


COPART  
100 YEAR FLOODPLAIN ANALYSIS  
87087E

PREPARED BY:

CLSI  
439 EAST MAIN STREET  
WESTMINSTER, MD 21157  
410-876-2017

SUBMITTED BY:

  
MARTIN H. RICKELL, JR.  
ASSOCIATE  
SENIOR PROJECT MANAGER

11/3/03  
DATE  
REVISED: 6-30-04  
REVISED: 10-28-04

439 East Main Street  
Westminster, MD 21157-5539  
(410) 848-1790  
(410) 848-1791 FAX



5111 Pegasus Court, Suite B  
Frederick, MD 21704-8318  
(301) 662-1799  
(301) 662-8004 FAX

November 04, 2004

Bureau of Environment and Resource Protection  
Enforcement Division  
225 North Center Street  
Westminster, MD 21157

Attn: Jason Stick, CFM  
Floodplain Management Specialist

Re: Copart  
CLSI Job No. 87087E  
County File No. S-03-032

Dear Mr. Stick,

The following is a point-by-point response to your comments dated October 08, 2004 regarding the floodplain study for the above referenced project.

1. Centerline stationing has been added to the stream channel on the floodplain map.
2. The tailwater cross-section has been added to the floodplain map.
3. The ex. Culvert under Green Mill Road has been profiled.
4. The centerline weir for Green Mill Road has been profiled. Spot shots from survey data have also been added.
5. The approved stream buffer is shown on the floodplain map.
6. The Water Resource Protection easement has been extended to the base of the dam in order to capture the dam breach inundation area.
7. A preliminary copy of the easement plat is included in this submittal. It should be noted that a pre-submittal conference is scheduled for Monday November 8<sup>th</sup>, 2004.

I trust this satisfies your comments and approval will be forthcoming. Should you have any questions, please do not hesitate to contact this office. Once approval is granted a digital copy of the entire floodplain study with maps will be submitted to your office.

Sincerely,

A handwritten signature in black ink that reads "Anthony G. Meyers". The signature is fluid and cursive.

Anthony G. Meyers  
Senior Design Engineer

AGM/kek

I:\Wfiles\JOB\87\87087E\doc\Covington~floodplainresponse.doc

CARROLL COUNTY MARYLAND  
225 N. Center Street  
Westminster, Maryland 21157  
FAX 410-386-2120  
1-866-302-8978



*CCERP*  
Environment and Resource Protection  
James E. Slater, Jr., AICP, QEP  
Deputy Director  
Email: jslater@cccd.com.org

Bureau of Resource Management  
Tom Devilbiss, C.P.G., Chief

October 8, 2004

CLSI, Inc.  
439 East Main Street  
Westminster, Maryland 21157-5539  
Attn: Anthony G. Meyers

RECEIVED  
OCT 12 2004  
BY: *87087E*  
*MR TM*

RE: S-03-032 Copart (County Floodplain)

Dear Mr. Meyers:

A Floodplain Review was performed for the above referenced site submitted July 28, 2004. The following comments must be addressed.

- 1) As a general hydraulic study requirement, the centerline stationing of the channel must be shown. See Section 4.5.B.1.a of the Carroll County Floodplain Management Manual (herein referred to as the "Manual").
- 2) Cross sections used to develop tailwater conditions on hydraulic structures must be shown. See Section 4.5.B.1.a of the Manual.
- 3) Weir profiles must be shown, as per Section 4.5.B.1.a of the Manual.
- 4) A road (weir) centerline profile with survey control data is required, as per Section 4.5.B.4.d of the Manual.
- 5) A variable width stream buffer is required in accordance with Section 114-10 of the Carroll County ordinances.
- 6) In this situation we recommend extending the Water Resource Protection easement to the base of the dam to cover the dam breach inundation.
- 7) All floodplains, stream buffers, and dam breach inundation areas shall be platted. See Section 114-11 of the Carroll County ordinances.

A point-by-point response letter is required with your next submission.

If you have any questions or require additional information, please do not hesitate to contact me at (410) 386-2844.

Sincerely,

Jason Stick, CFM  
Floodplain Management Specialist

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(301) 662-8004 FAX

July 1, 2004

Bureau of Environment and Resource Protection  
Enforcement Division  
225 North Center Street  
Westminster, MD 21157

Attn: Martin Covington, III P.E.

Re: Copart  
CLSI Job No. 87087E  
County File No. S-03-032

Dear Mr. Covington,

The following is a point-by-point response to your comments dated November 20, 2003, regarding the floodplain at Copart.

1. Centerline stationing has been added to the stream channel on the floodplain map.
2. The floodplain is based on ultimate zoning. Due to the fact that we are not disturbing near the floodplain, the pre and post water surface elevations are the same.
3. Stationing has been added the hydraulic cross sections and the Manning's coefficients are shown on the cross section.
4. There are no changes between the pre and post development stream channel or floodplain.
5. Survey control data has been added to the floodplain map.
  - a. All existing and proposed buildings are shown on the floodplain map.
  - b. The 100-year flood flows used in the study are labeled on the first and last cross sections that they are applied to.
6.
  - a. The profiles are oriented to correspond to the floodplain map.
  - b. The cross sections are plotted showing pre and post condition ground surface, floodplains, and energy grade lines.

#### Easements

Bearings and distances have added to the floodplain map to encompass the 100-year floodplain.

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Copart  
Page 2  
July 1, 2004

### Submittal Standards

1. The horizontal control shown hereon is based on the Maryland Coordinate System NAD 83
2. The vertical control is based upon North American Vertical Datum of 1988 (NAVD 88).
3. Coordinates and elevations values are provided in feet.
4. Four (4) grid tics have been provided on the floodplain plan.
5. We are aware that revisions to the existing detailed FEMA floodplain studies are based upon NGVD 1929. This is not applicable to this study.
6. Prior to final plan approval a copy of the floodplain map will be submitted to Carroll County in digital form.

I trust this satisfies your comments and approval will be forthcoming. Should you have any questions, please do not hesitate to contact this office.

Sincerely,

A handwritten signature in black ink that reads "Anthony G. Meyers".

Anthony G. Meyers  
Senior Design Engineer

AGM/kek

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CARROLL COUNTY MARYLAND  
225 N. Center Street  
Westminster, Maryland 21157  
FAX 410-386-2120  
1-888-302-8978



Environment and Resource Protection  
James E. Slater, Jr., AICP, OEP  
Deputy Director  
E-mail: jslater@ccg.com.org

Bureau of Resource Management  
Tom Devillbiss, C.P.G., Chief

November 20, 2003

RECEIVED  
NOV 24 2003

BY: .....

