FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

FOUNTAIN HILLS SOUTH FLOODPLAIN DELINEATION STUDY

FCD 92-05

TECHNICAL DATA NOTEBOOK HYDROLOGY

VOLUME 1 OF 4

AUGUST 1995
Revised November 1996

Prepared by

AGK ENGINEERS, INC.
2255 North 44th Street, Suite 330
Phoenix, Arizona 85008
(602) 244-2566

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TABLE OF CONTENTS

VOLUME 1 of 4

INTRODUCTION 1

SECTION 1: GENERAL DOCUMENTATION AND CORRESPONDENCE
- 1.1 Contact (Telephone) Reports
- 1.2 Meeting Minutes and Reports
- 1.3 General Correspondence
  - 1.3.1 Community
  - 1.3.2 State Coordination
  - 1.3.3 Other Agencies
  - 1.3.4 FEMA Regional Office
  - 1.3.5 FEMA Washington
  - 1.3.6 FEMA Technical Consultant
  - 1.3.7 Copy of Public Notices
- 1.4 Contract Documents

SECTION 2: MAPPING AND SURVEY INFORMATION
- 2.1 Topographic Mapping 2-1
- 2.2 Survey 2-1

SECTION 3: HYDROLOGIC ANALYSIS
- 3.1 Hydrologic Method Description 3-1
- 3.2 Parameter Estimation 3-1
  - 3.2.1 Drainage Area Boundaries 3-1
  - 3.2.2 Physical Parameters 3-4
    - 3.2.2.1 Watershed Subbasin Parameters 3-4
      - Soil and Land Use 3-4
      - Rainfall Losses 3-5
      - Unit Hydrograph and Time of Concentration . 3-6
    - 3.2.2.2 Reach Route Parameters 3-8
    - 3.2.2.3 Storage Route Parameters 3-9
  - 3.2.3 Statistical Parameters 3-9
  - 3.2.4 Precipitation 3-9
  - 3.2.5 Gage Data 3-10
- 3.3 Calibration 3-10
- 3.4 Special Problems and Solutions 3-10
- 3.5 Final Results 3-11
- 3.6 Final Modeling Results on Diskette 3-83

SECTION 6: REFERENCE MATERIALS
6.1 Other Published Flood Studies 6-1
6.2 Previous FEMA Studies 6-1
6.3 Other Applicable Studies 6-1
6.4 Published and Unpublished Historical Flood Information 6-1
6.5 Bibliography 6-1

LIST OF TABLES

Table 3.1 Watershed Size and Number of Subbasins
Table 3.2 100-year, 6-hour Storm Results (Existing Condition)
Table 3.3 100-year, 24-hour Storm Results (Existing Condition)
Table 3.4 100-year, 6-hour Storm Results (Future Condition)
Table 3.5 10-year, 6-hour Storm Results (Future Condition)

LIST OF FIGURES

FIGURE 1 Vicinity Map
FIGURE 2 Verification of Results

LIST OF PLATES

PLATE 1 Hydrology Map
PLATE 2 Soil Map
PLATE 3 Land Use Map

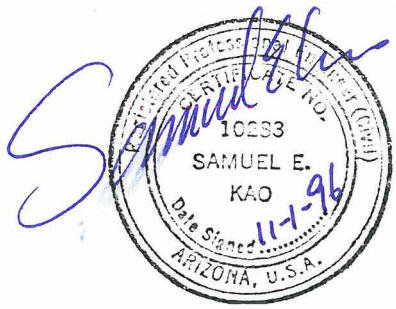
LIST OF APPENDICES

A. WATERSHED PARAMETERS

A.1	Powder Wash	(110)
A.2	Cereus Wash	(120)
A.3	Cyprus Point Wash	(130)
A.4	Jacklin Wash	(150)
A.5	Emerald Wash	(160)
A.6	Malta Drain	(170)
A.7	Colony Wash	(180)
A.8	Panorama Channel	(190)

B. SOIL AND LAND USE INFORMATION

B.1	Powder Wash	(110)
B.2	Cereus Wash	(120)
B.3	Cyprus Point Wash	(130)
B.4	Jacklin Wash	(150)
B.5	Emerald Wash	(160)
B.6	Malta Drain	(170)
B.7	Colony Wash	(180)
B.8	Panorama Channel	(190)



C. GREEN-AMPT PARAMETERS

C.1	Powder Wash	(110)
C.2	Cereus Wash	(120)
C.3	Cyprus Point Wash	(130)
C.4	Jacklin Wash	(150)
C.5	Emerald Wash	(160)
C.6	Malta Drain	(170)
C.7	Colony Wash	(180)
C.8	Panorama Channel	(190)

D. SLOPE ADJUSTMENT FOR Tc CALCULATION

D.1	Powder Wash	(110)
D.2	Cereus Wash	(120)
D.3	Cyprus Point Wash	(130)
D.4	Jacklin Wash	(150)
D.5	Emerald Wash	(160)
D.6	Malta Drain	(170)
D.7	Colony Wash	(180)
D.8	Panorama Channel	(190)

VOLUME 2 of 4

E. MCUHPA PROGRAM INPUT DATA

E.1	Powder Wash	(110)
E.2	Cereus Wash	(120)
E.3	Cyprus Point Wash	(130)
E.4	Jacklin Wash	(150)
E.5	Emerald Wash	(160)
E.6	Malta Drain	(170)
E.7	Colony Wash	(180)
E.8	Panorama Channel	(190)

F. RAINFALL INPUT

F.1	Powder Wash	(110)
F.2	Cereus Wash	(120)
F.3	Cyprus Point Wash	(130)
F.4	Jacklin Wash	(150)
F.5	Emerald Wash	(160)
F.6	Malta Drain	(170)
F.7	Colony Wash	(180)
F.8	Panorama Channel	(190)

G. FLOOD ROUTING DIAGRAMS

G.1	Powder Wash	(110)
G.2	Cereus Wash	(120)
G.3	Cyprus Point Wash	(130)
G.4	Jacklin Wash	(150)
G.5	Emerald Wash	(160)
G.6	Malta Drain	(170)
G.7	Colony Wash	(180)
G.8	Panorama Channel	(190)

H. STAGE DISCHARGE - STORAGE RELATIONSHIP

H.1	Powder Wash	(110)
H.2	Cereus Wash	(120)
H.3	Cyprus Point Wash	(130)
H.4	Jacklin Wash	(150)
H.5	Emerald Wash	(160)
H.6	Malta Drain	(170)
H.7	Colony Wash	(180)
H.8	Panorama Channel	(190)

I. NORMAL-DEPTH ROUTING PARAMETERS

I.1	Powder Wash	(110)
I.2	Cereus Wash	(120)
I.3	Cyprus Point Wash	(130)
I.4	Jacklin Wash	(150)
I.5	Emerald Wash	(160)
I.6	Malta Drain	(170)
I.7	Colony Wash	(180)
I.8	Panorama Channel	(190)

VOLUME 3 of 4

J. HEC-1 OUTPUT FOR 100-YR, 6-HOUR STORM (EXISTING CONDITION)

J.1	Powder Wash	(110)
J.2	Cereus Wash	(120)
J.3	Cyprus Point Wash	(130)
J.4	Jacklin Wash	(150)
J.5	Emerald Wash	(160)
J.6	Malta Drain	(170)
J.7	Colony Wash	(180)
J.8	Panorama Channel	(190)

K. HEC-1 OUTPUT FOR 100-YR, 24-HOUR STORM (EXISTING CONDITION)

K.1	Powder Wash	(110)
K.2	Cereus Wash	(120)
K.3	Cyprus Point Wash	(130)
K.4	Jacklin Wash	(150)
K.5	Emerald Wash	(160)
K.6	Malta Drain	(170)
K.7	Colony Wash	(180)
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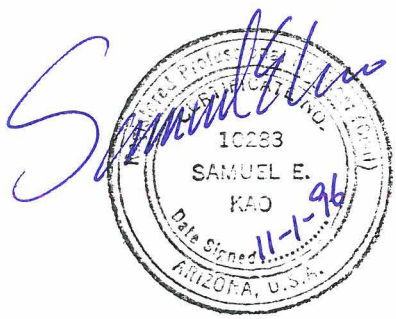

VOLUME 4 of 4

L. HEC-1 OUTPUT FOR 100-YR, 6-HOUR STORM (FUTURE CONDITION)

L.1	Powder Wash	(110)
L.2	Cereus Wash	(120)
L.3	Cyprus Point Wash	(130)
L.4	Jacklin Wash	(150)
L.5	Emerald Wash	(160)
L.6	Malta Drain	(170)
L.7	Colony Wash	(180)
L.8	Panorama Channel	(190)

M. HEC-1 OUTPUT FOR 10-YR, 6-HOUR STORM (FUTURE CONDITION)

M.1	Powder Wash	(110)
M.2	Cereus Wash	(120)
M.3	Cyprus Point Wash	(130)
M.4	Jacklin Wash	(150)
M.5	Emerald Wash	(160)
M.6	Malta Drain	(170)
M.7	Colony Wash	(180)
M.8	Panorama Channel	(190)

PREFACE

The Fountain Hills South Floodplain Delineation Study (Contract No. FCD 92-05) was performed for:

Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009
(602)506-1501 FAX (602)506-4601

Floodplain Management Branch
Branch Manager: Mr. Pedro Calza
Project Manager: Mr. Timothy M. Murphy

Watershed Management Branch
Branch Manager: Mr. Amir Motamedi
Project Manager: Ms. Sandy Story

By:

AGK Engineers, Inc.
2255 N. 44th Street, Suite 330
Phoenix, Arizona 85008
(602) 244-2566 FAX (602)244-8947

Project Manager: Samuel E. Kao, PhD, PE
Project Engineer: Hernan A. Aristizabal, EIT

FOUNTAIN HILLS SOUTH
FLOODPLAIN DELINEATION STUDY

FCD 92-05

TECHNICAL DATA NOTEBOOK

HYDROLOGY

INTRODUCTION

The hydrologic study presented in this report is a part of the scope of work performed by AGK Engineers, Inc. for the Flood Control District of Maricopa County (District) under Contract FCD 92-05. The project under this contract consists of floodplain/floodway delineation for the following washes and tributaries within the south portion of the incorporated area of the Town of Fountain Hills.

WASHES	TRIBUTARIES
Powder Wash	None
Cereus Wash	Chukar Wash Logan Wash
Cyprus Point Wash	None
Jacklin Wash	Kingstree Wash Mangrum Drain
Emerald Wash	None
Malta Drain	None
Colony Wash	Sycamore Wash Greystone Wash Sunburst Wash North Colony Wash Fountain Channel

However, Panorama Channel is included as a part of the hydrologic study, even though it is not included in the floodplain/floodway delineation. In addition, the hydrologic analysis for Laser Drain is included in that for Cereus Wash.

The purpose of this hydrologic study is to evaluate and determine the following:

- The 100-year peak discharges at various locations within each watershed based upon existing conditions.
- The 100-year peak discharges at the same locations within each watershed based upon future development conditions.
- The 10-year peak discharges at the same locations within each watershed based upon future development conditions.

The study area and its associated watershed is located at the Town of Fountain Hills, within Sections 14, 15, 16, 17, 20, 21, 22, 23, 26, 27, and 28, Township 3 North, Range 6 East, Gila and Salt River Base and Meridian, Maricopa County, Arizona. (See Figure 1)

The Town of Fountain Hills is an incorporated community with a population of approximately 20,000 people. The Town is surrounded by the McDowell Mountains on the west, Fort McDowell Indian Community on the north and east, and the Salt River Pima Maricopa Indian Community on the south. Topography of the study area is generally desert hill slopes in various phases of urbanization.

The study watershed is approximately 7.6 square miles, with a general drainage direction from west to east toward the Verde River. Washes in the study area are characterized as well defined channels with steep banks and grades. However, the natural drainage pattern of the study area has been somewhat altered since the development of this community in the early 1970's. In addition, roadway and culvert construction in conjunction with urbanization have greatly affected runoff peak discharges throughout the study area.

Climate of the study area is characterized by hot summer, mild winter and infrequent rainfall. The mean annual rainfall is about 8.5 inches, falling normally in two seasons. One season, primarily resulting from local convective storms, lasts

from July to mid-September; the other season, mainly formed by cyclonic (frontal) storms, extends from December through March. Of the two types of storms, the summer convective storm is considered to be the more critical flood producing event in this area.

In the early 1970's when urban development commenced in Fountain Hills, a master drainage study was performed by Trico International, Inc. to quantify flows in the study area. However, the assumptions, methodology and procedures used in that study are incompatible with the current criteria set forth by the District and the Federal Emergency Management Agency (FEMA).

As the urbanization progress continued, numerous localized drainage studies have been prepared by various consultants and developers. Nevertheless, it does not appear that any of the previous studies has been specifically performed or used for floodplain delineation purposes in the study area. Due to the differing methodology used in the preparation of these studies and the alteration of development schemes in some areas, few of the results could be reused in this study.

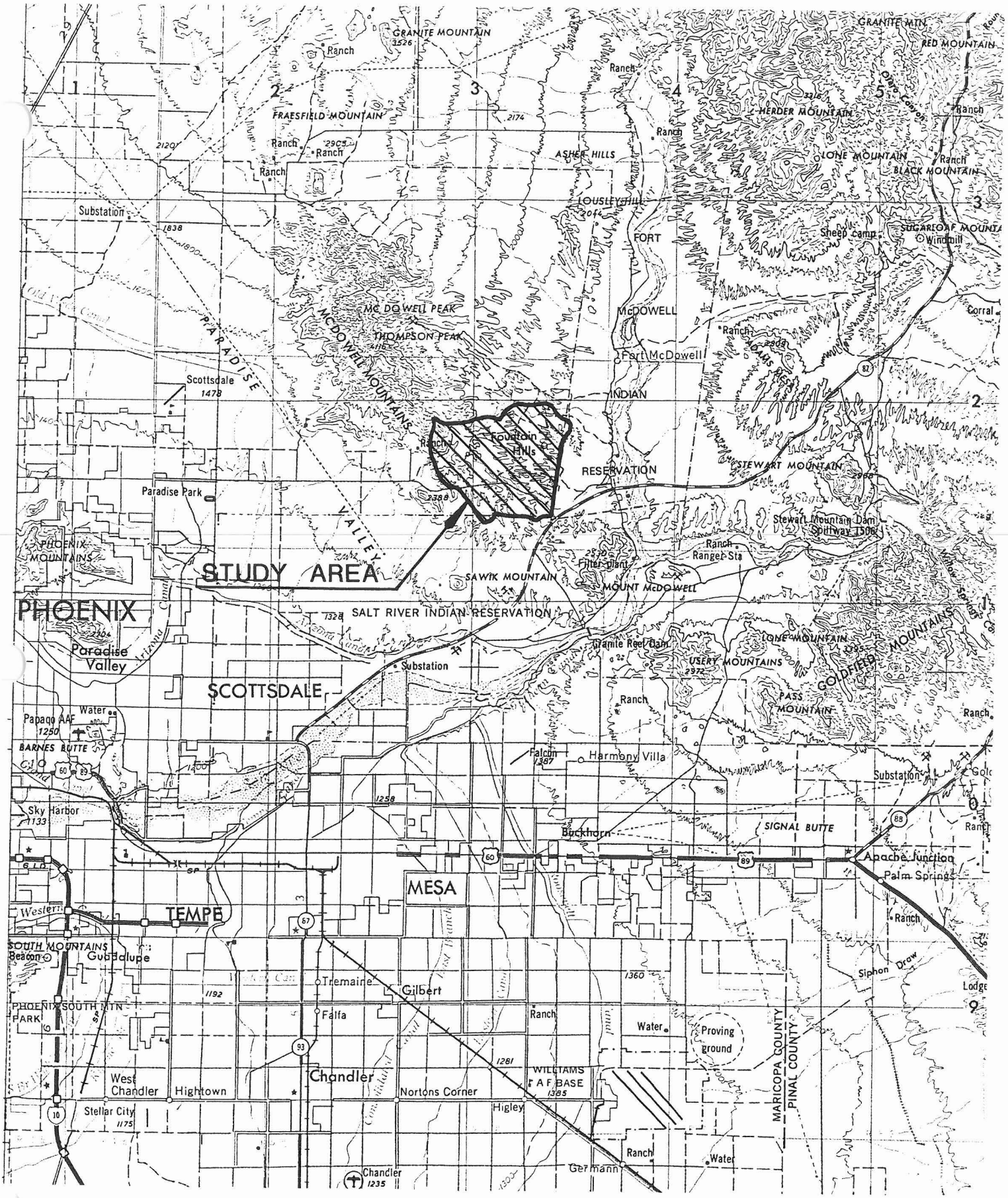

FIGURE 1

VICINITY MAP

Town of Fountain Hills South
Floodplain Delineation Study
FCD 92-05

Technical Data Notebook
Hydrology

Section 1: General Documentation and Correspondence

1.1 Contact (Telephone) Reports

1.2 Meeting Minutes and Reports

1.3 General Correspondence

1.4 Contract Documents

ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: Ham

JOB: _____ JOB NO.: 310.43

DATE: 2-12-93

MEMORANDUM

Telephone Conversation with George Nelson - Anderson-Nelson

RE: Survey Control Fountain Hills

Triangulation Survey Done in Early 70's and was not Redone for aerial mapping. Said That there is a fairly consistant error of .15 throughout But otherwise survey was Tight. Panel points for aerial mapping were taken from known control points.

ACK ENGINEERS, INC.
2255 N. 44th St. • Phoenix, Az. 85008 • Phone (602) 244-2566

SHEET _____ OF _____
BY Hen DATE 3-2-93
CHECK _____ DATE _____
CLIENT _____
JOB _____ JOB NO. _____

Memorandum of Phone Conversations
Reference Survey - Vertical Control & Mapping

2-25-93 Call From ELLIS HYDE - KENNY AERIAL MAPPING

We talked about the Datum Concerns and about how mapping was verified. Ellis said that they perform the mapping based upon the control supplied and all checks are internal. No field sections were taken. He said that this was within the requirements for aerial mapping.

2-25-93 Call to State Board of Technical Registration.

A call was placed in response to a statement by Richard Alcorcer, Alcorcer Surveying. During a meeting on 2-24-93 at FCDMC Mr. Alcorcer stated that it was a requirement of an aerial mapping firm to verify their mapping by field cross sections.

The State Board, Enforcement Section, said that there was no such requirement specifically called for in the Regulations.

2-25-93 Call to Tim Murphy - FCDMC

Reported to Tim on the ~~Phone~~ Conversations with Kenny Aerial and State Board. Tim said that he had included in IGA with Town a statement on "Quality Control Survey per FEMA" He also said that the Town's Change order with Anderson-Nelson Referenced the I.G.A. We Agreed that although the Survey was not required by Law it appeared to be required by Contract.

ACK ENGINEERS, INC.
2255 N. 44th St. • Phoenix, Az. 85008 • Phone (602) 244-2566

SHEET _____ OF _____

BY _____ DATE _____

CHECK _____ DATE _____

CLIENT _____

JOB _____ JOB NO. _____

2-26-93 Call From Sandy Cramer - Valco

She called to let me know that Val had gone ahead and run in the other ADOT Benchmark to check Datum. It was found that the proper adjustment between Fountain Hills Datum and 1929 NGVD should have been 1.17' instead of 1.26 feet. ~~That the~~ She said that the ~~Bureau~~ Bureau of Public Roads Cap that had been referenced as the basis for the Datum Conversion ~~was~~ did not check into the ADOT Bench loop and appears to have been reset. She said that they would report their findings to ADOT. Based on our conversation it appears that the Datum used for the mapping checks out within Tolerance.

3-1-93 Call to Tim Murphy - FCDMC

Let Tim know that ~~the~~ about the Datum used for the mapping appeared to be ok. We further discussed the field verification processes and he said that he would talk to Randy Harrell at the Town of Fountain Hills

ACK ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: S. E. Kao

JOB: Fountain Hills South JOB NO.: 310.43

DATE: 6-17-93

MEMORANDUM

Tim Murphy of FCDMC called me this afternoon and gave me the following information:

1. He has checked with Randy Harrel of Fountain Hills and Ray Baldwin of MCO about the existing structure on Chukar Wash near the section line of Section 28. Both Randy and Ray said that they do not plan to maintain or certify the structure. Therefore, in working on the HEC-1 modeling, no flood retarding should be considered for this structure.

2. At the junction of Logan Wash and Cereus Wash, there are two existing lakes. However, the inflow to the lakes is mainly from the wastewater treatment systems, not from storm runoff. Thus, no flood retarding should be considered for these lakes either. However, when we run the HEC-2 model thru the reach, we need to look at the upstream conditions to make sure the delineation is realistic.

ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: ES

JOB: Fountain Hills South Hydrology JOB NO.: 310.43

DATE: June 24, 1993

MEMORANDUM

I have received three phone calls from Larry and Alan at the GCA office. The topics of the phone calls are as follows:

1. Larry indicated that he needed the control data information from us.

2. Alan had some problems with the Kenney Aerial topo maps. He wanted to know if the new versions of the Section 16, 22 and 23 AutoCAD files supersede the older ones, and I informed him that they did. He also said that some of the contour elevations were incorrect and did not match up between some of the files. He wanted to know if we were aware of that. I stated that the AutoCAD files Hal sent to him are the originals we received and were not altered by us.

3. Larry had some problems matching the Zoning Map/Land Use overlay on the topo maps. I stated that the Kenney Aerial topo maps and the Town of Fountain Hills Zoning and Land Use maps did not match perfectly. The reason is that the two maps were created in different ways. I also stated that we moved the Zoning/Land Use overlay around to come up with an optimal positioning to best suit our needs, eventhough it did not match perfectly. He said it was only a minor problem, and that he would be finished within a week or two and then send his data and the original disks back to us. See Letter of Transmittal dated 06-02-1993.

ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: ES

JOB: Fountain Hills South Hydrology

JOB NO.: 310.43

DATE: July 1, 1993

MEMORANDUM

I called Hal Marron to ask about the control data GCA requested. There are two sources of control data: 1. the Anderson-Nelson control grid, 2. the Valco verification of control points. Hal suggested we send both to GCA, and if they want or need more information they can look through the horizontal and vertical control of the Fountain Hills Aerial Control - Street Paving Project also by Anderson-Nelson.

After comparing the two, Sam asked me to call Hal again for a reason as to the discrepancies. Hal said that Valco's survey was just a check of the Anderson-Nelson control grid, so eventhough it was not exact, it was still very close and should not cause any problems. Hal also said that GCA should use the Anderson-Nelson control grid. The Bureau of Public Roads brass caps have no state plane coordinates because they are ERM's only.

AGK ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: ES

JOB: Fountain Hills South Hydrology JOB NO.: 310.43

DATE: July 1, 1993

MEMORANDUM

I returned a call to GCA and spoke with Alan. He said they needed the following information to complete their work:

1. Soils data for our study area. This data includes % rock outcropping, and Green-Ampt parameters.

2. Control data to lock down all the AutoCAD files.

3. Information to properly lock down the Zoning and Land Use AutoCAD files supplied by the Town of Fountain Hills.

Sam and I called Alan back in the afternoon. Sam said that the soils information turned in by Tom Loomis is the same for our study. We told him that we would FAX over the control data information from Anderson-Nelson, along with instructions from AGK to translate the Zoning and Land Use AutoCAD files to the proper position for an optimal overlay.

ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: File

FROM: ES

JOB: Fountain Hills South Hydrology

JOB NO.: 310.43

DATE: July 2, 1993

MEMORANDUM

I spoke to Sandy of Valco to ask about their verification of the Anderson-Nelson control data. She said that their check was within tolerable limits.

AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, AZ 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

TO: File

FROM: H.A. Aristizabal

JOB: FCDMC - Fountain Hills (South) FIS

JOB NO.: 310.43

DATE: August 24, 1993

MEMORANDUM

Larry Bliley of GCA called this morning and informed me that the new data (Sections 22 and 14) he received from Kenney Aerial Mapping (KAM) still have the same problem as the previous version. I called Pete Dyroff of KAM and explained to him what Larry told me. He said he would check into it and call back. Pete called back later with Frank Deal on the speaker phone. They said they were unable to see a gap and would send someone over to AGK to show the files. I called Larry of GCA and asked if he could be here. He agreed.

We met at AGK office (Frank Deal and Tim Larking of KAM, Larry Bliley of GCA, and Hernan Aristizabal of AGK). It was determined that there was no gap between Sections 22 and 15 and the problem was that GCA assumed the edges of the sections were section lines. These are not true section lines, but trim lines projected from distant section corners. In this particular line, KAM assumed that the point shown on the north trim line as point 50346 was on the section line, so they projected their trim line through this point, which resulted in the trim line bearing inward. Section 15 included the area that was missing from this section, and apparently, GCA had overlooked this.

C:\310.43\GCA.MEM

Town of Fountain Hills South
Floodplain Delineation Study
FCD 92-05

Technical Data Notebook
Hydrology

Section 1: General Documentation and Correspondence

1.1 Contact (Telephone) Reports

1.2 Meeting Minutes and Reports

1.3 General Correspondence

1.4 Contract Documents

Fountain Hills Flood Insurance Studies
Main points discussed for letters
meeting of 3-8-93

FAX MEMO
PAGES 1 DATE 3-11-93 FAX # 248-7851
TO Tom Loomis
FROM Hal MARRON
CO. AGK
PH # 244-2566 FAX # 244-8547

Attendees:

George Sabol
Tom Loomis
Sam Kao
Hal Marron

We decided that a letter should be sent by each of our firms that addresses how the mapping and control problem has affected each of our firms. We felt such a letter should contain each of these points:

- o Historical Overview of Project
- o Problem Statement
- o Recap of Contracted Scope
- o Scope of services actually provided todate
  - explanation of why the different services have been needed
  - discussion of information and materials still required to complete the project (i.e. stereo contact prints, complete coordinate list, etc .)

We would include the following attachments:

- o Additional hours expended in timeline form
- o FEMA requirements for mapping and areas where the mapping does not meet these requirements.
  - spacing of control points
  - no quality control survey of mapping
  - panel point elevation differences

We also felt that we should include a statement with our planned present course of action. It was agreed that unless directed otherwise by the district that we should proceed with the digitized cross-sections from Kenney Aerial Mapping and the field survey to verify them.

Fountain Hills Flood Insurance Studies
Main points discussed for letters
meeting of 3-8-93

Attendees:

George Sabol
Tom Loomis
Sam Kao
Hal Marron

FAX MEMO
PAGES 1 DATE 3-11-93 FAX # 303 292-2415
TO GEORGE SABOL
FROM HAL MARRON
CO. AGK
PH # 602 249-2566 FAX # 602 249-8747

We decided that a letter should be sent by each of our firms that addresses how the mapping and control problem has affected each of our firms. We felt such a letter should contain each of these points:

- o Historical Overview of Project
- o Problem Statement
- o Recap of Contracted Scope
- o Scope of services actually provided todate
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AGK ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: FDMC/ File

FROM: H.A. Aristazabal

JOB: FCDMC - Fountain Hills FCD 92-05

JOB NO.: 310.43

DATE: July 8, 1993

MEMORANDUM

Reference: Progress Meeting of July 8, 1993 at District Office

Attendees:

Tim Murphy	FCDMC
Sandy Story	FCDMC
Sam Kao	AGK Engineers
Hernan Aristazabal	AGK Engineers

1. AGK submitted the hydrology of watersheds 130 and 120 and the routing for watershed 110.

2. The lake level for modeling purposes was discussed. Tim suggested that AGK discuss this with Randy Harrell, Fountain Hills Engineer.

3. FCDMC requested a computer disk for the input files of the hydrology model (HEC-1).

4. FCDMC wanted the Department of Water Resources (ADWR) to review the submittal of hydrologic computations for the dam in watershed 180. The District will take care of the coordination with ADWR.

AGK ENGINEERS, INC.
2255 N. 44th St. Phoenix, Az. 85008 • Phone (602) 244-2566

TO: FCDMC

FROM: H.A. Aristizabal

JOB: FCDMC - Fountain Hills FDC 92-05

JOB NO.: 310.43

DATE: July 22, 1993

M E M O R A N D U M

Reference: Progress meeting of July 22, 1993, 1:00 PM., at Discrict Office

Attendees:

Tim Murphy	FCDMC
Sandy Story	FCDMC
Sam Kao	AGK Engineers
Hernan Aristizabal	AGK Engineers

1. AGK Submitted the hydrology of watersheds 150, 160, 170, 180 and 190.

2. The HEC-1 program error on calculation of storage elevation from SQ, SE and SV cards was discussed during the meeting. FCDMC is aware of this problem from previous studies.

3. AGK obtained a copy of the "Estimated Manning's Roughness coefficient for stream channels and flood plains in Maricopa County, Arizona (FCDMC 1991)" and a sample copy of sheet 8 from the Deadman Wash Floodplain Delineation Study to use as a example.

4. AGK borrowed Volumes 1 and 2 of the Deadman Wash Floodplain Delineation Study FCD 90-65, and a copy of Manning's n value report for Fountain Hills (North).

George V. Sabol Consulting Engineers, Inc.
7950 East Acoma Drive, Suite 211, Scottsdale, Arizona 85260-6962
(602) 483-3368 FAX (602) 483-3990

MEMORANDUM

RECEIVED
AUG 24 1993
AGK ENGINEERS, INC.

To: Meeting Attendees:
Mr. Dave Johnson, FCDMC
Mr. Tim Murphy, FCDMC
Dr. Sam Kao, AGK
Mr. Hernan Aristizabal, AGK
Mr. Geza Kmetty, MKE
Mr. Frank Brown, MKE
Dr. George V. Sabol, GVSCE
Mr. Tom Loomis, GVSCE

From: Tom Loomis TRL

Subject: Meeting to discuss mapping accuracy

Project: Fountain Hills (North) Floodplain Delineation Study
Contract FCD 92-04

Date: 23 August 1993

The meeting was held on 16 August 1993 at 1:00 p.m. at the office of McLaughlin Kmetty Engineers, Ltd. There was not an agenda for this meeting. Mr. Loomis explained that the purpose of the meeting was for GVSCE and AGK to notify the FCDMC of concerns regarding the accuracy of the 200 scale mapping prepared by Kenney Aerial Mapping (KAM) and provided by the FCDMC. GVSCE has completed field verification check sections, and obtained photogrammetric HEC-2 cross sections from KAM. Mr. Loomis covered the following in regard to the accuracy of the mapping:

1. The mapping was prepared by KAM under a sub-contract with Anderson-Nelson, who had a contract with the Town of Fountain Hills. The purpose in preparing the mapping was to provide the Town with a planning tool. The mapping was never intended to be used for floodplain delineation purposes.

2. The mapping was prepared using a digital terrain model (DTM). The model was based on a 75-foot grid spacing and break line data. The grid spacing does not appear to be tight enough, and there apparently is insufficient break line data to adequately model the terrain, particularly in the channel area.

3. Six cross sections, picked at random by GVSCE by examining areas of the contour mapping which did not appear reasonable, were presented for support of statement 2 above. Each cross section plot depicts a comparison between the photogrammetric cross section and one extracted from the contours. Vertical errors of as much as 10 feet are apparent, assuming the photogrammetric cross sections are correct. The vertical errors result in a horizontal error of contour location which is very significant for plotted cross sections (errors of as much as 100 feet).

4. Dr. Kao presented four cross section comparisons from the Fountain Hills (South) area which depict similar differences, and an apparent horizontal shift which has yet to be explained.

Mr. Loomis then discussed the accuracy of the photogrammetric HEC-2 cross sections. Cross section plots of the field check sections against the photogrammetric sections were presented. The accuracy is significantly better with most differences occurring in heavily vegetated ares. There is also an, as yet, unexplained horizontal shift apparent in these plots. The photogrammetric cross sections appear to be sufficiently accurate to meet FEMA specifications.

Mr. Loomis described the following problems which are now apparent:

1. The contour mapping provided by the District does not meet FEMA specifications in certain areas and there is not enough data available to isolate these areas, as they are random, but appear most often in the channels.

2. The hydraulic model, based on the photogrammetric cross sections, will meet required accuracy. Floodplain boundaries that are to be plotted on the contour mapping will not be accurate in all areas.

3. The photogrammetric cross sections will not all have sufficient hydraulic capacity to convey the 100-year peak discharge because the cross section lengths were determined using the contour maps. The inaccuracy in the contour mapping resulted in photogrammetric cross sections that do not always extend far enough to adequately depict the floodplain.

Mr. Loomis presented the following recommendation to correct the problems:

1. The existing contour mapping is accurate enough to be used for the hydrology, but should not be used for the hydraulic analysis.

2. The stereo photography and control are apparently accurate enough to meet FEMA specifications. The stereo model should be used to create enhanced contour strip maps along each wash to be delineated, using conventional stereoscopic techniques, not a DTM. This could be done after the hydraulic modeling is completed and actual floodplain limits are known.

3. Photogrammetric extensions of the existing cross sections will be necessary in some areas.

Both Dr. Sabol and Dr. Kao requested that the District provide GVSCE amd AGK with financial relief for the costs incurred thus far which are not covered by the contract scope of work. The change order should also cover costs associated with the additional work to assist in the preparation of the enhanced mapping.

There was considerable discussion regarding the proposed solution and the change orders. Both Mr. Johnson and Mr. Murphy agreed that the proposed solution is acceptable and that a change order is appropriate. The following course of action was agreed upon:

1. Mr. Murphy will schedule a meeting with KAM to present this problem. Wednesday, 18 August 1993 was tentatively agreed upon. All parties are to attend.

2. Both AGK and GVSCE are to itemize costs incurred to date that are in excess of the agreed upon scope of work that is due to the mapping problems and attempts to resolve the problems.

3. The District will contract, or otherwise deal, directly with KAM to obtain acceptable mapping.

4. AGK and GVSCE are to prepare a statement of required effort and cost estimate for the extra work necessary to complete the project using the revised mapping.

Mr. Loomis discussed why it has taken so long to get to the point where this determination regarding mapping accuracy could be made. Seven iterations of submittal and checking of the photogrammetric cross sections was required because of errors found in KAM's submittals to GVSCE. This process took 2 months. The problems encountered included incorrect stationing, missing end points, erroneous data, sections out of order, incomplete X1 records, and missing data when cross sections contained horizontal angle points. It was pointed out by Mr. Murphy that this was a problem between GVSCE and its sub-contractor, KAM, and not the Districts' responsibility. However, Mr. Kmetty noted that this was a problem that the consultants inherited as a result of the District's decision to accept the existing mapping from KAM. The consultants had little choice as a result of that decision.

Town of Fountain Hills South
Floodplain Delineation Study
FCD 92-05

Technical Data Notebook
Hydrology

Section 1: General Documentation and Correspondence

1.1 Contact (Telephone) Reports

1.2 Meeting Minutes and Reports

1.3 General Correspondence

1.4 Contract Documents

1.3.1

COMMUNITY

1.3.2

STATE COORDINATION

State of Arizona
OFFICE OF THE STATE WATER ENGINEER
Supervision of Safety of Dams

License of Approval

Pursuant to Chapter 3, Title 45 (Waters), of the Arizona Revised Statutes, the STATE WATER ENGINEER has found that the FOUNTAIN HILLS DAM #19 *Dam and Reservoir, State Application Number* 7-41, *located in Sec.* 22, *Tp.* 3N, *R.* 6E, *G. & S. R. B & M,* Maricopa *County, State of Arizona, are safe to impound water; and the use of said dam and reservoir to impound water in accordance with and subject to the following terms and conditions is hereby authorized:* Use shall be only as a flood retarding structure, limited to temporary storage during periods of flood and for such additional time as may be required to completely evacuate the flood waters through the outlet conduit.

This license of approval supersedes every previous consent for use issued by the State of Arizona relative to said dam and reservoir.

Witness my hand and the seal of the Arizona Water Commission of the State of Arizona this 13th *day of* December, *19*73.

STATE WATER ENGINEER

Benson G. Scott

By Chief, Supervision of Safety of Dams

1.3.3

OTHER AGENCIES

AGK ENGINEERS, INC.
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PRINCIPALS
Edward A. Adair, P.E.
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ASSOCIATES
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Denis L. Howe, P.E.
Hal E. Marron, P.E.
Patrice M. Miller

January 6, 1993

Mr. Timothy M. Murphy
Project Manager
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05
Fountain Hills FIS (South)
Monthly Progress Report

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through December 27, 1992. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District and Town of Fountain Hills
- Participation in Public Meeting
- Schedule preparation and Projected Monthly Billing Estimation
- Subconsultant Agreement Preparation

Task 2 - Data Collection
- Meetings with Town of Fountain Hills and Anderson-Nelson
- Research Soils Maps and Zoning Land use.

Task 3 - Topographic Mapping
- Obtain hard copy and disks of study area

Task 4 - Field Survey Coordination
No work commenced.

Task 5 - Hydrology
- Commenced basin delineation

Task 6 - Floodplain and Floodway Delineation
No work commenced.

Task 7 - Final Products
No work commenced.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Hal Marron

Hal E. Marron, P.E.
Project Manager

HEM/kp

Enclosure

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February 11, 1993

Mr. Tim Murphy
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, AZ 85009

Reference: Fountain Hills Flood Insurance Study
Survey Control

Dear Mr. Murphy:

AGK Engineers and George V. Sabol Consulting Engineers have been encountering similar problems related to the basis of survey control used in the aerial mapping. In past projects, where AGK has been responsible for providing mapping, documentation has been supplied to the Flood Control District showing full descriptions of all monument and panel points as well as the notes for the horizontal and vertical control surveys that were used to establish these points. To date, the same level of information has not been made available for the mapping supplied by the District to AGK.

A variety of sources have been used to compile our current understanding of how the aerial mapping control was established. Unfortunately, some of the information is contradictory and other portions have not been made available to us. AGK did not budget within its Scope of Services to the District to re-establish the horizontal and vertical control grid used in the aerial mapping in order to "verify" the aerial mapping and its control.

The District's assistance in acquiring the horizontal and vertical aerial control surveys as well as complete monumentation and panel point descriptions in the NAD 83 coordinate system is requested.

Without these documents, it will be extremely difficult to verify that the mapping is on the NAD 83 coordinate system and the 1929 NGVD without a significant level of additional field survey and research. As this level of additional effort was not included in the project scope, a contract modification would be required.

Truly yours,

AGK ENGINEERS, INC.

Hal Marron

Hal E. Marron, P.E.
Project Manager

HEM/kp

FILE COPY

FOUNTAIN HILLS USGS QUADRANGLE MAP CORNERS
NAD 1983 State Plane Coordinates

USGS Quadrangle Map	Northing		Easting	
	Meters	SI Feet	Meters	SI Feet
Granite Reef NE Corner	291106.241	955072.969	240356.466	788571.083
Granite Reef SW Corner	277217.743	909507.031	228780.968	750593.727
Granite Reef NW Corner	291080.539	954988.645	228758.715	750520.719
McDowell Peak SW Corner	291068.817	954950.187	217160.916	712470.197
Fort McDowell NW Corner	304943.646	1000471.280	228736.390	750447.474

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February 8, 1993

Mr. Timothy M. Murphy
Project Manager
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05
Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through December 27, 1992. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District and Town of Fountain Hills
- Monthly Billing Estimation
- Subconsultant Agreement Preparation
- Legal Advertisement

Task 2 - Data Collection
- Meetings with Town of Fountain Hills and Anderson-Nelson
- Research Soils Maps and Zoning Land use.

Task 3 - Topographic Mapping
- Review mapping and edge match of sections

Task 4 - Field Survey Coordination
- Meet with Anderson-Nelson on control

Task 5 - Hydrology
- Basin delineation
- Flow path determination and Clark Unit Hydrograph related take-offs

Task 6 - Floodplain and Floodway Delineation
No work commenced.

Task 7 - Final Products
No work commenced.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Hal E. Marron, P.E.
Project Manager

HEM/kp

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February 17, 1993

Mr. Tim Murphy
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, AZ 85009

Reference: Fountain Hills Flood Insurance Study
Survey Control - Update
AGK Project No. 310.43

Dear Mr. Murphy:

Since the writing of our letter of February 11, 1993, AGK has been able to obtain copies of the vertical and horizontal control survey notes used for the aerial mapping supplied by the District to AGK for the above referenced project. Based upon our review of these notes and our research, we wish to refine our request for information from that expressed in our February 11, 1993 letter. The information requested is as follows:

1. A comprehensive listing of all panel points, brass caps, and other control points that are either shown on or used to establish the control for the mapping. The comprehensive listing should include the following:

   - point number or name
   - 1983 NAD State Plane Coordinates
   - local coordinates
   - 1929 NGVD ground elevation
   - 1929 NGVD monument elevation (if different)
   - local datum elevation (indicate ground or monument)
   - description of point
   - alternate descriptions or names for same point

   This listing should be complete for all low altitude and high altitude map panels, all control brass caps, and all the named points contained in the horizontal control survey. A partial list of these point names would include:

DEB	SWEAT	JUD
ALLEN (AKA AL)	NEW BAKER (N.B.)	NEW ROBERT (N.R.)
LOUIE	JULIE	PADUC (AKA P.D. & PADUKE)
NEW MICK (N.M.)	MF	PAT
RENA	TEEPEE	G.L.
RW		

FILE COPY

The request for alternate names is made due to naming convention inconsistencies found within the survey notes. Two examples are as follows:

Page 52 Horizontal Control

Panel 1100 - ECC 32-1 (F.H. original control)
Record 41559.110 N 17484.740 E
Also is BM #328
Record Elev. = 2039.74 0.35 above ground

(Editors note: From the Town of Fountain Hills Benchmark 328 is described as a PC located at coordinates 23807.998 N, 21801.806 E)

Page 44 Vertical Control

BM #16 - GLO BR Cap - angle point S.R.I.R.
Elev. 1536.12 0.55' above N.G.

This is the same description given to point number 153 in the August 24, 1992 letter from Anderson-Nelson and to panel point 1153.

2. Copies of the available documentation of the 1970 triangulation survey for Fountain Hills. It is our understanding that points established as a part of that survey were used as the basis for this new aerial control survey and that no new overall control closure was performed. This requested documentation could include the original survey notes and/or Math Plats or Records of Survey created from these notes.

3. A more comprehensive description of the method used to convert the elevations on the mapping from local datum to 1929 NGVD. The method described in Anderson-Nelson's letter of August 24, 1992 cannot be confirmed in the field. ADOT's recent construction of the Beeline Highway has destroyed the monument at the northwest corner of its intersection with Shea Boulevard. Other than the August 24 letter, AGK has been provided no record information showing that monument as part of the vertical control survey for Fountain Hills. AGK is currently conducting a control survey that will include ADOT control points and the two indian boundary points identified as points 123 and 153. We will keep you advised of the progress of this survey and its impact on the 1.26 feet adjustment factor used in the mapping conversion.

We thank you for your prompt action on this request.

Sincerely,

AGK ENGINEERS, INC.

Hal E. Marron, P.E.
Project Manager

HEM/kp

cc: Tom Loomis, George Sabol & Associates
Randy Harrell, Town of Fountain Hills
Don Anderson, Anderson-Nelson

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March 9, 1993

Mr. Timothy M. Murphy
Project Manager
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through February 28, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District and Town of Fountain Hills
- Monthly Billing Estimation
- Subconsultant Agreement Preparation and Coordination
- Legal Advertisement Coordination

Task 2 - Data Collection
- Meetings w/ Town of Fountain Hills, Anderson-Nelson, Sabol, and Kenney Aerial
- Research Soils Maps and Zoning Land use, update available mapping

Task 3 - Topographic Mapping
- Review mapping and edge match of sections. Meet with Kenney Aerial to revise bed sections
- Enter drainage areas into computer

Task 4 - Field Survey Coordination
- Meet w/ Anderson-Nelson, Sabol, FCDMC, ADOT, and subconsultant on control discrepancy
- Review horizontal and vertical control notes from Anderson-Nelson

Task 5 - Hydrology
- Basin delineation
- Flow path determination and Clark Unit Hydrograph related take-offs
- Enter soils maps

Task 6 - Floodplain and Floodway Delineation
- Identify cross section locations

Task 7 - Final Products
No work commenced.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Hal Marron

Hal E. Marron, P.E.
Project Manager

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Patrice M. Miller

March 22, 1993

Mr. Tim Murphy
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango Street
Phoenix, AZ 85009

Reference: Fountain Hills Flood Insurance Study
Survey Control - Update
AGK Project No. 310.43

FILE COPY

Dear Mr. Murphy:

As you are aware, the mapping and control for the above referenced project has been an area of concern for both of our offices. We have been making a concerted effort with all the parties involved to resolve the issues that affect the use of the mapping for the purposes of Flood Insurance Hydrology and Hydraulics. Our concern, however, is that despite the best efforts of AGK, George V. Sabol Consulting Engineers, Inc., and the District, those elements related to the mapping will continue to impact the project throughout the entire project term.

As of this date, we see the following issues as still being unresolved with respect to mapping:

1. The Compatibility of the Base Mapping with FEMA Criteria.

   In accordance with Appendix A of FEMA Release 37, it appears that the mapping may not meet FEMA standards. Areas of concern with respect to the mapping include, but are not limited to the following:

   - Appendix A, Section A 4-3, B (1) Vertical Control - the number of primary control points appears to have greater separation than the 1000 feet specified.
   - Appendix A, Section A 4-3, C (6) Quality Control Survey - This work has not been supplied to AGK by the District. AGK is responsible for verifying the cross sections used within the floodplain mapping portion of the project, but not to supply this survey that is directly related to the accuracy of the base mapping.

   Our concern is that there is a risk involved with FEMA's rejection of the study due to the inadequate mapping. As the Contract states that the District will supply the mapping for this project, we feel that the District must make a determination on how it wishes to proceed.

2. Impact of Mapping on the Project Schedule

   To date, the mapping concerns have affected AGK's ability to deliver Contract items on the projected schedule. Delays have been caused due to incorrect mapping, control concerns, and the necessity to redirect personnel to mapping problem resolution rather than hydrologic or hydraulic related tasks. In addition, requests for required information have not been responded to by the responsible parties. It appears that mapping related delays may continue indefinitely.

3. Impact of Mapping on the Project Budget

   The manpower that has been necessary to coordinate, verify, and deal with the mapping problems to date has far exceeded the budgeted manpower, scope and spirit contained within the Contract. Additional costs have been incurred by AGK and its subconsultant, Valco Surveying, in numerous ways that include:

- Replacement and remanipulation of 40 percent of originally supplied mapping due to errors.
- Need to establish a 1929 Vertical Datum Loop due to inability to verify elevations contained in datum conversion method supplied to us.
- Data search (including multiple queries) from Town of Fountain Hills, Kenney Aerial Mapping, Anderson-Nelson, and FCDMC. This includes greater than anticipated coordination time on the part of AGK.

Efforts to resolve these mapping problems are documented chronologically in the attached Appendix A.

At this time, we feel that we have done all we can to bring about a resolution to the mapping and control problems without further seriously impacting our ability to perform the remainder of the study within the budget provided. Unless directed otherwise, we will proceed as follows on the project:

1. We will terminate involvement in trying to resolve mapping and control issues related to the mapping. As the problems have been identified, it appears that this should now be handled by the District through its Agreement with the Town of Fountain Hills and the Town's consultants.
2. We will remain available to assist the District on a specific issue basis on these mapping and control problems. These services will be provided only when requested by the District.
3. We will continue with the hydrology study and related exhibits.
4. We will finalize our cross section locations and submit them to the District for approval. Upon receipt of approval, we will proceed with obtaining digitized cross sections from Kenney Aerial Mapping and the field survey required to verify selected cross sections.

At this point in time, we are of the opinion that the entities responsible for providing the mapping to us and the District are not making a concerted effort to resolve the problems. It is not our intent to add fuel to a burning fire, but we can no longer continue to participate in the resolution of these problems under the current conditions. We can not allow an untasked scope of work to degrade our abilities to deliver the remainder of the project.

Please let us know how you wish us to proceed.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Vice President

Enclosure: Appendix A: Documentation of efforts by AGK to resolve survey control and mapping problems.

APPENDIX A

June 25, 1992	Notice of Award of Fountain Hills South FIS given to AGK Engineers, Inc.
July 1992	Met with Town of Fountain Hills, FCDMC, Kenney Aerial, and Sabol to discuss mapping. Mapping reported as 80% complete, plus other coordination - .... **Total Time - 11 hours**
August 1992	Manipulation of Section 10 of mapping to review quality of mapping for use in flood study. Irregularities of contours noted in stream channels and roadways. Decision made to use digitized cross sections rather than generated cross sections directly from mathematical mapping base. **Total Time - 10 hours**
September 1992 thru November 1992	Revised portions of mapping reviewed. Problems with segmented or lacking lines in contour mapping. Receive copy of letter on basis of control and translation from Anderson-Nelson. **Total Time - 6 hours**
December 8, 1992	Verbal Notice to Proceed with Contract.
December 1992	Sealed mylars and computer disks of mapping received from District. Coordinate with Town of Fountain Hills.
December 1992 thru January 1993	Review mapping and mapping files. Identify match problems with 3 sections of mapping. Coordinate with Kenney Aerial, Sabol, District, Town of Fountain Hills and Anderson-Nelson. **Total Time - 22 hours**
January 13, 1993	Contract received from District.
February 1993	Coordinate verification survey with Valco. Identify approximately 1' Northing by Easting difference in translation to NAD 83. Request information from District on horizontal and vertical control surveys used to establish mapping. Locate surveys and obtain from Town of Fountain Hills. Begin vertical control survey to verify 1929 Datum. Field survey cannot verify 1929 Datum based upon method described in Anderson-Nelson letter of August 24, 1992. Letter of request for information related to panel coordinates and descriptions sent to District. Meeting held to discuss mapping and control problems. Valco Surveying re-establishes 1986 ADOT survey to transfer 1929 NGVD Datum to project. Receive three revised sections of mapping from Kenney Aerial. **Total Time - 35 hours AGK** **6.5 hours Valco**
February thru March 1993	Coordinate with Kenney Aerial, Anderson-Nelson, Sabol, and District on mapping and control issues, quality control survey requirements, panel point spacing, analysis, and checking procedures used. Preparation of letter detailing impact of mapping and control problems on project. **Total Time - 15 hours**

Total time identified on out of Scope of Work items to date **99 hours AGK**
6.5 hours Valco

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Patrice M. Miller

April 8, 1993

Mr. Timothy M. Murphy
Project Manager
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through March 28, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District and Town of Fountain Hills
- Monthly Billing Estimation
- Subconsultant Agreement Preparation and Coordination

Task 2 - Data Collection
- Coordinate information form Town of Fountain Hills, Anderson-Nelson, Sabol, and Kenney Aerial
- Research Zoning Land use, update available mapping

Task 3 - Topographic Mapping
- Enter Land Use into computer
- Enter drainage areas into computer
- Enter Soil Areas into computer
- Enter USGS Controls for Mapping

Task 4 - Field Survey Coordination
- Coordinate with Anderson-Nelson, Sabol, FCDMC, ADOT, and subconsultant on control discrepancy
- Review horizontal and vertical control notes from Anderson-Nelson
- Coordinate Vertical Control Problems

Task 5 - Hydrology
- Basin delineation
- Flow path determination and Clark Unit Hydrograph related take-offs
- Enter soils maps, Land Use
- Calculate Basin Roughness and Soil Properties

Task 6 - Floodplain and Floodway Delineation
- Identify cross section locations

Task 7 - Final Products
No work commenced.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Hal E. Marron, P.E.
Project Manager

HEM/cs

Enclosure

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2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

June 4, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through May 23, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - No work performed this period.

Task 3 - Topographic Mapping
- Add USGS quad map areas

Task 4 - Field Survey Coordination
- Coordinate Structure Surveys

Task 5 - Hydrology
- Flow path determination and Clark Unit Hydrograph related take-offs
- Enter soils maps, Land Use, Determine percent area per Basin
- Calculate Basin Roughness and Soil Properties
- Run MCUHP 1 on all basins
- Begin HEC-1 coding for initial conditions

Task 6 - Floodplain and Floodway Delineation
- Identify cross section locations
- Digital thalwegs

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Hal E. Marron/pmm

Hal E. Marron, P.E.
Project Manager

HEM/cs

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

ASSOCIATE
Patrice M. Miller
Michael J. Bonar, P.E.
Denis L. Howe, P.E.
Hal E. Marron, P.E.

AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

July 22, 1993

Mr. Tim Murphy
Flood Control District
of Maricopa County
2801 West Durango Street
Phoenix, AZ 85009

FILE COPY

Reference: Fountain Hills FIS, Contract FCD 92-05
AGK Project No. 310.43

Dear Mr. Murphy:

Through telephone conversation this afternoon, Mr. Randy Harrel, Town Engineer for Fountain Hills, gave me the following information that is relevant to this study:

1. The normal operating level for the Fountain Lake is set at one (1) foot below the spillway crest, which is the curb elevation at the road.

2. Each year, between August 1 and October 15, the lake surface is scheduled to drop gradually from the normal operating level to a level four (4) feet below the spillway crest. Then, the lake surface is gradually raised to the normal operating level by April 1.

AGK will incorporate the above information in our Hydrology Report.

Please let us know if you should have any questions.

Very truly yours,

AGK ENGINEERS, INC.

Samuel Kao

Samuel E. Kao, Ph.D., P.E.
Vice President

SEK/kp

cc: Mr. Ray Baldwin, MCO
Mr. Randy Harrel, Town of Fountain Hills

PRINCIPAL
Edward A. Adair, P.E.
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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

July 9, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through June 27, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meeting with Flood Control District on June 3, 1993
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination
- Coordinate Structure Surveys

Task 5 - Hydrology
- Run MCUHP 1 on all basins
- Run HEC-1 on most basins
- Check MCUHP and HEC-1 results

Task 6 - Floodplain and Floodway Delineation
- Digital thalwegs and cross section locations

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel Kao

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

July 29, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through July 25, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Meetings with Flood Control District on July 8, and July 22, 1993
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Digital thalwegs and cross section locations
- Estimation of n-values

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

SEK

September 30, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through September 26, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Estimation of n-values
- Review and verification of topo map and cross sections
- Coordination with District on mapping accuracy

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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Denis L. Howe, P.E.
Hal E. Marron, P.E.

AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

November 1, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through October 24, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation
- Submittal of Change Order Requests No. 1 and No. 2

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Review and verification of topo map and cross sections
- Preparation of HEC-2 files

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

December 1, 1993

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through November 21, 1993. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation
- Submittal of Change Order Requests No. 1 and No. 2

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel Kao

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

February 21, 1994

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through January 31, 1994. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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Hal E. Marron, P.E.

AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

March 7, 1994

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through February 27, 1994. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel Kao

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

April 6, 1994

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through March 27, 1994. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products - No work performed this period.

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

SEK

May 6, 1994

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through April 24, 1994. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Acair, P.E.
Samuel E. Kao, Ph.D., P.E.

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AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

June 8, 1994

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through May 29, 1994. We have performed the following work on each of the tasks cited:

Task 1 - Coordination
- Coordination with Flood Control District
- Monthly Billing Estimation

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation
- Preparation of HEC-2 files

Task 7 - Final Products

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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Denis L. Howe, P.E.

AGK ENGINEERS, INC.
2255 North 44th Street • Suite 330 • Phoenix, Arizona 85008 • Phone (602) 244-2566 • FAX (602) 244-8947

June 25, 1995

Mr. Timothy M. Murphy, Project Manager
Flood Control District of Maricopa County
2801 North Durango Street
Phoenix, AZ 85009

Reference: Contract FCD 92-05, Fountain Hills FIS (South)
Monthly Progress Report
AGK Project No. 310.43

Dear Mr. Murphy:

This letter serves as a progress report on the above referenced study through June 25, 1995. We have performed the following work on each of the tasks cited:

Task 1 - Coordination

Task 2 - Data Collection - completed

Task 3 - Topographic Mapping - completed

Task 4 - Field Survey Coordination - completed

Task 5 - Hydrology - completed

Task 6 - Floodplain and Floodway Delineation - completed

Task 7 - Final Products
Preparation of Final Report

If you have any questions on the project status, please do not hesitate to call.

Sincerely,

AGK ENGINEERS, INC.

Samuel Kao

Samuel E. Kao, Ph.D., P.E.
Project Manager

Enclosure

PRINCIPAL
Edward A. Adair, P.E.
Samuel E. Kao, Ph.D., P.E.

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Patrice M. Miller Denis L. Howe, P.E.
Michael J. Bonar, P.E.

AGK ENGINEERS, INC
2255 N. 44th Street Suite 230
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE July 8, 1993	JOB NO. 310.43
ATTENTION Mr. Tim Murphy	
RE: Fountain Hills (South) FIS FCD 92-05	

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:-

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progress Review
			Powder Wash
1	7-7-93	1	Powder Wash — Routing Diagrams &
			Routing Information, Storage & Culvert
			Data, HEC-1 Input/Output
			Current & Future conditions

THESE ARE TRANSMITTED as checked below:

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☒ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Emile Schmid

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AGK ENGINEERS, INC
2255 N. 44th Street Suite 230
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 8, 1993	310.43
ATTENTION: Mr. Tim Murphy	
RE: Fountain Hills (South) FIS FCD 92-05	

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progress Review
			Cereus Wash
1	6-29-93	1	Assumptions used in Model Development
1	7-7-93	1	Cereus Wash - Basin Development
			& Backup Material, Current & Future
			Development, Based on 100 Yr 6 Hr Storm

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SIGNED: Emile Schmid

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2255 N. 44th Street Suite 230
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE July 8, 1993	JOB NO. 310.43
ATTENTION	Mr. Tim Murphy
RE:	Fountain Hills (South) FIS FCD 92-05

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progress Review
			Cyprus Point Wash
1	7-7-93	1	Assumptions used in Model Development
1	7-7-93	1	Cyprus Point Wash - Basin Development
			& Back up Material, Current & Future
			Development, Based on 100yr 6hr Storm

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COPY TO _____

SIGNED: Emile Schmid

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AGK ENGINEERS, INC.
2255 N. 44th Street Su' 330
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 19 /1993	310.43
ATTENTION: Mr Tim Murphy	
RE: Fountain Hills (South) FIS FCD 92-05	

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - in Progress Review!
			Malta Drain
1	7/19/93	1	Assumptions used in Model Development
1	7/19/93	1	Cypruss point Wash - Basin development and backup material, current and Future conditions, Based on 100-Yr 6-Hr storm

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☒ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☒ For review and comment ☐ _____
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REMARKS _____

COPY TO _____

SIGNED: Penn A. Arthur

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AGK ENGINEERS, INC.
2255 N. 44th Street Sui 330
PHOENIX, ARIZONA 850u8

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 19, 1993	310.43

ATTENTION: Mr Tim Murphy

RE: Fountain Hills (South) FIS
FCD 92-05

TO Flood Control District
of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology in-progress Review
			Emerold wash
1	7/19/93	1	Assumption used in Model Development.
1	7/19/93	1	Emerold wash - Basin development and Backup
			Materials, curren and future conditions, Based
			on 100-Yr 6hr storm

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☒ For your use ☐ Approved as noted ☐ Submit ____ copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return ____ corrected prints
☒ For review and comment ☐ _____
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REMARKS _____

COPY TO _____

SIGNED: Norm R. Audahl

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AGK ENGINEERS, INC.
2255 N. 44th Street Suite 330
PHOENIX, ARIZONA 85008

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LETTER OF TRANSMITTAL

DATE	JOB NO.
July 19, 1993	310.43
ATTENTION: Mr Tim Murphy	
RE: Fountain Hills (South) FIS FCD 92-05	

TO Flood Control District of
Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progres Review
			Jacklin Wash
1			Assumptions used in Model Development
1			Jacklin wash - Basin development and
			Back up material, Curren and Future development,
			Based on 100-Yr 6-Hr Storm

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☒ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☒ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Norm D. Rasmussen

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AGK ENGINEERS, INC.
2255 N. 44th Street Su. 330
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 19, 1993	310.43

ATTENTION: Mr. Tim Murphy

RE: Fountain Hills (South) F.I.S.
FCD 92-05

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progress Review
			Colony wash
1	7/19/93	1	Assumption used in model Development
1	7/19/93	1	Colony wash - Basic development and Backup
			Development, Based on 100-Yr 6-Hr Storm

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
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☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
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AGK ENGINEERS, INC.
2255 N. 44th Street Suite 330
PHOENIX, ARIZONA 85

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
July 19, 1993	310.43
ATTENTION: Mr Tim Murphy	
RE: Fountain Hills (South) F IS FCD 92-05	

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☒ Attached ☐ Under separate cover via _____ the following items:

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☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
			Hydrology - In Progress Review
			Panorama Channel
1	7/19/93	1	Assumptions used in Model Development
1	7/19/93	1	Panorama channel - Basin development and
			Backup material, Current and Future conditions
			Based on 100-yr 6-hr storm

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(602) 244-2566

LETTER TRANSMITTAL

DATE	JOB NO.
July 22, 1993	310.43
ATTENTION: Mr. Tim Murphy	
RE: Fountain Hills (South) FCD 92-05	

TO Flood Control District of Maricopa County

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COPIES	DATE	NO.	DESCRIPTION
1	7/8/93		Memorandum of Progress Meeting of July 22, 1993

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PHOENIX, ARIZONA 85008

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LETTER OF TRANSMITTAL

DATE	JOB NO.
July 22	310.43

ATTENTION: Mr. Tim Murphy

RE: Fountain Hills (south) F.I.S.
FCD 92-05

TO Flood Control District
of Maricopa County

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COPIES	DATE	NO.	DESCRIPTION
1	July 22/93	1	
			Hydrology - In Progress Hec-1 Input files
			for Colony wash, Panorama wash, Malta wash,
			Emerald wash, Jackling wash, Cyprus point wash,
			Cereus wash, and Powder Wash,
			Future and existing conditions, Based on 100-Yr
			6-hr Storm

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PHOENIX, ARIZONA 85008

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LETTER OF TRANSMITTAL

DATE	JOB NO.
Aug 5 93	310.43
ATTENTION: Mr Tim Murphy	
RE: Fountain Hills (South) FCD 92-05	

TO Flood Control District of Maricopa County

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☐ Copy of letter ☐ Change order ☐ Maps and HEC1 Changes

COPIES	DATE	NO.	DESCRIPTION
1	8-7-93	1	Changes to HEC1
1	8-7-93	3	1" = 200' Maps showing HEC1 paramaters
1	8-7-93	3	1" = 800' Maps showing land use, Soils and sub-basins

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LETTER OF TRANSMITTAL

DATE	8/12/93	JOB NO.	310.43
ATTENTION	Tim Murphy		
RE:	Fountain Hills (South) FIS		

TO Flood Control District - Maricopa Cty.
2801 W. Durango
Phx AZ 85009

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☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Subbasin soils + Land-use Maps

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2255 N. 44th Street Suite 330
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTL 3 OF TRANSMITTAL

DATE	JOB NO.
Sep 14 /93	310.43
ATTENTION: Mr Tim Murphy	
RE: Fountain Hills (South) F.I.S. FCD 92-05	

TO Flood Control District of Maricopa County

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COPIES	DATE	NO.	DESCRIPTION
1	Sep 14/93	1	Estimation of Manning's n Value report.

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SIGNED: Thomas D. Faulstat

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Fax (602) 244-8947

LETTER OF TRANSMITTAL

DATE	JOB NO.
9/8/94	310.43

ATTENTION Tim Murphy.

RE: Fountain Hills (south)
FCD 92-05

TO Flood Control District of
Maricopa County

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1	9/8/94	17	X-section plot

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LETTER OF TRANSMITTAL

DATE	JOB NO.
2/10/95	310.43

ATTENTION: Tim Murphy

RE: Fountain Hills (Kath) FJS
FCD 92-05

TO Flood Control District of Maricopa County, 2801 West Durango
Phoenix, AZ 85009

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COPIES	DATE	NO.	DESCRIPTION
1	2/10/95	8	Preliminary Flood Maps
1	2/10/95		HEC-2 output print outs

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(602) 244-2566
Fax (602) 244-8947

LETTER OF TRANSMITTAL

DATE	JOB NO.
4-28-95	310.43

ATTENTION: Mr. Tim Murphy

RE: Fountain Hills South Floodplain Delineation FCD 92-05

TO Flood Control Dist. of Maricopa County

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☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1 Fa	4-28-95		Hydrology Report (Draft) (4 Volumes)

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REMARKS Please review this draft report and let us know your comments.

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2255 N. 44th Street Suite . . J
PHOENIX, ARIZONA 85008

(602) 244-2566
Fax (602) 244-8947

LETTE OF TRANSMITTAL

DATE	JOB NO.
6-5-95	310.43
ATTENTION: Mr. Tim Murphy	
RE: Fountain Hills South Delineation Contract FCD 92-05	

TO Flood Control Dist. of Maricopa County
2801 W. Durango St.
Phx, AZ 85009

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☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
2	6-2-95		Set of Delineation Maps (8 sheets total) (Draft)
2	6-2-95		HEC-2 Output and Summary (Draft)

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PHOENIX, ARIZONA 85008

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Fax (602) 244-8947

LETTER OF TRANSMITTAL

DATE	JOB NO.
6/7/95	310.45

ATTENTION Jim Murphy

RE: HEC-2 Input files.

TO Flood Control District of Maricopa County

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications

☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1		1	Disk with HEC-2 files

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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

2801 West Durango Street · Phoenix, Arizona 85009
Telephone: (602) 506-1501
Fax: (602) 506-4601
TT: (602) 506-5897

COVER SHEET

TO: HERNAN ARISTIZABAL

Company or Department: AGK ENGINEERS Fax # 244-8947

FROM: Tim Murphy

Number of pages being sent including Cover Sheet: 2

Comments: HERE ARE THE SPECIFIC COMMENTS FOR THESE 4 WASHES. HOPEFULLY I'LL BE ABLE TO HAVE THE LAST OF OUR COMMENTS TO YOU TUESDAY. UNFORTUNATELY I ONLY HAD A LITTLE BIT OF TIME TO WORK ON THIS TODAY, BECAUSE I HAD TO GO TO A FUNERAL.

CYPRUS POINT WASH

1. Why isn't the default friction loss equation being used? The default value is almost always used in floodplain studies done by the District.

2. At Saguaro Boulevard, as any analysis been done to determine the amount of overtopping flow that could flow to the north? It looks like most of the flow overtopping the culvert will flow to the north in Saguaro Boulevard and not across it. If this is the case, the delineation on the east side of Saguaro needs to be revised. I'd like to see some more analysis supporting the current delineation east of Saguaro on the south side of the wash.

3. Can two cross sections east of the Town border be added to the model with the information available? If this can be done it looks like it might help to better define the floodplain limits along the Town border.

4. Check the plotted location of cross section 2.69.

5. The name, Cyprus Point Wash appears to be doubled at cross section 2.69.

JACKLIN WASH

1. Why isn't the default friction loss equation being used?

2. On cross section 2.34 flow isn't properly contained in the left overbank.

3. Can cross section 2.91 be made more perpendicular to flow?

4. Check the plotted location of BFE 1575.

KINGSTREE WASH

1. Why isn't the default friction loss equation being used?

MALTA DRAIN

1. Need to contain flow on the right bank of cross section 3.0. Either add more GR points there or set a limit of effective flow.

2. Check the effective flow elevation on the right side of cross section 6.0, it seems low.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

2801 West Durango Street · Phoenix, Arizona 85009
Telephone: (602) 506-1501
Fax: (602) 506-4601
TT: (602) 506-5897

COVER SHEET

TO: HERNAN ARISTIZABAL

Company or Department: AGK ENGINEERS Fax # 244-8947

FROM: Tim Murphy

Number of pages being sent including Cover Sheet:

Comments: HERE ARE THE LAST OF OUR COMMENTS. I NOTICED IN THE HEC-2 MANUAL THAT THEY SAY TO USE 0.6 AND 0.8 FOR EXPANSION AND CONTRACTION COEFFICIENTS AT CULVERTS. I FOUND THIS IN TABLE 3.1, PAGE IV-14. TAKE A LOOK AT IT AND LET ME KNOW WHAT YOU THINK OF IT. I'LL BE OUT IN THE MORNING (THURSDAY).

LOGAN WASH

1. The second word in the second line of the comments after the J3 record should be area not are.

2. Check the channel station on cross section 0.00. The left channel station isn't a station on the GR records.

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

2801 West Durango Street · Phoenix, Arizona 85009
Telephone: (602) 506-1501
Fax: (602) 506-4601
TT: (602) 506-5897

COVER SHEET

TO: HERNAN ARISTIZABAL

Company or Department: AGK ENGINEERS Fax # 244-8947

FROM: TIM MURPHY

Number of pages being sent including Cover Sheet: 3

Comments: HERE ARE OUR SPECIFIC COMMENTS ON POWDER, CEREUS, AND LOGAN WASHES. I'LL TRY AND GET THE REST OF THE WASHES TO YOU TOMORROW.

POWDER WASH

1. At cross section 0.044 the channel is only 20 feet wide and yet there are 5 - 48" culverts there.

2. Cross section 0.063 revise the right station on the ET record.

3. Check the plotted location of cross sections 0.38 and 0.42. There locations don't agree with the distances used in the HEC-2 model.

4. Check the plotted locations of BFEs 1605, 1610, and 1620.

CEREUS WASH

1. Although now weir flow is expected at culvert CER1 (cross section 2.73) it would be helpful to have some information on what the top of road elevation is in the HEC-2 model.

2. Effective flow should be contained to the area of the culvert at cross sections 2.70 and 2.73.

3. Check the plotted postion of cross section 2.80 and why is the right overbank length 180 ft, it appears to approximately 120 ft.

4. Why the use of 0.2 and 0.4 for the contraction and expansion coefficients on the NC records between cross sections 1000 and 3.42?

5. Why the use of special bridge to model culverts CER4 and CER5 (cross sections 4.64 and 5.05)?

6. On cross section 5.05 the variable ELREA on the X3 record should be equal to the top of road elevation?

7. Check the spelling of Shea Blvd. on all the comment cards. Correct the spelling of the word upstream on the comment associated with cross section 2.80. Correct the spelling of Trevino on the comment just before cross section 3.42.

8. Check the location of BFE 1525.

9. BFEs 1610 and 1640 should be plotted more perpendicular to the floodplain.

10. Depending upon the final modeling results and the Towns' comments the A zone at Saguaro Boulevard might be changed to a Community Designated Hazard.

EMERALD WASH

1. On cross section 2.35 it would be better to have some sort of limit confining flow on the left side then allowing HEC-2 to extend the cross section approximately 2 feet.

2. Check cross section 2.39, the total area of flow is approximately 437 ft^2 and on cross sections 2.35 and 2.45 the area of flow is less then 150 ft^2. It looks like when the elevations of ELLEA and ELREA are exceeded that more of the cross section is considered as effective then should be.

3. On cross section 2.39 the culvert is five feet above the bottom of the channel, is this correct?

3. Add note on why Special Bridge is being used for the culvert at cross section 3.03.

4. Add some sort of note explaining what is going on at cross section 3.90. When you look at the plot of the cross section it seems pretty strange. It doesn't look like that main channel would last or that flow would be contained there.

COLONY WASH

1. Why isn't the default friction loss equation being used? The default value is almost always used in floodplain studies done by the District. Why isn't the default subdivision of the channel being used?

2. On cross section 2.92 it looks like XLOBR might be slightly long.

3. On cross section 3.32 there is a large area of flow compared to the area of the culvert.

4. From cross section 3.56 to 3.68 there is a Zone A designation on the north side of the wash. Where did it come from, and where is the supporting data for it?

5. From cross section 3.90 to 3.92 the plotted floodplain is too wide. I think you followed the wrong index contours.

6. Label structure #19 on the drawing.

7. On cross section 4.41 limit the effective flow on the left side. The SSTA from the HEC-2 results is over two hundred feet from the thalweg.

FOUNTAIN CHANNEL

1. Why isn't the default friction loss equation being used? The default value is almost always used in floodplain studies done by the District. Why isn't the default subdivision of the channel being used?

2. Check the spelling in the first couple of comments. Also, in the comment right before cross section 2.99, shouldn't the word upstream be downstream.

3. On cross sections 0.13 and 0.14 the XLOBR values are too large. You should be using the center of mass of the flow to determine the overbank length. It looks like you measured along the floodplain limit.

4. For cross section 0.24 the plotted position and the specified channel length don't agree. Check and revise.

5. The HEC-2 model is only a single profile run.

NORTH COLONY WASH

1. On the first QT record change the one in field one to a two.

2. For cross section 0.24 the plotted position and the specified channel length don't agree. Check and revise.

3. For cross sections 0.25 and 0.26 the values used for ELLEA and ELREA are too low. Check and revise.

4. On cross section 0.58 revise the right station on the ET record.

5. On cross section 0.60 revise the values used for XLOBL and XLOBR. They should be based upon the center of mass of overbank flow.

6. On cross section 0.67 the plotted floodplain limit doesn't agree with the HEC-2 results.

7. On cross section 0.82 the values used for ELLEA and ELREA don't make sense. Check and revise them.

8. On cross section 0.85 the top of road elevation specified on the X2 record doesn't make sense. Check and revise.

Kenney Aerial Mapping Inc.

West Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657

PHOTOGRAMMETRIC SERVICES

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK ENGINEERS
2255 N. 44th St. Suite 330
PHOENIX, AZ. 85008
Phone:

Date: 12 Jul 93
Attention: EMILE
Re: FOUNTAIN HILLS XSEC
Job #

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From: Received by Emile Schmid Date 7-13-93

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Kenney Aerial Mapping Inc.

11[illegible] t Fillmore, Phoenix, Arizona 85007
Ph 02) 258-6471 Fax: (602) 340-1877
3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657
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Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: ACK ENGINEERS
2255 No. 44th ST. Suite 330
PHOENIX, AZ. 85008
Phone: 244-2566

Date: 10 AUG 93
Attention: SAM KAO
Re: FOUNTAIN HILLS
Job # 930313

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- ☐ Film Positive(s)

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☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:
FOUNTAIN HILLS HC2 FILES

RECEIVED
AUG 10 1993
ACK ENGINEERS, INC.

From: GARY F. Received by _____ Date 10

All products containing digitized information must be reviewed for correctness and completeness within 30 days of receipt and we need to be notified immediately if there are any discrepancies. This policy enables us to better satisfy our customers and eliminates possible costs to regenerate the data.

PLEASE SIGN AND RETURN DUPLICATE COPY

Kenney Aerial Mapping Inc.

11[illegible] Fillmore, Phoenix, Arizona 85007
Pho[illegible]02) 258-6471 Fax: (602) 340-1877
3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 368-1651
PHOTOGRAMMETRIC SERVICES
Ellis O. Hyde, PRESIDENT
Peter A. Dyroff, VICE-PRESIDENT

RECEIVED
AUG 19 1993
AGK ENGINEERS, INC.

SHIPPING MEMORANDUM

To: AGK
2255 N. 44th St Suite330
Phoenix, Az 85008
Phone:

Date: 8-19-93
Attention: Hernan Aristizabal
Re: Fountain Hill South
Job #

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale
- ☐ Final Drafted Sheet(s) Scale
- ☐ Photo/Topo Composite(s) Scale
- ☐ Plan & Profile Sheet(s) Scale
- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size / Scale
  - Mylar Size / Scale
  - Sepia Size / Scale
- ☐ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s)
Contacts Sheets
Box(es) Copies Originals
Disc(s) 9 Tapes Rolls

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☒ Other Hotshot

ADDITIONAL INFORMATION:

Sec 15 + Sec 22

From: Frank Day Received by Date

PLEASE SIGN AND RETURN DUPLICATE COPY

AGK ENGINEERS, INC
2255 N. 44th Street Suite 230
PHOENIX, ARIZONA 85008

(602) 244-2566

LETTER OF TRANSMITTAL

DATE	JOB NO.
8.20.93	310.43

ATTENTION Frank Doal

RE: FCD 92-05
Fountain Hills FIS (South)

TO Kenney Aerial Mapping, Inc.
1130 W. Fillmore
Phoenix AZ 85007

WE ARE SENDING YOU ☑ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1			Blueline - Boundaries

THESE ARE TRANSMITTED as checked below:

☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☑ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☑ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS _____

COPY TO _____

SIGNED: Hernan Aristizabal

40% Pre-Consumer Content • 10% Post-Consumer Content

If enclosures are not as noted, kindly notify us at once.

Kenney Aerial Mapping Inc.

West Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657

PHOTOGRAMMETRIC SERVICES

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK

2255 N. 44th St. 330

PHOENIX, AZ

Phone:

Date: 1 Oct 93

Attention: HERNAN

Re: FOUNTAIN HILLS

Job #

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale
- ☐ Final Drafted Sheet(s)
  Scale
- ☐ Photo/Topo Composite(s)
  Scale
- ☐ Plan & Profile Sheet(s)
  Scale
- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size
  Scale
  Mylar Size
  Scale
  Sepia Size
  Scale
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:

Flight(s)
Contacts Sheets
Box(es) Copies Originals
Disc(s) 1 Tapes Rolls

SHIPPING INFORMATION:

☐ Pick up by Client Delivered by ~~GIANT~~ HOT SHOT

☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

COL.HCZ correct GR records

JKLNW.HCZ

POWDW.HCZ

From: GR Received by Date

PLEASE SIGN AND RETURN DUPLICATE COPY

AGK ENGINEERS, INC.
2255 N. 44th Street Suite :
PHOENIX, ARIZONA 85008

(602) 244-2566
Fax (602) 244-8947

LETTE' OF TRANSMITTAL

DATE	JOB NO.
March 3/94	310.43

ATTENTION Mr. Gary Finney

RE: Fountain Hills (South.)
FCD 92-05

TO Kenney Aerial Mapping Inc.
1130 W Fillmore, Phoenix, Az.

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1		1	File Pow27-W.DWG
1		1	File COLXSEC.DWG
1		1	Explanation of problems.

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☐ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS Mapping problems for Fountain Hills South.

COPY TO _____

SIGNED: Thomas D. Pinkston

40% Pre-Consumer Content • 10% Post-Consumer Content

If enclosures are not as noted, kindly notify us at once.

AGK ENGINEERS, INC
2255 N. 44th Street Suite J
PHOENIX, ARIZONA 85008

(602) 244-2566
Fax (602) 244-8947

LETTER OF TRANSMITTAL

TO Maricopa County Flood Control District

DATE	JOB NO.
3/8/94	310 43

ATTENTION Gary Eymie

RE: Fountain Hills (South) ITS
FCD 92-05

WE ARE SENDING YOU ☐ Attached ☐ Under separate cover via _____ the following items:

☐ Shop drawings ☐ Prints ☐ Plans ☐ Samples ☐ Specifications
☐ Copy of letter ☐ Change order ☐ _____

COPIES	DATE	NO.	DESCRIPTION
1		1	Disk containing x-sec in wrong location (x-sec)
			x-sec to be check (x-sec2)

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☐ For approval ☐ Approved as submitted ☐ Resubmit_____copies for approval
☐ For your use ☐ Approved as noted ☐ Submit_____copies for distribution
☒ As requested ☐ Returned for corrections ☐ Return_____corrected prints
☐ For review and comment ☐ _____
☐ FOR BIDS DUE _____ 19_____ ☐ PRINTS RETURNED AFTER LOAN TO US

REMARKS I recheck x-sec and Cervus 280 and Logan 499 are ok however I found problems with the following x-sec

CER 273, 278, 300, 323, 360, 393, 400, 431
col 342, 348, 415

I don't need x-sec col-290 only col 289, 291, 292, 329, 334
FC 326-327, 328

For x-sec on Molla and Mongrum I like to wait until I have mapping with 2-ft

COPY TO _____

40% Pre-Consumer Content • 10% Post-Consumer Content

SIGNED: Thomas D. Richardt

If enclosures are not as noted, kindly notify us at once.

Kenney Aerial Mapping Inc.

West Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657

PHOTOGRAMMETRIC SERVICES

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK ENGS.
2255 N. 44th St. #330
Phx AZ 85008
Phone: 244-2566

Date: 3/15/94
Attention: HERMAN
Re: Fountain Hills x Sec
Job # 930313

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale _____
- ☐ Final Drafted Sheet(s) Scale _____
- ☐ Photo/Topo Composite(s) Scale _____
- ☐ Plan & Profile Sheet(s) Scale _____
- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size _____ Scale _____
  - Mylar Size _____ Scale _____
  - Sepia Size _____ Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s) _____
Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) 2 Tapes _____ Rolls _____

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by Hot Shot
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

2 3½" HD Disks w/ 3 Files EACH in HEC2
FORMAT: COL.HC2, CER.HC2, FC.HC2

RECEIVED
MAR 15 1994
AGK ENGINEERS, INC.

From: Tim Larkin Received by _____ Date _____

PLEASE SIGN AND RETURN DUPLICATE COPY

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877
3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: AGK ENGINEERS
2255 N. 44TH ST. SUITE 330
PHOENIX, AZ. 85008
Phone: 244-2566

Date: 6 APR 94
Attention: HERNAN
Re: FOUNTAIN HILLS
Job # ~~9307~~ 930313

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____
- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size _____
  Scale _____
  Sepia Size _____
  Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s) _____
Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) 1 Tapes _____ Rolls _____

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by HOT SHOT
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

From: _____ Received by _____ Date _____

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Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

SHIPPING MEMORANDUM

Peter A. Dyroff, VICE-PRESIDENT

To: AGK ENGINEERS
2255 N. 44TH ST. #330
PHX. AZ. 85008
Phone: 244-2566

Date: 5-3-94
Attention: SAM KAO
Re: STONE CONTAINER ASH LAGOON
Job # 940328

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☑ Final Drafted Sheet(s)
  Scale 1" = 100'
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____

- ☐ Computer Tape(s)
- ☑ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____ Scale _____
  Mylar Size _____ Scale _____
  Sepia Size _____ Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☐ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s) _____
Contacts _____ Sheets 1
Box(es) _____ Copies _____ Originals _____
Disc(s) 1 / 3½" Tapes _____ Rolls _____

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by HOT SHOT
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:
FILENAME: 940328.DWG (DATA)
1 SHT. FINAL 1"=100'

From: PARVIZ MAKVAND Received by _____ Date _____

PLEASE SIGN AND RETURN DUPLICATE COPY

...ey Aerial Mapping Inc.

...nore, Phoenix, Arizona 85007
...) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 873-4185

PHOTOGRAMMETRIC SERVICES SINCE 1963

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK ENGINEERING
2255 N. 44th ST.
PHOENIX, AZ 85008
Phone: 244-2566

Date: MAR 8
Attention: HERNAN
Re: FOUNTAIN HILLS X SEC
Job # 930313

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s) Scale _____
- ☐ Final Drafted Sheet(s) Scale _____
- ☐ Photo/Topo Composite(s) Scale _____
- ☐ Plan & Profile Sheet(s) Scale _____
- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  - Paper Size _____ Scale _____
  - Mylar Size _____ Scale _____
  - Sepia Size _____ Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:

Flight(s) _____
Contacts _____ Sheets _____
Box(es) 1 Copies _____ Originals _____
Disc(s) _____ Tapes _____ Rolls _____

SHIPPING INFORMATION:

☐ Pick up by Client Delivered by HOT SHOT
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☒ Other

ADDITIONAL INFORMATION:

2 DISKS CONTAINING FILE NEWTRIM.ZIP (TRIM A WITH GAP REPAIRED)
3 DISKS CONTAINING FILE SEC2223.ZIP (TRIM D CONTOURS WITH Z)
1 DISK CONTAINING FILE UNZIP.EXE (JUST IN CASE)

From: GARY Received by _____ Date 8 MAR

PLEASE ...GN AND RETURN DUPLICATE COPY

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
P (602) 258-6471 Fax: (602) 340-1877
3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657
PHOTOGRAMMETRIC SERVICES
Ellis O. Hyde, PRESIDENT
Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK ENGS.
2255 N. 44th St.
Phx AZ. 85008
Phone: 244. 2566

Date: 3/17/94
Attention: Hernan
Re: Fountain hills xsec
Job # 930313

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____

- ☐ Computer Tape(s)
- ☒ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____ Scale _____
  Mylar Size _____ Scale _____
  Sepia Size _____ Scale _____
- ☐ Control Diagram
- ☐ Film Positive(s)

☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s) _____
Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) _____ Tapes _____ Rolls _____

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by _____
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

2 3 1/2" HD DISKS W/6 FILES EACH
COL. HC2 + COL. PTS
CEN. HC2 + CEN. PTS
FC. HC2 + FC. PTS

From: Tim Lankin Received by _____ Date _____

PLEASE SIGN AND RETURN DUPLICATE COPY

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
(602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657

PHOTOGRAMMETRIC SERVICES

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

SHIPPING MEMORANDUM

To: AGK ENGINEERS
2255 North 44th St. Suite 330
Phoenix, Az. 85008
Phone: 244-2566

Date: 16 June 94
Attention: Hernan
Re: Fountain Hills
Job # 930313

WE ARE SENDING YOU THE FOLLOWING:

- ☐ Aerial Film
- ☐ Contact Prints
- ☐ Blueline(s)
- ☐ Pencil Manuscript(s)
  Scale _____
- ☐ Final Drafted Sheet(s)
  Scale _____
- ☐ Photo/Topo Composite(s)
  Scale _____
- ☐ Plan & Profile Sheet(s)
  Scale _____
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- ☑ Computer Disc(s)
- ☐ Computer Hard Copy(s)
- ☐ Photo Enlargement(s)
  Paper Size _____
  Scale _____
  Mylar Size _____
  Scale _____
  Sepia Size _____
  Scale _____
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☒ As per Contract ☐ Extra Order Item

TOTAL NUMBERS OF SHIPMENT ARE:
Flight(s) _____
Contacts _____ Sheets _____
Box(es) _____ Copies _____ Originals _____
Disc(s) 1 Tapes _____ Rolls _____

SHIPPING INFORMATION:
☐ Pick up by Client Delivered by Hot Shot
☐ UPS ☐ Air Express ☐ Fed Ex ☐ US Mail
☐ Greyhound ☐ Trailways ☐ Other

ADDITIONAL INFORMATION:

Re 27CTR.DWG

From: Gary Finnie Received by _____ Date _____

~~PLEASE SIGN AND RETURN DUPLICATE COPY~~

Anderson-Nelson, Inc.

4441 East McDowell Road
Phoenix, Arizona 85008
(602) 273-1850
(602) 273-0264 FAX

Don N. Anderson, P.E., L.S.
George W. Nelson, L.S.

August 24, 1992

Tim Murphy
Flood Control District of Maricopa County
2801 West Durango Street
Phoenix, Arizona 85009

RE: FOUNTAIN HILLS
Conversion of Fountain Hills Local Coordinate System (FHLCS) to 1983 North American Data (NAD 1983)

Dear Tim:

The following described monuments F076 & F053 (FHLCS No. 153 & FHLCS No. 123) were included in a First Order, Class One GPS survey of the Fort McDowell Indian Reservation during March 1991. These two monuments were used as a basis of bearing for the coordinate conversion of High Altitude Flight Panels for Kenny Aerial Mapping.

F076/FHLCS No.153
Closing Corner on the south line of Sec.26, T3N, R6E. GLO brass cap (1911) set in fence line, 0.5 feet above ground. Section line closes on the west boundary of Ft. McDowell Indian Reservation.

	NORTHING	EASTING
NAD 1983	934211.599	763309.943
FHLCS (No.153)	15288.270	33491.412

F053/FHLCS No.123
Closing Corner on the north line of Sec.14, T3N, R6E. GLO brass cap (1911) set in fence line, 1.05 feet above ground. Section line closes on the west boundary of Ft. McDowell Indian Reservation.

	NORTHING	EASTING
NAD 1983	950029.117	765134.506
FHLCS (No.123)	31108.552	35316.292

Monument F053/FHLCS No.123 was used as the Base Point for the conversion. A line bearing North 06 degrees 34 minutes 48 seconds East from corner (F076) to corner (F053) was used as a base line for the azimuth conversion. An a average combined scale factor of (0.9998253) was used for the ground to grid conversion of the 1983 Datum.

Vertical control data is based on the following described bench mark:

Bureau of Public Roads brass disk set in concrete on to of a bank at the northwest corner of the intersection of Shea Blvd. and the Bee Line Highway. Disk is stamped "1543.72, 986+15.05, AH 986+08.20 / 1955". A revised elevation of (1542.457 feet) was established via a level circuit by Az. Hwy. Dept. (now referred to as ADOT) during the years 1964-1965. The stamped elevation of 1543.72 is the basis for Fountain Hills local vertical control system, therefore a factor of -1.26 feet was used to determine NGVD elevations.

The ADOT level circuit is based on 1929 Coast and Geodetic Survey C&GS Sea-Level Datum (current nomenclature is National Geodetic Vertical Datum NGVD). This circuit is tied to C&GS Bench Marks of Line 101 (First Order). The original field work was done in March of 1948. The following describes (two) bench marks of the "End of Airport Leveling" phase of Leveling Line 101:

H268 A C&GS B.M. Disk set in the top of a concrete post which is located 39 feet north of the centerline of MacDonald Drive and 32 feet east of the centerline of North 56th Street in the City of Scottsdale, Arizona. The last recovery date is April of 1967.

J268 A C&GS B.M. Disk set in the top of a concrete post which is located 35 feet north of the centerline of MacDonald Drive and 35 feet west of the centerline of Invergordon Road in the City of Scottsdale, Arizona. The last recovery date is April of 1967.

Horizontal and vertical control of aerial control panels was established on the ground by Anderson-Nelson, Inc. The accuracy of the control survey meets the requirements of a Third Order Survey. The attached Exhibit "A" is a listing of the High Altitude Flight Panels with NAD 1983 and NGVD coordinates and elevations.

The attached Exhibit "A" is list of aerial control panels and coordinates provided to Kenny Aerial Company for the High Altitude Flight.

If you have any questions or comments regarding the above, do not hesitate giving us a call.

Sincerely,

ANDERSON-NELSON, INC.

Don N. Anderson, PE, LS
Vice President

REGISTERED LAND SURVEYOR
CERTIFICATE NO.
18093
DON N.
ANDERSON, JR.
12-11-92
Date Signed
ARIZONA U.S.A.

EXHIBIT "A"

NAD 1983 / NGVD

FOUNTAIN HILLS AERIAL MAPPING
***** HIGH ALTITUDE AERIAL PANELS *****

THE U.S. SURVEY FOOT WAS USED IN CONVERTING COORDINATES

PANEL #	NORTHING	EASTING	GROUND ELEVATION
1100	960477.8493	747306.0692	2038.13
1102	960519.8959	755127.0946	1860.51
1103	959472.0810	745590.6119	2226.59
1104	957009.8603	745545.0179	2061.76
1107	955311.6880	755157.7252	1790.27
1108	955303.3254	749884.0707	1873.01
1109	955163.4049	747666.3442	1974.50
1110	953157.2954	747052.0756	1968.90
1112	960550.4386	760406.8591	1676.29
1113	960582.9949	765683.9190	1538.95
1114	960585.6924	766340.4763	1567.07
1118	955306.3439	765733.6103	1520.51
1121	950019.0308	749895.2568	1894.10
1122	950056.9981	755164.9280	1783.62
1123	950038.3634	765103.4434	1545.12
1133	948111.5641	747557.7032	- - - -
1135	944739.2863	747263.2637	2040.50
1136	944748.0438	749897.9883	1922.32
1137	944791.8511	755416.8830	1809.20
1138	944758.2490	764536.9814	1523.79
1142	939468.6182	749907.9655	1795.34
1143	939107.1614	760505.6908	1643.51
1144	939479.7053	763923.1227	1517.19
1148	934194.1029	749915.4122	1671.77
1150	934203.1023	755198.9191	1678.65
1152	934217.0139	760478.4566	1573.78
1153	934211.9307	763310.0638	1534.31

Kenney Aerial Mapping Inc.

1130 West Fillmore, Phoenix, Arizona 85007
Phone: (602) 258-6471 Fax: (602) 340-1877

3305 W. Spring Mountain Rd., Suite 60, Las Vegas, Nevada 89102
Phone: (702) 368-7574 Fax: (702) 362-1657

PHOTOGRAMMETRIC SERVICES

Ellis O. Hyde, PRESIDENT

Peter A. Dyroff, VICE-PRESIDENT

September 14, 1992

Mr. Tim Murphy
FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
2801 West Durango
Phoenix, Arizona 85009

Re: FOUNTAIN HILLS CONTROL CONVERSION AND SHIFT

Dear Tim,

In preparation of the above project, there were several steps involved which I will explain in the following:

A. The original control was on a local datem based on ground coordinates.

B. The deliverable, however was to be in the state plane coordinate system.

C. The shift in northing and easting, and the scale change in the horizontal, as requested, was based on the NAD 1983 datem. The elevation change was negitive 1.26 feet.

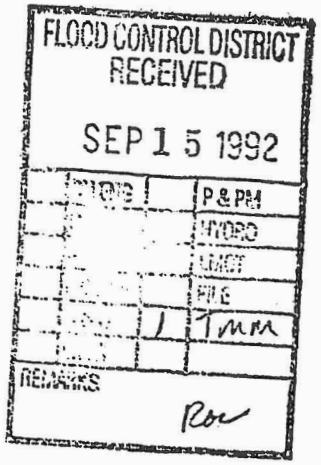
D. The conversion and shift factor was:

1. New easting = (old easting) + (729951.9067172697) times (.9998253)

2. New northing = (old northing) + (919086.5645376424) times (.9998253)

Thank You,

Tim Larkin
KENNEY AERIAL MAPPING
258-6471



Monument Descriptions

FOUNTAIN HILLS AERIAL MAPPING
****HIGH ALTITUDE AERIAL PANELS*****

Panel No.	DESCRIPTION
1100	1/2" RB IN CONC., NE OF N4 COR SEC. 5, T.3N, R.6E
1102	BC, NEC SEC.4, T.3N, R.6E
1103	PANEL POINT SE OF NWC SEC.5, T.3N, R.6E
1104	PANEL POINT ON RAMON DR., LOC. IN SW4 SEC. 5, T.3N, R.6E
1107	GLOBC, NEC SEC 9, T.3N, R.6E
1108	GLOBC, NEC SEC.8, T.3N, R.6E
1109	PANEL POINT ON ZOMOA PLAZA, SE OF N4 COR SEC 8, T.3N, R.6E
1110	PANEL POINT NEAR CTR. SEC. 8, T.3N, R.6E
1112	GLOBC, NEC SEC.3, T.3N, R.6E
1113	BC, NEC SEC.2, T.3N, R.6E
1114	BC AT INT.OF LINE BET. SEC 1/36 & RES. BDY., T.3 & 4N, R.6E
1118	BC OF LINE BET. SEC 1/12, 36' +/- E OF NEC S. 11, T.3N, R.6E (Possible reservation line monument labeled 160th Corner on 2" BC
1121	GLOBC, NEC SEC. 17, T.3N, R.6E
1122	PANEL POINT NEAR NEC SEC. 16, T.3N, R.6E
1123	PANEL POINT WEST OF C.C. SEC.11/14 & RESERVATION BDY.
1133	RB LOC. IN NE4 SEC. 17, T.3N, R.6E
1135	GLOBC, N4 COR SEC. 20, T.3N, R.6E
1136	GLOBC, NEC SEC. 20, T.3N, R.6E
1137	BOAT SPIKE AT INT. CHOLLA DR. & BAREL CACTUS WAY, E. OF NEC SEC. 21, T.3N, R.6E
1138	GLOBC AT INT.OF LINE BET. SEC 14/23 & RES. BDY., T.3N, R.6E
1142	GLOBC, NEC SEC. 29, T.3N, R.6E
1143	BOAT SPIKE AT C/L P.C. NICKLAUS DR., 2 LOTS W. OF INT. AT INDIAN WELLS DR., S. OF NEC SEC. 27, T.3N, R.6E
1144	GLOBC AT INT.OF LINE BET. SEC. 23/26 & RES. BDY., T.3N, R.6E
1148	GLOBC, NEC SEC. 32, T.3N, R.6E
1150	GLOBC, NEC SEC. 33, T.3N, R.6E
1152	GLOBC, NEC SEC. 34, T.3N, R.6E

)UNTAIN HILLS NORTH SECTION CORNER MONUMENTATION AND CONTROL POINTS

T3N R6E		Panel	State Plane	State Plane	Ground	Local	Local		
ction	Location	#	Northing	Easting	Elevation	Northing	Easting	Description	Source
1	North Line	1114	960585.6924	766340.4763	1567.07	41666.9715	36522.4727	Brass Cap at int. of Sec. line with Reservation Bdry.	Anderson-Nelson
2	NE Corner	1113	960582.9949	765683.9190	1538.95	41664.2735	35865.8006	Brass Cap	Anderson-Nelson
3	NE Corner	1112	960550.4386	760406.8591	1676.29	41631.7115	30587.8187	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
4	NE Corner	1102	960519.8959	755127.0946	1860.51	41601.1635	25307.1316	2" Brass Cap	Anderson-Nelson
5	NE Corner		960482.3769	749850.9589		41563.6380	20030.0740	3" Brass Cap set in concrete	Subdivision Plats
8	NE Corner	1108	955303.3254	749884.0707	1873.01	36383.6815	20063.1916	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
9	NE Corner	1107	955311.6880	755157.7252	1790.27	36392.0456	25337.7676	USGLO Brass Cap	Anderson-Nelson
10	NE Corner		955315.1398	760436.3623		36395.4980	30617.3270	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
11	NE Corner		955306.3764	765733.6067		36386.7330	35915.4970	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
11	South Line	(123)	950029.1170	765134.5060		31108.5520	35316.2920	USGLO Brass Cap at int. Sec. line & Resrvtn. Bdry.	Anderson-Nelson
14	NE Corner		950029.8903	765709.9528		31109.3250	35891.8390	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
15	NE Corner		950040.4085	760446.2855		31119.8450	30627.2520	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
16	NE Corner		950034.5095	755168.5297		31113.9450	25348.5740	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
17	NE Corner	1121	950019.0308	749895.2568	1894.10	31098.4636	20074.3797	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
20	N 1/4 Corner	1135	944739.2863	747263.2637	2040.50	25817.7966	17441.9267	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
20	NE Corner	1136	944748.0438	749897.9883	1922.32	25826.5556	20077.1117	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
21	NE Corner		944758.0945	755177.8661		25836.6080	25357.9120	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
22	NE Corner		944763.2826	760457.6106		25841.7970	30638.5790	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
23	North Line	1138	944758.2490	764536.9814	1523.79	25836.7626	34718.6626	USGLO Brass Cap at int. of Sec. line & Resrvtn. Bdry.	Anderson-Nelson
26	South Line	(153)	934211.5990	763309.9430		15288.2700	33491.4120	USGLO Brass Cap at int. Sec. line & Resrvtn. Bdry.	Anderson-Nelson
27	NE Corner		939286.8425	760467.1309		20564.4350	30648.1010	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
28	NE Corner		939475.3285	755188.5352		20552.9190	25368.5830	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats

FEB 10 '93 09:00 MCLAUG N KMETTY P.3

09/09/91
REVISED 10/02/91
REVISED 10/24/91
PC 4939

REVISIONS:
1) 10/2/91 Elev. Pt. #1122
2) 10/2/91 Elev. Pt. #1288
3) 10/23/91 Elev. Pt. #1263
4) 10/24/91 Added Phase Two

NOTE: ADD 1000 TO PT. NUMBERS ON EXHIBIT MAP TO CROSS-REFERENCE PANEL NUMBERS SHOWN HEREON.

FOUNTAIN HILLS AERIAL

***** HIGH ALTITUDE FLIGHT PANELS *****

PANEL #	FIELD MEASURED NORTH	EAST	GROUND ELEVATION
1100	41559.110	17484.740	2039.39
1101	---	---	1943.37
1102	41601.164	25307.132	1861.77
1103	40553.166	15768.983	2227.85
1104	38090.515	15723.381	2063.02
1105	---	---	2002.63
1106	---	---	1901.88
1107	36392.046	25337.768	1791.53
1108	36383.682	20063.192	1874.27
1109	36243.737	17845.078	1975.76
1110	34237.277	17230.702	1970.16
1111	---	---	1772.34
1112	41631.712	30587.819	1677.55
1113	41664.274	35865.801	1540.21
1114	41666.972	36522.473	1568.33
1115	---	---	1525.40
1116	---	---	1758.15
1117	---	---	1769.48
1118	36386.701	35915.501	1521.77
1119	---	---	1578.72
1120	---	---	1701.10
1121	31098.464	20074.380	1895.36
1122	31136.438	25344.972	1784.88
1123	31117.800	35285.224	1546.38
1130	---	---	1581.69
1131	---	---	1659.61
1132	---	---	1914.96
1133	29190.664	17736.418	2078.65
1134	---	---	2041.76
1135	25817.797	17441.927	1923.58
1136	25826.556	20077.112	1810.46
1137	25870.371	25596.971	1525.05
1138	25836.763	34718.663	

Received by FAX
From A-N
1/21/93

PANEL #	FIELD MEASURED NORTH	EAST	GROUND ELEVATION
1139	---	---	1590.59
1140	---	---	1725.54
1141	---	---	1886.04
1142	20546.208	20087.091	1796.60
1143	20184.688	30686.668	1644.77
1144	20557.297	34104.697	1518.45
1145	---	---	1551.73
1146	---	---	1654.23
1147	---	---	1840.04
1148	15270.771	20094.539	1673.03
1149	---	---	1748.46
1150	15279.772	25378.969	1679.91
1151	---	---	1622.35
1152	15293.686	30659.429	1575.04
1153	15288.602	33491.531	1535.57

***** LOW ALTITUDE FLIGHT PANELS *****

PANEL #	GROUND ELEVATION
1200	2122.72
1201	2063.04
1202	2038.20
1203	2092.98
1204	2057.25
1205	2013.73
1206	1988.87
1207	2014.31
1208	1981.65
1209	1960.58
1210	1963.11
1211	1939.27
1212	1926.51
1213	1997.70
1214	1931.10
1215	1994.38
1216	1970.65
1217	1890.04
1218	1869.34
1219	1895.84
1220	1853.15
1221	1846.64
1222	1895.41

Monument Descriptions

FOUNTAIN HILLS AERIAL MAPPING
****HIGH ALTITUDE AERIAL PANELS****

Point No.	DESCRIPTION
1100	1/2" RB IN CONC., NE OF N4 COR SEC. 5, T.3N, R.6E
1102	BC, NEC SEC.4, T.3N, R.6E
1103	PANEL POINT SE OF NWC SEC.5, T.3N, R.6E
1104	PANEL POINT ON RAMON DR., LOC IN SW4 SEC. 5, T.3N, R.6E
1107	GLOBC, NEC SEC 9, T.3N, R.6E
1108	GLOBC, NEC SEC.8, T.3N, R.6E
1109	PANEL POINT ON ZOMOA PLAZA, SE OF N4 COR SEC 8, T.3N, R.6E
1110	PANEL POINT NEAR CTR. SEC. 8, T.3N, R.6E
1112	GLOBC, NEC SEC.3, T.3N, R.6E
1113	BC, NEC SEC. [illegible] T.3N, R.6E
1114	BC AT INT OF LINE BET. SEC 1/36 & RES. BDY., T.3 & 4N, R.6E
1115	BC OF LINE BET. SEC 1/12, 36' +/- E OF NEC S. 11, T.3N, R.6E (Possible [illegible] location [illegible] 2' BC.
1121	GLOBC, NEC SEC. 17, T.3N, R.6E
1122	PANEL POINT NEAR NEC SEC. 16, T.3N, R.6E
1123	PANEL POINT WEST OF C.C. SEC.11/14 & RESERVATION BDY.
1133	RB LOC IN NE1 SEC 17, T.3N, R.6E
1135	GLOBC, N4 COR SEC. 20, T.3N, R.6E
1136	GLOBC, NEC SEC 20, T.3N, R.6E
1137	BOAT SPIKE AT [illegible]T. CHOLLA DR. & BAREL CACTUS WAY, E. NEC SEC. 21, T.3N, R.6E
1138	GLOBC AT INT OF LINE BET. SEC 14/23 & RES. BDY., T.3N, R.6E
1142	GLOBC NEC SEC 29, T.3N, R.6E
1143	BOAT SPIKE AT C/L P.G. NICKLAUS DR., 2 LOTS W. OF INT. AT INDIAN WELLS DR., S. OF NEC SEC. 27, T.3N, R.6E.
1144	GLOBC AT INT OF LINE BET. SEC. 23 & RES BDY., T.3N, R.6E
1148	GLOBC, NEC SEC 32, T.3N R.6E (checked)
1150	GLOBC, NEC SEC 33, T.3N, R.6E (checked)
1152	GLOBC NEC SEC 34, T.3N, R.6E
153	GLOBC 24"CP .5' [illegible] ground

FOUNTAIN HILLS NORTH SECTION CORNER MONUMENTATION AND CONTROL POINTS

T3N R6E		Panel	State Plane	State Plane	Ground	Local	Local		
Section	Location	#	Northing	Easting	Elevation	Northing	Easting	Description	Source
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4	NE Corner	1102	960519.8459	755127.0946	1860.51	41601.1635	25307.1316	2" Brass Cap	Anderson-Nelson
5	NE Corner		960482.[illegible]	749850.9589		41563.6380	20030.0740	3" Brass Cap set in concrete	Subdivision Plats
8	NE Corner	1108	955303.[illegible]	749884.0707	1873.01	36383.6815	20063.1916	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
9	NE Corner	1107	955311.6883	755157.7252	1790.27	36392.0456	25337.7676	USGLO Brass Cap	Anderson-Nelson
10	NE Corner		955315.1398	760436.3623		36395.4980	30617.3270	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
11	N[illegible]ner		955306.3764	765733.6067		36386.7330	35915.4970	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
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20	NE Corner	1136	944748.0438	749897.9883	1922.32	25826.5556	20077.1117	USGLO Brass Cap set on 2" Iron Pipe	Anderson-Nelson
21	NE Corner		944758.0945	755177.8661		25836.6080	25357.9120	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
22	NE Corner		944763.2826	760457.6106		25841.7970	30638.5790	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
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26	South Line	(153)	934211.5990	763309.9430		15288.2700	33491.4120	USGLO Brass Cap at int. Sec. line & Resrvtn. Bdry.	Anderson-Nelson
27	NE Corner		[illegible].8425	760467.1309		20564.4350	30648.1010	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats
28	NE Corner		[illegible].3285	755[illegible]252		20552.9190	25368.5830	USGLO Brass Cap set on 2" Iron Pipe	Subdivision Plats

REVISIONS:
1) 10/2/91 Elev. Pt. #1122
2) 10/2/91 Elev. Pt. #1288
3) 10/23/91 Elev. Pt. #1263
4) 10/24/91 Added Phase Two

09/09/91
REVISED 10/02/91
REVISED 10/24/91
PC 4939

NOTE: ADD 1000 TO PT. NUMBERS ON EXHIBIT MAP TO CROSS-REFERENCE PANEL NUMBERS SHOWN HEREON.

FOUNTAIN HILLS AERIAL

***** HIGH ALTITUDE FLIGHT PANELS *****

PANEL #	FIELD MEASURED NORTH	EAST	GROUND ELEVATION
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1101	---	---	1943.37
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1103	40553.16[illegible]	15768.983	2227.85
1104	38090.5[illegible]	15723.381	2063.02
1105	---	---	2002.63
1106	---	---	1901.88
1107	36392.046	25337.768	1791.53
1108	36383.682	20063.192	1874.27
1109	36243.737	17845.078	1975.76
1110	34237.277	17230.702	1970.16
	---	---	1772.34
	41631.712	30587.819	1677.55
	41664.274	35865.801	1540.21
	41666.972	36522.473	1568.33
11[illegible]	---	---	1525.40
1116	---	---	1758.15
1117	---	---	1769.48
1118	36386.701	35915.501	1521.77
1119	---	---	1578.72
1120	---	---	1701.10
1121	31098.464	20074.380	1895.36
1122	31136.438	25344.972	1784.88
1123	31117.800	35285.224	1546.38
1130	---	---	1581.69
1131	---	---	1659.61
1132	---	---	1914.96
1133	29190.664	17736.418	
1134	---	---	2078.65
1135	25817.797	17441.927	2041.76
1136	25826.556	20077.112	1923.58
1137	25870.371	25596.971	1810.46
1138	25836.763	34718.663	1525.05

Received by FAX
From A-N
1/21/93

PANEL #	FIELD MEASURED NORTH	EAST	GROUND ELEVATION
1139	---	---	1590.59
1140	---	---	1725.54
1141	---	---	1886.04
1142	20546.208	20087.091	1796.60
1143	20184.688	30686.668	1644.77
1144	20557.297	34104.697	1518.45
1145	---	---	1551.73
1146	---	---	1654.23
1147	---	---	1840.04
1148	15270.771	20094.539	1673.03
1149	---	---	1748.46
1150	15279.772	25378.969	1679.91
1151	---	---	1622.35
1152	15293.686	30659.429	1575.04
1153	15288.602	33491.531	1535.57

***** LOW ALTITUDE FLIGHT PANELS *****

PANEL #	GROUND ELEVATION
1200	2122.72
1201	[illegible].04
1202	[illegible].20
1203	[illegible].98
1204	2057.25
1205	2013.73
1206	1988.87
1207	2014.31
1208	1981.65
1209	1960.58
1210	1963.11
1211	1939.27
1212	1926.51
1213	1997.70
1214	1931.10
1215	1994.38
1216	1970.65
1217	1890.04
1218	1869.30
1219	1895.84
1220	1853.19
1221	1846.64
1222	1905.41

1.3.4

FEMA REGIONAL OFFICE

1.3.5

FEMA WASHINGTON

Federal Emergency Management Agency

Washington, D.C. 20472

FLOOD CONTROL DISTRICT
RECEIVED
OCT 23 1997
CH ENG | P & PM
DEP
ADM
FINA
1 RGN

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:
Case No.: 97-09-534P

The Honorable Don Stapley
Chairperson, Maricopa County Board
of Supervisors
301 West Jefferson Street
Phoenix, Arizona 85003

Community: Maricopa County, Arizona
Community No.: 040037
Panels Affected: 04013C1270 D, 1300 E, and 1750 E
Effective Date of This Revision: OCT 21 1997

102-I-C

Dear Mr. Stapley:

This responds to a request that the Federal Emergency Management Agency (FEMA) revise the effective Flood Insurance Rate Map (FIRM) for Maricopa County, Arizona and Incorporated Areas (the effective FIRM for your community), in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated February 10, 1997, Mr. Ron Nevitt, Program Manager, NFIP, Flood Control District of Maricopa County, requested that FEMA revise the FIRM to show the effects of detailed studies along the following flooding sources: Arrow Wash, Ashbrook Wash, Balboa Wash, Caliente Wash, Cereus Wash, Chukar Wash, Colony Wash, Cyprus Point Wash, Emerald Wash, Escalante Wash, Fountain Channel, Greystone Wash, Hesperus Wash, Jacklin Wash, Kingstree Wash, Laser Drain, Legend Wash, Logan Wash, Malta Drain, Mangrum Drain, North Colony Wash, Oxford Wash, Powder Wash, Sunburst Wash, Sycamore Wash, and Tulip Wash.

All data required to complete our review of this request were submitted with letters from Mr. Nevitt. Because this Letter of Map Revision (LOMR) is based on a detailed hydrologic or hydraulic study conducted by a Federal, State, or local agency to replace an approximate study conducted by FEMA, fees were not assessed for the review.

We have completed our review of the submitted data. We have revised the FIRM to add floodplain boundary delineations and zone designations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) along Arrow Wash, Ashbrook Wash, Balboa Wash, Caliente Wash, Cereus Wash, Chukar Wash, Colony Wash, Cyprus Point Wash, Emerald Wash, Escalante Wash, Fountain Channel, Greystone Wash, Hesperus Wash, Jacklin Wash, Kingstree Wash, Laser Drain, Legend Wash, Logan Wash, Malta Drain, Mangrum Drain, North Colony Wash, Oxford Wash, Powder Wash, Sunburst Wash, Sycamore Wash, and Tulip Wash. The modifications are shown on the enclosed annotated copies of FIRM Panel(s) 04013C1270 D, dated April 15, 1988, and 04013C1300 E and 04013C1750 E, both dated September 4, 1991. This LOMR hereby revises the above-referenced panel(s) of the effective FIRM.

Because this revision request also affects the Town of Fountain Hills, a separate LOMR for that community was issued on the same date as this LOMR.

The modifications are effective as of the date shown above. The map panel(s) as listed above and as modified by this letter will be used for all flood insurance policies and renewals issued for your community.

A review of the determination made by this LOMR and any requests to alter this determination should be made within 30 days. Any request to alter the determination must be based on scientific or technical data.

We are preparing a revised FIRM and Flood Insurance Study (FIS) report for Maricopa County, Arizona and Incorporated Areas; therefore, we will not physically revise and republish the FIRM and FIS report for your community to incorporate the modifications made by this LOMR at this time. Preliminary copies of the FIRM and FIS report will be distributed for review in fall 1997. For informational purposes, detailed flood hazard data for the above-mentioned flooding sources have been shown on the enclosed annotated copies of the Summary of Discharges Table, Floodway Data Table, and Flood Profile Panel(s). Please note that corporate limits for the Town of Fountain Hills are not shown on the effective FIRM. We will incorporate the modifications made by this LOMR, the detailed flood hazard data, and the corporate limits for the Town of Fountain Hills into the preliminary FIRM and FIS report before they are distributed, and the modifications will be included when the FIRM and FIS report become effective.

This revision affects effective FIRM Panels 04013C1270 D, 04013C1300 E, and 04013C1750 E. Effective FIRM Panels 04013C1300 E and 04013C1750 E are currently shown at a scale of 2,000 feet per inch. When the preliminary copies of the FIRM are distributed, portions of FIRM Panel 04013C1300 E will be replaced by FIRM Panels 04013C1288 F and 04013C1289 F, and portions of FIRM Panel 04013C1750 E will be replaced by FIRM Panels 04013C1726 F, 04013C1727 F, 04013C1728 F, and 04013C1729 F. The new FIRM panels will be shown at a scale of 500 feet per inch.

This LOMR is based on minimum floodplain management criteria established under the NFIP. Your community is responsible for approving all floodplain development, and for ensuring all necessary permits required by Federal or State law have been received. State, county, and community officials, based on knowledge of local conditions and in the interest of safety, may set higher standards for construction in the Special Flood Hazard Area. If the State, county, or community has adopted more restrictive or comprehensive floodplain management criteria, these criteria take precedence over the minimum NFIP criteria.

Because this LOMR will not be printed and distributed to primary users, such as local insurance agents and mortgage lenders, your community will serve as a repository for these new data. We encourage you to disseminate the information reflected by this LOMR throughout the community, so that interested persons, such as property owners, local insurance agents, and mortgage lenders, may benefit from the information. We also encourage you to prepare a related article for publication in your community's local newspaper. This article should describe the assistance that officials of your community will give to interested persons by providing these data and interpreting the NFIP maps.

This determination has been made pursuant to Section 206 of the Flood Disaster Protection Act of 1973 (Public Law 93-234) and is in accordance with the National Flood Insurance Act of 1968, as amended (Title XIII of the Housing and Urban Development Act of 1968, Public Law 90-448), 42 U.S.C. 4001-4128, and 44 CFR Part 65. Pursuant to Section 1361 of the National Flood Insurance Act of 1968, as amended, communities participating in the NFIP are required to adopt and enforce floodplain management regulations that meet or exceed minimum NFIP criteria. These criteria are the minimum and do not supersede any State or local requirements of a more stringent nature. This includes adoption of the effective FIRM to which the regulations apply and the modifications described in this LOMR. Our records show that your community has met this requirement.

A Consultation Coordination Officer (CCO) has been designated to assist your community. The CCO will be the primary liaison between your community and FEMA. For information regarding your CCO, please contact:

Ms. Dorothy M. Lacey
Director, Mitigation Division
Federal Emergency Management Agency, Region IX
The Presidio of San Francisco, Building 105
San Francisco, California 94129-1250
(415) 923-7177

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the CCO for your community at the telephone number cited above. If you have any technical questions regarding this LOMR, please contact Mr. John Magnotti of our staff in Washington, DC, either by telephone at (202) 646-3932 or by facsimile at (202) 646-4596.

Sincerely,

Frederick H. Sharrocks, Jr., Chief
Hazard Identification Branch
Mitigation Directorate

Enclosure(s)

cc: The Honorable Jerry Miles
Mayor, Town of Fountain Hills

Mr. Randy L. Harrel
Town Engineer
Town of Fountain Hills

Mr. Ron Nevitt ✓
Program Manager
NFIP
Flood Control District of Maricopa County

1.3.6

FEMA TECHNICAL CONSULTANT

1.3.7

COPY OF PUBLIC NOTICES

AGK ENGINEERS, INC.
2255 N. 44th St. Suite 330 • Phoenix, AZ 85008 • Phone (602) 244-2566 • FAX:(602) 244-8947

PRINCIPALS
Edward A. Adair, P.E.
R. Gerald Green, P.E.
Samuel E. Kao, Ph.D., P.E.

ASSOCIATES
Michael J. Bonar, P.E.
Denis L. Howe, P.E.
Hal E. Marron, P.E.
Patrice M. Miller

January 4, 1993

Mr. Frank Brown, P.E.
MKE
3501 North 16th Street
Phoenix, AZ 85016-6419

Reference: Local Advertisement
Fountain Hills Flood Insurance Studies

Dear Mr. Brown:

Per our telephone conversation today regarding the shared publication of the legal advertisement for the Fountain Hills Flood Insurance Study, AGK's understanding is as follows:

1. MKE will proceed with advertisement preparation and placement in the Arizona Republic and Times of Fountain Hills.

2. AGK will be sent a copy of the advertisement to review prior to publication.

3. Tim Murphy, Flood Control District of Maricopa County, will be sent a copy of the advertisement prior to publication to review and approve.

4. Two (2) Affidavits of Publication will be issued for each advertisement. One will name MKE (or Sabol) and the other will name AGK Engineers, Inc. as the party the affidavit was issued to.

5. MKE will submit an invoice to AGK for AGK's share of the publication cost along with a copy of the original invoices from the publications. AGK will pay 50% of the original invoice cost of publication to MKE.

Sincerely,

AGK ENGINEERS, INC.

Hal Marron

Hal E. Marron, P.E.
Project Manager

HEM/kp

MKE

McLaughlin Kmetty Engineers, Ltd.

3501 North 16th Street Phoenix, Arizona 85016-6419 (602) 248-7702 FAX (602) 248-78

GEZA E. KMETTY
RONALD C. McLAUGHLIN
HALFORD E. ERICKSON
WILLIAM R. KENDALL
RALPH L. TOREN
TERRENCE P. KENYON

DONALD L. ZIEMBA

Date 1-5-93

PAGE 1 of 1
INCL. this page

From Frank Brown

Transmitted to Fax Number 244-8947

To Mr. Hal Marron

Company AGK Engineers

Comments Hal,

please review and approve (by phone) this legal ad. I sent a copy to Tim Murphy.

JOB # 92-404.001

Complete @ 2'11

PUBLIC NOTICE
YOUR RIGHT TO KNOW

ANNOUNCEMENT OF FLOOD HAZARD STUDY

The Flood Control District of Maricopa County, under authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), is funding a detailed study of flood hazard areas in western Maricopa County as follows:

The Town of Fountain Hills, Arizona.

The study is being performed for the Flood Control District by AGK Engineers and George V. Sabol Consulting Engineers.

The purpose of this study is to examine and evaluate flood hazard areas which are developed or which are likely to be developed and to determine flood elevations for those areas. Flood elevations will be used by Maricopa County to carry out floodplain management objectives of the National Flood Insurance Program. They will also be used as the basis for determining appropriate flood insurance premium rates applicable for buildings and their contents.

This announcement is intended to notify all interested persons of the commencement of this study so that they may have an opportunity to bring any relevant facts and technical data concerning local flood hazards to the attention of the Flood Control District for consideration in the course of this study. Such information should be addressed to Mr. Tim Murphy or Ms. Sandy Story, Flood Control District of Maricopa County, 2801 W. Durango Street, Phoenix, AZ 85009, telephone (602) 506-1501.

Published in _____ on _____.

NOTE: If this transmission is incomplete, please call (602) 248-7702.

AFFIDAVIT OF PUBLICATION

The Arizona Republic/The Phoenix Gazette

STATE OF ARIZONA
COUNTY OF MARICOPA } SS.

JOAN LOHR, being first duly sworn, upon oath deposes and says: That she is the legal advertising manager of the Arizona Business Gazette, a newspaper of general circulation in the county of Maricopa, State of Arizona, published at Phoenix, Arizona, by Phoenix Newspapers Inc., which also publishes The Arizona Republic and The Phoenix Gazette, and that the copy hereto attached is a true copy of the advertisement published in the said paper on the dates as indicated.

~~The Arizona Republic~~
The Phoenix Gazette

JANUARY 13, 20, 1993

Sworn to before me this

25TH day of

JANUARY A.D. 19 93

OFFICIAL SEAL
MARY LEE BOOHER
NOTARY PUBLIC STATE OF ARIZONA
MARICOPA COUNTY
My Comm. Expires March 17, 1995

Notary Public

INVOICE NO. 93008

ANNOUNCEMENT OF FLOOD HAZARD STUDY

The Flood Control District of Maricopa County, under authority of the National Flood Insurance Act of 1968 (P.L. 90-448), as amended, and the Flood Disaster Protection Act of 1973 (P.L. 93-234), is funding a detailed study of flood hazard areas in The Town of Fountain Hills, Arizona.

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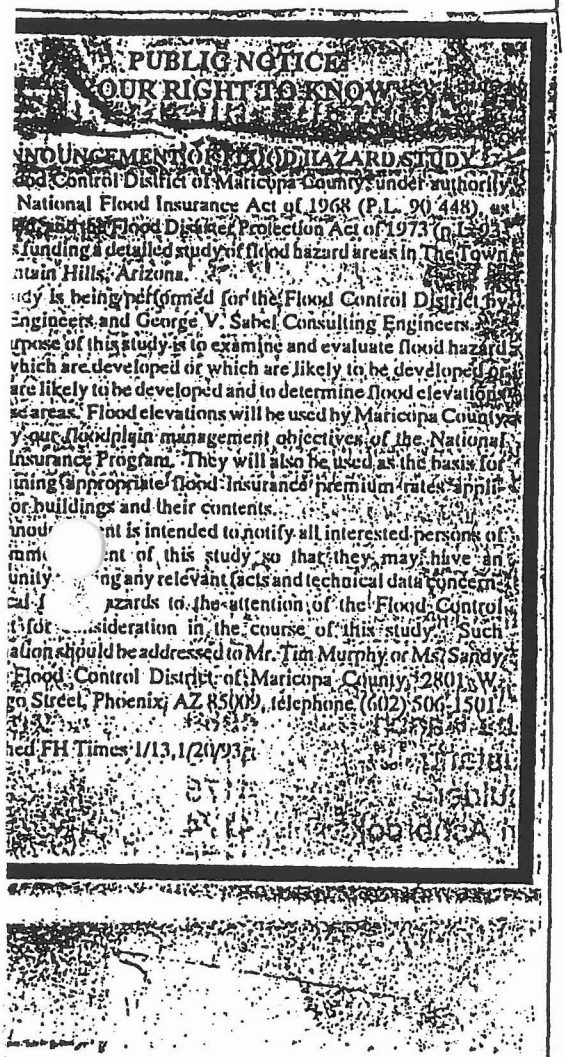
Published: Arizona Republic, January 13, 20, 1993.



PUBLIC NOTICE
OUR RIGHT TO KNOW

NOUNCEMENT OF FLOOD HAZARD STUDY
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Flood Control District of Maricopa County, 2801 W.
go Street, Phoenix, AZ 85009, telephone (602) 506-1501.
ed: FH Times: 1/13, 1/20/93.

AFFIDAVIT OF PUBLICATION

The Times
OF FOUNTAIN HILLS AND RIO VERDE, ARIZONA

A publication of Western States Publishers, Inc.

STATE OF ARIZONA
COUNTY OF MARICOPA } ss.

L. ALAN CRUIKSHANK, being first duly sworn, upon oath deposes and says: That he is the publisher of

THE TIMES OF FOUNTAIN HILLS AND RIO VERDE

a newspaper of general circulation in the County of Maricopa and the State of Arizona, published at Fountain Hills, Arizona, and that the copy hereto attached is a true copy of the advertisement as published weekly in The Times of Fountain Hills and Rio Verde on the following dates:

Jan 13, 1993
Jan 20, 1993

L. Alan Cruikshank

Sworn to before me this

23 day of

February A.D. 19 93

Karen Kirkendoll
Notary Public

OFFICIAL SEAL
KAREN KIRKENDOLL
NOTARY PUBLIC-ARIZONA
MARICOPA COUNTY
My comm. expires May 14, 1993

Flood control study will take one year

Maricopa County's Flood Control District is set to embark on a floodplain delineation study that will assist the town in future development and identify any problem areas.

Tim Murphy, project manager, stressed last week, however, that the Town of Fountain Hills would not be liable for correcting problems should any be found.

The study's main purpose is to identify potential flood hazard areas to safeguard life and property.

Murphy outlined the study's main benefits for the Town Council:

* Identification of flood hazards before significant development occurs.

* Identification of flood hazards caused by existing development.

* Determination of areas in need of flood protection, and structures that may require flood insurance.

* Minimize loss of life and property by regulating floodplain development.

* Development of hydrological information to address existing and future drainage problems.

Murphy said the county's study will not address the structural integrity of the earthen dams built here in the early 1970s.

He said the study will take about a year to complete, and the work will entail surveys and walk throughs on various washes in Fountain Hills.

No earth work, land disturbance or other improvement work will be done in connection with the $500,000 study.

Maricopa County has hired two consultants, George V. Sabol Consulting Engineers and AGK Engineers, to perform the study.

Fountain Hills has been divided up into two study areas for the project, with the northern half having 16 square miles of watershed area and the southern portion with eight square miles.

In addition, the north study area has 24 "river miles" to be studied, while the southern half has only 15 river miles.

"The town is not immediately obligated to do anything with the study's results," Murphy said Dec. 17. "The purpose is to identify potential problem areas" with the washes.

Results also will be forwarded to the Federal Emergency Management Agency, which ultimately will issue a "Flood Insurance Rate Map" on the basis of the study's findings.

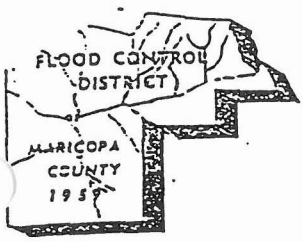
Although the town itself would not be taking out flood insurance, the study could identify any homeowners who may want to consider taking out flood insurance.

Town Manager Paul Nordin said the town will benefit in one area by having data available for future developments.

"We'll be able to tell developers what they will have to put in for culverts and that type of thing for future subdivisions and developments," he said.

Town Engineer Randy Harrel said results will be particularly helpful to the town for studying possible storm-drainage improvements on Saguaro Boulevard by Fountain Park and the Ashbrook Wash, which has major crossings on Fountain Hills and El Pueblo boulevards and Del Cambre Avenue.

JAN 4 '93 12:29 FROM FLOOD CONTROL PAGE.006



FLOOD CONTROL DIST. CT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
TDD (602) 506-5897

BOARD OF DIRECTORS

P. Ben Arredondo
Betsey Bayless
James D. Bruner
Carole Carpenter
Tom Freestone

Flood Control District

FOUNTAIN HILLS FLOODPLAIN DELINEATION STUDY

An open house to inform Fountain Hills residents of floodplain delineation studies being performed in the Town by the Flood Control District of Maricopa County will be conducted from 5 - 8 p.m., Thursday, December 17, 1992, in the Town Hall Conference Room, 16836 E. Palisades.

The public is invited to come by the Town Hall anytime between the hours of 5 - 8 p.m. to meet with District representatives to discuss the study.

A total of 39 linear miles of washes within the Town will be studied over the next 12 months. The study will involve mapping and hydraulic analysis of the washes and the delineation of the 100-year floodplain.

Technical and other information relevant to the study will be accepted for review and consideration during the study. Such information should be submitted to Mr. Tim Murphy, Flood Control District of Maricopa County, 2801 West Durango Street, Phoenix, Arizona, 85009, telephone 602-506-1501.

Town of Fountain Hills South
Floodplain Delineation Study
FCD 92-05

Technical Data Notebook
Hydrology

Section 1: General Documentation and Correspondence

1.1 Contact (Telephone) Reports

1.2 Meeting Minutes and Reports

1.3 General Correspondence

1.4 Contract Documents

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
TDD (602) 506-5897

BOARD OF DIRECTORS

P. Ben Arredondo
Betsey Bayless
James D. Bruner
Carole Carpenter
Tom Freestone

RECEIVED
JAN 13 1993
AGK ENGINEERS, INC.

JANUARY 11 1993

Mr. Edward A. Adair, P.E.
AGK Engineers, Inc.
2255 North 44th Street, Suite 330
Phoenix, Arizona 85008

SUBJECT: Contract FCD 92-05, Fountain Hills Floodplain Delineation Study, South

Dear Mr. Adair:

This letter will serve as confirmation of the December 8, 1992 verbal Notice To Proceed for the work under the above-referenced contract that was approved by the Board of Directors on December 7, 1992.

A fully executed contract is enclosed for your use. If you have any questions regarding work under the contract, please contact Tim Murphy at 506-1501.

Sincerely,

Leanna Cumberland
Chief, Contracting Branch

Enclosure (1)

CONTRACT FOR CONSULTANT SERVICES

CONTRACT FCD 92-05

Pursuant to the provisions of the Arizona Revised Statutes (A.R.S.), 48-3603, the Board of Directors has the authority to enter into contracts.

The Flood Control District of Maricopa County, Arizona, hereinafter called the "DISTRICT", is desirous of having certain professional services performed in connection with Flountain Hills Floodplain Delineation Study (South), hereinafter called the "PROJECT" and as more fully described in Exhibit "A", Scope of Work, attached; and,

AGK ENGINEERS, INC., hereinafter called "CONSULTANT", is desirous of performing said services;

THEREFORE, the parties hereto mutually agree as follows:

SECTION I - SERVICES OF THE CONSULTANT

The CONSULTANT, under the general supervision of the Chief, Hydrologist of the District's Hydrology Division shall prepare studies, reports, surveys, plans, drawings, specifications and cost estimates as are necessary for the PROJECT and according to the directions and designated standards of the DISTRICT and in accordance with Exhibit A. It is understood and agreed that the DISTRICT's authorized representative shall be the Chief, Planning and Project Management Division or his duly authorized representative, hereinafter called the "AGENT" and that he/she shall be the sole contact for administering this contract.

The CONSULTANT shall meet periodically with the AGENT so as to keep the DISTRICT informed of the progress of the work in accordance with the schedule defined in Exhibit A.

The CONSULTANT shall promptly advise the AGENT of any factors, which may develop during the PROJECT, that would likely result in contract costs in excess of budgetary constraints.

SECTION II - PERIOD OF SERVICE

The CONSULTANT shall complete all work per the schedule provided in Exhibit "A", Scope of Work within 450 calendar days after receipt of the Notice to Proceed, inclusive of DISTRICT review time. Should extension of this contract period be necessary, and any such extension(s) continue the date of contract expiration for a time period of more than one year from the date of contract execution, adjustment(s) of the consultant's fee(s) may, upon agreement by both the DISTRICT and the CONSULTANT, be made in accordance with the Consumer Price Index for Urban Consumers, Western Division published by the U.S. Department of Labor, Bureau of Labor Statistics, using the published edition coinciding with the initial contract expiration date. Any such fee adjustment shall only apply to the extended contract time period.

SECTION III - PAYMENTS TO THE CONSULTANT

The CONSULTANT shall be paid for work under this Contract a lump sum fee of $164,956.00 plus any adjustments that have been approved in writing in accordance with the Maricopa County Procurement Code.

The DISTRICT shall pay the CONSULTANT upon completion of the work as accepted by the DISTRICT, except that progress payments may be made as billed by the CONSULTANT based on approved monthly progress reports subject to the limitations set forth in Exhibit "A", Scope of Work. Ten percent of all contract payments made on an interim basis shall be retained by the DISTRICT as insurance of proper performance of the contract or, at the option of the CONSULTANT, a substitute security may be provided by the CONSULTANT in an authorized form pursuant to procedures established by the DISTRICT. The CONSULTANT is entitled to all interest from any such substitute security.

When the contract is fifty percent (50%) completed, one-half (1/2) of the amount retained will be paid to the CONSULTANT provided the CONSULTANT is making satisfactory progress on the contract and there is no specific cause or claim requiring a greater amount to be retained. After the contract is fifty percent (50%) completed, no more than five percent (5%) of the amount of any subsequent progress payments shall be retained providing the CONSULTANT is making satisfactory progress on the project, except if at any time the DISTRICT determines satisfactory progress is not being made, ten percent (10%) retention shall be reinstated for all progress payments made under the contract subsequent to the determination.

If the CONSULTANT desires a partial payment in accordance with the provisions above, the CONSULTANT will complete and forward, a DISTRICT provided form, indicating payment distribution to MBE/WBE firms.

Any retention shall be paid or substitute security returned or released, as applicable, to the CONSULTANT within forty-five (45) calendar days after: (1) final completion of all work per Exhibit A, (2) acceptance of work under the contract, (3) receipt of a completed "Certificate of Performance" form, (4) the CONSULTANT'S statement that no project disputes exist, (5) invoicing for any retained monies has been received by the DISTRICT, and (6) a document stating the total payments received by the prime as well as total payments the prime has made to MBE and WBE subcontractors, vendors, and suppliers.

SECTION IV - THE DISTRICT'S RESPONSIBILITIES

The DISTRICT shall furnish the CONSULTANT, at no cost to the CONSULTANT, the following information or services for this PROJECT:

A. One copy of on-hand maps, records, survey ties, bench marks or other data pertinent to the PROJECT. This does not, however, relieve the CONSULTANT of the responsibility of searching records for additional information, for requesting specific information or for verification of that information provided. The DISTRICT does not warrant the accuracy or comprehensiveness of any such information.

B. All available information and data relative to policies, standards, criteria, and studies, etc. impacting the PROJECT as identified by the CONSULTANT.

C. Availability of staff for consultation with the CONSULTANT during the performance of studies and plan development in order to identify the problems, needs, and other functional aspects of the PROJECT.

D. Examination of documents submitted by the CONSULTANT and rendering of decisions pertaining thereto promptly, to avoid unreasonable delay in the progress of the work by the CONSULTANT. The DISTRICT will keep the CONSULTANT advised concerning the progress of the DISTRICT's review of work.

SECTION V - ALTERATION IN SCOPE OF WORK

Any alteration in the scope of work that will result in a substantial change in the nature of the PROJECT so as to materially increase or decrease the contract fee will require negotiation of an amendment to the contract to be executed by the DISTRICT and the CONSULTANT. No work shall commence on the change until the contract amendment has been approved by the DISTRICT and the CONSULTANT has been notified to proceed by the AGENT. It is distinctly understood and agreed that no claim for extra work done or materials furnished by the CONSULTANT will be allowed by the

DISTRICT except as provided herein, nor shall the CONSULTANT do any work or furnish any materials not covered by this agreement unless such work is first authorized in writing in accordance with the Maricopa County Procurement Code. Any such work or materials furnished by the CONSULTANT without such written authorization first being given shall be at his own risk, cost, and expense, and he hereby agrees that without such written authorization he will make no claim for compensation for such work or materials furnished.

SECTION VI - RECORDS

Records of the CONSULTANT's payroll expense pertaining to this PROJECT and records of accounts between the DISTRICT and the CONSULTANT shall be kept on a generally recognized accounting basis and shall be available upon request to the DISTRICT or its authorized representative for audit during normal business hours. The records shall be subject to audit by appropriate grantor agency if the PROJECT is funded all or in part by a grant.

SECTION VII - PROJECT COMPLETION

If during the course of this contract situations arise which prevent completion within the allotted time, an extension may be granted by the AGENT.

SECTION VIII - TERMINATION

The DISTRICT may terminate this contract at any time upon reimbursement to the CONSULTANT of expenses which include reasonable charges for time and material for the percentage of work satisfactorily completed and turned over to the DISTRICT.

The DISTRICT reserves the right to postpone, terminate or abandon this PROJECT for the CONSULTANT's failure to complete the PROJECT on time, or failure to comply with the provisions of the contract. The DISTRICT also reserves the right to terminate any or all parts of this contract for its own convenience as the DISTRICT may determine at its sole discretion.

The DISTRICT hereby gives notice that pursuant to A.R.S. Section 38-511 "A" this contract may be cancelled without penalty or further obligation within three years after execution if any person significantly involved in initiation, negotiation, securing, drafting, or creating a contract on behalf of the DISTRICT is, at anytime while the contract or any extension of the contract is in effect, an employer, agent, or any other party to the contract

in any capacity or a consultant to any other party of the contract with respect to the subject matter of the contract. Cancellation under this section shall be effective when written notice from the Chief Engineer and General Manager is received by all of the parties of the contract. In addition, the DISTRICT may recoup any fee for commission paid or due to any person significantly involved in initiation, negotiation, securing, drafting, or creating the contract on behalf of the DISTRICT from any other party to the contract arising as a result of the contract.

The CONSULTANT may terminate this contract in the event of nonpayment of fees as specified in Section III, PAYMENTS TO THE CONSULTANT.

SECTION IX - OWNERSHIP OF DOCUMENTS

All original documents including, but not limited to studies, reports, tracings, drawings, physical and computer models, estimates, field notes, investigations, design analyses, calculations, computer software, and specifications, prepared in the performance of this Contract are to be and remain the property of the DISTRICT and are to be delivered to the AGENT before final payment is made to the CONSULTANT. The DISTRICT reserves the right to reuse the documents as it sees fit. However, the DISTRICT will not reuse, alter, or modify these documents without noting such alterations, modifications, or intent of their reuse, and will hold the CONSULTANT harmless from any claims arising from the reuse, alteration, or modification of the documents. The CONSULTANT may retain reproducible copies of all such documents delivered to the DISTRICT.

SECTION X - COMPLIANCE WITH LAWS

The CONSULTANT is required to comply with all Federal, State and local laws, local ordinances and regulations. The CONSULTANT's signature on this contract certifies compliance with the provisions of the I-9 requirements of the Immigration Reform and Control Act of 1986 for all personnel that the CONSULTANT and any subconsultants employ to complete this PROJECT. It is understood that the DISTRICT shall conduct itself in accordance with the provisions of the Maricopa County Procurement Code.

SECTION XI - GENERAL CONSIDERATIONS

A. Prior to beginning the work, the CONSULTANT shall furnish the DISTRICT for approval the names of its key employees, and of its sub-consultants and their key employees to be used on this PROJECT. Any subsequent changes are subject to the written approval of the DISTRICT.

The CONSULTANT in replacing a MBE/WBE subcontractor should attempt to contract with another MBE/WBE.

B. The failure of either party to enforce any of the provisions of this Contract or to require performance of the other party of any of the provisions hereof shall not be construed to be a waiver of such provisions, nor shall it affect the validity of this Contract or any part thereof, or the right of either party to thereafter enforce each and every provision.

C. The CONSULTANT shall be responsible for the cost of any additional design, field layout, testing, construction and supervision necessary to correct those errors or omissions attributable to the CONSULTANT and for any damage incurred by the DISTRICT as a result of additional construction costs caused by such CONSULTANT errors or omissions.

D. The fact that the DISTRICT has accepted or approved the CONSULTANT's work shall in no way relieve the CONSULTANT's responsibility.

E. It is mutually understood and agreed that this Contract shall be governed by the laws of the State of Arizona, both as to interpretation and performance. Any action at law, suit in equity, or judicial proceeding for the enforcement of this Contract, or any provision thereof, shall be instituted only in the courts of the State of Arizona.

SECTION XII - SUCCESSORS AND ASSIGNS

This Contract shall not be assigned by either party without prior written approval of the other except that the CONSULTANT may use in the performance of this Contract without prior approval of the DISTRICT, personnel or services of its related entities and affiliated companies as if they were an integral part of the CONSULTANT; and it shall extend to and be binding upon the heirs, executors, administrators, successors and assigns of the parties hereto.

SECTION XIII - NO KICK-BACK CERTIFICATION

The CONSULTANT warrants that no person has been employed or retained to solicit or secure this Contract upon any agreement or understanding for a commission, percentage, brokerage, or contingent fee; and that no member of the Board of Directors/Supervisors or any employee of the DISTRICT has any interest, financially or otherwise, in the CONSULTANT firm.

For breach or violation of this warranty, the DISTRICT shall have the right to annul this Contract without liability, or at its discretion to deduct from the Contract price or consideration, the full amount of such commission, percentage, brokerage, or contingent fee.

SECTION XIV - ANTI-DISCRIMINATION PROVISION

The Flood Control District of Maricopa County will endeavor to ensure in every way possible that minority and women-owned business enterprises shall have every opportunity to participate in providing professional services, purchased goods, and contractual services to the Flood Control District of Maricopa County without being discriminated against on the grounds of race, religion, sex, age, or national origin.

The CONSULTANT agrees not to discriminate against any employee or applicant for employment because of race, religion, color, sex, national origin, age, or handicap and further agrees not to engage in any unlawful employment practices. The CONSULTANT further agrees to insert the foregoing provisions in all subcontracts hereunder.

SECTION XV - AMENDMENTS

This Contract may be amended by mutual written agreement of the DISTRICT and the CONSULTANT.

SECTION XVI - INDEMNIFICATION AND INSURANCE

A. The CONSULTANT shall provide and maintain the following minimum insurance requirements:

1. Professional Liability. The CONSULTANT shall show evidence of maintaining continuous insurance for the past three (3) years with a minimum coverage limit of $1,000,000.00 each claim and/or in the aggregate.

The CONSULTANT shall provide and maintain Professional Liability Insurance with a minimum single limit of $1,000,000.00 for each claim made and an aggregate limit of $1,000,000.00 for all claims made through this contract's completion date or the policy's life, whichever is longer.

2. Commercial General Liability. Commercial general liability insurance with a minimum single limit of $1,000,000.00 for each coverage/occurrence. The policy shall include coverage for bodily injury and personal injury, broad form property damage and blanket contractual coverage.

3. Automobile Liability. Automobile liability insurance, with an individual single limit for bodily injury and property damage of no less than $1,000,000.00, each occurrence, with respects to CONSULTANT's vehicles (whether owned, hired, non-owned), assigned to or used in the performance of this contract.

4. Workers' Compensation Insurance. This insurance shall be maintained during the life of the contract.

5. Additional Insured. The policies, except professional liability and workers' compensation, required by this section shall name the DISTRICT as Additional Insured, and shall specify that insurance afforded the CONSULTANT shall be primary insurance, and that any insurance coverage carried by the DISTRICT or its employees shall be excess coverage, and not contributory coverage to that provided by the CONSULTANT. No policy issued under this contract shall lapse, be cancelled, allowed to expire, or be materially changed to affect the coverage available to the DISTRICT without thirty (30) days written notice to the DISTRICT.

6. DISTRICT approved documentation outlining the coverages specified in this section shall be filed with the DISTRICT prior to issuance of the Notice to Proceed.

B. The CONSULTANT agrees to indemnify and save harmless the DISTRICT, any of its departments, agencies, officers, or employees from all suits, including attorney's fees and costs of litigation, actions, loss, damage, expense, cost or claims, of any character or any nature arising out of the CONSULTANT's wanton, willful or negligent acts, errors or omissions in the performance of work under this Contract, and any wanton, willful or negligent acts, errors or omissions by any subconsultant or other agent used by the CONSULTANT in the performance of work under this Contract.

IN WITNESS WHEREOF, the parties herein have executed this Contract.

AGK ENGINEERS, INC.

Samuel Kao
Principal

SAMUEL E. KAO
Printed Name

VICE PRESIDENT
Title

86-0529793
Tax Identification Number

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

RECOMMENDED BY:

Stanley L. Smith
Acting Chief Engineer/General Manager

ACCEPTED AND APPROVED BY:

Betsey Bayless
Chairman, Board of Directors

ATTEST:

Lynn McCarroll

Date: 12-1-92

LEGAL REVIEW

Approved as to form and within the powers and authority granted under the laws of the State of Arizona to the Flood Control District of Maricopa County.

Julie M. Lemmon
General Counsel, District

Date: 10/29/92

Scope of Work
FCD 92-05
Floodplain Delineation and Topographic Mapping
For the Town of Fountain Hills (South)

GENERAL

The project consists of approximately 15 river miles of floodplain and floodway delineations for the southern portion of the Town of Fountain Hills (Town) as shown on Exhibit 1. This will require the development of the surface water hydrology for a 9 square mile watershed. Two (2) major retention structures and numerous road crossings are anticipated to have significant impacts on the floodplain delineations and development of the watershed hydrology.

The consultant will develop the hydrology using the U.S. Army Corps of Engineer's HEC-1 computer model and the floodplain and floodway delineations using the HEC-2 computer model. The consultant must use sound engineering judgement in the development of the hydrologic and hydraulic models. The results of the models must be analyzed carefully and refinements made to the input parameters in order to obtain the most realistic results.

The results of this study must be reviewed and approved by the District, the Town, and by the Arizona Department of Water Resources (ADWR) prior to submittal to the Federal Emergency Management Agency (FEMA). The study must then be revieved and accepted by the Federal Emergency Management Agency (FEMA) prior to the finalization of this contract. As a part of this requirement, the consultant is responsible for all Public Notification regarding this study.

Work under this Scope will be completed within 360 days from the date of Notice to Proceed, including District and ADWR reviews.

TASK 1 COORDINATION

1.1 The consultant will submit a project schedule showing coordination meetings and completion dates for each of the tasks and major sub-tasks in the Scope of Work. The schedule will be submitted within 14 days of the Notice To Proceed and shall be updated as needed.

1.2 The consultant shall participate in regular coordination meetings (approximately every three weeks) with the District's Project Manager and in milestone coordination meetings during the development of the hydrologic and hydraulic analyses. Coordination and milestone meetings will be combined to the maximum extent possible and will normally be held at the consultant's office. The consultant is responsible for the minutes of any meetings.

1.3 The consultant shall submit monthly progress reports at least 5 days before submittal of monthly invoices. The report shall be brief and should be no longer than two typed pages. At a minimum, the monthly report shall contain the following:

a. A description of the work accomplished, by task during the reporting month.

b. Percent (%) completed for the month and percent (%) cumulative completed for each task.

c. A brief description of the work to be accomplished the following month.

d. A description of any problems encountered.

1.4 The consultant is responsible for placing the legal advertising at the beginning of the study, notifying the public of the study. The ad will be run in a widely circulated newspaper twice, with approximately one week between runs. The ad also will be run twice in a local newspaper that serves the area being studied. After the ad is run the consultant will supply the District with original affidavits of publication from the newspaper(s) for each day that the ad ran.

1.5 The consultant will obtain the necessary Rights of Entry from the property owners where access may be required. The consultant can use the District's records as may be necessary to complete this task. The consultant will furnish the District with a list of all the property owners notified and a sample Right of Entry letter.

1.6 The consultant shall meet with officials from the Town of Fountain Hills. The purpose of this meeting is to identify local flooding problems and obtain information on current and planned public works projects, channel modifications, storm-drainage systems, development, and obtain the current corporate limits. The Town Engineer will also be contacted for input during the development of the hydrology and hydraulics model. The Town Engineer should also be contacted for updates on the street construction projects.

1.7 The District in coordination with the Town will plan and conduct two public meetings. One representative from the consultant will be required to attend each of the meetings. The first meeting will be to inform the public of the purpose and scope of the study. The second meeting will be to inform the public and obtain public comment on the study results, and shall take place prior to the submittal of the study to FEMA. The consultant will respond to the comments from the public and make revisions to the study if necessary.

1.8 Prior to finalizing of the hydrologic analysis, The consultant will submit maps, hydrology report, and HEC-1 model to the Arizona Department of Water Resources (ADWR) and any other governmental agency reviewers through the District. The consultant will respond to questions by the reviewers and make modifications to the hydrologic maps, model, and report if necessary.

1.9 The consultant will submit maps, hydraulics report, and HEC-2 model, to ADWR, FEMA for review by the Technical Evaluation Contractor (TEC), and any other governmental agency reviewers through the District. The consultant will respond to questions by the reviewers and make modifications to maps, models and report if required.

TASK 2 DATA COLLECTION

2.1 The consultant will collect and review pertinent data from the District, ADWR, the Town, and other outside sources. Data to be collected will include previous flood hazard reports and hydrology for the study area; existing topographic mapping; historical flooding information; as-built plans for existing structures; FEMA Flood Hazard Boundary Maps and any Letters of Map Amendment and/or Revisions and other pertinent information.

2.2 A written report summarizing the data collected will be submitted to the District for information purposes. A preliminary draft of this report is due within 90 days of Notice to Proceed.

TASK 3 TOPOGRAPHIC MAPPING

3.1 The District will supply data for use in a Digital Terrain Model (DTM) and contour mapping of the Fountain Hills area in a digital format. The data was prepared at an edited scale of 1 inch = 100 feet with a contour interval of 2 feet. Hard copy 1 inch = 200 feet scale plots of the contour mapping will also be supplied to the consultant.

The DTM data will be supplied in an ASCII data file containing grid coordinate data and break line data. The grid coordinate data is on a 75'x75' grid of spot elevations in the following format: Easting, Northing, Elevation. The break line data along washes and ridges will be in the following format: Easting, Northing, Elevation, Descriptor. The descriptor will identify each point on a specific break line.

The contour and planimetric data will be supplied in an AutoCAD Version 11.0 drawing file format.

3.2 The consultant will retain an aerial mapper to photogrammetrically determine the geometric cross section data for use in the HEC-2 models. The photogrammetrically determined cross sections must meet the accuracy requirements of FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors, March 1991. In those areas where the vegetation is too dense to determine the cross sections photogrammetrically, they will be determined by field survey. The consultant may also derive some of the HEC-2 cross sections from the DTM.

3.3 The consultant will develop the hydrologic base maps using the supplied mapping and DTM data. For those areas not covered by the supplied mapping, U.S. Geological Survey (USGS) topographical quadrangle maps will be used. Additional topographic information may be available through the Town for those areas not covered by the detailed mapping.

An overall watershed drainage basin map with sheet index will be prepared at a scale of 1 inch = 2000 feet.

The off-site soils, land use, sub-basin delineation, time of concentration, and flood routing maps will be based on 1 inch = 1000 feet scale photo-enlarged copies of USGS 7.5 minute quadrangle maps.

The on-site soils, land use, sub-basin, time of concentration, and flood routing maps will be prepared on 1 inch = 400 feet scale maps using the supplied topographic mapping.

3.4 Using the supplied topographic data the consultant will prepare the work study drawings of the floodplain/floodway delineations to a scale of 1 inch = 200 feet with a contour interval of 2 feet.

3.5 The consultant shall provide permanent non-erasable topographic mylars of the floodplain/floodway delineation work study drawings. In addition to the topographic data and floodplain/floodway delineations, each drawing shall include a minimum of a north arrow, scale, section corners and quarter corners (if found), current and proposed streets and Highway names, State Plane Coordinate System, major drainage features, corporate boundaries, cross section location lines, channel station center line, Base Flood Elevations (BFEs), index map, description and elevation of control points and ERMs, and reference marks used in ground control. A cover sheet will be provided with the project title, date of topographic mapping, and a location map showing geographic range covered by each specific mapping sheet. The drawings shall be 24" X 36" in size, with a scale of 1 inch = 200 feet and a contour interval of 2 feet. See Exhibit 2 for how the drawings are to be laid out.

3.6 Sketch maps no larger than 11" x 17" for the study area must be included in the narrative report along with the flood profile maps.

3.7 Digital contour and planimetric data developed for this study shall be delivered according to the District's Hydrologic Information System (HIS) Data Delivery Specifications revision 01.1. Topographic information from USGS topographic quadrangle maps should not be part of the HIS product.

TASK 4 FIELD SURVEY

4.1 Field surveying shall be undertaken to establish permanent elevation reference marks (ERMs), verify the accuracy of the topographic mapping, and where necessary to obtain surveys of bridges and other hydraulic structures. The consultant shall coordinate all the surveying work and ensure that it meets FEMA requirements. Quality control on the surveys will be per FEMA Document 37, Flood Insurance Study Guidelines and Specifications for Study Contractors, March 1991. Input from the District must be obtained regarding the proposed locations of the ERMs.

4.2 Ground Control for Field Surveying:

a. All topographic mapping and survey work shall meet or exceed Federal Emergency Management Agency (FEMA) minimum criteria as defined in FEMA Document 37. This would include, but is not limited to: the establishment of "permanent" elevation reference marks (ERMs); field control; and verification of profiles by the ground survey profile procedure.

b. Horizontal and Vertical Control: Where readily available, surveys will tie into State Plane Coordinate System 1983 NAD. Field control shall be sufficient, at least one "permanent" point per mile, such point(s) being used as Elevation Reference Marks (ERMs). Surveys will be based on National Geodetic Vertical Datum (NGVD), per FEMA guidelines. "Permanent" survey points shall consist of existing monumentation, such as brass caps or similar survey monuments. Where additional monumentation is needed, survey markers conforming to Maricopa Association of Governments (MAG) Uniform Standard Detail for Public Works Construction, detail 120-1, Type C, shall be placed 2" +/- above grade, and topped with a brass cap. Elevation Reference Marks will be labelled on available maps and described in a manner which allow them to be readily located in the field.

4.3 The consultant shall verify the accuracy of the mapping by the procedures called for in FEMA Document 37 or other methods approved by FEMA. This shall include the verification of cross sections used in the floodplain delineation. A minimum of 5% of the HEC-2 cross sections shall be verified by field surveying. The results of cross section verification will be submitted to the District prior to beginning the HEC-2 modeling.

Due to dense vegetation in some areas, the HEC-2 cross sections may have to be determined by field survey.

4.4 Field surveys or "as-built" plans (where available) of all bridges, culverts, flood retarding structures, and other hydraulic structures are to be obtained by the consultant. This information should be reduced and compiled into an 11"x 17" (maximum size) drawing for inclusion in the final report. The information presented in the drawing should be in a format appropriate for use in the HEC-2 model. Field surveys or "as-built" plans of bridges, culverts, hydraulic structures, and routing reaches must also be obtained where necessary for proper hydrologic modeling. It may be necessary to field survey some structures since the "as-built" plans may not be on 1929 NGVD.

4.5 Fountain Hills Structure number 19 and the lake structure shall be field surveyed. The field survey shall determine the elevations of the principal and emergency spillways, the crest of each structure, and other information necessary for the development of the hydrologic and hydraulic models.

TASK 5 HYDROLOGY

5.1 The hydrologic study of the watershed will be delivered to the District under separate cover from the hydraulic analysis. The consultant shall use the U.S. Army Corps of Engineers computer program HEC-1, 1991 Version, to develop a hydrologic model for the area. The methods and procedures in the Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology will also be used. An appropriate time step and number of ordinates is to be selected that allows for complete calculation of the flood hydrograph without sacrificing resolution of the flood peak. All calculations, or assumptions used in developing sub-basin and routing parameters shall be documented and made a part of the appendix for the hydrology report. Field surveys will need to be taken for hydrologic modeling purposes.

5.2 Hydrologic models shall be developed for each of the following events:

a. 100-year, 6-hour, existing condition.

b. 100-year, 24-hour, existing condition.

c. 10-year, future condition.

d. 100-year, future condition.

Work on the future condition HEC-1 models shall not begin until the existing condition models are approved.

5.3 It is required that the consultant obtain the approval of the District at each of the following steps:

a. Soil maps, watershed boundary maps, and land use maps.

b. HEC-1 parameter estimation.

c. HEC-1 flow diagram and input parameters.

d. HEC-1 results.

5.4 Four meetings associated with four tasks, and two field trips shall be held with the Flood Control District staff at the following mile stones:

a. One field trip at the start of the project to scope out the critical points of the watershed and problem areas.

b. Meeting number 1 as soon as basic data are gathered and the sub-basins have been delineated. Sample HEC-1 parameter estimations should also be presented and discussed at this meeting. A copy of the draft maps of the sub-basins must be delivered to the District at this meeting.

c. Meeting number 2 after all the parameters have been estimated. A draft copy of the parameters must be delivered to the District at least one week prior to this meeting.

d. Meeting number 3 after the preliminary HEC-1 results have been obtained and a draft report has been prepared. A copy of the draft report and the copy of the HEC-1 on a floppy disc, compatible with the Districts computer, must be delivered two weeks prior to the meeting. A second copy of each will be forwarded by the District to ADWR for their review and comment.

e. Meeting number 4 to review comments by the District and ADWR one week after the consultant has received the review comments. The District will require a minimum of two weeks to review the report and the model. A second field trip may be scheduled for the same day so the results obtained can be discussed.

5.5 The consultant will develop the hydrologic base maps using the supplied mapping and DTM data. For those areas not covered by the supplied mapping, U.S. Geological Survey (USGS) topographical quadrangle maps will be used. Additional topographic information may be available through the Town for those areas not covered by the detailed mapping.

An overall watershed drainage basin map with sheet index will be prepared at a scale of 1 inch = 2000 feet.

The off-site soils, land use, sub-basin delineation, time of concentration, and flood routing maps will be based on 1 inch = 1000 feet scale photo-enlarged copies of USGS 7.5 minute quadrangle maps.

The on-site soils, land use, sub-basin, time of concentration, and flood routing maps will be prepared on 1 inch = 400 feet scale maps using the supplied topographic mapping.

5.6 Using appropriate hydrologic judgement, sub-basins are to be identified that provide reasonable depiction of the watershed condition. The sub-basins must be as homogeneous as possible, using watershed area, watershed type (mountainous and flat lands or urban and undeveloped areas), and time of concentration as criteria. Sub-basin break-downs will be done in sufficient detail to provide peak discharges at structures, major road crossings, confluences, at the study boundary limits, and at other intermediate points. The Town's input will also be obtained on the location of concentration points.

5.7 The specific hydrologic techniques to be used in this study are:

a. Rainfall Depth: Point precipitation values will be determined using the information and procedures described in the Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology.

Rainfall Distribution: Peak discharges and peak volumes for the 100-year 6-hour storm will be estimated using the District's Distribution(s). Peak discharges and peak volumes for the 100-year 24-hour storm will be estimated using the SCS Type II rainfall distribution.

b. Areal Reduction: The point precipitation values will be areally reduced for critical concentration points. Areal reduction for the 6 hour rainfall duration will be applied using the curves in the Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology. NOAA HYDRO-40 will be used with the 24 hour rainfall reduction. Copies can be obtained from the District.

c. Rainfall Excess: The Green and Ampt methodology will be utilized for estimation of rainfall losses. The Lotus spreadsheet and procedures, provided by the District, will be used to determine composite parameter values for each sub-basin.

d. Unit Hydrograph: The Clark and S-Graph method should be used following the procedures outlined in the Drainage Design Manual for Maricopa County, Arizona: Volume I - Hydrology. The choices in methodology will be to the discretion of the consultant, with consent from the District.

e. Time of Concentration and S-Graph Lag Equation: The Papadakis method should be used with the Clark unit hydrograph, along with the MCUHP1 computer program, to determine the time of concentration. If this method results in unsuitable times of concentration, other method(s) must be used and compared for the most realistic result. The S-graph lag equation, along with the MCUHP2 computer program, should be used with the appropriate S-graph (Phoenix mountain or Phoenix Valley).

f. Channel Routing: Channel routing will be accomplished using either the Muskingum-Cunge or the Normal-Depth option of HEC-1. The choice of methodology will be at the discretion of the consultant, with consent from the District. Average cross sections will be developed utilizing available mapping and field reconnaissance data. Sufficient field cross sections will be taken to ensure that routing reaches are reasonable and representative of field conditions.

The HEC-1 routing parameters for the reaches modeled using HEC-2 will be adjusted after the HEC-2 cross sections are available. The resulting velocities and depths, for all reaches, must be assessed for realistic values.

g. Reservoir Routing: Detailed analysis of structures and ponding areas will be accomplished using the Modified Puls reservoir routing option of HEC-1. Stage versus discharge tables for hydraulic structures will be estimated using appropriate hydraulic methodology.

h. Channel Transmission Losses: Attempts should be made to estimate infiltration losses through channel bottoms based on existing field data or literature. If sufficient data is not available, the final report must acknowledge so and explain how the peaks and volumes of flow are affected by not including the transmission losses.

5.8 The District will provide appropriate references to facilitate parameter estimation.

5.9 Output of the computer model should be reviewed to see if the peak flows and volumes are realistic. Adjustments to input for obtaining the most realistic results is normal to the scope.

5.10 Every attempt must be made to recover historic stream gage data and use it to compare with the results obtained by the hydrologic model. Major differences must be discussed in the final report.

5.11.1 The final hydrologic report should include the following sections and documentation using ADWR standards (as a minimum):

a. Scope of the study.

b. Description of the watershed.

c. Previous studies and reports.

d. Methodology.

e. Assumptions.

f. Results.

g. Comparison of the results with other studies and/or stream gages.

h. Conclusion.

i. List of references and agencies contacted.

