



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

November 1, 2010

MEMORANDUM TO: Mr. Jerry Jennings, PE
Division One Engineer

FROM: Philip S. Harris, III, P.E., Unit Head *E. L. Fuchs*
Natural Environment Unit
Project Development and Environmental Analysis Branch

SUBJECT: Camden County, Widening of US 158 from Elizabeth City to the
separation of US 158 and NC 24; T.I.P. Number R-2414; Federal Aid
Project No. STP-158(2); WBS Element No. 34430.1.1

Attached are the permit modifications for the U.S. Army Corps of Engineers Section 404 Permit, N.C. Division of Water Quality Section 401 Water Quality Certification, and Division of Coastal Management CAMA Permit for the above referenced project. All environmental permits have been received for the construction of this project.

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

PSH/mat

Attachment

Cc: W/attachment

Mr. Randy Garris, P.E. State Contract Officer
Mr. Clay Willis, Division Environmental Officer
Mr. Andy Blankenship, Roadside Environmental
W/O attachment
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Jay Bennett, P.E., Roadway Design
Mr. Art McMillan, P.E., Highway Design
Mr. Ron Hancock, P.E., State Roadway Const. Engineer
Mr. Mike Robinson, P.E., State Bridge Const. Engineer

Mr. Dewayne Sykes, P.E., Utilities
Mr. Mark Staley, Roadside Environmental
Mr. John F. Sullivan, FHWA
Ms. Beth Harmon, EEP
Ms. Michele James, PDEA
Dr. David Chang, P.E., Hydraulics
Mr. Tom Koch, P.E., Structure Design

PROJECT COMMITMENTS

R-2414

**Widening of US 158 from Elizabeth City to the
separation of US 158 and NC 34 in Camden County
W.B.S. No. 34430.1.1, Federal Aid Project No. STP-158(2)**

COMMITMENTS THAT APPLY TO R-2414 A & B

Commitments Developed Through Project Development and Design

Roadside Environmental Unit

NCDOT best management practices will be adhered to during construction to minimize negative environmental impacts.

This is a standard NCDOT practice.

Cleared areas will be revegetated as quickly as possible during construction.

This is a standard NCDOT practice.

Special attention will be given to proper installation and maintenance of all erosion and sedimentation control devices.

This is a standard NCDOT practice.

Division 1 Construction Unit

There will be an in-water work moratorium for anadromous for this project from February 15 to June 15.

This environmental commitment will be implemented during the construction phase of the project.

Neither waste sites nor borrow sites will be allowed in wetlands.

This environmental commitment will be implemented during the construction phase of the project.

To ensure all borrow and waste activities occur on high ground, NCDOT shall require its contractors and/or agents 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 shall be available to the Corps upon request.

This environmental commitment will be implemented during the construction phase of the project.

Commitments Developed During Project Permitting

Division 1 Construction Unit

CAMA Permit issued January 12, 2009 Condition No. 6

In accordance with commitments made in your application, mechanized clearing shall not be used for the purpose of clearing vegetation in relocating overhead power lines within jurisdictional wetlands.

NCDWQ Certification issued December 18, 2008, Condition No. 4

The placement of culverts and other structures in waters, streams, and wetlands shall be placed below the elevation of the streambed by one foot for all culverts with a diameter greater than 48 inches, and 20 percent of the culvert diameter for culverts having a diameter less than 48 inches, to allow low flow passage of water and aquatic life. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in dis-equilibrium of wetlands or streambeds or banks, adjacent to or upstream and down stream of the above structures. The applicant is required to provide evidence that the equilibrium is being maintained if requested in writing by DWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact the NC DWQ for guidance on how to proceed and to determine whether or not a modification to this certification will be required.

CAMA Permit issued January 12, 2009 Condition No. 3

All pipe and culvert bottoms shall be buried at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) as designated by the Coastal Area Management Act (CAMA). Culverts placed in wetlands are not subject to this burial requirement.

NCDWQ Certification issued December 18, 2008, Condition No. 6

The permittee will need to adhere to all appropriate in-water work moratoriums (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission, the US Fish and Wildlife Service, and National Marine Fisheries Service. No in-water work is permitted between February 15 and June 15 of any year, without prior approval from the NC Division of Water Quality and the NC Wildlife Resources Commission, and Division of Coastal Management. In addition, the permittee shall conform to the NCDOT policy entitled "Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times.

NCDWQ Certification issued December 18, 2008, Condition No. 11
No utilities shall be relocated into jurisdictional wetland areas.

NCDWQ Certification issued December 18, 2008, Condition No. 24
All fill slopes located in jurisdictional wetlands shall be placed at slopes no flatter than 3:1, unless otherwise authorized by this certification.

NCDWQ Certification issued December 18, 2008, Condition No. 26
The outside buffer, wetland or water boundary located within the construction corridor approved by this certification shall be clearly marked by highly visible fencing prior to any land disturbing activities. Impacts to areas within the fencing are prohibited unless otherwise authorized by this certification.

CAMA Permit issued January 12, 2009 Condition No. 6
In accordance with commitments made by the permittee, all clearing within wetlands shall be accomplished by hand clearing only. Any other method of clearing within wetlands shall require additional approval from the Division [of Coastal Management].
Modification to CAMA Permit, issued October 22, 2010, authorizes mechanized clearing necessary for the mass soil improvement activity.

CAMA Permit issued January 12, 2009 Condition No. 19
Construction or removal of the temporary construction sheeting is prohibited while the moratorium referenced in Condition No. 2 of the CAMA permit is in effect without prior approval of the Division [of Coastal Management], in consultation with WRC.

NCDWQ Certification issued December 18, 2008, Condition No. 9
All pile driving or drilling activities shall be enclosed in turbidity curtains unless otherwise approved by DWQ in this certification.

Natural Environment Unit

Compensatory mitigation for impacts to ~~4.36~~ ~~4.66~~ 4.70 acres of wetlands and ~~247~~ 246 linear feet of stream associated with the authorized project is required. The North Carolina Ecosystem Enhancement Program (EEP) has indicated in a letter dated ~~July 14, 2008~~ ~~May 25, 2010~~ ~~September 20, 2010~~ October 1, 2010, that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.

In accordance with the permit application, compensatory mitigation for permanent stream impacts associated with the authorized project also includes on-site mitigation

for 50 linear feet of stream impacts at the culvert-to-bridge replacement location at Site 11 within TIP No. R-2414A.

Natural Environment Unit and Roadside Environmental Unit

CAMA Permit issued January 12, 2009 Condition No. 24

Due to the possibility that compaction, mechanized clearing and/or other site alterations might prevent the temporary Coastal Wetland impact areas from re-attaining pre-project wetland functions, the permittee shall provide an annual update on the Coastal Wetland areas temporarily impacted by this project. This annual update shall consist of photographs and a brief written report on the progress of these temporarily impacted areas in re-attaining their pre-project wetland functions. Within three years after project completion, the permittee shall hold an agency field meeting with DCM to determine if the Coastal Wetland areas temporarily impacted by this project have re-attained pre-project wetland functions. If at the end of three years DCM determines that the Coastal Wetland areas temporarily impacted by the project have not re-attained pre-project wetland functions, DCM will determine whether compensatory wetland mitigation shall be required.

COMMITMENTS THAT APPLY TO R-2414 B

Commitments Developed Through Project Development and Design

Roadway Design Unit/ Division 1/ Right of Way Branch/ Human Environment Unit

NCDOT will avoid impacting the Sawyer Graveyard.

The Sawyer Graveyard will not be impacted during construction – construction limits have been placed adjacent to the graveyard. NCDOT will mark the graveyard prior to beginning construction activities with orange protective fencing.

In accordance with Environmental Commitments contained within the Finding of No Significant Impact and Programmatic Section 4(f) Evaluations dated 7/13/98, the permittee shall move the Creekmore Store to the rear of its property for mitigation purposes. The permittee shall coordinate with the State Historic Preservation Officer prior to construction so that measures are taken to preserve the historic character of the Creekmore Store. Project construction shall not commence for section B of the project until NCDOT has completed all the requirements and implemented the stipulations agreed to by NCDOT, State Historic Preservation Office (SHPO) and the Federal Highway Administration (FHWA).

Commitments Developed During Project Permitting

Division 1 Construction Unit

Modification to NCDWQ Certification issued October 20, 2010, Condition No. 5
Should any dry or uncured mixing agent come in contact with jurisdictional waters, the NCDWQ shall be notified as quickly as possible, but no later than 24 hours after first knowledge that contact has occurred. If such contact should occur, the NCDOT and its contractors shall cease work immediately and take appropriate actions to remediate the contact. Work shall not begin until the DWQ has been notified and the issue has been resolved to the NCDWQ's satisfaction.

Modification to NCDWQ Certification issued October 20, 2010, Condition No. 4
Any mixing agent to be used in the mass soil mixing process stored onsite shall be stored in upland areas away from jurisdictional waters. Additionally, some type of containment fence shall be installed and maintained around storage areas as to protect jurisdictional waters from receiving any potential contaminated runoff from the storage area.

Modification to CAMA Permit, issued October 22, 2010, Condition No. 4
In accordance with commitments made by the permittee, impervious dikes shall be installed to provide a complete barrier between the soil mixing activity and the surrounding aquatic resources abutting this activity.

Modification to CAMA Permit, issued October 22, 2010, Condition No. 5
Construction and removal* of the impervious dikes is prohibited while the moratorium referenced in Condition No. 2 of this permit modification is in effect, without prior approval of DCM, in consultation with WRC.

**DCM conveys its approval to remove the impervious dike during the in-water moratorium in accordance with the included e-mail found in the CAMA Permit from the N.C. Wildlife Resources Commission on 10/28/10 and NCDOT on 10/26/10.*

Modification to CAMA Permit, issued October 22, 2010, Condition No. 6
The impervious dikes shall be properly maintained and retained until the soil mixture is complete and all of the work area contained by the impervious dikes has been stabilized. The impervious dikes shall be removed in a manner that does not cause or create the potential for sedimentation and erosion into wetlands or Waters of the State.



IN REPLY REFER TO

**DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS**

Washington Regulatory Field Office
Post Office Box 1000
Washington, North Carolina 27889-1000

July 1, 2010

Regulatory Division

Action ID No. SAW-1994-02124

Dr. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
N.C. Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Reference the Department of the Army (DA) permit issued to you on February 5, 2009, to widen approximately 5.5 miles of US 158/NC34 (TIP R-2414 A & B) from an existing two lane facility to a multi-lane facility from just east of the Pasquotank River to the US 158/NC 34 split in Belcross, Camden County, North Carolina. Also reference your subsequent written request dated May 21, 2010, for a permit modification to place additional fill in jurisdictional wetlands at sites 8 and 10 of the A section of the project to correct roadway grade elevations that are failing due to steeper than 1:1 shoulder slopes. Additionally, for the B section of the project you propose to reduce impacts at site 3 because this site has been previously filled by a permit obtained by the current landowner.

The proposed modification will increase jurisdictional impacts at the A section of the project by filling an additional 0.55 acres wetlands and reduce impacts by 0.24 acres at the B section because wetland fill has been reduced from .3 acres to .1 acres and excavation of wetlands has been reduced from .09 acres to .05 acres.

This modification request was coordinated with the appropriate State and Federal agencies and the coordination revealed no objections to this modification request. Therefore, the permit is hereby modified in accordance with the specific work activities described above and in the enclosed plans. It is understood that all conditions of the original permit remain applicable and that the expiration date is unchanged. In addition, the permittee will comply with the following special permit conditions:

- a. All work authorized by this permit modification must be performed in strict compliance with the attached work plans, which are part of this permit. Any modification to the permit plans must be approved by USACE prior to implementation.

b. Special condition t. of the original permit referenced above is hereby modified as follows: Compensatory mitigation for the unavoidable impacts to 4.66 acres of riparian wetlands and 246 linear feet of stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated May 25, 2010, from William D. Gilmore, EEP Director. Pursuant to the Tri-Party Memorandum of Agreement (MOA) between the NC Department of Environment and Natural Resources, the NC Department of Transportation and the US Army Corps of Engineers executed on March 8, 2007, and in accordance with Section X of Amendment No. 2 to the MOA, the EEP will provide 9.32 acres of restoration equivalent riparian wetlands and 492 linear feet of restoration equivalent warm water stream channel in the Pasquotank River Basin (Hydrologic Cataloging Unit 03010205). For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

c. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit, and any authorized modifications. A copy of this permit, and any authorized modifications, including all conditions, shall be available at the project site during construction and maintenance of this project.

Any questions regarding this correspondence may be directed to Mr. Bill Biddlecome, NCDOT Coordinator/Regulatory Project Manager at the Washington Regulatory Field Office, telephone (910) 251-4558. The Wilmington District is committed to providing the highest level of support to the public. To help us ensure we continue to do so, please complete the Customer Satisfaction Survey located online at <http://per2.nwp.usace.army.mil/survey.html>.

Sincerely,



for
Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Attachment

Copies Furnished (without attachment):

Ms. Cathy Brittingham
Division of Coastal Management
1638 Mail Service Center
Raleigh, North Carolina 27699-1638

Mr. David Wainwright
Water Quality Section
North Carolina Division of Environment
and Natural Resources
1650 Mail Service Center
Raleigh, North Carolina 27699-1650

Mr. Jim Hoadley
Division of Coastal Management
1367 U.S. Highway 17 South
Elizabeth City, North Carolina 27909

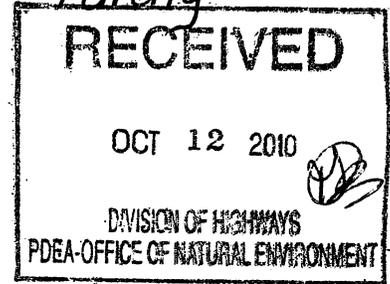


IN REPLY REFER TO

DEPARTMENT OF THE ARMY
WILMINGTON DISTRICT, CORPS OF ENGINEERS

Washington Regulatory Field Office
Post Office Box 1000
Washington, North Carolina 27889-1000

October 6, 2010



Regulatory Division

Action ID No. SAW-1994-02124

Dr. Gregory J. Thorpe, Ph.D.
Environmental Management Director, PDEA
N.C. Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina 27699-1548

Dear Dr. Thorpe:

Reference the Department of the Army (DA) permit issued to you on February 5, 2009, to widen approximately 5.5 miles of US 158/NC34 (TIP R-2414 A & B) from an existing two lane facility to a multi-lane facility from just east of the Pasquotank River to the US 158/NC 34 split in Belcross, Camden County, North Carolina. Also reference your subsequent written request dated October 1, 2010, for a permit modification to place additional fill in jurisdictional wetlands at sites 3, 6 and 7 of the B section of the project to prevent subsidence around the three culverts being installed at these sites.

The proposed modification will increase jurisdictional impacts at the B section of the project by filling an additional 0.04 acres of wetlands.

This modification request was coordinated with the appropriate State and Federal agencies and the coordination revealed no objections to this modification request. Therefore, the permit is hereby modified in accordance with the specific work activities described above and in the enclosed plans. It is understood that all conditions of the original permit remain applicable and that the expiration date is unchanged. In addition, the permittee will comply with the following special permit conditions:

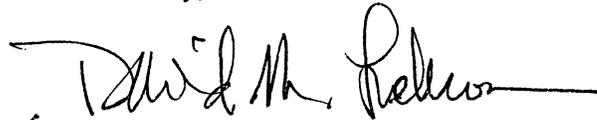
- a. All work authorized by this permit modification must be performed in strict compliance with the attached work plans, which are part of this permit. Any modification to the permit plans must be approved by USACE prior to implementation.
- b. Special condition t. of the original permit referenced above is hereby modified as follows: Compensatory mitigation for the unavoidable impacts to 4.7 acres of riparian wetlands and 246 linear feet of stream associated with the proposed project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated October 1, 2010, from William D.

Gilmore, EEP Director. Pursuant to the Tri-Party Memorandum of Agreement (MOA) between the NC Department of Environment and Natural Resources, the NC Department of Transportation and the US Army Corps of Engineers executed on March 8, 2007, and in accordance with Section X of Amendment No. 2 to the MOA, the EEP will provide 9.4 acres of restoration equivalent riparian wetlands and 492 linear feet of restoration equivalent warm water stream channel in the Pasquotank River Basin (Hydrologic Cataloging Unit 03010205). For wetlands, a minimum of 1:1 (impact to mitigation) must be in the form of wetland restoration. The NCDOT shall, within 30 days of the issue date of this permit, certify that sufficient funds have been provided to EEP to complete the required mitigation, pursuant to Paragraph V. of the MOA.

c. The permittee shall require its contractors and/or agents to comply with the terms and conditions of this permit in the construction and maintenance of this project, and shall provide each of its contractors and/or agents associated with the construction or maintenance of this project with a copy of this permit, and any authorized modifications. A copy of this permit, and any authorized modifications, including all conditions, shall be available at the project site during construction and maintenance of this project.

Any questions regarding this correspondence may be directed to Mr. Bill Biddlecome, NCDOT Coordinator/Regulatory Project Manager at the Washington Regulatory Field Office, telephone (910) 251-4558.

Sincerely,



 Jefferson M. Ryscavage
Colonel, U.S. Army
District Commander

Enclosure:

Copies Furnished (without enclosure):

Ms. Cathy Brittingham
Division of Coastal Management
1638 Mail Service Center
Raleigh, North Carolina 27699-1638

Mr. David Wainwright
Water Quality Section
North Carolina Division of Environment
and Natural Resources
1650 Mail Service Center
Raleigh, North Carolina 27699-1650

Mr. Steven Lane
N.C. Department of Environment and Natural Resources
Division of Coastal Management
400 Commerce Avenue
Morehead City, North Carolina 28557



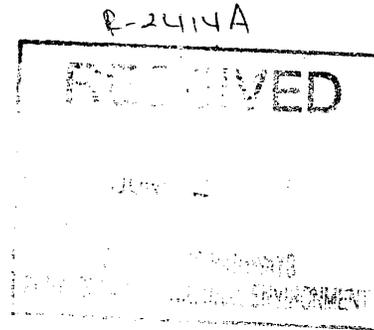
North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Beverly Eaves Perdue
Governor

Dee Freeman
Secretary

June 1, 2009



Dr. Greg Thorpe, PhD., Branch Manager
Project Development and Environmental Analysis Branch
North Carolina Department of Transportation
1598 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject: Correction to 401 Water Quality Certification for US 158/NC 34 from East of the Pasquotank River to the US 158/NC 34 split in Camden County, DWQ Project No. 20081602.
WQC No. 003774

Dear Dr. Thorpe:

This letter is in regards to the 401 Water Quality Certification (WQC) issued on December 18, 2008 for US 158/NC 34 in Camden County (DWQ Project No. 20081602). Condition 6 of the WQC issued on December 18, 2008 contains the following language:

“The permittee will need to adhere to all appropriate in-water work moratoriums (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission, the US Fish and Wildlife Service, and National Marine Fisheries Service. No in-water work is permitted between February 15 and June 15 of any year, without prior approval from the NC Division of Water Quality and the NC Wildlife Resources Commission. In addition, the permittee shall conform to the NCDOT policy entitled “Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times.”

This language is hereby corrected to read as follows:

“Except at permit Site 11, the permittee will need to adhere to all appropriate in-water work moratoriums (including the use of pile driving or vibration techniques) prescribed by the NC Wildlife Resources Commission, the US Fish and Wildlife Service, and National Marine Fisheries Service. No in-water work is permitted between February 15 and June 15 of any year, without prior approval from the NC Division of Water Quality and the NC Wildlife Resources Commission. At Site 11 the NCWRC has suggested, and the DWQ has agreed, that the necessary dewatering dikes required for construction at Site 11 may remain in place through this moratorium. These dikes shall not be placed, modified, or removed during the specified moratorium. In addition, the permittee shall conform to the NCDOT policy entitled “Stream Crossing Guidelines for Anadromous Fish Passage (May 12, 1997) at all times.”

Please attach a copy of this letter with any copies of the original Water Quality Certification. All other conditions written into the previous Water Quality Certification for this project dated December 18, 2008 still apply except where superceded by this correction. We are sorry for any inconvenience this may have caused. If you have any questions please contact David Wainwright at (919) 715-3415.

Sincerely,

Coleen H. Sullins,
Director

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: <http://h2o.enr.state.nc.us/ncwetlands/>

One
North Carolina
Naturally

cc: Bill Biddlecome, US Army Corps of Engineers, Washington Field Office
Jerry Jennings, PE, Acting Division 1 Engineer
Clay Willis, Division 1 Environmental Officer
Kathy Matthews, Environmental Protection Agency
Chris Militscher, Environmental Protection Agency
Travis Wilson, NC Wildlife Resources Commission
Gary Jordan, US Fish and Wildlife Service
Cathy Brittingham, Division of Coastal Management
Garcy Ward, DWQ Washington Regional Office
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North Carolina Department of Environment and Natural Resources

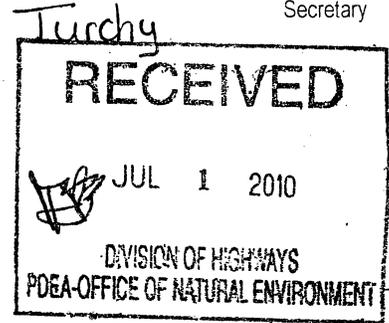
Division of Water Quality
Coleen H. Sullins
Director

Dee Freeman
Secretary

Beverly Eaves Perdue
Governor

June 28, 2010

Dr. Greg Thorpe, PhD., Manager
Planning and Environmental Branch
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548



Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS for Proposed improvements to US 158/NC 34 from East of the Pasquotank River to the US 158/NC 34 split in Camden County, Federal Aid Project No. STP-158(2), TIP R-2414A and R-2414B.
DWQ Project No. 20081602 v.2
WQC No. 003774

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 003774 issued to The North Carolina Department of Transportation dated December 18, 2008 and the corresponding correction issued June 1, 2009.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

for Coleen H. Sullins
Director

Attachments

- cc: Bill Biddlecome, US Army Corps of Engineers, Washington Field Office
- Jerry Jennings, PE, Division 1 Engineer
- Clay Willis, Division 1 Environmental Officer
- Chris Militscher, Environmental Protection Agency (electronic copy only)
- Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
- Cathy Brittingham, Division of Coastal Management
- Garcy Ward, DWQ Washington Regional Office
- File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd, Ste 250., Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: <http://h2o.enr.state.nc.us/ncwetlands/>

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Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with ADDITIONAL CONDITIONS

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (DWQ) Regulations in 15 NCAC 2H .0500. This certification authorized the NCDOT to impact 2.38 acres of jurisdictional wetlands (a net increase of 0.31 acres) in Camden County. This certification does not authorize any further impacts to streams other than those approved in the original certification dated December 18, 2008. The project shall be constructed pursuant to the modification dated received May 27, 2010. The authorized impacts are as described below:

Wetland Impacts in the Pasquotank River Basin

R-2414A

ORIGINAL IMPACTS APPROVED

Site	Station	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)*	Total Wetland Impact (ac)
1	7+00 -L-	0.01	0	0	0	0.19	0.20
2	10+75 -L- LT	0	0	0	0	0.07	0.07
3	12+30 -L- RT	0.01	0	0	0	0.18	0.19
4	13+80 - 14+63 -L-	0.03	0	0	0	0.34	0.37
5	15+60 - 15+75 -L- LT	0.01	0	0	0	0.07	0.08
6	16+62 - 18+17 -L- RT	0.02	0	0	0	2.00	2.02
7	16+79 - 23+30 -L- LT	0.12	0	0	0	0.54	0.66
8	20+16 - 43+00 -L- RT	1.46	0	0	0	1.96	3.42
9	24+50 - 25+12 -L- LT	0.01	0	0	0	0.04	0.05
10	25+90 - 42+90 -L- LT	0.18	0	0	0	4.08	4.26
11	43+10 -L-	0	0	0	0	0.01	0.01
TOTAL:		1.85	0.00	0.00	0.00	9.48	11.33

IMPACTS APPROVED WITH THIS MODIFICATION

Site	Station	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)*	Total Wetland Impact (ac)
1	7+00 -L-	0.01	0	0	0	0.19	0.20
2	10+75 -L- LT	0	0	0	0	0.07	0.07
3	12+30 -L- RT	0.01	0	0	0	0.18	0.19

4	13+80 - 14+63 -L-	0.03	0	0	0	0.34	0.37
5	15+60 - 15+75 -L- LT	0.01	0	0	0	0.07	0.08
6	16+62 - 18+17 -L- RT	0.02	0	0	0	2.00	2.02
7	16+79 - 23+30 -L- LT	0.12	0	0	0	0.54	0.66
8	20+16 - 43+00 -L- RT	1.90	0	0	0	1.52	3.42
9	24+50 - 25+12 -L- LT	0.01	0	0	0	0.04	0.05
10	25+90 - 42+90 -L- LT	0.29	0	0	0	3.97	4.26
11	43+10 -L-	0	0	0	0	0.01	0.01
TOTAL:		2.40	0.00	0.00	0.00	8.93	11.33
DIFFERENCE:		+0.55	0.00	0.00	0.00	-0.55	0.00

R-2414B

ORIGINAL IMPACTS APPROVED

Site	Station	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)*	Total Wetland Impact (ac)
1	-L- 47+82 LT/47+94 RT	0	0	0	0	0.01	0.01
2	-L- 51+60/51+95 RT	0.09	0	0	0	0.05	0.14
3	-L- 55+12 LT/56+49 RT	0.65	0	0	0	0.26	0.91
3	-L- 57+44/59+44 RT	0.30	0	0.09	0	0	0.39
4	-L- 62+65 LT/62+94 RT	0.06	0	0	0	0.04	0.10
5	-L- 67+19 LT/67+70 RT	0.08	0	0	0	0.06	0.14
6	-L- 72+48 LT/74+48 RT	0.85	0	0.01	0	0.37	1.23
7	-L- 88+60/89+28 LT	0.38	0	0	0	0.16	0.54
TOTAL:		2.41	0.00	0.10	0.00	0.95	3.46

IMPACTS APPROVED WITH THIS MODIFICATION

Site	Station	Fill (ac)	Fill (temporary) (ac)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing (ac)*	Total Wetland Impact (ac)
1	-L- 47+82 LT/47+94 RT	0	0	0	0	0.01	0.01
2	-L- 51+60/51+95 RT	0.09	0	0	0	0.05	0.14
3	-L- 55+12 LT/56+49 RT	0.65	0	0	0	0.26	0.91
3	-L- 57+44/59+44 RT	0.10	0	0.05	0	0	0.15
4	-L- 62+65 LT/62+94 RT	0.06	0	0	0	0.04	0.1
5	-L- 67+19 LT/67+70 RT	0.08	0	0	0	0.06	0.14
6	-L- 72+48 LT/74+48 RT	0.85	0	0.01	0	0.37	1.23
7	-L- 88+60/89+28 LT	0.38	0	0	0	0.16	0.54
TOTAL:		2.21	0.00	0.06	0.00	0.95	3.22

DIFFERENCE:		-0.20	0.00	-0.04	0.00	0.00	-0.24
TOTAL PERMITTED IMPACTS FOR PROJECT							
TOTAL FOR R-2414A:		2.40	0.00	0.00	0.00	8.93	11.33
TOTAL FOR R-2414B:		2.21	0.00	0.06	0.00	0.95	3.22
PROJECT TOTAL:		4.61	0.00	0.06	0.00	9.88	14.55

* Totals include areas to be hand cleared for utility relocations

Total Wetland Impact for Project: 14.55 acres.

Additional Impacts Requiring Mitigation: 0.31 acres

The application provides adequate assurance that the discharge of fill material into the waters of the Pasquotank River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received May 27, 2010. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated December 18, 2008, as well as the correction letter dated June 1, 2009, still apply except where superceded by this certification. Should your project change, you are required to notify the DWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

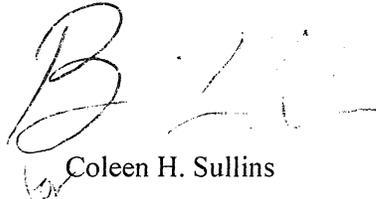
1. All other conditions written into previous Water Quality Certifications issued December 18, 2008 and the correction letter dated June 1, 2009 for this project still apply.
2. Compensatory mitigation for impacts to 0.31 acres riparian wetlands is required. We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated May 25, 2010 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 28th day of June 2010

DIVISION OF WATER QUALITY



Coleen H. Sullins

WQC No. 003774
Director



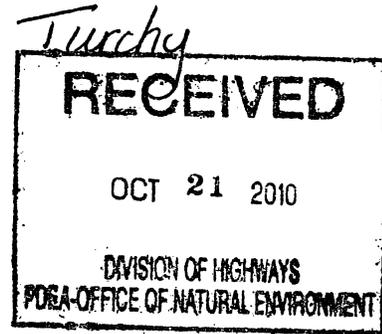
North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
Director

Dee Freeman
Secretary

Beverly Eaves Perdue
Governor

October 20, 2010



Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548

Subject: Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water with ADDITIONAL CONDITIONS for Proposed improvements to US 158/NC 34 from East of the Pasquotank River to the US 158/NC 34 split in Camden County, Federal Aid Project No. STP-158(2), TIP R-2414A and R-2414B.
DWQ Project No. 20081602 v.3
WQC No. 003774

Dear Dr. Thorpe:

Attached hereto is a modification of Certification No. 003774 issued to The North Carolina Department of Transportation (NCDOT) dated December 18, 2008.

If we can be of further assistance, do not hesitate to contact us.

Sincerely,

For Coleen H. Sullins
Director

Attachments

- cc: Bill Biddlecome, US Army Corps of Engineers, Washington Field Office
- Jerry Jennings, PE, Acting Division 1 Engineer
- Clay Willis, Division 1 Environmental Officer
- Chris Militscher, Environmental Protection Agency
- Travis Wilson, NC Wildlife Resources Commission (electronic copy only)
- Cathy Brittingham, Division of Coastal Management
- Garcy Ward, DWQ, Washington Regional Office
- File Copy

Transportation Permitting Unit
1650 Mail Service Center, Raleigh, North Carolina 27699-1650
Location: 2321 Crabtree Blvd. Suite 250, Raleigh, North Carolina 27604
Phone: 919-733-1786 \ FAX: 919-733-6893
Internet: <http://h2o.enr.state.nc.us/ncwellands/>



**Modification to the 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act
with ADDITIONAL CONDITIONS**

THIS CERTIFICATION is issued in conformity with the requirements of Section 401 Public Laws 92-500 and 95-217 of the United States and subject to the North Carolina Division of Water Quality (NCDWQ) Regulations in 15 NCAC 2H .0500. This certification authorizes the NCDOT to convert 0.04 acres of previously approved hand clearing impacts to 0.04 acres of mechanized clearing (for a project total of 14.55 acres) in Camden County. The project shall be constructed pursuant to the modification dated received October 7, 2010. **This certification does not allow any additional impacts to jurisdictional streams.** The authorized impacts are as described below:

Wetland Impacts in the Pasquotank River Basin

Site	Fill (ac)	Fill (temporary)	Excavation (ac)	Mechanized Clearing (ac)	Hand Clearing	Total Wetland Impact (ac)
INITIAL IMPACTS APPROVED FOR R-2414A						
TOTAL:	1.85	0.00	0.00	0.00	9.48	11.33
INITIAL IMPACTS APPROVED FOR R-2414B						
TOTAL:	2.41	0.00	0.10	0.00	0.95	3.46
ADDITIONAL IMPACTS APPROVED JUNE 28, 2010 FOR R-2414A						
TOTAL:	0.55	0.00	0.00	0.00	-0.55	0.00
ADDITIONAL IMPACTS APPROVED JUNE 28, 2010 FOR R-2414B						
TOTAL:	-0.20	0.00	-0.04	0.00	0.00	-0.24
TOTAL IMPACTS APPROVED PRIOR TO THIS CERTIFICATION						
TOTAL:	4.61	0.00	0.06	0.00	9.88	14.55
IMPACTS APPROVED WITH THIS CERTIFICATION R-2414A						
TOTAL:	0.00	0.00	0.00	0.00	0.00	0.00
IMPACTS APPROVED WITH THIS CERTIFICATION R-2414B						
Site 3	0.01	0	0	0	-0.01	0
Site 6	0.02	0	0	0	-0.02	0
Site 7	0.01	0	0	0	-0.01	0
TOTAL:	0.04	0.00	0.00	0.00	-0.04	0.00
TOTAL IMPACTS APPROVED FOR PROJECT						
TOTAL:	4.65	0.00	0.06	0.00	9.84	14.55

Total Wetland Impact for Project: 14.55 acres.

The application provides adequate assurance that the discharge of fill material into the waters of the Pasquotank River Basin in conjunction with the proposed development will not result in a violation of applicable Water Quality Standards and discharge guidelines. Therefore, the State of North Carolina certifies that this activity will not violate the applicable portions of Sections 301, 302, 303, 306, 307 of PL 92-500 and PL 95-217 if conducted in accordance with the application and conditions hereinafter set forth.

This approval is only valid for the purpose and design that you submitted in your modified application dated received October 14, 2010. All the authorized activities and conditions of certification associated with the original Water Quality Certification dated December 18, 2008 as well as the clarification letter dated June 1, 2009 still apply except where superseded by this certification. Should your project change, you are required to notify NCDWQ and submit a new application. If the property is sold, the new owner must be given a copy of this Certification and approval letter, and is thereby responsible for complying with all the conditions. If any additional wetland impacts, or stream impacts, for this project (now or in the future) exceed one acre or 150 linear feet, respectively, additional compensatory mitigation may be required as described in 15A NCAC 2H .0506 (h) (6) and (7). For this approval to remain valid, you are required to comply with all the conditions listed below. In addition, you should obtain all other federal, state or local permits before proceeding with your project including (but not limited to) Sediment and Erosion control, Coastal Stormwater, Non-discharge and Water Supply watershed regulations. This Certification shall expire on the same day as the expiration date of the corresponding Corps of Engineers Permit.

Condition(s) of Certification:

1. All other conditions written into the previous Water Quality Certification dated December 18, 2008 and the correction letter dated June 1, 2009 for this project still apply.
2. This modification is applicable only to the additional proposed activities. All of the authorized activities and conditions of certification associated with the original Water Quality Certification dated December 18, 2008 and subsequent modifications still apply except where superceded by this certification.
3. Compensatory mitigation for impacts to an additional 0.04 acres riverine wetlands is required (a project total of 4.71 acres). We understand that you have chosen to perform compensatory mitigation for impacts to wetlands through the North Carolina Ecosystem Enhancement Program (EEP), and that the EEP has agreed to implement the mitigation for the project. EEP has indicated in a letter dated October 1, 2010 that they will assume responsibility for satisfying the federal Clean Water Act compensatory mitigation requirements for the above-referenced project, in accordance with the Tri-Party MOA signed on July 22, 2003 and the Dual-Party MOA signed on April 12, 2004.
4. Any mixing agent to be used in the mass soil mixing process stored onsite shall be stored in upland areas away from jurisdictional waters. Additionally, some type of containment fence shall be installed and maintained around storage areas as to protect jurisdictional waters from receiving any potential contaminated runoff from the storage area.
5. Should any dry or uncured mixing agent come in contact with jurisdictional waters, the NCDWQ shall be notified as quickly as possible, but no later than 24 hours after first knowledge that contact has occurred. If such contact should occur, the NCDOT and its contractors shall cease work immediately and take appropriate actions to remediate the contact. Work shall not begin again until the DWQ has been notified and the issue has been resolved to the NCDWQ's satisfaction.
6. The NCDOT and its contractors shall construct and properly install protective sheet piles and slope stabilization measures as appropriate. The measures shall be designed, installed, and maintained such that uncured mixed soil will not come in contact with surface waters.

Violations of any condition herein set forth may result in revocation of this Certification and may result in criminal and/or civil penalties. This Certification shall become null and void unless the above conditions are made conditions of the Federal 404 and/or Coastal Area Management Act Permit. This Certification shall expire upon the expiration of the 404 or CAMA permit.

If this Certification is unacceptable to you have the right to an adjudicatory hearing upon written request within sixty (60) days following receipt of this Certification. This request must be in the form of a written petition conforming to Chapter 150B of the North Carolina General Statutes and filed with the Office of Administrative Hearings, 6714 Mail Service Center, Raleigh, N.C. 27699-6714. If modifications are made to an original Certification, you have the right to an adjudicatory hearing on the modifications upon written request within sixty (60) days following receipt of the Certification. Unless such demands are made, this Certification shall be final and binding.

This the 20th day of October 2010

DIVISION OF WATER QUALITY


Coleen H. Sullins
Director

Permit Class
MODIFICATION/MINOR

Permit Number
03-09

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

Major Development in an Area of Environmental Concern
pursuant to NCGS 113A-118

Excavation and/or filling pursuant to NCGS 113-229

Issued to N.C. Department of Transportation, 1598 Mail Service Center, Raleigh, NC 27699-1598

Authorizing development in Camden County at unnamed tributary to the Pasquotank River,
US 158 widening, as requested in the permittee's application letters dated 5/21/10 with e-mails
dated 6/10/10 & 6/30/10, incl. the attached workplan drawings (25) as described in Condition No. 1 below.