CLSI  
c/o Mr. Martin Rickell  
439 East Main Street  
Westminster, Maryland 21157

RE: S-03-032 Copart (Wholesale Internet Automotive Auction) County Floodplains

Dear Mr. Rickell:

A floodplain review was performed on the above referenced site plan submitted on November 4, 2003. Thank you for the floodplain study. The following items must be provided:

1. Centerline stationing of channel with all hydraulic sections and pre and post development structures stationed along it. Sections below hydraulic structures used for tailwater conditions must be shown. Equalities between the centerline stationing and the hydraulic cross sections, weir profiles, and any hydraulic structure stationing must be shown.
2. At each cross section, pre and post development water surface elevations (WSELs) must be provided. Where floodplains are present on existing or proposed building lots, the nearest point on the floodplain to the building must be shown with the WSELs stated.
3. Hydraulic cross sections must be plotted with a zero point shown where each section begins and all Manning's coefficients shown between tic marks.
4. Pre and Post development changes to the stream channel, floodplain, and floodway must be shown.
5. Survey control data, ties to traverse lines, etc., in accordance with the following:
  - a. All existing and proposed buildings or building sites shown.
  - b. The 100-year flood flows used in the study must be labeled on the first and last cross section that they are applied to.
6. Profiles
  - a. Must be oriented to correspond to the floodplain map.
  - b. Must be plotted showing pre and post condition ground surfaces, floodplains, energy grade lines, and all hydraulic structures and cross sections.

**Copart (Wholesale Internet Automotive Auction) County Floodplains**

Page 2

Be aware that due to backwater from the culvert hydraulic section 1 is "flooded out." The 100-year WSEL will need to be adjusted.

**Easements**

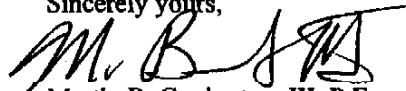
A metes and bounds description of the floodplain must be shown on the plans. The recordation will be bonded and the stormwater bond will not be released until the easement is conveyed to the County and a copy of the recordation is submitted to this office.

**Submittal Standards**

1. Coordinates for all floodplain studies and plats must be based upon the Maryland Coordinate System, North American Datum of 1983 / 99.
2. Elevations and topographic information must be based on the North American Vertical Datum of 1988 (NAD 88).
3. Coordinate and elevation values must be provided in feet.
4. At least four (4) north / east grid tics must be provided on the floodplain plans and plats.
5. Revisions to existing detailed FEMA floodplain / floodway studies must be based upon elevations converted to NGVD 1929 for submittal to FEMA.
6. Prior to final plan approval, a copy of the approved floodplain map must be submitted to Carroll County in digital form. The floodplain map must be submitted on CD-ROM in "Geographic Information System (G.I.S. Shapefile)" or CADD drawing file (.dgn). The County, currently, prefers "Geographic Information System (G.I.S. Shapefile)." These software requirements are subject to change as the industry standards evolve.

If you have any questions, I will be available at (410) 386-2205.

Sincerely yours,



Martin B. Covington, III, P.E.  
Stormwater Program Engineer

MBC/tms

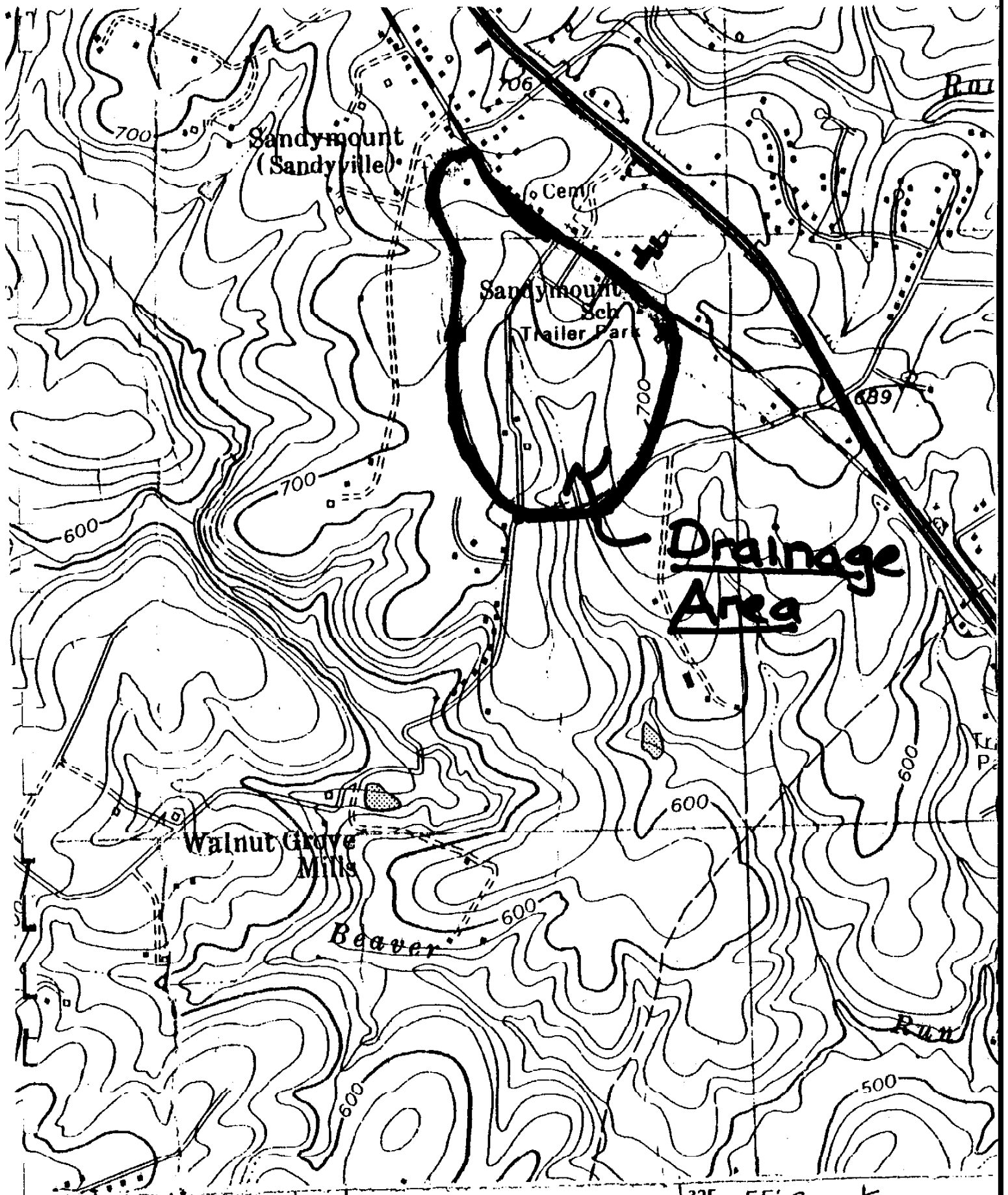
cc: Copart of Connecticut, Inc., c/o Mr. Michael Carson, 4665 Business Center Drive,  
Fairfield, CA 94534

Development Review

File

**Copart  
Floodplain Synopsis  
CLSI Job No. 87087E**

The floodplain was developed using ultimate zoning for the drainage area, which consisted of one-acre lots, quarter-acre lots, and commercial business. Flow Master Program was used to determine water surface elevations in the channel and HY-8 was used to analyze the existing culvert to determine headwater on the existing culvert and the effect it had on the floodplain.



