STATE OF NORTH CAROLINA
DEPARTMENT OF TRANSPORTATION

MICHAEL F. EASLEY
GOVERNOR

LYNDO TIPPETT
SECRETARY

July 10, 2008

U.S. Army Corps of Engineers
Regulatory Field Office
Post Office Box 1000
Washington, NC 27889-1000

Attn: Mr. William Wescott
NCDOT Coordinator

Dear Sir:

Subject: **Application for Individual Section 404 and 401 permits and Neuse Riparian Buffer Authorization** for construction of the SR 1923 Extension (Booker Dairy Road) from US 70 Business to US 301 in Johnston County. Federal Aid Project No. STP-1923(2). State Project No. 8.2312101. TIP No. U-3334. Debit $570.00 from WBS 34929.1.1.

The North Carolina Department of Transportation (NCDOT), Division of Highways, in consultation with the Federal Highway Administration (FHWA), proposes to construct the SR 1923 (Booker Dairy Rd.) extension north of Smithfield on new and existing location. Construction will begin at US 70 Business approximately 1 mile west of the US 70/Barbour Road intersection and end at the terminus of Ava Gardner Boulevard with US 301. The project is approximately 4.1 miles in length and has been divided into two sections, A and B. Final design is complete for the A section; however, the B section is in preliminary design.

The purpose of this letter is to request approval for a Section 404 Individual Permit, a Section 401 Water Quality Certification, and a Neuse Riparian Buffer Authorization. In addition to the cover letter and ENG Form 4345, this application package includes the following for U-3334A: permit drawings, riparian buffer drawings, a set of half size roadway plans, Merger 4B and 4C meeting minutes, USFWS concurrence letter, Michaux's sumac NRTR supplement report, and an EEP acceptance letter.

1.0 Purpose and Need

The purpose and need for this project, as identified in the Final Environmental Assessment (EA), is to: 1) provide another flood-free crossing of the Neuse River; 2) provide another east-west thoroughfare in Smithfield; and 3) improve access to north and west Smithfield.

2.0 Project Description

The improvements involve the construction of a new location road from US 70 Business east to Booker Dairy Road where it intersects with Buffalo Road. The proposed alignment then follows

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

TELEPHONE: 919-715-1500
FAX: 919-715-1501

WEBSITE: WWW.NCDOT.ORG

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

Booker Dairy Road to east of White Oak Road, where it will continue on new location in a southeasterly direction before tying into existing Ava Gardner Boulevard. The proposed alignment will then follow Ava Gardner Boulevard to its intersection with US 301. Proposed improvements include construction of a two-lane 24-foot roadway with 8-foot shoulders, 4 feet of which will be paved for bicycle accommodations. This project also includes a new 2,990-foot bridge span over Poplar Creek and the Neuse River.

3.0 Summary of Impacts

Waters of the U.S.: Proposed impacts to jurisdictional areas total 7.62 acres of permanent wetland impacts and 245 feet of permanent stream impacts. See Table 1 for the permanent and temporary impact summary for all sections.

Table 1. Summary of Wetland and Stream Impacts for U-3334

Section	Permanent Wetland (ac.)		Temporary Wetland* (ac.)		Permanent Stream (ft.)	Temporary Stream (ft.)
	Riparian	Non-riparian	Riparian	Non-riparian		
A	0.33	1.99	N/A	N/A	69	0.0
B**	0.0	5.3	N/A	N/A	176	N/A
Total	7.62		N/A		245	0.0

* Does not include 0.2 acre of temporary wetland fill for the installation of erosion control measures.
**Impacts are based on those calculated for the FONSI, therefore, impacts on this section are expected to decrease significantly once the final design is completed.

Neuse Riparian Buffers: Proposed impacts to riparian buffers total 86,873 square feet (sqft). See Table 2 for the impact summary for all sections.

Table 2. Summary of Buffer Impacts for U-3334

Section	Zone 1 Buffer Impacts (sqft)	Zone 2 Buffer Impacts (sqft)
A	48,895	10,560
B*	20,378	7,040
Total	69,273	17,600

* Impacts are based on stream impact numbers in the FONSI

4.0 Summary of Mitigation

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent possible. NCDOT proposes to utilize the Ecosystem Enhancement Program (EEP) to mitigate for wetland impacts.

5.0 Project Schedule

Construction of this project is divided into two sections (See Table 3 below). However, final permit drawings are attached for section U-3334A only. At this point, U-3334B is in preliminary design; therefore, permit drawings are not available for this section. The impact numbers given in section 3.0 are from the FONSI and represent maximum potential impacts. The impacts associated with this section are expected to significantly decrease once the final design is completed. Final permit drawings for U-3334B will be provided under separate cover in the form of a permit modification request. NCDOT understands that no construction will occur on U-3334B until the final design and

resulting impacts have been approved by the regulatory agencies.

Table 3. Project Sections and Scheduling

Section	Project Limits	Scheduled Let Date	Review Date
U-3334A	US 70 Business to Booker Dairy/Buffalo Rd. intersection	1/20/2009	12/2/2008
U-3334B	Booker Dairy/Buffalo Rd. intersection to US 301 via Ava Gardner Blvd.	Post year	N/A

6.0 NEPA Document Status

The FHWA and NCDOT completed the Environmental Assessment (EA) on October 17, 2000 in compliance with the NEPA guidelines. The EA explains the purpose and need for the project, provides a description of the alternatives considered, and characterizes the social, economic, and environmental effects. The EA was approved and circulated to federal, state, and local agencies. Then following the EA, a FONSI was completed on September 29, 2003. Copies of the project documents have been provided to regulatory review agencies involved in the approval process. Additional copies will be provided upon request.

In compliance with the NEPA/404 Merger Process, Concurrence Points 4B and 4C were reached for section A on October 20, 2004 and June 13, 2007, respectively. Copies of the meeting minutes are attached.

6.1 Independent Utility

U-3334 is in compliance with 23 CFR Part 771.111(f) which lists the FHWA characteristics of the independent utility of a project. The project meets the criteria for independent utility as discussed below:

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

7.0 Resource Status

The project is located in the Neuse River Basin and lies within Hydrologic Unit 03020201 (Subbasin 03-04-02). This is within the Southern Inner Coastal Plain ecoregion. The project crosses Poplar Creek and the Neuse River.

7.1 Wetland Delineations

A wetland identification and preliminary assessment analysis for the study area was performed and summarized in the 2000 Natural Resources Technical Report (NRTR). The wetlands within the study area were delineated based on the 1987 U.S. Army Corps of Engineers (USACE) Wetland Delineation Manual and a preliminary design was prepared to avoid and minimize wetlands to the

maximum extent possible. Data collected for wetlands were derived from a number of sources including USGS topographic maps, NWI maps, the Johnston County Soil Survey (US Department of Agriculture [USDA], 1990), aerial photography, and site reconnaissance. Wetland delineations were completed between June 1999 and March 2000. This delineation was verified by Mr. Eric Alsmeyer of the USACE, Wilmington District in February 2000 and reverified by Mr. William Wescott of the USACE, Wilmington District in March 2008.

7.2 Stream Delineations

Data collected for streams were derived from USGS topographic maps, the Johnston County Soil Survey (USDA, 1990), and site reconnaissance. The data included stream classification, which was presented in the NRTR. The N.C. Division of Water Quality (NCDWQ) concurred on stream classifications in 2000 and again in 2008, when Mr. Rob Ridings visited the site for a riparian buffer determination (see below).

7.3 Riparian Buffer Determinations

The project study area is located within the Neuse River Basin. Streams and jurisdictional surface waters depicted on either the most recent U.S. Geological Survey 7.5-minute topographic quadrangle or the county soil survey map are subject to the Neuse River Riparian Buffer Rules. On March 18, 2008 a field review was conducted with Rob Ridings of the NCDWQ to confirm which stream and open water features are subject to the Neuse River Riparian Buffer Rules.

7.4 U-3334A: Characterization of Jurisdictional Sites

7.4.1 Wetlands

There are four wetland communities found within the project study area: Levee Forest, Bottomland Hardwood Forest, Semi-permanent Impoundment, and Mixed Pine-Hardwood Woodland. More detailed information about these wetlands can be found in the EA, which includes figures showing the wetlands within the project area.

7.4.2 Streams

Best Usage Classifications for jurisdictional streams are provided in the EA. Neither High Quality Waters (HQW), Water Supplies (WS-I: undeveloped watersheds or WS-II: predominately undeveloped watersheds), nor Outstanding Resource Waters (ORW) occur within 1.0 mile of the project study area. None of the streams are designated as a North Carolina Natural or Scenic River, or as a National Wild and Scenic River. Additionally, the jurisdictional streams are not listed on the Final 2006 Section 303(d) list of impaired waters for the Neuse River Basin, nor do they drain into any Section 303(d) waters within 1.0 mile of the project study area.

7.5 Impacts to Jurisdictional Resources

At the present time, permit drawings for U-3334B detailing jurisdictional impacts are not available since design work has not been completed. Estimated impacts to jurisdictional areas within Section B (as shown in Table 1) are taken from the FONSI and represent the maximum possible impacts foreseen at this time. NCDOT will apply all prudent avoidance and minimization measures during the design process for U-3334B, which will be coordinated with the relevant review agencies.

Impacts to jurisdictional wetlands for U-3334A are summarized below in Table 4.

Table 4. Impacts to Wetlands for U-3334A

Permit Drawing Site Number (2007)	Name assigned during original Delineation (2000)	Type	Permanent Impacts (ac.)	Mitigation Required
1	WW	Non-riparian	1.91	Yes
2	WZ	Non-riparian	0.05	Yes
3	WF	Riparian	0.33	Yes
4	WG	Non-riparian	0.03	Yes
Total	N/A	N/A	2.32	N/A

Note: Temporary wetland impacts are not site-specific. See narrative below for details.

Permanent Impacts: Proposed permanent impacts include fill, excavation, and mechanized clearing in wetlands. Of these impacts, 1.99 acres are to non-riparian wetlands and 0.33 acre is to riparian wetlands. The total permanent wetland impacts for U-3334A are 2.32 acres. Proposed permanent impacts due to fill in surface waters is <0.01 acre (18 ft), and includes where two bents will be placed in the Neuse River (site 3) and where a culvert will be extended and replaced at an unnamed tributary (UT) to Buffalo Creek (site 5).

Temporary Impacts: NCDOT anticipates 0.20 acre of temporary impacts to wetlands within hand-clearing areas. These impacts involve the placement of temporary wetland fill for the installation of erosion control measures. These include some or all of the following: Temporary Silt Fence, Special Sediment Control Fence, and Temporary Rock Silt Checks.

Hand-Clearing: There will be 7.05 acres of hand-clearing on this project.

Utility Impacts: There will be no impacts to jurisdictional resources as a result of utility relocations for U-3334A.

Neuse River Basin Riparian Buffer Impacts: This project is located in the Neuse River Basin; therefore, the regulations pertaining to the buffer rules apply. There will be a total of 69,273 sqft of impacts to riparian buffers (see Table 5). Of this total, 66,332 sqft are due to the bridge crossings of the Neuse River and Poplar Creek. According to the buffer rules, bridges are allowable. Uses designated as allowable may proceed within the riparian buffer provided that there are no practical alternatives to the requested use pursuant to Item (8) of this rule. The remaining 2,941 sqft of impacts are the result of a pipe extension on a UT to Buffalo Creek. In a letter dated April 16, 2008, the NC Division of Water Quality required buffers be shown only at the outlet of the pipe since the stream has its approximate origins on the Johnston County soil survey to the south of Booker Dairy Rd. Because the total impact at this site is less than 150 feet/ 1/3 of an acre (the threshold for mitigation), it is considered allowable.

Table 5. Summary of Buffer Impacts for U-3334A (sqft)

Buffer Drawing Site #	Type	Total Buffers			Wetlands in Buffers		
		Zone 1	Zone 2	Total	Zone 1	Zone 2	Total
1	Bridge	21,540	8,734	30,274	21,540	8,734	30,274
2	Bridge	25,499	10,559	36,058	11,547	5,283	16,830
3	Road Crossing	1,856	1,085	2,941	0	0	0
Total		48,896	20,371	69,267	33,087	14,017	47,104

8.0 Protected Species

Plants and animals with federal classification of Endangered (E), Threatened (T), Proposed Endangered (PE), and Proposed Threatened (PT) are protected under provisions of Section 7 and Section 9 of the Endangered Species Act of 1973, as amended. The United States Fish and Wildlife Service (USFWS, 2008) lists four (4) federally protected species for Johnston County as of the January 31, 2008 listing (Table 6).

Table 6. Federally Protected Species in Johnston County

Common Name	Scientific Name	Federal Status	Habitat Present	Biological Conclusion
Red-cockaded woodpecker	*Picoides borealis*	E	No	No Effect
Dwarf wedgemussel (DWM)	*Alasmidonta heterodon*	E	Yes	May Affect, Not Likely to Adversely Affect
Tar River spinymussel (TSM)	*Elliptio steinstansana*	E	Yes	May Affect, Not Likely to Adversely Affect
Michaux's sumac	*Rhus michauxii*	E	Yes	No Effect

Surveys were completed in 2000 prior to the completion of the Final EA for all four species. During these surveys it was determined that there was no habitat in the study area for red-cockaded woodpecker, DWM, or TSM. Marginal habitat was found to exist for Michaux's sumac in the study area, but no individuals were found and a biological conclusion of 'No Effect' was rendered. An additional survey of the 'A' section of this project in 2005 for Michaux's sumac did not uncover any individuals and found that much of the potential habitat was either intensively managed (mowed, plowed, or grazed) or was sufficiently overgrown by a herbaceous and woody vine groundcover and shrubby sapling growth (see attached NRTR supplement report).

After a larger mussel survey was undertaken in 2004 and 2005, it was discovered that, within the study area, the Neuse River was host to a relatively high diversity of mussels. While no DWM or TSM individuals or any relict shells were found, their presence could not be entirely ruled out; therefore, DWM and TSM were given a biological conclusion of 'May Affect Not Likely to Adversely Affect' in the Neuse River (see attached concurrence letter from the USFWS).

The NC Natural Heritage Program (NCNHP) database (updated May 1, 2008) was also reviewed by NCDOT for recorded occurrences of protected species. No occurrences of federally protected species were recorded for the project study area.

8.1 Bald and Golden Eagle Protection Act (BGPA)

In the July 9, 2007 Federal Register (72:37346-37372), the bald eagle was declared recovered, and removed (de-listed) from the Federal List of Threatened and Endangered wildlife. This delisting took effect August 8, 2007. After delisting, the Bald and Golden Eagle Protection Act (Eagle Act) (16 U.S.C. 668-668d) becomes the primary law protecting bald eagles. Per this law, a survey was undertaken for bald eagle on August 7, 2007. Habitat on this stretch of the Neuse River is marginal and no eagles or their nests were found within a 660-foot radius of the project area. Therefore, this project will have no effect on the bald eagle.

8.2 Moratorium

According to the NC Wildlife Resources Commission, anadromous fish species are found in this portion of the Neuse River; therefore, NCDOT will strictly adhere to all stream-crossing guidelines for anadromous fish passage in the Neuse River and Poplar Creek, including an in-water work moratorium between February 15 and June 15. However, the final project design does not require in-water work for Poplar Creek.

9.0 Cultural Resources

The potential effect of the proposed Booker Dairy Rd. extension on cultural resources in the project area was evaluated in accordance with Section 106 of the National Historic Preservation Act of 1966, as amended. As described in Section IV.C of the EA, this project will not impact any architectural properties eligible for listing in the National Register of Historic Places. In addition, none of the archaeological sites identified within the project corridor are eligible for inclusion in the National Register. The State Historic Preservation Office concurs that no historic properties will be affected by this project (See letter dated April 8, 2000 in Appendix A of the EA).

10.0 FEMA Compliance

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

11.0 Mitigation Options

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

11.1 Avoidance and Minimization

All jurisdictional features were delineated, field verified and surveyed within the corridor for the Booker Dairy Rd. extension. Using these surveyed features, preliminary designs were adjusted to avoid and/or minimize impacts to jurisdictional areas. NCDOT employs many strategies to avoid and minimize impacts to jurisdictional areas in all of its designs. Many of these strategies have been incorporated into BMP documents that have been reviewed and approved by the resource agencies and which will be followed throughout construction. All wetland areas not affected by the project

will be protected from unnecessary encroachment. Individual avoidance and minimization items are as follows:

- No staging of construction equipment or storage of construction supplies will be allowed in wetlands or near surface waters.
- The project was designed to avoid or minimize disturbance to aquatic life movements.
- NCDOT will minimize long-term water quality impacts through the use of the most recent Best Management Practices for Protection of Surface Waters, as identified in the Federal Aid Highway Program (FHPM) and North Carolina Administrative Code, Chapter 4.
- NCDOT and its contractors will not excavate, fill, or perform land clearing activities within Waters of the U.S. or any areas under the jurisdiction of the USACE, except as authorized by the USACE. To ensure that all borrow and waste activities occur on high ground, except as authorized by permit, the NCDOT shall require its contractors to identify all areas to be used to borrow material, or to dispose of dredged, fill or waste material. Documentation of the location and characteristics of all borrow and disposal sites associated with the project will be available to the USACE on request.
- Crossings of jurisdictional areas were angled to cross as perpendicular as possible to minimize impacts.
- Design Standards in Sensitive Watersheds will be implemented to minimize erosion/sediment loss during the construction phase.
- The construction of a 2,990 foot bridge that will span Poplar Creek, the Neuse River and associated wetlands.
- The use of a temporary work bridge during construction.
- The use of Preformed Scour Holes and Hazardous Spill Catch Basins.
- The use of 3:1 fill slopes in jurisdictional areas where practicable.
- The use of hand clearing in wetlands where practicable.

11.3 Compensation

The NCDOT has avoided and minimized impacts to jurisdictional resources to the greatest extent practicable as described above. The unavoidable impacts to 2.32 acres of jurisdictional wetlands will be offset by compensatory mitigation provided by EEP. A copy of the EEP acceptance letter is included with this application.

It was determined in a phone conversation on 5/16/08 with William Wescott of the USACE and Rob Ridings of the NCDWQ that, since the B section of this project is currently unfunded and preliminary design has not been completed, mitigation for U-3334B did not need to be secured at this time. Mitigation for U-3334B will be found once final design work is completed and prior to application for a modification of this permit.

12.0 Indirect and Cumulative Effects

An Indirect and Cumulative Effects report was prepared for U-3334 (*Indirect and Cumulative Impacts Assessment*, URS Corp., 2003). The report details the potential socioeconomic and ecological effects that may result from U-3334 and other past, present, and reasonably foreseeable future development activities in the region. It was completed in June of 2003 and distributed shortly thereafter. Additional copies are available upon request.

The potential for project-induced growth and land use change was found to be minimal and would likely be limited to residential and commercial development along portions of the future Booker Dairy Rd. Due to constraints posed by the Neuse River floodplain and its associated wetlands, as well as existing development within the Town of Smithfield, project-related growth should be limited to nodes at each end of the project and at proposed intersections with Barbour Rd. and Buffalo Rd. In addition, very few projects (including residential, commercial, and transportation projects) were identified in, or close to, the study area and interviews with local planning officials did not indicate that any substantial development was planned.

Local zoning controls and comprehensive planning are often the most effective tools at controlling development. When combined with comprehensive planning, zoning allows communities to shape patterns of growth and development within their boundaries. The following federal, state, and local regulations are currently in place in the study area to protect surface water quality and accommodate or guide future growth:

- EPA National Pollution Discharge Elimination System (NPDES) - Phase II Stormwater Rules
- North Carolina – Water Supply Watershed Protection Act
- North Carolina – Neuse River Basin Nutrient Sensitive Waters Management Program
- North Carolina - Nonpoint Source Program
- North Carolina – Neuse River Basin Buffer Rules
- Johnston County – Municipal Transition District
- Town of Smithfield – Comprehensive Growth Management Plan

Adhering to these regulations for the protection of surface waters should limit direct and indirect impacts to this important resource. Project specific indirect and cumulative effects are minimal; therefore project specific mitigation strategies are not necessary.

13.0 Regulatory Approvals

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

Section 401: We are also requesting a Section 401 Water Quality Certification from the NCDWQ. In compliance with Section 143-215.3D(e) of the NCAC, we will provide $570.00 to act as payment for processing the Section 401 permit application previously noted in this application (see Subject line). We are providing five (5) copies of this application to the NCDWQ, for their approval.

Neuse Riparian Buffer Authorization: NCDOT requests that the NCDWQ review this application and issue a written approval for a Neuse Riparian Buffer Authorization.

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

If you have any questions or need additional information, please contact Amy James at 919-715-7216 or aejames@ncdot.gov.

Sincerely,

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

cc list:
w/attachment
Mr. Brian Wrenn, NCDWQ (5 copies)
Ms. Kathy Matthews, USEPA

w/o attachment (see website for attachments)
Dr. David Chang, P.E., Hydraulics
Mr. Greg Perfetti, P.E., Structure Design
Mr. Victor Barbour, P.E., Project Services
Mr. Mark Staley, Roadside Environmental
Mr. Richard E. Greene, P.E. Div. 4 Engineer
Mr. Chad Coggins, Div. 4 Environmental Officer
Mr. Scott McLendon, USACE, Wilmington
Mr. Gary Jordan, USFWS
Mr. Travis Wilson, NCWRC
Mr. Ron Sechler, NMFS
Ms. Anne Deaton, NCDMF
Mr. Jay Bennett, P.E., Roadway Design
Mr. Majed Alghandour, P.E., Programming & TIP
Mr. Art McMillan, P.E., Highway Design
Ms. Jameelah El-Amin, Project Planning Engineer
Mr. Drew Joyner, P.E., HEU
Mr. Clarence W. Coleman, P.E., FHWA
Ms. LeiLani Paugh, NEU
Ms. Beth Harmon, EEP
Mr. Todd Jones, NCDOT External Audit Branch

APPLICATION FOR DEPARTMENT OF THE ARMY PERMIT (33 CFR 325)

OMB APPROVAL NO. 0710-003
Expires December 31, 2004

Public reporting burden for this collection of information is estimated to average 10 hours per response, although the majority of applications should require 5 hours or less. This includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Department of Defense, Washington Headquarters Service Directorate of Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302; and to the Office of Management and Budget, Paperwork Reduction Project (0710-0003), Washington, DC 20503. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to any penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number. Please DO NOT RETURN your form to either of those addresses. Completed applications must be submitted to the District Engineer having jurisdiction over the location of the proposed activity.

PRIVACY ACT STATEMENT

Authority: Rivers and Harbors Act, Section 10, 33 USC 403: Clean Water Act, Section 404, 33 USC 1344; Marine Protection, Research and Sanctuaries Act, 33 USC 1413, Section 103. Principal Purpose: Information provided on this form will be used in evaluating the application for a permit. Routine Uses: This information may be shared with the Department of Justice and other federal, state, and local government agencies. Submission of requested information is voluntary, however, if information is not provided the permit application cannot be evaluated nor can a permit be issued.

One set of original drawings or good reproducible copies which show the location and character of the proposed activity must be attached to this application (see sample drawings and instructions) and be submitted to the District Engineer having jurisdiction over the location of the proposed activity. An application that is not completed in full will be returned.

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

1. APPLICATION NO.	2. FIELD OFFICE CODE	3. DATE RECEIVED	4. DATE APPLICATION COMPLETED

(ITEMS BELOW TO BE FILLED BY APPLICANT)

5. APPLICANT'S NAME North Carolina Department of Transportation Project Development & Environmental Analysis	8. AUTHORIZED AGENT'S NAME AND TITLE (an agent is not required)
6. APPLICANT'S ADDRESS 1598 Mail Service Center Raleigh, NC 27699-1548	9. AGENT'S ADDRESS
7. APPLICANT'S PHONE NOs. W/AREA CODE a. Residence b. Business 919-715-7216	10. AGENT'S PHONE NOs. W/AREA CODE a. Residence b. Business

11. **STATEMENT OF AUTHORIZATION**

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

APPLICANT'S SIGNATURE DATE

NAME, LOCATION, AND DESCRIPTION OR PROJECT OR ACTIVITY

12. PROJECT NAME OR TITLE (see instructions
TIP U-3334

13. NAME OF WATERBODY, IF KNOWN (if applicable)
Neuse River, Poplar Creek, UT to Buffalo Creek

14. PROJECT STREET ADDRESS (if applicable)
N/A

15. LOCATION OF PROJECT
Johnston (COUNTY) NC (STATE)

16. OTHER LOCATION DESCRIPTIONS, IF KNOWN (see instructions) **Section, Township, Range, Lat/Lon, and/or Accessors's Parcel Number, for example.**

17. DIRECTIONS TO THE SITE
Please see attached vicinity map and cover letter.

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

Improvements involve the construction of a new location road from US 70 Business east to Booker Dairy Road where it intersects with Buffalo Road. The proposed alignment then follows Booker Dairy Road to just east of White Oak Road, where it will continue on new location before tying into existing Ava Gardner Boulevard. The proposed alignment will then follow Ava Gardner Boulevard to its intersection with US 301.

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

The project purpose is to: 1) provide another flood-free crossing of the Neuse River; 2) provide another east-west thoroughfare in Smithfield; and 3) improve access to north and west Smithfield.

USE BLOCKS 20-22 IF DREDGED AND/OR FILL MATERIAL IS TO BE DISCHARGED

20. Reason(s) for Discharge

Construction of a new roadway that crosses several jurisdictional waters of the US

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

Please see attached permit drawings

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

Please see attached permit drawing summary sheet

23. Is Any Portion of the Work Already Complete? Yes _X_ No ___ IF YES, DESCRIBE THE COMPLETED WORK

Geotechnical test borings were made to determine an appropriate structure and foundation for a new bridge over the Neuse River. This action was permitted through a Nationwide 6 under separate cover (Action ID 200310727).

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

Please see attached permit drawings.

25. List of Other Certifications or Approvals/Denials Received from other Federal, State, or Local Agencies for Work Described in This Application.

AGENCY	TYPE APPROVAL*	IDENTIFICATION NUMBER	DATE APPLIED	DATE APPROVED	DATE DENIED

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

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

7/9/08

SIGNATURE OF APPLICANT DATE SIGNATURE OF AGENT DATE

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

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

Subject: Draft Minutes of the Interagency Drainage Review Meeting (4B) on October 20, 2004 for U-3334A, Johnston County.

Team Members:		Participants:
Eric Alsmeyer – USACE	PRESENT	Marshall Clawson – NCDOT Hydraulics Unit
*Nikki Thomson – NCDWQ	ABSENT	Dan Duffield – NCDOT Hydraulics Unit
Travis Wilson – NCWRC	PRESENT	Steve Bondor – Arcadis – Consultant Engineer
Beverly Robinson – NCDOT PDEA	PRESENT	Roy Girolami – NCDOT Structures Design
Michael Turchy – NCDOT PDEA	PRESENT	David Anderson – NCDOT Structures Design
Chris Militscher – USEPA	PRESENT	Kevin Bowen – NCDOT/DIV 4 Construction
Gary Jordan – USFWS	ABSENT	Mike McKeel – NCDOT/Resident Engineer
		Jerry Page – NCDOT/DIV 4 Construction
*Substitute – Beth Barnes	PRESENT	Jamie Shern – DEO - Wilson

The meeting began 9:15 am.

Marshall gave an over view of the project as a 4 lane design and NCDOT is only going to build 2 lanes now.

Conceptual Design- Steve Bondor with Arcadis gave an over view of the proposed drainage layout. Also mentioned 3 JD Streams on this project. Popular Creek, Neuse River, and Unnamed Trib at the end of the project.

Sheet 4: Steve Bondor (SB) - Explain general layout of drainage

Sheet 5: SB - Explain general layout of drainage, collecting and discharging to rock splash pads.

Beth Barnes (BB)– Are these areas flat?

SB - Yes

Sheet 6: SB - Equalizer Pipes starting with a 36"

Mike McKeel (MK) – Had a concern about the paralleling the sewer line

SB – No Conflict

Eric Alsmeyer (EA)– It's wide

SB – Yes, wide, that the reasoning behind the equalizer pipes

EA – Yes, wide and flat

Chris Militscher (CM) – What are the side slopes?

SB – 4:1 and 5:1 outside the wetlands and 3:1 through out the wetlands

Sheet 7: SB - Equalizer pipes

Marshall Clawson (MC) – Side slopes?

SB – 3:1 through out the wetlands

Sheet 8: SB – Continuation of the same Wetland

BB – PSH?

SB – Yes, pipe is out letting to a PSH

EA – Existing Cross Pipe?

SB – Yes, we are retaining and extending it with the same size, 24"

EA –Filling and Ditching?

SB – Roadway fill is filling the upper head of it

BB- How does that affect the rest of the Wetland? Are we removing the hydrology from the Wetland?

SB – No we are not removing the hydrology, the ditches still drain to the Wetland

EA – Why is the easement so far outside the R/W?

SB – Future 4 lane design.

EA – Make sure you account for the impact of the rip rap, you can make it as wide as you want as the wider you make it doesn't affect the impact as the length would

Sheet 9:

SB - Explain general layout of drainage

BB – What kind of treatment does the run off get?

SB – Grass Swale

MK – What's the extra R/W for?

SB – future ditch

Sheet 10: Bridged, half of the bridge drains back down line and the half of the bridge drains line ahead

Shows everyone the BSR. It's a four-lane design and we are only going to build two-lane.

MC: Deck drainage is for the entire bridge

SM – Are the basins retention or hazardous?

SB – They have a gate/valve so they are hazardous

BB – How about any close water intakes?

MC – Well we are just outside that 0.5 mile critical area, but we are still going to put the hazardous spill basins in

EA – Are Wetland Impact due to the HZ spill basin?

SB – Small amount of WL impacts due to the basin

MC – Basin will be sized to handle both bridges

EA – Going to need 3 impacts

- Permanent Bridge Impacts (impacts from piers, and piles)
- Temporary Bridge Impacts (H-pile impacts)
- Average Height and Weight of Permanent Bridge (for shading)

MK – Average length span for a work bridge would be about 50' (to be used to calculated impacts)

David Anderson (DA) – Structures is investigating changing the span arrangement to 130' spans and the use of 72" Modified Bulb T Concrete Girders

TW - Would that allow us to span the Neuse?

DA – No, we will still need two bents at the edge of the channel

MC – What about clearing limits for the work bridge and permanent bridge?

MK – 15' past the bridge (hand clearing)

CM – What about the power lines? How much more room will you need because of the power lines?

MK – Is CP&L moving the lines.

- From Project Services – "The power lines will not be moved"

EA – Impact of the basin to the Wetland at the outlet of the pipe

SB – Its right at the Wetland – Depends on the Final Design

TW – Any chance of spanning the Neuse?

DA – Not with Concrete and we've been instructed not to use steel as the demand has caused it to double in price except where absolutely needed.

- This estimate was sent on 10-22-02 to all at the 4B meeting via e-mail

General Question – When is the let the plans say Feb - 05 is this correct?

- From Project Services the let date is Sept – 05

Sheet 11

SB – Continuation of Bridge

Sheet 12

SB – Overview of basin and grass ditch to basin. The ditches are fabric lined where they become steep

SB/MC – Discussion about deck drainage being ditched or piped over to the basin

BB – Want to know if the water off the bridge is getting treatment?

MC – Yes, its getting treatment, it getting collected and probably ditched to the basin which after leaving the basin it is allowed to sheet flow through the buffers. No direct discharge of water over the river or the wetlands

EA – What's the PDE for?

SB – To construct the Basin and for future Maintenance reasons, both for the basin and the ditch

TW – Would like to see a cost estimate for a steel span over the Neuse, if we are going to spend some extra money this is where it needs to be

DA – What's the span going to be?

MC – 250' and that's just over the Neuse, structures will get a cost estimate for this comparison

Discussion on Work Bridge and spans and Concrete & Steel Girders

Sheet 13

SB – Explain general layout of drainage, wetland to the north, JD stream to the south. It shows up on the soils map.

2 lane design is a shoulder section, however the 4 lane design will be curb and gutter.

Discussion about the crossing where the JD stream is to the south side of the road. Buffers need only be shown to the south side of the road. Buffers as shown on the plan are incorrect to the north

SB – PSH right before entering wetland to the north, pipe is being extended

The crossing doesn't show up on the USGS quad map, but does on the soils, but just to the south side of the road.

MC – Need to look at this site and possibly get it thrown out.

BB – A field visit needs to be set up and some one from DWQ will go out and look at this site. We still need to provide some treatment at this area.

SB – We currently have grass ditches, which provide treatment.

Michael Turchy and MK – Want cost estimate for steel span

Meeting Adjourned

Subject: Minutes from Interagency 4C Hydraulic Design Review Meeting on U-3334A

Team Members:

William Wescott - USACE	(present)
Rob Riding -NCDWQ	(present)
Travis Wilson -NCWRC	(present)
Gary Jordan – USFWS	(present)
Chris Militscher-EPA	(present)
Kathy Matthews – EPA	(present)
Chris Rivenbark – NEU	(present)
Amy James - NEU	(present)
Elizabeth Lusk – NEU	(present)

Participants:

Marshall Clawson, NCDOT Hydraulics
Dan Duffield, NCDOT Hydraulics
Roy Girolami, NCDOT Structures Design Unit
Len Hill, Arcadis
Julie Taylor, Arcadis
Doug Taylor, NCDOT Roadway Design
Michael Bright, NCDOT Project Services – Utilities
Mike Robinson, NCDOT Construction
Wendi Johnson, NCDOT Division 4
Mark Staley, NCDOT REU

General Comments:

Introductions were made by all in attendance. Marshall started the review.

- Existing alignment and then off on new alignment and then tie back to existing alignment

Sheet 10

- Proposed Drainage system at the beginning of the bridge is collected to a hazardous spill basin at the beginning of the bridge.
    - Comment – need additional work area, need to permit for additional area – using mechanized clearing.

Sheet 9, 10, 11 and 12

- Work Bridge on both sides of proposed bridge with fingers
    - Comment – the detail for this is shown, however the work bridge did not get shown. Need to show work bridge
    - Need to permit for permanent impacts of bent, use mechanized clearing for this impact. Need to show additional 10' around each drilled shaft. It was decided to use mechanized clearing for each proposed bent from work bridge to work bridge
    - Need to show hand clear from 10' outside of work bridge to 10' outside of work bridge

Sheet 13

- Discussion about showing all impact for site 5 and to put the ultimate length of pipe in and permit the B section.
    - Comment – This was looked into and because of several issues, funding, design, right of way, etc. It was determined to not do this at this time and to continue with the current design

Meeting Adjourned

United States Department of the Interior

FISH AND WILDLIFE SERVICE
Raleigh Field Office
Post Office Box 33726
Raleigh, North Carolina 27636-3726

August 29, 2007

RECEIVED
AUG 31 2007
DIVISION OF HIGHWAYS
PDEA-OFFICE OF NATURAL ENVIRONMENT
James

Gregory J. Thorpe, Ph.D.
North Carolina Department of Transportation
Project Development and Environmental Analysis
1598 Mail Service Center
Raleigh, North Carolina 27699-1598

Dear Dr. Thorpe:

This letter is in response to your letter of August 23, 2007 which provided the U.S. Fish and Wildlife Service (Service) with the biological determination of the North Carolina Department of Transportation that the proposed extension of Booker Dairy Road (SR 1923) from US 70 Business to US 301, including new location bridges over the Neuse River and Poplar Creek in Johnston County (TIP No. U-3334) may affect, but is not likely to adversely affect the federally endangered dwarf wedgemussel (*Alasmidonta heterodon*) and Tar spinymussel (*Elliptio steinstansana*). These comments are provided in accordance with section 7 of the Endangered Species Act (ESA) of 1973, as amended (16 U.S.C. 1531-1543).

According to information provided, a mussel survey was conducted at the Poplar Creek crossing site on November 10, 2004. No mussels of any species were observed, and the habitat was determined to be unsuitable due to beaver impoundment. Surveys were also conducted at the Neuse River crossing site on January 6, 2005 and January 14, 2005. Neither of the federally listed species was found; however, many specimens of six other species were observed. All surveys extended 400 meters upstream and 400 meters downstream of each crossing site.

Based on the mussel survey results and other information available, the Service concurs with your determination that the project may affect, but is not likely to adversely affect the dwarf wedgemussel and Tar spinymussel. We believe that the requirements of section 7(a)(2) of the ESA have been satisfied. We remind you that obligations under section 7 consultation must be reconsidered if: (1) new information reveals impacts of this identified action that may affect listed species or critical habitat in a manner not previously considered in this review; (2) this action is subsequently modified in a manner that was not considered in this review; or (3) a new species is listed or critical habitat determined that may be affected by this identified action.

The Service appreciates the opportunity to review this project. If you have any questions regarding our response, please contact Mr. Gary Jordan at (919) 856-4520 (Ext. 32).

Sincerely,

Gary Jordan

for Pete Benjamin
Field Supervisor

cc: William Wescott, USACE, Washington, NC
Rob Ridings, NCDWQ, Raleigh, NC
Travis Wilson, NCWRC, Creedmoor, NC
Chris Militscher, USEPA, Raleigh, NC
John Sullivan, FHWA, Raleigh, NC
David Harris, NCDOT, Raleigh, NC

Modification and Supplement of the May 2000 NRTR
Booker Dairy Road Extension (SR 1923),
From US 70 Business to US 301,
Smithfield, Johnston County
TIP No. U-3334;
State Project No. 8.2312101; Federal Aid No. STP-1923(2)

This supplemental report is intended as an addendum to the original Natural Resources Technical Report (NRTR) dated May 2000. Investigations by the North Carolina Department of Transportation (NCDOT) found that potentially suitable habitat is present within the proposed project area for Michaux's sumac (*Rhus michauxii*). Since several alternative alignments were considered, field reconnaissance was scheduled for completion after selection of the preferred alternative and once a new roadway alignment was established. Until that time, an "Unresolved" biological conclusion was determined for Michaux's sumac.

This modification to the NRTR resolves the protected species issue for Michaux's sumac for the portion of the project identified as section "A." This section begins at US 70 Business and travels in an easterly direction to the Buffalo Road and Booker Dairy Road intersection. A plant survey will need to be conducted along the remaining portion of the project, identified as Section "B" which continues eastward from the Buffalo/Booker Dairy Road intersection to its terminus at US 301 near Ava Gardner Boulevard.

A species description, habitat preferences, and biological conclusion discussion which characterizes the likelihood of conflict with the proposed project is herein provided for Michaux's sumac.

MICHAUX'S SUMAC **Endangered**

Plant Family:	Anacardiaceae
Federally Listed:	September 28, 1989
State Status:	Endangered – Special Concern

Michaux's sumac is a rhizomatous, densely hairy shrub, with erect stems from one to three feet in height. The compound leaves contain evenly serrated, oblong to lanceolate, acuminate leaflets. Most plants are unisexual; however, more recent observations have revealed plants with both male and female flowers on one plant. In North Carolina, leaves emerge from late April to May. The flowers are small, borne in a terminal, erect, dense cluster, and colored greenish yellow to white. Flowering usually occurs from June to July; while the fruit, a red drupe, is produced through the months of August to October. Only 36 extant populations are known, with 31 in North Carolina, three in Virginia, and two populations in Georgia.

Michaux's sumac grows in sandy or rocky open woods in association with basic soils. It spreads by producing cloning shoots from the roots of mature plants. Apparently, this plant survives best in areas where some form of periodic disturbance provides or maintains open areas. At least twelve of the plant's populations in North Carolina are on highway rights-of way, roadsides, or on the edges of artificially maintained clearings.

Biological Conclusion: **No Effect**

A May 11, 2005 review of North Carolina Natural Heritage Program (NHP) maps depicting the Powhotan and Selma U.S. Geological Survey 7.5-minute topographic quadrangles indicated that no protected species are known to occur within a one-mile radius of the project site. Walking surveys were conducted by qualified biologists on May 16 and May 17, 2005 to determine if any populations of Michaux's sumac occur within the project area. The field investigators qualifications include being involved in Michaux's sumac propagation research for several years at North Carolina State University and they are very familiar with its habit and appearance. A total of 16 person hours were spent during a plant-by-plant search which focused on identification of the vegetative portions of the plant since flowers had not yet emerged.

Potentially suitable habitat was found in maintained cleared areas adjacent to residential or commercial development and agricultural fields or pastureland. The residential and commercial areas are intensely managed through regular mowing; the agricultural fields are routinely plowed and harvested; and the pastureland is continuously used as browsing land for cattle or horses. Clearings found within the forested portions of the survey area were typical of early successional (cutover) bottomland systems, with thick herbaceous and woody vine groundcovers and shrubby sapling growth.

Vegetation included thick stands of young sweetgum (*Liquidambar styraciflua*), red maple (*Acer rubrum*), and loblolly pine (*Pinus taeda*) saplings; mats of Japanese honeysuckle (*Lonicera japonica*), green briar (*Smilax rotundifolia*), and trumpet creeper (*Campsis radicans*); and dense areas of Japanese creeping grass (*Microstegium vimineum*). No evidence of Michaux's sumac exists in the project study area and the NHP has no record of known populations within a one-mile radius of the project site. Guidelines recently established by the NCDOT and USFWS state that a "No Effect" biological conclusion determination for plants is appropriate when field surveys find no specimens of a listed species and NHP maps show no populations located within a one-mile radius of the site.

The Michaux's sumac survey along Section "A" of the project alignment was completed by Cindy Carr and Layna Thrush of Mulkey Engineers & Consultants, Inc. (Mulkey) on May 16 and May 17, 2005. A summary description of their qualifications is provided below.

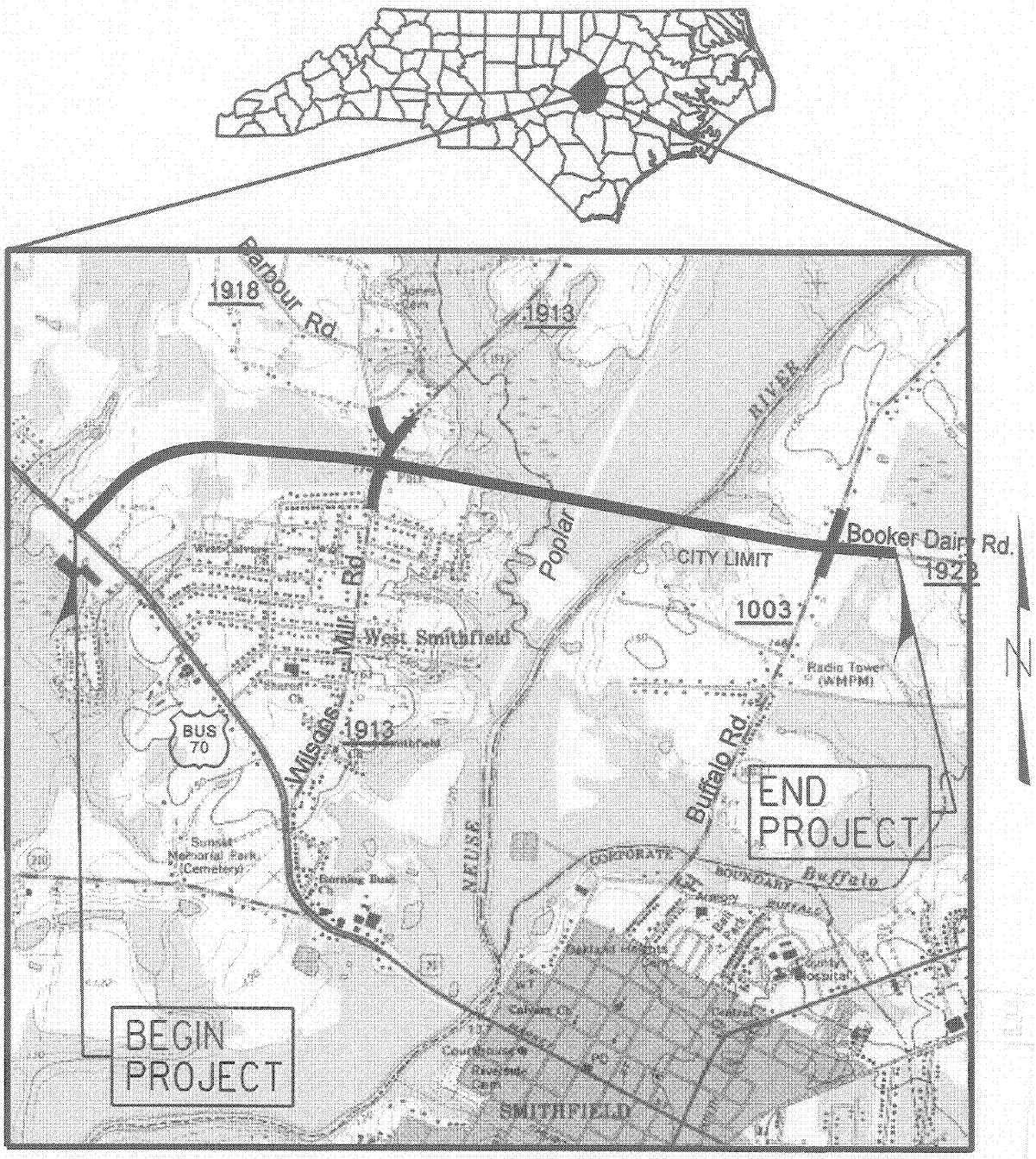
Qualifications of Field Investigators

Cindy S. Carr, Senior Scientist	
Education:	BS Ecosystem Assessment, North Carolina State University AS Business Administration, Calhoun State College
Experience:	Mulkey Engineers & Consultants, November 2002 to present ARCADIS, May 2000 to November 2002 CH2M HILL, October 1989 to June 1996
Certifications:	Wetland Professional-In-Training, Society of Wetland Scientists, 2001 Benthic Collection Protocols for Stream Restoration, NCDWQ, 2001 Stream ID and Buffer Rule Applications Program, NCDWQ, 2003

Expertise:	NEPA investigations, Section 7 field investigations, wetland determination/delineation, stream determination/delineation, 404/401 permits, stream and wetland restoration, habitat assessments, Rosgen stream assessment and classification, Phase I environmental site assessments, Michaux's sumac propagation research project at NCSU.

Layna Thrush, Scientist	
Education:	MS Forestry, North Carolina State University BA Political Science, Florida State University
Experience:	Mulkey Engineers & Consultants, May 2004 to present ARCADIS, May 2001 to May 2004
Expertise:	NEPA investigations, Section 7 field investigations, wetland determination and delineation, stream determination and delineation, stream and wetland restoration, habitat assessments, and Rosgen stream assessment and classification, Michaux's sumac graduate research project at NCSU.

VICINITY MAP



N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
JOHNSTON COUNTY

PROJECT: 8.2312101 (U-3334A)

SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

SHEET 1 OF 15 12/19/07

Buffer Drawing
Sheet 1 of 17

BUFFER IMPACTS SUMMARY

			IMPACT									BUFFER REPLACEMENT	
			TYPE			ALLOWABLE			MITIGABLE				
SITE NO.	STRUCTURE SIZE / TYPE	STATION (FROM/TO)	ROAD CROSSING	BRIDGE	PARALLEL IMPACT	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)	TOTAL (ft^2)	ZONE 1 (ft^2)	ZONE 2 (ft^2)
BUFFER 1*	Bridge	-L- 83+00		X		21540	8734	30274					
BUFFER 2	Bridge	-L- 104+00		X		25499	10559	36058					
BUFFER 3	36" Cross Pipe	-L- 129+25	X			1856	1085	2941					
TOTAL:						48895	20378	69273					

N.C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS

JOHNSON COUNTY
PROJECT: 8.23121011 (U-3334A)

4/24/2008
SHEET ___ OF ___

Rev. May 2006

Buffer Drawing
Sheet 2 of 17

BUFFER IMPACTS SUMMARY

		WETLANDS IN BUFFER	
Site	Station	ZONE 1 (ft^2)	ZONE 2 (ft^2)
1	-L- 83+00	21540	8734
2	-L- 104+0	11547	5283
	TOTAL	33087	14017

Buffer Drawing
Sheet 3 of 17

NC DEPARTMENT OF TRANSPORTATION

DIVISION OF HIGHWAYS

JOHNSON COUNTY

PROJECT: 8.23121011 (U-3334A)

SHEET of 5/22/20

PROPERTY OWNER

NAME AND ADDRESS

OWNER'S NAME	ADDRESS
ROSS W. LAMPE	P.O. BOX 150 SMITHFIELD, NC 27577
NEUSE FORESTRY, LLC	PO BOX 1492 SMITHFIELD, NC 27577
WILLIAM W. SMITH, JR. ET AL	606 BROOKWOOD LAND GOLDSBORO, NC 27534
JANICE REYNOLDS	117-32-142 PLACE JAMAICA, NY 11436
NC DEPT OF TRANSPORTATION	2415 BEDGOOD DRIVE WILSON, NC 27893
IRENE STEVENS, ET AL	690 W. MARKET STREET SMITHFIELD, NC 27577
LEO A SANDERS	101A BARBOUR ROAD SMITHFIELD, NC 27577
JAMES C. WILLIAMS	3713 PINELEA ROAD PIKESVILLE, MD 21208
DIANE B. SLOOP	1010 WILSONS MILLS ROAD SMITHFIELD, NC 27577
JERRY HANSLEY, JR.	176 LAKE VIEW HILLS FOUR OAKS, NC 27524
TOWN OF SMITHFIELD	PO BOX 461 SMITHFIELD, NC 27577
WILSON 1995 FAMILY LIMITED PARTNERSHIP	101E JOHNSTON STREET SMITHFIELD NC 27577
JOHN W. TWISDALE	1755 BUFFALO ROAD SMITHFILED, NC 27577
WAYNE L. BAREFOOT	258 MEADOWBROOK DRIVE FOUR OAKS, NC 27524

Buffer Drawing
Sheet 4 of 17

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
JOHNSTON COUNTY

PROJECT: 8.2312101 (U-3334A)

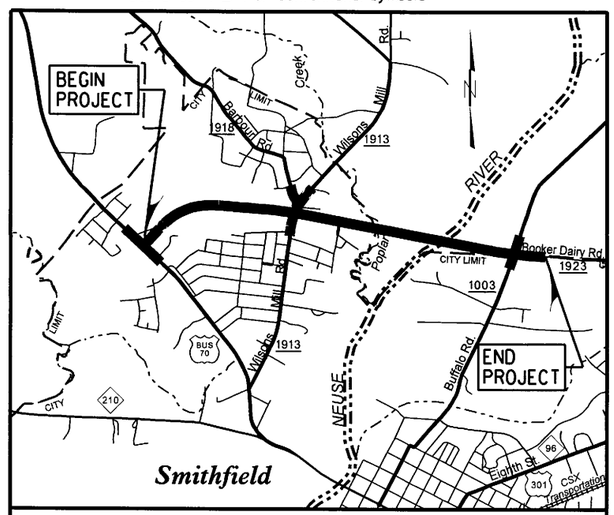
SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

SHEET 3 OF 15 12/19/07

TIP: U-3334A

CONTRACT:

See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

JOHNSTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3334A	1	

STATE PROJ. NO.	F. A. PROJ. NO.	DESCRIPTION
34929.1.1	STP-1923(2)	P.E.
34929.2.4	STP-1923(3)	ROW, UTIL.
		CONSTR.

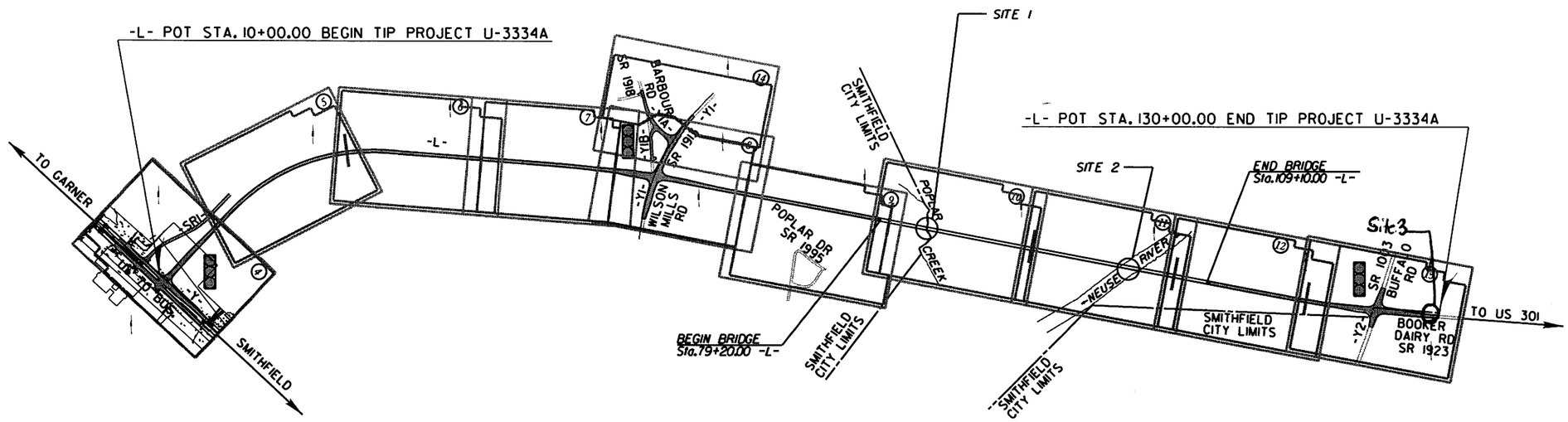
LOCATION: SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, AND SIGNALS

Buffer Drawing Sheet 5 of 17

U-3334A: BUFFER SITE MAP

NAD '83'



NCDOT CONTACT
TERESA BRUTON, P.E.
ROADWAY DESIGN-ENGINEERING COORDINATION

THIS IS A FULL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2005 = 6,000
ADT 2025 = 9,500
DHV = 10 %
D = 55 %
* T = 10 %
V = 50 MPH

*(TTST 4 % + DUAL 6 %)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-3334A =	1.707 miles
LENGTH OF STRUCTURE TIP PROJECT U-3334A =	0.566 miles
TOTAL LENGTH TIP PROJECT U-3334A =	2.273 miles

Prepared In The Office of:
ARCADIS
G & B of North Carolina, Inc.
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-6282 Fax: 919/854-5448
www.ARCADIS-US.COM
for the North Carolina Department of Transportation

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 13, 2003

LETTING DATE:
SEPTEMBER 20, 2005

ARCADIS CONTACT
STEVE SMALLWOOD, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
STATE DESIGN ENGINEER P.E.

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

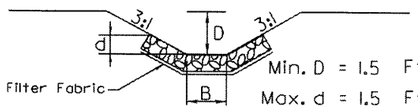
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

10' 0 20' 40'
SCALE

Buffer Drawing
Sheet 6 of 17

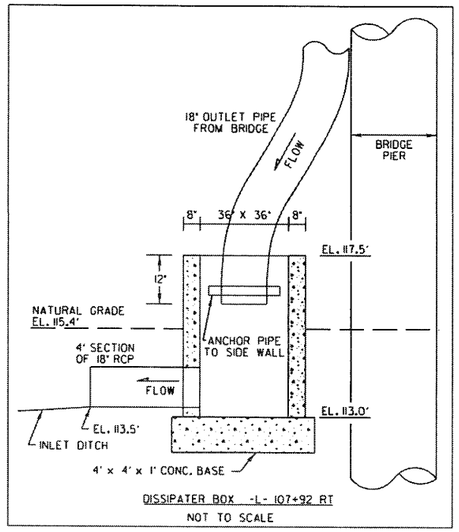
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

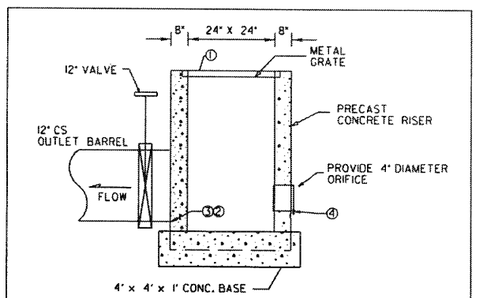


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

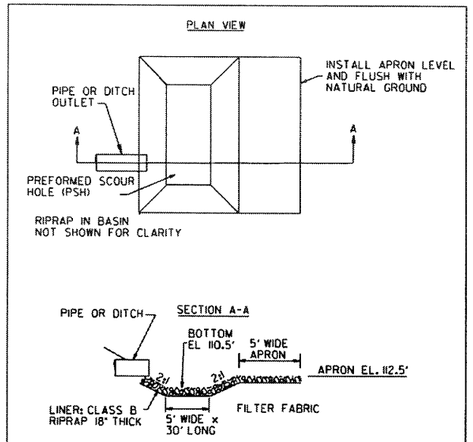


DISSIPATER BOX -L- 107+92 RT
NOT TO SCALE

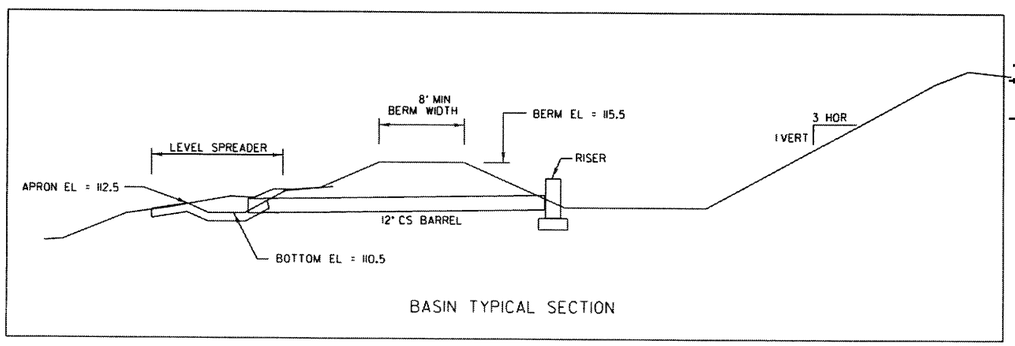


DESCRIPTION	ELEVATION
① TOP	113.5
② BOTTOM OF RISER EL.	111.0
③ OUTLET PIPE INVERT & DIAMETER	111.0
④ ORIFICE INVERT & DIAMETER	111.5 4"

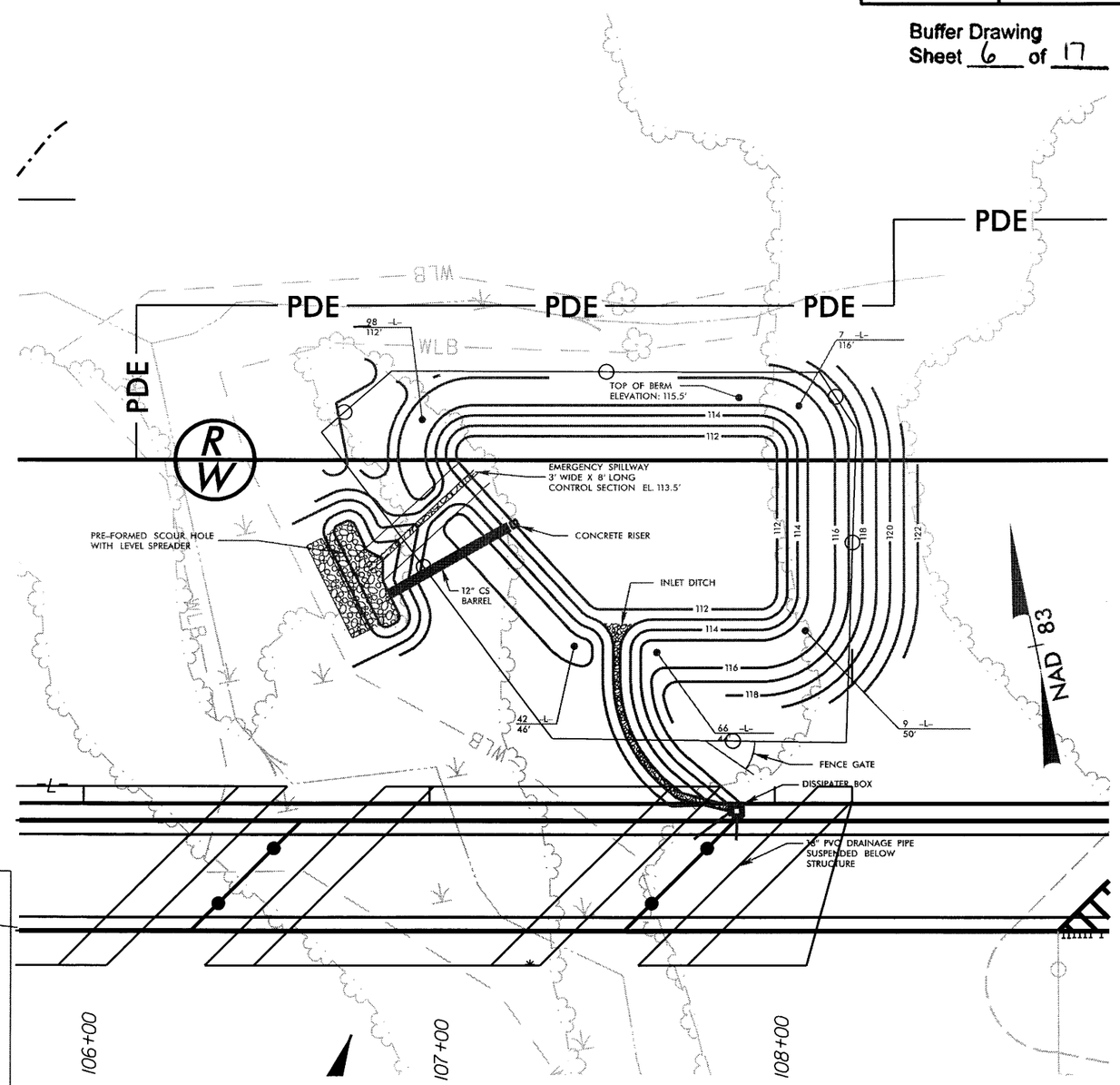
RISER DETAIL -L- 107+25 LT
NOT TO SCALE



LEVEL SPREADER



BASIN TYPICAL SECTION



HAZARDOUS SPILL BASIN / DETENTION POND

REVISIONS

ARCADIS G&M
DoNotRotate
Date: 8/16/16 Time: 8:14AM
PROJECT FILES

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

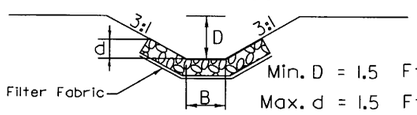
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

10' 0 20' 40'
SCALE

Buffer Drawing
Sheet 7 of 17

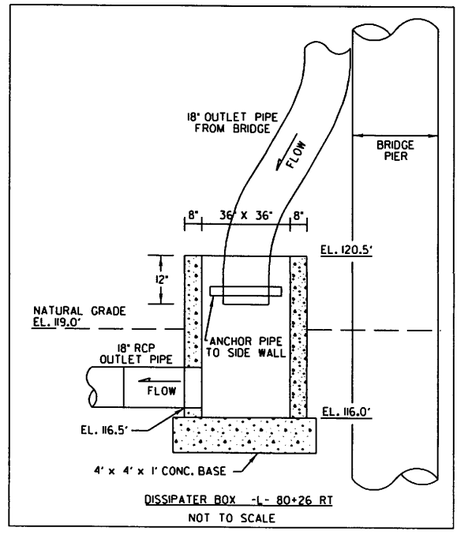
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

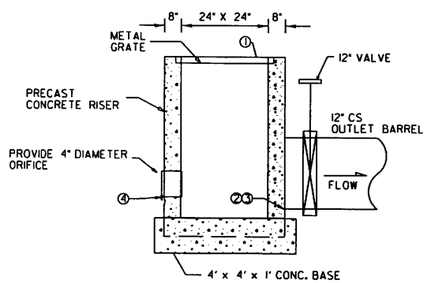


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

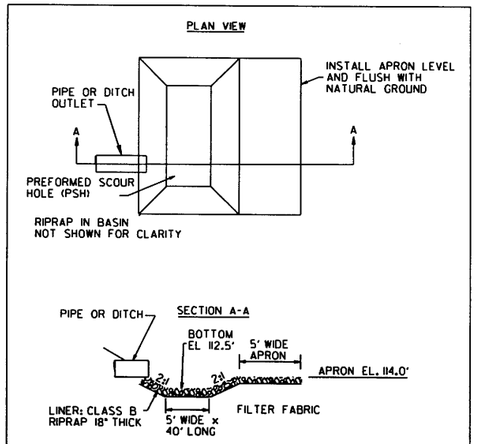


DISSIPATER BOX -L- 80+26 RT
NOT TO SCALE

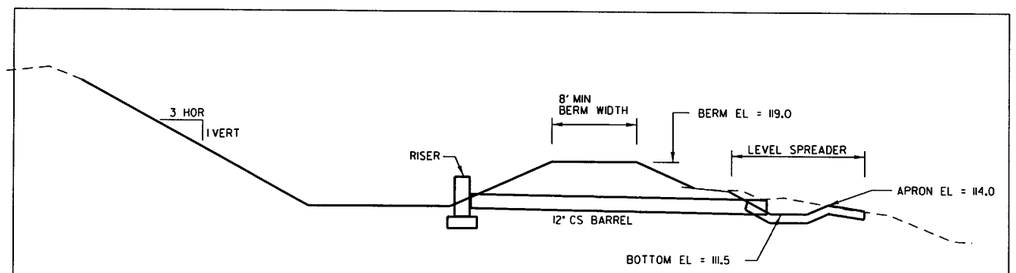


DESCRIPTION	ELEVATION
① TOP	117.0
② BOTTOM OF RISER EL.	112.0
③ OUTLET PIPE INVERT & DIAMETER	112.0
④ ORIFICE INVERT & DIAMETER	113.5 4"

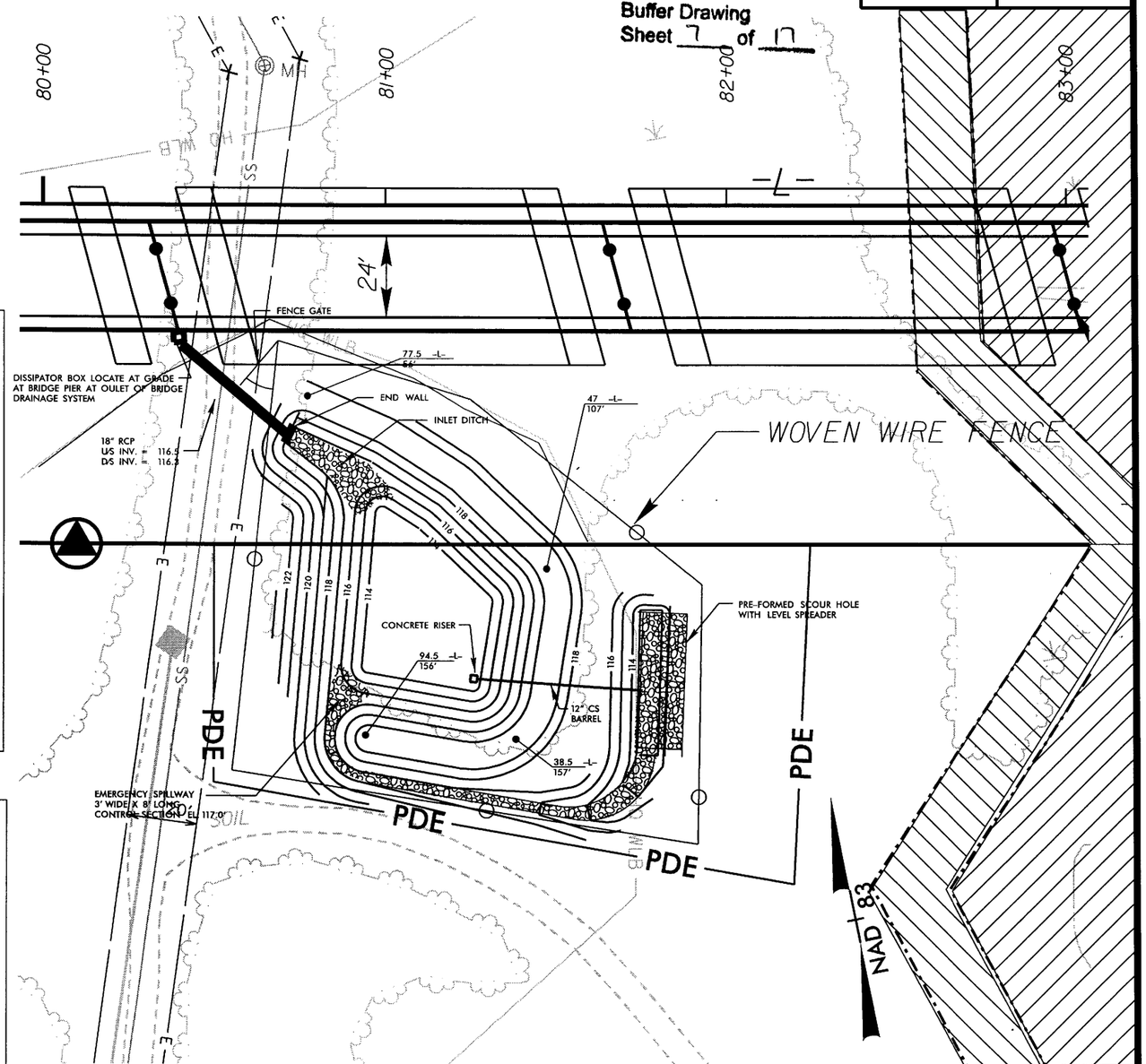
RISER DETAIL -L- 81+26 RT
NOT TO SCALE



LEVEL SPREADER



BASIN DETENTION POND TYPICAL SECTION



ALLOWABLE BUFFER ZONE IMPACT 1

ALLOWABLE BUFFER ZONE IMPACT 2

HAZARDOUS SPILL BASIN / DETENTION POND

REVISIONS

ARCADIS G&M
Date: 9/11/18
Time: 8:18AM
F:\ROOMA\PLES

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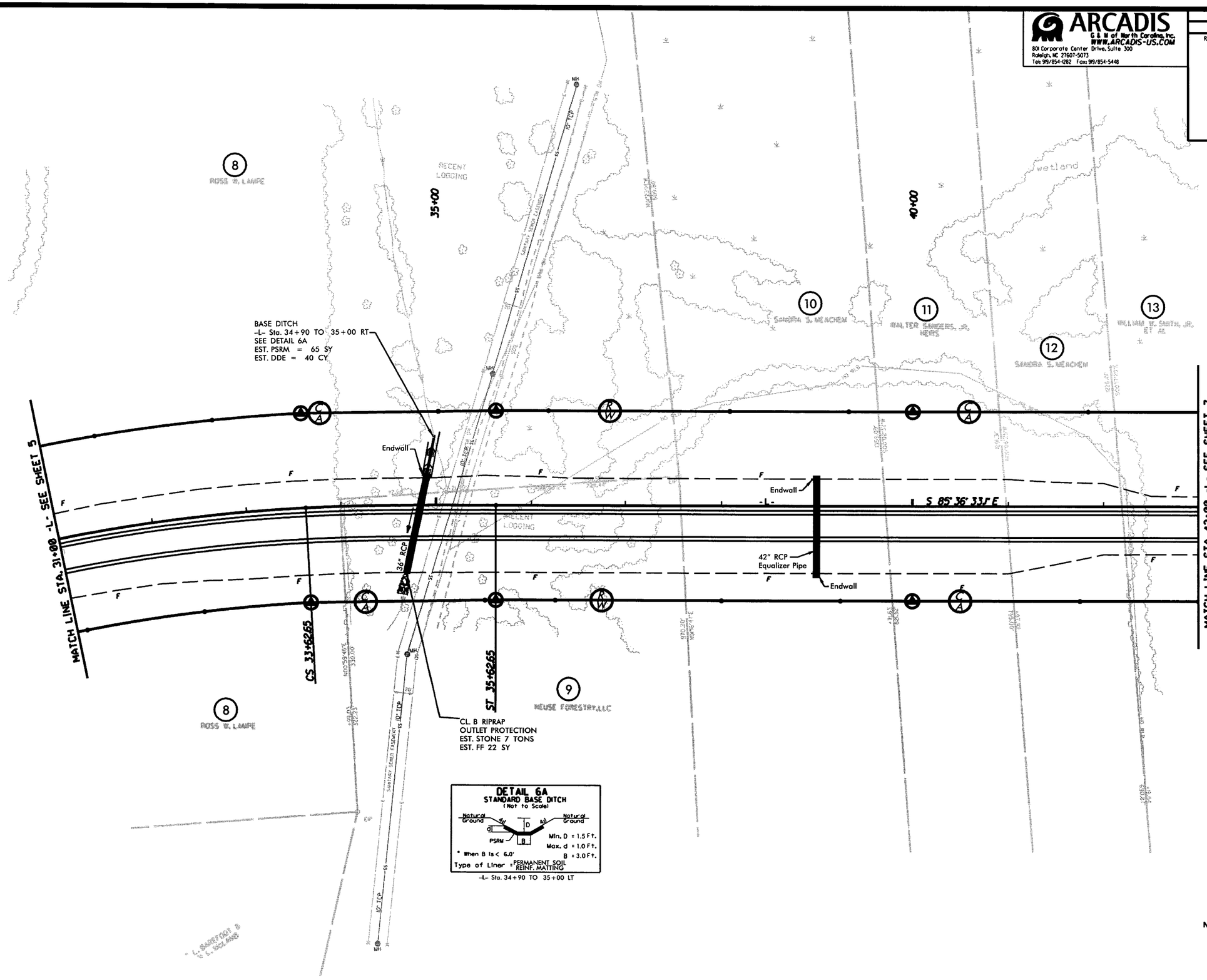
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 8 of 17

NAD 83



NOTE:
A FUTURE ACCESS POINT IS DESIGNATED AT LEFT AND RIGHT OF -L- Sta. 35+90 FOR PLACEMENT OF A ROAD AS DETERMINED BY THE CITY OF SMITHFIELD.

