



STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

BEVERLY EAVES PERDUE
GOVERNOR

EUGENE A. CONTI, JR.
SECRETARY

June 8, 2011

MEMORANDUM TO: Mr. Jay Swain, PE
Division 13 Engineer

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

SUBJECT: Burke County, Improvements to NC 18 (Sterling Street) from US
70 Bypass to I-40; Federal Aid Project STPNHF-M-8165(1);
WBS Number: 34831 1.1; **TIP Project U-2550B**

A handwritten signature in black ink, appearing to read "E. P. Harris" or similar, written over the typed name of Philip S. Harris, III.

Attached are the U.S. Army Corps of Engineers Section 404 Individual Permit and the N.C. Division of Water Quality Section 401 Water Quality Certification 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>

Cc: w/o attachment (see website for attachments):

Mr. Randy Garris, P.E. State Contract Officer
Mr. Roger Bryan, Division Environmental Officer
Mr. Majed Alghandour, P. E., Programming and TIP
Mr. Jay Bennett, P.E., Roadway Design Unit
Mr. Dewayne Sykes, P.E. Utilities Unit
Dr. David Chang, P.E., Hydraulics Unit
Mr. Art McMillan, P.E., Highway Design Branch
Mr. Tom Koch, P.E., Structure Design Unit
Mr. Mark Staley, Roadside Environmental Unit
Mr. Ron Hancock, P.E., State Roadway Construction Engineer
Mr. Mike Robinson, P.E., State Bridge Construction Engineer
Ms. Teresa Hart, P.E., PDEA Western Region Unit Head

PROJECT COMMITMENTS

T.I.P. U-2550B

NC 18 (Sterling Street)
From US 70 Bypass to I-40
Morganton, Burke County
Federal Aid Project STPNHF-M-8165(1)
WBS Number: 34831.1.1

COMMITMENTS FROM PROJECT DEVELOPMENT AND DESIGN

Project Development and Environmental Analysis

A US Army Corps of Engineers Individual Permit will be required for this project.

A section 401 General Water Quality Certification will be required by the North Carolina Department of Environment, Health, and Natural Resources (DEHNR) for activities resulting in discharge into any of the three streams involved with this project.

Stream Relocations and Modifications will be coordinated with the US Fish and Wildlife Service (USFWS), US Army Corps of Engineers (USACE), the North Carolina Department of Environment and Natural Resources, Division of Water Quality (DWQ), and the North Carolina Wildlife Resources Commission (WRC) in accordance with the Fish and Wildlife Coordination Act [72 Stat. 563, as amended; 16 USC 661 et seq.(1976)]. Bioengineering techniques will be applied to relocation streams.

- A stream relocation will be required for the UT to E. Prong Hunting Creek. Approximately 830 feet of this stream will require relocation, adjacent to the I-40 (west) off-ramp

Division Construction/Roadside Environmental Unit

Any trees and/or foliage removed by construction within the Broughton Hospital property will be replaced in kind.

This commitment is applicable to Section A.

Roadway Design Unit

The outside lanes in each direction along NC 18 will be widened to 4.2 meters (14 feet) to accommodate bicycle traffic. Bicycle-safe drainage grates will be included in the design.

Project plans show 14 foot outside lanes along NC 18 within the project limits.

Sidewalks will be added along a portion of the project. The location of these sidewalks and the amount of cost sharing will be coordinated between NCDOT and the City of Morganton.

NCDOT will install the same type of grates (Roadway Standard Drawing STD. 840.03) for catch basins that were installed during the construction of U-2550A along the outside of the outer lanes.

Location & Surveys Unit

This project will impact four geodetic survey markers. The North Carolina Geodetic Survey will be contacted prior to construction regarding the relocation of survey markers along the project.

This is a standard practice.

Traffic Engineering Branch

NCDOT will be installing a new signal at the intersection of NC 18 and ramps A and B.

Hydraulics Unit/Utilities

The issue of burying culvert extension bottoms under the substrate will be addressed in the final design of the hydraulic structures.

Plans for any waterline relocations will be submitted to the Division of Environmental Health for approval.

These commitments are standard practice.

COMMITMENTS FROM PERMITTING

Division 13 Construction

404 condition 10. The permittee shall schedule a pre-construction meeting between their representatives, the contractor, and the USACE, Wilmington District, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work in jurisdictional waters of the U.S. to ensure that there is a mutual understanding of all terms and conditions contained in this DA permit. The permittee shall provide the NCDOT Regulatory Project Manager with a copy of the final plans at least two (2) weeks prior to the pre-construction meeting along with a

description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the pre-construction meeting for a time when the USACE and the North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall notify the USACE and NCDWQ Project Managers a minimum of thirty (30) days in advance of the meeting.

404 condition 13 To ensure that all borrow and waste activities occur on uplands and do not result in the degradation of other waters and wetlands, except as authorized by this permit, the permittee 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. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as such information is available. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any stream or wetland. All jurisdictional wetland delineations for borrow and waste areas shall be verified by the USACE and shown on the approved reclamation plans. The permittee shall ensure that all such areas comply with the preceding condition of this permit and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This documentation will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition. All information will be available to the USACE upon request. The permittee shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the USACE within 30 days of the completion of the reclamation work.

401 condition 1 The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWQ staff shall be invited to the pre-construction meeting.

401 condition 2. Removal of the triple barrel culvert under I-40 at Site 4 shall be conducted in accordance with the culvert removal sequence submitted via email on January 19, 2011 and February 2, 2011.

Natural Environment Unit

404 condition 21 Compensatory mitigation for unavoidable, permanent impacts to 1,350 linear feet of stream associated with this project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated January 12, 2007, from William D Gilmore, EEP Director. Pursuant to the In-Lieu-Fee Instrument signed July 28, 2010, between the State of North Carolina, EEP and the U.S. Army Corps of Engineers, **the EEP will provide 525 linear feet of restoration to equivalent cool water stream channel in the Upper Catawba River Basin (HUC 03050101)**, in accordance with Section F of the instrument.

Natural Environment Unit/Roadside Environmental Unit/Division 13

404 condition 22. The permittee shall conduct on-site relocation and buffer establishment in accordance with the design submitted in the application dated December 1, 2010. The permittee shall submit as-built plans for the relocated stream within sixty (60) days of completion of the relocation project. The stream relocation and buffer establishment shall be completed within 30 days of completion of construction on the overall project.

404 condition 23. The permittee shall visually monitor the vegetative planting to assess and ensure stabilization of the stream segments which serve as on-site mitigation. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and a report shall be submitted to the USACE within sixty (60) days post-monitoring. To prevent mowing by adjacent landowners and maintenance crews, fencing shall be installed around the mitigation site. After 3 years of monitoring, the permittee shall schedule a close out site visit of the on-site mitigation.

404 condition 24. If the USACE determines that any part of the relocated channel is not stable (e.g., excessive erosion, aggradation, etc.), or is trending toward instability, and/or if the vegetative planting is not successful at the end of the monitoring period, the permittee shall submit an adaptive plan to this office to correct any stability or planting deficiency. Plan submissions shall specify the scope of work needed to remedy the problem(s), types of equipment to be utilized, construction methodologies, and a timeline for completion.

401 condition 4. Compensatory mitigation for impacts to jurisdictional streams shall be provided by onsite stream relocations of 481 linear feet of UT to East Prong Hunting Creek and by daylighting 115 linear feet of UT to East Prong Hunting Creek and East Prong Hunting Creek. The onsite stream relocation shall be constructed in accordance with design submitted in your application dated December 6, 2010. All onsite mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the Natural Environment Unit mitigation geodatabase. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 481 linear feet of impacts. All channel relocations will be constructed in a dry work area, will be completed and stabilized, and must be approved onsite by NCDWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have a 30 foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. All stream banks shall be matted coir fiber matting. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.

DEPARTMENT OF THE ARMY PERMIT

Permittee North Carolina Department of Transportation

Permit No. 2011-00133

Issuing Office CESAW-RG-A

NOTE: The term "you" and its derivatives, as used in this permit, means the permittee or any future transferee. The term "this office" refers to the appropriate district or division office of the Corps of Engineers having jurisdiction over the permitted activity or the appropriate official of that office acting under the authority of the commanding officer.

You are authorized to perform work in accordance with the terms and conditions specified below

Project Description: to conduct the following activities in waters of the U.S. for TIP No. U-2550 B: (1) permanently impact 1,350 linear feet of waters of the U.S., and (2) temporarily impact 0.03 acre of waters of the U.S. These impacts are associated with interchange improvements at the junction of NC 18 and I-40 and widening NC 18 through the interchange in Morganton, Burke County, North Carolina. Impacts will result from culvert extensions, culvert removal, site dewatering, bank stabilization, stream relocation, and on-site stream mitigation. All work will be conducted in accordance with the information submitted by NCDOT and with the general and special conditions of this permit.

Project Location: in Morganton, Burke County, North Carolina

Permit Conditions:

General Conditions:

1. The time limit for completing the work authorized ends on **December 31, 2016**. If you find that you need more time to complete the authorized activity, submit your request for a time extension to this office for consideration at least one month before the above date is reached.
2. You must maintain the activity authorized by this permit in good condition and in conformance with the terms and conditions of this permit. You are not relieved of this requirement if you abandon the permitted activity, although you may make a good faith transfer to a third party in compliance with General Condition 4 below. Should you wish to cease to maintain the authorized activity or should you desire to abandon it without a good faith transfer, you must obtain a modification of this permit from this office, which may require restoration of the area.
3. If you discover any previously unknown historic or archeological remains while accomplishing the activity authorized by this permit, you must immediately notify this office of what you have found. We will initiate the Federal and state coordination required to determine if the remains warrant a recovery effort or if the site is eligible for listing in the National Register of Historic Places.

4. If you sell the property associated with this permit, you must obtain the signature of the new owner in the space provided and forward a copy of the permit to this office to validate the transfer of this authorization.
5. If a conditioned water quality certification has been issued for your project, you must comply with the conditions specified in the certification as special conditions to this permit. For your convenience, a copy of the certification is attached if it contains such conditions.
6. You must allow representatives from this office to inspect the authorized activity at any time deemed necessary to ensure that it is being or has been accomplished in accordance with the terms and conditions of your permit,

Special Conditions:

SEE ATTACHED SPECIAL CONDITIONS

Further Information:

1. Congressional Authorities: You have been authorized to undertake the activity described above pursuant to:
 - () Section 10 of the Rivers and Harbors Act of 1899 (33 U.S.C. 403).
 - (X) Section 404 of the Clean Water Act (33 U.S.C. 1344).
 - () Section 103 of the Marine Protection, Research and Sanctuaries Act of 1972 (33 U.S.C. 1413).
2. Limits of this authorization.
 - a. This permit does not obviate the need to obtain other Federal, state, or local authorizations required by law
 - b. This permit does not grant any property rights or exclusive privileges.
 - c. This permit does not authorize any injury to the property or rights of others.
 - d. This permit does not authorize interference with any existing or proposed Federal project.
3. Limits of Federal Liability In issuing this permit, the Federal Government does not assume any liability for the following:
 - a. Damages to the permitted project or uses thereof as a result of other permitted or unpermitted activities or from natural causes.
 - b. Damages to the permitted project or uses thereof as a result of current or future activities undertaken by or on behalf of the United States in the public interest.
 - c. Damages to persons, property, or to other permitted or unpermitted activities or structures caused by the activity authorized by this permit.
 - d. Design or construction deficiencies associated with the permitted work.
 - e. Damage claims associated with any future modification, suspension, or revocation of this permit.

4 Reliance on Applicant's Data: The determination of this office that issuance of this permit is not contrary to the public interest was made in reliance on the information you provided.

5 Reevaluation of Permit Decision. This office may reevaluate its decision on this permit at any time the circumstances warrant. Circumstances that could require a reevaluation include, but are not limited to, the following:

- a. You fail to comply with the terms and conditions of this permit.
- b. The information provided by you in support of your permit application proves to have been false, incomplete, or inaccurate (See 4 above).
- c. Significant new information surfaces which this office did not consider in reaching the original public interest decision.

Such a reevaluation may result in a determination that it is appropriate to use the suspension, modification, and revocation procedures contained in 33 CFR 325.7 or enforcement procedures such as those contained in 33 CFR 326.4 and 326.5. The referenced enforcement procedures provide for the issuance of an administrative order requiring you to comply with the terms and conditions of your permit and for the initiation of legal action where appropriate. You will be required to pay for any corrective measures ordered by this office, and if you fail to comply with such directive, this office may in certain situations (such as those specified in 33 CFR 209.170) accomplish the corrective measures by contract or otherwise and bill you for the cost.

6. Extensions. General condition 1 establishes a time limit for the completion of the activity authorized by this permit. Unless there are circumstances requiring either a prompt completion of the authorized activity or a reevaluation of the public interest decision, the Corps will normally give favorable consideration to a request for an extension of this time limit.

Your signature below, as permittee, indicates that you accept and agree to comply with the terms and conditions of this permit.

E. L. Lusk for Gregory J. Thorne, PhD May 6, 2011
 (PERMITTEE) ~~#####~~ NCDOT (DATE)
 W
 5-11-11

This permit becomes effective when the Federal official, designated to act for the Secretary of the Army, has signed below

Scott J. Ryan 9 MAY 2011
 (DISTRICT COMMANDER) JEFFERSON M. RYSCAVAGE (DATE)
 COLONEL

When the structures or work authorized by this permit are still in existence at the time the property is transferred, the terms and conditions of this permit will continue to be binding on the new owner(s) of the property. To validate the transfer of this permit and the associated liabilities associated with compliance with its terms and conditions, have the transferee sign and date below

 (TRANSFeree) (DATE)

SPECIAL CONDITIONS

Action ID # 2011-00133

Work Limits

- 1) Failure to institute and carry out the details of the following special conditions will result in a directive to cease all ongoing and permitted work within waters of the U.S. associated with the permitted project, or such other remedies and/or fine as the Wilmington District Engineer, or his authorized representatives, may seek.
- 2) All work authorized by this permit must be performed in strict compliance with the attached plans, which are a part of this permit. Any modification to these plans must be approved by the U.S. Army Corps of Engineers (USACE) prior to implementation.
- * 3) The permittee shall ensure that the construction design plans for this project do not deviate from the permit plans attached to this authorization. The permittee shall provide written verification to the USACE, prior to any active construction in waters of the U.S., to confirm that final constructions drawings do comply with the attached permit drawings. Any deviation in the construction design plans will be brought to the attention of the USACE, Wilmington District, Asheville Regulatory Field Office prior to any active construction in waters of the U.S.
- 4) The permittee, upon receipt of a notice of revocation of this permit, or upon its expiration before completion of the work will, without expense to the United States and in such time and manner as the Secretary of the Army or his authorized representative may direct, restore the water or wetland to its pre-project condition.

Project Maintenance

- * 5) The permittee shall advise the USACE in writing at least two weeks prior to beginning the work authorized by this permit and again upon completion of the work authorized by this permit.
- 6) Unless otherwise authorized by this permit, all fill material placed in waters or wetlands shall be generated from an upland source and shall be clean and free of any pollutants except in trace quantities. Metal products, organic materials (including debris from land clearing activities), or unsightly debris will not be used.
- 7) 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. A copy of this permit, including all conditions, shall be available at the project site during construction and maintenance of this project.

- 8) During the clearing phase of the project, heavy equipment shall not be operated in surface waters or stream channels. Temporary stream crossings shall be used to access the opposite sides of stream channels. All temporary diversion channels and stream crossings shall be constructed of nonerodable materials. Grubbing of riparian vegetation shall not occur until immediately before construction begins on a given segment of stream channel.
- 9) If concrete is used during culvert installation or any other work in waters of the U.S., all necessary measures will be taken to prevent live or fresh concrete, including bags of uncured concrete, from coming into contact with streams until the concrete has cured.
- * 10) The permittee shall schedule a pre-construction meeting between their representatives, the contractor, and the USACE, Wilmington District, Asheville Regulatory Field Office, NCDOT Regulatory Project Manager, prior to any work in jurisdictional waters of the U.S. to ensure that there is a mutual understanding of all terms and conditions contained in this DA permit. The permittee shall provide the NCDOT Regulatory Project Manager with a copy of the final plans at least two (2) weeks prior to the pre-construction meeting along with a description of any changes that have been made to the project's design, construction methodology or construction timeframe. The permittee shall schedule the pre-construction meeting for a time when the USACE and the North Carolina Division of Water Quality (NCDWQ) Project Managers can attend. The permittee shall notify the USACE and NCDWQ Project Managers a minimum of thirty (30) days in advance of the meeting.
- 11) This permit does not authorize temporary placement or double handling of excavated or fill material within waters or wetlands outside the permitted area. This prohibition applies to all borrow and fill activities connected with this project.
- 12) Except as authorized by this permit or any USACE approved modification to this permit, no excavation, fill or mechanized land-clearing activities shall take place at any time in the construction or maintenance of this project, within waters or wetlands, nor shall any activity take place that causes the degradation of waters of the U.S. In addition, except as specified in the plans attached to this permit, no excavation, fill, or mechanized land clearing activities shall take place at any time in the construction or maintenance of this project in such a manner as to impair normal flows and circulation patterns within, into or out of, waters of the U.S., or to reduce the reach of water of the U.S.
- 13) To ensure that all borrow and waste activities occur on uplands and do not result in the degradation of other waters and wetlands, except as authorized by this permit, the permittee 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. The permittee shall provide the USACE with appropriate maps indicating the locations of proposed borrow or waste sites as soon as such information is available. The permittee will coordinate with the USACE before approving any borrow or waste sites that are within 400 feet of any stream or wetland. All jurisdictional wetland delineations for borrow and waste areas shall be verified by the USACE and shown on

the approved reclamation plans. The permittee shall ensure that all such areas comply with the preceding condition of this permit and shall require and maintain documentation of the location and characteristics of all borrow and disposal sites associated with this project. This documentation will include data regarding soils, vegetation and hydrology sufficient to clearly demonstrate compliance with the preceding condition. All information will be available to the USACE upon request. The permittee shall require its contractors to complete and execute reclamation plans for each waste and borrow site and provide written documentation that the reclamation plans have been implemented and all work is completed. This documentation will be provided to the USACE within 30 days of the completion of the reclamation work.

14) All authorized culverts will be installed to allow the passage of low stream flows and the continued movement of fish and other aquatic life as well as to prevent head-cutting of the streambed. For all box culverts and for pipes greater than 48 inches in diameter, the bottom of the culvert will be buried one foot below the bed of the stream unless such burial would be impractical and the USACE has waived this requirement. For culverts 48 inches in diameter or smaller, the bottom of the pipe will be buried below the bed of the stream to a depth equal to or greater than 20 percent of the diameter of the culvert. Design and placement of culverts and other structures including temporary erosion control measures shall not be conducted in a manner that may result in the disequilibrium of wetlands, streambeds or stream banks adjacent to, upstream of or downstream of the structures. For all culvert construction activities, the dimension, pattern, and profile of the stream, (above and below a pipe or culvert), shall not be modified by widening the stream channel or by reducing the depth of the stream. Riprap armoring of streams at culvert inlets and outlets shall be minimized above ordinary high water elevation in favor of bioengineering techniques such as bank sloping, erosion control matting and revegetation with deep-rooted native woody plants.

Related Laws

15) The permittee shall employ all sedimentation and erosion control measures necessary to prevent an increase in sedimentation or turbidity within waters and wetlands outside the permit area. This shall include, but is not limited to, the immediate installation of silt fencing or similar appropriate devices around all areas subject to soil disturbance or the movement of earthen fill, and the immediate stabilization of all disturbed areas. Additionally, the project must remain in full compliance with all aspects of the Sedimentation Pollution Control Act of 1973 (North Carolina General Statutes Chapter 113A Article 4).

16) All mechanized equipment operating near surface waters shall be regularly inspected to prevent contamination of streams from leakage of fuels, lubricants, hydraulic fluids or other toxic materials. No equipment staging or storage of construction material will occur in waters of the U.S. Hydro-seeding equipment will not be discharged or washed out into any surface waters or wetlands. In the event of a spill of petroleum products or any other hazardous waste, the permittee shall immediately report it to the NC Division of Water Quality at (919) 733-5083 or (800) 662-7956 and provisions of the North Carolina Oil Pollution and Hazardous Substances Control Act will be followed.

17) All conditions of the North Carolina Division of Water Quality's Section 401 Water Quality Certification No. 3853, dated April 1, 2011, are hereby incorporated as special conditions of this permit.

18) If the permittee discovers any previously unknown historic or archeological remains while accomplishing the authorized work, he will immediately notify the Wilmington District Engineer who will initiate the required State/Federal coordination.

19) This Department of the Army permit does not obviate the need to obtain other Federal, State, or local authorizations required by law

Enforcement

20) Violations of these conditions or violations of Section 404 of the Clean Water Act or Section 10 of the Rivers and Harbors Act must be reported in writing to the Wilmington District USACE within 24 hours of the permittee's discovery of the violation.

Mitigation

- * 21) Compensatory mitigation for unavoidable, permanent impacts to 1,350 linear feet of stream associated with this project shall be provided by the Ecosystem Enhancement Program (EEP), as outlined in the letter dated January 12, 2007, from William D Gilmore, EEP Director. Pursuant to the In-Lieu-Fee Instrument signed July 28, 2010, between the State of North Carolina, EEP and the U.S. Army Corps of Engineers, the EEP will provide 525 linear feet of restoration to equivalent cool water stream channel in the Upper Catawba River Basin (HUC 03050101), in accordance with Section F of the instrument.
- * 22) The permittee shall conduct on-site relocation and buffer establishment in accordance with the design submitted in the application dated December 1, 2010. The permittee shall submit as-built plans for the relocated stream within sixty (60) days of completion of the relocation project. The stream relocation and buffer establishment shall be completed within 30 days of completion of construction on the overall project.
- 23) The permittee shall visually monitor the vegetative planting to assess and ensure stabilization of the stream segments which serve as on-site mitigation. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and a report shall be submitted to the USACE within sixty (60) days post-monitoring. To prevent mowing by adjacent landowners and maintenance crews, fencing shall be installed around the mitigation site. After 3 years of monitoring, the permittee shall schedule a close out site visit of the on-site mitigation.

24) If the USACE determines that any part of the relocated channel is not stable (e.g., excessive erosion, aggradation, etc.), or is trending toward instability, and/or if the vegetative planting is not successful at the end of the monitoring period, the permittee shall submit an adaptive plan to this office to correct any stability or planting deficiency. Plan submissions shall specify the scope of work needed to remedy the problem(s), types of equipment to be utilized, construction methodologies, and a timeline for completion.



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North Carolina Department of Environment and Natural Resources

Division of Water Quality
Coleen H. Sullins
DirectorBeverly Eaves Perdue
GovernorDee Freeman
Secretary

April 1, 2011

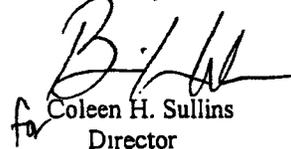
Dr. Greg Thorpe, PhD., Manager
Project Development and Environmental Analysis
North Carolina Department of Transportation
1548 Mail Service Center
Raleigh, North Carolina, 27699-1548Subject: 401 Water Quality Certification Pursuant to Section 401 of the Federal Clean Water Act with
ADDITIONAL CONDITIONS for Proposed improvements to NC 18 and I-40 Interchange in Morganton,
Burke County, Federal Aid Project No. M-8165(1), State Project No. 8.1851001, TIP Project No. U-
2550B
NCDWQ Project No. 20101017

Dear Dr. Thorpe:

Attached hereto is a copy of Certification No. 3853 issued to The North Carolina Department of Transportation
(NCDOT) dated April 1, 2011.

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

Sincerely,


for Coleen H. Sullins
Director

Attachments

cc: Lori Beckwith, US Army Corps of Engineers, Asheville Field Office
Roger Bryan, Division 13 Environmental Officer
Chris Militscher, Environmental Protection Agency (electronic copy only)
Marla Chambers, NC Wildlife Resources Commission (electronic copy only)
Marella Buncick, US Fish and Wildlife Service (electronic copy only)
Jason Elliott, NCDOT, Roadside Environmental Unit
Mike Parker, NCDWQ Asheville Regional Office
File Copy

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 impact 1,531 linear feet of jurisdictional streams in Burke County. The project shall be constructed pursuant to the application dated received December 6, 2010 and additional information dated received January 19, 2011 and February 2, 2011. The authorized impacts are as described below:

Stream Impacts in the Catawba River Basin

Site	Permanent Fill in Intermittent Stream (linear ft)	Temporary Fill in Intermittent Stream (linear ft)	Permanent Fill in Perennial Stream (linear ft)	Temporary Fill in Perennial Stream (linear ft)	Total Stream Impact (linear ft)	Stream Impacts Requiring Mitigation (linear ft)
1	0	0	29	35	64	29
2	0	0	263	0	263	204
3	0	0	865	49	914	865
4	0	0	115	52	167	0
5	0	0	0	45	45	0
6	0	0	39	0	39	0
7	0	0	39	0	39	0
Total	0	0	1,350	181	1,531	1,098

Total Stream Impact for Project: 1,531 linear feet

The application provides adequate assurance that the discharge of fill material into the waters of the Catawba 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 application dated received December 6, 2010 and additional information dated received January 19, 2011 and February 2, 2011. Should your project change, you are required to notify the 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:

Project Specific Conditions

1. The NCDOT Division Environmental Officer or Environmental Assistant will conduct a pre-construction meeting with all appropriate staff to ensure that the project supervisor and essential staff understand the potential issues with stream and pipe alignment at the permitted site. NCDWQ staff shall be invited to the pre-construction meeting.
2. Removal of the triple barrel culvert under I-40 at Site 4 shall be conducted in accordance with the culvert removal sequence submitted via email on January 19, 2011 and February 2, 2011
- * 3. Compensatory mitigation for impacts to 1,098 linear feet of streams at a replacement ratio of 1:1 is required. Compensatory mitigation shall be supplied as detailed in the table below:

Mitigation Type	Mitigation Credits
On-site - Site 3	481
On-Site - Site 4 (daylighting)	115
Off-site - EEP	502

- * 4. Compensatory mitigation for impacts to jurisdictional streams shall be provided by onsite stream relocations of 481 linear feet of UT to East Prong Hunting Creek and by daylighting 115 linear feet of UT to East Prong Hunting Creek and East Prong Hunting Creek. The onsite stream relocation shall be constructed in accordance with the design submitted in your application dated received December 6, 2010. All on-site mitigation sites shall be protected in perpetuity by a conservation easement or through NCDOT fee simple acquisition and recorded in the NCDOT Natural Environment Unit mitigation geodatabase. Please be reminded that as-builts for the completed streams shall be submitted to the North Carolina Division of Water Quality 401 Wetlands Unit with the as-builts for the rest of the project. If the parameters of this condition are not met, then the permittee shall supply additional stream mitigation for the 481 linear feet of impacts. All channel relocations will be constructed in a dry work area, will be completed and stabilized, and must be approved on site by NCDWQ staff, prior to diverting water into the new channel. Whenever possible, channel relocations shall be allowed to stabilize for an entire growing season. All stream relocations shall have a 30-foot wide native wooded buffer planted on both sides of the stream unless otherwise authorized by this Certification. All stream banks shall be matted with coir fiber matting. A transitional phase incorporating rolled erosion control product (RECP) and appropriate temporary ground cover is allowable.
5. The permittee shall visually monitor the vegetative plantings to assess and ensure complete stabilization of the mitigation stream segments. The monitoring shall be conducted annually for a minimum of 3 years after final planting. Photo documentation shall be utilized to document the success of the riparian vegetation and submitted to NCDWQ in a final report within sixty (60) days after completing monitoring. To prevent mowing by adjacent landowners and maintenance crews, fencing shall be installed around the mitigation site. After 3 years the NCDOT shall contact the NCDWQ to schedule a site visit to "close out" the mitigation site.
- * 6. Compensatory mitigation for the remaining 502 linear feet of impact to streams is required. We understand that you have chosen to perform compensatory mitigation for impacts to streams 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 November 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
7. The post-construction removal of any temporary bridge structures must return the project site to its preconstruction contours and elevations. The impacted areas shall be revegetated with appropriate native species.
8. Bridge deck drains shall not discharge directly into the stream. Stormwater shall be directed across the bridge and pre-treated through site-appropriate means (grassed swales, pre-formed scour holes, vegetated buffers, etc.) before entering the stream. Please refer to the most current version of *Stormwater Best Management Practices*.
9. No drill slurry or water that has been in contact with uncured concrete shall be allowed to enter surface waters. This water shall be captured, treated, and disposed of properly
10. If multiple pipes or barrels are required, they shall be designed to mimic natural stream cross section as closely as possible including pipes or barrels at flood plain elevation and/or sills where appropriate. Widening the stream channel should be avoided. Stream channel widening at the inlet or outlet end of structures typically decreases water velocity causing sediment deposition that requires increased maintenance and disrupts aquatic life passage.
11. Riprap shall not be placed in the active thalweg channel or placed in the streambed in a manner that precludes aquatic life passage. Bioengineering boulders or structures should be properly designed, sized and installed.