**Drainage Area**

WINKSBURG)  
52 IV NW

1334

Drainage Area Map

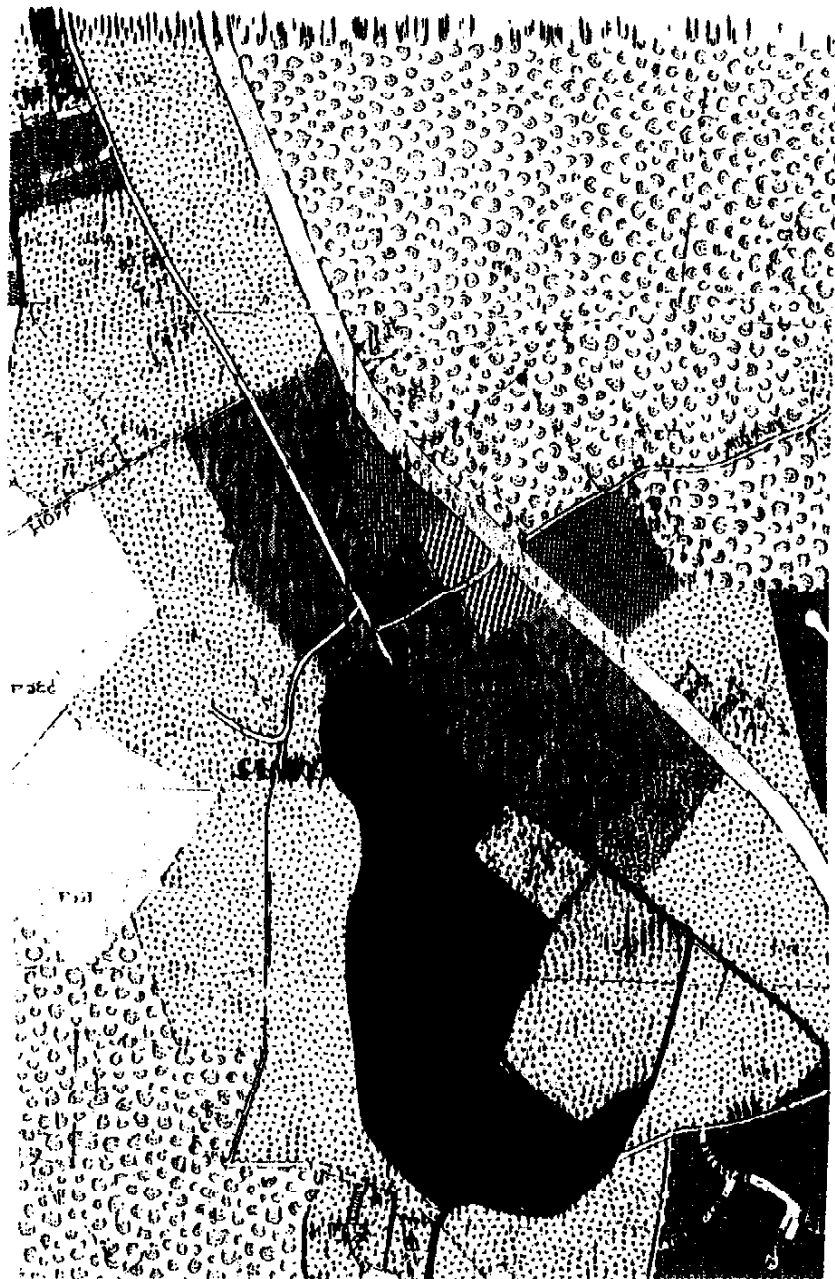
Scale: 1"=1,000'

1335

55'