SEE SHEETS 15 AND 16 -L- PROFILE

REVISIONS

ARCADIS G&M
Date: 01/16/2018
Time: 8:TIME8
Filename: FILE8

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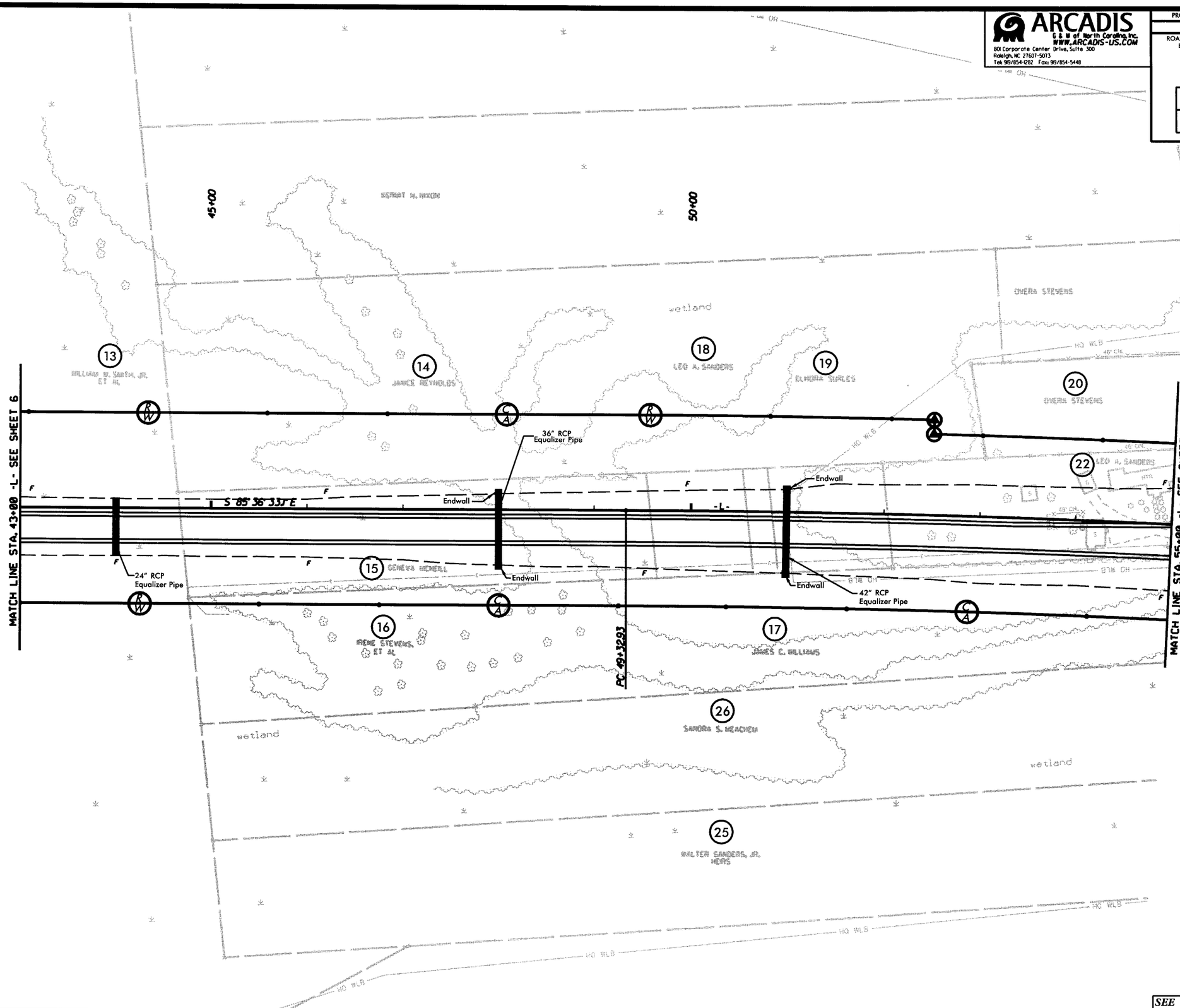
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 9 of 17

NAD 83



SEE SHEET 16 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
DesignSUITE
Finalcopy.dgn
Time: 8:17AM

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

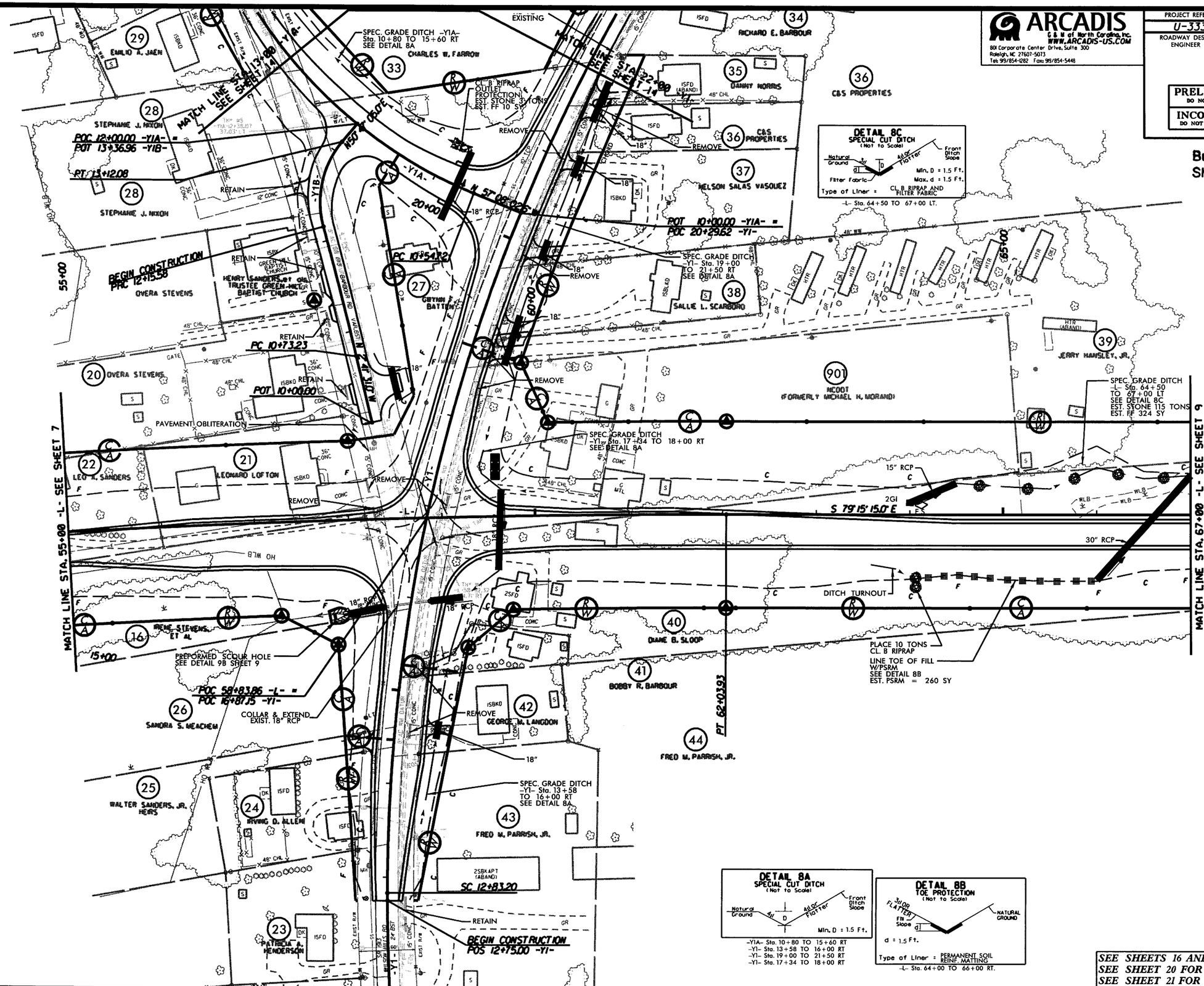
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 10 of 17

NAD 83

REVISIONS

R/W REVISION SS 6/04 MOVED TAPER OF RIGHT SIDE OF -Y1- AT END OF CONSTRUCTION TO AVOID UNDERGROUND STORAGE TANK BY ELIMINATE TAKING ON PARCEL 34



SEE SHEETS 16 AND 17 FOR -L- PROFILE
SEE SHEET 20 FOR -Y1- PROFILE
SEE SHEET 21 FOR -Y1A- PROFILE

ARCADIS G&M
DATE: 5/5/06
Plotted by: Timothy STACE

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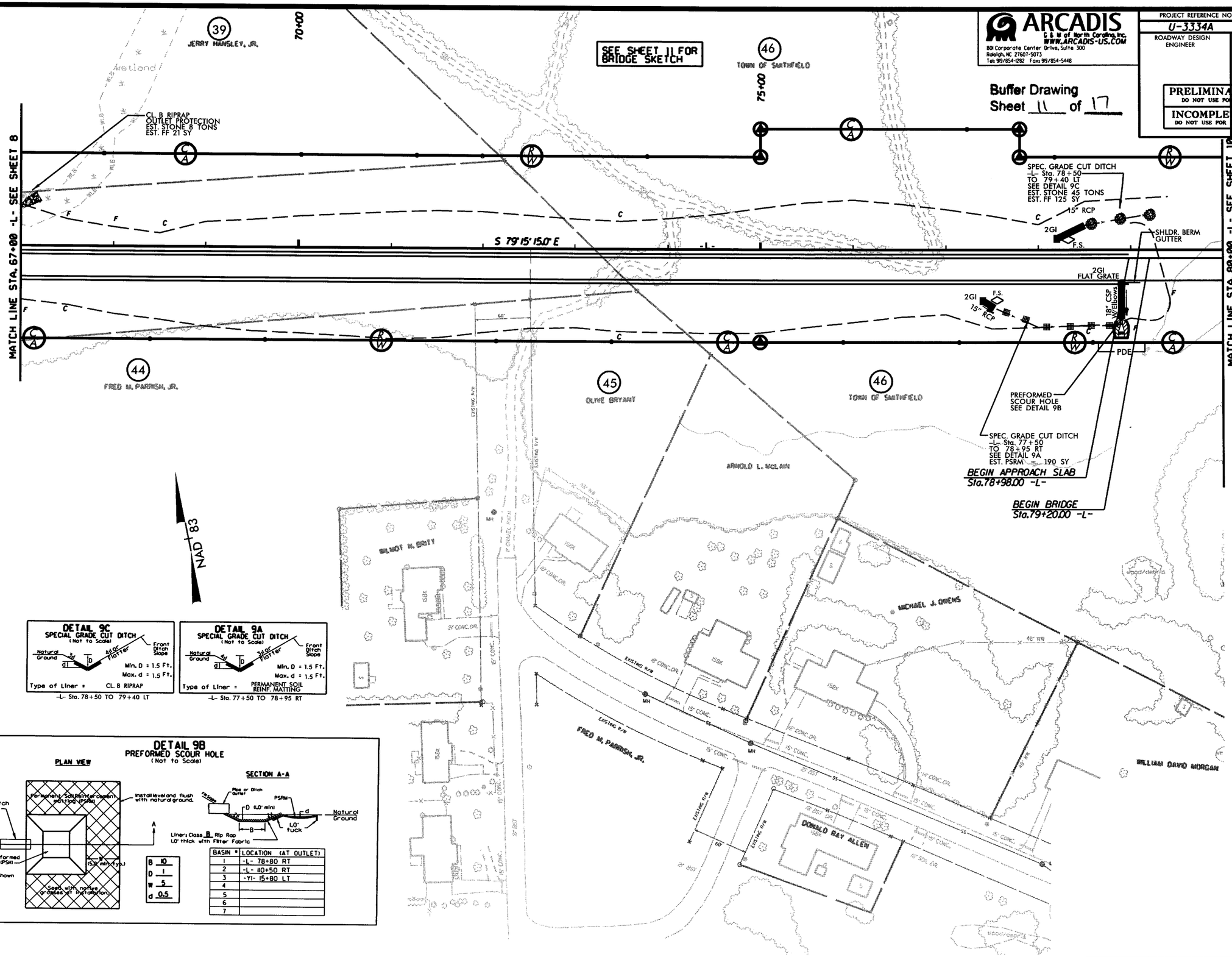
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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

Buffer Drawing
Sheet 11 of 17

SEE SHEET 11 FOR BRIDGE SKETCH



DETAIL 9C
SPECIAL GRADE CUT DITCH
(Not to Scale)

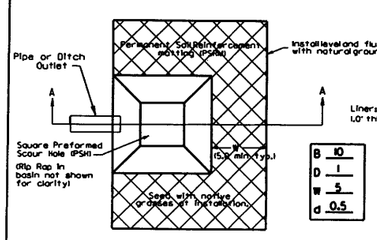
-L- Sta. 78+50 TO 79+40 LT

DETAIL 9A
SPECIAL GRADE CUT DITCH
(Not to Scale)

-L- Sta. 77+50 TO 78+95 RT

DETAIL 9B
PREFORMED SCOUR HOLE
(Not to Scale)

PLAN VIEW



SECTION A-A

B 10
D 1
W 5
d 0.5

BASIN #	LOCATION (AT OUTLET)
1	-L- 78+80 RT
2	-L- 80+50 RT
3	-Y1- 15+80 LT
4	
5	
6	
7	

SEE SHEET 17 FOR -L- PROFILE

REVISIONS

ARCADIS GM
DESIGNED: TB
DRAWN BY: TB
CHECKED BY: EEE
Times STAGE

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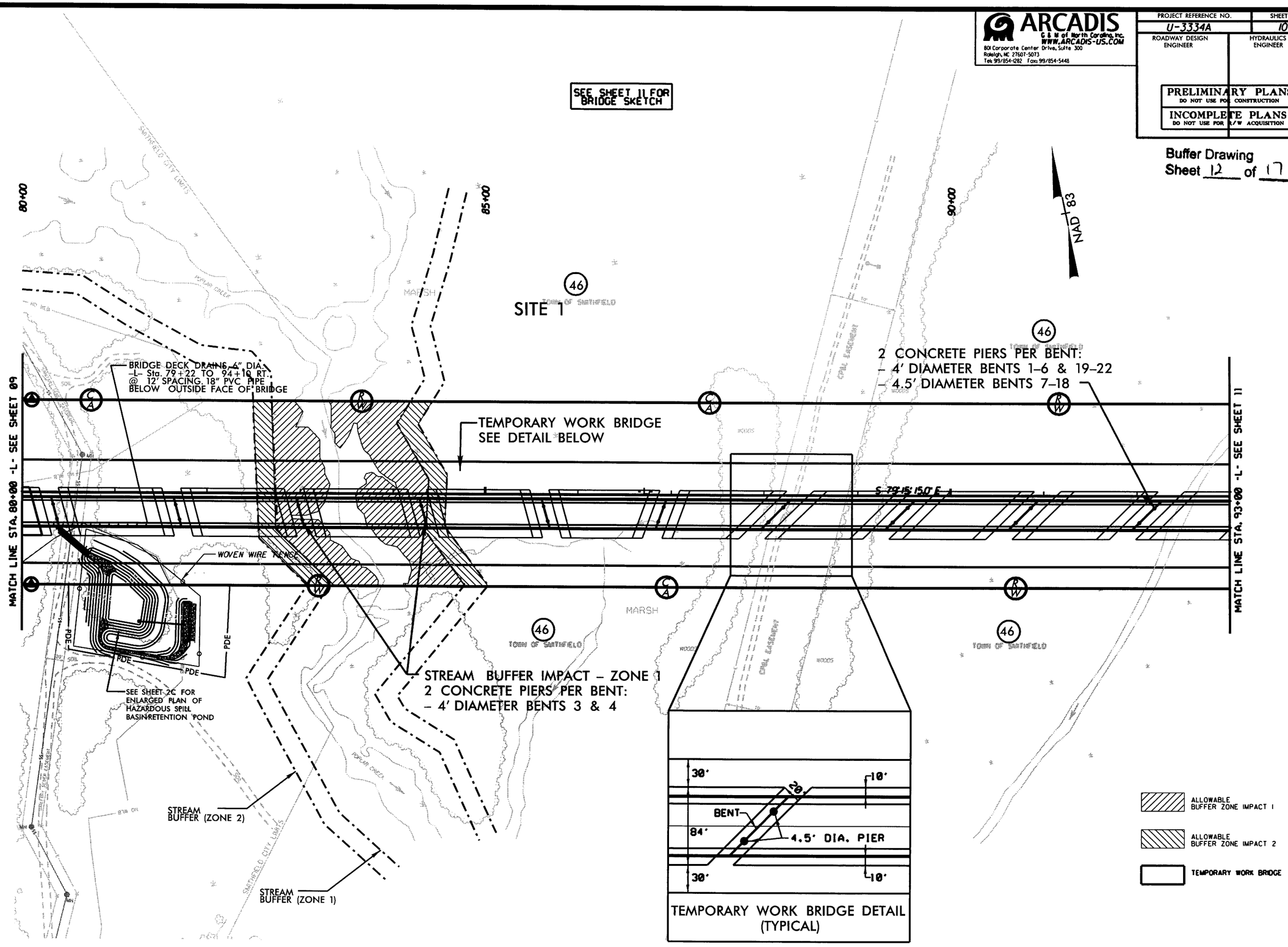
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 12 of 17



SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

ARCADIS G&M
DGN: U3334_BUFFER.DGN
Times STAGE

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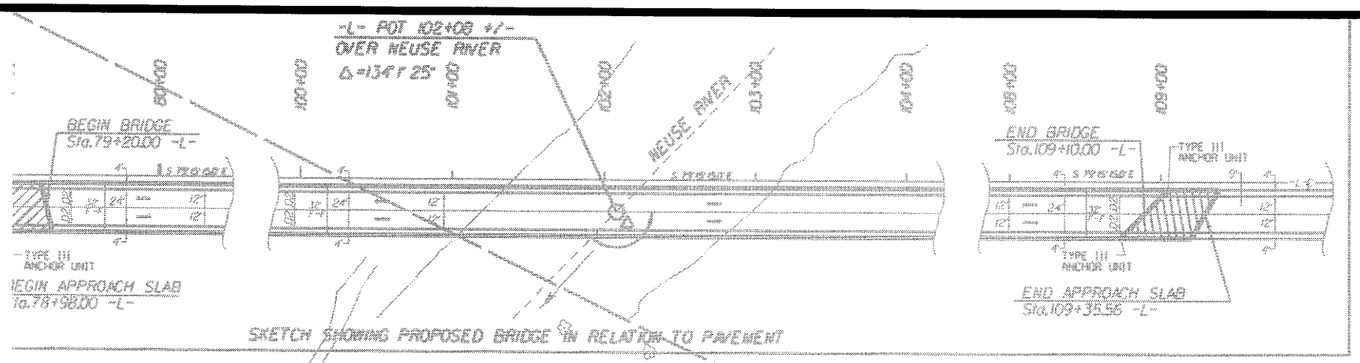
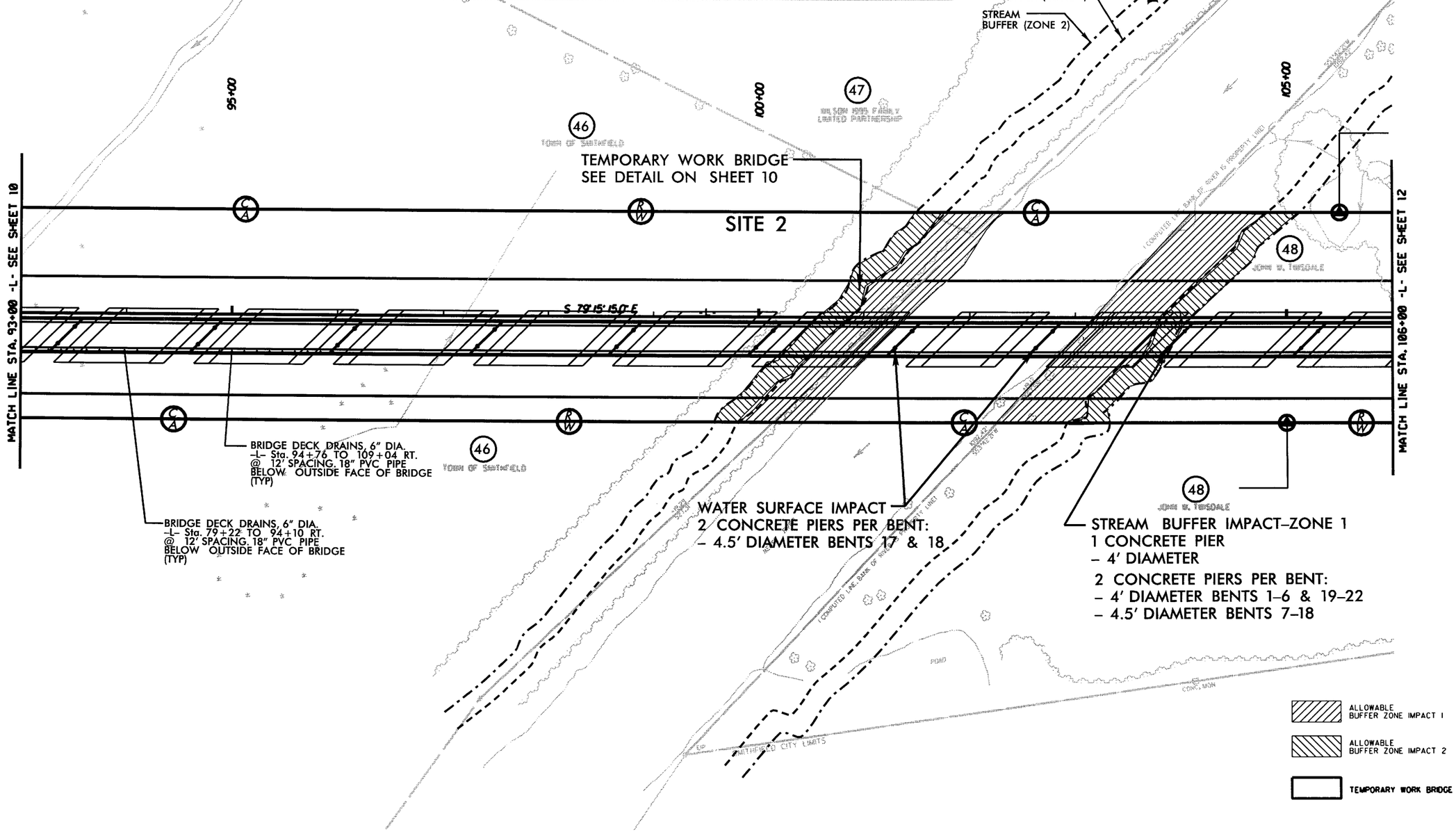
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 13 of 17





SEE SHEETS 17 AND 18 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
Date: 8/31/06 Time: 8:14AM
Filename: U3334A_B11.dgn

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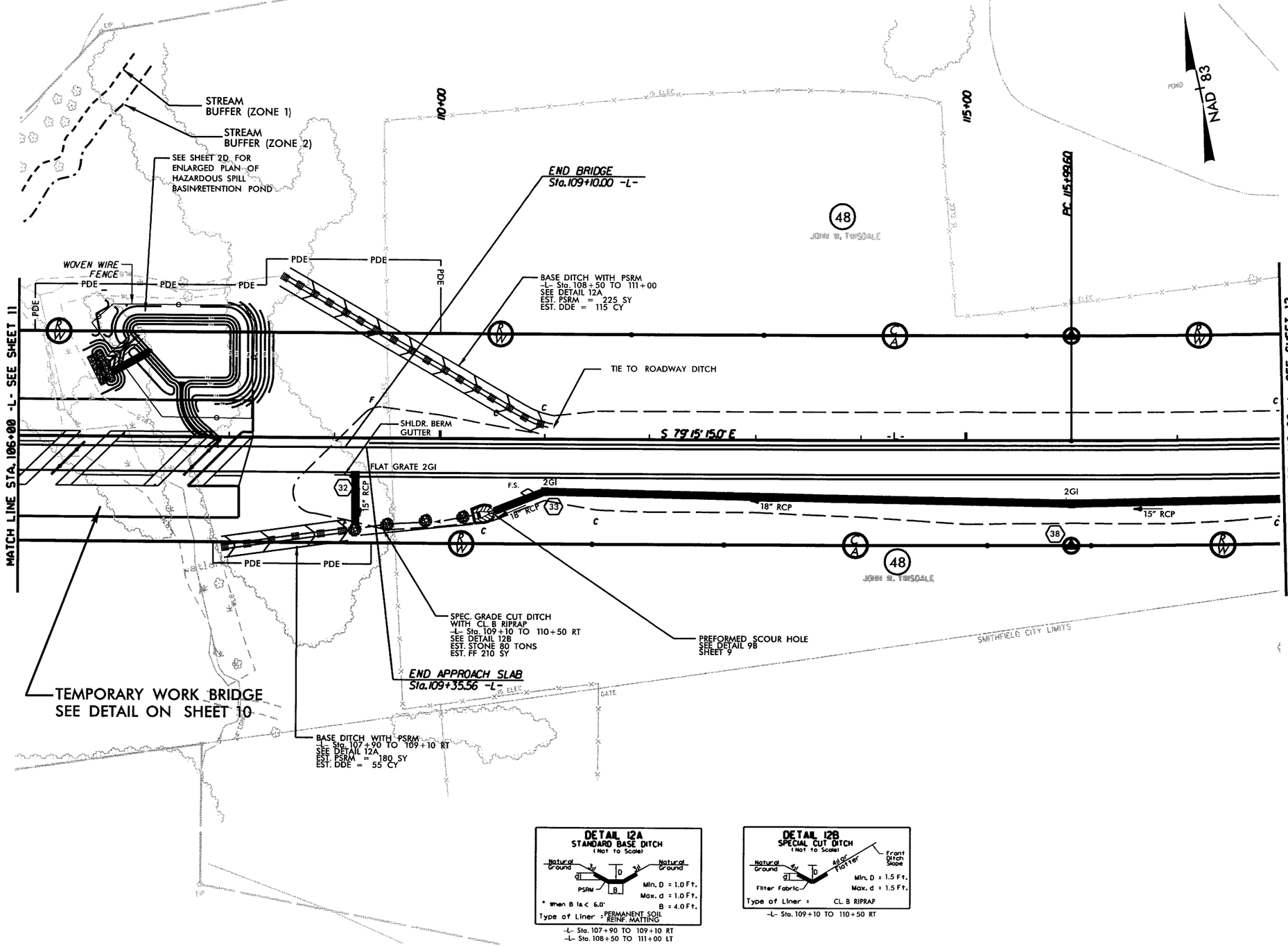
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 14 of 17



DETAIL 12A
STANDARD BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 4.0 Ft.
* When B is < 6.0'
Type of Liner = PERMANENT SOIL REINF. MATTING

-L- Sta. 107+90 TO 109+10 RT
-L- Sta. 108+50 TO 111+00 LT

DETAIL 12B
SPECIAL CUT DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Type of Liner = CL. B RIPRAP

-L- Sta. 109+10 TO 110+50 RT

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

ARCADIS G&M
Date=DATE4
Filename=SHEET
Times STMES

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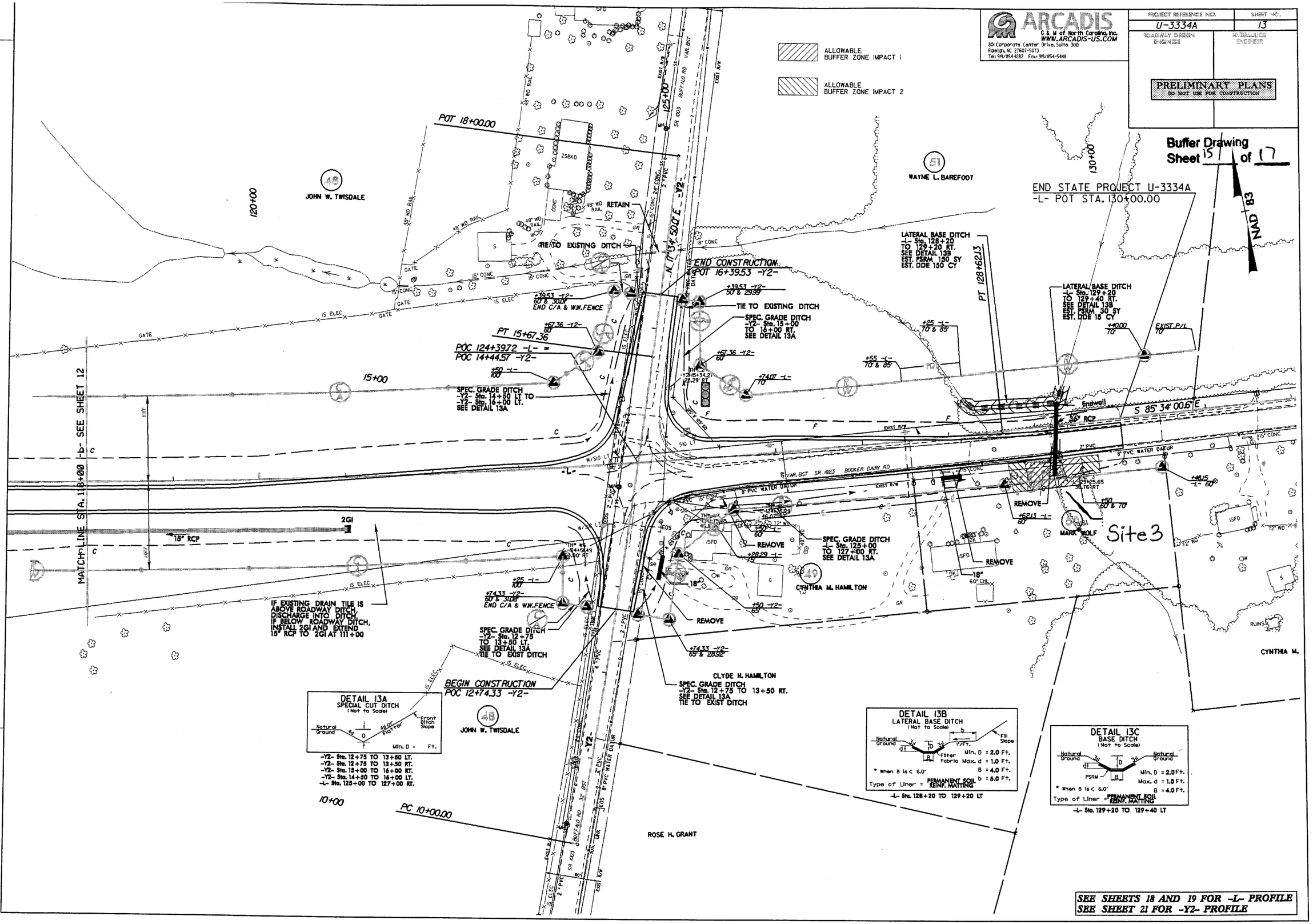
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Buffer Drawing
Sheet 15 of 17



SEE SHEETS 18 AND 19 FOR -L- PROFILE
SEE SHEET 21 FOR -Y2- PROFILE

REVISIONS

ARCADIS G&M
Date: 9/01/2011 Time: 9:17AM
File: Name: W:\PLES

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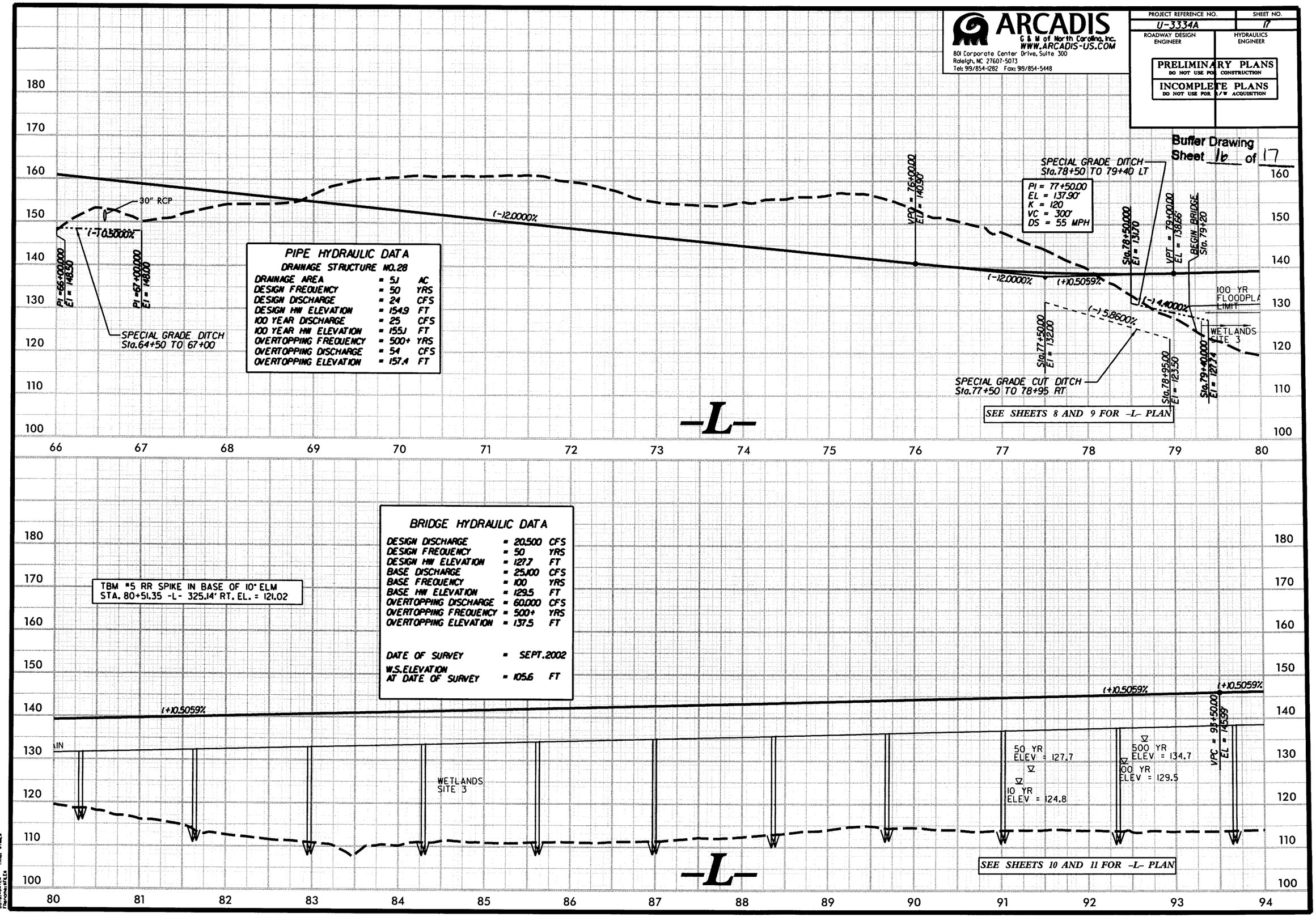
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 16 of 17



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.28

DRAINAGE AREA	= 51	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 24	CFS
DESIGN HW ELEVATION	= 154.9	FT
100 YEAR DISCHARGE	= 25	CFS
100 YEAR HW ELEVATION	= 155.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 54	CFS
OVERTOPPING ELEVATION	= 157.4	FT

TBM #5 RR SPIKE IN BASE OF 10" ELM
STA. 80+51.35 -L- 325.14' RT. EL. = 121.02

BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 20,500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 127.7	FT
BASE DISCHARGE	= 25,100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 129.5	FT
OVERTOPPING DISCHARGE	= 60,000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 137.5	FT
DATE OF SURVEY	= SEPT.2002	
W.S.ELEVATION AT DATE OF SURVEY	= 105.6	FT

ARCADIS G&M
Date:%DATE%
Filename:%FILE%
Time: %TIME%

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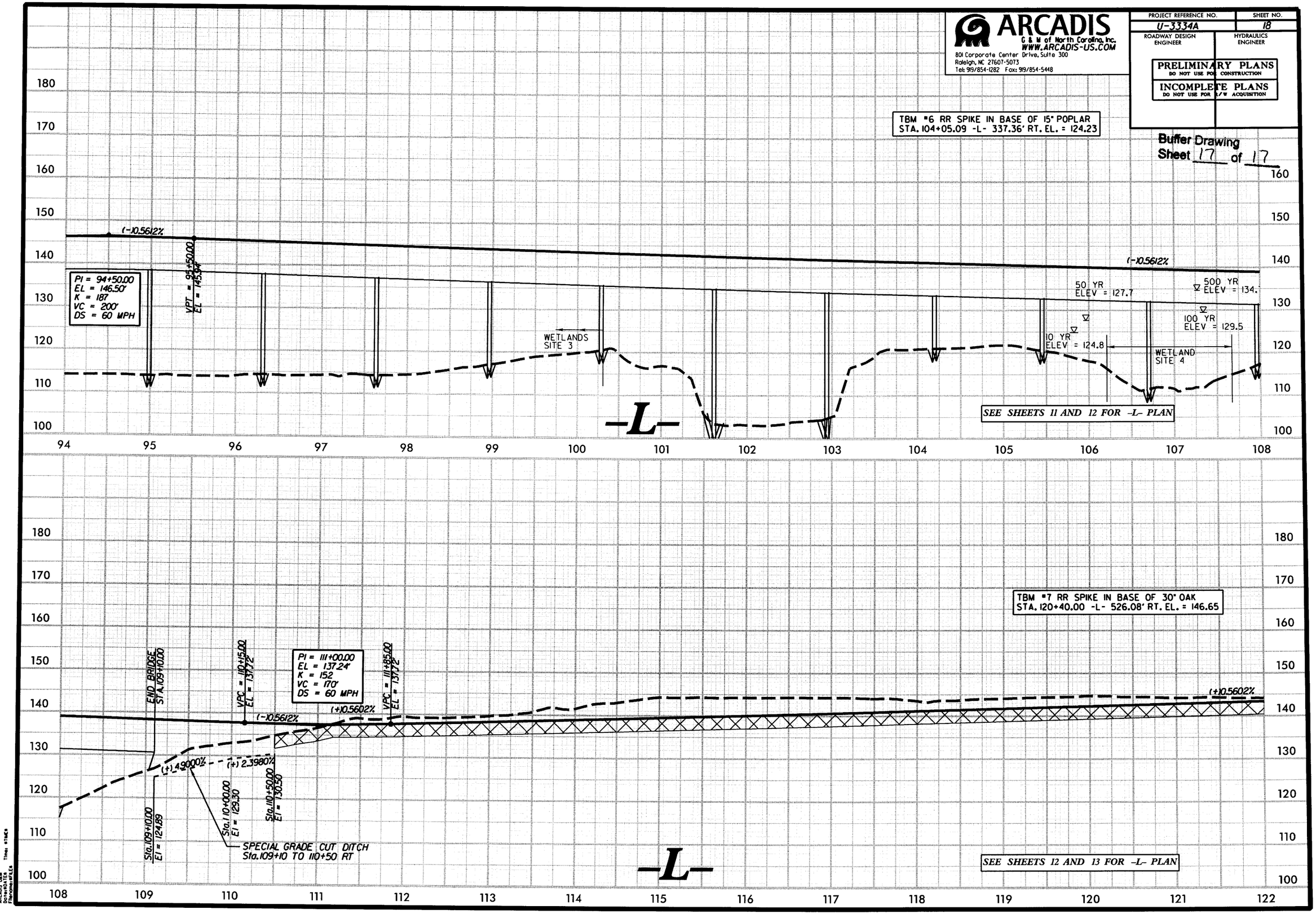
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

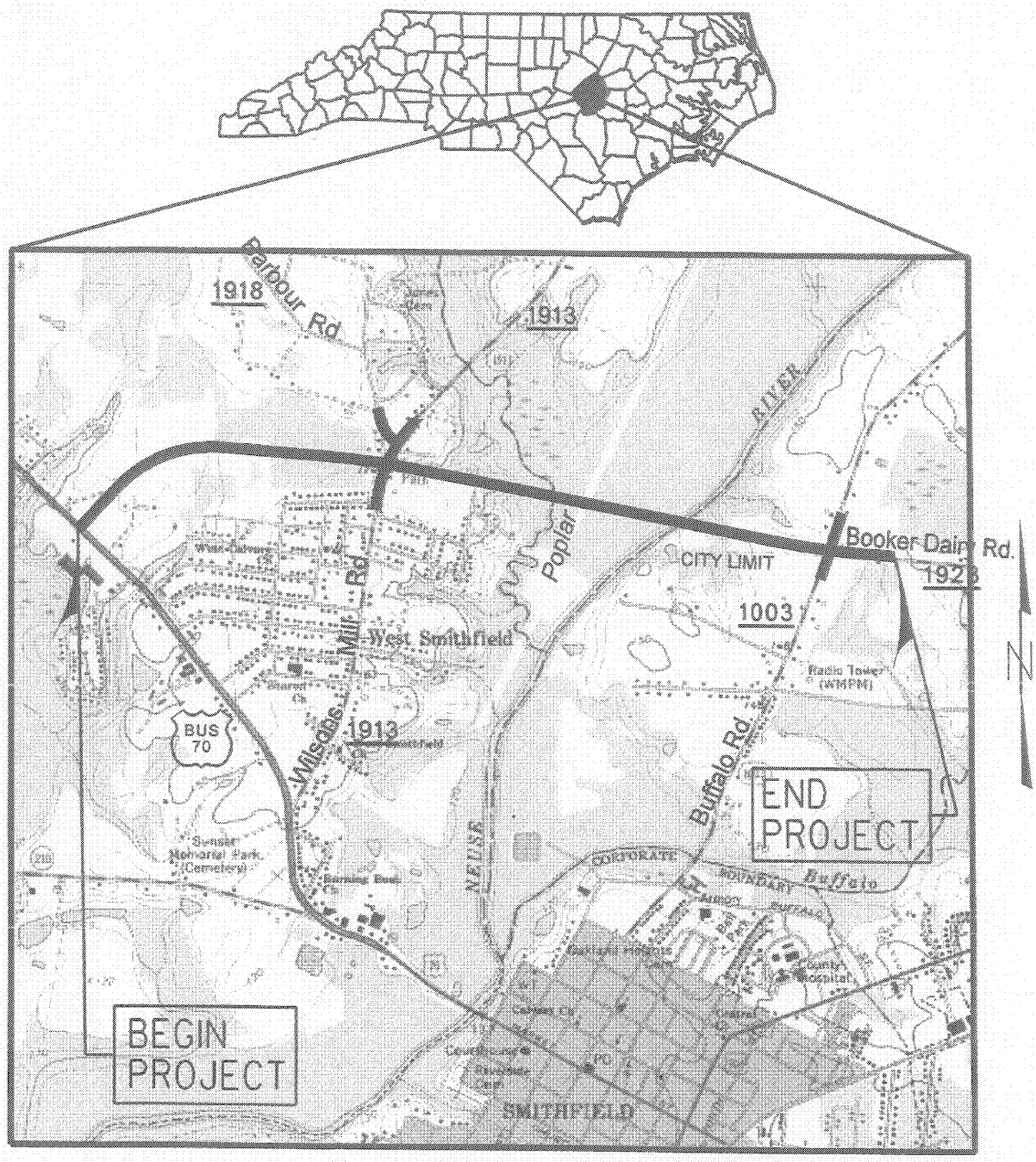
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION
INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

Buffer Drawing
Sheet 17 of 17



ARCADIS G&M
DATE: 10/10/06
DRAWN BY: R.E.S.
CHECKED BY: R.E.S.
Time: 9TMC6

VICINITY MAP



N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
JOHNSTON COUNTY

PROJECT: 8.2312101 (U-3334A)

SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

Permit Drawing
Sheet 1 of 26

SHEET 1 OF 15 12/19/07

PROPERTY OWNER

NAME AND ADDRESS

OWNER'S NAME	ADDRESS
ROSS W. LAMPE	P.O. BOX 150 SMITHFIELD, NC 27577
NEUSE FORESTRY, LLC	PO BOX 1492 SMITHFIELD, NC 27577
WILLIAM W. SMITH, JR. ET AL	606 BROOKWOOD LAND GOLDSBORO, NC 27534
JANICE REYNOLDS	117-32-142 PLACE JAMAICA, NY 11436
NC DEPT OF TRANSPORTATION	2415 BEDGOOD DRIVE WILSON, NC 27893
IRENE STEVENS, ET AL	690 W. MARKET STREET SMITHFIELD, NC 27577
LEO A SANDERS	101A BARBOUR ROAD SMITHFIELD, NC 27577
JAMES C. WILLIAMS	3713 PINELEA ROAD PIKESVILLE, MD 21208
DIANE B. SLOOP	1010 WILSONS MILLS ROAD SMITHFIELD, NC 27577
JERRY HANSLEY, JR.	176 LAKE VIEW HILLS FOUR OAKS, NC 27524
TOWN OF SMITHFIELD	PO BOX 461 SMITHFIELD, NC 27577
WILSON 1995 FAMILY LIMITED PARTNERSHIP	101E JOHNSTON STREET SMITHFIELD NC 27577
JOHN W. TWISDALE	1755 BUFFALO ROAD SMITHFILED, NC 27577
WAYNE L. BAREFOOT	258 MEADOWBROOK DRIVE FOUR OAKS, NC 27524

Permit Drawing
Sheet 2 of 26

N. C. DEPT. OF TRANSPORTATION
DIVISION OF HIGHWAYS
JOHNSTON COUNTY

PROJECT: 8.2312101 (U-3334A)

SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

SHEET 3 OF 15 12/19/07

WETLAND PERMIT IMPACT SUMMARY

			WETLAND IMPACTS					SURFACE WATER IMPACTS				
Site No.	Station (From/To)	Structure Size / Type	Permanent Fill In Wetlands (ac)	Temp. Fill In Wetlands (ac)	Excavation in Wetlands (ac)	Mechanized Clearing in Wetlands (ac)	Hand Clearing in Wetlands (ac)	Permanent SW impacts (ac)	Temp. SW impacts (ac)	Existing Channel Impacts Permanent (ft)	Existing Channel Impacts Temp. (ft)	Natural Stream Design (ft)
1	-L- 35+20 to 57+20	1@ 24", 1@36" and 1@42" RCP	1.91				0.59					
2	-L- 65+75 to 68+00	30" RCP	0.05				0.01					
3	-L- 79+40 to 102+00	Bridge	<0.01		0.02	0.31	6.15	<0.01				
4	-L- 107+00	Bridge				0.03	0.30					
5	-L- 128+20	36" RCP						<0.01		69		
TOTALS:			1.96		0.02	0.34	7.05	<0.01		69		

Permit Drawing
Sheet 3 of 26

Notes:

Pier impacts to the Neuse River = 4 drilled shafts at 4.5' diameter each = 64 sf or 0.001 ac or < 0.01 ac or 18 LF.

0.20 acre of Temporary Fill in Wetlands in the Hand Clearing areas for erosion control measures.

NC DEPARTMENT OF TRANSPORTATION
DIVISION OF HIGHWAYS

JOHNSTONCOUNTY
PROJECT: 8.2312101 (U-3334A)

SHEET REVISED 07/09/08

ATN Revised 3/31/05

TIP: U-3334A

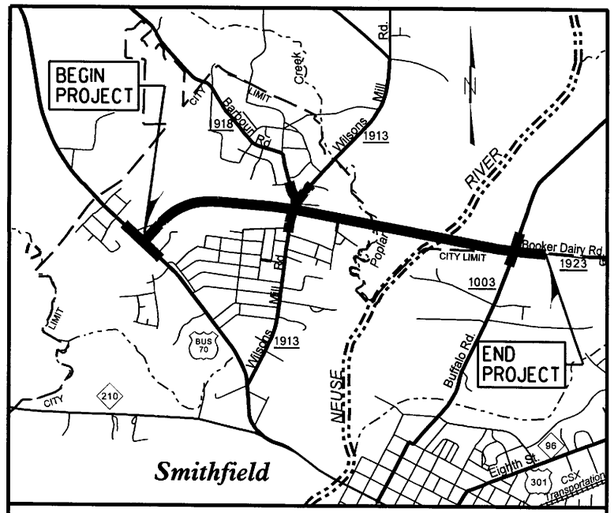
CONTRACT:

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3334A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34929.1.1	STP-1923(2)	P.E.
34929.2.4	STP-1923(3)	ROW, UTIL.
		CONSTR.

Permit Drawing
Sheet 4 of 26

See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

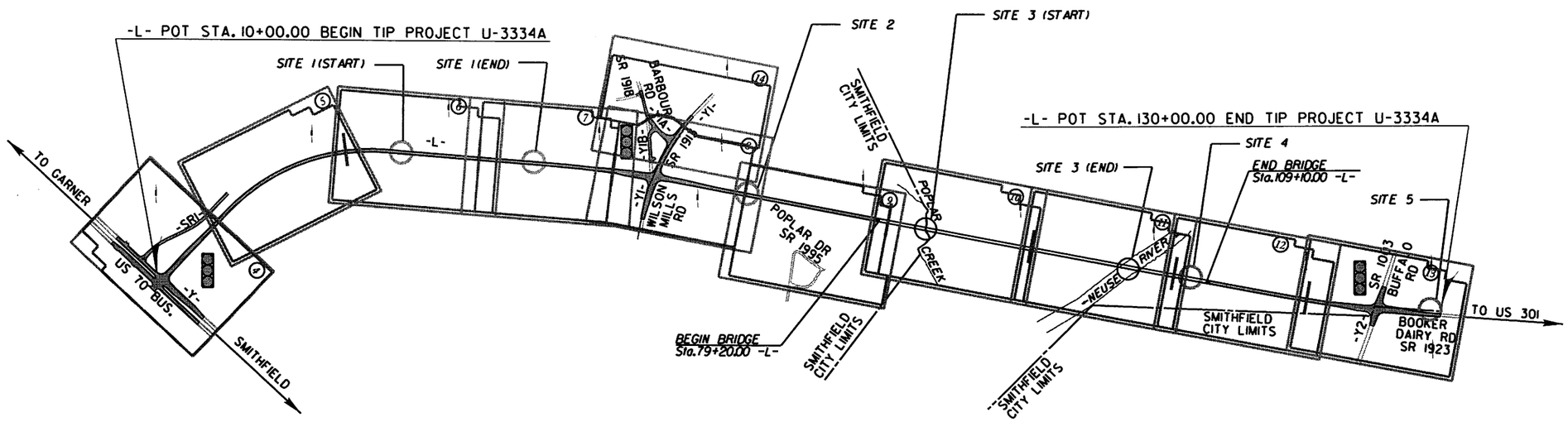
JOHNSTON COUNTY

LOCATION: SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, AND SIGNALS

U-3334A: WETLAND SITE MAP

NAD '83'



NCDOT CONTACT
TERESA BRUTON, P.E.
ROADWAY DESIGN-ENGINEERING COORDINATION

THIS IS A FULL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

INCOMPLETE PLANS
DO NOT USE FOR R/W ACQUISITION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2005 = 6,000
ADT 2025 = 9,500
DHV = 10 %
D = 55 %
* T = 10 %
V = 50 MPH

*(TTST 4 % + DUAL 6 %)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-3334A =	1.707 miles
LENGTH OF STRUCTURE TIP PROJECT U-3334A =	0.566 miles
TOTAL LENGTH TIP PROJECT U-3334A =	2.273 miles

Prepared In The Office of:
ARCADIS
C I S of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448
for the North Carolina Department of Transportation

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 13, 2003

LETTING DATE:
SEPTEMBER 20, 2005

ARCADIS CONTACT
STEVE SMALLWOOD, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION

APPROVED
DIVISION ADMINISTRATOR DATE

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

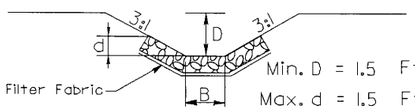
Permit Drawing
Sheet 5 of 26

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

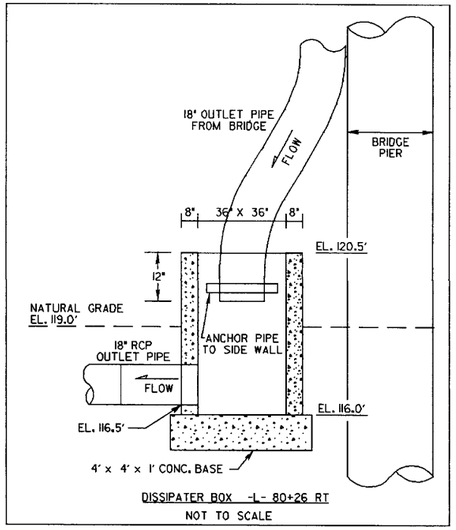
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

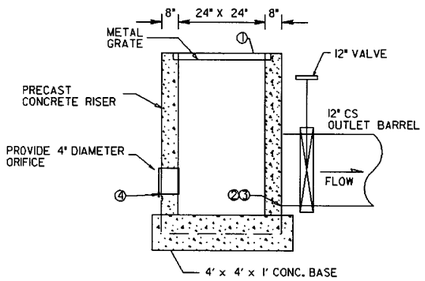


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

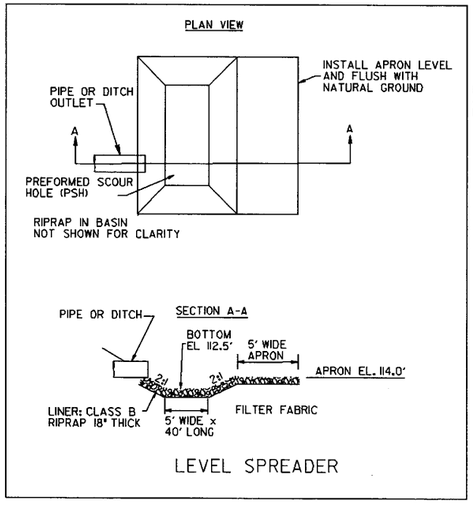


DISSIPATER BOX -L- 80+26 RT
NOT TO SCALE

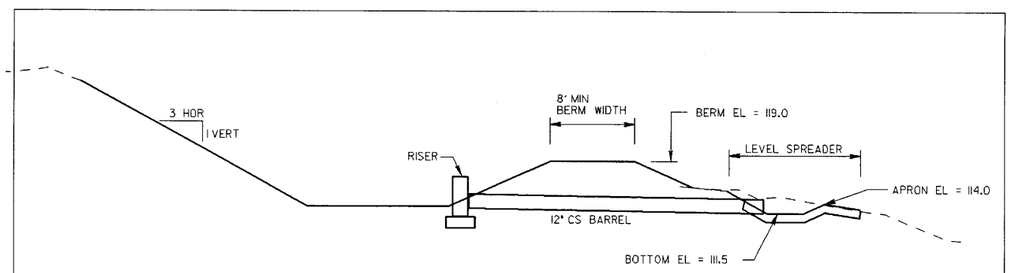


DESCRIPTION	ELEVATION
① TOP	117.0
② BOTTOM OF RISER EL.	112.0
③ OUTLET PIPE INVERT & DIAMETER	112.0
④ ORIFICE INVERT & DIAMETER	113.5 4"

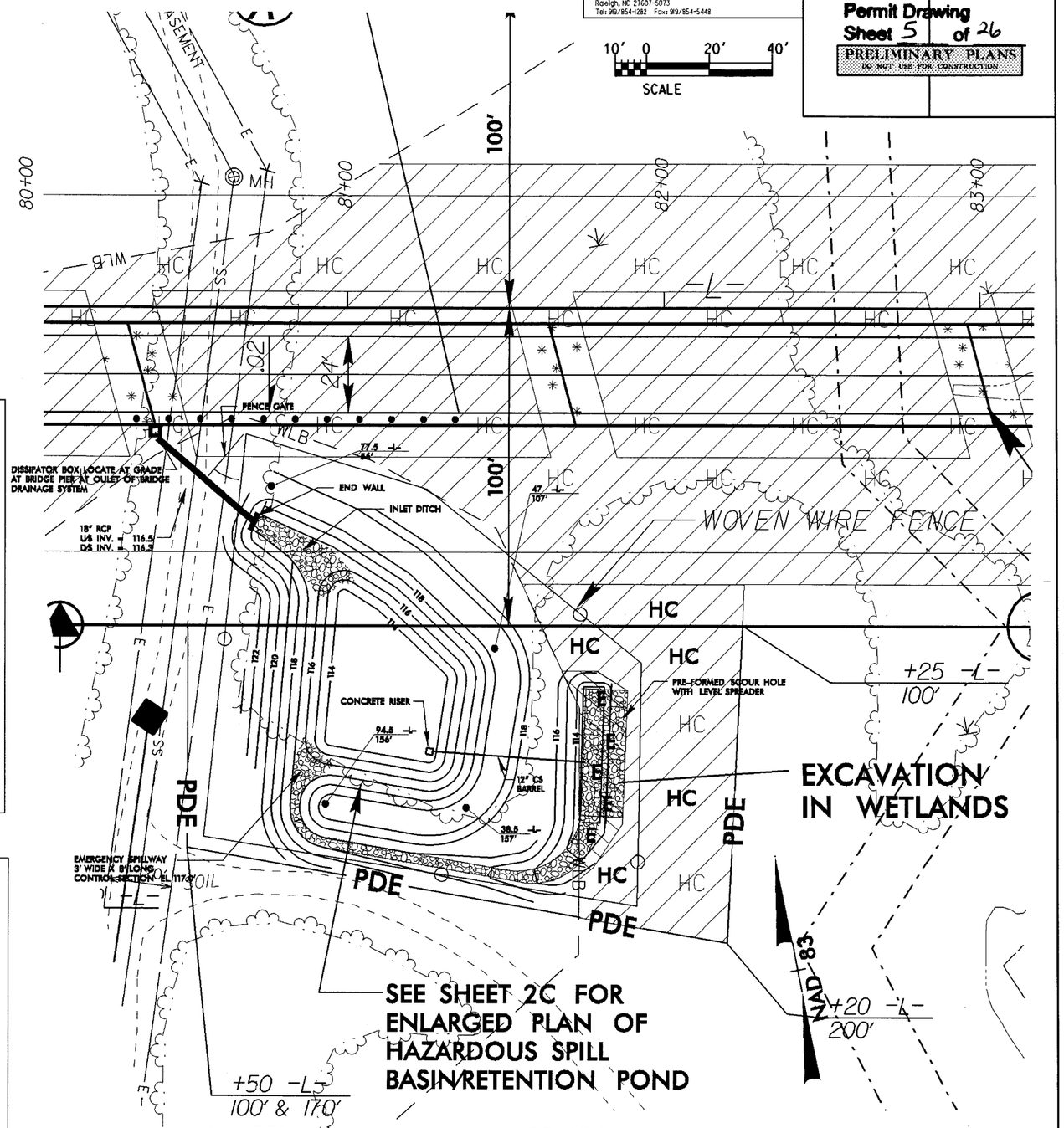
RISER DETAIL -L- 81+26 RT
NOT TO SCALE



LEVEL SPREADER



BASIN DETENTION POND TYPICAL SECTION



HAZARDOUS SPILL BASIN / DETENTION POND

ARCADIS G&M
Date: 9/24/14 Time: 9:11AM
FileNames: HFLE4

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Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2C
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

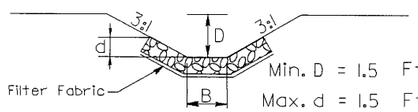
Permit Drawing
Sheet 6 of 26

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

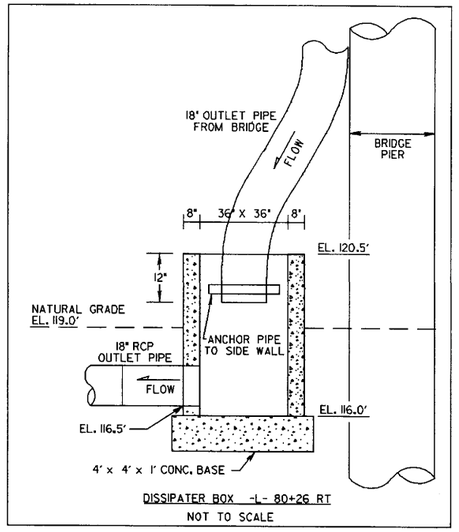
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

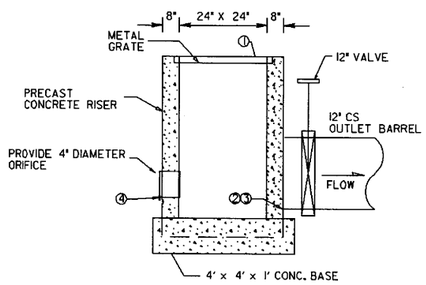


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

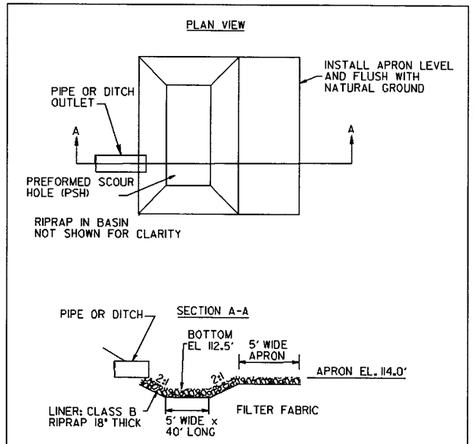


DISSIPATER BOX -L- 80+26 RT
NOT TO SCALE

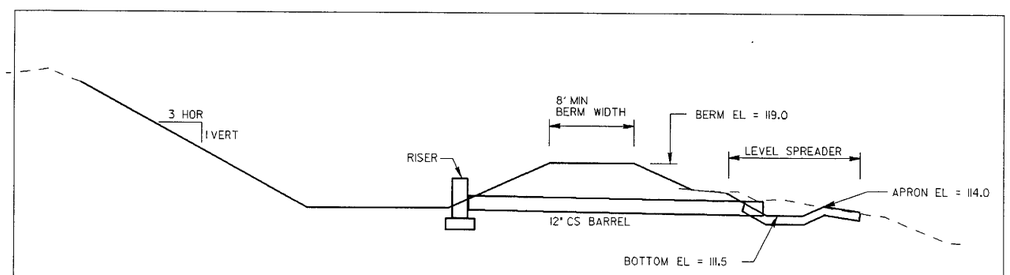


DESCRIPTION	ELEVATION
① TOP	117.0
② BOTTOM OF RISER EL.	112.0
③ OUTLET PIPE INVERT & DIAMETER	112.0
④ ORIFICE INVERT & DIAMETER	113.5 4"