12. Unless otherwise approved in this certification, placement of culverts and other structures in open waters and streams 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 NCDWQ. If this condition is unable to be met due to bedrock or other limiting features encountered during construction, please contact NCDWQ for guidance on how to proceed and to determine whether or not a permit modification will be required.
13. If concrete is used during construction, a dry work area shall be maintained to prevent direct contact between curing concrete and stream water. Water that inadvertently contacts uncured concrete shall not be discharged to surface waters due to the potential for elevated pH and possible aquatic life and fish kills.
14. During the construction of the project, no staging of equipment of any kind is permitted in waters of the U.S., or protected riparian buffers.
15. The dimension, pattern and profile of the stream above and below the crossing shall not be modified. Disturbed floodplains and streams shall be restored to natural geomorphic conditions.
16. The use of rip-rap above the Normal High Water Mark shall be minimized. Any rip-rap placed for stream stabilization shall be placed in stream channels in such a manner that it does not impede aquatic life passage.
- * 17. The Permittee shall ensure that the final design drawings adhere to the permit and to the permit drawings submitted for approval.
18. All work in or adjacent to stream waters shall be conducted in a dry work area. Approved BMP measures from the most current version of NCDOT Construction and Maintenance Activities manual such as sandbags, rock berms, cofferdams and other diversion structures shall be used to prevent excavation in flowing water.
19. Heavy equipment shall be operated from the banks rather than in the stream channel in order to minimize sedimentation and reduce the introduction of other pollutants into the stream.
20. All mechanized equipment operated near surface waters must be regularly inspected and maintained to prevent contamination of stream waters from fuels, lubricants, hydraulic fluids, or other toxic materials.
21. No rock, sand or other materials shall be dredged from the stream channel except where authorized by this certification.
22. Discharging hydroseed mixtures and washing out hydroseeders and other equipment in or adjacent to surface waters is prohibited.
23. The permittee and its authorized agents shall conduct its activities in a manner consistent with State water quality standards (including any requirements resulting from compliance with §303(d) of the Clean Water Act) and any other appropriate requirements of State and Federal law. If NCDWQ determines that such standards or laws are not being met (including the failure to sustain a designated or achieved use) or that State or federal law is being violated, or that further conditions are necessary to assure compliance, NCDWQ may reevaluate and modify this certification.
24. A copy of this Water Quality Certification shall be maintained on the construction site at all times. In addition, the Water Quality Certification and all subsequent modifications, if any, shall be maintained with the Division Engineer and the on-site project manager.
25. The outside buffer, wetland or water boundary located within the construction corridor approved by this authorization 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.

26. The issuance of this certification does not exempt the Permittee from complying with any and all statutes, rules, regulations, or ordinances that may be imposed by other government agencies (i.e. local, state, and federal) having jurisdiction, including but not limited to applicable buffer rules, stormwater management rules, soil erosion and sedimentation control requirements, etc.
27. The Permittee shall report any violations of this certification to the Division of Water Quality within 24 hours of discovery
- * 28. Upon completion of the project (including any impacts at associated borrow or waste sites), the NCDOT Division Engineer shall complete and return the enclosed "Certification of Completion Form" to notify NCDWQ when all work included in the 401 Certification has been completed.
29. Native riparian vegetation must be reestablished in the riparian areas within the construction limits of the project by the end of the growing season following completion of construction.
30. There shall be no excavation from, or waste disposal into, jurisdictional wetlands or waters associated with this permit without appropriate modification. Should waste or borrow sites, or access roads to waste or borrow sites, be located in wetlands or streams, compensatory mitigation will be required since that is a direct impact from road construction activities.
31. Erosion and sediment control practices must be in full compliance with all specifications governing the proper design, installation and operation and maintenance of such Best Management Practices in order to protect surface waters standards:
 - a. The erosion and sediment control measures for the project must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Sediment and Erosion Control Planning and Design Manual*.
 - b. The design, installation, operation, and maintenance of the sediment and erosion control measures must be such that they equal, or exceed, the requirements specified in the most recent version of the *North Carolina Sediment and Erosion Control Manual*. The devices shall be maintained on all construction sites, borrow sites, and waste pile (spoil) projects, including contractor-owned or leased borrow pits associated with the project.
 - c. For borrow pit sites, the erosion and sediment control measures must be designed, installed, operated, and maintained in accordance with the most recent version of the *North Carolina Surface Mining Manual*.
 - d. The reclamation measures and implementation must comply with the reclamation in accordance with the requirements of the Sedimentation Pollution Control Act.
32. Sediment and erosion control measures shall not be placed in wetlands or waters unless otherwise approved by this Certification.

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 you wish to contest any statement in the attached Certification you must file a petition for an administrative hearing. You may obtain the petition form from the office of Administrative hearings. You must file the petition with the office of Administrative Hearings within sixty (60) days of receipt of this notice. A petition is considered filed when it is received in the office of Administrative Hearings during normal office hours. The Office of Administrative Hearings accepts filings Monday through Friday between the hours of 8:00am and 5:00pm, except for official state holidays. The original and one (1) copy of the petition must be filed with the Office of Administrative Hearings.

The petition may be faxed-provided the original and one copy of the document is received by the Office of Administrative Hearings within five (5) business days following the faxed transmission.
The mailing address for the Office of Administrative Hearings is:

Office of Administrative Hearings
6714 Mail Service Center
Raleigh, NC 27699-6714
Telephone: (919)-733-2698, Facsimile: (919)-733-3478

432

A copy of the petition must also be served on DENR as follows:

Ms. Mary Penny Thompson, General Counsel
Department of Environment and Natural Resources
1601 Mail Service Center
Raleigh, NC 27699-1601

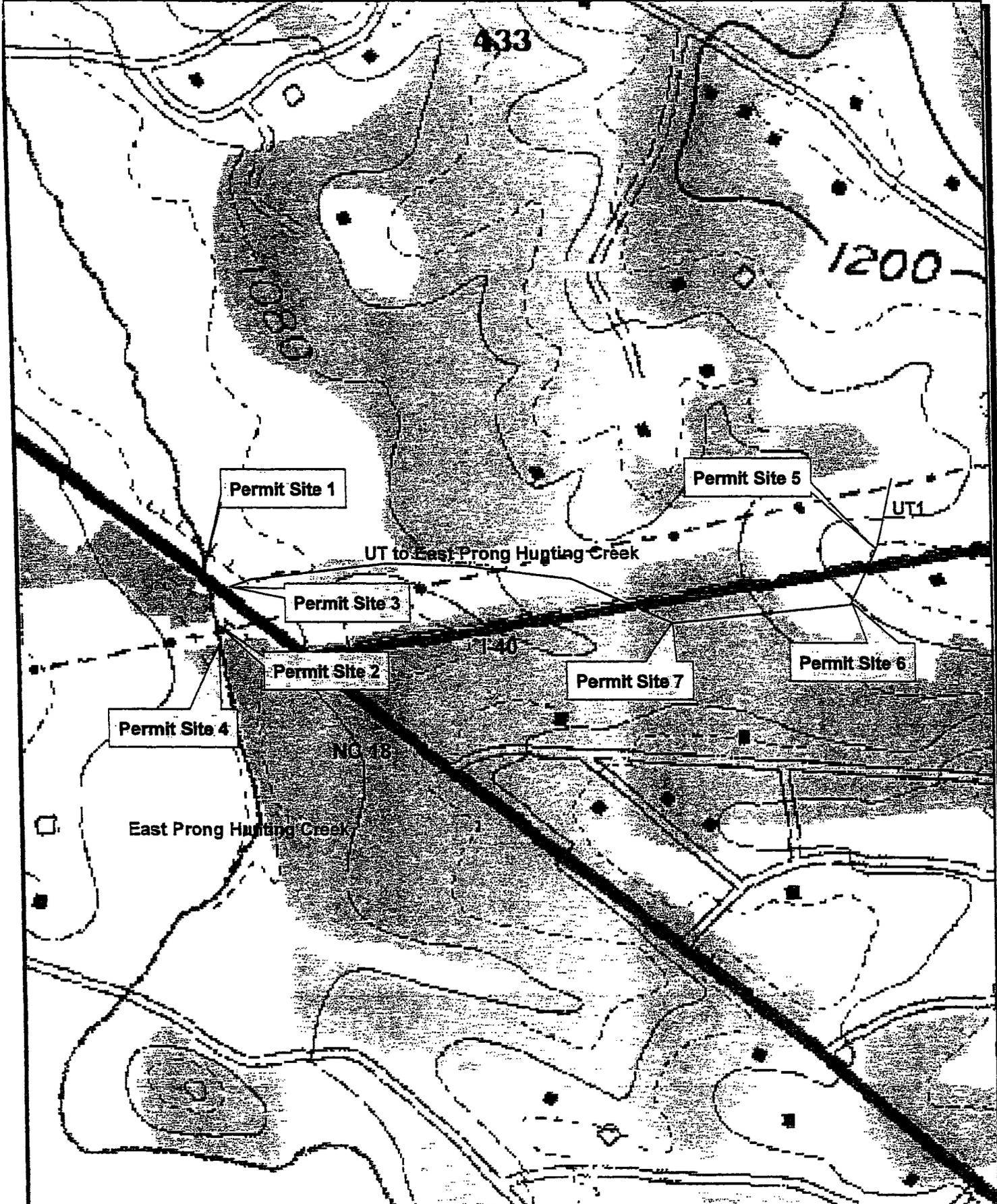
This the 1st day of April 2011

DIVISION OF WATER QUALITY



for Coleen H. Sullins
Director

WQC No. 3853



U-2550B
Burke County

<>

Permit Topo

Prepared by the NCDOT
 Project Development &
 Environmental Analysis Branch
 Natural Environment Unit



WETLAND PERMIT IMPACT SUMMARY

Site No	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
1	-L- 18+14/18+74	3-10x11 RCBC ext.						0.01	0.01	29	35	
2	-L- 19+79/21+24	3-10x11 RCBC ext.						0.06		263		
3	-RPA- 14+45/23+00	2-36" RCP, 84" CSP Stream Relocation						0.12	0.01	865	49	481
4	-Y1- 47+99/49+50	Rem. Ex. Culvert Repl. with 172' Bridge						0.02	0.01	115	52	
5	-Y1- 32+05/32+45	Reline ex. 66" CSP w/ 60" Welded Steel							<0.01		45	
6	-Y1- 34+75/35+06	Reline ex. 66" CSP w/ 60" Welded Steel & Bank Stabilization						<0.01		39		
7	-Y1- 36+35/36+73	78" CSP						<0.01		23		
7	-Y1- 36+35/36+73	Bank Stabilization						<0.01		16		
TOTALS.								0.21	0.03	1350	181	481

434

Permit Drawing
Sheet 1 of 25

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BURKE COUNTY
WBS - 34831 1 1 (U-2550B)

SHEET 6/25/2010

ATN Revised 3/31/05

Adjacent Property Owners

<u>Owner/ Business</u>	<u>Address</u>
Robbins Investments, LLC	PO Box 207, Forest City, NC 28043
Grace Hospital, Inc	2201 S Sterling St , Morganton, NC 28655
Reece & Nelson LLP	420 Bost Road, Morganton, NC 28655
R L Bush, Jr	1 Cedarwood Place, Lenoir, NC 28645
Southview Motel Corp	2400 S Sterling St , Morganton, NC 28655
Harriet T Stroup	117 Brookwood Rd , Morganton, NC 28655
Lou Ellen Daves	811 Woodbrook Dr , Morganton, NC 27410
RCM Investments	PO Box 1600, Rowlett, TX 75030
NCDOT, Div 13	PO Box 3279, Asheville, NC 28802

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NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Burke County
PROJ - 34831 1 1 (U-2550B)

SHEET

3/3/2009

PROF 3" CONC MONO. SLAB

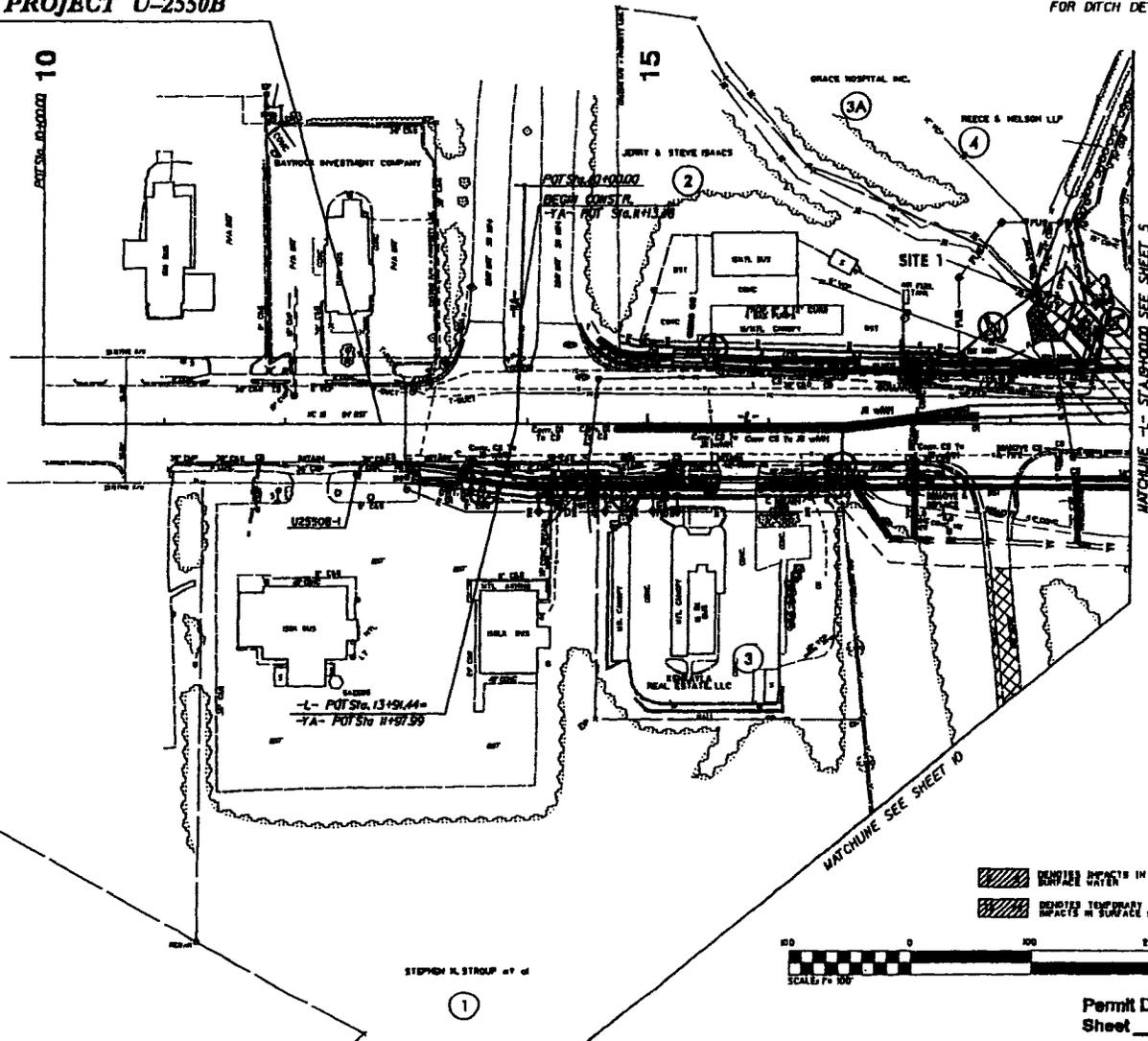
BY SHEET NO. ROADWAY DESIGN HYDRAULIC ENGINEER

PRELIMINARY PLAN OF HIGHWAY CONSTRUCTION

FOR -L- PROFILE SEE SHEET
FOR DITCH DETAILS SEE SHEET

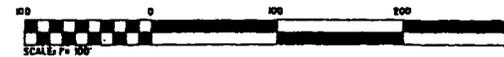
STA. 12+80.00 -L- BEGIN TIP PROJECT U-2550B

BEGIN CONSTRUCTION
FOR SIGNAL WORK
APPROXIMATELY 8950'
NORTHWEST ALONG
NC 18 (STERLING STREET)
SEE SIGNAL PLANS



SHADDED AREAS IN
IMPACTS IN SURFACE WATER

SHADDED AREAS IN
IMPACTS IN SURFACE WATER



Permit Drawing
Sheet 4 of 25

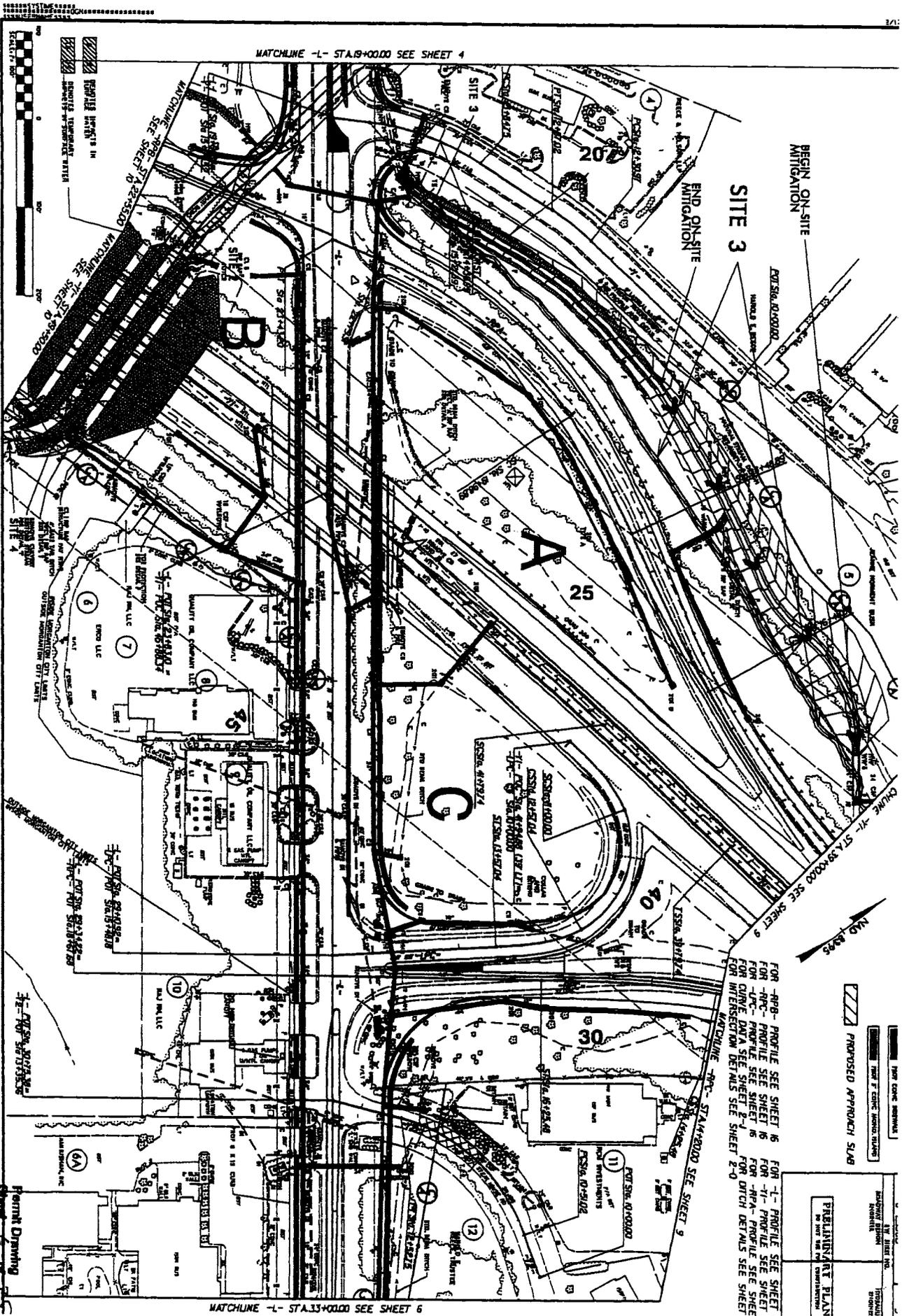
437

437

STEPHEN N. STROUP et al

1

11/20/2011 11:58:58 AM
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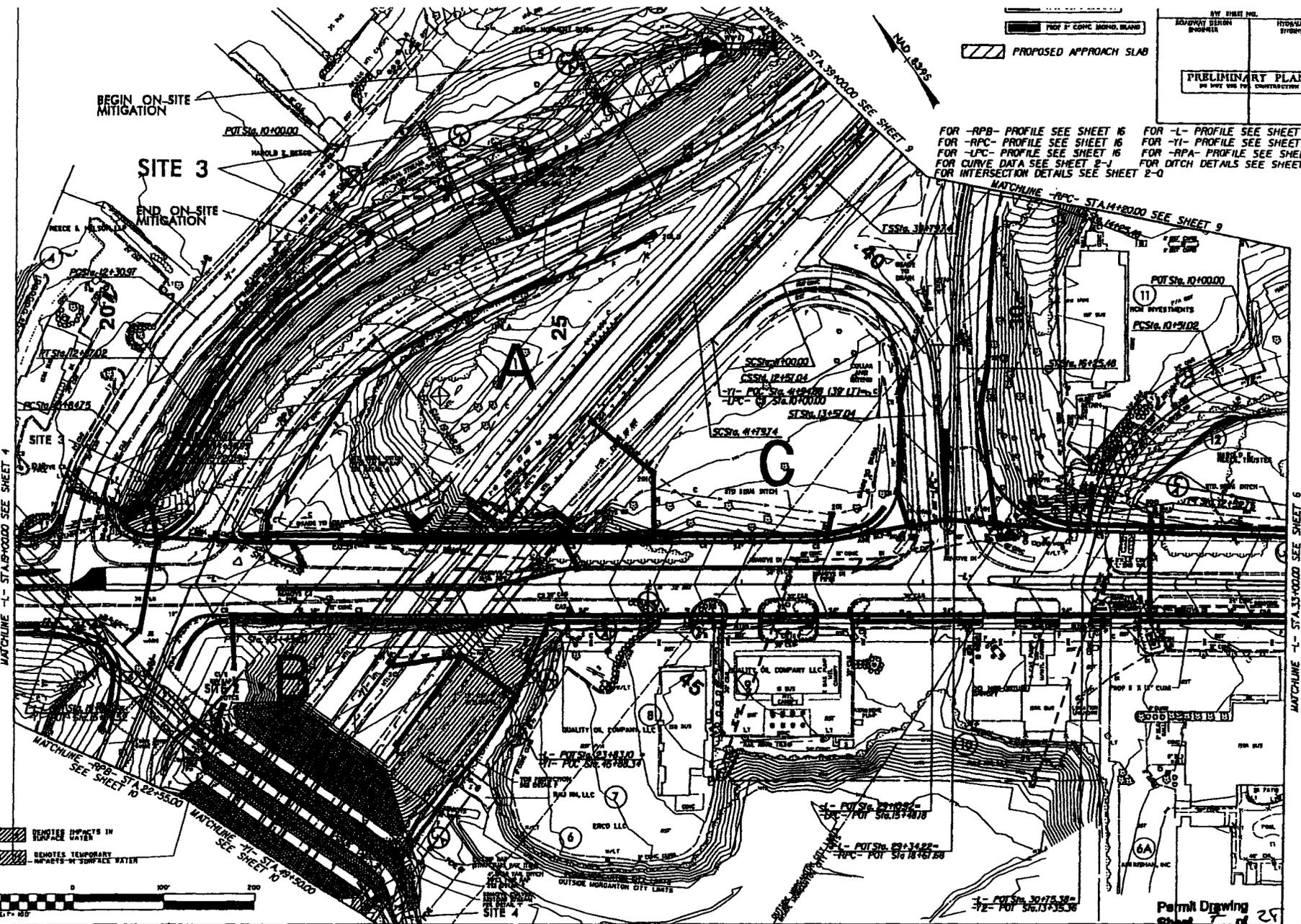
PROF 2' CONC. IMPRO. SLAB

PROPOSED APPROACH SLAB

BY SHEET NO.	HYDRAULIC
ADJUSTED SECTION	FLOW
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

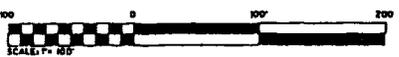
FOR -RPB- PROFILE SEE SHEET 16
 FOR -RPC- PROFILE SEE SHEET 16
 FOR -LPC- PROFILE SEE SHEET 16
 FOR CURVE DATA SEE SHEET 2-1
 FOR INTERSECTION DETAILS SEE SHEET 2-0

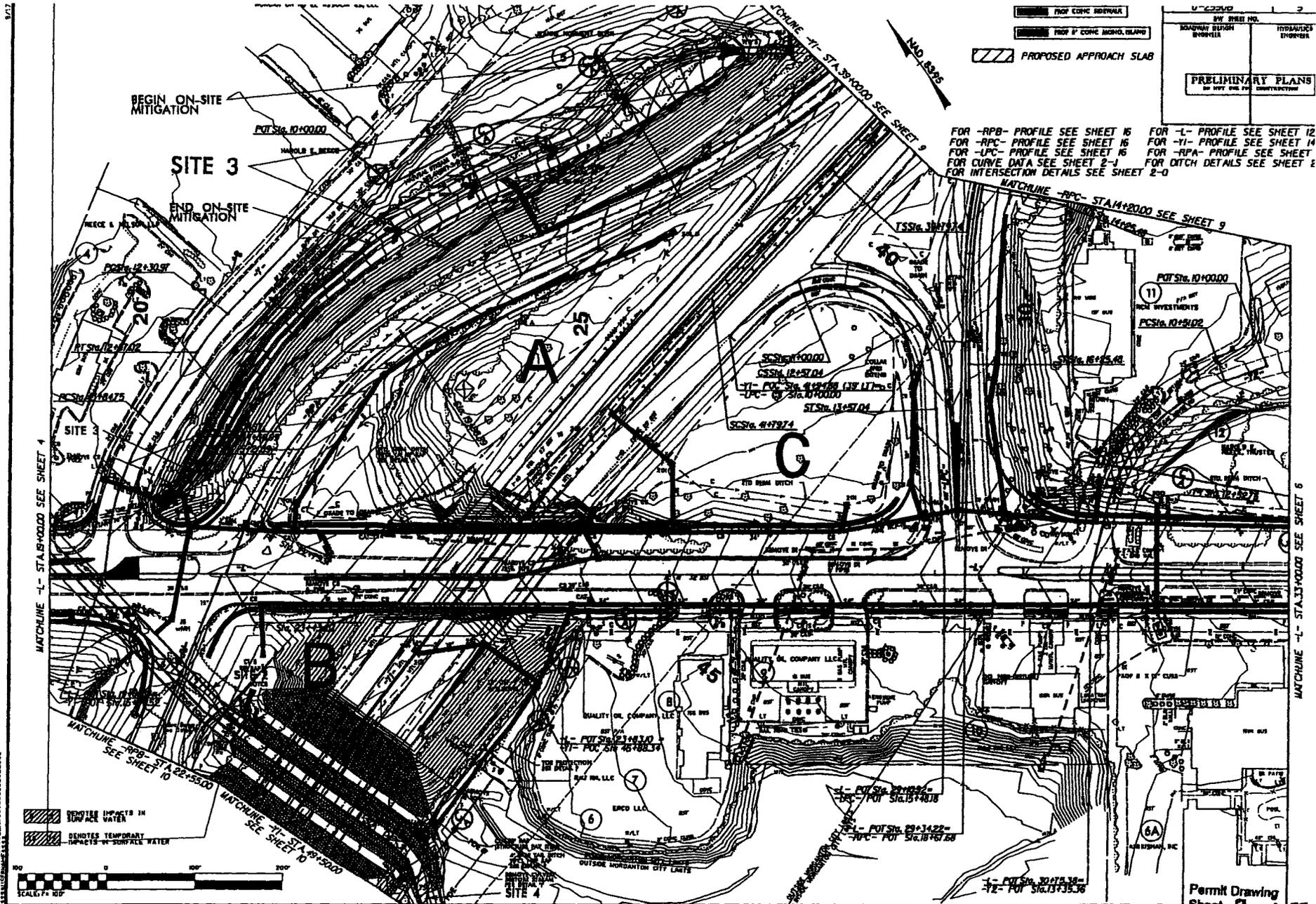
FOR -L- PROFILE SEE SHEET 1
 FOR -YI- PROFILE SEE SHEET 1
 FOR -RPA- PROFILE SEE SHEET 1
 FOR DITCH DETAILS SEE SHEET 2-0