This permit, issued on 7/1/10, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, all work authorized by this permit modification shall be carried out in accordance with the attached workplan drawings (25): 7 dated 5/2010; 2 dated 8/12/2009; and 16 dated received 6/30/2010.
- 2) Unless specifically altered herein, this minor modification authorizes the following: an additional 0.55 acres of permanent fill in wetlands at Site 8 and Site 10 of the R-2414A section to correct the roadway grade elevations; a reduction of the permanent wetland impacts at Site 3 of the R-2414B-section; replacement of the existing 24" pipe at Site 4 of the R-2414B-section; installation of a water line(s) at Sites 3, 5, 6 and 7 of the R-2414B-section; and installation of a forced main sewer at Site 3 of the R-2414B section.

(See attached sheet for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

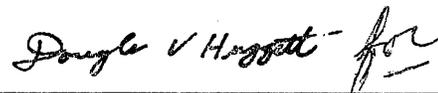
Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

No expiration date, pursuant to GS 136-44.7B

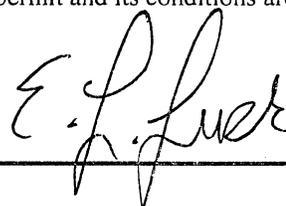
In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.



James H. Gregson, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.



Signature of Permittee

ADDITIONAL CONDITIONS

- 3) In accordance with commitments made by the permittee, no in-water work shall be conducted between February 15th to June 15th of any year without prior approval of the N.C. Division of Coastal Management (DCM), in consultation with the N.C. Wildlife Resources Commission (WRC).
- 4) All pipe and culvert bottoms shall be buried at least one foot below normal bed elevation when they are placed within the Public Trust Area of Environmental Concern (AEC) as designated by the Coastal Area Management Act (CAMA). Culverts placed in wetlands are not subject to this burial requirement.
- 5) Fill slopes in wetlands and Waters of the State shall be 3:1 or steeper.
- 6) The changes authorized by this minor modification shall not result in any additional permanent or temporary impacts to Coastal Wetlands.

NOTE: The changes authorized by this minor modification will increase the project's total permanent wetland impacts by 0.31 acres (0.55 acres of new impacts and 0.24 acres of reduced impacts).

NOTE: In accordance with the Ecosystem Enhancement Program (EEP) letter dated 5/25/10, compensatory mitigation for permanent impacts of 4.66 acres of riparian wetlands and 247 linear feet of stream associated with the authorized project shall be provided by the EEP.

- 7) Any relocation of utility lines that is not specifically depicted on the attached workplan drawings, or specifically described within the attached permit application, shall require approval from DCM, either under the authority of this permit, or by the utility company obtaining separate authorization.
- 8) Directional boring shall not be used for utility relocations, except as authorized by this modification.
- 9) The N.C. Division of Water Quality authorized a modification of the proposed project on 6/28/10 under Water Quality Certification No. 003774 (DWQ Project No. 20081602 v.2). Any violation of the Certification approved by DWQ shall be considered a violation of this CAMA permit.
- 10) This permit does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.
- 11) This minor modification shall be attached to the original of Permit No. 03-09, which was issued on 1/12/09, as well as the subsequent letter of refinement, and copies of all documents shall be readily available on site when a Division representative inspects the project for compliance.
- 12) All conditions and stipulations of the active permit remain in force under this minor modification unless altered herein.

NOTE: The U.S. Army Corps of Engineers has assigned the proposed project COE Action ID. No. 199402124.

Permit Class
MODIFICATION/MINOR

Permit Number
03-09

STATE OF NORTH CAROLINA
Department of Environment and Natural Resources
and
Coastal Resources Commission

Permit

for

Major Development in an Area of Environmental Concern
pursuant to NCGS 113A-118

Excavation and/or filling pursuant to NCGS 113-229

Issued to N.C. Department of Transportation, 1598 Mail Service Center, Raleigh, NC 27699-1598

Authorizing development in Camden County at unnamed tributary to the Pasquotank River,
US 158 widening, as requested in the permittee's application letter dated 10/7/2010, including
the attached workplan drawings (13): 9 dated 9/28/2010; 1 dated 9/6/2010; and 3 dated 8/2010.

This permit, issued on 10/22/10, is subject to compliance with the application (where consistent with the permit), all applicable regulations, special conditions and notes set forth below. Any violation of these terms may be subject to fines, imprisonment or civil action; or may cause the permit to be null and void.

- 1) Unless specifically altered herein, this minor modification authorizes the following: use of the stabilization method termed "mass soil mixing" at sites 3, 6 and 7; and a change in position of the utilities that are to be directionally bored at sites 3, 6 and 7; all as depicted on the attached workplan drawings.
- 2) In accordance with commitments made by the permittee, no in-water work shall be conducted between February 15th to June 15th of any year without prior approval of the N.C. Division of Coastal Management (DCM), in consultation with the N.C. Wildlife Resources Commission (WRC).
- 3) The authorized soil mixture shall not be allowed to contact the water in or entering into the adjacent wetlands or Waters of the State until it no longer poses a threat to aquatic organisms.

(See attached sheet for Additional Conditions)

This permit action may be appealed by the permittee or other qualified persons within twenty (20) days of the issuing date. An appeal requires resolution prior to work initiation or continuance as the case may be.

This permit must be accessible on-site to Department personnel when the project is inspected for compliance.

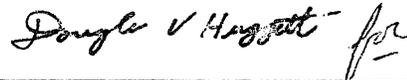
Any maintenance work or project modification not covered hereunder requires further Division approval.

All work must cease when the permit expires on

No expiration date, pursuant to GS 136-44.7B

In issuing this permit, the State of North Carolina agrees that your project is consistent with the North Carolina Coastal Management Program.

Signed by the authority of the Secretary of DENR and the Chairman of the Coastal Resources Commission.



James H. Gregson, Director
Division of Coastal Management

This permit and its conditions are hereby accepted.



Signature of Permittee

ADDITIONAL CONDITIONS

- 4) In accordance with commitments made by the permittee, impervious dikes shall be installed to provide a complete barrier between the soil mixing activity and the surrounding aquatic resources abutting this activity.
- 5) Construction and removal of the impervious dikes is prohibited while the moratorium referenced in Condition No. 2 of this permit modification is in effect, without prior approval of DCM, in consultation with WRC.
- 6) The impervious dikes shall be properly maintained and retained until the soil mixture is complete and all of the work area contained by the impervious dikes has been stabilized. The impervious dikes shall be removed in a manner that does not cause or create the potential for sedimentation and erosion into wetlands or Waters of the State.
- 7) Construction staging areas shall not be located in wetlands or Waters of the State.

NOTE: The mass soil mixing will increase the project's total permanent wetland impacts by 0.04 acres. In accordance with the Ecosystem Enhancement Program (EEP) letter dated 10/1/10, compensatory mitigation for the additional permanent impacts of 0.04 acres of riparian wetlands shall be provided by the EEP.

- 8) The authorized installation of utilities using the directional bore drilling method shall not result in any permanent or temporary impacts to wetlands or waters of the State, without permit modification.
- 9) The N.C. Division of Water Quality authorized a modification of the proposed project on 10/20/10 under Water Quality Certification No. C03774 (DWQ Project No. 20081602 v.3). Any violation of the Certification approved by DWQ shall be considered a violation of this CAMA permit.
- 10) This permit modification does not eliminate the need to obtain any additional state, federal or local permits, approvals or authorizations that may be required.
- 11) This minor modification shall be attached to the original of Permit No. 03-09, which was issued on 1/12/09, as well as the subsequent letter of refinement and modification, and copies of all documents shall be readily available on site when a Division representative inspects the project for compliance.
- 12) All conditions and stipulations of the active permit remain in force under this minor modification unless specifically altered herein.

NOTE: The U.S. Army Corps of Engineers has assigned the project COE Action ID. No. SAW-1994-02124.

Rivenbark, Chris

Subject: FW: R-2414 Removal of Sheeting During Moratorium Condition Modification

From: Brittingham, Cathy
Sent: Thursday, October 28, 2010 4:59 PM
To: Turchy, Michael A
Cc: Lane, Stephen; Wilson, Travis W.
Subject: RE: R-2414 Question

Hi Michael,

Thank you for coordinating with the N.C. Wildlife Resources Commission regarding Condition #5 of the minor modification of CAMA Major Permit No. 03-09 that was issued on 10/22/10 for TIP No. R-2414.

- 5) Construction and removal of the impervious dikes is prohibited while the moratorium referenced in Condition No. 2 of this permit modification is in effect, without prior approval of DCM, in consultation with WRC.

DCM conveys its approval to remove the impervious dike during the in-water moratorium in accordance with the e-mail below from the N.C. Wildlife Resources Commission on 10/28/10 and the e-mail below from NCDOT on 10/26/10.

Please let me or Stephen Lane know if you have any additional questions or concerns.

Sincerely,

Cathy Brittingham

From: Turchy, Michael A
Sent: Thursday, October 28, 2010 3:43 PM
To: Brittingham, Cathy
Subject: FW: R-2414 Question

Hi Cathy,

When I forwarded our permit conditions for the recent R-2414 to ensure they could be adhered to by all units of NCDOT, the Division expressed concern that time could be lost on the project if this sheeting must remain until the end of the anadromous fish moratorium. They requested that the words "and removal" be removed from Condition number 5 from the CAMA Permit, which states...

Construction and removal of the impervious dikes is prohibited while the moratorium referenced in Condition No. 2 of this permit modification is in effect, without prior approval of DCM, in consultation with WRC.

The Division committed to ensuring that the next condition (CAMA Condition #6) could still be adhered to even if the removal was during the moratorium.

Condition #6:

The impervious dikes shall be properly maintained and retained until the soil mixture is complete and all

10/29/2010

of the work area contained by the impervious dikes has been stabilized. The impervious dikes shall be removed in a manner that does not cause or create the potential for sedimentation and erosion into wetlands or Waters of the State.

I received the email below from Travis, indicating that WRC concurs with removal of the sheet piles during the moratorium, so long as we comply with the remaining conditions.

Due to this response, may I consider this conversation to be "prior approval from DCM, in consultation with WRC" to allow NCDOT to remove the words "and removal" from the CAMA Permit Condition No. 6, or will additional documentation be required?

Thanks for your consideration,
Michael

From: Wilson, Travis W.
Sent: Thursday, October 28, 2010 2:58 PM
To: Turchy, Michael A
Subject: RE: R-2414 Question

WRC concurs with allowing NCDOT to remove the sheet pile during the moratorium period as described below.

Travis W. Wilson
Eastern Region Highway Project Coordinator
Habitat Conservation Program
NC Wildlife Resources Commission
1142 I-85 Service Rd.
Creedmoor, NC 27522
Phone: 919-528-9886 ext. 6
Fax: 919-528-9839
Travis.Wilson@newildlife.org

From: Turchy, Michael A
Sent: Tuesday, October 26, 2010 4:40 PM
To: Wilson, Travis W.
Subject: R-2414 Question

Hi Travis,
I've got a question for you regarding the project R-2414, the widening of US 158/ NC 34, specifically along three culvert sites along the project.

As you probably viewed in our latest permit modification, NCDOT will be using a method called "mass soil mixing" at the approaches of the culverts due to poor soils and subsidence potential approaching the culverts. We are installing sheet piles to serve as impervious dikes as a protective measure to completely isolate this activity from the surrounding jurisdictional resources. The installation of these

10/29/2010

sheet piles will occur outside of the moratorium.

Division One has expressed concern that time could be lost on the project if this sheeting must remain until the end of the moratorium. They request that the words "and removal" be removed from Condition number 5 from the 10/22/2010 CAMA Permit, which states...

Construction and removal of the impervious dikes is prohibited while the moratorium referenced in Condition No. 2 of this permit modification is in effect, without prior approval of DCM, in consultation with WRC.

NCDOT is committed to ensuring that the next condition on the CAMA Permit, #6, be executed

The impervious dikes shall be properly maintained and retained until the soil mixture is complete and all of the work area contained by the impervious dikes has been stabilized. The impervious dikes shall be removed in a manner that does not cause or create the potential for sedimentation and erosion into wetlands or Waters of the State.

From WRC's standpoint, would it be possible to remove this sheeting during the moratorium, if the above conditions applied?

Thanks for your consideration,

Please let me know if there's any further information I can provide to help with your review.

-Michael

Michael Turchy, Environmental Supervisor
North Carolina Department of Transportation
PDEA | Natural Environment Unit

1598 Mail Service Center
Raleigh, NC 27699-1598

voice: (919) 431-6696
fax: (919) 431-2002

<http://www.ncdot.org/doh/preconstruct/pe/>

Email correspondence to and from this sender is subject to the N.C. Public Records Law and may be disclosed to third parties.

10/29/2010

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)
1	-L- 47+83 LT / 47+94 RT	1 @ 30" RCP					0.01				
2	-L- 51+60 LT / 51+95 RT	1 @ 30" RCP	0.09				0.05				
3	-L- 55+12 LT / 56+49 RT	1 @ 8' x 6' RCBC	0.65				0.26	0.04	0.01	121	29
	-L- 57+44 / 59+45 RT	-	0.10 (decrease of 0.2)		0.05 (decrease of 0.04)						
4	-L- 62+65 LT / 62+94 RT	1 @ 24" RCP	0.06				0.04				
5	-L- 67+19 LT / 67+70 RT	1 @ 30" RCP	0.08				0.06				
6	-L- 72+48 LT / 74+48 RT	2 @ 6' x 5' RCBC	0.85		0.01		0.37	0.05	0.01	92	21
Old SITE 7	-L- 82+23 / 82+43 RT	SITE DELETED									
7	-L- 88+60 / 89+28 LT	1 @ 10' x 5' RCBC	0.38				0.16	0.02	0.01	83	19
TOTALS:			2.22 (decrease of 0.2)		0.06 (decrease of 0.04)		0.95	0.11	0.03	297	69

0.22 Ac of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

Revised May 2010
Permit Drawing
Sheet 1 of 38

NC DEPARTMENT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 PROJECT 8.T020401 (R-2414B)
 US 158 - NC 34 WIDENING

WETLAND PERMIT IMPACT SUMMARY

Site No.	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ha)	Temp. Fill In Wetlands (ha)	Excavation in Wetlands (ha)	Mechanized Clearing in Wetlands (ha)	Hand Clearing in Wetlands (ha)	Permanent SW impacts (ha)	Temp. SW impacts (ha)	Existing Channel Impacts Permanent (m)	Existing Channel Impacts Temp. (m)	Natural Stream Design (m)
1	-L- 47+83 LT / 47+94 RT	1 @ 750 RCP					0.003					
2	-L- 51+60 LT / 51+95 RT	1 @ 750 RCP	0.036				0.020					
3	-L- 55+12 LT / 56+49 RT	1 @ 2.4m x 1.8m RCBC	0.265				0.106	0.016	0.003	37.0	8.8	
	-L- 57+44 RT / 59+45 RT	-	0.120		0.038							
4	-L- 62+65 LT / 62+94 RT	1 @ 600 RCP	0.026				0.017					
5	-L- 67+19 LT / 67+70 RT	1 @ 750 RCP	0.032				0.024					
6	-L- 72+48 LT / 74+48 RT	2 @ 1.8m x 1.5m RCBC	0.345		0.003		0.151	0.022	0.004	28.0	6.5	
Old Site 7	-L- 82+43 / 82+83 RT	SITE DELETED										
7	-L- 88+60L / 89+28L	1 @ 3.0m x 1.5m RCBC	0.154				0.064	0.008	0.004	25.4	5.7	
TOTALS:			0.978		0.041		0.385	0.046	0.011	90.4	21.0	

0.087 Ha of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

Permit Drawing
Sheet 2 of 38

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

CAMDEN COUNTY
PROJECT 8.T020401 (R-2414B)
US 158 - NC 34 WIDENING
SHEET June-08

Project No. 8.T020401 (R-2414B)

Property Owner List

Site NO.	Property NO.	Name DB and Pg	Address
1	(5)	Pecan Farms LLC DB 237 PG 728	203 Dogwood Tr. Elizabeth City NC 27909
2	(16)	Linda Sue Lamb Hinton WB 99E, PG 22	135 Cottonwood Dr Hertford NC 27944
	(14)	Fred E. Upton, Jr., ET UX DB 42, Pg 615 DB 111, Pg 278	165 US 158 West Camden NC 27921
	(13)	Fred E. Upton, Heirs DB 22, Pg 468 DB 111, Pg 401	165 US 158 West Camden NC 27921
3	(23)	A & S Properties, LLC DB 157, Pg 769	913 Business Park Drive Chesapeake VA 23320
	(24)	Blue Sky Developments DB 138, Pg 109 PC-3, CL 77-B (PLAT)	300 Bridge Court #101 Camden NC 27921
	(22)	Ricky and Sheila Edwards DB 142, Pg 536	PO BOX 336 Shiloh NC 27974
	(25)	Camden County Board of Education DB 31, Pg 419 MB 18, Pg 551A DB 35, Pg 511 DB 62, Pg 15 DB 83, Pg 451	174 North 343 Camden NC 27921

(continued)

Permit Drawing
Sheet 3 of 38

**N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS**

CAMDEN COUNTY

**PROJECT: 8.T020401 (R-2414B)
US 158 - NC 34 WIDENING**

Project No. 8.T020401 (R-2414B)

Property Owner List

Site NO.	Property NO.	Name DB and Pg	Address
4	32	Mary M. Gordon DB 95, Pg 491 DB 116, Pg 890	104 North 343 Camden NC 27921
	34	Glen D. Gordon, ET UX DB 94, Pg 280 DB 83, Pg 679 DB 128, Pg 504 DB 87, Pg 181 (Post Office Lease) DB 132, Pg 160 (Store Leased)	128 Billet S. Bridge Rd Camden NC 27921
5	32	Mary M. Gordon DB 46, Pg 316A	104 North 343 Camden NC 27921
	39	TIDEWATER Agronomics	1601 N. Road St. Elizabeth City NC 27909
	38	Everything Real Estate LLC	PO Box 310 Camden NC 27921
	36	George Wood Farms, Inc. DB 115, Pg 607 DB 115, Pg 621	PO Box 159 Camden NC 29721
6	36	George Wood Farms, Inc. DB 115, Pg 607 DB 115, Pg 621	PO BOX 159 Camden NC 29721
	43	Albemarle Hospital, ET AL DB 120, Pg 372 DB 113, Pg 670 (MAP)	1144 North Road St. Elizabeth City NC 27909
	42	James Reebuck + Elliot W. Jacobs	PO BOX 1554 Elizabeth City NC 27906

(continued)

Permit Drawing
Sheet 4 of 38

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CAMDEN COUNTY

PROJECT: 8.T020401 (R-2414B)
US 158 - NC 34 WIDENING

SHEET ___ OF ___

9/15/03

REVISED 2/20/06

Project No. 8.T020401 (R-2414B)

Property Owner List

Site NO.	Property NO.	Name DB and Pg	Address
6 (Cont.)	16A	Norfolk Southern Railway Co. (Leased to Chesapeake & Albemarle R/R Co)	3 Commercial Place Norfolk VA 23510
	44	Brown Farms, Inc. DB 64, Pg 191 DB 54, Pg 175 (MAP)	343 North 34 Camden NC 27921
	45	Belcross Properties LLC	PO BOX 26 Camden NC 27921
8	73	Doris H. Harris DB 33, Pg 604 PC 1, SL 15A	265 East US 158 Camden NC 27921
	74	W.W. Owens + Sons Moving + Storage, Inc	PO BOX 503 Elizabeth City NC 27909
	71	Joesph O. Sawyer, ET UX DB 95, Pg 360 PC 1, Pg 12A	640 North 343 Camden NC 29721
	75	Linda S. Demuth, ET AL DB 119, Pg 930	Wilhelmshoeh 27A Forchheim GR 91301
	72	W.W. Owens & Sons Moving & Storage, Inc. DB 81, Pg 700	PO BOX 503 Elizabeth City NC 27909
	76	Horace Melville Cuthrell, Jr., ET UX DB 78, Pg 809 PC 1, 163A	109 North 343 Camden NC 27921
	77	Wallace G. Cahoon DB 79, Pg 413 PC 1, SL 1A	1540 Cedar Road Chesapeake VA 23320

Permit Drawing
Sheet 5 of 38

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

CAMDEN COUNTY

PROJECT: 8.T020401 (R-2414B)
US 158 - NC 34 WIDENING

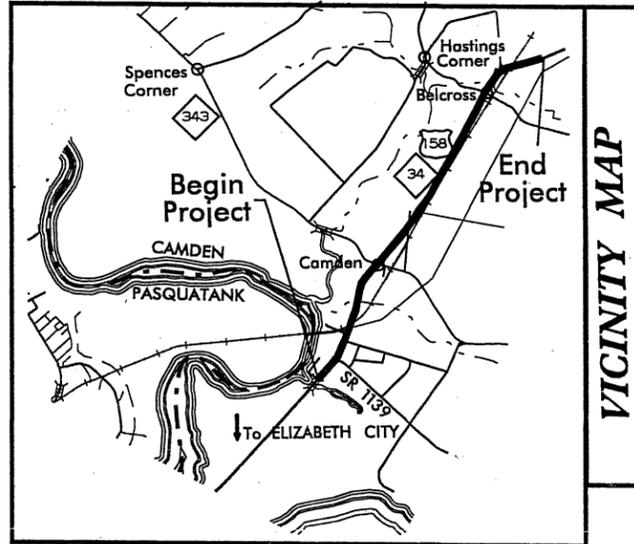
SHEET ___ OF ___

9/15/03

CONTRACT: TIP PROJECT: R-2414B

CONTRACT: TIP PROJECT: R-2414B

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



STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

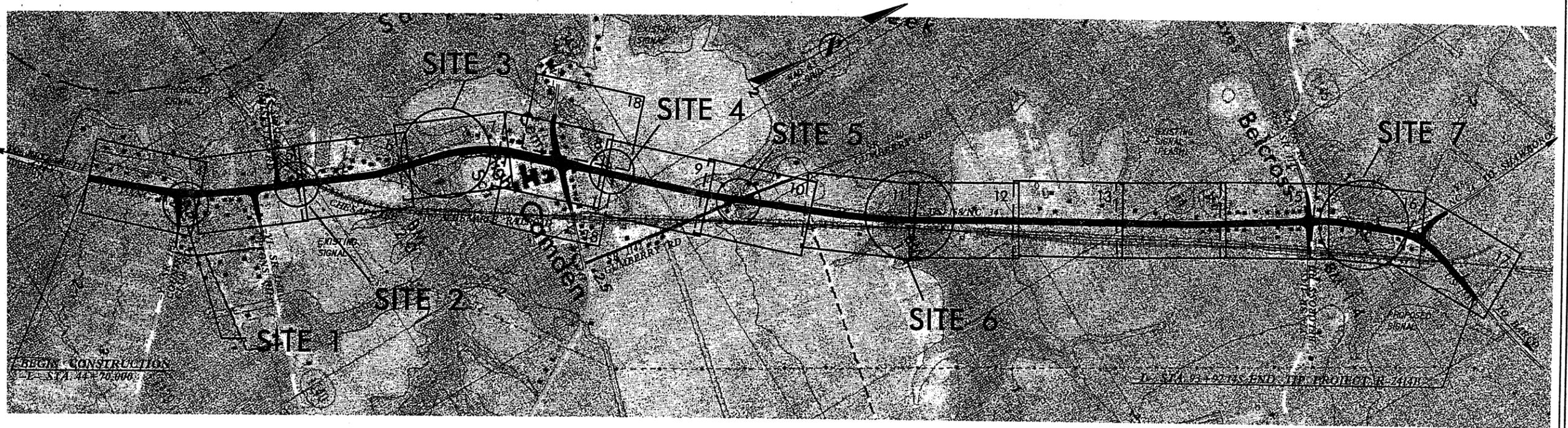
CAMDEN COUNTY

LOCATION: US 158-NC 34 FROM NORTH OF SR 1257
TO EAST OF NC 34 IN BELCROSS

TYPE OF WORK: GRADING, DRAINAGE, PAVING,
CURB & GUTTER, CULVERTS & SIGNALS

<p>ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN</p>	STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
	N.C.	R-2414B	1	
	STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
	34430.1.1	STP-158(2)	PE	
	34430.2.5		ROW & UTILITIES	

Permit Drawing
Sheet 6 of 38



THIS PROJECT IS NOT WITHIN ANY MUNICIPAL BOUNDARIES.

CLEARING ON THIS PROJECT SHALL BE PERFORMED TO THE LIMITS ESTABLISHED BY METHOD III.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

<p>GRAPHIC SCALES</p> <p>5 0 10 PLANS</p> <p>5 0 10 PROFILE (HORIZONTAL)</p> <p>1 0 2 PROFILE (VERTICAL)</p>	<p>DESIGN DATA</p> <p>ADT (2009) = 26,000 ADT (2029) = 41,500 DHV = 12% D = 60% T = 6% * V = 80 km/h * (TTST 2%+ DUAL 4%)</p>	<p>PROJECT LENGTH</p> <p>LENGTH ROADWAY TIP PROJECT R-2414B = 4.823 Km TOTAL LENGTH TIP PROJECT R-2414B = 4.823 Km</p>	<p>2006 STANDARD SPECIFICATIONS</p> <p>RIGHT OF WAY DATE: NOVEMBER 15, 2006</p> <p>LETTING DATE: NOVEMBER 17, 2009</p> <p>NCDOT CONTACT: B. DOUG TAYLOR, PE ROADWAY DESIGN PROJECT ENGINEER</p>		<p>HYDRAULICS ENGINEER</p> <p>SIGNATURE: _____ P.E.</p> <p>ROADWAY DESIGN ENGINEER</p> <p>SIGNATURE: _____ P.E.</p>	<p>DIVISION OF HIGHWAYS STATE OF NORTH CAROLINA</p> <p>STATE HIGHWAY DESIGN ENGINEER</p>
			<p>EDWARD G. WETHERILL, PE PROJECT ENGINEER</p> <p>BOB A. MAY, PE PROJECT DESIGN ENGINEER</p>			

16-JUN-2008 15:27
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sheet 1-A

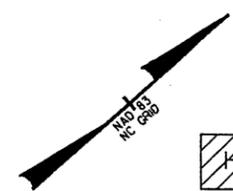
REVISIONS

R/W REVISION - REVISED R/W ALONG -L- & -Y- TO SHOW BEING ACQUIRED UNDER NCDOT PROJECT R-2414A. BAW
 R/W REVISION - ADDED PARCEL NO.5A & REVISED THE PROPERTY OWNER NAME ON PARCEL NO.5.BAM

WETHERILL ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - GC/OPS - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING ENGINEERS, INCORPORATED
 300 Research Drive, Suite G-10
 Raleigh, N.C. 27609

PROJECT REFERENCE NO. R-2414B	SHEET NO. 4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST. REV.	
R/W REV.	



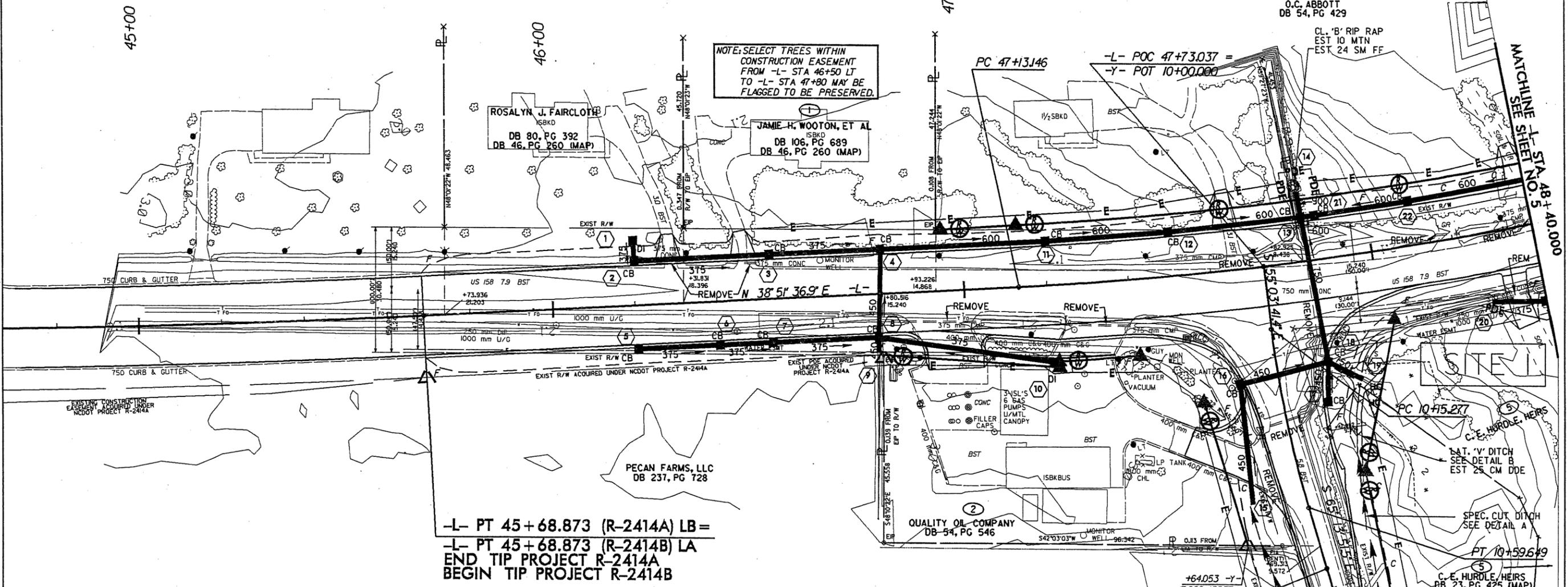
HC HC DENOTES HAND CLEARING

Permit Drawing
 Sheet 8 of 38

ROBERT F. MASSIELLO, ET UX
 DB III, PG 705
 DB 46, PG 260 (MAP)

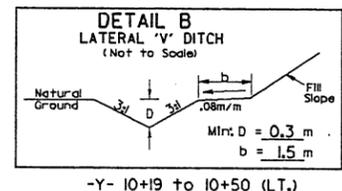
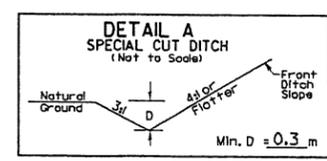
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 GEORGE T. GRIFFIN, ET UX
 DB 52, PG 687
 DB 46, PG 260 (MAP)

④
 O.C. ABBOTT
 DB 54, PG 429



-L- PT 45+68.873 (R-2414A) LB =
 -L- PT 45+68.873 (R-2414B) LA
 END TIP PROJECT R-2414A
 BEGIN TIP PROJECT R-2414B

NOTE: R/W AND EASEMENTS ON THE ROBINSON TRACT TO BE ACQUIRED UNDER THE R-2414A PROJECT.



NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

SEE SHEET NO. 19 FOR -L- GRADE AND PROFILE.
 SEE SHEET NO. 26 FOR -Y- GRADE AND PROFILE.
 SEE SHEET NO. 27 FOR -Y- INTERSECTION DETAIL.

R-2414A

PI Sta 45+33.809
 $\Delta = 8' 05'' 01.5''$ (LT.)
 L = 352.720
 T = 176.653
 R = 2,500.000
 SE = .025
 DS = 80 KM/H

-L-

PI Sta 48+39.173
 $\Delta = 16' 23'' 31.2''$ (LT.)
 L = 250.332
 T = 126.027
 R = 875.000
 SE = 0.03
 R'OFF = 60.750
 DS = 80 KM/H

-Y-

PI Sta 10+37.521
 $\Delta = 10' 10'' 10.1''$ (LT.)
 L = 44.373
 T = 22.245
 R = 250.000

-Y-

PI Sta 10+85.741
 $\Delta = 2' 32'' 38.4''$ (RT.)
 L = 21.313
 T = 10.658
 R = 480.000
 AH = S 62° 41' 13" E

-Y-

PI Sta 11+15.669
 $\Delta = 11' 00'' 32.5''$ (RT.)
 L = 38.429
 T = 19.274
 R = 200.000
 BK = S 62° 41' 13" E
 AH = S 51° 40' 40.5" E

PECAN FARMS, LLC
 DB 237, PG 728

SPEC. CUT DITCH
 SEE DETAIL A

PCC 10+96.395
 EXISTING CONSTRUCTION EASEMENT ACQUIRED UNDER NCDOT PROJECT R-2414A
 +20,000.00
 19,000 (62.34%)
 +30,000 -Y-
 9,444 (30.00%)
 12,000 (39.37%)
 -Y- POC 11+30.000
 END CONSTRUCTION

PT 11+34.824

20-SEP-2008 14:08
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 Call At 919.241.1237
 I:\cadd\2414\2414.dwg

REVISIONS

R/W REVISION - REVISED R/W ALONG -L- & -Y- TO SHOW BEING ACQUIRED UNDER NCDOT PROJECT R-2414A.BAM
 R/W REVISION - ADDED PARCEL NO.5A & REVISED THE PROPERTY OWNER NAME ON PARCEL NO.5.BAM.

WETHERILL ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 QUALITY DESIGN - SURVEYING - CONSTRUCTION OBSERVATION

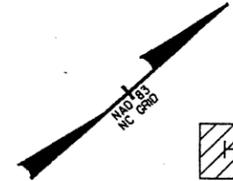
TRANSITE CONSULTING ENGINEERS, INCORPORATED
 300 Forelock Drive, Suite G-10
 Raleigh, N.C. 27609

METRIC

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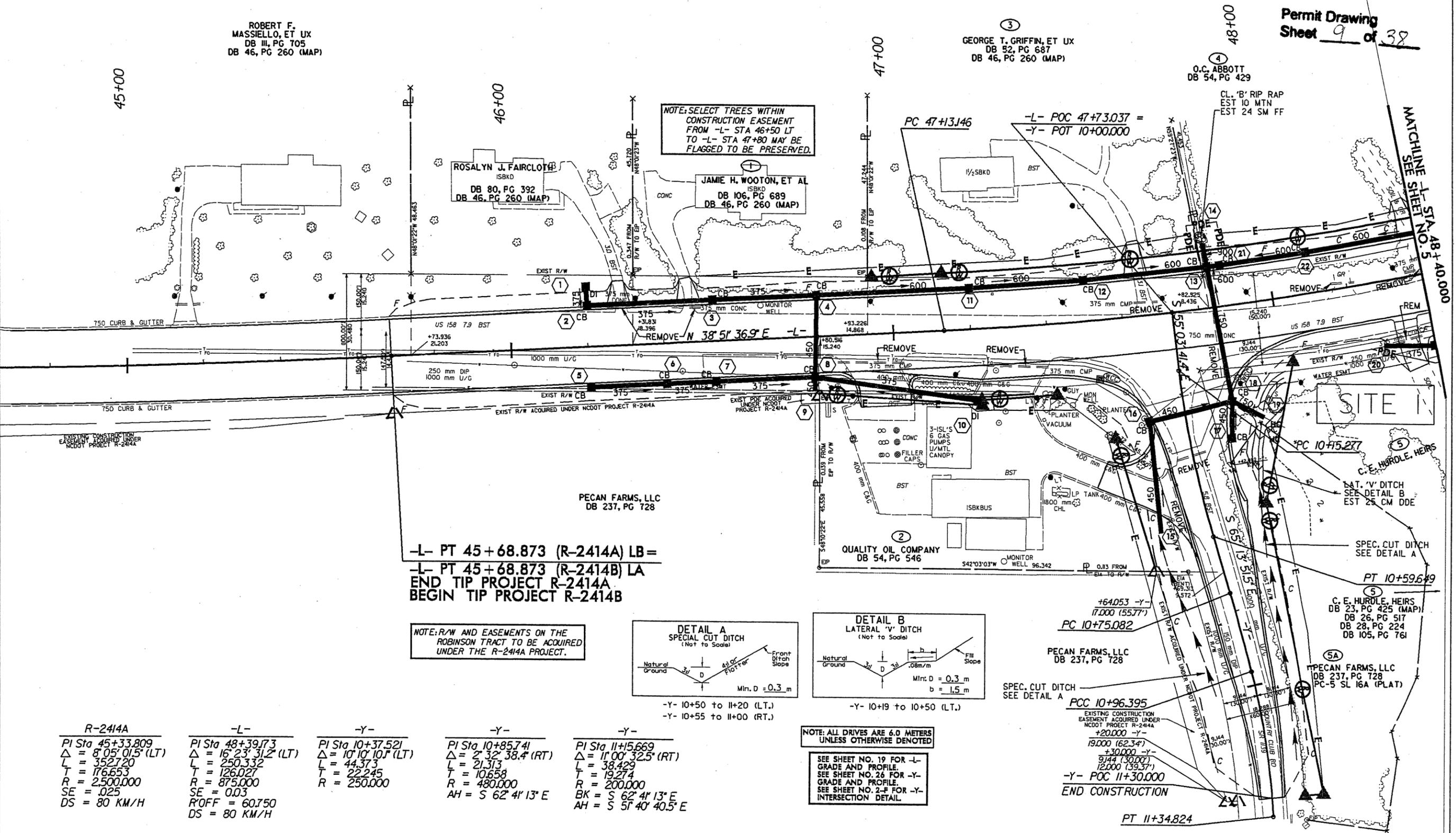
CONST. REV.
 R/W REV.