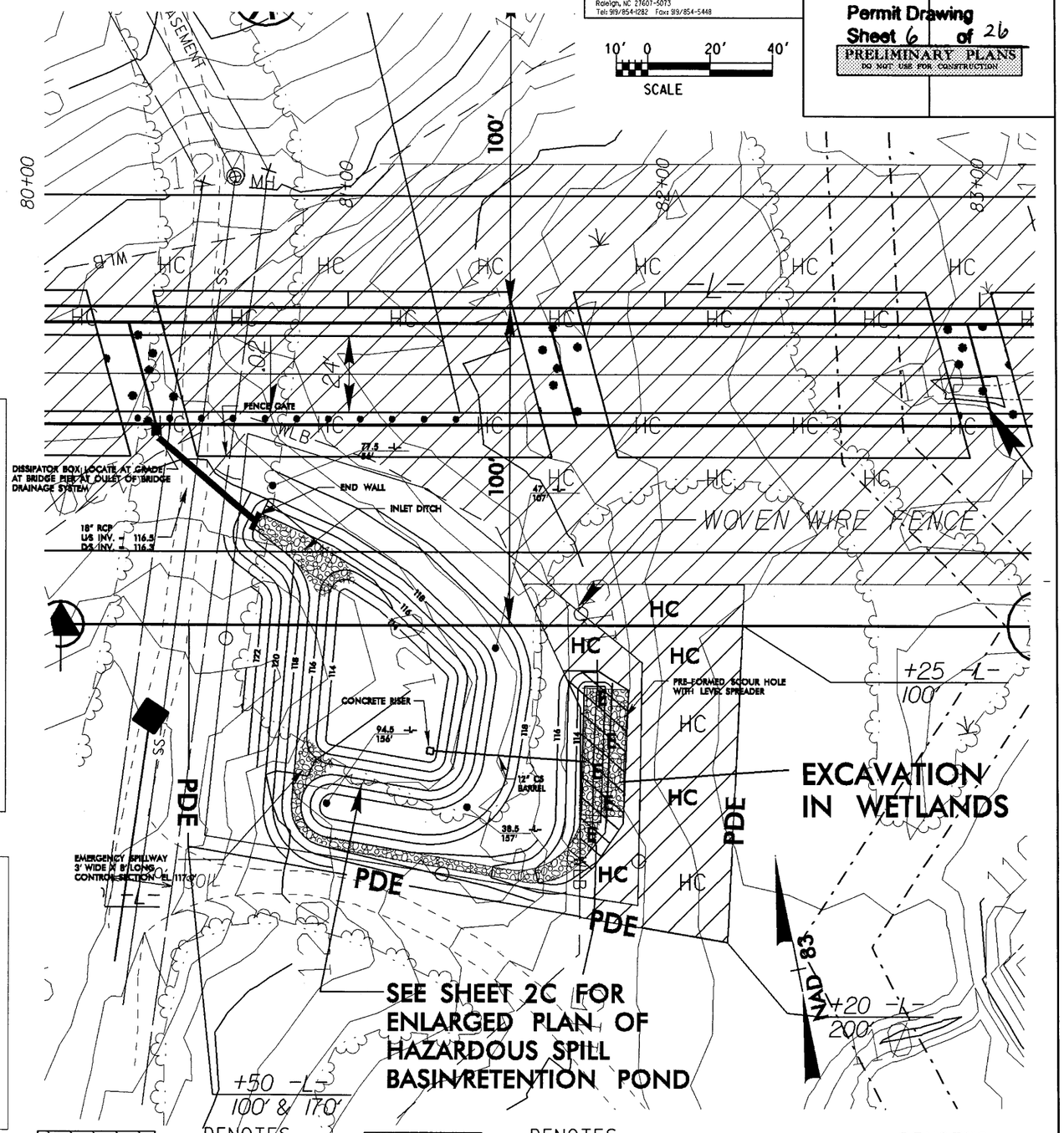
RISER DETAIL -L- 81+26 RT
NOT TO SCALE



LEVEL SPREADER



BASIN DETENTION POND TYPICAL SECTION



DENOTES EXCAVATION IN WETLANDS

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

HAZARDOUS SPILL BASIN / DETENTION POND

ACCUDAT: CEM
DATE: 4/10/2018
Filename: #FILE#
Time: #TIME#

ARCADIS
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801 Corporate Center Drive, Suite 300
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Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

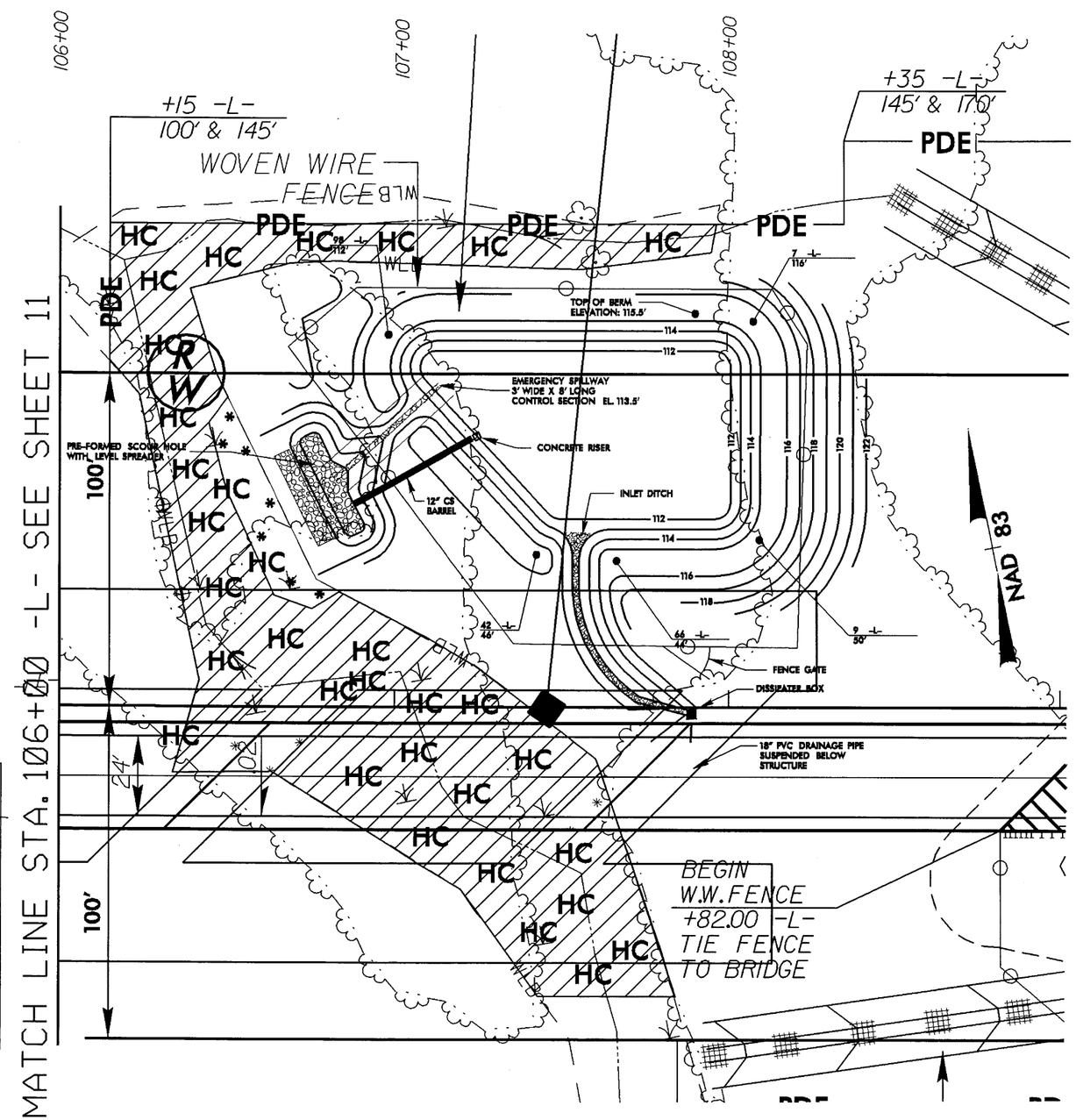
Permit Drawing
Sheet 7 of 26

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

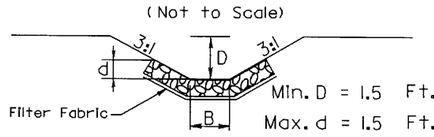
10' 0 20' 40'
SCALE

HAZARDOUS SPILL BASIN / DETENTION POND



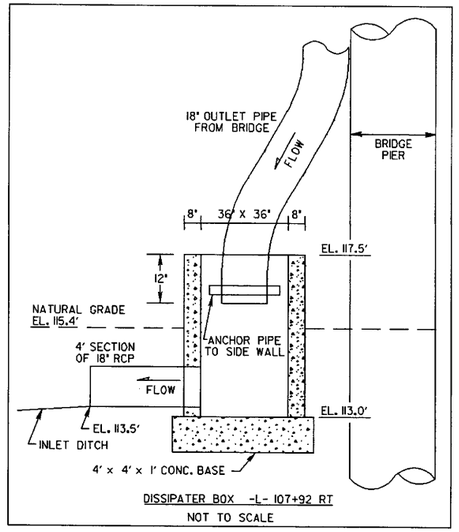
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

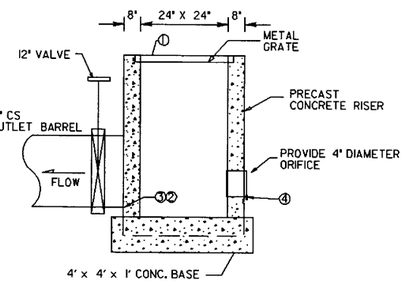


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

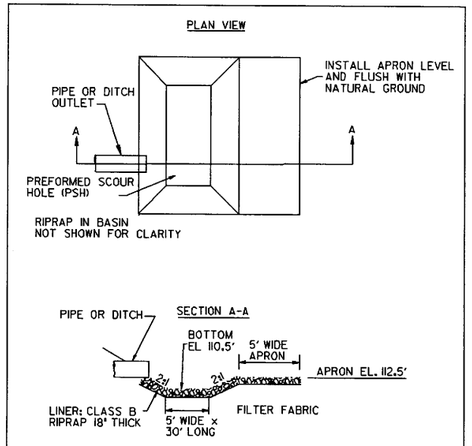


DISSIPATER BOX -L- 107+92 RT
NOT TO SCALE

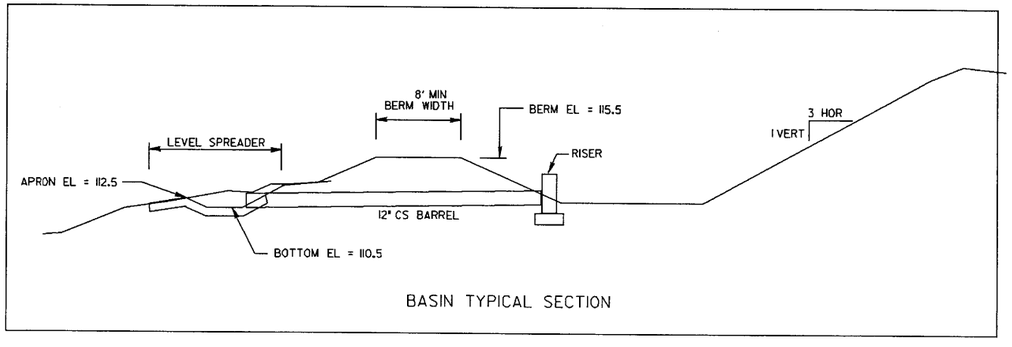


DESCRIPTION	ELEVATION
① TOP	113.5
② BOTTOM OF RISER EL.	111.0
③ OUTLET PIPE INVERT & DIAMETER	111.0
④ ORIFICE INVERT & DIAMETER	111.5 4'

RISER DETAIL -L- 107+25 LT
NOT TO SCALE



LEVEL SPREADER



BASIN TYPICAL SECTION

REVISIONS

ARCADIS G&M
Date: DATE
File: Jobno.DWG
Time: TIME

ARCADIS
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WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

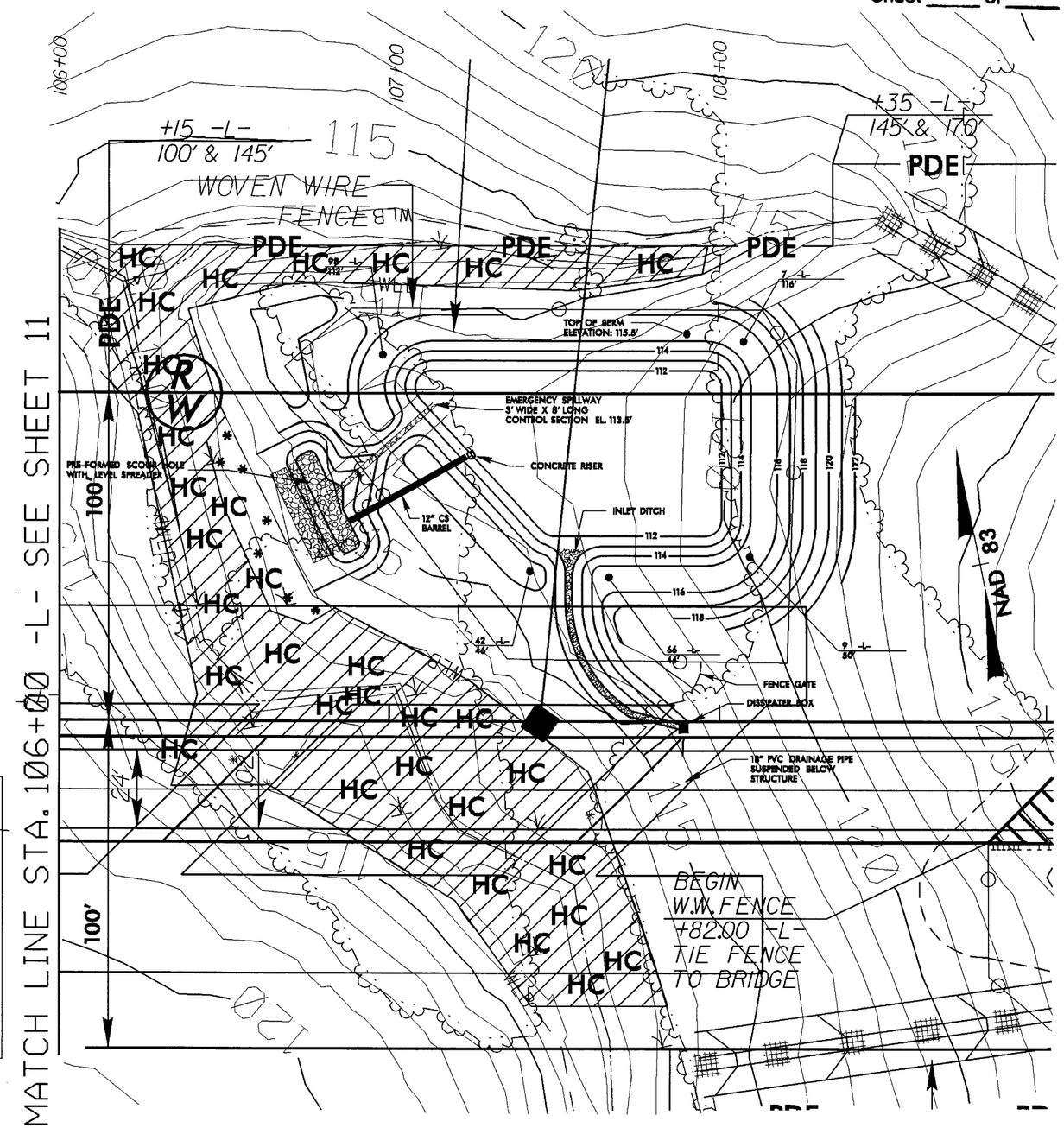
Permit Drawing
Sheet 8 of 26

DENOTES MECHANIZED CLEARING

DENOTES HAND CLEARING

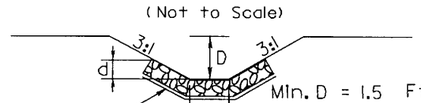
10' 0 20' 40'
SCALE

HAZARDOUS SPILL BASIN / DETENTION POND



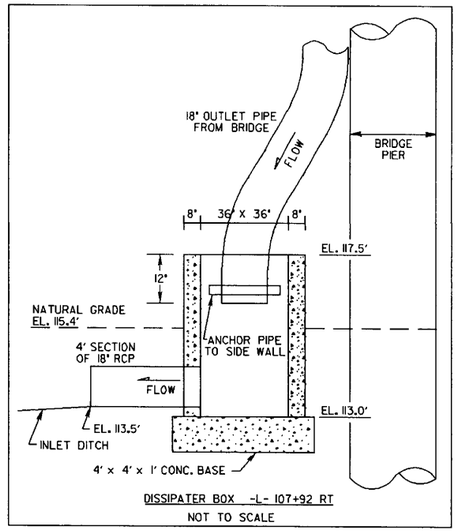
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

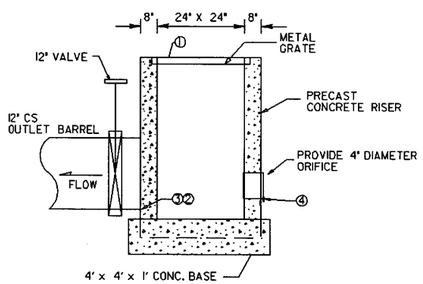


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

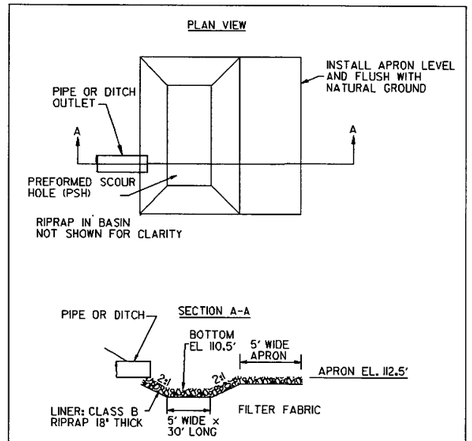


DISSIPATER BOX -L- 107+92 RT
NOT TO SCALE

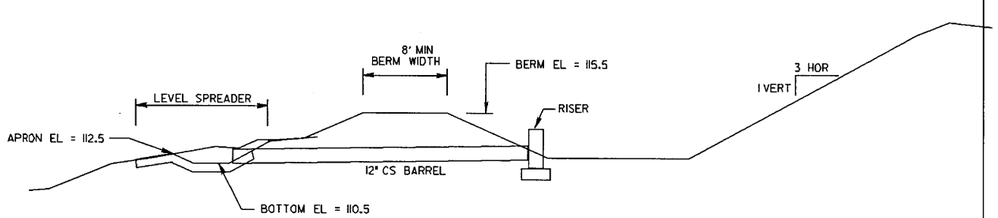


DESCRIPTION	ELEVATION
① TOP	113.5
② BOTTOM OF RISER EL.	111.0
③ OUTLET PIPE INVERT & DIAMETER	111.0
④ ORIFICE INVERT & DIAMETER	111.5 4"

RISER DETAIL -L- 107+25 LT
NOT TO SCALE



LEVEL SPREADER



BASIN TYPICAL SECTION

REVISIONS

ARCADIS G&M
Date: 10/1/06
Time: 9:11AM
Filename: 8FE.Dg

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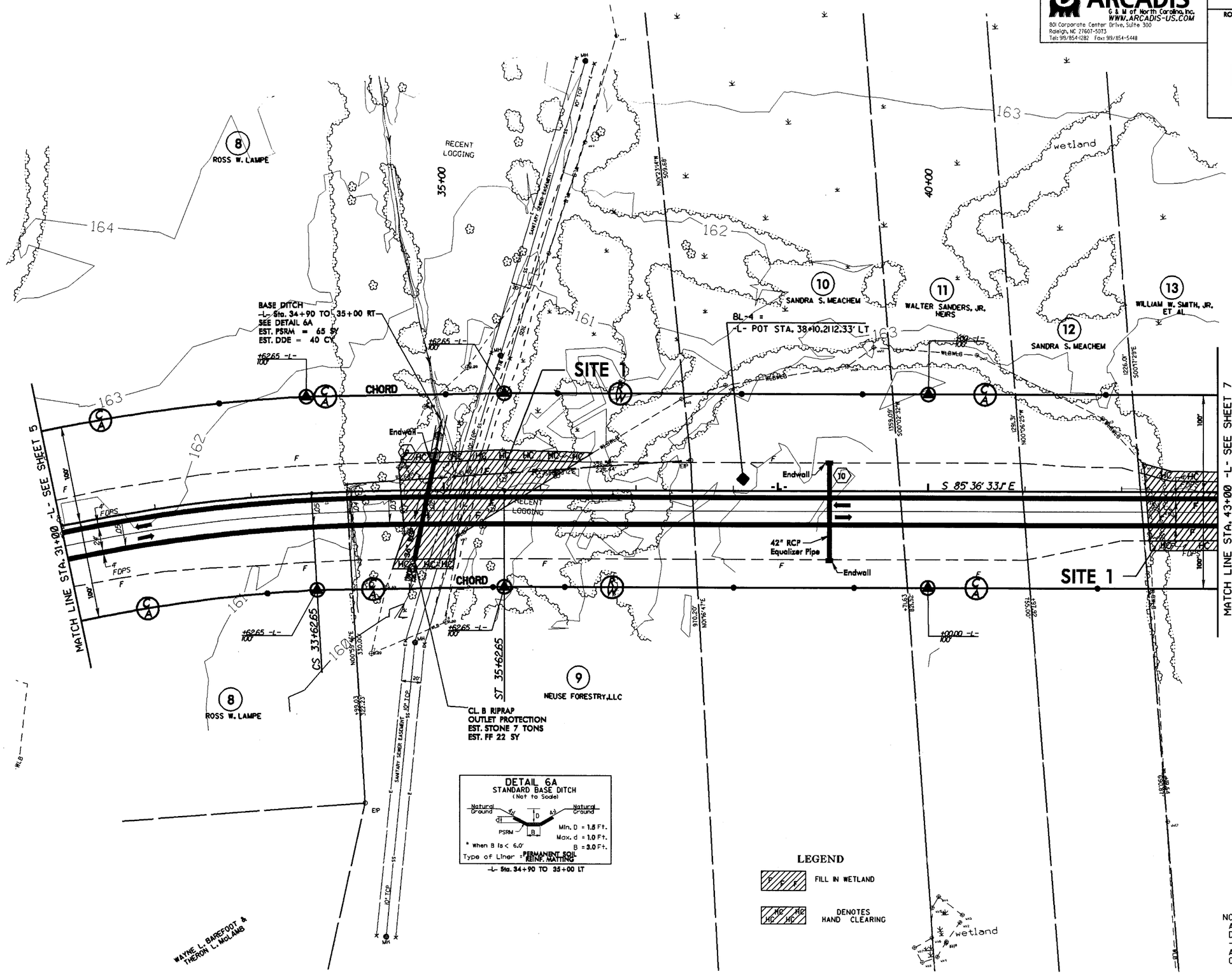
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 9 of 26



NOTE:
A FUTURE ACCESS POINT IS DESIGNATED AT LEFT AND RIGHT OF -L- Sta. 35+90 FOR PLACEMENT OF A ROAD AS DETERMINED BY THE CITY OF SMITHFIELD.

SEE SHEETS 15 AND 16 -L- PROFILE

REVISIONS

ARCADIS G&M
Date=10/1/08
Filename=#FILE#
Time= #TIME#

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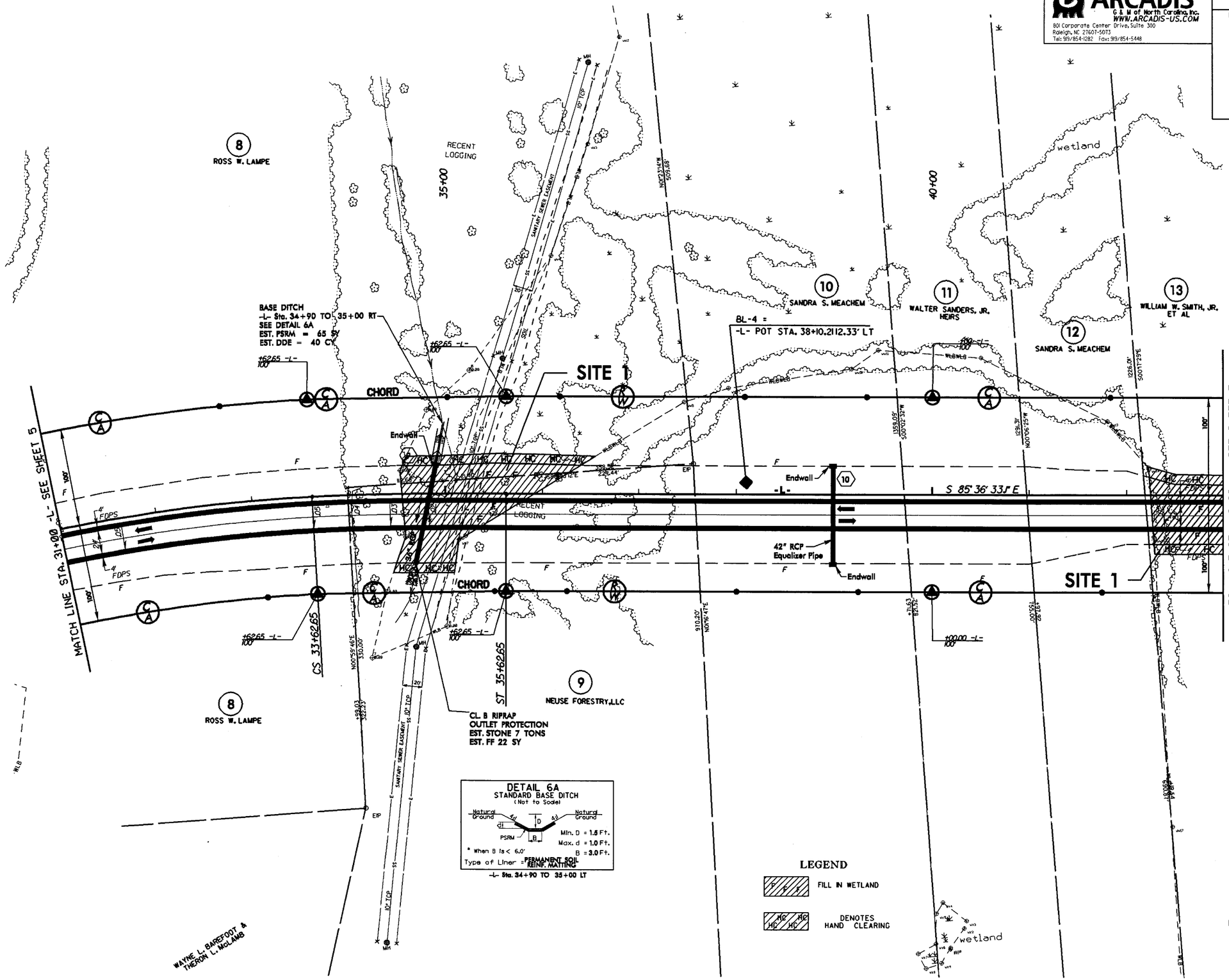
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 10 of 26



NOTE:
A FUTURE ACCESS POINT IS DESIGNATED AT LEFT AND RIGHT OF -L- Sta. 35+90 FOR PLACEMENT OF A ROAD AS DETERMINED BY THE CITY OF SMITHFIELD.

SEE SHEETS 15 AND 16 -L- PROFILE

REVISIONS

ARCADIS G&M
Date: 9/6/2016 Time: 9:TIME
Filename: FILE9

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G & M of North Carolina, Inc.
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801 Corporate Center Drive, Suite 300
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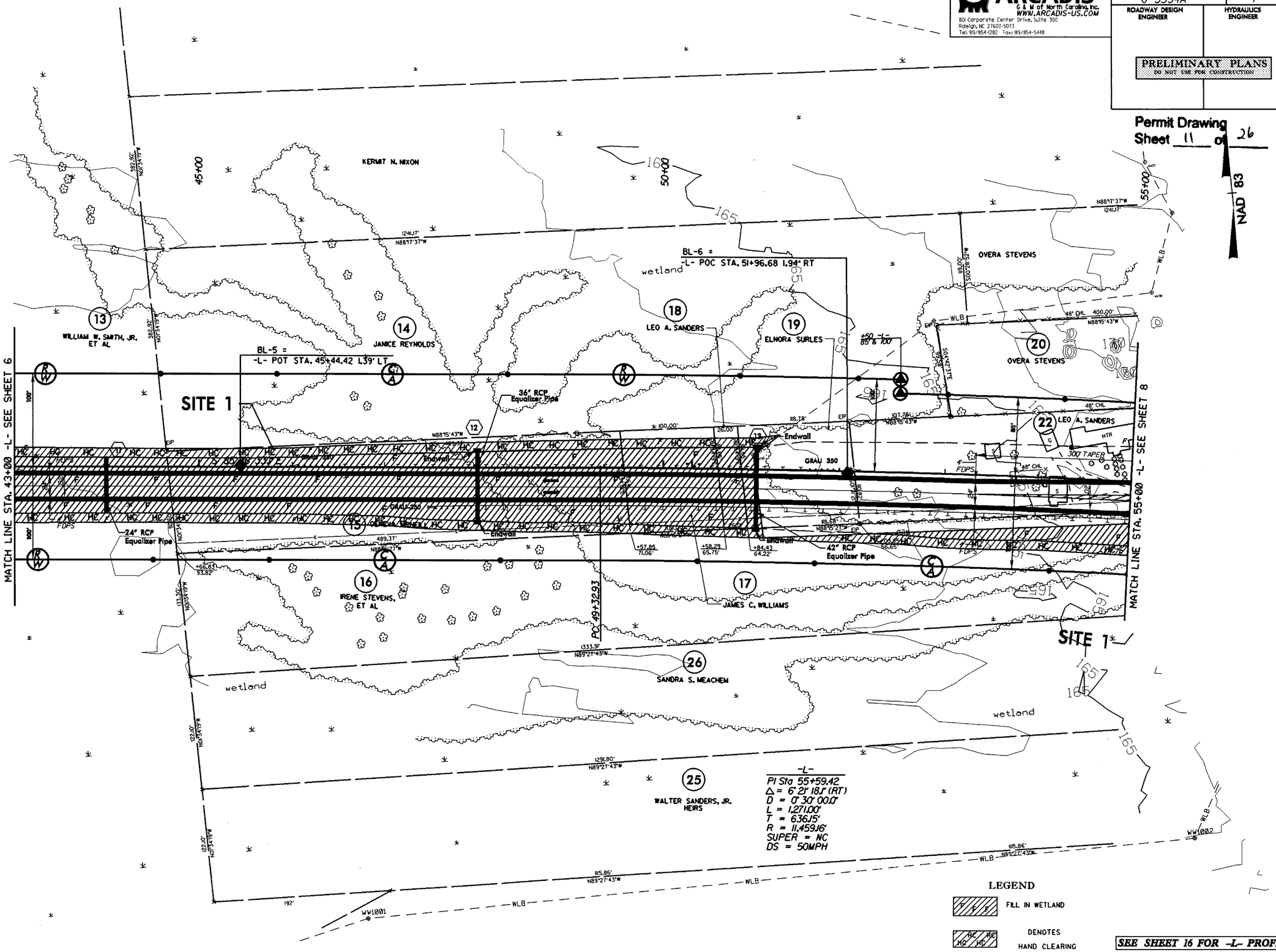
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 11 of 26

NAD 83



SEE SHEET 16 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
Date: 6/1/06
Filename: #FLE#
Time: #TIME#

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801 Corporate Center Drive, Suite 300
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Tel: 919/854-1282 Fax: 919/854-5448

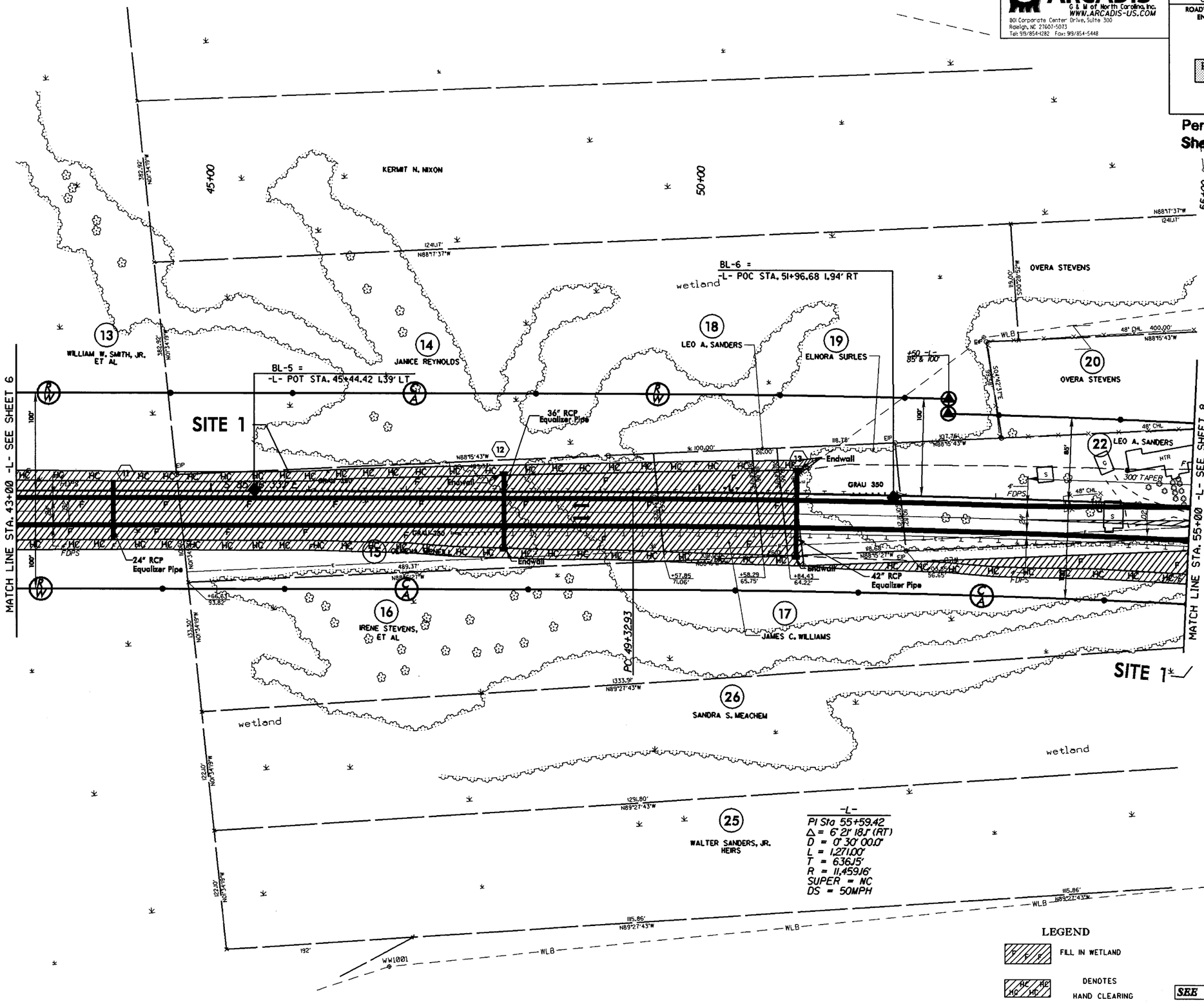
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 12 of 26

NAD 83

REVISIONS



SEE SHEET 16 FOR -L- PROFILE

ARCADIS G&M
DonnieROATES
FRenames#FLEs
Times: #TIME#

ARCADIS
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801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

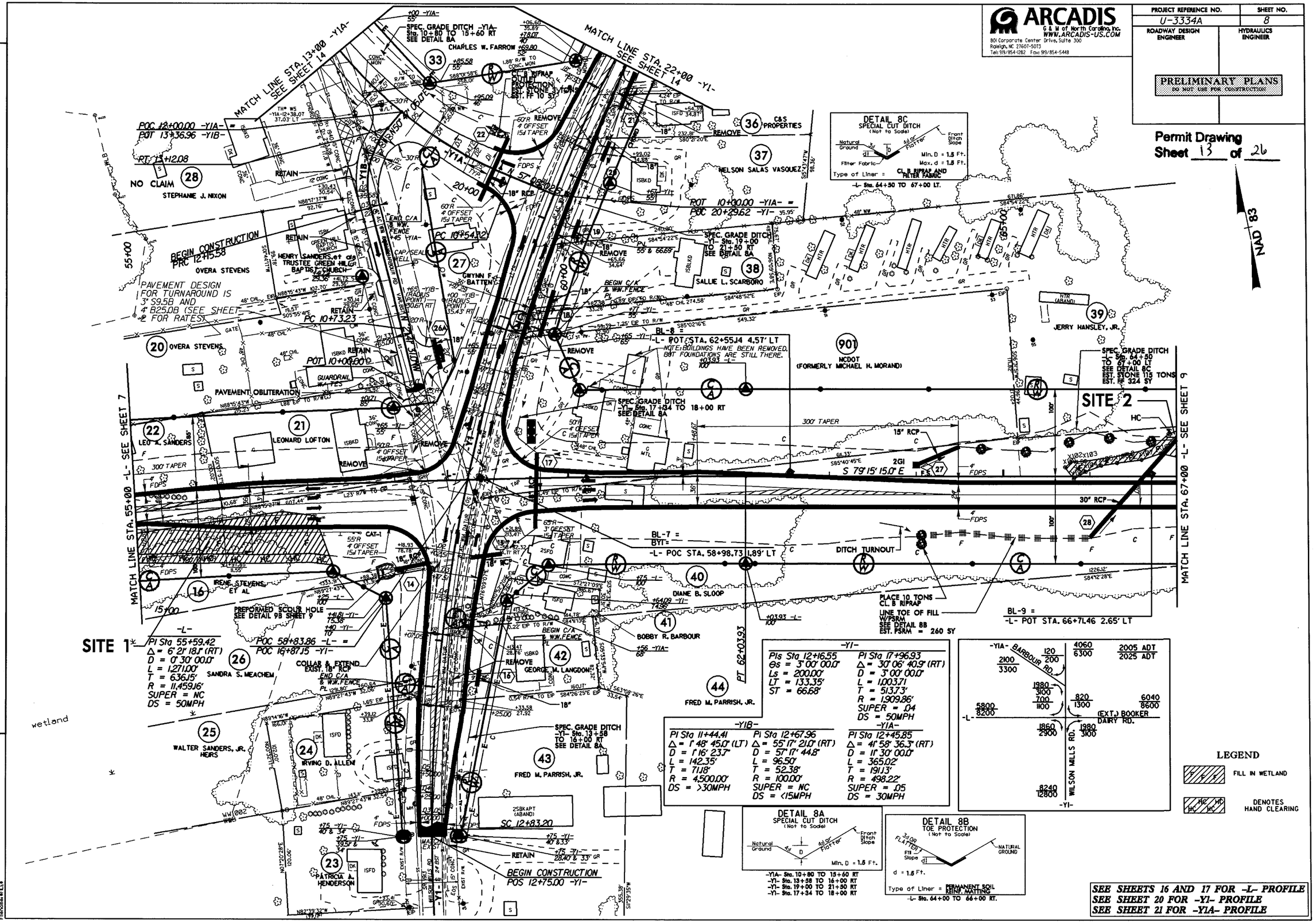
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 13 of 26

NAD 83

REVISIONS



SEE SHEETS 16 AND 17 FOR -L- PROFILE
SEE SHEET 20 FOR -Y1- PROFILE
SEE SHEET 21 FOR -Y1A- PROFILE

ARCADIS G&M
Date: 1/10/2008
Filename: 3334A_H_SE8
Time: 9:15:45

ARCADIS
G & M of North Carolina, Inc.
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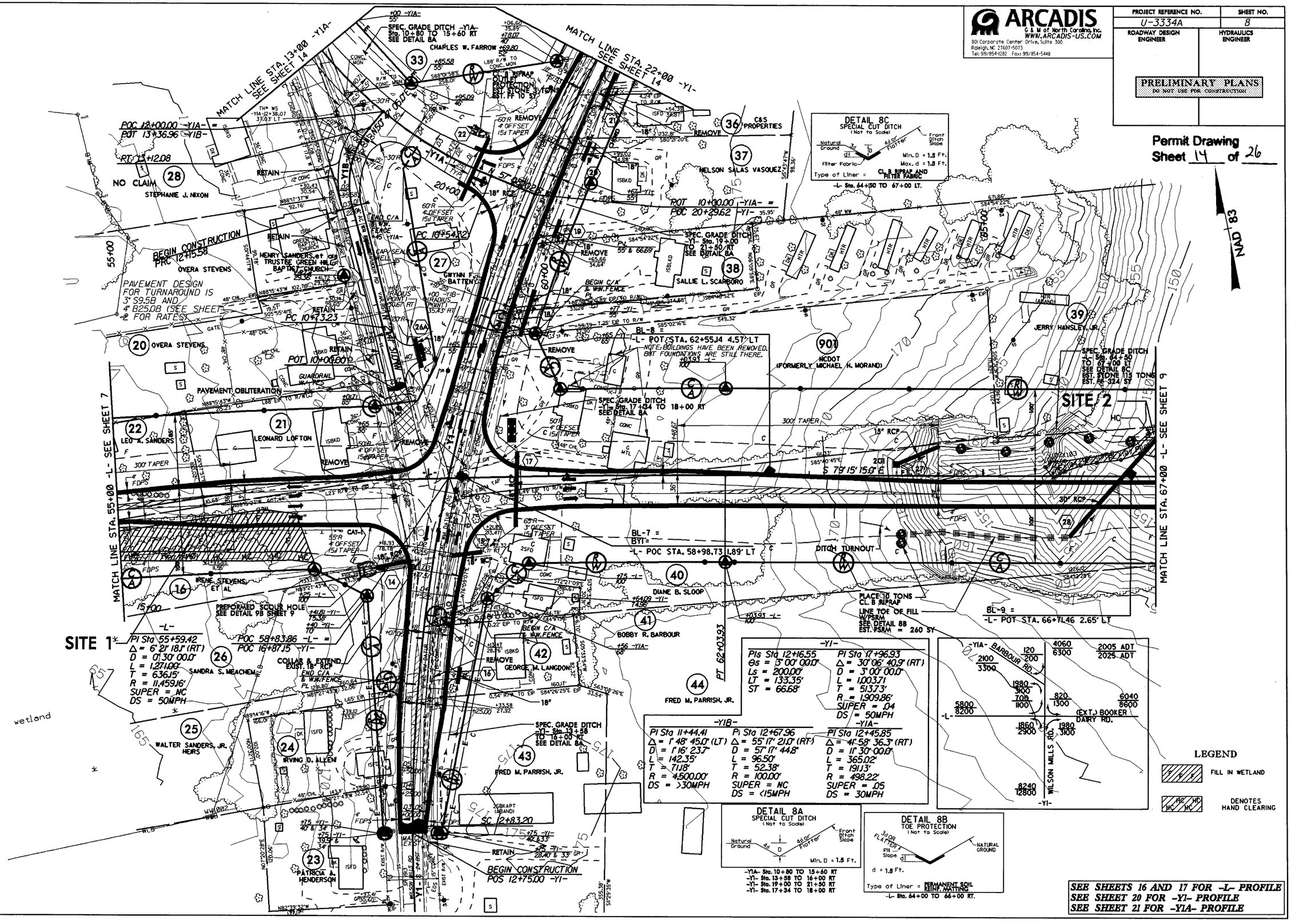
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 14 of 26



DETAIL 8C
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 4:1, D, 4:1 or Flatter, Front Ditch Slope
Filter Fabric
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Type of Liner = CL B RIPRAP AND FILTER FABRIC
-L- Sta. 64+50 TO 67+00 LT.

-Y1-

Pi Sta 12+16.55	Pi Sta 17+96.93
θs = 3° 00' 00.0"	Δ = 30° 06' 40.9" (RT)
Ls = 200.00'	D = 3° 00' 00.0"
LT = 133.35'	L = 1,003.71
ST = 66.68'	T = 513.73'
	R = 1,909.86'
	SUPER = .04
	DS = 50MPH

-Y1B-

Pi Sta 11+44.41	Pi Sta 12+67.96
Δ = 1° 48' 45.0" (LT)	Δ = 55° 17' 21.0" (RT)
D = 1° 16' 23.7"	D = 57° 17' 44.8"
L = 142.35'	L = 96.50'
T = 71.18'	T = 52.38'
R = 4,500.00'	R = 100.00'
DS = >30MPH	SUPER = NC
	DS = <15MPH

-Y1A-

Pi Sta 12+45.85
Δ = 41° 58' 36.3" (RT)
D = 11° 30' 00.0"
L = 365.02'
T = 191.13'
R = 498.22'
SUPER = .05
DS = 30MPH

DETAIL 8A
SPECIAL CUT DITCH
(Not to Scale)
Natural Ground, 4:1, D, 4:1 or Flatter, Front Ditch Slope
Min. D = 1.5 Ft.
-Y1A- Sta. 10+80 TO 15+60 RT
-Y1- Sta. 13+58 TO 16+00 RT
-Y1- Sta. 19+00 TO 21+50 RT
-Y1- Sta. 17+34 TO 18+00 RT

DETAIL 8B
TOE PROTECTION
(Not to Scale)
3:1 OR FLATTER, Fill Slope, d, NATURAL GROUND
d = 1.5 Ft.
Type of Liner = PERMANENT SOIL REINF. MATTING
-L- Sta. 64+00 TO 66+00 RT.

LEGEND
FILL IN WETLAND
HC HC HC HC DENOTES HAND CLEARING

SEE SHEETS 16 AND 17 FOR -L- PROFILE
SEE SHEET 20 FOR -Y1- PROFILE
SEE SHEET 21 FOR -Y1A- PROFILE

REVISIONS

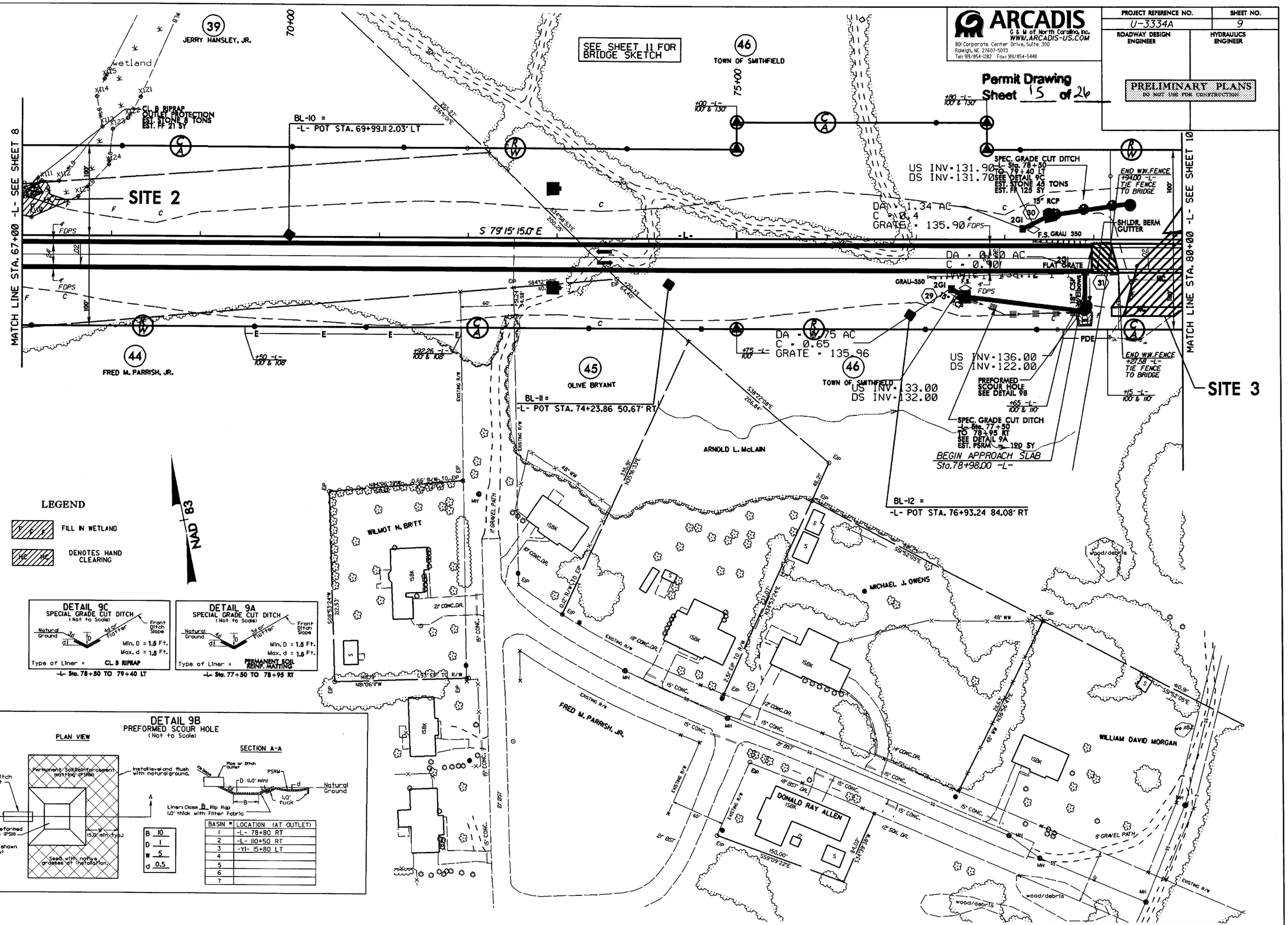
ARC-ADIS, GSA
Date: 6/8/2006 Time: 6:TM6
Filename: #FILE#

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 15 of 26



REVISIONS

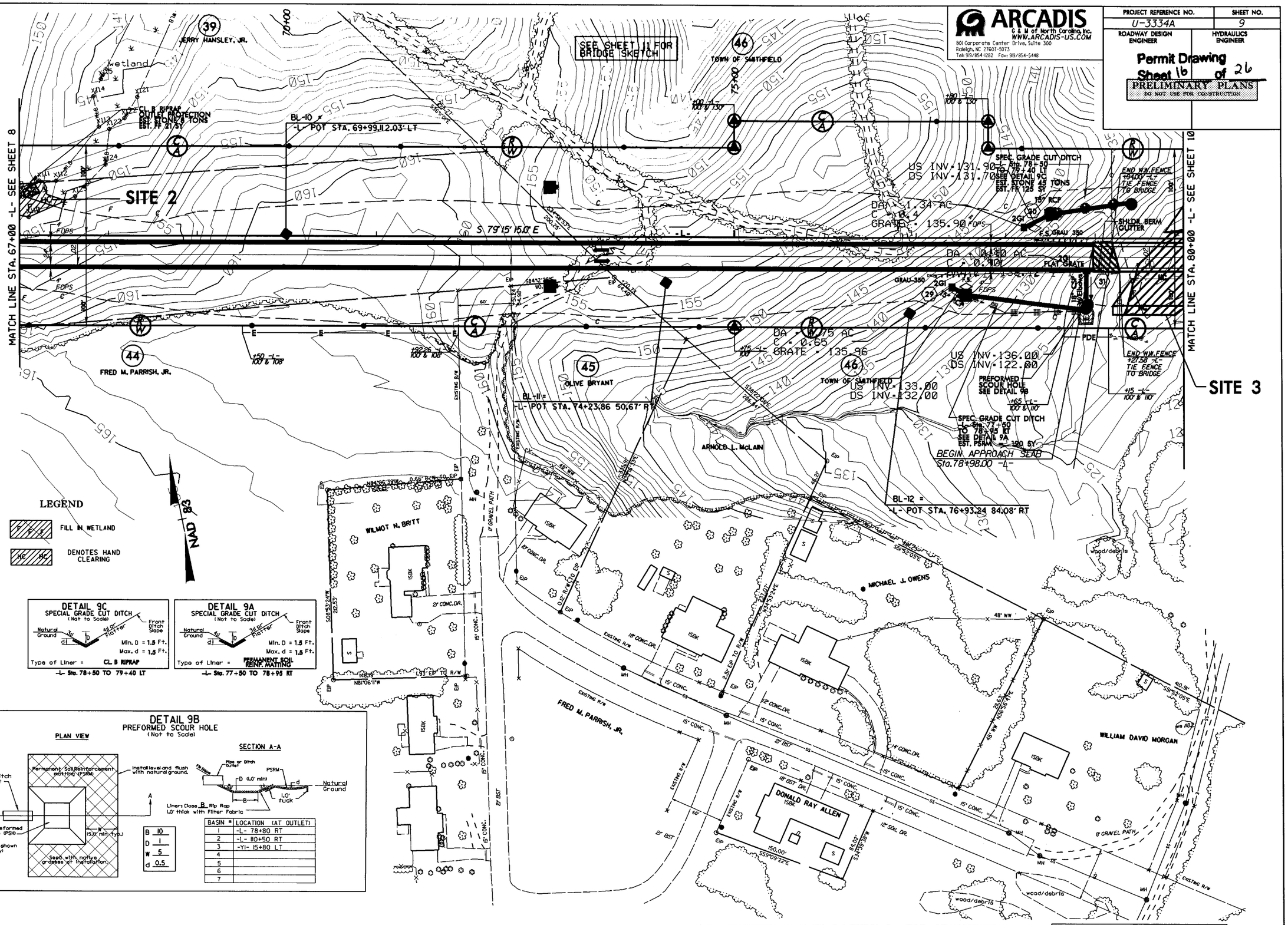
ARCADIS G&M
Date:DATE
File:Name:FILE
Time: TIME

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 16 of 26

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

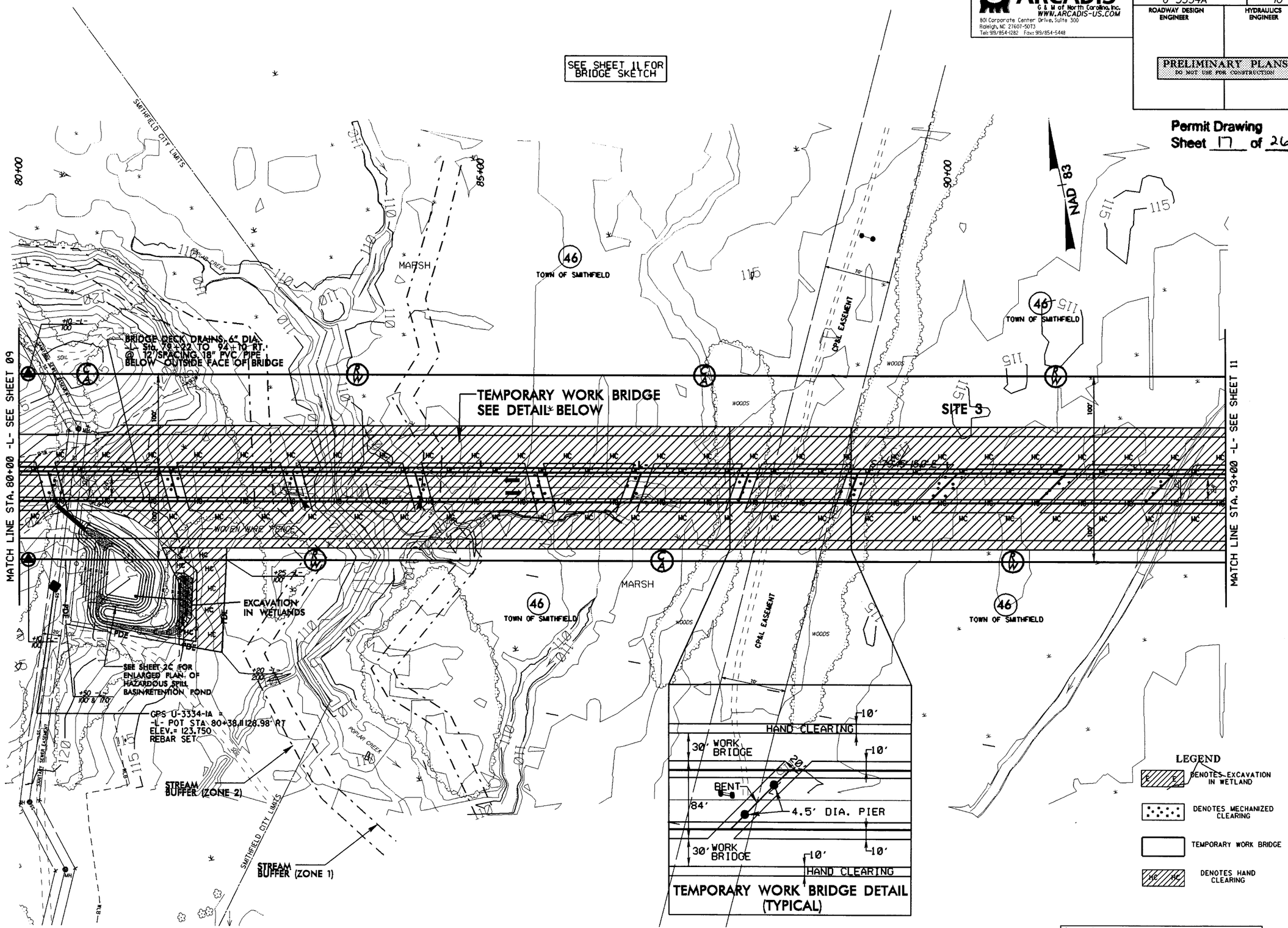
ARCADIS G&M
Date=10/4/Tex
Time=8:49 AM

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 17 of 26



SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

ARCADIS G&M
Date: 4/24/08
Filename: 4ES.dgn
Time: 8:TMC8

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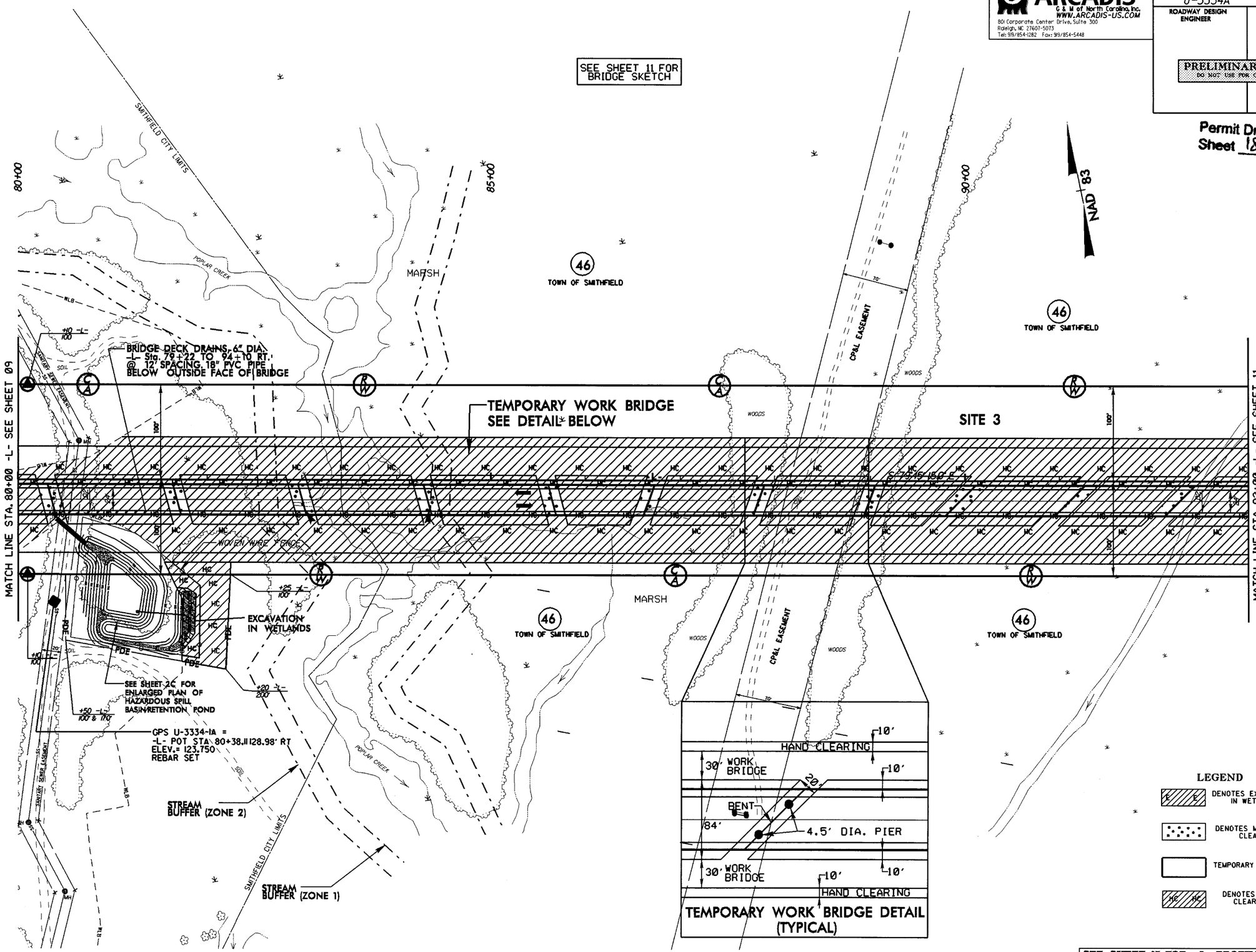
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 18 of 26



SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

ARCADIS G&M
Date: 9/14/2012 Time: ~TIME~
Filename: ~FILE~

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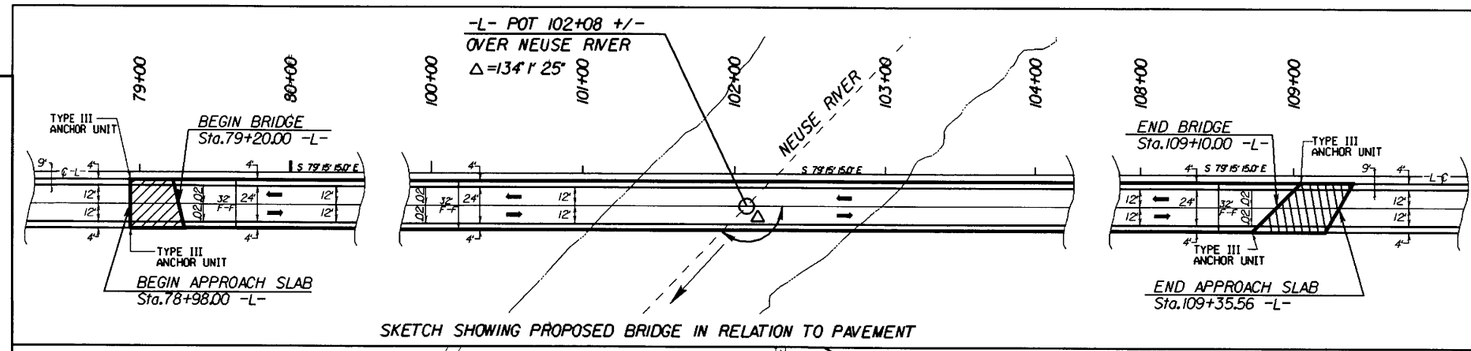
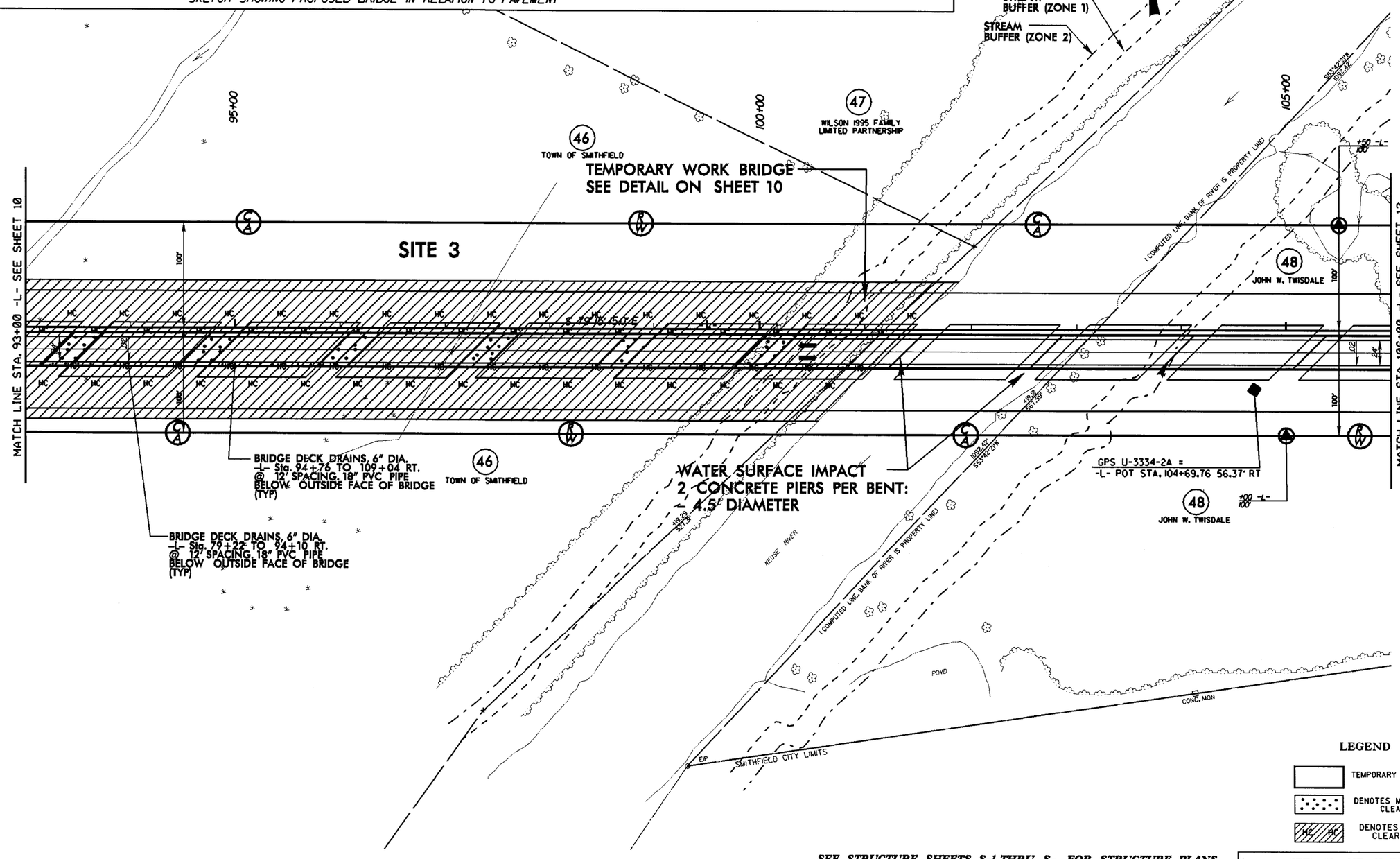
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 19 of 26



SKETCH SHOWING PROPOSED BRIDGE IN RELATION TO PAVEMENT



LEGEND

- TEMPORARY WORK BRIDGE
- DENOTES MECHANIZED CLEARING
- HC DENOTES HAND CLEARING

SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEETS 17 AND 18 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
Date: 4/10/2014 Time: 9:TM.E9
Filename: PTL.E9

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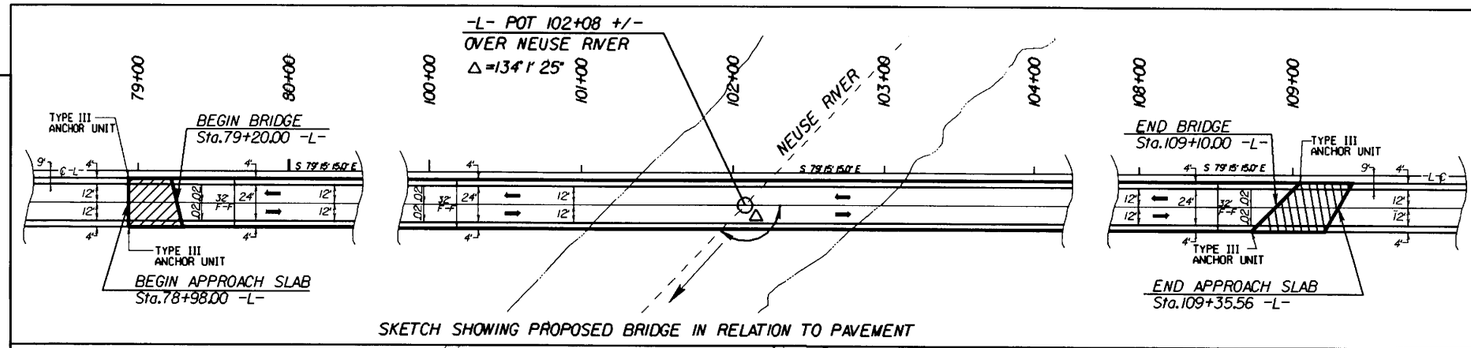
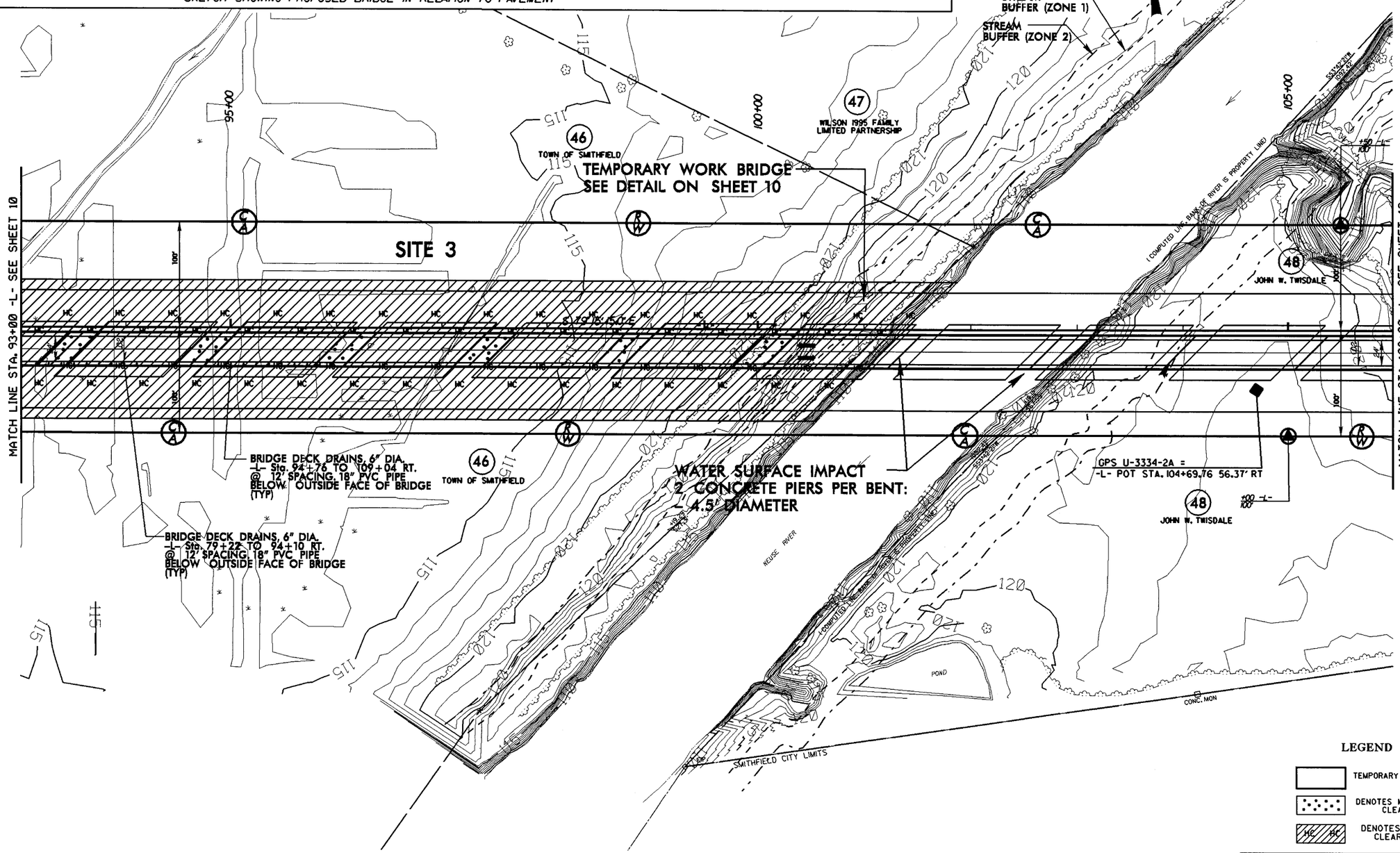
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 20 of 26





