 -L- STA 15+00.00

NC GRID  
NAD 83



STA 19+50 TO STA 21+70 -L- (17)

MATCH LINE 24+00 -L- SEE SHEET 5



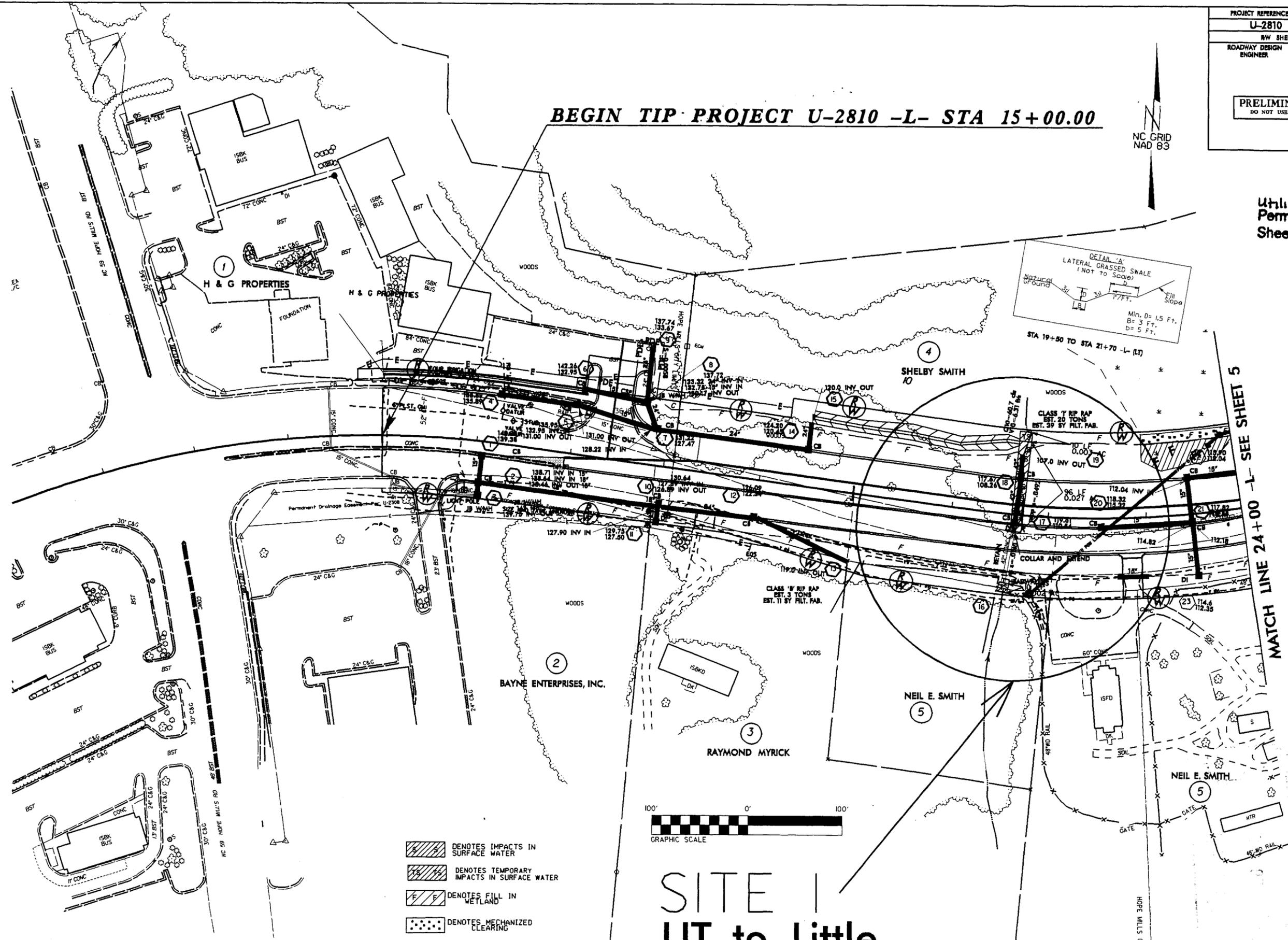
# SITE 1 UT to Little Rockfish Creek

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
SEE SHEET 23 FOR -L- PROFILE  
SEE SHEET 23 FOR -DRI- PROFILE

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

REVISIONS  
R/W REV. 10/1/07 ELIMINATED PROPOSED TCE AND PDE ON PARCEL 2. REDUCED TCE ON PARCEL 3. -sis

8/17/99  
20-FEB-2008 11:44  
C:\Users\jgarcia\Documents\sewer\2810\_hyd\pdm\_wet\_lidgn  
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8/17/99

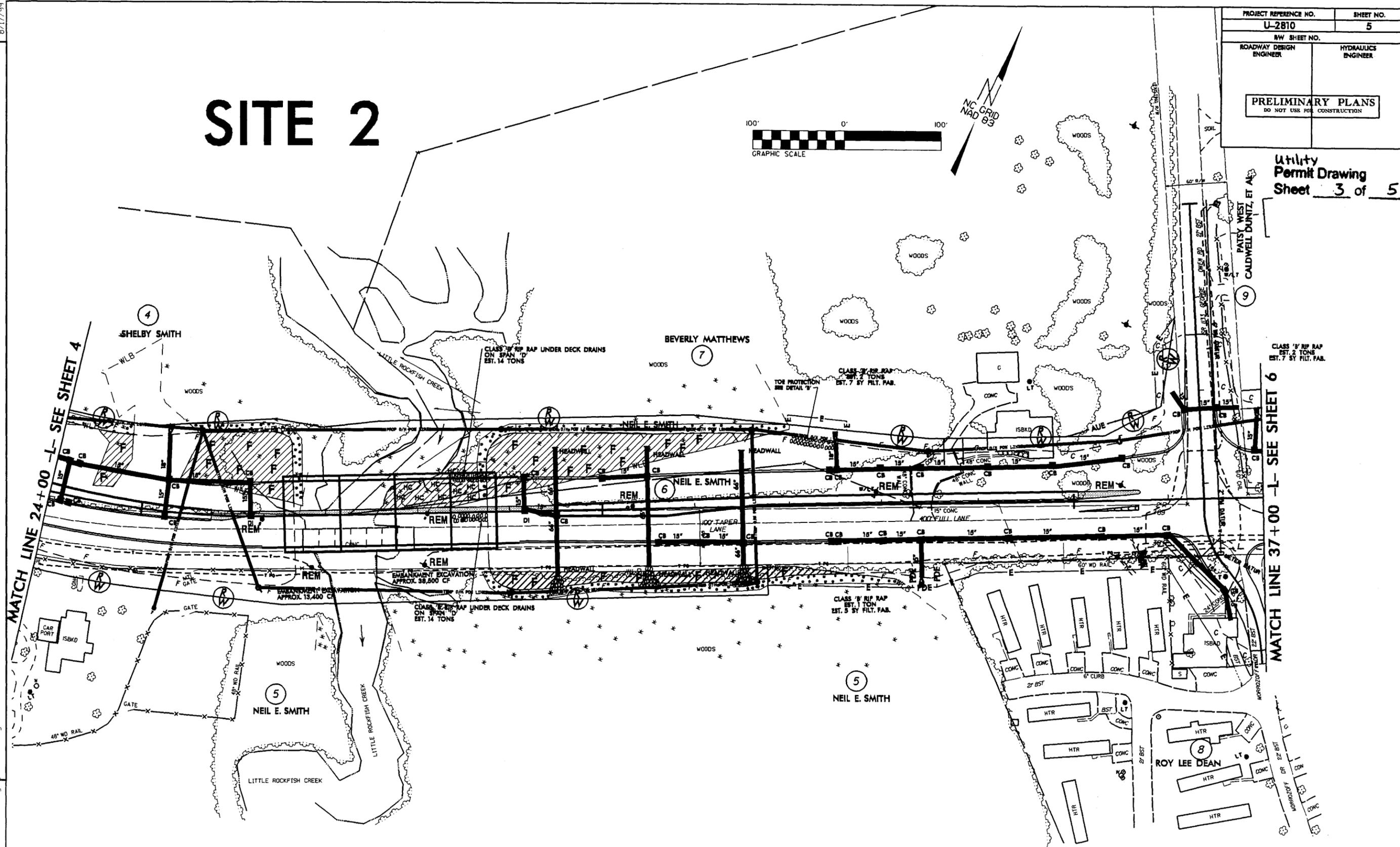
R/W REV(5/22/07) - CHANGED PROPERTY OWNER NAME ON PARCEL 9.sis

21-FEB-2008 10:21  
c:\uc-permits\sewer\uc2810\_hyd\p\m...ve.t.dgn  
5:58:11 PM

# SITE 2

PROJECT REFERENCE NO. U-2810	SHEET NO. 5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

Utility Permit Drawing  
Sheet 3 of 5



- DENOTES FILL IN WETLAND
- DENOTES HAND CLEARING
- DENOTES RESTORED WETLANDS
- DENOTES MECHANIZED CLEARING

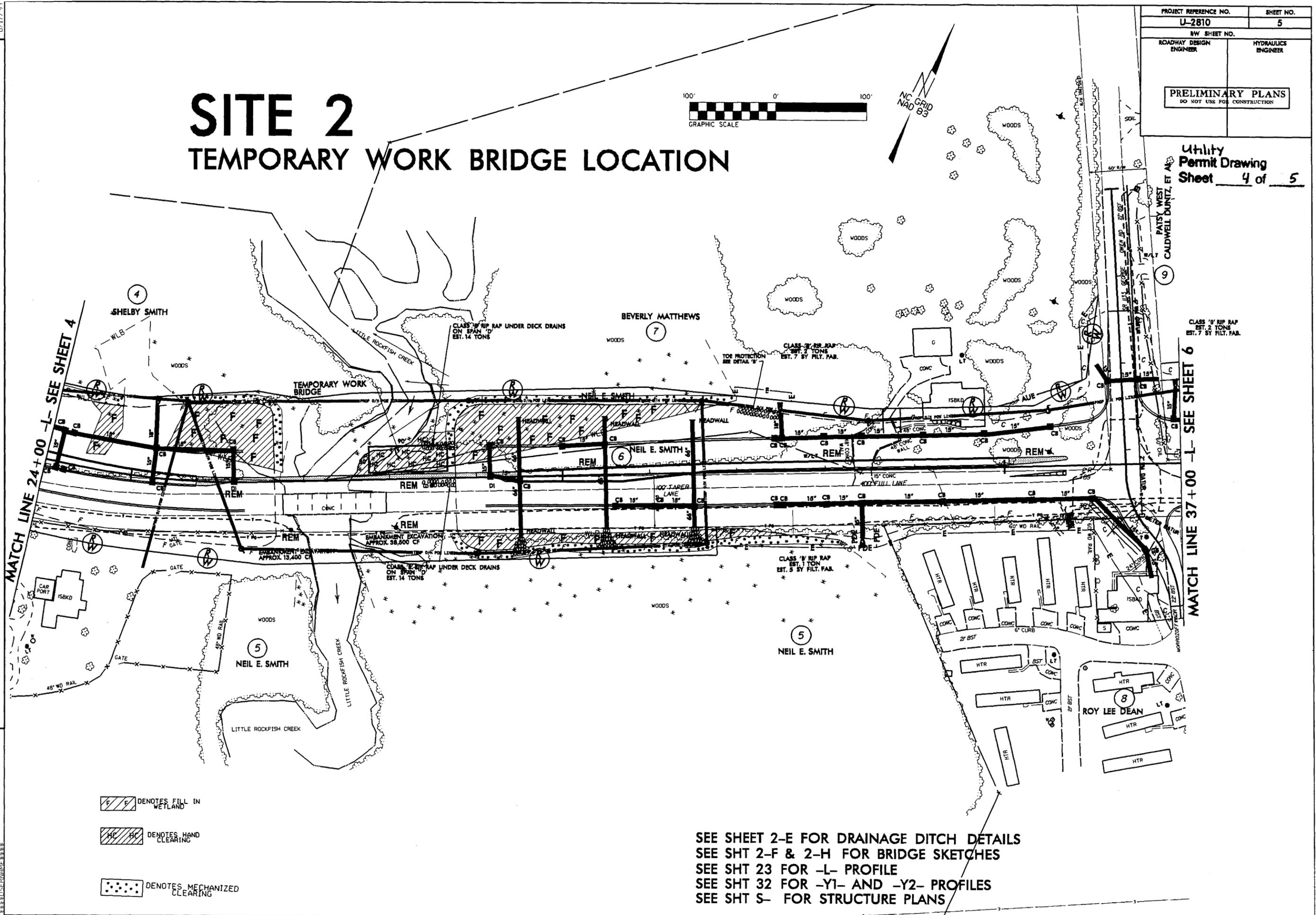
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT S- FOR STRUCTURE PLANS

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>5</b>
MW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

Utility Permit Drawing Sheet 4 of 5

# SITE 2

## TEMPORARY WORK BRIDGE LOCATION



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

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT S- FOR STRUCTURE PLANS

REVISIONS

R/W REV. (5/22/07) - CHANGED PROPERTY OWNER NAME ON PARCEL 9.sis

21-FEB-2008 10:21 C:\nc-permits\sewer\U-2810-hyd\p1\rm-wet\_2\_wor-kbr\rdgpc.dgn

8/17/99

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>6</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

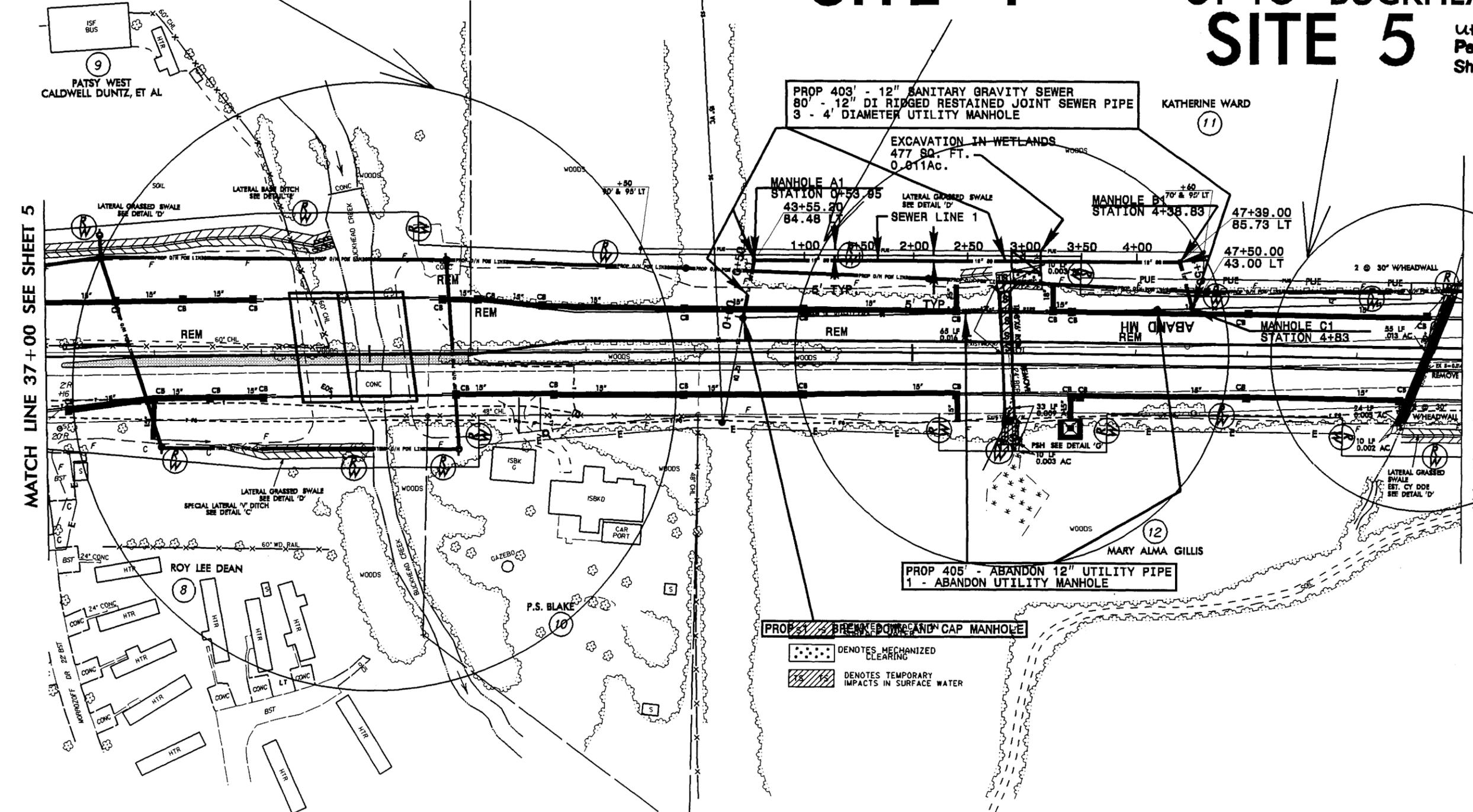


# SITE 3

# UT TO BUCKHEAD CK SITE 4

# UT TO BUCKHEAD CK SITE 5

Utility  
Permit Drawing  
Sheet **5** of **5**



MATCH LINE 37+00 SEE SHEET 5

MATCH LINE 50+00 SEE SHEET 7

**PROP 405' - BREAK DOWN AND CAP MANHOLE**

- DENOTES MECHANIZED CLEARING
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 2-G & 2-I FOR BRIDGE SKETCHES  
 SEE SHT 24 FOR -L- PROFILE  
 SEE SHT S- FOR STRUCTURE PLANS  
 SEE SHT C- FOR CULVERT PLANS

R/W REV. 15/22/07 - CHANGED PROPERTY OWNER NAME ON PARCEL 9.SIS

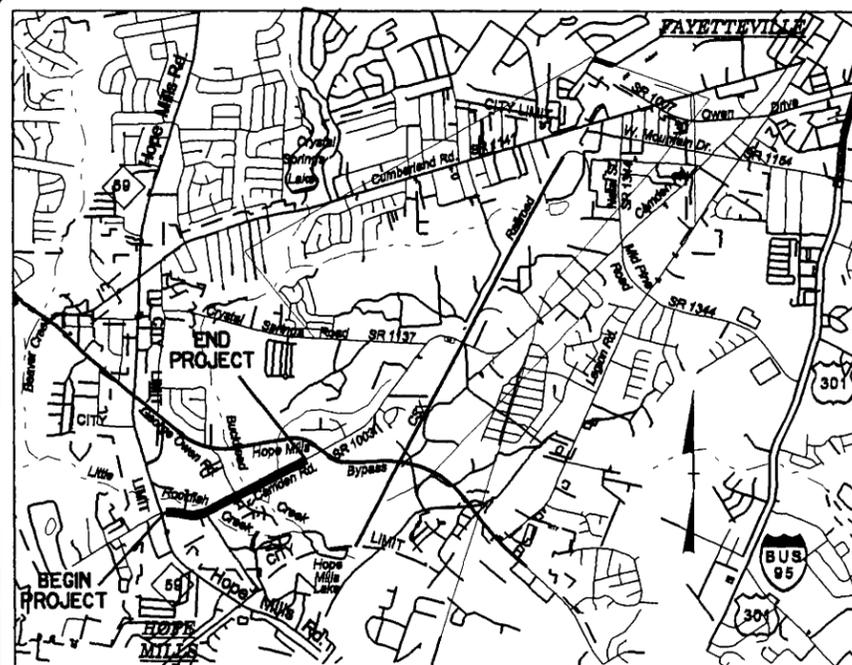
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8/17/99

09/08/99

21-FEB-2008 11:19  
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\$\$\$\$\$USERNAME\$\$\$\$\$

TIP PROJECT: U-2810A



VICINITY MAP

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

T.I.P. NO.	SHEET NO.
U-2810A	UO-1

Utility By Others  
(UBO)  
Permit Drawing  
Sheet 1 of 5

**UTILITY BY OTHERS PLANS  
CUMBERLAND COUNTY**

LOCATION: SR 1003 (CAMDEN ROAD) FROM NC 59  
(HOPE MILLS ROAD) TO HOPE MILLS BYPASS

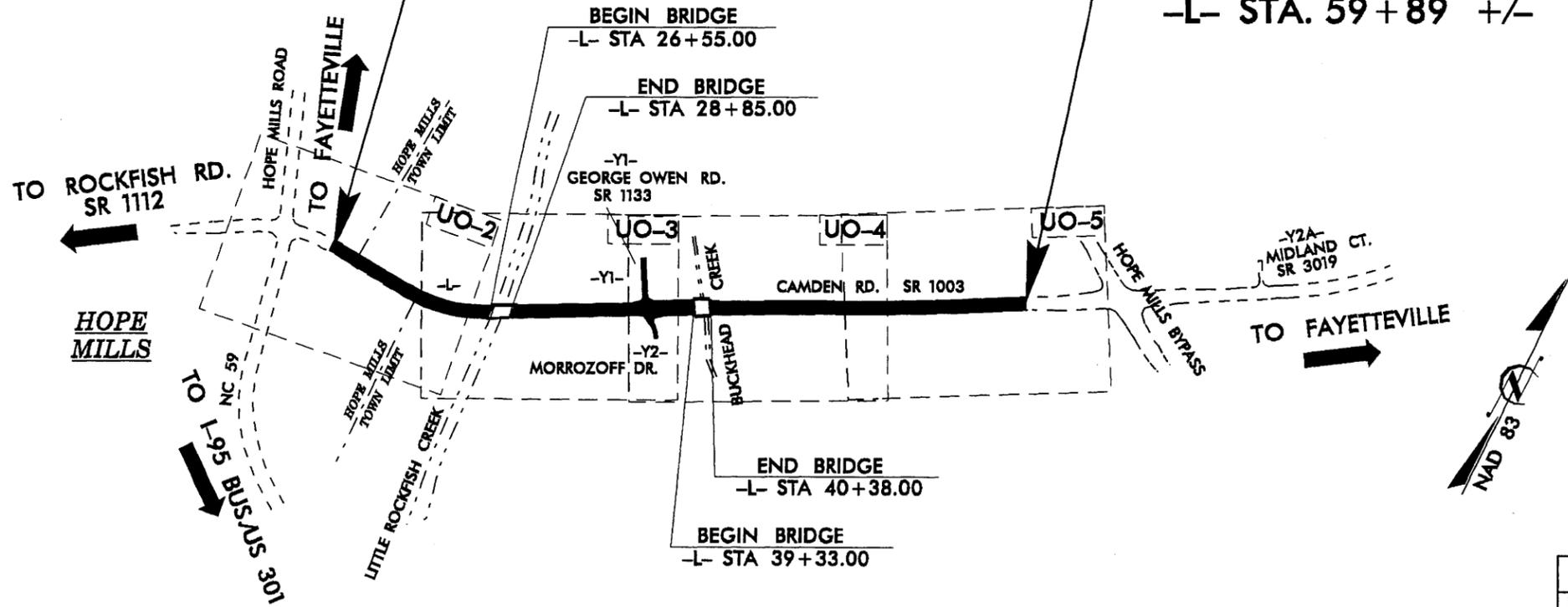
TYPE OF WORK: UTILITY CONSTRUCTION BY OTHERS

BEGIN TIP PROJECT U-2810A

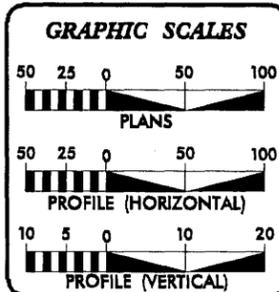
-L- STA. 15 + 00.00

END TIP PROJECT U-2810A

-L- STA. 59 + 89 +/-



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



INDEX OF SHEETS

SHEET NO.	DESCRIPTION
UO-1	TITLE SHEET
UO-2 THRU UO-5	UTILITY BY OTHERS PLAN SHEETS

- UTILITY OWNERS ON PROJECT
- (1) CITY OF FAYETTEVILLE PWC - ELECTRIC
  - (2) TIME WARNER CABLE - CABLE TV
  - (3) EMBARQ - FIBER OPTIC TELEPHONE

PREPARED IN THE OFFICE OF:  
DIVISION OF HIGHWAYS  
PROJECT SERVICES  
UTILITY SECTION

1591 MAIL SERVICES CENTER  
RALEIGH NC 27699-1591  
PHONE (919) 250-4128  
FAX (919) 250-4119

Roger Worthington, P.E. UTILITIES SECTION ENGINEER  
R. B. Wilkins, P.E. UTILITIES SQUAD LEADER PROJECT ENGINEER  
John A. Nigro, P.E. UTILITIES PROJECT DESIGNER

### UTILITIES BY OTHERS

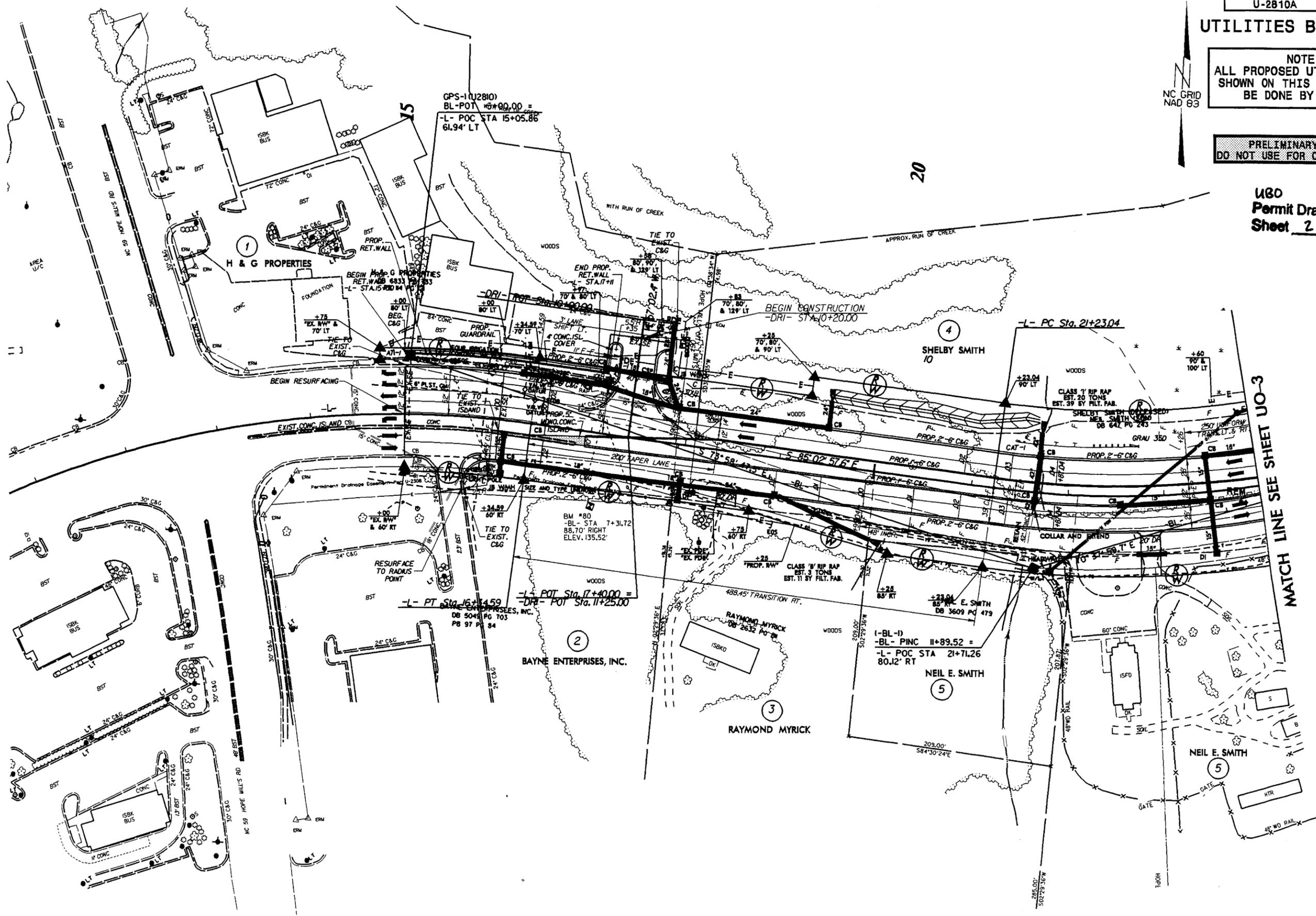
NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

U80  
Permit Drawing  
Sheet 2 of 5

5/14/99

21-FEB-2008 11:18  
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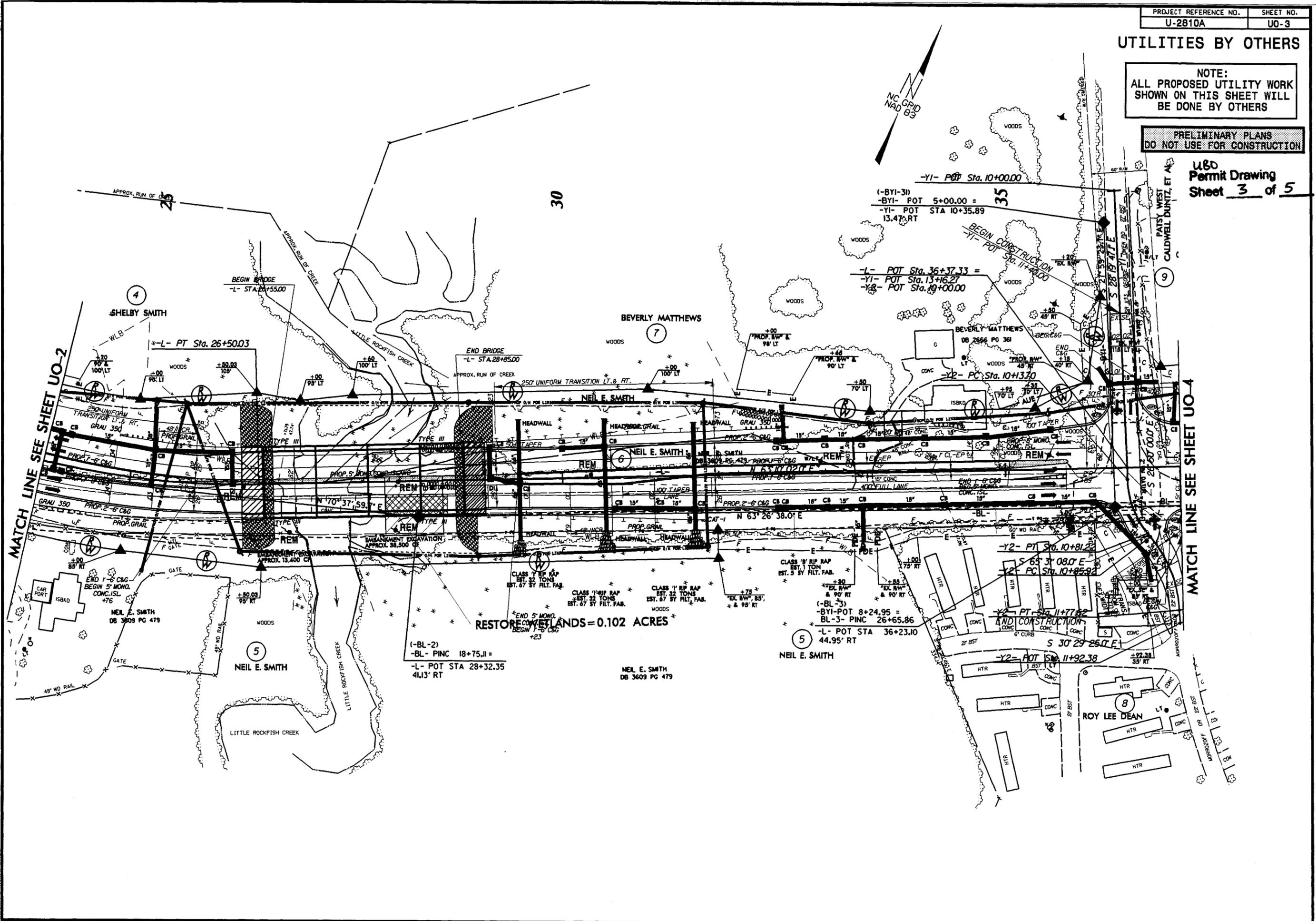
MATCH LINE SEE SHEET UO-3

# UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

U&O  
Permit Drawing  
Sheet 3 of 5



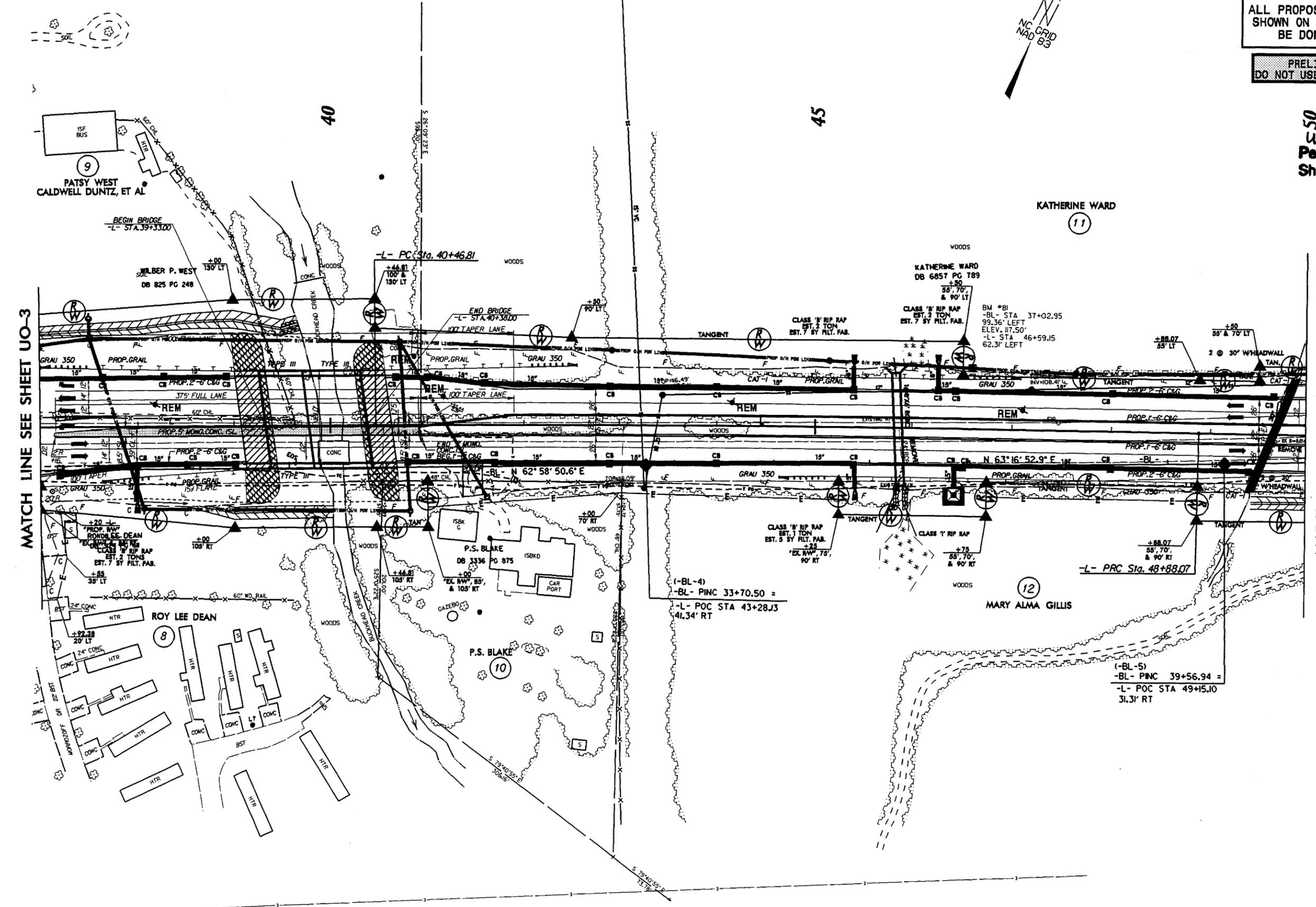
5/14/99  
 21-FEB-2008 10:19  
 utilities\ch\ut\p\p\U-2810a.ut\_5\_uo3.psh.dgn

### UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

50  
UBO  
Permit Drawing  
Sheet 4 of 5



MATCH LINE SEE SHEET UO-3

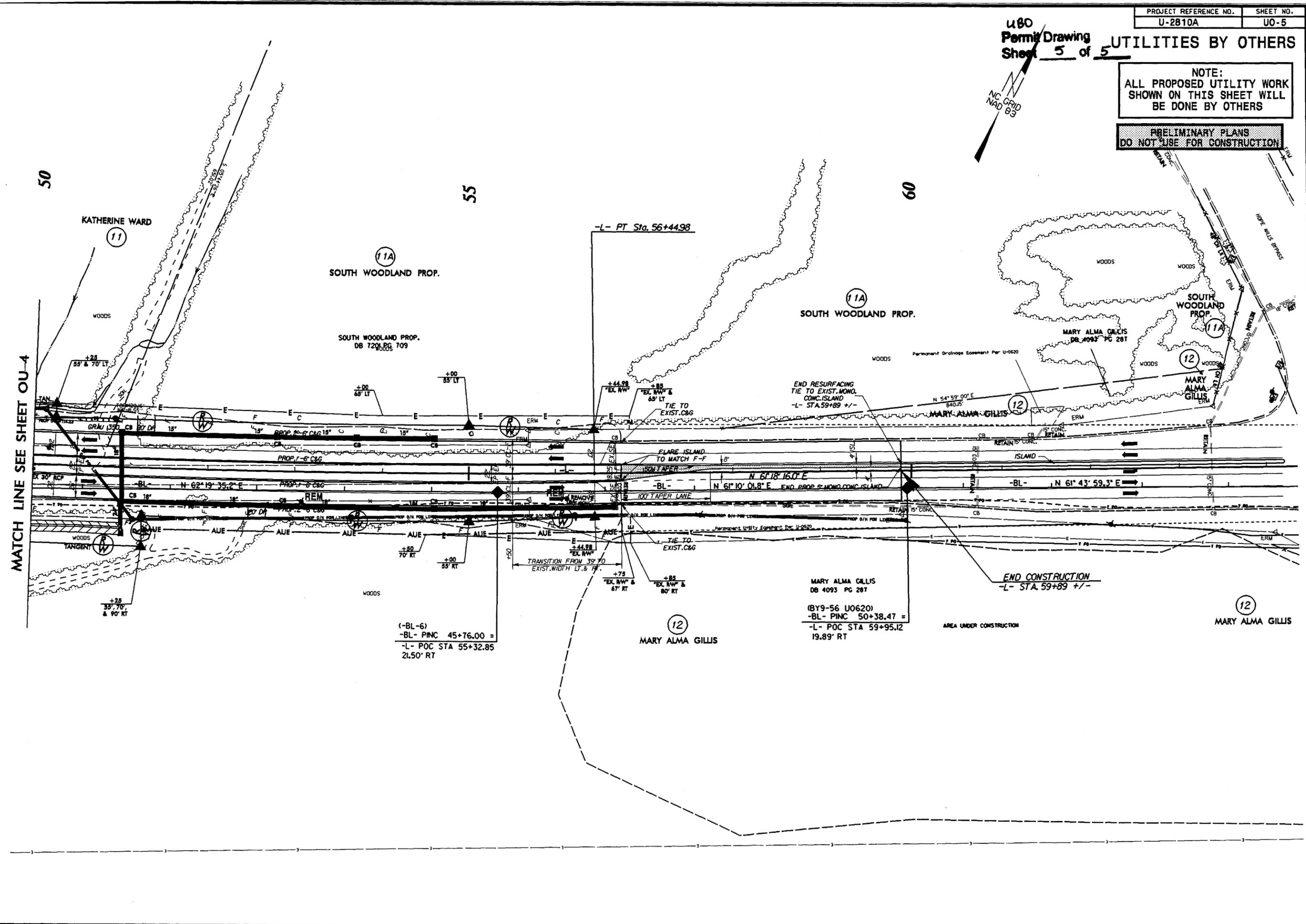
MATCH LINE SEE SHEET UO-5

u80  
Permit Drawing  
Sheet 5 of 5

UTILITIES BY OTHERS

NOTE:  
ALL PROPOSED UTILITY WORK  
SHOWN ON THIS SHEET WILL  
BE DONE BY OTHERS

PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION



MATCH LINE SEE SHEET OU-4

(-BL-6)  
-BL- PINC 45+76.00 =  
-L- POC STA 55+32.85  
21.50' RT

MARY ALMA GILLIS  
DB 4093 PG 287  
(BY9-56 U0620)  
-BL- PINC 50+38.47 =  
-L- POC STA 59+95.12  
19.89' RT

AREA UNDER CONSTRUCTION

5/14/99

21-FEB-2008 11:17  
\\s11101\p1\proj\2810a\ut-7-uo5-psh.dgn

05/08/99

See Sheet 1-A For Index of Sheets

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

**CUMBERLAND COUNTY**

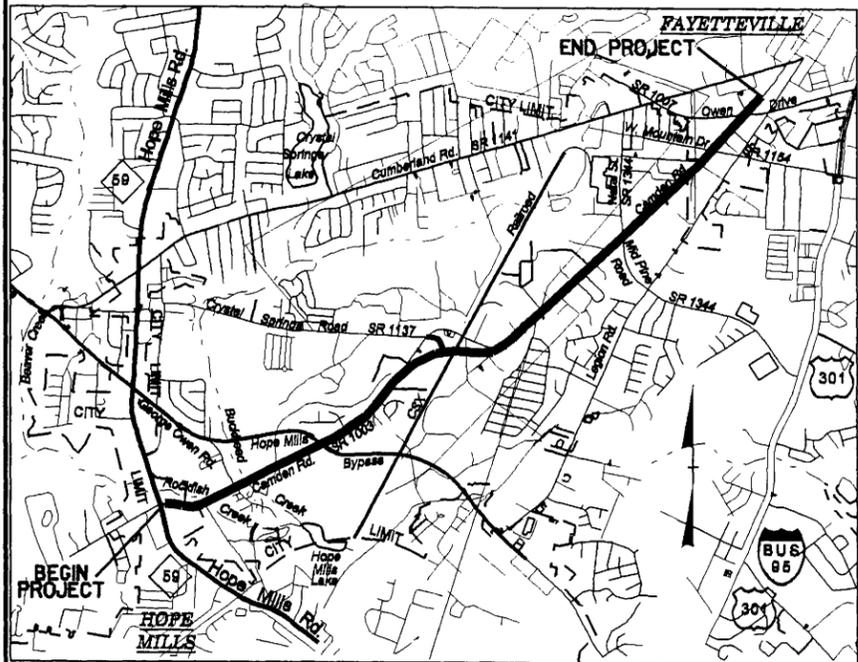
LOCATION: FAYETTEVILLE - SR 1003 (CAMDEN RD.) FROM  
NC 59 (HOPE MILLS RD.) TO NORTH OF SR 1007 (OWEN DR.)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, WIDENING, RESURFACING,  
CURB & GUTTER, SIGNALS, GUARDRAIL, CULVERT,  
STRUCTURES & RETAINING WALL

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2810	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34866.1.1	STP-1003(22)	P.E.	
34866.2.2	STP-1003(22)	R/W & UTIL	

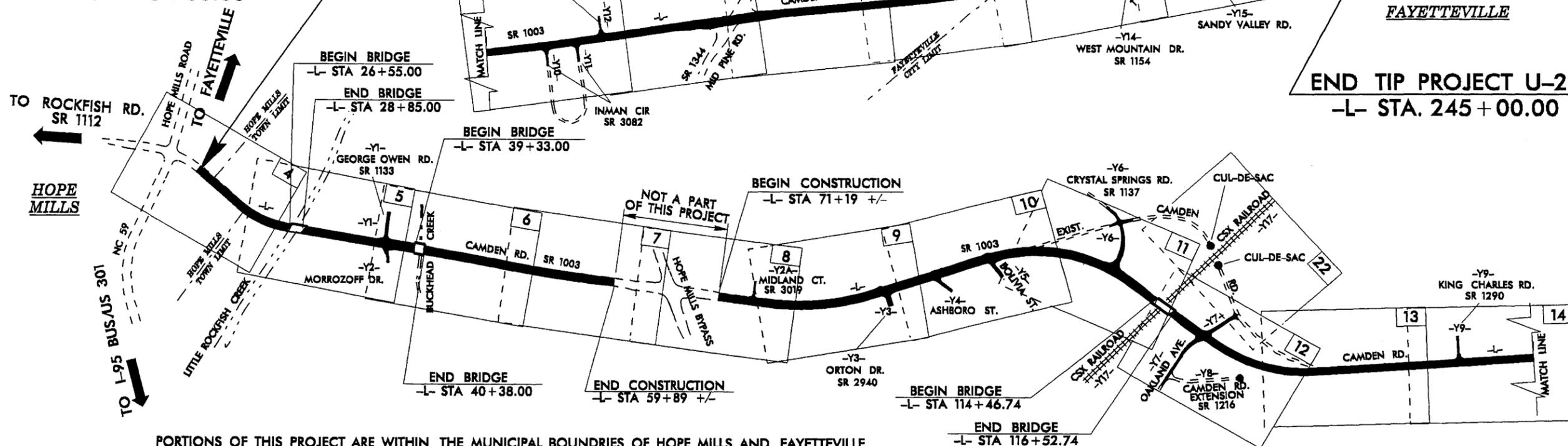
PRELIMINARY PLANS  
DO NOT USE FOR CONSTRUCTION

TIP PROJECT: U-2810



VICINITY MAP

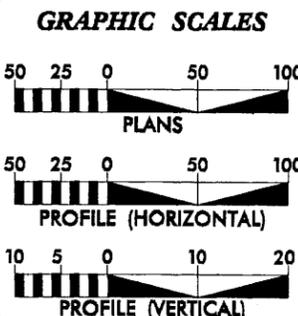
BEGIN TIP PROJECT U-2810  
-L- STA. 15+00.00



END TIP PROJECT U-2810  
-L- STA. 245+00.00

PORTIONS OF THIS PROJECT ARE WITHIN THE MUNICIPAL BOUNDRIES OF HOPE MILLS AND FAYETTEVILLE  
NOTES: CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD II

CONTRACT:



**DESIGN DATA**

ADT 2004 = 15,400
ADT 2030 = 26,800
DHV = 10 %
D = 60 %
T = 5 % *
V = 50 MPH
* TTST 1% DUAL 4%

**PROJECT LENGTH**

LENGTH ROADWAY TIP PROJ. U-2810 = 4.022 MILES +/-
LENGTH STRUCTURES TIP PROJ. U-2810 = 0.101 MILES +/-
TOTAL LENGTH OF TIP PROJ. U-2810 = 4.123 MILES +/-

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

2006 STANDARD SPECIFICATIONS	
RIGHT OF WAY DATE: SEPTEMBER 29, 2006	ROGER D. THOMAS, P.E. PROJECT ENGINEER
LETTING DATE: N/A	SAMUEL L. ST. CLAIR PROJECT DESIGN ENGINEER

**HYDRAULICS ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**ROADWAY DESIGN ENGINEER**

SIGNATURE: \_\_\_\_\_ P.E.

**DIVISION OF HIGHWAYS  
STATE OF NORTH CAROLINA**

STATE HIGHWAY DESIGN ENGINEER P.E.

16-JAN-2008 10:53  
R:\proj\English\U2810\_r.dy.tsh.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$

Note: Not to Scale

\*S.U.E. = Subsurface Utility Engineering

STATE OF NORTH CAROLINA  
DIVISION OF HIGHWAYS

# CONVENTIONAL PLAN SHEET SYMBOLS

## BOUNDARIES AND PROPERTY:

State Line	-----
County Line	-----
Township Line	-----
City Line	-----
Reservation Line	-----
Property Line	-----
Existing Iron Pin	⊙
Property Corner	⊗
Property Monument	⊠
Parcel/Sequence Number	Ⓜ23
Existing Fence Line	-x-x-x-
Proposed Woven Wire Fence	○
Proposed Chain Link Fence	□
Proposed Barbed Wire Fence	◇
Existing Wetland Boundary	-v.s-
Proposed Wetland Boundary	-v.s-
Existing High Quality Wetland Boundary	-h.v.s-
Existing Endangered Animal Boundary	-e.a.b-
Existing Endangered Plant Boundary	-e.p.b-

## 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	-----
River Basin Buffer	-RBB-
Flow Arrow	←
Disappearing Stream	-----
Spring	○
Swamp Marsh	-----
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 Marker	-----
Existing Control of Access	⊙
Proposed Control of Access	⊙
Existing Easement Line	E
Proposed Temporary Construction Easement	E
Proposed Temporary Drainage Easement	TDE
Proposed Permanent Drainage Easement	PDE
Proposed Permanent Utility Easement	PUE
Proposed Permanent Utility Easement	PUE
Proposed Permanent Aerial Utility Easement	AUE

## ROADS AND RELATED FEATURES:

Existing Edge of Pavement	-----
Existing Curb	-----
Proposed Slope Stakes Cut	-C-
Proposed Slope Stakes Fill	-F-
Proposed Wheel Chair Ramp	Ⓜ
Curb Cut for Future Wheel Chair Ramp	Ⓜ
Existing Metal Guardrail	-----
Proposed Guardrail	-----
Existing Cable Guiderail	-----
Proposed Cable Guiderail	-----
Equallity 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	⊙
Recorded U/G Power Line	-----
Designated U/G Power Line (S.U.E.*)	-----

## TELEPHONE:

Existing Telephone Pole	⊙
Proposed Telephone Pole	⊙
Telephone Manhole	⊙
Telephone Booth	⊠
Telephone Pedestal	⊠
Telephone Call Tower	⊠
U/G Telephone Cable Hand Hole	⊠
Recorded U/G Telephone Cable	-----
Designated U/G Telephone Cable (S.U.E.*)	-----
Recorded U/G Telephone Conduit	-----
Designated U/G Telephone Conduit (S.U.E.*)	-----
Recorded U/G Fiber Optics Cable	-----
Designated U/G Fiber Optics Cable (S.U.E.*)	-----

## WATER:

Water Manhole	⊙
Water Meter	⊙
Water Valve	⊙
Water Hydrant	⊙
Recorded U/G Water Line	-----
Designated U/G Water Line (S.U.E.*)	-----
Above Ground Water Line	-----

## TV:

TV Satellite Dish	⊙
TV Pedestal	⊠
TV Tower	⊗
U/G TV Cable Hand Hole	⊠
Recorded U/G TV Cable	-----
Designated U/G TV Cable (S.U.E.*)	-----
Recorded U/G Fiber Optic Cable	-----
Designated U/G Fiber Optic Cable (S.U.E.*)	-----

## GAS:

Gas Valve	⊙
Gas Meter	⊙
Recorded U/G Gas Line	-----
Designated U/G Gas Line (S.U.E.*)	-----
Above Ground Gas Line	-----

## SANITARY SEWER:

Sanitary Sewer Manhole	⊙
Sanitary Sewer Cleanout	⊙
U/G Sanitary Sewer Line	-----
Above Ground Sanitary Sewer	-----
Recorded SS Forced Main Line	-----
Designated SS Forced Main Line (S.U.E.*)	-----

## MISCELLANEOUS:

Utility Pole	⊙
Utility Pole with Base	⊙
Utility Located Object	⊙
Utility Traffic Signal Box	⊠
Utility Unknown U/G Line	-----
U/G Tank; Water, Gas, Oil	⊠
A/G Tank; Water, Gas, Oil	⊠
U/G Test Hole (S.U.E.*)	⊙
Abandoned According to Utility Records	AATUR
Determined According to Utility Records	DATUR
End of Information	E O I



SURVEY CONTROL SHEET U-2810

PROJECT REFERENCE NO.	SHEET NO.
U-2810	ID
Location and Surveys	

BL POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
101	GPS U2810-1	449885.9050	2010741.8040	149.02	15+05.86	61.94 LT
	U2810 BL-1	449695.6150	2011404.5450	116.29	21+71.26	80.12 RT
	U2810 BL-2	449923.9850	2012051.3380	112.22	28+32.35	41.13 RT
	U2810 BL-3	450276.4910	2012768.6660	119.19	36+23.13	41.34 RT
	U2810 BL-4	450596.6030	2013386.3990	119.19	43+28.10	44.35 RT
	U2810 BL-5	450860.2700	2013910.2180	118.27	49+15.10	31.31 RT
	U2810 BL-6	451147.7850	2014458.4660	134.22	55+32.85	21.50 RT
	U-0620-BY9-05	451370.8140	2014863.6060	156.51	59+05.12	19.89 RT
	U0620-BY9-05	451657.8650	2015397.4570	180.85	66+01.24	24.43 RT
	U0620-BY9-05	452019.0300	2016060.8840	177.83	73+56.53	26.13 RT
	U2810 BL-7	452345.5620	2016576.6940	179.94	79+78.29	41.65 RT
	U2810 BL-8	452840.9230	2017054.2920	177.93	86+43.87	49.63 RT
	U2810 BL-9	453298.1270	2017408.0510	178.57	92+21.85	60.47 RT
	U2810 BL-10	453709.8400	2017696.1000	176.37	97+24.11	45.66 RT
	U2810 BL-11	454264.3810	2018103.2890	181.91	103+80.25	103.13 LT
	U2810 BL-12	454534.3000	2018651.1470	192.67	109+04.33	80.07 RT
	U2810 BL-13	454934.8170	2019179.5570	189.41	112+31.76	47.05 LT
	U2810 BL-14	454319.5990	2019799.5570	192.62	114+44.47	26.59 RT
	U2810 BL-15	454297.9530	2019516.5990	192.62	117+81.60	47.66 RT
	U2810 BL-16	454256.5220	2019794.0050	195.63	120+59.14	87.00 RT
	U2810 BL-17	454030.8660	2020080.8860	200.12	123+14.48	321.58 RT
	GPS U2810-1	454513.5990	2020645.4970	198.52	129+30.83	28.64 RT
	U2810 BL-18	454932.5160	2021199.5130	199.78	136+20.71	38.47 RT
	GPS U2810-1	455224.4250	2021847.3450	202.27	148+74.76	35.32 RT
	U2810 BL-19	455555.2630	2021946.4730	200.79	149+92.90	30.79 RT
	U2810 BL-20	455943.6510	2022389.4470	205.27	151+81.16	31.74 RT
	U2810 BL-21	456466.7330	2022964.5200	216.66	159+57.44	35.30 RT
	U2810 BL-22	456885.6350	2023390.9910	211.50	165+54.43	31.88 RT
	U2810 BL-23	457354.7910	2023880.3450	210.58	172+32.60	30.52 RT
	U3312 BL-20	457856.2000	2024299.8500	212.81	178+82.89	29.12 LT
	U2810 BL-24	458196.4700	2024740.2430	212.83	184+35.91	20.57 RT
	U2810 BL-25	458600.3790	2025161.1970	218.20	190+20.05	10.33 RT
	U2810 BL-26	458998.4440	2025624.4130	219.15	196+30.70	8.40 RT
	U2810 BL-27	459388.7210	2026063.7270	219.56	202+17.05	27.48 RT
	U2810 BL-28	459810.2670	2026472.0130	213.59	208+02.91	34.14 RT
	U2810 BL-29	460092.2500	2026740.5000	211.42	211+32.24	38.93 RT
	U2810 BL-30	460436.1370	2027067.6540	210.27	225+55.85	44.57 RT
	U2810 BL-31	461035.4230	2027607.3270	203.05	230+37.64	35.82 RT
	GPS U2810-6	461444.0850	2027996.6990	194.98	233+03.22	26.55 RT
	GPS U2810-6	462113.2000	2028620.8590	186.81	239+52.02	26.55 RT
	U2810 BL-70	462653.6610	2029007.0610	191.74	246+14.26	16.24 RT

BM80 ELEVATION - 135.52  
N 449737 E 2010940  
L STATION 17+09 78 RIGHT  
R/R SPIKE IN BASE OF 24' PINE

BM85 ELEVATION - 202.28  
N 455380 E 2021793  
L STATION 143+63 92 RIGHT  
R/R SPIKE IN BASE OF 12' PINE

BM81 ELEVATION - 117.50  
N 450835 E 2013639  
L STATION 46+59 62 LEFT  
R/R SPIKE IN BASE OF 20' PINE

BM86 ELEVATION - 214.02  
N 457903 E 2024476  
L STATION 180+43 58 RIGHT  
R/R SPIKE IN BASE OF 10' PINE

BM82 ELEVATION - 187.23  
N 451728 E 2015579  
L STATION 67+94 50 RIGHT  
R/R SPIKE IN BASE OF 14' PINE

BM87 ELEVATION - 221.62  
N 459235 E 2025934  
L STATION 200+17 48 RIGHT  
R/R SPIKE IN BASE OF 20' PINE

BM83 ELEVATION - 176.54  
N 453942 E 2017925  
L STATION 100+62 61 RIGHT  
R/R SPIKE IN BASE OF 18' PINE

BM88 ELEVATION - 211.26  
N 460802 E 2027302  
L STATION 220+34 32 LEFT  
R/R SPIKE IN BASE OF 36' MAPLE

BM84 ELEVATION - 197.41  
N 454548 E 2019646  
L STATION 119+11 204 LEFT  
R/R SPIKE IN BASE OF 20' DAK

DATUM DESCRIPTION  
THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCGS FOR MONUMENT "TASTE" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 47047294(ft) EASTING: 201078.950(ft) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99988238 THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "TASTE" TO -L- STATION I5+00.00 IS S02°41'30.62"W 20,670.32 ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

BY1 POINT	DESC.	NORTH	EAST	ELEVATION	Y1 STATION	OFFSET
31	U2810 -BY1-31	450563.4350	2012606.1600	114.05	10+35.89	13.47 RT
303	U2810 BL-3	450276.4910	2012758.6660	113.16	OUTSIDE PROJECT LIMITS	

BY2 POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
32	U2810 -BY2-32	452314.9020	2015885.2580	160.39	Y2A 10+22.02	19.98 RT
254	(U0620) -BY9-54	452019.0300	2016060.8040	177.83	L 73+56.53	26.13 RT

BY3 POINT	DESC.	NORTH	EAST	ELEVATION	Y3 STATION	OFFSET
208	U2810 BL-8	452840.9230	2017054.2920	177.93	10+49.74	32.88 RT
33	U2810 -BY3-33	452739.6010	2017256.6370	182.94	OUTSIDE PROJECT LIMITS	

BY4 POINT	DESC.	NORTH	EAST	ELEVATION	Y4 STATION	OFFSET
209	U2810 BL-9	453298.1270	2017408.0510	178.57	10+61.91	7.90 LT
34	U2810 -BY4-34	453256.0530	2017834.4430	189.27	OUTSIDE PROJECT LIMITS	

BY5 POINT	DESC.	NORTH	EAST	ELEVATION	Y5 STATION	OFFSET
210	U2810 BL-10	453709.8400	2017696.1000	176.37	10+39.37	25.97 RT
35	U2810 -BY5-35	453625.3220	2018146.2750	186.78	OUTSIDE PROJECT LIMITS	

BY6 POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
36	U2810 -BY6-36	454823.6050	2018528.5660	186.92	Y6 14+00.18	94.00 LT
211	U2810 BL-11	454264.3810	2018103.2890	181.91	L 103+88.25	103.13 LT

BY7 POINT	DESC.	NORTH	EAST	ELEVATION	STATION	OFFSET
236	U2810 -BY6-36	454823.6050	2018528.5660	186.92	Y6 14+00.18	94.00 LT
37	U2810 -BY7-37	454837.9410	2018036.7250	186.23	L 105+36.19	650.32 LT

BY8 POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
39	U2810 -BY8-39	454434.9680	2019353.2910	175.48	116+17.86	89.23 LT
38	U2810 -BY8-38	454312.6400	2019287.9000	174.64	115+52.86	33.30 RT
40	U2810 -BY8-40	454184.7290	2019218.6270	173.84	114+84.00	161.44 RT

BY9 POINT	DESC.	NORTH	EAST	ELEVATION	Y7 STATION	OFFSET
41	U2810 -BY9-41	454672.7500	2019912.5940	200.97	10+21.26	14.61 LT
403	GPS U2810-3	454513.5990	2020645.4970	198.52	OUTSIDE PROJECT LIMITS	

BY10 POINT	DESC.	NORTH	EAST	ELEVATION	Y9 STATION	OFFSET
42	U2810 -BY10-42	455809.0920	2021711.2240	199.54	OUTSIDE PROJECT LIMITS	
219	U2810 BL-19	455555.2630	2021946.4730	207.77	OUTSIDE PROJECT LIMITS	

BY11 POINT	DESC.	NORTH	EAST	ELEVATION	Y10 STATION	OFFSET
221	U2810 BL-21	456466.7330	2022964.5200	216.66	10+35.72	29.38 RT
43	U2810 BY11-43	456274.9340	2023199.8460	215.07	13+36.30	13.24 LT

BY12 POINT	DESC.	NORTH	EAST	ELEVATION	Y11 STATION	OFFSET
44	U2810 -BY12-44	456720.3278	2023222.9437	213.16	10+32.23	26.89 LT
45	U2810 -BY12-45	456544.4480	2023336.0700	212.84	12+37.04	15.33 RT

BY13 POINT	DESC.	NORTH	EAST	ELEVATION	Y12 STATION	OFFSET
46	U2810 -BY13-46	457153.8940	2023107.8610	205.81	OUTSIDE PROJECT LIMITS	
222	U2810 BL-22	456885.2350	2023390.9910	211.50	OUTSIDE PROJECT LIMITS	

BY14 POINT	DESC.	NORTH	EAST	ELEVATION	L STATION	OFFSET
47	U2810 -BY14-47	458350.9600	2024281.4430	215.74	182+04.30	402.94 LT
503	GPS U2810-5	457856.2000	2024299.8500	186.81	178+82.89	25.12 LT
48	U2810 -BY14-48	457429.7970	2024337.1190	215.86	176+12.57	304.24 RT

BY14A POINT	DESC.	NORTH	EAST	ELEVATION	Y13 STATION	OFFSET
54	U2810 -BY14A-54	460096.2620	2026420.8600	211.13	10+37.27	16.05 RT
255	U2810 -BY14A-55	460092.2500	2026740.5000	211.42	OUTSIDE PROJECT LIMITS	

BY15 POINT	DESC.	NORTH	EAST	ELEVATION	Y14 STATION	OFFSET
49	U2810 -BY15-49	460490.9960	2026734.1080	210.87	10+69.74	17.09 LT
229	U2810 B-29	460436.1370	2027067.6540	210.27	14+07.69	25.159 LT
50	U2810 -BY15-50	460335.7980	2027370.1340	210.89	17+23.57	16.40 RT

BY16 POINT	DESC.	NORTH	EAST	ELEVATION	Y15 STATION	OFFSET
230	U2810 -BY16-51	461035.4230	2027607.3270	203.05	10+32.23	29.11 RT
51	U2810 -BY16-51	460934.7240	2027776.7330	199.29	12+24.67	13.37 LT

BY17 POINT	DESC.	NORTH	EAST	ELEVATION	Y16 STATION	OFFSET
52	U2810 -BY17-52	461418.5120	2027589.2400	193.95	10+16.22	52.03 RT
505	GPS U2810-5	461444.0850	2027996.6990	194.98	14+24.43	25.12 LT
53	U2810 -BY17-53	461485.8540	2028376.0690	194.82	OUTSIDE PROJECT LIMITS	

NOTES:  
THE CONTROL DATA FOR THIS PROJECT CAN BE FOUND ELECTRONICALLY BY SELECTING PROJECT CONTROL DATA AT:  
HTTP://WWW.DOH.DOT.STATE.NC.US/PRECONSTRUCTION/HIGHWAY/LOCATION/PROJECT  
SITE CALIBRATION INFORMATION HAS NOT BEEN PROVIDED FOR THIS PROJECT.  
IF FURTHER INFORMATION IS NEEDED, PLEASE CONTACT THE LOCATION AND SURVEYS UNIT.  
O INDICATES GNOMETIC CONTROL MONUMENTS USED OR SET FOR HORIZONTAL PROJECT CONTROL BY THE NCDOT LOCATION AND SURVEYS UNIT.  
PROJECT CONTROL ESTABLISHED USING GLOBAL POSITIONING SYSTEM.  
NETWORK ESTABLISHED FROM NGS ONLINE POSITIONING USER SERVICE (OPUS)  
SEE GPS CALIBRATION SHEET FOR HORIZONTAL AND VERTICAL COORDINATE VALUES.

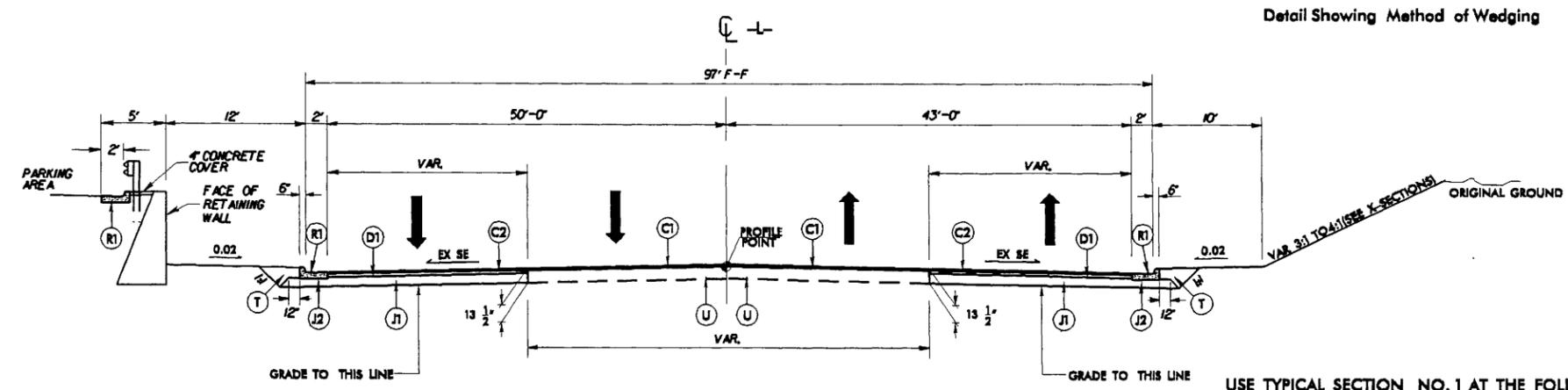
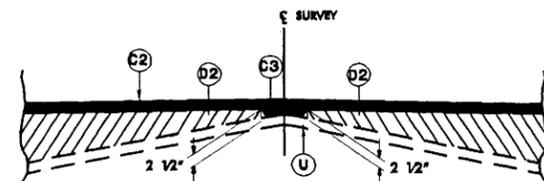
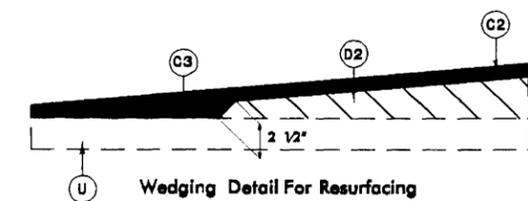
040397

# PAVEMENT SCHEDULE

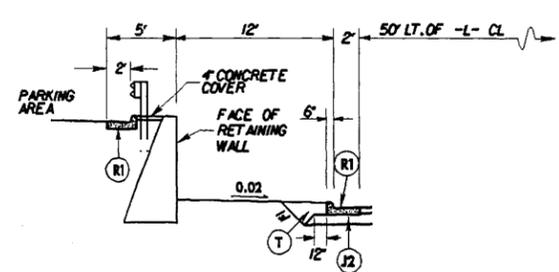
C1	PROP. APPROX. 1 1/2" ASPHALT CONCRETE SURFACE COURSE, TYPE 89.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.	R1	2'-8" CONCRETE CURB AND GUTTER.
C2	PROP. APPROX. 3" ASPHALT CONCRETE SURFACE COURSE, TYPE 89.5B AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD. IN EACH OF TWO LAYERS	R2	1'-8" CONCRETE CURB AND GUTTER.
C3	PROP. VAR. DEPTH ASPHALT CONCRETE SURFACE COURSE, TYPE 89.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH. TO BE PLACED IN LAYERS NOT TO EXCEED 2" IN DEPTH.	R3	EXPRESSWAY GUTTER.
D1	PROP. APPROX. 2 1/2" ASPHALT CONCRETE INTERMEDIATE COURSE, TYPE 119.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.	T	EARTH MATERIAL.
D2	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" IN DEPTH OR GREATER THAN 4" IN DEPTH.	U	EXISTING PAVEMENT.
J1	PROP. 8" AGGREGATE BASE COURSE.	W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)
J2	PROP. VARIABLE DEPTH ABC		

NOTE: PAVEMENT EDGE SLOPES ARE 1:1 UNLESS SHOWN OTHERWISE.

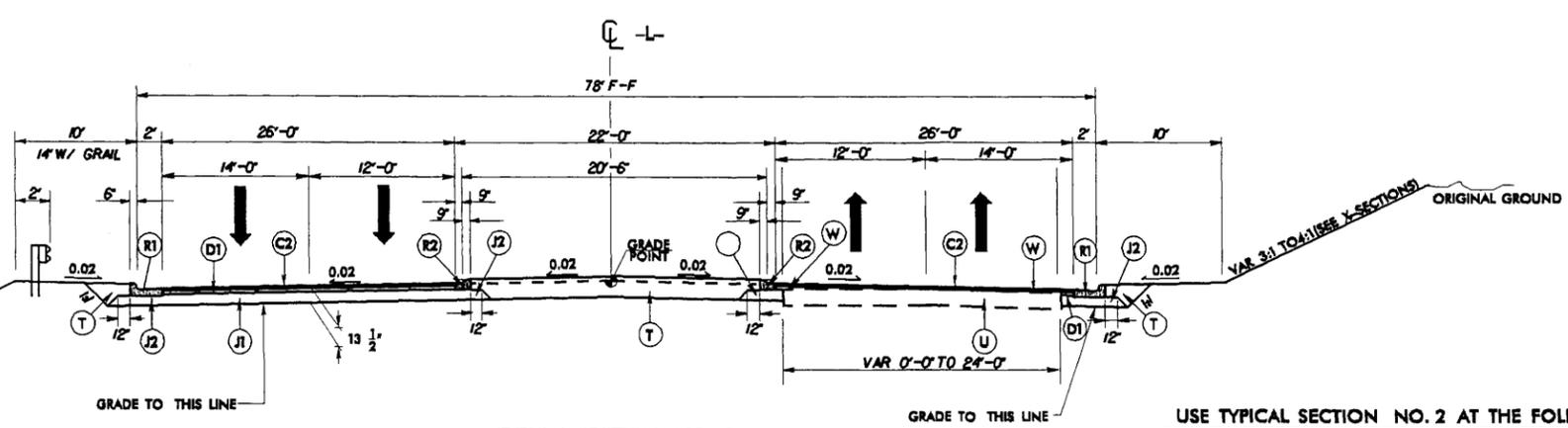
PROJECT REFERENCE NO. U-2810	SHEET NO. 2
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>PRELIMINARY PLANS</b> <small>DO NOT USE FOR CONSTRUCTION</small>	



USE TYPICAL SECTION NO. 1 AT THE FOLLOWING LOCATIONS:  
FROM -L- STA. 15+00 TO STA. 16+50



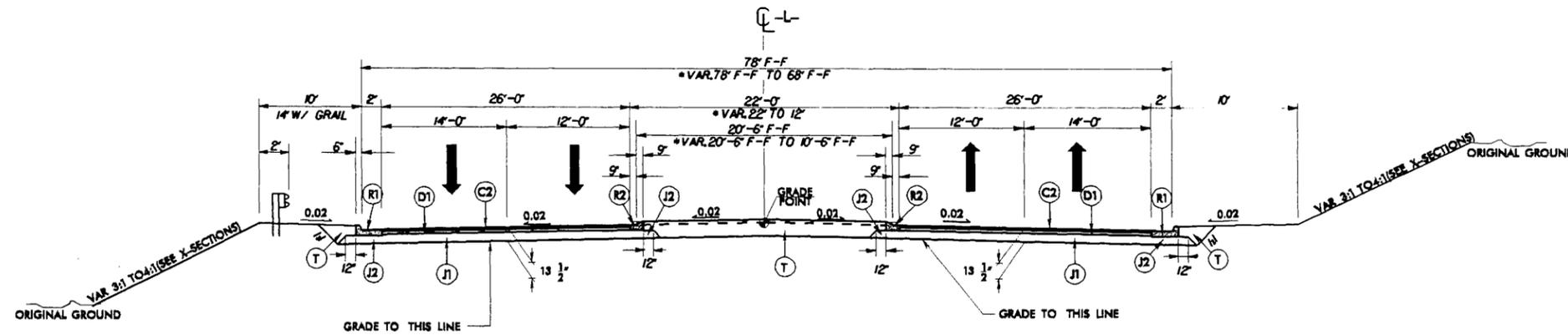
USE PARTIAL TYPICAL SECTION NO. 2A IN CONJUNCTION WITH TYPICAL SECTION 2 AS FOLLOWS:  
-L- STA. 16+50.00 LT. TO STA. 17+11.00 LT.