PROJECT REFERENCE NO. R-2414B	SHEET NO. 4
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



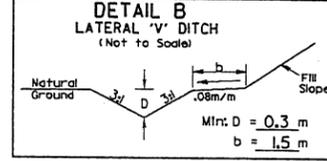
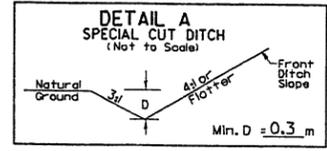
HC HC DENOTES HAND CLEARING

Permit Drawing Sheet 9 of 38



-L- PT 45+68.873 (R-2414A) LB=
 -L- PT 45+68.873 (R-2414B) LA
 END TIP PROJECT R-2414A
 BEGIN TIP PROJECT R-2414B

NOTE: R/W AND EASEMENTS ON THE ROBINSON TRACT TO BE ACQUIRED UNDER THE R-2414A PROJECT.



-Y- 10+50 to 11+20 (LT.)
 -Y- 10+55 to 11+00 (RT.)

-Y- 10+19 to 10+50 (LT.)

NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

SEE SHEET NO. 19 FOR -L- GRADE AND PROFILE.
 SEE SHEET NO. 26 FOR -Y- GRADE AND PROFILE.
 SEE SHEET NO. 2-F FOR -Y- INTERSECTION DETAIL.

R-2414A	-L-	-Y-	-Y-	-Y-
PI Sta 45+33.809	PI Sta 48+39.73	PI Sta 10+37.521	PI Sta 10+85.741	PI Sta 11+15.669
$\Delta = 8^{\circ}05'01.5"$ (LT)	$\Delta = 16^{\circ}23'31.2"$ (LT)	$\Delta = 10^{\circ}10'10.7"$ (LT)	$\Delta = 2^{\circ}32'38.4"$ (RT)	$\Delta = 11^{\circ}00'32.5"$ (RT)
L = 3527.20	L = 250.332	L = 44.373	L = 21.313	L = 38.429
T = 176.653	T = 126.027	T = 22.245	T = 10.658	T = 19.274
R = 2,500.000	R = 875.000	R = 250.000	R = 480.000	R = 200.000
SE = .025	SE = 0.03		AH = S 62° 41' 13" E	BK = S 62° 41' 13" E
DS = 80 KM/H	R/OFF = 60.750		AH = S 51° 40' 40.5" E	AH = S 51° 40' 40.5" E
	DS = 80 KM/H			

PECAN FARMS, LLC DB 237, PG 728
 SPEC. CUT DITCH SEE DETAIL A
 PCC 10+96.395
 EXISTING CONSTRUCTION EASEMENT ACQUIRED UNDER NCDOT PROJECT R-2414A
 +20,000 -Y-
 19,000 (62.34)
 +30,000 -Y-
 9,444 (30.00)
 12,000 (39.37)
 -Y- POC 11+30.000
 END CONSTRUCTION

PT 11+34.824

20-JAN-2008 14:08
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REVISIONS

R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCEL NO.5,7,8,9,13,15 & 17. ADDED PARCEL NO.16A,BAM

R/W REVISION - ADDED PARCEL NO.7B & PROPERTY OWNER NAME. BAM

F F DENOTES FILL IN WETLAND

HC HC DENOTES HAND CLEARING

TRAN SITE CONSULTING
ENGINEERS, INCORPORATED
1300 Piedmont Drive, Suite G-10
Kaleigh, N.C. 27609

TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GEOTECH - CONSTRUCTION OBSERVATION

METRIC

PROJECT REFERENCE NO. R-2414B SHEET NO. 5

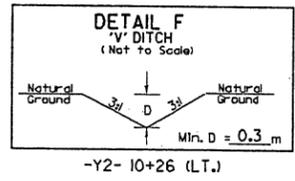
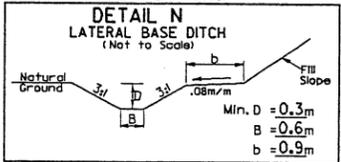
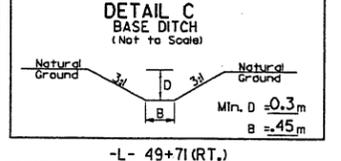
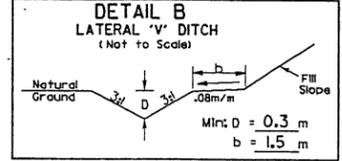
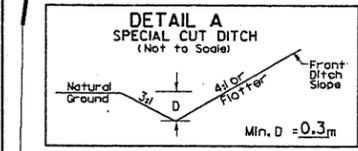
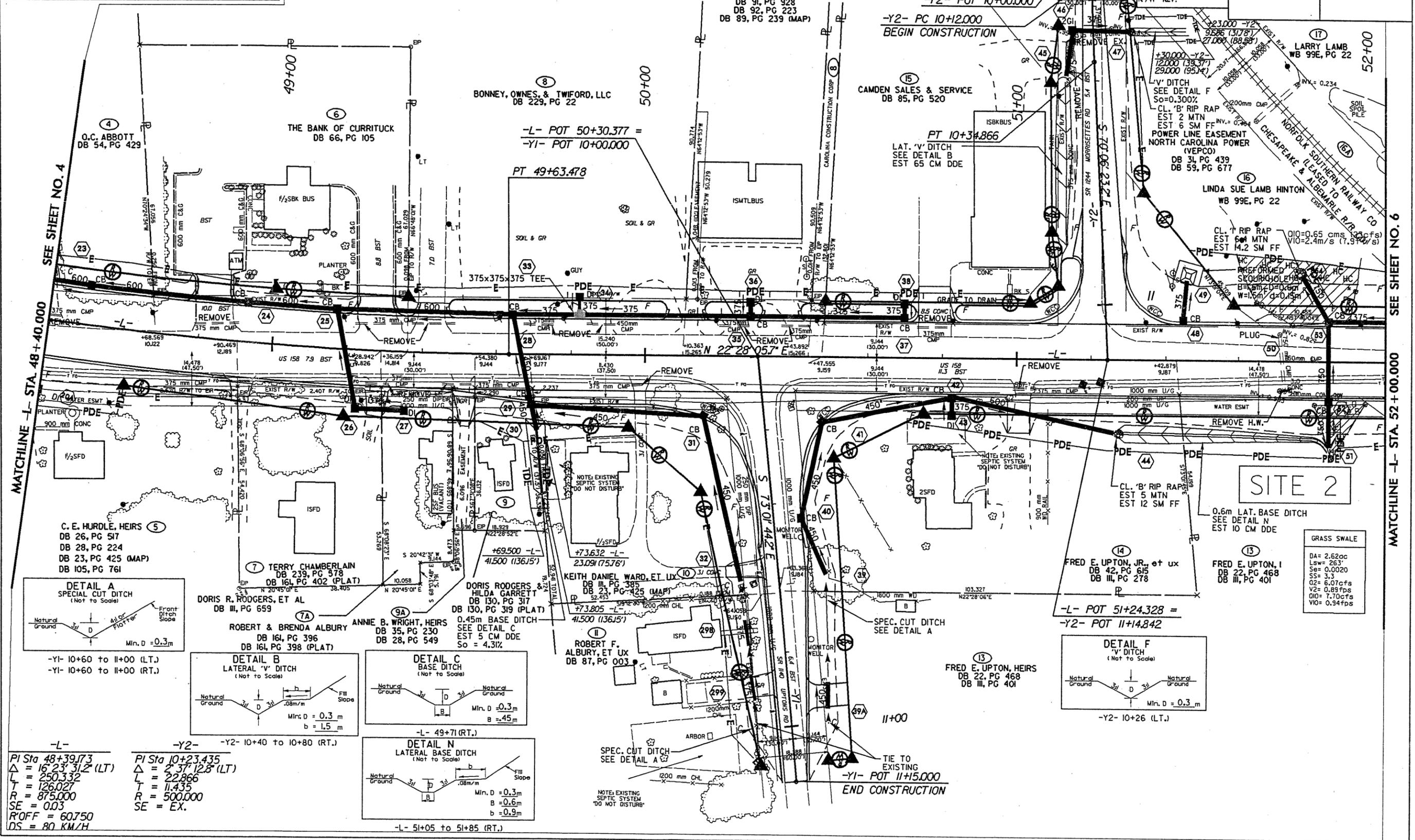
R/W SHEET NO.

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV.

R/W REV.



-L-
PI Sta 48+39.73
Δ = 16.23
L = 250.332
T = 126.027
R = 875.000
SE = 0.03
R/OFF = 60.750
DS = 80 KM/H

-Y2-
PI Sta 10+23.435
Δ = 2.37
L = 22.866
T = 11.435
R = 500.000
SE = EX.

GRASS SWALE

DA = 2.62cc
Lsw = 25.3'
Ss = 0.0020
Ss = 3.3
Q2 = 6.07cfs
V2 = 0.89fps
Q10 = 7.70cfs
V10 = 0.94fps

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MATCHLINE -L- STA. 52+00.000 SEE SHEET NO. 6

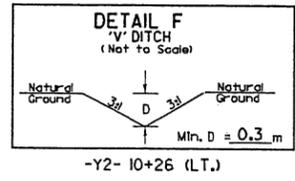
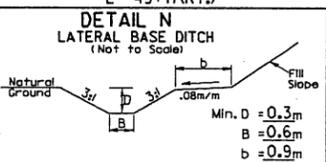
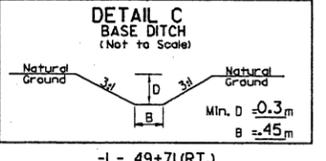
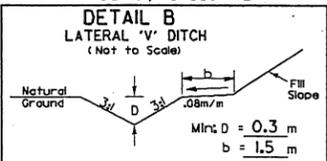
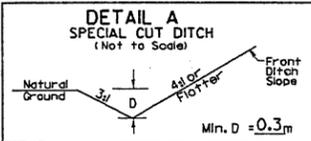
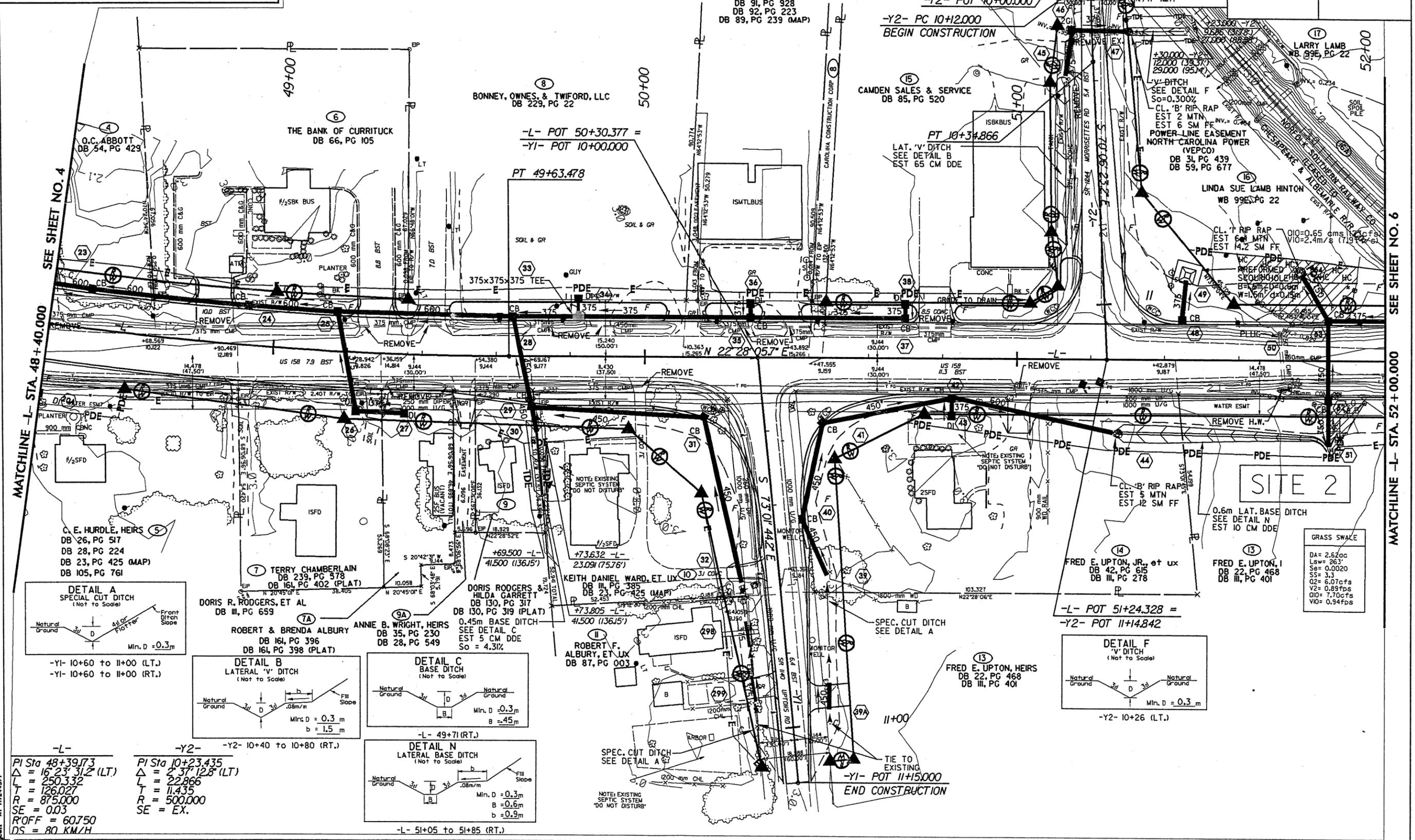
REVISIONS
 R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCEL NO.5,7,8,9,13,15 & 17. ADDED PARCEL NO.16A.BAM
 R/W REVISION - ADDED PARCEL NO.7B & PROPERTY OWNER NAME. BAM

F F DENOTES FILL IN WETLAND
HC HC DENOTES HAND CLEARING

TRAN SITE CONSULTING
 ENGINEERS, INCORPORATED
 1800 *dock Drive, Suite G-10
 Raleigh, N.C. 27609

TRAN SITE CONSULTING
 ENGINEERS, INCORPORATED
 1800 *dock Drive, Suite G-10
 Raleigh, N.C. 27609

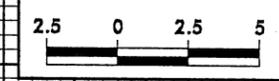
PROJECT REFERENCE NO. R-2414B	SHEET NO. 5
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>	



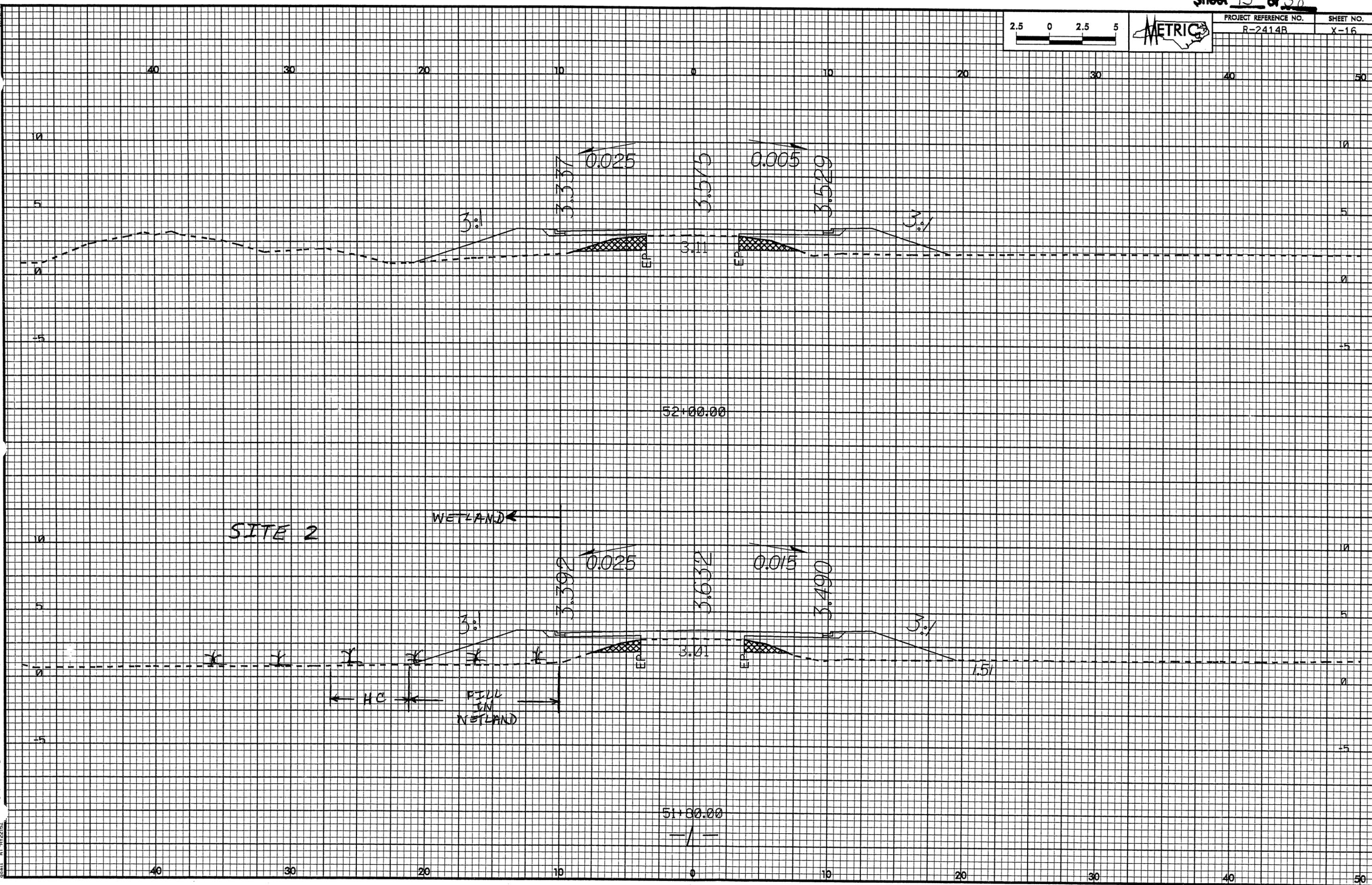
GRASS SWALE

DA = 2.62ac
 Lsw = 263'
 Ss = 0.0020
 Ss = 3.3
 Q2 = 6.07cfs
 V2 = 0.89fps
 Q10 = 7.70cfs
 V10 = 0.94fps

10/24/2008 09:53
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 11/12/2008 10:57



PROJECT REFERENCE NO. R-2414B	SHEET NO. X-16
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21-APR-2008 08:34:34 3d_xpl_line.dgn

PROJECT REFERENCE NO. R-2414B	SHEET NO. 6
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST. REV.	
R/W REV.	

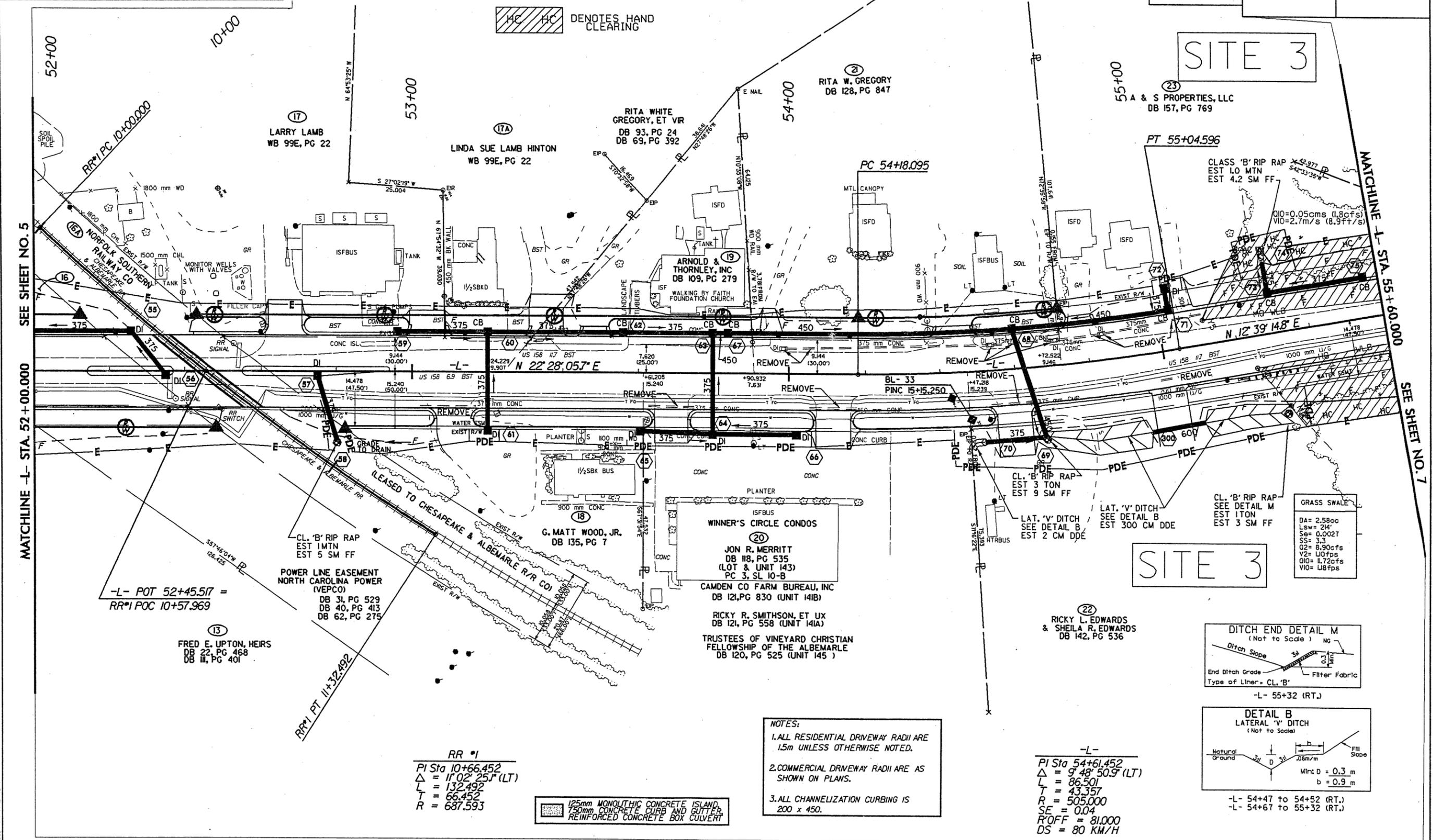
TRANSITE CONSULTING ENGINEERS, INCORPORATED
1800 Folsom Drive, Suite G-10
Faleigh, N.C. 27409

ETHERILL ENGINEERING
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GS/SPS - CONSTRUCTION OBSERVATION

METRIC
5 0 10

REVISIONS
11/07/06 - REVISED ROW AND TCE ON PARCEL 22.(ABP)
R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCEL NO.13,17,18,19,20,21 & 23. ADDED PARCEL NO.16A & 17A. BAM
R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.22.BAM

DENOTES FILL IN WETLAND
 DENOTES HAND CLEARING



SEE SHEET NO. 5
MATCHLINE -L- STA. 52+00.000

MATCHLINE -L- STA. 55+60.000
SEE SHEET NO. 7

11/07/06 09:53
L:\projects\110706\110706.dwg
11/07/06 11:32:49Z
11/07/06 11:32:49Z

13 FRED E. UPTON, HEIRS
DB 22, PG 468
DB 11, PG 401

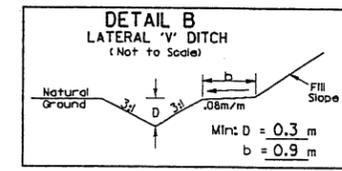
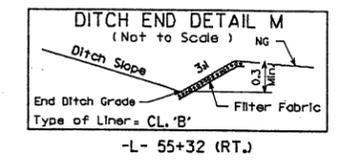
POWER LINE EASEMENT
NORTH CAROLINA POWER
(VEPCO)
DB 31, PG 529
DB 40, PG 413
DB 62, PG 275

RR #1
PI Sta 10+66.452
 $\Delta = 11^{\circ} 02' 25.7''$ (LT)
L = 132.492
T = 66.452
R = 687.593

125mm MONOLITHIC CONCRETE ISLAND
 150mm CONCRETE CURB AND GUTTER
 REINFORCED CONCRETE BOX CULVERT

NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
3. ALL CHANNELIZATION CURBING IS 200 x 450.

-L-
PI Sta 54+61.452
 $\Delta = 9^{\circ} 48' 50.9''$ (LT)
L = 86.501
T = 43.357
R = 505.000
SE = 0.04
R/OFF = 81.000
DS = 80 KM/H



GRASS SWALE
DA = 2.58ac
Ls = 214'
Se = 0.0027
SS = 3.3
Q2 = 8.90cfs
V2 = 1.07fps
V10 = 1.72cfs
V10 = 1.87fps

22 RICKY L. EDWARDS
& SHEILA R. EDWARDS
DB 142, PG 536

17A LINDA SUE LAMB HINTON
WB 99E, PG 22

RITA WHITE GREGORY, ET VIR
DB 93, PG 24
DB 69, PG 392

19 ARNOLD & THORNLEY, INC
DB 109, PG 279
WALKING BY FAITH FOUNDATION CHURCH

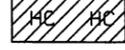
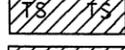
20 JON R. MERRITT
DB 118, PG 535
(LOT & UNIT 143)
PC 3, SL 10-B
CAMDEN CO FARM BUREAU, INC
DB 121, PG 830 (UNIT 141B)
RICKY R. SMITHSON, ET UX
DB 121, PG 558 (UNIT 141A)
TRUSTEES OF VINEYARD CHRISTIAN FELLOWSHIP OF THE ALBEMARLE
DB 120, PG 525 (UNIT 145)

SITE 3

SITE 3

REVISIONS

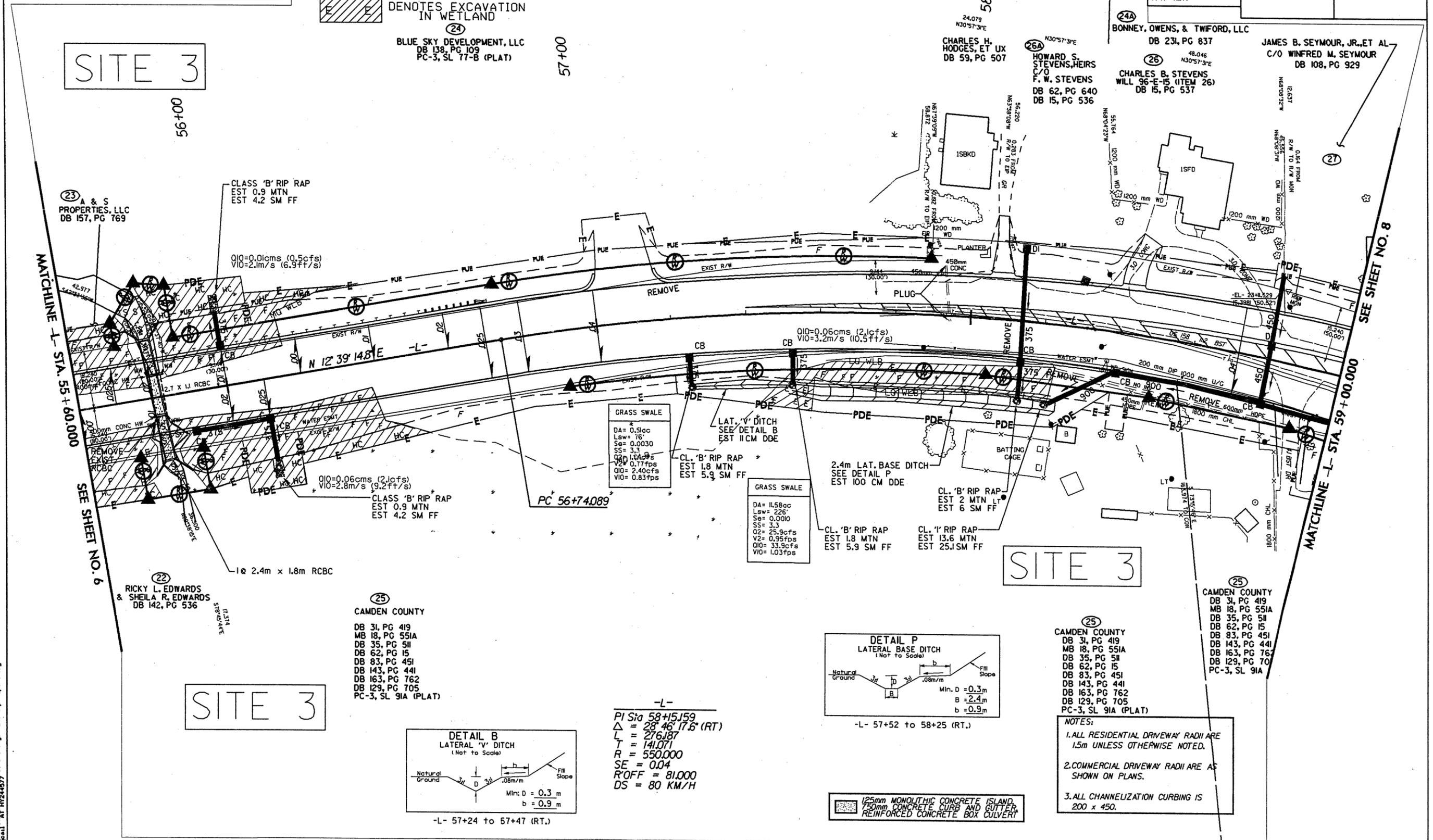
11/07/06 - REVISED ROW, TCE & PDE ON PARCEL 25.(ABP)
 R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCEL NO.23 & 24. ADDED PARCEL NO.24A & 25A. CORRECTED PROPERTY OWNER NAMES CHARLES H.HODGES & HOWARD S.STEVENS, HEIRS, BAM
 R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.22. BAM

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



Permit Drawing
 Sheet 16 of 38
 Revised MAY 2018

PROJECT REFERENCE NO. R-2414B		SHEET NO. 7
R/W SHEET NO.		
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		
CONST. REV.	R/W REV.	



SITE 3

SITE 3

SITE 3

24
 BLUE SKY DEVELOPMENT, LLC
 DB 138, PG 109
 PC-3, SL 77-B (PLAT)

23
 A & S PROPERTIES, LLC
 DB 157, PG 769

22
 RICKY L. EDWARDS & SHEILA R. EDWARDS
 DB 142, PG 536

25
 CAMDEN COUNTY
 DB 31, PG 419
 MB 18, PG 551A
 DB 35, PG 511
 DB 62, PG 15
 DB 83, PG 451
 DB 143, PG 441
 DB 163, PG 762
 DB 129, PG 705
 PC-3, SL 91A (PLAT)

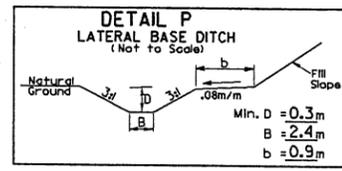
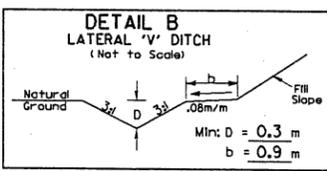
25
 CAMDEN COUNTY
 DB 31, PG 419
 MB 18, PG 551A
 DB 35, PG 511
 DB 62, PG 15
 DB 83, PG 451
 DB 143, PG 441
 DB 163, PG 762
 DB 129, PG 705
 PC-3, SL 91A (PLAT)

25
 CAMDEN COUNTY
 DB 31, PG 419
 MB 18, PG 551A
 DB 35, PG 511
 DB 62, PG 15
 DB 83, PG 451
 DB 143, PG 441
 DB 163, PG 762
 DB 129, PG 705
 PC-3, SL 91A (PLAT)

NOTES:
 1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

GRASS SWALE
 DA= 0.51cc
 Lsw= 76'
 Ss= 0.0030
 Ss= 3.3
 V2= 0.77fps
 V2= 2.40cfs
 Q10= 0.83fps

GRASS SWALE
 DA= 11.58cc
 Lsw= 226'
 Ss= 0.0010
 Ss= 3.3
 Q2= 25.9cfs
 V2= 0.95fps
 Q10= 33.9cfs
 V10= 1.03fps



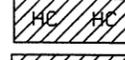
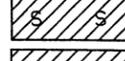
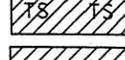
-L-
 PI Sta 58+15.59
 Δ = 28° 46' 17.6" (RT)
 L = 276.187
 T = 141.071
 R = 550.000
 SE = 0.04
 R/OFF = 81.000
 DS = 80 KM/H

125mm MONOLITHIC CONCRETE ISLAND,
 150mm CONCRETE CURB AND GUTTER,
 REINFORCED CONCRETE BOX CULVERT

12-AUG-2009 06:57
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 2414b.dwg
 j...