5.11.2 Tables and Figures for the main Text:

a. Location map (maximum size 11"x 17") at the appropriate scale.

b. Table showing the flow peaks and volumes at critical concentration points for different rainfall events.

c. Table showing the critical peaks and volumes for major concentration points as compared to previous studies (where available).

d. Table(s) showing the major parameters for all sub-basins (slope, area, soil loss calculations, friction, total rainfall, time of concentration or lag, major structures, etc.).

5.11.3 Tables and Figures for the appendices:

a. Topographic base map(s) showing the sub-basins, routing reaches, Tc flow paths or lag flow paths, major man-made structures, and references (i.e. street names, Township, Range, Section, etc.) at the scales defined in Task 5.5.

b. Soils map(s) at the same scale as the base map.

c. Land use map(s) at the same scale as above.

d. Schematic map for the HEC-1 showing the sub-basins (area, Tc), the flow paths, the routing reaches (length, slope, friction, width, velocities, transmission losses, etc.), order of combining the hydrographs, channel, pipe or culvert dimensions (where appropriate).

e. Pertinent data on all the structures in the watershed (such as spillway elevation, rating curves, etc.)

f. One set of study maps (i.e. sub-basin boundary maps, flow path maps, soils maps, land use maps) to be folded and delivered in a binder.

5.12 As part of the final products the consultant will supply the hydrologic data in conformance with District's HIS Data delivery Specifications revision 01.1.

Specific deviations from this hydrologic scope shall not be undertaken without the specific written concurrence from the Flood Control District.

TASK 6 FLOODPLAIN AND FLOODWAY DELINEATION

6.1 Floodplain and floodway delineations must be obtained using the U.S. Army Corps of Engineers HEC-2 Water Surface Profiles computer model, version 4.6.2, May 1991, and methodology acceptable to FEMA. This model will simulate the effects of floodplain geomorphology, flow changes, bridges, culverts, hydraulic roughness factors, effective flow limitations, split-flows, and other considerations. The consultant will prepare the study using the guidelines established in FEMA Document 37, Flood Insurance Study Guidelines and Specification for Study Contractors, March 1991, and FIA Document 12, Appeals, Revisions, and Amendments to Flood Insurance Maps, January 1990.

6.2 The delineation work shall meet requirements for floodplain and floodway delineations as prescribed by FEMA and ADWR.

6.3 The consultant is to make refinements to the HEC-2 model based on review of the model results by the District, ADWR, FEMA, and the Technical Evaluation Contractor. The consultant shall review the HEC-2 model results for reasonableness. Adjustments to the input parameters for obtaining the most realistic results is normal to the scope.

6.4 The consultant will prepare working maps and models of the 100-year floodplain and floodway during the course of the hydraulic modeling analysis for review by the District at progress and milestone meetings. Floodways are to be determined using equal conveyance encroachment methods to start with, but only encroachment method 1 will be used in the final analysis. The floodway encroachment is to be as near the one foot maximum rise in elevation as possible. Before determining floodways in areas of supercritical flow District approval must be obtained.

6.5 The consultant must obtain District approval at each of the following steps:

a. Field reconnaissance report and estimation of Manning's "n" values.

b. Proposed location and alignment of the cross sections and channel centerline.

c. Floodplain (natural) delineation.

d. Floodway delineation using equal conveyance encroachment.

e. Floodway delineation using encroachment method 1.

f. Final Hydraulics Report.

6.6.1 The consultant will conduct a field reconnaissance of the full study reach. This will include observation of channel and floodplain conditions for estimation of Manning's "n" values; photographic documentation of floodplain characteristics; determination of channel bank stations; observation of possible overflow areas; inspection of levees or other flood control structures; and measurement of bridge dimensions.

6.6.2 Mannings "n" values are to be determined using the methodology in the USGS report, Estimated Manning's Roughness Coefficients for Stream Channels and Flood Plains in Maricopa County, Arizona, April 1991. Copies of the report are available through the District.

6.6.3 A draft report on the field reconnaissance will be submitted to the District for review and approval prior to beginning the HEC-2 modeling. The report will present the determination of channel and overbank "n" values using captioned color photographs or color photocopies. The report will also discuss floodplain conditions affecting the delineation, describe structures and obstructions, and provide color photos or color photocopies of major hydraulic structures. Photo locations, structures, and "n" values will be displayed on reduced scale mapping included in the report. The final report will be included in the Final Hydraulics Report.

6.7.1 The cross section data for use in the HEC-2 models will be determined photogrammetrically. The location and alignment of cross sections and channel centerline will be submitted for the District's review and approval prior to digitizing the cross section data. Cross section stationing will be from left to right looking downstream with the thalweg as station 10,000. Cross sections will be spaced approximately every 500 feet, unless geographic or structural constraints dictate otherwise. Identification of cross sections will be in river miles, increasing upstream. The stationing will tie into the specified river mile of the existing FEMA studies. Cross section orientation may need to be altered after running of HEC-2 model to make sure that they are perpendicular to flow per FEMA criteria. The photogrammetrically determined cross sections can be supplemented with field cross sections and sections taken from the DTM.

6.7.2 All cross sections will be plotted at appropriate standard engineering scales. The cross section plots will show water surface elevations, ineffective flow areas, "n" values, encroachments, channel stationing, bridges, culverts, and other pertinent information. All plots are to be accompanied by a legend. Draft plots of the cross sections are to be available to be used as a check of input data and for working sections during compilation of the floodplain model. Final plots of the cross sections will be submitted as part of the Final Hydraulics Report.

6.8 Bridges and culverts must be modeled in compliance with HEC-2 modeling requirements for the selected routine. Where multiple bridges occur, each bridge will be modeled separately. The HEC-2 modeling results for bridges, culverts, and other hydraulic structures must be checked by use of an independent method approved by the District.

6.9 For floodplains identified as ponding areas, it is preferable to analyze the area by using the HEC-2 model, which will provide the District with water surface elevations. If appropriate, the consultant shall identify in the ponded floodplains a floodway.

6.10 Flood zones must be determined according to FEMA criteria and clearly labelled on the final drawings.

6.11 The total area of the floodplain and floodway must be determined for each reach in square miles and acres.

6.12 The final report for the floodplain/floodway delineation study will include, but is not limited to the following:

I. Introduction
   a. Purpose of study
   b. Authority for study
   c. Coordination and acknowledgments
   d. Public notification and contact

II. Area Studied
   a. Scope of study
   b. Community description
   c. Principal flood problems
   d. Flood protection measures

III. Engineering methods
   a. Hydrologic analyses
   b. Hydraulic analyses

IV. Floodplain Management applications
   a. Flood boundaries
   b. Floodways

V. Insurance applications and CRS summary

VI. Other studies

VII. Location of data

VIII. Bibliography

IX. Reduced Delineation Maps (11"x17")

X. ERMs

6.13 As part of the final products the consultant will supply the floodplain and floodway delineation data in conformance with the District's HIS Data Delivery Specifications revision 01.1.

TASK 7 FINAL PRODUCTS

7.1. One complete set of floodplain delineation work study drawings at 1 inch = 200 feet in reproducible form (mylar) and six blueline copies as outlined in Tasks 3 and 6.

7.2 Nine copies of the Hydrology and Hydraulics reports as outlined in Tasks 5 and 6. The consultant will incorporate the comments of the District, the Town, ADWR, FEMA and other reviewers into the reports. Hardcopy printouts of the HEC-1 and HEC-2 models will be included in the reports. The HEC-1 and HEC-2 model input and output files will be supplied in a digital format on 5-1/4", 1.2 MB diskettes compatible with an IBM-AT personal computer.

7.3 One complete set of mylars for the foldout maps (no larger than 11" x 17") used in the reports.

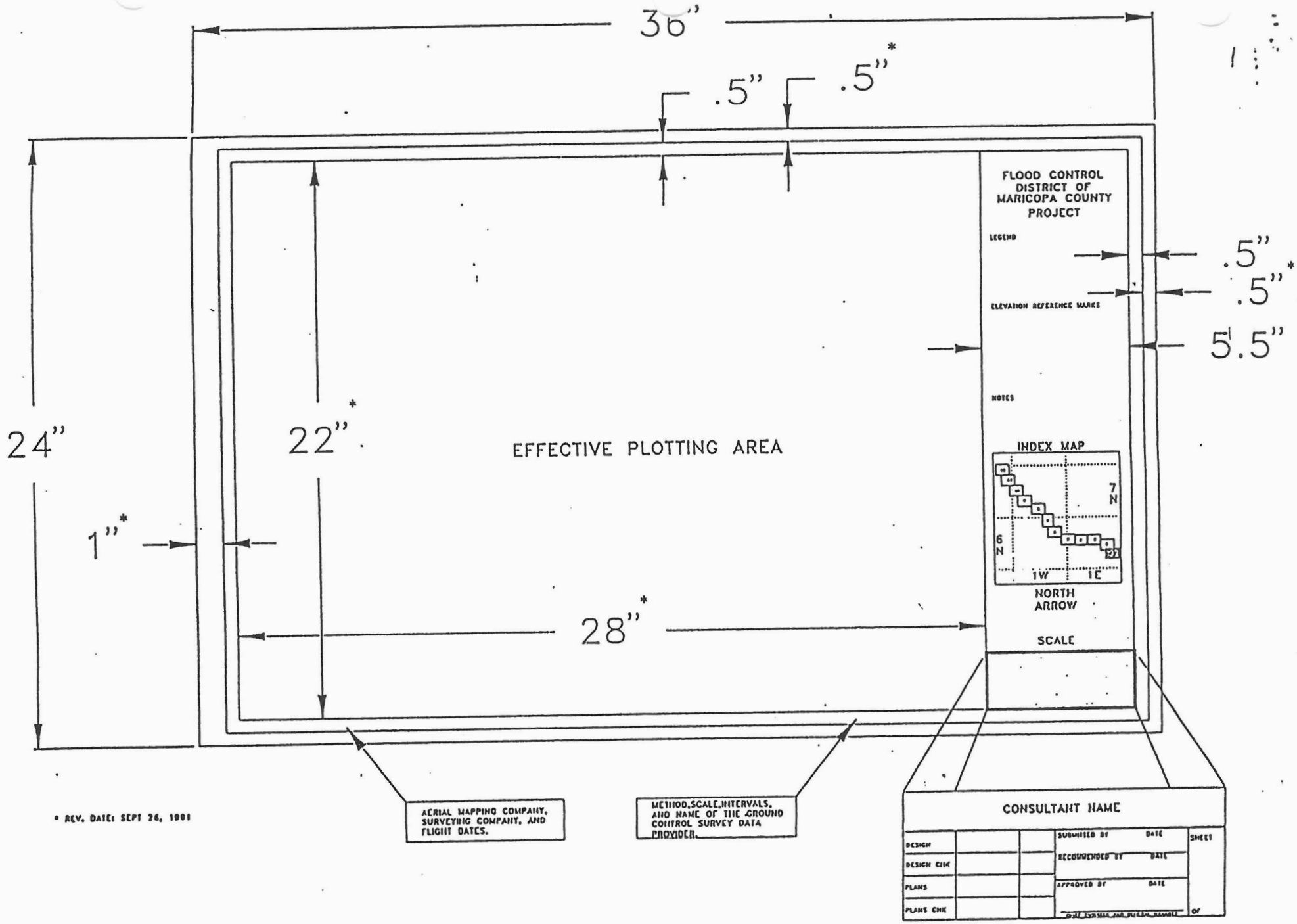
7.4 Tabular list of control points (ERMs) used with descriptions, elevations, and coordinates.

7.5 Digitized topographic data and floodplain/floodway data in conformance with the District's HIS Data Delivery Specifications revision 01.1.

7.6 Digitized hydrologic data in conformance with the District's HIS Data Delivery Specifications revision 01.1.

7.7 Documentation for this study will be as outlined in ADWR Sate Standard Attachment 1-90, Instructions for Organizing and Submitting Technical Documentation for Flood Studies, September 1991.

7.8 One copy of the current FIRM panels showing the proposed delineation.


36"
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EFFECTIVE PLOTTING AREA
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FLOOD CONTROL DISTRICT OF MARICOPA COUNTY
PROJECT
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INDEX MAP
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NORTH ARROW
SCALE
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DESIGN
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PLANS
PLANS CHK
SUBMITTED BY
DATE
RECOMMENDED BY
DATE
APPROVED BY
DATE
SHEET
OF
AERIAL MAPPING COMPANY, SURVEYING COMPANY, AND FLIGHT DATES.
METHOD, SCALE, INTERVALS, AND NAME OF THE GROUND CONTROL SURVEY DATA PROVIDER.
* REV. DATE: SEPT 26, 1991

Exhibit

orig: PMM
cc: EAA/SEK

FLOOD CONTROL DISTRICT
of
Maricopa County

2801 West Durango Street • Phoenix, Arizona 85009
Telephone (602) 506-1501
Fax (602) 506-4601
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BOARD OF DIRECTORS
Betsey Bayless
James D. Bruner
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Tom Rawles
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Neil S. Erwin, P.E., Chief Engineer and General Manager

RECEIVED
JAN 28 1994
AGK ENGINEERS, INC.

JAN 27 1994

Mr. Edward A. Adair, P.E.
AGK Engineers, Inc.
2255 North 44th Street, Suite 330
Phoenix, Arizona 85008

SUBJECT: Change Order No. 2, Contract FCD 92-05, Fountain Hills (South) Flood Delineation Study

Dear Mr. Adair:

Enclosed for your file is an executed original of the subject change order. If you have any questions, please contact Tim Murphy at 506-1501.

Sincerely,

Helen Ortiz
for Leanna Cumberland
Chief, Contracting Branch

Enclosure (1)

FLOOD CONTROL DISTRICT OF MARICOPA COUNTY

Contract Change Order No. 2

Date: 12/20/93 FCD Contract No./Name: FCD 92-05, Fountain Hills (South) FIS

To: AGK Engineers, Inc., Contractor/Consultant.

You are hereby directed to make the herein described changes from the plans and specifications or do the following described work not included in the plans and specifications on the above-mentioned project.

Changes requested by: Tim Murphy

Provide description of work to be done, estimate of quantities, and prices to be paid. Segregate between additional work at contract price, agreed price, and actual cost. Unless otherwise stated, rates for rental of equipment on actual cost work cover only such time as equipment is actually used and no allowance will be made for idle times.

* (1) Estimate of increases and/or decreases in contract items at contract prices.
** (2) Estimate of extra work at agreed price and/or actual cost.

Sheet No. 1 of 1

Bid Item No.	Description	Estimated Quantity	As-Built Quantity	Difference + or -	Unit Price	Difference + or -
There were some problems with the 1st set of mapping supplied to AGK Engineers, Inc. Additional time and effort were required by the consultant to review and use this set of mapping. The additional efforts associated with this change order are detailed in the attached letter, dated October 14, 1993, and made a part of Change Order #2. Change Order #2 is in the amount of $8,628.						

We, the undersigned Contractor/Consultant, having given careful consideration to the change(s) proposed, hereby agree, if this proposal is approved, that we will provide all equipment, furnish all material (except as may otherwise be noted above), and perform all services necessary for the work above specified, and we will accept as full payment therefore the prices shown above.

By reason of this proposed change --- days extension of time will be allowed.
Total new contract amount through this Change Order No. 2 $ 173,584

Contractor/Consultant: AGK Engineers, Inc.
2255 N. 44th St., Ste. 330
Phoenix, AZ 85008

By: Samuel Meso
Title: Vice President
Date: 1-4-94

Recommended by: Tim Murphy
Date: 1-6-94

Approved by:
Chief Engineers and General Manager
Date: 1/14/94

SECTION 2: MAPPING AND SURVEY INFORMATION

2.1 Topographic Mapping

Topographic mapping for the study area within the Town limits was furnished by the District. The base mapping has a scale of 1" = 200' with a contour interval of 2 feet. It was prepared by Kenney Aerial Mapping, Inc. in 1991 (***Reference 3***) under a subcontract with Anderson-Nelson, Inc. who was under contract with the Town of Fountain Hills. Horizontal and vertical controls were set by Anderson-Nelson, Inc.

The base mapping was prepared using a Digital Terrain Model (DTM), based on grid spot elevations using a 75-foot interval, and break lines defining wash flowlines and ridges. Reproducible mylars and digital drawings in Auto CAD format were provided by the District.

The mapping covered Sections 14, 15, 16, 17, 20, 21, 22, 23, 26, 27, and 28, Township 3 North, Range 6 East, Gila and Salt River Base and Meridian, Maricopa County, Arizona.

Topographic information for watershed outside the base mapping area was obtained from the United States Geological Survey (USGS) 7.5 minutes quadrangle maps (***References 4 and 5***).

2.2 Survey

Field survey was performed by Valco Surveying Corporation, a subconsultant to AGK Engineers, to provide supplemental topographic information as needed for this project. The horizontal and vertical controls used in field survey were compatible to what were used in the base mapping.

SECTION 3: HYDROLOGIC ANALYSIS

3.1 Hydrologic Method Description

In the absence of historical gaging data in this area, peak flows in this study were obtained through hydrologic modeling. The hydrologic modeling was performed by means of the 1991 version of the HEC-1 computer program as developed by the U.S. Army Corps of Engineers **(Reference 1).** The estimation procedures for model parameters and components were based on the Hydrologic Design Manual (hereinafter referred to as the Manual) published by the District **(Reference 2).**

Schematic flow routing diagrams for runoff modeling are presented in **Appendix G.** A duration of 6 hours was used for all storms with various frequencies. A time step of 2 minutes was used in the computation. Flows through the existing reservoir outlets or roadway culverts were modeled by the level-pool reservoir routing method, as contained in the HEC-1 program. The normal depth routing method was used for routing flow from one concentration point to the next.

3.2 Parameter Estimation

3.2.1 Drainage Area Boundaries

As previously indicated, the 7.6 square-mile watershed is divided into the following eight major washes. Locations of these washes are shown on Plate 1.

Powder Wash - Powder Wash is the south most wash in the study area. It flows in an east-west direction between Saguaro Boulevard and Powderhorn

Drive, thence turns south to the Salt River Pima Maricopa Indian Community after crossing Leo Drive. The size of its watershed is approximately 0.32 square mile.

Cereus Wash - The drainage area of Cereus Wash, which comprises approximately 2.62 square miles of land, is situated on both sides of Shea Boulevard. The majority of the land within the watershed is still in its natural state. It has seven major tributaries joining the main wash at various locations south of Shea Boulevard:

C.A.P. Wash
Walnut Wash
Chukar Wash
Logan Wash
Trevino Wash
Laser Drain
Last Trail Drain

However, only the floodplain of Chukar and Logan Washes would be delineated under this project.

Cyprus Point Wash - Cyprus Point Wash is located at about 2,000 feet north of Shea Boulevard. It is a relatively small wash, with an approximate drainage area of 0.15 square mile.

Jacklin Wash - Jacklin Wash is situated about a mile north of Shea Boulevard, with a drainage area approximately 0.67 square miles. Its major tributaries are Mangrum Drain and Kingstree Wash. Mangrum Drain joins Jacklin Wash near Jacklin Drive and Augustus Circle. Kingstree Wash originates near Fountain Hills Boulevard and flows in an east-west direction between Emerald Drive and Kingstree Boulevard. At the intersection of Inca Avenue and Kingstree Boulevard, the channel of Kingstree Wash is replaced

by the roadway of Kingstree Boulevard, and merges with Jacklin Wash at Saguaro Boulevard.

Emerald Wash - Emerald Wash begins on the west side of Fountain Hills Boulevard, flows easterly between Emerald Drive and Inca Avenue, and enters Fort McDowell Indian Community after crossing Saguaro Boulevard. It has a well defined channel, with a drainage area of approximately 0.61 square mile.

Malta Drain - Malta Drain is situated along the north side of Malta Drive with a drainage area of 0.23 square mile. It joins Emerald Wash near the Town's east boundary, a short distance downstream of Saguaro Boulevard.

Colony Wash - The watershed of Colony Wash is approximately 2.57 square miles. The wash has the following major tributaries:

Sunburst Wash
Greystone Wash
Sycamore Wash
Ironwood Wash
North Colony Wash
Fountain Channel
Lago Channel
Lake Spillway

However, floodplain delineation for Ironwood Wash, Lago Channel, and Lake Spillway is not included in the scope of work of this project.

Storm runoff from Sunburst, Greystone, and Sycamore Washes drains to a flood retarding structure known as Structure No. 19, which is a jurisdictional dam regulated by the Arizona Department of Water Resources (ADWR).

The famous Fountain Lake is also located within the Colony Wash watershed. The lake is formed by an earthen embankment constructed along the south perimeter of the lake. This earthen embankment is also regulated under the jurisdiction of ADWR.

Panorama Channel - Panorama Channel is situated along the east side of Panorama Drive and the northeast side of Quail Ridge Drive. It is a man-made channel to divert storm flows from the east and discharge them to Colony Wash after crossing the Town's east boundary.

Based on the topographic mapping information, the study watershed was divided into 275 subbasins to form an interconnected system of stream network components (see Plate 1). Watershed parameters such as size, length, elevation, and slope for each subbasin are tabulated in **Appendix A.** The size of watershed and number of subbasins for each major wash are summarized in Table 3.1.

3.2.2 Physical Parameters

3.2.2.1 Watershed Subbasin Parameters

Soil and Land Use: Information on soil groups was obtained from *Soil Survey of Aguila-Carefree Area,* published by the Soil Conservation Service (SCS) in April 1986 **(Reference 6).** Boundaries of the soil groups are shown on Plate 2. Information on land use was furnished by the Town of Fountain Hills. Locations of specific land use within the study area are shown on Plate 3. Soil and land use information for each subbasin is summarized in **Appendix B.**

Table 3.1

WATERSHED SIZE
AND NUMBER OF SUBBASINS

Wash Name	Watershed Size (sq.mi.)	No. of Subbasins
Powder Wash	0.32	15
Cereus Wash	2.62	76
Cypress Point Wash	0.15	8
Jacklin Wash	0.67	34
Emerald Wash	0.61	26
Malta Drain	0.23	11
Colony Wash	2.57	82
Panorama	0.44	23
Total	**7.61**	**275**

Rainfall Losses: Rainfall losses, which consist of surface retention loss and infiltration loss, were computed from the Green-Ampt method. The parameter estimation for the Green-Ampt method is discussed below and summarized in **Appendix C.**

Surface Retention Loss - The surface retention loss (1A) for each soil group was estimated on the basis of land use pattern and soil slopes obtained from **Reference 6**, as well as the criteria given in Table 4.1 of the Manual.

Percent of Outcrop - The weighted value of percent of rock outcrop (RTIMP) for each subbasin was computed according to the information obtained from **Reference 6.** A spreadsheet

program supplied by the District was used for calculating the effect of each soil type.

Infiltration Loss - The three parameters as coded in HEC-1 for infiltration loss are:

- Hydraulic conductivity at natural saturation (XKSAT)
- Wetting front capillary suction (PSIF)
- Volumetric soil moisture deficit (DTHETA)

The parameter values for various soil groups were taken from Table 4.2 of the Manual and computed by the District spreadsheet program. A comparison of the values obtained from the two sources yielded slight differences for PSIF and DTHETA. At the direction of the District, the values generated by their spreadsheet program were used. Weighted values of these parameters were computed for all the subareas for both the existing and future development conditions. The selection of DTHETA was based on the dry antecedent soil moisture condition for open and/or unzoned areas and the normal antecedent soil moisture condition for all zoned areas. In addition, values for XKSAT were adjusted according to the vegetation cover. A 30 percent vegetation cover was used for most undeveloped and low density residential areas. Areas that are on the steep slopes or have other zoning designations were assigned with other percentage of vegetation cover based upon aerial photography of the specific area.

Unit Hydrograph and Time of Concentration: The Clark unit hydrograph was used in the computation of peak discharges

in this study because all the subareas are less than 5 square miles in size. The Clark unit hydrograph consist of three parameters:

- Time of Concentration
- Storage Coefficient
- Time-Area Relation

Time of Concentration - The Papadakis method was used for estimating the time of concentration. It is a function of length and slope of the flow path, average rainfall intensity, and the watershed resistance coefficient, which is a function of watershed type and size. Values of these parameters are shown in **Appendix A.** The length and slope of the flow path for each subarea were obtained from the topographic maps **(References 3 through 5)**. A slope adjustment procedure for slopes greater than 200 feet per mile was implemented for several subareas in the watershed. This procedure was based on Figure 5.4 of the Manual. Detailed slope adjustment procedure for each subarea is presented in **Appendix D.** The rainfall intensity for each subarea was automatically computed by the MCUHP1 computer program. The values for resistance coefficient were determined from Table 5.1 of the Manual.

Storage Coefficient and Time-Area Relation - The storage coefficient is a function of time of concentration, the watershed size and the length of flow path. The time-area relation is a parameter showing the equal travel-time zones in a watershed.

The computation for time of concentration, storage coefficient and time-area relation was performed by means of trial-and-error method through the MCUHP1 computer program. Input and output values (including the ordinates of Clark unit hydrographs) are presented in **Appendix E**. A review of results indicated that all areas are suitable for the Clark method.

3.2.2.2 Reach Route Parameters

The normal depth routing method was used for routing flow from one concentration point to the next. The channel cross-sections used for normal depth routing were either digitized from the topographic base map in the case that they coincided with the location of a cross-section for hydraulic analysis, or were plotted by hand from the topographic base map. The slope between two concentration points was computed based on the length and elevations obtained from the topographic base map. The cross section information and slope computation for each subbasin are tabulated in **Appendix I.**

Because the *n* value is a relatively insensitive parameter in normal depth routing, the same were selected for both channel banks and overbank areas. The *n* value for routing through natural channels was selected to be 0.040; while for routing through streets, it was selected to be o.020.

Channel infiltration losses were not included in the routing computation. These losses were considered negligible

because of the typically narrow channels and moderately impervious soils which underlie the channel beds.

3.2.2.3 Storage Route Parameters

Flows through the existing reservoir outlets or roadway culverts were modeled by the level-pool reservoir routing method, as contained in the HEC-1 program. Invert elevations for the culverts located in major washes where floodplain delineation work was performed were obtained from field survey. Invert elevations for other culverts were determined from the 1" = 200' topographic map (**Reference 3**).

The relationships among stage, storage, and outflow at the culverts were developed from the 1" = 200' topographic map (**Reference 3**). The stage-discharge-storage relationship at each culvert is presented in **Appendix H**.

3.2.3 Statistical Parameters

There are no statistical data available for this project site.

3.2.4 Precipitation

The estimated rainfall depths for the 10 and 100 year storms were obtained from the charts derived from the NOAA Atlas published for Arizona **(Reference 7).** The 6-hour storm was used as the input for peak flow estimation, while the 24-hour storm was used for flow volume estimation. Copies of the rainfall charts are included in **Appendix F.**

The distribution and area reduction for the 6-hour storm were obtained by use of a computer program known as MCUHP1, which was developed by the District. The SCS Type II Distribution was used for the 24-hour storm. Areal reduction for rainfall was not applied for the 24-hour storm because the study area is much less than the 10-square-mile criterion.

3.2.5 Gage Data

None of the washes in the Fountain Hills area has ever been gaged by USGS or any other agency.

One recording precipitation gage was installed at Fountain Hills by the District in 1993. However, this short period of records could not be used for verifying the precipitation input in this study.

3.3 Calibration

As mentioned previously, historical gaging records are not available for the study area. However, the District has established a chart to describe the general relationships between peak discharge and watershed size in Maricopa County. In this study, the estimated peak discharges at major concentration points were plotted on the District's chart for comparison purposes. As indicated in Figure 2, the estimated values of peak discharges are in general agreement with the correlation curves developed by the District based on gaging information in the County.

3.4 Special Problems and Solutions

In the course of the study, special attention was paid to flow estimation at the following locations:

NATIONAL
12-081
Made in U.S.A.

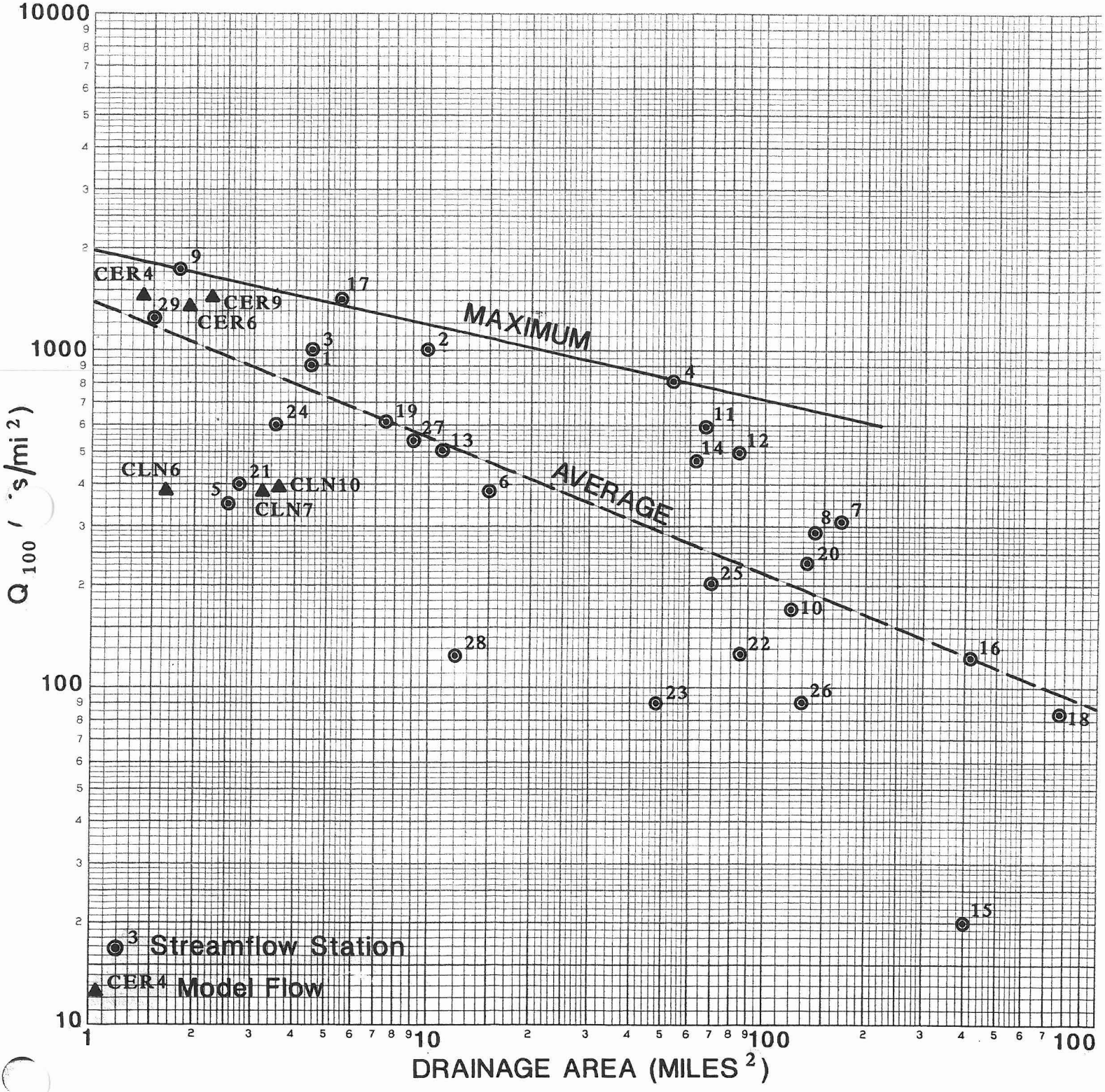

FIGURE 2
VERIFICATION OF RESULTS

Full Logarithmic, 3 × 3 Cycles

- Roadway embankments which caused water to overtop the roadway
- Street intersections where flows were split from one street into another

The rating curves that combined the pipe (culvert) flow and weir flow were used for runoff modeling at roadway embankments. As for street intersections where the street cross-sections are the primary conveyance mechanism, flows were split in proportion to the slopes of the streets.

3.5 Final Results

Results of runoff modeling for both the existing and future conditions are summarized in Tables 3.2 through 3.5. Outputs of the HEC-1 runs are presented in **Appendices J, K, L and M.**

In the absence of historical gaging data on the watershed, the peak flows in this study were derived through hydrologic modeling. The values of peak discharges resulting from hydrologic modeling appear to be reasonable for use as input for floodplain and floodway delineation.

Table 3.2.1
Powder Wash - 110
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	57	4.10	0.02	2850	110A	57	4.10	0.02	2850
110B	93	4.10	0.04	2325	110B	93	4.10	0.04	2325
PW1	149	4.10	0.06	2483	110C	11	4.07	0.00	2750
RPW1	148	4.13	0.06	2467	110D	211	4.10	0.07	3014
110C	11	4.07	0.00	2750	110E	73	4.07	0.03	2433
110D	211	4.10	0.07	3014	110F	22	4.03	0.01	2200
PW2	368	4.10	0.13	2831	110G	18	4.03	0.01	1800
RPW2	360	4.13	0.13	2769	110H	61	4.10	0.03	2033
110E	73	4.07	0.03	2433	110I	45	4.07	0.02	2250
*PW3	423	4.13	0.16	2644	110J	21	4.03	0.01	2100
110F	22	4.03	0.01	2200	110K	42	4.00	0.01	4200
110G	18	4.03	0.01	1800	110L	61	4.03	0.02	3050
PW3	453	4.10	0.17	2665	110M	81	4.03	0.03	2700
RPW3	446	4.17	0.17	2624	110N	35	4.03	0.01	3500
110H	61	4.10	0.03	2033	110O	12	4.03	0.00	3000
*PW4	502	4.17	0.20	2510	PW1	149	4.10	0.06	2483
110I	45	4.07	0.02	2250	PW2	368	4.10	0.13	2831
PW4	538	4.17	0.22	2445	* PW3	423	4.13	0.16	2644
SPW4	474	4.23	0.22	2155	PW3	453	4.10	0.17	2665
110J	21	4.03	0.01	2100	* PW4	502	4.17	0.20	2510
110K	42	4.00	0.01	4200	PW4	538	4.17	0.22	2445
R110K	38	4.03	0.01	3800	PW5	529	4.20	0.27	1959
110L	61	4.03	0.02	3050	* PW6	560	4.27	0.30	1867
PW5	529	4.20	0.27	1959	PW6	583	4.23	0.32	1822
RPW5	523	4.27	0.27	1937	R110K	38	4.03	0.01	3800
110M	81	4.03	0.03	2700	RPW1	148	4.13	0.06	2467
*PW6	560	4.27	0.30	1867	RPW2	360	4.13	0.13	2769
110N	35	4.03	0.01	3500	RPW3	446	4.17	0.17	2624
110O	12	4.03	0.00	3000	RPW5	523	4.27	0.27	1937
PW6	583	4.23	0.32	1822	SPW4	474	4.23	0.22	2155

Table 3.2.2
Cereus Wash - 120
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	32	4.07	0.02	1600	120A	32	4.07	0.02	1600
120B	122	4.07	0.05	2440	120B	122	4.07	0.05	2440
160A	20	4.00	0.01	2000	120C	14	4.03	0.01	2800
R160A	19	4.07	0.01	1900	120D	170	4.07	0.07	2429
CER1	172	4.07	0.08	2150	120E	35	4.07	0.02	1750
SCER1	132	4.20	0.08	1650	120F	58	4.03	0.02	2900
120C	14	4.03	0.01	2800	120G	95	4.10	0.04	2375
CER2	140	4.17	0.08	1750	120H	10	4.07	0.01	2000
RCER2	139	4.23	0.08	1738	120I	17	4.03	0.01	1700
120D	170	4.07	0.07	2429	120J	9	4.10	0.01	900
*CER3	283	4.10	0.15	1887	120K	71	4.07	0.03	2367
120H	10	4.07	0.01	2000	120L	92	4.10	0.04	2300
R120H	9	4.07	0.01	1800	120M	73	4.10	0.04	1825
120I	17	4.03	0.01	1700	120N	116	4.03	0.04	2900
CER3A	26	4.03	0.01	2600	120O	25	4.00	0.01	2500
SCER3A	19	4.20	0.01	1900	120P	94	4.00	0.03	3133
CER3	299	4.10	0.16	1869	120Q	87	4.07	0.04	2175
SCER3	291	4.13	0.16	1819	120R	23	4.07	0.01	2300
RCER3	290	4.17	0.16	1813	120S	18	4.03	0.01	1800
120E	35	4.07	0.02	1750	120T	5	4.07	0.00	2500
*CER4	321	4.17	0.18	1783	120U	55	4.03	0.02	2750
126A	18	4.03	0.01	1800	120V	26	4.03	0.01	2600
R126A	17	4.13	0.01	1700	120W	17	4.00	0.01	3400
126B	44	4.07	0.02	2200	120X	51	4.03	0.02	2550
WW1	60	4.10	0.03	2000	121A	103	4.10	0.05	2060
RWW1	59	4.13	0.03	1967	121B	38	4.10	0.02	1900
126C	233	4.13	0.14	1664	122A	39	4.07	0.02	1950
R126C	228	4.20	0.14	1629	122B	97	4.03	0.03	3233
126D	69	4.07	0.03	2300	122C	38	4.03	0.01	3800
WW3	332	4.17	0.20	1660	122D	78	4.07	0.03	2600
RWW3	329	4.20	0.20	1645	122E	83	4.03	0.03	2767
126E	227	4.13	0.09	2522	122F	20	4.07	0.01	2000
126F	149	4.10	0.05	2980	122G	70	4.03	0.02	3500
WW4	372	4.13	0.15	2480	122H	17	4.03	0.01	1700
RWW4	358	4.20	0.15	2387	122I	16	4.07	0.01	1600
126G	288	4.17	0.14	2057	122J	57	4.07	0.03	1900
126H	49	4.07	0.02	2450	122K	6	4.07	0.00	2000
WW5	1005	4.20	0.50	2010	123A	173	4.07	0.08	2163
RWW5	986	4.23	0.50	1972	123B	48	4.03	0.02	2400
126I	219	4.07	0.08	2738	123C	10	4.00	0.00	3333
126J	4	4.03	0.00	2000	123D	16	4.10	0.01	1600
R126J	4	4.07	0.00	2000	124A	165	4.13	0.07	2357
WW6	1080	4.23	0.58	1862	124B	128	4.07	0.04	3200
RWW6	1074	4.27	0.58	1852	124C	43	4.07	0.02	2150
126M	57	4.07	0.03	1900	124D	15	4.13	0.01	1500

*WW7	1098	4.27	0.61	1800	124E	128	4.10	0.05	2560
126K	27	4.03	0.01	2700	125A	167	4.17	0.08	2088
R126K	27	4.10	0.01	2700	125B	260	4.17	0.11	2364
126L	49	4.07	0.02	2450	125C	79	4.10	0.03	2633
WW7	1137	4.23	0.64	1777	125D	29	4.30	0.02	1450
SWW7	1066	4.33	0.64	1666	125E	124	4.10	0.05	2480
127A	65	4.10	0.03	2167	126A	18	4.03	0.01	1800
127B	102	4.03	0.04	2550	126B	44	4.07	0.02	2200
CAP1	163	4.07	0.07	2329	126C	233	4.13	0.14	1664
RCAP1	161	4.10	0.07	2300	126D	69	4.07	0.03	2300
127C	111	4.10	0.04	2775	126E	227	4.13	0.09	2522
127D	59	4.07	0.02	2950	126F	149	4.10	0.05	2980
CAP2	326	4.10	0.13	2508	126G	288	4.17	0.14	2057
RCAP2	322	4.10	0.13	2477	126H	49	4.07	0.02	2450
127E	261	4.07	0.10	2610	126I	219	4.07	0.08	2738
127F	348	4.17	0.15	2320	126J	4	4.03	0.00	2000
CAP3	576	4.13	0.25	2304	126K	27	4.03	0.01	2700
RCAP3	573	4.13	0.25	2292	126L	49	4.07	0.02	2450
127G	158	4.07	0.06	2633	126M	57	4.07	0.03	1900
CAP4	704	4.13	0.31	2271	126N	161	4.10	0.08	2013
SCAP4	702	4.13	0.31	2265	127A	65	4.10	0.03	2167
R2CAP4	698	4.17	0.31	2252	127B	102	4.03	0.04	2550
127I	21	4.07	0.01	2100	127C	111	4.10	0.04	2775
*CAP5	715	4.17	0.32	2234	127D	59	4.07	0.02	2950
127H	49	4.10	0.02	2450	127E	261	4.07	0.10	2610
CAP5	1076	4.13	0.47	2289	127F	348	4.17	0.15	2320
RCAP5	1067	4.17	0.47	2270	127G	158	4.07	0.06	2633
127J	81	4.10	0.03	2700	127H	49	4.10	0.02	2450
CAP6	1141	4.17	0.50	2282	127I	21	4.07	0.01	2100
WW8	1819	4.20	1.14	1596	127J	81	4.10	0.03	2700
RWW8	1804	4.27	1.14	1582	160A	20	4.00	0.01	2000
126N	161	4.10	0.08	2013	D122C	19	4.03	0.01	1900
WW9	1880	4.27	1.22	1541	D122C	19	4.03	0.01	1900
CER4	2069	4.27	1.40	1478	DO122C	19	4.03	0.01	1900
RCER4	2063	4.30	1.40	1474	CAP1	163	4.07	0.07	2329
120F	58	4.03	0.02	2900	CAP2	326	4.10	0.13	2508
*CER5	2078	4.30	1.42	1463	CAP3	576	4.13	0.25	2304
125A	167	4.17	0.08	2088	CAP4	704	4.13	0.31	2271
125B	260	4.17	0.11	2364	* CAP5	715	4.17	0.32	2234
CHK1	427	4.17	0.19	2247	CAP5	1076	4.13	0.47	2289
RCHK1	421	4.20	0.19	2216	CAP6	1141	4.17	0.50	2282
125C	79	4.10	0.03	2633	CER1	172	4.07	0.08	2150
R125C	65	4.20	0.03	2167	CER2	140	4.17	0.08	1750
125D	29	4.30	0.02	1450	* CER3	283	4.10	0.15	1887
CHK2	509	4.20	0.24	2121	CER3	299	4.10	0.16	1869
R2CHK2	499	4.27	0.24	2079	CER3A	26	4.03	0.01	2600
125E	124	4.10	0.05	2480	* CER4	321	4.17	0.18	1783
CHK3	573	4.23	0.28	2046	CER4	2069	4.27	1.40	1478
CER5	2426	4.30	1.71	1419	* CER5	2078	4.30	1.42	1463
RCER5	2417	4.30	1.71	1413	CER5	2426	4.30	1.71	1419
120G	95	4.10	0.04	2375	* CER6	2451	4.30	1.74	1409
*CER6	2451	4.30	1.74	1409	CER6	2665	4.30	1.94	1374
124A	165	4.13	0.07	2357	* CER7	2682	4.33	1.97	1361
124B	128	4.07	0.04	3200	CER7	2761	4.33	2.07	1334
LOG1	285	4.10	0.11	2591	CER7A	80	4.07	0.04	2000
RLOG1	281	4.13	0.11	2555	* CER8	2770	4.40	2.12	1307

124D	15	4.13	0.01	1500	CER8	2842	4.40	2.20	1292
*LOG2	296	4.13	0.12	2467	* CER9	2862	4.43	2.25	1272
124C	43	4.07	0.02	2150	CER9	2868	4.43	2.28	1258
LOG2	336	4.13	0.14	2400	CER10	587	4.17	2.29	256
RLOG2	324	4.20	0.14	2314	* CER11	590	4.20	2.30	257
124E	128	4.10	0.05	2560	CER11	877	4.17	2.50	351
LOG3	435	4.17	0.19	2289	* CER12	896	4.20	2.52	356
CER6	2665	4.30	1.94	1374	CER12	978	4.20	2.59	378
RCER6	2651	4.33	1.94	1366	CER13	985	4.20	2.60	379
120L	92	4.10	0.04	2300	* CER14	998	4.27	2.62	381
*CER7	2682	4.33	1.97	1361	CER14	1004	4.27	2.62	383
120J	9	4.10	0.01	900	CHK1	427	4.17	0.19	2247
R120J	9	4.10	0.01	900	CHK2	509	4.20	0.24	2121
120K	71	4.07	0.03	2367	CHK3	573	4.23	0.28	2046
CER7A	80	4.07	0.04	2000	LOG1	285	4.10	0.11	2591
SCER7A	77	4.13	0.04	1925	* LOG2	296	4.13	0.12	2467
RCER7A	75	4.20	0.04	1875	LOG2	336	4.13	0.14	2400
120M	73	4.10	0.04	1825	LOG3	435	4.17	0.19	2289
123B	48	4.03	0.02	2400	LSR1	126	4.07	0.05	2520
S123B	48	4.07	0.02	2400	LSR1B	52	4.10	0.02	2600
R123B	47	4.07	0.02	2350	LSR2	254	4.07	0.11	2309
R123B	47	4.07	0.02	2350	LSR2	257	4.07	0.11	2336
CER7	2761	4.33	2.07	1334	LSR2B	102	4.07	0.05	2040
RCER7	2744	4.40	2.07	1326	LSR3	411	4.07	0.18	2283
120N	116	4.03	0.04	2900	LSR4	464	4.10	0.20	2320
*CER8	2770	4.40	2.12	1307	LSR5	466	4.10	0.21	2219
123A	173	4.07	0.08	2163	LTD1	141	4.10	0.07	2014
S123A	167	4.10	0.08	2088	TRV1	182	4.10	0.09	2022
123D	16	4.10	0.01	1600	WW1	60	4.10	0.03	2000
TRV1	182	4.10	0.09	2022	WW3	332	4.17	0.20	1660
STRV1	181	4.13	0.09	2011	WW4	372	4.13	0.15	2480
RTRV1	173	4.20	0.09	1922	WW5	1005	4.20	0.50	2010
123C	10	4.00	0.00	3333	WW6	1080	4.23	0.58	1862
S123C	10	4.00	0.00	3333	* WW7	1098	4.27	0.61	1800
R123C	10	4.00	0.00	3333	WW7	1137	4.23	0.64	1777
R123C	8	4.13	0.00	2667	WW8	1819	4.20	1.14	1596
CER8	2842	4.40	2.20	1292	WW9	1880	4.27	1.22	1541
RCER8	2835	4.43	2.20	1289	R120H	9	4.07	0.01	1800
120O	25	4.00	0.01	2500	R120J	9	4.10	0.01	900
S120O	25	4.03	0.01	2500	R120O	24	4.03	0.01	2400
R120O	24	4.03	0.01	2400	R120O	20	4.17	0.01	2000
R120O	20	4.17	0.01	2000	R120P	92	4.03	0.03	3067
120Q	87	4.07	0.04	2175	R120W	11	4.10	0.01	2200
*CER9	2862	4.43	2.25	1272	R121A	103	4.10	0.05	2060
120P	94	4.00	0.03	3133	R122C	19	4.07	0.01	1900
S120P	94	4.00	0.03	3133	R122D	78	4.07	0.03	2600
R120P	92	4.03	0.03	3067	R122F	20	4.10	0.01	2000
CER9	2868	4.43	2.28	1258	R123B	47	4.07	0.02	2350
SCER9	563	5.23	2.28	247	R123B	47	4.07	0.02	2350
120R	23	4.07	0.01	2300	R123C	8	4.13	0.00	2667
120S	18	4.03	0.01	1800	R123C	10	4.00	0.00	3333
CER10	587	4.17	2.29	256	R125C	65	4.20	0.03	2167
RCER10	587	4.20	2.29	256	R126A	17	4.13	0.01	1700
120T	5	4.07	0.00	2500	R126C	228	4.20	0.14	1629
*CER11	590	4.20	2.30	257	R126J	4	4.07	0.00	2000
122C	38	4.03	0.01	3800	R126K	27	4.10	0.01	2700

DO122C	19	4.03	0.01	1900	R160A	19	4.07	0.01	1900
D122C	19	4.03	0.01	1900	R2CAP4	698	4.17	0.31	2252
R122C	19	4.07	0.01	1900	R2CHK2	499	4.27	0.24	2079
122E	83	4.03	0.03	2767	RCAP1	161	4.10	0.07	2300
LSR2B	102	4.07	0.05	2040	RCAP2	322	4.10	0.13	2477
RLSR2B	99	4.10	0.05	1980	RCAP3	573	4.13	0.25	2292
122D	78	4.07	0.03	2600	RCAP5	1067	4.17	0.47	2270
R122D	78	4.07	0.03	2600	RCER2	139	4.23	0.08	1738
122F	20	4.07	0.01	2000	RCER3	290	4.17	0.16	1813
R122F	20	4.10	0.01	2000	RCER4	2063	4.30	1.40	1474
122G	70	4.03	0.02	3500	RCER5	2417	4.30	1.71	1413
LSR2	257	4.07	0.11	2336	RCER6	2651	4.33	1.94	1366
LSR2	254	4.07	0.11	2309	RCER7	2744	4.40	2.07	1326
122A	39	4.07	0.02	1950	RCER7A	75	4.20	0.04	1875
D122C	19	4.03	0.01	1900	RCER8	2835	4.43	2.20	1289
RD122C	16	4.17	0.01	1600	RCER10	587	4.20	2.29	256
LSR1B	52	4.10	0.02	2600	RCER11	872	4.20	2.50	349
RLSR1B	49	4.23	0.02	2450	RCER13	981	4.27	2.60	377
122B	97	4.03	0.03	3233	RCER13	973	4.20	2.59	376
LSR1	126	4.07	0.05	2520	RCHK1	421	4.20	0.19	2216
RLSR1	126	4.07	0.05	2520	RD122C	16	4.17	0.01	1600
122H	17	4.03	0.01	1700	RLOG1	281	4.13	0.11	2555
122I	16	4.07	0.01	1600	RLOG2	324	4.20	0.14	2314
LSR3	411	4.07	0.18	2283	RLSR1	126	4.07	0.05	2520
RSL3	410	4.10	0.18	2278	RLSR1B	49	4.23	0.02	2450
122J	57	4.07	0.03	1900	RLSR2B	99	4.10	0.05	1980
LSR4	464	4.10	0.20	2320	RSL3	410	4.10	0.18	2278
RSL4	461	4.10	0.20	2305	RSL4	461	4.10	0.20	2305
122K	6	4.07	0.00	2000	RTRV1	173	4.20	0.09	1922
LSR5	466	4.10	0.21	2219	RWW1	59	4.13	0.03	1967
CER11	877	4.17	2.50	351	RWW3	329	4.20	0.20	1645
RCER11	872	4.20	2.50	349	RWW4	358	4.20	0.15	2387
120U	55	4.03	0.02	2750	RWW5	986	4.23	0.50	1972
*CER12	896	4.20	2.52	356	RWW6	1074	4.27	0.58	1852
121A	103	4.10	0.05	2060	RWW8	1804	4.27	1.14	1582
R121A	103	4.10	0.05	2060	S120O	25	4.03	0.01	2500
121B	38	4.10	0.02	1900	S120P	94	4.00	0.03	3133
LTD1	141	4.10	0.07	2014	S120W	11	4.07	0.01	2200
CER12	978	4.20	2.59	378	S123A	167	4.10	0.08	2088
RCER13	973	4.20	2.59	376	S123B	48	4.07	0.02	2400
120V	26	4.03	0.01	2600	S123C	10	4.00	0.00	3333
CER13	985	4.20	2.60	379	SCAP4	702	4.13	0.31	2265
SCER13	984	4.23	2.60	378	SCER1	132	4.20	0.08	1650
RCER13	981	4.27	2.60	377	SCER3	291	4.13	0.16	1819
120X	51	4.03	0.02	2550	SCER3A	19	4.20	0.01	1900
*CER14	998	4.27	2.62	381	SCER7A	77	4.13	0.04	1925
120W	17	4.00	0.01	3400	SCER9	563	5.23	2.28	247
S120W	11	4.07	0.01	2200	SCER13	984	4.23	2.60	378
R120W	11	4.10	0.01	2200	STRV1	181	4.13	0.09	2011
CER14	1004	4.27	2.62	383	SWW7	1066	4.33	0.64	1666

Table 3.2.3
Cyprus Point Wash - 130
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	14	4.07	0.01	1400	130A	14	4.07	0.01	1400
130B	87	4.03	0.03	2900	130B	87	4.03	0.03	2900
130C	10	4.07	0.01	2000	130C	10	4.07	0.01	2000
R130C	10	4.13	0.01	2000	130D	7	4.07	0.00	1750
130D	7	4.07	0.00	1750	130E	8	4.07	0.00	2000
CP1	115	4.03	0.05	2300	130F	86	4.07	0.04	2150
RCP1	110	4.13	0.05	2200	130G	32	4.07	0.01	3200
130F	86	4.07	0.04	2150	131A	113	4.07	0.05	2260
*CP2	193	4.10	0.09	2144	CP1	115	4.03	0.05	2300
130E	8	4.07	0.00	2000	* CP2	193	4.10	0.09	2144
CP2	200	4.10	0.09	2222	CP2	200	4.10	0.09	2222
RCP2	197	4.13	0.09	2189	CP3	303	4.10	0.14	2164
131A	113	4.07	0.05	2260	CP4	331	4.10	0.15	2207
CP3	303	4.10	0.14	2164	R130C	10	4.13	0.01	2000
SCP3	303	4.10	0.14	2164	RCP1	110	4.13	0.05	2200
RCP3	303	4.10	0.14	2164	RCP2	197	4.13	0.09	2189
130G	32	4.07	0.01	3200	RCP3	303	4.10	0.14	2164
CP4	331	4.10	0.15	2207	SCP3	303	4.10	0.14	2164

Table 3.2.4
Jacklin Wash - 150
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151A	9	4.00	0.00	3000	150A	27	4.03	0.01	2700
DO151A	2	4.00	0.00	667	150B	7	4.03	0.00	2333
D151A	6	4.00	0.00	2000	150C	63	4.03	0.02	3150
R151A	6	4.07	0.00	2000	150D	105	4.10	0.05	2100
151B	11	4.03	0.00	2245	150E	66	4.00	0.02	3300
DO151B	6	4.03	0.00	1224	150F	11	4.03	0.00	2750
D151B	6	4.03	0.00	1224	150G	9	4.07	0.00	1837
KGT1	12	4.07	0.01	1200	150H	92	4.03	0.03	3067
RKGT1	10	4.23	0.01	1000	150I	206	4.13	0.12	1717
151C	12	4.03	0.01	2400	150J	12	4.10	0.01	1200
KGT2	18	4.17	0.01	1800	150K	26	4.03	0.01	2600
RKGT2	18	4.23	0.01	1800	150L	22	4.07	0.01	2200
151D	107	4.03	0.04	2675	150M	67	4.03	0.02	3350
151F	6	4.07	0.00	2000	150N	3	4.03	0.00	3000
DO151F	3	4.07	0.00	1000	150O	7	4.07	0.00	1750
D151F	3	4.07	0.00	1000	150P	2	4.07	0.00	2000
RD151F	3	4.07	0.00	1000	151A	9	4.00	0.00	3000
D151B	6	4.03	0.00	1224	151B	11	4.03	0.00	2245
RD151B	6	4.07	0.00	1224	151C	12	4.03	0.01	2400
KGT3A	115	4.03	0.04	2875	151D	107	4.03	0.04	2675
R151D	113	4.13	0.04	2825	151E	148	4.07	0.07	2114
151E	148	4.07	0.07	2114	151F	6	4.07	0.00	2000
*KGT3	263	4.13	0.12	2192	151H	8	4.07	0.00	1633
151I	13	4.03	0.01	1300	151I	13	4.03	0.01	1300
KGT3	274	4.13	0.13	2108	151J	10	4.00	0.00	3333
RKGT3	274	4.13	0.13	2108	151K	104	4.03	0.03	3467
151J	10	4.00	0.00	3333	151L	142	4.03	0.05	2840
*KGT4	279	4.13	0.13	2146	152A	103	4.07	0.04	2575
151H	8	4.07	0.00	1633	152B	39	4.03	0.02	1950
R151H	8	4.10	0.00	1633	152C	33	4.03	0.01	3300
KGT4	286	4.13	0.13	2200	152D	42	4.07	0.02	2100
RKGT4	286	4.13	0.13	2200	152E	38	4.07	0.02	1900
151K	104	4.03	0.03	3467	152F	32	4.07	0.01	3200
KGT5	357	4.07	0.17	2100	D151A	2	4.00	0.00	667
RKGT5	356	4.13	0.17	2094	D151A	6	4.00	0.00	2000
151L	142	4.03	0.05	2840	D151B	6	4.03	0.00	1224
KGT6	480	4.10	0.22	2182	D151B	6	4.03	0.00	1224
152A	103	4.07	0.04	2575	D151F	3	4.07	0.00	1000
R152A	101	4.10	0.04	2525	DO151A	2	4.00	0.00	667
152B	39	4.03	0.02	1950	DO151B	6	4.03	0.00	1224
*MNG1	138	4.07	0.06	2300	DO151F	3	4.07	0.00	1000
152C	33	4.03	0.01	3300	JKL1	11	4.33	0.01	1100
MNG1	171	4.07	0.07	2443	JKL2	168	4.07	0.09	1867
RMNG1	165	4.13	0.07	2357	JKL3	208	4.07	0.11	1891
152D	42	4.07	0.02	2100	JKL4	80	4.27	0.12	667

*MNG2	202	4.13	0.09	2244	JKL5	166	4.03	0.15	1107
152E	38	4.07	0.02	1900	JKL6	329	4.20	0.27	1219
MNG2	237	4.10	0.10	2370	* JKL7	352	4.20	0.29	1214
RMNG2	237	4.17	0.10	2370	JKL7	607	4.20	0.41	1480
152F	32	4.07	0.01	3200	* JKL8	617	4.23	0.41	1505
MNG3	262	4.17	0.12	2183	JKL8	994	4.17	0.63	1578
150A	27	4.03	0.01	2700	JKL9	971	4.23	0.66	1471
S150A	8	4.37	0.01	800	JKL10	973	4.27	0.66	1474
150B	7	4.03	0.00	2333	JKL11	977	4.27	0.66	1480
R150B	7	4.03	0.00	2333	KGT1	12	4.07	0.01	1200
S150B	7	4.03	0.00	2333	KGT2	18	4.17	0.01	1800
JKL1	11	4.33	0.01	1100	* KGT3	263	4.13	0.12	2192
RJKL1	11	4.37	0.01	1100	KGT3	274	4.13	0.13	2108
150C	63	4.03	0.02	3150	KGT3A	115	4.03	0.04	2875
150D	105	4.10	0.05	2100	* KGT4	279	4.13	0.13	2146
JKL2	168	4.07	0.09	1867	KGT4	286	4.13	0.13	2200
RJKL2	161	4.10	0.09	1789	KGT5	357	4.07	0.17	2100
150E	66	4.00	0.02	3300	KGT6	480	4.10	0.22	2182
JKL3	208	4.07	0.11	1891	* MNG1	138	4.07	0.06	2300
SJKL3	71	4.50	0.11	645	MNG1	171	4.07	0.07	2443
150F	11	4.03	0.00	2750	* MNG2	202	4.13	0.09	2244
150G	9	4.07	0.00	1837	MNG2	237	4.10	0.10	2370
D151A	2	4.00	0.00	667	MNG3	262	4.17	0.12	2183
RD151A	2	4.13	0.00	667	R150B	7	4.03	0.00	2333
JKL4	80	4.27	0.12	667	R150J	12	4.17	0.01	1200
RJKL4	80	4.27	0.12	667	R151A	6	4.07	0.00	2000
150H	92	4.03	0.03	3067	R151D	113	4.13	0.04	2825
JKL5	166	4.03	0.15	1107	R151H	8	4.10	0.00	1633
RJKL5	147	4.27	0.15	980	R152A	101	4.10	0.04	2525
150I	206	4.13	0.12	1717	RD151A	2	4.13	0.00	667
JKL6	329	4.20	0.27	1219	RD151B	6	4.07	0.00	1224
RJKL6	329	4.23	0.27	1219	RD151F	3	4.07	0.00	1000
150J	12	4.10	0.01	1200	RJKL1	11	4.37	0.01	1100
R150J	12	4.17	0.01	1200	RJKL10	976	4.27	0.66	1479
150K	26	4.03	0.01	2600	RJKL2	161	4.10	0.09	1789
*JKL7	352	4.20	0.29	1214	RJKL4	80	4.27	0.12	667
JKL7	607	4.20	0.41	1480	RJKL5	147	4.27	0.15	980
RJKL7	603	4.23	0.41	1471	RJKL6	329	4.23	0.27	1219
150L	22	4.07	0.01	2200	RJKL7	603	4.23	0.41	1471
*JKL8	617	4.23	0.41	1505	RJKL8	957	4.27	0.63	1519
JKL8	994	4.17	0.63	1578	RKGT1	10	4.23	0.01	1000
SJKL8	960	4.23	0.63	1524	RKGT2	18	4.23	0.01	1800
RJKL8	957	4.27	0.63	1519	RKGT3	274	4.13	0.13	2108
150M	67	4.03	0.02	3350	RKGT4	286	4.13	0.13	2200
JKL9	971	4.23	0.66	1471	RKGT5	356	4.13	0.17	2094
SJKL9	969	4.27	0.66	1468	RMNG1	165	4.13	0.07	2357
150N	3	4.03	0.00	3000	RMNG2	237	4.17	0.10	2370
150O	7	4.07	0.00	1750	S150A	8	4.37	0.01	800
JKL10	973	4.27	0.66	1474	S150B	7	4.03	0.00	2333
RJKL10	976	4.27	0.66	1479	SJKL3	71	4.50	0.11	645
150P	2	4.07	0.00	2000	SJKL8	960	4.23	0.63	1524
JKL11	977	4.27	0.66	1480	SJKL9	969	4.27	0.66	1468

Table 3.2.5
Emerald Wash - 160
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	13	4.03	0.00	2653	151F	6	4.07	0.00	2000
R160V	13	4.07	0.00	2653	151G	4	4.07	0.00	1333
160W	6	4.00	0.00	3000	160B	20	4.03	0.01	2000
EMR13A	19	4.03	0.01	1900	160C	46	4.03	0.02	2300
DO160W	4	4.03	0.01	400	160D	59	4.13	0.04	1475
D160W	15	4.03	0.01	1500	160F	27	4.10	0.02	1350
REM13A	14	4.10	0.01	1400	160G	43	4.10	0.02	2150
160X	72	4.07	0.03	2400	160H	43	4.07	0.02	2150
EMR13B	85	4.07	0.04	2125	160I	12	4.03	0.00	2449
REM13B	82	4.17	0.04	2050	160J	28	4.00	0.01	2800
160Y	11	4.03	0.00	2750	160K	81	4.03	0.03	2700
R160Y	11	4.03	0.00	2750	160L	20	4.03	0.01	2000
160Z	115	4.10	0.06	1917	160M	147	4.07	0.06	2450
EMR13	200	4.13	0.10	2000	160N	69	4.00	0.02	3450
160G	43	4.10	0.02	2150	160O	158	4.07	0.06	2633
R160G	43	4.13	0.02	2150	160P	61	4.03	0.02	3050
160H	43	4.07	0.02	2150	160Q	17	4.03	0.01	1700
EMR1	83	4.10	0.04	2075	160R	134	4.07	0.05	2680
REMR1	83	4.10	0.04	2075	160S	36	4.00	0.01	3600
160I	12	4.03	0.00	2449	160T	27	4.03	0.01	2700
160J	28	4.00	0.01	2800	160U	174	4.07	0.08	2175
EMR2	111	4.03	0.06	1850	160V	13	4.03	0.00	2653
REMR2	109	4.07	0.06	1817	160W	6	4.00	0.00	3000
160K	81	4.03	0.03	2700	160X	72	4.07	0.03	2400
EMR3	186	4.07	0.08	2325	160Y	11	4.03	0.00	2750
REMR3	185	4.10	0.08	2313	160Z	115	4.10	0.06	1917
160M	147	4.07	0.06	2450	160AA	14	4.03	0.00	2857
*EMR4	326	4.10	0.14	2329	D151F	3	4.07	0.00	1000
160L	20	4.03	0.01	2000	D160W	4	4.03	0.01	400
R160L	20	4.07	0.01	2000	D160W	15	4.03	0.01	1500
160N	69	4.00	0.02	3450	DO151F	3	4.07	0.00	1000
EMR4	402	4.07	0.17	2365	DO160W	4	4.03	0.01	400
SEMR4	207	4.30	0.17	1218	EMR1	83	4.10	0.04	2075
160B	20	4.03	0.01	2000	EMR11	242	4.27	0.43	563
R160B	16	4.30	0.01	1600	* EMR12	357	4.17	0.51	700
160C	46	4.03	0.02	2300	EMR12	539	4.13	0.61	884
R160C	44	4.10	0.02	2200	EMR13	536	4.20	0.61	879
EMR5A	49	4.13	0.02	2450	EMR13	200	4.13	0.10	2000
160D	59	4.13	0.04	1475	EMR13A	19	4.03	0.01	1900
160F	27	4.10	0.02	1350	EMR13B	85	4.07	0.04	2125
EMR5	335	4.17	0.25	1340	EMR2	111	4.03	0.06	1850
REMR5	334	4.20	0.25	1336	EMR3	186	4.07	0.08	2325
160O	158	4.07	0.06	2633	* EMR4	326	4.10	0.14	2329
*EMR6	463	4.10	0.32	1447	EMR4	402	4.07	0.17	2365
151F	6	4.07	0.00	2000	EMR5	335	4.17	0.25	1340

DO151F	3	4.07	0.00	1000
D151F	3	4.07	0.00	1000
R151F	3	4.17	0.00	1000
151G	4	4.07	0.00	1333
EMR6A	7	4.13	0.01	700
REMR6A	7	4.17	0.01	700
EMR6	470	4.10	0.33	1424
REMR6	460	4.20	0.33	1394
160P	61	4.03	0.02	3050
EMR7	495	4.17	0.35	1414
SEMR7	213	4.90	0.35	609
160Q	17	4.03	0.01	1700
D160W	4	4.03	0.01	400
RD160W	4	4.03	0.01	400
EMR8	214	4.90	0.36	594
REMR8	214	4.93	0.36	594
160R	134	4.07	0.05	2680
EMR9	302	4.10	0.41	737
REMR9	302	4.10	0.41	737
160S	36	4.00	0.01	3600
EMR10	325	4.07	0.42	774
SEMR10	236	4.40	0.42	562
160T	27	4.03	0.01	2700
EMR11	242	4.27	0.43	563
REMR11	242	4.37	0.43	563
160U	174	4.07	0.08	2175
*EMR12	357	4.17	0.51	700
EMR12	539	4.13	0.61	884
SEMR12	529	4.20	0.61	867
REMR12	529	4.20	0.61	867
160AA	14	4.03	0.00	2857
EMR13	536	4.20	0.61	879
EMR5A	49	4.13	0.02	2450
* EMR6	463	4.10	0.32	1447
EMR6	470	4.10	0.33	1424
EMR6A	7	4.13	0.01	700
EMR7	495	4.17	0.35	1414
EMR8	214	4.90	0.36	594
EMR9	302	4.10	0.41	737
EMR10	325	4.07	0.42	774
R151F	3	4.17	0.00	1000
R160B	16	4.30	0.01	1600
R160C	44	4.10	0.02	2200
R160G	43	4.13	0.02	2150
R160L	20	4.07	0.01	2000
R160V	13	4.07	0.00	2653
R160Y	11	4.03	0.00	2750
RD160W	4	4.03	0.01	400
REM13A	14	4.10	0.01	1400
REM13B	82	4.17	0.04	2050
REMR1	83	4.10	0.04	2075
REMR2	109	4.07	0.06	1817
REMR3	185	4.10	0.08	2313
REMR5	334	4.20	0.25	1336
REMR6	460	4.20	0.33	1394
REMR6A	7	4.17	0.01	700
REMR8	214	4.93	0.36	594
REMR9	302	4.10	0.41	737
REMR11	242	4.37	0.43	563
REMR12	529	4.20	0.61	867
SEMR4	207	4.30	0.17	1218
SEMR7	213	4.90	0.35	609
SEMR10	236	4.40	0.42	562
SEMR12	529	4.20	0.61	867

Table 3.2.6
Malta Drain - 170
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	13	4.03	0.00	2653	160V	13	4.03	0.00	2653
R160V	13	4.07	0.00	2653	160W	6	4.00	0.00	3000
160W	6	4.00	0.00	3000	170A	71	4.03	0.02	3550
EMR13A	19	4.03	0.01	1900	170B	13	4.00	0.00	3250
DO160W	15	4.03	0.01	1500	170C	87	4.03	0.03	2900
D160W	4	4.03	0.01	400	170D	16	4.03	0.01	1600
R160W	4	4.07	0.01	400	170E	212	4.07	0.09	2356
170A	71	4.03	0.02	3550	170F	49	4.03	0.02	2450
170B	13	4.00	0.00	3250	170G	6	4.03	0.00	2000
MLT1	87	4.03	0.04	2175	170H	29	4.00	0.01	2900
RMLT1	83	4.10	0.04	2075	170I1	51	4.07	0.02	2550
170C	87	4.03	0.03	2900	170I2	34	4.03	0.01	3400
MLT2	167	4.07	0.07	2386	170I3	15	4.03	0.01	1500
170D	16	4.03	0.01	1600	D160W	4	4.03	0.01	400
MLT3	183	4.07	0.08	2288	D179I1	25	4.07	0.02	1250
RMLT3	175	4.17	0.08	2188	DMLT6A	26	4.07	0.03	867
170E	212	4.07	0.09	2356	DO160W	15	4.03	0.01	1500
MLT4	366	4.13	0.17	2153	DO180R	26	4.07	0.03	867
170F	49	4.03	0.02	2450	DO180S	25	4.07	0.02	1250
R170F	49	4.03	0.02	2450	EMR13A	19	4.03	0.01	1900
170G	6	4.03	0.00	2000	MLT1	87	4.03	0.04	2175
MLT4A	415	4.10	0.19	2184	MLT2	167	4.07	0.07	2386
RMLT4A	414	4.13	0.19	2179	MLT3	183	4.07	0.08	2288
170H	29	4.00	0.01	2900	MLT4	366	4.13	0.17	2153
MLT5	431	4.10	0.20	2155	MLT4A	415	4.10	0.19	2184
SMLT5	440	4.13	0.20	2200	MLT5	431	4.10	0.20	2155
RMLT5	429	4.13	0.20	2145	MLT6	466	4.13	0.24	1942
170I1	51	4.07	0.02	2550	MLT6A	51	4.07	0.03	1700
DO180S	25	4.07	0.02	1250	R160V	13	4.07	0.00	2653
D179I1	25	4.07	0.02	1250	R160W	4	4.07	0.01	400
R170I1	24	4.17	0.02	1200	R170F	49	4.03	0.02	2450
170I2	34	4.03	0.01	3400	R170I1	24	4.17	0.02	1200
MLT6A	51	4.07	0.03	1700	RMLT1	83	4.10	0.04	2075
DO180R	26	4.07	0.03	867	RMLT3	175	4.17	0.08	2188
DMLT6A	26	4.07	0.03	867	RMLT4A	414	4.13	0.19	2179
RMLT6A	25	4.13	0.03	833	RMLT5	429	4.13	0.20	2145
170I3	15	4.03	0.01	1500	RMLT6A	25	4.13	0.03	833
MLT6	466	4.13	0.24	1942	SMLT5	440	4.13	0.20	2200

Table 3.2.7
Colony Wash - 180
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
185A	105	4.03	0.04	2625	160E	9	4.03	0.00	2250
R185A	97	4.20	0.04	2425	170I1	51	4.07	0.02	2550
185B	145	4.13	0.08	1813	170I2	34	4.03	0.01	3400
IRW1	237	4.13	0.12	1975	180A	64	4.03	0.03	2133
SIRW1	140	4.40	0.12	1167	180B	31	4.17	0.03	1033
180A	64	4.03	0.03	2133	180C	30	4.03	0.01	3000
R180A	64	4.03	0.03	2133	180D	6	4.07	0.00	2000
180B	31	4.17	0.03	1033	180E	52	4.03	0.02	2600
IRW2	191	4.27	0.18	1061	180F	191	4.07	0.07	2729
RIRW2	191	4.27	0.18	1061	180G	72	4.07	0.03	2400
186A	218	4.07	0.10	2180	180H	39	4.10	0.02	1950
186B	13	4.03	0.00	2653	180I	11	4.03	0.00	2750
R186B	13	4.07	0.00	2653	180J	78	4.07	0.03	2600
SNB1A	231	4.07	0.10	2310	180K	74	4.03	0.03	2467
RSNB1A	230	4.17	0.10	2300	180L	42	4.00	0.01	4200
186C	42	4.03	0.02	2100	180M	10	4.07	0.00	2041
R186C	41	4.07	0.02	2050	180N	108	4.03	0.04	2700
186D	147	4.10	0.08	1838	180O	51	4.03	0.02	2550
SNB1	403	4.13	0.20	2015	180P	33	4.03	0.01	3300
RSNB1	400	4.20	0.20	2000	180Q	77	4.07	0.03	2567
186E	90	4.07	0.04	2250	180R	67	4.03	0.03	2233
186F	64	4.07	0.03	2133	180S	111	4.03	0.04	2775
SNB2	508	4.17	0.27	1881	180T	64	4.03	0.02	3200
RSNB2	502	4.23	0.27	1859	180U	34	4.07	0.02	1700
186G	136	4.10	0.07	1943	181A	0	0.03	0.08	0
SNB3	606	4.20	0.33	1836	181B	45	4.07	0.02	2250
SSNB3	92	4.90	0.33	279	182A	138	4.03	0.05	2760
186H	35	4.10	0.03	1167	182B	92	4.07	0.04	2300
160E	9	4.03	0.00	2250	182C	49	4.07	0.02	2450
R160E	9	4.07	0.00	2250	182D	243	4.07	0.09	2700
SNB4	107	4.63	0.36	297	182E	167	4.07	0.06	2783
RSNB4	107	4.70	0.36	297	182F	26	4.10	0.01	2600
186I	70	4.07	0.03	2333	182G	89	4.10	0.05	1780
*SNB5	122	4.37	0.39	313	182I	79	4.10	0.04	1975
187A	28	4.00	0.01	2800	182J	28	4.10	0.01	2800
R187A	28	4.03	0.01	2800	182K	76	4.03	0.02	3800
187B	20	4.03	0.01	2000	182L	16	4.03	0.00	3265
GRS1	48	4.03	0.02	2400	183A	130	4.03	0.04	3250
RGRS1	44	4.13	0.02	2200	183B	101	4.07	0.04	2525
187C	35	4.03	0.01	3500	183F	109	4.07	0.05	2180
R187C	33	4.07	0.01	3300	183G	204	4.07	0.09	2267
187D	120	4.13	0.07	1714	183H	54	4.03	0.02	2700
*GRS2	194	4.13	0.10	1940	183I	142	4.07	0.06	2367
188A	24	4.03	0.01	2400	183J	16	4.00	0.00	3265
R188A	24	4.07	0.01	2400	183K	7	4.00	0.00	3500

188B	169	4.07	0.07	2414	184A	48	4.03	0.02	2400
188C	51	4.07	0.02	2550	184B	42	4.07	0.02	2100
SYR1	243	4.07	0.10	2430	184C	39	4.03	0.01	3900
RSYC1	236	4.10	0.10	2360	184D	12	4.07	0.01	1200
188D	119	4.07	0.05	2380	184E	151	4.17	0.11	1373
188E	96	4.10	0.05	1920	184F	13	4.07	0.01	1300
SYR2	450	4.10	0.20	2250	184G	131	4.07	0.05	2620
RSYC2	436	4.20	0.20	2180	184H	26	4.07	0.01	2600
188F	146	4.10	0.07	2086	184I	80	4.03	0.03	2667
SYR3	558	4.17	0.28	1993	184J	20	4.03	0.01	2000
SSYC3	251	4.50	0.28	896	184K	12	4.03	0.00	3000
RSYC3	251	4.50	0.28	896	185A	105	4.03	0.04	2625
188G	3	4.03	0.00	3000	185B	145	4.13	0.08	1813
SYR4	252	4.50	0.28	900	186A	218	4.07	0.10	2180
GRS2	396	4.20	0.38	1042	186B	13	4.03	0.00	2653
SGRS2	396	4.20	0.38	1042	186C	42	4.03	0.02	2100
187E	11	4.03	0.00	2245	186D	147	4.10	0.08	1838
R187E	11	4.07	0.00	2245	186E	90	4.07	0.04	2250
187F	5	4.07	0.00	1667	186F	64	4.07	0.03	2133
GRS3A	16	4.07	0.01	1600	186G	136	4.10	0.07	1943
RGRS3A	16	4.07	0.01	1600	186H	35	4.10	0.03	1167
187G	53	4.17	0.04	1325	186I	70	4.07	0.03	2333
GRS3	461	4.20	0.43	1072	187A	28	4.00	0.01	2800
RGRS3	461	4.20	0.43	1072	187B	20	4.03	0.01	2000
187H	10	4.03	0.00	2500	187C	35	4.03	0.01	3500
*SNB5	467	4.20	0.43	1086	187D	120	4.13	0.07	1714
SNB5	541	4.20	0.82	660	187E	11	4.03	0.00	2245
RSNB5	541	4.23	0.82	660	187F	5	4.07	0.00	1667
187I	66	4.03	0.02	3300	187G	53	4.17	0.04	1325
SNB6	569	4.20	0.85	669	187H	10	4.03	0.00	2500
SSNB6	94	5.87	0.85	111	187I	66	4.03	0.02	3300
RSNB6	94	5.97	0.85	111	188A	24	4.03	0.01	2400
180F	191	4.07	0.07	2729	188B	169	4.07	0.07	2414
*CLN1	217	4.07	0.92	236	188C	51	4.07	0.02	2550
CLN1	373	4.10	1.10	339	188D	119	4.07	0.05	2380
SCLN1	289	4.47	1.10	263	188E	96	4.10	0.05	1920
180C	30	4.03	0.01	3000	188F	146	4.10	0.07	2086
R180C	29	4.07	0.01	2900	188G	3	4.03	0.00	3000
180D	6	4.07	0.00	2000	D170I1	25	4.07	0.02	1250
180E	52	4.03	0.02	2600	D170I1	25	4.07	0.02	1250
CLN2	313	4.30	1.13	277	D170I1	25	4.07	0.02	1250
RCLN2	313	4.33	1.13	277	D170I2	26	4.07	0.01	2600
180G	72	4.07	0.03	2400	D183K	364	4.10	1.22	298
CLN3	354	4.13	1.16	305	D183K	37	4.10	1.22	30
SCLN3	303	4.63	1.16	261	DFC2	451	4.17	0.26	1735
180H	39	4.10	0.02	1950	DFHN	0	0.03	1.00	0
R180H	39	4.10	0.02	1950	DMLT6A	26	4.07	0.01	2600
180I	11	4.03	0.00	2750	DO183K	37	4.10	1.22	30
R180I	11	4.07	0.00	2750	DOFC2	122	4.17	0.26	469
180J	78	4.07	0.03	2600	* CLN1	217	4.07	0.92	236
CLN4B	126	4.07	0.06	2100	CLN1	373	4.10	1.10	339
RCLN4B	126	4.10	0.06	2100	CLN2	313	4.30	1.13	277
180M	10	4.07	0.00	2041	CLN3	354	4.13	1.16	305
CLN4	367	4.17	1.22	301	CLN4	367	4.17	1.22	301
RCLN4	367	4.27	1.22	301	CLN4B	126	4.07	0.06	2100
180N	108	4.03	0.04	2700	CLN5	655	4.30	1.63	402

184C	39	4.03	0.01	3900	CLN6	635	4.53	1.67	380
184D	12	4.07	0.01	1200	* CLN7	643	4.57	1.69	380
NCL1	51	4.03	0.02	2550	CLN7	1270	4.37	3.33	381
RNCL1	51	4.03	0.02	2550	* CLN8	1276	4.40	3.35	381
184E	151	4.17	0.11	1373	CLN8	1312	4.37	3.45	380
NCL2	188	4.13	0.13	1446	CLN9	1327	4.43	3.50	379
SNCL2	174	4.23	0.13	1338	* CLN10	1333	4.47	3.52	379
184F	13	4.07	0.01	1300	* CLN10	1385	4.47	3.59	386
R184F	13	4.07	0.01	1300	CLN10	1401	4.47	3.62	387
NCL3	185	4.23	0.14	1321	CL10A	166	4.07	0.07	2371
RNCL3	185	4.23	0.14	1321	FC1	167	4.10	0.09	1856
SNCL3	178	4.33	0.14	1271	FC2	586	4.10	0.26	2254
184A	48	4.03	0.02	2400	FC3	713	4.10	0.37	1927
R184A	37	4.17	0.02	1850	FC3A	223	4.07	0.09	2478
184B	42	4.07	0.02	2100	FC3B	269	4.10	0.11	2445
NCL4A	78	4.10	0.04	1950	FC4	738	4.13	0.39	1892
RNCL4A	78	4.13	0.04	1950	FC5	857	4.17	1.61	532
NCL4	242	4.27	0.18	1344	FC6	880	4.17	1.63	540
RNCL4	242	4.30	0.18	1344	FC7	885	4.20	1.64	540
184G	131	4.07	0.05	2620	GRS1	48	4.03	0.02	2400
NCL5	325	4.13	0.23	1413	* GRS2	194	4.13	0.10	1940
SNCL5	246	4.47	0.23	1070	GRS2	396	4.20	0.38	1042
184H	26	4.07	0.01	2600	GRS3	461	4.20	0.43	1072
183A	130	4.03	0.04	3250	GRS3A	16	4.07	0.01	1600
R183A	124	4.10	0.04	3100	IRW1	237	4.13	0.12	1975
183B	101	4.07	0.04	2525	IRW2	191	4.27	0.18	1061
NCL6A	225	4.07	0.08	2813	LC1	290	4.07	1.16	250
SNCL6A	1	6.10	0.08	13	LC2	399	4.10	1.22	327
RNCL6A	1	6.17	0.08	13	LC3	401	4.10	1.22	329
NCL6	258	4.40	0.33	782	MLT6A	51	4.07	0.01	5100
RNCL6	257	4.47	0.33	779	NCL1	51	4.03	0.02	2550
184I	80	4.03	0.03	2667	NCL2	188	4.13	0.13	1446
NCL7	289	4.23	0.36	803	NCL3	185	4.23	0.14	1321
SNCL7	283	4.33	0.36	786	NCL4	242	4.27	0.18	1344
RNCL7	283	4.37	0.36	786	NCL4A	78	4.10	0.04	1950
184J	20	4.03	0.01	2000	NCL5	325	4.13	0.23	1413
NCL8	291	4.27	0.37	786	NCL6	258	4.40	0.33	782
SNCL8	292	4.23	0.37	789	NCL6A	225	4.07	0.08	2813
RNCL8	291	4.27	0.37	786	NCL7	289	4.23	0.36	803
184K	12	4.03	0.00	3000	NCL8	291	4.27	0.37	786
NCL9	295	4.27	0.37	797	NCL9	295	4.27	0.37	797
RNCL9	294	4.33	0.37	795	SNB1	403	4.13	0.20	2015
CLN5	655	4.30	1.63	402	SNB1A	231	4.07	0.10	2310
SCLN5	613	4.60	1.63	376	SNB2	508	4.17	0.27	1881
180K	74	4.03	0.03	2467	SNB3	606	4.20	0.33	1836
R180K	72	4.07	0.03	2400	SNB4	107	4.63	0.36	297
180L	42	4.00	0.01	4200	* SNB5	122	4.37	0.39	313
CLN6	635	4.53	1.67	380	* SNB5	467	4.20	0.43	1086
RCLN6	635	4.60	1.67	380	SNB5	541	4.20	0.82	660
180O	51	4.03	0.02	2550	SNB6	569	4.20	0.85	669
*CLN7	643	4.57	1.69	380	SYR1	243	4.07	0.10	2430
182G	89	4.10	0.05	1780	SYR2	450	4.10	0.20	2250
182I	79	4.10	0.04	1975	SYR3	558	4.17	0.28	1993
FC1	167	4.10	0.09	1856	SYR4	252	4.50	0.28	900
RFC1	166	4.13	0.09	1844	R160E	9	4.07	0.00	2250
182D	243	4.07	0.09	2700	R170I1	24	4.17	0.02	1200

R182D	236	4.10	0.09	2622	R170I1	25	4.10	0.02	1250
182E	167	4.07	0.06	2783	R180A	64	4.03	0.03	2133
182F	26	4.10	0.01	2600	R180C	29	4.07	0.01	2900
FC2	586	4.10	0.26	2254	R180H	39	4.10	0.02	1950
SFC2	579	4.13	0.26	2227	R180I	11	4.07	0.00	2750
RFC2	573	4.17	0.26	2204	R180K	72	4.07	0.03	2400
DOFC2	122	4.17	0.26	469	R181A	0	0.03	0.08	0
DFC2	451	4.17	0.26	1735	R182A	134	4.10	0.05	2680
182A	138	4.03	0.05	2760	R182D	236	4.10	0.09	2622
R182A	134	4.10	0.05	2680	R183A	124	4.10	0.04	3100
182B	92	4.07	0.04	2300	R183K	35	4.17	1.22	29
FC3A	223	4.07	0.09	2478	R183K	35	4.20	1.22	29
SFC3A	222	4.10	0.09	2467	R184A	37	4.17	0.02	1850
182C	49	4.07	0.02	2450	R184F	13	4.07	0.01	1300
FC3B	269	4.10	0.11	2445	R185A	97	4.20	0.04	2425
RFC3B	269	4.10	0.11	2445	R186B	13	4.07	0.00	2653
FC3	713	4.10	0.37	1927	R186C	41	4.07	0.02	2050
RFC4	712	4.13	0.37	1924	R187A	28	4.03	0.01	2800
182J	28	4.10	0.01	2800	R187C	33	4.07	0.01	3300
FC4	738	4.13	0.39	1892	R187E	11	4.07	0.00	2245
SFC4	668	4.23	0.39	1713	R188A	24	4.07	0.01	2400
DFHN	0	0.03	1.00	0	RCLN2	313	4.33	1.13	277
183F	109	4.07	0.05	2180	RCLN4	367	4.27	1.22	301
183G	204	4.07	0.09	2267	RCLN4B	126	4.10	0.06	2100
183H	54	4.03	0.02	2700	RCLN6	635	4.60	1.67	380
LC1	290	4.07	1.16	250	RCLN7	1269	4.40	3.33	381
RLC1	285	4.10	1.16	246	RCLN9	1324	4.47	3.50	378
183I	142	4.07	0.06	2367	RCL10A	160	4.10	0.07	2286
183J	16	4.00	0.00	3265	RFC1	166	4.13	0.09	1844
LC2	399	4.10	1.22	327	RFC2	573	4.17	0.26	2204
SLC2	397	4.10	1.22	325	RFC3B	269	4.10	0.11	2445
RLC2	397	4.10	1.22	325	RFC4	712	4.13	0.37	1924
183K	7	4.00	0.00	3500	RFC5	854	4.20	1.61	530
LC3	401	4.10	1.22	329	RFC6	880	4.20	1.63	540
DO183K	37	4.10	1.22	30	RGRS1	44	4.13	0.02	2200
D183K	364	4.10	1.22	298	RGRS3	461	4.20	0.43	1072
FC5	857	4.17	1.61	532	RGRS3A	16	4.07	0.01	1600
RFC5	854	4.20	1.61	530	RIRW2	191	4.27	0.18	1061
182K	76	4.03	0.02	3800	RLC1	285	4.10	1.16	246
FC6	880	4.17	1.63	540	RLC2	397	4.10	1.22	325
RFC6	880	4.20	1.63	540	RMLT6A	25	4.13	0.01	2500
182L	16	4.03	0.00	3265	RNCL1	51	4.03	0.02	2550
FC7	885	4.20	1.64	540	RNCL3	185	4.23	0.14	1321
CLN7	1270	4.37	3.33	381	RNCL4	242	4.30	0.18	1344
RCLN7	1269	4.40	3.33	381	RNCL4A	78	4.13	0.04	1950
180P	33	4.03	0.01	3300	RNCL6	257	4.47	0.33	779
*CLN8	1276	4.40	3.35	381	RNCL6A	1	6.17	0.08	13
181A	0	0.03	0.08	0	RNCL7	283	4.37	0.36	786
R181A	0	0.03	0.08	0	RNCL8	291	4.27	0.37	786
181B	45	4.07	0.02	2250	RNCL9	294	4.33	0.37	795
D183K	37	4.10	1.22	30	RSNB1	400	4.20	0.20	2000
R183K	35	4.17	1.22	29	RSNB1A	230	4.17	0.10	2300
R183K	35	4.20	1.22	29	RSNB2	502	4.23	0.27	1859
CLN8	1312	4.37	3.45	380	RSNB4	107	4.70	0.36	297
SCLN8	1295	4.43	3.45	375	RSNB5	541	4.23	0.82	660
180S	111	4.03	0.04	2775	RSNB6	94	5.97	0.85	111

170I1	51	4.07	0.02	2550	RSYC1	236	4.10	0.10	2360
D170I1	25	4.07	0.02	1250	RSYC2	436	4.20	0.20	2180
D170I1	25	4.07	0.02	1250	RSYC3	251	4.50	0.28	896
R170I1	25	4.10	0.02	1250	SCLN1	289	4.47	1.10	263
CLN9	1327	4.43	3.50	379	SCLN3	303	4.63	1.16	261
RCLN9	1324	4.47	3.50	378	SCLN5	613	4.60	1.63	376
180U	34	4.07	0.02	1700	SCLN8	1295	4.43	3.45	375
*CLN10	1333	4.47	3.52	379	SFC2	579	4.13	0.26	2227
180Q	77	4.07	0.03	2567	SFC3A	222	4.10	0.09	2467
180R	67	4.03	0.03	2233	SFC4	668	4.23	0.39	1713
170I2	34	4.03	0.01	3400	SGRS2	396	4.20	0.38	1042
D170I1	25	4.07	0.02	1250	SIRW1	140	4.40	0.12	1167
R170I1	24	4.17	0.02	1200	SLC2	397	4.10	1.22	325
MLT6A	51	4.07	0.01	5100	SNCL2	174	4.23	0.13	1338
D170I2	26	4.07	0.01	2600	SNCL3	178	4.33	0.14	1271
DMLT6A	26	4.07	0.01	2600	SNCL5	246	4.47	0.23	1070
RMLT6A	25	4.13	0.01	2500	SNCL6A	1	6.10	0.08	13
CL10A	166	4.07	0.07	2371	SNCL7	283	4.33	0.36	786
RCL10A	160	4.10	0.07	2286	SNCL8	292	4.23	0.37	789
*CLN10	1385	4.47	3.59	386	SSNB3	92	4.90	0.33	279
180T	64	4.03	0.02	3200	SSNB6	94	5.87	0.85	111
CLN10	1401	4.47	3.62	387	SSYC3	251	4.50	0.28	896

Table 3.2.8
Panorama Channel - 190
100-year, 6-hour Storm Results

Existing Condition In HEC-1 Run Order					Existing Condition In Numerical Order by Operation Type				
HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm	HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	67	4.07	0.03	2233	182H	67	4.07	0.03	2233
S182H	64	4.10	0.03	2133	190A	48	4.03	0.02	2400
R182H	64	4.10	0.03	2133	190B	17	4.03	0.01	1700
190A	48	4.03	0.02	2400	190C	60	4.03	0.02	3000
PNR1A	109	4.07	0.05	2180	190D	17	4.00	0.00	3469
SPNR1A	106	4.13	0.05	2120	190E	8	4.03	0.00	2667
RPNR1A	102	4.17	0.05	2040	190F	15	4.03	0.01	1500
190B	17	4.03	0.01	1700	190G	13	4.07	0.01	1300
PNR1	114	4.17	0.05	2280	190H	194	4.07	0.08	2425
RPNR1	112	4.17	0.05	2240	190I	36	4.03	0.01	3600
190C	60	4.03	0.02	3000	190J	22	4.03	0.01	2200
PNR2	151	4.17	0.08	1888	190K	19	4.10	0.01	1900
RPNR2	150	4.17	0.08	1875	190L	30	4.03	0.01	3000
190D	17	4.00	0.00	3469	190M	20	4.03	0.01	2000
R190D	17	4.03	0.00	3469	190N	47	4.10	0.02	2350
190E	8	4.03	0.00	2667	190O	17	4.03	0.01	1700
190F	15	4.03	0.01	1500	190P	71	4.00	0.02	3550
190G	13	4.07	0.01	1300	190Q	23	4.10	0.01	2300
PNR3A	52	4.03	0.02	2600	190R	36	4.10	0.01	3600
RPNR3A	51	4.07	0.02	2550	190S	17	4.10	0.01	1700
190H	194	4.07	0.08	2425	190T	259	4.17	0.13	1992
R190H	192	4.07	0.08	2400	190U	54	4.03	0.02	2700
190I	36	4.03	0.01	3600	190V	37	4.07	0.02	1850
190J	22	4.03	0.01	2200	PNR1	114	4.17	0.05	2280
PNR3	395	4.10	0.19	2079	PNR1A	109	4.07	0.05	2180
RPNR3	394	4.13	0.19	2074	PNR2	151	4.17	0.08	1888
190K	19	4.10	0.01	1900	PNR3	395	4.10	0.19	2079
R190K	18	4.13	0.01	1800	PNR3A	52	4.03	0.02	2600
190L	30	4.03	0.01	3000	* PNR4	435	4.13	0.21	2071
*PNR4	435	4.13	0.21	2071	PNR4	494	4.13	0.24	2058
190M	20	4.03	0.01	2000	* PNR5	558	4.13	0.28	1993
190N	47	4.10	0.02	2350	PNR5	592	4.13	0.29	2041
PNR4	494	4.13	0.24	2058	PNR5A	86	4.00	0.03	2867
RPNR4	490	4.17	0.24	2042	* PNR6	602	4.17	0.30	2007
190O	17	4.03	0.01	1700	PNR6	860	4.17	0.43	2000
R190O	16	4.07	0.01	1600	* PNR7	872	4.20	0.45	1938
190P	71	4.00	0.02	3550	PNR7	906	4.20	0.47	1928
PNR5A	86	4.00	0.03	2867	R182H	64	4.10	0.03	2133
RPNR5A	85	4.03	0.03	2833	R190D	17	4.03	0.00	3469
190Q	23	4.10	0.01	2300	R190H	192	4.07	0.08	2400
*PNR5	558	4.13	0.28	1993	R190K	18	4.13	0.01	1800
190R	36	4.10	0.01	3600	R190O	16	4.07	0.01	1600
PNR5	592	4.13	0.29	2041	R190U	54	4.07	0.02	2700
RPNR5	589	4.17	0.29	2031	RPNR1	112	4.17	0.05	2240
190S	17	4.10	0.01	1700	RPNR1A	102	4.17	0.05	2040

*PNR6	602	4.17	0.30	2007	RPNR2	150	4.17	0.08	1875
190T	259	4.17	0.13	1992	RPNR3	394	4.13	0.19	2074
PNR6	860	4.17	0.43	2000	RPNR3A	51	4.07	0.02	2550
RPNR6	847	4.20	0.43	1970	RPNR4	490	4.17	0.24	2042
190V	37	4.07	0.02	1850	RPNR5	589	4.17	0.29	2031
*PNR7	872	4.20	0.45	1938	RPNR5A	85	4.03	0.03	2833
190U	54	4.03	0.02	2700	RPNR6	847	4.20	0.43	1970
R190U	54	4.07	0.02	2700	S182H	64	4.10	0.03	2133
PNR7	906	4.20	0.47	1928	SPNR1A	106	4.13	0.05	2120

Table 3.3.1
Powder Wash - 110
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	36	12.07	0.02	1800
110B	58	12.07	0.04	1450
PW1	93	12.07	0.06	1550
RPW1	93	12.10	0.06	1550
110C	7	12.03	0.00	1750
110D	125	12.03	0.07	1786
PW2	224	12.07	0.13	1723
RPW2	223	12.10	0.13	1715
110E	42	12.03	0.03	1400
*PW3	263	12.07	0.16	1644
110F	13	12.00	0.01	1300
110G	10	12.00	0.01	1000
PW3	284	12.07	0.17	1671
RPW3	276	12.17	0.17	1624
110H	41	12.07	0.03	1367
*PW4	313	12.13	0.20	1565
110I	28	12.03	0.02	1400
PW4	338	12.13	0.22	1536
SPW4	331	12.17	0.22	1505
110J	12	12.00	0.01	1200
110K	22	12.00	0.01	2200
R110K	21	12.00	0.01	2100
110L	37	12.03	0.02	1850
PW5	387	12.07	0.27	1433
RPW5	380	12.17	0.27	1407
110M	49	12.03	0.03	1633
*PW6	413	12.13	0.30	1377
110N	22	12.03	0.01	2200
110O	7	12.00	0.00	1750
PW6	434	12.13	0.32	1356

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	36	12.07	0.02	1800
110B	58	12.07	0.04	1450
110C	7	12.03	0.00	1750
110D	125	12.03	0.07	1786
110E	42	12.03	0.03	1400
110F	13	12.00	0.01	1300
110G	10	12.00	0.01	1000
110H	41	12.07	0.03	1367
110I	28	12.03	0.02	1400
110J	12	12.00	0.01	1200
110K	22	12.00	0.01	2200
110L	37	12.03	0.02	1850
110M	49	12.03	0.03	1633
110N	22	12.03	0.01	2200
110O	7	12.00	0.00	1750
PW1	93	12.07	0.06	1550
PW2	224	12.07	0.13	1723
* PW3	263	12.07	0.16	1644
PW3	284	12.07	0.17	1671
* PW4	313	12.13	0.20	1565
PW4	338	12.13	0.22	1536
PW5	387	12.07	0.27	1433
* PW6	413	12.13	0.30	1377
PW6	434	12.13	0.32	1356
R110K	21	12.00	0.01	2100
RPW1	93	12.10	0.06	1550
RPW2	223	12.10	0.13	1715
RPW3	276	12.17	0.17	1624
RPW5	380	12.17	0.27	1407
SPW4	331	12.17	0.22	1505

Table 3.3.2
Cereus Wash - 120
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	21	12.03	0.02	1050
120B	77	12.03	0.05	1540
160A	11	12.00	0.01	1100
R160A	11	12.03	0.01	1100
CER1	109	12.03	0.08	1363
SCER1	100	12.10	0.08	1250
120C	8	12.00	0.01	1600
CER2	107	12.10	0.08	1338
RCER2	105	12.17	0.08	1313
120D	105	12.03	0.07	1500
*CER3	199	12.07	0.15	1327
120H	6	12.03	0.01	1200
R120H	6	12.07	0.01	1200
120I	11	12.03	0.01	1100
CER3A	17	12.03	0.01	1700
SCER3A	13	12.17	0.01	1300
CER3	211	12.07	0.16	1319
SCER3	207	12.10	0.16	1294
RCER3	207	12.13	0.16	1294
120E	23	12.07	0.02	1150
*CER4	228	12.13	0.18	1267
126A	11	12.03	0.01	1100
R126A	11	12.10	0.01	1100
126B	29	12.03	0.02	1450
WW1	39	12.07	0.03	1300
RWW1	39	12.10	0.03	1300
126C	160	12.10	0.14	1143
R126C	156	12.17	0.14	1114
126D	42	12.03	0.03	1400
WW3	227	12.10	0.20	1135
RWW3	225	12.13	0.20	1125
126E	140	12.10	0.09	1556
126F	91	12.07	0.05	1820
WW4	230	12.10	0.15	1533
RWW4	227	12.17	0.15	1513
126G	189	12.17	0.14	1350
126H	30	12.03	0.02	1500
WW5	663	12.13	0.50	1326
RWW5	659	12.20	0.50	1318
126I	135	12.03	0.08	1688
126J	3	12.03	0.00	1500
R126J	3	12.07	0.00	1500
WW6	753	12.17	0.58	1298
RWW6	749	12.20	0.58	1291
126M	37	12.03	0.03	1233

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	21	12.03	0.02	1050
120B	77	12.03	0.05	1540
120C	8	12.00	0.01	1600
120D	105	12.03	0.07	1500
120E	23	12.07	0.02	1150
120F	35	12.03	0.02	1750
120G	59	12.07	0.04	1475
120H	6	12.03	0.01	1200
120I	11	12.03	0.01	1100
120J	6	12.07	0.01	600
120K	46	12.07	0.03	1533
120L	57	12.10	0.04	1425
120M	50	12.07	0.04	1250
120N	73	12.03	0.04	1825
120O	14	12.00	0.01	1400
120P	47	12.00	0.03	1567
120Q	55	12.03	0.04	1375
120R	15	12.07	0.01	1500
120S	11	12.03	0.01	1100
120T	3	12.03	0.00	1500
120U	33	12.00	0.02	1650
120V	16	12.03	0.01	1600
120W	8	12.00	0.01	1600
120X	29	12.00	0.02	1450
121A	68	12.07	0.05	1360
121B	25	12.07	0.02	1250
122A	26	12.07	0.02	1300
122B	58	12.00	0.03	1933
122C	23	12.00	0.01	2300
122D	48	12.03	0.03	1600
122E	51	12.03	0.03	1700
122F	13	12.07	0.01	1300
122G	40	12.00	0.02	2000
122H	10	12.00	0.01	1000
122I	10	12.03	0.01	1000
122J	36	12.03	0.03	1200
122K	4	12.03	0.00	1333
123A	109	12.03	0.08	1363
123B	29	12.03	0.02	1450
123C	5	12.00	0.00	1667
123D	11	12.07	0.01	1100
124A	107	12.13	0.07	1529
124B	75	12.03	0.04	1875
124C	28	12.03	0.02	1400
124D	10	12.13	0.01	1000

*WW7	774	12.20	0.61	1269	124E	80	12.10	0.05	1600
126K	18	12.03	0.01	1800	125A	111	12.13	0.08	1388
R126K	17	12.07	0.01	1700	125B	170	12.13	0.11	1545
126L	32	12.07	0.02	1600	125C	49	12.07	0.03	1633
WW7	814	12.17	0.64	1272	125D	20	12.30	0.02	1000
SWW7	809	12.20	0.64	1264	125E	75	12.07	0.05	1500
127A	40	12.10	0.03	1333	126A	11	12.03	0.01	1100
127B	62	12.03	0.04	1550	126B	29	12.03	0.02	1450
CAP1	101	12.03	0.07	1443	126C	160	12.10	0.14	1143
RCAP1	99	12.07	0.07	1414	126D	42	12.03	0.03	1400
127C	68	12.07	0.04	1700	126E	140	12.10	0.09	1556
127D	36	12.03	0.02	1800	126F	91	12.07	0.05	1820
CAP2	202	12.07	0.13	1554	126G	189	12.17	0.14	1350
RCAP2	200	12.10	0.13	1538	126H	30	12.03	0.02	1500
127E	165	12.03	0.10	1650	126I	135	12.03	0.08	1688
127F	224	12.13	0.15	1493	126J	3	12.03	0.00	1500
CAP3	382	12.07	0.25	1528	126K	18	12.03	0.01	1800
RCAP3	380	12.10	0.25	1520	126L	32	12.07	0.02	1600
127G	97	12.03	0.06	1617	126M	37	12.03	0.03	1233
CAP4	471	12.07	0.31	1519	126N	107	12.07	0.08	1338
SCAP4	470	12.07	0.31	1516	127A	40	12.10	0.03	1333
R2CAP4	469	12.10	0.31	1513	127B	62	12.03	0.04	1550
127I	14	12.03	0.01	1400	127C	68	12.07	0.04	1700
*CAP5	481	12.10	0.32	1503	127D	36	12.03	0.02	1800
127H	30	12.07	0.02	1500	127E	165	12.03	0.10	1650
CAP5	711	12.10	0.47	1513	127F	224	12.13	0.15	1493
RCAP5	707	12.13	0.47	1504	127G	97	12.03	0.06	1617
127J	51	12.10	0.03	1700	127H	30	12.07	0.02	1500
CAP6	756	12.13	0.50	1512	127I	14	12.03	0.01	1400
WW8	1556	12.13	1.14	1365	127J	51	12.10	0.03	1700
RWW8	1535	12.23	1.14	1346	160A	11	12.00	0.01	1100
126N	107	12.07	0.08	1338	D122C	11	12.00	0.01	1100
WW9	1611	12.23	1.22	1320	D122C	11	12.00	0.01	1100
CER4	1822	12.20	1.40	1301	DO122C	11	12.00	0.01	1100
RCER4	1818	12.23	1.40	1299	CAP1	101	12.03	0.07	1443
120F	35	12.03	0.02	1750	CAP2	202	12.07	0.13	1554
*CER5	1834	12.23	1.42	1292	CAP3	382	12.07	0.25	1528
125A	111	12.13	0.08	1388	CAP4	471	12.07	0.31	1519
125B	170	12.13	0.11	1545	* CAP5	481	12.10	0.32	1503
CHK1	280	12.13	0.19	1474	CAP5	711	12.10	0.47	1513
RCHK1	278	12.17	0.19	1463	CAP6	756	12.13	0.50	1512
125C	49	12.07	0.03	1633	CER1	109	12.03	0.08	1363
R125C	43	12.17	0.03	1433	CER2	107	12.10	0.08	1338
125D	20	12.30	0.02	1000	* CER3	199	12.07	0.15	1327
CHK2	339	12.17	0.24	1413	CER3	211	12.07	0.16	1319
R2CHK2	335	12.23	0.24	1396	CER3A	17	12.03	0.01	1700
125E	75	12.07	0.05	1500	* CER4	228	12.13	0.18	1267
CHK3	389	12.17	0.28	1389	CER4	1822	12.20	1.40	1301
CER5	2215	12.23	1.71	1295	* CER5	1834	12.23	1.42	1292
RCER5	2204	12.27	1.71	1289	CER5	2215	12.23	1.71	1295
120G	59	12.07	0.04	1475	* CER6	2238	12.27	1.74	1286
*CER6	2238	12.27	1.74	1286	CER6	2480	12.23	1.94	1278
124A	107	12.13	0.07	1529	* CER7	2500	12.30	1.97	1269
124B	75	12.03	0.04	1875	CER7	2592	12.27	2.07	1252
LOG1	180	12.07	0.11	1636	CER7A	52	12.07	0.04	1300
RLOG1	178	12.10	0.11	1618	* CER8	2604	12.33	2.12	1228

124D	10	12.13	0.01	1000
*LOG2	188	12.10	0.12	1567
124C	28	12.03	0.02	1400
LOG2	215	12.10	0.14	1536
RLOG2	211	12.17	0.14	1507
124E	80	12.10	0.05	1600
LOG3	287	12.13	0.19	1511
CER6	2480	12.23	1.94	1278
RCER6	2470	12.30	1.94	1273
120L	57	12.10	0.04	1425
*CER7	2500	12.30	1.97	1269
120J	6	12.07	0.01	600
R120J	6	12.10	0.01	600
120K	46	12.07	0.03	1533
CER7A	52	12.07	0.04	1300
SCER7A	52	12.07	0.04	1300
RCER7A	50	12.17	0.04	1250
120M	50	12.07	0.04	1250
123B	29	12.03	0.02	1450
S123B	29	12.03	0.02	1450
R123B	29	12.03	0.02	1450
R123B	29	12.03	0.02	1450
CER7	2592	12.27	2.07	1252
RCER7	2577	12.33	2.07	1245
120N	73	12.03	0.04	1825
*CER8	2604	12.33	2.12	1228
123A	109	12.03	0.08	1363
S123A	106	12.07	0.08	1325
123D	11	12.07	0.01	1100
TRV1	117	12.07	0.09	1300
STRV1	117	12.10	0.09	1300
RTRV1	114	12.17	0.09	1267
123C	5	12.00	0.00	1667
S123C	5	12.00	0.00	1667
R123C	5	12.00	0.00	1667
R123C	5	12.07	0.00	1667
CER8	2684	12.33	2.20	1220
RCER8	2678	12.37	2.20	1217
120O	14	12.00	0.01	1400
S120O	14	12.00	0.01	1400
R120O	13	12.00	0.01	1300
R120O	13	12.10	0.01	1300
120Q	55	12.03	0.04	1375
*CER9	2706	12.37	2.25	1203
120P	47	12.00	0.03	1567
S120P	47	12.00	0.03	1567
R120P	47	12.00	0.03	1567
CER9	2711	12.37	2.28	1189
SCER9	563	13.03	2.28	247
120R	15	12.07	0.01	1500
120S	11	12.03	0.01	1100
CER10	584	12.17	2.29	255
RCER10	583	12.20	2.29	255
120T	3	12.03	0.00	1500
*CER11	585	12.20	2.30	254
122C	23	12.00	0.01	2300
CER8	2684	12.33	2.20	1220
* CER9	2706	12.37	2.25	1203
CER9	2711	12.37	2.28	1189
CER10	584	12.17	2.29	255
* CER11	585	12.20	2.30	254
CER11	848	12.17	2.50	339
* CER12	860	12.20	2.52	341
CER12	937	12.20	2.59	362
CER13	944	12.20	2.60	363
* CER14	943	12.27	2.62	360
CER14	948	12.23	2.62	362
CHK1	280	12.13	0.19	1474
CHK2	339	12.17	0.24	1413
CHK3	389	12.17	0.28	1389
LOG1	180	12.07	0.11	1636
* LOG2	188	12.10	0.12	1567
LOG2	215	12.10	0.14	1536
LOG3	287	12.13	0.19	1511
LSR1	83	12.03	0.05	1660
LSR1B	35	12.07	0.02	1750
LSR2	162	12.03	0.11	1473
LSR2B	62	12.03	0.05	1240
LSR3	262	12.07	0.18	1456
LSR4	297	12.07	0.20	1485
LSR5	299	12.10	0.21	1424
LTD1	93	12.07	0.07	1329
TRV1	117	12.07	0.09	1300
WW1	39	12.07	0.03	1300
WW3	227	12.10	0.20	1135
WW4	230	12.10	0.15	1533
WW5	663	12.13	0.50	1326
WW6	753	12.17	0.58	1298
WW7	814	12.17	0.64	1272
* WW7	774	12.20	0.61	1269
WW8	1556	12.13	1.14	1365
WW9	1611	12.23	1.22	1320
R120H	6	12.07	0.01	1200
R120J	6	12.10	0.01	600
R120O	13	12.00	0.01	1300
R120O	13	12.10	0.01	1300
R120P	47	12.00	0.03	1567
R120W	7	12.07	0.01	1400
R121A	67	12.10	0.05	1340
R122C	11	12.03	0.01	1100
R122D	48	12.03	0.03	1600
R122F	13	12.07	0.01	1300
R123B	29	12.03	0.02	1450
R123B	29	12.03	0.02	1450
R123C	5	12.07	0.00	1667
R123C	5	12.00	0.00	1667
R125C	43	12.17	0.03	1433
R126A	11	12.10	0.01	1100
R126C	156	12.17	0.14	1114
R126J	3	12.07	0.00	1500
R126K	17	12.07	0.01	1700
R160A			0.01	0

DO122C	11	12.00	0.01	1100
D122C	11	12.00	0.01	1100
R122C	11	12.03	0.01	1100
122E	51	12.03	0.03	1700
LSR2B	62	12.03	0.05	1240
RLSR2B	62	12.07	0.05	1240
122D	48	12.03	0.03	1600
R122D	48	12.03	0.03	1600
122F	13	12.07	0.01	1300
R122F	13	12.07	0.01	1300
122G	40	12.00	0.02	2000
LSR2	162	12.03	0.11	1473
RLSR2	160	12.03	0.11	1455
122A	26	12.07	0.02	1300
D122C	11	12.00	0.01	1100
RD122C	11	12.17	0.01	1100
LSR1B	35	12.07	0.02	1750
RLSR1B	33	12.20	0.02	1650
122B	58	12.00	0.03	1933
LSR1	83	12.03	0.05	1660
RLSR1	82	12.07	0.05	1640
122H	10	12.00	0.01	1000
122I	10	12.03	0.01	1000
LSR3	262	12.07	0.18	1456
RLSR3	261	12.07	0.18	1450
122J	36	12.03	0.03	1200
LSR4	297	12.07	0.20	1485
RLS4	296	12.10	0.20	1480
122K	4	12.03	0.00	1333
LSR5	299	12.10	0.21	1424
CER11	848	12.17	2.50	339
RCER11	844	12.20	2.50	338
120U	33	12.00	0.02	1650
*CER12	860	12.20	2.52	341
121A	68	12.07	0.05	1360
R121A	67	12.10	0.05	1340
121B	25	12.07	0.02	1250
LTD1	93	12.07	0.07	1329
CER12	937	12.20	2.59	362
RCER13	935	12.20	2.59	361
120V	16	12.03	0.01	1600
CER13	944	12.20	2.60	363
SCER13	939	12.23	2.60	361
RCER13	935	12.27	2.60	360
120X	29	12.00	0.02	1450
*CER14	943	12.27	2.62	360
120W	8	12.00	0.01	1600
S120W	7	12.03	0.01	1400
R120W	7	12.07	0.01	1400
CER14	948	12.23	2.62	362
R2CAP4	469	12.10	0.31	1513
R2CHK2	335	12.23	0.24	1396
RCAP1	99	12.07	0.07	1414
RCAP2	200	12.10	0.13	1538
RCAP3	380	12.10	0.25	1520
RCAP5	707	12.13	0.47	1504
RCER2	105	12.17	0.08	1313
RCER3	207	12.13	0.16	1294
RCER4	1818	12.23	1.40	1299
RCER5	2204	12.27	1.71	1289
RCER6	2470	12.30	1.94	1273
RCER7	2577	12.33	2.07	1245
RCER7A	50	12.17	0.04	1250
RCER8	2678	12.37	2.20	1217
RCER10	583	12.20	2.29	255
RCER11	844	12.20	2.50	338
RCER13	935	12.27	2.60	360
RCER13	935	12.20	2.59	361
RCHK1	278	12.17	0.19	1463
RD122C	11	12.17	0.01	1100
RLOG1	178	12.10	0.11	1618
RLOG2	211	12.17	0.14	1507
RLS4	296	12.10	0.20	1480
RLSR1	82	12.07	0.05	1640
RLSR1B	33	12.20	0.02	1650
RLSR2	160	12.03	0.11	1455
RLSR2B	62	12.07	0.05	1240
RLSR3	261	12.07	0.18	1450
RTRV1	114	12.17	0.09	1267
RWW1	39	12.10	0.03	1300
RWW3	225	12.13	0.20	1125
RWW4	227	12.17	0.15	1513
RWW5	659	12.20	0.50	1318
RWW6	749	12.20	0.58	1291
RWW8	1535	12.23	1.14	1346
S120O	14	12.00	0.01	1400
S120P	47	12.00	0.03	1567
S120W	7	12.03	0.01	1400
S123A	106	12.07	0.08	1325
S123B	29	12.03	0.02	1450
S123C	5	12.00	0.00	1667
SCAP4	470	12.07	0.31	1516
SCER1	100	12.10	0.08	1250
SCER3	207	12.10	0.16	1294
SCER3A	13	12.17	0.01	1300
SCER7A	52	12.07	0.04	1300
SCER9	563	13.03	2.28	247
SCER13	939	12.23	2.60	361
STRV1	117	12.10	0.09	1300
SWW7	809	12.20	0.64	1264

Table 3.3.3
Cyprus Point Wash - 130
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	9	12.07	0.01	900
130B	50	12.00	0.03	1667
130C	7	12.03	0.01	1400
R130C	7	12.10	0.01	1400
130D	5	12.03	0.00	1250
CP1	70	12.03	0.05	1400
RCP1	68	12.10	0.05	1360
130F	56	12.07	0.04	1400
*CP2	123	12.07	0.09	1367
130E	5	12.03	0.00	1250
CP2	128	12.07	0.09	1422
RCP2	127	12.10	0.09	1411
131A	72	12.03	0.05	1440
CP3	198	12.07	0.14	1414
SCP3	198	12.07	0.14	1414
RCP3	198	12.07	0.14	1414
130G	18	12.03	0.01	1800
CP4	215	12.07	0.15	1433

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	9	12.07	0.01	900
130B	50	12.00	0.03	1667
130C	7	12.03	0.01	1400
130D	5	12.03	0.00	1250
130E	5	12.03	0.00	1250
130F	56	12.07	0.04	1400
130G	18	12.03	0.01	1800
131A	72	12.03	0.05	1440
CP1	70	12.03	0.05	1400
* CP2	123	12.07	0.09	1367
CP2	128	12.07	0.09	1422
CP3	198	12.07	0.14	1414
CP4	215	12.07	0.15	1433
R130C	7	12.10	0.01	1400
RCP1	68	12.10	0.05	1360
RCP2	127	12.10	0.09	1411
RCP3	198	12.07	0.14	1414
SCP3	198	12.07	0.14	1414

Table 3.3.4
Jacklin Wash - 150
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151A	5	12.00	0.00	1667
DO151A	4	12.00	0.00	1333
D151A	4	12.00	0.00	1333
R151A	4	12.03	0.00	1333
151B	7	12.03	0.00	1429
DO151B	4	12.03	0.00	816
D151B	4	12.03	0.00	816
KGT1	7	12.03	0.01	700
RKGT1	7	12.20	0.01	700
151C	8	12.03	0.01	1600
KGT2	12	12.10	0.01	1200
RKGT2	12	12.20	0.01	1200
151D	63	12.03	0.04	1575
151F	4	12.03	0.00	1333
DO151F	2	12.03	0.00	667
D151F	2	12.03	0.00	667
RD151F	2	12.07	0.00	667
D151B	4	12.03	0.00	816
RD151B	4	12.03	0.00	816
KGT3A	69	12.03	0.04	1725
R151D	67	12.13	0.04	1675
151E	95	12.03	0.07	1357
*KGT3	169	12.07	0.12	1408
151I	8	12.03	0.01	800
KGT3	177	12.07	0.13	1362
RKGT3	177	12.07	0.13	1362
151J	5	12.00	0.00	1667
*KGT4	181	12.07	0.13	1392
151H	5	12.07	0.00	1020
R151H	5	12.10	0.00	1020
KGT4	187	12.07	0.13	1438
RKGT4	185	12.10	0.13	1423
151K	58	12.00	0.03	1933
KGT5	234	12.03	0.17	1376
RKGT5	232	12.10	0.17	1365
151L	87	12.03	0.05	1740
KGT6	315	12.07	0.22	1432
152A	63	12.03	0.04	1575
R152A	62	12.07	0.04	1550
152B	24	12.03	0.02	1200
*MNG1	86	12.03	0.06	1433
152C	20	12.03	0.01	2000
MNG1	106	12.03	0.07	1514
RMNG1	105	12.10	0.07	1500
152D	27	12.03	0.02	1350

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
150A	16	12.03	0.01	1600
150B	5	12.03	0.00	1667
150C	36	12.00	0.02	1800
150D	71	12.07	0.05	1420
150E	35	12.00	0.02	1750
150F	6	12.00	0.00	1500
150G	6	12.03	0.00	1224
150H	53	12.00	0.03	1767
150I	141	12.10	0.12	1175
150J	9	12.10	0.01	900
150K	15	12.00	0.01	1500
150L	14	12.03	0.01	1400
150M	37	12.00	0.02	1850
150N	2	12.00	0.00	2000
150O	5	12.03	0.00	1250
150P	1	12.03	0.00	1000
151A	5	12.00	0.00	1667
151B	7	12.03	0.00	1429
151C	8	12.03	0.01	1600
151D	63	12.03	0.04	1575
151E	95	12.03	0.07	1357
151F	4	12.03	0.00	1333
151H	5	12.07	0.00	1020
151I	8	12.03	0.01	800
151J	5	12.00	0.00	1667
151K	58	12.00	0.03	1933
151L	87	12.03	0.05	1740
152A	63	12.03	0.04	1575
152B	24	12.03	0.02	1200
152C	20	12.03	0.01	2000
152D	27	12.03	0.02	1350
152E	24	12.03	0.02	1200
152F	20	12.03	0.01	2000
D151A	1	12.00	0.00	333
D151A	4	12.00	0.00	1333
D151B	4	12.03	0.00	816
D151B	4	12.03	0.00	816
D151F	2	12.03	0.00	667
DO151A	4	12.00	0.00	1333
DO151B	4	12.03	0.00	816
DO151F	2	12.03	0.00	667
JKL1	5	12.03	0.01	500
JKL2	110	12.03	0.09	1222
JKL3	138	12.03	0.11	1255
JKL4	67	12.13	0.12	558

*MNG2	130	12.07	0.09	1444	JKL5	117	12.03	0.15	780
152E	24	12.03	0.02	1200	JKL6	236	12.13	0.27	874
MNG2	154	12.07	0.10	1540	* JKL7	252	12.17	0.29	869
RMNG2	154	12.13	0.10	1540	JKL7	422	12.13	0.41	1029
152F	20	12.03	0.01	2000	* JKL8	429	12.17	0.41	1046
MNG3	171	12.10	0.12	1425	JKL8	723	12.10	0.63	1148
150A	16	12.03	0.01	1600	JKL9	739	12.13	0.66	1120
S150A	3	12.53	0.01	300	JKL10	725	12.20	0.66	1098
150B	5	12.03	0.00	1667	JKL11	725	12.20	0.66	1098
R150B	5	12.03	0.00	1667	KGT1	7	12.03	0.01	700
S150B	5	12.03	0.00	1667	KGT2	12	12.10	0.01	1200
JKL1	5	12.03	0.01	500	* KGT3	169	12.07	0.12	1408
RJKL1	5	12.53	0.01	500	KGT3	177	12.07	0.13	1362
150C	36	12.00	0.02	1800	KGT3A	69	12.03	0.04	1725
150D	71	12.07	0.05	1420	* KGT4	181	12.07	0.13	1392
JKL2	110	12.03	0.09	1222	KGT4	187	12.07	0.13	1438
RJKL2	107	12.07	0.09	1189	KGT5	234	12.03	0.17	1376
150E	35	12.00	0.02	1750	KGT6	315	12.07	0.22	1432
JKL3	138	12.03	0.11	1255	* MNG1	86	12.03	0.06	1433
SJKL3	60	12.40	0.11	545	MNG1	106	12.03	0.07	1514
150F	6	12.00	0.00	1500	* MNG2	130	12.07	0.09	1444
150G	6	12.03	0.00	1224	MNG2	154	12.07	0.10	1540
D151A	1	12.00	0.00	333	MNG3	171	12.10	0.12	1425
RD151A	1	12.20	0.00	333	R150B	5	12.03	0.00	1667
JKL4	67	12.13	0.12	558	R150J	9	12.13	0.01	900
RJKL4	67	12.17	0.12	558	R151A	4	12.03	0.00	1333
150H	53	12.00	0.03	1767	R151D	67	12.13	0.04	1675
JKL5	117	12.03	0.15	780	R151H	5	12.10	0.00	1020
RJKL5	108	12.27	0.15	720	R152A	62	12.07	0.04	1550
150I	141	12.10	0.12	1175	RD151A	1	12.20	0.00	333
JKL6	236	12.13	0.27	874	RD151B	4	12.03	0.00	816
RJKL6	236	12.17	0.27	874	RD151F	2	12.07	0.00	667
150J	9	12.10	0.01	900	RJKL1	5	12.53	0.01	500
R150J	9	12.13	0.01	900	RJKL10	724	12.20	0.66	1097
150K	15	12.00	0.01	1500	RJKL2	107	12.07	0.09	1189
*JKL7	252	12.17	0.29	869	RJKL4	67	12.17	0.12	558
JKL7	422	12.13	0.41	1029	RJKL5	108	12.27	0.15	720
RJKL7	419	12.17	0.41	1022	RJKL6	236	12.17	0.27	874
150L	14	12.03	0.01	1400	RJKL7	419	12.17	0.41	1022
*JKL8	429	12.17	0.41	1046	RJKL8	718	12.17	0.63	1140
JKL8	723	12.10	0.63	1148	RKGT1	7	12.20	0.01	700
SJKL8	720	12.13	0.63	1143	RKGT2	12	12.20	0.01	1200
RJKL8	718	12.17	0.63	1140	RKGT3	177	12.07	0.13	1362
150M	37	12.00	0.02	1850	RKGT4	185	12.10	0.13	1423
JKL9	739	12.13	0.66	1120	RKGT5	232	12.10	0.17	1365
SJKL9	720	12.20	0.66	1091	RMNG1	105	12.10	0.07	1500
150N	2	12.00	0.00	2000	RMNG2	154	12.13	0.10	1540
150O	5	12.03	0.00	1250	S150A	3	12.53	0.01	300
JKL10	725	12.20	0.66	1098	S150B	5	12.03	0.00	1667
RJKL10	724	12.20	0.66	1097	SJKL3	60	12.40	0.11	545
150P	1	12.03	0.00	1000	SJKL8	720	12.13	0.63	1143
JKL11	725	12.20	0.66	1098	SJKL9	720	12.20	0.66	1091

Table 3.3.5
Emerald Wash - 160
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	8	12.00	0.00	1633
R160V	8	12.03	0.00	1633
160W	3	12.00	0.00	1500
EMR13A	11	12.00	0.01	1100
DO160W	9	12.00	0.01	900
D160W	9	12.00	0.01	900
REM13A	9	12.07	0.01	900
160X	44	12.03	0.03	1467
EMR13B	53	12.03	0.04	1325
REM13B	52	12.13	0.04	1300
160Y	6	12.00	0.00	1500
R160Y	6	12.03	0.00	1500
160Z	78	12.07	0.06	1300
EMR13	133	12.10	0.10	1330
160G	29	12.07	0.02	1450
R160G	29	12.13	0.02	1450
160H	28	12.03	0.02	1400
EMR1	56	12.07	0.04	1400
REMR1	56	12.07	0.04	1400
160I	8	12.03	0.00	1633
160J	14	12.00	0.01	1400
EMR2	74	12.03	0.06	1233
REMR2	73	12.07	0.06	1217
160K	47	12.00	0.03	1567
EMR3	120	12.03	0.08	1500
REMR3	118	12.10	0.08	1475
160M	91	12.03	0.06	1517
*EMR4	207	12.07	0.14	1479
160L	13	12.03	0.01	1300
R160L	13	12.07	0.01	1300
160N	37	12.00	0.02	1850
EMR4	254	12.03	0.17	1494
SEMR4	192	12.17	0.17	1129
160B	12	12.00	0.01	1200
R160B	10	12.27	0.01	1000
160C	27	12.00	0.02	1350
R160C	27	12.07	0.02	1350
EMR5A	31	12.13	0.02	1550
160D	41	12.13	0.04	1025
160F	19	12.07	0.02	950
EMR5	282	12.13	0.25	1128
REMR5	281	12.17	0.25	1124
160O	98	12.03	0.06	1633
*EMR6	361	12.10	0.32	1128
151F	4	12.03	0.00	1333

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151F	4	12.03	0.00	1333
151G	3	12.07	0.00	1000
160AA	8	12.00	0.00	1633
160B	12	12.00	0.01	1200
160C	27	12.00	0.02	1350
160D	41	12.13	0.04	1025
160F	19	12.07	0.02	950
160G	29	12.07	0.02	1450
160H	28	12.03	0.02	1400
160I	8	12.03	0.00	1633
160J	14	12.00	0.01	1400
160K	47	12.00	0.03	1567
160L	13	12.03	0.01	1300
160M	91	12.03	0.06	1517
160N	37	12.00	0.02	1850
160O	98	12.03	0.06	1633
160P	36	12.03	0.02	1800
160Q	10	12.00	0.01	1000
160R	81	12.03	0.05	1620
160S	19	12.00	0.01	1900
160T	16	12.00	0.01	1600
160U	112	12.07	0.08	1400
160V	8	12.00	0.00	1633
160W	3	12.00	0.00	1500
160X	44	12.03	0.03	1467
160Y	6	12.00	0.00	1500
160Z	78	12.07	0.06	1300
D151F	2	12.03	0.00	667
D160W	2	12.00	0.01	200
D160W	9	12.00	0.01	900
DO151F	2	12.03	0.00	667
DO160W	9	12.00	0.01	900
EMR1	56	12.07	0.04	1400
EMR2	74	12.03	0.06	1233
EMR3	120	12.03	0.08	1500
* EMR4	207	12.07	0.14	1479
EMR4	254	12.03	0.17	1494
EMR5	282	12.13	0.25	1128
EMR5A	31	12.13	0.02	1550
* EMR6	361	12.10	0.32	1128
EMR6	366	12.10	0.33	1109
EMR6A	5	12.10	0.01	500
EMR7	381	12.17	0.35	1089
EMR8	191	12.67	0.36	531
EMR9	245	12.07	0.41	598

DO151F	2	12.03	0.00	667
D151F	2	12.03	0.00	667
R151F	2	12.17	0.00	667
151G	3	12.07	0.00	1000
EMR6A	5	12.10	0.01	500
REMR6A	5	12.10	0.01	500
EMR6	366	12.10	0.33	1109
REMR6	359	12.17	0.33	1088
160P	36	12.03	0.02	1800
EMR7	381	12.17	0.35	1089
SEMR7	190	12.70	0.35	543
160Q	10	12.00	0.01	1000
D160W	2	12.00	0.01	200
RD160W	2	12.00	0.01	200
EMR8	191	12.67	0.36	531
REMR8	191	12.70	0.36	531
160R	81	12.03	0.05	1620
EMR9	245	12.07	0.41	598
REMR9	244	12.10	0.41	595
160S	19	12.00	0.01	1900
EMR10	257	12.07	0.42	612
SEMR10	211	12.33	0.42	502
160T	16	12.00	0.01	1600
EMR11	214	12.30	0.43	498
REMR11	214	12.43	0.43	498
160U	112	12.07	0.08	1400
*EMR12	282	12.13	0.51	553
EMR12	414	12.10	0.61	679
SEMR12	394	12.20	0.61	646
REMR12	394	12.23	0.61	646
160AA	8	12.00	0.00	1633
EMR13	398	12.20	0.61	652
EMR10	257	12.07	0.42	612
EMR11	214	12.30	0.43	498
* EMR12	282	12.13	0.51	553
EMR12	414	12.10	0.61	679
EMR13	398	12.20	0.61	652
EMR13	133	12.10	0.10	1330
EMR13A	11	12.00	0.01	1100
EMR13B	53	12.03	0.04	1325
R151F	2	12.17	0.00	667
R160B	10	12.27	0.01	1000
R160C	27	12.07	0.02	1350
R160G	29	12.13	0.02	1450
R160L	13	12.07	0.01	1300
R160V	8	12.03	0.00	1633
R160Y	6	12.03	0.00	1500
RD160W	2	12.00	0.01	200
REMR1	56	12.07	0.04	1400
REMR2	73	12.07	0.06	1217
REMR3	118	12.10	0.08	1475
REMR5	281	12.17	0.25	1124
REMR6	359	12.17	0.33	1088
REMR6A	5	12.10	0.01	500
REMR8	191	12.70	0.36	531
REMR9	244	12.10	0.41	595
REMR11	214	12.43	0.43	498
REMR12	394	12.23	0.61	646
REM13A	9	12.07	0.01	900
REM13B	52	12.13	0.04	1300
SEMR4	192	12.17	0.17	1129
SEMR7	190	12.70	0.35	543
SEMR10	211	12.33	0.42	502
SEMR12	394	12.20	0.61	646

Table 3.3.6
Malta Drain - 170
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	8	12.00	0.00	1633
R160V	8	12.03	0.00	1633
160W	3	12.00	0.00	1500
EMR13A	11	12.00	0.01	1100
DO160W	2	12.00	0.01	200
D160W	2	12.00	0.01	200
R160W	2	12.03	0.01	200
170A	40	12.00	0.02	2000
170B	7	12.00	0.00	1750
MLT1	49	12.00	0.04	1225
RMLT1	48	12.07	0.04	1200
170C	53	12.03	0.03	1767
MLT2	101	12.03	0.07	1443
170D	10	12.03	0.01	1000
MLT3	112	12.03	0.08	1400
RMLT3	109	12.13	0.08	1363
170E	138	12.07	0.09	1533
MLT4	244	12.07	0.17	1435
170F	30	12.03	0.02	1500
R170F	30	12.03	0.02	1500
170G	4	12.03	0.00	1333
MLT4A	277	12.07	0.19	1458
RMLT4A	277	12.07	0.19	1458
170H	16	12.00	0.01	1600
MLT5	289	12.07	0.20	1445
SMLT5	292	12.10	0.20	1460
RMLT5	288	12.07	0.20	1440
170I1	33	12.03	0.02	1650
DO180S	16	12.03	0.02	800
D179I1	16	12.03	0.02	800
R170I1	16	12.13	0.02	800
170I2	21	12.00	0.01	2100
MLT6A	34	12.03	0.03	1133
DO180R	17	12.03	0.03	567
DMLT6A	17	12.03	0.03	567
RMLT6A	17	12.10	0.03	567
170I3	9	12.03	0.01	900
MLT6	313	12.07	0.24	1304

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	8	12.00	0.00	1633
160W	3	12.00	0.00	1500
170A	40	12.00	0.02	2000
170B	7	12.00	0.00	1750
170C	53	12.03	0.03	1767
170D	10	12.03	0.01	1000
170E	138	12.07	0.09	1533
170F	30	12.03	0.02	1500
170G	4	12.03	0.00	1333
170H	16	12.00	0.01	1600
170I1	33	12.03	0.02	1650
170I2	21	12.00	0.01	2100
170I3	9	12.03	0.01	900
D160W	2	12.00	0.01	200
D179I1	16	12.03	0.02	800
DMLT6A	17	12.03	0.03	567
DO160W	2	12.00	0.01	200
DO180R	17	12.03	0.03	567
DO180S	16	12.03	0.02	800
EMR13A	11	12.00	0.01	1100
MLT1	49	12.00	0.04	1225
MLT2	101	12.03	0.07	1443
MLT3	112	12.03	0.08	1400
MLT4	244	12.07	0.17	1435
MLT4A	277	12.07	0.19	1458
MLT5	289	12.07	0.20	1445
MLT6	313	12.07	0.24	1304
MLT6A	34	12.03	0.03	1133
R160V	8	12.03	0.00	1633
R160W	2	12.03	0.01	200
R170F	30	12.03	0.02	1500
R170I1	16	12.13	0.02	800
RMLT1	48	12.07	0.04	1200
RMLT3	109	12.13	0.08	1363
RMLT4A	277	12.07	0.19	1458
RMLT5	288	12.07	0.20	1440
RMLT6A	17	12.10	0.03	567
SMLT5	292	12.10	0.20	1460

Table 3.3.7
Colony Wash - 180
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
185A	65	12.03	0.04	1625
R185A	63	12.13	0.04	1575
185B	98	12.10	0.08	1225
IRW1	160	12.10	0.12	1333
SIRW1	109	12.30	0.12	908
180A	39	12.03	0.03	1300
R180A	39	12.03	0.03	1300
180B	22	12.13	0.03	733
IRW2	151	12.10	0.18	839
RIRW2	151	12.10	0.18	839
186A	140	12.07	0.10	1400
186B	8	12.00	0.00	1633
R186B	8	12.07	0.00	1633
SNB1A	147	12.07	0.10	1470
RSNB1A	144	12.17	0.10	1440
186C	26	12.03	0.02	1300
R186C	26	12.03	0.02	1300
186D	99	12.10	0.08	1238
SNB1	264	12.10	0.20	1320
RSNB1	262	12.17	0.20	1310
186E	55	12.03	0.04	1375
186F	41	12.03	0.03	1367
SNB2	344	12.10	0.27	1274
RSNB2	342	12.17	0.27	1267
186G	89	12.07	0.07	1271
SNB3	420	12.13	0.33	1273
SSNB3	74	12.90	0.33	224
186H	25	12.10	0.03	833
160E	6	12.03	0.00	1500
R160E	6	12.07	0.00	1500
SNB4	87	12.60	0.36	242
RSNB4	87	12.67	0.36	242
186I	43	12.03	0.03	1433
*SNB5	92	12.53	0.39	236
187A	15	12.00	0.01	1500
R187A	15	12.00	0.01	1500
187B	12	12.03	0.01	1200
GRS1	27	12.00	0.02	1350
RGRS1	27	12.10	0.02	1350
187C	20	12.00	0.01	2000
R187C	20	12.03	0.01	2000
187D	82	12.10	0.07	1171
*GRS2	127	12.10	0.10	1270
188A	15	12.00	0.01	1500
R188A	15	12.03	0.01	1500

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160E	6	12.03	0.00	1500
170I1	33	12.03	0.02	1650
170I2	21	12.00	0.01	2100
180A	39	12.03	0.03	1300
180B	22	12.13	0.03	733
180C	17	12.00	0.01	1700
180D	4	12.03	0.00	1333
180E	31	12.00	0.02	1550
180F	115	12.03	0.07	1643
180G	45	12.03	0.03	1500
180H	26	12.07	0.02	1300
180I	7	12.00	0.00	1750
180J	50	12.03	0.03	1667
180K	47	12.03	0.03	1567
180L	24	12.00	0.01	2400
180M	6	12.03	0.00	1224
180N	65	12.03	0.04	1625
180O	32	12.03	0.02	1600
180P	19	12.00	0.01	1900
180Q	49	12.03	0.03	1633
180R	39	12.03	0.03	1300
180S	64	12.00	0.04	1600
180T	39	12.03	0.02	1950
180U	21	12.07	0.02	1050
181A	0	0.03	0.08	0
181B	30	12.07	0.02	1500
182A	81	12.00	0.05	1620
182B	58	12.03	0.04	1450
182C	32	12.03	0.02	1600
182D	149	12.03	0.09	1656
182E	104	12.03	0.06	1733
182F	18	12.07	0.01	1800
182G	61	12.10	0.05	1220
182I	53	12.07	0.04	1325
182J	19	12.07	0.01	1900
182K	42	12.00	0.02	2100
182L	9	12.00	0.00	1837
183A	73	12.00	0.04	1825
183B	62	12.03	0.04	1550
183F	69	12.03	0.05	1380
183G	132	12.07	0.09	1467
183H	31	12.00	0.02	1550
183I	89	12.03	0.06	1483
183J	9	12.00	0.00	1837
183K	4	12.00	0.00	2000

188B	104	12.03	0.07	1486
188C	32	12.03	0.02	1600
SYR1	150	12.03	0.10	1500
RSYC1	148	12.07	0.10	1480
188D	77	12.07	0.05	1540
188E	64	12.07	0.05	1280
SYR2	290	12.07	0.20	1450
RSYC2	284	12.17	0.20	1420
188F	96	12.07	0.07	1371
SYR3	371	12.13	0.28	1325
SSYC3	222	12.40	0.28	793
RSYC3	222	12.43	0.28	793
188G	2	12.03	0.00	2000
SYR4	222	12.43	0.28	793
GRS2	312	12.20	0.38	821
SGRS2	312	12.20	0.38	821
187E	7	12.03	0.00	1429
R187E	7	12.03	0.00	1429
187F	3	12.07	0.00	1000
GRS3A	10	12.03	0.01	1000
RGRS3A	10	12.07	0.01	1000
187G	38	12.13	0.04	950
GRS3	358	12.17	0.43	833
RGRS3	358	12.20	0.43	833
187H	6	12.00	0.00	1500
*SNB5	361	12.20	0.43	840
SNB5	445	12.20	0.82	543
RSNB5	445	12.20	0.82	543
187I	38	12.00	0.02	1900
SNB6	464	12.17	0.85	546
SSNB6	90	13.63	0.85	106
RSNB6	90	13.73	0.85	106
180F	115	12.03	0.07	1643
*CLN1	172	12.07	0.92	187
CLN1	322	12.07	1.10	293
SCLN1	254	12.33	1.10	231
180C	17	12.00	0.01	1700
R180C	17	12.03	0.01	1700
180D	4	12.03	0.00	1333
180E	31	12.00	0.02	1550
CLN2	281	12.10	1.13	249
RCLN2	280	12.17	1.13	248
180G	45	12.03	0.03	1500
CLN3	317	12.10	1.16	273
SCLN3	273	12.47	1.16	235
180H	26	12.07	0.02	1300
R180H	26	12.10	0.02	1300
180I	7	12.00	0.00	1750
R180I	7	12.07	0.00	1750
180J	50	12.03	0.03	1667
CLN4B	82	12.07	0.06	1367
RCLN4B	83	12.07	0.06	1383
180M	6	12.03	0.00	1224
CLN4	340	12.10	1.22	279
RCLN4	338	12.20	1.22	277
180N	65	12.03	0.04	1625

184A	30	12.03	0.02	1500
184B	29	12.07	0.02	1450
184C	23	12.00	0.01	2300
184D	8	12.07	0.01	800
184E	107	12.13	0.11	973
184F	9	12.03	0.01	900
184G	80	12.03	0.05	1600
184H	17	12.03	0.01	1700
184I	49	12.03	0.03	1633
184J	12	12.03	0.01	1200
184K	7	12.00	0.00	1750
185A	65	12.03	0.04	1625
185B	98	12.10	0.08	1225
186A	140	12.07	0.10	1400
186B	8	12.00	0.00	1633
186C	26	12.03	0.02	1300
186D	99	12.10	0.08	1238
186E	55	12.03	0.04	1375
186F	41	12.03	0.03	1367
186G	89	12.07	0.07	1271
186H	25	12.10	0.03	833
186I	43	12.03	0.03	1433
187A	15	12.00	0.01	1500
187B	12	12.03	0.01	1200
187C	20	12.00	0.01	2000
187D	82	12.10	0.07	1171
187E	7	12.03	0.00	1429
187F	3	12.07	0.00	1000
187G	38	12.13	0.04	950
187H	6	12.00	0.00	1500
187I	38	12.00	0.02	1900
188A	15	12.00	0.01	1500
188B	104	12.03	0.07	1486
188C	32	12.03	0.02	1600
188D	77	12.07	0.05	1540
188E	64	12.07	0.05	1280
188F	96	12.07	0.07	1371
188G	2	12.03	0.00	2000
D170I1	16	12.03	0.02	800
D170I1	16	12.03	0.02	800
D170I1	16	12.03	0.02	800
D170I2	17	12.03	0.01	1700
D183K	298	12.07	1.22	244
D183K	29	12.07	1.22	24
DFC2	364	12.13	0.26	1400
DFHN	0	0.03	1.00	0
DMLT6A	17	12.03	0.01	1700
DO183K	298	12.07	1.22	244
DOFC2	364	12.13	0.26	1400
* CLN1	172	12.07	0.92	187
CLN1	322	12.07	1.10	293
CLN2	281	12.10	1.13	249
CLN3	317	12.10	1.16	273
CLN4	340	12.10	1.22	279
CLN4B	82	12.07	0.06	1367
CLN5	608	12.17	1.63	373

184C	23	12.00	0.01	2300
184D	8	12.07	0.01	800
NCL1	31	12.03	0.02	1550
RNCL1	31	12.03	0.02	1550
184E	107	12.13	0.11	973
NCL2	133	12.10	0.13	1023
SNCL2	127	12.17	0.13	977
184F	9	12.03	0.01	900
R184F	9	12.07	0.01	900
NCL3	135	12.17	0.14	964
RNCL3	135	12.17	0.14	964
SNCL3	132	12.23	0.14	943
184A	30	12.03	0.02	1500
R184A	25	12.13	0.02	1250
184B	29	12.07	0.02	1450
NCL4A	53	12.07	0.04	1325
RNCL4A	53	12.10	0.04	1325
NCL4	179	12.17	0.18	994
RNCL4	179	12.20	0.18	994
184G	80	12.03	0.05	1600
NCL5	245	12.07	0.23	1065
SNCL5	205	12.30	0.23	891
184H	17	12.03	0.01	1700
183A	73	12.00	0.04	1825
R183A	72	12.03	0.04	1800
183B	62	12.03	0.04	1550
NCL6A	134	12.03	0.08	1675
SNCL6A	1	15.87	0.08	13
RNCL6A	1	17.03	0.08	13
NCL6	215	12.27	0.33	652
RNCL6	214	12.33	0.33	648
184I	49	12.03	0.03	1633
NCL7	234	12.27	0.36	650
SNCL7	233	12.27	0.36	647
RNCL7	233	12.30	0.36	647
184J	12	12.03	0.01	1200
NCL8	239	12.27	0.37	646
SNCL8	239	12.30	0.37	646
RNCL8	239	12.30	0.37	646
184K	7	12.00	0.00	1750
NCL9	241	12.27	0.37	651
RNCL9	240	12.33	0.37	649
CLN5	608	12.17	1.63	373
SCLN5	545	12.53	1.63	334
180K	47	12.03	0.03	1567
R180K	46	12.07	0.03	1533
180L	24	12.00	0.01	2400
CLN6	563	12.50	1.67	337
RCLN6	562	12.53	1.67	337
180O	32	12.03	0.02	1600
*CLN7	569	12.53	1.69	337
182G	61	12.10	0.05	1220
182I	53	12.07	0.04	1325
FC1	114	12.07	0.09	1267
RFC1	114	12.10	0.09	1267
182D	149	12.03	0.09	1656
CLN6	563	12.50	1.67	337
* CLN7	569	12.53	1.69	337
CLN7	1209	12.17	3.33	363
* CLN8	1217	12.17	3.35	363
CLN8	1271	12.17	3.45	368
CLN9	1286	12.20	3.50	367
* CLN10	1297	12.27	3.52	368
* CLN10	1366	12.20	3.59	381
CLN10	1388	12.20	3.62	383
CL10A	104	12.03	0.07	1486
FC1	114	12.07	0.09	1267
FC2	381	12.07	0.26	1465
FC3	528	12.10	0.37	1427
FC3A	138	12.03	0.09	1533
FC3B	170	12.07	0.11	1545
FC4	542	12.10	0.39	1390
FC5	790	12.13	1.61	491
FC6	812	12.10	1.63	498
FC7	818	12.13	1.64	499
GRS1	27	12.00	0.02	1350
* GRS2	127	12.10	0.10	1270
GRS2	312	12.20	0.38	821
GRS3	358	12.17	0.43	833
GRS3A	10	12.03	0.01	1000
IRW1	160	12.10	0.12	1333
IRW2	151	12.10	0.18	839
LC1	231	12.03	1.16	199
LC2	325	12.07	1.22	266
LC3	327	12.07	1.22	268
MLT6A	34	12.03	0.01	3400
NCL1	31	12.03	0.02	1550
NCL2	133	12.10	0.13	1023
NCL3	135	12.17	0.14	964
NCL4	179	12.17	0.18	994
NCL4A	53	12.07	0.04	1325
NCL5	245	12.07	0.23	1065
NCL6	215	12.27	0.33	652
NCL6A	134	12.03	0.08	1675
NCL7	234	12.27	0.36	650
NCL8	239	12.27	0.37	646
NCL9	241	12.27	0.37	651
SNB1	264	12.10	0.20	1320
SNB1A	147	12.07	0.10	1470
SNB2	344	12.10	0.27	1274
SNB3	420	12.13	0.33	1273
SNB4	87	12.60	0.36	242
* SNB5	92	12.53	0.39	236
* SNB5	361	12.20	0.43	840
SNB5	445	12.20	0.82	543
SNB6	464	12.17	0.85	546
SYR1	150	12.03	0.10	1500
SYR2	290	12.07	0.20	1450
SYR3	371	12.13	0.28	1325
SYR4	222	12.43	0.28	793
R160E	6	12.07	0.00	1500
R170I1	16	12.13	0.02	800

R182D	147	12.07	0.09	1633	R170I1	16	12.07	0.02	800
182E	104	12.03	0.06	1733	R180A	39	12.03	0.03	1300
182F	18	12.07	0.01	1800	R180C	17	12.03	0.01	1700
FC2	381	12.07	0.26	1465	R180H	26	12.10	0.02	1300
SFC2	378	12.10	0.26	1454	R180I	7	12.07	0.00	1750
RFC2	375	12.13	0.26	1442	R180K	46	12.07	0.03	1533
DOFC2	364	12.13	0.26	1400	R181A	0	0.03	0.08	0
DFC2	364	12.13	0.26	1400	R182A	80	12.07	0.05	1600
182A	81	12.00	0.05	1620	R182D	147	12.07	0.09	1633
R182A	80	12.07	0.05	1600	R183A	72	12.03	0.04	1800
182B	58	12.03	0.04	1450	R183K	28	12.13	1.22	23
FC3A	138	12.03	0.09	1533	R183K	28	12.13	1.22	23
SFC3A	138	12.07	0.09	1533	R184A	25	12.13	0.02	1250
182C	32	12.03	0.02	1600	R184F	9	12.07	0.01	900
FC3B	170	12.07	0.11	1545	R185A	63	12.13	0.04	1575
RFC3B	170	12.07	0.11	1545	R186B	8	12.07	0.00	1633
FC3	528	12.10	0.37	1427	R186C	26	12.03	0.02	1300
RFC4	524	12.13	0.37	1416	R187A	15	12.00	0.01	1500
182J	19	12.07	0.01	1900	R187C	20	12.03	0.01	2000
FC4	542	12.10	0.39	1390	R187E	7	12.03	0.00	1429
SFC4	515	12.20	0.39	1321	R188A	15	12.03	0.01	1500
DFHN	0	0.03	1.00	0	RCLN2	280	12.17	1.13	248
183F	69	12.03	0.05	1380	RCLN4	338	12.20	1.22	277
183G	132	12.07	0.09	1467	RCLN4B	83	12.07	0.06	1383
183H	31	12.00	0.02	1550	RCLN6	562	12.53	1.67	337
LC1	231	12.03	1.16	199	RCLN7	1208	12.17	3.33	363
RLC1	229	12.07	1.16	197	RCLN9	1284	12.27	3.50	367
183I	89	12.03	0.06	1483	RCL10A	102	12.07	0.07	1457
183J	9	12.00	0.00	1837	RFC1	114	12.10	0.09	1267
LC2	325	12.07	1.22	266	RFC2	375	12.13	0.26	1442
SLC2	324	12.07	1.22	266	RFC3B	170	12.07	0.11	1545
RLC2	324	12.07	1.22	266	RFC4	524	12.13	0.37	1416
183K	4	12.00	0.00	2000	RFC5	790	12.13	1.61	491
LC3	327	12.07	1.22	268	RFC6	812	12.13	1.63	498
DO183K	298	12.07	1.22	244	RGRS1	27	12.10	0.02	1350
D183K	298	12.07	1.22	244	RGRS3	358	12.20	0.43	833
FC5	790	12.13	1.61	491	RGRS3A	10	12.07	0.01	1000
RFC5	790	12.13	1.61	491	RIRW2	151	12.10	0.18	839
182K	42	12.00	0.02	2100	RLC1	229	12.07	1.16	197
FC6	812	12.10	1.63	498	RLC2	324	12.07	1.22	266
RFC6	812	12.13	1.63	498	RMLT6A	17	12.10	0.01	1700
182L	9	12.00	0.00	1837	RNCL1	31	12.03	0.02	1550
FC7	818	12.13	1.64	499	RNCL3	135	12.17	0.14	964
CLN7	1209	12.17	3.33	363	RNCL4	179	12.20	0.18	994
RCLN7	1208	12.17	3.33	363	RNCL4A	53	12.10	0.04	1325
180P	19	12.00	0.01	1900	RNCL6	214	12.33	0.33	648
*CLN8	1217	12.17	3.35	363	RNCL6A	1	17.03	0.08	13
181A	0	0.03	0.08	0	RNCL7	233	12.30	0.36	647
R181A	0	0.03	0.08	0	RNCL8	239	12.30	0.37	646
181B	30	12.07	0.02	1500	RNCL9	240	12.33	0.37	649
D183K	29	12.07	1.22	24	RSNB1	262	12.17	0.20	1310
R183K	28	12.13	1.22	23	RSNB1A	144	12.17	0.10	1440
R183K	28	12.13	1.22	23	RSNB2	342	12.17	0.27	1267
CLN8	1271	12.17	3.45	368	RSNB4	87	12.67	0.36	242
SCLN8	1249	12.23	3.45	362	RSNB5	445	12.20	0.82	543
180S	64	12.00	0.04	1600	RSNB6	90	13.73	0.85	106

170I1	33	12.03	0.02	1650	RSYC1	148	12.07	0.10	1480
D170I1	16	12.03	0.02	800	RSYC2	284	12.17	0.20	1420
D170I1	16	12.03	0.02	800	RSYC3	222	12.43	0.28	793
R170I1	16	12.07	0.02	800	SCLN1	254	12.33	1.10	231
CLN9	1286	12.20	3.50	367	SCLN3	273	12.47	1.16	235
RCLN9	1284	12.27	3.50	367	SCLN5	545	12.53	1.63	334
180U	21	12.07	0.02	1050	SCLN8	1249	12.23	3.45	362
*CLN10	1297	12.27	3.52	368	SFC2	378	12.10	0.26	1454
180Q	49	12.03	0.03	1633	SFC3A	138	12.07	0.09	1533
180R	39	12.03	0.03	1300	SFC4	515	12.20	0.39	1321
170I2	21	12.00	0.01	2100	SGRS2	312	12.20	0.38	821
D170I1	16	12.03	0.02	800	SIRW1	109	12.30	0.12	908
R170I1	16	12.13	0.02	800	SLC2	324	12.07	1.22	266
MLT6A	34	12.03	0.01	3400	SNCL2	127	12.17	0.13	977
D170I2	17	12.03	0.01	1700	SNCL3	132	12.23	0.14	943
DMLT6A	17	12.03	0.01	1700	SNCL5	205	12.30	0.23	891
RMLT6A	17	12.10	0.01	1700	SNCL6A	1	15.87	0.08	13
CL10A	104	12.03	0.07	1486	SNCL7	233	12.27	0.36	647
RCL10A	102	12.07	0.07	1457	SNCL8	239	12.30	0.37	646
*CLN10	1366	12.20	3.59	381	SSNB3	74	12.90	0.33	224
180T	39	12.03	0.02	1950	SSNB6	90	13.63	0.85	106
CLN10	1388	12.20	3.62	383	SSYC3	222	12.40	0.28	793

Table 3.3.8
Panorama Channel - 190
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	41	12.03	0.03	1367
R182H	40	12.07	0.03	1333
190A	29	12.03	0.02	1450
PNR1A	69	12.03	0.05	1380
SPNR1A	62	12.10	0.05	1240
RPNR1A	62	12.13	0.05	1240
190B	11	12.03	0.01	1100
PNR1	71	12.13	0.05	1420
RPNR1	70	12.17	0.05	1400
190C	36	12.03	0.02	1800
PNR2	98	12.10	0.08	1225
RPNR2	97	12.13	0.08	1213
190D	8	12.00	0.00	1633
R190D	8	12.00	0.00	1633
190E	5	12.03	0.00	1667
190F	9	12.03	0.01	900
190G	9	12.03	0.01	900
PNR3A	31	12.03	0.02	1550
RPNR3A	31	12.03	0.02	1550
190H	116	12.03	0.08	1450
R190H	116	12.03	0.08	1450

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	41	12.03	0.03	1367
190A	29	12.03	0.02	1450
190B	11	12.03	0.01	1100
190C	36	12.03	0.02	1800
190D	8	12.00	0.00	1633
190E	5	12.03	0.00	1667
190F	9	12.03	0.01	900
190G	9	12.03	0.01	900
190H	116	12.03	0.08	1450
190I	21	12.00	0.01	2100
190J	14	12.03	0.01	1400
190K	11	12.07	0.01	1100
190L	18	12.00	0.01	1800
190M	13	12.03	0.01	1300
190N	28	12.07	0.02	1400
190O	10	12.00	0.01	1000
190P	37	12.00	0.02	1850
190Q	13	12.07	0.01	1300
190R	22	12.07	0.01	2200
190S	10	12.07	0.01	1000
190T	166	12.13	0.13	1277

190I	21	12.00	0.01	2100
190J	14	12.03	0.01	1400
PNR3	257	12.10	0.19	1353
RPNR3	254	12.13	0.19	1337
190K	11	12.07	0.01	1100
R190K	11	12.10	0.01	1100
190L	18	12.00	0.01	1800
*PNR4	279	12.10	0.21	1329
190M	13	12.03	0.01	1300
190N	28	12.07	0.02	1400
PNR4	317	12.10	0.24	1321
RPNR4	311	12.13	0.24	1296
190O	10	12.00	0.01	1000
R190O	10	12.03	0.01	1000
190P	37	12.00	0.02	1850
PNR5A	47	12.00	0.03	1567
RPNR5A	47	12.00	0.03	1567
190Q	13	12.07	0.01	1300
*PNR5	353	12.10	0.28	1261
190R	22	12.07	0.01	2200
PNR5	374	12.10	0.29	1290
RPNR5	373	12.13	0.29	1286
190S	10	12.07	0.01	1000
*PNR6	382	12.13	0.30	1273
190T	166	12.13	0.13	1277
PNR6	547	12.13	0.43	1272
RPNR6	544	12.17	0.43	1265
190V	22	12.03	0.02	1100
*PNR7	559	12.17	0.45	1242
190U	33	12.03	0.02	1650
R190U	33	12.03	0.02	1650
PNR7	582	12.13	0.47	1238

190U	33	12.03	0.02	1650
190V	22	12.03	0.02	1100
PNR1	71	12.13	0.05	1420
PNR1A	69	12.03	0.05	1380
PNR2	98	12.10	0.08	1225
PNR3	257	12.10	0.19	1353
PNR3A	31	12.03	0.02	1550
* PNR4	279	12.10	0.21	1329
PNR4	317	12.10	0.24	1321
* PNR5	353	12.10	0.28	1261
PNR5	374	12.10	0.29	1290
PNR5A	47	12.00	0.03	1567
* PNR6	382	12.13	0.30	1273
PNR6	547	12.13	0.43	1272
* PNR7	559	12.17	0.45	1242
PNR7	582	12.13	0.47	1238
R182H	40	12.07	0.03	1333
R190D	8	12.00	0.00	1633
R190H	116	12.03	0.08	1450
R190K	11	12.10	0.01	1100
R190O	10	12.03	0.01	1000
R190U	33	12.03	0.02	1650
RPNR1	70	12.17	0.05	1400
RPNR1A	62	12.13	0.05	1240
RPNR2	97	12.13	0.08	1213
RPNR3	254	12.13	0.19	1337
RPNR3A	31	12.03	0.02	1550
RPNR4	311	12.13	0.24	1296
RPNR5	373	12.13	0.29	1286
RPNR5A	47	12.00	0.03	1567
RPNR6	544	12.17	0.43	1265
SPNR1A	62	12.10	0.05	1240

Table 3.4.1
Powder Wash - 110
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	57	4.07	0.02	2850
110B	94	4.07	0.04	2350
PW1	151	4.07	0.06	2517
RPW1	151	4.07	0.06	2517
110C	11	4.03	0.00	2750
110D	213	4.03	0.07	3043
PW2	371	4.07	0.13	2854
RPW2	364	4.10	0.13	2800
110E	75	4.03	0.03	2500
*PW3	430	4.07	0.16	2688
110F	22	4.03	0.01	2200
110G	19	4.03	0.01	1900
PW3	468	4.07	0.17	2753
RPW3	457	4.13	0.17	2688
110H	66	4.10	0.03	2200
*PW4	520	4.13	0.20	2600
110I	45	4.07	0.02	2250
PW4	562	4.10	0.22	2555
SPW4	492	4.20	0.22	2236
110J	21	4.03	0.01	2100
110K	44	4.00	0.01	4400
R110K	41	4.03	0.01	4100
110L	64	4.03	0.02	3200
PW5	563	4.17	0.27	2085
RPW5	556	4.23	0.27	2059
110M	83	4.03	0.03	2767
*PW6	601	4.23	0.30	2003
110N	36	4.03	0.01	3600
110O	12	4.00	0.00	3000
PW6	629	4.20	0.32	1966

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	57	4.07	0.02	2850
110B	94	4.07	0.04	2350
110C	11	4.03	0.00	2750
110D	213	4.03	0.07	3043
110E	75	4.03	0.03	2500
110F	22	4.03	0.01	2200
110G	19	4.03	0.01	1900
110H	66	4.10	0.03	2200
110I	45	4.07	0.02	2250
110J	21	4.03	0.01	2100
110K	44	4.00	0.01	4400
110L	64	4.03	0.02	3200
110M	83	4.03	0.03	2767
110N	36	4.03	0.01	3600
110O	12	4.00	0.00	3000
PW1	151	4.07	0.06	2517
PW2	371	4.07	0.13	2854
* PW3	430	4.07	0.16	2688
PW3	468	4.07	0.17	2753
* PW4	520	4.13	0.20	2600
PW4	562	4.10	0.22	2555
PW5	563	4.17	0.27	2085
* PW6	601	4.23	0.30	2003
PW6	629	4.20	0.32	1966
R110K	41	4.03	0.01	4100
RPW1	151	4.07	0.06	2517
RPW2	364	4.10	0.13	2800
RPW3	457	4.13	0.17	2688
RPW5	556	4.23	0.27	2059
SPW4	492	4.20	0.22	2236