LEGEND

- TEMPORARY WORK BRIDGE
- DENOTES MECHANIZED CLEARING
- HC DENOTES HAND CLEARING

SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEETS 17 AND 18 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
Date:DATE Time: #TIME#
File:Name:#FILE#

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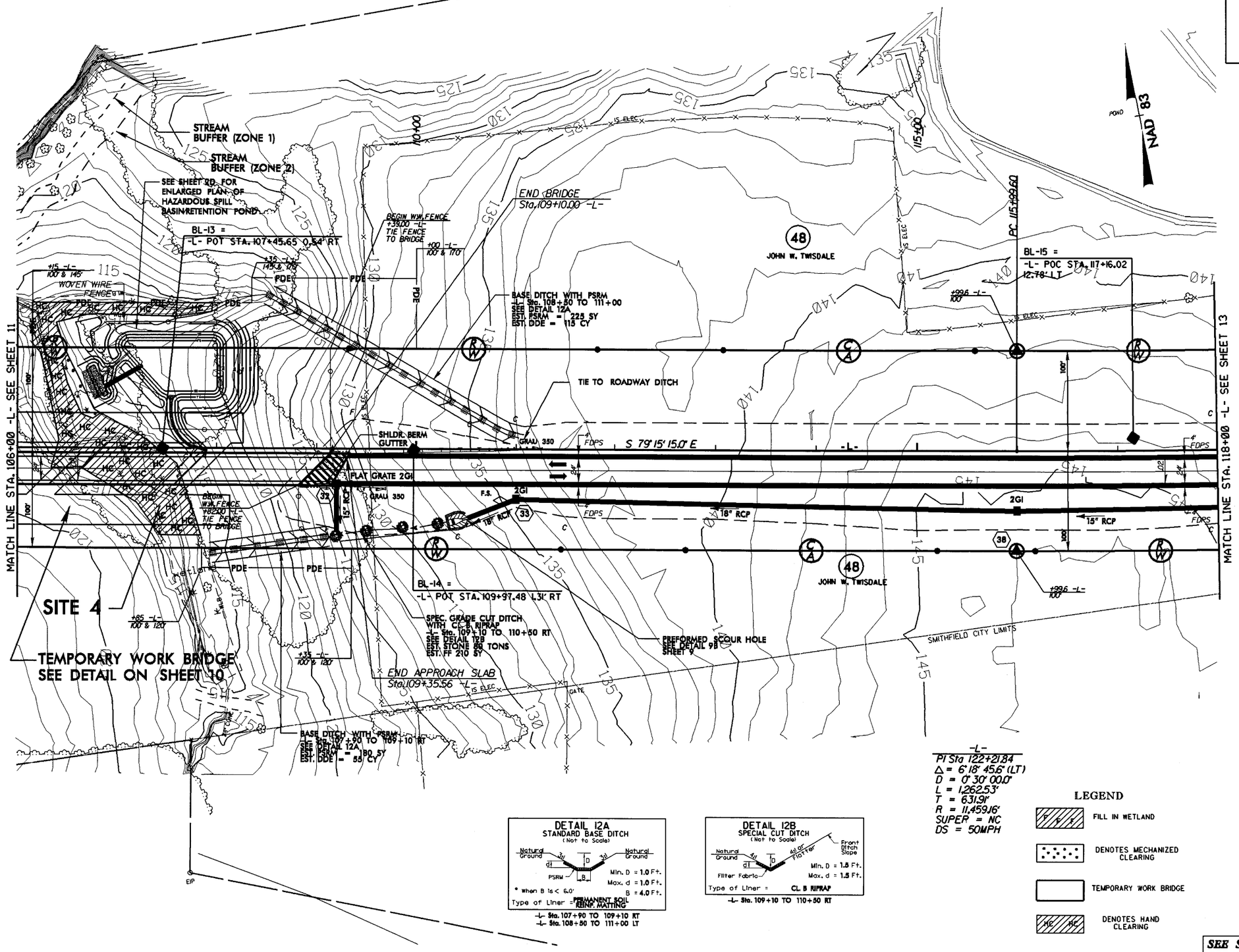
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 21 of 26



-L-
PI Sta 122+21.84
Δ = 6° 18' 45.6" (LT)
D = 0° 30' 00.0"
L = 1,262.53'
T = 631.91'
R = 11,459.16'
SUPER = NC
DS = 50MPH

DETAIL 12A
STANDARD BASE DITCH
(Not to Scale)

Natural Ground — 3:1 — D — 3:1 — Natural Ground; d1; PSRM; B

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 4.0 Ft.
* when B is < 6.0'
Type of Liner = PERMANENT SOIL REINF. MATTING

-L- Sta. 107+90 TO 109+10 RT
-L- Sta. 108+50 TO 111+00 LT

DETAIL 12B
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground — 4:1 — D — 4:1 or Flatter — Front Ditch Slope; d1; Filter Fabric

Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Type of Liner = CL. B RIPRAP

-L- Sta. 109+10 TO 110+50 RT

LEGEND

- FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- TEMPORARY WORK BRIDGE
- DENOTES HAND CLEARING

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

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Date:#DATE#
Filename:#FILE#
Time: #TIME#

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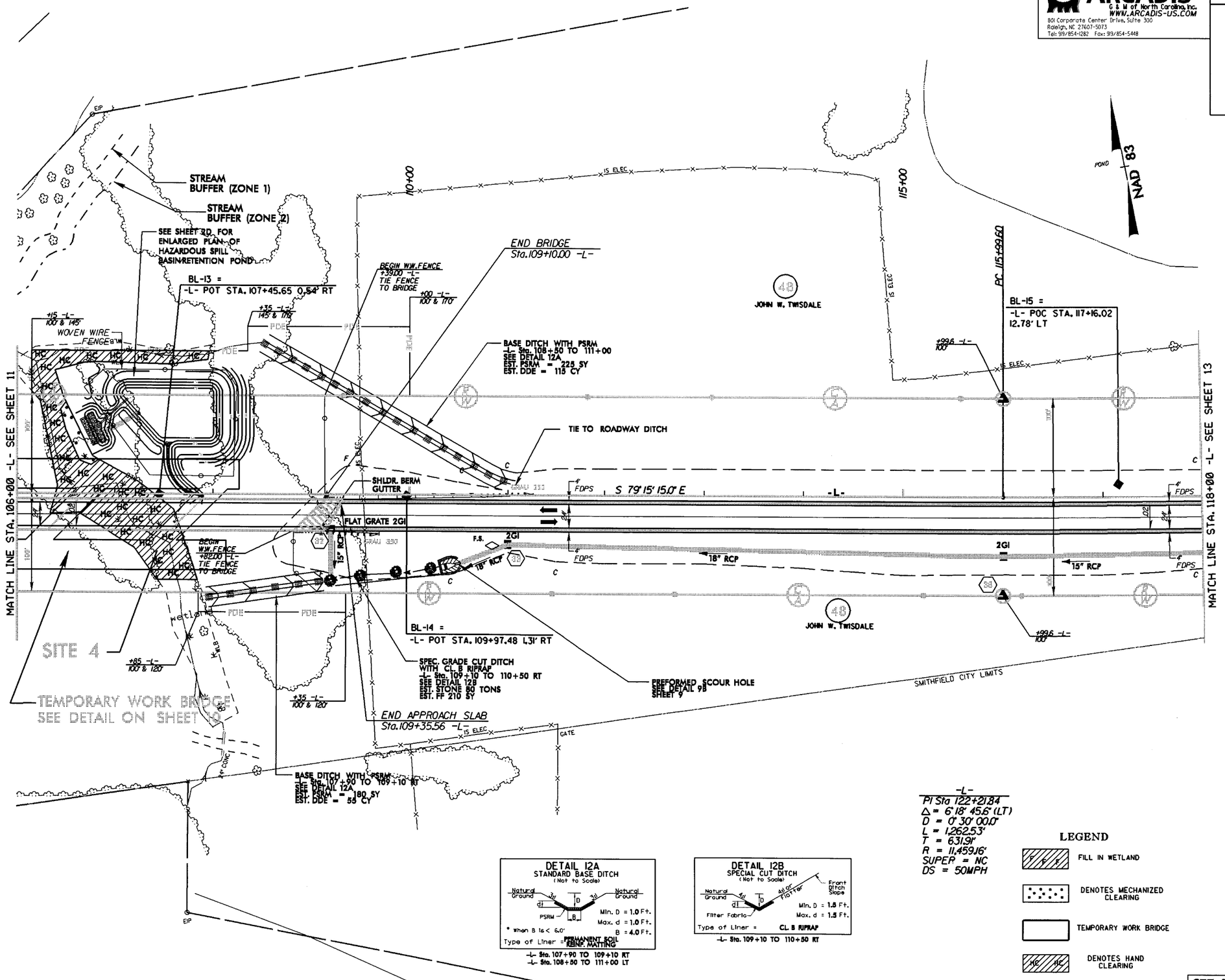
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 22 of 26

REVISIONS



-L-
PI Sta 122+21.84
Δ = 6°18' 45.6" (LT)
D = 0° 30' 00.0"
L = 1,262.53'
T = 631.91'
R = 11,459.16'
SUPER = NC
DS = 50MPH

LEGEND

- FILL IN WETLAND
- DENOTES MECHANIZED CLEARING
- TEMPORARY WORK BRIDGE
- DENOTES HAND CLEARING

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

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Date: 4/11/06 Time: #TIME#
Filename: #FILE#

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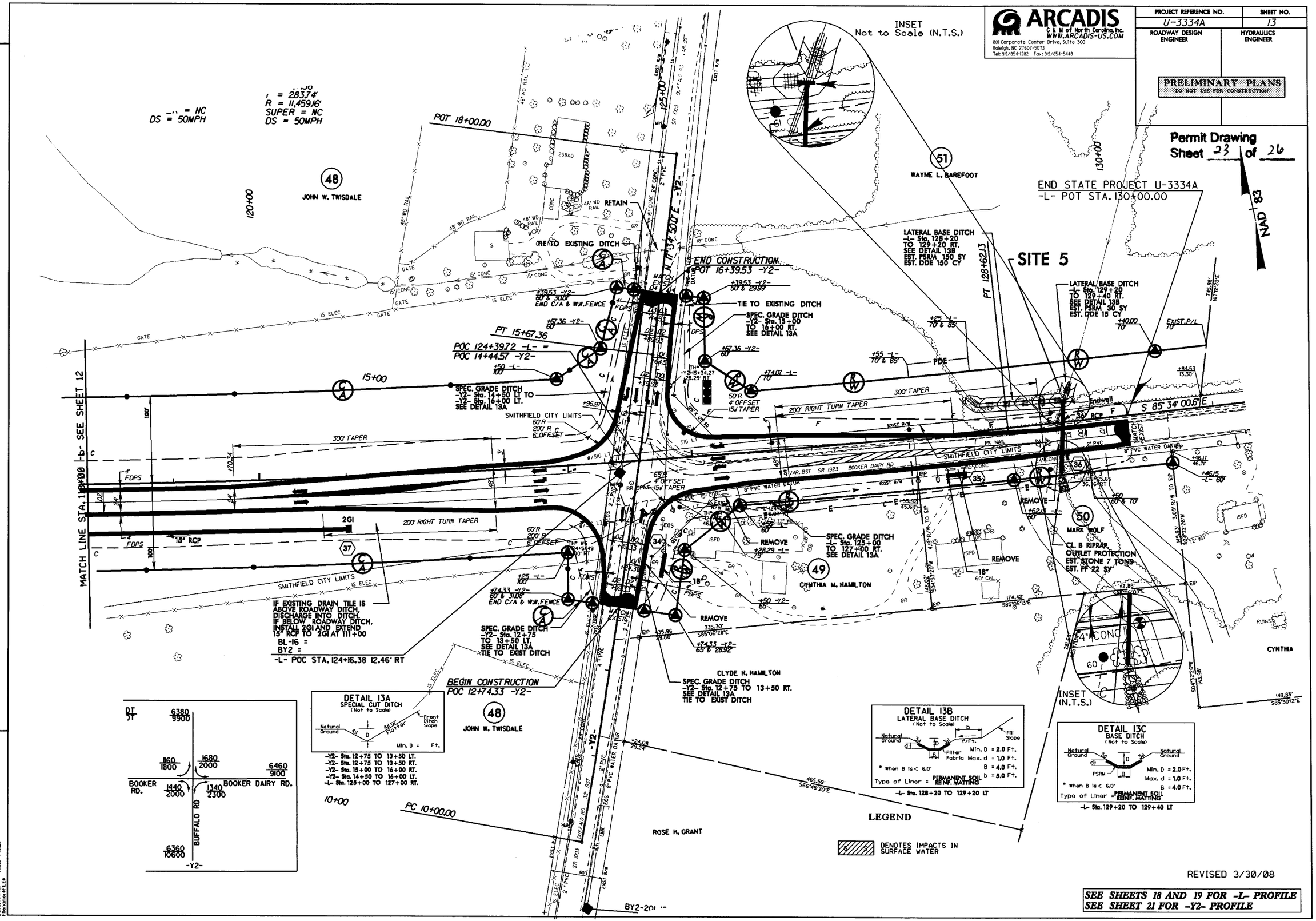
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 23 of 26



REVISED 3/30/08

SEE SHEETS 18 AND 19 FOR -L- PROFILE
SEE SHEET 21 FOR -Y2- PROFILE

REVISIONS

ARCADIS GEM
Date: 03/31/2008
Time: 9:11:45 AM
Filename: U3334A_H_SHEET13.dgn

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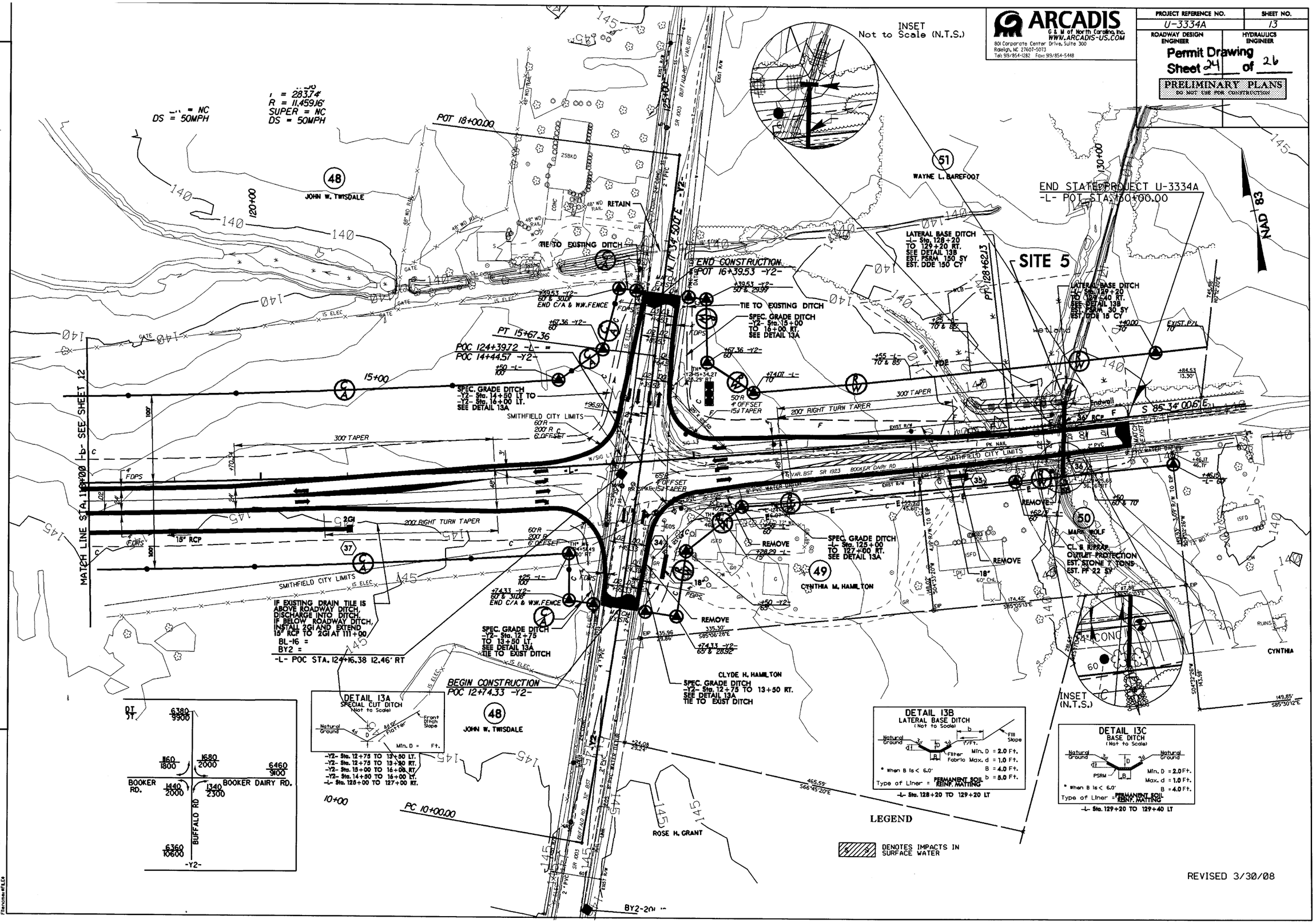
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

Permit Drawing
Sheet 24 of 26

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISED 3/30/08

REVISIONS

ARCADIS G&M
Date: 4/24/2008
Time: 8:17 AM
Drawing: 13.dgn

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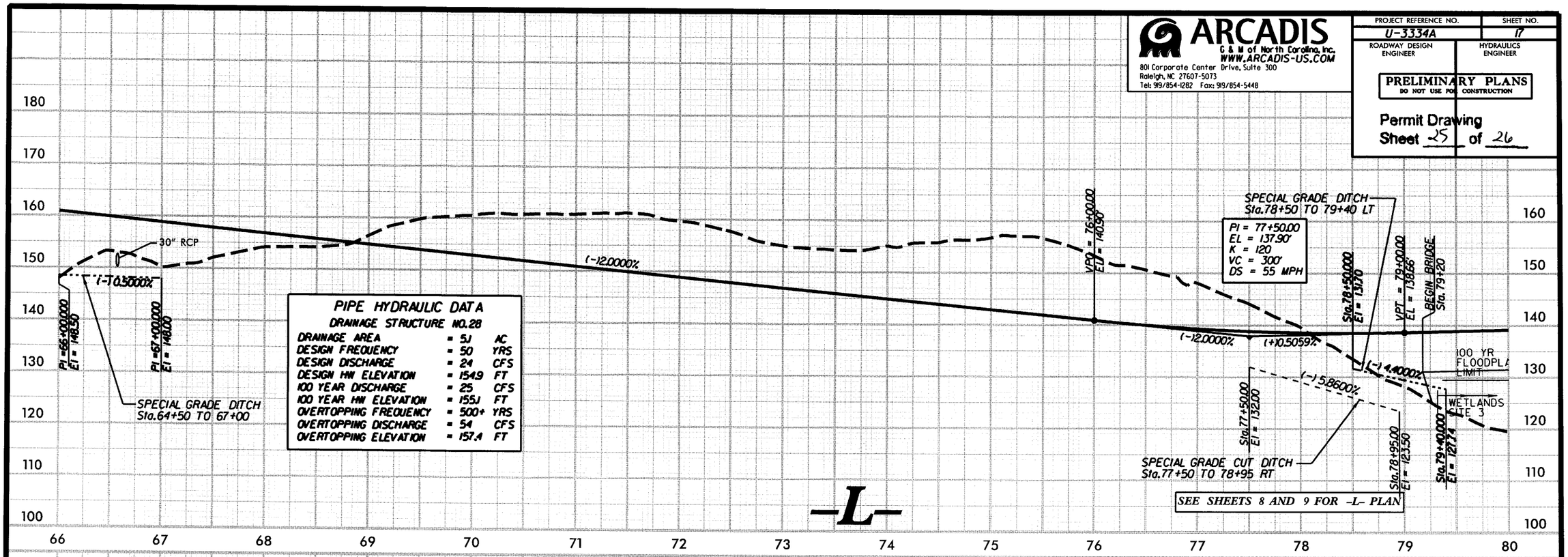
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

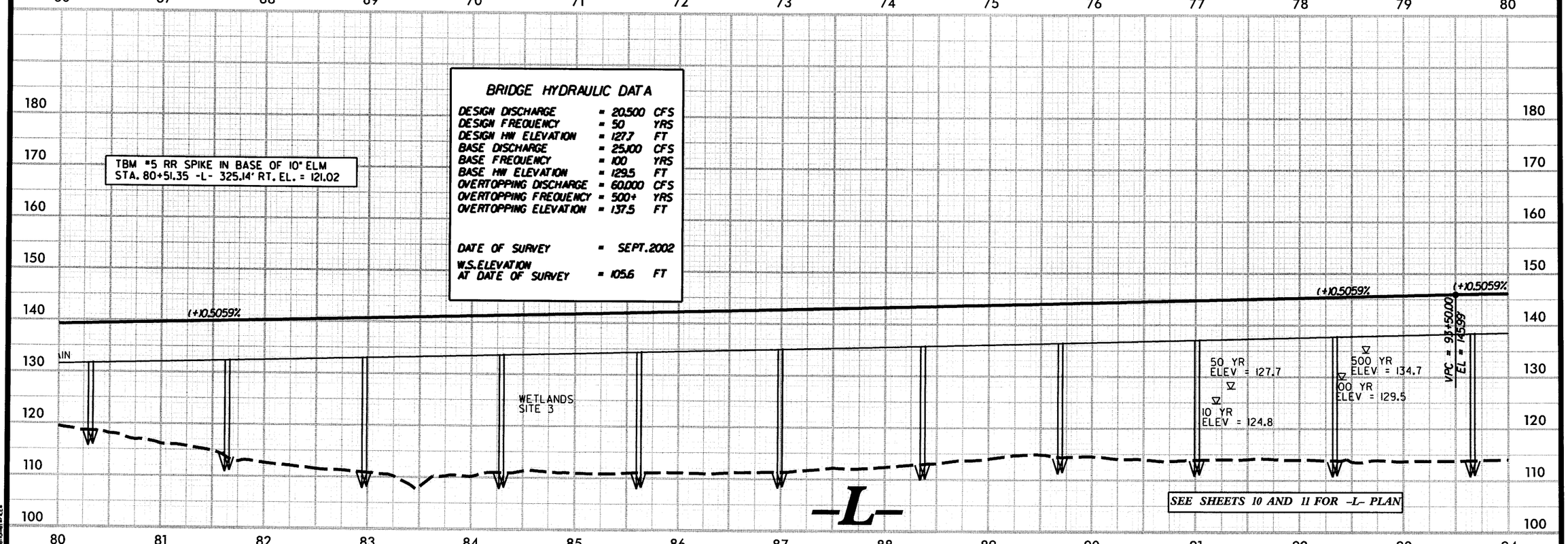
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 25 of 26



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.28

DRAINAGE AREA	= 51	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 24	CFS
DESIGN HW ELEVATION	= 154.9	FT
100 YEAR DISCHARGE	= 25	CFS
100 YEAR HW ELEVATION	= 155.1	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 54	CFS
OVERTOPPING ELEVATION	= 157.4	FT



BRIDGE HYDRAULIC DATA

DESIGN DISCHARGE	= 20,500	CFS
DESIGN FREQUENCY	= 50	YRS
DESIGN HW ELEVATION	= 127.7	FT
BASE DISCHARGE	= 25,100	CFS
BASE FREQUENCY	= 100	YRS
BASE HW ELEVATION	= 129.5	FT
OVERTOPPING DISCHARGE	= 60,000	CFS
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING ELEVATION	= 137.5	FT
DATE OF SURVEY	= SEPT.2002	
W.S.ELEVATION AT DATE OF SURVEY	= 105.6	FT

ARCADIS G&M
Date=DATE
Filename=FILE
Time= TIME

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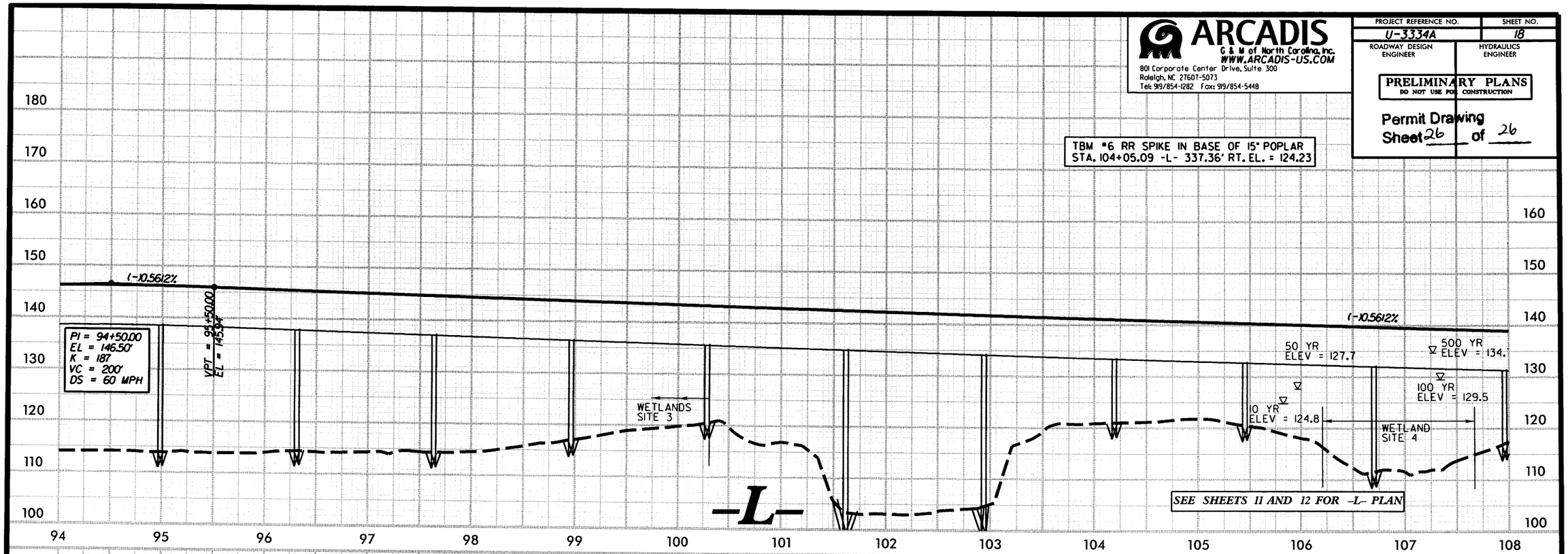
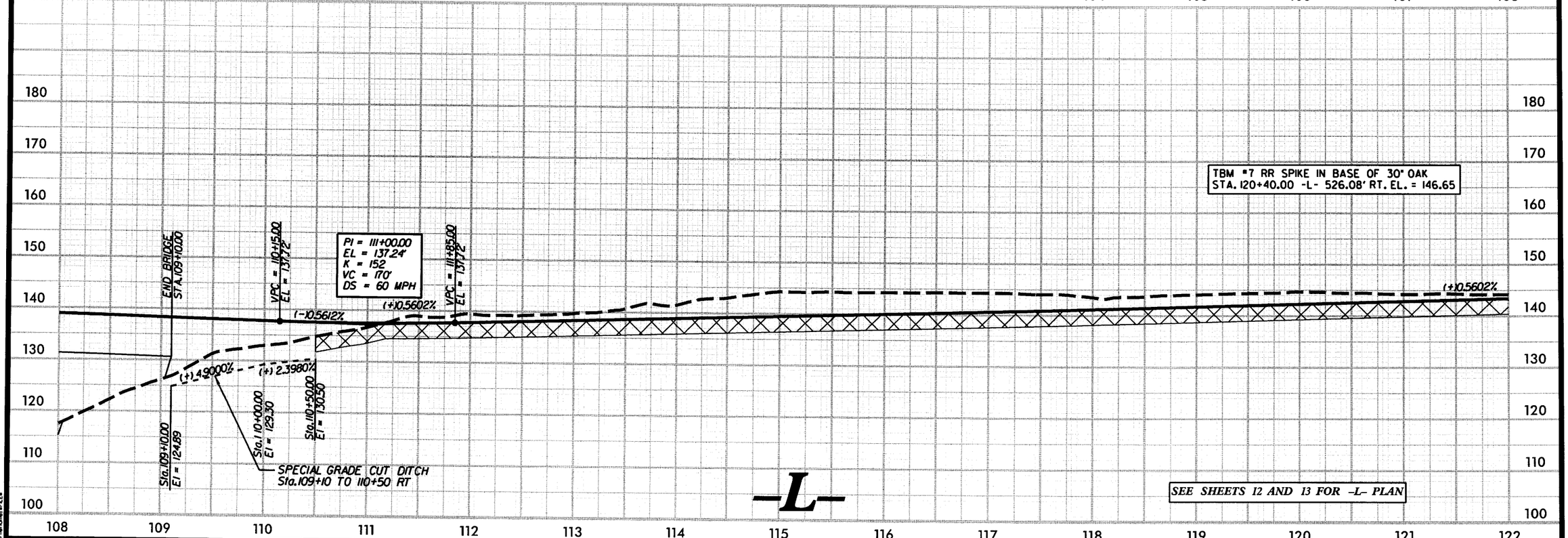
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

Permit Drawing
Sheet 26 of 26



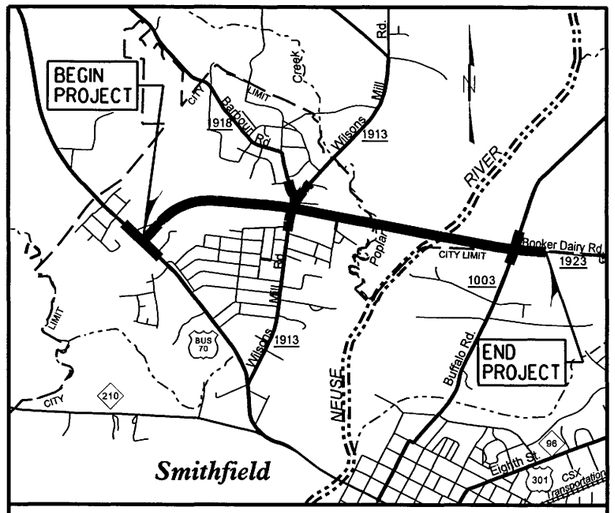


ARCADIS G&M
Date: 9/13/2011
Filename: PLE.dgn
Time: 9:17AM

TIP: U-3334A

CONTRACT:

See Sheet 1-B For Conventional Symbols



VICINITY MAP

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

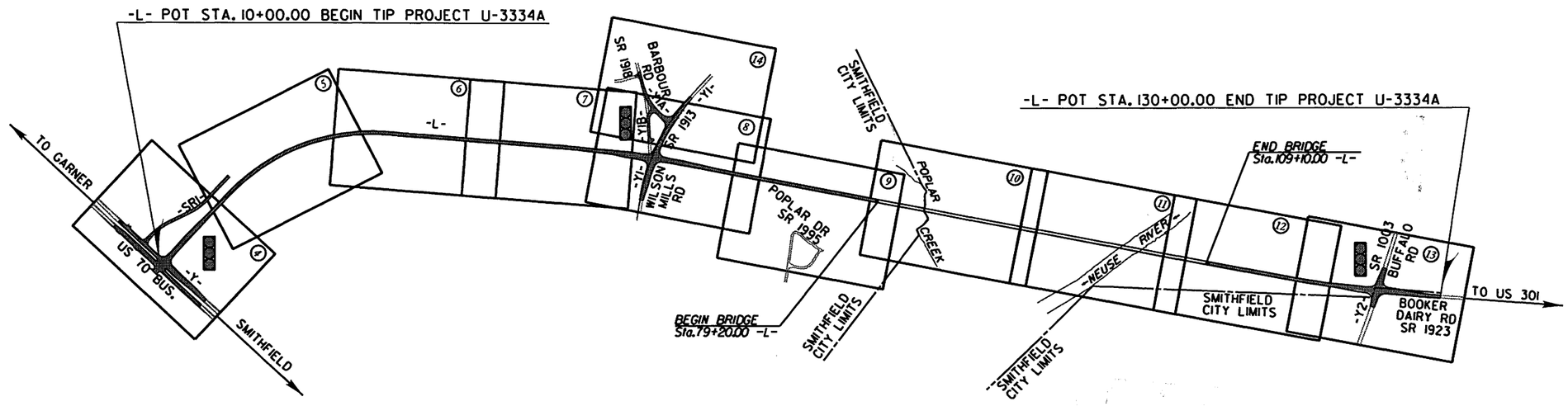
JOHNSTON COUNTY

STATE	STATE PROJECT REFERENCE NO.	SHEET NO.	TOTAL SHEETS
N.C.	U-3334A	1	

STATE PROJ. NO.	F.A. PROJ. NO.	DESCRIPTION
34929.1.1	STP-1923(2)	P.E.
34929.2.4	STP-1923(3)	ROW, UTIL.
		CONSTR.

LOCATION: SR 1923 EXTENSION (BOOKER DAIRY RD) FROM US 70 BUSINESS WEST TO SR 1003 (BUFFALO RD)

TYPE OF WORK: GRADING, PAVING, DRAINAGE, STRUCTURES, AND SIGNALS



NCDOT CONTACT
TERESA BRUTON, P.E.
ROADWAY DESIGN-ENGINEERING COORDINATION

THIS IS A FULL CONTROLLED-ACCESS PROJECT WITH ACCESS BEING LIMITED TO POINTS SHOWN ON THE PLANS.

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

GRAPHIC SCALES

50 25 0 50 100
PLANS

50 25 0 50 100
PROFILE (HORIZONTAL)

10 5 0 10 20
PROFILE (VERTICAL)

DESIGN DATA

ADT 2005 = 6,000
ADT 2025 = 9,500
DHV = 10 %
D = 55 %
* T = 10 %
V = 50 MPH

*(TTST 4 % + DUAL 6 %)

PROJECT LENGTH

LENGTH OF ROADWAY TIP PROJECT U-3334A =	1.707 miles
LENGTH OF STRUCTURE TIP PROJECT U-3334A =	0.566 miles
TOTAL LENGTH TIP PROJECT U-3334A =	2.273 miles

Prepared In The Office of:
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Tel: 919/854-1282 Fax: 919/854-5448
For the North Carolina Department of Transportation

2002 STANDARD SPECIFICATIONS

RIGHT OF WAY DATE:
NOVEMBER 13, 2003

LETTING DATE:
SEPTEMBER 20, 2005

ARCADIS CONTACT
STEVE SMALLWOOD, P.E.
PROJECT ENGINEER

HYDRAULICS ENGINEER
SIGNATURE: P.E.

ROADWAY DESIGN ENGINEER
SIGNATURE: P.E.

DIVISION OF HIGHWAYS
STATE OF NORTH CAROLINA
P.E.
STATE DESIGN ENGINEER

DEPARTMENT OF TRANSPORTATION
FEDERAL HIGHWAY ADMINISTRATION
APPROVED
DIVISION ADMINISTRATOR DATE

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	1-B

*S.U.E = SUBSURFACE UTILITY ENGINEER

STATE OF NORTH CAROLINA
DIVISION OF HIGHWAYS

CONVENTIONAL SYMBOLS

ROADS & RELATED ITEMS

Edge of Pavement
Curb
Prop. Slope Stakes Cut — C
Prop. Slope Stakes Fill — F
Prop. Woven Wire Fence
Prop. Chain Link Fence
Prop. Barbed Wire Fence
Prop. Wheelchair Ramp — WCR
Curb Cut for Future Wheelchair Ramp — CCFR
Exist. Guardrail
Prop. Guardrail
Equality Symbol
Pavement Removal and Obliteration

RIGHT OF WAY

Baseline Control Point
Existing Right of Way Marker
Exist. Right of Way Line w/Marker
Prop. Right of Way Line with Proposed R/W Marker (Iron Pin & Cap)
Prop. Right of Way Line with Proposed (Concrete or Granite) R/W Marker
Exist. Control of Access Line — CA
Prop. Control of Access Line — CA
Exist. Easement Line — E
Prop. Temp. Construction Easement Line — E
Prop. Temp. Drainage Easement Line — TDE
Prop. Perm. Drainage Easement Line — PDE

HYDROLOGY

Stream or Body of Water
River Basin Buffer — RBB
Flow Arrow
Disappearing Stream
Spring
Swamp Marsh
Shoreline
Falls, Rapids
Prop Lateral, Tail, Head Ditches — FLOW

STRUCTURES

MAJOR
Bridge, Tunnel, or Box Culvert — CONC
Bridge Wing Wall, Head Wall and End Wall — CONC WW

MINOR
Head & End Wall — CONC HW
Pipe Culvert
Footbridge
Drainage Boxes — CB
Paved Ditch Gutter

UTILITIES

Exist. Pole
Exist. Power Pole
Prop. Power Pole
Exist. Telephone Pole
Prop. Telephone Pole
Exist. Joint Use Pole
Prop. Joint Use Pole
Telephone Pedestal — T
U/G Telephone Cable Hand Hold — HH
Cable TV Pedestal — C
U/G TV Cable Hand Hold — HH
U/G Power Cable Hand Hold — HH
Hydrant
Satellite Dish
Exist. Water Valve
Sewer Clean Out
Power Manhole — P
Telephone Booth
Cellular Telephone Tower
Water Manhole — W
Light Pole
H-Frame Pole
Power Line Tower
Pole with Base
Gas Valve
Gas Meter
Telephone Manhole — T
Power Transformer
Sanitary Sewer Manhole
Storm Sewer Manhole — S
Tank; Water, Gas, Oil
Water Tank With Legs
Traffic Signal Junction Box — S
Fiber Optic Splice Box — F
Television or Radio Tower
Utility Power Line Connects to Traffic Signal Lines Cut Into the Pavement — TS
Proposed Traffic Signal

Recorded Water Line — W
Designated Water Line (S.U.E.*) — W
Sanitary Sewer — SS
Recorded Sanitary Sewer Force Main — FSS
Designated Sanitary Sewer Force Main(S.U.E.*) — FSS
Recorded Gas Line — G
Designated Gas Line (S.U.E.*) — G
Storm Sewer — S
Recorded Power Line — P
Designated Power Line (S.U.E.*) — P
Recorded Telephone Cable — T
Designated Telephone Cable (S.U.E.*) — T
Recorded U/G Telephone Conduit — TC
Designated U/G Telephone Conduit (S.U.E.*) — TC
Unknown Utility (S.U.E.*) — UTL
Recorded Television Cable — TV
Designated Television Cable (S.U.E.*) — TV
Recorded Fiber Optics Cable — FO
Designated Fiber Optics Cable (S.U.E.*) — FO
Exist. Water Meter — O
U/G Test Hole (S.U.E.*)
Abandoned According to U/G Record — ATTUR
End of Information — E.O.I.

BOUNDARIES & PROPERTIES

State Line
County Line
Township Line
City Line
Reservation Line
Property Line
Property Line Symbol — PL
Exist. Iron Pin — EIP
Property Corner
Property Monument — ECM
Property Number — 123
Parcel Number — 6
Fence Line
Existing Wetland Boundaries — WW & ISBW — WLB
High Quality Wetland Boundary — HQ WLB
Medium Quality Wetland Boundaries — MQ WLB
Low Quality Wetland Boundaries — LQ WLB
Proposed Wetland Boundaries — WLB
Existing Endangered Animal Boundaries — EAB
Existing Endangered Plant Boundaries — EPB

BUILDINGS & OTHER CULTURE

Buildings
Foundations
Area Outline
Gate
Gas Pump Vent or U/G Tank Cap
Church
School
Park
Cemetery
Dam
Sign — S
Well — W
Small Mine
Swimming Pool

TOPOGRAPHY

Loose Surface
Hard Surface
Change in Road Surface
Curb
Right of Way Symbol — R/W
Guard Post — GP
Paved Walk
Bridge
Box Culvert or Tunnel
Ferry
Culvert
Footbridge
Trail, Footpath
Light House

VEGETATION

Single Tree
Single Shrub
Hedge
Woods Line
Orchard
Vineyard — VINEYARD

RAILROADS

Standard Gauge
RR Signal Milepost — CSX TRANSPORTATION — MILEPOST 35
Switch — SWITCH

revised 02/02/00

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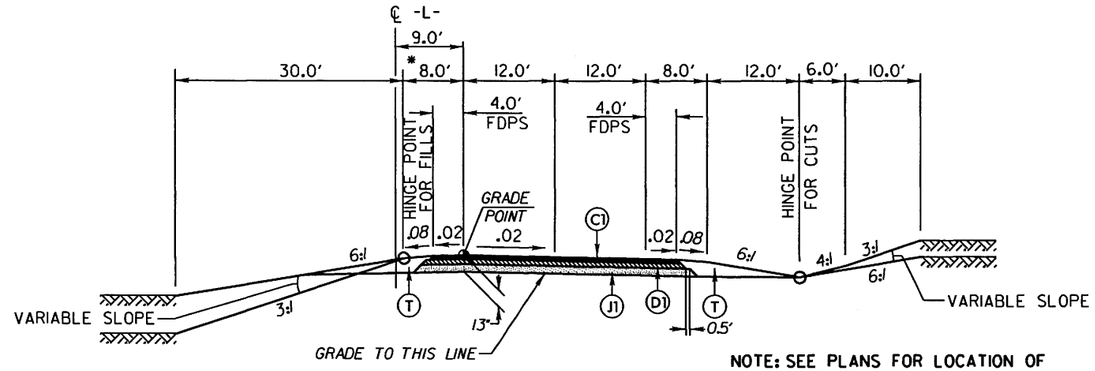
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2
ROADWAY DESIGN ENGINEER	PAVING ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

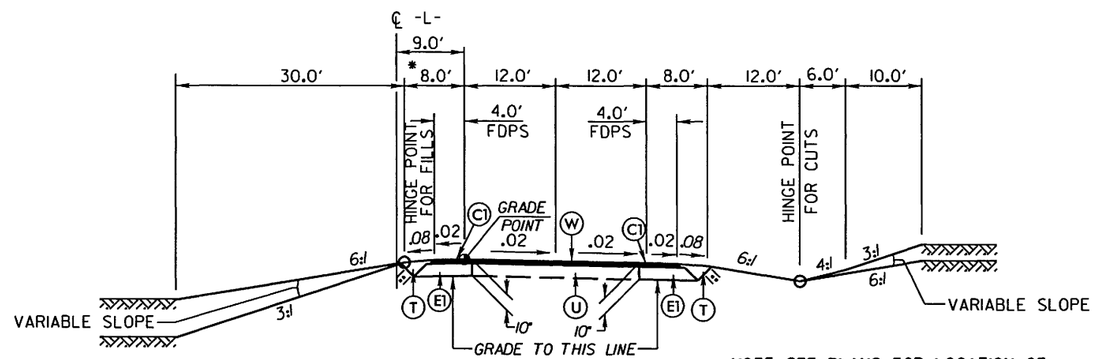


*11.0' WHERE WIDENED FOR GUARDRAIL

NOTE: SEE PLANS FOR LOCATION OF TURN LANES AND TAPERS.

TYPICAL SECTION #1

USE TYPICAL SECTION #1:
STA. 10+00.00 -L- TO STA. 79+20.00 -L- (BRIDGE)
STA. 109+10.00 -L- (BRIDGE) TO STA. 124+39.72 -L-



NOTE: SEE PLANS FOR LOCATION OF TURN LANES AND TAPERS.

TYPICAL SECTION #2

USE TYPICAL SECTION #2:
USE IN CONJUNCTION WITH WEDGING DETAIL ON SHEET 2A
STA. 124+39.72 -L- TO STA. 130+00.00 -L-

CODE	PAVEMENT SCHEDULE
C1	PROP. APPROX. 3.0" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD IN EACH OF TWO LAYERS.
C2	PROP. APPROX. 1.5" ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 168 LBS. PER SQ. YD.
C3	PROP. VAR. DEPTH ASPHALT CONC. SURFACE COURSE, TYPE S9.5B, AT AN AVERAGE RATE OF 112 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT TO EXCEED 1.5" IN DEPTH.
D1	PROP. APPROX. 4.0" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
D2	PROP. APPROX. 2.5" ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 285 LBS. PER SQ. YD.
D3	PROP. VAR. DEPTH ASPHALT CONC. INTERMEDIATE COURSE, TYPE I19.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT LESS THAN 2.25" OR GREATER THAN 4" IN DEPTH.
E1	PROP. APPROX. 7.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 399 LBS. PER SQ. YD IN EACH OF TWO LAYERS.
E2	PROP. APPROX. 5.5" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 627 LBS. PER SQ. YD.
E3	PROP. APPROX. 4.0" ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 456 LBS. PER SQ. YD.
E4	PROP. VAR. DEPTH ASPHALT CONC. BASE COURSE, TYPE B25.0B, AT AN AVERAGE RATE OF 114 LBS. PER SQ. YD. PER 1" DEPTH TO BE PLACED IN LAYERS NOT GREATER THAN 5.5" OR LESS THAN 3" IN DEPTH.
J1	PROP. 6.0" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VARIABLE DEPTH ASPHALT PAVEMENT (SEE WEDGING DETAIL)

Note: Pavement Edge Slopes are 1:1 Unless Shown Otherwise

REVISIONS

ARCADIS G&M
Date: 7/2/2008 Time: 7:29:57 AM
P:\PROJECTS\CONTRACTS\U3334A-rdy-typ.dgn

ARCADIS
C & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
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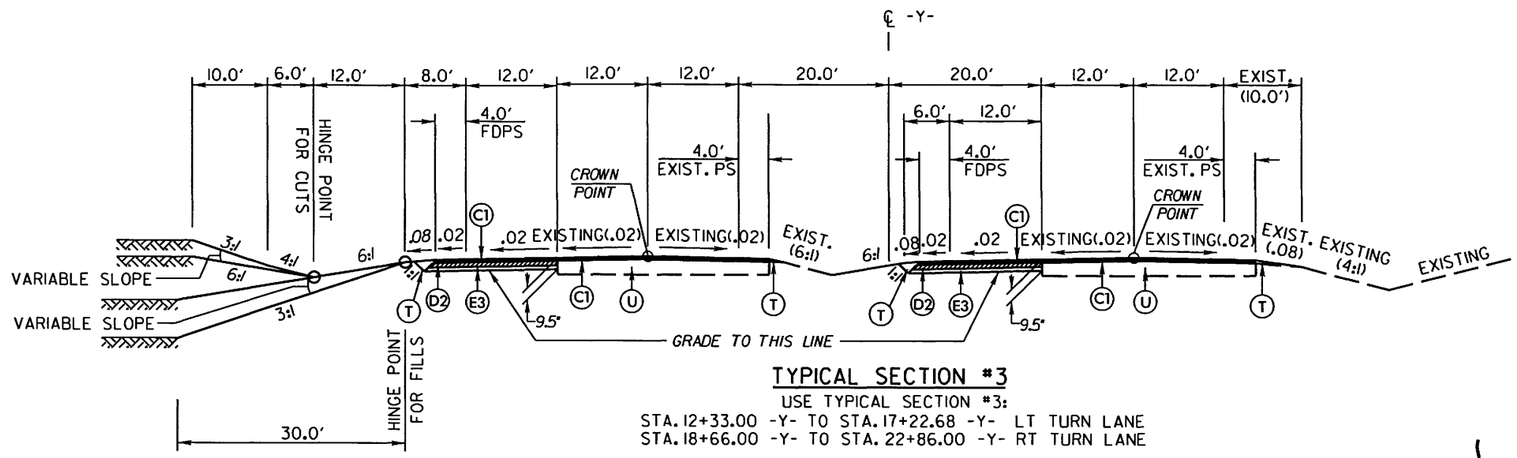
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2A
ROADWAY DESIGN ENGINEER	PAVING ENGINEER

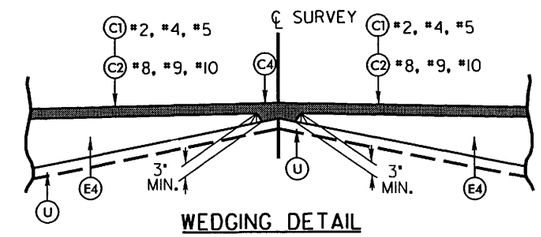
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



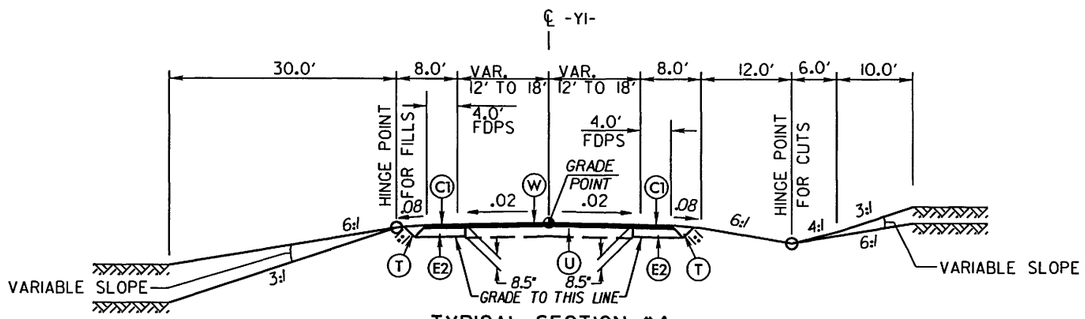
TYPICAL SECTION #3

USE TYPICAL SECTION #3:
STA. 12+33.00 -Y- TO STA. 17+22.68 -Y- LT TURN LANE
STA. 18+66.00 -Y- TO STA. 22+86.00 -Y- RT TURN LANE



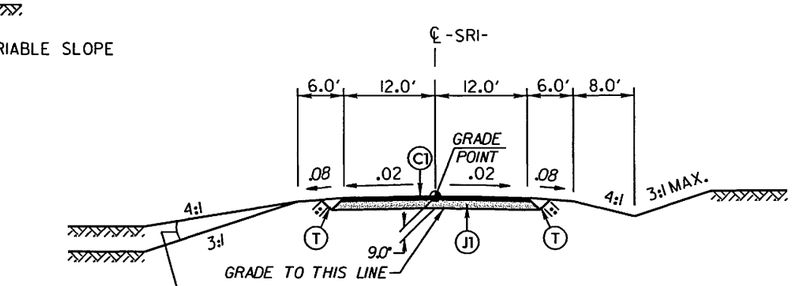
WEDGING DETAIL

USE IN CONJUNCTION WITH TYPICAL SECTIONS #2, #4, #5, #8, #9, & #10



TYPICAL SECTION #4

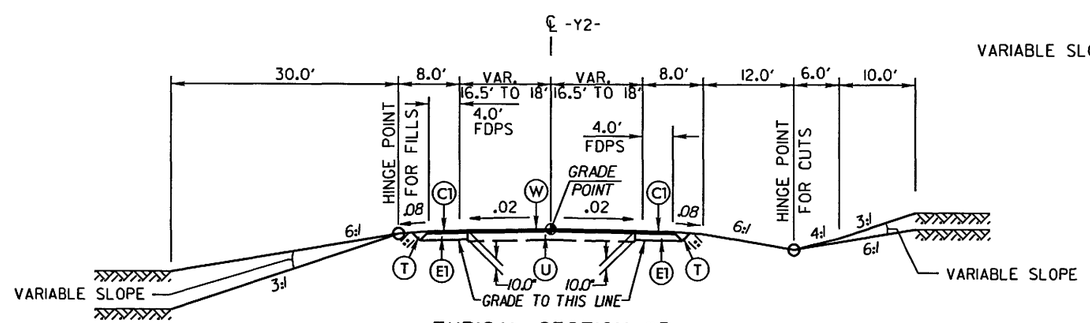
USE TYPICAL SECTION #4:
USE IN CONJUNCTION WITH WEDGING DETAIL
STA. 12+75.00 -Y1- TO STA. 16+53.29 -Y1-
STA. 16+90.24 -Y1- TO STA. 23+20 -Y1-



TYPICAL SECTION #6

USE TYPICAL SECTION #6:
STA. 10+43.66 -SRI- TO STA. 20+23.39 -SRI-

NOTE: SEE PLANS FOR LOCATION OF TURN LANES AND TAPERS.



TYPICAL SECTION #5

USE TYPICAL SECTION #5:
USE IN CONJUNCTION WITH WEDGING DETAIL
STA. 12+74.33 -Y2- TO STA. 14+10.87 -Y2-
STA. 14+47.63 -Y2- TO STA. 16+39.53 -Y2-

CODE	PAVEMENT SCHEDULE
C1	3.0" TYPE S9.5B
C2	1.5" TYPE SF9.5B
C3	VAR. DEPTH TYPE S9.5B
D1	4.0" TYPE I19.0B
D2	2.5" TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	7.0" TYPE B25.0B
E2	5.5" TYPE B25.0B
E3	4.0" TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	6.0" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH ASPHALT PAVEMENT

Note: Pavement Edge Slopes are 1:1 Unless Shown Otherwise

ARCADIS C&M
Date: 7/2/2008 Time: 7:25:58 AM
J:\Projects\Active\Projects\U-3334A\U-3334A_rdy_plan.dgn

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801 Corporate Center Drive, Suite 300
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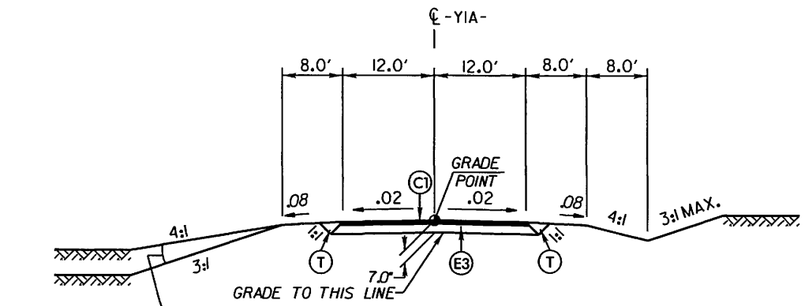
Tel: 919/854-1282 Fax: 919/854-5448

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2B
ROADWAY DESIGN ENGINEER	PAVING ENGINEER

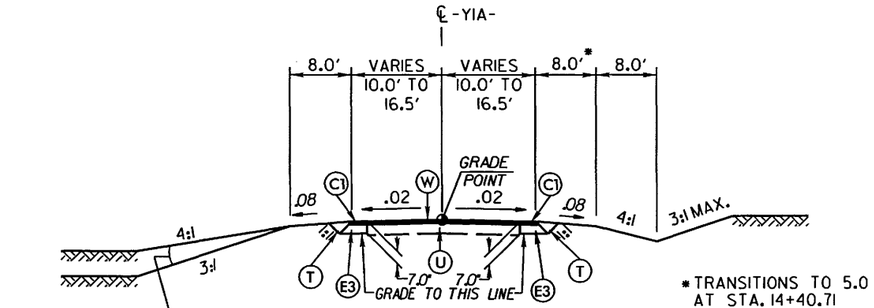
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



TYPICAL SECTION #7

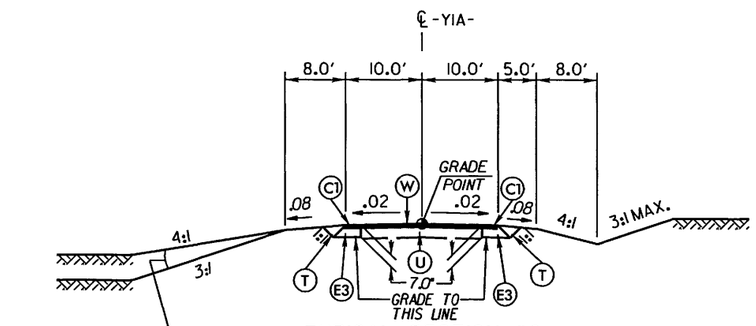
USE TYPICAL SECTION #7:
STA. 10+22.00 -YIA- TO STA. 12+90.00 -YIA-



*TRANSITIONS TO 5.0
AT STA. 14+40.71

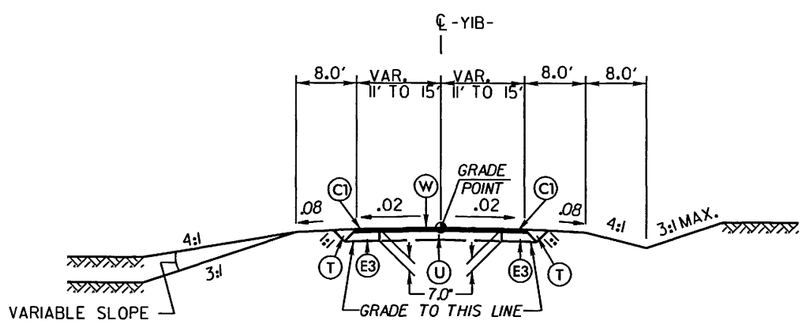
TYPICAL SECTION #8

USE TYPICAL SECTION #8:
USE IN CONJUNCTION WITH WEDGING DETAIL ON SHEET 2A
STA. 12+90.00 -YIA- TO STA. 14+40.71 -YIA-



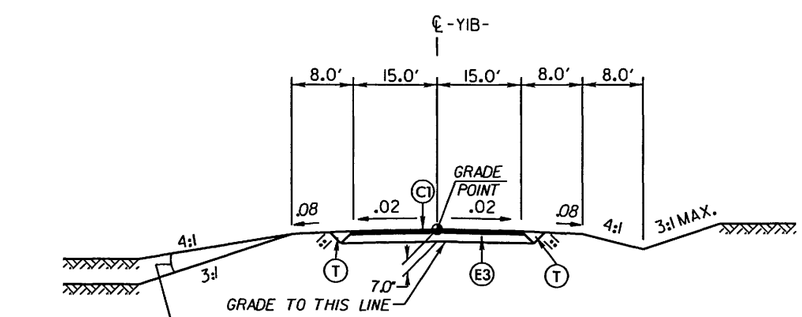
TYPICAL SECTION #9

USE TYPICAL SECTION #9:
USE IN CONJUNCTION WITH WEDGING DETAIL ON SHEET 2A
STA. 14+40.71 -YIA- TO STA. 15+65.00 -YIA-



TYPICAL SECTION #10

USE TYPICAL SECTION #10:
USE IN CONJUNCTION WITH WEDGING DETAIL ON SHEET 2A
STA. 12+15.58 -YIB- TO STA. 12+80 -YIB-



TYPICAL SECTION #11

USE TYPICAL SECTION #11:
STA. 12+80 -YIB- TO STA. 13+20.45 -YIB-

NOTE: SEE PLANS FOR TURNAROUND PAVEMENT DESIGN

NOTE: OVERLAY EXISTING YIB FROM STA. 10+00 TO 12+15.58 WITH 1.25" S9.5B

CODE	PAVEMENT SCHEDULE
C1	3.0" TYPE S9.5B
C2	1.5" TYPE SF9.5B
C3	VAR. DEPTH TYPE S9.5B
D1	4.0" TYPE I19.0B
D2	2.5" TYPE I19.0B
D3	VAR. DEPTH TYPE I19.0B
E1	7.0" TYPE B25.0B
E2	5.5" TYPE B25.0B
E3	4.0" TYPE B25.0B
E4	VAR. DEPTH TYPE B25.0B
J1	6.0" AGGREGATE BASE COURSE
T	EARTH MATERIAL
U	EXISTING PAVEMENT
W	VAR. DEPTH ASPHALT PAVEMENT

Note: Pavement Edge Slopes are 1:1 Unless Shown Otherwise

ARCADIS CGM
DATE: 7/2/2008 Time: 7:28:59 AM
Filename: C:\DOCUMENTS\ACADD\U3334A_PDP_TYP.DGN

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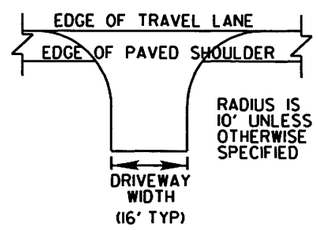
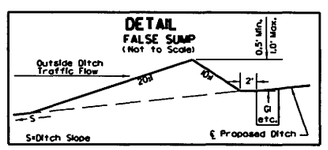
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2C
ROADWAY DESIGN ENGINEER	PAVING ENGINEER

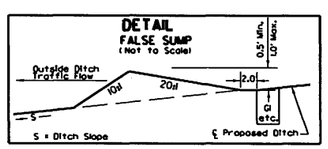
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

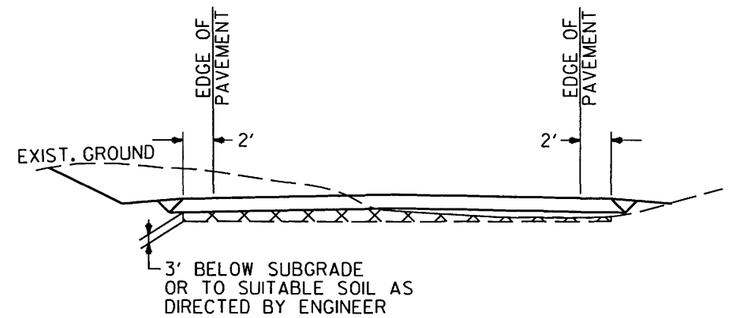
TYPICAL FOR DRIVEWAY TURNOUTS
SEE PLANS FOR DRIVEWAY LOCATIONS



SEE PLANS FOR LOCATION OF FALSE SUMPS

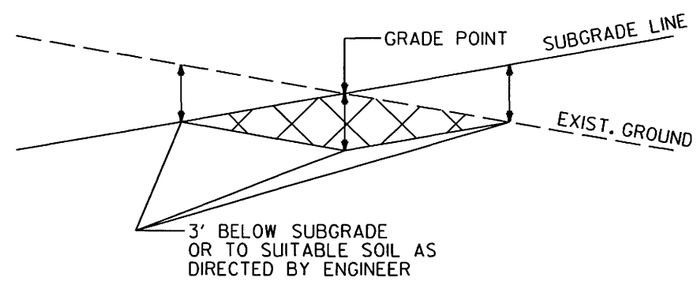






DETAIL SHOWING UNDERCUT LIMITS

STA. 10+70 TO STA. 12+75 -L-
STA. 17+00 TO STA. 19+25 -L-
STA. 59+15 TO STA. 64+25 -L-
STA. 110+50 TO STA. 124+10 -L-
STA. 12+33 TO STA. 22+86 -Y-
STA. 12+75 TO STA. 23+20 -Y1-



DETAIL OF UNDERCUT AT GRADE POINT

REVISIONS

ARCADIS G&M
Date: 6/27/2008 Time: 1:29:00 AM
F:\Projects\Roadway\Proj\U3334a_rdy_4.rpt.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2D
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

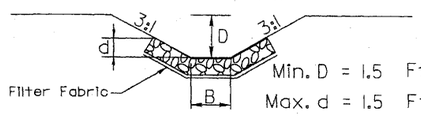
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

10' 0 20' 40'
SCALE

REVISIONS

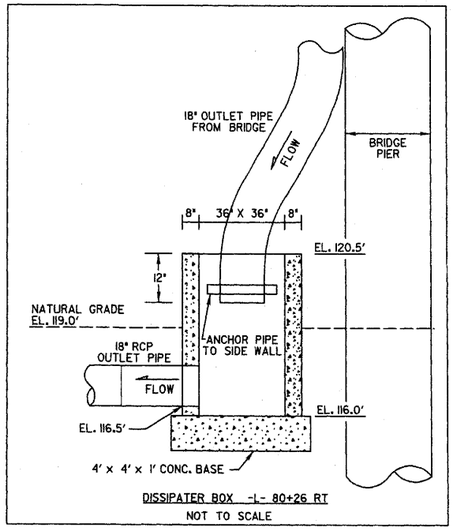
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

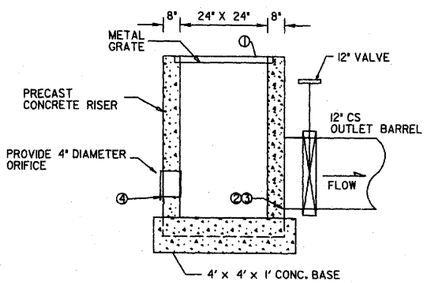


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

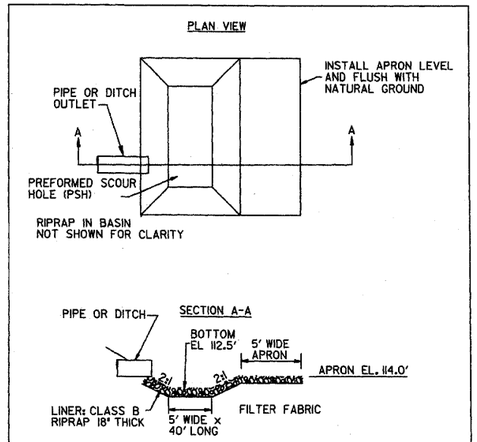


DISSIPATER BOX -L- 80+26 RT
NOT TO SCALE

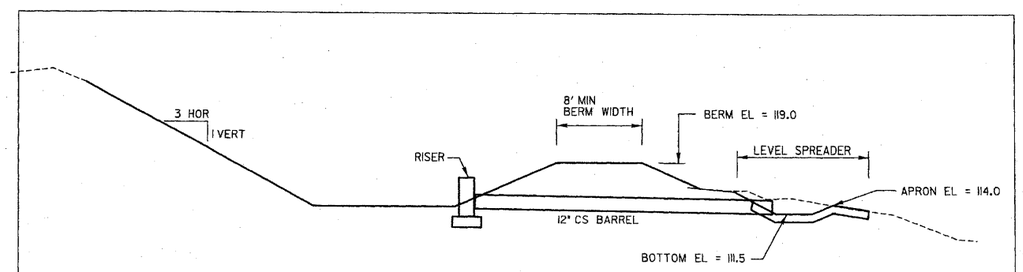


DESCRIPTION	ELEVATION
① TOP	117.0
② BOTTOM OF RISER EL.	112.0
③ OUTLET PIPE INVERT & DIAMETER	112.0
④ ORIFICE INVERT & DIAMETER	113.5 4"

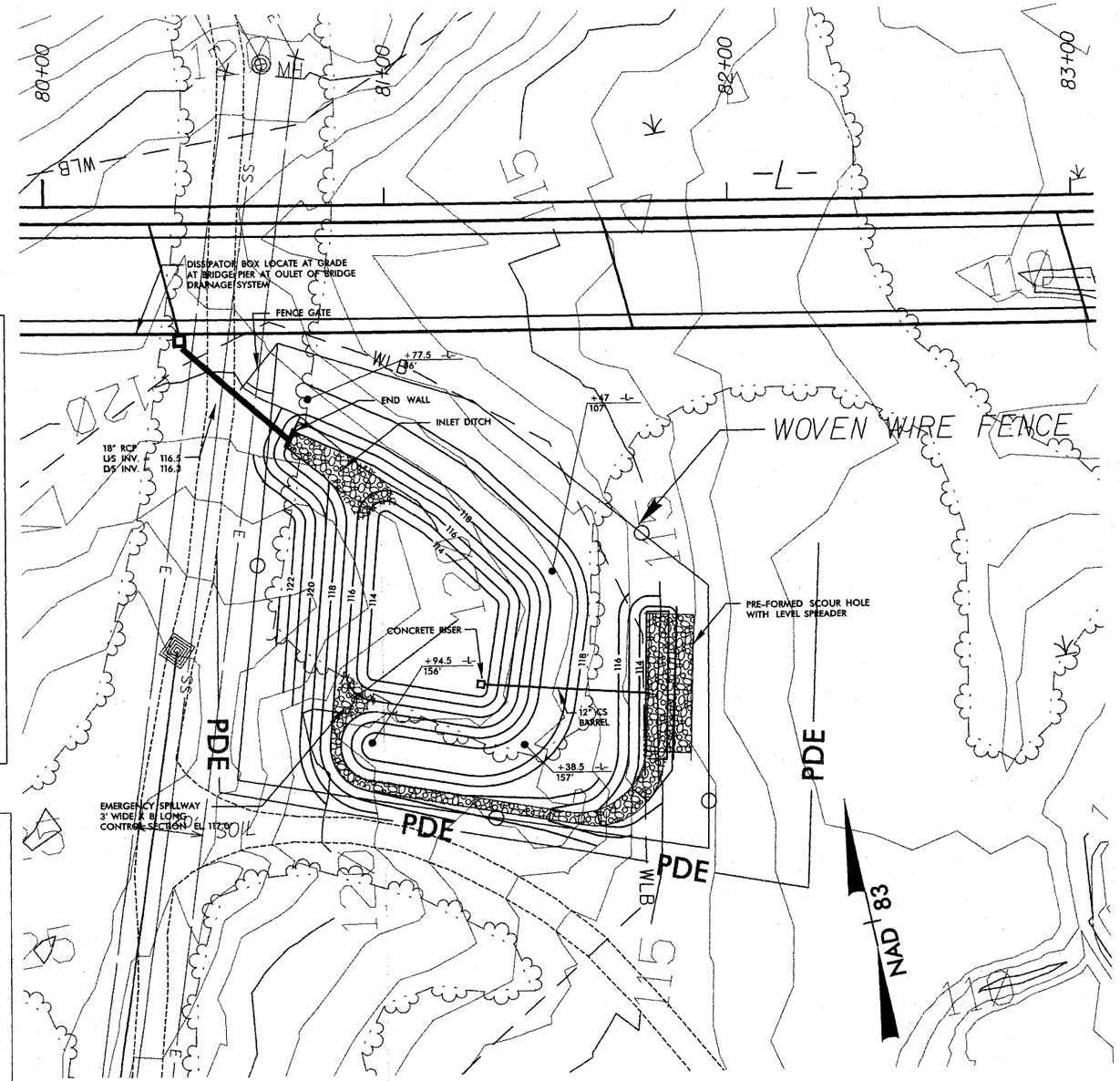
RISER DETAIL -L- 81+26 RT
NOT TO SCALE



LEVEL SPREADER



BASIN DETENTION POND TYPICAL SECTION



HAZARDOUS SPILL BASIN / DETENTION POND

ARCADIS G&M
Date: 10/30/2008 Time: 4:27:22 PM
Filename: \\cadnxp\proj\U3334a_rdy_psh_2d.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	2E
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

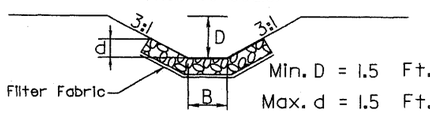
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

10' 0 20' 40'
SCALE

REVISIONS

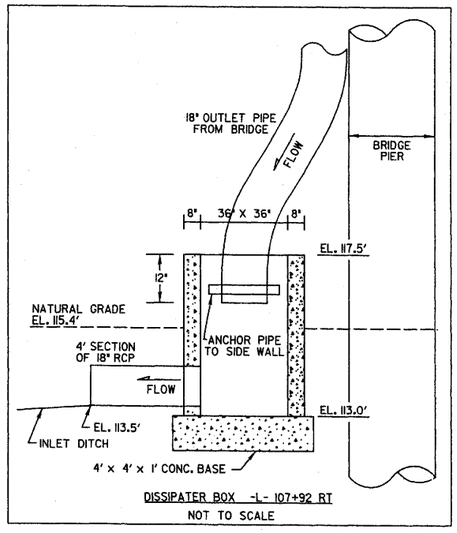
INLET DITCH and EMERGENCY SPILLWAY DITCH

(Not to Scale)

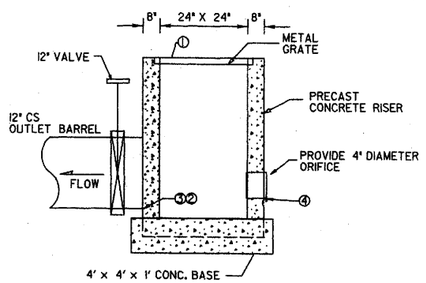


Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 3 Ft.