USE TYPICAL SECTION NO. 2 AT THE FOLLOWING LOCATIONS:  
FROM -L- STA. 16+50 TO STA. 20+00  
FROM -L- STA. 46+00 TO STA. 54+00  
FROM -L- STA. 77+00 TO STA. 92+50

16-MAN-2008 10-53 U-2810.rdw typ.dgn

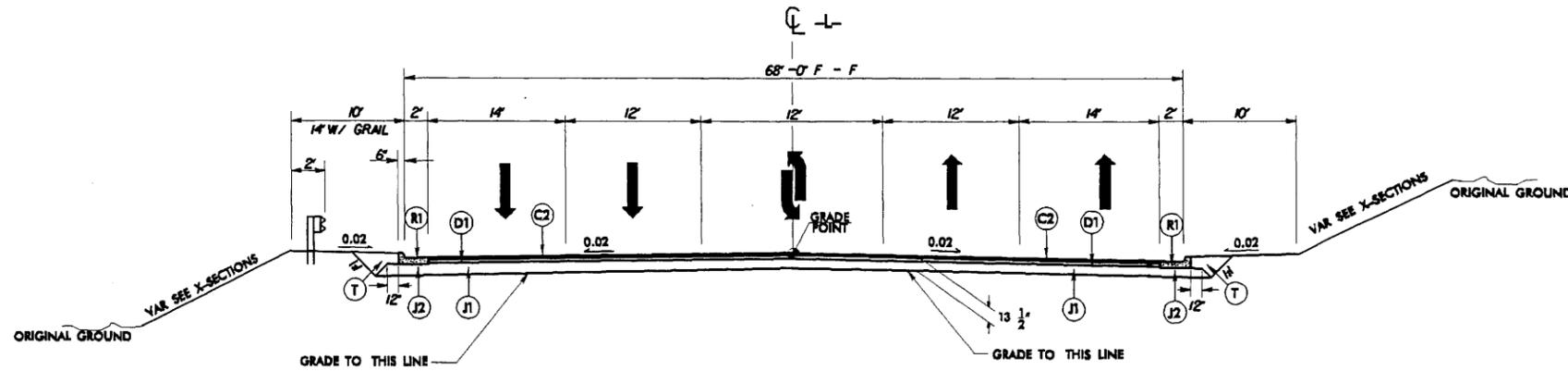
PROJECT REFERENCE NO. U-2810	SHEET NO. 2-A
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>PRELIMINARY PLANS</b> <small>DO NOT USE FOR CONSTRUCTION</small>	



**TYPICAL SECTION NO. 3**

USE TYPICAL SECTION NO. 3 AT THE FOLLOWING LOCATIONS:

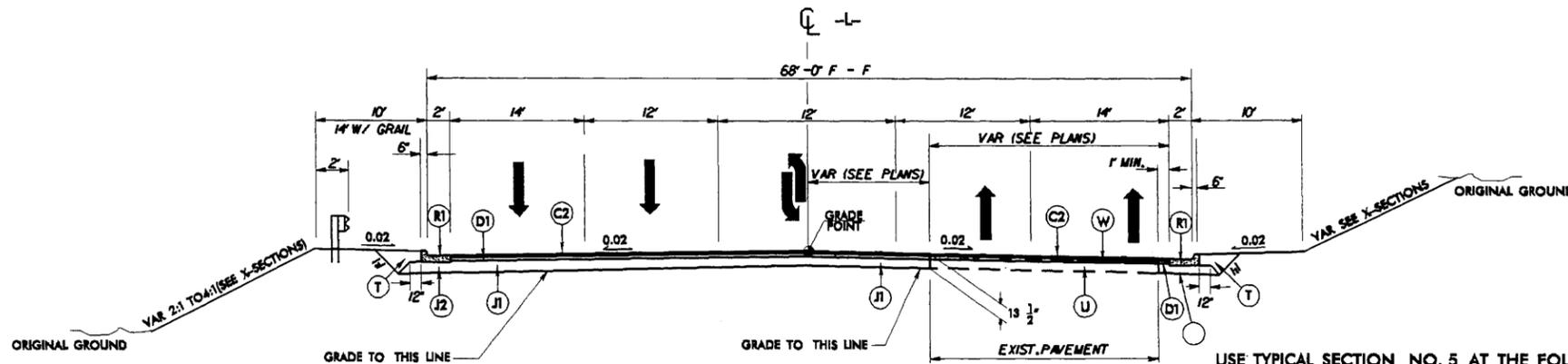
- FROM -L- STA. 20+00 TO STA. 23+26
- FROM -L- STA. 23+26 TO STA. 25+76
- FROM -L- STA. 29+23 TO STA. 31+73
- FROM -L- STA. 31+73 TO STA. 39+33 (BEGIN BRIDGE)
- FROM -L- STA. 40+38 (END BRIDGE) TO STA. 46+00
- FROM -L- STA. 54+00 TO STA. 56+75+/-
- FROM -L- STA. 73+00+/- TO STA. 77+00
- FROM -L- STA. 92+50 TO STA. 114+46.74 (BEGIN BRIDGE)



**TYPICAL SECTION NO. 4**

USE TYPICAL SECTION NO. 4 AT THE FOLLOWING LOCATIONS

- FROM -L- STA. 25+76 TO STA. 26+55 (BEGIN BRIDGE)
- FROM -L- STA. 28+85 (END BRIDGE) TO STA. 29+23
- FROM -L- STA. 116+52.74 (END BRIDGE) TO STA. 131+00
- FROM -L- STA. 161+00 TO STA. 169+00



**TYPICAL SECTION NO. 5**

USE TYPICAL SECTION NO. 5 AT THE FOLLOWING LOCATIONS

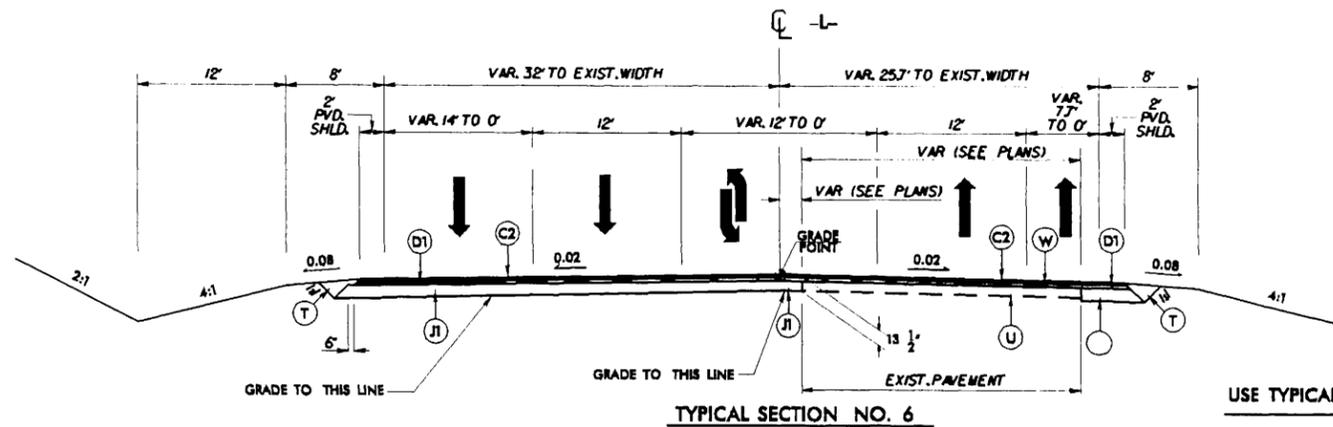
- FROM -L- STA. 131+00 TO STA. 161+00
- FROM -L- STA. 169+00 TO STA. 176+50+/-
- FROM -L- STA. 181+50+/- TO STA. 230+18.74
- FROM -L- STA. 231+45.22 TO STA. 240+75

NOTE: RESURFACE WITH (C1) FROM  
-L- STA. 176+50+/- TO STA. 181+50+/-

**PAVEMENT SCHEDULE**

C1	1 1/2" S9.5B
C2	3" S9.5B
D1	2 1/2" I19.0B
J1	8" ABC
J2	VAR. DEPTH ABC
R1	2'-6" CURB AND GUTTER
T	EARTH
U	EXISTING PAVEMENT.
W	WEDGING

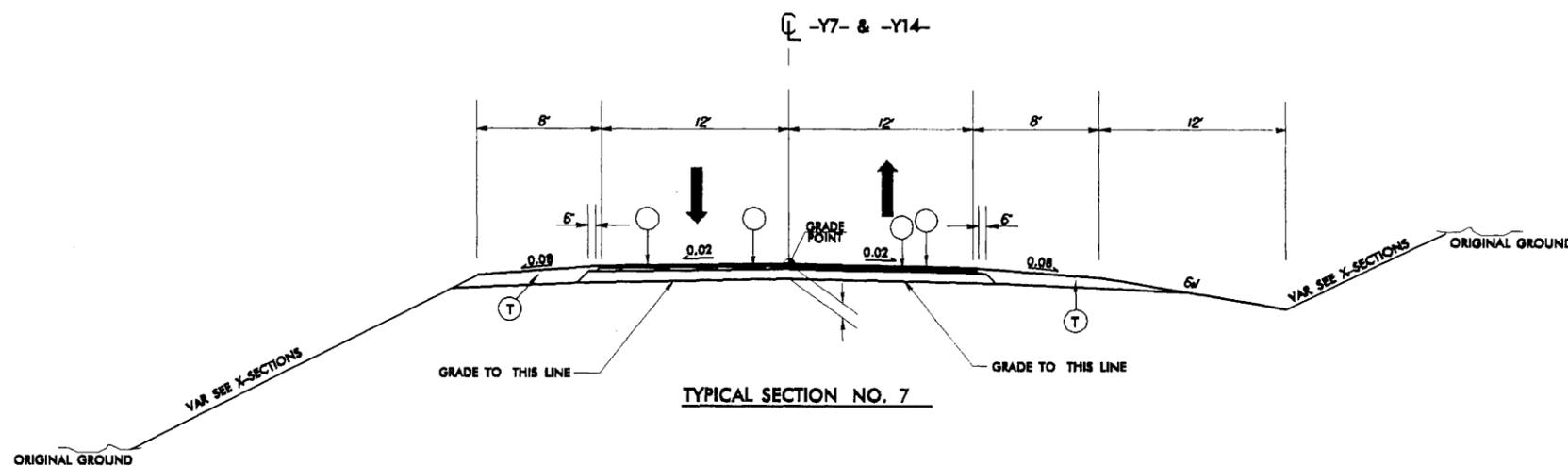
PROJECT REFERENCE NO. U-2810	SHEET NO. 2-8
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>PRELIMINARY PLANS</b> <small>DO NOT USE FOR CONSTRUCTION</small>	



**TYPICAL SECTION NO. 6**

USE TYPICAL SECTION NO. 6 AT THE FOLLOWING LOCATIONS

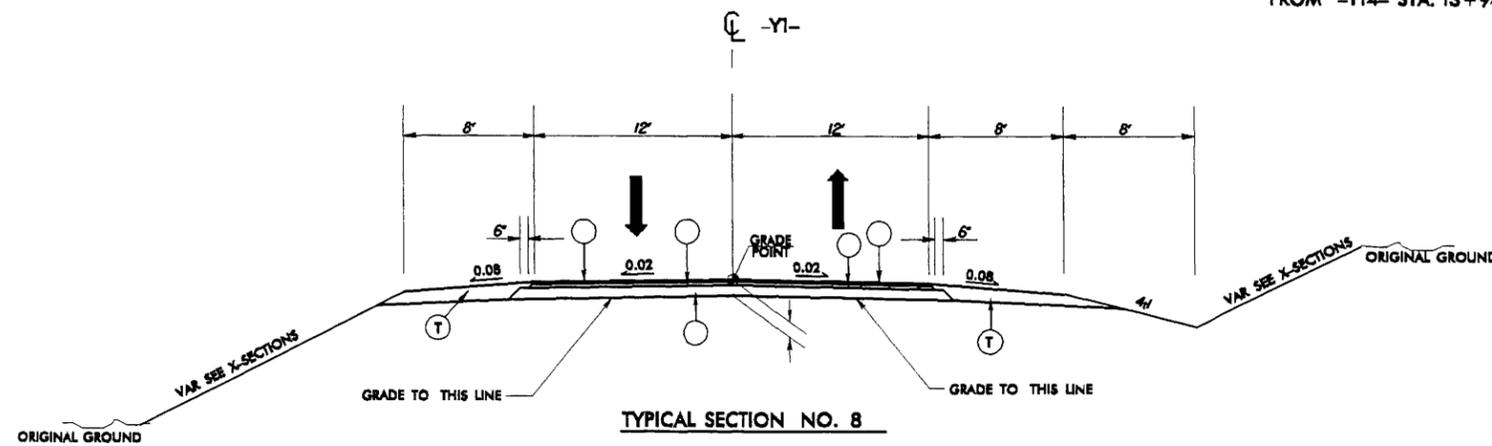
FROM -L- STA. 240+75 TO STA. 245+00



**TYPICAL SECTION NO. 7**

USE TYPICAL SECTION NO. 7 AT THE FOLLOWING LOCATIONS

FROM -Y6- STA. 10+00.00 TO STA. 18+46.72  
 FROM -Y7- STA. 10+11.55 TO STA. 13+43.61  
 FROM -Y14- STA. 8+00 TO STA. 12+83.50  
 FROM -Y14- STA. 13+94.48 TO STA. 18+31.52



**TYPICAL SECTION NO. 8**

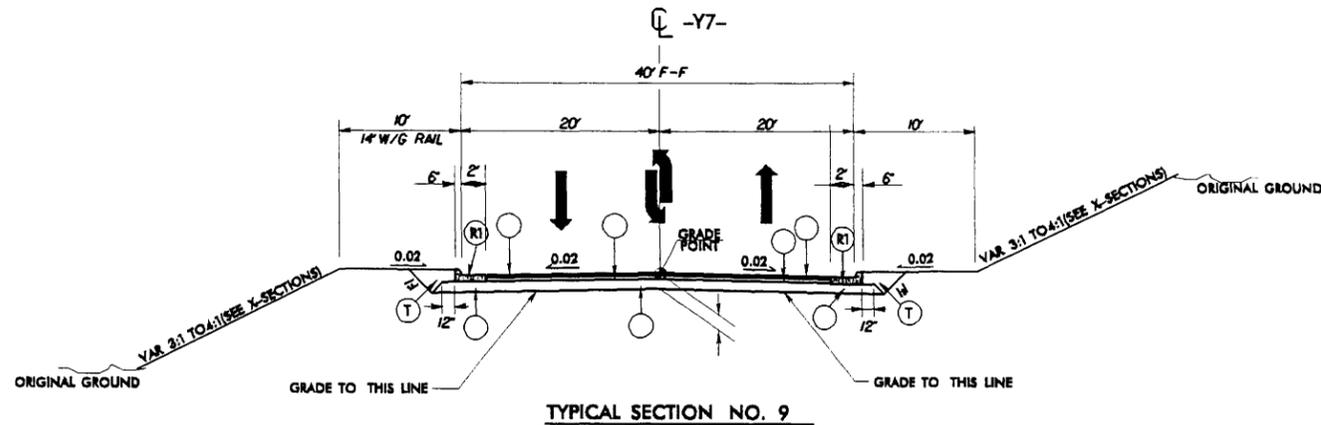
USE TYPICAL SECTION NO. 8 AT THE FOLLOWING LOCATIONS

FROM -Y1- STA. 11+00.00 TO STA. 12+79.26

**PAVEMENT SCHEDULE**

C1	1½" 89.5B
C2	3" 89.5B
D1	2½" 119.0B
J1	8" ABC
J2	VAR. DEPTH ABC
R1	2'-8" CURB AND GUTTER
T	EARTH
U	EXISTING PAVEMENT.
W	WEDGING

PROJECT REFERENCE NO. U-2810	SHEET NO. 2-C
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>PRELIMINARY PLANS</b> <small>DO NOT USE FOR CONSTRUCTION</small>	

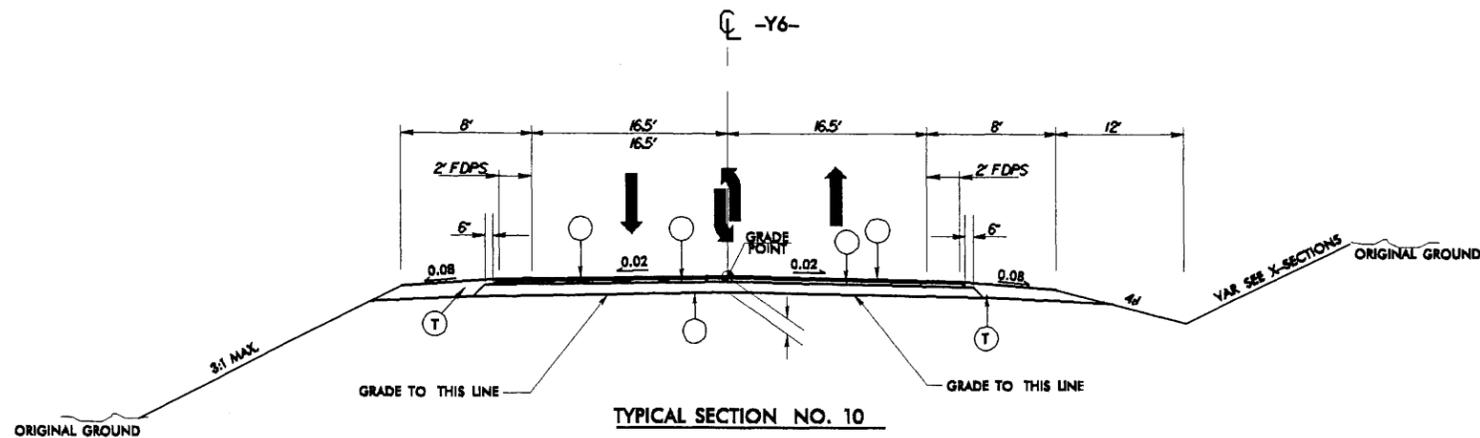


**TYPICAL SECTION NO. 9**

USE TYPICAL SECTION NO. 9 AT THE FOLLOWING LOCATIONS  
FROM -Y7- STA. 14+11.94 TO STA. 19+19.73

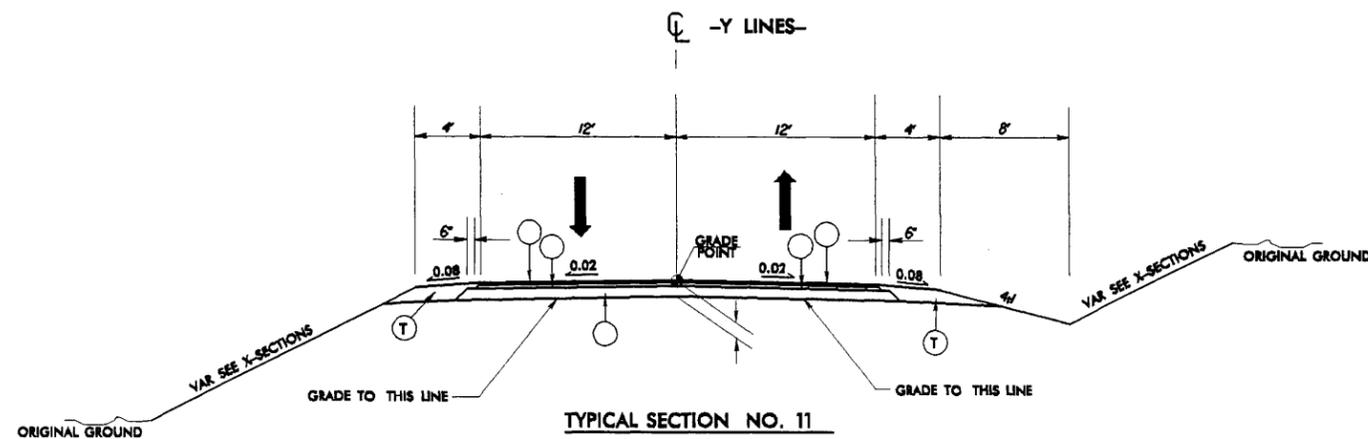
**PAVEMENT SCHEDULE**

C2	3" 69.5B
D1	2 1/2" 119.0B
J1	8" ABC
R3	EXPRESSWAY GUTTER
T	EARTH



**TYPICAL SECTION NO. 10**

USE TYPICAL SECTION NO. 10 AT THE FOLLOWING LOCATIONS  
FROM -Y6- STA. 10+00.00 TO STA. 18+46.72



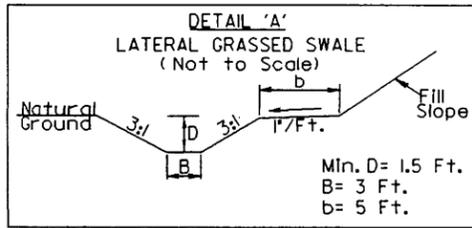
**TYPICAL SECTION NO. 11**

USE TYPICAL SECTION NO. 11 AT THE FOLLOWING LOCATIONS

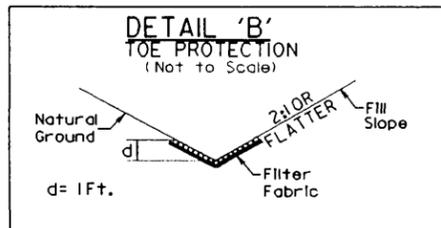
- FROM -Y2- STA. 10+37.22 TO STA. 11+90.00
- FROM -Y4- STA. 10+37.00 TO STA. 11+00.00
- FROM -Y9- STA. 12+00.00 TO STA. 12+30.87
- FROM -Y10- STA. 10+32.00 TO STA. 11+00.00
- FROM -Y11- STA. 10+34.16 TO STA. 12+00.00
- FROM -Y12- STA. 11+00.00 TO STA. 12+85.78
- FROM -Y13- STA. 11+00.00 TO STA. 12+51.48
- FROM -Y15- STA. 10+39.37 TO STA. 11+00.00



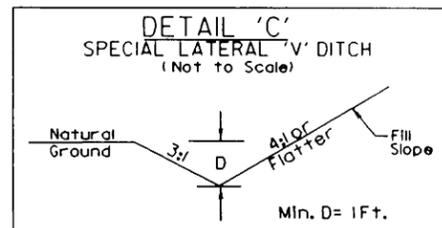
PROJECT REFERENCE NO. U-2810	SHEET NO. 2E
RAW SHEET NO.	
HYDRAULICS ENGINEER	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



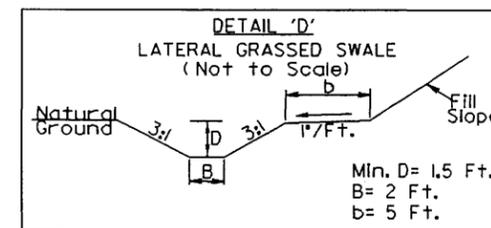
STA 19+50 TO STA 21+70 -L- (LT)



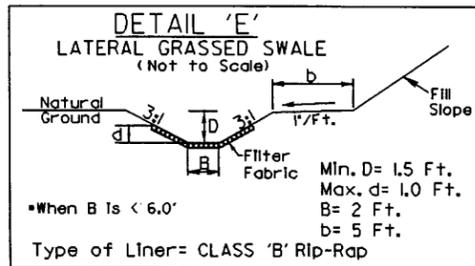
Type of Liner= CLASS 'B' Rip-Rap  
FROM STA. 32+00 TO STA. 32+50 -L- (LT)



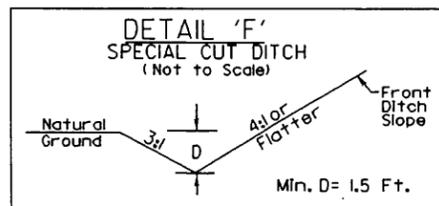
FROM STA. 12+22 TO STA. 12+30 -Y1- (LT)  
FROM STA. 38+00 TO STA. 38+75 -L- (RT)  
FROM STA. 36+75 TO STA. 37+00 -L- (LT)



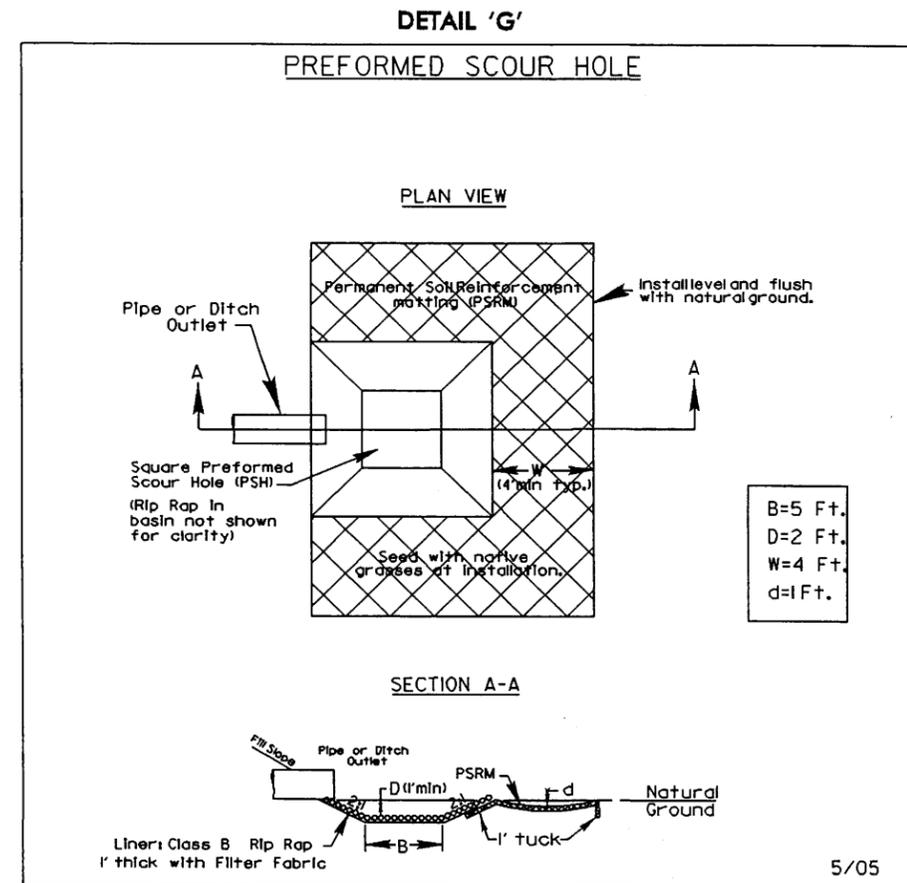
FROM STA. 37+00 TO STA. 39+50 -L- (LT)  
FROM STA. 38+75 TO STA. 39+90 -L- (RT)  
FROM STA. 45+40 TO STA. 45+75 -L- (LT)  
FROM STA. 49+25 TO STA. 51+00 -L- (RT)



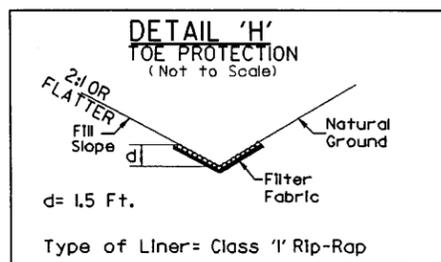
FROM STA. 39+50 TO STA. 39+70 -L- (LT)



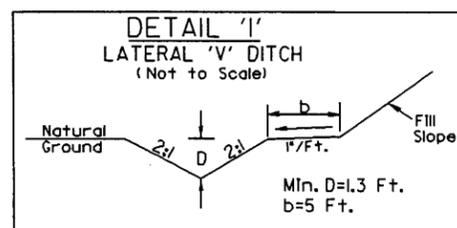
FROM STA. 11+50 TO STA. 12+22 -Y1- (LT)  
FROM STA. 11+50 TO STA. 12+00 -Y1- (RT)



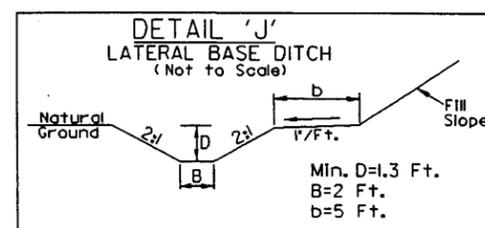
STA 46+40 -L- (RT)  
STA 117+03 -L- (RT)



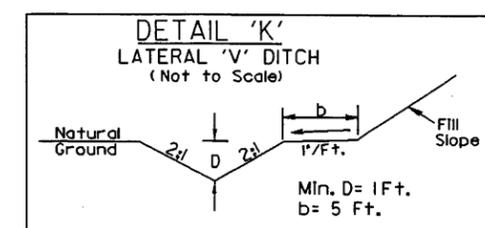
FROM STA. 98+50 TO STA. 99+50 -L- (RT)



FROM STA. 11+80 TO STA. 13+00 -Y7- (RT)



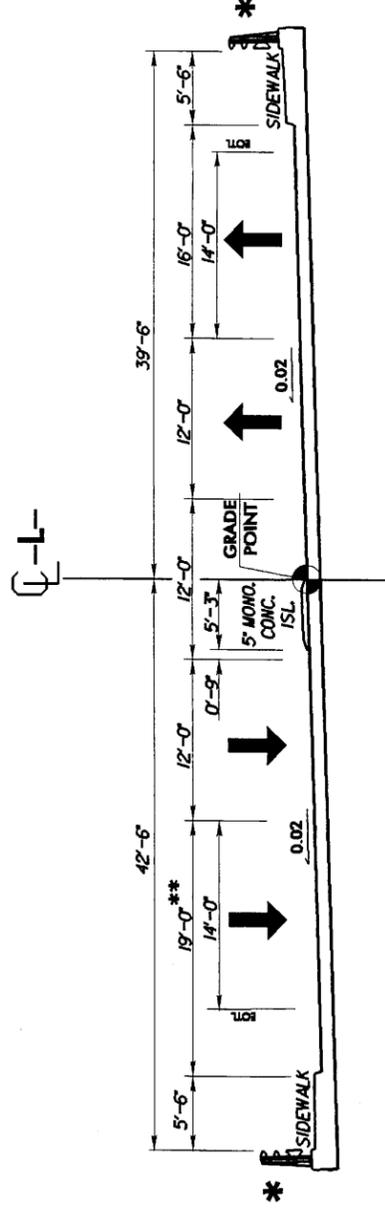
FROM STA. 117+00 TO STA. 120+00 -L- (LT)



FROM STA. 128+00 TO STA. 129+00 -L- (RT)

## STRUCTURE TYPICAL SECTIONS

### -L- STRUCTURES SR 1003 (CAMDEN RD.) OVER LITTLE ROCKFISH CREEK

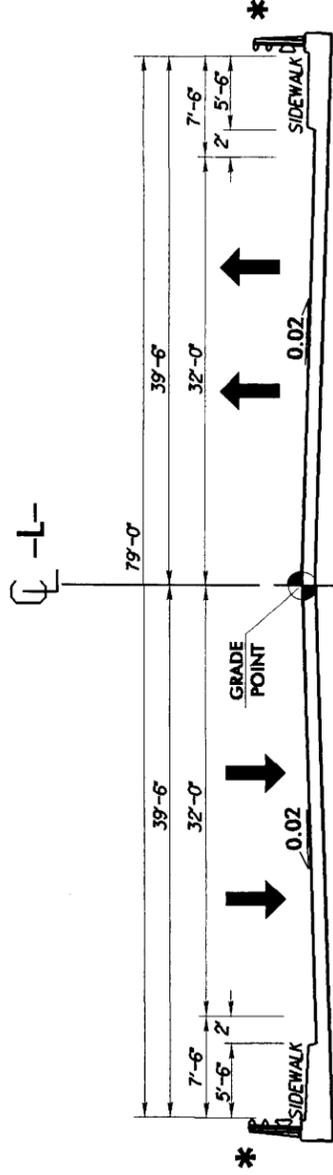


**DESIGN DATA -L-**  
 ADT 2004 = 15,400  
 ADT 2030 = 26,800  
 DHV = 10 %  
 D = 60 %  
 TTST = 1%  
 DUAL = 4%  
 V = 50 MPH  
 FUNC CLASS - COLLECTOR  
 \* THREE-BAR METAL RAIL

### TYPICAL SECTION ON STRUCTURE

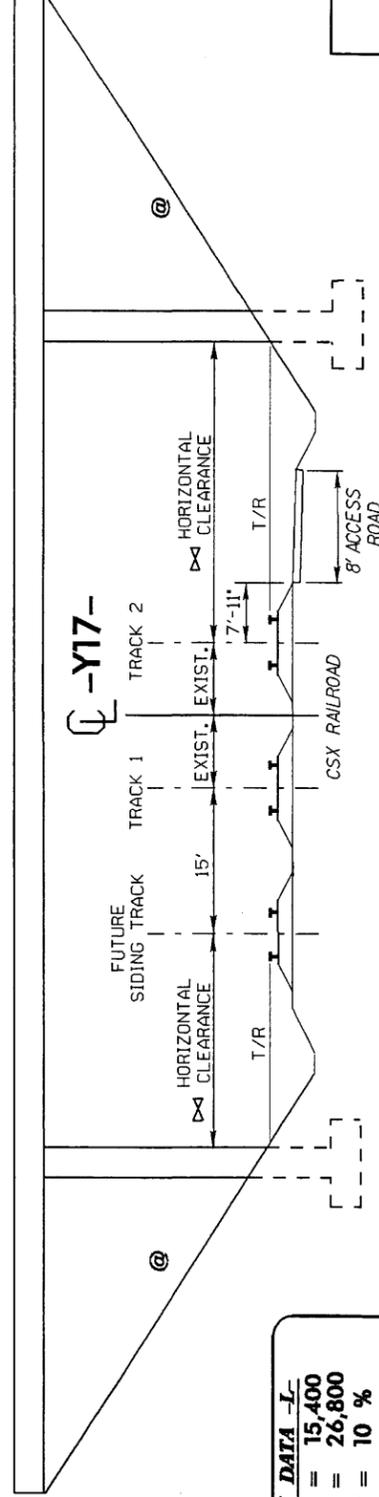
\*\* WIDTH NEEDED TO ACCOMMODATE HYDRAULIC SPREAD

### -L- STRUCTURE SR 1003 (CAMDEN RD.) OVER CSX RAILROAD (-Y17-)



### TYPICAL SECTION ON STRUCTURE

**DESIGN DATA -L-**  
 ADT 2004 = 15,400  
 ADT 2030 = 26,800  
 DHV = 10 %  
 D = 60 %  
 TTST = 1%  
 DUAL = 4%  
 V = 50 MPH  
 FUNC CLASS - COLLECTOR  
 \* THREE-BAR METAL RAIL



### TYPICAL SECTION UNDER STRUCTURE

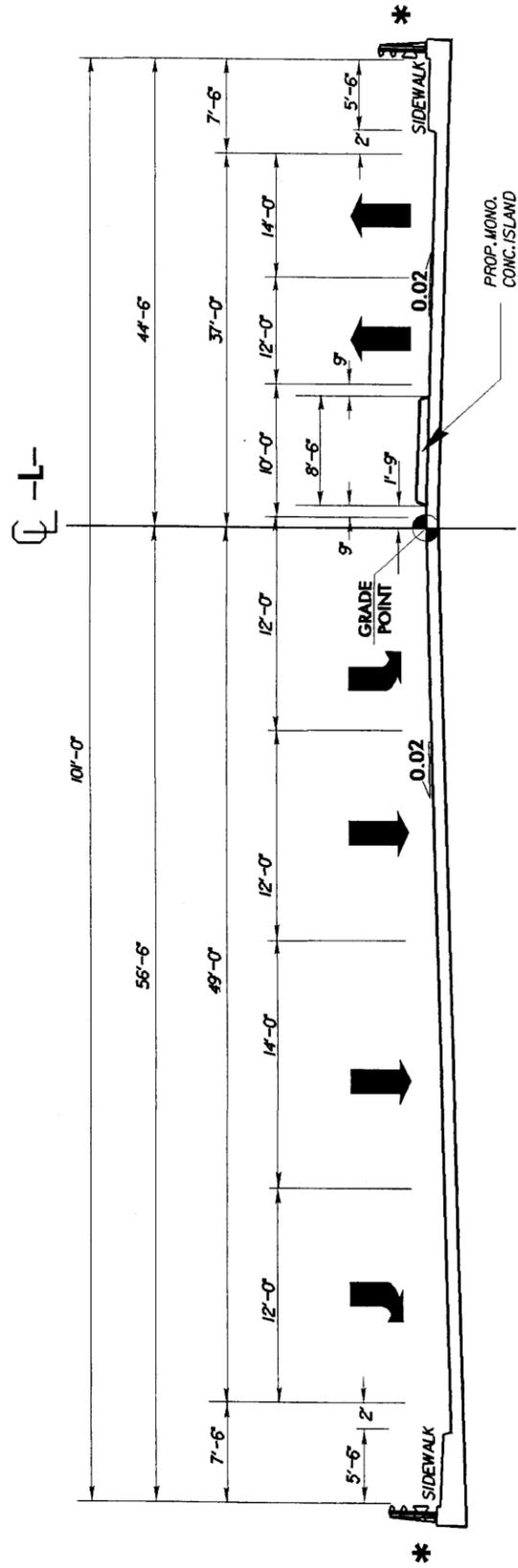
MINIMUM VERTICAL CLEARANCE = 23'-0"

