STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

June 4, 2012

EUGENE A. CONTI, JR.
SECRETARY

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

ATTN: Ms. Sarah Hair
NCDOT Coordinator

Dear Madam:

Subject: **Request for Modification to the Section 404 Individual Permit and Section 401 Water Quality Certification** for I-485 (Charlotte Outer Loop) from east of I-77 to I-85 in Mecklenburg County. Division 10, TIP's R-2248 E and R-2123 CE, Debit $570 from WBS 34410.3.GV2

Reference: USACE Individual Permit Action ID SAW-2011-01237, dated Nov.22, 2011.
NCDWQ Water Quality Certification No. 003868, dated October 14, 2011.

Due to changes in design, the following modifications have been made that impact jurisdictional resources for both R-2123 CE and R-2248 E, Charlotte Outer Loop in Mecklenburg County.

R-2123 CE – Interchange Portion with I-85 and Future I-485

There are no changes to jurisdictional sites for this project. However, there are two non-jurisdictional areas that have been modified.

The drainage on Plan sheet 8, Ramp B has been revised over the utility culvert. An additional system drop inlet has been provided to collect the water in the ditches prior to reaching the utility culvert. Due to the slope of these ditches, short sections of shoulder berm gutter were added. Attached are the R-2123 CE Roadway Plan sheets 8, 8A and ditch details 1 and 2 displaying these modifications.

To better transition to the R-2248 E section of the project, shoulder drains were added to R-2123 CE Sheet 10. These shoulder drains resulted in the addition of a drop inlet structure and pipe at -L- 94+50. Attached is the R-2123 CE Roadway Plan sheet 10 displaying this modification.

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

TELEPHONE: 919-707-6100
FAX: 919-212-5785

WEBSITE: WWW.NCDOT.ORG

LOCATION:
1020 BIRCH RIDGE DRIVE
RALEIGH NC 27610-4328

R-2248 E – Roadway Portion of Future I-485 between I-85 and NC 115

There are several changes to the permit sites for R-2248 E. These revisions were due to utility modifications, pedestrian/ greenway access, and project limit changes.

Permit Site 5

As stated in the original Permit Application:

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

Revision: Length of 8' x 7' RCBC increased from 489 to 525 linear feet. (+36 feet)

Reason: The 8' x 7' RCBC was lengthened and slightly shifted to the south. Minor grade, fill slope, and alignment changes were necessary to accommodate the approach to the new bridge over Stream S7.

Reference: Permit Site 5, Roadway Plan Sheet 11 (Permit Drawing Sheets 19 and 20 of 108, REVISED MARCH 2012)

Impacts: Permanent stream impacts associated with the 8' x 7' RCBC have increased by 36 linear feet, from 489 to 525 linear feet.
Bank stabilization has decreased by 9 linear feet, from 56 feet to 44 feet.
Temporary stream impacts have been decreased by 9 linear feet (but remain at 0.01 acre.)
Wetland impacts at this site have not changed.

Permit Site 6:

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

Revision: Elimination of 9' x 7' RCBC at Site 6.

Reason: Dual bridges will be constructed to cross the area including Stream S7.

Reference: Permit Site 5, Roadway Plan Sheet 11 and 12 (Permit Drawing Sheets 19, 20, 21, and 22 of 108, REVISED MARCH 2012).

Impacts: All stream impacts (276 of permanent stream impacts, and <0.01 acre of temporary stream impacts) and 36 feet of bank stabilization at Site 6 have been eliminated.

Permit Site 12:

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

Revision: Sewer line added.

Reason: A new sewer line will cross portions of Wetland WBA and will cross Stream S11.

Reference: Permit Site 12, Roadway Plan Sheets 20A and 33 (Permit Drawing Sheets 43, 44, 53 and 54 of 108, REVISED MARCH 2012)

Impacts: No impacts to Stream S11 will occur; the sewer line crossing of S11 will be accomplished via trenchless install (bore & jack).

Amount of permanent or temporary fill in wetlands has <u>not changed</u> at this site.

Wetland impacts due to excavation have increased due to removal of old sewer line under the new bridge, as well as removal of two manholes within the wetland.

Mechanized clearing will increase due to removal of manholes when existing sewer line is abandoned, and mechanized clearing of wetland area / PUE under the bridge.
Excavation in wetlands has <u>increased</u> by 0.04 acre from 0 acre to 0.042 acre.
Mechanized clearing has <u>increased</u> by 0.15 acre from 0 acre to 0.149 acre.
Hand clearing has <u>decreased</u> by 0.12 acre from 0.612 acre to 0.497 acre.

Note – previous hand clearing activities did not require mitigation. The new hand clearing will require mitigation due to maintaining the vegetation in the cut wetland, thus changing the wetland type/function.

Permit Site 13:

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

Revision: A new water line will cross portions of wetland WO. Utility pole guy-wire anchors will also result in impacts to wetland WO.

Reason: Water line and utility pole guy-wire anchors added, south of Y22.

Reference: Roadway Plan Sheets 20B and 31 (Permit Drawing Sheets 45, 46, 51 and 52 of 108, REVISED MARCH 2012)

Impacts: Impacts to wetlands WL and WP have <u>not changed</u>. The alignment of the water line was placed as close to the fill slope as possible, in order to minimize impacts to WO. Water line installation must occur prior to construction of Y20, which precludes placing the water line under the future fill slope.

Mechanized clearing of wetland WO has <u>increased</u> by 0.09 (0.08 acre for water line installation, 0.01 acre for guy-wire anchor installation).

Excavation in wetlands has <u>increased</u> by 0.03 acre (due to installation of water line and installation of guy-wire anchors).

Within the wetland area to be mechanically cleared, a 15-foot wide corridor centered on the water line will be maintained as an access for future repair and maintenance. The wetland type conversion (forested to herbaceous) within this 15 foot-wide corridor will result in an area of 0.05 acre to be maintained as herbaceous wetland.

Permit Site 14

As stated in the Original Permit Application:

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

Revision: Elimination of 2 @ 7' x 8' RCBC at S11/Mallard Creek Road.

Reason: The project no longer includes this stream crossing.

Reference: Roadway Plan Sheets 20C and 33 (Permit Drawing Sheets 47, 48, 53 and 54 of 108, REVISED MARCH 2012)

Impacts: Elimination of the 2 @ 7' x 8' RCBC at S11/Mallard Creek Road will result in
a decrease of 0.02 acre of permanent fill in wetlands,
a decrease of 35 feet from bank stabilization
and a decrease of 0.01 acre of temporary stream impacts.

Total Project Impact Changes for the Yadkin Pee Dee River Basin:

Streams:
The R-2248E project has decreased stream impacts at site 5 (bank stabilization), site 6 (culvert and bank stabilization) and site 14 (bank stabilization) and increased impacts at site 5 (increased culvert length) for an overall stream impact decrease of 323 linear feet. The stream impacts for the Yadkin-Pee Dee Basin portion of the project went from 7,257 to 6,934 – a change of 323 linear feet (of which 83 feet are bank stabilization).
The total Temporary Surface Water Impacts have been decreased by 0.01 acre from 0.08 acre to 0.07 acre.

Wetlands:
The R-2248E project has increased wetland impacts at site 12 (excavation, mechanized clearing and new hand clearing) and site 13 (excavation and mechanized clearing) and decreased wetland impacts at site 14 (fill) for an overall increase of 0.79 acre of impacts. The wetland impacts for the Yadkin- Pee Dee Basin portion of this project went from 6.64 acres to 7.43 acres. The total wetland impacts for the R-2248E section went from 7.3 acre to 8.1 acre.

R-2248 E Mitigation

The Ecosystem Enhancement Program (EEP) has previously accepted 6,800 feet of Stream Mitigation, and 6.64 acres of Wetlands for Impacts in the Yadkin- Pee Dee River Basin (see attached letter dated April, 21, 2011). See the details of the mitigation changes below.

Streams

Site 5 – In the previous 401 permit, DWQ required mitigation for 545 linear feet of stream which included bank stabilization. For the purposes of DWQ mitigation, the increase of impacts at site 5 is 25 feet (36 feet of increase minus 9 feet of bank stabilization). In the previous 404 permit, the USACE required mitigation for 489 linear feet of stream impacts which did not include bank stabilization. **For the purposes of mitigation, the increase of stream impacts at site 5 is 36 linear feet.**

Site 6 – In the previous 401 permit, DWQ required mitigation for 312 linear feet of stream which included bank stabilization. In previous 404, the USACE required mitigation for 276 linear feet of stream impacts which did not include bank stabilization. **For the purpose of mitigation, the reduction of stream impacts at site 6 is 276 linear feet.**

Site 14 – In the previous 401 permit, DWQ required mitigation for 838 linear feet of stream which included bank stabilization. In the previous 404, the USACE required 803 linear feet of impacts which did not include bank stabilization. Bank stabilization will decrease 35 linear feet at this site. There is no mitigation reduction at this site.

Total reduction in stream mitigation requirements in the Yadkin- Pee Dee Basin will be 240 linear feet for a total of 6,560 linear feet (6,800 – 240).

Wetlands

Site 12 – the previous 404/401 permits had 1.8 acres of impacts and required mitigation for 1.8 acre of impacts. The increase in impacts that will require **additional non-riverine mitigation at site 12 will be 0.687 acre.**

Site 13 – the previous 404/401 permits had 0.34 acre of impacts and required mitigation for 0.34 acre of impacts. The increase in impacts that will require **additional non-riverine mitigation at site 13 will be 0.12 acre.**

Site 14 – the previous 404/401 permits had 0.62 acre of impacts and required mitigation for 0.62 acre of impacts. **This site has a decrease of 0.02 acre of riverine wetland impacts.**

The total increase of wetland impacts requiring mitigation in the Yadkin- Pee Dee Basin will be 0.79 acres for a total of 7.43 acres (6.64 + 0.79).

Please see the attached EEP letter with the new mitigation provision.

Mitigation Concerns:

Also included in this Permit Modification are concerns raised from the Ecosystem Enhancement Program based on the wording in the current permit.

1. It appears there is a typo on page 4, condition W of the special conditions of the existing 404. The Catawba Mitigation numbers are accurate, however, the Yadkin numbers reference that the EEP will provide mitigation as stated in their April 21, 2011 letter (attached), of 16.44 acres. This should be 12.44 acres, as we are impacting 6.22 (as stated in your first sentence of condition W). 6.22 x 2 = 12.44.

2. EEP has additional concerns about the non-riparian wetlands as noted in an email from Beth Harmon dated 9/21/2011:
   "when we accepted the non-riparian wetland impacts, we agreed to provide riparian mitigation credits since non-riparian wetlands are difficult to locate in the piedmont. EEP received approval from the IRT at the February 2011 meeting to provide riparian wetland mitigation credits for non-riparian wetland impacts. The IRT requested that EEP incorporate this into the acceptance letters so that the project managers would know in advance that non-riparian mitigation would not be provided. In the permit, the USACE project manager stated that EEP would provide non-riparian wetland mitigation for the non-riparian impacts. This is different from the acceptance letter that was provided. Do you know if that can be changed or will the USACE project manager only accept non-riparian mitigation for the non-riparian wetland impacts?"

Condition W of the existing 404 specifically states that "0.84 acres equivalent non-riparian wetlands". The Ecosystem Enhancement Program is requesting that this wording be changed to reflect the non-riparian issue resolved at the IRT meeting. Please direct any questions regarding this mitigation concern to Beth Harmon at 919 715-1929 or beth.harmon@ncdenr.gov.

Thank you for your assistance with this project. If you have any questions or need additional information regarding the permit modification request, please contact Michael Turchy at maturchy@ncdot.gov. A copy of this modification application will also be posted at http://www.ncdot.org/planning/pe/naturalunit/Permit.html.

Sincerely,

E. L. Lush

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

CC:
NCDOT Permit Application Standard Distribution List

Ecosystem Enhancement PROGRAM

May 29, 2012

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

Dear Mr. Thorpe:

Subject: EEP Mitigation Acceptance Letter:

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

The purpose of this letter is to notify you that the Ecosystem Enhancement Program (EEP) will provide the compensatory stream and riparian wetland mitigation for the unavoidable impact associated with the above referenced project. Based on the information supplied by you on May 25, 2012, the impacts are located in CU 03050101 of the Catawba River Basin and 03040105 of the Yadkin River Basin in the Southern Piedmont (SP) Eco-Region, and are as follows:

IMPACTS / MITIGATION UNITS	Stream			Wetlands			Buffer	
	Cold	Cool	Warm	RW	NRW	CM	Zone 1	Zone 2
Impacts - Catawba 03050101 (SP)			551	0.17				
Impacts - Yadkin 03040105 (SP)			6,560	6.20	1.23			
Impacts – Total Project			7,111	6.37	1.23			

This mitigation acceptance letter replaces the mitigation acceptance letter issued on March 29, 2010 and April 21, 2011. EEP understand this project will be completed under the Design Build process and additional impact information may be forthcoming. In accordance with the directive from the February 8, 2011 IRT meeting, non-riparian wetland impacts located in the mountains and piedmont areas of North Carolina will be accepted as requested but mitigated utilizing riparian wetland mitigation credits. EEP commits to implementing sufficient compensatory stream and riparian wetland mitigation credits to offset the impacts associated with this project in accordance with the N.C. Department of Environment and Natural Resources' Ecosystem Enhancement Program In-Lieu Fee Instrument dated July 28, 2010. If the above referenced impact amounts are revised, then this mitigation acceptance letter will no longer be valid and a new mitigation acceptance letter will be required from EEP.

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

Sincerely,

James B. Stanfill for

Michael Ellison
EEP Deputy Director

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

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- (1259+00/1260+50)	Roadway Fill	0.385			0.020		0.02		297		
2	-L- (1266+00/1266+50)	Roadway Fill	0.222			0.028		0.05		602		
3	-Y10- (65+50)	54" Pipe	0.015			0.011		<0.01	<0.01	48	38	
3		Bank Stabilization								24		
4	-L- (1297+00/1299+50)	84" Pipe	0.507		0.042	0.079		0.08	<0.01	428	8	
4		Bank Stabilization								69		
5	-L- (1342+00/1343+00)	8'x7' RCBC	0.116					0.04	0.01	525	175	
5		Bank Stabilization								44		
6	-L- (1345+00)	9'X7' RCBC						0.00	0.00	0	0	
6		Bank Stabilization								0		
7	-L- (1355+00/1367+00)	Roadway Fill	1.723			0.061		0.09	0.01	1561	127	
7		Bank Stabilization								21		
8	-L- (1390+00/1415+00)	Roadway Fill	1.060					0.22	<0.01	2497	56	
8		Bank Stabilization								28		
9	-L- (1421+00)	42" Pipe						<0.01	<0.01	81	8	
9		Bank Stabilization								37		
10	-L- (1441+00)	60" Pipe						<0.01	<0.01	44	18	
10		Bank Stabilization								51		
11	-L- (1465+00/1476+00)	Roadway Fill	0.144					<0.01	<0.01	138	48	
12	-Y22- (54+00/60+00)	Roadway Fill	1.609			0.164						
12		Temp. Wrk. Br.		0.051								
12		Bridge/Int. Bents	0.010				0.497					
12		Bridge/Splash Pads	0.017									
12		Sewer line/Manholes			0.042	0.149						
13	-Y20- (41+00/48+00)	Roadway Fill	0.311			0.030						
13		Water line			0.028	0.078						
13		Utility Pole Anchors			0.001	0.008						
14	-L- (1486+00/1495+00)	Roadway Fill	0.596					0.40	<0.01	803	34	
14	-Y25- (23+23)	2 @ 7' x 8' RCBC	0.000					0.00	0.00		0	
14		Bank Stabilization								0		
15	-Y22- (86+00/90+00)	72" Pipe	0.080			0.012		0.03	<0.01	295	21	
15		Bank Stabilization								50		
16	-L- (1526+20/1526+45)	48" Pipe	0.031					0.01		190		
TOTALS:			6.83	0.05	0.11	0.64	0.50	0.97	0.07	7833	533	0

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

****Site 13 - of 0.078ac mechanized clearing impacts for water line installation, 0.050ac will be maintained for repair access.
Permanent wetland type conversion will result in 0.050ac mitigable wetland impacts at this site
Does this 0.050ac of mitigable wetland impact need to be added into totals somewhere?*****