Type of Liner = CL B Riprap

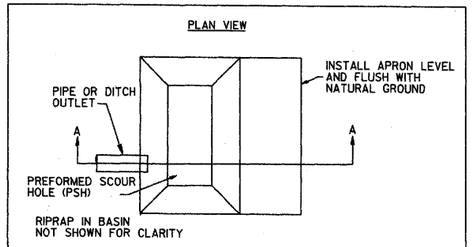


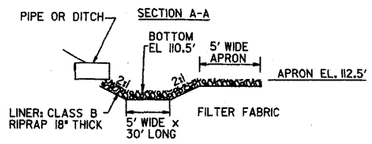
DISSIPATER BOX -L- 107+92 RT
NOT TO SCALE



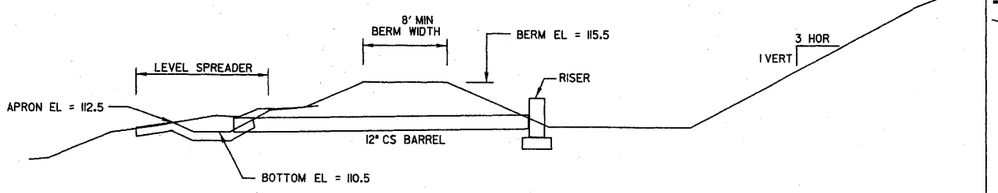
DESCRIPTION	ELEVATION
① TOP	113.5
② BOTTOM OF RISER EL.	111.0
③ OUTLET PIPE INVERT & DIAMETER	111.0
④ ORIFICE INVERT & DIAMETER	111.5 4"

RISER DETAIL -L- 107+25 LT
NOT TO SCALE

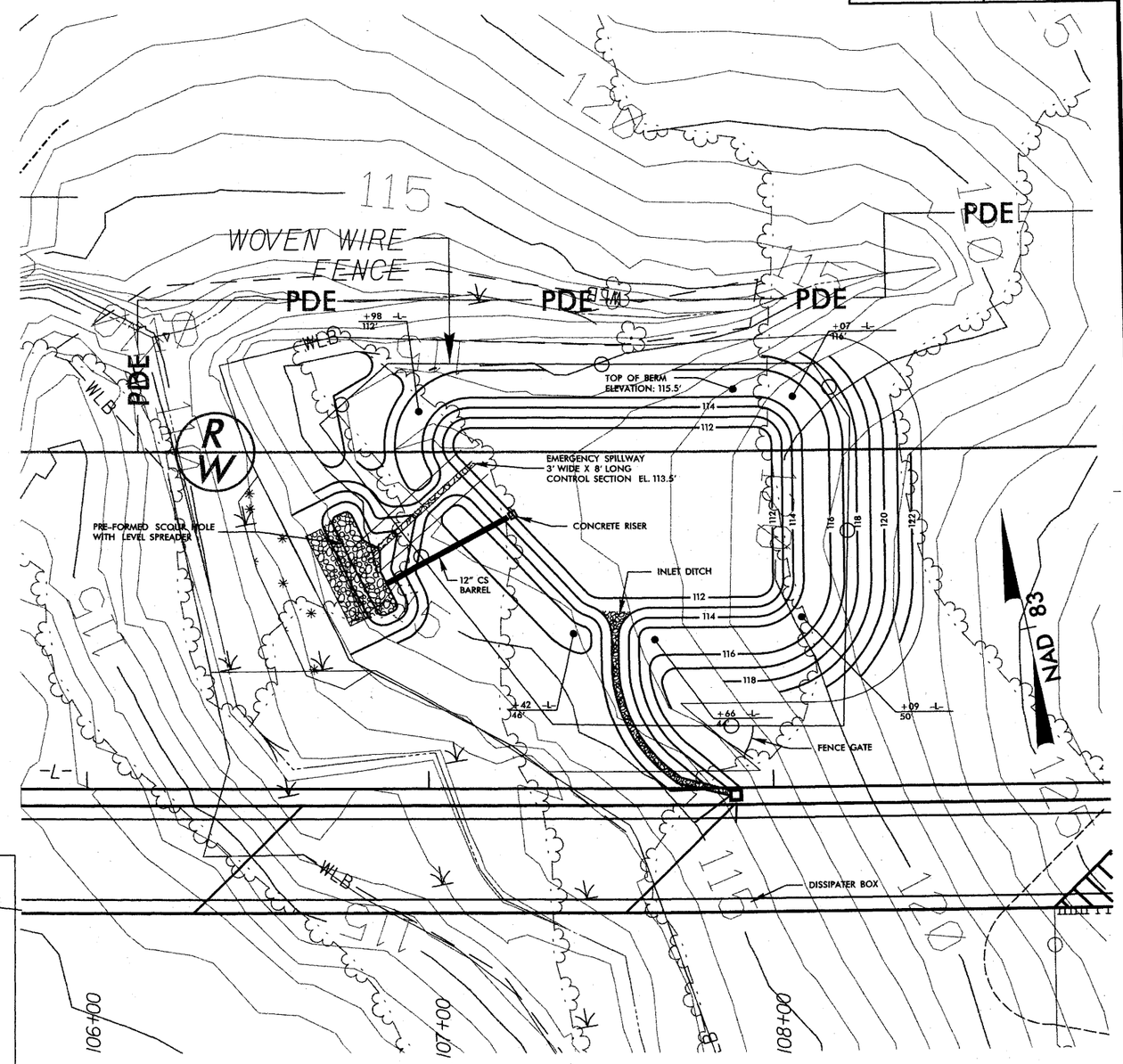




LEVEL SPREADER



BASIN TYPICAL SECTION



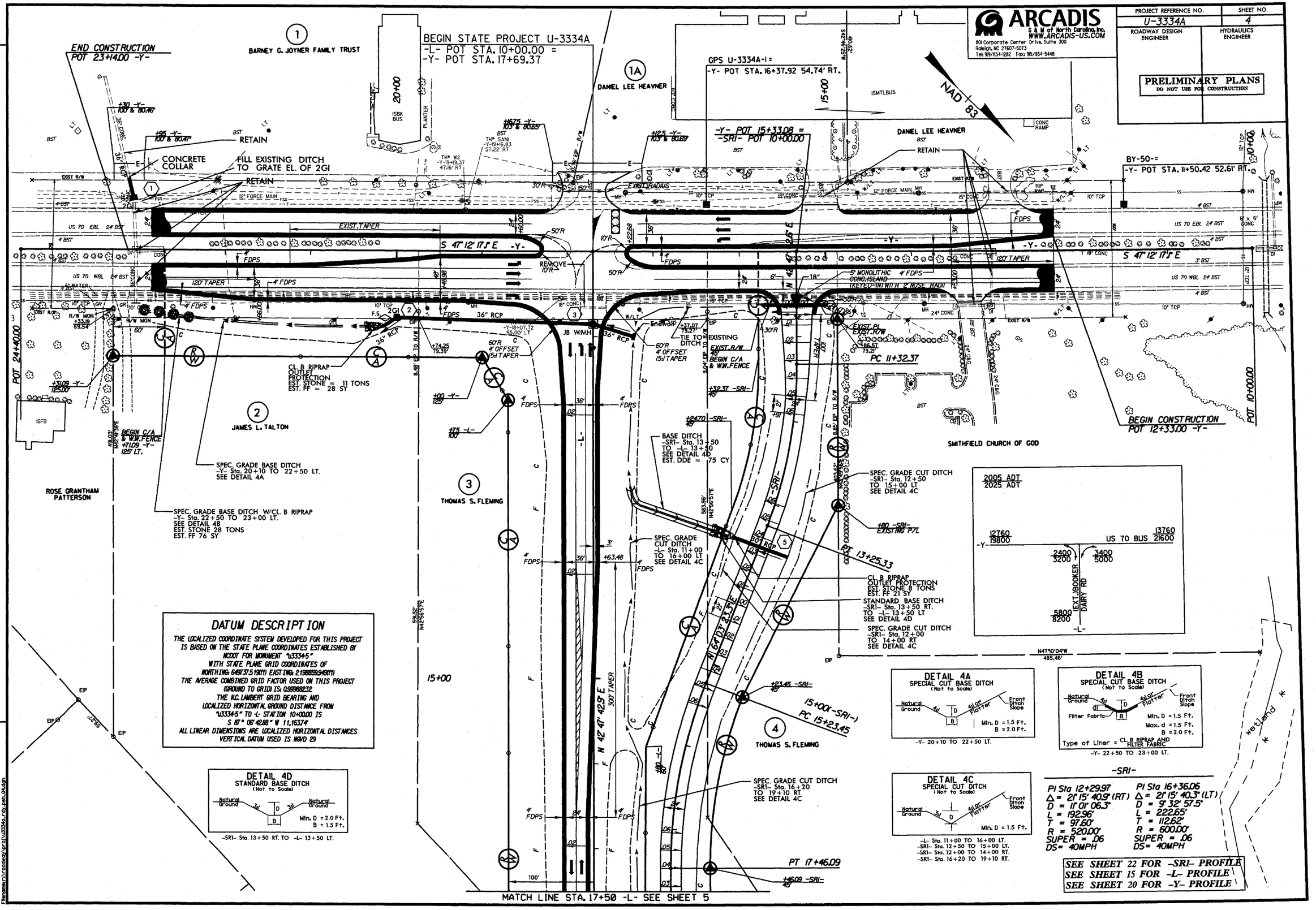
HAZARDOUS SPILL BASIN / DETENTION POND

ARCADIS G&M
Date: 3/25/2008 Time: 12:12 PM
Filename: J:\Projects\Ge3\U3334a_rdy_psh_2e.dgn

PROJECT REFERENCE NO.	SHEET NO.
U-3334A	4
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

ARCADIS
G & M of North Carolina, Inc.
WWW.ARCADIS-US.COM
801 Corporate Center Drive, Suite 300
Raleigh, NC 27607-5073
Tel: 919/854-1282 Fax: 919/854-5448

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



DATUM DESCRIPTION

THE LOCALIZED COORDINATE SYSTEM DEVELOPED FOR THIS PROJECT IS BASED ON THE STATE PLANE COORDINATES ESTABLISHED BY NCDOT FOR MONUMENT "U3334-5"
WITH STATE PLANE GRID COORDINATES OF
NORTHING: 649737.5191(M) EASTING: 2198859.9491(M)
THE AVERAGE COMBINED GRID FACTOR USED ON THIS PROJECT (GROUND TO GRID) IS: 0.99998232
THE N.C. LAMBERT GRID BEARING AND LOCALIZED HORIZONTAL GROUND DISTANCE FROM "U3334-5" TO -L- STATION 10+00.00 IS
S 87° 06' 42.88" W 11,163.74'
ALL LINEAR DIMENSIONS ARE LOCALIZED HORIZONTAL DISTANCES
VERTICAL DATUM USED IS NGVD 29

DETAIL 4D
STANDARD BASE DITCH
(Not to Scale)

Natural Ground — 3:1 — D — 3:1 — Natural Ground; B
Min. D = 2.0 Ft.
B = 1.5 Ft.

-SR1- Sta. 13+50 RT. TO -L- 13+50 LT.

DETAIL 4A
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground — 4:1 — D — 4:1 or Flatter — Front Ditch Slope; B
Min. D = 1.5 Ft.
B = 2.0 Ft.

-Y- 20+10 TO 22+50 LT.

DETAIL 4B
SPECIAL CUT BASE DITCH
(Not to Scale)

Natural Ground — 4:1 — d — D — 4:1 or Flatter — Front Ditch Slope; Filter Fabric; B
Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
B = 2.0 Ft.
Type of Liner = CL B RIPRAP AND FILTER FABRIC

-Y- 22+50 TO 23+00 LT.

DETAIL 4C
SPECIAL CUT DITCH
(Not to Scale)

Natural Ground — 3:1 — D — 4:1 or Flatter — Front Ditch Slope
Min. D = 1.5 Ft.

-L- Sta. 11+00 TO 16+00 LT.
-SR1- Sta. 12+50 TO 15+00 LT.
-SR1- Sta. 12+00 TO 14+00 RT.
-SR1- Sta. 16+20 TO 19+10 RT.

-SR1-

PI Sta 12+29.97	PI Sta 16+36.06
Δ = 21° 15' 40.9" (RT)	Δ = 21° 15' 40.3" (LT)
D = 11° 01' 06.3"	D = 9° 32' 57.5"
L = 192.96'	L = 222.65'
T = 97.60'	T = 112.62'
R = 520.00'	R = 600.00'
SUPER = .06	SUPER = .06
DS = 40MPH	DS = 40MPH

SEE SHEET 22 FOR -SR1- PROFILE
SEE SHEET 15 FOR -L- PROFILE
SEE SHEET 20 FOR -Y- PROFILE

REVISIONS

ARCADIS G&M
Date: 3/26/2008 Time: 10:04:41 PM
Filename: u3334a_hydraulic_plan_sheet_04.dgn

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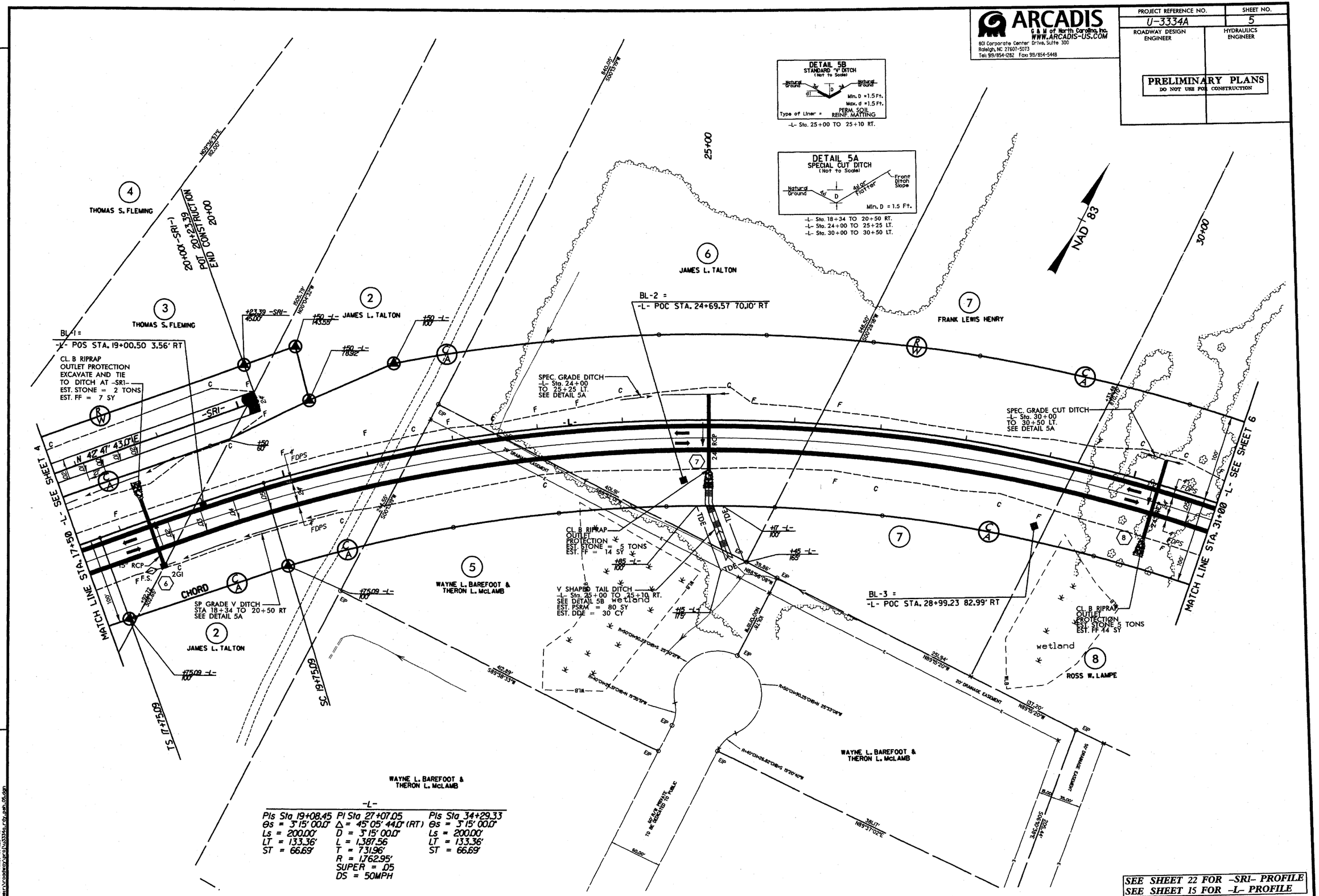
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	5
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 22 FOR -SRI- PROFILE
SEE SHEET 15 FOR -L- PROFILE

ARCADIS G&M
Date: 3/26/2009 Time: 10:46:25 PM
File: Drawing1 (Modeled) (Layout) U3334a_dr01_sum_05.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	6
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

NAD 83

MATCH LINE STA. 31+00 -L- SEE SHEET 5

MATCH LINE STA. 43+00 -L- SEE SHEET 7

8 ROSS W. LAMPE

RECENT LOGGING

35+00

40+00

wetland

SANITARY SEWER EASEMENT

BASE DITCH
-L- Sta. 34+90 TO 35+00 RT
SEE DETAIL 6A
EST. PSRM = 65 SY
EST. DDE = 40 CY

+62.65 -L-

CHORD

Endwall

36" RCP

10" TCP

BL-4 =
-L- POT STA. 38+10.2112.33' LT

10 SANDRA S. MEACHEM

11 WALTER SANDERS, JR. HEIRS

12 SANDRA S. MEACHEM

13 WILLIAM W. SMITH, JR. ET AL

S 85°36'33.5" E

42" RCP
Equalizer Pipe

Endwall

CS 33+62.65

ST 35+62.65

+00.00 -L-

9 NEUSE FORESTRY, LLC

CL. B RIPRAP
OUTLET PROTECTION
EST. STONE 7 TONS
EST. FF 22 SY

DETAIL 6A
STANDARD BASE DITCH
(Not To Scale)

Natural Ground — d — D — d — Natural Ground
PSRM — B

Min. D = 1.5 Ft.
Max. d = 1.0 Ft.
B = 3.0 Ft.

* When B is < 6.0'

Type of Liner = PERMANENT SOIL REINF. MATTING

-L- Sta. 34+90 TO 35+00 LT

WAYNE L. BAREFOOT & THERON L. MCLAMB

NOTE:
A FUTURE ACCESS POINT IS DESIGNATED AT LEFT AND RIGHT OF -L- Sta. 35+90 FOR PLACEMENT OF A ROAD AS DETERMINED BY THE CITY OF SMITHFIELD.

ARCADIS C&M
Date: 3/26/2008 Time: 10:46:26 PM
P:\Projects\U3334a\U3334a_r-of_path_06.dgn

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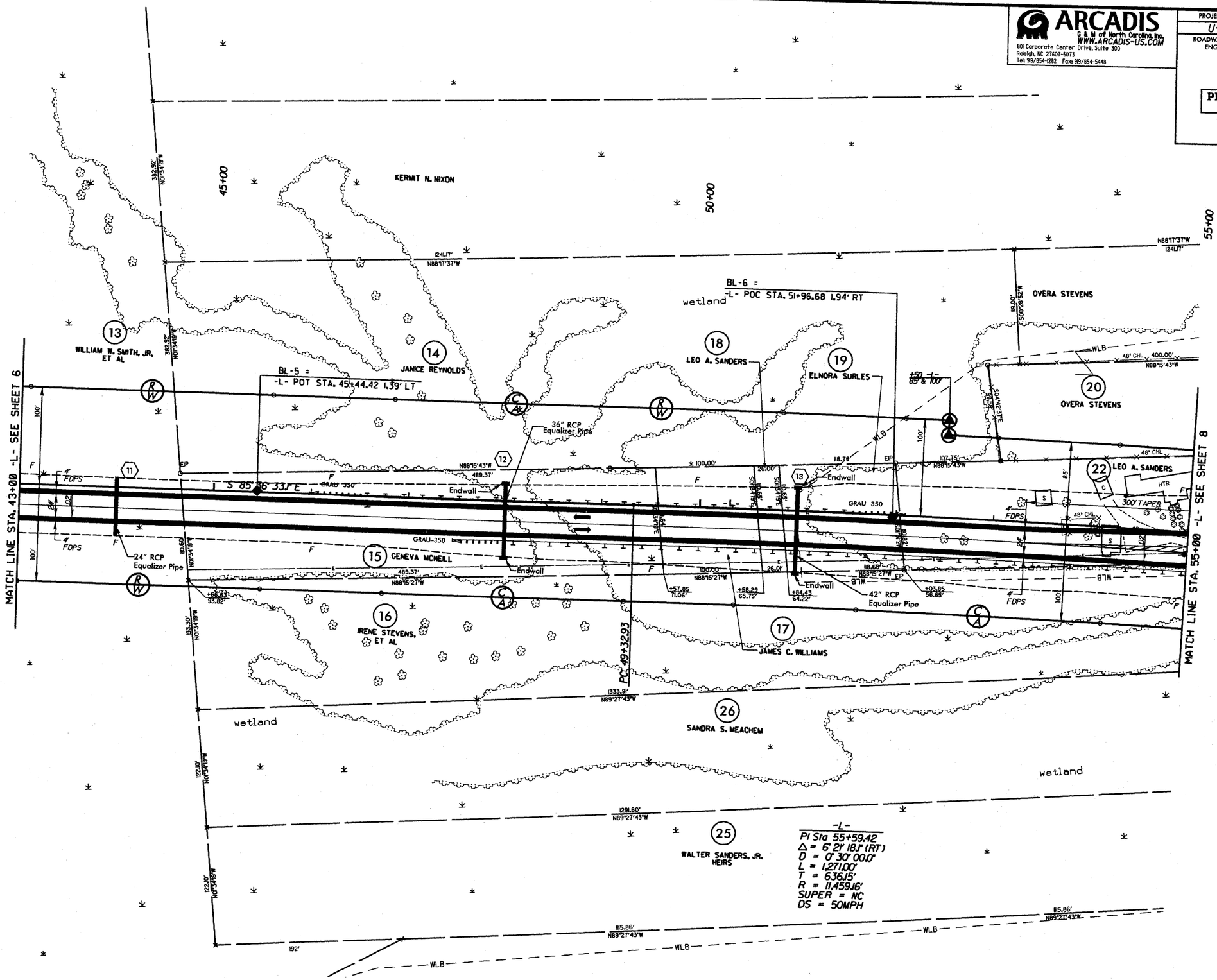
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	7
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE SHEET 16 FOR -L- PROFILE

REVISIONS

ARCADIS G&M
Date:3/26/2008 Time: 10:42:27 PM
P:\Members\roadway\proj\U3334a_rdy_pah_07.dgn

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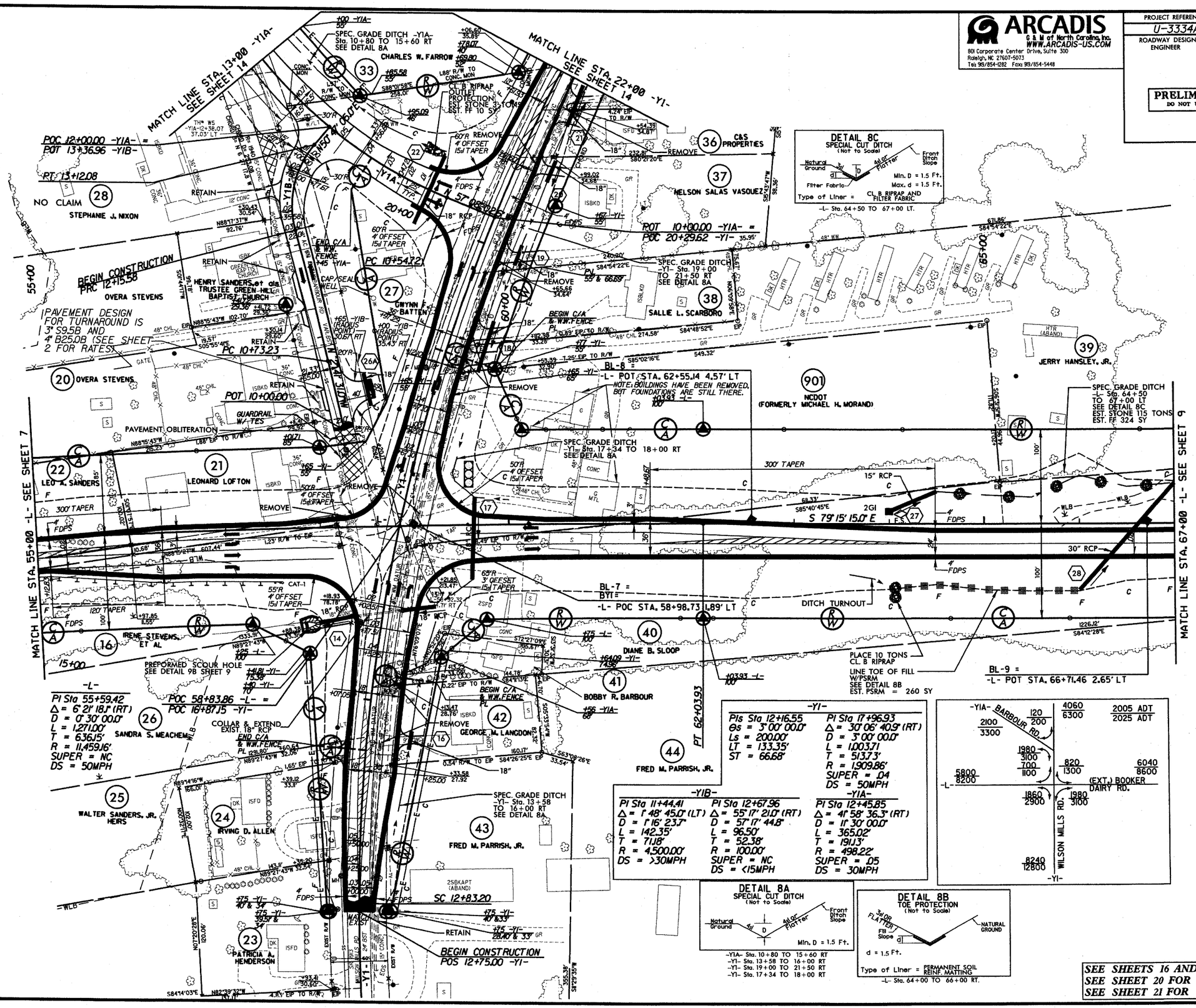
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	8
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEETS 16 AND 17 FOR -L- PROFILE
SEE SHEET 20 FOR -Y1- PROFILE
SEE SHEET 21 FOR -Y1A- PROFILE

ARCADIS G&M
Date: 3/26/2008 Time: 10:40:28 PM
File: Drawing1 Model(s): U3334a_rdy_psh_08.dgn

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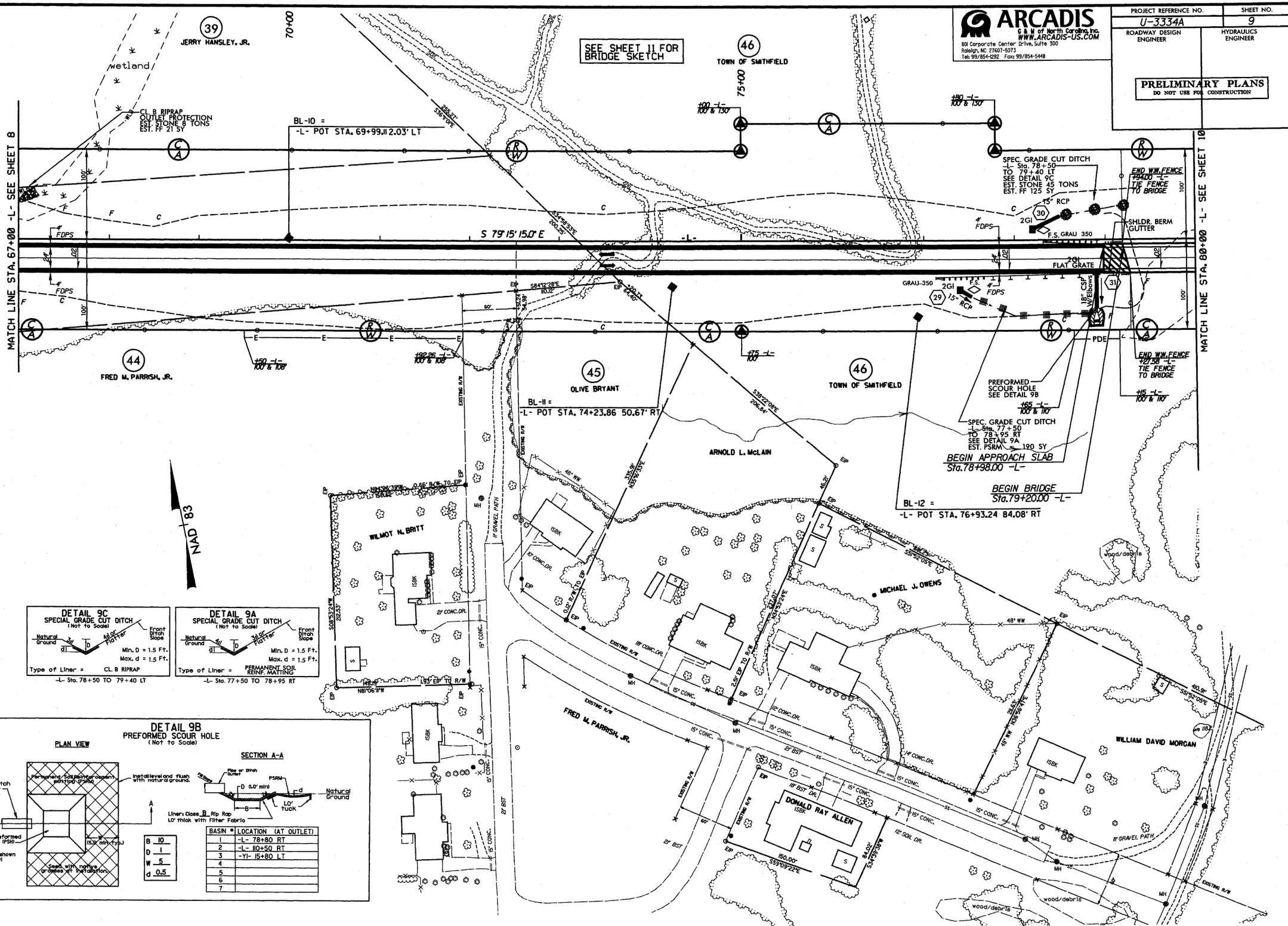
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	9
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



REVISIONS

ARCADIS G&M
Date:3/28/2008 Time: 10:14:23 PM
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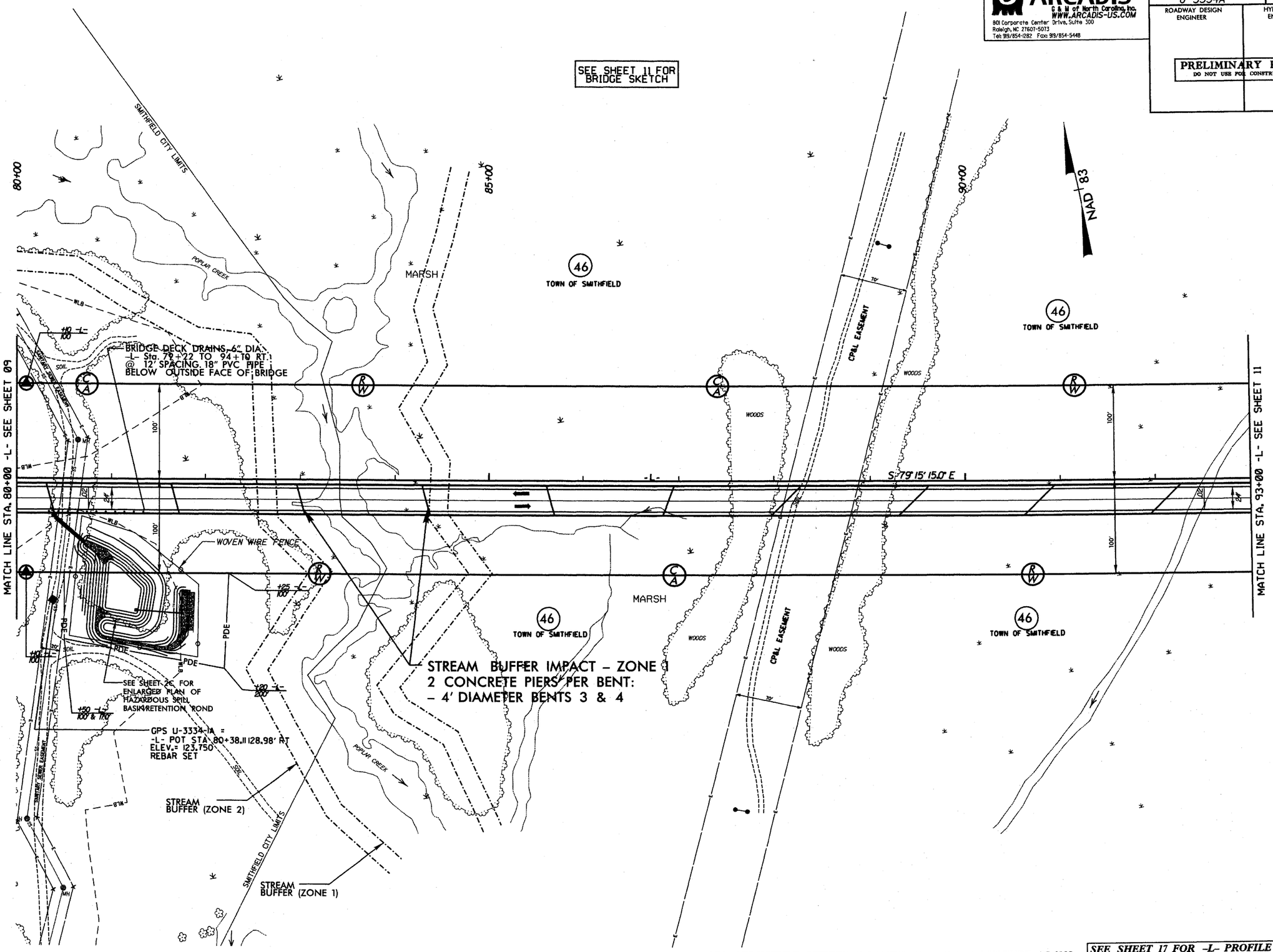
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	10
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEET 17 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

ARCADIS G&M
Default / 08/12/2008 Time: 10:43:30 PM
Filename=n:\roadway\proj\u3334a_rdy_path_10.dgn

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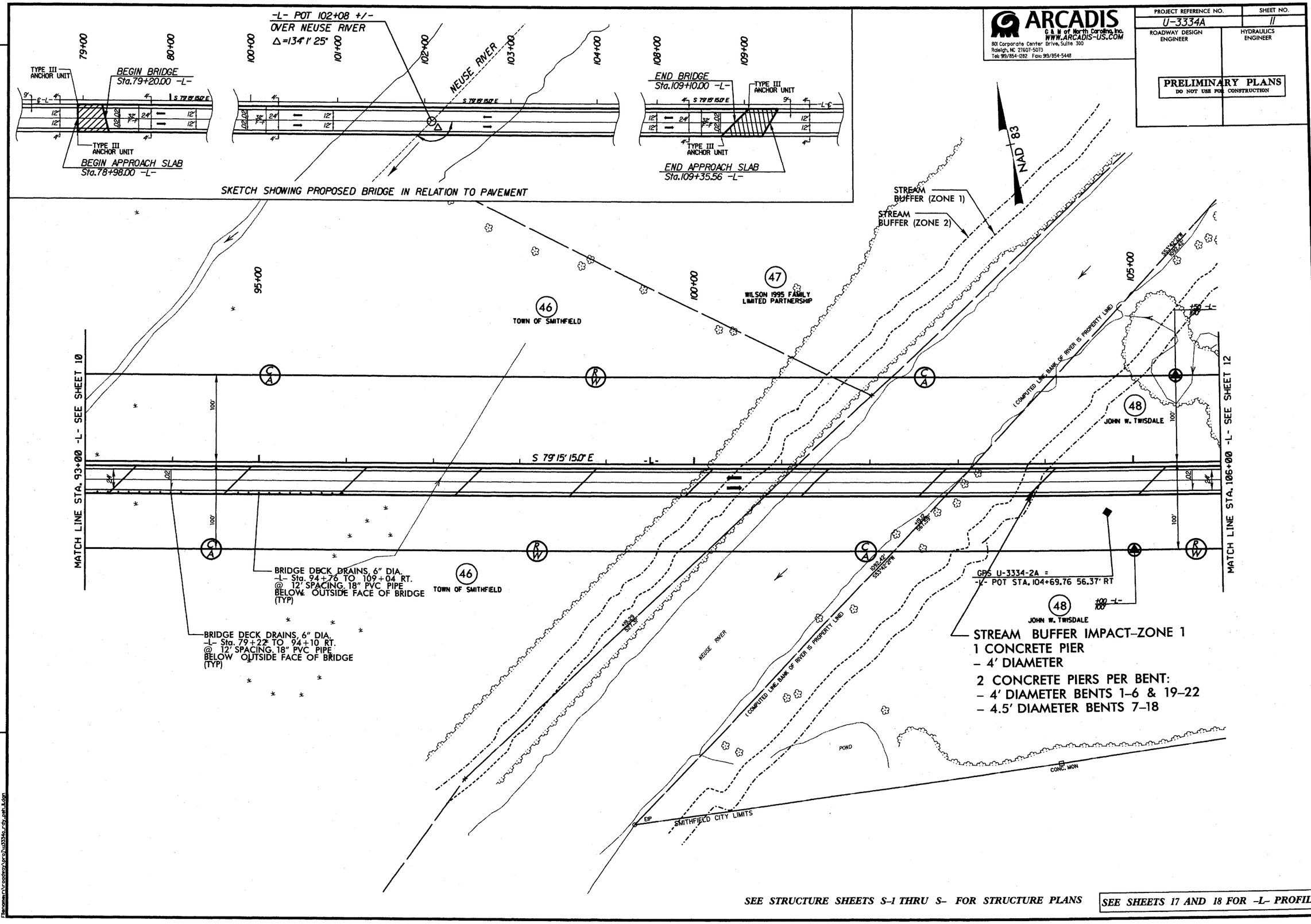
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	11
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



SEE STRUCTURE SHEETS S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEETS 17 AND 18 FOR -L- PROFILE

REVISIONS

ARCADIS C&M
Date: 3/26/2008 Time: 10:43:11 PM
Filename: n:\r:\odeo\proj\u3334a_rdy_path_1.dgn

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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	12
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

-L-
PI Sta 122+21.84
Δ = 6°18' 45.6" (LT)
D = 0°30' 00.0"
L = 1,262.53'
T = 631.91'
R = 11,459.16'
SUPER = NC
DS = 50MPH

DETAIL 12A
STANDARD BASE DITCH
(Not to Scale)

Min. D = 1.0 Ft.
Max. d = 1.0 Ft.
B = 4.0 Ft.
* When B is < 6.0'
Type of Liner = PERMANENT SOIL REINF. MATTING
-L- Sta. 107+90 TO 109+10 RT
-L- Sta. 108+50 TO 111+00 LT

DETAIL 12B
SPECIAL CUT DITCH
(Not to Scale)

Min. D = 1.5 Ft.
Max. d = 1.5 Ft.
Type of Liner = CL. B RIPRAP
-L- Sta. 109+10 TO 110+50 RT

SEE STRUCTURES SHEET S-1 THRU S- FOR STRUCTURE PLANS

SEE SHEET 18 FOR -L- PROFILE
SEE SHEET 11 FOR BRIDGE SKETCH

REVISIONS

ARCADIS G&M
Date: 3/26/2008 Time: 10:43:32 PM
Filename: n:\roadway\proj\u3334c_rdy_path_12.dgn

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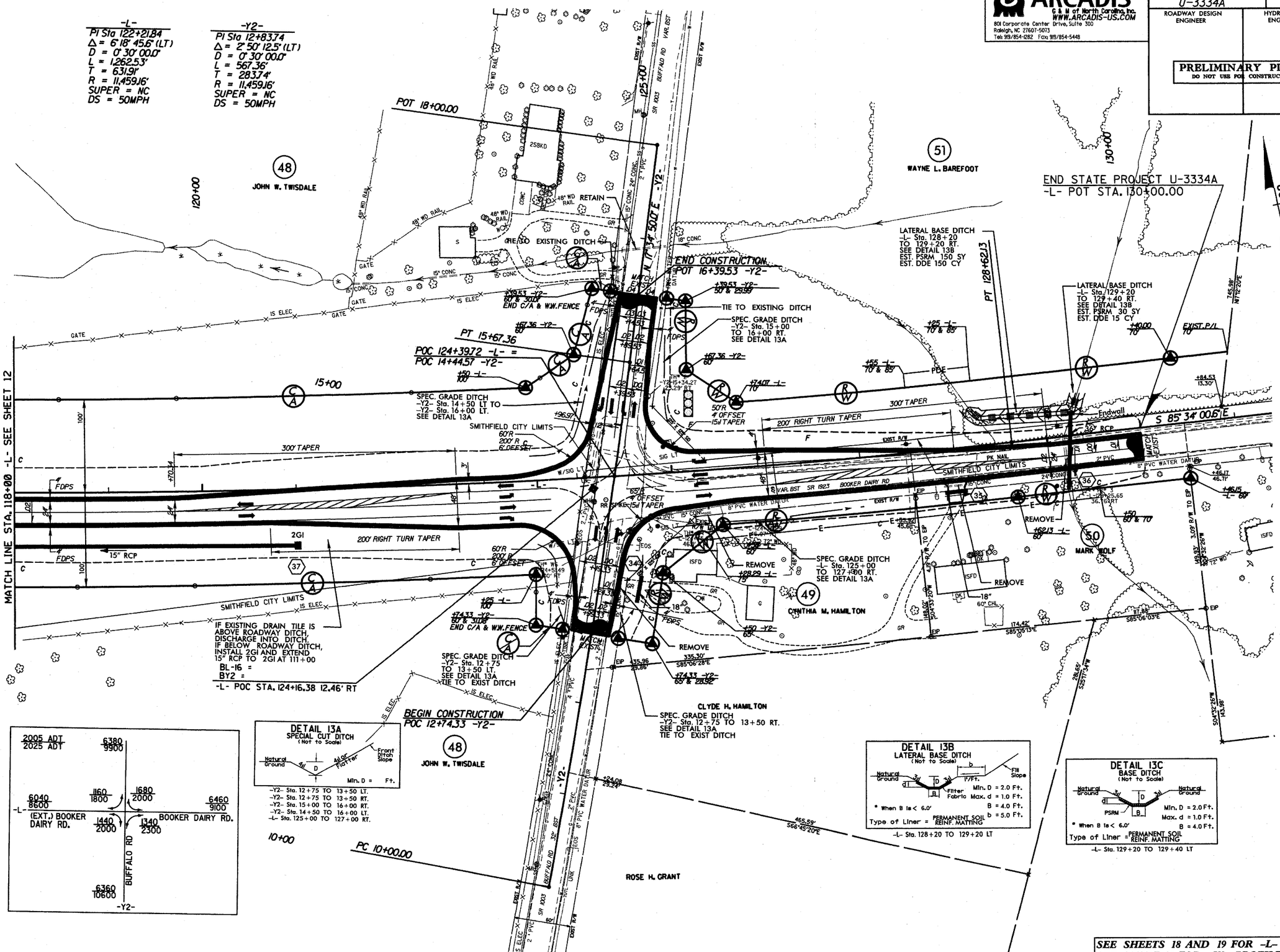
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	13
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS

-L-
PI Sta 122+21.84
Δ = 6° 18' 45.6" (LT)
D = 0° 30' 00.0"
L = 1,262.53'
T = 631.91'
R = 11,459.16'
SUPER = NC
DS = 50MPH

-Y2-
PI Sta 12+83.74
Δ = 2° 50' 12.5" (LT)
D = 0° 30' 00.0"
L = 567.36'
T = 283.74'
R = 11,459.16'
SUPER = NC
DS = 50MPH



SEE SHEETS 18 AND 19 FOR -L- PROFILE
SEE SHEET 21 FOR -Y2- PROFILE

ARCADIS G&M
Date: 3/26/2008 Time: 10:14:33 PM
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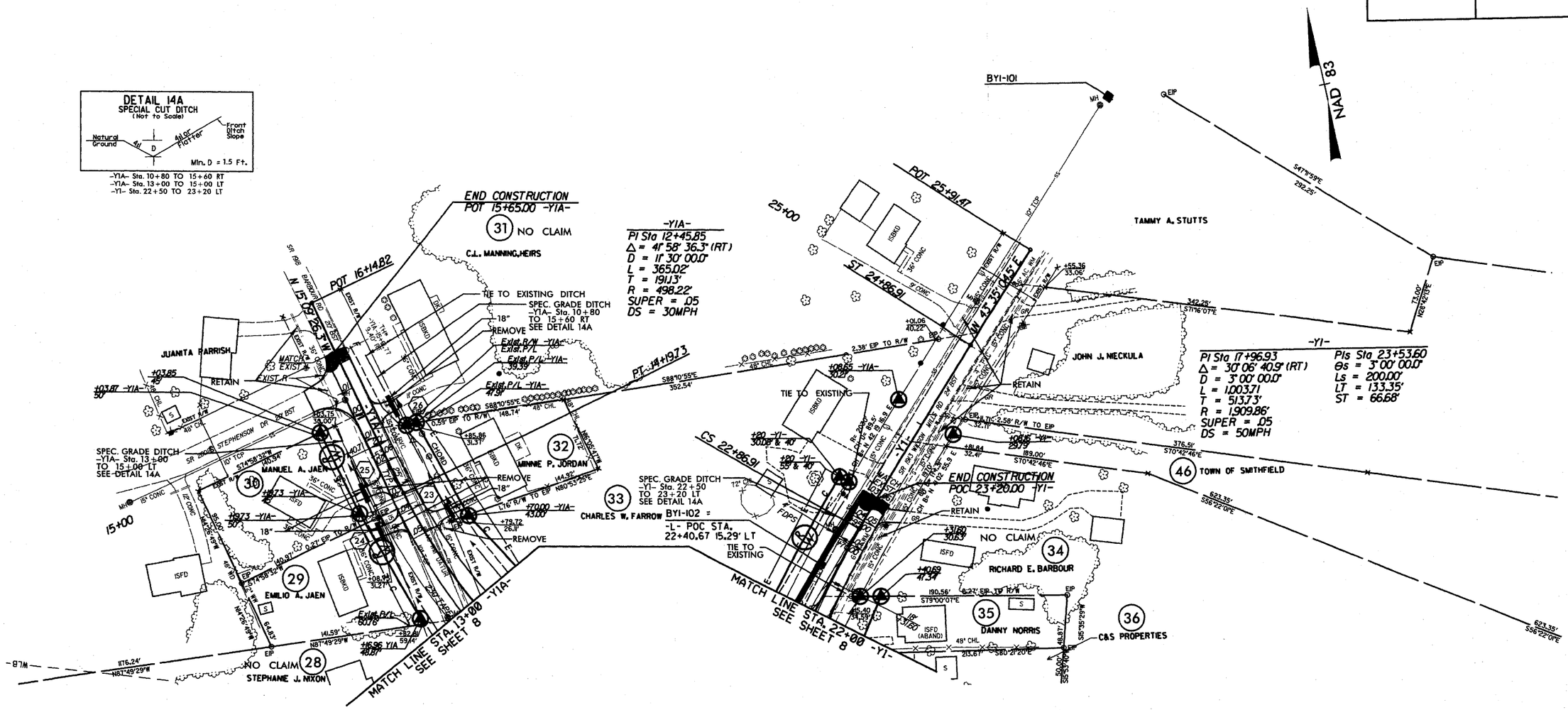
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	14
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

REVISIONS



SEE SHEET 20 FOR -Y1- PROFILE
SEE SHEET 21 FOR -Y1A- PROFILE

ARCADIS CAM
Date: 10/29/2008 Time: 10:43:34 PM
Filename: Y:\roadway\proj\U3334a_r-dy_pph_14.dgn

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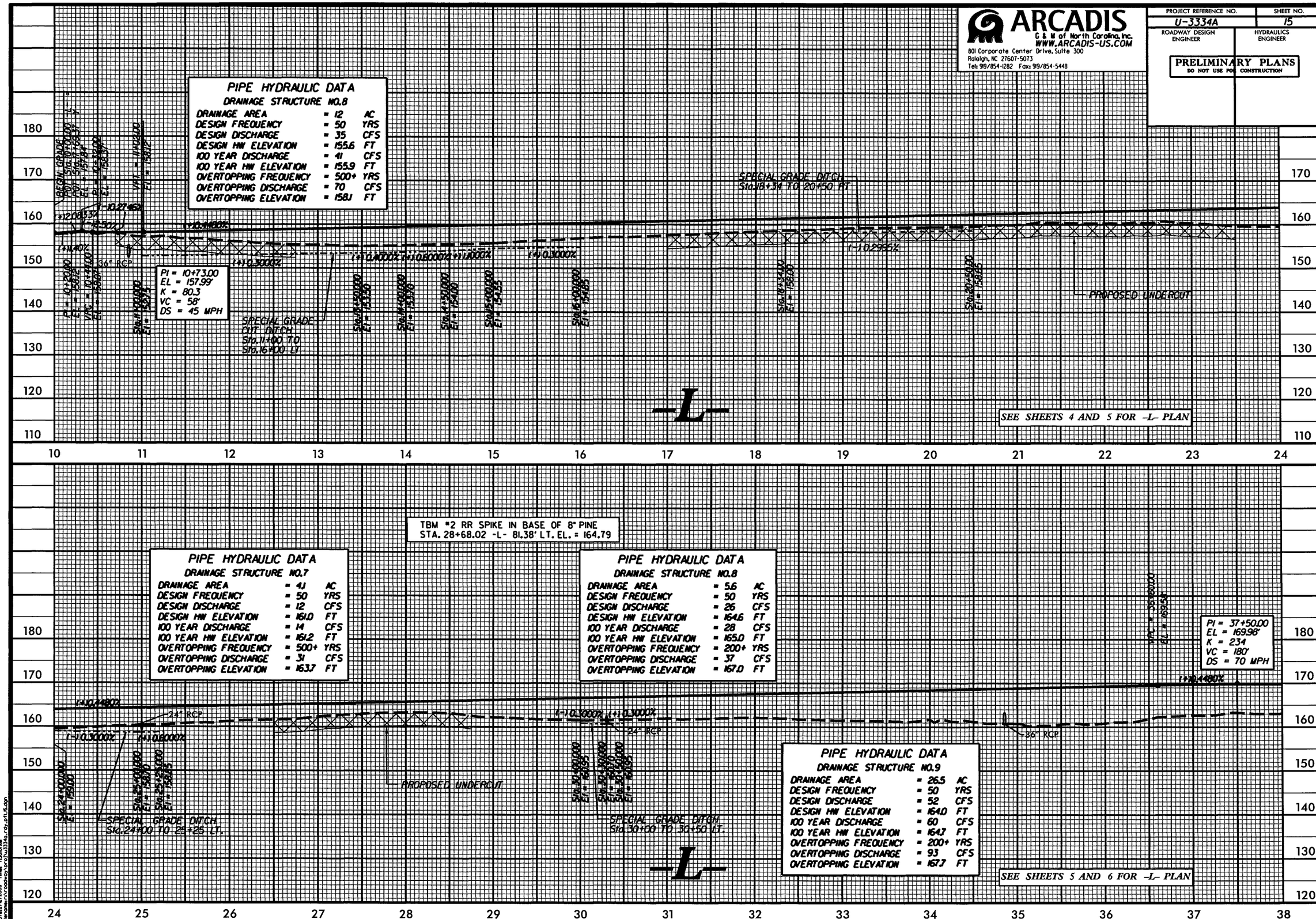
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	15
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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Date: 2/12/2008 Time: 7:30:00 AM
Filename: r:\roadway\proj\u3334a_rdy_pl_6.dgn

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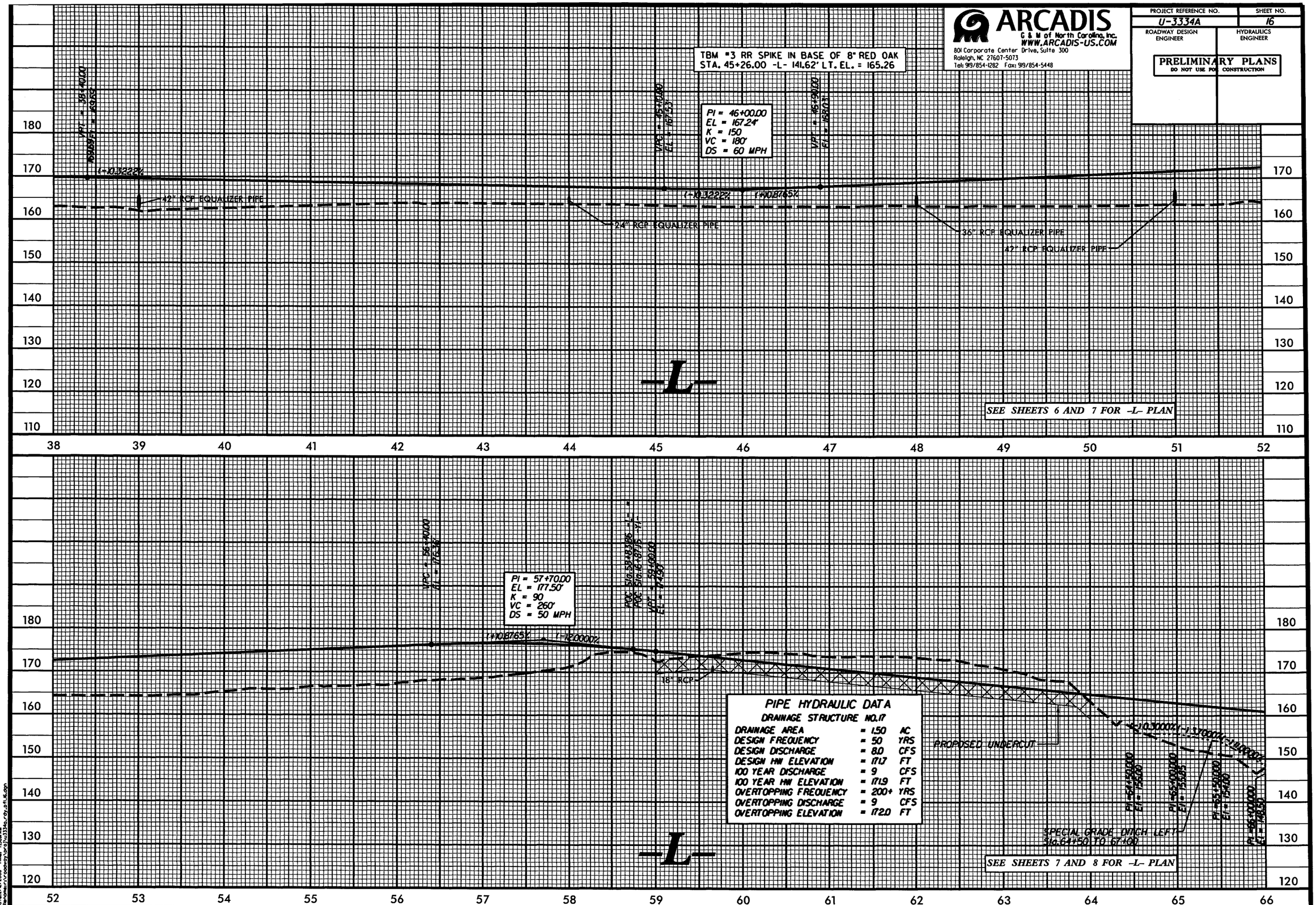
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	16
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 17

DRAINAGE AREA	= 1.50	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 8.0	CFS
DESIGN HW ELEVATION	= 171.7	FT
100 YEAR DISCHARGE	= 9	CFS
100 YEAR HW ELEVATION	= 171.9	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 9	CFS
OVERTOPPING ELEVATION	= 172.0	FT

ARCADIS CAM
Date: 2/12/2008 Time: 7:30AM
File Name: P:\Projects\Active\U-3334A_rdy_01HL.dgn

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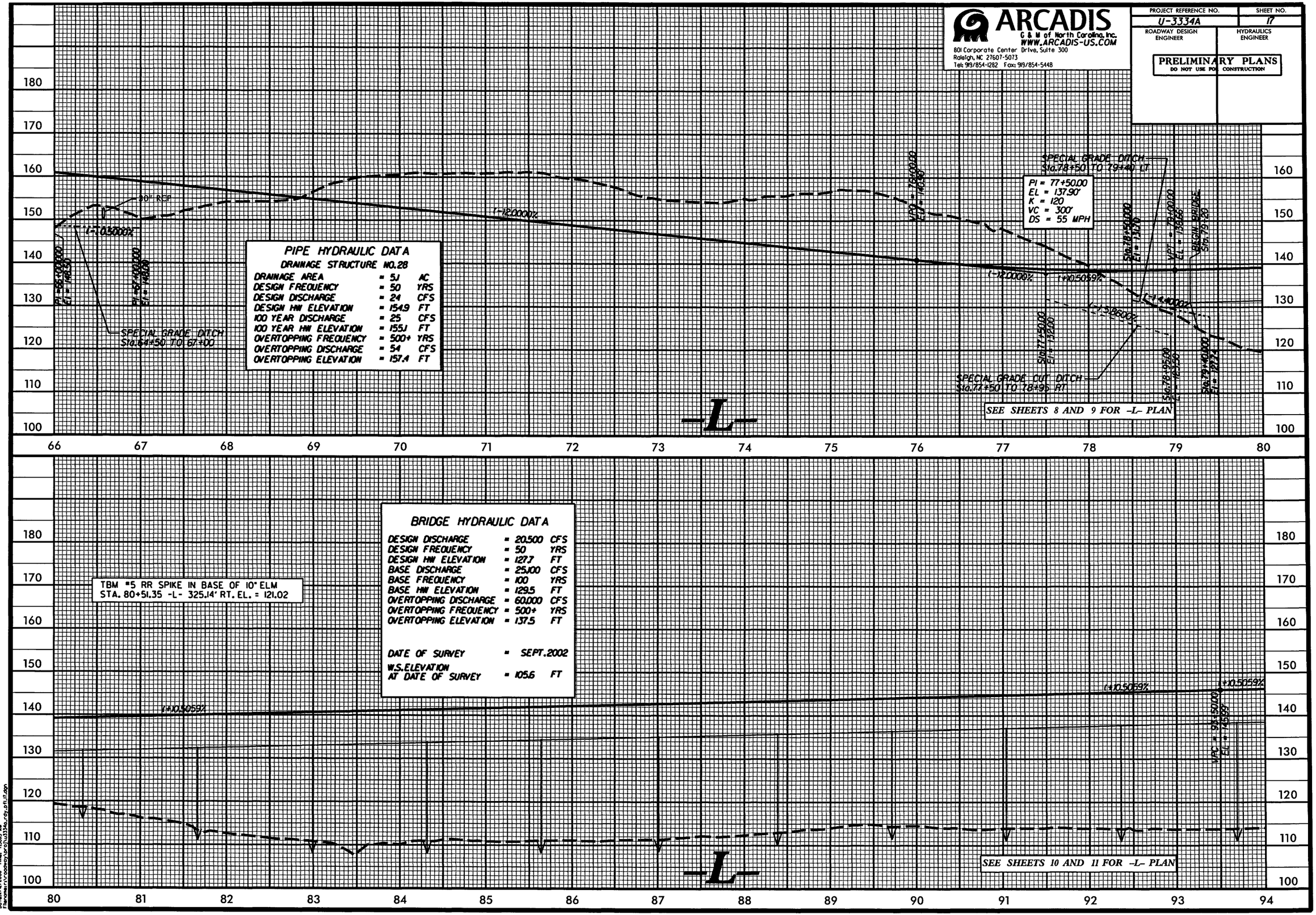
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	17
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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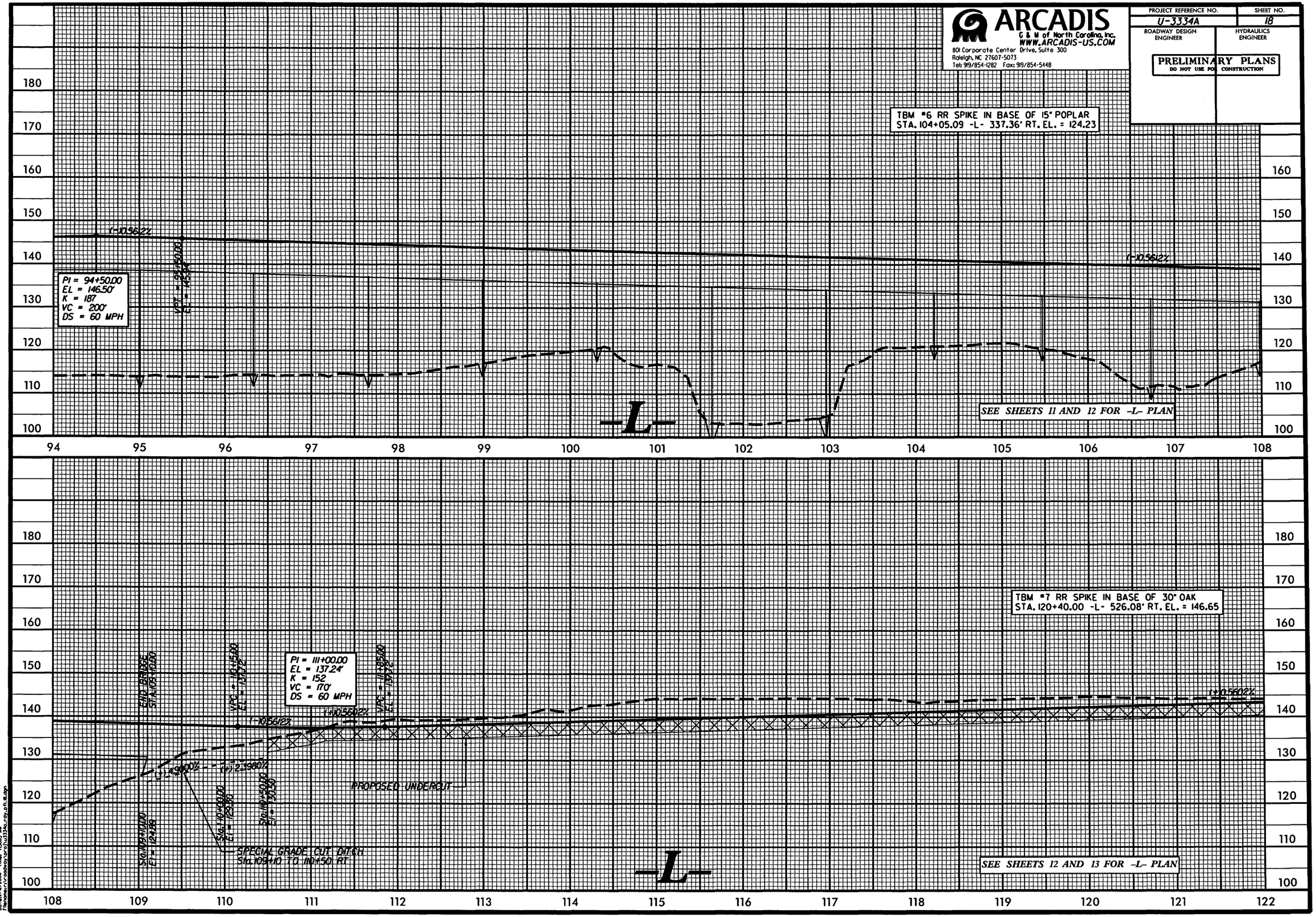
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	18
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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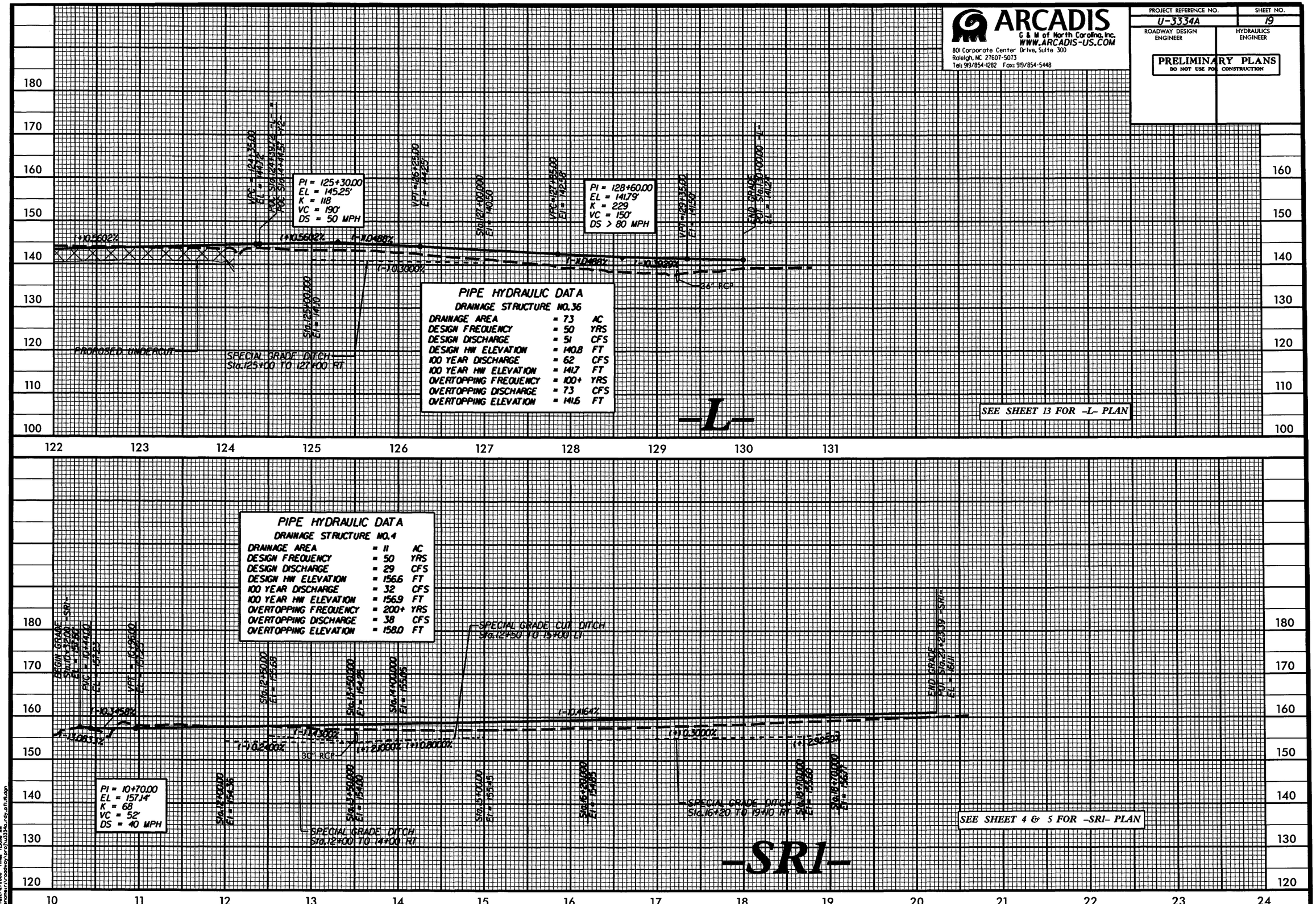
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	19
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 36