∞ HORIZONTAL CLEARANCES TO BE DETERMINED BY STRUCTURE DESIGN UNIT AND CSX RAILWAY  
 @ SLOPE DETERMINED BY THE GEOTECHNICAL UNIT  
 REVISED 2/2006

PROJECT REFERENCE NO. U-2810	SHEET NO. 2-F
ROADWAY DESIGN ENGINEER	ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

# STRUCTURE TYPICAL SECTIONS

## -L- STRUCTURES SR 1003 (CAMDEN RD.) OVER BUCKHEAD CREEK



TYPICAL SECTION ON STRUCTURE

**DESIGN DATA -L-**  
 ADT 2004 = 15,400  
 ADT 2030 = 26,800  
 DHV = 10 %  
 D = 60 %  
 TTST = 1%  
 DUAL = 4%  
 V = 50 MPH  
 FUNC CLASS - COLLECTOR  
 \* THREE-BAR METAL RAIL

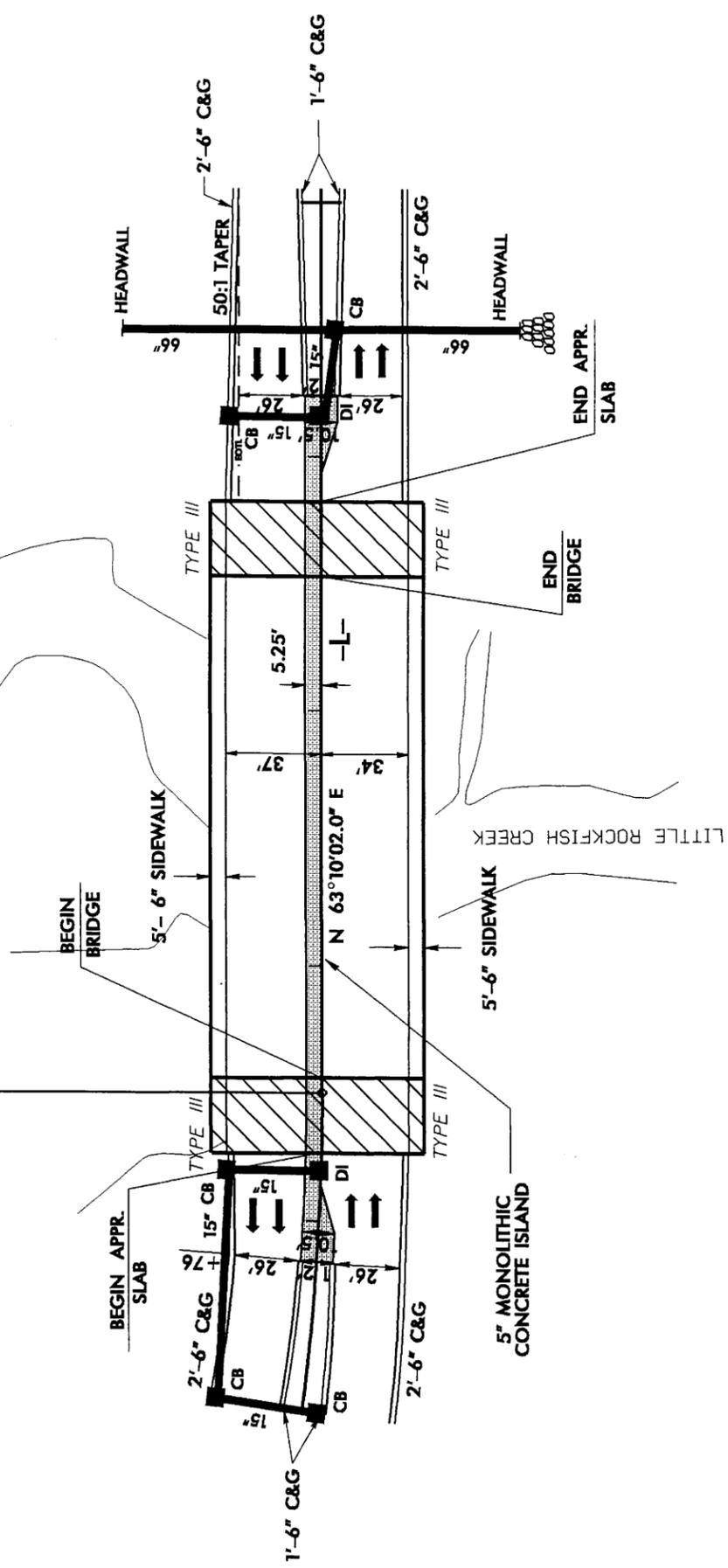
REV.: January 26, 2006

PROJECT REFERENCE NO. U-2810	SHEET NO. 2-6
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
<b>PRELIMINARY PLANS</b> <small>NO. 1003, USE FOR CONSTRUCTION</small>	

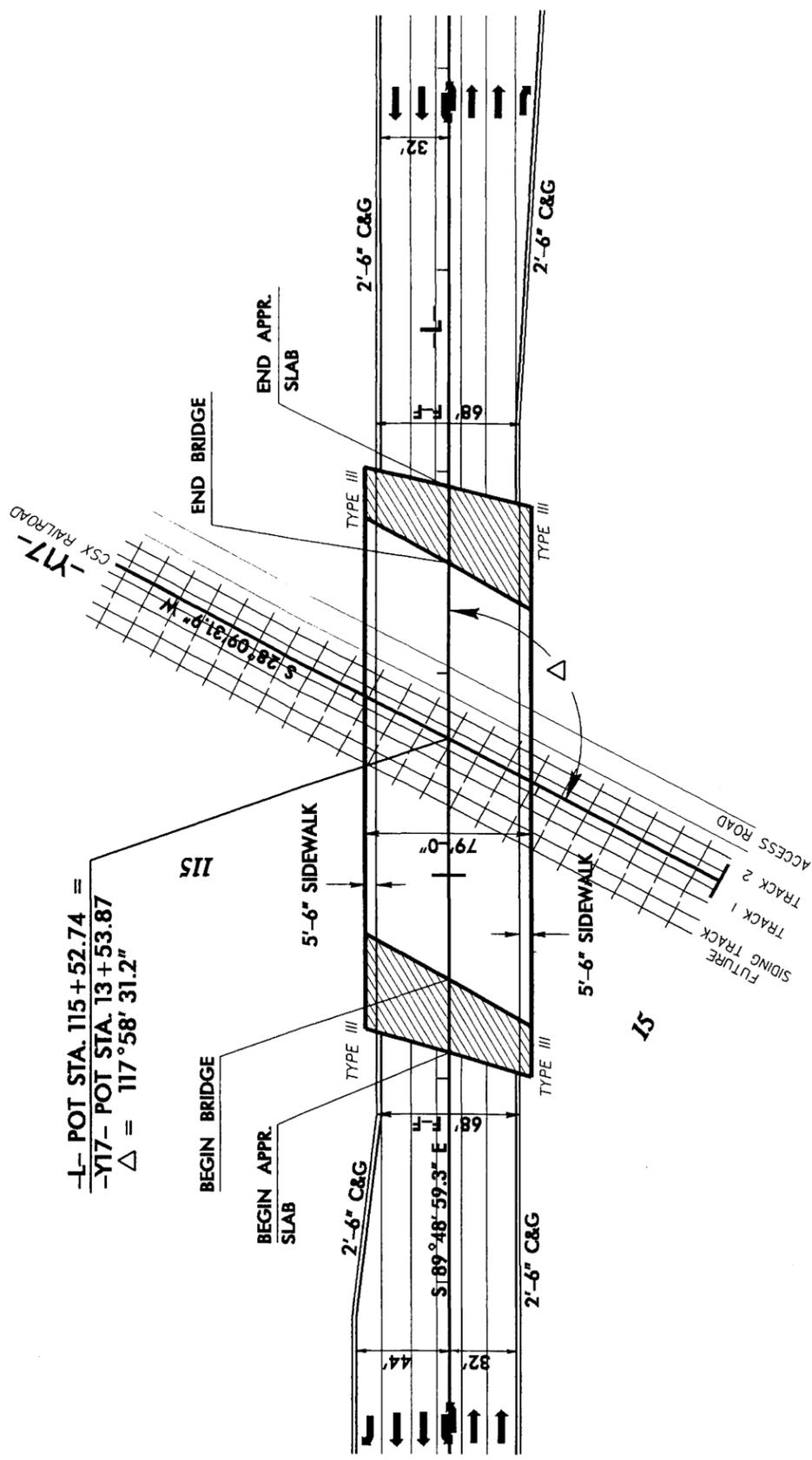
**SKETCH SHOWING PAVEMENT WIDTH TO BRIDGE WIDTH RELATIONSHIP**

-L- PT STA.26+50.03

30



**DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER LITTLE ROCKFISH CREEK**



-L- POT STA. 115 + 52.74 =  
 -Y17- POT STA. 13 + 53.87  
 $\Delta = 117^\circ 58' 31.2''$

**DETAIL SHOWING PAVEMENT-BRIDGE RELATIONSHIP FOR -L- OVER CSX RAILROAD (-Y17-)**

PROJECT REFERENCE NO. U-2810	SHEET NO. 2-H
ROADWAY DESIGN ENGINEER	PAVEMENT DESIGN ENGINEER
PRELIMINARY PLANS	



PROJECT REFERENCE NO.	SHEET NO.
U-2810	4
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

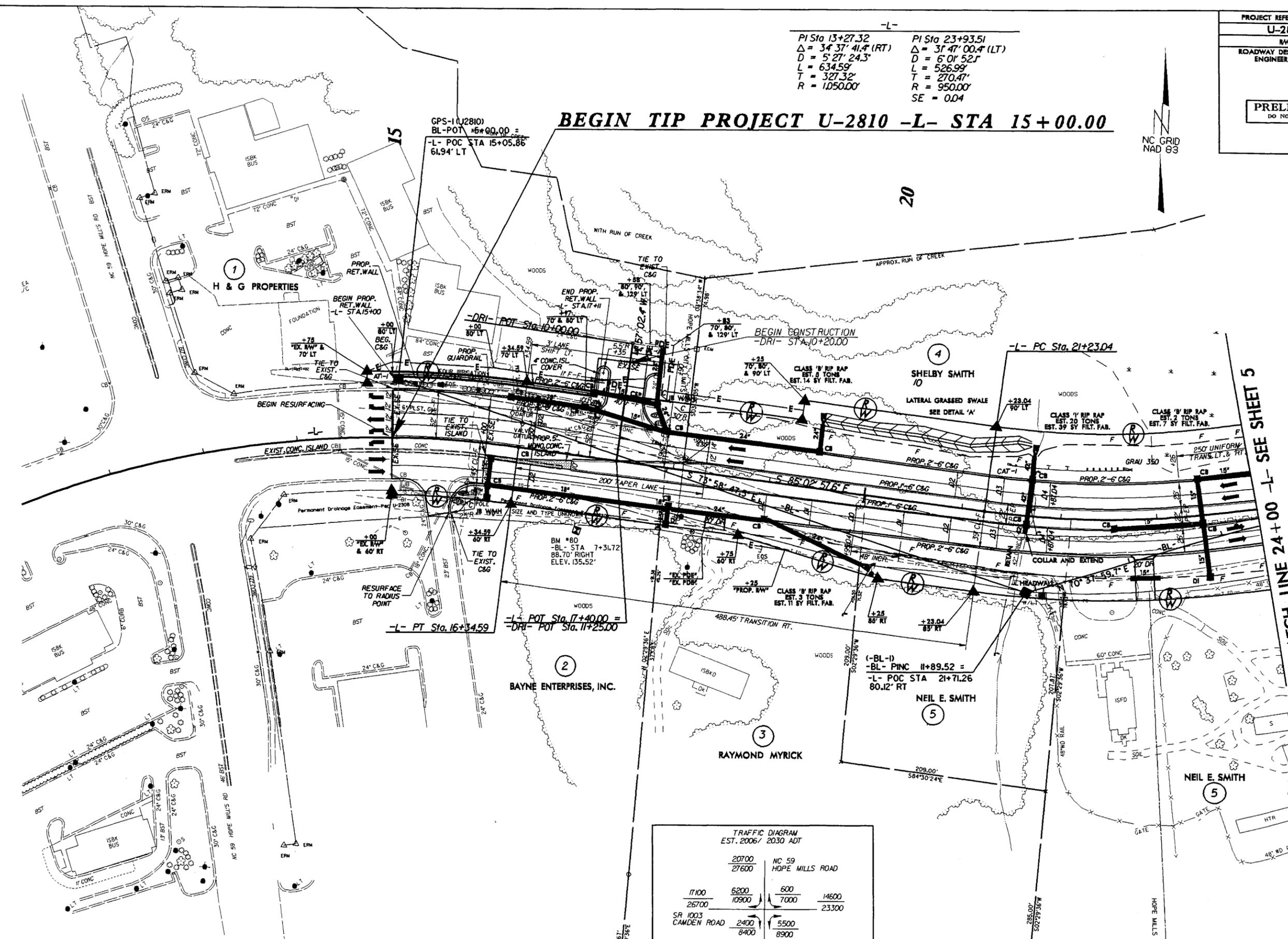
-L-

PI Sta 13+27.32	PI Sta 23+93.51
$\Delta = 34' 37" 41.4' (RT)$	$\Delta = 31' 47" 00.4' (LT)$
$D = 5' 27" 24.3'$	$D = 6' 01" 52.1'$
$L = 634.59'$	$L = 526.99'$
$T = 327.32'$	$T = 270.47'$
$R = 1050.00'$	$R = 950.00'$
	$SE = 0.04$

**BEGIN TIP PROJECT U-2810 -L- STA 15+00.00**

NC GRID  
NAD 83

REV. 18/11/07 ELIMINATED PROPOSED TCE AND PDE ON PARCEL 2. REDUCED TCE ON PARCEL 3. -SIS



TRAFFIC DIAGRAM  
EST. 2006 / 2030 ADT

20700	NC 59 HOPE MILLS ROAD		
27600	6200	600	14600
	10900	7000	
17100			23300
26700	2400	5500	
	8400	8900	
SR 1003 CAMDEN ROAD	21800		27000

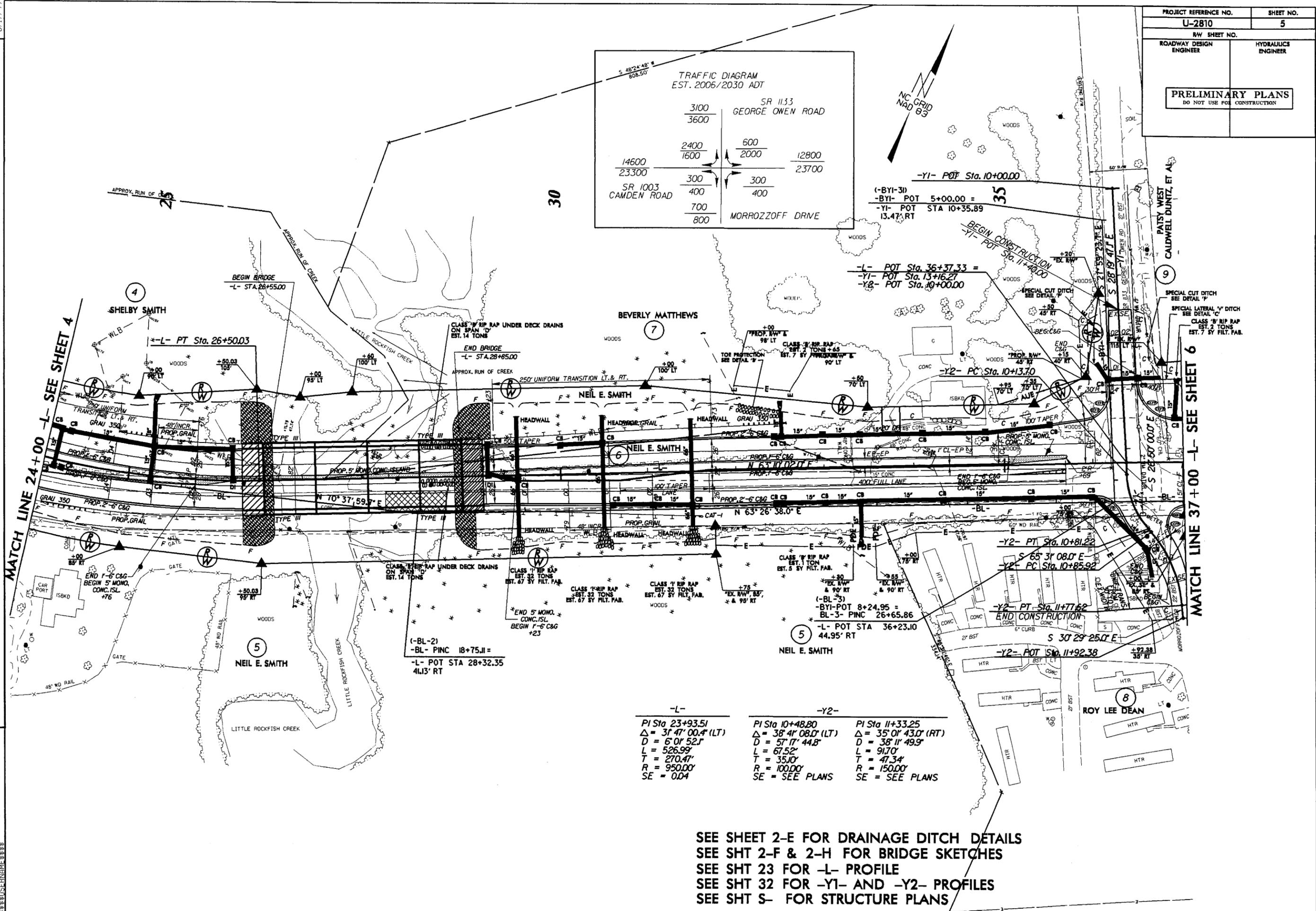
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
SEE SHEET 23 FOR -L- PROFILE  
SEE SHEET 23 FOR -DRI- PROFILE

8/17/99

16-JAN-2008 10:54  
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USER:RDM

TRAFFIC DIAGRAM  
EST. 2006/2030 ADT

		SR 1133 GEORGE OWEN ROAD	
	3100 3600	600 2000	12800
14600 23300	2400 1600	300 400	300 400
		SR 1003 CAMDEN ROAD	
	700 800		
		MORROZZOFF DRIVE	



-L-	-Y2-	-Y2-
PI Sta 23+93.51	PI Sta 10+48.80	PI Sta 11+33.25
$\Delta = 31' 47'' 00.4''$ (LT)	$\Delta = 38' 4'' 08.0''$ (LT)	$\Delta = 35' 0'' 43.0''$ (RT)
D = 6' 0'' 52.1'	D = 57' 17'' 44.8'	D = 38' 11'' 49.9'
L = 526.99'	L = 67.52'	L = 91.70'
T = 270.47'	T = 35.10'	T = 47.34'
R = 950.00'	R = 100.00'	R = 150.00'
SE = 0.04	SE = SEE PLANS	SE = SEE PLANS

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHT 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHT 23 FOR -L- PROFILE  
 SEE SHT 32 FOR -Y1- AND -Y2- PROFILES  
 SEE SHT 5- FOR STRUCTURE PLANS

REVISIONS  
R/W REV. 15/22/07 - CHANGED PROPERTY OWNER NAME ON PARCEL 9.616

16-JAN-2008 10:54  
 \$\$\$SYTIME\$\$\$  
 \$\$\$SYTIME\$\$\$

8/17/99

8/17/99

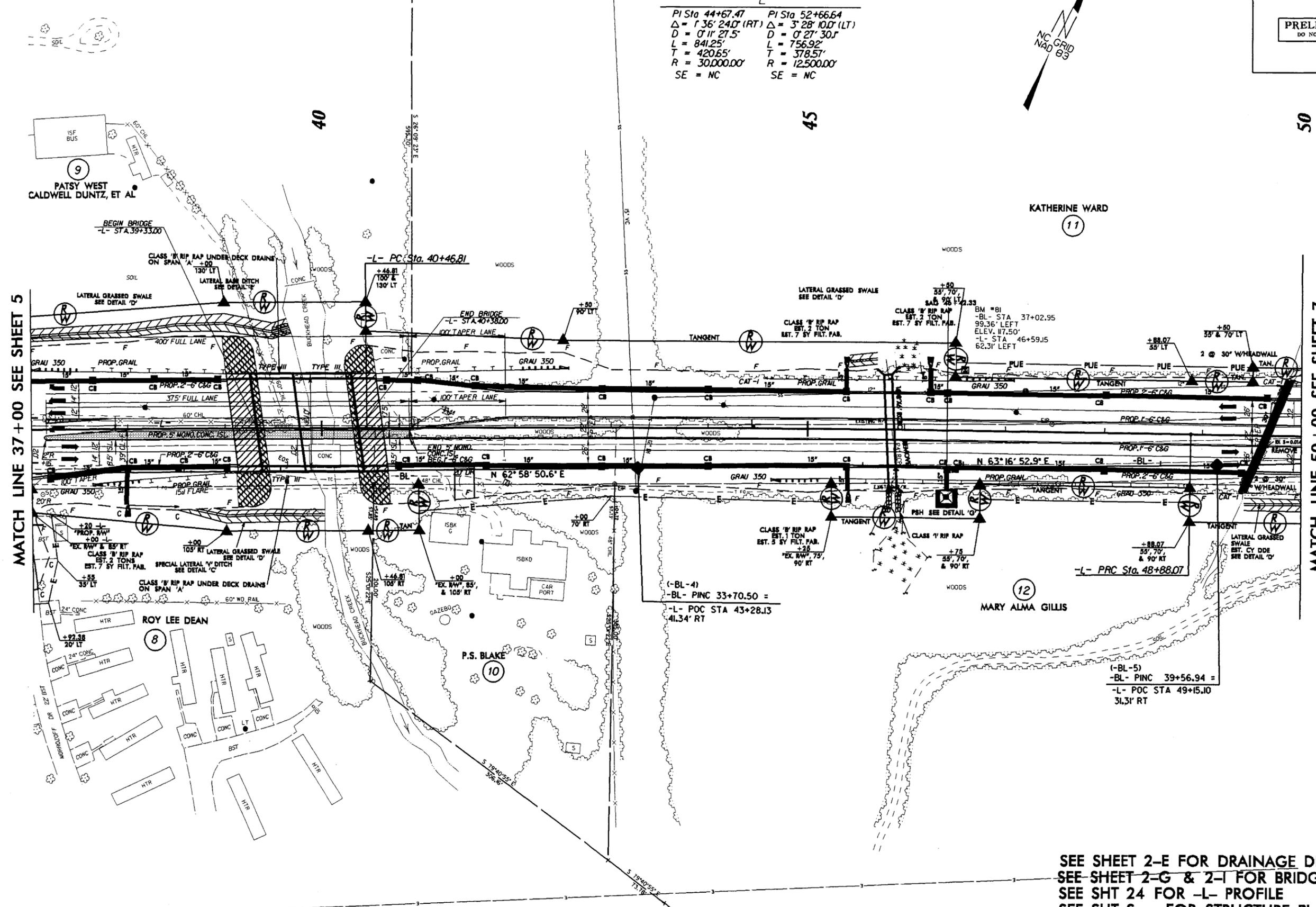
R/W REV.15/22/071 - CHANGED PROPERTY OWNER NAME ON PARCEL 9.SIS

16-JAN-2008 10:54  
C:\P\PLANS\22810\_rdy\_psh\_s6.dgn  
\$\$\$\$\$USERNAME\$\$\$\$\$

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>6</b>
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

- L -

PI Sta 44+67.47	PI Sta 52+66.64
$\Delta = 1'36"24.0'$ (RT)	$\Delta = 3'28"10.0'$ (LT)
D = 0'11'27.5"	D = 0'27'30.1"
L = 841.25'	L = 756.92'
T = 420.65'	T = 378.57'
R = 30,000.00'	R = 12,500.00'
SE = NC	SE = NC



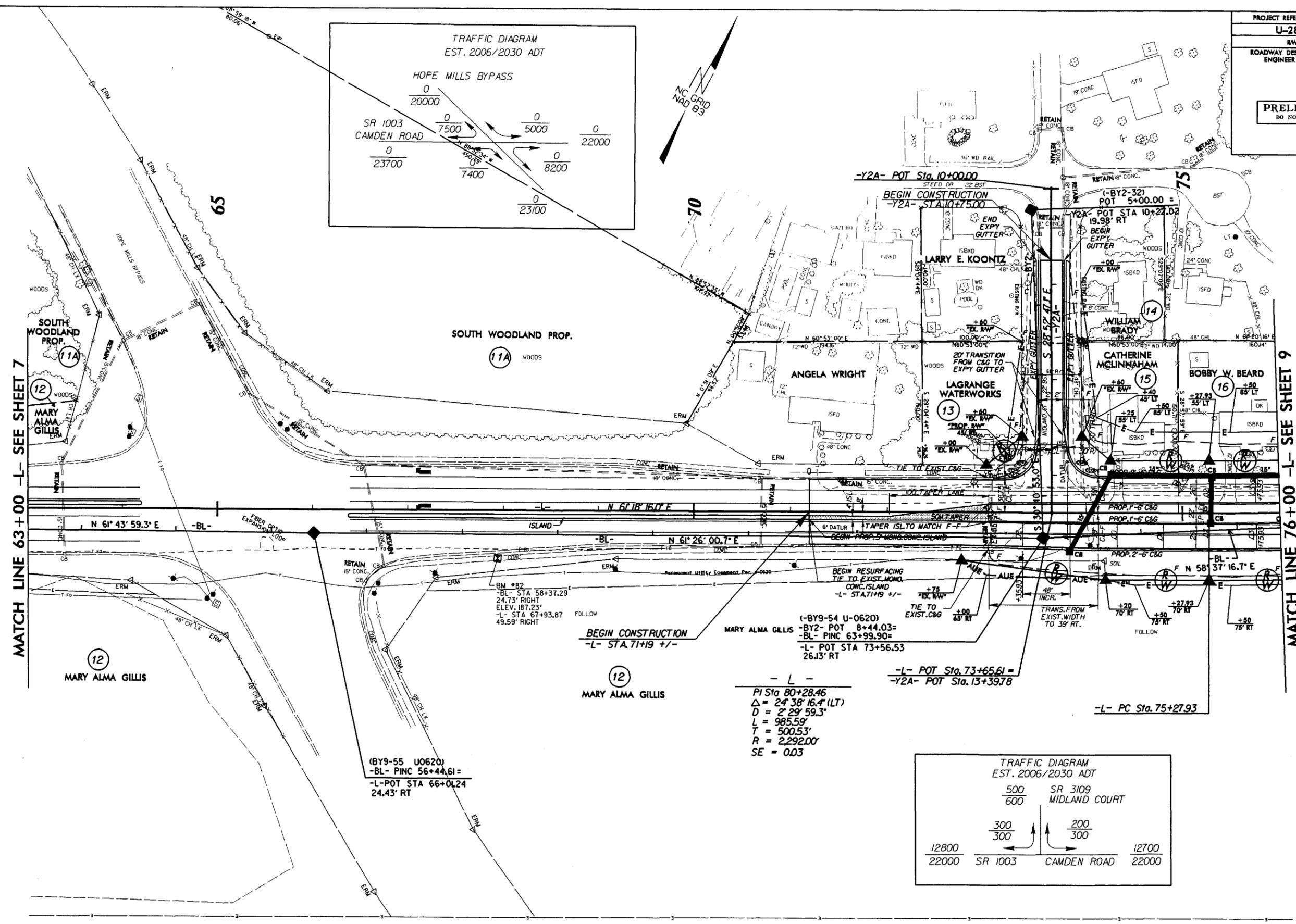
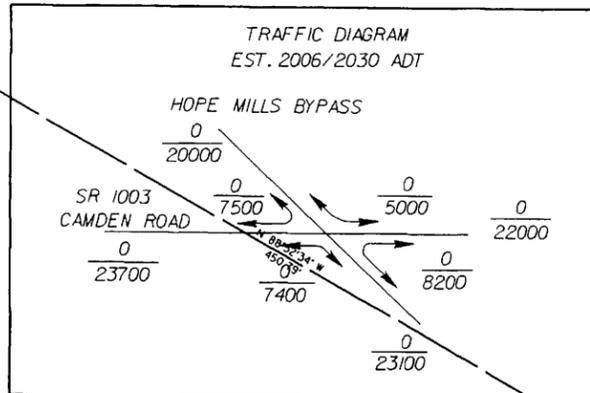
MATCH LINE 37+00 SEE SHEET 5

MATCH LINE 50+00 SEE SHEET 7

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 2-G & 2-I FOR BRIDGE SKETCHES  
 SEE SHT 24 FOR -L- PROFILE  
 SEE SHT S- FOR STRUCTURE PLANS  
 SEE SHT C- FOR CULVERT PLANS



PROJECT REFERENCE NO.	SHEET NO.
U-2810	8
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	



MATCH LINE 63+00 -L- SEE SHEET 7

MATCH LINE 76+00 -L- SEE SHEET 9

REVISIONS  
UTILITY EASEMENT ADDED FOR PARCEL NO.12 JDE 12-20-06  
BROKE PARCEL NO.11 UP, ADDED PARCEL NO.11A (SOUTH WOODLAND PROP.) JDE 01-23-07

BEGIN CONSTRUCTION  
-L- STA. 71+19 +/-

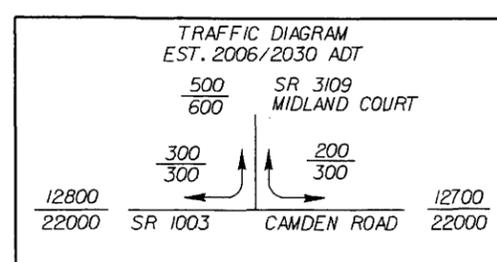
MARY ALMA GILLIS  
(-BY9-54 U-0620)  
-BY2- POT 8+44.03=  
-BL- PINC 63+99.90=  
-L- POT STA 73+56.53  
26J3' RT

-L- POT Sta. 73+65.61 =  
-Y2A- POT Sta. 13+39.78

-L- PC Sta. 75+27.93

- L -  
PI Sta 80+28.46  
Δ = 24° 38' 16.4" (LT)  
D = 2' 29" 59.3"  
L = 985.59'  
T = 500.53'  
R = 2,292.00'  
SE = 0.03

(BY9-55 U0620)  
-BL- PINC 56+44.61=  
-L- POT STA 66+04.24  
24.43' RT

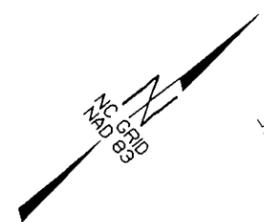
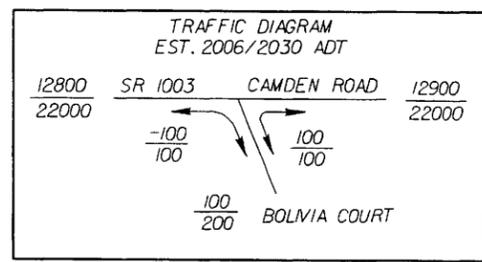


16-JAN-2008 10:54  
13310101.dwg  
13310101.dgn

SEE SHEET 25 FOR -L- PROFILE  
SEE SHEET 32 FOR -Y2A- PROFILE



PROJECT REFERENCE NO.	SHEET NO.
U-2810	10
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	



-L-  
PI Sta 104+87.82  
Δ = 53° 31' 01" (RT)  
D = 3° 58' 04.3"  
L = 1,348.76'  
T = 728.10'  
R = 1,444.00'  
SE = 0.04

(-BL-9)  
-BY4- POT 5+00.00 =  
BL-9- PINC 82+79.83 =  
-L- POT STA 92+21.85  
60.47' RT

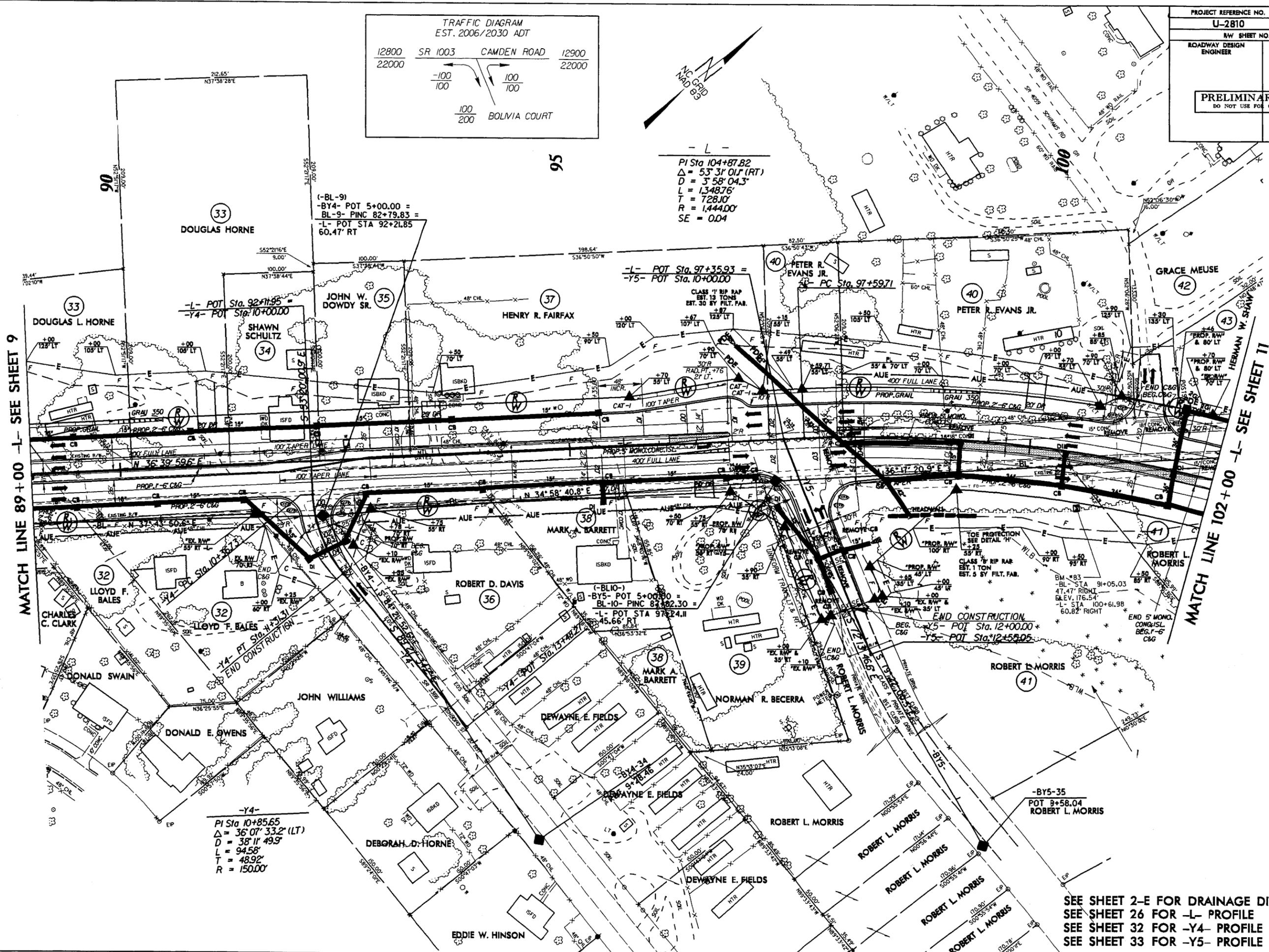
-L- POT Sta 92+11.95 =  
-Y4- POT Sta 10+00.00

-L- POT Sta 97+35.93 =  
-Y5- POT Sta 10+00.00

(-BL10-)  
-BY5- POT 5+00.00 =  
BL-10- PINC 82+82.30 =  
-L- POT STA 97+24.11  
45.66' RT

-Y4-  
PI Sta 10+85.65  
Δ = 36° 07' 33.2" (LT)  
D = 38° 11' 49.9"  
L = 94.58'  
T = 48.92'  
R = 150.00'