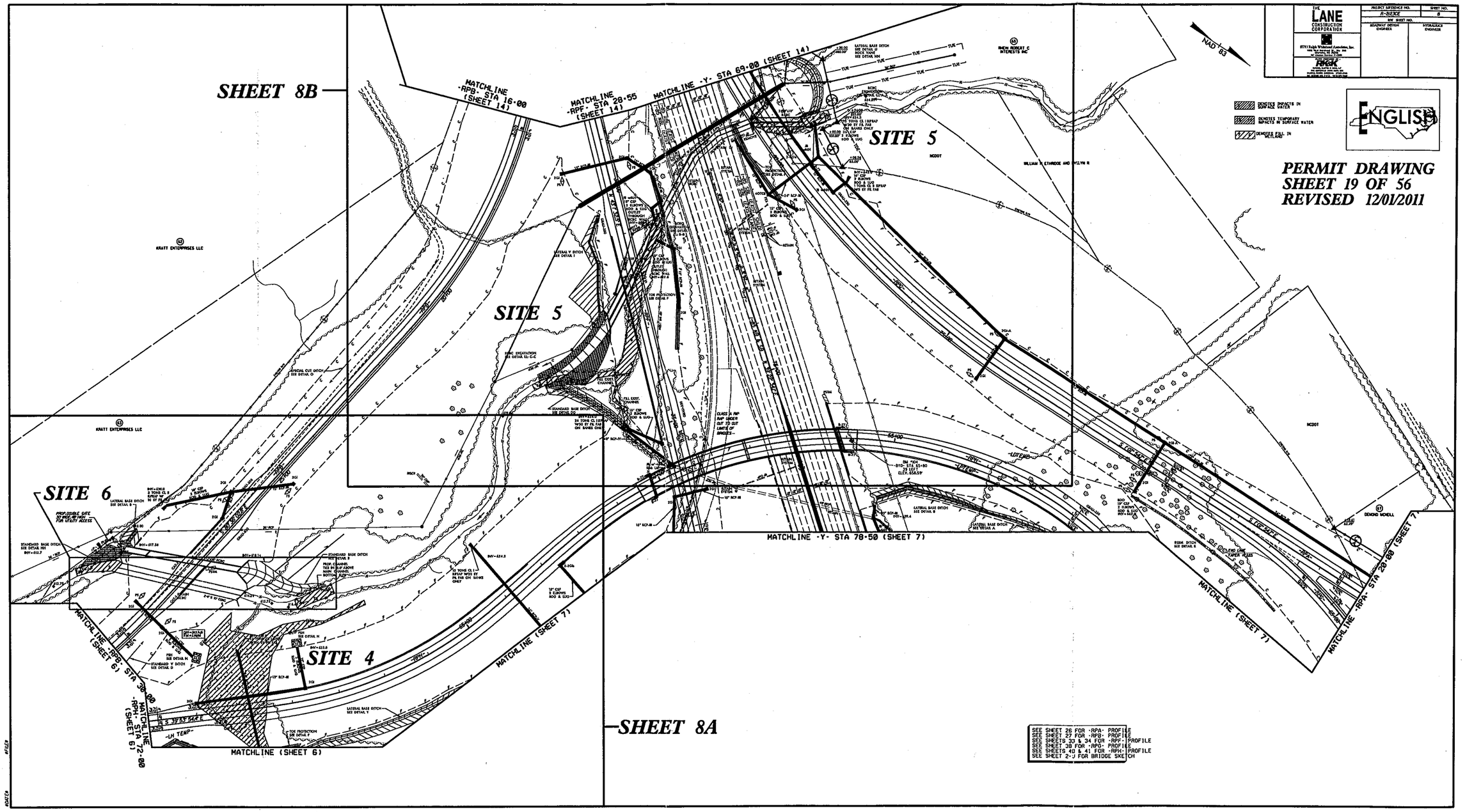
Permit Drawing
Revised March 2012
Page 2 of 108

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

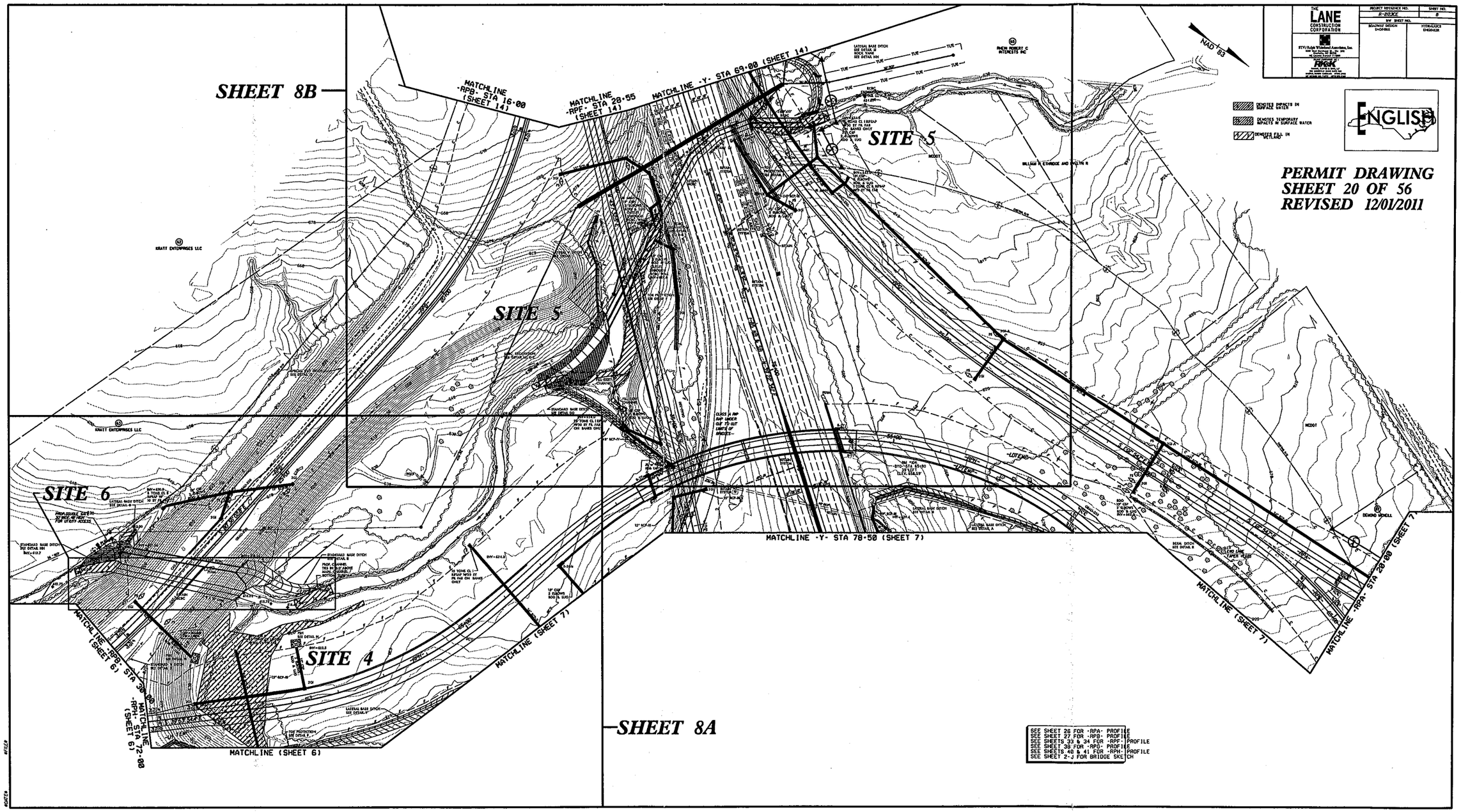
MECKLENBURG COUNTY
WBS - 34410.3.GV2 (R-2248E)

SHEET 4/12/2012

ATN Revised 3/31/05



SHEET 8B
SHEET 8A
SITE 4
SITE 5
SITE 5
SITE 6
MATCHLINE -RPB- STA 16+00 (SHEET 14)
MATCHLINE -RPF- STA 28+55 (SHEET 14)
MATCHLINE -Y- STA 69+00 (SHEET 14)
MATCHLINE -Y- STA 78+50 (SHEET 7)
MATCHLINE (SHEET 7)
MATCHLINE (SHEET 6)
MATCHLINE -RPA- STA 20+00 (SHEET 7)
MATCHLINE -RPB- STA 30+00 (SHEET 6)
MATCHLINE -RPH- STA 72+00 (SHEET 6)
KRATT ENTERPRISES LLC
NAD 83
THE LANE CONSTRUCTION CORPORATION
ENGLISH
PERMIT DRAWING
SHEET 19 OF 56
REVISED 12/01/2011
SEE SHEET 26 FOR -RPA- PROFILE
SEE SHEET 27 FOR -RPB- PROFILE
SEE SHEETS 33 & 34 FOR -RPF- PROFILE
SEE SHEET 38 FOR -RPG- PROFILE
SEE SHEETS 40 & 41 FOR -RPH- PROFILE
SEE SHEET 2-J FOR BRIDGE SKETCH



SHEET 8B
SHEET 8A
SITE 4
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SITE 6
MATCHLINE -RPB- STA 16+00 (SHEET 14)
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MATCHLINE -Y- STA 78+50 (SHEET 7)
MATCHLINE -RPA- STA 20+00 (SHEET 7)
MATCHLINE (SHEET 7)
MATCHLINE (SHEET 6)
MATCHLINE -RPB- STA 30+00 (SHEET 6)
MATCHLINE -RPH- STA 72+00 (SHEET 6)
KRATT ENTERPRISES LLC
RHEIN ROBERT C INTERESTS INC
NAD 83
THE LANE CONSTRUCTION CORPORATION
STV/Ralph Whitehead Associates, Inc.
PROJECT REFERENCE NO.
R-2923CE
SHEET NO.
8
BW SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
DENOTES IMPACTS IN SURFACE WATER
DENOTES TEMPORARY IMPACTS IN SURFACE WATER
DENOTES FILL IN WETLAND
ENGLISH
PERMIT DRAWING
SHEET 20 OF 56
REVISED 12/01/2011
SEE SHEET 26 FOR -RPA- PROFILE
SEE SHEET 27 FOR -RPB- PROFILE
SEE SHEETS 33 & 34 FOR -RPF- PROFILE
SEE SHEET 38 FOR -RPG- PROFILE
SEE SHEETS 40 & 41 FOR -RPH- PROFILE
SEE SHEET 2-J FOR BRIDGE SKETCH

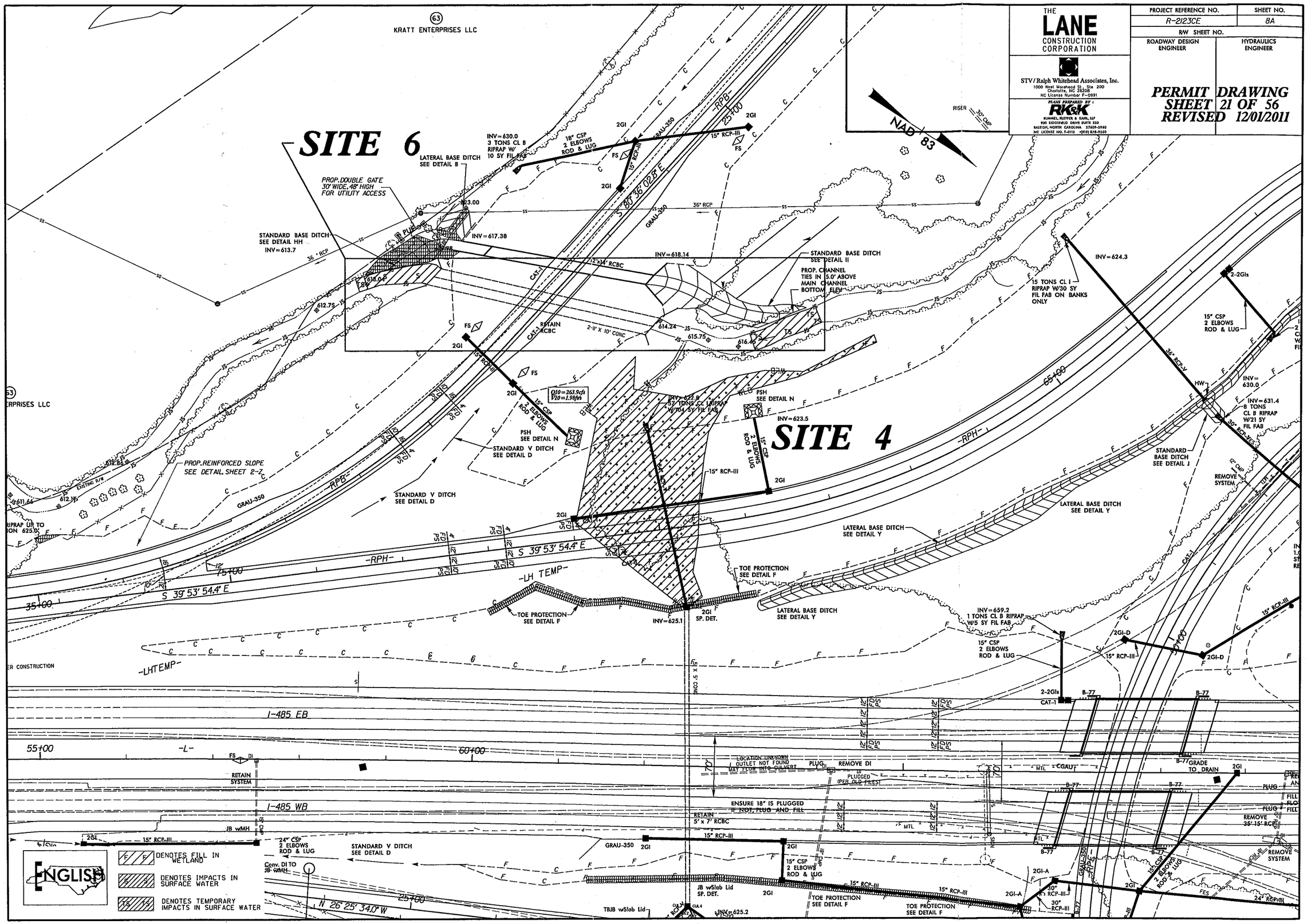
THE LANE CONSTRUCTION CORPORATION

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste 200
Charlotte, NC 28208
NC License Number F-0991

PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0113 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	8A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 21 OF 56
REVISED 12/01/2011



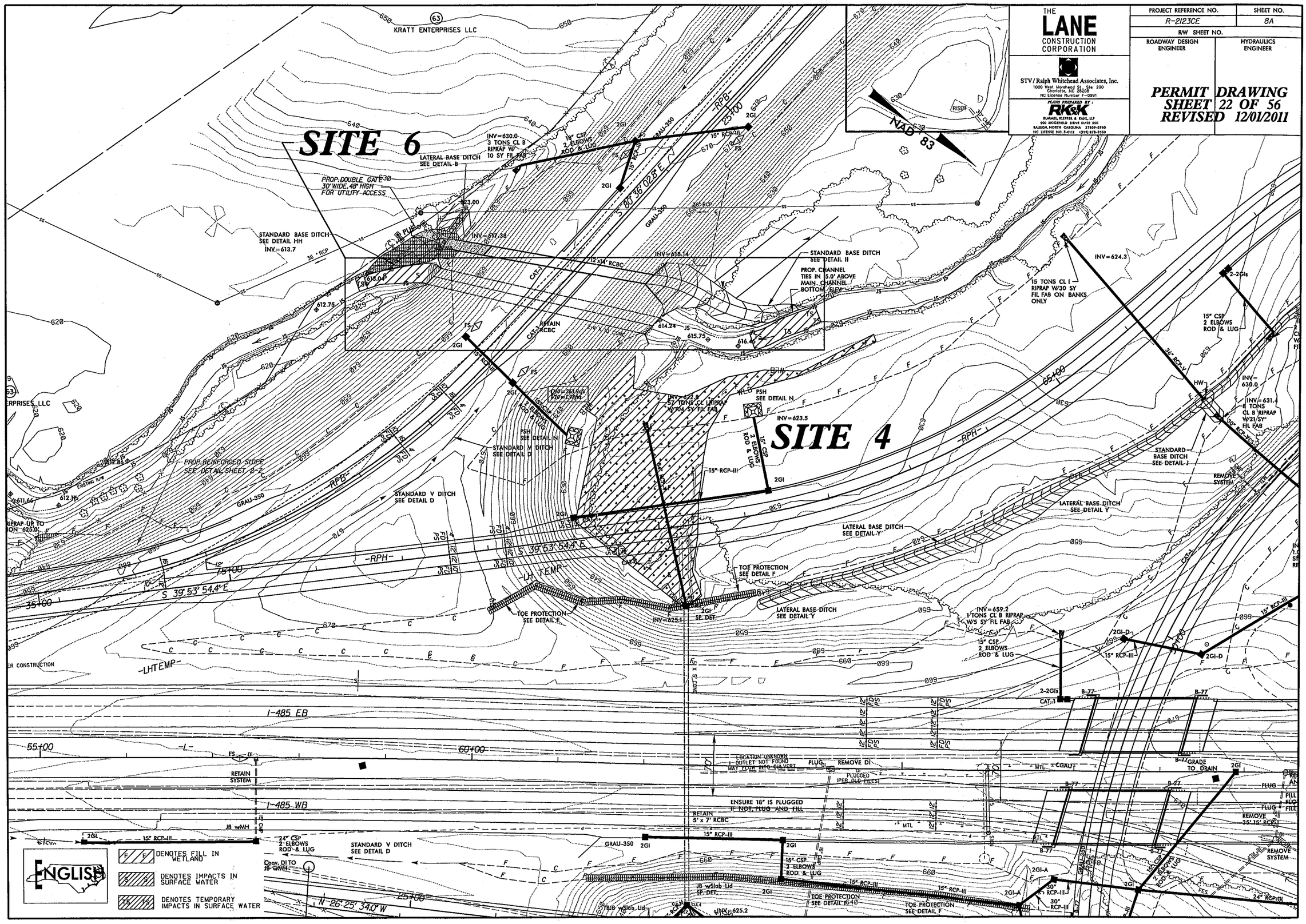
THE LANE CONSTRUCTION CORPORATION

STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste 200
Charlotte, NC 28208
NC License Number F-0991

PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	8A
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 22 OF 56
REVISED 12/01/2011



THE LANE CONSTRUCTION CORPORATION

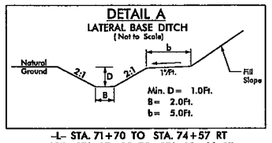
STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St. Ste 200
Charlotte, NC 28208
NC License Number F-0991

PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	DITCH DETAILS 1
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

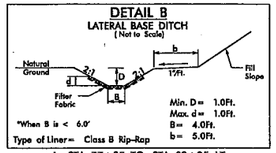
PERMIT DRAWING
SHEET 6 OF 56
REVISED 12/01/2011

DETAIL A
LATERAL BASE DITCH
(Not to Scale)



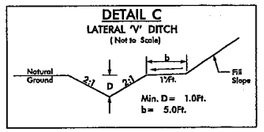
-L- STA. 71+70 TO STA. 74+57 RT
-RPE- STA. 37+25 TO STA. 39+00 RT
-RPG- STA. 33+50 TO STA. 34+00 LT
-RPG- STA. 39+60 TO STA. 41+75 LT
-Y- STA. 56+50 TO STA. 59+00 LT
-FETEMP- STA. 53+50 TO STA. 57+00 RT
-LDTEMP- STA. 14+75 TO STA. 16+50 RT

DETAIL B
LATERAL BASE DITCH
(Not to Scale)



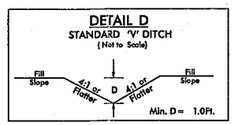
-L- STA. 77+85 TO STA. 82+25 LT
-RPB- STA. 27+89 TO STA. 28+35 RT
-RPE- STA. 39+00 TO STA. 41+10 RT
-RPE- STA. 67+73 TO STA. 68+25 RT
-Y- STA. 59+00 TO STA. 61+47 LT
-Y- STA. 146+50 TO STA. 149+53 RT
-Y- STA. 146+67 TO STA. 150+00 LT

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



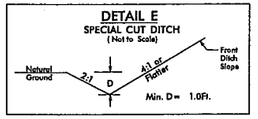
-L- STA. 79+90 TO STA. 82+00 RT
-L- STA. 83+13 TO STA. 86+00 LT
-L- STA. 83+35 TO STA. 85+50 RT
-RPF- STA. 65+50 TO STA. 67+50 LT
-RPG- STA. 34+00 TO STA. 35+75 LT
-RPH- STA. 15+23.28 TO STA. 23+20.13 LT
-Y1- STA. 20+00 TO STA. 22+00 RT

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



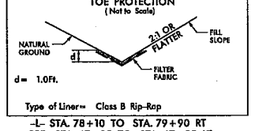
-L- STA. 54+50 TO STA. 60+00 RT
-RPB- STA. 29+50 TO STA. 31+33.99 LT
-RPG- STA. 63+00 TO STA. 65+50 RT

DETAIL E
SPECIAL CUT DITCH
(Not to Scale)



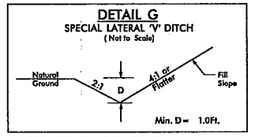
-L- STA. 92+50 TO STA. 98+00 LT
-L- STA. 104+50 TO STA. 106+50 RT
-RPC- STA. 11+60.65 TO STA. 14+13.15 RT
-RPD- STA. 12+73.34 TO STA. 15+88.41 RT
-RPE- STA. 19+90 TO STA. 21+90 RT
-RPF- STA. 68+50 TO STA. 72+00 RT
-RPH- STA. 20+50 TO STA. 23+50 RT
-RPH- STA. 33+25 TO STA. 34+00 RT
-RPH- STA. 37+50 TO STA. 41+50 RT
-Y- STA. 48+00 TO STA. 50+00 RT
-Y- STA. 105+00 TO STA. 108+00 RT
-Y- STA. 128+00 TO STA. 131+00 LT
-Y- STA. 157+00 TO STA. 160+50 RT
-Y- STA. 157+50 TO STA. 160+00 LT
-Y1- STA. 10+50 TO STA. 13+00 RT
-Y1- STA. 18+00 TO STA. 20+00 RT
-Y1- STA. 28+00 TO STA. 31+00 RT

DETAIL F
TOE PROTECTION
(Not to Scale)



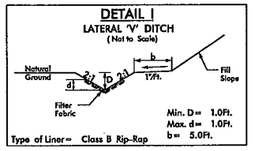
-L- STA. 78+10 TO STA. 79+90 RT
-RPE- STA. 47+35 TO STA. 47+85 LT
-RPF- STA. 17+50 TO STA. 24+00 LT
-RPF- STA. 30+00 TO STA. 33+50 LT
-RPG- STA. 27+00 TO STA. 32+15 LT
-RPG- STA. 41+45 TO STA. 41+95 LT
-RPG- STA. 51+50 TO STA. 52+50 RT
-RPG- STA. 79+40 TO STA. 81+10 LT
-RPH- STA. 69+00 TO STA. 72+10 LT
-Y- STA. 135+65 TO STA. 136+25 RT
-FETEMP- STA. 53+50 TO STA. 65+00 LT
-LHTEMP- STA. 61+00 TO STA. 63+30 RT
-LPTEMP- STA. 62+50 TO STA. 63+50 LT
-LPTEMP- STA. 68+00 TO STA. 68+85 LT

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



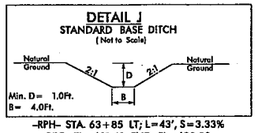
-RPC- STA. 14+13.15 TO STA. 17+50 RT
-RPF- STA. 79+84 TO STA. 80+78 LT
-Y- STA. 113+00 TO STA. 114+80 RT
-Y1- STA. 21+00 TO STA. 23+70 LT
-LHTEMP- STA. 50+00 TO STA. 52+00 LT
-LHTEMP- STA. 52+00 TO STA. 53+50 RT

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



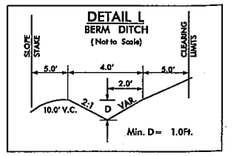
-RPF- STA. 30+50 TO STA. 32+75 RT
-RPF- STA. 55+25 TO STA. 58+00 LT
-RPF- STA. 63+00 TO STA. 65+50 LT
-Y- STA. 145+50 TO STA. 146+67 LT

DETAIL J
STANDARD BASE DITCH
(Not to Scale)



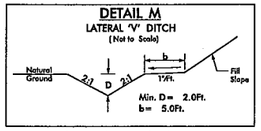
-RPH- STA. 63+85 LT; L=43', S=3.33%
BEG EL=631.43, END EL=630.00
(TIE TO PROPOSE PIPE)

DETAIL L
BERM DITCH
(Not to Scale)



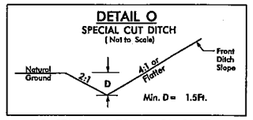
-L- STA. 89+50 TO STA. 95+00 RT
-L- STA. 105+50 TO STA. 107+00 RT
-RPD2- STA. 17+00 TO STA. 18+75 RT
-RPE- STA. 63+50 TO STA. 66+00 RT
-RPF- STA. 45+25 TO STA. 46+00 LT
-RPF- STA. 71+80 TO STA. 74+00 RT
-RPF- STA. 74+00 TO STA. 76+50 RT
-RPF- STA. 78+87 TO STA. 80+75 RT
-RPH- STA. 35+65 TO STA. 41+75 RT
-Y- STA. 45+18 TO STA. 55+00 RT
-Y- STA. 53+50 TO STA. 55+50 LT
-Y- STA. 112+44 TO STA. 114+50 LT

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



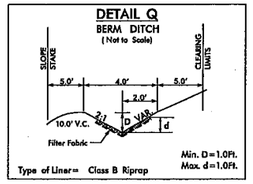
-Y- STA. 91+96 TO STA. 96+70 LT
-Y1- STA. 31+00 TO STA. 32+20 RT
-FETEMP- STA. 55+00 TO STA. 55+90 LT

DETAIL O
SPECIAL CUT DITCH
(Not to Scale)



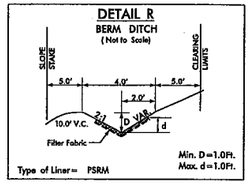
-RPB- STA. 19+50 TO STA. 26+00 RT

DETAIL Q
BERM DITCH
(Not to Scale)



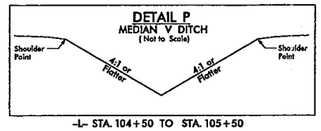
-RPD- STA. 12+90 TO STA. 15+88.41 RT
-RPD2- STA. 18+75 TO STA. 21+50 RT
-RPE- STA. 61+50 TO STA. 63+50 RT
-RPF- STA. 76+50 TO STA. 78+87 RT
-RPG- STA. 57+25 TO STA. 58+65 RT
-Y- STA. 132+50 TO STA. 135+40 LT

DETAIL R
BERM DITCH
(Not to Scale)

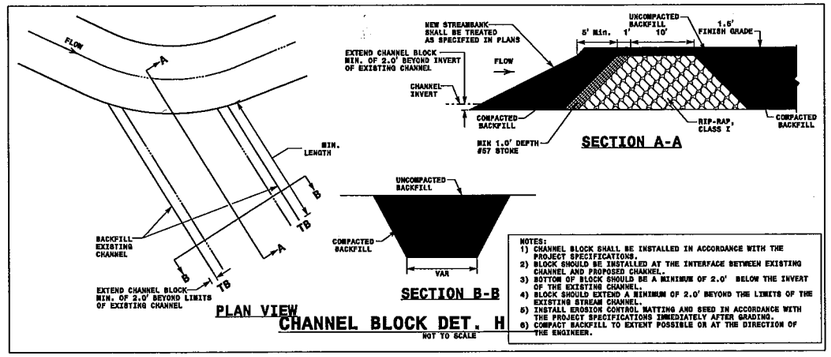


-L- STA. 88+00 TO STA. 89+50 RT
-L- STA. 98+00 TO STA. 105+50 RT
-RPD2- STA. 21+50 TO STA. 24+00 RT
-RPF- STA. 70+75 TO STA. 71+80 RT
-RPG- STA. 52+50 TO STA. 57+25 RT
-RPG- STA. 66+00 TO STA. 70+00 LT
-RPH- STA. 23+20 TO STA. 25+20 RT
-Y- STA. 55+00 TO STA. 61+50 RT
-Y- STA. 55+50 TO STA. 56+50 LT
-Y- STA. 114+50 TO STA. 119+15 LT
-Y- STA. 129+50 TO STA. 132+50 LT
-Y- STA. 155+00 TO STA. 159+00 LT

DETAIL P
MEDIAN V DITCH
(Not to Scale)



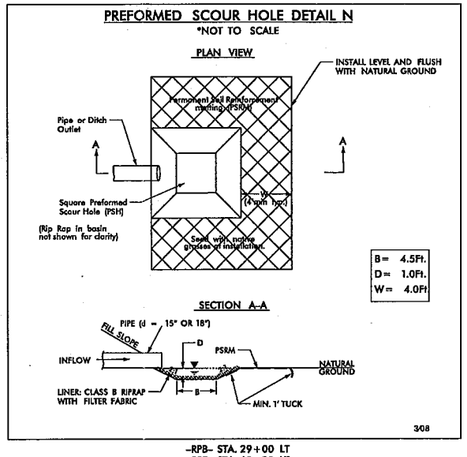
-L- STA. 104+50 TO STA. 105+50



CHANNEL BLOCK DET. H

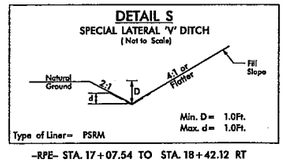
-RPE- STA. 59+00 LT
-RPF- STA. 56+60 RT
-RPF- STA. 57+33 RT
-RPG- STA. 82+35 RT

PREFORMED SCOUR HOLE DETAIL N
*NOT TO SCALE



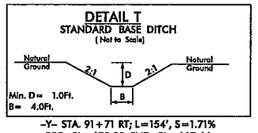
-RPB- STA. 29+00 LT
-RPE- STA. 60+90 LT
-RPE- STA. 66+52 LT
-RPF- STA. 55+11 RT
-RPF- STA. 55+25 RT
-RPH- STA. 68+68 RT
-Y- STA. 129+59 RT

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



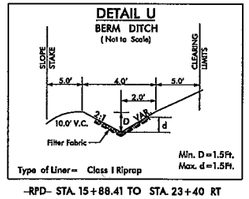
-RPE- STA. 17+07.54 TO STA. 18+42.12 RT

DETAIL T
STANDARD BASE DITCH
(Not to Scale)



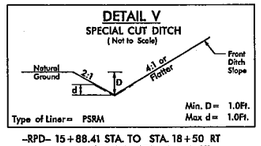
-Y- STA. 91+71 RT; L=154', S=1.71%
BEG EL=670.30, END EL=667.66
(TIE TO EXISTING DITCH)

DETAIL U
BERM DITCH
(Not to Scale)



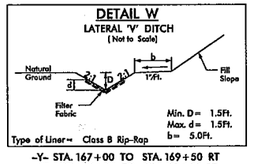
-RPD- STA. 15+88.41 TO STA. 23+40 RT

DETAIL V
SPECIAL CUT DITCH
(Not to Scale)



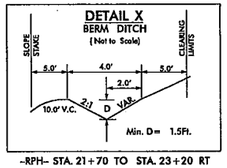
-RPD- 15+88.41 STA. TO STA. 18+50 RT
-L- 42+50 STA. TO STA. 43+50 LT

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



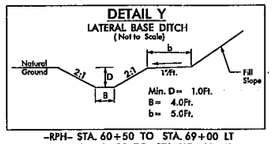
-Y- STA. 167+00 TO STA. 169+50 RT
-Y1- STA. 32+20 TO STA. 33+00 RT

DETAIL X
BERM DITCH
(Not to Scale)



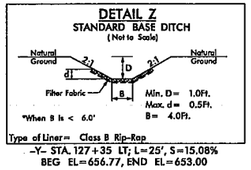
-RPH- STA. 21+70 TO STA. 23+20 RT

DETAIL Y
LATERAL BASE DITCH
(Not to Scale)



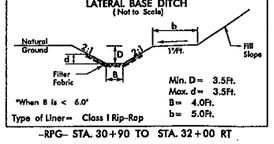
-RPH- STA. 60+50 TO STA. 69+00 LT
-Y- STA. 114+80 TO STA. 115+92 RT
-LDTEMP- STA. 27+00 TO STA. 33+50 LT
-LPTEMP- STA. 66+00 TO STA. 68+00 LT

DETAIL Z
STANDARD BASE DITCH
(Not to Scale)



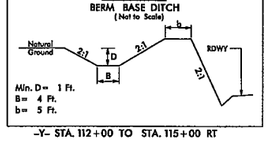
-Y- STA. 127+35 LT; L=25', S=15.08%
BEG EL=656.77, END EL=653.00

DETAIL AA
LATERAL BASE DITCH
(Not to Scale)



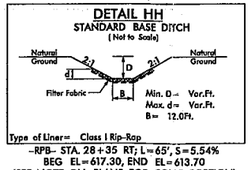
-RPG- STA. 30+90 TO STA. 32+00 RT

DETAIL BB
BERM BASE DITCH
(Not to Scale)



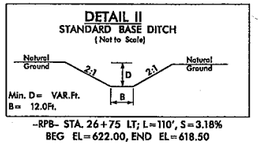
-Y- STA. 112+00 TO STA. 115+00 RT

DETAIL HH
STANDARD BASE DITCH
(Not to Scale)



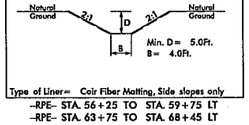
-RPB- STA. 28+35 RT; L=65', S=5.54%
BEG EL=617.30, END EL=613.70
(SEE NOTE ON PLANS FOR CONC. PORTION)

DETAIL II
STANDARD BASE DITCH
(Not to Scale)