Table 3.4.2
Cereus Wash - 120
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	33	4.07	0.02	1650
120B	130	4.07	0.05	2600
160A	20	4.00	0.01	2000
R160A	19	4.07	0.01	1900
CER1	182	4.07	0.08	2275
SCER1	138	4.20	0.08	1725
120C	14	4.03	0.01	2800
CER2	146	4.17	0.08	1825
RCER2	145	4.27	0.08	1813
120D	174	4.07	0.07	2486
*CER3	294	4.10	0.15	1960
120H	10	4.07	0.01	2000
R120H	10	4.07	0.01	2000
120I	18	4.03	0.01	1800
CER3A	27	4.03	0.01	2700
SCER3A	21	4.17	0.01	2100
CER3	313	4.10	0.16	1956
SCER3	301	4.13	0.16	1881
RCER3	301	4.17	0.16	1881
120E	36	4.07	0.02	1800
*CER4	332	4.17	0.18	1844
126A	19	4.03	0.01	1900
R126A	18	4.13	0.01	1800
126B	46	4.07	0.02	2300
WW1	63	4.07	0.03	2100
RWW1	62	4.10	0.03	2067
126C	243	4.13	0.14	1736
R126C	241	4.17	0.14	1721
126D	71	4.07	0.03	2367
WW3	353	4.17	0.20	1765
RWW3	348	4.20	0.20	1740
126E	227	4.13	0.09	2522
126F	149	4.10	0.05	2980
WW4	372	4.13	0.15	2480
RWW4	358	4.20	0.15	2387
126G	290	4.10	0.14	2071
126H	51	4.03	0.02	2550
WW5	997	4.17	0.50	1994
RWW5	986	4.23	0.50	1972
126I	227	4.07	0.08	2838
126J	4	4.03	0.00	2000
R126J	4	4.07	0.00	2000
WW6	1094	4.20	0.58	1886
RWW6	1090	4.23	0.58	1879
126M	59	4.07	0.03	1967

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	33	4.07	0.02	1650
120B	130	4.07	0.05	2600
120C	14	4.03	0.01	2800
120D	174	4.07	0.07	2486
120E	36	4.07	0.02	1800
120F	60	4.03	0.02	3000
120G	98	4.07	0.04	2450
120H	10	4.07	0.01	2000
120I	18	4.03	0.01	1800
120J	9	4.10	0.01	900
120K	74	4.07	0.03	2467
120L	97	4.07	0.04	2425
120M	77	4.10	0.04	1925
120N	123	4.03	0.04	3075
120O	25	4.00	0.01	2500
120P	96	4.00	0.03	3200
120Q	92	4.07	0.04	2300
120R	27	4.07	0.01	2700
120S	18	4.03	0.01	1800
120T	6	4.03	0.00	3000
120U	57	4.03	0.02	2850
120V	27	4.03	0.01	2700
120W	17	4.00	0.01	3400
120X	52	4.03	0.02	2600
121A	105	4.10	0.05	2100
121B	38	4.10	0.02	1900
122A	41	4.07	0.02	2050
122B	103	4.03	0.03	3433
122C	40	4.03	0.01	4000
122D	83	4.07	0.03	2767
122E	89	4.03	0.03	2967
122F	22	4.07	0.01	2200
122G	70	4.03	0.02	3500
122H	18	4.03	0.01	1800
122I	18	4.03	0.01	1800
122J	59	4.07	0.03	1967
122K	6	4.07	0.00	2000
123A	181	4.07	0.08	2263
123B	50	4.03	0.02	2500
123C	10	4.00	0.00	3333
123D	16	4.10	0.01	1600
124A	166	4.07	0.07	2371
124B	131	4.03	0.04	3275
124C	45	4.07	0.02	2250
124D	16	4.10	0.01	1600

*WW7	1119	4.23	0.61	1834	124E	135	4.07	0.05	2700
126K	28	4.03	0.01	2800	125A	167	4.10	0.08	2088
R126K	28	4.10	0.01	2800	125B	262	4.10	0.11	2382
126L	52	4.07	0.02	2600	125C	80	4.07	0.03	2667
WW7	1162	4.23	0.64	1816	125D	28	4.20	0.02	1400
SWW7	1089	4.30	0.64	1702	125E	128	4.03	0.05	2560
127A	66	4.07	0.03	2200	126A	19	4.03	0.01	1900
127B	105	4.03	0.04	2625	126B	46	4.07	0.02	2300
CAP1	170	4.07	0.07	2429	126C	243	4.13	0.14	1736
RCAP1	167	4.10	0.07	2386	126D	71	4.07	0.03	2367
127C	112	4.07	0.04	2800	126E	227	4.13	0.09	2522
127D	61	4.03	0.02	3050	126F	149	4.10	0.05	2980
CAP2	338	4.07	0.13	2600	126G	290	4.10	0.14	2071
RCAP2	333	4.10	0.13	2562	126H	51	4.03	0.02	2550
127E	251	4.07	0.10	2510	126I	227	4.07	0.08	2838
127F	350	4.10	0.15	2333	126J	4	4.03	0.00	2000
CAP3	597	4.10	0.25	2388	126K	28	4.03	0.01	2800
RCAP3	592	4.10	0.25	2368	126L	52	4.07	0.02	2600
127G	163	4.03	0.06	2717	126M	59	4.07	0.03	1967
CAP4	743	4.10	0.31	2397	126N	165	4.10	0.08	2063
SCAP4	735	4.10	0.31	2371	127A	66	4.07	0.03	2200
R2CAP4	732	4.13	0.31	2361	127B	105	4.03	0.04	2625
127I	21	4.07	0.01	2100	127C	112	4.07	0.04	2800
*CAP5	750	4.13	0.32	2344	127D	61	4.03	0.02	3050
127H	50	4.03	0.02	2500	127E	251	4.07	0.10	2510
CAP5	1112	4.10	0.47	2366	127F	350	4.10	0.15	2333
RCAP5	1102	4.13	0.47	2345	127G	163	4.03	0.06	2717
127J	82	4.07	0.03	2733	127H	50	4.03	0.02	2500
CAP6	1174	4.13	0.50	2348	127I	21	4.07	0.01	2100
WW8	1867	4.17	1.14	1638	127J	82	4.07	0.03	2733
RWW8	1852	4.27	1.14	1625	160A	20	4.00	0.01	2000
126N	165	4.10	0.08	2063	D122C	20	4.03	0.01	2000
WW9	1934	4.23	1.22	1585	DO122C	20	4.03	0.01	2000
CER4	2143	4.23	1.40	1531	CAP1	170	4.07	0.07	2429
RCER4	2139	4.27	1.40	1528	CAP2	338	4.07	0.13	2600
120F	60	4.03	0.02	3000	CAP3	597	4.10	0.25	2388
*CER5	2158	4.27	1.42	1520	CAP4	743	4.10	0.31	2397
125A	167	4.10	0.08	2088	* CAP5	750	4.13	0.32	2344
125B	262	4.10	0.11	2382	CAP5	1112	4.10	0.47	2366
CHK1	428	4.10	0.19	2253	CAP6	1174	4.13	0.50	2348
RCHK1	422	4.13	0.19	2221	CER1	182	4.07	0.08	2275
125C	80	4.07	0.03	2667	CER2	146	4.17	0.08	1825
R125C	65	4.13	0.03	2167	* CER3	294	4.10	0.15	1960
125D	28	4.20	0.02	1400	CER3	313	4.10	0.16	1956
CHK2	514	4.13	0.24	2142	CER3A	27	4.03	0.01	2700
R2CHK2	504	4.20	0.24	2100	* CER4	332	4.17	0.18	1844
125E	128	4.03	0.05	2560	CER4	2143	4.23	1.40	1531
CHK3	592	4.17	0.28	2114	* CER5	2158	4.27	1.42	1520
CER5	2503	4.27	1.71	1464	CER5	2503	4.27	1.71	1464
RCER5	2490	4.30	1.71	1456	* CER6	2526	4.27	1.74	1452
120G	98	4.07	0.04	2450	CER6	2748	4.27	1.94	1416
*CER6	2526	4.27	1.74	1452	* CER7	2769	4.30	1.97	1406
124A	166	4.07	0.07	2371	CER7	2860	4.30	2.07	1382
124B	131	4.03	0.04	3275	CER7A	83	4.07	0.04	2075
LOG1	292	4.07	0.11	2655	* CER8	2877	4.37	2.12	1357
RLOG1	287	4.07	0.11	2609	CER8	2961	4.37	2.20	1346

124D	16	4.10	0.01	1600
*LOG2	303	4.07	0.12	2525
124C	45	4.07	0.02	2250
LOG2	348	4.07	0.14	2486
RLOG2	340	4.13	0.14	2429
124E	135	4.07	0.05	2700
LOG3	458	4.13	0.19	2411
CER6	2748	4.27	1.94	1416
RCER6	2734	4.30	1.94	1409
120L	97	4.07	0.04	2425
*CER7	2769	4.30	1.97	1406
120J	9	4.10	0.01	900
R120J	9	4.10	0.01	900
120K	74	4.07	0.03	2467
CER7A	83	4.07	0.04	2075
SCER7A	80	4.13	0.04	2000
RCER7A	77	4.20	0.04	1925
120M	77	4.10	0.04	1925
123B	50	4.03	0.02	2500
S123B	50	4.07	0.02	2500
R123B	49	4.07	0.02	2450
R123B	49	4.07	0.02	2450
CER7	2860	4.30	2.07	1382
RCER7	2843	4.37	2.07	1373
120N	123	4.03	0.04	3075
*CER8	2877	4.37	2.12	1357
123A	181	4.07	0.08	2263
S123A	175	4.10	0.08	2188
123D	16	4.10	0.01	1600
TRV1	191	4.10	0.09	2122
STRV1	189	4.13	0.09	2100
RTRV1	181	4.20	0.09	2011
123C	10	4.00	0.00	3333
S123C	10	4.00	0.00	3333
R123C	10	4.00	0.00	3333
R123C	9	4.13	0.00	3000
CER8	2961	4.37	2.20	1346
RCER8	2954	4.40	2.20	1343
120O	25	4.00	0.01	2500
S120O	25	4.03	0.01	2500
R120O	24	4.03	0.01	2400
R120O	21	4.17	0.01	2100
120Q	92	4.07	0.04	2300
*CER9	2988	4.40	2.25	1328
120P	96	4.00	0.03	3200
S120P	96	4.00	0.03	3200
R120P	94	4.03	0.03	3133
CER9	2998	4.40	2.28	1315
SCER9	563	5.27	2.28	247
120R	27	4.07	0.01	2700
120S	18	4.03	0.01	1800
CER10	593	4.10	2.29	259
RCER10	592	4.13	2.29	259
120T	6	4.03	0.00	3000
*CER11	595	4.13	2.30	259
122C	40	4.03	0.01	4000

* CER9	2988	4.40	2.25	1328
CER9	2998	4.40	2.28	1315
CER10	593	4.10	2.29	259
* CER11	595	4.13	2.30	259
CER11	915	4.13	2.50	366
* CER12	940	4.13	2.52	373
CER12	1027	4.13	2.59	397
CER13	1040	4.17	2.60	400
* CER14	1052	4.20	2.62	402
CER14	1059	4.20	2.62	404
CHK1	428	4.10	0.19	2253
CHK2	514	4.13	0.24	2142
CHK3	592	4.17	0.28	2114
D122C	20	4.03	0.01	2000
LOG1	292	4.07	0.11	2655
* LOG2	303	4.07	0.12	2525
LOG2	348	4.07	0.14	2486
LOG3	458	4.13	0.19	2411
LSR1	136	4.07	0.05	2720
LSR1B	56	4.10	0.02	2800
LSR2	272	4.07	0.11	2473
LSR2B	108	4.03	0.05	2160
LSR3	439	4.07	0.18	2439
LSR4	494	4.10	0.20	2470
LSR5	497	4.10	0.21	2367
LTD1	143	4.10	0.07	2043
TRV1	191	4.10	0.09	2122
WW1	63	4.07	0.03	2100
WW3	353	4.17	0.20	1765
WW4	372	4.13	0.15	2480
WW5	997	4.17	0.50	1994
WW6	1094	4.20	0.58	1886
* WW7	1119	4.23	0.61	1834
WW7	1162	4.23	0.64	1816
WW8	1867	4.17	1.14	1638
WW9	1934	4.23	1.22	1585
R120H	10	4.07	0.01	2000
R120J	9	4.10	0.01	900
R120O	24	4.03	0.01	2400
R120O	21	4.17	0.01	2100
R120P	94	4.03	0.03	3133
R120W	11	4.10	0.01	2200
R121A	105	4.10	0.05	2100
R122C	19	4.07	0.01	1900
R122D	83	4.07	0.03	2767
R122F	22	4.10	0.01	2200
R123B	49	4.07	0.02	2450
R123B	49	4.07	0.02	2450
R123C	9	4.13	0.00	3000
R123C	10	4.00	0.00	3333
R125C	65	4.13	0.03	2167
R126A	18	4.13	0.01	1800
R126C	241	4.17	0.14	1721
R126J	4	4.07	0.00	2000
R126K	28	4.10	0.01	2800
R160A	19	4.07	0.01	1900

DO122C	20	4.03	0.01	2000	R2CAP4	732	4.13	0.31	2361
D122C	20	4.03	0.01	2000	R2CHK2	504	4.20	0.24	2100
R122C	19	4.07	0.01	1900	RCAP1	167	4.10	0.07	2386
122E	89	4.03	0.03	2967	RCAP2	333	4.10	0.13	2562
LSR2B	108	4.03	0.05	2160	RCAP3	592	4.10	0.25	2368
RLSR2B	105	4.10	0.05	2100	RCAP5	1102	4.13	0.47	2345
122D	83	4.07	0.03	2767	RCER2	145	4.27	0.08	1813
R122D	83	4.07	0.03	2767	RCER3	301	4.17	0.16	1881
122F	22	4.07	0.01	2200	RCER4	2139	4.27	1.40	1528
R122F	22	4.10	0.01	2200	RCER5	2490	4.30	1.71	1456
122G	70	4.03	0.02	3500	RCER6	2734	4.30	1.94	1409
LSR2	272	4.07	0.11	2473	RCER7	2843	4.37	2.07	1373
RLSR2	269	4.07	0.11	2445	RCER7A	77	4.20	0.04	1925
122A	41	4.07	0.02	2050	RCER8	2954	4.40	2.20	1343
D122C	20	4.03	0.01	2000	RCER10	592	4.13	2.29	259
RD122C	17	4.17	0.01	1700	RCER11	912	4.17	2.50	365
LSR1B	56	4.10	0.02	2800	RCER13	1027	4.17	2.59	397
RLSR1B	53	4.20	0.02	2650	RCER13	1032	4.20	2.60	397
122B	103	4.03	0.03	3433	RCHK1	422	4.13	0.19	2221
LSR1	136	4.07	0.05	2720	RD122C	17	4.17	0.01	1700
RLSR1	136	4.07	0.05	2720	RLOG1	287	4.07	0.11	2609
122H	18	4.03	0.01	1800	RLOG2	340	4.13	0.14	2429
122I	18	4.03	0.01	1800	RLS4	491	4.10	0.20	2455
LSR3	439	4.07	0.18	2439	RLSR1	136	4.07	0.05	2720
RLSR3	437	4.10	0.18	2428	RLSR1B	53	4.20	0.02	2650
122J	59	4.07	0.03	1967	RLSR2	269	4.07	0.11	2445
LSR4	494	4.10	0.20	2470	RLSR2B	105	4.10	0.05	2100
RLS4	491	4.10	0.20	2455	RLSR3	437	4.10	0.18	2428
122K	6	4.07	0.00	2000	RTRV1	181	4.20	0.09	2011
LSR5	497	4.10	0.21	2367	RWW1	62	4.10	0.03	2067
CER11	915	4.13	2.50	366	RWW3	348	4.20	0.20	1740
RCER11	912	4.17	2.50	365	RWW4	358	4.20	0.15	2387
120U	57	4.03	0.02	2850	RWW5	986	4.23	0.50	1972
*CER12	940	4.13	2.52	373	RWW6	1090	4.23	0.58	1879
121A	105	4.10	0.05	2100	RWW8	1852	4.27	1.14	1625
R121A	105	4.10	0.05	2100	S120O	25	4.03	0.01	2500
121B	38	4.10	0.02	1900	S120P	96	4.00	0.03	3200
LTD1	143	4.10	0.07	2043	S120W	11	4.07	0.01	2200
CER12	1027	4.13	2.59	397	S123A	175	4.10	0.08	2188
RCER13	1027	4.17	2.59	397	S123B	50	4.07	0.02	2500
120V	27	4.03	0.01	2700	S123C	10	4.00	0.00	3333
CER13	1040	4.17	2.60	400	SCAP4	735	4.10	0.31	2371
SCER13	1035	4.20	2.60	398	SCER1	138	4.20	0.08	1725
RCER13	1032	4.20	2.60	397	SCER3	301	4.13	0.16	1881
120X	52	4.03	0.02	2600	SCER3A	21	4.17	0.01	2100
*CER14	1052	4.20	2.62	402	SCER7A	80	4.13	0.04	2000
120W	17	4.00	0.01	3400	SCER9	563	5.27	2.28	247
S120W	11	4.07	0.01	2200	SCER13	1035	4.20	2.60	398
R120W	11	4.10	0.01	2200	STRV1	189	4.13	0.09	2100
CER14	1059	4.20	2.62	404	SWW7	1089	4.30	0.64	1702

Table 3.4.3
Cyprus Point Wash - 130
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	14	4.07	0.01	1400
130B	90	4.03	0.03	3000
130C	10	4.07	0.01	2000
R130C	10	4.13	0.01	2000
130D	7	4.07	0.00	1750
CP1	118	4.03	0.05	2360
RCP1	112	4.13	0.05	2240
130F	92	4.07	0.04	2300
*CP2	201	4.10	0.09	2233
130E	8	4.07	0.00	2000
CP2	208	4.10	0.09	2311
RCP2	204	4.13	0.09	2267
131A	117	4.07	0.05	2340
CP3	315	4.10	0.14	2250
SCP3	314	4.10	0.14	2243
RCP3	314	4.10	0.14	2243
130G	35	4.03	0.01	3500
CP4	341	4.10	0.15	2273

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	14	4.07	0.01	1400
130B	90	4.03	0.03	3000
130C	10	4.07	0.01	2000
130D	7	4.07	0.00	1750
130E	8	4.07	0.00	2000
130F	92	4.07	0.04	2300
130G	35	4.03	0.01	3500
131A	117	4.07	0.05	2340
CP1	118	4.03	0.05	2360
* CP2	201	4.10	0.09	2233
CP2	208	4.10	0.09	2311
CP3	315	4.10	0.14	2250
CP4	341	4.10	0.15	2273
R130C	10	4.13	0.01	2000
RCP1	112	4.13	0.05	2240
RCP2	204	4.13	0.09	2267
RCP3	314	4.10	0.14	2243
SCP3	314	4.10	0.14	2243

Table 3.4.4
Cyprus Point Wash - 130
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	14	4.07	0.01	1400
130B	90	4.03	0.03	3000
130C	10	4.07	0.01	2000
R130C	10	4.13	0.01	2000
130D	7	4.07	0.00	1750
CP1	118	4.03	0.05	2360
RCP1	112	4.13	0.05	2240
130F	92	4.07	0.04	2300
*CP2	201	4.10	0.09	2233
130E	8	4.07	0.00	2000
CP2	208	4.10	0.09	2311
RCP2	204	4.13	0.09	2267
131A	117	4.07	0.05	2340
CP3	315	4.10	0.14	2250
SCP3	314	4.10	0.14	2243
RCP3	314	4.10	0.14	2243
130G	35	4.03	0.01	3500
CP4	341	4.10	0.15	2273
RD151B	6	4.07	0.00	1224
KGT3A	118	4.03	0.04	2950
R151D	116	4.13	0.04	2900
151E	151	4.07	0.07	2157
*KGT3	271	4.10	0.12	2258
151I	13	4.03	0.01	1300
KGT3	283	4.10	0.13	2177
RKGT3	283	4.10	0.13	2177
151J	10	4.00	0.00	3333
*KGT4	289	4.10	0.13	2223
151H	8	4.07	0.00	1633
R151H	8	4.10	0.00	1633
KGT4	297	4.10	0.13	2285
RKGT4	296	4.13	0.13	2277
151K	105	4.03	0.03	3500
KGT5	368	4.10	0.17	2165
RKGT5	367	4.13	0.17	2159
151L	146	4.03	0.05	2920
KGT6	496	4.10	0.22	2255
152A	106	4.07	0.04	2650
R152A	105	4.07	0.04	2625
152B	41	4.03	0.02	2050
*MNG1	145	4.07	0.06	2417
152C	34	4.03	0.01	3400
MNG1	178	4.07	0.07	2543
RMNG1	171	4.13	0.07	2443
152D	44	4.07	0.02	2200

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	14	4.07	0.01	1400
130B	90	4.03	0.03	3000
130C	10	4.07	0.01	2000
130D	7	4.07	0.00	1750
130E	8	4.07	0.00	2000
130F	92	4.07	0.04	2300
130G	35	4.03	0.01	3500
131A	117	4.07	0.05	2340
CP1	118	4.03	0.05	2360
* CP2	201	4.10	0.09	2233
CP2	208	4.10	0.09	2311
CP3	315	4.10	0.14	2250
CP4	341	4.10	0.15	2273
R130C	10	4.13	0.01	2000
RCP1	112	4.13	0.05	2240
RCP2	204	4.13	0.09	2267
RCP3	314	4.10	0.14	2243
SCP3	314	4.10	0.14	2243
151C	12	4.03	0.01	2400
151D	110	4.03	0.04	2750
151E	151	4.07	0.07	2157
151F	6	4.07	0.00	2000
151H	8	4.07	0.00	1633
151I	13	4.03	0.01	1300
151J	10	4.00	0.00	3333
151K	105	4.03	0.03	3500
151L	146	4.03	0.05	2920
152A	106	4.07	0.04	2650
152B	41	4.03	0.02	2050
152C	34	4.03	0.01	3400
152D	44	4.07	0.02	2200
152E	39	4.07	0.02	1950
152F	35	4.07	0.01	3500
D151A	2	4.00	0.00	667
D151A	7	4.00	0.00	2333
D151B	6	4.03	0.00	1224
D151B	6	4.03	0.00	1224
D151F	3	4.07	0.00	1000
DO151A	2	4.00	0.00	667
DO151B	6	4.03	0.00	1224
DO151F	3	4.07	0.00	1000
JKL1	14	4.30	0.01	1400
JKL2	175	4.07	0.09	1944
JKL3	215	4.07	0.11	1955
JKL4	82	4.30	0.12	683

*MNG2	209	4.13	0.09	2322
152E	39	4.07	0.02	1950
MNG2	247	4.10	0.10	2470
RMNG2	246	4.17	0.10	2460
152F	35	4.07	0.01	3500
MNG3	273	4.17	0.12	2275
150A	27	4.03	0.01	2700
S150A	10	4.33	0.01	1000
150B	8	4.03	0.00	2667
R150B	8	4.03	0.00	2667
S150B	8	4.03	0.00	2667
JKL1	14	4.30	0.01	1400
RJKL1	14	4.33	0.01	1400
150C	63	4.03	0.02	3150
150D	110	4.10	0.05	2200
JKL2	175	4.07	0.09	1944
RJKL2	167	4.10	0.09	1856
150E	67	4.00	0.02	3350
JKL3	215	4.07	0.11	1955
SJKL3	74	4.50	0.11	673
150F	11	4.03	0.00	2750
150G	9	4.07	0.00	1837
D151A	2	4.00	0.00	667
RD151A	2	4.13	0.00	667
JKL4	82	4.30	0.12	683
RJKL4	82	4.30	0.12	683
150H	94	4.03	0.03	3133
JKL5	169	4.03	0.15	1127
RJKL5	151	4.27	0.15	1007
150I	219	4.13	0.12	1825
JKL6	346	4.20	0.27	1281
RJKL6	345	4.23	0.27	1278
150J	12	4.10	0.01	1200
R150J	12	4.17	0.01	1200
150K	27	4.03	0.01	2700
*JKL7	369	4.20	0.29	1272
JKL7	638	4.17	0.41	1556
RJKL7	634	4.20	0.41	1546
150L	24	4.03	0.01	2400
*JKL8	651	4.20	0.41	1588
JKL8	1044	4.17	0.63	1657
SJKL8	1004	4.23	0.63	1594
RJKL8	1000	4.23	0.63	1587
150M	71	4.03	0.02	3550
JKL9	1019	4.23	0.66	1544
SJKL9	1016	4.27	0.66	1539
150N	3	4.03	0.00	3000
150O	8	4.07	0.00	2000
JKL10	1021	4.27	0.66	1547
RJKL10	1019	4.27	0.66	1544
150P	2	4.07	0.00	2000
JKL11	1020	4.27	0.66	1545

JKL5	169	4.03	0.15	1127
JKL6	346	4.20	0.27	1281
* JKL7	369	4.20	0.29	1272
JKL7	638	4.17	0.41	1556
* JKL8	651	4.20	0.41	1588
JKL8	1044	4.17	0.63	1657
JKL9	1019	4.23	0.66	1544
JKL10	1021	4.27	0.66	1547
JKL11	1020	4.27	0.66	1545
KGT1	12	4.07	0.01	1200
KGT2	18	4.17	0.01	1800
* KGT3	271	4.10	0.12	2258
KGT3	283	4.10	0.13	2177
KGT3A	118	4.03	0.04	2950
* KGT4	289	4.10	0.13	2223
KGT4	297	4.10	0.13	2285
KGT5	368	4.10	0.17	2165
KGT6	496	4.10	0.22	2255
* MNG1	145	4.07	0.06	2417
MNG1	178	4.07	0.07	2543
* MNG2	209	4.13	0.09	2322
MNG2	247	4.10	0.10	2470
MNG3	273	4.17	0.12	2275
R150B	8	4.03	0.00	2667
R150J	12	4.17	0.01	1200
R151A	6	4.07	0.00	2000
R151D	116	4.13	0.04	2900
R151H	8	4.10	0.00	1633
R152A	105	4.07	0.04	2625
RD151A	2	4.13	0.00	667
RD151B	6	4.07	0.00	1224
RD151F	3	4.07	0.00	1000
RJKL1	14	4.33	0.01	1400
RJKL10	1019	4.27	0.66	1544
RJKL2	167	4.10	0.09	1856
RJKL4	82	4.30	0.12	683
RJKL5	151	4.27	0.15	1007
RJKL6	345	4.23	0.27	1278
RJKL7	634	4.20	0.41	1546
RJKL8	1000	4.23	0.63	1587
RKGT1	10	4.23	0.01	1000
RKGT2	18	4.23	0.01	1800
RKGT3	283	4.10	0.13	2177
RKGT4	296	4.13	0.13	2277
RKGT5	367	4.13	0.17	2159
RMNG1	171	4.13	0.07	2443
RMNG2	246	4.17	0.10	2460
S150A	10	4.33	0.01	1000
S150B	8	4.03	0.00	2667
SJKL3	74	4.50	0.11	673
SJKL8	1004	4.23	0.63	1594
SJKL9	1016	4.27	0.66	1539

Table 3.4.5
Emerald Wash - 160
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	13	4.03	0.00	2653
R160V	13	4.07	0.00	2653
160W	6	4.00	0.00	3000
EMR13A	19	4.03	0.01	1900
DO160W	4	4.03	0.01	400
D160W	15	4.03	0.01	1500
REM13A	14	4.10	0.01	1400
160X	74	4.07	0.03	2467
EMR13B	88	4.07	0.04	2200
REM13B	85	4.17	0.04	2125
160Y	11	4.03	0.00	2750
R160Y	11	4.03	0.00	2750
160Z	122	4.10	0.06	2033
EMR13	209	4.13	0.10	2090
160G	44	4.10	0.02	2200
R160G	44	4.13	0.02	2200
160H	43	4.07	0.02	2150
EMR1	84	4.10	0.04	2100
REMR1	84	4.10	0.04	2100
160I	12	4.03	0.00	2449
160J	28	4.00	0.01	2800
EMR2	113	4.03	0.06	1883
REMR2	111	4.07	0.06	1850
160K	82	4.03	0.03	2733
EMR3	190	4.07	0.08	2375
REMR3	189	4.10	0.08	2363
160M	153	4.07	0.06	2550
*EMR4	336	4.10	0.14	2400
160L	20	4.03	0.01	2000
R160L	20	4.07	0.01	2000
160N	70	4.00	0.02	3500
EMR4	413	4.07	0.17	2429
SEMR4	209	4.30	0.17	1229
160B	20	4.03	0.01	2000
R160B	16	4.30	0.01	1600
160C	46	4.03	0.02	2300
R160C	44	4.10	0.02	2200
EMR5A	49	4.13	0.02	2450
160D	62	4.13	0.04	1550
160F	28	4.10	0.02	1400
EMR5	341	4.17	0.25	1364
REMR5	340	4.20	0.25	1360
160O	162	4.07	0.06	2700
*EMR6	474	4.10	0.32	1481
151F	6	4.07	0.00	2000

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151F	6	4.07	0.00	2000
151G	4	4.07	0.00	1333
160B	20	4.03	0.01	2000
160C	46	4.03	0.02	2300
160D	62	4.13	0.04	1550
160F	28	4.10	0.02	1400
160G	44	4.10	0.02	2200
160H	43	4.07	0.02	2150
160I	12	4.03	0.00	2449
160J	28	4.00	0.01	2800
160K	82	4.03	0.03	2733
160L	20	4.03	0.01	2000
160M	153	4.07	0.06	2550
160N	70	4.00	0.02	3500
160O	162	4.07	0.06	2700
160P	62	4.03	0.02	3100
160Q	17	4.03	0.01	1700
160R	137	4.07	0.05	2740
160S	36	4.00	0.01	3600
160T	27	4.03	0.01	2700
160U	181	4.07	0.08	2263
160V	13	4.03	0.00	2653
160W	6	4.00	0.00	3000
160X	74	4.07	0.03	2467
160Y	11	4.03	0.00	2750
160Z	122	4.10	0.06	2033
160AA	14	4.03	0.00	2857
D151F	3	4.07	0.00	1000
D160W	4	4.03	0.01	400
D160W	15	4.03	0.01	1500
DO151F	3	4.07	0.00	1000
DO160W	4	4.03	0.01	400
EMR1	84	4.10	0.04	2100
EMR2	113	4.03	0.06	1883
EMR3	190	4.07	0.08	2375
* EMR4	336	4.10	0.14	2400
EMR4	413	4.07	0.17	2429
EMR5	341	4.17	0.25	1364
EMR5A	49	4.13	0.02	2450
* EMR6	474	4.10	0.32	1481
EMR6	480	4.10	0.33	1455
EMR6A	7	4.13	0.01	700
EMR7	508	4.17	0.35	1451
EMR8	218	4.93	0.36	606
EMR9	310	4.07	0.41	756

DO151F	3	4.07	0.00	1000
D151F	3	4.07	0.00	1000
R151F	3	4.17	0.00	1000
151G	4	4.07	0.00	1333
EMR6A	7	4.13	0.01	700
REMR6A	7	4.17	0.01	700
EMR6	480	4.10	0.33	1455
REMR6	470	4.20	0.33	1424
160P	62	4.03	0.02	3100
EMR7	508	4.17	0.35	1451
SEMR7	217	4.93	0.35	620
160Q	17	4.03	0.01	1700
D160W	4	4.03	0.01	400
RD160W	4	4.03	0.01	400
EMR8	218	4.93	0.36	606
REMR8	218	4.97	0.36	606
160R	137	4.07	0.05	2740
EMR9	310	4.07	0.41	756
REMR9	310	4.10	0.41	756
160S	36	4.00	0.01	3600
EMR10	333	4.07	0.42	793
SEMR10	240	4.40	0.42	571
160T	27	4.03	0.01	2700
EMR11	246	4.27	0.43	572
REMR11	246	4.37	0.43	572
160U	181	4.07	0.08	2263
*EMR12	373	4.17	0.51	731
EMR12	563	4.13	0.61	923
SEMR12	554	4.20	0.61	908
REMR12	555	4.20	0.61	910
160AA	14	4.03	0.00	2857
EMR13	562	4.20	0.61	921
EMR10	333	4.07	0.42	793
EMR11	246	4.27	0.43	572
* EMR12	373	4.17	0.51	731
EMR12	563	4.13	0.61	923
EMR13	562	4.20	0.61	921
EMR13	209	4.13	0.10	2090
EMR13A	19	4.03	0.01	1900
EMR13B	88	4.07	0.04	2200
R151F	3	4.17	0.00	1000
R160B	16	4.30	0.01	1600
R160C	44	4.10	0.02	2200
R160G	44	4.13	0.02	2200
R160L	20	4.07	0.01	2000
R160V	13	4.07	0.00	2653
R160Y	11	4.03	0.00	2750
RD160W	4	4.03	0.01	400
REM13A	14	4.10	0.01	1400
REM13B	85	4.17	0.04	2125
REMR1	84	4.10	0.04	2100
REMR2	111	4.07	0.06	1850
REMR3	189	4.10	0.08	2363
REMR5	340	4.20	0.25	1360
REMR6	470	4.20	0.33	1424
REMR6A	7	4.17	0.01	700
REMR8	218	4.97	0.36	606
REMR9	310	4.10	0.41	756
REMR11	246	4.37	0.43	572
REMR12	555	4.20	0.61	910
SEMR4	209	4.30	0.17	1229
SEMR7	217	4.93	0.35	620
SEMR10	240	4.40	0.42	571
SEMR12	554	4.20	0.61	908

Table 3.4.6
Malta Drain - 170
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	13	4.03	0.00	2653
R160V	13	4.07	0.00	2653
160W	6	4.00	0.00	3000
EMR13A	19	4.03	0.01	1900
DO160W	15	4.03	0.01	1500
D160W	4	4.03	0.01	400
R160W	4	4.07	0.01	400
170A	73	4.03	0.02	3650
170B	13	4.00	0.00	3250
MLT1	88	4.03	0.04	2200
RMLT1	85	4.10	0.04	2125
170C	89	4.03	0.03	2967
MLT2	171	4.07	0.07	2443
170D	17	4.03	0.01	1700
MLT3	187	4.07	0.08	2338
RMLT3	178	4.17	0.08	2225
170E	222	4.07	0.09	2467
MLT4	378	4.13	0.17	2224
170F	51	4.03	0.02	2550
R170F	51	4.03	0.02	2550
170G	6	4.03	0.00	2000
MLT4A	430	4.10	0.19	2263
RMLT4A	428	4.10	0.19	2253
170H	30	4.00	0.01	3000
MLT5	448	4.10	0.20	2240
SMLT5	447	4.13	0.20	2235
RMLT5	446	4.13	0.20	2230
170I1	53	4.07	0.02	2650
DO180S	26	4.07	0.02	1300
D179I1	26	4.07	0.02	1300
R170I1	25	4.17	0.02	1250
170I2	34	4.03	0.01	3400
MLT6A	53	4.07	0.03	1767
DO180R	26	4.07	0.03	867
DMLT6A	26	4.07	0.03	867
RMLT6A	26	4.13	0.03	867
170I3	15	4.03	0.01	1500
MLT6	483	4.13	0.24	2013

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	13	4.03	0.00	2653
160W	6	4.00	0.00	3000
170A	73	4.03	0.02	3650
170B	13	4.00	0.00	3250
170C	89	4.03	0.03	2967
170D	17	4.03	0.01	1700
170E	222	4.07	0.09	2467
170F	51	4.03	0.02	2550
170G	6	4.03	0.00	2000
170H	30	4.00	0.01	3000
170I1	53	4.07	0.02	2650
170I2	34	4.03	0.01	3400
170I3	15	4.03	0.01	1500
D160W	4	4.03	0.01	400
D179I1	26	4.07	0.02	1300
DMLT6A	26	4.07	0.03	867
DO160W	15	4.03	0.01	1500
DO180R	26	4.07	0.03	867
DO180S	26	4.07	0.02	1300
EMR13A	19	4.03	0.01	1900
MLT1	88	4.03	0.04	2200
MLT2	171	4.07	0.07	2443
MLT3	187	4.07	0.08	2338
MLT4	378	4.13	0.17	2224
MLT4A	430	4.10	0.19	2263
MLT5	448	4.10	0.20	2240
MLT6	483	4.13	0.24	2013
MLT6A	53	4.07	0.03	1767
R160V	13	4.07	0.00	2653
R160W	4	4.07	0.01	400
R170F	51	4.03	0.02	2550
R170I1	25	4.17	0.02	1250
RMLT1	85	4.10	0.04	2125
RMLT3	178	4.17	0.08	2225
RMLT4A	428	4.10	0.19	2253
RMLT5	446	4.13	0.20	2230
RMLT6A	26	4.13	0.03	867
SMLT5	447	4.13	0.20	2235

Table 3.4.7
Colony Wash - 180
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
185A	108	4.03	0.04	2700
R185A	101	4.20	0.04	2525
185B	153	4.10	0.08	1913
IRW1	249	4.13	0.12	2075
SIRW1	147	4.40	0.12	1225
180A	65	4.03	0.03	2167
R180A	65	4.03	0.03	2167
180B	32	4.17	0.03	1067
IRW2	200	4.27	0.18	1111
RIRW2	200	4.27	0.18	1111
186A	224	4.07	0.10	2240
186B	14	4.03	0.00	2857
R186B	13	4.07	0.00	2653
SNB1A	238	4.07	0.10	2380
RSNB1A	236	4.13	0.10	2360
186C	42	4.03	0.02	2100
R186C	42	4.07	0.02	2100
186D	154	4.10	0.08	1925
SNB1	424	4.13	0.20	2120
RSNB1	416	4.20	0.20	2080
186E	93	4.07	0.04	2325
186F	68	4.07	0.03	2267
SNB2	533	4.17	0.27	1974
RSNB2	526	4.23	0.27	1948
186G	143	4.07	0.07	2043
SNB3	636	4.20	0.33	1927
SSNB3	100	4.93	0.33	303
186H	36	4.10	0.03	1200
160E	10	4.03	0.00	2500
R160E	10	4.07	0.00	2500
SNB4	116	4.63	0.36	322
RSNB4	116	4.70	0.36	322
186I	72	4.07	0.03	2400
*SNB5	135	4.30	0.39	346
187A	29	4.00	0.01	2900
R187A	29	4.03	0.01	2900
187B	21	4.03	0.01	2100
GRS1	49	4.03	0.02	2450
RGRS1	46	4.13	0.02	2300
187C	35	4.03	0.01	3500
R187C	34	4.07	0.01	3400
187D	126	4.13	0.07	1800
*GRS2	203	4.13	0.10	2030
188A	25	4.03	0.01	2500
R188A	24	4.07	0.01	2400

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160E	10	4.03	0.00	2500
170I1	53	4.07	0.02	2650
170I2	34	4.03	0.01	3400
180A	65	4.03	0.03	2167
180B	32	4.17	0.03	1067
180C	30	4.03	0.01	3000
180D	6	4.07	0.00	2000
180E	52	4.03	0.02	2600
180F	195	4.07	0.07	2786
180G	74	4.07	0.03	2467
180H	43	4.10	0.02	2150
180I	11	4.03	0.00	2750
180J	84	4.07	0.03	2800
180K	77	4.03	0.03	2567
180L	43	4.00	0.01	4300
180M	10	4.07	0.00	2041
180N	115	4.03	0.04	2875
180O	55	4.03	0.02	2750
180P	35	4.03	0.01	3500
180Q	84	4.07	0.03	2800
180R	79	4.03	0.03	2633
180S	113	4.03	0.04	2825
180T	67	4.03	0.02	3350
180U	42	4.07	0.02	2100
181A	0	0.03	0.08	0
181B	48	4.07	0.02	2400
182A	156	4.03	0.05	3120
182B	101	4.07	0.04	2525
182C	53	4.07	0.02	2650
182D	269	4.07	0.09	2989
182E	175	4.07	0.06	2917
182F	27	4.10	0.01	2700
182G	94	4.10	0.05	1880
182I	83	4.10	0.04	2075
182J	29	4.10	0.01	2900
182K	82	4.00	0.02	4100
182L	16	4.00	0.00	3265
183A	133	4.03	0.04	3325
183B	112	4.07	0.04	2800
183F	122	4.07	0.05	2440
183G	233	4.07	0.09	2589
183H	56	4.03	0.02	2800
183I	154	4.07	0.06	2567
183J	16	4.00	0.00	3265
183K	7	4.00	0.00	3500

188B	178	4.07	0.07	2543	184A	49	4.03	0.02	2450
188C	52	4.07	0.02	2600	184B	44	4.07	0.02	2200
SYR1	254	4.07	0.10	2540	184C	40	4.03	0.01	4000
RSYC1	249	4.10	0.10	2490	184D	13	4.07	0.01	1300
188D	122	4.07	0.05	2440	184E	170	4.17	0.11	1545
188E	100	4.10	0.05	2000	184F	14	4.07	0.01	1400
SYR2	469	4.10	0.20	2345	184G	145	4.07	0.05	2900
RSYC2	455	4.20	0.20	2275	184H	28	4.07	0.01	2800
188F	152	4.10	0.07	2171	184I	86	4.03	0.03	2867
SYR3	584	4.17	0.28	2086	184J	22	4.03	0.01	2200
SSYC3	259	4.50	0.28	925	184K	12	4.03	0.00	3000
RSYC3	259	4.50	0.28	925	185A	108	4.03	0.04	2700
188G	3	4.03	0.00	3000	185B	153	4.10	0.08	1913
SYR4	259	4.50	0.28	925	186A	224	4.07	0.10	2240
GRS2	414	4.17	0.38	1089	186B	14	4.03	0.00	2857
SGRS2	414	4.17	0.38	1089	186C	42	4.03	0.02	2100
187E	11	4.03	0.00	2245	186D	154	4.10	0.08	1925
R187E	11	4.07	0.00	2245	186E	93	4.07	0.04	2325
187F	5	4.07	0.00	1667	186F	68	4.07	0.03	2267
GRS3A	16	4.07	0.01	1600	186G	143	4.07	0.07	2043
RGRS3A	16	4.07	0.01	1600	186H	36	4.10	0.03	1200
187G	56	4.17	0.04	1400	186I	72	4.07	0.03	2400
GRS3	484	4.17	0.43	1126	187A	29	4.00	0.01	2900
RGRS3	482	4.17	0.43	1121	187B	21	4.03	0.01	2100
187H	11	4.03	0.00	2750	187C	35	4.03	0.01	3500
*SNB5	489	4.17	0.43	1137	187D	126	4.13	0.07	1800
SNB5	580	4.20	0.82	707	187E	11	4.03	0.00	2245
RSNB5	579	4.20	0.82	706	187F	5	4.07	0.00	1667
187I	68	4.03	0.02	3400	187G	56	4.17	0.04	1400
SNB6	610	4.17	0.85	718	187H	11	4.03	0.00	2750
SSNB6	96	6.20	0.85	113	187I	68	4.03	0.02	3400
RSNB6	96	6.30	0.85	113	188A	25	4.03	0.01	2500
180F	195	4.07	0.07	2786	188B	178	4.07	0.07	2543
*CLN1	225	4.07	0.92	245	188C	52	4.07	0.02	2600
CLN1	387	4.10	1.10	352	188D	122	4.07	0.05	2440
SCLN1	302	4.47	1.10	275	188E	100	4.10	0.05	2000
180C	30	4.03	0.01	3000	188F	152	4.10	0.07	2171
R180C	30	4.07	0.01	3000	188G	3	4.03	0.00	3000
180D	6	4.07	0.00	2000	D170I1	26	4.07	0.02	1300
180E	52	4.03	0.02	2600	D170I1	26	4.07	0.02	1300
CLN2	326	4.30	1.13	288	D170I1	26	4.07	0.02	1300
RCLN2	325	4.37	1.13	288	D170I2	26	4.07	0.01	2600
180G	74	4.07	0.03	2467	D183K	411	4.10	1.22	337
CLN3	366	4.13	1.16	316	D183K	42	4.10	1.22	34
SCLN3	315	4.63	1.16	272	DFC2	460	4.17	0.26	1769
180H	43	4.10	0.02	2150	DFHN	0	0.03	1.00	0
R180H	43	4.10	0.02	2150	DMLT6A	26	4.07	0.01	2600
180I	11	4.03	0.00	2750	DO183K	42	4.10	1.22	34
R180I	11	4.07	0.00	2750	DOFC2	158	4.17	0.26	608
180J	84	4.07	0.03	2800	* CLN1	225	4.07	0.92	245
CLN4B	136	4.07	0.06	2267	CLN1	387	4.10	1.10	352
RCLN4B	135	4.10	0.06	2250	CLN2	326	4.30	1.13	288
180M	10	4.07	0.00	2041	CLN3	366	4.13	1.16	316
CLN4	382	4.17	1.22	313	CLN4	382	4.17	1.22	313
RCLN4	382	4.27	1.22	313	CLN4B	136	4.07	0.06	2267
180N	115	4.03	0.04	2875	CLN5	698	4.30	1.63	428

184C	40	4.03	0.01	4000
184D	13	4.07	0.01	1300
NCL1	53	4.03	0.02	2650
RNCL1	52	4.03	0.02	2600
184E	170	4.17	0.11	1545
NCL2	210	4.13	0.13	1615
SNCL2	194	4.23	0.13	1492
184F	14	4.07	0.01	1400
R184F	14	4.07	0.01	1400
NCL3	205	4.23	0.14	1464
RNCL3	205	4.23	0.14	1464
SNCL3	198	4.33	0.14	1414
184A	49	4.03	0.02	2450
R184A	38	4.13	0.02	1900
184B	44	4.07	0.02	2200
NCL4A	81	4.10	0.04	2025
RNCL4A	81	4.13	0.04	2025
NCL4	264	4.27	0.18	1467
RNCL4	263	4.30	0.18	1461
184G	145	4.07	0.05	2900
NCL5	351	4.13	0.23	1526
SNCL5	262	4.47	0.23	1139
184H	28	4.07	0.01	2800
183A	133	4.03	0.04	3325
R183A	128	4.07	0.04	3200
183B	112	4.07	0.04	2800
NCL6A	240	4.07	0.08	3000
SNCL6A	1	6.13	0.08	13
RNCL6A	1	6.33	0.08	13
NCL6	273	4.43	0.33	827
RNCL6	273	4.50	0.33	827
184I	86	4.03	0.03	2867
NCL7	305	4.20	0.36	847
SNCL7	297	4.37	0.36	825
RNCL7	296	4.40	0.36	822
184J	22	4.03	0.01	2200
NCL8	304	4.33	0.37	822
SNCL8	304	4.33	0.37	822
RNCL8	304	4.30	0.37	822
184K	12	4.03	0.00	3000
NCL9	308	4.30	0.37	832
RNCL9	307	4.33	0.37	830
CLN5	698	4.30	1.63	428
SCLN5	662	4.57	1.63	406
180K	77	4.03	0.03	2567
R180K	75	4.07	0.03	2500
180L	43	4.00	0.01	4300
CLN6	688	4.50	1.67	412
RCLN6	688	4.53	1.67	412
180O	55	4.03	0.02	2750
*CLN7	699	4.53	1.69	414
182G	94	4.10	0.05	1880
182I	83	4.10	0.04	2075
FC1	177	4.10	0.09	1967
RFC1	176	4.13	0.09	1956
182D	269	4.07	0.09	2989
* CLN7	699	4.53	1.69	414
CLN7	1452	4.33	3.33	436
* CLN8	1460	4.37	3.35	436
CLN8	1506	4.33	3.45	437
CLN9	1523	4.40	3.50	435
* CLN10	1536	4.43	3.52	436
* CLN10	1606	4.43	3.59	447
CLN10	1625	4.43	3.62	449
CL10A	185	4.07	0.07	2643
FC1	177	4.10	0.09	1967
FC2	632	4.10	0.26	2431
FC3	755	4.10	0.37	2041
FC3A	252	4.07	0.09	2800
FC3B	301	4.10	0.11	2736
FC4	780	4.13	0.39	2000
FC5	954	4.17	1.61	593
FC6	982	4.17	1.63	602
FC7	987	4.20	1.64	602
GRS1	49	4.03	0.02	2450
* GRS2	203	4.13	0.10	2030
GRS2	414	4.17	0.38	1089
GRS3	484	4.17	0.43	1126
GRS3A	16	4.07	0.01	1600
IRW1	249	4.13	0.12	2075
IRW2	200	4.27	0.18	1111
LC1	330	4.07	1.16	284
LC2	451	4.10	1.22	370
LC3	454	4.10	1.22	372
MLT6A	53	4.07	0.01	5300
NCL1	53	4.03	0.02	2650
NCL2	210	4.13	0.13	1615
NCL3	205	4.23	0.14	1464
NCL4	264	4.27	0.18	1467
NCL4A	81	4.10	0.04	2025
NCL5	351	4.13	0.23	1526
NCL6	273	4.43	0.33	827
NCL6A	240	4.07	0.08	3000
NCL7	305	4.20	0.36	847
NCL8	304	4.33	0.37	822
NCL9	308	4.30	0.37	832
SNB1	424	4.13	0.20	2120
SNB1A	238	4.07	0.10	2380
SNB2	533	4.17	0.27	1974
SNB3	636	4.20	0.33	1927
SNB4	116	4.63	0.36	322
* SNB5	135	4.30	0.39	346
* SNB5	489	4.17	0.43	1137
SNB5	580	4.20	0.82	707
SNB6	610	4.17	0.85	718
SYR1	254	4.07	0.10	2540
SYR2	469	4.10	0.20	2345
SYR3	584	4.17	0.28	2086
SYR4	259	4.50	0.28	925
R160E	10	4.07	0.00	2500
R170I1	25	4.17	0.02	1250

R182D	263	4.10	0.09	2922	R170I1	26	4.10	0.02	1300
182E	175	4.07	0.06	2917	R180A	65	4.03	0.03	2167
182F	27	4.10	0.01	2700	R180C	30	4.07	0.01	3000
FC2	632	4.10	0.26	2431	R180H	43	4.10	0.02	2150
SFC2	624	4.13	0.26	2400	R180I	11	4.07	0.00	2750
RFC2	617	4.17	0.26	2373	R180K	75	4.07	0.03	2500
DOFC2	158	4.17	0.26	608	R181A	0	0.03	0.08	0
DFC2	460	4.17	0.26	1769	R182A	152	4.10	0.05	3040
182A	156	4.03	0.05	3120	R182D	263	4.10	0.09	2922
R182A	152	4.10	0.05	3040	R183A	128	4.07	0.04	3200
182B	101	4.07	0.04	2525	R183K	41	4.17	1.22	34
FC3A	252	4.07	0.09	2800	R183K	41	4.17	1.22	34
SFC3A	250	4.10	0.09	2778	R184A	38	4.13	0.02	1900
182C	53	4.07	0.02	2650	R184F	14	4.07	0.01	1400
FC3B	301	4.10	0.11	2736	R185A	101	4.20	0.04	2525
RFC3B	301	4.10	0.11	2736	R186B	13	4.07	0.00	2653
FC3	755	4.10	0.37	2041	R186C	42	4.07	0.02	2100
RFC4	752	4.13	0.37	2032	R187A	29	4.03	0.01	2900
182J	29	4.10	0.01	2900	R187C	34	4.07	0.01	3400
FC4	780	4.13	0.39	2000	R187E	11	4.07	0.00	2245
SFC4	712	4.23	0.39	1826	R188A	24	4.07	0.01	2400
DFHN	0	0.03	1.00	0	RCLN2	325	4.37	1.13	288
183F	122	4.07	0.05	2440	RCLN4	382	4.27	1.22	313
183G	233	4.07	0.09	2589	RCLN4B	135	4.10	0.06	2250
183H	56	4.03	0.02	2800	RCLN6	688	4.53	1.67	412
LC1	330	4.07	1.16	284	RCLN7	1451	4.37	3.33	436
RLC1	326	4.10	1.16	281	RCLN9	1521	4.47	3.50	435
183I	154	4.07	0.06	2567	RCL10A	183	4.07	0.07	2614
183J	16	4.00	0.00	3265	RFC1	176	4.13	0.09	1956
LC2	451	4.10	1.22	370	RFC2	617	4.17	0.26	2373
SLC2	450	4.10	1.22	369	RFC3B	301	4.10	0.11	2736
RLC2	450	4.10	1.22	369	RFC4	752	4.13	0.37	2032
183K	7	4.00	0.00	3500	RFC5	951	4.17	1.61	591
LC3	454	4.10	1.22	372	RFC6	981	4.20	1.63	602
DO183K	42	4.10	1.22	34	RGRS1	46	4.13	0.02	2300
D183K	411	4.10	1.22	337	RGRS3	482	4.17	0.43	1121
FC5	954	4.17	1.61	593	RGRS3A	16	4.07	0.01	1600
RFC5	951	4.17	1.61	591	RIRW2	200	4.27	0.18	1111
182K	82	4.00	0.02	4100	RLC1	326	4.10	1.16	281
FC6	982	4.17	1.63	602	RLC2	450	4.10	1.22	369
RFC6	981	4.20	1.63	602	RMLT6A	26	4.13	0.01	2600
182L	16	4.00	0.00	3265	RNCL1	52	4.03	0.02	2600
FC7	987	4.20	1.64	602	RNCL3	205	4.23	0.14	1464
CLN7	1452	4.33	3.33	436	RNCL4	263	4.30	0.18	1461
RCLN7	1451	4.37	3.33	436	RNCL4A	81	4.13	0.04	2025
180P	35	4.03	0.01	3500	RNCL6	273	4.50	0.33	827
*CLN8	1460	4.37	3.35	436	RNCL6A	1	6.33	0.08	13
181A	0	0.03	0.08	0	RNCL7	296	4.40	0.36	822
R181A	0	0.03	0.08	0	RNCL8	304	4.30	0.37	822
181B	48	4.07	0.02	2400	RNCL9	307	4.33	0.37	830
D183K	42	4.10	1.22	34	RSNB1	416	4.20	0.20	2080
R183K	41	4.17	1.22	34	RSNB1A	236	4.13	0.10	2360
R183K	41	4.17	1.22	34	RSNB2	526	4.23	0.27	1948
CLN8	1506	4.33	3.45	437	RSNB4	116	4.70	0.36	322
SCLN8	1486	4.43	3.45	431	RSNB5	579	4.20	0.82	706
180S	113	4.03	0.04	2825	RSNB6	96	6.30	0.85	113

170I1	53	4.07	0.02	2650	RSYC1	249	4.10	0.10	2490
D170I1	26	4.07	0.02	1300	RSYC2	455	4.20	0.20	2275
D170I1	26	4.07	0.02	1300	RSYC3	259	4.50	0.28	925
R170I1	26	4.10	0.02	1300	SCLN1	302	4.47	1.10	275
CLN9	1523	4.40	3.50	435	SCLN3	315	4.63	1.16	272
RCLN9	1521	4.47	3.50	435	SCLN5	662	4.57	1.63	406
180U	42	4.07	0.02	2100	SCLN8	1486	4.43	3.45	431
*CLN10	1536	4.43	3.52	436	SFC2	624	4.13	0.26	2400
180Q	84	4.07	0.03	2800	SFC3A	250	4.10	0.09	2778
180R	79	4.03	0.03	2633	SFC4	712	4.23	0.39	1826
170I2	34	4.03	0.01	3400	SGRS2	414	4.17	0.38	1089
D170I1	26	4.07	0.02	1300	SIRW1	147	4.40	0.12	1225
R170I1	25	4.17	0.02	1250	SLC2	450	4.10	1.22	369
MLT6A	53	4.07	0.01	5300	SNCL2	194	4.23	0.13	1492
D170I2	26	4.07	0.01	2600	SNCL3	198	4.33	0.14	1414
DMLT6A	26	4.07	0.01	2600	SNCL5	262	4.47	0.23	1139
RMLT6A	26	4.13	0.01	2600	SNCL6A	1	6.13	0.08	13
CL10A	185	4.07	0.07	2643	SNCL7	297	4.37	0.36	825
RCL10A	183	4.07	0.07	2614	SNCL8	304	4.33	0.37	822
*CLN10	1606	4.43	3.59	447	SSNB3	100	4.93	0.33	303
180T	67	4.03	0.02	3350	SSNB6	96	6.20	0.85	113
CLN10	1625	4.43	3.62	449	SSYC3	259	4.50	0.28	925

Table 3.4.8
Panorama Channel - 190
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	75	4.03	0.03	2500
S182H	72	4.10	0.03	2400
R182H	72	4.10	0.03	2400
190A	53	4.03	0.02	2650
PNR1A	122	4.07	0.05	2440
SPNR1A	123	4.07	0.05	2460
RPNR1A	123	4.10	0.05	2460
190B	19	4.03	0.01	1900
PNR1	140	4.10	0.05	2800
RPNR1	138	4.10	0.05	2760
190C	64	4.03	0.02	3200
PNR2	195	4.10	0.08	2438
RPNR2	191	4.13	0.08	2388
190D	18	4.00	0.00	3673
R190D	18	4.00	0.00	3673
190E	8	4.03	0.00	2667
190F	16	4.03	0.01	1600
190G	14	4.07	0.01	1400
PNR3A	55	4.03	0.02	2750
RPNR3A	54	4.03	0.02	2700
190H	214	4.07	0.08	2675
R190H	213	4.07	0.08	2663
190I	37	4.03	0.01	3700
190J	23	4.03	0.01	2300
PNR3	495	4.10	0.19	2605
RPNR3	493	4.10	0.19	2595
190K	21	4.03	0.01	2100
R190K	21	4.07	0.01	2100
190L	31	4.03	0.01	3100
*PNR4	540	4.10	0.21	2571
190M	23	4.03	0.01	2300
190N	52	4.03	0.02	2600
PNR4	606	4.10	0.24	2525
RPNR4	596	4.13	0.24	2483
190O	15	4.03	0.01	1500
R190O	15	4.07	0.01	1500
190P	72	4.00	0.02	3600
PNR5A	85	4.00	0.03	2833
RPNR5A	83	4.03	0.03	2767
190Q	23	4.10	0.01	2300
*PNR5	670	4.13	0.28	2393
190R	40	4.03	0.01	4000
PNR5	703	4.13	0.29	2424
RPNR5	698	4.13	0.29	2407
190S	17	4.10	0.01	1700

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	75	4.03	0.03	2500
190A	53	4.03	0.02	2650
190B	19	4.03	0.01	1900
190C	64	4.03	0.02	3200
190D	18	4.00	0.00	3673
190E	8	4.03	0.00	2667
190F	16	4.03	0.01	1600
190G	14	4.07	0.01	1400
190H	214	4.07	0.08	2675
190I	37	4.03	0.01	3700
190J	23	4.03	0.01	2300
190K	21	4.03	0.01	2100
190L	31	4.03	0.01	3100
190M	23	4.03	0.01	2300
190N	52	4.03	0.02	2600
190O	15	4.03	0.01	1500
190P	72	4.00	0.02	3600
190Q	23	4.10	0.01	2300
190R	40	4.03	0.01	4000
190S	17	4.10	0.01	1700
190T	266	4.10	0.13	2046
190U	57	4.03	0.02	2850
190V	38	4.07	0.02	1900
PNR1	140	4.10	0.05	2800
PNR1A	122	4.07	0.05	2440
PNR2	195	4.10	0.08	2438
PNR3	495	4.10	0.19	2605
PNR3A	55	4.03	0.02	2750
* PNR4	540	4.10	0.21	2571
PNR4	606	4.10	0.24	2525
* PNR5	670	4.13	0.28	2393
PNR5	703	4.13	0.29	2424
PNR5A	85	4.00	0.03	2833
* PNR6	714	4.13	0.30	2380
PNR6	973	4.13	0.43	2263
* PNR7	985	4.17	0.45	2189
PNR7	1027	4.17	0.47	2185
R182H	72	4.10	0.03	2400
R190D	18	4.00	0.00	3673
R190H	213	4.07	0.08	2663
R190K	21	4.07	0.01	2100
R190O	15	4.07	0.01	1500
R190U	56	4.07	0.02	2800
RPNR1	138	4.10	0.05	2760
RPNR1A	123	4.10	0.05	2460

*PNR6	714	4.13	0.30	2380	RPNR2	191	4.13	0.08	2388
190T	266	4.10	0.13	2046	RPNR3	493	4.10	0.19	2595
PNR6	973	4.13	0.43	2263	RPNR3A	54	4.03	0.02	2700
RPNR6	956	4.17	0.43	2223	RPNR4	596	4.13	0.24	2483
190V	38	4.07	0.02	1900	RPNR5	698	4.13	0.29	2407
*PNR7	985	4.17	0.45	2189	RPNR5A	83	4.03	0.03	2767
190U	57	4.03	0.02	2850	RPNR6	956	4.17	0.43	2223
R190U	56	4.07	0.02	2800	S182H	72	4.10	0.03	2400
PNR7	1027	4.17	0.47	2185	SPNR1A	123	4.07	0.05	2460

Table 3.5.1
Powder Wash - 110
100-year, 6-hour Storm Results

Future Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	33	4.08	0.02	1650
110B	53	4.08	0.04	1325
PW1	85	4.08	0.06	1417
RPW1	84	4.08	0.06	1400
110C	7	4.00	0.00	1750
110D	123	4.00	0.07	1757
PW2	207	4.08	0.13	1592
RPW2	202	4.08	0.13	1554
110E	43	4.00	0.03	1433
*PW3	240	4.08	0.16	1500
110F	12	4.00	0.01	1200
110G	11	4.00	0.01	1100
PW3	261	4.08	0.17	1535
RPW3	238	4.17	0.17	1400
110H	37	4.08	0.03	1233
*PW4	273	4.17	0.20	1365
110I	24	4.08	0.02	1200
PW4	293	4.17	0.22	1332
SPW4	287	4.25	0.22	1305
110J	12	4.00	0.01	1200
110K	27	4.00	0.01	2700
R110K	24	4.08	0.01	2400
110L	36	4.00	0.02	1800
PW5	334	4.17	0.27	1237
RPW5	328	4.25	0.27	1215
110M	46	4.00	0.03	1533
*PW6	351	4.25	0.30	1170
110N	19	4.08	0.01	1900
110O	7	4.00	0.00	1750
PW6	363	4.25	0.32	1134

Future Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
110A	33	4.08	0.02	1650
110B	53	4.08	0.04	1325
110C	7	4.00	0.00	1750
110D	123	4.00	0.07	1757
110E	43	4.00	0.03	1433
110F	12	4.00	0.01	1200
110G	11	4.00	0.01	1100
110H	37	4.08	0.03	1233
110I	24	4.08	0.02	1200
110J	12	4.00	0.01	1200
110K	27	4.00	0.01	2700
110L	36	4.00	0.02	1800
110M	46	4.00	0.03	1533
110N	19	4.08	0.01	1900
110O	7	4.00	0.00	1750
PW1	85	4.08	0.06	1417
PW2	207	4.08	0.13	1592
PW3	261	4.08	0.17	1535
* PW3	240	4.08	0.16	1500
PW4	293	4.17	0.22	1332
* PW4	273	4.17	0.20	1365
PW5	334	4.17	0.27	1237
PW6	363	4.25	0.32	1134
* PW6	351	4.25	0.30	1170
R110K	24	4.08	0.01	2400
RPW1	84	4.08	0.06	1400
RPW2	202	4.08	0.13	1554
RPW3	238	4.17	0.17	1400
RPW5	328	4.25	0.27	1215
SPW4	287	4.25	0.22	1305

Table 3.5.2
Cereus Wash - 120
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	19	4.08	0.02	950
120B	73	4.08	0.05	1460
160A	12	4.00	0.01	1200
R160A	11	4.08	0.01	1100
CER1	102	4.08	0.08	1275
SCER1	89	4.17	0.08	1113
120C	8	4.00	0.01	1600
CER2	94	4.17	0.08	1175
RCER2	88	4.25	0.08	1100
120D	94	4.08	0.07	1343
*CER3	163	4.08	0.15	1087
120H	6	4.08	0.01	1200
R120H	5	4.08	0.01	1000
120I	9	4.00	0.01	900
CER3A	15	4.08	0.01	1500
SCER3A	7	4.33	0.01	700
CER3	163	4.08	0.16	1019
SCER3	160	4.17	0.16	1000
RCER3	156	4.25	0.16	975
120E	20	4.08	0.02	1000
*CER4	170	4.25	0.18	944
126A	11	4.00	0.01	1100
R126A	9	4.17	0.01	900
126B	26	4.08	0.02	1300
WW1	34	4.08	0.03	1133
RWW1	33	4.17	0.03	1100
126C	124	4.17	0.14	886
R126C	117	4.25	0.14	836
126D	38	4.08	0.03	1267
WW3	176	4.17	0.20	880
RWW3	169	4.25	0.20	845
126E	120	4.08	0.09	1333
126F	85	4.08	0.05	1700
WW4	205	4.08	0.15	1367
RWW4	173	4.25	0.15	1153
126G	159	4.08	0.14	1136
126H	27	4.08	0.02	1350
WW5	484	4.25	0.50	968
RWW5	460	4.25	0.50	920
126I	127	4.08	0.08	1588
126J	2	4.08	0.00	1000
R126J	2	4.08	0.00	1000
WW6	514	4.25	0.58	886
RWW6	503	4.33	0.58	867
126M	32	4.08	0.03	1067

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
120A	19	4.08	0.02	950
120B	73	4.08	0.05	1460
120C	8	4.00	0.01	1600
120D	94	4.08	0.07	1343
120E	20	4.08	0.02	1000
120F	33	4.00	0.02	1650
120G	55	4.08	0.04	1375
120H	6	4.08	0.01	1200
120I	9	4.00	0.01	900
120J	5	4.08	0.01	500
120K	40	4.08	0.03	1333
120L	56	4.08	0.04	1400
120M	44	4.08	0.04	1100
120N	72	4.00	0.04	1800
120O	15	4.00	0.01	1500
120P	57	4.00	0.03	1900
120Q	54	4.08	0.04	1350
120R	16	4.08	0.01	1600
120S	10	4.08	0.01	1000
120T	3	4.00	0.00	1500
120U	34	4.00	0.02	1700
120V	15	4.00	0.01	1500
120W	10	4.00	0.01	2000
120X	32	4.00	0.02	1600
121A	56	4.08	0.05	1120
121B	20	4.08	0.02	1000
122A	23	4.08	0.02	1150
122B	61	4.00	0.03	2033
122C	22	4.00	0.01	2200
122D	45	4.08	0.03	1500
122E	51	4.00	0.03	1700
122F	13	4.08	0.01	1300
122G	43	4.00	0.02	2150
122H	10	4.00	0.01	1000
122I	10	4.08	0.01	1000
122J	33	4.08	0.03	1100
122K	4	4.08	0.00	1333
123A	98	4.08	0.08	1225
123B	27	4.00	0.02	1350
123C	6	4.00	0.00	2000
123D	9	4.08	0.01	900
124A	96	4.08	0.07	1371
124B	76	4.00	0.04	1900
124C	25	4.08	0.02	1250
124D	9	4.08	0.01	900

*WW7	513	4.33	0.61	841	124E	76	4.08	0.05	1520
126K	16	4.08	0.01	1600	125A	96	4.08	0.08	1200
R126K	16	4.08	0.01	1600	125B	151	4.08	0.11	1373
126L	29	4.08	0.02	1450	125C	45	4.08	0.03	1500
WW7	535	4.25	0.64	836	125D	16	4.17	0.02	800
SWW7	534	4.33	0.64	834	125E	71	4.00	0.05	1420
127A	35	4.08	0.03	1167	126A	11	4.00	0.01	1100
127B	56	4.00	0.04	1400	126B	26	4.08	0.02	1300
CAP1	89	4.08	0.07	1271	126C	124	4.17	0.14	886
RCAP1	84	4.08	0.07	1200	126D	38	4.08	0.03	1267
127C	62	4.08	0.04	1550	126E	120	4.08	0.09	1333
127D	32	4.08	0.02	1600	126F	85	4.08	0.05	1700
CAP2	178	4.08	0.13	1369	126G	159	4.08	0.14	1136
RCAP2	175	4.08	0.13	1346	126H	27	4.08	0.02	1350
127E	142	4.08	0.10	1420	126I	127	4.08	0.08	1588
127F	202	4.08	0.15	1347	126J	2	4.08	0.00	1000
CAP3	343	4.08	0.25	1372	126K	16	4.08	0.01	1600
RCAP3	330	4.17	0.25	1320	126L	29	4.08	0.02	1450
127G	93	4.00	0.06	1550	126M	32	4.08	0.03	1067
CAP4	412	4.08	0.31	1329	126N	91	4.08	0.08	1138
SCAP4	407	4.08	0.31	1313	127A	35	4.08	0.03	1167
R2CAP4	404	4.17	0.31	1303	127B	56	4.00	0.04	1400
127I	12	4.08	0.01	1200	127C	62	4.08	0.04	1550
*CAP5	413	4.17	0.32	1291	127D	32	4.08	0.02	1600
127H	28	4.00	0.02	1400	127E	142	4.08	0.10	1420
CAP5	596	4.17	0.47	1268	127F	202	4.08	0.15	1347
RCAP5	579	4.17	0.47	1232	127G	93	4.00	0.06	1550
127J	46	4.08	0.03	1533	127H	28	4.00	0.02	1400
CAP6	616	4.17	0.50	1232	127I	12	4.08	0.01	1200
WW8	954	4.25	1.14	837	127J	46	4.08	0.03	1533
RWW8	943	4.33	1.14	827	160A	12	4.00	0.01	1200
126N	91	4.08	0.08	1138	D122C	11	4.00	0.01	1100
WW9	979	4.33	1.22	802	D122C	11	4.00	0.01	1100
CER4	1077	4.33	1.40	769	DO122C	11	4.00	0.01	1100
RCER4	1060	4.33	1.40	757	CAP1	89	4.08	0.07	1271
120F	33	4.00	0.02	1650	CAP2	178	4.08	0.13	1369
*CER5	1067	4.33	1.42	751	CAP3	343	4.08	0.25	1372
125A	96	4.08	0.08	1200	CAP4	412	4.08	0.31	1329
125B	151	4.08	0.11	1373	* CAP5	413	4.17	0.32	1291
CHK1	247	4.08	0.19	1300	CAP5	596	4.17	0.47	1268
RCHK1	244	4.17	0.19	1284	CAP6	616	4.17	0.50	1232
125C	45	4.08	0.03	1500	CER1	102	4.08	0.08	1275
R125C	36	4.17	0.03	1200	CER10	576	4.33	2.29	252
125D	16	4.17	0.02	800	* CER11	576	4.42	2.30	250
CHK2	295	4.17	0.24	1229	CER11	715	4.42	2.50	286
R2CHK2	290	4.25	0.24	1208	* CER12	720	4.42	2.52	286
125E	71	4.00	0.05	1420	CER12	752	4.42	2.59	290
CHK3	327	4.25	0.28	1168	CER13	748	4.42	2.60	288
CER5	1250	4.33	1.71	731	* CER14	752	4.50	2.62	287
RCER5	1229	4.42	1.71	719	CER14	753	4.50	2.62	287
120G	55	4.08	0.04	1375	CER2	94	4.17	0.08	1175
*CER6	1241	4.42	1.74	713	* CER3	163	4.08	0.15	1087
124A	96	4.08	0.07	1371	CER3	163	4.08	0.16	1019
124B	76	4.00	0.04	1900	CER3A	15	4.08	0.01	1500
LOG1	166	4.08	0.11	1509	* CER4	170	4.25	0.18	944
RLOG1	165	4.08	0.11	1500	CER4	1077	4.33	1.40	769

124D	9	4.08	0.01	900
*LOG2	174	4.08	0.12	1450
124C	25	4.08	0.02	1250
LOG2	199	4.08	0.14	1421
RLOG2	187	4.17	0.14	1336
124E	76	4.08	0.05	1520
LOG3	249	4.17	0.19	1311
CER6	1342	4.33	1.94	692
RCER6	1335	4.42	1.94	688
120L	56	4.08	0.04	1400
*CER7	1349	4.42	1.97	685
120J	5	4.08	0.01	500
R120J	5	4.08	0.01	500
120K	40	4.08	0.03	1333
CER7A	45	4.08	0.04	1125
SCER7A	45	4.08	0.04	1125
RCER7A	41	4.17	0.04	1025
120M	44	4.08	0.04	1100
123B	27	4.00	0.02	1350
S123B	27	4.00	0.02	1350
R123B	27	4.08	0.02	1350
R123B	27	4.08	0.02	1350
CER7	1386	4.42	2.07	670
RCER7	1374	4.50	2.07	664
120N	72	4.00	0.04	1800
*CER8	1387	4.50	2.12	654
123A	98	4.08	0.08	1225
S123A	91	4.17	0.08	1138
123D	9	4.08	0.01	900
TRV1	99	4.17	0.09	1100
RTRV1	89	4.25	0.09	989
123C	6	4.00	0.00	2000
S123C	6	4.00	0.00	2000
R123C	6	4.00	0.00	2000
R123C	5	4.17	0.00	1667
CER8	1417	4.50	2.20	644
RCER8	1412	4.50	2.20	642
120O	15	4.00	0.01	1500
S120O	15	4.00	0.01	1500
R120O	13	4.08	0.01	1300
R120O	11	4.17	0.01	1100
120Q	54	4.08	0.04	1350
*CER9	1426	4.50	2.25	634
120P	57	4.00	0.03	1900
S120P	57	4.00	0.03	1900
R120P	48	4.00	0.03	1600
CER9	1427	4.50	2.28	626
SCER9	563	5.08	2.28	247
120R	16	4.08	0.01	1600
120S	10	4.08	0.01	1000
CER10	576	4.33	2.29	252
RCER10	575	4.42	2.29	251
120T	3	4.00	0.00	1500
*CER11	576	4.42	2.30	250
122C	22	4.00	0.01	2200
DO122C	11	4.00	0.01	1100
* CER5	1067	4.33	1.42	751
CER5	1250	4.33	1.71	731
* CER6	1241	4.42	1.74	713
CER6	1342	4.33	1.94	692
* CER7	1349	4.42	1.97	685
CER7	1386	4.42	2.07	670
CER7A	45	4.08	0.04	1125
* CER8	1387	4.50	2.12	654
CER8	1417	4.50	2.20	644
* CER9	1426	4.50	2.25	634
CER9	1427	4.50	2.28	626
CHK1	247	4.08	0.19	1300
CHK2	295	4.17	0.24	1229
CHK3	327	4.25	0.28	1168
LOG1	166	4.08	0.11	1509
* LOG2	174	4.08	0.12	1450
LOG2	199	4.08	0.14	1421
LOG3	249	4.17	0.19	1311
LSR1	78	4.08	0.05	1560
LSR1B	29	4.17	0.02	1450
LSR2	155	4.08	0.11	1409
LSR2B	60	4.08	0.05	1200
LSR3	245	4.08	0.18	1361
LSR4	273	4.08	0.20	1365
LSR5	272	4.17	0.21	1295
LTD1	74	4.08	0.07	1057
TRV1	99	4.17	0.09	1100
WW1	34	4.08	0.03	1133
WW3	176	4.17	0.20	880
WW4	205	4.08	0.15	1367
WW5	484	4.25	0.50	968
WW6	514	4.25	0.58	886
* WW7	513	4.33	0.61	841
WW7	535	4.25	0.64	836
WW8	954	4.25	1.14	837
WW9	979	4.33	1.22	802
R120H	5	4.08	0.01	1000
R120J	5	4.08	0.01	500
R120O	11	4.17	0.01	1100
R120O	13	4.08	0.01	1300
R120P	48	4.00	0.03	1600
R120W	6	4.17	0.01	1200
R121A	54	4.17	0.05	1080
R122C	11	4.08	0.01	1100
R122D	45	4.08	0.03	1500
R122F	13	4.08	0.01	1300
R123B	27	4.08	0.02	1350
R123B	27	4.08	0.02	1350
R123C	5	4.17	0.00	1667
R123C	6	4.00	0.00	2000
R125C	36	4.17	0.03	1200
R126A	9	4.17	0.01	900
R126C	117	4.25	0.14	836
R126J	2	4.08	0.00	1000
R126K	16	4.08	0.01	1600
R160A	11	4.08	0.01	1100

D122C	11	4.00	0.01	1100	R2CAP4	404	4.17	0.31	1303
R122C	11	4.08	0.01	1100	R2CHK2	290	4.25	0.24	1208
122E	51	4.00	0.03	1700	RCAP1	84	4.08	0.07	1200
LSR2B	60	4.08	0.05	1200	RCAP2	175	4.08	0.13	1346
RLSR2B	60	4.08	0.05	1200	RCAP3	330	4.17	0.25	1320
122D	45	4.08	0.03	1500	RCAP5	579	4.17	0.47	1232
R122D	45	4.08	0.03	1500	RCER10	575	4.42	2.29	251
122F	13	4.08	0.01	1300	RCER11	712	4.42	2.50	285
R122F	13	4.08	0.01	1300	RCER13	744	4.50	2.59	287
122G	43	4.00	0.02	2150	RCER13	746	4.50	2.60	287
LSR2	155	4.08	0.11	1409	RCER2	88	4.25	0.08	1100
RLSR2	147	4.08	0.11	1336	RCER3	156	4.25	0.16	975
122A	23	4.08	0.02	1150	RCER4	1060	4.33	1.40	757
D122C	11	4.00	0.01	1100	RCER5	1229	4.42	1.71	719
RD122C	9	4.25	0.01	900	RCER6	1335	4.42	1.94	688
LSR1B	29	4.17	0.02	1450	RCER7	1374	4.50	2.07	664
RLSR1B	26	4.25	0.02	1300	RCER7A	41	4.17	0.04	1025
122B	61	4.00	0.03	2033	RCER8	1412	4.50	2.20	642
LSR1	78	4.08	0.05	1560	RCHK1	244	4.17	0.19	1284
RLSR1	78	4.08	0.05	1560	RD122C	9	4.25	0.01	900
122H	10	4.00	0.01	1000	RLOG1	165	4.08	0.11	1500
122I	10	4.08	0.01	1000	RLOG2	187	4.17	0.14	1336
LSR3	245	4.08	0.18	1361	RLS4	269	4.17	0.20	1345
RLSR3	241	4.08	0.18	1339	RLSR1	78	4.08	0.05	1560
122J	33	4.08	0.03	1100	RLSR1B	26	4.25	0.02	1300
LSR4	273	4.08	0.20	1365	RLSR2	147	4.08	0.11	1336
RLS4	269	4.17	0.20	1345	RLSR2B	60	4.08	0.05	1200
122K	4	4.08	0.00	1333	RLSR3	241	4.08	0.18	1339
LSR5	272	4.17	0.21	1295	RTRV1	89	4.25	0.09	989
CER11	715	4.42	2.50	286	RWW1	33	4.17	0.03	1100
RCER11	712	4.42	2.50	285	RWW3	169	4.25	0.20	845
120U	34	4.00	0.02	1700	RWW4	173	4.25	0.15	1153
*CER12	720	4.42	2.52	286	RWW5	460	4.25	0.50	920
121A	56	4.08	0.05	1120	RWW6	503	4.33	0.58	867
R121A	54	4.17	0.05	1080	RWW8	943	4.33	1.14	827
121B	20	4.08	0.02	1000	S120O	15	4.00	0.01	1500
LTD1	74	4.08	0.07	1057	S120P	57	4.00	0.03	1900
CER12	752	4.42	2.59	290	S120W	6	4.08	0.01	1200
RCER13	744	4.50	2.59	287	S123A	91	4.17	0.08	1138
120V	15	4.00	0.01	1500	S123B	27	4.00	0.02	1350
CER13	748	4.42	2.60	288	S123C	6	4.00	0.00	2000
RCER13	746	4.50	2.60	287	SCAP4	407	4.08	0.31	1313
120X	32	4.00	0.02	1600	SCER1	89	4.17	0.08	1113
*CER14	752	4.50	2.62	287	SCER3	160	4.17	0.16	1000
120W	10	4.00	0.01	2000	SCER3A	7	4.33	0.01	700
S120W	6	4.08	0.01	1200	SCER7A	45	4.08	0.04	1125
R120W	6	4.17	0.01	1200	SCER9	563	5.08	2.28	247
CER14	753	4.50	2.62	287	SWW7	534	4.33	0.64	834

Table 3.5.3
Cyprus Point Wash - 130
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	8	4.08	0.01	800
130B	49	4.00	0.03	1633
130C	6	4.08	0.01	1200
R130C	5	4.17	0.01	1000
130D	4	4.08	0.00	1000
CP1	63	4.00	0.05	1260
RCP1	61	4.17	0.05	1220
130F	52	4.08	0.04	1300
*CP2	111	4.08	0.09	1233
130E	4	4.08	0.00	1000
CP2	115	4.08	0.09	1278
RCP2	113	4.17	0.09	1256
131A	65	4.08	0.05	1300
CP3	172	4.08	0.14	1229
SCP3	172	4.08	0.14	1229
RCP3	172	4.08	0.14	1229
130G	21	4.00	0.01	2100
CP4	189	4.08	0.15	1260

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
130A	8	4.08	0.01	800
130B	49	4.00	0.03	1633
130C	6	4.08	0.01	1200
130D	4	4.08	0.00	1000
130E	4	4.08	0.00	1000
130F	52	4.08	0.04	1300
130G	21	4.00	0.01	2100
131A	65	4.08	0.05	1300
CP1	63	4.00	0.05	1260
* CP2	111	4.08	0.09	1233
CP2	115	4.08	0.09	1278
CP3	172	4.08	0.14	1229
CP4	189	4.08	0.15	1260
R130C	5	4.17	0.01	1000
RCP1	61	4.17	0.05	1220
RCP2	113	4.17	0.09	1256
RCP3	172	4.08	0.14	1229
SCP3	172	4.08	0.14	1229

Table 3.5.4
Jacklin Wash - 150
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151A	5	4.00	0.00	1667
DO151A	1	4.00	0.00	333
D151A	4	4.00	0.00	1333
R151A	4	4.08	0.00	1333
151B	6	4.08	0.00	1224
DO151B	3	4.08	0.00	612
D151B	3	4.08	0.00	612
KGT1	7	4.08	0.01	700
RKGT1	5	4.33	0.01	500
151C	7	4.00	0.01	1400
KGT2	8	4.25	0.01	800
RKGT2	8	4.33	0.01	800
151D	60	4.00	0.04	1500
151F	3	4.08	0.00	1000
DO151F	2	4.08	0.00	667
D151F	2	4.08	0.00	667
RD151F	2	4.08	0.00	667
D151B	3	4.08	0.00	612
RD151B	3	4.08	0.00	612
KGT3A	64	4.00	0.04	1600
R151D	61	4.17	0.04	1525
151E	82	4.08	0.07	1171
*KGT3	139	4.08	0.12	1158
151I	7	4.08	0.01	700
KGT3	146	4.08	0.13	1123
RKGT3	146	4.08	0.13	1123
151J	6	4.00	0.00	2000
*KGT4	150	4.08	0.13	1154
151H	4	4.08	0.00	816
R151H	4	4.17	0.00	816
KGT4	155	4.08	0.13	1192
RKGT4	154	4.17	0.13	1185
151K	62	4.00	0.03	2067
KGT5	192	4.08	0.17	1129
RKGT5	191	4.17	0.17	1124
151L	83	4.00	0.05	1660
KGT6	261	4.08	0.22	1186
152A	57	4.08	0.04	1425
R152A	57	4.08	0.04	1425
152B	22	4.08	0.02	1100
*MNG1	79	4.08	0.06	1317
152C	18	4.00	0.01	1800
MNG1	97	4.08	0.07	1386
RMNG1	93	4.17	0.07	1329
152D	24	4.08	0.02	1200

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
150A	15	4.00	0.01	1500
150B	4	4.00	0.00	1333
150C	35	4.00	0.02	1750
150D	61	4.08	0.05	1220
150E	39	4.00	0.02	1950
150F	6	4.00	0.00	1500
150G	5	4.08	0.00	1020
150H	52	4.00	0.03	1733
150I	121	4.17	0.12	1008
150J	7	4.17	0.01	700
150K	15	4.00	0.01	1500
150L	13	4.08	0.01	1300
150M	40	4.00	0.02	2000
150N	1	4.00	0.00	1000
150O	4	4.08	0.00	1000
150P	1	4.00	0.00	1000
151A	5	4.00	0.00	1667
151B	6	4.08	0.00	1224
151C	7	4.00	0.01	1400
151D	60	4.00	0.04	1500
151E	82	4.08	0.07	1171
151F	3	4.08	0.00	1000
151H	4	4.08	0.00	816
151I	7	4.08	0.01	700
151J	6	4.00	0.00	2000
151K	62	4.00	0.03	2067
151L	83	4.00	0.05	1660
152A	57	4.08	0.04	1425
152B	22	4.08	0.02	1100
152C	18	4.00	0.01	1800
152D	24	4.08	0.02	1200
152E	21	4.08	0.02	1050
152F	19	4.08	0.01	1900
D151A	1	4.00	0.00	333
D151A	4	4.00	0.00	1333
D151B	3	4.08	0.00	612
D151B	3	4.08	0.00	612
D151F	2	4.08	0.00	667
DO151A	1	4.00	0.00	333
DO151B	3	4.08	0.00	612
DO151F	2	4.08	0.00	667
JKL1	4	4.08	0.01	400
JKL2	97	4.08	0.09	1078
JKL3	115	4.08	0.11	1045
JKL4	58	4.25	0.12	483

*MNG2	113	4.08	0.09	1256
152E	21	4.08	0.02	1050
MNG2	134	4.08	0.10	1340
RMNG2	128	4.17	0.10	1280
152F	19	4.08	0.01	1900
MNG3	144	4.17	0.12	1200
150A	15	4.00	0.01	1500
S150A	0	0.08	0.01	0
150B	4	4.00	0.00	1333
R150B	4	4.00	0.00	1333
S150B	4	4.08	0.00	1333
JKL1	4	4.08	0.01	400
RJKL1	4	4.08	0.01	400
150C	35	4.00	0.02	1750
150D	61	4.08	0.05	1220
JKL2	97	4.08	0.09	1078
RJKL2	90	4.17	0.09	1000
150E	39	4.00	0.02	1950
JKL3	115	4.08	0.11	1045
SJKL3	53	4.42	0.11	482
150F	6	4.00	0.00	1500
150G	5	4.08	0.00	1020
D151A	1	4.00	0.00	333
RD151A	1	4.25	0.00	333
JKL4	58	4.25	0.12	483
RJKL4	58	4.25	0.12	483
150H	52	4.00	0.03	1733
JKL5	97	4.08	0.15	647
RJKL5	90	4.33	0.15	600
150I	121	4.17	0.12	1008
JKL6	192	4.25	0.27	711
RJKL6	191	4.25	0.27	707
150J	7	4.17	0.01	700
R150J	7	4.17	0.01	700
150K	15	4.00	0.01	1500
*JKL7	203	4.25	0.29	700
JKL7	336	4.17	0.41	820
RJKL7	336	4.25	0.41	820
150L	13	4.08	0.01	1300
*JKL8	344	4.25	0.41	839
JKL8	558	4.17	0.63	886
SJKL8	549	4.25	0.63	871
RJKL8	547	4.25	0.63	868
150M	40	4.00	0.02	2000
JKL9	556	4.25	0.66	842
SJKL9	536	4.33	0.66	812
150N	1	4.00	0.00	1000
150O	4	4.08	0.00	1000
JKL10	538	4.33	0.66	815
RJKL10	526	4.33	0.66	797
150P	1	4.00	0.00	1000
JKL11	526	4.33	0.66	797
JKL5	97	4.08	0.15	647
JKL6	192	4.25	0.27	711
* JKL7	203	4.25	0.29	700
JKL7	336	4.17	0.41	820
* JKL8	344	4.25	0.41	839
JKL8	558	4.17	0.63	886
JKL9	556	4.25	0.66	842
JKL10	538	4.33	0.66	815
JKL11	526	4.33	0.66	797
KGT1	7	4.08	0.01	700
KGT2	8	4.25	0.01	800
* KGT3	139	4.08	0.12	1158
KGT3	146	4.08	0.13	1123
KGT3A	64	4.00	0.04	1600
* KGT4	150	4.08	0.13	1154
KGT4	155	4.08	0.13	1192
KGT5	192	4.08	0.17	1129
KGT6	261	4.08	0.22	1186
* MNG1	79	4.08	0.06	1317
MNG1	97	4.08	0.07	1386
* MNG2	113	4.08	0.09	1256
MNG2	134	4.08	0.10	1340
MNG3	144	4.17	0.12	1200
R150B	4	4.00	0.00	1333
R150J	7	4.17	0.01	700
R151A	4	4.08	0.00	1333
R151D	61	4.17	0.04	1525
R151H	4	4.17	0.00	816
R152A	57	4.08	0.04	1425
RD151A	1	4.25	0.00	333
RD151B	3	4.08	0.00	612
RD151F	2	4.08	0.00	667
RJKL1	4	4.08	0.01	400
RJKL10	526	4.33	0.66	797
RJKL2	90	4.17	0.09	1000
RJKL4	58	4.25	0.12	483
RJKL5	90	4.33	0.15	600
RJKL6	191	4.25	0.27	707
RJKL7	336	4.25	0.41	820
RJKL8	547	4.25	0.63	868
RKGT1	5	4.33	0.01	500
RKGT2	8	4.33	0.01	800
RKGT3	146	4.08	0.13	1123
RKGT4	154	4.17	0.13	1185
RKGT5	191	4.17	0.17	1124
RMNG1	93	4.17	0.07	1329
RMNG2	128	4.17	0.10	1280
S150A	0	0.08	0.01	0
S150B	4	4.08	0.00	1333
SJKL3	53	4.42	0.11	482
SJKL8	549	4.25	0.63	871
SJKL9	536	4.33	0.66	812

Table 3.5.5
Emerald Wash - 160
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	7	4.00	0.00	1429
R160V	7	4.08	0.00	1429
160W	3	4.00	0.00	1500
EMR13A	10	4.08	0.01	1000
DO160W	2	4.08	0.01	200
D160W	8	4.08	0.01	800
REM13A	8	4.17	0.01	800
160X	40	4.08	0.03	1333
EMR13B	47	4.08	0.04	1175
REM13B	44	4.17	0.04	1100
160Y	6	4.00	0.00	1500
R160Y	6	4.08	0.00	1500
160Z	69	4.08	0.06	1150
EMR13	114	4.17	0.10	1140
160G	25	4.08	0.02	1250
R160G	25	4.17	0.02	1250
160H	24	4.08	0.02	1200
EMR1	47	4.08	0.04	1175
REMR1	47	4.17	0.04	1175
160I	7	4.00	0.00	1429
160J	17	4.00	0.01	1700
EMR2	63	4.08	0.06	1050
REMR2	63	4.08	0.06	1050
160K	46	4.00	0.03	1533
EMR3	105	4.08	0.08	1313
REMR3	105	4.08	0.08	1313
160M	83	4.08	0.06	1383
*EMR4	188	4.08	0.14	1343
160L	11	4.00	0.01	1100
R160L	11	4.08	0.01	1100
160N	40	4.00	0.02	2000
EMR4	231	4.08	0.17	1359
SEMR4	166	4.25	0.17	976
160B	11	4.00	0.01	1100
R160B	8	4.42	0.01	800
160C	26	4.00	0.02	1300
R160C	24	4.08	0.02	1200
EMR5A	25	4.17	0.02	1250
160D	36	4.17	0.04	900
160F	15	4.08	0.02	750
EMR5	241	4.17	0.25	964
REMR5	238	4.25	0.25	952
160O	87	4.08	0.06	1450
*EMR6	289	4.25	0.32	903
151F	3	4.08	0.00	1000

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
151F	3	4.08	0.00	1000
151G	2	4.08	0.00	667
160AA	8	4.00	0.00	1633
160B	11	4.00	0.01	1100
160C	26	4.00	0.02	1300
160D	36	4.17	0.04	900
160F	15	4.08	0.02	750
160G	25	4.08	0.02	1250
160H	24	4.08	0.02	1200
160I	7	4.00	0.00	1429
160J	17	4.00	0.01	1700
160K	46	4.00	0.03	1533
160L	11	4.00	0.01	1100
160M	83	4.08	0.06	1383
160N	40	4.00	0.02	2000
160O	87	4.08	0.06	1450
160P	34	4.00	0.02	1700
160Q	10	4.00	0.01	1000
160R	73	4.08	0.05	1460
160S	21	4.00	0.01	2100
160T	16	4.00	0.01	1600
160U	103	4.08	0.08	1288
160V	7	4.00	0.00	1429
160W	3	4.00	0.00	1500
160X	40	4.08	0.03	1333
160Y	6	4.00	0.00	1500
160Z	69	4.08	0.06	1150
D151F	2	4.08	0.00	667
D160W	2	4.08	0.01	200
D160W	8	4.08	0.01	800
DO151F	2	4.08	0.00	667
DO160W	2	4.08	0.01	200
EMR1	47	4.08	0.04	1175
EMR2	63	4.08	0.06	1050
EMR3	105	4.08	0.08	1313
* EMR4	188	4.08	0.14	1343
EMR4	231	4.08	0.17	1359
EMR5	241	4.17	0.25	964
EMR5A	25	4.17	0.02	1250
* EMR6	289	4.25	0.32	903
EMR6	292	4.25	0.33	885
EMR6A	3	4.17	0.01	300
EMR7	302	4.25	0.35	863
EMR8	174	4.67	0.36	483
EMR9	212	4.08	0.41	517

DO151F	2	4.08	0.00	667
D151F	2	4.08	0.00	667
R151F	1	4.25	0.00	333
151G	2	4.08	0.00	667
EMR6A	3	4.17	0.01	300
REMR6A	3	4.25	0.01	300
EMR6	292	4.25	0.33	885
REMR6	288	4.25	0.33	873
160P	34	4.00	0.02	1700
EMR7	302	4.25	0.35	863
SEMR7	173	4.67	0.35	494
160Q	10	4.00	0.01	1000
D160W	2	4.08	0.01	200
RD160W	2	4.08	0.01	200
EMR8	174	4.67	0.36	483
REMR8	174	4.67	0.36	483
160R	73	4.08	0.05	1460
EMR9	212	4.08	0.41	517
REMR9	211	4.17	0.41	515
160S	21	4.00	0.01	2100
EMR10	220	4.08	0.42	524
SEMR10	185	4.50	0.42	440
160T	16	4.00	0.01	1600
EMR11	186	4.42	0.43	433
REMR11	186	4.58	0.43	433
160U	103	4.08	0.08	1288
*EMR12	243	4.17	0.51	476
EMR12	347	4.17	0.61	569
SEMR12	327	4.25	0.61	536
REMR12	325	4.25	0.61	533
160AA	8	4.00	0.00	1633
EMR13	329	4.25	0.61	539
EMR10	220	4.08	0.42	524
EMR11	186	4.42	0.43	433
* EMR12	243	4.17	0.51	476
EMR12	347	4.17	0.61	569
EMR13	114	4.17	0.10	1140
EMR13	329	4.25	0.61	539
EMR13A	10	4.08	0.01	1000
EMR13B	47	4.08	0.04	1175
R151F	1	4.25	0.00	333
R160B	8	4.42	0.01	800
R160C	24	4.08	0.02	1200
R160G	25	4.17	0.02	1250
R160L	11	4.08	0.01	1100
R160V	7	4.08	0.00	1429
R160Y	6	4.08	0.00	1500
RD160W	2	4.08	0.01	200
REMR1	47	4.17	0.04	1175
REMR2	63	4.08	0.06	1050
REMR3	105	4.08	0.08	1313
REMR5	238	4.25	0.25	952
REMR6	288	4.25	0.33	873
REMR6A	3	4.25	0.01	300
REMR8	174	4.67	0.36	483
REMR9	211	4.17	0.41	515
REMR11	186	4.58	0.43	433
REMR12	325	4.25	0.61	533
REM13A	8	4.17	0.01	800
REM13B	44	4.17	0.04	1100
SEMR4	166	4.25	0.17	976
SEMR7	173	4.67	0.35	494
SEMR10	185	4.50	0.42	440
SEMR12	327	4.25	0.61	536

Table 3.5.6
Malta Drain - 170
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	7	4.00	0.00	1429
R160V	7	4.08	0.00	1429
160W	3	4.00	0.00	1500
EMR13A	10	4.08	0.01	1000
DO160W	8	4.08	0.01	800
D160W	2	4.08	0.01	200
R160W	2	4.08	0.01	200
170A	41	4.00	0.02	2050
170B	8	4.00	0.00	2000
MLT1	50	4.00	0.04	1250
RMLT1	47	4.08	0.04	1175
170C	48	4.00	0.03	1600
MLT2	94	4.08	0.07	1343
170D	9	4.08	0.01	900
MLT3	103	4.08	0.08	1288
RMLT3	96	4.25	0.08	1200
170E	126	4.08	0.09	1400
MLT4	187	4.17	0.17	1100
170F	30	4.00	0.02	1500
R170F	29	4.00	0.02	1450
170G	4	4.08	0.00	1333
MLT4A	212	4.17	0.19	1116
RMLT4A	212	4.17	0.19	1116
170H	18	4.00	0.01	1800
MLT5	219	4.17	0.20	1095
SMLT5	219	4.17	0.20	1095
RMLT5	216	4.25	0.20	1080
170I1	30	4.08	0.02	1500
DO180S	15	4.08	0.02	750
D179I1	15	4.08	0.02	750
R170I1	14	4.25	0.02	700
170I2	20	4.00	0.01	2000
MLT6A	30	4.08	0.03	1000
DO180R	15	4.08	0.03	500
DMLT6A	15	4.08	0.03	500
RMLT6A	14	4.17	0.03	467
170I3	9	4.00	0.01	900
MLT6	236	4.17	0.24	983

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160V	7	4.00	0.00	1429
160W	3	4.00	0.00	1500
170A	41	4.00	0.02	2050
170B	8	4.00	0.00	2000
170C	48	4.00	0.03	1600
170D	9	4.08	0.01	900
170E	126	4.08	0.09	1400
170F	30	4.00	0.02	1500
170G	4	4.08	0.00	1333
170H	18	4.00	0.01	1800
170I1	30	4.08	0.02	1500
170I2	20	4.00	0.01	2000
170I3	9	4.00	0.01	900
D160W	2	4.08	0.01	200
D179I1	15	4.08	0.02	750
DMLT6A	15	4.08	0.03	500
DO160W	8	4.08	0.01	800
DO180R	15	4.08	0.03	500
DO180S	15	4.08	0.02	750
EMR13A	10	4.08	0.01	1000
MLT1	50	4.00	0.04	1250
MLT2	94	4.08	0.07	1343
MLT3	103	4.08	0.08	1288
MLT4	187	4.17	0.17	1100
MLT4A	212	4.17	0.19	1116
MLT5	219	4.17	0.20	1095
MLT6	236	4.17	0.24	983
MLT6A	30	4.08	0.03	1000
R160V	7	4.08	0.00	1429
R160W	2	4.08	0.01	200
R170F	29	4.00	0.02	1450
R170I1	14	4.25	0.02	700
RMLT1	47	4.08	0.04	1175
RMLT3	96	4.25	0.08	1200
RMLT4A	212	4.17	0.19	1116
RMLT5	216	4.25	0.20	1080
RMLT6A	14	4.17	0.03	467
SMLT5	219	4.17	0.20	1095

Table 3.5.7
Colony Wash - 180
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
185A	60	4.00	0.04	1500
R185A	57	4.17	0.04	1425
185B	82	4.17	0.08	1025
IRW1	139	4.17	0.12	1158
SIRW1	94	4.33	0.12	783
180A	35	4.00	0.03	1167
R180A	35	4.08	0.03	1167
180B	18	4.17	0.03	600
IRW2	128	4.17	0.18	711
RIRW2	128	4.17	0.18	711
186A	121	4.08	0.10	1210
186B	7	4.00	0.00	1429
R186B	7	4.08	0.00	1429
SNB1A	128	4.08	0.10	1280
RSNB1A	121	4.25	0.10	1210
186C	23	4.00	0.02	1150
R186C	23	4.08	0.02	1150
186D	82	4.17	0.08	1025
SNB1	219	4.17	0.20	1095
RSNB1	215	4.25	0.20	1075
186E	50	4.08	0.04	1250
186F	37	4.08	0.03	1233
SNB2	281	4.17	0.27	1041
RSNB2	276	4.25	0.27	1022
186G	78	4.08	0.07	1114
SNB3	332	4.25	0.33	1006
SSNB3	58	4.92	0.33	176
186H	20	4.17	0.03	667
160E	5	4.00	0.00	1250
R160E	5	4.08	0.00	1250
SNB4	66	4.75	0.36	183
RSNB4	66	4.83	0.36	183
186I	38	4.08	0.03	1267
*SNB5	69	4.08	0.39	177
187A	17	4.00	0.01	1700
R187A	16	4.00	0.01	1600
187B	12	4.00	0.01	1200
GRS1	28	4.00	0.02	1400
RGRS1	26	4.17	0.02	1300
187C	20	4.00	0.01	2000
R187C	20	4.08	0.01	2000
187D	67	4.17	0.07	957
*GRS2	110	4.17	0.10	1100
188A	14	4.00	0.01	1400
R188A	13	4.08	0.01	1300

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
160E	5	4.00	0.00	1250
170I1	30	4.08	0.02	1500
170I2	20	4.00	0.01	2000
180A	35	4.00	0.03	1167
180B	18	4.17	0.03	600
180C	17	4.00	0.01	1700
180D	3	4.08	0.00	1000
180E	29	4.00	0.02	1450
180F	104	4.08	0.07	1486
180G	40	4.08	0.03	1333
180H	25	4.08	0.02	1250
180I	7	4.00	0.00	1750
180J	48	4.08	0.03	1600
180K	44	4.00	0.03	1467
180L	26	4.00	0.01	2600
180M	5	4.08	0.00	1020
180N	64	4.00	0.04	1600
180O	33	4.00	0.02	1650
180P	21	4.00	0.01	2100
180Q	50	4.08	0.03	1667
180R	47	4.00	0.03	1567
180S	69	4.00	0.04	1725
180T	40	4.00	0.02	2000
180U	24	4.08	0.02	1200
181A	0	0.08	0.08	0
181B	28	4.08	0.02	1400
182A	94	4.00	0.05	1880
182B	60	4.08	0.04	1500
182C	32	4.08	0.02	1600
182D	158	4.08	0.09	1756
182E	102	4.08	0.06	1700
182F	16	4.08	0.01	1600
182G	56	4.08	0.05	1120
182I	49	4.08	0.04	1225
182J	16	4.08	0.01	1600
182K	51	4.00	0.02	2550
182L	10	4.00	0.00	2041
183A	77	4.00	0.04	1925
183B	64	4.08	0.04	1600
183F	70	4.08	0.05	1400
183G	138	4.08	0.09	1533
183H	33	4.00	0.02	1650
183I	90	4.08	0.06	1500
183J	10	4.00	0.00	2041
183K	4	4.00	0.00	2000

188B	98	4.08	0.07	1400	184A	27	4.00	0.02	1350
188C	28	4.08	0.02	1400	184B	25	4.08	0.02	1250
SYR1	140	4.08	0.10	1400	184C	23	4.00	0.01	2300
RSYC1	140	4.08	0.10	1400	184D	7	4.08	0.01	700
188D	66	4.08	0.05	1320	184E	95	4.17	0.11	864
188E	54	4.08	0.05	1080	184F	8	4.08	0.01	800
SYR2	259	4.08	0.20	1295	184G	81	4.08	0.05	1620
RSYC2	256	4.25	0.20	1280	184H	16	4.08	0.01	1600
188F	82	4.08	0.07	1171	184I	49	4.00	0.03	1633
SYR3	318	4.25	0.28	1136	184J	12	4.00	0.01	1200
SSYC3	190	4.50	0.28	679	184K	7	4.00	0.00	1750
RSYC3	190	4.50	0.28	679	185A	60	4.00	0.04	1500
188G	1	4.00	0.00	1000	185B	82	4.17	0.08	1025
SYR4	190	4.50	0.28	679	186A	121	4.08	0.10	1210
GRS2	249	4.33	0.38	655	186B	7	4.00	0.00	1429
SGRS2	249	4.33	0.38	655	186C	23	4.00	0.02	1150
187E	6	4.08	0.00	1224	186D	82	4.17	0.08	1025
R187E	6	4.08	0.00	1224	186E	50	4.08	0.04	1250
187F	3	4.08	0.00	1000	186F	37	4.08	0.03	1233
GRS3A	9	4.08	0.01	900	186G	78	4.08	0.07	1114
RGRS3A	9	4.08	0.01	900	186H	20	4.17	0.03	667
187G	32	4.17	0.04	800	186I	38	4.08	0.03	1267
GRS3	285	4.17	0.43	663	187A	17	4.00	0.01	1700
RGRS3	285	4.25	0.43	663	187B	12	4.00	0.01	1200
187H	6	4.00	0.00	1500	187C	20	4.00	0.01	2000
*SNB5	289	4.17	0.43	672	187D	67	4.17	0.07	957
SNB5	329	4.17	0.82	401	187E	6	4.08	0.00	1224
RSNB5	328	4.25	0.82	400	187F	3	4.08	0.00	1000
187I	37	4.00	0.02	1850	187G	32	4.17	0.04	800
SNB6	345	4.17	0.85	406	187H	6	4.00	0.00	1500
SSNB6	86	5.42	0.85	101	187I	37	4.00	0.02	1850
RSNB6	86	5.50	0.85	101	188A	14	4.00	0.01	1400
180F	104	4.08	0.07	1486	188B	98	4.08	0.07	1400
*CLN1	138	4.08	0.92	150	188C	28	4.08	0.02	1400
CLN1	234	4.17	1.10	213	188D	66	4.08	0.05	1320
SCLN1	207	4.42	1.10	188	188E	54	4.08	0.05	1080
180C	17	4.00	0.01	1700	188F	82	4.08	0.07	1171
R180C	17	4.08	0.01	1700	188G	1	4.00	0.00	1000
180D	3	4.08	0.00	1000	D170I1	15	4.08	0.02	750
180E	29	4.00	0.02	1450	D170I1	15	4.08	0.02	750
CLN2	224	4.25	1.13	198	D170I1	15	4.08	0.02	750
RCLN2	224	4.25	1.13	198	D170I2	15	4.08	0.01	1500
180G	40	4.08	0.03	1333	D183K	243	4.08	1.22	199
CLN3	243	4.25	1.16	209	D183K	22	4.08	1.22	18
SCLN3	232	4.42	1.16	200	DFC2	353	4.17	0.26	1358
180H	25	4.08	0.02	1250	DFHN	0	0.08	1.00	0
R180H	24	4.08	0.02	1200	DMLT6A	15	4.08	0.01	1500
180I	7	4.00	0.00	1750	DO183K	22	4.08	1.22	18
R180I	6	4.08	0.00	1500	DOFC2	7	4.17	0.26	27
180J	48	4.08	0.03	1600	* CLN1	138	4.08	0.92	150
CLN4B	79	4.08	0.06	1317	CLN1	234	4.17	1.10	213
RCLN4B	78	4.08	0.06	1300	CLN2	224	4.25	1.13	198
180M	5	4.08	0.00	1020	CLN3	243	4.25	1.16	209
CLN4	278	4.25	1.22	228	CLN4	278	4.25	1.22	228
RCLN4	278	4.33	1.22	228	CLN4B	79	4.08	0.06	1317
180N	64	4.00	0.04	1600	CLN5	473	4.33	1.63	290

184C	23	4.00	0.01	2300	CLN6	418	4.67	1.67	250
184D	7	4.08	0.01	700	* CLN7	420	4.75	1.69	249
NCL1	30	4.00	0.02	1500	CLN7	852	4.33	3.33	256
RNCL1	29	4.00	0.02	1450	* CLN8	858	4.33	3.35	256
184E	95	4.17	0.11	864	CLN8	884	4.33	3.45	256
NCL2	117	4.17	0.13	900	CLN9	910	4.33	3.50	260
SNCL2	117	4.17	0.13	900	* CLN10	964	4.33	3.59	269
184F	8	4.08	0.01	800	* CLN10	915	4.42	3.52	260
R184F	8	4.08	0.01	800	CLN10	979	4.33	3.62	270
NCL3	124	4.17	0.14	886	CL10A	108	4.08	0.07	1543
RNCL3	123	4.17	0.14	879	FC1	105	4.08	0.09	1167
SNCL3	121	4.25	0.14	864	FC2	376	4.08	0.26	1446
184A	27	4.00	0.02	1350	FC3	523	4.17	0.37	1414
R184A	20	4.17	0.02	1000	FC3A	153	4.08	0.09	1700
184B	25	4.08	0.02	1250	FC3B	182	4.08	0.11	1655
NCL4A	43	4.17	0.04	1075	FC4	537	4.17	0.39	1377
RNCL4A	43	4.17	0.04	1075	FC5	610	4.17	1.61	379
NCL4	162	4.17	0.18	900	FC6	621	4.17	1.63	381
RNCL4	162	4.17	0.18	900	FC7	622	4.17	1.64	379
184G	81	4.08	0.05	1620	GRS1	28	4.00	0.02	1400
NCL5	226	4.17	0.23	983	* GRS2	110	4.17	0.10	1100
SNCL5	183	4.33	0.23	796	GRS2	249	4.33	0.38	655
184H	16	4.08	0.01	1600	GRS3	285	4.17	0.43	663
183A	77	4.00	0.04	1925	GRS3A	9	4.08	0.01	900
R183A	75	4.08	0.04	1875	IRW1	139	4.17	0.12	1158
183B	64	4.08	0.04	1600	IRW2	128	4.17	0.18	711
NCL6A	138	4.08	0.08	1725	LC1	192	4.08	1.16	166
SNCL6A	0	6.17	0.08	0	LC2	266	4.08	1.22	218
RNCL6A	0	6.33	0.08	0	LC3	265	4.08	1.22	217
NCL6	192	4.33	0.33	582	MLT6A	30	4.08	0.01	3000
RNCL6	191	4.42	0.33	579	NCL1	30	4.00	0.02	1500
184I	49	4.00	0.03	1633	NCL2	117	4.17	0.13	900
NCL7	208	4.33	0.36	578	NCL3	124	4.17	0.14	886
SNCL7	208	4.33	0.36	578	NCL4	162	4.17	0.18	900
RNCL7	207	4.42	0.36	575	NCL4A	43	4.17	0.04	1075
184J	12	4.00	0.01	1200	NCL5	226	4.17	0.23	983
NCL8	211	4.33	0.37	570	NCL6	192	4.33	0.33	582
RNCL8	211	4.42	0.37	570	NCL6A	138	4.08	0.08	1725
184K	7	4.00	0.00	1750	NCL7	208	4.33	0.36	578
NCL9	212	4.42	0.37	573	NCL8	211	4.33	0.37	570
RNCL9	212	4.42	0.37	573	NCL9	212	4.42	0.37	573
CLN5	473	4.33	1.63	290	SNB1	219	4.17	0.20	1095
SCLN5	408	4.67	1.63	250	SNB1A	128	4.08	0.10	1280
180K	44	4.00	0.03	1467	SNB2	281	4.17	0.27	1041
R180K	44	4.08	0.03	1467	SNB3	332	4.25	0.33	1006
180L	26	4.00	0.01	2600	SNB4	66	4.75	0.36	183
CLN6	418	4.67	1.67	250	* SNB5	289	4.17	0.43	672
RCLN6	416	4.75	1.67	249	SNB5	329	4.17	0.82	401
180O	33	4.00	0.02	1650	SNB5	69	4.08	0.39	177
*CLN7	420	4.75	1.69	249	SNB6	345	4.17	0.85	406
182G	56	4.08	0.05	1120	SYR1	140	4.08	0.10	1400
182I	49	4.08	0.04	1225	SYR2	259	4.08	0.20	1295
FC1	105	4.08	0.09	1167	SYR3	318	4.25	0.28	1136
RFC1	105	4.17	0.09	1167	SYR4	190	4.50	0.28	679
182D	158	4.08	0.09	1756	R160E	5	4.08	0.00	1250
R182D	158	4.08	0.09	1756	R170I1	15	4.08	0.02	750

182E	102	4.08	0.06	1700	R170I1	14	4.25	0.02	700
182F	16	4.08	0.01	1600	R180A	35	4.08	0.03	1167
FC2	376	4.08	0.26	1446	R180C	17	4.08	0.01	1700
SFC2	365	4.17	0.26	1404	R180H	24	4.08	0.02	1200
RFC2	360	4.17	0.26	1385	R180I	6	4.08	0.00	1500
DOFC2	7	4.17	0.26	27	R180K	44	4.08	0.03	1467
DFC2	353	4.17	0.26	1358	R181A	0	0.08	0.08	0
182A	94	4.00	0.05	1880	R182A	94	4.08	0.05	1880
R182A	94	4.08	0.05	1880	R182D	158	4.08	0.09	1756
182B	60	4.08	0.04	1500	R183A	75	4.08	0.04	1875
FC3A	153	4.08	0.09	1700	R183K	21	4.25	1.22	17
SFC3A	151	4.08	0.09	1678	R183K	21	4.17	1.22	17
182C	32	4.08	0.02	1600	R184A	20	4.17	0.02	1000
FC3B	182	4.08	0.11	1655	R184F	8	4.08	0.01	800
RFC3B	182	4.08	0.11	1655	R185A	57	4.17	0.04	1425
FC3	523	4.17	0.37	1414	R186B	7	4.08	0.00	1429
RFC3	522	4.17	0.37	1411	R186C	23	4.08	0.02	1150
182J	16	4.08	0.01	1600	R187A	16	4.00	0.01	1600
FC4	537	4.17	0.39	1377	R187C	20	4.08	0.01	2000
SFC4	504	4.25	0.39	1292	R187E	6	4.08	0.00	1224
DFHN	0	0.08	1.00	0	R188A	13	4.08	0.01	1300
183F	70	4.08	0.05	1400	RCLN2	224	4.25	1.13	198
183G	138	4.08	0.09	1533	RCLN4	278	4.33	1.22	228
183H	33	4.00	0.02	1650	RCLN4B	78	4.08	0.06	1300
LC1	192	4.08	1.16	166	RCLN6	416	4.75	1.67	249
RLC1	189	4.08	1.16	163	RCLN7	852	4.33	3.33	256
183I	90	4.08	0.06	1500	RCLN9	906	4.42	3.50	259
183J	10	4.00	0.00	2041	RCL10A	107	4.08	0.07	1529
LC2	266	4.08	1.22	218	RFC1	105	4.17	0.09	1167
SLC2	263	4.08	1.22	216	RFC2	360	4.17	0.26	1385
RLC2	263	4.08	1.22	216	RFC3	522	4.17	0.37	1411
183K	4	4.00	0.00	2000	RFC3B	182	4.08	0.11	1655
LC3	265	4.08	1.22	217	RFC5	602	4.17	1.61	374
DO183K	22	4.08	1.22	18	RFC6	618	4.25	1.63	379
D183K	243	4.08	1.22	199	RGRS1	26	4.17	0.02	1300
FC5	610	4.17	1.61	379	RGRS3	285	4.25	0.43	663
RFC5	602	4.17	1.61	374	RGRS3A	9	4.08	0.01	900
182K	51	4.00	0.02	2550	RIRW2	128	4.17	0.18	711
FC6	621	4.17	1.63	381	RLC1	189	4.08	1.16	163
RFC6	618	4.25	1.63	379	RLC2	263	4.08	1.22	216
182L	10	4.00	0.00	2041	RMLT6A	15	4.17	0.01	1500
FC7	622	4.17	1.64	379	RNCL1	29	4.00	0.02	1450
CLN7	852	4.33	3.33	256	RNCL3	123	4.17	0.14	879
RCLN7	852	4.33	3.33	256	RNCL4	162	4.17	0.18	900
180P	21	4.00	0.01	2100	RNCL4A	43	4.17	0.04	1075
*CLN8	858	4.33	3.35	256	RNCL6	191	4.42	0.33	579
181A	0	0.08	0.08	0	RNCL6A	0	6.33	0.08	0
R181A	0	0.08	0.08	0	RNCL7	207	4.42	0.36	575
181B	28	4.08	0.02	1400	RNCL8	211	4.42	0.37	570
D183K	22	4.08	1.22	18	RNCL9	212	4.42	0.37	573
R183K	21	4.17	1.22	17	RSNB1	215	4.25	0.20	1075
R183K	21	4.25	1.22	17	RSNB1A	121	4.25	0.10	1210
CLN8	884	4.33	3.45	256	RSNB2	276	4.25	0.27	1022
SCLN8	882	4.33	3.45	256	RSNB4	66	4.83	0.36	183
180S	69	4.00	0.04	1725	RSNB5	328	4.25	0.82	400
170I1	30	4.08	0.02	1500	RSNB6	86	5.50	0.85	101

D170I1	15	4.08	0.02	750	RSYC1	140	4.08	0.10	1400
D170I1	15	4.08	0.02	750	RSYC2	256	4.25	0.20	1280
R170I1	15	4.08	0.02	750	RSYC3	190	4.50	0.28	679
CLN9	910	4.33	3.50	260	SCLN1	207	4.42	1.10	188
RCLN9	906	4.42	3.50	259	SCLN3	232	4.42	1.16	200
180U	24	4.08	0.02	1200	SCLN5	408	4.67	1.63	250
*CLN10	915	4.42	3.52	260	SCLN8	882	4.33	3.45	256
180Q	50	4.08	0.03	1667	SFC2	365	4.17	0.26	1404
180R	47	4.00	0.03	1567	SFC3A	151	4.08	0.09	1678
170I2	20	4.00	0.01	2000	SFC4	504	4.25	0.39	1292
D170I1	15	4.08	0.02	750	SGRS2	249	4.33	0.38	655
R170I1	14	4.25	0.02	700	SIRW1	94	4.33	0.12	783
MLT6A	30	4.08	0.01	3000	SLC2	263	4.08	1.22	216
D170I2	15	4.08	0.01	1500	SNCL2	117	4.17	0.13	900
DMLT6A	15	4.08	0.01	1500	SNCL3	121	4.25	0.14	864
RMLT6A	15	4.17	0.01	1500	SNCL5	183	4.33	0.23	796
CL10A	108	4.08	0.07	1543	SNCL6A	0	6.17	0.08	0
RCL10A	107	4.08	0.07	1529	SNCL7	208	4.33	0.36	578
*CLN10	964	4.33	3.59	269	SSNB3	58	4.92	0.33	176
180T	40	4.00	0.02	2000	SSNB6	86	5.42	0.85	101
CLN10	979	4.33	3.62	270	SSYC3	190	4.50	0.28	679

Table 3.5.8
Panorama Channel - 190
100-year, 24-hour Storm Results

Existing Condition
In HEC-1 Run Order

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	43	4.00	0.03	1433
S182H	42	4.08	0.03	1400
R182H	42	4.08	0.03	1400
190A	30	4.00	0.02	1500
PNR1A	71	4.08	0.05	1420
SPNR1A	65	4.17	0.05	1300
RPNR1A	65	4.17	0.05	1300
190B	11	4.00	0.01	1100
PNR1	73	4.17	0.05	1460
RPNR1	71	4.17	0.05	1420
190C	37	4.00	0.02	1850
PNR2	97	4.17	0.08	1213
RPNR2	93	4.25	0.08	1163
190D	11	4.00	0.00	2245
R190D	11	4.00	0.00	2245
190E	5	4.00	0.00	1667
190F	9	4.00	0.01	900
190G	8	4.08	0.01	800
PNR3A	33	4.00	0.02	1650
RPNR3A	32	4.00	0.02	1600
190H	121	4.08	0.08	1513
R190H	121	4.08	0.08	1513
190I	22	4.00	0.01	2200
190J	13	4.08	0.01	1300
PNR3	247	4.08	0.19	1300
RPNR3	246	4.17	0.19	1295
190K	12	4.00	0.01	1200
R190K	12	4.08	0.01	1200
190L	18	4.00	0.01	1800
*PNR4	269	4.08	0.21	1281
190M	13	4.08	0.01	1300
190N	30	4.00	0.02	1500
PNR4	310	4.08	0.24	1292
RPNR4	301	4.17	0.24	1254
190O	8	4.00	0.01	800
R190O	7	4.08	0.01	700
190P	43	4.00	0.02	2150
PNR5A	49	4.00	0.03	1633
RPNR5A	48	4.00	0.03	1600
190Q	10	4.08	0.01	1000
*PNR5	337	4.17	0.28	1204
190R	23	4.00	0.01	2300
PNR5	354	4.17	0.29	1221
RPNR5	350	4.17	0.29	1207
190S	8	4.08	0.01	800

Existing Condition
In Numerical Order by Operation Type

HEC-1 ID	Peak Discharge in cds	Time to Peak in hours	Drainage Area, in sq miles	Unit Discharge in cfs/sm
182H	43	4.00	0.03	1433
190A	30	4.00	0.02	1500
190B	11	4.00	0.01	1100
190C	37	4.00	0.02	1850
190D	11	4.00	0.00	2245
190E	5	4.00	0.00	1667
190F	9	4.00	0.01	900
190G	8	4.08	0.01	800
190H	121	4.08	0.08	1513
190I	22	4.00	0.01	2200
190J	13	4.08	0.01	1300
190K	12	4.00	0.01	1200
190L	18	4.00	0.01	1800
190M	13	4.08	0.01	1300
190N	30	4.00	0.02	1500
190O	8	4.00	0.01	800
190P	43	4.00	0.02	2150
190Q	10	4.08	0.01	1000
190R	23	4.00	0.01	2300
190S	8	4.08	0.01	800
190T	135	4.08	0.13	1038
190U	32	4.00	0.02	1600
190V	18	4.08	0.02	900
PNR1	73	4.17	0.05	1460
PNR1A	71	4.08	0.05	1420
PNR2	97	4.17	0.08	1213
PNR3	247	4.08	0.19	1300
PNR3A	33	4.00	0.02	1650
* PNR4	269	4.08	0.21	1281
PNR4	310	4.08	0.24	1292
* PNR5	337	4.17	0.28	1204
PNR5	354	4.17	0.29	1221
PNR5A	49	4.00	0.03	1633
* PNR6	357	4.17	0.30	1190
PNR6	487	4.17	0.43	1133
* PNR7	488	4.25	0.45	1084
PNR7	506	4.25	0.47	1077
R182H	42	4.08	0.03	1400
R190D	11	4.00	0.00	2245
R190H	121	4.08	0.08	1513
R190K	12	4.08	0.01	1200
R190O	7	4.08	0.01	700
R190U	32	4.08	0.02	1600
RPNR1	71	4.17	0.05	1420
RPNR1A	65	4.17	0.05	1300

*PNR6	357	4.17	0.30	1190	RPNR2	93	4.25	0.08	1163
190T	135	4.08	0.13	1038	RPNR3	246	4.17	0.19	1295
PNR6	487	4.17	0.43	1133	RPNR3A	32	4.00	0.02	1600
RPNR6	478	4.25	0.43	1112	RPNR4	301	4.17	0.24	1254
190V	18	4.08	0.02	900	RPNR5	350	4.17	0.29	1207
*PNR7	488	4.25	0.45	1084	RPNR5A	48	4.00	0.03	1600
190U	32	4.00	0.02	1600	RPNR6	478	4.25	0.43	1112
R190U	32	4.08	0.02	1600	S182H	42	4.08	0.03	1400
PNR7	506	4.25	0.47	1077	SPNR1A	65	4.17	0.05	1300

SECTION 6: REFERENCE MATERIALS

6.1 Other Published Flood Studies

There are no other significant published flood studies of record.

6.2 Previous FEMA Studies

There are no previous FEAM studies for the study watershed.

6.3 Other Applicable Studies

Refer to Sections 6.5.

6.4 Published and Unpublished Historical Flood Information

There is no significant historical flood information of record for this watershed.

6.5 Bibliography

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3. Kenney Aerial Mapping, Inc., *Topographic Maps for the Town of Fountain Hills, Scale 1" = 200', Contour Interval = 2 feet,* 1991.

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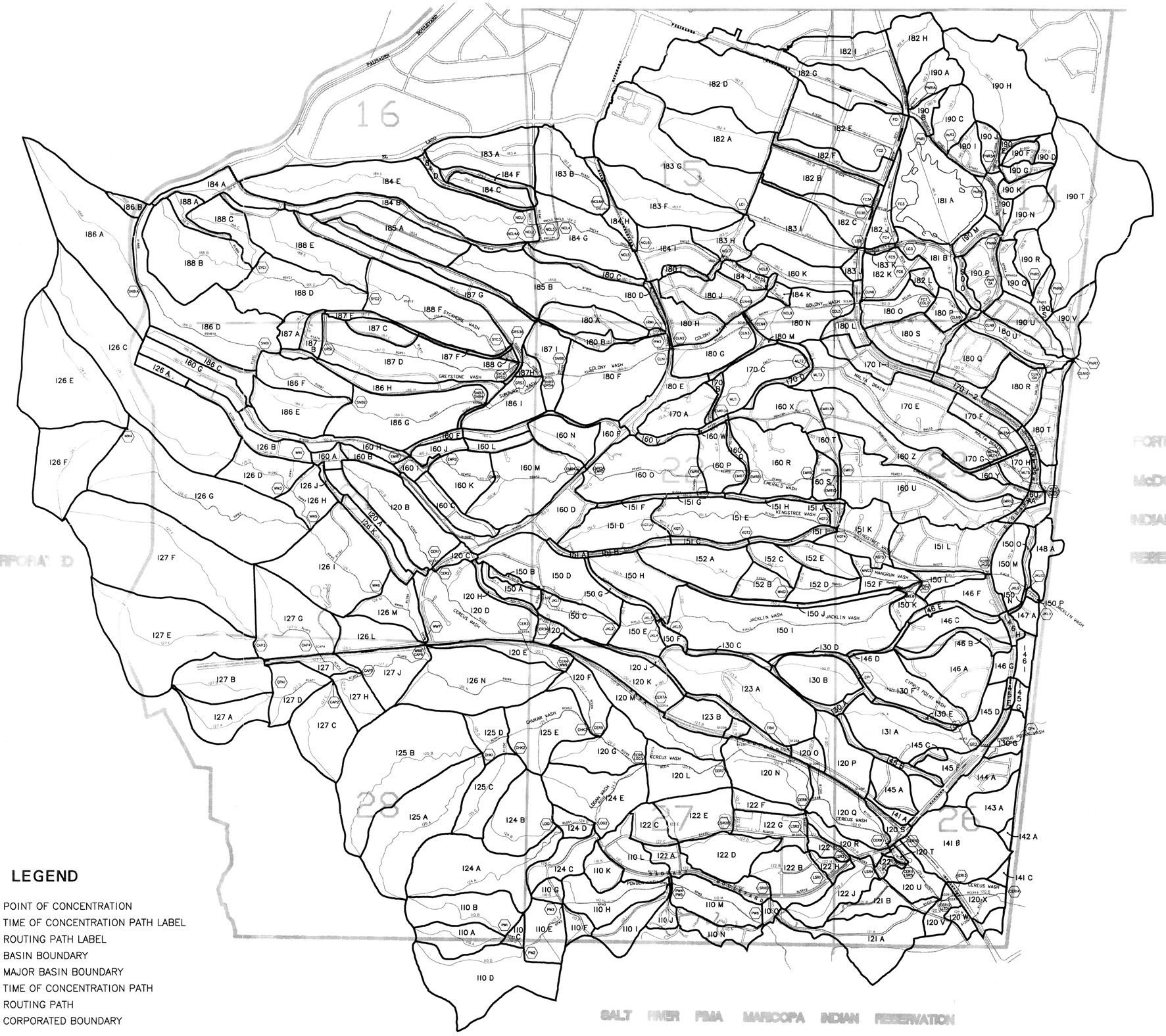
7. U.S. Department of Commerce, National Oceanic and Atmospheric Administration, National Weather Service, *Precipitation-Frequency Atlas of the Western United States, Volume VIII - Arizona,* 1973.



LEGEND

- POINT OF CONCENTRATION
- TIME OF CONCENTRATION PATH LABEL
- ROUTING PATH LABEL
- BASIN BOUNDARY
- MAJOR BASIN BOUNDARY
- TIME OF CONCENTRATION PATH
- ROUTING PATH
- CORPORATED BOUNDARY

ACK ENGINEERS, INC.
2255 NORTH 44TH STREET, SUITE 330
PHOENIX, ARIZONA 85008
TELEPHONE (602) 244-2566

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PLATE 1

HYDROLOGY MAP

FILE: HYD-FINL DATE: 04/13/95

LEGEND

- SECTION LINES
- 16 — SECTION NUMBER
- SOIL TYPE 41 — SOIL TYPE CLASSIFICATION
- CORPORATED BOUNDARY
- BASIN BOUNDARY
- 127 B — BASIN I.D.
- MAJOR BASIN BOUNDARY
- STREETS

ACK ENGINEERS, INC.
2255 NORTH 44TH STREET, SUITE 330
PHOENIX, ARIZONA 85008
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FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PLATE 2

SOILS MAP

FILE: FH-SOIL.DWG DATE: 4/13/95

ORD. 91-01
REZONING PLAT 601-A
LOTS # 22,23,24,25,26
FROM R-3 TO R1-10

S.U. C-2 Z83-168 (CABLE T.V. FACILITY)

S.U. R-4 Z88-262 (COLUMBARIUM)

C-3 P.D. Z89-67

R-3 R.U.P. Z78-160 Z88-13

R-5 R.U.P.D. Z87-80 327+25 332-42

R.U.P. R-3 Z78-160 Z88-13

R1-35 R.U.P.D. Z86-234

R.U.P.D. P-3,R-5 Z79-43 Z84-163 Z85-179

R-3 R.U.P.B. Z85-179

R-4 R.U.P.D. Z87-82

S.U. C3 Z86-148 MINI STORAGE

S.U. C-1 Z78-83 (HELIPORT)

S.U. C-3 Z87-2 MINI STORAGE

UNINCORPORATED

S.U. RURAL-43 Z79-62 T.V. TOWER & STATION

S.U. R1-8,RURAL-43 Z86-176 (WATER TREATMENT FACILITY)

S.U. R1-8,RURAL-43 Z85-243 (WATER TREATMENT FACILITY)

R1-35 R.U.P.D. Z87-121

R.U.P. R1-10 Z82-122 Z84-213

R.U.P. R-3 Z82-122

R.U.P. R1-35 Z82-122

IND-1 P.D. Z85-230

S.U. IND-1 MINI WRHSE & RV STOR Z86-58 Z88-55

I.U.P.D. IND-2 P.D. Z86-58 Z88-55

IND-2 P.D. Z88-55

R1-35 R.U.P.D. Z82-01

R1-6 P.D. Z87-69

R-3 R.U.P. Z78-53

R-5 P.D. Z86-239

C-2 P.D. Z89-61 Z87-83

I.U.P.D IND-2 Z88-55

RURAL-43

RURAL-190

R1-10

R1-18

R1-8

R1-35

R-1

R-2

R-3

R-4

R-5

C-1

C-2

C-3

C-0

IND-1

16

21

22

28

800 0 800 1600

LEGEND

- SECTION LINES
- 16 SECTION NUMBER
- ZONING BOUNDARY
- R1-35 R.U.P.D. Z86-234 ZONING CLASSIFICATION
- R1-35 ZONING CLASSIFICATION
- CORPORATED BOUNDARY
- BASIN BOUNDARY
- 127 B BASIN I.D.
- MAJOR BASIN BOUNDARY
- STREETS

SALT RIVER PIMA MARICOPA INDIAN RESERVATION

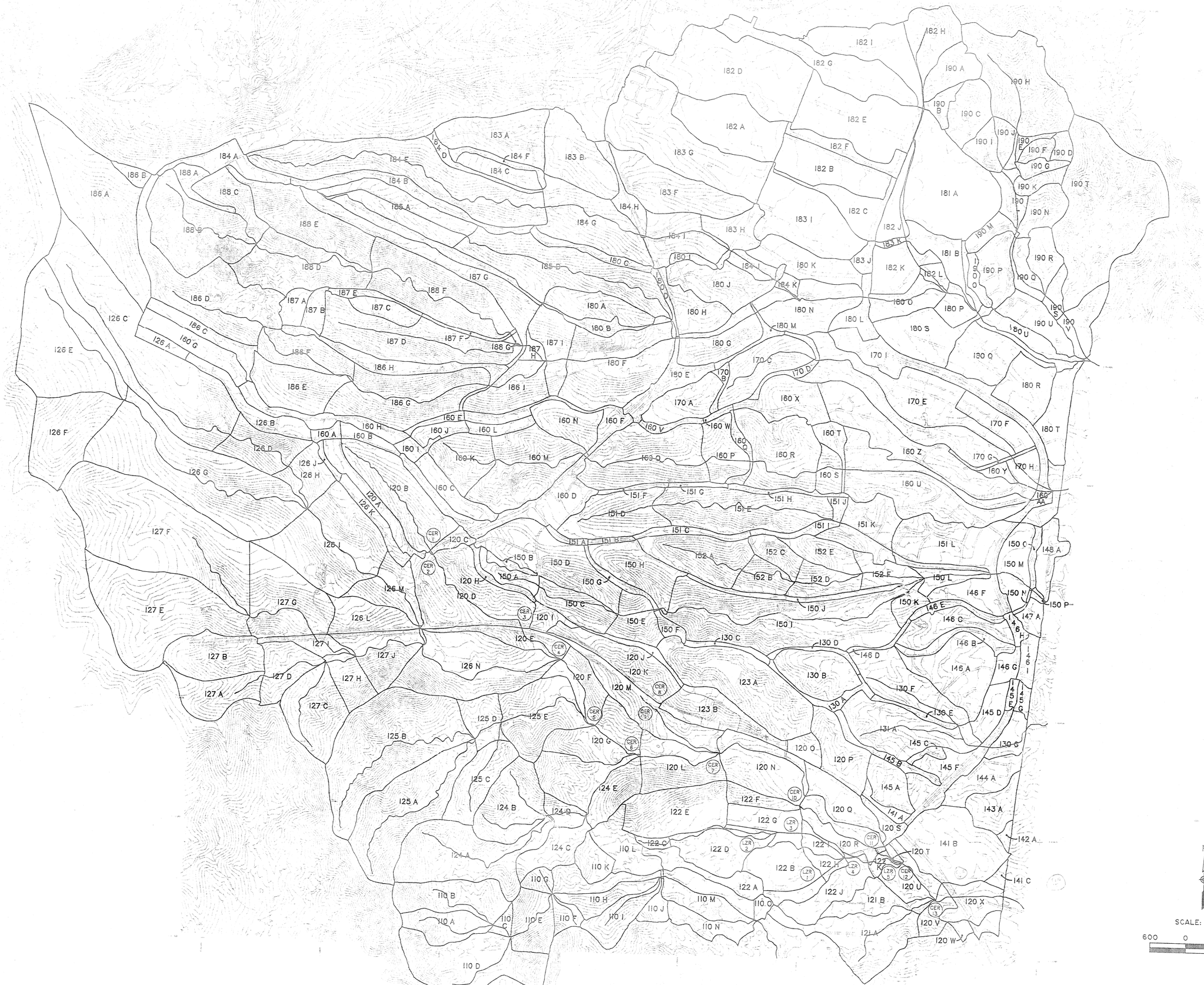
ACK ENGINEERS, INC.
2255 NORTH 44TH STREET, SUITE 330
PHOENIX, ARIZONA 85008
TELEPHONE (602) 244-2566

FLOOD CONTROL DISTRICT
OF MARICOPA COUNTY

PLATE 3

LAND USE MAP

FILE: LANDUSE.DWG DATE: 4/13/95



N

SCALE: 1"=600'

600 0 600 1200

ENGINEERS, INC.

2255 NORTH 44TH STREET, SUITE 330
PHOENIX, ARIZONA 85008
TELEPHONE (602) 244-2566

APPENDIX A

WATERSHED PARAMETERS

A.1 Watershed Parameters - Powder Wash (110)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
110A	21	14.01	0.022	1750	0.33	1938	1688	250	0.143	754.3	324	C	0.121
110B	20	23.13	0.036	2125	0.40	1970	1688	282	0.133	700.7	327	C	0.116
110C	23	2.74	0.004	688	0.13	1798	1676	122	0.177	936.3	347	C	0.139
110D	26	45.15	0.071	2113	0.40	1930	1676	254	0.120	634.7	320	C	0.109
110E	25	15.85	0.025	1250	0.24	1846	1655	191	0.153	806.8	333	C	0.120
110F	380	4.88	0.008	975	0.18	1814	1655	159	0.163	861.0	340	C	0.133
110G	24	4.06	0.006	625	0.12	1780	1655	125	0.200	1056.0	357	C	0.135
110H	28	19.95	0.031	2113	0.40	1655	1614	41	0.019	102.5	-	Comp.	0.096
110I	27	12.66	0.020	1665	0.32	1701	1614	87	0.052	275.9	254	C	0.122
110J	34	4.32	0.007	913	0.17	1692	1620	72	0.079	416.4	290	B	0.071
110K	16	7.85	0.012	788	0.15	1718	1634	84	0.107	562.8	308	A	0.034
110L	29	15.17	0.024	2088	0.40	1796	1622	174	0.083	440.0	294	B	0.064
110M	38	19.99	0.031	1825	0.35	1620	1581	39	0.021	112.8	-	Comp.	0.056
110N	35	9.84	0.015	1688	0.32	1641	1581	60	0.036	187.7	-	B	0.066
110O	36	2.28	0.004	550	0.10	1591	1581	10	0.018	96.0	-	Comp.	0.065
TOTAL	15	201.87	0.32										

A.2 Watershed Parameters - Cereus Wash (120)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
120A	131	10.17	0.016	2575	0.49	1902	1776	126	0.049	258.4	245	B	0.066
160A	134	3.71	0.006	700	0.13	1916	1879	37	0.053	279.1	256	B	0.072
120B	130	33.86	0.053	2475	0.47	1884	1754	130	0.053	277.3	255	C	0.112
120C	129	3.43	0.005	913	0.17	1832	1779	53	0.058	306.5	266	Comp.	0.086
120D	227	44.03	0.069	2965	0.56	1777	1690	87	0.029	154.9	-	B	0.057
120E	226	11.61	0.018	2475	0.47	1728	1654	74	0.030	157.9	-	B	0.065
120F	294	13.76	0.022	1675	0.32	1690	1634	56	0.033	176.5	-	B	0.064
120G	11	23.45	0.037	2025	0.38	1776	1617	159	0.079	414.6	290	C	0.116
120H	107	3.47	0.005	1613	0.31	1832	1758	74	0.046	242.2	235	B	0.073
120I	228	4.61	0.007	975	0.18	1763	1695	68	0.070	368.2	283	C	0.133
120J	230	3.60	0.006	1675	0.32	1763	1739	24	0.014	75.7	-	B	0.072
120K	295	21.51	0.034	2275	0.43	1755	1652	103	0.045	239.1	232	C	0.117
120L	37	23.22	0.036	2050	0.39	1780	1599	181	0.088	466.2	297	C	0.116
120M	N/S	25.60	0.040	3700	0.70	1710	1599	111	0.030	158.4	-	B	0.061
120N	39	28.26	0.044	2500	0.47	1599	1512	87	0.035	183.7	-	B	0.060
120O	288	5.06	0.008	700	0.13	1610	1592	18	0.026	135.8	-	B	0.070
120P	287	18.04	0.028	700	0.13	1685	1586	99	0.141	746.7	326	C	0.119
120Q	49	22.46	0.035	2150	0.41	1593	1552	41	0.019	100.7	-	B	0.061
120R	48	7.69	0.012	1713	0.32	1590	1560	30	0.018	92.5	-	B	0.068
120S	265	4.23	0.007	1125	0.21	1582	1560	22	0.020	103.3	-	B	0.071
120T	53	1.27	0.002	550	0.10	1566	1542	24	0.044	230.4	226	C	0.147
120U	51	12.06	0.019	1350	0.26	1574	1536	38	0.028	148.6	-	B	0.065
120V	52	6.43	0.010	1075	0.20	1610	1532	78	0.073	383.1	286	C	0.130
120W	286	3.51	0.005	440	0.08	1555	1541	14	0.032	168.0	-	B	0.073
120X	284	10.49	0.016	1070	0.20	1550	1518	32	0.030	157.9	-	B	0.066
121A	43	31.85	0.050	2775	0.53	1592	1549	43	0.015	81.8	-	B	0.059
121B	44	12.67	0.020	2300	0.44	1584	1536	48	0.021	110.2	-	B	0.065

A.2 Watershed Parameters - Cereus Wash (120)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
122A	32	13.00	0.020	2525	0.48	1666	1591	75	0.030	156.8	-	B	0.065
122B	42	21.68	0.034	1688	0.32	1612	1571	41	0.024	128.2	-	B	0.062
122C	31	9.22	0.014	1175	0.22	1797	1629	168	0.143	754.9	329	C	0.126
122D	33	20.47	0.032	1963	0.37	1628	1583	45	0.023	121.0	-	B	0.062
122E	30	20.48	0.032	1750	0.33	1772	1599	173	0.099	522.0	305	C	0.117
122F	40	6.56	0.010	1563	0.30	1689	1590	99	0.063	334.4	275	C	0.130
122G	41	14.09	0.022	1563	0.30	1610	1576	34	0.022	114.9	-	A	0.033
122H	46	3.94	0.006	863	0.16	1586	1562	24	0.028	146.8	-	B	0.072
122I	47	4.79	0.007	1013	0.19	1576	1562	14	0.014	73.0	-	B	0.071
122J	45	15.83	0.025	1963	0.37	1590	1554	36	0.018	96.8	-	B	0.064
122K	50	2.16	0.003	950	0.18	1554	1542	12	0.013	66.7	-	B	0.075
123A	291	47.98	0.075	2800	0.53	1745	1596	149	0.053	281.0	256	C	0.108
123B	New	11.89	0.019	1380	0.26	1745	1625	120	0.087	459.1	296	C	0.123
123C	New	2.19	0.003	360	0.07	1698	1618	80	0.222	1173.3	367	C	0.141
123D	289	6.49	0.010	2130	0.40	1744	1589	155	0.073	384.2	286	C	0.130
124A	18	45.33	0.071	3350	0.63	1970	1658	312	0.093	491.7	301	C	0.109
124B	14	27.36	0.043	1600	0.30	1788	1658	130	0.081	429.0	293	C	0.114
124C	17	12.92	0.020	1963	0.37	1774	1646	128	0.065	344.3	277	C	0.122
124D	13	5.77	0.009	1050	0.20	1746	1646	100	0.095	502.9	303	C	0.131
124E	12	32.74	0.051	2338	0.44	1814	1617	197	0.084	444.9	295	C	0.112
125A	19	49.55	0.077	3825	0.72	1968	1686	282	0.074	389.3	287	C	0.108
125B	5	72.25	0.113	3875	0.73	1875	1686	189	0.049	257.5	243	C	0.104
125C	15	19.24	0.030	1825	0.35	1812	1682	130	0.071	376.1	285	C	0.118
125D	22	11.33	0.018	1100	0.21	1686	1685	1	0.001	4.8	-	B	0.066
125E	10	29.86	0.047	2175	0.41	1685	1634	51	0.023	123.8	-	B	0.060
126A	?	4.19	0.007	1075	0.20	2010	1980	30	0.028	147.3	-	B	0.071

A.2 Watershed Parameters - Cereus Wash (120)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
126B	148	13.34	0.021	2465	0.47	1987	1897	90	0.037	192.8	-	B	0.065
126C	297	90.75	0.142	5200	0.98	2110	1831	279	0.054	283.3	257	C	0.101
126D	140	18.16	0.028	1700	0.32	1924	1794	130	0.076	403.8	289	C	0.119
126E	296	57.87	0.090	2900	0.55	2080	1900	180	0.062	327.7	273	C	0.106
126F	145	35.21	0.055	2200	0.42	2150	1900	250	0.114	600.0	311	C	0.111
126G	144	86.87	0.136	4550	0.86	2140	1770	370	0.081	429.4	293	C	0.102
126H	139	12.74	0.020	1513	0.29	1909	1770	139	0.092	485.1	300	C	0.122
126I	138	52.28	0.082	2525	0.48	1888	1735	153	0.061	319.9	271	C	0.107
126J	133	1.59	0.002	800	0.15	1908	1887	21	0.026	138.6	-	B	0.077
126K	132	7.61	0.012	1900	0.36	1891	1788	103	0.054	286.2	259	B	0.068
126L	224	15.01	0.023	2050	0.39	1846	1724	122	0.060	314.2	269	C	0.121
126M	225	16.25	0.025	1900	0.36	1837	1712	125	0.066	347.4	278	C	0.120
126N	9	49.06	0.077	3550	0.67	1930	1654	276	0.078	410.5	290	C	0.108
127A	1	18.22	0.028	1900	0.36	1920	1764	156	0.082	433.5	293	C	0.118
127B	6	24.85	0.039	1800	0.34	1940	1764	176	0.098	516.3	305	C	0.115
127C	3	27.06	0.042	2063	0.39	1878	1734	144	0.070	368.6	283	C	0.114
127D	2	15.51	0.024	1575	0.30	1852	1734	118	0.075	395.6	288	C	0.120
127E	221	66.11	0.103	3500	0.66	2080	1776	304	0.087	458.6	296	C	0.104
127F	223	93.91	0.147	4300	0.81	2160	1776	384	0.089	471.5	297	C	0.101
127G	222	36.34	0.057	2138	0.40	1906	1746	160	0.075	395.1	288	C	0.111
127H	4	11.26	0.018	1425	0.27	1940	1725	215	0.151	796.6	329	C	0.124
127I	7	6.59	0.010	1875	0.36	1835	1725	110	0.059	309.8	269	B	0.069
127J	8	20.56	0.032	2075	0.39	1942	1700	242	0.117	615.8	313	C	0.117
TOTAL	76	1678.47	2.623										

A.3 Watershed Parameters - Cyprus Point Wash (130)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
130A	281	4.94	0.008	2235	0.42	1699	1604	95	0.043	224.4	221	B	0.070
130B	292	20.07	0.031	1450	0.27	1701	1606	95	0.066	345.9	277	Comp.	0.112
130C	290	2.99	0.005	1565	0.30	1729	1699	30	0.019	101.2	-	A	0.037
130D	292	2.60	0.004	1775	0.34	1702	1604	98	0.055	291.5	262	B	0.074
130E	272	2.83	0.004	1550	0.29	1619	1538	81	0.052	275.9	254	B	0.074
130F	282	24.94	0.039	2250	0.43	1634	1539	95	0.042	222.9	221	C	0.115
130G	260	7.27	0.011	900	0.17	1526	1499	27	0.030	158.4	-	B	0.068
131A	271	31.51	0.049	2480	0.47	1654	1522	132	0.053	281.0	256	C	0.113
TOTAL	8	97.14	0.152										

A.4 Watershed Parameters - Jacklin Wash (150)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
150A	108	6.23	0.010	1363	0.26	1824	1754	70	0.051	271.2	252	B	0.069
150B	109	2.22	0.003	925	0.18	1817	1758	59	0.064	336.8	275	B	0.075
150C	106	14.34	0.022	1650	0.31	1758	1664	94	0.057	300.8	264	B	0.064
150D	110	35.10	0.055	3225	0.61	1831	1664	167	0.052	273.4	253	Comp.	0.116
150E	229	12.78	0.020	1000	0.19	1748	1662	86	0.086	454.1	296	B	0.065
150F	91	2.87	0.004	825	0.16	1742	1676	66	0.080	422.4	291	B	0.074
150G	92	3.49	0.005	1750	0.33	1784	1676	108	0.062	325.9	273	B	0.073
150H	83	20.66	0.032	1875	0.36	1784	1634	150	0.080	422.4	291	B	0.062
150I	293	75.18	0.117	4600	0.87	1740	1544	196	0.043	225.0	223	C	0.103
150J	81	6.67	0.010	3750	0.71	1741	1550	191	0.051	268.9	251	B	0.069
150K	73	5.88	0.009	1125	0.21	1603	1536	67	0.060	314.5	269	B	0.069
150L	72	6.67	0.010	1425	0.27	1551	1514	37	0.026	137.1	-	B	0.069
150M	55	14.98	0.023	1225	0.23	1534	1502	32	0.026	137.9	-	B	0.064
150N	56	0.58	0.001	550	0.10	1517	1510	7	0.013	67.2	-	A	0.042
150O	54	2.83	0.004	1175	0.22	1531	1510	21	0.018	94.4	-	B	0.074
150P	75	0.83	0.001	350	0.07	1512	1496	16	0.046	241.4	233	C	0.152
151A	111	1.82	0.003	765	0.14	1798	1783	15	0.020	103.5	-	A	0.038
151B	87	3.37	0.005	1460	0.28	1783	1748	35	0.024	126.6	-	A	0.037
151C	84	3.48	0.005	1360	0.26	1748	1715	33	0.024	128.1	-	A	0.037
151D	112	24.79	0.039	1725	0.33	1794	1700	94	0.054	287.7	259	Comp.	0.100
151E	88	42.44	0.066	3800	0.72	1748	1590	158	0.042	219.5	218	B	0.058
151F	113	1.98	0.003	1238	0.23	1778	1726	52	0.042	221.8	220	B	0.076
151G	90	1.75	0.003	1650	0.31	1726	1710	16	0.010	51.2	-	A	0.038
151H	89	3.43	0.005	2000	0.38	1710	1627	83	0.042	219.1	218	B	0.073
151I	85	4.11	0.006	1565	0.30	1715	1585	130	0.083	438.6	294	B	0.072
151J	86	2.20	0.003	550	0.10	1652	1586	66	0.120	633.6	315	B	0.075
151K	76	20.91	0.033	1325	0.25	1642	1555	87	0.066	346.7	278	Comp.	0.086
151L	58	33.57	0.052	2250	0.43	1621	1522	99	0.044	232.3	227	Comp.	0.082

A.4 Watershed Parameters - Jacklin Wash (150)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ. Ft/Mi	Land Type	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi			
152A	82	25.37	0.040	1925	0.36	1766	1626	140	0.073	384.0	286	C	0.115
152B	79	10.02	0.016	1365	0.26	1704	1590	114	0.084	441.0	294	C	0.125
152C	80	8.45	0.013	1238	0.23	1717	1590	127	0.103	541.6	307	C	0.127
152D	77	11.56	0.018	1600	0.30	1671	1565	106	0.066	349.8	279	C	0.123
152E	78	11.20	0.017	1650	0.31	1691	1565	126	0.076	403.2	289	C	0.124
152F	74	9.13	0.014	1425	0.27	1632	1536	96	0.067	355.7	280	C	0.126
TOTAL	34	430.88	0.673										

A.5 Watershed Parameters - Emerald Wash (160)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
160A		this basin is now part of the Cereus Wash Watershed (120)											
160B	135	4.21	0.007	1213	0.23	1902	1877	25	0.021	108.8	-	A	0.036
160C	127	10.35	0.016	1765	0.33	1873	1822	51	0.029	152.6	-	A	0.034
160D	128	26.37	0.041	4163	0.79	1877	1710	167	0.040	211.8	211	Comp.	0.102
160E	123	2.63	0.004	1125	0.21	1871	1821	50	0.044	234.7	228	B	0.074
160F	115	11.46	0.018	3900	0.74	1844	1710	134	0.034	181.4	-	Comp.	0.051
160G	147	14.52	0.023	2800	0.53	2020	1950	70	0.025	132.0	-	B	0.064
160H	141	13.07	0.020	3225	0.61	1958	1861	97	0.030	158.8	-	A	0.033
160I	126	3.49	0.005	938	0.18	1876	1821	55	0.059	309.6	268	Comp.	0.123
160J	121	5.20	0.008	525	0.10	1859	1821	38	0.072	382.2	286	B	0.070
160K	125	17.75	0.028	1300	0.25	1850	1740	110	0.085	446.8	295	C	0.119
160L	122	4.81	0.008	1300	0.25	1844	1792	52	0.040	211.2	211	B	0.071
160M	124	37.90	0.059	2300	0.44	1832	1690	142	0.062	326.0	273	C	0.111
160N	116	13.97	0.022	1238	0.23	1794	1698	96	0.078	409.4	290	B	0.064
160O	114	41.67	0.065	2425	0.46	1750	1637	113	0.047	246.0	236	C	0.110
160P	100	14.53	0.023	1350	0.26	1718	1628	90	0.067	352.0	279	C	0.121
160Q	99	3.79	0.006	1000	0.19	1717	1631	86	0.086	454.1	296	B	0.072
160R	95	33.63	0.053	2113	0.40	1717	1594	123	0.058	307.4	267	C	0.112
160S	93	6.83	0.011	800	0.15	1651	1584	67	0.084	442.2	294	B	0.069
160T	94	5.65	0.009	1025	0.19	1664	1595	69	0.067	355.4	280	B	0.070
160U	59	49.43	0.077	3865	0.73	1642	1516	126	0.033	172.1	-	B	0.057
160V	104	2.89	0.005	1165	0.22	1759	1729	30	0.026	136.0	-	A	0.037
160W	101	1.26	0.002	600	0.11	1736	1717	19	0.032	167.2	-	A	0.039
160X	96	18.31	0.029	1665	0.32	1726	1640	86	0.052	272.7	252	C	0.118
160Y	61	2.59	0.004	850	0.16	1572	1539	33	0.039	205.0	205	B	0.074
160Z	60	38.76	0.061	4500	0.85	1672	1523	149	0.033	174.8	-	B	0.058
160AA	57	3.36	0.005	838	0.16	1535	1509	26	0.031	163.8	-	B	0.073
TOTAL	26	388.43	0.607										

A.6 Watershed Parameters - Malta Drain (170)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
170A	103	15.08	0.024	1450	0.27	1761	1688	73	0.050	265.8	248	B	0.064
170B	102	2.24	0.004	550	0.10	1729	1685	44	0.080	422.4	291	B	0.075
170C	98	21.63	0.034	2225	0.42	1729	1632	97	0.044	230.2	226	B	0.062
170D	97	4.54	0.007	1500	0.28	1730	1631	99	0.066	348.5	279	B	0.071
170E	69	60.94	0.095	4250	0.80	1665	1534	131	0.031	162.7	-	B	0.055
170F	64	11.46	0.018	1500	0.28	1588	1546	42	0.028	147.8	-	B	0.065
170G	63	1.84	0.003	1200	0.23	1606	1536	70	0.058	308.0	267	B	0.076
170H	62	5.98	0.009	665	0.13	1544	1522	22	0.033	174.7	-	B	0.069
170I-1	65C	14.16	0.022	2225	0.42	1662	1597	65	0.029	154.2	-	B	0.064
170I-2	65C	7.57	0.012	1700	0.32	1597	1553	44	0.026	136.7	-	A	0.035
170I-3	65C	3.91	0.006	1200	0.23	1553	1509	44	0.037	193.6	-	B	0.072
TOTAL	11	149.33	0.233										

A.7 Watershed Parameters - Colony Wash (180)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
180A	240	15.92	0.025	2060	0.39	1806	1684	122	0.059	312.7	269	B	0.063
180B	239	18.50	0.029	6438	1.22	1970	1670	300	0.047	246.0	236	B	0.063
180C	199	6.55	0.010	1050	0.20	1812	1724	88	0.084	442.5	295	B	0.069
180D	241	2.09	0.003	1313	0.25	1735	1663	72	0.055	289.5	260	B	0.076
180E	105	11.91	0.019	1675	0.32	1759	1663	96	0.057	302.6	265	B	0.065
180F	117	47.27	0.074	2350	0.45	1784	1650	134	0.057	301.1	265	C	0.108
180G	243	18.67	0.029	1663	0.31	1692	1617	75	0.045	238.1	230	C	0.118
180H	244	13.39	0.021	2200	0.42	1729	1638	91	0.041	218.4	217	C	0.122
180I	189	2.30	0.004	850	0.16	1721	1690	31	0.036	192.6	-	B	0.075
180J	187	21.81	0.034	2575	0.49	1729	1648	81	0.031	166.1	-	B	0.062
180K	183	18.54	0.029	2150	0.41	1673	1602	71	0.033	174.4	-	B	0.063
180L	252	8.00	0.013	1025	0.19	1661	1595	66	0.064	340.0	276	B	0.068
180M	251	3.14	0.005	1613	0.31	1720	1629	91	0.056	297.9	264	B	0.073
180N	245	26.20	0.041	1650	0.31	1663	1590	73	0.044	233.6	228	C	0.115
180O	248	12.08	0.019	1638	0.31	1613	1560	53	0.032	170.8	-	B	0.065
180P	246	6.82	0.011	950	0.18	1574	1547	27	0.028	150.1	-	B	0.069
180Q	66	20.22	0.032	2400	0.45	1594	1528	66	0.028	145.2	-	B	0.062
180R	67	17.38	0.027	1688	0.32	1570	1528	42	0.025	131.4	-	B	0.063
180S	247	22.24	0.035	2125	0.40	1616	1555	61	0.029	151.6	-	A	0.032
180T	68	14.56	0.023	1875	0.36	1543	1516	27	0.014	76.0	-	A	0.033
180U	253	12.40	0.019	2013	0.38	1556	1515	41	0.020	107.5	-	B	0.065
181A	169	50.62	0.079	2300	0.44	1600	1573	27	0.012	62.0	-	B	0.057
181B	178	13.77	0.022	2225	0.42	1587	1547	40	0.018	94.9	-	B	0.064
182A	193	32.23	0.050	2000	0.38	1702	1647	55	0.028	145.2	-	B	0.059
182B	173	24.78	0.039	2400	0.45	1650	1599	51	0.021	112.2	-	B	0.061
182C	175	14.26	0.022	2200	0.42	1649	1594	55	0.025	132.0	-	B	0.064
182D	194	60.37	0.094	3165	0.60	1724	1635	89	0.028	148.5	-	B	0.056

A.7 Watershed Parameters - Colony Wash (180)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ. Ft/Mi	Land Type	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi			
182E	171	40.90	0.064	2600	0.49	1645	1594	51	0.020	103.6	-	B	0.058
182F	172	9.62	0.015	2550	0.48	1647	1594	53	0.021	109.7	-	B	0.066
182G	188	30.85	0.048	3910	0.74	1685	1601	84	0.021	113.4	-	B	0.060
182H	this basin is now part of the Panorama Channel Watershed (190)												
182I	170	25.58	0.040	3080	0.58	1650	1601	49	0.016	84.0	-	B	0.061
182J	174	9.53	0.015	1700	0.32	1596	1578	18	0.011	55.9	-	B	0.067
182K	182	15.33	0.024	1025	0.19	1597	1574	23	0.022	118.5	-	B	0.064
182L	180	3.34	0.005	710	0.13	1584	1560	24	0.034	178.5	-	B	0.073
183A	203	27.76	0.043	1975	0.37	1902	1765	137	0.069	366.3	283	B	0.060
183B	196	26.16	0.041	1825	0.35	1804	1722	82	0.045	237.2	229	C	0.115
183C	Sub-Basins 183C, 183D, & 183E are now part of the Fountain Hills												
183D													
183E													
183F	191	31.32	0.049	3000	0.57	1741	1645	96	0.032	169.0	-	B	0.059
183G	192	59.32	0.093	3625	0.69	1724	1645	79	0.022	115.1	-	B	0.056
183H	186	11.54	0.018	1275	0.24	1694	1643	51	0.040	211.2	211	B	0.065
183I	176	36.70	0.057	2540	0.48	1650	1600	50	0.020	103.9	-	B	0.058
183J	177	3.19	0.005	730	0.14	1610	1599	11	0.015	79.6	-	A	0.037
183K	181	1.21	0.002	530	0.10	1599	1584	15	0.028	149.4	-	A	0.039
184A	215	12.34	0.019	1975	0.37	2066	1979	87	0.044	232.6	227	B	0.065
184B	206	14.97	0.023	3330	0.63	1988	1812	176	0.053	279.1	256	B	0.064
184C	198	8.70	0.014	1480	0.28	1884	1772	112	0.076	399.6	289	B	0.067
184D	205	4.77	0.007	2225	0.42	1910	1770	140	0.063	332.2	274	B	0.071
184E	204	69.68	0.109	5625	1.07	2006	1740	266	0.047	249.7	239	C	0.104
184F	202	4.39	0.007	1990	0.38	1900	1780	120	0.060	318.4	271	B	0.071
184G	201	34.08	0.053	2175	0.41	1823	1692	131	0.060	318.0	270	C	0.112
184H	195	7.64	0.012	1865	0.35	1764	1704	60	0.032	169.9	-	B	0.068
184I	190	20.14	0.031	2060	0.39	1725	1657	68	0.033	174.3	-	B	0.062

A.7 Watershed Parameters - Colony Wash (180)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
184J	185	5.19	0.008	1000	0.19	1685	1630	55	0.055	290.4	262	C	0.132
184K	184	2.29	0.004	560	0.11	1649	1600	49	0.088	462.0	297	C	0.141
185A	207	26.09	0.041	2715	0.51	1980	1820	160	0.059	311.2	269	B	0.061
185B	242	52.04	0.081	3925	0.74	1854	1662	192	0.049	258.3	244	C	0.107
186A	220	63.10	0.099	3400	0.64	2190	1978	212	0.062	329.2	273	C	0.105
186B	219	3.18	0.005	700	0.13	2112	2076	36	0.051	271.5	253	C	0.137
186C	146	10.80	0.017	2000	0.38	2030	1918	112	0.056	295.7	263	B	0.066
186D	231	51.74	0.081	3950	0.75	2075	1867	208	0.053	278.0	255	C	0.107
186E	142	22.94	0.036	1863	0.35	1924	1784	140	0.075	396.8	288	C	0.116
186F	143	18.35	0.029	2025	0.38	1890	1784	106	0.052	276.4	254	C	0.118
186G	136	42.45	0.066	3125	0.59	1912	1722	190	0.061	321.0	272	C	0.109
186H	137	15.82	0.025	4350	0.82	1890	1739	151	0.035	183.3	-	B	0.064
186I	120	18.37	0.029	1780	0.34	1822	1685	137	0.077	406.4	289	C	0.118
187A	232	5.54	0.009	600	0.11	1891	1859	32	0.053	281.6	256	C	0.131
187B	233	5.19	0.008	1000	0.19	1904	1849	55	0.055	290.4	262	C	0.132
187C	235	7.60	0.012	1213	0.23	1903	1828	75	0.062	326.5	273	B	0.068
187D	234	45.11	0.070	3980	0.75	1904	1696	208	0.052	275.9	254	C	0.109
187E	?		0.000	1668	0.32	1905	1845	60	0.036	189.9	-	A	ERR
187F	236	2.13	0.003	1725	0.33	1845	1716	129	0.075	394.9	287	B	0.075
187G	237	27.24	0.043	4800	0.91	1984	1705	279	0.058	306.9	267	C	0.114
187H	119	2.81	0.004	675	0.13	1728	1685	43	0.064	336.4	275	C	0.139
187I	118	15.30	0.024	1330	0.25	1810	1680	130	0.098	516.1	305	C	0.120
188A	214	5.60	0.009	1320	0.25	2071	1974	97	0.073	388.0	286	B	0.070
188B	213	42.50	0.066	2440	0.46	2072	1846	226	0.093	489.0	300	C	0.109
188C	218	14.00	0.022	1790	0.34	2034	1846	188	0.105	554.5	308	C	0.121
188D	212	35.26	0.055	2930	0.55	2050	1769	281	0.096	506.4	304	C	0.111

A.7 Watershed Parameters - Colony Wash (180)

BASIN NUMBER	Set #	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ. Ft/Mi	Land Type	Kb
		Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi			
188E	211	33.25	0.052	3400	0.64	2032	1769	263	0.077	408.4	289	C	0.112
188F	238	45.99	0.072	3400	0.64	1912	1702	210	0.062	326.1	273	C	0.108
188G	250	0.87	0.001	380	0.07	1740	1696	44	0.116	611.4	313	C	0.152
TOTAL	82	1645.77	2.572										

A.8 Watershed Parameters - Panorama Channel (190)

BASIN	Set	BASIN AREA		BASIN LENGTH		BASIN ELEVATION			SLOPE		ADJ.	Land	Kb
NUMBER	#	Acres	Sq. Miles	Feet	Miles	Highest	Lowest	Change	Ft/Ft	Ft/Mi	Ft/Mi	Type	
182H	168	17.18	0.027	1600	0.30	1697	1605	92	0.058	303.6	266	C	0.119
190A	167	11.95	0.019	1350	0.26	1716	1598	118	0.087	461.5	297	C	0.123
190B	166	4.66	0.007	1025	0.19	1675	1588	87	0.085	448.2	295	C	0.133
190C	165	13.86	0.022	1385	0.26	1685	1585	100	0.072	381.2	286	C	0.121
190D	159	3.46	0.005	375	0.07	1701	1614	87	0.232	1225.0	366	C	0.137
190E	160	2.14	0.003	950	0.18	1650	1575	75	0.079	416.8	291	B	0.075
190F	158	4.08	0.006	875	0.17	1629	1575	54	0.062	325.9	273	C	0.135
190G	150	4.14	0.006	1180	0.22	1707	1575	132	0.112	590.6	311	C	0.135
190H	161	47.74	0.075	2300	0.44	1719	1580	139	0.060	319.1	271	C	0.108
190I	164	7.45	0.012	1215	0.23	1677	1575	102	0.084	443.3	295	B	0.068
190J	157	5.84	0.009	1150	0.22	1677	1575	102	0.089	468.3	297	C	0.131
190K	151	5.20	0.008	1100	0.21	1703	1566	137	0.125	657.6	321	C	0.132
190L	156	7.26	0.011	1215	0.23	1590	1552	38	0.031	165.1	-	B	0.068
190M	162	5.69	0.009	1265	0.24	1579	1551	28	0.022	116.9	-	B	0.070
190N	152	11.21	0.018	1250	0.24	1660	1544	116	0.093	490.0	301	C	0.124
190O	179	3.28	0.005	1025	0.19	1571	1557	14	0.014	72.1	-	A	0.037
190P	163	13.38	0.021	1100	0.21	1567	1538	29	0.026	139.2	-	A	0.033
190Q	154	7.99	0.012	1400	0.27	1560	1526	34	0.024	128.2	-	B	0.068
190R	153	9.69	0.015	1340	0.25	1615	1526	89	0.066	350.7	279	C	0.125
190S	155	4.82	0.008	950	0.18	1576	1522	54	0.057	300.1	264	C	0.133
190T	149	82.42	0.129	3925	0.74	1710	1522	188	0.048	252.9	241	C	0.102
190U	249	13.47	0.021	1888	0.36	1552	1525	27	0.014	75.5	-	A	0.033
190V	254	11.73	0.018	1513	0.29	1610	1515	95	0.063	331.5	274	C	0.123
TOTAL	23	281.44	0.440										

GRAND	Basin	Acres	Sq. Miles
TOTAL	275	4873.33	7.615

* NOTE - These totals do not include the Mystery Wash Watersheds (140)

APPENDIX B

SOIL AND LAND USE INFORMATION

B.1 Soils and Land Use Information - Powder Wash (110)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	0.08	13.93	-	-	14.01
110A	14.01		PERCENT	1%	99%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.55	0.46	-	-	14.01
0.33	324.0		PERCENT	97%	3%	0%	0%	100%
LAND			% DEV	15%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	15%
C	0.122		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	8.62	14.56	-	-	23.18
110B	23.18		PERCENT	37%	63%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	23.18	-	-	-	23.18
0.40	327.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.117		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	1.99	0.75	-	-	2.74
110C	2.74		PERCENT	73%	27%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.74	-	-	-	2.74
0.13	347.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.139		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	72	-	-	-	TOTAL
			ACRES	45.15	-	-	-	45.15
110D	45.15		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	45.15	-	-	-	45.15
0.40	320.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.111		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	-	-	-	TOTAL
			ACRES	15.85	-	-	-	15.85
110E	15.85		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	15.85	-	-	-	15.85
0.24	333.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.121		I.A.	0.15	-	-	-	T.D.