-BY5-35  
POT 9+58.04  
ROBERT L. MORRIS



MATCH LINE 89+00 -L- SEE SHEET 9

MATCH LINE 102+00 -L- SEE SHEET 11

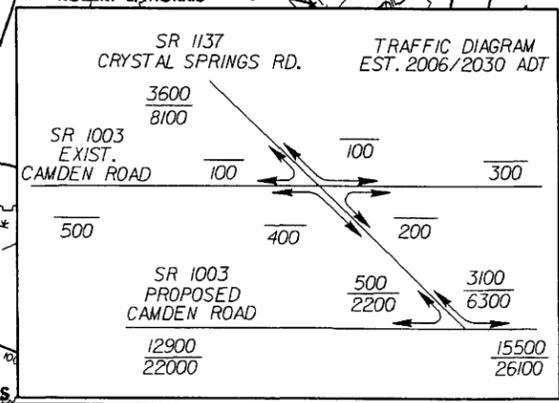
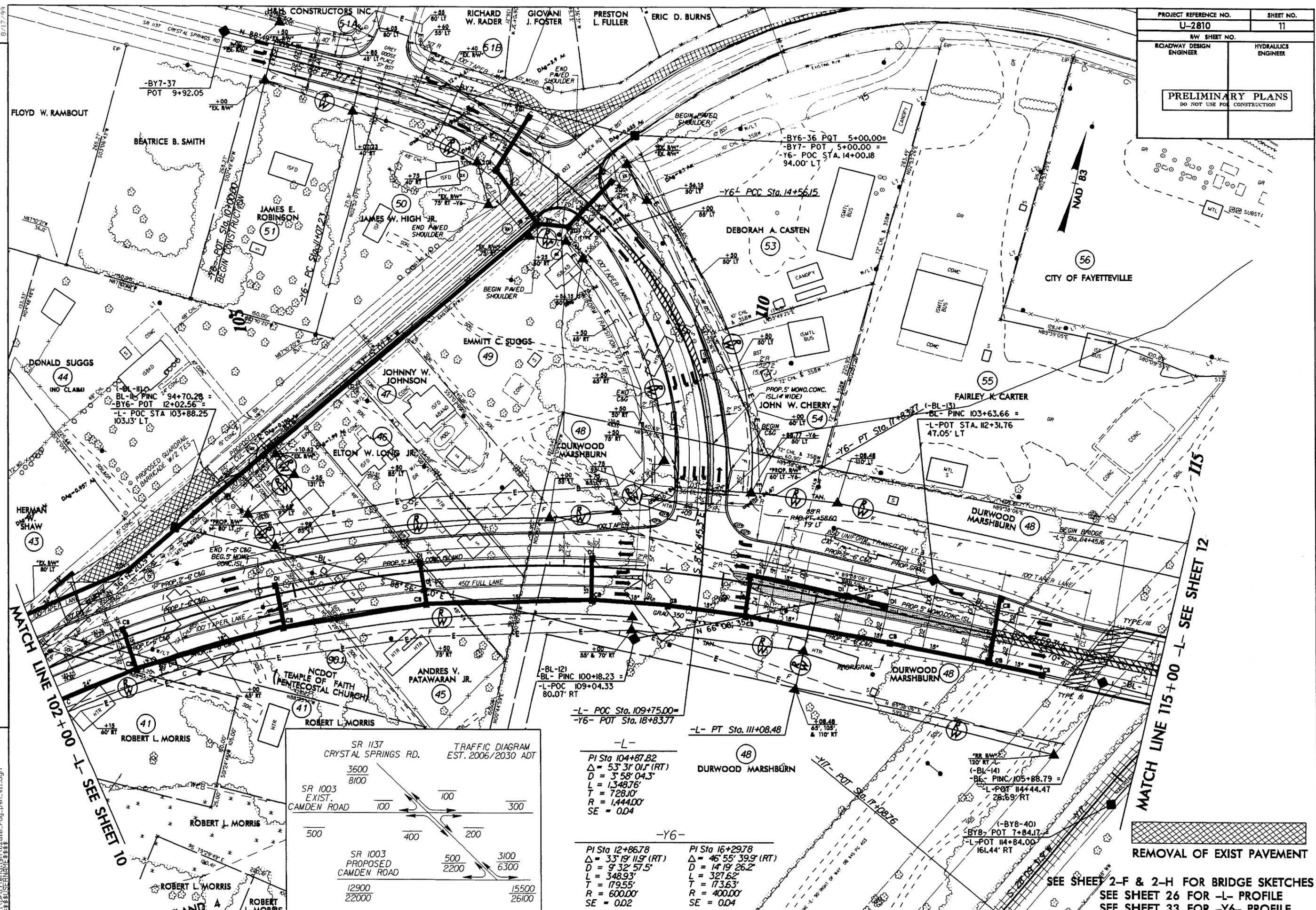
SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
SEE SHEET 26 FOR -L- PROFILE  
SEE SHEET 32 FOR -Y4- PROFILE  
SEE SHEET 33 FOR -Y5- PROFILE

REVISIONS  
JDE 01-23-07  
JDE 12-20-06  
JDE 01-23-06  
UTILITY EASEMENT ADDED FOR PARCEL NO. 32, 36, 38, 39 & 40

16-JAN-2008 10:54  
U:\2810\_rdy\_psh.s10.dgn  
8/17/99

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>11</b>
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

REVISIONS  
 ADDED DRIVE TO PARCEL 43, MOVED CUL-DE-SAC TO PARCEL 45, CHANGED ROW FOR PARCEL 45 REVISED 07 JDE  
 ADDED PARCEL 51A (H&H CONSTRUCTORS INC.), ADDED PARCEL 51B (RICHARD W. RADER) JDE 01-23-07



**-L-**  
 PI Sta 104+87.82  
 $\Delta = 53^\circ 31' 01.1''$  (RT)  
 $D = 3^\circ 58' 04.3''$   
 $L = 1,348.76'$   
 $T = 728.10'$   
 $R = 1,444.00'$   
 $SE = 0.04$

**-Y6-**  
 PI Sta 12+86.78  
 $\Delta = 33^\circ 19' 11.9''$  (RT)  
 $D = 9^\circ 32' 57.5''$   
 $L = 348.93'$   
 $T = 179.55'$   
 $R = 600.00'$   
 $SE = 0.02$

PI Sta 16+29.78  
 $\Delta = 46^\circ 55' 39.9''$  (RT)  
 $D = 14^\circ 19' 26.2''$   
 $L = 321.62'$   
 $T = 173.63'$   
 $R = 400.00'$   
 $SE = 0.04$

**REMOVAL OF EXIST PAVEMENT**

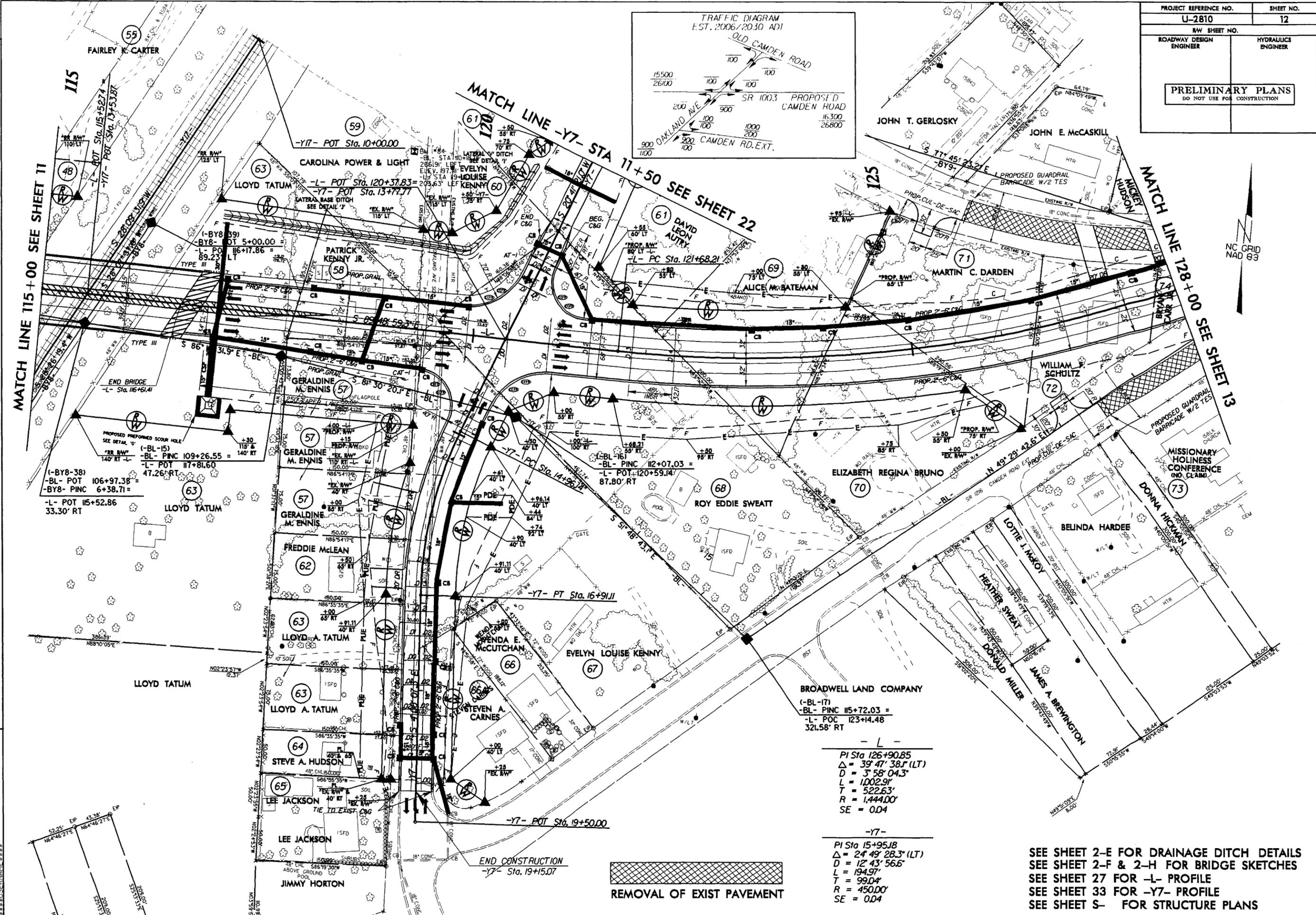
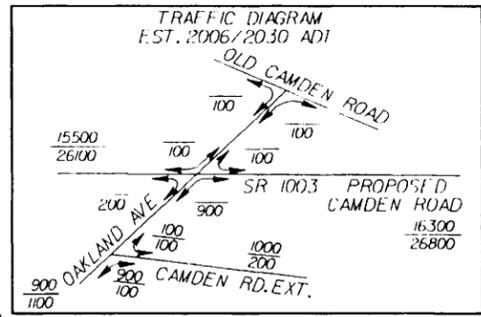
MATCH LINE 102+00 -L- SEE SHEET 10

MATCH LINE 115+00 -L- SEE SHEET 12

SEE SHEET 2-F & 2-H FOR BRIDGE SKETCHES  
 SEE SHEET 26 FOR -L- PROFILE  
 SEE SHEET 33 FOR -Y6- PROFILE

16-JAN-2008 10:54  
 P:\projects\2810\2810\_rdw-ph-sh-11.dgn  
 \$\$\$\$\$\$USER\$ \$\$\$\$\$\$

PROJECT REFERENCE NO.	SHEET NO.
U-2810	12
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



MATCH LINE 115+00 SEE SHEET 11

MATCH LINE -Y7- STA 11+50 SEE SHEET 22

MATCH LINE 128+00 SEE SHEET 13

REVISIONS  
R/W REV. 11/16/07 PROPERTY LINE DATA UPDATED TO INCLUDE PARCEL 66A (STEVEN A. CARNES) - sis

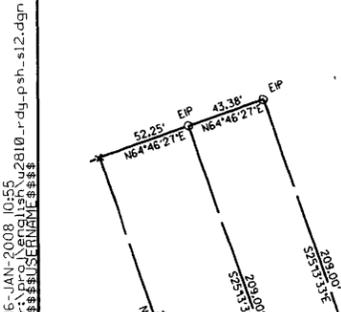
BROADWELL LAND COMPANY  
(-BL-17)  
-BL- PINC 115+72.03 =  
-L- POC 123+14.48  
321.58' RT

- L -  
PI Sta 126+90.85  
Δ = 39' 47' 38.1" (LT)  
D = 3' 58' 04.3"  
L = 1002.91'  
T = 522.63'  
R = 1,444.00'  
SE = 0.04

-Y7-  
PI Sta 15+95.18  
Δ = 24' 49' 28.3" (LT)  
D = 12' 43' 56.6"  
L = 194.97'  
T = 99.04'  
R = 450.00'  
SE = 0.04

REMOVAL OF EXIST PAVEMENT

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
SEE SHEET 2-F & 2-H FOR BRIDGE SKETCHES  
SEE SHEET 27 FOR -L- PROFILE  
SEE SHEET 33 FOR -Y7- PROFILE  
SEE SHEET S- FOR STRUCTURE PLANS

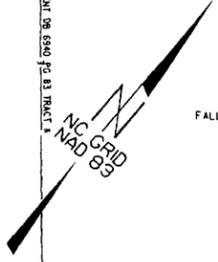


8/17/99

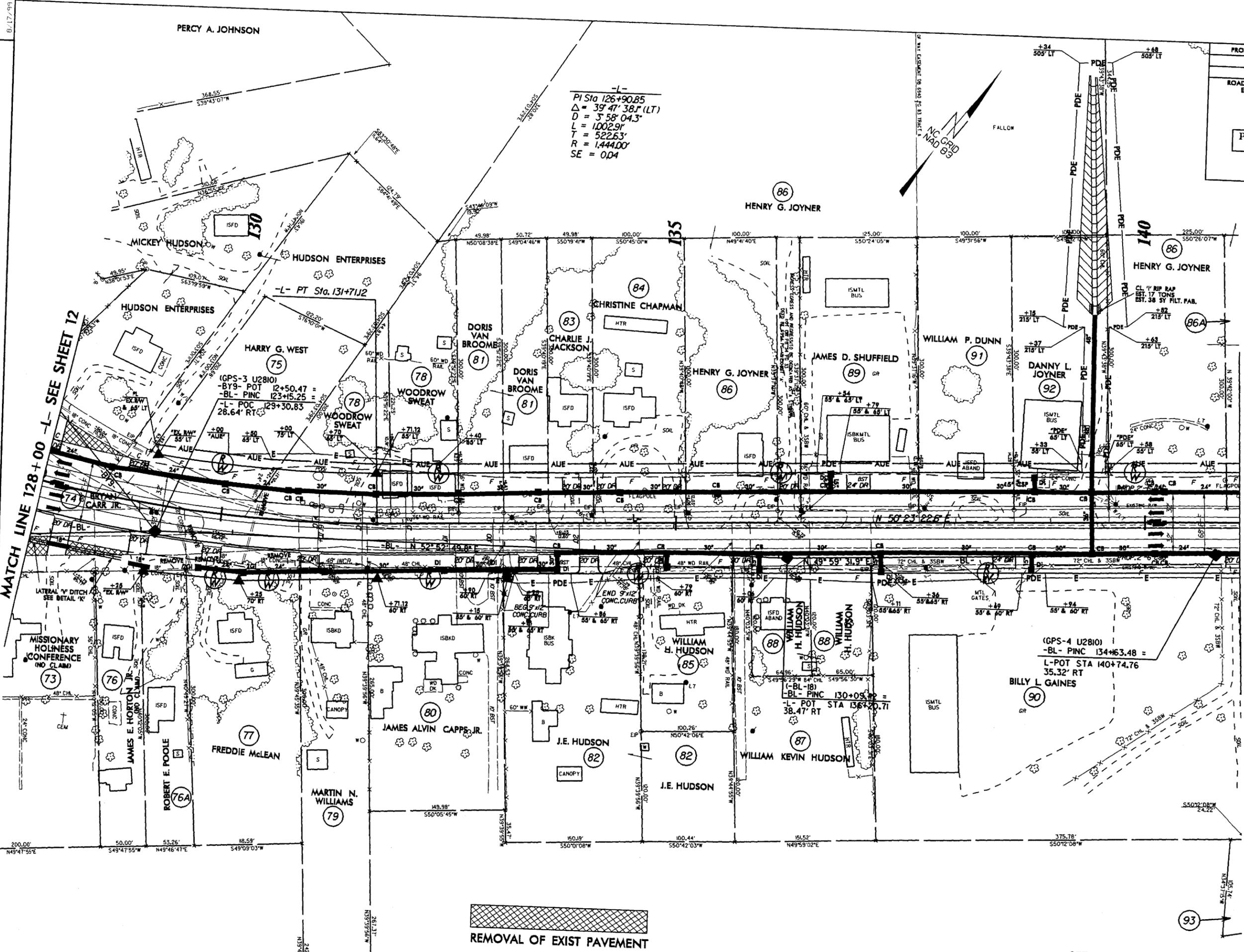
15-JAN-2008 10:55  
C:\pco\152810\_r-dj\_psh\_s12.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2810	13
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-L-  
 PI Sta 126+90.85  
 $\Delta = 39^{\circ} 47' 38.1" (LT)$   
 $D = 3^{\circ} 58' 04.3"$   
 $L = 1002.91'$   
 $T = 522.63'$   
 $R = 1,444.00'$   
 $SE = 0.04$



REV. 18/27/07 - CHANGED PROPERTY OWNER NAME AND PARCEL NUMBER OF PARCEL 86 TO 86A. Job



15-JAN-2008 10:55 AM  
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 \$\$\$\$USER\$

  
 REMOVAL OF EXIST PAVEMENT

SEE SHEET 2-E FOR DRAINAGE DITCH DETAILS  
 SEE SHEET 27 FOR

8/17/99

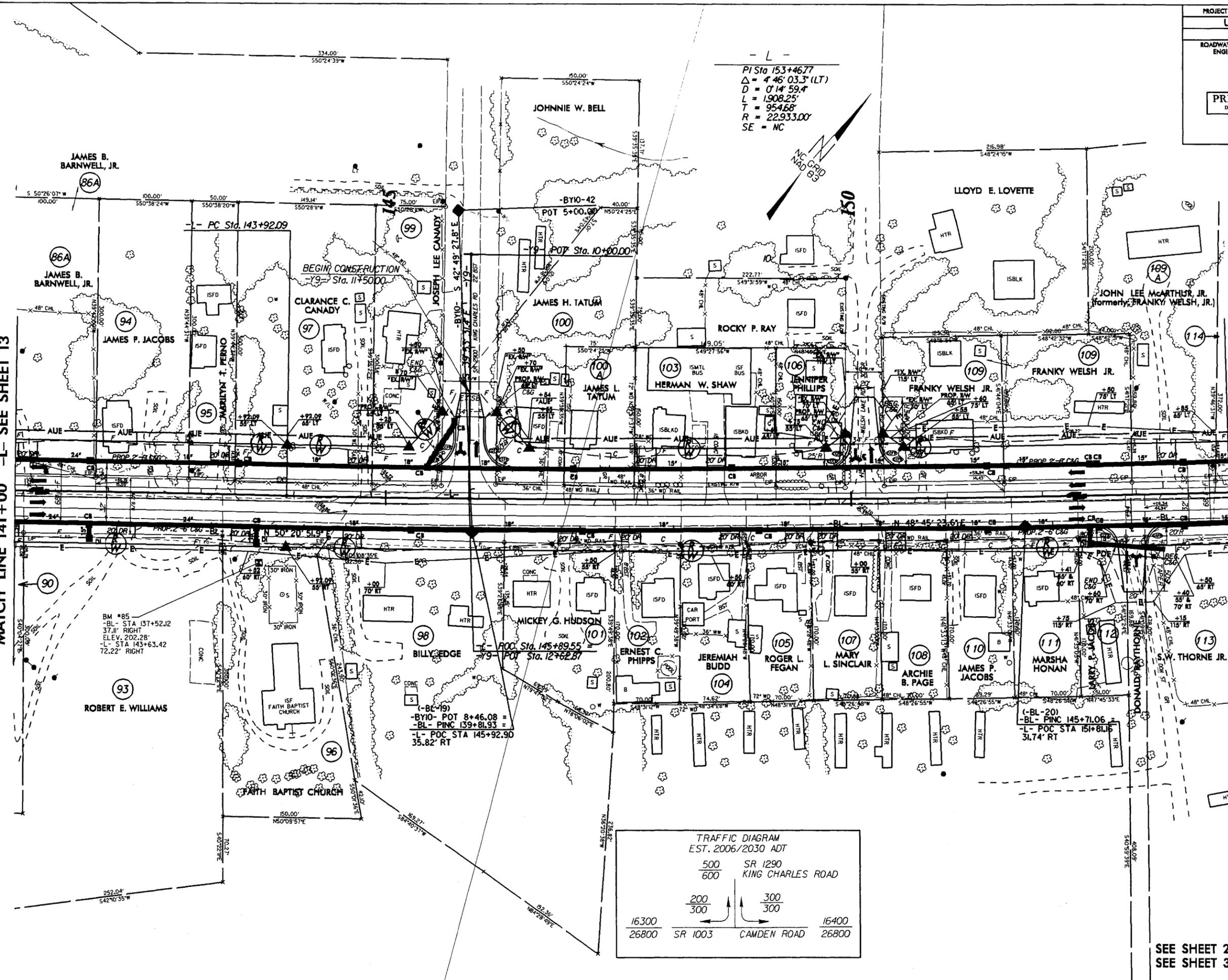
R/W REV. (01/03/08) - INCLUSION OF PARCEL 109A FORMERLY PARCEL 109 - Jde

15-JAN-2008 10:55 U:\2810\_r-dj\_psh\_a14.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-2810	14
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

MATCH LINE 141+00 -L- SEE SHEET 13

MATCH LINE 154+00 -L- SEE SHEET 15

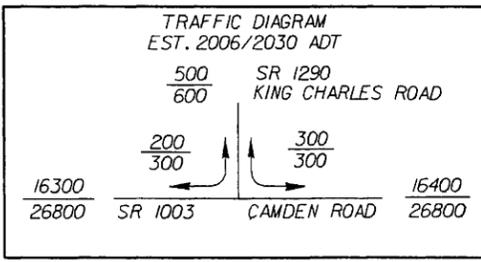


- L -  
 PI Sta 153+46.77  
 $\Delta = 4' 46'' 03.3''$  (LT)  
 $D = 0' 14'' 59.4''$   
 $L = 1908.25'$   
 $T = 954.68'$   
 $R = 22933.00'$   
 SE = NC

BM #85  
 -BL- STA 137+52.12  
 37.11' RIGHT  
 ELEV. 202.28'  
 -L- STA 143+63.42  
 72.22' RIGHT

(-BL-19)  
 -BYIO- POT 8+46.08 =  
 -BL- PINC 139+81.93 =  
 -L- POC STA 145+92.90  
 35.82' RT

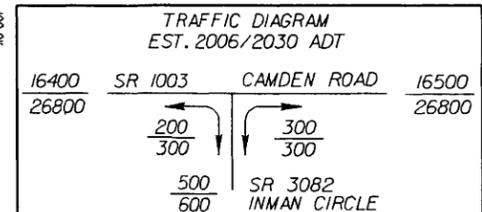
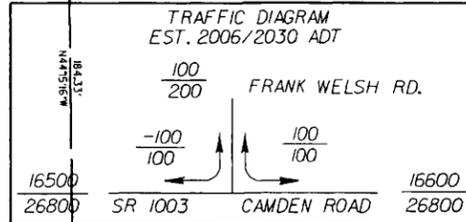
(-BL-20)  
 -BL- PINC 145+71.06 =  
 -L- POC STA 151+81.15  
 31.74' RT



SEE SHEET 28 FOR -L- PROFILE  
 SEE SHEET 34 FOR -Y9- PROFILE

PROJECT REFERENCE NO.	SHEET NO.
U-2810	15
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

JUDY B. CRUMMIE



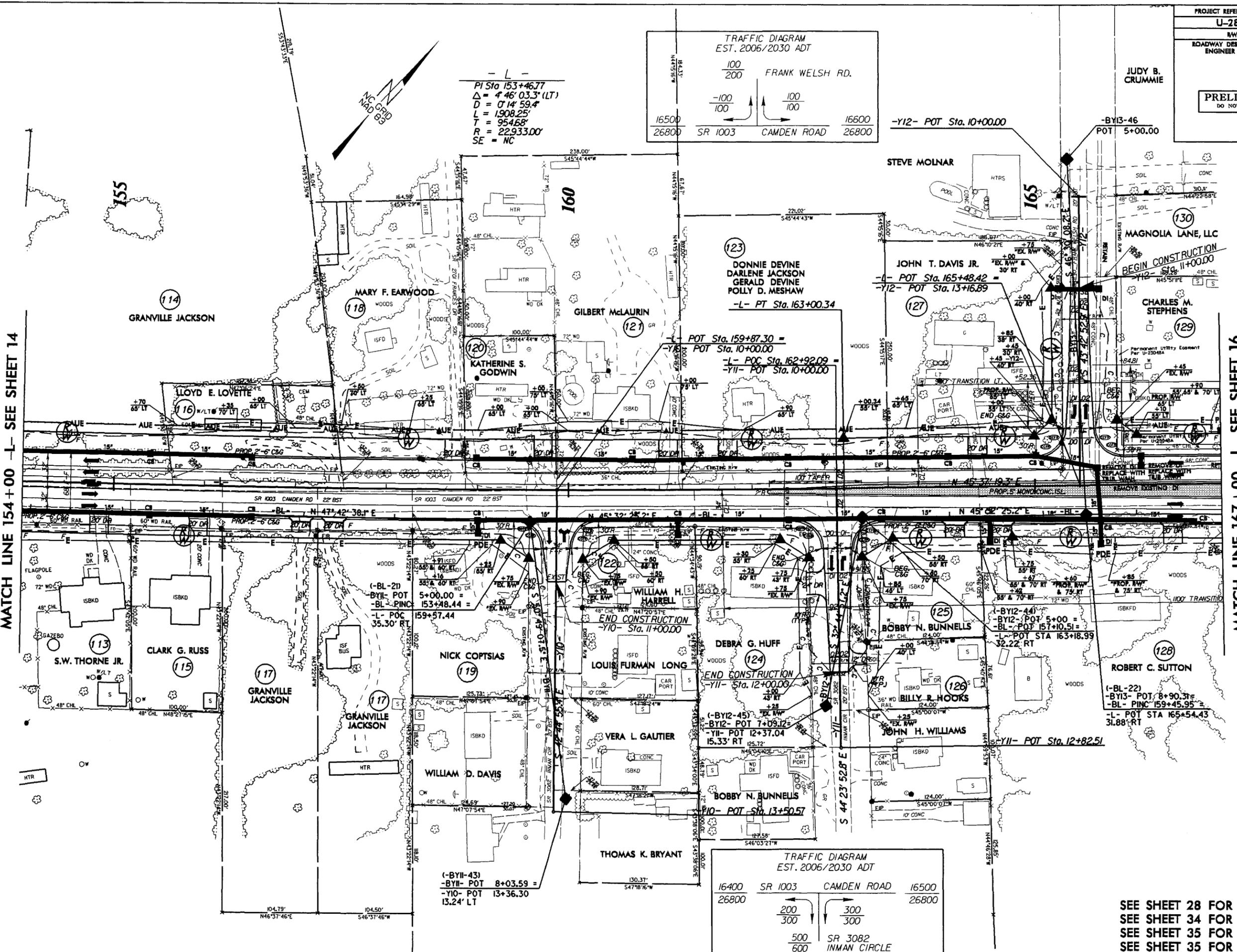
- L -  
PI Sta 153+46.77  
 $\Delta = 4' 46'' 03.3''$  (LT)  
D = 0' 14'' 59.4''  
L = 1908.25'  
T = 95468'  
R = 22933.00'  
SE = NC

(-BY11-43)  
-BY11- POT 8+03.59 =  
-Y10- POT 13+36.30  
13.24' LT

MATCH LINE 154+00 -L- SEE SHEET 14

MATCH LINE 167+00 -L- SEE SHEET 16

REVISIONS  
UTILITY EASEMENT ADDED FOR PARCEL NO. 114, 115, 118, 120, 121, 123, 127 & 129 JDE 12-20-06  
PARCEL NAME CHANGES 117 GRANVILLE JACKSON, 123 DONNIE DEVINE, DARLENE JACKSON, GERALD DEVINE, POLLY D. MESHAW, 124 DEBRA G. HUFF, 126 BILLY R. HOOKS, JDE 01-23-07

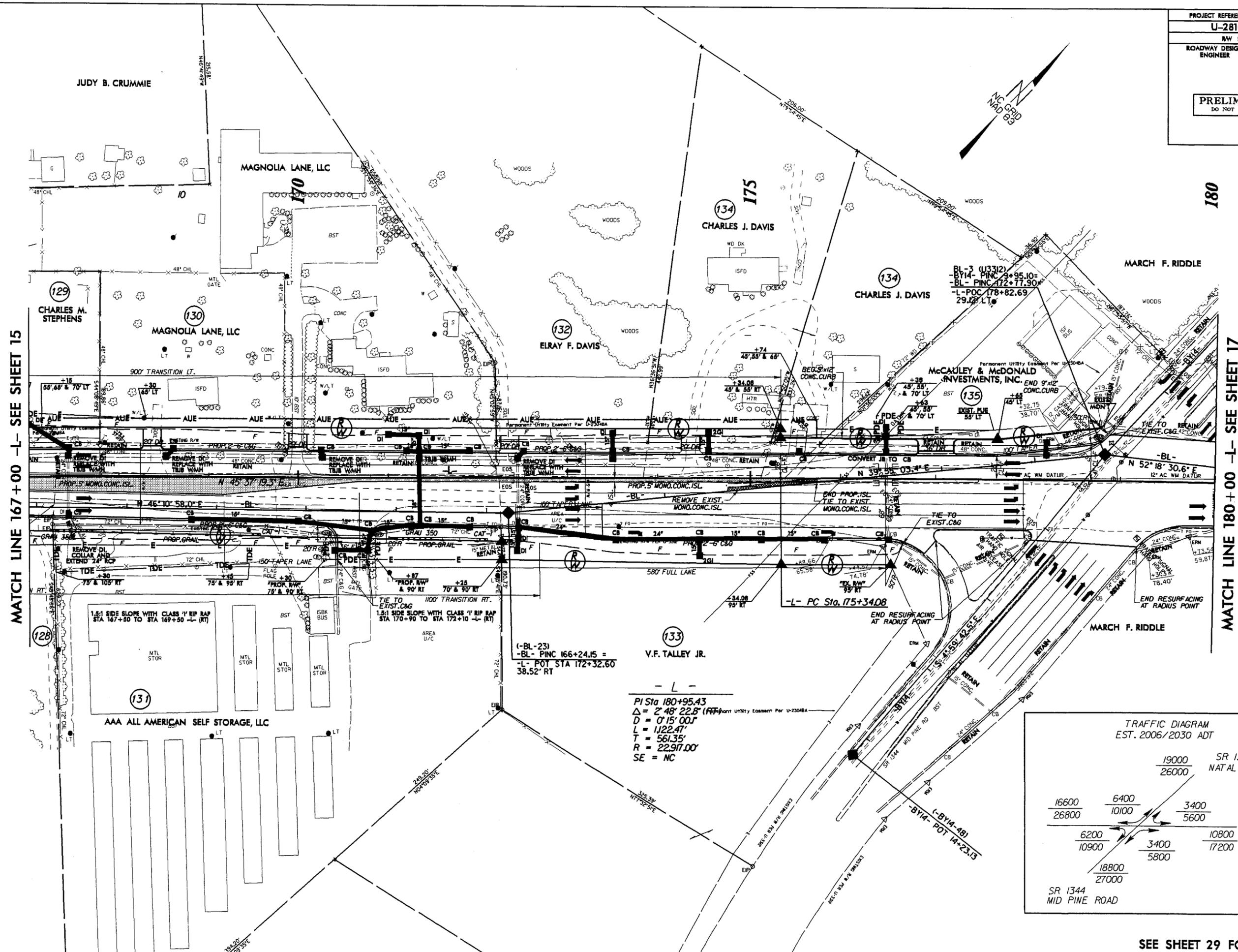


SEE SHEET 28 FOR -L- PROFILE  
SEE SHEET 34 FOR -Y10- PROFILE  
SEE SHEET 35 FOR -Y11- PROFILE  
SEE SHEET 35 FOR -Y12- PROFILE

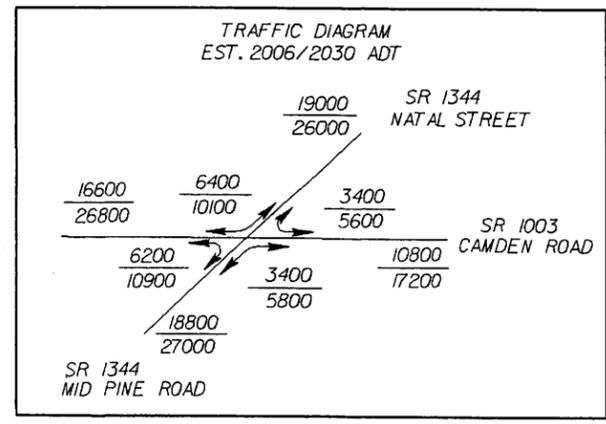
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15-JAN-2008 10:55  
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USER:RUBEN

PROJECT REFERENCE NO.	SHEET NO.
U-2810	16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

8/17/99  
 UTILITY EASEMENT ADDED FOR PARCEL NO. 129, 130, 132 & 134 JDE 12-20-06  
 16-JAN-2008 10:55  
 \\p01\eng\130\2810\_rdy\_pah\_s16.dgn  
 \$\$\$USERNAME\$\$\$



MATCH LINE 180+00 -L- SEE SHEET 17



- L -  
 PI Sta 180+95.43  
 $\Delta = 2' 48'' 22.8''$   
 $D = 0' 15'' 00''$   
 $L = 1122.47'$   
 $T = 561.35'$   
 $R = 22977.00'$   
 $SE = NC$

SEE SHEET 29 FOR -L- PROFILE

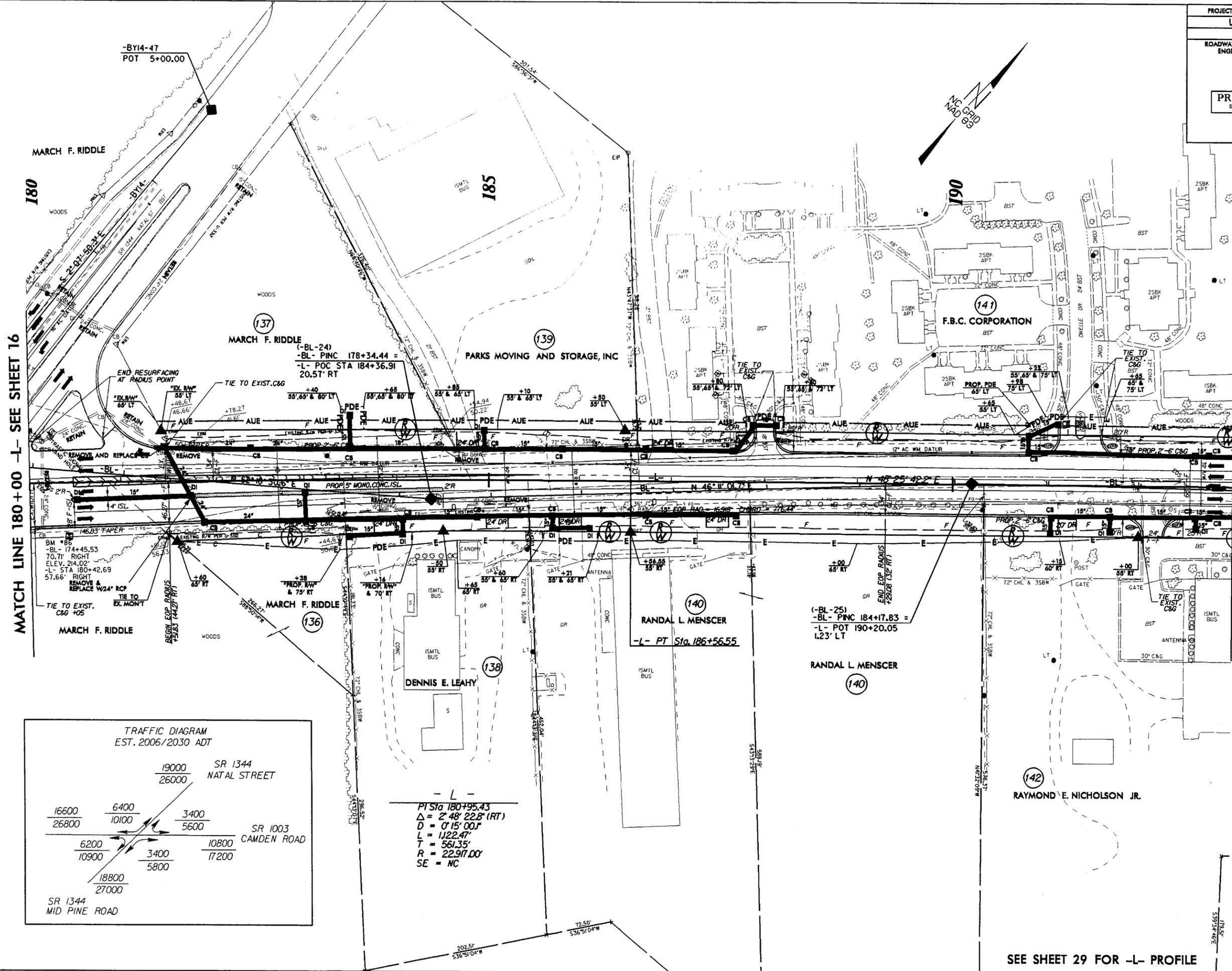
PROJECT REFERENCE NO.	SHEET NO.
U-2810	17
RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