REVISIONS

11/07/06 - REVISED ROW, TCE & PDE ON PARCEL 25.(ABP)
 R/W REVISION - REVISED PROPERTY OWNER NAMES ON PARCEL NO.23 & 24. ADDED PARCEL NO.24A & 25A. CORRECTED PROPERTY OWNER NAMES CHARLES H.HODGES & HOWARD S.STEVENS, HEIRS. BAM
 R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.22. BAM

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

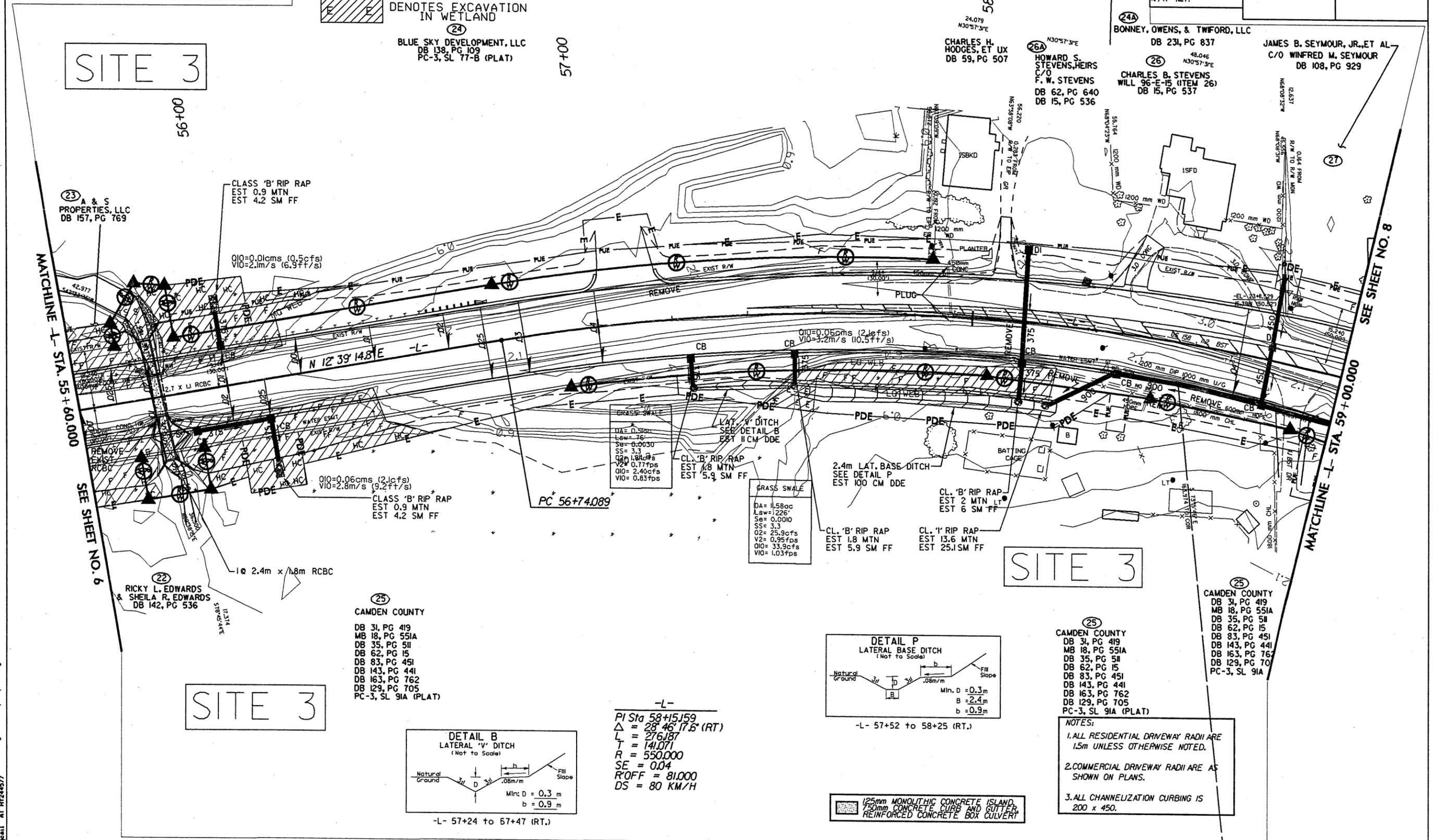
Permit Drawing
 Sheet 17 of 38
 Revised May 2010



5 0 10

PROJECT REFERENCE NO. R-2414B	SHEET NO. 7
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SITE 3

SITE 3

SITE 3

24
 BLUE SKY DEVELOPMENT, LLC
 DB 138, PG 109
 PC-3, SL 77-B (PLAT)

23
 A & S PROPERTIES, LLC
 DB 157, PG 769

22
 RICKY L. EDWARDS & SHEILA R. EDWARDS
 DB 142, PG 536

25
 CAMDEN COUNTY
 DB 31, PG 419
 MB 18, PG 551A
 DB 35, PG 511
 DB 62, PG 15
 DB 83, PG 451
 DB 143, PG 441
 DB 163, PG 762
 DB 129, PG 705
 PC-3, SL 91A (PLAT)

26A
 HOWARD S. STEVENS, HEIRS
 C/O F. W. STEVENS
 DB 62, PG 640
 DB 15, PG 536

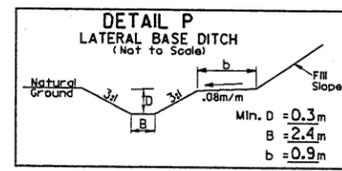
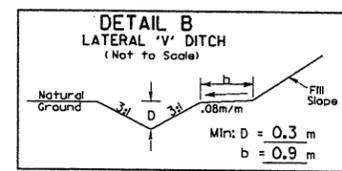
24A
 BONNEY, OWENS, & TWIFORD, LLC
 DB 231, PG 837

26
 CHARLES B. STEVENS
 WILL 96-E-15 (ITEM 26)
 DB 15, PG 537

27
 JAMES B. SEYMOUR, JR., ET AL
 C/O WINFRED M. SEYMOUR
 DB 108, PG 929

GRASS SWALE
 DA = 0.58oc
 Lsw = 76'
 Ss = 0.0030
 Ss = 3.3
 Q2 = 1.84cfs
 V2 = 0.77fps
 Q10 = 2.40cfs
 V10 = 0.83fps

GRASS SWALE
 DA = 1.58oc
 Lsw = 1226'
 Ss = 0.0010
 Ss = 3.3
 Q2 = 25.9cfs
 V2 = 0.95fps
 Q10 = 33.9cfs
 V10 = 1.03fps



-L-
 PI Sta 58+15.159
 $\Delta = 28' 46'' 17.6''$ (RT)
 L = 276.187
 T = 141.071
 R = 550.000
 SE = 0.04
 R/OFF = 81.000
 DS = 80 KM/H

125mm MONOLITHIC CONCRETE ISLAND
 150mm CONCRETE CURBS AND GUTTERS
 REINFORCED CONCRETE BOX CULVERT

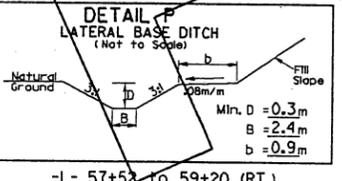
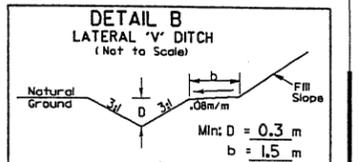
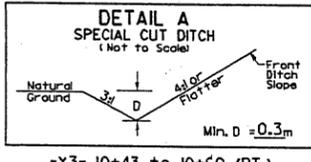
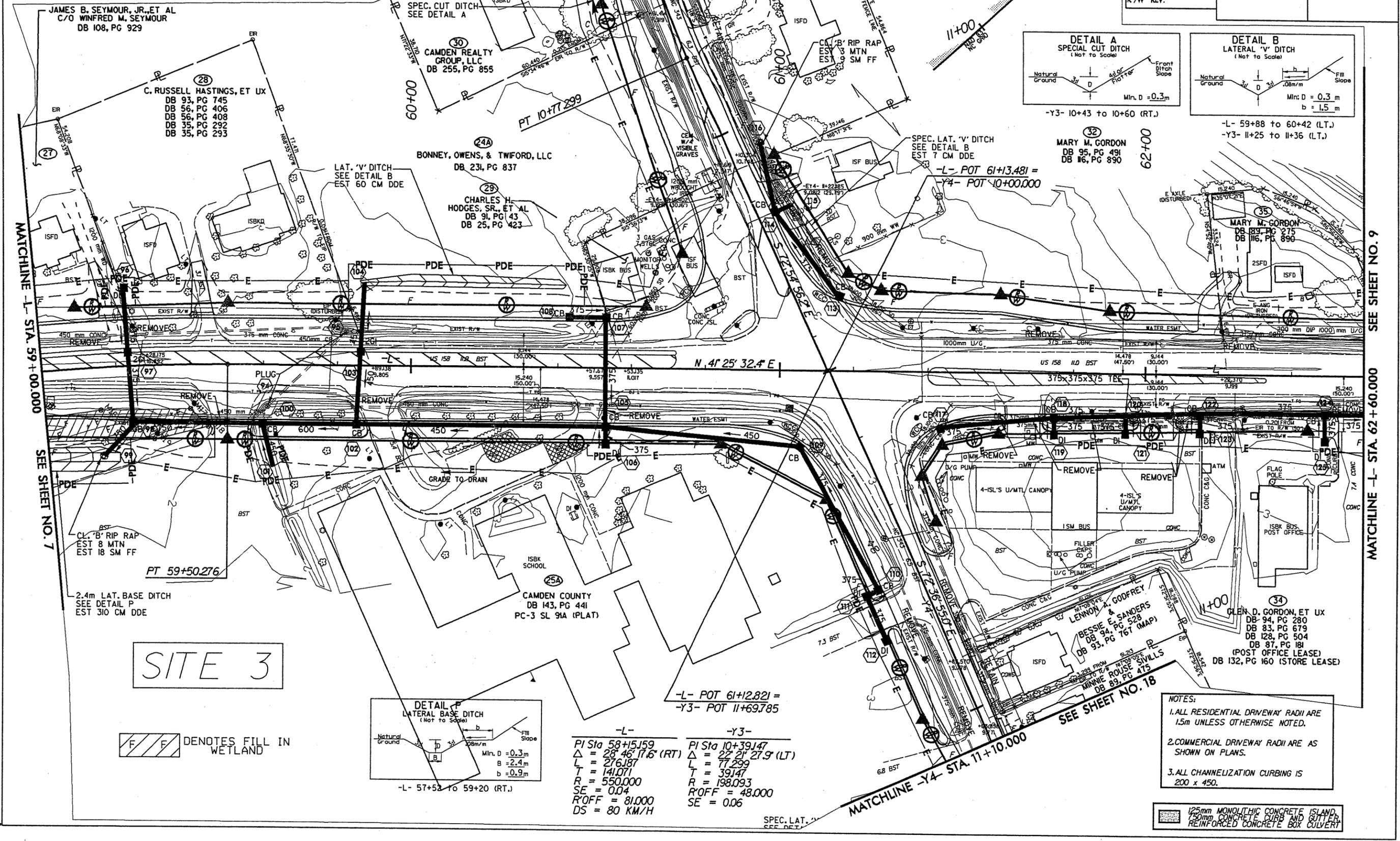
- NOTES:**
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

11/22/2009 06:57
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 11/22/2009 06:57
 I:\s\2414B\17.dwg

REVISIONS	
R/W	REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO.30. ADDED PARCEL NO.24A & 25A. BAM

TRANSTE CONSULTING ENGINEERS, INCORPORATED
 300 Parkway Drive, 3rd Floor
 Raleigh, N.C. 27601

PROJECT REFERENCE NO. R-2414B	SHEET NO. 8
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

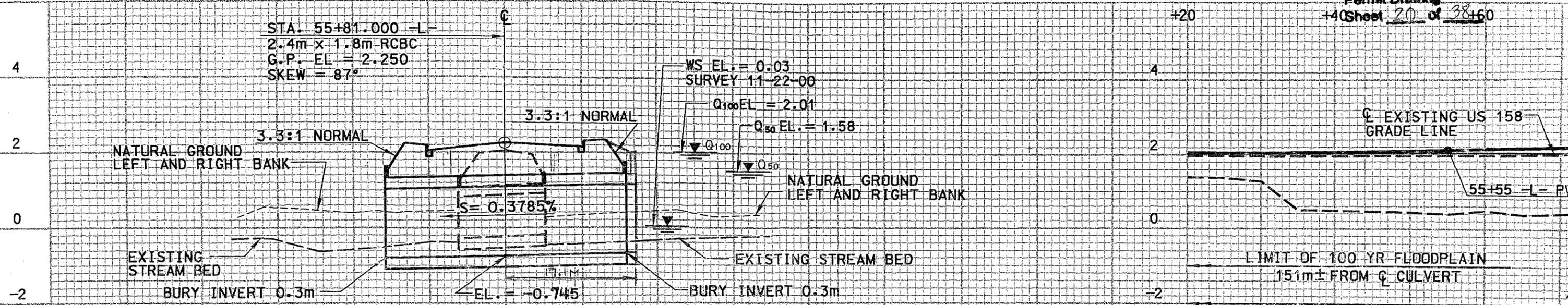


-L-	-Y3-
PI Sta 58+15.59	PI Sta 10+39.147
$\Delta = 28' 46'' 17.6''$ (RT)	$\Delta = 22' 21'' 27.9''$ (LT)
L = 276.187	L = 77.299
T = 141.071	T = 39.147
R = 550.000	R = 198.093
SE = 0.04	R/OFF = 48.000
R/OFF = 81.000	SE = 0.06
DS = 80 KM/H	

- NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADI ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADI ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

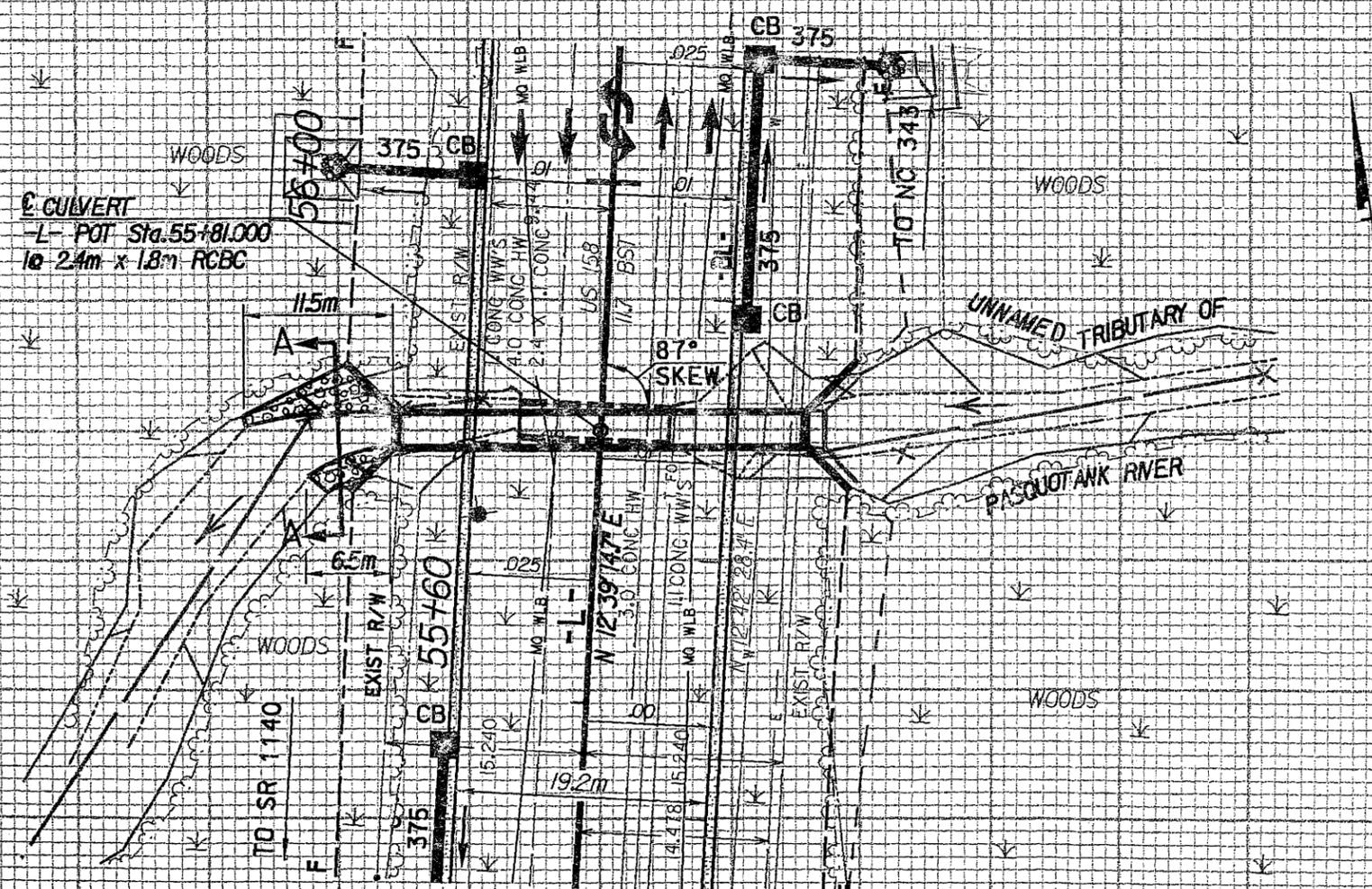
125mm MONOLITHIC CONCRETE ISLAND, 150mm CONCRETE CURB AND GUTTER, REINFORCED CONCRETE BOX CULVERT

11/20/2008 10:33
 I:\projects\2008\11\20\1124477\cal\warrings\2414b-prm-pln88.dgn

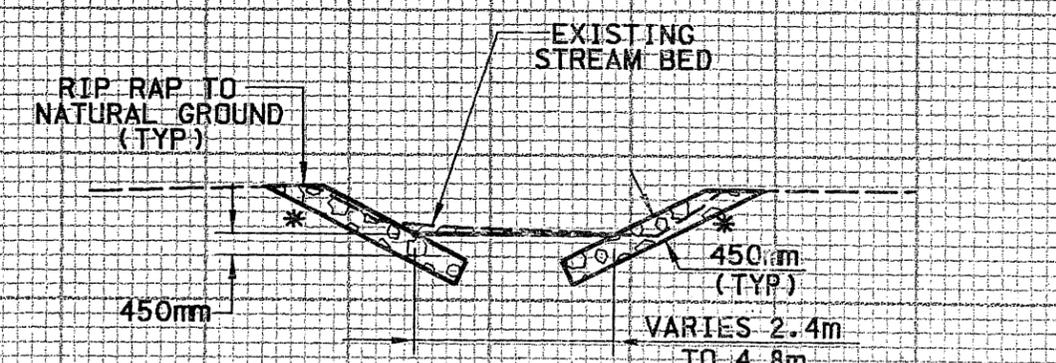


PROFILE

FLOODPLAIN



PLAN

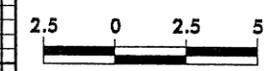


L = 11.5m (RT) & 6.5m (LT) MEASURED FROM END OF CULVERT
 EST. EXCAVATION = 4m³
 EST. CLASS I RIP RAP = 23 TONS
 EST. FILTER FABRIC = 30m²

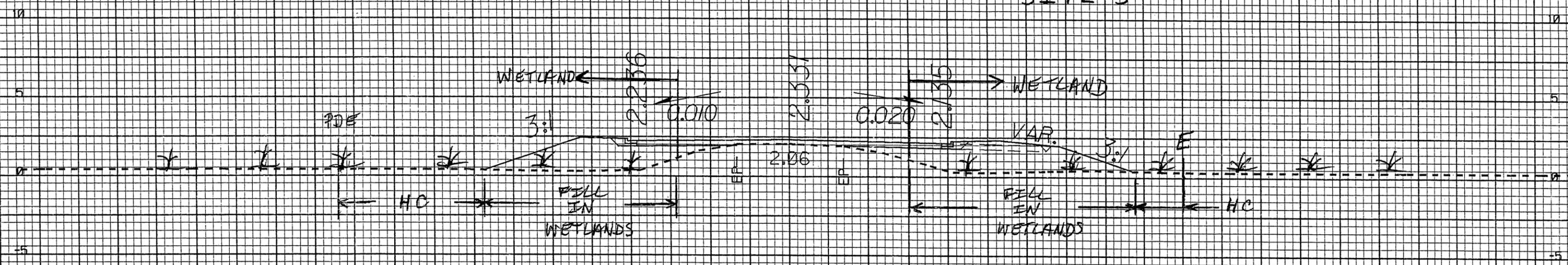
SECTION A-A

CHANNEL EXCAVATION
 * SIDE SLOPES VARY FROM 2:1 TO EXISTING

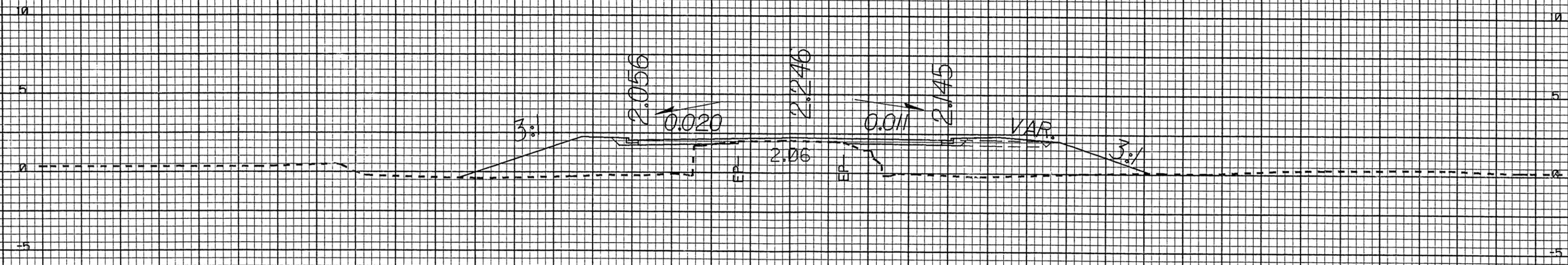
HORIZ. SCALE 1:500
 VERT. SCALE 1:200



SITE 3

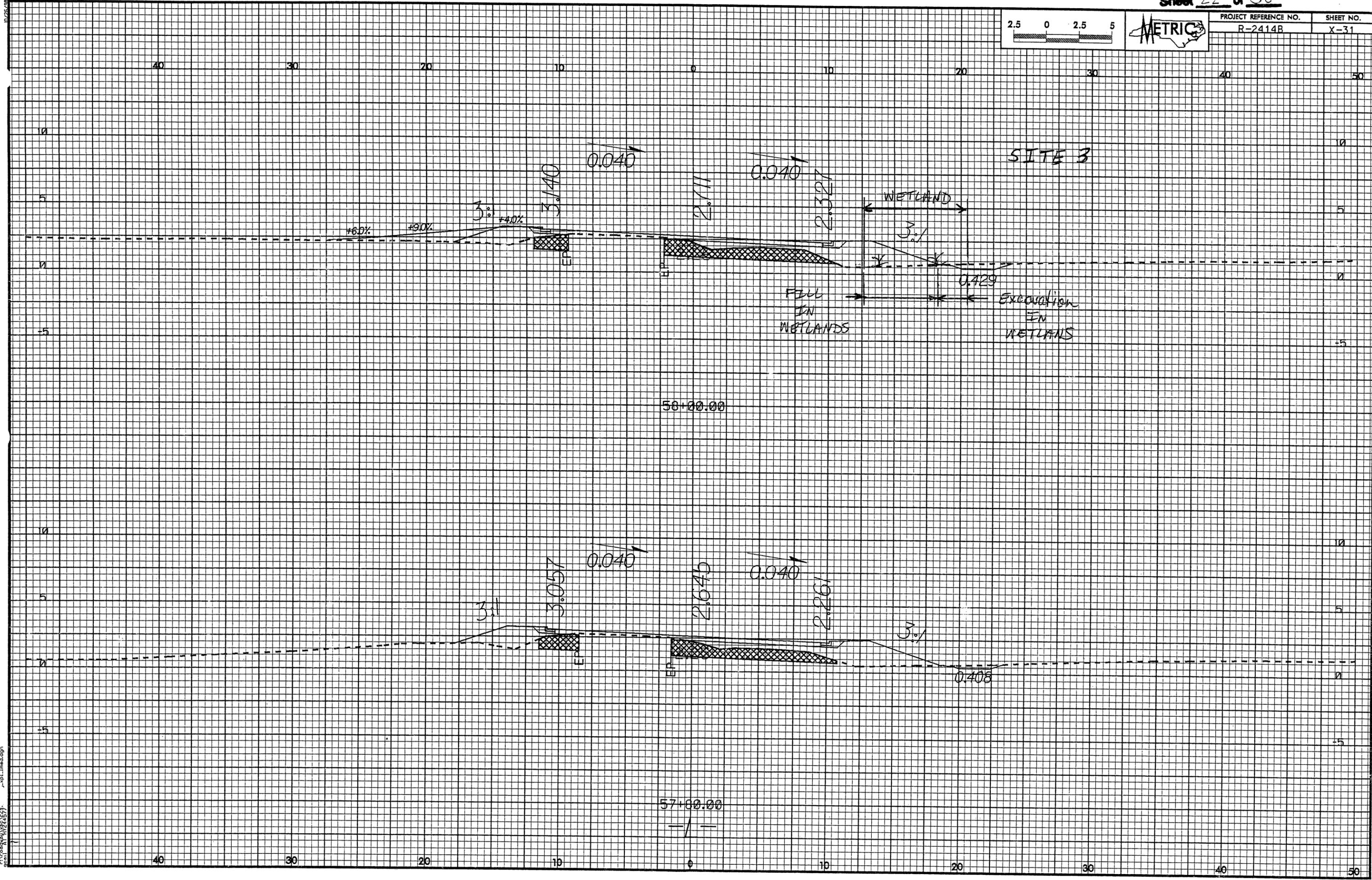
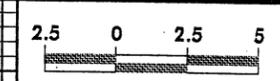


56+00.00



55+80.00

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16-JUN-2008 12:53
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sheet11.dwg

REVISIONS

R/W REVISION - REVISED THE PROPERTY OWNER NAME AND PARCEL NO. ON PARCEL NO. 34. REVISED PROPERTY OWNER NAME FROM CHARLIE S. BARLETT TO JARED & STEPHANIE DALTON (NO CLAIM). BAM

ETHERILL ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - GEOTECH - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING ENGINEERS, INCORPORATED
 100 Pennock Drive, Box G-10
 Raleigh, N.C. 27609

METRIC

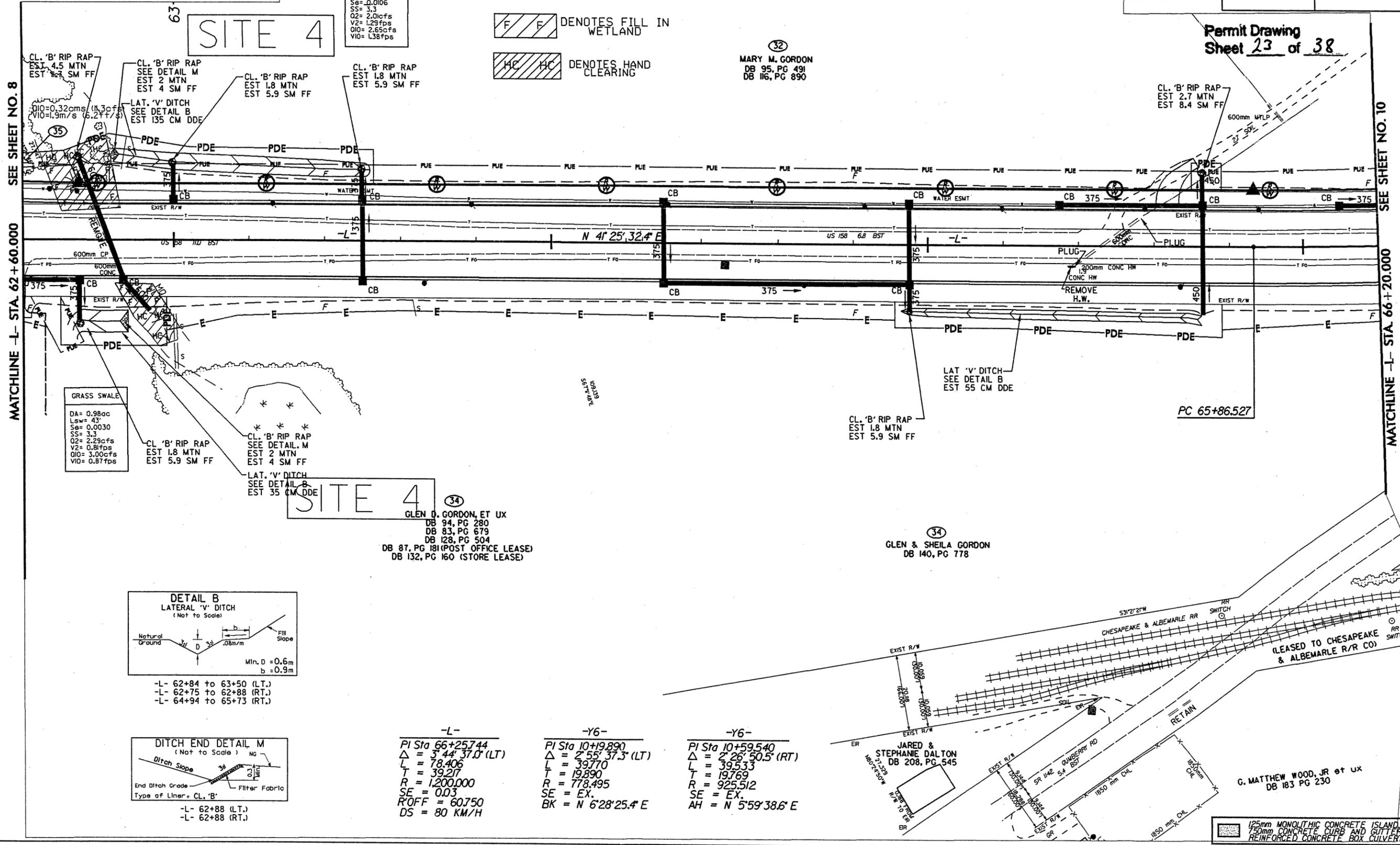
PROJECT REFERENCE NO. R-2414B SHEET NO. 9

R/W SHEET NO.

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

PRELIMINARY PLANS

CONST. REV. R/W REV.



SEE SHEET NO. 8
MATCHLINE -L- STA. 62+60.000

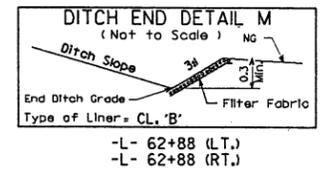
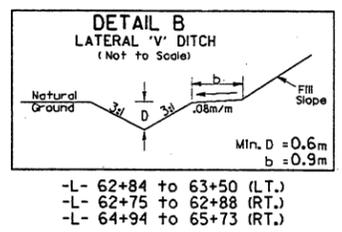
SEE SHEET NO. 10
MATCHLINE -L- STA. 66+20.000

GRASS SWALE
 DA= 0.980c
 Lsw= 43'
 Se= 0.0030
 SS= 3.3
 Q2= 2.28cfs
 V2= 0.81fps
 Q10= 3.00cfs
 V10= 0.87fps

GRASS SWALE
 DA= 0.570c
 Lsw= 27'
 Se= 0.0106
 SS= 3.3
 Q2= 2.01cfs
 V2= 1.29fps
 Q10= 2.65cfs
 V10= 1.38fps

F F DENOTES FILL IN WETLAND

HC HC DENOTES HAND CLEARING



34
 GLEN D. GORDON, ET UX
 DB 94, PG 280
 DB 83, PG 679
 DB 123, PG 504
 DB 87, PG 181 (POST OFFICE LEASE)
 DB 132, PG 160 (STORE LEASE)

32
 MARY M. GORDON
 DB 95, PG 491
 DB 116, PG 890

34
 GLEN & SHEILA GORDON
 DB 140, PG 778

PC 65+86.527

-L-
 PI Sta 66+25.744
 $\Delta = 3' 44' 37.0''$ (LT.)
 L = 18.406
 T = 39.217
 R = 1,200.000
 SE = 0.03
 ROFF = 60.750
 DS = 80 KM/H

-Y6-
 PI Sta 10+19.890
 $\Delta = 2' 55' 37.3''$ (LT.)
 L = 39.770
 T = 19.890
 R = 778.495
 SE = EX.
 BK = N 6'28'25.4'' E

-Y6-
 PI Sta 10+59.540
 $\Delta = 2' 26' 50.5''$ (RT.)
 L = 39.533
 T = 19.769
 R = 925.512
 SE = EX.
 AH = N 5'59'38.6'' E

125mm MONOLITHIC CONCRETE ISLAND
 750mm CONCRETE CURB AND GUTTER
 REINFORCED CONCRETE BOX CULVERT

12-AUG-2009 06:58
 C:\Users\jgordon\Documents\2414b\proj\plan\p01.dwg

REVISIONS

R/W REVISION - REVISED THE PROPERTY OWNER NAME AND PARCEL NO. ON PARCEL NO. 34. REVISED PROPERTY OWNER NAME FROM CHARLIE S. BARLETT TO JARED & STEPHANIE DALTON (NO CLAIM). BAM

ETHERILL ENGINEERING
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GEOTECHNICAL - CONSTRUCTION OBSERVATION

TRAN SITE CONSULTING ENGINEERS, INCORPORATED
300 Forecock Drive, Suite G-10
Tallahassee, FL 32309

METRIC

PROJECT REFERENCE NO. R-2414B SHEET NO. 9

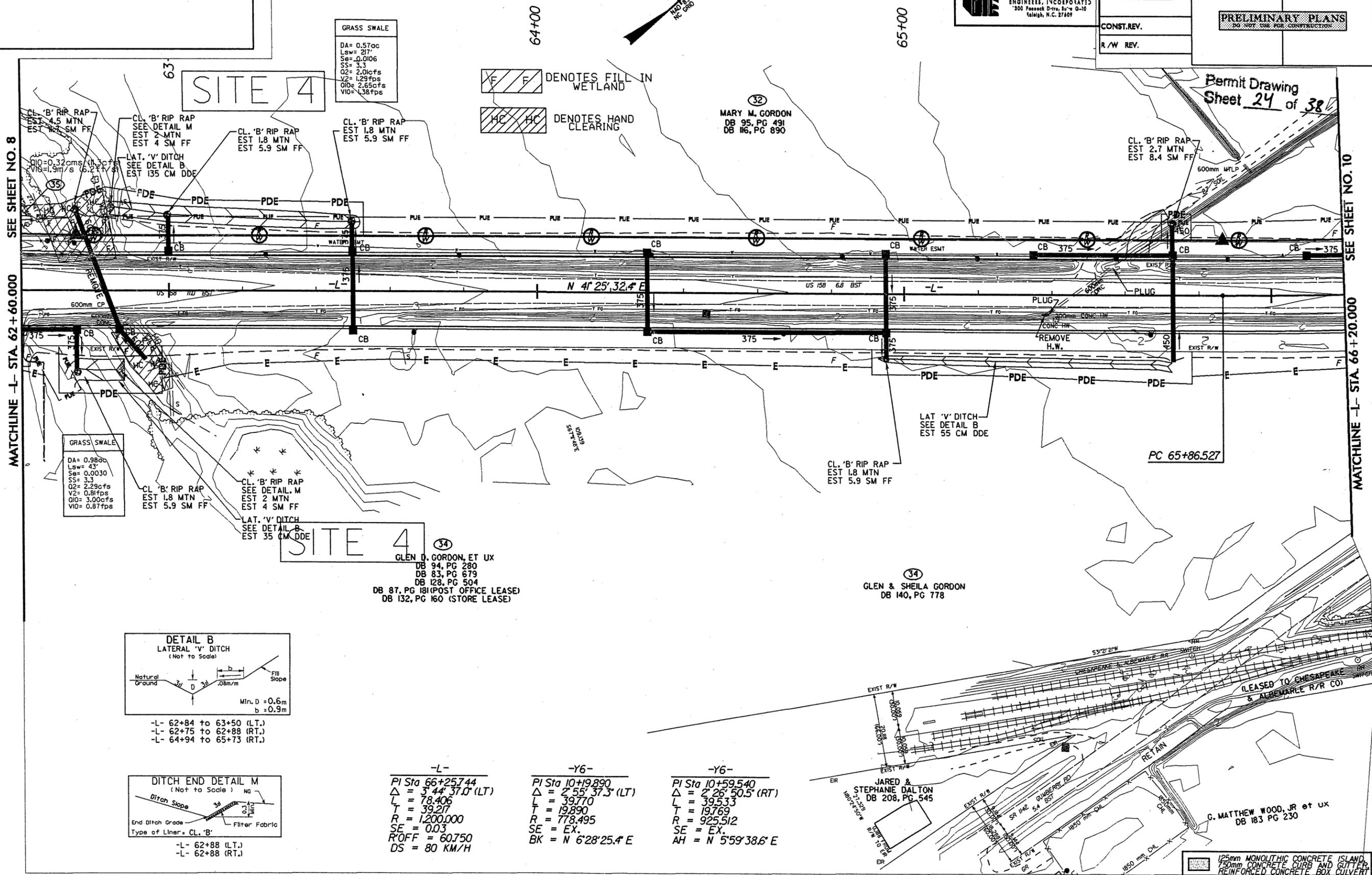
R/W SHEET NO.

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

CONST. REV.

R/W REV.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEET NO. 8

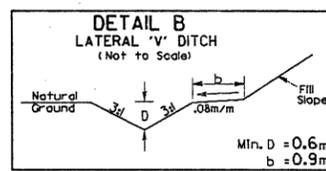
MATCHLINE -L- STA. 62+60.000

SEE SHEET NO. 10

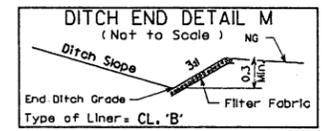
MATCHLINE -L- STA. 66+20.000

GRASS SWALE
DA= 0.9800
Lsw= 43'
Ss= 0.0030
Q2= 2.29cfs
V2= 0.81fps
Q10= 3.00cfs
V10= 0.87fps

GRASS SWALE
DA= 0.5700
Lsw= 217'
Ss= 0.0106
Q2= 2.01cfs
V2= 1.23fps
Q10= 2.65cfs
V10= 1.38fps



-L- 62+84 to 63+50 (LT.)
-L- 62+75 to 62+88 (RT.)
-L- 64+94 to 65+73 (RT.)



-L- 62+88 (LT.)
-L- 62+88 (RT.)