B.1 Soils and Land Use Information - Powder Wash (110)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	-	-	-	TOTAL
			ACRES	4.88	-	-	-	4.88
110F	4.88		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.88	-	-	-	4.88
0.18	340.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.133		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	-	-	-	TOTAL
			ACRES	4.06	-	-	-	4.06
110G	4.06		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.06	-	-	-	4.06
0.12	357.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.135		I.A.	0.16	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	61	-	-	TOTAL
			ACRES	6.30	13.61	-	-	19.91
110H	19.95		PERCENT	32%	68%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	C-3	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.97	5.99	-	-	19.95
0.40	102.5		PERCENT	70%	30%	0%	0%	100%
LAND			% DEV	15%	90%	-	-	
TYPE	Kb		% VEG	30%	10%	-	-	38%
Comp.	0.096		I.A.	0.15	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	11.11	1.55	-	-	12.66
110I	12.66		PERCENT	88%	12%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-190	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.01	11.65	-	-	12.66
0.32	254.0		PERCENT	8%	92%	0%	0%	100%
LAND			% DEV	0%	15%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	14%
C	0.124		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	3.40	0.92	-	-	4.32
110J	4.32		PERCENT	79%	21%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.32	-	-	-	4.32
0.17	290.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
B	0.071		I.A.	0.15	-	-	-	T.D.

B.1 Soils and Land Use Information - Powder Wash (110)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	4.86	2.99	-	-	7.85
110K	7.85		PERCENT	62%	38%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	C-3	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.85	-	-	-	7.85
0.15	308.0		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	90%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	90%
A	0.035		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	13.09	2.11	-	-	15.20
110L	15.20		PERCENT	86%	14%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	R1-8	C-3	-	TOTAL
Mi	Ft/Mi		ACRES	0.15	12.46	2.58	-	15.20
0.40	294.0		PERCENT	1%	82%	17%	0%	100%
LAND			% DEV	15%	25%	90%	-	
TYPE	Kb		% VEG	30%	30%	0%	-	36%
B	0.065		I.A.	0.15	0.10	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	19.99	-	-	-	19.99
110M	19.99		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	19.99	-	-	-	19.99
0.35	112.8		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
Comp.	0.056		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	9.84	-	-	-	9.84
110N	9.84		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	9.84	-	-	-	9.84
0.32	187.7		PERCENT	100%	0%	0%	0%	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
B	0.067		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	2.78	-	-	-	2.78
110O	2.78		PERCENT	100%	0%	0%	0%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	C-3	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.95	0.83	-	-	2.78
0.10	96.0		PERCENT	70%	30%	0%	0%	100%
LAND			% DEV	15%	90%	-	-	
TYPE	Kb		% VEG	30%	10%	-	-	38%
Comp.	0.065		I.A.	0.15	0.05	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	1.09	9.08	-	-	10.17
120A	10.17		PERCENT	11%	89%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
			ACRES	10.17	-	-	-	10.17
0.49	245.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	70%	-	-	-	
			% VEG	10%	-	-	-	70%
B	0.066		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	3.71	-	-	-	3.71
160A	3.71		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
			ACRES	3.71	-	-	-	3.71
0.13	256		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	90%	-	-	-	
			% VEG	10%	-	-	-	90%
B	0.072		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	5.34	28.52	-	-	33.86
120B	33.86		PERCENT	16%	84%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
			ACRES	33.86	-	-	-	33.86
0.47	255.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	20%	-	-	-	
			% VEG	30%	-	-	-	20%
C	0.112		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.43	-	-	-	3.43
120C	3.43		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	2.80	0.63	-	-	3.43
0.17	266.0		PERCENT	82%	18%	-	-	100%
LAND TYPE	Kb		% DEV	90%	50%	-	-	
			% VEG	5%	5%	-	-	83%
Comp.	0.086		I.A.	0.10	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	33.02	11.01	-	-	44.03
120D	44.03		PERCENT	75%	25%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
			ACRES	1.81	35.13	7.09	-	44.03
0.56	154.9		PERCENT	4%	80%	16%	-	100%
LAND TYPE	Kb		% DEV	100%	15%	50%	-	
			% VEG	10%	30%	5%	-	24%
B	0.057		I.A.	0.10	0.15	0.05	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	4.97	6.64	-	-	11.61
120E	11.61		PERCENT	43%	57%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.42	5.19	-	-	11.61
0.47	157.9		PERCENT	55%	45%	-	-	100%
LAND			% DEV	55%	85%	-	-	
TYPE	Kb		% VEG	10%	10%	-	-	68%
B	0.065		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	63	-	-	TOTAL
			ACRES	6.45	7.31	-	-	13.76
120F	13.76		PERCENT	47%	53%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.76	-	-	-	13.76
0.32	176.5		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
B	0.064		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	96	-	-	TOTAL
			ACRES	16.16	7.29	-	-	23.45
120G	23.45		PERCENT	69%	31%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	23.45	-	-	-	23.45
0.38	290.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.116		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	1.72	1.75	-	-	3.47
120H	3.47		PERCENT	50%	50%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.45	1.02	-	-	3.47
0.31	235.0		PERCENT	71%	29%	-	-	100%
LAND			% DEV	70%	100%	-	-	
TYPE	Kb		% VEG	10%	0%	-	-	79%
B	0.073		I.A.	0.10	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	3.56	1.05	-	-	4.61
120I	4.61		PERCENT	77%	23%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.61	-	-	-	4.61
0.18	283.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	40%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	40%
C	0.133		I.A.	0.15	-	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.60	-	-	-	3.60
120J	3.60		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
			ACRES	3.60	-	-	-	3.60
0.32	75.7		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	60%	-	-	-	
			% VEG	5%	-	-	-	60%
B	0.072		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	21.51	-	-	-	21.51
120K	21.51		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
			ACRES	21.51	-	-	-	21.51
0.43	232.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	45%	-	-	-	
			% VEG	30%	-	-	-	45%
C	0.117		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	96	-	-	TOTAL
			ACRES	13.15	10.07	-	-	23.22
120L	23.22		PERCENT	57%	43%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
			ACRES	6.61	16.61	-	-	23.22
0.39	297.0		PERCENT	28%	72%	-	-	100%
LAND TYPE	Kb		% DEV	0%	0%	-	-	
			% VEG	30%	30%	-	-	0%
C	0.116		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	63	-	-	TOTAL
			ACRES	17.80	7.80	-	-	25.60
120M	25.60		PERCENT	70%	30%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
			ACRES	18.32	7.28	-	-	25.60
0.70	158.4		PERCENT	72%	28%	-	-	100%
LAND TYPE	Kb		% DEV	55%	0%	-	-	
			% VEG	25%	25%	-	-	39%
B	0.061		I.A.	0.10	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	63	96	-	TOTAL
			ACRES	6.64	6.84	14.78	-	28.26
120N	28.26		PERCENT	23%	24%	52%	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
			ACRES	4.09	24.17	-	-	28.26
0.47	183.7		PERCENT	14%	86%	-	-	100%
LAND TYPE	Kb		% DEV	100%	0%	-	-	
			% VEG	0%	30%	-	-	14%
B	0.060		I.A.	0.05	0.15	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	5.06	-	-	-	5.06
120O	5.06		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.06	-	-	-	5.06
0.13	135.8		PERCENT	100%	-	-	-	100%
LAND			% DEV	40%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	40%
B	0.070		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	18.04	-	-	-	18.04
120P	18.04		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	18.04	-	-	-	18.04
0.13	326.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	30%	-	-	-	
TYPE	Kb		% VEG	25%	-	-	-	30%
C	0.119		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	96	-	TOTAL
			ACRES	1.99	8.70	11.77	-	22.46
120Q	22.46		PERCENT	9%	39%	52%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.75	19.74	-	-	22.49
0.41	100.7		PERCENT	12%	88%	-	-	100%
LAND			% DEV	100%	5%	-	-	
TYPE	Kb		% VEG	0%	30%	-	-	17%
B	0.061		I.A.	0.05	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	7.69	-	-	-	7.69
120R	7.69		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	C-1	IND-1	-	TOTAL
Mi	Ft/Mi		ACRES	0.40	1.20	6.09	-	7.69
0.32	92.5		PERCENT	5%	16%	79%	-	100%
LAND			% DEV	15%	10%	5%	-	
TYPE	Kb		% VEG	15%	15%	30%	-	6%
B	0.068		I.A.	0.10	0.10	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	96	-	-	TOTAL
			ACRES	0.22	4.01	-	-	4.23
120S	4.23		PERCENT	5%	95%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	R1-6	C-1	IND-1	TOTAL
Mi	Ft/Mi		ACRES	2.26	0.19	0.77	1.01	4.23
0.21	103.3		PERCENT	53%	4%	18%	24%	100%
LAND			% DEV	100%	0%	60%	10%	
TYPE	Kb		% VEG	0%	15%	15%	0%	67%
B	0.071		I.A.	0.05	0.15	0.05	0.05	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	96	-	-	TOTAL
			ACRES	0.10	1.17	-	-	1.27
120T	1.27		PERCENT	8%	92%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R-5	C-1	-	TOTAL
			ACRES	0.06	0.41	0.80	-	1.27
0.10	226.0		PERCENT	5%	32%	63%	-	100%
LAND TYPE	Kb		% DEV	0%	0%	0%	-	
			% VEG	30%	30%	30%	-	0%
C	0.147		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	96	-	-	TOTAL
			ACRES	6.87	5.19	-	-	12.06
120U	12.06		PERCENT	57%	43%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-5	RUR-43	C-1	-	TOTAL
			ACRES	9.39	1.21	1.46	-	12.06
0.26	148.6		PERCENT	78%	10%	12%	-	100%
LAND TYPE	Kb		% DEV	0%	90%	100%	-	
			% VEG	30%	5%	5%	-	21%
B	0.065		I.A.	0.15	0.05	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	96	-	-	TOTAL
			ACRES	4.84	1.59	-	-	6.43
120V	6.43		PERCENT	75%	25%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-5	RUR-43	-	-	TOTAL
			ACRES	0.62	5.81	-	-	6.43
0.20	286.0		PERCENT	10%	90%	-	-	100%
LAND TYPE	Kb		% DEV	0%	5%	-	-	
			% VEG	30%	30%	-	-	5%
C	0.130		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	3.51	-	-	-	3.51
120W	3.51		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-5	RUR-43	-	-	TOTAL
			ACRES	0.12	3.39	-	-	3.51
0.08	168.0		PERCENT	3%	97%	-	-	100%
LAND TYPE	Kb		% DEV	100%	15%	-	-	
			% VEG	0%	30%	-	-	18%
B	0.073		I.A.	0.05	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	96	-	-	TOTAL
			ACRES	2.61	7.88	-	-	10.49
120X	10.49		PERCENT	25%	75%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-5	C-2	-	-	TOTAL
			ACRES	6.94	3.55	-	-	10.49
0.20	157.9		PERCENT	66%	34%	-	-	100%
LAND TYPE	Kb		% DEV	50%	0%	-	-	
			% VEG	20%	30%	-	-	33%
B	0.066		I.A.	0.10	0.15	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP		-	-	-	TOTAL
			ACRES	31.85	-	-	-	31.85
121A	31.85		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	31.85	-	-	-	31.85
0.53	81.8		PERCENT	100%	-	-	-	100%
LAND			% DEV	40%	-	-	-	
TYPE	Kb		% VEG	25%	-	-	-	40%
B	0.059		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	12.67	-	-	-	12.67
121B	12.67		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-5	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.23	12.44	-	-	12.67
0.44	110.2		PERCENT	2%	98%	-	-	100%
LAND			% DEV	0%	70%	-	-	
TYPE	Kb		% VEG	30%	25%	-	-	69%
B	0.065		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	13.00	-	-	-	13.00
122A	13.00		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	C-0	IND-2	-	TOTAL
Mi	Ft/Mi		ACRES	9.13	2.84	1.03	-	13.00
0.48	156.8		PERCENT	70%	22%	8%	-	100%
LAND			% DEV	25%	5%	0%	-	
TYPE	Kb		% VEG	15%	20%	30%	-	19%
B	0.065		I.A.	0.10	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	21.68	-	-	-	21.68
122B	21.68		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	C-0	IND-1	IND-2	TOTAL
Mi	Ft/Mi		ACRES	0.11	4.20	11.58	5.79	21.68
0.32	128.2		PERCENT	1%	19%	53%	27%	100%
LAND			% DEV	0%	0%	50%	50%	
TYPE	Kb		% VEG	30%	25%	10%	20%	40%
B	0.062		I.A.	0.15	0.15	0.10	0.10	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	5.18	4.04	-	-	9.22
122C	9.22		PERCENT	56%	44%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.38	1.84	-	-	9.22
0.22	329.0		PERCENT	80%	20%	-	-	100%
LAND			% DEV	15%	0%	-	-	
TYPE	Kb		% VEG	15%	30%	-	-	12%
C	0.126		I.A.	0.15	0.15	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	20.47	-	-	-	20.47
122D	20.47		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	IND-1	IND-2	-	TOTAL
Mi	Ft/Mi		ACRES	15.52	0.18	4.77	-	20.47
0.37	121.0		PERCENT	76%	1%	23%	-	100%
LAND			% DEV	5%	0%	0%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	4%
B	0.062		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	11.81	8.67	-	-	20.48
122E	20.48		PERCENT	58%	42%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	IND-1	IND-2	-	TOTAL
Mi	Ft/Mi		ACRES	9.03	9.92	1.53	-	20.48
0.33	305.0		PERCENT	44%	48%	7%	-	100%
LAND			% DEV	15%	0%	100%	-	
TYPE	Kb		% VEG	15%	30%	0%	-	14%
C	0.117		I.A.	0.15	0.15	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	1.20	5.36	-	-	6.56
122F	6.56		PERCENT	18%	82%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	IND-1	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.56	-	-	-	6.56
0.30	275.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	20%
C	0.130		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	14.09	-	-	-	14.09
122G	14.09		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	IND-1	IND-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.43	0.66	-	-	14.09
0.30	114.9		PERCENT	95%	5%	-	-	100%
LAND			% DEV	90%	0%	-	-	
TYPE	Kb		% VEG	15%	30%	-	-	86%
A	0.033		I.A.	0.10	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	3.94	-	-	-	3.94
122H	3.94		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	C-0	IND-2	-	TOTAL
Mi	Ft/Mi		ACRES	0.84	0.12	2.98	-	3.94
0.16	146.8		PERCENT	21%	3%	76%	-	100%
LAND			% DEV	30%	0%	20%	-	
TYPE	Kb		% VEG	25%	30%	30%	-	22%
B	0.072		I.A.	0.15	0.15	0.15	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	4.79	-	-	-	4.79
122I	4.79		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	IND-1	IND-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.25	2.54	-	-	4.79
0.19	73.0		PERCENT	47%	53%	-	-	100%
LAND			% DEV	40%	0%	-	-	
TYPE	Kb		% VEG	20%	30%	-	-	19%
B	0.071		I.A.	0.10	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	-	-	-	TOTAL
			ACRES	15.83	-	-	-	15.83
122J	15.83		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	R-3	C-0	-	TOTAL
Mi	Ft/Mi		ACRES	9.45	4.08	2.30	-	15.83
0.37	96.8		PERCENT	60%	26%	15%	-	100%
LAND			% DEV	60%	60%	0%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	51%
B	0.064		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	96	-	-	TOTAL
			ACRES	1.86	0.30	-	-	2.16
122K	2.16		PERCENT	86%	14%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-5	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	0.75	1.06	0.36	-	2.17
0.18	66.7		PERCENT	35%	49%	17%	-	101%
LAND			% DEV	0%	0%	100%	-	
TYPE	Kb		% VEG	30%	30%	0%	-	17%
B	0.075		I.A.	0.15	0.15	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	47.98	-	-	-	47.98
123A	47.98		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	47.98	-	-	-	47.98
0.53	256.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	20%
C	0.108		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.89	-	-	-	11.89
123B	11.89		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	11.89	-	-	-	11.89
0.26	296.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	25%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	25%
C	0.123		I.A.	0.15	-	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.19	-	-	-	2.19
123C	2.19		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.19	-	-	-	2.19
0.07	367.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.141		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	6.49	-	-	-	6.49
123D	6.49		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.49	-	-	-	6.49
0.40	286.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	45%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	45%
C	0.130		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	72	-	TOTAL
			ACRES	7.56	5.11	32.66	-	45.33
124A	45.33		PERCENT	17%	11%	72%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.39	42.94	-	-	45.33
0.63	301.0		PERCENT	5%	95%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
C	0.109		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	72	-	TOTAL
			ACRES	4.45	8.75	14.16	-	27.36
124B	27.36		PERCENT	16%	32%	52%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	11.40	15.96	-	-	27.36
0.30	293.0		PERCENT	42%	58%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
C	0.114		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	3.72	9.20	-	-	12.92
124C	12.92		PERCENT	29%	71%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	C-0	-	TOTAL
Mi	Ft/Mi		ACRES	0.38	9.78	2.76	-	12.92
0.37	277.0		PERCENT	3%	76%	21%	-	100%
LAND			% DEV	0%	15%	20%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	16%
C	0.122		I.A.	0.15	0.15	0.15	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	-	-	TOTAL
			ACRES	2.08	3.69	-	-	5.77
124D	5.77		PERCENT	36%	64%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	RUR-43	C-1	IND-1	TOTAL
			ACRES	3.90	0.33	1.43	0.11	5.77
0.20	303.0		PERCENT	68%	6%	25%	2%	100%
LAND			% DEV	0%	0%	0%	0%	
TYPE	Kb		% VEG	30%	30%	30%	30%	0%
C	0.131		I.A.	0.15	0.15	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	63	96	-	TOTAL
			ACRES	3.33	27.36	2.05	-	32.74
124E	32.74		PERCENT	10%	84%	6%	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	IND-1	-	-	TOTAL
			ACRES	25.72	7.02	-	-	32.74
0.44	295.0		PERCENT	79%	21%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
C	0.112		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	72	-	-	-	TOTAL
			ACRES	49.55	-	-	-	49.55
125A	49.55		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
			ACRES	49.55	-	-	-	49.55
0.72	287.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.108		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	4.26	67.99	-	-	72.25
125B	72.25		PERCENT	6%	94%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
			ACRES	72.25	-	-	-	72.25
0.73	243.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.104		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	1.97	17.27	-	-	19.24
125C	19.24		PERCENT	10%	90%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
			ACRES	19.24	-	-	-	19.24
0.35	285.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.118		I.A.	0.15	-	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	72	-	-	TOTAL
			ACRES	9.26	2.07	-	-	11.33
125D	11.33		PERCENT	82%	18%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	11.33	-	-	-	11.33
0.21	4.8		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
B	0.066		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	63	-	-	-	TOTAL
			ACRES	29.86	-	-	-	29.86
125E	29.86		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	24.73	5.13	-	-	29.86
0.41	123.8		PERCENT	83%	17%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
B	0.060		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	4.19	-	-	-	4.19
126A	4.19		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.19	-	-	-	4.19
0.20	147.3		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	60%
B	0.071		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	13.34	-	-	-	13.34
126B	13.34		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.34	-	-	-	13.34
0.47	192.8		PERCENT	100%	-	-	-	100%
LAND			% DEV	50%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	50%
B	0.065		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	90.75	-	-	-	90.75
126C	90.75		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	UNINC.	TOTAL
Mi	Ft/Mi		ACRES	18.27	2.01	25.15	45.32	90.75
0.98	257.0		PERCENT	20%	2%	28%	50%	100%
LAND			% DEV	40%	10%	2%	0%	
TYPE	Kb		% VEG	20%	30%	30%	30%	9%
C	0.101		I.A.	0.10	0.15	0.15	0.15	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	18.16	-	-	-	18.16
126D	18.16		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	1.54	10.20	6.42	-	18.16
0.32	289.0		PERCENT	8%	56%	35%	-	100%
LAND			% DEV	30%	20%	0%	-	
TYPE	Kb		% VEG	10%	30%	30%	-	14%
C	0.119		I.A.	0.10	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	72	-	-	TOTAL
			ACRES	15.66	42.21	-	-	57.87
126E	57.87		PERCENT	27%	73%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	UNINC.	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	57.87	-	-	-	57.87
0.55	273.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.106		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	72	-	-	-	TOTAL
			ACRES	35.21	-	-	-	35.21
126F	35.21		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	UNINC.	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	35.21	-	-	-	35.21
0.42	311.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.111		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	72	-	-	TOTAL
			ACRES	33.59	53.28	-	-	86.87
126G	86.87		PERCENT	39%	61%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	UNINC.	-	TOTAL
Mi	Ft/Mi		ACRES	3.19	59.62	24.06	-	86.87
0.86	293.0		PERCENT	4%	69%	28%	-	100%
LAND			% DEV	0%	0%	0%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	0%
C	0.102		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	12.74	-	-	-	12.74
126H	12.74		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	5.76	0.19	6.79	-	12.74
0.29	300.0		PERCENT	45%	1%	53%	-	100%
LAND			% DEV	75%	0%	0%	-	
TYPE	Kb		% VEG	20%	30%	30%	-	34%
C	0.122		I.A.	0.10	0.15	0.15	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	72	-	-	TOTAL
			ACRES	25.08	27.20	-	-	52.28
126I	52.28		PERCENT	48%	52%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	17.47	9.61	25.20	-	52.28
0.48	271.0		PERCENT	33%	18%	48%	-	100%
LAND			% DEV	30%	0%	0%	-	
TYPE	Kb		% VEG	25%	30%	30%	-	10%
C	0.107		I.A.	0.10	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	1.59	-	-	-	1.59
126J	1.59		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.59	-	-	-	1.59
0.15	138.6		PERCENT	100%	-	-	-	100%
LAND			% DEV	50%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	50%
B	0.077		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	0.72	6.88	-	-	7.60
126K	7.60		PERCENT	9%	91%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.60	-	-	-	7.60
0.36	259.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	60%
B	0.068		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	72	-	TOTAL
			ACRES	0.47	11.27	3.27	-	15.01
126L	15.01		PERCENT	3%	75%	22%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	9.53	5.48	-	-	15.01
0.39	269.0		PERCENT	63%	37%	-	-	100%
LAND			% DEV	0%	15%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	5%
C	0.121		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	61	72	TOTAL
			ACRES	5.78	2.16	4.92	3.39	16.25
126M	16.25		PERCENT	36%	13%	30%	21%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	1.89	3.09	11.27	-	16.25
0.36	278.0		PERCENT	12%	19%	69%	-	100%
LAND			% DEV	50%	0%	10%	-	
TYPE	Kb		% VEG	20%	30%	30%	-	13%
C	0.120		I.A.	0.10	0.15	0.15	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN	TOTAL	SOILS :	GROUP	40	61	63	72	TOTAL
NUMBER	AREA		ACRES	14.13	9.38	17.21	8.34	49.06
126N	49.06		PERCENT	29%	19%	35%	17%	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.46	42.60	-	-	49.06
0.67	290.0		PERCENT	13%	87%	-	-	1.00
LAND			% DEV	0%	5%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	4%
C	0.108		I.A.	0.15	0.15	-	-	T.D.

BASIN	TOTAL	SOILS :	GROUP	41	-	-	-	TOTAL
NUMBER	AREA		ACRES	18.22	-	-	-	18.22
127A	18.22		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	18.22	-	-	-	18.22
0.36	293.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.118		I.A.	0.15	-	-	-	T.D.

BASIN	TOTAL	SOILS :	GROUP	41	61	-	-	TOTAL
NUMBER	AREA		ACRES	21.27	3.58	-	-	24.85
127B	24.85		PERCENT	86%	14%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	24.85	-	-	-	24.85
0.34	305.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	30%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	30%
C	0.115		I.A.	0.10	-	-	-	T.D.

BASIN	TOTAL	SOILS :	GROUP	41	72	-	-	TOTAL
NUMBER	AREA		ACRES	7.21	19.85	-	-	27.06
127C	27.06		PERCENT	27%	73%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	27.06	-	-	-	27.06
0.39	283.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.114		I.A.	0.15	-	-	-	T.D.

BASIN	TOTAL	SOILS :	GROUP	40	41	61	-	TOTAL
NUMBER	AREA		ACRES	0.14	8.69	6.68	-	15.51
127D	15.51		PERCENT	1%	56%	43%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	15.51	-	-	-	15.51
0.30	288.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
C	0.120		I.A.	0.15	-	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	61	72	-	TOTAL
			ACRES	22.83	2.79	40.49	-	66.11
127E	66.11		PERCENT	35%	4%	61%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	UNINC.	-	-	TOTAL
Mi	Ft/Mi		ACRES	54.21	11.90	-	-	66.11
0.66	296.0		PERCENT	82%	18%	-	-	100%
LAND			% DEV	5%	5%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	5%
C	0.104		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	72	-	-	-	TOTAL
			ACRES	93.91	-	-	-	93.91
127F	93.91		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	UNINC.	TOTAL
Mi	Ft/Mi		ACRES	14.97	15.81	22.17	40.96	93.91
0.81	297.0		PERCENT	16%	17%	24%	44%	100%
LAND			% DEV	0%	0%	0%	0%	
TYPE	Kb		% VEG	30%	30%	30%	30%	0%
C	0.101		I.A.	0.15	0.15	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	61	72	-	-	TOTAL
			ACRES	10.91	25.43	-	-	36.34
127G	36.34		PERCENT	30%	70%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	18.26	3.75	14.33	-	36.34
0.40	288.0		PERCENT	50%	10%	39%	-	100%
LAND			% DEV	30%	0%	5%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	17%
C	0.111		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	72	-	-	TOTAL
			ACRES	1.66	9.60	-	-	11.26
127H	11.26		PERCENT	15%	85%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	11.26	-	-	-	11.26
0.27	329.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.124		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	1.35	5.24	-	-	6.59
127I	6.59		PERCENT	20%	80%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.59	-	-	-	6.59
0.36	269.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	60%
B	0.069		I.A.	0.10	-	-	-	T.D.

B.2 Soils and Land Use Information - Cereus Wash (120)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	72	-	-	TOTAL
			ACRES	7.61	12.95	-	-	20.56
127J	20.56		PERCENT	37%	63%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
			ACRES	20.56	-	-	-	20.56
0.39	313.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	0%	-	-	-	
			% VEG	20%	-	-	-	0%
C	0.117		I.A.	0.10	-	-	-	T.D.

B.3 Soils and Land Use Information - Cyprus Point Wash (130)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	4.94	-	-	-	4.94
130A	4.94		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	RUP R1-8	RUPR1-1	RUPR1-3	TOTAL
			ACRES	2.47	0.98	0.16	1.33	4.94
0.42	221		PERCENT	50%	20%	3%	27%	100%
LAND			% DEV	60%	100%	0%	60%	
TYPE	Kb		% VEG	10%	5%	10%	10%	66%
B	0.070		I.A.	0.05	0.10	0.10	0.05	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	20.07	-	-	-	20.07
130B	20.07		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUPR1-1	RUPR1-3	-	-	TOTAL
			ACRES	3.80	16.27	-	-	20.07
0.27	277		PERCENT	19%	81%	-	-	100%
LAND			% DEV	60%	30%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	36%
Comp.	0.112		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.99	-	-	-	2.99
130C	2.99		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	RUPR1-3	-	-	TOTAL
			ACRES	2.58	0.41	-	-	2.99
0.30	101.2		PERCENT	86%	14%	-	-	100%
LAND			% DEV	70%	100%	-	-	
TYPE	Kb		% VEG	10%	5%	-	-	74%
A	0.037		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.60	-	-	-	2.60
130D	2.60		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUPR1-1	RUPR1-3	-	-	TOTAL
			ACRES	1.93	0.67	-	-	2.60
0.34	262		PERCENT	74%	26%	-	-	100%
LAND			% DEV	90%	50%	-	-	
TYPE	Kb		% VEG	10%	10%	-	-	80%
B	0.074		I.A.	0.10	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.83	-	-	-	2.83
130E	2.83		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
			ACRES	2.83	-	-	-	2.83
0.29	254		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	60%
B	0.074		I.A.	0.05	-	-	-	T.D.

B.3 Soils and Land Use Information - Cyprus Point Wash (130)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	24.94	-	-	-	24.94
130F	24.94		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-10	-	-	TOTAL
			ACRES	12.21	12.73	-	-	24.94
0.43	221		PERCENT	49%	51%	-	-	100%
LAND			% DEV	50%	15%	-	-	
TYPE	Kb		% VEG	20%	20%	-	-	32%
C	0.115		I.A.	0.10	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	5.51	1.76	-	-	7.27
130G	7.27		PERCENT	76%	24%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-3	R1-5	-	-	TOTAL
			ACRES	2.60	4.67	-	-	7.27
0.17	158.4		PERCENT	36%	64%	-	-	100%
LAND			% DEV	5%	0%	-	-	
TYPE	Kb		% VEG	20%	20%	-	-	2%
B	0.068		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	31.50	-	-	-	31.50
131A	31.51		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	18.36	13.14	-	-	31.50
0.47	256		PERCENT	58%	42%	-	-	100%
LAND			% DEV	50%	45%	-	-	
TYPE	Kb		% VEG	20%	20%	-	-	48%
C	0.113		I.A.	0.10	0.15	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	4.05	2.18	-	-	6.23
150A	6.23		PERCENT	65%	35%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.78	0.45	-	-	6.23
0.26	252.0		PERCENT	93%	7%	-	-	100%
LAND			% DEV	60%	100%	-	-	
TYPE	Kb		% VEG	15%	5%	-	-	63%
B	0.069		I.A.	0.10	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.22	-	-	-	2.22
150B	2.22		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.22	-	-	-	2.22
0.18	275.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	90%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	90%
B	0.075		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	61	-	-	TOTAL
			ACRES	14.20	0.14	-	-	14.34
150C	14.34		PERCENT	99%	1%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	14.34	-	-	-	14.34
0.31	264.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	60%
B	0.064		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	35.09	-	-	-	35.09
150D	35.10		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-8	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	1.82	9.03	24.24	-	35.09
0.61	253.0		PERCENT	5%	26%	69%	-	100%
LAND			% DEV	100%	45%	30%	-	
TYPE	Kb		% VEG	5%	10%	15%	-	37%
Comp.	0.116		I.A.	0.05	0.10	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	12.78	-	-	-	12.78
150E	12.78		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	12.78	-	-	-	12.78
0.19	296.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	55%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	55%
B	0.065		I.A.	0.15	-	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.87	-	-	-	2.87
150F	2.87		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.87	-	-	-	2.87
0.16	291.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	60%
B	0.074		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.49	-	-	-	3.49
150G	3.49		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.49	-	-	-	3.49
0.33	273.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	60%
B	0.073		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	20.66	-	-	-	20.66
150H	20.66		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	20.66	-	-	-	20.66
0.36	291.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	50%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	50%
B	0.062		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	75.18	-	-	-	75.18
150I	75.18		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-10	R1-35	C-2	TOTAL
Mi	Ft/Mi		ACRES	1.25	27.07	43.81	3.05	75.18
0.87	223.0		PERCENT	2%	36%	58%	4%	100%
LAND			% DEV	100%	20%	20%	100%	
TYPE	Kb		% VEG	5%	15%	15%	5%	25%
C	0.103		I.A.	0.05	0.20	0.15	0.05	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	6.67	-	-	-	6.67
150J	6.67		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.24	3.43	-	-	6.67
0.71	251.0		PERCENT	49%	51%	-	-	100%
LAND			% DEV	80%	80%	-	-	
TYPE	Kb		% VEG	5%	5%	-	-	80%
B	0.069		I.A.	0.05	0.05	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	5.88	-	-	-	5.88
150K	5.88		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.88	-	-	-	5.88
0.21	269.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	60%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	60%
B	0.069		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	6.67	-	-	-	6.67
150L	6.67		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.67	-	-	-	6.67
0.27	137.1		PERCENT	100%	-	-	-	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	15%
B	0.069		I.A.	0.20	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	9.23	5.75	-	-	14.98
150M	14.98		PERCENT	62%	38%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	14.98	-	-	-	14.98
0.23	137.9		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	20%
B	0.064		I.A.	0.20	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	0.54	0.04	-	-	0.58
150N	0.58		PERCENT	93%	7%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.58	-	-	-	0.58
0.10	67.2		PERCENT	100%	-	-	-	100%
LAND			% DEV	80%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	80%
A	0.042		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	93	-	-	-	TOTAL
			ACRES	2.83	-	-	-	2.83
150O	2.83		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.83	-	-	-	2.83
0.22	94.4		PERCENT	100%	-	-	-	100%
LAND			% DEV	65%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	65%
B	0.074		I.A.	0.05	-	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	0.35	0.48	-	-	0.82
150P	0.83		PERCENT	42%	58%	-	-	99%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.83	-	-	-	0.83
0.07	233.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	80%	-	-	-	10%
C	0.152		I.A.	0.25	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	1.82	-	-	-	1.82
151A	1.82		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.57	1.25	-	-	1.82
0.14	103.5		PERCENT	31%	69%	-	-	100%
LAND			% DEV	80%	80%	-	-	
TYPE	Kb		% VEG	0%	0%	-	-	80%
A	0.038		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.37	-	-	-	3.37
151B	3.37		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.37	-	-	-	3.37
0.28	126.6		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
A	0.037		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.48	-	-	-	3.48
151C	3.48		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.48	-	-	-	3.48
0.26	128.1		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
A	0.037		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	24.79	-	-	-	24.79
151D	24.79		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-18	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	0.64	9.04	15.11	-	24.79
0.33	259.0		PERCENT	3%	36%	61%	-	100%
LAND			% DEV	100%	55%	40%	-	
TYPE	Kb		% VEG	0%	15%	15%	-	47%
Comp.	0.100		I.A.	0.05	0.15	0.15	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	42.44	-	-	-	42.44
151E	42.44		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	R1-35	-	-	TOTAL
			ACRES	16.48	25.96	-	-	42.44
0.72	218.0		PERCENT	39%	61%	-	-	100%
LAND			% DEV	50%	50%	-	-	
TYPE	Kb		% VEG	15%	15%	-	-	50%
B	0.058		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	1.98	-	-	-	1.98
151F	1.98		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
			ACRES	1.98	-	-	-	1.98
0.23	220.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
B	0.076		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	1.75	-	-	-	1.75
151G	1.75		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
			ACRES	1.75	-	-	-	1.75
0.31	51.2		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
A	0.038		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.43	-	-	-	3.43
151H	3.43		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
			ACRES	3.43	-	-	-	3.43
0.38	218.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
B	0.073		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	4.11	-	-	-	4.11
151I	4.11		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
			ACRES	4.11	-	-	-	4.11
0.30	294.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	90%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	90%
B	0.072		I.A.	0.05	-	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.20	-	-	-	2.20
151J	2.20		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-18	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	1.37	0.63	0.28	-	2.28
0.10	315.0		PERCENT	62%	29%	13%	-	103%
LAND			% DEV	60%	60%	100%	-	
TYPE	Kb		% VEG	5%	15%	0%	-	67%
B	0.075		I.A.	0.05	0.10	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	20.91	-	-	-	20.91
151K	20.91		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-18	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	11.17	3.76	5.98	-	20.91
0.25	278.0		PERCENT	53%	18%	29%	-	100%
LAND			% DEV	80%	100%	20%	-	
TYPE	Kb		% VEG	10%	5%	15%	-	66%
Comp.	0.086		I.A.	0.10	0.10	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	33.57	-	-	-	33.57
151L	33.57		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-8	R1-10	C-1	TOTAL
Mi	Ft/Mi		ACRES	1.90	12.21	10.81	8.65	33.57
0.43	227.0		PERCENT	6%	36%	32%	26%	100%
LAND			% DEV	80%	70%	80%	25%	
TYPE	Kb		% VEG	5%	10%	10%	10%	62%
Comp.	0.082		I.A.	0.05	0.10	0.05	0.10	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	25.37	-	-	-	25.37
152A	25.37		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	25.37	-	-	-	25.37
0.36	286.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	35%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	35%
C	0.115		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	10.02	-	-	-	10.02
152B	10.02		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	10.02	-	-	-	10.02
0.26	294.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	20%
C	0.125		I.A.	0.15	-	-	-	T.D.

B.4 Soils and Land Use Information - Jacklin Wash (150)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	8.45	-	-	-	8.45
152C	8.45		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	8.45	-	-	-	8.45
0.23	307.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	20%
C	0.127		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.56	-	-	-	11.56
152D	11.56		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.18	5.38	-	-	11.56
0.30	279.0		PERCENT	53%	47%	-	-	100%
LAND			% DEV	50%	15%	-	-	
TYPE	Kb		% VEG	15%	15%	-	-	34%
C	0.123		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.20	-	-	-	11.20
152E	11.20		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.44	10.76	-	-	11.20
0.31	289.0		PERCENT	4%	96%	-	-	100%
LAND			% DEV	100%	15%	-	-	
TYPE	Kb		% VEG	15%	15%	-	-	18%
C	0.124		I.A.	0.15	0.20	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	9.13	-	-	-	9.13
152F	9.13		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-10	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	8.43	0.70	-	-	9.13
0.27	280.0		PERCENT	92%	8%	-	-	100%
LAND			% DEV	15%	0%	-	-	
TYPE	Kb		% VEG	15%	15%	-	-	14%
C	0.126		I.A.	0.15	0.20	-	-	T.D.

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA
160A	3.71
LENGTH Mi	SLOPE Ft/Mi
0.12	254
LAND TYPE	Kb
B	0.072

this Sub-Basin is now part of the Cereus

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	4.44	-	-	-	-
160B	4.44		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	-
			ACRES	4.44	-	-	-	-
0.23	108.8		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	90%	-	-	-	-
			% VEG	5%	-	-	-	-
A	0.036		I.A.	0.10	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	-
			ACRES	4.71	5.64	-	-	-
160C	10.35		PERCENT	46%	54%	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	5.07	5.28	-	-	-
0.33	152.6		PERCENT	49%	51%	-	-	-
LAND TYPE	Kb		% DEV	90%	95%	-	-	-
			% VEG	5%	10%	-	-	-
A	0.034		I.A.	0.10	0.10	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	-
			ACRES	22.83	3.54	-	-	-
160D	26.37		PERCENT	87%	13%	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R1-8	R1-18	R1-35	C-1
			ACRES	4.76	10.04	5.85	2.30	3.42
0.79	211		PERCENT	18%	38%	22%	9%	13%
LAND TYPE	Kb		% DEV	25%	90%	30%	90%	0%
			% VEG	10%	5%	2%	10%	10%
Comp.	0.102		I.A.	0.10	0.10	0.10	0.05	0.15

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	2.63	-	-	-	-
160E	2.63		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	2.22	0.41	-	-	-
0.21	228		PERCENT	85%	16%	-	-	-
LAND TYPE	Kb		% DEV	60%	80%	-	-	-
			% VEG	10%	5%	-	-	-
B	0.074		I.A.	0.10	0.05	-	-	-

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	-
			ACRES	8.19	3.27	-	-	-
160F	11.46		PERCENT	71%	29%	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-18	R1-35	-	-
			ACRES	3.15	1.56	6.75	-	-
0.74	181.4		PERCENT	27%	14%	59%	-	-
LAND			% DEV	50%	0%	90%	-	-
TYPE	Kb		% VEG	10%	5%	10%	-	-
Comp.	0.051		I.A.	0.10	0.10	0.10	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	14.52	-	-	-	-
160G	14.52		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	-
			ACRES	14.52	-	-	-	-
0.53	132.0		PERCENT	100%	-	-	-	-
LAND			% DEV	75%	-	-	-	-
TYPE	Kb		% VEG	10%	-	-	-	-
B	0.064		I.A.	0.10	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	13.07	-	-	-	-
160H	13.07		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	9.38	3.69	-	-	-
0.61	158.8		PERCENT	72%	28%	-	-	-
LAND			% DEV	90%	80%	-	-	-
TYPE	Kb		% VEG	10%	5%	-	-	-
A	0.033		I.A.	0.10	0.05	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	3.49	-	-	-	-
160I	3.49		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	2.47	1.02	-	-	-
0.18	268		PERCENT	71%	29%	-	-	-
LAND			% DEV	45%	90%	-	-	-
TYPE	Kb		% VEG	10%	5%	-	-	-
Comp.	0.123		I.A.	0.10	0.05	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	-
			ACRES	5.20	-	-	-	-
160J	5.20		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	4.42	0.78	-	-	-
0.10	286		PERCENT	85%	15%	-	-	-
LAND			% DEV	50%	100%	-	-	-
TYPE	Kb		% VEG	10%	5%	-	-	-
B	0.070		I.A.	0.10	0.05	-	-	-

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	-
			ACRES	9.70	8.05	-	-	-
160K	17.75		PERCENT	55%	45%	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	-
			ACRES	17.75	-	-	-	-
0.25	295		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	40%	-	-	-	-
			% VEG	30%	-	-	-	-
C	0.119		I.A.	0.15	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	-
			ACRES	1.89	2.92	-	-	-
160L	4.81		PERCENT	39%	61%	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	3.98	0.83	-	-	-
0.25	211		PERCENT	83%	17%	-	-	-
LAND TYPE	Kb		% DEV	95%	100%	-	-	-
			% VEG	5%	0%	-	-	-
B	0.071		I.A.	0.10	0.05	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	63	-	-
			ACRES	24.43	2.93	10.54	-	-
160M	37.90		PERCENT	64%	8%	28%	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	-
			ACRES	4.05	33.85	-	-	-
0.44	273		PERCENT	11%	89%	-	-	-
LAND TYPE	Kb		% DEV	50%	15%	-	-	-
			% VEG	30%	30%	-	-	-
C	0.111		I.A.	0.15	0.15	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	13.97	-	-	-	-
160N	13.97		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	-
			ACRES	13.97	-	-	-	-
0.23	290		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	60%	-	-	-	-
			% VEG	30%	-	-	-	-
B	0.064		I.A.	0.15	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	41.67	-	-	-	-
160O	41.67		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	41.67	-	-	-	-
0.46	236		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	40%	-	-	-	-
			% VEG	30%	-	-	-	-
C	0.110		I.A.	0.15	-	-	-	-

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	14.52	-	-	-	-
160P	14.53		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	14.52	-	-	-	-
0.26	279		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	40%	-	-	-	-
			% VEG	30%	-	-	-	-
C	0.121		I.A.	0.15	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	3.79	-	-	-	-
160Q	3.79		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	3.79	-	-	-	-
0.19	296		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	80%	-	-	-	-
			% VEG	5%	-	-	-	-
B	0.072		I.A.	0.05	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	33.63	-	-	-	-
160R	33.63		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	33.63	-	-	-	-
0.40	267		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	30%	-	-	-	-
			% VEG	30%	-	-	-	-
C	0.112		I.A.	0.15	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	6.83	-	-	-	-
160S	6.83		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-18	-	-	-
			ACRES	0.96	5.87	-	-	-
0.15	294		PERCENT	14%	86%	-	-	-
LAND TYPE	Kb		% DEV	50%	50%	-	-	-
			% VEG	30%	30%	-	-	-
B	0.069		I.A.	0.15	0.15	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	5.65	-	-	-	-
160T	5.65		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-18	-	-	-
			ACRES	3.00	2.65	-	-	-
0.19	280		PERCENT	53%	47%	-	-	-
LAND TYPE	Kb		% DEV	65%	85%	-	-	-
			% VEG	10%	20%	-	-	-
B	0.070		I.A.	0.10	0.10	-	-	-

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	49.43	-	-	-	-
160U	49.43		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R1-8	C-1	-	-
			ACRES	3.65	41.66	4.12	-	-
0.73	172.1		PERCENT	7%	84%	8%	-	-
LAND TYPE	Kb		% DEV	30%	50%	25%	-	-
			% VEG	30%	20%	5%	-	-
B	0.057		I.A.	0.15	0.10	0.10	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	2.89	-	-	-	-
160V	2.89		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	2.89	-	-	-	-
0.22	136.0		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	80%	-	-	-	-
			% VEG	5%	-	-	-	-
A	0.037		I.A.	0.05	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	1.26	-	-	-	-
160W	1.26		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-18	-	-	-	-
			ACRES	1.26	-	-	-	-
0.11	167.2		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	90%	-	-	-	-
			% VEG	5%	-	-	-	-
A	0.039		I.A.	0.05	-	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	18.31	-	-	-	-
160X	18.31		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-18	-	-	-
			ACRES	1.19	17.12	-	-	-
0.32	252		PERCENT	6%	93%	-	-	-
LAND TYPE	Kb		% DEV	0%	45%	-	-	-
			% VEG	10%	25%	-	-	-
C	0.118		I.A.	0.15	0.15	-	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	2.59	-	-	-	-
160Y	2.59		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	-
			ACRES	2.59	-	-	-	-
0.16	205		PERCENT	100%	-	-	-	-
LAND TYPE	Kb		% DEV	60%	-	-	-	-
			% VEG	20%	-	-	-	-
B	0.074		I.A.	0.10	-	-	-	-

B.5 Soils and Land Use Information - Emerald Wash (160)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	38.76	-	-	-	-
160Z	38.76		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R1-8	R1-18	-	-
			ACRES	1.77	36.48	0.51	-	-
0.85	174.8		PERCENT	5%	94%	1%	-	-
LAND TYPE	Kb		% DEV	30%	50%	100%	-	-
			% VEG	5%	15%	0%	-	-
B	0.058		I.A.	0.10	0.10	0.05	-	-

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	-
			ACRES	3.34	-	-	-	-
160AA	3.36		PERCENT	100%	-	-	-	-
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	C-1	-	-	-
			ACRES	2.22	1.12	-	-	-
0.16	163.8		PERCENT	66%	33%	-	-	-
LAND TYPE	Kb		% DEV	60%	50%	-	-	-
			% VEG	30%	5%	-	-	-
B	0.073		I.A.	0.10	0.05	-	-	-

B.6 Soils and Land Use Information - Malta Drain (170)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	15.08	-	-	-	15.08
170A	15.08		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	15.08	-	-	-	15.08
0.27	248.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	55%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	55%
B	0.064		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.24	-	-	-	2.24
170B	2.24		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.24	-	-	-	2.24
0.10	291.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
B	0.075		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	21.63	-	-	-	21.63
170C	21.63		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	21.63	-	-	-	21.63
0.42	226.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	50%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	50%
B	0.062		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	4.54	-	-	-	4.54
170D	4.54		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-18	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.54	-	-	-	4.54
0.28	279.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	70%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	70%
B	0.071		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	60.94	-	-	-	60.94
170E	60.94		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-3	R1-8	R1-18	TOTAL
Mi	Ft/Mi		ACRES	6.61	2.82	45.36	6.15	60.94
0.80	162.7		PERCENT	11%	5%	74%	10%	100%
LAND			% DEV	50%	50%	60%	30%	
TYPE	Kb		% VEG	10%	10%	20%	25%	55%
B	0.055		I.A.	0.10	0.10	0.15	0.15	T.D.

B.6 Soils and Land Use Information - Malta Drain (170)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.46	-	-	-	11.46
170F	11.46		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-3	R1-8	-	TOTAL
Mi	Ft/Mi		ACRES	3.86	5.74	1.86	-	11.46
0.28	147.8		PERCENT	34%	50%	16%	-	100%
LAND			% DEV	50%	50%	100%	-	
TYPE	Kb		% VEG	10%	10%	0%	-	58%
B	0.065		I.A.	0.10	0.10	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	1.84	-	-	-	1.84
170G	1.84		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-3	R1-8	-	TOTAL
Mi	Ft/Mi		ACRES	0.17	0.30	1.37	-	1.84
0.23	267.0		PERCENT	9%	16%	74%	-	100%
LAND			% DEV	100%	100%	100%	-	
TYPE	Kb		% VEG	0%	0%	0%	-	100%
B	0.076		I.A.	0.05	0.05	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	5.98	-	-	-	5.98
170H	5.98		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-3	R1-8	C-1	TOTAL
Mi	Ft/Mi		ACRES	0.29	4.03	1.61	0.05	5.98
0.13	174.7		PERCENT	5%	67%	27%	1%	100%
LAND			% DEV	55%	20%	80%	0%	
TYPE	Kb		% VEG	10%	10%	25%	30%	38%
B	0.069		I.A.	0.10	0.10	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	14.16	-	-	-	14.16
170I-1	14.16		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-3	R1-8	-	TOTAL
Mi	Ft/Mi		ACRES	3.55	8.27	2.34	-	14.16
0.42	154.2		PERCENT	25%	58%	17%	-	100%
LAND			% DEV	50%	70%	50%	-	
TYPE	Kb		% VEG	5%	5%	5%	-	62%
B	0.064		I.A.	0.10	0.05	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	7.57	-	-	-	7.57
170I-2	7.57		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	C-1	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.82	1.75	-	-	7.57
0.32	136.7		PERCENT	77%	23%	-	-	100%
LAND			% DEV	85%	100%	-	-	
TYPE	Kb		% VEG	5%	0%	-	-	89%
A	0.035		I.A.	0.05	0.05	-	-	T.D.

B.6 Soils and Land Use Information - Malta Drain (170)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.91	-	-	-	3.91
170I-3	3.91		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R1-8	-	-	TOTAL
			ACRES	3.29	0.62	-	-	3.91
0.23	193.6		PERCENT	84%	16%	-	-	100%
LAND TYPE	Kb		% DEV	90%	0%	-	-	
			% VEG	5%	30%	-	-	76%
B	0.072		I.A.	0.05	0.15	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	15.25	0.67	-	-	15.92
180A	15.92		PERCENT	96%	4%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	15.92	-	-	-	15.92
0.39	269.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	55%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	55%
B	0.063		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	5.89	12.61	-	-	18.50
180B	18.50		PERCENT	32%	68%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	12.17	6.33	-	-	18.50
1.22	236.0		PERCENT	66%	34%	-	-	100%
LAND			% DEV	60%	90%	-	-	
TYPE	Kb		% VEG	15%	20%	-	-	70%
B	0.063		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	1.90	4.65	-	-	6.55
180C	6.55		PERCENT	29%	71%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.28	6.27	-	-	6.55
0.20	295.0		PERCENT	4%	96%	-	-	100%
LAND			% DEV	100%	55%	-	-	
TYPE	Kb		% VEG	5%	15%	-	-	57%
B	0.069		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.09	-	-	-	2.09
180D	2.09		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.57	1.52	-	-	2.09
0.25	260.0		PERCENT	27%	73%	-	-	100%
LAND			% DEV	100%	80%	-	-	
TYPE	Kb		% VEG	5%	5%	-	-	85%
B	0.076		I.A.	0.10	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.91	-	-	-	11.91
180E	11.91		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R1-18	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	0.11	9.60	2.20	-	11.91
0.32	265.0		PERCENT	1%	81%	18%	-	100%
LAND			% DEV	0%	80%	50%	-	
TYPE	Kb		% VEG	30%	20%	5%	-	74%
B	0.065		I.A.	0.15	0.10	0.10	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	43.14	4.13	-	-	47.27
180F	47.27		PERCENT	91%	9%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R1-18	R1-35	-	TOTAL
			ACRES	0.22	0.36	46.69	-	47.27
0.45	265.0		PERCENT	0%	1%	99%	-	100%
LAND TYPE	Kb		% DEV	0%	0%	40%	-	
			% VEG	30%	30%	30%	-	40%
C	0.108		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	18.67	-	-	-	18.67
180G	18.67		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R1-18	-	-	TOTAL
			ACRES	3.43	15.24	-	-	18.67
0.31	230.0		PERCENT	18%	82%	-	-	100%
LAND TYPE	Kb		% DEV	10%	55%	-	-	
			% VEG	30%	30%	-	-	47%
C	0.118		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	13.39	-	-	-	13.39
180H	13.39		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	-	-	-	TOTAL
			ACRES	13.39	-	-	-	13.39
0.42	217.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	40%	-	-	-	
			% VEG	30%	-	-	-	40%
C	0.122		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.30	-	-	-	2.30
180I	2.30		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	-	-	-	TOTAL
			ACRES	2.30	-	-	-	2.30
0.16	192.6		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	75%	-	-	-	
			% VEG	5%	-	-	-	75%
B	0.075		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	21.81	-	-	-	21.81
180J	21.81		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R-4	-	-	TOTAL
			ACRES	20.86	0.95	-	-	21.81
0.49	166.1		PERCENT	96%	4%	-	-	100%
LAND TYPE	Kb		% DEV	40%	90%	-	-	
			% VEG	20%	20%	-	-	42%
B	0.062		I.A.	0.10	0.10	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	18.54	-	-	-	18.54
180K	18.54		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-4	C-1	-	-	TOTAL
			ACRES	17.73	0.81	-	-	18.54
0.41	174.4		PERCENT	96%	4%	-	-	100%
LAND TYPE	Kb		% DEV	70%	100%	-	-	
			% VEG	5%	0%	-	-	71%
B	0.063		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	8.00	-	-	-	8.00
180L	8.00		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R-3	R1-8	C-2/3	TOTAL
			ACRES	0.78	3.59	0.89	2.74	8.00
0.19	276.0		PERCENT	10%	45%	11%	34%	100%
LAND TYPE	Kb		% DEV	0%	60%	80%	100%	
			% VEG	10%	5%	5%	0%	70%
B	0.068		I.A.	0.10	0.05	0.10	0.05	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.14	-	-	-	3.14
180M	3.14		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R1-18	-	-	TOTAL
			ACRES	0.14	3.00	-	-	3.14
0.31	264.0		PERCENT	4%	96%	-	-	100%
LAND TYPE	Kb		% DEV	100%	80%	-	-	
			% VEG	0%	5%	-	-	81%
B	0.073		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	26.20	-	-	-	26.20
180N	26.20		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2/4	R1-8	R1-18	C-1	TOTAL
			ACRES	10.28	1.92	13.28	0.72	26.20
0.31	228.0		PERCENT	39%	7%	51%	3%	100%
LAND TYPE	Kb		% DEV	40%	0%	0%	0%	
			% VEG	28%	25%	30%	30%	16%
C	0.115		I.A.	0.14	0.10	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	12.08	-	-	-	12.08
180O	12.08		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	C-1	C-3	-	-	TOTAL
			ACRES	3.72	8.36	-	-	12.08
0.31	170.8		PERCENT	31%	69%	-	-	100%
LAND TYPE	Kb		% DEV	5%	65%	-	-	
			% VEG	13%	13%	-	-	47%
B	0.065		I.A.	0.08	0.08	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	-	-	TOTAL
			ACRES	0.53	6.29	-	-	6.82
180P	6.82		PERCENT	8%	92%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	R-5	C-1/3	TOTAL
Mi	Ft/Mi		ACRES	0.36	0.35	2.91	3.20	6.82
0.18	150.1		PERCENT	5%	5%	43%	47%	100%
LAND			% DEV	100%	100%	0%	50%	
TYPE	Kb		% VEG	25%	25%	25%	5%	34%
B	0.069		I.A.	0.13	0.13	0.13	0.05	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	17.31	2.91	-	-	20.22
180Q	20.22		PERCENT	86%	14%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	C-1	C-3	TOTAL
Mi	Ft/Mi		ACRES	0.34	1.20	3.45	15.01	20.00
0.45	145.2		PERCENT	2%	6%	17%	74%	99%
LAND			% DEV	0%	100%	0%	50%	
TYPE	Kb		% VEG	7%	7%	10%	10%	43%
B	0.062		I.A.	0.07	0.07	0.11	0.11	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	7.05	10.33	-	-	17.38
180R	17.38		PERCENT	41%	59%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	C-1	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	17.38	-	-	-	17.38
0.32	131.4		PERCENT	100%	-	-	-	100%
LAND			% DEV	5%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	5%
B	0.063		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	-	-	TOTAL
			ACRES	0.74	21.50	-	-	22.24
180S	22.24		PERCENT	3%	97%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	C-3	-	TOTAL
Mi	Ft/Mi		ACRES	1.33	0.97	19.94	-	22.24
0.40	151.6		PERCENT	6%	4%	90%	-	100%
LAND			% DEV	50%	100%	80%	-	
TYPE	Kb		% VEG	4%	4%	5%	-	79%
A	0.032		I.A.	0.07	0.07	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	93	-	-	TOTAL
			ACRES	7.63	6.93	-	-	14.56
180T	14.56		PERCENT	52%	48%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	C-1	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	14.56	-	-	-	14.56
0.36	76.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	75%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	75%
A	0.033		I.A.	0.10	-	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	93	-	TOTAL
			ACRES	7.77	1.50	3.13	-	12.40
180U	12.40		PERCENT	63%	12%	25%	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-4	C-1	-	-	TOTAL
			ACRES	11.24	1.16	-	-	12.40
0.38	107.5		PERCENT	91%	9%	-	-	100%
LAND TYPE	Kb		% DEV	10%	100%	-	-	
			% VEG	30%	10%	-	-	18%
B	0.065		I.A.	0.15	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	50.62	-	-	-	50.62
181A	50.62		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-5	RUR-190	C-1	-	TOTAL
			ACRES	3.14	42.60	4.88	-	50.62
0.44	62.0		PERCENT	6%	84%	10%	-	100%
LAND TYPE	Kb		% DEV	100%	0%	0%	-	
			% VEG	0%	20%	30%	-	6%
B	0.057		I.A.	0.05	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	-	-	TOTAL
			ACRES	1.49	12.28	-	-	13.77
181B	13.77		PERCENT	11%	89%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R-4	RUR-190	C-1	TOTAL
			ACRES	9.55	0.52	1.09	2.61	13.77
0.42	94.9		PERCENT	69%	4%	8%	19%	100%
LAND TYPE	Kb		% DEV	60%	100%	20%	10%	
			% VEG	10%	10%	20%	15%	49%
B	0.064		I.A.	0.05	0.05	0.10	0.10	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	32.23	-	-	-	32.23
182A	32.23		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	C-2	-	-	-	TOTAL
			ACRES	32.23	-	-	-	32.23
0.38	145.2		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	5%	-	-	-	
			% VEG	20%	-	-	-	5%
B	0.059		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	24.78	-	-	-	24.78
182B	24.78		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-190	C-2	-	-	TOTAL
			ACRES	2.57	22.21	-	-	24.78
0.45	112.2		PERCENT	10%	90%	-	-	100%
LAND TYPE	Kb		% DEV	100%	10%	-	-	
			% VEG	0%	5%	-	-	19%
B	0.061		I.A.	0.05	0.10	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	14.26	-	-	-	14.26
182C	14.26		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-190	C-1	C-2	-	TOTAL
Mi	Ft/Mi		ACRES	1.10	5.08	8.08	-	14.26
0.42	132.0		PERCENT	8%	36%	57%	-	100%
LAND			% DEV	100%	100%	0%	-	
TYPE	Kb		% VEG	0%	0%	0%	-	43%
B	0.064		I.A.	0.05	0.08	0.08	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	60.37	-	-	-	60.37
182D	60.37		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	C-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.52	59.85	-	-	60.37
0.60	148.5		PERCENT	1%	99%	-	-	100%
LAND			% DEV	100%	20%	-	-	
TYPE	Kb		% VEG	0%	20%	-	-	21%
B	0.056		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	40.90	-	-	-	40.90
182E	40.90		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-190	C-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.14	33.76	-	-	40.90
0.49	103.6		PERCENT	17%	83%	-	-	100%
LAND			% DEV	100%	45%	-	-	
TYPE	Kb		% VEG	0%	0%	-	-	55%
B	0.058		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	9.62	-	-	-	9.62
182F	9.62		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	RUR-190	C-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.62	7.00	-	-	9.62
0.48	109.7		PERCENT	27%	73%	-	-	100%
LAND			% DEV	100%	50%	-	-	
TYPE	Kb		% VEG	0%	5%	-	-	64%
B	0.066		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	30.85	-	-	-	30.85
182G	30.85		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-5	RUR-190	C-2	TOTAL
Mi	Ft/Mi		ACRES	7.37	1.33	0.20	21.95	30.85
0.74	113.4		PERCENT	24%	4%	1%	71%	100%
LAND			% DEV	65%	100%	100%	60%	
TYPE	Kb		% VEG	4%	4%	0%	0%	63%
B	0.060		I.A.	0.09	0.09	0.05	0.05	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA
182H	17.18
LENGTH Mi	SLOPE Ft/Mi
0.30	266.0
LAND TYPE	Kb
C	0.119

this Sub-Basin is now part of the Panorama Channel Watershed (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
182I	25.58		ACRES	24.54	1.04	-	-	25.58
			PERCENT	96%	4%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R-4	R-5	C-2	TOTAL
			ACRES	9.58	1.02	6.86	8.12	25.58
0.58	84.0		PERCENT	37%	4%	27%	32%	100%
LAND TYPE	Kb		% DEV	45%	100%	100%	55%	
			% VEG	3%	3%	3%	5%	65%
B	0.061		I.A.	0.08	0.08	0.08	0.05	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
182J	9.53		ACRES	9.53	-	-	-	9.53
			PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-190	C-1	-	-	TOTAL
			ACRES	6.53	3.00	-	-	9.53
0.32	55.9		PERCENT	69%	31%	-	-	100%
LAND TYPE	Kb		% DEV	0%	40%	-	-	
			% VEG	30%	5%	-	-	13%
B	0.067		I.A.	0.15	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
182K	15.33		ACRES	15.33	-	-	-	15.33
			PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	C-1	-	-	TOTAL
			ACRES	2.29	13.04	-	-	15.33
0.19	118.5		PERCENT	15%	85%	-	-	100%
LAND TYPE	Kb		% DEV	100%	10%	-	-	
			% VEG	5%	10%	-	-	23%
B	0.064		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
182L	3.34		ACRES	3.34	-	-	-	3.34
			PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R-5	C-1	-	TOTAL
			ACRES	2.45	0.17	0.72	-	3.34
0.13	178.5		PERCENT	73%	5%	22%	-	100%
LAND TYPE	Kb		% DEV	100%	0%	0%	-	
			% VEG	7%	7%	30%	-	73%
B	0.073		I.A.	0.10	0.10	0.15	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	27.76	-	-	-	27.76
183A	27.76		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R1-10	-	-	TOTAL
			ACRES	4.30	23.46	-	-	27.76
0.37	283.0		PERCENT	15%	85%	-	-	100%
LAND TYPE	Kb		% DEV	50%	50%	-	-	
			% VEG	25%	25%	-	-	50%
B	0.060		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	26.16	-	-	-	26.16
183B	26.16		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-3	R-4	-	-	TOTAL
			ACRES	1.69	24.47	-	-	26.16
0.35	229.0		PERCENT	6%	94%	-	-	100%
LAND TYPE	Kb		% DEV	10%	0%	-	-	
			% VEG	30%	30%	-	-	1%
C	0.115		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA
183C	
LENGTH Mi	SLOPE Ft/Mi
LAND TYPE	Kb

this Sub-Basin is now part of the Fountain Hills North Study

BASIN NUMBER	TOTAL AREA
183D	
LENGTH Mi	SLOPE Ft/Mi
LAND TYPE	Kb

this Sub-Basin is now part of the Fountain Hills North Study

BASIN NUMBER	TOTAL AREA
183E	
LENGTH Mi	SLOPE Ft/Mi
LAND TYPE	Kb

this Sub-Basin is now part of the Fountain Hills North Study

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	31.32	-	-	-	31.32
183F	31.32		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	31.32	-	-	-	31.32
0.57	169.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
B	0.059		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	59.32	-	-	-	59.32
183G	59.32		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	C-2	-	-	TOTAL
Mi	Ft/Mi		ACRES	31.46	27.86	-	-	59.32
0.69	115.1		PERCENT	53%	47%	-	-	100%
LAND			% DEV	25%	10%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	18%
B	0.056		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	11.54	-	-	-	11.54
183H	11.54		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.61	10.93	-	-	11.54
0.24	211.0		PERCENT	5%	95%	-	-	100%
LAND			% DEV	100%	50%	-	-	
TYPE	Kb		% VEG	0%	28%	-	-	53%
B	0.065		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	36.70	-	-	-	36.70
183I	36.70		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	C-1	C-2	-	TOTAL
Mi	Ft/Mi		ACRES	17.90	0.85	17.95	-	36.70
0.48	103.9		PERCENT	49%	2%	49%	-	100%
LAND			% DEV	50%	100%	0%	-	
TYPE	Kb		% VEG	10%	0%	0%	-	27%
B	0.058		I.A.	0.10	0.10	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	3.19	-	-	-	3.19
183J	3.19		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	C-1	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.18	3.01	-	-	3.19
0.14	79.6		PERCENT	6%	94%	-	-	100%
LAND			% DEV	65%	100%	-	-	
TYPE	Kb		% VEG	5%	0%	-	-	98%
A	0.037		I.A.	0.05	0.05	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	1.21	-	-	-	1.21
183K	1.21		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	C-1	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.21	-	-	-	1.21
0.10	149.4		PERCENT	100%	-	-	-	100%
LAND			% DEV	100%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	100%
A	0.039		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	12.34	-	-	-	12.34
184A	12.34		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-10	C-2	-	TOTAL
Mi	Ft/Mi		ACRES	8.67	3.39	0.28	-	12.34
0.37	227.0		PERCENT	70%	27%	2%	-	100%
LAND			% DEV	70%	70%	50%	-	
TYPE	Kb		% VEG	10%	10%	20%	-	70%
B	0.065		I.A.	0.05	0.05	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	14.97	-	-	-	14.97
184B	14.97		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-8	R1-10	-	TOTAL
Mi	Ft/Mi		ACRES	0.20	7.43	7.34	-	14.97
0.63	256.0		PERCENT	1%	50%	49%	-	100%
LAND			% DEV	100%	50%	50%	-	
TYPE	Kb		% VEG	0%	20%	20%	-	51%
B	0.064		I.A.	0.05	0.10	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	7.12	1.58	-	-	8.70
184C	8.70		PERCENT	82%	18%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-10	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.45	8.25	-	-	8.70
0.28	289.0		PERCENT	5%	95%	-	-	100%
LAND			% DEV	100%	50%	-	-	
TYPE	Kb		% VEG	0%	10%	-	-	53%
B	0.067		I.A.	0.05	0.10	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	4.06	0.71	-	-	4.77
184D	4.77		PERCENT	85%	15%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-10	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.21	4.56	-	-	4.77
0.42	274.0		PERCENT	4%	96%	-	-	100%
LAND			% DEV	100%	50%	-	-	
TYPE	Kb		% VEG	0%	5%	-	-	52%
B	0.071		I.A.	0.05	0.05	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	5.92	63.76	-	-	69.68
184E	69.68		PERCENT	8%	92%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-10	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.32	68.36	-	-	69.68
1.07	239.0		PERCENT	2%	98%	-	-	100%
LAND			% DEV	100%	15%	-	-	
TYPE	Kb		% VEG	0%	30%	-	-	17%
C	0.104		I.A.	0.05	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	4.13	0.26	-	-	4.39
184F	4.39		PERCENT	94%	6%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R1-10	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.85	3.54	-	-	4.39
0.38	271.0		PERCENT	19%	81%	-	-	100%
LAND			% DEV	100%	50%	-	-	
TYPE	Kb		% VEG	0%	5%	-	-	60%
B	0.071		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	10.78	23.30	-	-	34.08
184G	34.08		PERCENT	32%	68%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	R1-35	-	TOTAL
Mi	Ft/Mi		ACRES	14.87	14.03	5.18	-	34.08
0.41	270.0		PERCENT	44%	41%	15%	-	100%
LAND			% DEV	5%	5%	15%	-	
TYPE	Kb		% VEG	30%	30%	30%	-	7%
C	0.112		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	7.64	-	-	-	7.64
184H	7.64		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.64	-	-	-	7.64
0.35	169.9		PERCENT	100%	-	-	-	100%
LAND			% DEV	55%	-	-	-	
TYPE	Kb		% VEG	15%	-	-	-	55%
B	0.068		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	20.14	-	-	-	20.14
184I	20.14		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-2	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	8.84	11.30	-	-	20.14
0.39	174.3		PERCENT	44%	56%	-	-	100%
LAND			% DEV	45%	45%	-	-	
TYPE	Kb		% VEG	25%	25%	-	-	45%
B	0.062		I.A.	0.15	0.15	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	5.19	-	-	-	5.19
184J	5.19		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-2	R-4	-	-	TOTAL
			ACRES	1.10	4.09	-	-	5.19
0.19	262.0		PERCENT	21%	79%	-	-	100%
LAND TYPE			% DEV	55%	30%	-	-	
	Kb		% VEG	19%	19%	-	-	35%
C	0.132		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	-	-	-	TOTAL
			ACRES	2.29	-	-	-	2.29
184K	2.29		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R-4	-	-	-	TOTAL
			ACRES	2.29	-	-	-	2.29
0.11	297.0		PERCENT	100%	-	-	-	100%
LAND TYPE			% DEV	40%	-	-	-	
	Kb		% VEG	25%	-	-	-	40%
C	0.141		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	26.09	-	-	-	26.09
185A	26.09		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
			ACRES	26.09	-	-	-	26.09
0.51	269.0		PERCENT	100%	-	-	-	100%
LAND TYPE			% DEV	50%	-	-	-	
	Kb		% VEG	20%	-	-	-	50%
B	0.061		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	8.36	43.68	-	-	52.04
185B	52.04		PERCENT	16%	84%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	12.45	39.59	-	-	52.04
0.74	244.0		PERCENT	24%	76%	-	-	100%
LAND TYPE			% DEV	30%	30%	-	-	
	Kb		% VEG	30%	30%	-	-	30%
C	0.107		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	63.10	-	-	-	63.10
186A	63.10		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	RUR-43	-	-	TOTAL
			ACRES	5.15	57.95	-	-	63.10
0.64	273.0		PERCENT	8%	92%	-	-	100%
LAND TYPE			% DEV	100%	0%	-	-	
	Kb		% VEG	0%	30%	-	-	8%
C	0.105		I.A.	0.05	0.15	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	3.18	-	-	-	3.18
186B	3.18		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	RUR-43	C-2	-	TOTAL
			ACRES	0.04	2.98	0.16	-	3.18
0.13	253.0		PERCENT	1%	94%	5%	-	100%
LAND TYPE	Kb		% DEV	100%	0%	0%	-	
			% VEG	0%	30%	30%	-	1%
C	0.137		I.A.	0.05	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	10.80	-	-	-	10.80
186C	10.80		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
			ACRES	6.76	3.70	0.34	-	10.80
0.38	263.0		PERCENT	63%	34%	3%	-	100%
LAND TYPE	Kb		% DEV	50%	100%	100%	-	
			% VEG	20%	0%	0%	-	69%
B	0.066		I.A.	0.10	0.05	0.05	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	30.04	21.70	-	-	51.74
186D	51.74		PERCENT	58%	42%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
			ACRES	1.67	10.05	40.02	-	51.74
0.75	255.0		PERCENT	3%	19%	77%	-	100%
LAND TYPE	Kb		% DEV	0%	0%	5%	-	
			% VEG	30%	30%	30%	-	4%
C	0.107		I.A.	0.15	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	22.94	-	-	-	22.94
186E	22.94		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	2.77	20.17	-	-	22.94
0.35	288.0		PERCENT	12%	88%	-	-	100%
LAND TYPE	Kb		% DEV	55%	0%	-	-	
			% VEG	20%	30%	-	-	7%
C	0.116		I.A.	0.10	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	14.34	4.01	-	-	18.35
186F	18.35		PERCENT	78%	22%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	1.17	17.18	-	-	18.35
0.38	254.0		PERCENT	6%	94%	-	-	100%
LAND TYPE	Kb		% DEV	50%	0%	-	-	
			% VEG	25%	30%	-	-	3%
C	0.118		I.A.	0.15	0.15	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	42.45	-	-	-	42.45
186G	42.45		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	42.45	-	-	-	42.45
0.59	272.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	5%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	5%
C	0.109		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	1.39	16.98	-	-	18.37
186H	15.82		PERCENT	9%	107%	-	-	116%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
Mi	Ft/Mi		ACRES	6.16	9.66	-	-	15.82
0.82	183.3		PERCENT	39%	61%	-	-	100%
LAND			% DEV	50%	60%	-	-	
TYPE	Kb		% VEG	10%	10%	-	-	56%
B	0.064		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	1.39	16.98	-	-	18.37
186I	18.37		PERCENT	8%	92%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	18.37	-	-	-	18.37
0.34	289.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
C	0.118		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	3.06	2.48	-	-	5.54
187A	5.54		PERCENT	55%	45%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	RUR-43	-	-	TOTAL
Mi	Ft/Mi		ACRES	0.47	5.07	-	-	5.54
0.11	256.0		PERCENT	8%	92%	-	-	100%
LAND			% DEV	0%	10%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	9%
C	0.131		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	3.78	1.41	-	-	5.19
187B	5.19		PERCENT	73%	27%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.19	-	-	-	5.19
0.19	262.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	20%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	20%
C	0.132		I.A.	0.15	-	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	7.60	-	-	-	7.60
187C	7.60		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	5.23	2.37	-	-	7.60
0.23	273.0		PERCENT	69%	31%	-	-	100%
LAND TYPE	Kb		% DEV	50%	50%	-	-	
			% VEG	25%	25%	-	-	50%
B	0.068		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	44.79	0.32	-	-	45.11
187D	45.11		PERCENT	99%	1%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	7.95	37.16	-	-	45.11
0.75	254.0		PERCENT	18%	82%	-	-	100%
LAND TYPE	Kb		% DEV	50%	30%	-	-	
			% VEG	30%	30%	-	-	34%
C	0.109		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	3.32	-	-	-	3.32
187E	3.32		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	2.34	0.98	-	-	3.32
0.32	189.9		PERCENT	70%	30%	-	-	100%
LAND TYPE	Kb		% DEV	80%	100%	-	-	
			% VEG	10%	0%	-	-	86%
A	0.037		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	2.13	-	-	-	2.13
187F	2.13		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
			ACRES	2.13	-	-	-	2.13
0.33	287.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	100%	-	-	-	
			% VEG	0%	-	-	-	100%
B	0.075		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	27.24	-	-	-	27.24
187G	27.24		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	19.31	7.93	-	-	27.24
0.91	267.0		PERCENT	71%	29%	-	-	100%
LAND TYPE	Kb		% DEV	45%	50%	-	-	
			% VEG	20%	20%	-	-	46%
C	0.114		I.A.	0.10	0.10	-	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	2.81	-	-	-	2.81
187H	2.81		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.81	-	-	-	2.81
0.13	275.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	15%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	15%
C	0.139		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	41	-	-	TOTAL
			ACRES	1.73	13.57	-	-	15.30
187I	15.30		PERCENT	11%	89%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	15.30	-	-	-	15.30
0.25	305.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	30%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	30%
C	0.120		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	5.60	-	-	-	5.60
188A	5.60		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	C-2	-	TOTAL
Mi	Ft/Mi		ACRES	3.99	1.53	0.08	-	5.60
0.25	286.0		PERCENT	71%	27%	1%	-	100%
LAND			% DEV	60%	100%	50%	-	
TYPE	Kb		% VEG	25%	0%	20%	-	71%
B	0.070		I.A.	0.10	0.05	0.10	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	14.19	28.31	-	-	42.50
188B	42.50		PERCENT	33%	67%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	C-2	TOTAL
Mi	Ft/Mi		ACRES	0.78	4.45	27.61	9.66	42.50
0.46	300.0		PERCENT	2%	10%	65%	23%	100%
LAND			% DEV	60%	45%	0%	0%	
TYPE	Kb		% VEG	25%	30%	30%	30%	6%
C	0.109		I.A.	0.10	0.15	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	11.34	2.66	-	-	14.00
188C	14.00		PERCENT	81%	19%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
Mi	Ft/Mi		ACRES	1.32	7.73	4.95	-	14.00
0.34	308.0		PERCENT	9%	55%	35%	-	100%
LAND			% DEV	80%	35%	0%	-	
TYPE	Kb		% VEG	20%	30%	30%	-	27%
C	0.121		I.A.	0.10	0.15	0.15	-	T.D.

B.7 Soils and Land Use Information - Colony Drain (180)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	22.17	13.09	-	-	35.26
188D	35.26		PERCENT	63%	37%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	RUR-43	-	-	-	TOTAL
			ACRES	35.26	-	-	-	35.26
0.55	304.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	5%	-	-	-	
			% VEG	30%	-	-	-	5%
C	0.111		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	63	-	-	TOTAL
			ACRES	32.33	0.93	-	-	33.26
188E	33.25		PERCENT	97%	3%	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	RUR-43	-	TOTAL
			ACRES	4.49	22.10	6.66	-	33.25
0.64	289.0		PERCENT	14%	66%	20%	-	100%
LAND TYPE	Kb		% DEV	85%	10%	0%	-	
			% VEG	10%	30%	30%	-	18%
C	0.112		I.A.	0.05	0.15	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	45.99	-	-	-	45.99
188F	45.99		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-8	R1-35	-	-	TOTAL
			ACRES	1.83	44.16	-	-	45.99
0.64	273.0		PERCENT	4%	96%	-	-	100%
LAND TYPE	Kb		% DEV	100%	15%	-	-	
			% VEG	0%	30%	-	-	18%
C	0.108		I.A.	0.05	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	0.87	-	-	-	0.87
188G	0.87		PERCENT	100%	-	-	-	100%
LENGTH Mi	SLOPE Ft/Mi	LAND USE:	ZONE	R1-35	-	-	-	TOTAL
			ACRES	0.87	-	-	-	0.87
0.07	313.0		PERCENT	100%	-	-	-	100%
LAND TYPE	Kb		% DEV	0%	-	-	-	
			% VEG	30%	-	-	-	0%
C	0.152		I.A.	0.15	-	-	-	T.D.

B.8 Soils and Land Use Information - Panorama Channel (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	17.18	-	-	-	17.18
182H	17.18		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-5	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	17.18	-	-	-	17.18
0.30	266.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
C	0.119		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	11.95	-	-	-	11.95
190A	11.95		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-5	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	11.95	-	-	-	11.95
0.26	297.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	10%
C	0.123		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	0.43	4.22	-	-	4.65
190B	4.66		PERCENT	9%	91%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-5	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.66	-	-	-	4.66
0.19	295.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	45%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	45%
C	0.133		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	0.82	13.04	-	-	13.86
190C	13.86		PERCENT	6%	94%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-5	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.86	-	-	-	13.86
0.26	286.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	40%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	40%
C	0.121		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	3.46	-	-	-	3.46
190D	3.46		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.46	-	-	-	3.46
0.07	366.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	20%	-	-	-	0%
C	0.137		I.A.	0.10	-	-	-	T.D.

B.8 Soils and Land Use Information - Panorama Channel (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	2.14	-	-	-	2.14
190E	2.14		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	2.14	-	-	-	2.14
0.18	291.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	50%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	50%
B	0.075		I.A.	0.05	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	4.08	-	-	-	4.08
190F	4.08		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.08	-	-	-	4.08
0.17	273.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	10%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	10%
C	0.135		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	4.14	-	-	-	4.14
190G	4.14		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.14	-	-	-	4.14
0.22	311.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	25%	-	-	-	
TYPE	Kb		% VEG	10%	-	-	-	25%
C	0.135		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	47.74	-	-	-	47.74
190H	47.74		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-5	-	-	TOTAL
Mi	Ft/Mi		ACRES	33.67	14.07	-	-	47.74
0.44	271.0		PERCENT	71%	29%	-	-	100%
LAND			% DEV	5%	5%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	5%
C	0.108		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	3.61	3.84	-	-	7.45
190I	7.45		PERCENT	48%	52%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-5	RUR-190	-	TOTAL
Mi	Ft/Mi		ACRES	0.96	5.90	0.59	-	7.45
0.23	295.0		PERCENT	13%	79%	8%	-	100%
LAND			% DEV	0%	80%	100%	-	
TYPE	Kb		% VEG	13%	13%	0%	-	71%
B	0.068		I.A.	0.11	0.11	0.05	-	T.D.

B.8 Soils and Land Use Information - Panorama Channel (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	40	41	-	-	TOTAL
			ACRES	0.26	5.58	-	-	5.84
190J	5.84		PERCENT	4%	96%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-5	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.42	4.42	-	-	5.84
0.22	297.0		PERCENT	24%	76%	-	-	100%
LAND			% DEV	25%	25%	-	-	
TYPE	Kb		% VEG	24%	24%	-	-	25%
C	0.131		I.A.	0.14	0.14	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	5.20	-	-	-	5.20
190K	5.20		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	5.11	0.09	-	-	5.20
0.21	321.0		PERCENT	98%	2%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
C	0.132		I.A.	0.15	0.15	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	41	-	TOTAL
			ACRES	0.55	2.25	4.46	-	7.26
190L	7.26		PERCENT	8%	31%	61%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	RUR-190	-	TOTAL
Mi	Ft/Mi		ACRES	5.74	1.27	0.25	-	7.26
0.23	165.1		PERCENT	79%	17%	3%	-	100%
LAND			% DEV	50%	50%	0%	-	
TYPE	Kb		% VEG	23%	23%	30%	-	48%
B	0.068		I.A.	0.10	0.10	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	93	-	TOTAL
			ACRES	1.74	2.94	1.01	-	5.69
190M	5.69		PERCENT	31%	52%	18%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	RUR-190	C-1	-	TOTAL
Mi	Ft/Mi		ACRES	1.65	0.62	3.42	-	5.69
0.24	116.9		PERCENT	29%	11%	60%	-	100%
LAND			% DEV	100%	50%	0%	-	
TYPE	Kb		% VEG	0%	20%	30%	-	34%
B	0.070		I.A.	0.05	0.10	0.15	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	41	-	-	-	TOTAL
			ACRES	11.21	-	-	-	11.21
190N	11.21		PERCENT	100%	-	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	1.85	9.36	-	-	11.21
0.24	301.0		PERCENT	17%	83%	-	-	100%
LAND			% DEV	0%	0%	-	-	
TYPE	Kb		% VEG	30%	30%	-	-	0%
C	0.124		I.A.	0.15	0.15	-	-	T.D.

B.8 Soils and Land Use Information - Panorama Channel (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	40	93	-	TOTAL
			ACRES	0.41	0.53	2.78	-	3.72
190O	3.72		PERCENT	11%	14%	75%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.06	0.66	-	-	3.72
0.19	72.1		PERCENT	82%	18%	-	-	100%
LAND			% DEV	90%	100%	-	-	
TYPE	Kb		% VEG	5%	5%	-	-	92%
A	0.036		I.A.	0.05	0.05	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	93	-	-	TOTAL
			ACRES	3.25	10.13	-	-	13.38
190P	13.38		PERCENT	24%	76%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.74	5.64	-	-	13.38
0.21	139.2		PERCENT	58%	42%	-	-	100%
LAND			% DEV	80%	100%	-	-	
TYPE	Kb		% VEG	6%	6%	-	-	88%
A	0.033		I.A.	0.08	0.08	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	41	93	-	TOTAL
			ACRES	4.37	2.02	1.60	-	7.99
190Q	7.99		PERCENT	55%	25%	20%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	7.99	-	-	-	7.99
0.27	128.2		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	60%	-	-	-	0%
B	0.068		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	41	-	-	TOTAL
			ACRES	0.80	8.89	-	-	9.69
190R	9.69		PERCENT	8%	92%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	9.69	-	-	-	9.69
0.25	279.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	30%	-	-	-	0%
C	0.125		I.A.	0.15	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	41	93	-	TOTAL
			ACRES	1.47	1.32	2.03	-	4.82
190S	4.82		PERCENT	30%	27%	42%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	4.82	-	-	-	4.82
0.18	264.0		PERCENT	100%	-	-	-	100%
LAND			% DEV	0%	-	-	-	
TYPE	Kb		% VEG	60%	-	-	-	0%
C	0.133		I.A.	0.15	-	-	-	T.D.

B.8 Soils and Land Use Information - Panorama Channel (190)

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	41	93	-	TOTAL
			ACRES	1.33	80.95	0.14	-	82.42
190T	82.42		PERCENT	2%	98%	0%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-3	R-4	R-5	F.M. RES	TOTAL
Mi	Ft/Mi		ACRES	8.10	22.17	5.11	47.04	82.42
0.74	241.0		PERCENT	10%	27%	6%	57%	100%
LAND			% DEV	0%	0%	0%	0%	
TYPE	Kb		% VEG	30%	30%	30%	30%	0%
C	0.102		I.A.	0.15	0.15	0.15	0.15	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	93	-	-	TOTAL
			ACRES	2.35	11.12	-	-	13.47
190U	13.47		PERCENT	17%	83%	-	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	-	-	-	TOTAL
Mi	Ft/Mi		ACRES	13.47	-	-	-	13.47
0.36	75.5		PERCENT	100%	-	-	-	100%
LAND			% DEV	70%	-	-	-	
TYPE	Kb		% VEG	5%	-	-	-	70%
A	0.033		I.A.	0.10	-	-	-	T.D.

BASIN NUMBER	TOTAL AREA	SOILS :	GROUP	6	41	93	-	TOTAL
			ACRES	4.50	4.52	2.71	-	11.73
190V	11.73		PERCENT	38%	39%	23%	-	100%
LENGTH	SLOPE	LAND USE:	ZONE	R-4	F.M. RES	-	-	TOTAL
Mi	Ft/Mi		ACRES	3.87	7.86	-	-	11.73
0.29	274.0		PERCENT	33%	67%	-	-	100%
LAND			% DEV	10%	0%	-	-	
TYPE	Kb		% VEG	45%	30%	-	-	3%
C	0.123		I.A.	0.15	0.15	-	-	T.D.

APPENDIX C

GREEN-AMPT PARAMETERS

C.1 Green-Ampt Parameters - Powder Wash (110)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
110A	14.01	0.022	72	99.41%	0.09			30.00%	
			63	0.59%	0.14			25.00%	
			TOTAL	100.00%	0.17	7.40	0.15	30.00%	0.15
110B	23.18	0.036	72	62.81%	0.09			30.00%	
			63	37.19%	0.14			25.00%	
			TOTAL	100.00%	0.106	7.00	0.16	28.00%	0.15
110C	2.74	0.004	72	27.37%	0.09			30.00%	
			63	72.63%	0.14			25.00%	
			TOTAL	100.00%	0.12	6.60	0.18	26.00%	0.15
110D	45.15	0.071	72	100.00%	0.09	7.40	0.15	30.00%	0.15
110E	15.85	0.025	63	100.00%	0.14	6.20	0.23	25.00%	0.15
110F	4.88	0.008	63	100.00%	0.14	6.20	0.23	25.00%	0.15
110G	4.06	0.006	63	100.00%	0.14	6.20	0.23	25.00%	0.15
110H	19.95	0.031	61	68.22%	0.15			0.00%	
			63	31.78%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.10	0.25	8.00%	0.15
110I	12.66	0.020	61	87.76%	0.15			0.00%	
			63	12.24%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.05	0.25	3.00%	0.15
110J	4.32	0.007	61	78.70%	0.15			0.00%	
			63	21.30%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.10	0.25	5.00%	0.15
110K	7.85	0.012	61	61.91%	0.15			0.00%	
			63	38.09%	0.14			25.00%	
			TOTAL	100.00%	0.12	6.20	0.24	10.00%	0.15
110L	15.20	0.024	61	86.12%	0.15			0.00%	
			63	13.88%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.05	0.25	3.00%	0.15
110M	19.99	0.031	61	100.00%	0.15	6.00	0.25	0.00%	0.15
110N	9.84	0.015	61	100.00%	0.15	6.00	0.25	0.00%	0.15
110O	2.78	0.004	61	100.00%	0.15	6.00	0.25	0.00%	0.15

* Note - DTHETA and IA are Land Use weighted values

C.2 Green-Ampt Parameters - Cereus Wash (120)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
120A	10.17	0.016	40	10.72%	0.17			0.00%	
			41	89.28%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.100
160A	3.71	0.006	41	100.00%	0.17	5.70	0.25	0.00%	0.100
120B	33.86	0.053	40	15.77%	0.17			0.00%	
			41	84.23%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
120C	3.43	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.100
120D	44.03	0.069	40	74.99%	0.17			0.00%	
			61	25.01%	0.15			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.132
120E	11.61	0.018	40	42.81%	0.17			0.00%	
			61	57.19%	0.15			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.050
120F	13.76	0.022	40	46.88%	0.17			0.00%	
			63	53.13%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.00	0.25	13.28%	0.050
120G	23.45	0.037	63	68.91%	0.14			25.00%	
			96	31.09%	0.07			0.00%	
			TOTAL	100.00%	0.11	6.80	0.17	17.23%	0.150
120H	3.47	0.005	40	49.57%	0.17			0.00%	
			61	50.43%	0.15			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.085
120I	4.61	0.007	40	77.22%	0.17			0.00%	
			61	22.78%	0.15			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
120J	3.60	0.006	40	100.00%	0.17	5.70	0.25	0.00%	0.100
120K	21.51	0.034	40	100.00%	0.17	5.70	0.25	0.00%	0.150
120L	23.22	0.036	63	56.63%	0.14			25.00%	
			96	43.37%	0.07			0.00%	
			TOTAL	100.00%	0.10	7.00	0.15	14.16%	0.150
120M	25.60	0.040	40	69.53%	0.17			0.00%	
			63	30.47%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	76.20%	0.100

C.2 Green-Ampt Parameters - Cereus Wash (120)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
120N	28.26	0.044	40	23.50%	0.17			0.00%	
			63	24.20%	0.14			25.00%	
			96	52.30%	0.07			0.00%	
			TOTAL	100.00%	0.10	7.00	0.15	6.05%	0.136
120O	5.06	0.008	40	100.00%	0.17	5.70	0.25	0.00%	0.100
120P	18.04	0.028	40	100.00%	0.17	5.70	0.25	0.00%	0.150
120Q	22.46	0.035	40	8.86%	0.17			0.00%	
			61	38.74%	0.15			0.00%	
			96	52.40%	0.07			0.00%	
			TOTAL	100.00%	0.10	7.00	0.15	0.00%	0.138
120R	7.69	0.012	61	100.00%	0.15	6.00	0.25	0.00%	0.140
120S	4.23	0.007	40	5.20%	0.17			0.00%	
			96	94.80%	0.07			0.00%	
			TOTAL	100.00%	0.07	8.00	0.15	0.00%	0.054
120T	1.27	0.002	61	7.87%	0.15			0.00%	
			96	92.13%	0.07			0.00%	
			TOTAL	100.00%	0.07	8.00	0.15	0.00%	0.150
120U	12.06	0.019	61	56.97%	0.15			0.00%	
			96	43.03%	0.07			0.00%	
			TOTAL	100.00%	0.11	6.80	0.17	0.00%	0.011
120V	6.43	0.010	61	75.27%	0.15			0.00%	
			96	24.73%	0.07			0.00%	
			TOTAL	100.00%	0.12	6.60	0.19	0.00%	0.150
120W	3.51	0.005	61	100.00%	0.15	6.00	0.25	0.00%	0.147
120X	10.49	0.016	61	24.88%	0.15			0.00%	
			96	75.12%	0.07			0.00%	
			TOTAL	100.00%	0.08	7.60	0.15	0.00%	0.117
121A	31.85	0.050	61	100.00%	0.15	6.00	0.25	0.00%	0.150
121B	12.67	0.020	61	100.00%	0.15	6.00	0.25	0.00%	0.150
122A	13.00	0.020	61	100.00%	0.15	6.00	0.25	0.00%	0.115
122B	21.68	0.034	61	100.00%	0.15	6.00	0.25	0.00%	0.110
122C	9.22	0.014	61	56.18%	0.15			0.00%	
			63	43.82%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.00	0.25	10.95%	0.150
122D	20.47	0.032	61	100.00%	0.15	6.00	0.25	0.00%	0.150

C.2 Green-Ampt Parameters - Cereus Wash (120)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
122E	20.48	0.032	61	57.67%	0.15			0.00%	
			63	42.33%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.00	0.25	10.58%	0.144
122F	6.56	0.010	61	18.29%	0.15			0.00%	
			63	81.71%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.20	0.23	20.43%	0.150
122G	14.09	0.022	61	100.00%	0.15	6.00	0.25	0.00%	0.100
122H	3.94	0.006	61	100.00%	0.15	6.00	0.25	0.00%	0.150
122I	4.79	0.007	61	100.00%	0.15	6.00	0.25	0.00%	0.150
122J	15.83	0.025	61	100.00%	0.15	6.00	0.25	0.00%	0.150
122K	2.16	0.003	61	86.11%	0.15			0.00%	
			96	13.89%	0.07			0.00%	
			TOTAL	100.00%	0.13	6.40	0.21	0.00%	0.134
123A	47.98	0.075	40	100.00%	0.17	5.70	0.25	0.00%	0.150
123B	11.89	0.019	40	100.00%	0.17	5.70	0.25	0.00%	0.150
123C	2.19	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.150
123D	6.49	0.010	40	100.00%	0.17	5.70	0.25	0.00%	0.100
124A	45.33	0.071	61	16.68%	0.15			0.00%	
			63	11.27%	0.14			25.00%	
			72	72.05%	0.09			30.00%	
			TOTAL	100.00%	0.10	7.00	0.15	24.43%	0.150
124B	27.36	0.043	61	16.26%	0.15			0.00%	
			63	31.98%	0.14			25.00%	
			72	51.75%	0.09			30.00%	
			TOTAL	100.00%	0.11	6.80	0.17	23.52%	0.150
124C	12.92	0.020	61	28.79%	0.15			0.00%	
			63	71.21%	0.14			25.00%	
			TOTAL	100.00%	0.14	6.20	0.23	17.80%	0.150
124D	5.77	0.009	61	36.05%	0.15			0.00%	
			63	63.95%	0.14			25.00%	
			TOTAL	100.00%	0.14	6.20	0.23	15.99%	0.150
124E	32.74	0.051	61	10.17%	0.15			0.00%	
			63	83.57%	0.14			25.00%	
			96	6.26%	0.07			0.00%	
			TOTAL	100.00%	0.13	6.40	0.21	20.89%	0.150
125A	49.55	0.077	72	100.00%	0.09	7.30	0.15	30.00%	0.150

C.2 Green-Ampt Parameters - Cereus Wash (120)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
125B	72.25	0.113	63	5.90%	0.14			25.00%	
			72	94.10%	0.09			30.00%	
			TOTAL	100.00%	0.09	7.30	0.15	29.71%	0.150
125C	19.24	0.030	63	10.24%	0.14			25.00%	
			72	89.76%	0.09			30.00%	
			TOTAL	100.00%	0.09	7.30	0.15	29.49%	0.150
125D	11.33	0.018	63	81.73%	0.14			25.00%	
			72	18.27%	0.09			30.00%	
			TOTAL	100.00%	0.13	6.40	0.21	25.91%	0.100
125E	29.86	0.047	63	100.00%	0.14	6.20	0.23	25.00%	0.150
126A	4.19	0.007	41	100.00%	0.17	5.70	0.25	0.00%	0.100
126B	13.34	0.021	41	100.00%	0.17	5.70	0.25	0.00%	0.100
126C	90.75	0.142	41	100.00%	0.17	5.70	0.32	0.00%	0.140
126D	18.16	0.028	41	100.00%	0.17	5.70	0.25	0.00%	0.146
126E	57.87	0.090	41	27.06%	0.17			0.00%	
			72	72.94%	0.09			30.00%	
			TOTAL	100.00%	0.11	6.80	0.36	21.88%	0.150
126F	35.21	0.055	72	100.00%	0.09	7.30	0.33	30.00%	0.150
126G	86.87	0.136	41	38.67%	0.17			0.00%	
			72	61.33%	0.09			30.00%	
			TOTAL	100.00%	0.12	6.60	0.24	18.40%	0.150
126H	12.74	0.020	41	100.00%	0.17	5.70	0.25	0.00%	0.127
126I	52.28	0.082	41	47.97%	0.17			0.00%	
			72	52.03%	0.09			30.00%	
			TOTAL	100.00%	0.12	6.60	0.19	15.61%	0.133
126J	1.59	0.002	41	100.00%	0.17	5.70	0.25	0.00%	0.100
126K	7.60	0.012	40	9.47%	0.17			0.00%	
			41	90.53%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.100
126L	15.01	0.023	40	3.13%	0.17			0.00%	
			61	75.08%	0.15			0.00%	
			72	21.79%	0.09			30.00%	
			TOTAL	100.00%	0.13	6.40	0.21	6.54%	0.150

C.2 Green-Ampt Parameters - Cereus Wash (120)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
126M	16.25	0.025	40	35.57%	0.17			0.00%	
			41	13.29%	0.17			0.00%	
			61	30.28%	0.15			0.00%	
			72	20.86%	0.09			30.00%	
			TOTAL	100.00%	0.14	6.20	0.23	6.26%	0.144
126N	49.06	0.077	40	28.80%	0.17			0.00%	
			61	19.12%	0.15			0.00%	
			63	35.08%	0.14			25.00%	
			72	17.00%	0.09			30.00%	
			TOTAL	100.00%	0.14	6.20	0.23	13.87%	0.150
127A	18.22	0.028	41	100.00%	0.17	5.70	0.25	0.00%	0.150
127B	24.85	0.039	41	85.59%	0.17			0.00%	
			61	14.41%	0.15			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.100
127C	27.06	0.042	41	26.64%	0.17			0.00%	
			72	73.36%	0.09			30.00%	
			TOTAL	100.00%	0.11	6.80	0.17	22.01%	0.150
127D	15.51	0.024	40	0.90%	0.17			0.00%	
			41	56.03%	0.17			0.00%	
			61	43.07%	0.15			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.150
127E	66.11	0.103	40	34.53%	0.17			0.00%	
			61	4.22%	0.15			0.00%	
			72	61.25%	0.09			30.00%	
			TOTAL	100.00%	0.11	6.80	0.20	18.37%	0.150
127F	93.91	0.147	72	100.00%	0.09	7.30	0.23	30.00%	0.150
127G	36.34	0.057	61	30.02%	0.15			0.00%	
			72	69.98%	0.09			30.00%	
			TOTAL	100.00%	0.10	7.00	0.15	20.99%	0.150
127H	11.26	0.018	40	14.74%	0.17			0.00%	
			72	85.26%	0.09			30.00%	
			TOTAL	100.00%	0.10	7.00	0.15	25.58%	0.150
127I	6.59	0.010	40	20.49%	0.17			0.00%	
			61	79.51%	0.15			0.00%	
			TOTAL	100.00%	0.15	6.00	0.25	0.00%	0.100

C.3 Green-Ampt Parameters - Cyprus Point Wash (130)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
127J	20.56	0.032	40	37.01%	0.17			0.00%	
			72	62.99%	0.09			30.00%	
			TOTAL	100.00%	0.11	6.80	0.17	18.90%	0.100

C.3 Green-Ampt Parameters - Cyprus Point Wash (130)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
130A	4.94	0.008	40	100.00%	0.17	5.70	0.25	0.00%	0.062
130B	20.07	0.031	40	100.00%	0.17	5.70	0.25	0.00%	0.150
130C	2.99	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
130D	2.60	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.100
130E	2.86	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.050
130F	24.94	0.039	40	100.00%	0.17	5.70	0.25	0.00%	0.130
130G	7.27	0.011	40	75.79%	0.17			0.00%	
			93	24.21%	0.33			0.00%	
			TOTAL	100.00%	0.20	5.30	0.25	0.00%	0.150
131A	31.50	0.049	40	100.00%	0.17	5.70	0.25	0.00%	0.121

C.4 Green-Ampt Parameters - Jacklin Wash (150)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
150A	6.23	0.010	40	65.01%	0.17			0.00%	
			61	34.99%	0.15			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.096
150B	2.22	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.100
150C	14.34	0.022	40	99.02%	0.17			0.00%	
			61	0.98%	0.15			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
150D	35.09	0.055	40	100.00%	0.17	5.70	0.25	0.00%	0.132
150E	12.78	0.020	40	100.00%	0.17	5.70	0.25	0.00%	0.150
150F	2.87	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.150
150G	3.49	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
150H	20.66	0.032	40	100.00%	0.17	5.70	0.25	0.00%	0.150
150I	75.18	0.117	40	100.00%	0.17	5.70	0.25	0.00%	0.162
150J	6.67	0.010	40	100.00%	0.17	5.70	0.25	0.00%	0.050
150K	5.88	0.009	40	100.00%	0.17	5.70	0.25	0.00%	0.100
150L	6.67	0.010	40	100.00%	0.17	5.70	0.25	0.00%	0.200
150M	14.98	0.023	40	61.62%	0.17			0.00%	
			93	38.38%	0.33			0.00%	
			TOTAL	100.00%	0.22	5.10	0.25	0.00%	0.200
150N	0.58	0.001	40	93.10%	0.17			0.00%	
			93	6.90%	0.33			0.00%	
			TOTAL	100.00%	0.18	5.60	0.25	0.00%	0.050
150O	2.83	0.004	93	100.00%	0.33	4.35	0.25	0.00%	0.050
150P	0.83	0.001	40	42.17%	0.17			0.00%	
			93	57.83%	0.33			0.00%	
			TOTAL	100.00%	0.25	4.80	0.25	0.00%	0.250
151A	1.82	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.050
151B	3.37	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
151C	3.48	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
151D	24.79	0.039	40	100.00%	0.17	5.70	0.25	0.00%	0.147
151E	42.44	0.066	40	100.00%	0.17	5.70	0.25	0.00%	0.150
151F	1.98	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.050
151G	1.75	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.100
151H	3.43	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
151I	4.11	0.006	40	100.00%	0.17	5.70	0.25	0.00%	0.050

C.4 Green-Ampt Parameters - Jacklin Wash (150)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
151J	2.20	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.064
151K	20.91	0.033	40	100.00%	0.17	5.70	0.25	0.00%	0.100
151L	33.57	0.052	40	100.00%	0.17	5.70	0.25	0.00%	0.063
152A	25.37	0.040	40	100.00%	0.17	5.70	0.25	0.00%	0.150
152B	10.02	0.016	40	100.00%	0.17	5.70	0.25	0.00%	0.150
152C	8.45	0.013	40	100.00%	0.17	5.70	0.25	0.00%	0.150
152D	11.56	0.018	40	100.00%	0.17	5.70	0.25	0.00%	0.150
152E	11.20	0.018	40	100.00%	0.17	5.70	0.25	0.00%	0.198
152F	9.13	0.014	40	100.00%	0.17	5.70	0.25	0.00%	0.154

C.5 Green-Ampt Parameters - Emerald Wash (160)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
160A	this Sub-Basin is now part of the Cereus Wash Watershed (120)								
160B	4.44	0.007	41	100.00%	0.17	5.70	0.25	0.00%	0.100
160C	10.35	0.016	40	45.51%	0.17			0.00%	
			41	54.49%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.100
160D	26.37	0.041	40	86.58%	0.17			0.00%	
			41	13.42%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.102
160E	2.63	0.004	41	100.00%	0.17	5.70	0.25	0.00%	0.092
160F	11.46	0.018	40	71.47%	0.17			0.00%	
			41	28.53%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.100
160G	14.52	0.023	41	100.00%	0.17	5.70	0.25	0.00%	0.100
160H	13.07	0.020	41	100.00%	0.17	5.70	0.25	0.00%	0.086
160I	3.49	0.005	41	100.00%	0.17	5.70	0.25	0.00%	0.085
160J	5.20	0.008	41	100.00%	0.17	5.70	0.25	0.00%	0.093
160K	17.75	0.028	41	54.65%	0.17			0.00%	
			63	45.35%	0.14			0.00%	
			TOTAL	100.00%	0.16	5.80	0.25	0.00%	0.150
160L	4.81	0.008	40	39.29%	0.17			0.00%	
			41	60.71%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.091
160M	37.90	0.059	40	64.46%	0.17			0.00%	
			41	7.73%	0.17			0.00%	
			63	27.81%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	6.95%	0.150
160N	13.97	0.022	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160O	41.67	0.065	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160P	14.52	0.023	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160Q	3.79	0.006	40	100.00%	0.17	5.70	0.25	0.00%	0.050
160R	33.63	0.053	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160S	6.83	0.011	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160T	5.65	0.009	40	100.00%	0.17	5.70	0.25	0.00%	0.100
160U	49.43	0.077	40	100.00%	0.17	5.70	0.25	0.00%	0.104
160V	2.89	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050

C.5 Green-Ampt Parameters - Emerald Wash (160)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
160W	1.26	0.002	40	100.00%	0.17	5.70	0.25	0.00%	0.050
160X	18.31	0.029	40	100.00%	0.17	5.70	0.25	0.00%	0.150
160Y	2.59	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.100
160Z	38.76	0.061	40	100.00%	0.17	5.70	0.25	0.00%	0.099
160AA	3.34	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.083

C.6 Green-Ampt Parameters - Malta Drain (160)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
170A	15.08	0.024	40	100.00%	0.17	5.70	0.25	0.00%	0.150
170B	2.24	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.050
170C	21.63	0.034	40	100.00%	0.17	5.70	0.25	0.00%	0.150
170D	4.54	0.007	40	100.00%	0.17	5.70	0.25	0.00%	0.050
170E	60.94	0.095	40	100.00%	0.17	5.70	0.25	0.00%	0.142
170F	11.46	0.018	40	100.00%	0.17	5.70	0.25	0.00%	0.092
170G	1.84	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.050
170H	5.98	0.009	40	100.00%	0.17	5.70	0.25	0.00%	0.114
170I-1	14.16	0.022	40	100.00%	0.17	5.70	0.25	0.00%	0.075
170I-2	7.57	0.012	40	100.00%	0.17	5.70	0.25	0.00%	0.050
170I-3	3.91	0.006	40	100.00%	0.17	5.70	0.25	0.00%	0.066

C.7 Green-Ampt Parameters - Colony Wash (180)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
180A	15.92	0.025	40	95.79%	0.17			0.00%	
			41	4.21%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
180B	18.50	0.029	40	31.84%	0.17			0.00%	
			41	68.16%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.067
180C	6.55	0.010	40	29.01%	0.17			0.00%	
			41	70.99%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.098
180D	2.09	0.003	40	100.00%	0.17	5.70	0.25	0.00%	0.064
180E	11.91	0.019	40	100.00%	0.17	5.70	0.25	0.00%	0.100
180F	47.27	0.074	40	91.26%	0.17			0.00%	
			41	8.74%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
180G	18.67	0.029	40	100.00%	0.17	5.70	0.25	0.00%	0.150
180H	13.39	0.021	40	100.00%	0.17	5.70	0.25	0.00%	0.150
180I	2.30	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.050
180J	21.81	0.034	40	100.00%	0.17	5.70	0.25	0.00%	0.100
180K	18.54	0.029	40	100.00%	0.17	5.70	0.25	0.00%	0.050
180L	8.00	0.013	40	100.00%	0.17	5.70	0.25	0.00%	0.061
180M	3.14	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
180N	26.20	0.041	40	100.00%	0.17	5.70	0.25	0.00%	0.142
180O	12.08	0.019	40	100.00%	0.17	5.70	0.25	0.00%	0.080
180P	6.82	0.011	6	7.77%	0.62			0.00%	
			40	92.23%	0.17			0.00%	
			TOTAL	100.00%	0.19	5.40	0.25	0.00%	0.092
180Q	20.22	0.032	40	85.61%	0.17			0.00%	
			93	14.39%	0.33			0.00%	
			TOTAL	100.00%	0.19	5.40	0.25	0.00%	0.107
180R	17.38	0.027	40	40.56%	0.17			0.00%	
			93	59.44%	0.33			0.00%	
			TOTAL	100.00%	0.25	4.80	0.25	0.00%	0.150
180S	22.24	0.035	6	3.33%	0.62			0.00%	
			40	96.67%	0.17			0.00%	
			TOTAL	100.00%	0.18	5.60	0.25	0.00%	0.052

C.7 Green-Ampt Parameters - Colony Wash (180)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
180T	14.56	0.023	40	52.40%	0.17			0.00%	
			93	41.60%	0.33			0.00%	
			TOTAL	100.00%	0.23	5.00	0.25	0.00%	0.100
180U	12.40	0.019	40	12.10%	0.17			0.00%	
			93	0.2524	0.33			0.00%	
			6	62.66%	0.62			0.00%	
			TOTAL	100.00%	0.45	3.81	0.25	0.00%	0.145
181A	50.62	0.079	40	100.00%	0.17	5.70	0.25	0.00%	0.144
181B	13.77	0.022	6	10.82%	0.62			0.00%	
			40	89.18%	0.17			0.00%	
			TOTAL	100.00%	0.20	5.30	0.25	0.00%	0.063
182A	32.23	0.050	40	100.00%	0.17	5.70	0.25	0.00%	0.150
182B	24.78	0.039	40	100.00%	0.17	5.70	0.25	0.00%	0.095
182C	14.26	0.022	40	100.00%	0.17	5.70	0.25	0.00%	0.078
182D	60.37	0.094	40	100.00%	0.17	5.70	0.25	0.00%	0.100
182E	40.90	0.064	40	100.00%	0.17	5.70	0.25	0.00%	0.091
182F	9.62	0.015	40	100.00%	0.17	5.70	0.25	0.00%	0.050
182G	30.85	0.048	40	100.00%	0.17	5.70	0.25	0.00%	0.061
182H	this Sub-Basin is now part of the Panorama Channel Watershed (190)								
182I	25.58	0.040	40	95.93%	0.17			0.00%	
			41	4.07%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.070
182J	9.53	0.015	40	100.00%	0.17	5.70	0.25	0.00%	0.134
182K	15.33	0.024	40	100.00%	0.17	5.70	0.25	0.00%	0.093
182L	3.34	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.111
183A	27.76	0.043	40	100.00%	0.17	5.70	0.25	0.00%	0.150
183B	26.16	0.041	40	100.00%	0.17	5.70	0.25	0.00%	0.150
183C 183D 183E	these Sub-Basins are now part of the Fountain Hills North Study								
183F	31.32	0.049	40	100.00%	0.17	5.70	0.25	0.00%	0.150
183G	59.32	0.093	40	100.00%	0.17	5.70	0.25	0.00%	0.150
183H	11.54	0.018	40	100.00%	0.17	5.70	0.25	0.00%	0.150
183I	36.70	0.057	40	100.00%	0.17	5.70	0.25	0.00%	0.100
183J	3.19	0.005	40	100.00%	0.17	5.70	0.25	0.00%	0.050
183K	1.21	0.002	40	100.00%	0.17	5.70	0.25	0.00%	0.050

C.7 Green-Ampt Parameters - Colony Wash (180)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
184A	12.34	0.019	41	100.00%	0.17	5.70	0.25	0.00%	0.051
184B	14.97	0.023	41	100.00%	0.17	5.70	0.25	0.00%	0.099
184C	8.70	0.014	40	81.84%	0.17			0.00%	
			41	18.16%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.097
184D	4.77	0.007	40	85.12%	0.17			0.00%	
			41	14.88%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.050
184E	69.68	0.109	40	8.50%	0.17			0.00%	
			41	91.50%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.148
184F	4.39	0.007	40	94.08%	0.17			0.00%	
			41	5.92%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.050
184G	34.08	0.053	40	31.63%	0.17			0.00%	
			41	68.37%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
184H	7.64	0.012	40	100.00%	0.17	5.70	0.25	0.00%	0.100
184I	20.14	0.031	40	100.00%	0.17	5.70	0.25	0.00%	0.150
184J	5.19	0.008	40	100.00%	0.17	5.70	0.25	0.00%	0.150
184K	2.29	0.004	40	100.00%	0.17	5.70	0.25	0.00%	0.150
185A	26.09	0.041	41	100.00%	0.17	5.70	0.25	0.00%	0.100
185B	52.04	0.081	40	16.06%	0.17			0.00%	
			41	83.94%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
186A	63.10	0.099	41	100.00%	0.17	5.70	0.25	0.00%	0.142
186B	3.18	0.005	41	100.00%	0.17	5.70	0.25	0.00%	0.149
186C	10.80	0.017	41	100.00%	0.17	5.70	0.25	0.00%	0.081
186D	51.74	0.081	41	58.06%	0.17			0.00%	
			63	41.94%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	10.49%	0.150
186E	22.94	0.036	41	100.00%	0.17	5.70	0.25	0.00%	0.144
186F	18.35	0.029	41	78.15%	0.17			0.00%	
			63	21.85%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	5.46%	0.150
186G	42.45	0.066	41	100.00%	0.17	5.70	0.25	0.00%	0.150

C.7 Green-Ampt Parameters - Colony Wash (180)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
186H	15.82	0.025	41	87.04%	0.17			0.00%	
			63	12.96%	0.14			25.00%	
			TOTAL	100.00%	0.17	5.70	0.25	3.24%	0.050
186I	18.37	0.029	40	7.57%	0.17			0.00%	
			41	92.43%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
187A	5.54	0.009	41	55.23%	0.17			0.00%	
			63	44.77%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	11.19%	0.150
187B	5.19	0.008	41	72.83%	0.17			0.00%	
			63	27.17%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	6.79%	0.150
187C	7.60	0.012	41	100.00%	0.17	5.70	0.25	0.00%	0.150
187D	45.11	0.070	41	99.29%	0.17			0.00%	
			63	0.71%	0.14			25.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.18%	0.150
187E	3.32	0.005	41	100.00%	0.17	5.70	0.25	0.00%	0.050
187F	2.13	0.003	41	100.00%	0.17	5.70	0.25	0.00%	0.050
187G	27.24	0.043	41	100.00%	0.17	5.70	0.25	0.00%	0.100
187H	2.81	0.004	41	100.00%	0.17	5.70	0.25	0.00%	0.150
187I	15.30	0.024	40	11.31%	0.17			0.00%	
			41	88.69%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
188A	5.60	0.009	41	100.00%	0.17	5.70	0.25	0.00%	0.086
188B	42.50	0.066	41	33.39%	0.17			0.00%	
			63	66.61%	0.14			25.00%	
			TOTAL	100.00%	0.15	6.00	0.25	16.65%	0.149
188C	14.00	0.022	41	81.00%	0.17			0.00%	
			63	19.00%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	4.75%	0.145
188D	35.26	0.055	41	62.88%	0.17			0.00%	
			63	37.12%	0.14			25.00%	
			TOTAL	100.00%	0.16	5.80	0.25	9.28%	0.150
188E	33.26	0.052	41	97.20%	0.17			0.00%	
			63	28.00%	0.14			25.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.70%	0.136

C.8 Green-Ampt Parameters - Panorama Channel (190)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
188F	45.99	0.072	41	100.00%	0.17	5.70	0.25	0.00%	0.146
188G	0.87	0.001	41	100.00%	0.17	5.70	0.25	0.00%	0.150
182H	17.18	0.027	41	100.00%	0.17	5.70	0.25	0.00%	0.150
190A	11.95	0.019	41	100.00%	0.17	5.70	0.25	0.00%	0.150
190B	4.66	0.007	40	9.23%	0.17			0.00%	
			41	90.77%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
190C	13.86	0.022	40	5.92%	0.17			0.00%	
			41	94.08%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.150
190D	3.46	0.005	41	100.00%	0.17	5.70	0.25	0.00%	0.100
190E	2.14	0.003	41	100.00%	0.17	5.70	0.25	0.00%	0.050
190F	4.08	0.006	41	100.00%	0.17	5.70	0.25	0.00%	0.100
190G	4.14	0.006	41	100.00%	0.17	5.70	0.25	0.00%	0.100
190H	47.74	0.075	41	100.00%	0.17	5.70	0.25	0.00%	0.150
190I	7.45	0.012	40	48.46%	0.17			0.00%	
			41	51.54%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.105
190J	5.84	0.009	40	4.45%	0.17			0.00%	
			41	95.55%	0.17			0.00%	
			TOTAL	100.00%	0.17	5.70	0.25	0.00%	0.140
190K	5.20	0.008	41	100.00%	0.17	5.70	0.25	0.00%	0.150
190L	7.26	0.011	6	7.58%	0.62			0.00%	
			40	30.99%	0.17			0.00%	
			41	61.43%	0.17			0.00%	
			TOTAL	100.00%	0.19	5.40	0.25	0.00%	0.102
190M	5.69	0.009	6	30.58%	0.62			0.00%	
			40	51.67%	0.17			0.00%	
			93	17.75%	0.33			0.00%	
			TOTAL	100.00%	0.28	4.60	0.25	0.00%	0.116
190N	11.21	0.018	41	100.00%	0.17	5.70	0.25	0.00%	0.150
190O	3.72	0.006	6	11.02%	0.62			0.00%	
			40	14.25%	0.17			0.00%	
			93	74.73%	0.33			0.00%	
			TOTAL	100.00%	0.32	4.40	0.25	0.00%	0.050

C.8 Green-Ampt Parameters - Panorama Channel (190)

Sub-Area	Area (acres)	Area (sq. mi.)	Soil Type Number	Soil Type Percent	XKSAT (in/hr)	PSIF (in)	DTHETA (in)	ROCK (%)	IA (in)
190P	13.38	0.021	6	24.29%	0.62			0.00%	
			93	75.71%	0.33			0.00%	
			TOTAL	100.00%	0.38	4.10	0.25	0.00%	0.080
190Q	7.99	0.012	6	54.69%	0.62			0.00%	
			41	25.28%	0.17			0.00%	
			93	20.03%	0.33			0.00%	
			TOTAL	100.00%	0.39	4.00	0.25	0.00%	0.150
190R	9.69	0.015	6	8.26%	0.62			0.00%	
			41	91.74%	0.17			0.00%	
			TOTAL	100.00%	0.19	5.40	0.25	0.00%	0.150
190S	4.82	0.008	6	30.50%	0.62			0.00%	
			41	27.39%	0.17			0.00%	
			93	42.12%	0.33			0.00%	
			TOTAL	100.00%	0.33	4.35	0.25	0.00%	0.150
190T	82.42	0.129	6	1.61%	0.62			0.00%	
			41	98.22%	0.17			0.00%	
			93	0.17%	0.33			0.00%	
			TOTAL	100.00%	0.17	5.70	0.33	0.00%	0.150
190U	13.47	0.021	6	17.45%	0.62			0.00%	
			93	0.8255	0.33			0.00%	
			TOTAL	100.00%	0.37	4.15	0.25	0.00%	0.100
190V	11.73	0.018	6	38.36%	0.62			0.00%	
			41	38.53%	0.17			0.00%	
			93	23.10%	0.33			0.00%	
			TOTAL	100.00%	0.33	4.35	0.32	0.00%	0.150

APPENDIX D

SLOPE ADJUSTMENT FOR Tc CALCULATION

D.1

POWDER WASH

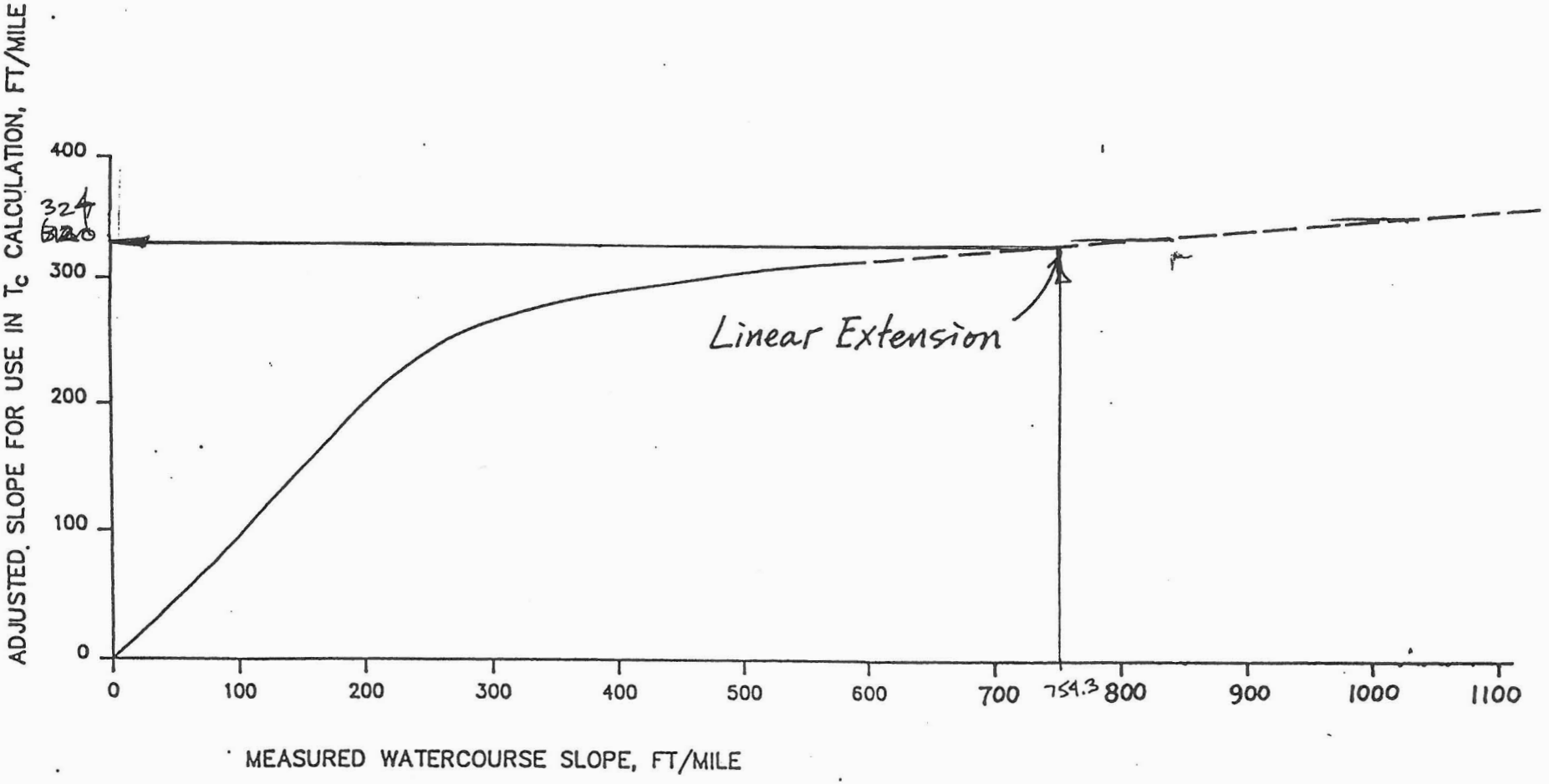


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash Basin

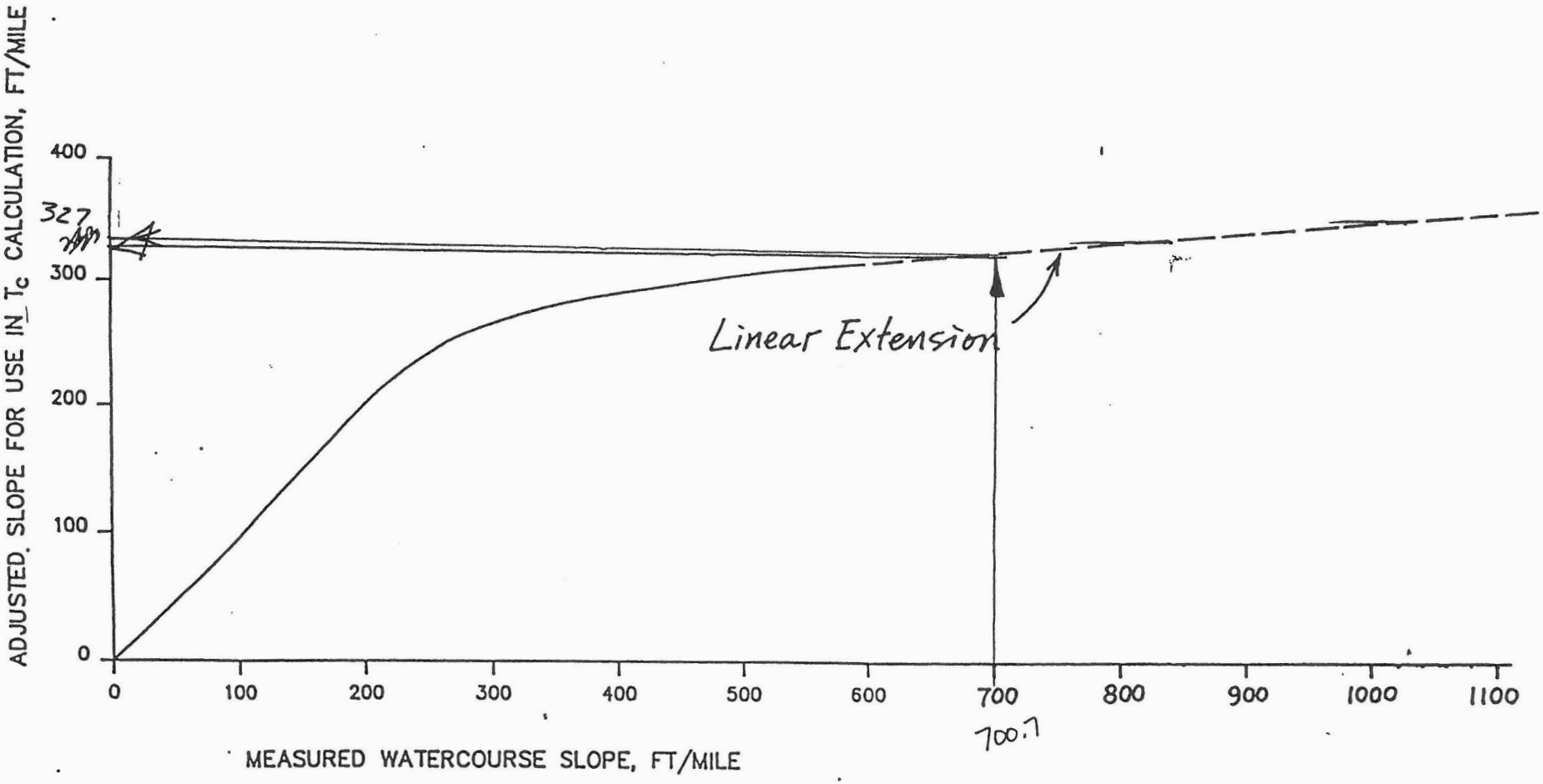


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash Basin 110B

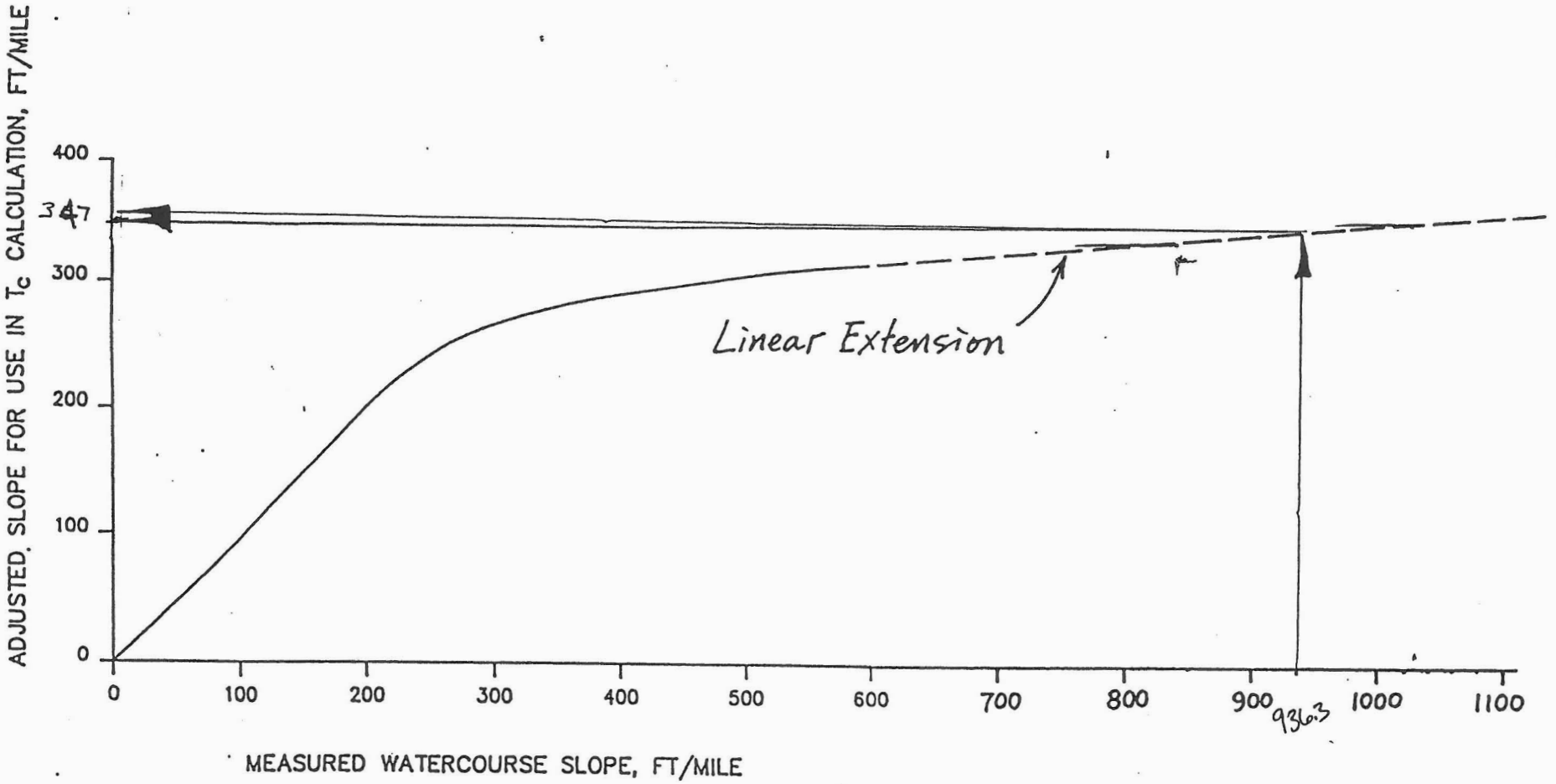


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash
Basin 110 C

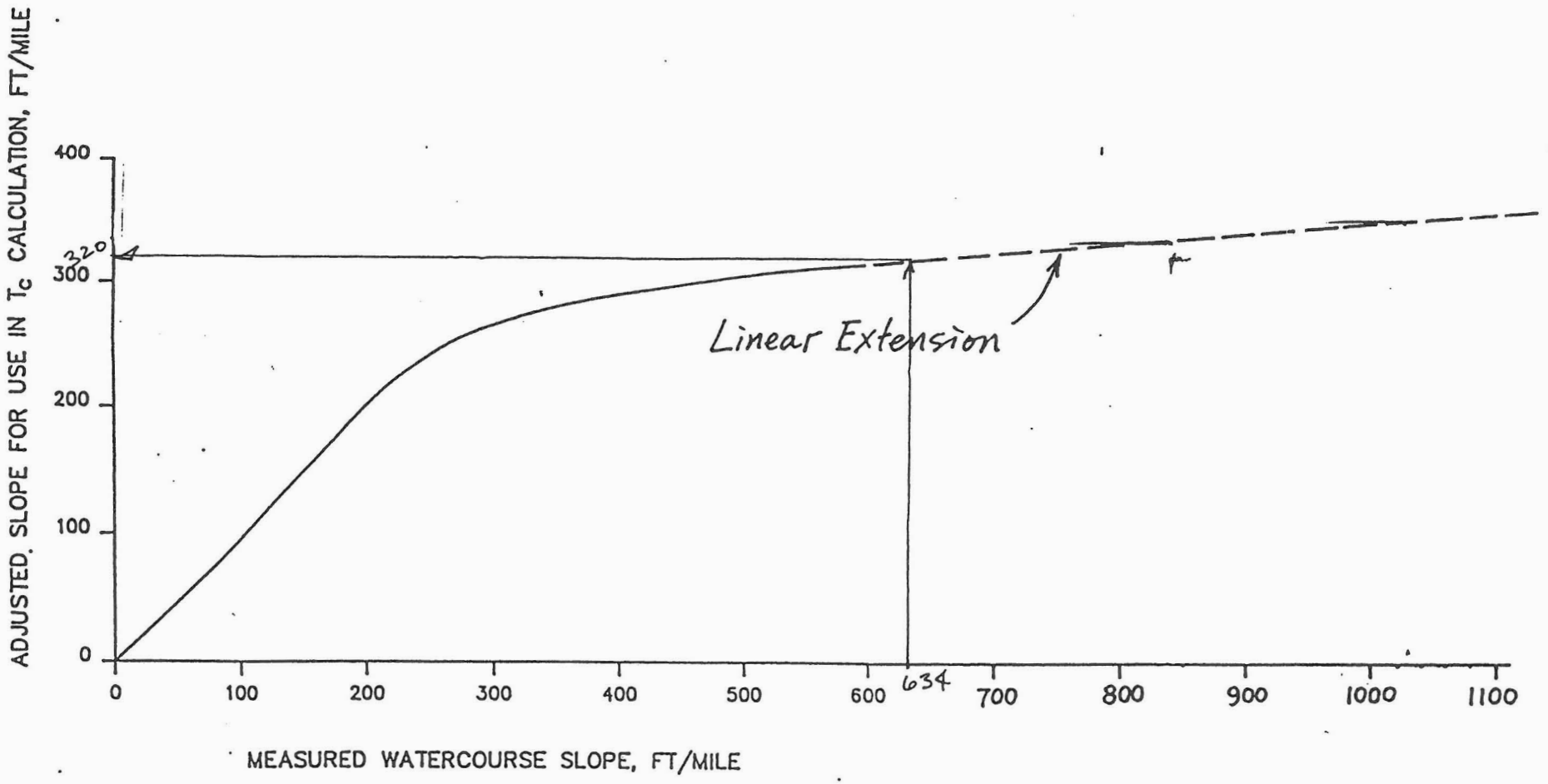


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash
Basin 110 D

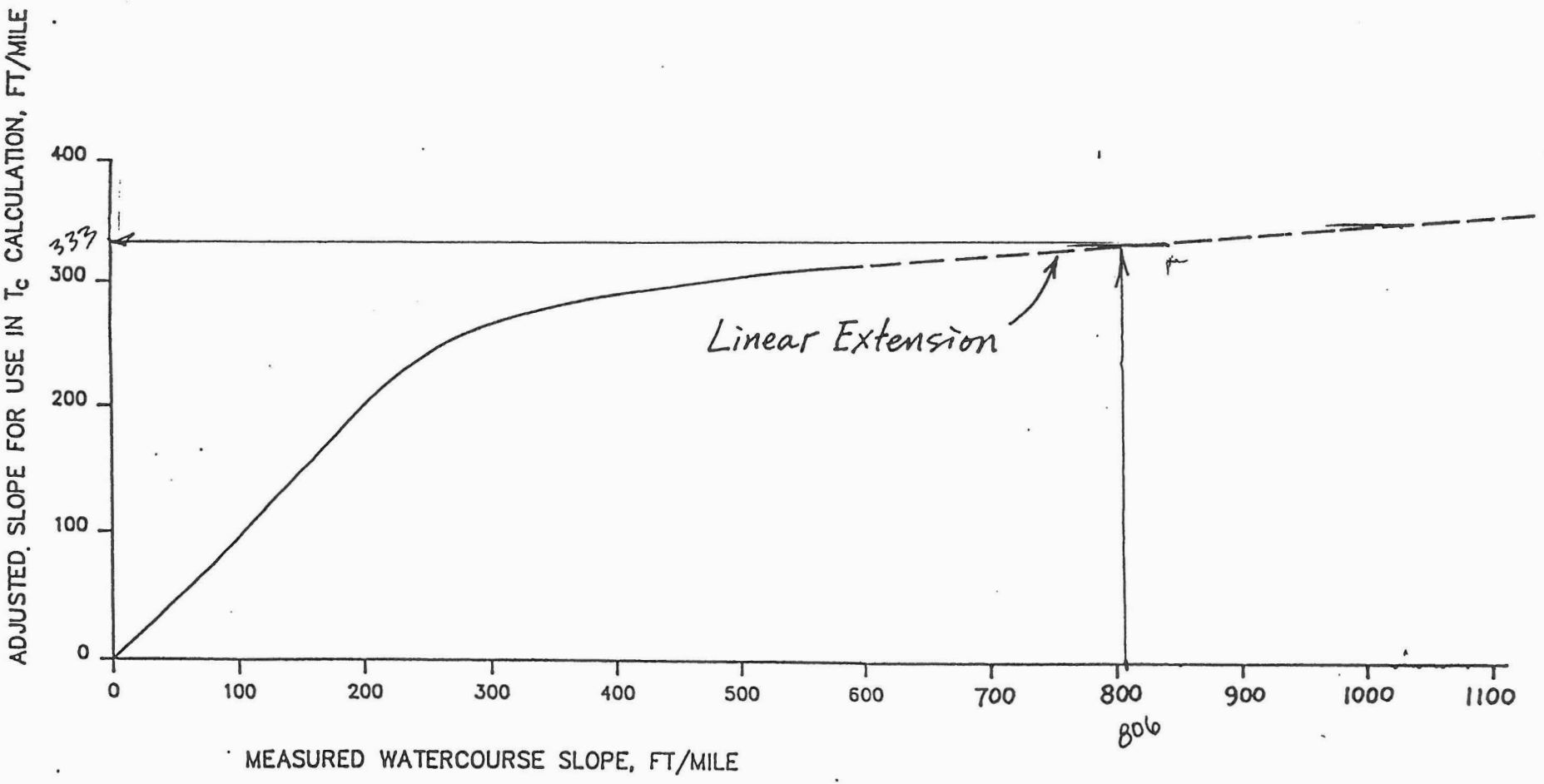


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

POWDER WASH
BASIN 110 E

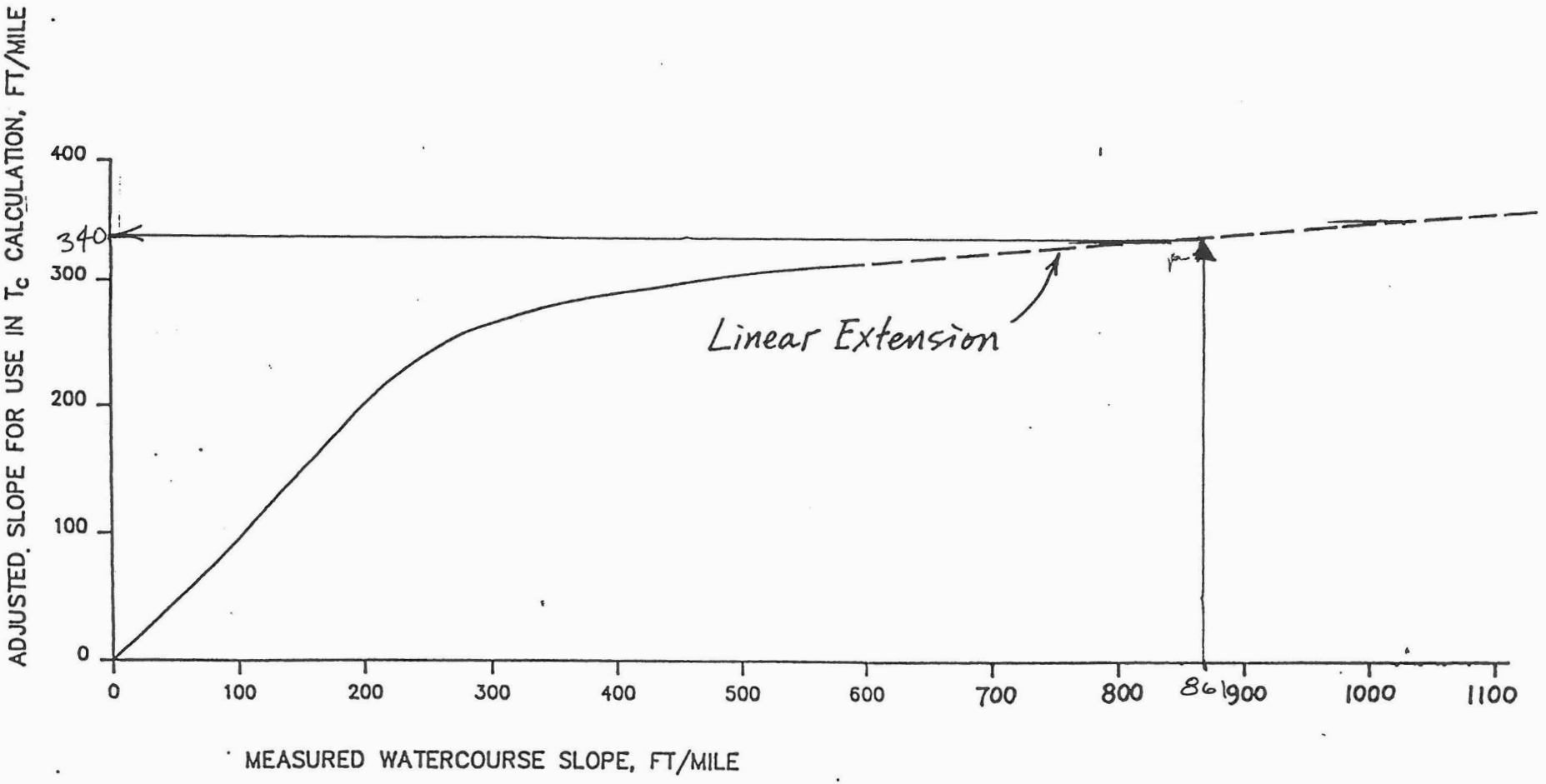


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash
Basin 110 F

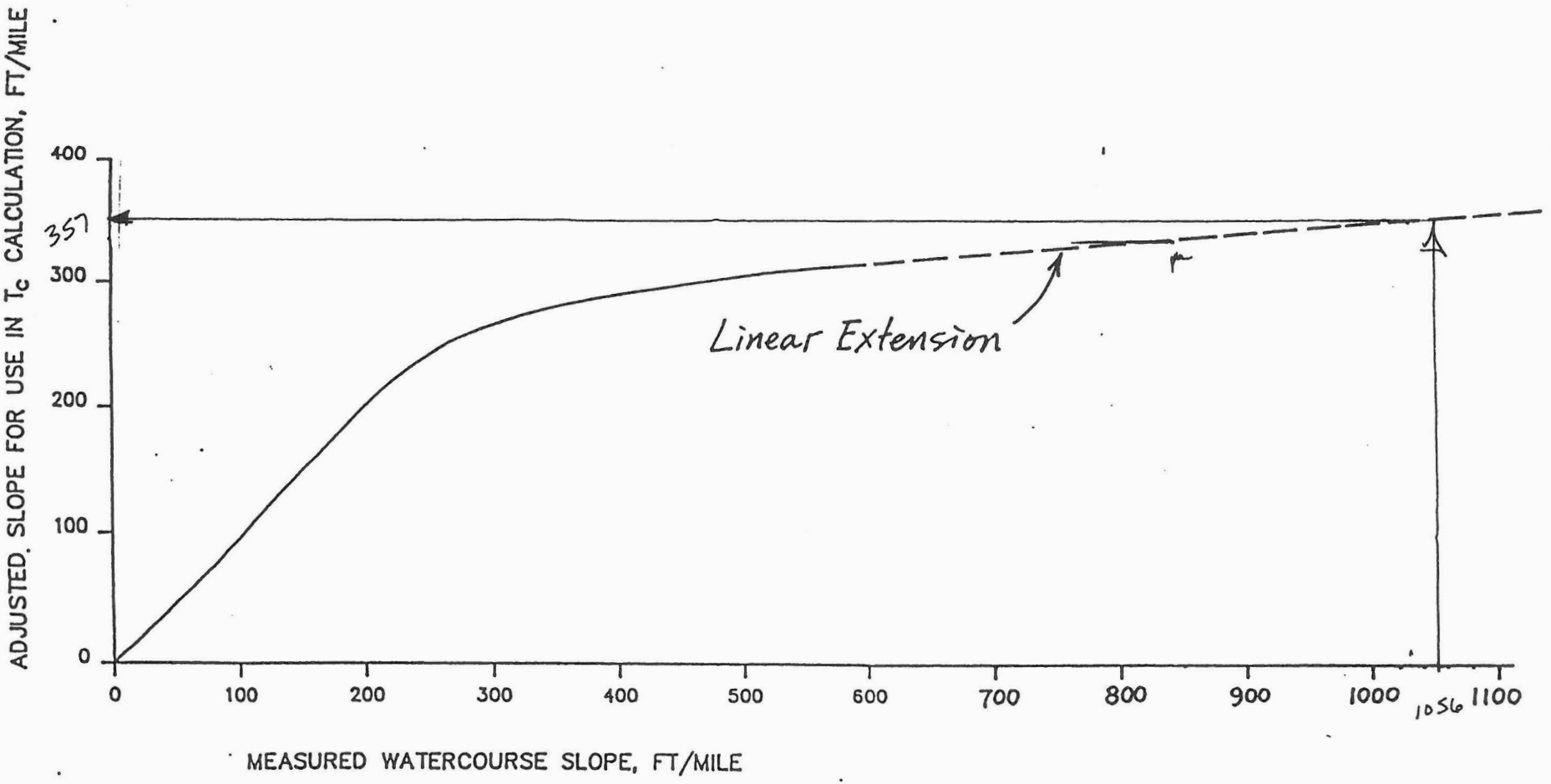


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

Powder Wash
Basin 110G

POWDER WASH WATERSHED
BASIN 110I
SLOPE: 275.9 FT/MI
ADJ. SLOPE: 254 FT/MI

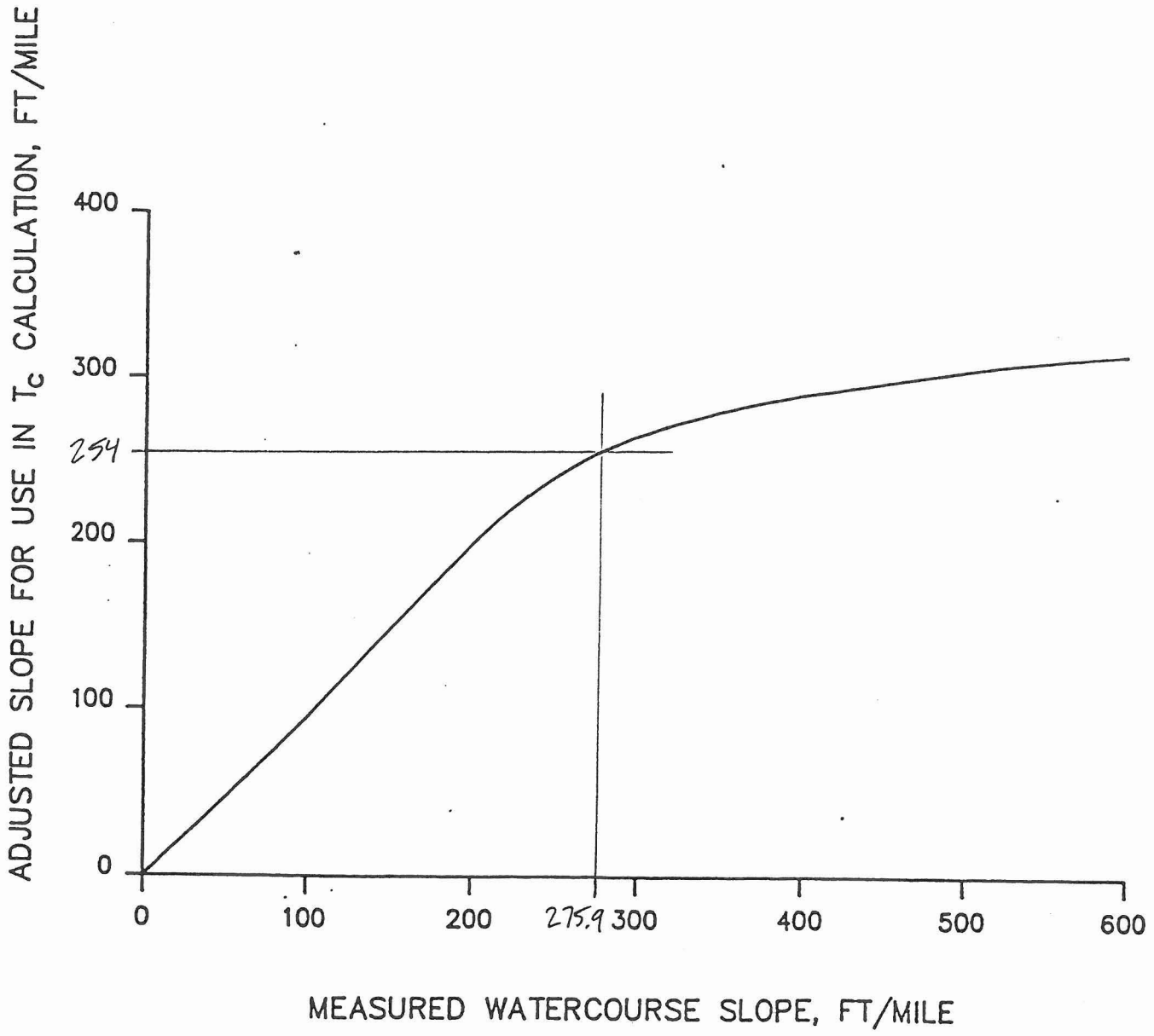


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

POWDER WASH WATERSHED
BASIN 110J
SLOPE: 416.4 FT/MI
ADJ. SLOPE: 290 FT/MI

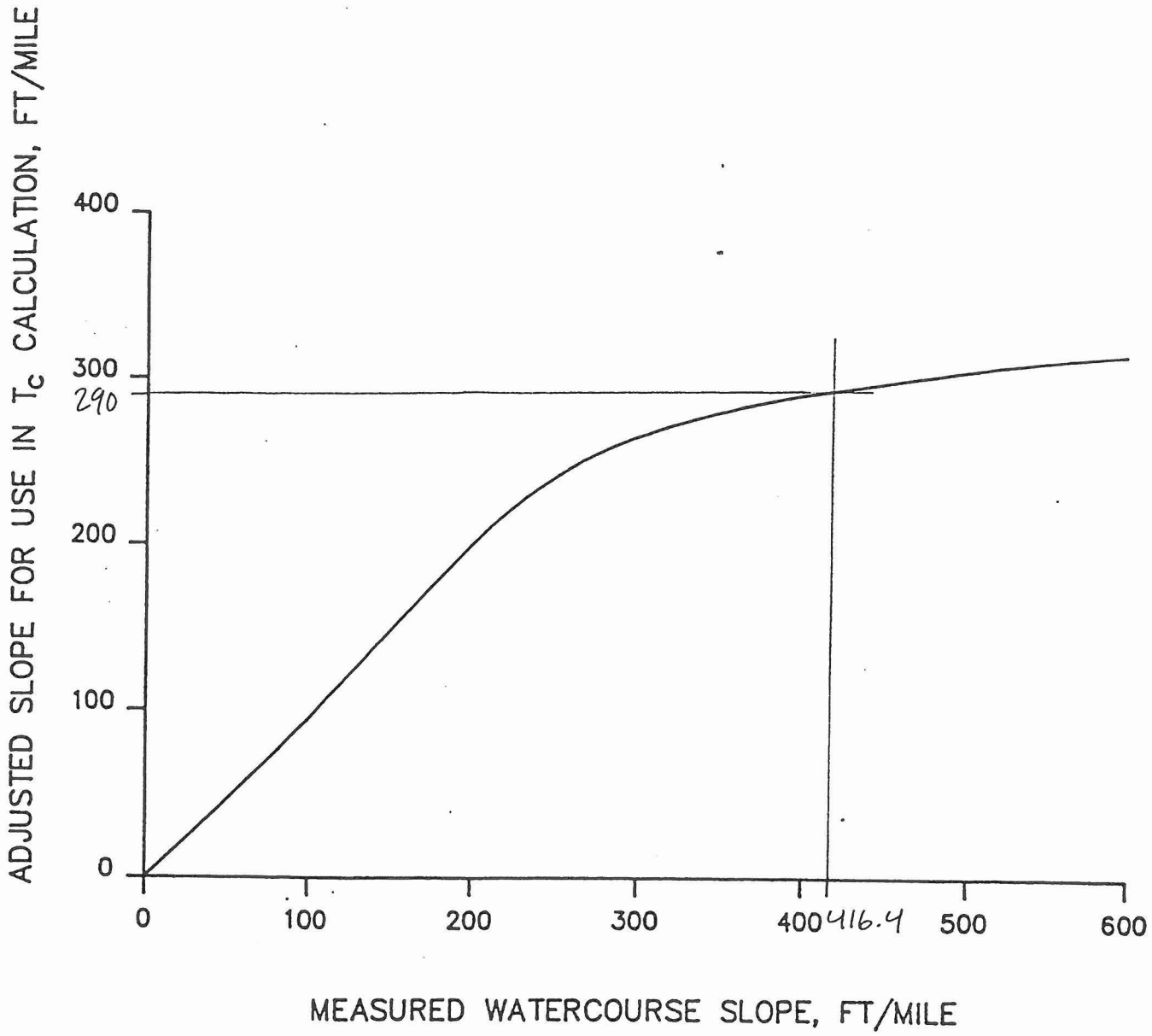


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

POWDER WASH WATERSHED
BASIN 110K
SLOPE: 562.8 FT/MI
ADJ. SLOPE: 308 FT/MI

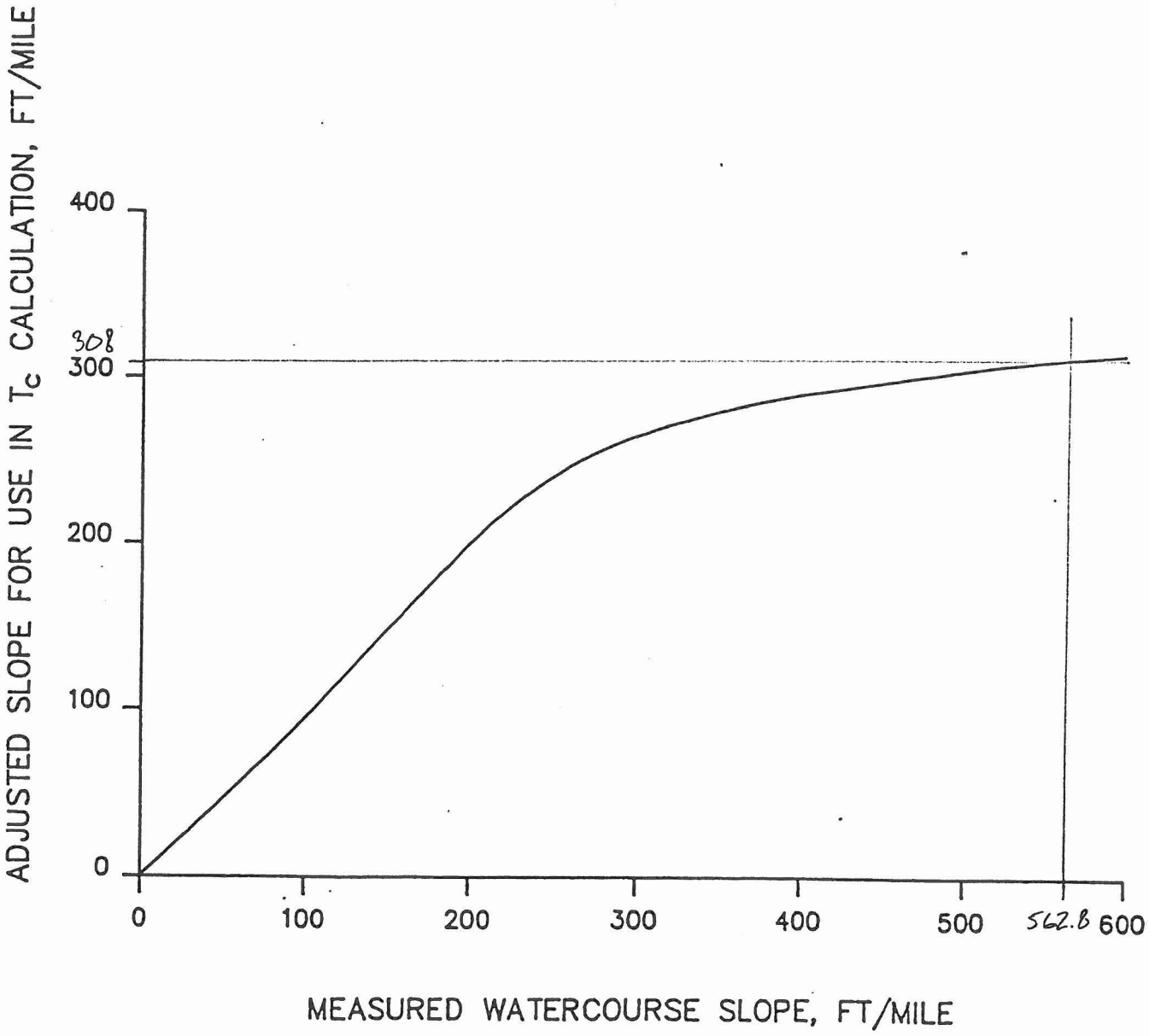


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

POWDER WASH WATERSHED
BASIN 110L
SLOPE: 440.0 FT/MI
ADJ. SLOPE: 294 FT/MI

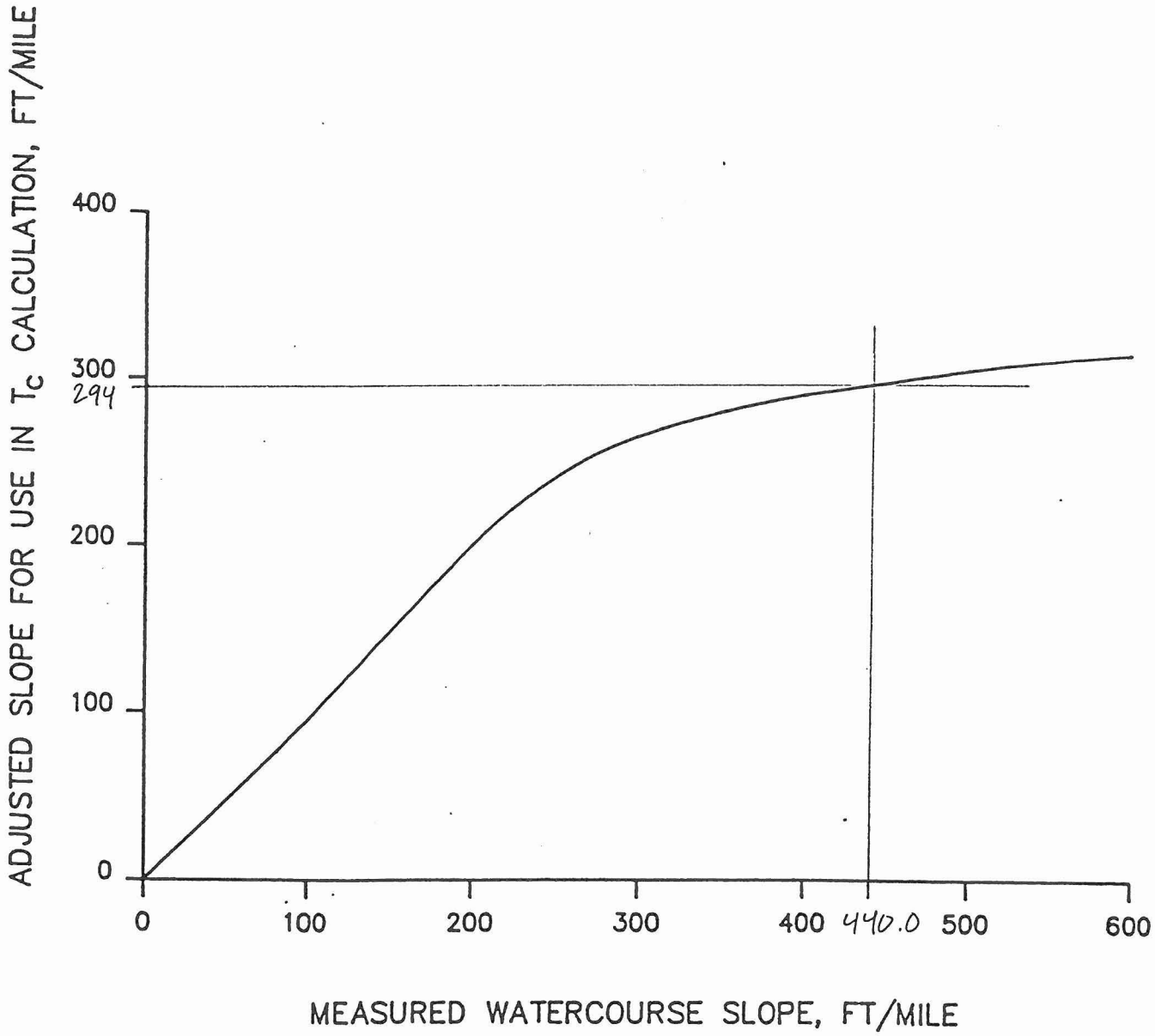


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

D.2

CEREUS WASH

CEREUS WASH WATERSHED
BASIN 120A
SLOPE: 258.4 FT/MI
ADJ. SLOPE: 245 FT/MI

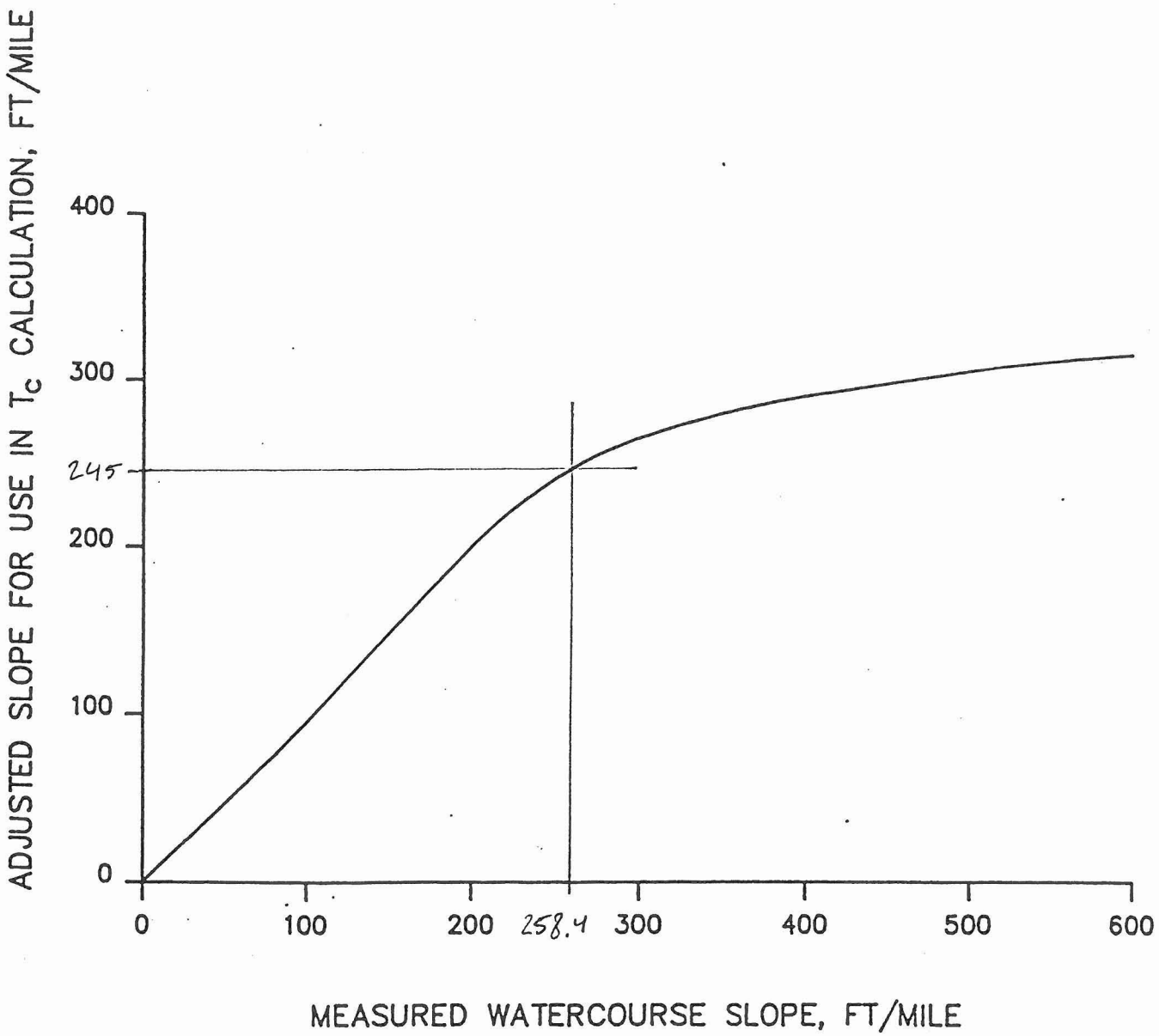


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 160A
SLOPE: 279.1 FT/MI
ADJ. SLOPE: 256 FT/MI