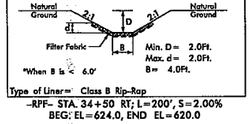
-RPB- STA. 26+75 LT; L=110', S=3.18%
BEG EL=622.00, END EL=618.50

DETAIL CC
STANDARD BASE DITCH
(Not to Scale)



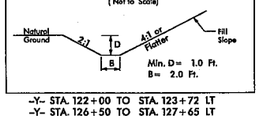
-RPE- STA. 56+25 TO STA. 59+75 LT
-RPE- STA. 63+75 TO STA. 68+45 LT
-RPE- STA. 67+53 LT; L=50', S=1.00%
BEG EL=657.9, END EL=657.4

DETAIL DD
STANDARD BASE DITCH
(Not to Scale)



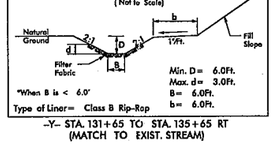
-RPF- STA. 34+50 RT; L=200', S=2.00%
BEG; EL=624.0, END EL=620.0

DETAIL EE
SPECIAL LATERAL BASE DITCH
(Not to Scale)



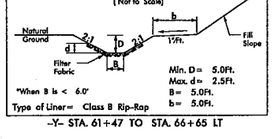
-Y- STA. 122+00 TO STA. 123+72 LT
-Y- STA. 126+50 TO STA. 127+65 LT

DETAIL FF
LATERAL BASE DITCH
(Not to Scale)



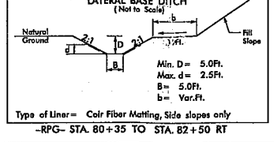
-Y- STA. 131+65 TO STA. 135+65 RT
(MATCH TO EXIST. STREAM)

DETAIL GG
LATERAL BASE DITCH
(Not to Scale)



-Y- STA. 61+47 TO STA. 66+65 LT

DETAIL JJ
LATERAL BASE DITCH
(Not to Scale)



-RPG- STA. 80+35 TO STA. 82+50 RT

$FILE$
$DATE$

THE LANE CONSTRUCTION CORPORATION

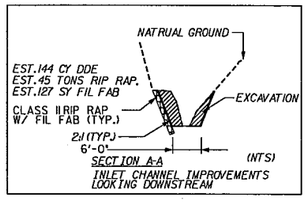
STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste 200
Charlotte, NC 28208
NC License Number F-0891

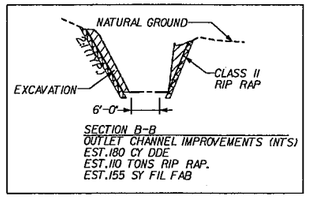
PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 RIDGEFIELD DRIVE SUITE 350
RALEIGH, NORTH CAROLINA 27609-2940
NC LICENSE NO. F-0112 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	DITCH DETAILS 2
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

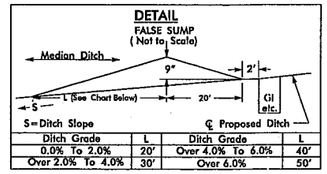
PERMIT DRAWING
SHEET 7 OF 56
REVISED 12/01/2011

DETAIL KK
UT TO ROCKY RIVER RCBC EXCAVATION



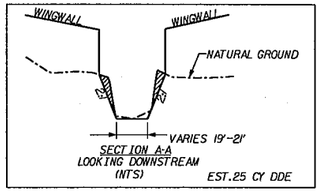


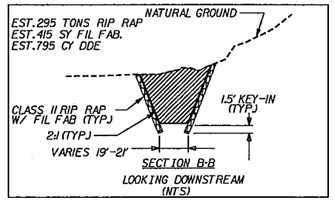
-Y- STA. 148+00

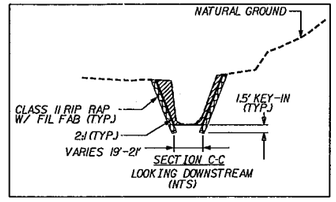


Ditch Grade	L	Ditch Grade	L
0.0% To 2.0%	20'	Over 4.0% To 6.0%	40'
Over 2.0% To 4.0%	30'	Over 6.0%	50'

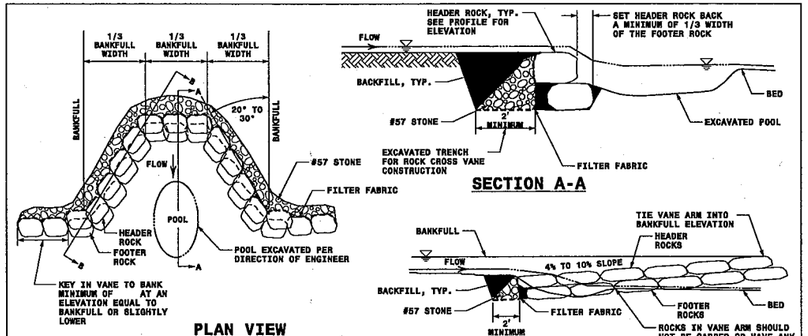
DETAIL LL
STONY CREEK RCBC EXCAVATION







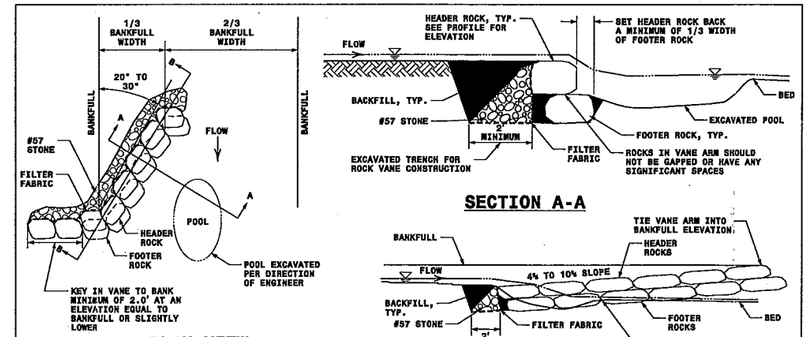
-Y- STA. 70+00



STATION	BOULDER DIMENSIONS (FT) HEIGHT	LENGTH	WIDTH
-RPG- 82+36	RT 2.0'	2.0'	4.0'

NOTES:
1) DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2) DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3) CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5) POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

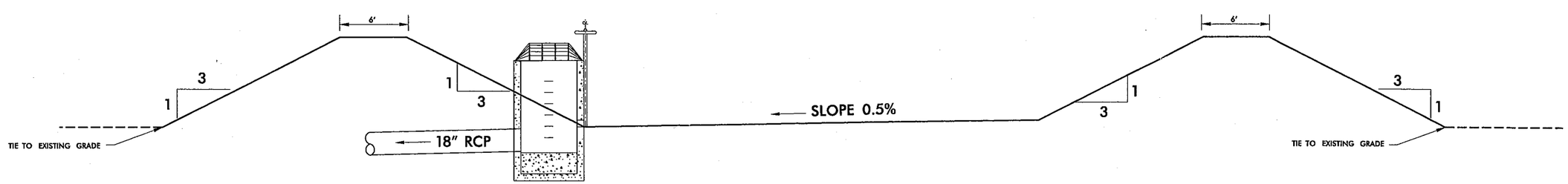
ROCK CROSS VANE DETAIL MM
NOT TO SCALE



STATION	BOULDER DIMENSIONS (FT) HEIGHT	LENGTH	WIDTH
-RPG- 80+52	RT 2.0'	2.0'	4.0'
-RPG- 81+22	RT 2.0'	2.0'	4.0'
-RPE- 56+90	LT 2.0'	2.0'	4.0'
-RPE- 58+93	LT 2.0'	2.0'	4.0'
-RPE- 64+19	LT 2.0'	2.0'	4.0'
-RPE- 67+00	LT 2.0'	2.0'	4.0'
-RPE- 67+69	LT 2.0'	2.0'	4.0'

NOTES:
1) DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
2) DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
3) CLASS "A" STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
4) COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.
5) POOL DEPTH SHOULD BE 2 TO 3 TIMES BANKFULL DEPTH.

ROCK VANE DETAIL NN
NOT TO SCALE



TYPICAL SECTION A-A – MODIFIED BASIN

N.T.S.

$FILE$

$DATE$

THE LANE CONSTRUCTION CORPORATION

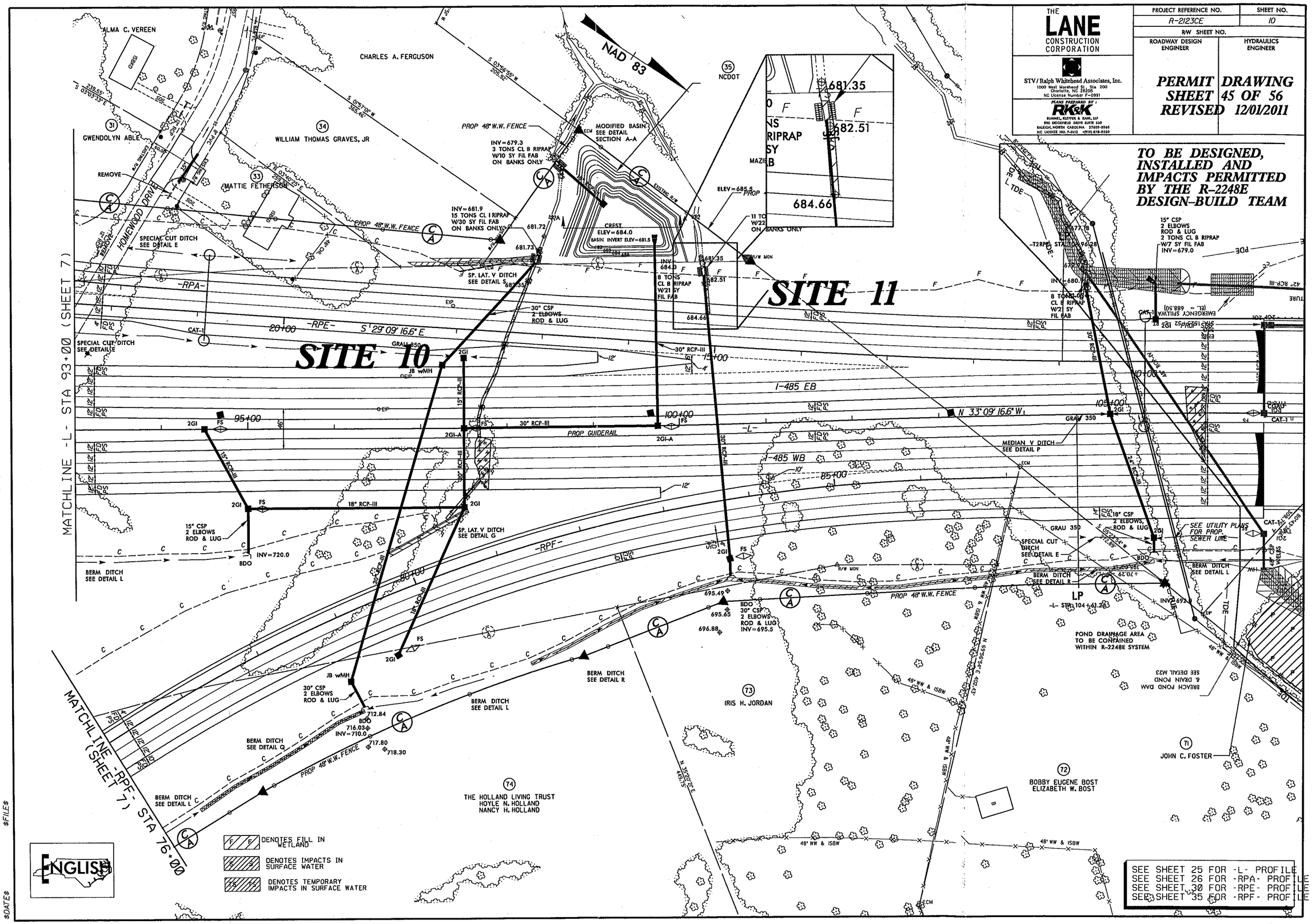
STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste 200
Charlotte, NC 28208
NC License Number F-0991

PLANS PREPARED BY:
RK&K
RUMMEL, KLEPPER & KAHL, LLP
900 SEGGFIELD DRIVE SUITE 330
RALEIGH, NORTH CAROLINA 27609-3965
NC LICENSE NO. F-0113 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 45 OF 56
REVISED 12/01/2011