REMOVES IMPACTS IN
 ROADWAY CATCHER

REMOVES TEMPORARY
 IMPACTS IN SURFACE WATER





FOR -RPB- PROFILE SEE SHEET 16 FOR -L- PROFILE SEE SHEET 12
 FOR -RPC- PROFILE SEE SHEET 16 FOR -VI- PROFILE SEE SHEET 14
 FOR -LPC- PROFILE SEE SHEET 16 FOR -RPA- PROFILE SEE SHEET 14
 FOR CURVE DATA SEE SHEET 2-J FOR DITCH DETAILS SEE SHEET E
 FOR INTERSECTION DETAILS SEE SHEET 2-O

denotes IMPACTS IN SURFACE WATER
 denotes TEMPORARY IMPACTS IN SURFACE WATER

Permit Drawing
 Sheet 7 of 11

MATCHLINE -L- STA.18+00.00 SEE SHEET 4

MATCHLINE -RPC- STA.22+55.00 SEE SHEET 10

MATCHLINE -VI- STA.29+50.00 SEE SHEET 10

MATCHLINE -RPC- STA.31+80.00 SEE SHEET 9

MATCHLINE -L- STA.33+00.00 SEE SHEET 6

A 25

C

QUALITY OIL COMPANY, LLC

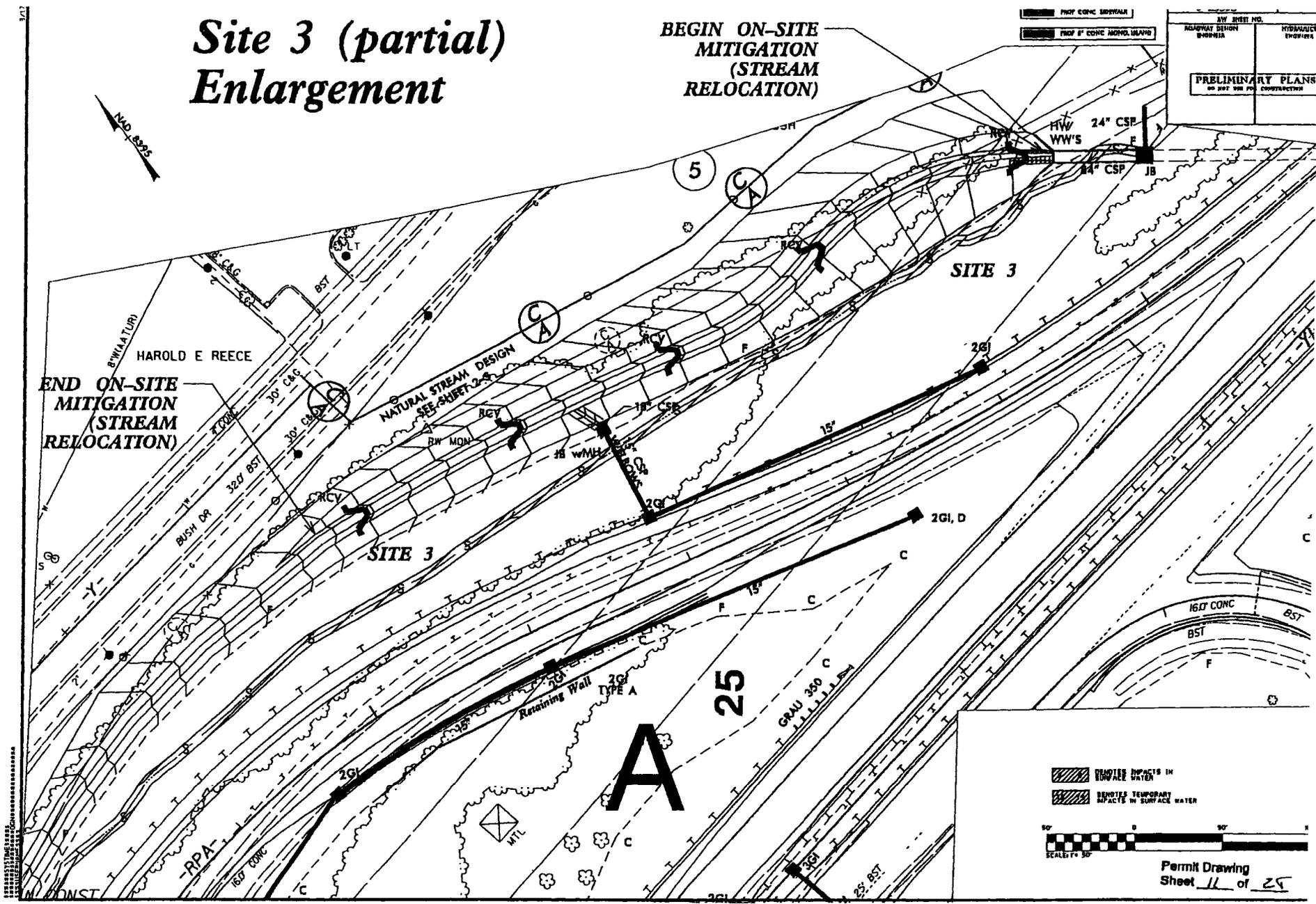
Site 3 (partial) Enlargement

BEGIN ON-SITE
MITIGATION
(STREAM
RELOCATION)

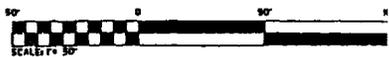
END ON-SITE
MITIGATION
(STREAM
RELOCATION)

PROJECT NO.		NY STATE NO.
ADAPTATION DESIGN NUMBER		HYDRAULIC ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION		

444



TEMPORARY IMPACTS IN WATER
 TEMPORARY IMPACTS IN SURFACE WATER

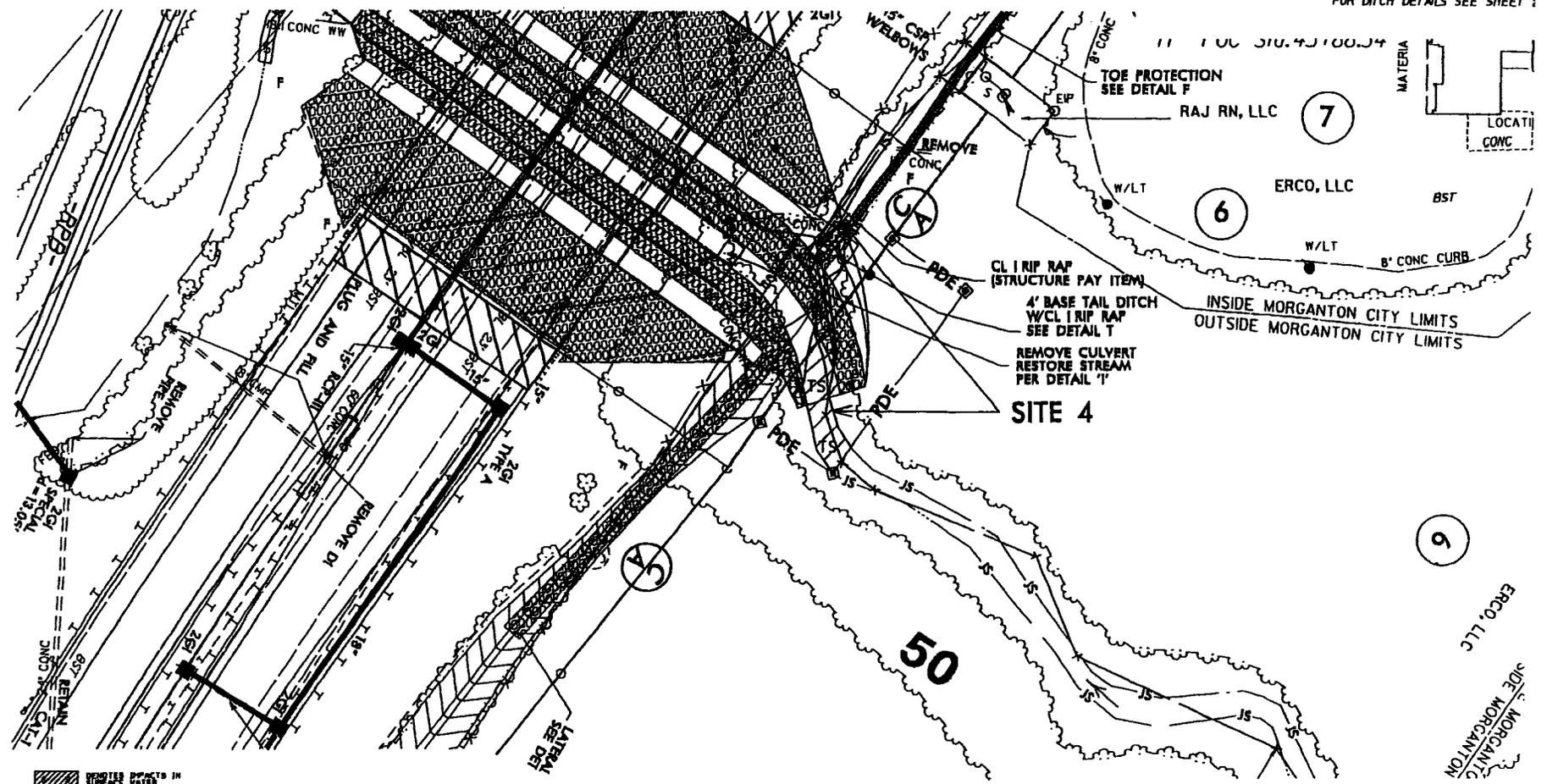


Permit Drawing
Sheet 11 of 25

Site 4 Enlargement

PROP 8" CONC W/10% BLAND	BY PERMIT NO.	HYDRAULIC
	ROADWAY DESIGN	DESIGNER
PRELIMINARY PLANS		
BY PERMIT NO. FOR CONSTRUCTION		

FOR -L- PROFILE SEE SHEET 12
FOR DITCH DETAILS SEE SHEET 1



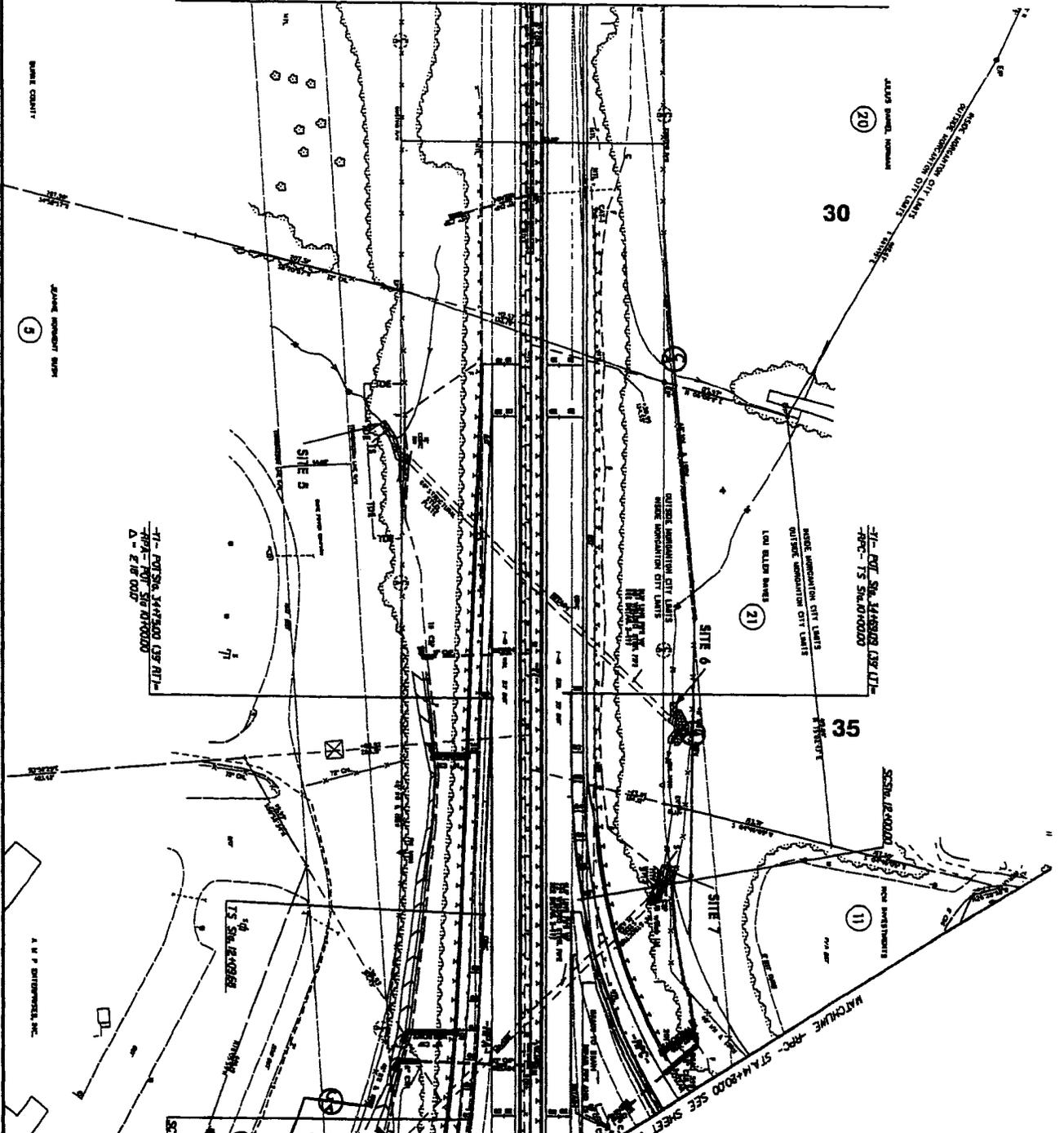
DEMOTES PERMANENT IMPACTS IN SURFACE WATER
 DEMOTES TEMPORARY IMPACTS IN SURFACE WATER



445

Permit Drawing
Sheet 12 of 28

MATCHLINE -71- STA.28+00.00 SEE SHEET 8

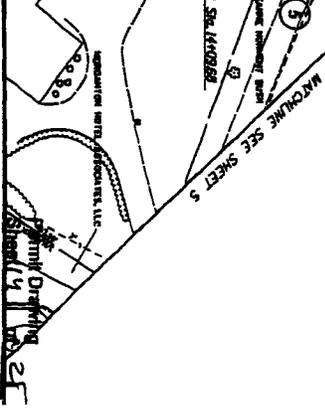


MATCHLINE -71- STA.35+00.00 SEE SHEET 5

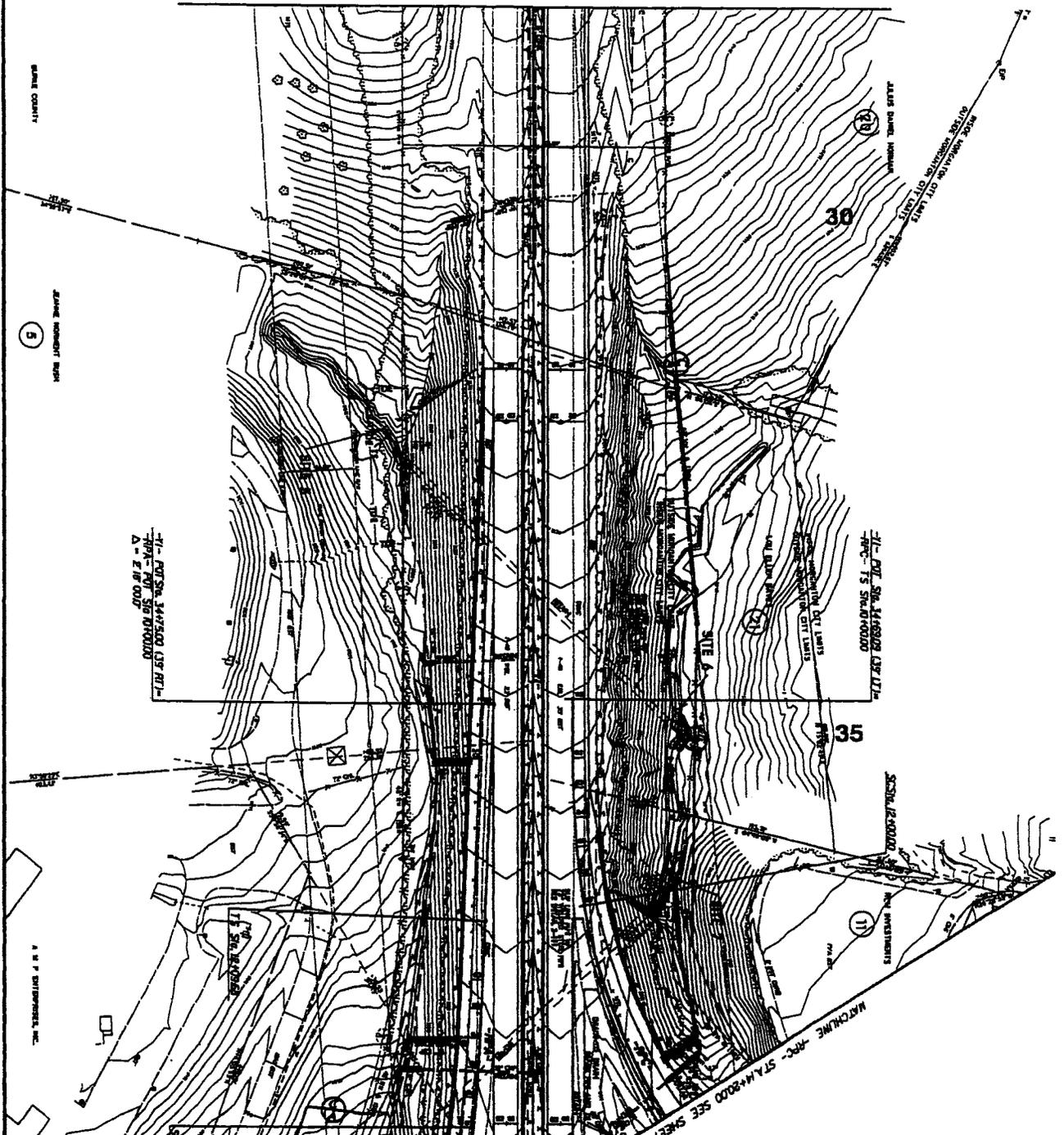


- FOR -71- PROFILE SEE SHEET 1
- FOR -70- PROFILE SEE SHEET 1
- FOR -72- PROFILE SEE SHEET 2
- FOR DITCH DETAILS SEE SHEET 2
- FOR DITCH DETAILS SEE SHEET 2

<p>PRELIMINARY PLANS</p> <p>DATE: 10/1/71</p> <p>BY: [Signature]</p>	
<p>DESIGNED BY: [Signature]</p> <p>CHECKED BY: [Signature]</p>	<p>APPROVED BY: [Signature]</p> <p>DATE: 10/1/71</p>



MATCHLINE -YI- STA.28+00.00 SEE SHEET 8



-YI- CIV. STA. 34+50.00 US RT. -
 -RPA- FOR STA. 35+00.00
 Δ = 2.18' 0.00'

-YI- CIV. STA. 34+50.00 US RT. -
 -RRC- TS STA. 35+00.00

MATCHLINE -YI- STA.39+00.00 SEE SHEET 5



PROPOSED GRADE IN
 EXISTING TERRAIN

FOR -YI- PROFILE SEE SHEET 13
 FOR -RPA- PROFILE SEE SHEET 14
 FOR -RRC- PROFILE SEE SHEET 14
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2

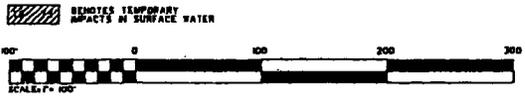
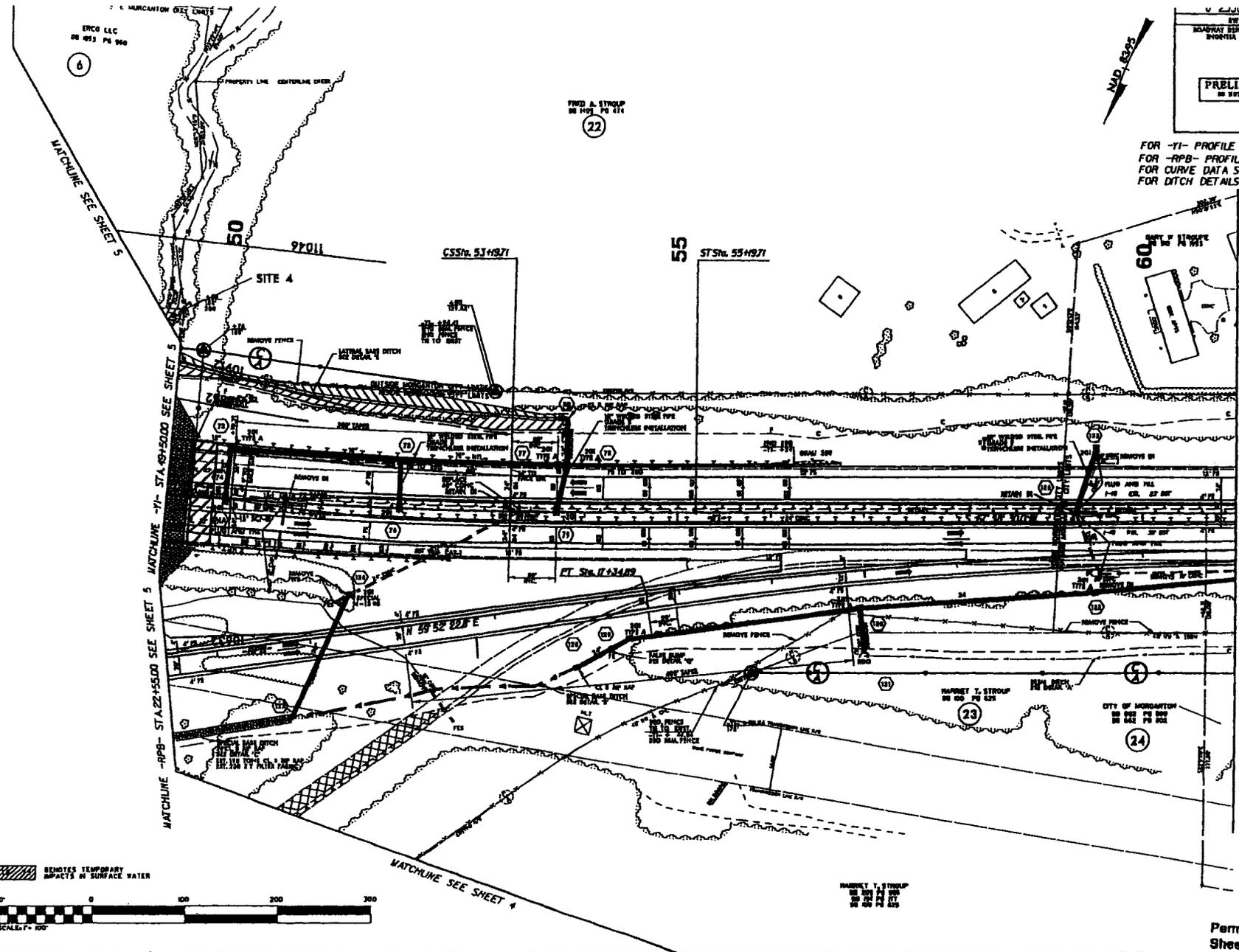
NAD 83/95	
PRELIMINARY PLANS	
DESIGNED BY	HYDRAULIC ENGINEER
CHECKED BY	
DATE	

South
 Drawing
 Sheet
 15 of 2

547

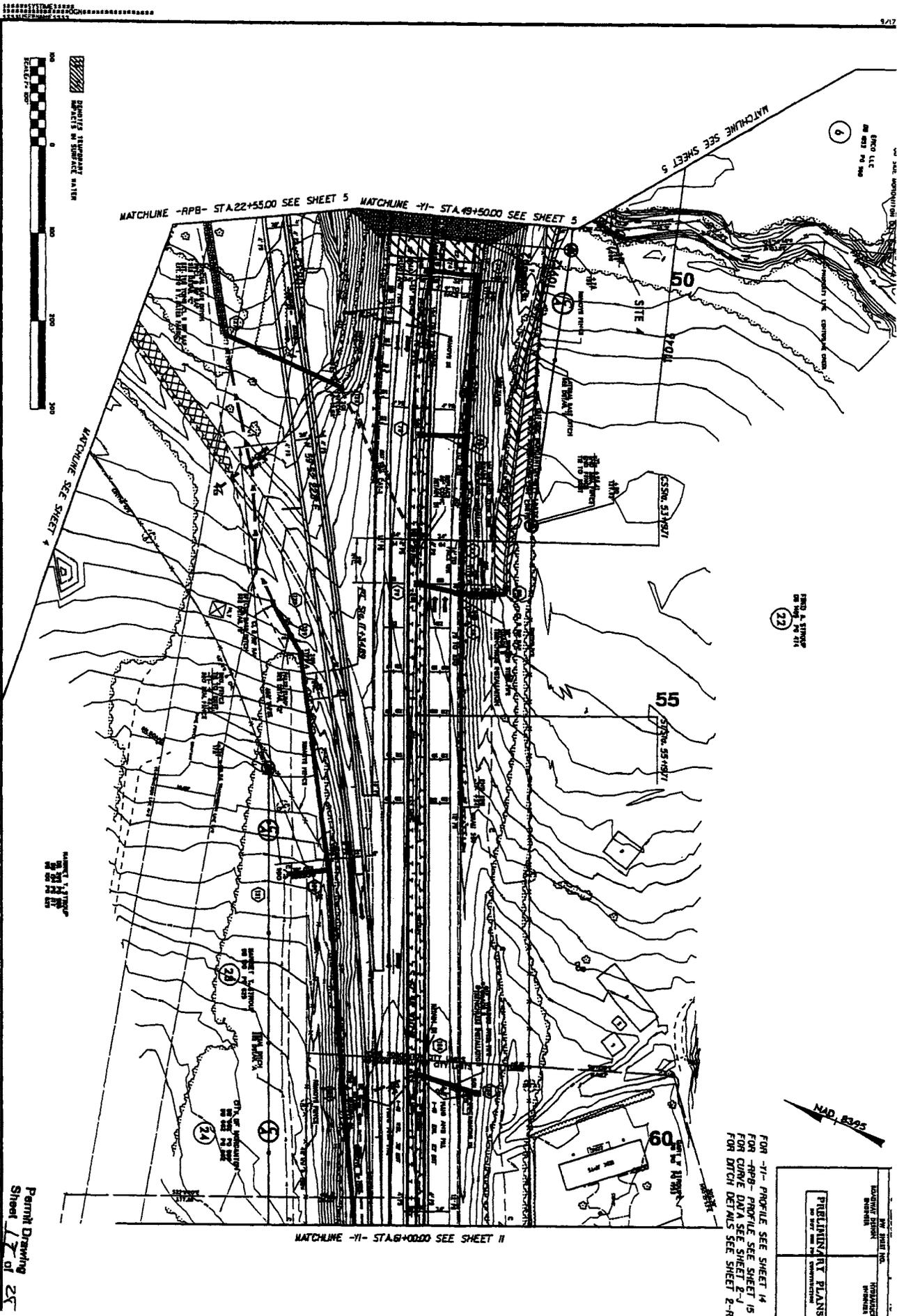
BY SHEET NO.	
ROADWAY DESIGN	HYDRAULIC DESIGN
PRELIMINARY PLANS	
DO NOT USE FOR CONSTRUCTION	

FOR -YI- PROFILE SEE SHEET 14
 FOR -RPB- PROFILE SEE SHEET 15
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2-R



REMOVES TEMPORARY IMPACTS IN SURFACE WATER

MARKET T. STROUP
 00 000 PA 020



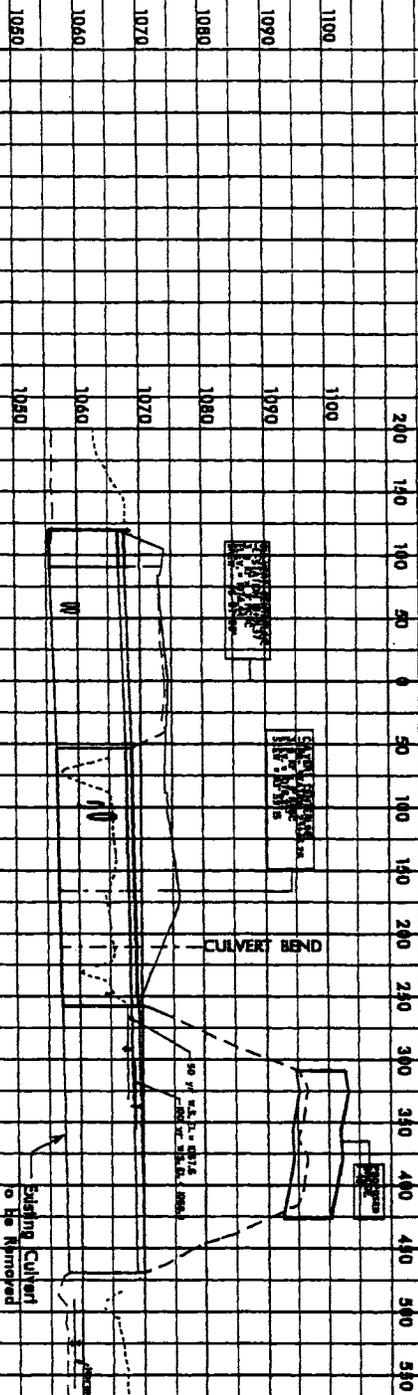
Permit Drawing
Sheet 17 of 25

FOR -YI- PROFILE SEE SHEET 14
FOR -RPB- PROFILE SEE SHEET 15
FOR CURVE DATA SEE SHEET 2-J
FOR DITCH DETAILS SEE SHEET 2-R

PRELIMINARY PLANS FOR THE [Project Name]	DRAWING NUMBER [Number]	SHEET NUMBER [Number]
--	----------------------------	--------------------------