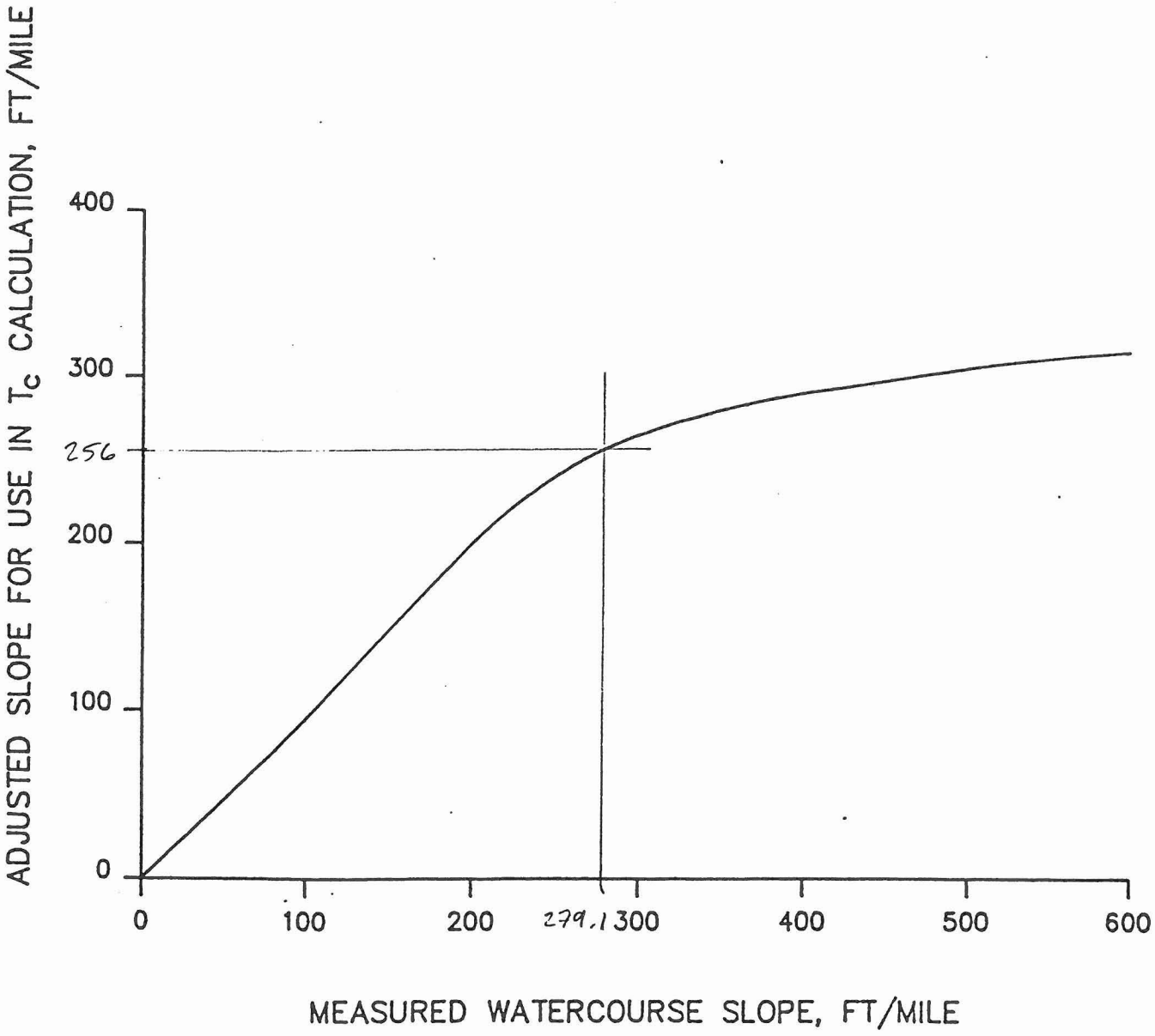


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120B
SLOPE: 277.3 FT/MI
ADJ. SLOPE: 255 FT/MI

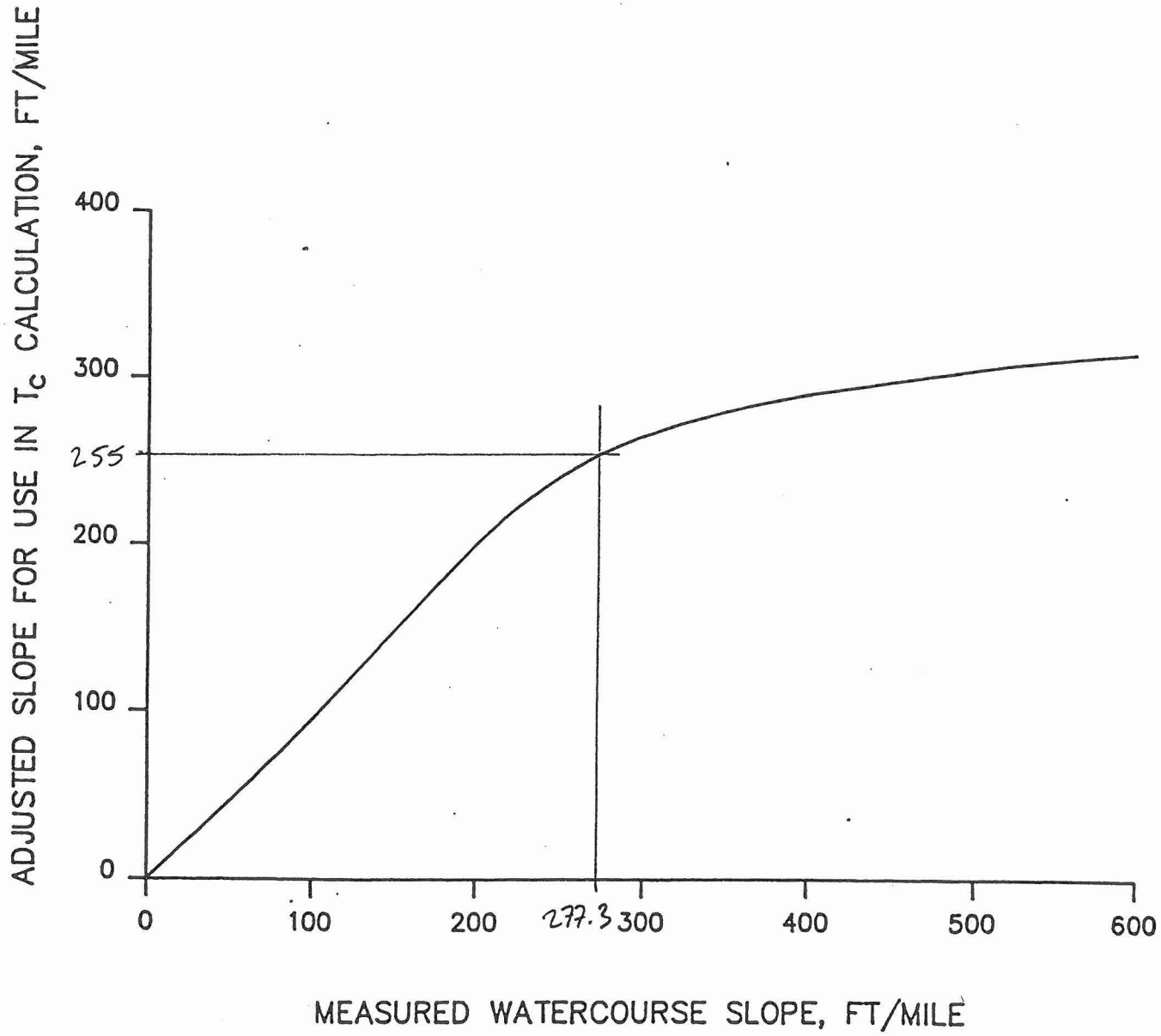


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120 C
SLOPE: 306.5 FT/MI
ADJ. SLOPE: 266 FT/MI

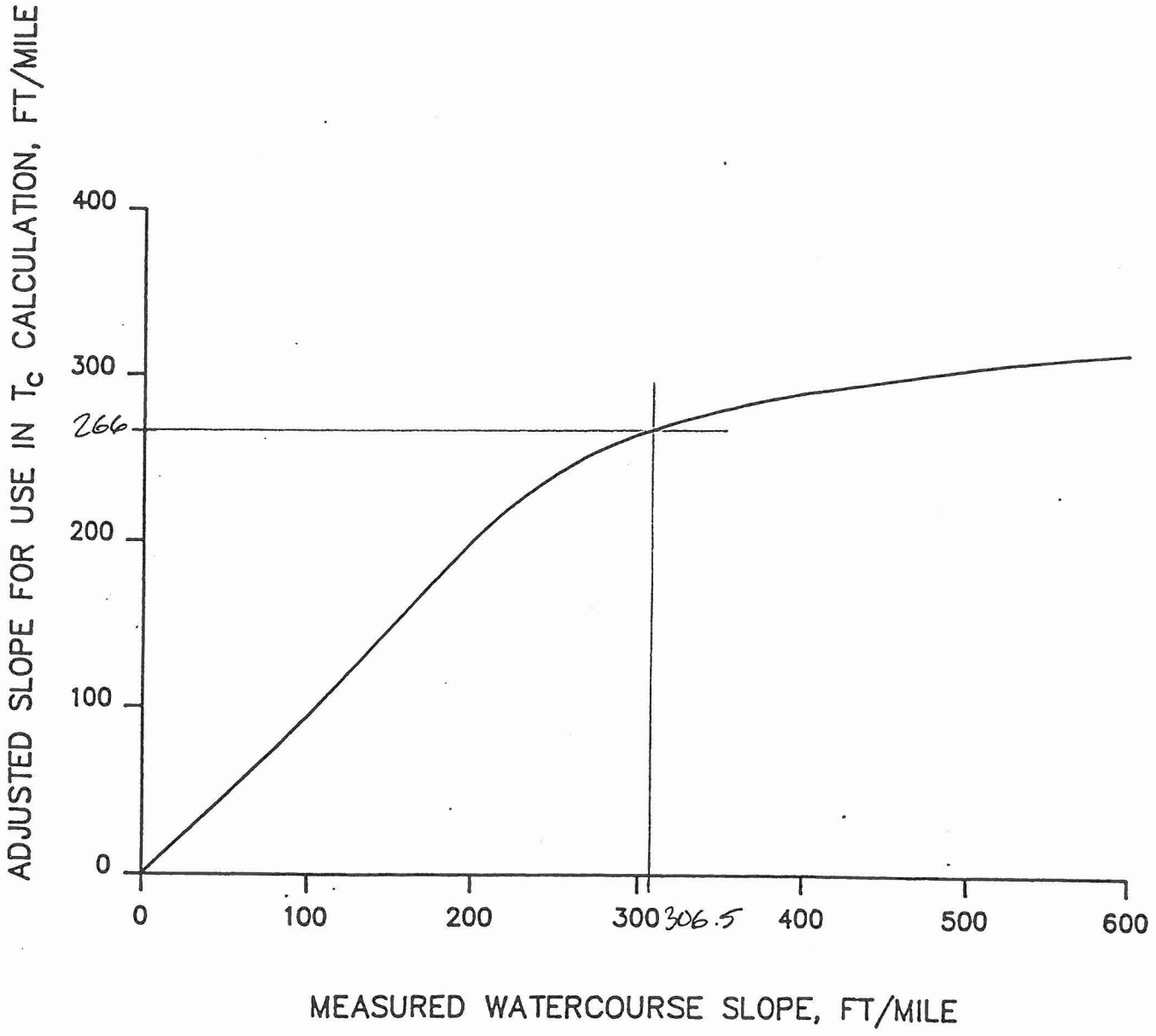


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120 G
SLOPE : 414.6 FT/MI
ADJ. SLOPE : 290 FT/MI

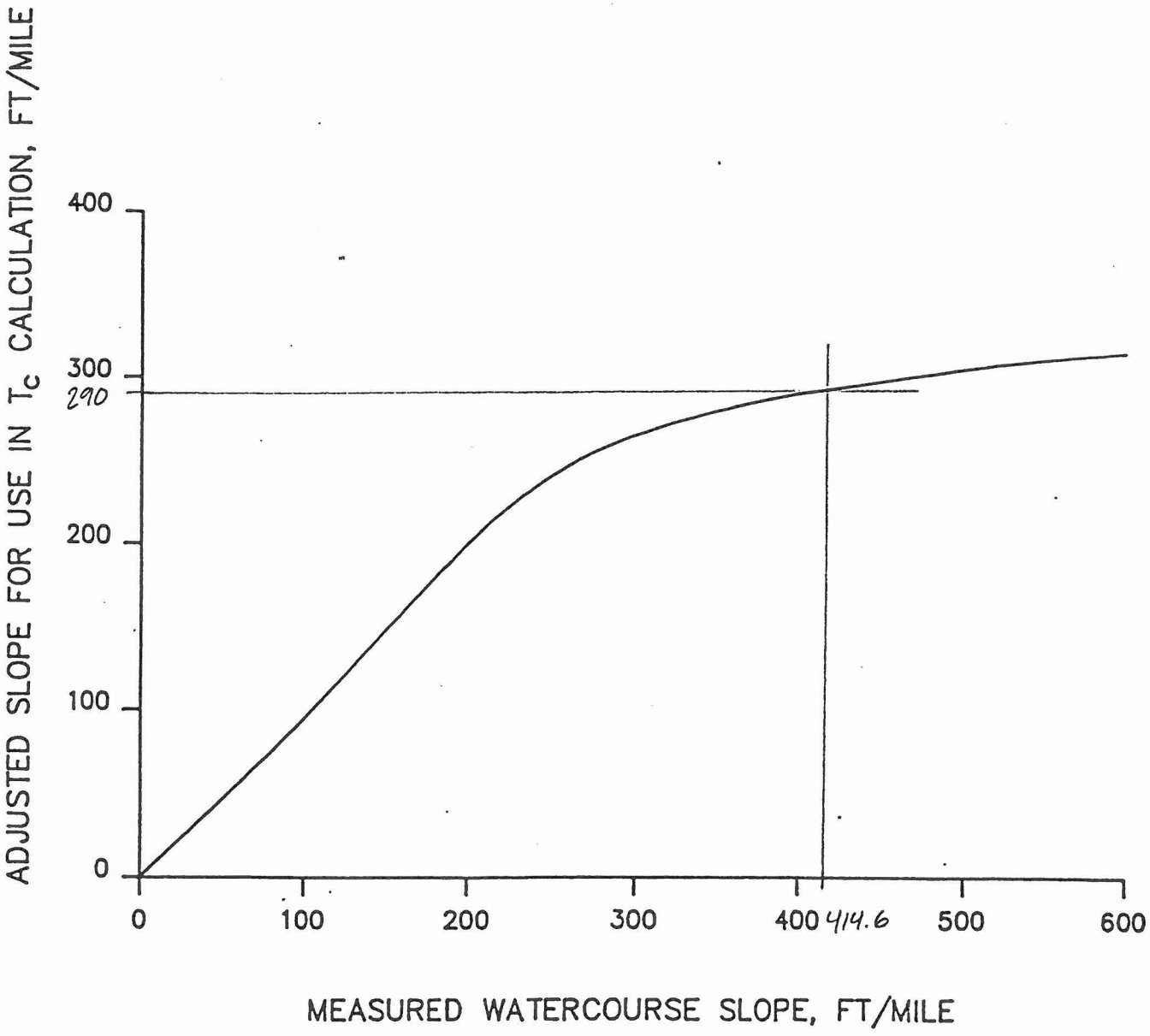


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120 H
SLOPE: 242.2 FT/MI
ADJ. SLOPE: 235 FT/MI

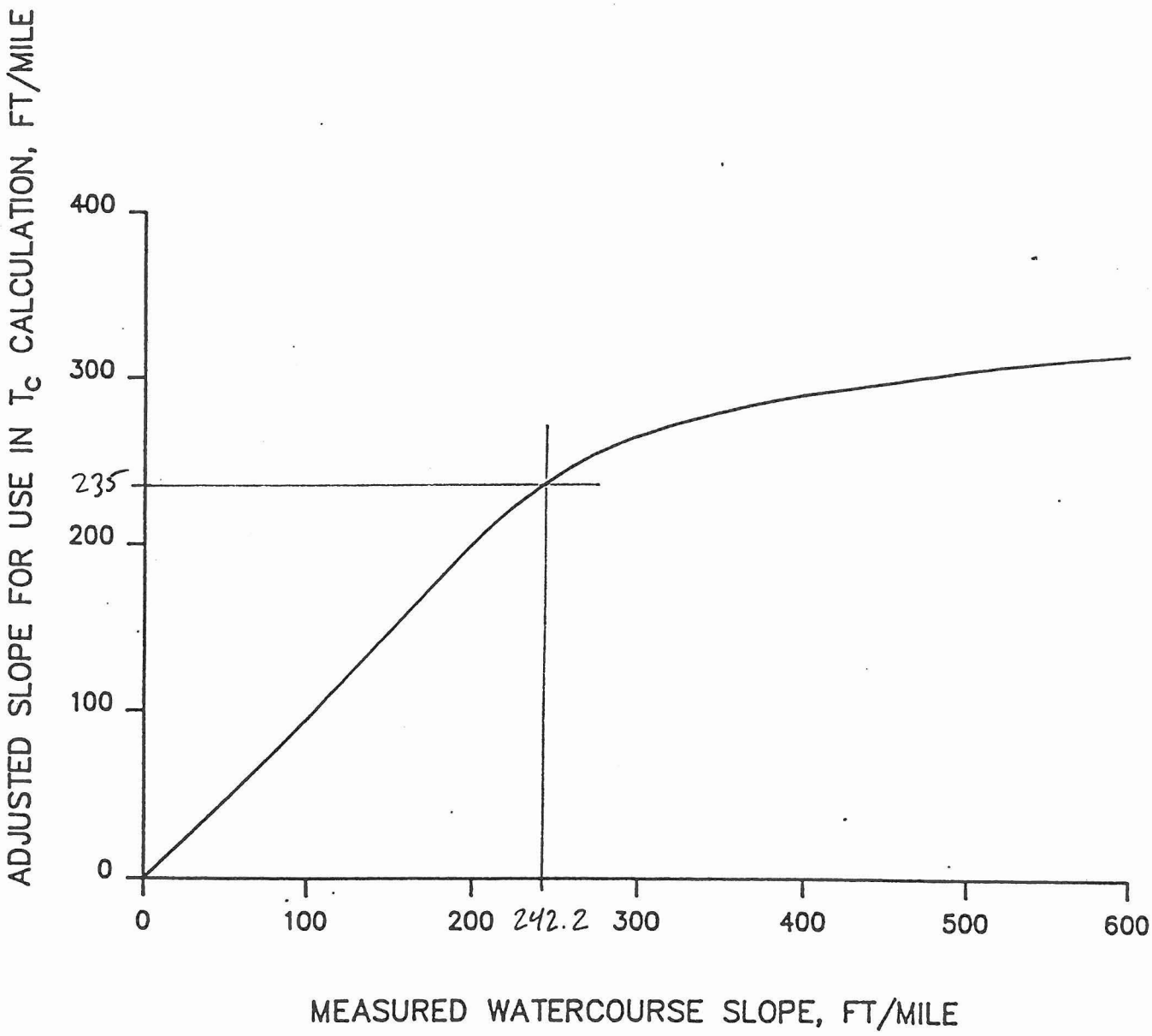


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CERUS WASH WATERSHED
BASIN 120 I
SLOPE: 368.2 FT/MI
ADJ. SLOPE: 283 FT/MI

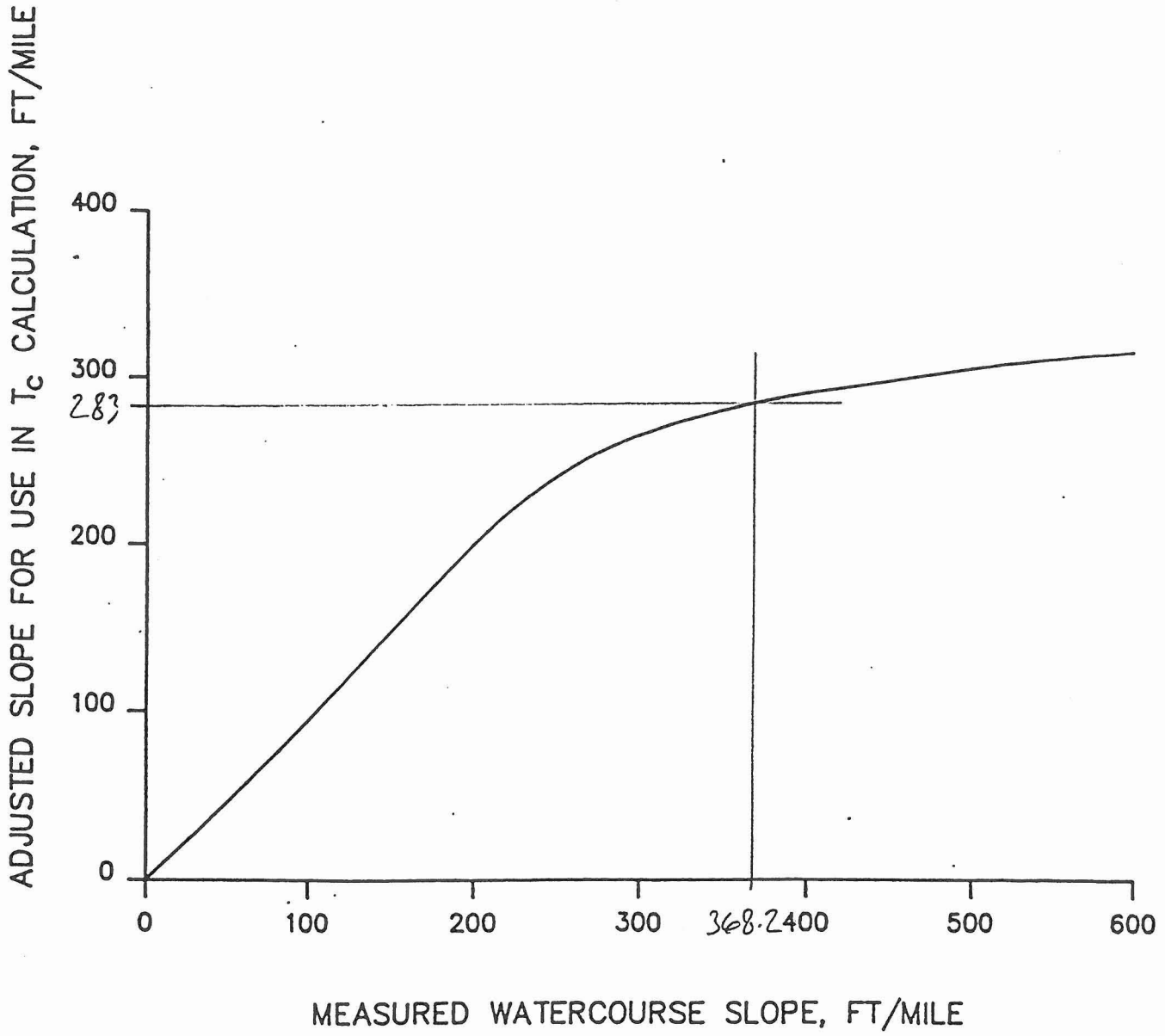


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120K
SLOPE: 239.1 FT/MI
ADJ. SLOPE: 232 FT/MI

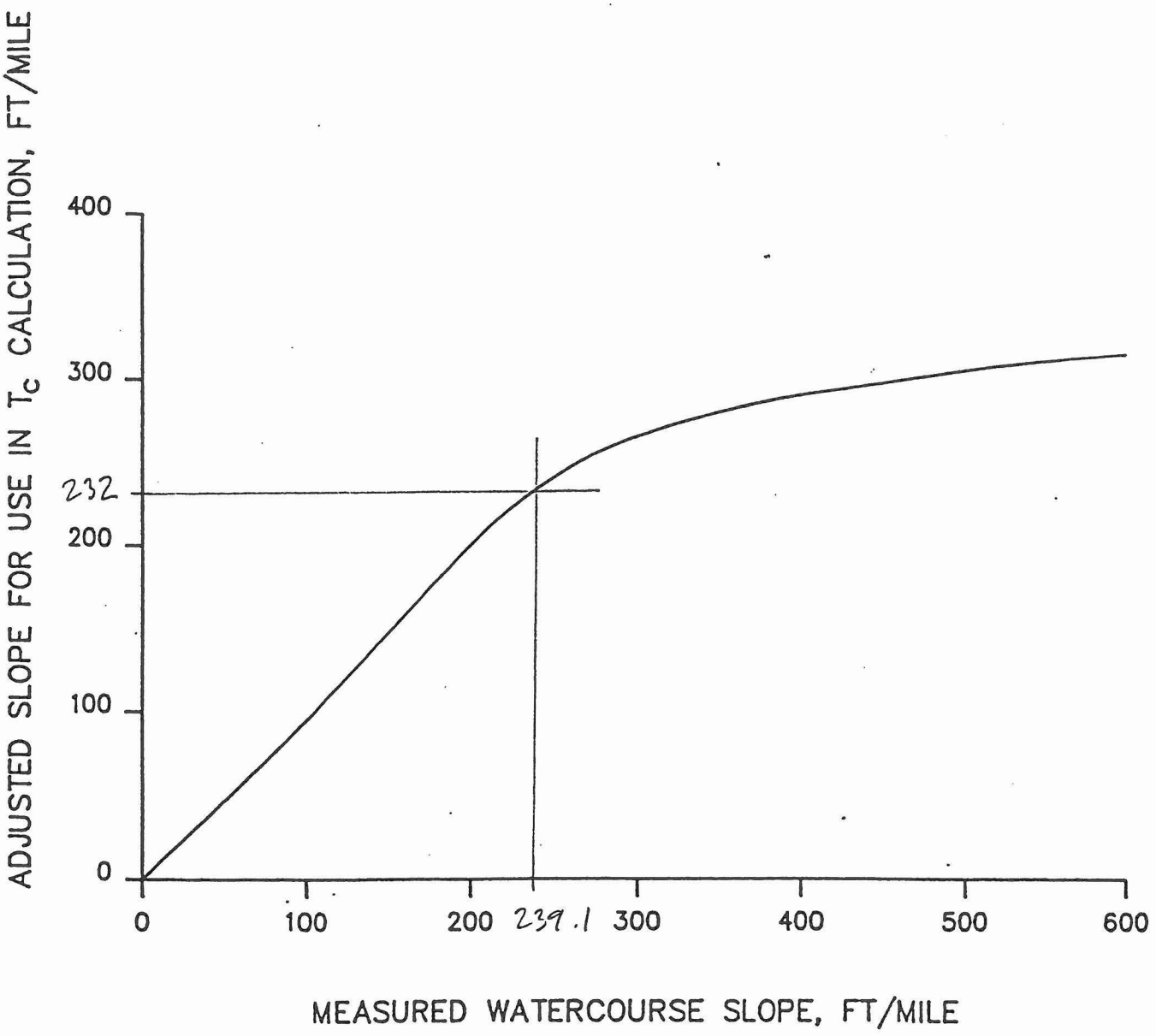


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120L
SLOPE: 466.2 FT/MI
ADJ. SLOPE: 297 FT/MI

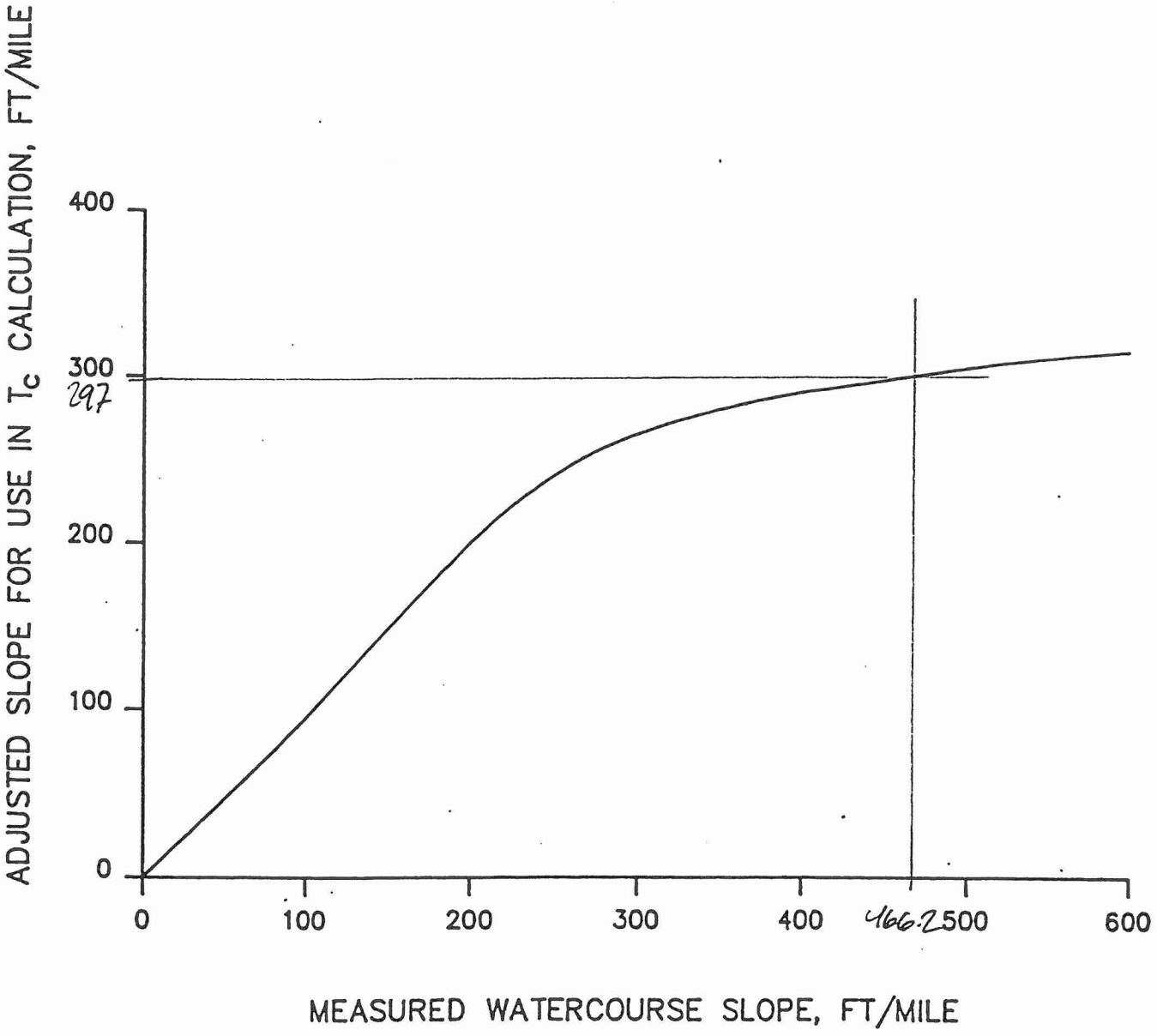


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

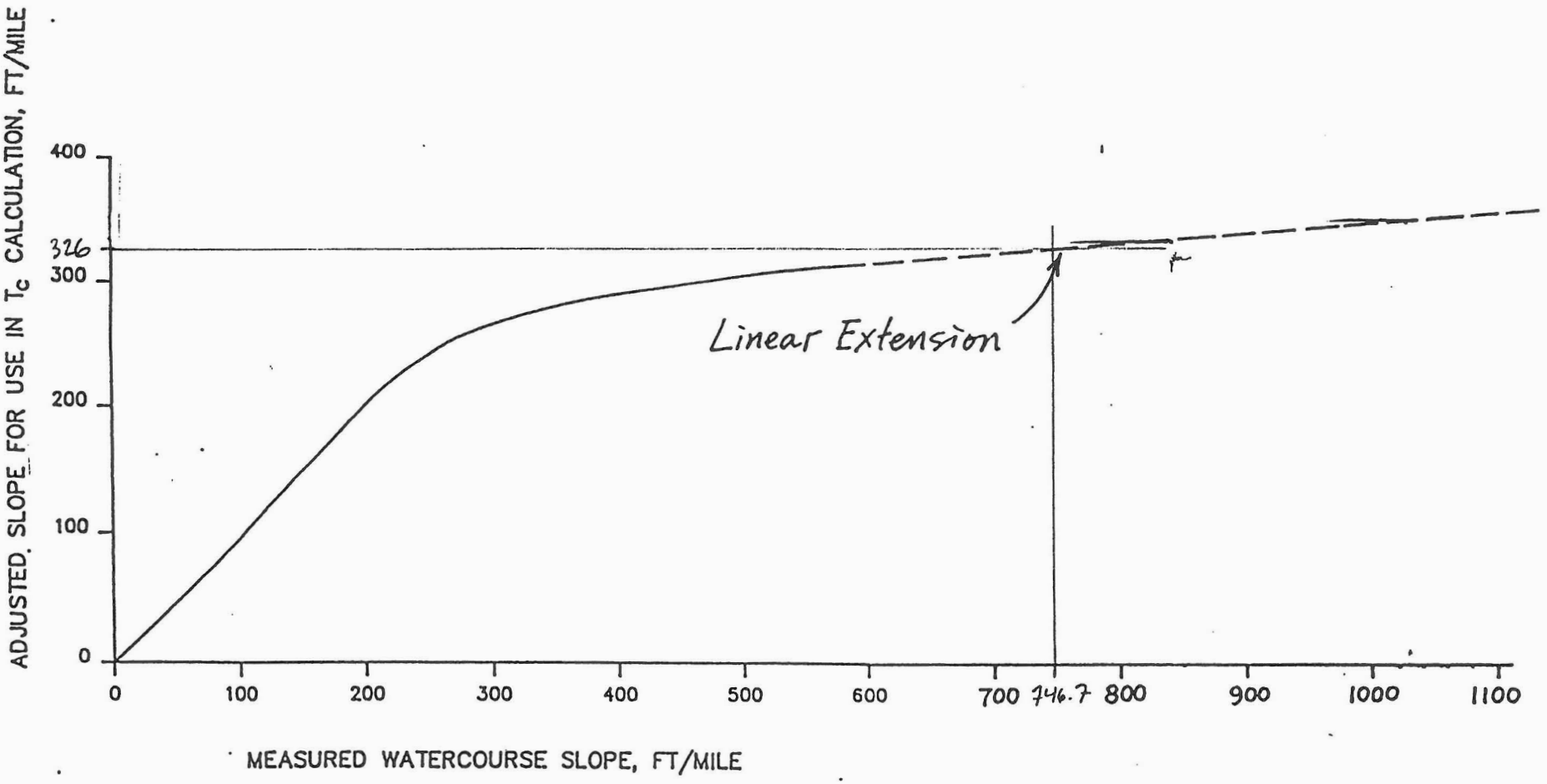


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120P
SLOPE: 746.7 FT/MI
ADJ. SLOPE: 326 FT/MI

CEREUS WASH WATERSHED
BASIN 120T
SLOPE: 230.4 FT/MI
ADJ. SLOPE: 226 FT/MI

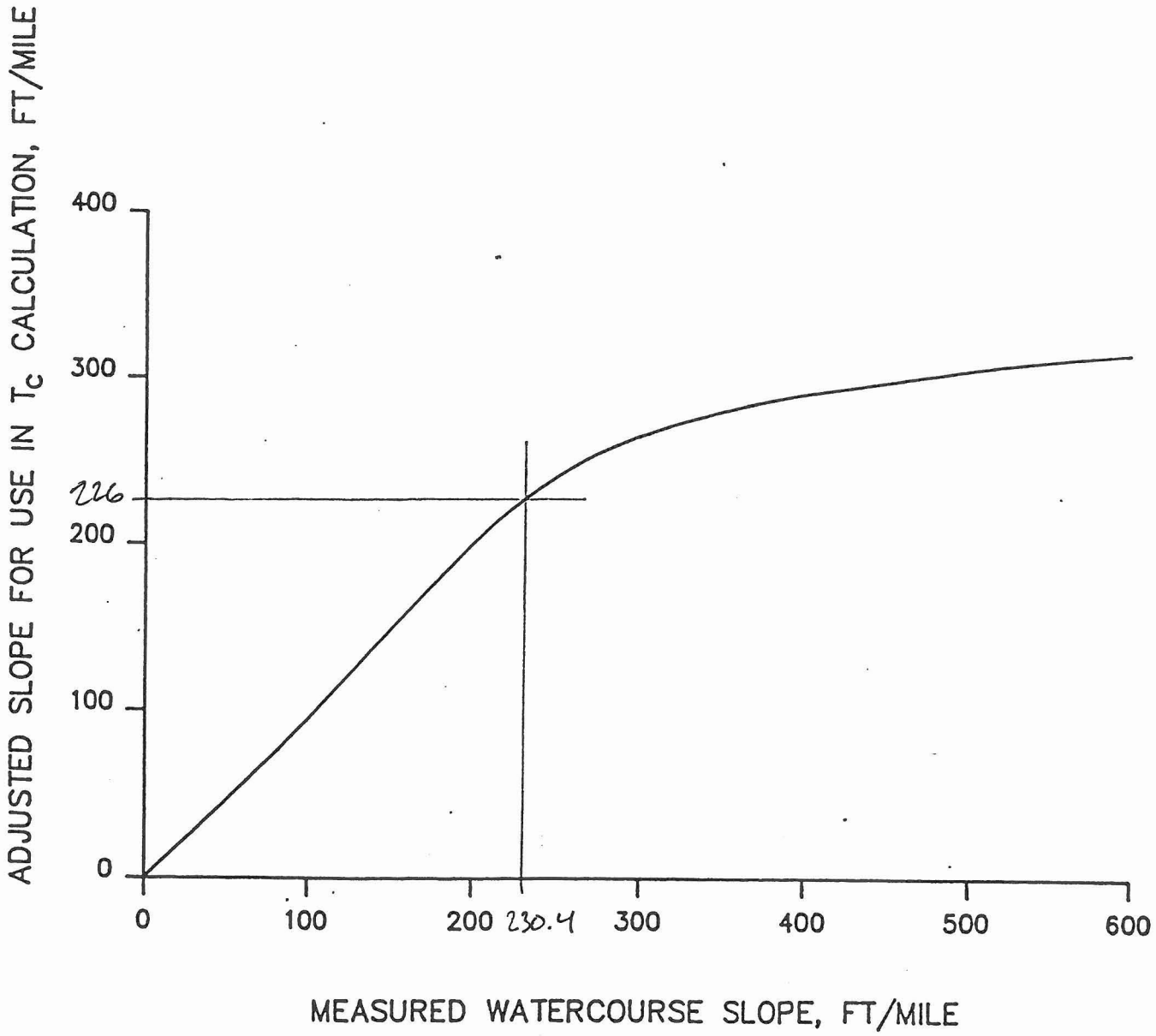


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 120V
SLOPE: 383.1 FT/MI
ADJ. SLOPE: 286 FT/MI

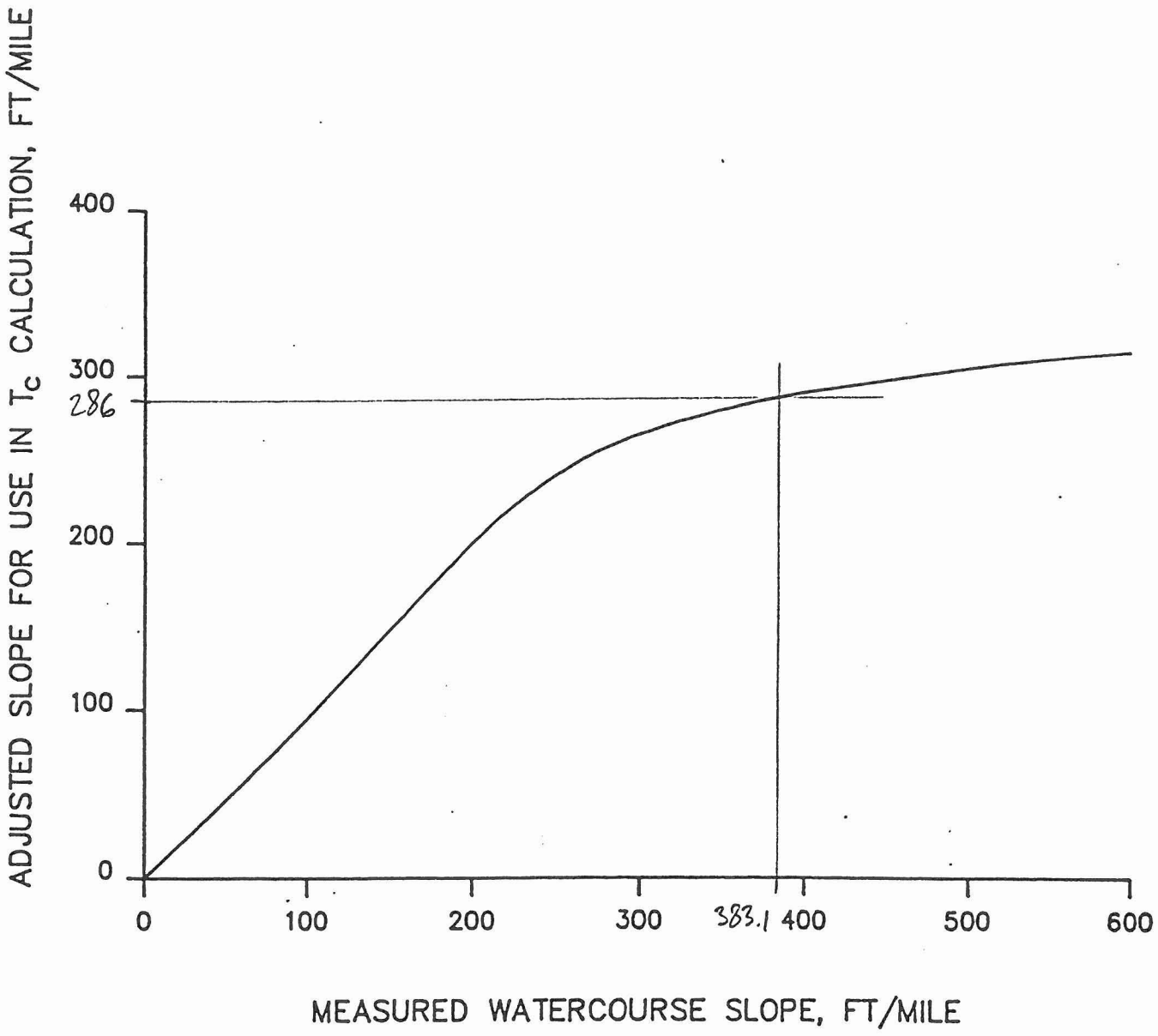


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

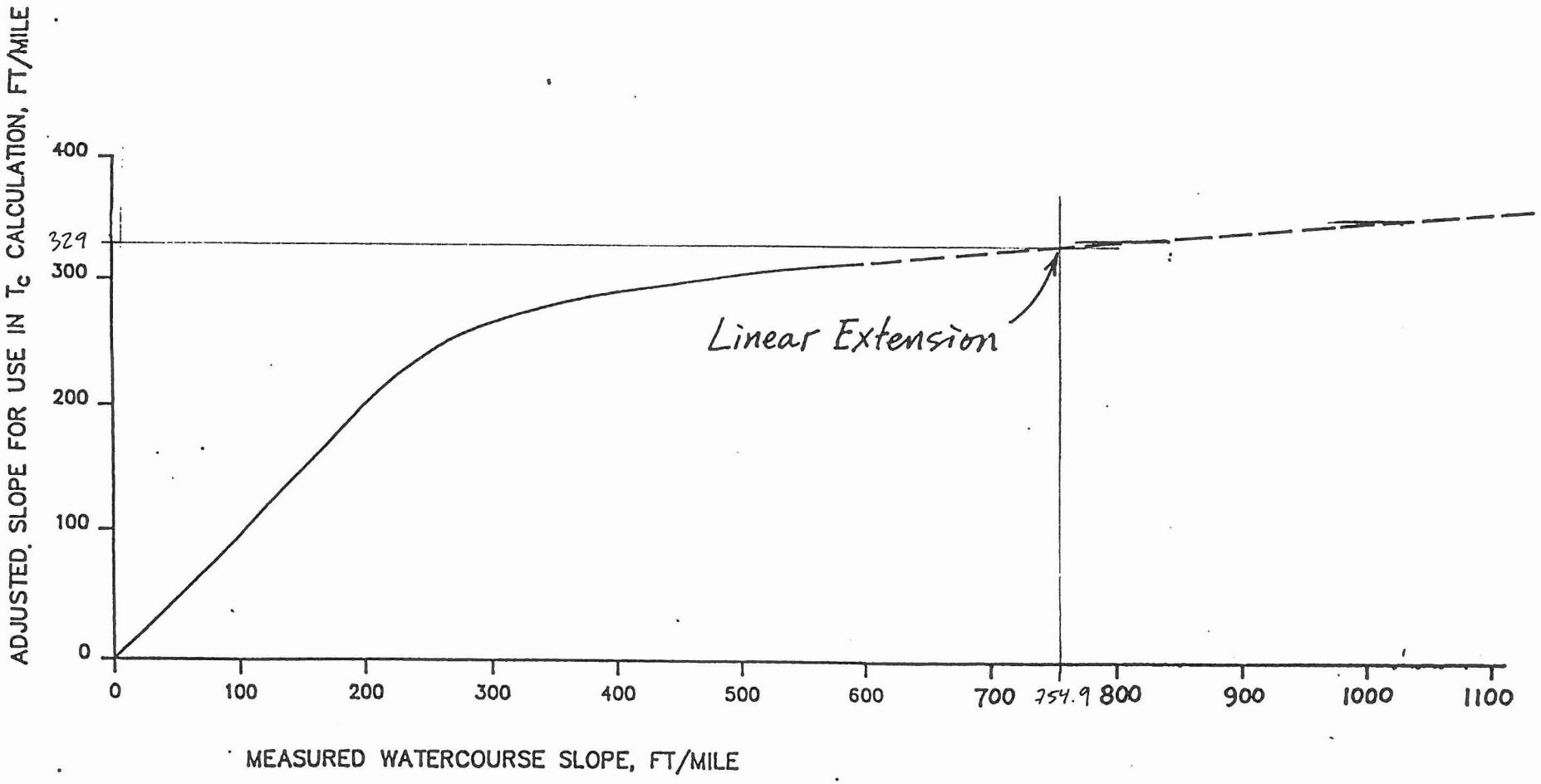


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 122 C
SLOPE: 754.9 FT/MI
ADJ. SLOPE: 329 FT/MI

CEREUS WASH WATERSHED
BASIN 122E
SLOPE: 522.0 FT/MI
ADJ. SLOPE: 305 FT/MI

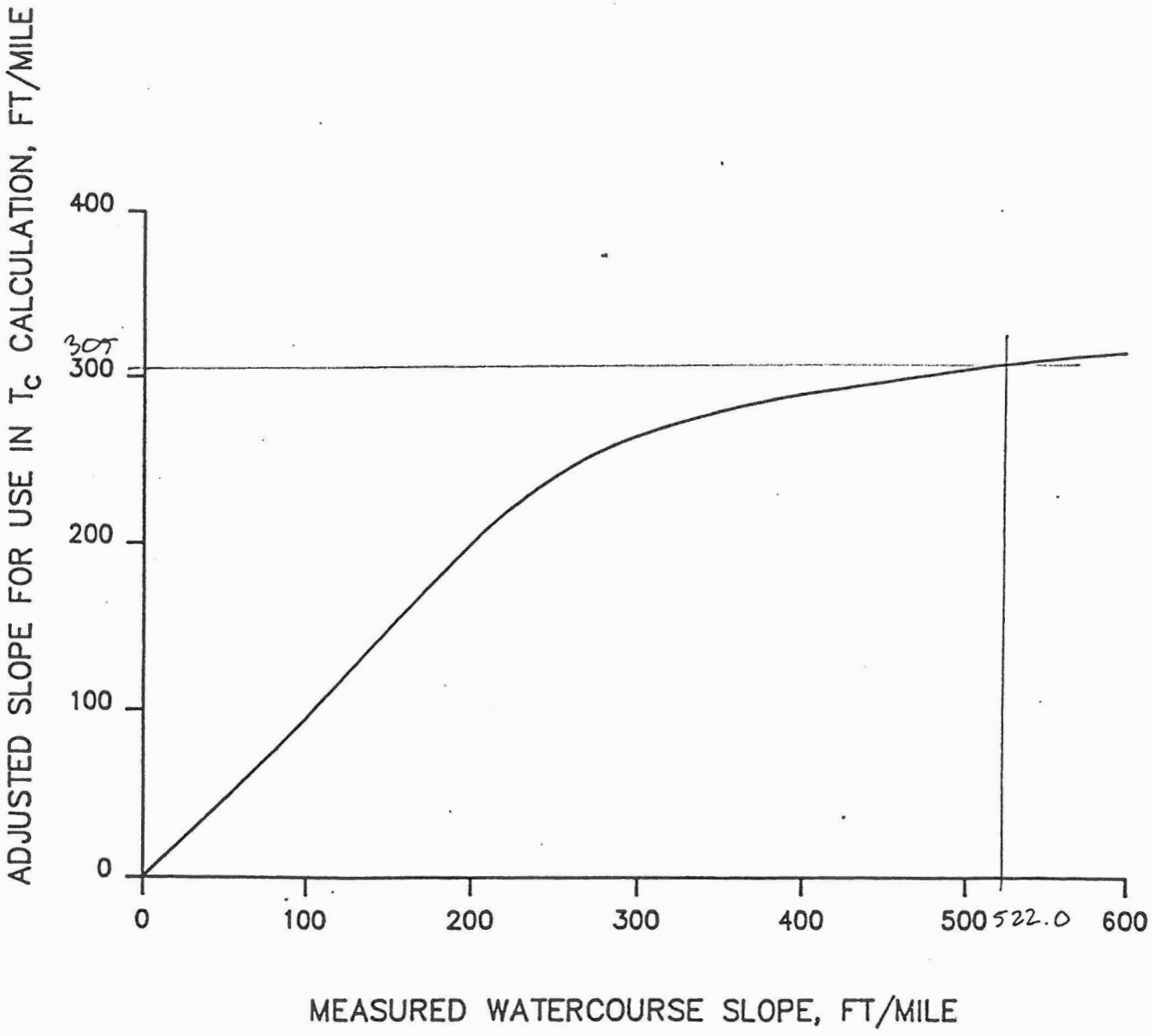


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 122F
SLOPE: 334.4 FT/MI
ADJ. SLOPE: 275 FT/MI

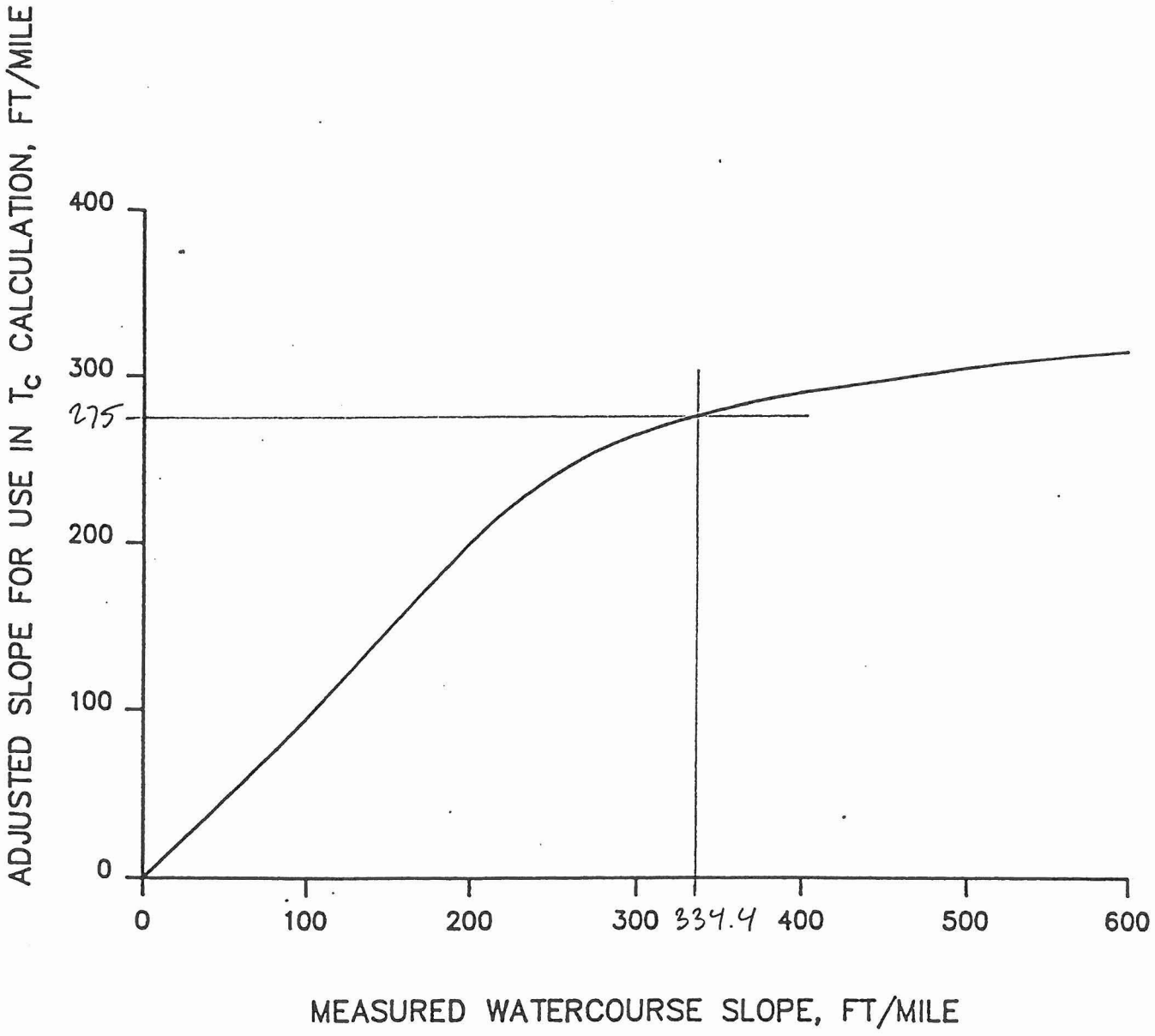


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 123A
SLOPE: 281.0 FT/MI
ADJ. SLOPE: 256 FT/MI

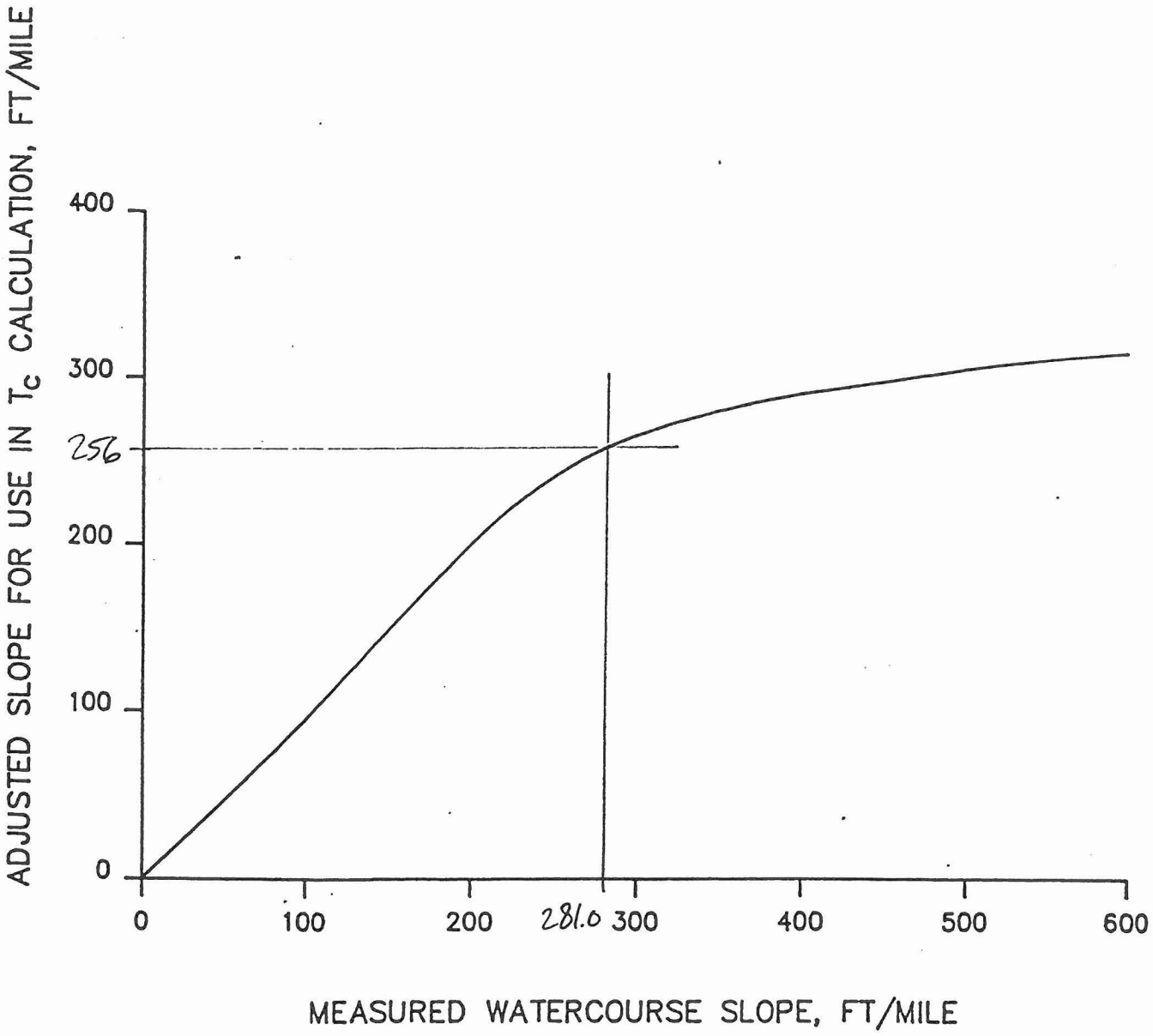


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 123B
SLOPE: 459.1 FT/MI
ADJ. SLOPE: 296 FT/MI

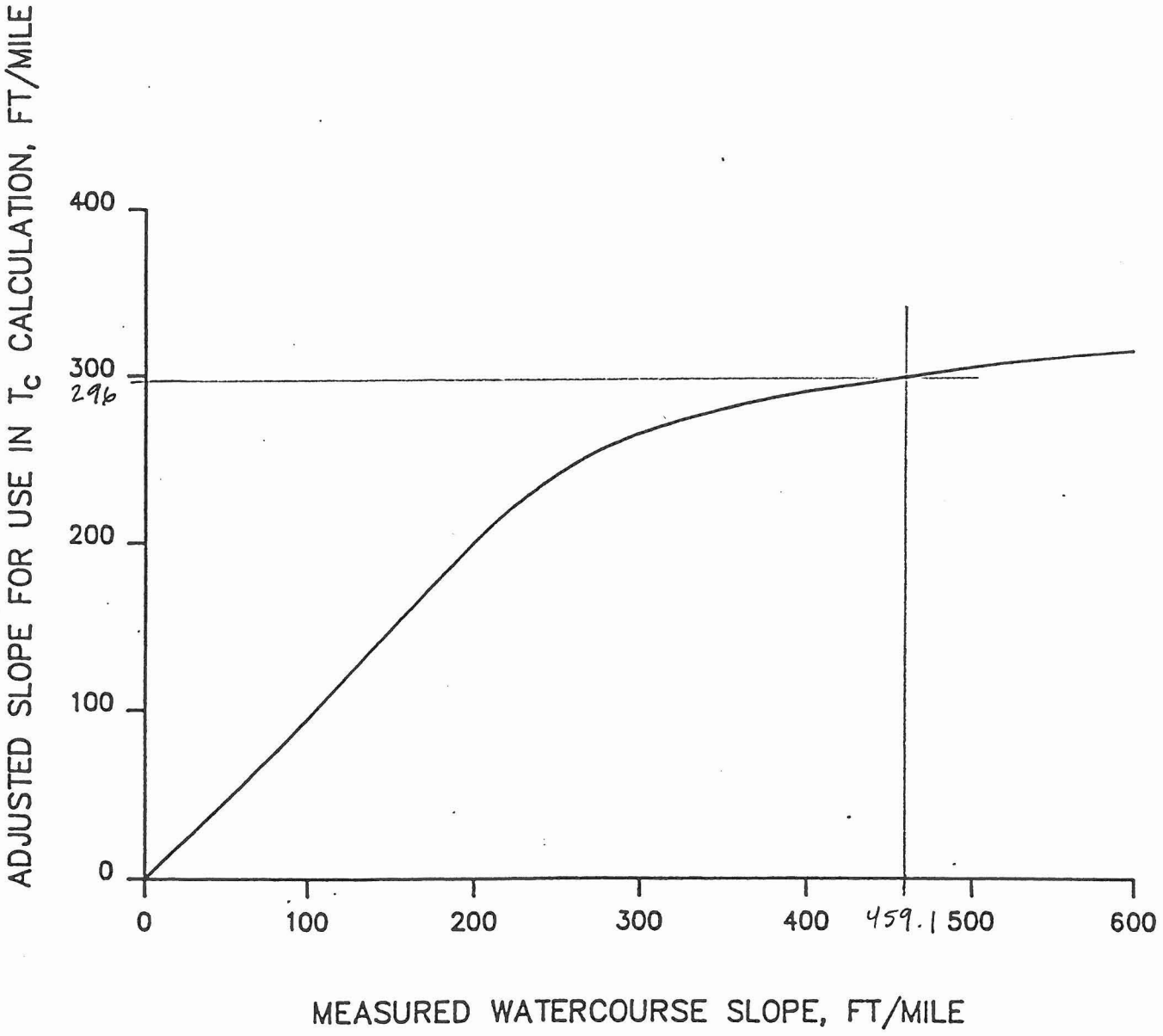


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

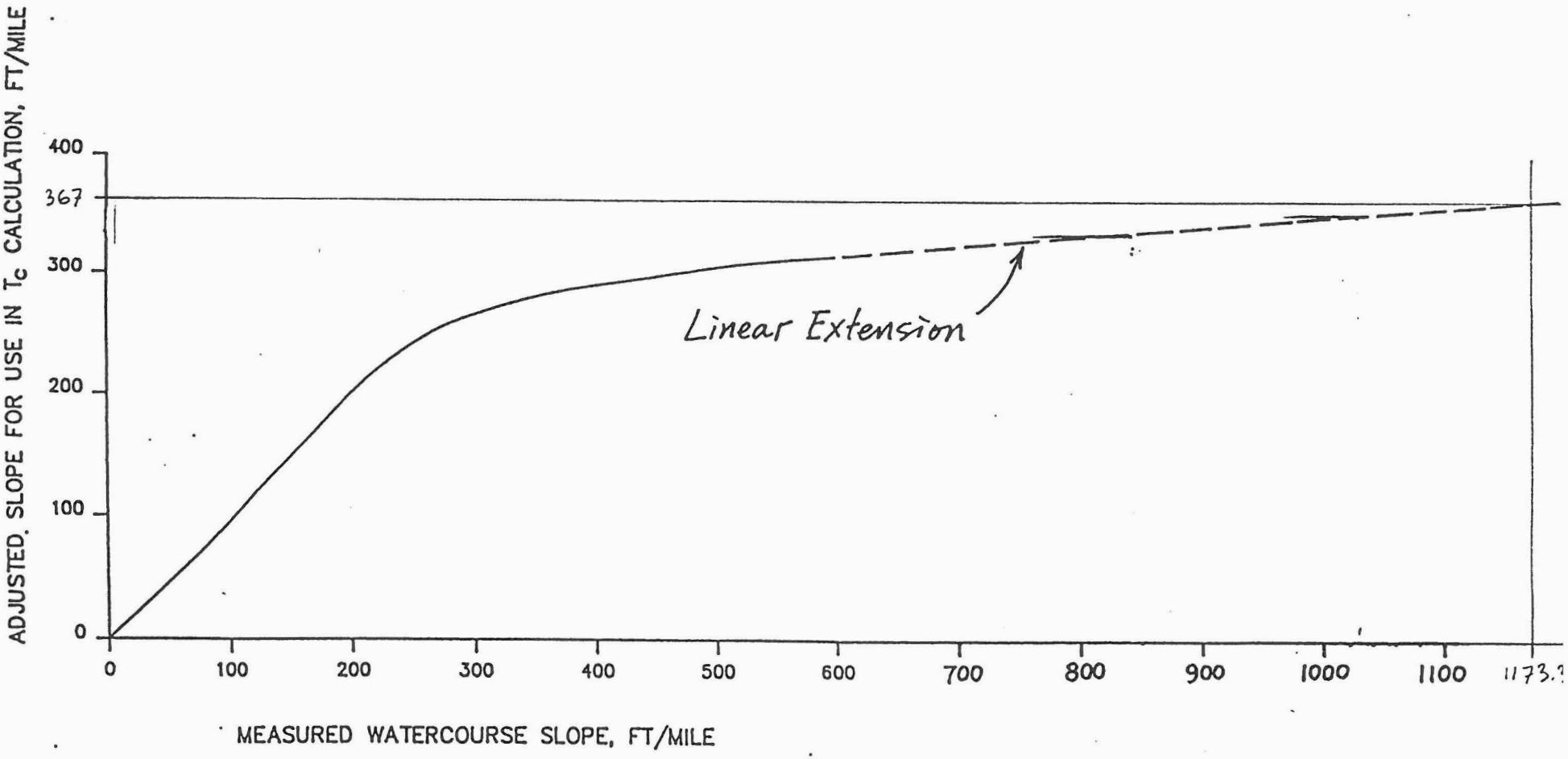


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 123C
SLOPE: 1173.3 FT/MI
ADJ. SLOPE: 367 FT/MI

CEREUS WASH WATERSHED
BASIN 123 D
SLOPE: 384.0 FT/MI
ADJ. SLOPE: 286 FT/MI

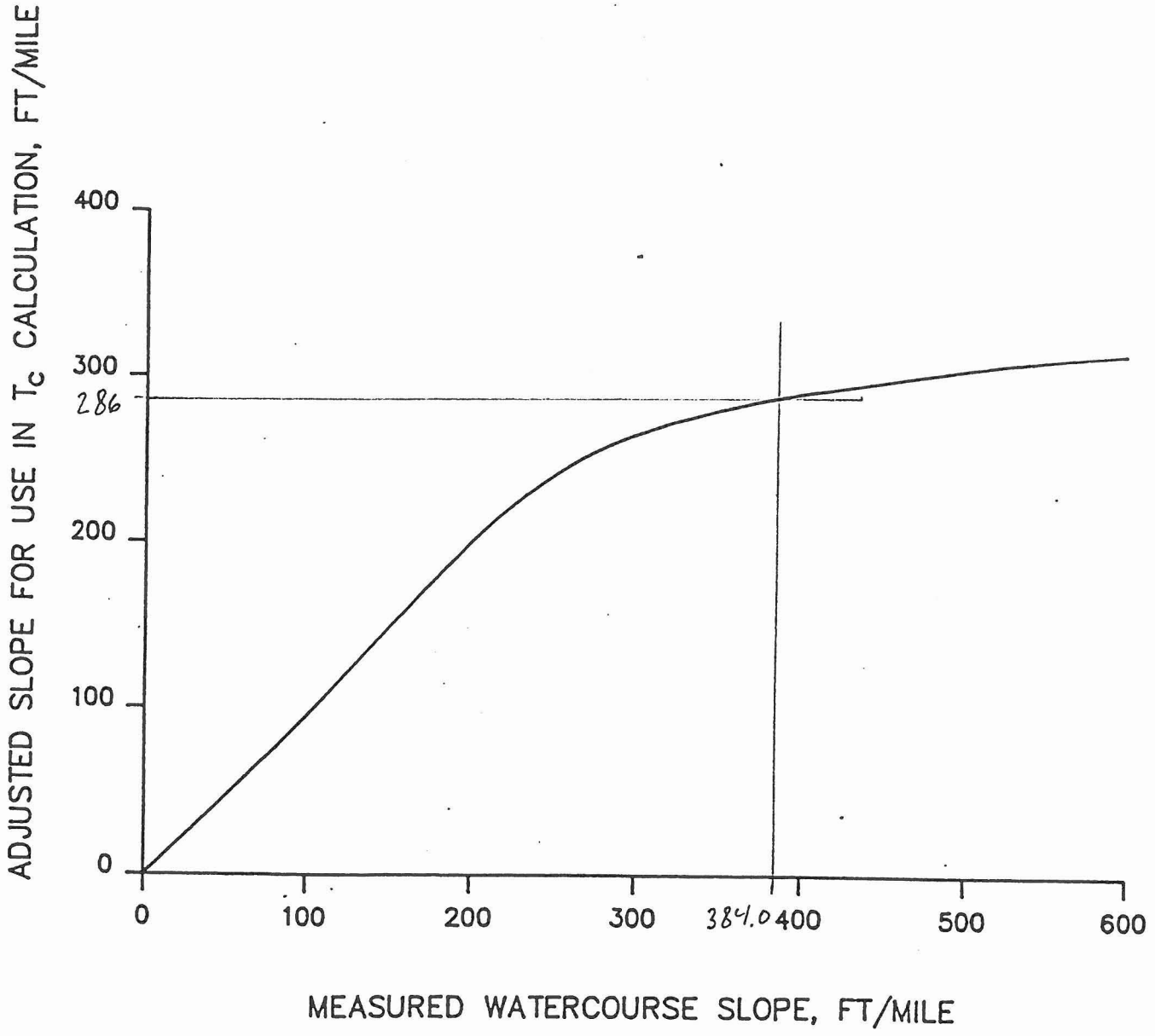


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 124 A
SLOPE: 491.7 FT/MI
ADJ. SLOPE: 301 FT/MI

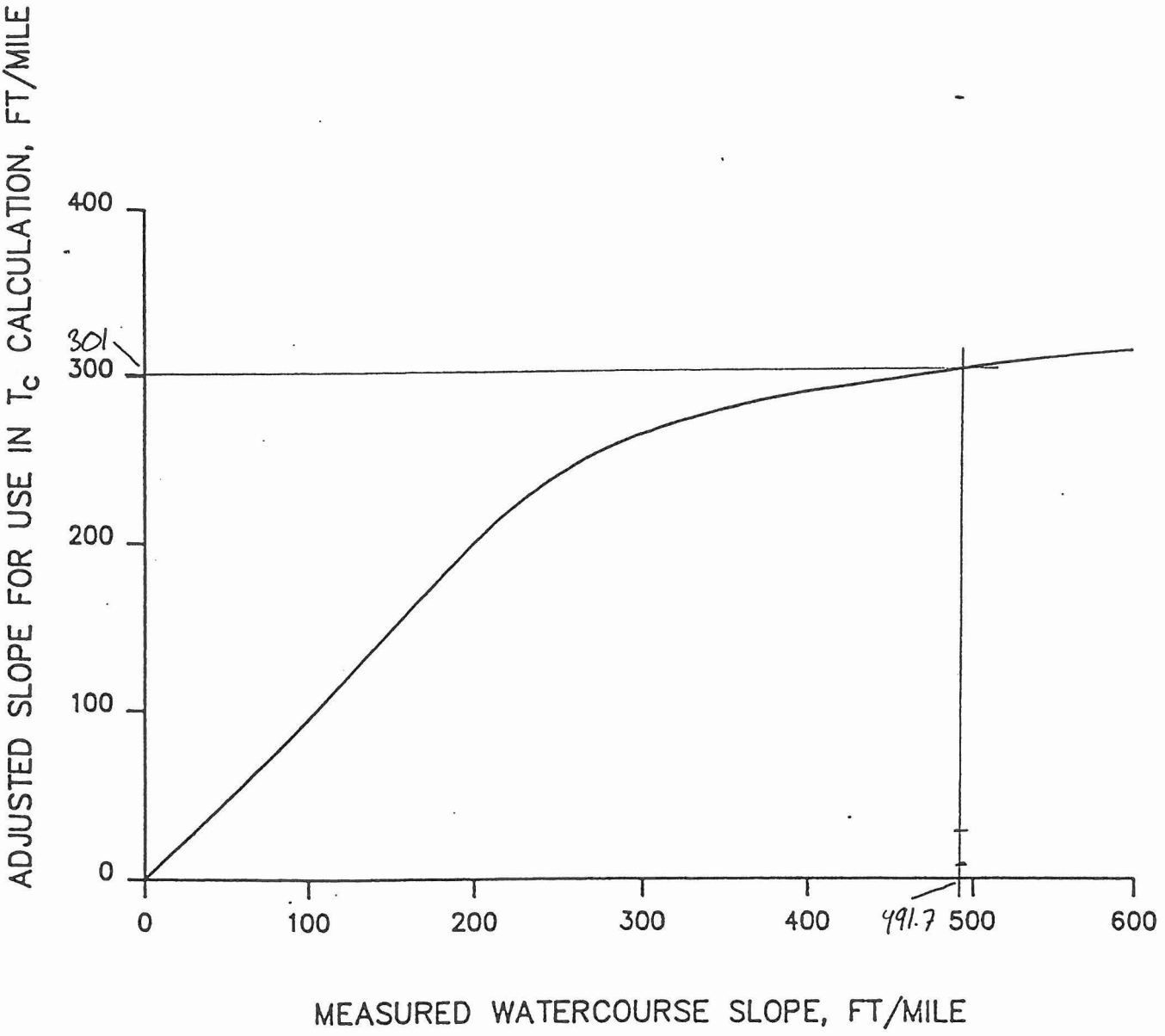


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 124 B
SLOPE: 429.0 FT/MI
ADJ. SLOPE: 293 FT/MI

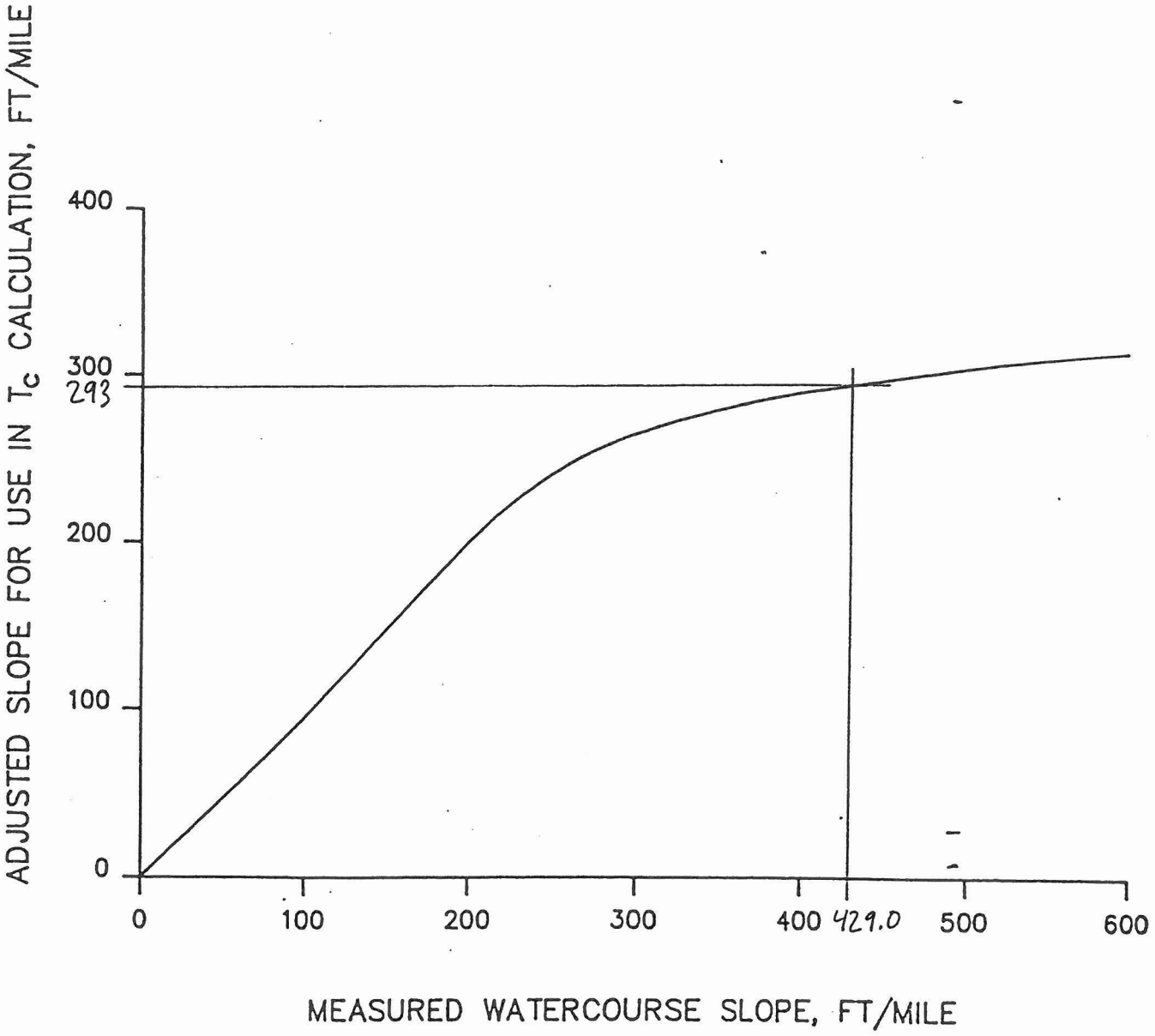


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 124 C
SLOPE: 344.3 FT/MI
ADJ. SLOPE: 277 FT/MI

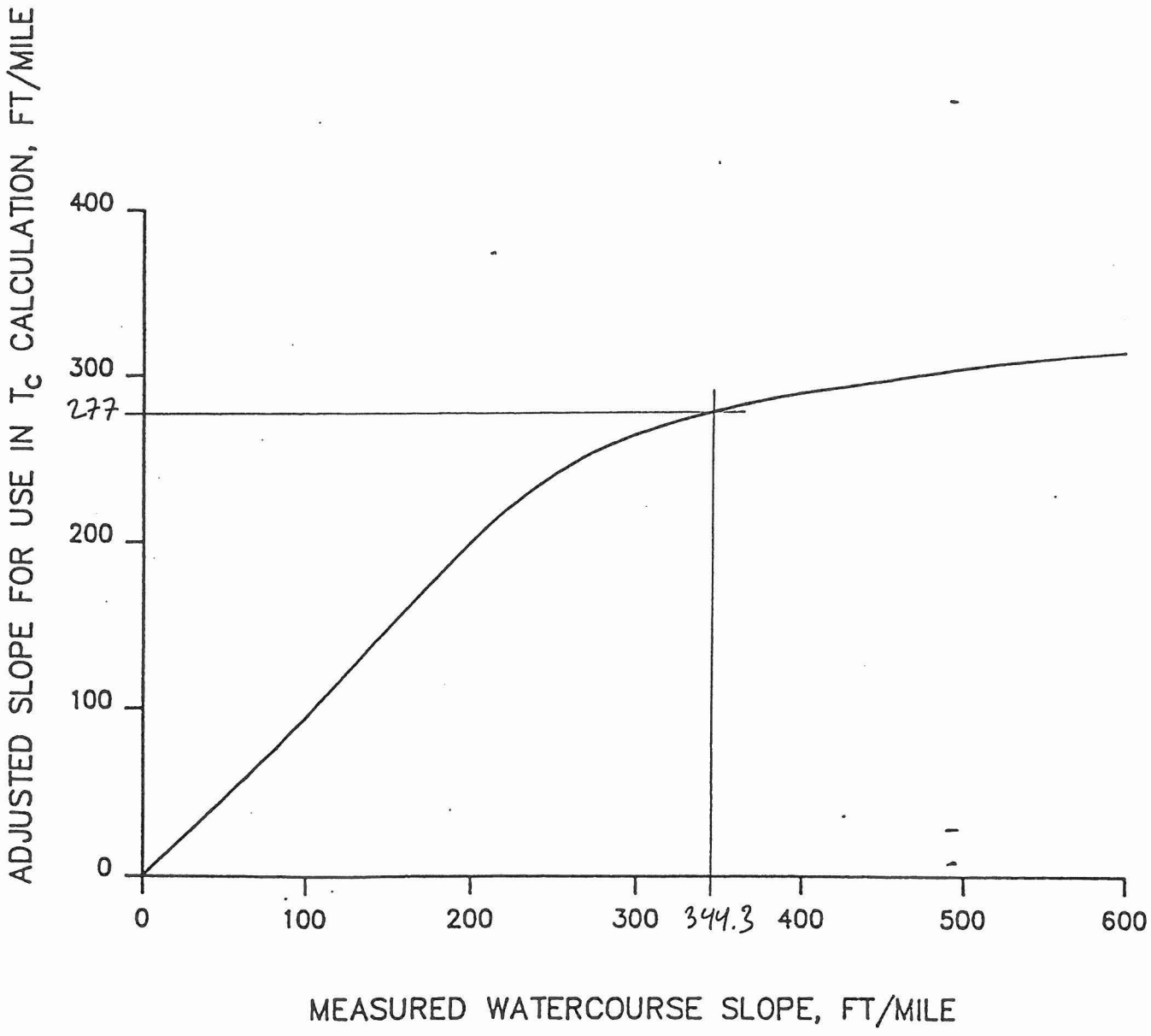


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 124D
SLOPE: 502.9 FT/MI
ADJ. SLOPE: 303 FT/MI

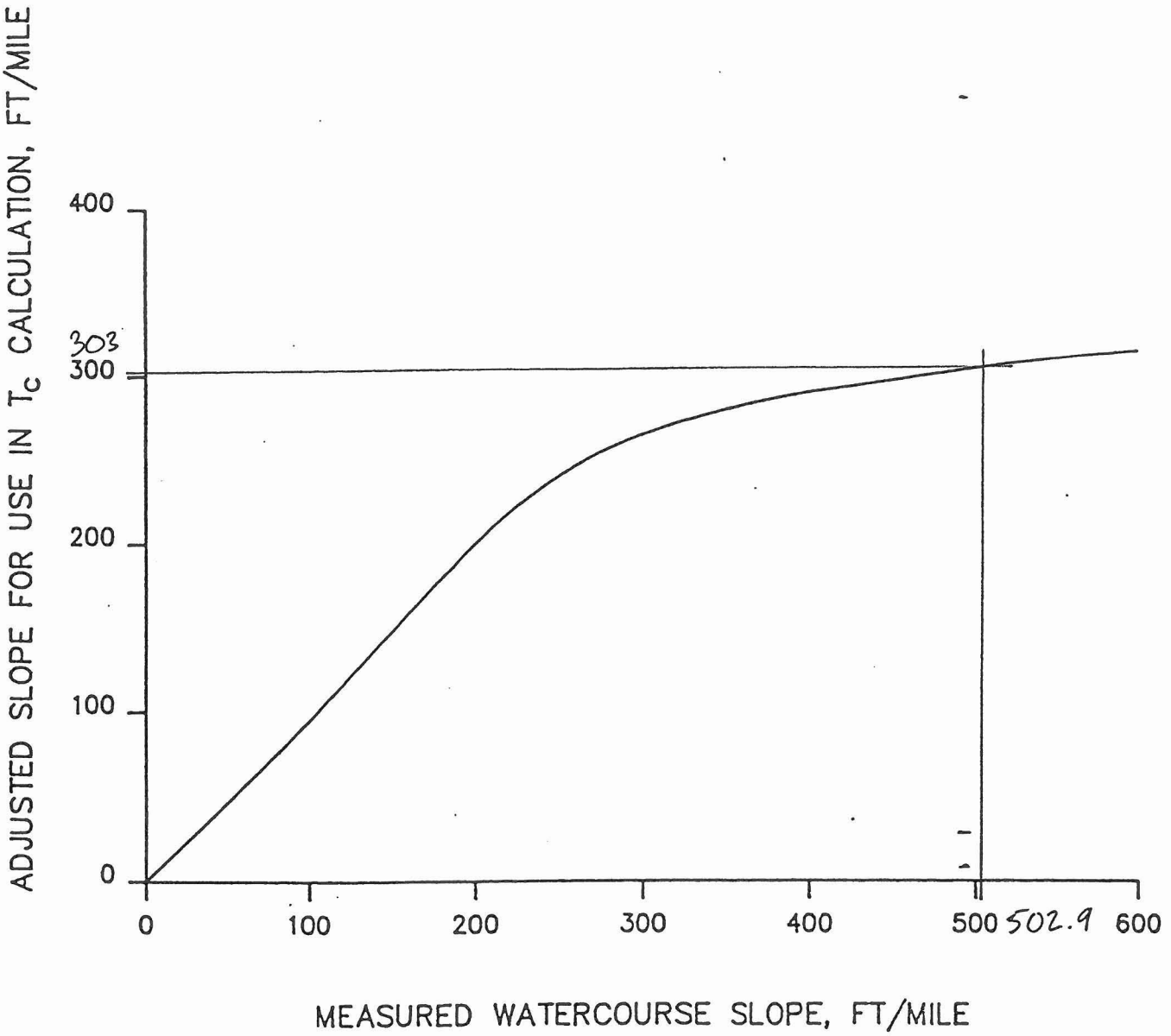


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 124E
SLOPE: 444.9 FT/MI
ADJ. SLOPE: 295 FT/MI

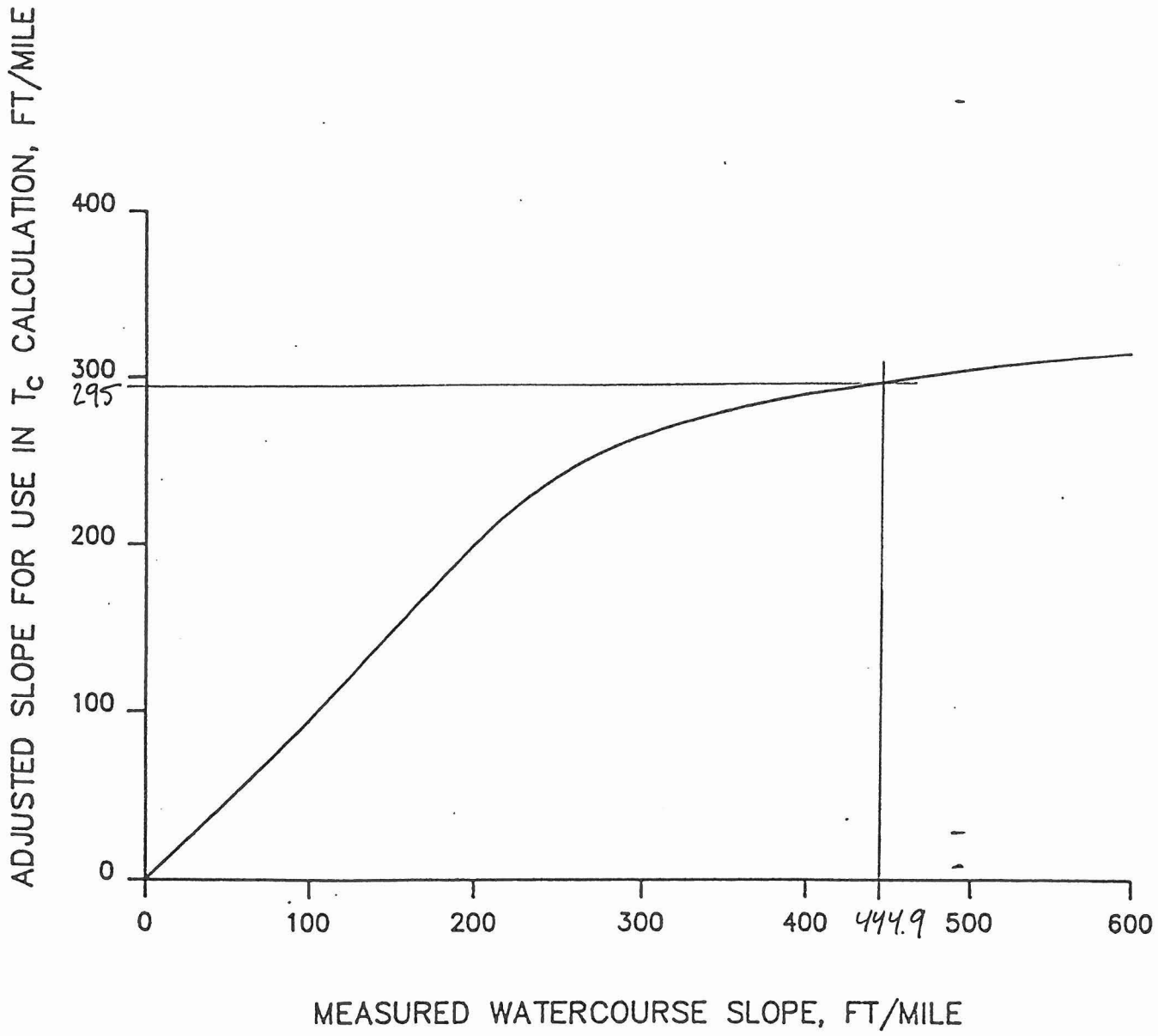


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 125A
SLOPE: 389.3 FT/MI
ADJ. SLOPE: 287 FT/MI

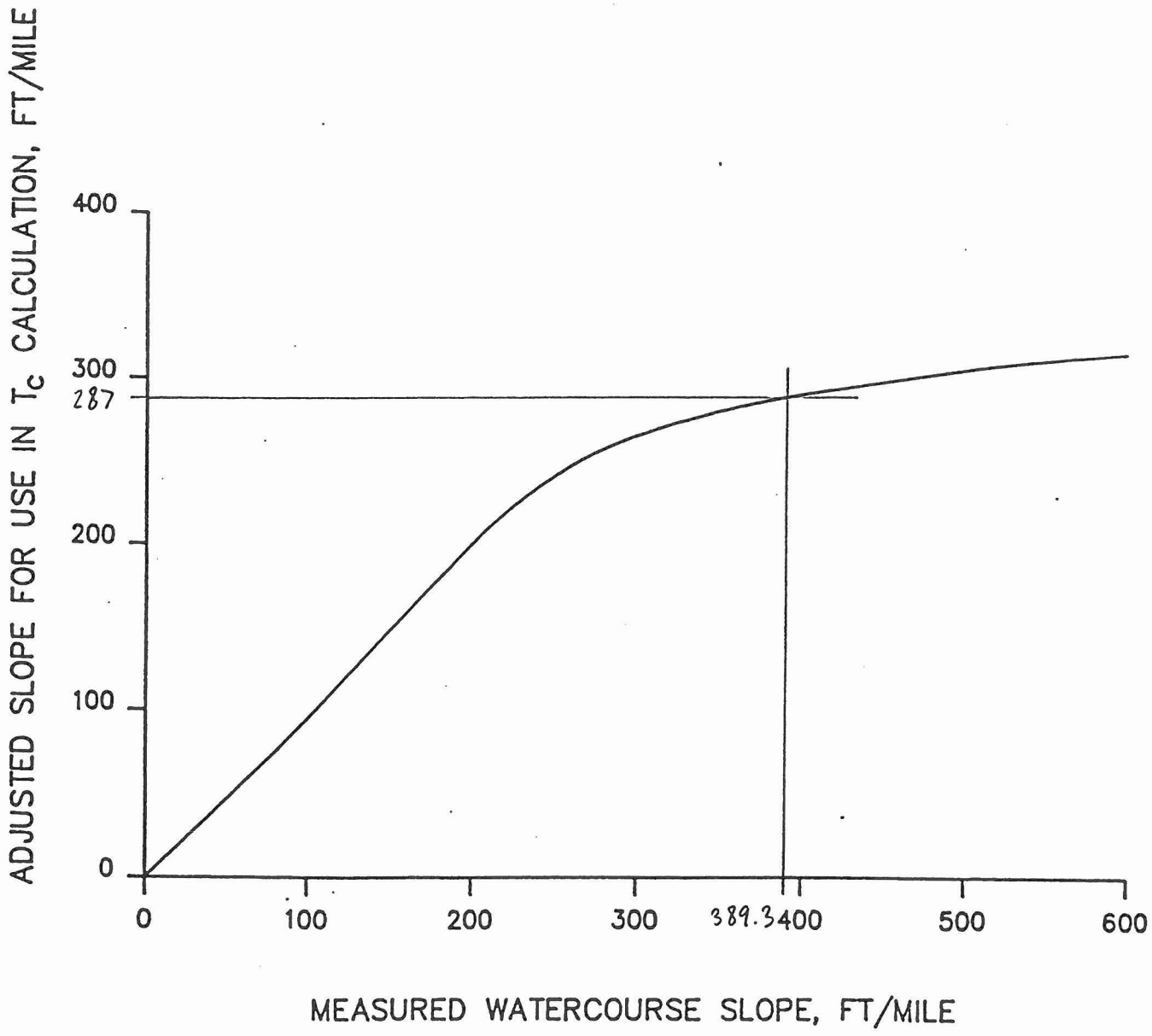


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 125B
SLOPE: 257.5 FT/MI
ADJ. SLOPE: 243 FT/MI

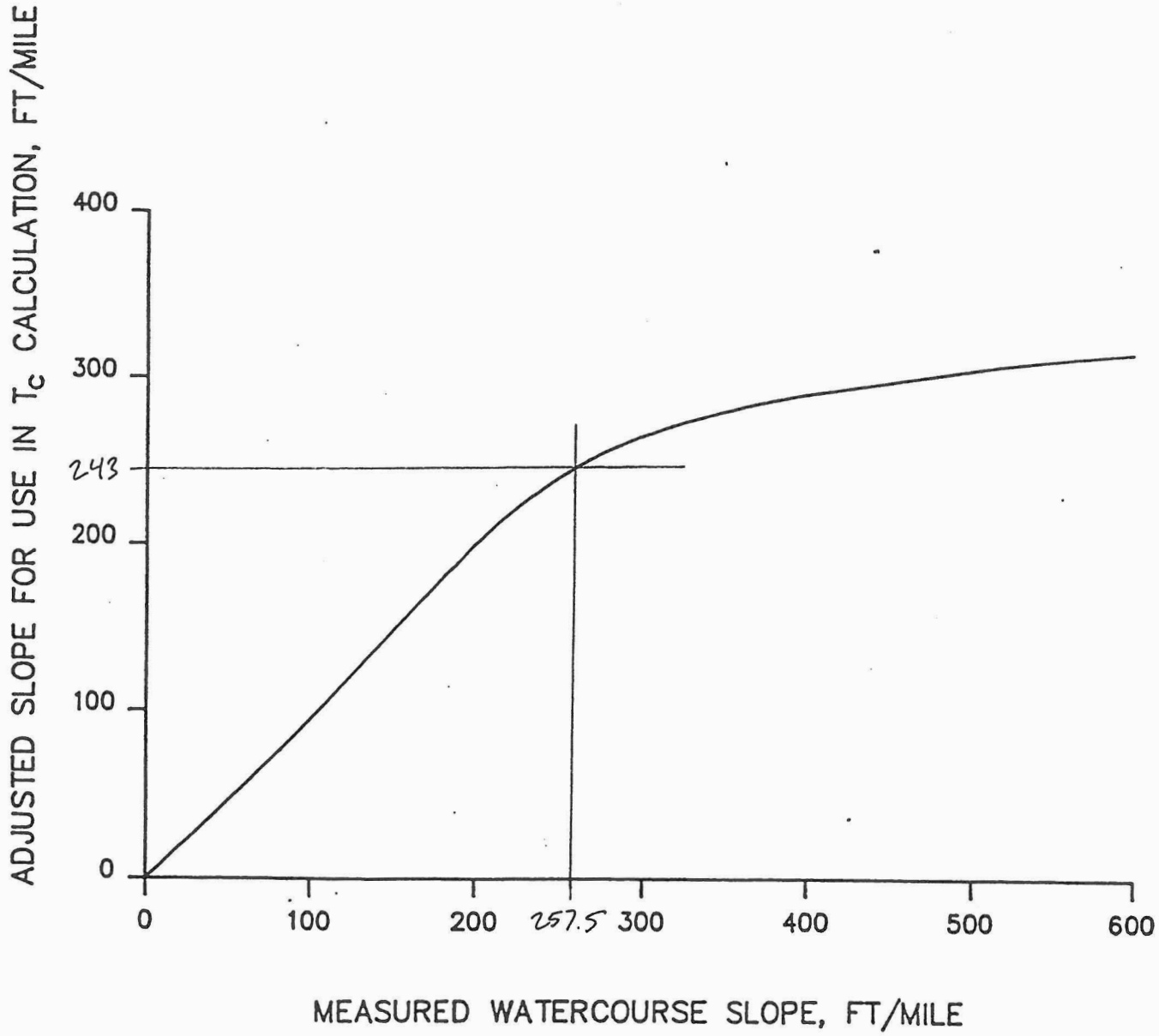


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 125C
SLOPE: 376.1 FT/MI
ADJ. SLOPE: 285 FT/MI

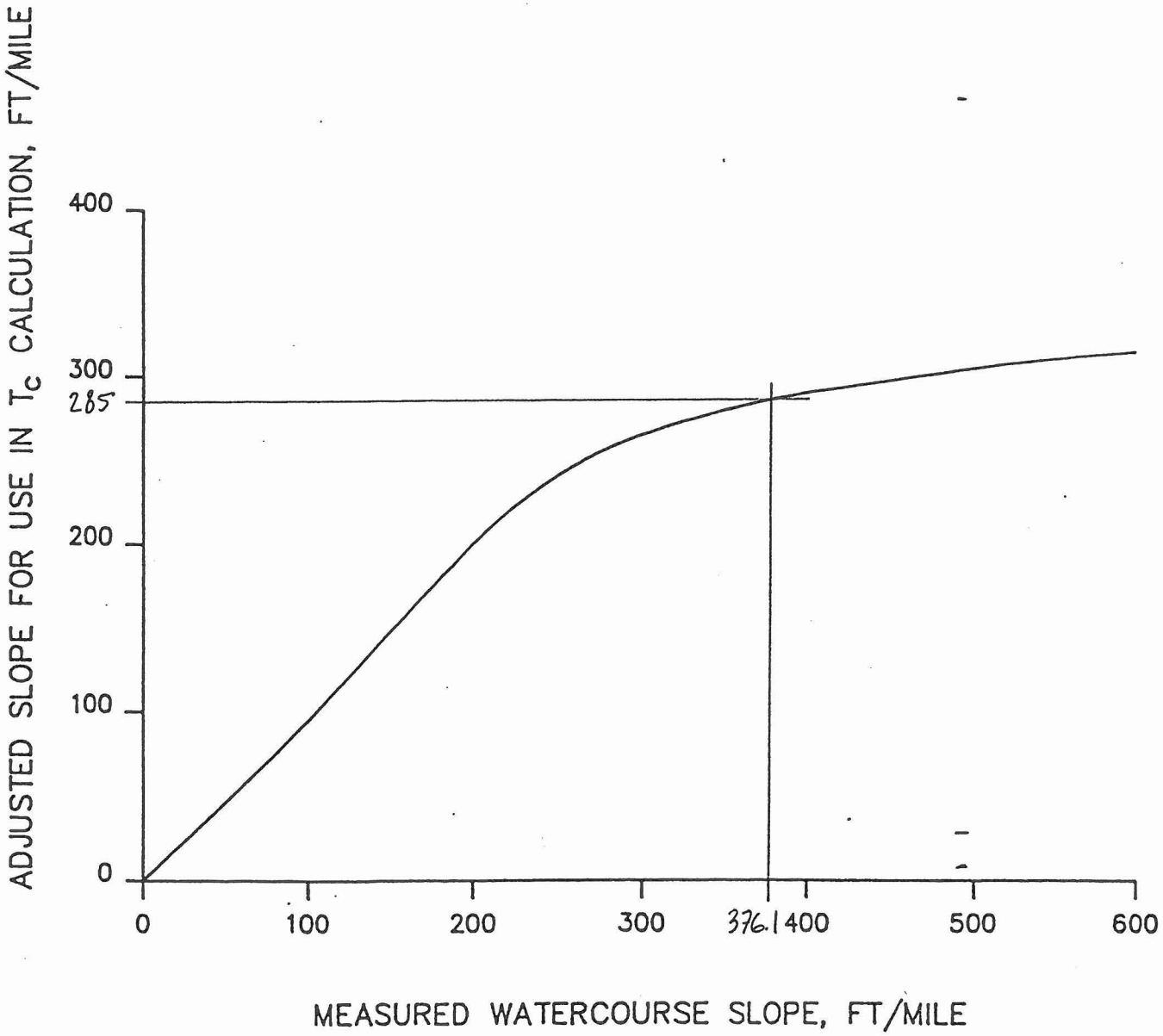


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 C
SLOPE: 283.3 FT/MI
ADJ. SLOPE: 257 FT/MI

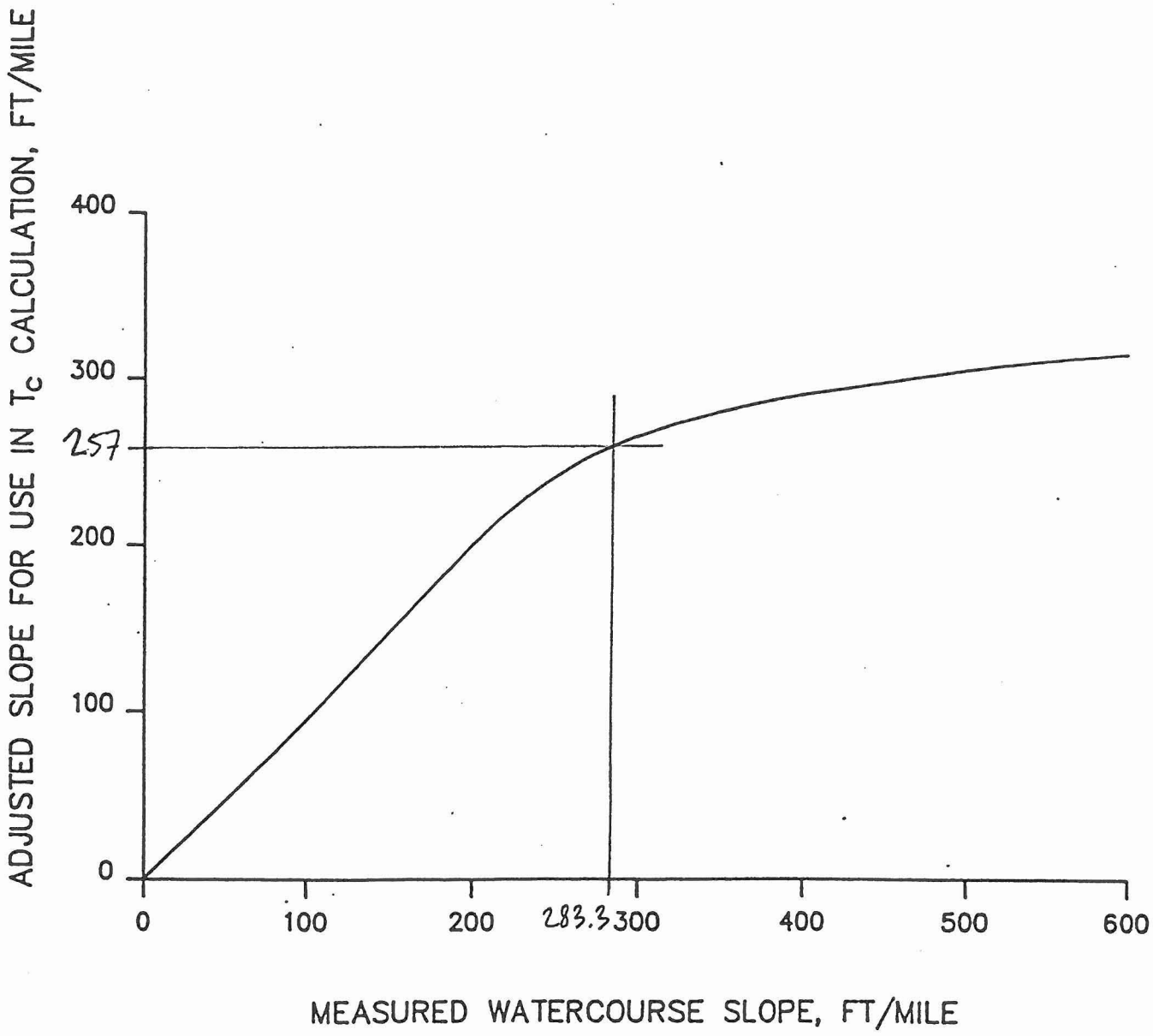


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 D
SLOPE: 403.8 FT/MI
ADJ. SLOPE: 289 FT/MI

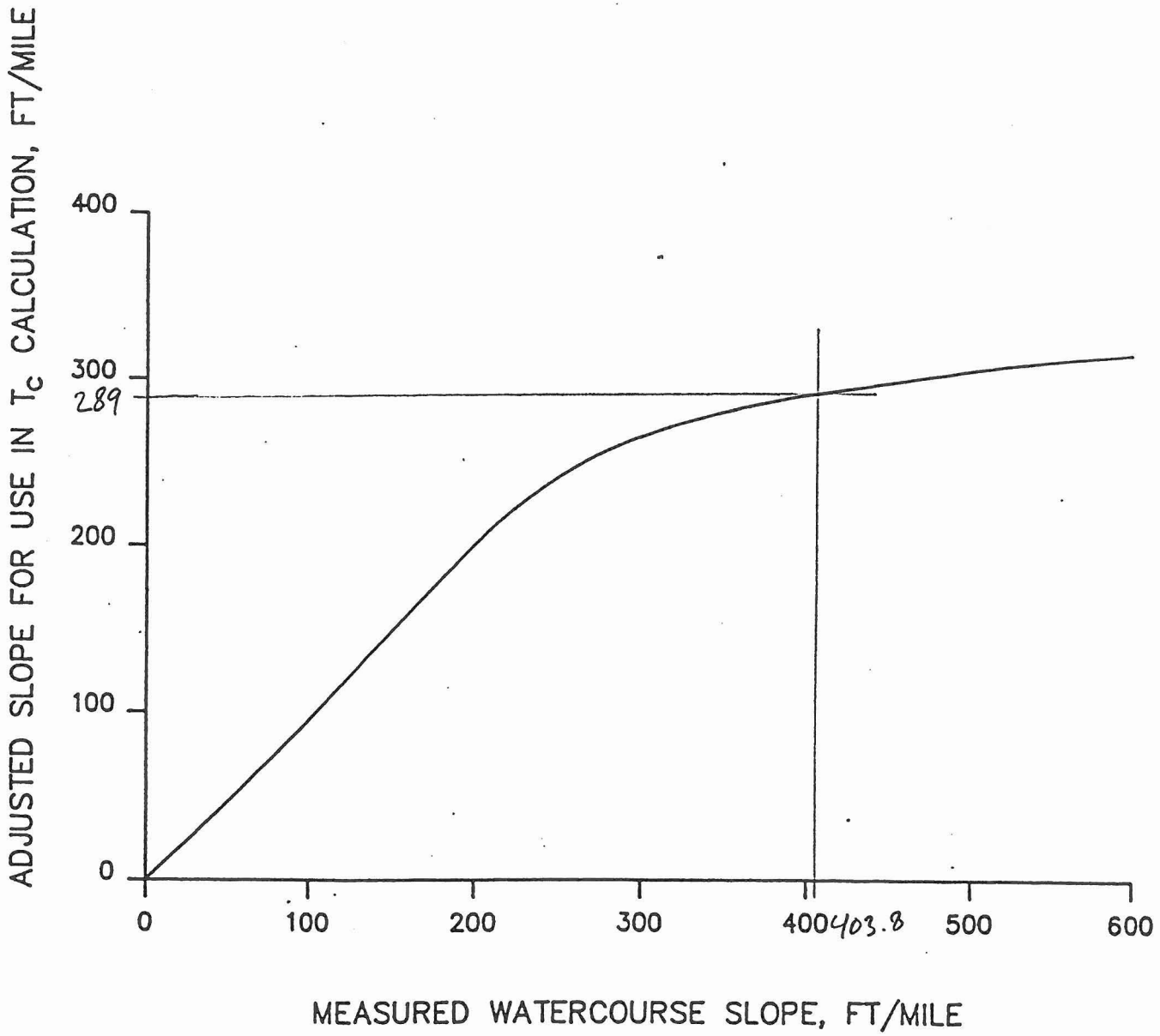


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126E
SLOPE: 327.7 FT/MI
ADJ. SLOPE: 273 FT/MI

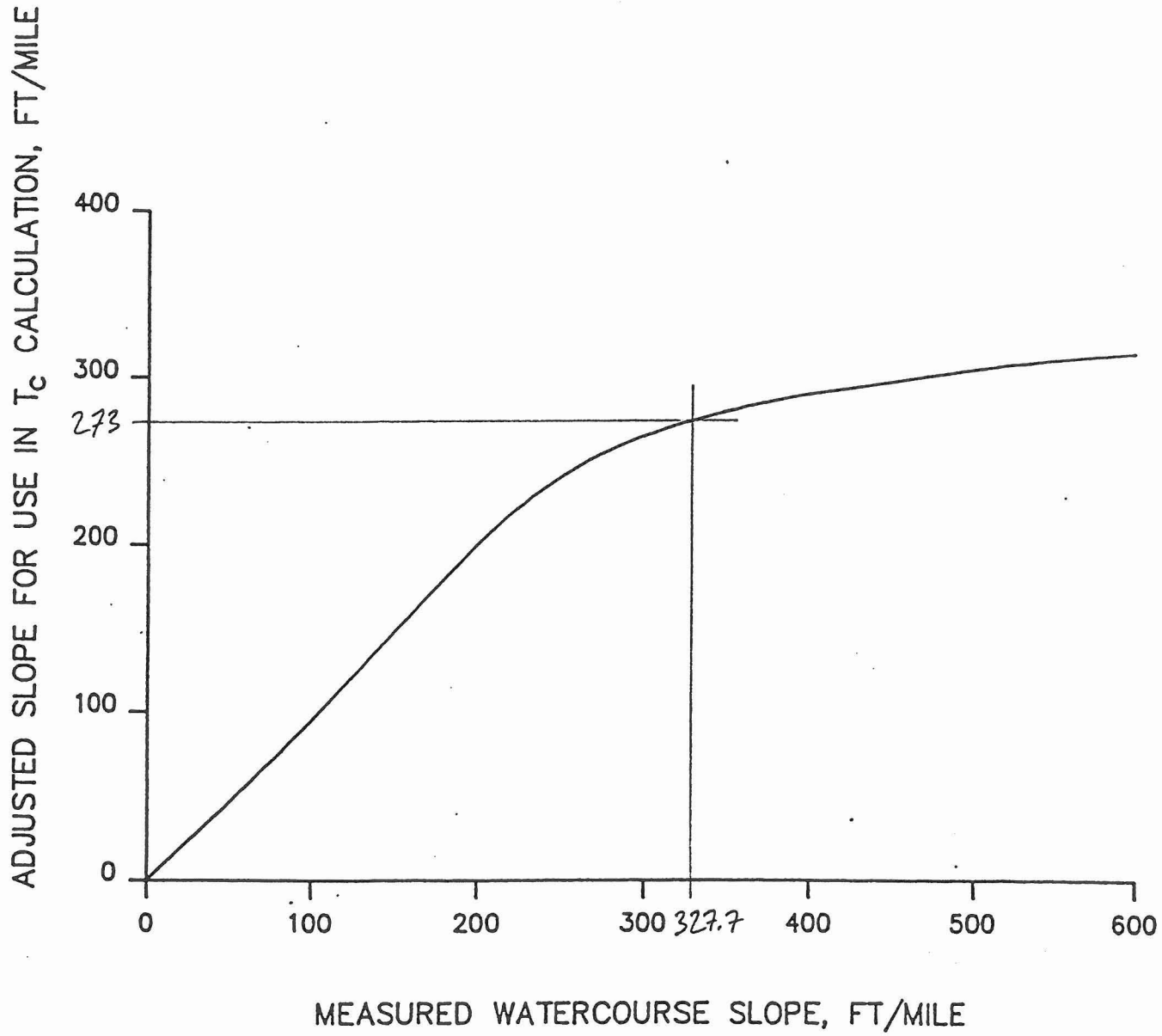


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 F
SLOPE: 600.0 FT/MI
ADJ. SLOPE: 311 FT/MI

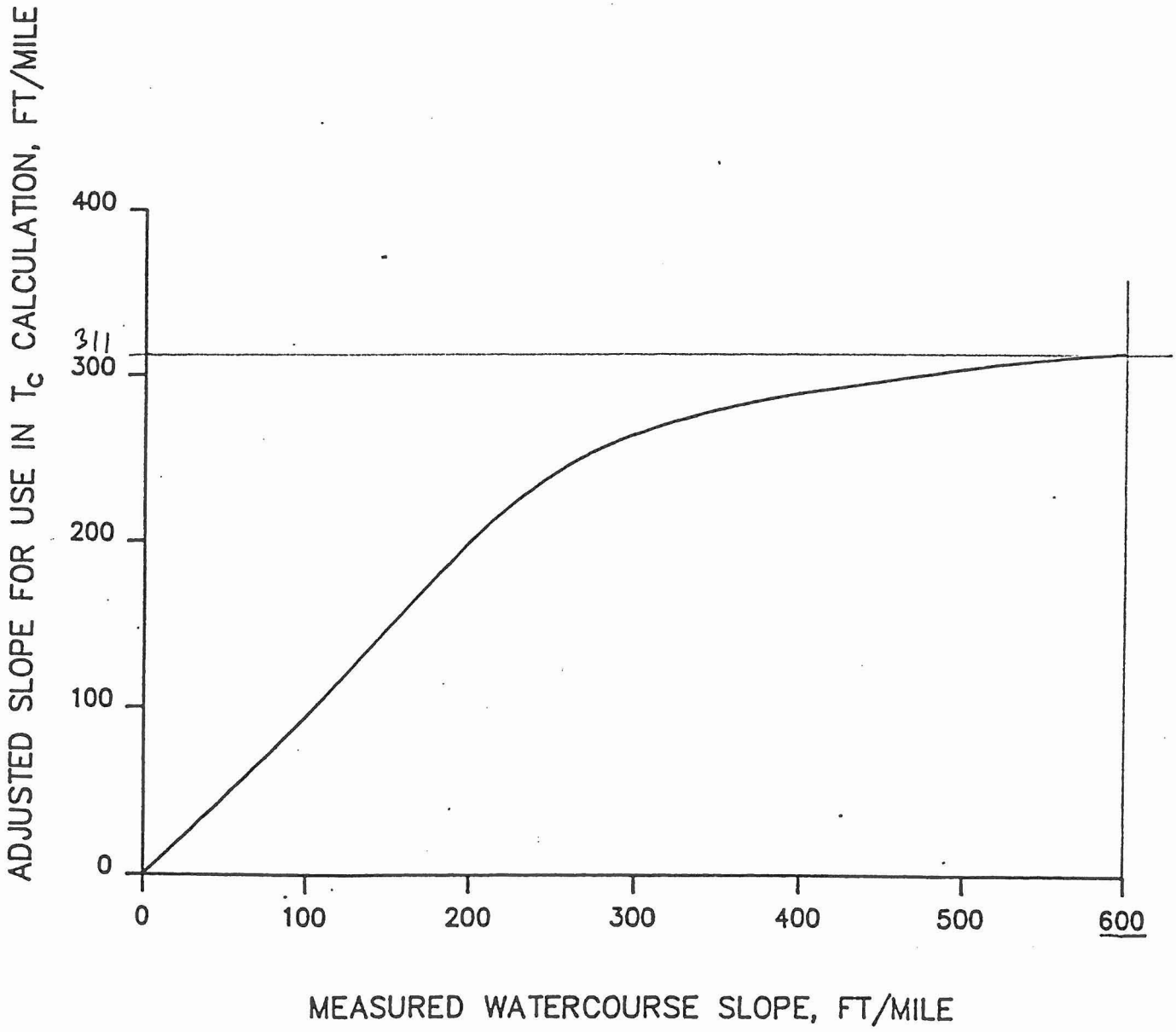


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 G
SLOPE: 429.4 FT/MI
ADJ. SLOPE: 293 FT/MI

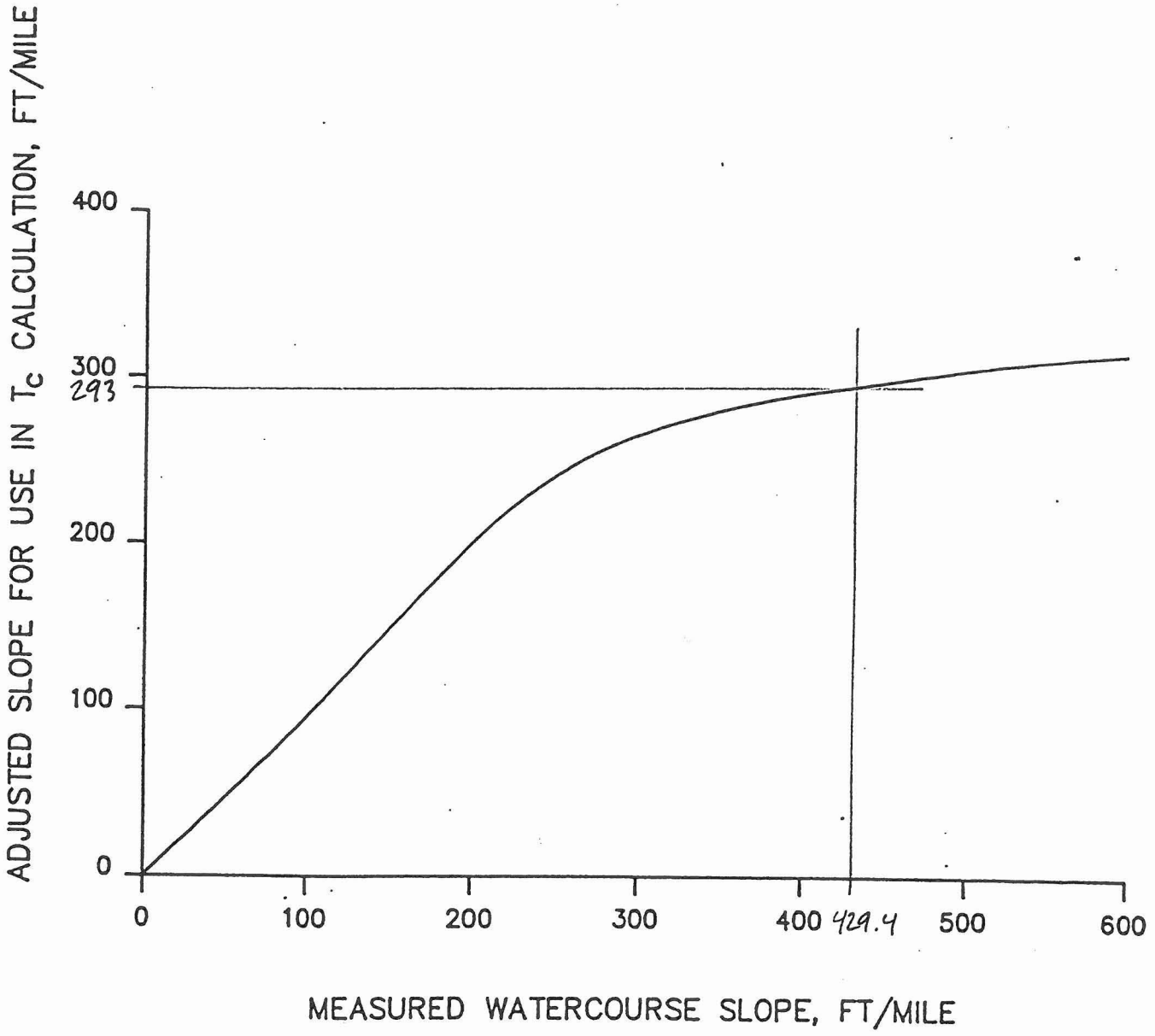


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 H
SLOPE: 485.1 FT/MI
ADJ. SLOPE: 300 FT/MI

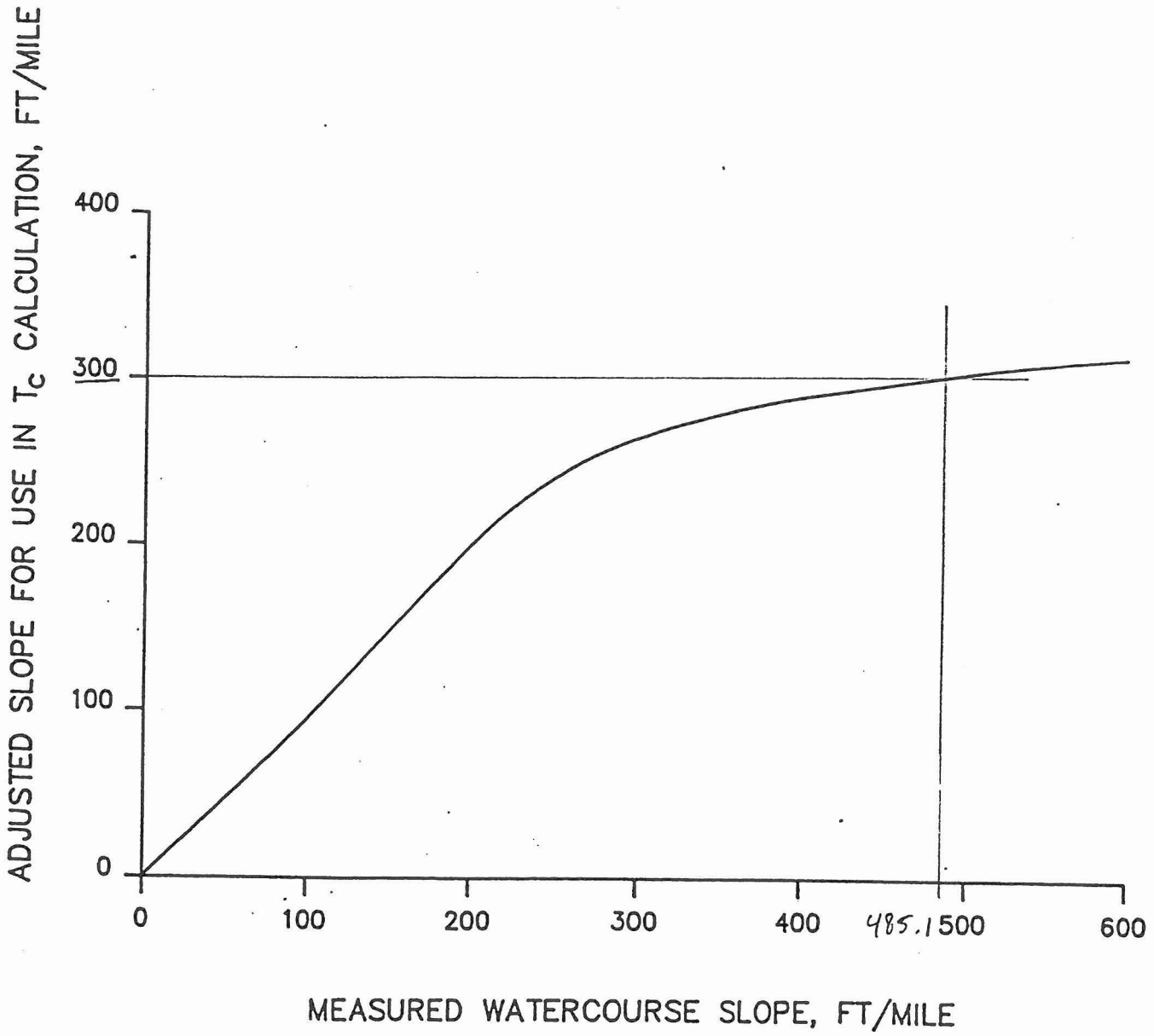


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 I
SLOPE: 319.9 FT/MI
ADJ. SLOPE: 271 FT/MI

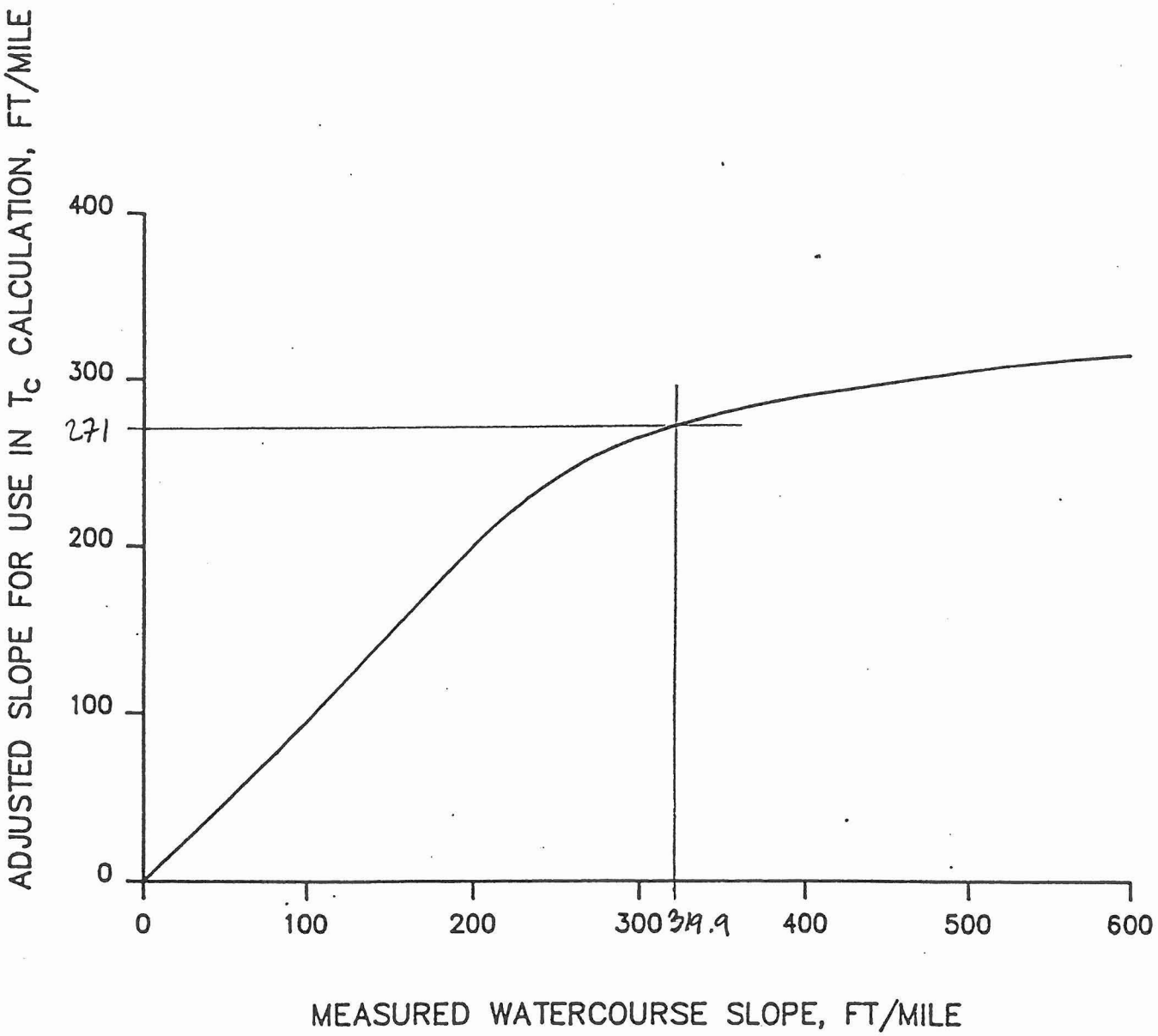


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 K
SLOPE: 286.2 FT/MI
ADJ. SLOPE: 259 FT/MI

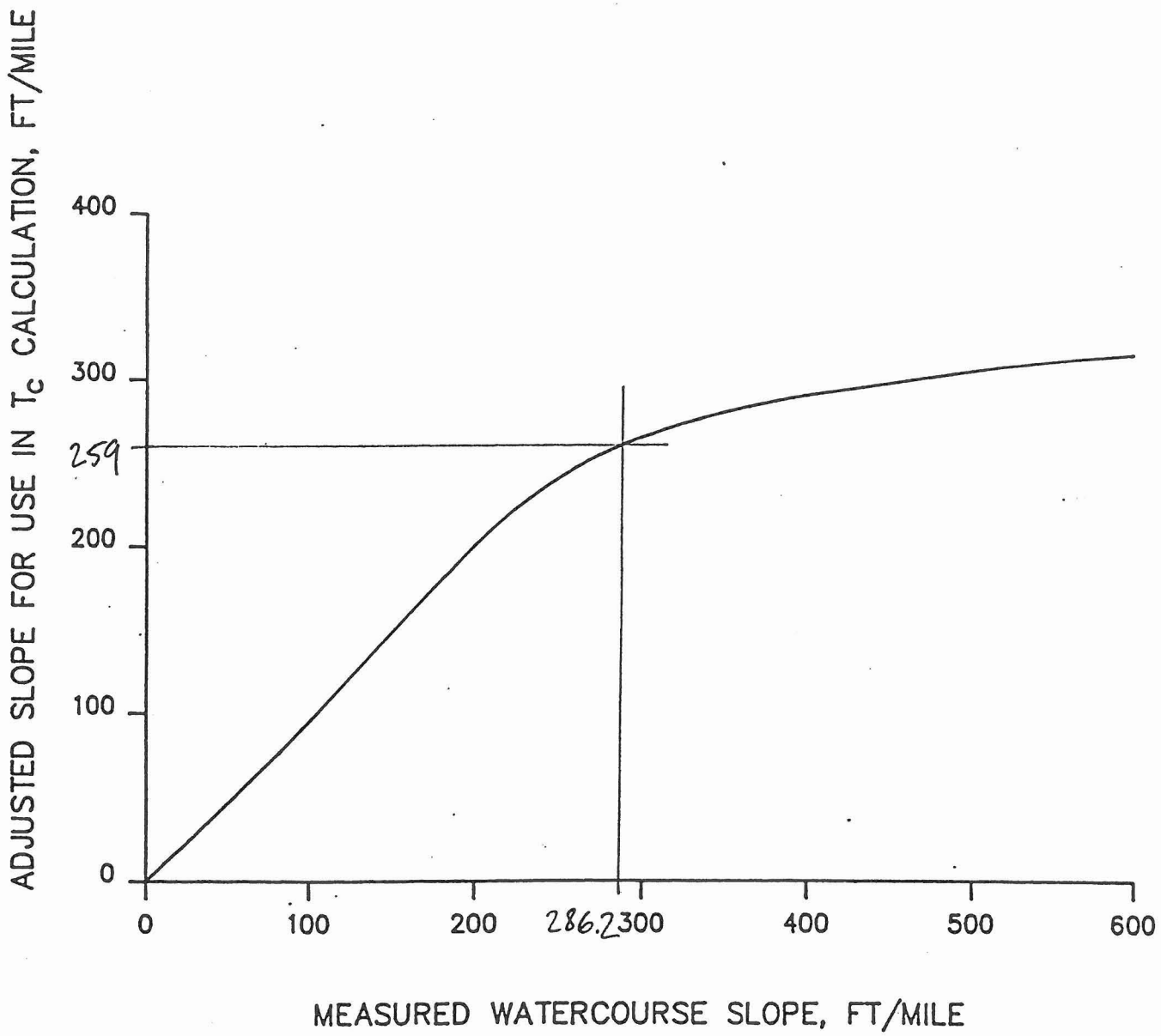


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126 L
SLOPE: 314.2 FT/MI
ADJ. SLOPE: 269 FT/MI

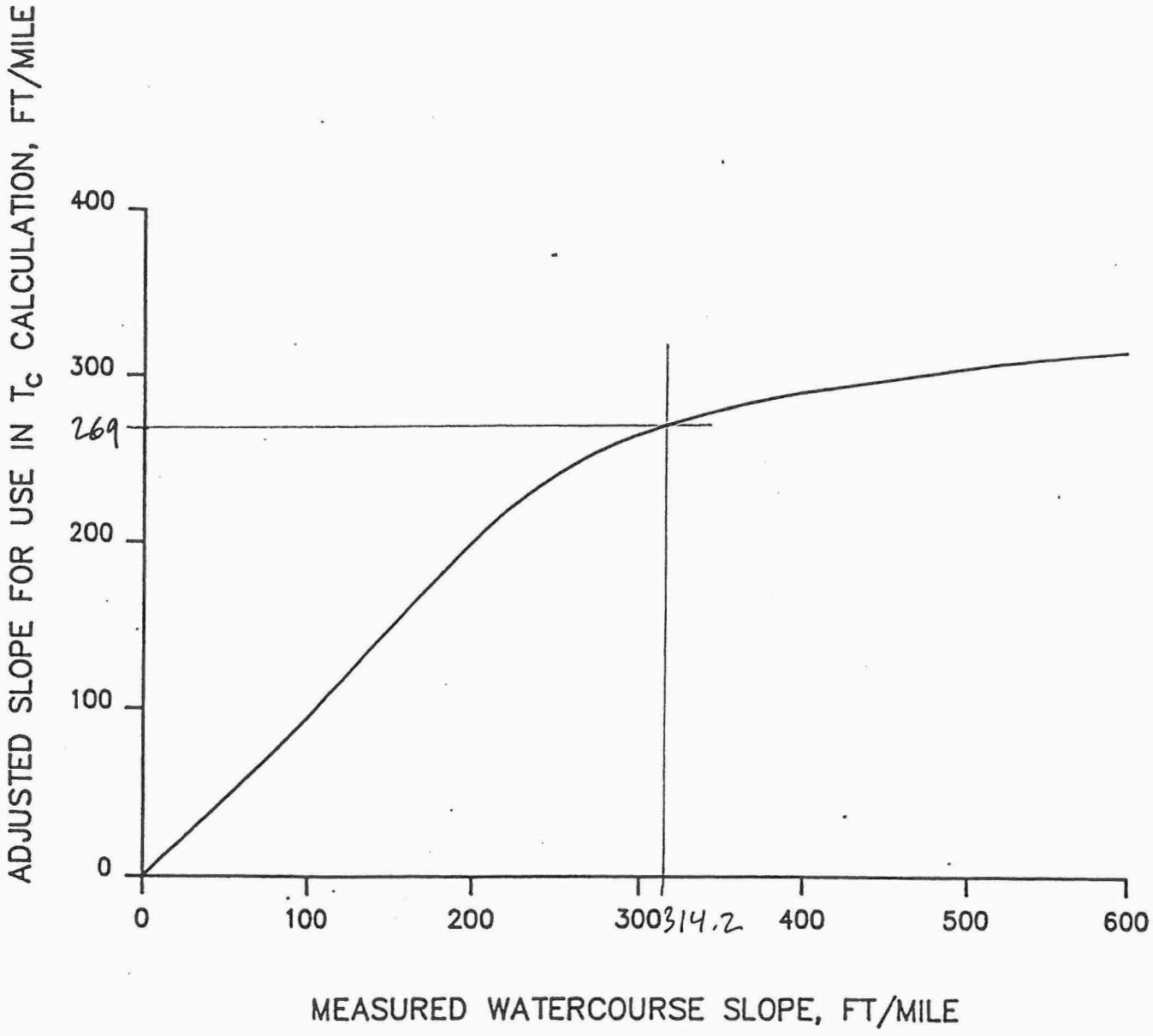


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126M
SLOPE: 347.4 FT/MI
ADJ. SLOPE: 278 FT/MI

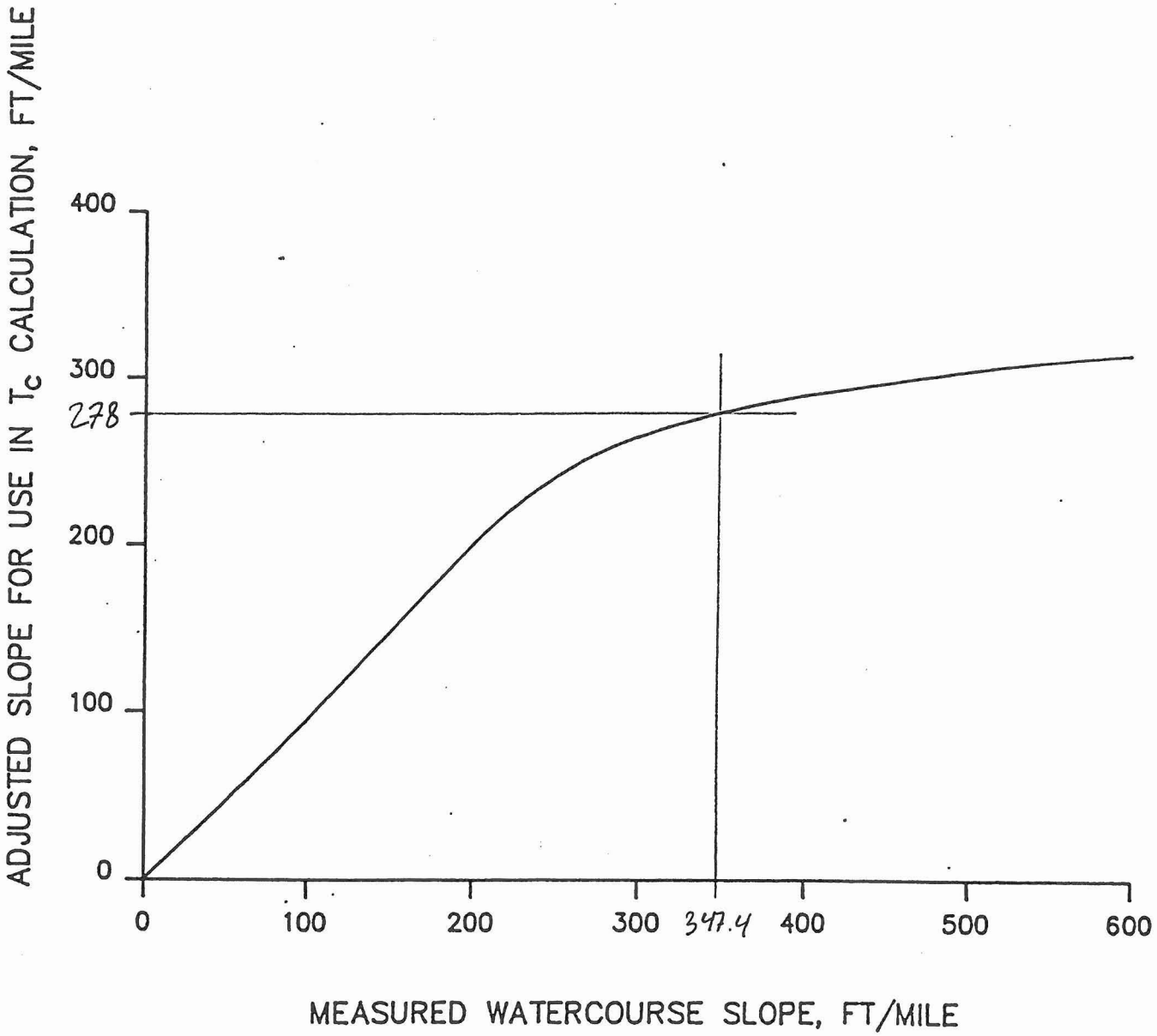


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 126N
SLOPE: 410.5 FT/MI
ADJ. SLOPE: 290 FT/MI

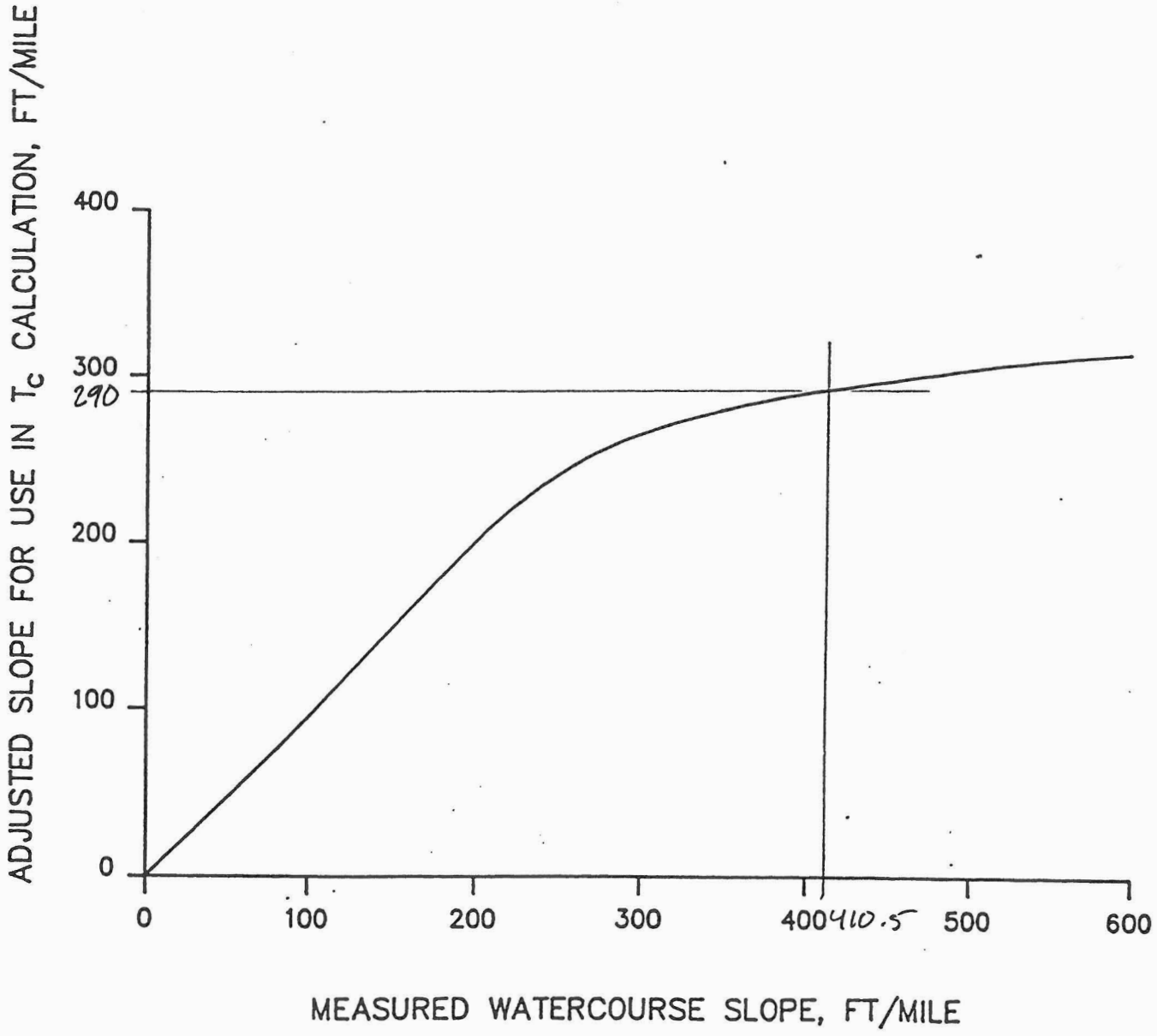


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 A
SLOPE: 433.5 FT/MI
ADJ. SLOPE: 293 FT/MI

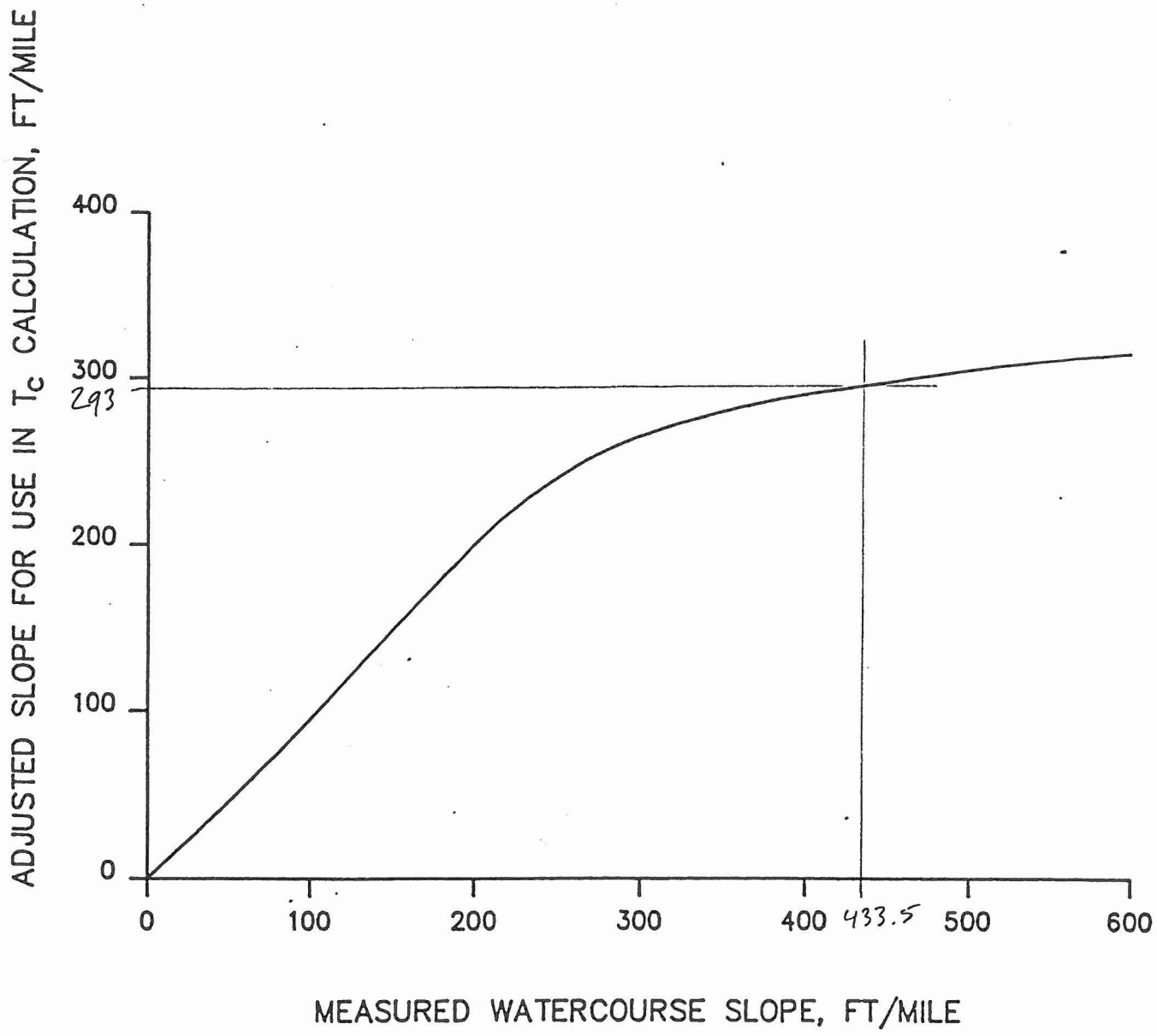


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 B
SLOPE: 516.3 FT/MI
ADJ. SLOPE: 305 FT/MI

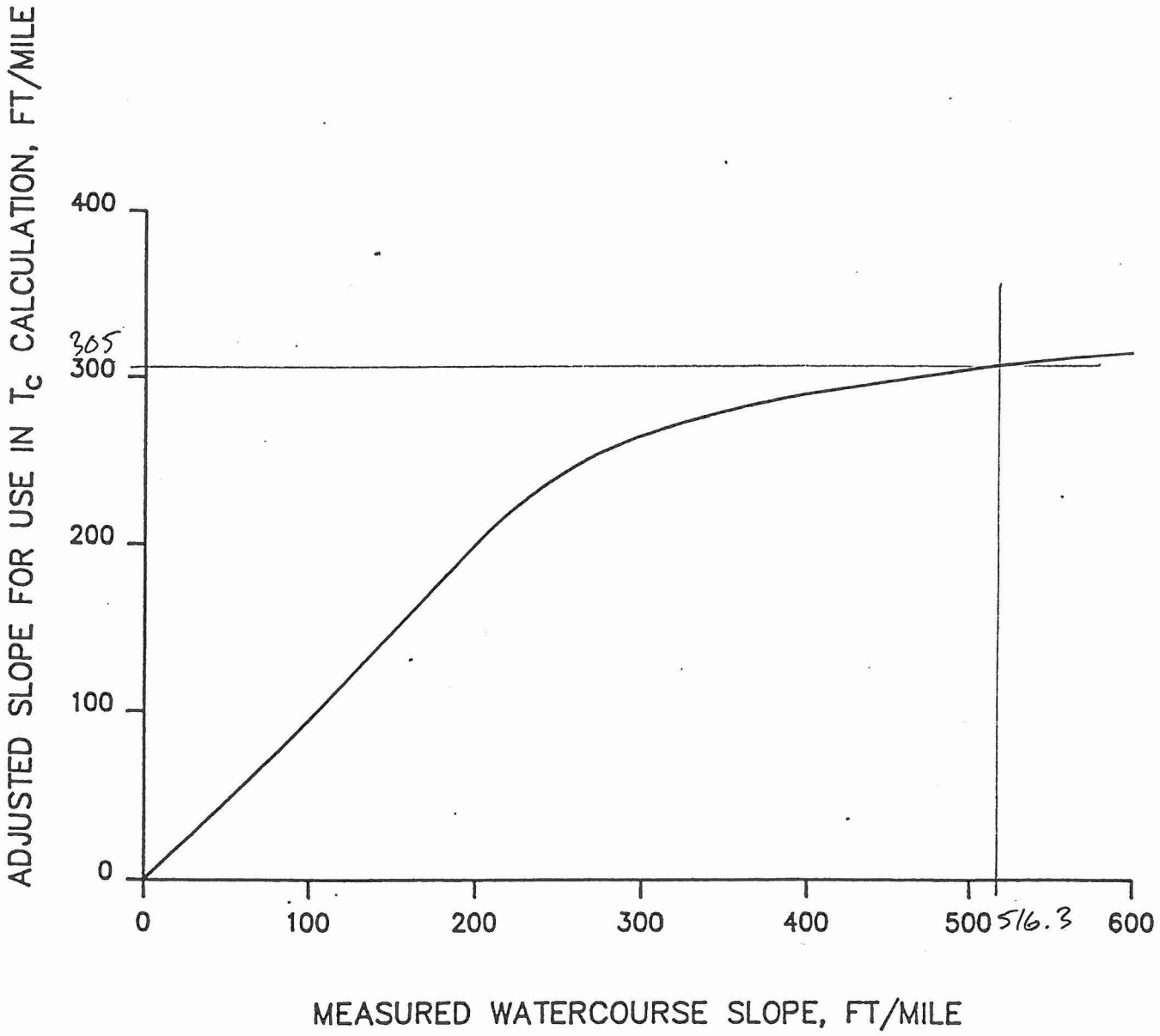


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127C
SLOPE: 368.6 FT/MI
ADJ. SLOPE: 283 FT/MI