TO BE DESIGNED, INSTALLED AND IMPACTS PERMITTED BY THE R-2248E DESIGN-BUILD TEAM



$FILE$

$DATE$

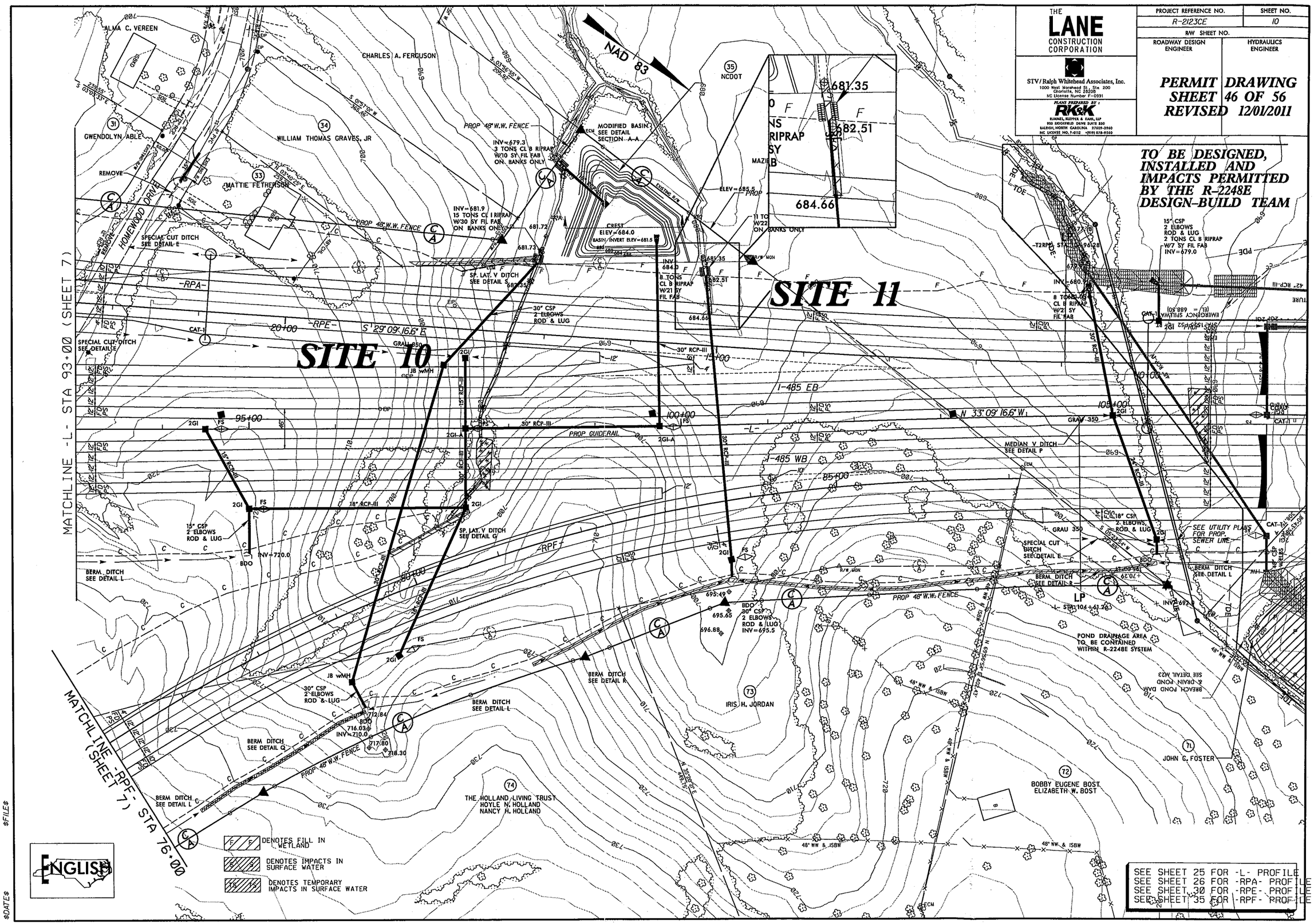
THE LANE CONSTRUCTION CORPORATION

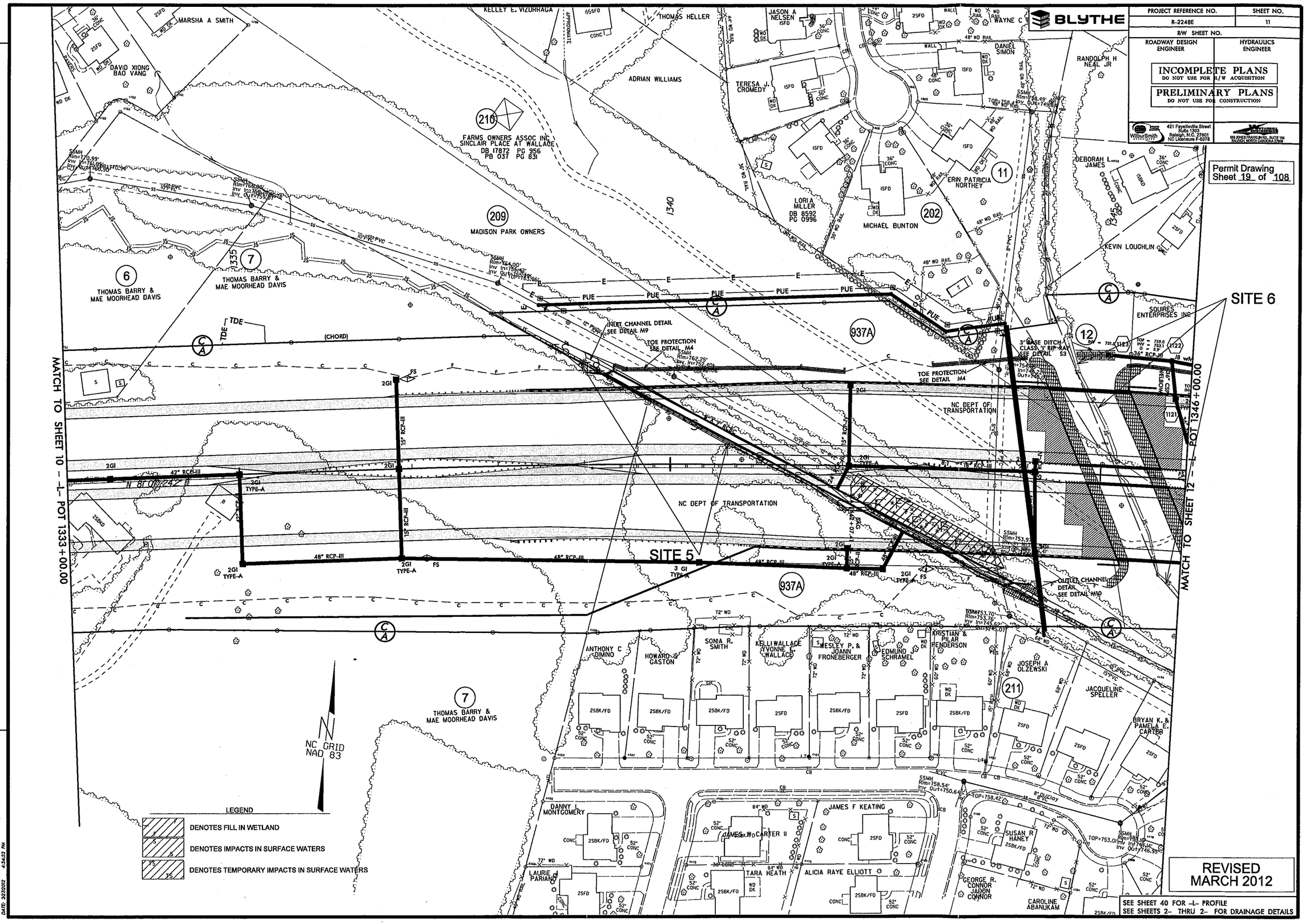
STV/Ralph Whitehead Associates, Inc.
1000 West Morehead St., Ste. 200
Charlotte, NC 28208
NC License Number F-0391

PLANS PREPARED BY:
RK&K
BUNNELL, KLEPPER & FAHL, LLP
900 RIDGEFIELD DRIVE SUITE 330
RALEIGH, NORTH CAROLINA 27609-3960
NC LICENSE NO. F-0112 (919) 878-9560

PROJECT REFERENCE NO.	SHEET NO.
R-2123CE	10
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PERMIT DRAWING
SHEET 46 OF 56
REVISED 12/01/2011





BLYTHE
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
11
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
421 Fayetteville Street Suite 1303 Raleigh, N.C. 27601 NC Licensure F-0378
WilburSmith
Permit Drawing Sheet 19 of 108
SITE 6
SITE 5
MATCH TO SHEET 10 - -L- POT 1333+00.00
MATCH TO SHEET 12 - -L- POT 1346+00.00
NC GRID NAD 83
LEGEND
DENOTES FILL IN WETLAND
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
REVISED MARCH 2012
SEE SHEET 40 FOR -L- PROFILE
SEE SHEETS 2- THRU 2- FOR DRAINAGE DETAILS

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

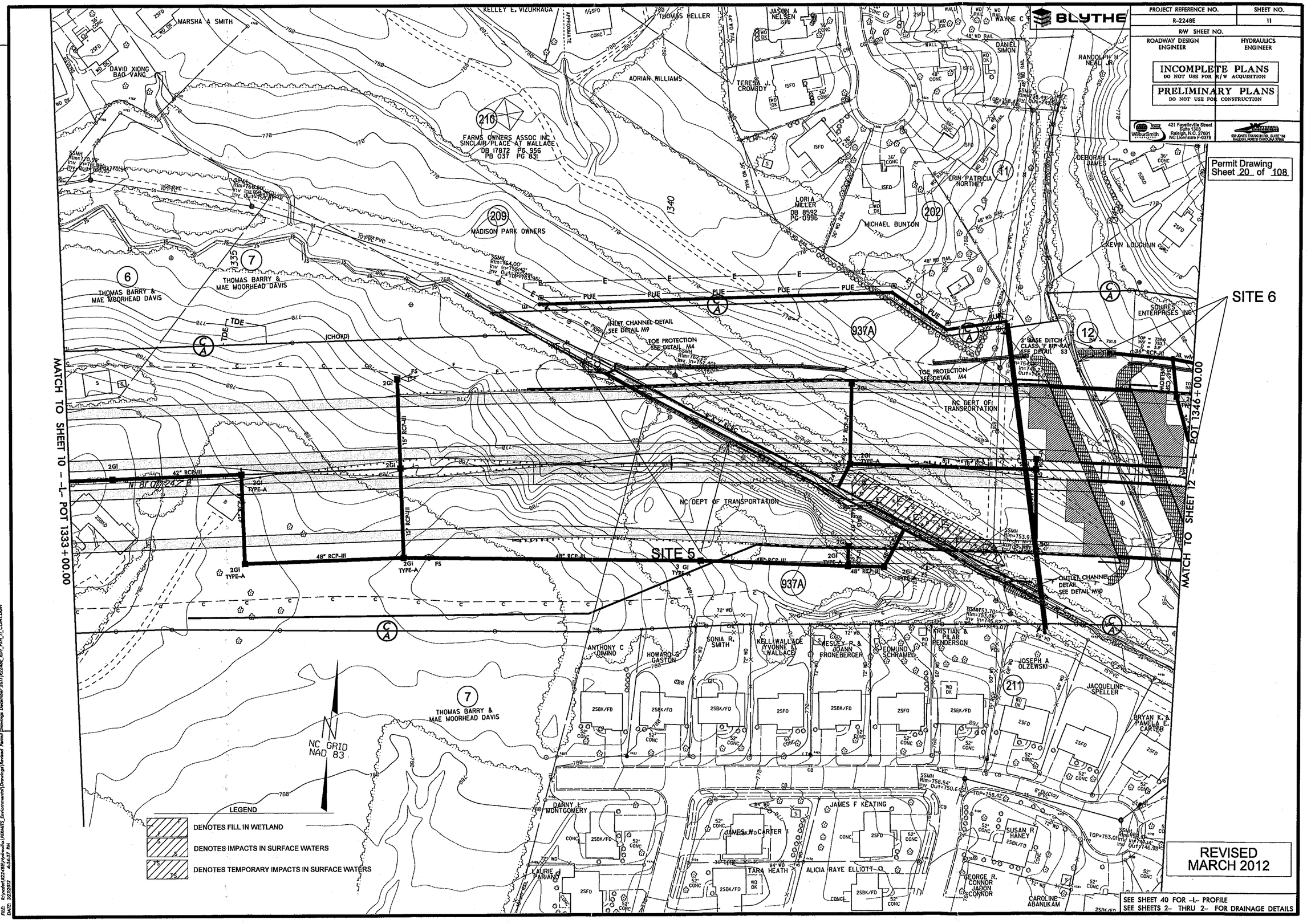
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

BLYTHE

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

KITCHELL
599 JONES FRANKLIN RD., SUITE 194
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 20 of 108



REVISED
MARCH 2012

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

REVISIONS

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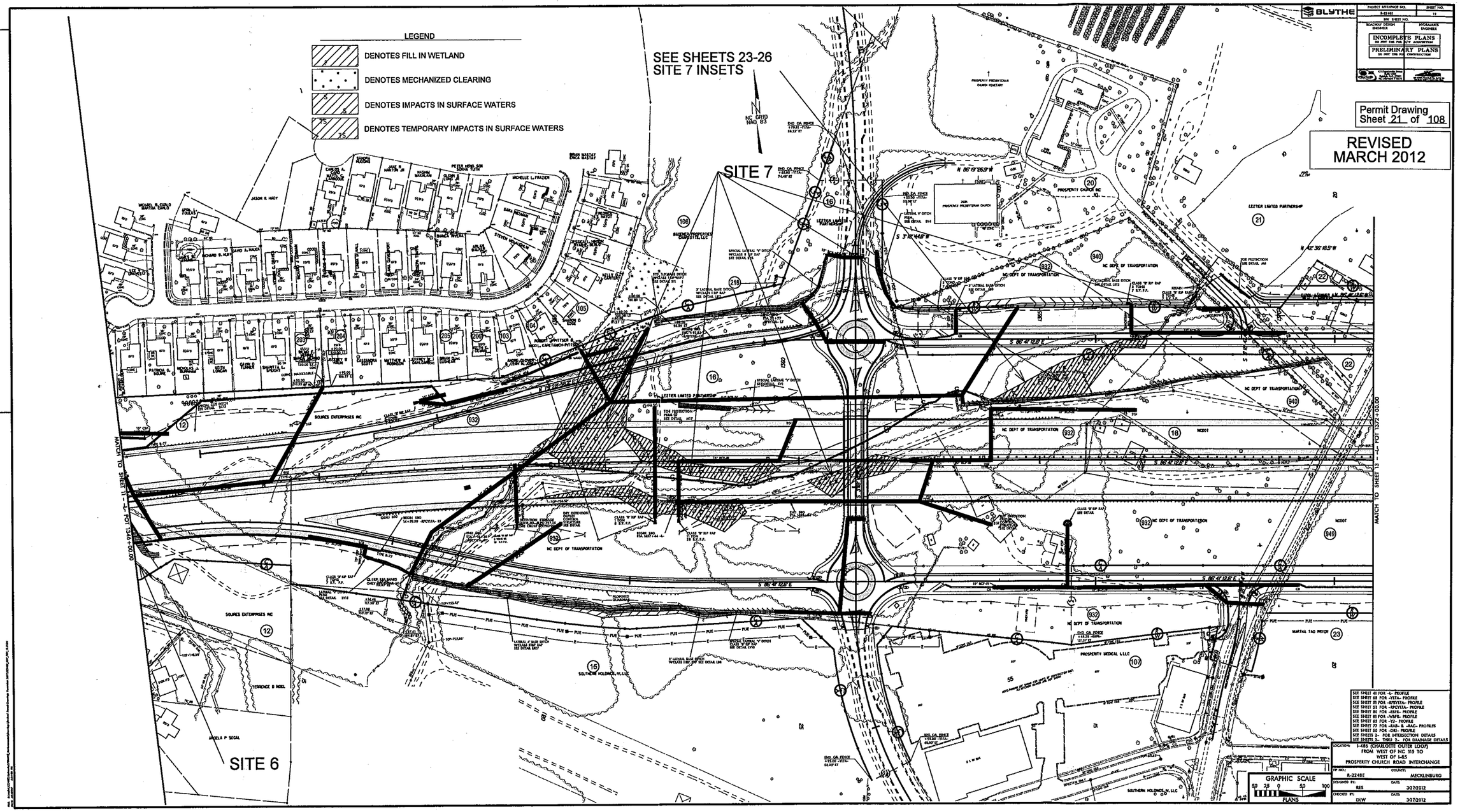
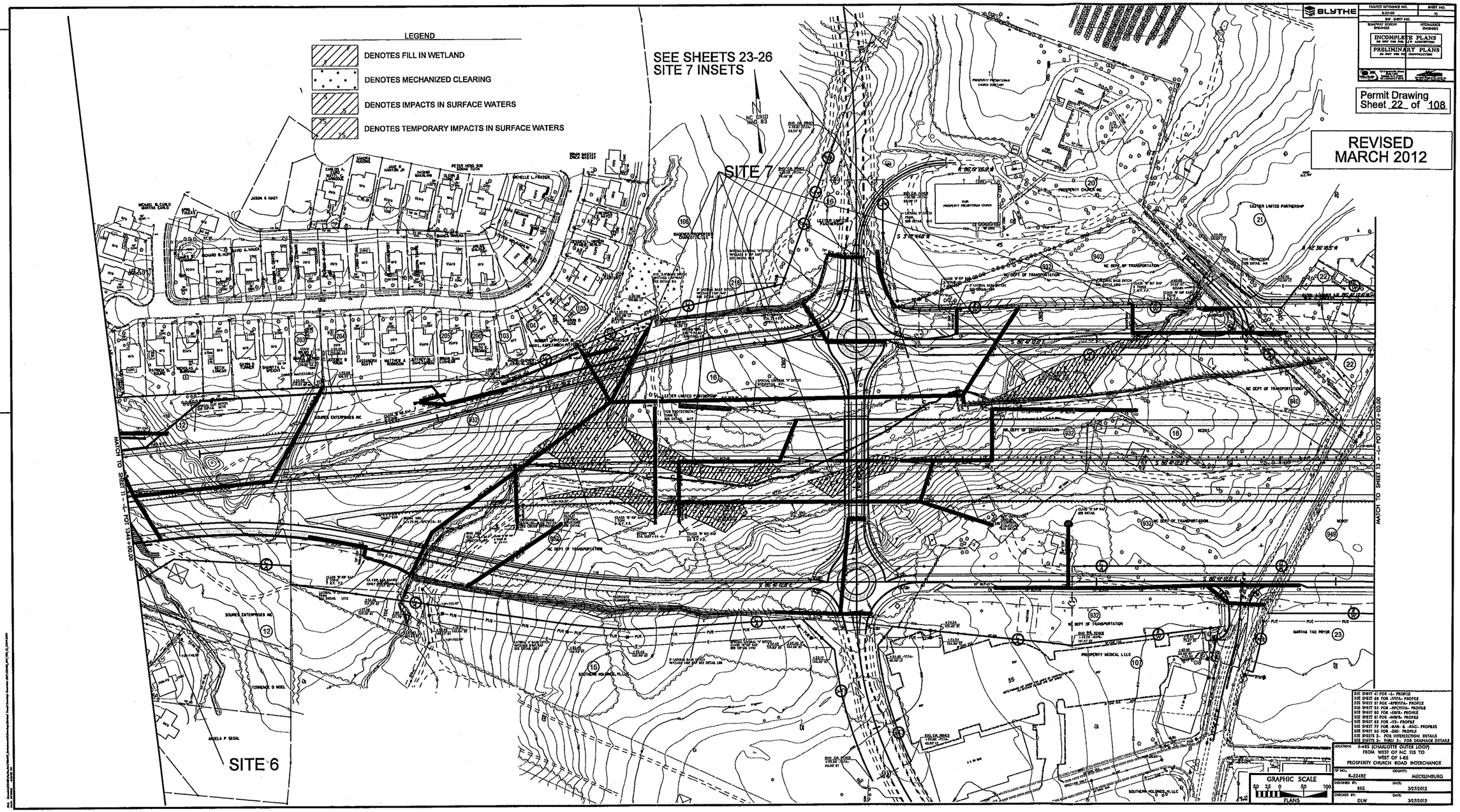
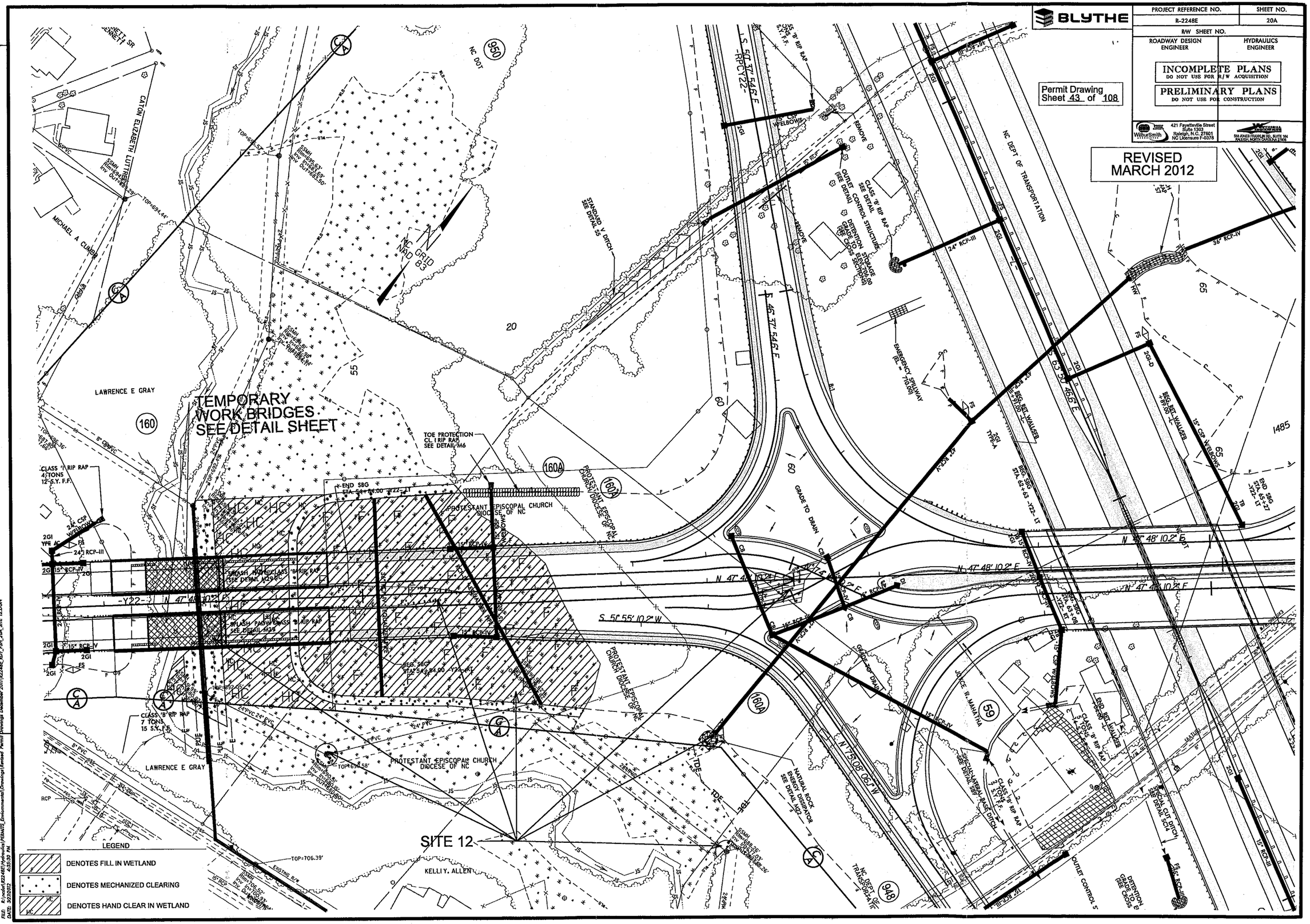

LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
SEE SHEETS 23-26
SITE 7 INSETS
NC GRID
NAD 83
SITE 7
SITE 6
MATCH TO SHEET 11 - -L- POT 1324+00.00
MATCH TO SHEET 13 - -L- POT 1372+00.00
NC DEPT OF TRANSPORTATION
PROSPERITY PRESBYTERIAN CHURCH
PROSPERITY CHURCH RD
LEETHER LIMITED PARTNERSHIP
SOURCE ENTERPRISES INC
SOUTHERN HOLDINGS, IV, LLC
PROSPERITY MEDICAL LLC
MARTHA TAO PRYOR
TERRENCE D NOEL
ANGELA P SEGAL
BLYTHE
INCOMPLETE PLANS
PRELIMINARY PLANS
Permit Drawing
Sheet 21 of 108
REVISED
MARCH 2012
SEE SHEET 41 FOR -L- PROFILE
SEE SHEET 68 FOR -Y17A- PROFILE
SEE SHEET 81 FOR -RPCY17A- PROFILE
SEE SHEET 83 FOR -RPCY17A- PROFILE
SEE SHEET 80 FOR -RAR- PROFILE
SEE SHEET 81 FOR -WMR- PROFILE
SEE SHEET 82 FOR -Y2- PROFILE
SEE SHEET 72 FOR -RAS- & -RAC- PROFILES
SEE SHEET 60 FOR -OR- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 3- THRU 3- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE
TIP NO.: B-2248E
COUNTY: MECKLENBURG
DESIGNED BY: BES
DATE: 3/27/2012
CHECKED BY: DLW
DATE: 3/27/2012
GRAPHIC SCALE
50 25 0 50 100
PLANS


LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES IMPACTS IN SURFACE WATERS
DENOTES TEMPORARY IMPACTS IN SURFACE WATERS
SEE SHEETS 23-26
SITE 7 INSETS
SITE 7
SITE 6
MATCH TO SHEET 11 - -L- POT 1324+00.00
MATCH TO SHEET 13 - -L- POT 1372+00.00
BLYTHE
INCOMPLETE PLANS
PRELIMINARY PLANS
Permit Drawing
Sheet 22 of 108
REVISED
MARCH 2012
SEE SHEET 41 FOR -L- PROFILE
SEE SHEET 69 FOR -Y17/A- PROFILE
SEE SHEET 51 FOR -RPY17/A- PROFILE
SEE SHEET 52 FOR -RPCY17/A- PROFILE
SEE SHEET 61 FOR -ESFR- PROFILE
SEE SHEET 61 FOR -WSFR- PROFILE
SEE SHEET 63 FOR -Y7- PROFILE
SEE SHEET 77 FOR -RAB- & -RAC- PROFILES
SEE SHEET 80 FOR -D81- PROFILE
SEE SHEETS 2- FOR INTERSECTION DETAILS
SEE SHEETS 3- THRU 3- FOR DRAINAGE DETAILS
LOCATION: I-485 (CHARLOTTE OUTER LOOP) FROM WEST OF NC 115 TO WEST OF I-85 PROSPERITY CHURCH ROAD INTERCHANGE
TIP NO.: I-2248E
COUNTY: MECKLENBURG
DESIGNED BY: RES
DATE: 3/27/2012
CHECKED BY: DLW
DATE: 3/27/2012
GRAPHIC SCALE
50 25 0 50 100
PLANS


BLYTHE
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
20A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378
Permit Drawing
Sheet 43 of 108
REVISED
MARCH 2012
TEMPORARY
WORK BRIDGES
SEE DETAIL SHEET
SITE 12
LAWRENCE E GRAY
CATON ELIZABETH LUTTRER
MICHAEL A CUMBR
NC DEPT OF TRANSPORTATION
PROTESTANT EPISCOPAL CHURCH
DIOCESE OF NC
KELLI Y. ALLEN
JOYCE W. MAHATHA
NC GRID
NAD 83
STANDARD V DITCH
SEE DETAIL S5
TOE PROTECTION
CL I RIP RAP
SEE DETAIL M6
CLASS 'B' RIP RAP
SEE DETAIL
OUTLET CONTROL STRUCTURE
(SEE DETAIL)
DETENTION STORAGE
GRADE TO ELEV.706.00
(SEE CROSS SECTIONS)
ENERGENCY SPILLWAY
(EL = 710.00)
GRADE TO DRAIN
NATURAL ROCK
ENERGY DISSIPATOR
SEE DETAIL M22
SPECIAL LATERAL BASE DITCH
SEE DETAIL S89
SPECIAL CUT DITCH
SEE DETAIL SC14
DETENTION
GRADE TO EL
(SEE CROSS
OUTLET CONTROL S
S 51° 55' 10.2" W
N 47° 48' 10.2" E
N 75° 08' 06.1" W
S 63° 50' 46.6" E
S 50° 37' 54.6" E
S 46° 37' 54.6" E
24" RCP-III
36" RCP-IV
15" RCP-IV
15" CSP WELBOWS
24" CSP WELBOWS
24" RCP-III
15" RCP-IV
15" RCP-III
TOP=706.39'
TOP=694.44'
LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEAR IN WETLAND
REVISIONS
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BLYTHE
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
20A
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378
Permit Drawing
Sheet 44 of 108
REVISED
MARCH 2012
TEMPORARY
WORK BRIDGES
SEE DETAIL SHEET
SITE 12
LAWRENCE E. GRAY
PROTESTANT EPISCOPAL CHURCH
DIOCESE OF NC
KELLI Y. ALLEN
NC DEPT OF TRANSPORTATION
NC GRID
NAD 83
LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
DENOTES HAND CLEAR IN WETLAND
REVISIONS

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

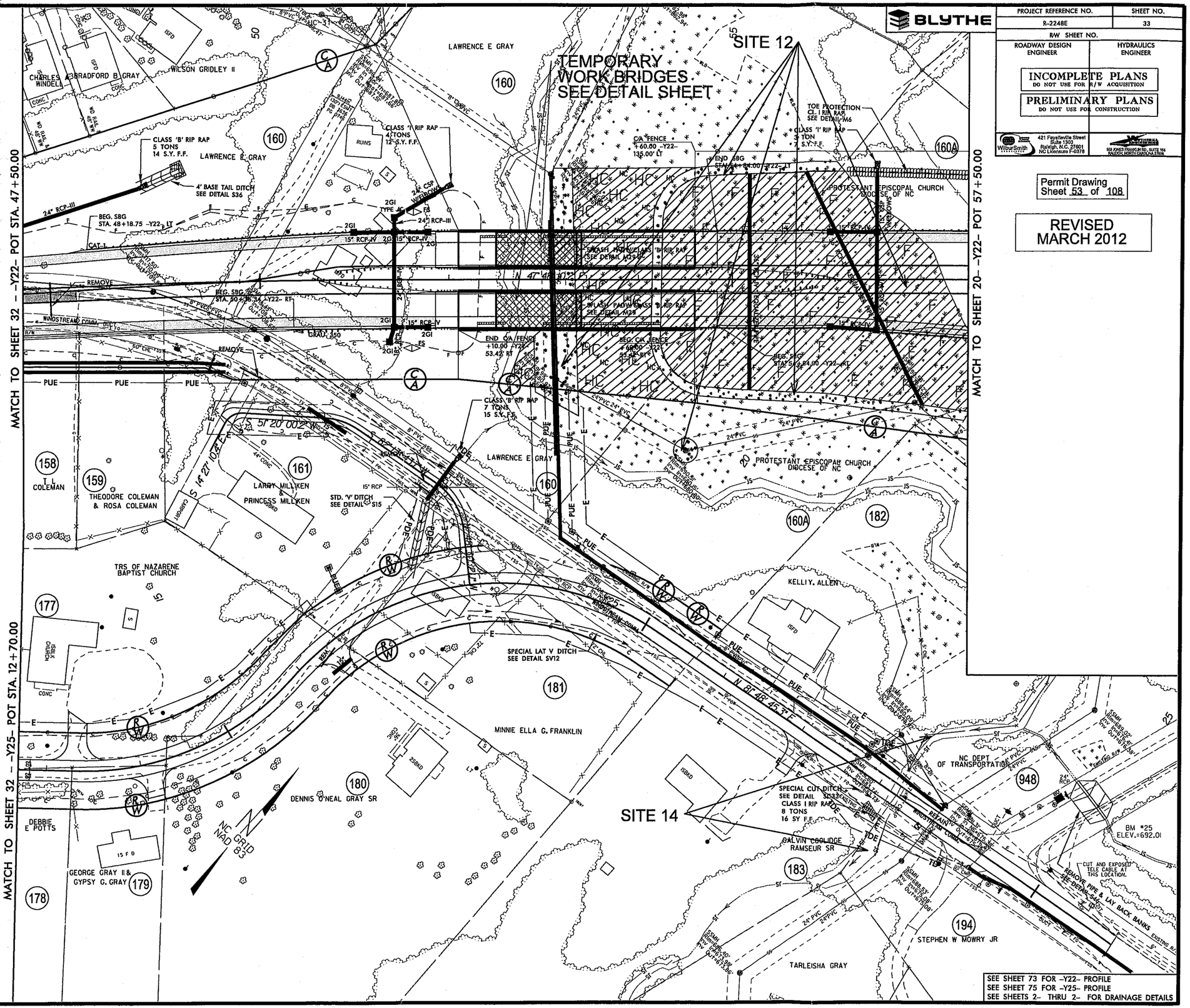
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

WINDELL ENGINEERING
503 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 53 of 108

REVISED
MARCH 2012



LEGEND

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

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

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

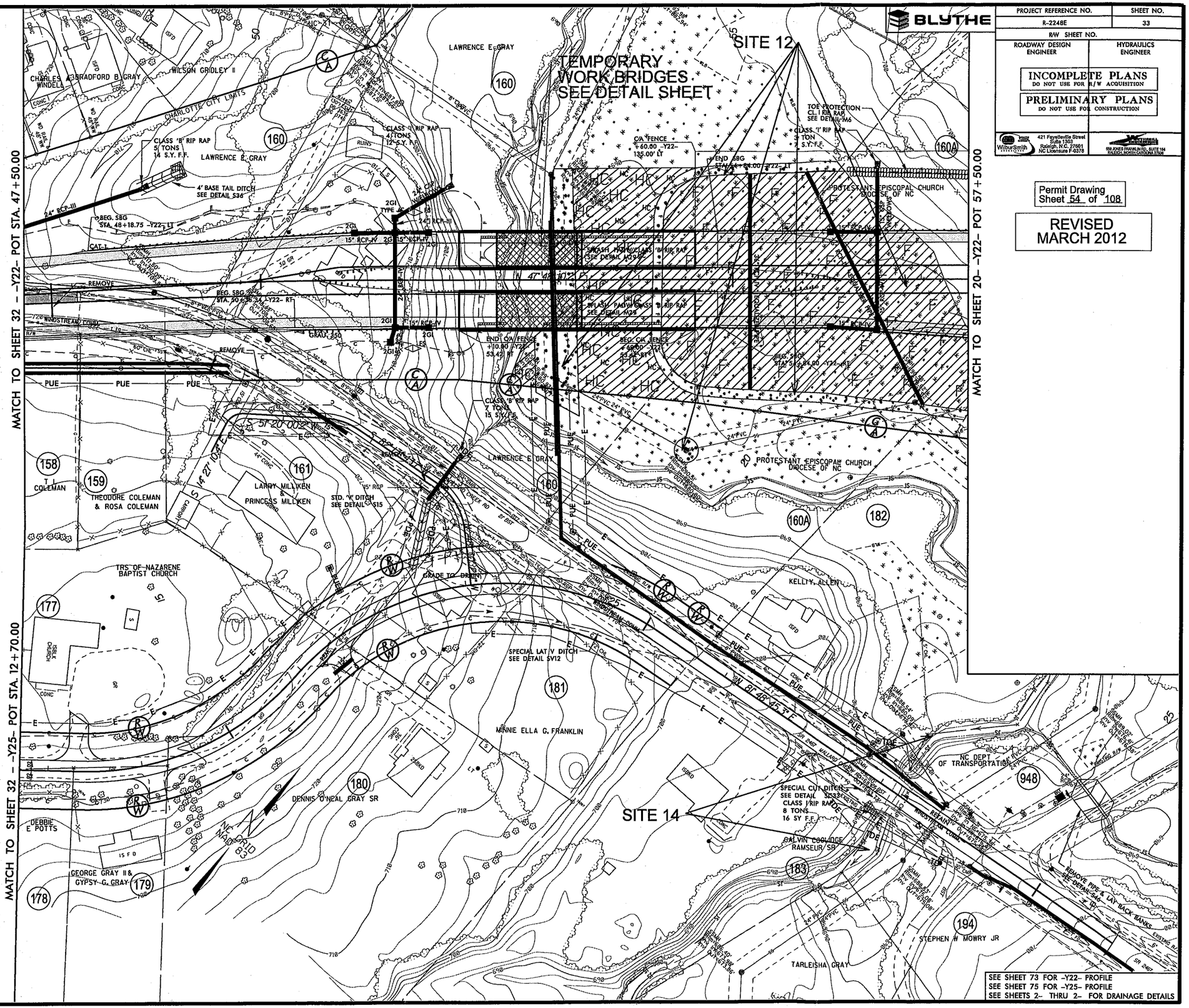
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

