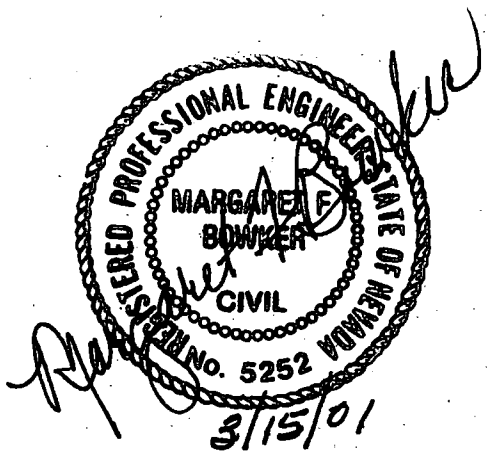
APPLICATION FOR LETTER OF MAP REVISION (LOMR)

BRANCH 3 OF WHITES CREEK

HYDRAULIC ANALYSIS OF BRANCH 3

PREPARED FOR:
Nevada Tri-Partners

Nimbus Job No. 06750-0008
March, 2001



Nimbus Engineers
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INTRODUCTION

This narrative has been prepared to accompany an application for a Letter of Map Revision (LOMR) for Branch 3 of Whites Creek. This stream reach is located in the southeast Truckee Meadows, south of Reno, Nevada (Figure 1) and is in an area that is undergoing urban development. The project is located in unincorporated Washoe County . Whites Creek is part of the lower Steamboat Creek drainage basin.

The project area is found on Panel 3186 of FIRM Number 32031C3178 E, Washoe County, Nevada, and Incorporated Areas. The initial flood plain boundaries presented on Flood Insurance Rate Maps (FIRM) were determined by approximate methods which have no available documentation. The boundaries were modified by a CLOMR in a document titled "Hydrologic and Hydraulic Analysis Whites Creek Meadows Subdivision" (Nimbus Engineers, October 1994), FEMA case number 95-09-133R. The present study covers only Branch 3 of Whites Creek from just downstream of South Virginia Street (U.S. 395) to Steamboat Creek.

Whites Creek originates in the Sierra Nevada Mountains and flows easterly to Steamboat Creek located in the Truckee Meadows. The Whites Creek watershed extends to an elevation of over 10,600 feet. The watershed is vegetated mainly with pine trees and mountain mahogany brush in the upper elevations an sagebrush with grass understory in the lower elevations. Approximately 2 miles upstream of South Virginia Street the watercourse diverges into four smaller channels. These channels have been named Whites Creek Branches 1 through 4. Before development began, these channels lost their definition and flowed across South Virginia Street and downstream farm land as sheet flow to Steamboat Creek. Urban development and construction of culverts under Highway I-580 have re-routed the channels and the sheet flow has been channelized. The subject of this study, Branch 3,passes under I-580 at Nevada Department of Transportation (NDOT) station "H" 535+33 through three 12 ft x 5 ft reinforced concrete box (RCB) culverts. They outlet near the southwest corner of Whites Creek Meadows Subdivision (Figure 2). Before construction of the channel, runoff then traveled as sheet flow eastward into Steamboat Creek.

The developed conditions for this LOMR take into account the constructed channel and related culverts in Branch 3. The general channel design consists of a base width of 80 feet and side slopes of 3:1. The channel is being lowered to the Steamboat Creek elevation through a series of drop structures and has varying channel slopes. The flow will pass under Steamboat Parkway through five 5 ft x 12 ft reinforced concrete box culverts (RCBs) just upstream of Steamboat Creek. As-built diagrams of the channel and culverts are shown in Appendix B. The existing conditions HEC-1 model is derived from the model used in the CLOMR application, but has been truncated at the Branch 3 confluence with Steamboat Creek, the downstream end of this study. This model is in Appendix C and a HEC-2 hydraulic analysis for developed conditions is presented in Appendix D. The existing FIRM is shown in

Figure 3. The revised Annotated FIRM is shown in Figure 4 and the developed conditions are shown in Figure 5. A watershed map (which is also the hydrologic workmap) is presented in Figure 6.

Please find the following attachments in support of of this LOMR request:

Appendix A Figures

- Figure 1 Vicinity Map
- Figure 2 Culvert Index Map
- Figure 3 Existing FIRM
- Figure 4 Annotated FIRM
- Figure 5 Proposed Conditions LOMR
- Figure 6 Watershed Map (Hydrologic Workmap)

Appendix B FEMA Forms and Attachments
Appendix C HEC-1 Model for Developed Conditions, file name BR3-LOMR.dat
Appendix D HEC-2 Model for Developed Conditions, file name 008LOMR.dat
Appendix E As-Built Hydraulic Workmap
Appendix F As-built Diagram for the Steamboat Parkway culverts
Appendix G Supporting Calculations for HEC-1 model
Appendix H Discs with the HEC-1 and HEC-2 models

APPENDIX A

FIGURES

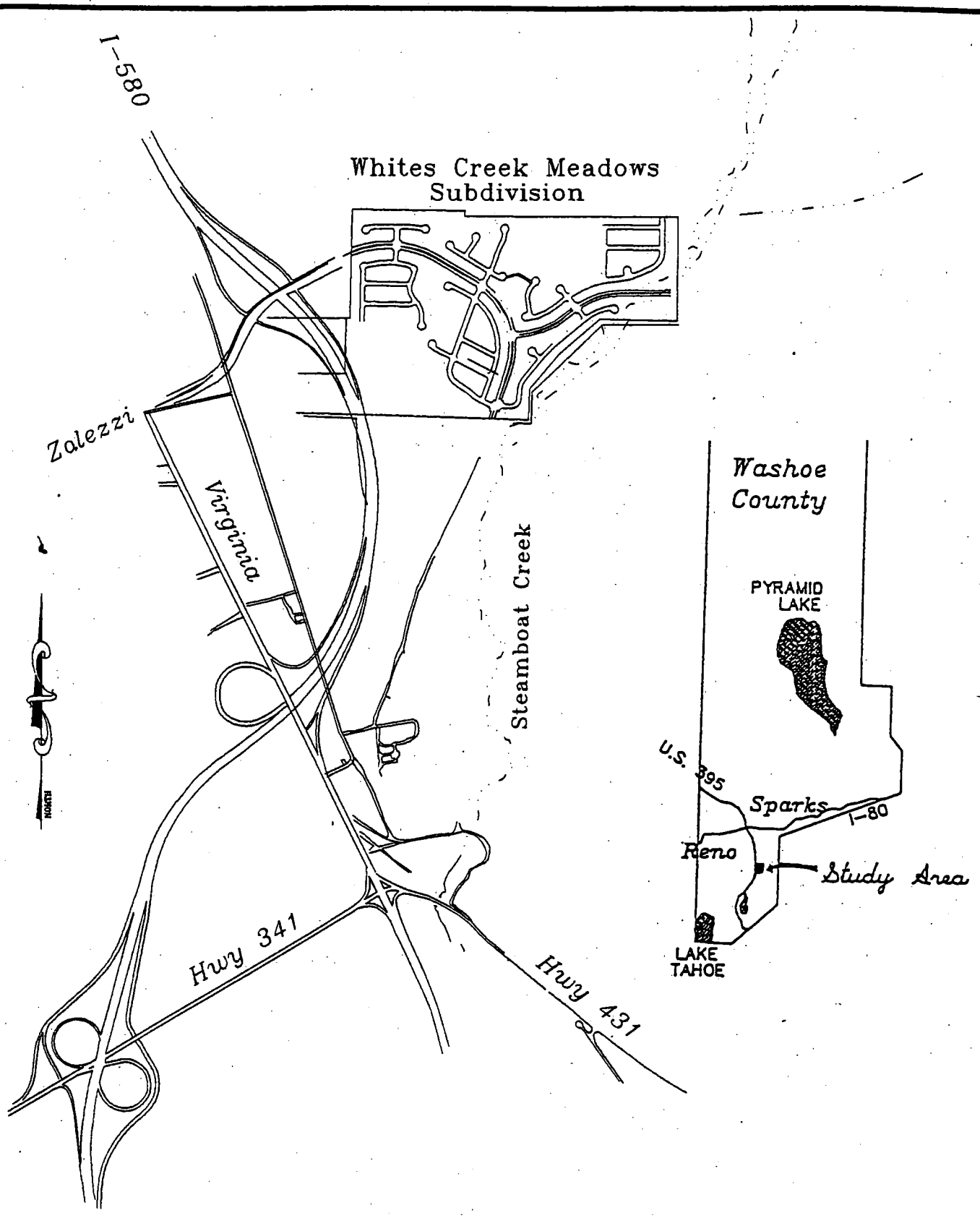

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Figure 1

Vicinity Map

Whites Creek Meadows Subdivision

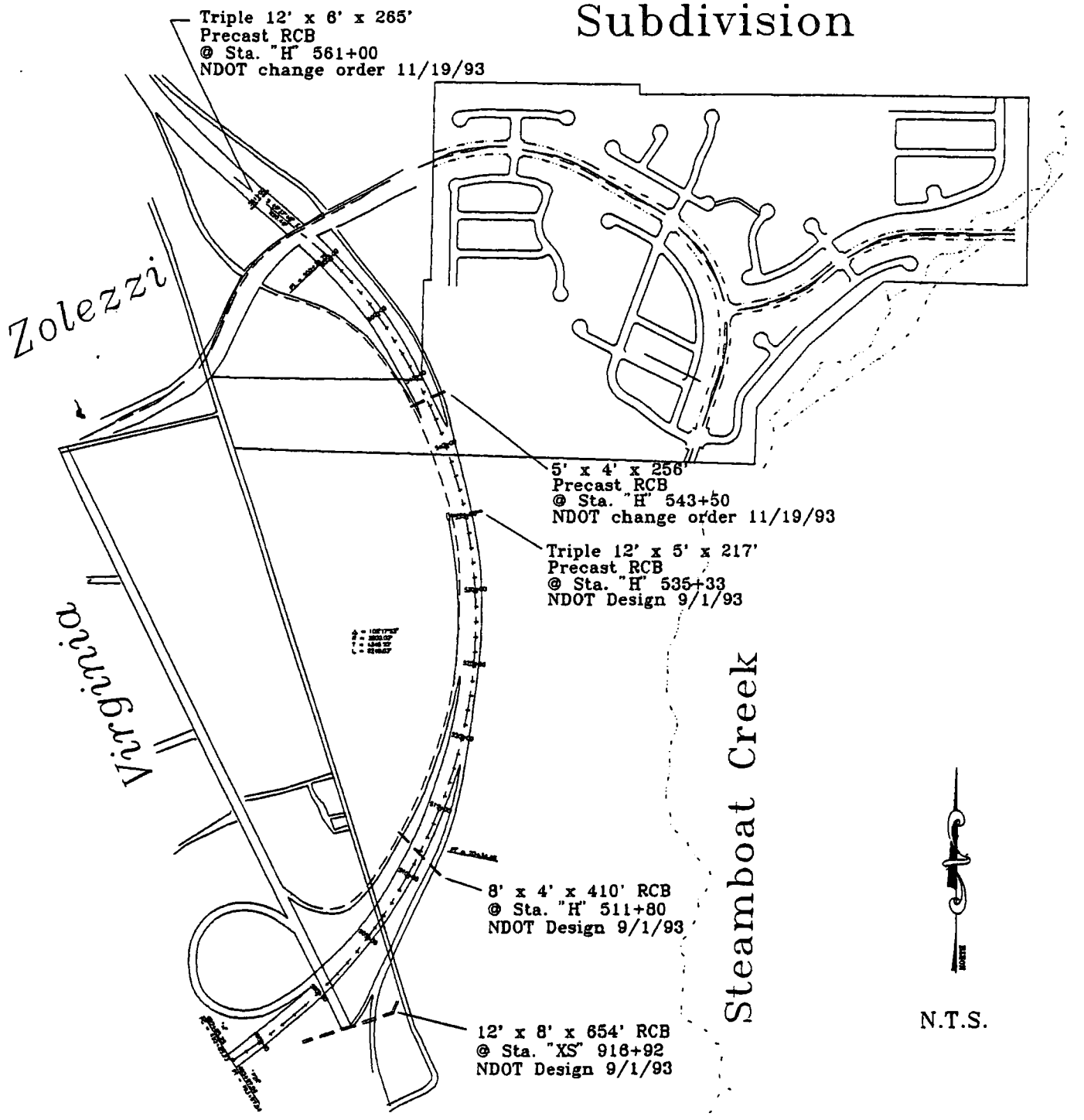

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Figure 2
Culvert Index Map

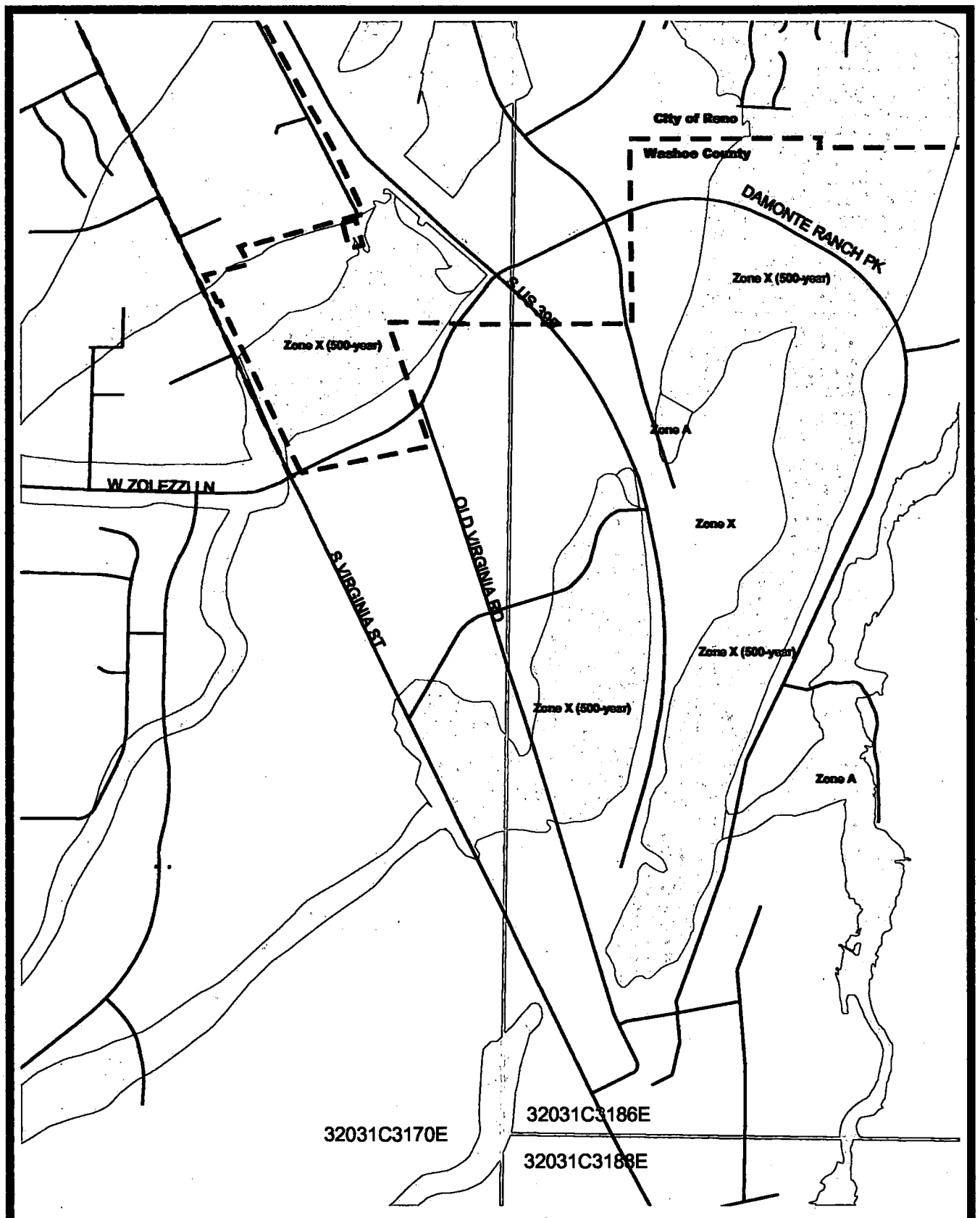

Figure 3
Existing FIRM

Nimbus Job No. 0008

Date: March 2001

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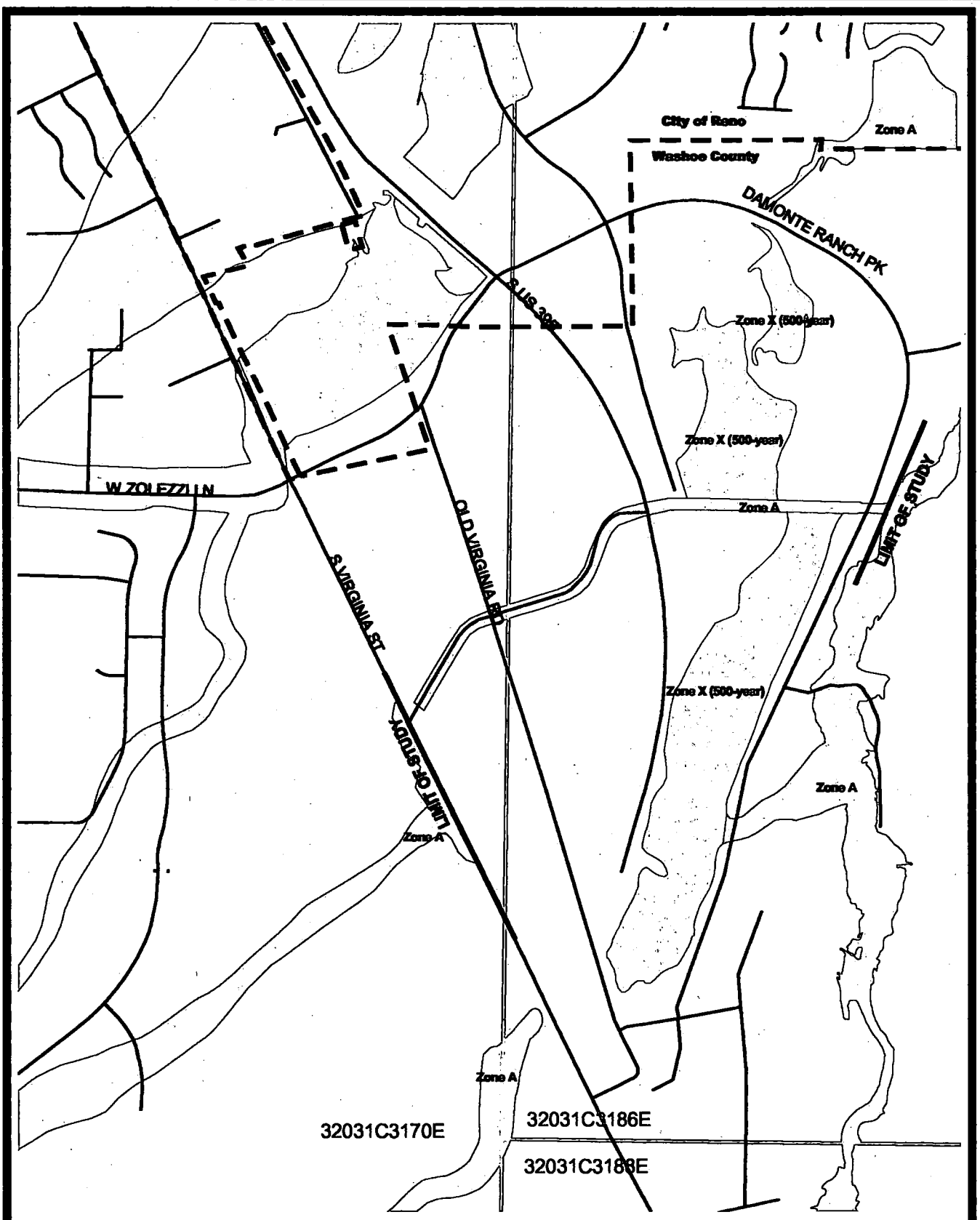

Figure 4
Annotated FIRM

Nimbus Job No. 0008 *Date: March 2001*

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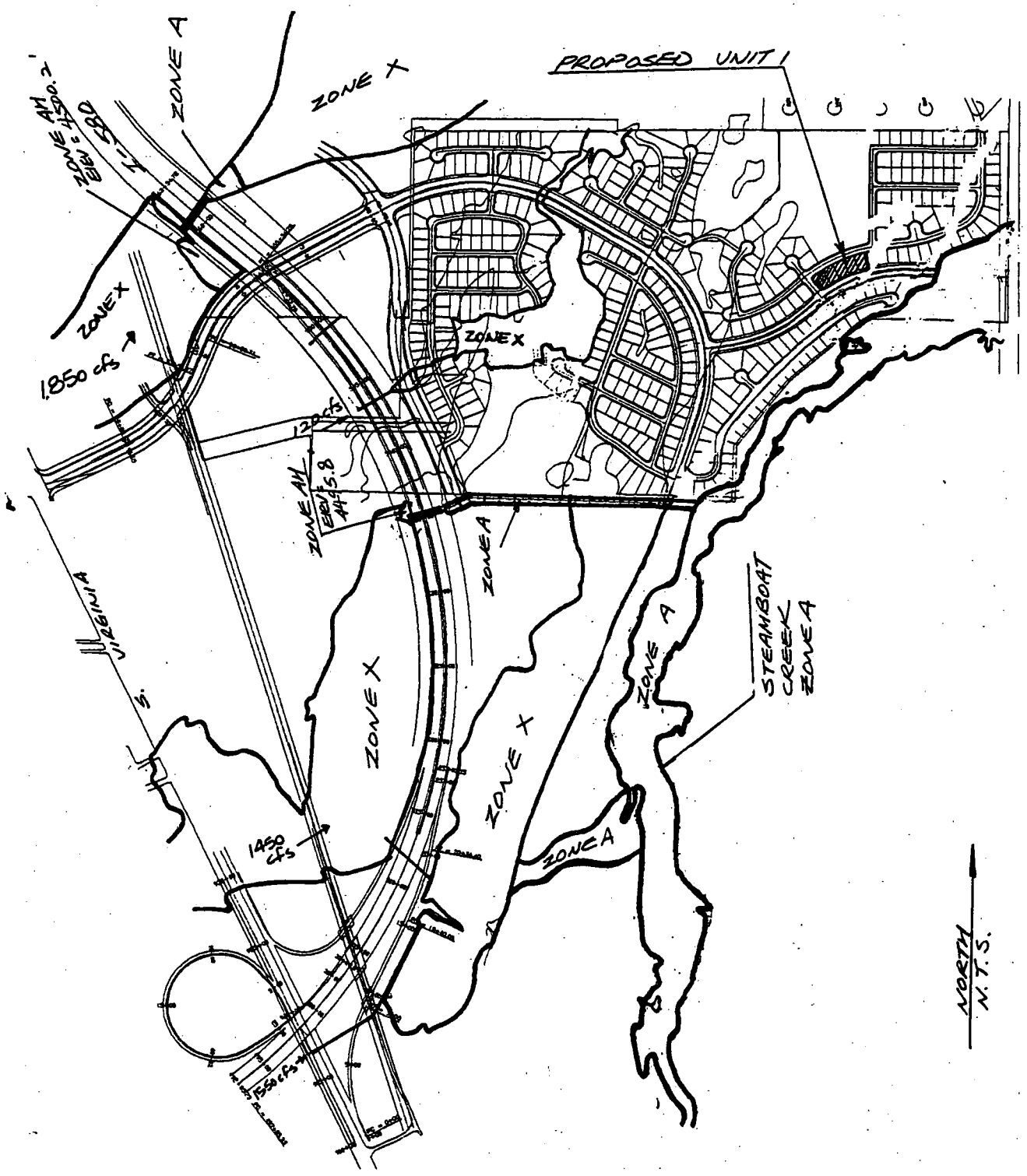

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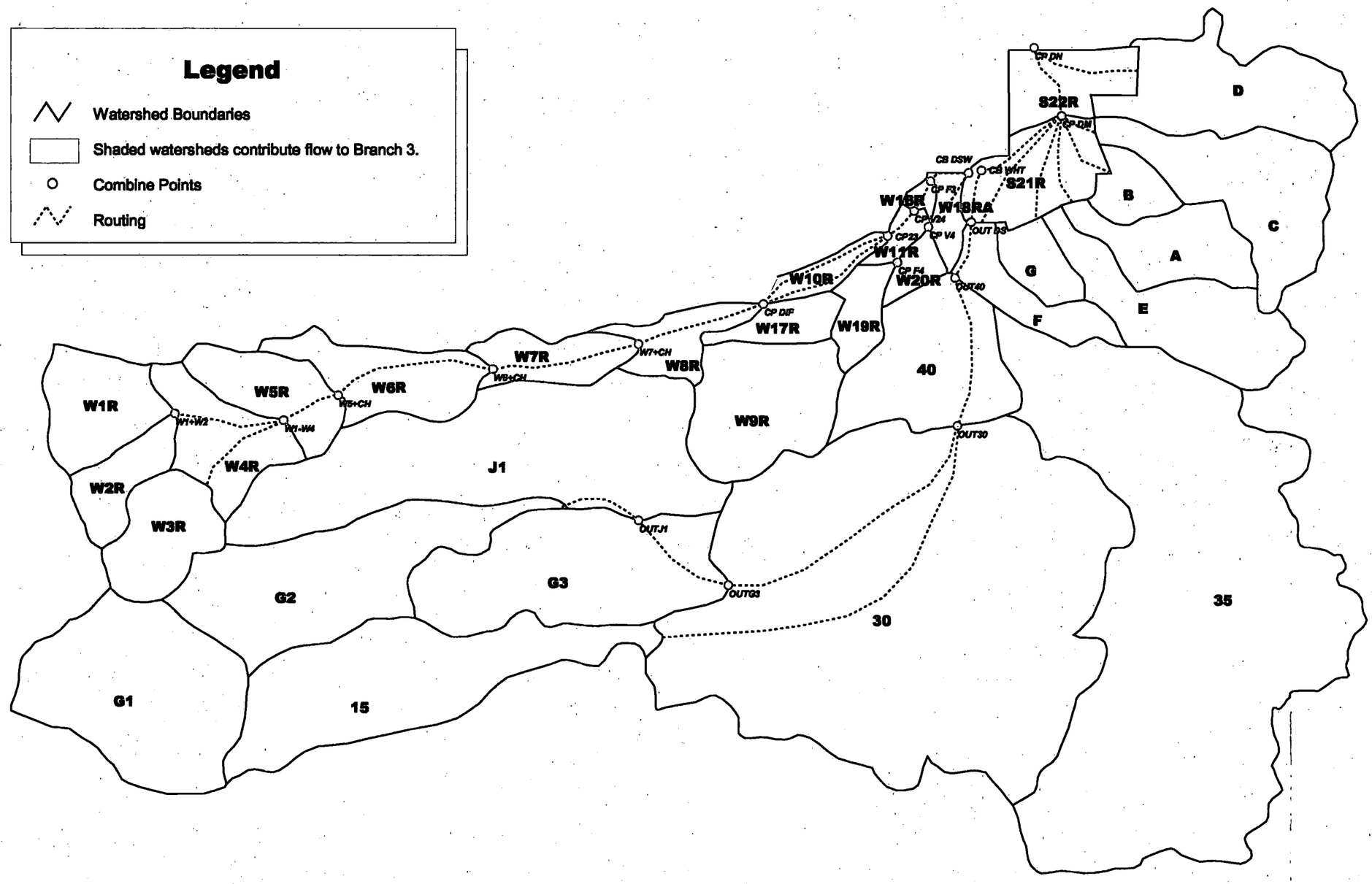
Figure 5
Proposed Conditions
LOMR

Legend

- Watershed Boundaries
- Shaded watersheds contribute flow to Branch 3.
- Combine Points
- Routing



N
W E
S

0 5000 10000 15000 20000 25000 Feet

Figure 6

Watershed Map

Nimbus Job No. 0008

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APPENDIX B

FEMA FORMS AND ATTACHMENTS

FEDERAL EMERGENCY MANAGEMENT AGENCY **REVISION REQUESTER AND COMMUNITY OFFICIAL**	O.M.B No. 3067-0148 Expires April 30, 2001

1. REQUESTED RESPONSE FROM FEMA

This request is for a:

☐ CLOMR A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60,65 & 72).

☒ LOMR A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, floodway or flood elevations. LOMRs typically decrease flood hazards. (See 44 CFR Ch. 1 Parts 60 & 65.)

☐ Other Describe: _____

2. OVERVIEW

1. The basis for this revision request is (are): (check all that apply)

☒ Physical Change ☐ Improved Methodology/Data ☐ Floodway Revision

☐ Other Describe: _____

Note: A photograph is not required, but is very helpful during review.

2. Flooding Source: Whites Creek Branch 3

3. Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels

4. FEMA zone designations affected: Zone X, Zone A
(example: A, AH, AO, A1-A30, A99, AE, V, V1-V30, VE, B, C, D, X)

5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301 480287	Katy, City Harris County	TX TX	480301 48201C	0005D 0220G	02/08/83 09/28/90
320019	Washoe County, Unincorporated Area	NV	320019	3186E	4/25/95
320019 320020	Washoe County, Unincorporated Area City of Reno	NV	320019 320019	3170E 3186E	4/25/95 4/25/95

6. The area of revision encompasses the following types of flooding and structures. Check all that apply.

Types of Flooding	Structures
☒ Riverine	☒ Channelization
☐ Coastal	☐ Levee/Floodwall
☐ Alluvial fan	☒ Bridge/Culvert
☐ Shallow Flooding (e.g. Zones AO and AH)	☐ Dam
☐ Lakes	☐ Fill
☐ Other (describe)	☐ Other (describe)

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

4. ENCROACHMENT INFORMATION

1. Does the State have jurisdiction over the floodway or its adoption by communities participating in the NFIP?
☐ Yes ☒ No

.. Yes, attach a copy of a letter notifying the appropriate State agency of the floodway revision and documentation of the approval of the revised floodway by the appropriate State agency.

2. Does the development in the floodway cause the 1% annual chance (base) elevation to increase at any location by more than 0.000 feet? ☐ Yes ☐ No ☒ N/A

3. Does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the base flood elevation to increase at any location by more than one foot (or other increase limit if community or state has adopted more stringent criteria - even if a floodway has not been delineated by FEMA)? ☐ Yes ☒ No

If the answer to either items is Yes, please attach documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

5. MAINTENANCE RESPONSIBILITY

The community is willing to assume responsibility for ☐ performing ☐ overseeing compliance with the maintenance and operation plans of the Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels
(Name)
flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Operation and maintenance plans are attached. ☒ Yes ☐ No ☐ N/A

6. REVIEW FEE

The review fee for the appropriate request category has been included. ☒ Yes Fee amount: $4,000

OR

This request is based on a federally sponsored flood-control project where 50 percent or more of the project's cost is federally sponsored, or the request is based on detailed hydrologic and hydraulic studies conducted by Federal, State, or local agencies to replace approximate studies conducted by FEMA and shown on the effective FIRM; thus the project is fee exempt. ☐ Yes

Please see Instructions for Fee Amounts

7. SIGNATURE

Note: **I understand that my signature indicates that all information submitted in support of this request is correct**

Margaret F Bowker
Signature of Revision Requester

Margaret F. Bowker, P.E.
Printed Name and Title of Revision Requester

Nimbus Engineers
Company Name

Telephone No.: 775/689-8630 Date: 3/13/01

Note: **Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.**

Signature of Community Official

Printed Name and Title of Community Official

Community Name

Telephone No.: Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is in accordance with 44 CFR Ch. 1, Sect 65.2

Margaret F Bowker
Signature

Margaret F. Bowker, P.E.
Printed Name and Title of Revision Requester

.egistr No. 5252 Expires (Date) 12/31/02 State NV

Type of License/Expertise: CIVIL

Check which forms have been included with this request

Form Name and (Number)	Required if .....
☐ Hydrologic (3)	new or revised discharges
☒ Hydraulic (4)	new or revised water-surface elevations
☒ Mapping (5)	floodplain/floodway changes
☒ Channelization (6)	channel is modified
☒ Bridge/Culvert (7)	addition/revision of bridge/culvert
☐ Levee/Floodwall (8)	addition/revision of levee/floodwall
☐ Coastal (9)	new or revised coastal elevations
☐ Coastal Structures (10)	addition/revision of coastal structure
☐ Dam (11)	addition/revision of dam
☐ Alluvial Fan (12)	structures proposed on alluvial fan

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 1 ATTACHMENT

PART 2 - Community Names

- The study area is in an area of unincorporated Washoe County that is in the process of being annexed by the City of Reno. The area is not yet annexed by Reno but is considered to be in Reno's Sphere of Influence

PART 5 - Maintenance Responsibility

- An operation and maintenance plan for the Branch 3 Channel is attached

DAMONTE RANCH DRAINAGE DISTRICT MASTER FLOOD CONTROL MAINTENANCE AND OPERATION AGREEMENT

This Agreement is entered into on this 14th day of April, 1998, by and between the Damonte Ranch Drainage District, (DRDD), a Nevada non-profit corporation, and Washoe County, (County) a political subdivision of the State of Nevada.

RECITALS

1. SCOPE: The intent of this document shall set forth the maintenance and operation standards for those flood control facilities located within the Damonte Ranch Trade Center and as more specifically depicted in the Southeast Truckee Meadows Master Flood Control Plan.

2. FACILITY DESCRIPTION: The facilities to be maintained and operated under this agreement are as follows:

   2.1 The DRDD shall maintain and operate those grass lined channels, concrete drop structures and rock rip rap more specifically detailed on the improvement plans entitled Damonte Ranch Whites Creek Branch 3 Flood Control Channels, Sheets C1-C12, as prepared by Nimbus Engineers, dated August 1996, and on file in the Washoe County Engineer's Office.

   2.2 The County shall maintain and operate all drainage structures within all public right of ways.

   2.3 The DRDD reserves the right to expand the boundaries of these facilities from time to time, subject to the review and approval of those facility expansions by the Washoe County Engineer.

3. FUTURE MODIFICATIONS, REVIEW AND APPROVALS: Any proposed future modifications of these specific improvements must receive the review and approvals of both the DRDD and County prior to any activities occurring in these areas.

4. LEVEL OF MAINTENANCE:

   4.1 The minimum level of maintenance required for these facilities shall be as follows:

4.1.1 Woody plant species within the immediate channel flowlines will be removed annually.

4.1.2 Sedimentation deposits in excess of one foot in depth shall be removed from the channel. The removal shall conform to the original geometric section of the channel.

4.1.3 Any erosion in excess of one foot in depth shall be back-filled and compacted in conformance with the original geometric section of the channel.

4.1.4 Areas of the channels that have been disturbed for sediment removal or erosion backfill shall be immediately seeded with the same type vegetation that was originally specified and planted.

4.1.5 An inspection of the channel shall be performed following any storm event that produces channel flow depth in excess of three feet. Any sediment deposit or erosion observed as described in 4.1.2 and 4.1.3 shall be removed/restored as soon as the channel has dried sufficiently to allow maintenance equipment to operate within the channel in an efficient manner so as to minimize channel disturbances.

4.1.6 Should the degree of erosion or sedimentation be such that the channel integrity is compromised, following or during any storm event, such that the public health, safety and welfare is imperiled, remedial measures to restore the channel shall be taken immediately to keep the flows confined within the flood control facilities.

5. ADHERENCE TO LEVEL OF MAINTENANCE:

5.1 Primary maintenance responsibility for the master flood control drainage facilities shall rest with the DRDD.

5.2 Washoe County shall assume maintenance responsibility only if the DRDD fails to do so. Should Washoe County have to assume said maintenance responsibilities, the DRDD shall be required to be noticed and reimburse the County in accordance with the provisions of Section 7 and 8 herein.

6. FACILITY STATUS REPORT:

6.1 Within thirty (30) days of the annual anniversary of this Agreement, the DRDD shall retain a registered civil engineer to inspect the flood control

facilities and submit a written Facility Status Report to the County. The report shall address the status and adequacy of the maintenance of the flood control facilities in accordance with those provisions of Section 4 of this Agreement, as well as the adequacy of the current fee assessments to sustain the maintenance thereof.

7. NOTICES:

7.1 If the County determines the DRDD is not in compliance with the level of maintenance described in Section 4 of this Agreement, the County shall notify the DRDD of its findings in writing. The County shall provide DRDD thirty (30) calendar days to rectify any non-compliance findings as outlined in Section 4. If after thirty (30) days any non-compliance findings remain, the County may, upon 48 hours notice to the DRDD, enter on to the property and proceed with remedial measures consistent with those outlined in Section 4 to restore the level of maintenance of the master flood control facility. Any remedial measure enacted by Washoe County under the terms of this provision shall be subject to reimbursement to the County for its expenses by DRDD.

7.2. Should the County in its judgment, determine during a storm event that there is an immediate need for maintenance on the master drainage facility due to a direct threat to the public health, safety and welfare, as a direct result of non-compliance of the DRDD described in 7.1 above, the County may immediately enter and proceed with emergency measures to correct the situation without additional notice to DRDD. Any emergency measures enacted by Washoe County under the terms of this provision shall be subject to reimbursement.

8. REIMBURSEMENTS:

8.1 The County shall be entitled to be reimbursed for its actual expenses incurred as a result of its actions enacted under the terms and provisions of Sections 7.1 and 7.2 of this Agreement. In such an event the County shall invoice the DRDD for reimbursement of its expenses within 45 calendar days of incurrance of expenses, for payment by the DRDD within 30 days of receipt of the County invoice.

9. RESERVE ACCOUNT:

9.1 The DRDD shall establish and maintain, at a minimum, a reserve account for routine and emergency maintenance in the amount of $10,000. The DRDD shall provide evidence of the maintenance of this account to the

County in conjunction with the submission of the Facility Status Report (Section 6) of this Agreement.

9.2 The DRDD shall provide the County with a copy of the DRDD's official annual budget within 30 days of the beginning of the DRDD's fiscal year.

10. PERMITS, LICENSES AND OTHER RIGHTS:

10.1 The DRDD or its assigns shall be responsible for obtaining and maintaining all licenses, permits or other entitlement necessary or required to provide for the operation and maintenance of these flood control facilities.

10.2 In the event and to the extent any of the functions and/or obligations of the DRDD, as described herein, may be assumed by the County, or any other public or quasi-public agency or district designated by the County, including, without limitation, a general, local or special improvement district, or landscape maintenance district ("Agency/District"), the DRDD shall have the power and duty to delegate and transfer such functions and/or obligations such as, by way of example, and not of limitation, the maintenance of surface water drainage facilities and integral wetlands to such Agency/District.

10.3 Consistent with the foregoing, the County and/or such Agency/District shall assume, obtain and maintain all licenses, permits and other entitlements necessary or required to provide for the operation and maintenance of these facilities.

10.4 Further, consistent with the foregoing, all costs and expenses incurred to affect the assumption, conveyance and transfer of the functions and obligations of the DRDD to such Agency/District shall be borne entirely by the Agency/District.

11. ACCESS RIGHTS FOR INSPECTION:

11.1 It is expressly understood that the County shall have the same access rights to the master drainage facilities as those maintained by the DRDD for the purposes of inspection and maintenance as described in section 7, of the facilities.

12. ADDITIONAL AGREEMENT:

12.1 From the date of this Agreement forward, County agrees to assure that contributing upstream facilities shall be designed and constructed to applicable Washoe County Codes in place at the time of approval of the contributing upstream facilities.

DAMONTE RANCH DRAINAGE DISTRICT,
a Nevada non-profit corporation

By its Board of Directors:

DI LORETO SOUTH TRUCKEE MEADOWS, INC.,
a Nevada corporation

By:_____
Perry M. Di Loreto, President

BDM DEVELOPMENT
a Nevada limited liability company

By:_____
Craig Dutton, Managing Member

STEAMBOAT CREEK DEVELOPMENT, INC.,
a Nevada corporation

By:_____
Robert E. Lewis, President

" COUNTY "

COUNTY OF WASHOE, NEVADA

By:_____
Chairman

Attest:_____

STATE OF NEVADA)
) SS
COUNTY OF WASHOE)

This instrument was acknowledged before me on 4-30-98,
by [illegible]
as [illegible]
of [illegible]

KATHLEEN A. ZEISER
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 92-3396-2 - EXPIRES JULY 17, 2000

[illegible]
(Signature of notarial officer)

[illegible]
(Title and Rank)

(My commission expires: 7-17-00)

STATE OF NEVADA)
) SS
COUNTY OF WASHOE)

This instrument was acknowledged before me on 4-30-98,
by Curtis Dutton
as Managing Member
of BDM Development

Karin Kremers
(Signature of notarial officer)

KARIN KREMERS
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 93-1620-2 - EXPIRES JULY 25, 2001

notary
(Title and Rank)

(My commission expires: 7-25-01)

STATE OF NEVADA)
) SS
COUNTY OF WASHOE)

This instrument was acknowledged before me on 4-30-98,
by [illegible]
as [illegible]
of [illegible]

KATHLEEN A. ZEISER
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 92-3096-2 - EXPIRES JULY 17, 2000

[illegible]
(Signature of notarial officer)

Notary
(Title and Rank)

(My commission expires: 7-17-00)

STATE OF NEVADA)
) SS
COUNTY OF WASHOE)

This instrument was acknowledged before me on 4-30-98,
by [illegible]
as [illegible]
of [illegible]

KATHLEEN A. ZEISER
Notary Public - State of Nevada
Appointment Recorded in Washoe County
No: 92-3096-2 - EXPIRES JULY 17, 2000

[illegible]
(Signature of notarial officer)

Notary
(Title and Rank)

(My commission expires: 7-17-00)

FEDERAL EMERGENCY MANAGEMENT AGENCY **HYDROLOGIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

ublic reporting burden for this form is estimated to average 3.67 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Washoe County Unincorporated, City of Reno

Flooding Source: Whites Creek Branch 3

Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels

1. REASON FOR NEW HYDROLOGIC ANALYSIS

☐ No existing analysis ☐ Improved data ☒ Changed physical condition of watershed

☐ Alternative methodology ☐ Proposed Conditions (CLOMR) ☐ Other

For the reason stated above, please attach a detailed explanation. If a computer program/model was used in revising the hydrologic analysis, please provide a diskette with the input files for the same flood recurrence intervals contained in the FIS for that stream; and at least for the 1% annual chance (base) flood where no detailed study exists.

Explanation provided: ☒ Yes ☐ No **Diskettes provided:** ☒ Yes ☐ No

2. METHODOLOGY FOR NEW ANALYSIS

Indicate Method	Required Data	Data Included
☐ Statistical Analysis of Gage Records	Form 3 - Attachment A	☐ Yes ☒ No
☐ Regional Regression Equations	Form 3 - Attachment C	☐ Yes ☒ No
☒ Precipitation/Runoff Model	Form 3 - Attachment D	☒ Yes ☐ No
☐ Other	Back-up computations and supporting data	☒ Yes ☐ No

3. APPROVAL OF ANALYSIS

The hydrologic analysis has already been approved by a local, state, or Federal Agency. ☒ Yes ☐ No ☐ Not Required

If Yes, attach evidence of approval. ☒ **Approval attached.** If No, attach explanation. ☐ **Explanation attached.**

4. COMPARISON OF BASE FLOOD DISCHARGES

Location:	Drainage Area (SqMi)	FIS(cfs)	Revised (cfs)
Diffluence of Whites Creek Branches 1,2,3 &4	9.35	N/A	3220
-----	-----	-----	-----
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Note: When revised discharges are not significantly different than the FIS discharges, FEMA may require a confidence limits analysis (see attachment B) at a later date to complete the review.

If only a portion of a detailed study area was revised please attach an explanation describing the transition from the proposed discharges to the effective discharges. ☐ **Explanation Included** ☒ **Explanation Not Required**

5. HISTORICAL FLOODING INFORMATION

,f historical data are available for the flooding source please provide: Location, peak discharges/water-surface elevations and dates, and source of information. ☐ **Data Attached** ☒ **Data Not Available**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 3 ATTACHMENT

PART 1- Reason for new Hydrologic Analysis

- Runoff that formerly traveled as overland flow is now collected by a culvert and then conveyed by a newly constructed channel to Steamboat Creek

PART 3 - Approval of Analysis

- The study was approved by Washoe County and the City of Reno in FEMA case number 95-09-133R. See also signature section on page 2 of Form 1.

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☒ Yes ☐ No

Initial fee amount: $ _____

METHOD OF PAYMENT (Check one box)

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

Check or money order only.
Make payable to
National Flood Insurance Program

CARD NUMBER

☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

EXP. Date ☐☐☐☐

_____
Signature

or

19. This request is for a project that is for public benefit and is intended to reduce the flood hazard to existing development in identified flood hazard areas as opposed to planned floodplain development. ☐ Yes ☒ No

or

20. This request is to correct an error or to include the effects of natural changes within the areas of special flood hazards. ☐ Yes ☑ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Margaret J Bowker
Signature of Revision Requester

Margaret Bowker
Printed Name and Title of Revision Requester

Nimbus Engineers
Company Name

11/17/94
Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

David T. Price
Signature of Community Official

David T. Price
Printed Name and Title of Community Official
Washoe County Engineer

Washoe County
Community Name

11/23/94
Date

Does this request impact any other communities? ☐ Yes ☒ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

9. INITIAL REVIEW FEE

18. The minimum initial review fee for the appropriate request category has been included. ☒ Yes ☐ No

Initial fee amount: $ _____

METHOD OF PAYMENT (Check one box)

☐ PAYMENT ENCLOSED ☐ VISA ☐ MASTERCARD

Check or money order only.
Make payable to
National Flood Insurance Program

CARD NUMBER

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16

EXP. Date

_____ Signature

or

19. This request is for a project that is for public benefit and is intended to reduce the flood hazard to existing development in identified flood hazard areas as opposed to planned floodplain development. ☐ Yes ☒ No

or

20. This request is to correct an error or to include the effects of natural changes within the areas of special flood hazards. ☐ Yes ☑ No

Note: I understand that my signature indicates that all information submitted in support of this request is correct.

Margaret J Bowker
Signature of Revision Requester

Margaret Bowker
Printed Name and Title of Revision Requester

Nimbus Engineers
Company Name

11/17/94
Date

Note: Signature indicates that the community understands, from the revision requester, the impacts of the revision on flooding conditions in the community.

Signature of Community Official

Steve Varela, City Engineer/Maint. Dir
Printed Name and Title of Community Official

City of Reno, Nv.
Community Name

11/22/94
Date

Does this request impact any other communities? ☐ Yes ☒ No

If yes, attach letters from all affected jurisdictions acknowledging revision request and approving changes to floodway, if applicable.

Note: Although a photograph of physical changes is not required, it may be helpful for FEMA's review.

ATTACHMENT D: PRECIPITATION/RUNOFF MODEL

		FIS:		Revised:	
1.	Method or model used:	HEC-1		HEC-1	
	Version:	4.1		4.1	
	Date:	June, 1998		June 1998	
2.	Source of rainfall depth:	-----		NOAA Atlas	
3.	Source of rainfall distribution:	-----		SCS Type II	
4.	Rainfall duration:	-----		24 hours	
5.	Areal adjustment to precipitation (%):	-----		-----	
6.	Maximum overland flow length	-----		-----	
7.	Hydrograph development method:	-----		SCS Unit	
8.	Loss rate method:	-----		SCS Curve Number	
	Source of soils information:	-----		SCS Soil Survey	
	Source of land use information:	-----		N/A	
9.	Channel routing method:	-----		Muskingum	
10.	Reservoir routing:	☐ Yes	☐ No	☐ Yes	☒ No
11.	Baseflow considerations:	☐ Yes	☐ No	☐ Yes	☒ No
	If Yes, explain below how baseflow was determined:				
	N/A				
12.	Snowmelt considerations:	☐ Yes	☐ No	☐ Yes	☒ No
13.	Model calibration:	☐ Yes	☐ No	☐ Yes	☒ No
	If Yes, explain below how calibration was performed				

14.	Future land use condition:	☐ Yes	☐ No	☐ Yes	☒ No
	If Yes, explain why below				
	-----				

15. **Attach precipitation/runoff model, hydrologic model schematic, curve number calculations, time of concentration calculations, and supporting maps, delineating the watershed boundary and drainage area divides.**

Information and Maps provided? ☒ Yes ☐ No

NOTE: FEMA policy is to base flooding on existing conditions.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.25 hours per response. The burden estimate includes the time for viewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and viewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Washoe County, Unincorporated Area

Flooding Source: Whites Creek Branch 3

Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels

1. REACH TO BE REVISED

Describe the limits of the revision OR submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☒ Yes

Downstream Limit: Confluence with Steamboat Creek

Upstream Limit: South Virginia Street (U.S. 395)

2. MODELS SUBMITTED

Requirements: for areas which have detailed flooding:	for areas which do not have detailed flooding:
Full input and output listings along with files on diskette for each of the models listed below (items 1-4) and a summary of the source of input parameters used in the models must be provided. The summary must include a description of any changes made from model to model (e.g., Duplicate Effective model to Corrected Effective model). At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See structions for directions on when other models may be required.	Only the 100-year (Base) flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses (including all calculations) for existing or pre-project conditions and revised or post-project conditions must be submitted.

1. Duplicate Effective Model ☐ Natural File Name _____ ☐ Floodway File Name _____
Copies of the hydraulic analysis used in the effective FIS, referred to as the effective models (10-, 50-, 100-, and 500-year multi-profile runs and the floodway run) must be obtained and then reproduced on the requester's equipment to produce the Duplicate Effective model. This is required to assure that the effective models input data has been transferred correctly to the requester's equipment and to assure that the revised data will be integrated into the effective data to provide a continuous FIS model upstream and downstream of the revised reach.

2. Corrected Effective Model ☐ Natural File Name _____ ☐ Floodway File Name _____
The Corrected Effective model is the model that corrects any errors that occur in the Duplicate Effective model, adds any additional cross sections to the Duplicate Effective model, or incorporates more detailed topographic information than that used in the currently effective model. The Correctly Effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model ☒ Natural File Name BR3-LOMR ☐ Floodway File Name _____
The Duplicate Effective model or Corrective Effective model is modified to produce the Existing or Pre-Project Conditions model to reflect any modifications that have occurred within the floodplain since the date of the Effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the Corrected Effective model or Duplicate Effective model.

4. Revised or Post-Project Conditions Model ☒ Natural File Name 008LOMR.dat ☐ Floodway File Name _____
The Existing or Pre-Project Conditions model (or Duplicate Effective model or Corrected Effective model, as appropriate) is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for the proposed project this model must reflect proposed conditions.

5. Other – Please attach a sheet describing all other models submitted along with the file names. ☐ Natural ☐ Floodway

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

3. STARTING WATER-SURFACE ELEVATIONS

Explain how they were determined. Explanation Attached? ☒ Yes ☐ No

NOTE: If the effective study is an approximate study, the slope/area method is recommended. For detailed analysis studies, using a known water-surface elevation is recommended.

4. RESULTS (from the model used to revise the 100-year water surface elevations)

If the results indicate any of the following, attach an explanation - to this form, or to the hydraulic model printout- as to the reasonableness of the situation.

☐ Supercritical depth ☒ Critical Depth ☐ Drawdowns ☐ Negative Floodway Surcharges

☐ Floodway Surcharges Greater Than Maximum Allowed by Community/State

☐ Water surface elevations higher than the end points of cross sections.

☐ Floodway discharge is different than the Natural 100-year (base) flood discharge.

☐ Project causes 100-year floodplain or floodway elevations to increase (state if increases are located off the requester's property)

Explanation attached with Form ☒ **Explanation provided on attached printout** ☐

If Hydraulic model used is HEC-2, has it been checked with FEMA'S CHECK-2 computer program? ☐ **Yes** ☒ **No**
(see instructions for information on how to obtain CHECK-2)

5. REVISED FIRM/FBFM AND FLOOD PROFILES

1. **Profile Transition**

   a. 100-Year Water-Surface Elevations - indicate the difference in water surface elevations where the project 100-year elevations tie into the existing 100-year water surface elevations at each end of the project.

   Downstream End _____ within _____ (feet) Upstream End _____ within N/A (feet)
   Cross-Section # *Cross-Section #*

   b. Floodway Elevations - indicate the difference in water surface elevations where the project floodway elevations tie into the existing floodway water surface elevations at each end of the project.

   Downstream End _____ within _____ (feet) Upstream End _____ within N/A (feet)
   Cross-Section # *Cross-Section #*

   c. Floodway widths - indicate the difference in floodway widths where the project floodway widths tie into the existing floodway width at each end of the project.

   Downstream End _____ within _____ (feet) Upstream End _____ within N/A (feet)
   Cross-Section # *Cross-Section #*

2. **Profile Checklist (check box if information has been provided on profile)**

   The following information (unless in parentheses) must be included at the same scale as the existing profiles for this project:

   ☐ Stream Name ☐ Community Name ☐ Corporate Limits labeled ☐ Study limits labeled

   ☐ Confluences labeled ☐ Channel Stationing ☐ Streambed profiled ☐ Cross Sections labeled

   ☐ Horizontal/Vertical Scales indicated ☐ 100-year elevs profiled*

   ☐ Road Crossings ☐ Labeled ☐ Low Chord Elevations ☐ Top of Road Elevations

   *All recurrence intervals in the effective study must also be profiled.

   Floodway Data Table

   Attach a Floodway Data Table for each cross section listed in the published Floodway Data table in the FIS report.

   Floodway Data Table Attached ☐ **Yes** ☒ **Not Required**

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 4 ATTACHMENT

PART 2 - Models Submitted

- Hard copies of the existing and proposed conditions models are presented in Appendix B. The existing conditions HEC-1 model is the same as that presented in the CLOMR Application for FEMA case number 95-09-133R truncated at the end of the study area for this project. Electronic copies are also attached.

PART 3- Starting Water Surface Elevation

- The starting water surface elevations were determined using normal depth for a slope of 0.003 upstream and 0.002 downstream.

PART 4 - Results

- Critical Depth was present in the model and is reasonable because of the slopes in the channel. The steep slopes necessitated using a sloping drop structure.

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE / COASTAL MAPPING**	O.M.B No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.5 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Note: Fill out one form for each flooding source studied

Community Name: Washoe County, Unincorporated Area

Flooding Source: Whites Creek Branch 3

Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels

This is a ☒ Manual ☐ Digital submission. *Digital map submissions may be used to update digital FIRMs (DFIRMs). For updating DFIRMs, these submissions must be coordinated with FEMA Headquarters as far in advance as possible.*

1. MAPPING CHANGES

1. A topographic workmap must be submitted showing the following information (check N/A when not applicable):

a. Revised approximate 100-year floodplain boundaries (Zone A)	☐ Yes	☒ No	☐ N/A
b. Revised detailed 100- and 500-year floodplain boundaries.	☐ Yes	☒ No	☐ N/A
c. Revised floodway boundaries	☐ Yes	☒ No	☐ N/A
d. Location and alignment of all cross sections with stationing control indicated.	☒ Yes	☐ No	☐ N/A
e. Stream alignments, road alignments and dam alignments.	☒ Yes	☐ No	☐ N/A
Current community boundaries.	☐ Yes	☒ No	☐ N/A
g. Effective 100- year floodplain and floodway boundaries from FIRM/FBFM reduced or enlarged to the scale of the topographic workmap	☐ Yes	☒ No	☐ N/A
h. Tie-ins between the effective and revised 100-, 500-year and floodway boundaries	☐ Yes	☒ No	☐ N/A
i. The requester's property boundaries and community easements	☐ Yes	☒ No	☐ N/A
j. The signed certification of a registered professional engineer	☒ Yes	☐ No	☐ N/A
k. Location and description of reference marks	☐ Yes	☒ No	☐ N/A
l. Vertical datum (example: NGVD, NAVD)	☒ Yes	☐ No	☐ N/A
m. Coastal zone designations tie into adjacent areas not being revised	☐ Yes	☐ No	☒ N/A
n. Location and alignment of all coastal transects used to revise the coastal analyze	☐ Yes	☐ No	☒ N/A
o. V-zone has been delineated to extend landward to the heel of the primary frontal dune	☐ Yes	☐ No	☒ N/A

If any items are marked No or N/A please attach an explanation.

2. What is the source and date of the updated topographic information (example: orthophoto maps, July 1985; filed survey, May 1979, beach profile, June 1987 etc.)? Orthophoto maps, June 1996

3. What is the scale and contour interval of the following workmaps?

Effective FIS Scale 1"=200' Contour Interval 1'

Revision Request Scale 1"=50' Contour Interval 1'

NOTE: Revised topographic information must be of equal or greater detail than effective.

4. Attach an annotated FIRM/FBFM at the scale of the effective FIRM/FBFM showing the revised 100- and 500-year floodplain and the floodway boundaries and how they tie into those shown on the effective FIRM/FBFM downstream and upstream of the revisions or adjacent to the area of revision for coastal studies. **FIRM/FBFM attached?** ☒ **Yes** ☐ **No**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. EARTH FILL PLACEMENT

The fill is: ☐ Existing ☐ Proposed

2. Has fill been/will be placed in the regulatory floodway? ☐ Yes ☐ No
If Yes, please attach completed Riverine Hydraulic Analysis Form (Form 4).

3. Has fill been/will be placed in floodway fringe (*area between the floodway and 100-year floodplain boundaries*)? ☐ Yes ☐ No

If Yes, then complete A, B, C, and D below.

a. Are fill slopes for granular materials steeper than one vertical on one-and-one-half horizontal? ☐ Yes ☐ No

If Yes, justify steeper slopes .....

b. Is adequate erosion protection provided for fill slopes exposed to moving flood waters? (*Slopes exposed to flows with velocities of up to 5 feet per second (fps) during the 100-year flood must, at a minimum, be protected by a cover of grass, vines, weeds, or similar vegetation; slopes exposed to flows with velocities greater than 5 fps during the 100-year flood must, at a minimum, be protected by stone or rock riprap.)*

☐ Yes ☐ No

If No, describe erosion protection provided .....

c. Has all fill placed in revised 100-year floodplain been compacted to 95 percent of the maximum density obtainable with the Standard Proctor Test Method or acceptable equivalent method? ☐ Yes ☐ No

d. Can structures conceivably be constructed on the fill at any time in the future? ☐ Yes ☐ No

If Yes, attach certification of fill compaction (item 3c. above) by the community's NFIP permit official, a registered professional engineer, or an accredited soils engineer in accordance with Subparagraph 65.5(a)(6) of the NFIP regulations.

Fill certification attached ☐ **Yes** ☐ **No**

4. Has fill been/will be placed in a V zone? ☐ Yes ☒ No

If Yes, is the fill protected from erosion by a flood control structure such as a revetment or seawall?

☐ Yes ☐ No

If Yes, attach the Coastal Structures Form (Form 10).

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 5 ATTACHMENT

PART 1 - Mapping Changes

- 1. A hydrologic work map is included. The following items were checked No or N/A on Form 5:

a. The revised 100-year floodplain boundaries are shown on the existing and annotated FIRM.
b. The revised floodplain boundaries are shown on the annotated FIRM.
c. There are no floodways shown on the existing FIRM.
f. The community boundaries are shown on the existing and annotated FIRM.
g. The floodplains are shown on the annotated FIRM.
h. Tie-ins are shown on the annotated FIRM.
i. The property boundaries are shown on the annotated FIRM.
k. No reference marks were located in the area of interest.
m. The effective floodplain is not associated with a coastal zone.
n. The effective floodplain is not associated with a coastal zone.
o. The effective floodplain is not associated with a coastal zone.

- 4. An annotated FIRM is shown as Figure 4 in the report.

FEDERAL EMERGENCY MANAGEMENT AGENCY **CHANNELIZATION**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1.75 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Washoe County, Unincorporated Area, City of Reno

Flooding Source: Whites Creek Branch 3

Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3 Flood Channels

1. REACH TO BE REVISED

Describe the limits of the revision **OR** submit a copy of the FIRM with the revision area clearly highlighted.
Copy of FIRM(s) attached depicting area of the revision (highlighted, or circled)? ☐ Yes

Downstream Limit: Confluence with Steamboat Creek

Upstream Limit: South Virginia Street (U.S. 395)

2. CHANNEL DESCRIPTION

Attach the following information about the channel (check box if information has been provided):

☒ Description of the inlet and outlet

☒ Description of the shape of the channel *(both cross sectional and planimetric configuration)* and its lining *(channel bottom and sides)*:

3. ACCESSORY STRUCTURES

The channelization includes:

- ☐ Levees *(Attach Levee/Floodwall System Analysis Form - Form 8)*
- ☒ Drop structures
- ☐ Superelevated sections
- ☐ Transitions in cross sectional geometry
- ☐ Debris basin/detention basin
- ☐ Energy dissipater
- ☐ Other (Describe):

4. DRAWING CHECKLIST

Attach the plans of the channelization certified by a registered professional engineer. The plan detail and information should include (check box if information has been provided):

☒ Channel alignment and locations of inlet, outlet, and accessory structures

☒ Channel lining

☒ Typical cross sections and profiles of channel banks and invert

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

5. HYDRAULIC CONSIDERATIONS

1. The channel was designed to carry 3000 (cfs) and/or the 100-year flood.

2. The design elevation in the channel based on:

- [x] Subcritical flow
- [ ] Critical flow
- [ ] Supercritical flow
- [ ] Energy grade line

3. **If there is the potential for a hydraulic jump at the following locations, check the box(es) that apply and attach an explanation of how the hydraulic jump is controlled without affecting the stability of the channel.**

Inlet to channel?	[x] Yes
Outlet of channel?	[ ] Yes
At Drop Structures?	[ ] Yes
At Transitions?	[ ] Yes
Other locations?	[ ] Yes

Explanation Attached? [x] **Yes** [ ] **No** [ ] **N/A**

6. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood water-surface elevations, then provide the following information **(Check the box if provided):**

- [ ] Estimated sediment load
- [ ] Method used to estimate sediment transport
- [ ] Method used to estimate scour and/or deposition
- [ ] Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 6 ATTACHMENT

PART 2 - Channel Description

- A description of the channel is provided in the as-built drawings in Appendix E The inlet has rip-rap at the floor of the triple 12' x 5' box culverts under I-580. At its outlet, the channel spills into Steamboat Creek protected by rip rap. The basic channel design is trapezoidal, with an 80 foot wide base, 3:1 side slopes and varying channel slopes. The channel lining is natural grass.

PART 4 - Drawing Checklist

- The channel alignment and locations of inlet, outlet and accessory structures are shown on the as-built drawings.
- Typical cross-sections and profiles channel banks and inverts are shown on the as-built drawings.

PART 5 - Hydraulic Considerations

- 3. The potential for a hydraulic jump is controlled by rip-rap at the entrance to the channel.

FEDERAL EMERGENCY MANAGEMENT AGENCY **BRIDGE/CULVERT**	O.M.B. Burden No. 3067-0148 Expires April 30, 2001

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

You are not required to respond to this collection of information unless a valid OMB Control Number is displayed in the upper right corner of this form.

Community Name: Washoe County, Unincorporated Area, City of Reno

Flooding Source: Whites Creek Branch 3

Project Name/Identifier: Damonte Ranch Subdivision Whites Creek Branch 3

1. IDENTIFIER

1. Name of structure (roadway, railroad, etc.): Steamboat Parkway

2. Location of bridge/culvert along flooding source (in terms of stream distance or cross-section identifier):

   12+41

3. This revision reflects (check one of the following):

   ☒ New bridge/culvert not modeled in the FIS

   ☐ Modified bridge/culvert previously modeled in the FIS

   ☐ New analysis of bridge/culvert previously modeled in the FIS

4. Hydraulic model used to analyze the structure *(e.g., HEC-2 with special bridge routine, WSPRO, HY8)*

   HEC-2 with special culvert

   If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structure(s). *(Attach justification)*

   Justification attached ☐ **Yes** ☐ **No** ☒ **N/A**

PLEASE REFER TO THE INSTRUCTIONS FOR THE APPROPRIATE MAILING ADDRESS

2. DRAWING CHECKLIST

Attach plans of the structure(s) certified by a registered professional engineer. The plan detail and information should include the following (check the boxes if the information has been provided):

- ☒ Dimensions (height, width, span, radius, length)
- ☒ Shape (culverts only)
- ☒ Material
- ☐ Beveling or Rounding
- ☐ Wing Wall Angle
- ☐ Low Chord Elevations - Upstream and Downstream
- ☐ Top of Road Elevations - Upstream and Downstream
- ☒ Structure Invert Elevations - Upstream and Downstream
- ☐ Stream Invert Elevations - Upstream and Downstream
- ☐ Skew Angle
- ☐ Cross-Section Locations
- ☐ Distances Between Cross Sections
- ☐ Erosion Protection

3. SEDIMENT TRANSPORT CONSIDERATIONS

If there is any indication from historical records that sediment transport (including scour and deposition) can affect the 100-year (base flood) water-surface elevations; and/or based on the stream geomorphology, vegetative cover, development of the watershed and bank conditions, there is a potential for debris and sediment transport (including sewer and deposition) to affect the base flood elevations, then provide the following information **(Check the box if provided):**

- ☐ Estimated sediment load
- ☐ Method used to estimate sediment transport
- ☐ Method used to estimate scour and/or deposition
- ☐ Method used to revise hydraulic or hydrologic analysis (model) to account for sediment transport

WHITES CREEK BRANCH 3 LOMR REQUEST
MT-2 FORM 7 ATTACHMENT

PART 2 - Drawing Checklist

- The culvert details are shown in Appendix F.

APPENDIX C

HEC-1 MODEL FOR DEVELOPED CONDITIONS

file name BR3-LOMR.dat

```
*****************************************
*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*  RUN DATE   08MAR01  TIME  09:37:06   *
*                                       *
*****************************************
```


```
*****************************************
*                                       *
*   U.S. ARMY CORPS OF ENGINEERS        *
*   HYDROLOGIC ENGINEERING CENTER       *
*        609 SECOND STREET              *
*     DAVIS, CALIFORNIA 95616           *
*         (916) 756-1104                *
*                                       *
*****************************************
```


```
X     X  XXXXXXX   XXXXX          X
X     X  X        X     X        XX
X     X  X        X              X
XXXXXXX  XXXX     X        XXXXX  X
X     X  X        X              X
X     X  X        X    X         X
X     X  XXXXXXX  XXXXX          XXX
```

THIS PROGRAM REPLACES ALL PREVIOUS VERSIONS OF HEC-1 KNOWN AS HEC1 (JAN 73), HEC1GS, HEC1DB, AND HEC1KW.