3 - 10'x11' RCBC



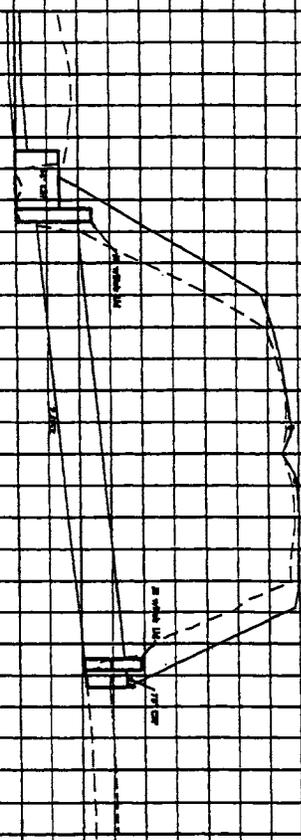
INCOMPLETE PLANS
 PRELIMINARY PLANS
 NOT TO BE USED FOR CONSTRUCTION

PRINT DRAWING
 Sheet 1 of 2

78" GSP w/IB & 84" GSP Extension

1120
1110
1100
1090
1080
1070

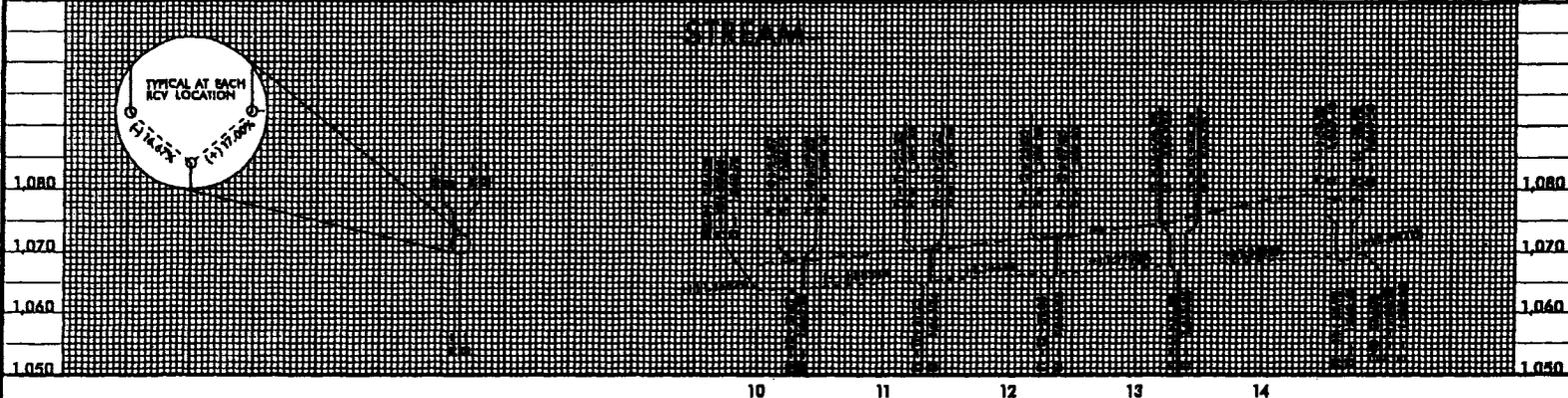
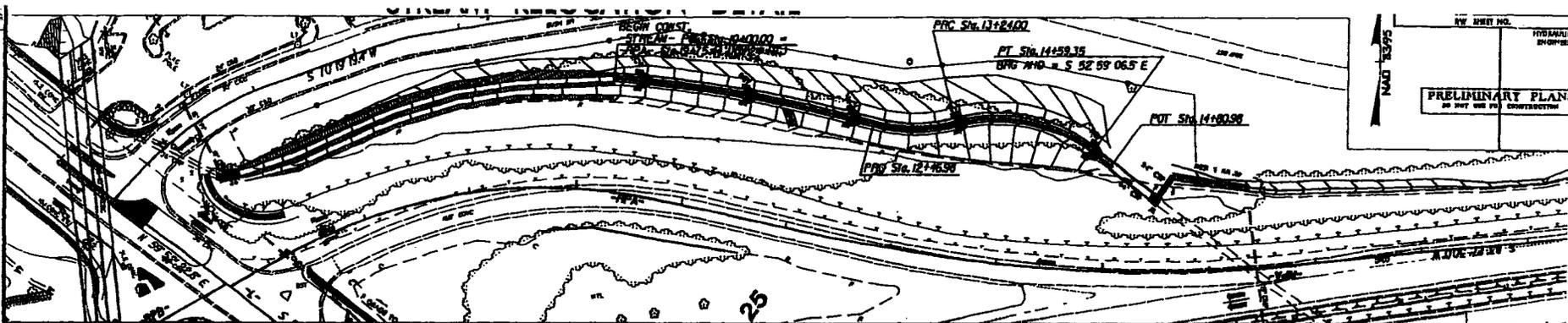
350 300 250 200 150 100 50 0 50 100 150 200 250 300 350



INCORPORATE PLANS
 IN THE PRELIMINARY PLANS
 FOR THE PROJECT

Permit Drawing
 Sheet 19 of 2

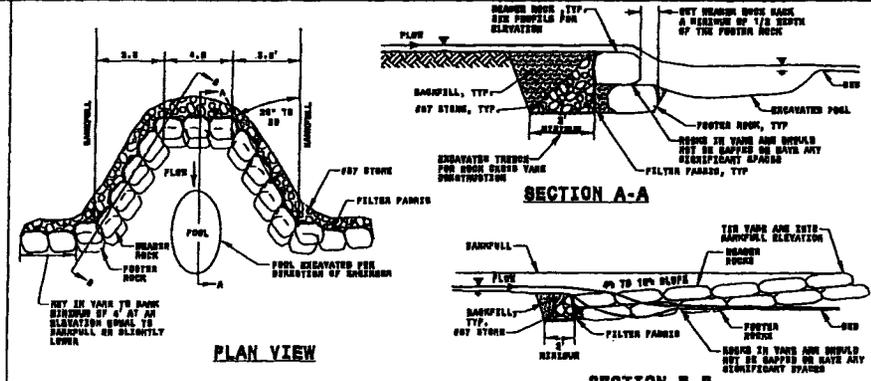
453



STREAM CURVE DATA

PI Sta 14+59.35	PI Sta 14+60.98
Δ = 47° 14' (RT)	Δ = 23° 27' (RT)
D = 409' 06"	D = 38' 49"
L = 266.98'	L = 77.05'
T = 127.88'	T = 38.57'
R = 1500.0'	R = 1500.0'

PI Sta 13+96.67	PI Sta 14+60.98
Δ = 5° 42' 06.3" (RT)	
D = 34' 49"	
L = 135.12'	
T = 13.57'	
R = 1500.0'	

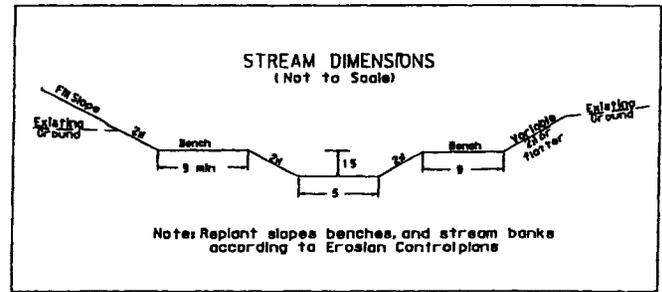


STATION	NUMBER	LENGTH (FT)	WIDTH	DEPTH
10+81	1	3	4	4
11+31	2	3	4	4
12+31	2	3	4	4
13+31	2	3	4	4
14+31	2	3	4	4

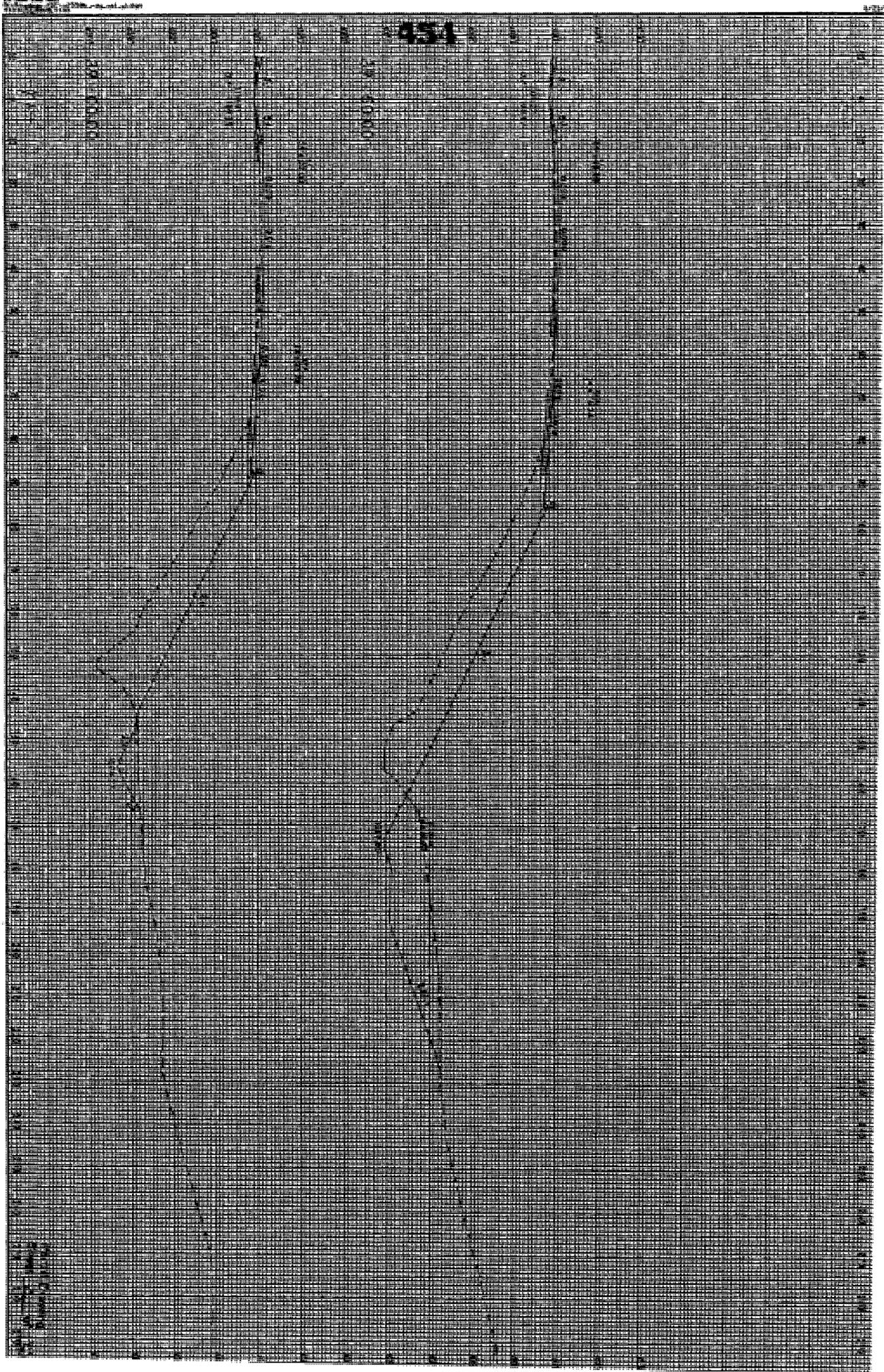
ROCK CROSS YANE DETAIL
NOT TO SCALE

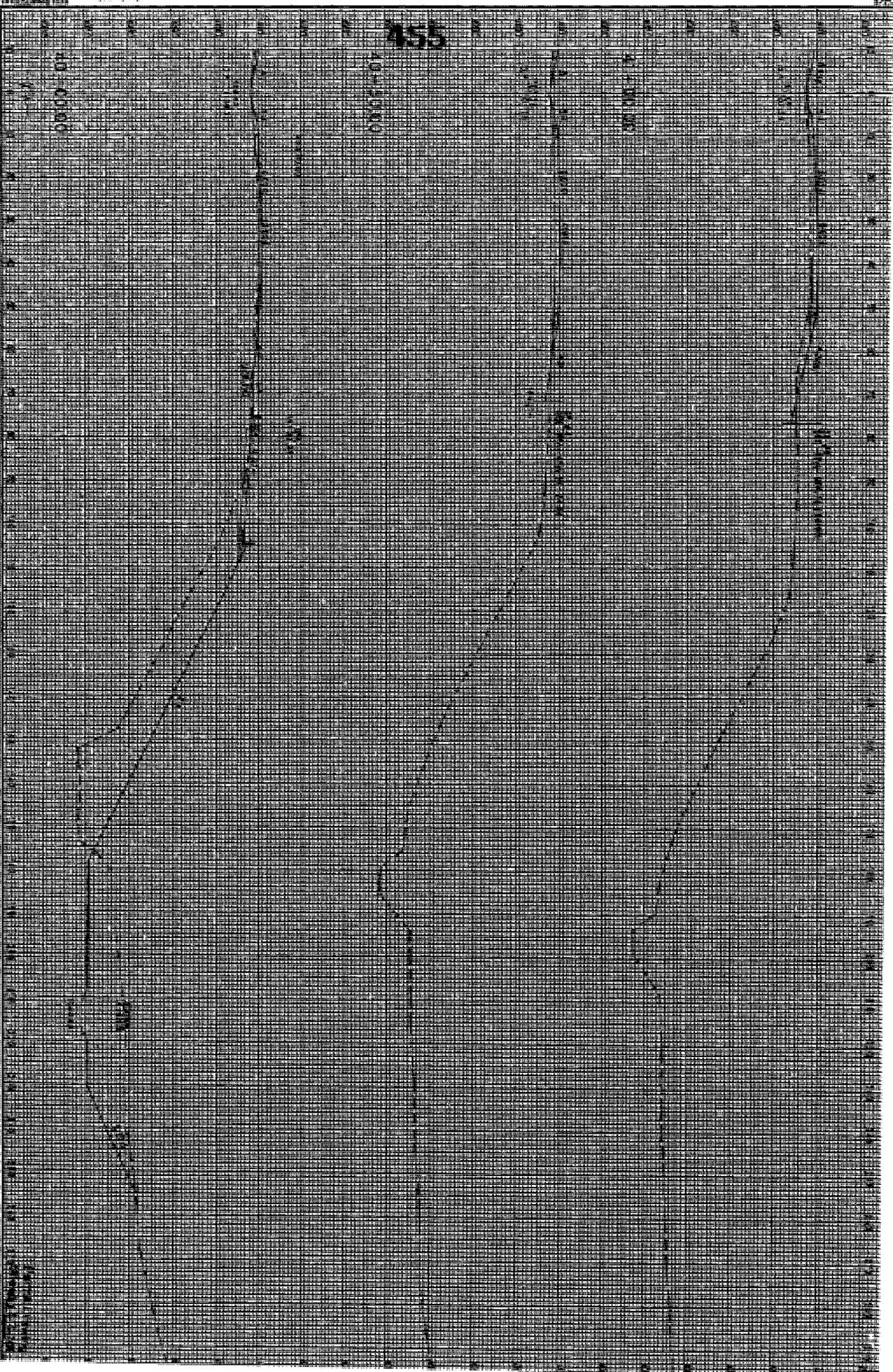
NOTES:

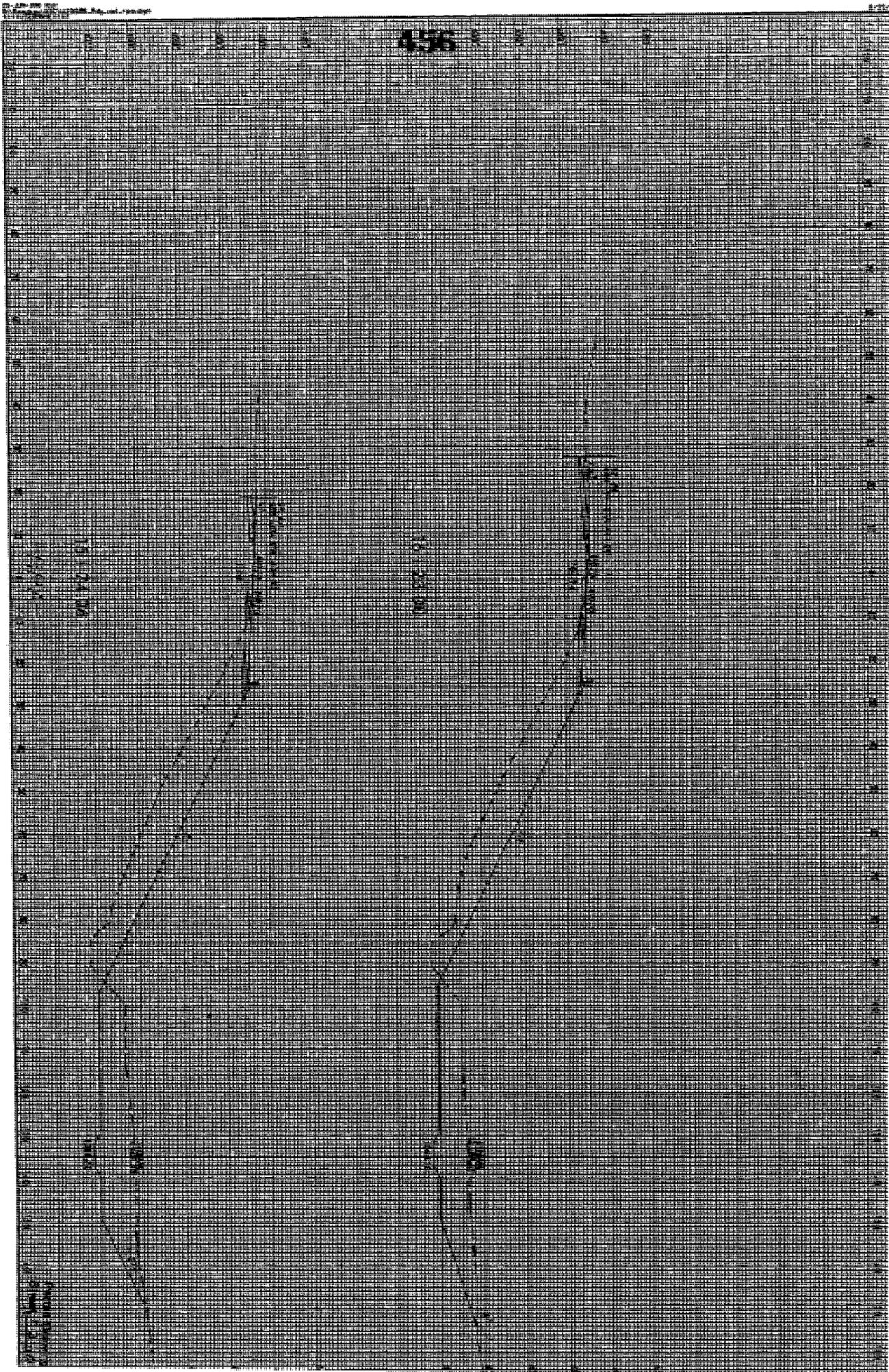
1. TOPMOST PART OF POOL TO BE IN LINE WITH UNDER BANK AND TIED INTO BANKFULL.
2. IN POOL, EXCAVATE FROM THE SLOPE TO FOOTER ROCKS.
3. BANKS TO BE SLOPED TO 1:1.
4. BANKS TO BE SLOPED TO 1:1.

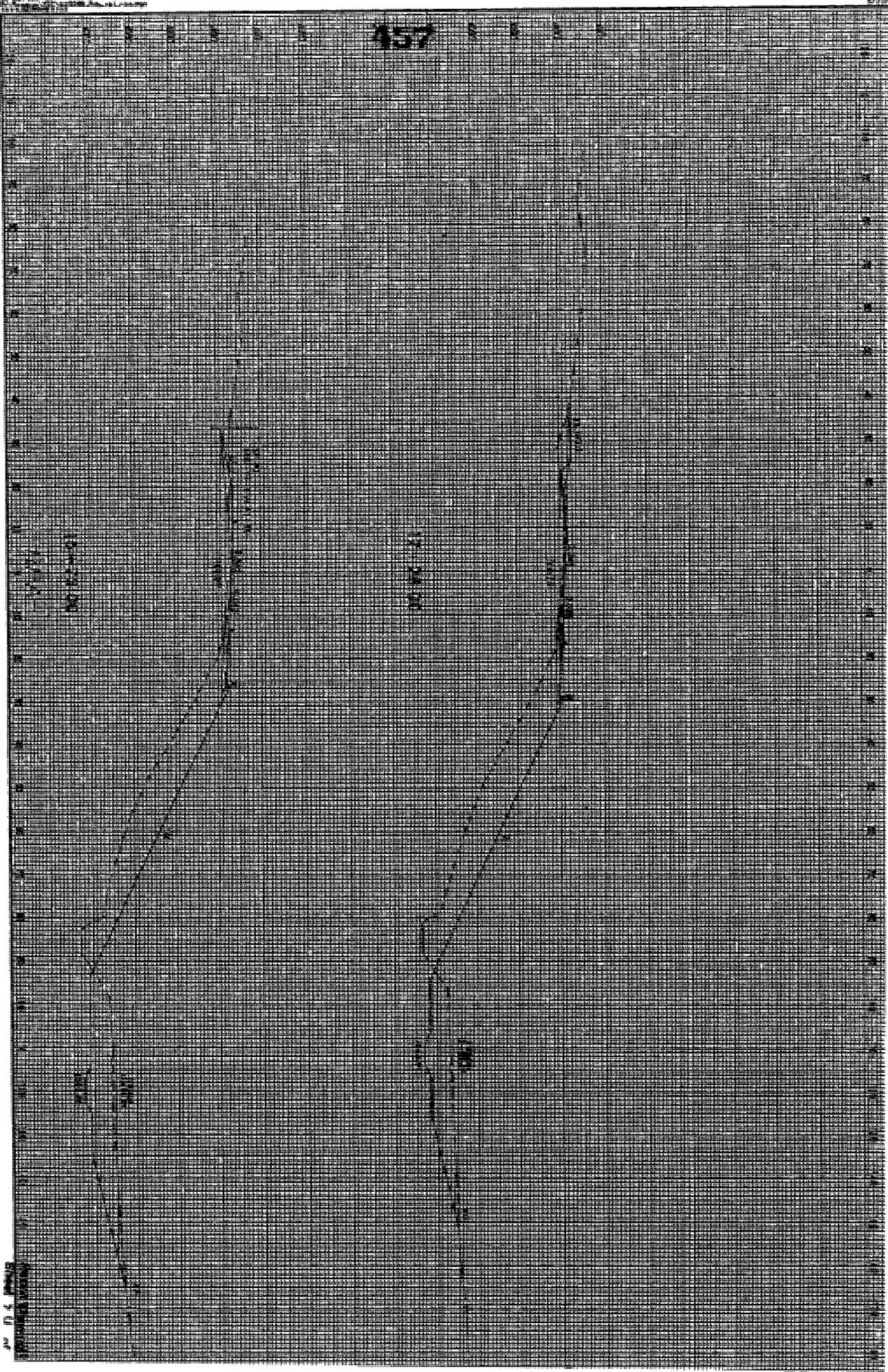


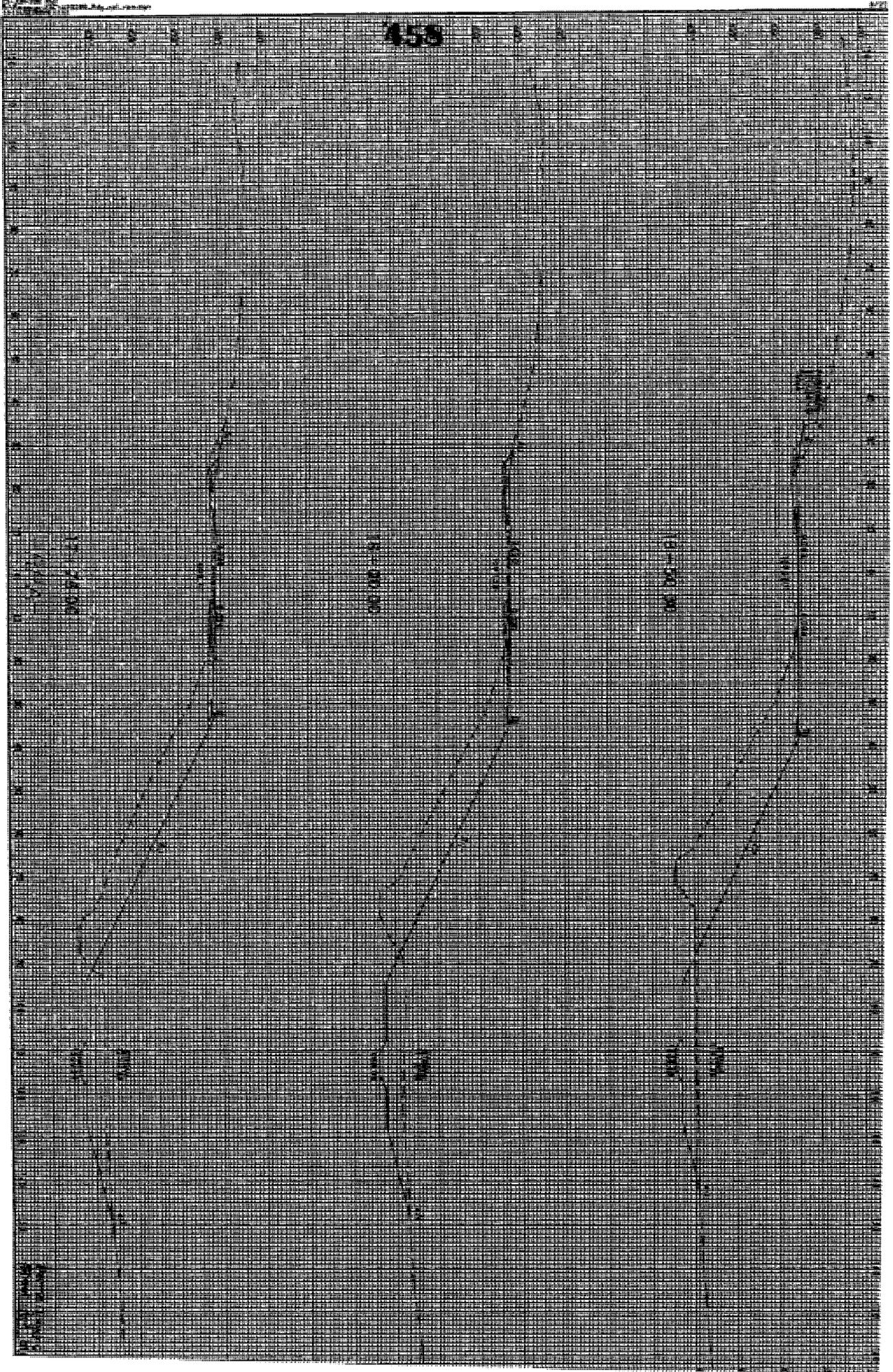
Note: Replant slopes benches, and stream banks according to Erosion Control plans