Permit Drawing
Sheet 54 of 108

REVISED
MARCH 2012

REVISIONS



LEGEND

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

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

FILE: R:\roadw\R2248E\Hydraulics\PERMITS_Environmental\Drawings\Revised Permit Drawings December 2011\R2248E_RDY_PSH_33_CONT.DGN
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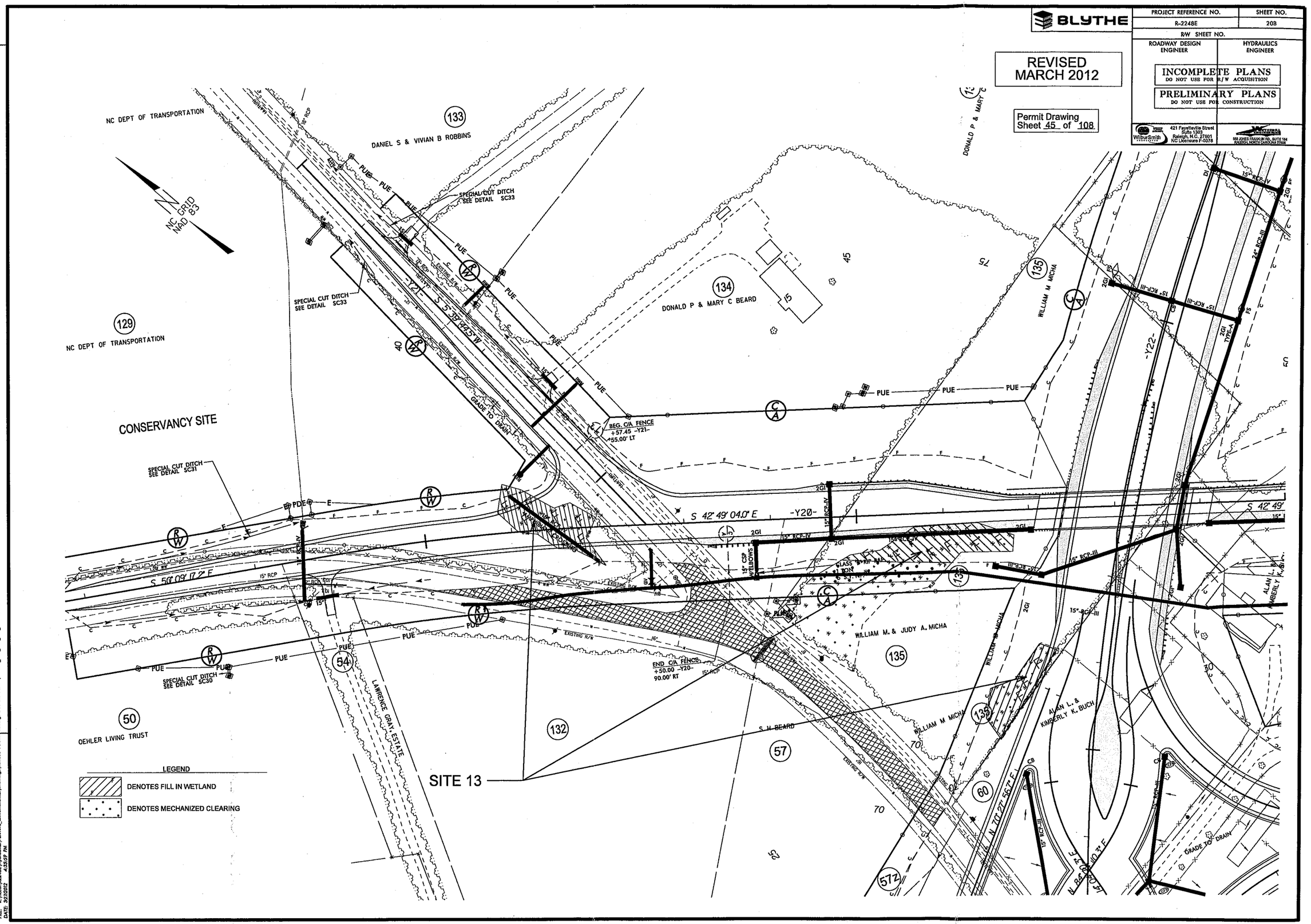

BLYTHE
PROJECT REFERENCE NO.
R-2248E
SHEET NO.
20B
R/W SHEET NO.
ROADWAY DESIGN ENGINEER
HYDRAULICS ENGINEER
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378
WilburSmith
REVISED
MARCH 2012
Permit Drawing
Sheet 45 of 108
NC DEPT OF TRANSPORTATION
DANIEL S & VIVIAN B ROBBINS
133
NC GRID
NAD 83
SPECIAL CUT DITCH
SEE DETAIL SC33
129
NC DEPT OF TRANSPORTATION
CONSERVANCY SITE
SPECIAL CUT DITCH
SEE DETAIL SC31
SPECIAL CUT DITCH
SEE DETAIL SC30
50
OEHLER LIVING TRUST
LAWRENCE GRAY ESTATE
54
132
SITE 13
57
S H BEARD
134
DONALD P & MARY C BEARD
135
WILLIAM M MICHA
WILLIAM M. & JUDY A. MICHA
ALAN L. & KIMBERLY K. BUCH
60
57z
DONALD P & MARY C
BEG. C/A FENCE
+57.45 -Y21-
55.00' LT
END C/A FENCE
+50.00 -Y20-
90.00' RT
S 42° 49' 04.0" E
-Y20-
S 50° 09' 17.2" E
-Y21-
S 5° 39' 44.5" W
GRADE TO DRAIN
15" RCP-IV
15" RCP-III
24" RCP-III
15" CSP WELBOWS
LEGEND
DENOTES FILL IN WETLAND
DENOTES MECHANIZED CLEARING
REVISIONS

BLYTHE

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

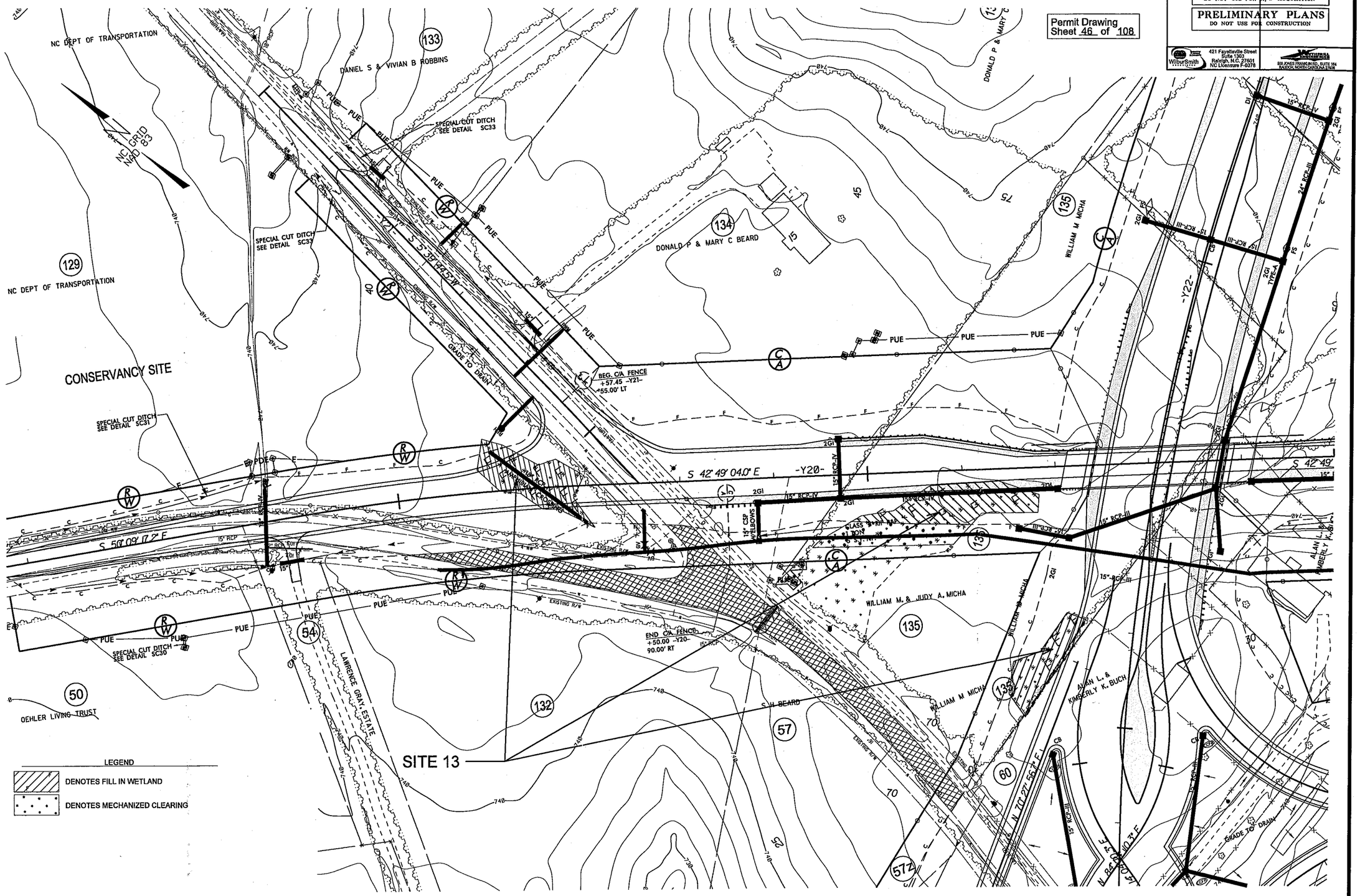
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

REVISED
MARCH 2012

Permit Drawing
Sheet 46 of 108



LEGEND

DENOTES FILL IN WETLAND

DENOTES MECHANIZED CLEARING

REVISIONS

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

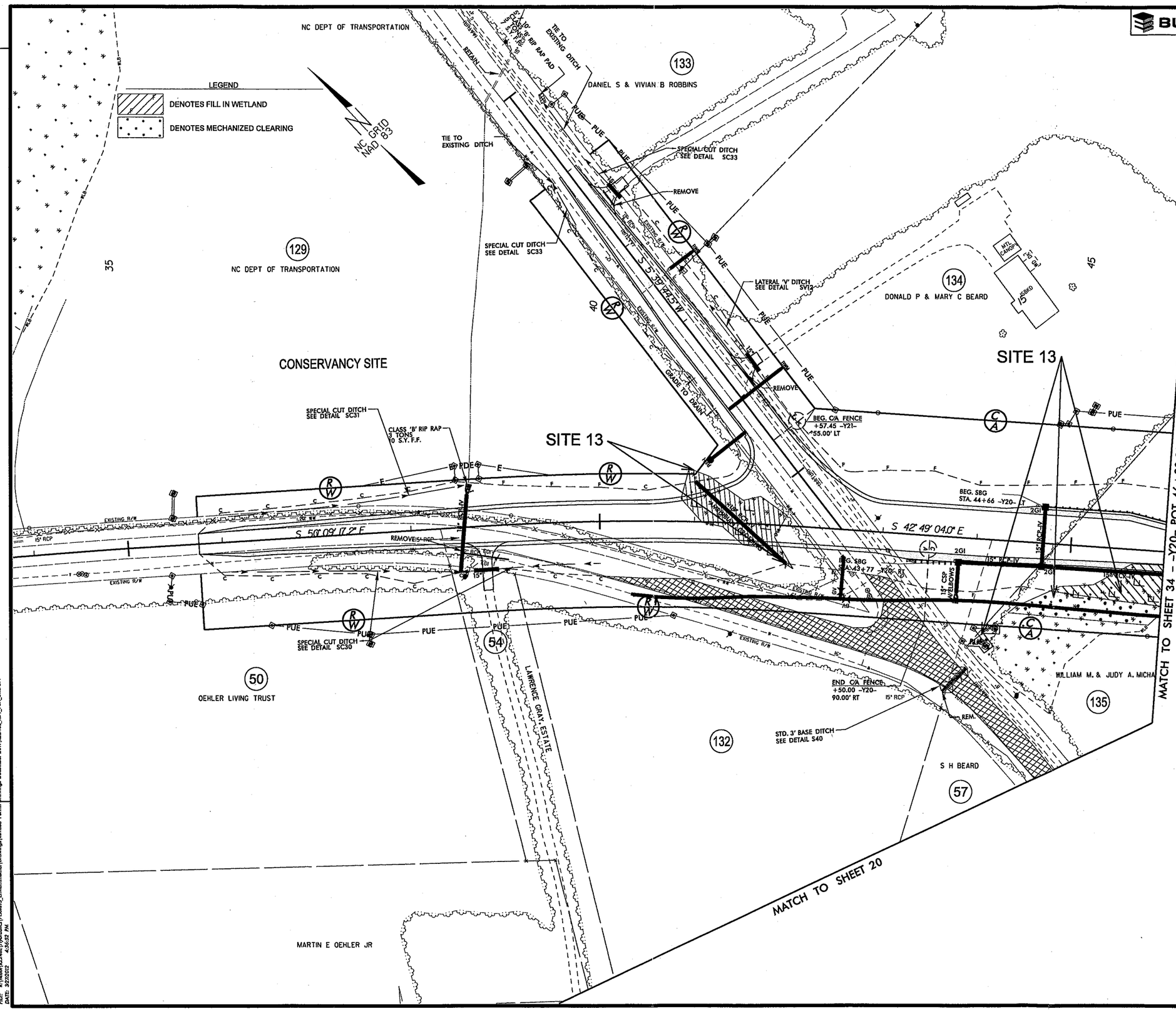
BLYTHE

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

KITTELLE CONSULTANTS, INC.
158 JONES FRANKLIN RD., SUITE 164
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 51 of 108

REVISED
MARCH 2012



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

REVISIONS

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BLYTHE

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

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

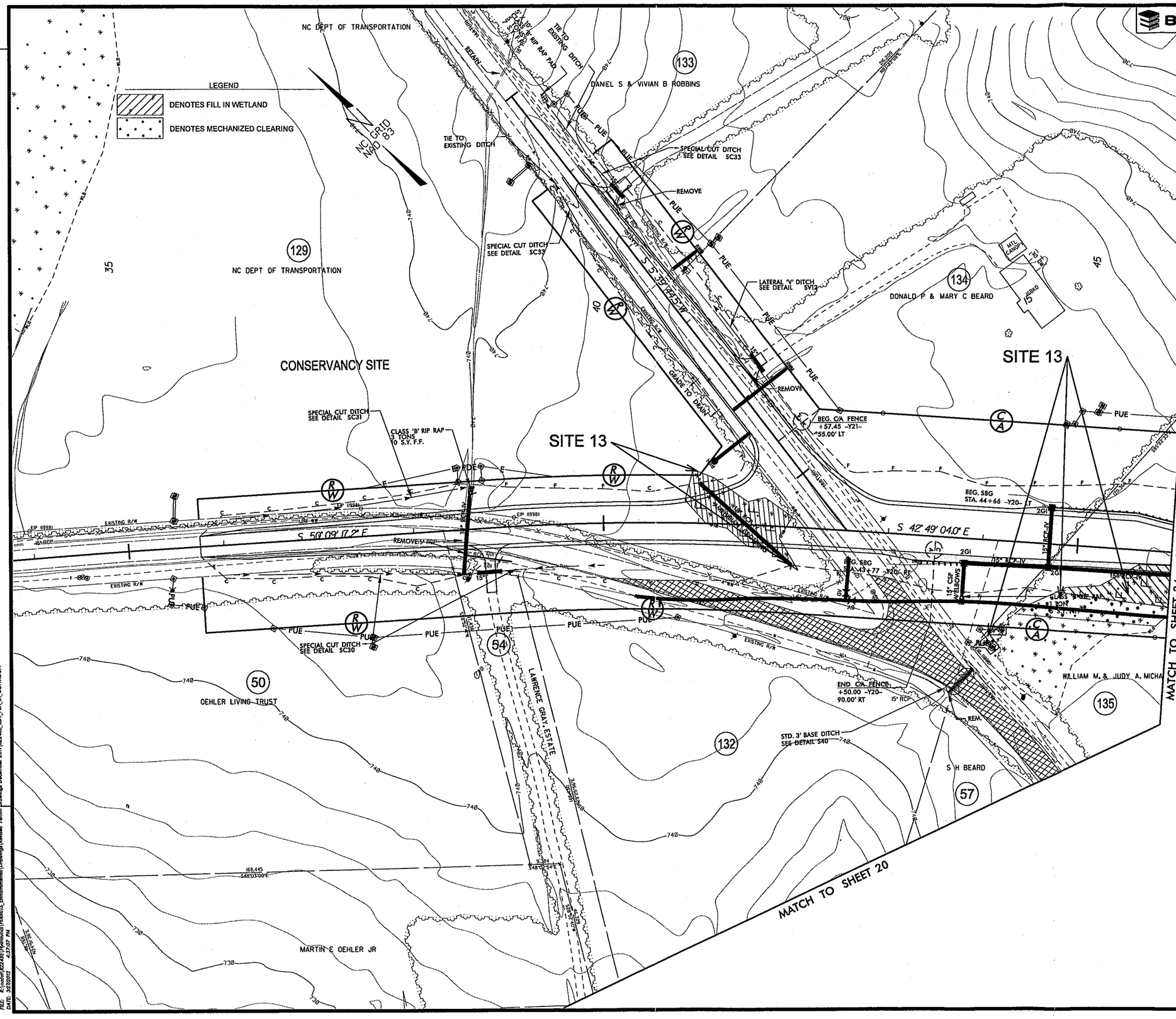
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