THE DEFINITIONS OF VARIABLES -RTIMP- AND -RTIOR- HAVE CHANGED FROM THOSE USED WITH THE 1973-STYLE INPUT STRUCTURE.
THE DEFINITION OF -AMSKK- ON RM-CARD WAS CHANGED WITH REVISIONS DATED 28 SEP 81. THIS IS THE FORTRAN77 VERSION
NEW OPTIONS: DAMBREAK OUTFLOW SUBMERGENCE , SINGLE EVENT DAMAGE CALCULATION, DSS:WRITE STAGE FREQUENCY,
DSS:READ TIME SERIES AT DESIRED CALCULATION INTERVAL LOSS RATE:GREEN AND AMPT INFILTRATION
KINEMATIC WAVE: NEW FINITE DIFFERENCE ALGORITHM

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10
          *
          *DIAGRAM
    1     ID   ********************************************************************************
    2     ID     *MODEL FOR WHITES CREEK BRANCH 3 TO ITS CONFLUENCE WITH STEAMBOAT
    3     ID    100-Year HEC-1 for proposed conditions.  Includes Steamboat Creek &
    4     ID    tributaries (i.e. Galena, Jones, Browns, Bailey, 30, & 40 watersheds);
    5     ID
    6     ID     MODEL FOR BRANCH 3 LOMR  TRUNCATED AT BRANCH 3 CONFLUENCE WITH
    7     ID     STEAMBOAT CREEK JUST ABOVE PROPOSED DIVERSION STRUCTURE ON DAMONTE RANCH
    8     ID    File Name: BR3-LOMR.dat
    9     ID    Nimbus Engineers                 February, 2001
   10     ID
   11     ID   ********************************************************************************
          *
          *  ********************************************************************************
          *
          *   Legend :
          *    W(No.)R = Subbasin
          *    CP XX = Combine flows at point XX
          *    RT XX = Route to CP XX
          *    DV XX = Divert hydrograph XX
          *    DR XX = Recall hydrograph XX
          *    XX = Street and Channel #, where applicable
          *       V = Virginia, Z = Zolezzi, F = 580 (Freeway), W = Wedge
          *
          *  ********************************************************************************
          *
   12     IT       5 27JUL00    0005     288
   13     IO       5       0
   14     IN    15.0
          *  TOTAL WATERSHED AREA = 85 SQ. MI.
          *  AREAL REDUCTION =  0.94
          *
   15     JR    PREC    0.94

   16     KK     W1R Whites Creek 1
   17     BA    1.36
   18     PB     5.5
   19     PC     0.0    .002    .005    .008    .011    .014    .017    .020    .023    .026
   20     PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
   21     PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
   22     PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
   23     PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
   24     PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
   25     PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
   26     PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
   27     PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
   28     PC    .983    .986    .992    .995    .998   1.00
   29     LS              63
   30     UD    0.48
```

```
LINE          ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  31          KK     W2R  Whites Creek No. 2
  32          BA    0.84
  33          PB     5.4
  34          LS              65
  35          UD    0.52

  36          KK   W1+W2  Combine W1 and W2
  37          HC       2

  38          KK    RT-A  Route to pt A
  39          RM       1   0.122      0.4

  40          KK     W3R  Whites Creek No. 3
  41          BA    1.38
  42          PB    5.25
  43          LS              65
  44          UD    0.54

  45          KK    RT-A  Route to pt A
  46          RM       1   0.095      0.4

  47          KK     W4R  Whites Creek No. 4
  48          BA    1.47
  49          PB     5.0
  50          LS              57
  51          UD    0.72

  52          KK   W1234  Combine W1-W4
  53          HC       3

  54          KK    RT-B  Route to pt B
  55          RM       1  0.0597      0.4

  56          KK     W5R  Whites Creek No. 5
  57          BA    1.27
  58          PB     4.8
  59          LS              58
  60          UD    0.85

  61          KK   W5+CH  Combine W5 and channel
  62          HC       2

  63          KK    RT-C  Route to pt C
  64          RM       2   0.185      0.4

  65          KK     W6R  Whites Creek No. 6
  66          BA    1.43
  67          PB     4.1
  68          LS              57
  69          UD    1.23
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  70      KK   W6+CH  Combine W6 and channel
  71      HC       2

  72      KK    RT-D  Route to pt D
  73      RM       1   0.122     0.4

  74      KK     W7R  Whites Creek No. 7
  75      BA    0.85
  76      PB     3.4
  77      LS             68
  78      UD    0.96

  79      KK   W7+CH  Combine W7 and channel
  80      HC       2

  81      KK  RT-DIF  Route flows to Diffluence
  82      RM       1   0.104     0.4

  83      KK     W8R  Whites Creek No. 8
  84      BA    0.75
  85      PB     3.0
  86      LS             65
  87      UD    1.19

  88      KK  CP DIF  Combine flows at Diffluence
  89      HC       2

  90      KK    DV 4  Divert flows into channel #4 - south branch
  91      KM          Hydrograph at this station is flow in channel 4
  92      DT  CH 123
  93      DI       0    2000    3500    5100
  94      DQ       0    1700    2700    3750

  95      KK   RT W4  Route flows in channel #4 to Wedge Parkway
  96      RM       2    .178      .3

  97      KK    W17R  Whites Creek No. 17
  98      BA    0.58
  99      PB     2.8
 100      LS             67
 101      UD    0.31

 102      KK   CP W4  Combine flows at Wedge Parkway
 103      HC       2

 104      KK   RT F4  Route flows to proposed RCB at 580
 105      RM       1   0.111      .3

 106      KK    W19R  Whites Creek No. 19
 107      BA    0.33
 108      PB    2.75
 109      LS             60
 110      UD    0.22
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  111     KK     W9R  Whites Creek No. 9  (Steamboat Hills Area, above Mt. Rose Hwy)
  112     BA    2.39
  113     PB     2.8
  114     LS              69
  115     UD    0.51

  116     KK   RT F4  Route flows to proposed RCB at 580  (Channel 4)
  117     RM       2   0.181      0.3

  118     KK   CP F4  Combine flows at proposed I-580 RCB  (Channel 4)
  119     HC       3

  120     KK   RT V4  Route flows to Virginia Street (Channel 4 near Browns School)
  121     RM       1   0.121       .3

  122     KK    W20R  Whites Creek No. 20
  123     BA    0.22
  124     PB    2.73
  125     LS              61
  126     UD    0.22

  127     KK   CP V4  Combine flows at Channel #4 and Virginia St. (near Browns School)
  128     HC       2

  129     KK  RT STM  ROUTE BRACH 4 TO STEAMBOAT CREEK  - THRU PROPOSED CHANNEL
  130     RK    2250   0.013     .035            TRAP      75        3
          *
          *  ************************************************************************
          *
          *  STEAMBOAT CREEK MODEL
          *
          *  ************************************************************************
          *

  131     KK     G1G2 Upper Galena Creek - G1 & G2 COMBINED
  132     BA      8.0
  133     PB     4.89
  134     LS               70
  135     UD      1.9

  136     KK   OUTJ1 Route to Confluence with Jones Creek
  137     RD    5280    .046    0.07            TRAP      15      0.5

  138     KK       J1 Jones Creek Watershed
  139     BA      6.4
  140     PB     3.51
  141     LS              58
  142     UD      1.3
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  143     KK   OUTJ1 Combine Jones and Galena Creek
  144     HC       2

  145     KK   OUTG3 Route Galena to Pleasant Valley foothill
  146     RD    7392   0.043    0.07            TRAP      15       1

  147     KK      G3 Lower Galena Creek
  148     BA     3.9
  149     PB     3.4
  150     LS              62
  151     UD     1.2

  152     KK   OUTG3 Combine Galena flows at Pleasant Valley foothill
  153     HC       2

  154     KK   OUT30 Route Galena Creek watershed to Steamboat Gage  (use COE routing)
  155     RM       7    0.61     0.2

  156     KK      15 Browns Creek
  157     BA     4.2
  158     PB    4.10
  159     LS              61
  160     UD     1.7

  161     KK   OUT30 Route Browns Creek to Steamboat Gage  (use COE routing)
  162     RM      16    1.34     0.2

  163     KK      30 COE Watershed No. 30
  164     BA    16.7
  165     BF     500        0       1
  166     PB     2.8
  167     LS              77
  168     UD     1.8

  169     KK   OUT30 Combine
  170     HC       3

  171     KK   OUT40 Route flows to HWY 341 (use COE routing)
  172     RM       3    0.23     0.2

  173     KK      35 Bailey Canyon
  174     BA    15.3
  175     BF       0       10     1.1
  176     PB    2.95
  177     LS              80
  178     UD     2.2

  179     KK      40 Watershed No.40
  180     BA     2.5
  181     PB    2.77
  182     LS              77
  183     UD     1.1
```

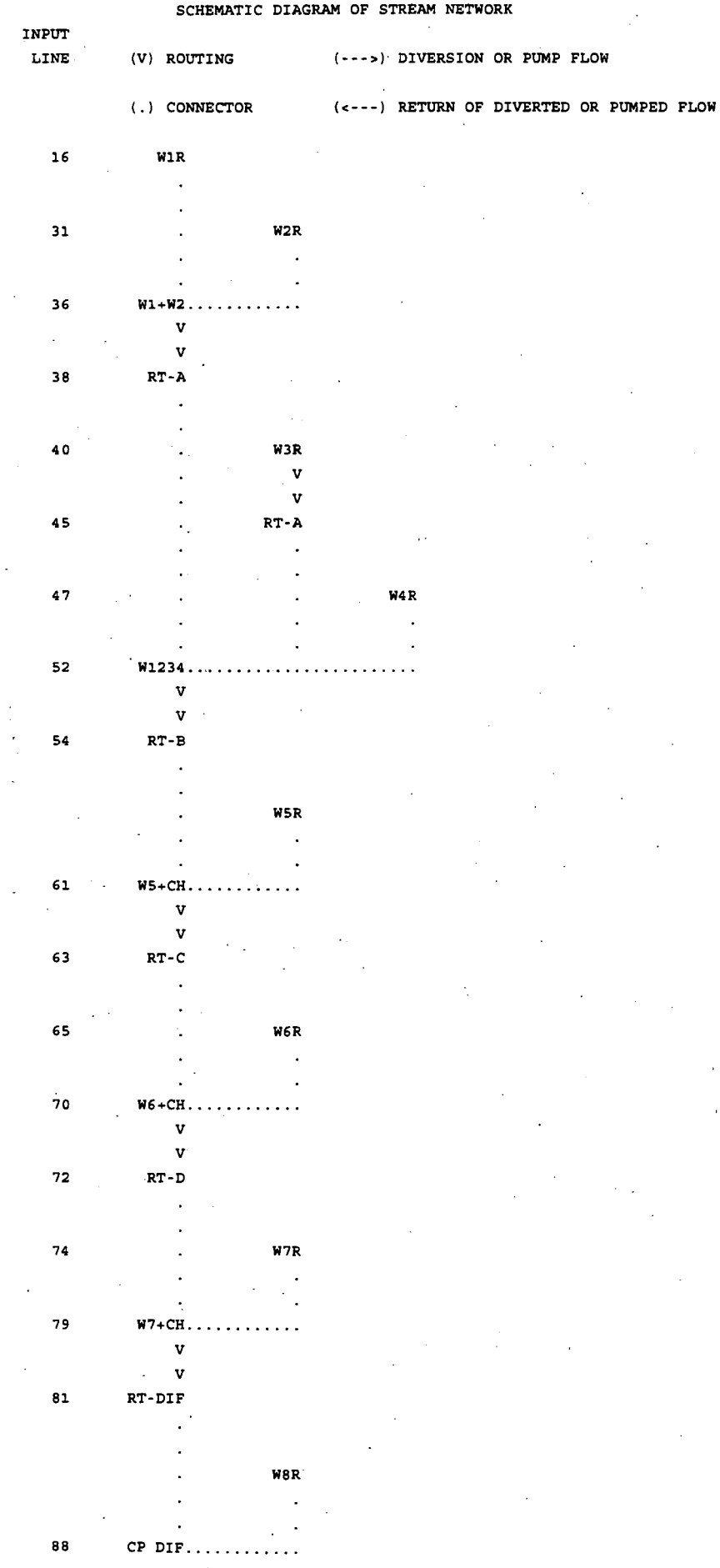
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  184     KK   OUT40  Combine Steamboat Ck with areas 35 and 40 at HWY 341
  185     HC       3

  186     KK  OUT341  ROUTE STEAMBOAT THROUGH HWY 341 USING MODIFIED PULS
  187     RS       1    STOR        0
  188     SA     .31    9.48     46.1
  189     SE    4550    4560     4570
  190     SQ     300    2475    58000

  191     KK    C-1B
  192     BA   0.072
  193     PB     2.5
  194     LS             69       64
  195     UD    0.22

  196     KK    C-1A
  197     BA   0.062
  198     LS             64
  199     UD    0.20

  200     KK   RT C1 ROUTING POD C-1A THRU CHANNEL C-1C TO CHANNEL C-1E
  201     RD    1000   0.014   0.030            TRAP       5       3

  202     KK   RT C1 ROUTING POD C-1A THRU CHANNEL C-1E TO CULVERT C-C2C
  203     RD    1800  0.0056   0.030            TRAP       5       3

  204     KK   CPC1B
  205     HC       2

  206     KK  CB CUR  Combine flows just north of SR 341 (Steamboat Ck)
  207     HC       2

  208     KK   OUTDS  Route Steamboat to just north of south Damonte property line
  209     RM       2   0.153     .35

  210     KK   CB DS  COMBINE STEAMBOAT & WHITES BRANCH 4 @ DAMONTE SOUTH BOUNDARY
  211     HC       2

  212     KK  RT WHT  ROUTE TO SOUTH BOUNDARY OF WHITE'S CREEK MEADOW SUBDIVISION
  213     RM       1   0.084     0.2
          *
          * WHITES CREEK BRANCH3
          *

  214     KK  DR 123  Recall channel 1, 2, and 3 flows
  215     DR  CH 123

  216     KK  DV 2&3  Divert flows into channels 2 and 3 - two middle branches
  217     KM          Hydrograph at this station is flow in channels 2 and 3
  218     DT    CH 1
  219     DI       0   1700    2700    3750
  220     DQ       0    350     550     700
```

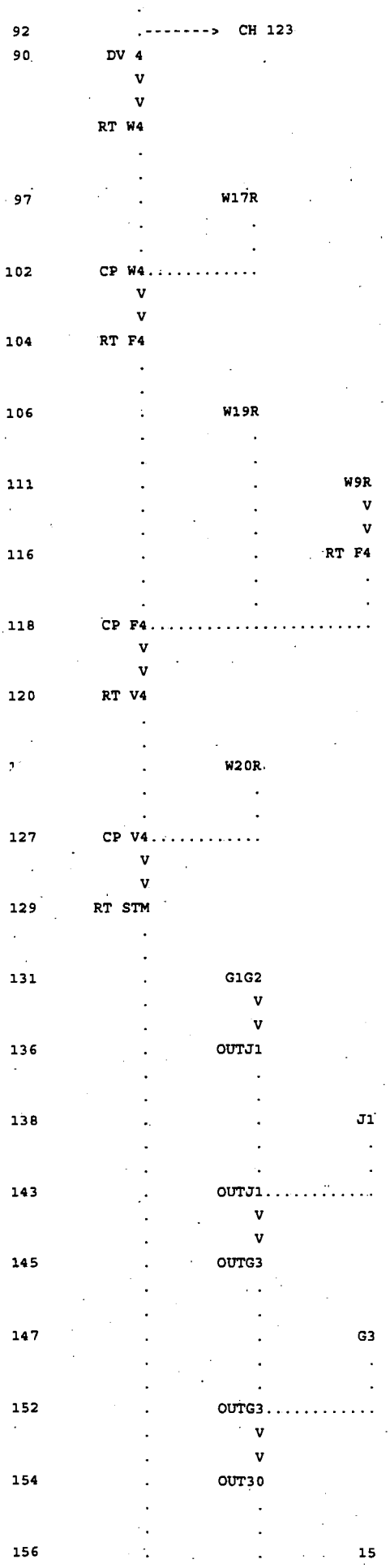
```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

 221      KK  RT 2&3  Route flows to pt where channels 2 and 3 combine (2000' u/s Virginia)
 222      RM       3    .245      .3

 223      KK    W10R  Whites Creek No. 10
 224      BA     0.3
 225      PB     2.8
 226      PC     0.0    .002    .005    .008    .011    .014    .017    .020    .023    .026
 227      PC    .029    .032    .035    .038    .041    .044    .048    .052    .056    .060
 228      PC    .064    .068    .072    .076    .080    .085    .090    .095    .100    .105
 229      PC    .110    .115    .120    .126    .133    .140    .147    .155    .163    .172
 230      PC    .181    .191    .203    .218    .236    .257    .283    .387    .663    .707
 231      PC    .735    .758    .776    .791    .804    .815    .825    .834    .842    .849
 232      PC    .856    .863    .869    .875    .881    .887    .893    .898    .903    .908
 233      PC    .913    .918    .922    .926    .930    .934    .938    .942    .946    .950
 234      PC    .953    .956    .959    .962    .965    .968    .971    .974    .977    .980
 235      PC    .983    .986    .992    .995    .998   1.00
 236      LS              55
 237      UD     .32

 238      KK   CP 23  Combine local flows with channels 2 and 3
 239      HC       2

 240      KK  DV 23A  Divert flows at CP 23 (Channels 2 and 3 Diverge)
 241      KM          Hydrograph at this station is in channel 3 (Channel 2 is diverted)
 242      DT    CH 2
 243      DI       0    2000    3500
 244      DQ       0    1000    1750

 245      KK   RT V3  Route flow to Virginia St. (CP V3)
 246      RM       2   0.136      .2

 247      KK    W11R  Whites Creek No. 11
 248      BA    0.32
 249      PB     2.7
 250      LS              75
 251      UD    0.27

 252      KK  CP V24  Combine Subbasin W11R, and Channel 3 at Virginia Street
 253      HC       2

 254      KK   RT F3  Route flow to F3 (Channel 3 at 580)
 255      RM       3   0.234      0.2

 256      KK    W16R  Whites Creek No. 16
 257      BA    0.11
 258      PB     2.7
 259      LS              81
 260      UD    0.21
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

  261     KK   CP F3  Combine flows at proposed RCB on 580  (Channel 3)
  262     HC       2

  263     KK  RT DSW  ROUTE THRU DRAINAGE DITCH TO STEAMBOAT CREEK
          *  USED CHANNEL DESIGN PARAMETERS
  264     RD    2700   0.003   0.035            TRAP      50       3

  265     KK   W18RA
          * Basin W18R - subdivided - area south of Channel #3 = W18RA
  266     BA    0.21
  267     PB     2.7
  268     LS             80
  269     UD    0.33

  270     KK  CB DSW  COMBINE WHITES CREEK BRANCHES 3 & W18RA @ STEAMBOAT CREEK
  271     HC       2

  272     KK     S-1
  273     BA   0.041
  274     PH       1   0.001   0.478   0.869   0.145    1.52    1.58    2.11    2.53
  275     LS              66
  276     UD    0.17

  277     KK   RT S3 ROUTING POD S-1 THRU STEAMBOAT TO CPS3A
  278     RM       2  0.1236      0.4

  279     KK     S-2
  280     BA   0.062
  281     LS             62
  282     UD    0.20

  283     KK   RT S3 ROUTING POD S-2 THRU STEAMBOAT TO CPS3A
  284     RM     0.5   .0403       .1

  285     KK    S-3A
  286     BA   0.039
  287     LS             63
  288     UD    0.17

  289     KK   RT S3 ROUTING POD S-3A THRU CHANNEL ST-1 TO CPS3A
  290     RD    1000  0.0025   0.030            TRAP       5       3

  291     KK   CPS3A
  292     HC       3

  293     KK   RT S5 ROUTING CPS3A THRU STEAMBOAT TO CPS5
  294     RM       4  0.3311      0.4

  295     KK    S-3B
  296     BA   0.016
  297     LS             63
  298     UD    0.14
```

```
LINE      ID.....1.....2.....3.....4.....5.....6.....7.....8.....9.....10

299       KK   RT S5 ROUTING POD S-3B THRU STEAMBOAT TO CPS5
300       RM       3  0.2837     0.4

301       KK     S-4
302       BA   0.021
303       LS             63
304       UD    0.16

305       KK   RT S5 ROUTING POD S-4 THRU STEAMBOAT TO CPS5
306       RM       2  0.1497     0.4

307       KK     S-5
308       BA   0.032
309       LS             76
310       UD    0.16

311       KK   RT S5 ROUTING POD S-5 OVERLAND TO CPS5
312       RM       2  0.1230     0.1

313       KK    CPS5
314       HC       4

315       KK  RT WHT ROUTINT CPS5 TO WHT THRU STEAMBOAT
316       RM       2  0.1775      .4

317       KK  CB WHT  COMBINE STEAMBOAT CREEK W/ WHITES CREEK BRANCHES 3&4
318       HC       3
          *
          *   DIVERSION FROM STEAMBOAT TO EAST
          *

319       KK  DIVSTR STAGE, STORAGE, AND DISCHARGE FROM DIVERSION POND
320       RS       1    ELEV    4475
          *
          * DIVERSION POND AREAS FOR ELEVATION 4475 TO 4490; 5-108"CMP, I.E.4475
          * WEIR WIDTH = 240' @ CREST 4485'
          * ADDITIONAL ELEVATIONS ADDED TO RESERVOIR JUST IN CASE, AREAS IN THESE 2 ARE
          * KEPT CLOSE TO THE AREA AT ELEVATION 4488
          *
321       SA     .08    0.11    0.37    0.93    1.17    2.86    3.23    3.63    4.00    4.83
322       SA    5.64     5.8
323       SE    4475    4476    4477    4479    4480    4483    4484    4485    4486    4487
324       SE    4488    4489
325       SQ       0      50     150     695    1010    1850    2250    2700    3876      55
326       SQ    7717   10080
327       ZZ
```

SCHEMATIC DIAGRAM OF STREAM NETWORK




92 .--------> CH 123
90 DV 4
V
V
RT W4
97 W17R
102 CP W4
V
V
104 RT F4
106 W19R
111 W9R
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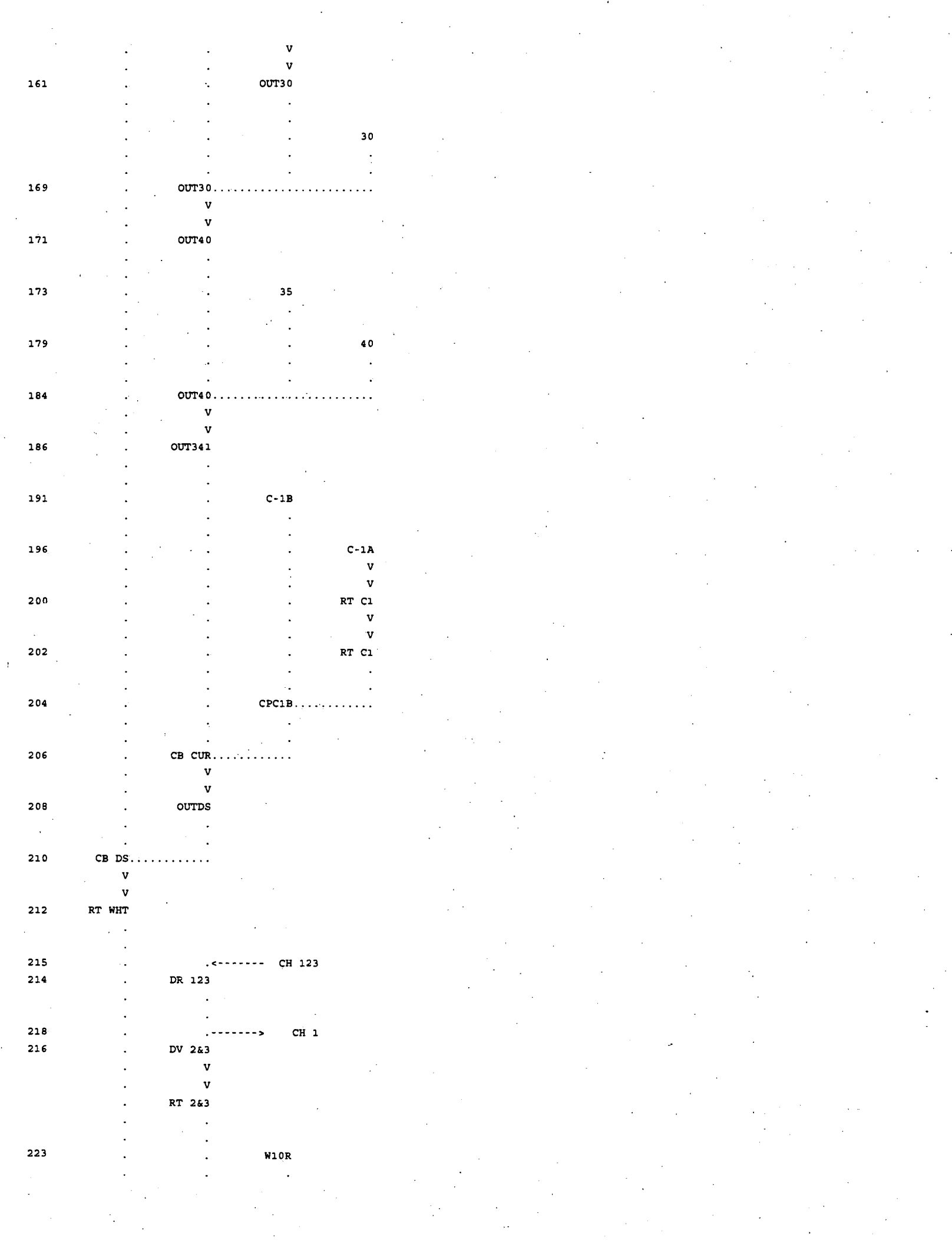
V
116 RT F4
118 CP F4
V
V
120 RT V4
W20R
127 CP V4
V
V
129 RT STM
131 G1G2
V
V
136 OUTJ1
138 J1
143 OUTJ1
V
V
145 OUTG3
147 G3
152 OUTG3
V
V
154 OUT30
156 15


V
V
161 OUT30
30
169 OUT30
V
V
171 OUT40
173 35
179 40
184 OUT40
V
V
186 OUT341
191 C-1B
196 C-1A
V
V
200 RT C1
V
V
202 RT C1
204 CPC1B
206 CB CUR
V
V
208 OUTDS
210 CB DS
V
V
212 RT WHT
215 <-------- CH 123
214 DR 123
218 --------> CH 1
216 DV 2&3
V
V
RT 2&3
223 W10R

```
238          CP 23.....
242          .-------->   CH 2
             DV 23A
                V
                V
245          RT V3
247                W11R
252          CP V24.....
                V
                V
254          RT F3
256                W16R
261          CP F3.....
                V
                V
263          RT DSW
265                W18RA
270          CB DSW.....
272                S-1
                   V
                   V
277                RT S3
279                      S-2
                            V
                            V
283                      RT S3
285                               S-3A
                                     V
                                     V
289                               RT S3
291                CPS3A.....
                      V
                      V
293                RT S5
295                      S-3B
                            V
                            V
                         RT S5
301                               S-4
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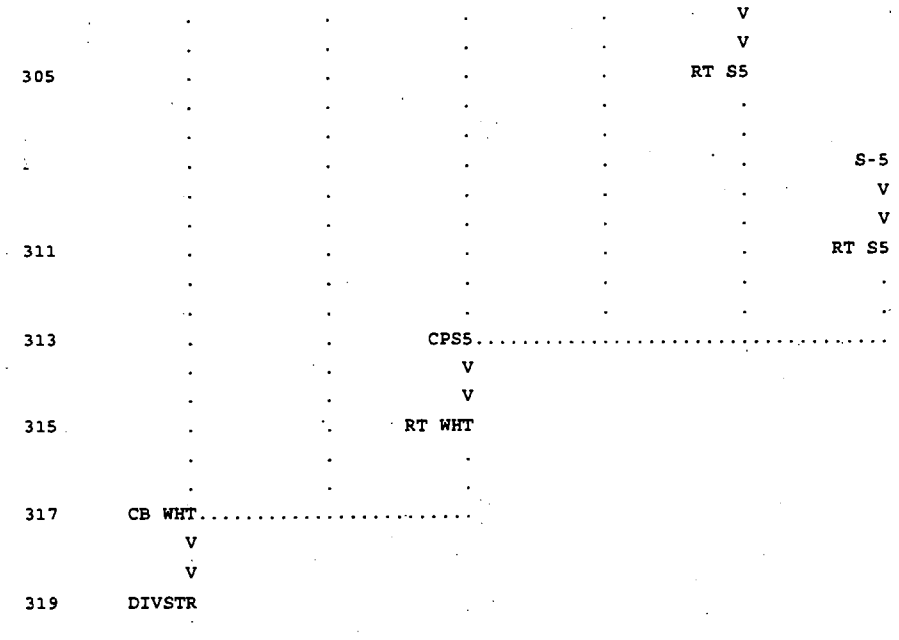

(***) RUNOFF ALSO COMPUTED AT THIS LOCATION

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*                                       *
*   FLOOD HYDROGRAPH PACKAGE  (HEC-1)   *
*             JUN  1998                 *
*           VERSION 4.1                 *
*                                       *
*      DATE   08MAR01  TIME  09:37:06   *
*                                       *
*****************************************
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```
*****************************************
*                                       *
*    U.S. ARMY CORPS OF ENGINEERS       *
*    HYDROLOGIC ENGINEERING CENTER      *
*         609 SECOND STREET             *
*       DAVIS, CALIFORNIA 95616         *
*           (916) 756-1104              *
*                                       *
*****************************************
```


```
*MODEL FOR WHITES CREEK BRANCH 3 TO ITS CONFLUENCE WITH STEAMBOAT
100-Year HEC-1 for proposed conditions.  Includes Steamboat Creek &
tributaries (i.e. Galena, Jones, Browns, Bailey, 30, & 40 watersheds);

 MODEL FOR BRANCH 3 LOMR  TRUNCATED AT BRANCH 3 CONFLUENCE WITH
 STEAMBOAT CREEK JUST ABOVE PROPOSED DIVERSION STRUCTURE ON DAMONTE RANCH
File Name: BR3-LOMR.dat
Nimbus Engineers                February, 2001
```

```
 13 IO          OUTPUT CONTROL VARIABLES
                     IPRNT          5  PRINT CONTROL
                     IPLOT          0  PLOT CONTROL
                     QSCAL          0.  HYDROGRAPH PLOT SCALE

    IT          HYDROGRAPH TIME DATA
                     NMIN           5  MINUTES IN COMPUTATION INTERVAL
                     IDATE     27JUL 0  STARTING DATE
                     ITIME        0005  STARTING TIME
                        NQ         288  NUMBER OF HYDROGRAPH ORDINATES
                    NDDATE     28JUL 0  ENDING DATE
                    NDTIME        0000  ENDING TIME
                    ICENT           19  CENTURY MARK

                  COMPUTATION INTERVAL      .08 HOURS
                      TOTAL TIME BASE   23.92 HOURS

        ENGLISH UNITS
             DRAINAGE AREA         SQUARE MILES
             PRECIPITATION DEPTH   INCHES
             LENGTH, ELEVATION     FEET
             FLOW                  CUBIC FEET PER SECOND
             STORAGE VOLUME        ACRE-FEET
             SURFACE AREA          ACRES
             TEMPERATURE           DEGREES FAHRENHEIT

    JP          MULTI-PLAN OPTION
                    NPLAN           1  NUMBER OF PLANS

    JR          MULTI-RATIO OPTION
                   RATIOS OF PRECIPITATION
                   .94
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    RT-A.
      ADJUST NSTPS AND/OR COMPUTATION INTERVAL TO MEET CRITERIA IN USER MANUAL).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    RT-B.
      ADJUST NSTPS AND/OR COMPUTATION INTERVAL TO MEET CRITERIA IN USER MANUAL).
**    WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH    RT-D.
      ADJUST NSTPS AND/OR COMPUTATION INTERVAL TO MEET CRITERIA IN USER MANUAL).
***** WARNING *****  POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH   RT S3.
      ADJUST NSTPS AND/OR COMPUTATION INTERVAL TO MEET CRITERIA IN USER MANUAL).
```

***** WARNING ***** POSSIBLE INSTABILITIES IN THE MUSKINGUM ROUTING FOR REACH RT S3.
ADJUST NSTPS AND/OR COMPUTATION INTERVAL TO MEET CRITERIA IN USER MANUAL).

PEAK FLOW AND STAGE (END-OF-PERIOD) SUMMARY FOR MULTIPLE PLAN-RATIO ECONOMIC COMPUTATIONS
FLOWS IN CUBIC FEET PER SECOND, AREA IN SQUARE MILES
TIME TO PEAK IN HOURS

					RATIOS APPLIED TO PRECIPITATION
OPERATION	STATION	AREA	PLAN		RATIO 1
					.94
HYDROGRAPH AT	W1R	1.36	1	FLOW	809.
				TIME	12.42
HYDROGRAPH AT	W2R	.84	1	FLOW	507.
				TIME	12.42
2 COMBINED AT	W1+W2	2.20	1	FLOW	1317.
				TIME	12.42
ROUTED TO	RT-A	2.20	1	FLOW	1291.
				TIME	12.58
HYDROGRAPH AT	W3R	1.38	1	FLOW	762.
				TIME	12.50
ROUTED TO	RT-A	1.38	1	FLOW	759.
				TIME	12.58
HYDROGRAPH AT	W4R	1.47	1	FLOW	336.
				TIME	12.75
3 COMBINED AT	W1234	5.05	1	FLOW	2366.
				TIME	12.58
ROUTED TO	RT-B	5.05	1	FLOW	2351.
				TIME	12.67
HYDROGRAPH AT	W5R	1.27	1	FLOW	249.
				TIME	12.92
2 COMBINED AT	W5+CH	6.32	1	FLOW	2577.
				TIME	12.67
ROUTED TO	RT-C	6.32	1	FLOW	2550.
				TIME	12.83
HYDROGRAPH AT	W6R	1.43	1	FLOW	117.
				TIME	13.50
2 COMBINED AT	W6+CH	7.75	1	FLOW	2632.
				TIME	12.83
ROUTED TO	RT-D	7.75	1	FLOW	2594.
				TIME	13.00
HYDROGRAPH AT	W7R	.85	1	FLOW	129.
				TIME	13.00
2 COMBINED AT	W7+CH	8.60	1	FLOW	2722.
				TIME	13.00
ROUTED TO	RT-DIF	8.60	1	FLOW	2712.
				TIME	13.08
HYDROGRAPH AT	W8R	.75	1	FLOW	49.

				TIME	13.42
2 COMBINED AT	CP DIF	9.35	1	FLOW	2757.
				TIME	13.08
DI ON TO	CH 123	9.35	1	FLOW	2205.
				TIME	13.08
HYDROGRAPH AT	DV 4	9.35	1	FLOW	552.
				TIME	13.08
ROUTED TO	RT W4	9.35	1	FLOW	536.
				TIME	13.25
HYDROGRAPH AT	W17R	.58	1	FLOW	87.
				TIME	12.25
2 COMBINED AT	CP W4	9.93	1	FLOW	560.
				TIME	13.25
ROUTED TO	RT F4	9.93	1	FLOW	546.
				TIME	13.33
HYDROGRAPH AT	W19R	.33	1	FLOW	16.
				TIME	12.25
HYDROGRAPH AT	W9R	2.39	1	FLOW	335.
				TIME	12.50
ROUTED TO	RT F4	2.39	1	FLOW	326.
				TIME	12.67
3 COMBINED AT	CP F4	12.65	1	FLOW	724.
				TIME	13.33
ROUTED TO	RT V4	12.65	1	FLOW	711.
				TIME	13.42
HYDROGRAPH AT	W20R	.22	1	FLOW	13.
				TIME	12.25
2 COMBINED AT	CP V4	12.87	1	FLOW	715.
				TIME	13.42
ROUTED TO	RT STM	12.87	1	FLOW	713.
				TIME	13.50
HYDROGRAPH AT	G1G2	8.00	1	FLOW	2018.
				TIME	14.00
ROUTED TO	OUTJ1	8.00	1	FLOW	2018.
				TIME	14.08
HYDROGRAPH AT	J1	6.40	1	FLOW	313.
				TIME	13.67
2 COMBINED AT	OUTJ1	14.40	1	FLOW	2307.
				TIME	14.00
ROUTED TO	OUTG3	14.40	1	FLOW	2306.
				TIME	14.17
HY RAPH AT	G3	3.90	1	FLOW	285.
				TIME	13.42
2 COMBINED AT	OUTG3	18.30	1	FLOW	2531.

				TIME	14.08
ROUTED TO	OUT30	18.30	1	FLOW	2505.
				TIME	14.67
HYDROGRAPH AT	15	4.20	1	FLOW	410.
				TIME	14.00
ROUTED TO	OUT30	4.20	1	FLOW	401.
				TIME	15.33
HYDROGRAPH AT	30	16.70	1	FLOW	2494.
				TIME	13.92
3 COMBINED AT	OUT30	39.20	1	FLOW	5072.
				TIME	14.50
ROUTED TO	OUT40	39.20	1	FLOW	5053.
				TIME	14.75
HYDROGRAPH AT	35	15.30	1	FLOW	2158.
				TIME	14.33
HYDROGRAPH AT	40	2.50	1	FLOW	416.
				TIME	13.17
3 COMBINED AT	OUT40	57.00	1	FLOW	7318.
				TIME	14.58
ROUTED TO	OUT341	57.00	1	FLOW	7314.
				TIME	14.67
			** PEAK STAGES IN FEET **		
			1	STAGE	4560.87
				TIME	14.67
HYDROGRAPH AT	C-1B	.07	1	FLOW	60.
				TIME	12.08
HYDROGRAPH AT	C-1A	.06	1	FLOW	4.
				TIME	12.17
ROUTED TO	RT C1	.06	1	FLOW	4.
				TIME	12.33
ROUTED TO	RT C1	.06	1	FLOW	4.
				TIME	12.58
2 COMBINED AT	CPC1B	.13	1	FLOW	60.
				TIME	12.08
2 COMBINED AT	CB CUR	57.13	1	FLOW	7326.
				TIME	14.67
ROUTED TO	OUTDS	57.13	1	FLOW	7319.
				TIME	14.83
2 COMBINED AT	CB DS	70.00	1	FLOW	7546.
				TIME	14.83
ROUTED TO	RT WHT	70.00	1	FLOW	7538.
				TIME	14.92
HYDROGRAPH AT	DR 123	.00	1	FLOW	2205.
				TIME	13.08

DIVERSION TO	CH 1	.00	1	FLOW	451.
				TIME	13.08
HYDROGRAPH AT	DV 2&3	.00	1	FLOW	1754.
				TIME	13.08
ROUTED TO	RT 2&3	.00	1	FLOW	1720.
				TIME	13.33
HYDROGRAPH AT	W10R	.30	1	FLOW	3.
				TIME	12.92
2 COMBINED AT	CP 23	.30	1	FLOW	1723.
				TIME	13.33
DIVERSION TO	CH 2	.30	1	FLOW	862.
				TIME	13.33
HYDROGRAPH AT	DV 23A	.30	1	FLOW	862.
				TIME	13.33
ROUTED TO	RT V3	.30	1	FLOW	849.
				TIME	13.50
HYDROGRAPH AT	W11R	.32	1	FLOW	108.
				TIME	12.17
2 COMBINED AT	CP V24	.62	1	FLOW	865.
				TIME	13.50
ROUTED TO	RT F3	.62	1	FLOW	845.
				TIME	13.75
HY APH AT	W16R	.11	1	FLOW	65.
				TIME	12.08
2 COMBINED AT	CP F3	.73	1	FLOW	854.
				TIME	13.75
ROUTED TO	RT DSW	.73	1	FLOW	852.
				TIME	13.83
HYDROGRAPH AT	W18RA	.21	1	FLOW	92.
				TIME	12.25
2 COMBINED AT	CB DSW	.94	1	FLOW	863.
				TIME	13.83
HYDROGRAPH AT	S-1	.04	1	FLOW	14.
				TIME	7.08
ROUTED TO	RT S3	.04	1	FLOW	13.
				TIME	7.17
HYDROGRAPH AT	S-2	.06	1	FLOW	15.
				TIME	7.08
ROUTED TO	RT S3	.06	1	FLOW	14.
				TIME	7.17
HYDROGRAPH AT	S-3A	.04	1	FLOW	11.
				TIME	7.08
ROUTED TO	RT S3	.04	1	FLOW	10.
				TIME	7.25

3 COMBINED AT	CPS3A	.14	1	FLOW	37.
				TIME	7.17
ROUTED TO	RT S5	.14	1	FLOW	35.
				TIME	7.50
HYDROGRAPH AT	S-3B	.02	1	FLOW	5.
				TIME	7.08
ROUTED TO	RT S5	.02	1	FLOW	5.
				TIME	7.50
HYDROGRAPH AT	S-4	.02	1	FLOW	6.
				TIME	7.08
ROUTED TO	RT S5	.02	1	FLOW	6.
				TIME	7.25
HYDROGRAPH AT	S-5	.03	1	FLOW	21.
				TIME	6.25
ROUTED TO	RT S5	.03	1	FLOW	18.
				TIME	6.33
4 COMBINED AT	CPS5	.21	1	FLOW	55.
				TIME	7.50
ROUTED TO	RT WHT	.21	1	FLOW	54.
				TIME	7.67
3 COMBINED AT	CB WHT	71.15	1	FLOW	7984.
				TIME	14.83
RC TO	DIVSTR	71.15	1	FLOW	7985.
				TIME	14.83

** PEAK STAGES IN FEET **

1	STAGE	4488.11
	TIME	14.83

SUMMARY OF KINEMATIC WAVE - MUSKINGUM-CUNGE ROUTING
(FLOW IS DIRECT RUNOFF WITHOUT BASE FLOW)

ISTAQ	ELEMENT	DT	PEAK	TIME TO PEAK	VOLUME	INTERPOLATED TO COMPUTATION INTERVAL DT	PEAK	TIME TO PEAK	VOLUME
		(MIN)	(CFS)	(MIN)	(IN)	(MIN)	(CFS)	(MIN)	(IN)
FOR PLAN = 1 RATIO= .94									
RT STM	MANE	1.35	714.28	808.70	.23	5.00	713.18	810.00	.23

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1608E+03 EXCESS= .0000E+00 OUTFLOW= .1602E+03 BASIN STORAGE= .8534E+00 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
OUTJ1	MANE	5.00	2017.57	845.00	1.64	5.00	2017.57	845.00	1.64

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7027E+03 EXCESS= .0000E+00 OUTFLOW= .6995E+03 BASIN STORAGE= .4234E+01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
OUTG3	MANE	5.00	2305.58	850.00	1.06	5.00	2305.58	850.00	1.06

CONTINUITY SUMMARY (AC-FT) - INFLOW= .8204E+03 EXCESS= .0000E+00 OUTFLOW= .8146E+03 BASIN STORAGE= .7346E+01 PERCENT ERROR= -.2

FOR PLAN = 1 RATIO= .00									
RT C1	MANE	1.25	4.32	736.25	.77	5.00	4.25	740.00	.77

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2549E+01 EXCESS= .0000E+00 OUTFLOW= .2532E+01 BASIN STORAGE= .1746E-01 PERCENT ERROR= .0

FOR PLAN = 1 RATIO= .00									
RT C1	MANE	1.75	4.35	747.25	.75	5.00	4.22	755.00	.75

CONTINUITY SUMMARY (AC-FT) - INFLOW= .2533E+01 EXCESS= .0000E+00 OUTFLOW= .2492E+01 BASIN STORAGE= .4446E-01 PERCENT ERROR= -.1

FOR PLAN = 1 RATIO= .00									
RT DSW	MANE	5.00	851.79	830.00	4.91	5.00	851.79	830.00	4.91

CONTINUITY SUMMARY (AC-FT) - INFLOW= .1933E+03 EXCESS= .0000E+00 OUTFLOW= .1915E+03 BASIN STORAGE= .2393E+01 PERCENT ERROR= -.3

FOR PLAN = 1 RATIO= .00									
RT S3	MANE	1.50	10.23	433.50	3.62	5.00	10.19	435.00	3.62

CONTINUITY SUMMARY (AC-FT) - INFLOW= .7578E+01 EXCESS= .0000E+00 OUTFLOW= .7537E+01 BASIN STORAGE= .4286E-01 PERCENT ERROR= .0

*** NORMAL END OF HEC-1 ***

APPENDIX D

HEC-2 MODEL FOR DEVELOPED CONDITIONS

file name008LOMR.dat

Damonte Ranch Subdivision
Whites Creek Branch 3
As Built Civil Design Plans For
FLOOD CONTROL CHANNELS

APPROVALS

WASHOE COUNTY PERMIT # _____
SIGNED BY WASHOE CO. ON _____
DUST CONTROL PERMIT # _____

NOTE TO ALL USING THESE PLANS:

IF THE NECCESARY APPROVAL DATES ARE NOT SHOWN ABOVE, THESE PLANS SHALL BE CONSIDERED PRELIMINARY AND NOT FOR CONSTRUCTION. PRIOR TO CONSTRUCTION OR THE ORDERING OF ANY MATERIALS OBTAIN A SET OF DRAWINGS WHICH HAVE ALL OF THE NECESSARY APPROVALS FROM THE ENGINEER.

OWNER

Nevada Tri-Partners
C/O Di LORETO CONSTRUCTION
1425 EAST GREG STREET
Sparks, Nv. 89431 (702) 359-3000

DESIGN ENGINEER

Nimbus Engineers
3785 Baker Lane, Suite 201 Margaret Bowker PE
Reno, Nv. 89509 (775) 689-8630

CERTIFICATION:

COMPLIANCE WITH MASTER PLAN

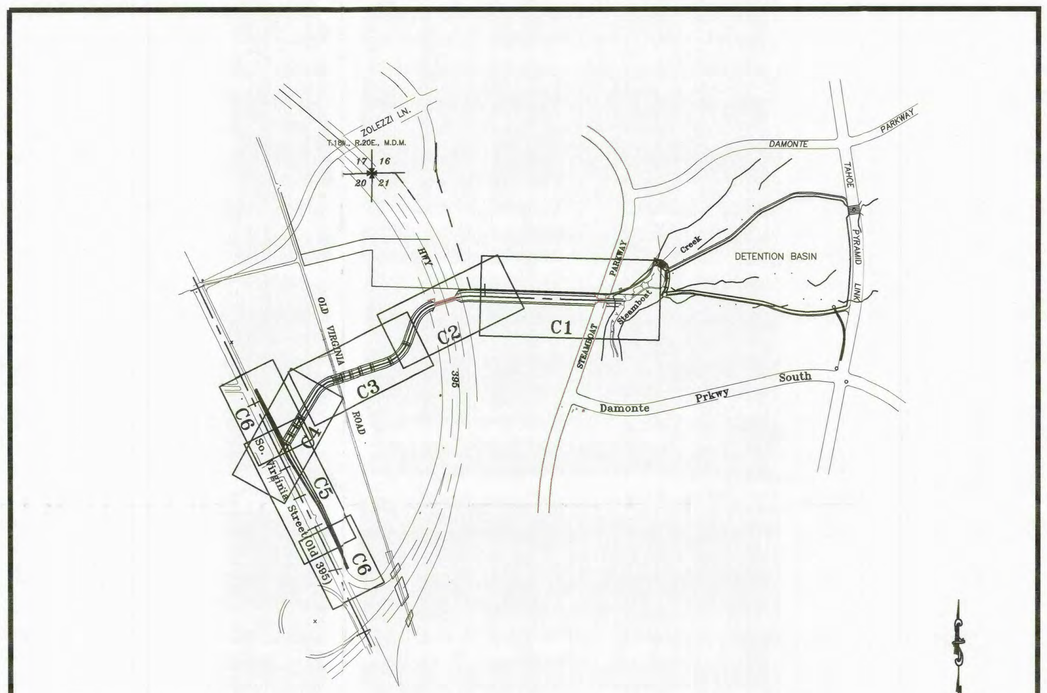
VERTICAL DATUM:

NAVD 29

BASIS OF BEARING:

INDEX

VICINITY MAP



N.T.S.

LEGEND

- Flowline (Low Flow Channel/Channel Where No Low Flow)
- Top of Design Channel
- Existing Grade, Center
- Existing Grade, Right
- Existing Grade, Left

NOTES

1. ALL CONSTRUCTION SHALL CONFORM TO COUNTY OF WASHOE STANDARDS.
2. ALL CONSTRUCTION SHALL CONFORM TO THE LASTEST EDITION OF STANDARD SPECIFICATIONS FOR PUBLIC WORKS CONSTRUCTION AND THE STANDARD DETAILS FOR PUBLIC WORKS ADOPTED BY THE COUNTY OF WASHOE, EXCEPT AS MODIFIED BY THESE PLANS OR SPECIAL PROVISIONS.
3. THE CONTRACTOR SHALL OBTAIN AND PAY FOR ALL NECESSARY PERMITS AND FEES REQUIRED FOR CONSTRUCTION.
4. THE CONTRACTOR SHALL VERIFY IN FIELD, ALL ELEVATIONS, DIMENSIONS, FLOW LINES, EXISTING CONDITIONS, AND POINTS OF CONNECTION WITH ADJOINING PROPERTY (PUBLIC OR PRIVATE). ANY DISCREPANCIES SHALL BE CALLED TO THE ATTENTION OF THE ENGINEER PRIOR TO PROCEEDING WITH CONSTRUCTION. THE CONTRACTOR IS RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING UTILITIES DURING CONSTRUCTION.
5. THE CONTRACTOR SHALL MAINTAIN A DUST CONTROL PROGRAM TO INCLUDE WATERING OF OPEN AREAS AND MAINTAIN CONFORMITY WITH SECTION 40.030 OF WASHOE COUNTY AIR POLLUTION PROVISIONS AND THE STATE OF NEVADA NDPDES PERMIT.
6. ALL WETLANDS AREAS THAT ARE TO PRESERVED SHALL BE FENCED PRIOR TO THE START OF CONSTRUCTION. FENCES SHALL BE MAINTAINED IN GOOD REPAIR BY THE CONTRACTOR.
7. ALL CONSTRUCTION SHALL CONFORM TO THE TERMS AND CONDITIONS OF THE CORPS OF ENGINEERS 404 PERMIT CESPK-CO-O P.N. # _____ WETLANDS MITIGATION FEATURES SHALL BE CONSTRUCT UNDER A SEPARATE CONTRACT.
8. THE CONTRACTOR SHALL NOTIFY THE PROJECT ENGINEER, THE SOILS ENGINEER, WASHOE COUNTY AND SIERRA PACIFIC POWER COMPANY 48 HOURS PRIOR TO COMMENCEMENT OF WORK.
9. THE CONTRACTOR SHALL BE RESPONSIBLE FOR ANY AND ALL DAMAGE TO EXISTING UTILITIES ENCOUNTERED DURING CONSTRUCTION. IT SHALL BE THE CONTRACTORS RESPONSIBILITY TO CONTACT THE UTILITY COMPANIES FOR LOCATIONS OR POT-HOLING PRIOR TO CONSTRUCTION.
10. ANY IRRIGATION FEATURES INTERRUPTED BY THIS PROJECT SHALL BE FILLED AND/OR GRADED TO DRAIN AS DIRECTED BY THE ENGINEER.
11. THE CONTRACTOR SHALL MAINTAIN ALL EXISTING DRAINAGE FACILITIES WITHIN THE CONSTRUCTION AREA UNTIL NEW DRAINAGE IMPROVEMENTS ARE IN PLACE AND FUNCTIONING.
12. ALL EXCAVATION AND EMBANKMENT SHALL BE IN ACCORDANCE WITH THE COUNTY OF WASHOE STANDARDS AND GEOTECHNICAL INVESTIGATION BY _____, DATED _____
13. IT IS THE INTENT OF THESE SPECIFICATIONS AND IMPROVEMENT PLANS THAT THE WORK PREFORMED UNDER THE CONTRACT SHALL RESULT IN A COMPLETE OPERATING SYSTEM IN SATISFACTORY WORKING CONDITION WITH RESPECT TO THE FUNCTIONAL PURPOSES OF THE INSTALLATION. IF THERE ARE ANY QUESTIONS REGARDING THE STATED OR IMPLIED MEANING OF THESE PLANS, THE CONTRACTOR IS DIRECTED TO CONTACT THE CONSULTING ENGINEER IMMEDIATELY AT:

    NIMBUS ENGINEERS
    3785 Baker Lane, Suite 201
    RENO, NV 89509 (702)689-8630
14. ALL AREAS DISTURBED AND LEFT UNDEVELOPED FOR A PERIOD OF MORE THAN 30 DAYS SHALL BE STABILIZED BY THE APPLICATION OF A DUST PALLIATIVE OR PLANTED IN CONFORMANCE WITH THE FOLLOWING:
    a. USE HAND OPERATED BROADCAST SEEDER.
    b. RAKE IMMEDIATELY TO COVER SEED.
    c. HYDROMULCH ENTIRE SEEDED AREA.
    d. WATER AREA LIBERALLY DURING FIRST GROWING SEASON TO ASSURE SURVIVAL, THEN REDUCE WATERING TO ONCE EVER THREE WEEKS OR AS NEEDED.

    MAINTENANCE:
    a. EXCLUDE FOOT TRAFFIC AS MUCH AS POSSIBLE DURING PLANT ESTABLISHMENT.
    b. AREAS THAT FAIL TO RESPOND OR BECOME DAMAGED SHALL BE TREATED AGAIN USING THE SAME TREATMENT INITIALLY APPLIED.

    MATERIAL RECOMMENDATIONS:
    SEED: a. SODAR STREAMBANK WHEATGRASS 12 lbs./ACRE
    b. NORDAN DESERT WHEATGRASS 8 lbs./ACRE
    FERTILIZER: 16-20-0 100 lbs./ACRE
    HYDROMULCH: WEYERHAEUSER SILVA-FIBER OR EQUIVALENT 2000 lbs./ACRE
15. NO MATERIAL OF ANY KIND SHALL BE STOCKPILED, OR CONSTRUCTION EQUIPMENT PARKED ON CONCRETE OR ASPHALT SURFACES TO BE MAINTAINED BY WASHOE COUNTY OR THE CITY OF RENO.
16. SHOULD ANY PREHISTORIC OR HISTORIC REMAINS/ARTIFACT BE DISCOVERED DURING CHANNEL CONSTRUCTION, WORK SHALL TEMPORARILY BE HALTED AT THE SPECIFIC SITE AND THE DEPARTMENT OF CONSERVATION AND NATURAL RESOURES, DIVISION OF HISTORIC PRESERVATION AND ARCHEOLOGY SHALL BE NOTIFIED TO RECORD AND PHOTOGRAPH THE SITE. THE PERIOD OF TEMPORARY DELAY SHALL BE LIMITED TO A MAXIMUM OF TWO WORKING DAYS FROM THE DATE OF NOTIFICATION.

SURVEYOR'S CERTIFICATE

I, GARY WHEELER, A PROFESSIONAL LAND SURVEYOR LICENSED IN THE STATE OF NEVADA, AS AGENT FOR WESTERN NEVADA SURVEYING AND MAPPING, LLC, CERTIFY THAT:

1) THIS TOPOGRAPHICAL MAP REPRESENTS THE RESULTS OF A SURVEY CONDUCTED UNDER MY SUPERVISION AT THE INSTANCE OF DOUBLE DIAMOND RANCH, LLC.
2) THE LAND SURVEYED LIES WITHIN SECTION 21, TOWNSHIP 18 NORTH, RANGE 20 EAST, MDM, COUNTY OF WASHOE, STATE OF NEVADA, AND THE SURVEY WAS COMPLETED ON MARCH 27, 2000.

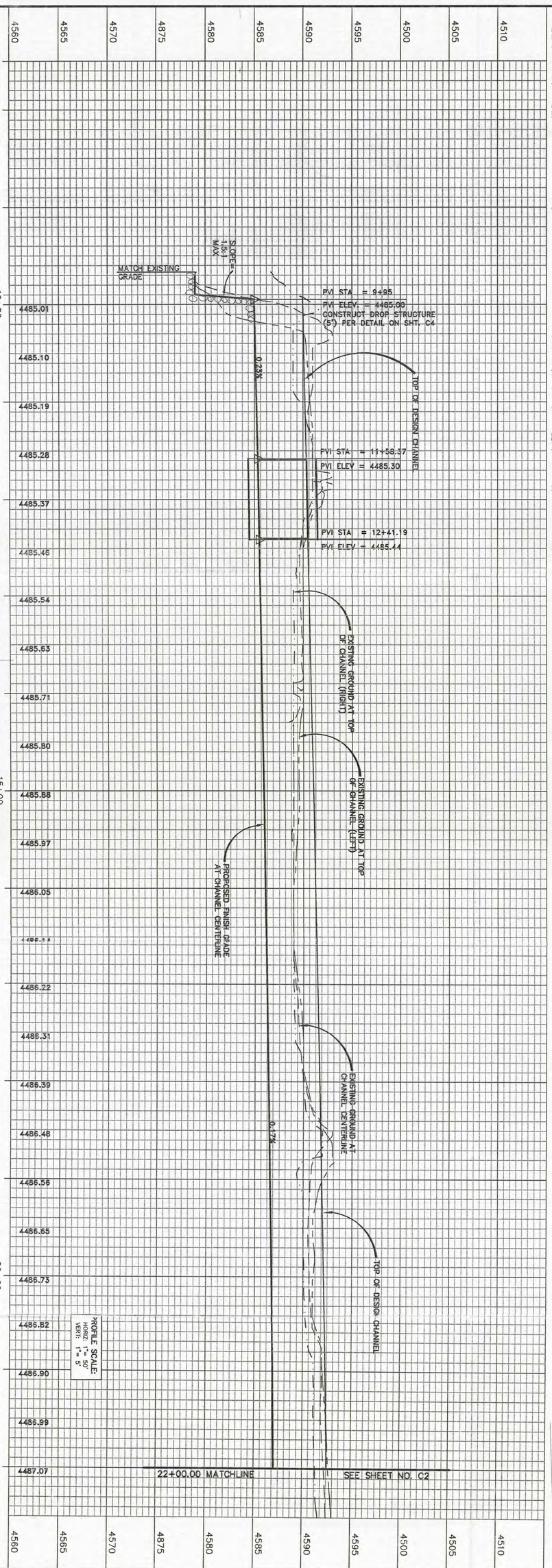
DATE:
GARY O. WHEELER, P.L.S. 12685

DATE	REVISIONS

Nimbus Engineers
3785 Baker Ln. Suite 201 • Reno, NV 89509
Mail: P.O. Box 10220 • Reno, NV 89510
(775) 689-8630 • Fax (775) 689-8614
www.nimbusengineers.com

TITLE SHEET
As Built Civil Design Plans for
Whites Creek Branch 3
Washoe
Nevada
Reno

JOB NO.:	0008
SCALE:	N.A.
FILE:	008TITLE
DATE:	03-2001
DESIGN BY:	XX
DRAWN BY:	KK
CHECKED BY:	DW



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FILE:	604CH01
DATE:	AUG 1996
DESIGN BY:	RMH/GA
DRAWN BY:	TWM
CHECKED BY:	RMH

Damonte Ranch Flood Control Channels

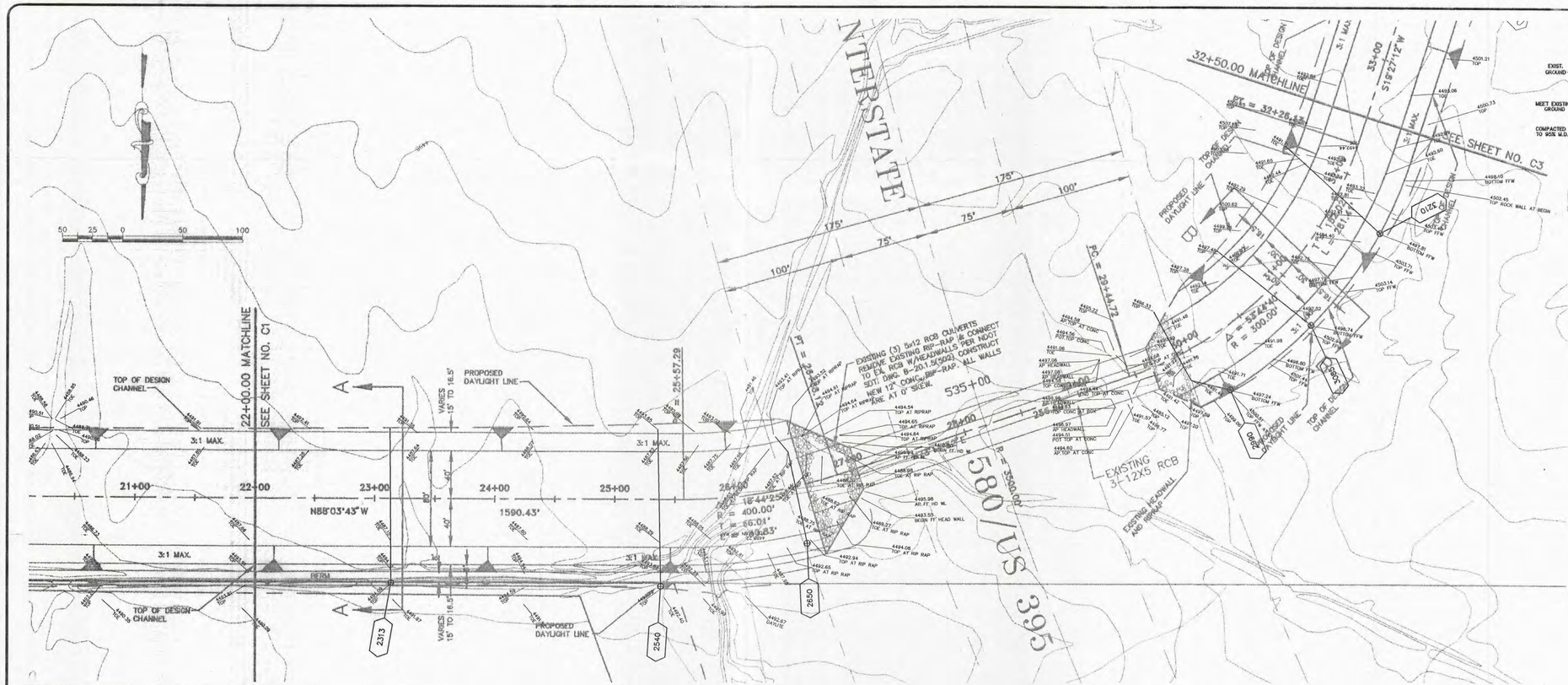
Branch 3 Flood Control Channel

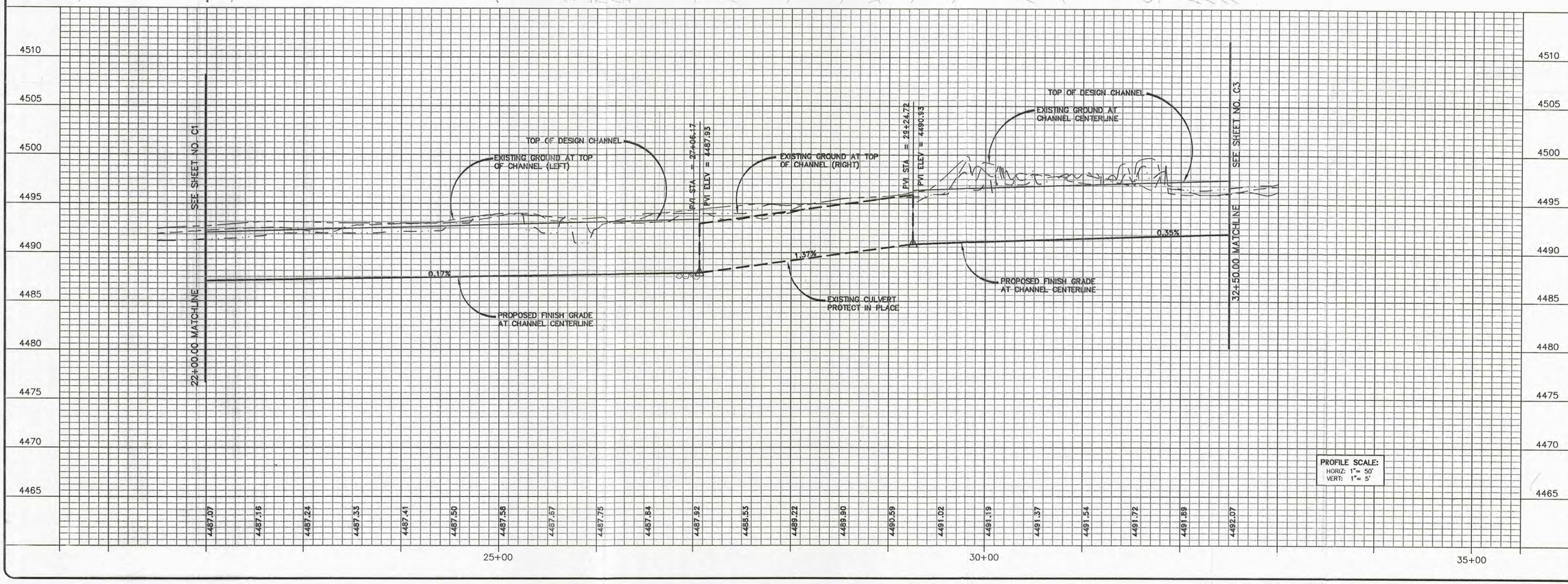
PLAN AND PROFILE

Reno Washoe Nevada

Nimbus Engineers
3710 Grant Dr., Suite A, Reno, NV 89509
Mail : P.O. Box 10220, Reno, NV 89510
(702) 689-8630