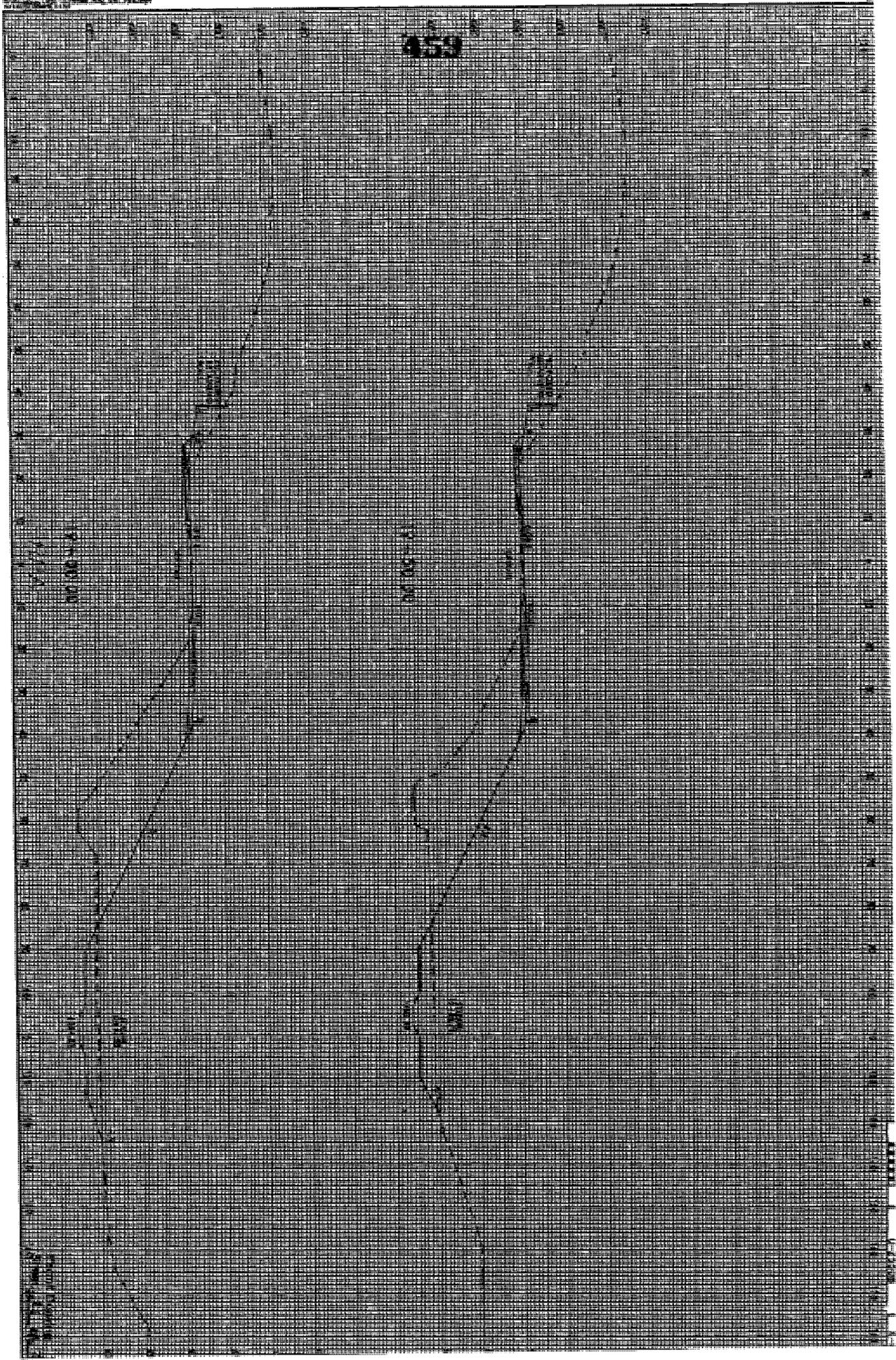


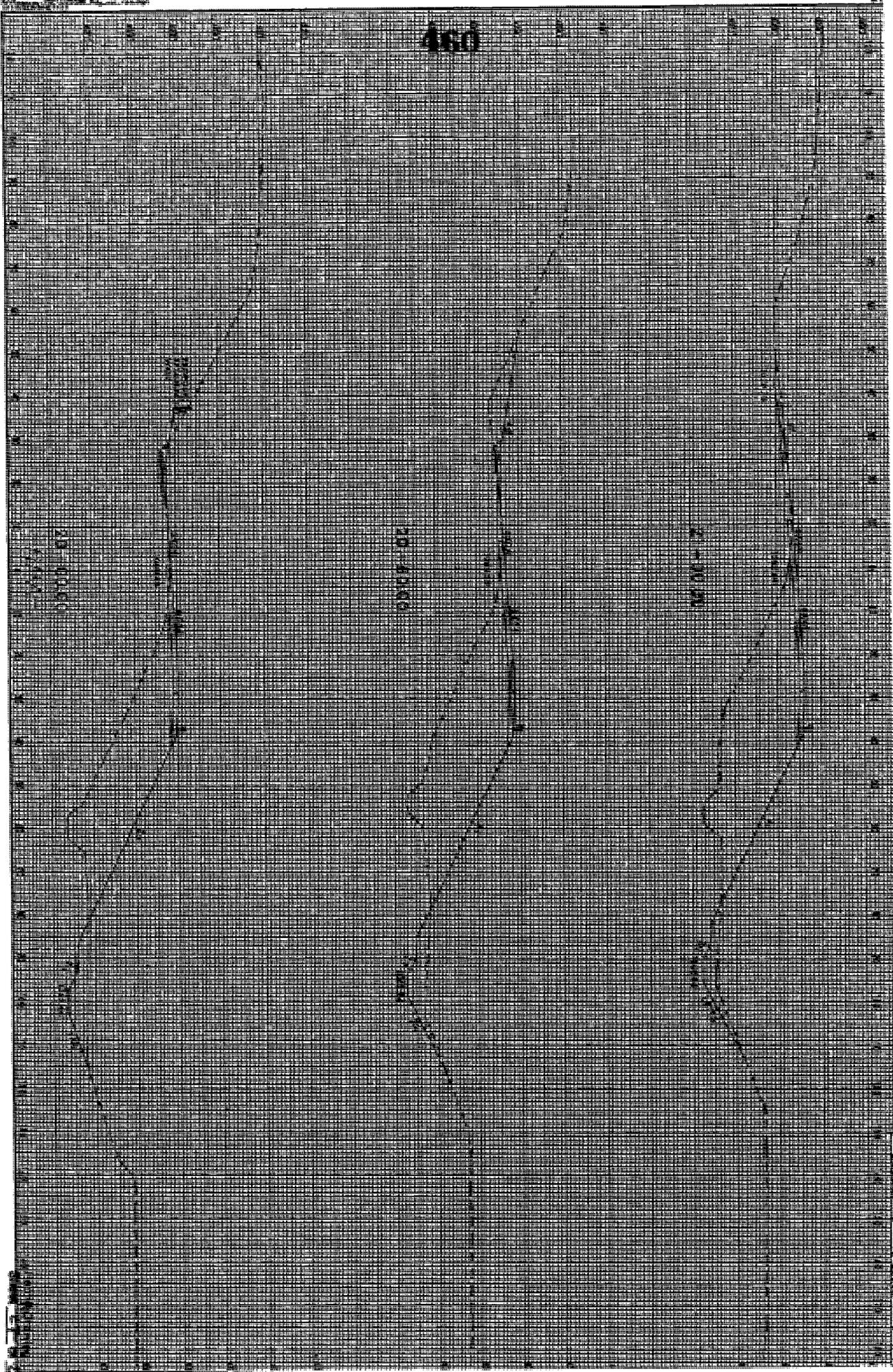








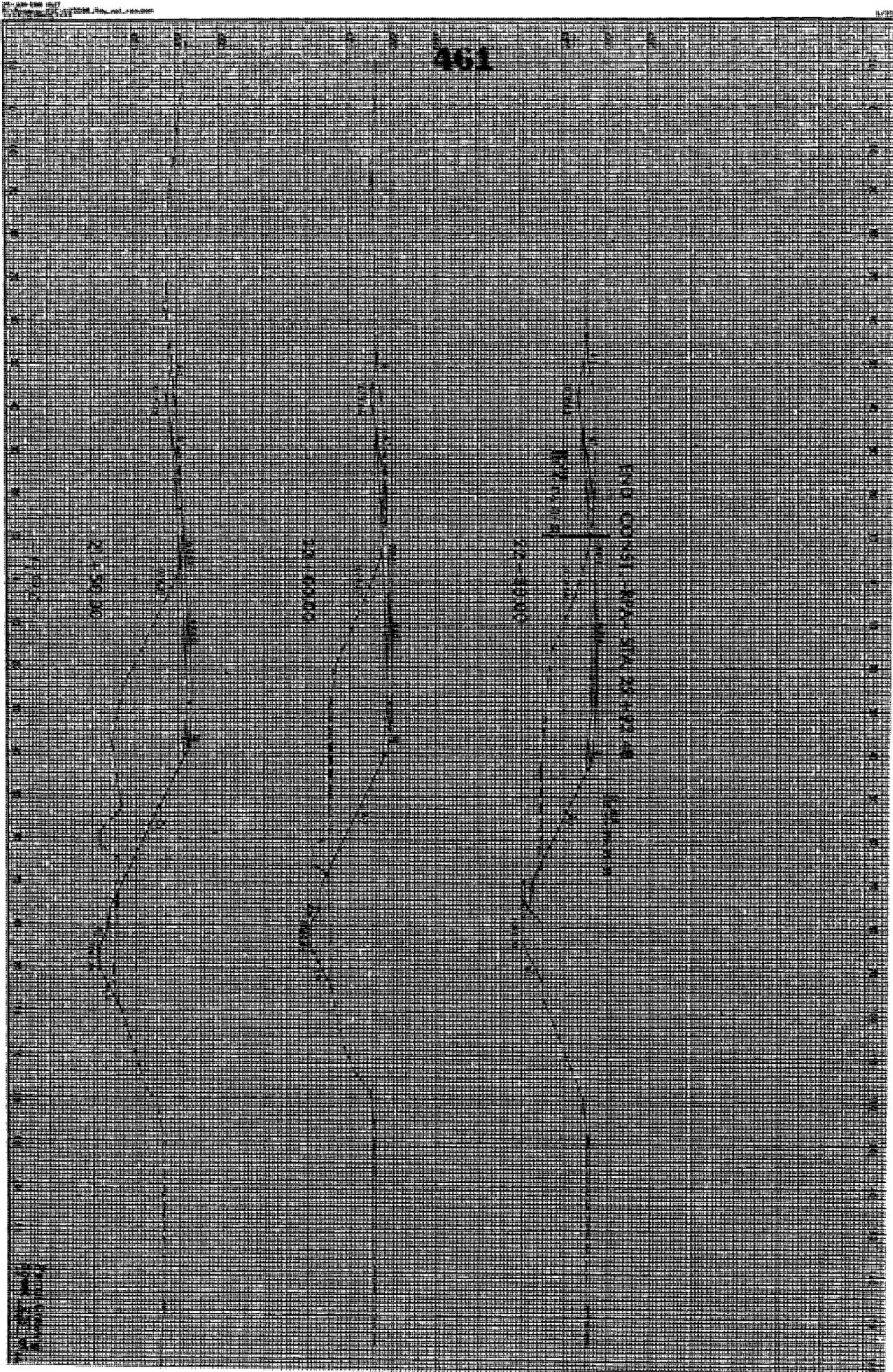




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STORMWATER MANAGEMENT PLAN

U-2550B, WBS No.: 34831.1.1

Date: 06/25/10

Burke County

Hydraulics Project Manager: Andrew Nottingham, PE

ROADWAY DESCRIPTION

TIP Project U-2550B proposes to modify the existing interchange at the intersection of I-40 and NC18 in Morganton. The project also proposes to continue the multi-lane widening of NC18 (Sterling Street) completed under Tip project U-2550. NC 18 will be widened to a four-lane, concrete median divided facility. To accomplish this, the I-40 bridge over NC 18 will need to be reconstructed in order to provide adequate horizontal clearance. An on-site detour and temporary structure will be constructed to maintain traffic along I-40 during construction. The I-40 westbound off-ramp will be realigned in order to accommodate the temporary onsite detour. The I-40 westbound on-ramp will be realigned to tie into the current intersection of NC 18 and the I-40 westbound off-ramp. Acceleration and deceleration lanes along I-40 will also be extended improving safety for traffic entering and exiting the highway.

ENVIRONMENTAL DESCRIPTION AND IMPACTS

The project is located in the Catawba River Basin (HUC-03050101); Sub-basin 03-08-31 and crosses East Prong Hunting Creek. Adjacent to the proposed improvements are two perennial streams: an unnamed tributary to East Prong Hunting Creek (*UT to East Prong Hunting Creek*) and an additional unnamed tributary (*UTI*). East Prong Hunting Creek crosses under I-40 and then under NC 18 (Sterling St.) directly north of the interchange through 10'x 11' triple box culverts. *UT to E. Prong Hunting Creek* runs westwards paralleling the I-40 eastbound lanes. It then crosses under I-40 through a 78-inch diameter, 345-foot long steel pipe culvert. *UT to E. Prong Hunting Creek* then parallels the I-40 westbound off-ramp and Bush Drive for approximately 835 feet before flowing into East Prong Hunting Creek. *UTI* flows from a pond adjacent to Bush Drive and then through a 350-foot long, 66-inch diameter steel pipe culvert before flowing into *UT to E. Prong Hunting Creek*.

Impacts to East Prong Hunting Creek will involve extending the existing triple-barrel culvert upstream (south) of NC 18 and downstream (north) of NC18 to accommodate the realigning of the westbound I-40 on-ramp with the westbound I-40 off-ramp. Also the existing triple barrel culvert under I-40 will be removed and replaced with a single-span bridge. The total length of the new triple-barrel culvert is 225'. The length of existing culvert under I-40 to be removed is 211'. After removal of the existing culvert, the stream will be contained in a channel with low flow benches, and will be stabilized with rip rap along the fresh cut slopes. Upstream of I-40, the existing stream has migrated eastwardly and has begun to undermine the existing culvert eastern wing-wall.

Approximately 65' of stream will be relocated to better align the stream with the new open stream channel

Impacts to UT to E. Prong Hunting Creek will involve the relocation of 845'' of stream and extending the 78'' pipe under I-40 on the upstream end of the reach, as well as the dual 36'' pipes on the downstream of the reach. The total length of pipe extensions for UT East Prong Creek are 103'.

Impacts to UT1 East Prong Hunting Creek include temporary impacts associated with re-lining the existing 66'' metal pipe under I-40 with a welded steel liner. The existing pipe length will be retained.

Neither High Quality Waters (HQW), Water Supplies (WS-I or WS-II), nor Outstanding Resources Waters (ORW) occur within 1.0 mile of the project. The North Carolina Wildlife Resources Commission (NCWRC) lists Burke County as a trout county. East Prong Hunting Creek is not listed as a trout stream. There are no 303(d) streams within one mile of the project.

BEST MANAGEMENT PRACTICES

Best Management Practices (BMPs) and measures used on the project are non-structural and attempt to reduce storm water impacts to the receiving streams due to erosion and runoff. NC 18 is a curb and gutter road with associated piped drainage systems. I-40 is typically a shoulder-section road with a few areas of curbing in high fill locations and some areas along the ramps at steeper grades. Where possible, the piped outlets will be discharged into grassed roadside ditches prior to the receiving streams. Where warranted, ditches will be armored with appropriately sized rip rap to provide erosion resistance. Culverts were designed to protect stream stability and provide fish passage where possible. In locations where the proposed alignment will be shifted from the current alignment, the existing pavement will be removed. The remaining areas will then be replanted with vegetation. Natural stream design will be used in the stream relocation.

Stream Relocation

- Ramp A station 14+93 to station 22+80 along the right side. 481 feet of natural stream design proposed.

Culverts

- -L- Station 18+14 left to 21+24 right and -Y1- 46+50 left to 47+99 right: extend NC 18 Culvert and remove I-40 culvert.
- -RPA- 14+45 left to -Y1- 36+73 right: extend existing 78'' corrugated metal pipe.

Stream Relocation Summary

An unnamed tributary to East Prong Creek will be impacted by proposed roadway fill along Ramp A stations 14+45 to 23+00. The stream is perennial and has a drainage area of 120.5 acres. The existing stream is a G5c using the Rosgen classification system. The total stream reach length is 1000' and is located between the ramp and a service road along I-40. Downstream of the reach, two 36" metal pipes accept the stream flow and then discharge the stream into a box culvert carrying East Prong Creek. These pipe outlets are perched two feet inside the culvert. At the upper end of the reach, a 78" metal pipe discharges the stream after crossing I-40 from south to north. The outlet end of the 78" pipe is perched 2.4' and has developed a wide scour hole. Both the downstream and the upstream pipes will need to be extended to accommodate roadway fill. The only pools evident in the stream include the scour hole and two other small pools, all located within 300 feet of the downstream end of the 78" cross pipe. This scour hole/pool sequence is a likely evolution of the stream achieving energy dissipation. The current stream is functionally stable; a result of good vegetation and a stable profile slope. It's essentially non-sinuuous as it follows the ramp alignment. The current stream is predominately entrenched, except for the lower portion of the reach where stream banks are somewhat lower and provide some flooding relief. The streambed is predominately sand.

The stream will be relocated and restored using a priority-2 stream restoration approach, and will be classified as a Rosgen C5 stream with no sinuosity or either a slightly entrenched Rosgen B5c stream with no sinuosity. The proposed grade is slightly less than the existing grade, which appears stable. To ensure stability, rock cross-vanes will be used to maintain grade control. Energy dissipation at the outlet of the 78" metal pipe will be achieved by using a "drop structure", which is a junction box with a drop in inverts between the existing pipe and the new pipe extension. A floodplain will be created along the stream relocation to provide bankfull flood stage relief, and decrease shear stresses along the stream. Reference reaches include a stable B4c and a C5 stream as well as the existing stream. To ensure long-term stability of the stream, the riparian buffer will be held in Right of Way to allow for vegetation establishment and buffer protection.

Sediment Transport Analysis

$$\text{Shear stress, } \tau = \gamma R s$$

γ = density of water (62.4 lb/ft³)

R = hydraulic radius = Area/Wetted Perimeter

s = slope

Stream power computation

$$P = v\tau$$

v = channel velocity (ft/s)

τ = shear stress (lb/ft²)

Existing Stream

$$R = 10.6^2/9.6\text{ft} = 1.10\text{ft}$$

$$s = 0.0124\text{ft/ft}$$

$$\tau = (62.4 \text{ lb/ft}^3)(1.10\text{ft})(0.0124\text{ft/ft}) = 0.85\text{lb/ft}^2$$

$$P = (4.81 \text{ ft/s})(0.85\text{lb/ft}^2) = 4.1 \text{ ft.lbs/s.ft}^2$$

Reference Stream

$$R = 12.2\text{ft}^2/13.7\text{ft} = 0.89\text{ft}$$

$$s = 0.0139\text{ft/ft}$$

$$\tau = (62.4 \text{ lb/ft}^3)(0.89\text{ft})(0.0139\text{ft/ft}) = 0.77\text{lb/ft}^2$$

$$P = (4.8 \text{ ft/s})(0.77\text{lb/ft}^2) = 3.7 \text{ ft.lbs/s.ft}^2$$

Proposed Stream

$$R = 12.0\text{ft}^2/11.71\text{ft} = 1.02\text{ft}$$

$$s = 0.0123\text{ft/ft}$$

$$\tau = (62.4 \text{ lb/ft}^3)(1.02\text{ft})(0.0123\text{ft/ft}) = 0.79\text{lb/ft}^2$$

$$P = (4.2 \text{ ft/s})(0.78\text{lb/ft}^2) = 3.3 \text{ ft.lbs/s.ft}^2$$

Variables	Existing Channel	Proposed Reach	Reference Reach	Reference Reach
	E. Prong Trib.	E. Prong Trib	Lost Cove Cr.	Tr. to Rocky Br.
1. Stream type	G5c	C5/B5c	B4c	C5
2. Drainage area (D.A.)	120.5 ac.	120.5 ac.	24.8 sq. mi.	360 ac.
3. Bankfull width (Wbkf) ft.	6.1	11.0	62.3	13.3
4. Bankfull mean depth (dbkf) ft.	1.73	0.92	3.36	0.92
5. Width/depth ratio (Wbkf/dbkf)	3.5	12.0	18.5	14.5
6. Bankfull cross-sectional area (Abkf) ft. ²	10.6	12.0	208.0	12.2
7. Bankfull mean velocity (Vbkf) ft/sec	4.81	4.2		4.8
8. Bankfull discharge (Qbkf) ft. ³ /sec	50	50		59
9. Bankfull max depth (dmbkf) ft.	2.1	1.5	5.4	1.8
10. Width of floodprone area (Wfpa) ft.	8.3- 22.1	37	>200	38-60
11. Entrenchment ratio (Wfpa/Wbkf)	1.4-3.6	3.4	>3	2.9-4.5
12. Meander length (Lm) ft.	N/A	N/A	540	38 to 51
13. Ratio of meander length to bankfull width (Lm/Wbkf)	N/A	N/A	8.7	2.9 to 3.8
14. Radius of curvature (Rc) ft.	N/A	N/A	62.5	20 to 30
15. Ratio of radius of curvature to bankfull width (Rc/Wbkf)	N/A	N/A	1	1.5 to 2.3
16. Belt width (Wbit) ft.	N/A	N/A	500	18
17. Meander width ratio (Wbit/Wbkf)	N/A	N/A	8	1.40
18. Sinuosity (stream length/valley length) (K)	1.03	1.01	1.2	1.09
19. Valley Slope (VS)	1.64%	1.25%	0.0088	1.27%
20. Average slope (CS)	1.24%	1.23%	0.0084	1.39%
21. Pool slope	0.003	0.0017		0.001
22. Ratio of pool slope to average slope	0.242	0.138		0.072
23. Maximum pool depth (dpmax) ft.	3.2 to 3.8	1.8	7.7	1.8
24. Ratio of pool depth to average bankfull depth (dp/dbkf)	1.86 to 2.22	1.96	2.3	1.96
25. Pool width (Wp) ft.	7.56 to 24.50	11.0	59.5	14.0
26. Ratio of pool width to bankfull width	1.24 to 4.0	1.00	0.96	1.05
27. Pool to pool spacing ft.	85 to 140	100 to 130	190	30 to 80
28. Ratio of pool to pool spacing to bankfull width	13.9 to 22.9	9.1 to 11.4	3.05	2.3 to 6.0
29. Ratio of lowest bank height to bankfull height (or max bankfull depth) (BHlow/dmbkf)	N/A	N/A	1.0	0.6

NATURAL CHANNEL DESIGN DATA

MORPHOLOGICAL MEASUREMENT TABLE

SITE 3: Station 14+97 to 19+75 Ramp A

N.C. DEPT OF TRANSPORTATION
 DIVISION OF HIGHWAYS
 Burke County
 PROJECT 34831.1.1 (U-2550B)

SHEET OF

rev 6/25/10

WETLAND PERMIT IMPACT SUMMARY

Site No	Station (From/To)	Structure Size / Type	WETLAND IMPACTS					SURFACE WATER IMPACTS				
			Permanent Fill In Wetlands (ac)	Temp Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp (ft)	Natural Stream Design (ft)
1	-L- 18+14/18+74	3-10x11 RCBC ext.						0.01	0.01	29	35	
2	-L- 19+79/21+24	3-10x11 RCBC ext.						0.06		263		
3	-RPA- 14+45/23+00	2-36" RCP, 84" CSP Stream Relocation						0.12	0.01	865	49	481
4	-Y1- 47+99/49+50	Rem. Ex. Culvert Repl. with 172' Bridge						0.02	0.01	115	52	
5	-Y1- 32+05/32+45	Reline ex. 66" CSP w/ 60" Welded Steel							<0.01		45	
6	-Y1- 34+75/35+06	Reline ex. 66" CSP w/ 60" Welded Steel & Bank Stabilization						<0.01		39		
7	-Y1- 36+35/36+73	78" CSP						<0.01		23		
7	-Y1- 36+35/36+73	Bank Stabilization						<0.01		16		
TOTALS.								0.21	0.03	1350	181	481

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

BURKE COUNTY
WBS - 34831 1 1 (U-2550B)

Adjacent Property Owners

<u>Owner/ Business</u>	<u>Address</u>
Robbins Investments, LLC	PO Box 207, Forest City, NC 28043
Grace Hospital, Inc	2201 S. Sterling St , Morganton, NC 28655
Reece & Nelson LLP	420 Bost Road, Morganton, NC 28655
R L Bush, Jr	1 Cedarwood Place, Lenoir, NC 28645
Southview Motel Corp	2400 S. Sterling St , Morganton, NC 28655
Harriet T Stroup	117 Brookwood Rd , Morganton, NC 28655
Lou Ellen Daves	811 Woodbrook Dr , Morganton, NC 27410
RCM Investments	PO Box 1600, Rowlett, TX 75030
NCDOT, Div 13	PO Box 3279, Asheville, NC 28802

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

Burke County
PROJ - 34831 1.1 (U-2550B)

SHEET 3/3/2009

Permit Drawing
Sheet 2 of 25

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CONTRACT: U-2550B
TIP PROJECT: U-2550B

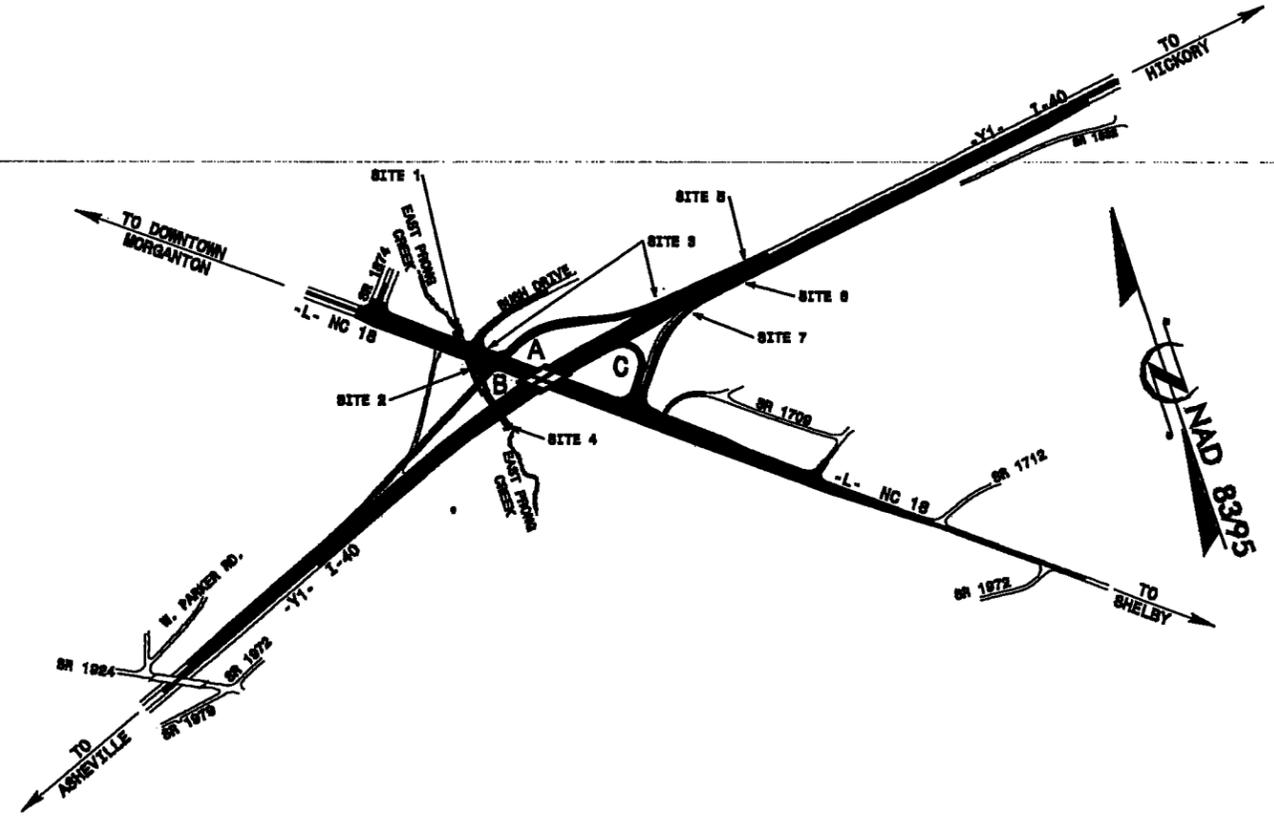
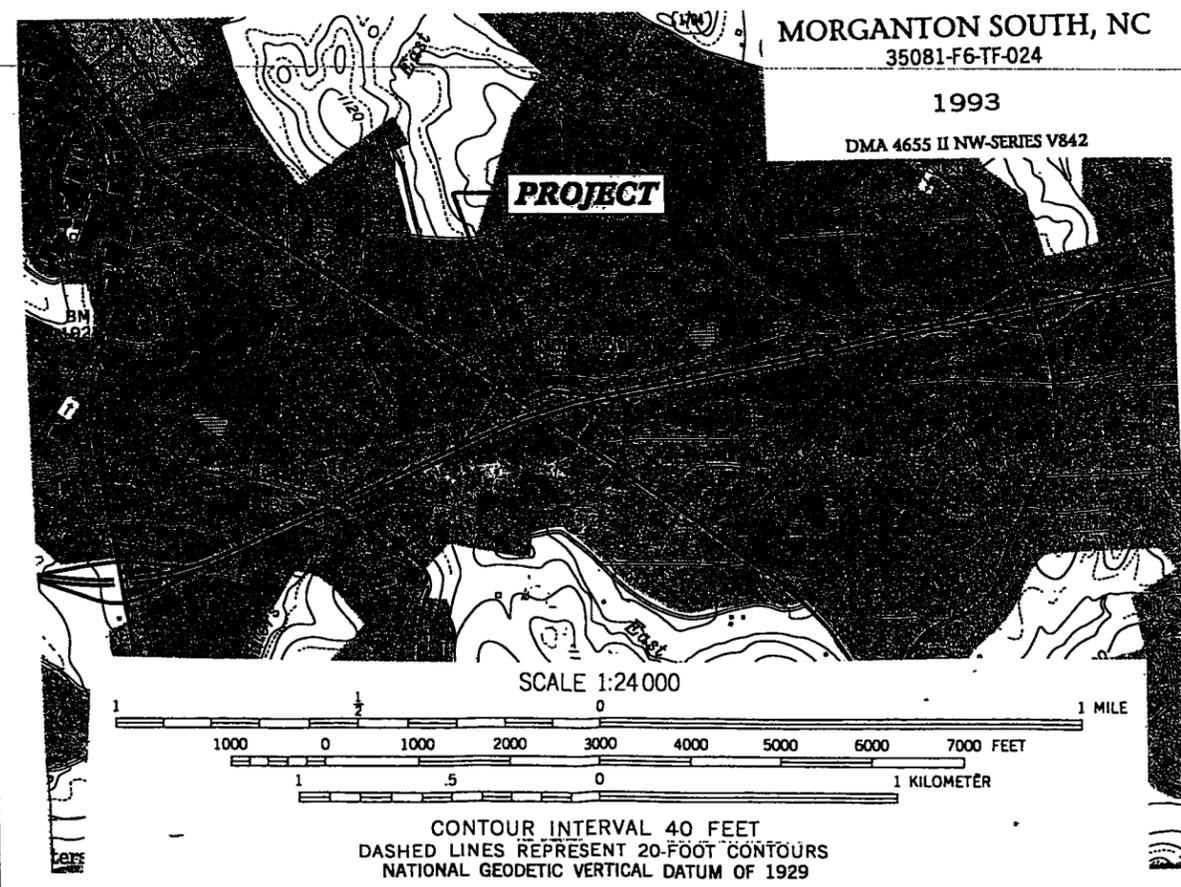
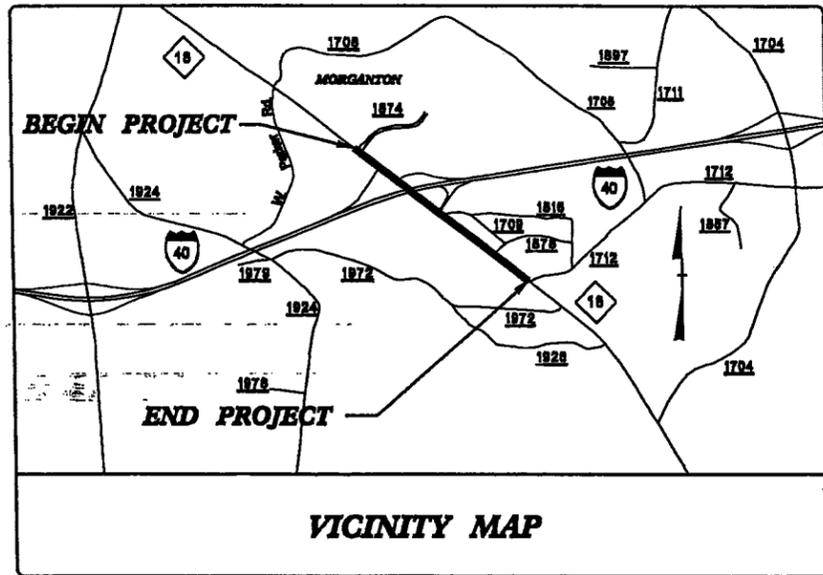
STATE OF NORTH CAROLINA
 DIVISION OF HIGHWAYS

BURKE COUNTY

LOCATION: MORGANTON - NC 18 (STERLING STREET)
 AND I-40 INTERCHANGE
 TYPE OF WORK: GRADING, PAVING, DRAINAGE, AND STRUCTURES

PERMIT DRAWINGS

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-2550B	1	
STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION	
34831.1.1	STPNHF-M-8165(1)	P.E.	
34831.2.4	STPNHF-0018(13)	RW, UTIL.	