DRAINAGE AREA	= 73	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 51	CFS
DESIGN HW ELEVATION	= 140.8	FT
100 YEAR DISCHARGE	= 62	CFS
100 YEAR HW ELEVATION	= 141.7	FT
OVERTOPPING FREQUENCY	= 100+	YRS
OVERTOPPING DISCHARGE	= 73	CFS
OVERTOPPING ELEVATION	= 141.6	FT

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO. 4

DRAINAGE AREA	= 11	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 29	CFS
DESIGN HW ELEVATION	= 156.6	FT
100 YEAR DISCHARGE	= 32	CFS
100 YEAR HW ELEVATION	= 156.9	FT
OVERTOPPING FREQUENCY	= 200+	YRS
OVERTOPPING DISCHARGE	= 38	CFS
OVERTOPPING ELEVATION	= 158.0	FT

ARCADIS G&M
Date: 07/07/2008 Time: 1:30:06 AM
Filename: I:\roadway\proj\u3334a_rdy_sri_h.dgn

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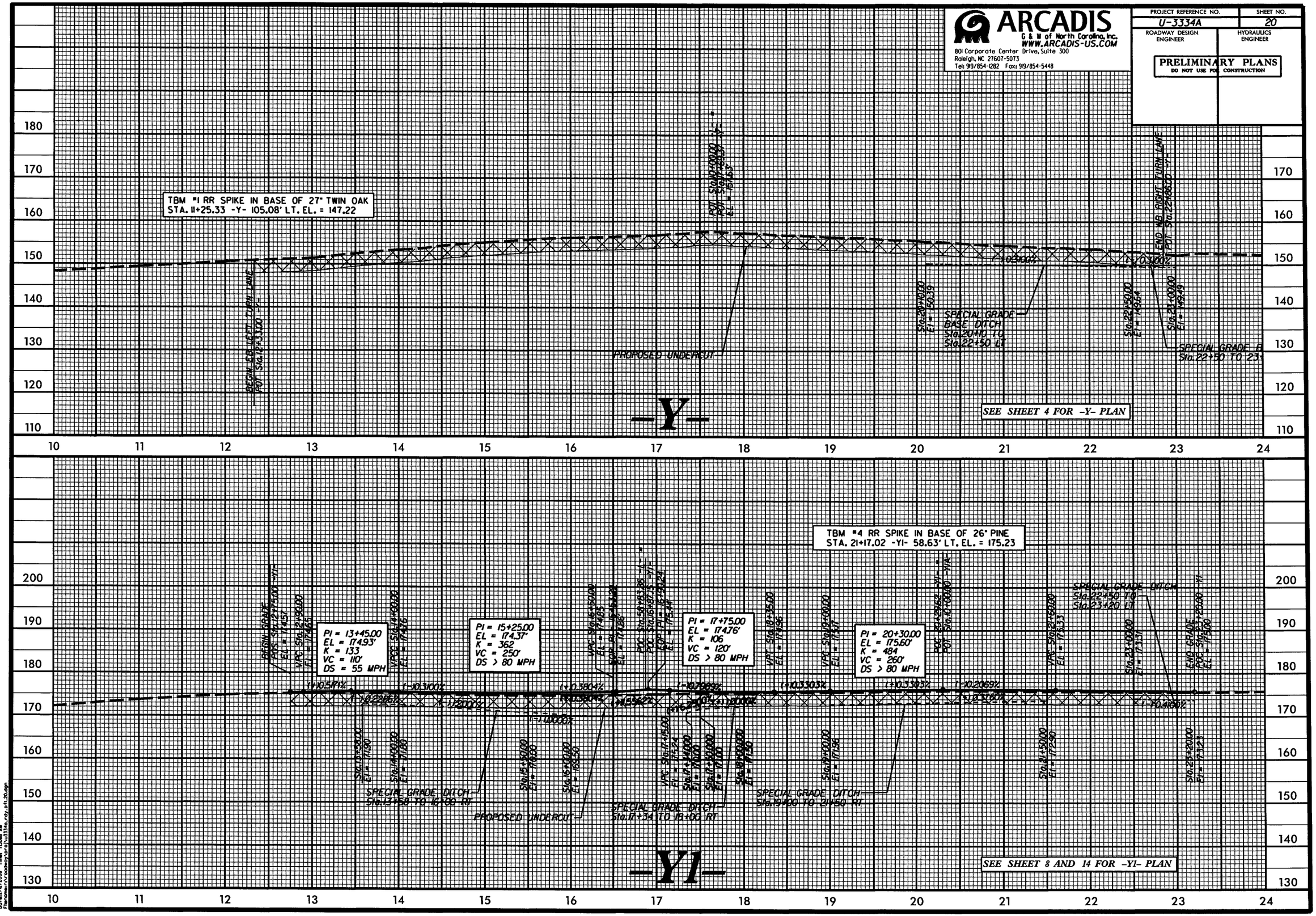
PROJECT REFERENCE NO.	SHEET NO.
U-3334A	20
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION



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Date:2/12/2008 Time: 1:20:48 AM
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PROJECT REFERENCE NO.	SHEET NO.
U-3334A	21
ROADWAY DESIGN ENGINEER	HYDRAULICS ENGINEER

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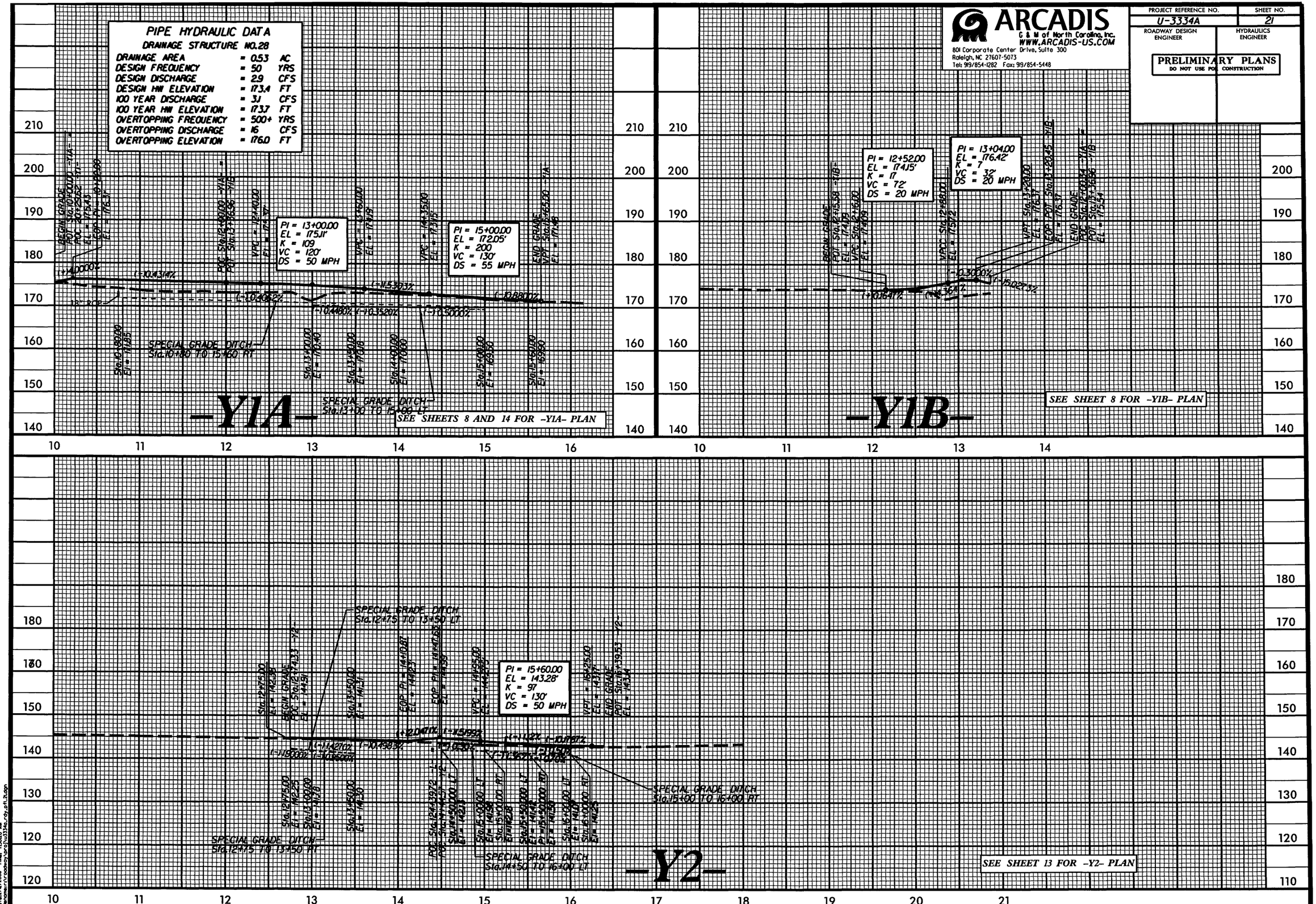
PRELIMINARY PLANS
DO NOT USE FOR CONSTRUCTION

PIPE HYDRAULIC DATA
DRAINAGE STRUCTURE NO.28

DRAINAGE AREA	= 0.53	AC
DESIGN FREQUENCY	= 50	YRS
DESIGN DISCHARGE	= 2.9	CFS
DESIGN HW ELEVATION	= 173.4	FT
100 YEAR DISCHARGE	= 3.1	CFS
100 YEAR HW ELEVATION	= 173.7	FT
OVERTOPPING FREQUENCY	= 500+	YRS
OVERTOPPING DISCHARGE	= 16	CFS
OVERTOPPING ELEVATION	= 176.0	FT



ARCADIS G&M
Date: 07/07/2008 Time: 3:50:00 AM
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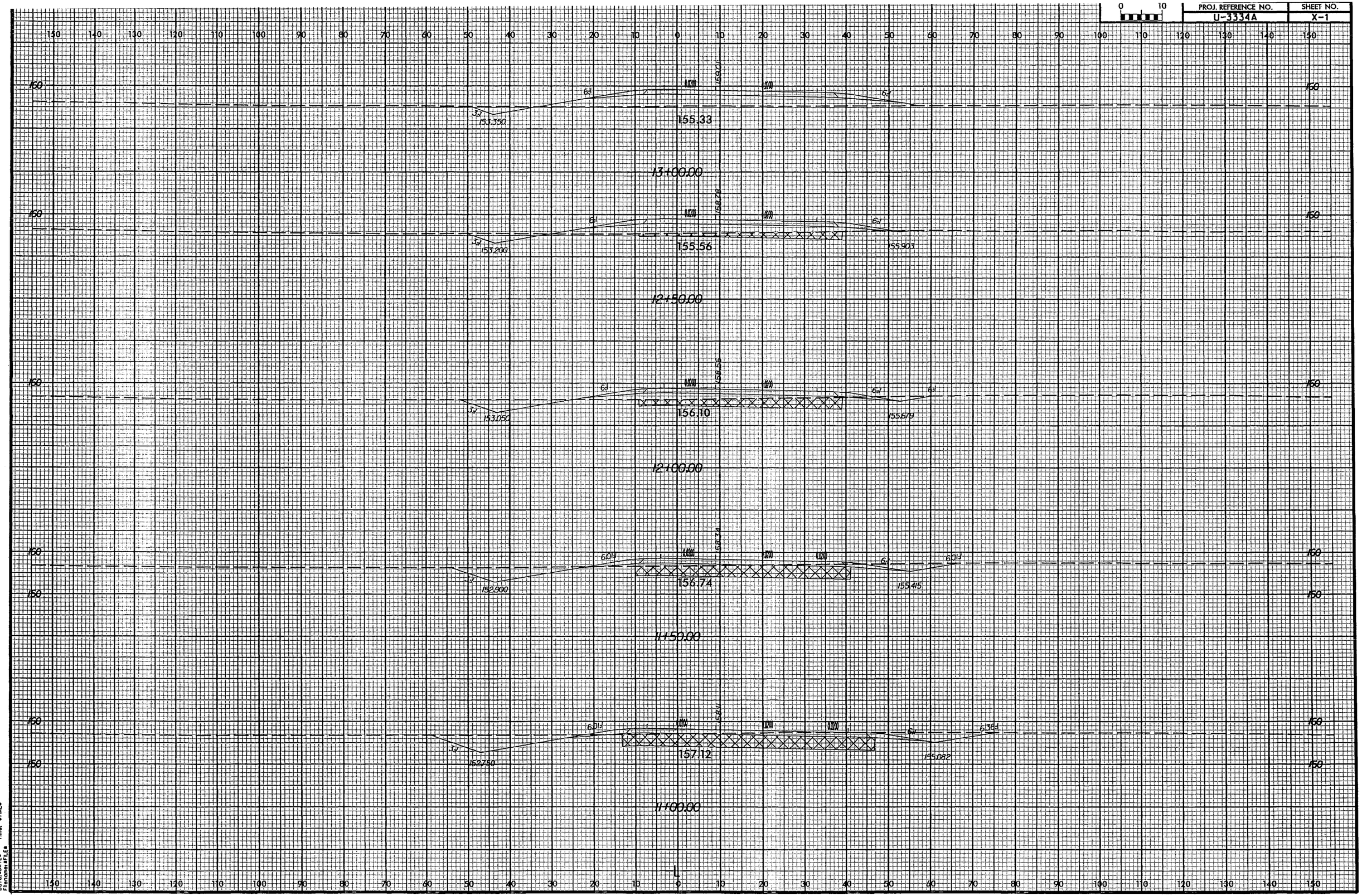
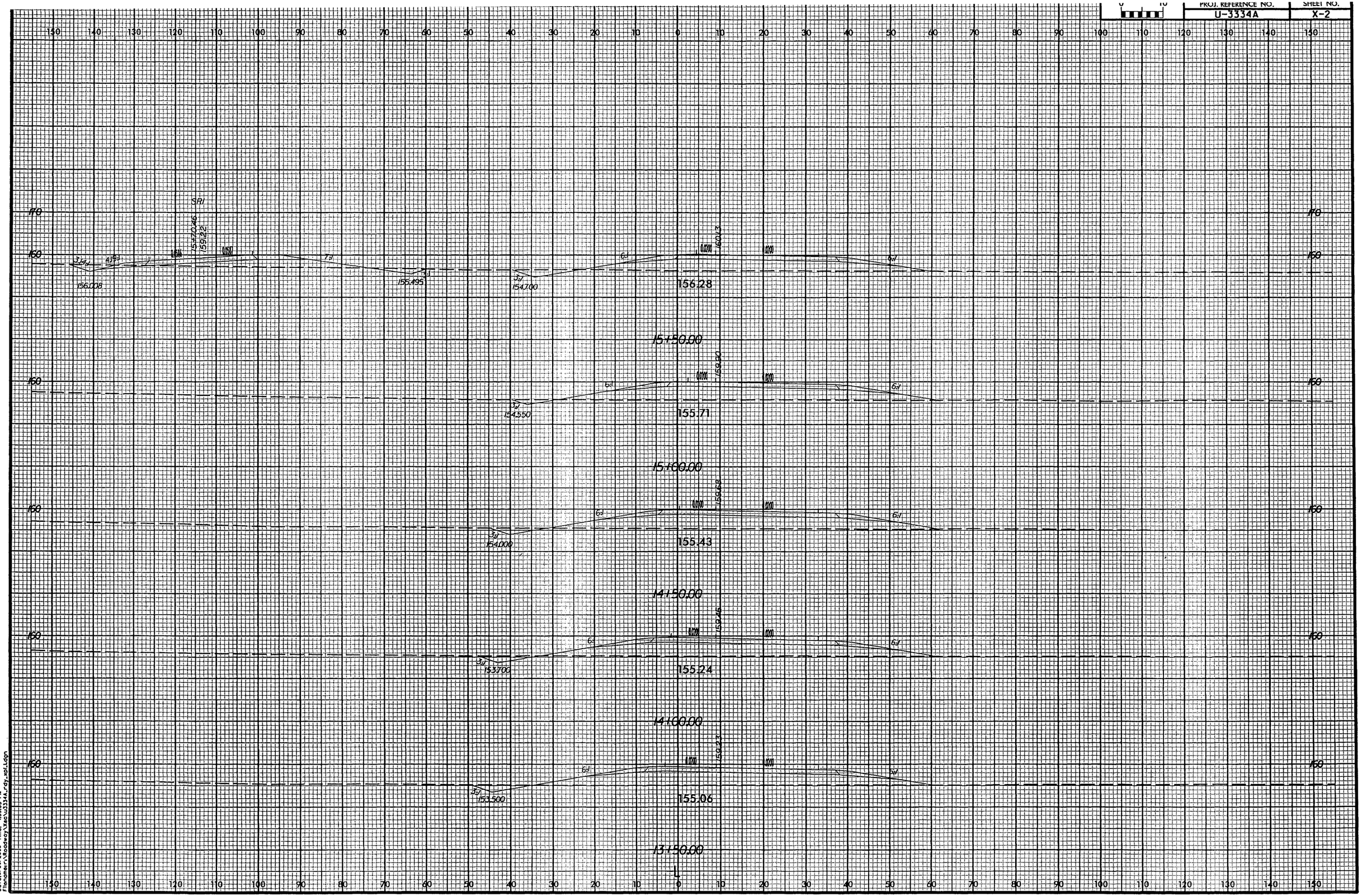
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-1



ARCADIS C&M
Date: 8/24/2016
Time: 8TMC8
Filename: FILE8

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-2



ARC405 C&M
Date:3/29/2005 Time: 4:55:03 PM
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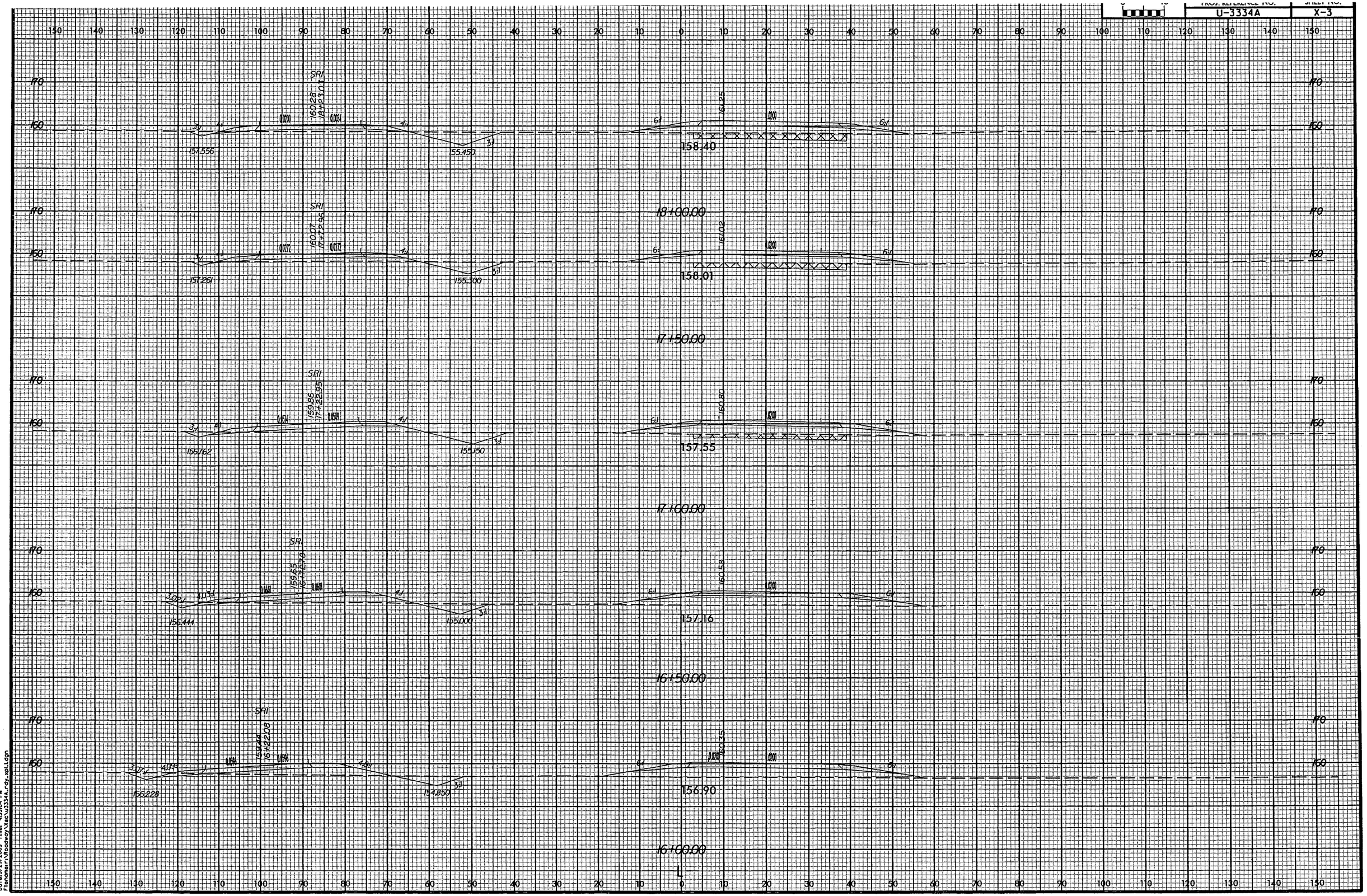
PROJ. REFERENCE NO.
U-3334A

SHEET NO.
X-3



ARCADIS G&M
Date:3/29/2005 Time: 15:01 PM
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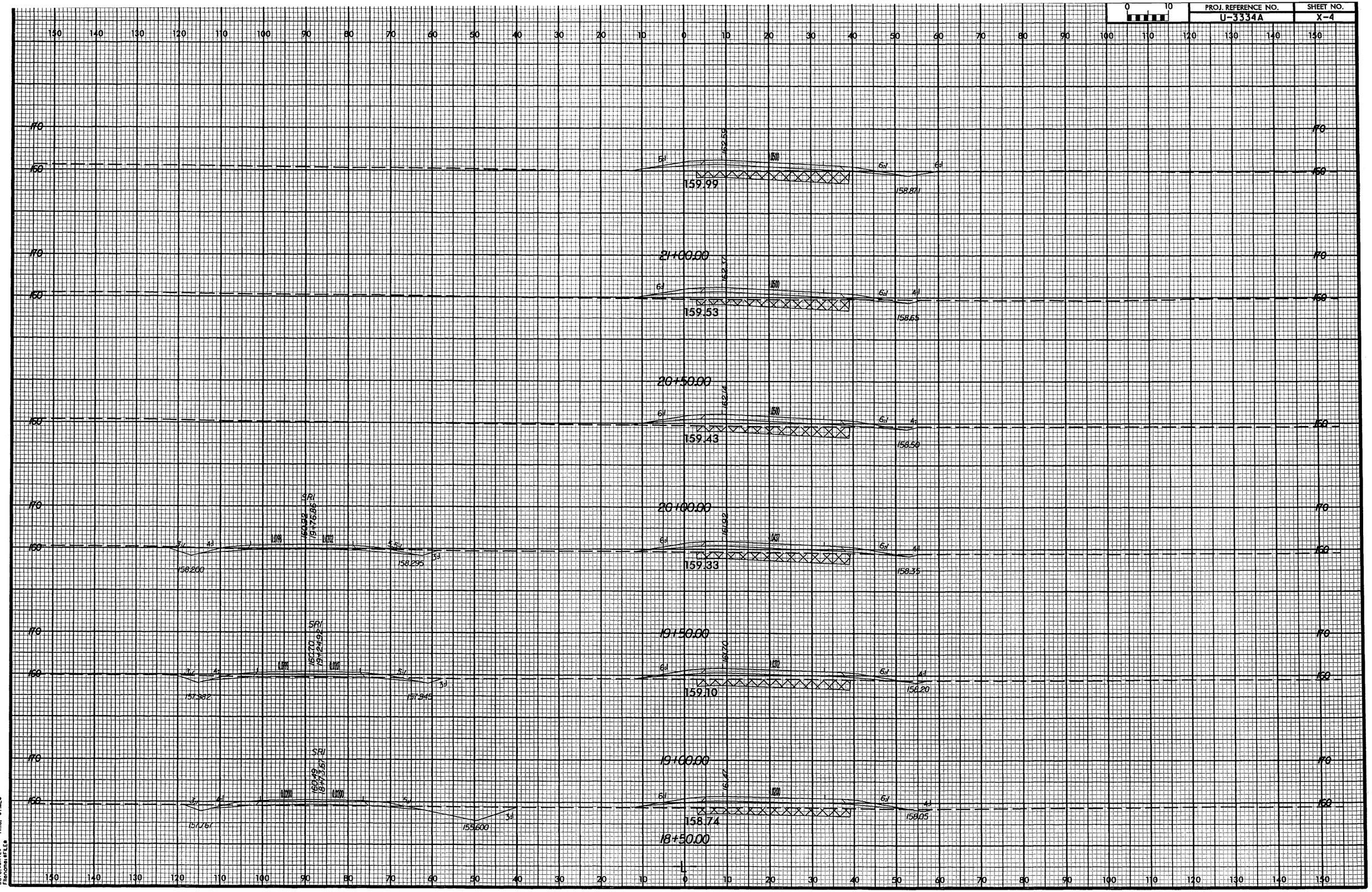
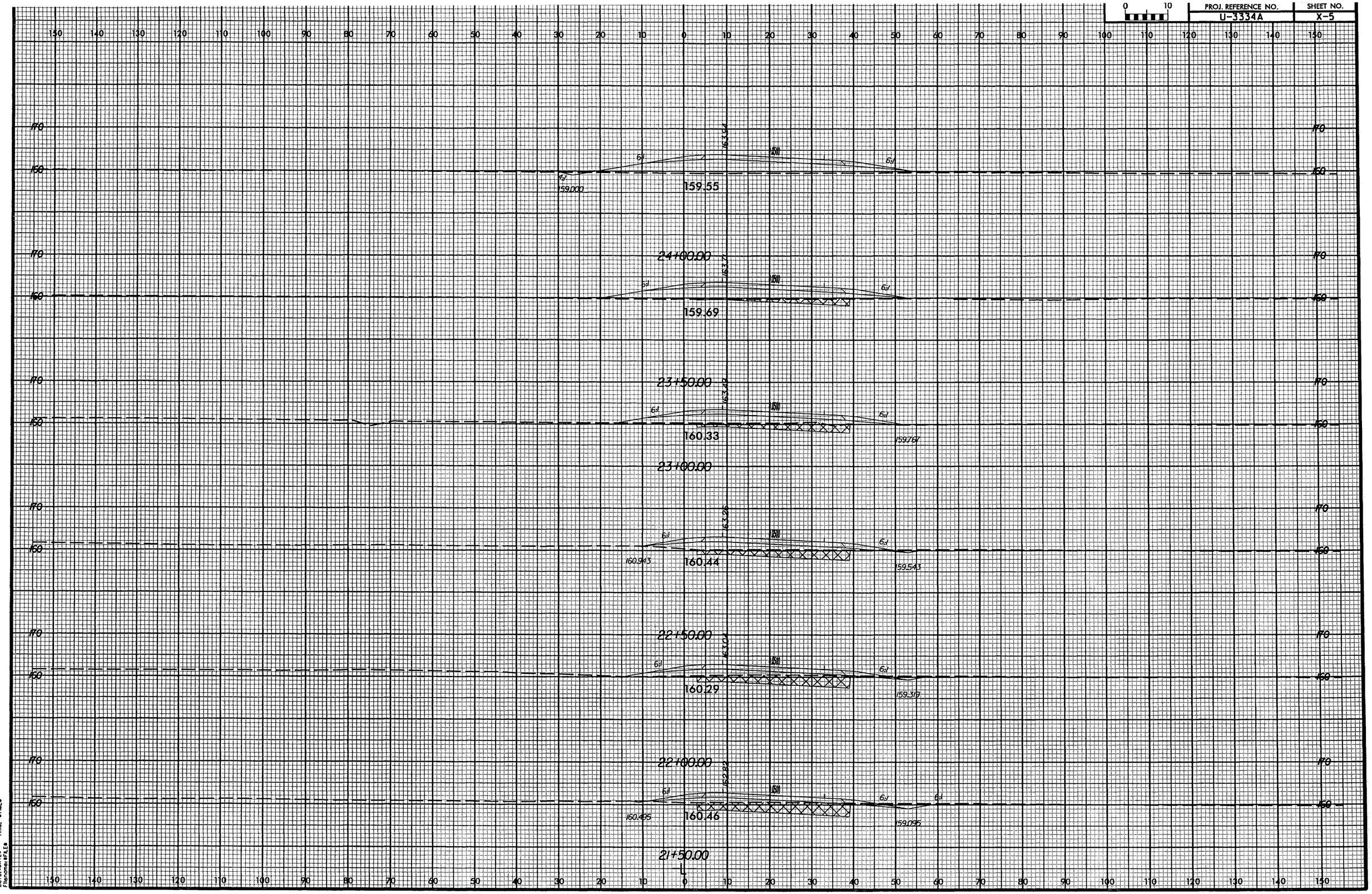
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-4



ARCADIS CAM
Date:&DATE&
Filename:&FILE&
Time: &TIME&

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-5



ARCADIS G&M
Raleigh, NC
Date: 8/31/18
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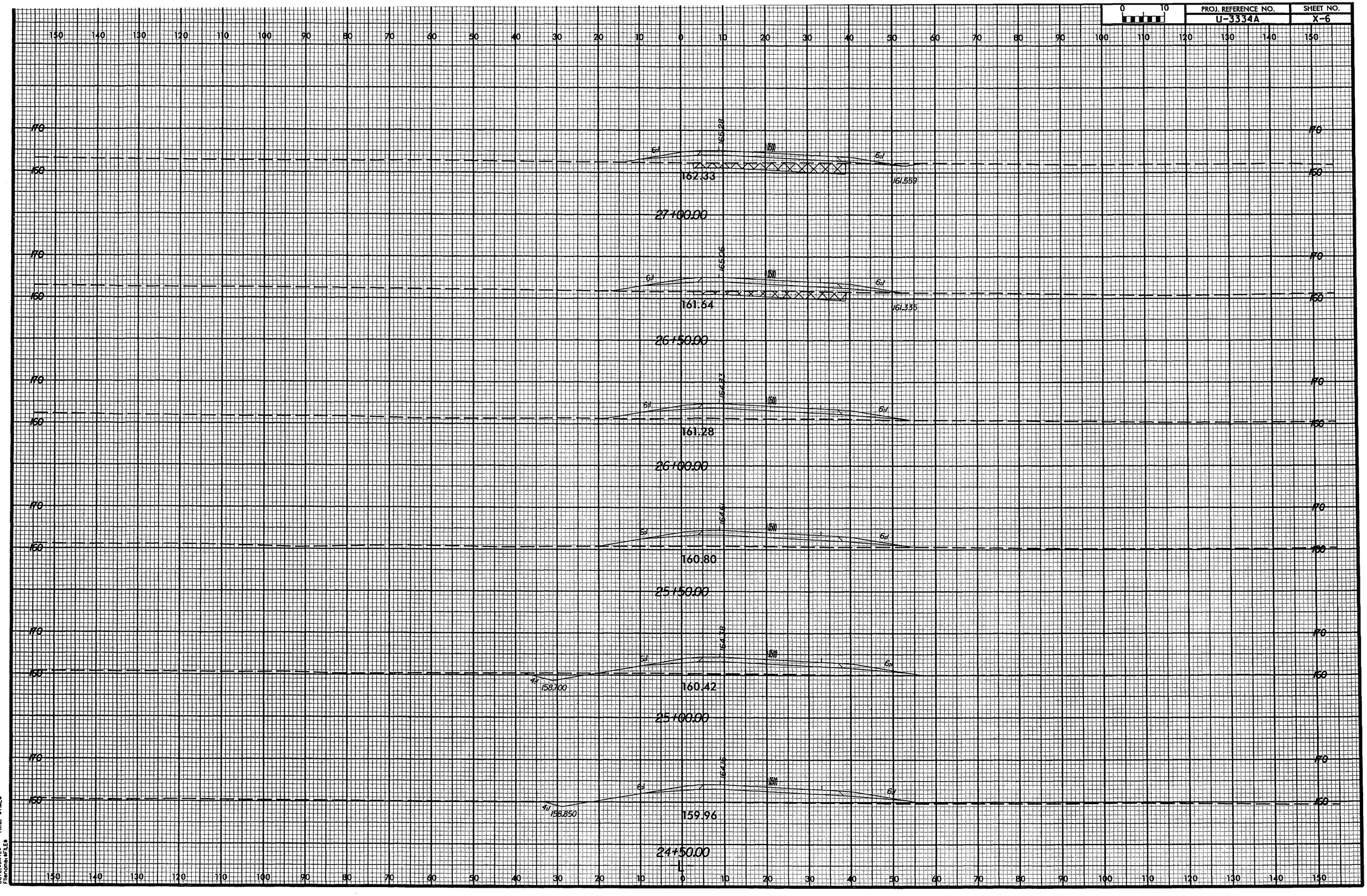
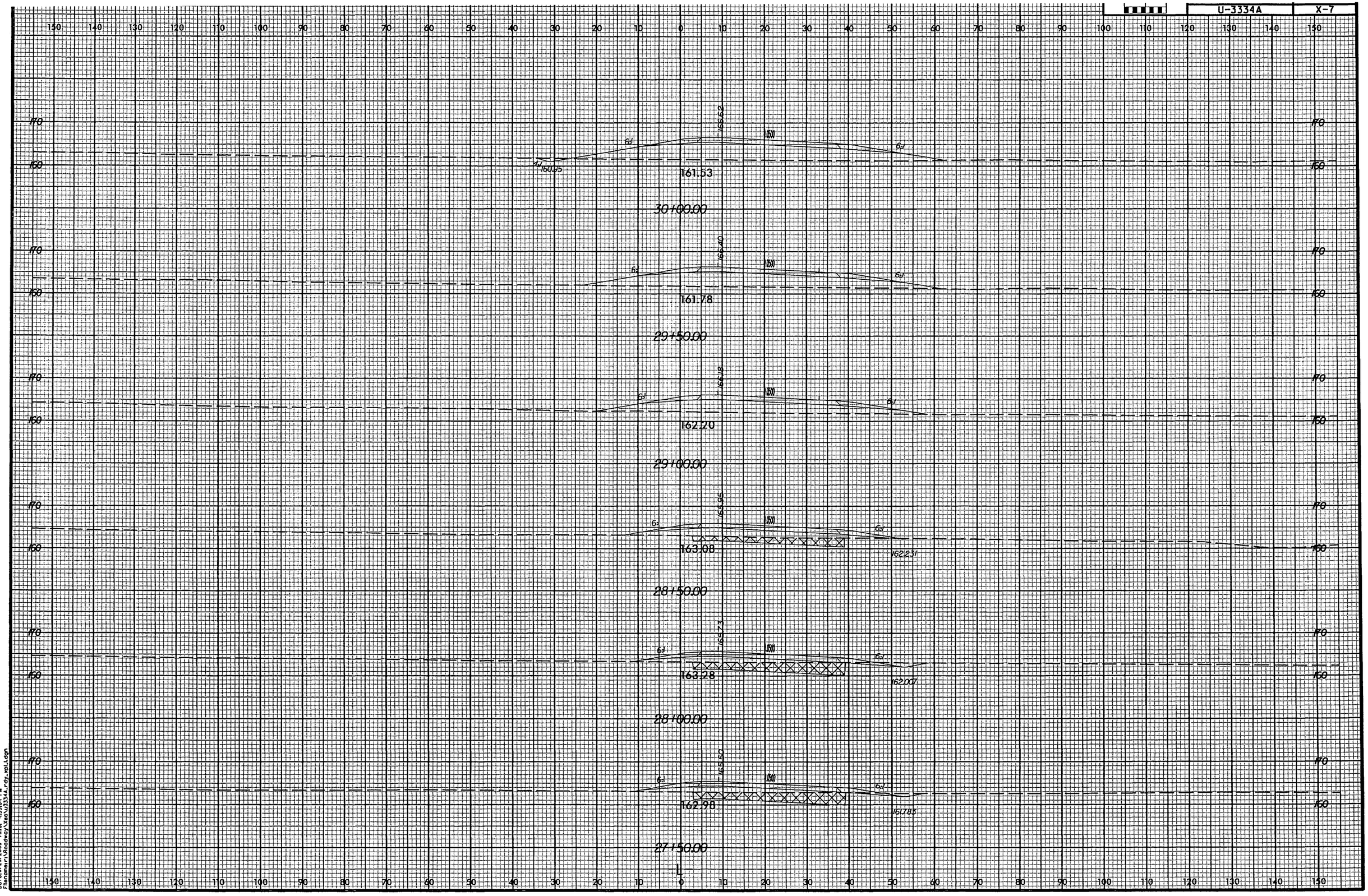
Time: 8TIME8

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-6

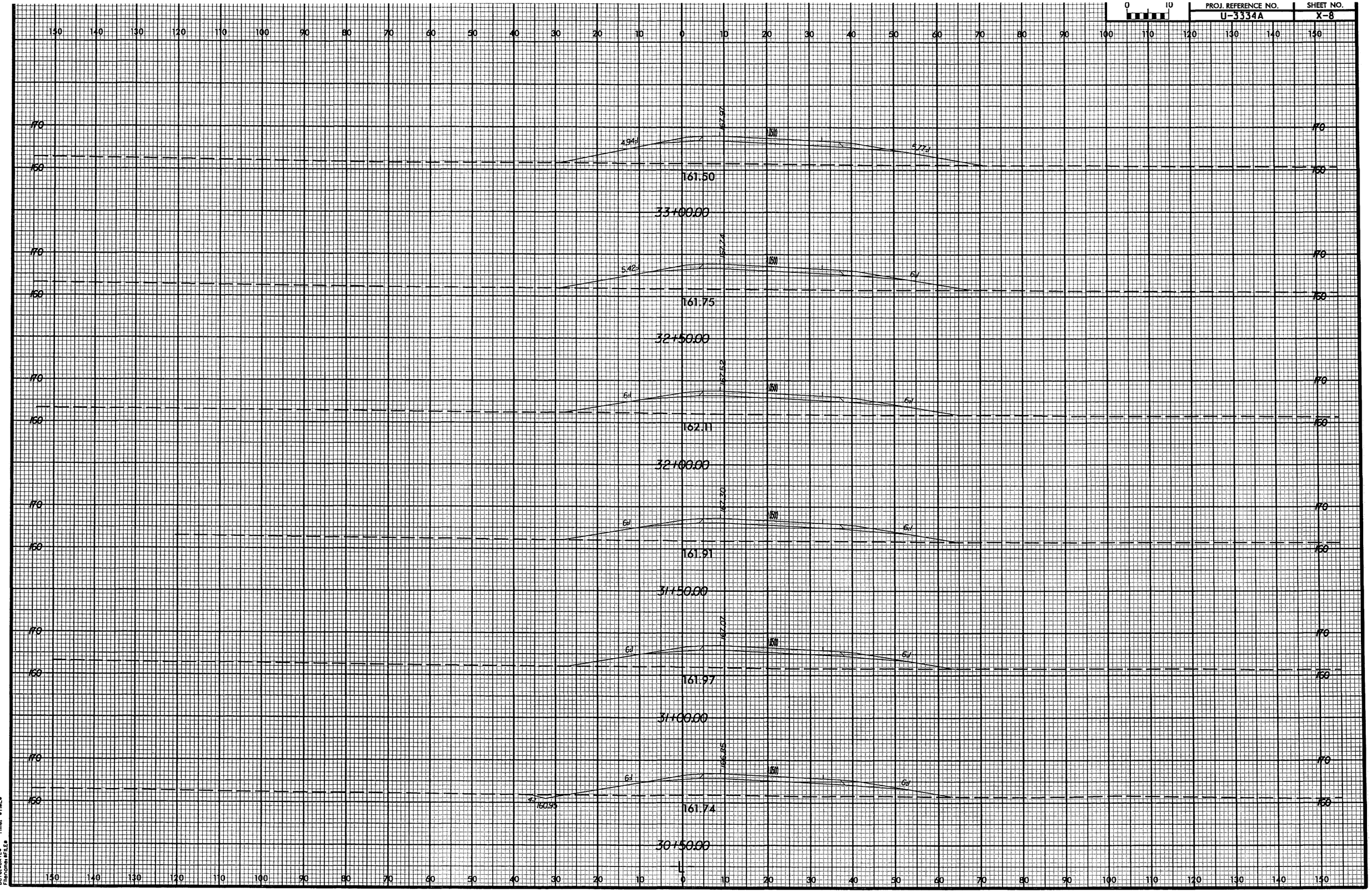


ARCADIS G&M
Date:&DATE&
Filename:&FILE&
Time: &TIME&



ARCADS C&M
Date:3/29/2005 Time: 4:55:04 PM
Filename:r:\Roadway\Xsec\U3334A_roy_rpl.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-8



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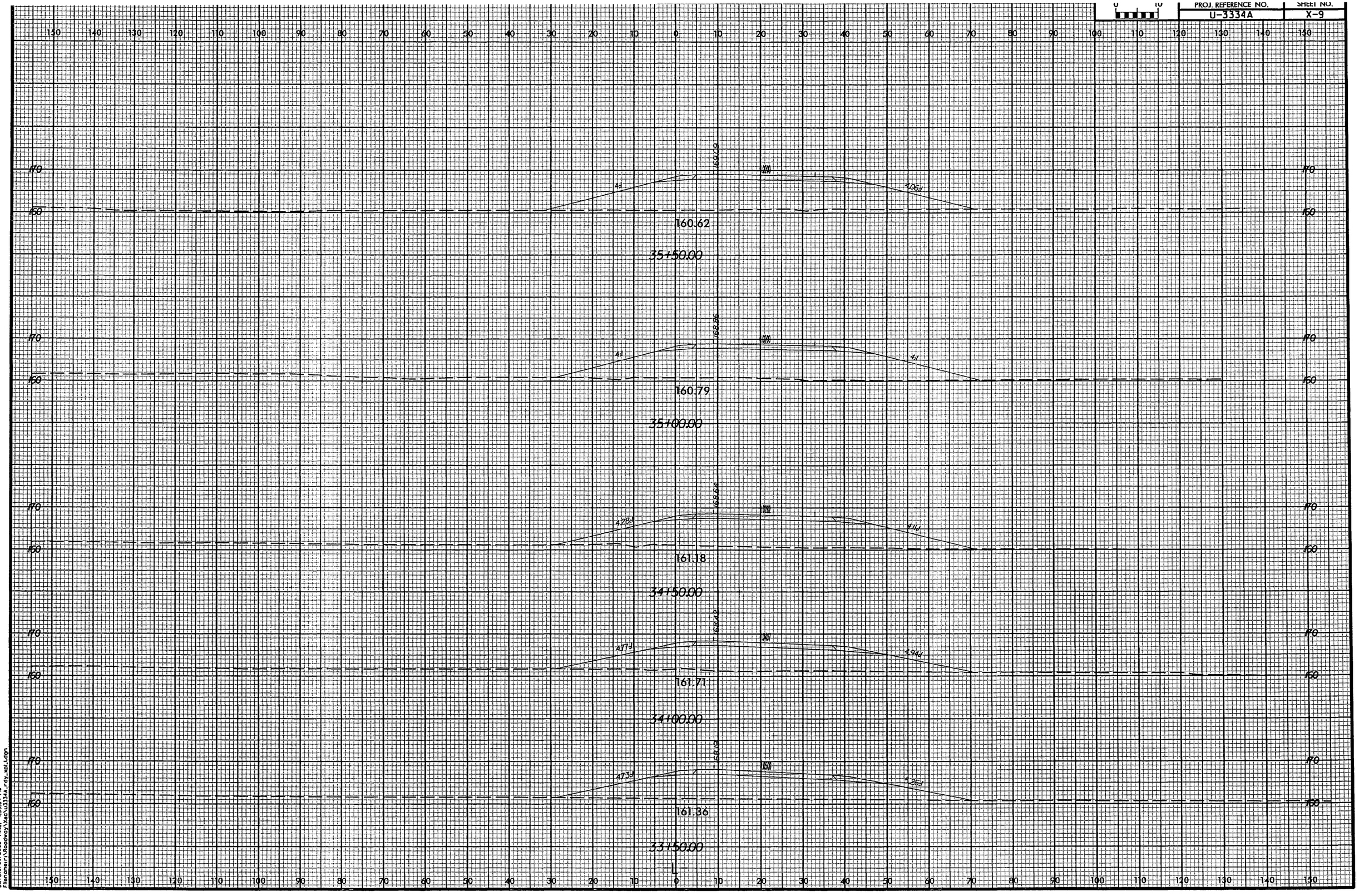
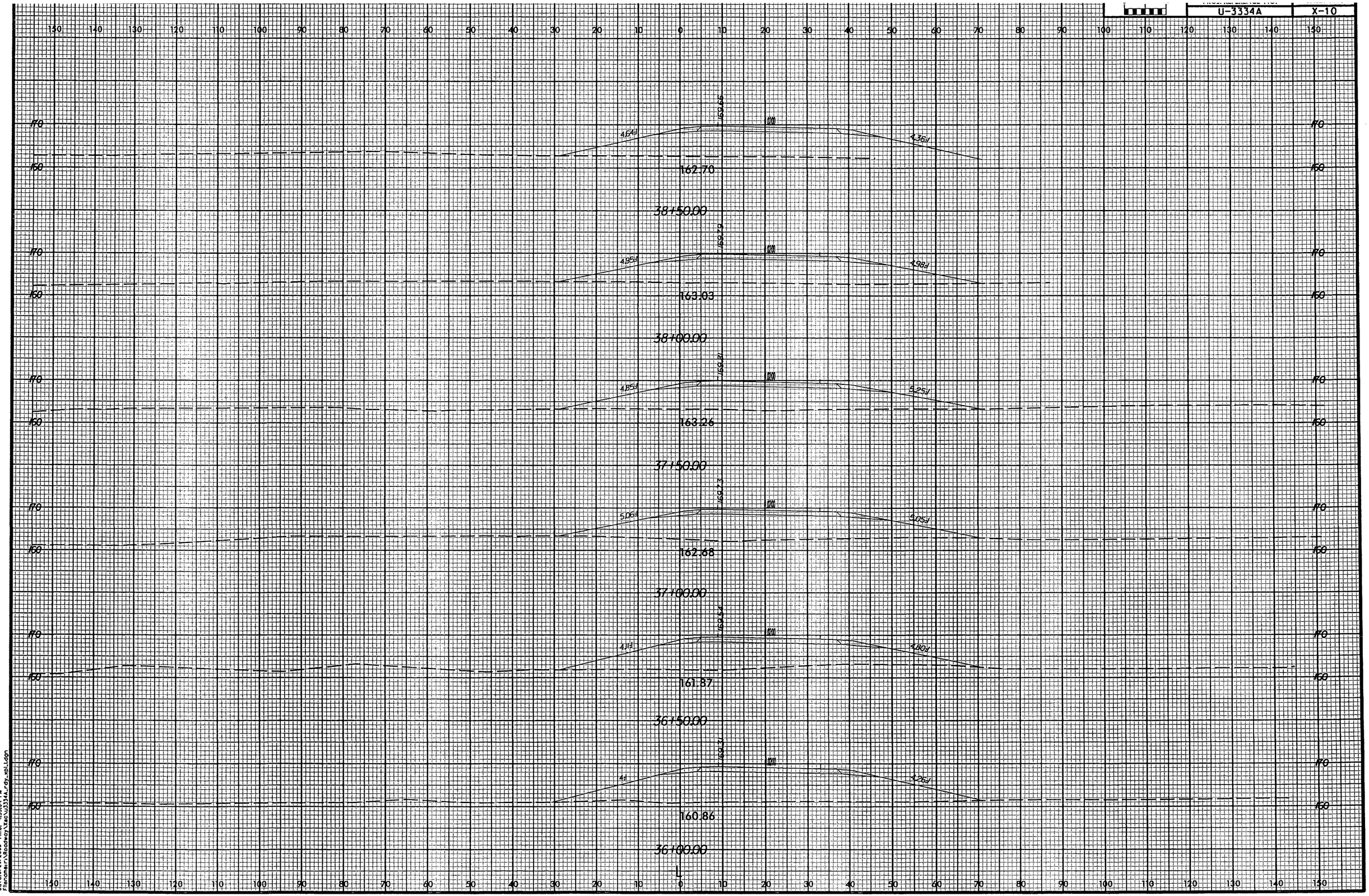
Date:@DATE@ Time: @TIME@
Filename:@FILE@



ARCADIS GAM
Date:3/29/2005 Time: 4:55:04 PM
Filename:r:\Roadway\Xsec\u3334A_rdy_xsl.dgn



ARCADIS GEM
Date:3/29/2005 Time: 1:55:04 PM
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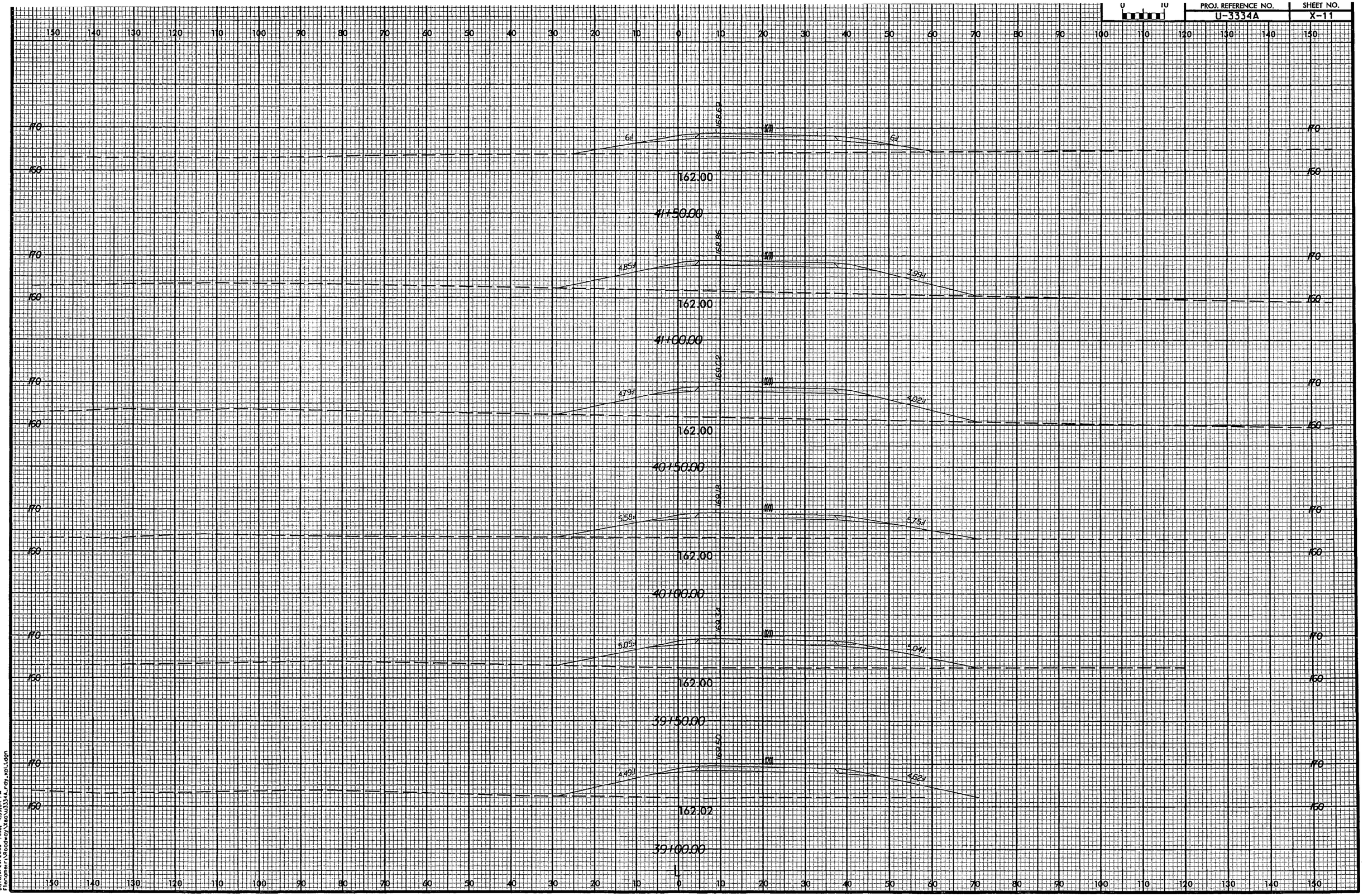
0 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3334A	X-11



ARCADS .dgn
Date: 3/22/2005 Time: 4:55:04 PM
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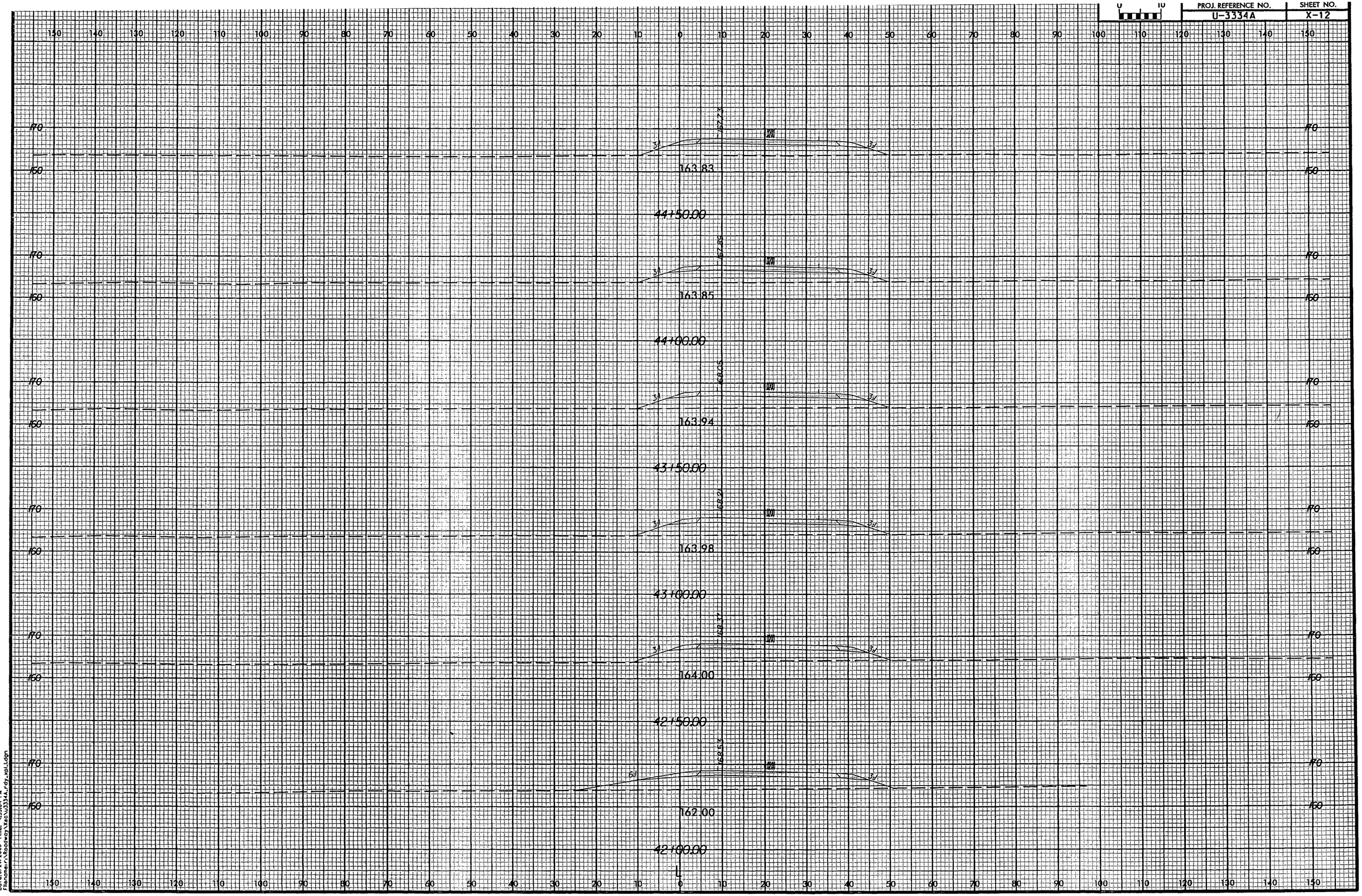
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-12



ARCADIS C&M
Date:3/29/2005 Time: 1:55:04 PM
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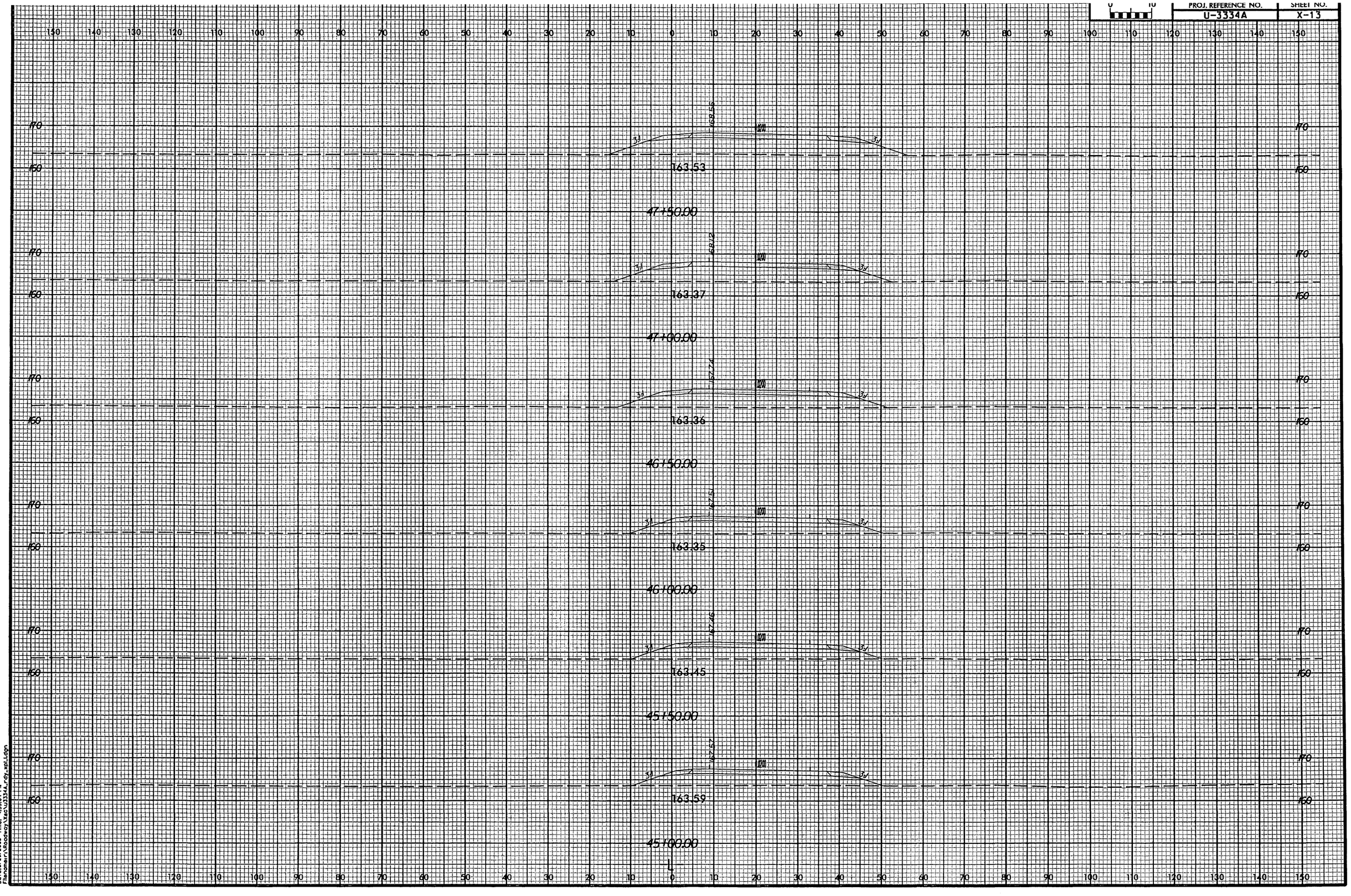
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-13



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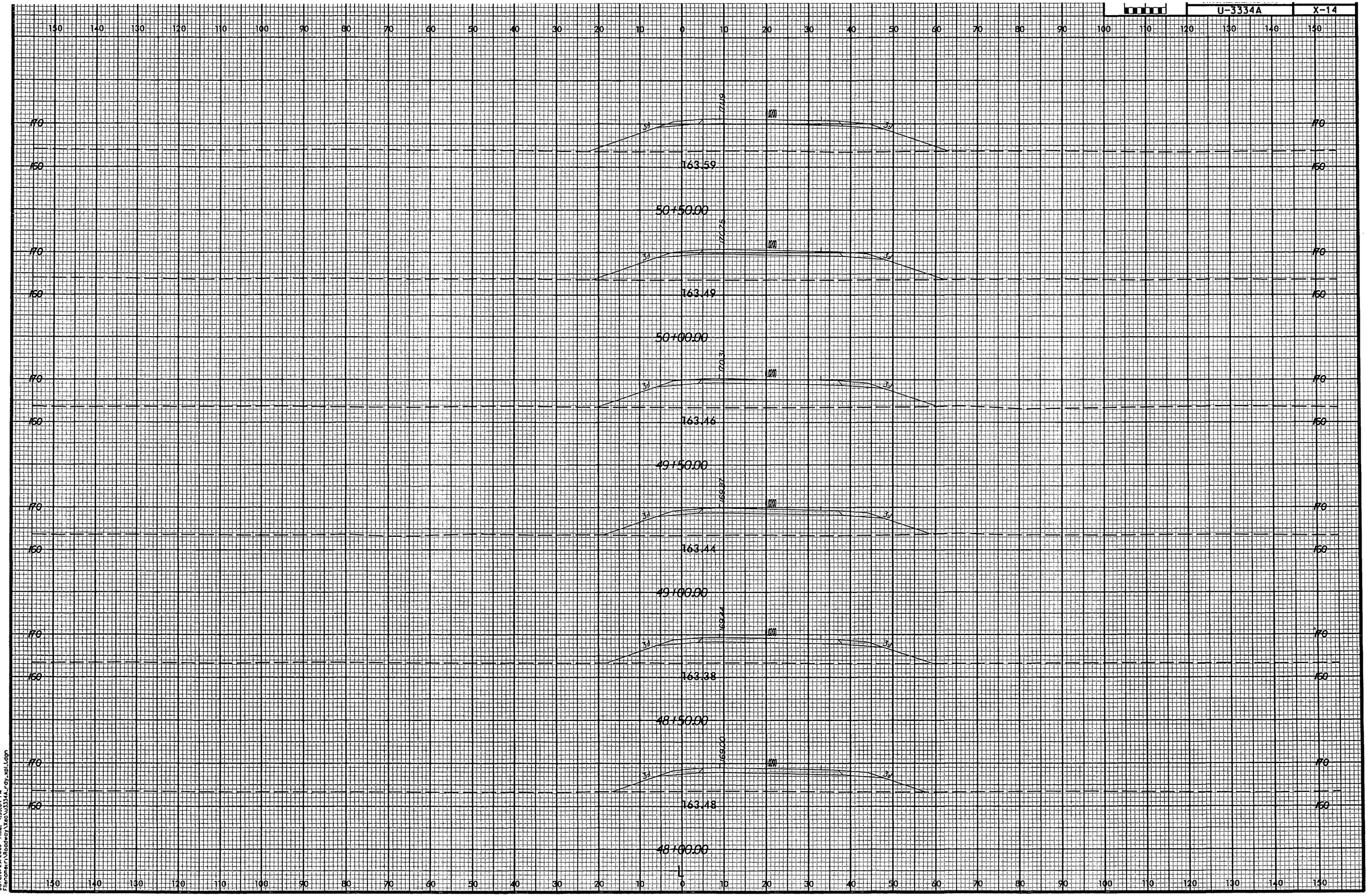

ARCADIS C&M
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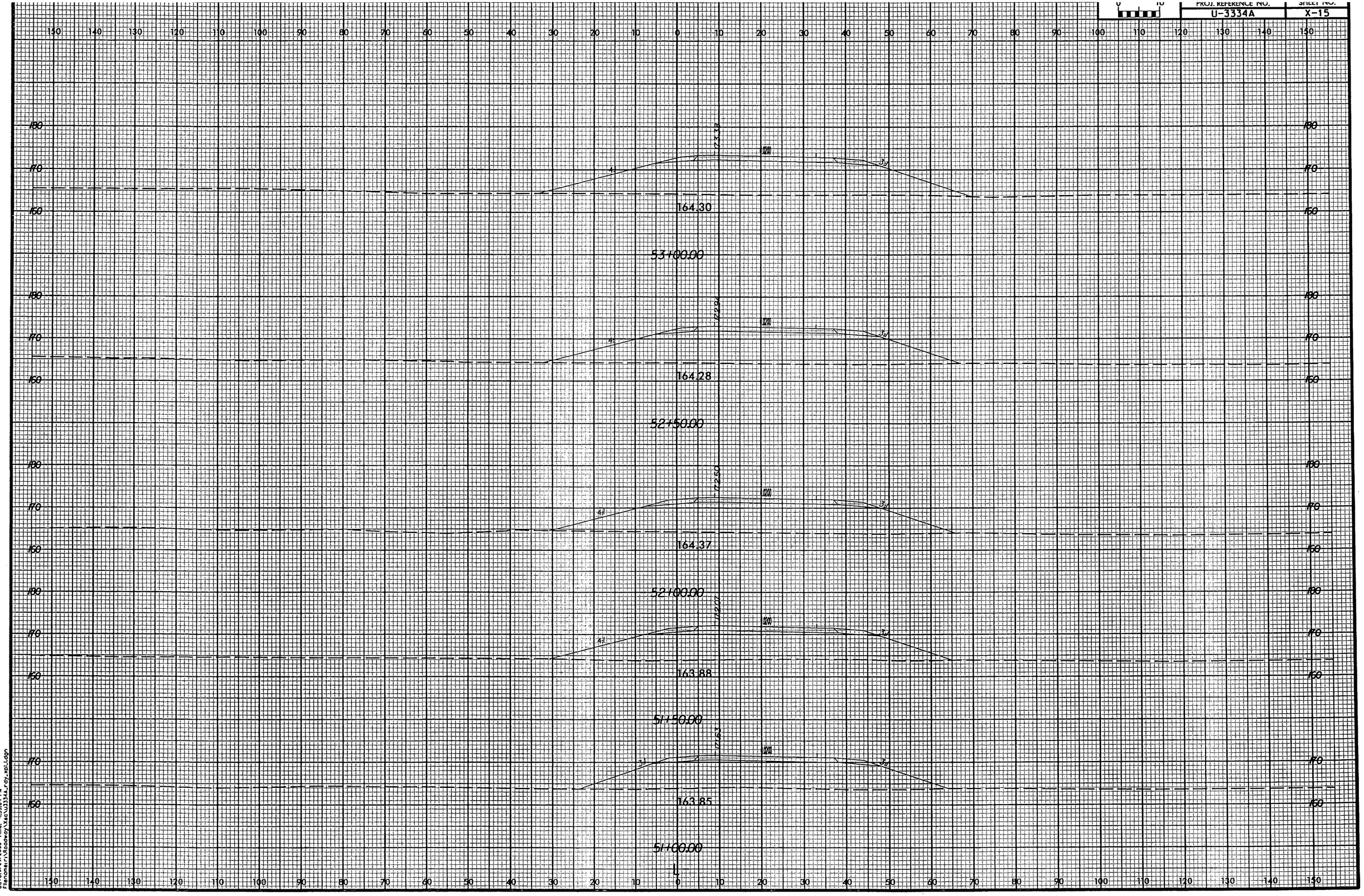
File:homeir:\Roadway\tec\u3334A_rdy_xpl.dgn