DATE	REVISIONS
1/28/97	notes





REVISIONS	DATE
notes	1/28/97

Nimbus Engineers
3710 Grant Dr., Suite A Reno, NV 89509
Mail : P.O. Box 5870 Reno, NV 89513
(702) 852-8530

Demonte Ranch Flood Control Channels

Branch 3 Flood Control Channel
PLAN AND PROFILE

Washoe Nevada

Reno

JOB NO.:	9604
SCALE:	1"=50'
FILE:	604CH02
DATE:	AUG 1996
DESIGN BY:	RWH
DRAWN BY:	TWM/GA
CHECKED BY:	RWH

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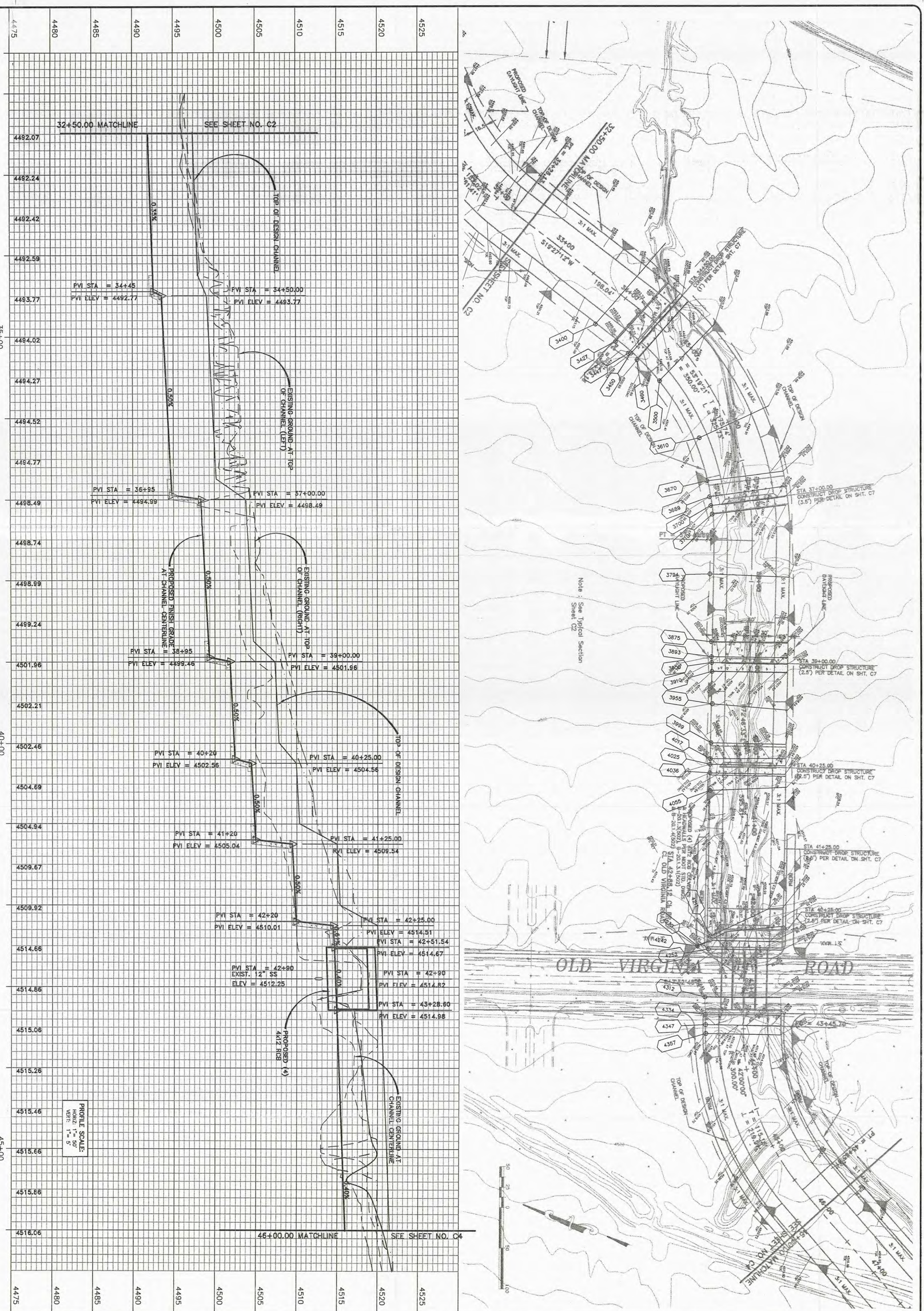

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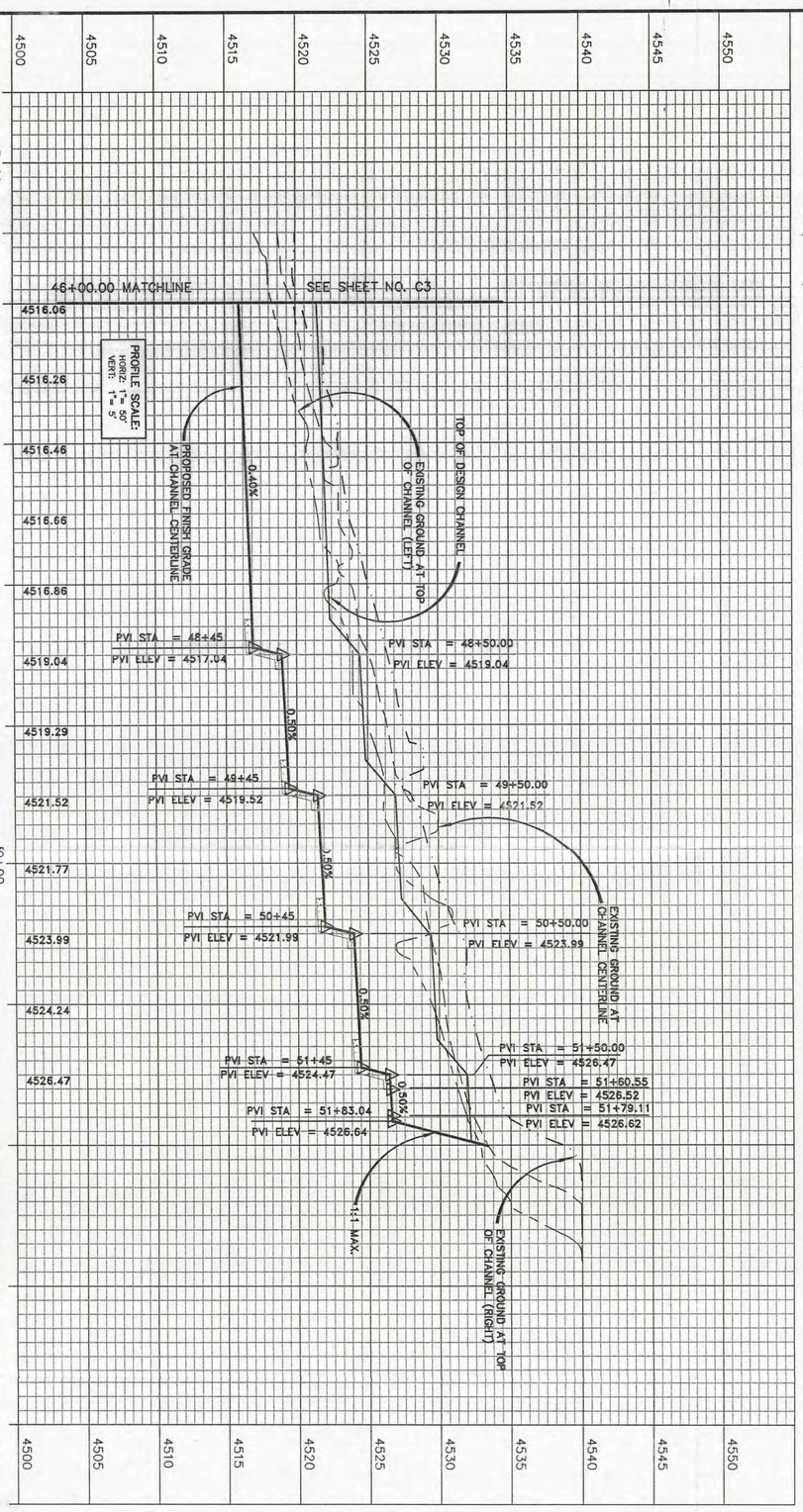
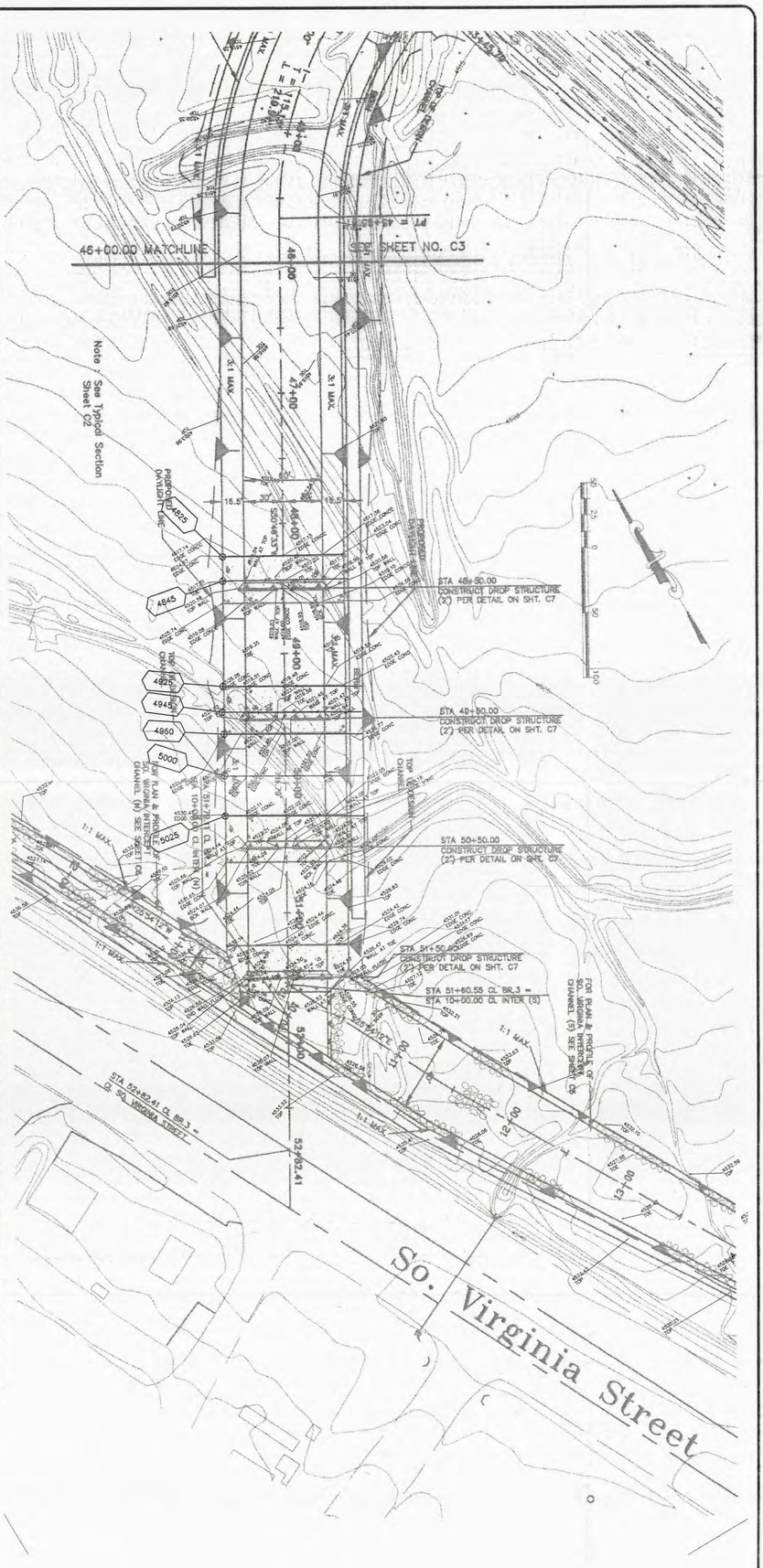
	FILE: 604CH03	PLAN AND PROFILE	
	DATE: AUG 1996		
	DESIGN BY: RMH		
	DRAWN BY: TWM/GA		
	CHECKED BY: RMH		
		Reno Washoe Nevada	

Nimbus Engineers
3710 Grant Dr., Suite A, Reno, NV 89509
Mail : P.O. Box 10220, Reno, NV 89510
(702) 688-8630

DATE	REVISIONS
1/28/97	notes





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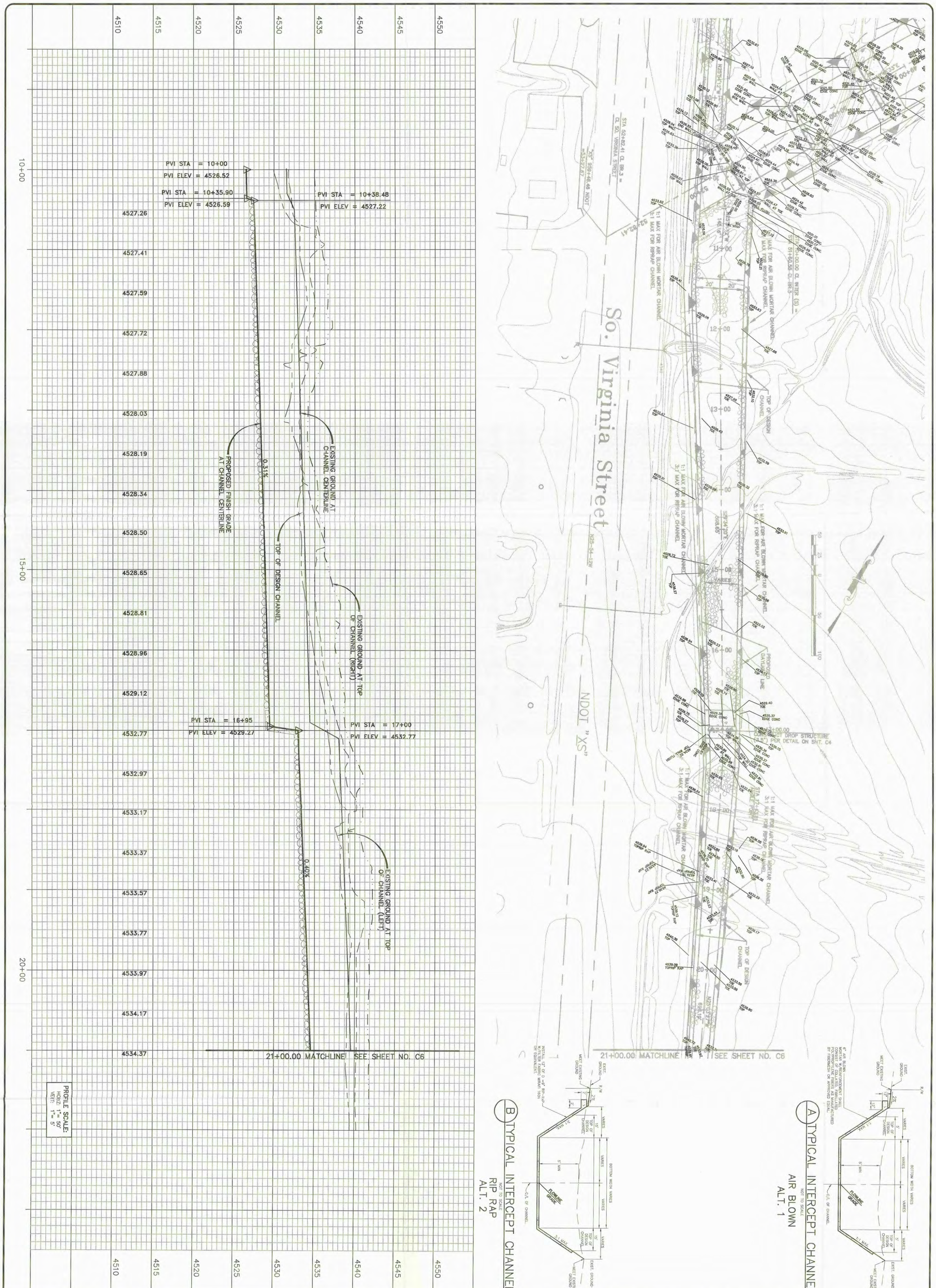

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FILE:	604CH05
DATE:	AUG 1996
DESIGN BY:	RMH
DRAWN BY:	TWM/GA
CHECKED BY:	RMH

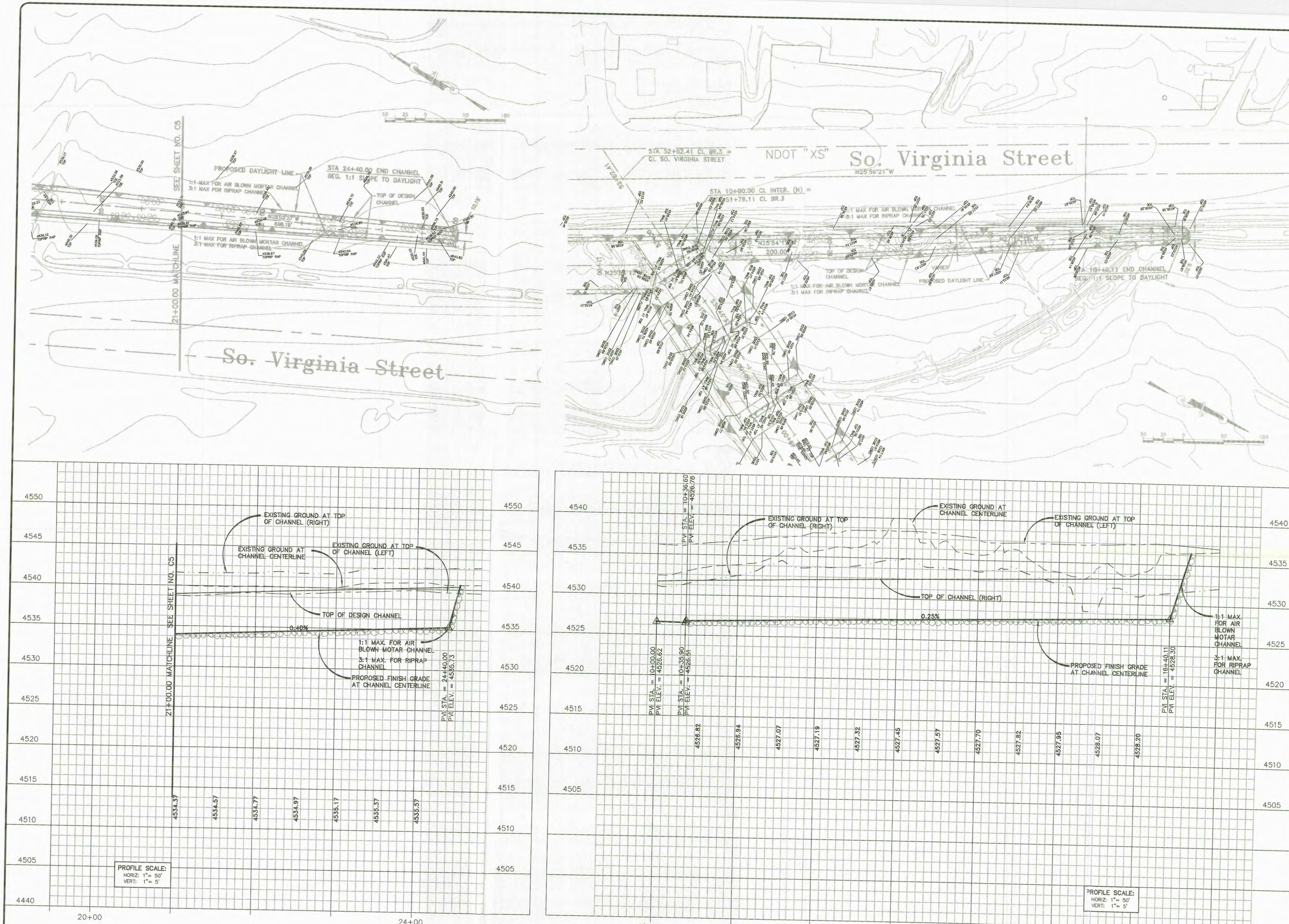
Damonte Ranch Flood Control Channels

Virginia Street Intercept Channel South

Reno Washoe Nevada

Nimbus Engineers
3710 Grant Dr., Suite A, Reno, NV 89509
Mail : P.O. Box 10220, Reno, NV 89510
(702) 689-8630

DATE	REVISIONS
1/28/97	notes



REVISIONS

DATE	REVISIONS
1/28/97	notes

Nimbus Engineers
3710 Grant Dr. Suite A, Reno, NV 89509
Mail: P.O. Box 10220, Reno, NV 89510
(702) 689-8630

Damonte Ranch Flood Control Channels

Virginia Street Intercept Channel

North & South

Washoe

Reno

Nevada

JOB NO.:	9604
SCALE:	1"=50'
FILE:	604CH06
DATE:	JUL 1996
DESIGN BY:	RMH
DRAWN BY:	TWM/GA
CHECKED BY:	RMH

C6

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*  Version   4.6.2;  May 1991             *
*                                         *
*      DATE    17JUL00     TIME   09:29:46 *
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****************************************
*  U.S. ARMY CORPS OF ENGINEERS        *
*  HYDROLOGIC ENGINEERING CENTER       *
*  609 SECOND STREET, SUITE D          *
*  DAVIS, CALIFORNIA 95616-4687        *
*          (916) 756-1104              *
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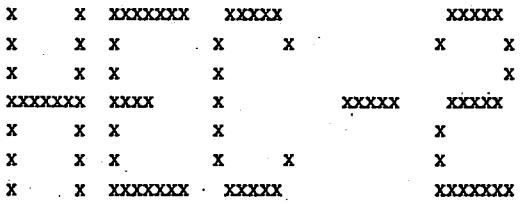

THIS RUN EXECUTED 17JUL00 09:29:46

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**************************************
 HEC-2 WATER SURFACE PROFILES

 Version  4.6.2;  May 1991
**************************************


T1     WHITES CREEK BRANCH 3 AS-BUILT MODEL            NIMBUS JOB # 0008
T2     BY NIMBUS ENGINEERS, RENO, NEVADA               FILE NAME: 008LOMR.DAT
T3      BRANCH 3-100yr; AS-BUILT                       DATE: JUNE 2000

       AS-BUILT MODEL REVISED FROM FILE: Rbr3100y.dat DATE: NOV 1997

       CRA - REVISED MODEL PER AS-BUILT SURVEY INFORMATION; CHANGED MANNING'S
             IN MODEL FOR DROP STRUCTURES(6/2000).

       TMM - REVISED CHANGES TO DROP STRUCTURE AND CULVERT LOCATIONS. AS SHOWN
             IN PLANS BY ODYSSEY.  OLD VIRGINIA ROAD HAS BEEN RELOCATED.

J1  ICHECK    INQ       NINV      IDIR      STRT      METRIC    HVINS     Q         WSEL      FQ

      0         2         0         0         0         0         0         0    4487.5         0

J2  NPROF     IPLOT     PRFVS     XSECV     XSECH     FN        ALLDC     IBW       CHNIM     ITRACE

      1         0        -1

J3  VARIABLE CODES FOR SUMMARY PRINTOUT

    150         38         43         13         14         15         26          1         53         54
     25          8          3
     STARTING WATER SURFACE ELEVATION = 4487.5
     STARTING ELEVATION FROM STEAMBOAT DIVERSION STRUCTURE DESIGN HEC-2 MODEL

QT       2       7000       7000
     STEAMBOAT CREEK 100-YEAR FLOW AT THE TIME WHEN THE WHITES CREEK PEAK
     DISCHARGE ENTERS STEAMBOAT CREEK IS USED INSTEAD OF THE PEAK DISCHARGE
     TO START WSEL FOR WHITES CREEEK BRANCH 3 DESIGN.
NC     0.04       0.04      0.035        0.1        0.3
ET                 7.1                                                  1000     1254.78
X1    1300.1         36     1082.0     1141.81        315         380        360
X4         2     4477.5     1085.5     4477.5     1100.5
GR    4488.5        997     4488.0      1000.0     4487.0     1049.96     4486.0     1054.27     4485.0     1056.91
GR    4484.0    1061.42     4483.0     1073.89     4482.0     1079.28     4481.0     1080.29     4480.0      1082.0
GR    4479.0     1082.8     4478.0     1084.09     4478.0     1101.28     4479.0     1103.41     4480.0      1106.3
GR    4481.0    1136.26     4482.0     1141.81     4482.0      1154.1     4481.0      1156.5     4481.0     1160.62
GR    4482.0    1169.17     4482.0     1174.07     4481.0     1176.94     4481.0     1179.77     4482.0     1181.76
GR    4483.0    1185.94     4484.0     1188.27     4485.0     1193.95     4486.0     1196.47     4486.0     1204.17
GR    4486.0    1216.85     4487.0     1225.08     4488.0     1230.24     4489.0     1239.07     4490.0     1254.78
GR    4491.0    1358.86
```

```
X1     00.2        35       1049       1098         75         75         75
GR     4490      1000       4489       1002       4488       1008       4487       1012       4486       1014
GR     4485      1018       4484       1023       4483       1043       4482       1048       4481       1049
GR     4480      1050       4479       1051       4478       1055       4478       1065       4479       1068
GR     4480      1075       4480       1090       4481       1098       4482       1119       4483       1130
GR     4484      1154       4485       1155       4488       1162       4488       1168       4489       1175
GR     4489      1186       4488       1188       4487       1190       4486       1192       4486       1196
GR     4487      1199       4488       1203       4489       1213       4490       1224       4491       1290

     BRANCH 3 CHANNEL  FROM I-580 OUTLET TO STEAMBOAT CREEK
     B = 80' & 3:1 SIDE SLOPE


QT        2       1450       3000
     SPLIT Q=3000 CFS MODEL INTO BR3CB-DN.DAT AND BR3CB-UP.DAT TO MODEL UPSTREAM
     AND DOWNSTREAM OF CULVERT AT I-580.

X1      995          4       1000       1137         40         40         40
GR   4488.8       1000    4484.76       1021    4484.46       1115    4488.61       1137


X1     1080          4       1000       1115        115         55         85
GR   4491.5       1000    4484.52       1019    4485.02       1099    4489.71       1115


NC                                      0.3        0.5
X1     1158          4       1000       1116      58.37      58.37      58.37
X3       10
GR   4491.3       1000     4485.3       1018     4485.3       1098     4491.3       1116
     CULVERT UNDER ZOLLEZI EXTENSION


SC    5.012        0.2        2.9        100          5         12      82.82        9.1    4485.44     4485.3
X1     1241          4       1000       1098      82.82      82.82      82.82
X2                               2    4490.44    4492.44
X3       10
GR   4491.4       1000    4485.44       1018    4485.44       1080    4491.44       1098


X1     1300          4       1000       1116      58.81      58.81      58.81
GR   4491.5       1000    4485.54       1018    4485.54       1098    4491.54       1116


NC                                      0.1        0.3
X1     1330          4       1000       1118        200        200        200
GR   4491.9       1000    4485.71       1025    4485.57       1104    4489.79       1118
```

```
X1    1590        4       1000       1114        260        260        260
GR    4492.9      1000    4485.95    1025        4485.71    1102       4489.4     1114

X1    1830        4       1000       1118        240        240        240
GR    4492.0      1000    4486.51    1028        4486.24    1104       4491.02    1118

X1    2070        4       1000       1119        240        240        240
GR    4493.4      1000    4486.73    1026        4487.47    1104       4491.58    1119

X1    2313        4       1000       1115        243        243        243
GR    4494.1      1000    4487.15    1024        4487.53    1101       4492       1115

X1    2540        4       1000       1119        227        227        227
GR    4493.7      1000    4488.29    1025        4487.82    1104       4493.65    1119

X1    2650        4       1000       1093        110        110        110
GR    4492.9      1000    4488.75    1020        4487.62    1075       4493.4     1093

NC                                   .3          .5

      REM BRANCH 3 UPSTEAM OF NDOT R/W FOR I580
      USE EXISTING 3-12'X5' RCB UNDER THE FREEWAY
      NDOT CONSTRUCTION PLAN SHOW PRECAST SINGLE BARREL CULVERT THEREFORE
      THE PEIR WIDTH IS 2'-3".

X1    2706        4       1000       1042.25     56.17      56.17      57.17
X3    10
GR    4496        1000    4487.93    1000        4487.93    1042.25    4496       1042.25

SC    3.012       .2      2.9        100         5          12         218.56     10.1       4490.93    4487.93
X1    2927        4       1000       1042.25     220.5      220.5      220.5
X2                        2          4495.93     4515
X3    10
GR    4497.0      1000.00 4490.57    1000.00     4490.06    1042.25    4497.06    1042.25

X1    2990        4       1000       1084        75         60         63
GR    4497.2      1000    4491.44    1018        4491.48    1066       4496.33    1084

NC                                   .1          .3
X1    3085        5       1000       1100        110        82         95
GR    4502.9      1000    4496.74    1001        4492.52    1022       4492.52    1082       4498.12    1100

X1    3210        5       1000       1133        145        100        115
GR    4502.5      1000    4498.10    1002.0      4492.60    1018.0     4492.44    1080       4507.13    1133

X1    3400        4       1000       1131.5      190        190        190
GR    4501.2      1000    4493.19    1017.6      4492.92    1081.3     4511.62    1131.5
  END GRASS CHANNEL BEGIN DROP STRUCTURE
```

```
NC     .016      0.016      0.016
X1     3427          4       1000    1092.7       27       27       27
GR   4499.0       1000    4493.23    1014.6  4493.06   1077.7  4498.73   1092.4
  BOTTOM OF DROP

X1     3447          4       1000    1096.4       20       20       20
GR   4499.5       1000    4492.89    1018.2  4493.04   1078.9  4498.89   1096.4
  TOP OF STRUCTURE

X1     3450          8       1000    1093.8        3        3        3
GR   4499.5       1000    4495.23      1010  4495.19   1043.1  4493.73   1043.1  4493.68   1053.0
GR   4495.1     1053.0    4495.12    1081.8  4498.89   1093.8
  END STRUCTURE BEGIN GRASS CHANNEL

NC     0.04       0.04      0.035
X1     3460          4       1000    1094.4       10       10       10
GR   4499.9       1000    4493.97    1011.7  4494.20   1079.6  4498.99   1094.4

X1     3500          4       1000    1097.5       40       40       40
GR   4501.2       1000    4494.52    1012.6  4494.45   1078.9  4503.21   1097.5

X1     3601          4       1000    1093.6       99       99       99
GR   4502.4       1000    4495.78    1016.2  4494.91   1072.6  4504.56   1093.6
  END GRASS CHANNEL BEGIN DROP STRUCTURE

NC    0.016      0.016      0.016
X1     3670          4       1000    1094.2       69       69       69
GR   4504.4       1000    4495.07    1020.9  4495.10   1075.0  4503.10   1094.2
       M OF DROP

X1     3689          4       1000    1092.9       19       19       19
GR   4504.4       1000    4495.15    1020.9  4495.10   1075.0  4503.10   1092.9
  TOP OF STRUCTURE

X1     3700          8       1000    1092.1       11       11       11
GR   4504.6       1000    4499.91    1011.2  4499.95   1041.8  4498.48   1041.8  4498.38   1051.7
GR   4499.8     1051.7    4499.92    1081.5  4503.78   1092.1
  END STRUCTURE BEGIN GRASS CHANNEL

NC     0.04       0.04      0.035
X1     3710          4       1000    1091.5       10       10       10
GR   4504.9       1000    4498.46    1015.2  4498.49   1076.7  4503.93   1091.5

X1     3794          4       1000    1097.3       84       84       84
GR   4505.9       1000    4498.93    1017.8  4498.87   1082.2  4505.36   1097.3
  END GRASS CHANNEL BEGIN DROP STRUCTURE

NC    0.016      0.016      0.016
X1     3875          4       1000    1093.7       81       81       81
GR   4507.2       1000    4499.45    1016.9  4499.30   1076.8  4507.02   1093.7
  BOTTOM OF DROP
```

```
X1     3893          4       1000     1092.9          18          18          18
GR   4507.4       1000    4499.51     1019.7     4499.32     1073.1     4507.32     1092.9
  TOP OF STRUCTURE

X1     3900          8       1000     1092.6           7           7           7
GR   4507.4       1000    4503.46     1010.4     4503.44     1040.7     4501.80     1040.7    4501.84     1050.7
GR   4503.3     1050.7    4503.24     1081.3     4507.44     1092.6
  END STRUCTURE BEGIN GRASS CHANNEL

NC     0.04       0.04      0.035
X1     3910          4       1000       1092          10          10          10
GR   4507.5       1000    4502.13     1014.6     4501.84     1076.9     4507.60        1092

X1     3955          4       1000       1093          45          45          45
GR   4508.3       1000    4502.14     1017.1     4502.32    1078.87     4508.64        1093
  END GRASS CHANNEL BEGIN DROP STRUCTURE

NC    0.016      0.016     0.016
X1     3999          4       1000     1091.8          44          44          44
GR   4509.3       1000    4502.48     1016.1     4502.28     1075.0     4510.52     1091.8
  BOTTOM OF DROP

X1     4017          4       1000     1092.2          18          18          18
GR   4510.1       1000    4502.66     1017.0     4502.73     1072.4     4510.94     1092.2
  TOP OF STRUCTURE

X1     4025          8       1000     1092.4           8           8           8
GR   4510.1       1000    4506.05     1008.9     4506.00     1040.5     4504.51     1040.5    4504.43     1050.6
GI     05.9     1050.6    4505.99     1080.8     4510.94     1092.4
  E.. STRUCTURE BEGIN GRASS CHANNEL

NC     0.04       0.04      0.035
X1     4036          4       1000       1093          11          11          11
GR   4510.4       1000    4504.84     1013.0     4504.53     1076.5     4511.06        1093
  END GRASS CHANNEL BEGIN DROP STRUCTURE

  BEGIN CHANGES FROM ODYSSEY ENGINEERING 11-14-97

X1     4055          4       1000       1093          24          24          24
GR   4510.7       1000    4504.91     1016.0     4505.36     1078.0     4511.78        1094

NC                                         .3          .5
X1     4092          4       1000       1103          50          10          32
X3       10
GR   4511.6       1000    4506.11       1018     4505.57       1080     4511.66        1103

SC    4.012         .2        2.9        100           4          12         120        11.2    4506.00     4504.44
X1     4211          4       1000       1100         125         125         125
X2                             2    4510.00        4515
X3       10
GR   4511.9       1000    4506.00       1021     4505.99       1080     4514.35        1100
  BOTTOM OF DROP
```

```
NC      .016      0.016      0.016
X1      4230          5       1000       1105          1         25         13
GR    4516.5       1000    4506.19     1032.0    4506.11     1036.0    4506.97       1086       4516       1105

NC                                        .1          .3
  TOP OF STRUCTURE
X1      4242          8       1000       1105         12         12         12
GR    4516.5       1000    4511.51       1018    4511.44       1052    4510.00       1052    4510.00       1062
GR    4511.5       1062    4511.56       1093       4516       1105

X1      4252          4       1000       1105         10         10         10
GR    4513.6       1000    4510.36       1024    4510.36     1090.0    4516.18       1105
  END STRUCTURE BEGIN GRASS CHANNEL

NC      0.04       0.04      0.035
X1      4273          4       1000       1099         21         21         21
GR    4517.8       1000    4510.46       1020    4510.39     1081.0    4517.28       1099
  END GRASS CHANNEL BEGIN SRUCTURE

NC     0.016      0.016      0.016
X1      4312          5       1000       1093         39         39         39
GR    4519.9       1000    4510.88     1017.5    4510.52       1046    4510.88     1076.5    4519.53       1093
  BOTTOM OF DROP

X1      4334          4       1000       1093         22         22         22
GR    4519.9       1000    4510.55     1016.5    4510.55     1076.5     4519.2       1093
  TOP OF STRUCTURE

X1      4347          8       1000       1093         12         12         12
GR    4519.9       1000    4516.46       1012    4516.50     1041.5    4514.96     1041.5    4514.96     1051.5
GR    4516.4     1051.5    4516.49       1081    4522.26       1093
  END OF STRUCTURE BEGIN GRASS CHANNEL

NC      0.04       0.04      0.035
X1      4357          4       1000       1093         10         10         10
GR    4519.9       1000    4515.05     1016.0    4514.95     1076.5    4520.49       1093

X1      4440          4       1000       1093         83         83         83
GR    4519.9       1000    4515.25     1015.0    4515.50     1078.0    4520.85       1093

  END CHANGES FROM ODYSSEY ENGINEERING 11-14-97


X1      4600          4       1000       1089        160        160        160
GR    4521.2       1000    4516.06     1015.0    4516.12     1072.0    4521.84       1089

X1      4800          4       1000       1090        200        200        200
GR    4524.6       1000    4517.20     1016.5    4517.39     1076.5    4522.70       1090
  END GRASS CHANNEL BEGIN DROP STRUCTURE
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```
NC     .016      0.016      0.016
X1     4825          4       1000       1090         25         25         25
GR   4524.9       1000    4517.14     1016.5    4517.36     1076.5    4523.04       1090
  BOTTOM OF DROP

X1     4845          4       1000       1093         20         20         20
GR   4525.4       1000    4517.31     1017.0    4517.72     1076.5    4523.93       1093
  TOP OF STRUCTURE

X1     4850          8       1000       1093          5          5          5
GR   4525.5       1000    4520.59       1012    4520.55     1041.5    4519.03     1041.5    4519.01     1051.5
GR   4520.5     1051.5    4520.56       1081    4524.15       1093
  END STRUCTURE BEGIN GRASS CHANNEL

NC      0.04       0.04      0.035
X1     4860          4       1000       1091         10         10         10
GR   4525.7       1000    4519.08     1016.5    4519.10     1076.5    4524.59       1091

X1     4900          4       1000       1091         40         40         40
GR   4527.3       1000    4519.35     1016.5    4519.60     1078.0    4525.10       1091
  END GRASS CHANNEL BEGIN DROP STRUCTURE

NC     0.016      0.016      0.016
X1     4925          4       1000       1093         25         25         25
GR   4528.3       1000    4519.51     1016.5    4519.53       1077    4525.43       1093
  BOTTOM OF DROP

X1     4945          4       1000       1093         20         20         20
GR     28.9       1000    4519.53       1021    4519.53       1076    4526.02       1093
  1__ OF STRUCTURE

X1     4950          8       1000       1093          5          5          5
GR   4528.9       1000    4523.02       1011    4523.01     1041.5    4521.45     1041.5    4521.45     1051.5
GR   4523.0     1051.5    4522.94       1082    4526.39       1093
  END STRUCTURE BEGIN GRASS CHANNEL

NC      0.04       0.04      0.035
X1     4960          4       1000       1093         10         10         10
GR   4528.9       1000    4521.46       1013    4521.50       1075    4526.77       1093

X1     5000          4       1000       1093         40         40         40
GR   4529.9       1000    4521.79     1016.5    4521.70     1076.5    4528.18       1093
  END GRASS CHANNEL BEGIN DROP STRUCTURE; CHANGE N-VALUES

NC     0.016      0.016      0.016
X1     5025          4       1000       1093         25         25         25
GR   4530.5       1000    4522.11     1016.5    4522.05       1077    4527.69       1093
  BOTTOM OF DROP
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```
X1     5045          4       1000       1093          20          20          20
GR   4531.1       1000    4522.21       1021     4522.23        1076     4528.66        1093
  TOP OF STRUCTURE

X1     5050          8       1000       1093           5           5           5
GR   4531.3       1000    4525.66       1013     4525.52      1041.5     4524.08      1041.5     4524.08      1051.5
GR   4525.5     1051.5    4525.51       1081     4529.49        1093
  END STRUCTURE BEGIN GRASS CHANNEL; CHANGE N-VALUES

NC      0.04       0.04       0.035
X1     5060          4       1000       1093          10          10          10
GR   4531.6       1000    4524.26     1019.5     4524.16        1078     4529.02        1093

X1     5100          4       1000       1094          40          40          40
GR   4531.9       1000    4524.47       1021     4524.30        1078     4528.83        1094
  END GRASS CHANNEL BEGIN DROP STRUCTURE; CHANGE N-VALUES

NC     0.016      0.016      0.016
X1     5125          4       1000       1094          25          25          25
GR   4532.1       1000    4524.44       1022     4524.42        1082     4529.74        1094
  BOTTOM OF DROP

X1     5145          4       1000       1094          20          20          20
GR   4532.2       1000    4524.45       1022     4524.57        1083     4529.74        1094

  NOTE - WEIR CONSTRUCTED AT THIS DROP STRUCTURE


X1     5150          8       1000       1102           5           5           5
GR   4532.1       1000    4528.04       1011     4528.07        1041     4526.61        1041     4526.61        1051
GR   4528.1       1051    4528.03       1094     4531.01        1102
  END STRUCTURE BEGIN GRASS CHANNEL; CHANGE N-VALUES