8/17/99

PARCEL NAME CHANGE (138 DENNIS E. LEAHY) JDE 01-23-07

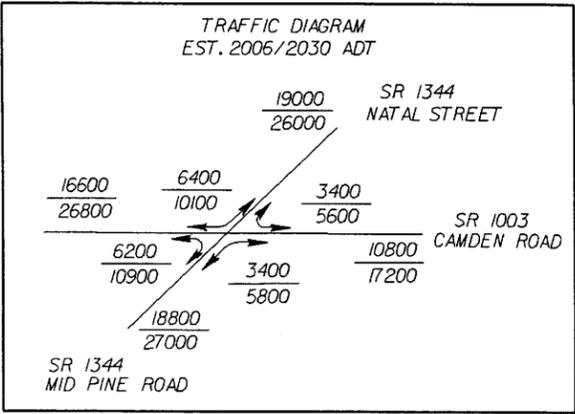
UTILITY EASEMENT ADDED FOR PARCEL NO. 137, 139 & 141 JDE 12-20-06

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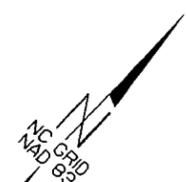
MATCH LINE 180+00 -L- SEE SHEET 16

MATCH LINE 193+00 -L- SEE SHEET 18



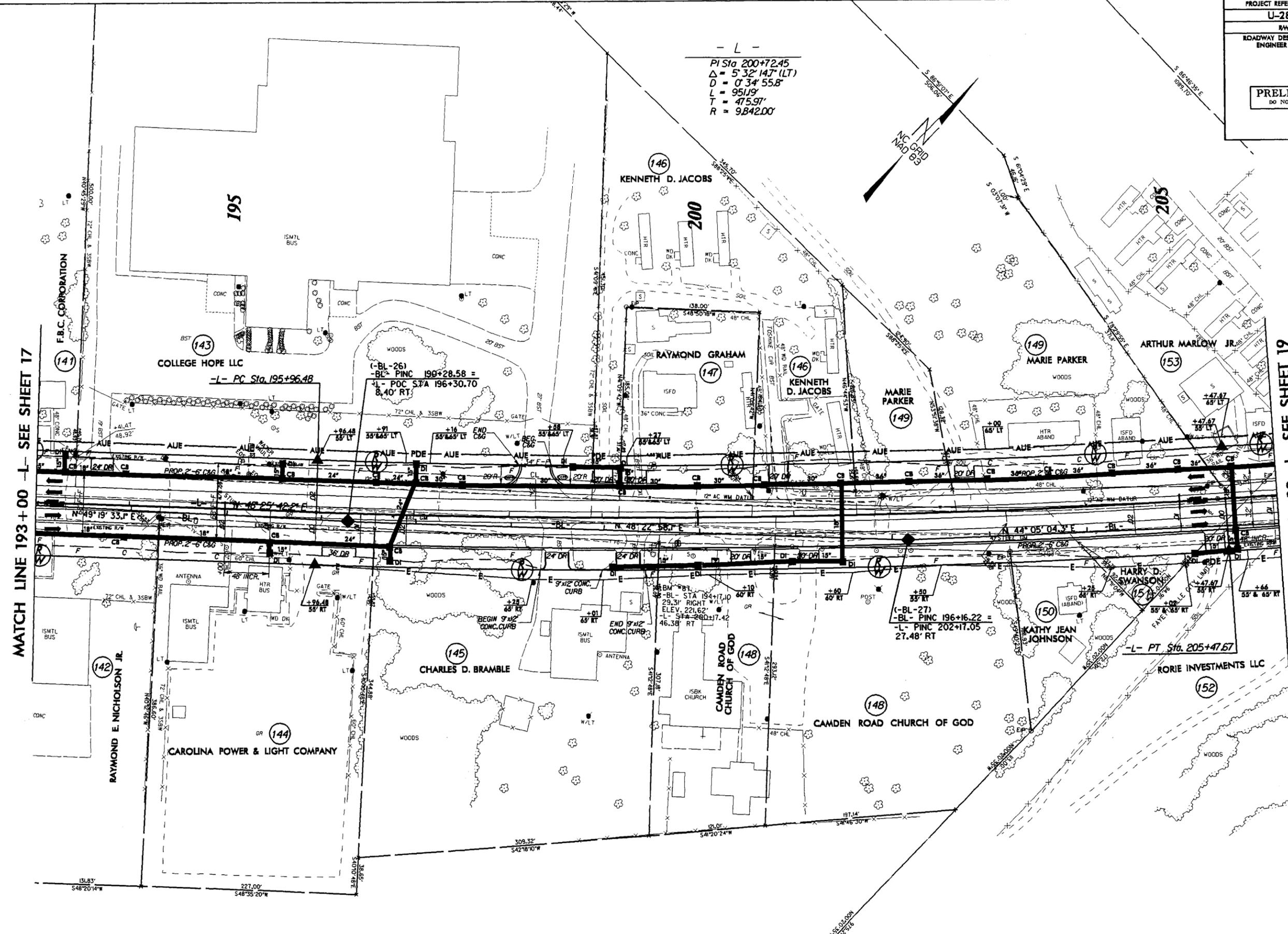
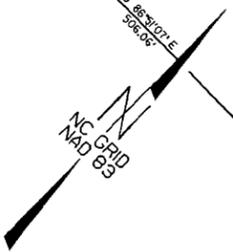
- L -  
 PI Sta 180+95.43  
 $\Delta = 2' 48' 22.8''$  (RT)  
 $D = 0' 15' 00.0''$   
 $L = 1122.47'$   
 $T = 561.35'$   
 $R = 22.917.00'$   
 SE = NC

SEE SHEET 29 FOR -L- PROFILE



PROJECT REFERENCE NO.	SHEET NO.
U-2810	18
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

- L -  
 PI Sta 200+72.45  
 $\Delta = 5^{\circ} 32' 14.7" (LT)$   
 $D = 0^{\circ} 34' 55.8"$   
 $L = 951.19'$   
 $T = 475.97'$   
 $R = 9842.00'$

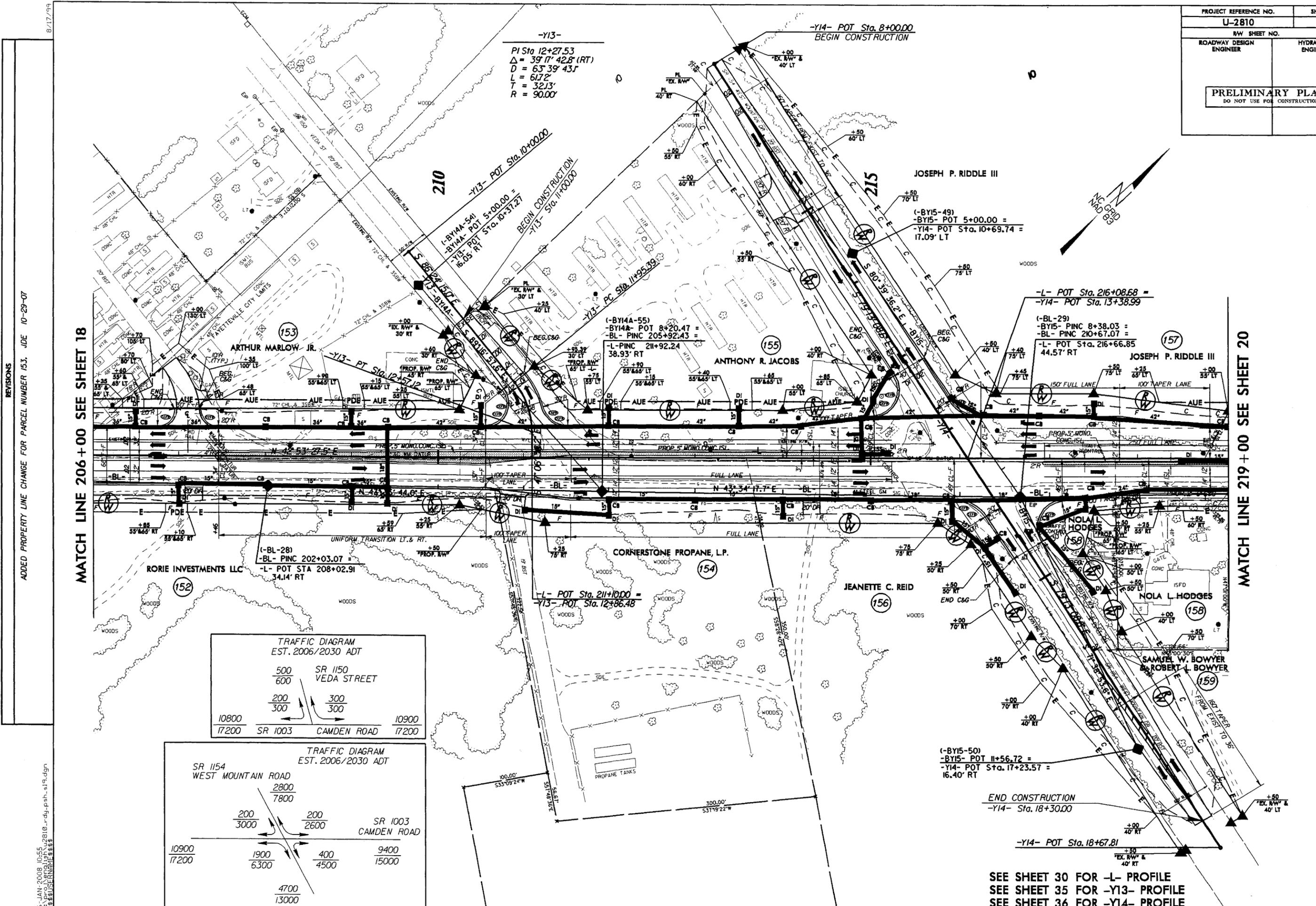


ADDED PROPERTY LINE CHANGES FOR PARCEL NUMBERS 149 & 153, JDE 10-29-07

16-JAN-2008 10:55 u2810\_rdy\_pah\_s18.dgn

SEE SHEET 30 FOR -L- PROFILE

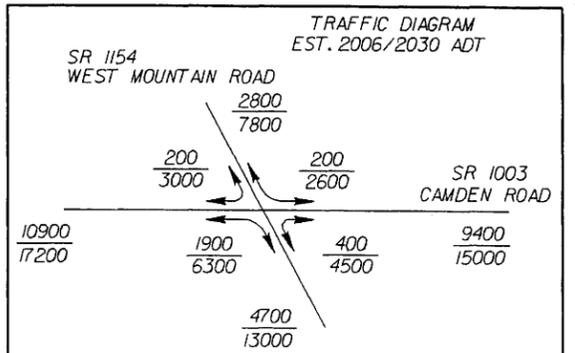
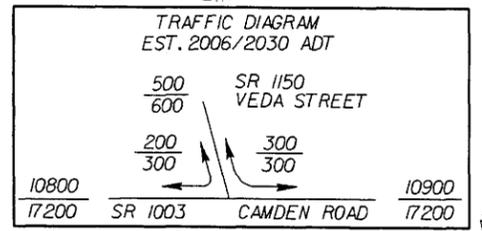
PROJECT REFERENCE NO.	SHEET NO.
U-2810	19
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



ADDED PROPERTY LINE CHANGE FOR PARCEL NUMBER 153, JDE 10-29-07

MATCH LINE 206 +00 SEE SHEET 18

MATCH LINE 219 +00 SEE SHEET 20



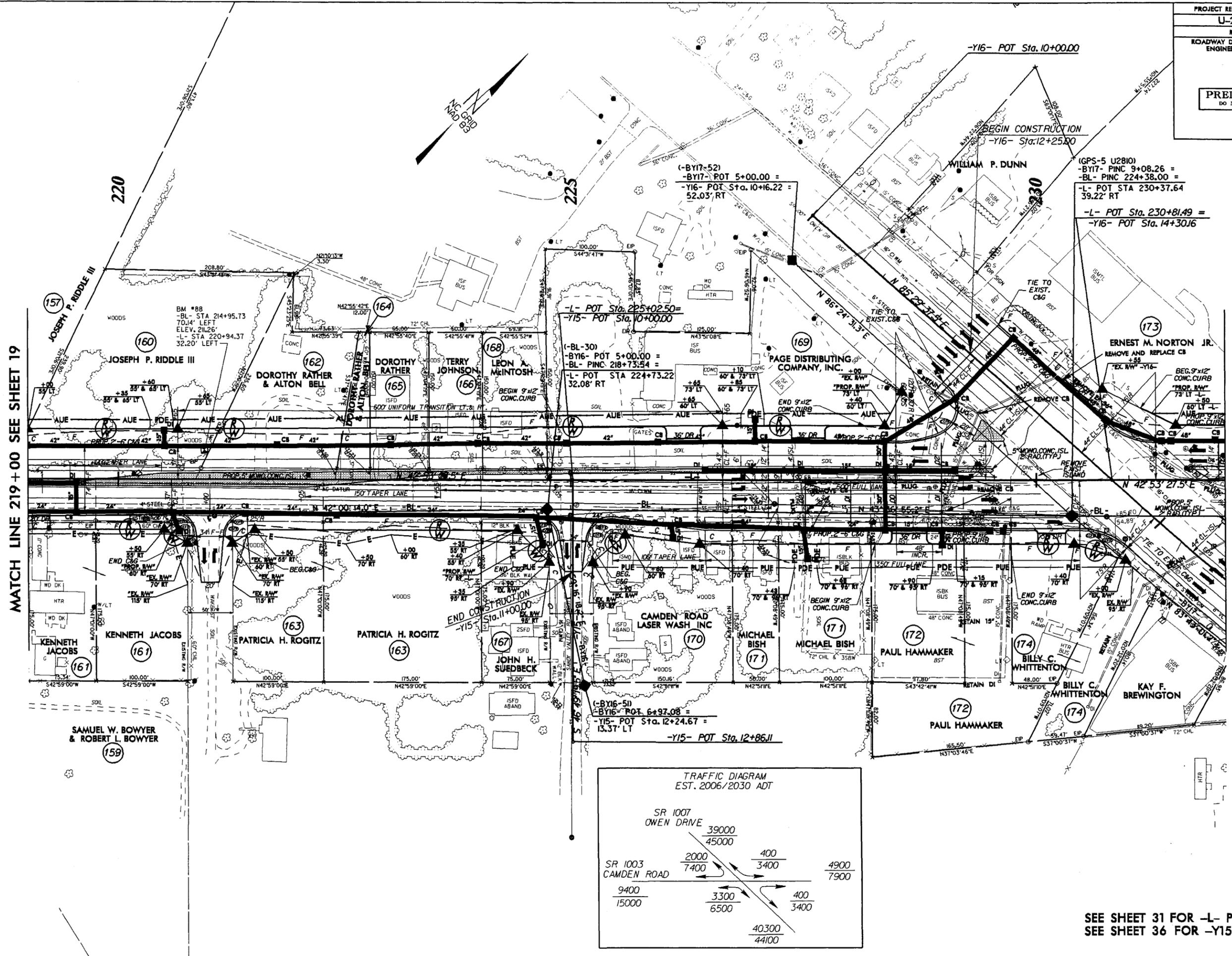
SEE SHEET 30 FOR -L- PROFILE  
SEE SHEET 35 FOR -Y13- PROFILE  
SEE SHEET 36 FOR -Y14- PROFILE

8/17/99

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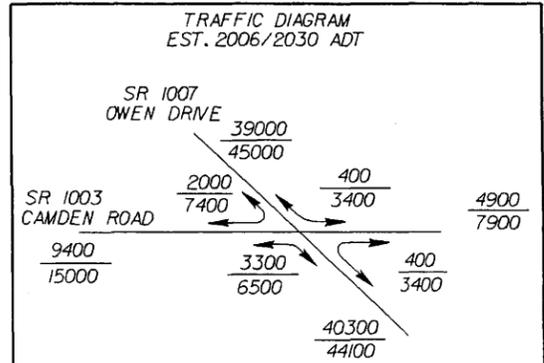
PROJECT REFERENCE NO.	SHEET NO.
U-2810	20
RAW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b>	
DO NOT USE FOR CONSTRUCTION	

REVISIONS  
 UTILITY EASEMENT ADDED FOR PARCEL NO. 157, 160, 162, 164 THRU 174 IDE 12-20-06  
 PARCEL NAME CHANGES 157 JOSEPH P. RIDDLE III/89 SAMUEL W. BOWYER & ROBERT L. BOWYER/60 JOSEPH P. RIDDLE III/62 DOROTHY RATHER & ALTON BELL JOE 01-23-07  
 NAME CHANGES 164 DOROTHY RATHER/ALTON BELL/66 TERRY JOHNSON/60 CAMDEN ROAD LASER WASH INC/71 MICHAEL BISH/74 BILLY C. WHITTENTON/IDE 01-23-07/79  
 15-JAN-2008 10:55  
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 \$\$\$USERNAME\$\$\$



MATCH LINE 219 + 00 SEE SHEET 19

MATCH LINE 232 + 00 SEE SHEET 21



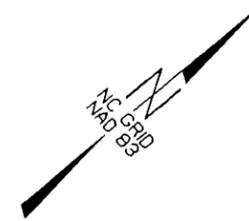
(GPS-5 U2810)  
 -BY17- PINC 9+08.26 =  
 -BL- PINC 224+38.00 =  
 -L- POT STA 230+37.64  
 39.22' RT  
 -L- POT Sta. 230+81.49 =  
 -Y16- POT Sta. 14+30J6

SEE SHEET 31 FOR -L- PROFILE  
 SEE SHEET 36 FOR -Y15- & -Y16- PROFILE

8/17/99

PROJECT REFERENCE NO.	SHEET NO.
U-2810	21
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

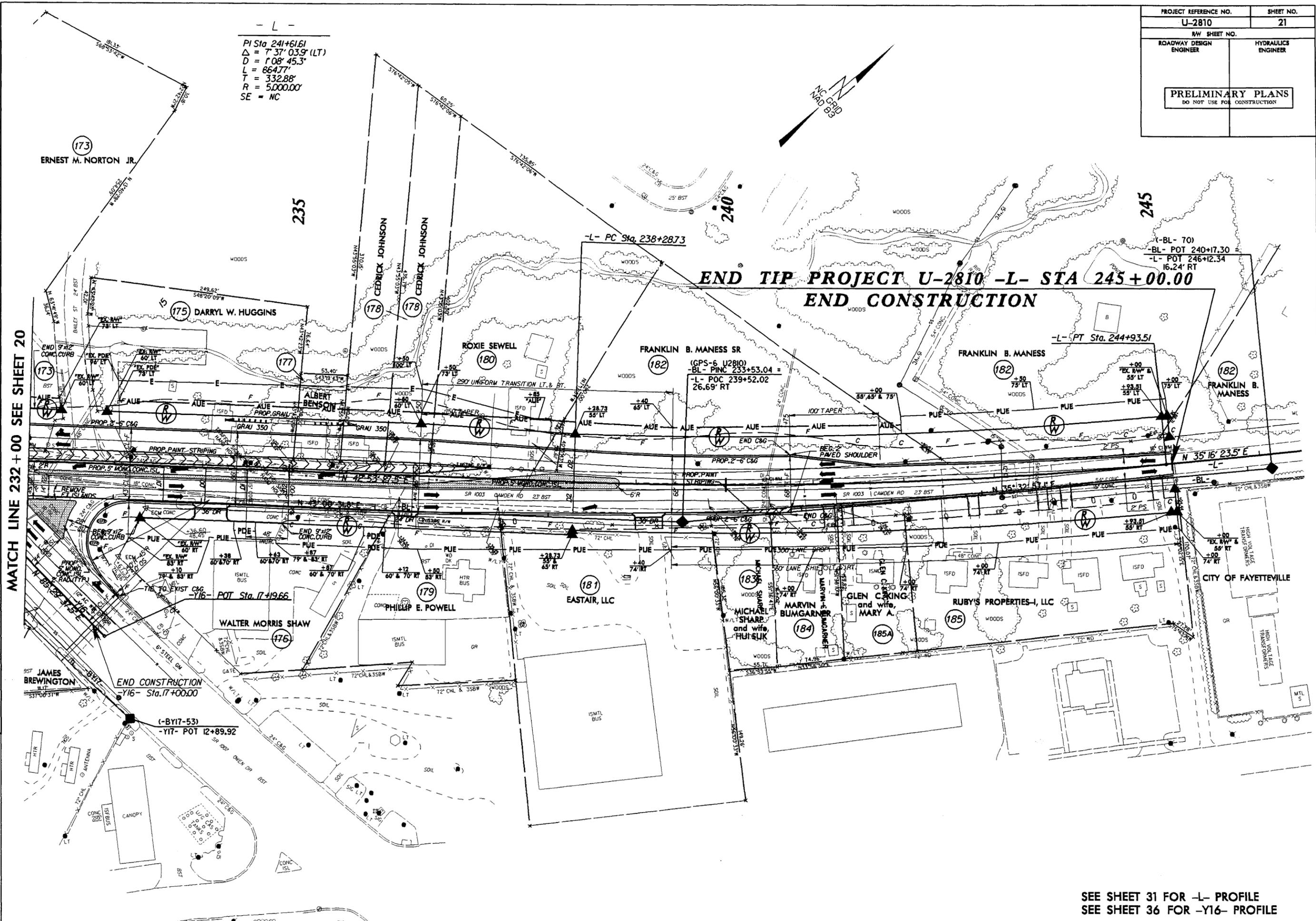
- L -  
 PI Sta 241+61.61  
 $\Delta = 7^{\circ} 37' 03.9''$  (LT)  
 $D = 108^{\circ} 45.3'$   
 $L = 864.77'$   
 $T = 332.88'$   
 $R = 5,000.00'$   
 SE = NC



MATCH LINE 232 + 00 SEE SHEET 20

**END TIP PROJECT U-2810 -L- STA 245+00.00**  
**END CONSTRUCTION**

R/W REV (12/10/07) - REVISED PUE ON PARCEL 76 TO MISS BUILDING, SIS



SEE SHEET 31 FOR -L- PROFILE  
 SEE SHEET 36 FOR -Y16- PROFILE

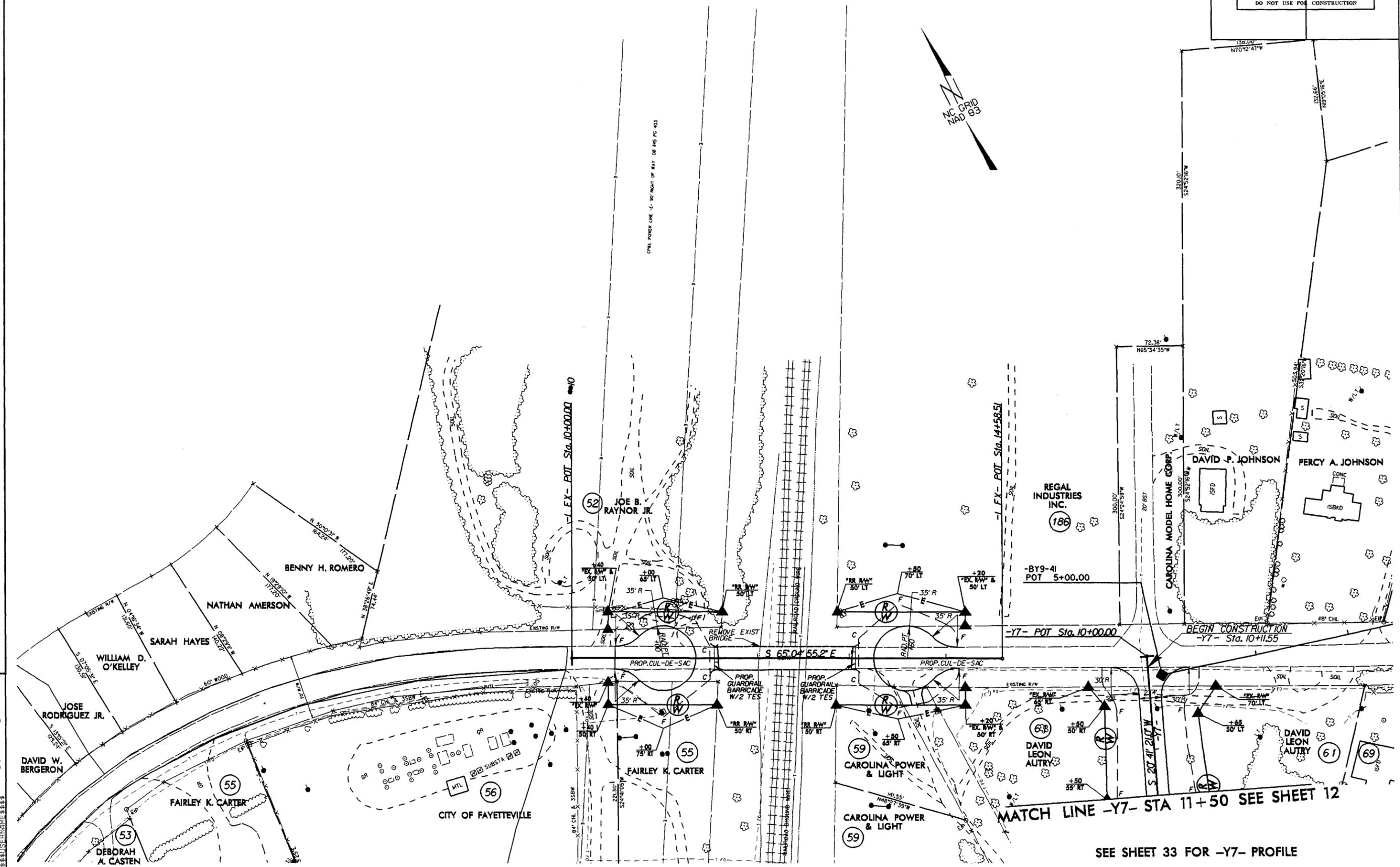
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 USER:RAMESES

8/17/99

FROM NEW SURVEYS - PARCEL NAME CHANGES (6) DAVID LEON AUTRY, 69 ALICE M. BATEMAN) JDE 01-23-07

REVISIONS

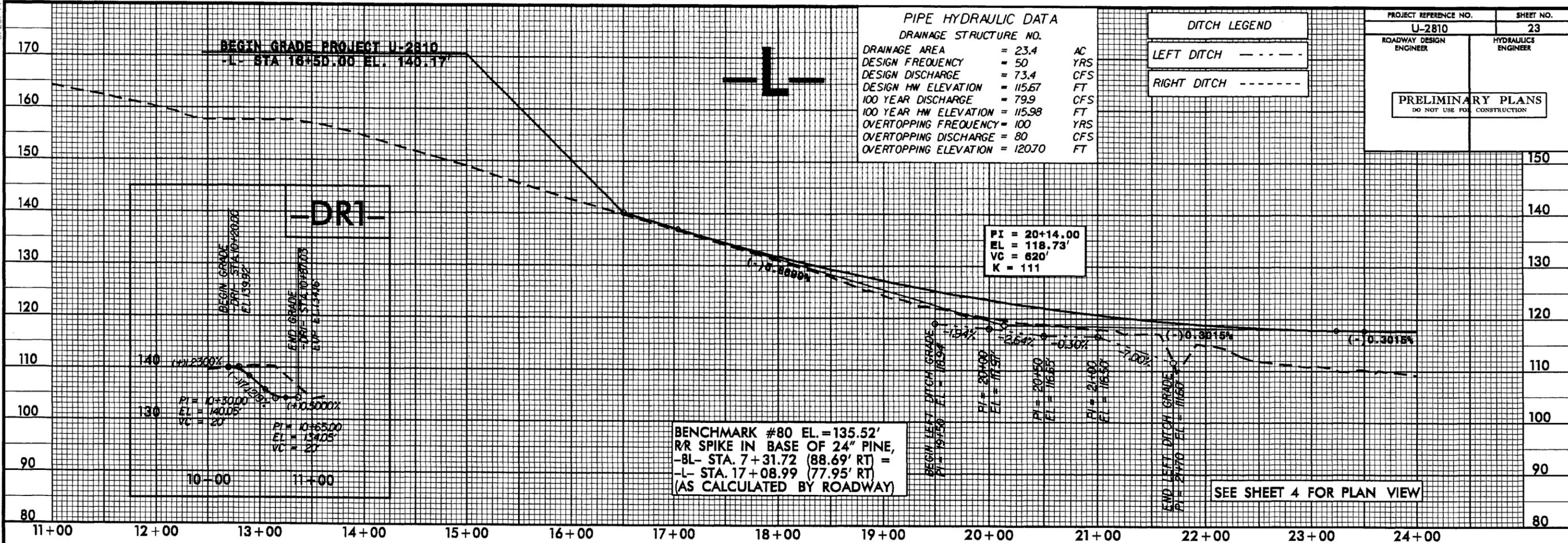
PROJECT REFERENCE NO. U-2810	SHEET NO. 22
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



16-JAN-2008 10:56  
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16-2810-22.dwg

SEE SHEET 33 FOR -Y7- PROFILE

5/28/09



**PIPE HYDRAULIC DATA**  
DRAINAGE STRUCTURE NO.

DRAINAGE AREA	= 23.4	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 73.4	CFS
DESIGN HW ELEVATION	= 115.67	FT
100 YEAR DISCHARGE	= 79.9	CFS
100 YEAR HW ELEVATION	= 115.98	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 80	CFS
OVERTOPPING ELEVATION	= 120.70	FT

**DITCH LEGEND**

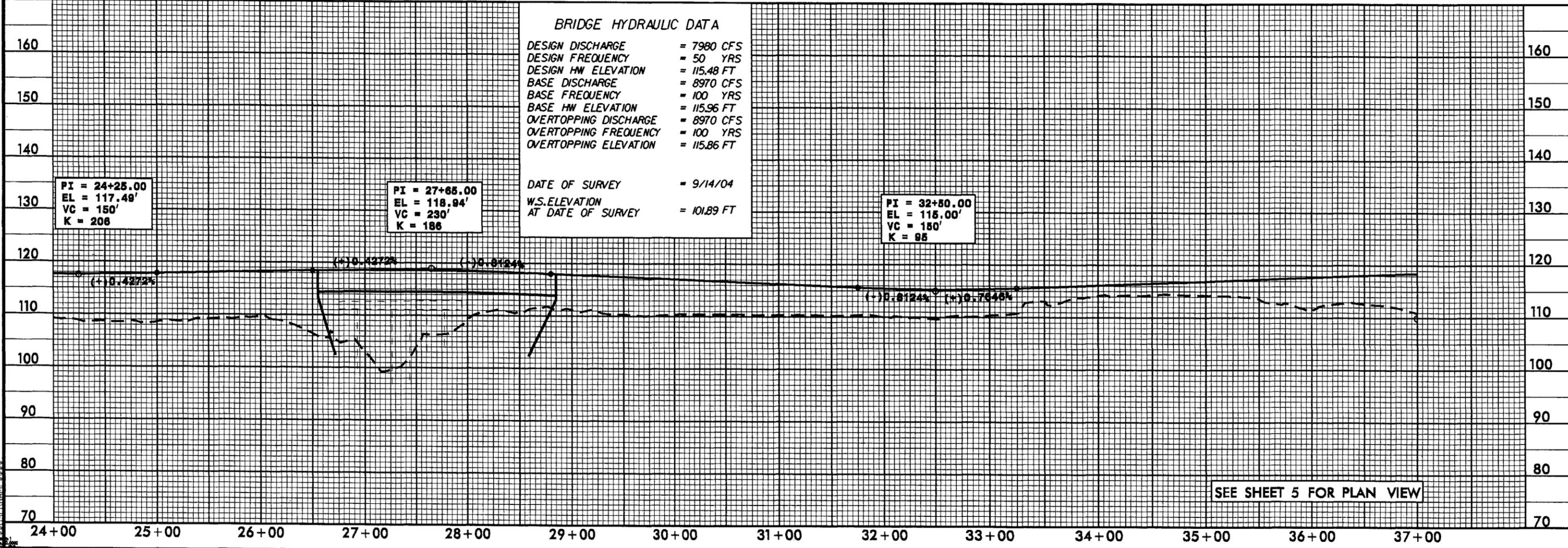
LEFT DITCH	-----
RIGHT DITCH	-----

PROJECT REFERENCE NO.	U-2810	SHEET NO.	23
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION			

**BENCHMARK #80 EL. = 135.52'**  
R/R SPIKE IN BASE OF 24" PINE,  
-BL- STA. 7+31.72 (88.69' RT) =  
-L- STA. 17+08.99 (77.95' RT)  
(AS CALCULATED BY ROADWAY)

SEE SHEET 4 FOR PLAN VIEW

15-JAN-2008 10:56  
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**BRIDGE HYDRAULIC DATA**

DESIGN DISCHARGE	= 7980	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 115.48	FT
BASE DISCHARGE	= 8970	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 115.96	FT
OVERTOPPING DISCHARGE	= 8970	CFS
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING ELEVATION	= 115.86	FT

DATE OF SURVEY = 9/14/04  
W.S. ELEVATION AT DATE OF SURVEY = 101.89 FT

PI = 24+25.00  
EL = 117.48'  
VC = 150'  
K = 206

PI = 27+65.00  
EL = 118.94'  
VC = 230'  
K = 186

PI = 32+80.00  
EL = 115.00'  
VC = 180'  
K = 85

SEE SHEET 5 FOR PLAN VIEW

### BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE = 2230 CFS  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN HW ELEVATION = 115.79 FT  
 BASE DISCHARGE = 2500 CFS  
 BASE FREQUENCY = 100 YRS  
 BASE HW ELEVATION = 115.93 FT  
 OVERTOPPING DISCHARGE = 3250 CFS  
 OVERTOPPING FREQUENCY = 500 YRS  
 OVERTOPPING ELEVATION = 117.15 FT

DATE OF SURVEY =  
 W.S. ELEVATION AT DATE OF SURVEY = 106.80 FT

### PIPE HYDRAULIC DATA

DRAINAGE STRUCTURE NO.  
 DRAINAGE AREA = 28.3 AC  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN DISCHARGE = 44.4 CFS  
 DESIGN HW ELEVATION = 117.99 FT  
 100 YEAR DISCHARGE = 51.6 CFS  
 100 YEAR HW ELEVATION = 118.28 FT  
 OVERTOPPING FREQUENCY = 100 YRS  
 OVERTOPPING DISCHARGE = 51.6 CFS  
 OVERTOPPING ELEVATION = 120.35 FT