ARCADS.GLM
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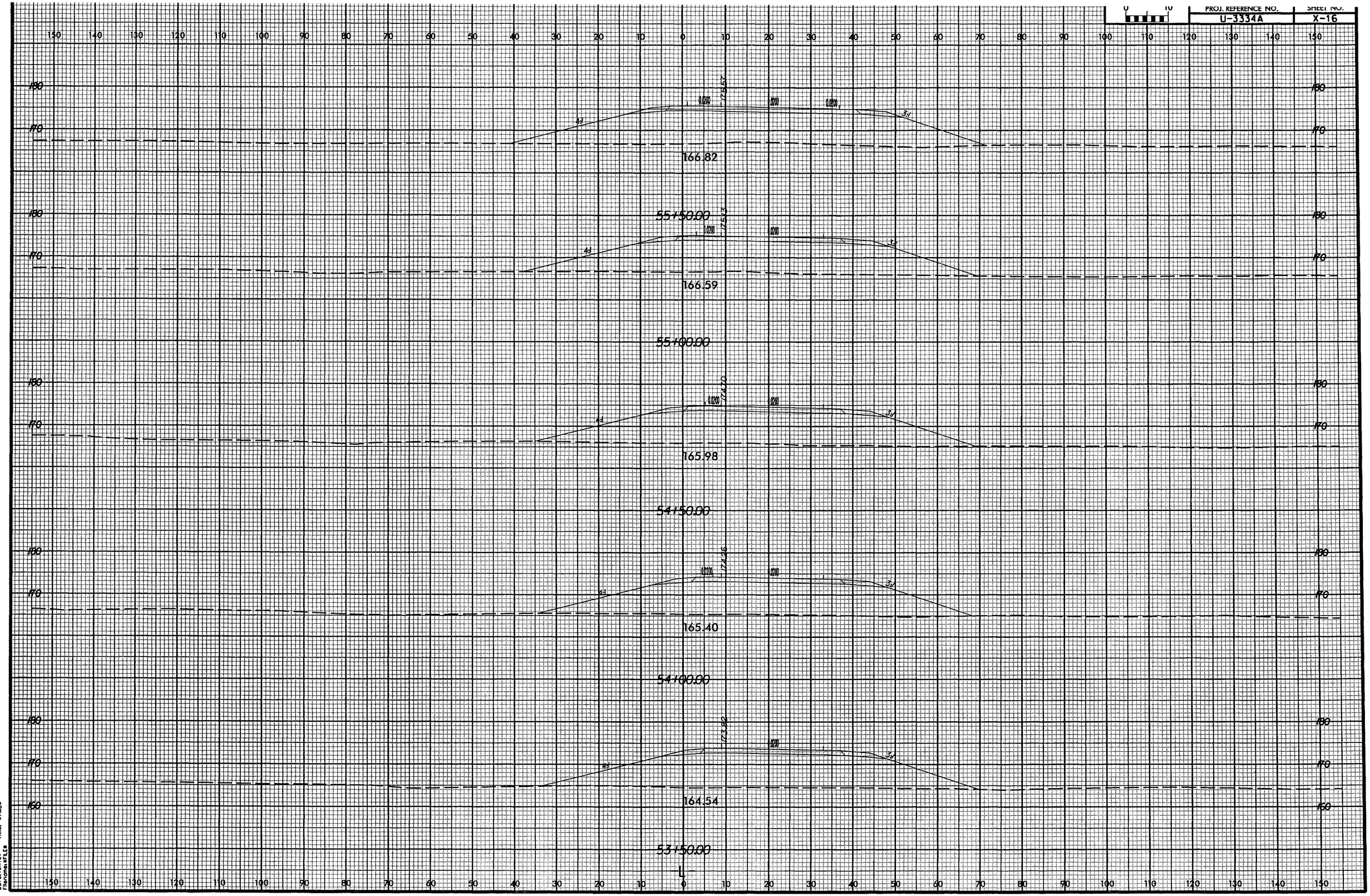
PROJ. REFERENCE NO.
U-3334A
SHEET NO.
X-16
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55+00.00
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3:1
0.0200
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180
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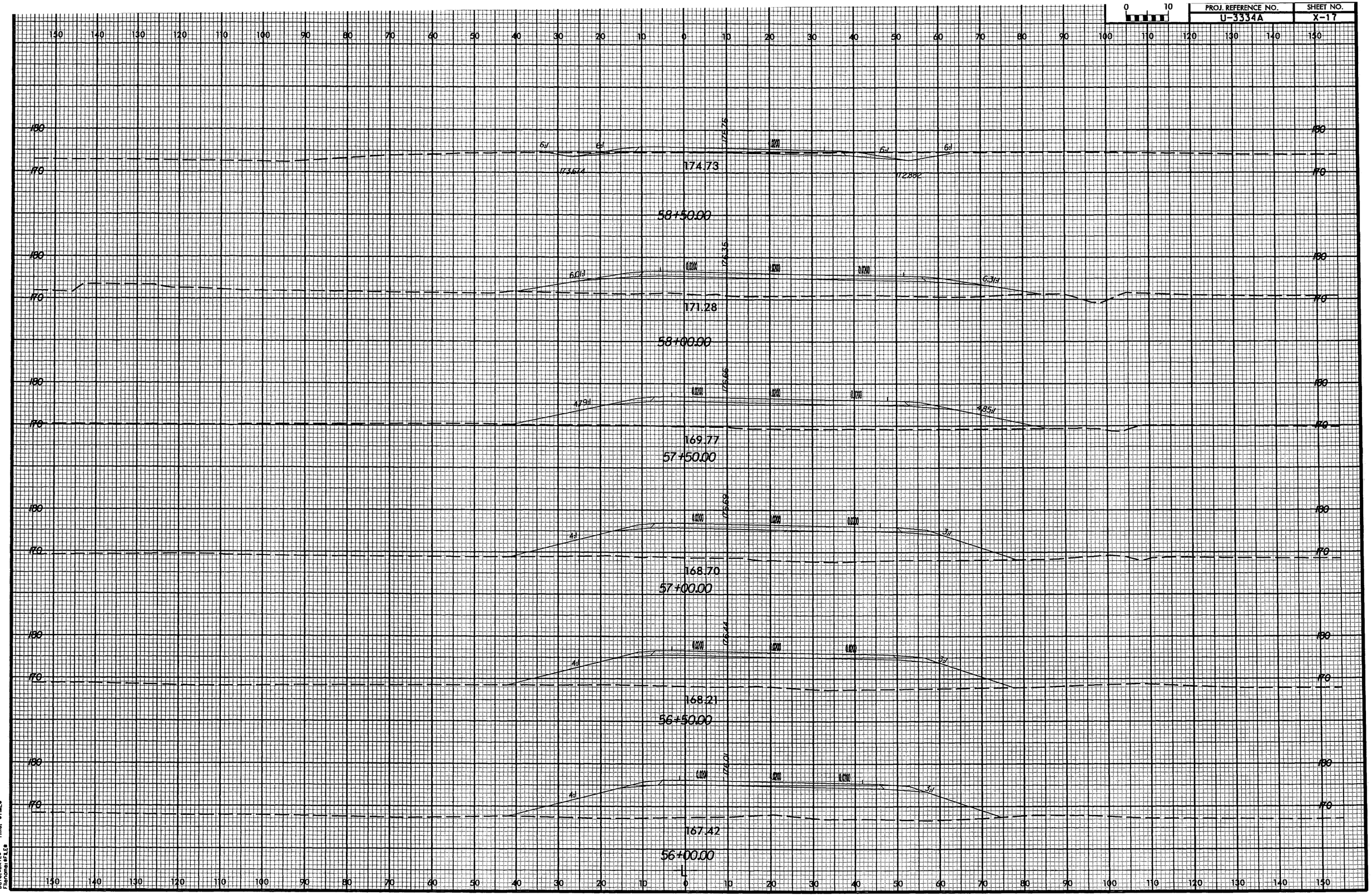
Filename:$FILE$

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-17



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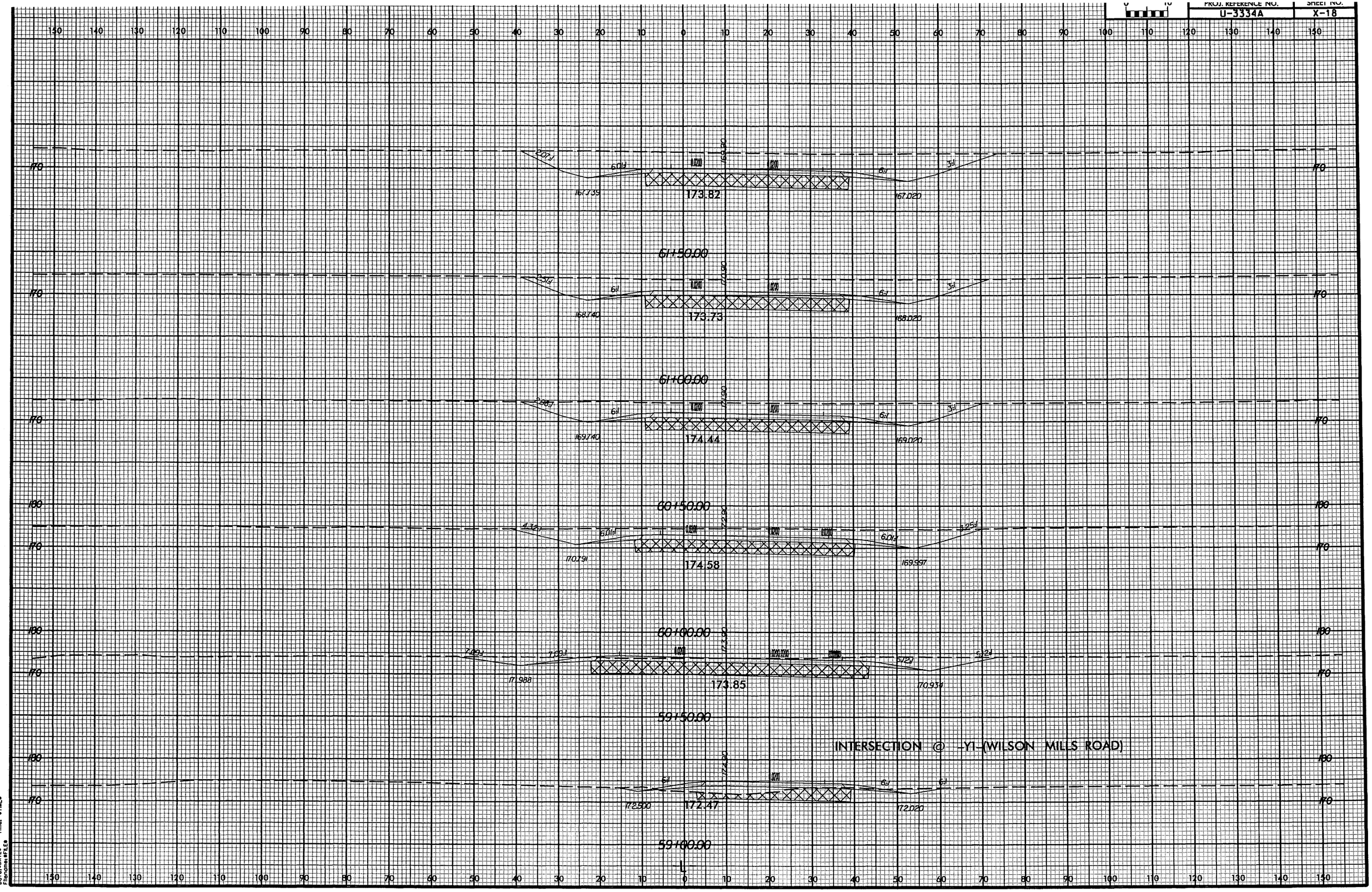
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61+50.00
2.37:1
6:1
170.90
168.740
173.73
168.020
61+00.00
2.88:1
169.90
169.740
174.44
169.020
60+50.00
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4.36:1
6.01:1
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170.791
174.58
169.997
3.25:1
60+00.00
7.49:1
7.09:1
171.90
171.988
173.85
170.934
5.12:1
5.24:1
59+50.00
INTERSECTION @ -Y1-(WILSON MILLS ROAD)
172.90
5:1
6:1
172.500
172.47
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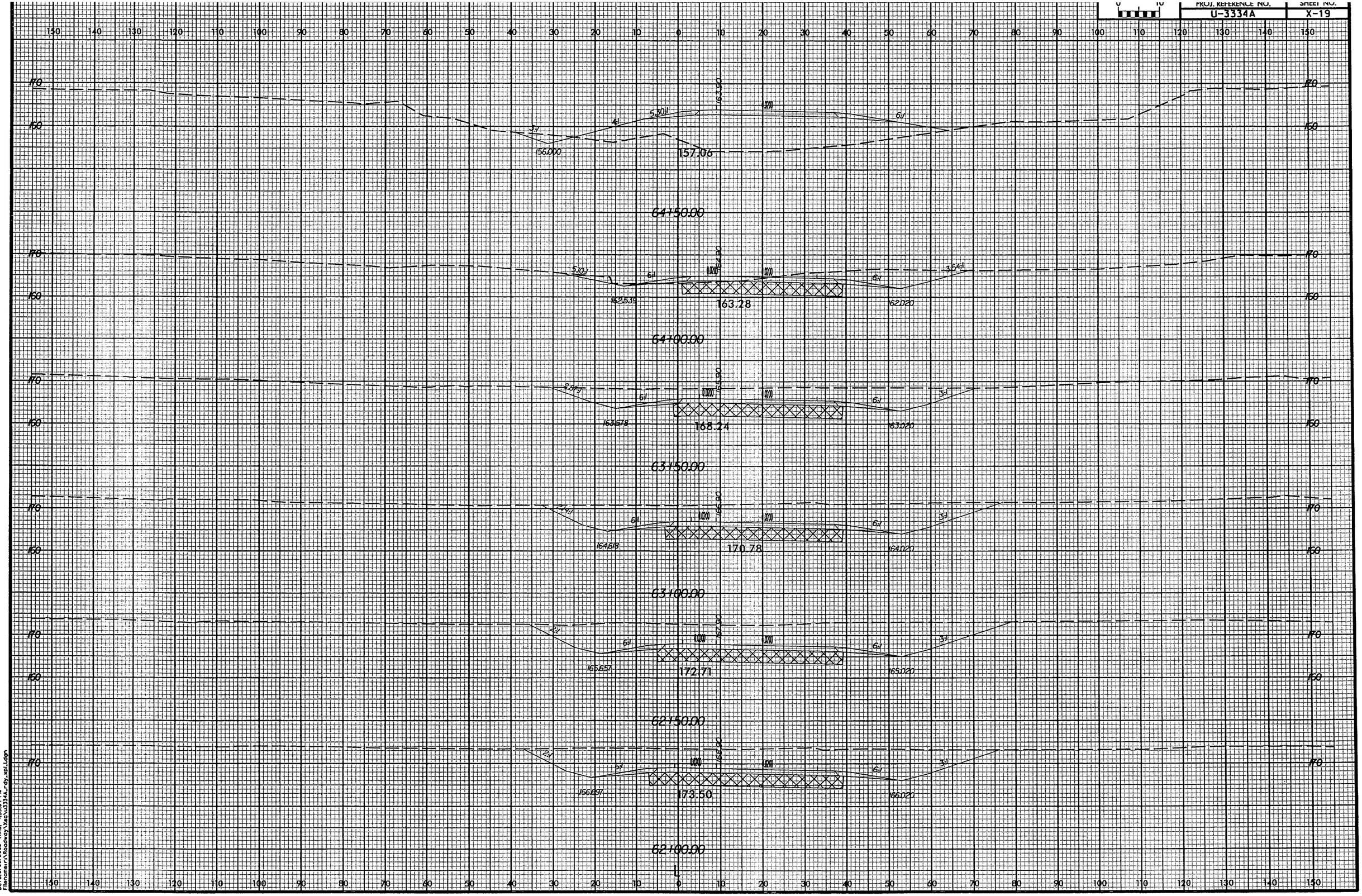
Filename=$FILE$

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-19



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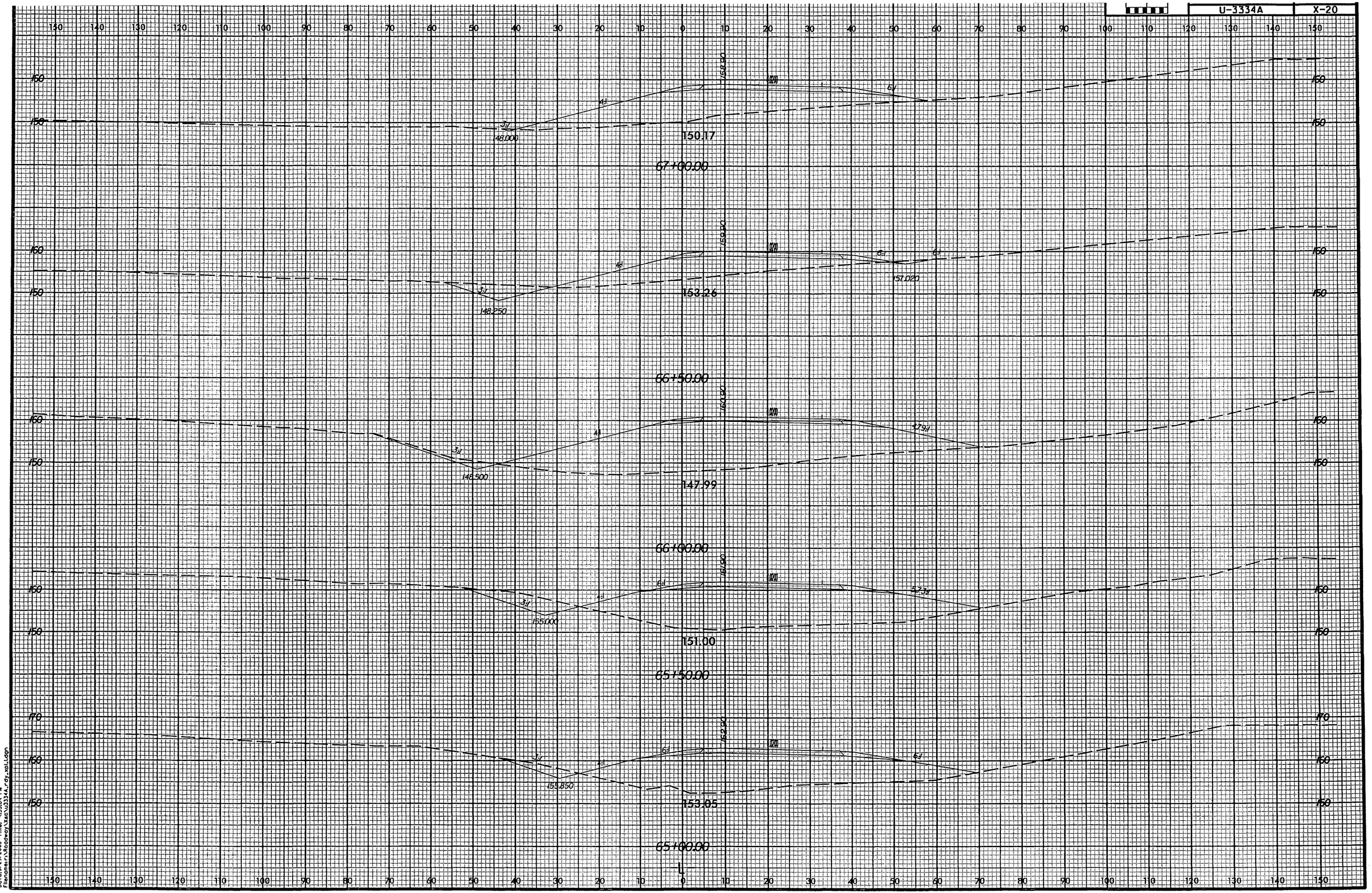
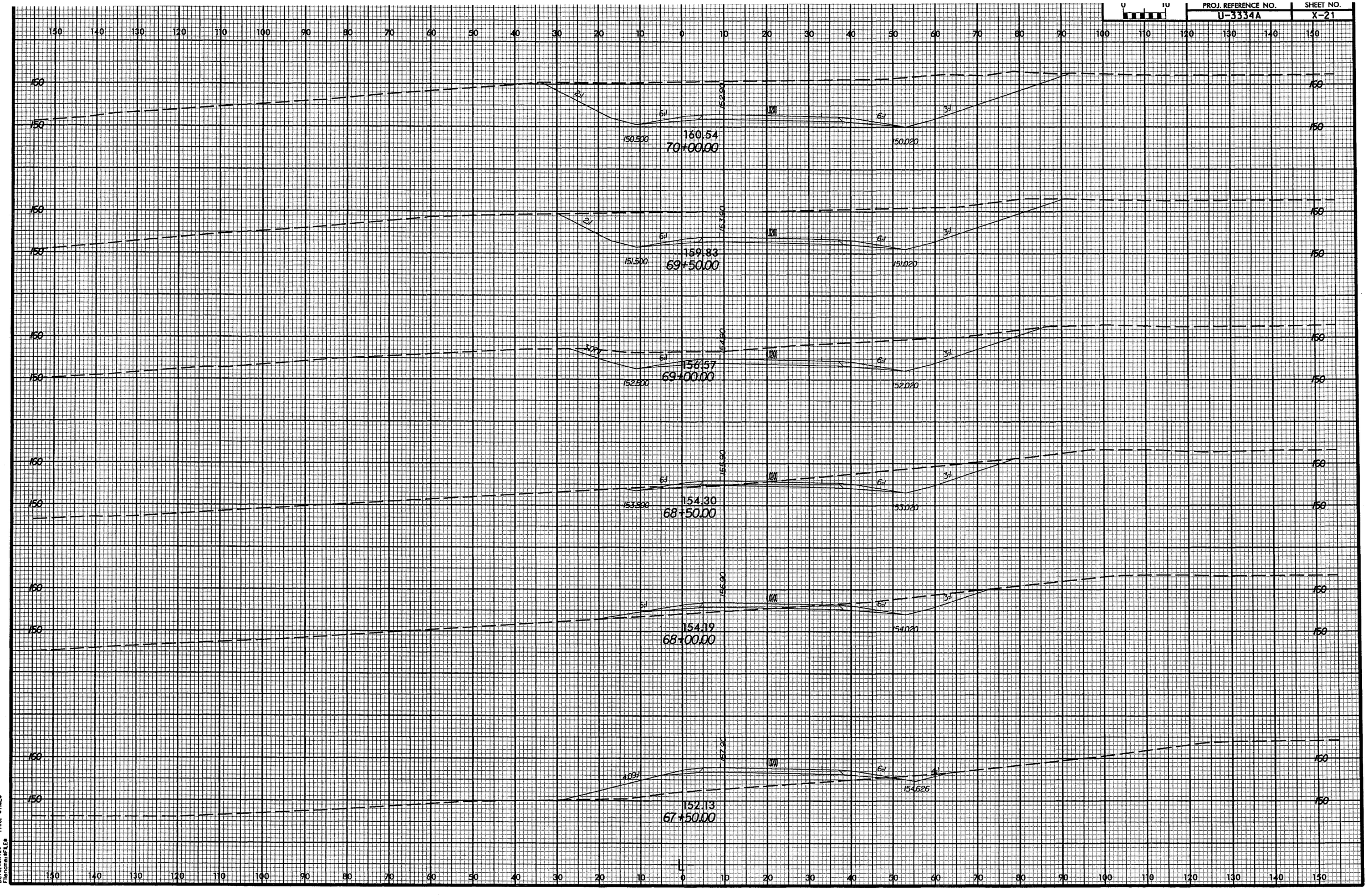


ARC405.CLM
Date:3/29/2005 Time: 4:55:01 PM
Filename:r:\Roadway\Xsec\U3334A_rdy_xs1.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-21



ARCADS CAM
Dgn: U3334A
Filename: PFL6
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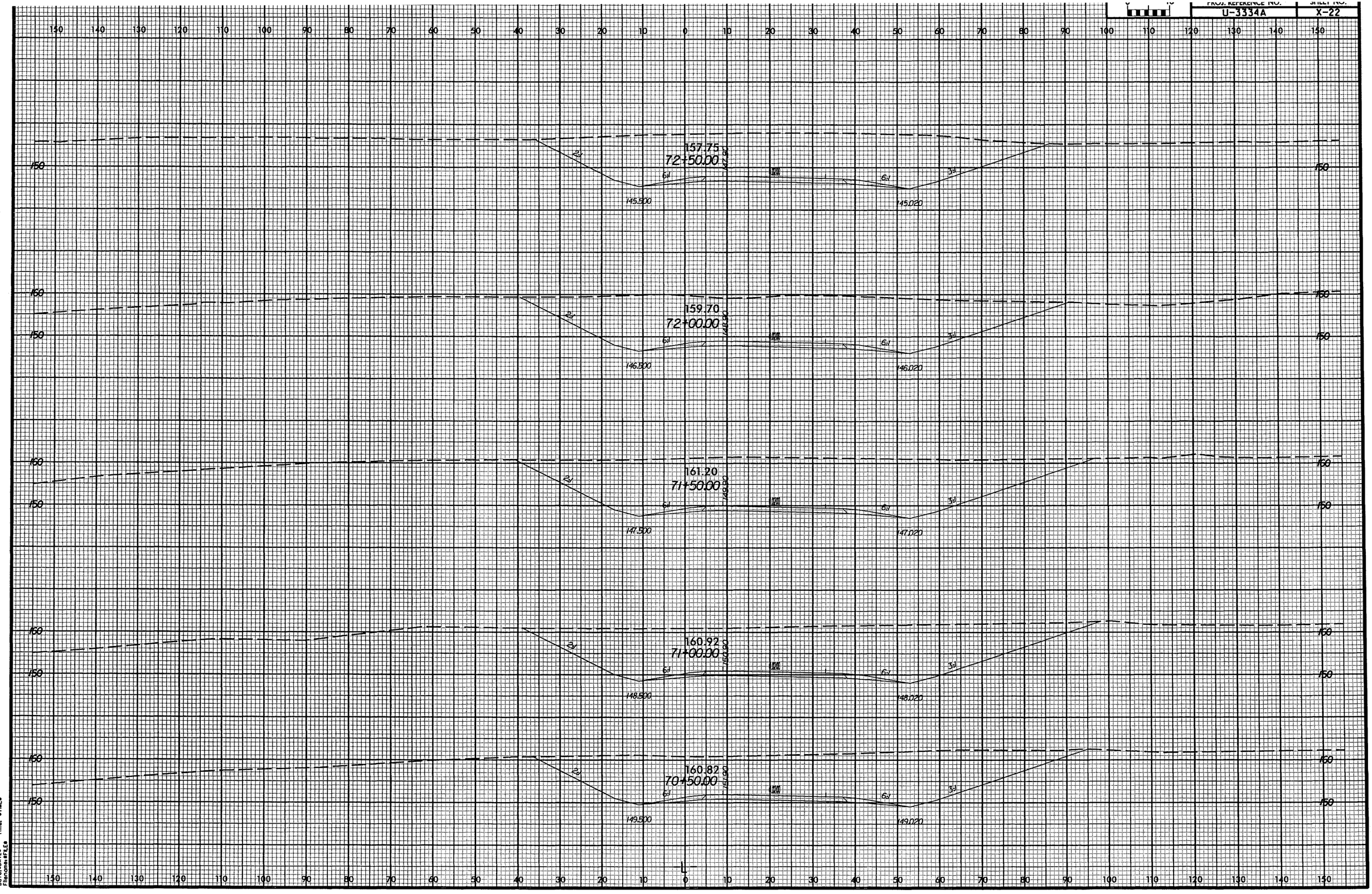

ARCADIS G&M
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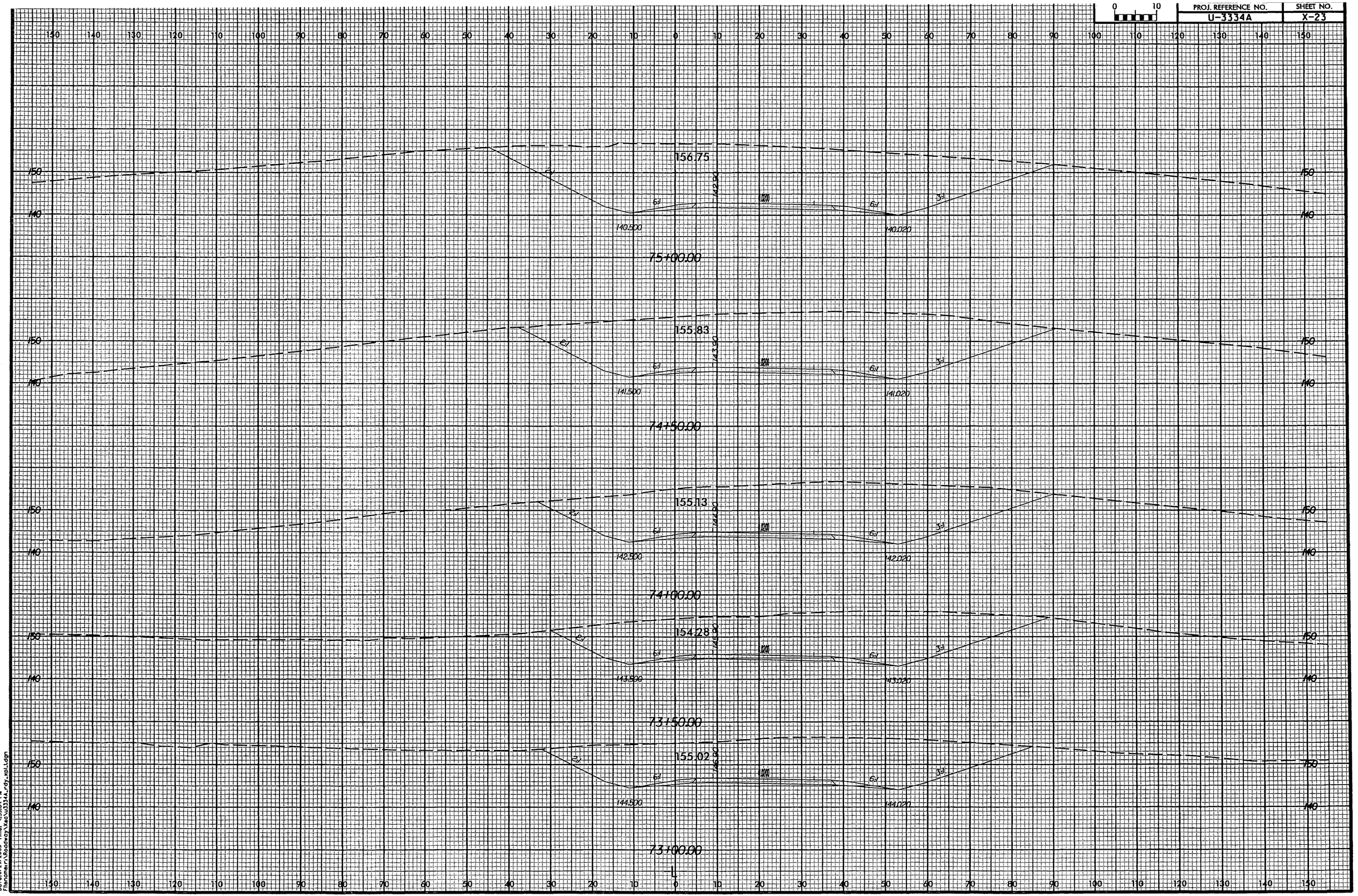
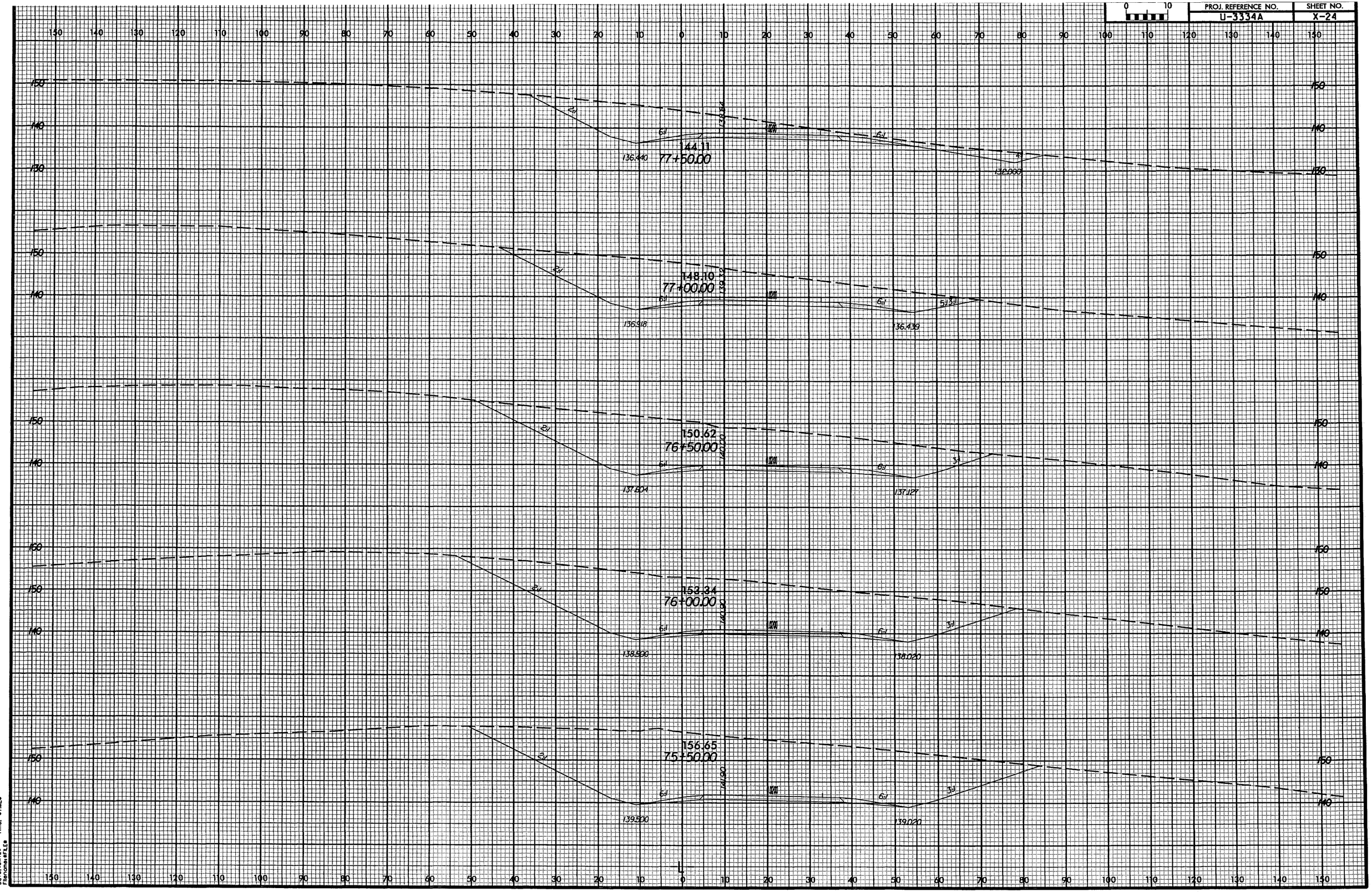
File:@dgn@PLE@ Time: @TIME@

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-23



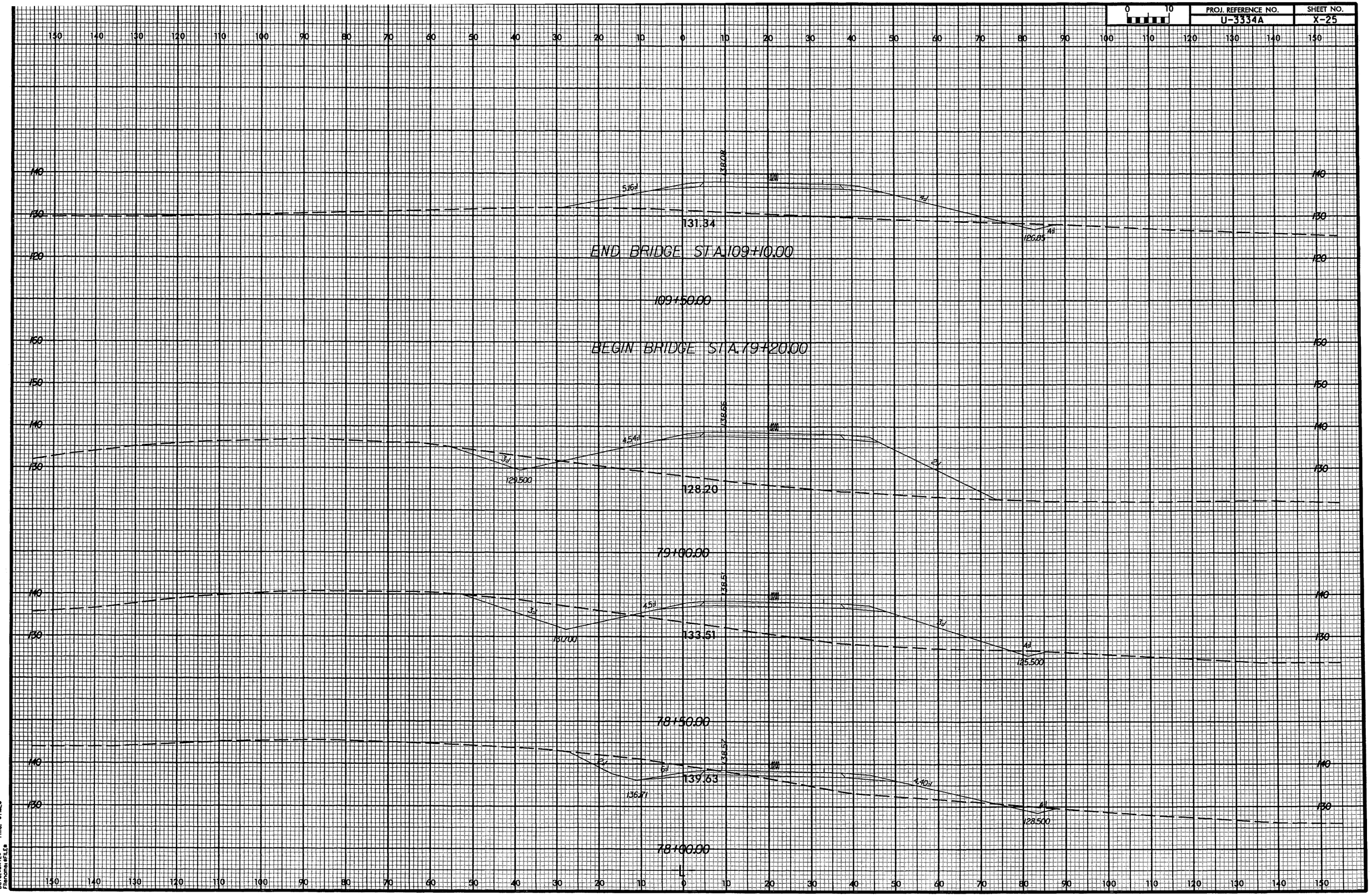
ARCADIS GSM
Date: 3/29/2005 Time: 4:55:04 PM
Filename: \Roadway\Xsec\U3334A_rdy_xpl.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-24



ARCADIS CGM
Date:&DATE&
Filename:&FILE&
Time: &TIME&

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-25



ARCADIS G&M
Date: 4/13/18
Filename: #FILE#
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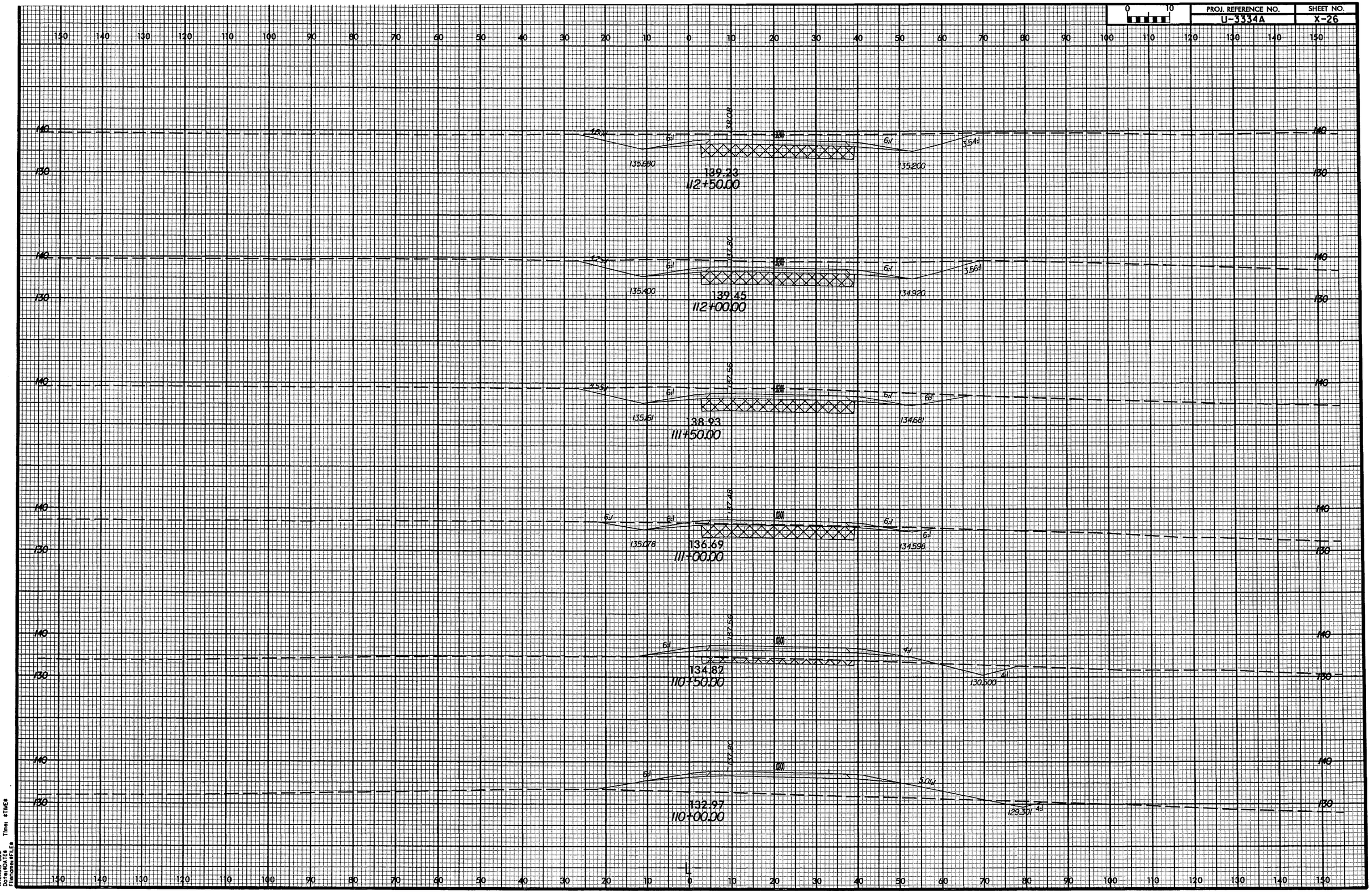
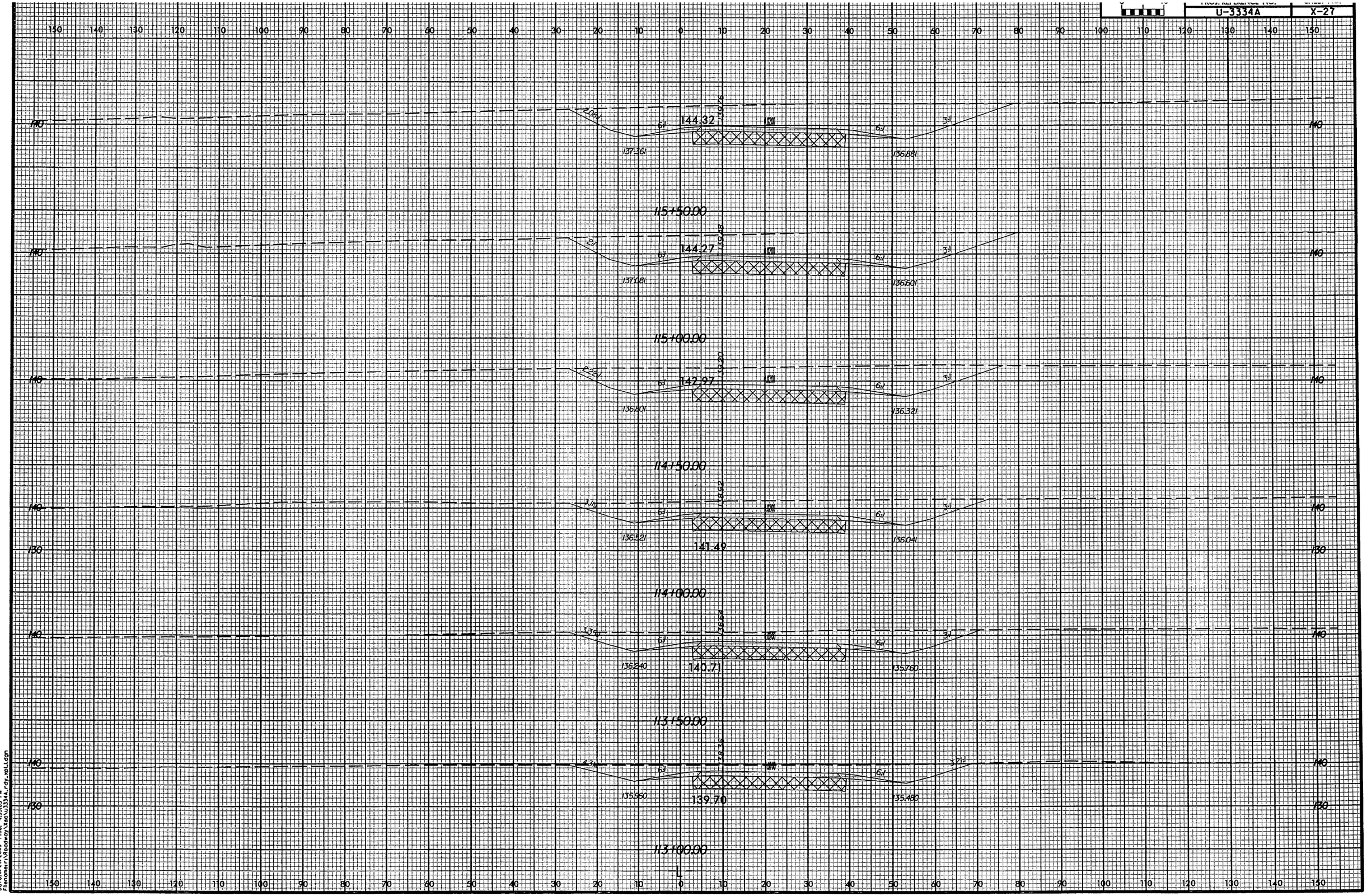
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-26



ARCADIS G&M
Date: 9/11/2018 Time: $TIME$
Filename: $FILE$



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Date:3/29/2005 Time: 455:05 PM
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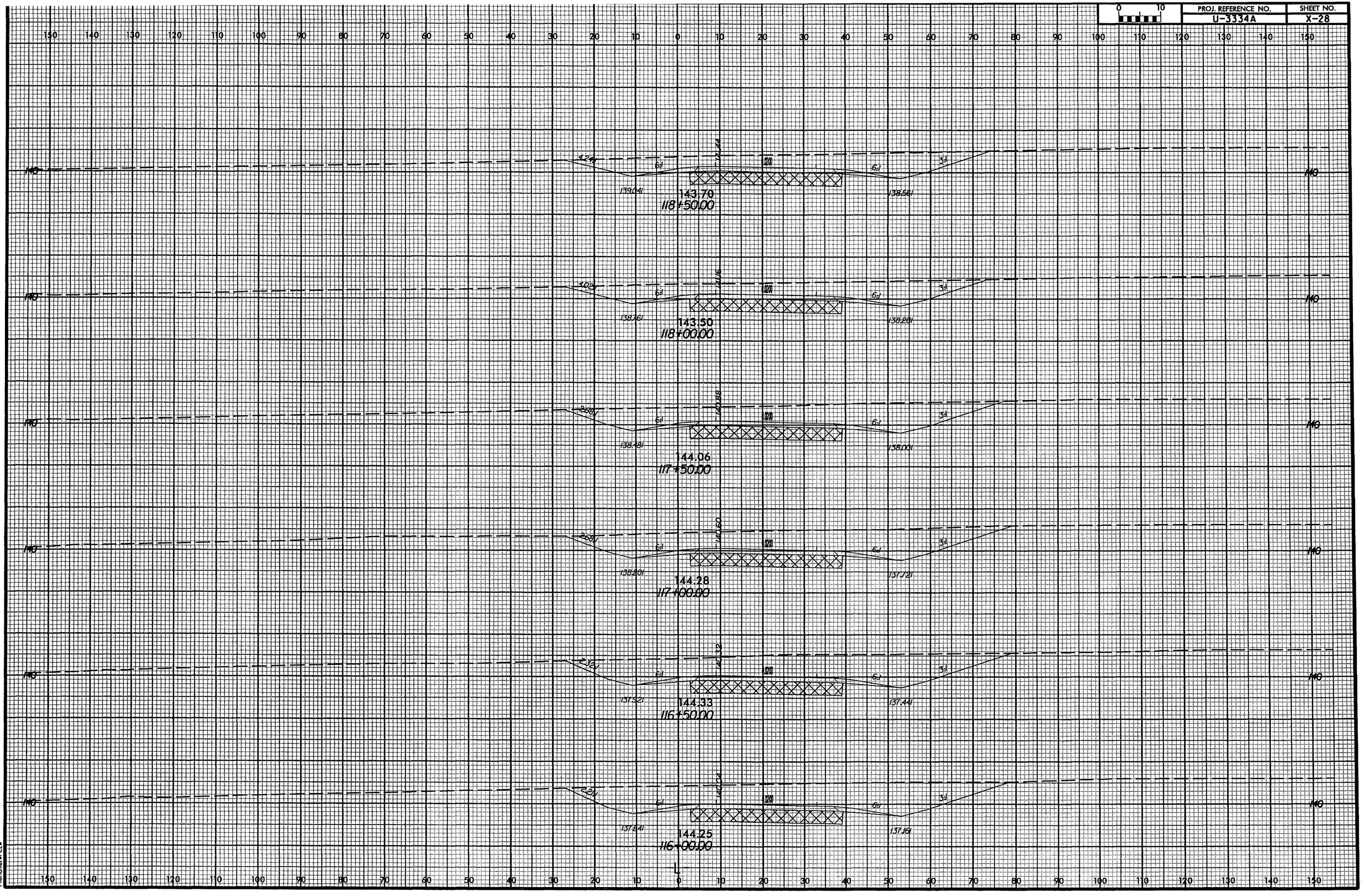
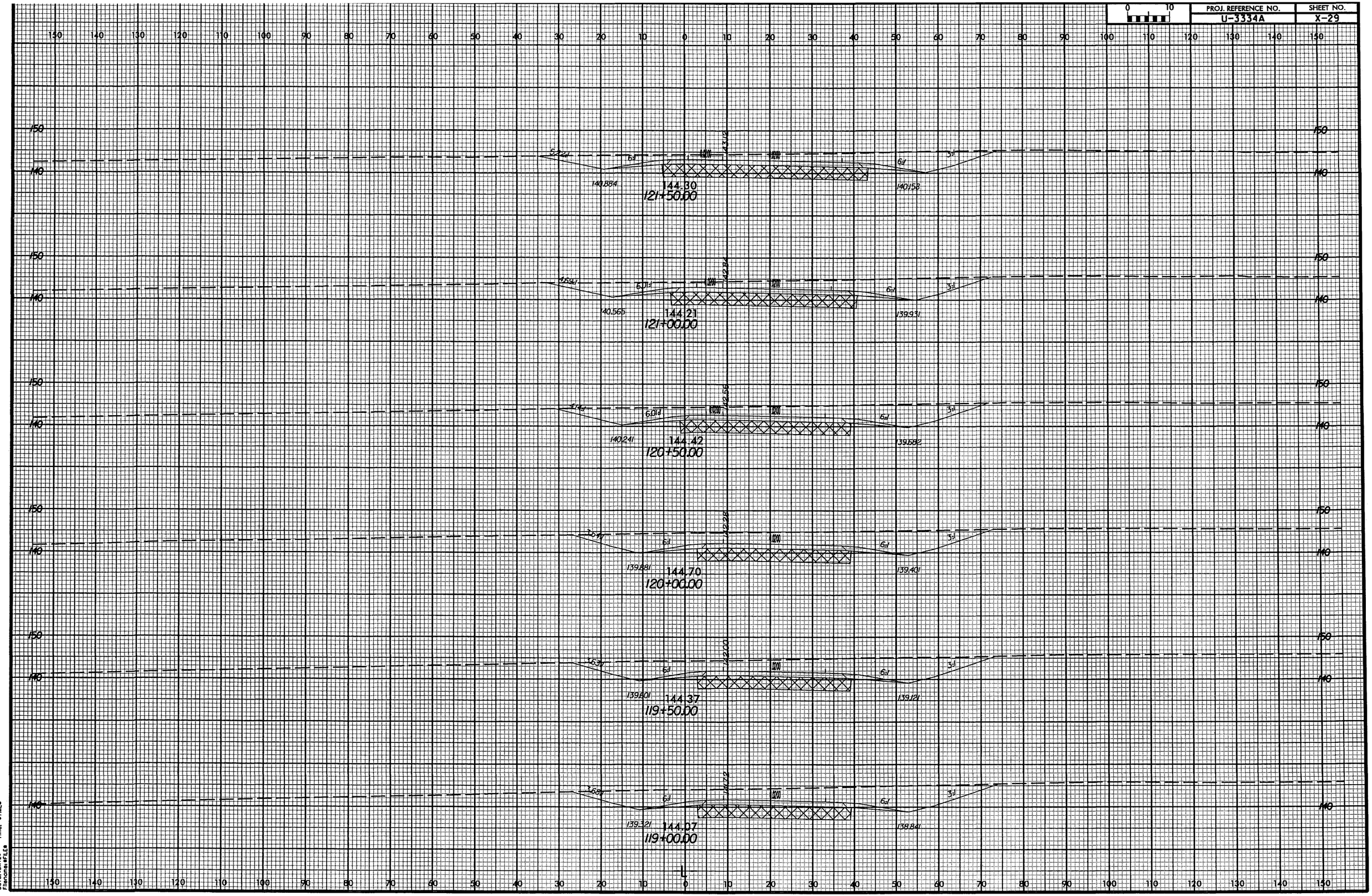
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-28



ARCADIS G&M
North Carolina, Inc.
Phone:(704)525-8126
Time: STIMES
File:

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-29



ARC-DOS CAM
DGN:R/DATE Time: @TIME@
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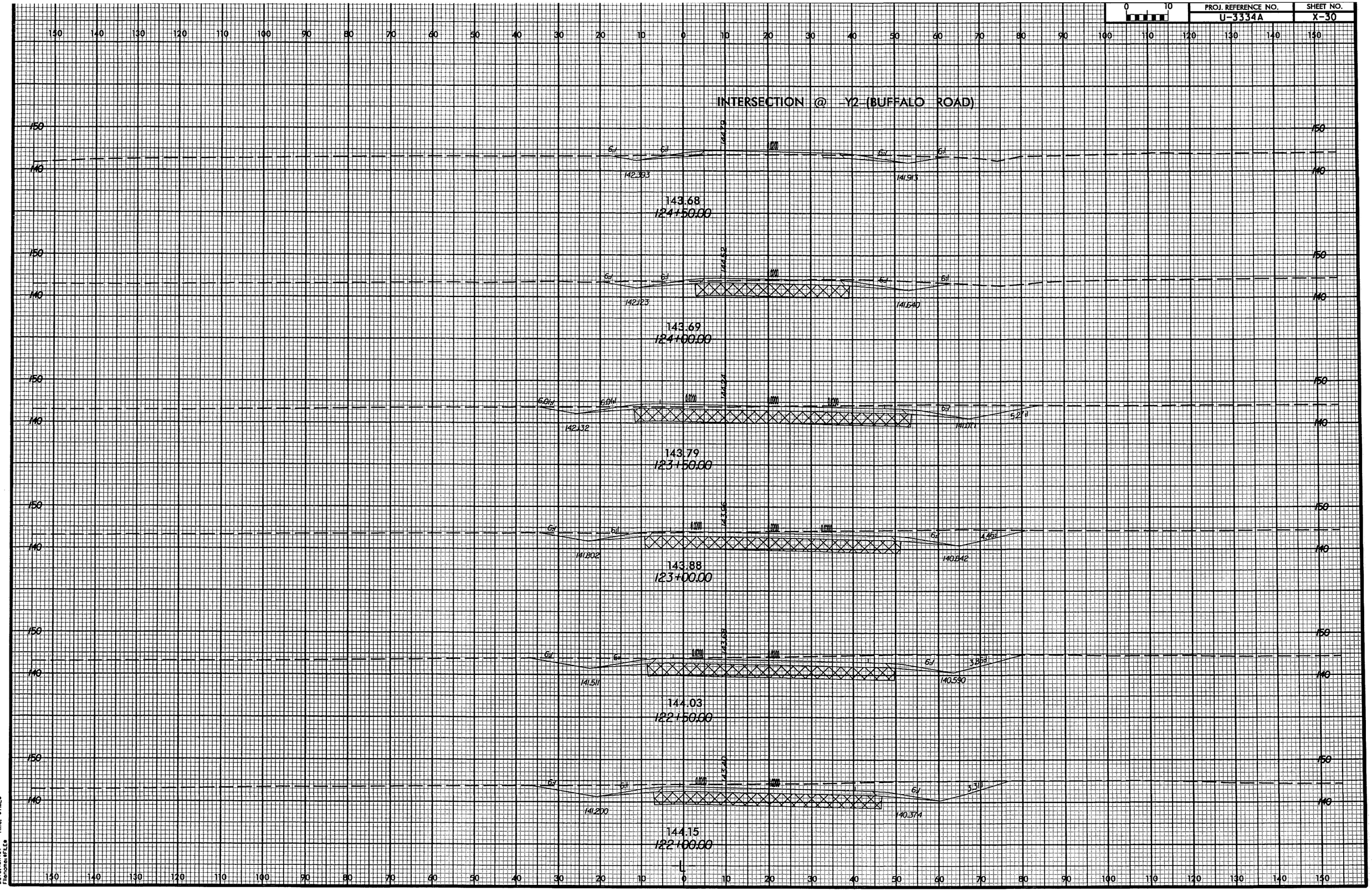
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-30



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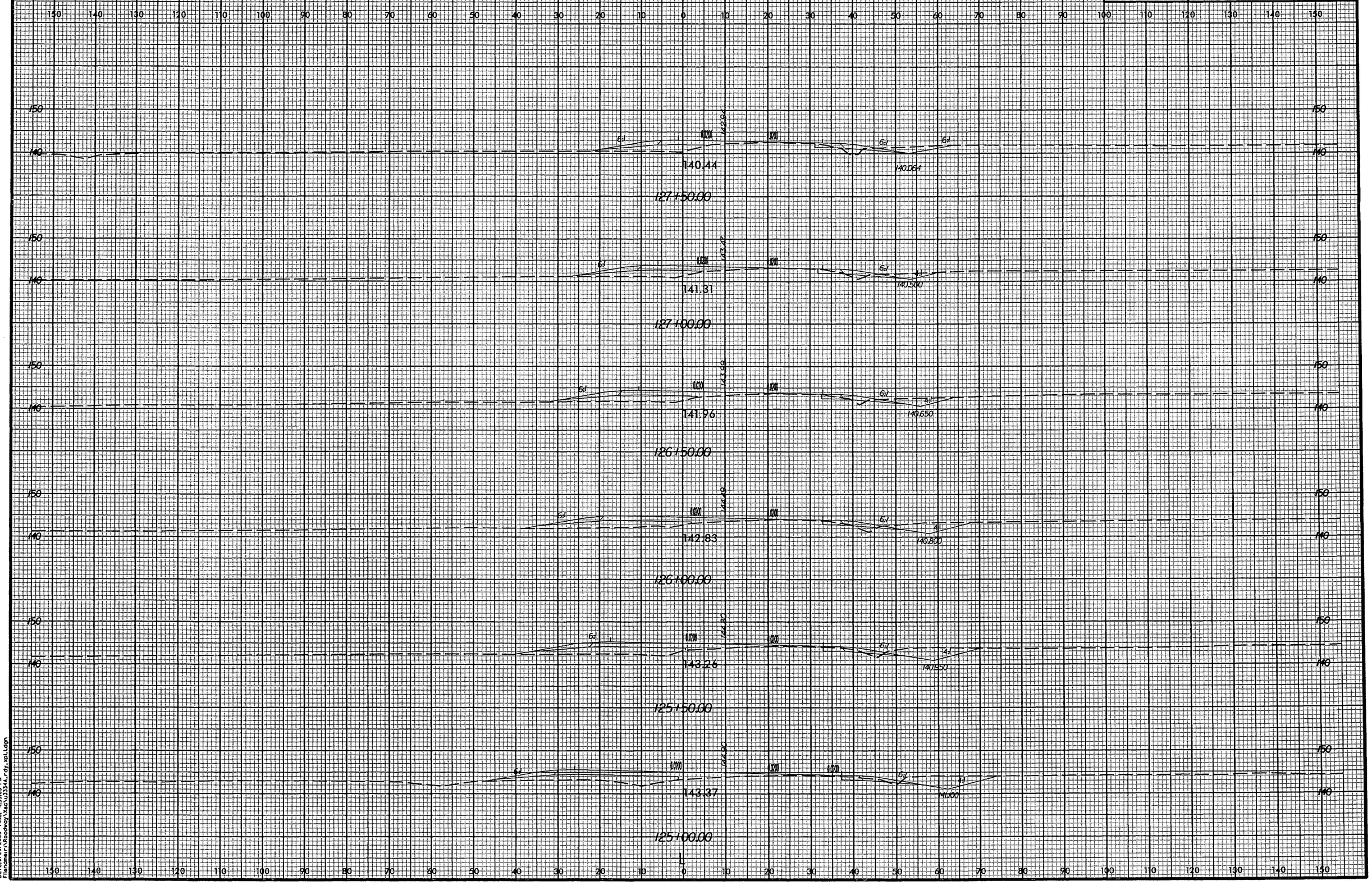
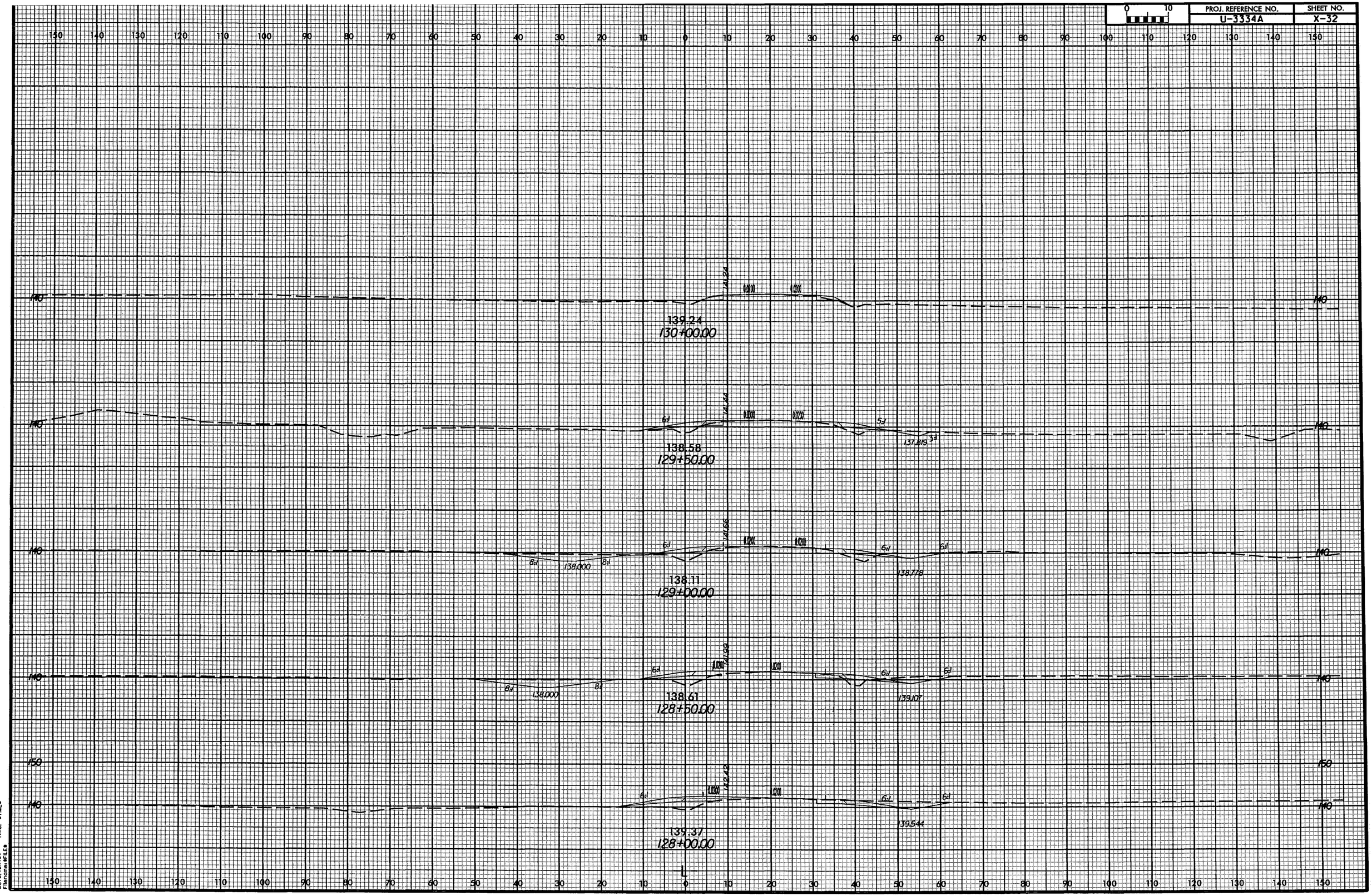
0 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3334A	X-31



ARCADIS G&M
Date: 3/29/2005 Time: 4:55:05 PM
Filename: Roadway Plans\U3334-L-dy_x01.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-32