Copart  
87087E  
11/3/03

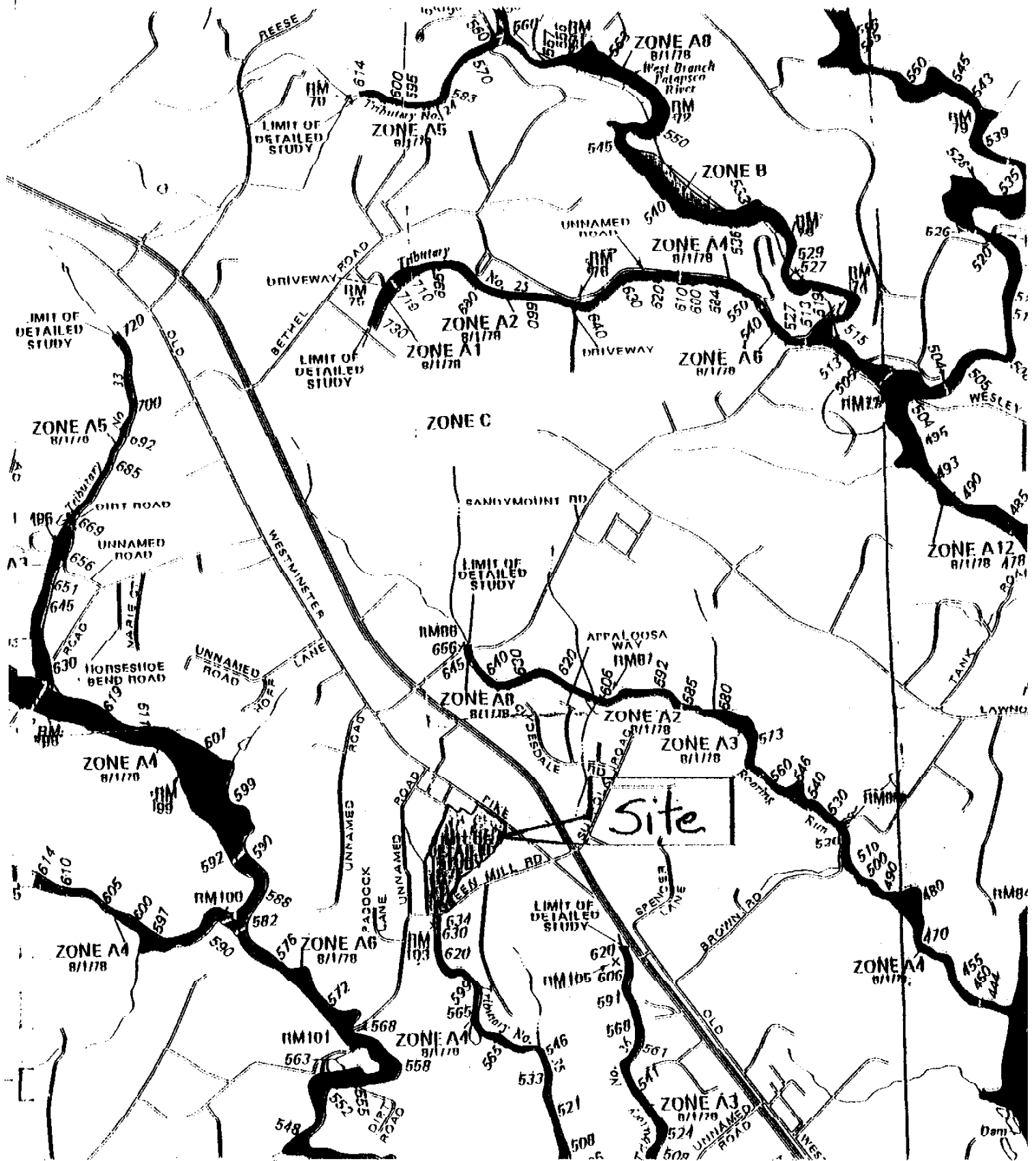
# Zoning Map



- R-10,000
- R-40,000
- Commercial

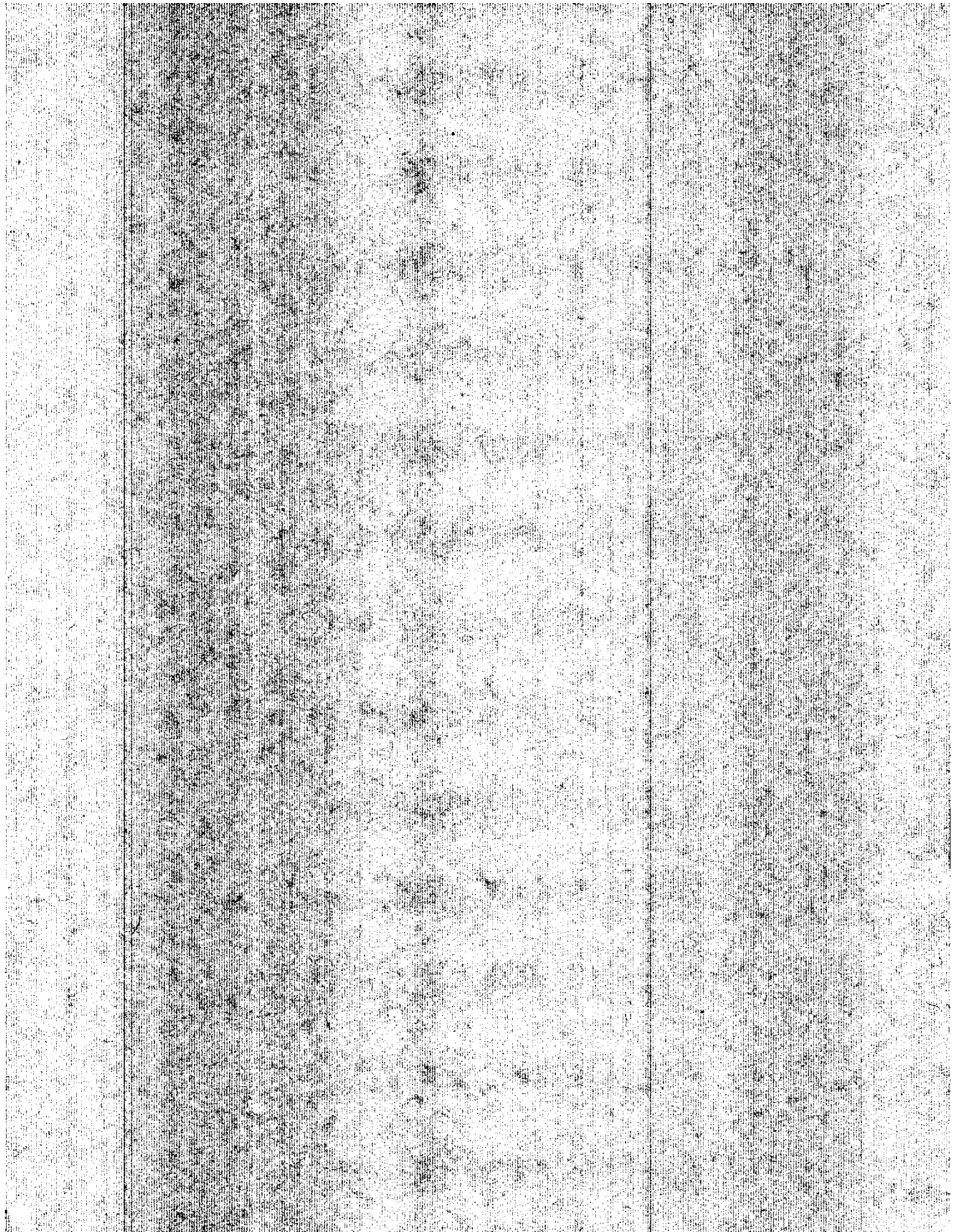
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87087E  
11/3/03  
Scale: 1" = 1000'





FEMA MAP  
 Firm 240015 0100A

Copyart  
 87087E  
 11/3/03  
 Scale: 1"=2000'



Copart

Condition: Ultimate

Printed 10/23/2003 2:39:32 PM



Version

Project: Copart

File: H:\87\87087\tr55ult.rcn  
Condition: Ultimate  
Rainfall: CARROLL  
Prepared By:  
Using Version

Diek: \_\_\_\_\_  
Units: Area=Acres, Linear=Feet  
Date: 10/23/2003 2:39:32 PM



Summary Table

Area	CN	Area	%Imp	Imp. Area	Tc	Tt	Qp100
Ultimate	75	102.500	39.6	40.573	0.20	0.00	542.89
	75	102.500	39.6	40.573			542.89

Project: Copart

File: H:\87\87087\tr55ult.rcn  
 Condition: Ultimate  
 Rainfall: CARROLL  
 Prepared By:  
 Using Version

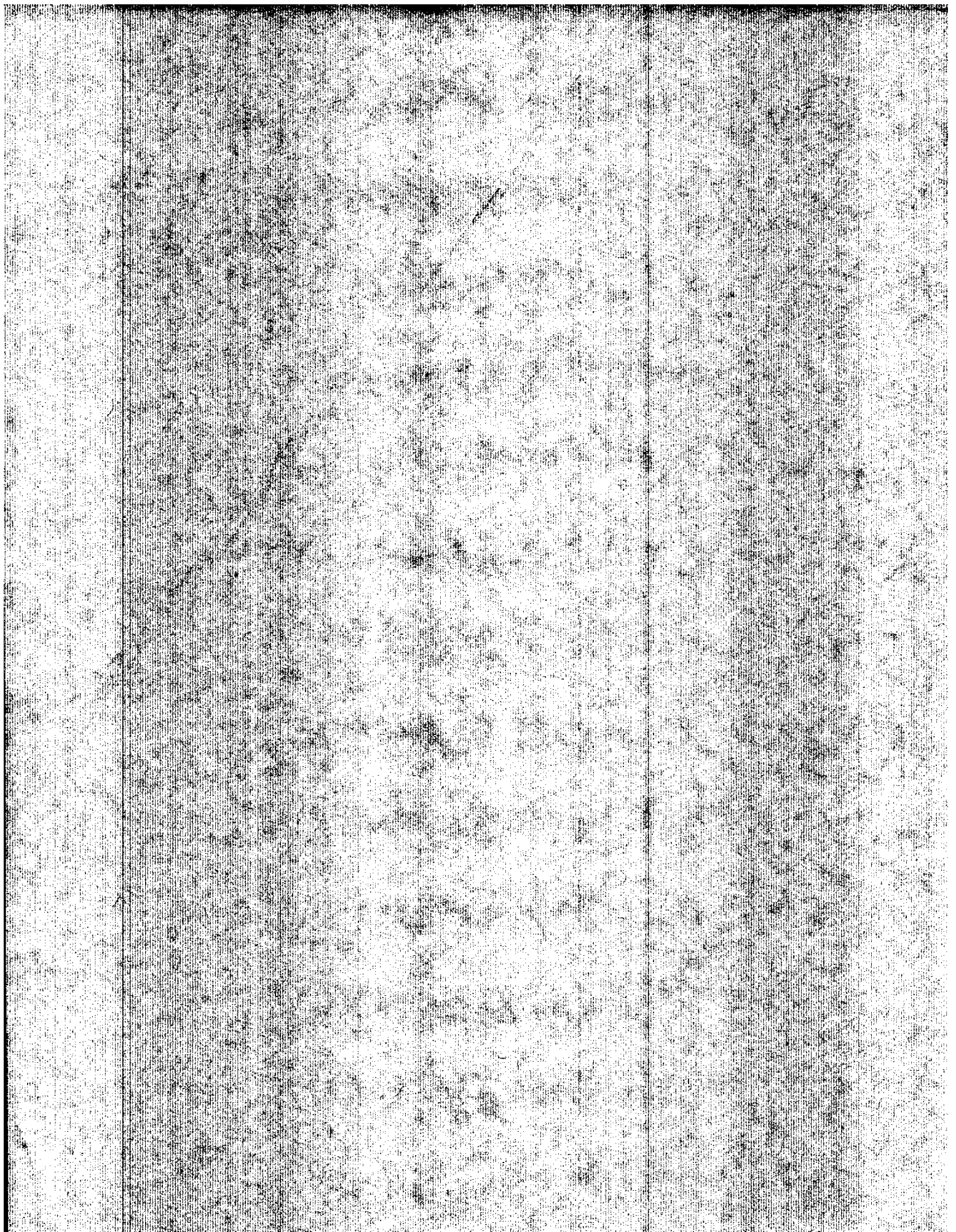
Area: Ultimate  
 Units: Area=Acres, Linear=Feet  
 Date: 10/23/2003 2:39:32 PM