### DITCH LEGEND

LEFT DITCH - - - - -  
 RIGHT DITCH - - - - -

PI = 39+50.00  
 EL = 120.35'  
 VC = 150'  
 K = 141

PI = 46+75.00  
 EL = 118.17'  
 VC = 150'  
 K = 141

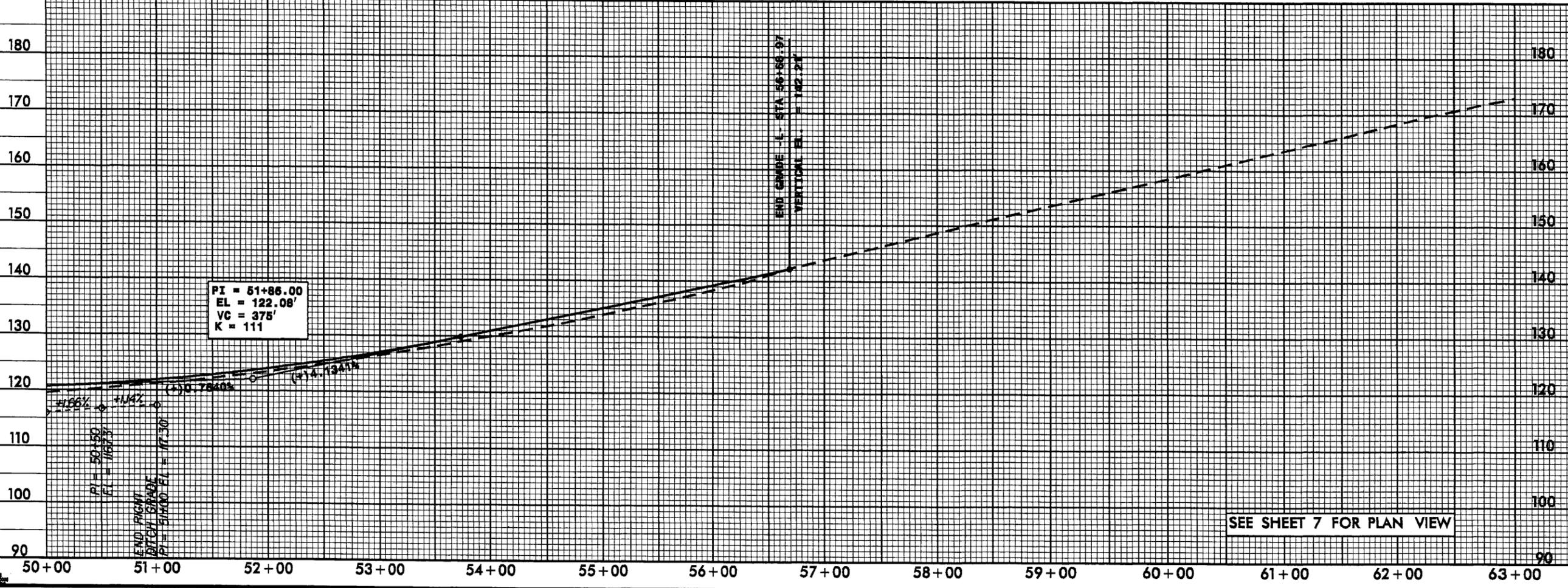
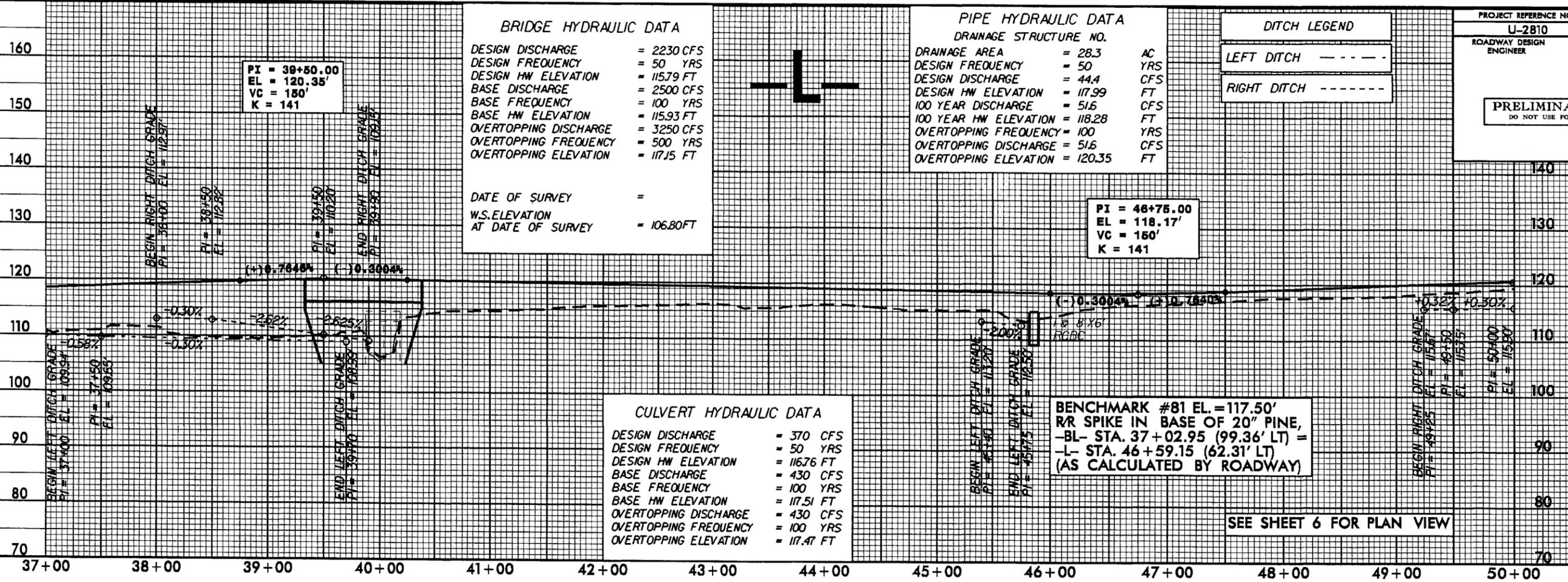
### CULVERT HYDRAULIC DATA

DESIGN DISCHARGE = 370 CFS  
 DESIGN FREQUENCY = 50 YRS  
 DESIGN HW ELEVATION = 116.76 FT  
 BASE DISCHARGE = 430 CFS  
 BASE FREQUENCY = 100 YRS  
 BASE HW ELEVATION = 117.51 FT  
 OVERTOPPING DISCHARGE = 430 CFS  
 OVERTOPPING FREQUENCY = 100 YRS  
 OVERTOPPING ELEVATION = 117.47 FT

BENCHMARK #81 EL. = 117.50'  
 RR SPIKE IN BASE OF 20" PINE,  
 -BL- STA. 37+02.95 (99.36' LT) =  
 -L- STA. 46+59.15 (62.31' LT)  
 (AS CALCULATED BY ROADWAY)

SEE SHEET 6 FOR PLAN VIEW

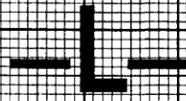
SEE SHEET 7 FOR PLAN VIEW



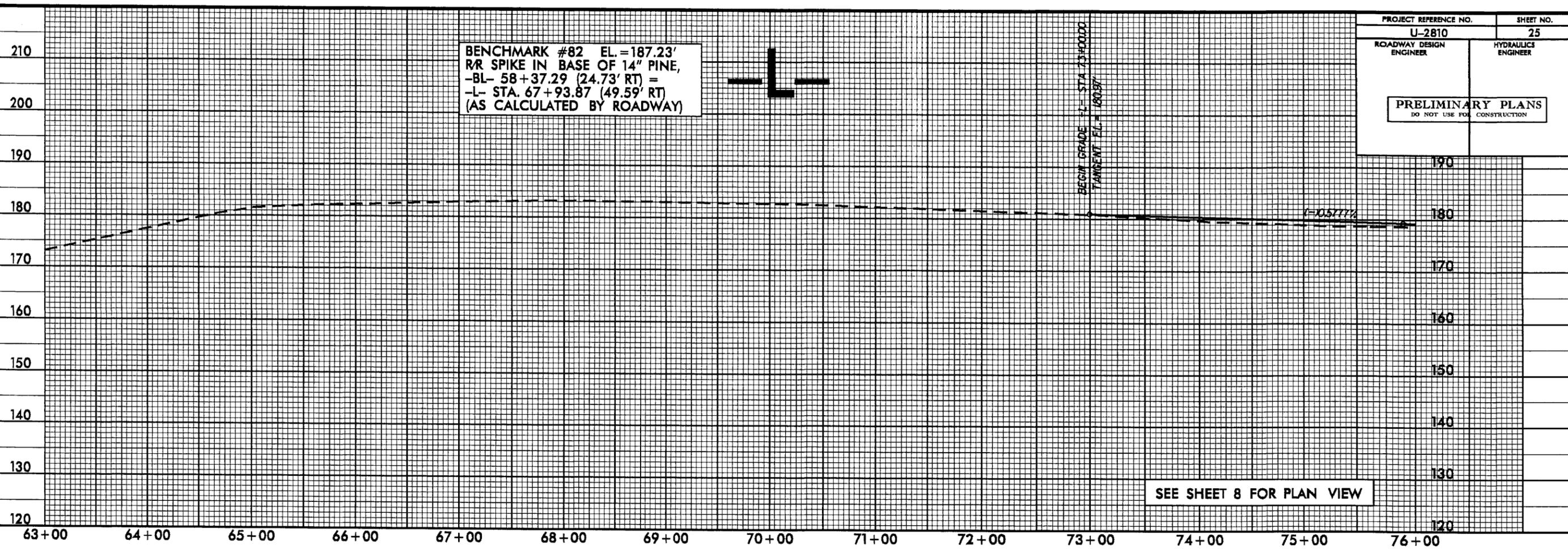
5/28/99

PROJECT REFERENCE NO.		SHEET NO.	
U-2810		25	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
<b>PRELIMINARY PLANS</b>			
<small>DO NOT USE FOR CONSTRUCTION</small>			

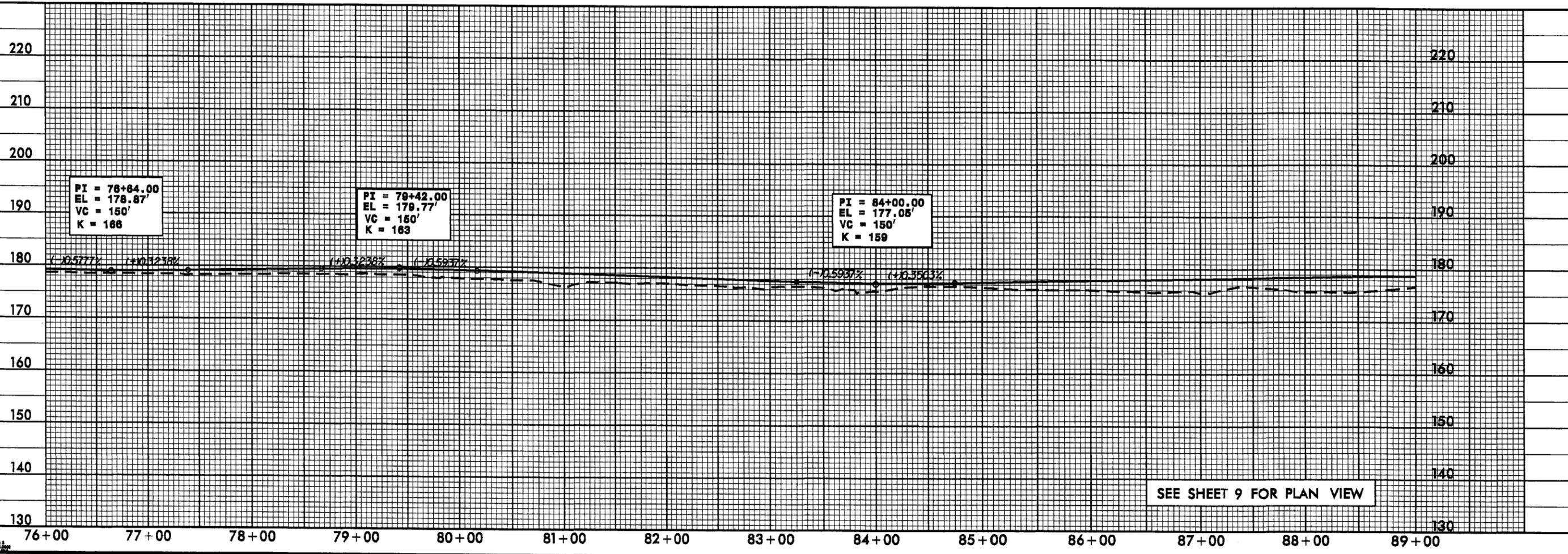
BENCHMARK #82 EL. = 187.23'  
 R/R SPIKE IN BASE OF 14" PINE,  
 -BL- 58+37.29 (24.73' RT) =  
 -L- STA. 67+93.87 (49.59' RT)  
 (AS CALCULATED BY ROADWAY)



BEGIN GRADE - L - STA. 73+00.00  
 TANGENT - EL. = 180.97'



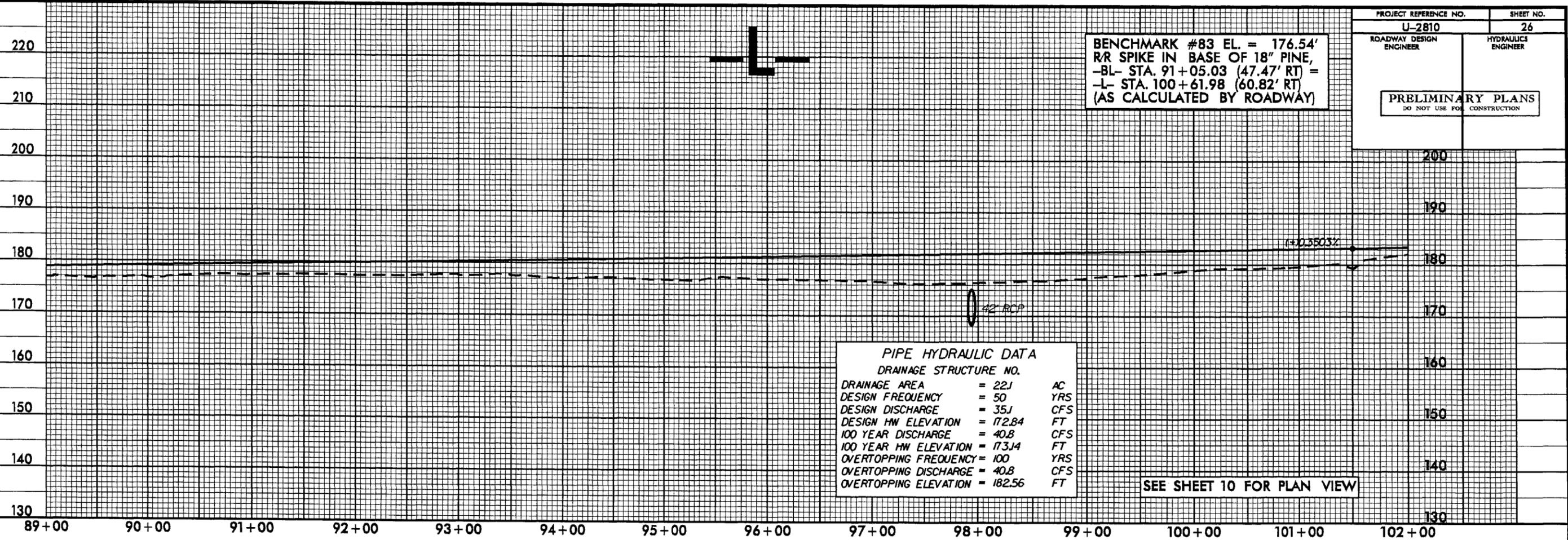
SEE SHEET 8 FOR PLAN VIEW



SEE SHEET 9 FOR PLAN VIEW

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 11:11 AM 1/28/99

5/28/99

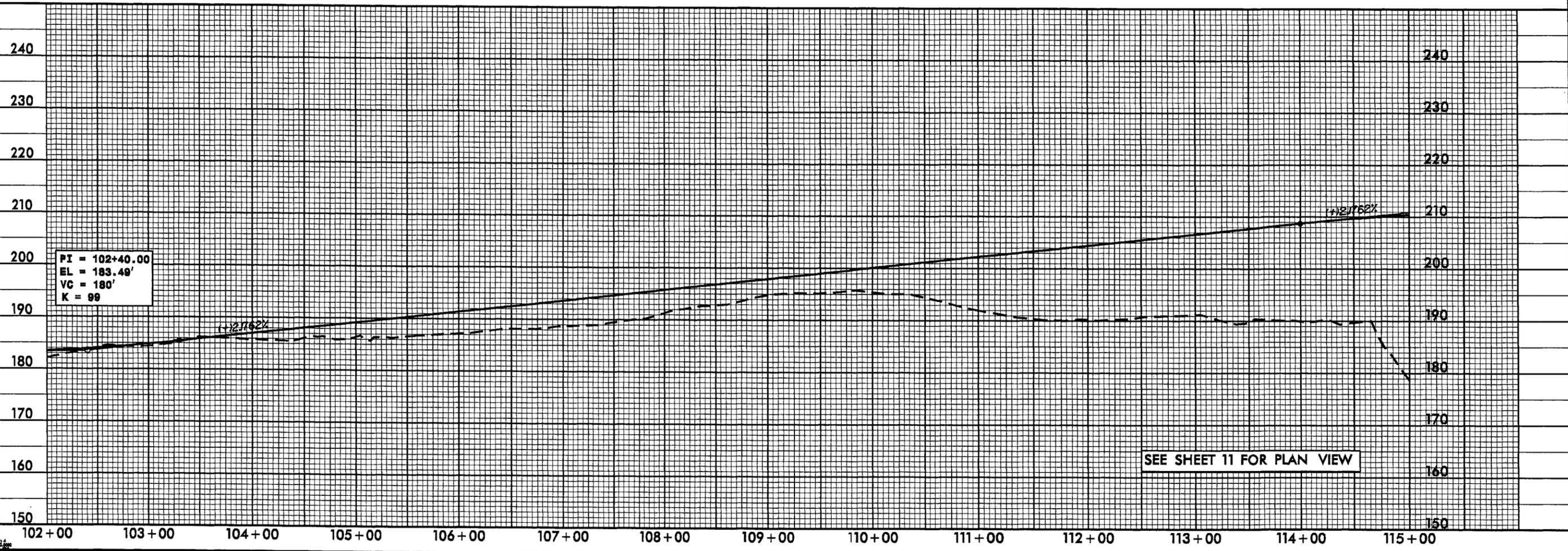


BENCHMARK #83 EL. = 176.54'  
 RR SPIKE IN BASE OF 18" PINE,  
 -BL- STA. 91+05.03 (47.47' RT) =  
 -L- STA. 100+61.98 (60.82' RT)  
 (AS CALCULATED BY ROADWAY)

PROJECT REFERENCE NO. U-2810	SHEET NO. 26
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

PIPE HYDRAULIC DATA		
DRAINAGE STRUCTURE NO.		
DRAINAGE AREA	= 22J	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 35J	CFS
DESIGN HW ELEVATION	= 172.84	FT
100 YEAR DISCHARGE	= 40.8	CFS
100 YEAR HW ELEVATION	= 173.14	FT
OVERTOPPING FREQUENCY	= 100	YRS
OVERTOPPING DISCHARGE	= 40.8	CFS
OVERTOPPING ELEVATION	= 182.56	FT

SEE SHEET 10 FOR PLAN VIEW

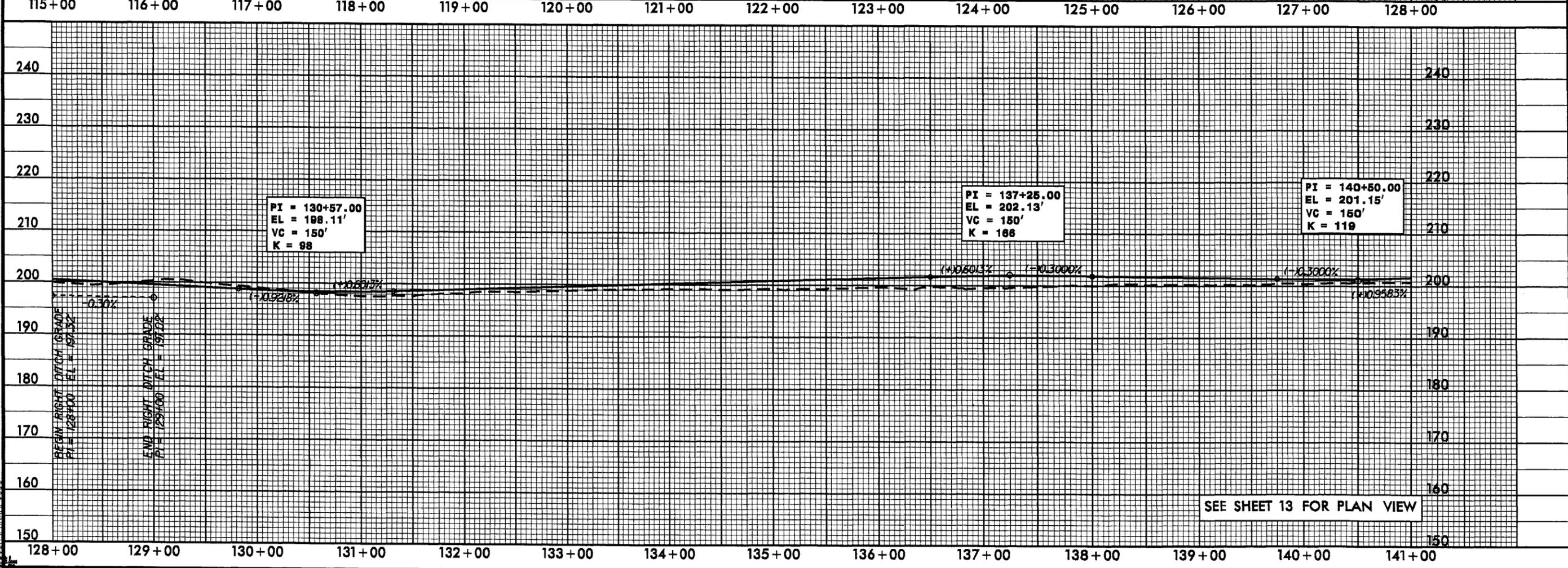
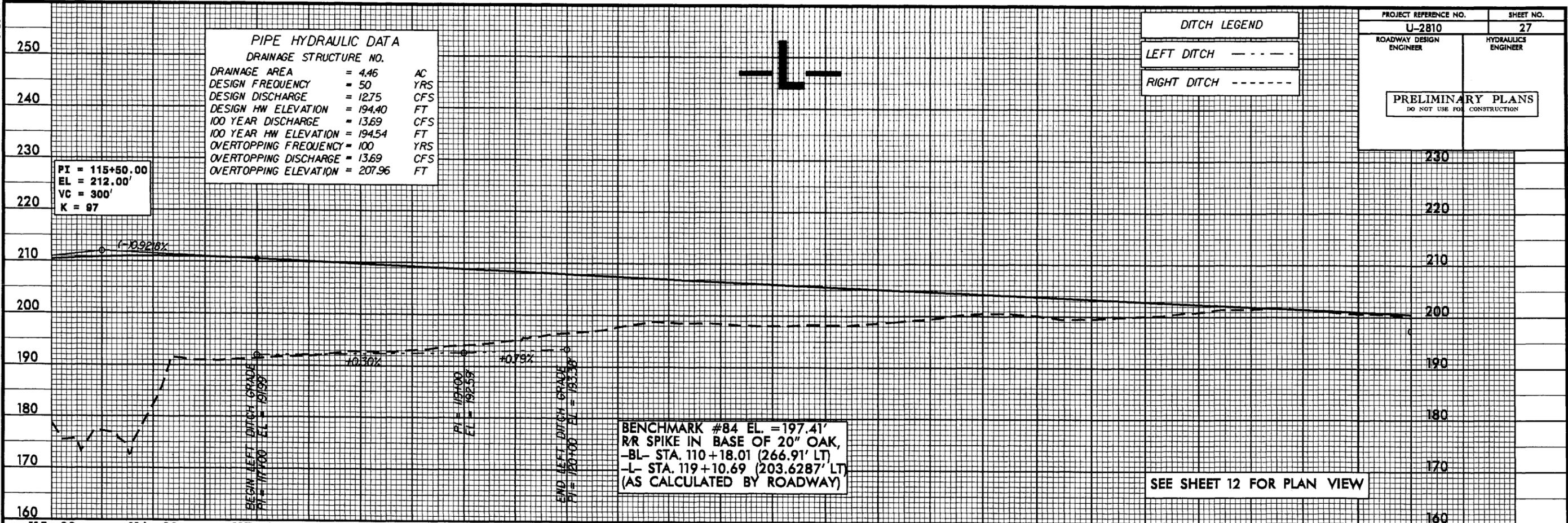


PI = 102+40.00  
 EL = 183.49'  
 VC = 180'  
 K = 99

SEE SHEET 11 FOR PLAN VIEW

16-JAN-2008 10:56  
 U:\PROJECTS\2810.rdy.p1.s26.dgn

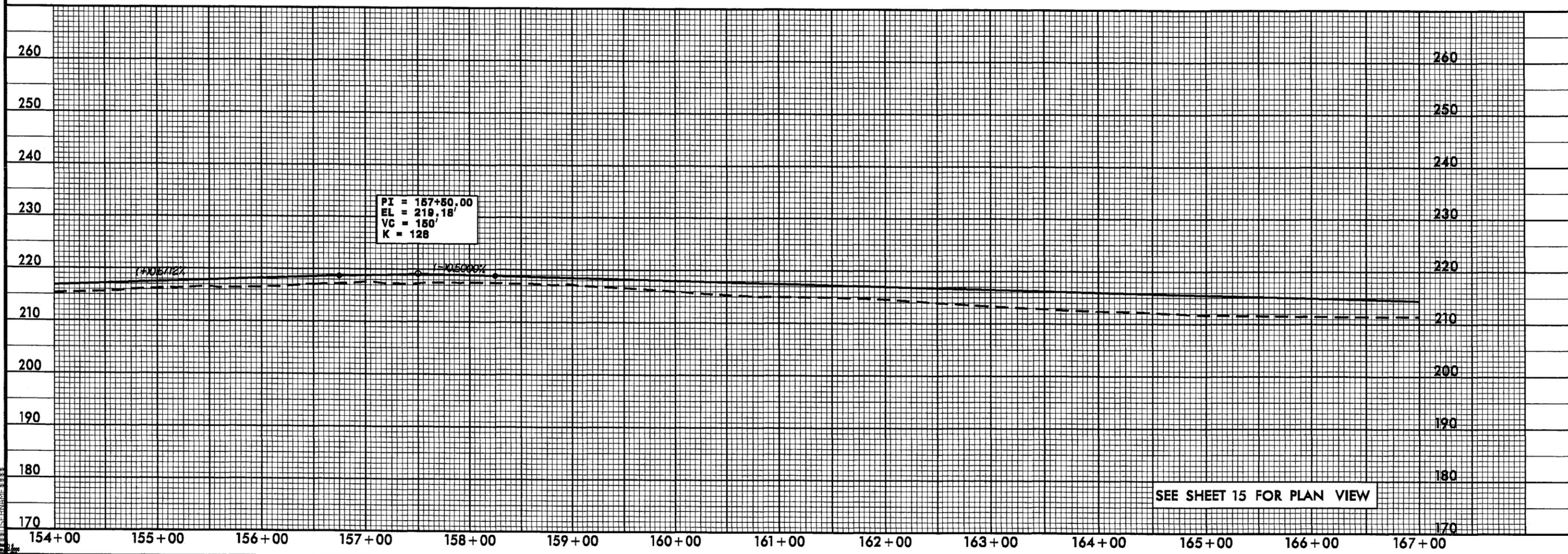
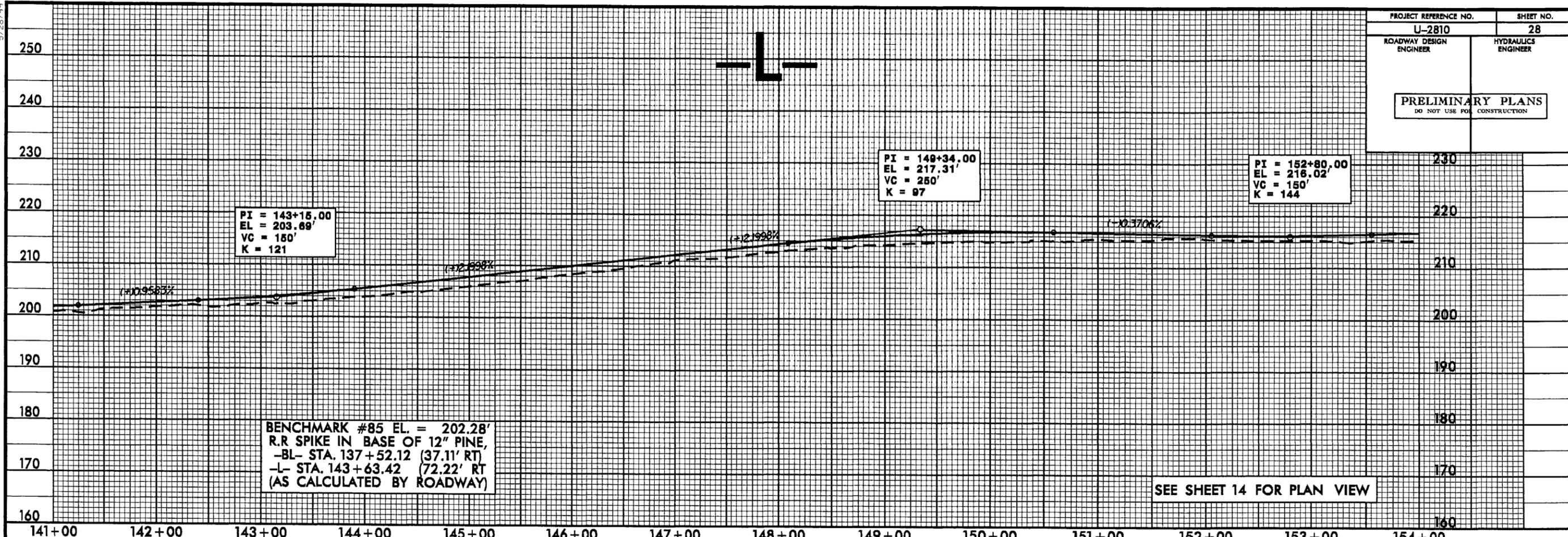
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\\pco\eng\lsh\p2810\_rdy-pl1.s27.dgn

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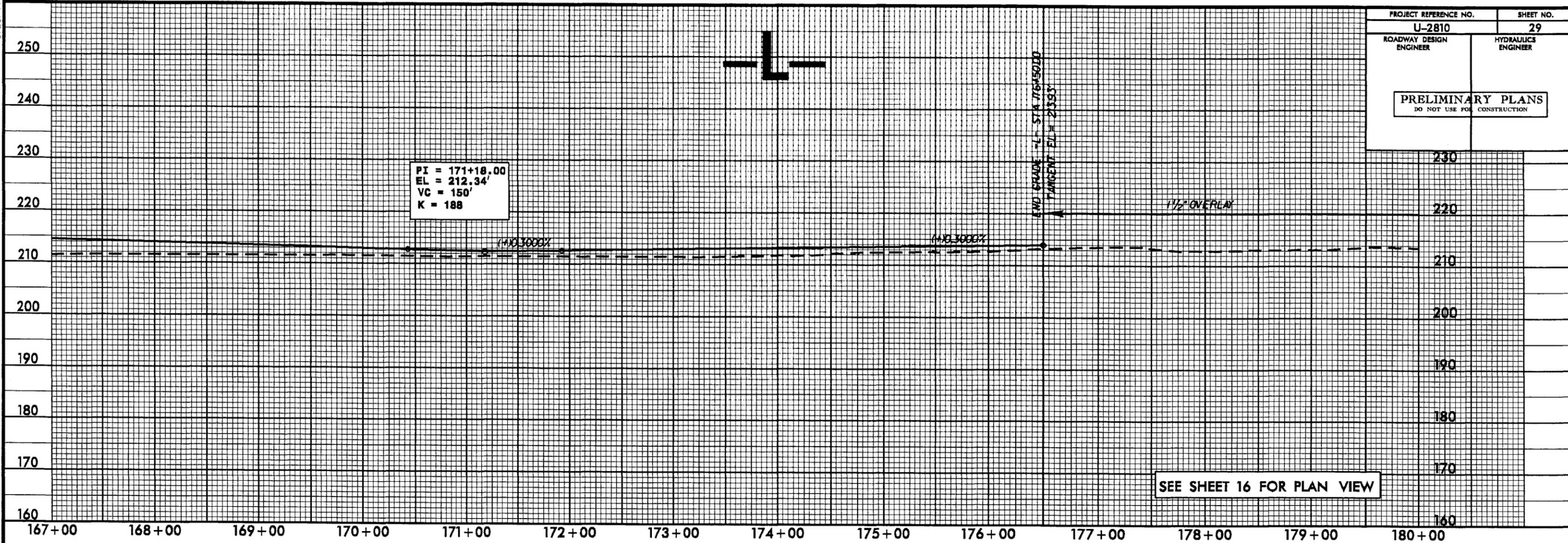
PROJECT REFERENCE NO. U-2810	SHEET NO. 28
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



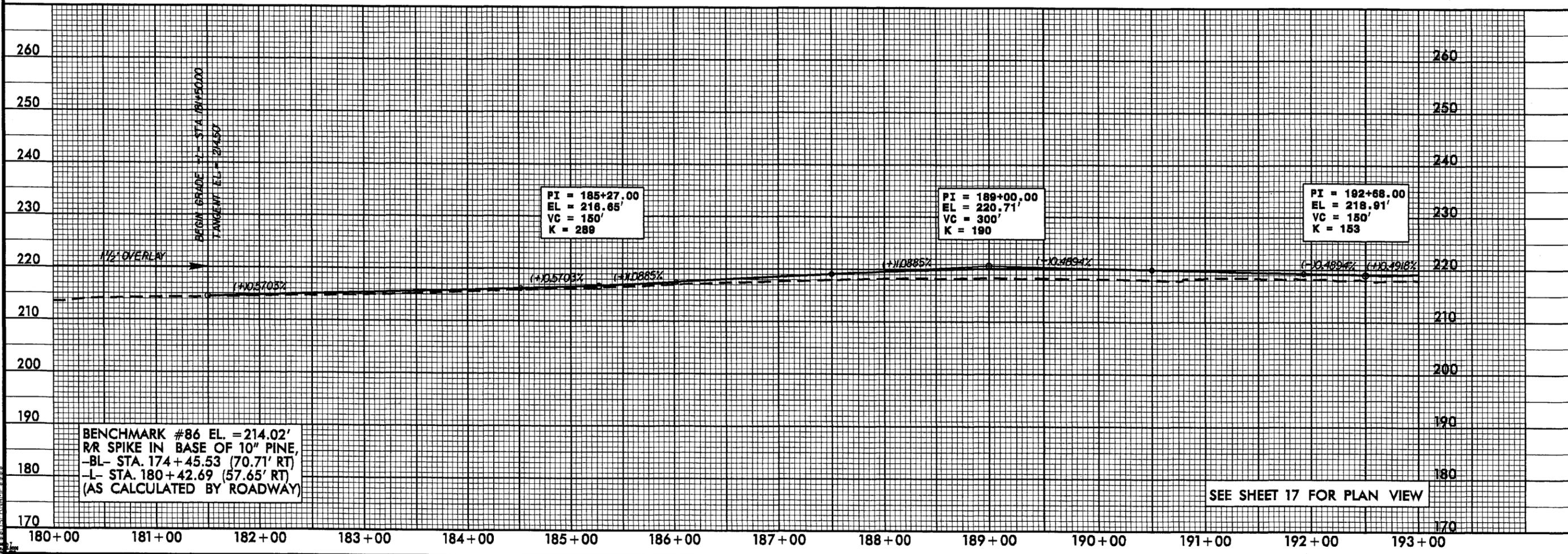
16-JAN-2008 10:56 2810\_rdy-pl-28.dgn

5/28/99

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>29</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



SEE SHEET 16 FOR PLAN VIEW



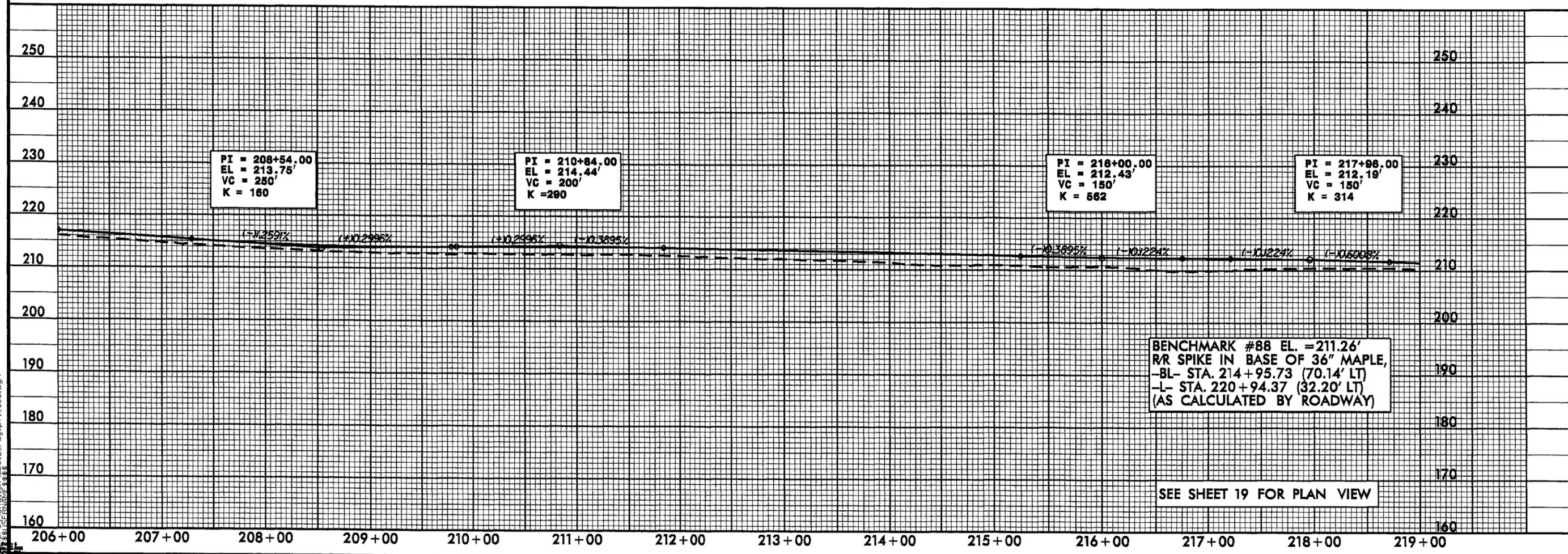
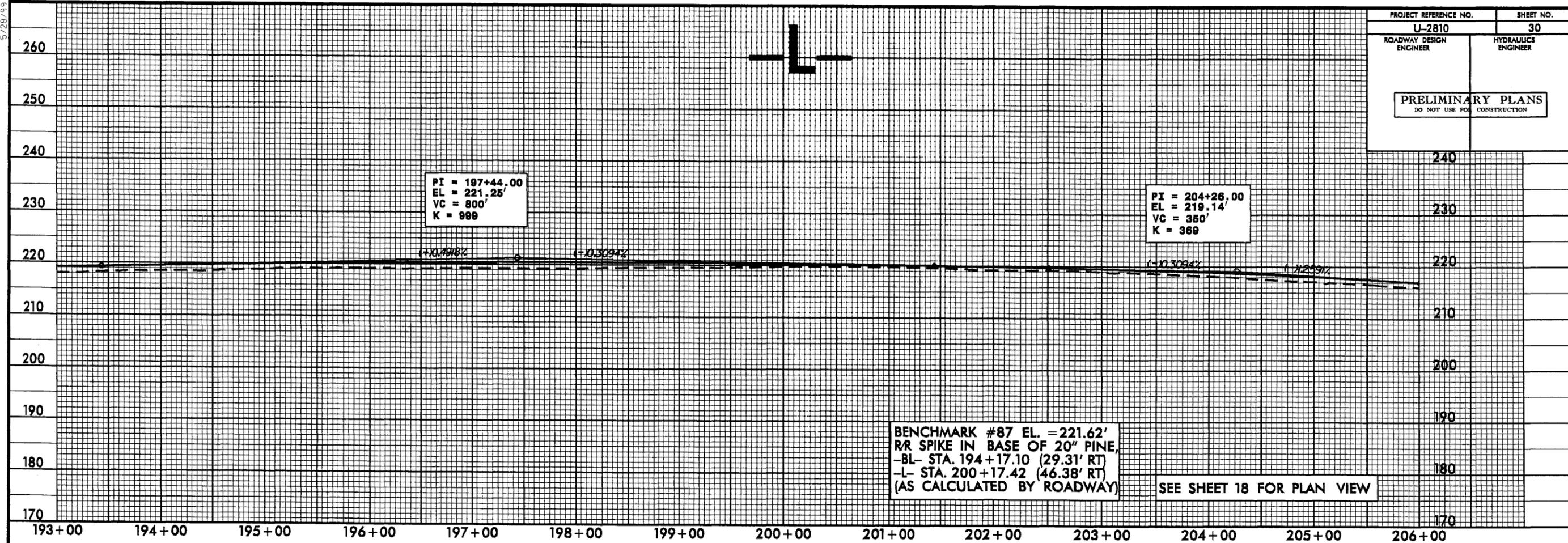
**BENCHMARK #86 EL. = 214.02'**  
**RR SPIKE IN BASE OF 10" PINE,**  
**-BL- STA. 174+45.53 (70.71' RT)**  
**-L- STA. 180+42.69 (57.65' RT)**  
**(AS CALCULATED BY ROADWAY)**