SITE 4
GLEN D. GORDON, ET UX
DB 94, PG 280
DB 83, PG 679
DB 128, PG 504
DB 87, PG 181 (POST OFFICE LEASE)
DB 132, PG 160 (STORE LEASE)

SITE 4
GLEN & SHEILA GORDON
DB 140, PG 778

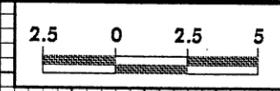
-L-
PI Sta 66+25.744
Δ = 3° 44' 37.0" (LT.)
L = 78.406
T = 39.217
R = 1,200.000
SE = 0.03
R'OFF = 60.750
DS = 80 KM/H

-Y6-
PI Sta 10+19.890
Δ = 2° 55' 37.3" (LT.)
L = 39.770
T = 19.890
R = 778.495
SE = EX.
BK = N 6° 28' 25.4" E

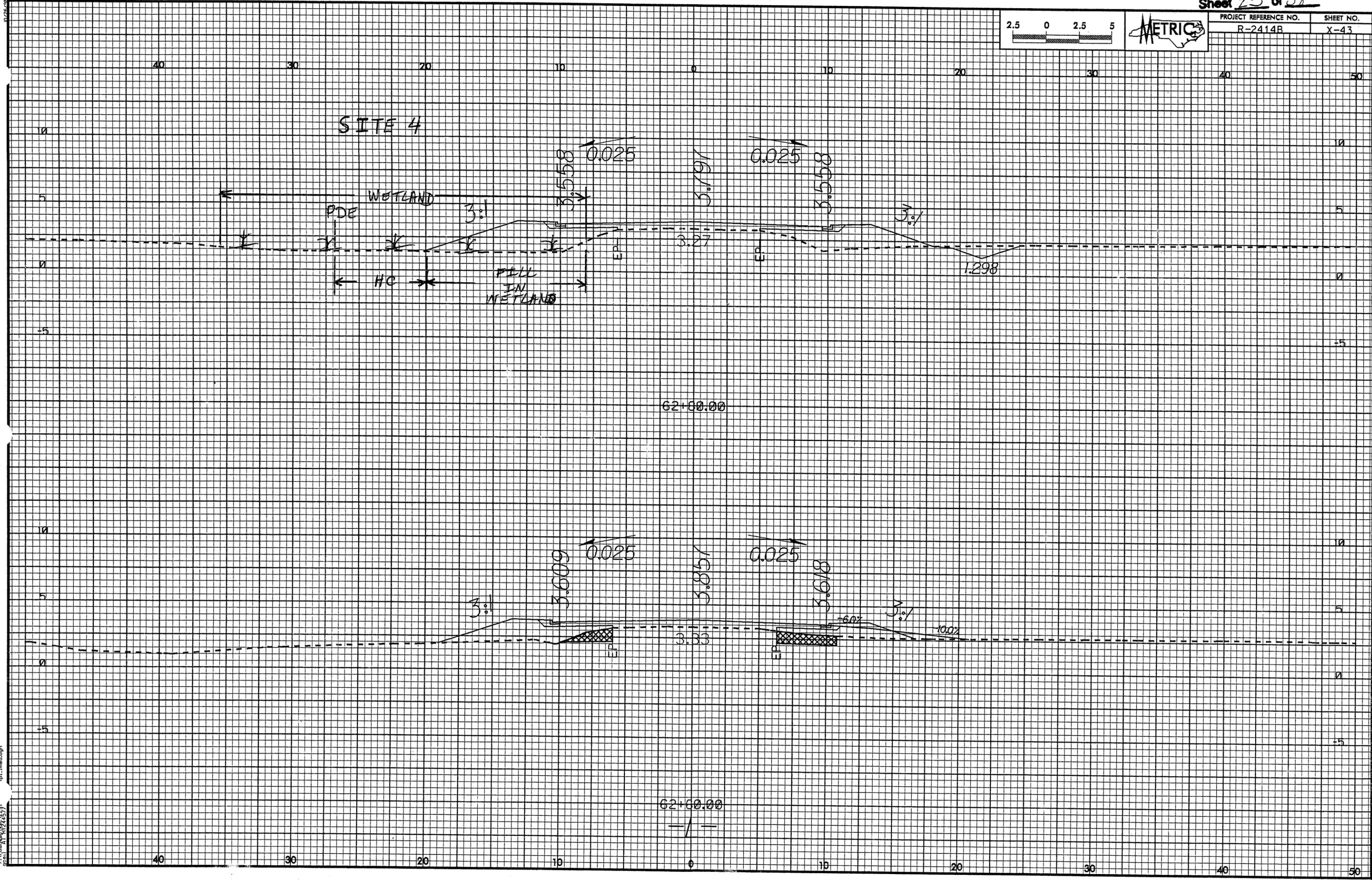
-Y6-
PI Sta 10+59.540
Δ = 2° 26' 50.5" (RT.)
L = 39.533
T = 19.769
R = 925.512
SE = EX.
AH = N 5° 59' 38.6" E

125mm MONOLITHIC CONCRETE ISLAND
750mm CONCRETE CURB AND GUTTER
REINFORCED CONCRETE BOX CULVERT

11-01-2009 06:58
C:\Users\jared\Documents\Projects\2414b\pms\plan\p1.dwg



PROJECT REFERENCE NO.	SHEET NO.
R-2414B	X-43

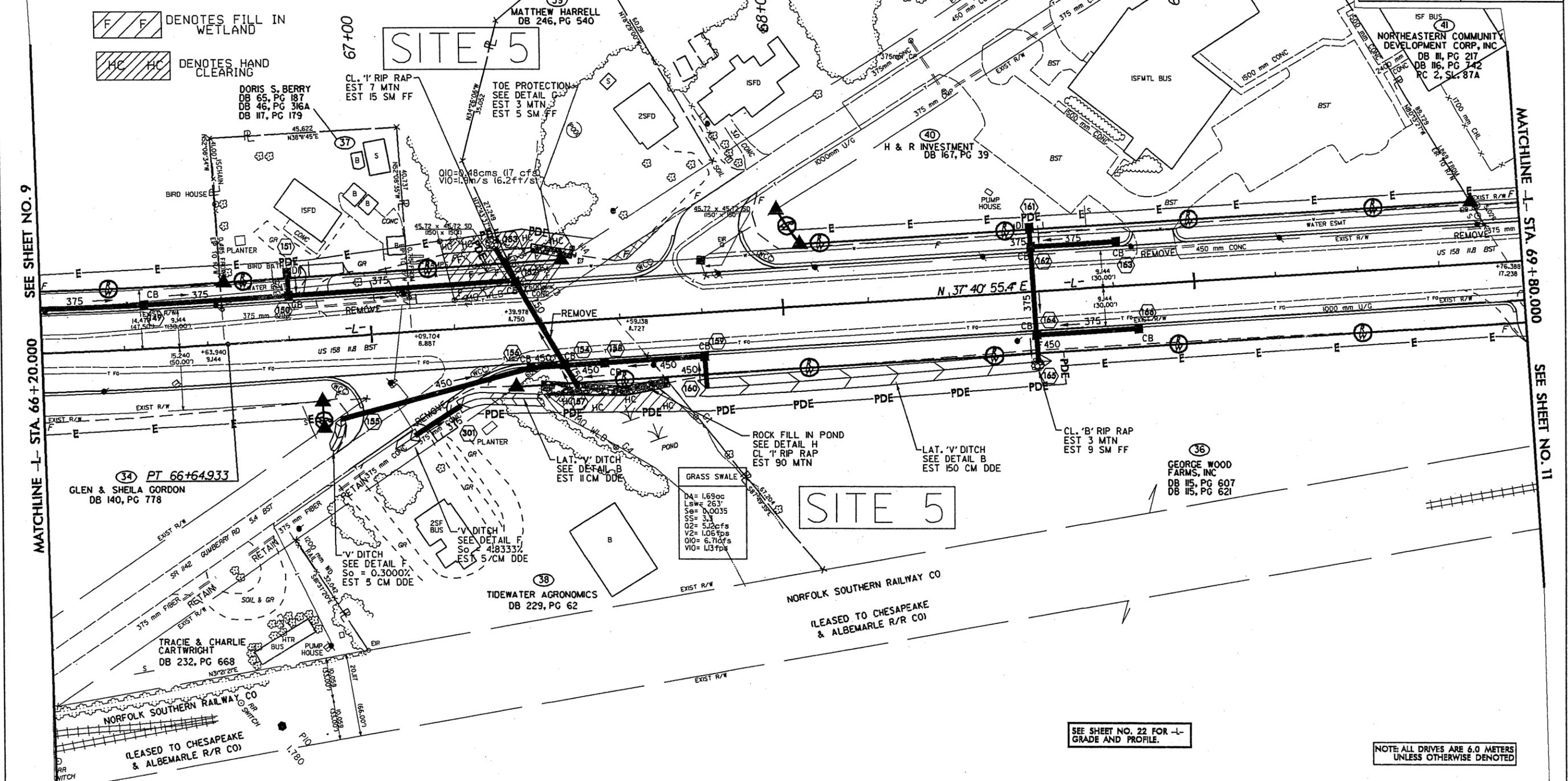


16-JUL-2009 13:51
ep_lined.dgn
921-4122457

REVISIONS
 R/W REVISION - REVISED PROPERTY OWNER NAME & ELIMINATED PARCEL NO.36 (NO CLAIM),REVISED PROPERTY OWNER NAMES ON PARCEL NO.38,39 & 40. B.A.M

TRAN SITE CONSULTING ENGINEERS, INCORPORATED
 300 Pasquot Drive, Suite G-10
 Raleigh, N.C. 27609

METRIC
 PROJECT REFERENCE NO. R-2414B SHEET NO. 10
 R/W SHEET NO.
 ROADWAY DESIGN ENGINEER
 HYDRAULICS ENGINEER
PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

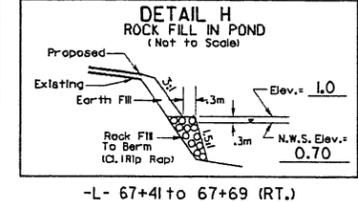
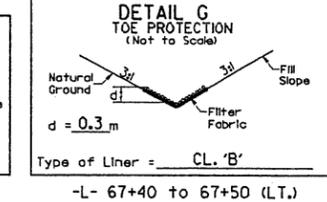
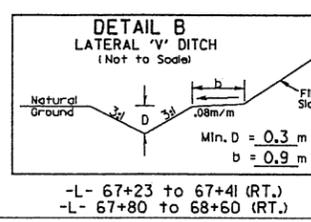
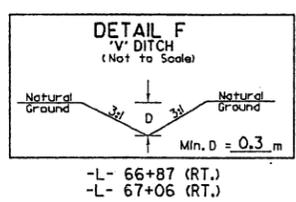


SEE SHEET NO. 9
 MATCHLINE -L- STA. 66+20.000

MATCHLINE -L- STA. 69+80.000
 SEE SHEET NO. 11

-L-
 PI Sta 66+25.744
 $\Delta = 3.44^\circ 37.0' (LT)$
 $L = 78.406$
 $T = 39.217$
 $R = 1,200.000$
 $SE = 0.03$
 $R/OFF = 60.750$
 $DS = 80 \text{ KM/H}$

125mm MONOLITHIC CONCRETE ISLAND,
 150mm CONCRETE CURB AND GUTTER,
 REINFORCED CONCRETE BOX CULVERT



SEE SHEET NO. 22 FOR -L- GRADE AND PROFILE.

NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

8 JAN 2008 10:44 AM
 C:\Users\paul\Documents\2414b.dwg
 2414b.dwg
 2414b.dwg

REVISIONS
11/07/06 - REVISED ROW, TCE & PDE ON PARCEL 36 (ABP)
R/W REVISION - REVISED PROPERTY OWNER NAME ON PARCEL NO. 42 & ADDED DEED BOOK DESCRIPTION TO PARCEL NO. 44. BAM

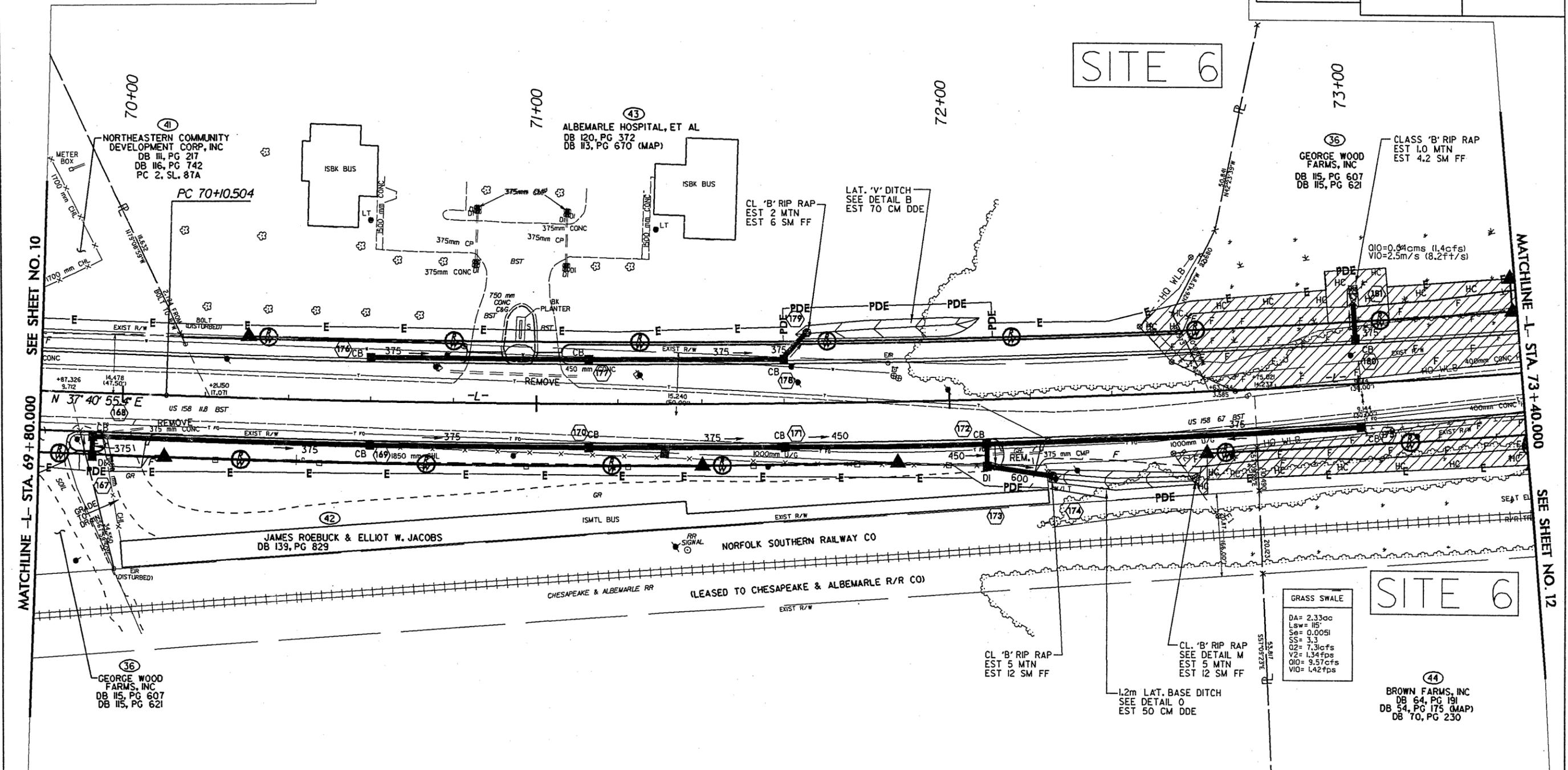
ETHERELL ENGINEERING
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GIS/SPS - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING
ENGINEERS, INC. (NC 010114123)
300 Parnock Drive, Suite G-10
Tallahassee, N.C. 27409

PROJECT REFERENCE NO. R-2414B	SHEET NO. II
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS <small>DO NOT BE USED FOR CONSTRUCTION</small>	
CONST. REV.	
R/W REV.	

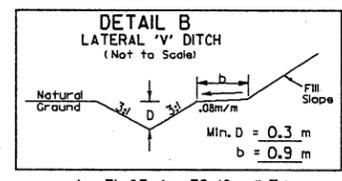
DENOTES FILL IN WETLAND

DENOTES HAND CLEARING

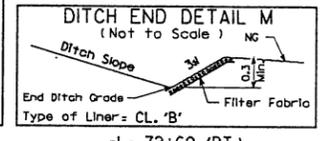
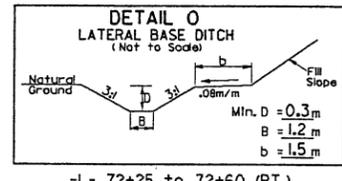


MATCHLINE -L- STA. 69+80.000
SEE SHEET NO. 10

MATCHLINE -L- STA. 73+40.000
SEE SHEET NO. 12



-L-
PI Sta 72+27.319
 $\Delta = 8' 51'' 20''$ (LT.)
L = 432.766
T = 216.815
R = 2,800.000
SE = NC
DS = 80 KM/H



GRASS SWALE
DA= 2.33oc
Lsw= 115'
Se= 0.0051
SS= 3.3
Q2= 7.3cfs
V2= 1.34fps
Q10= 9.57cfs
V10= 1.42fps

SITE 6

44
BROWN FARMS, INC
DB 64, PG 191
DB 54, PG 175 (MAP)
DB 70, PG 230

125mm MONOLITHIC CONCRETE ISLAND,
75mm CONCRETE CURB AND GUTTER,
REINFORCED CONCRETE BOX CULVERT

NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

SEE SHEET NO. 22 FOR -L- GRADE AND PROFILE.

11/07/06 10:48
d:\projects\11-07-06\11-07-06.dwg
11/07/06 10:48
d:\projects\11-07-06\11-07-06.dwg

REVISIONS
 R/W REVISION - REVISED PDE & TCE ON PARCEL NO.36.(BAM)
 R/W REVISION - ADDED DEED BOOK DESCRIPTION TO PARCEL NO.44. BAM

WETZELL ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - GEOTECHNICAL - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING ENGINEERS, INCORPORATED
 300 Pecosack Drive, Suite G-10
 Raleigh, N.C. 27609

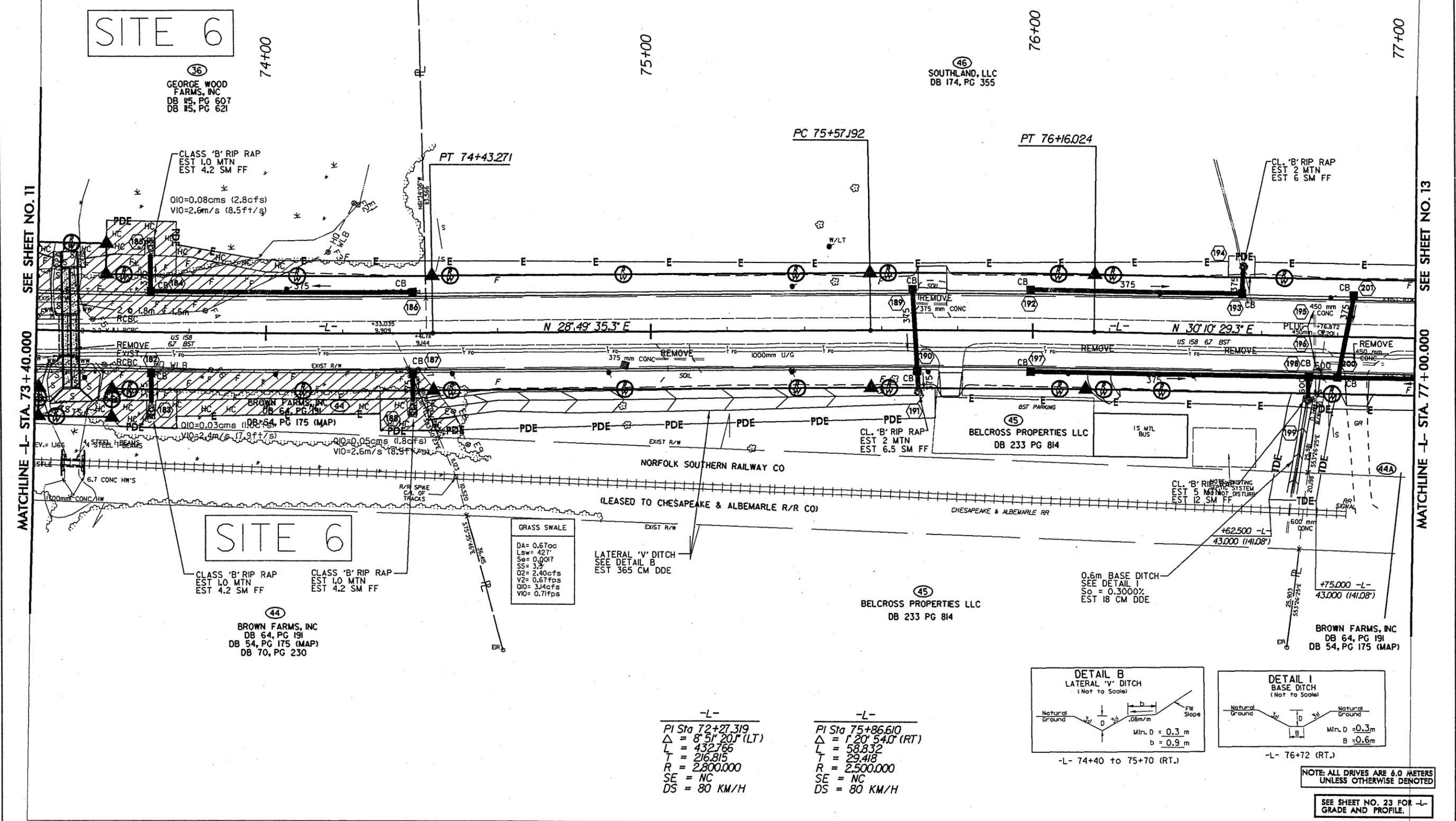
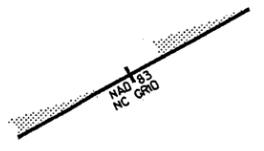
METRIC

PROJECT REFERENCE NO. R-2414B SHEET NO. 12
 R/W SHEET NO.
 ROADWAY DESIGN ENGINEER
 HYDRAULICS ENGINEER

PRELIMINARY PLANS
 DO NOT USE FOR CONSTRUCTION

CONST.REV.
 R/W REV.

F F DENOTES FILL IN WETLAND
 HC HC DENOTES HAND CLEARING
 E E DENOTES EXCAVATION IN WETLAND



SEE SHEET NO. 11
 MATCHLINE -L- STA. 73 + 40.000

SEE SHEET NO. 13
 MATCHLINE -L- STA. 77 + 00.000

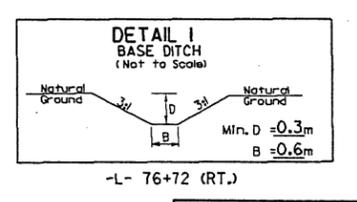
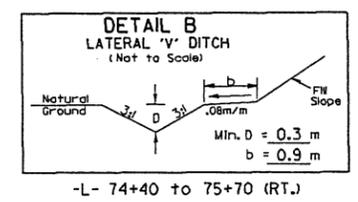
GRASS SWALE
 DA= 0.6700
 Lsw= 42.7
 Ss= 0.0017
 Ss= 3.3
 Q2= 2.40cfs
 V2= 0.67fps
 Q10= 3.14cfs
 V10= 0.71fps

LATERAL 'V' DITCH
 SEE DETAIL B
 EST 365 CM DDE

0.6m BASE DITCH
 SEE DETAIL I
 So = 0.3000%
 EST 18 CM DDE

-L-
 PI Sta 72+27.319
 Δ = 8° 51' 20" (LT)
 L = 432.766
 T = 216.815
 R = 2,800.000
 SE = NC
 DS = 80 KM/H

-L-
 PI Sta 75+86.610
 Δ = 1° 20' 54" (RT)
 L = 58.832
 T = 29.418
 R = 2,500.000
 SE = NC
 DS = 80 KM/H



NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

SEE SHEET NO. 23 FOR -L- GRADE AND PROFILE.

11/01/2008 09:56
 I:\01\Projects\2008\2414B\Drawings\2414B.dwg
 User: pph12.dgn

REVISIONS
R/W REVISION - REVISED PDE & TCE ON PARCEL NO.36.(BAM)
R/W REVISION - ADDED DEED BOOK DESCRIPTION TO PARCEL NO.44. BAM

W. ETHRELL ENGINEERING
TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
CIVIL/SITE DESIGN - GS/RPS - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING ENGINEERS, INCORPORATED
300 Pasquot Drive, Suite G-10
Raleigh, N.C. 27609

METRIC

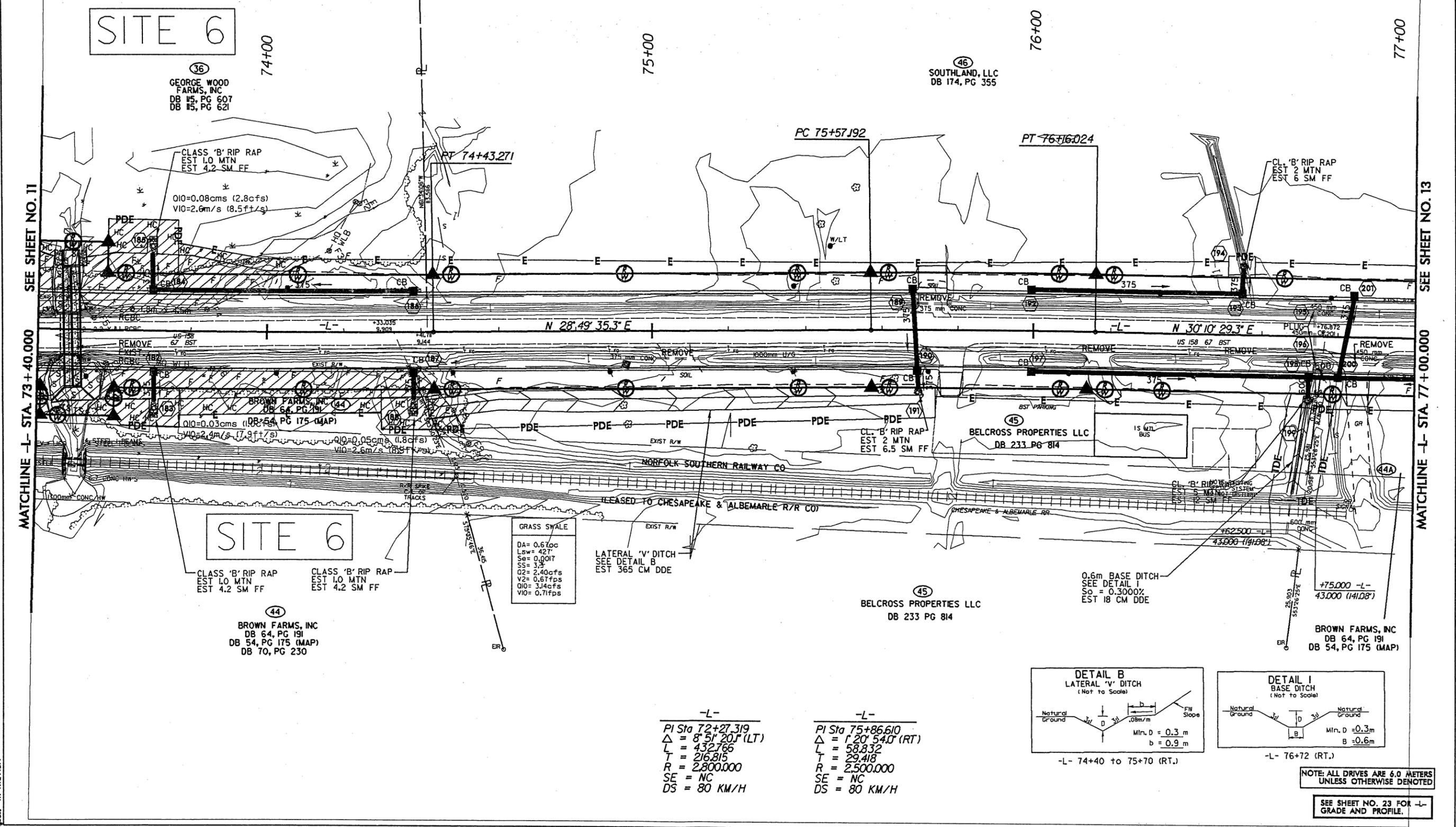
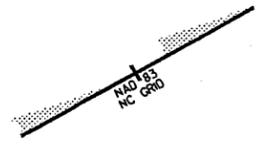
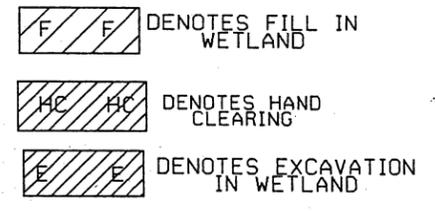
PROJECT REFERENCE NO. R-2414B SHEET NO. 12

R/W SHEET NO.

ROADWAY DESIGN ENGINEER HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

CONST. REV.
R/W REV.

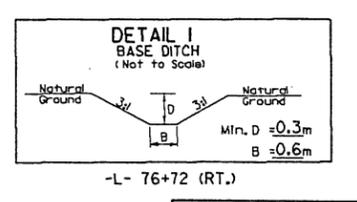
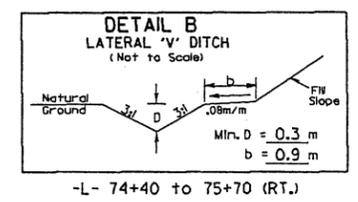


SEE SHEET NO. 11
MATCHLINE -L- STA. 73 + 40.000

SEE SHEET NO. 13
MATCHLINE -L- STA. 77 + 00.000

-L-
PI Sta 72+27.319
 $\Delta = 8^{\circ}51'20''$ (LT)
L = 432.766
T = 216.815
R = 2.800.000
SE = NC
DS = 80 KM/H

-L-
PI Sta 75+86.610
 $\Delta = 1^{\circ}20'54''$ (RT)
L = 58.832
T = 29.418
R = 2.500.000
SE = NC
DS = 80 KM/H

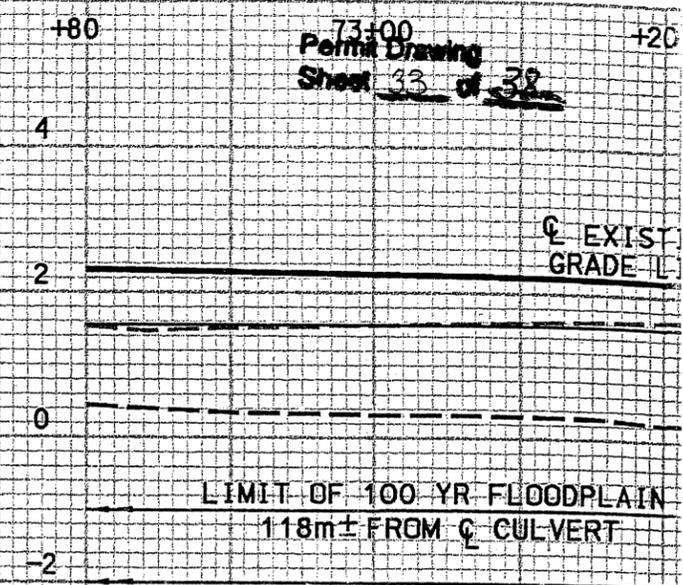
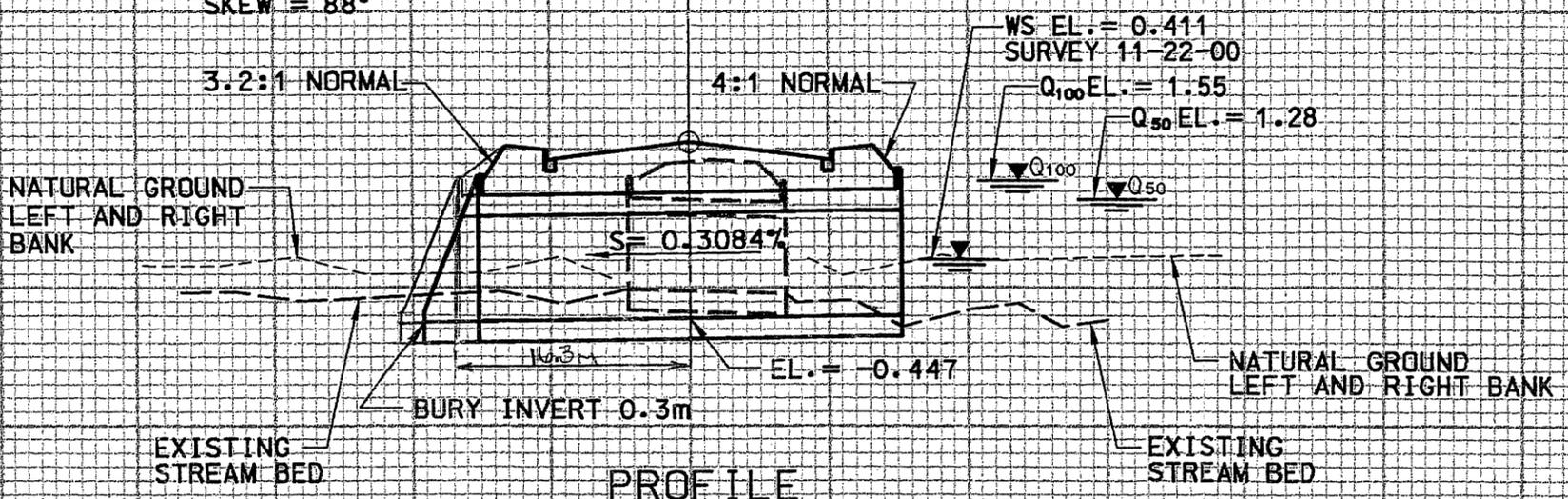


NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED

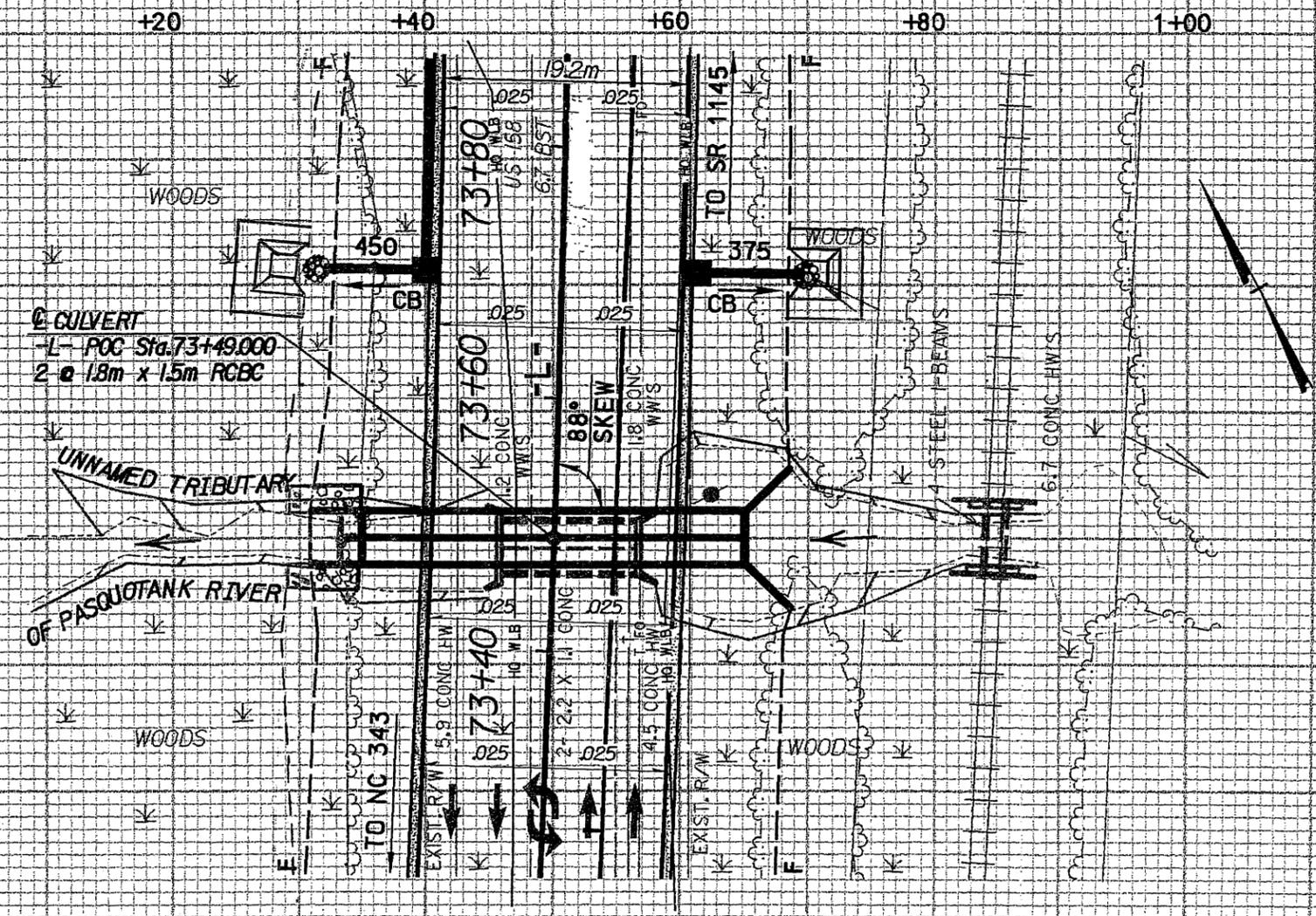
SEE SHEET NO. 23 FOR -L- GRADE AND PROFILE.