Runoff Curve Number - Area Ultimate							
SubArea	Soil	Use	Description	CN	Area	%Imp	Imp. Area
.1	B	17	1 Acre Lots	68	65.400	20.0	13.080
.2	B	10	Commercial / Business	92	28.500	85.0	24.225
.3	B	14	1/4 Acre Lots	75	8.600	38.0	3.268
				75	102.500	39.6	40.573

Time of Concentration - Area Ultimate									
From Elev	To Elev	Flow Type	Surface	Dist	Slope u/u	n	V u/s	Tc hours	
0.0	0.0	Time							0.20
									0.20

Runoff - Area Ultimate								
Area: 102.500 CN: 75 Tc: 0.20 P/S Area: 0.000 Type II Storm								
Storm Frequency	1	2	5	10	25	50	100	
Inches of Rainfall	2.50	3.10	4.00	5.00	5.40	6.20	7.10	
Ia / P Used	0.27	0.22	0.17	0.13	0.12	0.11	0.10	
Unit Peak Discharge	713.52	739.22	764.15	781.81	787.12	795.77	799.91	
Inches of Runoff	0.65	1.03	1.67	2.45	2.78	3.45	4.24	
Pond/Swamp Factor	1.00	1.00	1.00	1.00	1.00	1.00	1.00	
Peak Discharge	74.34	121.56	203.97	306.68	350.13	440.09	542.89	



Section A: CL stream st. 2+72  
Worksheet for Irregular Channel

Project Description	
Project File	h:\87\87087\floodpla.fm2
Worksheet	Section A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

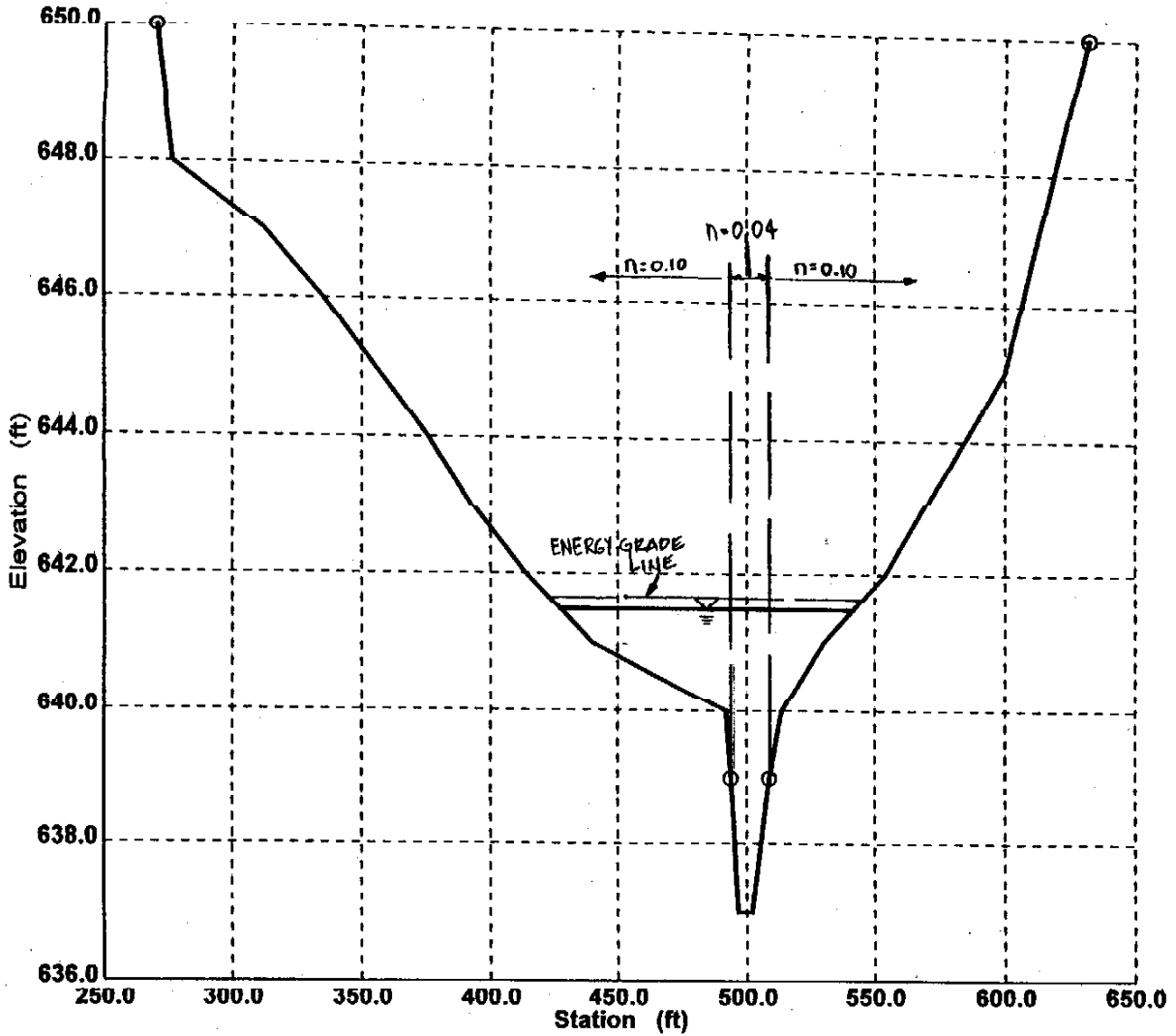
Input Data				
Channel Slope	0.016000 ft/ft			
Elevation range: 637.00 ft to 650.00 ft.				
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness
270.00	650.00	270.00	494.00	0.100
277.00	648.00	494.00	509.00	0.040
312.00	647.00	509.00	632.00	0.100
335.00	646.00			
355.00	645.00			
376.00	644.00			
393.00	643.00			
414.00	642.00			
440.00	641.00			
492.00	640.00			
494.00	639.00			
497.00	637.00			
502.00	637.00			
509.00	639.00			
514.00	640.00			
530.00	641.00			
554.00	642.00			
600.00	645.00			
632.00	650.00			
Discharge	543.00	cfs		

Results	
Wtd. Mannings Coefficient	0.082
Water Surface Elevation	641.48 ft
Flow Area	143.09 ft <sup>2</sup>
Wetted Perimeter	115.12 ft
Top Width	113.84 ft
Height	4.48 ft
Critical Depth	640.99 ft
Critical Slope	0.066300 ft/ft
Velocity	3.79 ft/s
Velocity Head	0.22 ft
Specific Energy	641.70 ft
Froude Number	0.60
Flow is subcritical.	