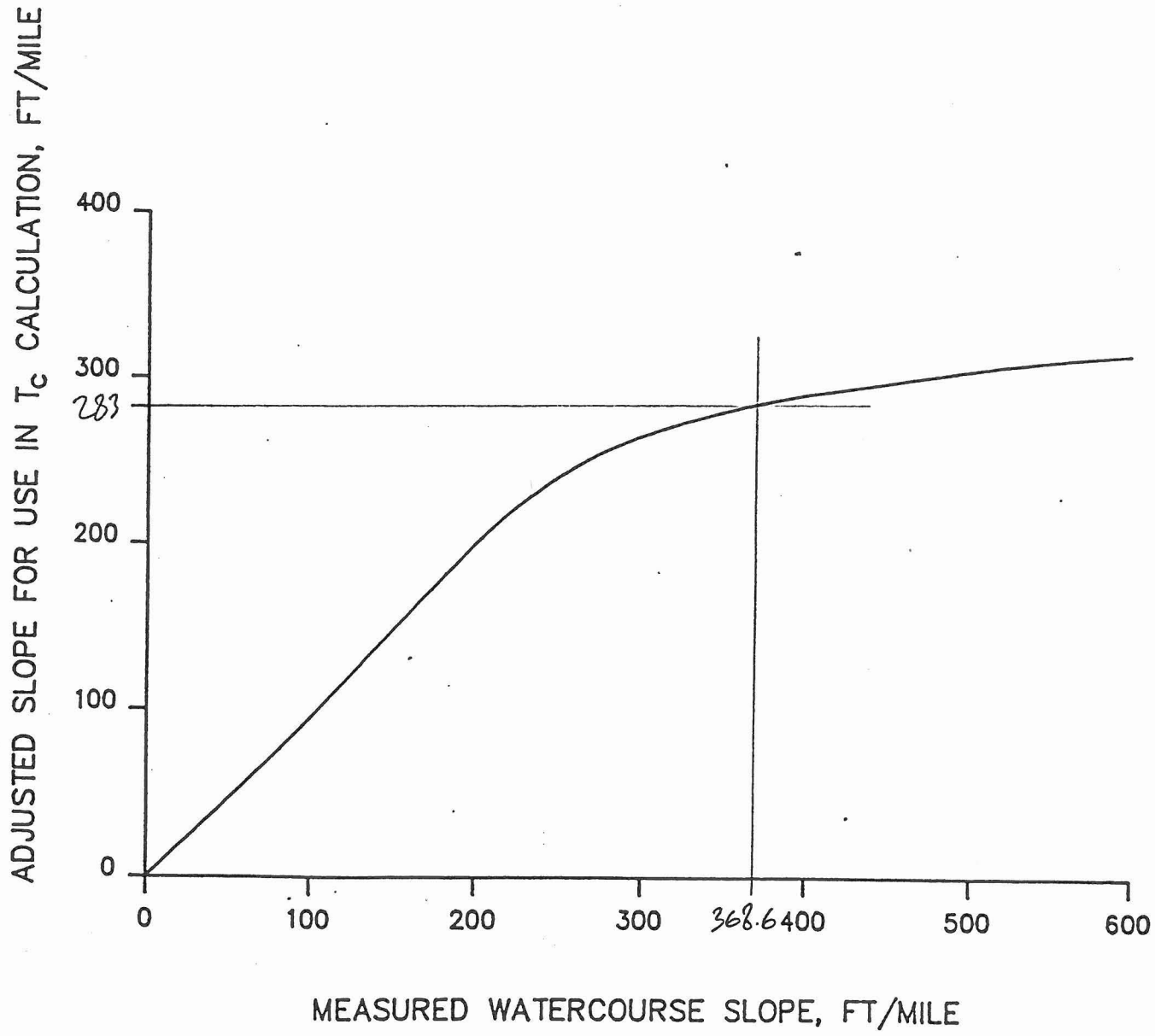


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 D
SLOPE: 395.6 FT/MI
ADJ. SLOPE: 288 FT/MI

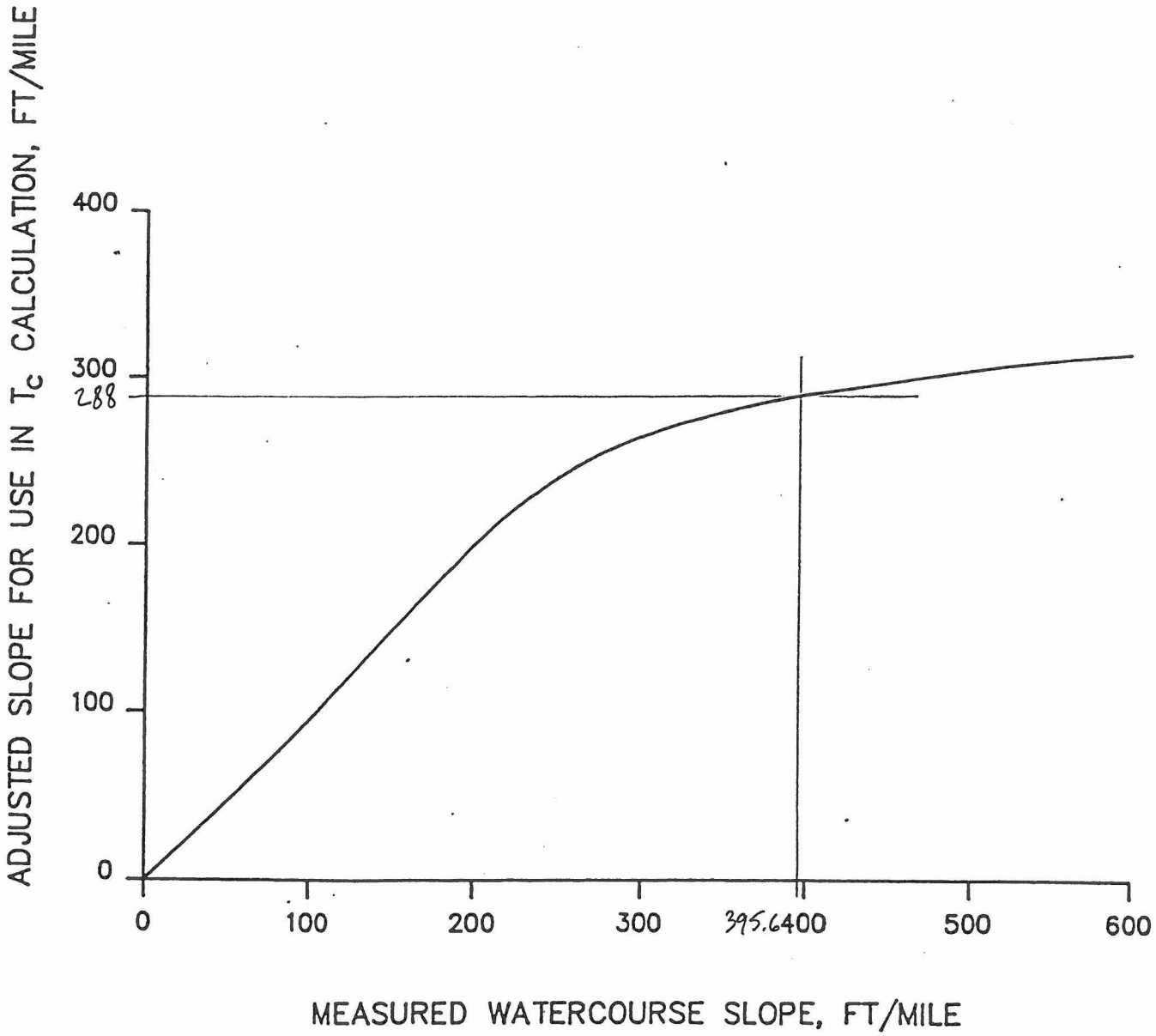


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 E
SLOPE: 458.6 FT/MI
ADJ. SLOPE: 296 FT/MI

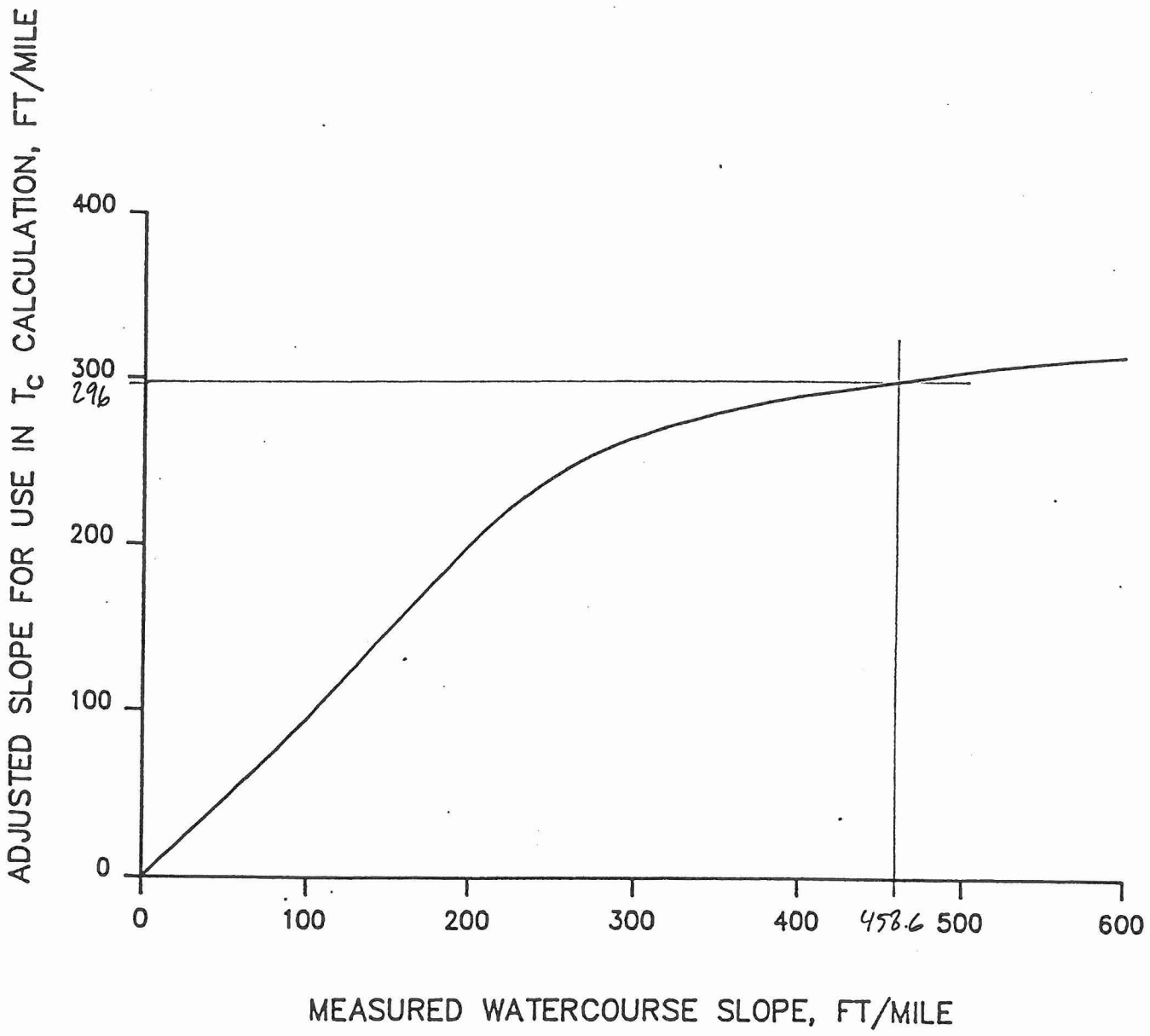


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127F
SLOPE: 471.5 FT/MI
ADJ. SLOPE: 297 FT/MI

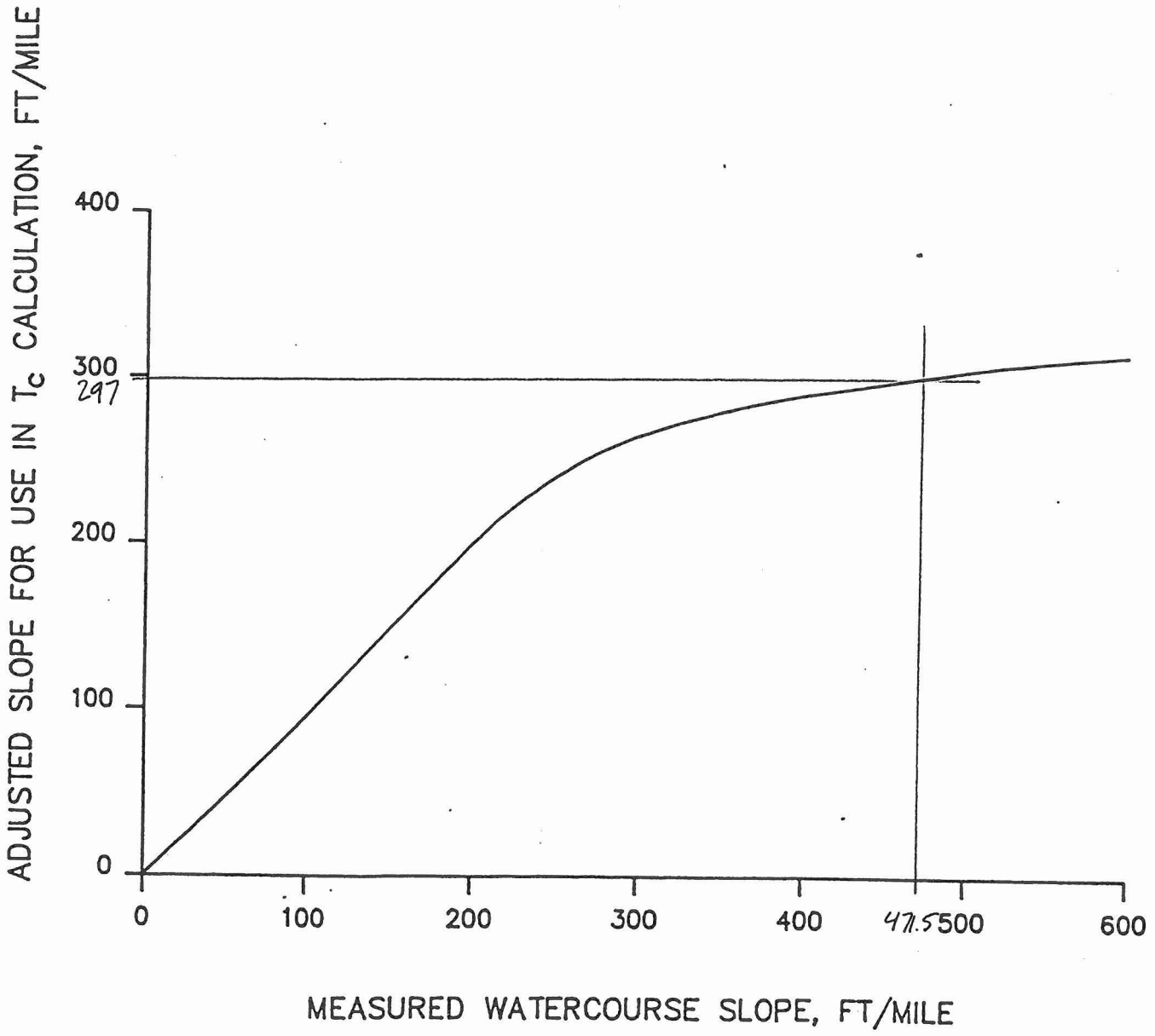


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 12T G
SLOPE: 395.1 FT/MI
ADJ. SLOPE: 288 FT/MI

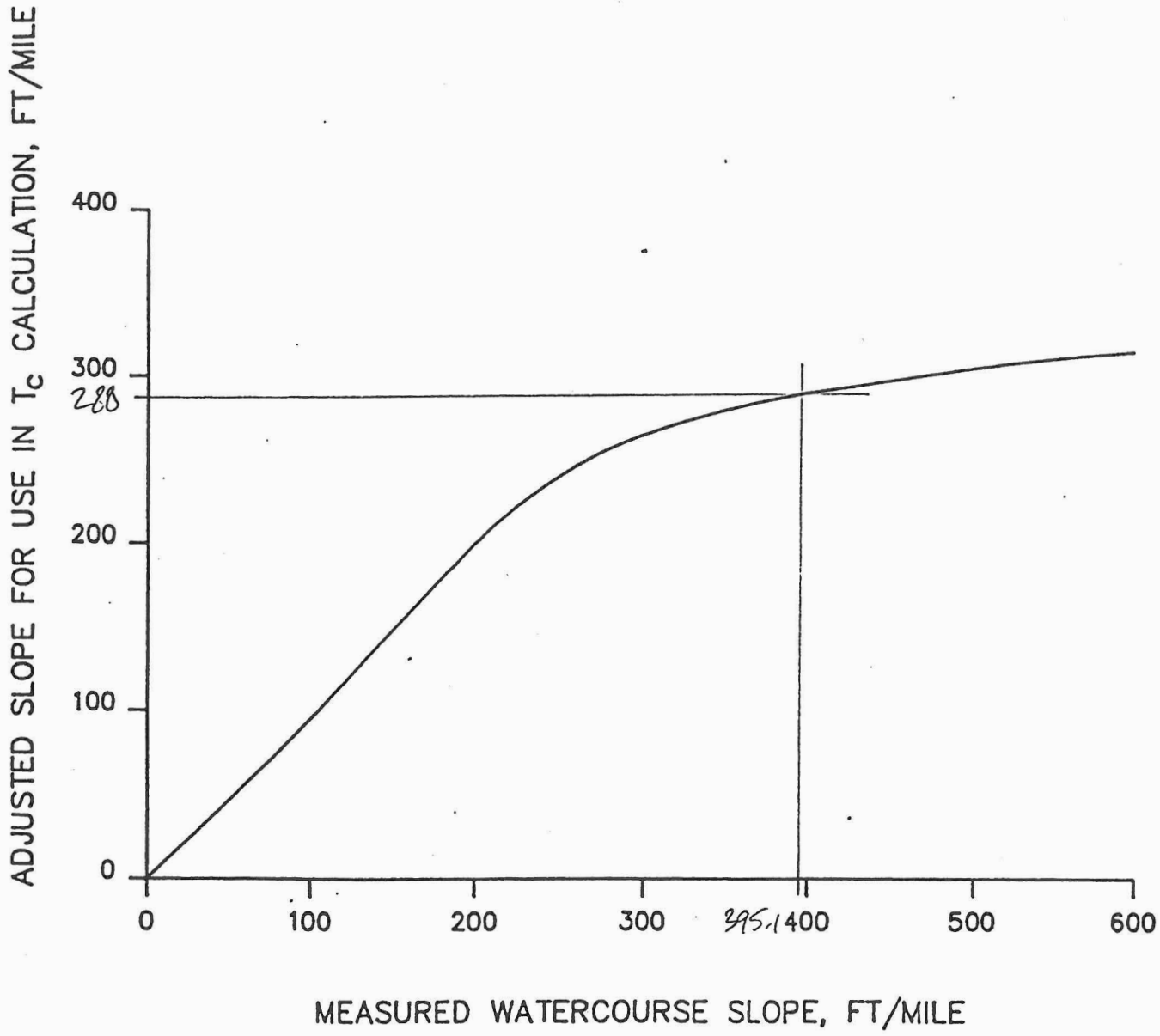


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

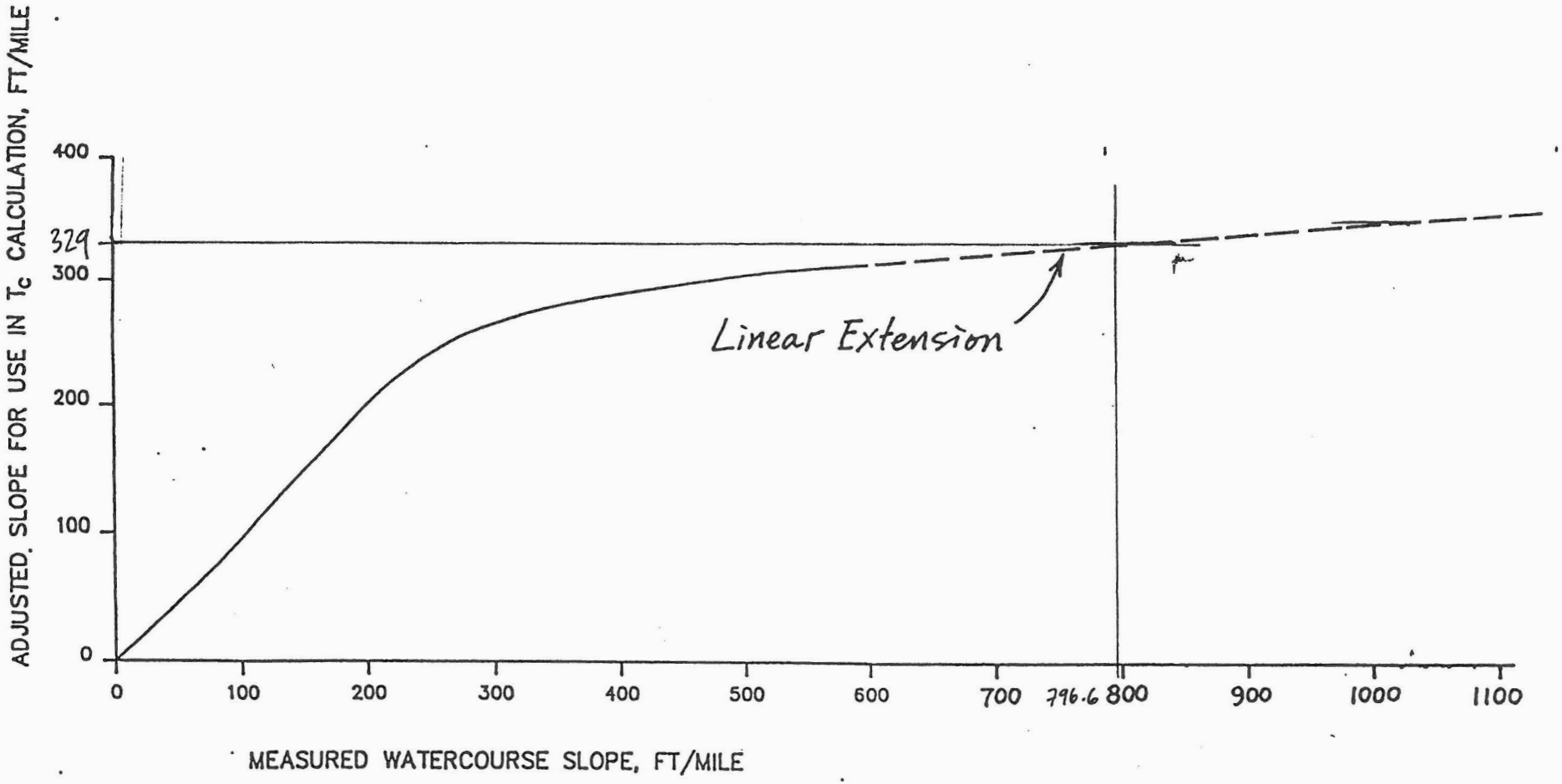


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 H
SLOPE: 796.6 FT/MI
ADJ. SLOPE: 329 FT/MI

CEREUS WASH WATERSHED
BASIN 127 I
SLOPE: 309.8 FT/MI
ADJ. SLOPE: 269 FT/MI

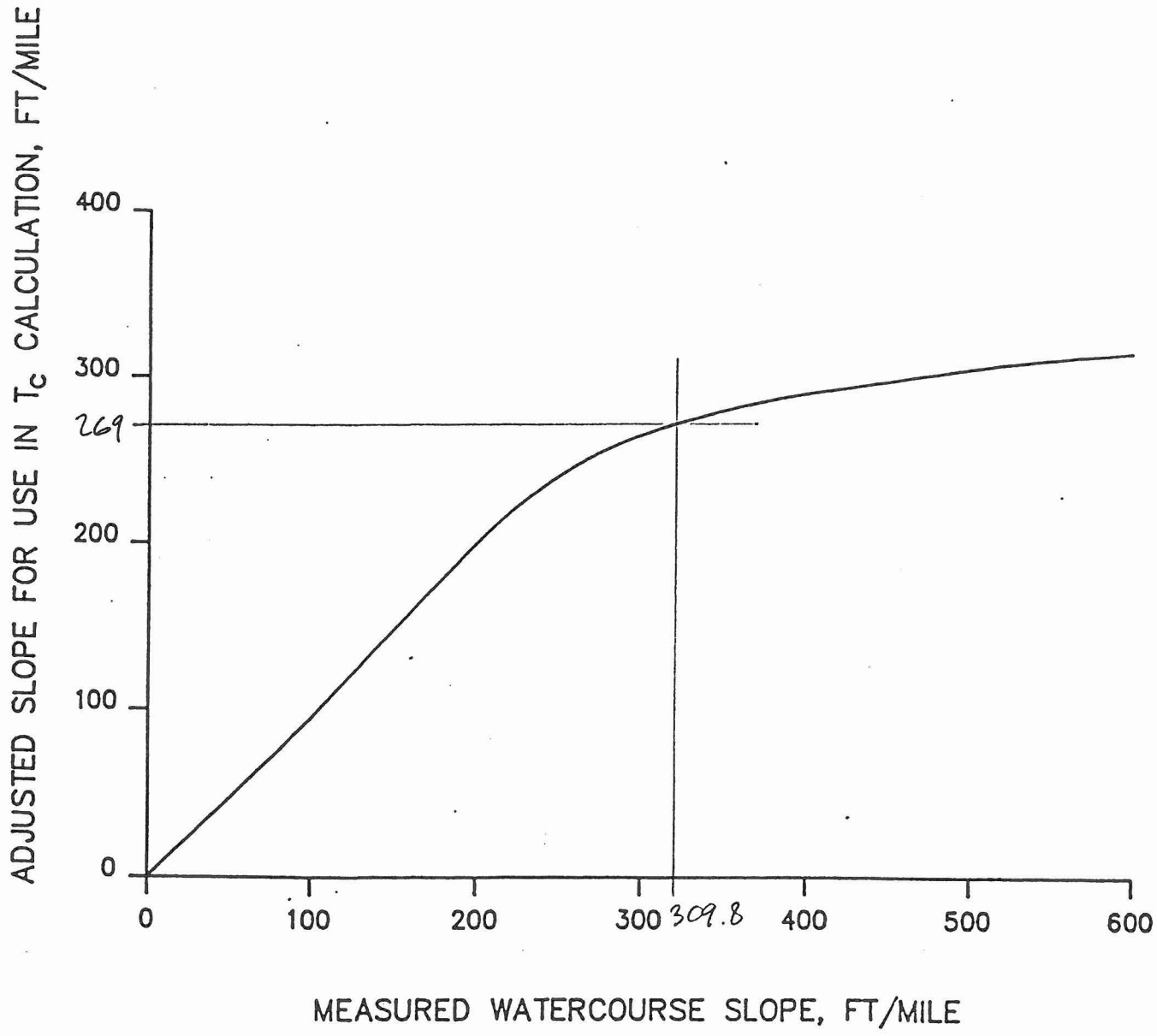


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

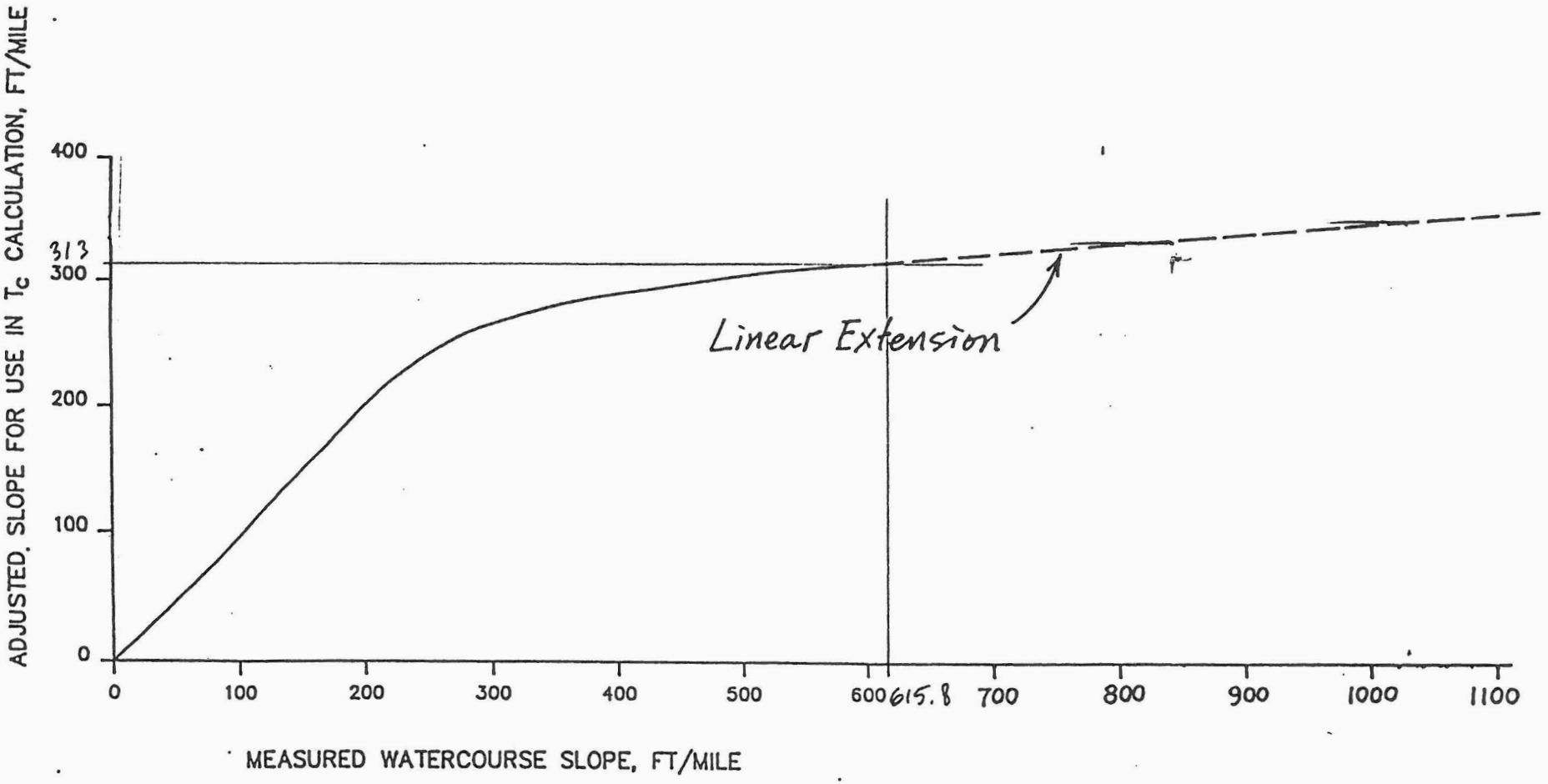


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CEREUS WASH WATERSHED
BASIN 127 J
SLOPE: 615.8 FT/MI
ADJ. SLOPE: 313 FT/MI

D.3

CYPRUS POINT WASH

CYPRUS POINT WASH WATERSHED
BASIN 130A
SLOPE: 224.4 FT/MI
ADJ. SLOPE: 221 FT/MI

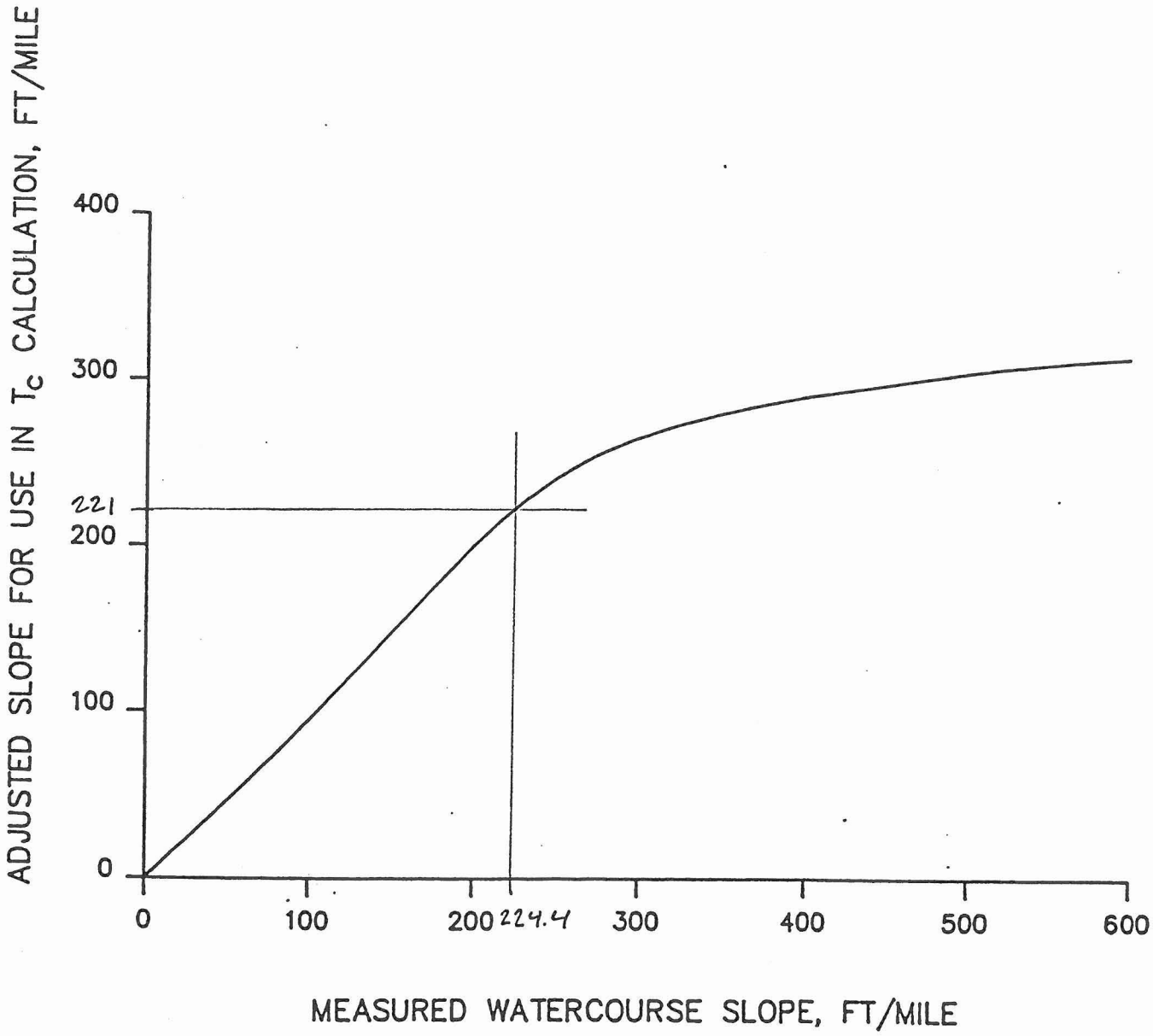


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CYPRUS POINT WASH WATERSHED
BASIN 130B
SLOPE: 345.9 FT/MI
ADJ. SLOPE: 277 FT/MI

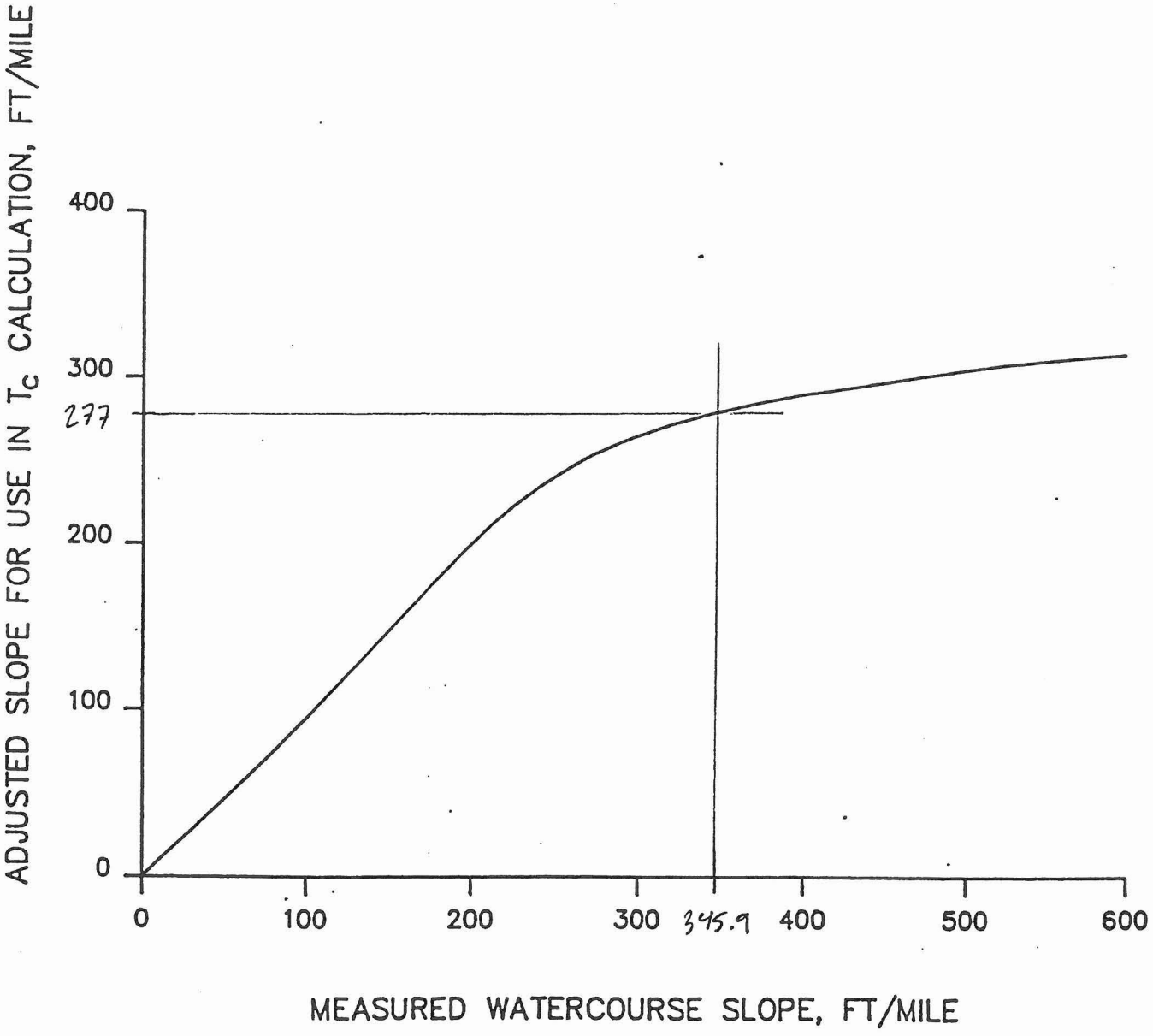


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CYPRUS POINT WASH WATERSHED
BASIN 130D
SLOPE: 291.5 FT/MI
ADJ. SLOPE: 262 FT/MI

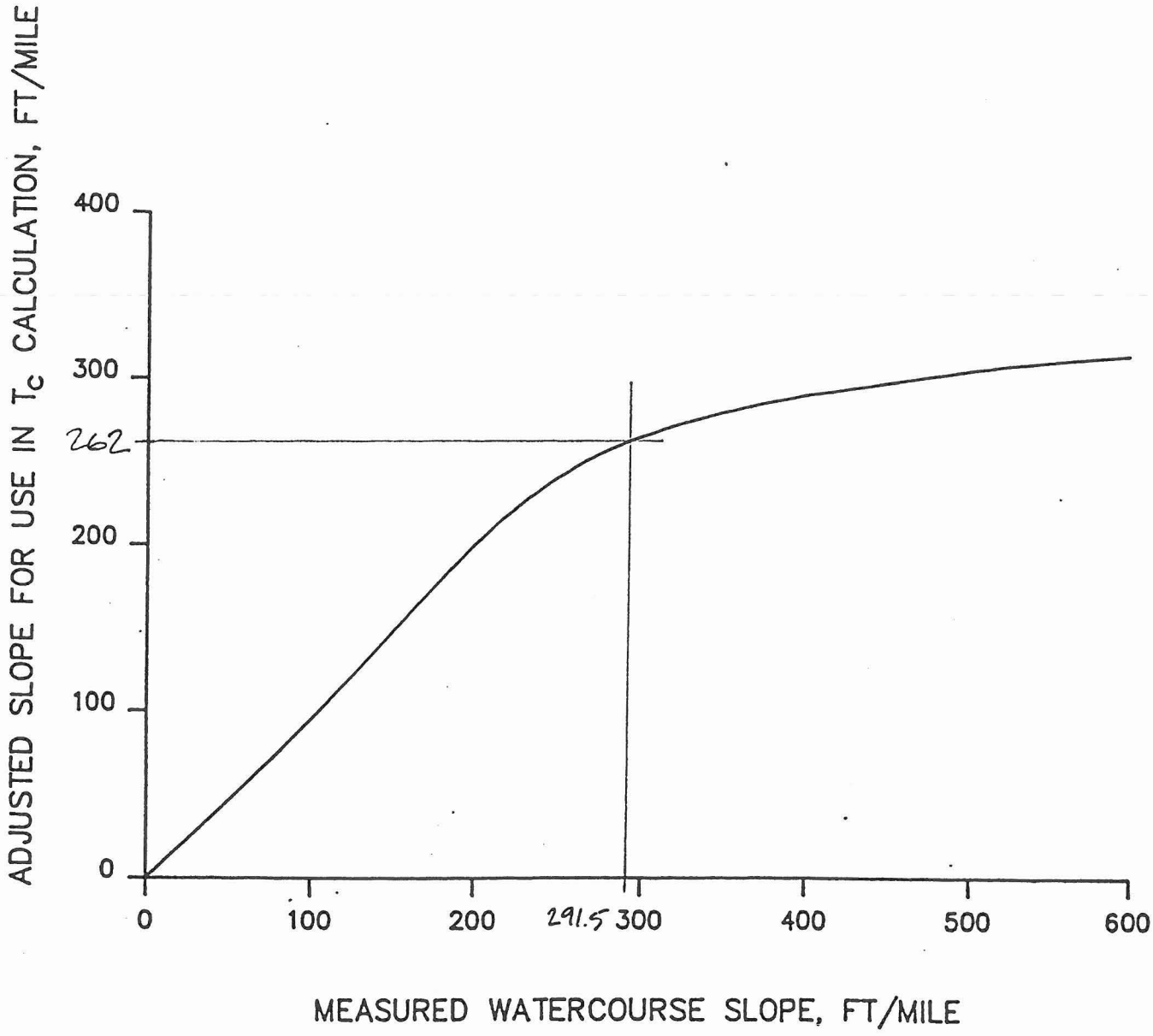


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CYPRUS POINT WASH WATERSHED
BASIN 130E
SLOPE: 275.9 FT/MI
ADJ. SLOPE: 254 FT/MI

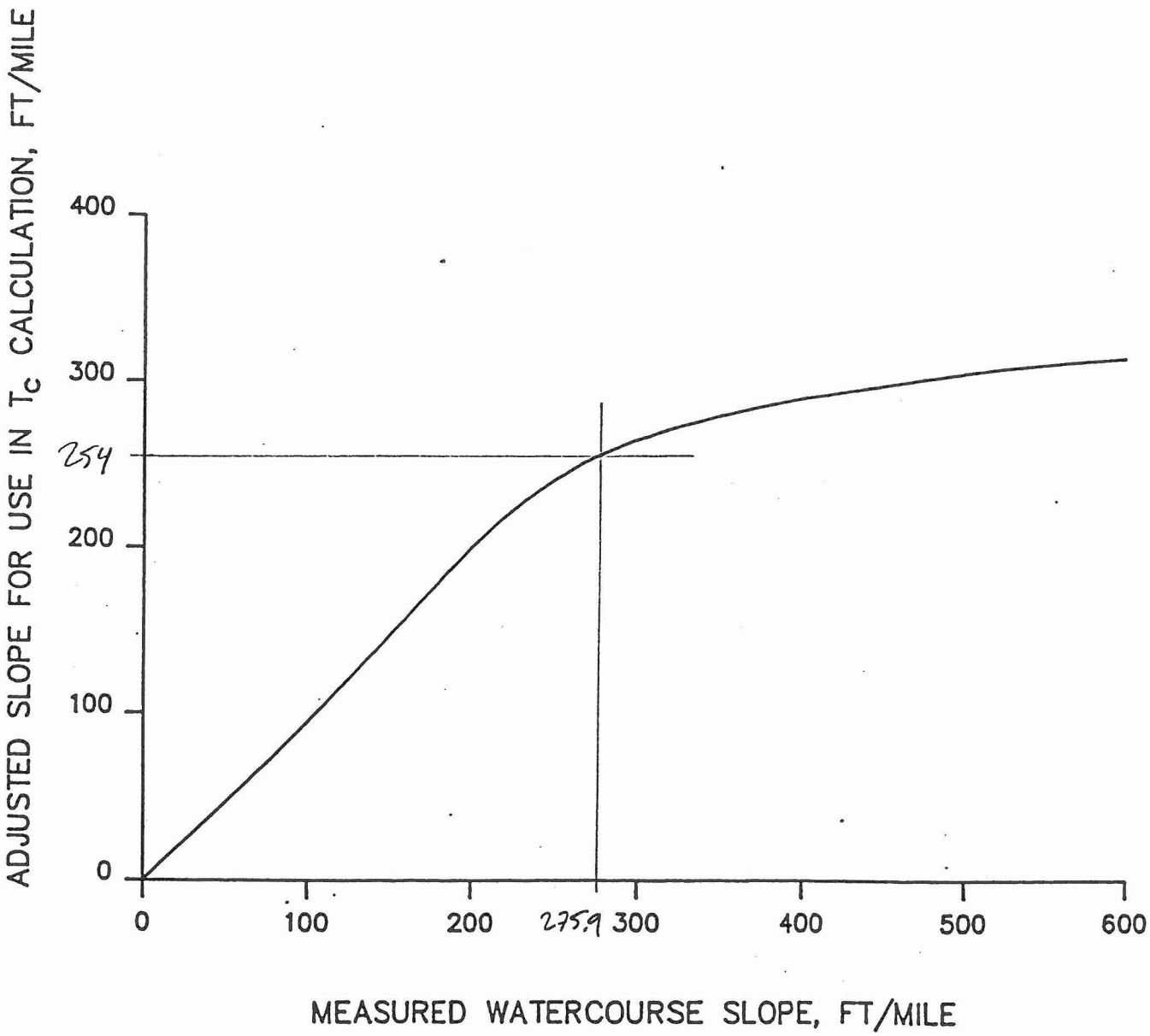


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CYPRUS POINT WASH WATERSHED
BASIN 130F
SLOPE: 222.9 FT/MI
ADJ. SLOPE: 221 FT/MI

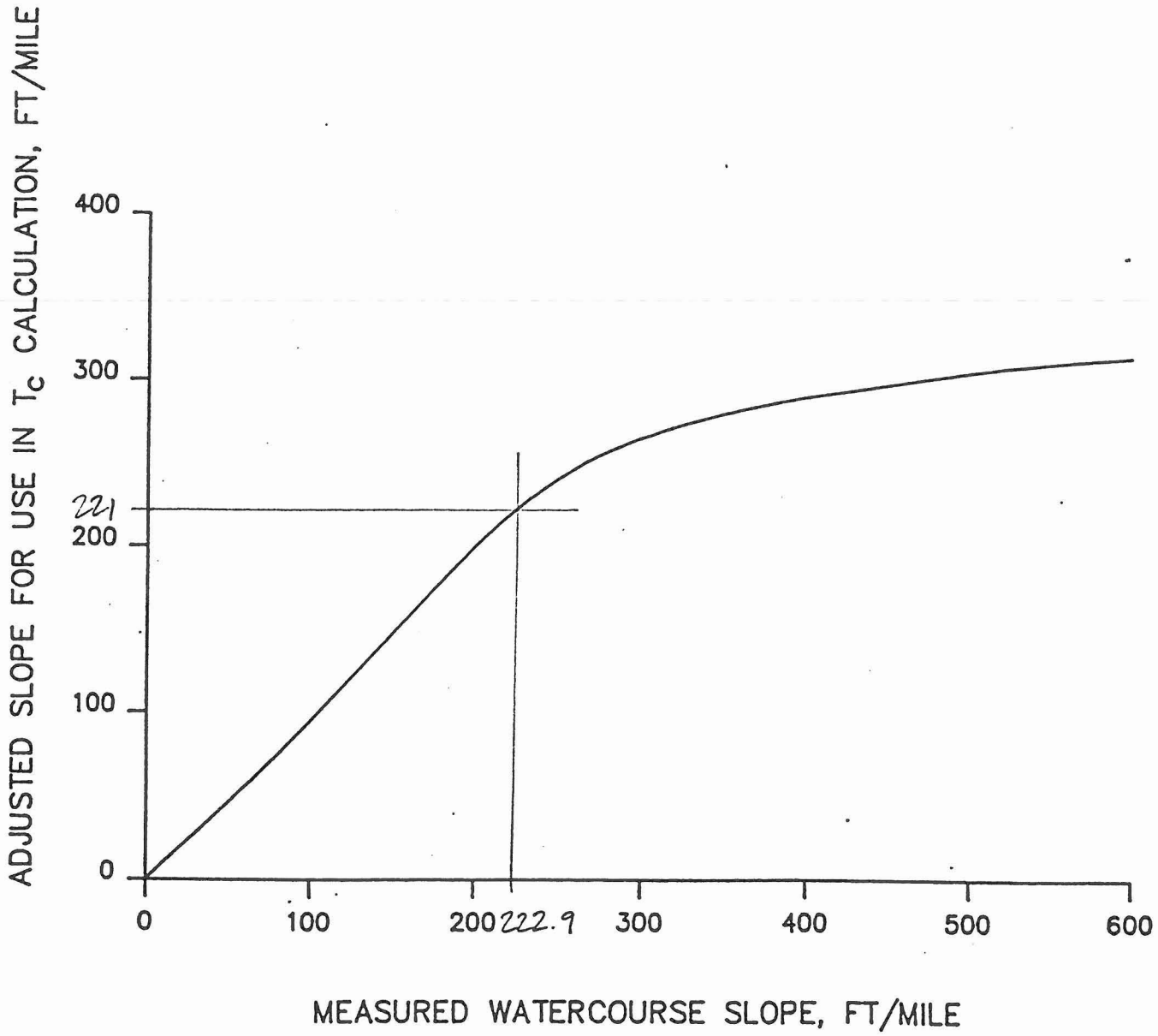


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

CYPRUS POINT WASH WATERSHED
BASIN 131A
SLOPE: 281.0 FT/MI
ADJ. SLOPE: 256 FT/MI

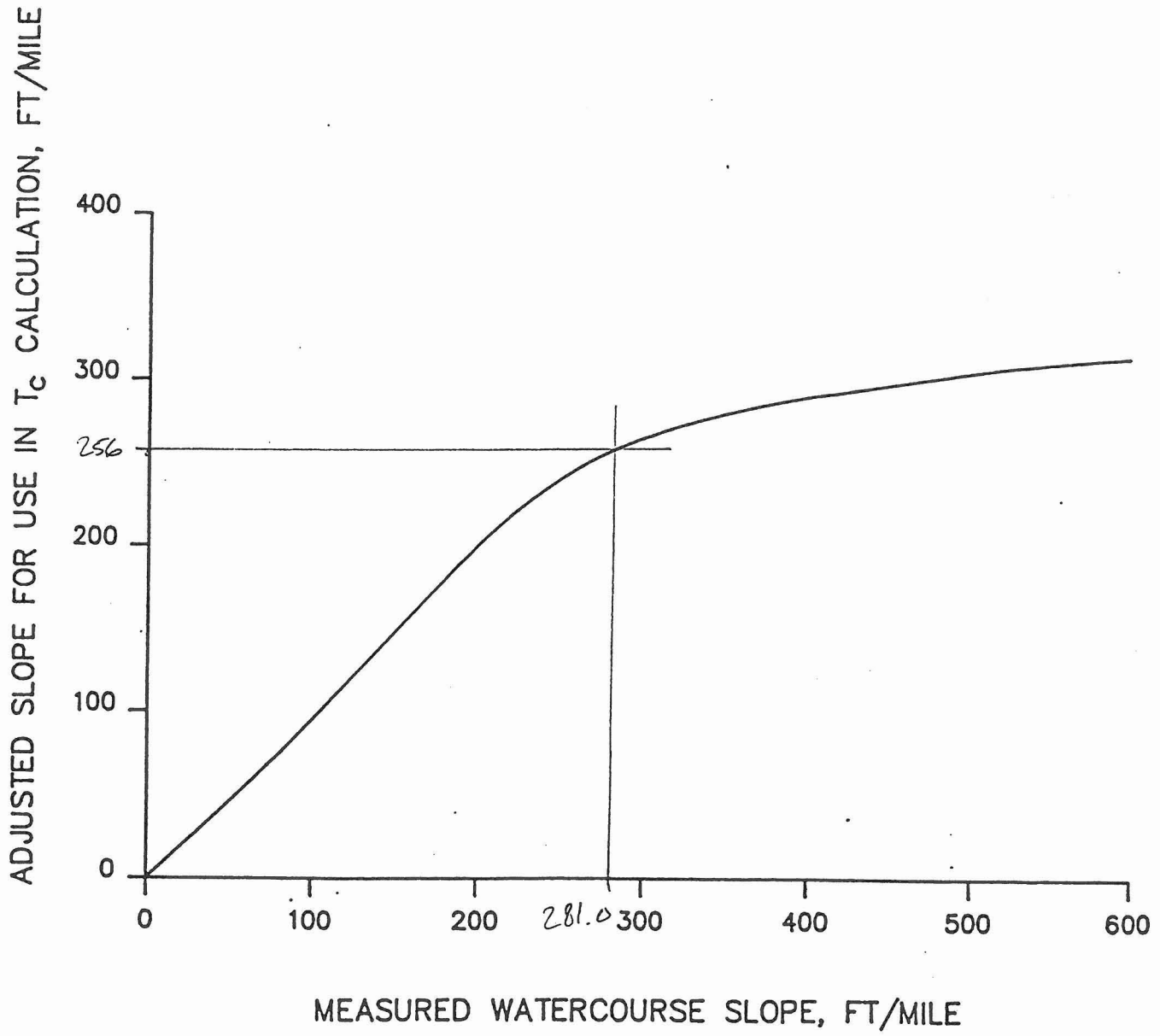


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

D.4

JACKLIN WASH

JACKLIN WASH WATERSHED
BASIN 150B
SLOPE: 336.8 FT/MI
ADJ. SLOPE: 275 FT/MI

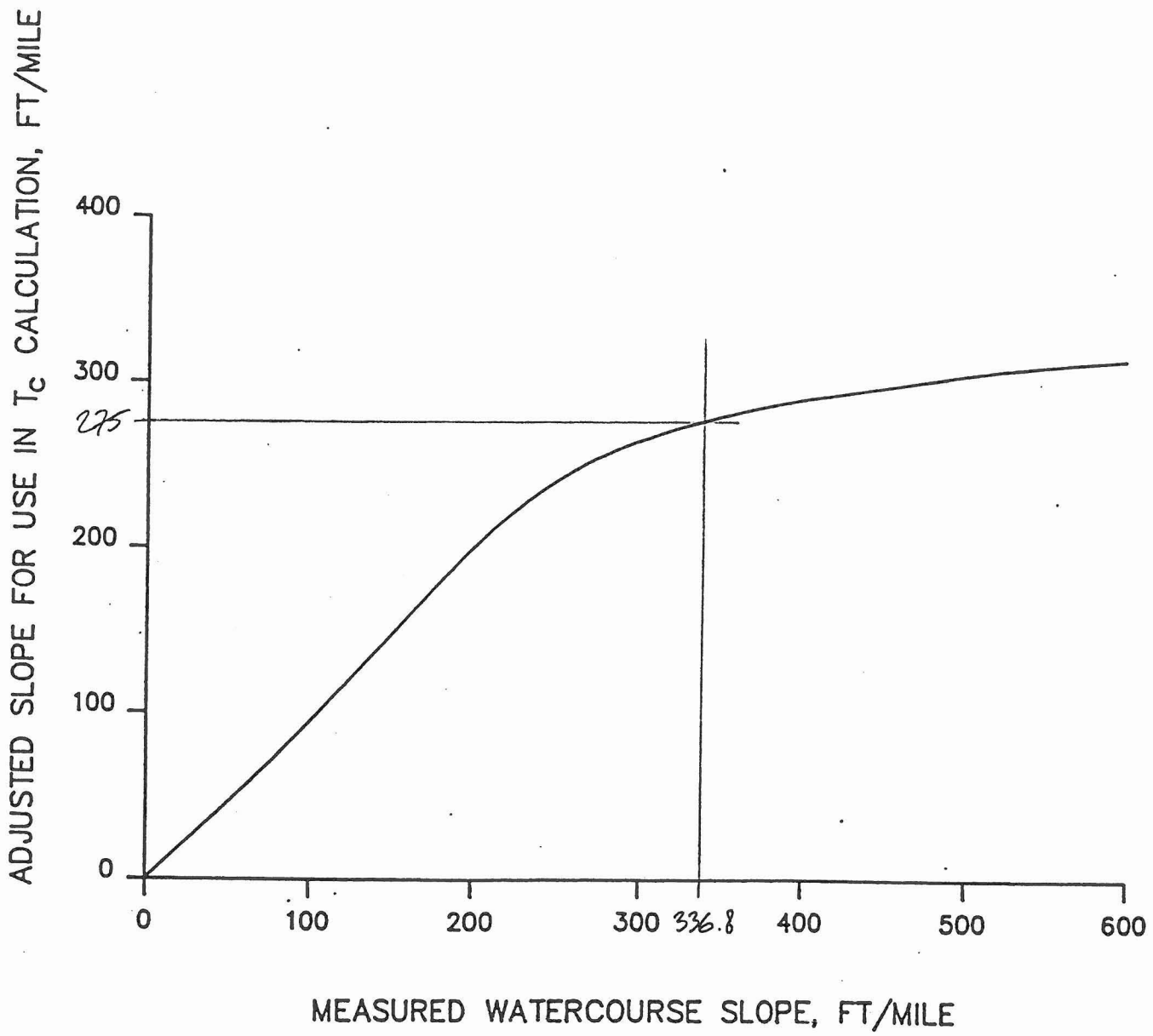


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150C
SLOPE: 300.8 FT/MI
ADJ. SLOPE: 264 FT/MI

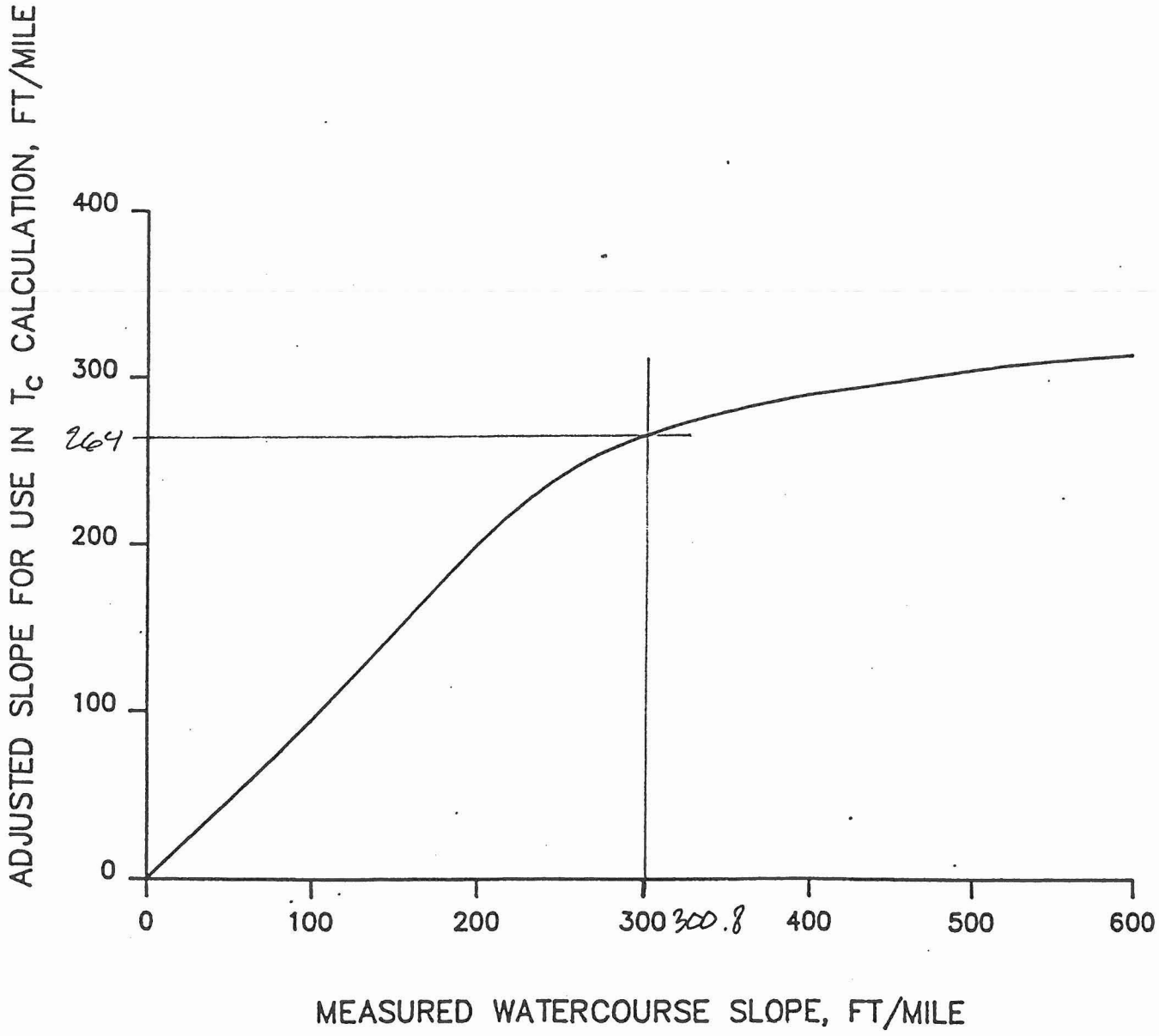


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150 D
SLOPE: 273.4 FT/MI
ADJ. SLOPE: 253 FT/MI

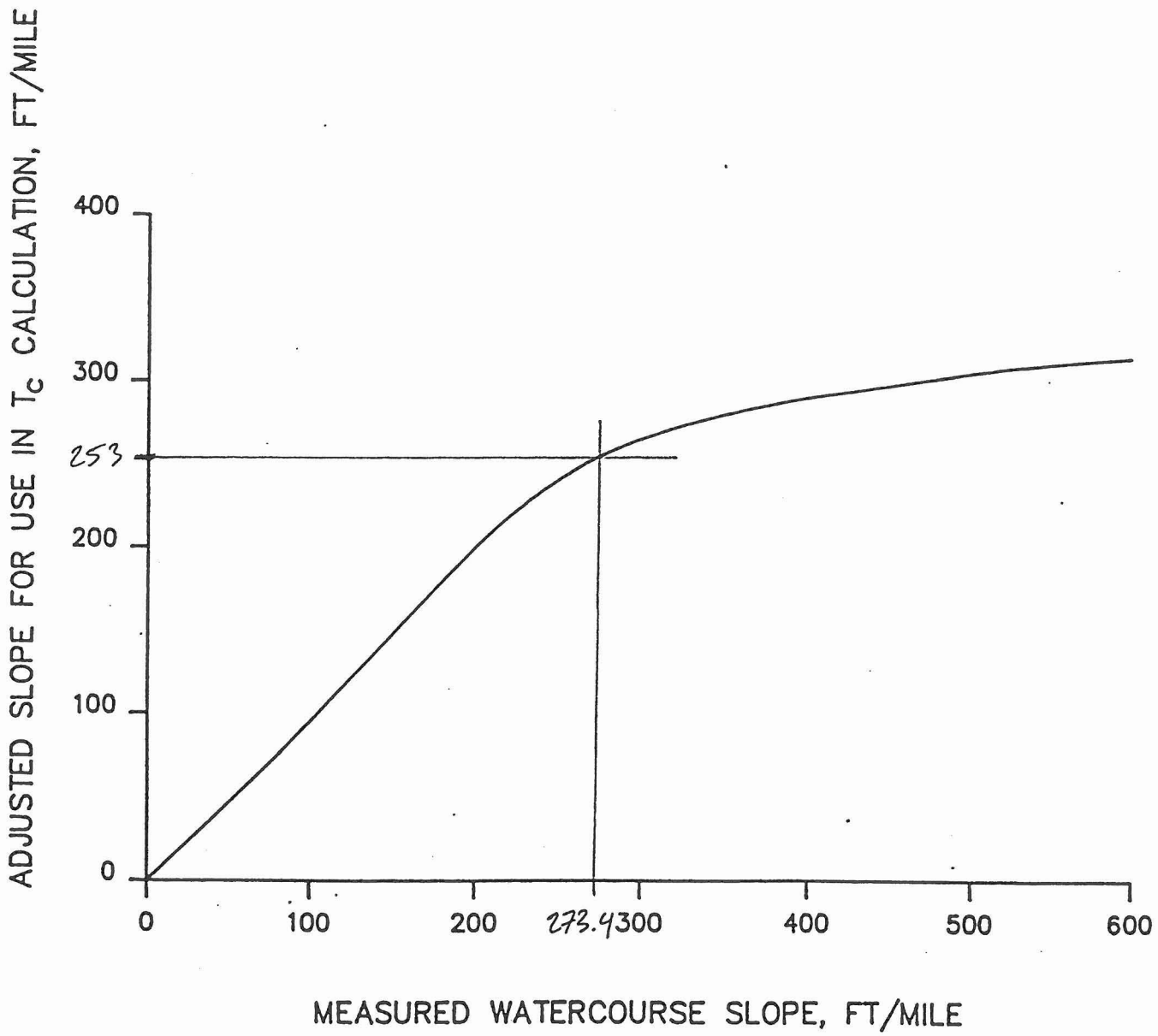


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150E
SLOPE: 454.1 FT/MI
ADJ. SLOPE: 296 FT/MI

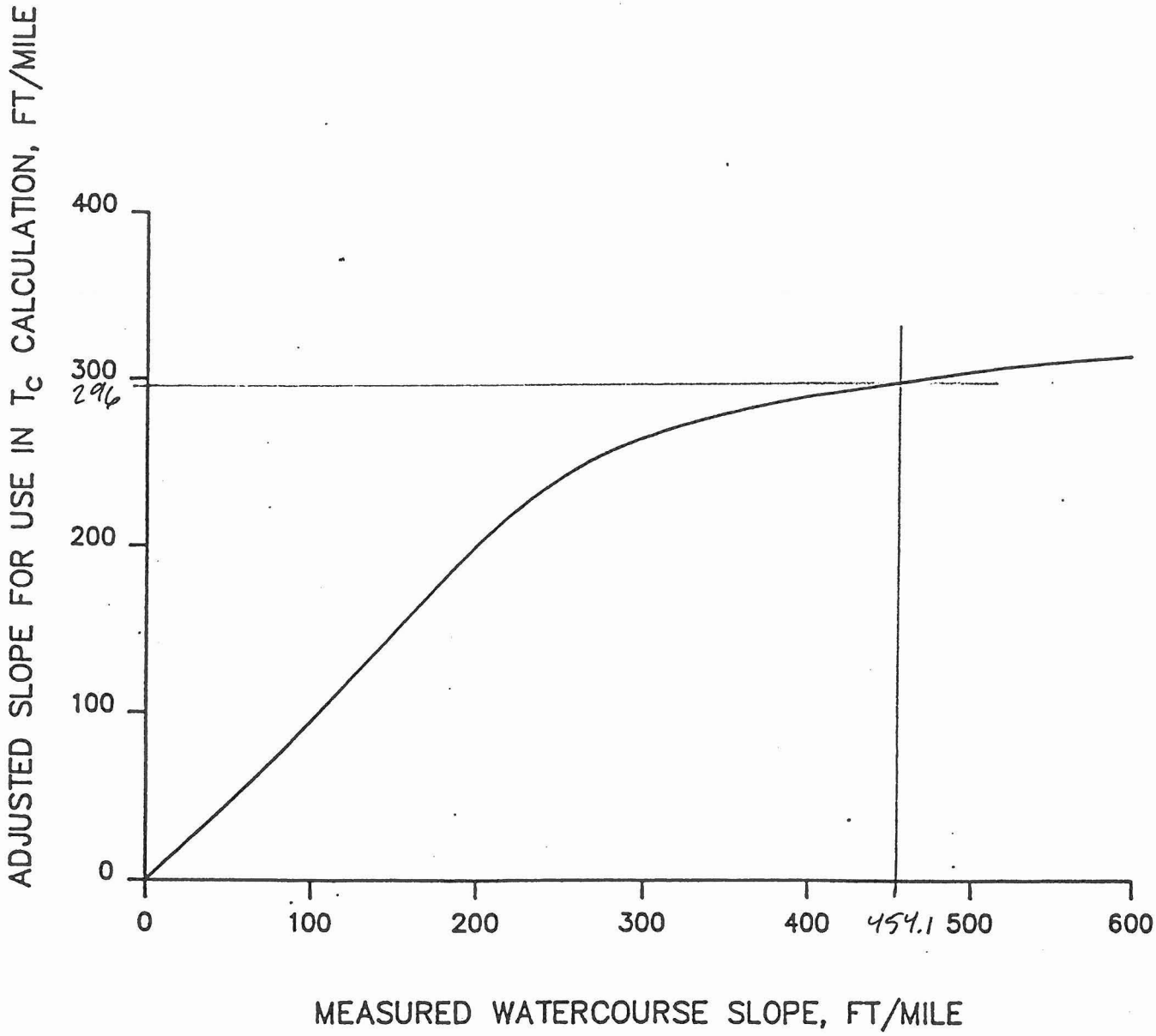


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150 F
SLOPE: 422.4 FT/MI
ADJ. SLOPE: 291 FT/MI

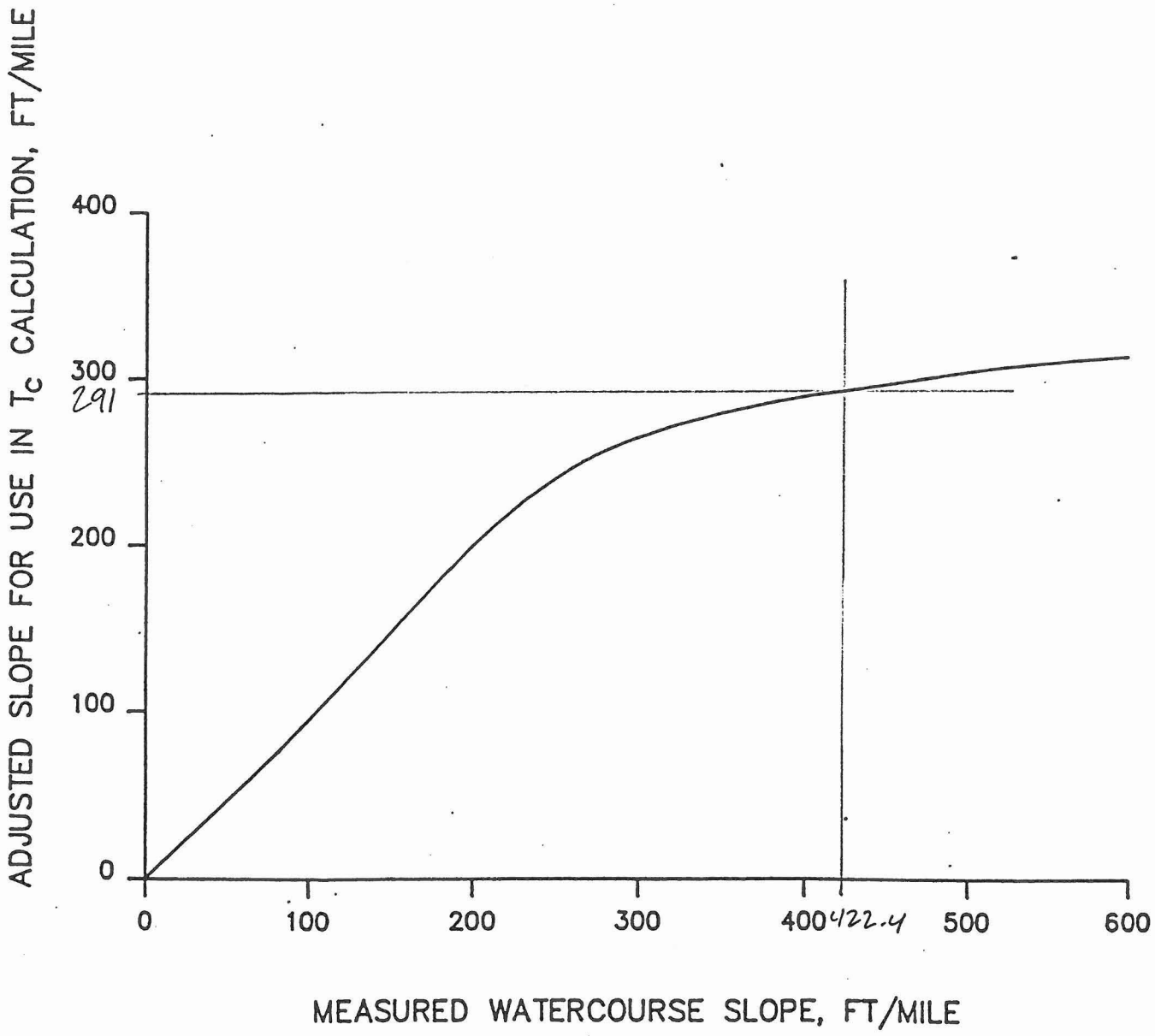


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150 G
SLOPE: 325.9 FT/MI
ADJ. SLOPE: 273 FT/MI

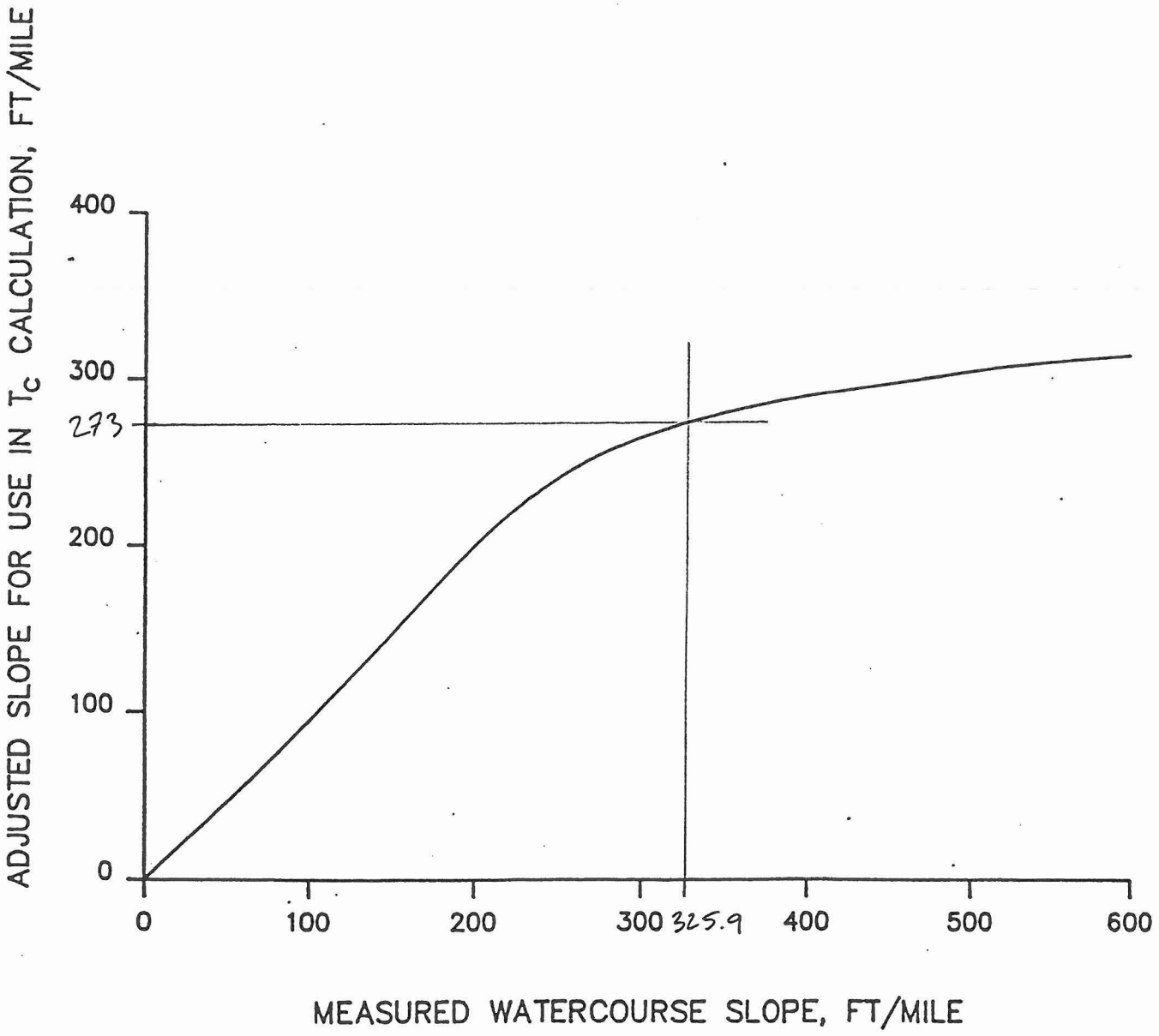


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150 H
SLOPE: 422.4 FT/MI
ADJ. SLOPE: 291 FT/MI

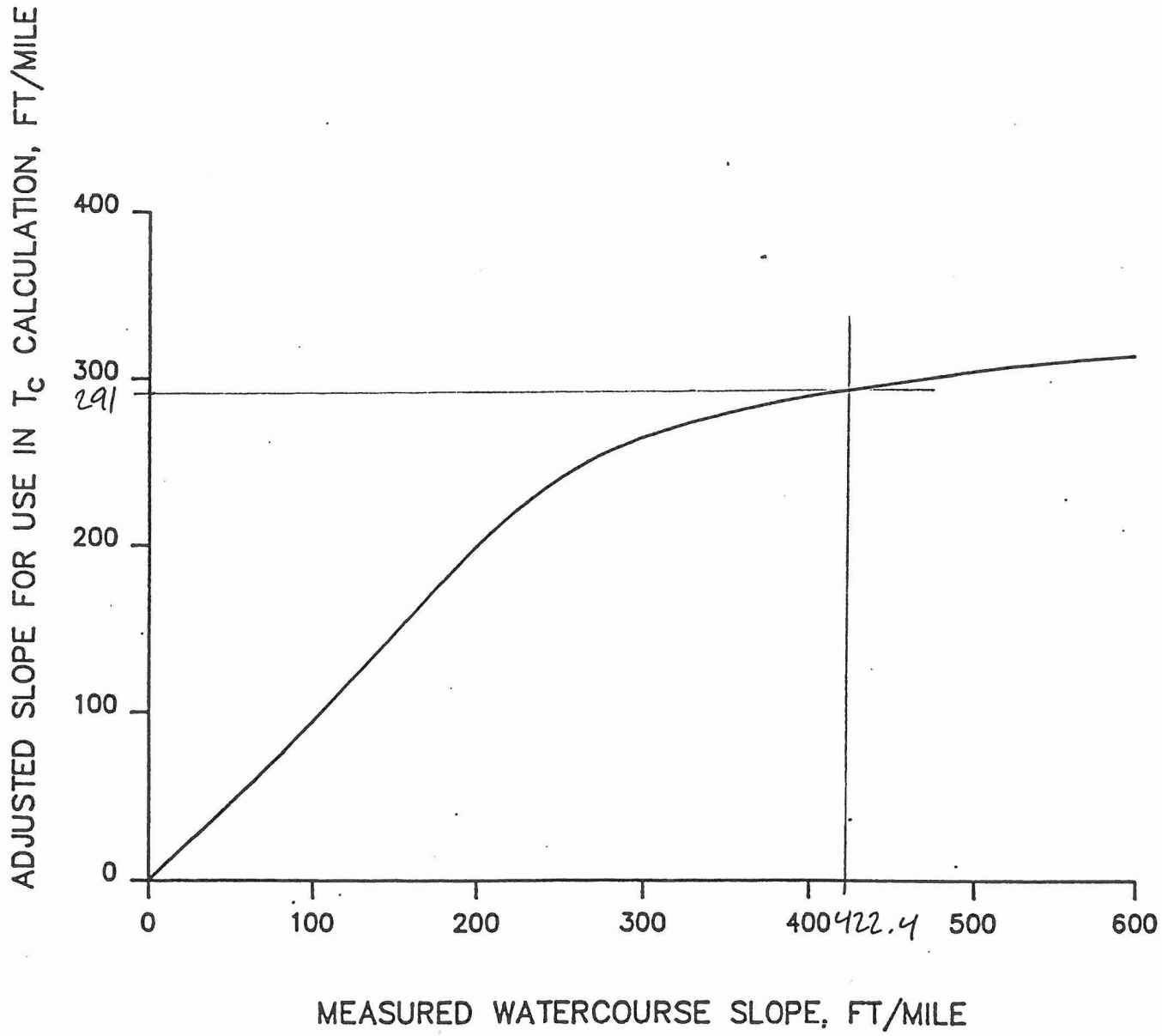


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150I
SLOPE: 225.0 FT/MI
ADJ. SLOPE: 223 FT/MI

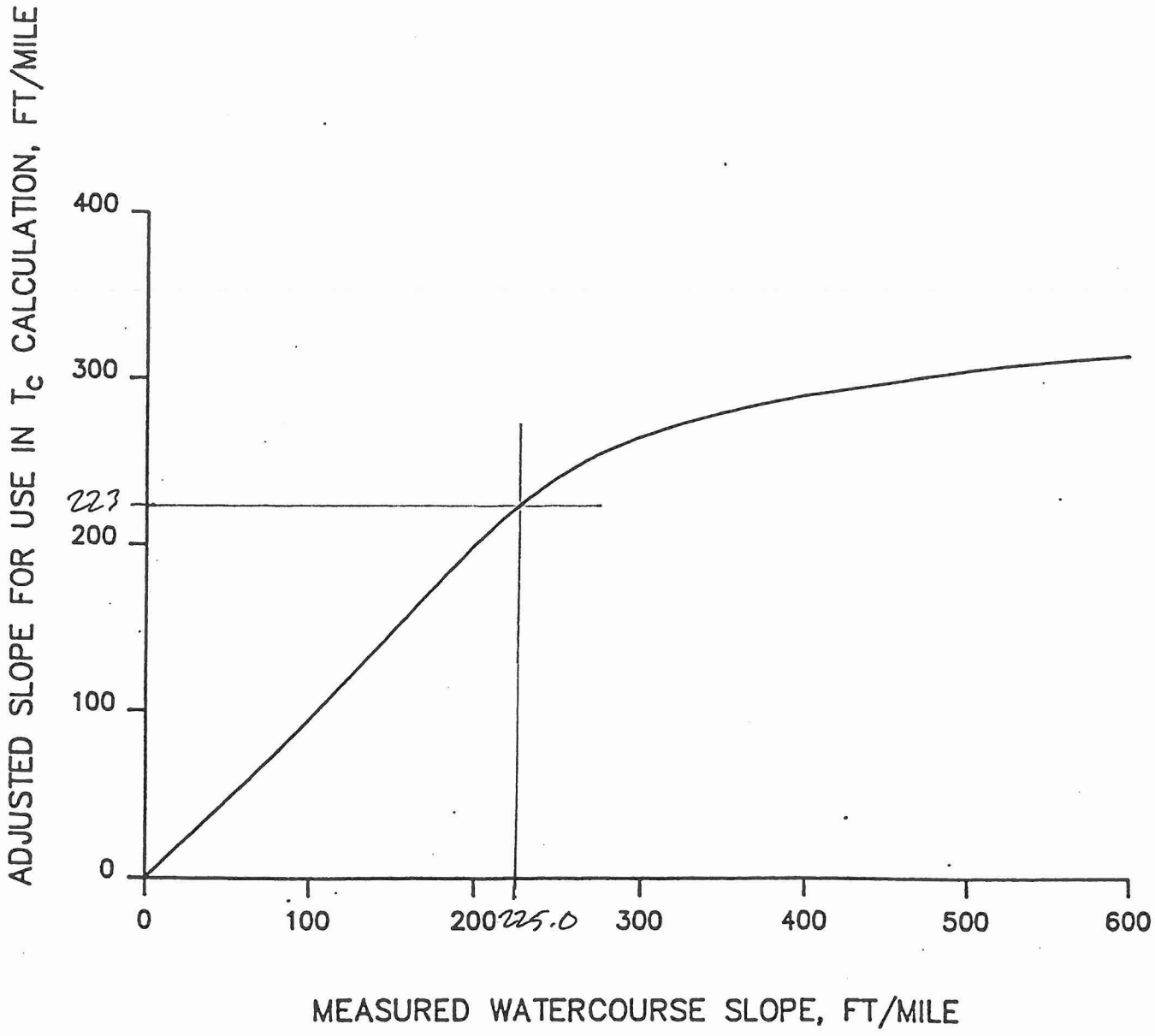


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150J
SLOPE: 268.9 FT/MI
ADJ. SLOPE: 251 FT/MI

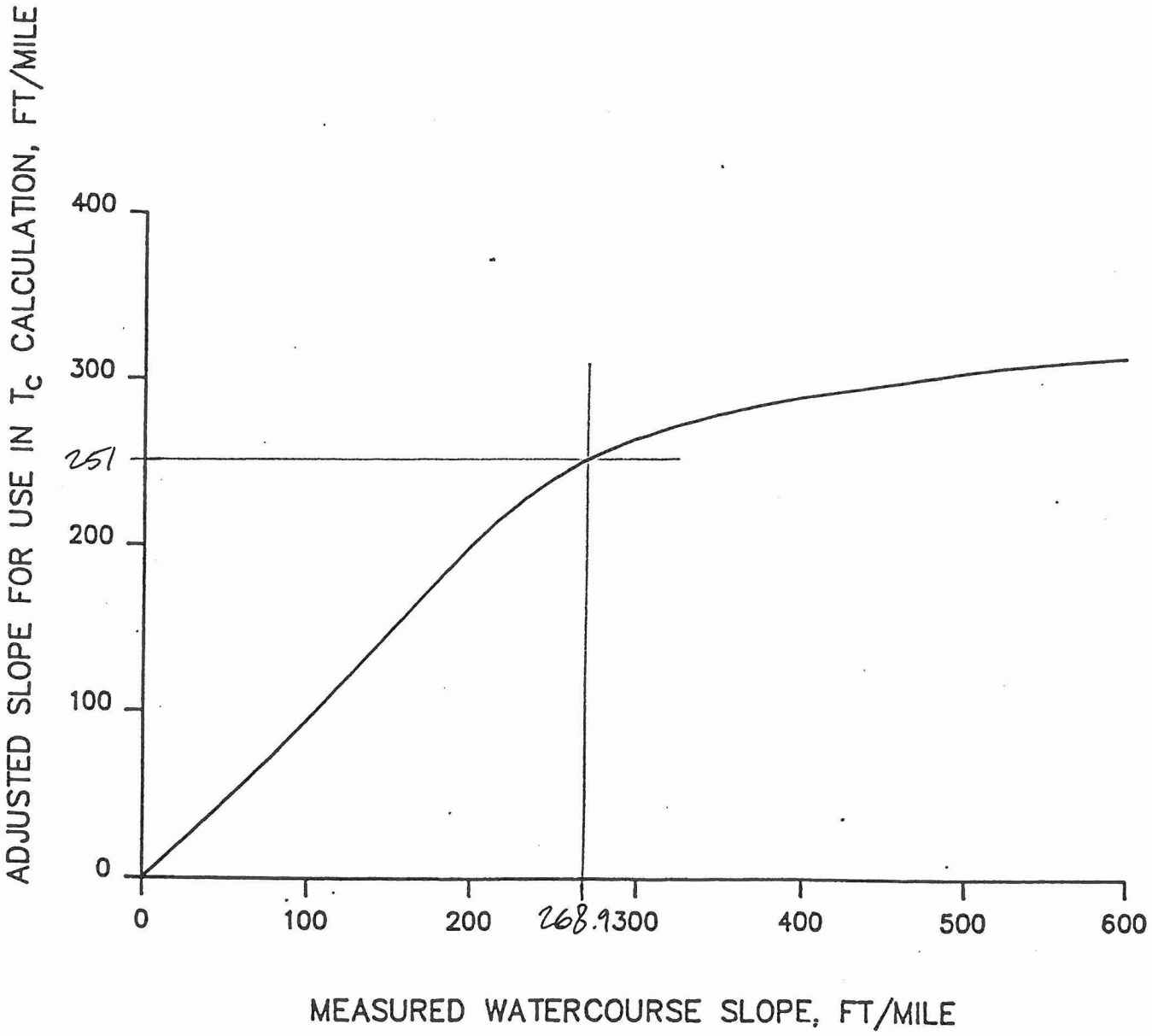


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150K
SLOPE: 314.5 FT/MI
ADJ. SLOPE: 269 FT/MI

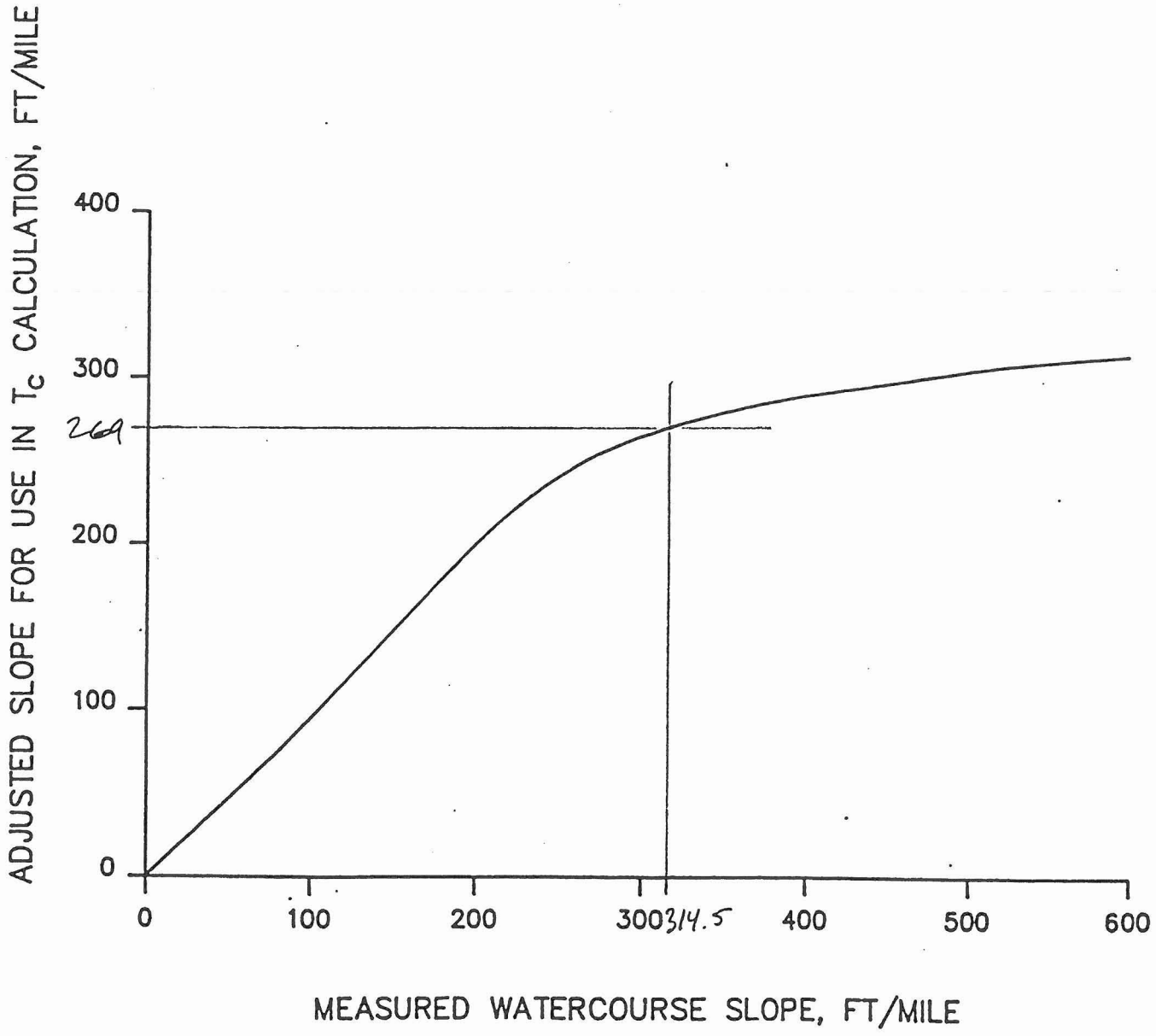


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 150 P
SLOPE: 241.4 FT/MI
ADJ. SLOPE: 233 FT/MI

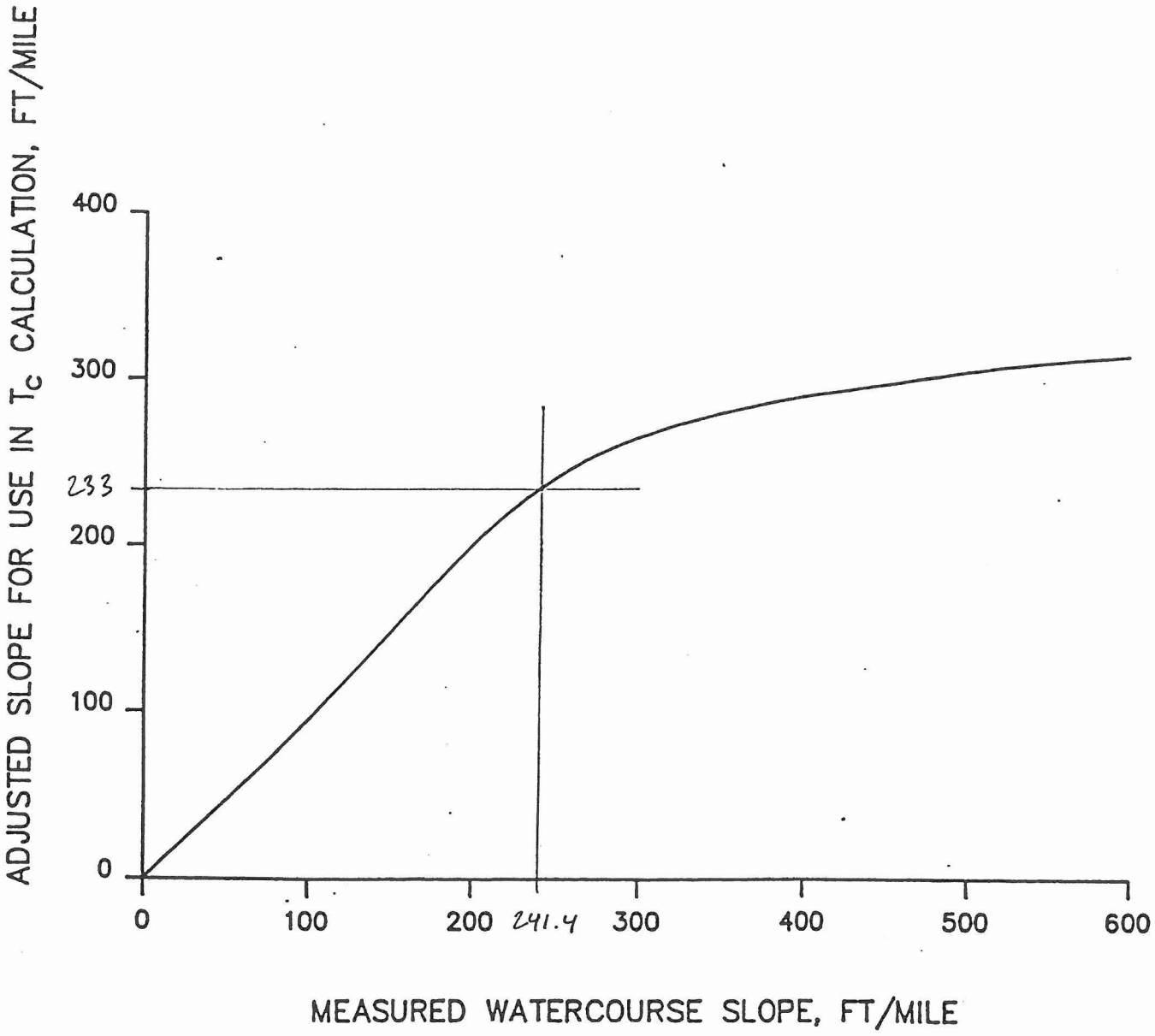


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151 D
SLOPE: 287.7 FT/MI
ADJ. SLOPE: 259 FT/MI

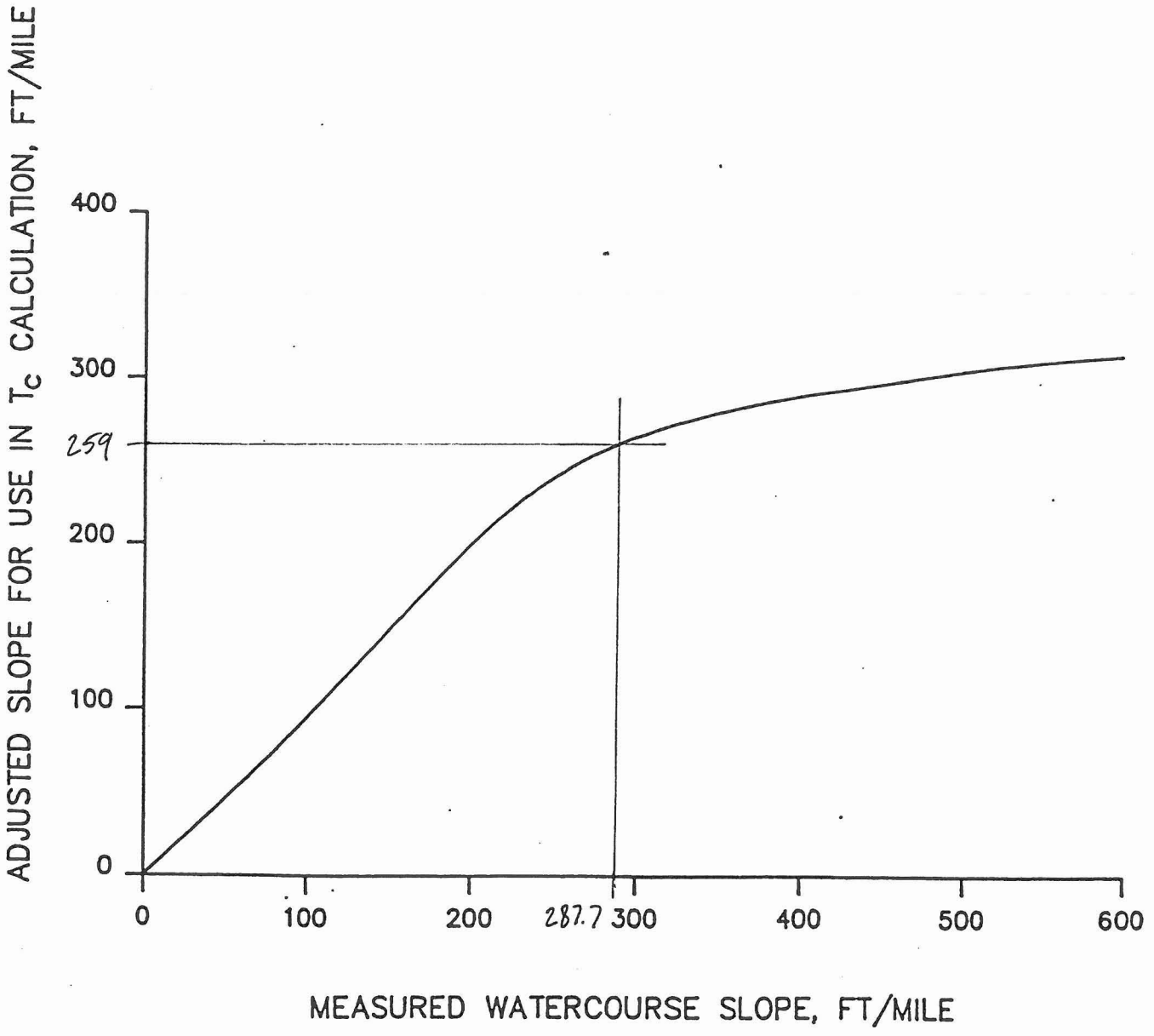


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151E
SLOPE: 219.5 FT/MI
ADJ. SLOPE: 218 FT/MI

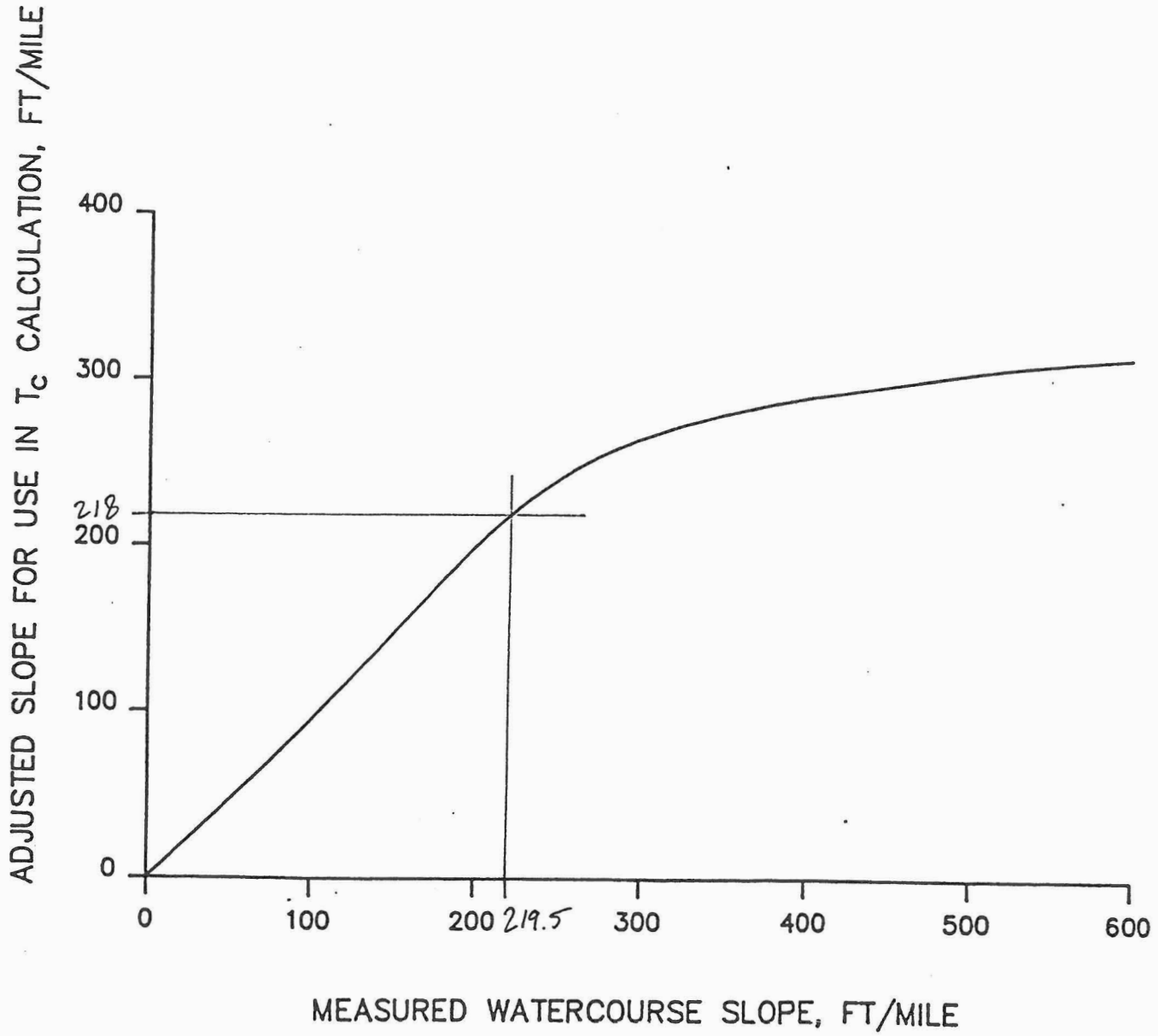


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151 F
SLOPE: 221.8 FT/MI
ADJ. SLOPE: 220 FT/MI

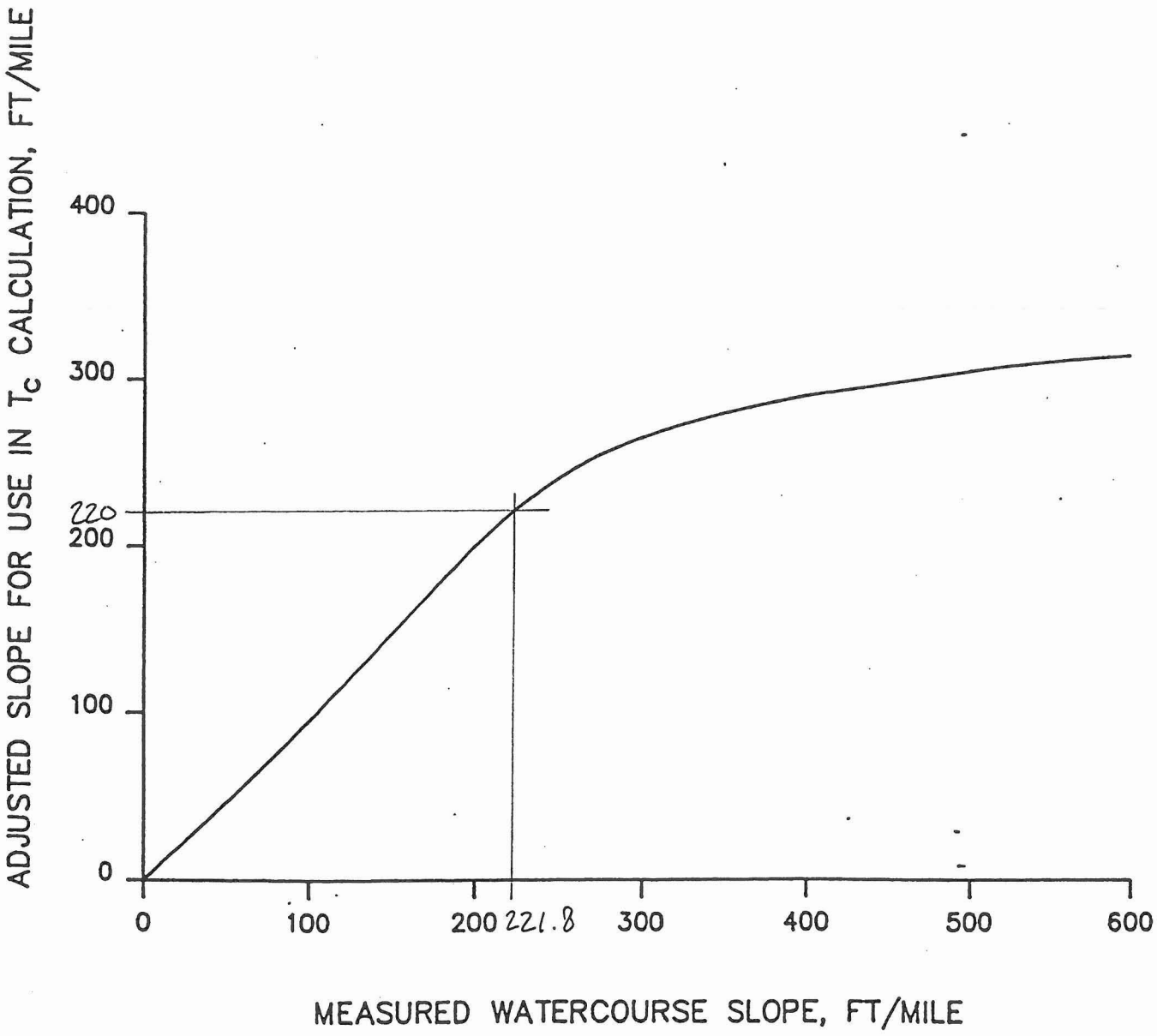


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151H
SLOPE: 219.1 FT/MI
ADJ. SLOPE: 218 FT/MI

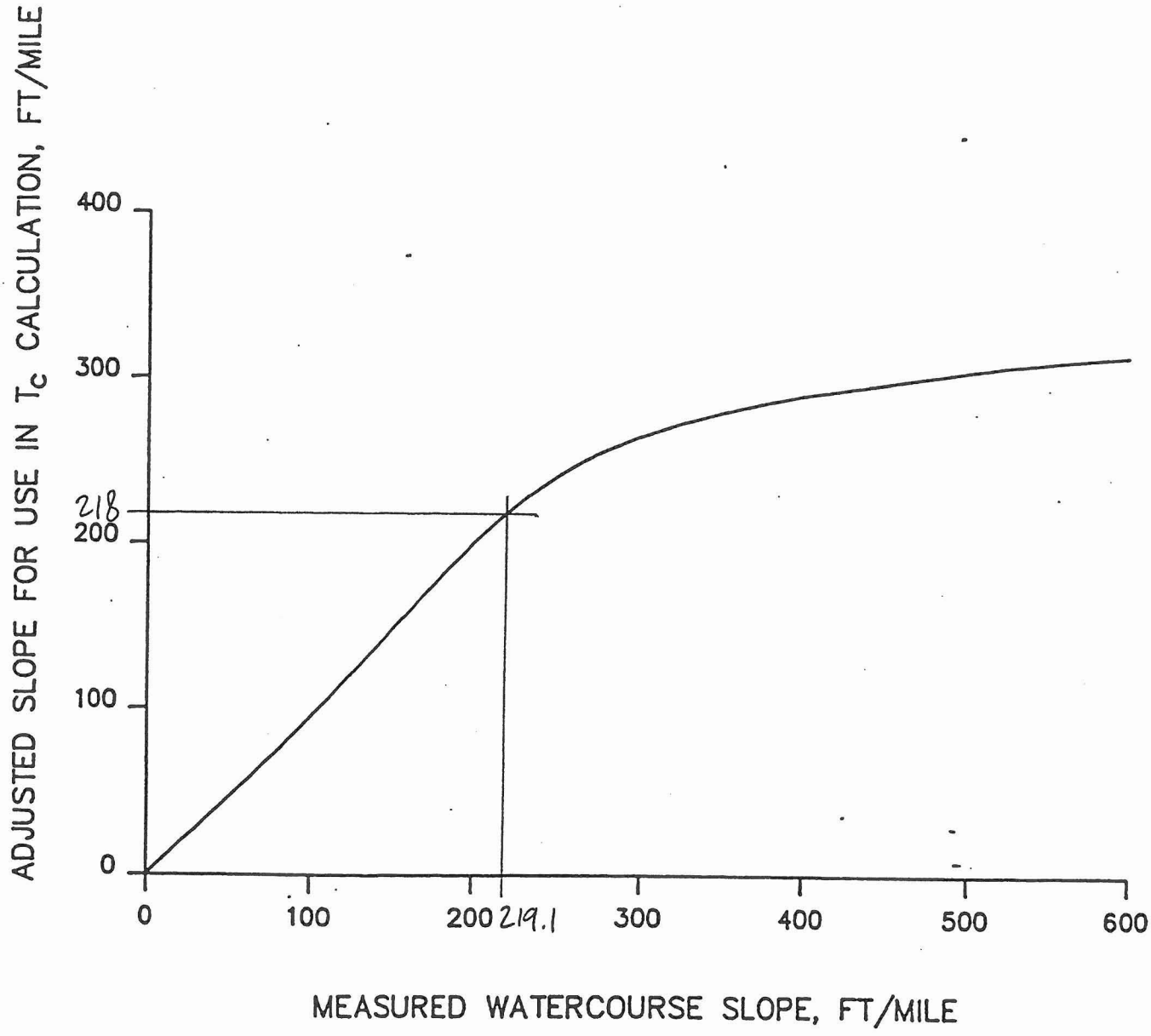


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151 I
SLOPE: 438.6 FT/MI
ADJ. SLOPE: 294 FT/MI

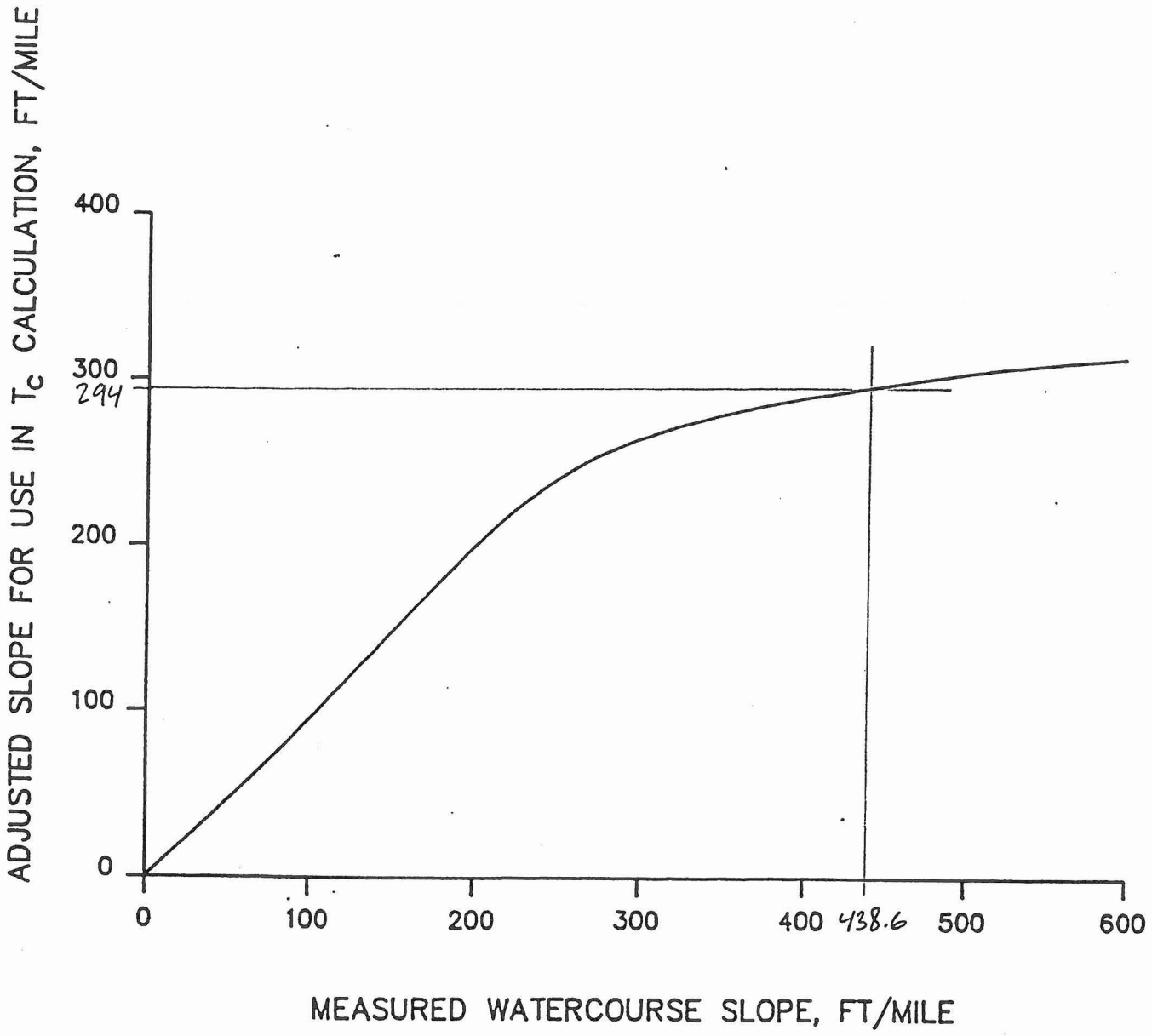


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

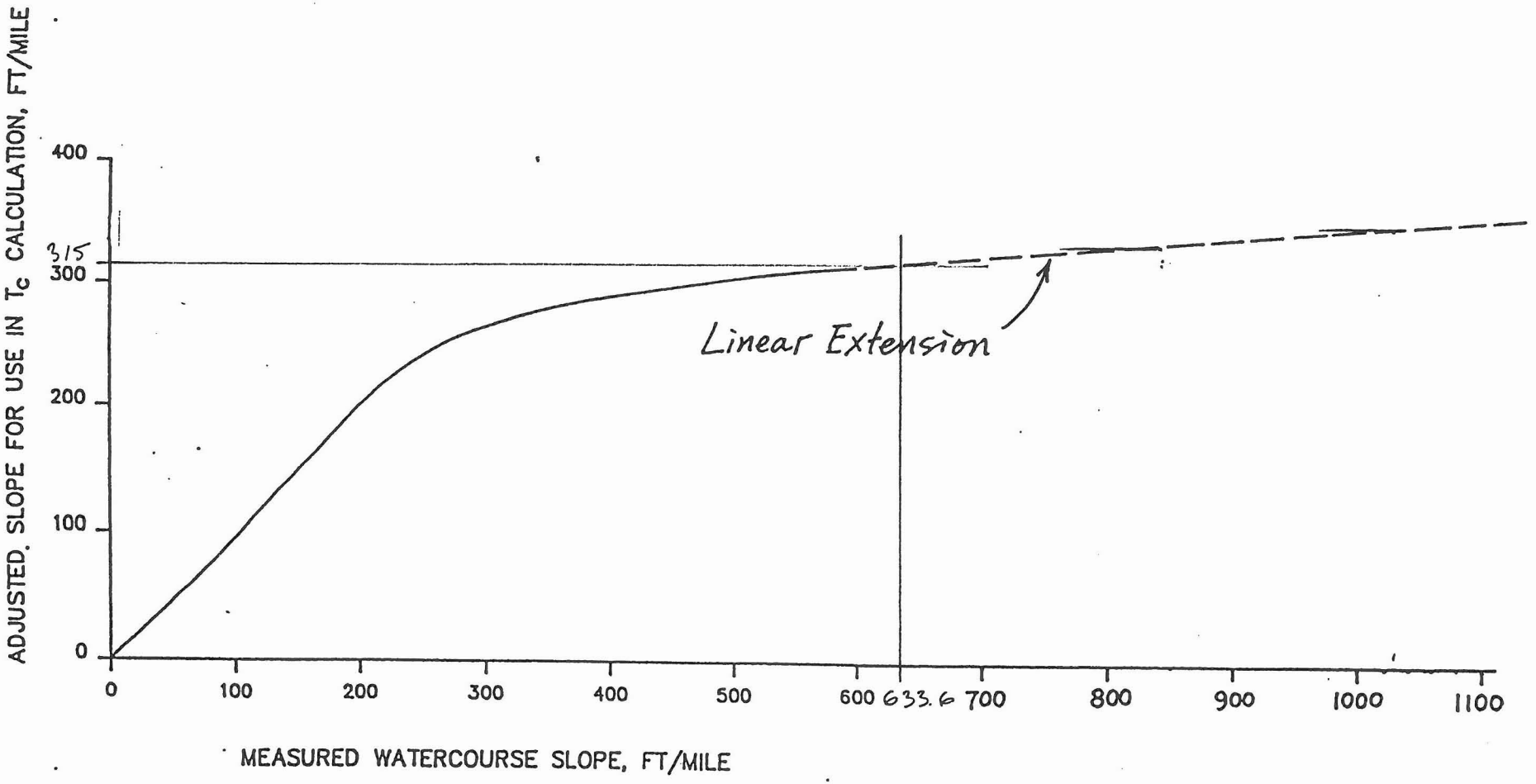


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151 J
SLOPE: 633.6 FT/MI
ADJ. SLOPE: 315 FT/MI

JACKLIN WASH WATERSHED
BASIN 151K
SLOPE: 346.7 FT/MI
ADJ. SLOPE: 278 FT/MI

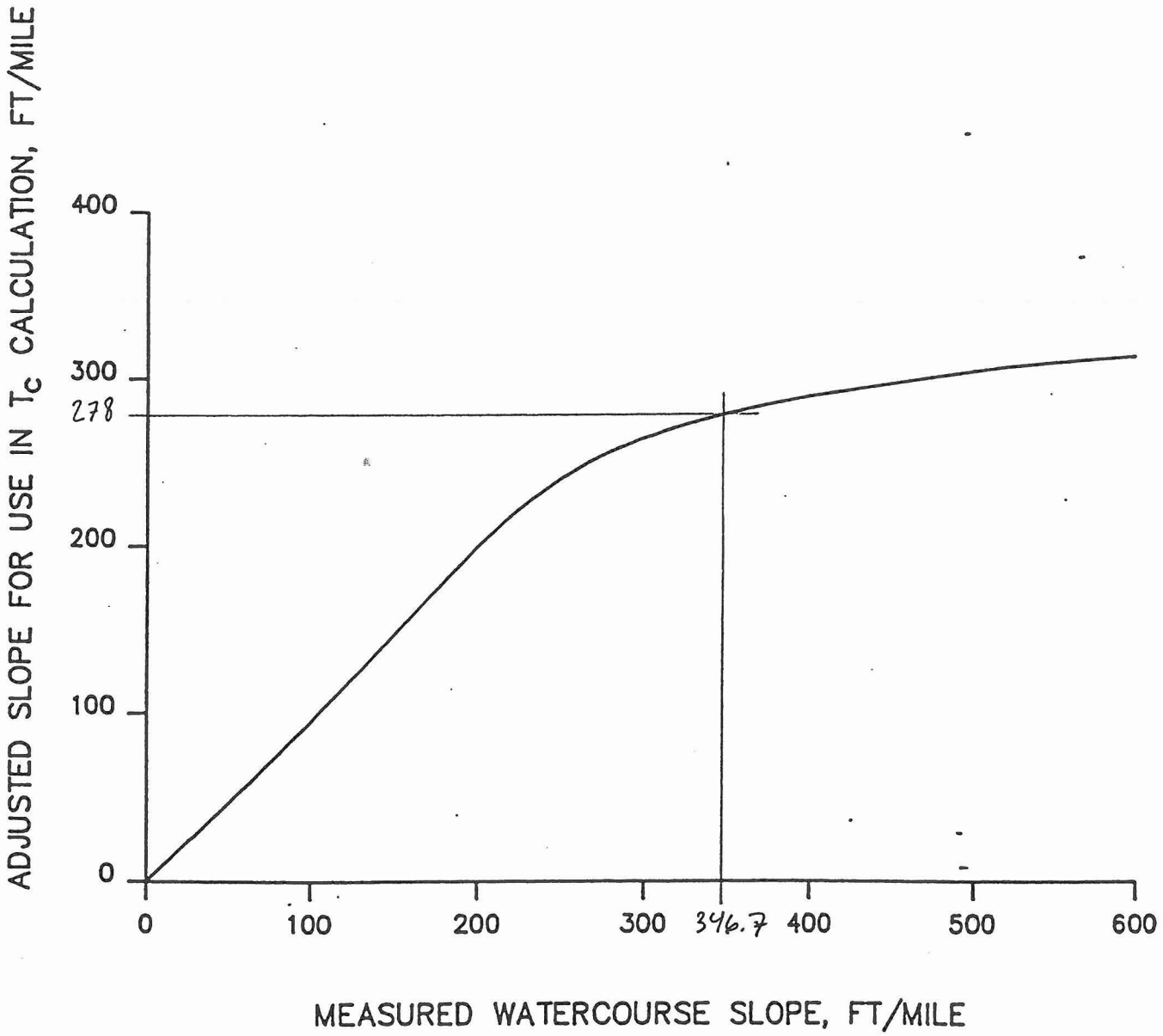


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 151 L
SLOPE: 232.3 FT/MI
ADJ. SLOPE: 227 FT/MI

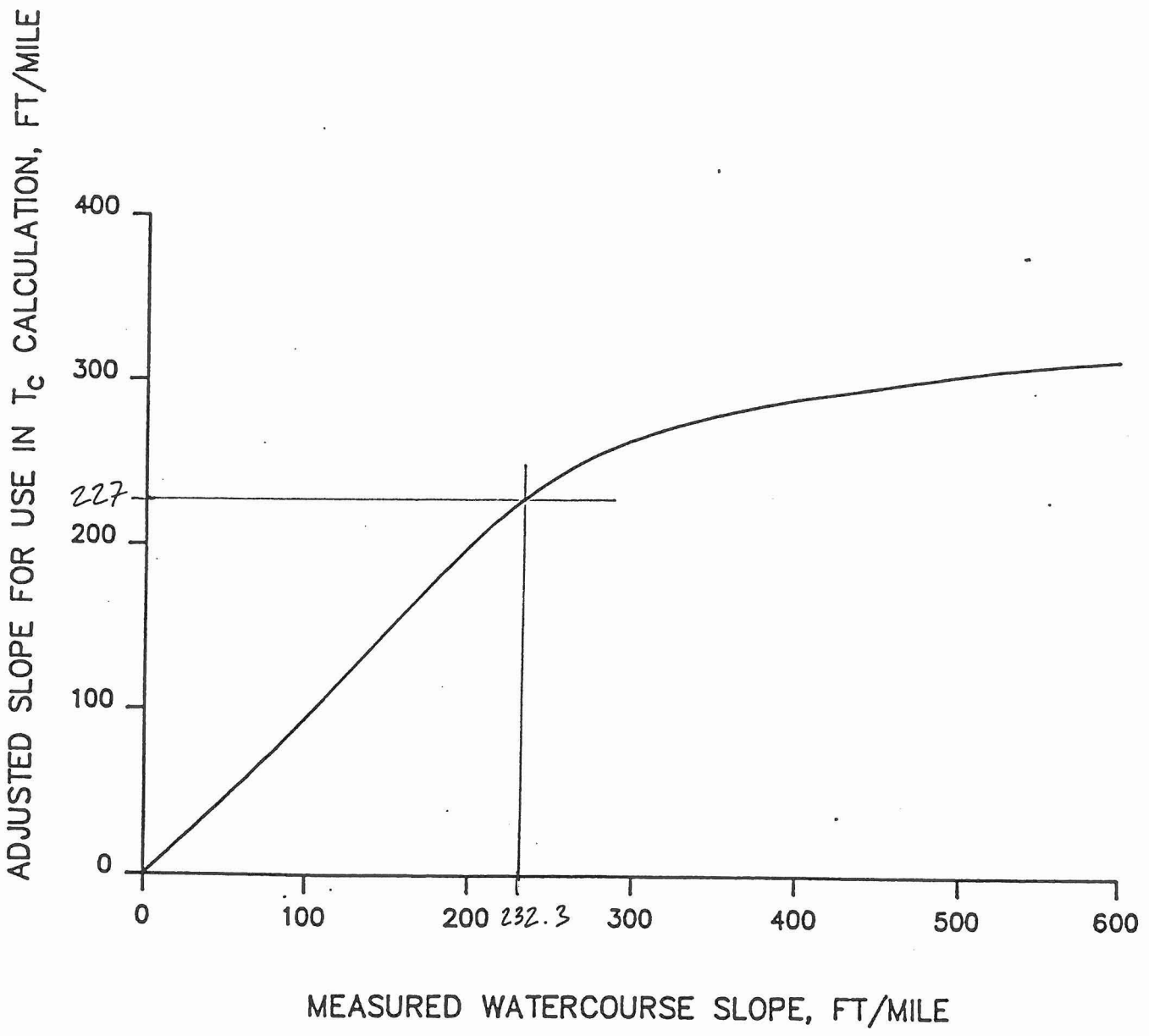


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152A
SLOPE: 384.0 FT/MI
ADJ. SLOPE: 286 FT/MI

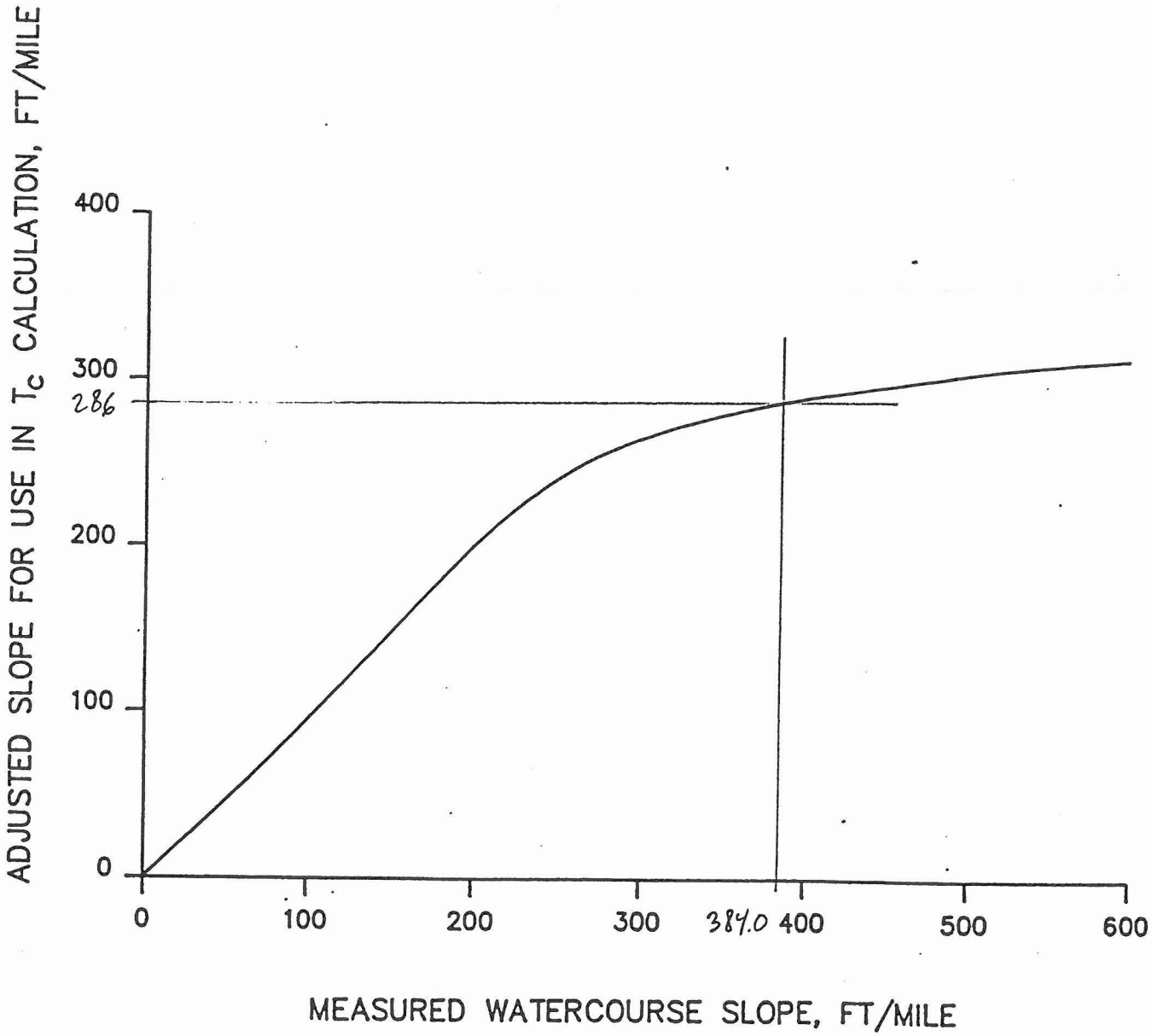


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152 B
SLOPE: 441.0 FT/MI
ADJ. SLOPE: 294 FT/MI

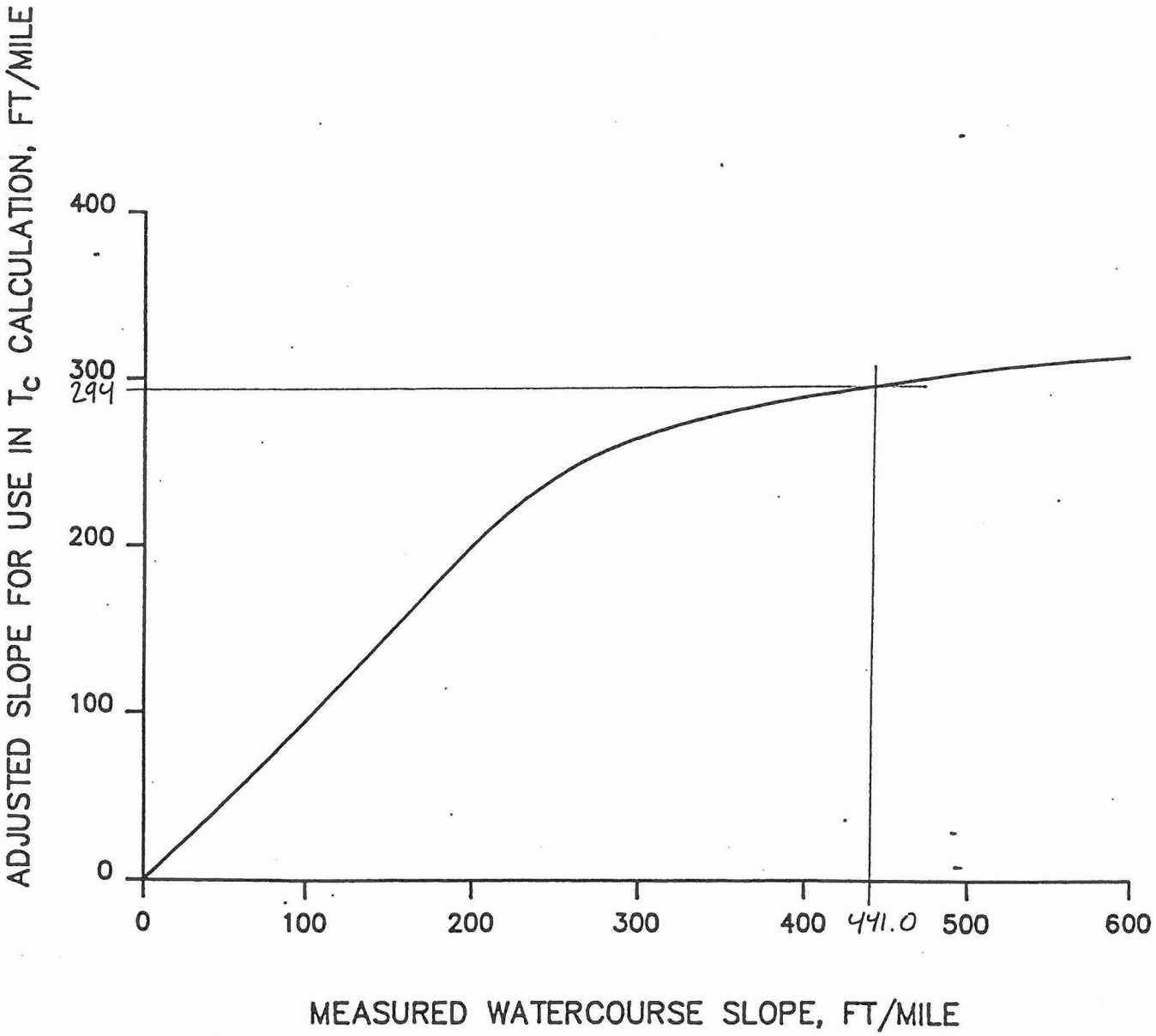


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152C
SLOPE: 541.6 FT/MI
ADJ. SLOPE: 307 FT/MI

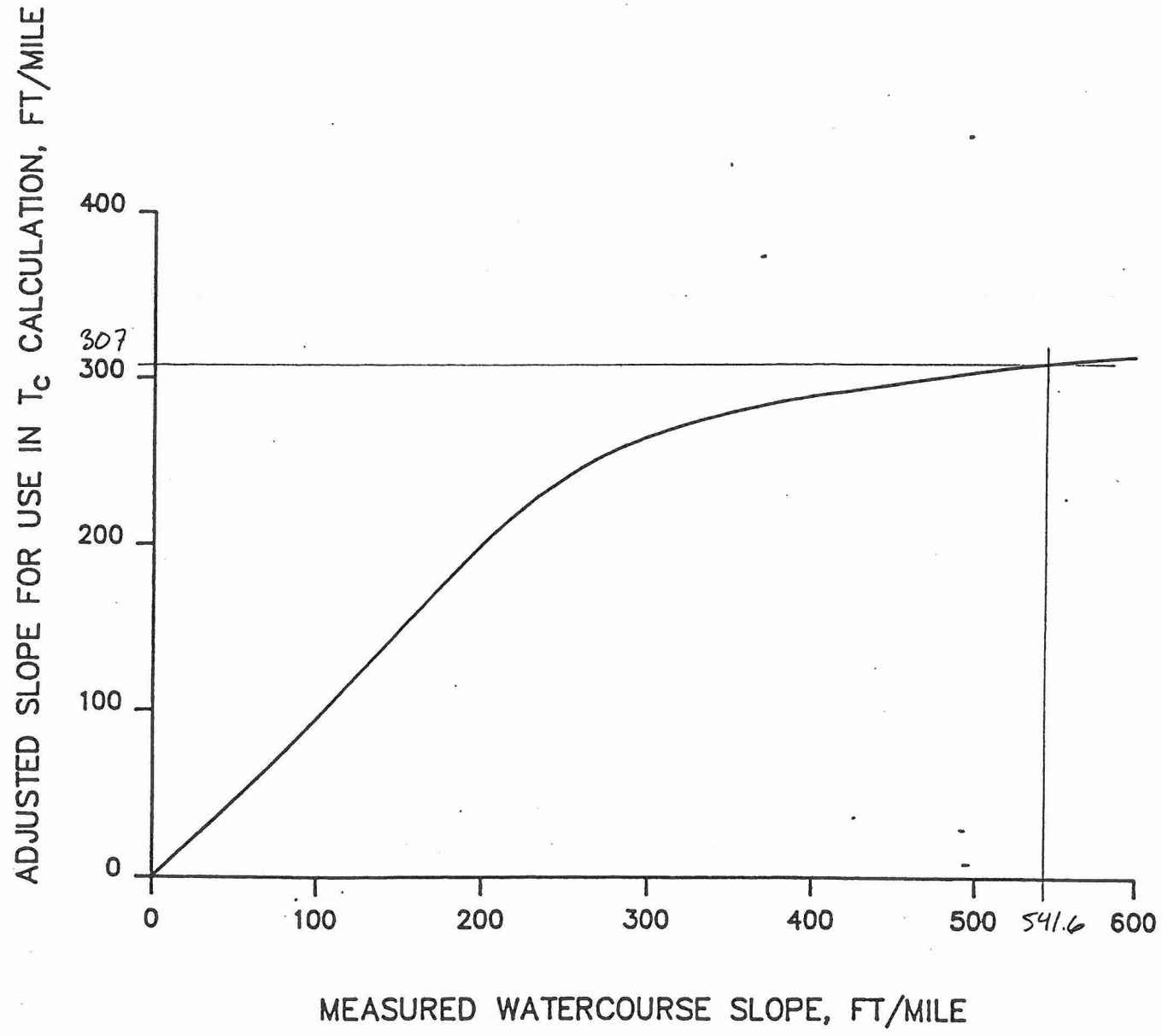


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152 D
SLOPE: 349.8 FT/MI
ADJ. SLOPE: 279 FT/MI

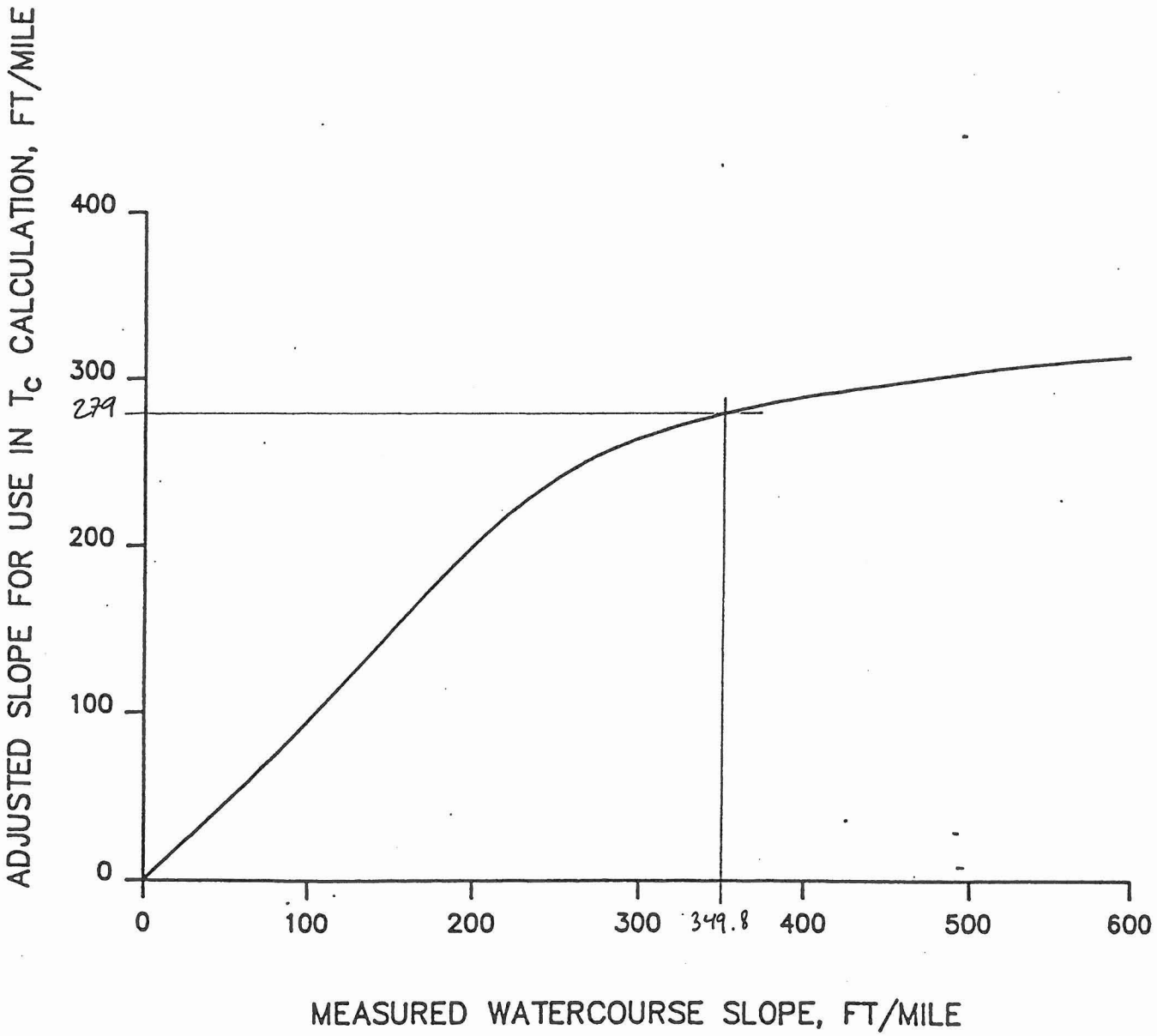


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152 E
SLOPE: 403.2 FT/MI
ADJ. SLOPE: 289 FT/MI

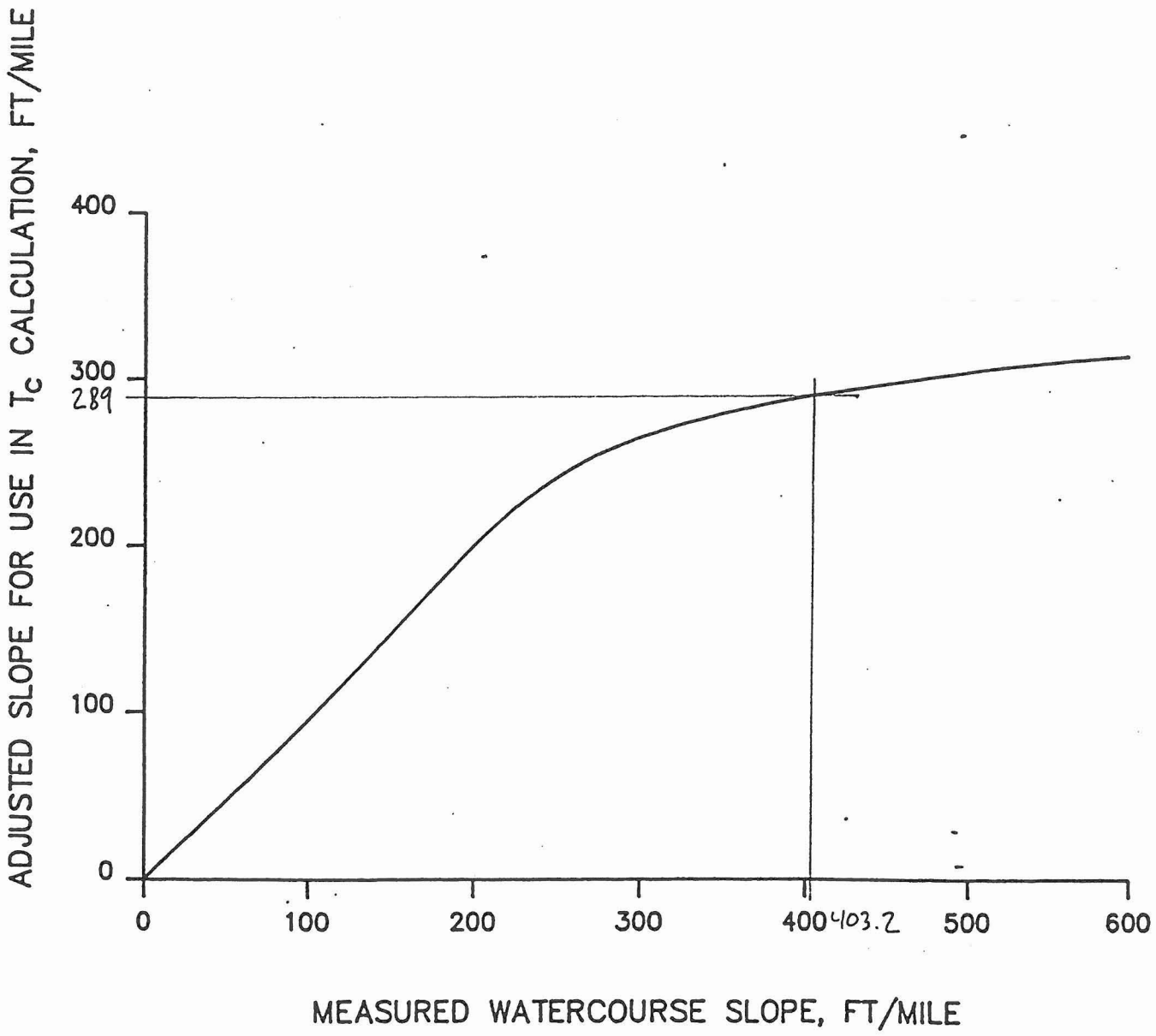


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

JACKLIN WASH WATERSHED
BASIN 152F
SLOPE: 355.7 FT/MI
ADJ. SLOPE: 280 FT/MI

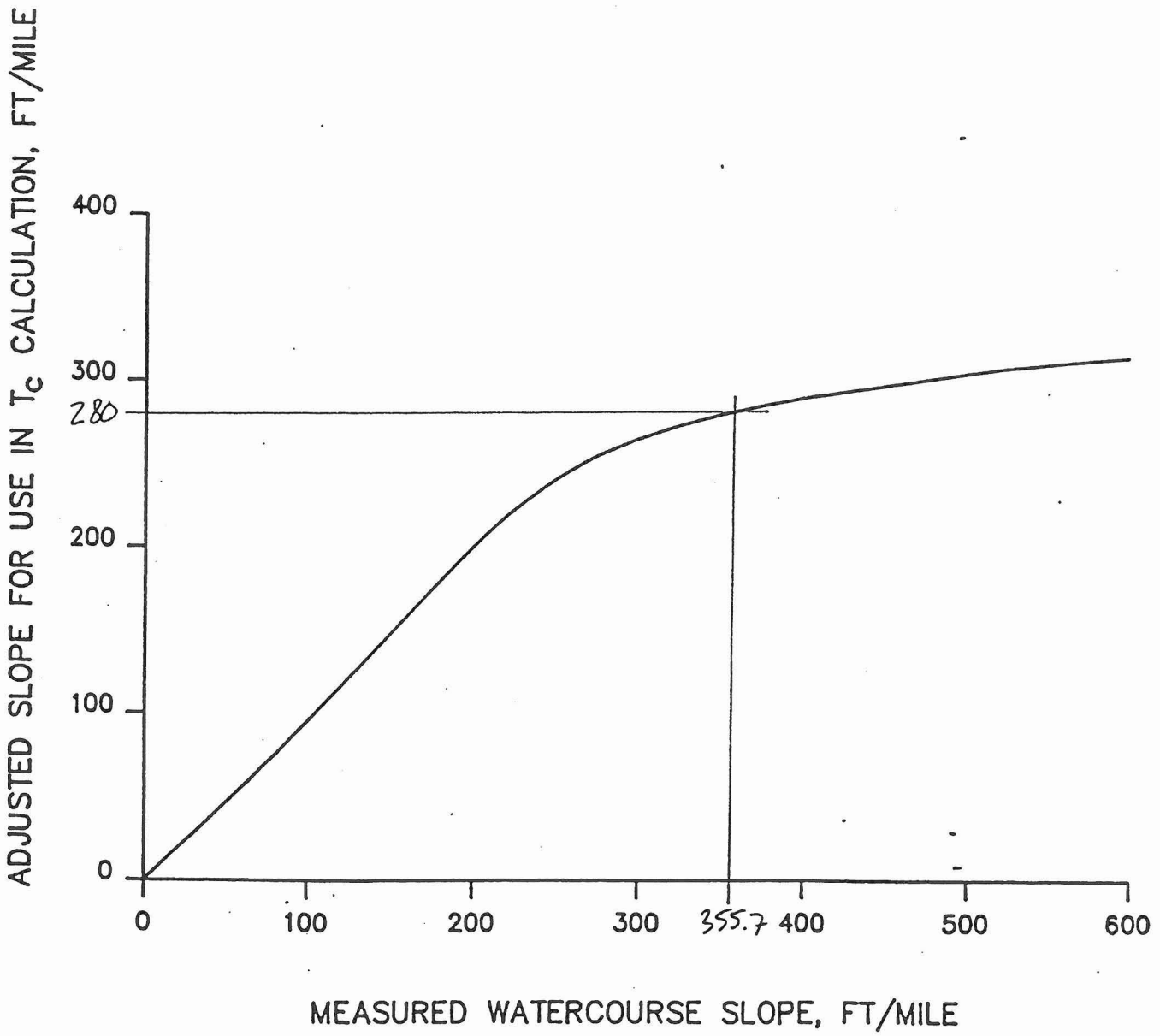


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

D.5

EMERALD WASH

EMERALD WASH WATERSHED
BASIN 160D

SLOPE: 211.8 FT/MI
ADJ. SLOPE: 211 FT/MI

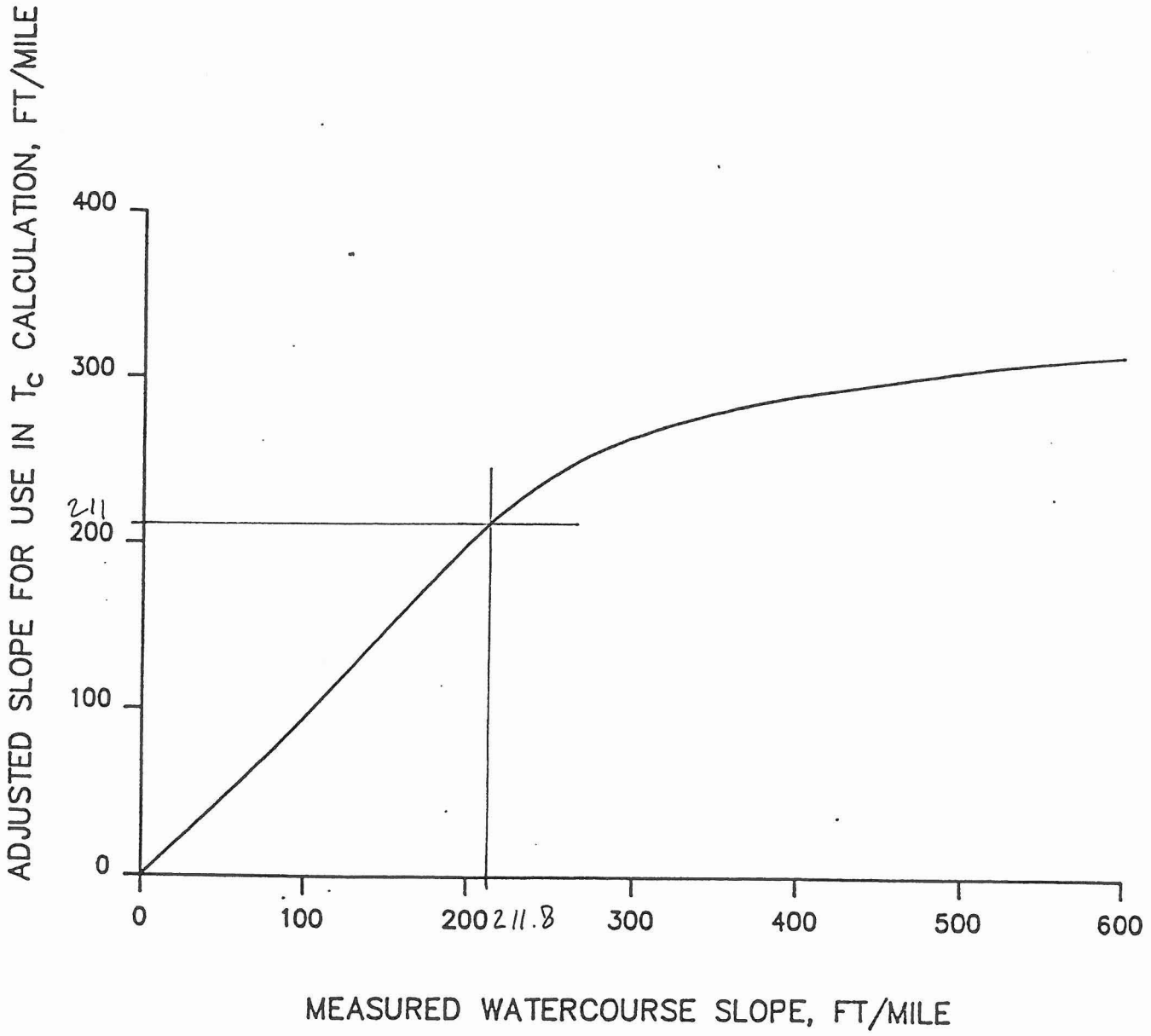


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160E
SLOPE: 234.7 FT/MI
ADJ. SLOPE: 228 FT/MI

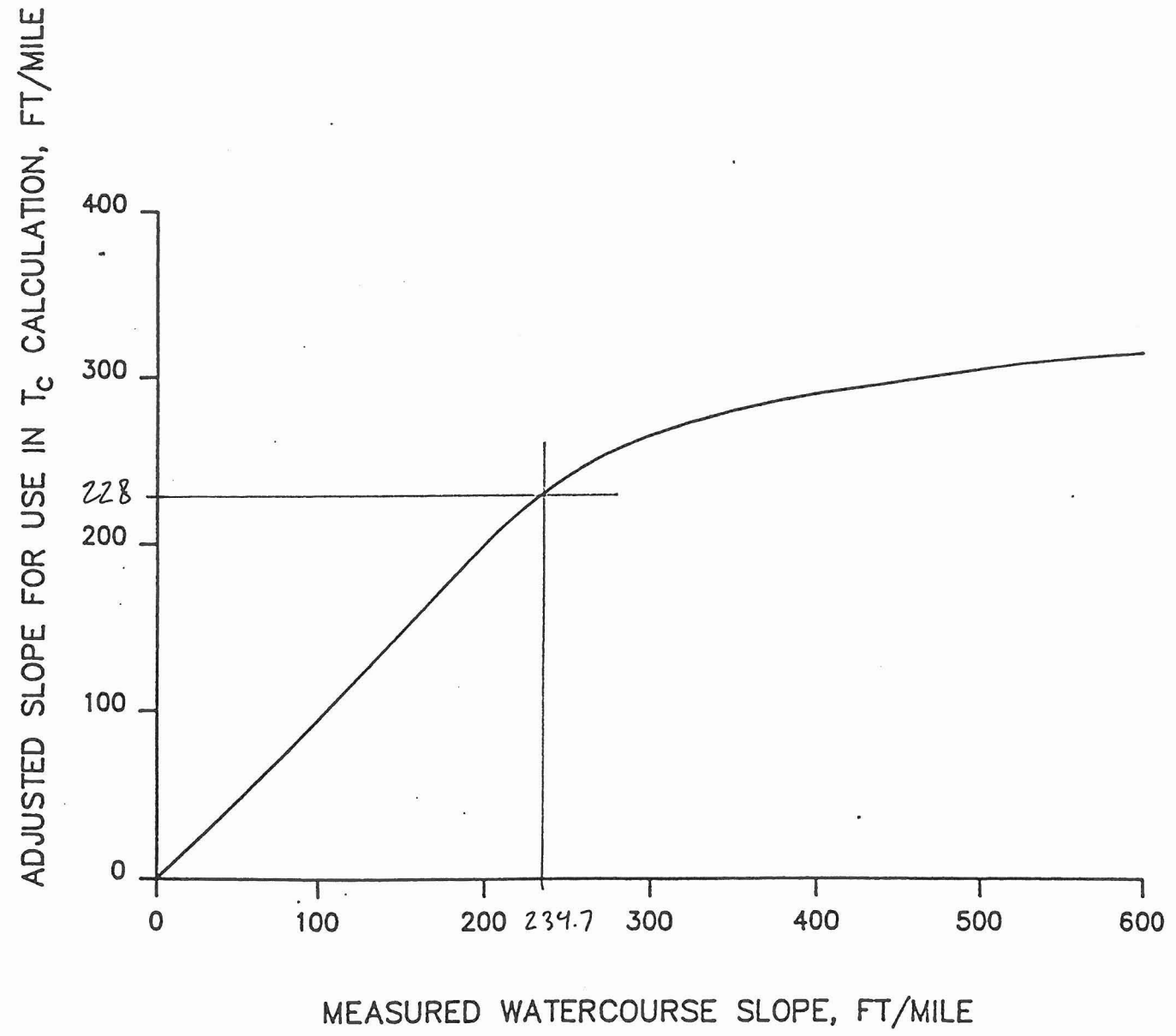


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160 I
SLOPE: 309.6 FT/MI
ADJ. SLOPE: 268 FT/MI

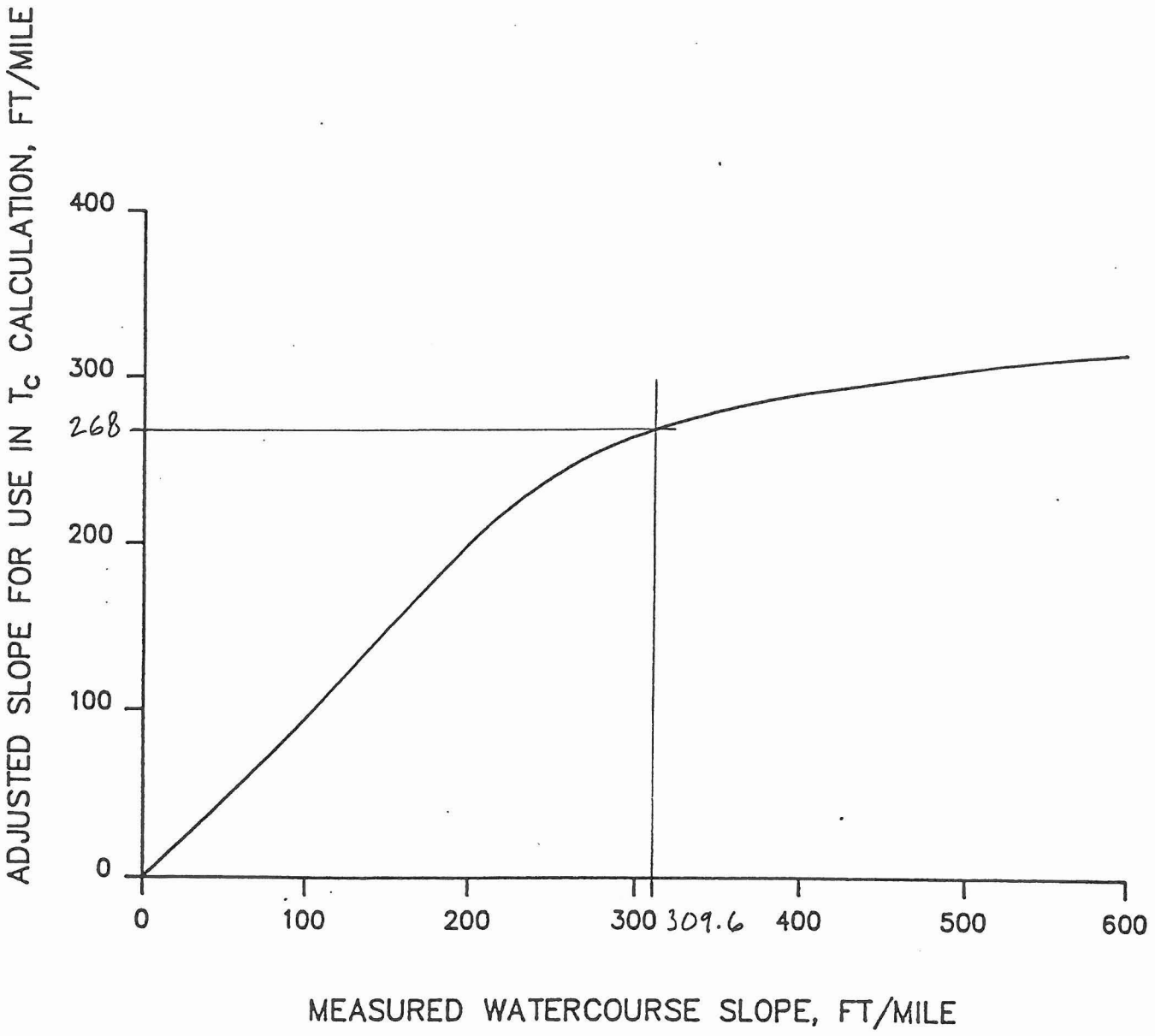


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160J
SLOPE: 382.2 FT/MI
ADJ. SLOPE: 286 FT/MI