11/15/2008 10:56
 c:\p1\work\2414b\drawings\2414b.dwg
 p112.dwg
 p112.dwg

STA. 73+49.000 -L-
 2 @ 1.8 x 1.5m RCBC
 G.P. EL. = 2.103
 SKEW = 88°

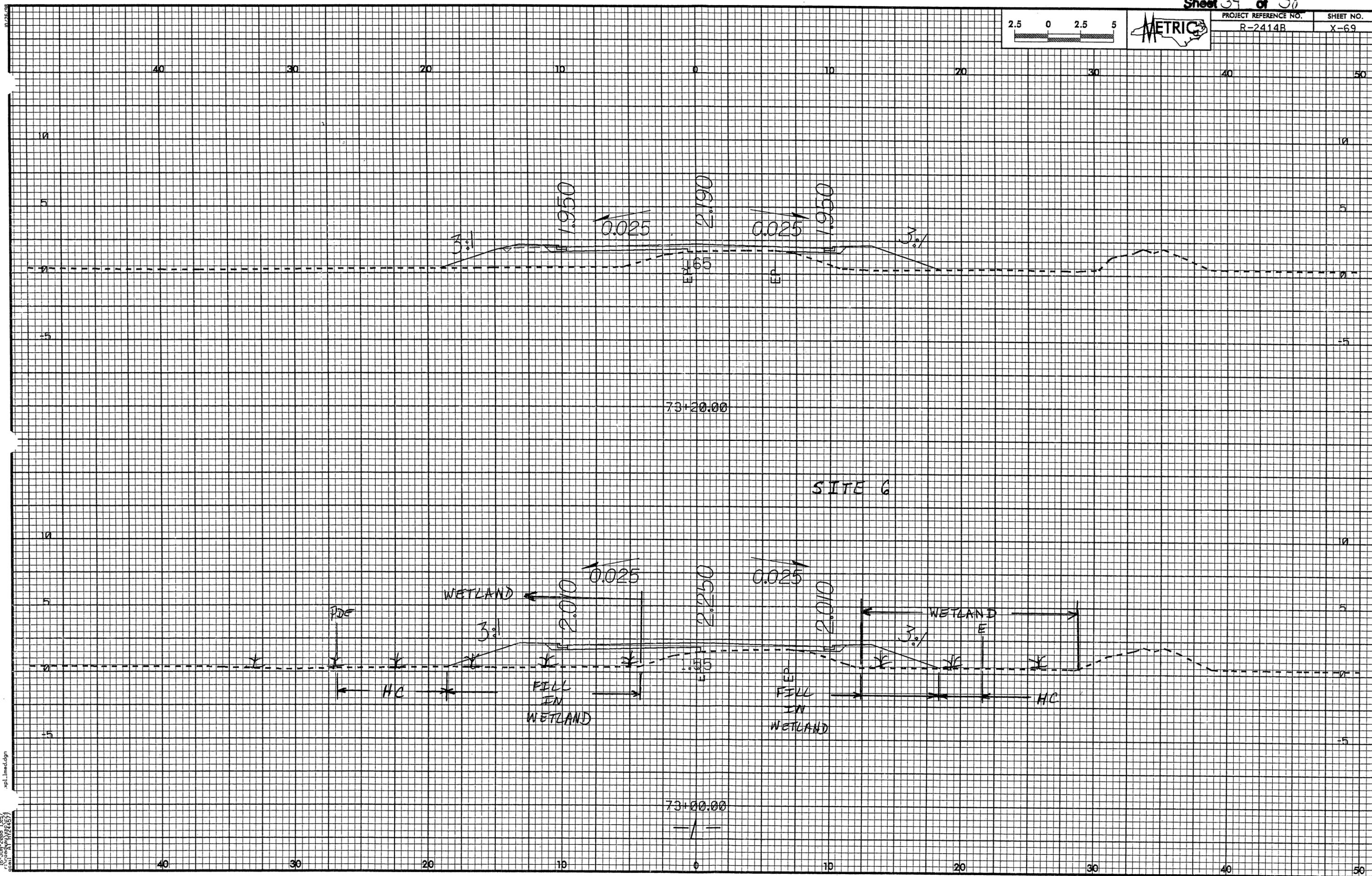
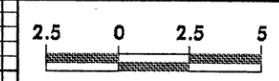


PROFILE



PLAN

HORIZ. SCALE 1:500
 VERT. SCALE 1:200

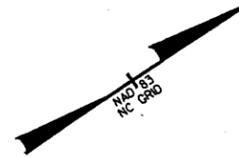


16 JUN 2008 13:57
r:\projects\102457
final.dwg

REVISIONS

R/W REVISION - REVISED ROW, PDE & TCE ON PARCEL NOS. 71, 74, 75, 76 & 77. REVISED FLAGGING DUE TO THE ELIMINATION OF EQUATLTY.(BAM)
 R/W REVISION - ADDED PARCEL NO. 71A & REVISED THE PROPERTY OWNER NAMES ON PARCEL NO. 71A & 74. BAM

DENOTES FILL IN WETLAND
 DENOTES HAND CLEARING

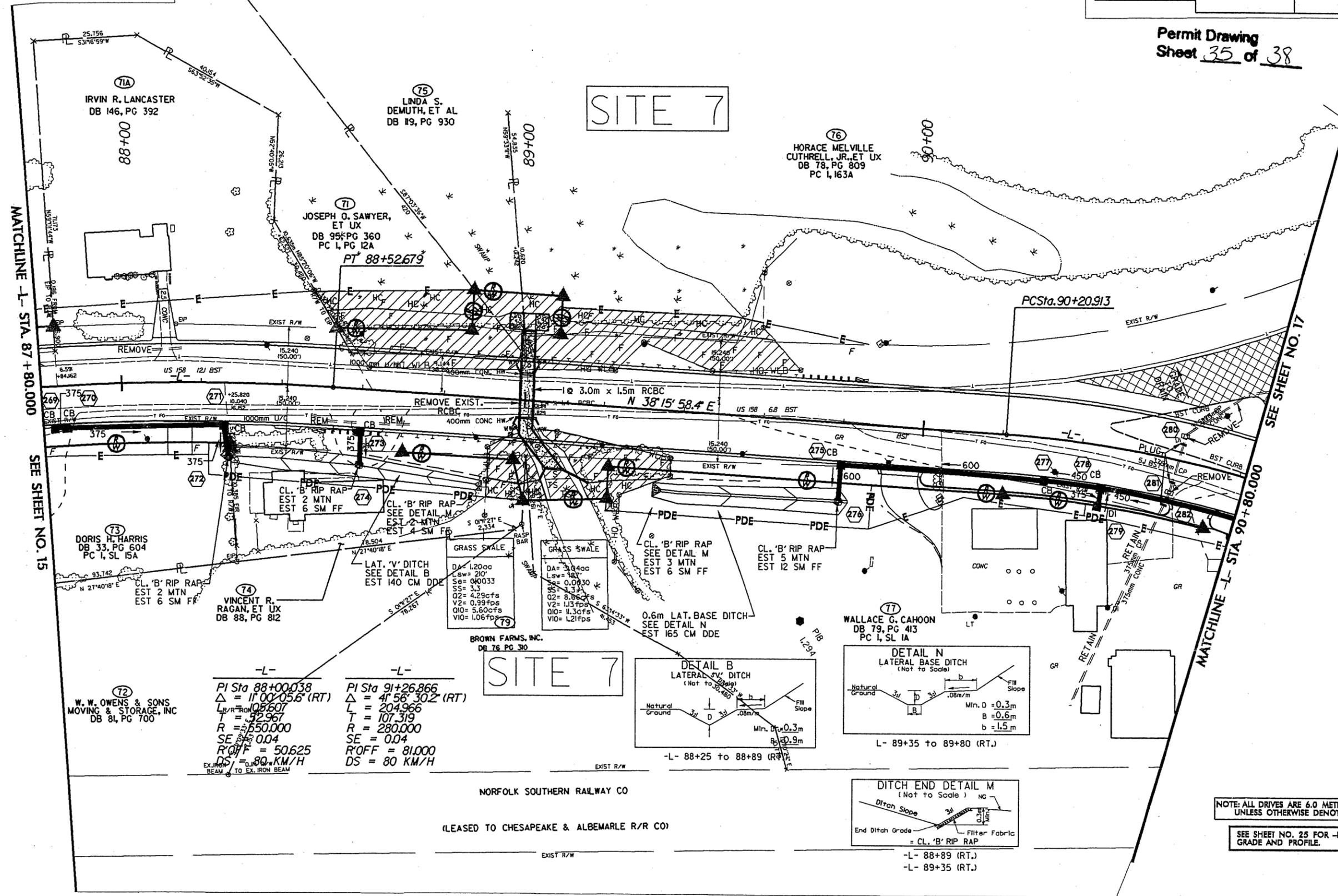


W. BETHRELL ENGINEERING
 TRANSPORTATION PLANNING/DESIGN - BRIDGE/STRUCTURE DESIGN
 CIVIL/SITE DESIGN - QS/QPS - CONSTRUCTION OBSERVATION

TRANSITE CONSULTING ENGINEERS, INCORPORATED
 300 Pensacola Drive, Suite G-10
 Raleigh, N.C. 27609

PROJECT REFERENCE NO. R-2414B	SHEET NO. 16
R/W SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	
CONST. REV.	
R/W REV.	

Permit Drawing
 Sheet 35 of 38



MATCHLINE -L- STA. 87+80.000

SEE SHEET NO. 15

SEE SHEET NO. 17

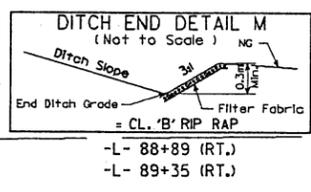
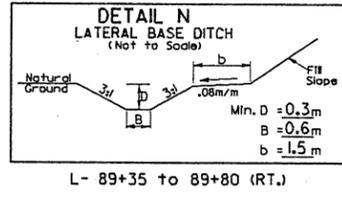
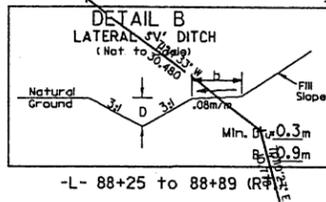
MATCHLINE -L- STA. 90+80.000

(72) W. W. OWENS & SONS
 MOVING & STORAGE, INC
 DB 81, PG 700

-L-
 PI Sta 88+00.038
 $\Delta = 11^{\circ}00'05.6''$ (RT)
 $L = 108.607$
 $T = 92.967$
 $R = 550.000$
 $SE = 0.04$
 $R/OFF = 50.625$
 $DS = 80$ KM/H
 EXISTING BEAM TO EX. IRON BEAM

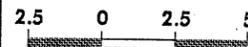
-L-
 PI Sta 91+26.866
 $\Delta = 41^{\circ}56'30.2''$ (RT)
 $L = 204.966$
 $T = 107.319$
 $R = 280.000$
 $SE = 0.04$
 $R/OFF = 81.000$
 $DS = 80$ KM/H

NORFOLK SOUTHERN RAILWAY CO
 (LEASED TO CHESAPEAKE & ALBEMARLE R/R CO)



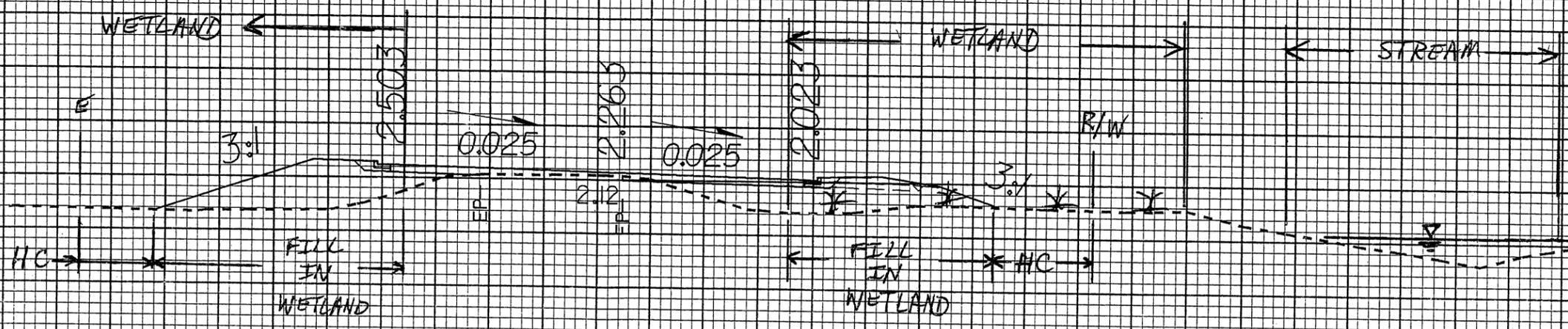
NOTE: ALL DRIVES ARE 6.0 METERS UNLESS OTHERWISE DENOTED
 SEE SHEET NO. 25 FOR -L- GRADE AND PROFILE.

11/21/2008 10:58 AM AT P:\2414B\Drawings\2414B.dwg



Permit Drawing
Sheet 38 of 38

SITE 7

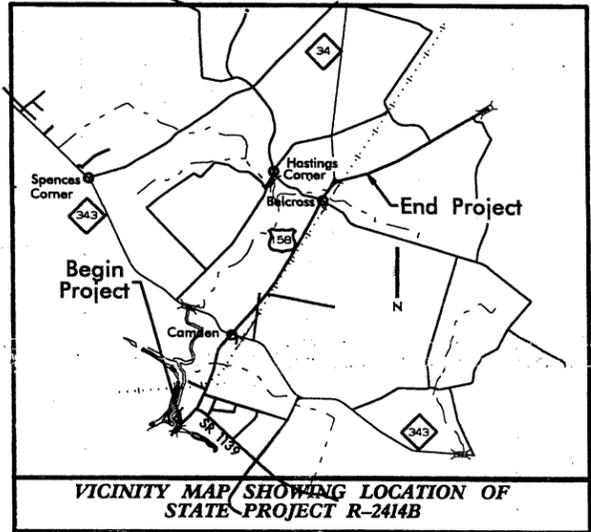


16-JUN-2008 14:21
C:\p\proj\2414B\2414B.dgn
User: jpl

09/08/99

TIP PROJECT: R-2414B

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



STATE OF NORTH CAROLINA DIVISION OF HIGHWAYS

UTILITY PERMIT PLANS CAMDEN COUNTY

LOCATION: US 158-NC 34 FROM SOUTH OF SR 1257
TO EAST OF NC 34 IN BELCROSS

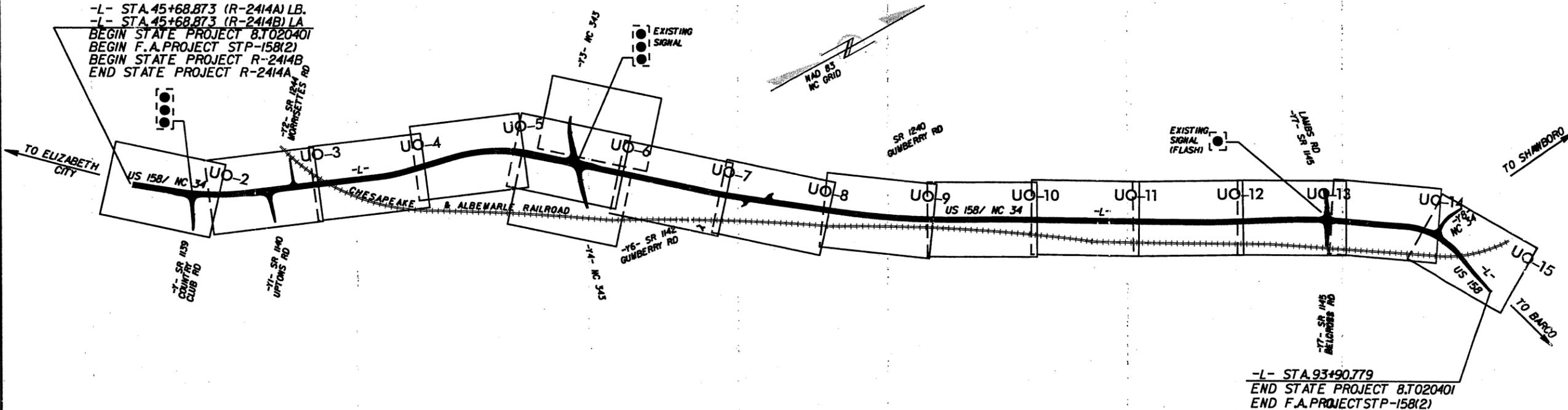
TYPE OF WORK: UTILITIES RELOCATION

ALL DIMENSIONS IN THESE PLANS ARE IN METERS UNLESS OTHERWISE SHOWN

T.L.P. NO.	SHEET NO.
R-2414B	UO-1

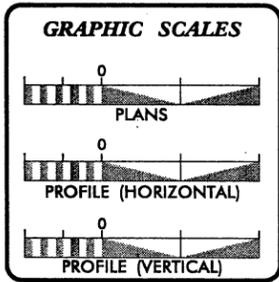
Utility Permit Drawing
Sheet 1 of 15

-L- STA. 45+68.873 (R-2414A) LB.
 -L- STA. 45+68.873 (R-2414B) LA
 BEGIN STATE PROJECT 8.T020401
 BEGIN F.A. PROJECT STP-158(2)
 BEGIN STATE PROJECT R-2414B
 END STATE PROJECT R-2414A



-L- STA. 93+90.779
 END STATE PROJECT 8.T020401
 END F.A. PROJECT STP-158(2)

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-15	UTILITY BY OTHERS PLAN SHEETS

- UTILITY OWNERS ON PROJECT
- (1) PIEDMONT NATURAL GAS
 - (2) DOMINION POWER
 - (3) CHARTER CATV
 - (4) EMBARQ
 - (5) MEDIACOM

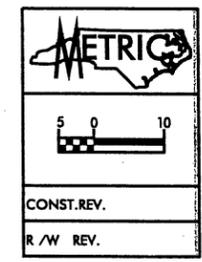
PREPARED IN THE OFFICE OF:
 DIVISION OF HIGHWAYS
 DESIGN SERVICES
 UTILITY SECTION

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

Roger Worthington, P.E. UTILITIES SECTION ENGINEER
 Corey Bousquet, P.E. UTILITIES SQUAD LEADER PROJECT ENGINEER
 Britt McCurry UTILITIES PROJECT DESIGNER

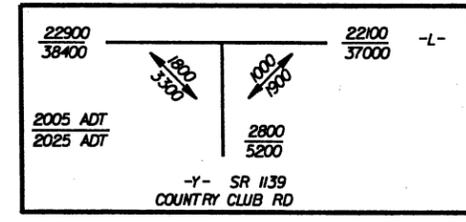
07-SEP-2010 15:36
R:\UT\11\files\RD\Ut\ProJ\wt_land_permit\2414b_ut_uotsh.dgn
kkamil AT UC0237482

Utility
Permit Drawing
Sheet 2 of 15



UTILITIES BY OTHERS

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

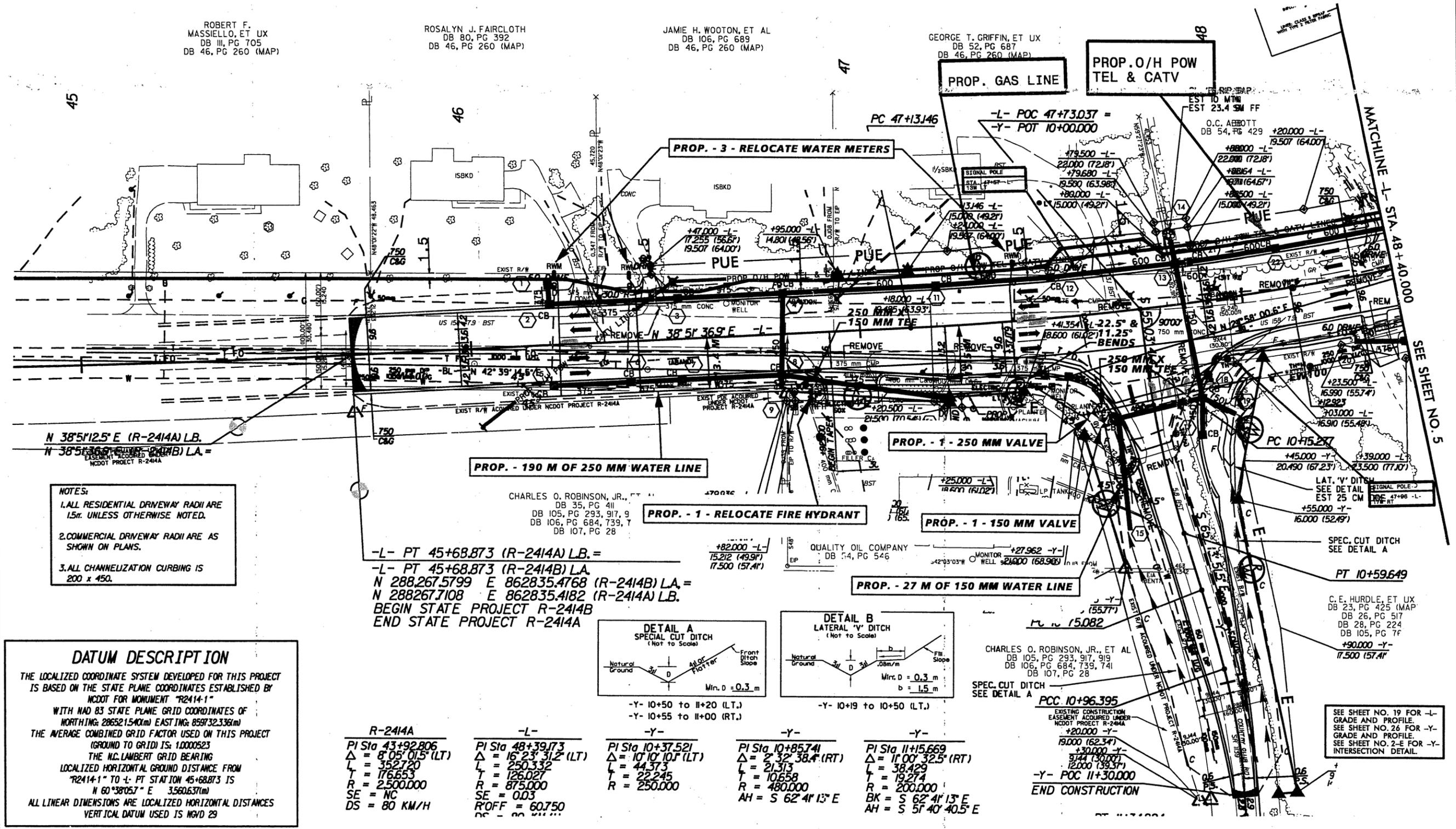


ROBERT F. MASSIELLO, ET UX
DB III, PG 705
DB 46, PG 260 (MAP)

ROSALYN J. FAIRCLOTH
DB 80, PG 392
DB 46, PG 260 (MAP)

JAMIE H. WOOTON, ET AL
DB 106, PG 689
DB 46, PG 260 (MAP)

GEORGE T. GRIFFIN, ET UX
DB 52, PG 687
DB 46, PG 260 (MAP)



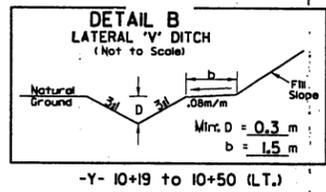
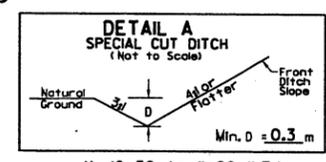
- NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5x UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "R2414-1" WITH NAD 83 STATE PLANE GRID COORDINATES OF NORTHING: 286521.540(m) EASTING: 859732.336(m) THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 1.0000523 THE N.C. LAMBERT GRID BEARING LOCALIZED HORIZONTAL GROUND DISTANCE FROM "R2414-1" TO L- PT STATION 45+68.873 IS N 60°38'05.7" E 3.560637(m) ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES VERTICAL DATUM USED IS NGVD 29

CHARLES O. ROBINSON, JR., ET AL
DB 35, PG 411
DB 105, PG 293, 917, 9
DB 106, PG 684, 739, 7
DB 107, PG 28

-L- PT 45+68.873 (R-2414A) L.B. =
-L- PT 45+68.873 (R-2414B) L.A.
N 288,267.5799 E 862835.4768 (R-2414B) L.A. =
N 288267.7108 E 862835.4182 (R-2414A) L.B.
BEGIN STATE PROJECT R-2414B
END STATE PROJECT R-2414A



R-2414A	-L-	-Y-	-Y-	-Y-
PI Sta 43+92.806	PI Sta 48+39.73	PI Sta 10+37.521	PI Sta 10+85.741	PI Sta 11+56.669
Δ = 8°05'01.5" (LT)	Δ = 16°23'31.2" (LT)	Δ = 10°10'10.1" (LT)	Δ = 2°32'38.4" (RT)	Δ = 11°00'32.5" (RT)
L = 352.720	L = 250.332	L = 44.373	L = 21.313	L = 38.429
T = 176.653	T = 126.027	T = 22.245	T = 10.658	T = 19.274
R = 2,500.000	R = 875.000	R = 250.000	R = 480.000	R = 200.000
SE = NC	SE = 0.03		AH = S 62°41'13" E	BK = S 62°41'13" E
DS = 80 KM/H	R'OFF = 60.750		AH = S 51°40'40.5" E	

SEE SHEET NO. 19 FOR -L- GRADE AND PROFILE.
SEE SHEET NO. 26 FOR -Y- GRADE AND PROFILE.
SEE SHEET NO. 2-E FOR -Y- INTERSECTION DETAIL.

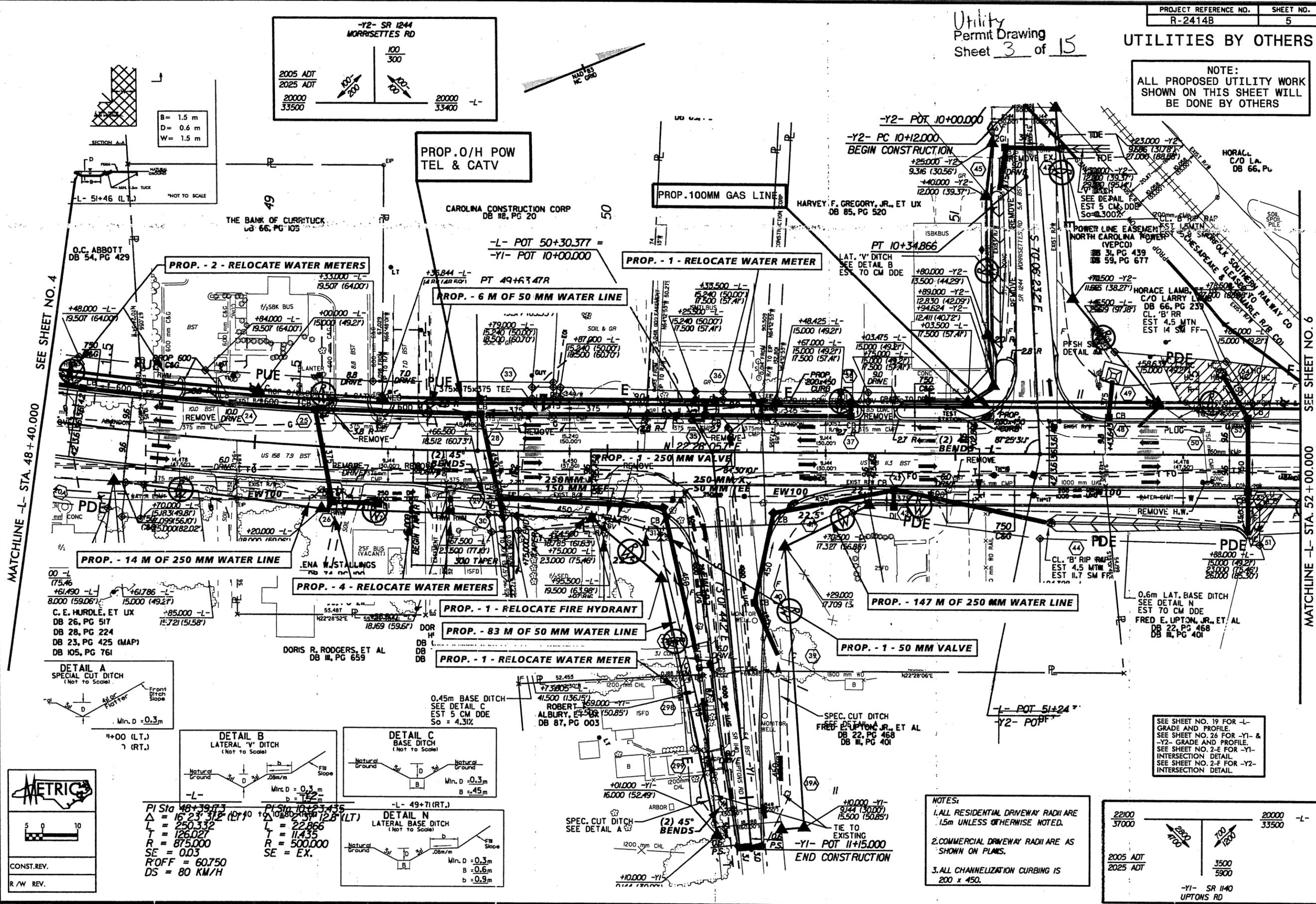
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Utility
Permit Drawing
Sheet 3 of 15

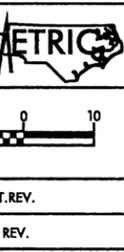
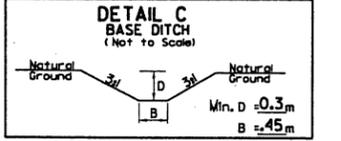
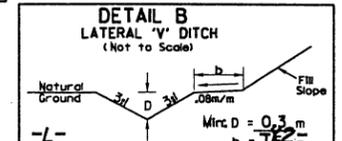
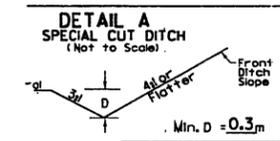
UTILITIES BY OTHERS

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



MATCHLINE -L- STA. 48+40.000

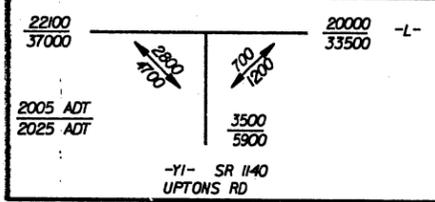
MATCHLINE -L- STA. 52+00.000



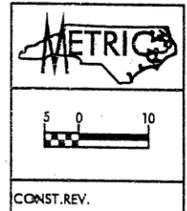
PI Sta 48+39.73
Δ = 16.23 312 (LT) 40
L = 250.332
T = 126.027
R = 875.000
SE = 0.03
R'OFF = 60.750
DS = 80 KM/H

-L- 49+71 (RT.)
Δ = 10.880 750 128 (LT)
L = 22.866
T = 11.435
R = 500.000
SE = EX.

NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
3. ALL CHANNELIZATION CURBING IS 200 x 450.



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UTILITIES BY OTHERS

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

PROP. 100MM GAS LINE

PROP. O/H POW TEL & CATV

PROP. - 20 M TRENCHLESS INSTALLATION OF 75 MM IN SOIL
19 M TRENCHLESS INSTALLATION OF 75 MM NOT IN SOIL

PROP. U/G POWER & TEL BY DIRECTIONAL BORE
PROP. 100MM GAS LINE BY DIRECTIONAL BORE

PROP. - 53M OF 75 MM FORCE MAIN SEWER

STA 55+21
45° BEND, BEGIN PROPOSED TRENCHLESS INSTALLATION

PROP. - 1 - RELOCATE WATER METER

PROP. - 8 M OF 250 MM WATER LINE

PROP. - 8 M OF 250 MM WATER LINE

PROP. - 5 M OF 40 MM FORCE MAIN SEWER

PROP. - 2 - RELOCATE WATER METERS

PROP. - 6 M OF 50 MM WATER LINE

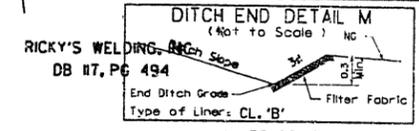
PROP. - 1 - RELOCATE FIRE HYDRANT

PROP. - 1 - RELOCATE WATER METER

PROP. - 9 - RELOCATE WATER METERS

PROP. - 45 M OF 250 MM WATER LINE

PROP. - 19 M TRENCHLESS INSTALLATION OF 250 MM IN SOIL
19 M TRENCHLESS INSTALLATION OF 250 MM NOT IN SOIL



DETAIL B LATERAL 'V' DITCH

NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 15m UNLESS OTHERWISE NOTED.
2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
3. ALL CHANNELIZATION CURBING IS 200 x 450.

■ = 125 MONOLITHIC CONCRETE ISLAND

Utility Permit Drawing Sheet 4 of 15 revised 9/25/10

SEE SHEET NO. 5

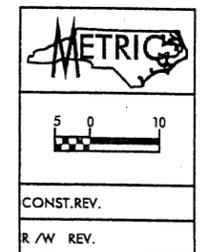
MATCHLINE -L- STA. 52+00.000

MATCHLINE -L- STA. 55+60.000

SEE SHEET NO. 7

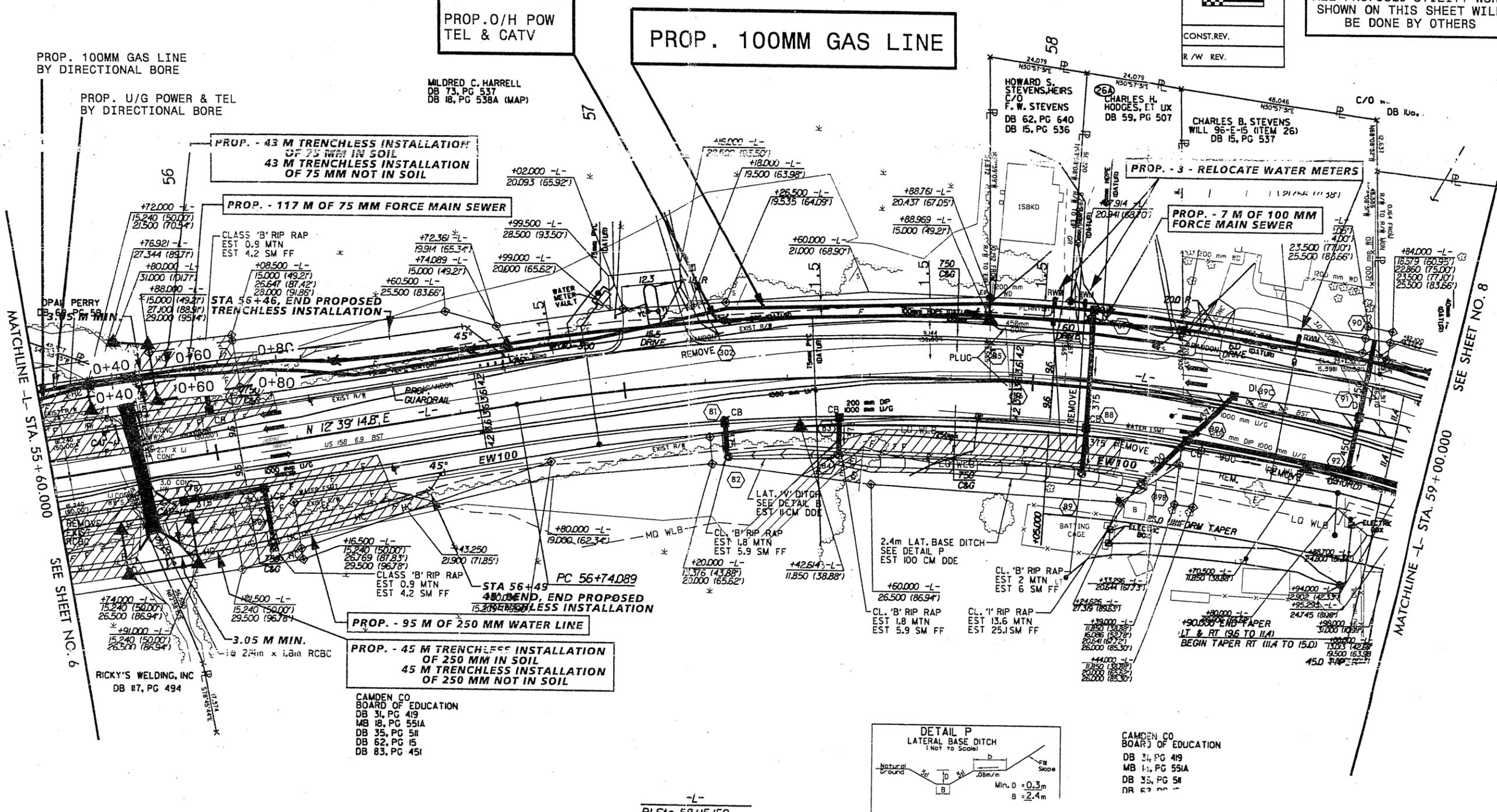
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UTILITIES BY OTHERS

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



PROP. 0/H POW TEL & CATV

PROP. 100MM GAS LINE

PROP. - 43 M TRENCHLESS INSTALLATION OF 75 MM IN SOIL
43 M TRENCHLESS INSTALLATION OF 75 MM NOT IN SOIL

PROP. - 117 M OF 75 MM FORCE MAIN SEWER

PROP. - 3 - RELOCATE WATER METERS

PROP. - 7 M OF 100 MM FORCE MAIN SEWER

PROP. - 95 M OF 250 MM WATER LINE

PROP. - 45 M TRENCHLESS INSTALLATION OF 250 MM IN SOIL
45 M TRENCHLESS INSTALLATION OF 250 MM NOT IN SOIL

PROP. 100MM GAS LINE BY DIRECTIONAL BORE
PROP. U/G POWER & TEL BY DIRECTIONAL BORE

MILDRED C. HARRELL
DB 73, PG 537
DB 18, PG 538A (MAP)

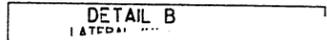
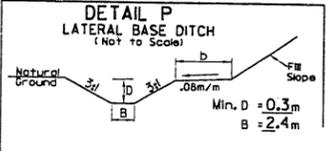
CLASS 'B' RIP RAP
EST 0.9 MTN
EST 4.2 SM FF

STA 56+46, END PROPOSED TRENCHLESS INSTALLATION

STA 56+49, END PROPOSED TRENCHLESS INSTALLATION

MATCHLINE -L- STA. 55 + 60.000
SEE SHEET NO. 6

MATCHLINE -L- STA. 59 + 00.000
SEE SHEET NO. 8



-L-
PI Sta 58+15.59
 $\Delta = 2^{\circ} 45' 17.5''$

CAMDEN CO BOARD OF EDUCATION
DB 31, PG 419
MB 18, PG 551A
DB 35, PG 51
DB 62, PG 15
DB 83, PG 451

- NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

Utility
Permit Drawing
Sheet 5 of 15
revised 9/28/10

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5/14/99

NOTES:
 1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

Utility
 Permit Drawing
 Sheet 7 of 15

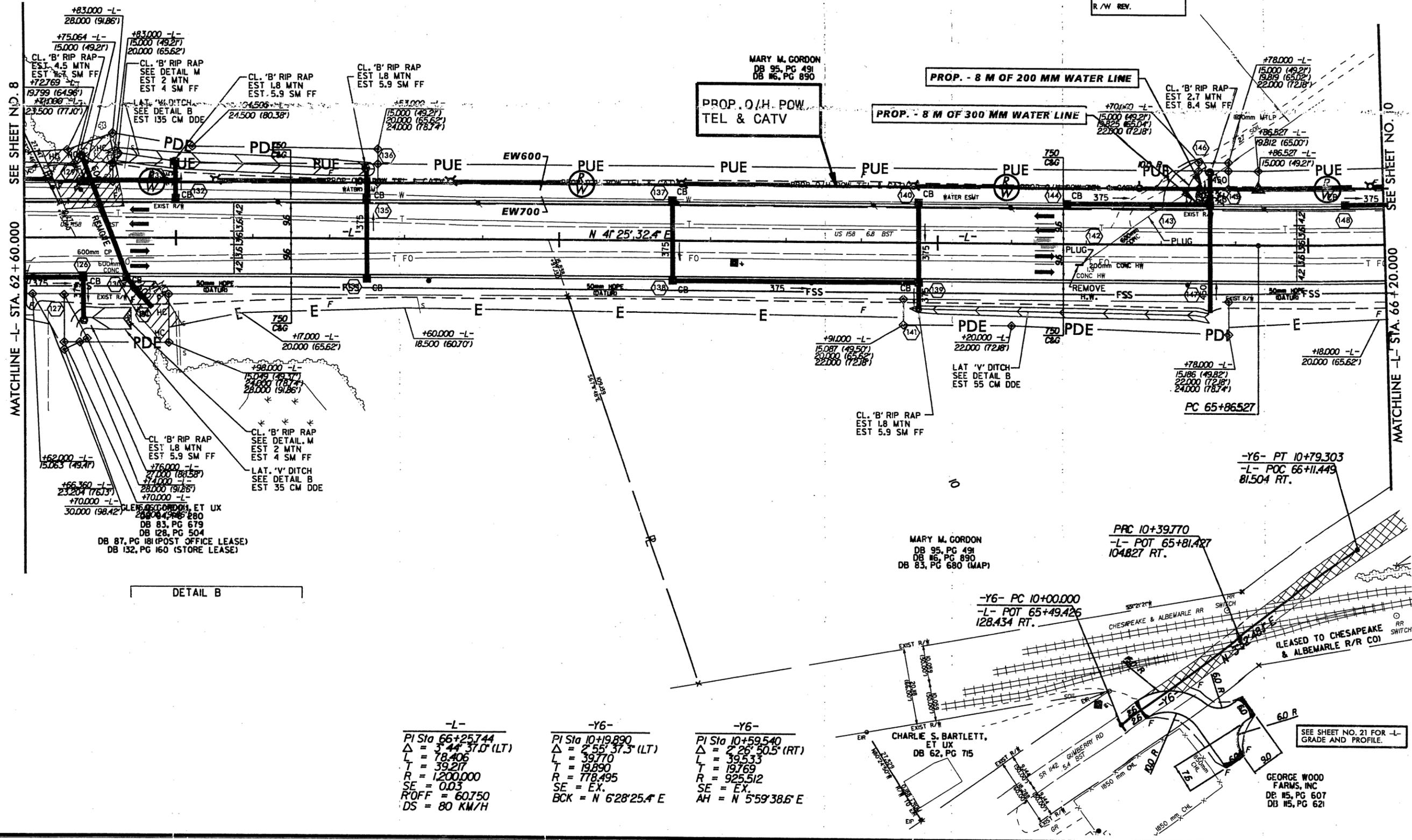
METRIC

CONST. REV.
 R/W REV.