SEE SHEET 17 FOR PLAN VIEW

K:\JAN 2008 10:55 AM\p01\proj\2810\rdy\pf1\_s29.dgn

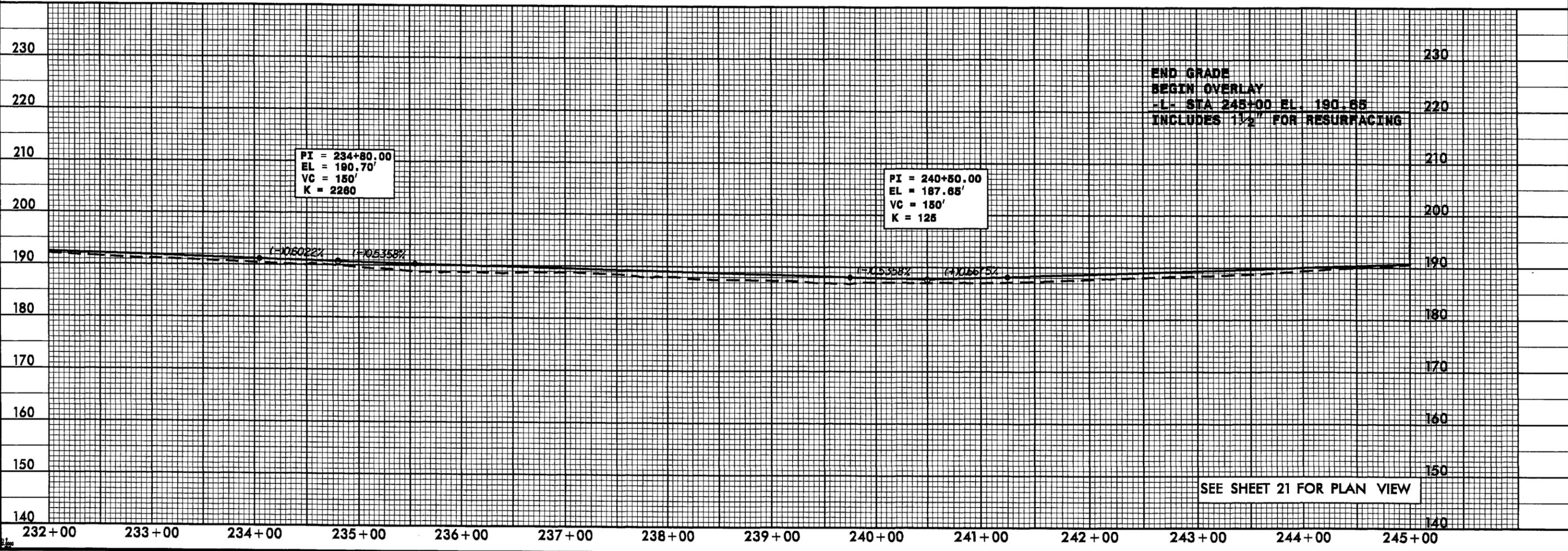
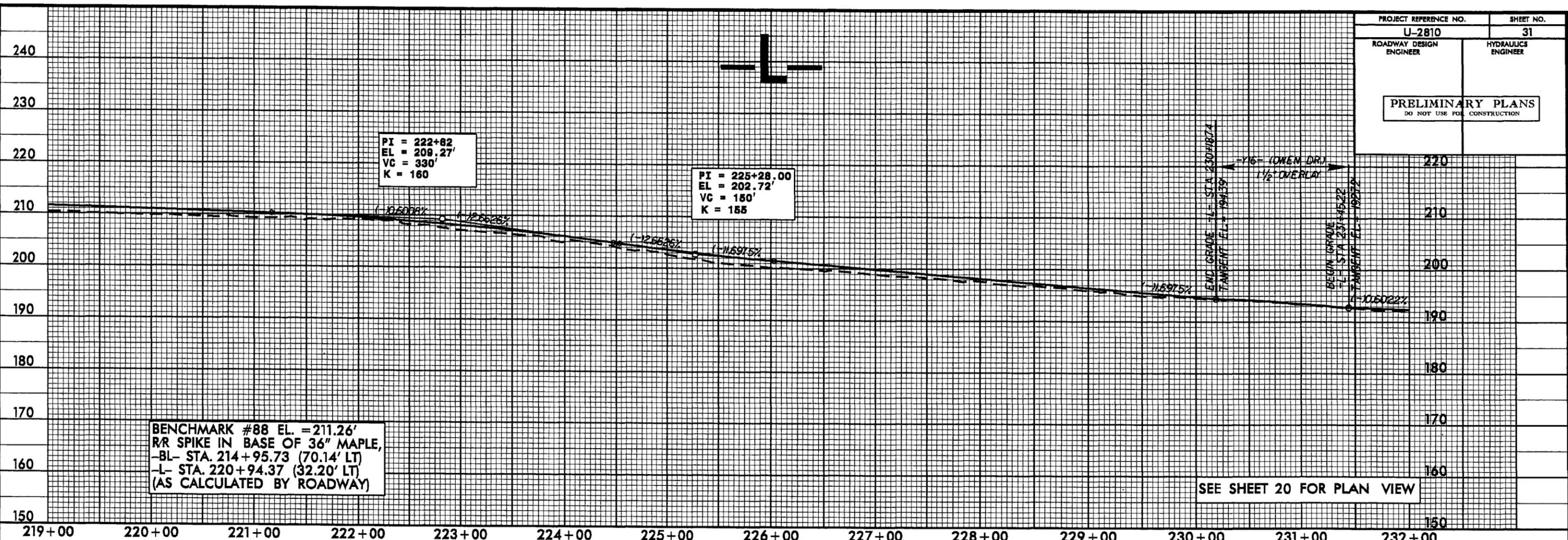
5/28/99

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>30</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	



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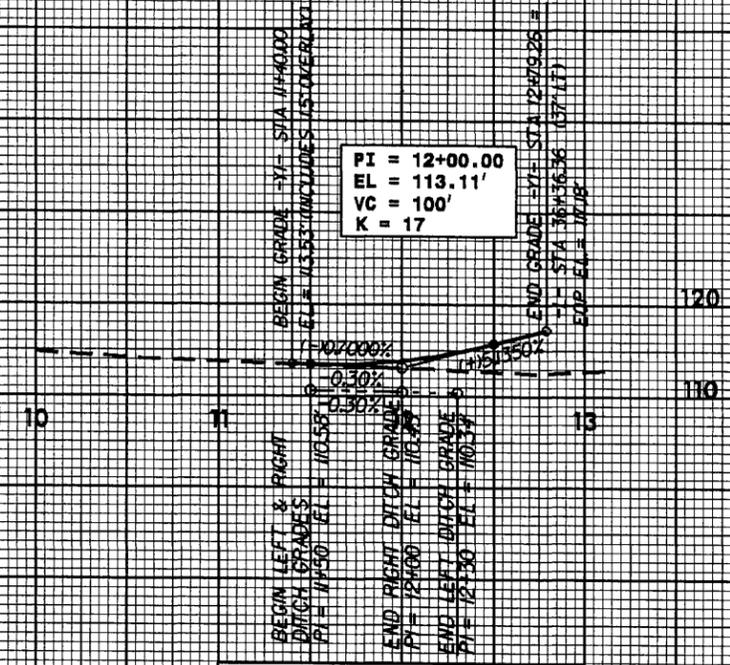


15-JAN-2008 10:56  
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# -Y1-

GEORGE OWEN RD. (SR 1133)

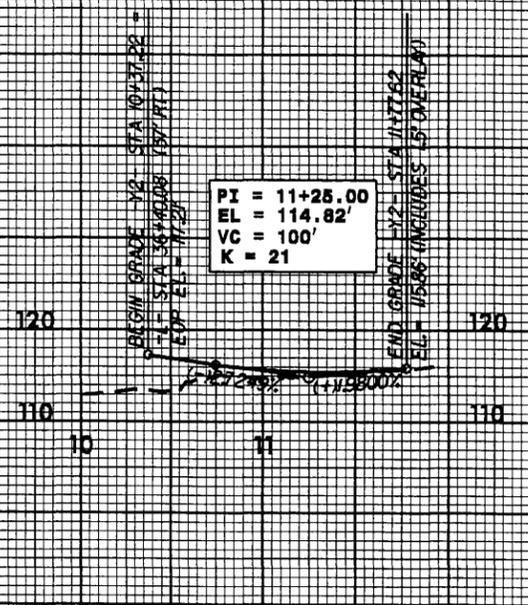
PI = 12+00.00  
EL = 113.11'  
VC = 100'  
K = 17



SEE SHEET 5 FOR PLAN VIEW

# -Y2-

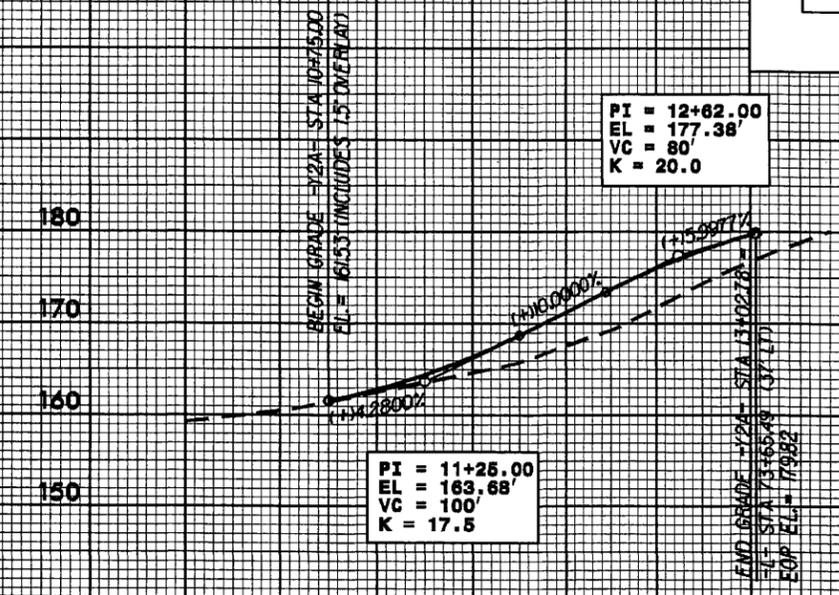
PI = 11+25.00  
EL = 114.82'  
VC = 100'  
K = 21



SEE SHEET 5 FOR PLAN VIEW

# -Y2A-

PI = 12+62.00  
EL = 177.38'  
VC = 80'  
K = 20.0

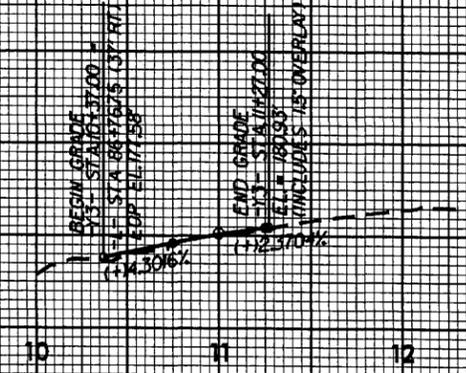


SEE SHEET 8 FOR PLAN VIEW

# -Y3-

ORTON DR. (SR 2940)

PI = 11+00.00  
EL = 180.29'  
VC = 50'  
K = 28

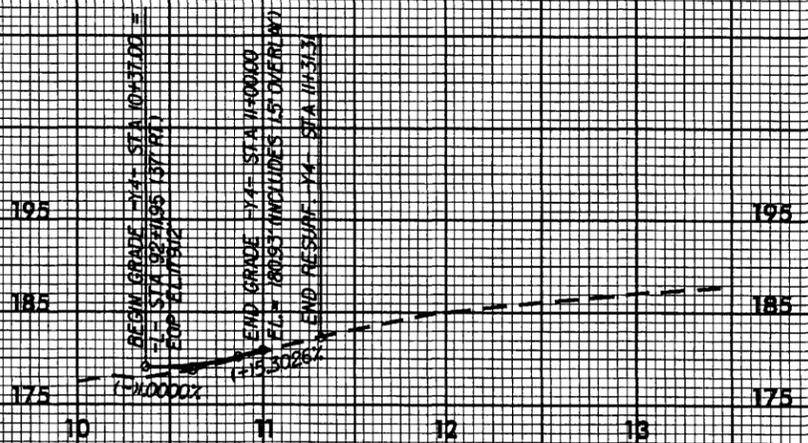


SEE SHEET 9 FOR PLAN VIEW

# -Y4-

ASHEBORO DR. (SR 3366)

PI = 10+62.00  
EL = 178.87'  
VC = 50'  
K = 8



SEE SHEET 10 FOR PLAN VIEW

DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

5/14/99

PROJECT REFERENCE NO. U-2810	SHEET NO. 33
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

# -Y5-

BOLIVIA ST.

# -Y6-

CRYSTAL SPRINGS RD. (SR 1137)

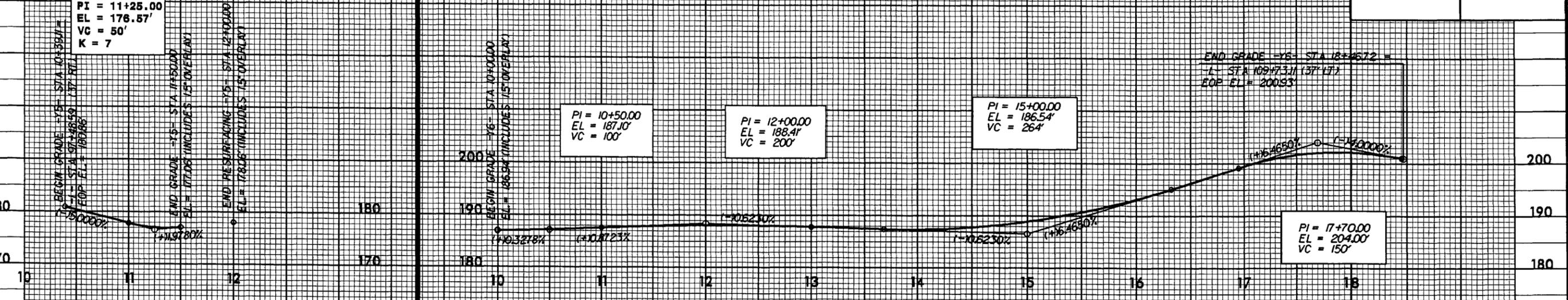
PI = 11+25.00  
EL = 178.57'  
VC = 50'  
K = 7

PI = 10+50.00  
EL = 187.10'  
VC = 100'

PI = 12+00.00  
EL = 188.41'  
VC = 200'

PI = 15+00.00  
EL = 186.54'  
VC = 264'

PI = 17+70.00  
EL = 204.00'  
VC = 150'



SEE SHEET 10 FOR PLAN VIEW

SEE SHEET 11 FOR PLAN VIEW

# -Y7-

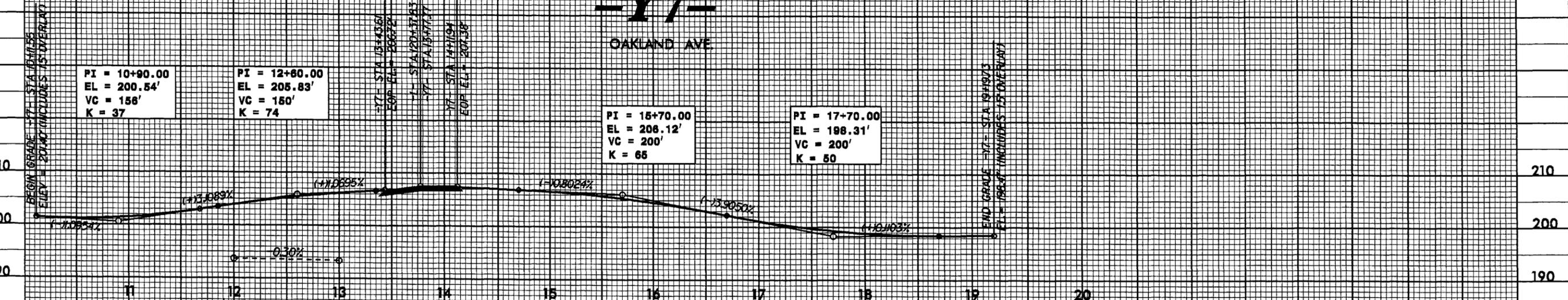
OAKLAND AVE.

PI = 10+90.00  
EL = 200.54'  
VC = 158'  
K = 37

PI = 12+60.00  
EL = 205.83'  
VC = 160'  
K = 74

PI = 15+70.00  
EL = 208.12'  
VC = 200'  
K = 65

PI = 17+70.00  
EL = 198.31'  
VC = 200'  
K = 60



SEE SHEET 12 AND 22 FOR PLAN VIEW

PIPE HYDRAULIC DATA	
DRAINAGE STRUCTURE NO.	
DRAINAGE AREA	= 2.39 AC
DESIGN FREQUENCY	= 50 YRS
DESIGN DISCHARGE	= 7.40 CFS
DESIGN HW ELEVATION	= 197.39 FT
100 YEAR DISCHARGE	= 7.95 CFS
100 YEAR HW ELEVATION	= 197.56 FT
OVERTOPPING FREQUENCY	= 100 YRS
OVERTOPPING DISCHARGE	= 7.95 CFS
OVERTOPPING ELEVATION	= 203.34 FT

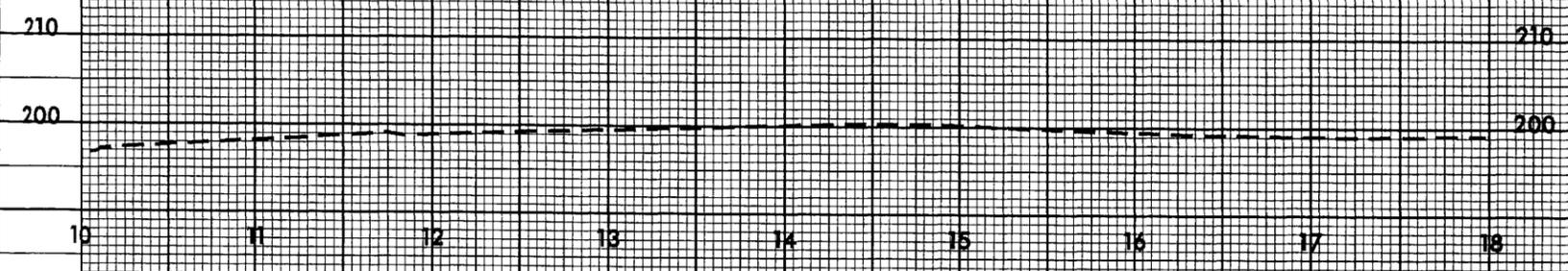
DITCH LEGEND	
LEFT DITCH	-----
RIGHT DITCH	-----

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PROJECT REFERENCE NO.	SHEET NO.
U-2810	34
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

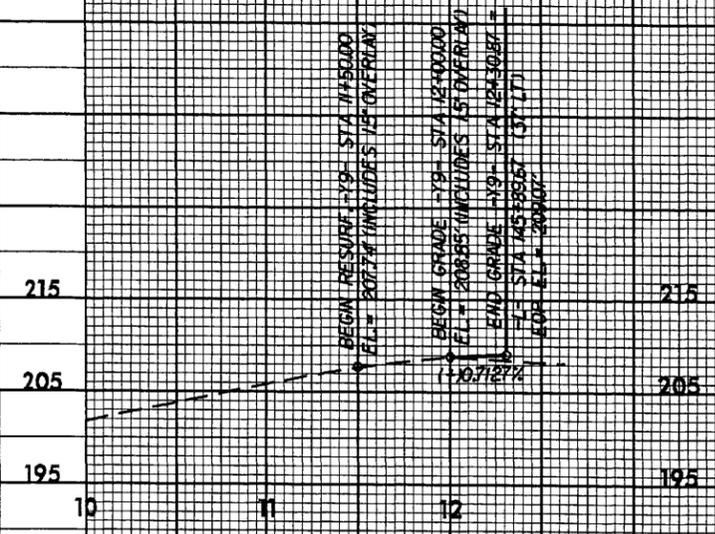
# -Y8-

CAMDEN RD. EXT (SR 1216)



# -Y9-

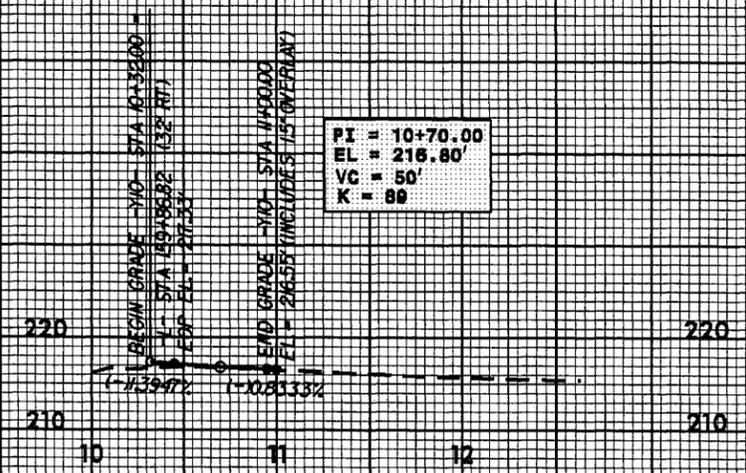
KING CHARLES DR. (SR 2900)



SEE SHEET 14 FOR PLAN VIEW

# -Y10-

INMAN CIR. (SR 3082)



SEE SHEET 15 FOR PLAN VIEW

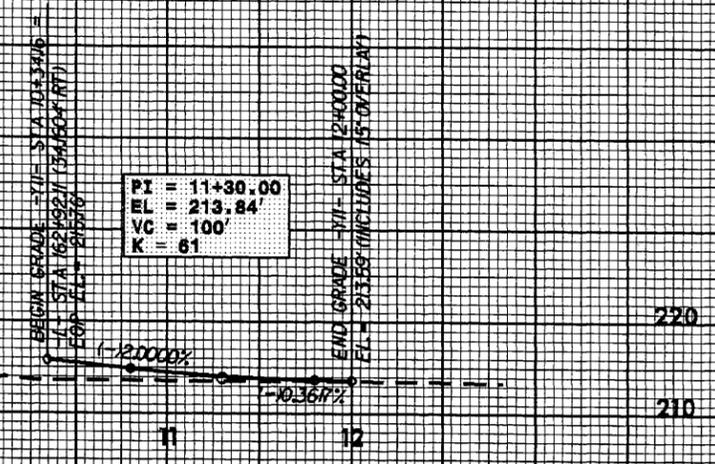
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 \$\$\$\$

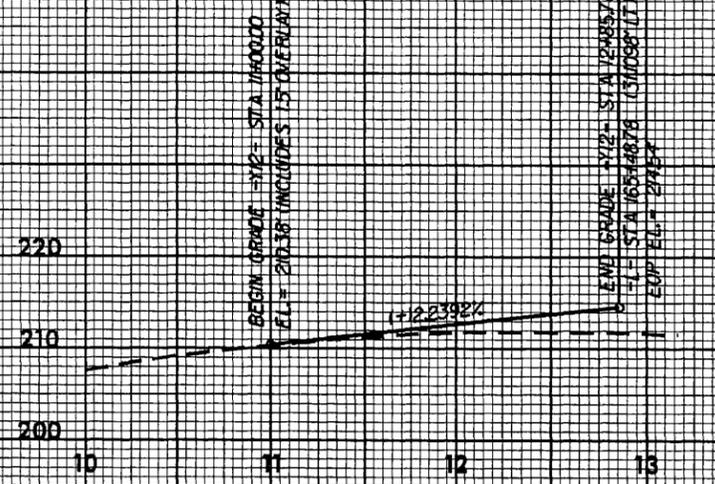
5/14/99

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>35</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

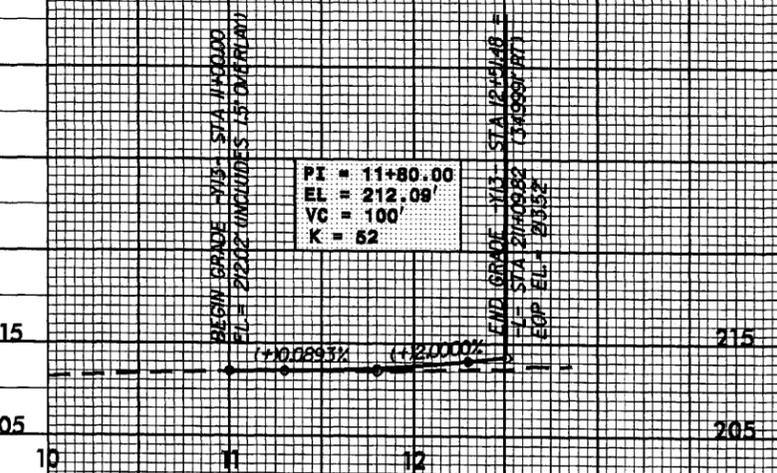
**-Y11-**  
INMAN CR. (SR 3082)



**-Y12-**  
FRANK WELSH DR. (SR 3740)



**-Y13-**  
VEDA ST. (SR 1150)

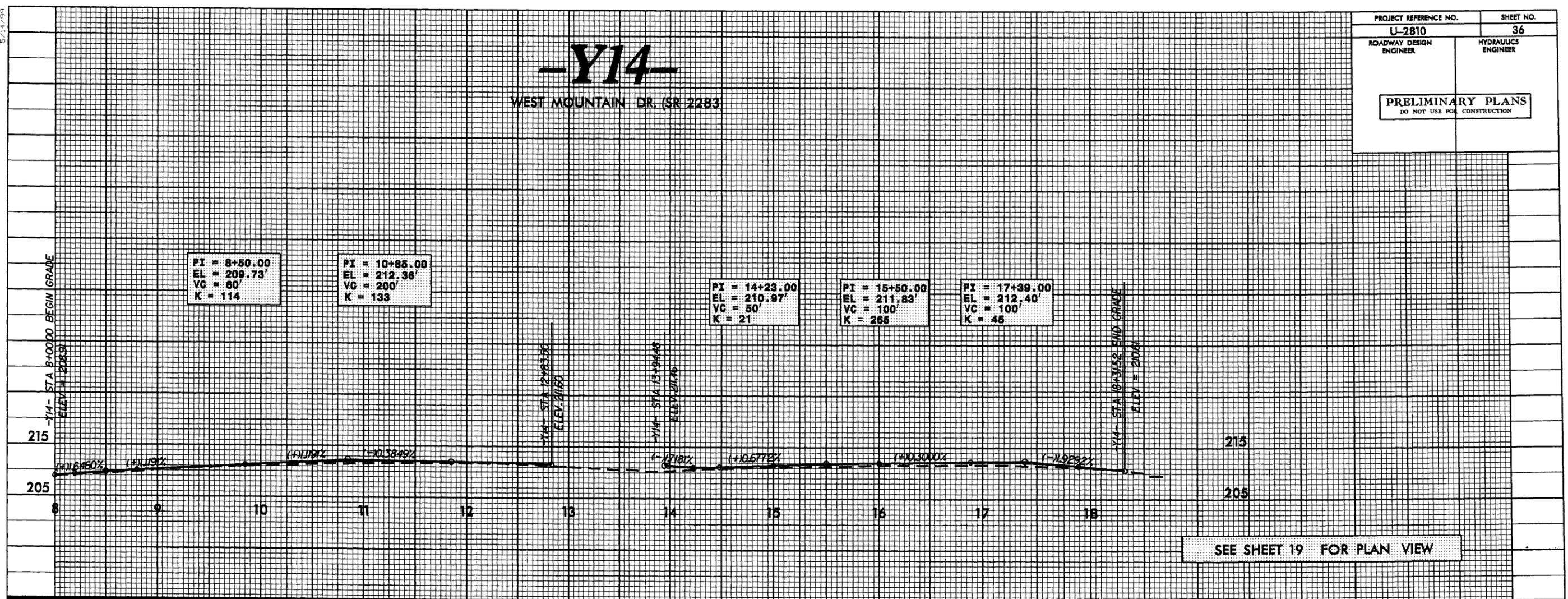


15 JAN 2008 10:56 U-2810-r.dwg s35.dgn

PROJECT REFERENCE NO. <b>U-2810</b>	SHEET NO. <b>36</b>
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
<b>PRELIMINARY PLANS</b> DO NOT USE FOR CONSTRUCTION	

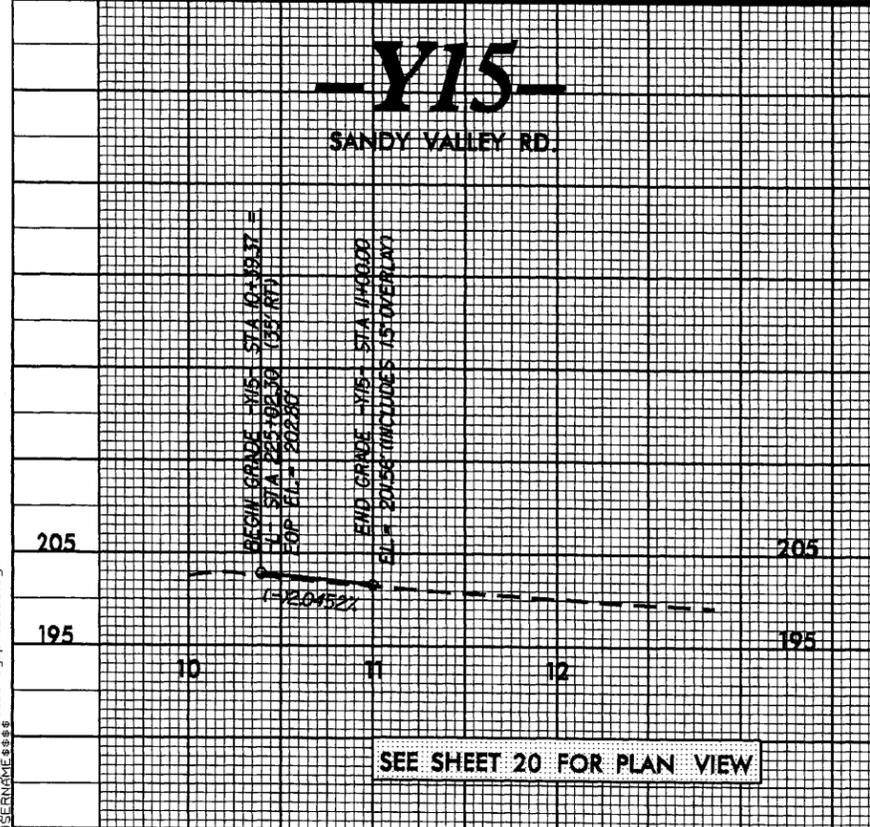
# -Y14-

WEST MOUNTAIN DR. (SR 2283)



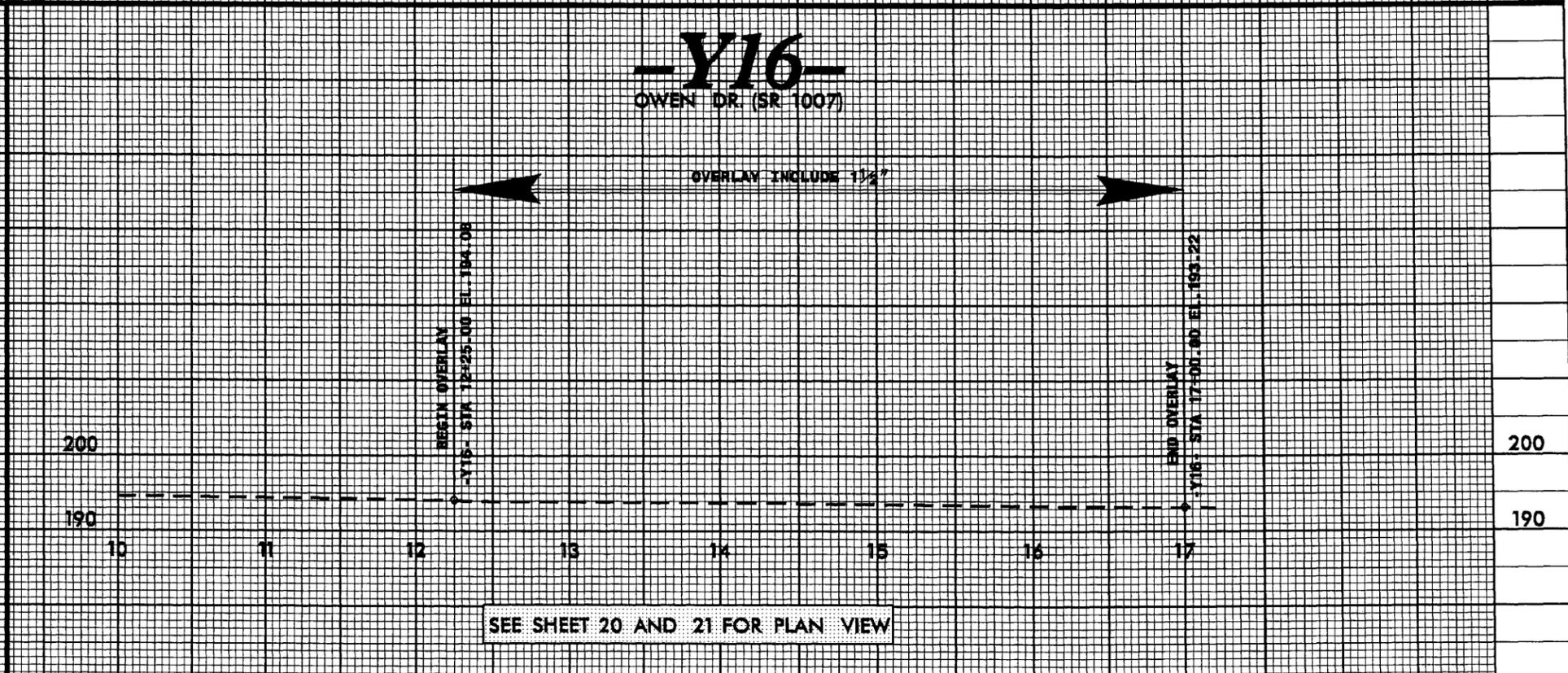
# -Y15-

SANDY VALLEY RD.



# -Y16-

OWEN DR. (SR 1007)



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