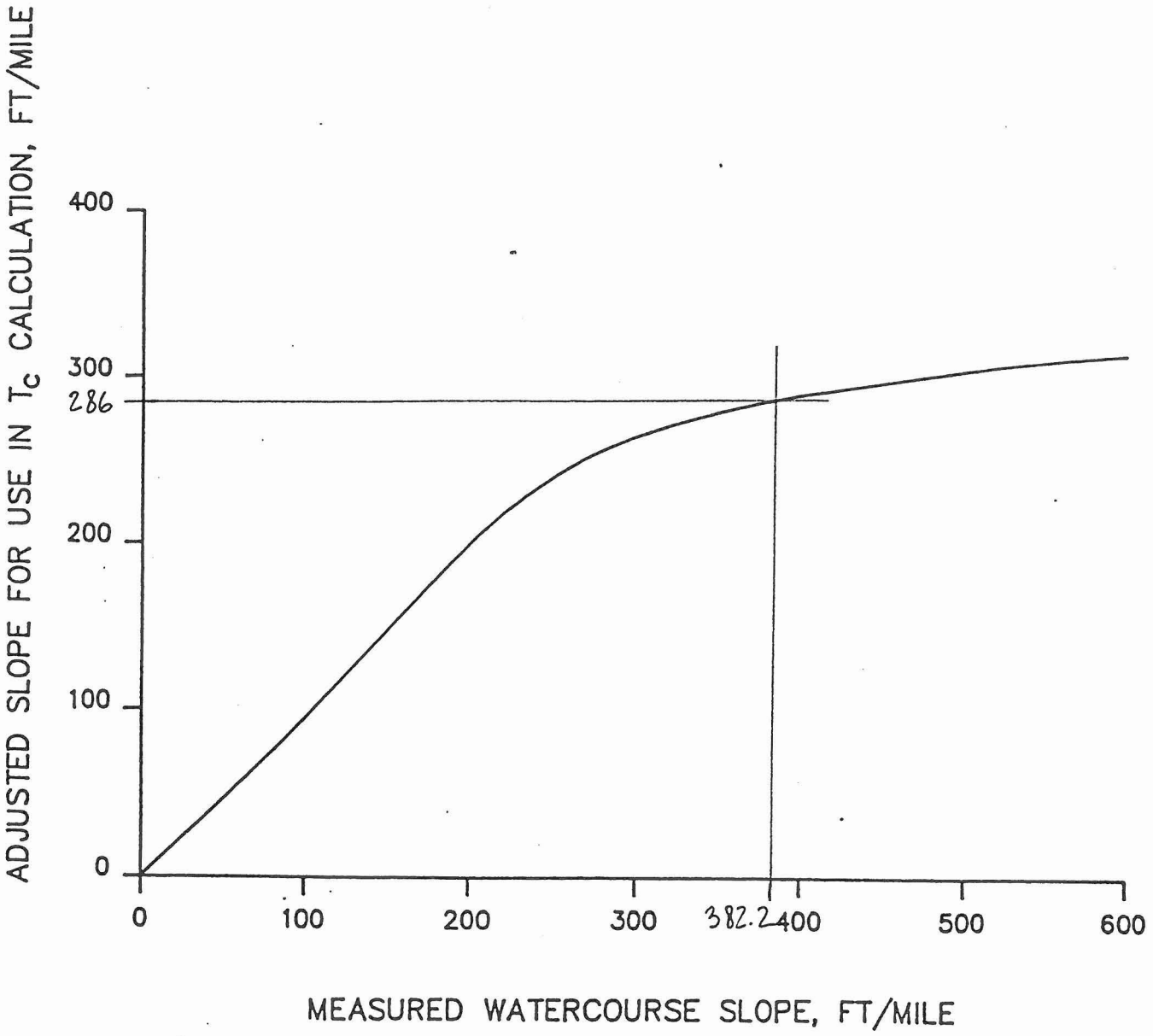


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160 K
SLOPE: 446.8 FT/MI
ADJ. SLOPE: 295 FT/MI

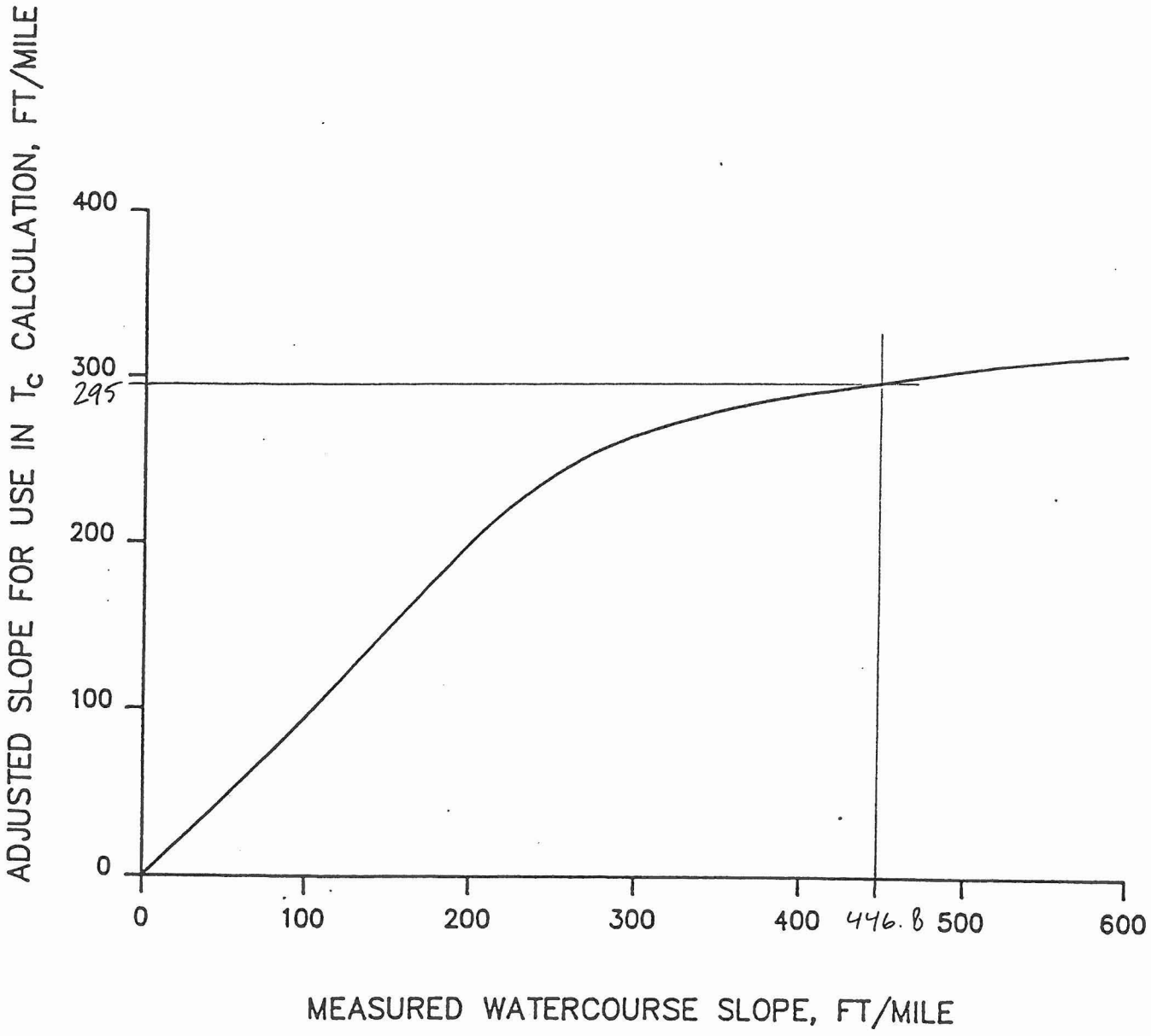


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160 L
SLOPE: 211.2 FT/MI
ADJ. SLOPE: 211 FT/MI

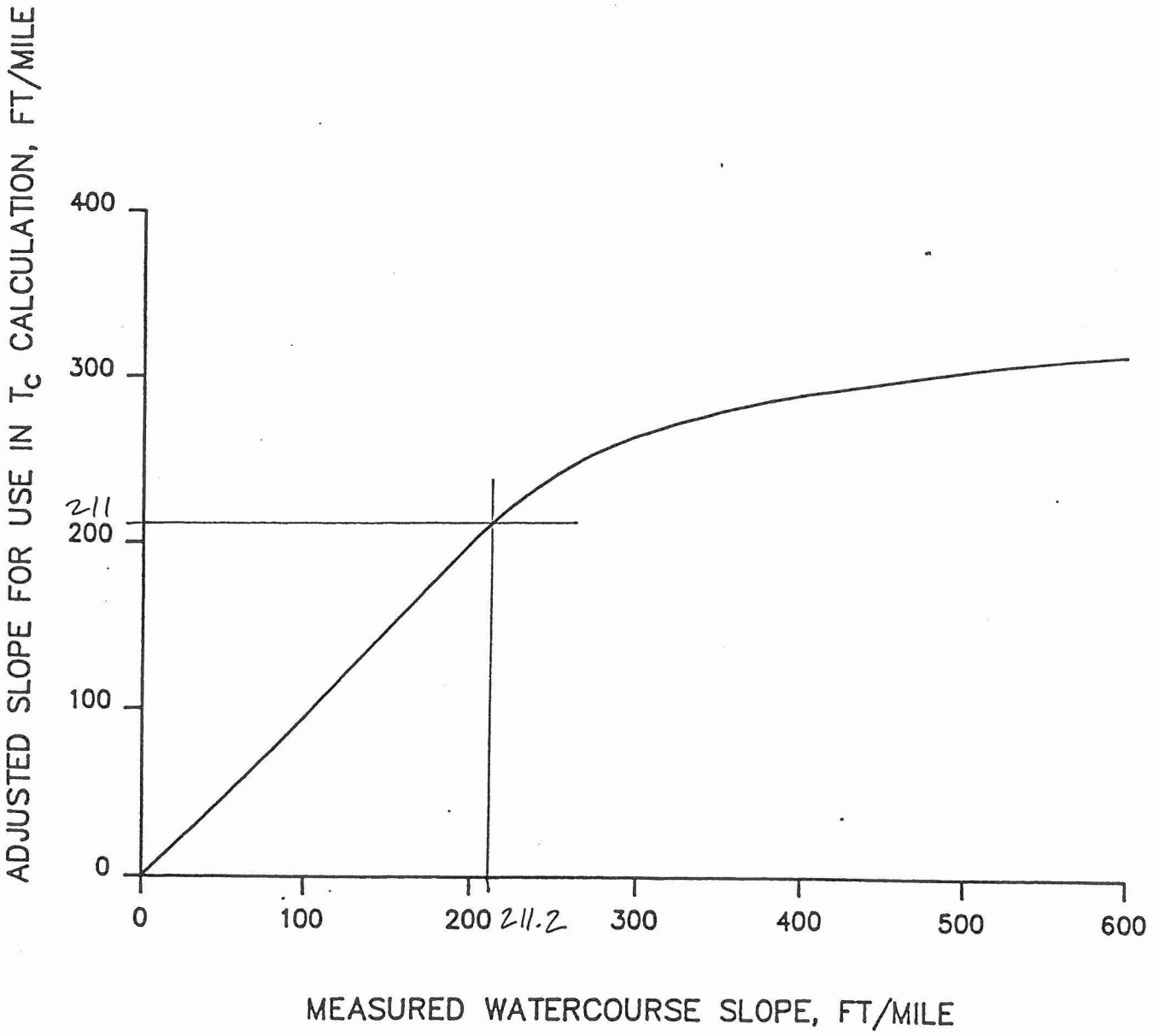


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160M
SLOPE: 326.0 FT/MI
ADJ. SLOPE: 273 FT/MI

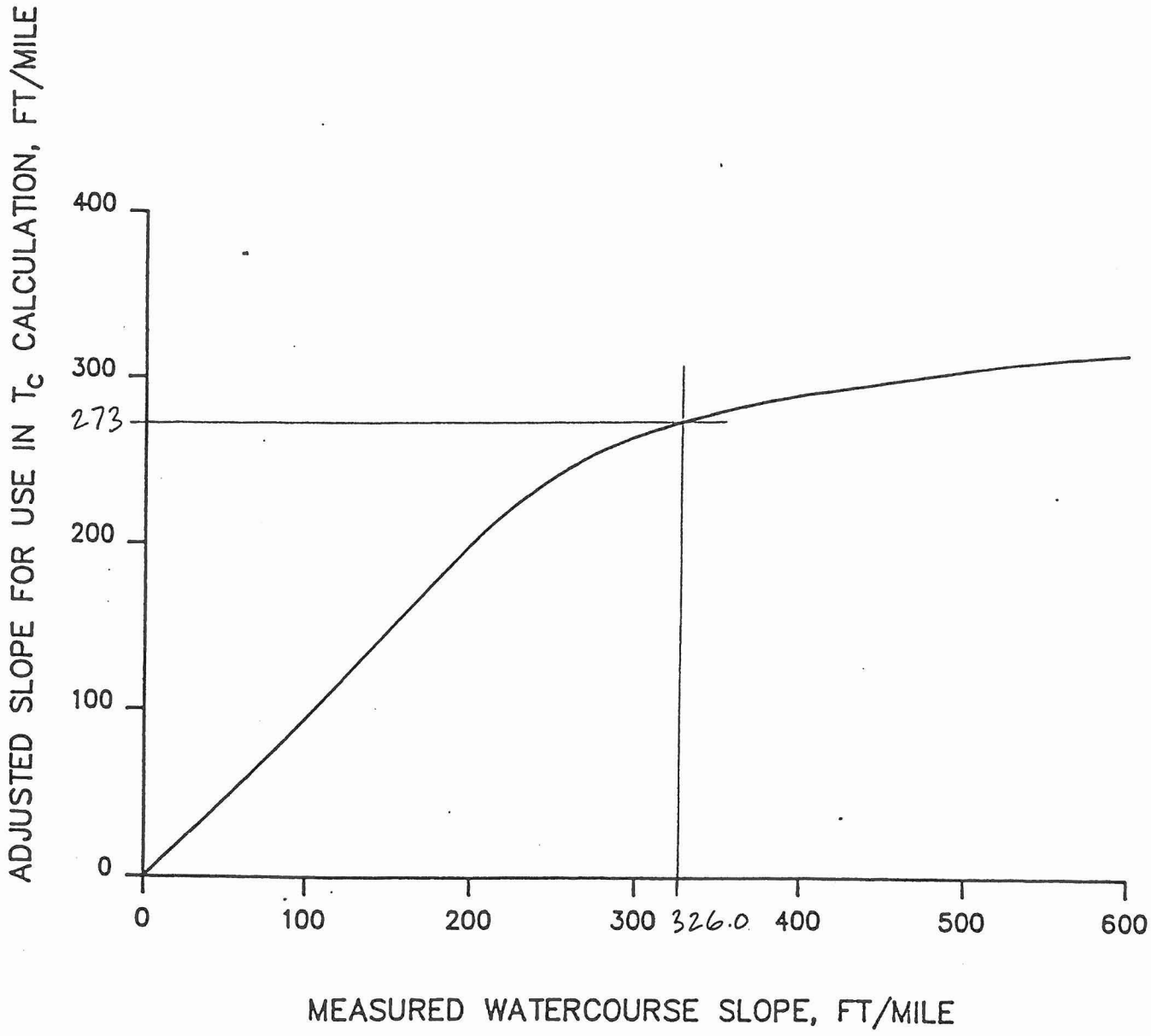


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160N
SLOPE: 409.4 FT/MI
ADJ. SLOPE: 290 FT/MI

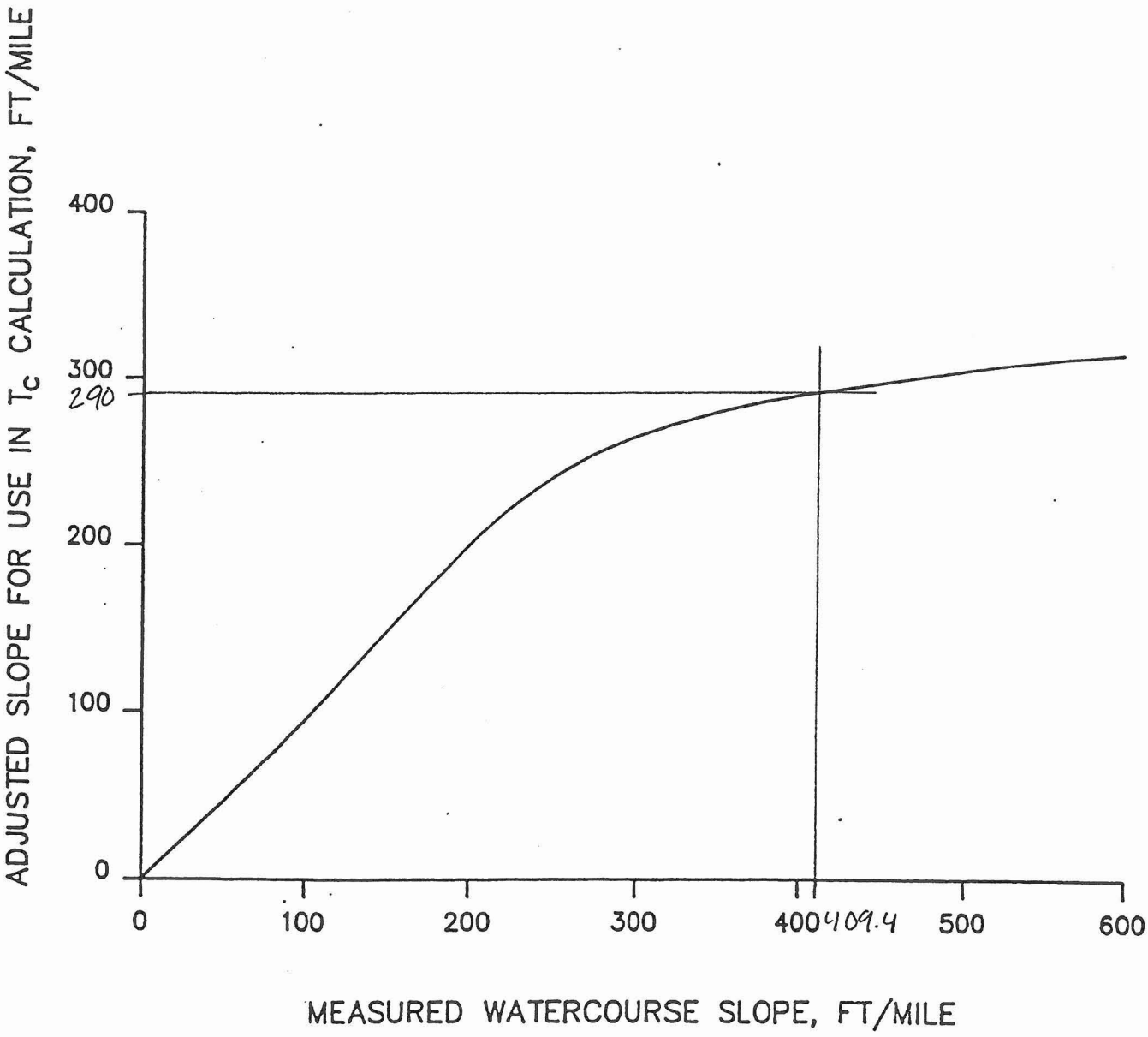


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 1600
SLOPE: 246.0 FT/MI
ADJ. SLOPE: 236 FT/MI

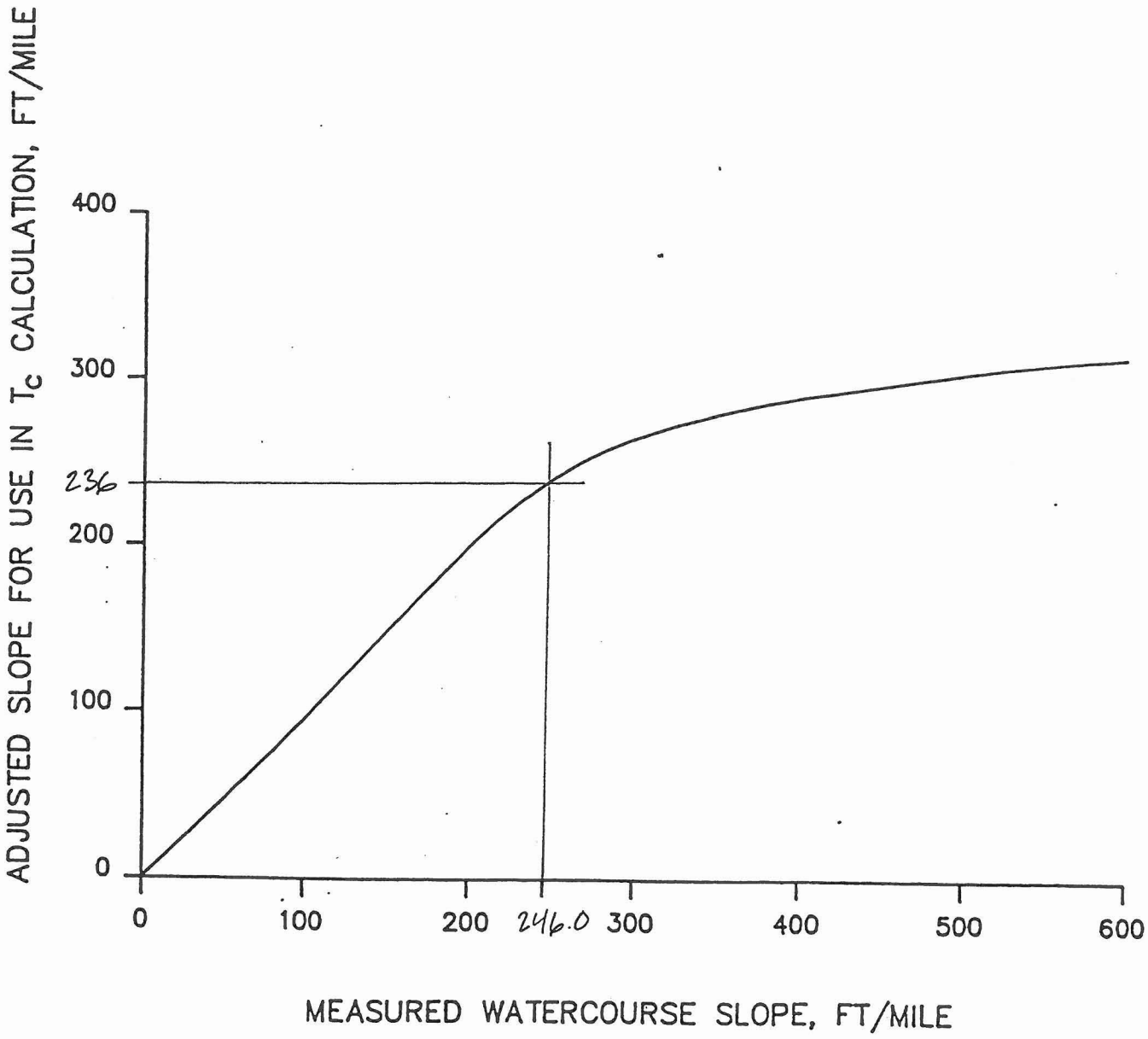


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160P
SLOPE: 352.0 FT/MI
ADJ. SLOPE: 279 FT/MI

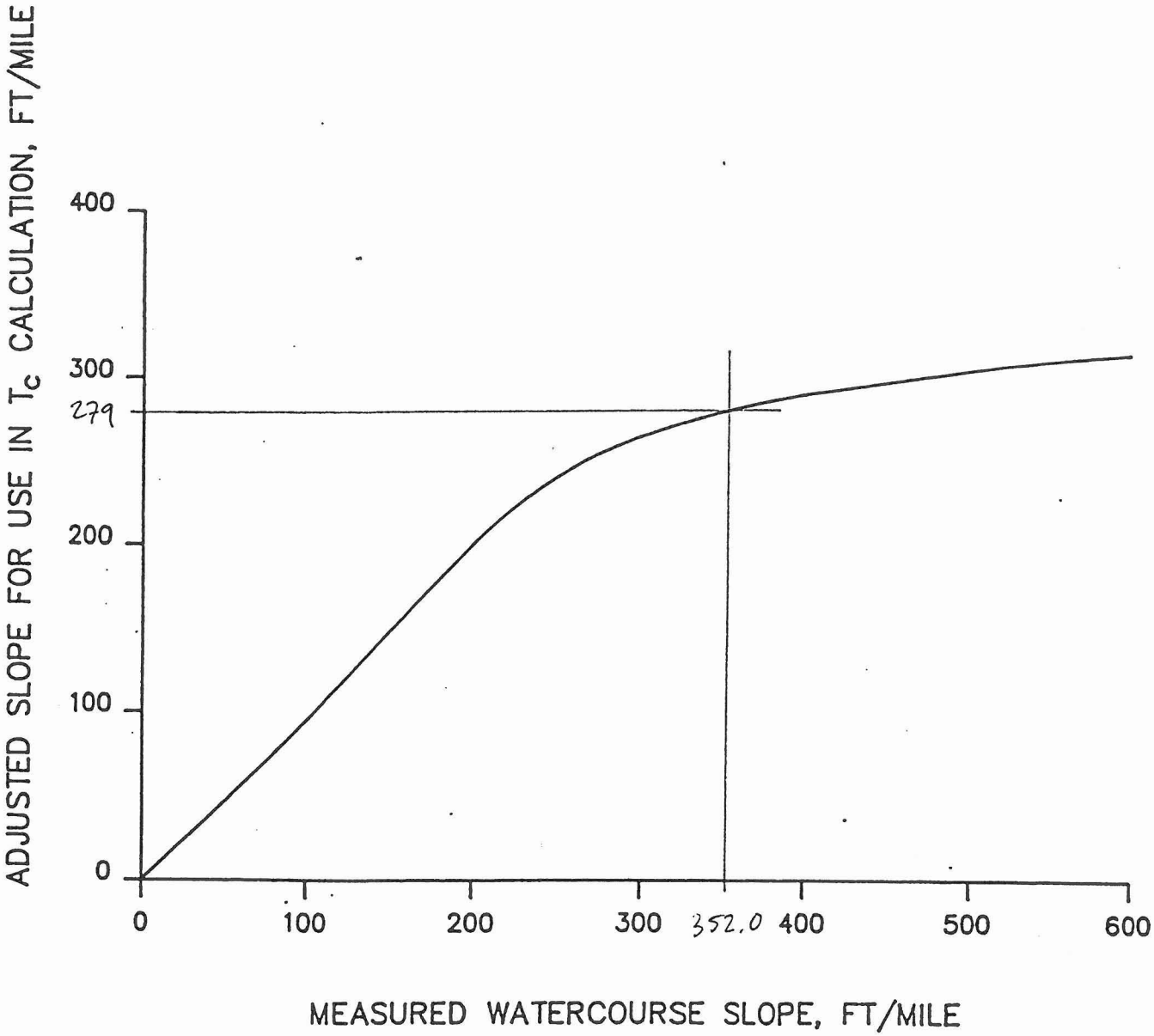


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160Q
SLOPE: 454.1 FT/MI
ADJ. SLOPE: 296 FT/MI

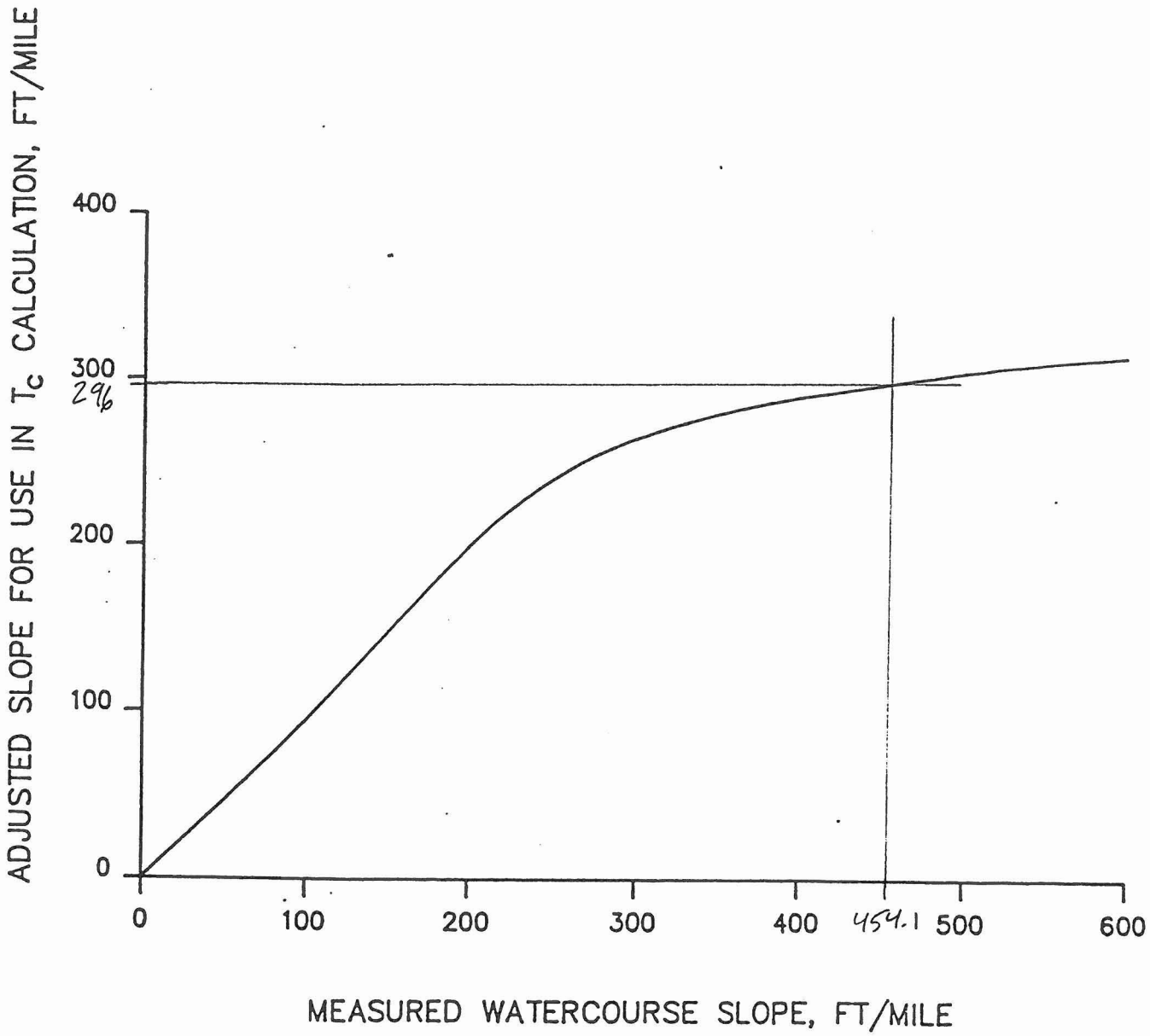


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160 R
SLOPE: 307.4 FT/MI
ADJ. SLOPE: 267 FT/MI

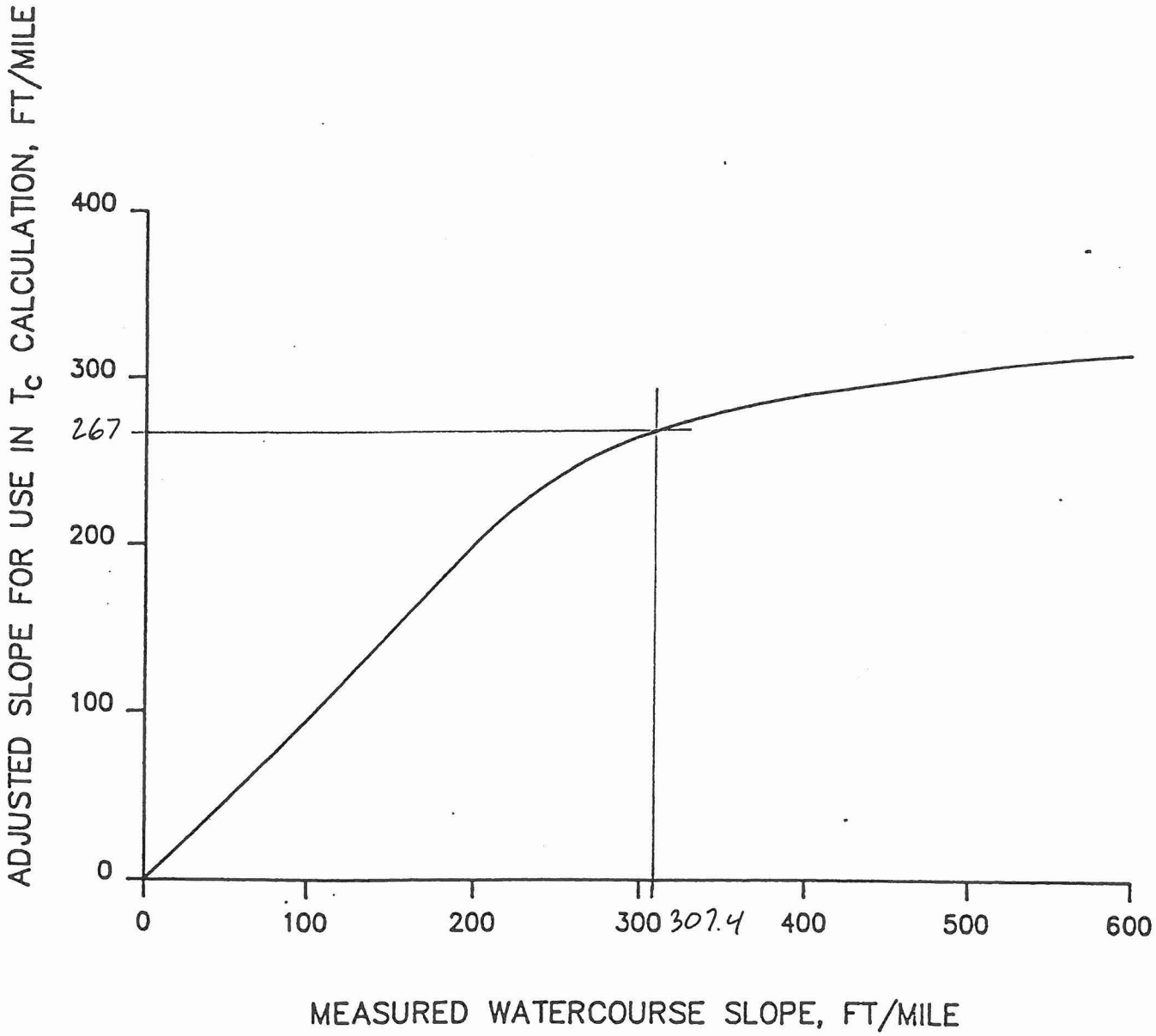


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSH.
BASIN 160S
SLOPE: 442.2 FT/MI
ADJ. SLOPE: 294 FT/MI

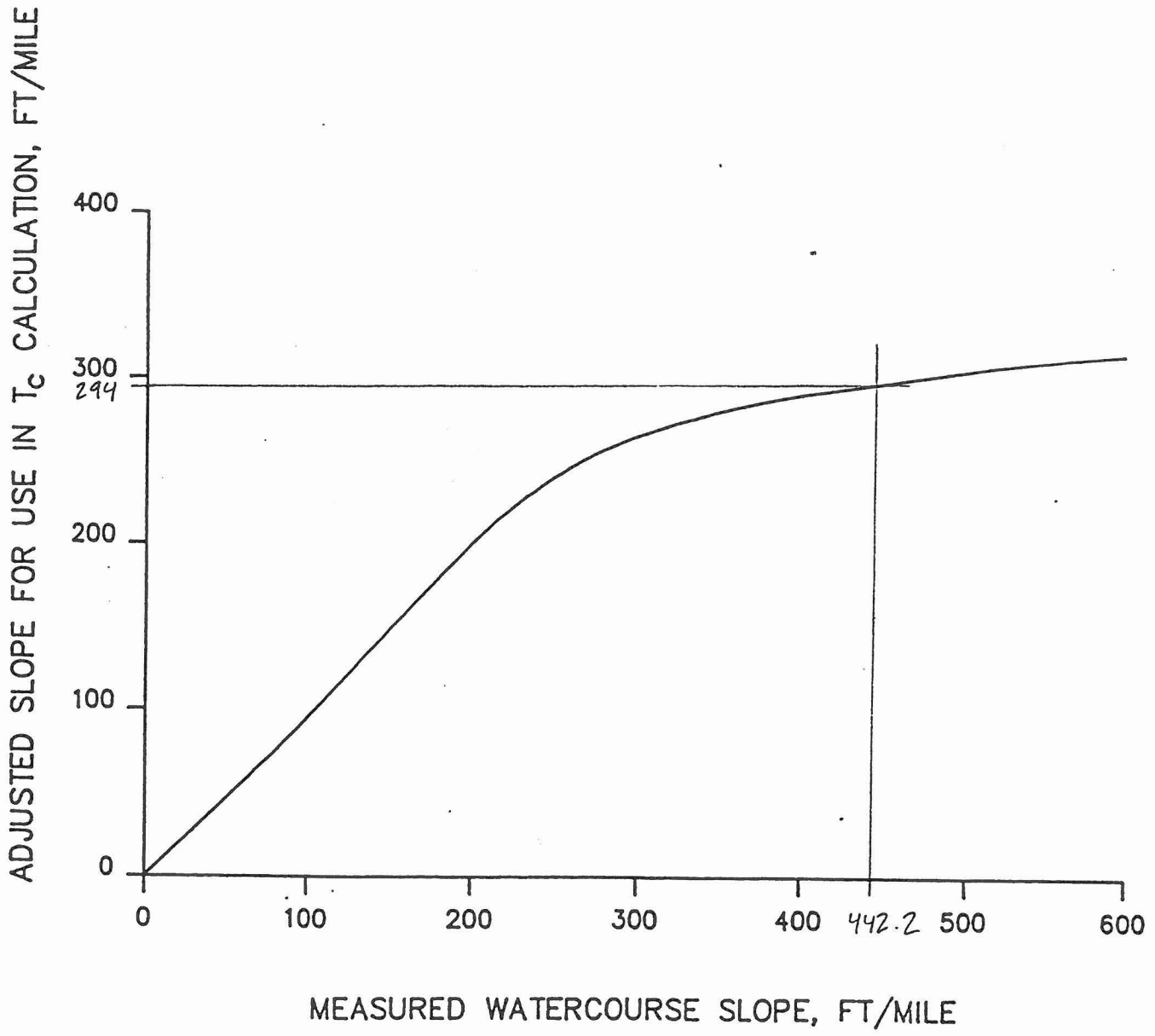


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160T
SLOPE: 355.4 FT/MI
ADJ. SLOPE: 280 FT/MI

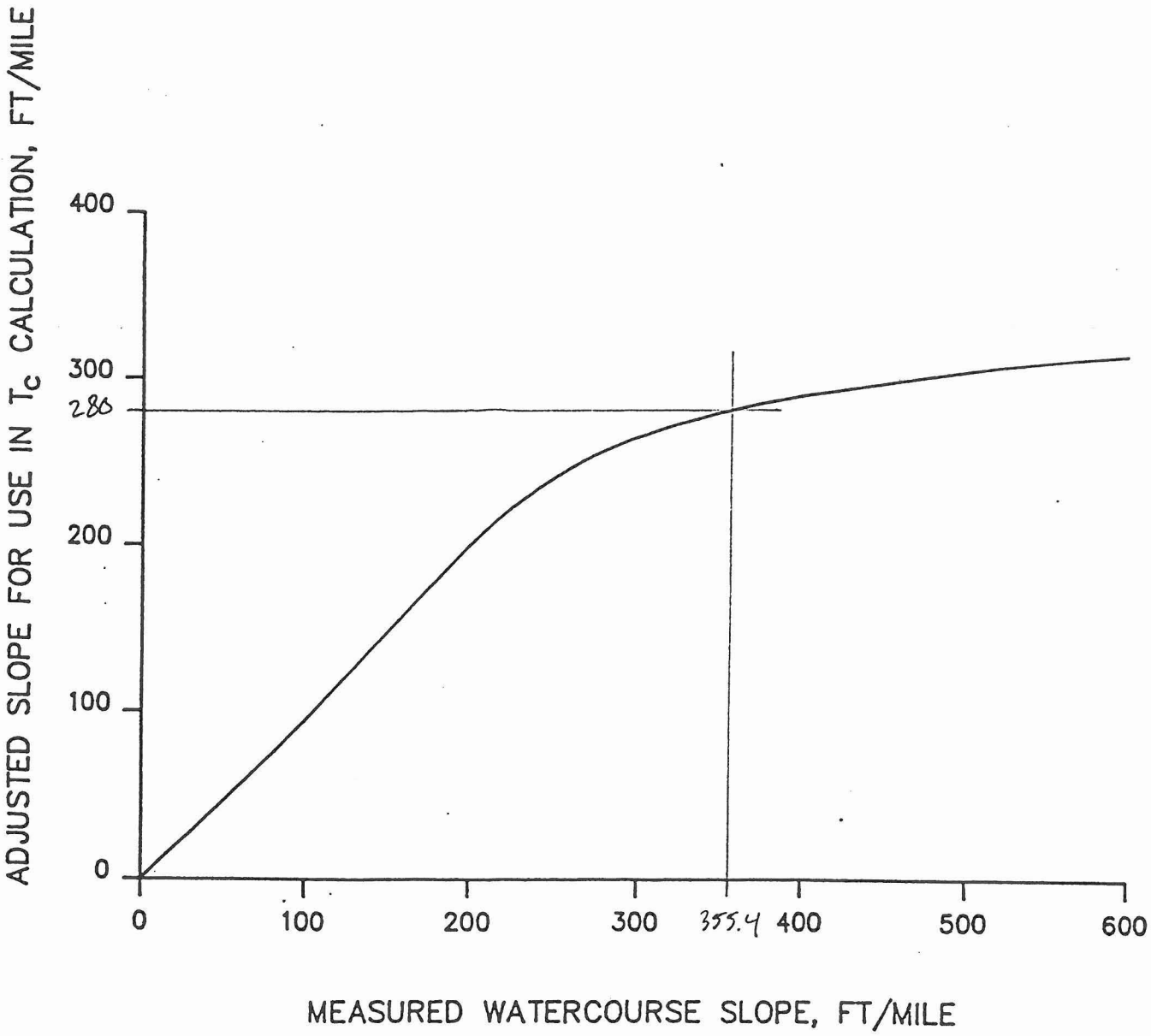


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

EMERALD WASH WATERSHED
BASIN 160X
SLOPE: 272.7 FT/MI
ADJ. SLOPE: 252 FT/MI

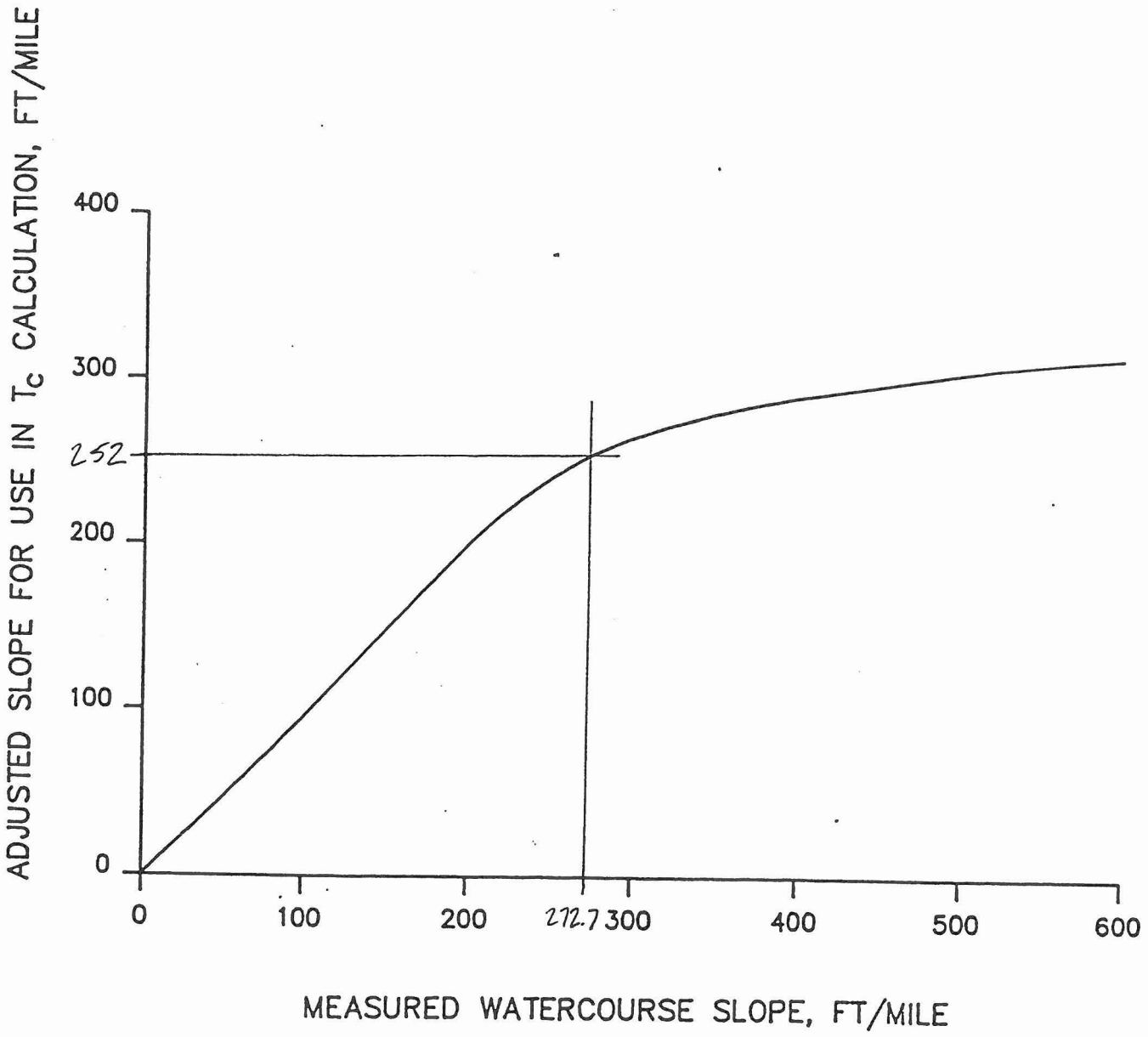


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

ADJ. SLOPE: 205 FT/MI

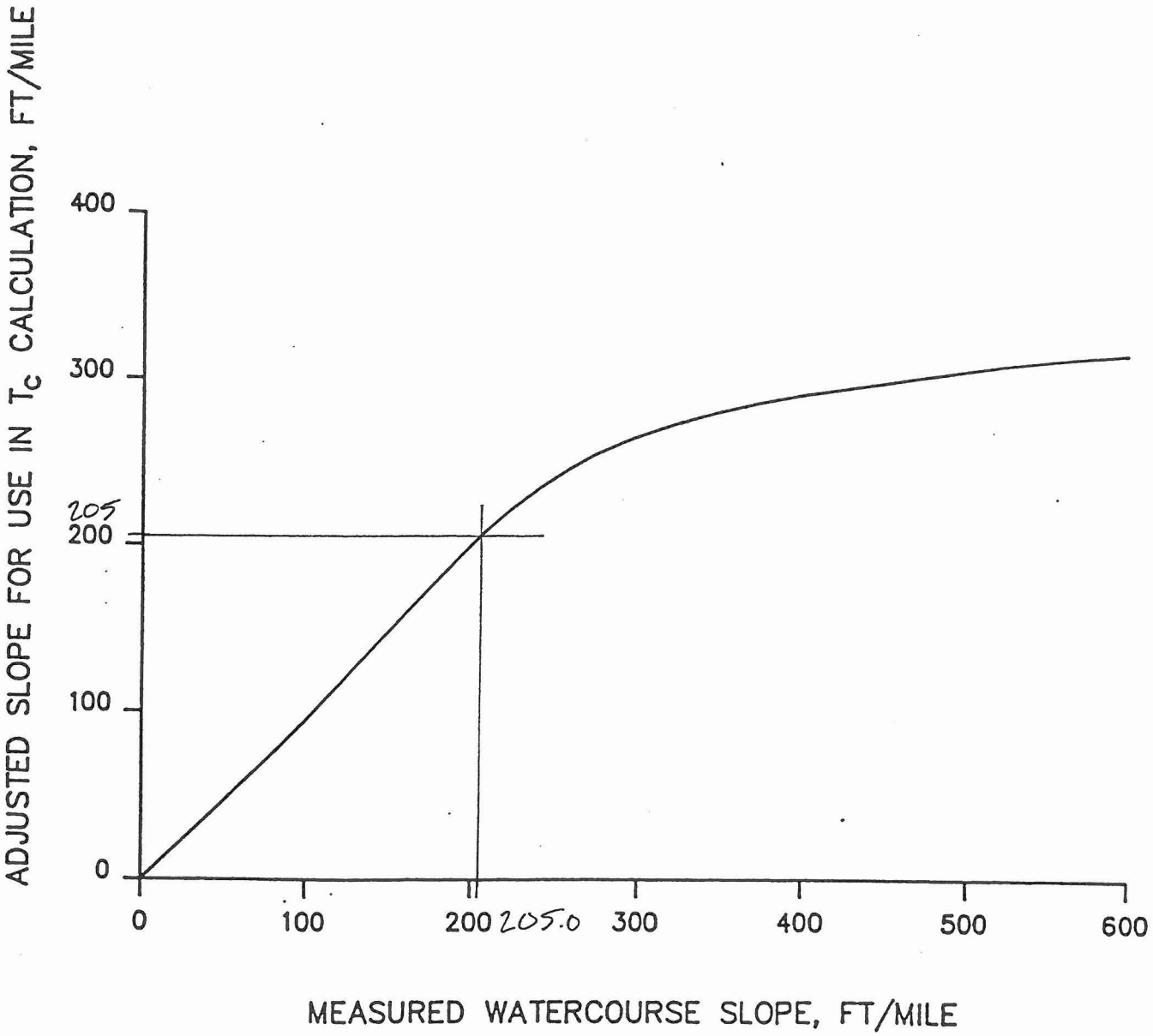


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

D.6

MALTA DRAIN

MALTA DRAIN WATERSHED
BASIN 170 A
SLOPE: 265.8 FT/MI
ADJ. SLOPE: 248 FT/MI

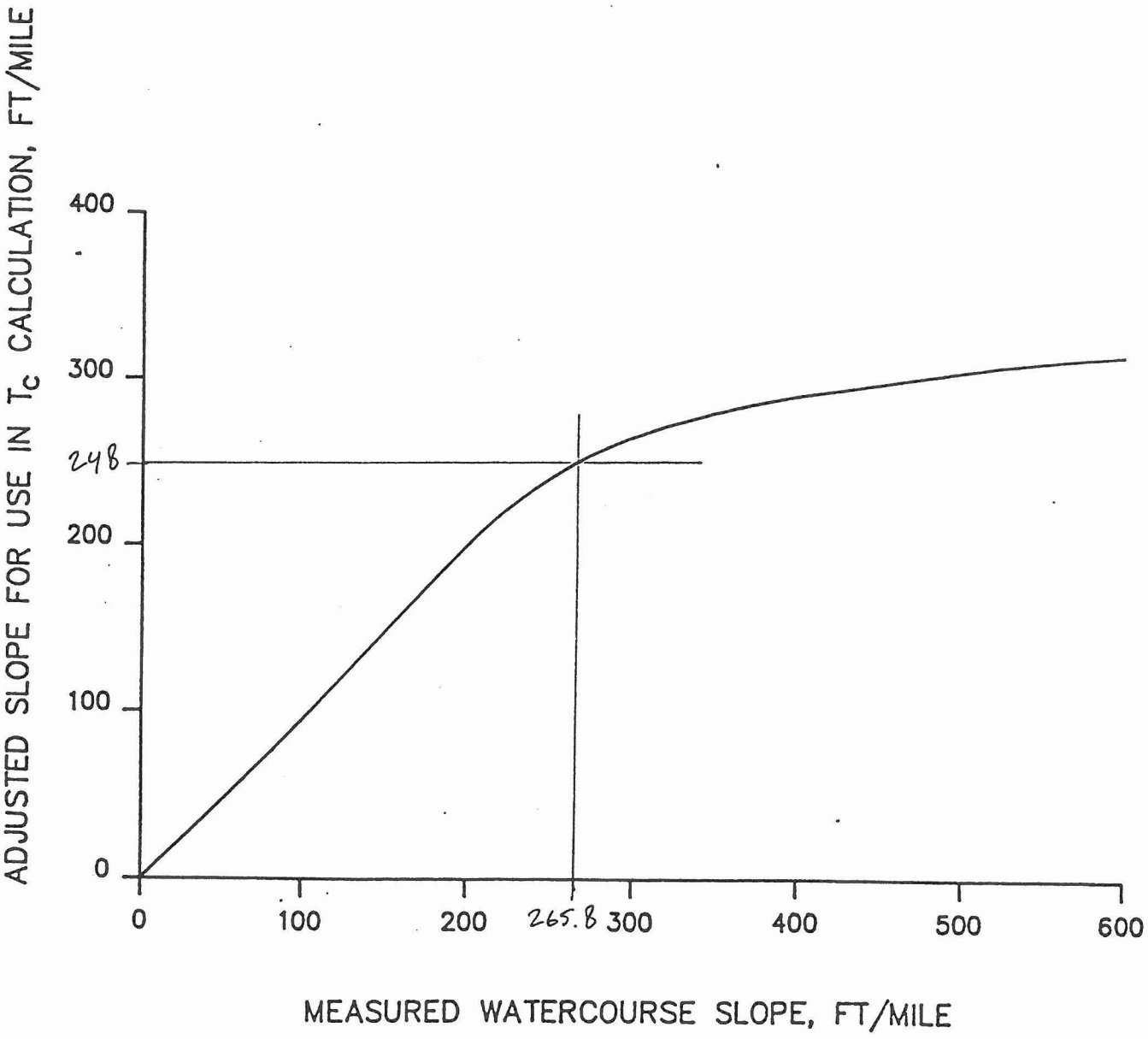


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

MALTA DRAIN WATERSHED
BASIN 170 B
SLOPE: 422.4 FT/MI
ADJ. SLOPE: 291 FT/MI

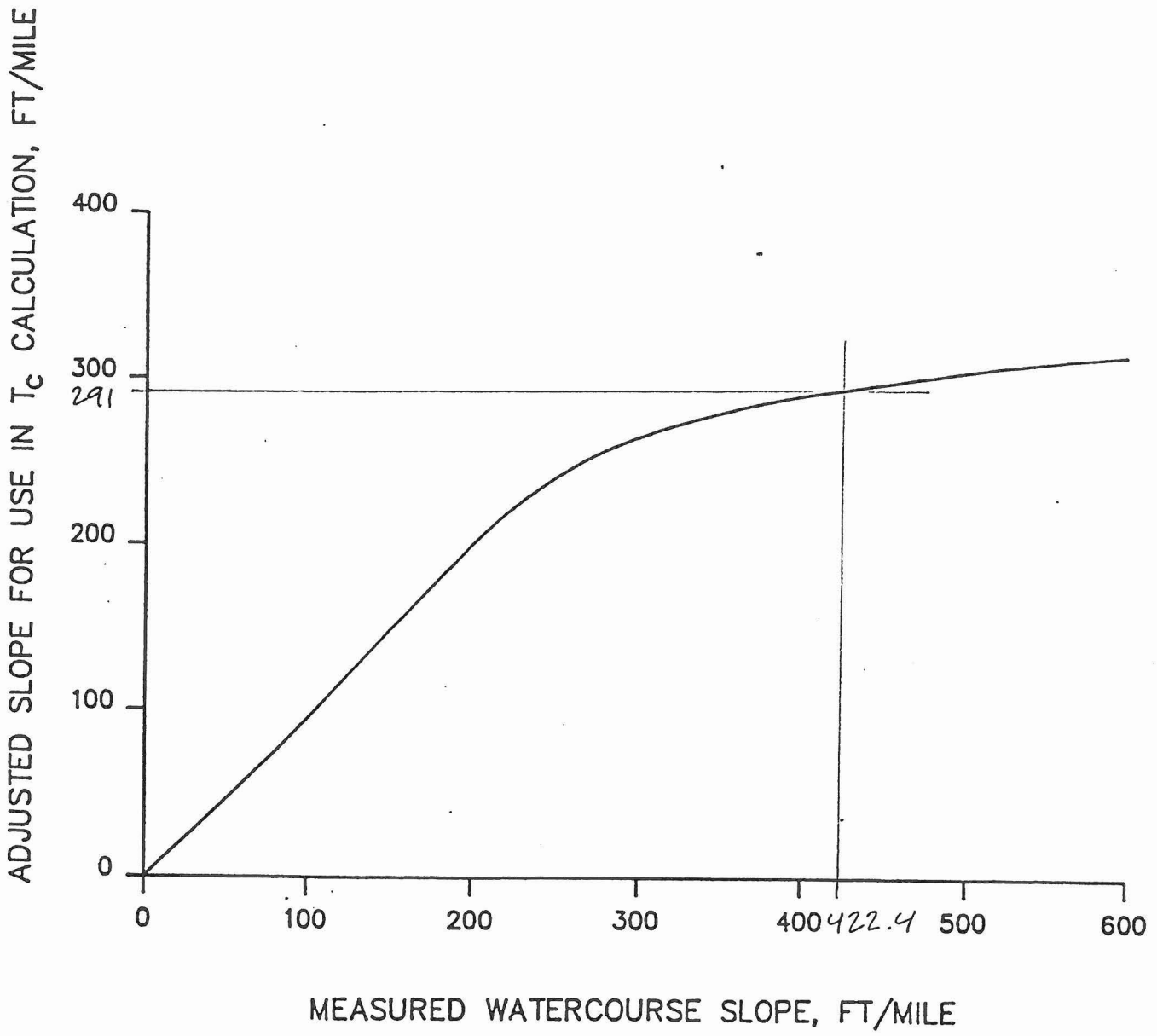


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

MALTA DRAIN WATERSHED
BASIN 170 C
SLOPE: 230.2 FT/MI
ADJ. SLOPE: 226 FT/MI

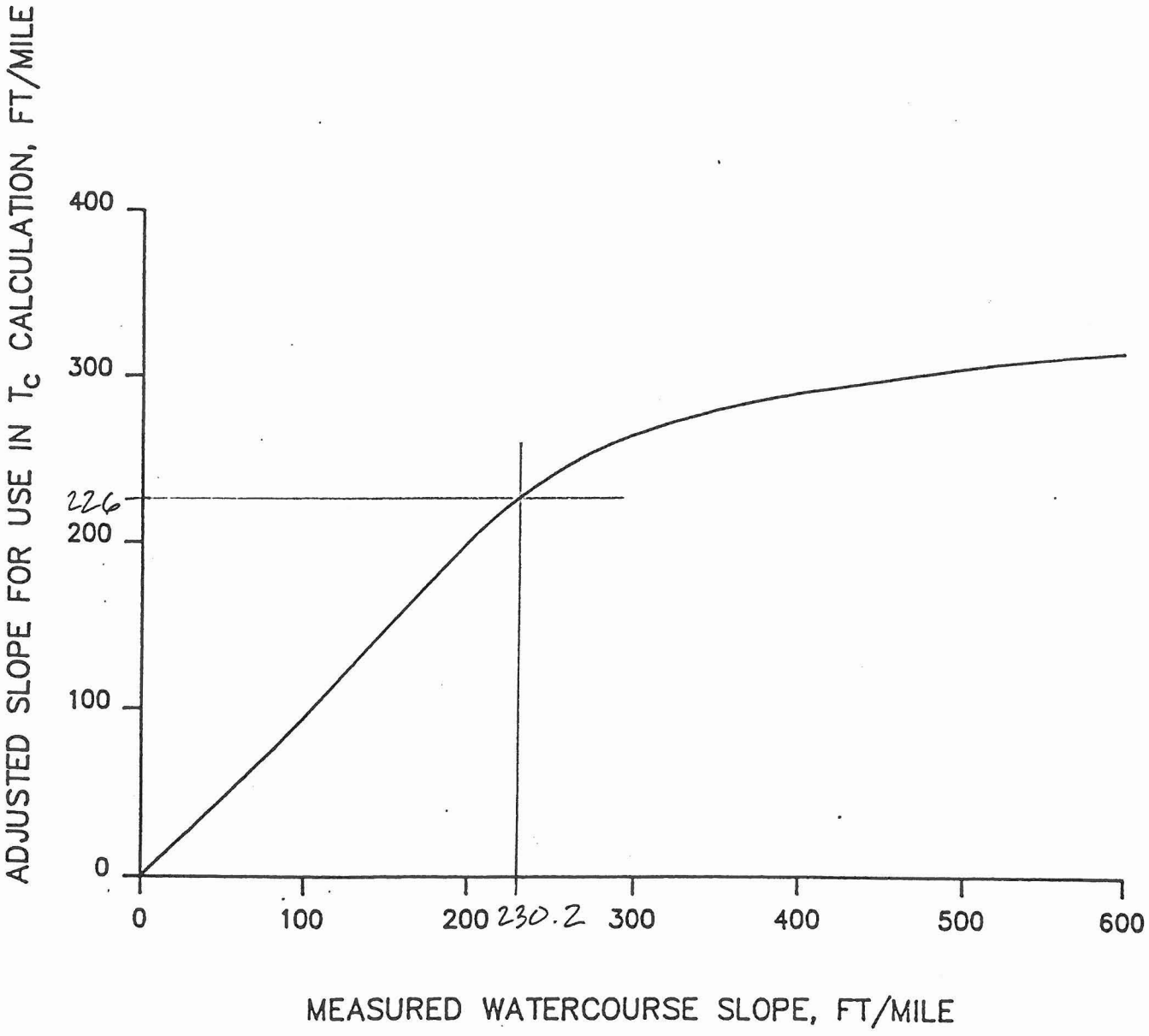


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

MALTA DRAIN WATERSHED
BASIN 170 D
SLOPE: 348.5 FT/MI
ADJ. SLOPE: 279 FT/MI

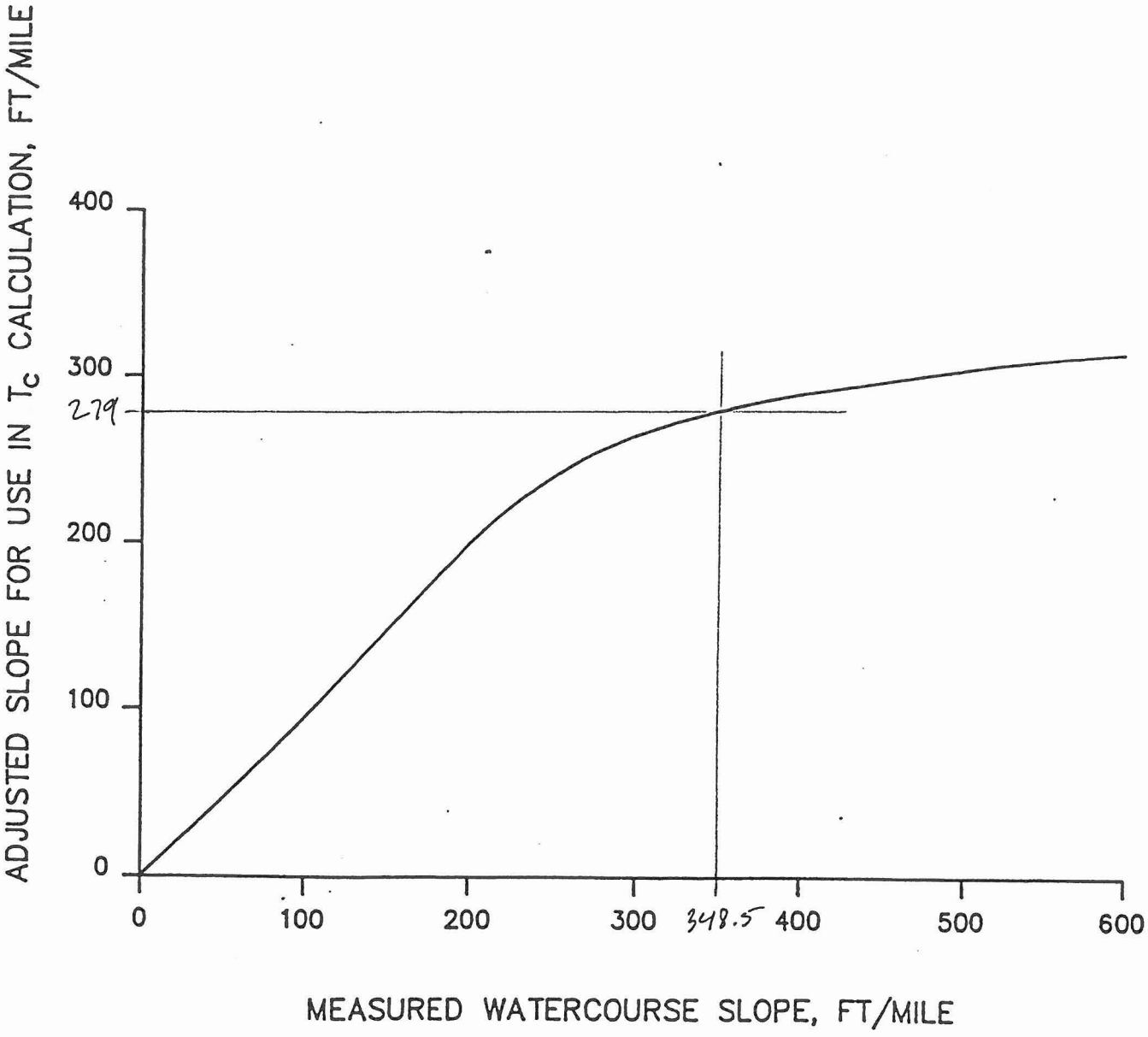


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

MALTA DRAIN WATERSHED
BASIN 170 G
SLOPE: 308.0 FT/MI
ADJ. SLOPE: 267 FT/MI

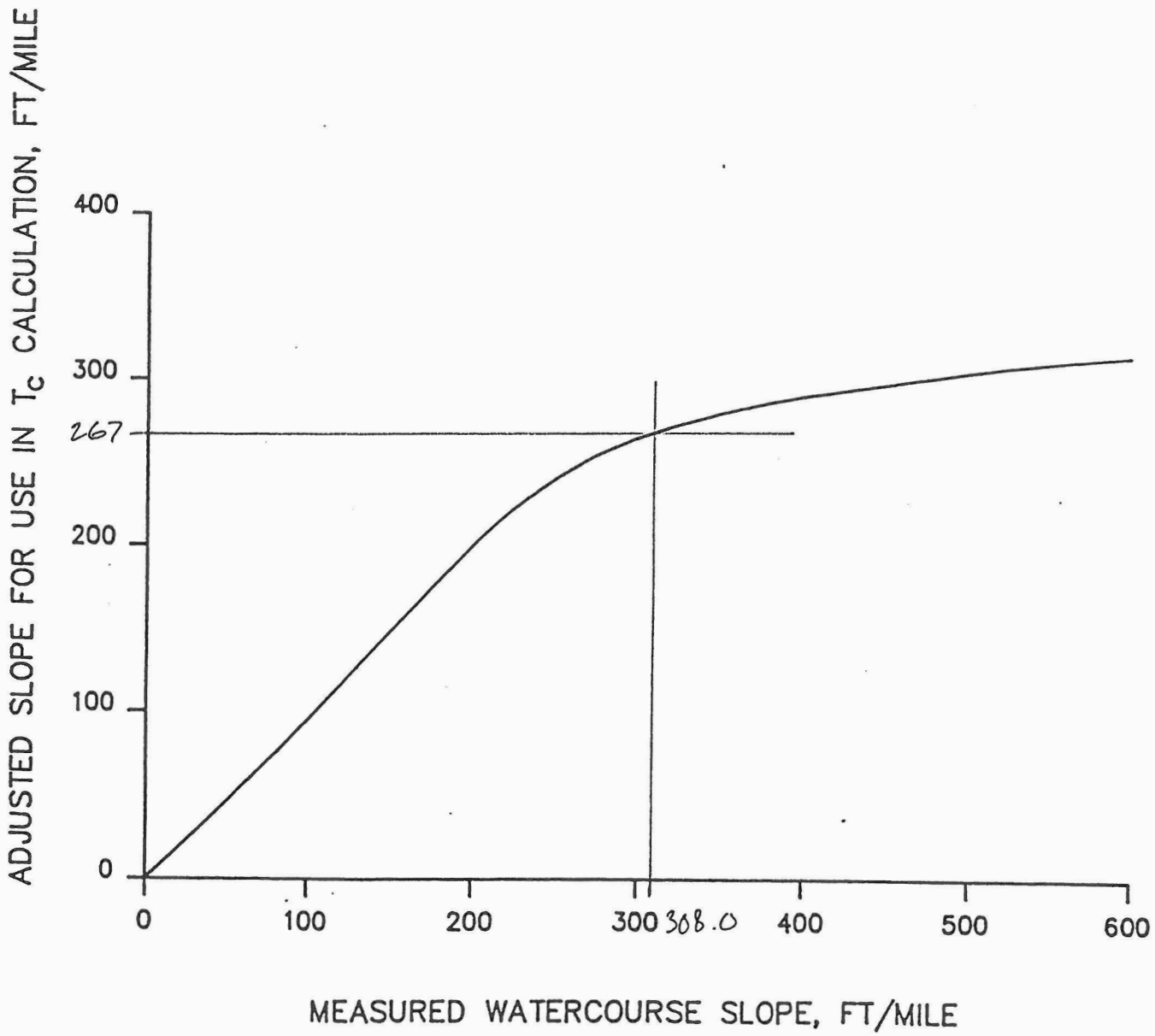


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

D.7

COLONY WASH

COLONY WASH WATERSHED
BASIN 180 A
SLOPE: 312.7 FT/MI
ADJ. SLOPE: 269 FT/MI

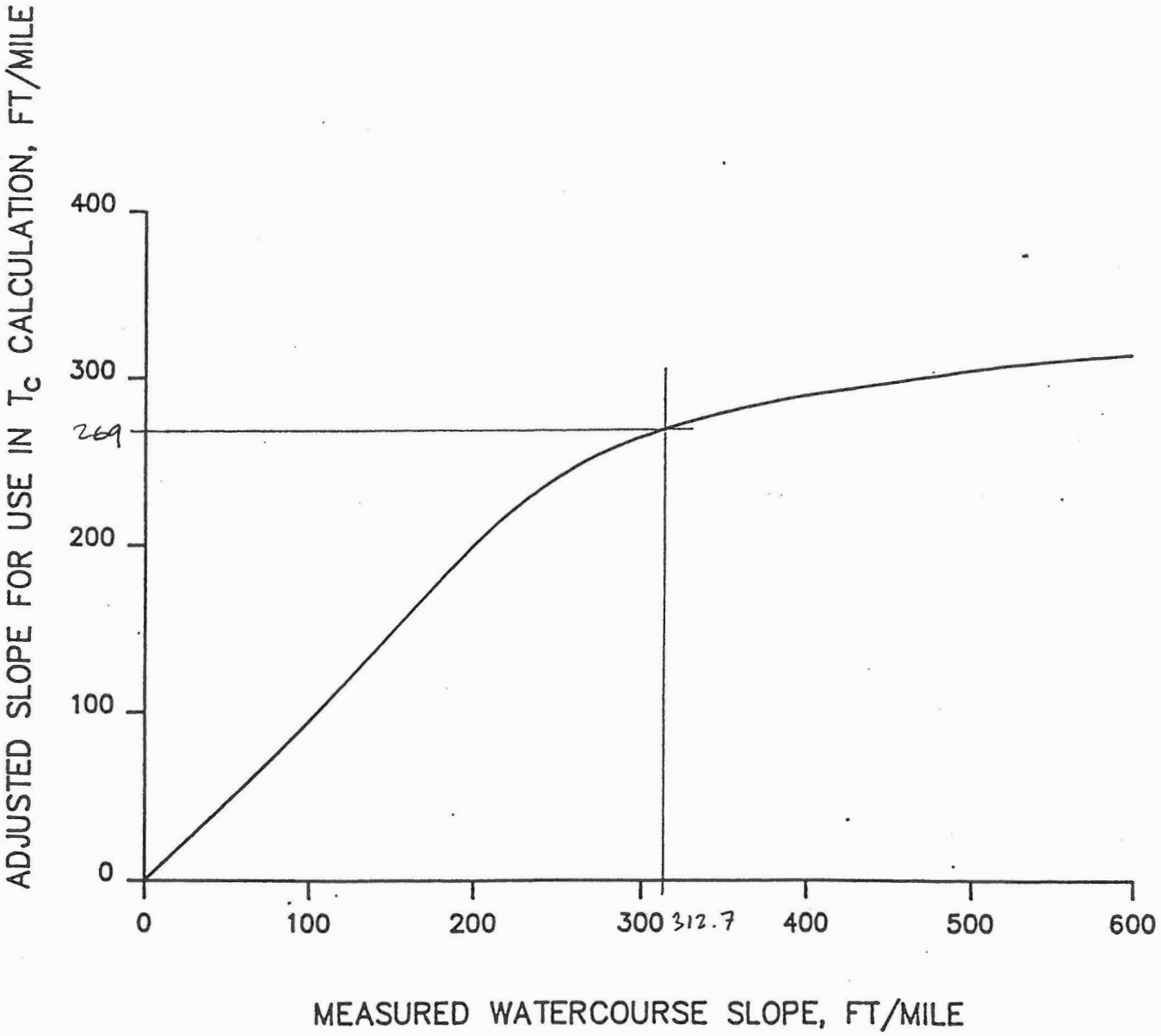


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180 B
SLOPE: 246.0 FT/MI
ADJ. SLOPE: 236 FT/MI

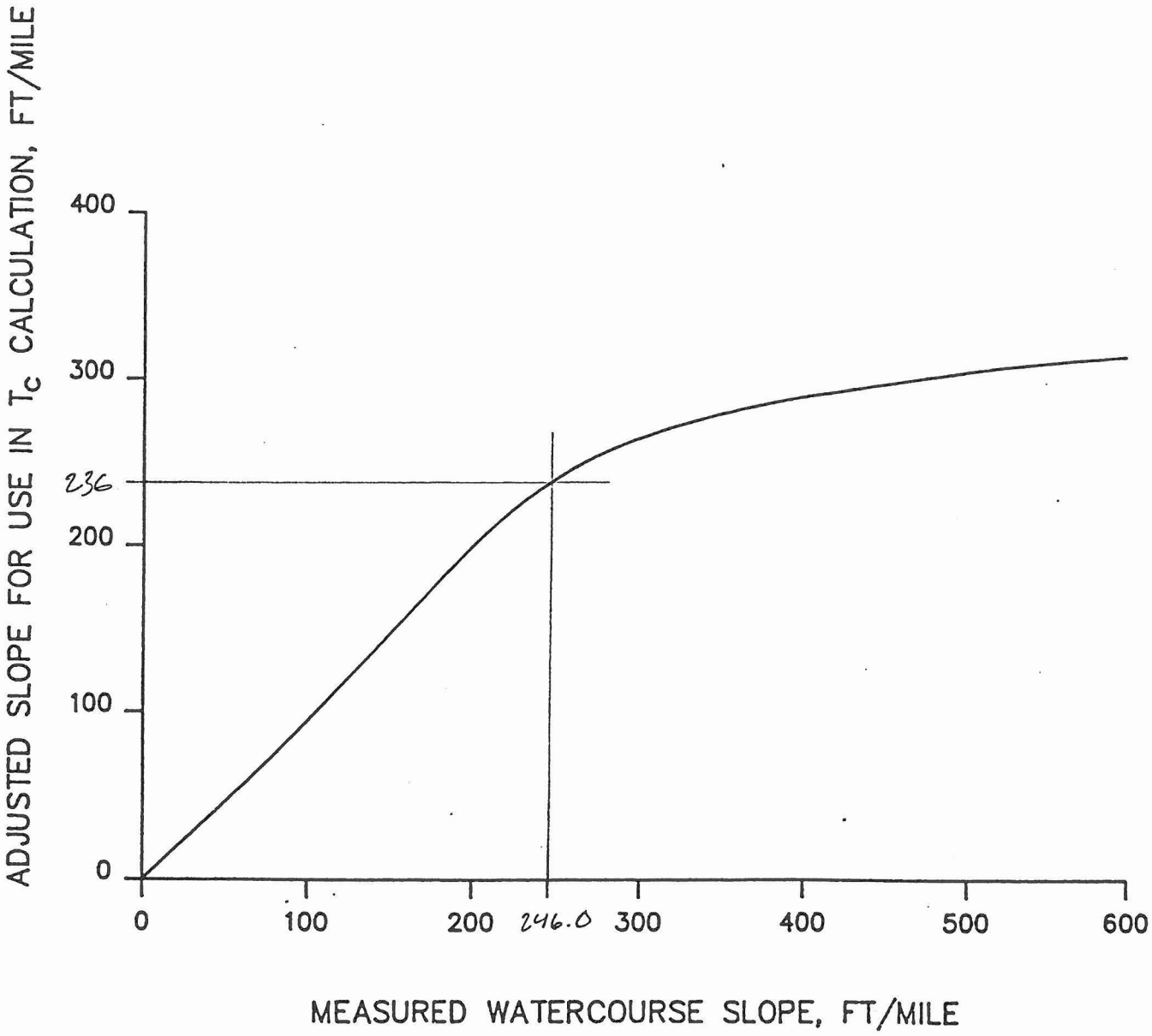


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180C
SLOPE: 442.5 FT/MI
ADJ. SLOPE: 295 FT/MI

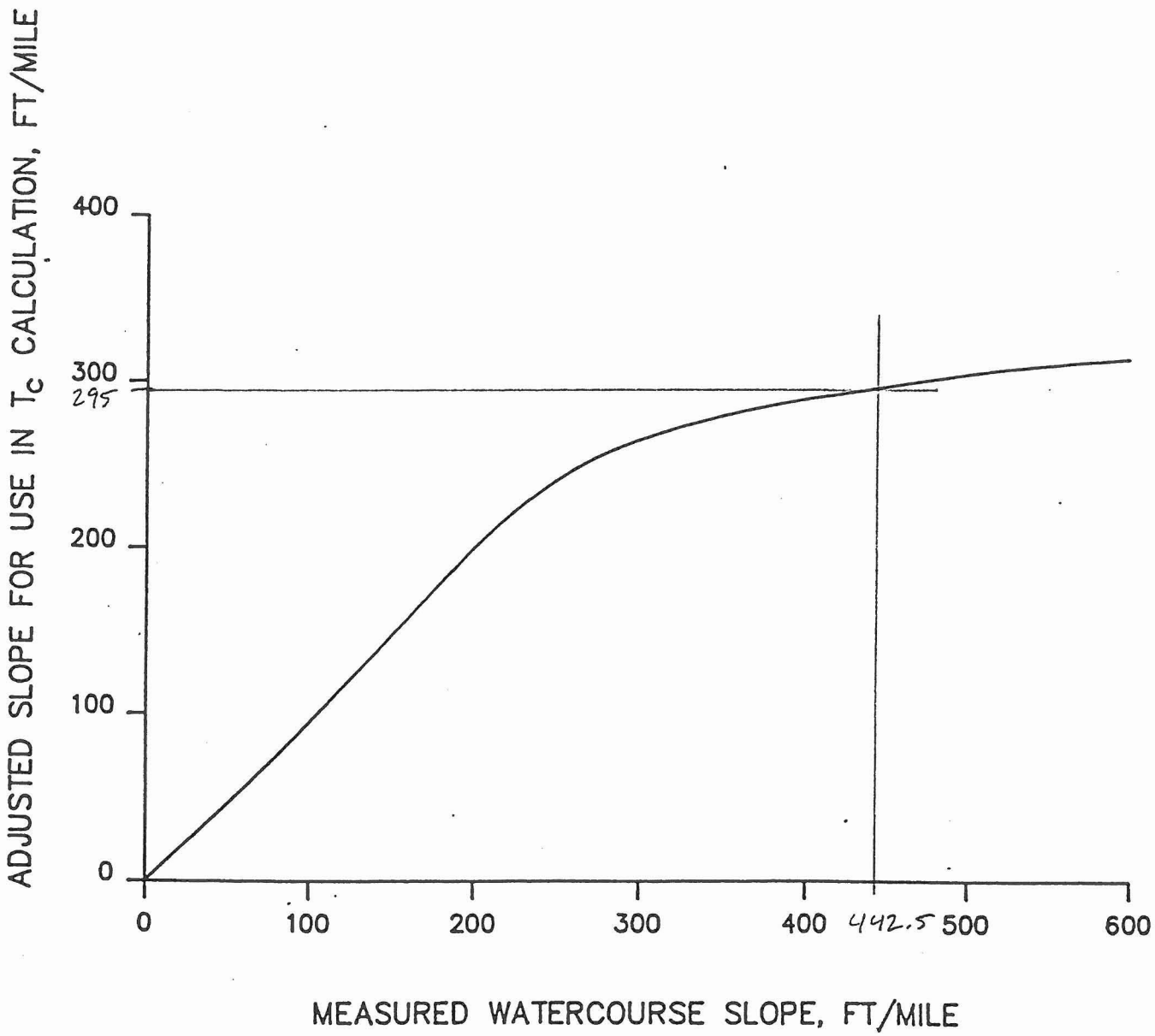


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180D
SLOPE: 289.5 FT/MI
ADJ. SLOPE: 260 FT/MI

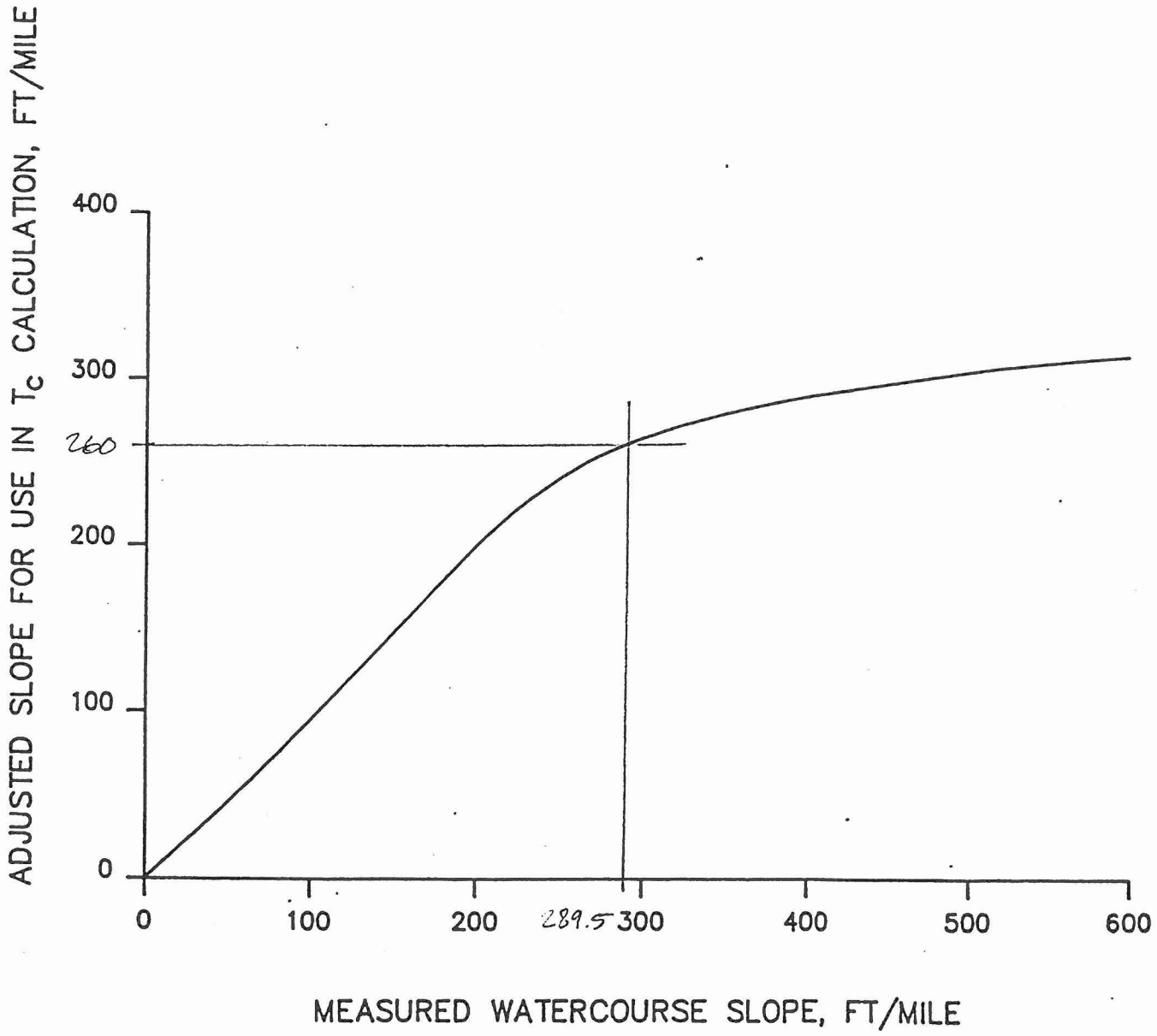


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180E
SLOPE: 302.6 FT/MI
ADJ. SLOPE: 265 FT/MI

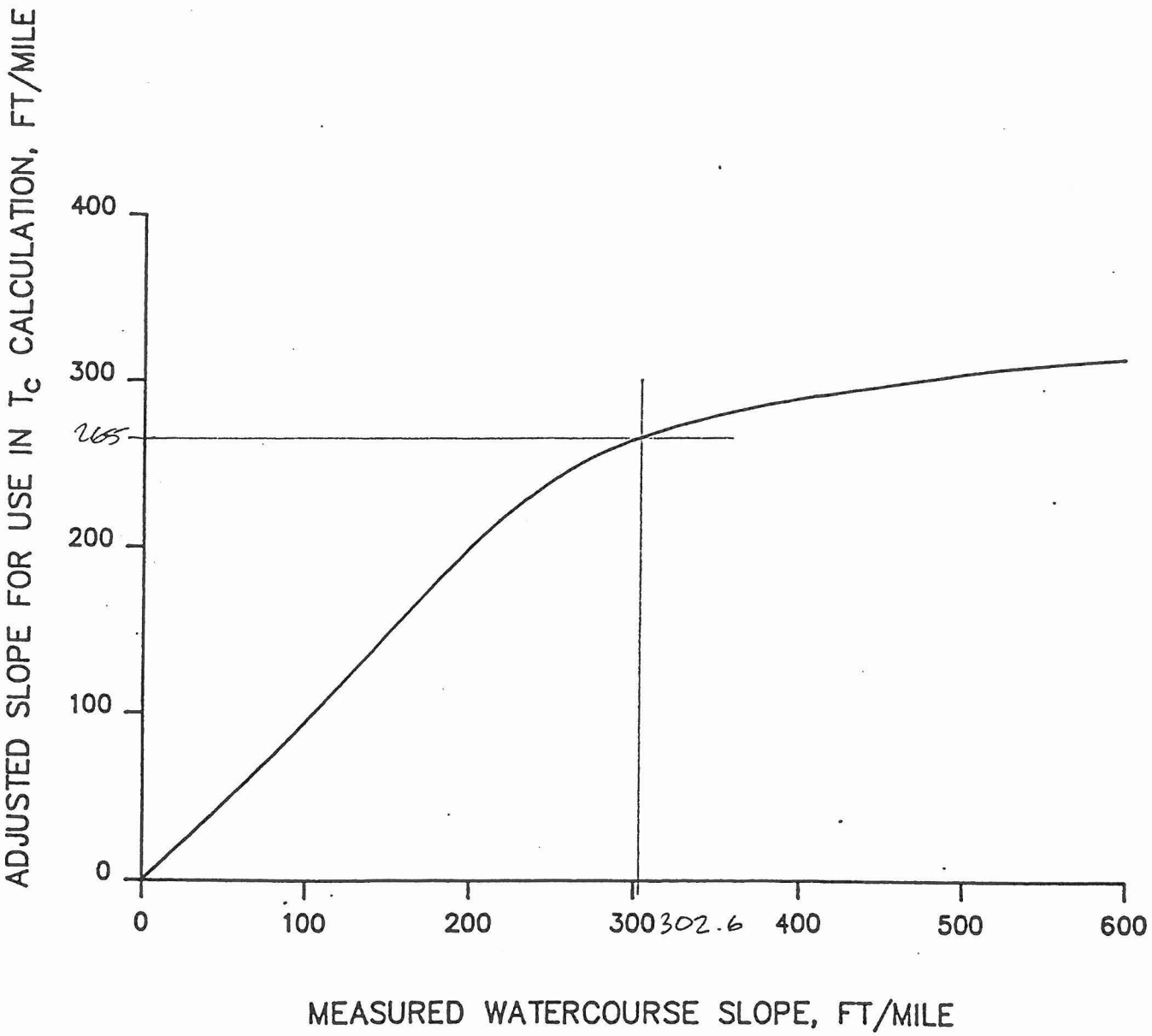


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180F
SLOPE: 301.1 FT/MI
ADJ. SLOPE: 265 FT/MI

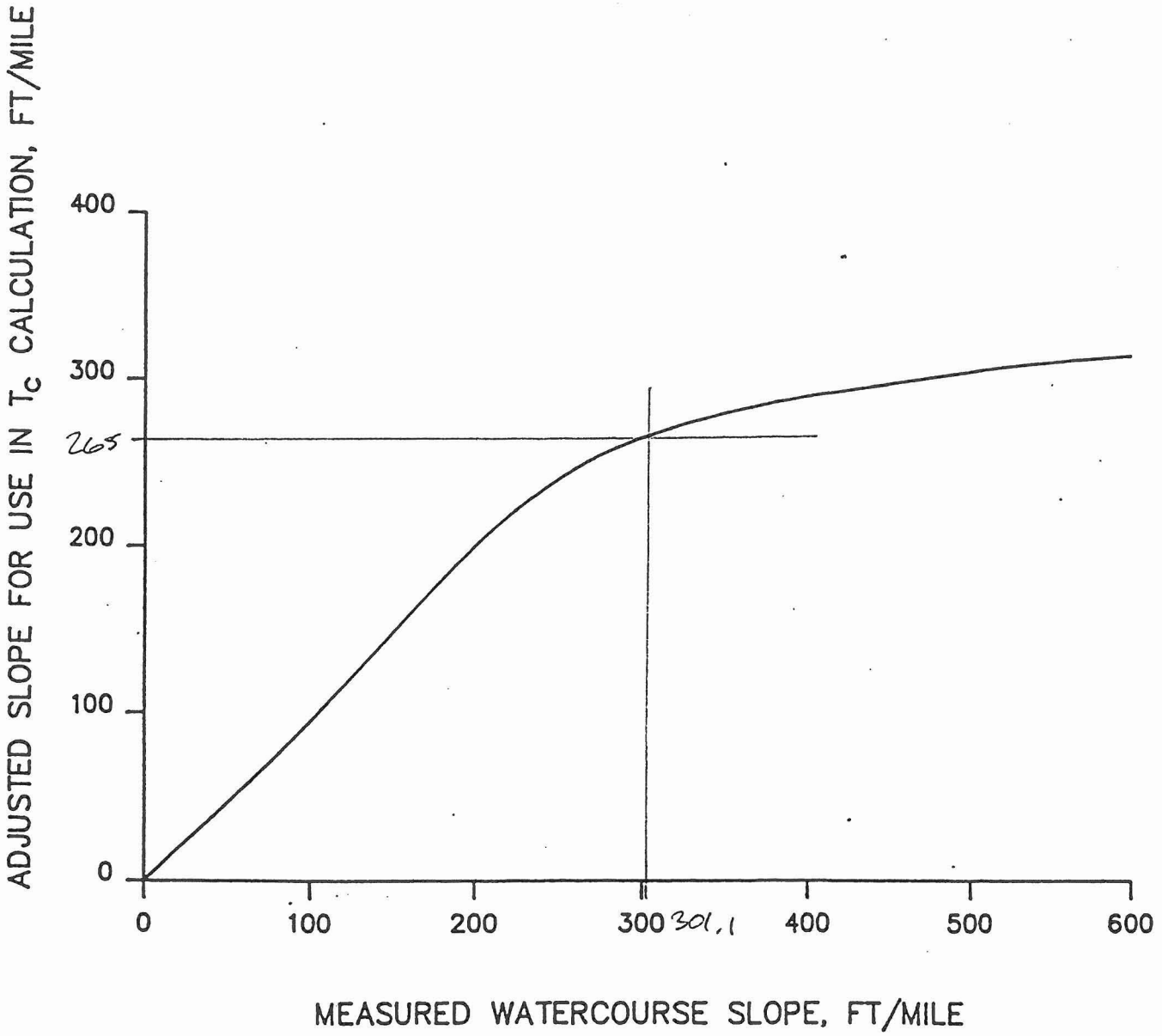


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180 G
SLOPE: 238.1 FT/MI
ADJ. SLOPE: 230 FT/MI

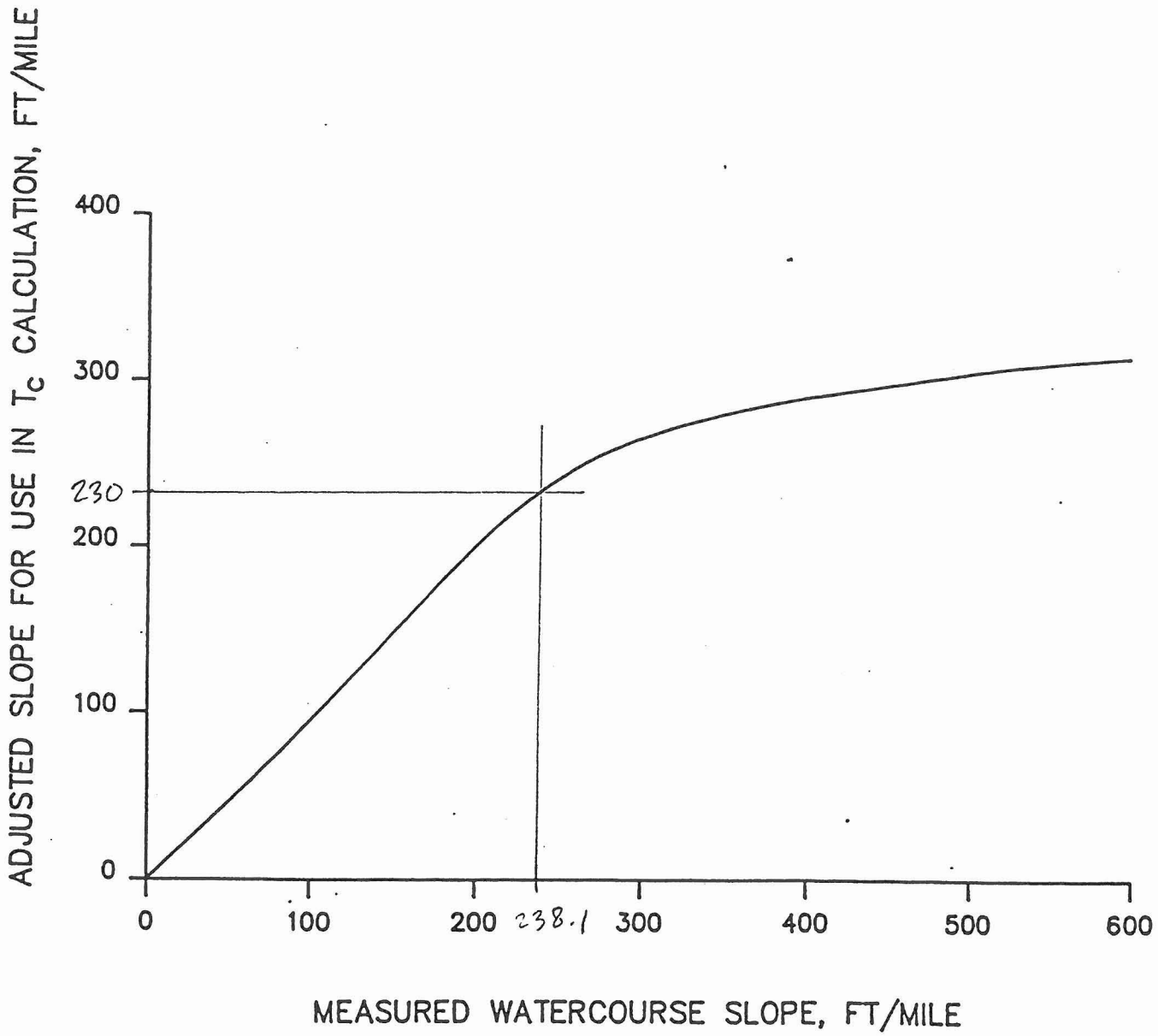


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180 H
SLOPE: 218.4 FT/MI
ADJ. SLOPE: 217 FT/MI

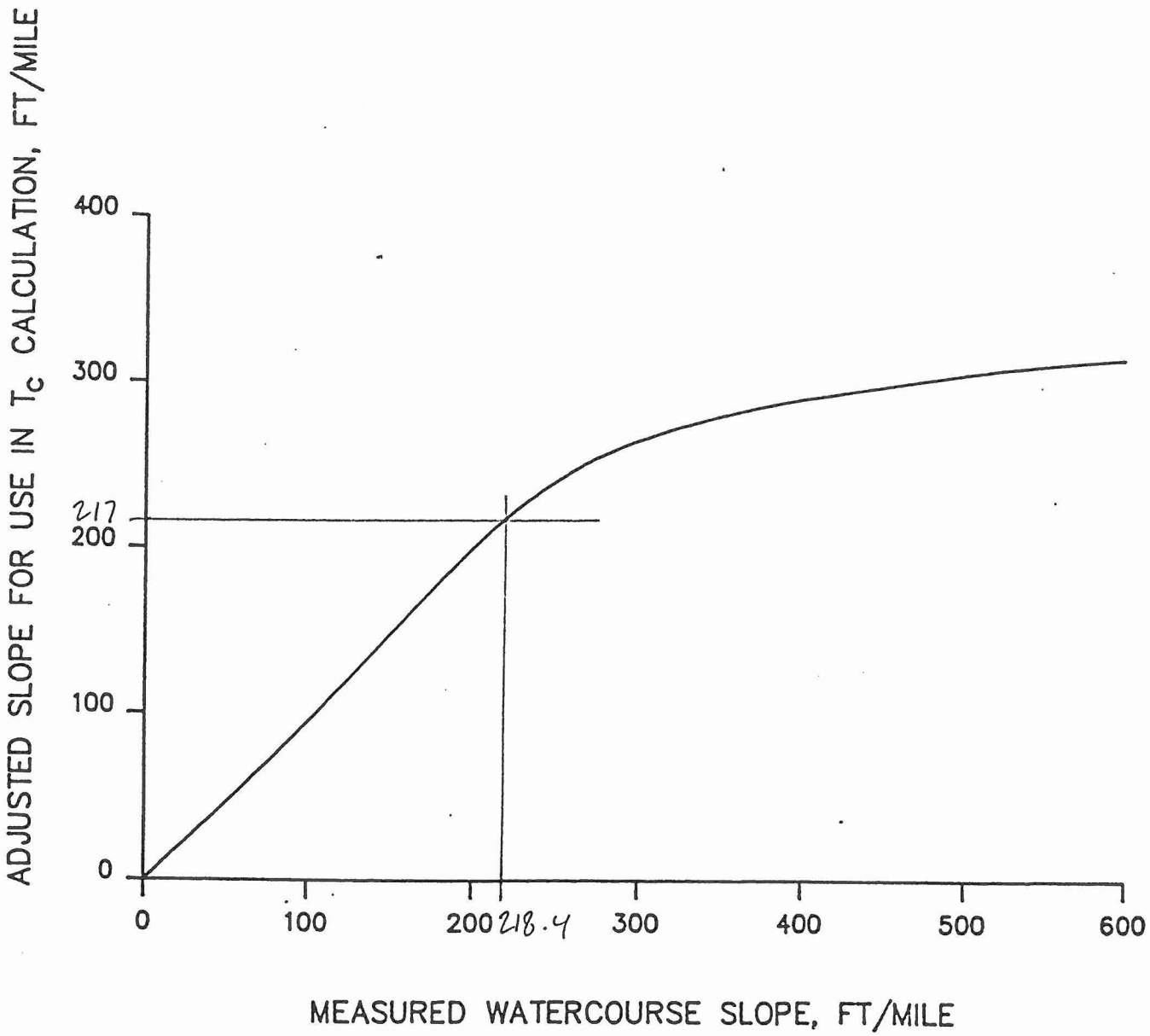


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180 L
SLOPE: 340.0 FT/MI
ADJ. SLOPE: 276 FT/MI

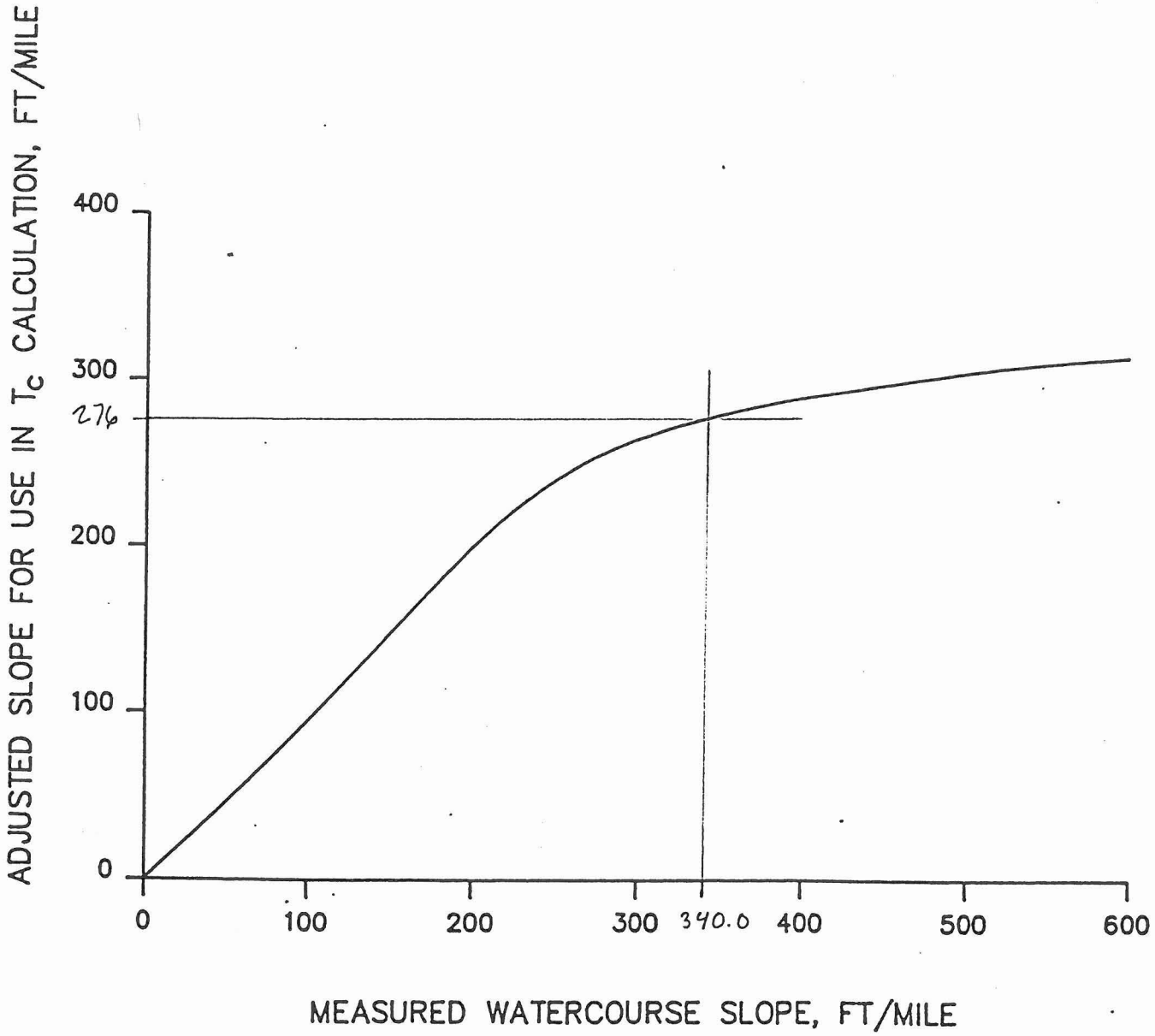


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180M
SLOPE: 297.9 FT/MI
ADJ. SLOPE: 264 FT/MI

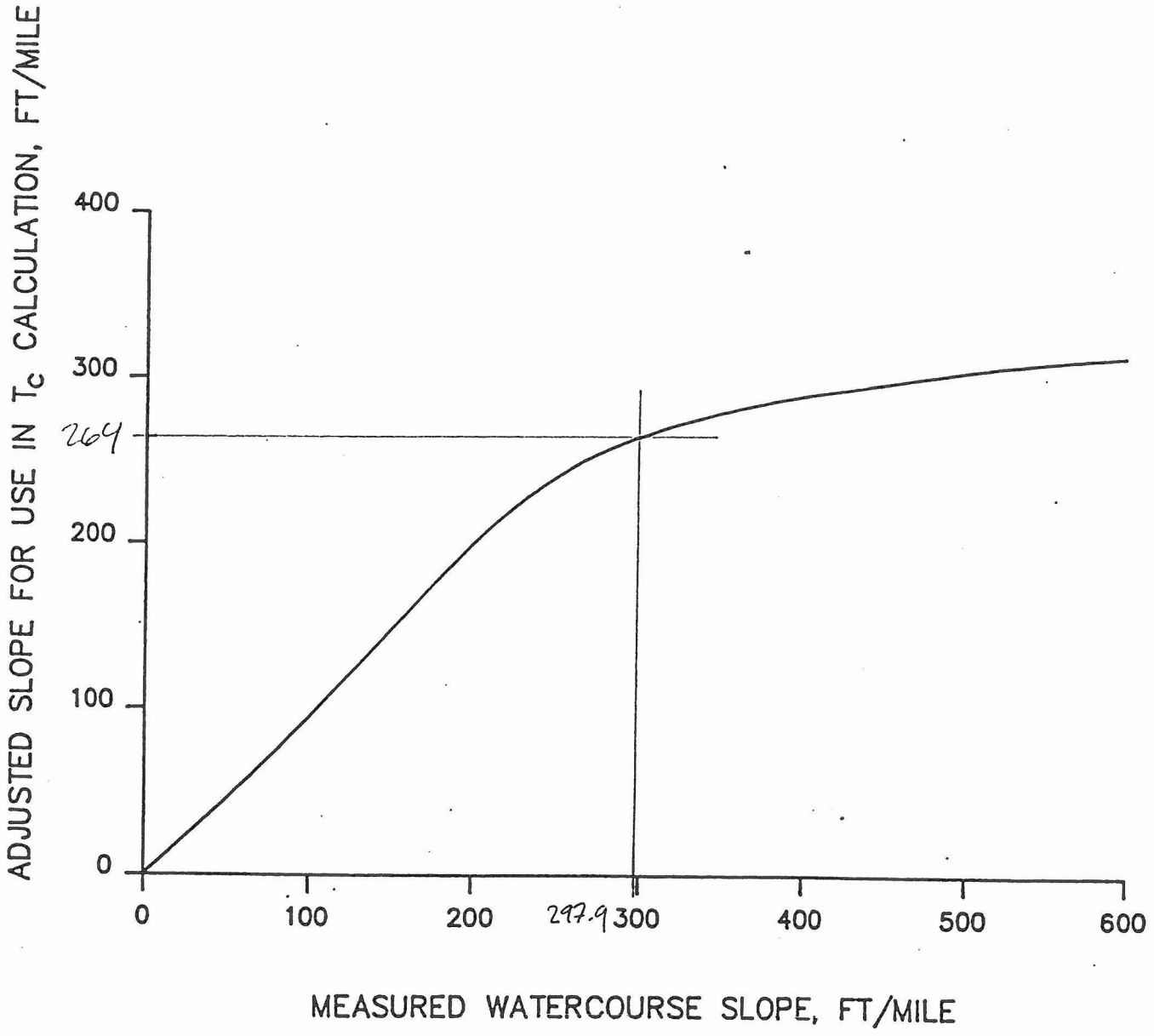


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 180 N
SLOPE: 233.6 FT/MI
ADJ. SLOPE: 228 FT/MI

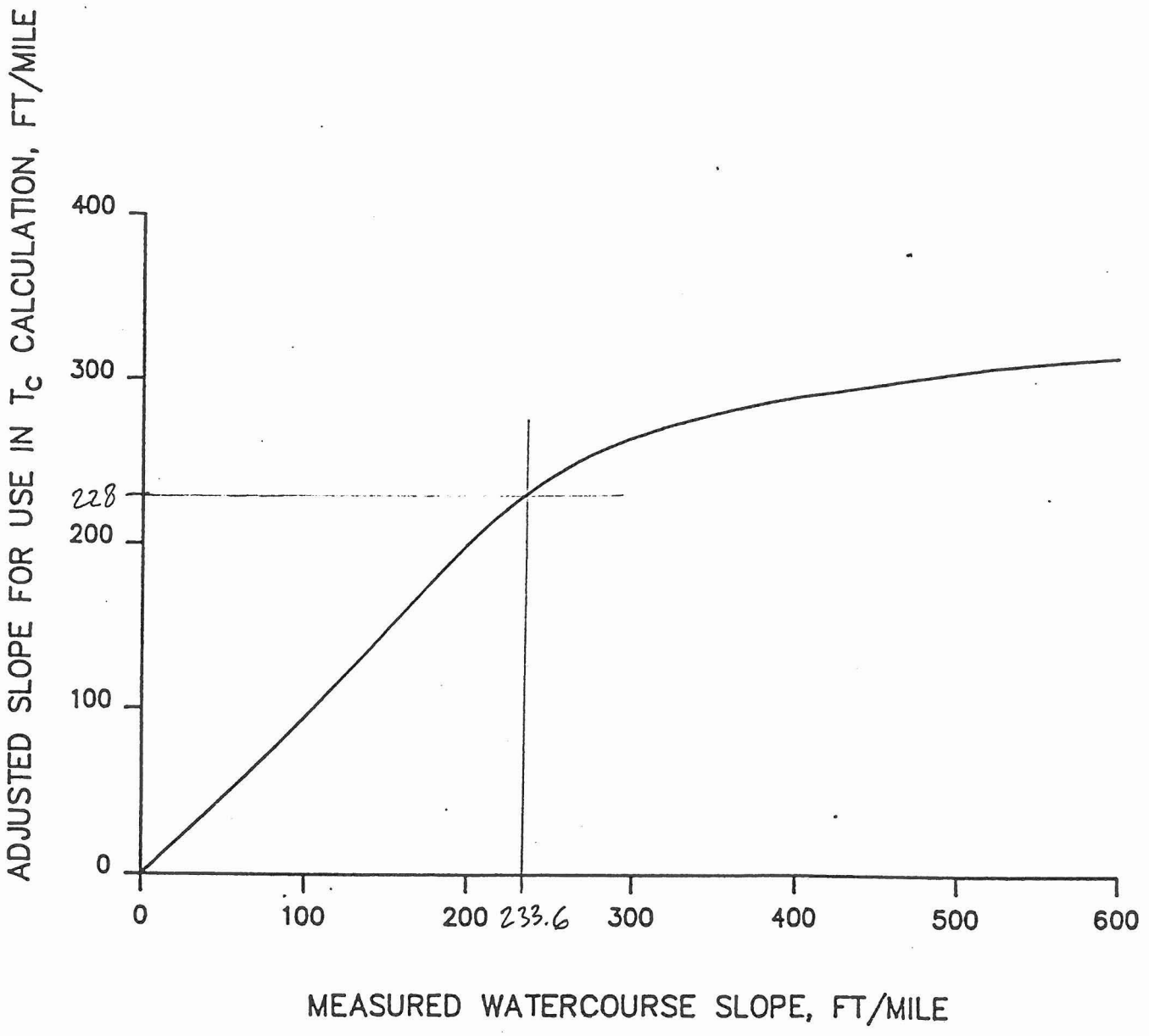


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 183 A
SLOPE: 366.3 FT/MI
ADJ. SLOPE: 283 FT/MI

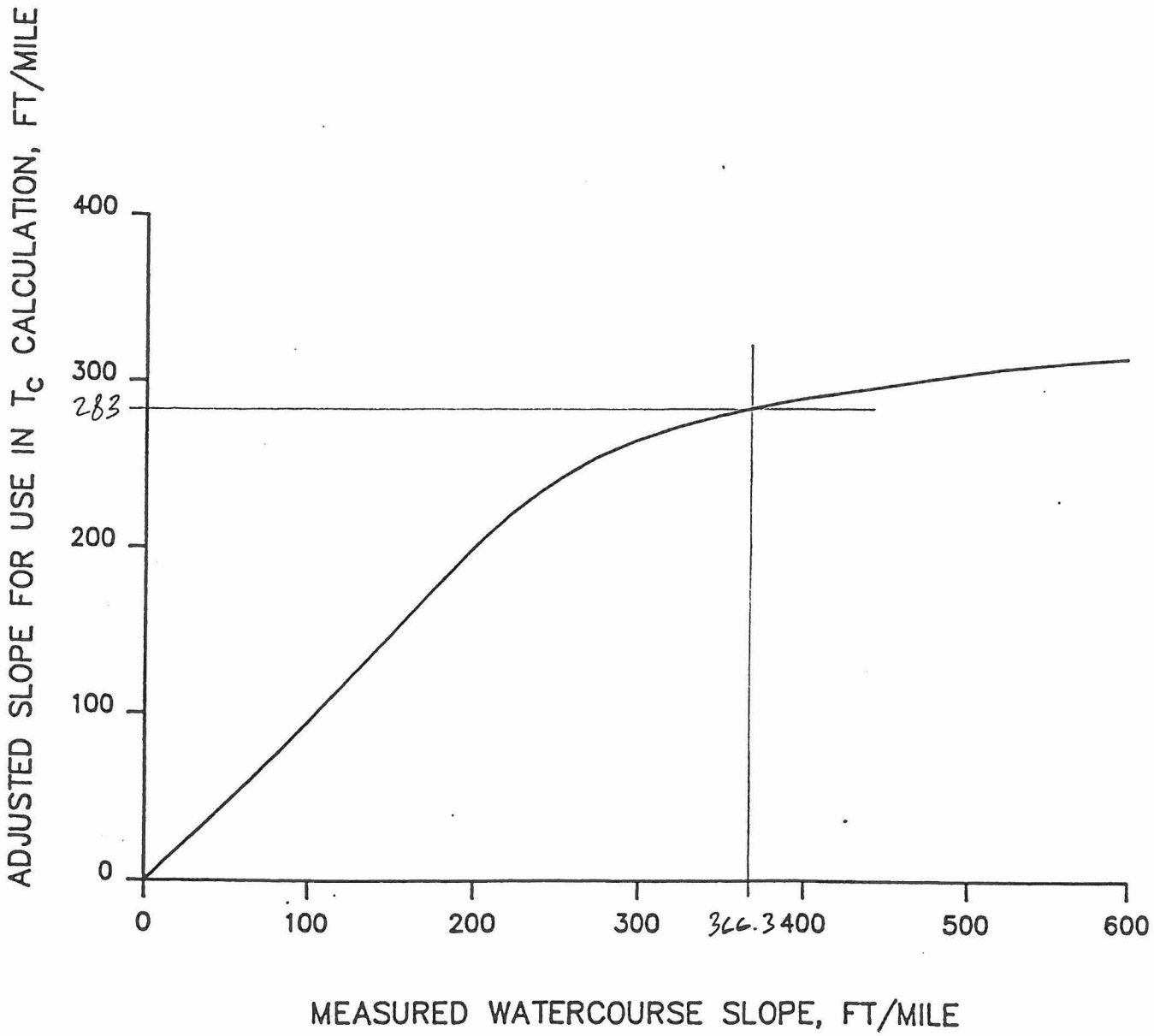


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 183 B
SLOPE: 237.2 FT/MI
ADJ. SLOPE: 229 FT/MI

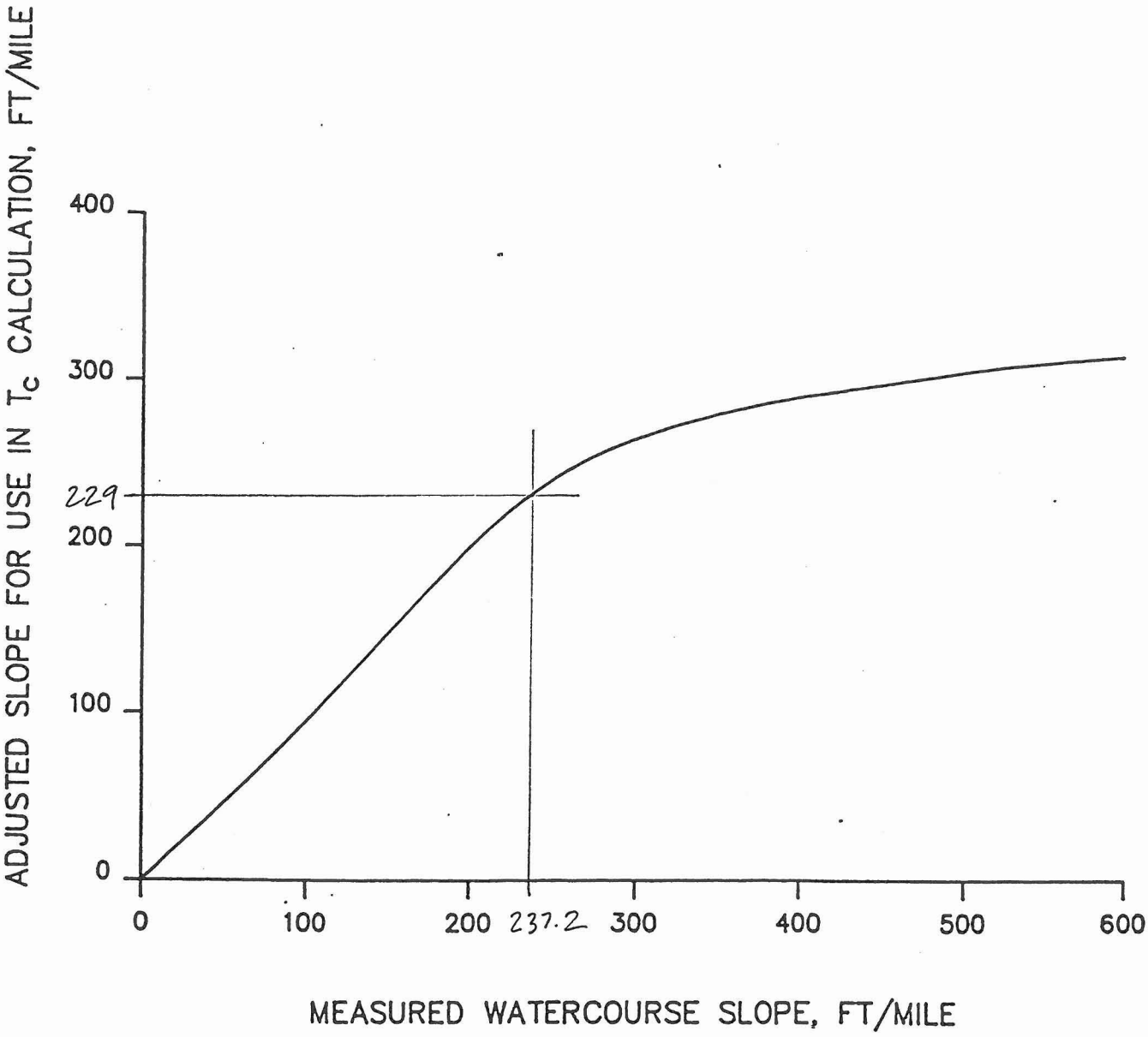


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 183 H
SLOPE : 211.2 FT/MI
ADJ. SLOPE : 211 FT/MI

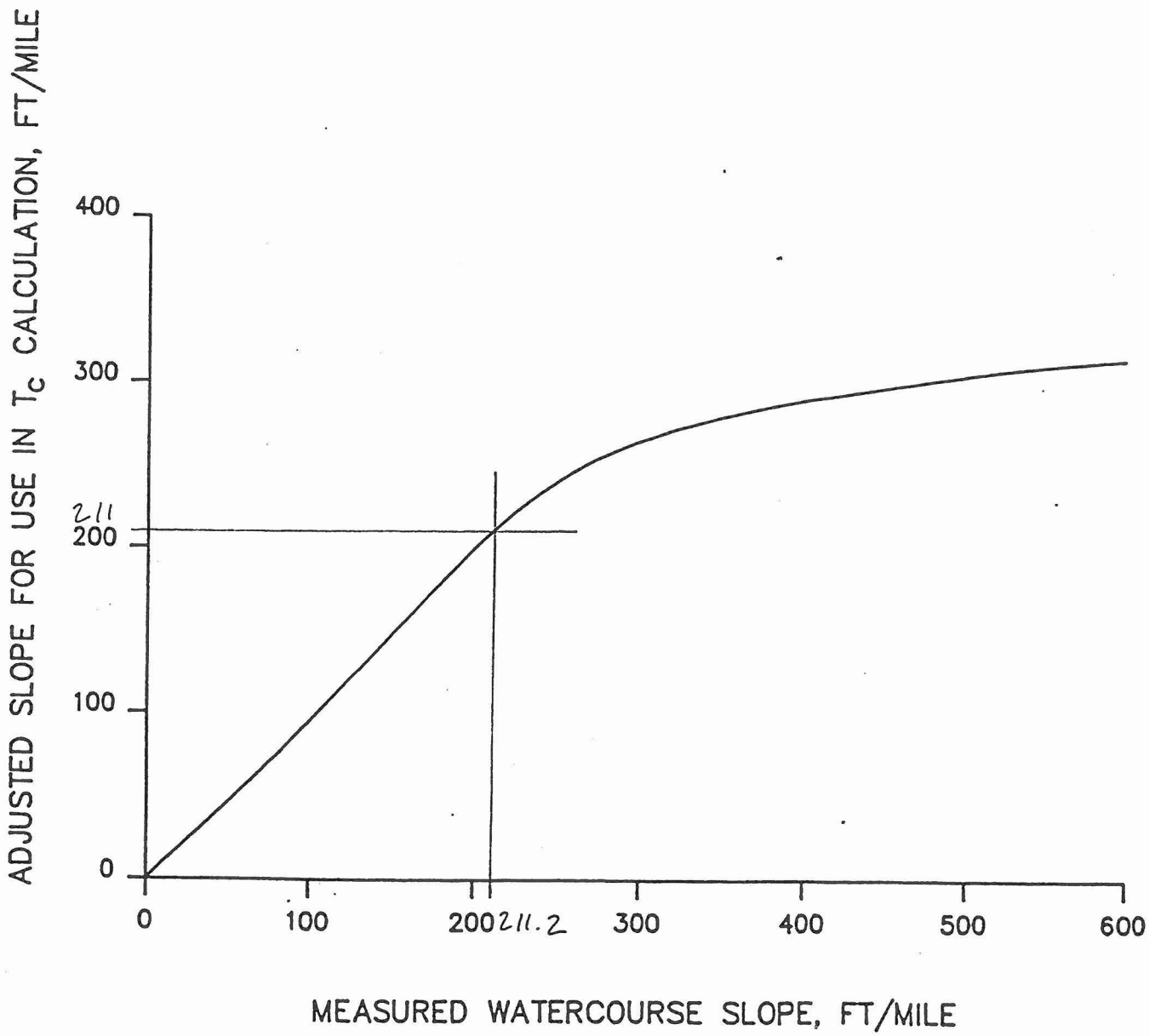


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184 A
SLOPE: 232.6 FT/MI
ADJ. SLOPE: 227 FT/MI

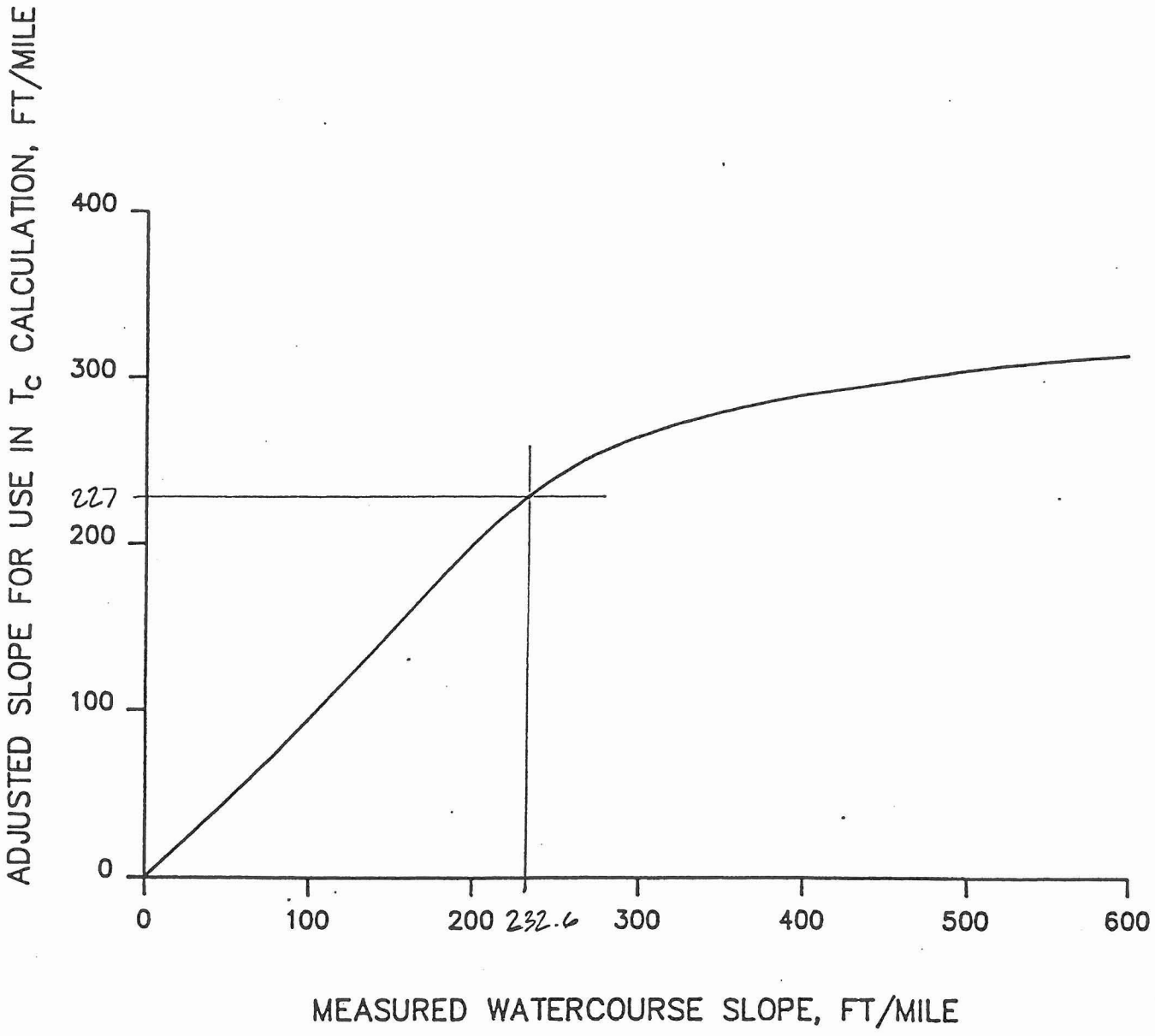


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184 B
SLOPE: 279.1 FT/MI
ADJ. SLOPE: 256 FT/MI

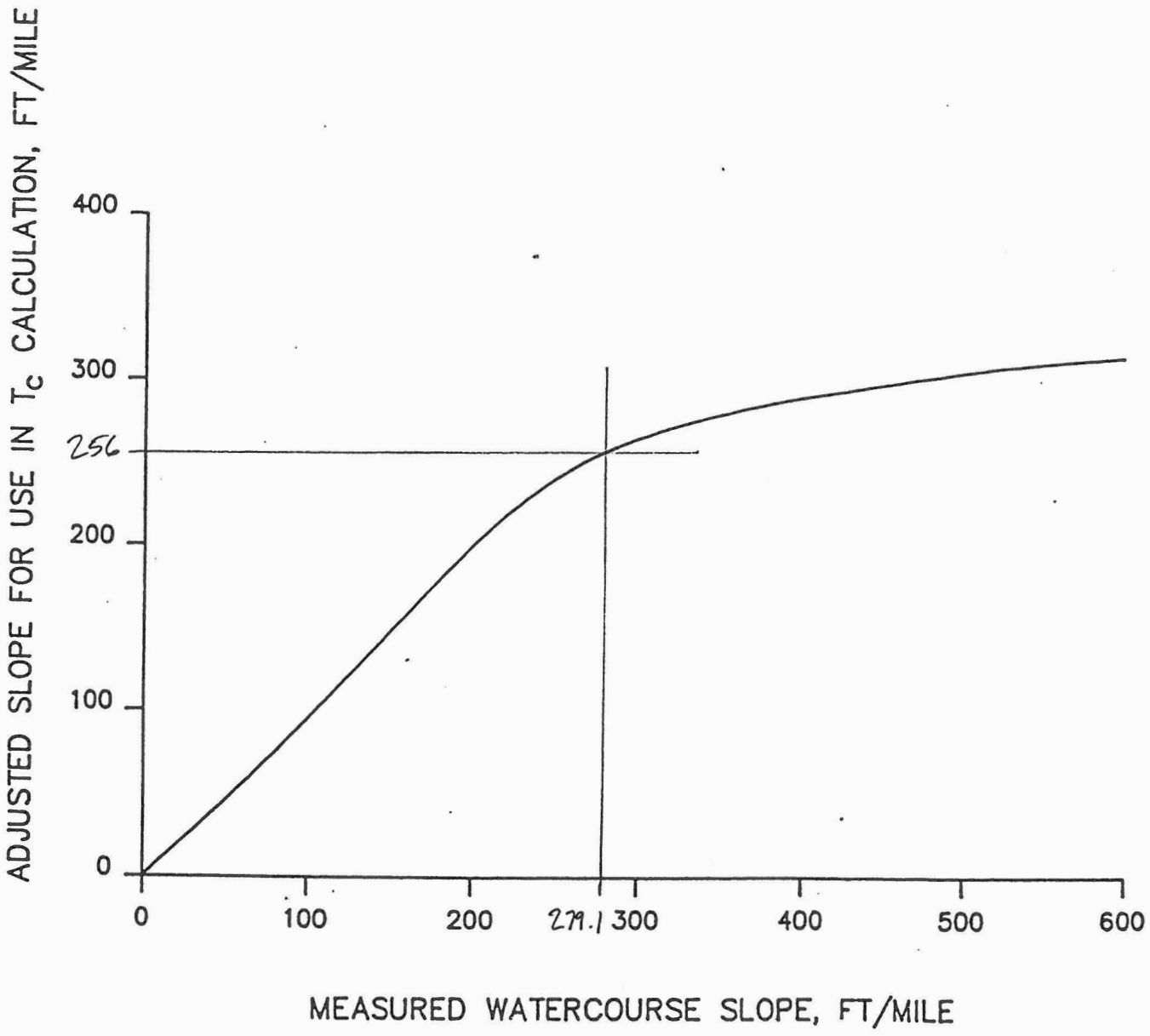


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184C
SLOPE: 399.6 FT/MI
ADJ. SLOPE: 289 FT/MI

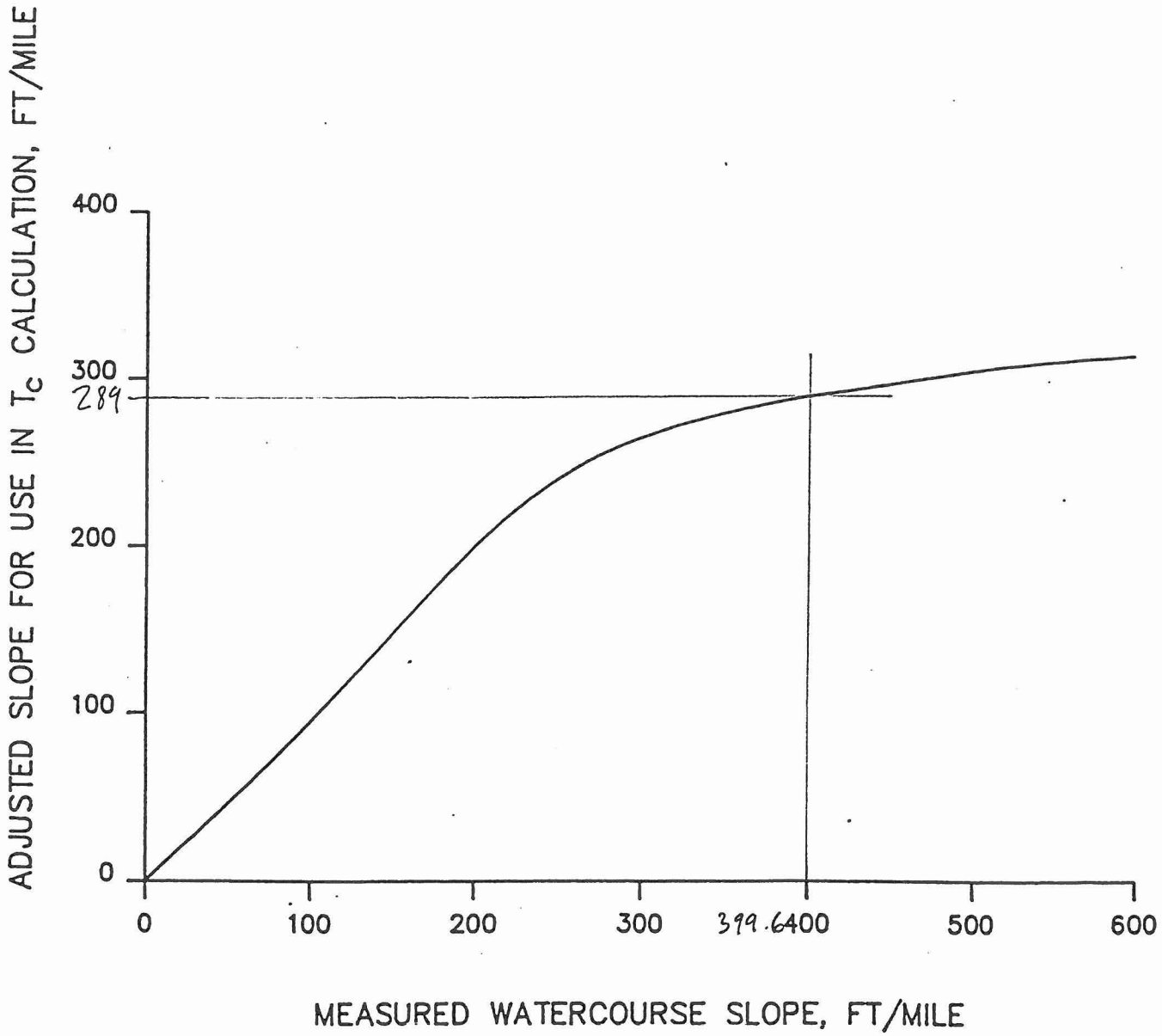


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184D
SLOPE: 332.2 FT/MI
ADJ. SLOPE: 274 FT/MI

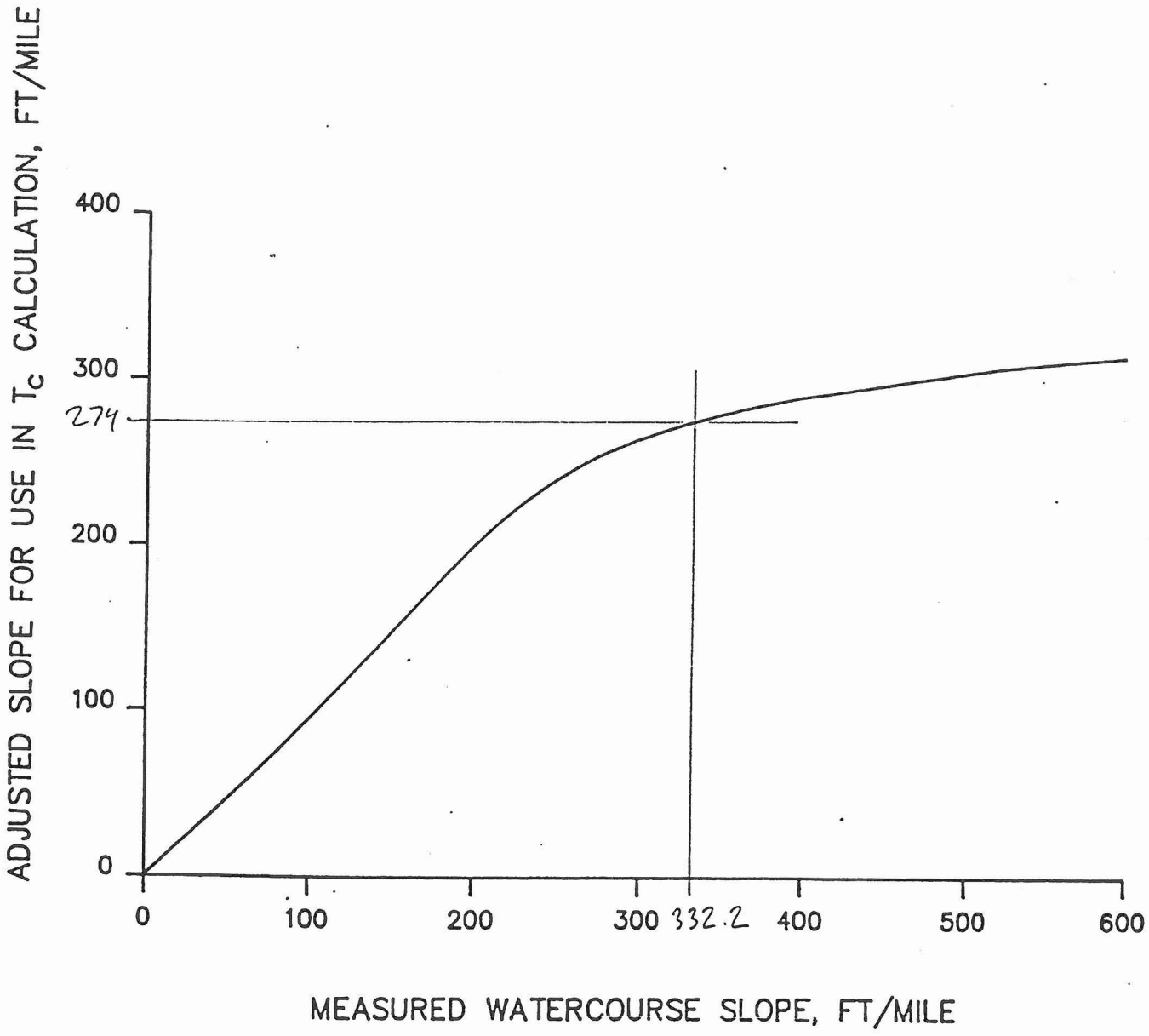


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184E
SLOPE: 249.7 FT/MI
ADJ. SLOPE: 239 FT/MI

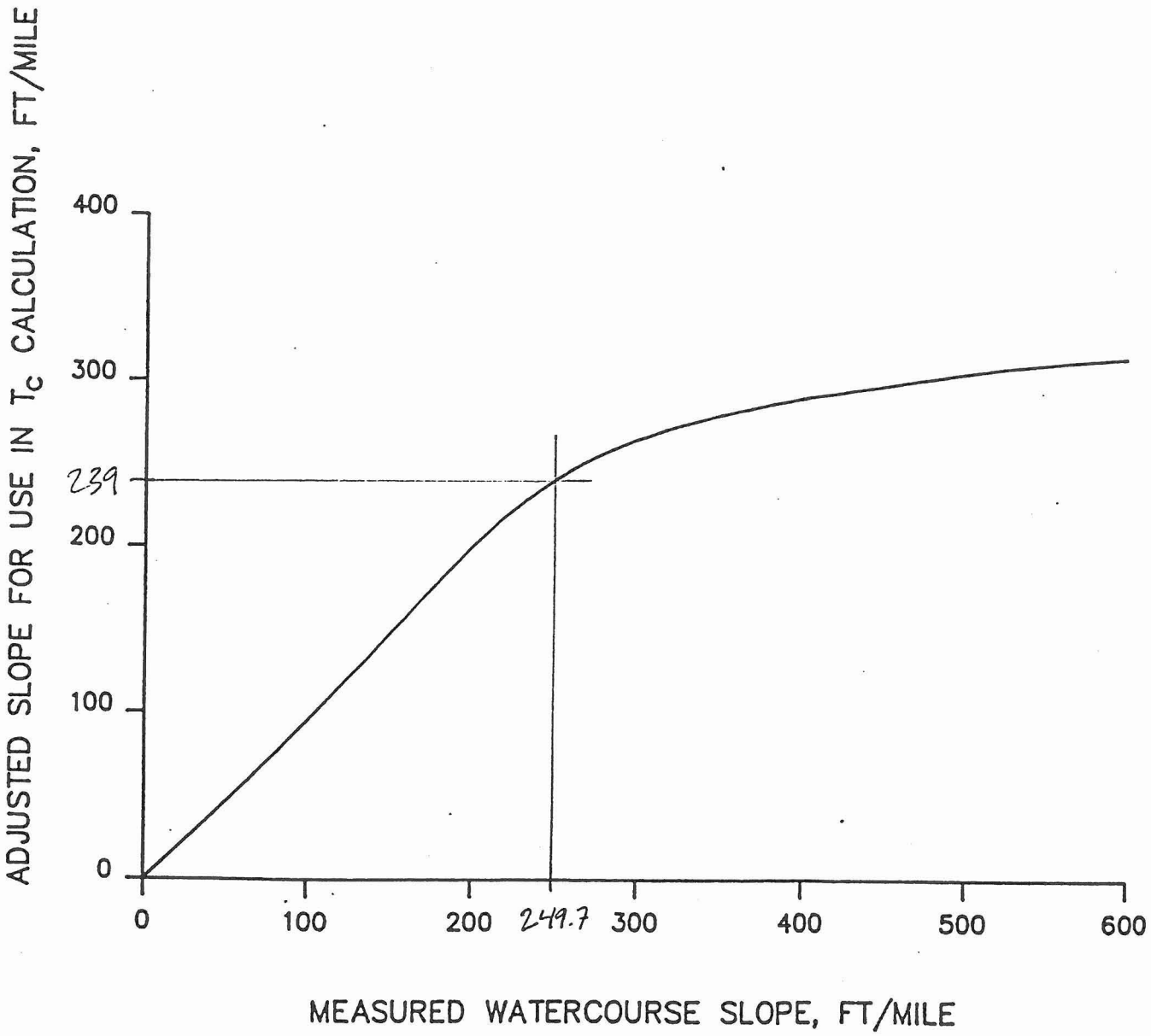


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184 F
SLOPE: 318.4 FT/MI
ADJ. SLOPE: 271 FT/MI

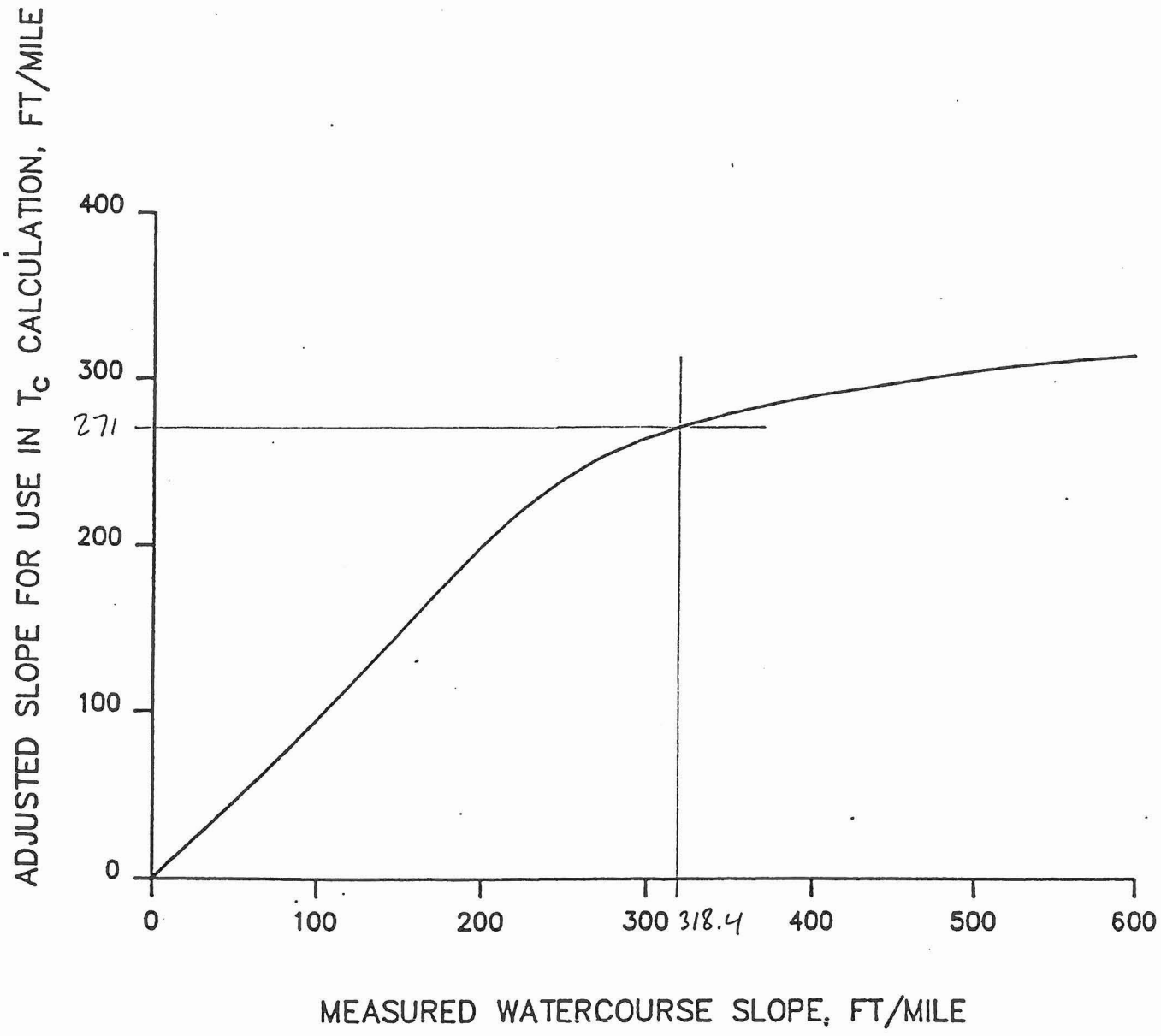


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184G
SLOPE : 318.0 FT/MI
ADJ. SLOPE : 270 FT/MI

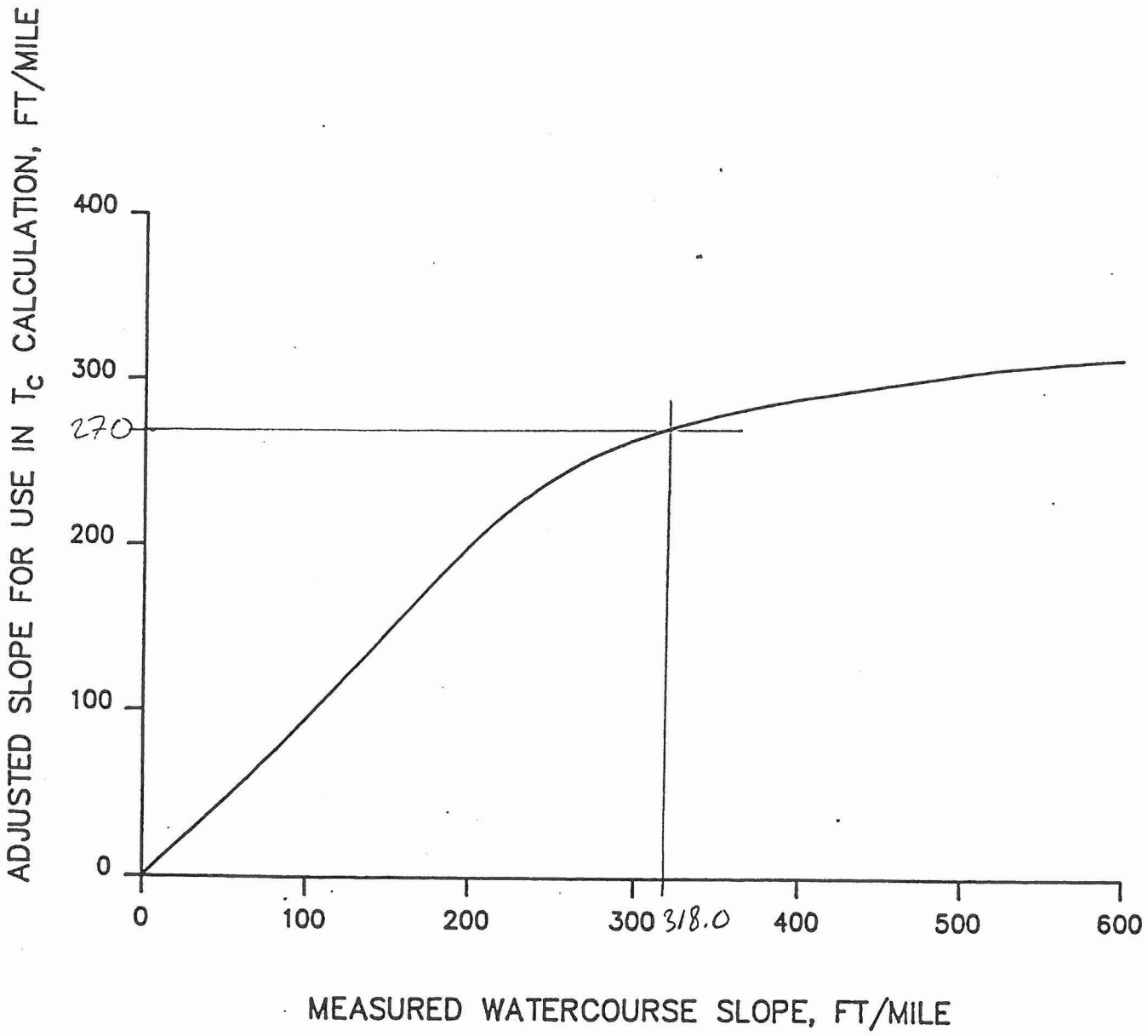


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184 J
SLOPE: 290.4 FT/MI
ADJ. SLOPE: 262 FT/MI

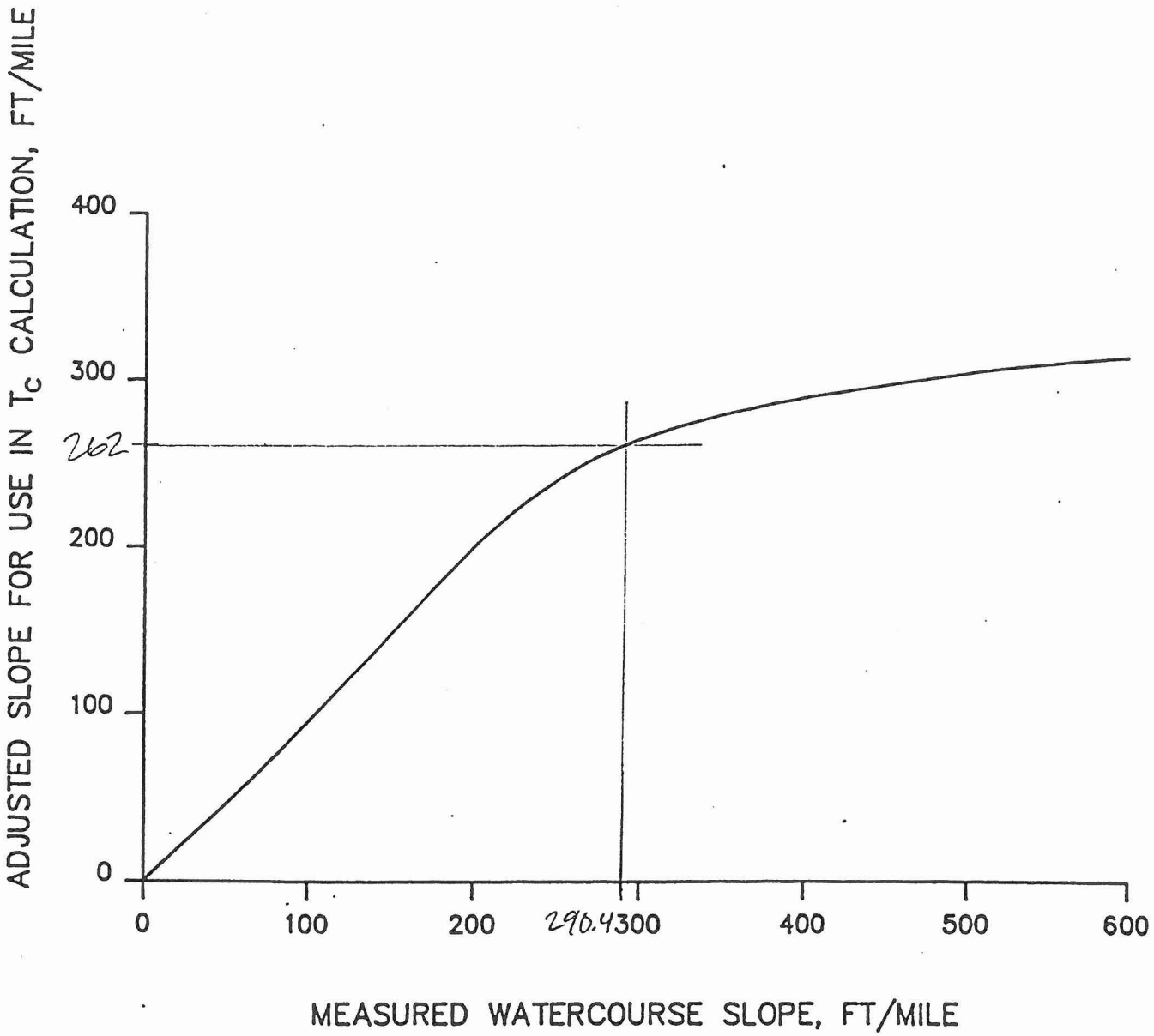


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 184K
SLOPE: 462.0 FT/MI
ADJ. SLOPE: 297 FT/MI

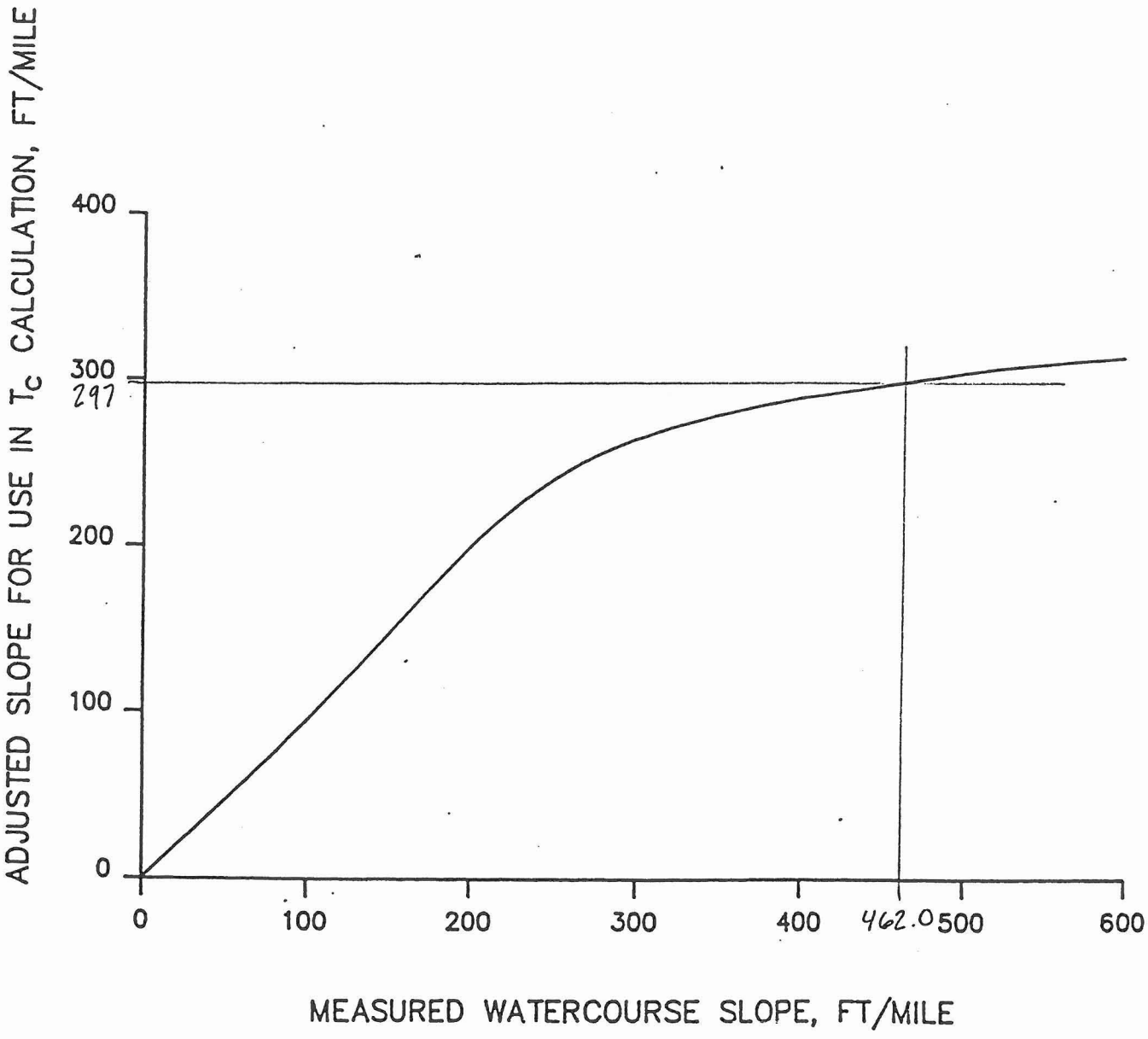


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 185 A
SLOPE : 311.2 FT/MI
ADJ. SLOPE : 269 FT/MI