PROJECT REFERENCE NO. R-2414B
 SHEET NO. 9

UTILITIES BY OTHERS

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



SEE SHEET NO. 8
 MATCHLINE -L- STA. 62+60.000

SEE SHEET NO. 10
 MATCHLINE -L- STA. 66+20.000

DETAIL B

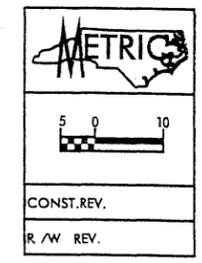
-L-
 PI Sta 66+25.744
 $\Delta = 3^{\circ}44'37.0''$ (LT)
 L = 78.406
 T = 39.217
 R = 1200.000
 SE = 0.03
 R/OFF = 60.750
 DS = 80 KM/H

-Y6-
 PI Sta 10+19.890
 $\Delta = 2^{\circ}55'37.3''$ (LT)
 L = 39.770
 T = 19.890
 R = 778.495
 SE = EX.
 BCK = N 6'28'25.4" E

-Y6-
 PI Sta 10+59.540
 $\Delta = 2^{\circ}26'50.5''$ (RT)
 L = 39.533
 T = 19.769
 R = 925.512
 SE = EX.
 AH = N 5'59'38.6" E

SEE SHEET NO. 21 FOR -L- GRADE AND PROFILE.

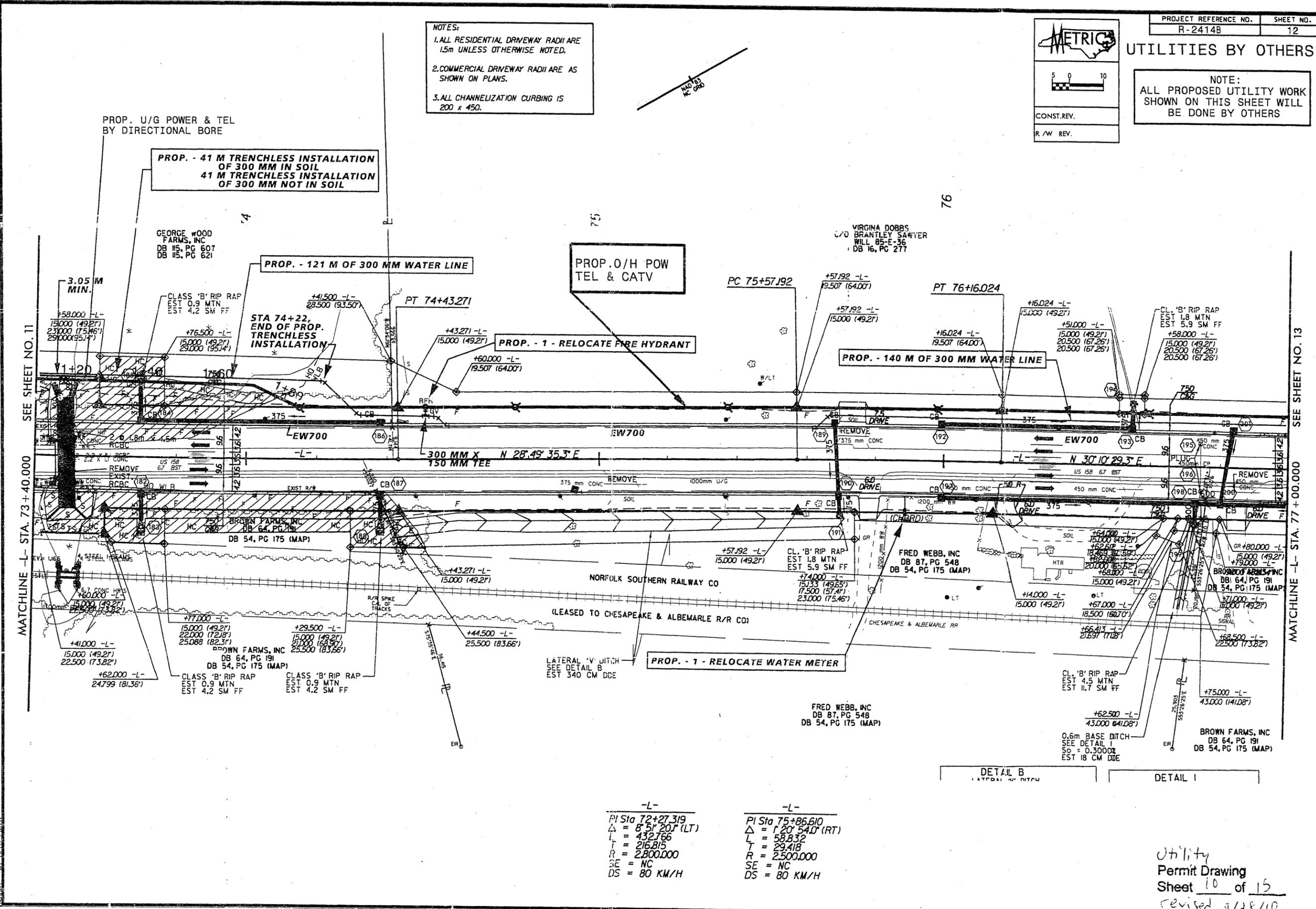
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UTILITIES BY OTHERS

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

NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 15m UNLESS OTHERWISE NOTED.
2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
3. ALL CHANNELIZATION CURBING IS 200 x 450.



MATCHLINE -L- STA. 73 + 40.000 SEE SHEET NO. 11

MATCHLINE -L- STA. 77 + 00.000 SEE SHEET NO. 13

-L-	-L-
PI Sta 72+27.319	PI Sta 75+86.610
Δ = 8' 5" 20" (LT)	Δ = 1' 20" 54" (RT)
L = 432.766	L = 58.832
T = 216.815	T = 29.418
R = 2,800.000	R = 2,500.000
SE = NC	SE = NC
DS = 80 KM/H	DS = 80 KM/H

DETAIL B LATERAL DITCH
DETAIL I

Utility
Permit Drawing
Sheet 10 of 15
revised 9/28/10

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5/14/99

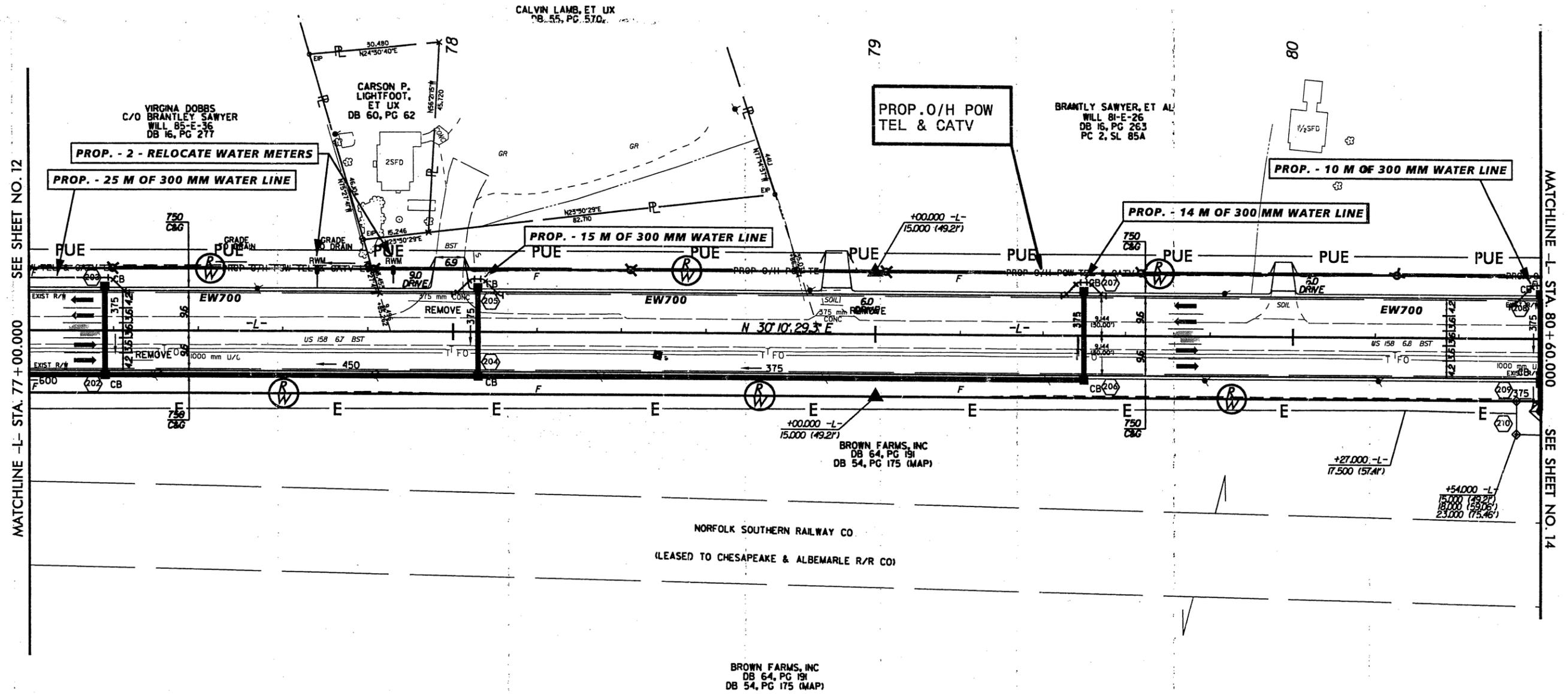
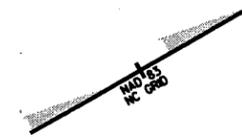
METRIC

CONST. REV.
R/W REV.

UTILITIES BY OTHERS

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

- NOTES:**
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 15m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.



MATCHLINE -L- STA. 77 + 00.000 SEE SHEET NO. 12

MATCHLINE -L- STA. 80 + 60.000 SEE SHEET NO. 14

Utility
Permit Drawing
Sheet 11 of 15

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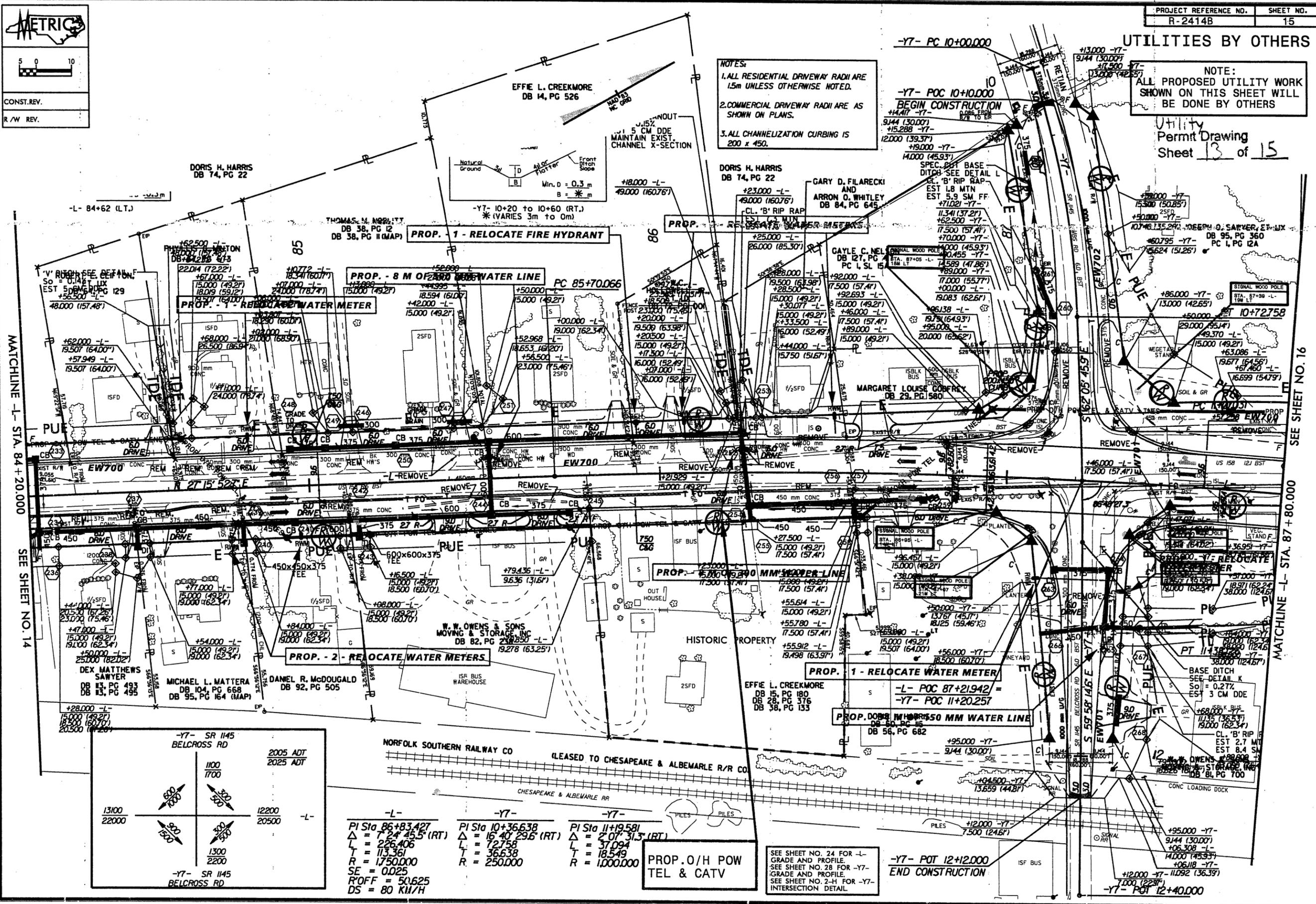
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R/W REV.

UTILITIES BY OTHERS

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

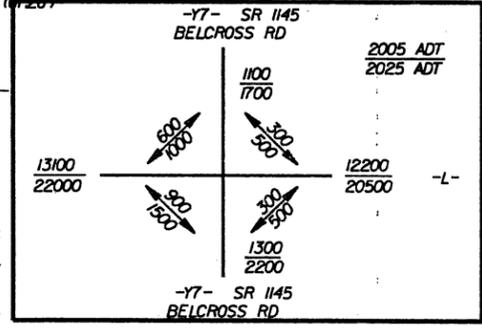
Utility Permit Drawing Sheet 13 of 15

NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
3. ALL CHANNELIZATION CURBING IS 200 x 450.



MATCHLINE -L- STA. 84+20.000
SEE SHEET NO. 14

MATCHLINE -L- STA. 87+80.000
SEE SHEET NO. 16



-L-	-Y7-	-Y7-
PI Sta 86+83.427	PI Sta 10+36.638	PI Sta 11+19.581
$\Delta = 72^\circ 45' 25''$ (RT)	$\Delta = 16^\circ 40' 29.6''$ (RT)	$\Delta = 2^\circ 07' 31.3''$ (RT)
L = 226.406	L = 727.58	L = 37.094
T = 113.361	T = 366.38	T = 18.549
R = 1750.000	R = 250.000	R = 1000.000
SE = 0.025		
R'OFF = 50.625		
DS = 80 KM/H		

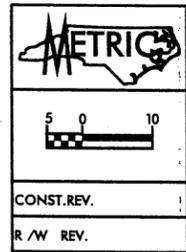
PROP. 0/H POW TEL & CATV

SEE SHEET NO. 24 FOR -L- GRADE AND PROFILE.
SEE SHEET NO. 28 FOR -Y7- GRADE AND PROFILE.
SEE SHEET NO. 2-H FOR -Y7- INTERSECTION DETAIL.

-Y7- POT 12+12.000
END CONSTRUCTION

-Y7- POT 12+40.000

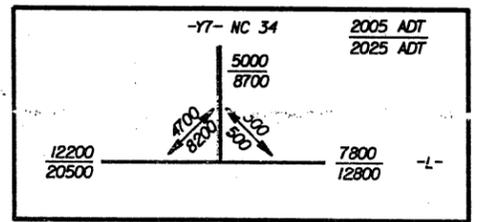
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UTILITIES BY OTHERS

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

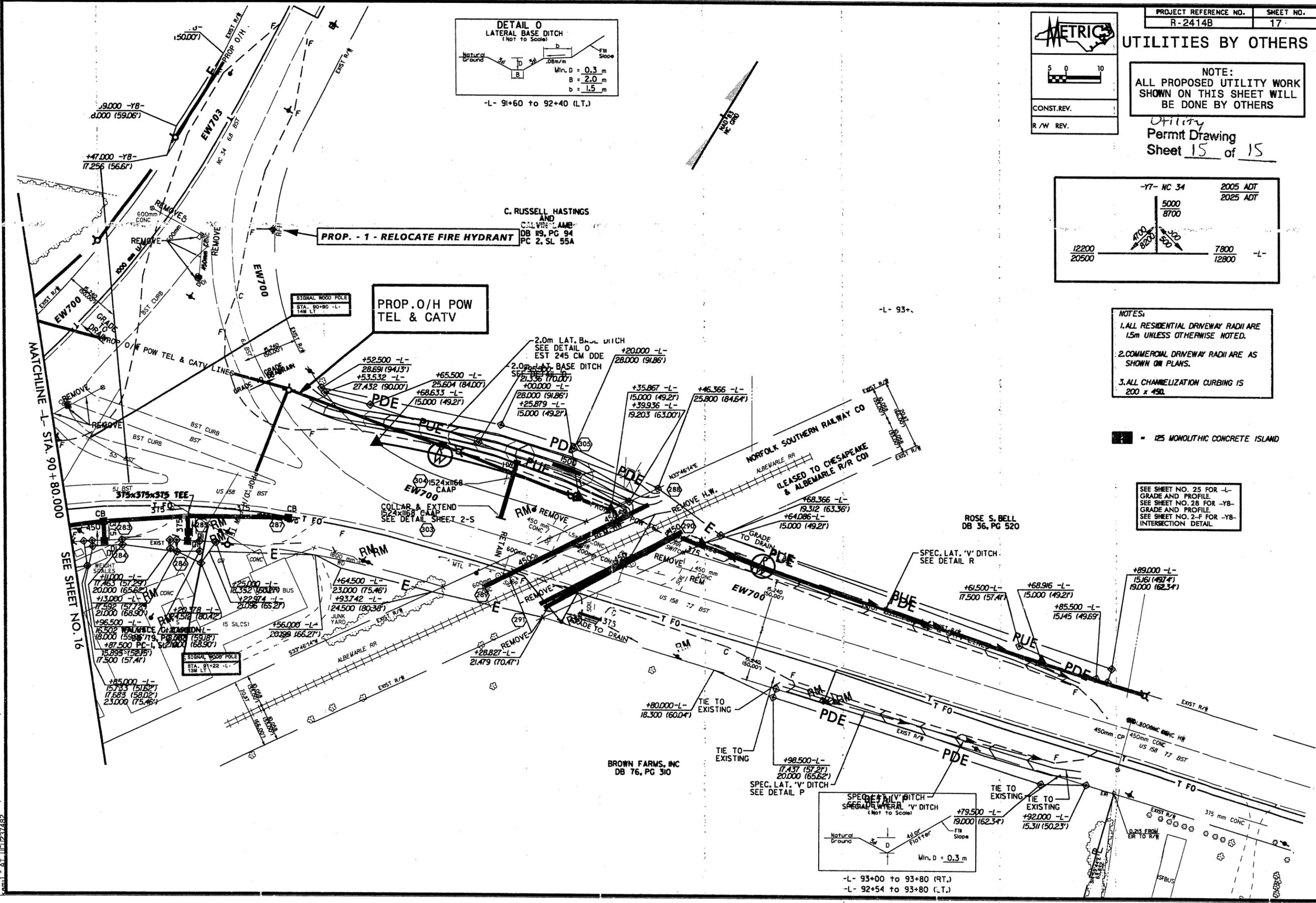
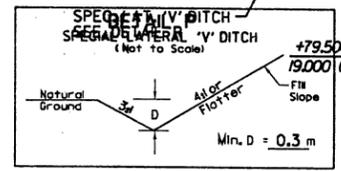
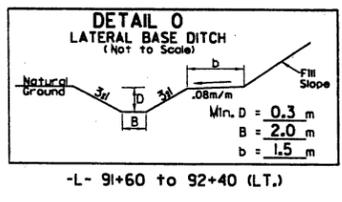
Utility Permit Drawing Sheet 15 of 15



- NOTES:
1. ALL RESIDENTIAL DRIVEWAY RADII ARE 1.5m UNLESS OTHERWISE NOTED.
 2. COMMERCIAL DRIVEWAY RADII ARE AS SHOWN ON PLANS.
 3. ALL CHANNELIZATION CURBING IS 200 x 450.

■ = 125 MONOLITHIC CONCRETE ISLAND

SEE SHEET NO. 25 FOR -L- GRADE AND PROFILE.
SEE SHEET NO. 28 FOR -Y8- GRADE AND PROFILE.
SEE SHEET NO. 2-F FOR -Y8- INTERSECTION DETAIL.



C. RUSSELL HASTINGS AND CALVERT LAMB DB 19, PG 94 PC 2, SL 55A

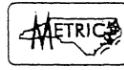
PROP. O/H POW TEL & CATV

PROP. - 1 - RELOCATE FIRE HYDRANT

MATCHLINE -L- STA. 90+80.000 SEE SHEET NO. 16

-L- 93+00 to 93+80 (RT.)
-L- 92+54 to 93+80 (L.T.)

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GEOTECHNICAL ENGINEER

ENGINEER

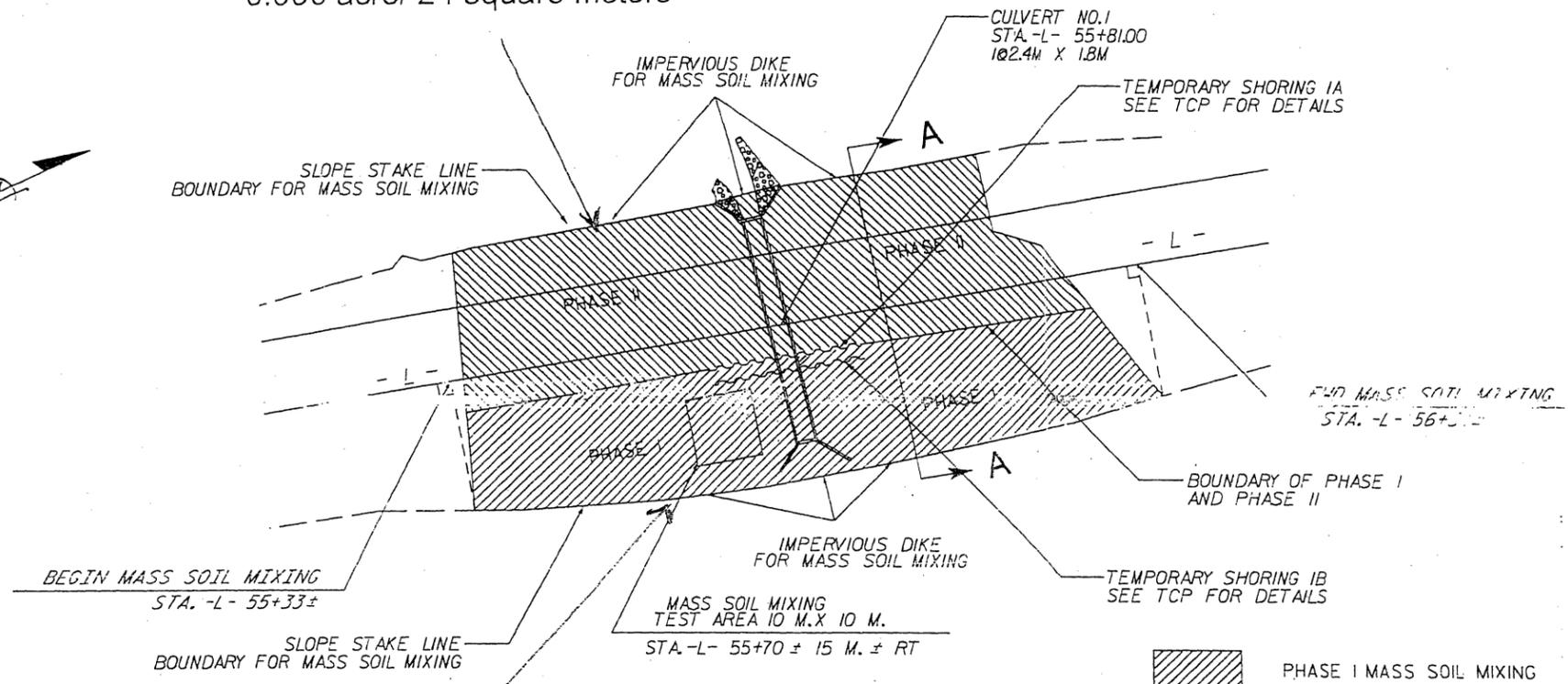
NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32171

YOUNG PAK

SIGNATURE DATE SIGNATURE DATE

Geotechnical Drawings Sheet 1 of 3

0.006 acre/ 24 square meters



0.008 acre/ 31.5 square meters

MASS SOIL MIXING NO.1 PLAN VIEW

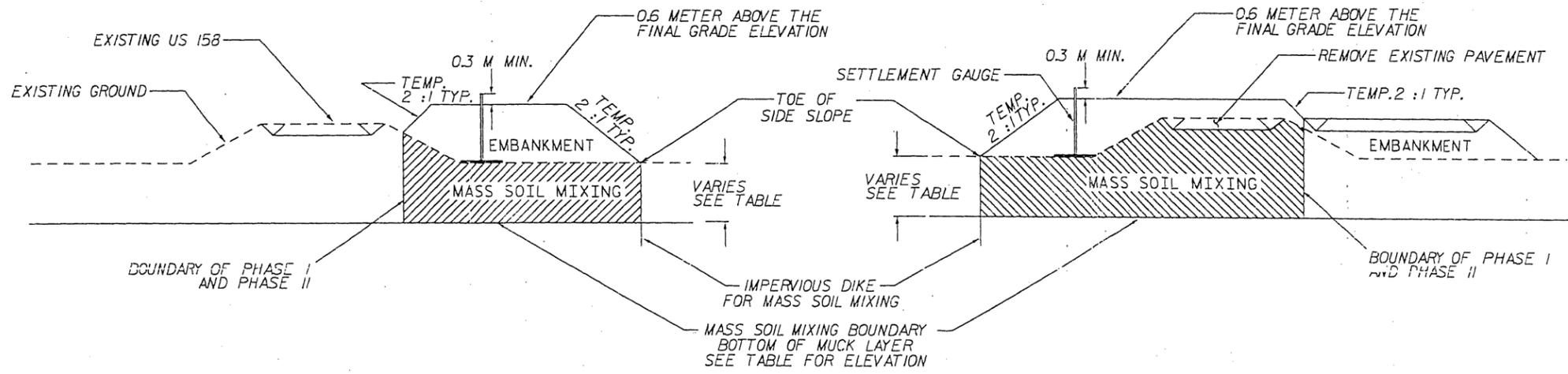
Not To Scale

- PHASE I MASS SOIL MIXING
- PHASE II MASS SOIL MIXING

MASS SOIL MIXING BOTTOM ELEVATIONS

STATION	ELEVATION* (PHASE I)	ELEVATION* (PHASE II)
-L- 55+33.00	-5.5 M	-5.5 M
-L- 55+40.00	-5.5 M	-5.5 M
-L- 55+60.00	-5.5 M	-5.5 M
-L- 55+80.00	-5.5 M	-5.5 M
-L- 56+00.00	-6.0 M	-7.5 M
-L- 56+20.00	-4.5 M	-3.0 M
-L- 56+34.00	-4.5 M	-

* USE A LINEAR INTERPOLATION OF THE ELEVATION BETWEEN THE STATIONS



TRAFFIC PHASE I A-A CROSS SECTION TYP.

Not To Scale

TRAFFIC PHASE II A-A CROSS SECTION TYP.

Not To Scale

DRAFT

PREPARED BY J. PARK	DATE: 08/2010
DRAWN BY K. J. KIM	DATE: 08/2010

GEOTECHNICAL ENGINEERING UNIT

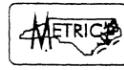
EASTERN REGIONAL OFFICE

WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

TOTAL SHEETS



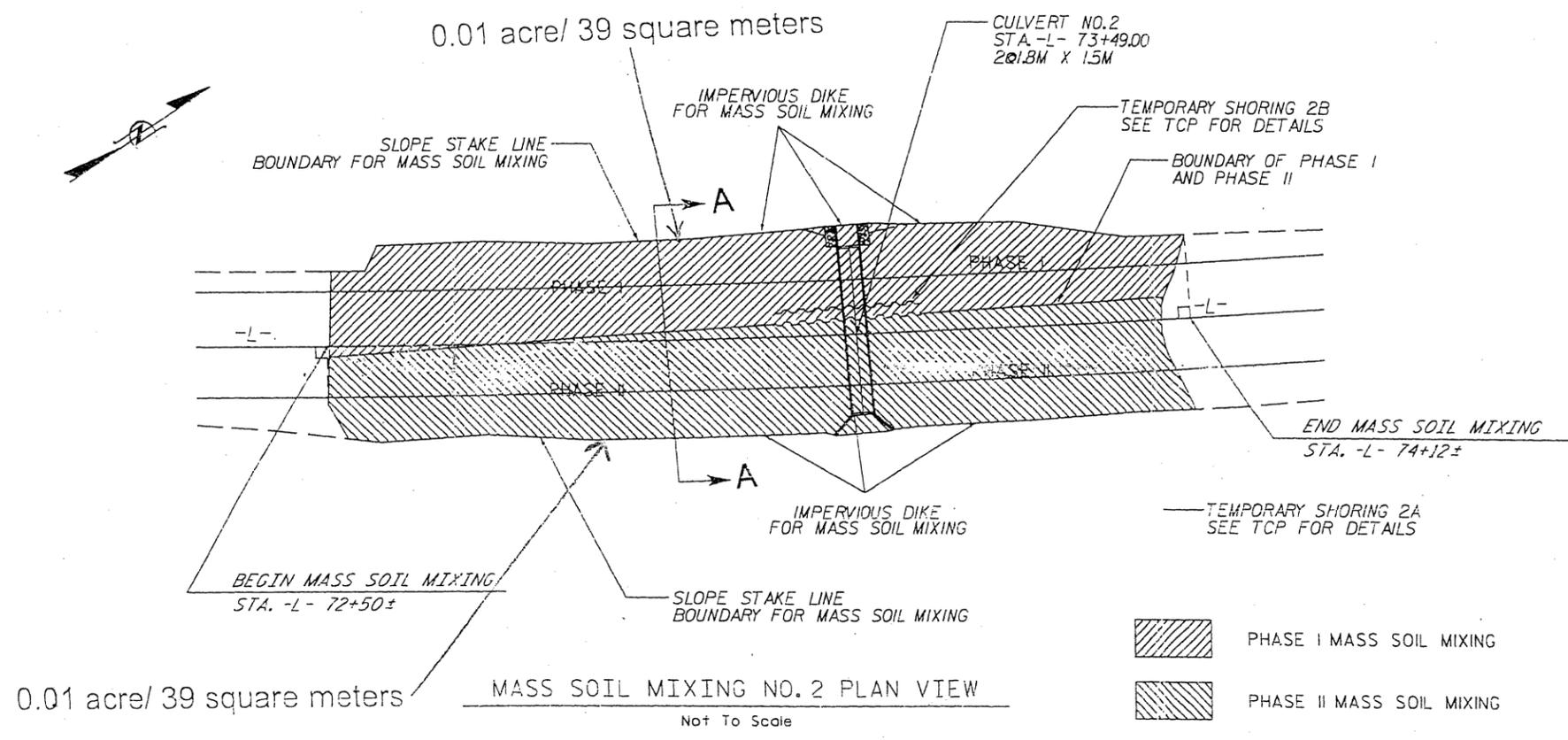
GEOTECHNICAL ENGINEER

ENGINEER

NORTH CAROLINA PROFESSIONAL ENGINEER SEAL 32171 JIN YOUNG PARK

SIGNATURE DATE SIGNATURE DATE

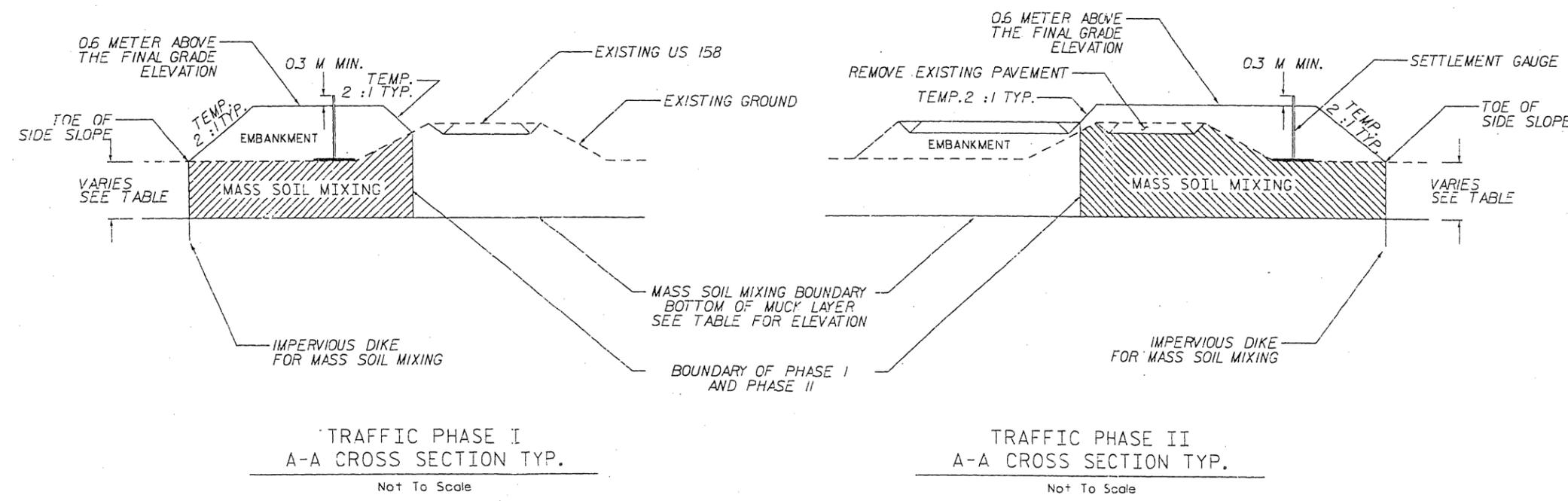
Geotechnical Drawings Sheet 2 of 3



MASS SOIL MIXING BOTTOM ELEVATIONS

STATION	ELEVATION* (PHASE I)	ELEVATION* (PHASE II)
-L- 72+50.00	-1.5 M	-1.0 M
-L- 72+60.00	-1.5 M	-1.0 M
-L- 72+80.00	-2.5 M	-1.5 M
-L- 73+00.00	-4.0 M	-3.0 M
-L- 73+20.00	-5.0 M	-5.0 M
-L- 73+40.00	-5.0 M	-4.0 M
-L- 73+60.00	-3.0 M	-4.0 M
-L- 73+80.00	-1.0 M	-1.0 M
-L- 74+00.00	-1.0 M	-1.0 M
-L- 74+12.00	-1.0 M	-1.0 M