NC      0.04       0.04       0.035
X1     5160          4       1000       1120          10          10          10
GR   4532.1       1000    4526.56     1016.5     4526.55        1088     4532.02        1120
```

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*PROF 1

CCHV= .100 CEHV= .300

*SECNO 1300.100

3470 ENCROACHMENT STATIONS= 1000.0 1254.8 TYPE= 1 TARGET= 254.780

1300.100	10.00	4487.50	.00	.00	4488.54	1.04	.00	.00	4480.00
7000.0	629.1	4429.0	1941.9	124.2	474.7	326.3	.0	.0	4482.00
.00	5.06	9.33	5.95	.040	.035	.040	.000	4477.50	1024.98
.003157	315.	360.	380.	0	0	0	.00	202.68	1227.66

*SECNO 1300.200

3265 DIVIDED FLOW

1300.200	9.61	4487.61	.00	.00	4488.87	1.26	.26	.06	4481.00
7000.0	798.5	4203.7	1997.8	140.7	402.8	307.1	1.5	.3	4481.00
.00	5.68	10.44	6.50	.040	.035	.040	.000	4478.00	1009.57
.003767	75.	75.	75.	2	0	0	.00	164.16	1201.43

*SECNO 995.000

3280 CROSS SECTION 995.00 EXTENDED .35 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .45

995.000	4.50	4488.96	.00	.00	4489.08	.13	.10	.11	4488.80
1450.0	.0	1450.0	.0	.0	507.6	.0	2.2	.5	4488.61
.01	.00	2.86	.00	.000	.035	.000	.000	4484.46	1000.00
.000799	40.	40.	40.	3	0	0	.00	137.00	1137.00

*SECNO 1080.000

1080.000	4.46	4488.98	.00	.00	4489.20	.21	.09	.03	4491.50
1450.0	.0	1450.0	.0	.0	391.1	.0	3.0	.7	4489.71
.01	.00	3.71	.00	.000	.035	.000	.000	4484.52	1006.85
.001355	115.	85.	55.	2	0	0	.00	105.68	1112.52

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .300 CEHV= .500
*SECNO 1158.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4491.30 ELREA= 4491.30

1158.000	3.75	4489.05	.00	.00	4489.33	.28	.10	.03	4491.30
1450.0	.0	1450.0	.0	.0	341.9	.0	3.5	.8	4491.30
.02	.00	4.24	.00	.000	.035	.000	.000	4485.30	1006.76
.002033	58.	58.	58.	0	0	0	.00	102.48	1109.24

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	5	.012	.20	2.90	100.00	5.00	12.00	82.82	9	1	4485.44	4485.30

CHART 9 - BOX CULVERT WITH FLARED WINGWALL AND INLET TOP EDGE BEVEL
SCALE 1 - WINGWALL FLARED 45 DEGREES; INLET TOP EDGE = 0.043D

*SECNO 1241.000

SPECIAL CULVERT OUTLET CONTROL
EG 4489.704 EGOC = 4489.906 PCWSE= 4489.047 ELTRD= 4492.440

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
4489.70	4489.91	.58	0.	1450.	4.726	300.0	4492.44	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4491.40 ELREA= 4491.44

1241.000	4.12	4489.56	.00	.00	4489.91	.35	.58	.00	4491.40
1450.0	.0	1450.0	.0	.0	306.8	.0	4.1	1.0	4491.44
.02	.00	4.73	.00	.000	.035	.000	.000	4485.44	1005.55
.002348	83.	83.	83.	2	0	0	.00	86.82	1092.37

*SECNO 1300.000

1300.000	4.30	4489.84	.00	.00	4490.05	.20	.10	.04	4491.50
1450.0	.0	1450.0	.0	.0	400.1	.0	4.6	1.1	4491.54
.03	.00	3.62	.00	.000	.035	.000	.000	4485.54	1005.00
.001260	59.	59.	59.	2	0	0	.00	105.91	1110.91

**CNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

CCHV= .100 CEHV= .300

*SECNO 1330.000

3280 CROSS SECTION 1330.00 EXTENDED .31 FEET

1330.000	4.53	4490.10	.00	.00	4490.28	.18	.23	.00	4491.90
1450.0	.0	1450.0	.0	.0	425.5	.0	6.5	1.6	4489.79
.04	.00	3.41	.00	.000	.035	.000	.000	4485.57	1007.26
.001089	200.	200.	200.	2	0	0	.00	110.74	1118.00

*SECNO 1590.000

3280 CROSS SECTION 1590.00 EXTENDED .98 FEET

1590.000	4.67	4490.38	.00	.00	4490.57	.19	.28	.00	4492.90
1450.0	.0	1450.0	.0	.0	419.6	.0	9.0	2.3	4489.40
.06	.00	3.46	.00	.000	.035	.000	.000	4485.71	1009.06
.001072	260.	260.	260.	2	0	0	.00	104.94	1114.00

*SECNO 1830.000

1830.000	4.41	4490.65	.00	.00	4490.86	.21	.29	.01	4492.00
1450.0	.0	1450.0	.0	.0	396.8	.0	11.3	2.9	4491.02
.08	.00	3.65	.00	.000	.035	.000	.000	4486.24	1006.90
358	240.	240.	240.	1	0	0	.00	110.01	1116.91

*SECNO 2070.000

2070.000	4.27	4491.00	.00	.00	4491.25	.25	.37	.01	4493.40
1450.0	.0	1450.0	.0	.0	362.0	.0	13.4	3.5	4491.58
.10	.00	4.01	.00	.000	.035	.000	.000	4486.73	1009.37
.001785	240.	240.	240.	2	0	0	.00	107.49	1116.87

*SECNO 2313.000

2313.000	4.27	4491.42	.00	.00	4491.66	.24	.41	.00	4494.10
1450.0	.0	1450.0	.0	.0	369.1	.0	15.4	4.1	4492.00
.12	.00	3.93	.00	.000	.035	.000	.000	4487.15	1009.26
.001604	243.	243.	243.	2	0	0	.00	103.91	1113.18

*SECNO 2540.000

2540.000	3.98	4491.80	.00	.00	4492.08	.27	.41	.01	4493.70
1450.0	.0	1450.0	.0	.0	344.9	.0	17.3	4.6	4493.65
.13	.00	4.20	.00	.000	.035	.000	.000	4487.82	1008.77
.002048	227.	227.	227.	0	0	0	.00	105.48	1114.25

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 2650.000									
2650.000	4.34	4491.96	.00	.00	4492.44	.48	.30	.06	4492.90
1450.0	.0	1450.0	.0	.0	261.9	.0	18.0	4.8	4493.40
.14	.00	5.54	.00	.000	.035	.000	.000	4487.62	1004.53
.003795	110.	110.	110.	2	0	0	.00	83.99	1088.52

CCHV= .300 CEHV= .500
*SECNO 2706.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .69

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4496.00 ELREA= 4496.00

2706.000	4.00	4491.94	.00	.00	4493.07	1.14	.31	.33	4496.00
1450.0	.0	1450.0	.0	.0	169.2	.0	18.3	4.9	4496.00
.14	.00	8.57	.00	.000	.035	.000	.000	4487.93	1000.00
.008067	56.	57.	56.	2	0	0	.00	42.25	1042.25

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COFQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	3	.012	..20	2.90	100.00	5.00	12.00	218.56	10	1	4490.93	4487.93

CHART 10 - BOX CULVERT; 90-DEGREE HEADWALL; CHAMFERED OR BEVELED INLET EDGES
SCALE 1 - INLET EDGES CHAMFERED 3/4-INCH

*SECNO 2927.000

SPECIAL CULVERT INLET CONTROL
EGIC = 4497.069 EGOC = 4496.820 PCWSE= 4491.935 ELTRD= 4515.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.00

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
4497.07	4496.82	3.99	0.	1450.	5.451	180.0	4515.00	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4497.00 ELREA= 4497.06

2927.000	6.55	4496.61	.00	.00	4497.07	.46	3.99	.00	4497.00
1450.0	.0	1450.0	.0	.0	266.0	.0	19.4	5.1	4497.06
.15	.00	5.45	.00	.000	.035	.000	.000	4490.06	1000.00
.002007	221.	221.	221.	2	0	0	.00	42.25	1042.25

*SECNO 2990.000
3280 CROSS SECTION 2990.00 EXTENDED .66 FEET

2990.000	5.55	4496.99	.00	.00	4497.23	.24	.10	.07	4497.20
1450.0	.0	1450.0	.0	.0	369.3	.0	19.9	5.2	4496.33
.15	.00	3.93	.00	.000	.035	.000	.000	4491.44	1000.65
.001216	75.	63.	60.	2	0	0	.00	83.35	1084.00

CC[illegible] .100 CEHV= .300
*SECNO 3085.000

3085.000	4.60	4497.12	.00	.00	4497.37	.25	.13	.00	4502.90
1450.0	.0	1450.0	.0	.0	361.9	.0	20.7	5.4	4498.12
.16	.00	4.01	.00	.000	.035	.000	.000	4492.52	1000.94
.001544	110.	95.	82.	2	0	0	.00	95.83	1096.77

*SECNO 3210.000

3210.000	4.86	4497.30	.00	.00	4497.53	.24	.17	.00	4502.50
1450.0	.0	1450.0	.0	.0	370.0	.0	21.6	5.7	4507.13
.17	.00	3.92	.00	.000	.035	.000	.000	4492.44	1004.36
.001382	145.	115.	100.	1	0	0	.00	93.13	1097.49

*SECNO 3400.000

3400.000	4.63	4497.55	.00	.00	4497.84	.29	.29	.02	4501.20
1450.0	.0	1450.0	.0	.0	336.2	.0	23.2	6.1	4511.62
.18	.00	4.31	.00	.000	.035	.000	.000	4492.92	1008.02
.001715	190.	190.	190.	2	0	0	.00	85.72	1093.74

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3427.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.11

3427.000	4.50	4497.56	.00	.00	4497.86	.30	.02	.00	4499.00
1450.0	.0	1450.0	.0	.0	328.7	.0	23.4	6.1	4498.73
.18	.00	4.41	.00	.000	.016	.000	.000	4493.06	1003.64
.000386	27.	27.	27.	2	0	0	.00	85.73	1089.37

*SECNO 3447.000

3447.000	4.70	4497.59	.00	.00	4497.87	.28	.01	.00	4499.50
1450.0	.0	1450.0	.0	.0	341.9	.0	23.5	6.2	4498.89
.18	.00	4.24	.00	.000	.016	.000	.000	4492.89	1005.26
.000345	20.	20.	20.	1	0	0	.00	87.24	1092.50

*SECNO 3450.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3[illegible]ITICAL DEPTH ASSUMED

[illegible].000	3.54	4497.22	4497.22	.00	4498.30	1.08	.00	.24	4499.50
1450.0	.0	1450.0	.0	.0	174.1	.0	23.6	6.2	4498.89
.18	.00	8.33	.00	.000	.016	.000	.000	4493.68	1005.33
.003178	3.	3.	3.	20	19	0	.00	83.17	1088.50

*SECNO 3460.000

3301 HV CHANGED MORE THAN HVINS

3460.000	4.09	4498.06	.00	.00	4498.40	.34	.03	.07	4499.90
1450.0	.0	1450.0	.0	.0	309.0	.0	23.6	6.2	4498.99
.18	.00	4.69	.00	.000	.035	.000	.000	4493.97	1003.64
.002340	10.	10.	10.	3	0	0	.00	87.87	1091.51

*SECNO 3500.000

3500.000	3.64	4498.09	.00	.00	4498.55	.47	.11	.04	4501.20
1450.0	.0	1450.0	.0	.0	264.8	.0	23.9	6.3	4503.21
.19	.00	5.48	.00	.000	.035	.000	.000	4494.45	1005.87
.003510	40.	40.	40.	2	0	0	.00	80.75	1086.62

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 3601.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .61

3601.000	3.38	4498.29	.00	.00	4499.23	.94	.53	.14	4502.40
1450.0	.0	1450.0	.0	.0	186.1	.0	24.4	6.4	4504.56
.19	.00	7.79	.00	.000	.035	.000	.000	4494.91	1010.06
.009340	99.	99.	99.	2	0	0	.00	69.89	1079.95

*SECNO 3670.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 3.16

3670.000	3.75	4498.82	.00	.00	4499.41	.59	.15	.03	4504.40
1450.0	.0	1450.0	.0	.0	234.5	.0	24.7	6.5	4503.10
.19	.00	6.18	.00	.000	.016	.000	.000	4495.07	1012.50
.000935	69.	69.	69.	2	0	0	.00	71.43	1083.93

*SECNO 3689.000

3689.000	3.72	4498.82	.00	.00	4499.44	.62	.02	.01	4504.40
1450.0	.0	1450.0	.0	.0	230.2	.0	24.8	6.6	4503.10
.19	.00	6.30	.00	.000	.016	.000	.000	4495.10	1012.62
.000982	19.	19.	19.	2	0	0	.00	70.69	1083.31

*SECNO 3700.000

3685 20 TRIALS ATTEMPTED WSEL,CWSEL

3693 PROBABLE MINIMUM SPECIFIC ENERGY

3720 CRITICAL DEPTH ASSUMED

3700.000	3.63	4502.01	4502.01	.00	4503.08	1.08	.02	.14	4504.60
1450.0	.0	1450.0	.0	.0	174.0	.0	24.9	6.6	4503.78
.19	.00	8.33	.00	.000	.016	.000	.000	4498.38	1006.20
.003080	11.	11.	11.	20	8	0	.00	81.03	1087.23

*SECNO 3710.000

3301 HV CHANGED MORE THAN HVINS

3710.000	4.40	4502.86	.00	.00	4503.18	.32	.02	.08	4504.90
1450.0	.0	1450.0	.0	.0	318.4	.0	24.9	6.6	4503.93
.19	.00	4.55	.00	.000	.035	.000	.000	4498.46	1004.82
.001992	10.	10.	10.	3	0	0	.00	83.77	1088.58

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 3794.000									
3794.000	4.15	4503.02	.00	.00	4503.37	.35	.18	.01	4505.90
1450.0	.0	1450.0	.0	.0	307.0	.0	25.5	6.8	4505.36
.20	.00	4.72	.00	.000	.035	.000	.000	4498.87	1007.35
.002273	84.	84.	84.	2	0	0	.00	84.52	1091.86
*SECNO 3875.000									
3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.62									
3875.000	3.69	4502.99	.00	.00	4503.54	.54	.11	.06	4507.20
1450.0	.0	1450.0	.0	.0	245.5	.0	26.1	6.9	4507.02
.20	.00	5.91	.00	.000	.016	.000	.000	4499.30	1009.17
.000866	81.	81.	81.	2	0	0	.00	75.72	1084.89
*SECNO 3893.000									
3893.000	3.58	4502.90	.00	.00	4503.60	.70	.02	.05	4507.40
1450.0	.0	1450.0	.0	.0	216.7	.0	26.1	7.0	4507.32
.20	.00	6.69	.00	.000	.016	.000	.000	4499.32	1011.22
.001196	18.	18.	18.	2	0	0	.00	70.75	1081.98
*SECNO 3900.000									
3685 20 TRIALS ATTEMPTED WSEL,CWSEL									
3693 PROBABLE MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
3900.000	3.64	4505.44	4505.44	.00	4506.51	1.07	.01	.11	4507.40
1450.0	.0	1450.0	.0	.0	174.7	.0	26.2	7.0	4507.44
.20	.00	8.30	.00	.000	.016	.000	.000	4501.80	1005.17
.003100	7.	7.	7.	20	5	0	.00	82.05	1087.22
*SECNO 3910.000									
3301 HV CHANGED MORE THAN HVINS									
3910.000	4.45	4506.29	.00	.00	4506.61	.32	.03	.07	4507.50
1450.0	.0	1450.0	.0	.0	317.2	.0	26.2	7.0	4507.60
.20	.00	4.57	.00	.000	.035	.000	.000	4501.84	1003.31
.002060	10.	10.	10.	3	0	0	.00	85.24	1088.55

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 3955.000									
3955.000	4.22	4506.36	.00	.00	4506.72	.37	.10	.01	4508.30
1450.0	.0	1450.0	.0	.0	297.7	.0	26.6	7.1	4508.64
.21	.00	4.87	.00	.000	.035	.000	.000	4502.14	1005.40
.002438	45.	45.	45.	2	0	0	.00	82.50	1087.89
*SECNO 3999.000									
3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.93									
3999.000	4.07	4506.35	.00	.00	4506.80	.45	.05	.03	4509.30
1450.0	.0	1450.0	.0	.0	268.2	.0	26.8	7.2	4510.52
.21	.00	5.41	.00	.000	.016	.000	.000	4502.28	1006.97
.000654	44.	44.	44.	2	0	0	.00	76.32	1083.29
*SECNO 4017.000									
4017.000	3.57	4506.23	.00	.00	4506.87	.64	.01	.06	4510.10
1450.0	.0	1450.0	.0	.0	225.1	.0	26.9	7.2	4510.94
.21	.00	6.44	.00	.000	.016	.000	.000	4502.66	1008.84
.001080	18.	18.	18.	2	0	0	.00	72.00	1080.84
*SECNO 4025.000									
3685 20 TRIALS ATTEMPTED WSEL,CWSEL									
3693 PROBABLE MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
4025.000	3.63	4508.06	4508.06	.00	4509.14	1.08	.01	.13	4510.10
1450.0	.0	1450.0	.0	.0	174.1	.0	27.0	7.2	4510.94
.21	.00	8.33	.00	.000	.016	.000	.000	4504.43	1004.48
.003091	8.	8.	8.	20	5	0	.00	81.18	1085.66
*SECNO 4036.000									
3301 HV CHANGED MORE THAN HVINS									
4036.000	4.37	4508.90	.00	.00	4509.24	.34	.03	.07	4510.40
1450.0	.0	1450.0	.0	.0	311.1	.0	27.0	7.2	4511.06
.21	.00	4.66	.00	.000	.035	.000	.000	4504.53	1003.50
.002159	11.	11.	11.	3	0	0	.00	84.04	1087.54

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4055.000

4055.000	3.97	4508.88	.00	.00	4509.34	.46	.06	.04	4510.70
1450.0	.0	1404.6	45.4	.0	253.9	15.4	27.2	7.3	4505.36
.21	.00	5.53	2.94	.000	.035	.040	.000	4504.91	1005.03
.003261	24.	24.	24.	2	0	0	.00	81.74	1086.77

CCHV= .300 CEHV= .500

*SECNO 4092.000

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4511.60 ELREA= 4511.66

4092.000	3.36	4508.93	.00	.00	4509.57	.64	.14	.09	4511.60
1450.0	.0	1450.0	.0	.0	225.8	.0	27.4	7.3	4511.66
.21	.00	6.42	.00	.000	.035	.000	.000	4505.57	1008.76
.006193	50.	32.	10.	2	0	0	.00	83.93	1092.68

SPECIAL CULVERT

SC	CUNO	CUNV	ENTLC	COPQ	RDLEN	RISE	SPAN	CULVLN	CHRT	SCL	ELCHU	ELCHD
	4	.012	.20	2.90	100.00	4.00	12.00	120.00	11	2	4506.00	4504.44

CHA... 11 - BOX CULVERT; SKEWED HEADWALL; CHAMFERED OR BEVELED INLET EDGES
SCALE 2 - HEADWALL SKEWED 30 DEGREES; INLET EDGES CHAMFERED 3/4-INCH

*SECNO 4211.000

SPECIAL CULVERT INLET CONTROL
EGIC = 4511.247 EGOC = 4510.252 PCWSE= 4508.929 ELTRD= 4515.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.19