8/17/98

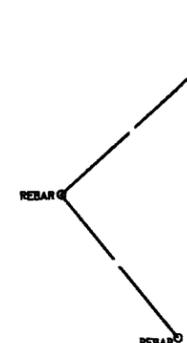
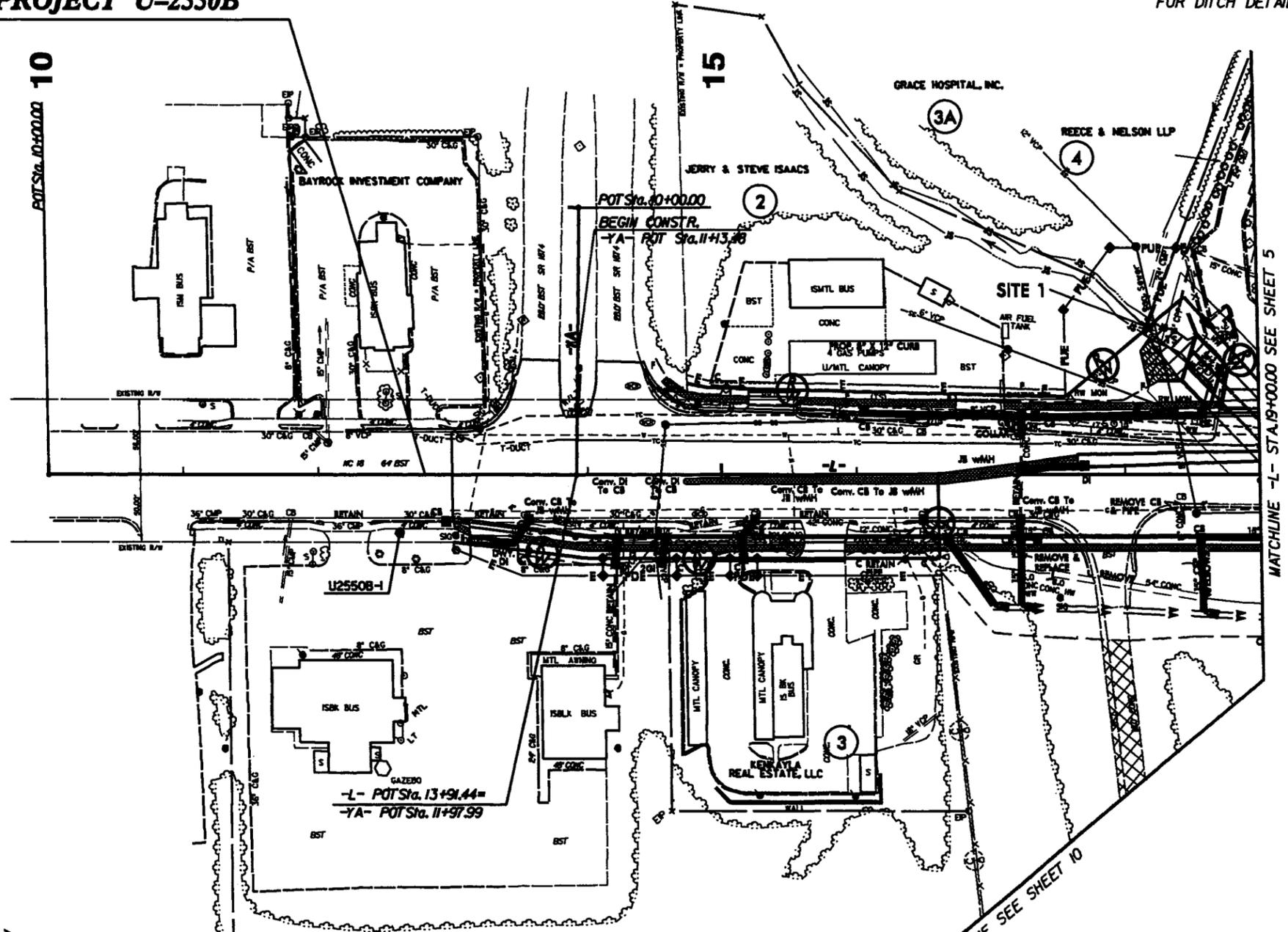
PROP CONC SIDEWALK
PROP 3' CONC MONO. ISLAND

PROJECT REFERENCE NO. U-2550B		SHEET NO. 4	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

STA. 12+80.00 -L- BEGIN TIP PROJECT U-2550B

FOR -L- PROFILE SEE SHEET 12
FOR DITCH DETAILS SEE SHEET 2-R

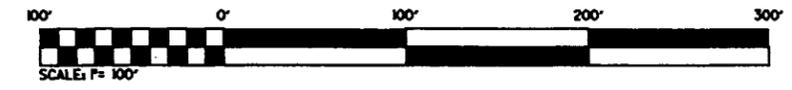
BEGIN CONSTRUCTION
FOR SIGNAL WORK
APPROXIMATELY 8950'
NORTHWEST ALONG
NC 18 (STERLING STREET)
SEE SIGNAL PLANS



STEPHEN H. STROUP, et al

1

DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



Permit Drawing
Sheet 4 of 25

*****SYSTEMS DESIGN*****
*****LIEFERMAN*****

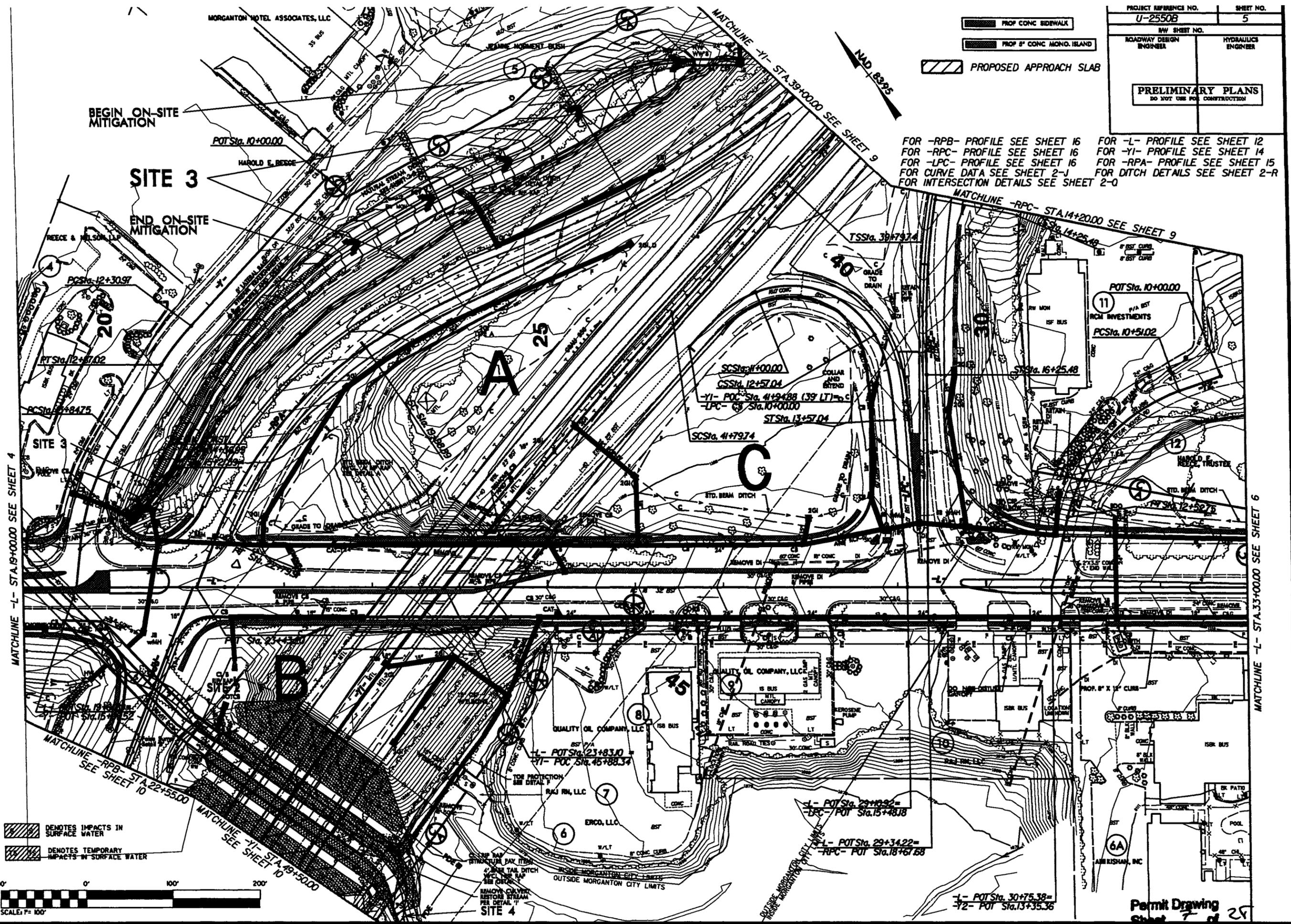
8/17/91

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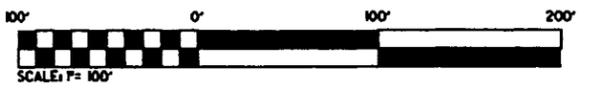
- PROP CONC SIDEWALK
- PROP 8" CONC MONO ISLAND
- PROPOSED APPROACH SLAB

FOR -RPB- PROFILE SEE SHEET 16
 FOR -RPC- PROFILE SEE SHEET 16
 FOR -LPC- PROFILE SEE SHEET 16
 FOR CURVE DATA SEE SHEET 2-J
 FOR INTERSECTION DETAILS SEE SHEET 2-0

FOR -L- PROFILE SEE SHEET 12
 FOR -YI- PROFILE SEE SHEET 14
 FOR -RPA- PROFILE SEE SHEET 15
 FOR DITCH DETAILS SEE SHEET 2-0



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



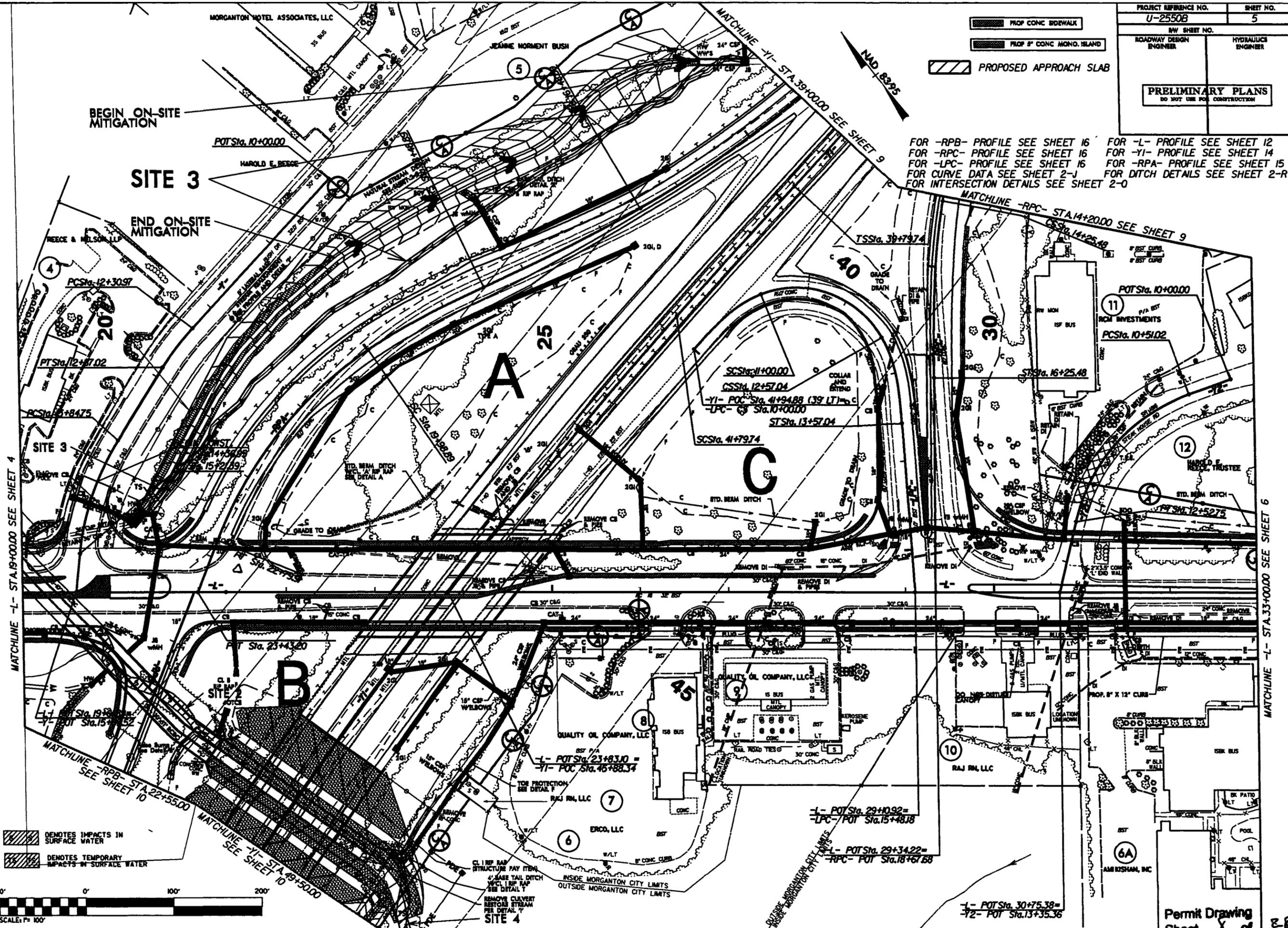
Permit Drawing
 Sheet 7 of 25

8/17/99

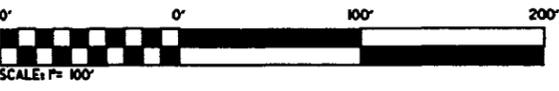
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RDW SHEET NO.	HYDRAULICS ENGINEER
ROADWAY DESIGN ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

-  PROP CONC SIDEWALK
-  PROP 8" CONC MONO. ISLAND
-  PROPOSED APPROACH SLAB

FOR -RPB- PROFILE SEE SHEET 16 FOR -L- PROFILE SEE SHEET 12
 FOR -RPC- PROFILE SEE SHEET 16 FOR -YI- PROFILE SEE SHEET 14
 FOR -LPC- PROFILE SEE SHEET 16 FOR -RPA- PROFILE SEE SHEET 15
 FOR CURVE DATA SEE SHEET 2-J FOR DITCH DETAILS SEE SHEET 2-R
 FOR INTERSECTION DETAILS SEE SHEET 2-0



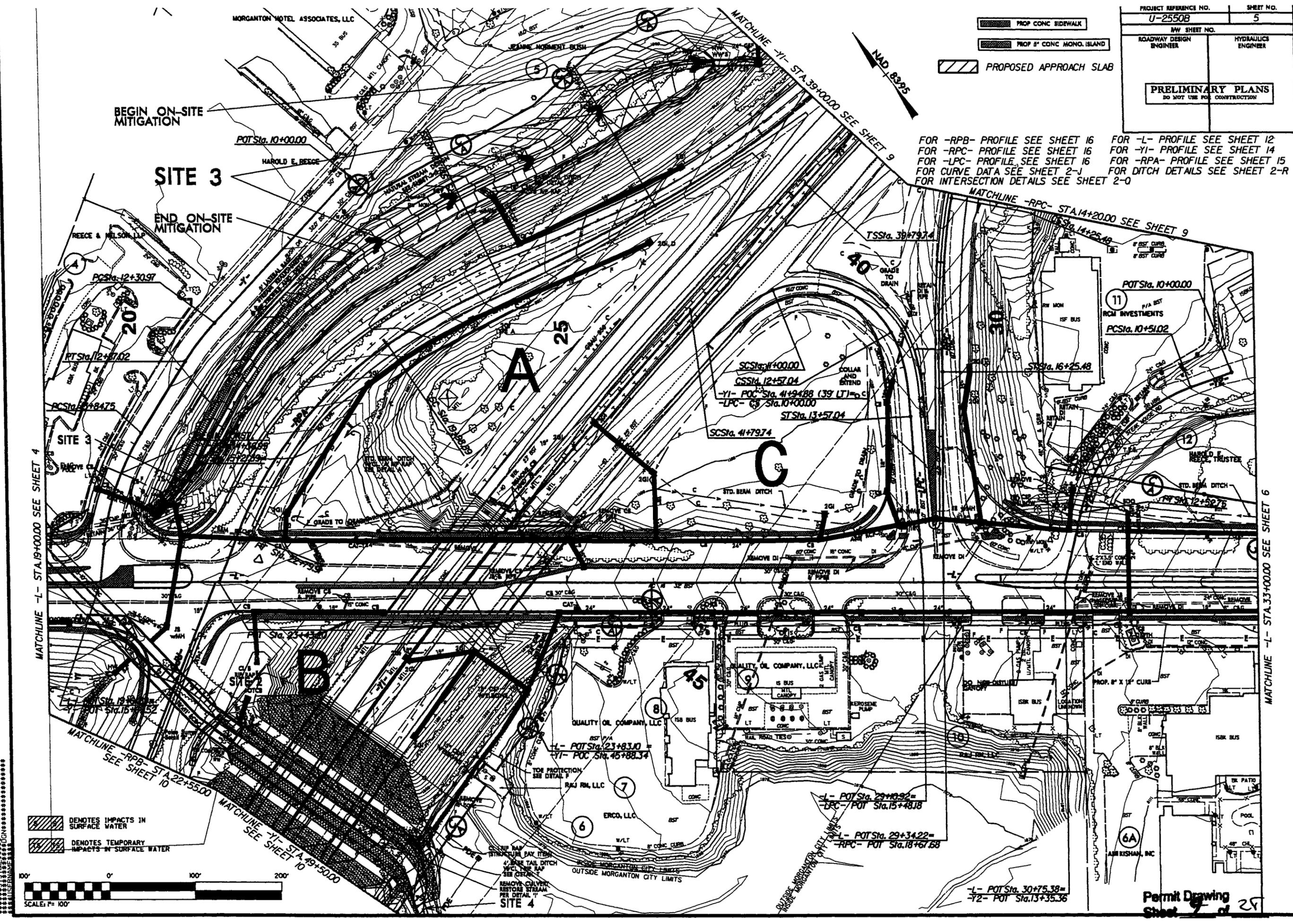
-  DEMOTES IMPACTS IN SURFACE WATER
-  DEMOTES TEMPORARY IMPACTS IN SURFACE WATER



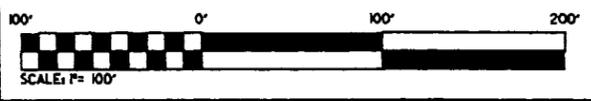
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RW SHEET NO.	
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

- PROP CONC SIDEWALK
- PROP 3' CONC MON. ISLAND
- PROPOSED APPROACH SLAB

FOR -RPB- PROFILE SEE SHEET 16 FOR -L- PROFILE SEE SHEET 12
 FOR -RPC- PROFILE SEE SHEET 16 FOR -YI- PROFILE SEE SHEET 14
 FOR -LPC- PROFILE SEE SHEET 16 FOR -RPA- PROFILE SEE SHEET 15
 FOR CURVE DATA SEE SHEET 2-J FOR DITCH DETAILS SEE SHEET 2-I
 FOR INTERSECTION DETAILS SEE SHEET 2-0



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



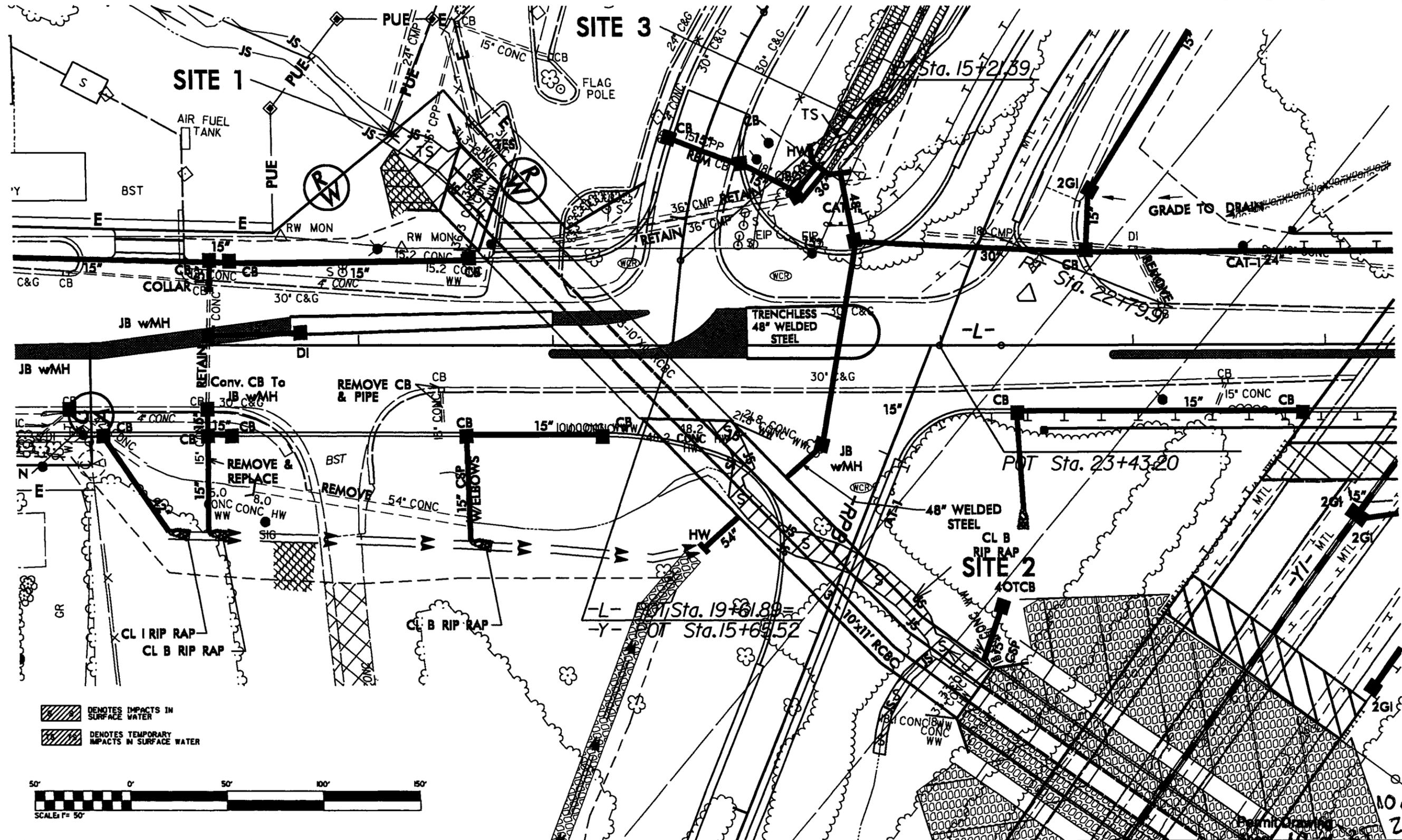
B/17/99

Sites 1, 2, & 3 (partial) Enlargement

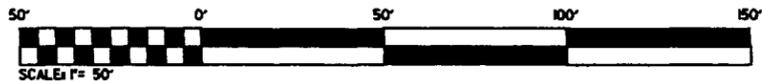
PROP CONC SIDEWALK
PROP 8" CONC MONO. ISLAND

PROJECT REFERENCE NO. U-2550B		SHEET NO.	
HWY SHEET NO.		HYDRAULICS ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

FOR -L- PROFILE SEE SHEET 12
FOR DITCH DETAILS SEE SHEET 2-R



 DENOTES IMPACTS IN SURFACE WATER
 DENOTES TEMPORARY IMPACTS IN SURFACE WATER



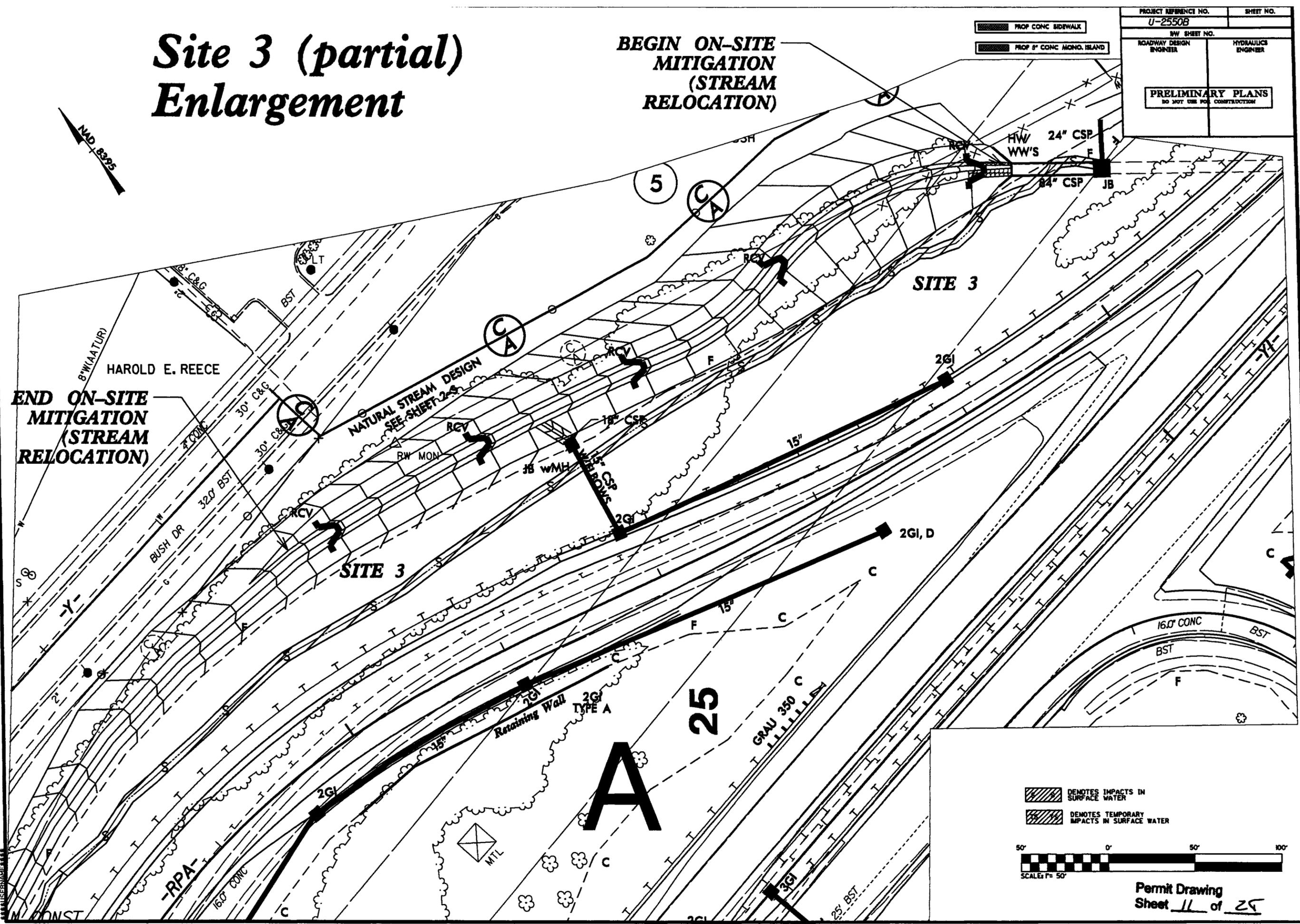
8/17/99
*****SUNTIME DESIGN*****
*****LAWRENCE*****

Site 3 (partial) Enlargement

BEGIN ON-SITE
MITIGATION
(STREAM
RELOCATION)

END ON-SITE
MITIGATION
(STREAM
RELOCATION)

PROJECT REFERENCE NO. U-2550B		SHEET NO.	
BY SHEET NO.			
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER

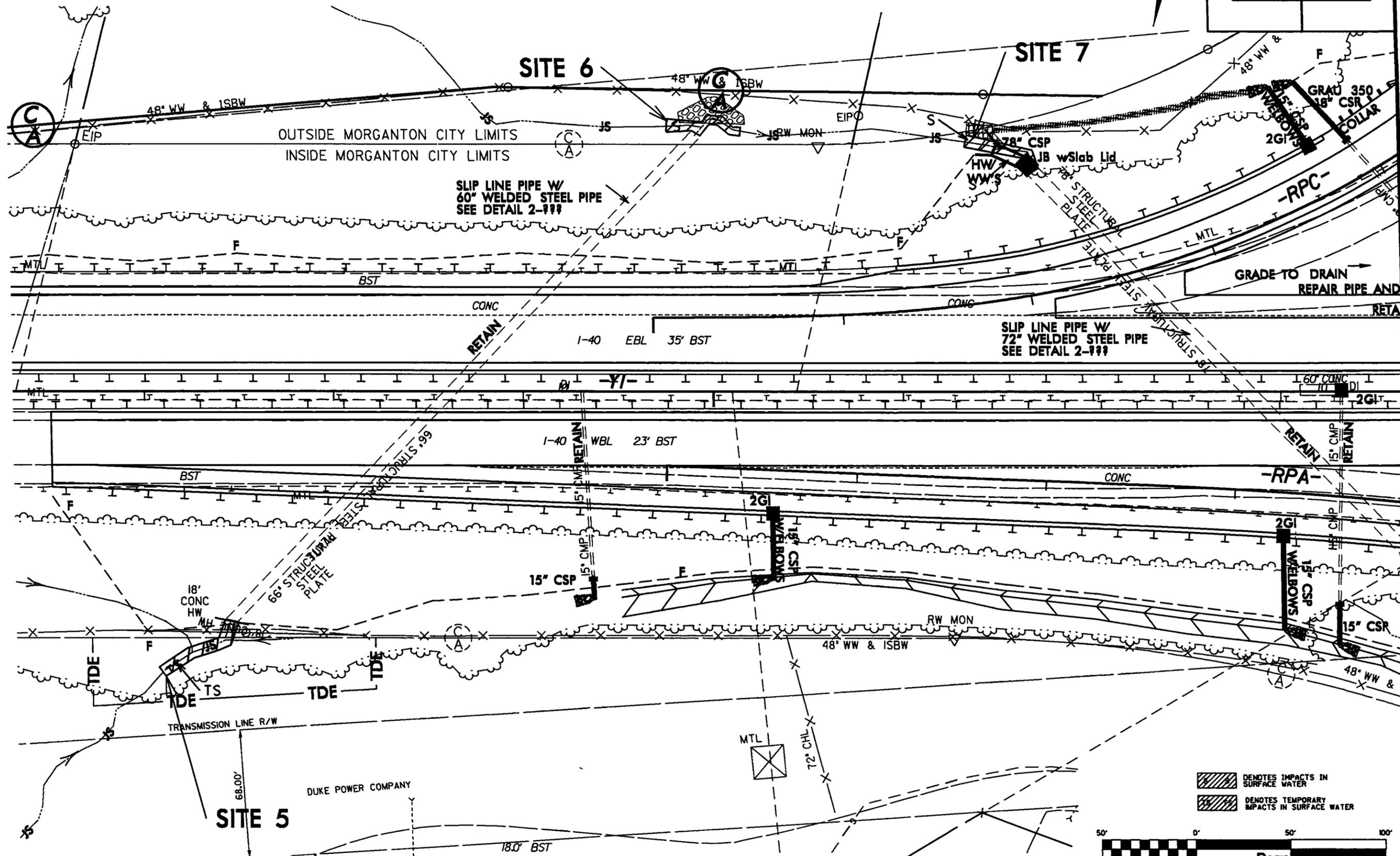


Permit Drawing
Sheet 11 of 25

8/17/99

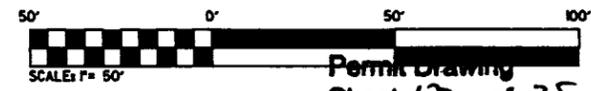
Sites 5, 6, & 7 Enlargement

PROJECT REFERENCE NO. U-2550B		SHEET NO.	
RW SHEET NO.		HYDRAULIC ENGINEER	
ROADWAY DESIGN ENGINEER		HYDRAULIC ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