ARCADS CAM
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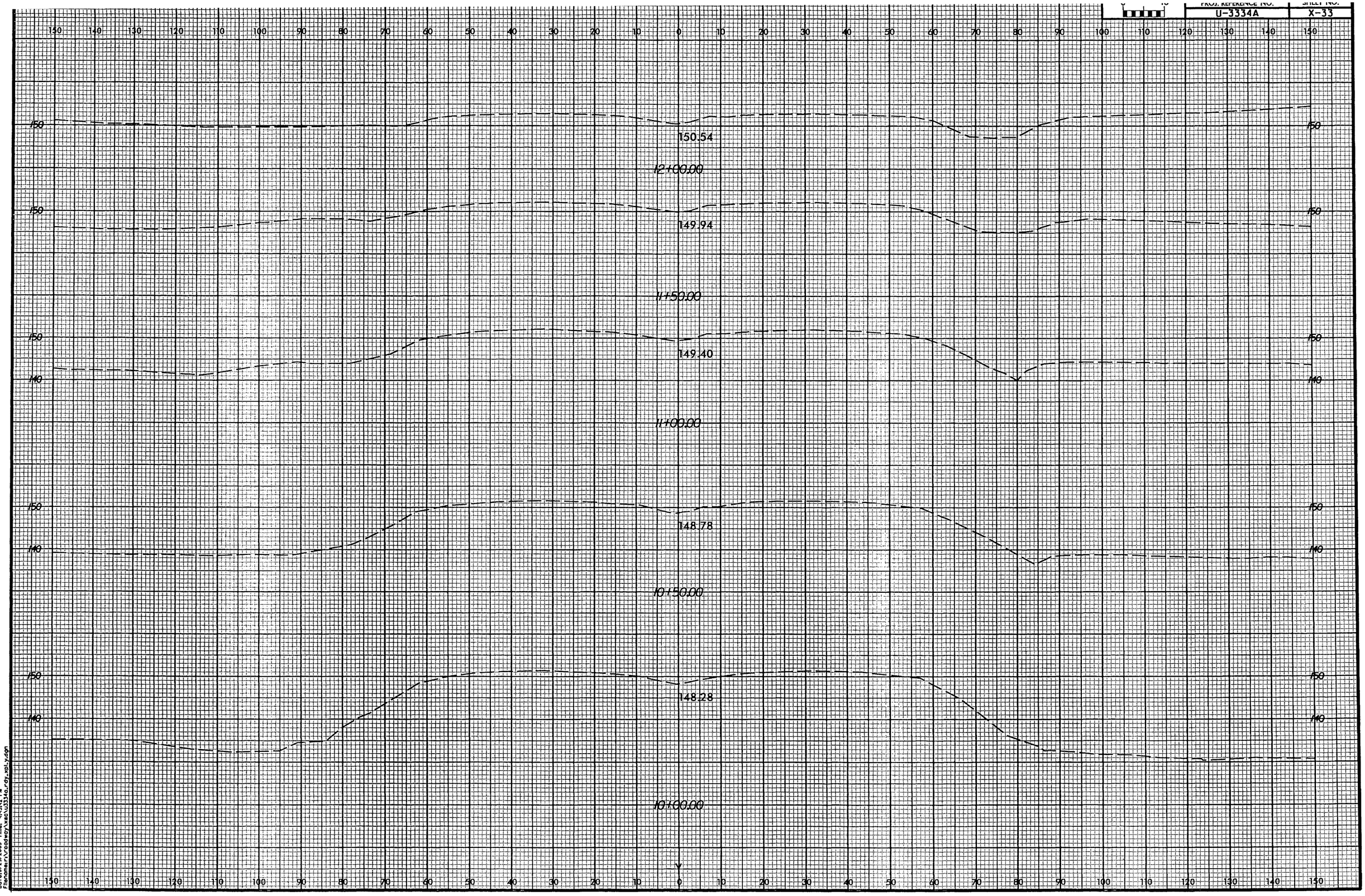
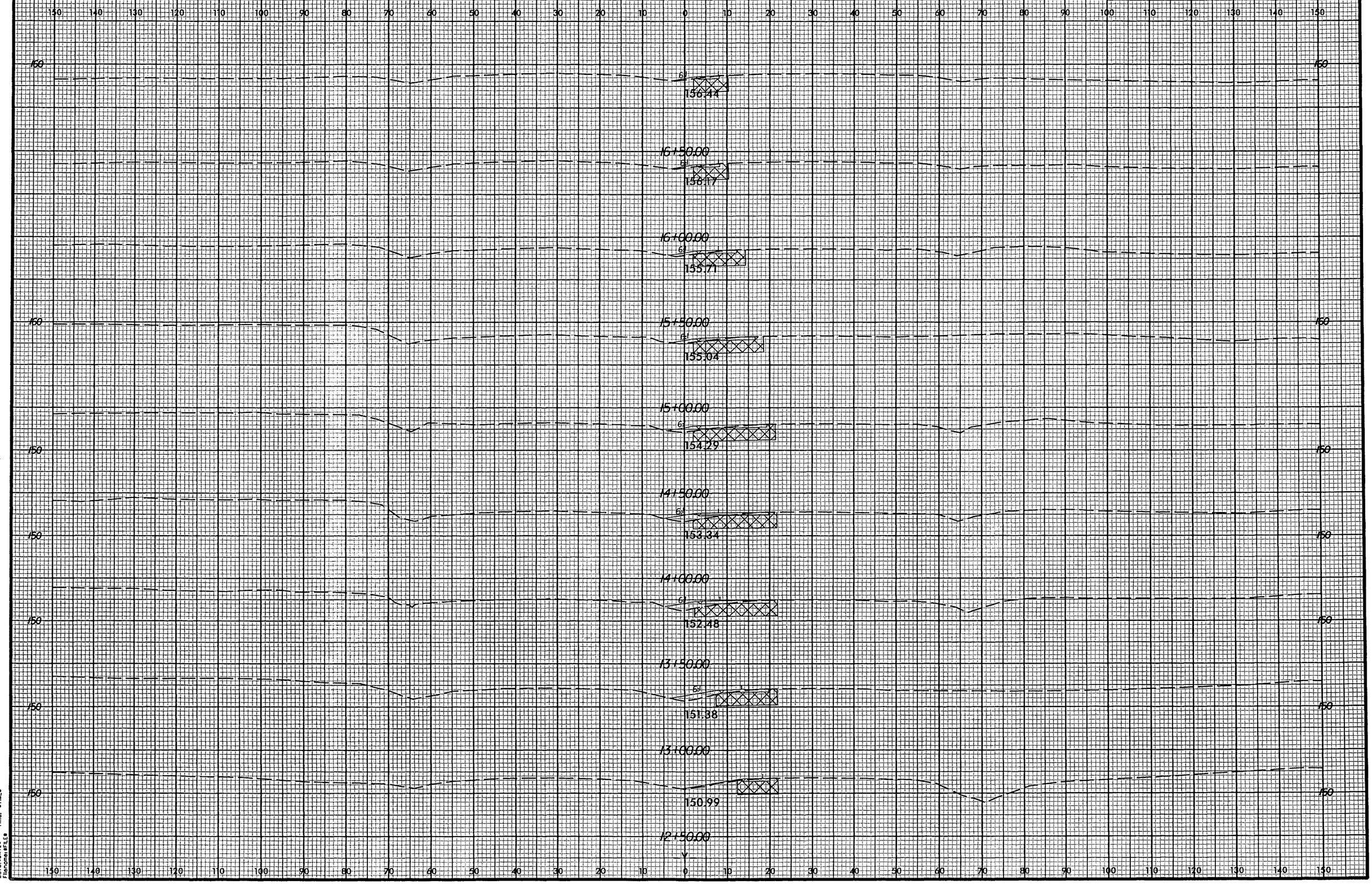


ARCADS CAM
Date:3/29/2005 Time: 4:43:42 PM
Filename:r:\roadway\xsec\u3334a_rdy_xpl_y.dgn

0 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3334A	X-34



ARCADIS CGM
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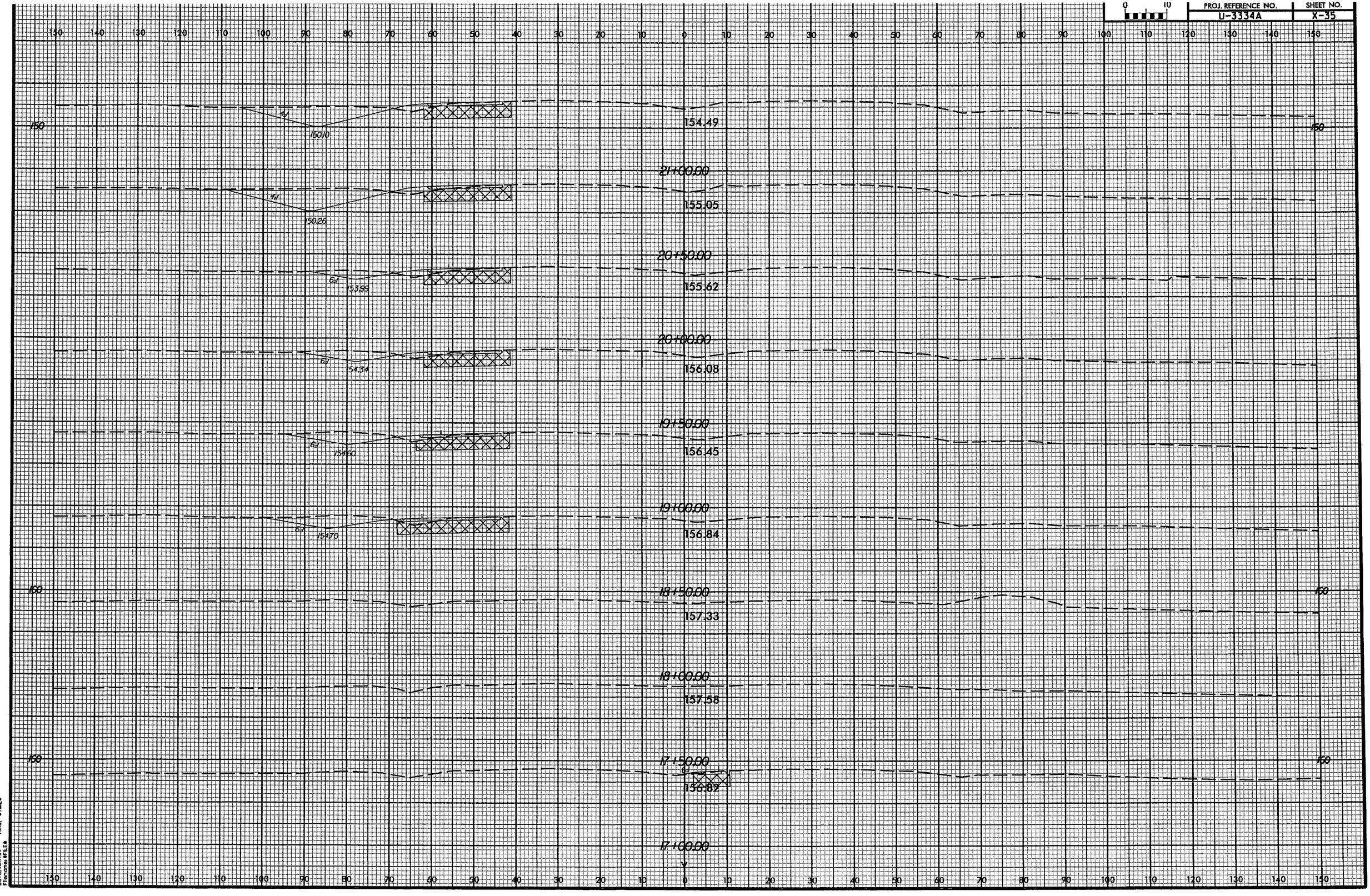
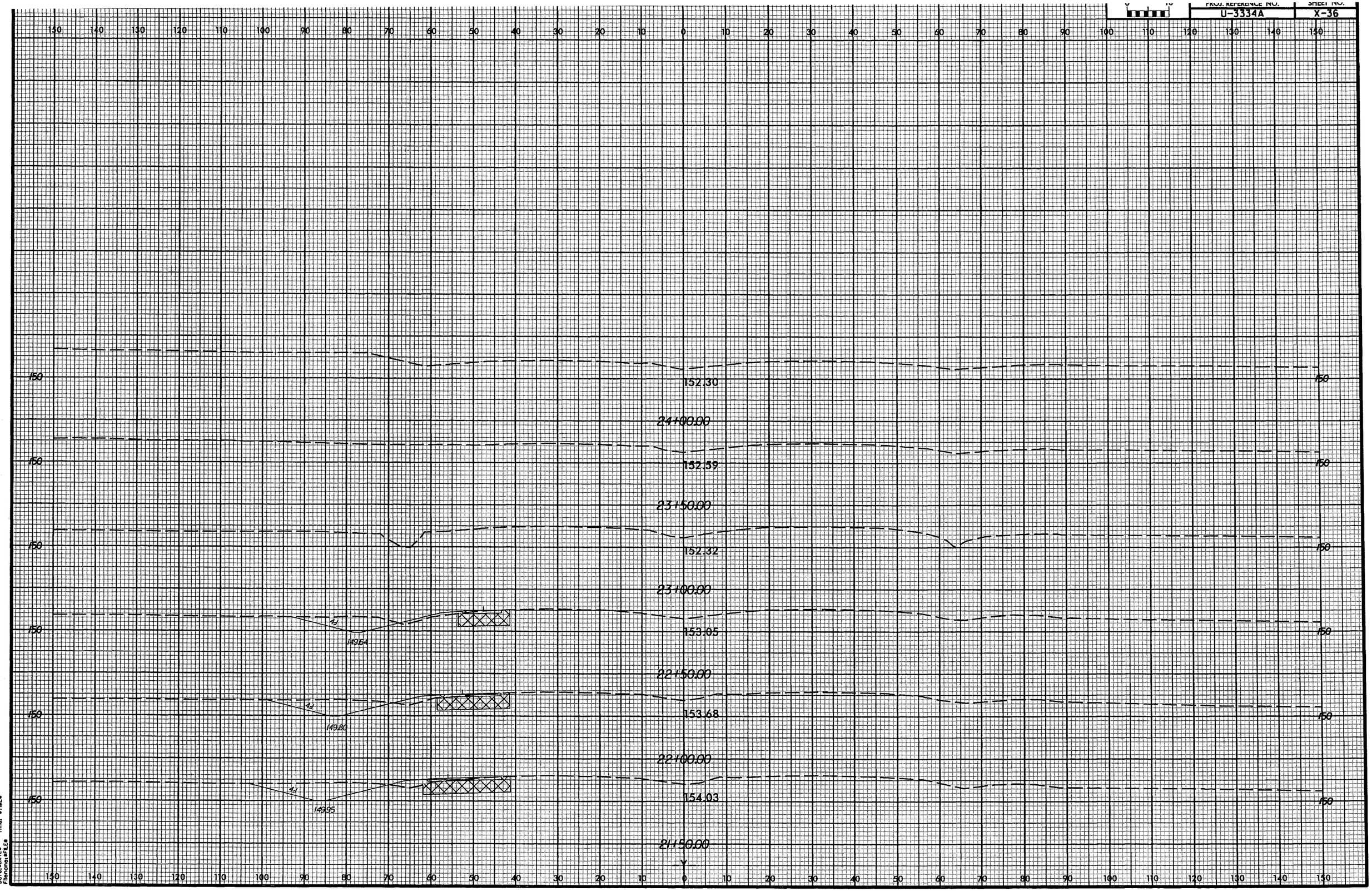
Filename:#FILE#

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-35



ARCADIS G&M
D:\Terr\ROATE
P:\Roadway\FILES
Time: $TIME$

PROJ. REFERENCE NO.: U-3334A
SHEET NO.: X-36



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Time: $TIME$
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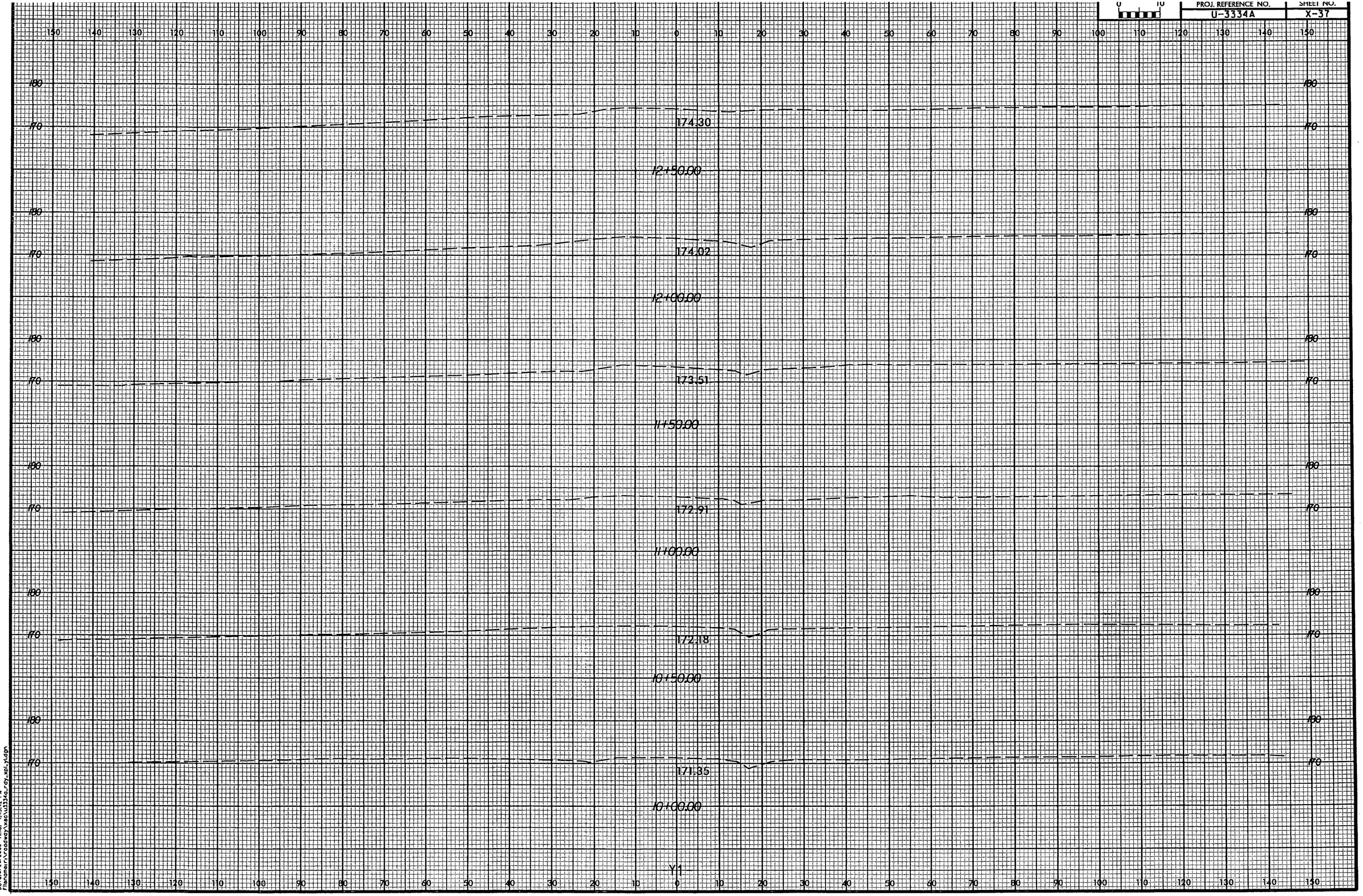
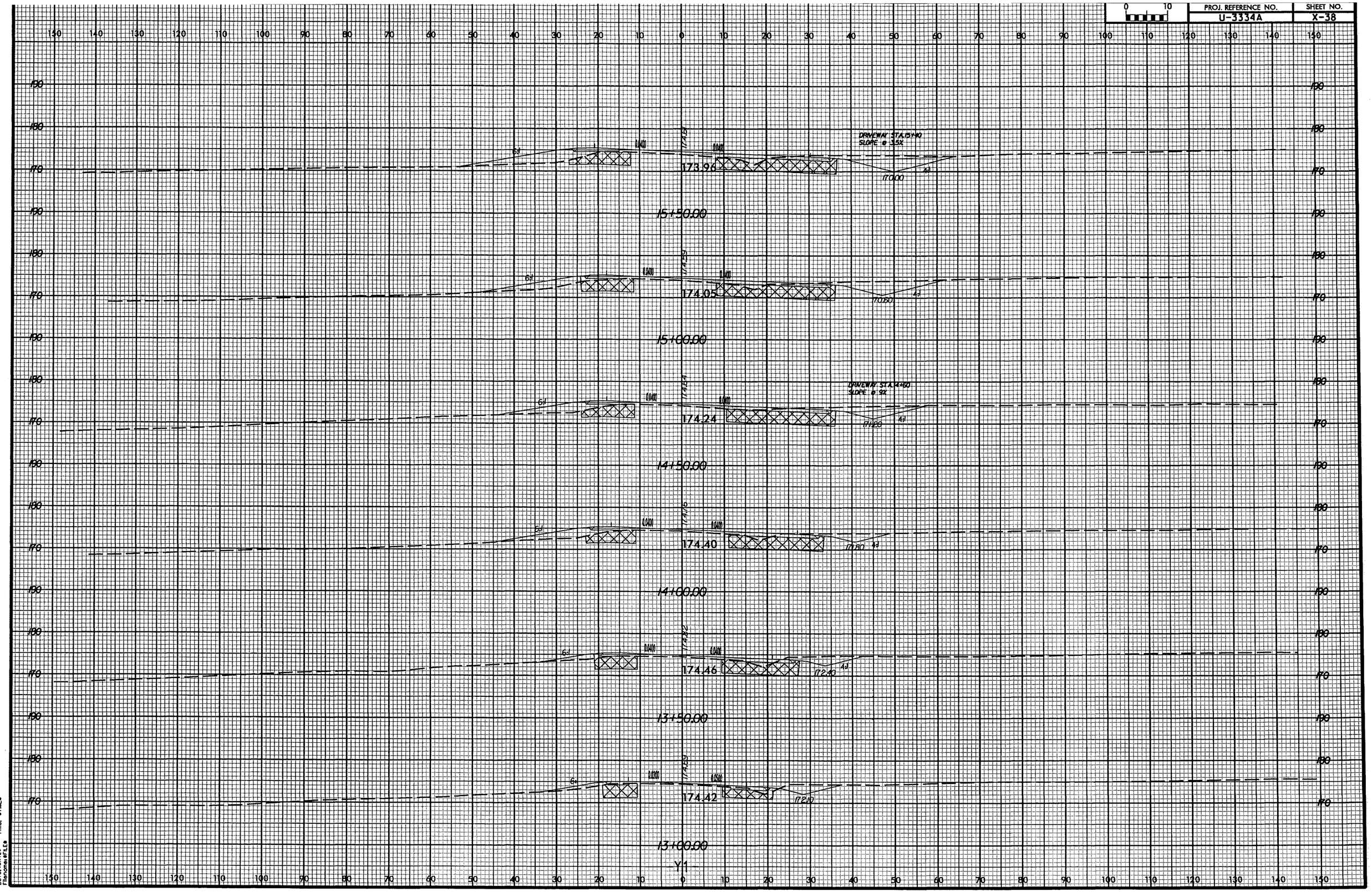


ARCADIS G&M
Date:3/29/2005 Time: 4:43:42 PM
File:home:r\roadway\xes\u3334a_rdy_xsl_h.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-38



ARCADIS CGM
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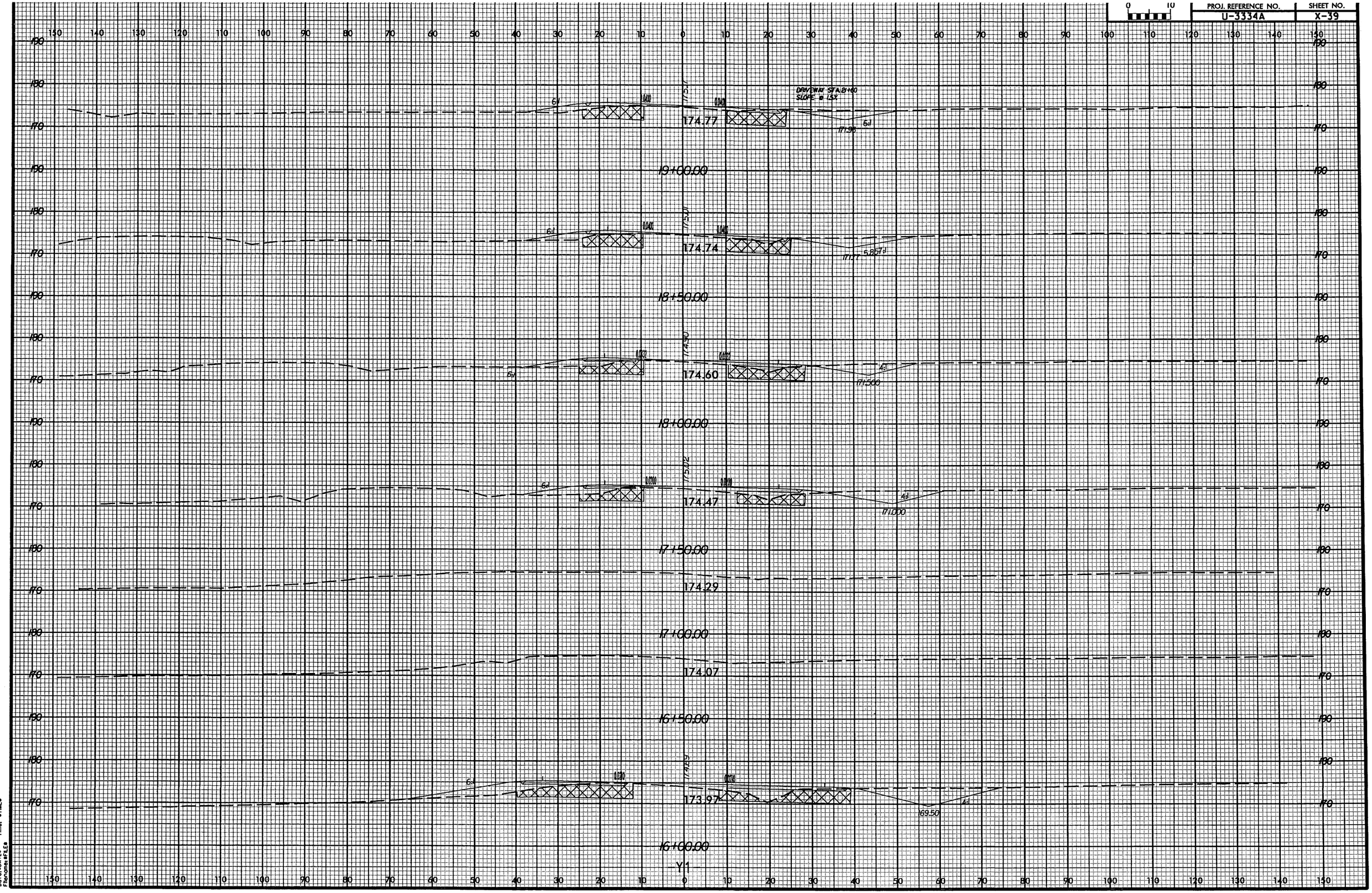
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-39



ARCADIS CAM
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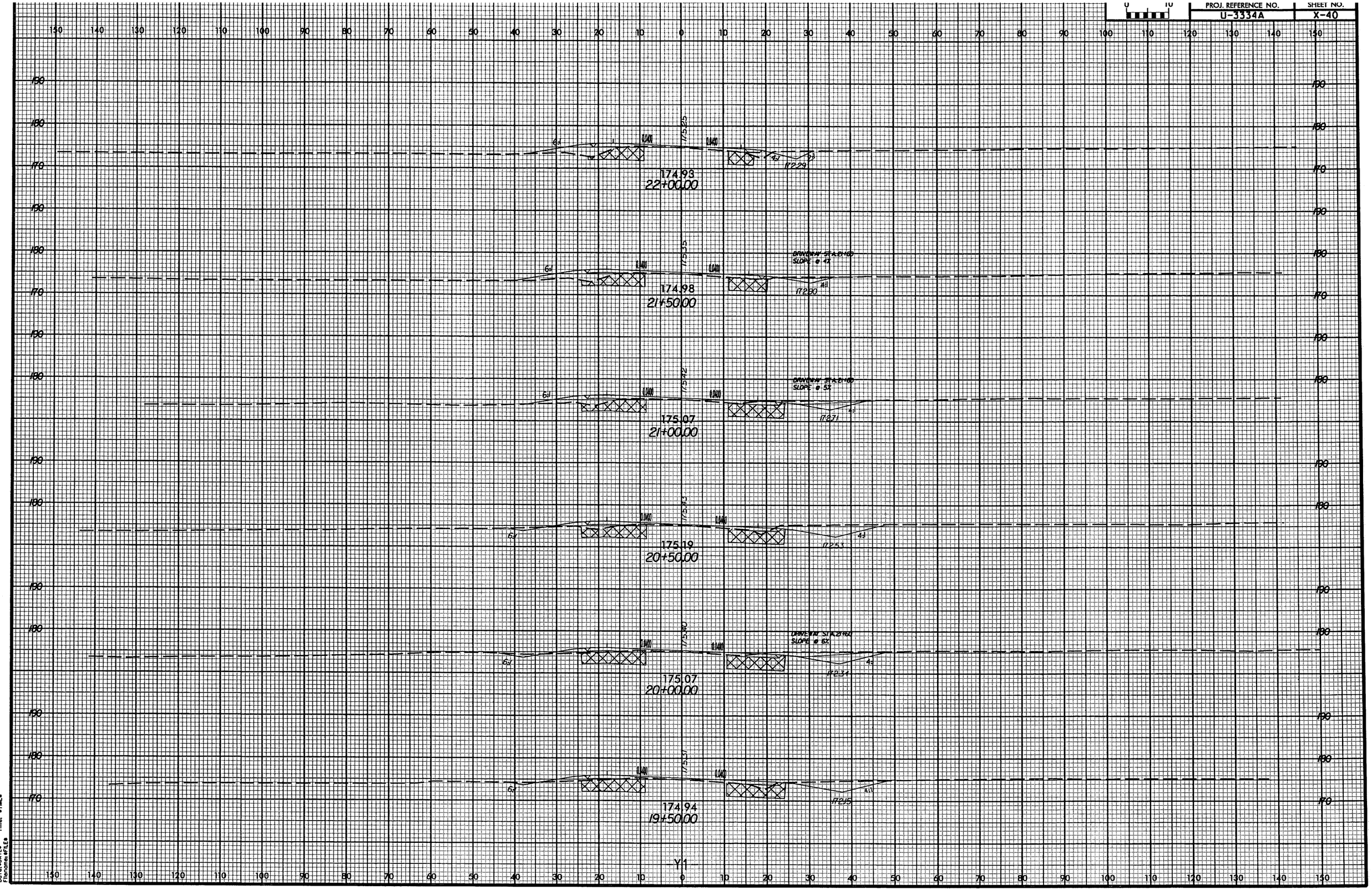
Filename:%FILE%
Time: %TIME%



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Filename:#FILE#
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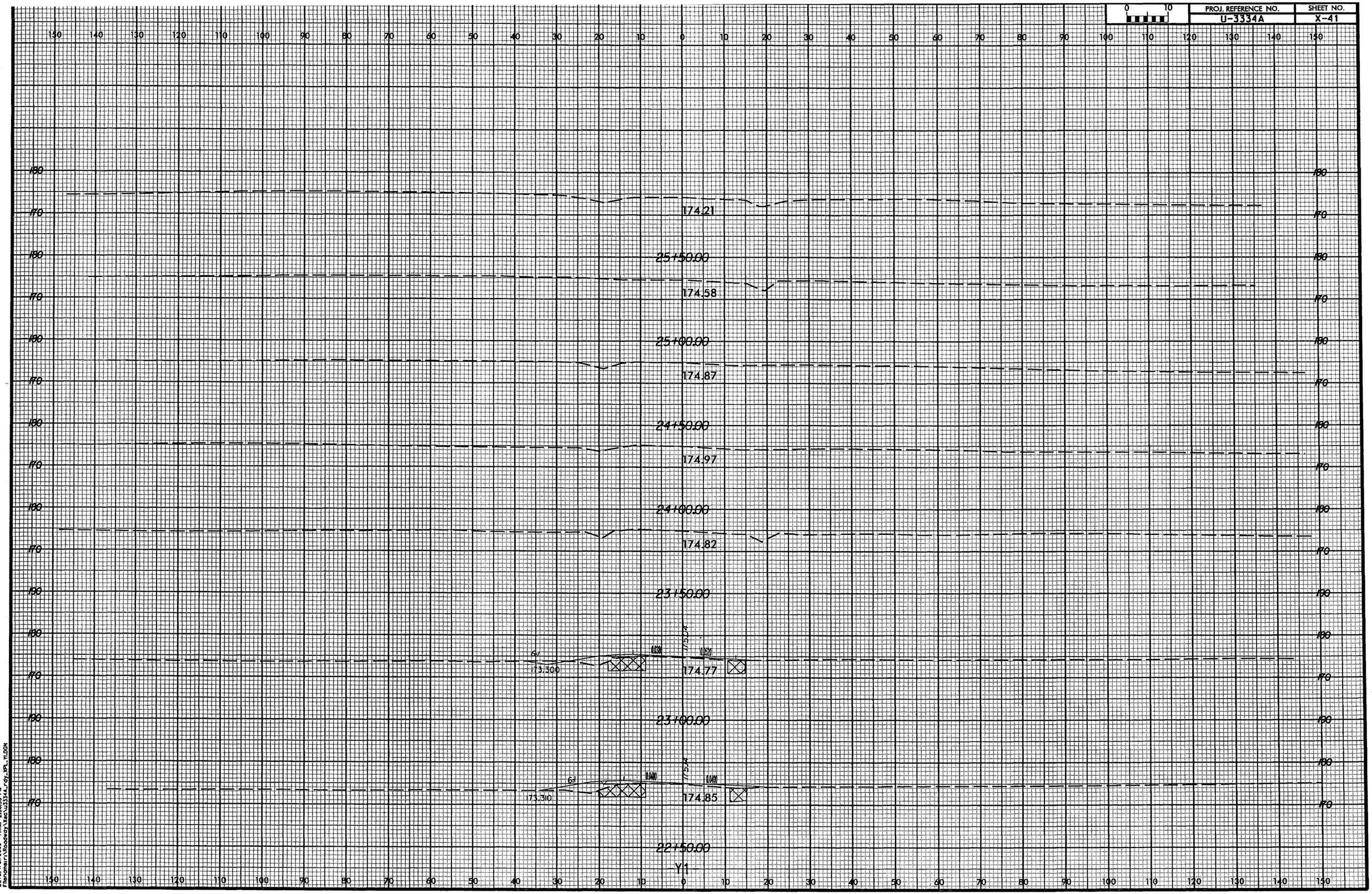
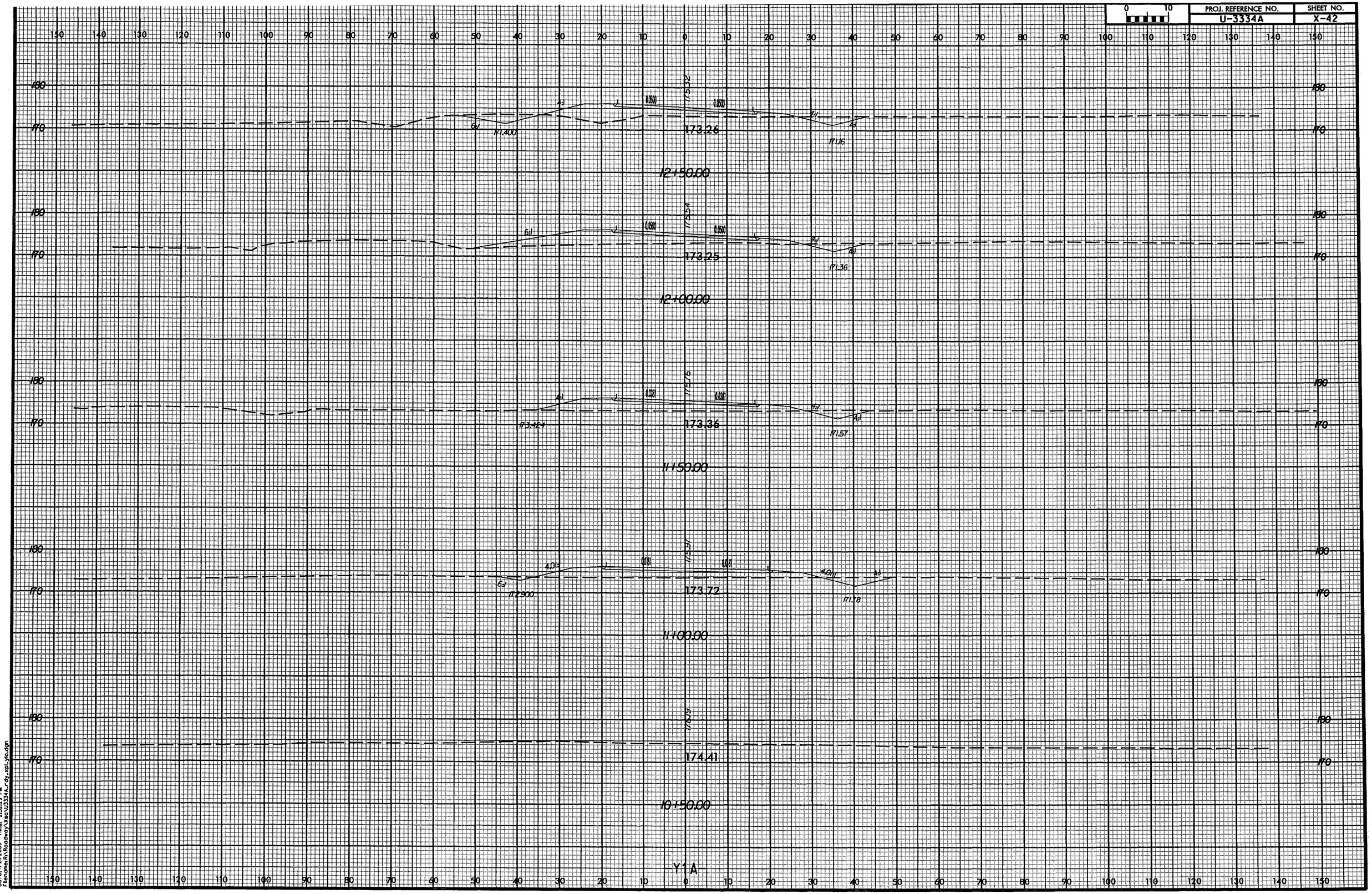
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-41



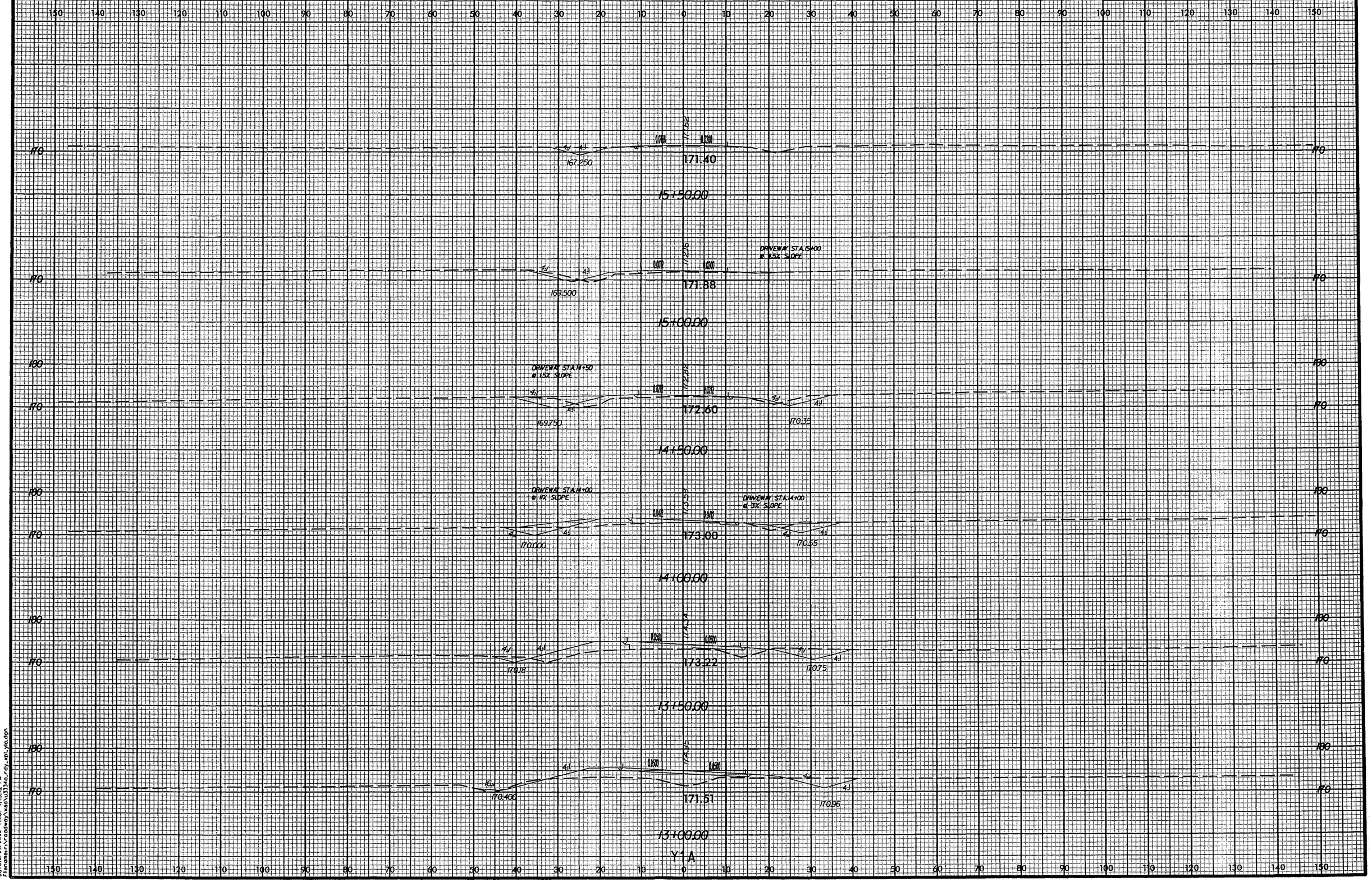
ARC-205 GAM
Date: 10/14/2005 Time: 2:30:58 PM
Filename: r:\Rodney\Mac\U3334_r-dy_XPL_Y1.DGN

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-42



ARC405 C&M
Date: 1/12/2005 Time: 2:32:29 PM
Filename: R:\Roadway\Ken\U3334A_rdy_xpl_Yld.dgn

0 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3334A	X-43



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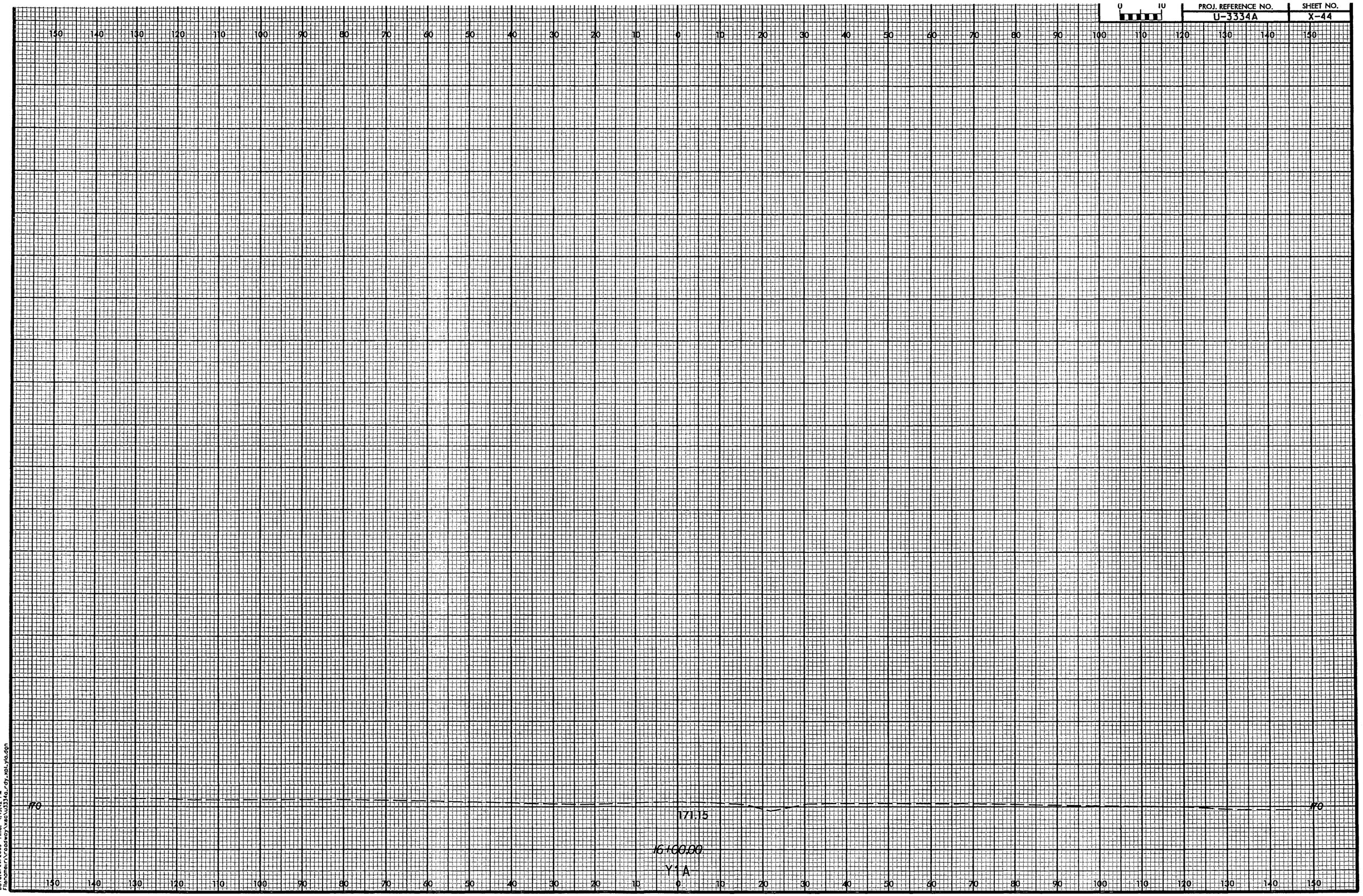
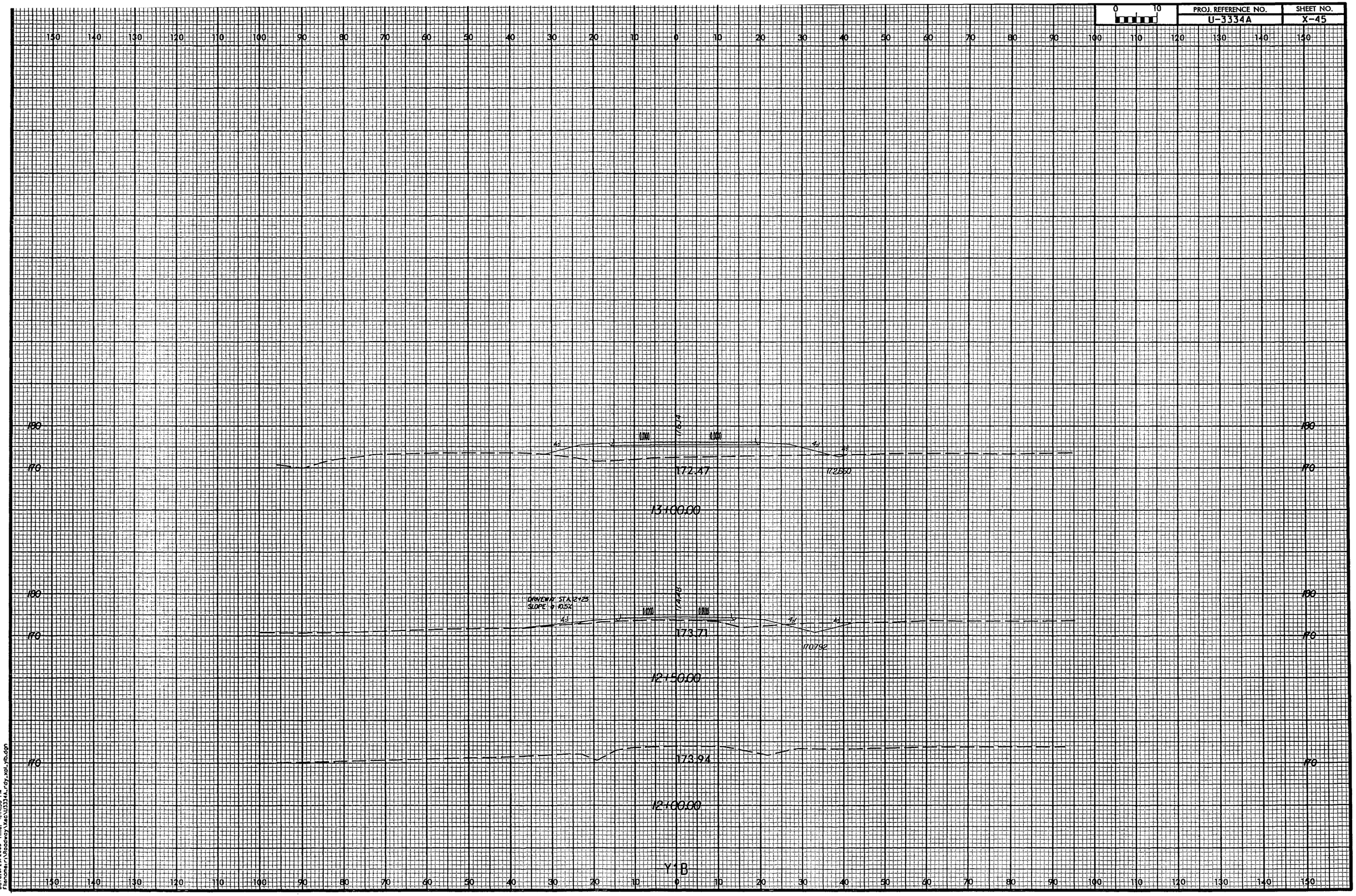
Filename:r:\roadway\xsec\u3334a_rdy_xb1_y1a.dgn



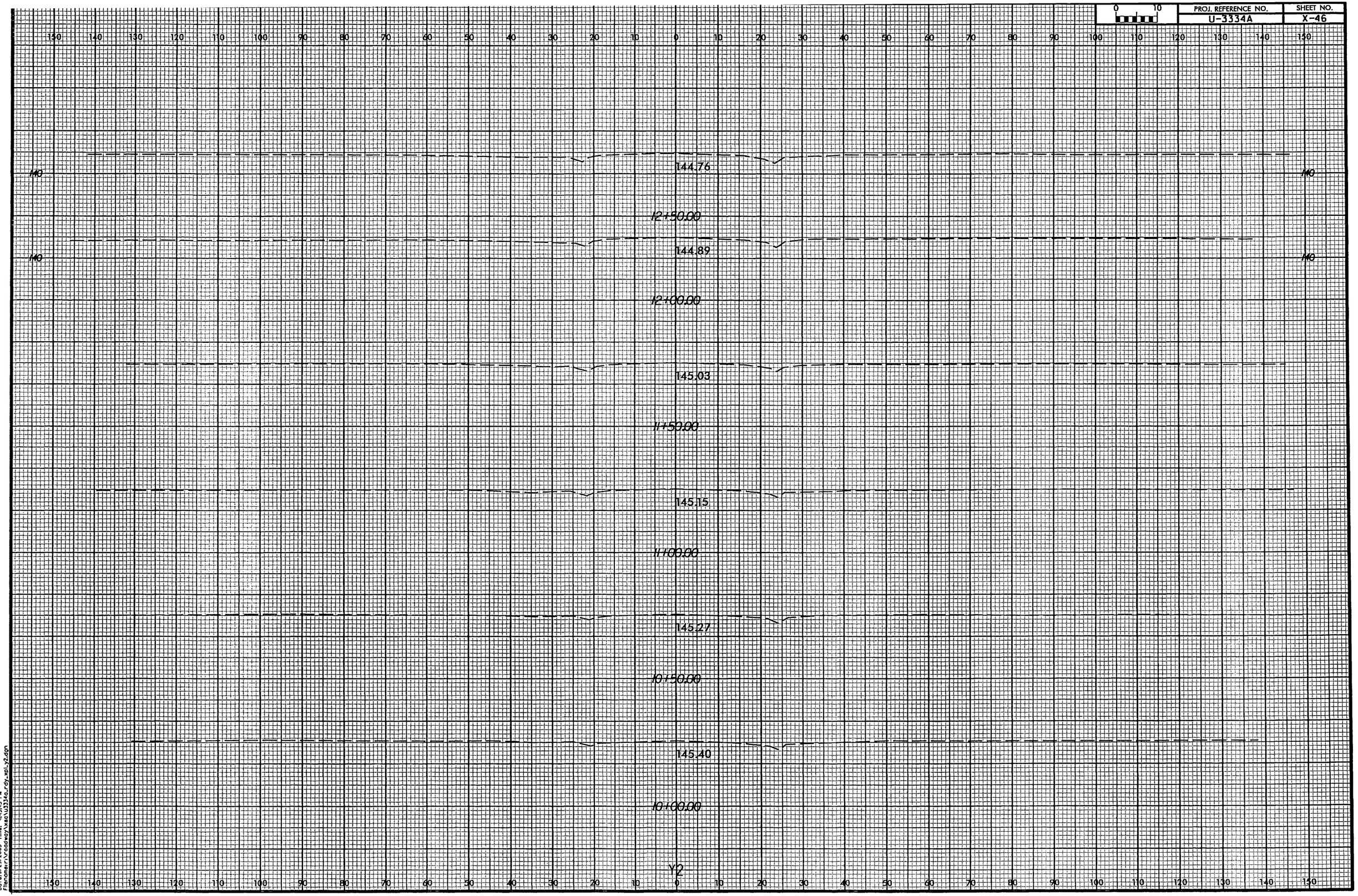
ARCADIS G&M
Date: 4/29/2005 Time: 4:43:42 PM
Filename: r:\roadway\xsec\u3334a_rdy_xsl_v10.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-45



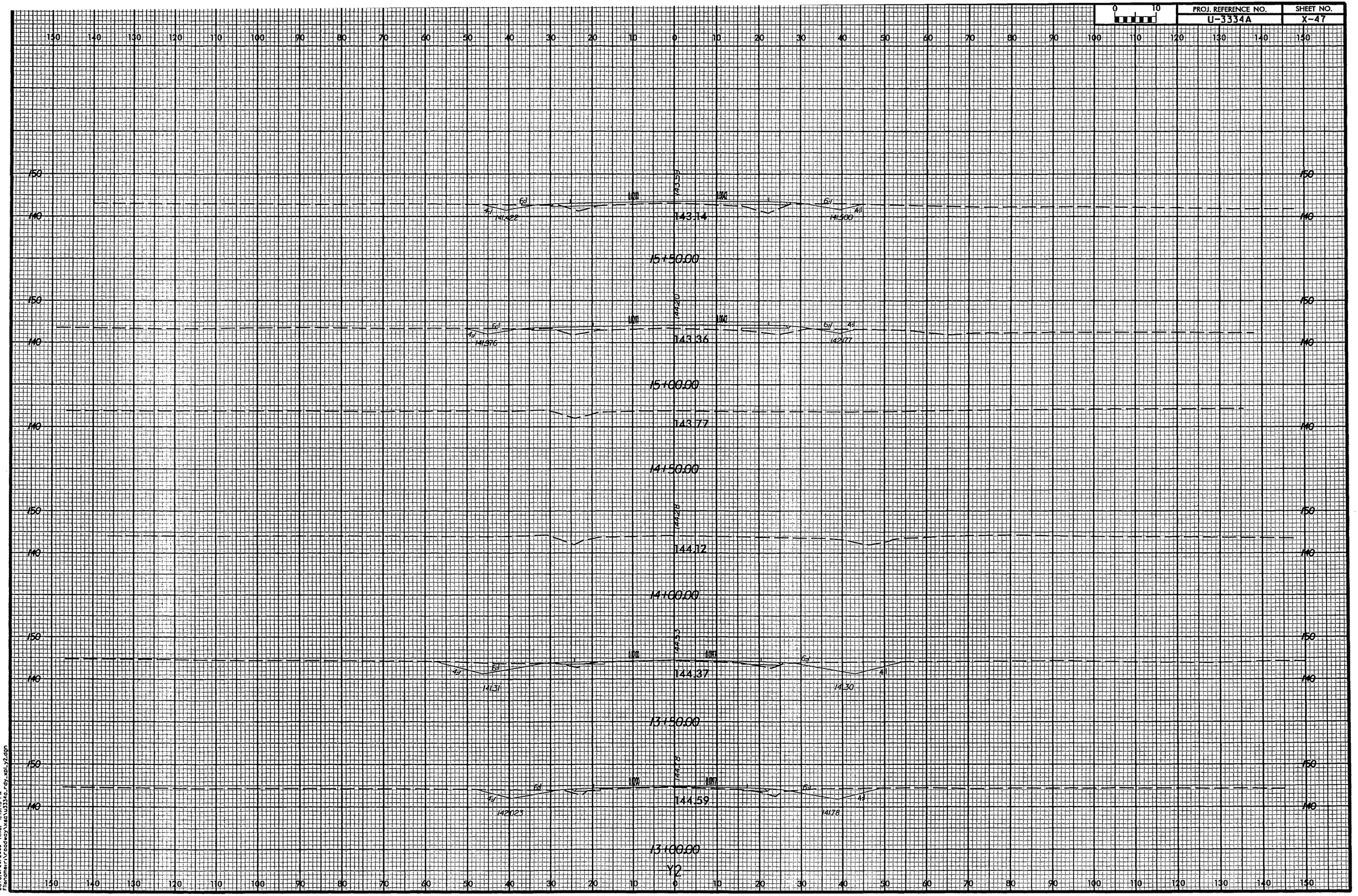
ARCADIS G&M
Date:3/29/2005 Time: 4:44:50 PM
Filename:N:\Roadway\Mac\U3334A_rdy_X01_YB1.dgn

0 10	PROJ. REFERENCE NO.	SHEET NO.
	U-3334A	X-46



ARCADIS C&M
Date:3/29/2005 Time: 4:13:13 PM
Filename:R:\Cadsey\xsec\U3334a_rdy_xpl_y2.dgn

PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-47



ARCADIS G&M
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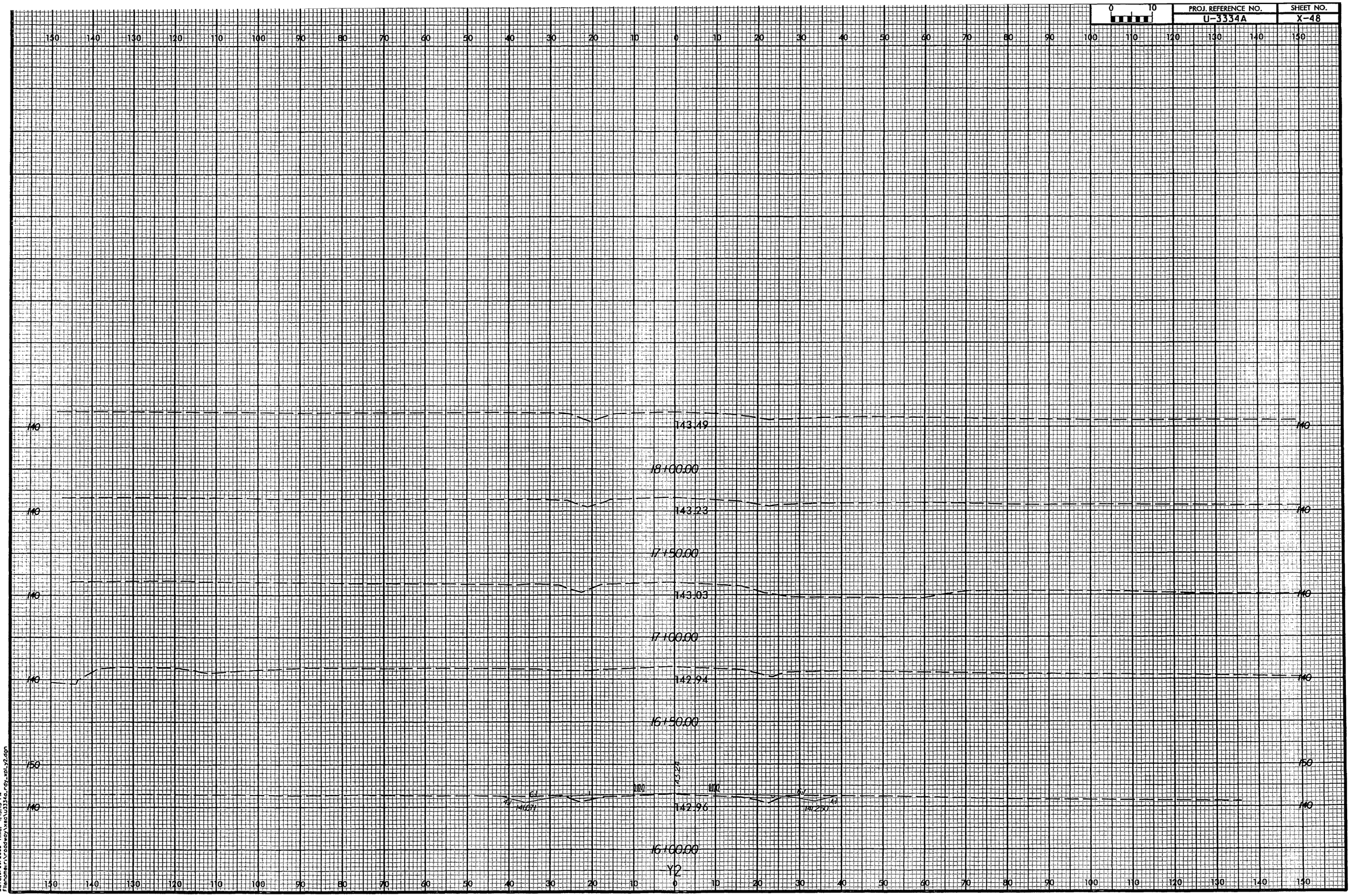
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PROJ. REFERENCE NO.
U-3334A
SHEET NO.
X-48
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140
143.49
18+00.00
143.23
17+50.00
143.03
17+00.00
142.94
16+50.00
143.25
142.96
16+00.00
Y2
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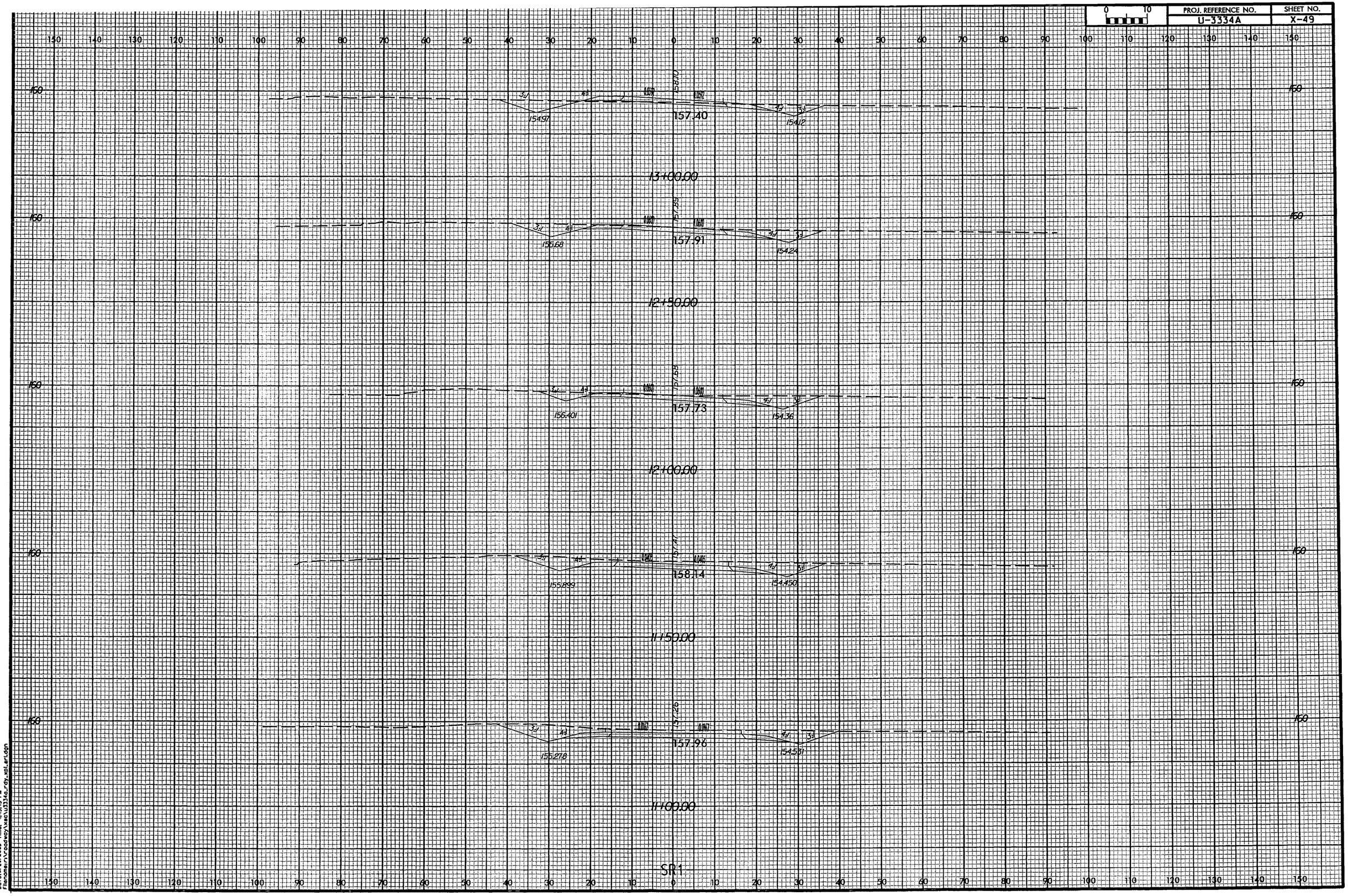
PROJ. REFERENCE NO.	SHEET NO.
U-3334A	X-49



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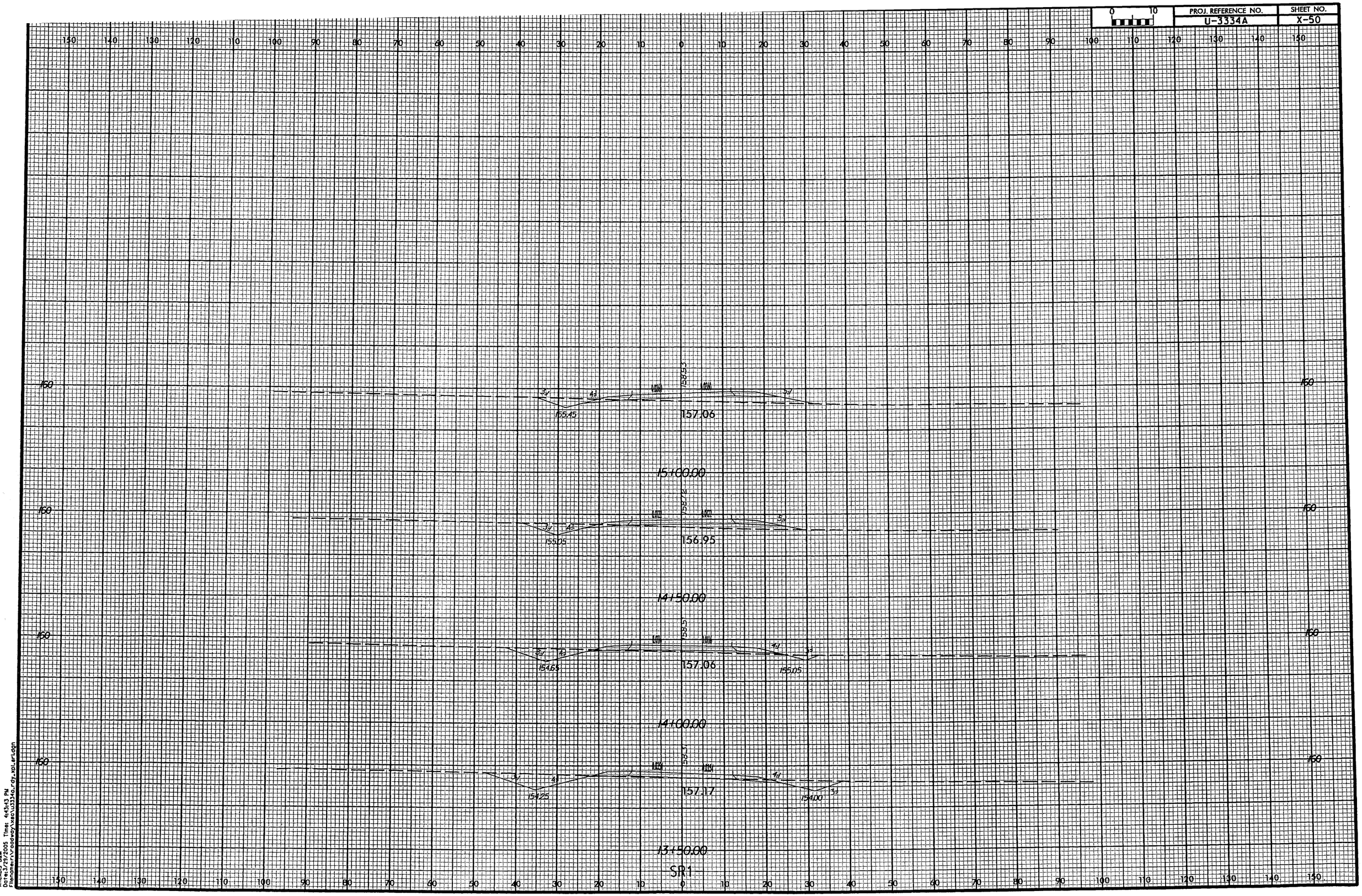

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