SPECIAL CULVERT

EGIC	EGOC	H4	QWEIR	QCULV	VCH	ACULV	ELTRD	WEIRLN
4511.25	4510.25	1.68	0.	1450.	3.911	192.0	4515.00	0.

3495 OVERBANK AREA ASSUMED NON-EFFECTIVE, ELLEA= 4511.90 ELREA= 4514.35

4211.000	5.02	4511.01	.00	.00	4511.25	.24	1.68	.00	4511.90
1450.0	.0	1450.0	.0	.0	370.7	.0	28.2	7.6	4514.35
.22	.00	3.91	.00	.000	.035	.000	.000	4505.99	1003.17
.001296	125.	125.	125.	2	0	0	.00	88.84	1092.01

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4230.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.60

4230.000	4.84	4510.95	.00	.00	4511.33	.39	.01	.07	4516.50
1450.0	.0	1450.0	.0	.0	291.1	.0	28.3	7.6	4516.00
.22	.00	4.98	.00	.000	.016	.000	.000	4506.11	1017.24
.000503	1.	13.	25.	2	0	0	.00	77.12	1094.36

CCHV= .100 CEHV= .300
*SECNO 4242.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4242.000	3.50	4513.50	4513.50	.00	4514.54	1.04	.01	.20	4516.50
1450.0	.0	1450.0	.0	.0	176.9	.0	28.4	7.6	4516.00
.22	.00	8.20	.00	.000	.016	.000	.000	4510.00	1010.83
.003211	12.	12.	12.	20	19	0	.00	87.40	1098.23

*SECNO 4252.000
3280 CROSS SECTION 4252.00 EXTENDED .74 FEET

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.75

4252.000	3.98	4514.34	.00	.00	4514.63	.28	.01	.08	4513.60
1450.0	.0	1450.0	.0	.0	339.5	.0	28.5	7.6	4516.18
.22	.00	4.27	.00	.000	.016	.000	.000	4510.36	1000.00
.000425	10.	10.	10.	3	0	0	.00	100.25	1100.25

*SECNO 4273.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = .36

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
4273.000	3.86	4514.25	.00	.00	4514.69	.44	.02	.05	4517.80
1450.0	.0	1450.0	.0	.0	272.6	.0	28.6	7.7	4517.28
.23	.00	5.32	.00	.000	.035	.000	.000	4510.39	1009.66
.003206	21.	21.	21.	2	0	0	.00	81.43	1091.09

*SECNO 4312.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.74

4312.000	3.66	4514.18	.00	.00	4514.82	.64	.07	.06	4519.90
1450.0	.0	1450.0	.0	.0	226.4	.0	28.8	7.8	4519.53
.23	.00	6.41	.00	.000	.016	.000	.000	4510.52	1011.10
.001058	39.	39.	39.	2	0	0	.00	71.70	1082.80

*SECNO 4334.000

4334.000	3.80	4514.35	.00	.00	4514.85	.50	.02	.01	4519.90
1450.0	.0	1450.0	.0	.0	254.3	.0	28.9	7.8	4519.20
.23	.00	5.70	.00	.000	.016	.000	.000	4510.55	1009.80
.000751	22.	22.	22.	2	0	0	.00	73.94	1083.74

*S 4347.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4347.000	3.61	4518.57	4518.57	.00	4519.66	1.10	.02	.18	4519.90
1450.0	.0	1450.0	.0	.0	172.4	.0	29.0	7.8	4522.26
.23	.00	8.41	.00	.000	.016	.000	.000	4514.96	1004.65
.003166	12.	12.	12.	20	11	0	.00	80.66	1085.32

*SECNO 4357.000

3301 HV CHANGED MORE THAN HVINS

4357.000	4.52	4519.47	.00	.00	4519.77	.29	.02	.08	4519.90
1450.0	.0	1450.0	.0	.0	333.3	.0	29.1	7.8	4520.49
.23	.00	4.35	.00	.000	.035	.000	.000	4514.95	1001.41
.001831	10.	10.	10.	3	0	0	.00	88.56	1089.97

"CNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST
*SECNO 4440.000									
4440.000	4.37	4519.62	.00	.00	4519.94	.31	.16	.01	4519.90
1450.0	.0	1450.0	.0	.0	322.2	.0	29.7	8.0	4520.85
.23	.00	4.50	.00	.000	.035	.000	.000	4515.25	1000.90
.002053	83.	83.	83.	2	0	0	.00	88.66	1089.56
*SECNO 4600.000									
4600.000	3.87	4519.93	.00	.00	4520.41	.47	.42	.05	4521.20
1450.0	.0	1450.0	.0	.0	262.4	.0	30.8	8.3	4521.84
.24	.00	5.53	.00	.000	.035	.000	.000	4516.06	1003.70
.003526	160.	160.	160.	0	0	0	.00	79.63	1083.33
*SECNO 4800.000									
4800.000	3.48	4520.68	.00	.00	4521.29	.62	.84	.04	4524.60
1450.0	.0	1450.0	.0	.0	230.2	.0	31.9	8.7	4522.70
.25	.00	6.30	.00	.000	.035	.000	.000	4517.20	1008.74
.005152	200.	200.	200.	2	0	0	.00	76.11	1084.86
*SECNO 4825.000									
33 RNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.35									
4825.000	3.64	4520.78	.00	.00	4521.34	.57	.05	.01	4524.90
1450.0	.0	1450.0	.0	.0	240.2	.0	32.0	8.7	4523.04
.25	.00	6.04	.00	.000	.016	.000	.000	4517.14	1008.75
.000933	25.	25.	25.	0	0	0	.00	75.89	1084.64
*SECNO 4845.000									
4845.000	3.38	4520.69	.00	.00	4521.41	.72	.02	.05	4525.40
1450.0	.0	1450.0	.0	.0	213.0	.0	32.1	8.7	4523.93
.25	.00	6.81	.00	.000	.016	.000	.000	4517.31	1009.89
.001355	20.	20.	20.	2	0	0	.00	74.52	1084.40
*SECNO 4850.000									
3685 20 TRIALS ATTEMPTED WSEL,CWSEL									
3693 PROBABLE MINIMUM SPECIFIC ENERGY									
3720 CRITICAL DEPTH ASSUMED									
4850.000	3.64	4522.65	4522.65	.00	4523.74	1.09	.01	.11	4525.50
1450.0	.0	1450.0	.0	.0	172.8	.0	32.2	8.8	4524.15
.25	.00	8.39	.00	.000	.016	.000	.000	4519.01	1006.96
.003157	5.	5.	5.	20	8	0	.00	81.03	1087.99

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4860.000

3301 HV CHANGED MORE THAN HVINS

4860.000	4.44	4523.52	.00	.00	4523.85	.33	.02	.08	4525.70
1450.0	.0	1450.0	.0	.0	315.8	.0	32.2	8.8	4524.59
.25	.00	4.59	.00	.000	.035	.000	.000	4519.08	1005.44
.002012	10.	10.	10.	3	0	0	.00	82.72	1088.16

*SECNO 4900.000

4900.000	4.21	4523.56	.00	.00	4523.96	.39	.09	.02	4527.30
1450.0	.0	1450.0	.0	.0	288.6	.0	32.5	8.8	4525.10
.26	.00	5.02	.00	.000	.035	.000	.000	4519.35	1007.75
.002590	40.	40.	40.	2	0	0	.00	79.62	1087.37

*SECNO 4925.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.13

4925.000	4.07	4523.58	.00	.00	4523.99	.41	.03	.00	4528.30
1450.0	.0	1450.0	.0	.0	283.5	.0	32.7	8.9	4525.43
.26	.00	5.11	.00	.000	.016	.000	.000	4519.51	1008.86
.000569	25.	25.	25.	2	0	0	.00	79.13	1087.99

*SECNO 4945.000

4945.000	4.01	4523.54	.00	.00	4524.02	.48	.01	.02	4528.90
1450.0	.0	1450.0	.0	.0	259.6	.0	32.8	8.9	4526.02
.26	.00	5.59	.00	.000	.016	.000	.000	4519.53	1012.01
.000704	20.	20.	20.	2	0	0	.00	74.49	1086.50

*SECNO 4950.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

4950.000	3.60	4525.05	4525.05	.00	4526.15	1.09	.01	.18	4528.90
1450.0	.0	1450.0	.0	.0	172.7	.0	32.8	8.9	4526.39
.26	.00	8.39	.00	.000	.016	.000	.000	4521.45	1007.20
.003198	5.	5.	5.	20	15	0	.00	81.54	1088.74

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 4960.000

3301 HV CHANGED MORE THAN HVINS

4960.000	4.49	4525.95	.00	.00	4526.25	.30	.02	.08	4528.90
1450.0	.0	1450.0	.0	.0	328.1	.0	32.9	9.0	4526.77
.26	.00	4.42	.00	.000	.035	.000	.000	4521.46	1005.16
.001841	10.	10.	10.	3	0	0	.00	85.02	1090.18

*SECNO 5000.000

5000.000	4.28	4525.98	.00	.00	4526.36	.37	.08	.02	4529.90
1450.0	.0	1450.0	.0	.0	295.4	.0	33.1	9.0	4528.18
.26	.00	4.91	.00	.000	.035	.000	.000	4521.70	1007.97
.002390	40.	40.	40.	2	0	0	.00	79.43	1087.40

*SECNO 5025.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.90

5025.000	3.91	4525.96	.00	.00	4526.40	.44	.03	.02	4530.50
1450.0	.0	1450.0	.0	.0	271.0	.0	33.3	9.1	4527.69
.26	.00	5.35	.00	.000	.016	.000	.000	4522.05	1008.93
.000660	25.	25.	25.	2	0	0	.00	79.17	1088.09

*SECNO 5045.000

5045.000	3.66	4525.87	.00	.00	4526.47	.59	.02	.05	4531.10
1450.0	.0	1450.0	.0	.0	234.3	.0	33.4	9.1	4528.66
.26	.00	6.19	.00	.000	.016	.000	.000	4522.21	1012.35
.000967	20.	20.	20.	2	0	0	.00	73.28	1085.63

*SECNO 5050.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5050.000	3.58	4527.66	4527.66	.00	4528.79	1.13	.01	.16	4531.30
1450.0	.0	1450.0	.0	.0	170.3	.0	33.4	9.1	4529.49
.26	.00	8.52	.00	.000	.016	.000	.000	4524.08	1008.38
.003212	5.	5.	5.	20	5	0	.00	79.11	1087.49

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5060.000

3301 HV CHANGED MORE THAN HVINS

5060.000	4.39	4528.55	.00	.00	4528.89	.34	.03	.08	4531.60
1450.0	.0	1450.0	.0	.0	307.7	.0	33.5	9.1	4529.02
.26	.00	4.71	.00	.000	.035	.000	.000	4524.16	1008.11
.002212	10.	10.	10.	3	0	0	.00	83.42	1091.54

*SECNO 5100.000

5100.000	4.33	4528.63	.00	.00	4528.99	.36	.09	.01	4531.90
1450.0	.0	1450.0	.0	.0	299.5	.0	33.8	9.2	4528.83
.27	.00	4.84	.00	.000	.035	.000	.000	4524.30	1009.24
.002438	40.	40.	40.	2	0	0	.00	84.05	1093.29

*SECNO 5125.000

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 2.22

5125.000	4.23	4528.65	.00	.00	4529.02	.37	.02	.00	4532.10
1450.0	.0	1450.0	.0	.0	299.0	.0	34.0	9.3	4529.74
.27	.00	4.85	.00	.000	.016	.000	.000	4524.42	1009.90
.00496	25.	25.	25.	2	0	0	.00	81.64	1091.55

*SECNO 5145.000

5145.000	4.21	4528.66	.00	.00	4529.03	.37	.01	.00	4532.20
1450.0	.0	1450.0	.0	.0	295.9	.0	34.1	9.3	4529.74
.27	.00	4.90	.00	.000	.016	.000	.000	4524.45	1010.06
.000513	20.	20.	20.	2	0	0	.00	81.64	1091.70

*SECNO 5150.000

3301 HV CHANGED MORE THAN HVINS

3685 20 TRIALS ATTEMPTED WSEL,CWSEL
3693 PROBABLE MINIMUM SPECIFIC ENERGY
3720 CRITICAL DEPTH ASSUMED

5150.000	3.33	4529.94	4529.94	.00	4530.94	1.00	.01	.19	4532.10
1450.0	.0	1450.0	.0	.0	180.7	.0	34.1	9.3	4531.01
.27	.00	8.03	.00	.000	.016	.000	.000	4526.61	1005.84
.003255	5.	5.	5.	20	15	0	.00	93.30	1099.14

SECNO	DEPTH	CWSEL	CRIWS	WSELK	EG	HV	HL	OLOSS	L-BANK ELEV
	QLOB	QCH	QROB	ALOB	ACH	AROB	VOL	TWA	R-BANK ELEV
TIME	VLOB	VCH	VROB	XNL	XNCH	XNR	WTN	ELMIN	SSTA
SLOPE	XLOBL	XLCH	XLOBR	ITRIAL	IDC	ICONT	CORAR	TOPWID	ENDST

*SECNO 5160.000

3301 HV CHANGED MORE THAN HVINS

3302 WARNING: CONVEYANCE CHANGE OUTSIDE OF ACCEPTABLE RANGE, KRATIO = 1.48

5160.000	4.27	4530.82	.00	.00	4531.04	.22	.02	.08	4532.10
1450.0	.0	1450.0	.0	.0	385.6	.0	34.2	9.3	4532.02
.27	.00	3.76	.00	.000	.035	.000	.000	4526.55	1003.81
.001478	10.	10.	10.	3	0	0	.00	109.19	1112.99

THIS RUN EXECUTED 17JUL00 09:29:47

****
HEC-2 WATER SURFACE PROFILES

Version 4.6.2; May 1991
****

NOTE- ASTERISK (*) AT LEFT OF CROSS-SECTION NUMBER INDICATES MESSAGE IN SUMMARY OF ERRORS LIST

BRANCH 3-100yr; AS-BUILT

SUMMARY PRINTOUT

	SECNO	Q	QLOB	QCH	QROB	VCH	CWSEL	SSTA	ENDST	AREA	DEPTH	EG
	1300.100	7000.00	629.13	4429.00	1941.87	9.33	4487.50	1024.98	1227.66	925.22	10.00	4488.54
	1300.200	7000.00	798.54	4203.66	1997.80	10.44	4487.61	1009.57	1201.43	850.60	9.61	4488.87
*	995.000	1450.00	.00	1450.00	.00	2.86	4488.96	1000.00	1137.00	507.58	4.50	4489.08
	1080.000	1450.00	.00	1450.00	.00	3.71	4488.98	1006.85	1112.52	391.08	4.46	4489.20
	1158.000	1450.00	.00	1450.00	.00	4.24	4489.05	1006.76	1109.24	341.89	3.75	4489.33
	41.000	1450.00	.00	1450.00	.00	4.73	4489.56	1005.55	1092.37	306.84	4.12	4489.91
	1300.000	1450.00	.00	1450.00	.00	3.62	4489.84	1005.00	1110.91	400.10	4.30	4490.05
	1330.000	1450.00	.00	1450.00	.00	3.41	4490.10	1007.26	1118.00	425.54	4.53	4490.28
	1590.000	1450.00	.00	1450.00	.00	3.46	4490.38	1009.06	1114.00	419.63	4.67	4490.57
	1830.000	1450.00	.00	1450.00	.00	3.65	4490.65	1006.90	1116.91	396.76	4.41	4490.86
	2070.000	1450.00	.00	1450.00	.00	4.01	4491.00	1009.37	1116.87	361.99	4.27	4491.25
	2313.000	1450.00	.00	1450.00	.00	3.93	4491.42	1009.26	1113.18	369.09	4.27	4491.66
	2540.000	1450.00	.00	1450.00	.00	4.20	4491.80	1008.77	1114.25	344.94	3.98	4492.08
	2650.000	1450.00	.00	1450.00	.00	5.54	4491.96	1004.53	1088.52	261.86	4.34	4492.44
*	2706.000	1450.00	.00	1450.00	.00	8.57	4491.94	1000.00	1042.25	169.25	4.00	4493.07
*	2927.000	1450.00	.00	1450.00	.00	5.45	4496.61	1000.00	1042.25	266.02	6.55	4497.07
	2990.000	1450.00	.00	1450.00	.00	3.93	4496.99	1000.65	1084.00	369.32	5.55	4497.23

	SECNO	Q	QLOB	QCH	QROB	VCH	CWSEL	SSTA	ENDST	AREA	DEPTH	EG
	3085.000	1450.00	.00	1450.00	.00	4.01	4497.12	1000.94	1096.77	361.94	4.60	4497.37
	3210.000	1450.00	.00	1450.00	.00	3.92	4497.30	1004.36	1097.49	370.03	4.86	4497.53
	3400.000	1450.00	.00	1450.00	.00	4.31	4497.55	1008.02	1093.74	336.19	4.63	4497.84
*	3427.000	1450.00	.00	1450.00	.00	4.41	4497.56	1003.64	1089.37	328.69	4.50	4497.86
	3447.000	1450.00	.00	1450.00	.00	4.24	4497.59	1005.26	1092.50	341.92	4.70	4497.87
*	3450.000	1450.00	.00	1450.00	.00	8.33	4497.22	1005.33	1088.50	174.09	3.54	4498.30
	3460.000	1450.00	.00	1450.00	.00	4.69	4498.06	1003.64	1091.51	308.98	4.09	4498.40
	3500.000	1450.00	.00	1450.00	.00	5.48	4498.09	1005.87	1086.62	264.80	3.64	4498.55
*	3601.000	1450.00	.00	1450.00	.00	7.79	4498.29	1010.06	1079.95	186.11	3.38	4499.23
*	3670.000	1450.00	.00	1450.00	.00	6.18	4498.82	1012.50	1083.93	234.48	3.75	4499.41
	3689.000	1450.00	.00	1450.00	.00	6.30	4498.82	1012.62	1083.31	230.17	3.72	4499.44
*	3700.000	1450.00	.00	1450.00	.00	8.33	4502.01	1006.20	1087.23	174.05	3.63	4503.08
	3710.000	1450.00	.00	1450.00	.00	4.55	4502.86	1004.82	1088.58	318.36	4.40	4503.18
	3794.000	1450.00	.00	1450.00	.00	4.72	4503.02	1007.35	1091.86	307.00	4.15	4503.37
*	3875.000	1450.00	.00	1450.00	.00	5.91	4502.99	1009.17	1084.89	245.49	3.69	4503.54
	3893.000	1450.00	.00	1450.00	.00	6.69	4502.90	1011.22	1081.98	216.73	3.58	4503.60
*	3900.000	1450.00	.00	1450.00	.00	8.30	4505.44	1005.17	1087.22	174.70	3.64	4506.51
	3910.000	1450.00	.00	1450.00	.00	4.57	4506.29	1003.31	1088.55	317.16	4.45	4506.61
	3955.000	1450.00	.00	1450.00	.00	4.87	4506.36	1005.40	1087.89	297.74	4.22	4506.72
*	3999.000	1450.00	.00	1450.00	.00	5.41	4506.35	1006.97	1083.29	268.19	4.07	4506.80
	4017.000	1450.00	.00	1450.00	.00	6.44	4506.23	1008.84	1080.84	225.13	3.57	4506.87
*	4025.000	1450.00	.00	1450.00	.00	8.33	4508.06	1004.48	1085.66	174.10	3.63	4509.14
	4036.000	1450.00	.00	1450.00	.00	4.66	4508.90	1003.50	1087.54	311.14	4.37	4509.24
	4055.000	1450.00	.00	1404.60	45.40	5.53	4508.88	1005.03	1086.77	269.32	3.97	4509.34
	4092.000	1450.00	.00	1450.00	.00	6.42	4508.93	1008.76	1092.68	225.84	3.36	4509.57
*	4211.000	1450.00	.00	1450.00	.00	3.91	4511.01	1003.17	1092.01	370.71	5.02	4511.25

	SECNO	Q	QLOB	QCH	QROB	VCH	CWSEL	SSTA	ENDST	AREA	DEPTH	EG
*	4230.000	1450.00	.00	1450.00	.00	4.98	4510.95	1017.24	1094.36	291.13	4.84	4511.33
*	4242.000	1450.00	.00	1450.00	.00	8.20	4513.50	1010.83	1098.23	176.85	3.50	4514.54
*	4252.000	1450.00	.00	1450.00	.00	4.27	4514.34	1000.00	1100.25	339.53	3.98	4514.63
*	4273.000	1450.00	.00	1450.00	.00	5.32	4514.25	1009.66	1091.09	272.59	3.86	4514.69
*	4312.000	1450.00	.00	1450.00	.00	6.41	4514.18	1011.10	1082.80	226.36	3.66	4514.82