Section A CL stream st. 2+72  
Cross Section for Irregular Channel

Project Description	
Project File	h:\87\87087\floodpla.fm2
Worksheet	Section A
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.082
Channel Slope	0.016000 ft/ft
Water Surface Elevation	641.48 ft
Discharge	543.00 cfs



Section B: CL stream st. 5+72  
Worksheet for Irregular Channel

Project Description	
Project File	h:\87\87087\Floodpla.fm2
Worksheet	Section B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

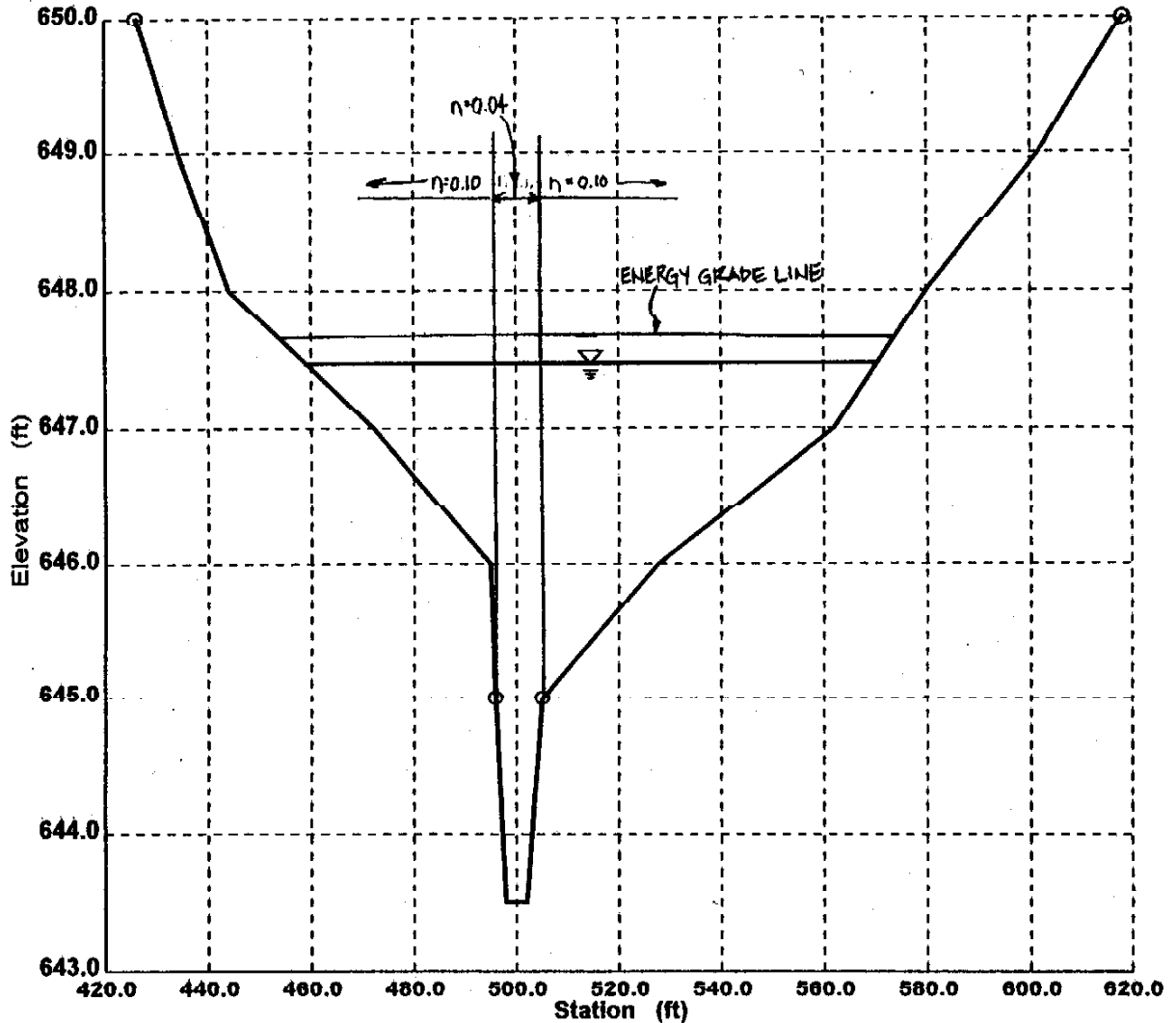
Input Data					
Channel Slope	0.016000 ft/ft				
Elevation range: 643.50 ft to 650.00 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
426.00	650.00	426.00	496.00	0.100	
434.00	649.00	496.00	505.00	0.040	
444.00	648.00	505.00	618.00	0.100	
472.00	647.00				
495.00	646.00				
496.00	645.00				
498.00	643.50				
502.00	643.50				
505.00	645.00				
528.00	646.00				
562.00	647.00				
580.00	648.00				
602.00	649.00				
618.00	650.00				
Discharge	543.00	cfs			

Results		
Wtd. Mannings Coefficient	0.056	
Water Surface Elevation	647.47	ft
Flow Area	139.42	ft <sup>2</sup>
Wetted Perimeter	112.88	ft
Top Width	111.53	ft
Height	3.97	ft
Critical Depth	647.02	ft
Critical Slope	0.033868	ft/ft
Velocity	3.89	ft/s
Velocity Head	0.24	ft
Specific Energy	647.70	ft
Froude Number	0.61	
Flow is subcritical.		

Section B: CL stream st. 5+72  
Cross Section for Irregular Channel

Project Description	
Project File	h:\87\87087\floodpla.fm2
Worksheet	Section B
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.056
Channel Slope	0.016000 ft/ft
Water Surface Elevation	647.47 ft
Discharge	543.00 cfs



Section C: CL stream st. 9+16  
Worksheet for Irregular Channel

Project Description	
Project File	h:\87\87087\floodpla.fm2
Worksheet	Section C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