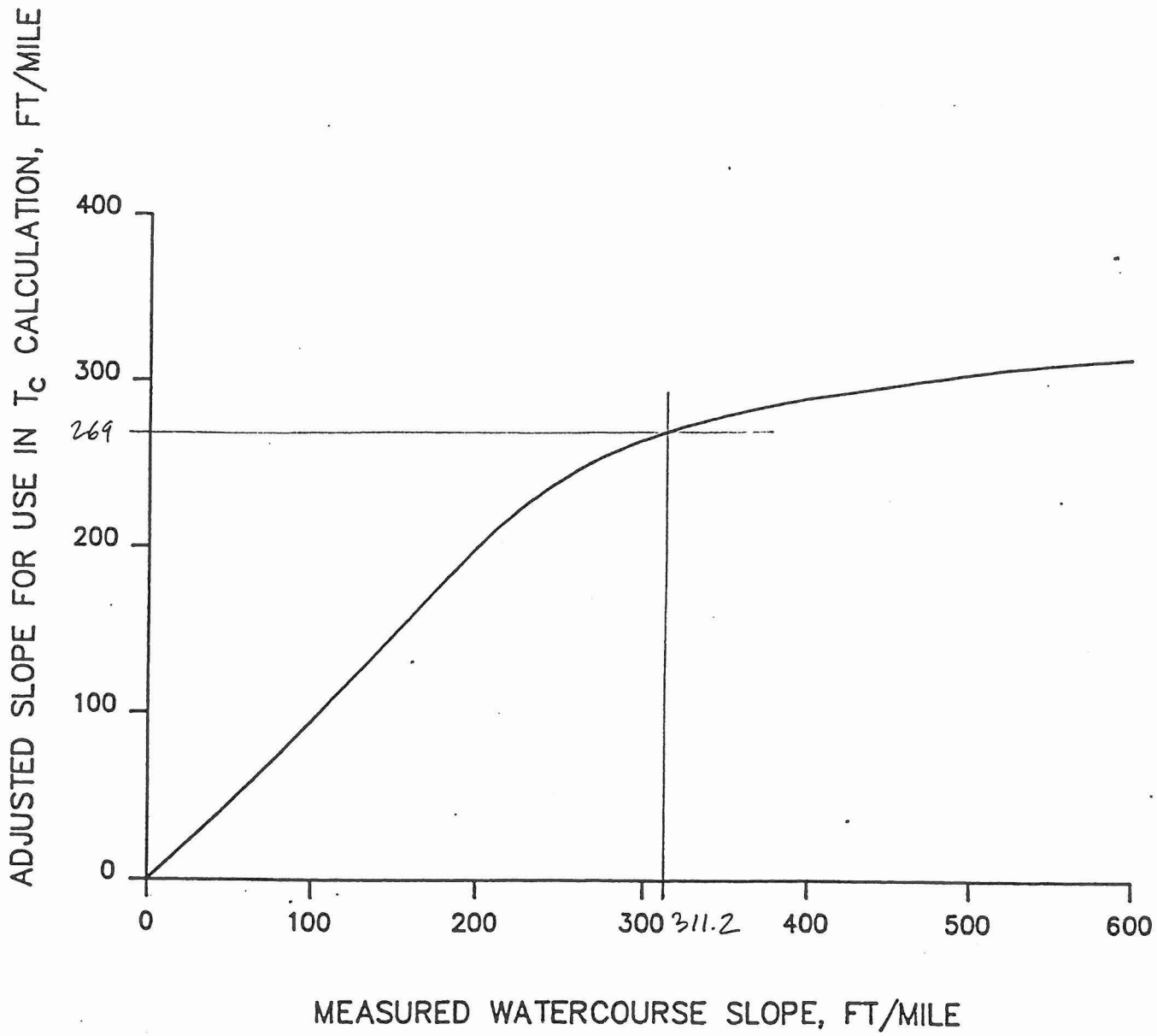


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 185 B
SLOPE: 258.3 FT/MI
ADJ. SLOPE: 244 FT/MI

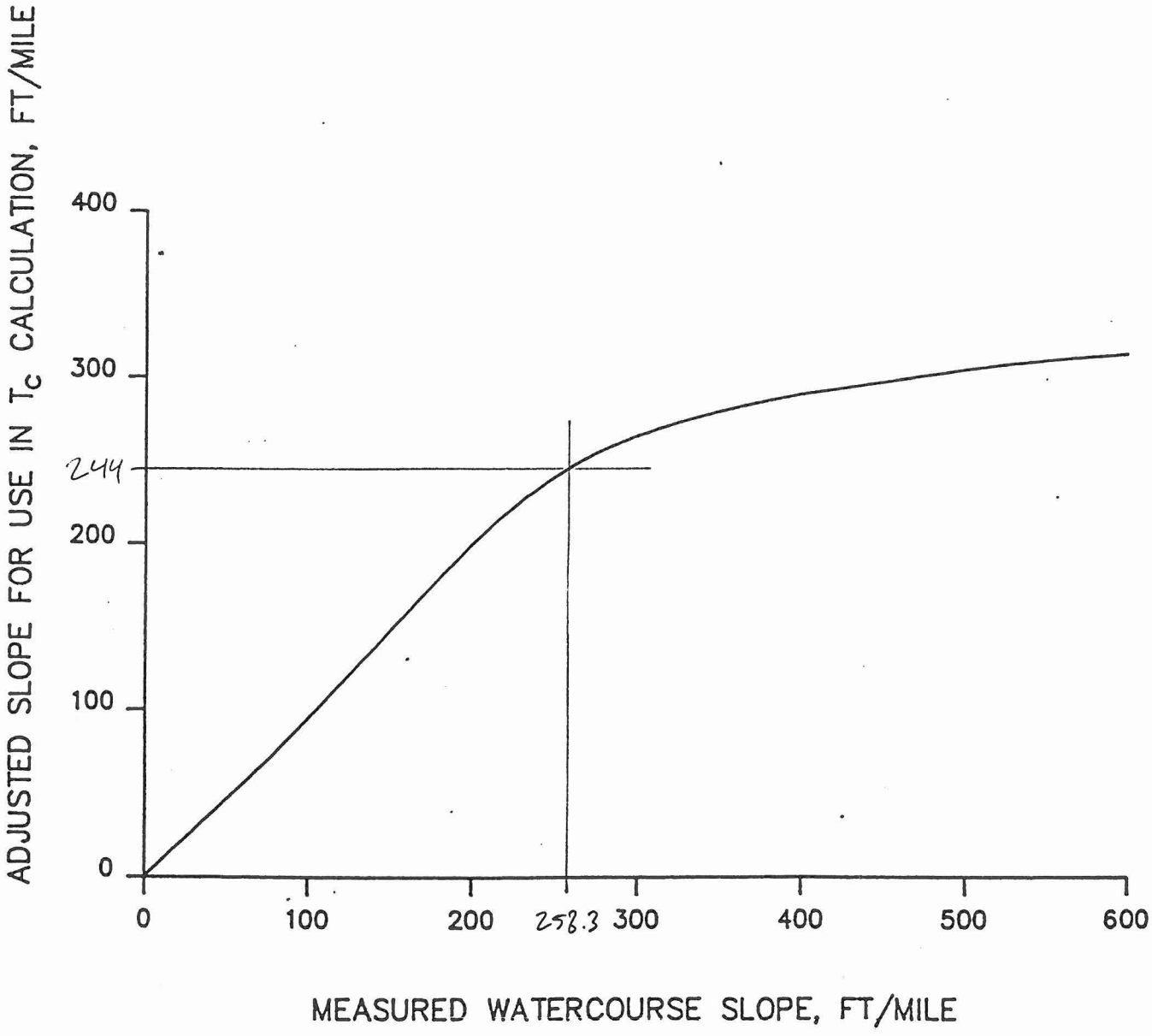


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186A
SLOPE: 329.2 FT/MI
ADJ. SLOPE: 273 FT/MI

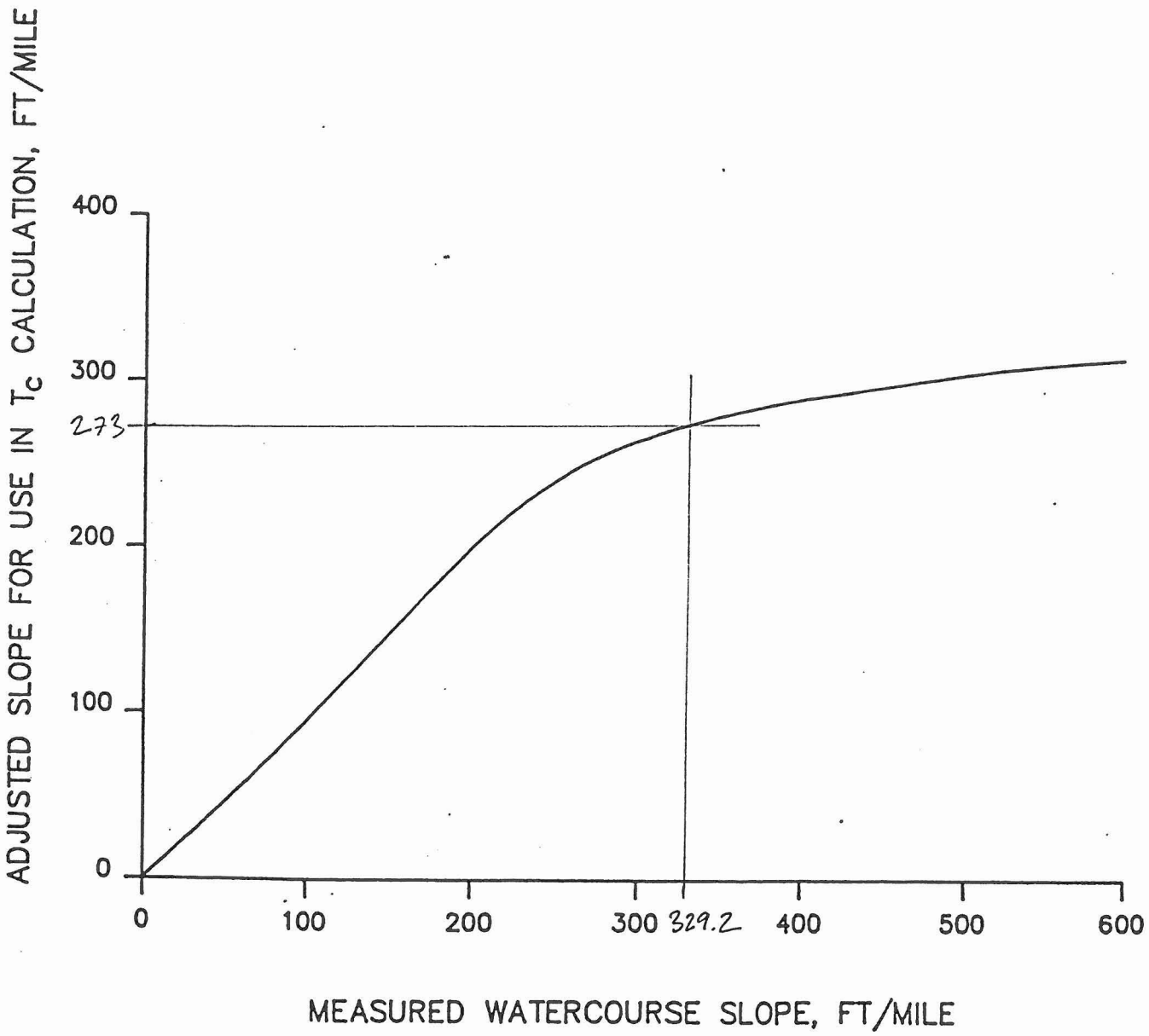


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186B
SLOPE: 271.5 FT/MI
ADJ. SLOPE: 253 FT/MI

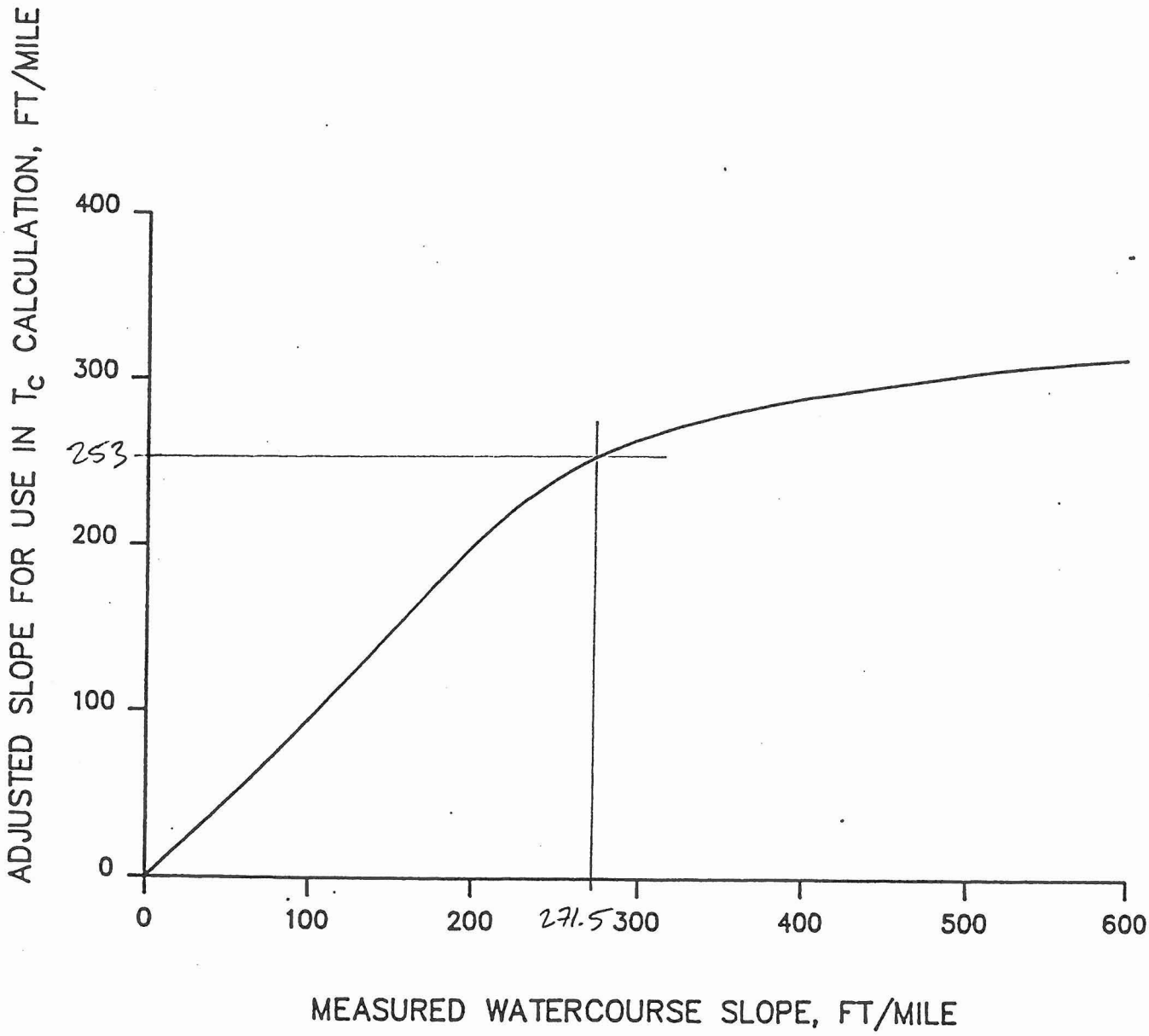


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186C
SLOPE: 295.7 FT/MI
ADJ. SLOPE: 263 FT/MI

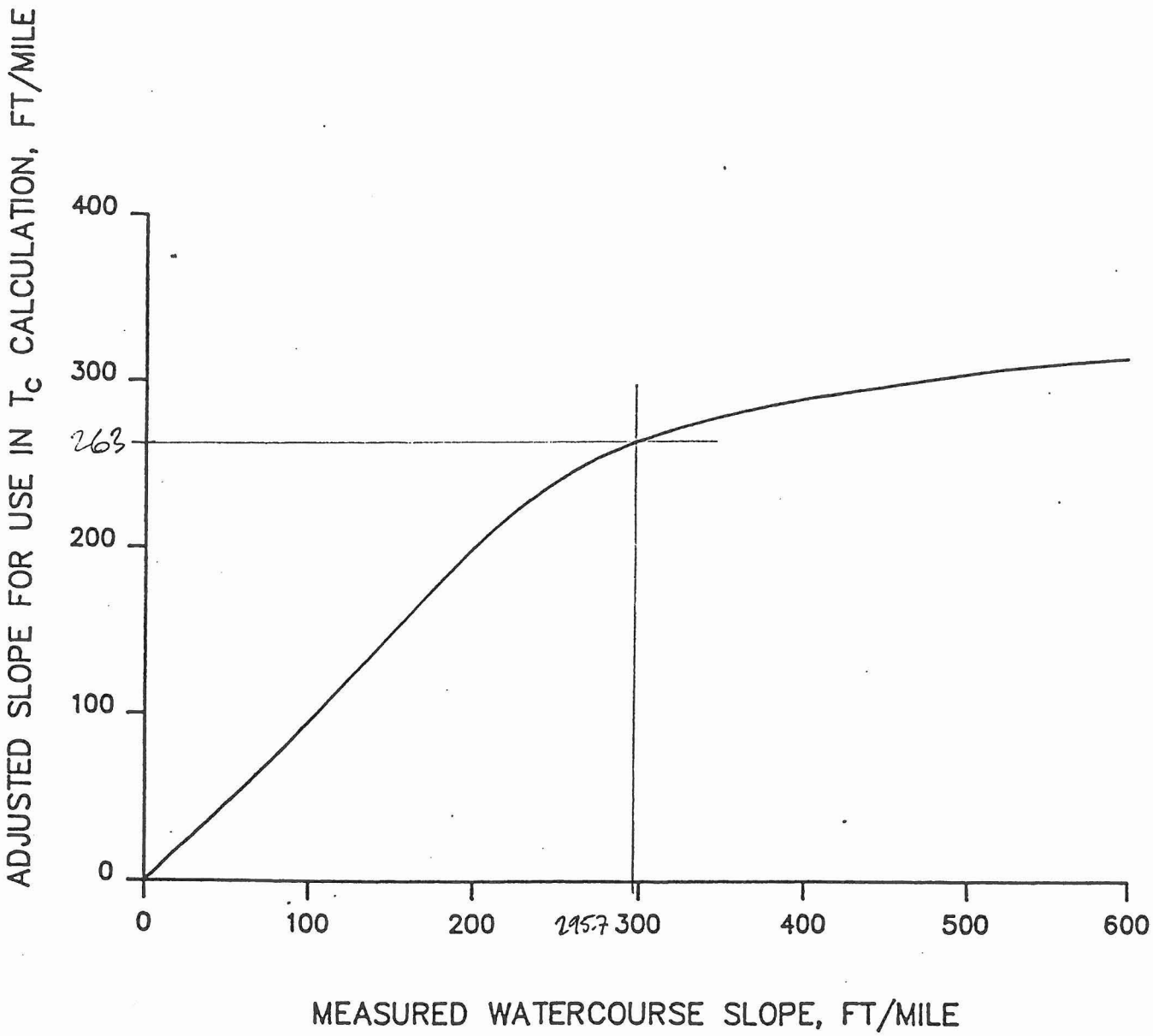


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186D
SLOPE: 278.0 FT/MI
ADJ. SLOPE: 255 FT/MI

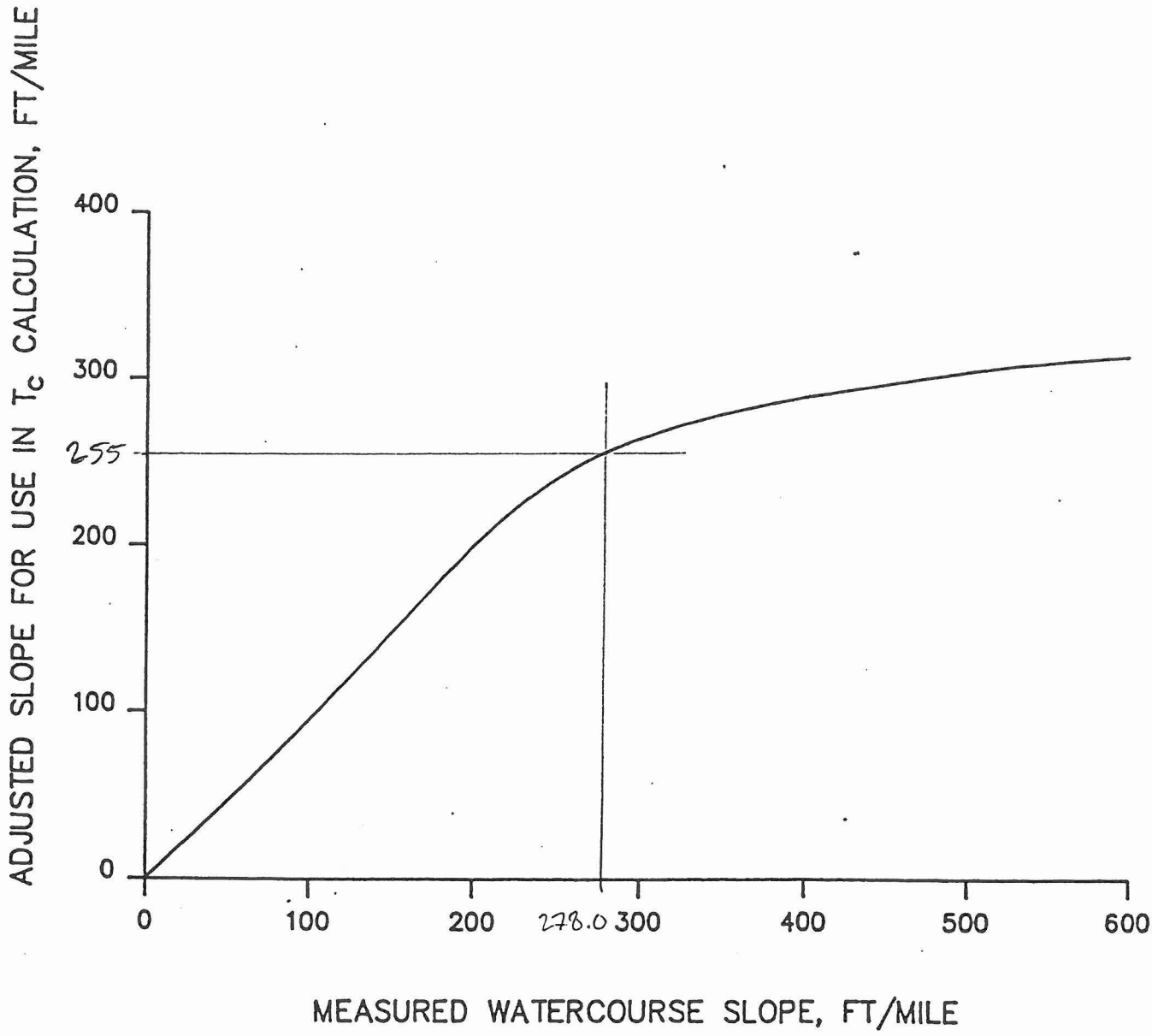


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186E
SLOPE: 396.8 FT/MI
ADJ. SLOPE: 288 FT/MI

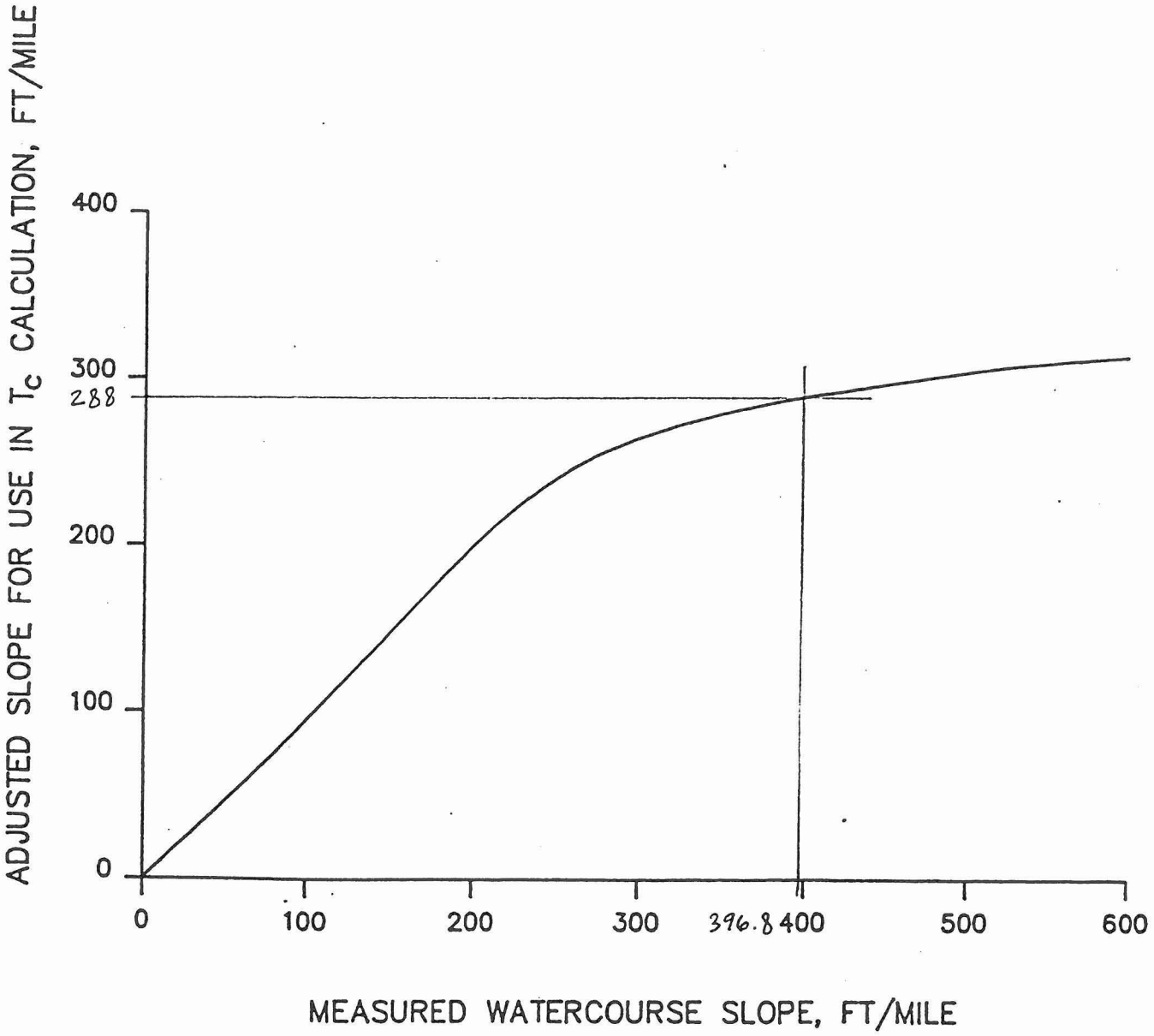


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186 F
SLOPE: 276.4 FT/MI
ADJ. SLOPE: 254 FT/MI

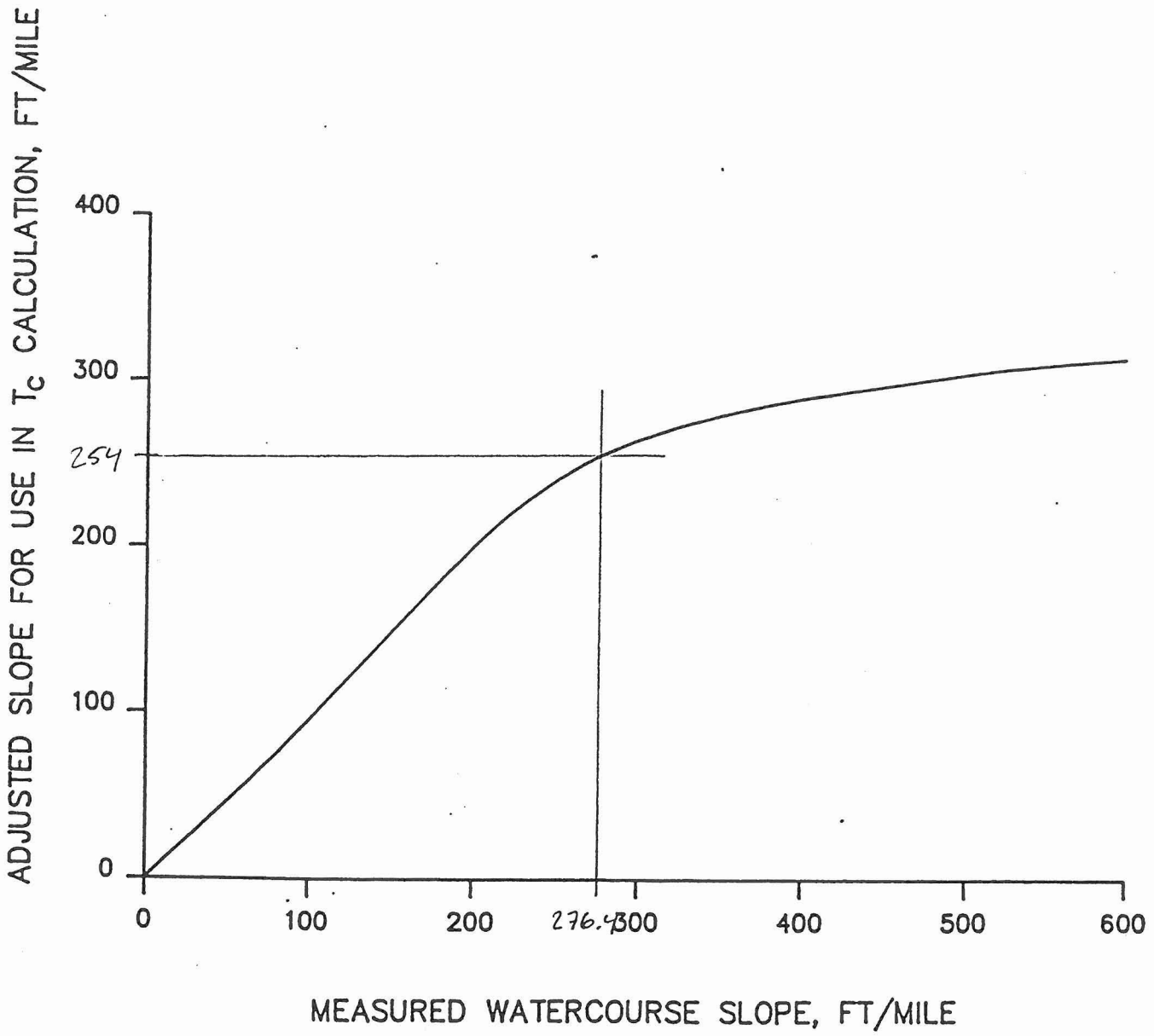


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 1866
SLOPE: 321.0 FT/MI
ADJ. SLOPE: 272 FT/MI

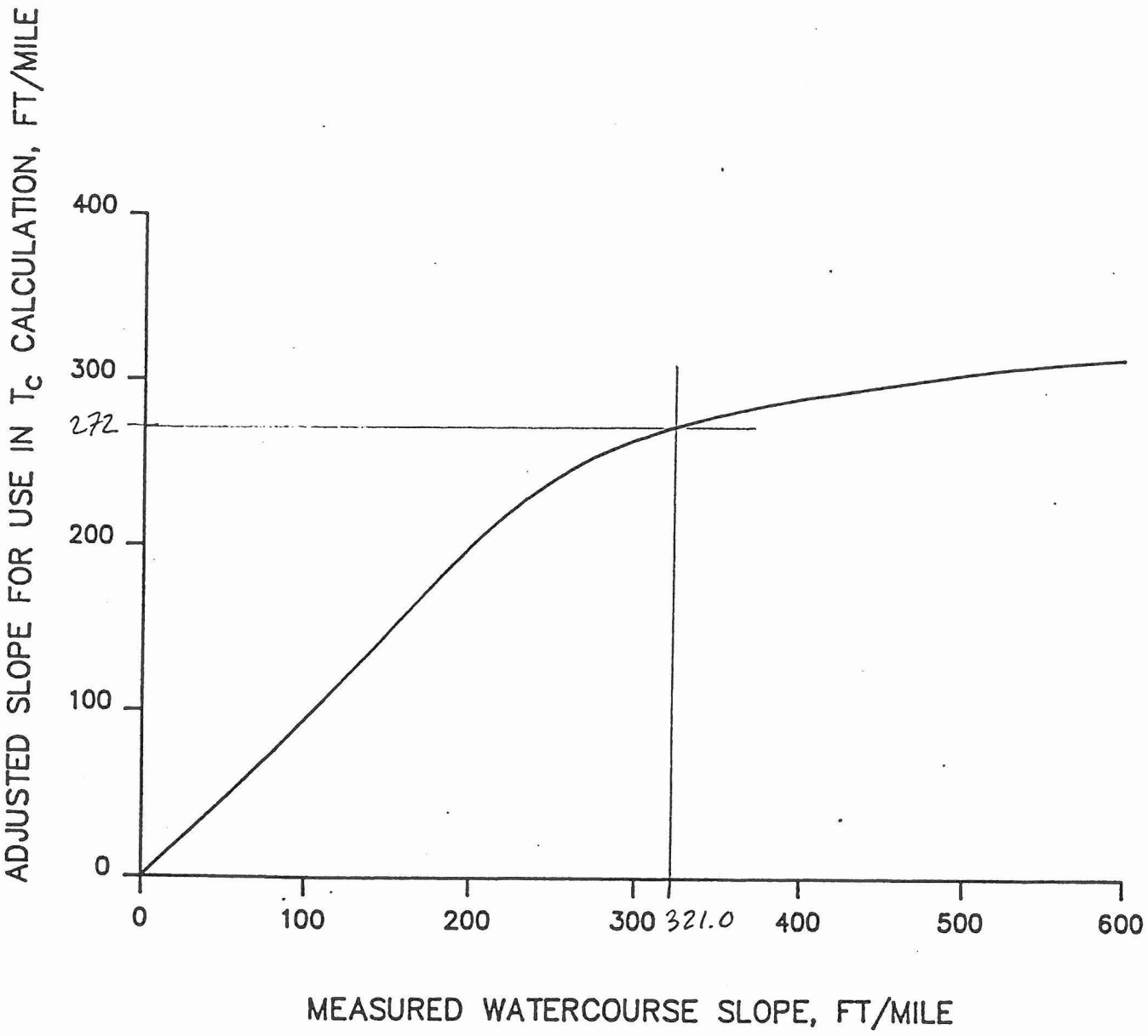


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 186 I
SLOPE: 406.4 FT/MI
ADJ. SLOPE: 289 FT/MI

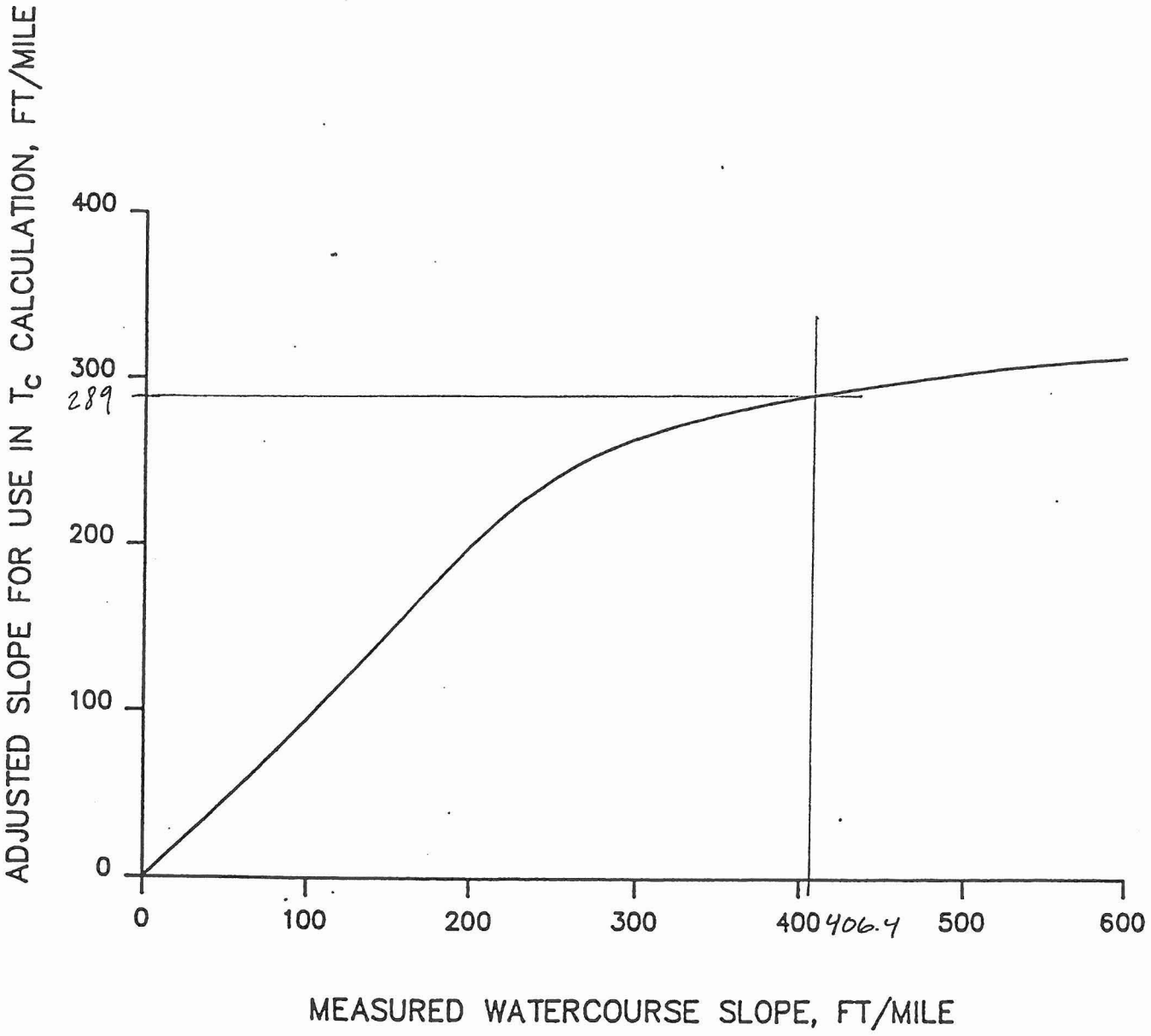


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 A
SLOPE: 281.6 FT/MI
ADJ. SLOPE: 256 FT/MI

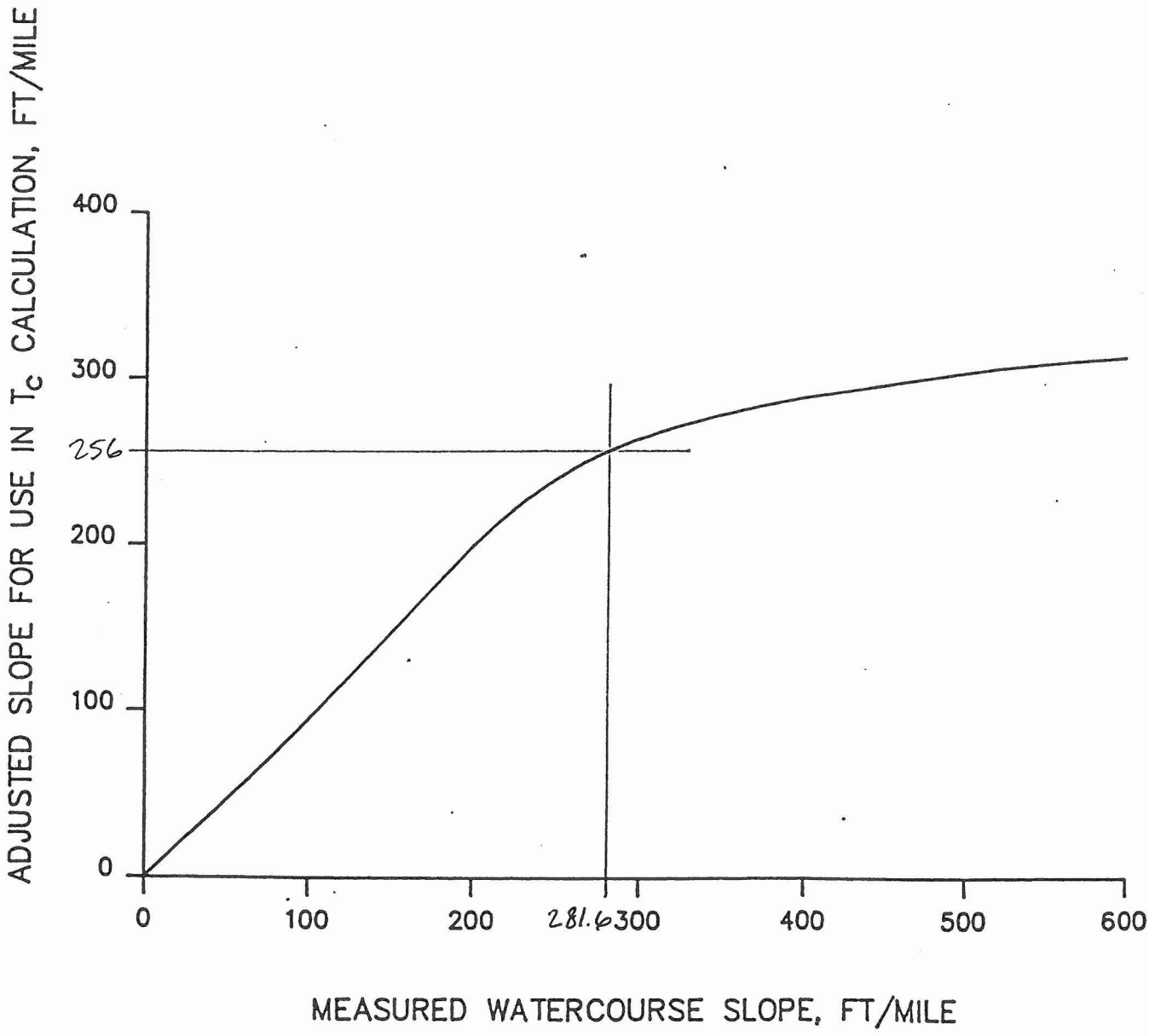


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 B
SLOPE: 290.4 FT/MI
ADJ. SLOPE: 262 FT/MI

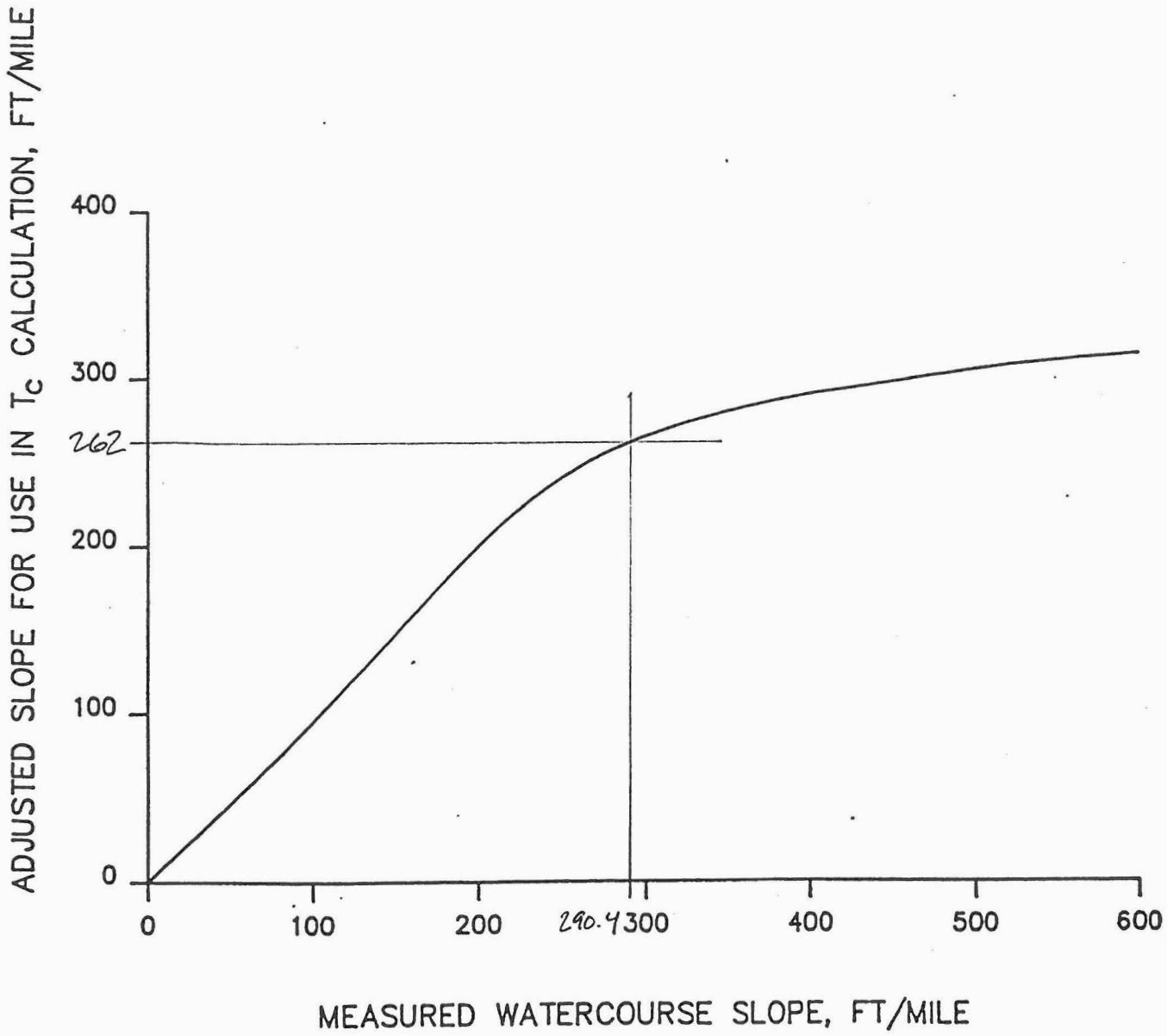


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 C
SLOPE: 326.5 FT/MI
ADJ. SLOPE: 273 FT/MI

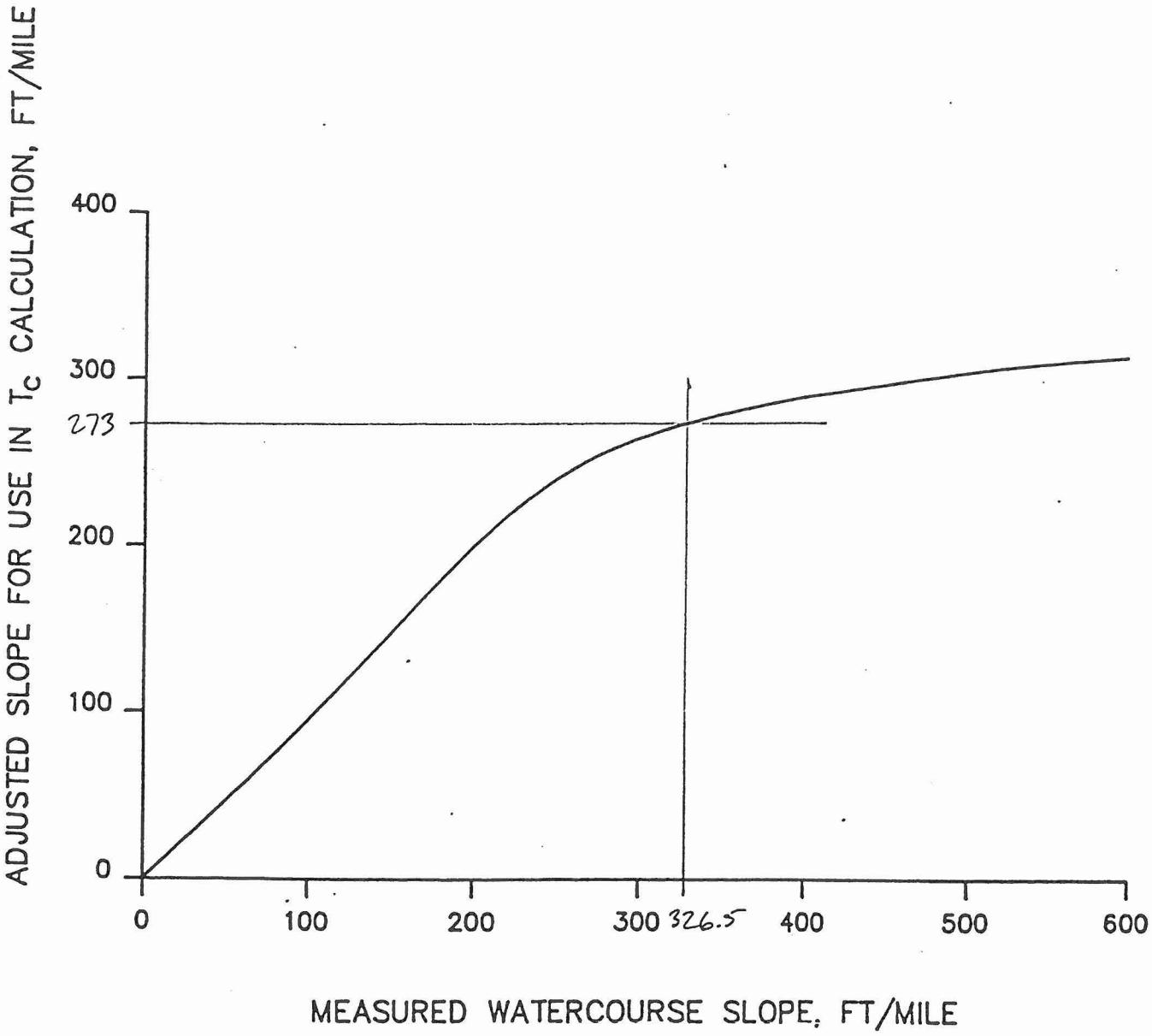


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 D
SLOPE: 275.9 FT/MI
ADJ. SLOPE: 254 FT/MI

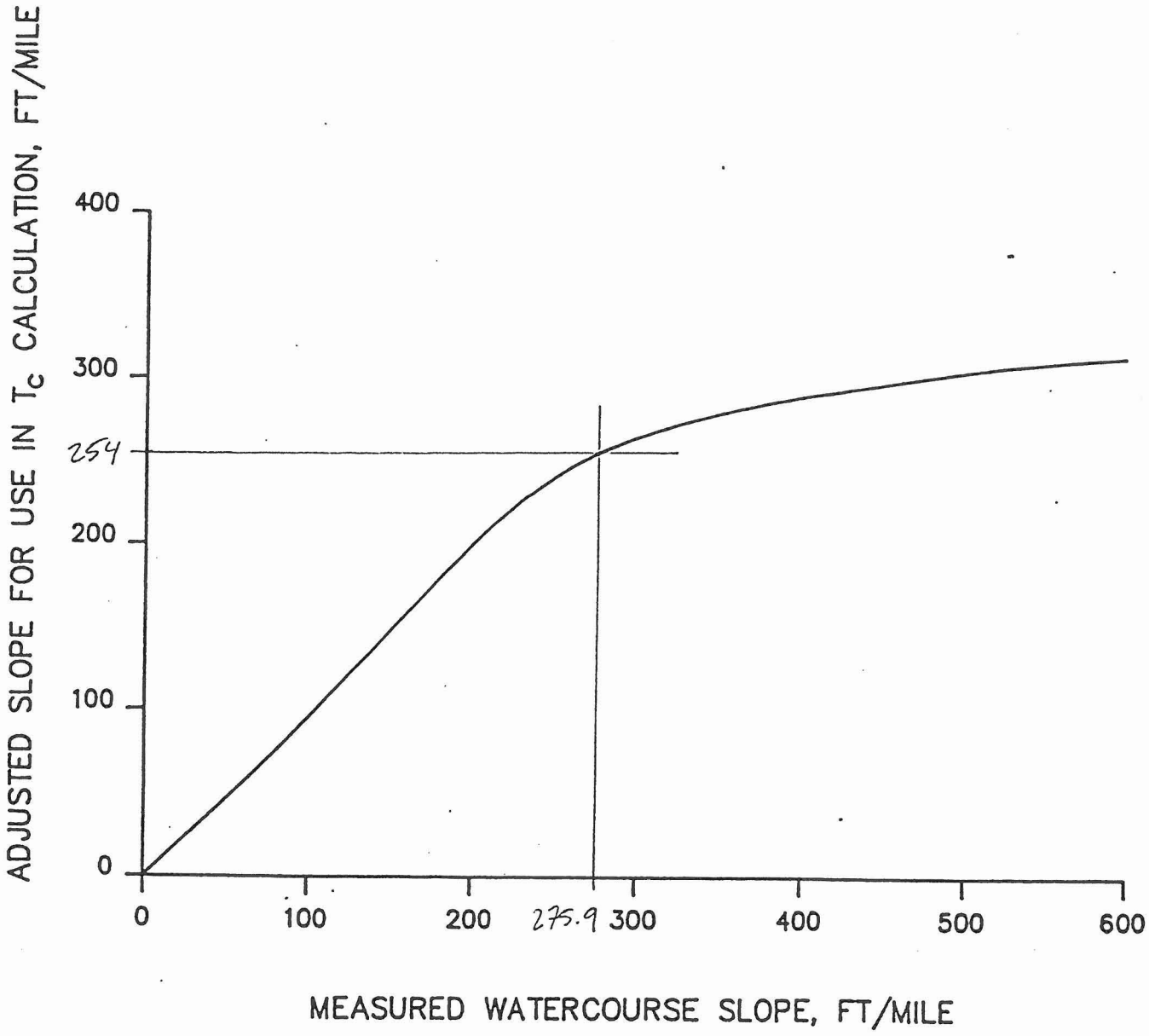


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187F
SLOPE: 394.9 FT/MI
ADJ. SLOPE: 287 FT/MI

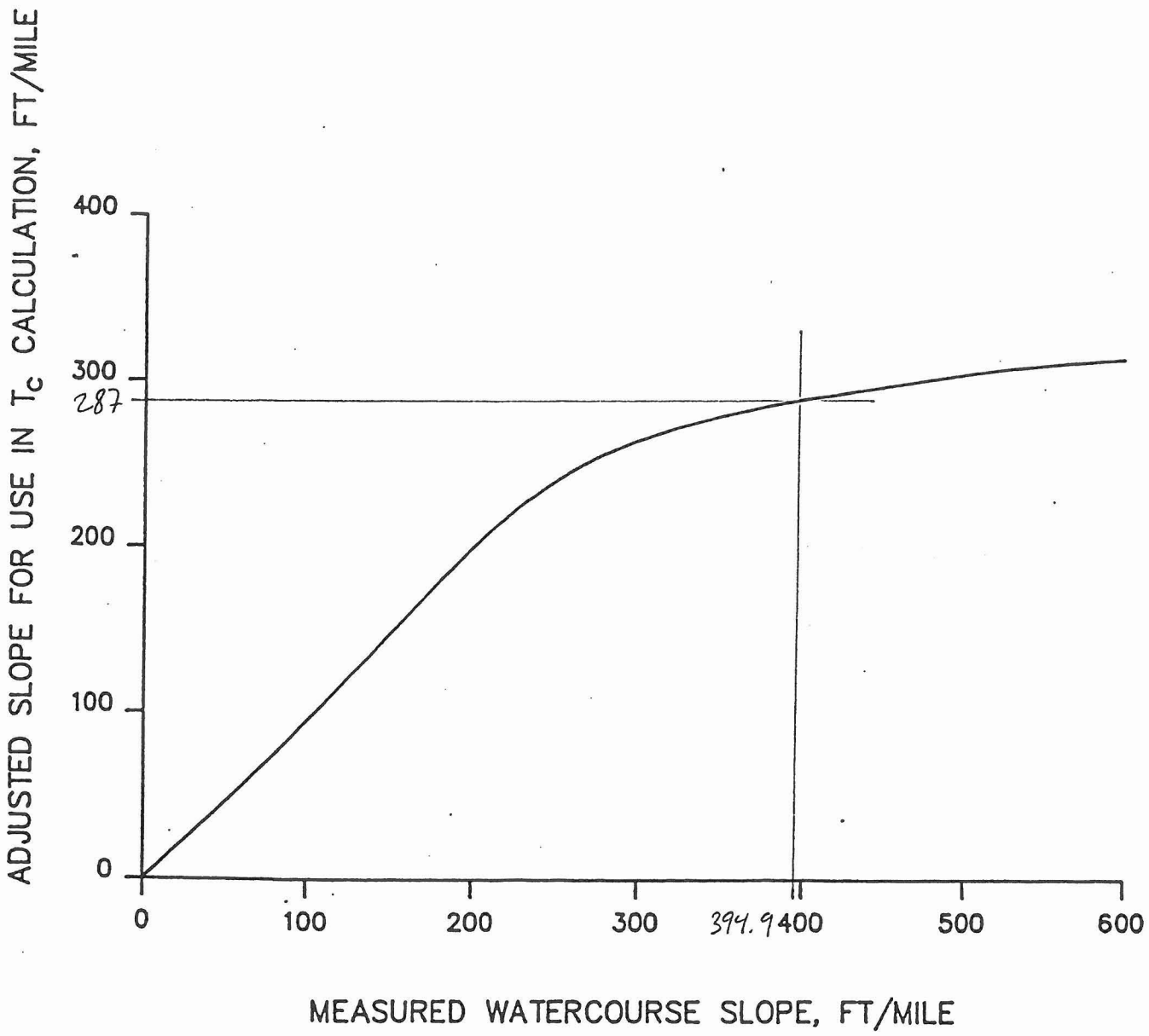


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 G
SLOPE: 306.9 FT/MI
ADJ. SLOPE: 267 FT/MI

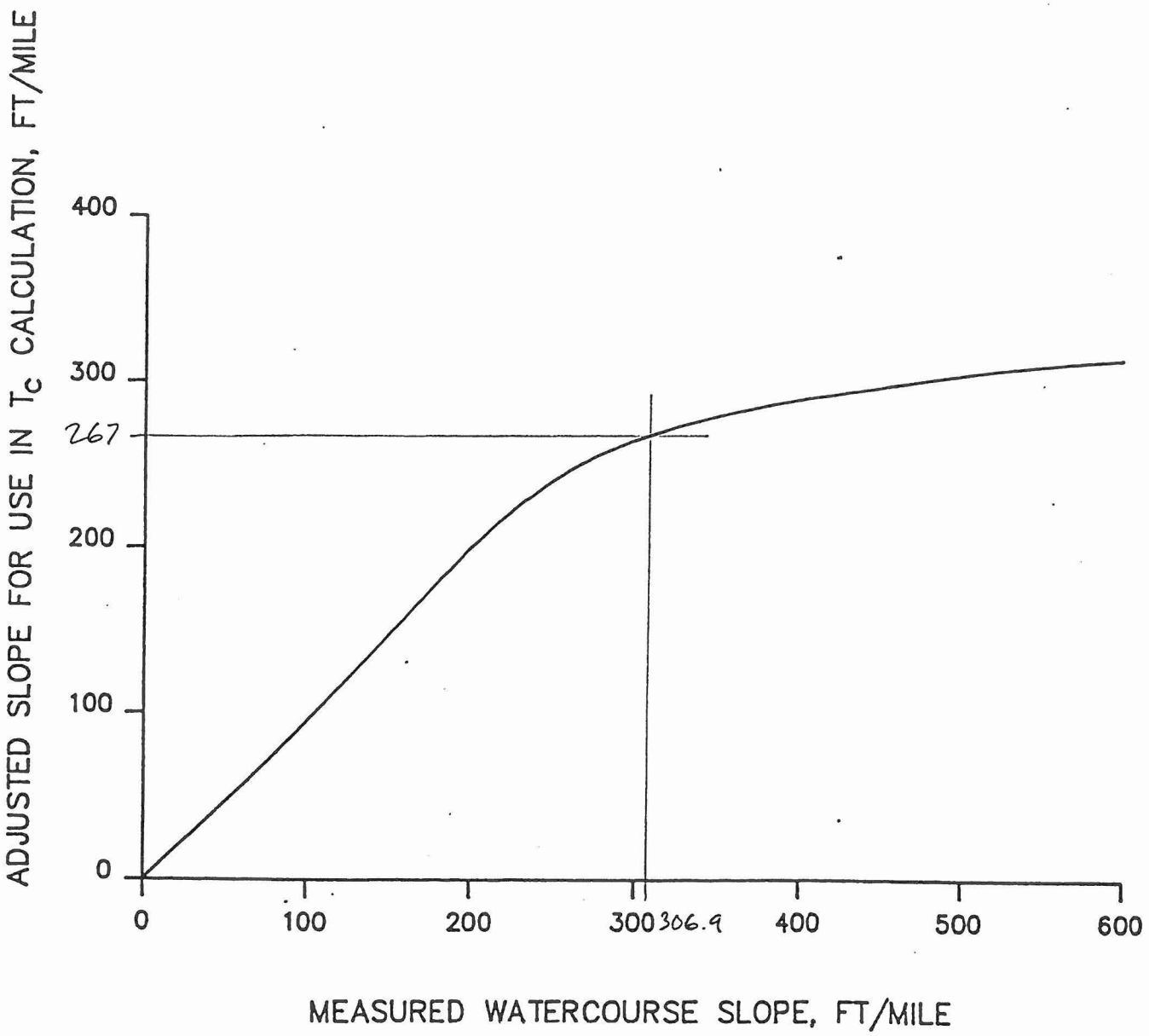


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 H
SLOPE: 336.4 FT/MI
ADJ. SLOPE: 275 FT/MI

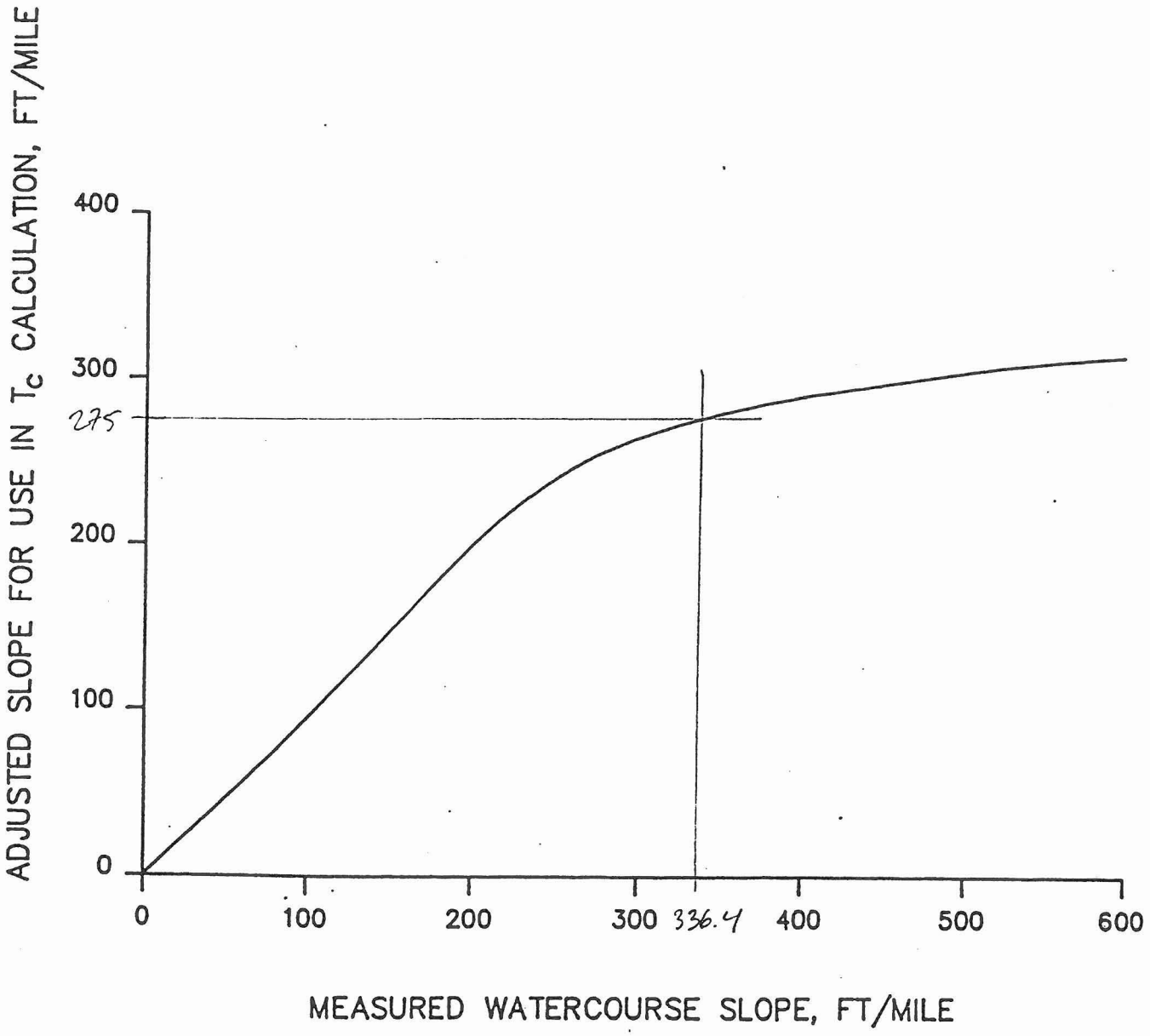


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 187 I
SLOPE: 516.1 FT/MI
ADJ. SLOPE: 305 FT/MI

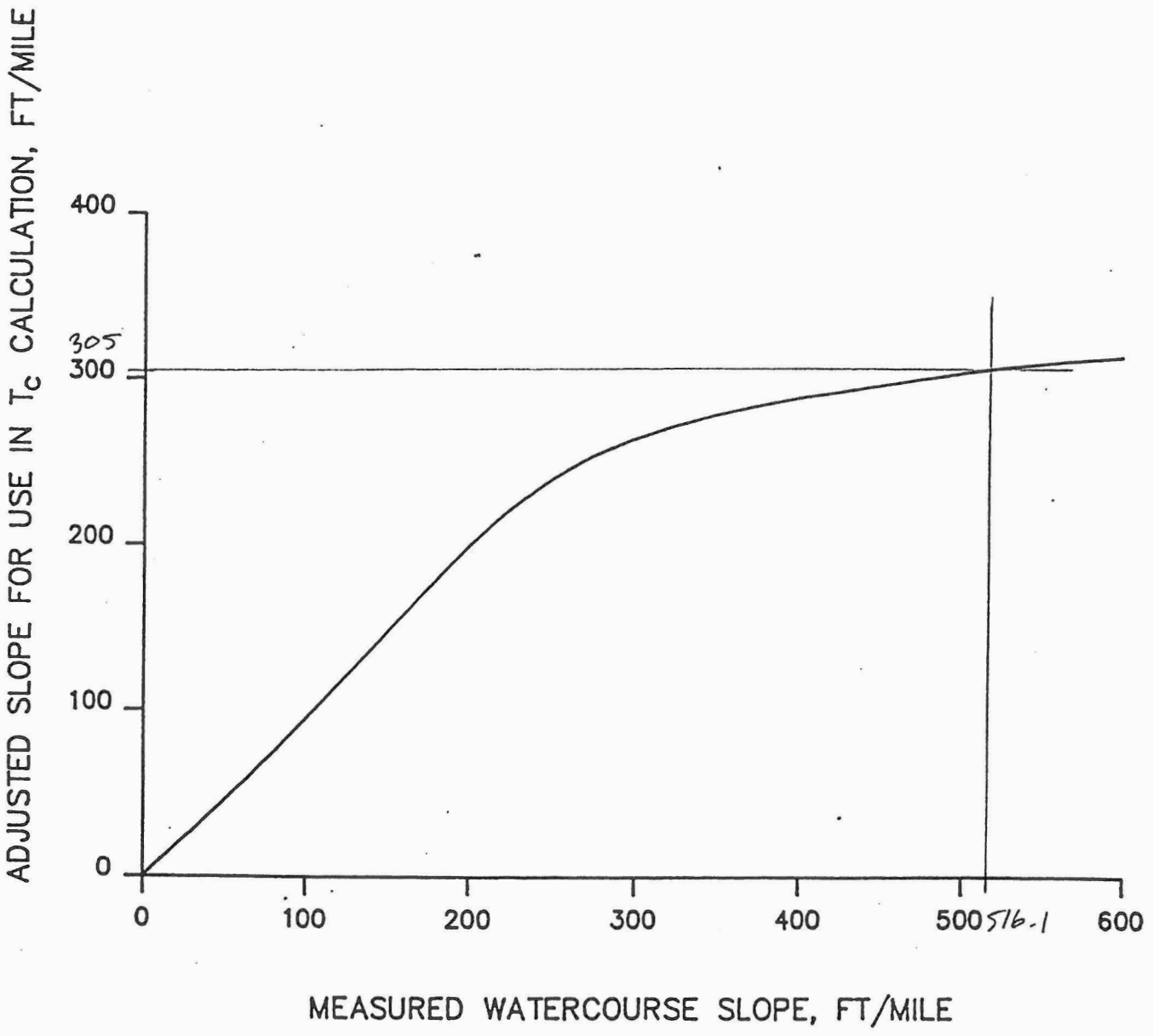


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188A
SLOPE: 388.0 FT/MI
ADJ. SLOPE: 286 FT/MI

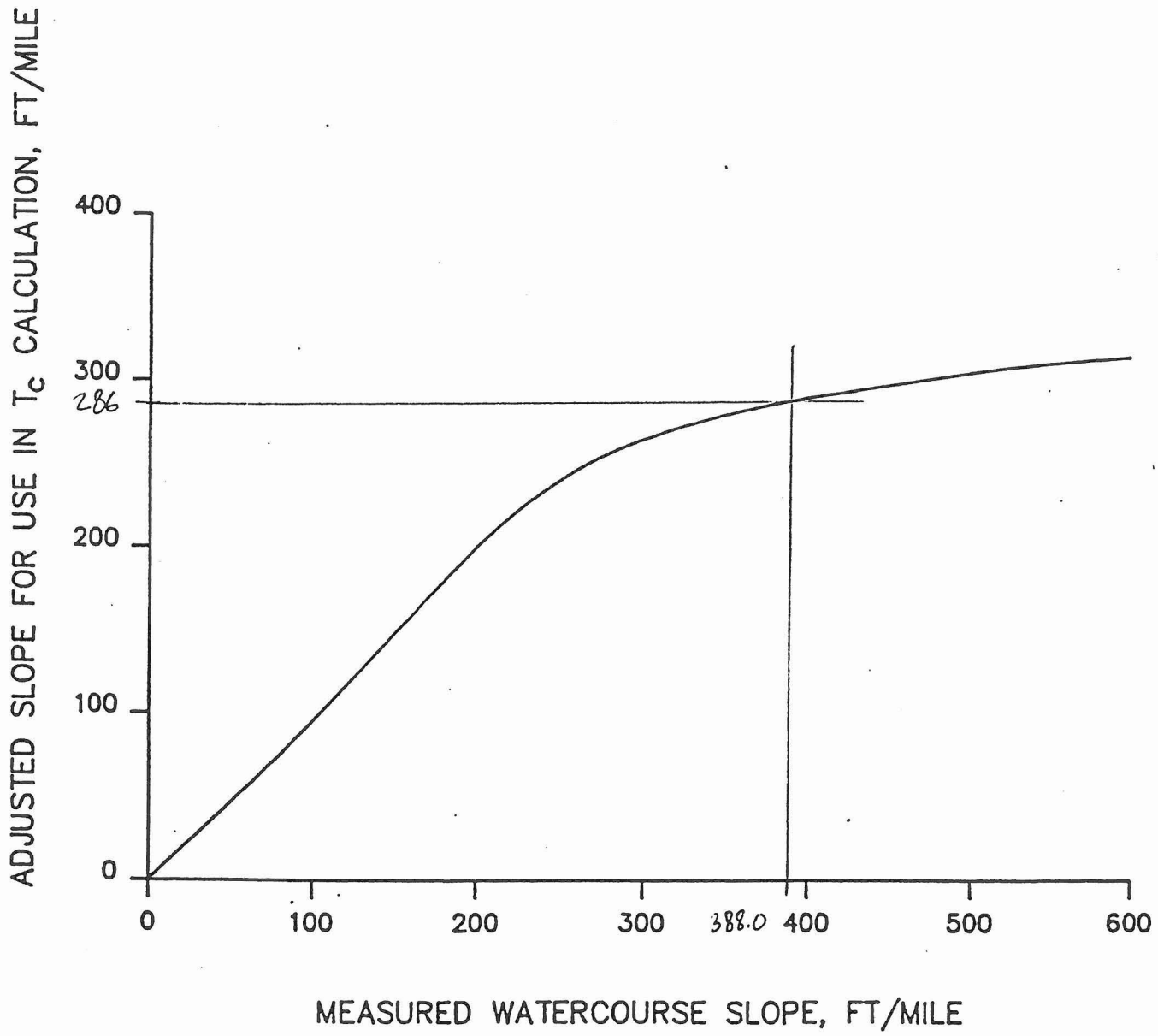


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188 B
SLOPE: 489.0 FT/MI
ADJ. SLOPE: 300 FT/MI

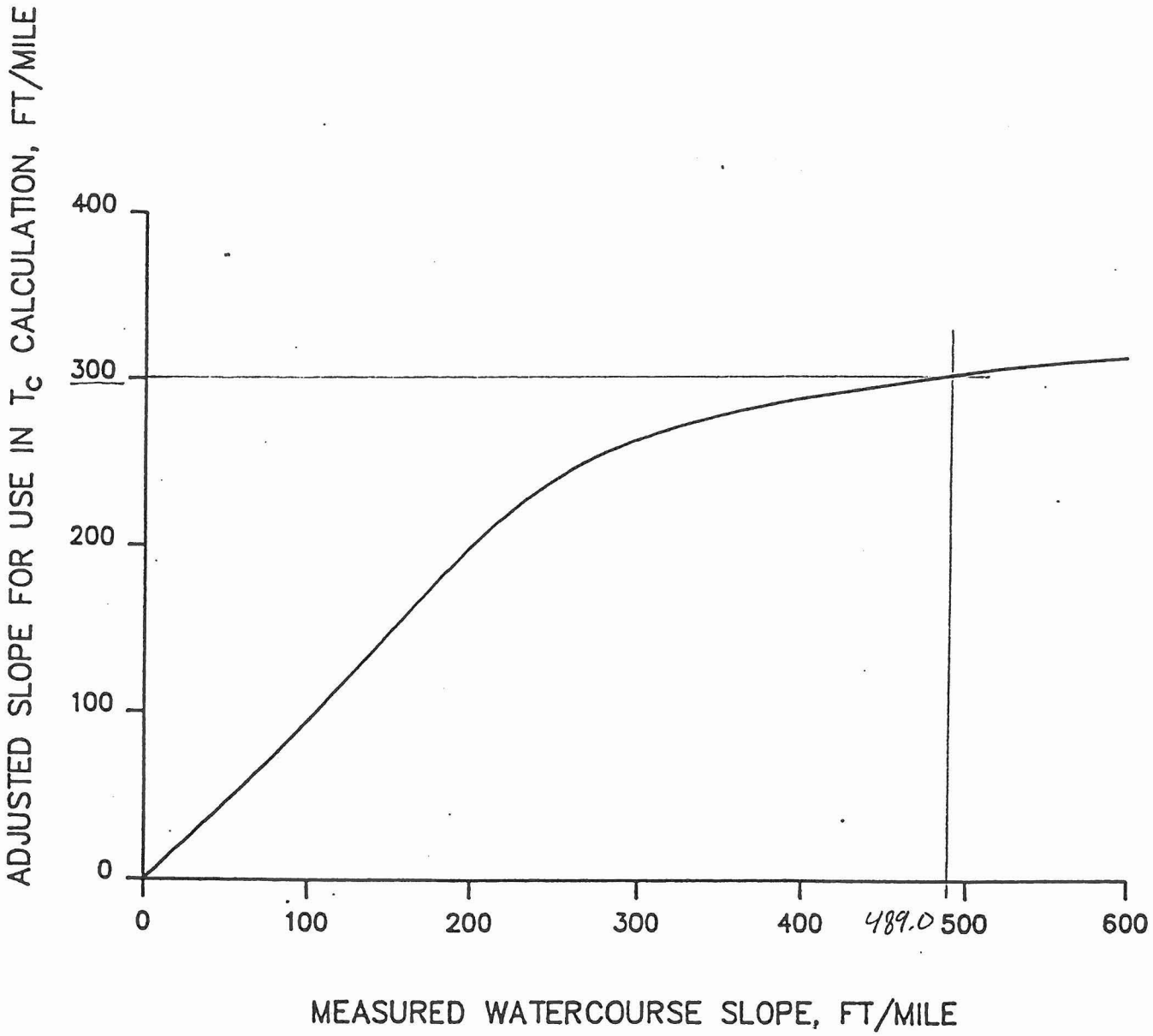


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188 C
SLOPE: 554.5 FT/MI
ADJ. SLOPE: 308 FT/MI

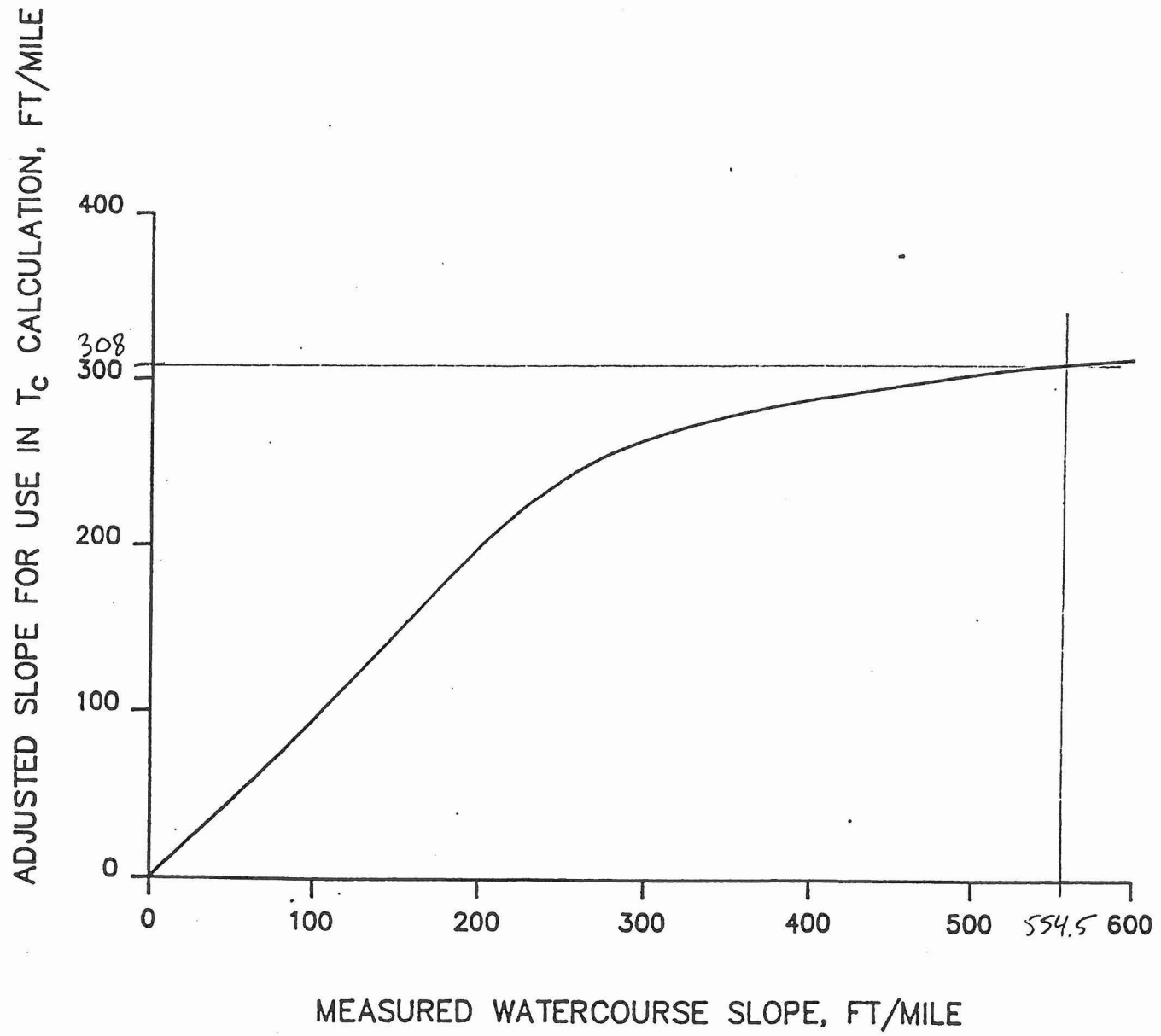


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188 D
SLOPE: 506.4 FT/MI
ADJ. SLOPE: 304 FT/MI

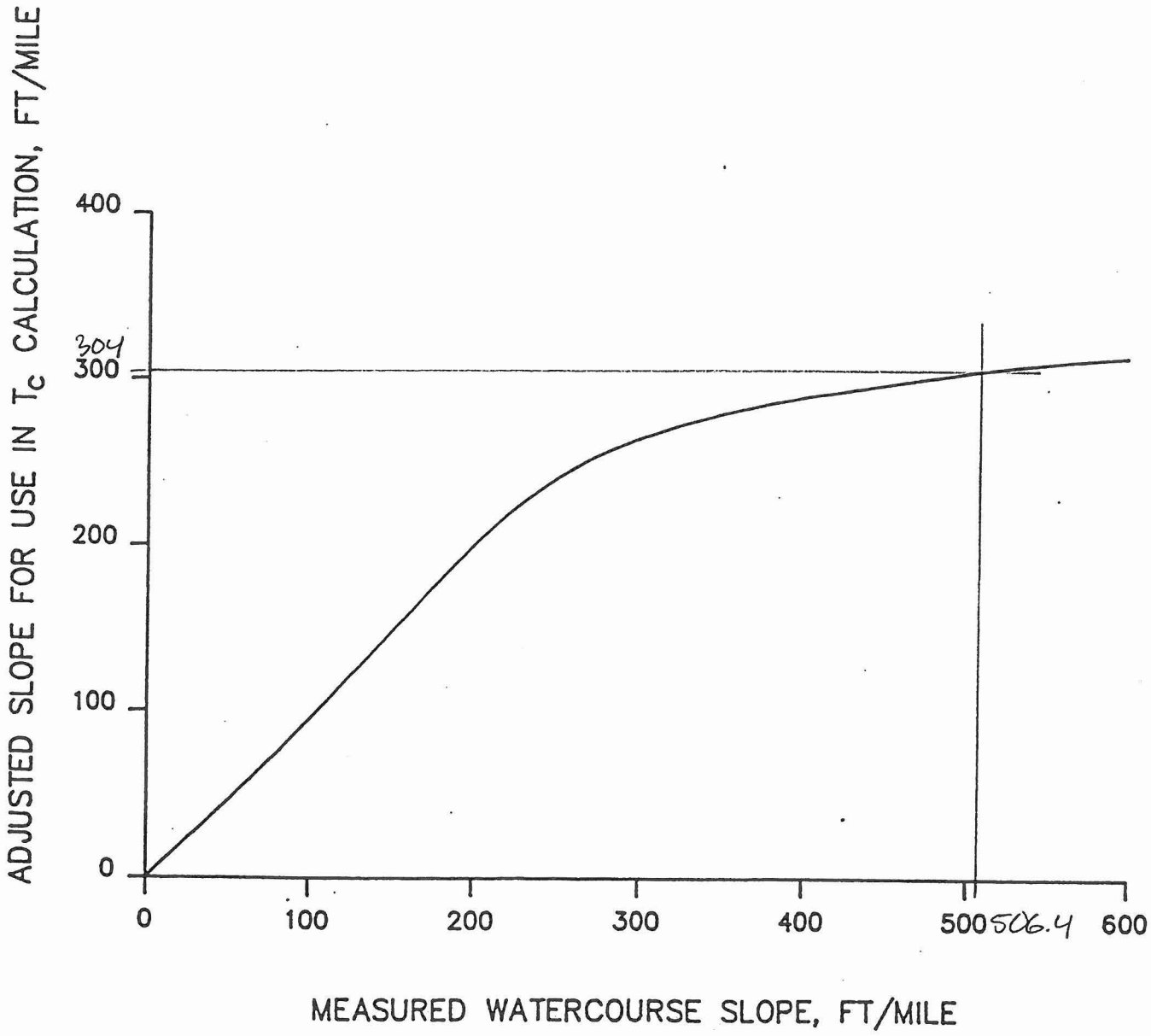


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188E
SLOPE: 408.4 FT/MI
ADJ. SLOPE: 289 FT/MI

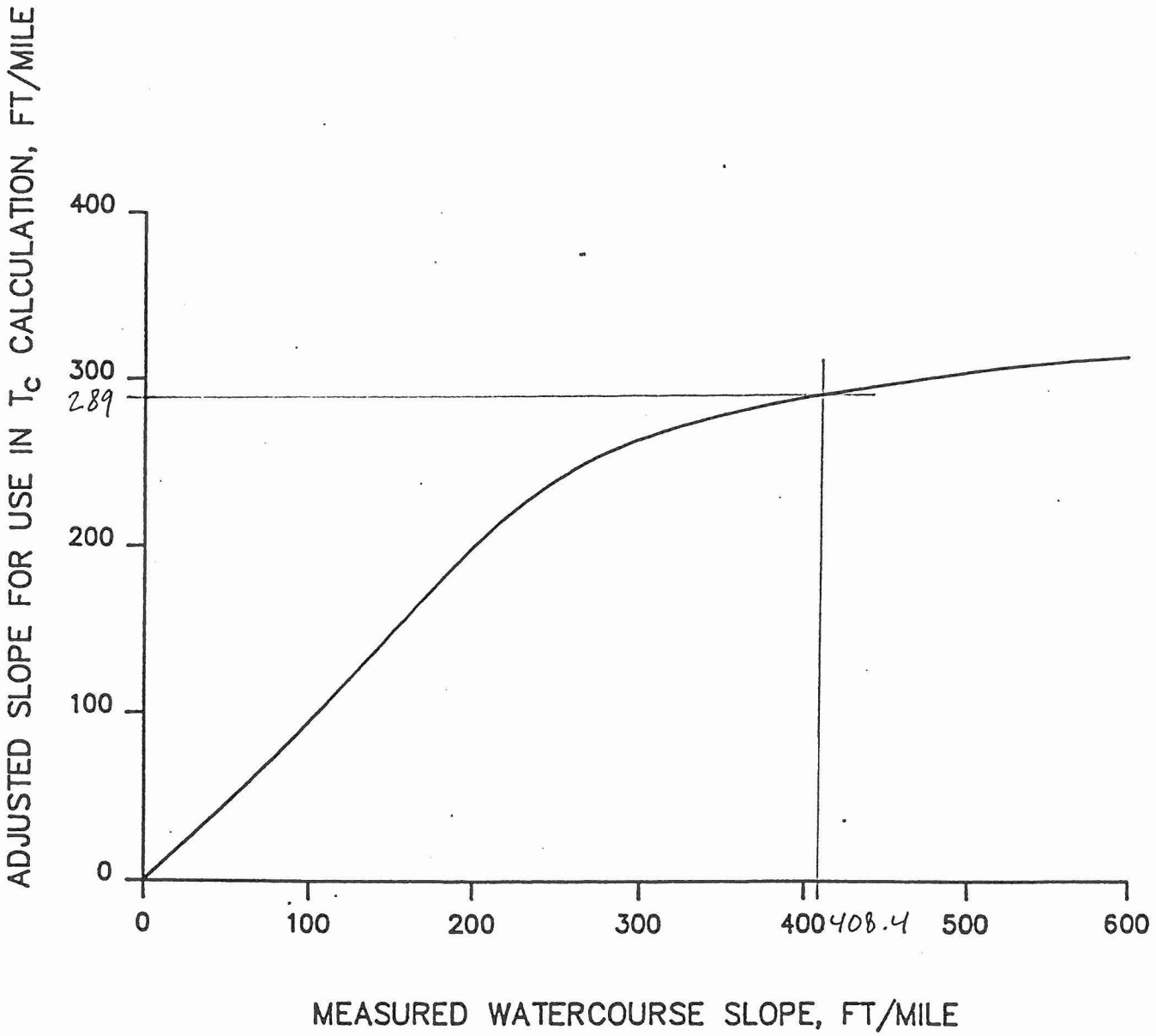


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188 F
SLOPE: 326.1 FT/MI
ADJ. SLOPE: 273 FT/MI

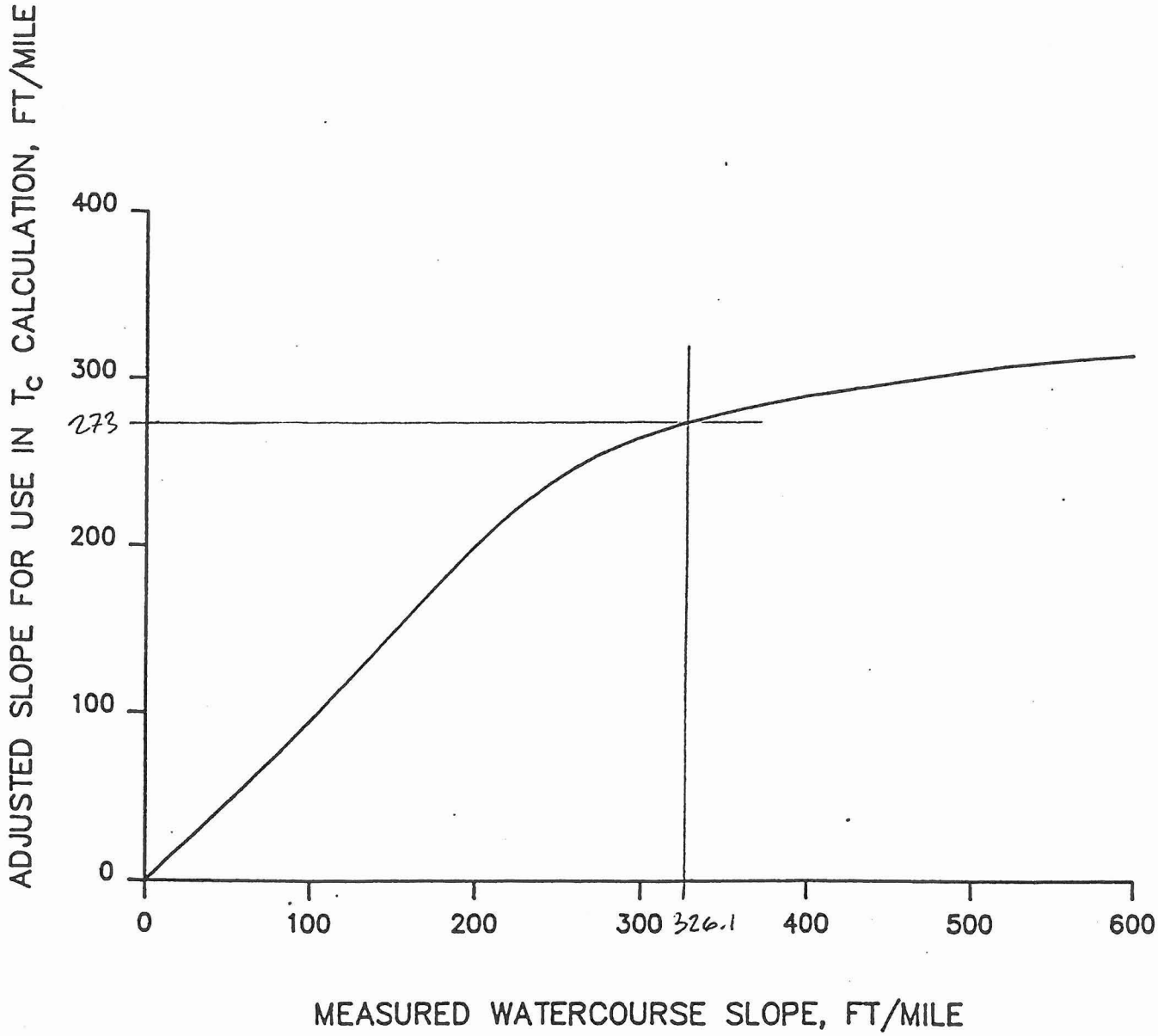


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

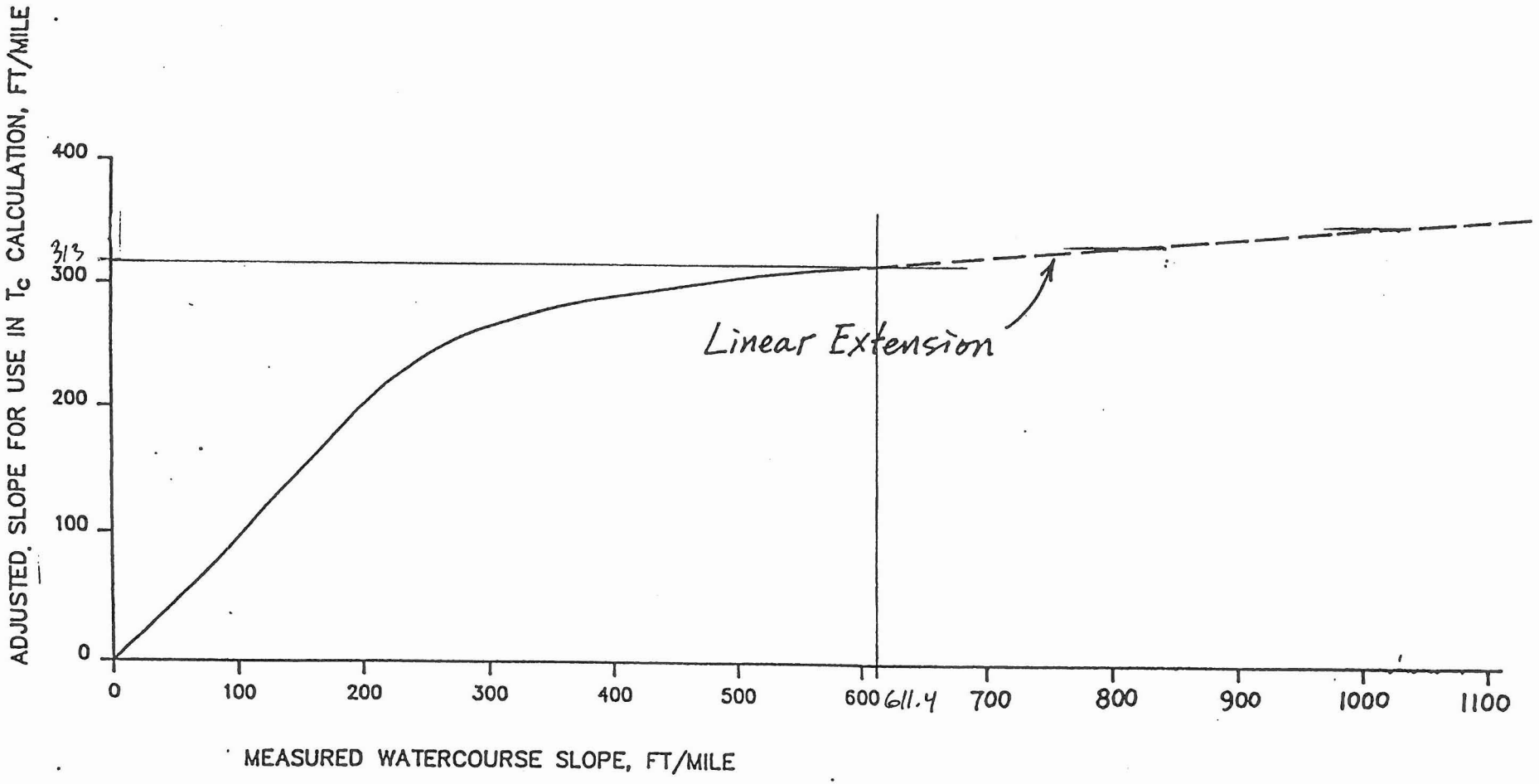


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

COLONY WASH WATERSHED
BASIN 188 G
SLOPE: 611.4 FT/MI
ADJ. SLOPE: 313 FT/MI

D.8

PANORAMA CHANNEL

COLONY WASH WATERSHED
BASIN 182 H
SLOPE: 303.6 FT/MI
ADJ. SLOPE: 266 FT/MI

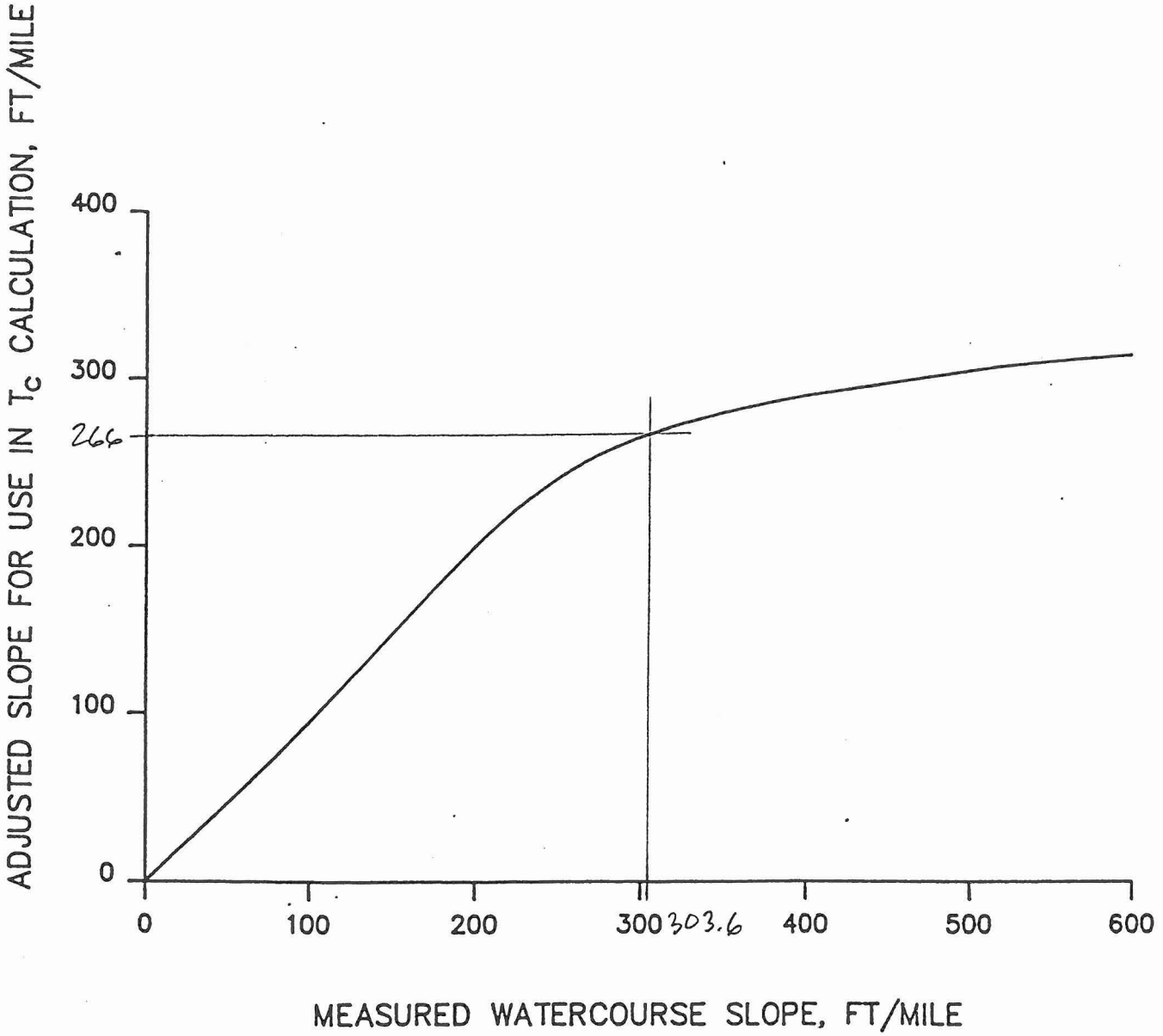


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 A
SLOPE: 461.5 FT/MI
ADJ. SLOPE: 297 FT/MI

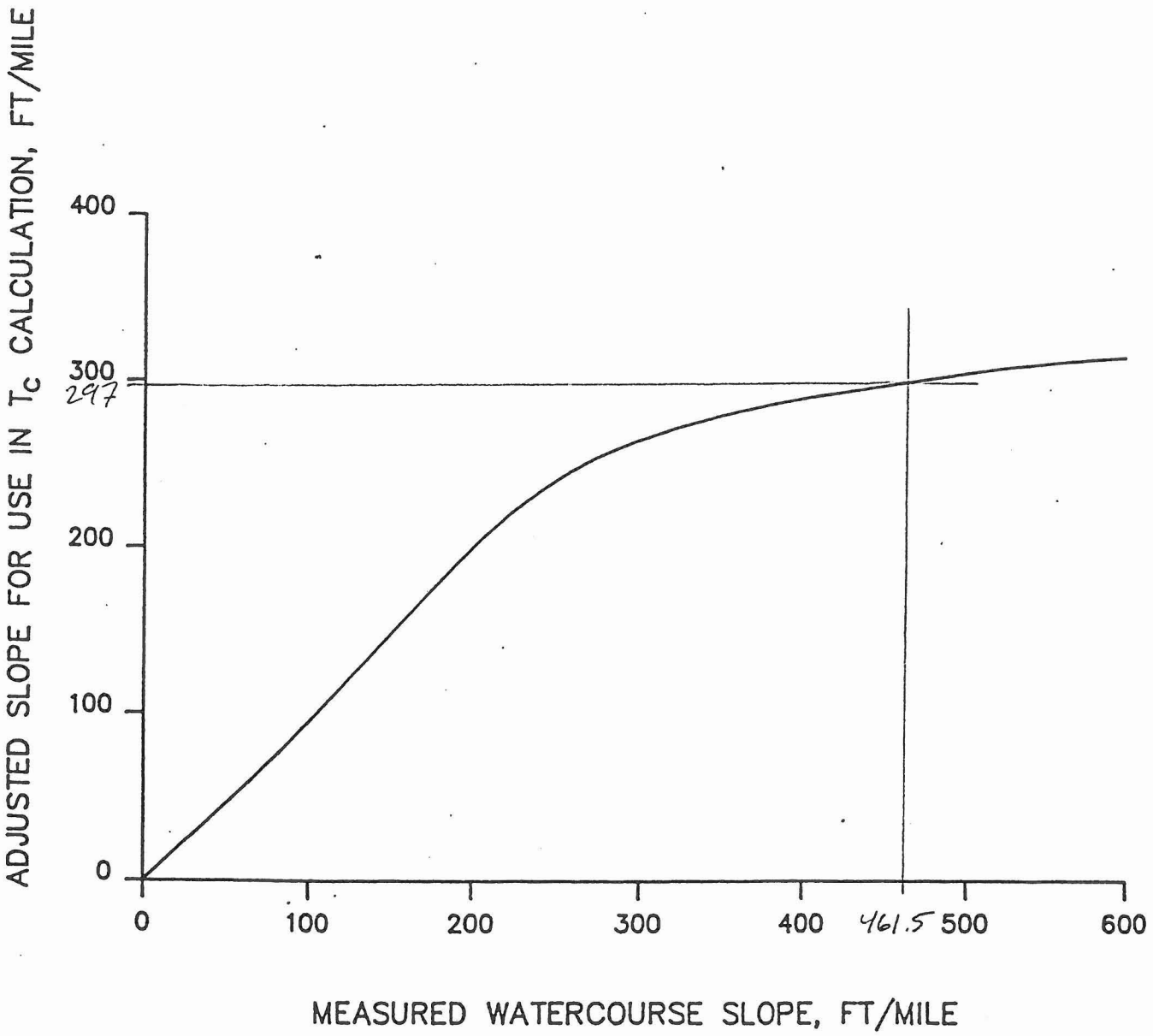


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 B
SLOPE: 448.2 FT/MI
ADJ. SLOPE: 295 FT/MI

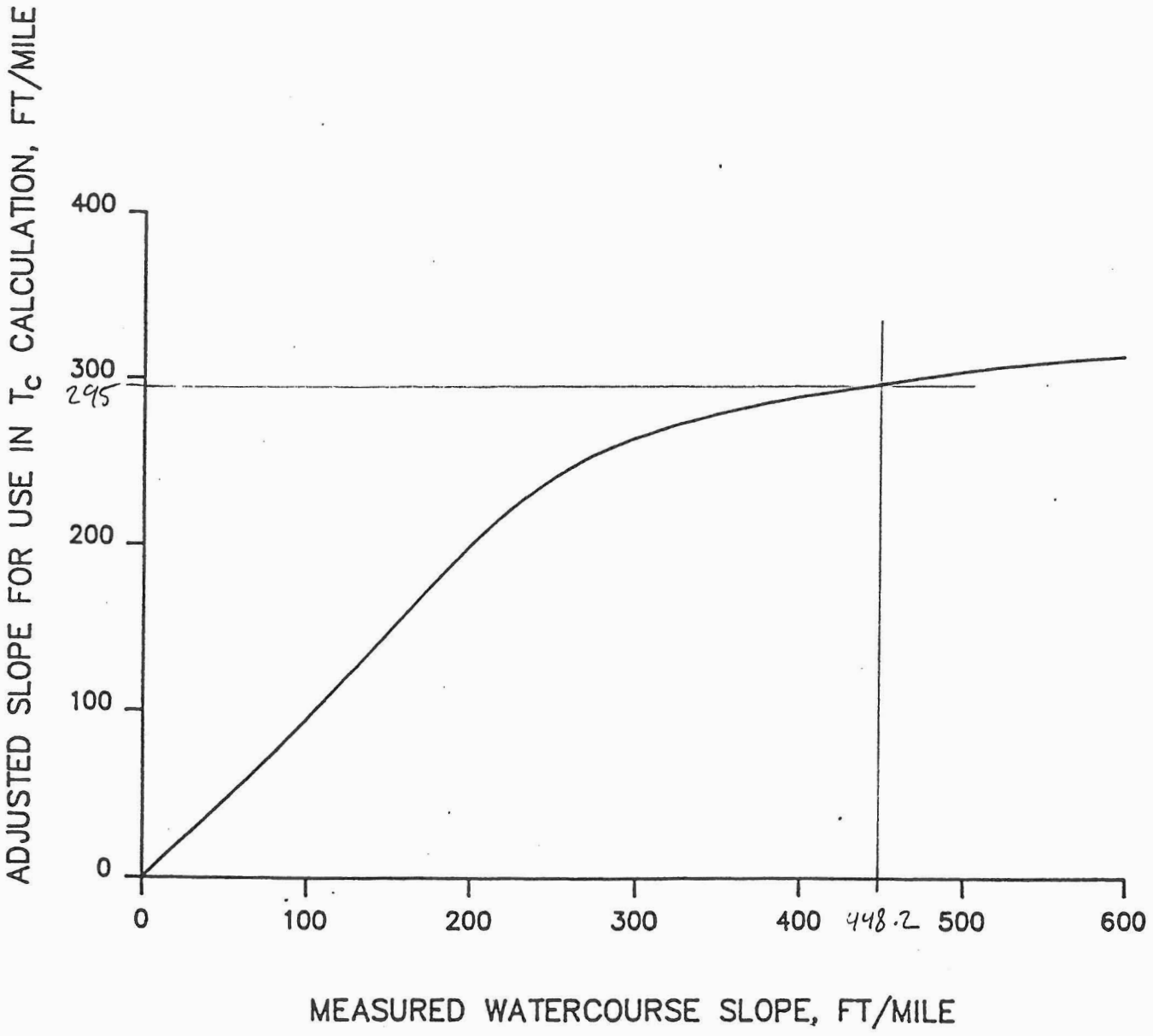


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 C
SLOPE: 381.2 FT/MI
ADJ. SLOPE: 286 FT/MI

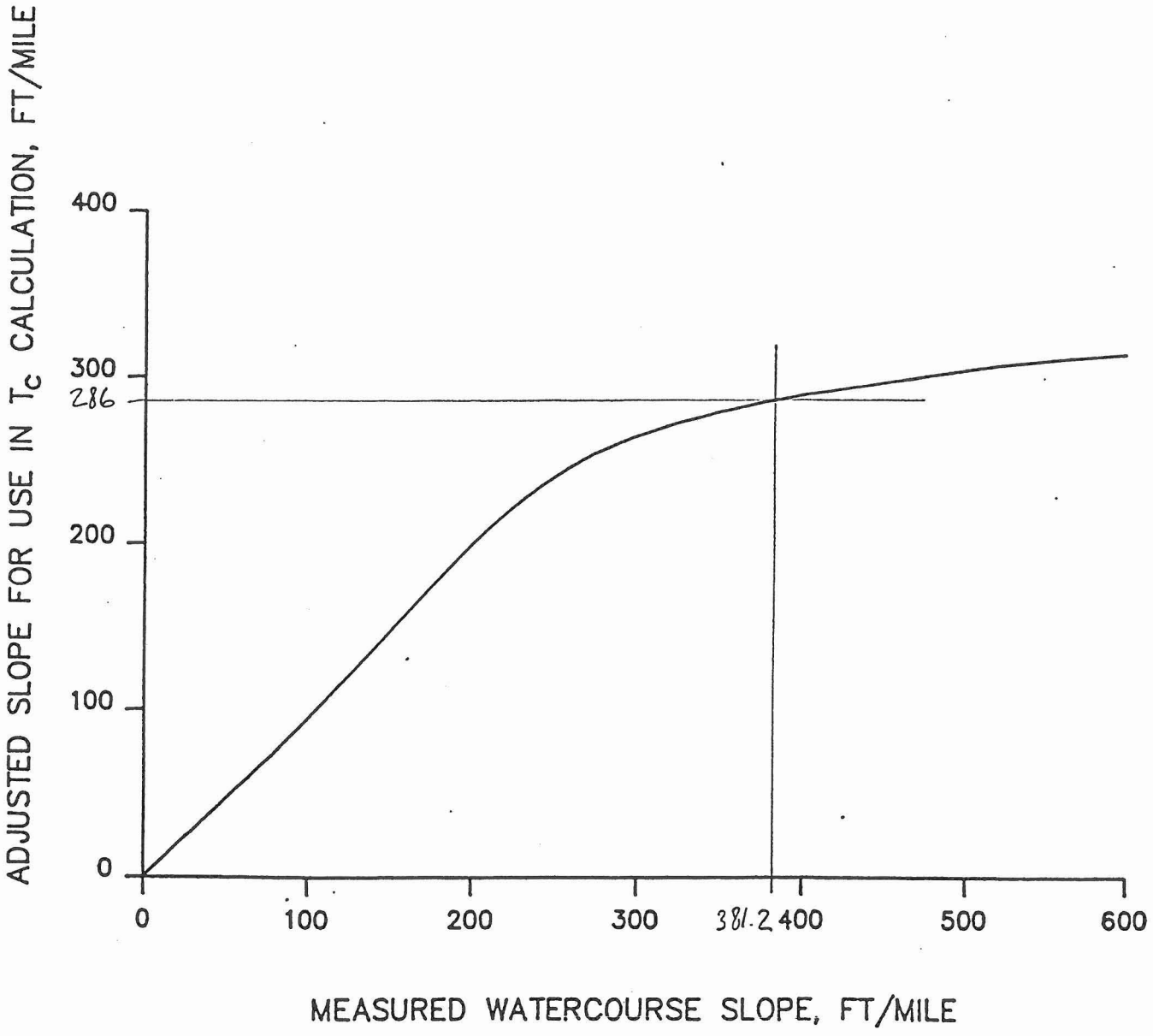


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

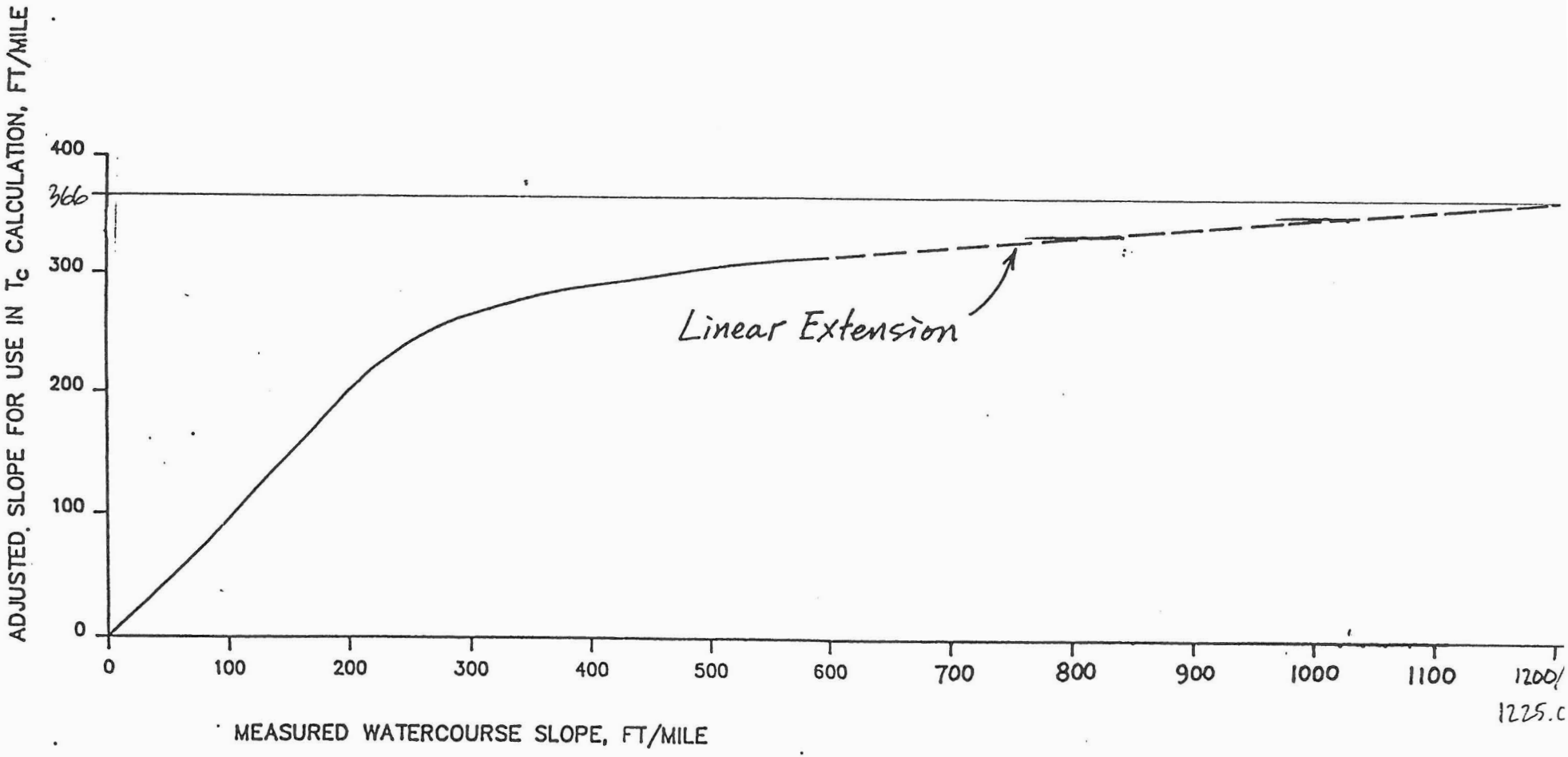


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 D
SLOPE: 1225.0 FT/ME
ADJ. SLOPE: 366 FT/ME

PANORAMA CHANNEL WATERSHED
BASIN 190 E
SLOPE: 416.8 FT/MI
ADJ. SLOPE: 291 FT/MI

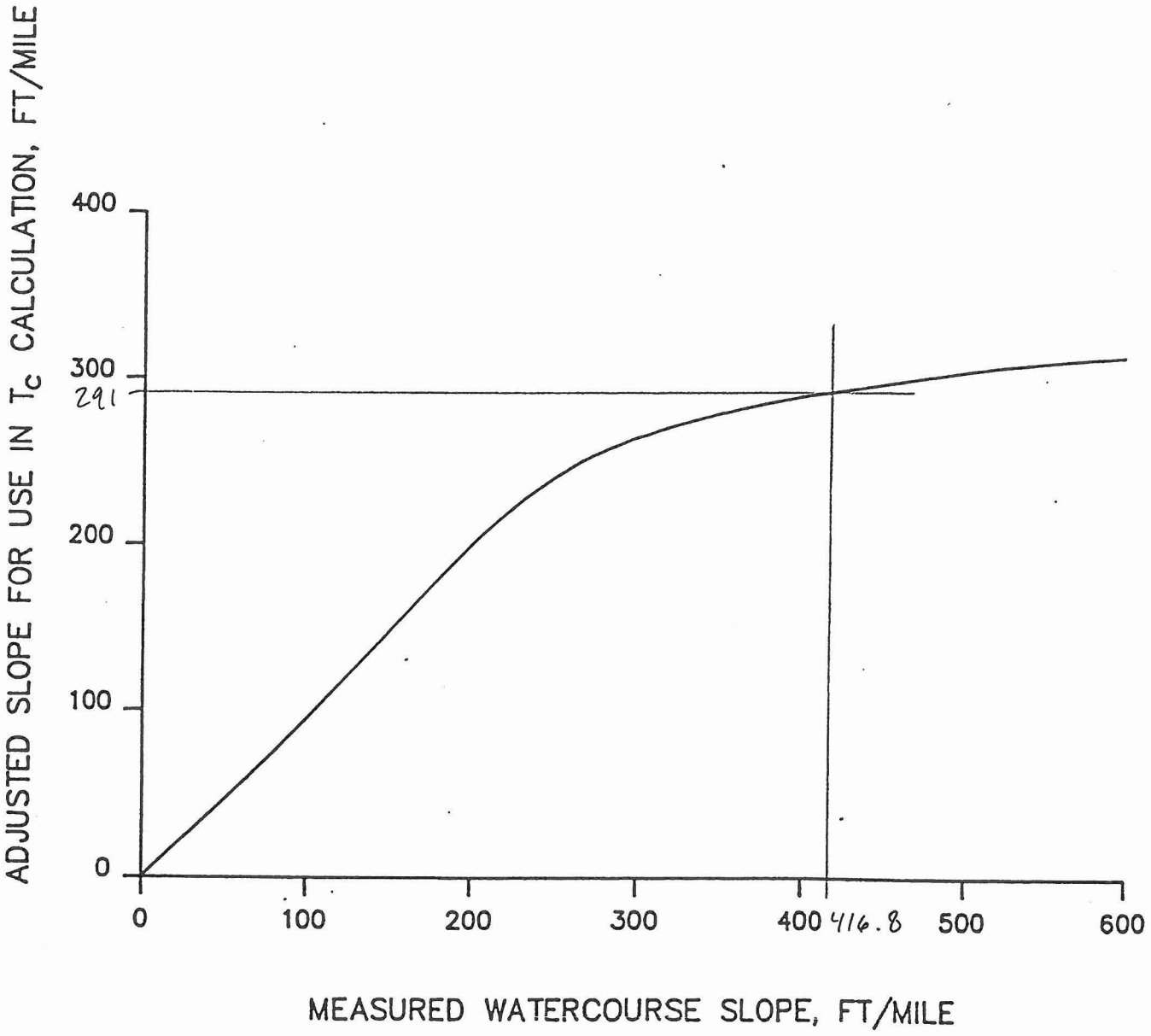


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190F
SLOPE: 325.9 FT/MI
ADJ. SLOPE: 273 FT/MI

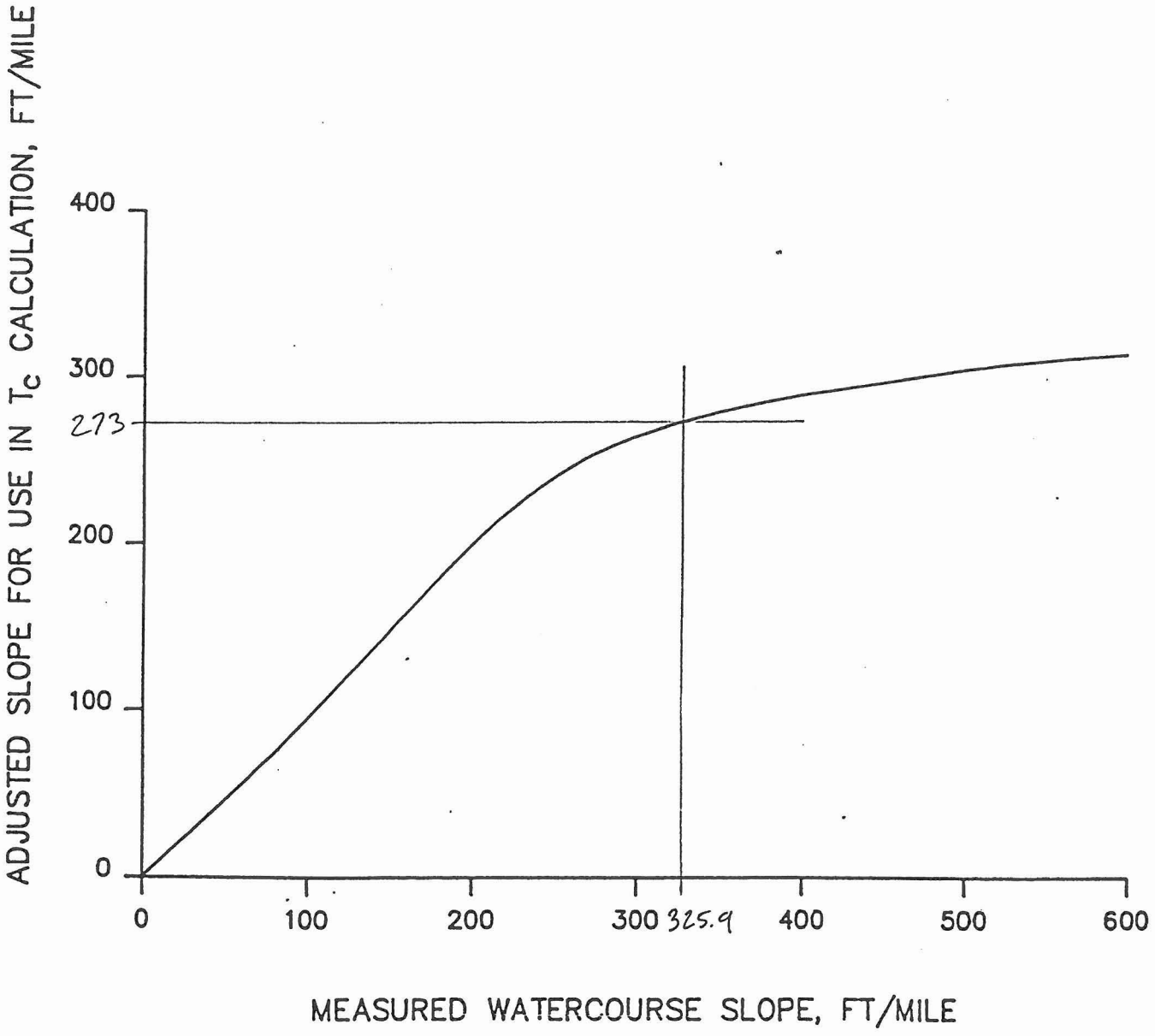


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 G
SLOPE: 590.6 FT/MI
ADJ. SLOPE: 311 FT/MI

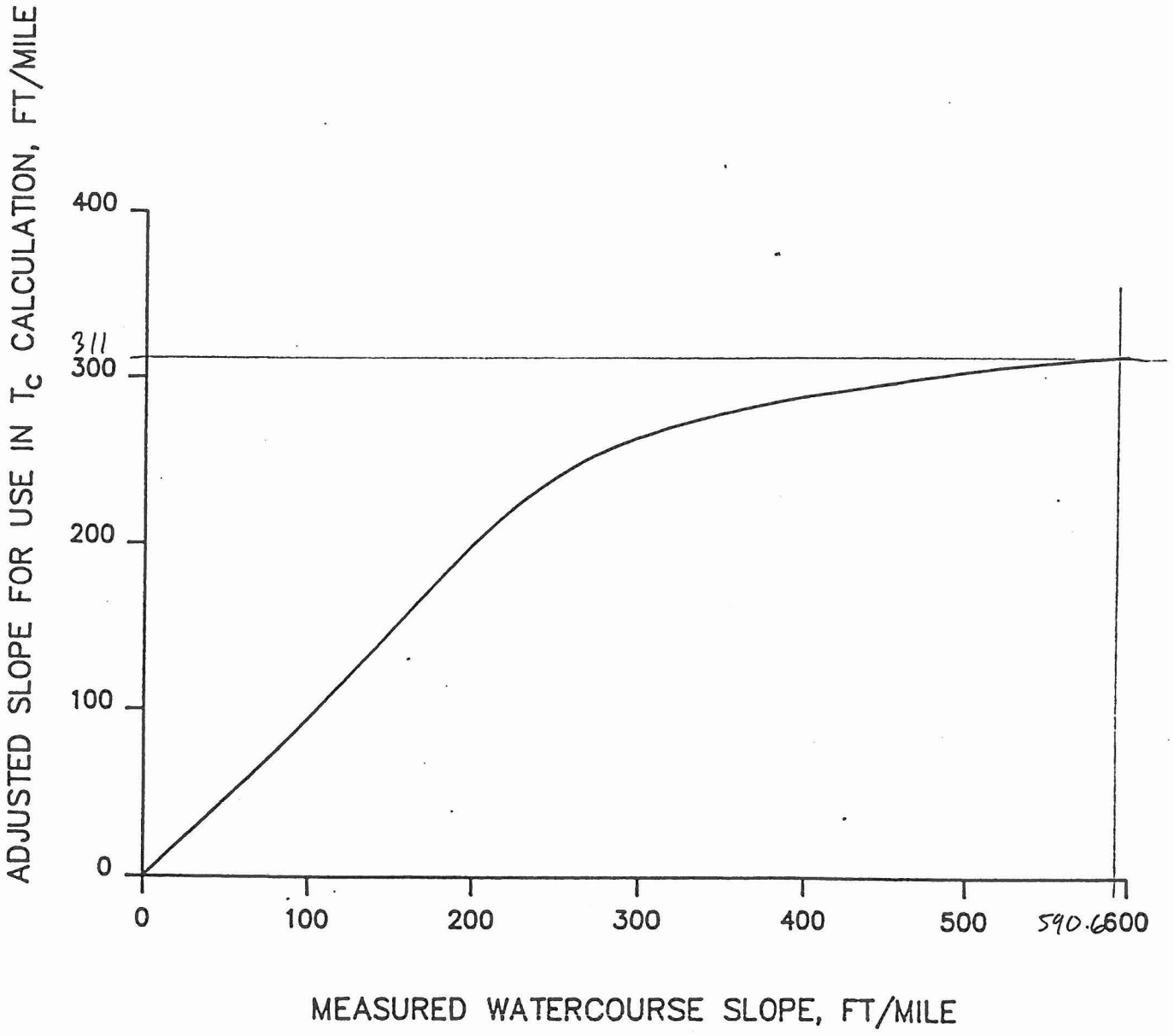


Figure 5.4
Slope Adjustment for Steep Watercourses In Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 H
SLOPE: 319.1 FT/MI
ADJ. SLOPE: 271 FT/MI

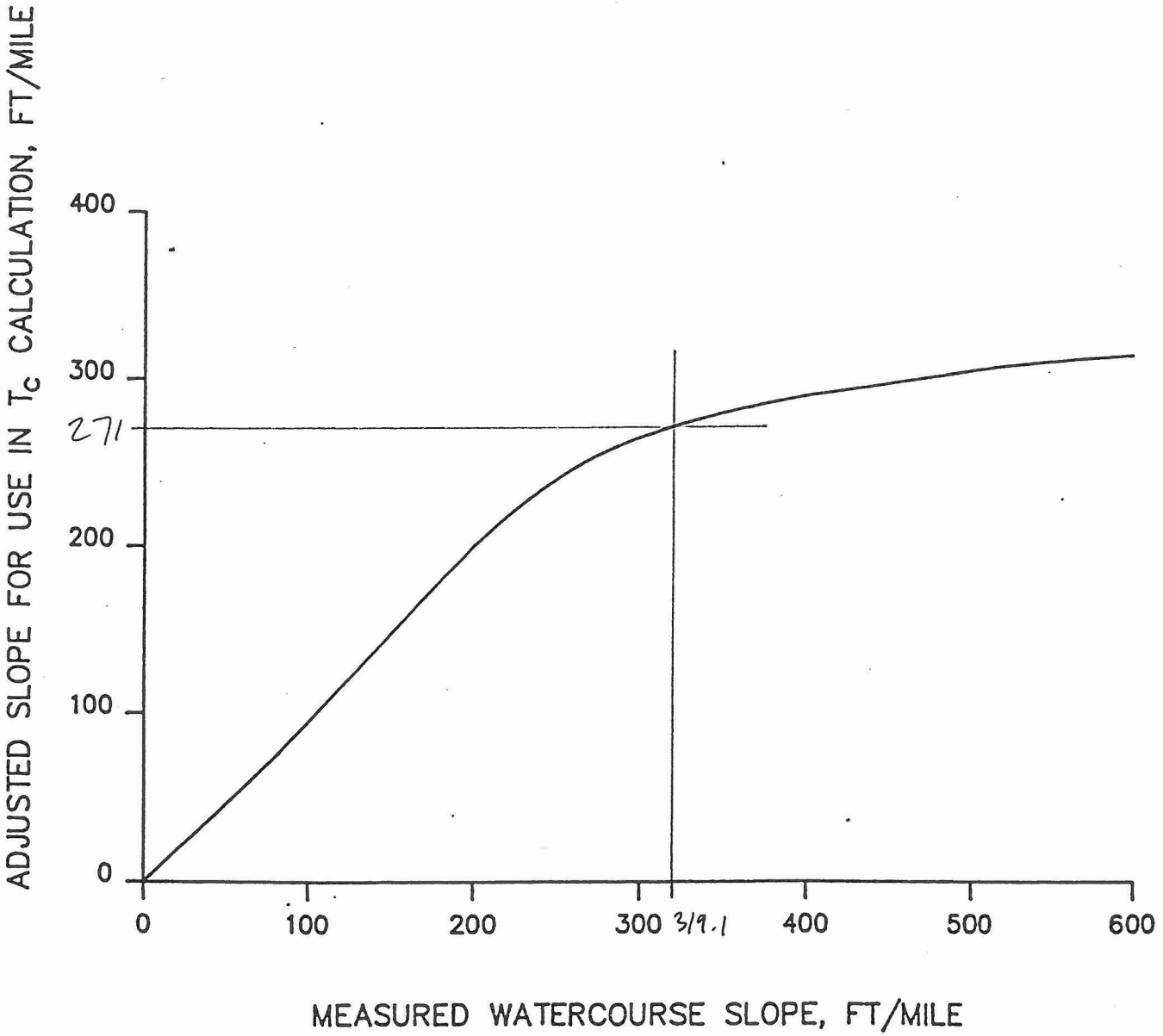


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 I
SLOPE: 443.3 FT/MI
ADJ. SLOPE: 295 FT/MI

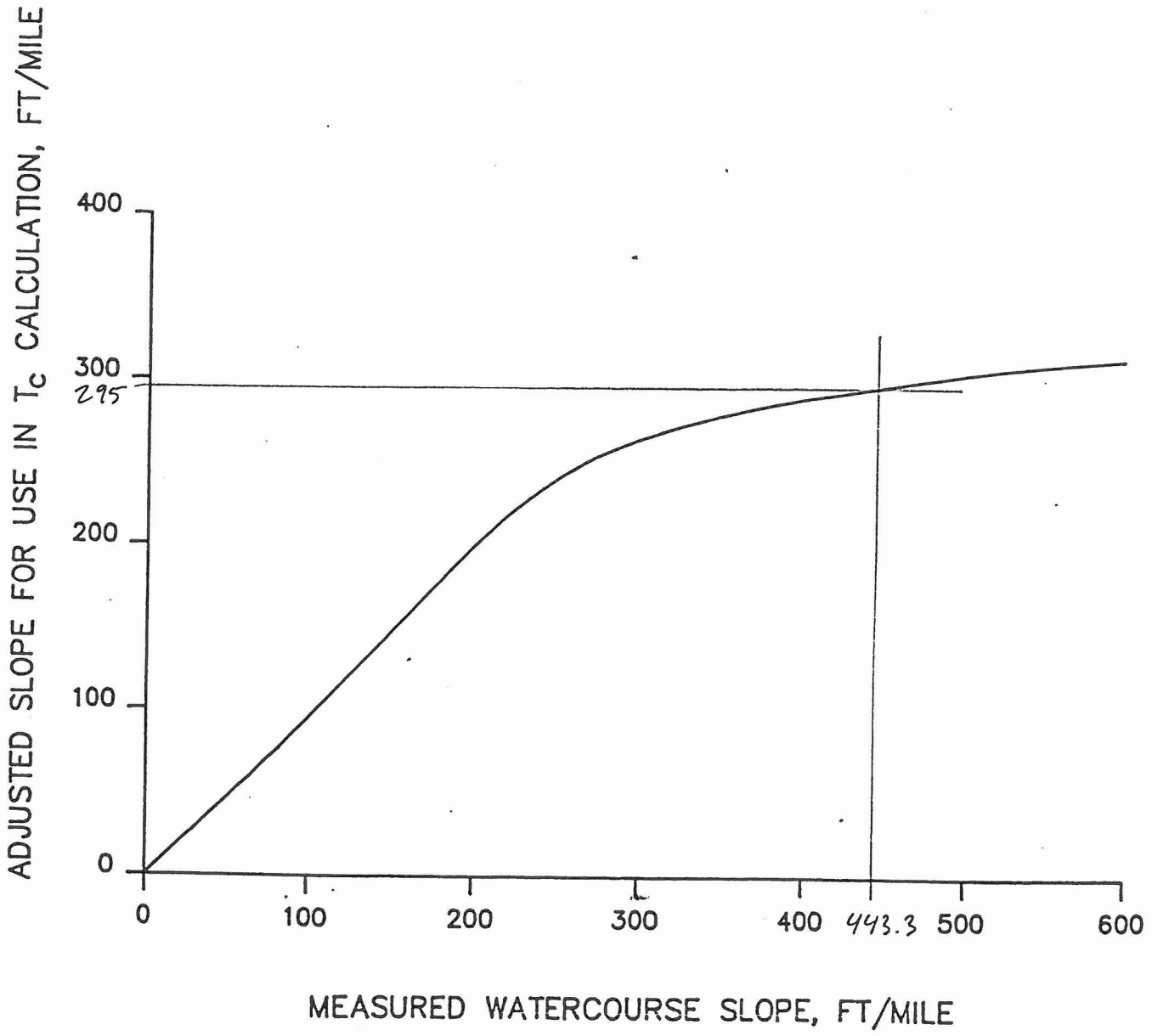


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 J
SLOPE: 468.3 FT/MI
ADJ. SLOPE: 297 FT/MI

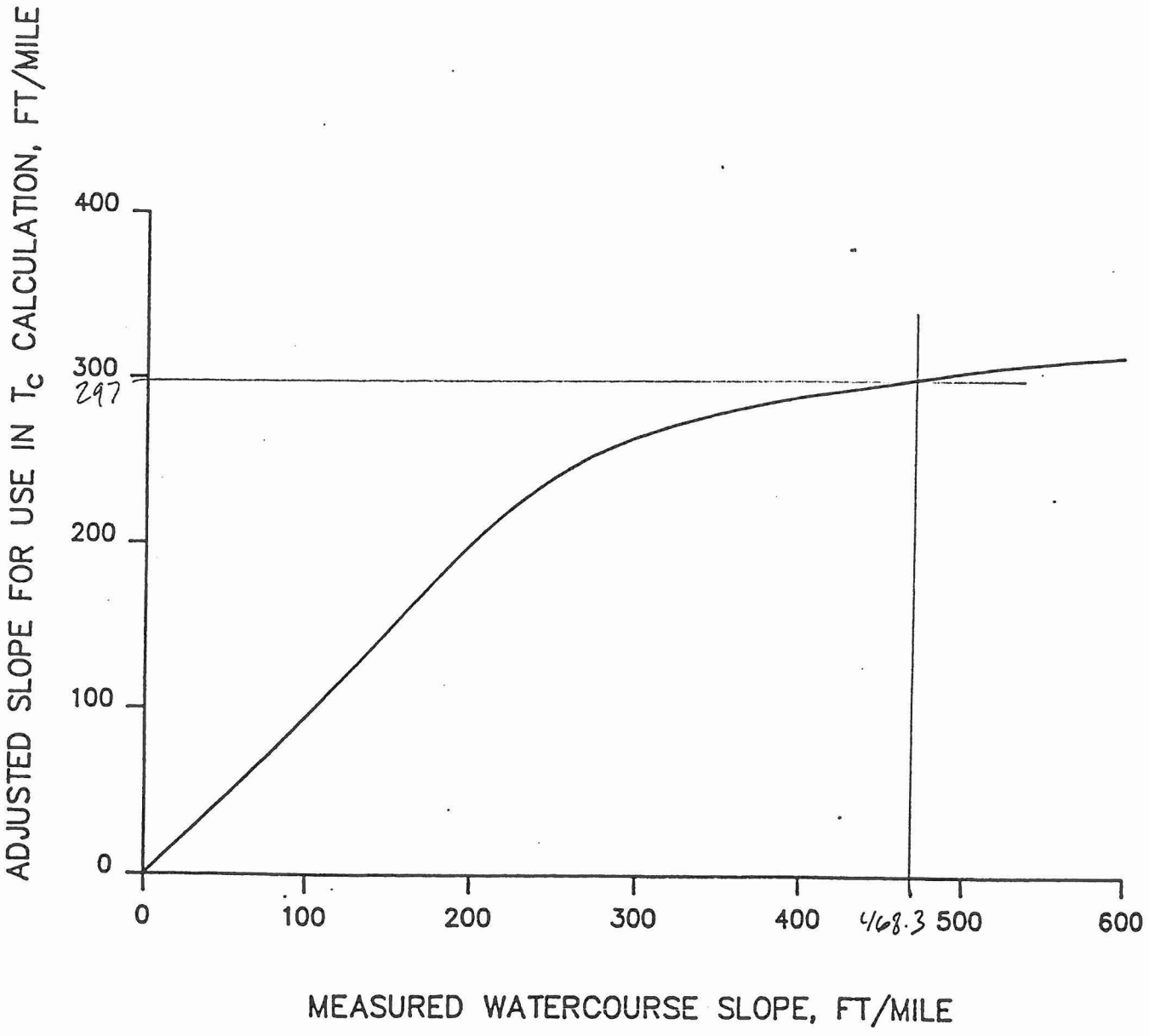


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

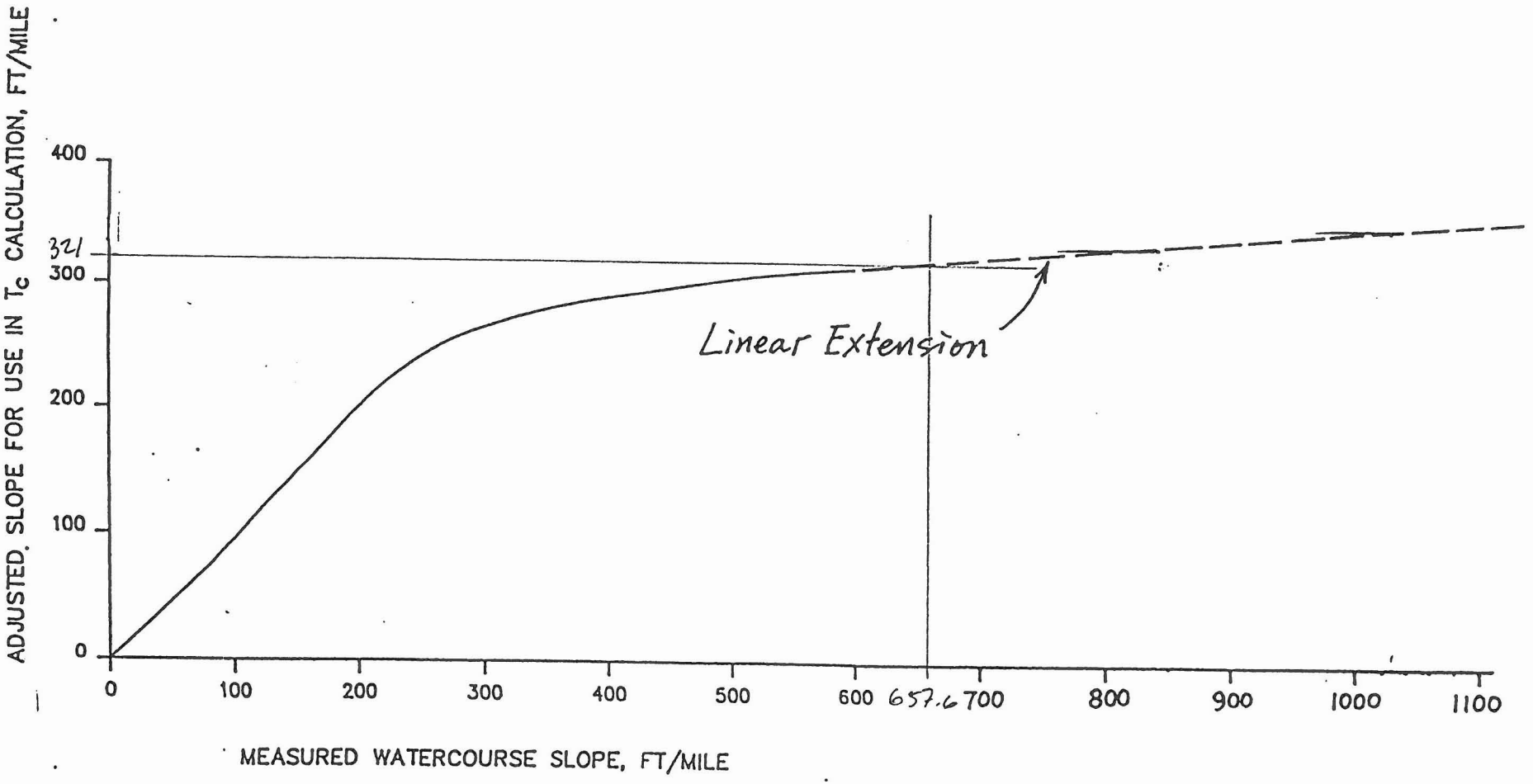


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190K
SLOPE: 657.6 FT/MI
ADJ. SLOPE: 321 FT/MI

PANORAMA CHANNEL WATERSHED
BASIN 190 N
SLOPE: 490.0 FT/MI
ADJ. SLOPE: 301 FT/MI

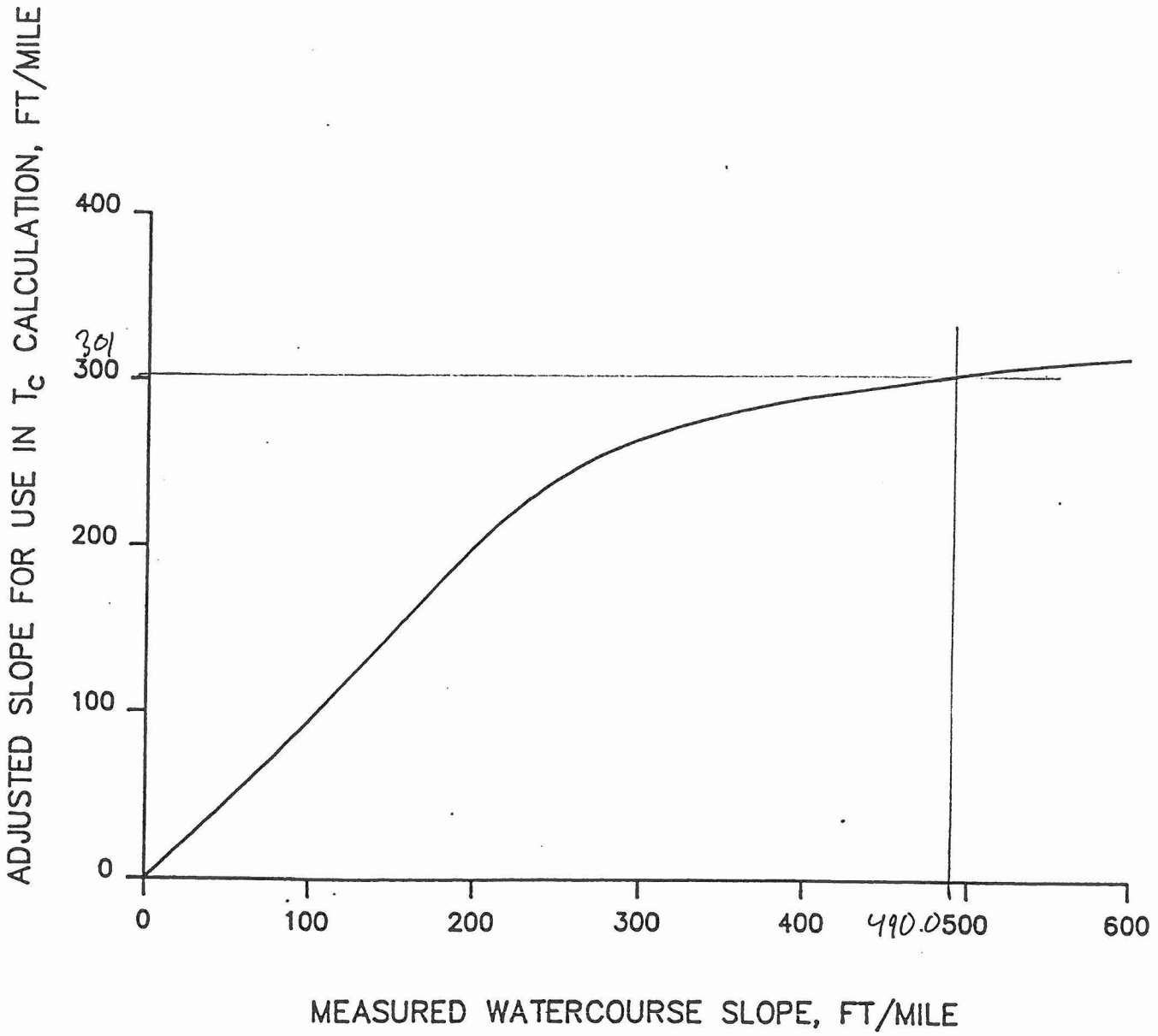


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 R
SLOPE: 350.7 FT/MI
ADJ. SLOPE: 279 FT/MI

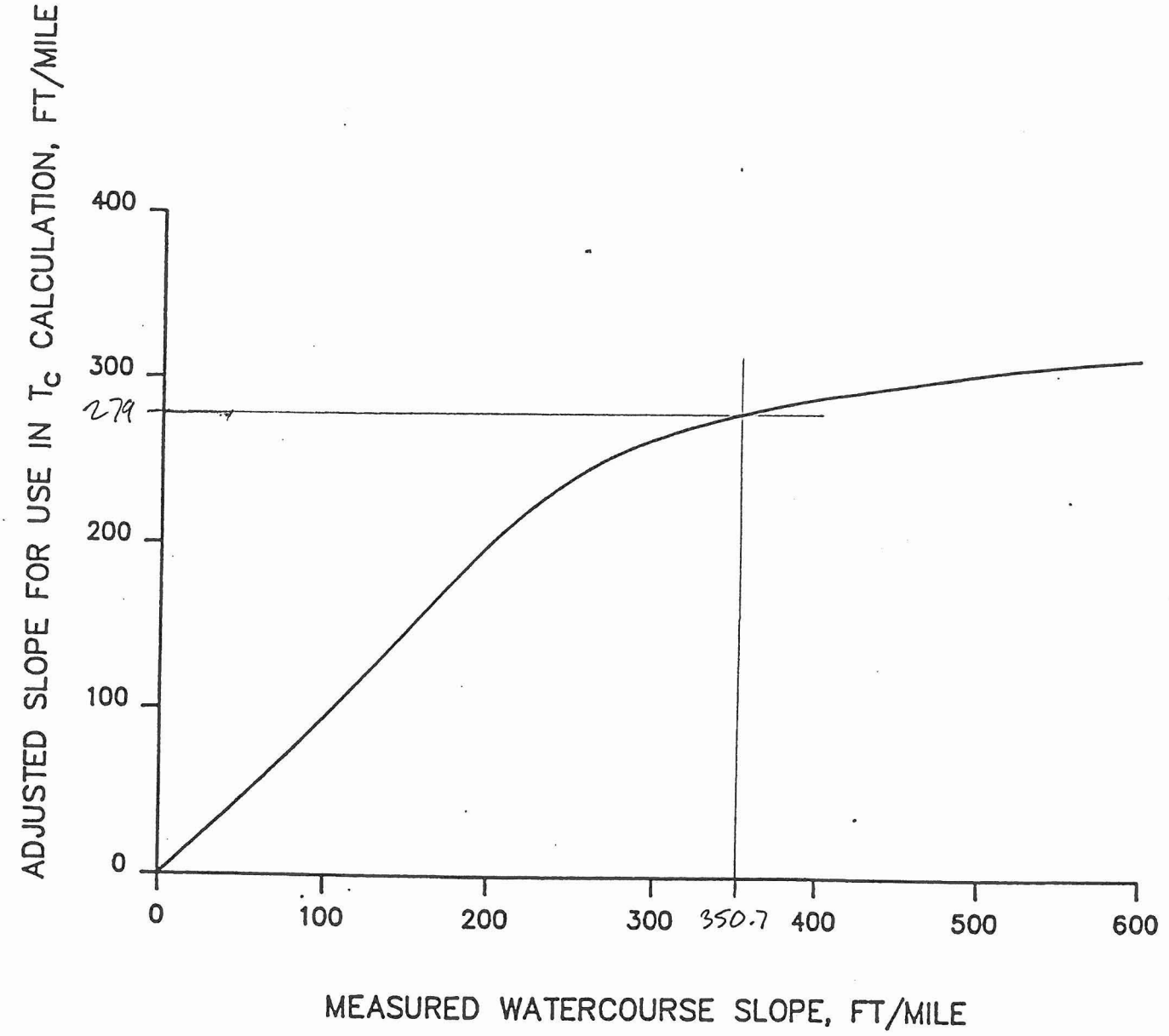


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 S
SLOPE: 300.1 FT/MC
ADJ. SLOPE: 264 FT/MC

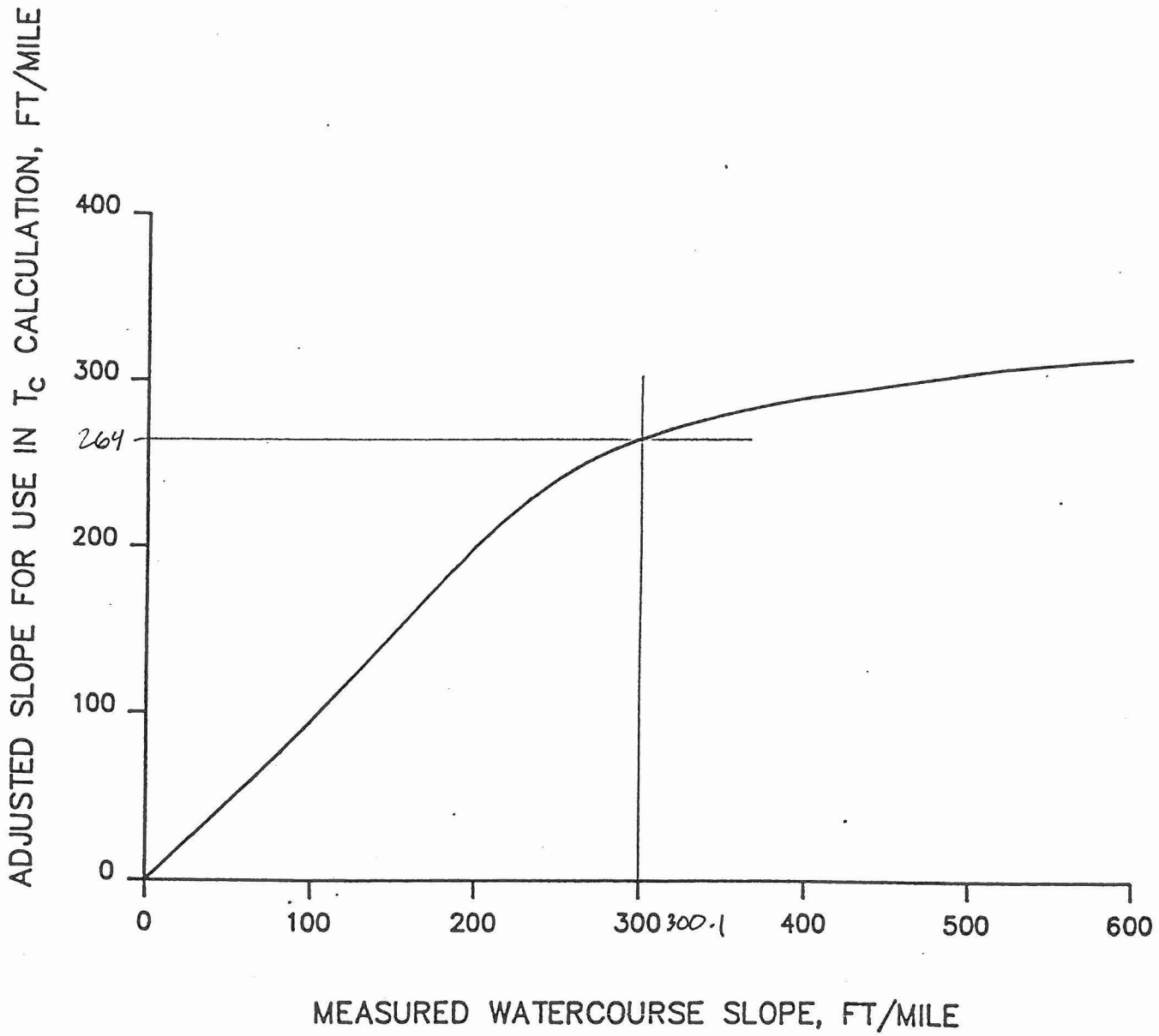


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 T
SLOPE: 252.9 FT/MI
ADJ. SLOPE: 241 FT/MI

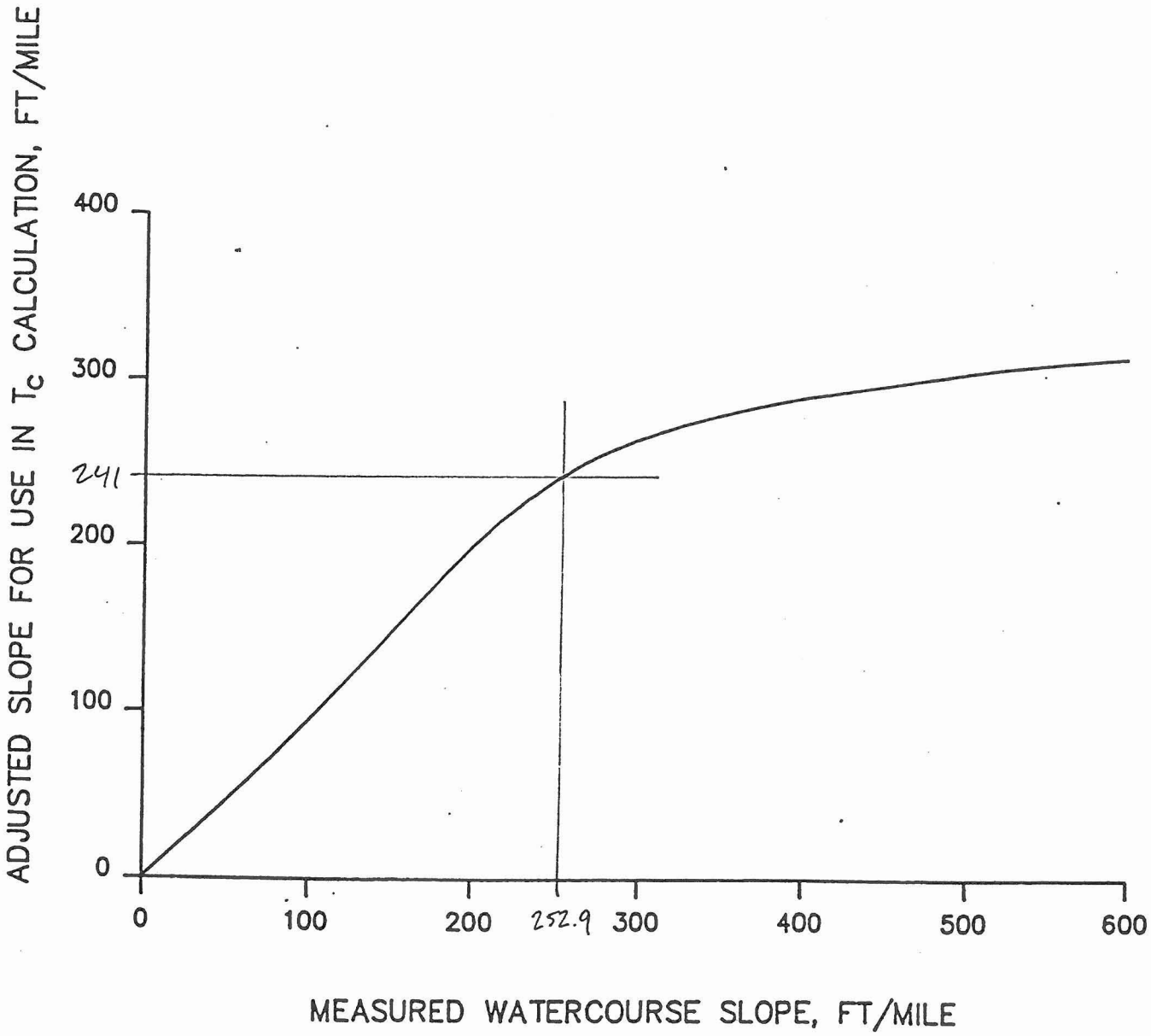


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)

PANORAMA CHANNEL WATERSHED
BASIN 190 V
SLOPE: 331.5 FT/MI
ADJ. SLOPE: 274 FT/MI

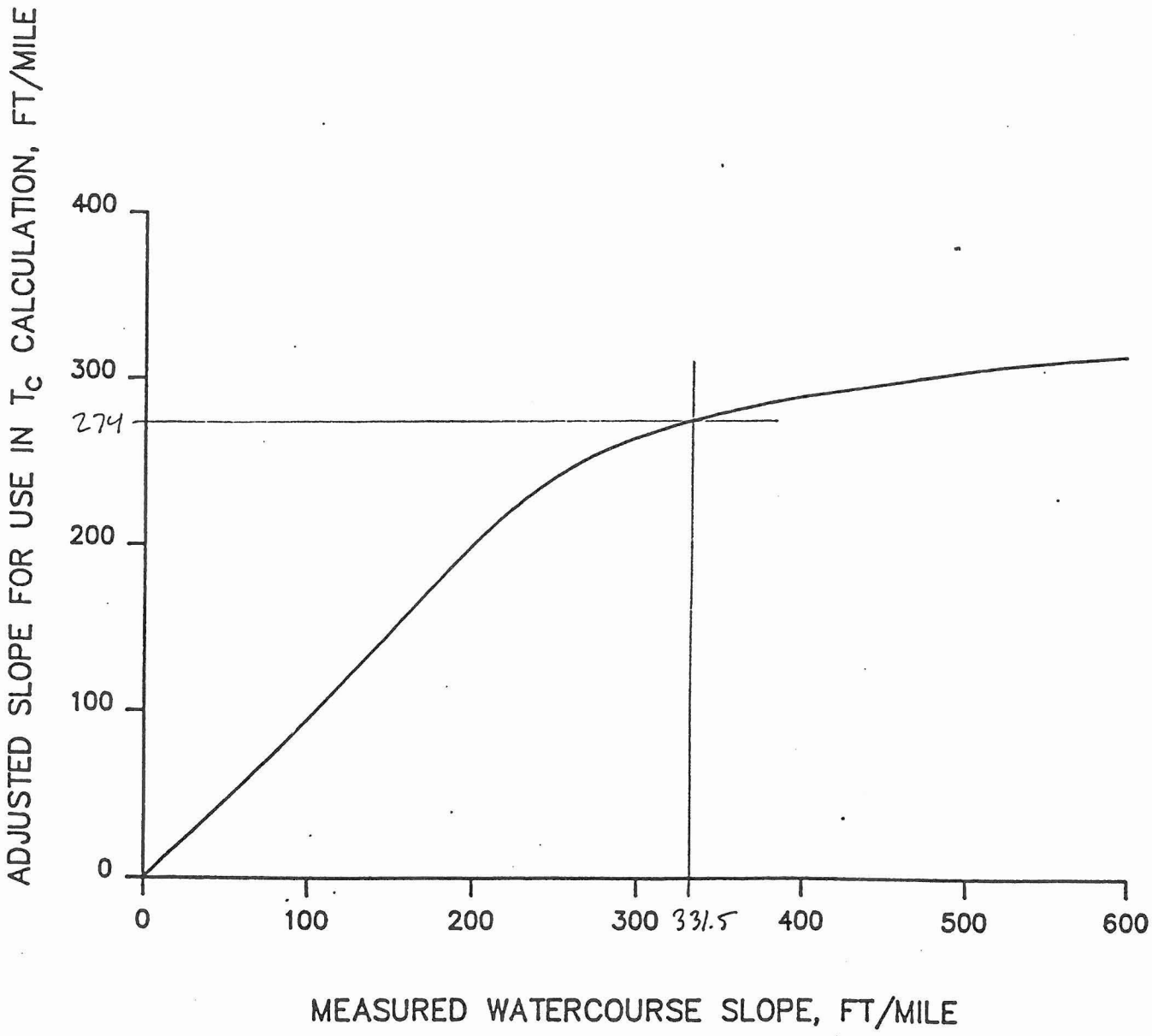


Figure 5.4
Slope Adjustment for Steep Watercourses in Natural Watersheds
(Source: *Drainage Criteria Manual*, Urban Drainage and Flood Control District, Colorado, May 1984.)