REVISIONS

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



Permit Drawing
Sheet 13 of 25

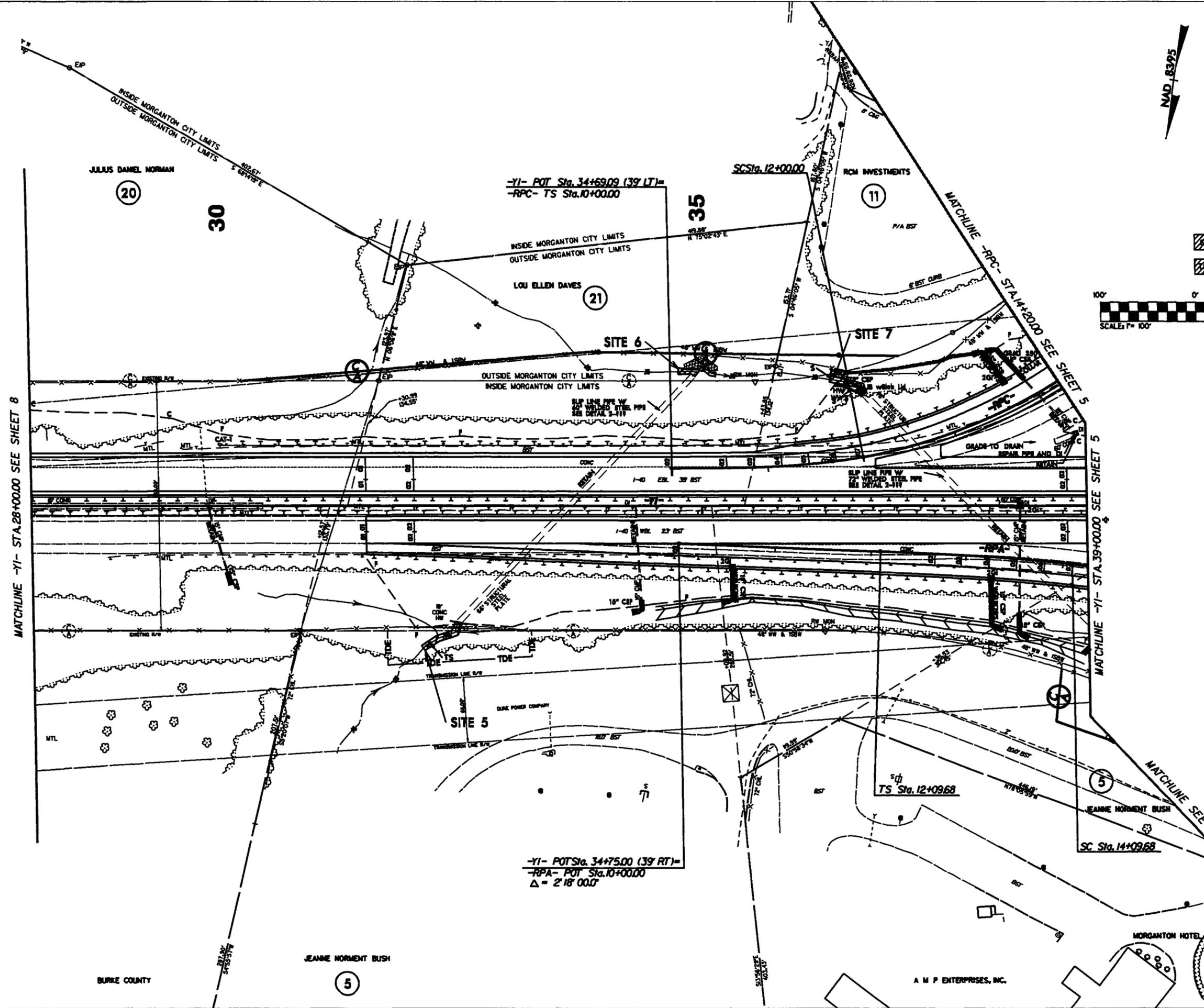
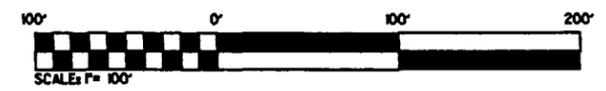
 SYSTEMS TIME *****

8/17/99

PROJECT REFERENCE NO. U-2550B		SHEET NO. 9	
HW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS <small>DO NOT USE FOR CONSTRUCTION</small>			

FOR -YI- PROFILE SEE SHEET 13
 FOR -RPA- PROFILE SEE SHEET 15
 FOR -RPC- PROFILE SEE SHEET 16
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2-R

- DENOTES IMPACTS IN SURFACE WATER
- DENOTES TEMPORARY IMPACTS IN SURFACE WATER



MATCHLINE -YI- STA. 28+00.00 SEE SHEET 8

MATCHLINE -YI- STA. 39+00.00 SEE SHEET 5

MATCHLINE SEE SHEET 5

-YI- POT Sta. 34+69.09 (39' LT) =
 -RPC- TS Sta. 10+00.00

-YI- POT Sta. 34+75.00 (39' RT) =
 -RPA- POT Sta. 10+00.00
 Δ = 2' 18" 00.0"

*****SYSTEMS TIME *****
 *****DESIGN *****
 *****DRAWING *****

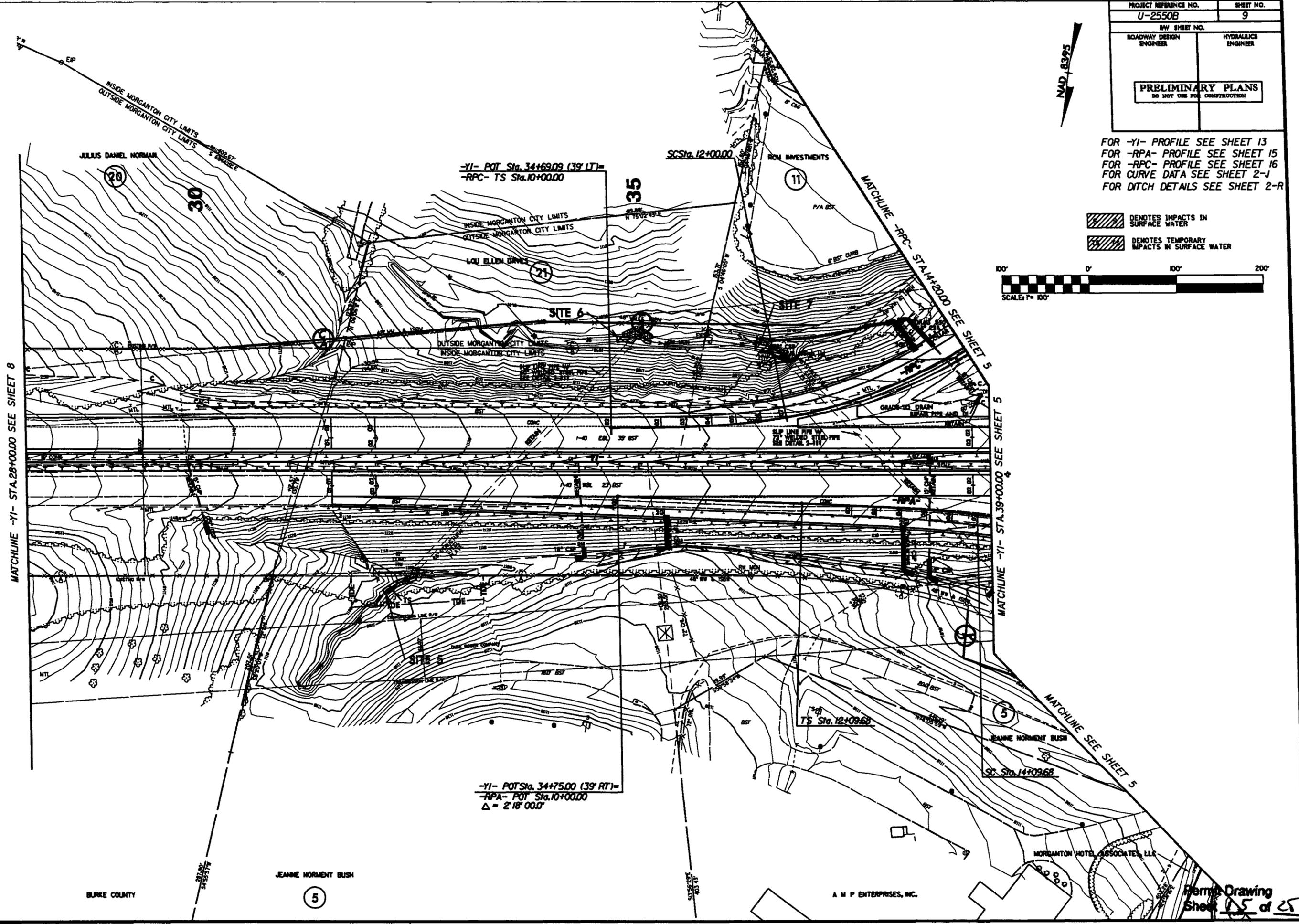
Permit Drawing
 Sheet 14 of 25

8/17/99

PROJECT REFERENCE NO. U-2550B		SHEET NO. 9	
HW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

FOR -YI- PROFILE SEE SHEET 13
 FOR -RPA- PROFILE SEE SHEET 15
 FOR -RPC- PROFILE SEE SHEET 16
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2-R

-  DENOTES IMPACTS IN SURFACE WATER
-  DENOTES TEMPORARY IMPACTS IN SURFACE WATER



MATCHLINE -YI- STA.28+00.00 SEE SHEET 8

MATCHLINE -YI- STA.39+00.00 SEE SHEET 5

MATCHLINE SEE SHEET 5

 SYSTEMS
 DESIGN
 ENGINEERS
 P.C.
 1000
 W. MAIN ST.
 SUITE 100
 WASHINGTON, DC 20004

BURKE COUNTY

JEANNE NORMENT BUSH

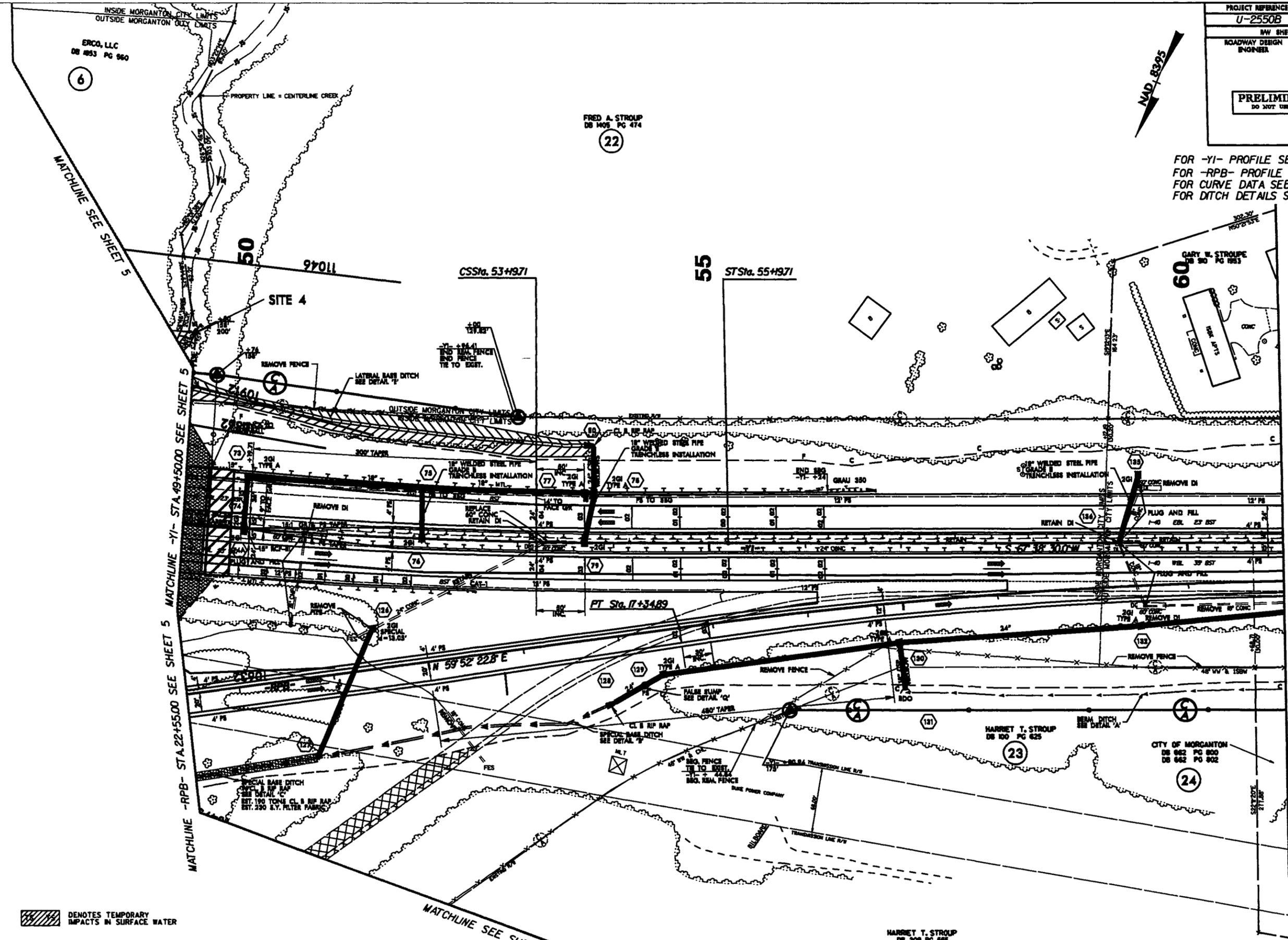
A M P ENTERPRISES, INC.

Final Drawing Sheet 15 of 25

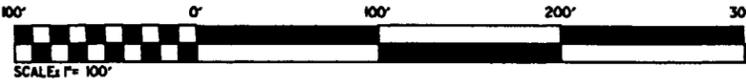
8/17/99

PROJECT REFERENCE NO. U-2550B		SHEET NO. 10	
RW SHEET NO.			
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER		
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			

FOR -YI- PROFILE SEE SHEET 14
 FOR -RPB- PROFILE SEE SHEET 15
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2-R



DENOTES TEMPORARY IMPACTS IN SURFACE WATER



MATCHLINE SEE SHEET 4

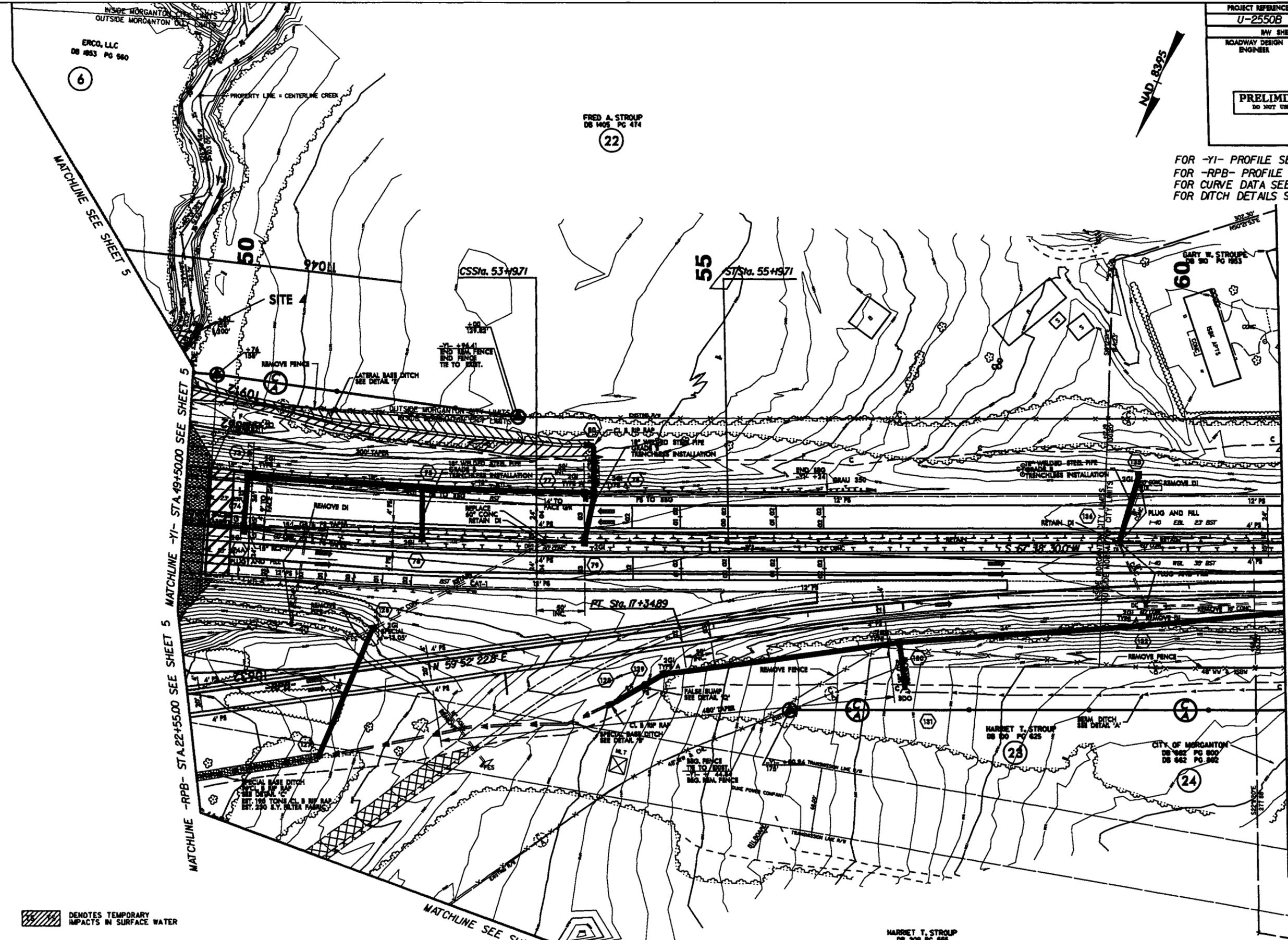
HARRIET T. STROUP
 DB 209 PG 585
 DB 194 PG 117
 DB 100 PG 625

8/17/99

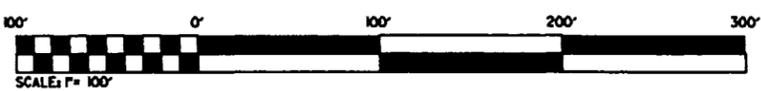
PROJECT REFERENCE NO. U-2550B		SHEET NO. 10	
RAW SHEET NO.			
ROADWAY DESIGN ENGINEER		HYDRAULICS ENGINEER	
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION			



FOR -YI- PROFILE SEE SHEET 14
 FOR -RPB- PROFILE SEE SHEET 15
 FOR CURVE DATA SEE SHEET 2-J
 FOR DITCH DETAILS SEE SHEET 2-R



DENOTES TEMPORARY IMPACTS IN SURFACE WATER



HARRET T. STROUP
 DB 209 PG 986
 DB 194 PG 117
 DB 150 PG 625

5/14/99

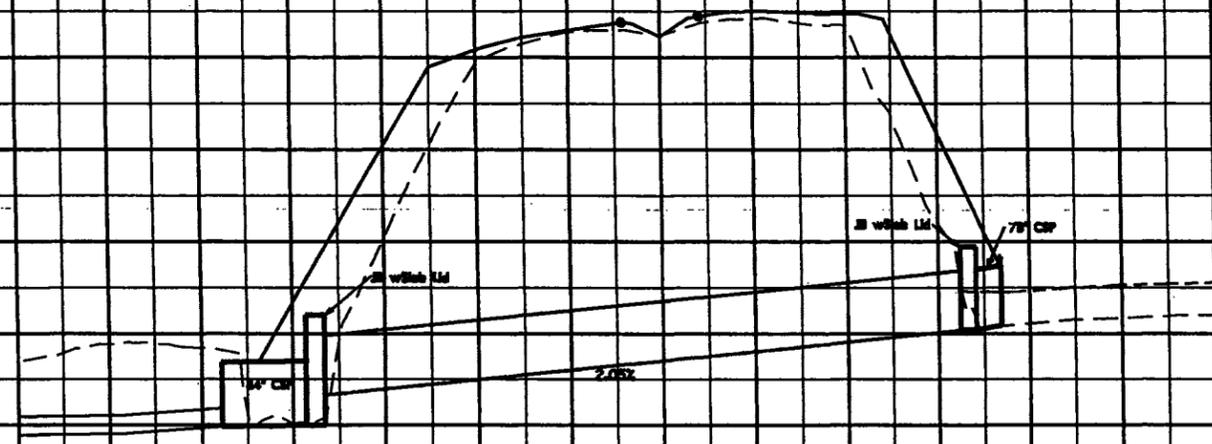
PROJECT REFERENCE NO.	SHEET NO.
ROADWAY DESIGN ENGINEER	HYDRAULIC ENGINEER
INCOMPLETE PLANS DO NOT USE FOR ACQUISITION PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	

78" CSP w/JB & 84" CSP Extension

350 300 250 200 150 100 50 0 50 100 150 200 250 300 350

Sta. 37+83.14
 78" CSP (To Be Extended as Noted)
 Skew = 45.86 deg.

1120
1110
1100
1090
1080
1070

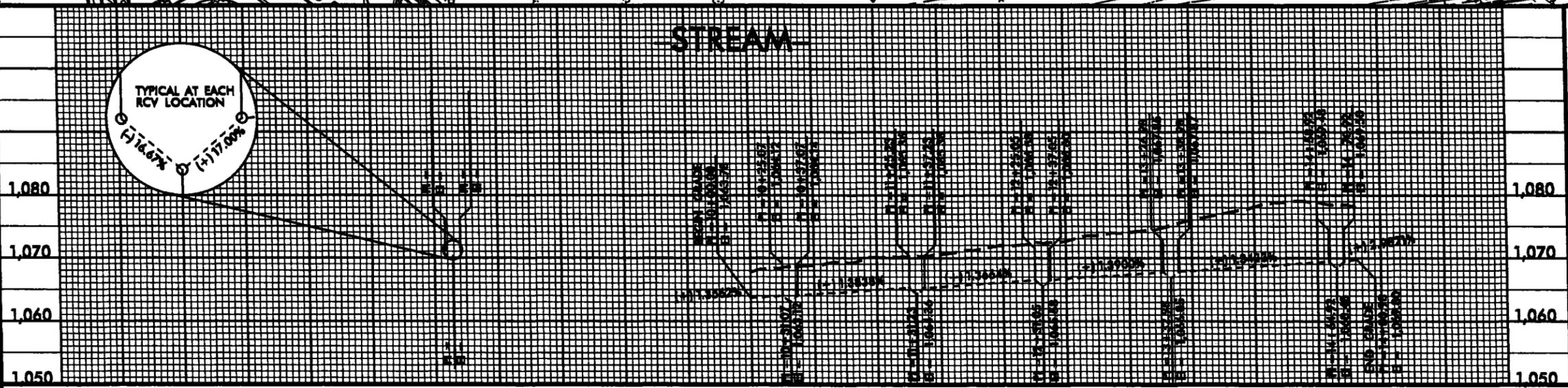
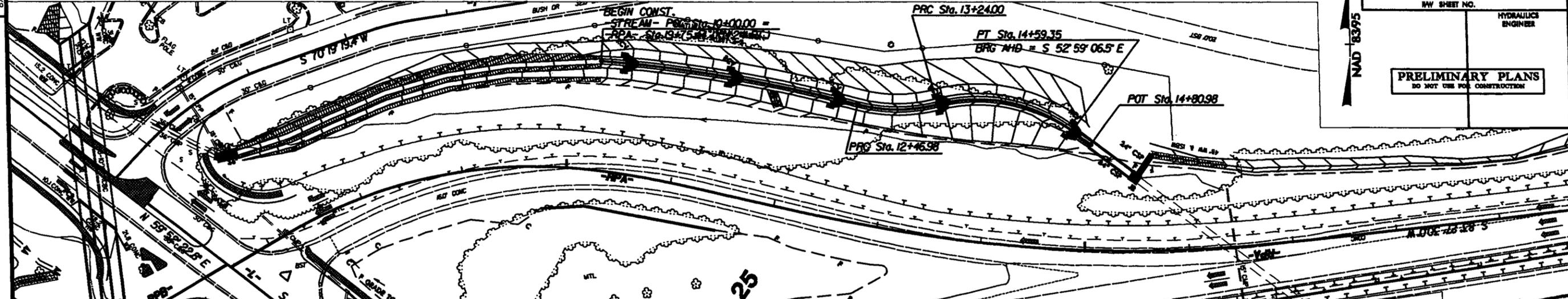


25-MAR-2008 08:54
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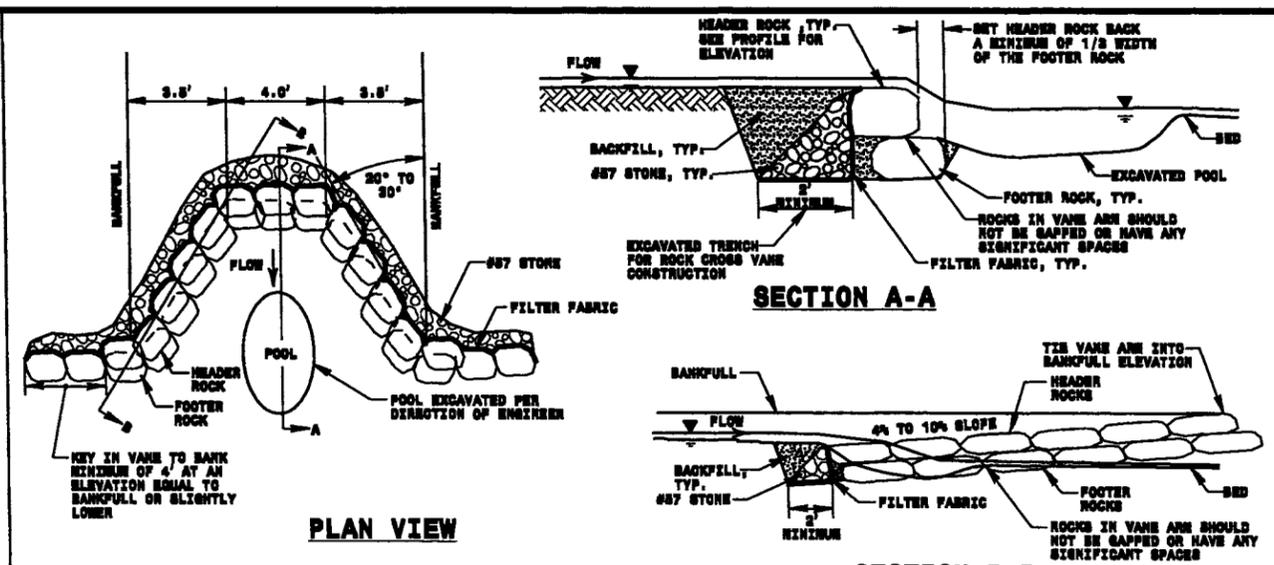
8/17/99

STREAM RELOCATION DETAIL

PROJECT REFERENCE NO. U-2550B	SHEET NO. 2-5
HWY SHEET NO.	HYDRAULICS ENGINEER
PRELIMINARY PLANS DO NOT USE FOR CONSTRUCTION	



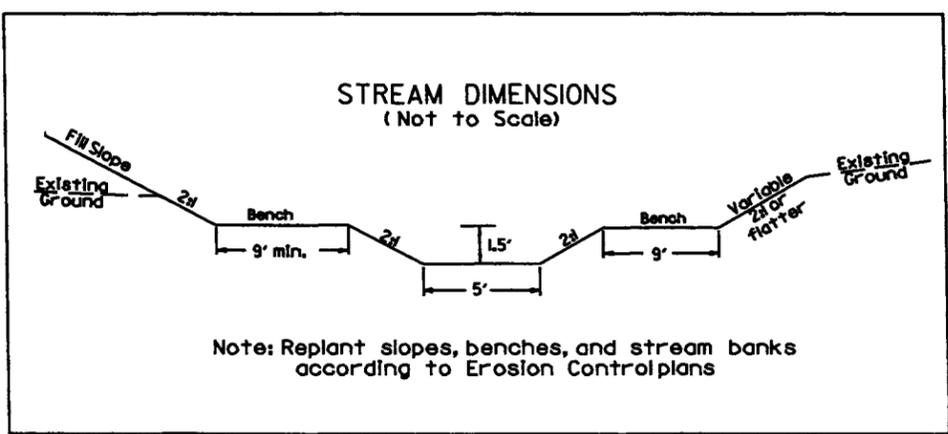
STREAM CURVE DATA	
PI Sta 11+23.82	PI Sta 12+86.36
$\Delta = 107^{\circ} 15' 14.8\"$ (RT)	$\Delta = 25^{\circ} 25' 12.1\"$ (LT)
$D = 4^{\circ} 09' 06.7\"$	$D = 38^{\circ} 11' 49.9\"$
$L = 246.98'$	$L = 77.02'$
$T = 123.82'$	$T = 39.38'$
$R = 1,380.00'$	$R = 150.00'$
PI Sta 13+96.67	
$\Delta = 51^{\circ} 42' 06.3\"$ (RT)	
$D = 38^{\circ} 11' 49.9\"$	
$L = 135.35'$	
$T = 72.68'$	
$R = 150.00'$	



STATION	BOULDER DIMENSIONS (FT)		
	HEIGHT	LENGTH	WIDTH
10+81	2	2	4
11+81	2	2	4
12+81	2	2	4
12+89	2	2	4
14+82	2	2	4

ROCK CROSS VANE DETAIL
NOT TO SCALE

- NOTES:**
- DEEPEST PART OF POOL TO BE IN LINE WITH WHERE VANE ARM TIES INTO BANKFULL.
 - DO NOT EXCAVATE POOL TOO CLOSE TO FOOTER BOULDERS.
 - CLASS 'A' STONE CAN BE USED TO REDUCE VOIDS BETWEEN HEADERS AND FOOTERS.
 - COMPACT BACKFILL TO EXTENT POSSIBLE OR AT THE DIRECTION OF THE ENGINEER.