*USE A LINEAR INTERPOLATION OF THE ELEVATION BETWEEN THE STATIONS



DRAFT

GEOTECHNICAL ENGINEERING UNIT

EASTERN REGIONAL OFFICE

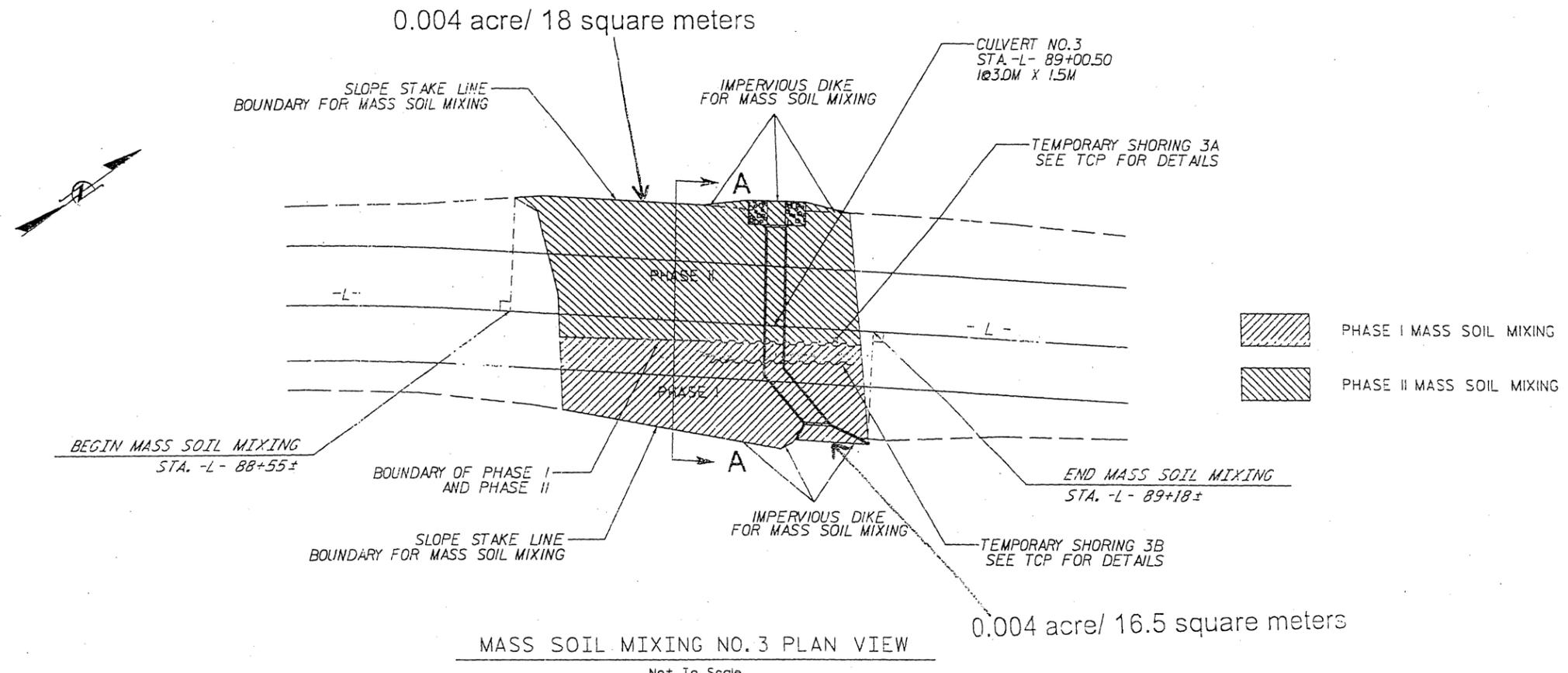
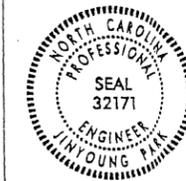
WESTERN REGIONAL OFFICE

STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION
RALEIGH

PREPARED BY J. PARK	DATE 08/2010
DESIGNED BY K. J. KIM	DATE 08/2010

REVISIONS					SHEET NO.
NO.	BY	DATE	NO.	BY	DATE
1			3		
2			4		

TOTAL SHEETS



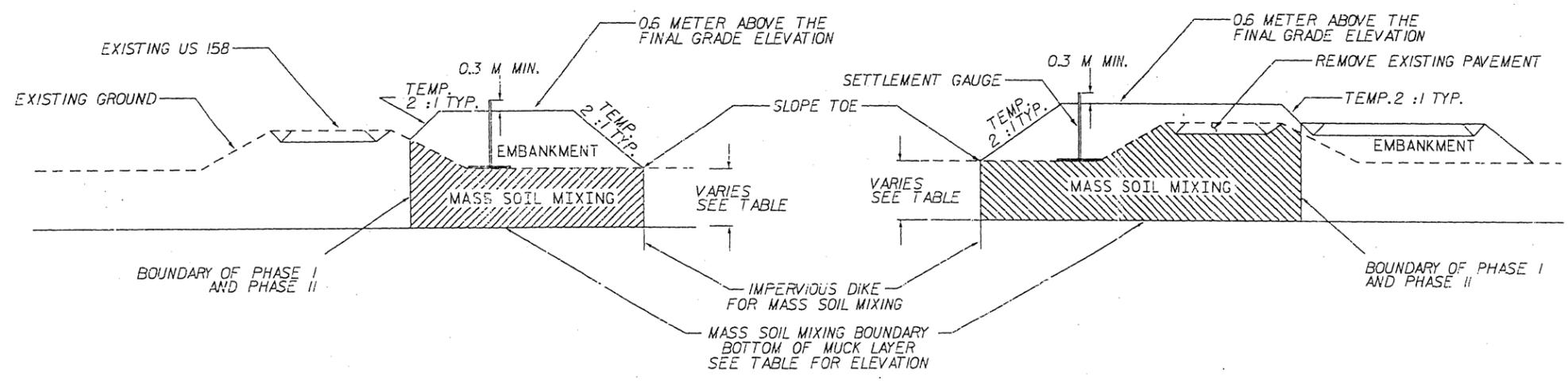
PHASE I MASS SOIL MIXING
 PHASE II MASS SOIL MIXING

MASS SOIL MIXING NO.3 PLAN VIEW
Not To Scale

MASS SOIL MIXING BOTTOM ELEVATIONS

STATION	ELEVATION* (PHASE I)	ELEVATION* (PHASE II)
-L- 88+55.00	-	-1.0 M
-L- 88+80.00	-1.5 M	-1.5 M
-L- 89+00.00	-2.5 M	-2.5 M
-L- 89+18.00	1.0 M	-

* USE A LINEAR INTERPOLATION OF THE ELEVATION BETWEEN THE STATIONS



TRAFFIC PHASE I
A-A CROSS SECTION TYP.
Not To Scale

TRAFFIC PHASE II
A-A CROSS SECTION TYP.
Not To Scale

DRAFT

MASS SOIL MIXING

1.0 GENERAL

The work covered by this provision consists of furnishing all equipment, labor, and materials, and performing all operations required for installing and testing mass soil mixing as specified herein and shown on the contract plans. The term "Mass Soil Mixing" used in this provision is intended as a generic term and refers to a mechanical method of blending in-situ soil with a reagent binder or grout using a mixing tool. The binder or grout is injected and in-situ soils are mixed to achieve a design strength. The purpose of the Soil Mixing program specified herein is to improve the strength and deformation characteristics of the soft organic soils within the limits indicated on the project drawings to assure the stability and performance of the roadway embankment constructed over the treated soil mass. The Contractor shall hire a specialty subcontractor who meets the requirements of the subcontractor qualifications in Section 2.0 below. The Contractor shall perform all work described in this provision in accordance with this provision and the NCDOT Standard Specifications for Road and Structures unless otherwise directed by the Engineer.

2.0 SUBCONTRACTOR QUALIFICATIONS

The mass soil mixing subcontractor shall have a minimum of five continuous years of documented experience in soil mixing and shall provide at least one project manager, site superintendent, and operator with a minimum of three years of documented experience in soil mixing within the last five years. Both the site superintendent and the operator shall be available for this project on a full-time basis.

3.0 SUBMITTALS

- 3.1 Before beginning of mass soil mixing construction, the Contractor shall submit the following for approval by the Engineer. Within 15 days of the receipt of the submittal, the Engineer will notify the Contractor of approval or rejection of the subcontractor's qualification.
- A. Detailed documentation to prove that the subcontractor meets the qualification requirements stated in Section 2.0.
 - B. List of soil mixing projects the subcontractor has performed with contact information of the project owners.
 - C. List of soil mixing projects the project manager has performed with contact information of the project owners.
 - D. List of soil mixing projects the site superintendent has performed with contact information of the project owners.
 - E. List of soil mixing projects the operator has performed with contact information of the project owners.
 - F. Resumes of the project manager, site superintendent, and operator
 - G. Certifications and training records of the operator of soil mixing

3.2 After the Engineer's approval of the mass soil mixing subcontractor, but no less than 30 days before beginning of mass soil mixing construction, the Contractor shall submit the following for approval by the Engineer. Within 30 days of the receipt of the submittal, the Engineer will notify the Contractor of approval or rejection of the submittals. The Contractor shall not perform any soil mixing work until all of the items listed below have been approved by the Engineer.

- A. List and sizes of proposed equipment, tools, binder or grout delivery system including mixing tool used to mix the in-situ soil and binder or grout.
- B. Soil mix design including sources and type of binder material with proportions. Also, proposed binder or grout mixture, mixing rates, flow rates, air injection pressure and volume flow rates, auger/mixing tools rotational speed, auger down pressure, and auger penetration and withdrawal rates.
- C. Mass soil mixing construction sequence and step-by step description of work procedures outlining means and methods to achieve the specified criteria detailed in this Special Provision.
- D. Mass soil mixing construction schedule.
- E. Design plans and supporting engineering analysis and calculations of temporary embankment and slope stabilization to assure stability of both the existing and widened roadway embankments during the mass soil mixing work.
- F. Material suppliers' certifications of quality.
- G. Contractor's Quality Assurance-Quality Control (QA/QC) Plan, including, but not limited to:
 - a. Details and procedures of all testing and sampling
 - b. Measures to be implemented each day during Soil Mixing to monitor, modify, record, and control binder or grout ratios and quantities, mixing time, and other related aspects of the Soil Mixing process
- F. Sample log to be used to report daily production records of mass soil mixing. The log shall contain at least the following information:
 - a. project name
 - b. date, start and finish time, and duration of mixing operation
 - c. machine number
 - d. type of mixing tool
 - e. location of the treated area in terms of station number and offset from -L-
 - f. surface area, depth, and volume of the treatment
 - g. quantity of binder material and injection ratio
 - h. installation air pressure
 - i. rate of insertion and withdrawal of mixing tool
 - j. description of obstructions or interruptions of mass soil mixing operation
 - k. weather

4.0 PRECONSTRUCTION MEETING

After approval of the submittals in Section 3.0, but before starting any mass soil mixing work including the test section, the Contractor shall have a preconstruction meeting to discuss the

details of materials, equipment, construction, inspection, and testing for the mass soil mixing. Schedule this meeting with the representatives of the Department's Resident Engineer, Construction Unit, and Geotechnical Engineering Unit, and the Contractor and the mass soil mixing subcontractor including the project manager, site superintendent, and operator. Notify them of the meeting schedule a minimum of seven days in advance of the meeting.

5.0. SOIL MIXING EQUIPMENT AND STORAGE TANKS FOR BINDER OR GROUT MATERIALS

A. Soil Mixing Equipment

Use self-contained soil mixing rigs for soil mixing. The minimum equipment requirements are:

- a. One or more pressure tanks rated to safely contain an air pressure 8 bar.
- b. Base equipment capable of firmly supporting the mixing tool throughout the installation process.
- c. Torque and rotational speed suitable for thorough mixing.
- d. Specially designed mixing tools with the capacity to construct the required geometries and dimensions as shown in the plan

The soil mixing equipment shall have real-time computer control system to permit accurate and continuous monitoring, recording, and control of the following: binder and water proportioning, grout mix, water-cement ratio, mixing tool depths, binder or grout injection pressures and quantities, auger rotational speeds, auger down pressure, auger advancement and withdrawal rates, and other operations required for mass soil mixing.

The soil mixing equipment shall be of sufficient size, capacity, and torque to perform the required mass soil mixing operations. The equipment shall be capable of advancing through the soft untreated ground or previously installed and cured mass soil mixing area as necessary to complete the work.

Soil mixing equipment must allow the use of compressed air or grout during mixing. Mixing tools must be capable of injecting binder or grout through the mixing tool. Rotate and orient mixing tools sufficiently to break up the in situ soils and disperse and blend with injected binder or grout to form the soil/binder mixture. Continuous auger flights are not allowed. Mixing tools shall be rotated sufficiently fast and be oriented to thoroughly break up the in situ soils and disperse and blend with injected cement/grout to form a homogenous mixture. Mixture rotation speed during mixing shall be chosen by the Soil Mixing Contractor and should not vary by more than 10% at any time.

B. Storage Tanks for Binder Materials or Grout Mixing Plant

Store and deliver binder materials to the mixing points in closed pressure tanks suitable to be used as pressure vessels, for all pressures required including those to be used to load and unload the materials. Provide storage tanks or silos for adequate storage space for

continuous production. The bulk storage equipment includes all pumps, scales, mixers, valves, gauges, and regulating devices required to measure and mix binder.

The grout mixing plant shall include the necessary equipment including a high shear mixer capable of producing a colloidal suspension of cement and additives in water and pumps, valves, hoses, supply lines, and all other equipment as required to adequately supply grout to the mixing tool. Positive displacement grout pumps shall be used to transfer the grout to the mixing auger. The grout pump shall be capable of pumping to the required distance and elevations to provide an adequate supply of grout to the mixing tool. The plant shall be equipped to accept dry or liquid additives in measured amounts. Storage tanks shall be provided (as needed) to store and allow for an adequate supply of batches or continuously mixed grout to the soil mixing machine. Grout shall be agitated until fully mixed and recirculated in the storage tanks to maintain a homogeneous mix and prevent flash set. Grout meters or calibrated tanks shall be provided to measure injection volumes.

6.0 MATERIALS

A. Reagent Binder

Use a binder material consisting of cement and slag. The percentage of slag shall not exceed 50% of the binder material by weight. The binder shall be delivered in a powder form. Protect the binder material from damage by moisture while in transit to and in storage at the job site.

1. Cement:

Use Type I or II Portland Cement in accordance with Section 1024 of the Standard Specifications for Roads and Structures. No other types of cement will be allowed. All cement shall be homogeneous in composition and properties, and shall be manufactured using the same method at one plant by the same manufacturer. Material which has become caked due to moisture absorption shall not be used. Bags of cement shall be stacked no more than ten bags high to avoid compaction. Cement containing lumps or foreign material that may be deleterious to the mass soil mixing operation shall not be used. Tricalcium aluminate content shall not exceed 7%.

2. Slag

Use ground granulated blast furnace slag. Other types of slag or fly ash may be allowed upon approval of the Engineer.

3. Additives

All additives shall be included in the mix design submittal for the Engineer's review and approval. No admixtures shall be used without the Engineer's approval.

B. Grout

Grout shall be a stable homogeneous mixture of cement, slag, and water. The percentage of slag shall not exceed 50% of the binder material by weight. The Contractor shall not change grout composition unless conditions encountered so require, in which case the Contractor shall submit the change in writing with substantiating reasons for the Engineer's review and

approval. The requirements of cement, slag, additives, and water for grout are the same as the reagent binder material above.

C. Water

Water used in mass soil mixing shall be clean and potable, of neutral pH, and free from sewage, oil, acid, alkali, salts, organic materials, and other deleterious contamination. If the Contractor obtains water from sources other than public drinking water supply, then the Contractor shall provide water quality test data to prove that the water meets this requirement.

7.0 FIELD TEST SECTION

The Contractor shall construct a mass soil mixing test section before beginning a full-scale production work. The test section construction is to verify that the Contractor is capable of performing the mass soil mixing work in accordance with this provision and other contract requirements. In addition, the test section construction is to verify that the Contractor's proposed construction method, procedures, and equipment will produce the mass soil mixing meeting the acceptance criteria specified in this provision. The test section shall be constructed at a location designated in the plan unless otherwise directed by the Engineer. The size of the test section shall be 9 to 10 meter in width and 9 to 10 meter in length unless otherwise approved by the Engineer. The Contractor shall use the same materials, equipment, and construction method and procedures for test section construction as he proposes for production mass soil mixing in this project. The quality control and quality assurance (QC/QA) measures specified in this provision shall also be implemented in the test section construction. The sampling and testing requirements for the test section are as follows:

- 1) Unconfined Compressive Testing of Wet Samples: one sample at every two meter depth of the treated soil mass at two different locations selected by the Engineer
- 2) Cone Penetration Test (CPT): two CPT tests at locations selected by the Engineer down to a depth of two meters below the bottom of the mass soil mixing
- 3) Coring and Unconfined Compressive Testing: a continuous coring down to the bottom of the mass soil mixing at two different locations selected by the Engineer

The Engineer will determine acceptance or rejection of the test section based on the acceptance criteria specified in this provision. If the test section is accepted by the Engineer, it will become part of the production mass soil mixing and will be paid for accordingly. The Contractor may continue the mass soil mixing operation upon the Engineer's acceptance of the test section. If the test section fails to meet the acceptance criteria, the Contractor shall cease all soil mixing operations and submit a revised soil mix design, a list of revised equipment and tools, and/or revised construction methods and procedures including the applicable items in Section 3.2 for the Engineer's review and approval. The Engineer will notify the Contractor of approval or rejection of the submittals within 10 days of the receipt of the submittals. After the Engineer's approval of the revised submittals, the Contractor shall construct a new test section at a location designated by the Engineer following the same requirements applied in the previous test section construction. If the second test section fails to meet the acceptance criteria, the Contractor shall either replace all key personnel of the mass soil mixing subcontractor including the project manager, site superintendent, and operator, or change the

mass soil mixing subcontractor. In either case, the Contractor shall resubmit all of the items listed in Section 3.0 for the Engineer's review and approval. The Engineer will notify the Contractor of approval or rejection of the submittals within 15 days of the receipt of the submittals. This process shall repeat until the test section is accepted by the Engineer.

8.0 CONSTRUCTION METHODS

- 8.1 The Contractor shall furnish all labor, equipment, and materials necessary to conduct all mass soil mixing operations. The Contractor shall use same procedures, materials, and construction methods and equipment used in the test section construction throughout the production mass soil mixing work. Variations may be proposed with the condition that the Contractor demonstrates by constructing a new test section as required in Section 7.0 that the revised procedures, materials, or construction methods or equipment will provide mass soil mixing that meets all of the acceptance criteria. The Contractor shall continuously monitor the soil mixing operation, and if necessary, shall propose modification to any aspects of the work, such as water/cement ratio, to achieve compliance with contract requirements and acceptance criteria, all subject to the Engineer's review and approval. If at any time, the Contractor's equipment, methods, or materials do not produce a satisfactory mass soil mixing, the Contractor shall stop the soil mixing operation and submit for the Engineer's review and approval a plan of action to produce mass soil mixing that meets the acceptance criteria described in this provision.
- 8.2 Relative to the overall site requirements and preparatory work prior to mass soil mixing work, the Contractor shall perform all survey layouts and utility clearances associated with the mass soil mixing operation and coordination will all local, state, and federal agencies having jurisdiction, and all utility companies having facilities that could be impacted by the mass soil mixing construction. Also, The Contractor shall perform clearing and grubbing prior to soil mixing operation in accordance with Section 200 of the NCDOT Standard Specifications for Roads and Structures.
- 8.3 The Contractor shall design, construct, and maintain stable working surfaces for all mass soil mixing operations. The Contractor shall provide timber crane mats of sufficient width and length to form a stable working platform for the mixing equipment and other support equipment.
- 8.4 The Contractor shall design, construct, and maintain temporary embankment and slope stabilization measures during the entire mass soil mixing operation to assure stability of both the existing and widened roadway embankments. The subcontractor of mass soil mixing shall design the temporary embankment and slope stabilization and submit the design plans and supporting engineering analysis and calculations as specified in Section 3.0 of this provision.
- 8.5 The Contractor shall mobilize and maintain a sufficient number of personnel and equipment to meet the schedule completion dates and other milestones. The Contractor shall coordinate all mass soil mixing operations with all other aspects of the work in the contract, including the installation of impervious dikes for the culvert construction.

- 8.6 The Contractor shall design a mass soil mixing sequence layout to achieve the plan area coverage as designated on the contract plans, to the required elevations and limits. The total depth of penetration shall be measured and recorded. Pre-measured marks on the mixing tool may be used to determine the depth of mixing. The Contractor shall perform the mass soil mixing operation in such a manner to produce a homogeneous mass of mixed soils meeting all of the acceptance criteria specified in this provision.
- 8.7 At all times during and at completion of mass soil mixing operations, the site shall be maintained clear of all debris. Any spoil material shall be piped or channeled to holding ponds or other retention structures within the work area. The Contractor shall take all necessary precautions and implement measures to prevent any materials from the mass soil mixing operation from entering storm drain structures, drainage courses, other utility lines, or from leaving the site via surface runoff. The Contractor shall prevent any materials from migrating to any water body. In the event any materials enter storm drain structures, drainage courses, or other utilities, including, but not limited to, surface water bodies beyond the limits of the mass soil mixing operations, the Contractor shall collect and remove all of these materials, and perform all other required/necessary remediation that may be directed by the Engineer or responsible environmental agency, at no additional cost or schedule impact to the Department. The Contractor shall conduct all mass soil mixing operations to conform to the in-water construction moratorium, sedimentation and turbidity control requirements, and all other regulatory requirements of federal, state, and local agencies having jurisdiction over the work.
- 8.7 The Soil Mixing tool shall penetrate the ground as the binder powder or grout is injected into the soil from a nozzle located on the mixing tool. The tool is rotated at a high speed while it is moved back and forth through a known volume of soil until the designed weight of binder or injection rate of grout has been added. The binder take (or injection rate) per cubic meter of soil shall be adjusted upwards if minimum strength parameters can not be obtained. Pumps will be used to transfer the binder from the pressure vessel to the Soil Mixing rig. The pressure vessel will be equipped with a load cell which indicates the weight of the binder in the vessel. Inject a known weight of binder into a known volume of soil to achieve the required binder concentration. Inject binder or grout by air pressure as the mixing tool advances through the soil. The number of passes necessary for either mixing or reagent injection must be submitted for review and acceptance before proceeding with production mixing.
- 8.8 Alert the Engineer immediately if the installation process is interrupted due to obstructions or a dense layer above the planned mixing elevation. Obstructions shall be penetrated with approved methods of either removing the obstructions or loosening them, including any dense soil layers, sufficiently to allow Soil Mixing unless otherwise directed by the Engineer.
- 8.9 The operator shall monitor and adjust as necessary during soil mixing the feeding of material, the injection air pressure, and the rates of rotation. All metering equipment shall be calibrated at the beginning of the project and as frequently as recommended by

the metering equipment manufacturer. Submit the calibration results to the Engineer. Keep the injection of binder within 10 percent of the target unit weight per volume.

- 8.10 Within 24 hours of completion of the mass soil mixing operation, place a separation fabric on the entire surface of freshly mixed soil area and cover it with 0.6 m thickness of the common borrow material for embankment construction meeting the NCDOT Standard Specifications for Road and Structures. Wait until the mixed soil mass achieves the required design strength specified in the acceptance criteria herein. The Contractor shall not place any other fill materials over the mass soil mixing area until the mixed soil mass has attained the required strength. After the mixed soil mass has attained the required strength, the cover material shall be compacted to the required density specified in the NCDOT Standard Specifications. Do not place vibratory rollers on the mixed soil mass until strength requirements have been achieved.
- 8.11 Use a mix design to produce the completed and cured mixed soil mass that meets the acceptance criteria specified in Section 11.0 in this provision. However, do not produce too stiff mixed soil mass that will make timber pile penetration and sheet pile installation practically impossible.

9.0 QUALITY ASSURANCE AND QUALITY CONTROL PROGRAM

- 9.1 The Contractor shall implement a Quality Assurance and Quality Control (QA/QC) program to confirm the mass soil mixing work satisfies the specified performance requirements and acceptance criteria. The QA-QC program shall be implemented as part of the mass soil mixing work, at no additional cost to the Department.
- 9.2 The Contractor shall undertake general Quality Control for construction of homogeneous mixed soil mass, which shall include, at a minimum, real time (computer) monitoring and graphical recording of the following soil mixing parameters continuously throughout the depth of each operation:
- a. Drilling and mixing depth
 - b. Mixing tool penetration and withdrawal rates
 - c. Mixing tool rotation speeds
 - d. Binder or grout injection rate of each auger
 - e. Amperage resistance to penetration.
- 9.3 The Contractor shall obtain, form, preserve, cure, and transport the core samples, including all sample labeling and documentation in the format accepted by the Engineer.
- 9.4 QC Daily Reports shall be submitted for each work shift, within two hours of the end of each work shift. Each QC Daily Report shall document progress of the mass soil mixing

construction, present the results of QC parameter monitoring, and present the results of the strength testing of wet-grab samples and continuity of core samples.

- 9.5 The QC Daily Report shall, at a minimum, include the following results of the QC parameters monitored for each mass soil mixing operation:
- a. Identification of Area of Work, by way of geographic orientation and stations/offsets
 - b. Rig number and names of the Superintendent and the Operator
 - c. Date and time (start and finish) of each operation
 - d. Mass soil mixing treated surface area, top and bottom elevations, and volume.
 - e. Binder or grout injection pressure, rate and volume
 - f. Date, time, plan location, and elevation and other details of all mass soil mix wet grab samples and any other samples taken during the work shift, and the names of persons responsible for obtaining the wet samples
 - g. Description of obstructions, interruptions, or other difficulties experienced during installation and how they were resolved, and notes of observations of any unusual behavior of any equipment during the mass soil mixing operation
 - h. Graphical results derived from real time (computer) monitoring for each rig operation at each 0.3 meter of penetration and withdrawal, and for every minute of mixing tool rotation without vertical motion:
 1. Shaft rotation speed and revolution number at each 0.3 meter of penetration.
 2. Penetration and withdrawal rates in meter per minute vs. depth.
 3. Quantity of binder or grout injection of each rig operation at every 0.3 meter vertical interval for insertion, mixing, and withdrawal.

10.0 TESTING REQUIREMENTS

The Contractor shall hire a geotechnical firm to conduct the following testing to verify that the mass soil mixing product meets the acceptance criteria specified in Section 11.0 of this provision. Use a geotechnical firm prequalified by the Contractual Services Unit of the Department for each type of testing. The Engineer reserves the right to request additional testing at no additional cost to the Department if the test was performed improperly or the test results are inconclusive or unreliable. In addition, the Contractor shall assist the Department's

personnel to perform its own testing to assure the mass soil mixing product meets the design requirements.

10.1 Unconfined Compressive Testing of Wet Samples

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both drilling for geotechnical investigations (work code 3050) and laboratory and technician certification to collect wet samples for unconfined compressive testing. After completion of the mass soil mixing of every 200 square meters of surface area, collect a minimum of one sample at every two meter depth of the treated soil mass as directed by the Engineer. Prepare the test specimens and perform the compressive strength tests in accordance with the ASTM D 1633.

10.2 Cone Penetration Test (CPT)

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both geotechnical engineering services of roadway foundation investigation and design and drilling for geotechnical investigations (work code 3050) to conduct cone penetration tests as specified herein. Conduct a minimum of one CPT per 100 square meter of mass soil mixing area a minimum of seven days after completion of the mass soil mixing work at a location designated by the Engineer. The CPT shall be performed down to a depth of two meters below the bottom of the mass soil mixing.

10.3 Coring and Unconfined Compressive Testing

The Contractor shall hire a geotechnical firm meeting the prequalification requirements for both drilling for geotechnical investigations (work code 3050) and laboratory and technician certification to perform coring of the treated soil mass and unconfined compressive strength testing of the coring samples. Perform a minimum of one coring per 200 square meter of mass soil mixing area a minimum of seven days after completion of the mass soil mixing work at a location designated by the Engineer in the presence of the Engineer or his/her designee. The coring shall be performed continuously down to the bottom of the mass soil mixing in a manner to achieve the maximum recovery possible.

Coring shall generally comply with the requirements of ASTM D2113, except that the core barrel shall produce core samples of either PQ or 101 mm diameter, in runs of 1.52 meters. The coring shall be done only with triple-tube core barrel with split inner barrel, using wire-line equipment. Core bit shall have fine diamonds, be stepped, and have face flush or outward water discharge. The Contractor shall fill each core hole with neat cement grout (w/c = 1:1) at the completion of coring in that hole, using tremie grout methods.

Core sample storage and transportation shall comply with ASTM D5079, except that as a moisture loss prevention measure, the Contractor shall promptly (within 30 minutes of removal of core from the core barrel) completely wrap each soil-cement core specimen in two layers of 4-mil-thick clear plastic, and tape the open sides and ends shut to prevent moisture loss. If the Engineer or the Contractor must make further examination of a core specimen, then such examination shall be done in the controlled environment room with 100% controlled humidity

conditions with the specimen exposed for as brief a time as possible, but not for more than 45 minutes.

Contractor Documentation of core shall include a detailed field log with sketch and description of the treated soil column, that illustrates each crack and variation of the composition of the core sample, to a scale of 25 mm to 150 mm of core length and full-scale across the diameter. Provide the completed field logs to the Engineer and make the entire core sample available for inspection immediately at the end of the coring of each core hole. The Contractor shall preserve and retain the core throughout the time of the coring at each coring location. At the completion of each core hole, the Engineer will make a visual inspection of the core, measure the recovery ratio of the core, and select portions to be tested for unconfined compression strength. Prepare a test specimen for unconfined compressive testing for every two meter length of the core and perform the compressive strength tests in accordance with ASTM D2166. In addition, the Engineer may select core samples to be tested in the Engineer's laboratory for unconfined compressive strength. The Contractor shall wrap each specimen in two layers of 4 mil plastic and tape to prevent loss of moisture, and label each specimen with the soil mixing location, depth, and date. The Contractor shall transport the specimens in a padded wooden box, which provides padding between each specimen, to the testing laboratory within 12 hours of the Engineer's review. The Contractor shall retain all remaining core not selected for testing in a heated and humidified storage room where minimum 95% humidity and 21 degree C shall be continuously provided throughout the remainder of the project time.

11.0 ACCEPTANCE CRITERIA

The completed mass soil mixing shall meet all of the following requirements for an element to be considered acceptable and compliant. If any item listed below is not met, the affected area as determined by the Engineer shall be considered as defective and shall be subject to a remedial work. No work shall be performed in the defective area until the Engineer approves the remedial measures proposed by the Contractor.

- 11.1 The limits of the mass soil mixing in both horizontal and vertical dimensions shall be as shown in the contract plans or as directed by the Engineer.
- 11.2 All construction records including the QA/QC records have been submitted to the Engineer and demonstrate that the mass soil mixing operation was done in conformance with all of the requirements specified in this provision and produces a homogeneously mixed soil mass.
- 11.3 The results of the unconfined compressive testing of wet samples as specified in Section 10.1 show an average and a minimum unconfined compressive strength not less than 165 KPa and 83 KPa at seven days, respectively.
- 11.4 The Cone Penetration Test (CPT) as specified in Section 10.2 demonstrates a homogeneous and thorough treatment of the mass soil mixing throughout the entire depth of penetration. In addition, the CPT results show a minimum average corrected cone resistance (q_t) of 1,100 KPa within any one (1) meter interval of the mass soil mixing

depth. The cone resistance (q_c) shall be corrected to q_t to account for pore water effects in accordance with ASTM D5778.

11.5 The coring performed as specified in Section 10.3 shows a homogeneous profile of the treated soil mass with a minimum recovery ratio of 50% for any two (2) meter segment of the core. In addition, the results of the unconfined compressive testing of core samples as specified in Section 10.3 show an average and a minimum unconfined compressive strength not less than 165 KPa and 83 KPa at seven days, respectively.

11.6 Any additional test conducted by the Engineer confirms that the mass soil mixing product meets the acceptance criteria stated above.

12.0 REMEDIAL WORK

The Contractor shall submit a plan of remedial work for the mass soil mixing area determined by the Engineer as defective based on the acceptance criteria in Section 12.0. The Engineer will review the submittal and approve or reject it within seven days from the date the submittal is received. All remedial work shall be performed in accordance with this provision including the acceptance criteria unless otherwise approved by the Engineer. The Contractor shall perform all remedial work at his own expense. No additional compensation or time extension will be made for any remedial work.

13.0 MEASUREMENT AND PAYMENT

The quantity of mass soil mixing to be paid for shall be the quantity of the completely treated and accepted soil mass in cubic meters. Measurement shall be made from the limits of mass soil mixing shown on the plans or from the revised limits as directed by the Engineer. No separate measurement for payment will be made of any remedial work. No separate measurement for payment will be made of the temporary embankment and slope stabilization since this work is considered as incidental to the mass soil mixing.

The quantity of mass soil mixing measured as specified above will be paid for at the contract unit price per cubic meter of "Mass Soil Mixing". The unit bid price for this pay item shall include the cost of furnishing all equipment, labor, and materials, temporary embankment and slope stabilization, mobilization, testing, QA/QC, remedial work, and incidentals necessary to complete the required work. Temporary shoring for maintenance of traffic, impervious dike for mass soil mixing, nonwoven fabric for soil separation, settlement monitoring, embankment fill, and surcharge placement and removal will be measured and paid for separately.

Pay Items:

Mass Soil Mixing Cubic Meter

IMPERVIOUS DIKE FOR MASS SOIL MIXING**DESCRIPTION**

The work covered by this provision consists of furnishing all equipment, labor, and materials for installing, maintaining, and removing impervious dike for mass soil mixing as specified herein, as shown on the contract plans, and as directed by the Engineer. The impervious dike shall provide a complete barrier along the limits of mass soil mixing and contain all materials including, but not limited to, reagent binder, grout, water, and mixed soil, within the limits of mass soil mixing during mixing operation and curing of the mixed soil. Also, it shall not permit seepage of water into the mass soil mixing site during mixing operation and curing of the mixed soil. The impervious dike for mass soil mixing shall extend at a minimum to the bottom of the mass soil mixing. The impervious dike for mass soil mixing shall be a steel sheet pile with an ample strength to withstand the pressures imposed by the surrounding soils and water, unless other types of impervious dike for mass soil mixing that meet the requirements specified herein are proposed by the Contractor and approved by the Engineer. Submit a proposed design of impervious dike for mass soil mixing, either a sheet pile or other types, a minimum of seven (7) days prior to beginning of the impervious dike construction for the Engineer's review and approval.

MATERIALS

Steel sheet piles shall meet the requirements of ASTM A328. Provide Type 7 Contractor's Certifications in accordance with Article 106-3 of the *Standard Specifications* for all materials used for construction of impervious dike for mass soil mixing. Load, transport, unload and store all materials such that they are kept clean and free of damage.

CONSTRUCTION

Install sheet piles in accordance with the applicable parts of Section 452 of the *Standard Specifications*. Install and interlock sheet piling as shown on the plans with a tolerance of 40mm per meter from vertical. Perform welding in accordance with Article 1072-20 of the *Standard Specifications*. The Contractor shall maintain the impervious dike until it is no longer needed. Remove the impervious dike in a manner that does not damage or disturb the mass soil mixing treated soils, roadway embankment, culvert, or surrounding areas.

MEASUREMENT AND PAYMENT

The quantity of Impervious Dike for Mass Soil Mixing to be paid for shall be the actual number of linear meters of impervious dike constructed and measured in place from end to end of installation that has been completed and accepted.

The quantity of Impervious Dike for Mass Soil Mixing measured as specified above will be paid for at the contract unit price per linear meter of Impervious Dike for Mass Soil Mixing. Such

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price and payment shall be considered as full compensation for furnishing all labor, tools, equipment, materials and all incidentals necessary to install, maintain, and remove the impervious dike and complete the work as described in this provision.

Payment will be made under:

Pay Item

Impervious Dike for Mass Soil Mixing

Pay Unit

Linear Meter