	4334.000	1450.00	.00	1450.00	.00	5.70	4514.35	1009.80	1083.74	254.32	3.80	4514.85
*	4347.000	1450.00	.00	1450.00	.00	8.41	4518.57	1004.65	1085.32	172.38	3.61	4519.66
	4357.000	1450.00	.00	1450.00	.00	4.35	4519.47	1001.41	1089.97	333.28	4.52	4519.77
	4440.000	1450.00	.00	1450.00	.00	4.50	4519.62	1000.90	1089.56	322.17	4.37	4519.94
	4600.000	1450.00	.00	1450.00	.00	5.53	4519.93	1003.70	1083.33	262.43	3.87	4520.41
	4800.000	1450.00	.00	1450.00	.00	6.30	4520.68	1008.74	1084.86	230.21	3.48	4521.29
*	4825.000	1450.00	.00	1450.00	.00	6.04	4520.78	1008.75	1084.64	240.21	3.64	4521.34
	4845.000	1450.00	.00	1450.00	.00	6.81	4520.69	1009.89	1084.40	213.02	3.38	4521.41
*	4850.000	1450.00	.00	1450.00	.00	8.39	4522.65	1006.96	1087.99	172.80	3.64	4523.74
	4860.000	1450.00	.00	1450.00	.00	4.59	4523.52	1005.44	1088.16	315.84	4.44	4523.85
	4900.000	1450.00	.00	1450.00	.00	5.02	4523.56	1007.75	1087.37	288.58	4.21	4523.96
*	4925.000	1450.00	.00	1450.00	.00	5.11	4523.58	1008.86	1087.99	283.52	4.07	4523.99
	4945.000	1450.00	.00	1450.00	.00	5.59	4523.54	1012.01	1086.50	259.57	4.01	4524.02
*	4950.000	1450.00	.00	1450.00	.00	8.39	4525.05	1007.20	1088.74	172.72	3.60	4526.15
	4960.000	1450.00	.00	1450.00	.00	4.42	4525.95	1005.16	1090.18	328.09	4.49	4526.25
	5000.000	1450.00	.00	1450.00	.00	4.91	4525.98	1007.97	1087.40	295.39	4.28	4526.36
*	5025.000	1450.00	.00	1450.00	.00	5.35	4525.96	1008.93	1088.09	271.05	3.91	4526.40
	5045.000	1450.00	.00	1450.00	.00	6.19	4525.87	1012.35	1085.63	234.28	3.66	4526.47
*	5050.000	1450.00	.00	1450.00	.00	8.52	4527.66	1008.38	1087.49	170.27	3.58	4528.79
	5060.000	1450.00	.00	1450.00	.00	4.71	4528.55	1008.11	1091.54	307.70	4.39	4528.89
	5100.000	1450.00	.00	1450.00	.00	4.84	4528.63	1009.24	1093.29	299.52	4.33	4528.99

	SECNO	Q	QLOB	QCH	QROB	VCH	CWSEL	SSTA	ENDST	AREA	DEPTH	EG
*	5125.000	1450.00	.00	1450.00	.00	4.85	4528.65	1009.90	1091.55	299.03	4.23	4529.02
	5145.000	1450.00	.00	1450.00	.00	4.90	4528.66	1010.06	1091.70	295.91	4.21	4529.03
*	5150.000	1450.00	.00	1450.00	.00	8.03	4529.94	1005.84	1099.14	180.67	3.33	4530.94
*	5160.000	1450.00	.00	1450.00	.00	3.76	4530.82	1003.81	1112.99	385.56	4.27	4531.04

BR[illegible] 3-100yr; AS-BUILT

SUMMARY PRINTOUT TABLE 150

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	1300.100	.00	.00	.00	4477.50	7000.00	4487.50	.00	4488.54	31.57	9.33	925.22	1245.93
	1300.200	75.00	.00	.00	4478.00	7000.00	4487.61	.00	4488.87	37.67	10.44	850.60	1140.59
*	995.000	40.00	.00	.00	4484.46	1450.00	4488.96	.00	4489.08	7.99	2.86	507.58	512.83
	1080.000	85.00	.00	.00	4484.52	1450.00	4488.98	.00	4489.20	13.55	3.71	391.08	393.90
	1158.000	58.37	.00	.00	4485.30	1450.00	4489.05	.00	4489.33	20.33	4.24	341.89	321.56
	1241.000	82.82	4492.44	4490.44	4485.44	1450.00	4489.56	.00	4489.91	23.48	4.73	306.84	299.21
	1300.000	58.81	.00	.00	4485.54	1450.00	4489.84	.00	4490.05	12.60	3.62	400.10	408.48
	1330.000	200.00	.00	.00	4485.57	1450.00	4490.10	.00	4490.28	10.89	3.41	425.54	439.37
	1590.000	260.00	.00	.00	4485.71	1450.00	4490.38	.00	4490.57	10.72	3.46	419.63	442.87
	1830.000	240.00	.00	.00	4486.24	1450.00	4490.65	.00	4490.86	13.58	3.65	396.76	393.48
	2070.000	240.00	.00	.00	4486.73	1450.00	4491.00	.00	4491.25	17.85	4.01	361.99	343.15
	3.000	243.00	.00	.00	4487.15	1450.00	4491.42	.00	4491.66	16.04	3.93	369.09	362.01
	2540.000	227.00	.00	.00	4487.82	1450.00	4491.80	.00	4492.08	20.48	4.20	344.94	320.41
	2650.000	110.00	.00	.00	4487.62	1450.00	4491.96	.00	4492.44	37.95	5.54	261.86	235.37
*	2706.000	57.17	.00	.00	4487.93	1450.00	4491.94	.00	4493.07	80.67	8.57	169.25	161.44
*	2927.000	220.50	4515.00	4495.93	4490.06	1450.00	4496.61	.00	4497.07	20.07	5.45	266.02	323.65
	2990.000	63.00	.00	.00	4491.44	1450.00	4496.99	.00	4497.23	12.16	3.93	369.32	415.84
	3085.000	95.00	.00	.00	4492.52	1450.00	4497.12	.00	4497.37	15.44	4.01	361.94	369.01
	3210.000	115.00	.00	.00	4492.44	1450.00	4497.30	.00	4497.53	13.82	3.92	370.03	390.11
	3400.000	190.00	.00	.00	4492.92	1450.00	4497.55	.00	4497.84	17.15	4.31	336.19	350.16
*	3427.000	27.00	.00	.00	4493.06	1450.00	4497.56	.00	4497.86	3.86	4.41	328.69	738.30
	3447.000	20.00	.00	.00	4492.89	1450.00	4497.59	.00	4497.87	3.45	4.24	341.92	780.13
*	3450.000	3.00	.00	.00	4493.68	1450.00	4497.22	4497.22	4498.30	31.78	8.33	174.09	257.20
	3460.000	10.00	.00	.00	4493.97	1450.00	4498.06	.00	4498.40	23.40	4.69	308.98	299.77

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	3500.000	40.00	.00	.00	4494.45	1450.00	4498.09	.00	4498.55	35.10	5.48	264.80	244.74
*	3601.000	99.00	.00	.00	4494.91	1450.00	4498.29	.00	4499.23	93.40	7.79	186.11	150.04
*	3670.000	69.00	.00	.00	4495.07	1450.00	4498.82	.00	4499.41	9.35	6.18	234.48	474.21
	3689.000	19.00	.00	.00	4495.10	1450.00	4498.82	.00	4499.44	9.82	6.30	230.17	462.83
*	3700.000	11.00	.00	.00	4498.38	1450.00	4502.01	4502.01	4503.08	30.80	8.33	174.05	261.25
	3710.000	10.00	.00	.00	4498.46	1450.00	4502.86	.00	4503.18	19.92	4.55	318.36	324.89
	3794.000	84.00	.00	.00	4498.87	1450.00	4503.02	.00	4503.37	22.73	4.72	307.00	304.13
*	3875.000	81.00	.00	.00	4499.30	1450.00	4502.99	.00	4503.54	8.66	5.91	245.49	492.65
	3893.000	18.00	.00	.00	4499.32	1450.00	4502.90	.00	4503.60	11.96	6.69	216.73	419.23
*	3900.000	7.00	.00	.00	4501.80	1450.00	4505.44	4505.44	4506.51	31.00	8.30	174.70	260.44
	3910.000	10.00	.00	.00	4501.84	1450.00	4506.29	.00	4506.61	20.60	4.57	317.16	319.45
	3955.000	45.00	.00	.00	4502.14	1450.00	4506.36	.00	4506.72	24.38	4.87	297.74	293.67
*	3999.000	44.00	.00	.00	4502.28	1450.00	4506.35	.00	4506.80	6.54	5.41	268.19	567.20
	4017.000	18.00	.00	.00	4502.66	1450.00	4506.23	.00	4506.87	10.80	6.44	225.13	441.25
*	4025.000	8.00	.00	.00	4504.43	1450.00	4508.06	4508.06	4509.14	30.91	8.33	174.10	260.80
	4036.000	11.00	.00	.00	4504.53	1450.00	4508.90	.00	4509.24	21.59	4.66	311.14	312.05
	4055.000	24.00	.00	.00	4504.91	1450.00	4508.88	.00	4509.34	32.61	5.53	269.32	253.90
	4092.000	32.00	.00	.00	4505.57	1450.00	4508.93	.00	4509.57	61.93	6.42	225.84	184.25
*	4211.000	125.00	4515.00	4510.00	4505.99	1450.00	4511.01	.00	4511.25	12.96	3.91	370.71	402.85
*	4230.000	13.00	.00	.00	4506.11	1450.00	4510.95	.00	4511.33	5.03	4.98	291.13	646.35
*	4242.000	12.00	.00	.00	4510.00	1450.00	4513.50	4513.50	4514.54	32.11	8.20	176.85	255.88
*	4252.000	10.00	.00	.00	4510.36	1450.00	4514.34	.00	4514.63	4.25	4.27	339.53	703.26
*	4273.000	21.00	.00	.00	4510.39	1450.00	4514.25	.00	4514.69	32.06	5.32	272.59	256.11
*	4312.000	39.00	.00	.00	4510.52	1450.00	4514.18	.00	4514.82	10.58	6.41	226.36	445.75
	4334.000	22.00	.00	.00	4510.55	1450.00	4514.35	.00	4514.85	7.51	5.70	254.32	529.00
*	4347.000	12.00	.00	.00	4514.96	1450.00	4518.57	4518.57	4519.66	31.66	8.41	172.38	257.69

	SECNO	XLCH	ELTRD	ELLC	ELMIN	Q	CWSEL	CRIWS	EG	10*KS	VCH	AREA	.01K
	4357.000	10.00	.00	.00	4514.95	1450.00	4519.47	.00	4519.77	18.31	4.35	333.28	338.82
	4440.000	83.00	.00	.00	4515.25	1450.00	4519.62	.00	4519.94	20.53	4.50	322.17	320.02
	4600.000	160.00	.00	.00	4516.06	1450.00	4519.93	.00	4520.41	35.26	5.53	262.43	244.18
	4800.000	200.00	.00	.00	4517.20	1450.00	4520.68	.00	4521.29	51.52	6.30	230.21	202.01
*	4825.000	25.00	.00	.00	4517.14	1450.00	4520.78	.00	4521.34	9.33	6.04	240.21	474.70
	4845.000	20.00	.00	.00	4517.31	1450.00	4520.69	.00	4521.41	13.55	6.81	213.02	393.92
*	4850.000	5.00	.00	.00	4519.01	1450.00	4522.65	4522.65	4523.74	31.57	8.39	172.80	258.07
	4860.000	10.00	.00	.00	4519.08	1450.00	4523.52	.00	4523.85	20.12	4.59	315.84	323.27
	4900.000	40.00	.00	.00	4519.35	1450.00	4523.56	.00	4523.96	25.90	5.02	288.58	284.90
*	4925.000	25.00	.00	.00	4519.51	1450.00	4523.58	.00	4523.99	5.69	5.11	283.52	607.71
	4945.000	20.00	.00	.00	4519.53	1450.00	4523.54	.00	4524.02	7.04	5.59	259.57	546.39
*	4950.000	5.00	.00	.00	4521.45	1450.00	4525.05	4525.05	4526.15	31.98	8.39	172.72	256.40
	4960.000	10.00	.00	.00	4521.46	1450.00	4525.95	.00	4526.25	18.41	4.42	328.09	337.91
	5000.000	40.00	.00	.00	4521.70	1450.00	4525.98	.00	4526.36	23.90	4.91	295.39	296.62
*	5025.000	25.00	.00	.00	4522.05	1450.00	4525.96	.00	4526.40	6.60	5.35	271.05	564.33
	5045.000	20.00	.00	.00	4522.21	1450.00	4525.87	.00	4526.47	9.67	6.19	234.28	466.25
*	5050.000	5.00	.00	.00	4524.08	1450.00	4527.66	4527.66	4528.79	32.12	8.52	170.27	255.85
	5060.000	10.00	.00	.00	4524.16	1450.00	4528.55	.00	4528.89	22.12	4.71	307.70	308.27
	5100.000	40.00	.00	.00	4524.30	1450.00	4528.63	.00	4528.99	24.38	4.84	299.52	293.65
*	5125.000	25.00	.00	.00	4524.42	1450.00	4528.65	.00	4529.02	4.96	4.85	299.03	651.38
	5145.000	20.00	.00	.00	4524.45	1450.00	4528.66	.00	4529.03	5.13	4.90	295.91	640.01
*	5150.000	5.00	.00	.00	4526.61	1450.00	4529.94	4529.94	4530.94	32.55	8.03	180.67	254.14
*	5160.000	10.00	.00	.00	4526.55	1450.00	4530.82	.00	4531.04	14.78	3.76	385.56	377.17

BRA[illegible] 3-100yr; AS-BUILT

SUMMARY PRINTOUT TABLE 150

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	1300.100	7000.00	4487.50	.00	.00	.00	202.68	.00
	1300.200	7000.00	4487.61	.00	.11	.00	164.16	75.00
*	995.000	1450.00	4488.96	.00	1.35	.00	137.00	40.00
	1080.000	1450.00	4488.98	.00	.03	.00	105.68	85.00
	1158.000	1450.00	4489.05	.00	.06	.00	102.48	58.37
	1241.000	1450.00	4489.56	.00	.51	.00	86.82	82.82
	1300.000	1450.00	4489.84	.00	.28	.00	105.91	58.81
	1330.000	1450.00	4490.10	.00	.26	.00	110.74	200.00
	1590.000	1450.00	4490.38	.00	.28	.00	104.94	260.00
	1830.000	1450.00	4490.65	.00	.27	.00	110.01	240.00
	2070.000	1450.00	4491.00	.00	.34	.00	107.49	240.00
	3.000	1450.00	4491.42	.00	.42	.00	103.91	243.00
	2540.000	1450.00	4491.80	.00	.39	.00	105.48	227.00
	2650.000	1450.00	4491.96	.00	.16	.00	83.99	110.00
*	2706.000	1450.00	4491.94	.00	-.03	.00	42.25	57.17
*	2927.000	1450.00	4496.61	.00	4.67	.00	42.25	220.50
	2990.000	1450.00	4496.99	.00	.39	.00	83.35	63.00
	3085.000	1450.00	4497.12	.00	.12	.00	95.83	95.00
	3210.000	1450.00	4497.30	.00	.18	.00	93.13	115.00
	3400.000	1450.00	4497.55	.00	.26	.00	85.72	190.00
*	3427.000	1450.00	4497.56	.00	.01	.00	85.73	27.00
	3447.000	1450.00	4497.59	.00	.03	.00	87.24	20.00
*	3450.000	1450.00	4497.22	.00	-.37	.00	83.17	3.00
	3460.000	1450.00	4498.06	.00	.84	.00	87.87	10.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	3500.000	1450.00	4498.09	.00	.03	.00	80.75	40.00
*	3601.000	1450.00	4498.29	.00	.20	.00	69.89	99.00
*	3670.000	1450.00	4498.82	.00	.53	.00	71.43	69.00
	3689.000	1450.00	4498.82	.00	.00	.00	70.69	19.00
*	3700.000	1450.00	4502.01	.00	3.18	.00	81.03	11.00
	3710.000	1450.00	4502.86	.00	.86	.00	83.77	10.00
	3794.000	1450.00	4503.02	.00	.16	.00	84.52	84.00
*	3875.000	1450.00	4502.99	.00	-.03	.00	75.72	81.00
	3893.000	1450.00	4502.90	.00	-.09	.00	70.75	18.00
*	3900.000	1450.00	4505.44	.00	2.54	.00	82.05	7.00
	3910.000	1450.00	4506.29	.00	.84	.00	85.24	10.00
	3955.000	1450.00	4506.36	.00	.07	.00	82.50	45.00
*	3999.000	1450.00	4506.35	.00	-.01	.00	76.32	44.00
	4017.000	1450.00	4506.23	.00	-.12	.00	72.00	18.00
*	4025.000	1450.00	4508.06	.00	1.83	.00	81.18	8.00
	4036.000	1450.00	4508.90	.00	.84	.00	84.04	11.00
	4055.000	1450.00	4508.88	.00	-.03	.00	81.74	24.00
	4092.000	1450.00	4508.93	.00	.05	.00	83.93	32.00
*	4211.000	1450.00	4511.01	.00	2.08	.00	88.84	125.00
*	4230.000	1450.00	4510.95	.00	-.06	.00	77.12	13.00
*	4242.000	1450.00	4513.50	.00	2.55	.00	87.40	12.00
*	4252.000	1450.00	4514.34	.00	.85	.00	100.25	10.00
*	4273.000	1450.00	4514.25	.00	-.09	.00	81.43	21.00
*	4312.000	1450.00	4514.18	.00	-.07	.00	71.70	39.00
	4334.000	1450.00	4514.35	.00	.17	.00	73.94	22.00
*	4347.000	1450.00	4518.57	.00	4.22	.00	80.66	12.00

	SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
	4357.000	1450.00	4519.47	.00	.91	.00	88.56	10.00
	4440.000	1450.00	4519.62	.00	.15	.00	88.66	83.00
	4600.000	1450.00	4519.93	.00	.31	.00	79.63	160.00
	4800.000	1450.00	4520.68	.00	.75	.00	76.11	200.00
*	4825.000	1450.00	4520.78	.00	.10	.00	75.89	25.00
	4845.000	1450.00	4520.69	.00	-.08	.00	74.52	20.00
*	4850.000	1450.00	4522.65	.00	1.96	.00	81.03	5.00
	4860.000	1450.00	4523.52	.00	.87	.00	82.72	10.00
	4900.000	1450.00	4523.56	.00	.05	.00	79.62	40.00
*	4925.000	1450.00	4523.58	.00	.02	.00	79.13	25.00
	4945.000	1450.00	4523.54	.00	-.04	.00	74.49	20.00
*	4950.000	1450.00	4525.05	.00	1.51	.00	81.54	5.00
	4960.000	1450.00	4525.95	.00	.89	.00	85.02	10.00
	5000.000	1450.00	4525.98	.00	.03	.00	79.43	40.00
*	5025.000	1450.00	4525.96	.00	-.02	.00	79.17	25.00
	5045.000	1450.00	4525.87	.00	-.09	.00	73.28	20.00
*	5050.000	1450.00	4527.66	.00	1.79	.00	79.11	5.00
	5060.000	1450.00	4528.55	.00	.89	.00	83.42	10.00
	5100.000	1450.00	4528.63	.00	.08	.00	84.05	40.00
*	5125.000	1450.00	4528.65	.00	.02	.00	81.64	25.00
	5145.000	1450.00	4528.66	.00	.00	.00	81.64	20.00
*	5150.000	1450.00	4529.94	.00	1.29	.00	93.30	5.00
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SUMmARY OF ERRORS AND SPECIAL NOTES

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WARNING SECNO=   2927.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE

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CAUTION SECNO=   3450.000  PROFILE=  1  CRITICAL DEPTH ASSUMED
CAUTION SECNO=   3450.000  PROFILE=  1  PROBABLE MINIMUM SPECIFIC ENERGY
CAUTION SECNO=   3450.000  PROFILE=  1  20 TRIALS ATTEMPTED TO BALANCE WSEL

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WARNING SECNO=   4825.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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WARNING SECNO=   5160.000  PROFILE=  1  CONVEYANCE CHANGE OUTSIDE ACCEPTABLE RANGE