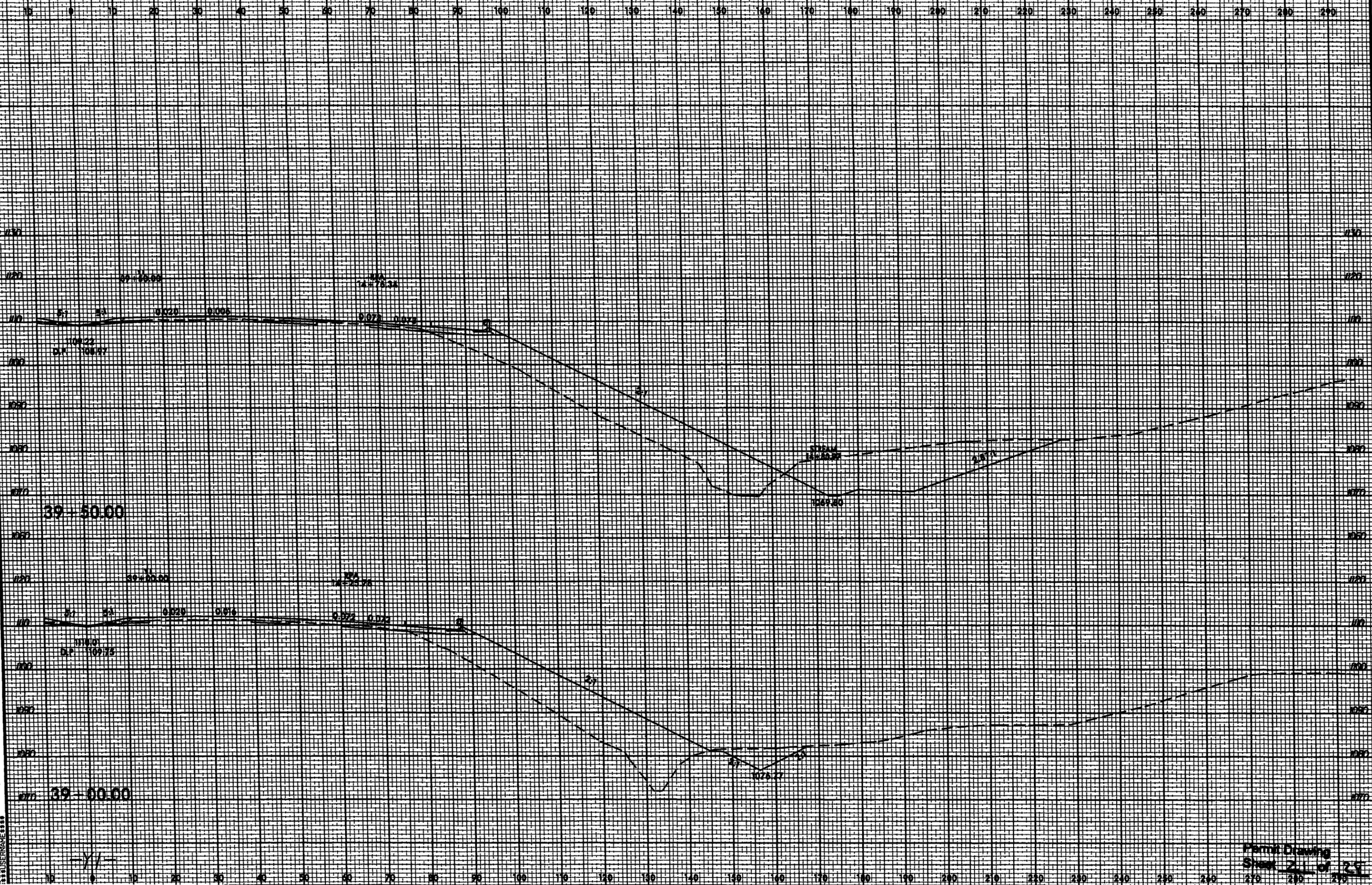


Note: Replant slopes, benches, and stream banks according to Erosion Control plans

8/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-32



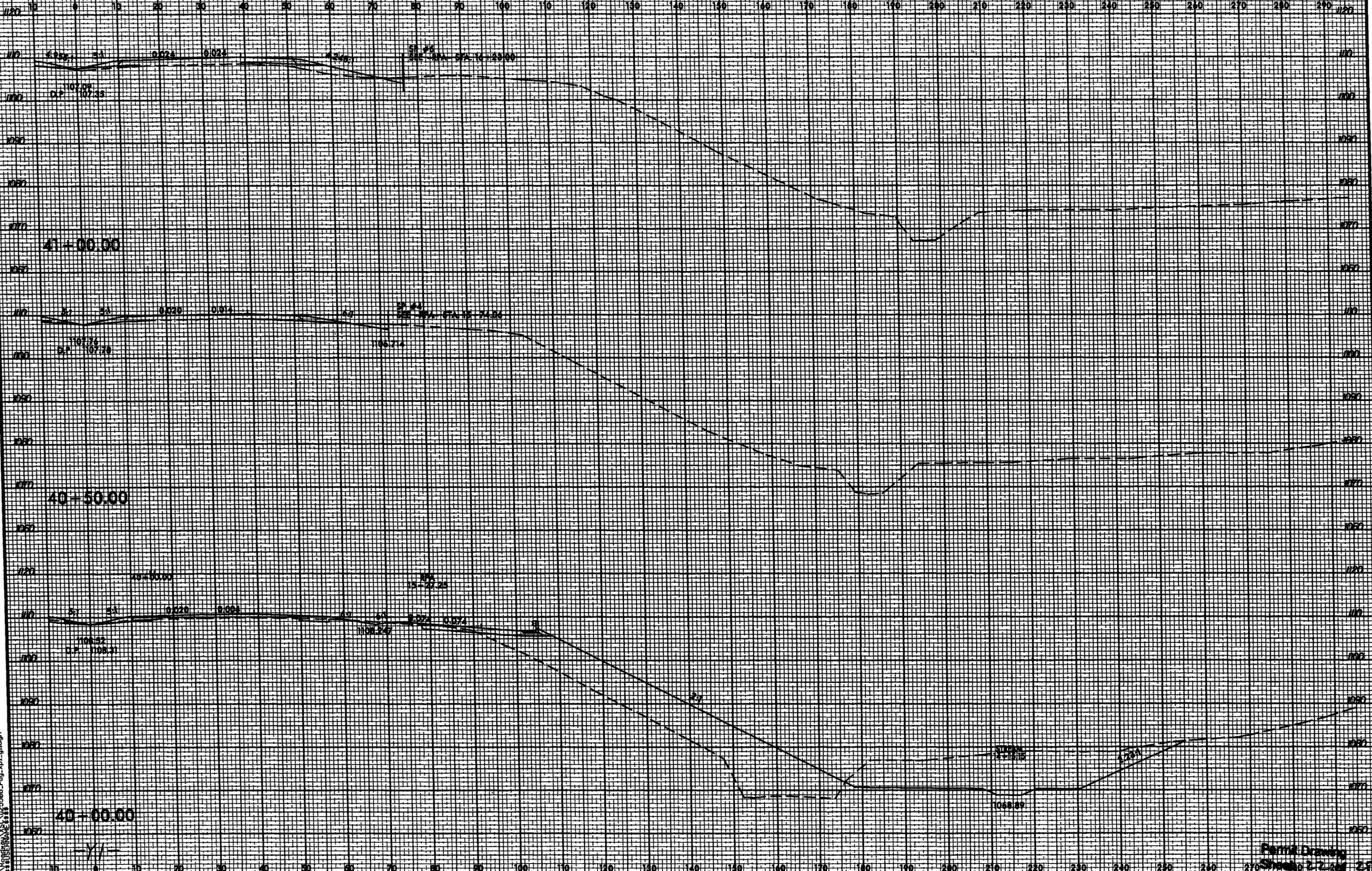
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Permit Drawing Sheet 21 of 28

8/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-33



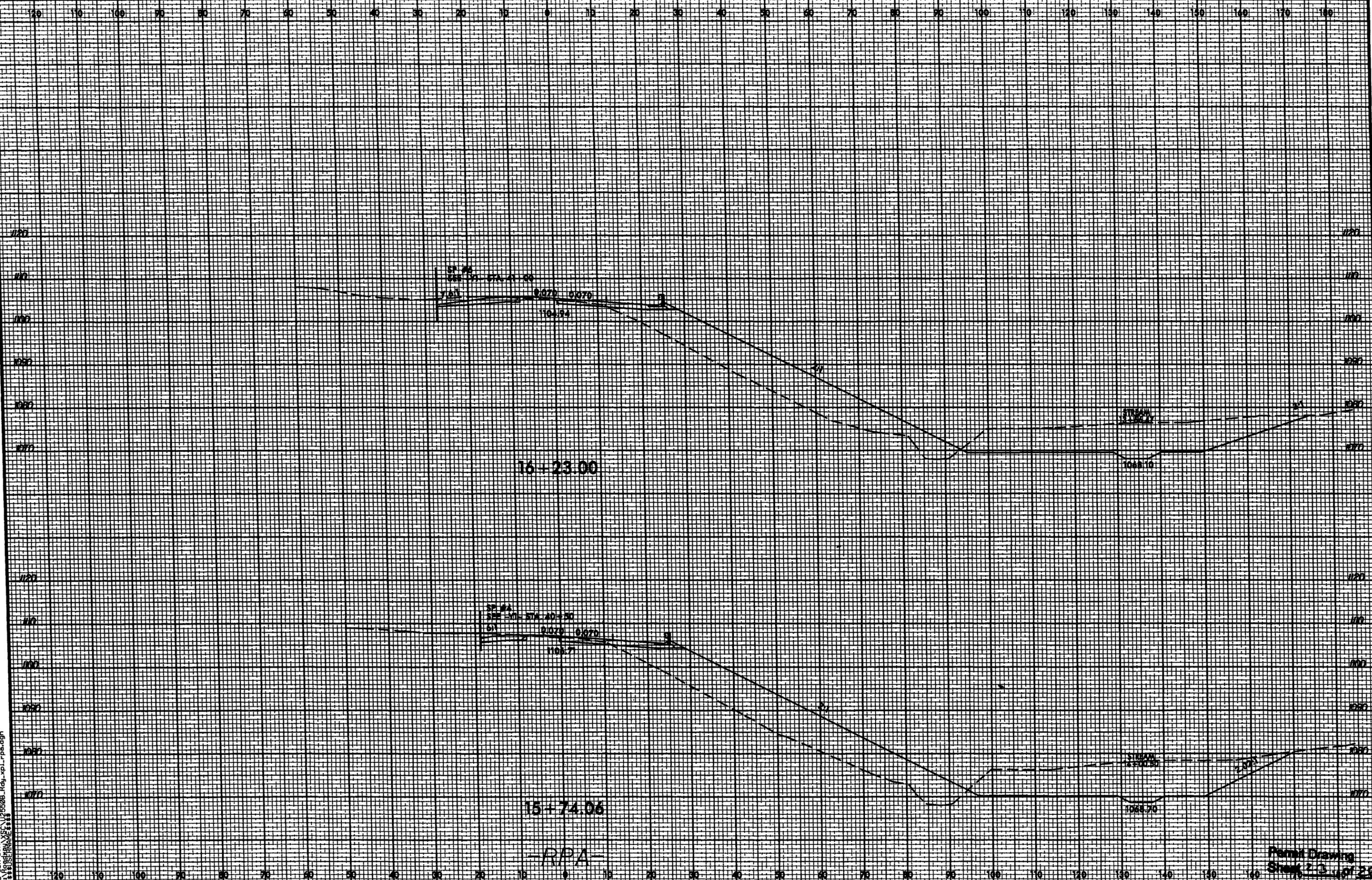
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Permit Drawing Sheet 22 of 25

8/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-66



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USER:NAME

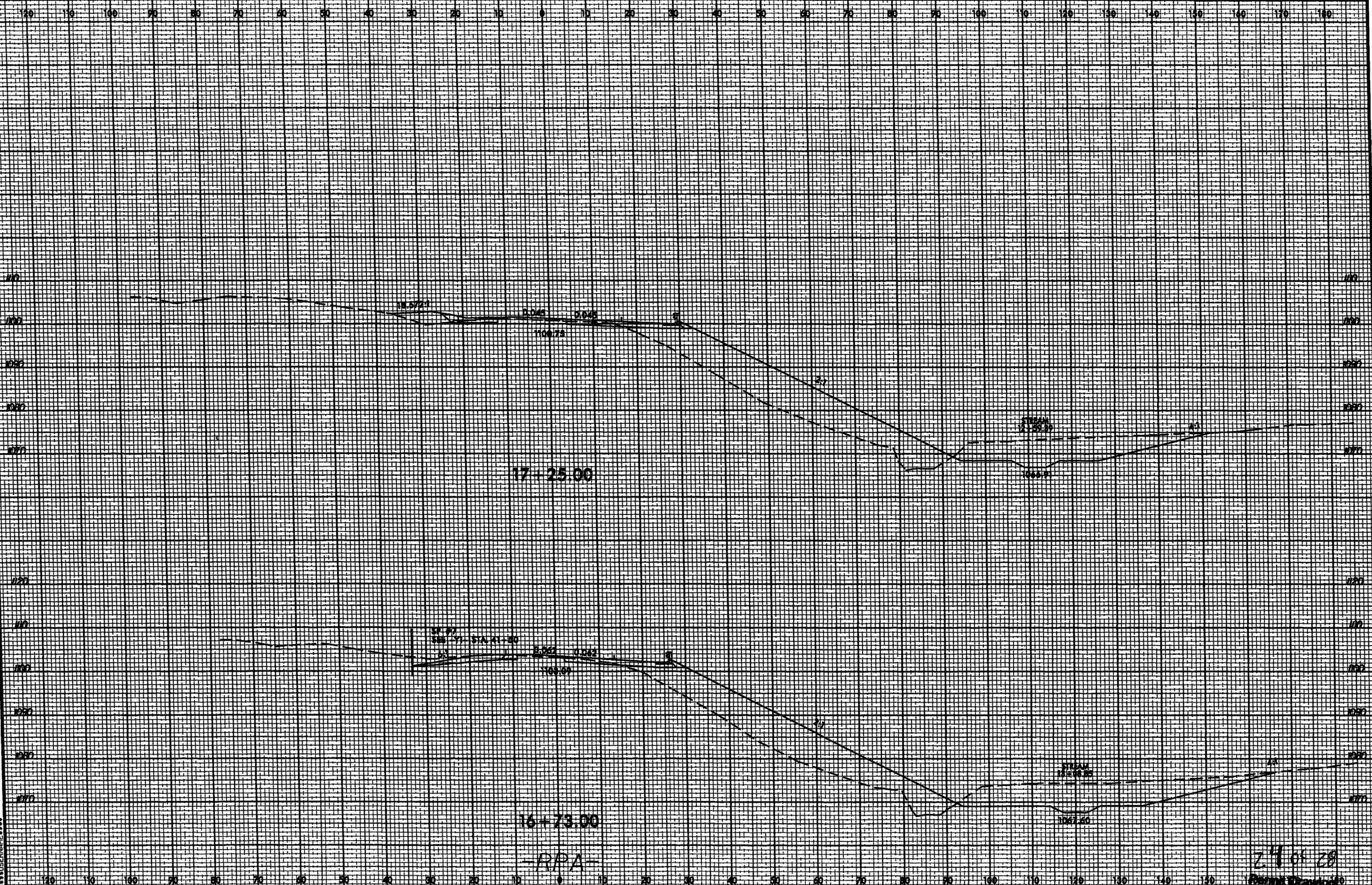
-RPA-

Reprint Drawing
Sheet 2 of 2

8/23/99



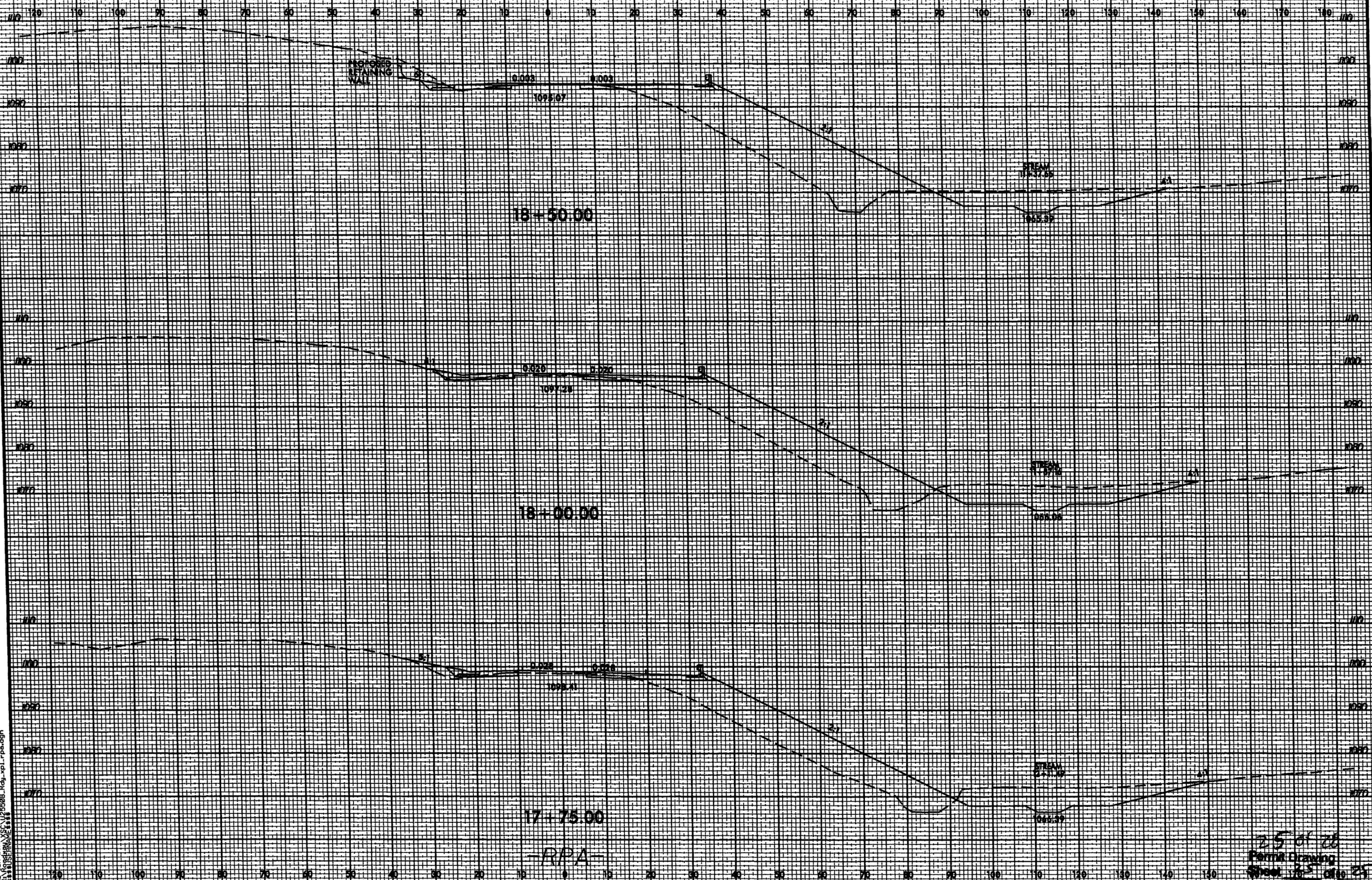
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15 JUN 2010 017 125508.Rdy...rpe.dgn

2/1/01 20

8/23/98



25 JUN 2010 10:17:05 U:\P5568.Rdy.xpl.rpa.dgn

-RPA-

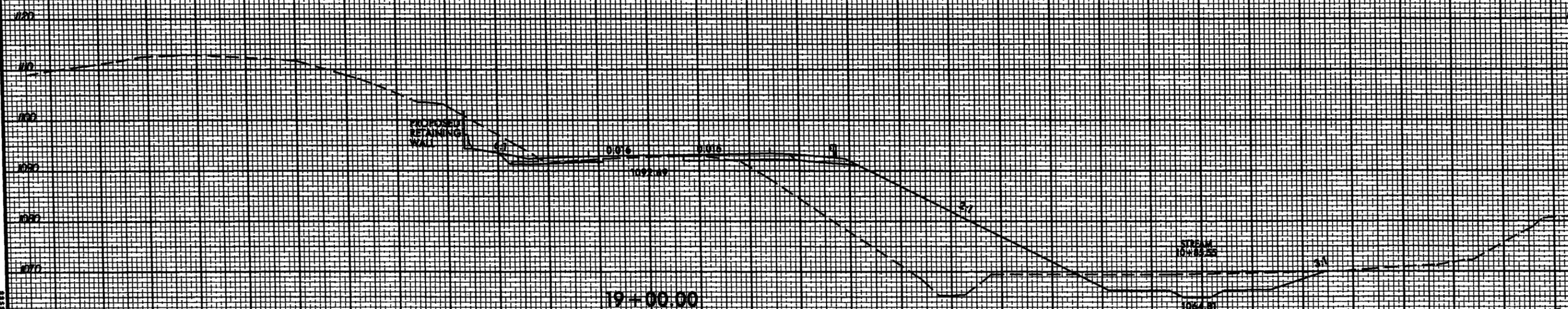
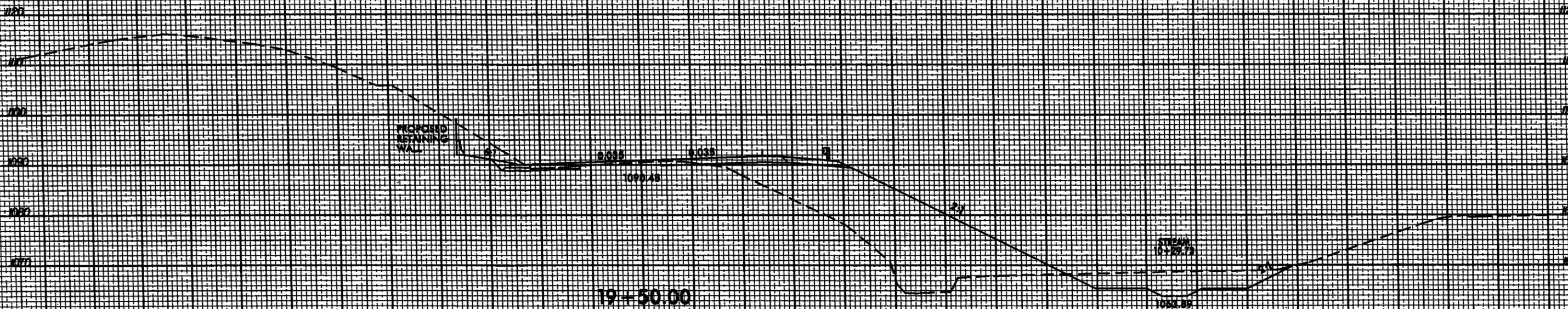
25 of 28
Perma Drawing
Sheet 6 of 25

8/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-69

120 110 100 90 80 70 60 50 40 30 20 10 0 10 20 30 40 50 60 70 80 90 100 110 120 130 140 150 160 170 180



-RPA-

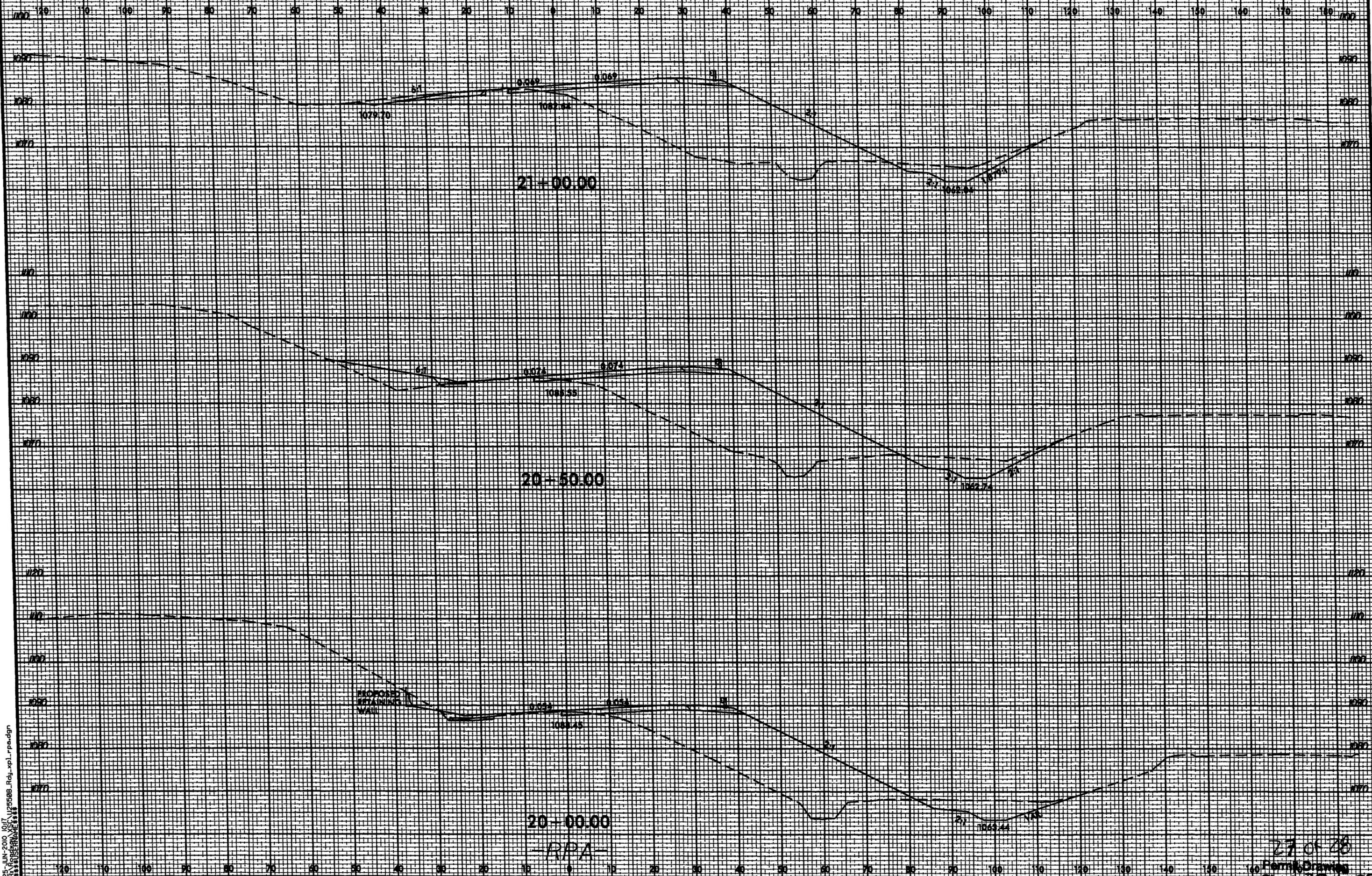
26 of 28
Permit Drawing
Sheet 26 of 28

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8/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-70



PROPOSED
RETAINING
WALL

21+00.00

20+50.00

20+00.00

-RPA-

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Rem's Drawing

25 JUN 2010 10:17 AM U:\2550B_Rd\..._rpa.dgn

B/23/99



PROJ. REFERENCE NO. U-2550B SHEET NO. X-71

END CONST. -RPA- STA 22+92.48

22-38.00

22-00.00

21+50.00

-RPA-

28 of 28
22
Permit Drawing
Sheet 28 of 25

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