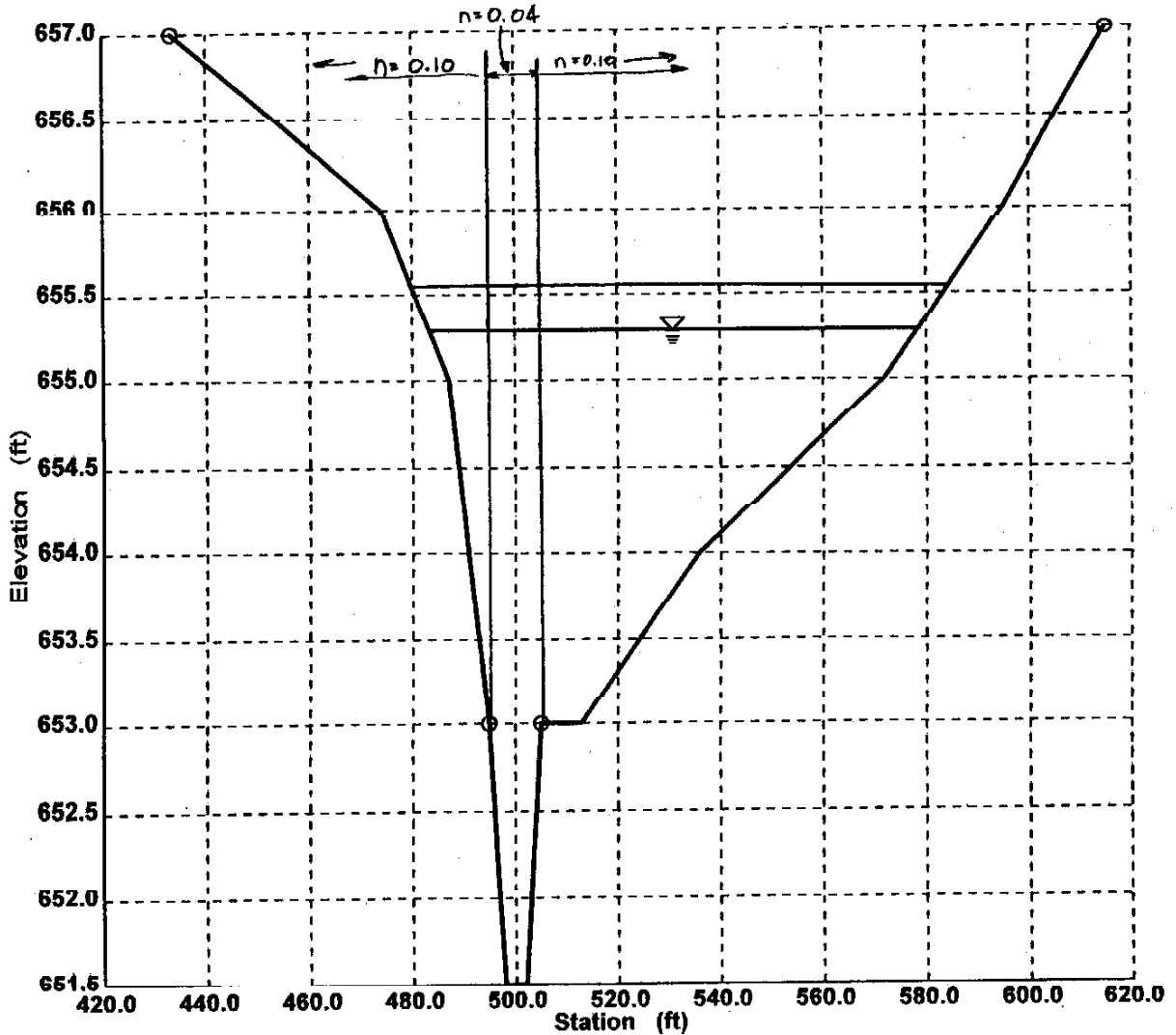
Input Data					
Channel Slope	0.016000 ft/ft				
Elevation range: 651.50 ft to 657.00 ft.					
Station (ft)	Elevation (ft)	Start Station	End Station	Roughness	
433.00	657.00	433.00	495.00	0.100	
474.00	656.00	495.00	505.00	0.040	
487.00	655.00	505.00	615.00	0.100	
491.00	654.00				
495.00	653.00				
498.00	651.50				
502.00	651.50				
505.00	653.00				
513.00	653.00				
536.00	654.00				
572.00	655.00				
595.00	656.00				
615.00	657.00				
Discharge	543.00	cfs			

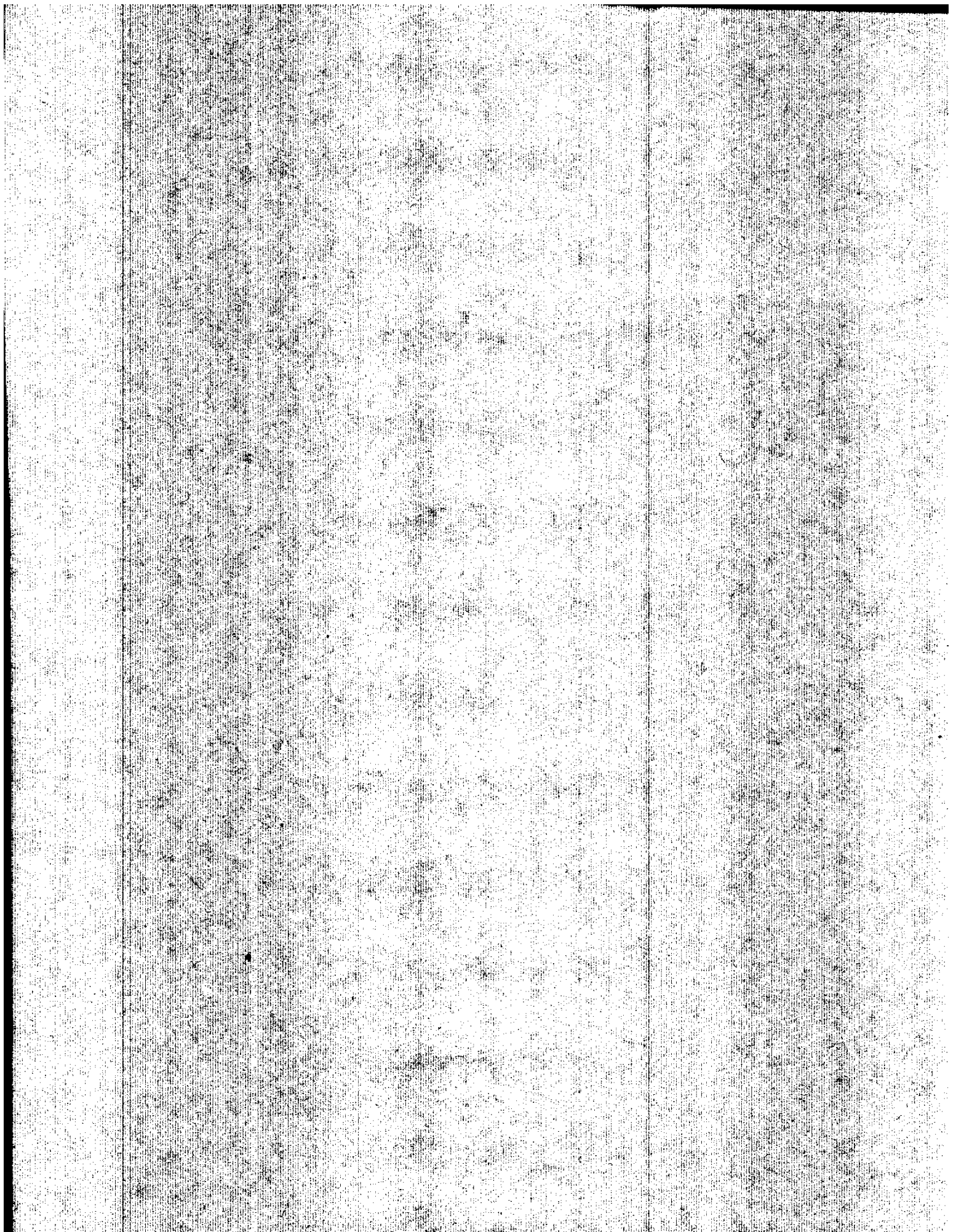
Results		
Wtd. Mannings Coefficient	0.057	
Water Surface Elevation	655.29	ft
Flow Area	133.06	ft <sup>2</sup>
Wetted Perimeter	96.41	ft
Top Width	95.40	ft
Height	3.79	ft
Critical Depth	654.77	ft
Critical Slope	0.036465	ft/ft
Velocity	4.08	ft/s
Velocity Head	0.26	ft
Specific Energy	655.55	ft
Froude Number	0.61	
Flow is subcritical.		