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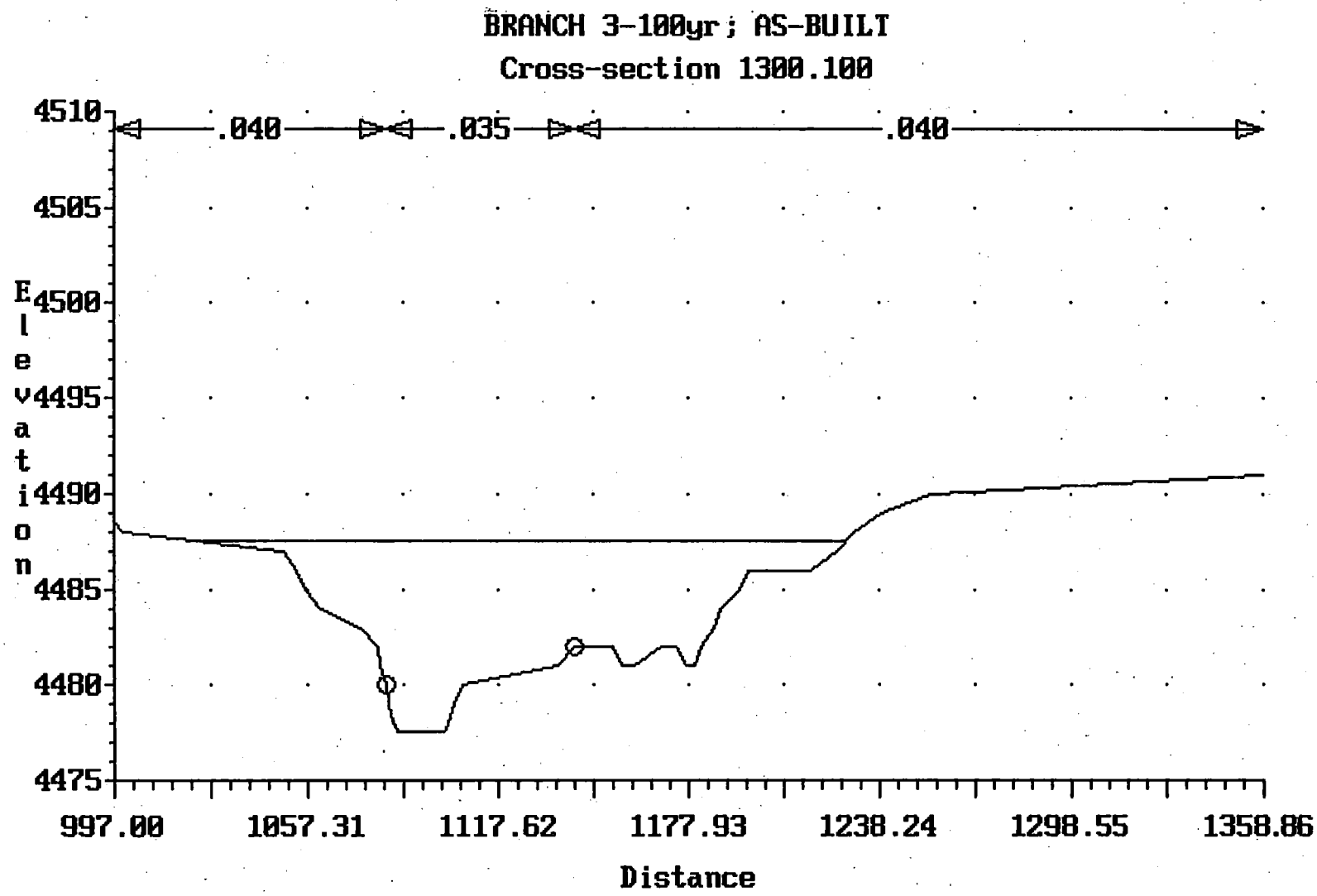
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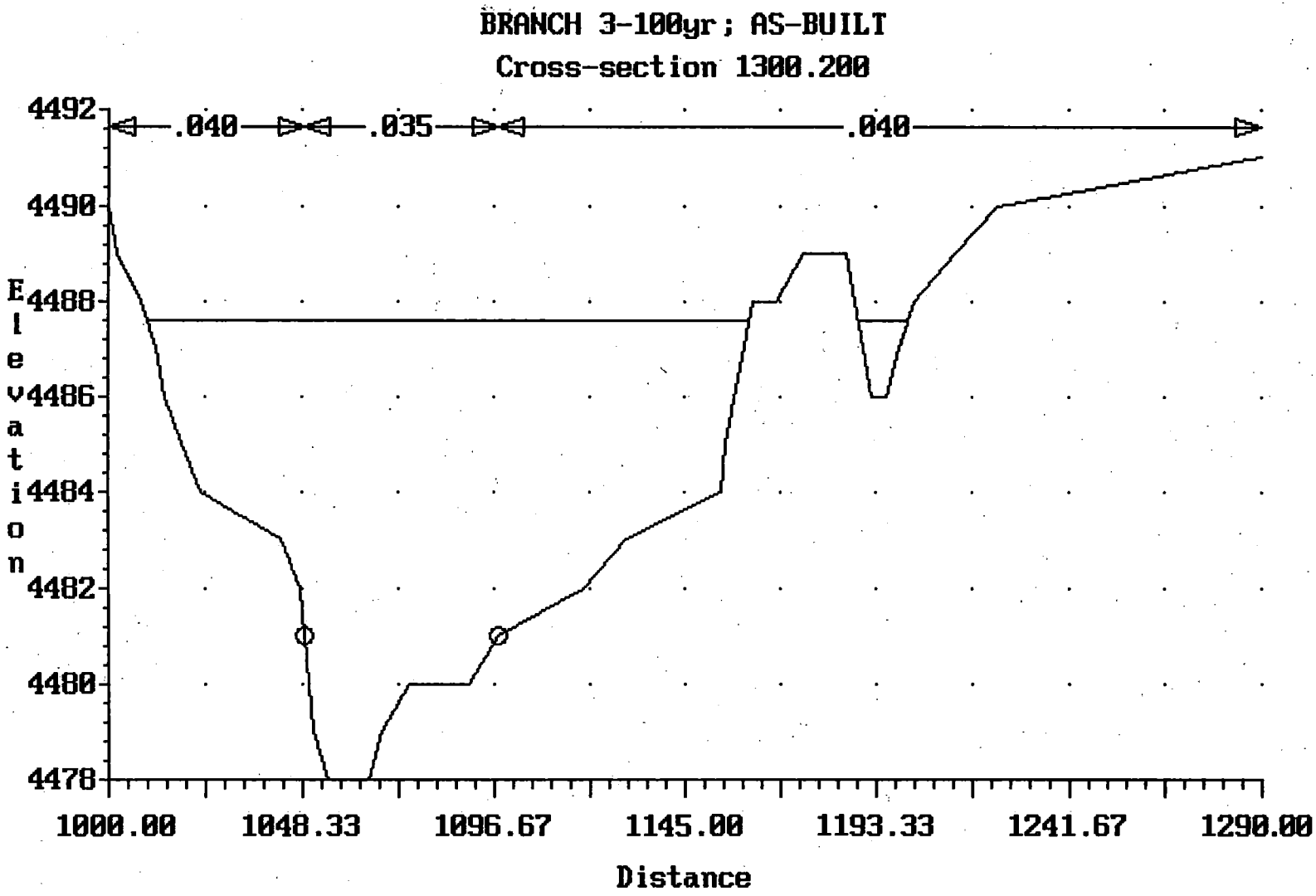
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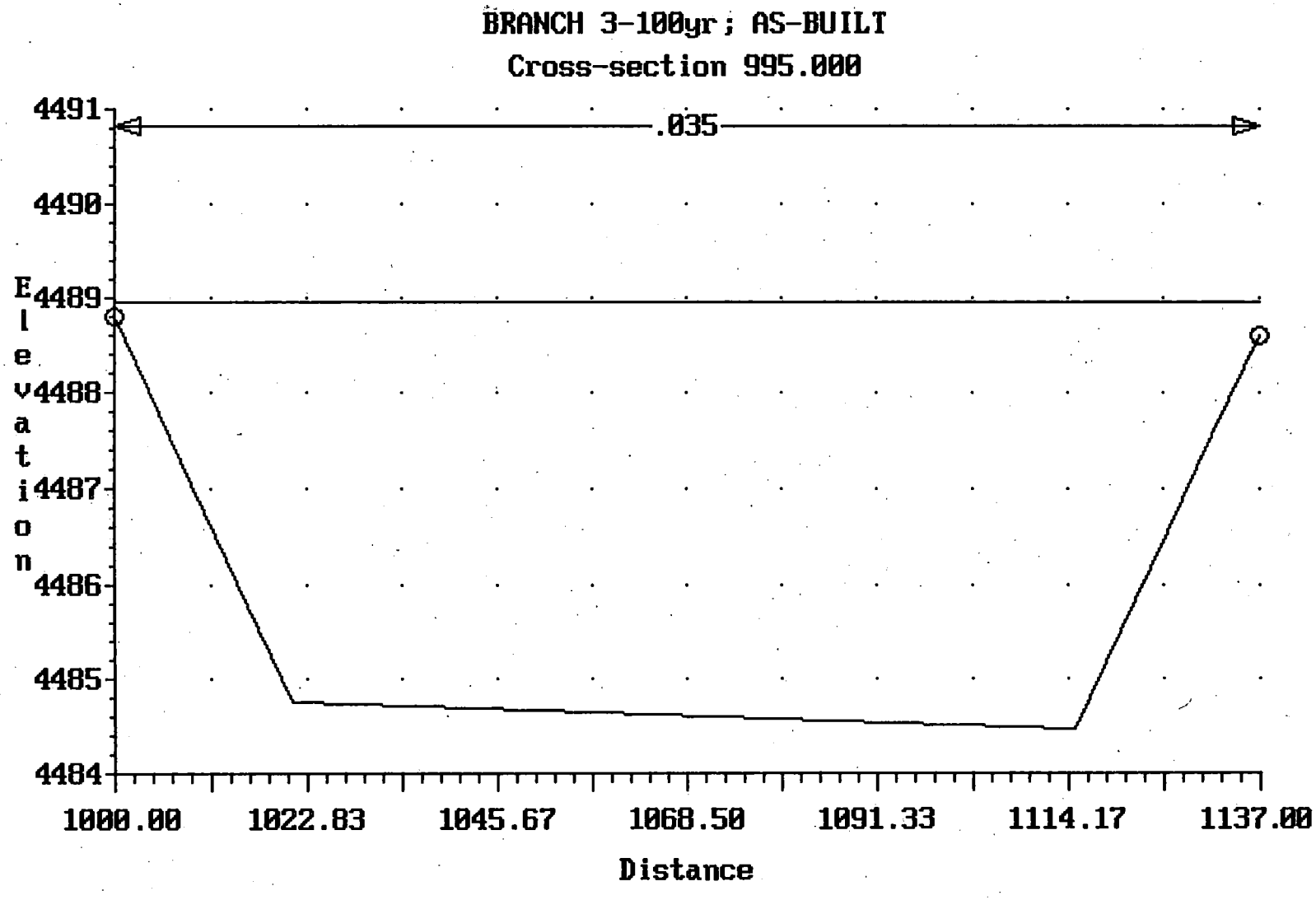
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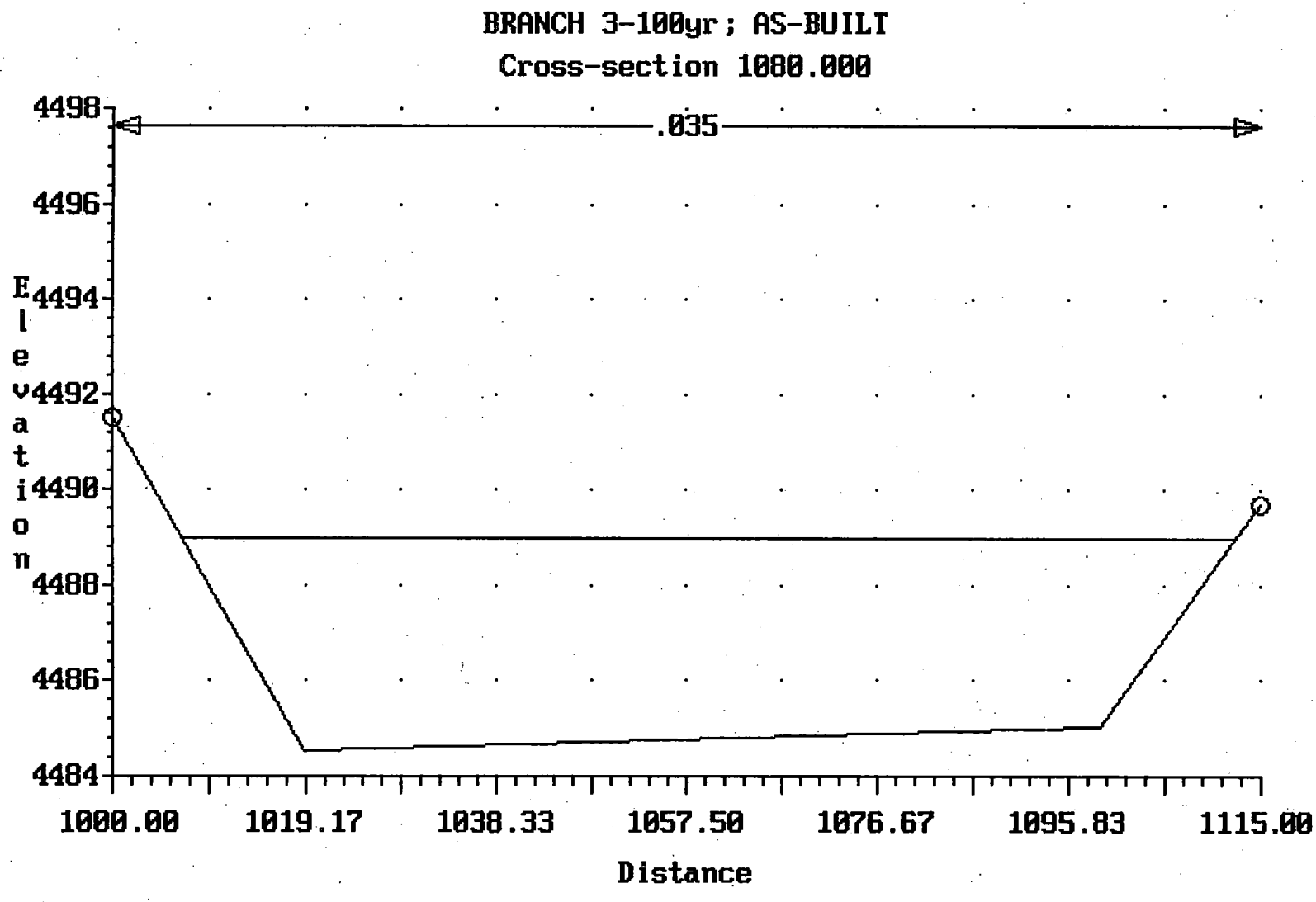
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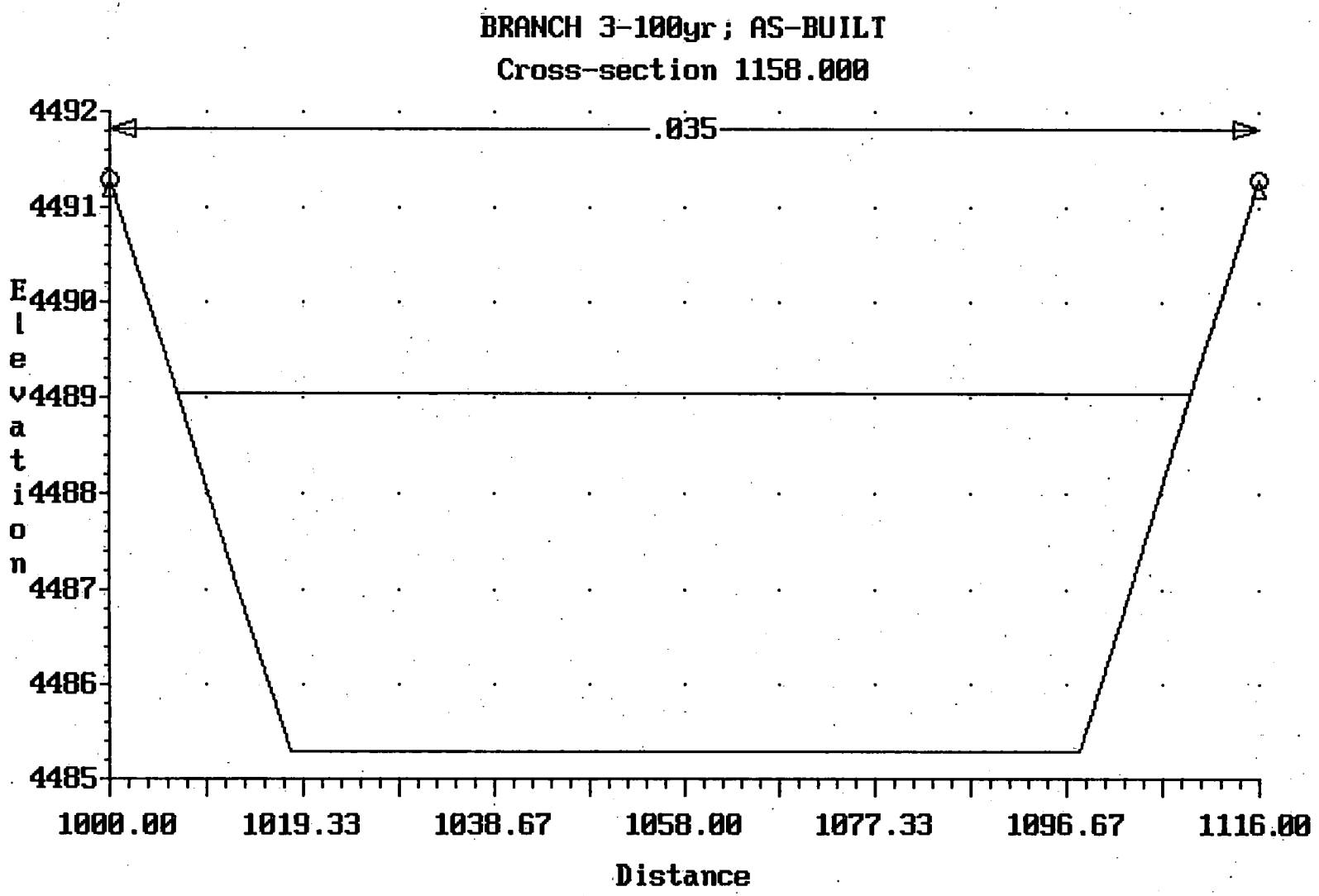
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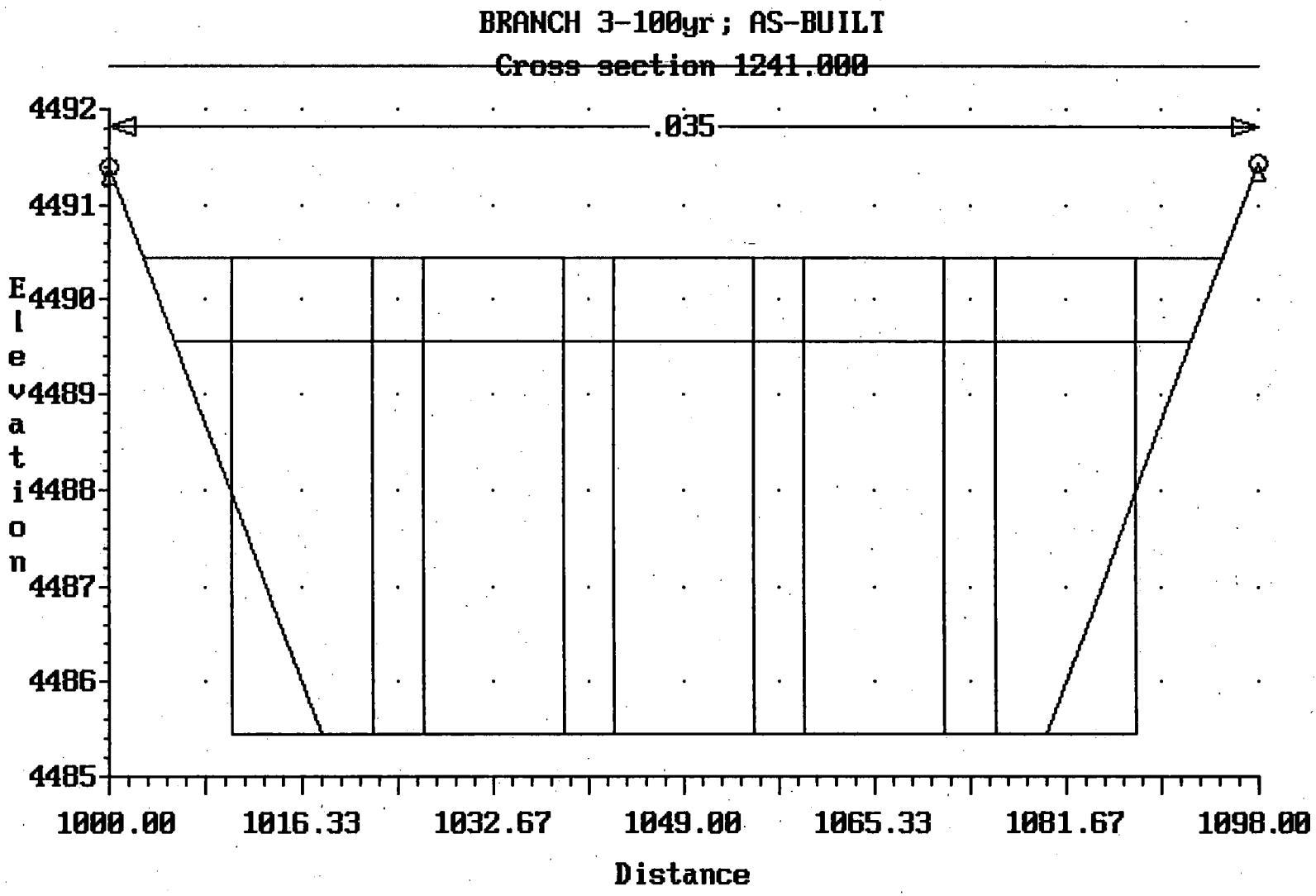
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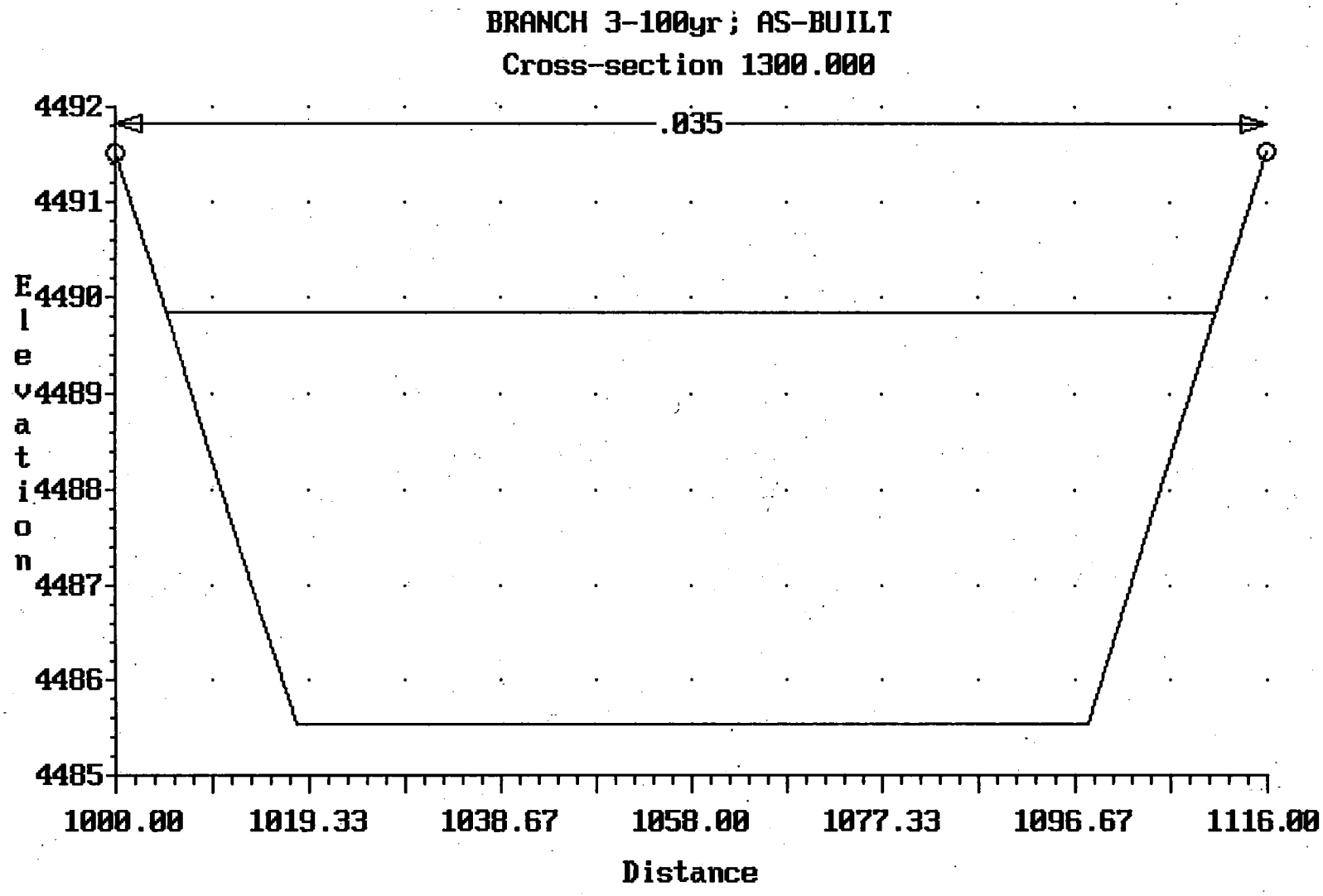
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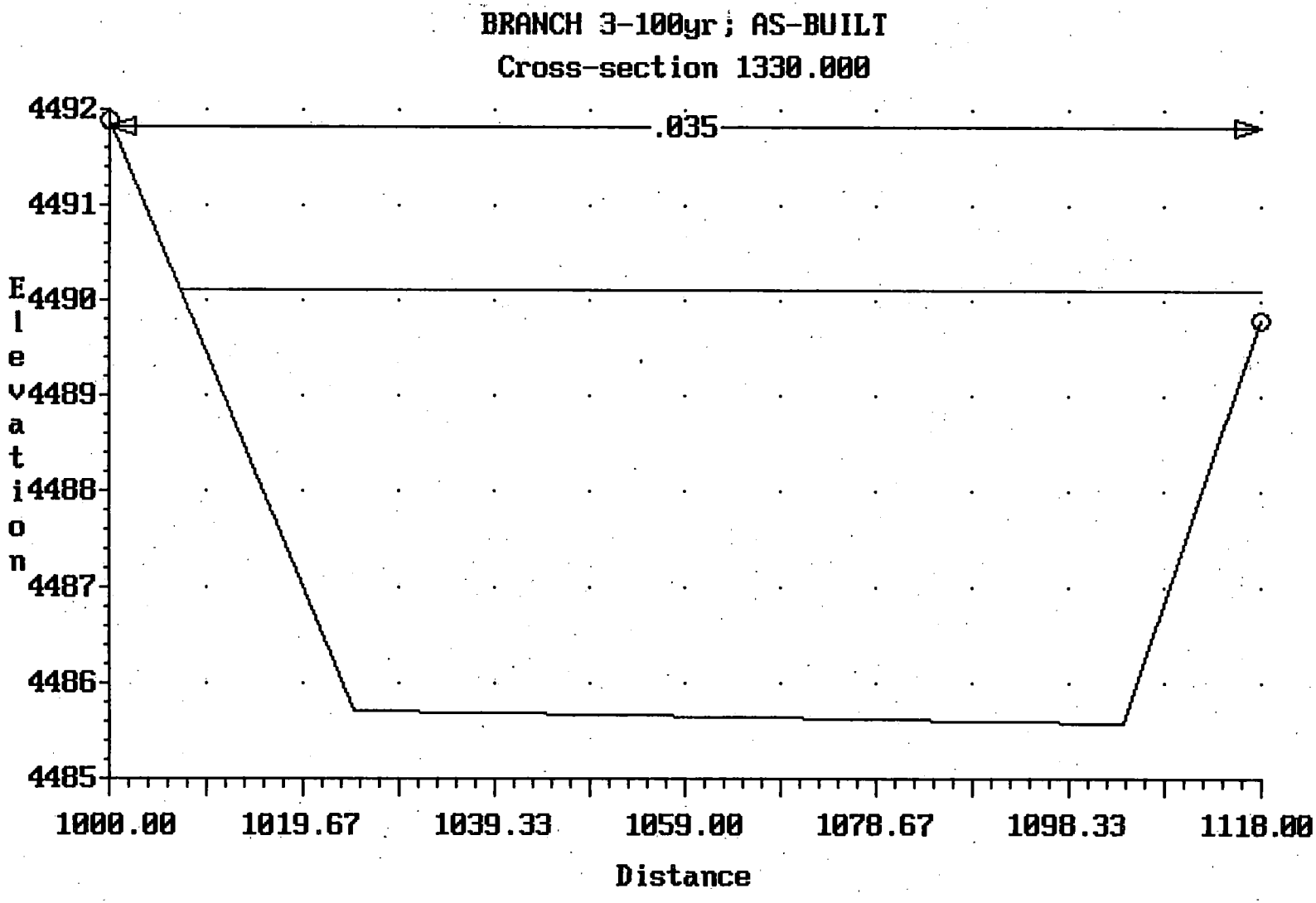
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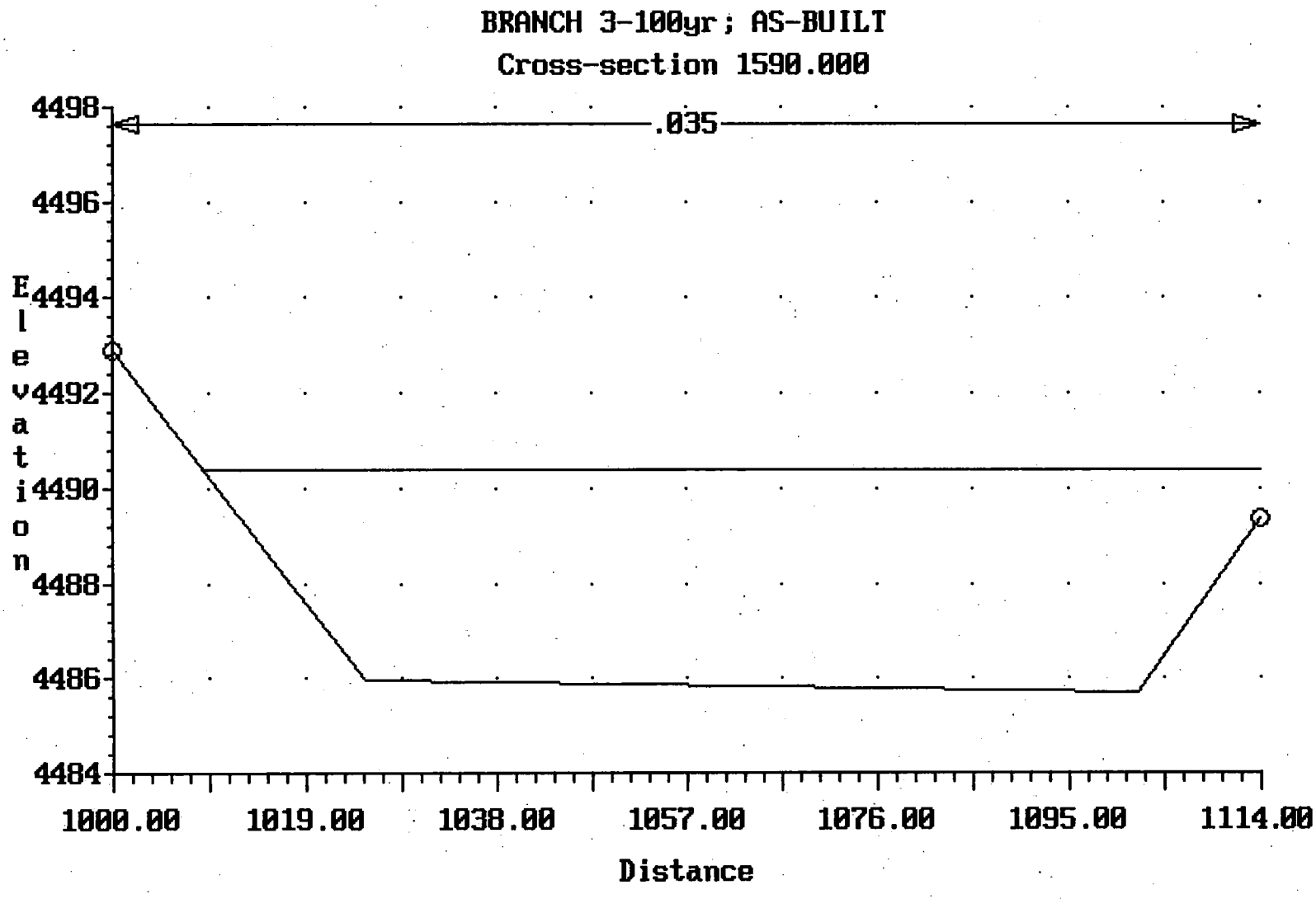
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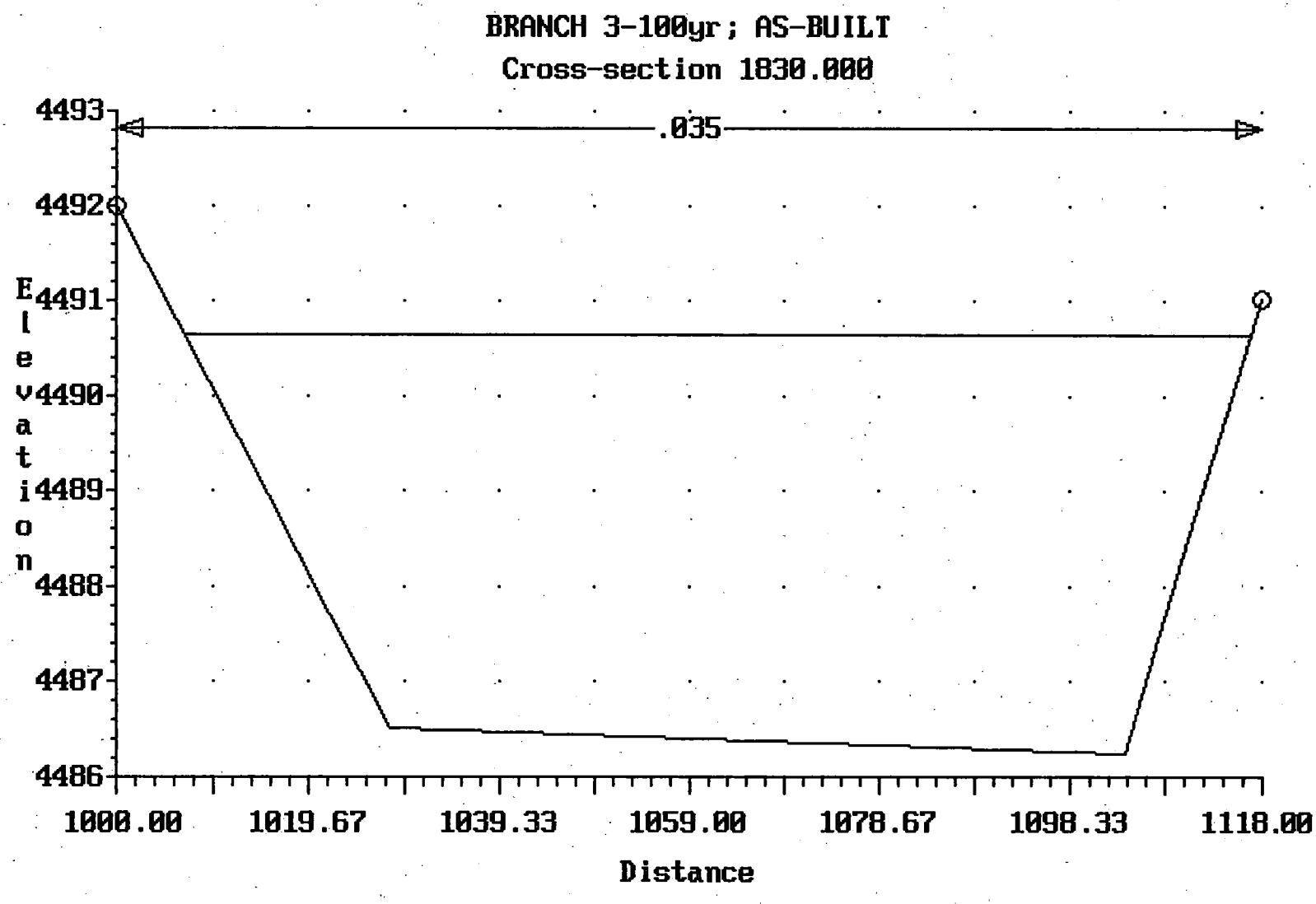
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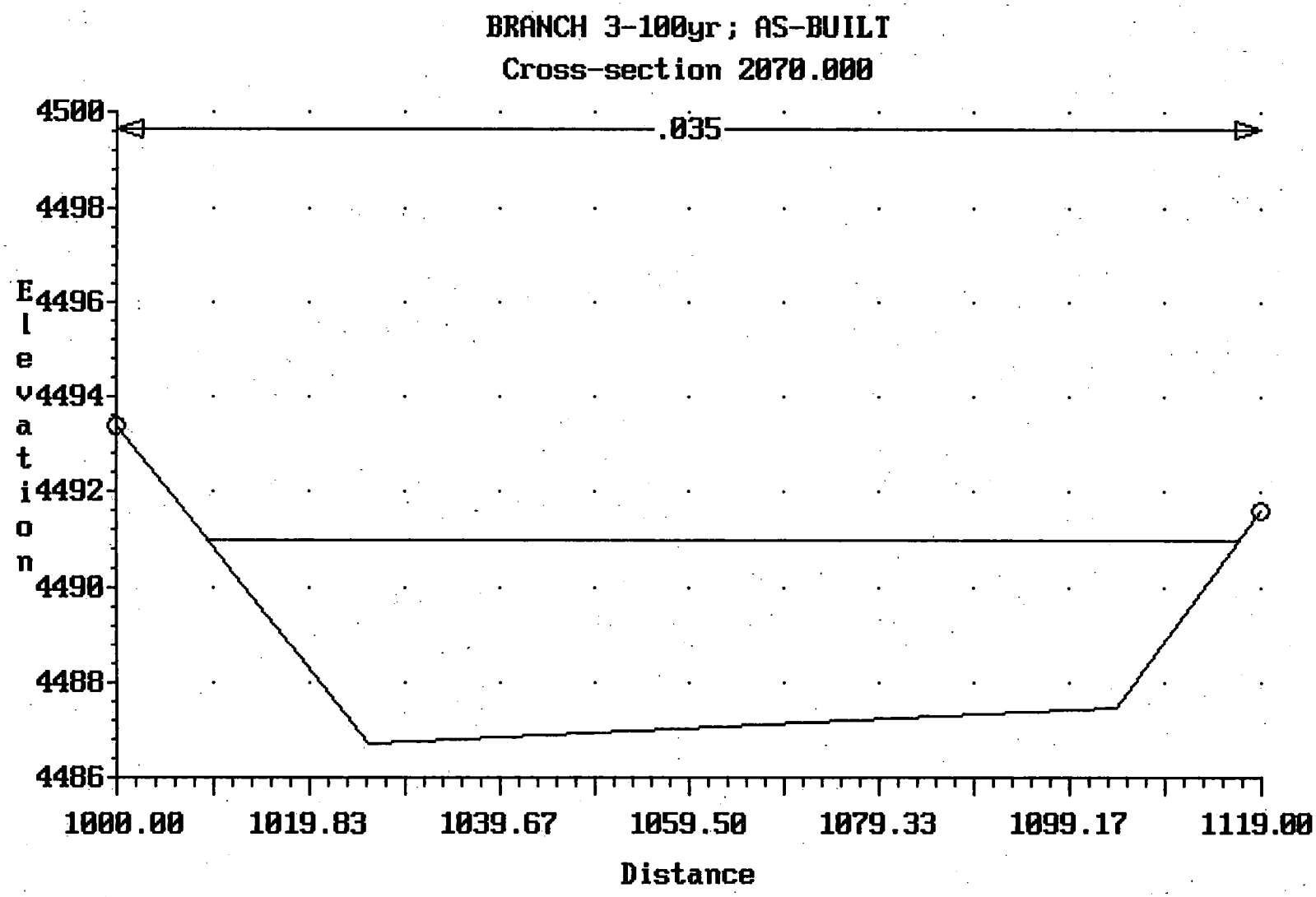
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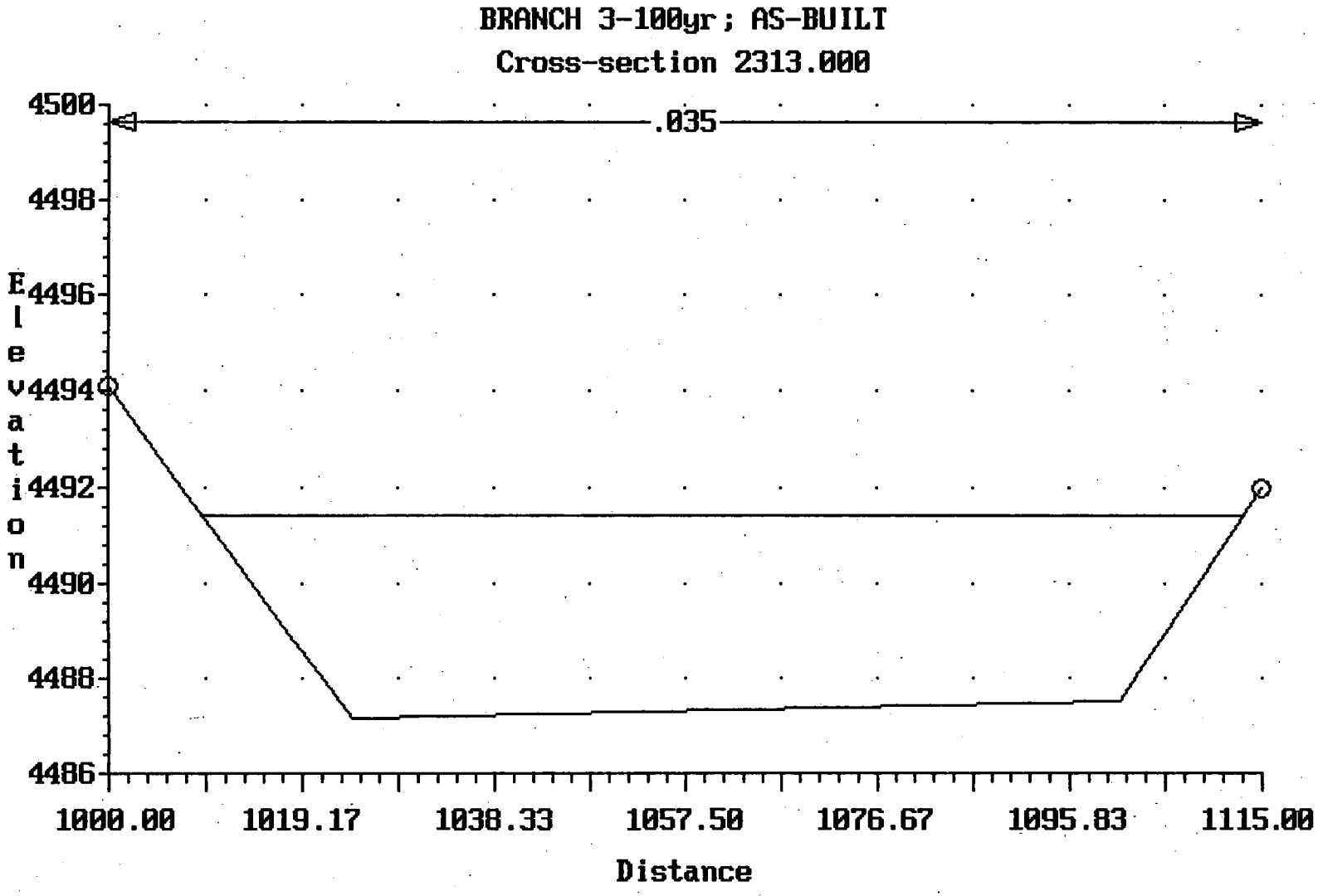
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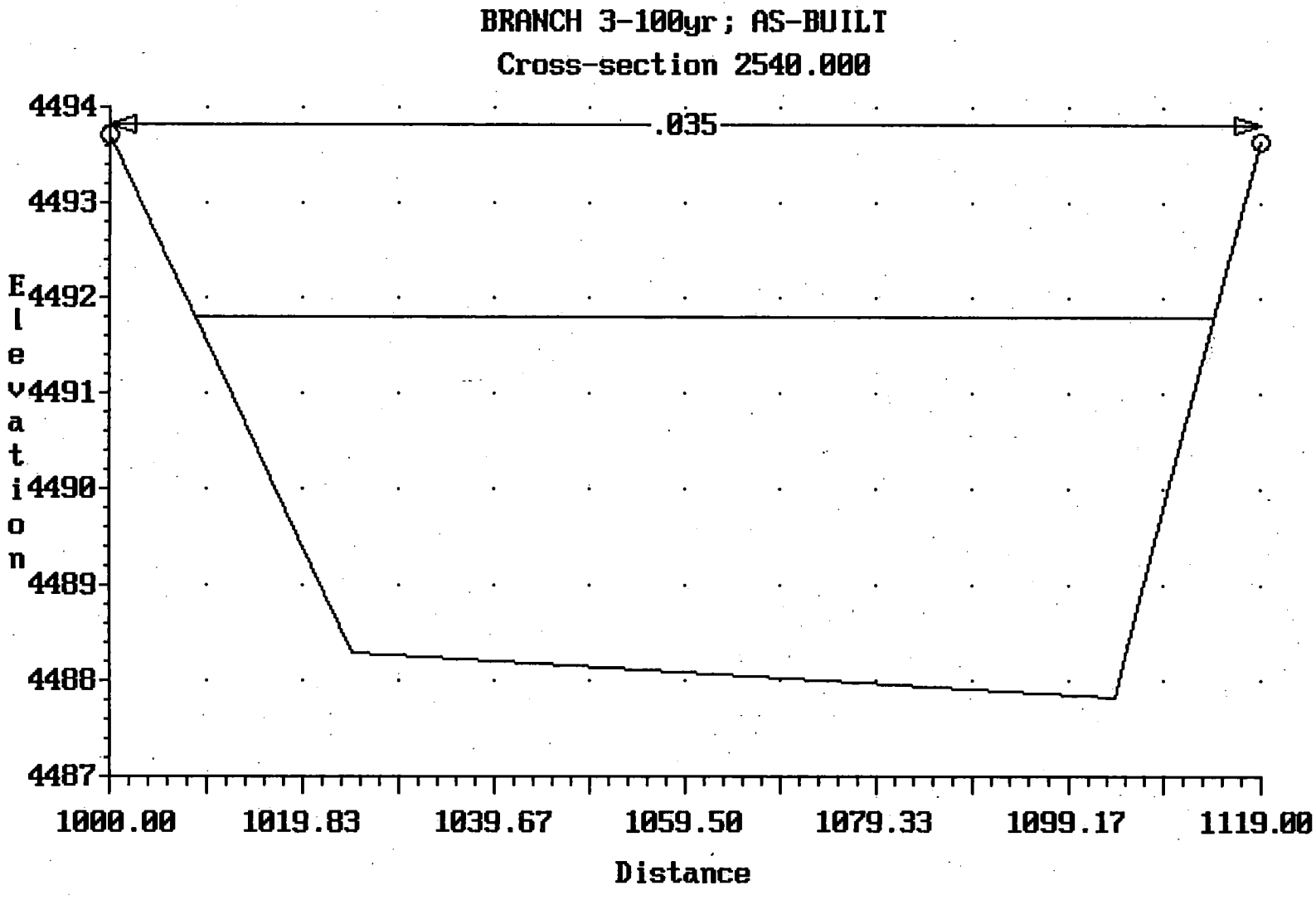
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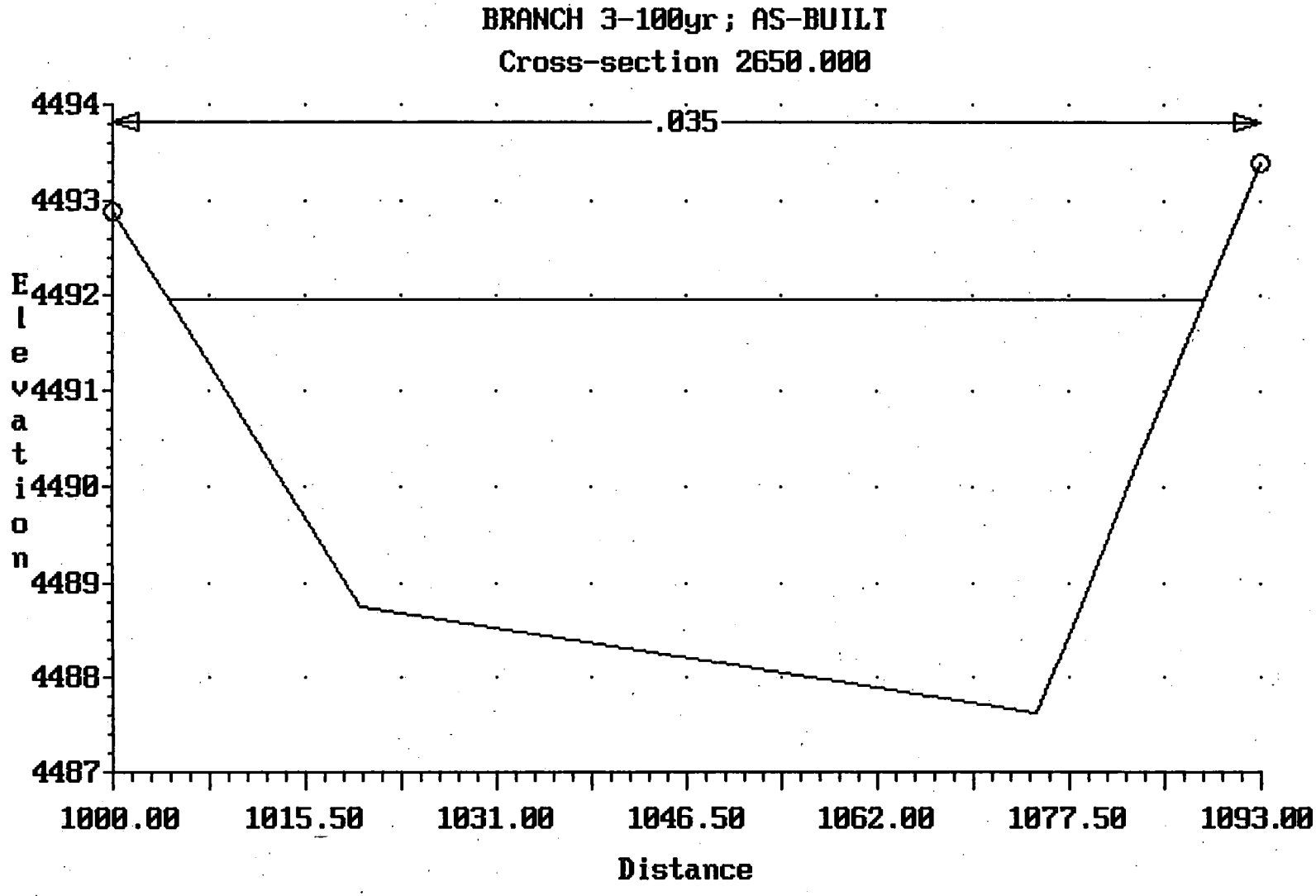
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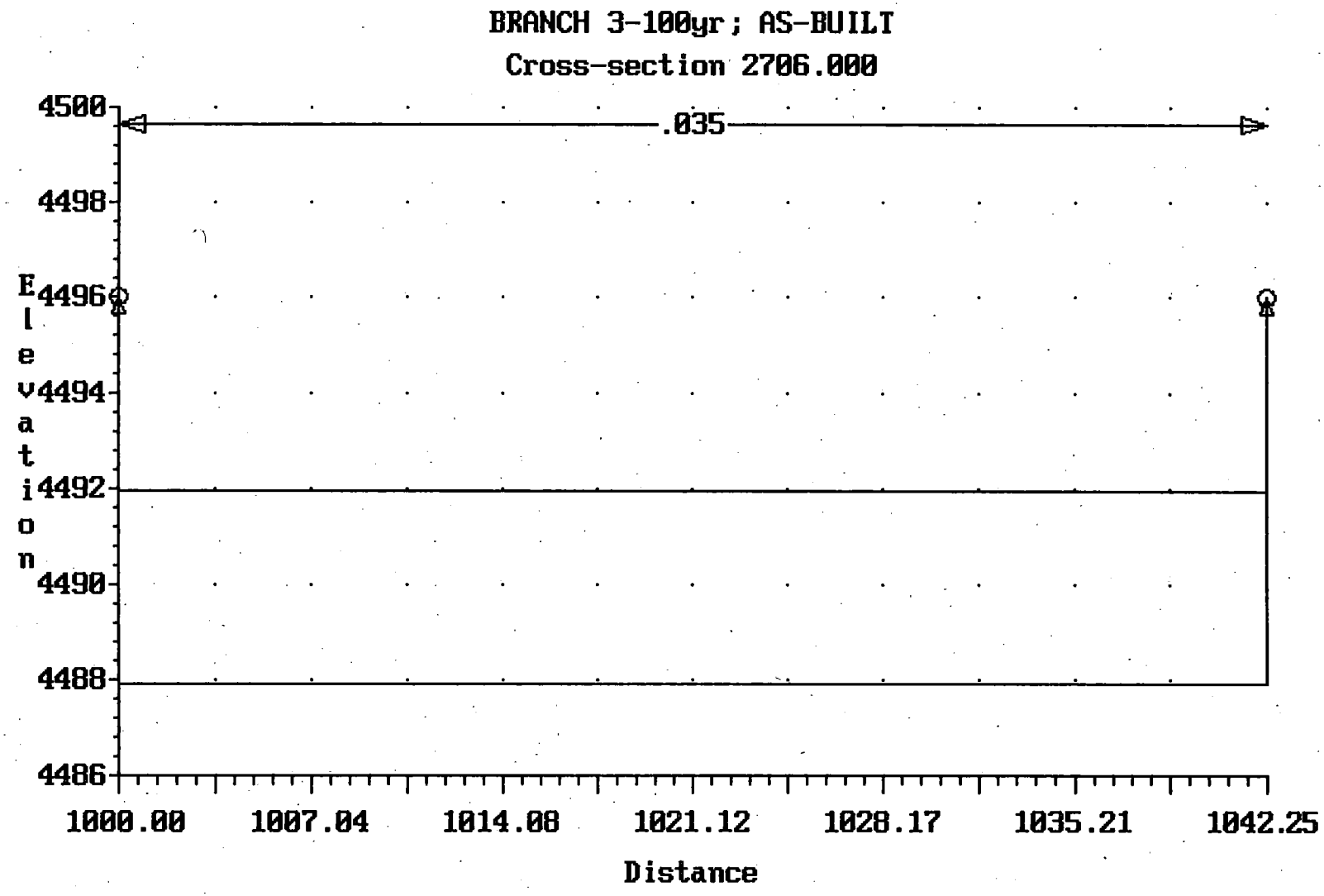
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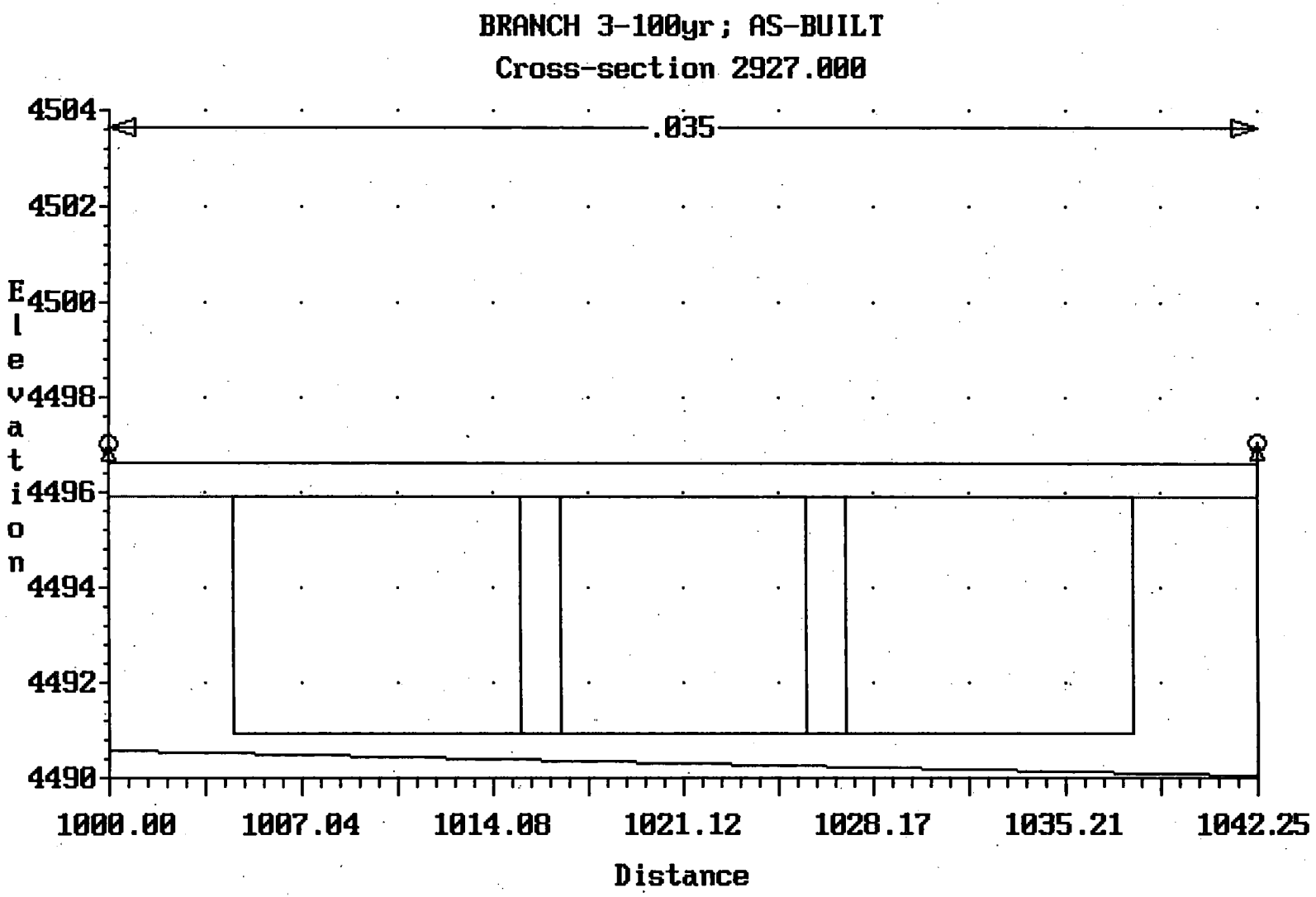
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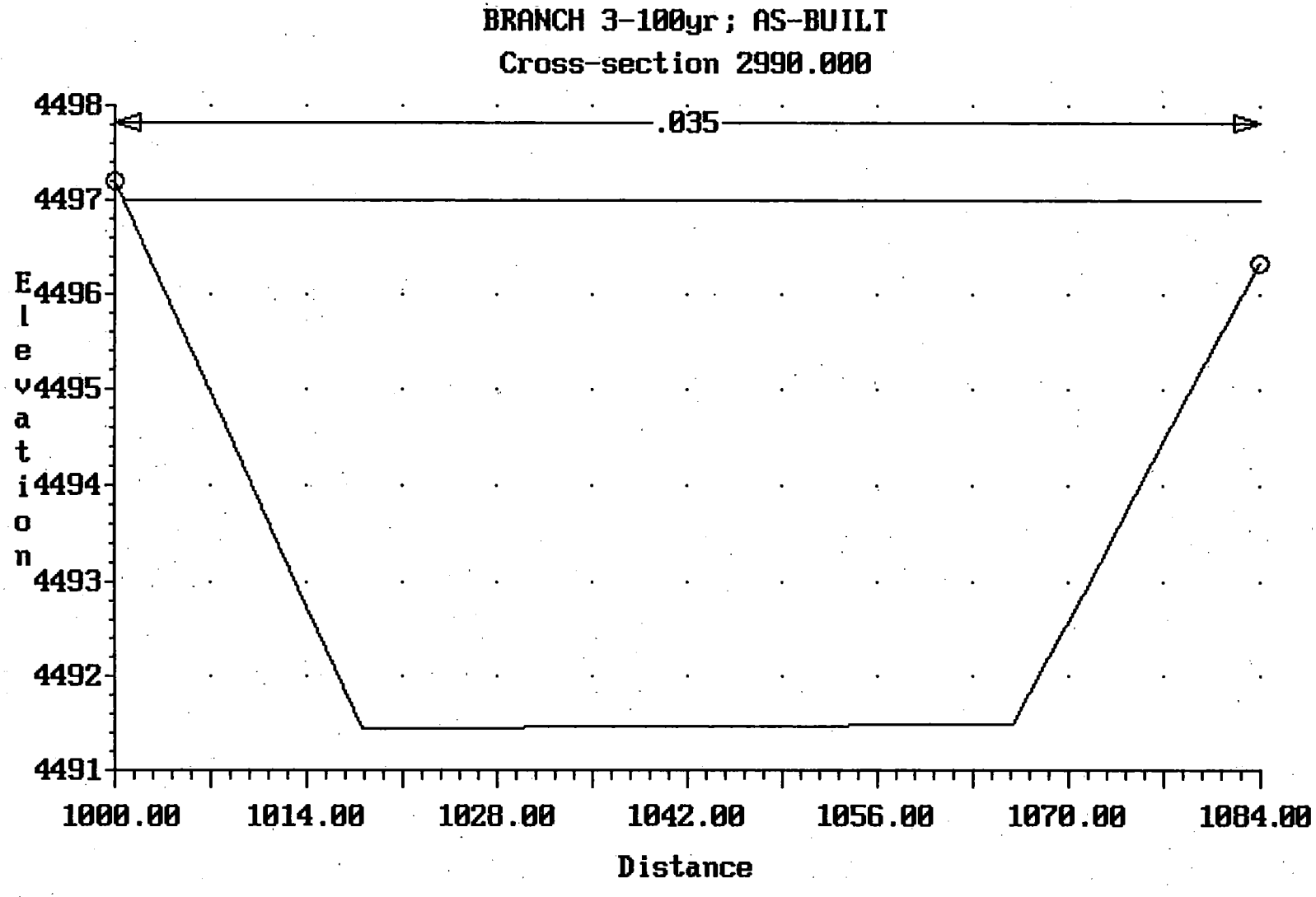
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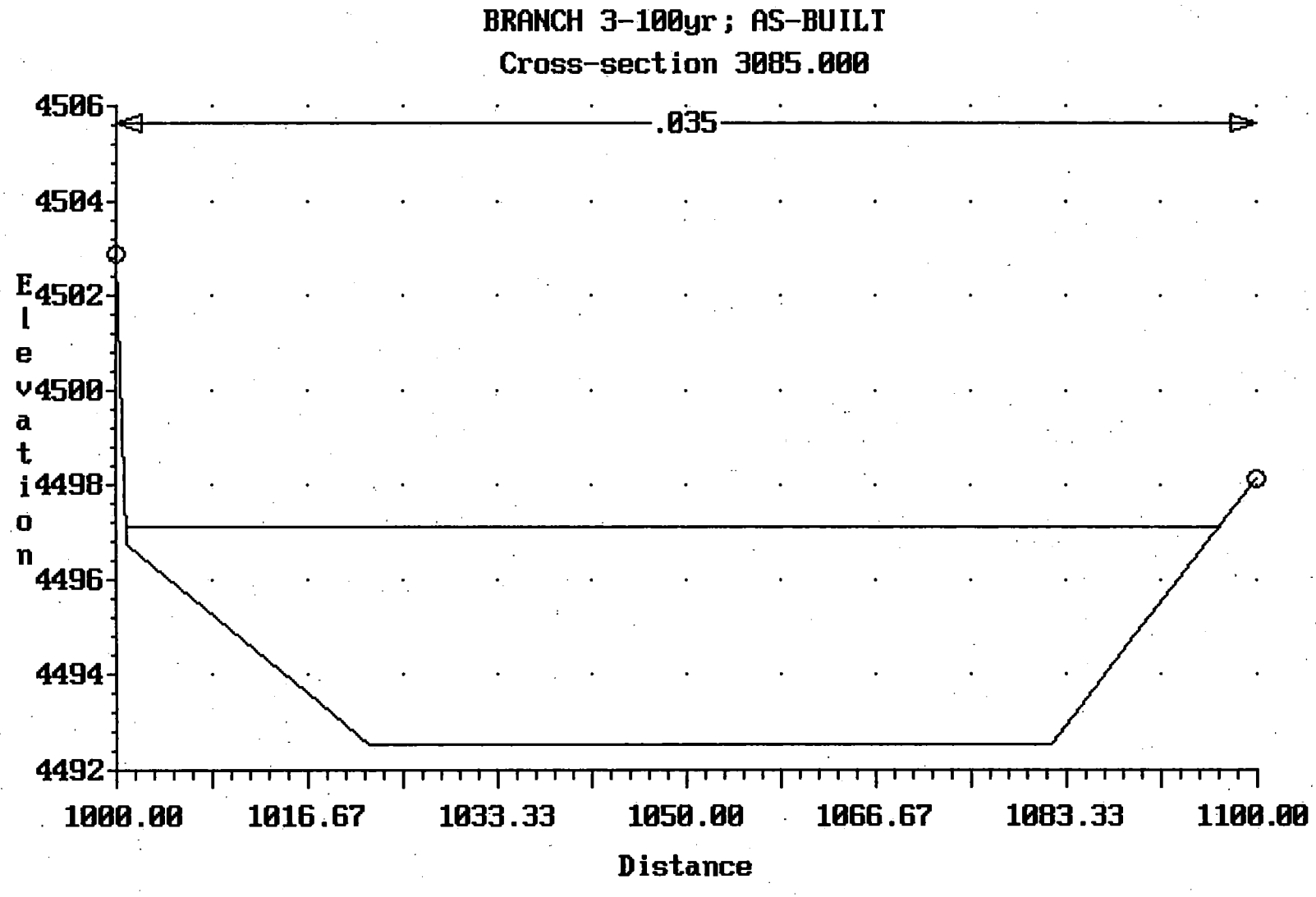
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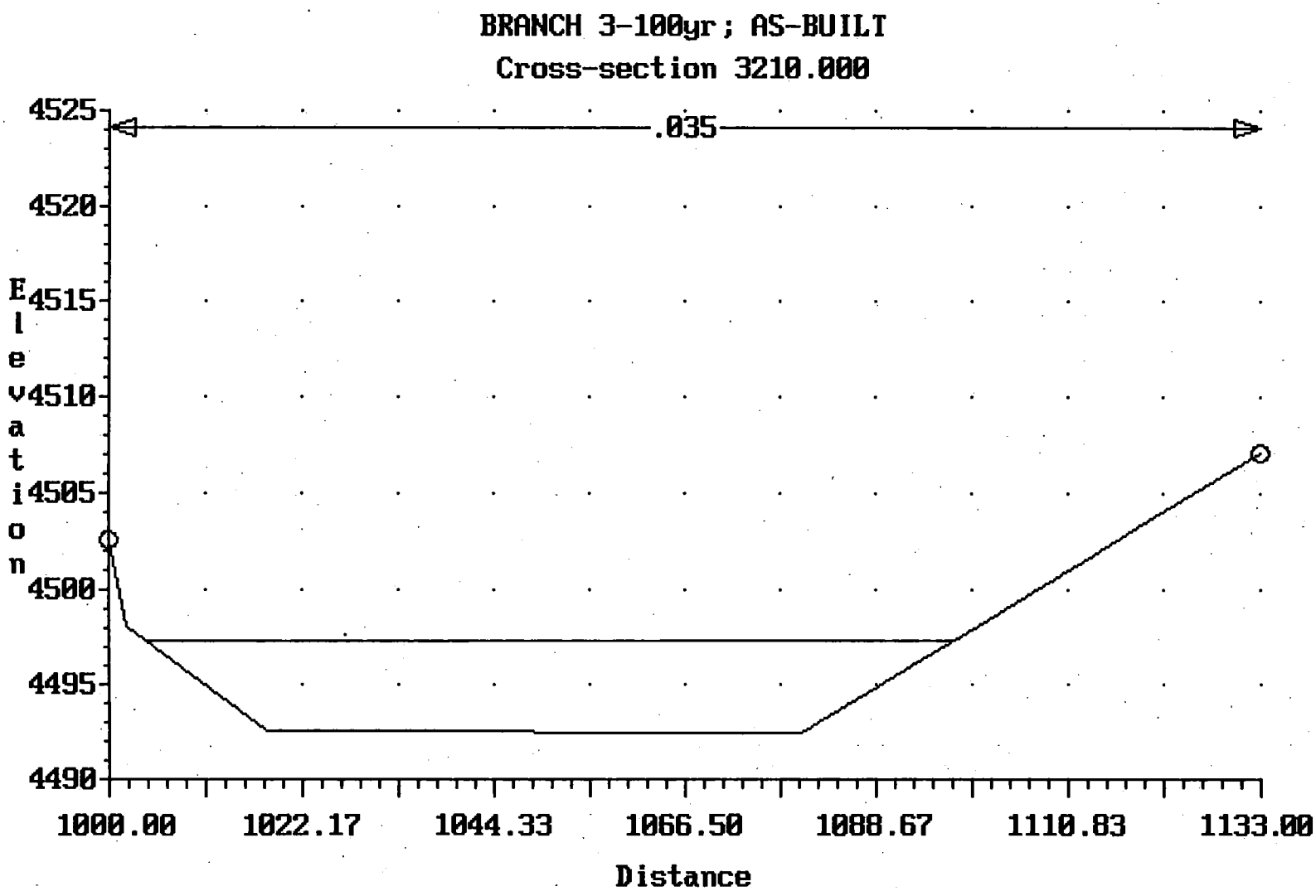
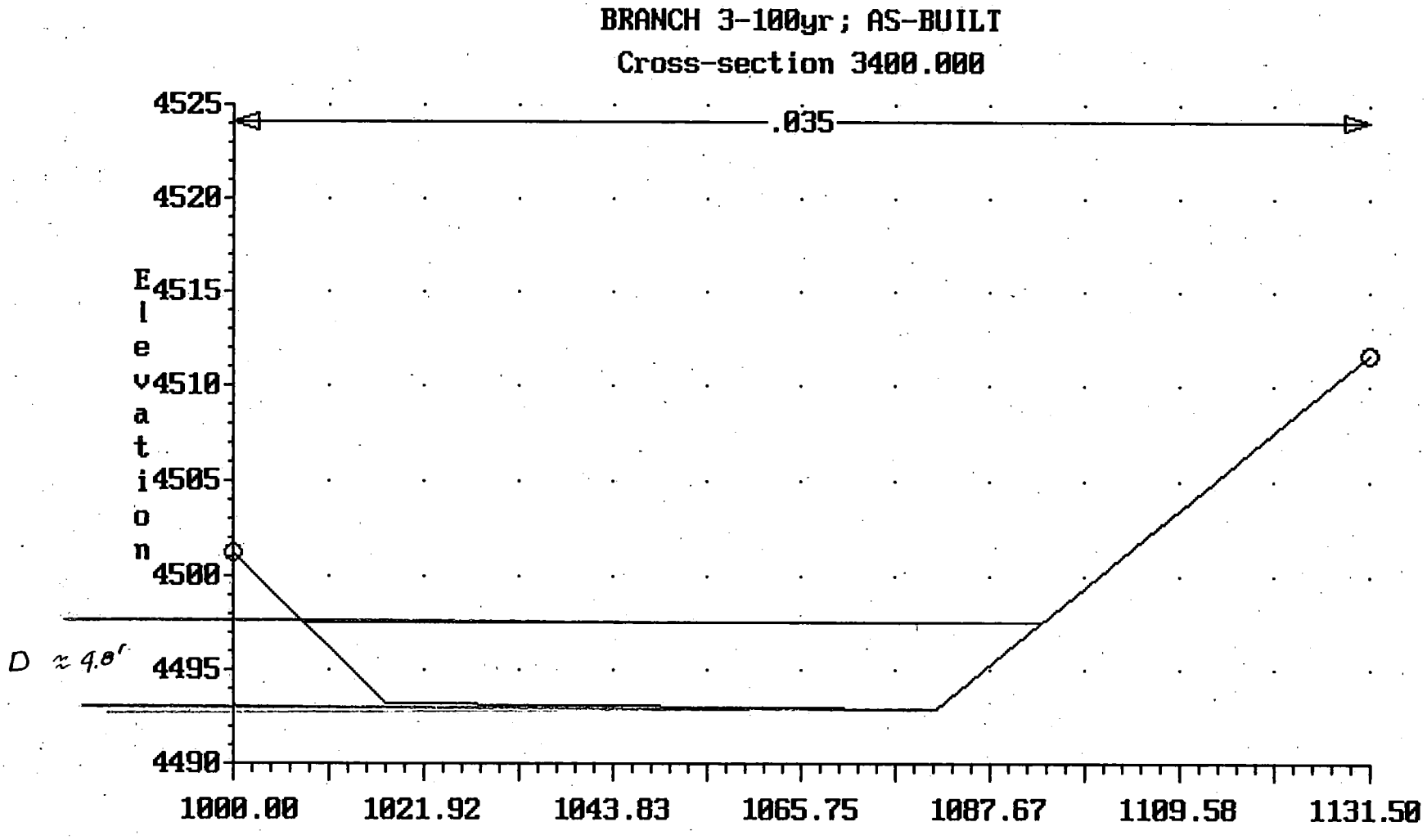
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3210.000
.035
4525
4520
4515
4510
4505
4500
4495
4490
Elevation
1000.00
1022.17
1044.33
1066.50
1088.67
1110.83
1133.00
Distance

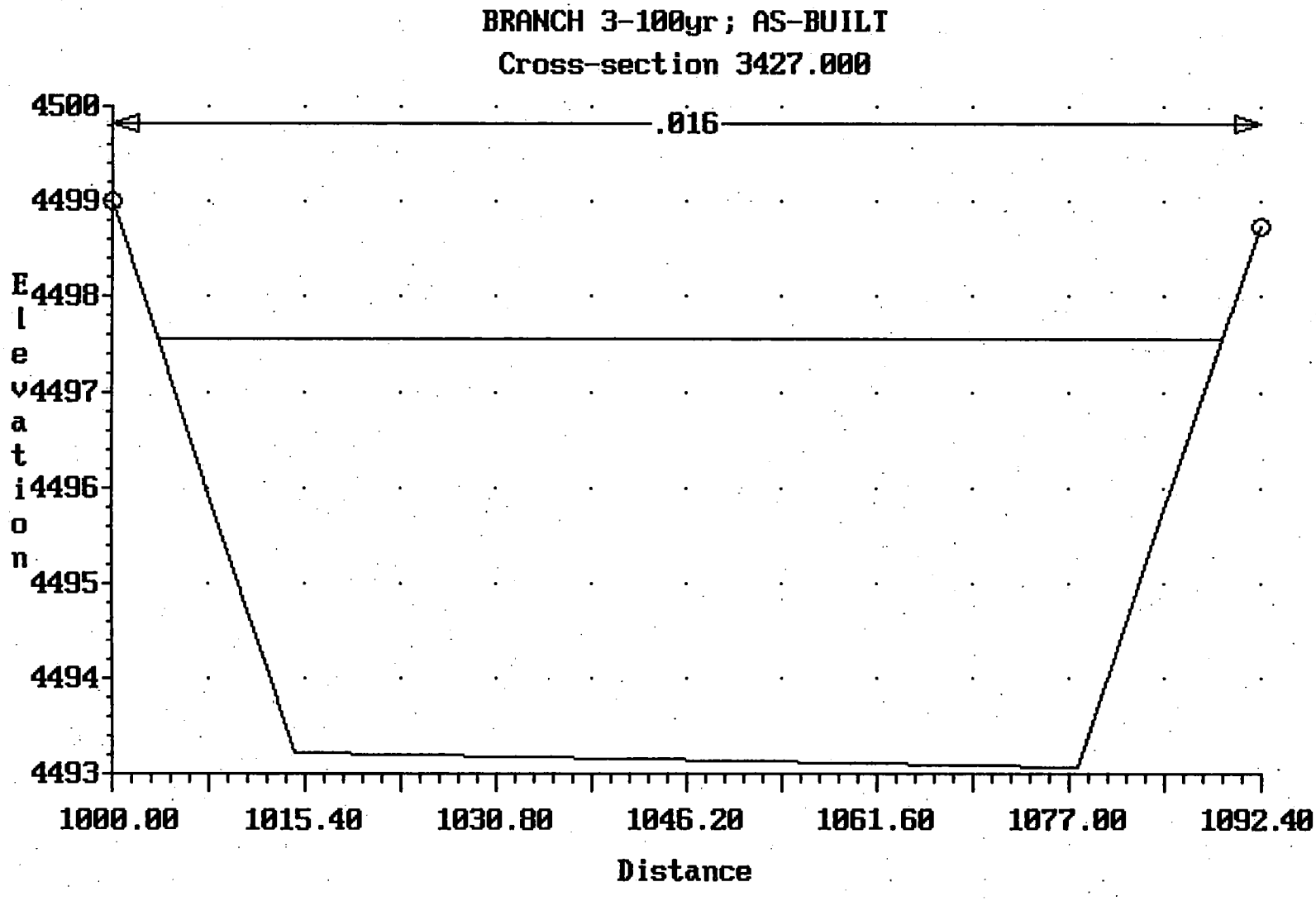


D ≈ 4.8'

BTW 3210 & 3400 WSE IS INTERPOLATE

PER CONST. IMP. PLANS FL- TOP BERM EL ≈ 5.6' @ 3300

BUT SINCE EG RIGHT - LEFT IS HIGH FL - EG @ BANK (RT/LT) ≥ 4.31'


BRANCH 3-100yr; AS-BUILT
Cross-section 3427.000
.016
4500
4499
4498
4497
4496
4495
4494
4493
Elevation
1000.00
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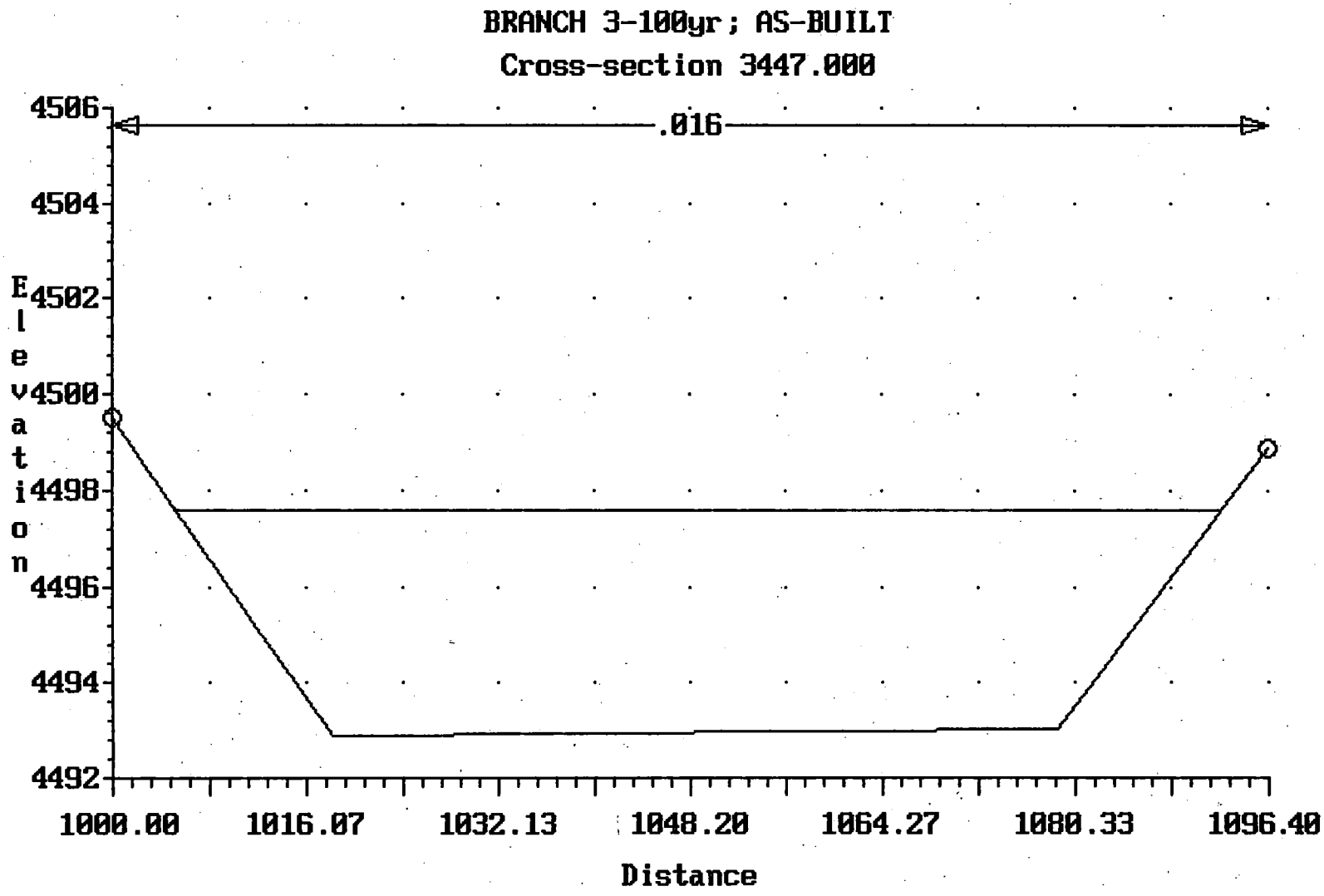
1030.80
1046.20
1061.60
1077.00
1092.40
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3447.000
.016
4506
4504
4502
4500
4498
4496
4494
4492
Elevation
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1016.07
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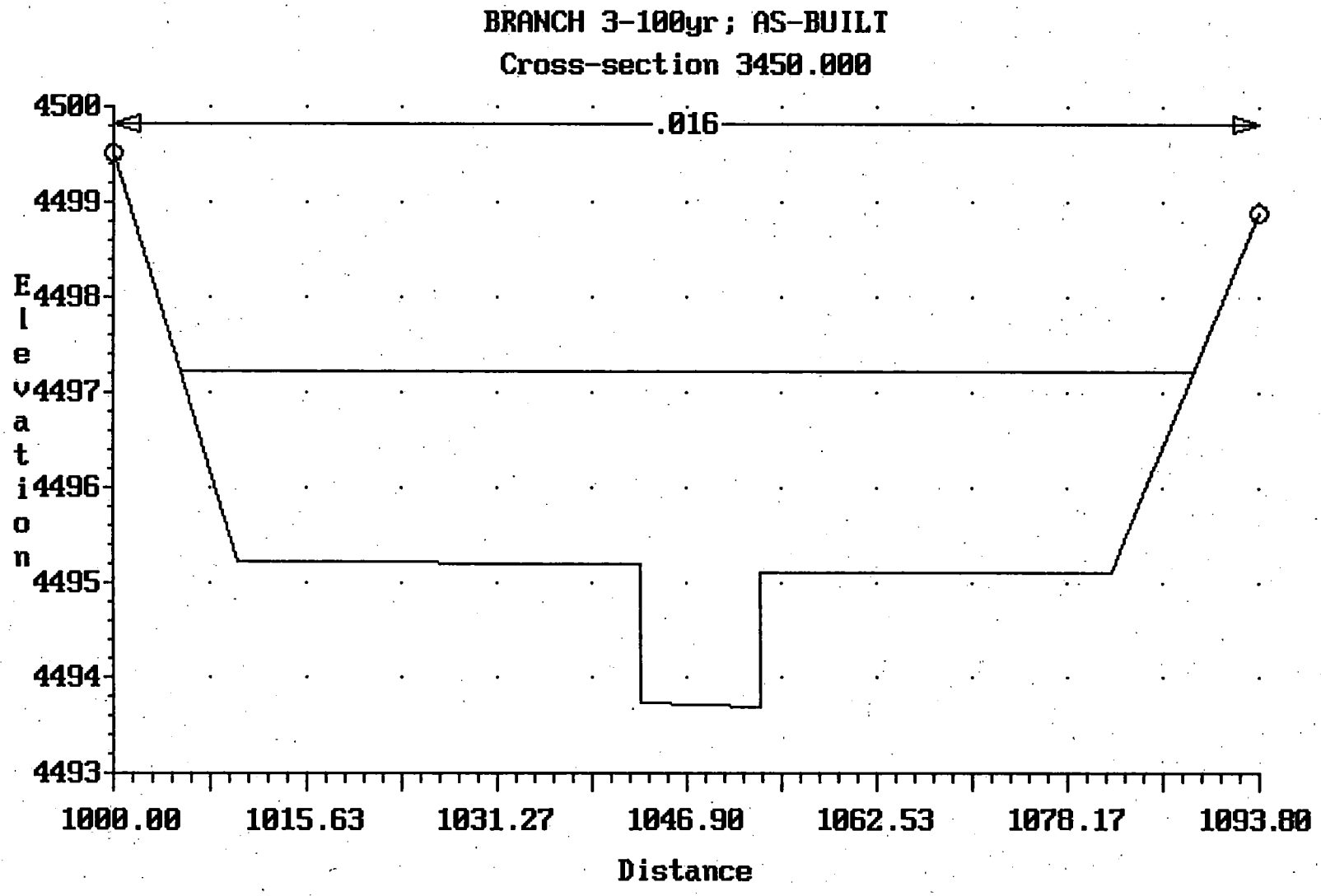
1064.27
1080.33
1096.40
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3450.000
.016
4500
4499
4498
4497
4496
4495
4494
4493
Elevation
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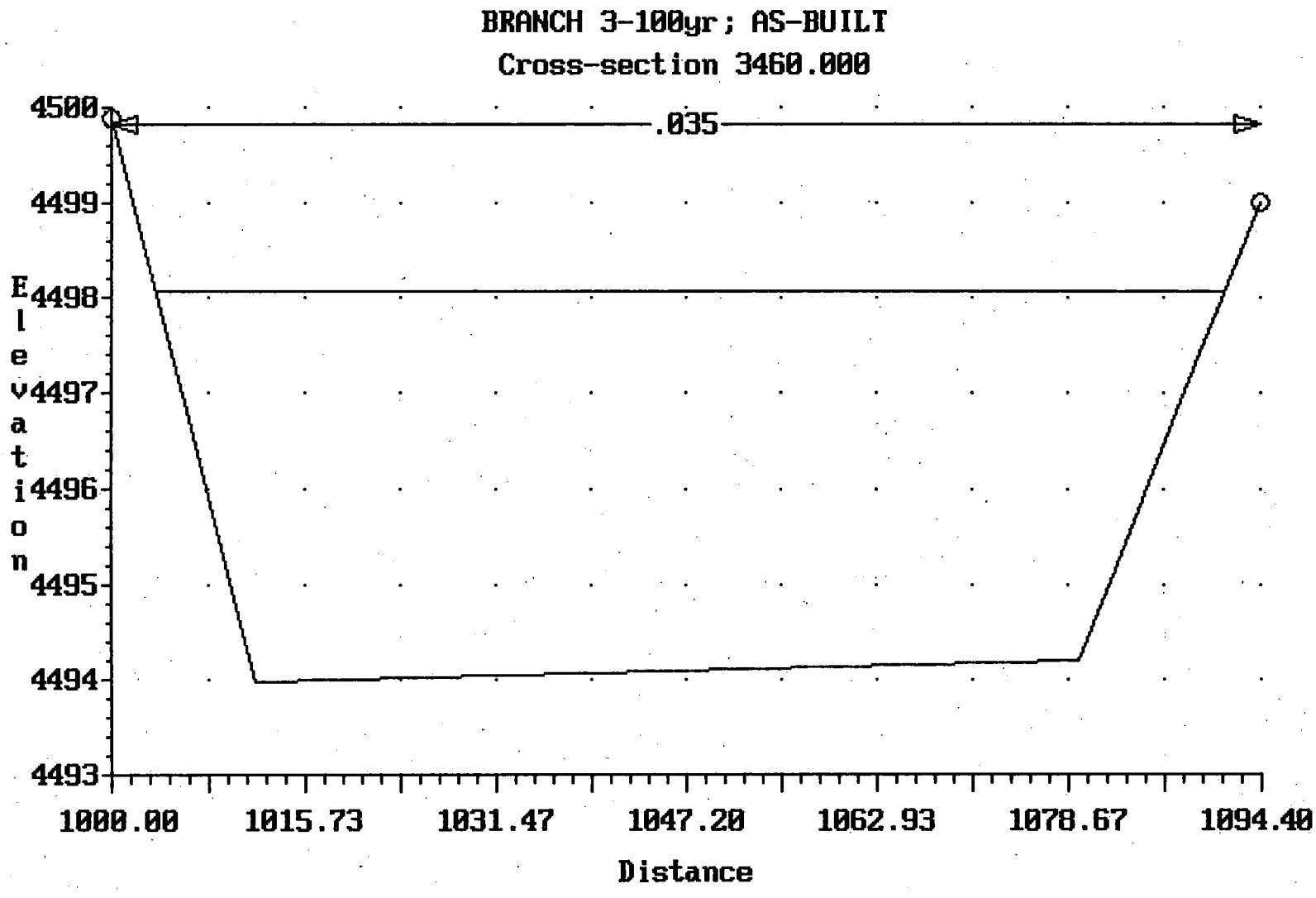
1046.90
1062.53
1078.17
1093.80
Distance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Cross-section 3460.000
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4499
4498
4497
4496
4495
4494
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Elevation
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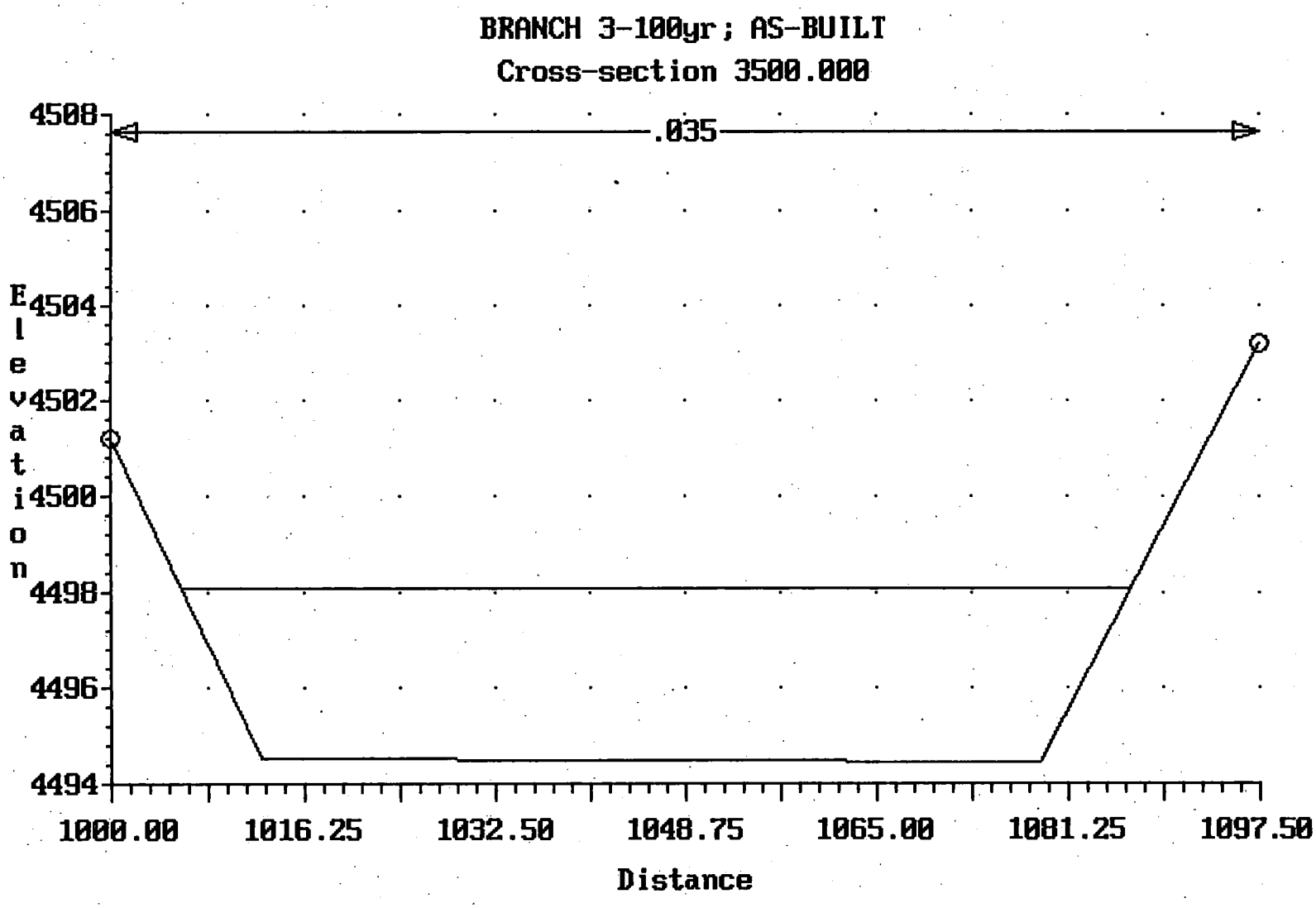
1062.93
1078.67
1094.40
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3500.000
.035
4508
4506
4504
4502
4500
4498
4496
4494
Elevation
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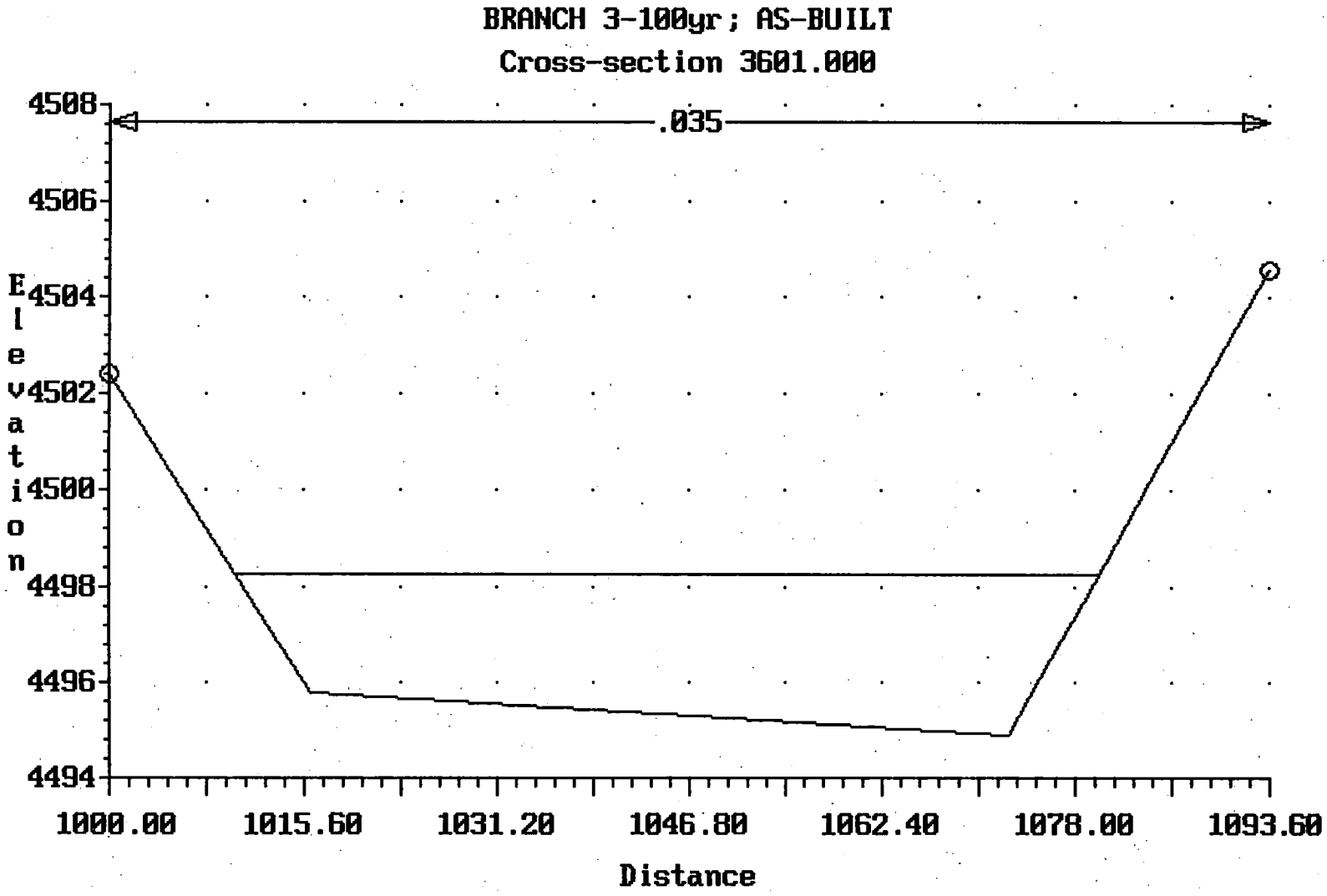
1016.25
1032.50
1048.75
1065.00
1081.25
1097.50
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3601.000
.035
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4506
4504
4502
4500
4498
4496
4494
Elevation
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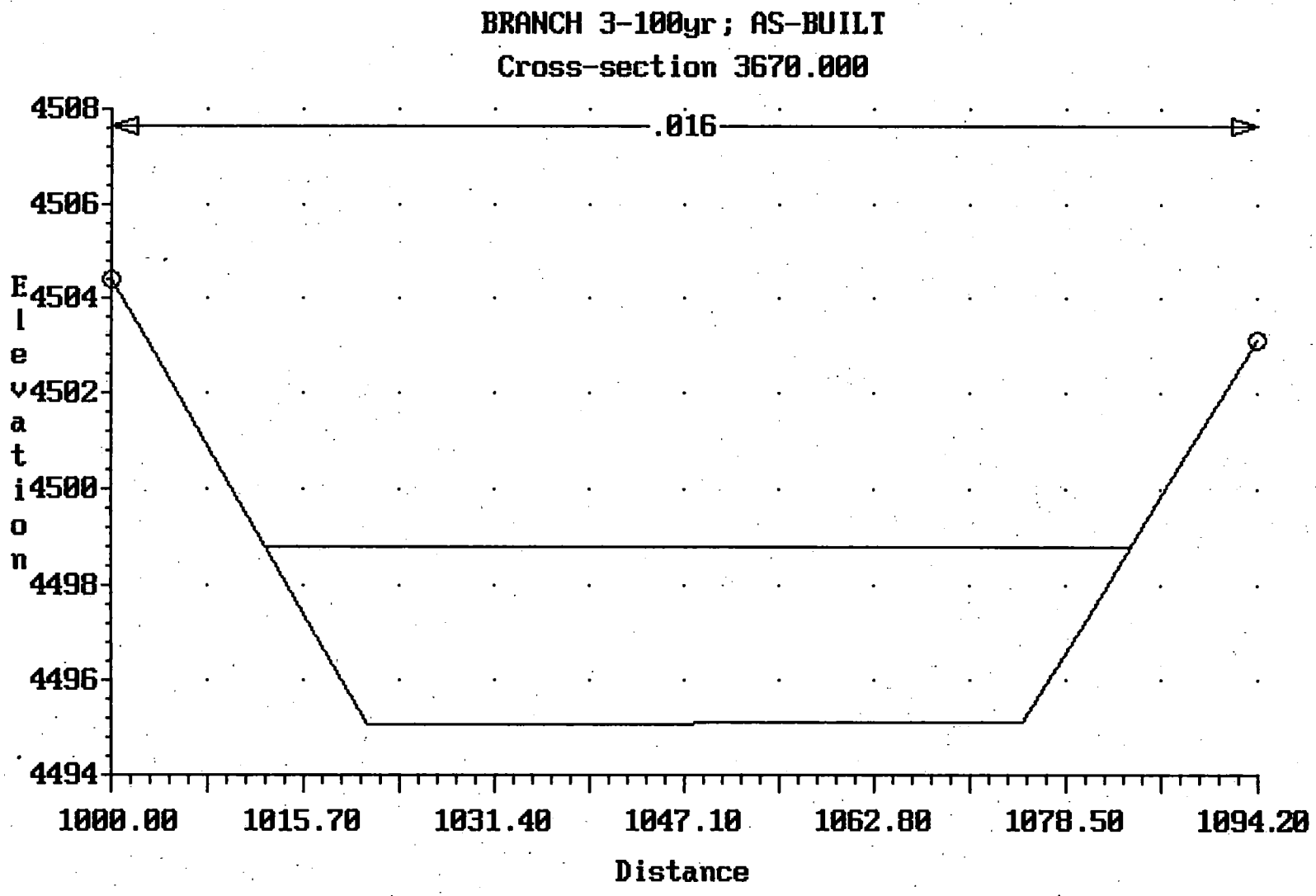
1046.80
1062.40
1078.00
1093.60
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3670.000
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4508
4506
4504
4502
4500
4498
4496
4494
Elevation
1000.00
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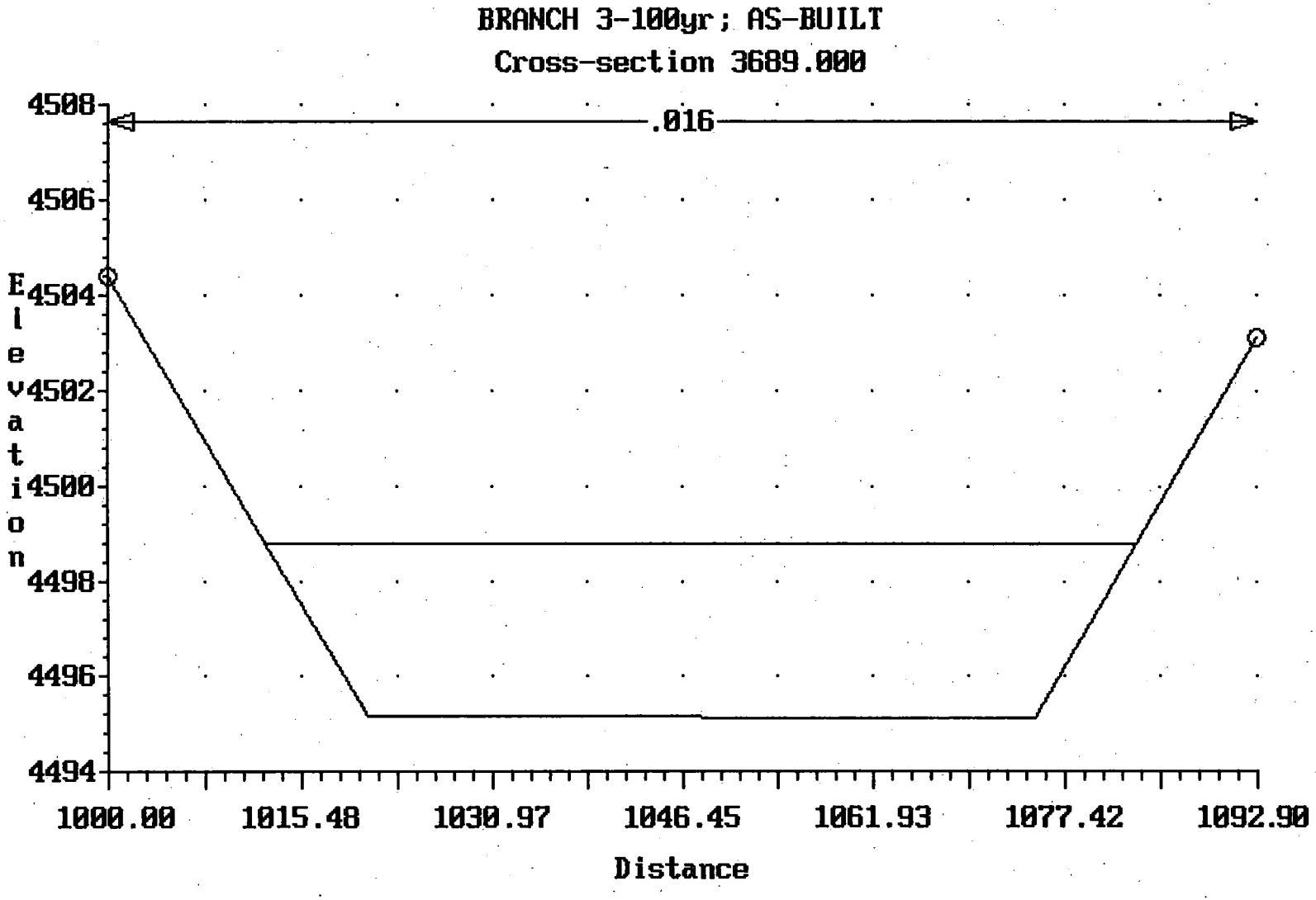
1062.80
1078.50
1094.20
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3689.000
.016
4508
4506
4504
4502
4500
4498
4496
4494
Elevation
1000.00
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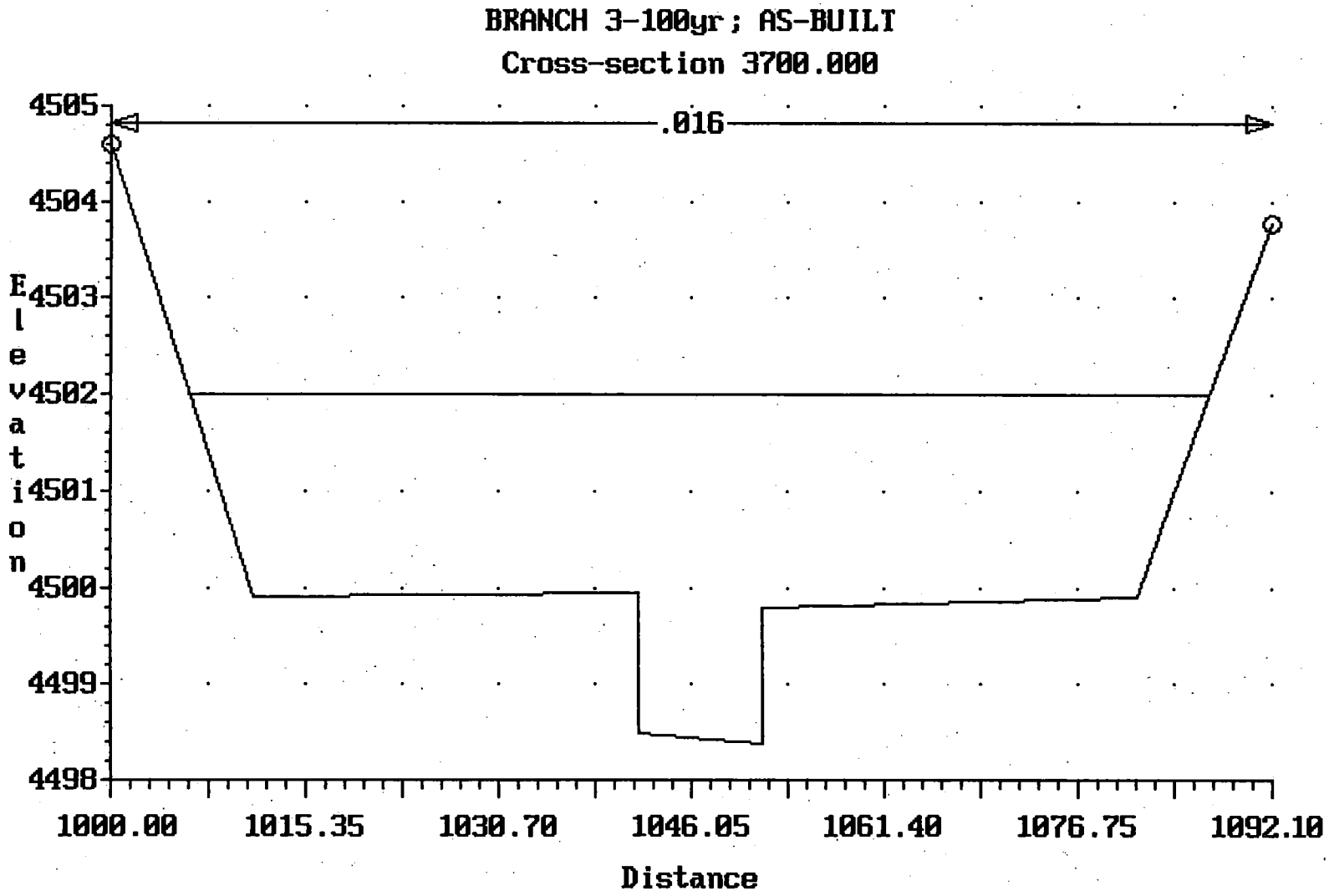
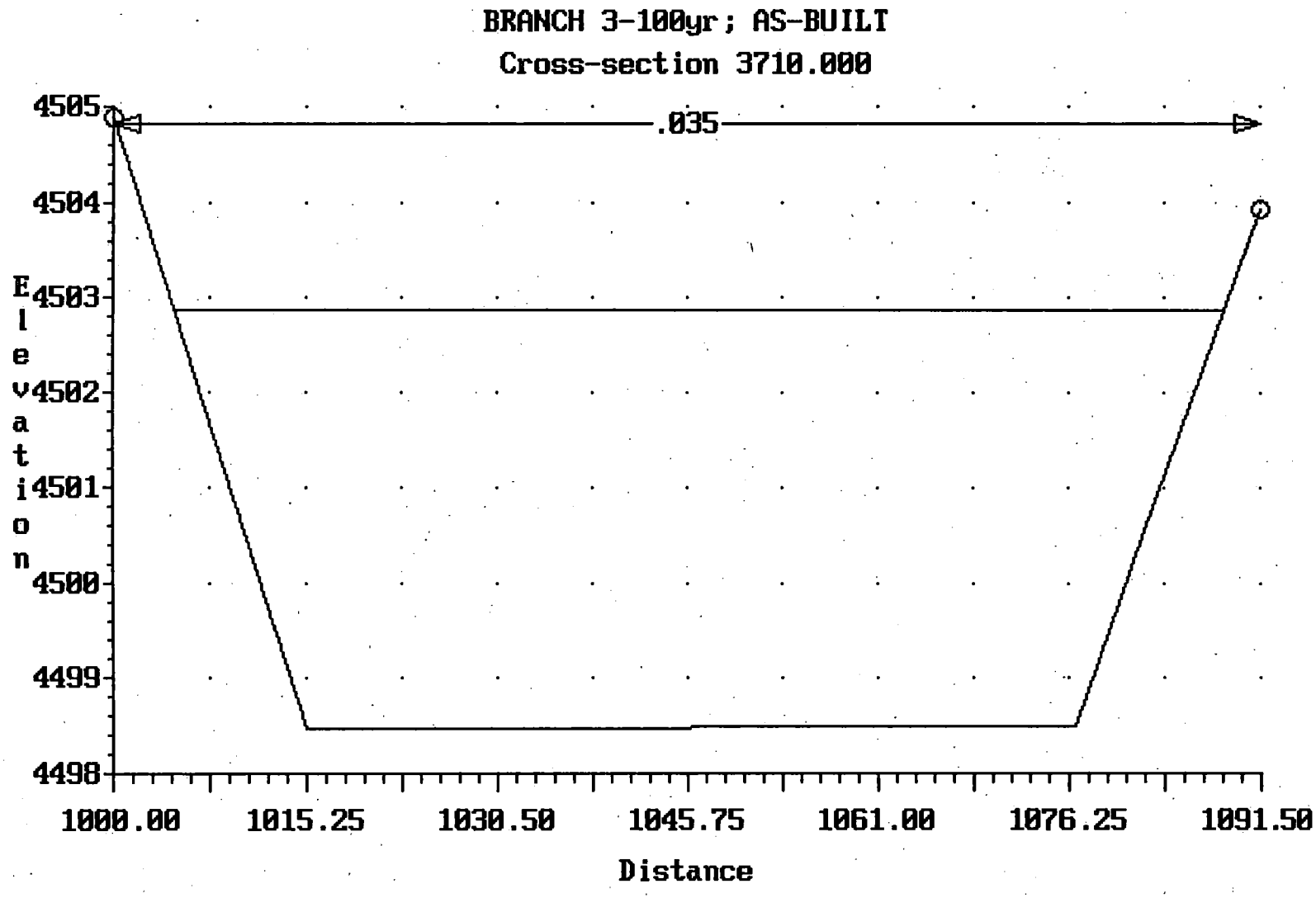
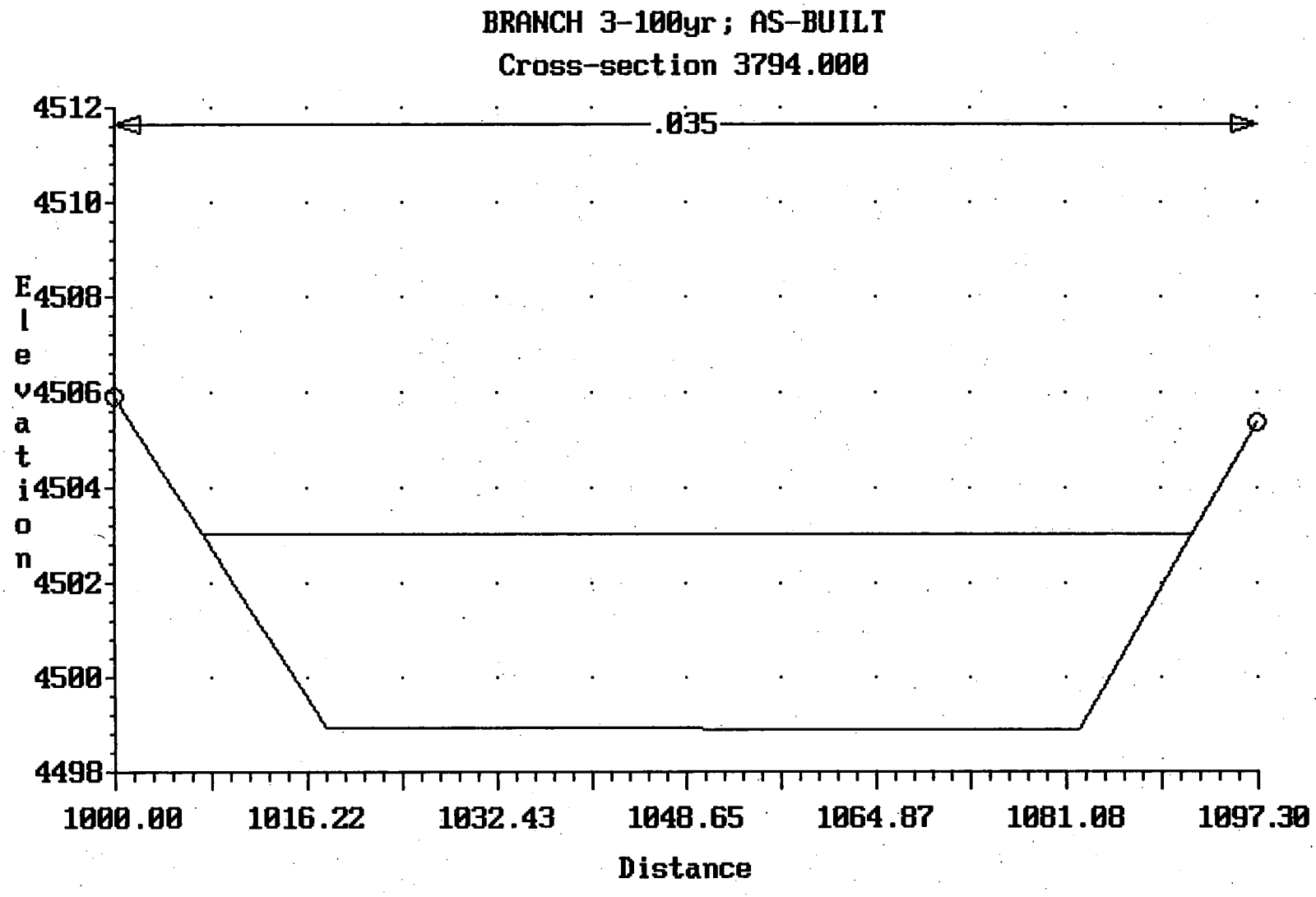
1030.97
1046.45
1061.93
1077.42
1092.90
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3700.000
.016
4505
4504
4503
4502
4501
4500
4499
4498
Elevation
1000.00
1015.35
1030.70
1046.05
1061.40
1076.75
1092.10
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3710.000
.035
4505
4504
4503
4502
4501
4500
4499
4498
Elevation
1000.00
1015.25
1030.50
1045.75
1061.00
1076.25
1091.50
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3794.000
.035
4512
4510
4508
4506
4504
4502
4500
4498
Elevation
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1016.22
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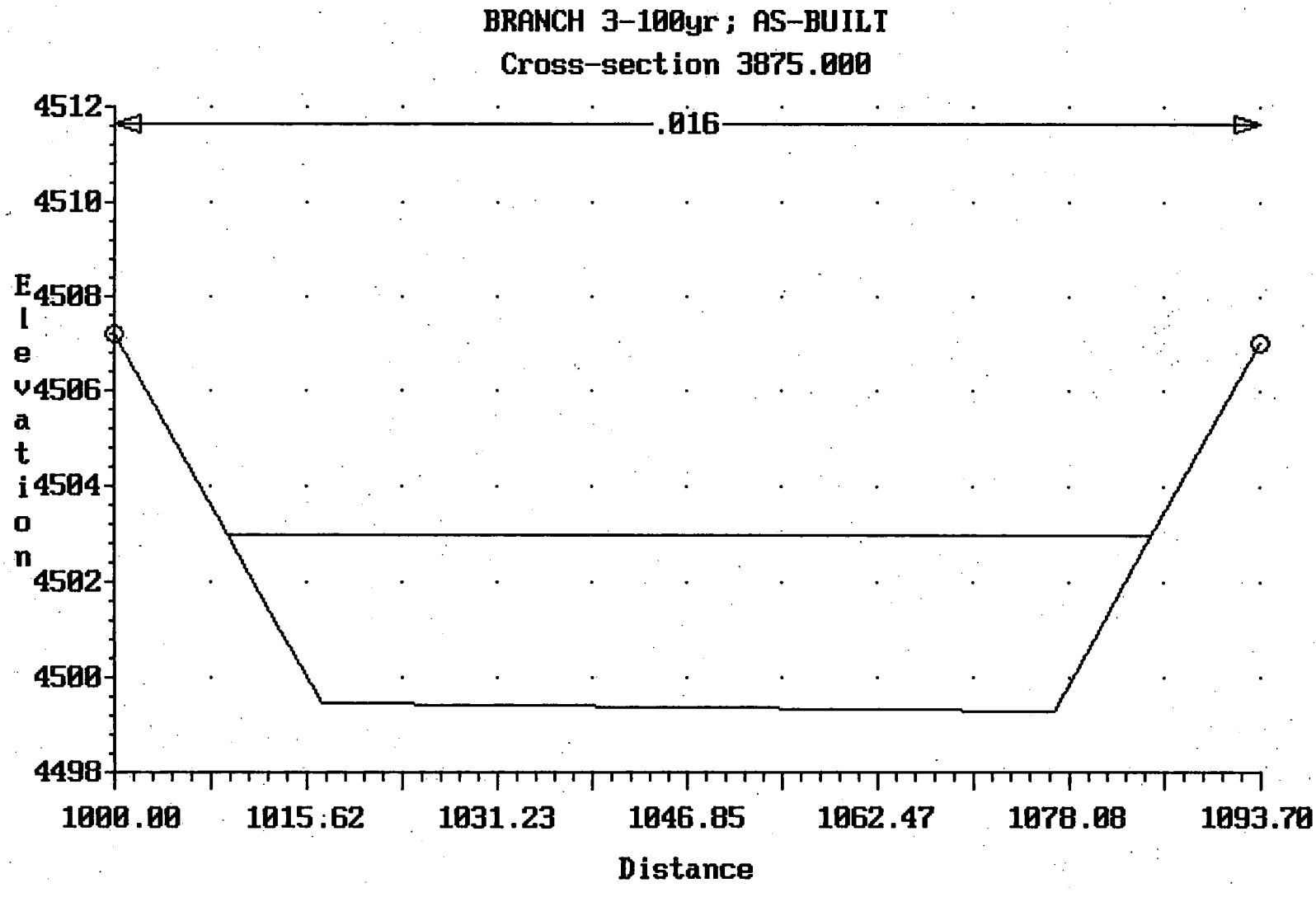
1048.65
1064.87
1081.08
1097.30
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3875.000
.016
4512
4510
4508
4506
4504
4502
4500
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Elevation
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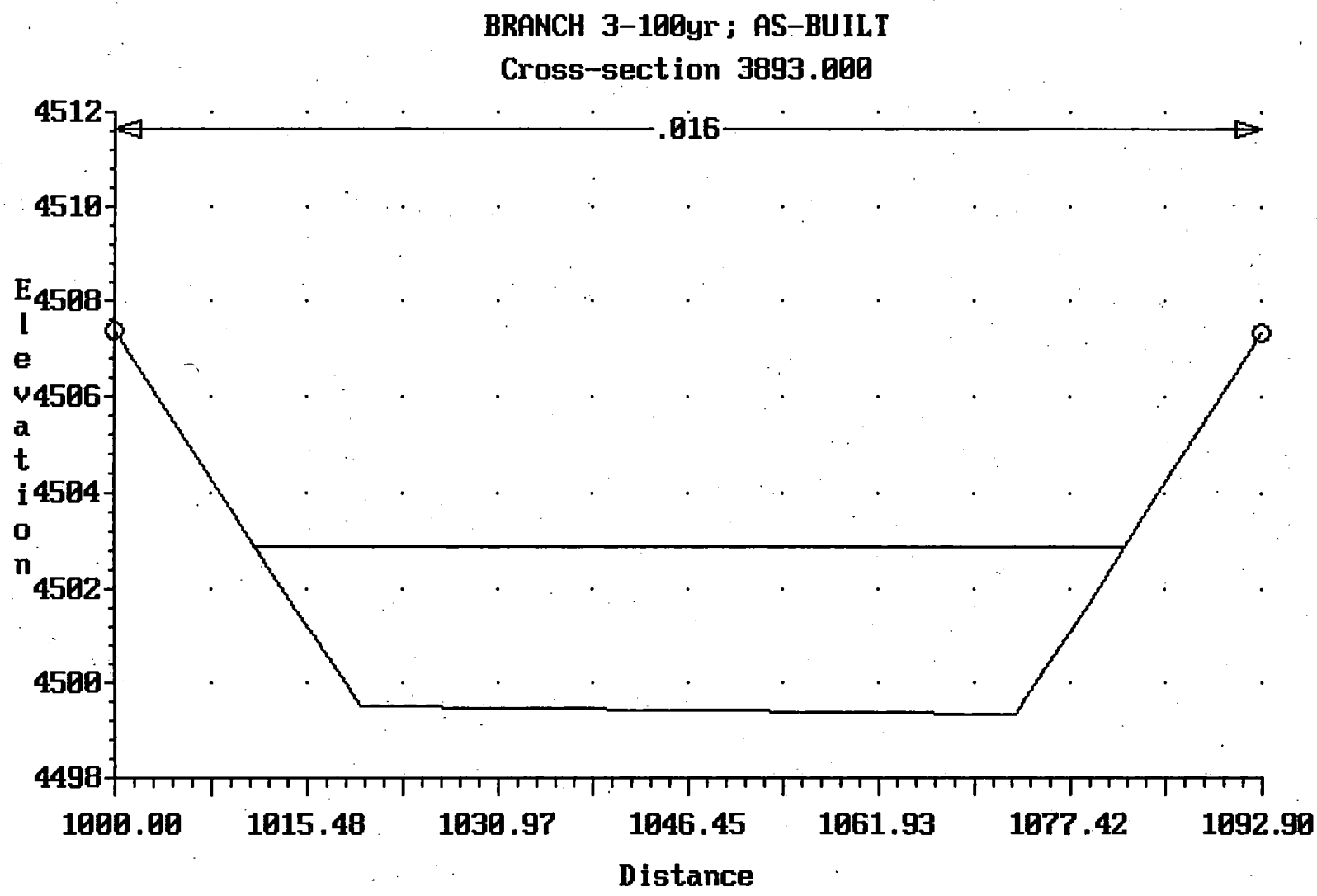
1062.47
1078.08
1093.70
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3893.000
.016
4512
4510
4508
4506
4504
4502
4500
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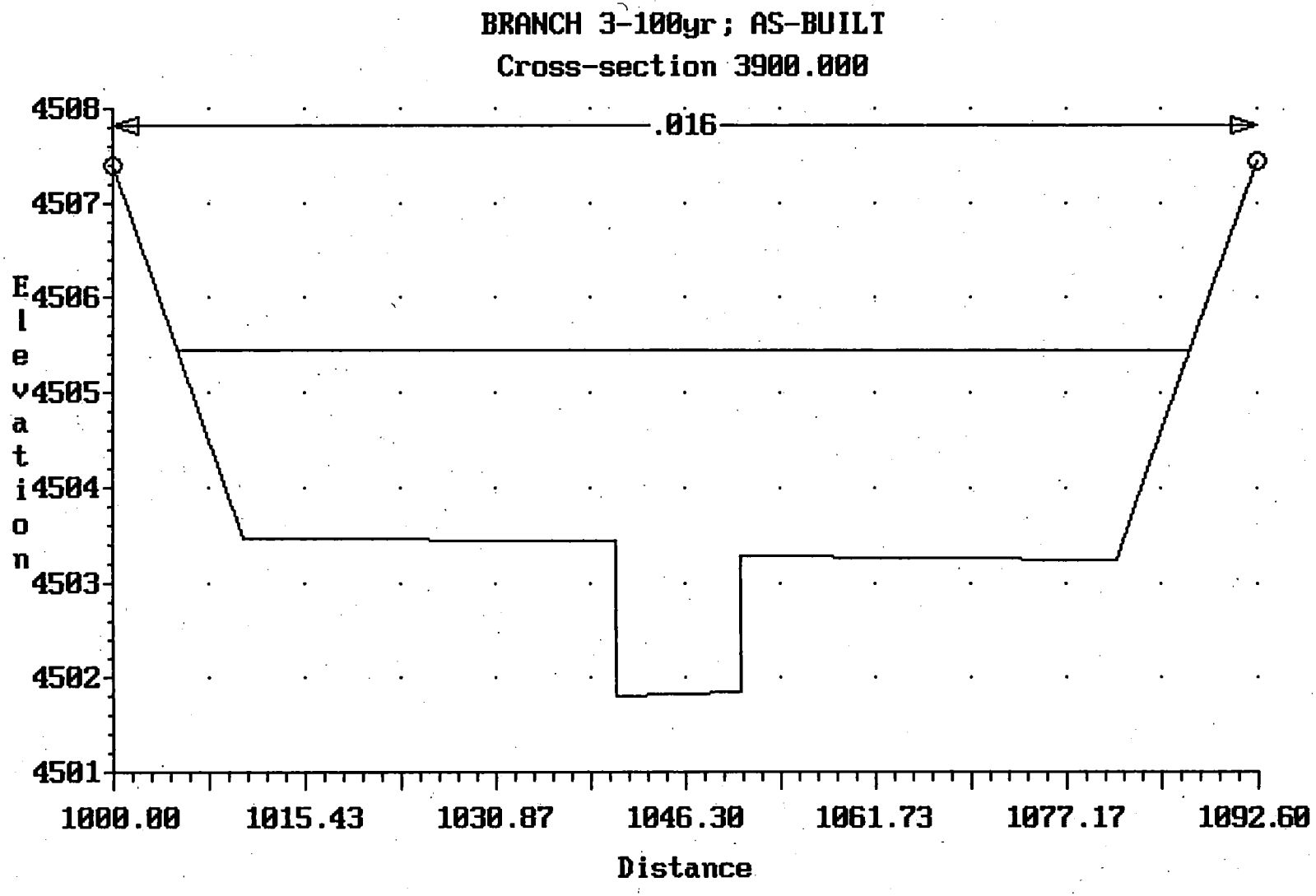
Elevation
1000.00
1015.48
1030.97
1046.45
1061.93
1077.42
1092.90
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3900.000
.016
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4507
4506
4505
4504
4503
4502
4501
Elevation
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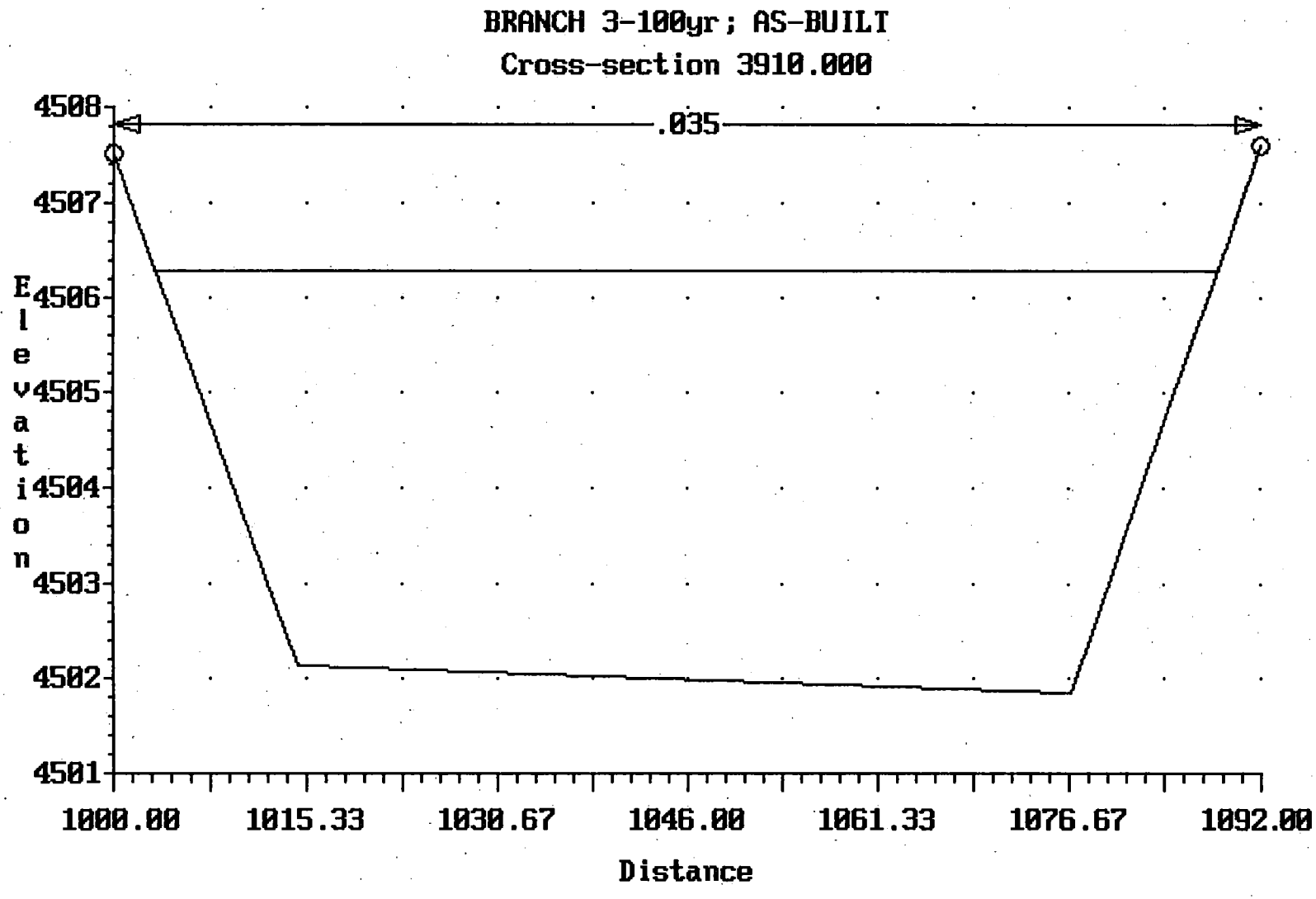
1015.43
1030.87
1046.30
1061.73
1077.17
1092.60
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3910.000
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4507
4506
4505
4504
4503
4502
4501
Elevation
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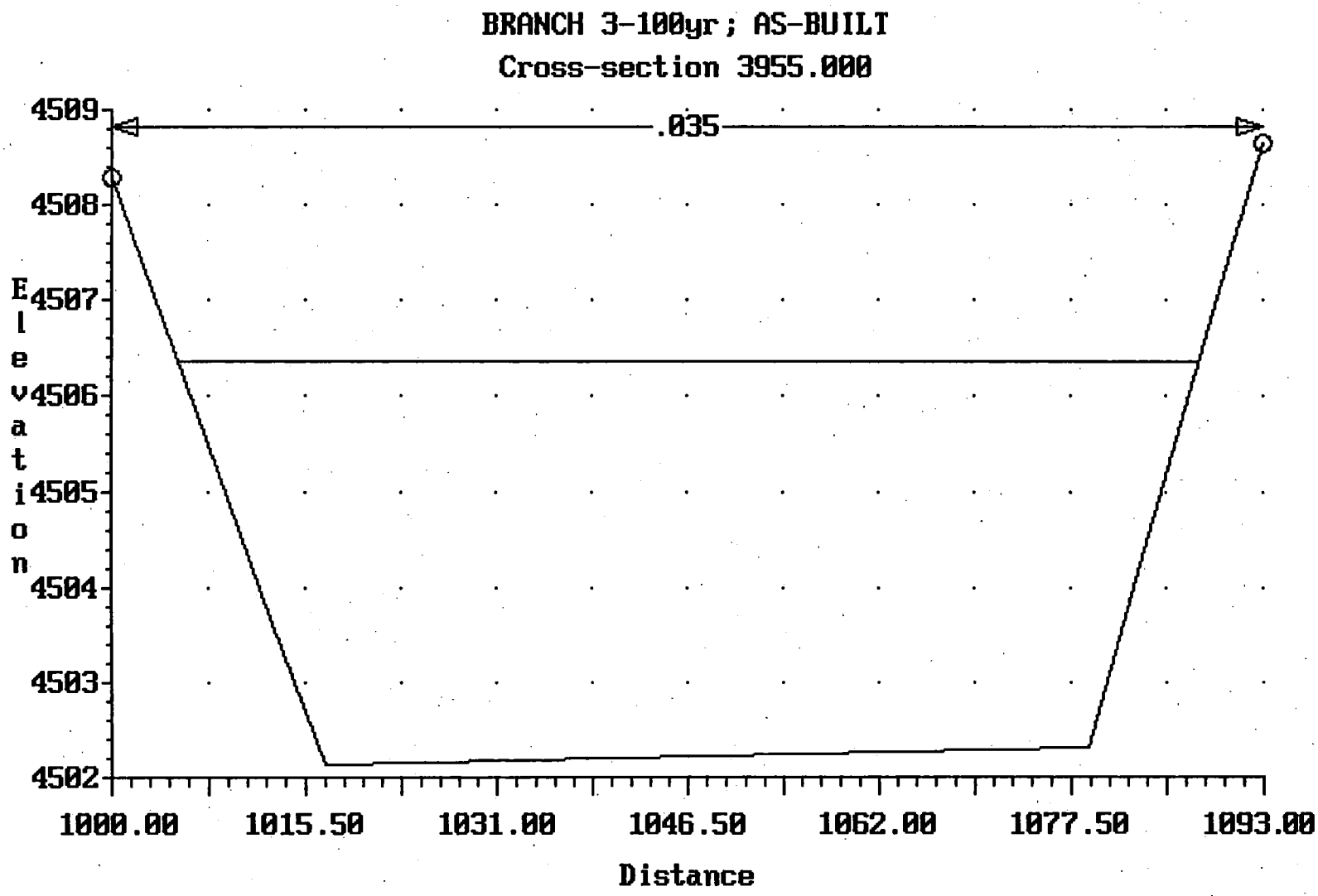
1061.33
1076.67
1092.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3955.000
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4509
4508
4507
4506
4505
4504
4503
4502
Elevation
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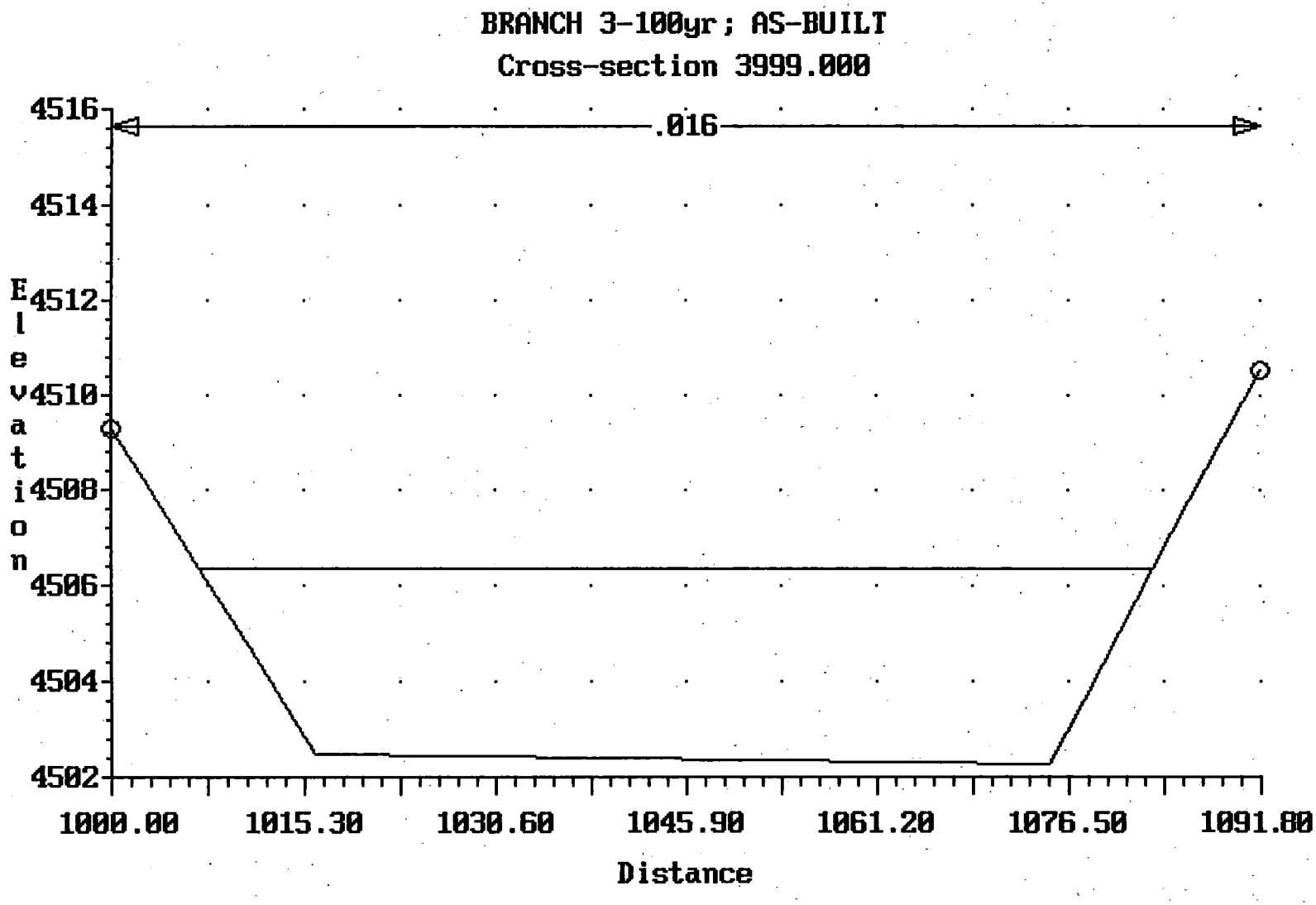
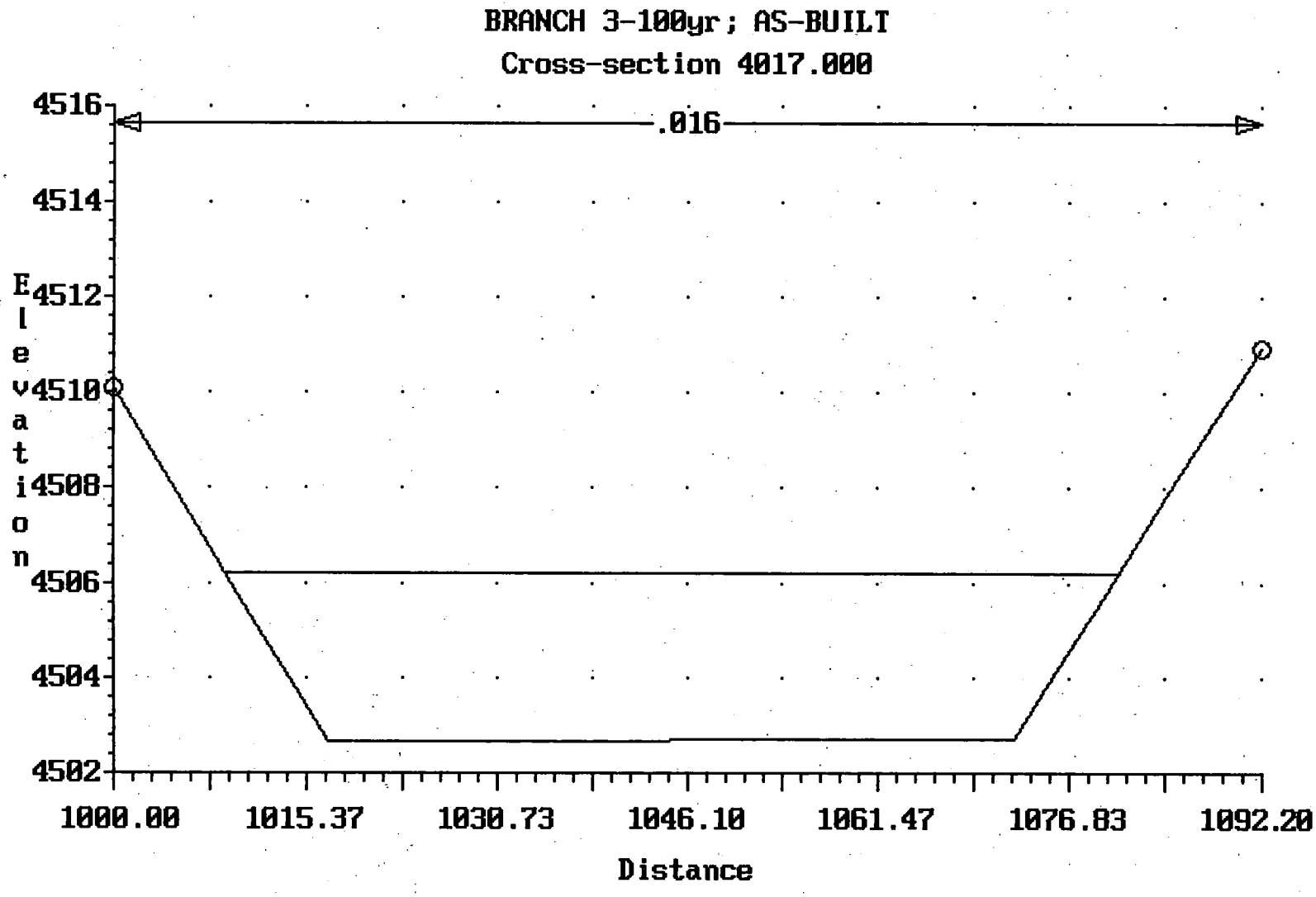
1015.50
1031.00
1046.50
1062.00
1077.50
1093.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 3999.000
.016
4516
4514
4512
4510
4508
4506
4504
4502
Elevation
1000.00
1015.30
1030.60
1045.90
1061.20
1076.50
1091.80
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4017.000
.016
4516
4514
4512
4510
4508
4506
4504
4502
Elevation
1000.00
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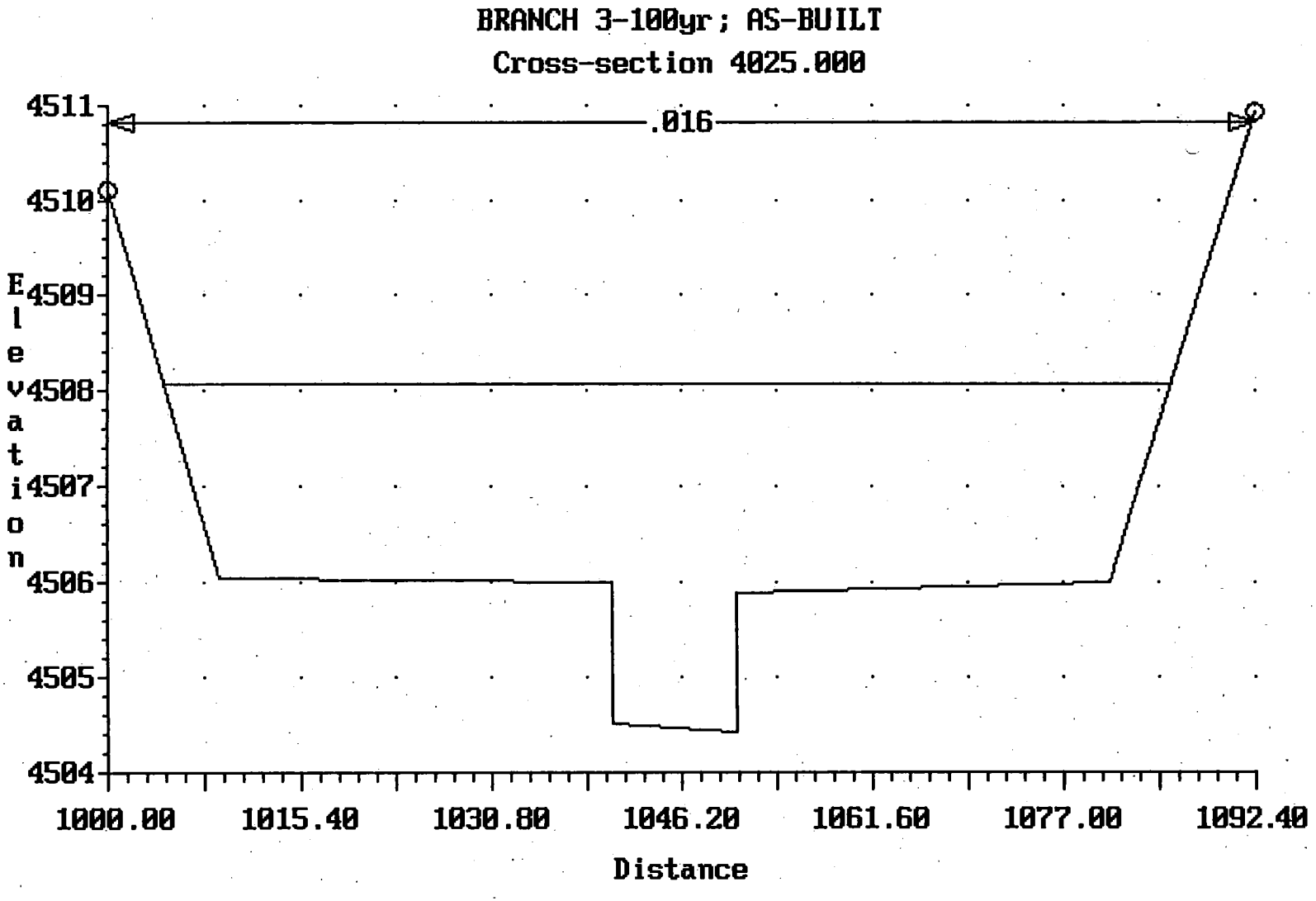
1061.47
1076.83
1092.20
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4025.000
.016
4511
4510
4509
4508
4507
4506
4505
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Elevation
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1030.80
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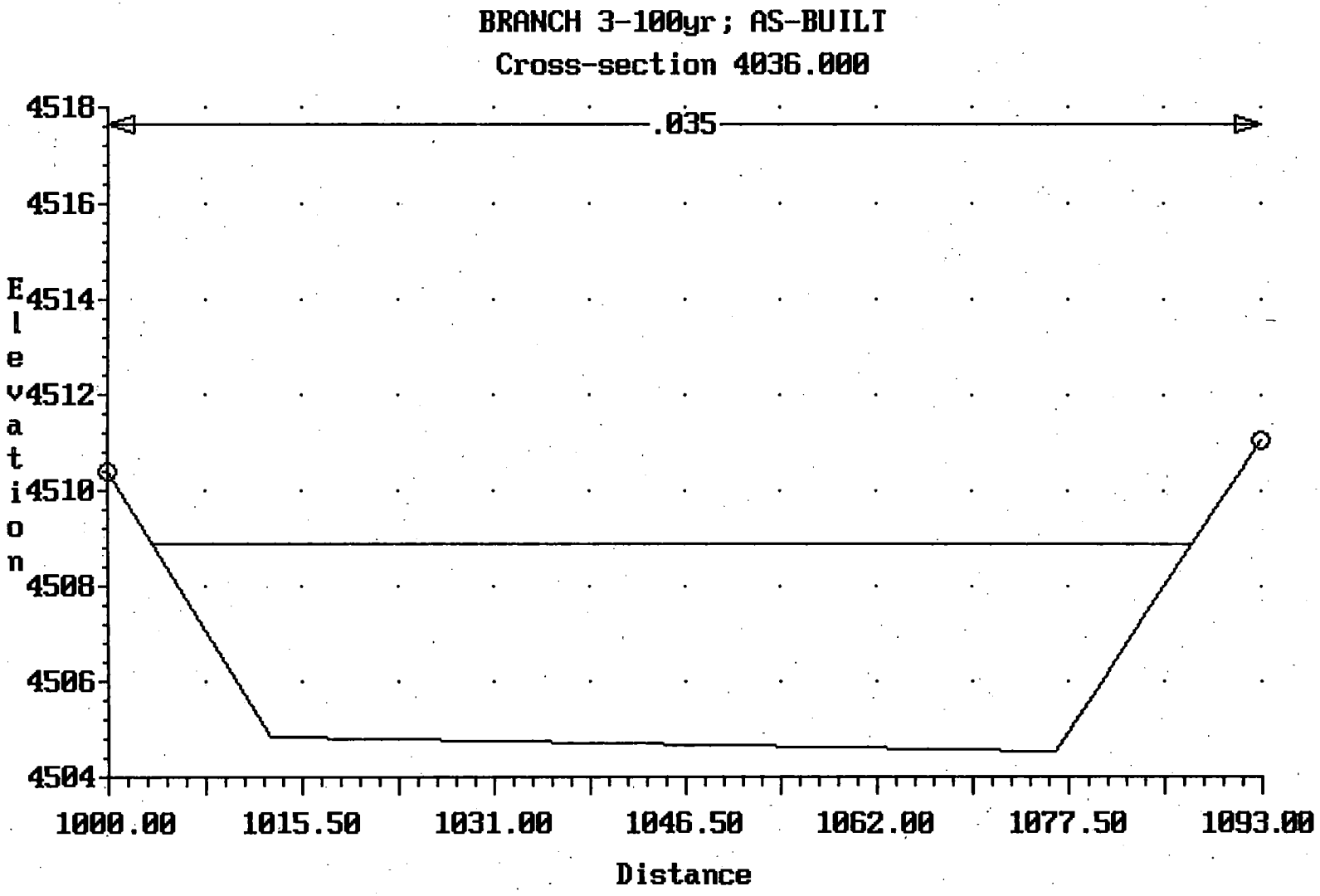
1061.60
1077.00
1092.40
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4036.000
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4518
4516
4514
4512
4510
4508
4506
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Elevation
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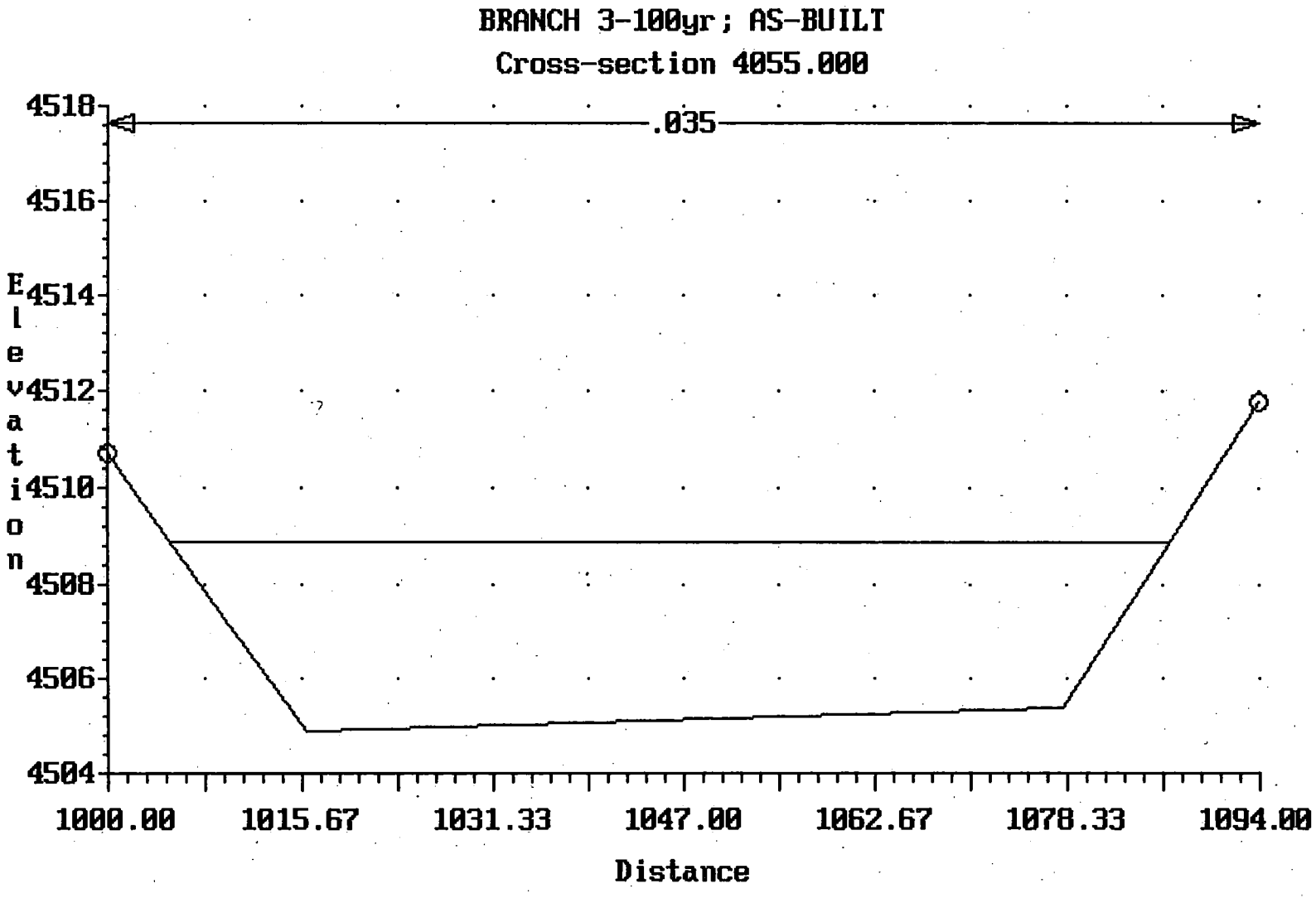
1093.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4055.000
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4514
4512
4510
4508
4506
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Elevation
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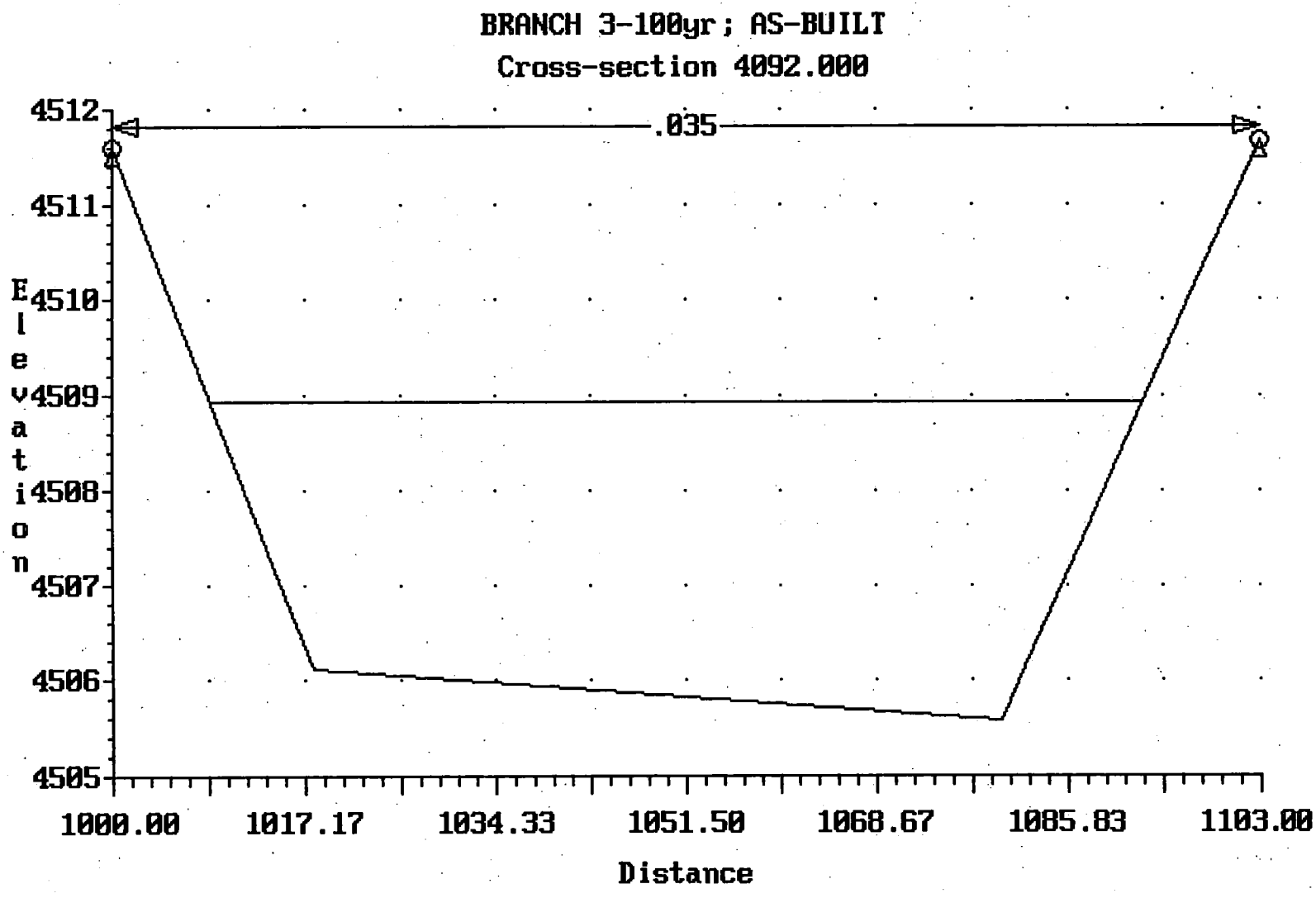
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4092.000
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4510
4509
4508
4507
4506
4505
Elevation
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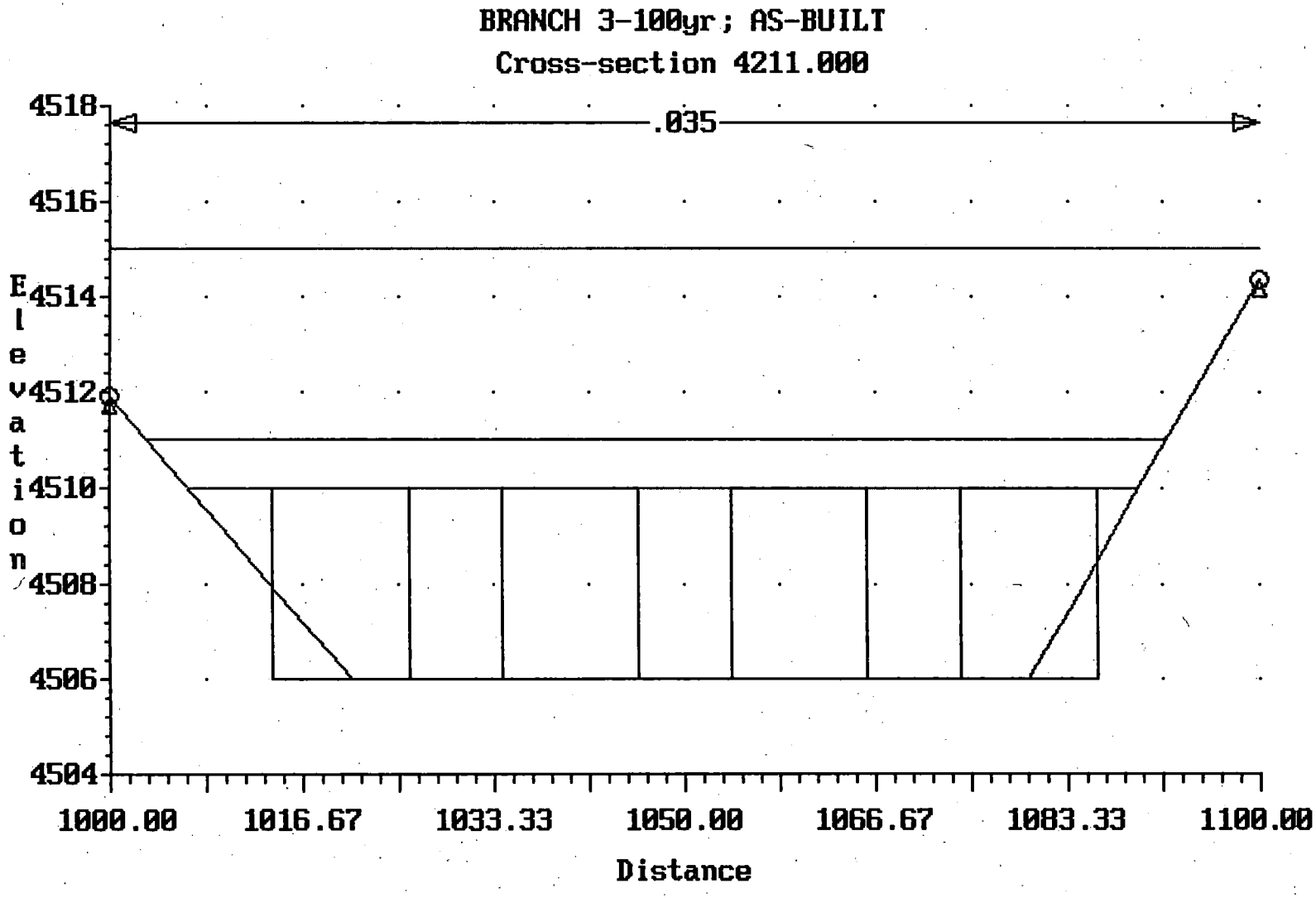
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4211.000
.035
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4516
4514
4512
4510
4508
4506
4504
Elevation
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1016.67
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1050.00
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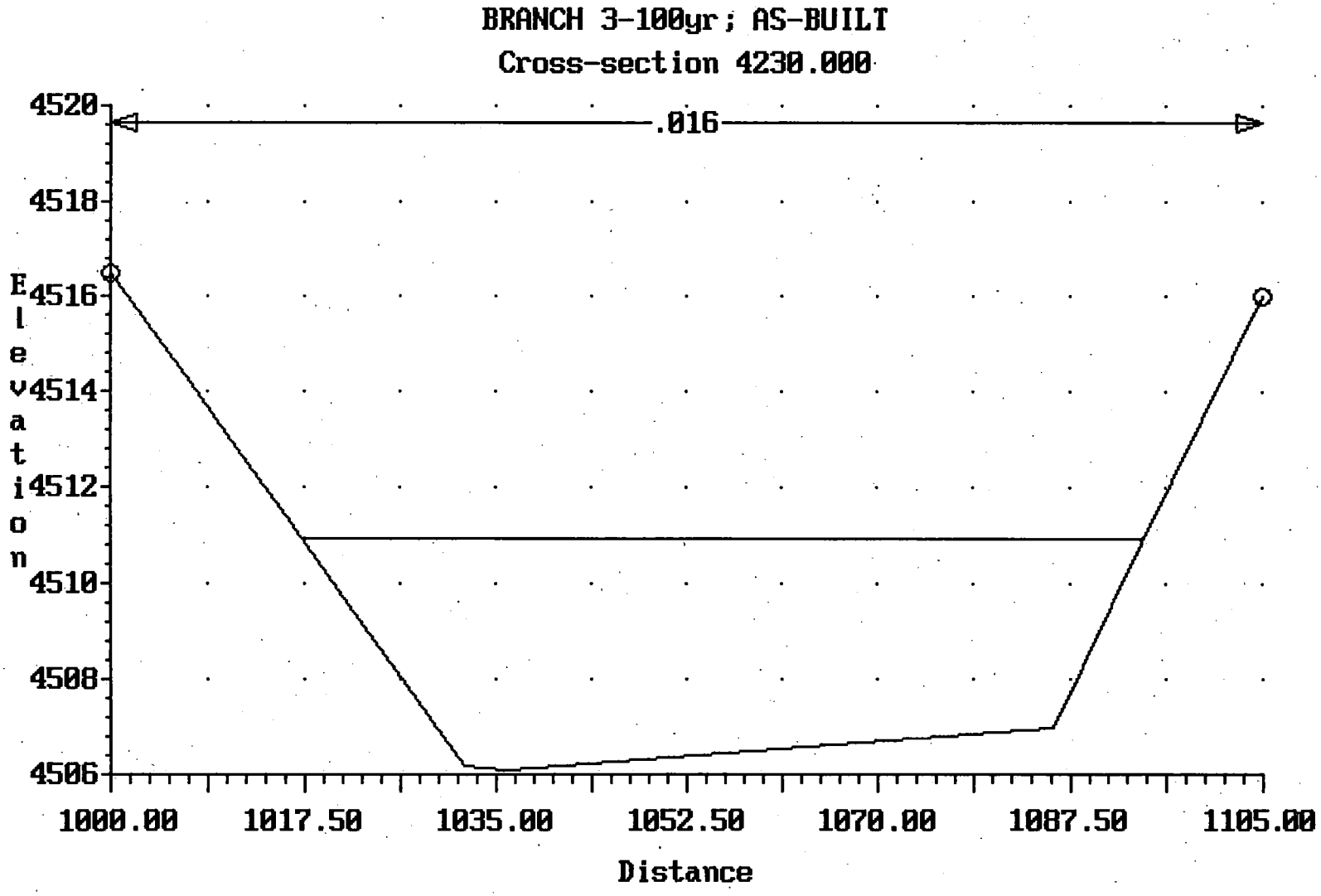
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4230.000
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4518
4516
4514
4512
4510
4508
4506
Elevation
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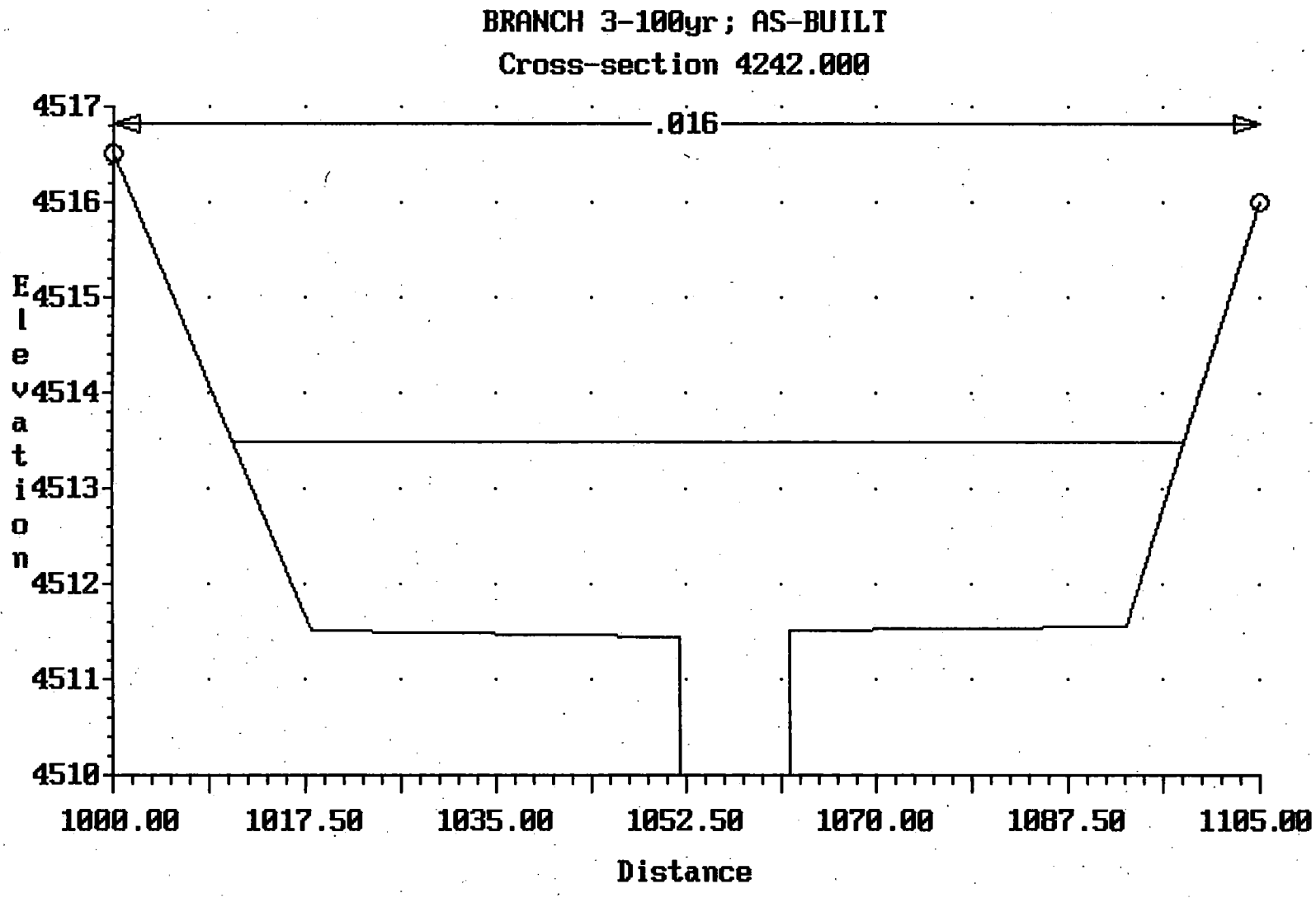
1035.00
1052.50
1070.00
1087.50
1105.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4242.000
.016
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4516
4515
4514
4513
4512
4511
4510
Elevation
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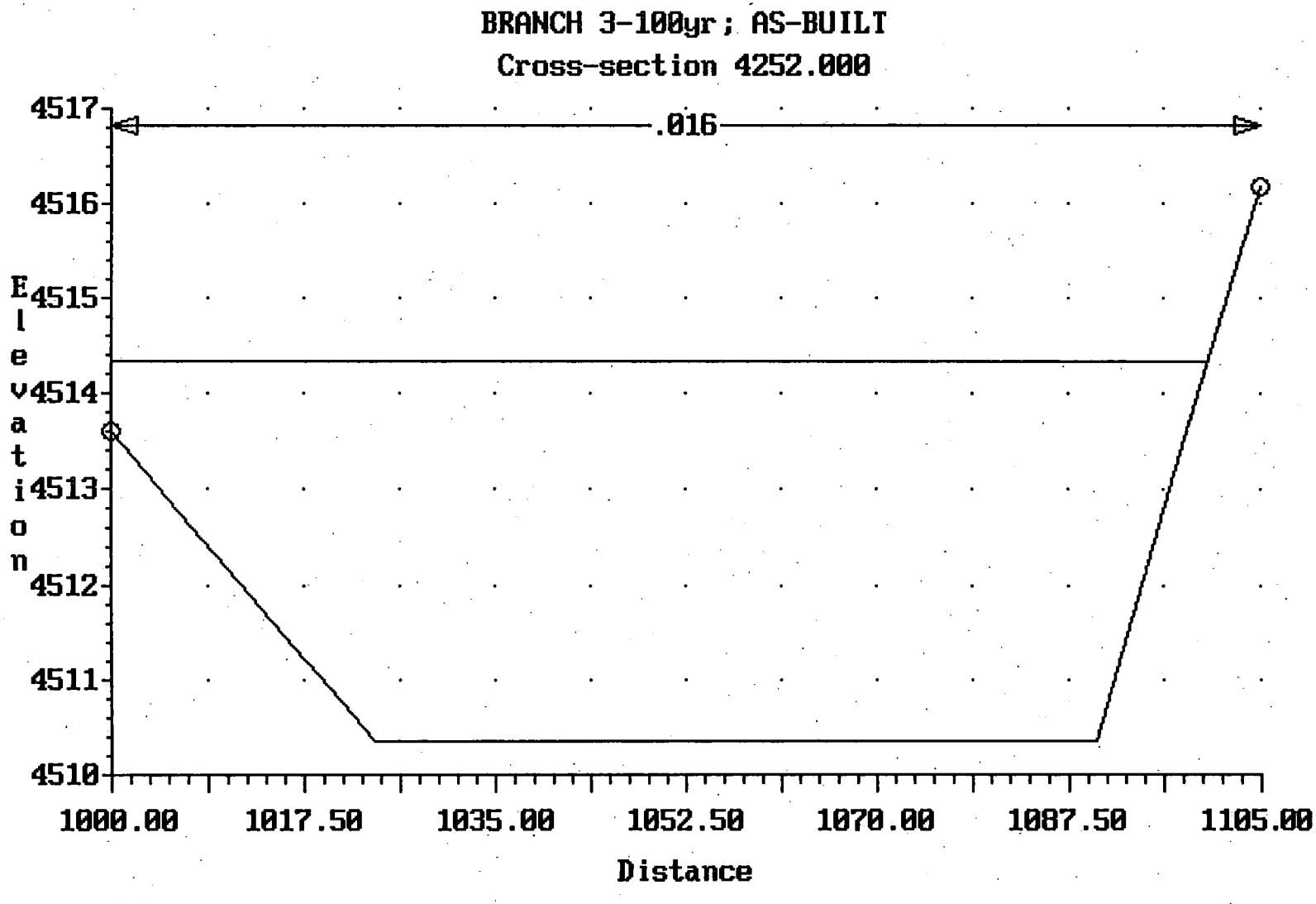
1070.00
1087.50
1105.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4252.000
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4515
4514
4513
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1070.00
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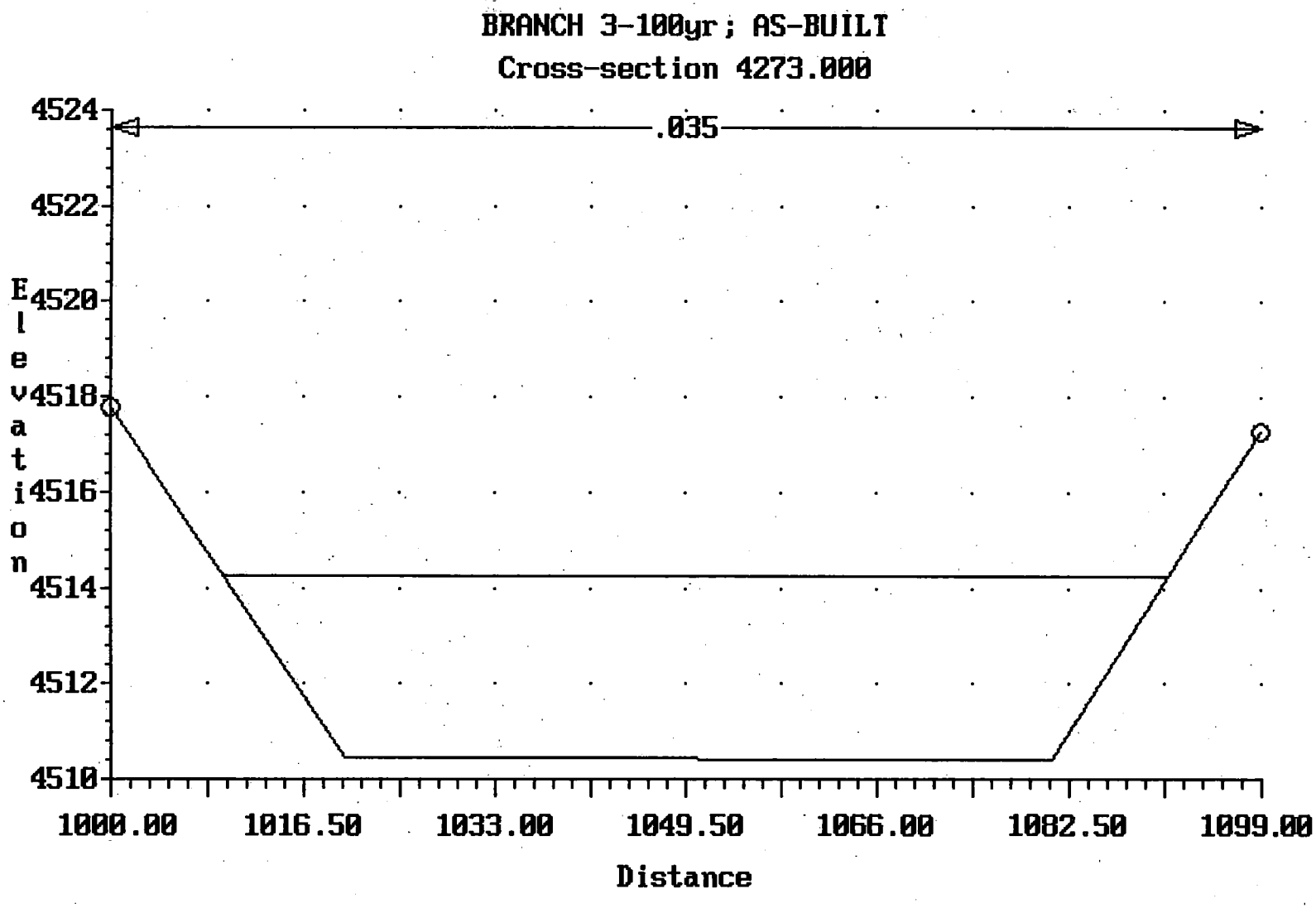
1105.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4273.000
.035
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4522
4520
4518
4516
4514
4512
4510
Elevation
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1016.50
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1066.00
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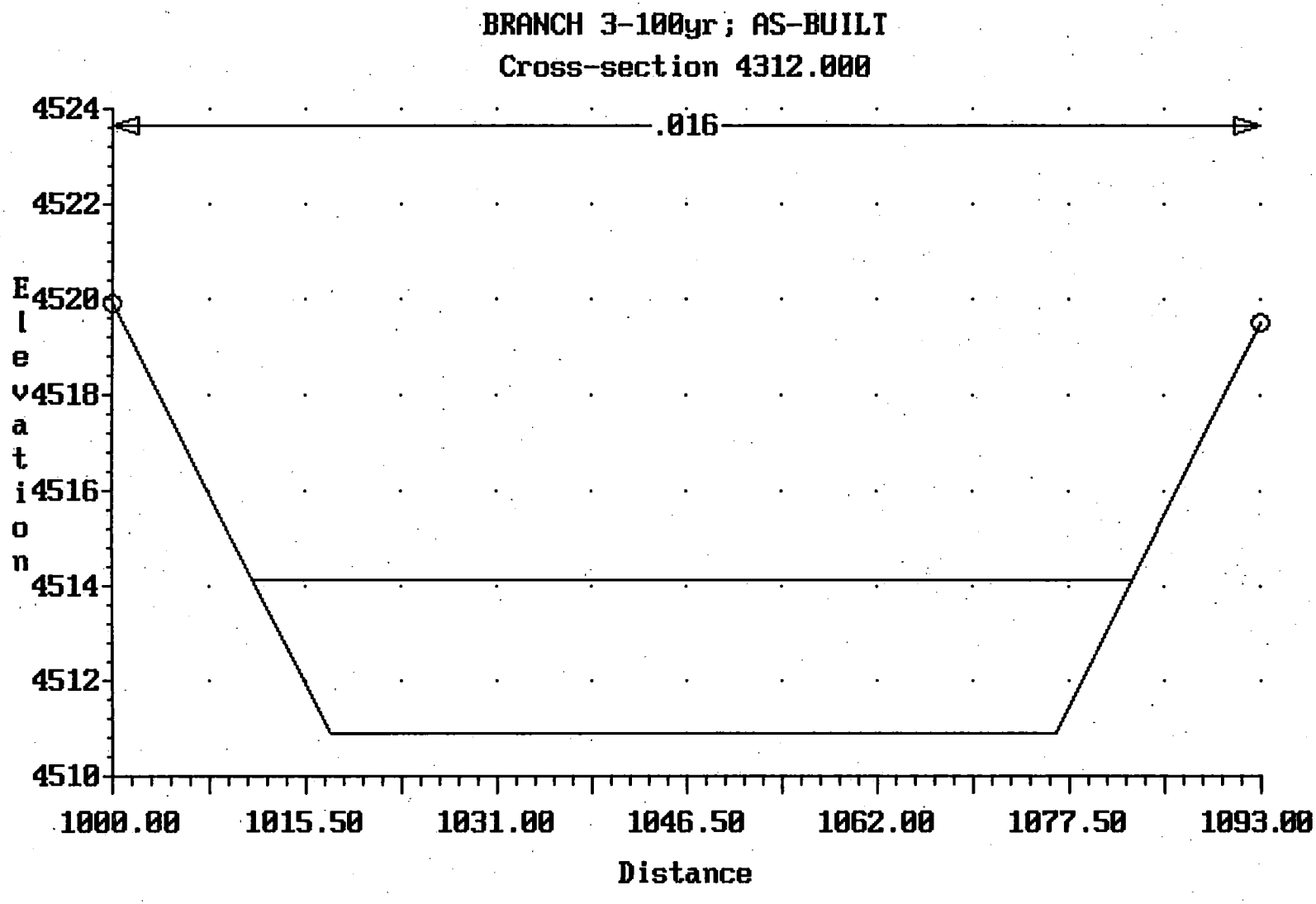
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4312.000
.016
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4522
4520
4518
4516
4514
4512
4510
Elevation
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1015.50
1031.00
1046.50
1062.00
1077.50
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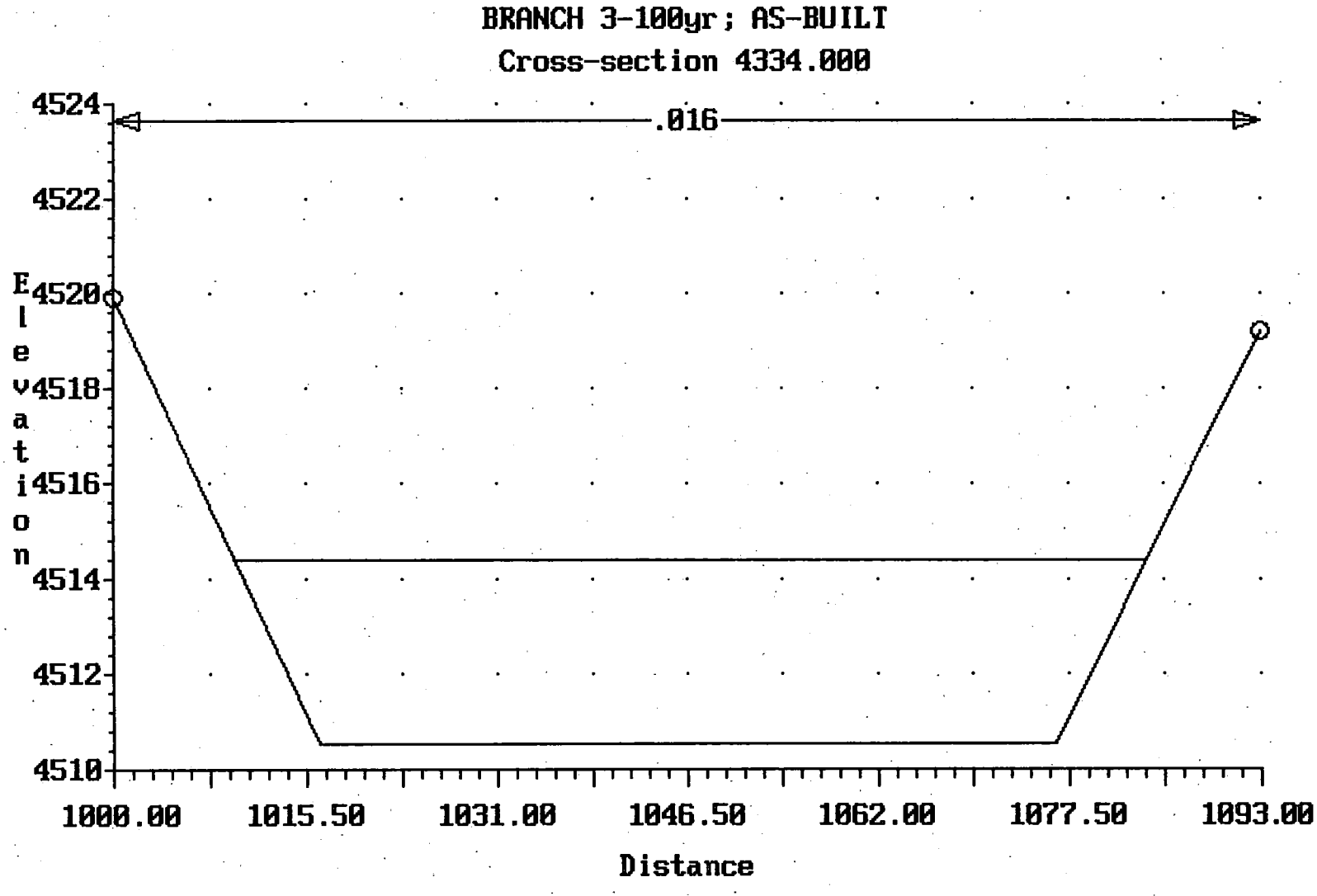
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4334.000
.016
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4522
4520
4518
4516
4514
4512
4510
Elevation
1000.00
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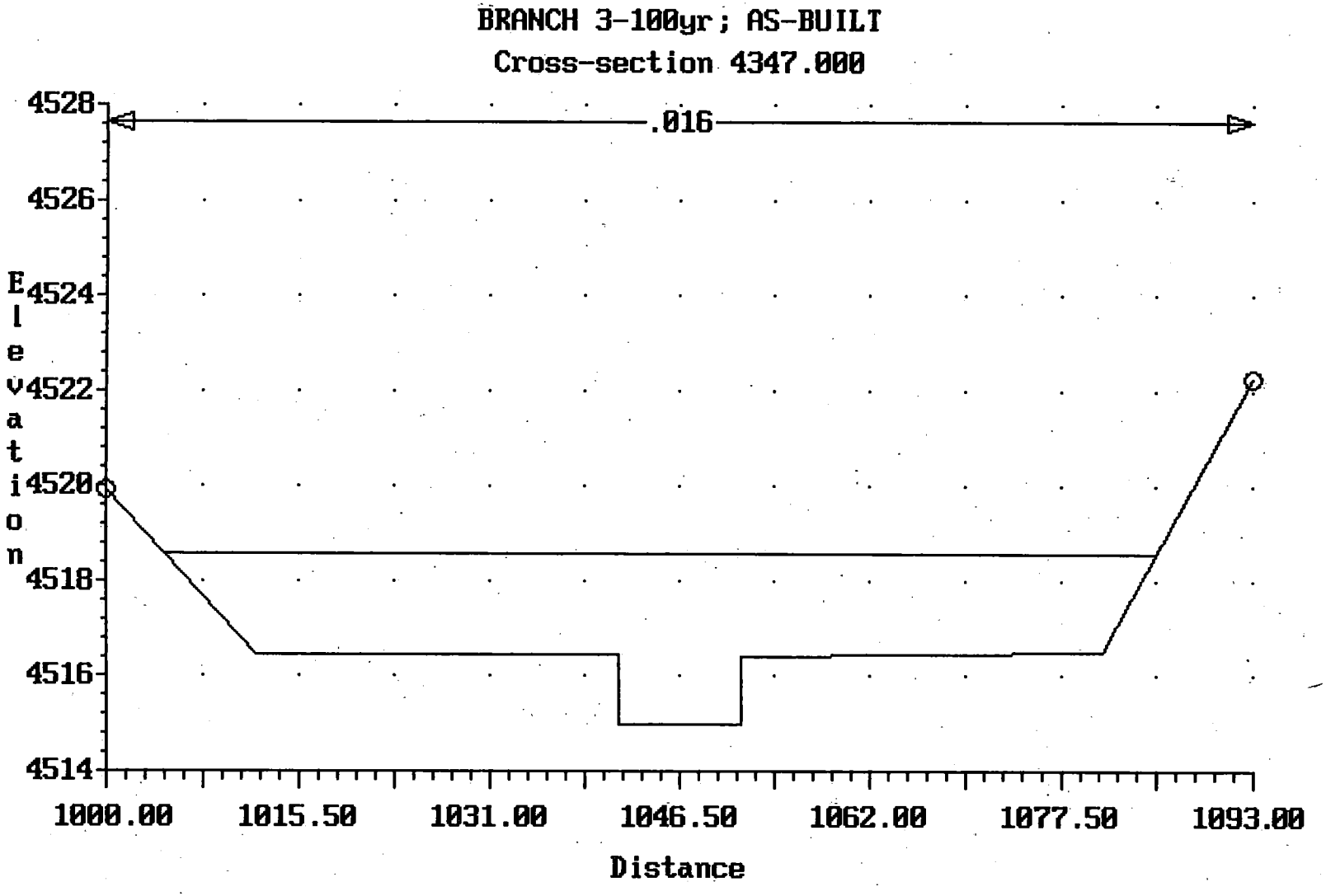
1046.50
1062.00
1077.50
1093.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4347.000
.016
4528
4526
4524
4522
4520
4518
4516
4514
Elevation
1000.00
1015.50
1031.00
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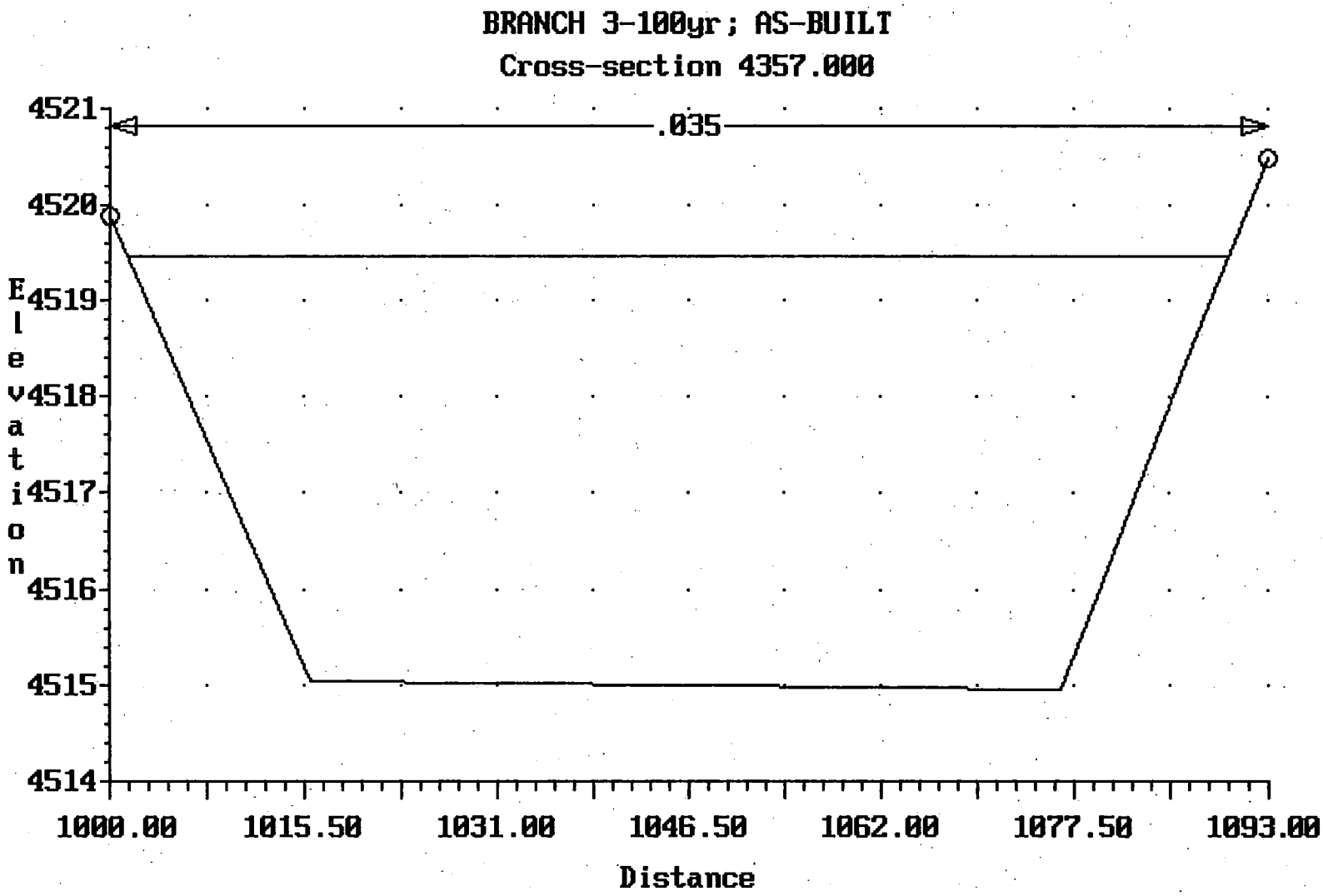
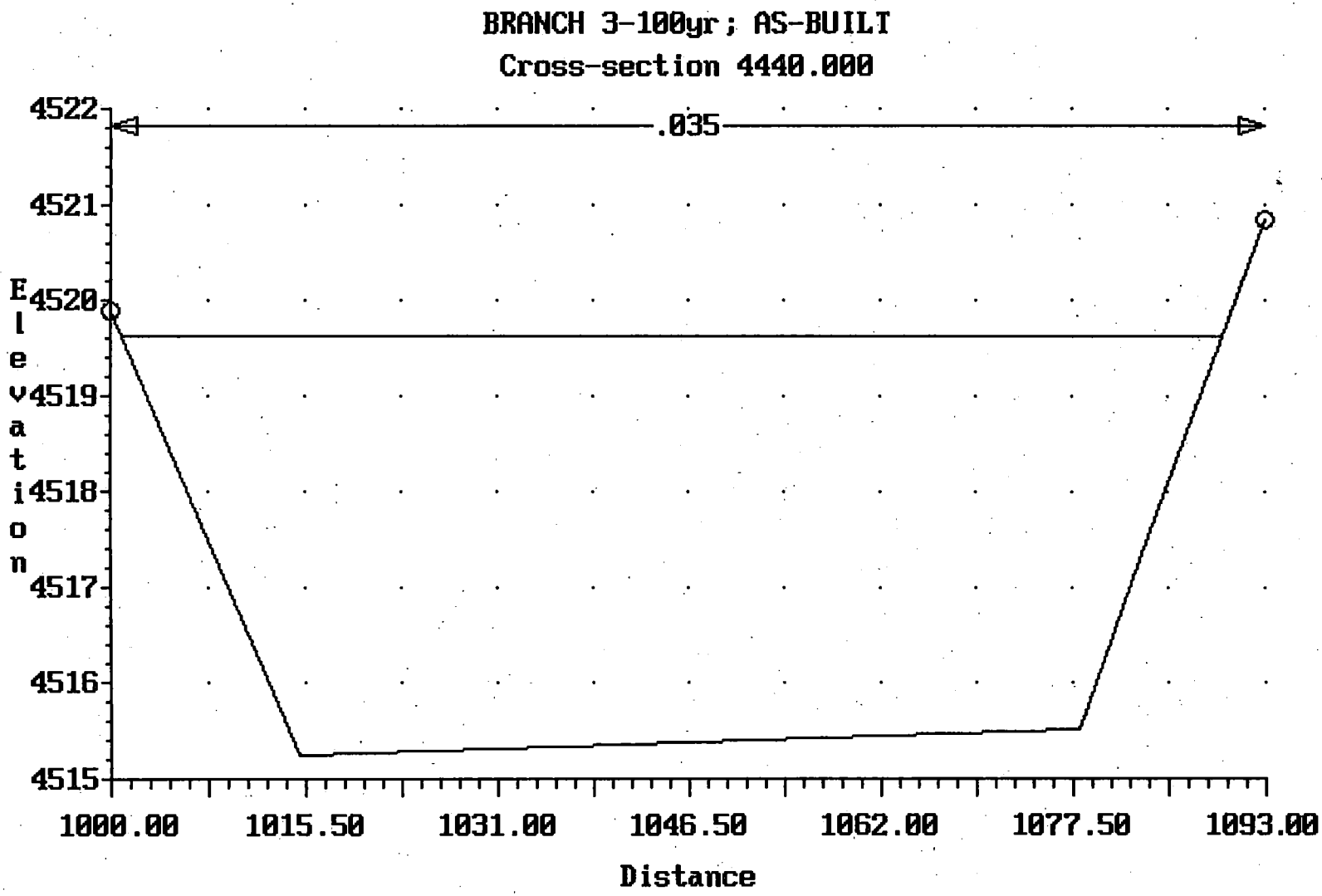
1062.00
1077.50
1093.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4357.000
.035
4521
4520
4519
4518
4517
4516
4515
4514
Elevation
1000.00
1015.50
1031.00
1046.50
1062.00
1077.50
1093.00
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4440.000
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4522
4521
4520
4519
4518
4517
4516
4515
Elevation
1000.00
1015.50
1031.00
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1062.00
1077.50
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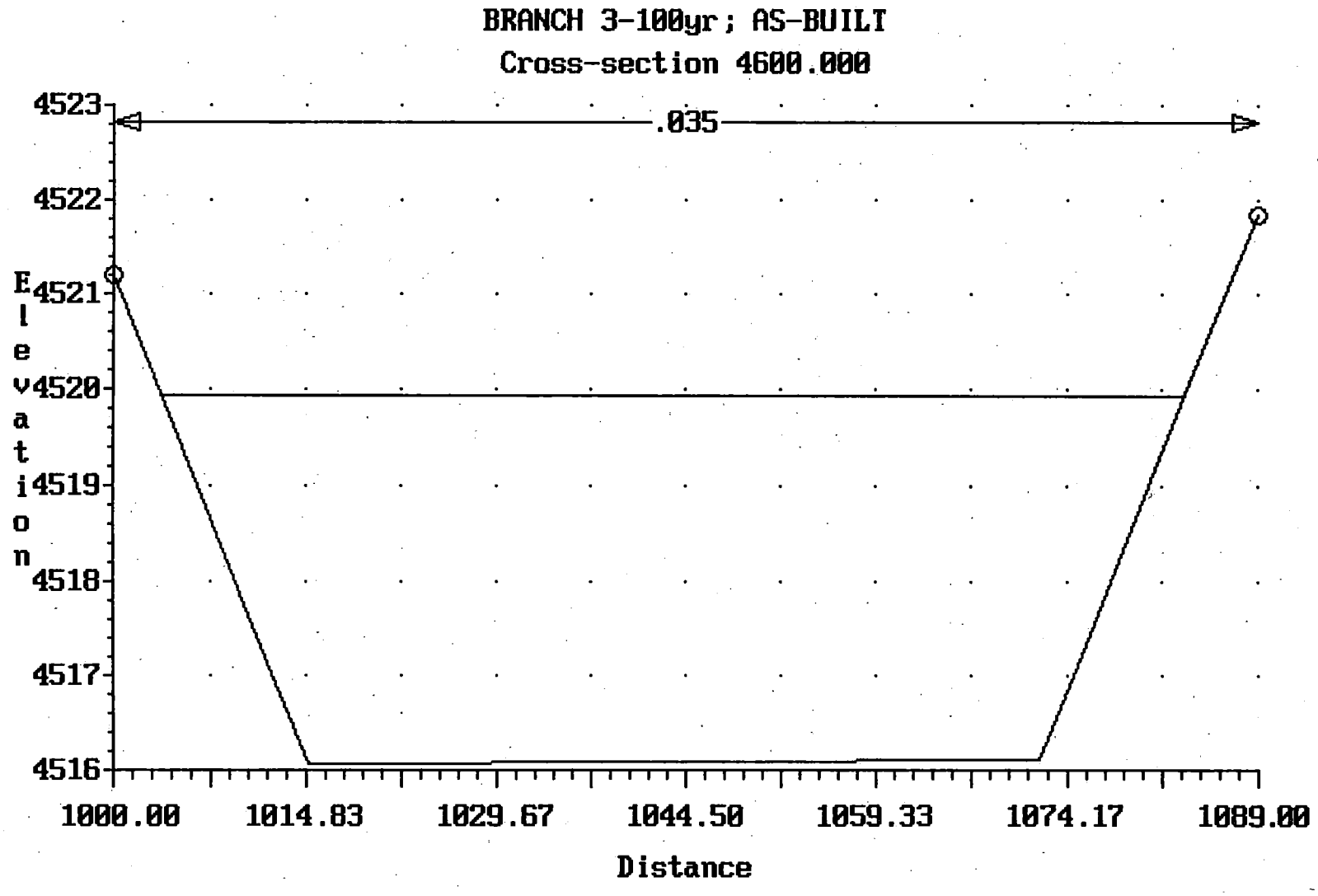
Distance


BRANCH 3-100yr; AS-BUILT
Cross-section 4600.000
.035
4523
4522
4521
4520
4519
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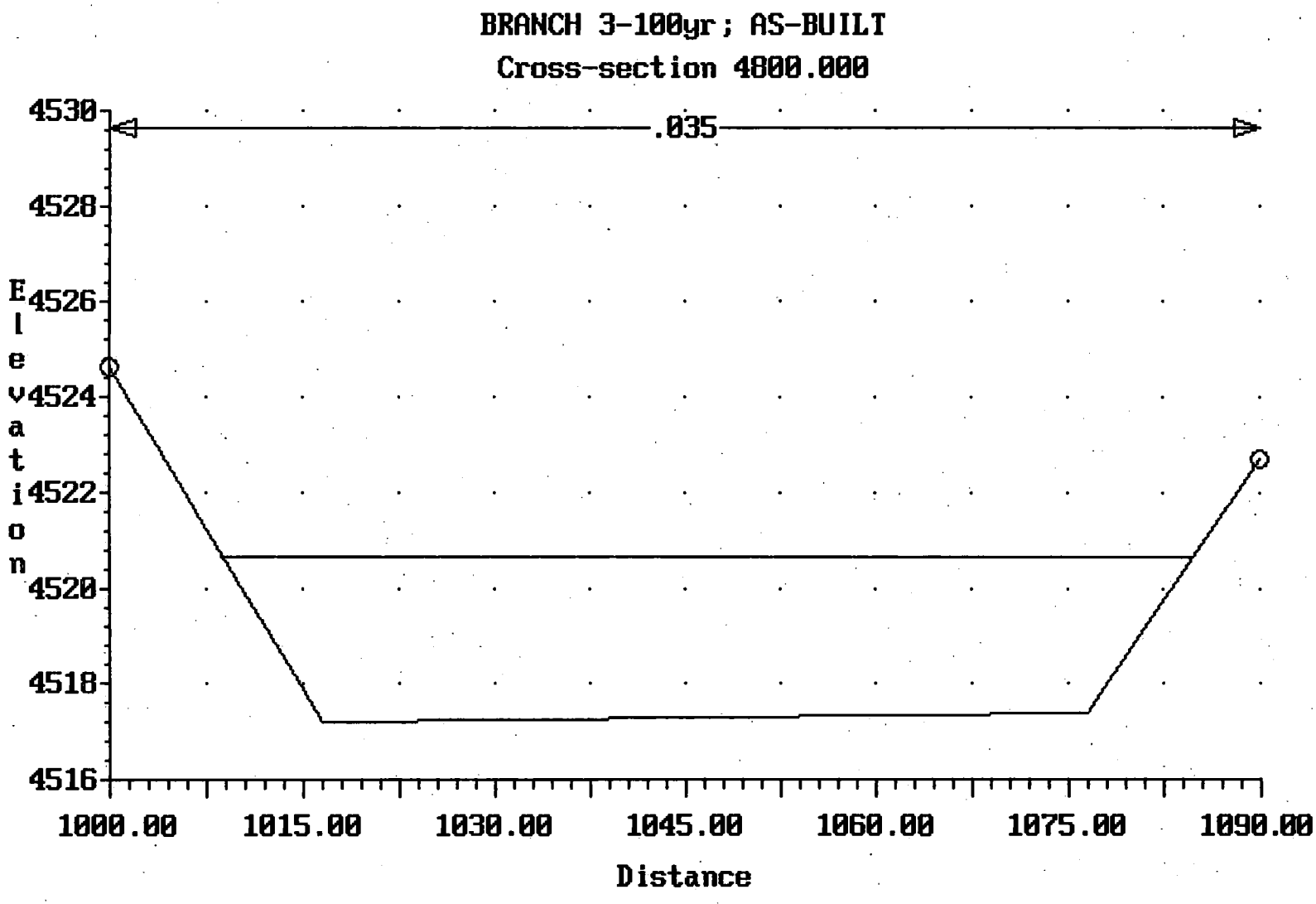
Distance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Elevation
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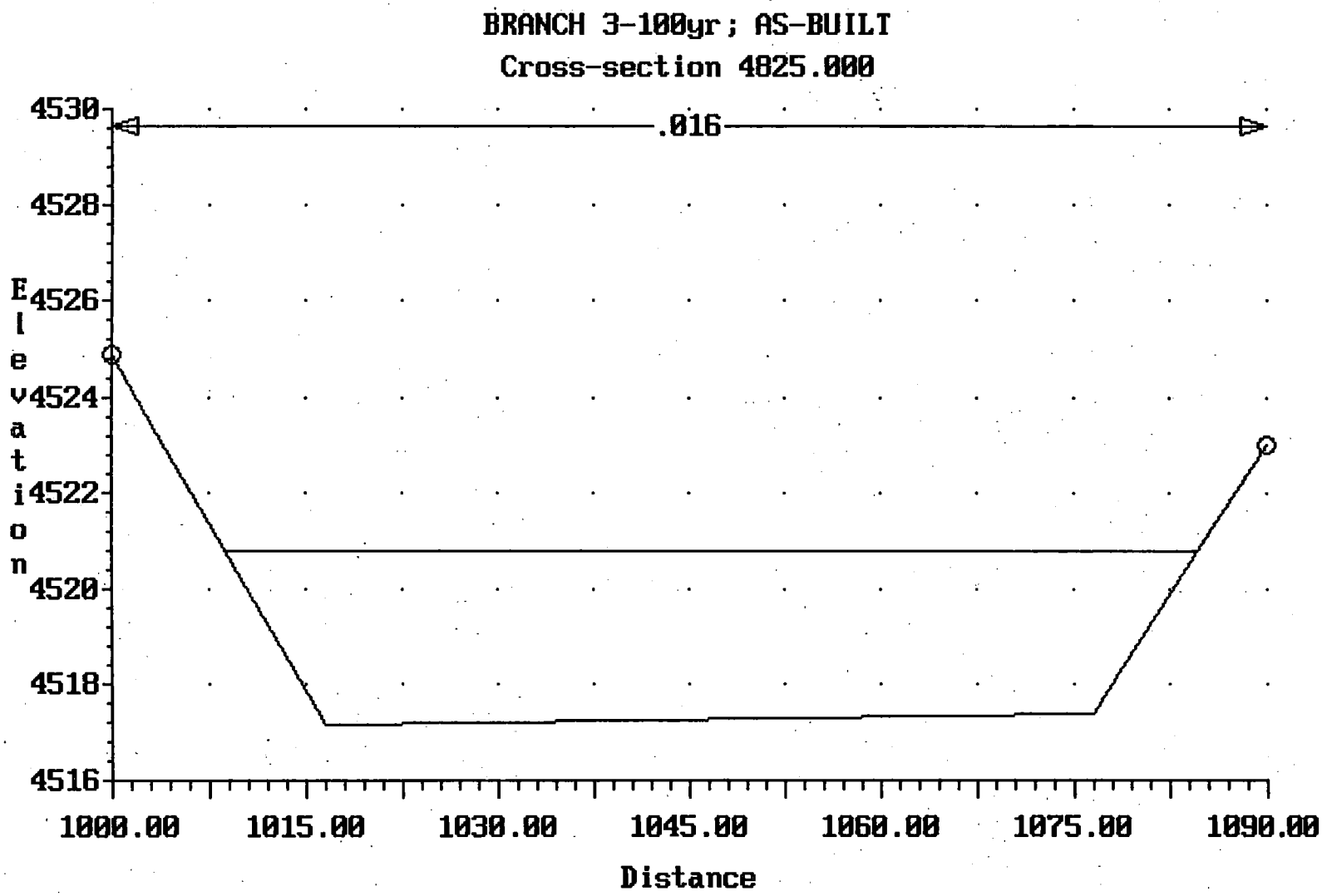
Distance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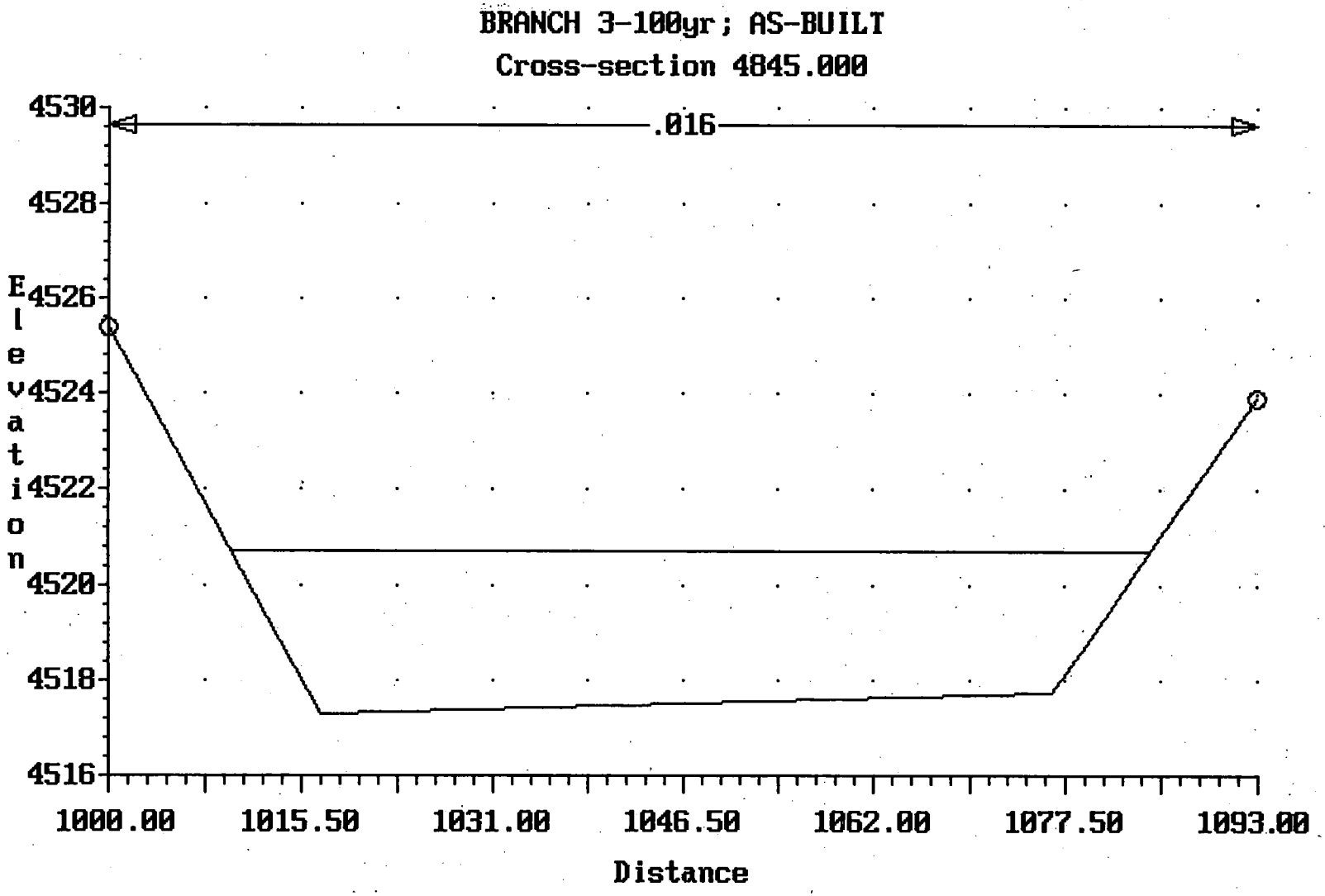
Distance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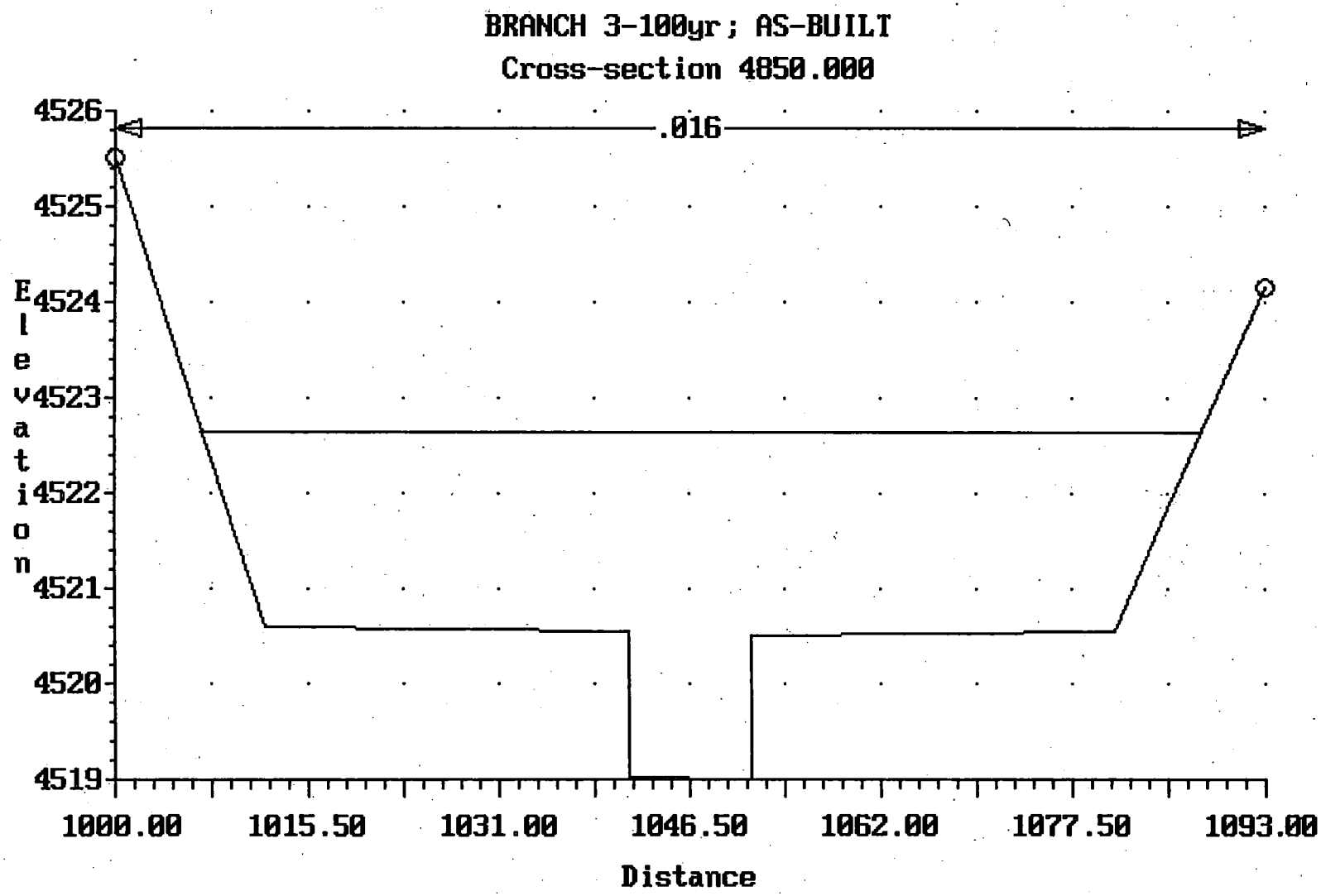
Distance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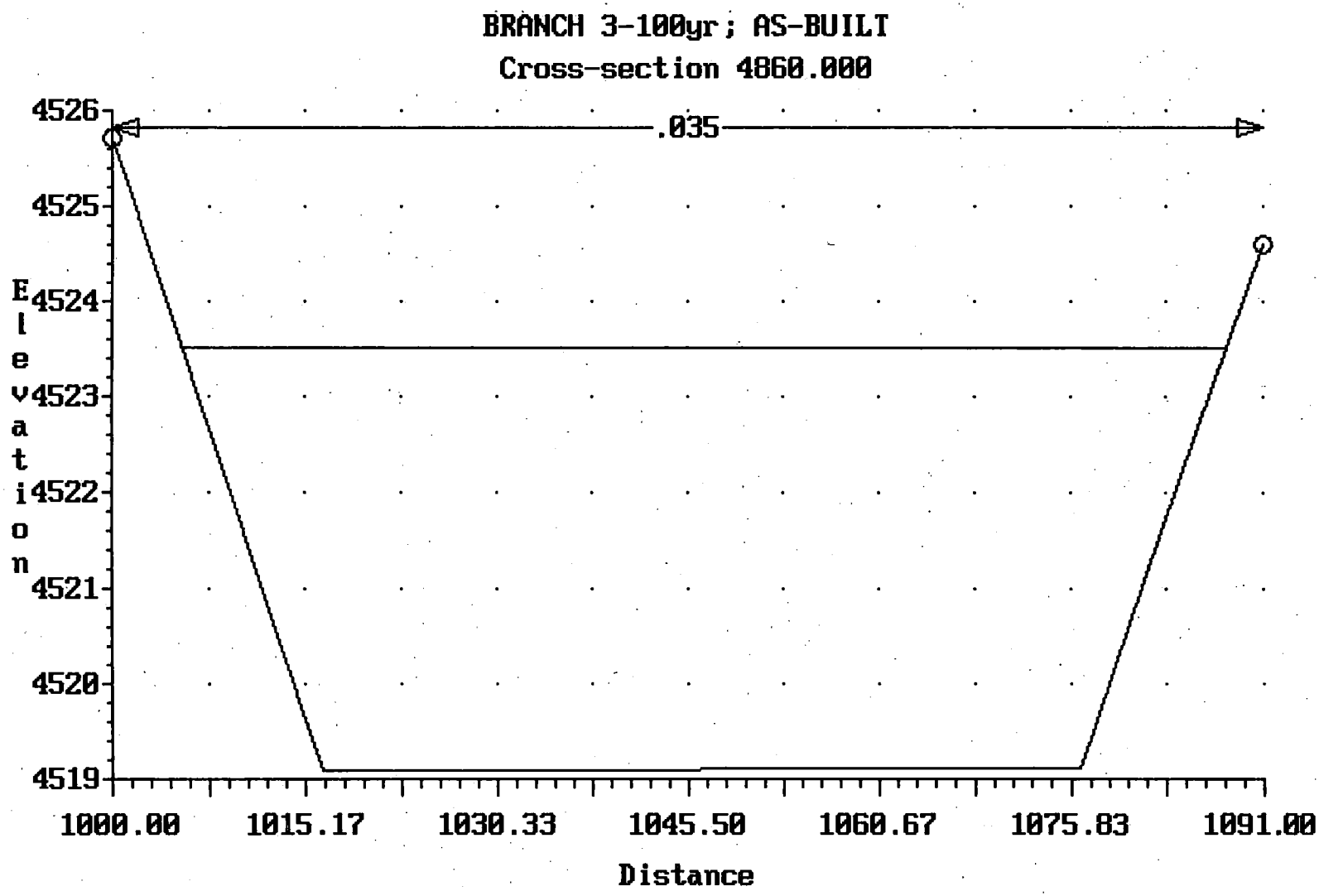
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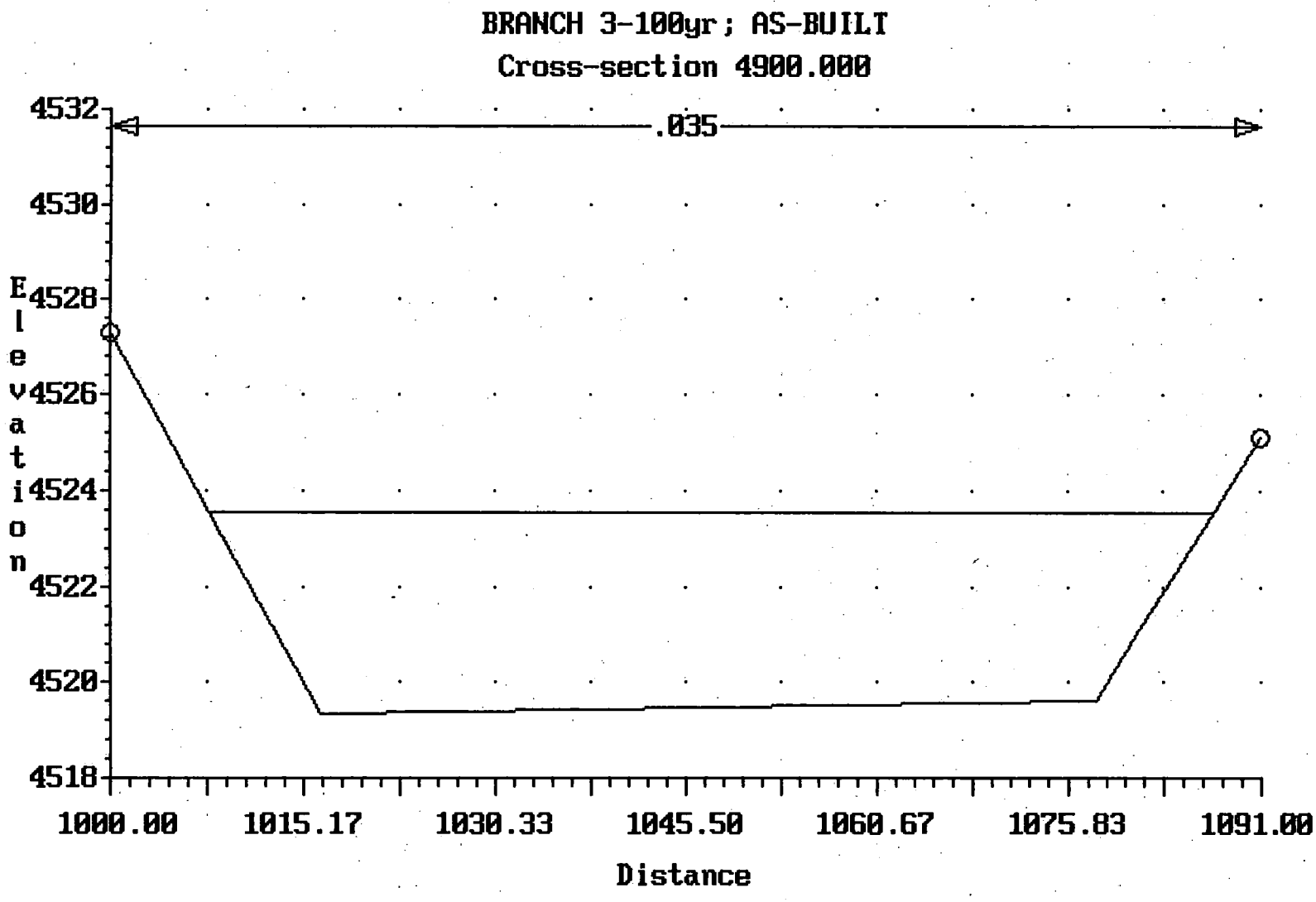
Distance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Cross-section 4900.000
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Elevation
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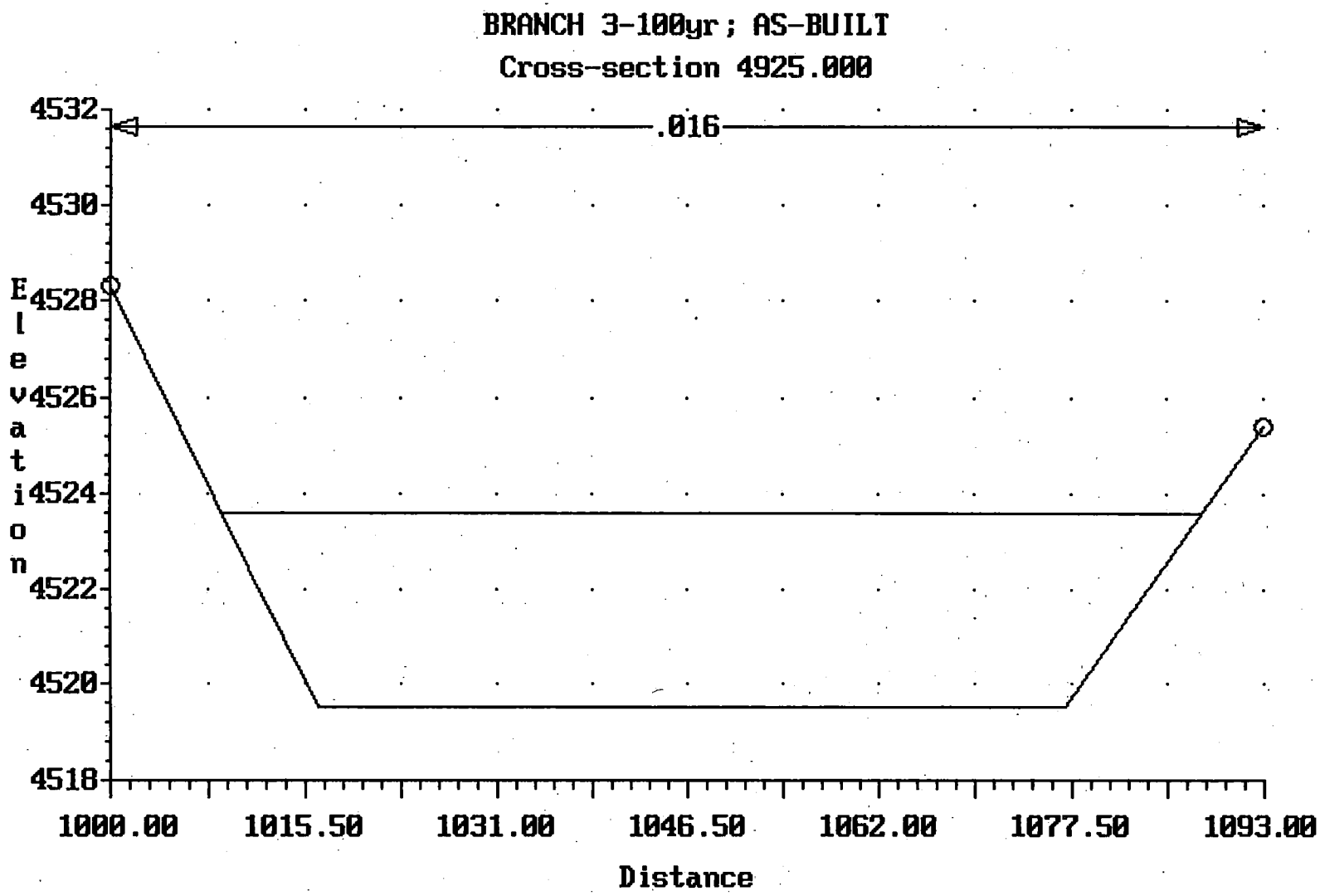
Distance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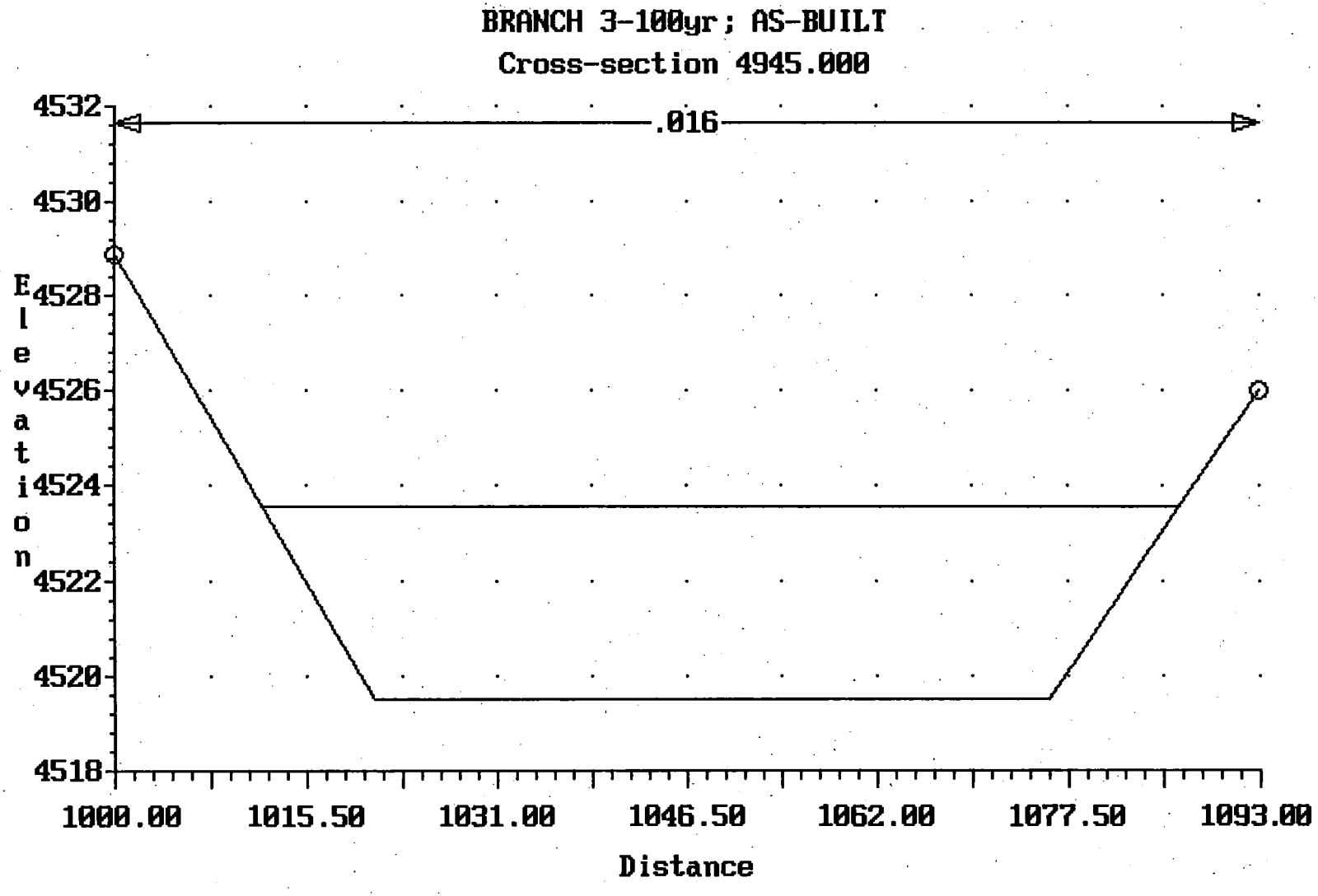
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Elevation
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1062.00
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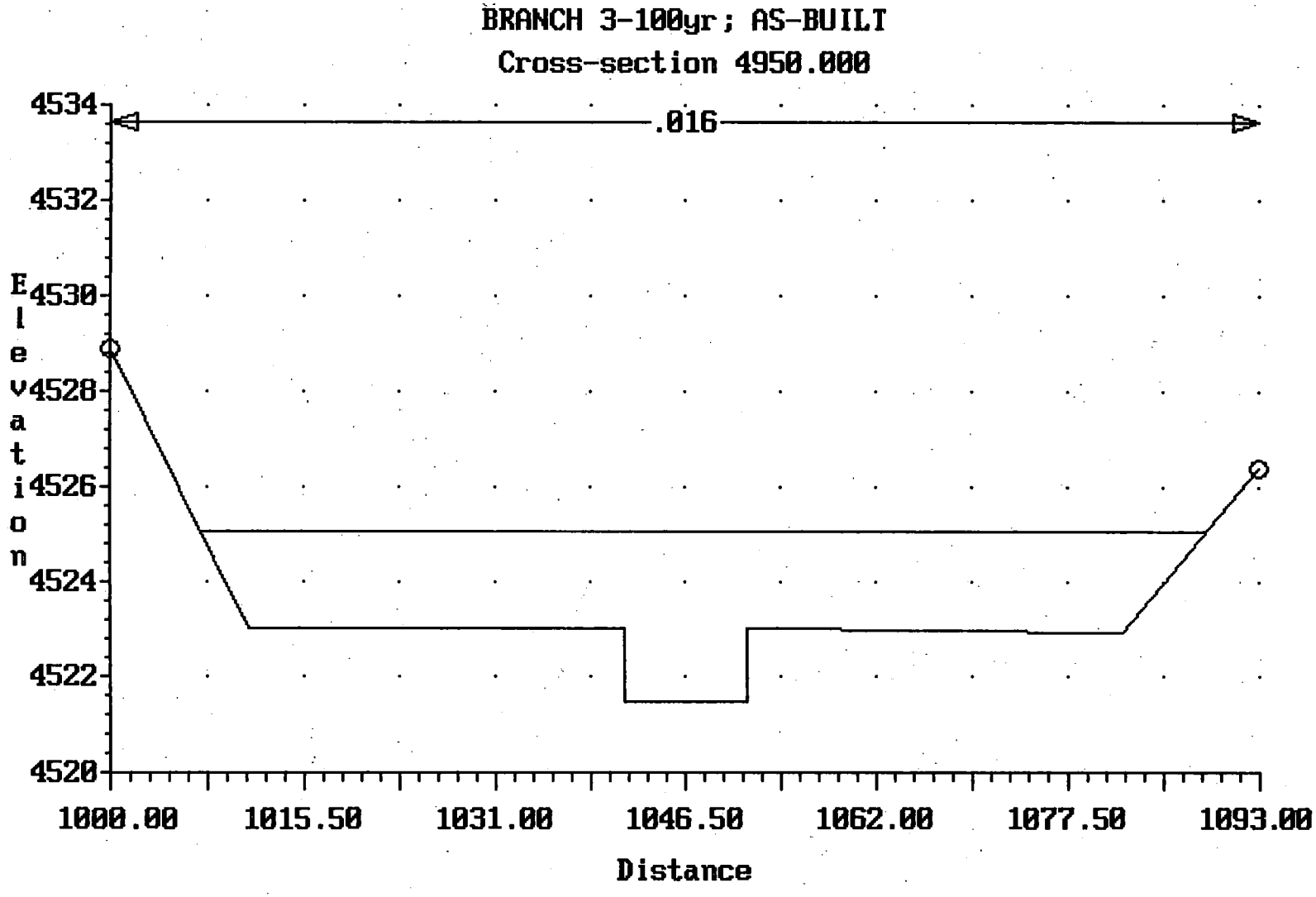
Distance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Elevation
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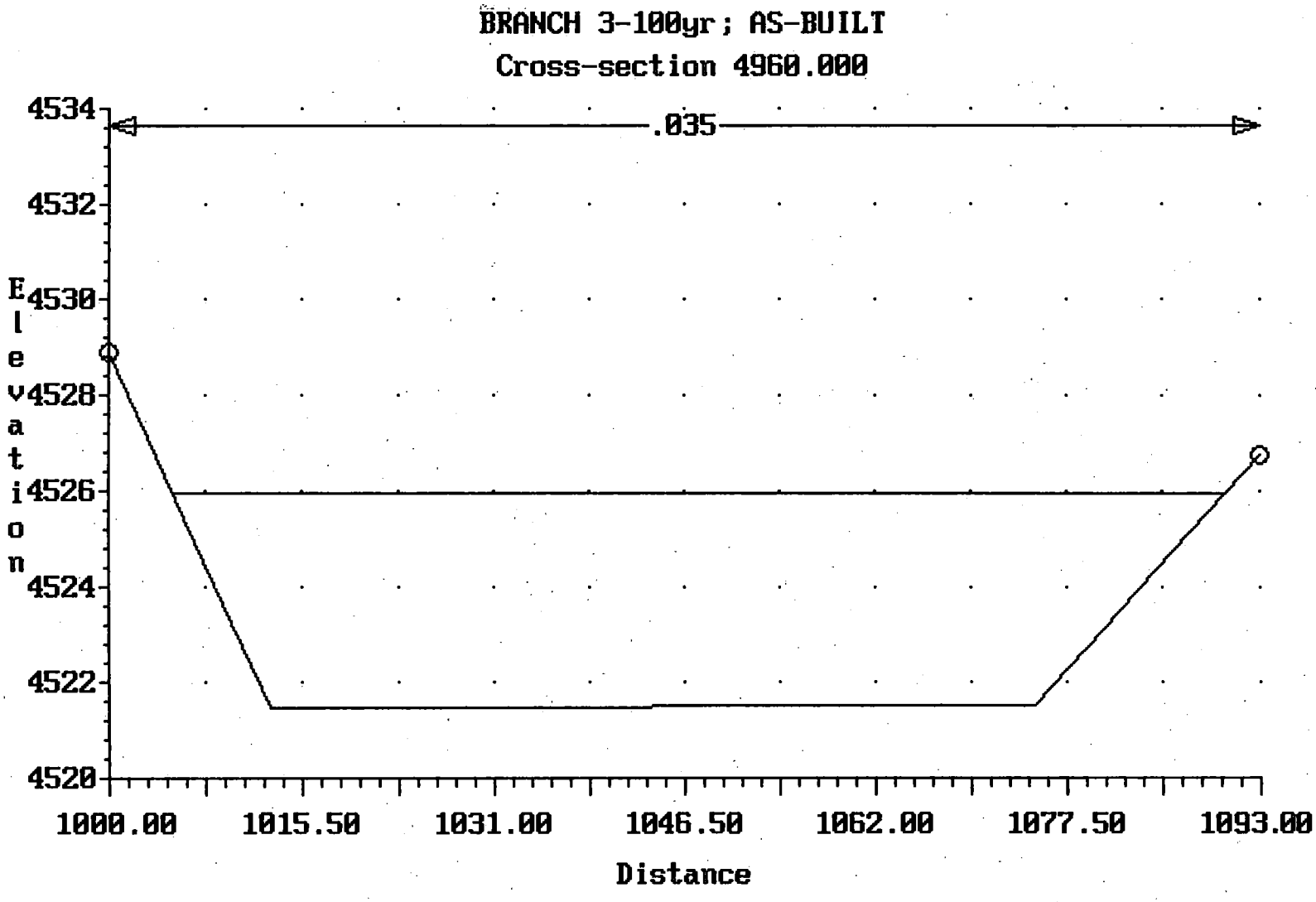
Distance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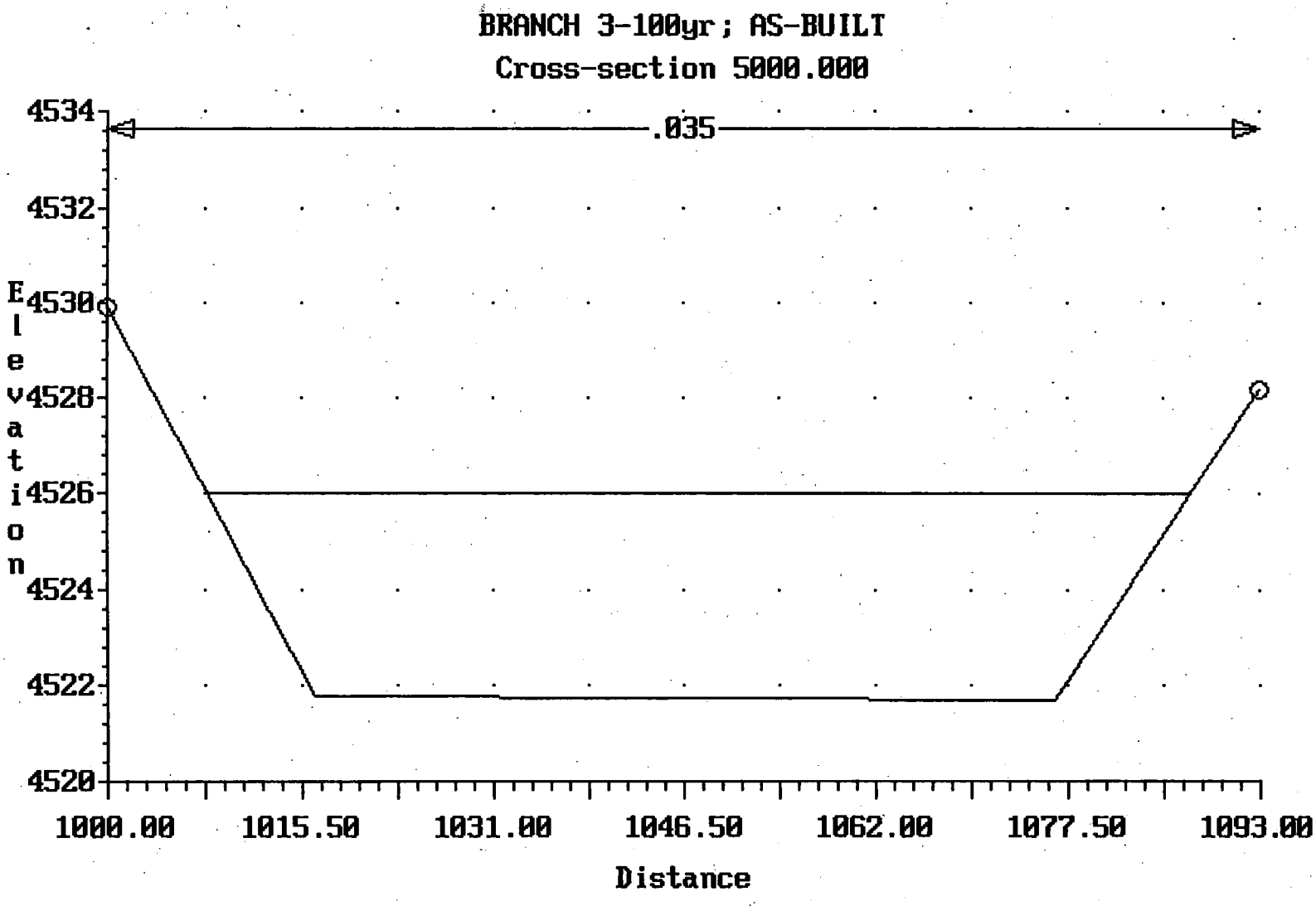
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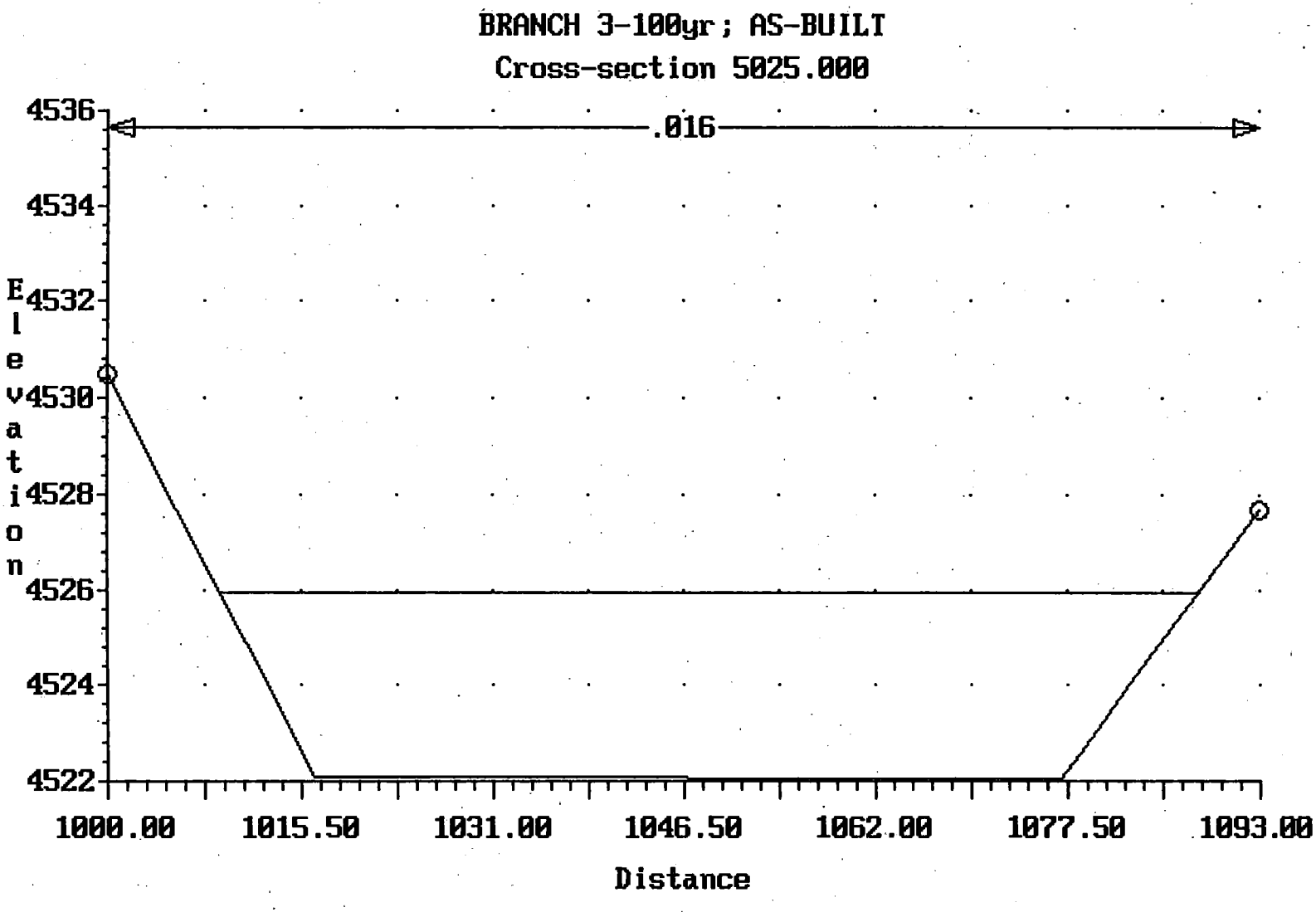
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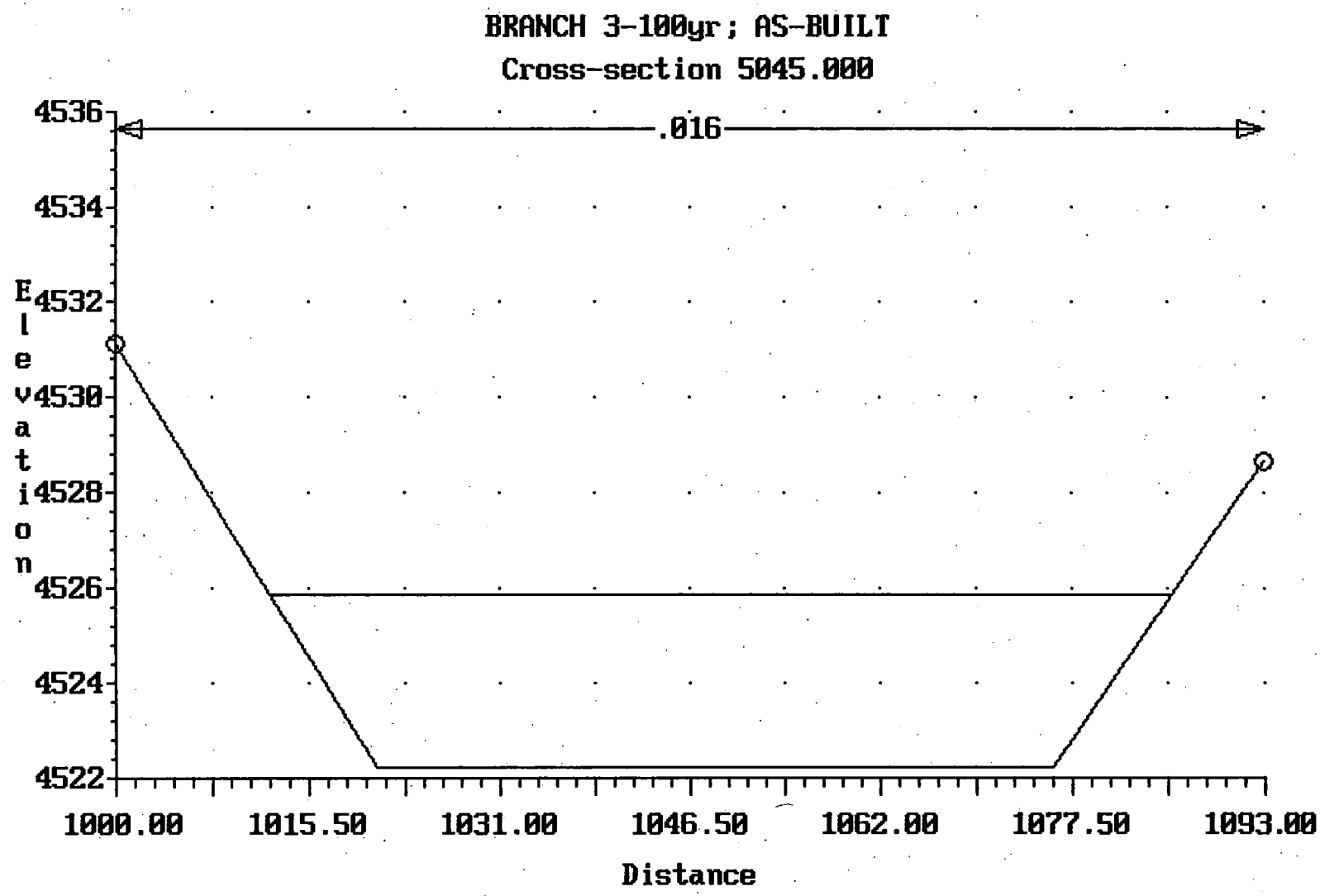
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Elevation
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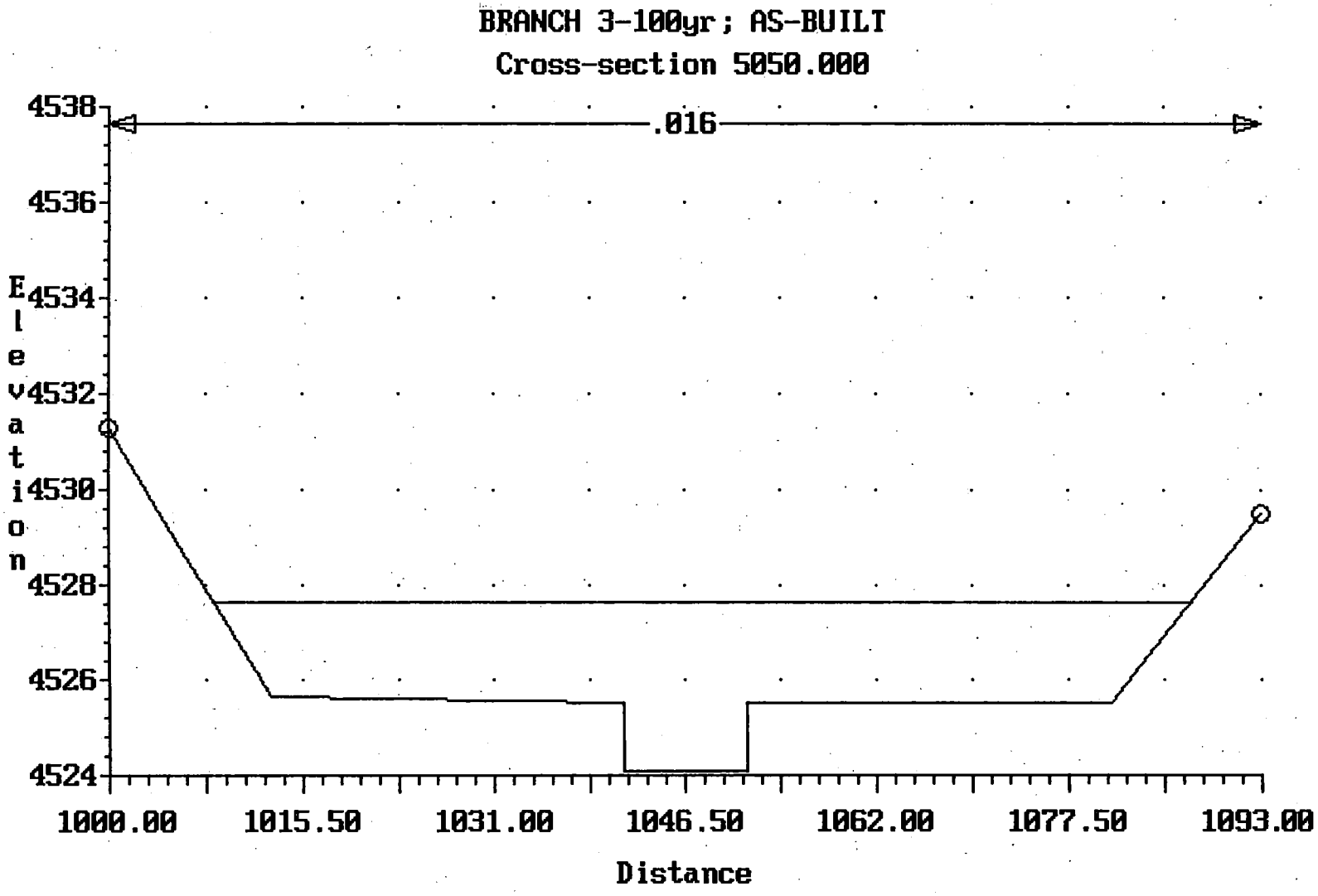
Distance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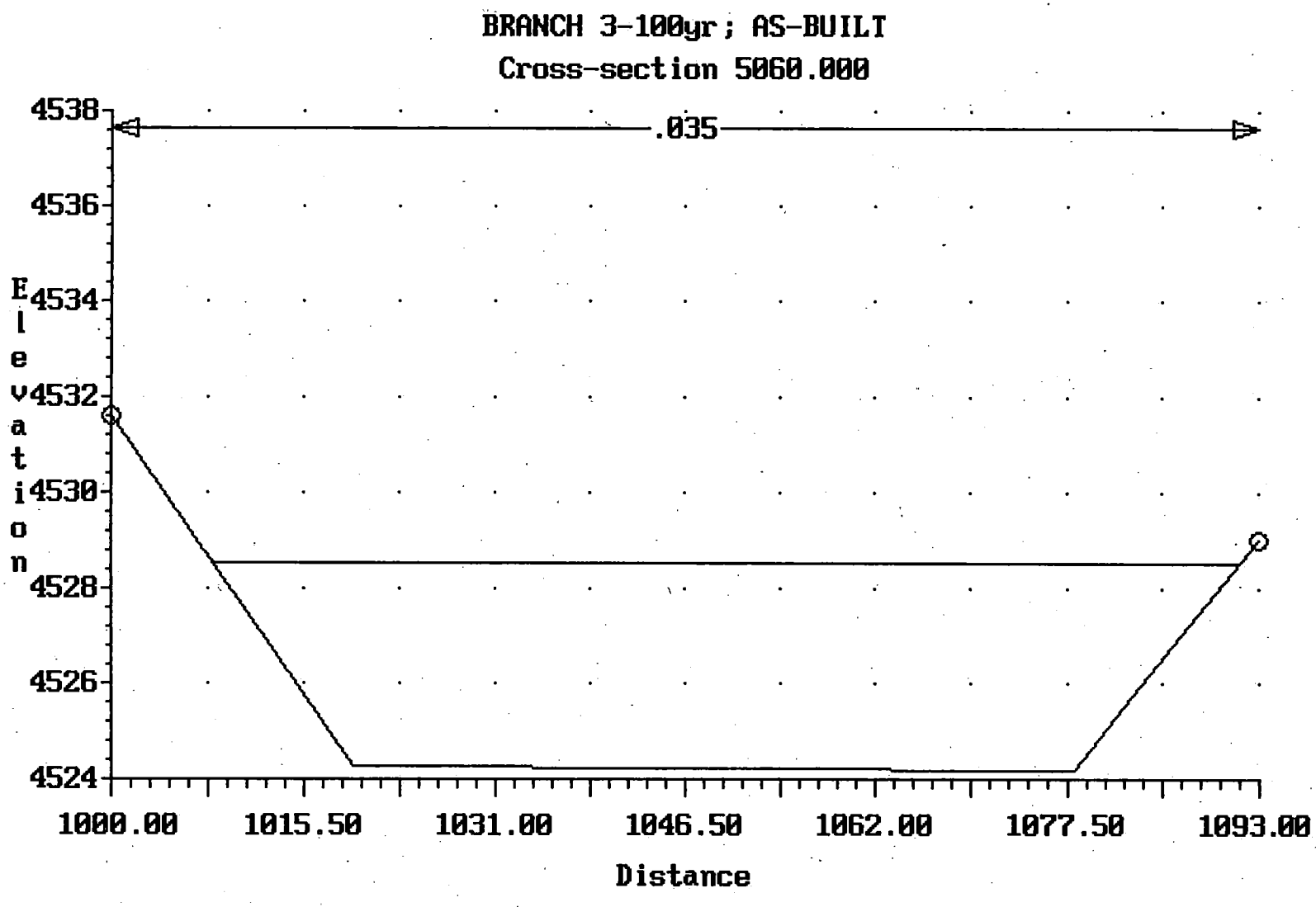