MATHEWS, RAYBURN, CLEMENTS, PLLC
500 JONES FRANKLIN RD., SUITE 154
RALEIGH, NORTH CAROLINA 27606

Permit Drawing
Sheet 52 of 108

REVISED
MARCH 2012



REVISIONS

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

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BLYTHE

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

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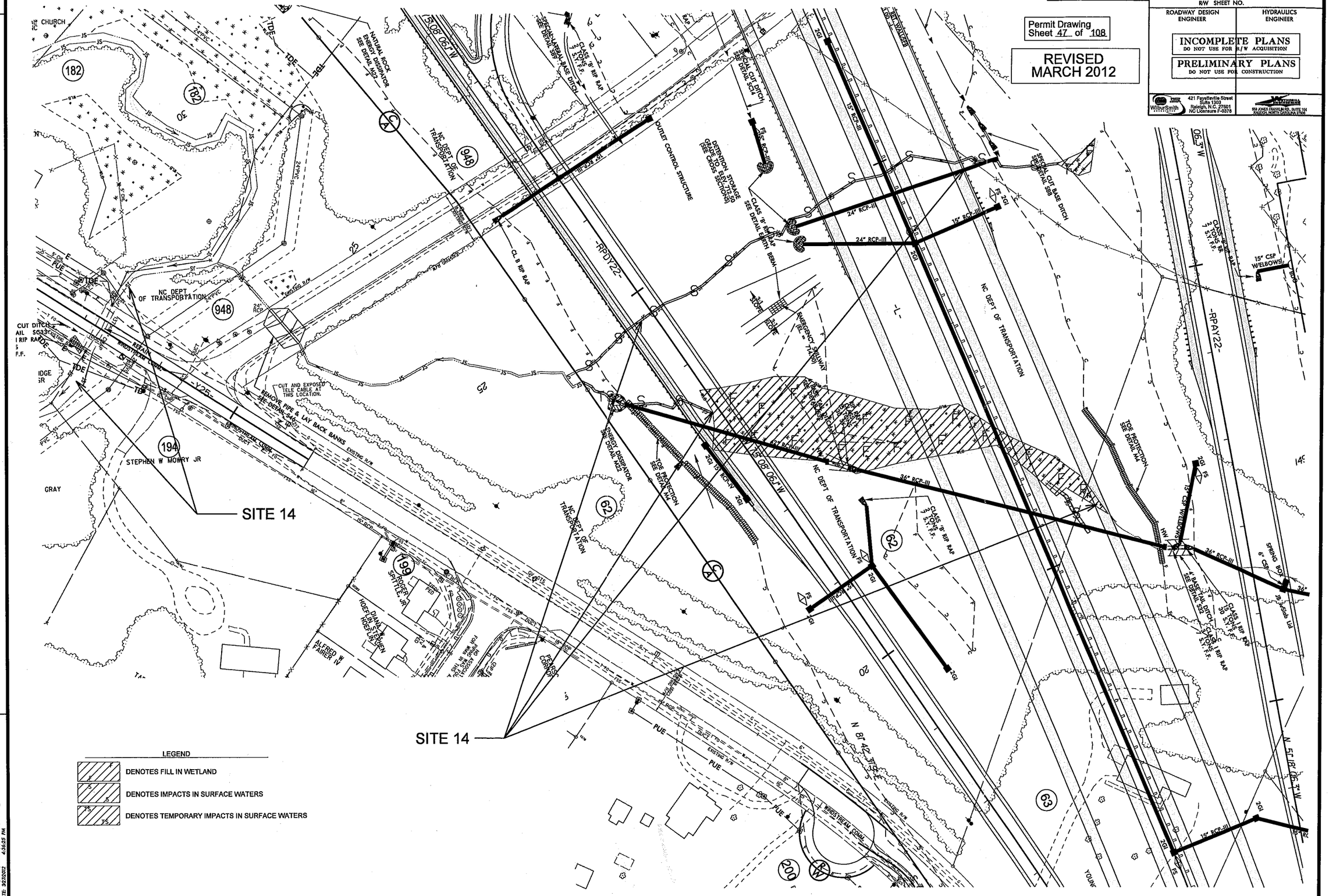
WilburSmith
421 Fayetteville Street
Suite 1303
Raleigh, N.C. 27601
NC Licensure F-0378

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



REVISIONS

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

INCOMPLETE PLANS
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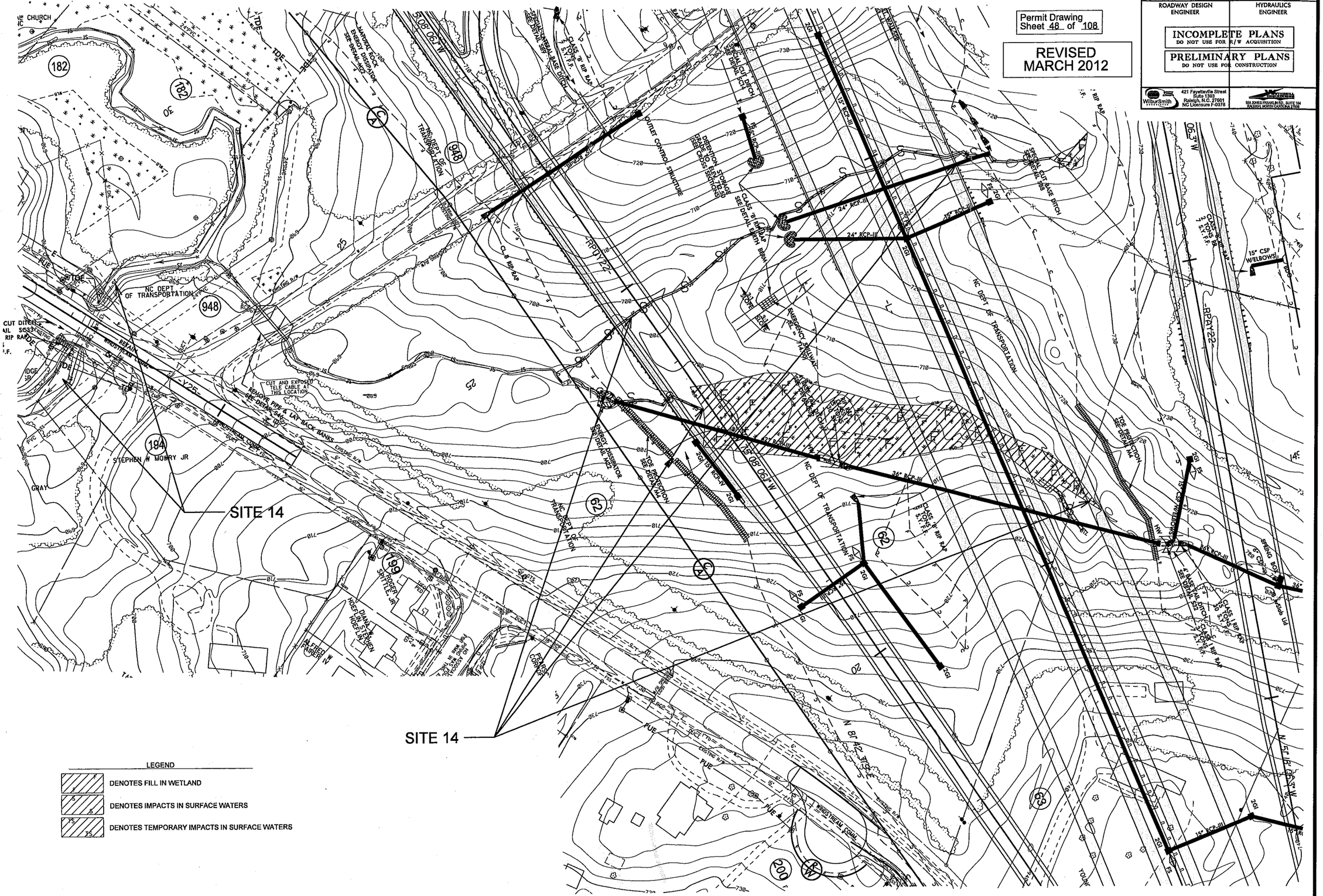
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

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

Permit Drawing
Sheet 48 of 108

REVISED
MARCH 2012



LEGEND

DENOTES FILL IN WETLAND

DENOTES IMPACTS IN SURFACE WATERS

DENOTES TEMPORARY IMPACTS IN SURFACE WATERS

REVISIONS

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BLYTHE

PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

INCOMPLETE PLANS
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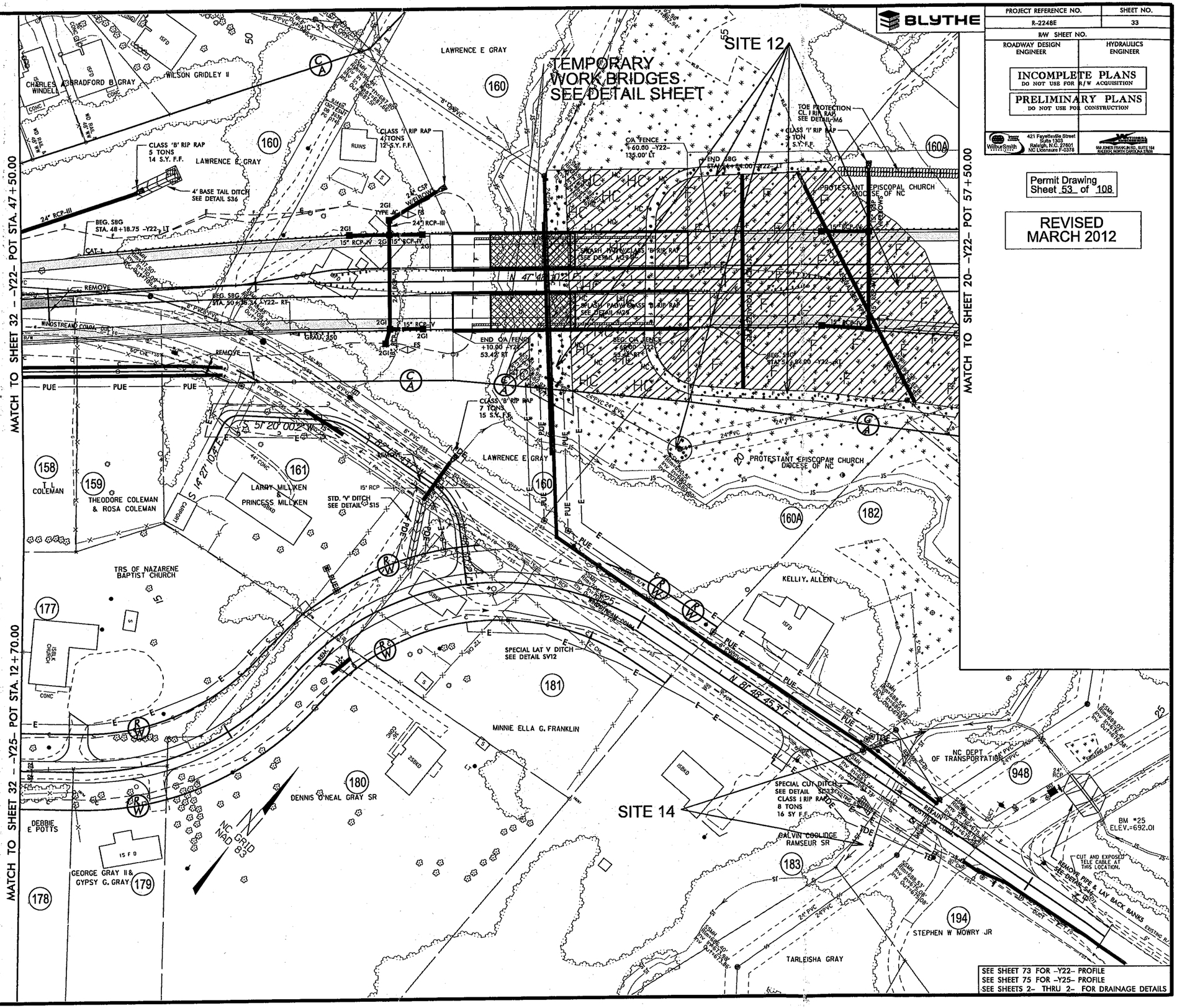
DO NOT USE FOR CONSTRUCTION

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

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

Permit Drawing
Sheet 53 of 108

REVISED
MARCH 2012



LEGEND

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

REVISIONS

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PROJECT REFERENCE NO.	SHEET NO.
R-2248E	33
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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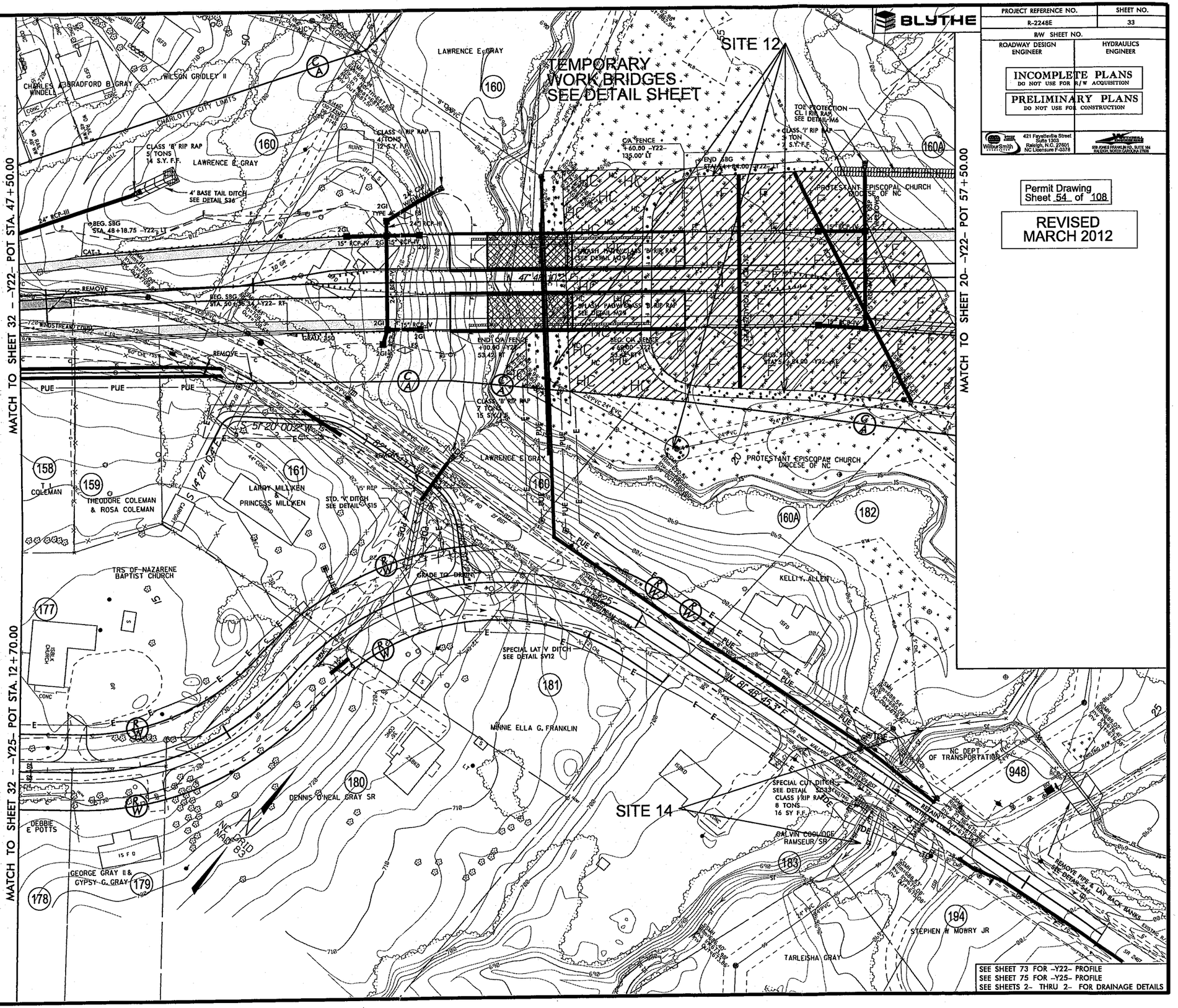
WilburSmith ASSOCIATES
421 Fayetteville Street
Suite 1300
Raleigh, N.C. 27601
NC Licensure F-0378

KIMLEY-HORN AND ASSOCIATES, INC.
4700 HOMEWOOD PARKWAY, SUITE 144
RALEIGH, NORTH CAROLINA 27609

Permit Drawing
Sheet 54 of 108

REVISED
MARCH 2012



LEGEND

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

REVISIONS

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