Section C: CL stream st. 9+16  
Cross Section for Irregular Channel

Project Description	
Project File	h:\87\87087\loodpla.fm2
Worksheet	Section C
Flow Element	Irregular Channel
Method	Manning's Formula
Solve For	Water Elevation

Section Data	
Wtd. Mannings Coefficient	0.057
Channel Slope	0.016000 ft/ft
Water Surface Elevation	655.29 ft
Discharge	543.00 cfs





CURRENT DATE: 10-25-2004  
 CURRENT TIME: 12:46:31

FILE DATE: 10-25-2004  
 FILE NAME: HY8FP1

FHWA CULVERT ANALYSIS  
 HY-8, VERSION 6.1

C		SITE DATA			CULVERT SHAPE, MATERIAL, INLET				
U		-----			-----				
L	INLET	OUTLET	CULVERT	BARRELS					
V	ELEV.	ELEV.	LENGTH	SHAPE	SPAN	RISE	MANNING	INLET	
NO.	(ft)	(ft)	(ft)	MATERIAL	(ft)	(ft)	n	TYPE	
1	631.86	630.86	73.01	1 RCP	6.00	6.00	.013	CONVENTIONAL	
2									
3									
4									
5									
6									

SUMMARY OF CULVERT FLOWS (cfs) FILE: HY8FP1 DATE: 10-25-2004

ELEV (ft)	TOTAL	1	2	3	4	5	6	ROADWAY	ITR
631.86	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	1
634.47	54.3	54.3	0.0	0.0	0.0	0.0	0.0	0.00	1
635.92	108.6	108.6	0.0	0.0	0.0	0.0	0.0	0.00	1
637.08	162.9	162.9	0.0	0.0	0.0	0.0	0.0	0.00	1
638.22	217.2	217.2	0.0	0.0	0.0	0.0	0.0	0.00	1
639.52	271.5	271.5	0.0	0.0	0.0	0.0	0.0	0.00	1
641.08	325.8	325.8	0.0	0.0	0.0	0.0	0.0	0.00	1
641.88	350.0	350.0	0.0	0.0	0.0	0.0	0.0	0.00	1
642.60	434.4	370.2	0.0	0.0	0.0	0.0	0.0	64.15	8
642.76	488.7	374.7	0.0	0.0	0.0	0.0	0.0	114.01	11
642.89	543.0	378.0	0.0	0.0	0.0	0.0	0.0	164.88	9
641.95	352.0	352.0	0.0	0.0	0.0	0.0	0.0	0.0	OVERTOPPING

SUMMARY OF ITERATIVE SOLUTION ERRORS FILE: HY8FP1 DATE: 10-25-2004

HEAD	HEAD	TOTAL	FLOW	% FLOW
ELEV (ft)	ERROR (ft)	FLOW (cfs)	ERROR (cfs)	ERROR
631.86	0.000	0.00	0.00	0.00
634.47	0.000	54.30	0.00	0.00
635.92	0.000	108.60	0.00	0.00
637.08	0.000	162.90	0.00	0.00
638.22	0.000	217.20	0.00	0.00
639.52	0.000	271.50	0.00	0.00
641.08	0.000	325.80	0.00	0.00
641.88	0.000	350.00	0.00	0.00
642.60	0.000	434.40	0.02	0.00
642.76	0.000	488.70	0.03	0.01
642.89	0.000	543.00	0.07	0.01

<1> TOLERANCE (ft) = 0.000

<2> TOLERANCE (%) = 1.000



CURRENT DATE: 10 25 2004

FILE DATE: 10-25-2004

CURRENT TIME: 13:46:31

FILE NAME: HY8FP1

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 TAILWATER
 

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## \*\*\*\*\* USER DEFINED CHANNEL CROSS-SECTION

FILE NAME: FP

MAIN CHANNEL AND LT &amp; RT OVER BANKS

FILE DATE: 10-28-2003

LEFT CHANNEL BOUNDARY           6  
 RIGHT CHANNEL BOUNDARY           9  
 MANNING n LEFT OVER BANK       0.100  
 MANNING n MAIN CHANNEL           0.040  
 MANNING n RIGHT OVER BANK       n 100  
 SLOPE OF CHANNEL                 0.0160 ft/ft

CROSS-SECTION	X	Y
COORD. NO.	(ft)	(ft)
1	375.00	641.00
2	387.00	640.00
3	410.00	639.00
4	437.00	638.00
5	463.00	637.00
6	494.00	635.00
7	495.00	630.00
8	507.00	630.00
9	524.00	636.00
10	528.00	636.00
11	534.00	638.00
12	566.00	639.00
13	572.00	640.00
14	585.00	641.00

## \*\*\*\*\* UNIFORM FLOW RATING CURVE FOR DOWNSTREAM CHANNEL

FLOW	W.S.E.	FROUDE	DEPTH	VEL.	SHEAR
(cfs)	(ft)	NUMBER	(ft)	(f/s)	(psf)
0.00	630.00	0.000	-0.86	0.00	0.00
54.30	630.98	0.778	0.12	4.11	0.82
108.60	631.46	0.814	0.60	5.13	1.14
162.90	631.84	0.835	0.98	5.82	1.38
217.20	632.17	0.849	1.31	6.36	1.57
271.50	632.45	0.860	1.59	6.78	1.73
325.80	632.71	0.869	1.85	7.15	1.87
350.00	632.82	0.873	1.96	7.30	1.93
434.40	633.17	0.883	2.31	7.76	2.12
488.70	633.38	0.888	2.52	8.02	2.22
543.00	633.58	0.893	2.72	8.26	2.33

Note: Shear stress was calculated using R.

CURRENT DATE: 10-25-2004  
CURRENT TIME: 13:46:31

FILE DATE: 10 25 2004  
FILE NAME: HV8FP1

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ROADWAY OVERTOPPING DATA

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ROADWAY SURFACE

PAVED

EMBANKMENT TOP WIDTH

30.00 ft

\*\*\*\*\* USER DEFINED ROADWAY PROFILE

CROSS-SECTION	X	Y
COORD. NO.	ft	ft
1	243.00	650.00
2	280.00	648.00
3	301.00	647.00
4	318.00	646.00
5	337.00	645.00
6	359.00	644.00
7	386.00	643.00
8	478.00	642.20
9	500.00	641.95
10	579.00	643.00
11	602.00	644.00
12	627.00	645.00
13	645.00	646.00
14	679.00	648.00
15	707.00	650.00

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