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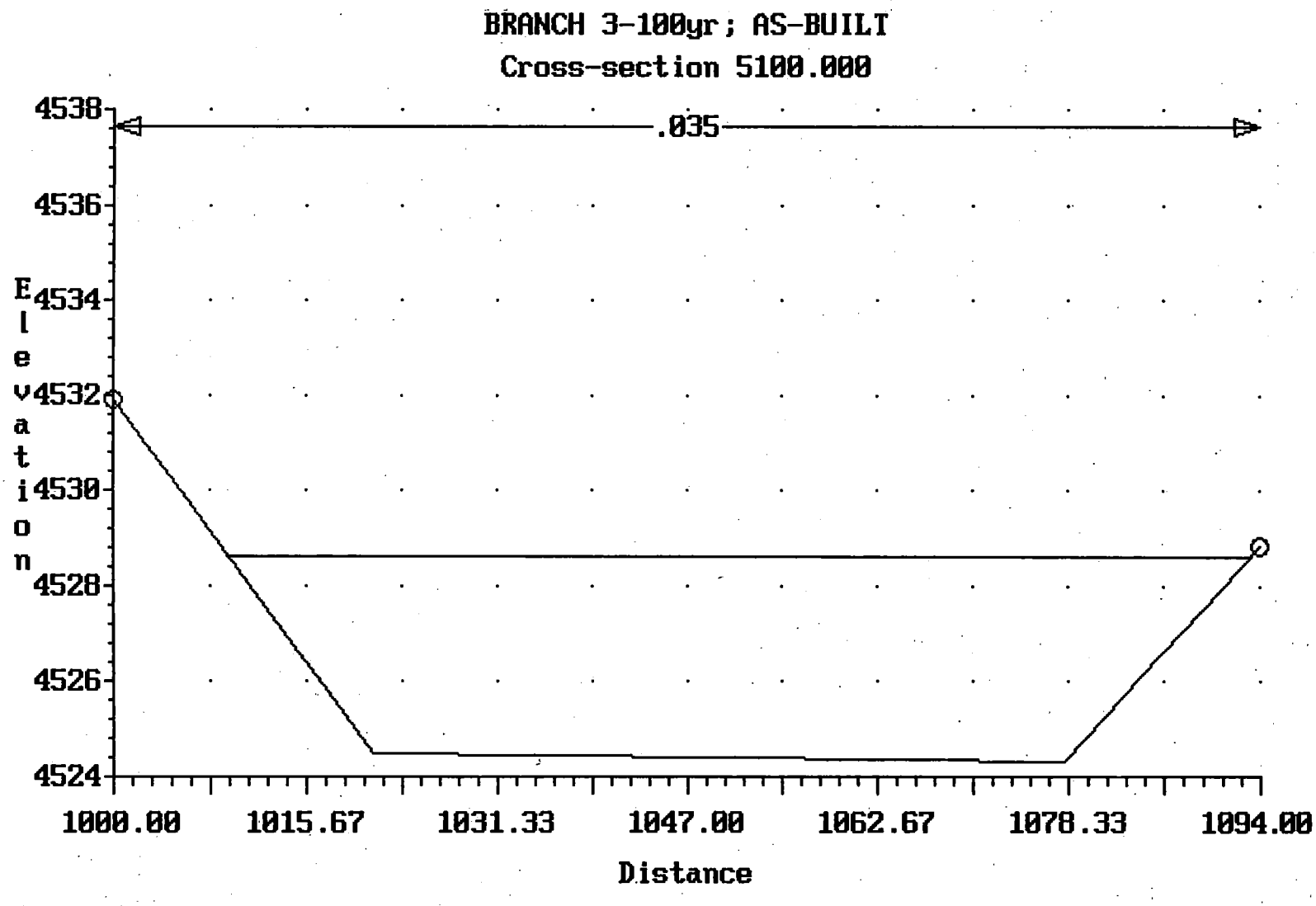
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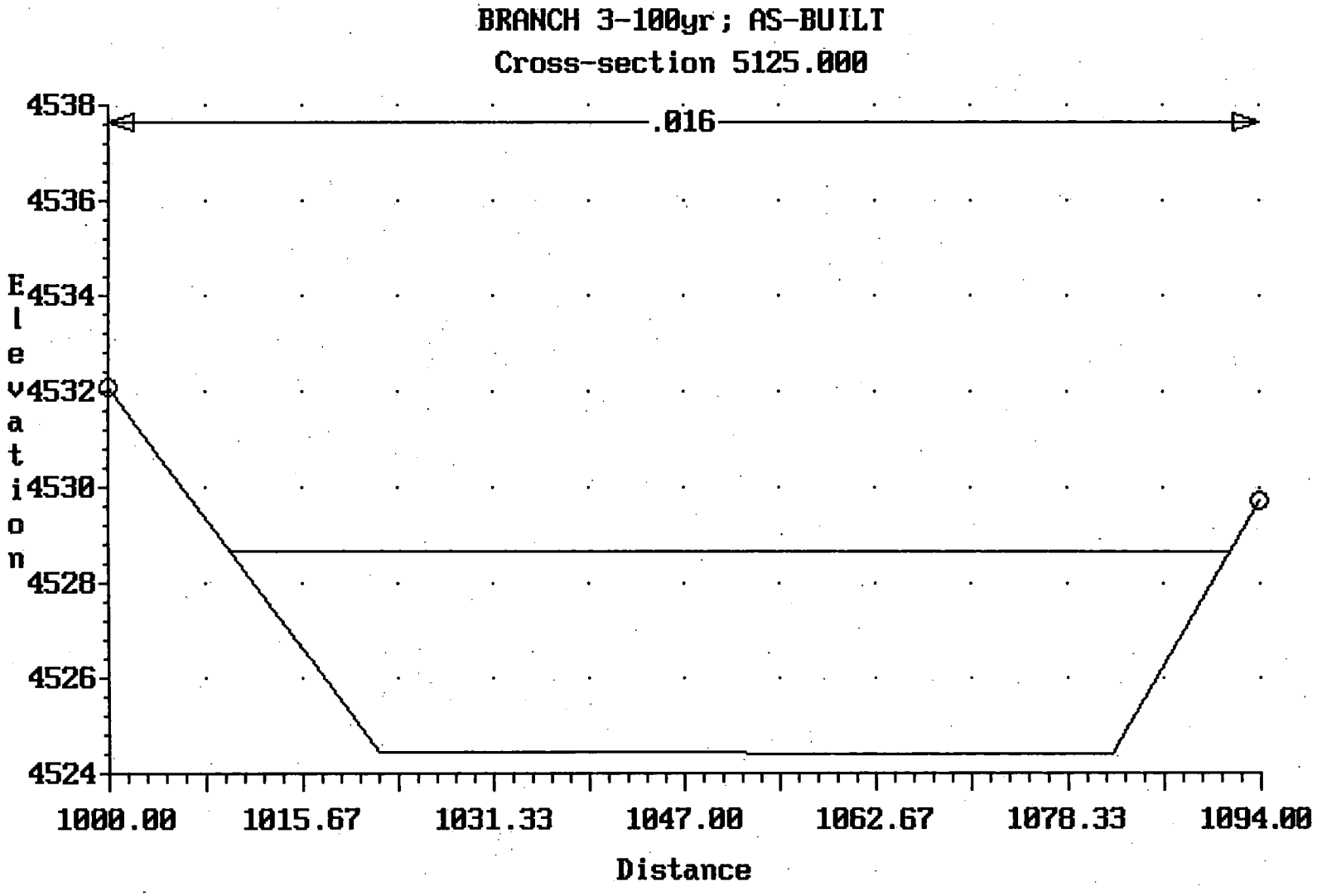
Distance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4530
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Elevation
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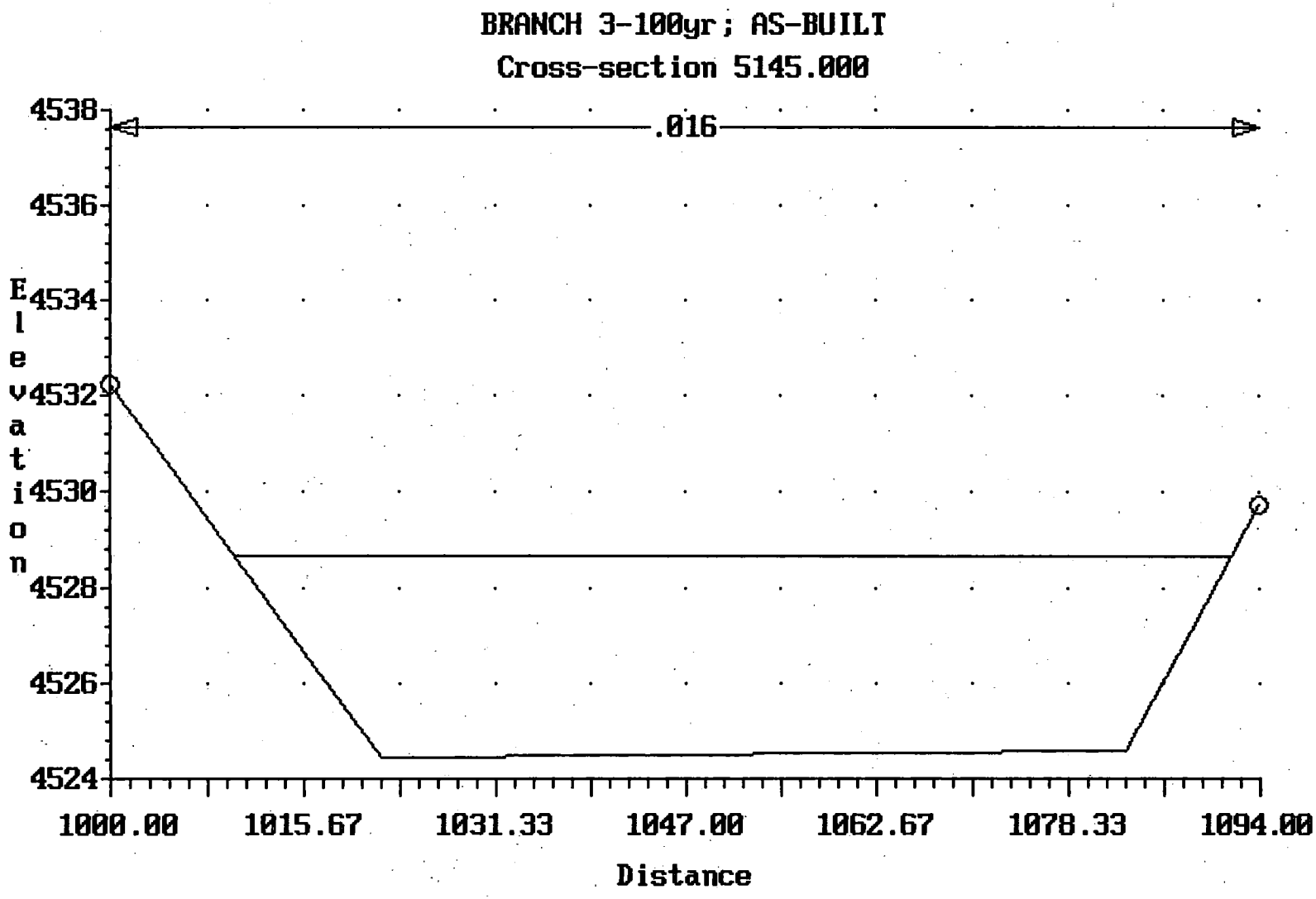
Distance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4530
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Elevation
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1094.00
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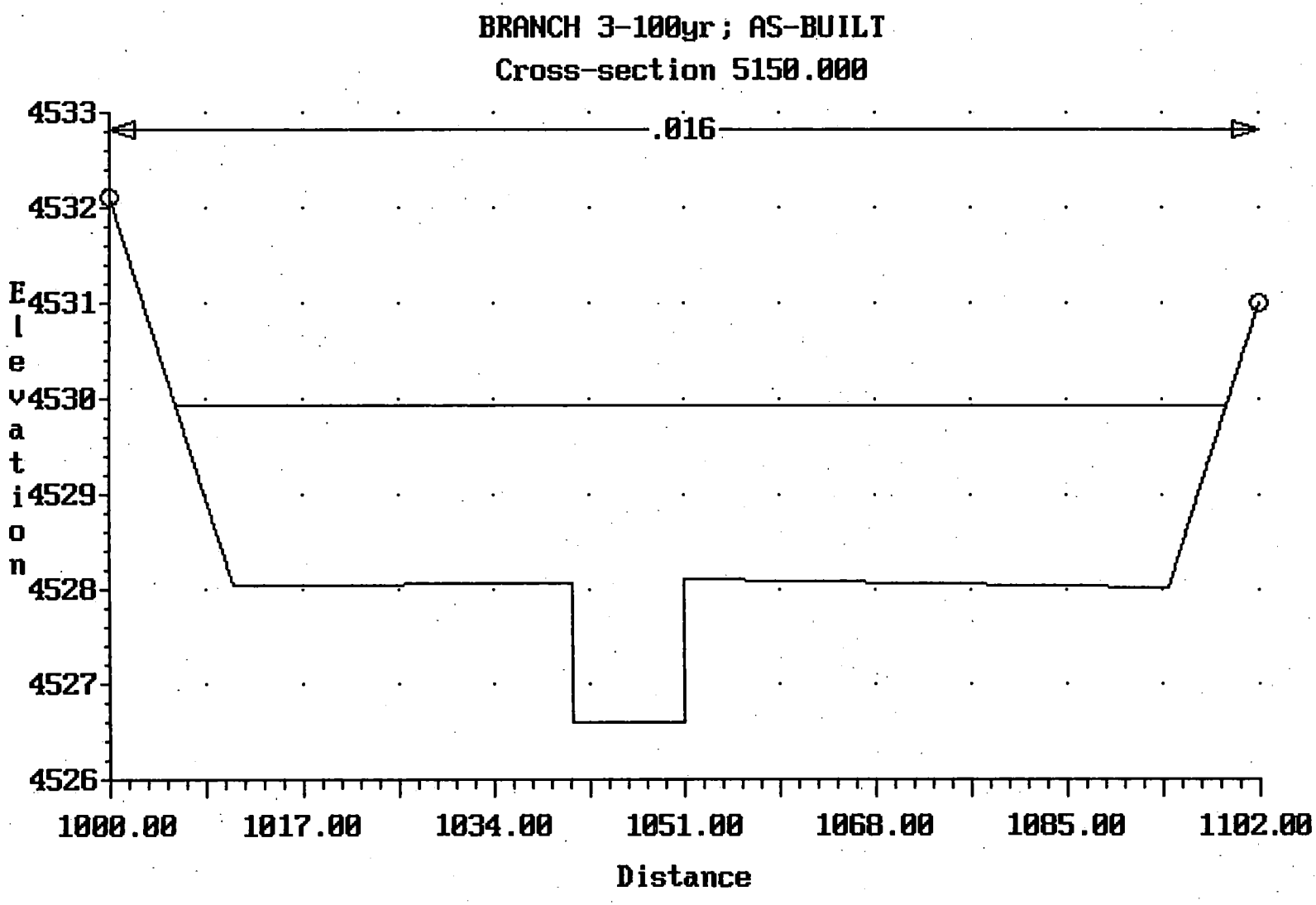
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Cross-section 5150.000
.016
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4531
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4529
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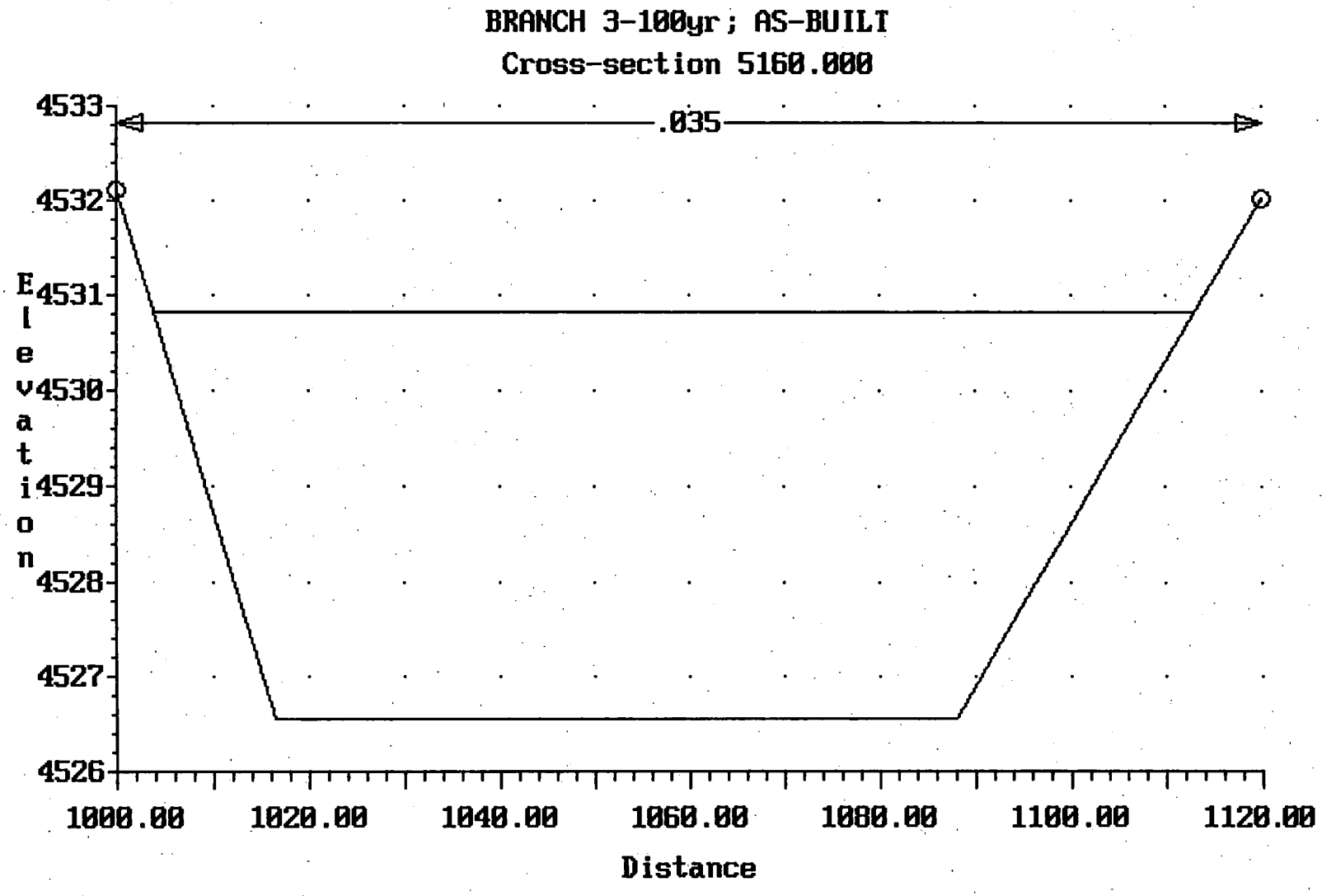
Distance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4531
4530
4529
4528
4527
4526
Elevation
1000.00
1020.00
1040.00
1060.00
1080.00
1100.00
1120.00
Distance

APPENDIX E

AS-BUILT HYDRAULIC WORKMAP

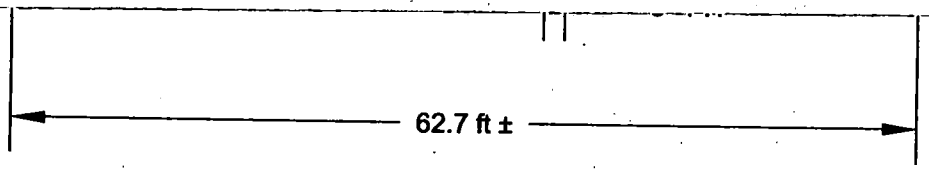
APPENDIX F

AS-BUILT DIAGRAMS FOR STEAMBOAT PARKWAY CULVERTS

STEAMBOAT PARKWAY BOX CULVERT DETAIL

Plan View

N.T.S.



Elevations NAVD 29

Sheet 1 of 1	**APPENDIX F**	**Scale:** N.T.S.	Nimbus Engineers
Nimbus Job # 0008	**STEAMBOAT PARKWAY BOX CULVERTS**	**Contour Interval:** N/A	3785 Baker Ln., Suite 201 • Reno, NV 89509
Date: March 2001	*Whites Creek Branch 3*	**File Name:** 008culv	Mail: P.O. Box 10220 • Reno, NV 89510
	Reno *Washoe County* *Nevada*	**Drawn By:** KK	(775) 689-8630 • Fax (775) 689-8614
		Designed By:	www.nimbusengineers.com

APPENDIX G

SUPPORTING CALCULATIONS FOR THE HEC-1 MODEL

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W1

	SOIL	AREA	% AREA
	1450	3.05	31
	1100	2.00	21
9.5 in²	756	2.40	25
	1440	1.00	10
	1460	1.30	13
		9.75	100

SOIL #	% SUB. AREA	CN
756	25	61
1100	21	64
1440	10	59
1450	31	64
1460	13	66

WEIGHTED CN = 63

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SHEET NO. _____ OF _____
CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

SUBBASIN W1

SOIL 7516

GROUP	%	VEG (%)	% COVER	CN	
A	20	40 PINE	50	36	
		30 MANZ	40	40	40.8
		30 SAGE	25	48	
B	33	40 PINE	50	60	
		30 MANZ	40	54	59.4
		30 SAGE	25	64	
C	41	40 PINE	50	70	
		30 MANZ	40	63	69.7
		30 SAGE	25	76	
D	6	40 PINE	50	81	
		30 MANZ	40	68	77.4
		30 SAGE	25	82	

CN = .61

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SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W1

SOIL # 1100

GROUP	%	VEG (%)	% COVER	CN	
B	60	40 PINE	50	60	
		30 MAHOG	40	54	59.4
		30 SAGE	25	64	
C	30	40 PINE	50	70	
		30 MAHOG	40	63	69.7
		30 SAGE	25	76	
D	10	40 PINE	50	81	
		30 MAHOG	40	68	77.4
		30 SAGE	25	82	

CN = 64

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W1

SOIL # 1440

GROUP	%	VEG (%)	% COVER	CN	
B	100	20 MAHOG	50	48	
		70 PINE	40	61	58.9
		10 BARE	20	66	

CN = 59

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JOB
SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W1

SOIL 1450

GROUP	%	% VEG.	% COVER	CN	
A	30	85% PINE	50	36	36.6
		15% MOHOG	40	40	
B	10	85 PINE	50	60	59.1
		15 MOHOG	40	54	
C	5	85 PINE	50	70	69
		15 MOHOG	40	63	
D	55	85 PINE	50	81	79
		15 MOHOG	40	68	

CN = 64

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W1

SOIL # 1460

GROUP	%	VEG (%)		% COVER	CN	
B	62	20	MANZ	50	48	
		70	PINE	40	61	58.9
		10	SAGE	20	66	
C	4	20	MANZ	50	57	
		70	PINE	40	73	70.3
		10	SAGE	20	78	
D	34	20	MANZ	50	63	
		70	PINE	40	82	78.5
		10	SAGE	20	85	

CN = 66

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SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W2 5.8 IN^2

SOIL	AREA	% AREA
1100	2.9	49
1440	0.75	13
1450	1.75	30
756	0.5	8
	5.9	100%

SOIL #	% SUBBASIN	CN
756	8	58
1100	49	61
1440	13	65
1450	30	73

WEIGHTED CN = 65

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SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W2

SOIL TSL

Group	%	Veg (%)	% Cover	CN	
A	20	10 PINE	50	36	
		80 MAHOG	40	40	40.4
		10 SAGE	10	48	
B	33	10 PINE	50	60	
		80 MAHOG	40	54	56.4
		10 SAGE	10	72	
C	41	10 PINE	50	70	
		80 MAHOG	40	63	65.9
		10 SAGE	10	85	
D	6	10 PINE	50	81	
		80 MAHOG	40	68	71.5
		10 SAGE	10	90	

CN = 58

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W2

SOIL # 1100

GROUP	%	VEG (%)	% COVER	CN	
B	60	10 PINE	50	60	
		80 MANOG	46	54	56.4
		10 SAGE	10	72	
C	30	10 PINE	50	70	
		80 MANOG	40	63	65.9
		10 SAGE	10	85	
D	10	10 PINE	50	81	
		80 MANOG	40	68	71.5
		10 SAGE	10	90	

CN = 61

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SHEET NO. OF
CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W2

SOIL # 1440

GROUP	%	VEG (%)	% COVER	CN	
B	100	90 PINE	30	64	64.8
		10 SAGE	10	72	

CN = 65

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JOB
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CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W2

SOIL # 1450

GROUP	%	VEG (%)	% COVER	CN	
A	30	20 MANOG	30	46	47.6
		80 SAGE	10	48	
B	10	20 MANOG	30	60	69.6
		80 SAGE	10	72	
C	5	20 MANOG	30	68	81.6
		80 SAGE	10	85	
D	55	20 MANOG	30	73	86.6
		80 SAGE	10	90	

CN = 73

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CALCULATED BY DATE
CHECKED BY DATE
SCALE

SUBBASIN W3 9.5 IN^2

SOIL #	AREA	% AREA
756	0.4	4
1100	5.2	55
1432	0.5	5
1440	0.9	10
1450	2.5	26
	9.5	100

SOIL #	% SUBBASIN	CN
756	4	61
1100	55	64
1432	5	69
1440	10	59
1450	26	69

WEIGHTED CN = 65

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W3

SOIL 756

GROUP	%	VEG (%)	% COVER	CN	
A	20	70 PINE	40	43	42.1
		30 MANOG	40	40	
B	33	70 PINE	40	61	58.9
		30 MANOG	40	54	
C	41	70 PINE	40	73	70.0
		30 MANOG	40	63	
D	6	70 PINE	40	82	77.8
		30 MANOG	40	68	

CN = 61

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JOB _____

SHEET NO. _____ OF _____

CALCULATED BY _____ DATE _____

CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W3

SOIL # 1100

GROUP	%	VEG %	% COVER	CN	
B	60	70 PINE	40	61	58.9
		30 MANZ	40	54	
C	30	70 PINE	40	73	70.0
		30 MANZ	40	63	
D	10	70 PINE	40	82	77.8
		30 MANZ	40	68	

CN = 64

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SCALE _____

SUBBASIN W3

SOIL #1432

GROUP	%	VEG %	% COVER	CN	
B	20	70 PINE	40	61	58.9
		30 MANZ	40	54	
C	70	70 PINE	40	73	70.0
		30 MANZ	40	63	
D	10	70 PINE	40	82	77.8
		30 MANZ	40	68	

CN = 69

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SUBBASIN W3

SOIL # 1440

GROUP	%	VEG %	% COVER	CN	
B	100	80 PINE	40	61	58.9
		20 MANZ	40	54	

CN = 59

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SCALE _____

SUBBASIN W3

SOIL # 1450

GROUP	%	VEG %	% COVER	CN	
A	30	50 MANOR	30	46	47
		50 SAGE	10	48	
B	10	50 MANOR	30	60	66
		50 SAGE	10	72	
C	5	50 MANOR	30	68	66.5
		50 SAGE	10	85	
D	55	50 MANOR	30	73	81.5
		50 SAGE	10	90	

CN = 69

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CHECKED BY DATE
SCALE

SUBBASIN W14 AREA = 10

SOIL #	AREA	% AREA
756	7.3	73
1432	2.7	27

SOIL #	% SUBBASIN	CN
756	73	55
1432	27	61

WEIGHTED CN = 57

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CALCULATED BY _____ DATE _____
CHECKED BY _____ DATE _____
SCALE _____

SUBBASIN W4

SOIL # 756

GROUP	%	VEG %	% COVER	CN	
A	20	40 MANZ	30	46	
		30 MANZ	60	34	37.6
		30 PINE	70	30	
B	33	40 MANZ	30	60	
		30 MANZ	60	43	52.8
		30 PINE	70	53	
C	41	40 MANZ	30	68	
		30 MANZ	60	53	62.3
		30 PINE	70	64	
D	6	40 MANZ	30	73	
		30 MANZ	60	60	71.2
		30 PINE	70	80	

CN = 55

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CHECKED BY _____ DATE _____

SCALE _____

SUBBASIN W4

SOIL # 1432

GROUP	%	VEG. %	% COVER	CN	
B	20	40 MANOG	30	60	52.8
		30 MANOG	60	43	
		30 PINE	70	53	
C	70	40 MANOG	30	68	62.3
		30 MANOG	60	53	
		30 PINE	70	64	
D	10	40 MANOG	30	73	71.2
		30 MANOG	60	60	
		30 PINE	70	80	

CN = 61

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CHECKED BY DATE
SCALE

SUBBASIN W5 AREA = 9 mi^2

SOIL #	AREA	% AREA	
756	4.2	45	
1120	0.3	3	← NEGLECT
1432	2.3+2.5	52	
	9.3	100%	

SOIL #	% SUBBASIN	CN
756	47	54
1432	53	61

WEIGHTED CN = 58

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SCALE

SUBBASIN WS

SOIL # 75C

GROUP	%	VEG	%	% COVER	CN	
A	20	50	PINE	65	40	
		25	MANOG	60	34	38.5
		25	MANOG	40	40	
B	33	50	PINE	65	53	
		25	MANOG	60	43	50.8
		25	MANOG	40	54	
C	41	50	PINE	65	66	
		25	MANOG	60	53	62.0
		25	MANOG	40	63	
D	6	50	PINE	65	79	
		25	MANOG	60	60	71.5
		25	MANOG	40	68	

CN = 54

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SCALE

SUBBASIN W5

SOIL # 1432

GROUP	%	VEG %	% COVER	CN	
B	20	50 PINE	65	53	
		25 MANOG	60	43	50.8
		25 MANOG	40	54	
C	70	50 PINE	65	66	
		25 MANOG	60	53	62.0
		25 MANOG	40	63	
D	10	50 PINE	65	79	
		25 MANOG	60	60	71.5
		25 MANOG	40	68	

CN = 61

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SCALE

SUBBASIN Wall6 10.4 IN²

SOIL #	AREA	% AREA
1120 + 1121	2.0	19
1432	2.4 + 5.9	81
	10.3	100%

SOIL #	%	CN
1120 + 1121	19	50
1432	81	59

WEIGHTED CN = 57

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SCALE

SUBBASIN W6

SOIL # 1120 + 1121

GROUP	%	VEG %	% COVER	CN	
B	100	55 MANZ	50	48	50.2
		45 PINE	70	53	

CN = 50

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SCALE _____

SUBBASIN W6

SOIL # 1432

Group	%	Veg	%	% Cover	CN	
B	20	55	MANOG	50	48	50.2
		45	PINE	70	53	
C	70	55	MANOG	50	57	60.2
		45	PINE	70	64	
D	10	55	MANOG	50	63	70.2
		45	PINE	70	79	

CN = 59

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CALCULATED BY _____ DATE _____

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SCALE _____

SUBBASIN W17R
→ ALL SOILS

GROUP	%	VEG	% COVER	CN
A	0	SAME	40	
B	8	SAME	40	52
C	77	SAME	40	68
D	15	SAME	40	75

CN = 68

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SUBBASIN W7R - AREA = 6.3 IN^2

SOIL	AREA	% AREA	GROUP
554	0.55	8	C
559	4.4	69	C
222	0.3	5	D
662	0.5	8	B
930	0.65	10	D
	6.4	100	

SOIL GROUP	% AREA
A	6
B	8
C	77
D	15

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SUBBASIN WBR

ALL SOILS

GROUP	%	VEG*	% COVER	CN
A	0	SAME	40	
B	34	SAME	40	56
C	57	SAME	40	68
D	9	SAME	40	75

CN = 65

* USE CN INFORMATION FROM W7

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SCALE

SUBBASIN WBR AREA = 5.4

SOIL	AREA	% AREA	GROUP
554	0.8+0.4	22	C
281	0.5	9	D
668	1.1	20	B
559	0.8+1.1	35	C
662	0.8	14	B
	5.5		

SOIL GROUP	% AREA
A	0
B	34
C	57
D	9

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SCALE _____

SUBBASIN W10R

GROUP	%	VEG	% COVER	CN
A				
B	90	SAME	45	54
C	9	"	"	65
D	1	"	"	72

WEIGHTED CN = 55

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SCALE _____

SUBBASIN W1R

GROUP	%	VEG	% COVER	CN	
A	2	75% PAST	FAIR	49	
		25% RES.		77	56.0
B	76	"	"	69	
		"	"	85	73.0
C	19	"	"	79	
		"	"	90	81.7
D	3	"	"	84	
		"	"	92	86.0

WEIGHTED CN = 75

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SCALE _____

SUBBASIN W16R

GROUP	%	VEG	% COVER	CN
A				
B	10	PASTURE	FAIR	69
C	32	"	"	79
D	58	"	"	84

WEIGHTED CN = 81

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CALCULATED BY _____ DATE _____
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SCALE _____

SUBBASIN WIBR - WIBRA

GROUP	%	VEG	% COVER	CN
A				
B	10	PAST.	FAIR	69
C	55			79
D	35			84

WEIGHTED CN = 80

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JOB Whites Creek (CN method)
SHEET NO. 1 OF 2
CALCULATED BY OPB DATE 8 Sept., 1993
CHECKED BY DATE
SCALE 9301

Estimation of Lag Time with SCS Curve Number Method

$$T_c = \frac{l^{0.8}\left[\left(\frac{1000}{CN}\right)-9\right]^{0.7}}{1140\ Y^{0.5}}$$

Where: T_c = time of concentration.
l = hydraulic flow length in ft.
CN = runoff curve number
Y = average watershed slope

$$Lag = 0.6\,(T_c)$$

$$\Rightarrow L = \frac{l^{0.8}\left[\left(\frac{1000}{CN}\right)-9\right]^{0.7}}{1900\ Y^{0.5}}$$

Whites Creek Subcatchments	Curve Number CN	Hydraulic length l (Ft)	Ave. Slope Y (%)	Lag (hr)
1.) W1R	63	9,000	38	0.44
2) W2R	65	10,000	34	0.52
3.) W3R	65	8,700	26	0.54
4.) W4R	57	11,200	32	0.72
5.) W5R	58	11,200	22	0.85
6.) W6R	57	17,700	23	1.23
7.) W7R	68	11,000	10	0.96
8.) W8R	65	11,300	8	1.19

**********RESULTS**********

WATERSHED: W10R

REACH TYPE	LENGTH (FT)	HEIGHT (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TRAVEL TIME (HR)
7.00	6000.00	340.00	5.67	4.79	0.35
7.00	2400.00	80.00	3.33	3.67	0.18

Lc	=	8400.00
TOTAL HEIGHT	=	420.00
AVERAGE SLOPE (%)	=	5.00
TRAVEL TIME BY UPLAND METHOD	=	0.53
WATERSHED LAG BY UPLAND METHOD	=	0.32

DEFINITION OF REACH TYPES

7	PAVED AREA & SMALL UPLAND GULLIES
7	PAVED AREA & SMALL UPLAND GULLIES

**********RESULTS**********

WATERSHED: w11r

REACH TYPE	LENGTH (FT)	HEIGHT (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TRAVEL TIME (HR)
7.00	2000.00	80.00	4.00	4.02	0.14
7.00	2000.00	60.00	3.00	3.48	0.16
7.00	2000.00	60.00	3.00	3.48	0.16

Lc	=	6000.00
TOTAL HEIGHT	=	200.00
AVERAGE SLOPE (%)	=	3.33
TRAVEL TIME BY UPLAND METHOD	=	0.46
WATERSHED LAG BY UPLAND METHOD	=	0.27

DEFINITION OF REACH TYPES

7	PAVED AREA & SMALL UPLAND GULLIES
	PAVED AREA & SMALL UPLAND GULLIES
	PAVED AREA & SMALL UPLAND GULLIES

**********RESULTS**********

WATERSHED: w16r

REACH TYPE	LENGTH (FT)	HEIGHT (FT)	SLOPE (FT/FT)	VELOCITY (FPS)	TRAVEL TIME (HR)
7.00	3200.00	50.00	1.56	2.50	0.35

Lc	=	3200.00
TOTAL HEIGHT	=	50.00
AVERAGE SLOPE (%)	=	1.56
TRAVEL TIME BY UPLAND METHOD	=	0.35
WATERSHED LAG BY UPLAND METHOD	=	0.21

DEFINITION OF REACH TYPES

7 PAVED AREA & SMALL UPLAND GULLIES

APPENDIX H

DISCS WITH THE HEC-1 AND HEC-2 MODELS