LETTER OF MAP REVISION
FOR PETERSON FIELD
DRAINAGE CHANNEL

COLORADO SPRINGS, COLORADO
EL PASO COUNTY

JUNE, 1998
Revised OCTOBER, 1998
Revised JANUARY, 1999
Revised MAY, 1999

Prepared for:
Colorado Springs Engineering Division
30 S. Nevada Avenue
P.O. Box 1575
Colorado Springs, CO 80901

Prepared by:
URS Greiner, Inc.
8415 Explorer Drive, Suite 110
Colorado Springs, CO 80920

URSG Project No. 6742167

TRANSMITTAL FORM

URS Greiner Woodward Clyde
8415 Explorer Drive, Suite 110
Colorado Springs, CO 80920
(719) 531-0001
(719) 531-0007 fax

TO: Michael J. Baker
Attn: Ms. Pernille Bush-Pedersen
3601 Eisenhower Avenue, Suite 600
Alexandria Virginia, VA 22304

DATE: 05/06/99

FROM: Ron Sanchez

SUBJECT: **Peterson Field Drainage Channel**
FIRM Letter of Map Revision
Case No. 98-08-372P
City of Colorado Springs, Colorado
URSG Project No. 67-42167.08

REMARKS:

Please find attached one copy of the above referenced LOMR Submittal. We have revised the limits of this study as detailed in the accompanying report. Feel free to dispose of previous revisions of this report as necessary.

If you have further questions feel free to contact me at the number above.

Attachments

Cc: Mike Chaves, City of Colorado Springs
Dan Bunting, Pikes Peak Regional Floodplain Administrator
John Schwab
File: 67.42167

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A Division of URS Corporation

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May 5, 1999

Michael Baker, Jr., Inc.
Attn: Ms. Pernille Buch-Pedersen
3604 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

RE: Petersen Field Drainage Channel - FIRM Letter of Map Revision (LOMR)
Case No. 98-08-372P, City of Colorado Springs, Colorado
URSG Project No. 6742167.08

Dear Ms. Buch-Pedersen,

We have enclosed a copy of the revised LOMR report for the Petersen Field Drainage Channel from Hancock Expressway east to the Colorado Springs Airport boundary. In general, we have modified the limits of the LOMR request, deleting Segment 1 and reducing Segment 2 to match FIS Study Section AA. The limits of our detailed study have been revised to extend from Hancock Expressway east to the Colorado Springs Airport Boundary. The report recommends updating the floodplain limits through this reach to account for channel improvements that have been constructed. The result of the LOMR will be a reduced floodplain area through this reach. We have attempted to address the comments in your review letter dated March 26, 1999, with our response letter enclosed in Appendix B.

Please call if you have any questions or need any additional information.

Sincerely,
URS Greiner, Inc.

Ronald J. Sanchez, P.E
Project Engineer

John P. Schwab, P.E.
Project Manager

cc: Mike Chaves, Colorado Springs City Engineering Division
Dan Bunting, Pikes Peak Regional Floodplain Administrator

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APPENDIX A - LOMR FORMS

Form 1 **Revision Requestor and Community Official Form**

Form 2 **Certification by Registered Professional Engineer and/or Land Surveyor Form**

Form 4 **Riverine Hydraulic Analysis Form**
Channel Profile Drawings
FIS Effective Models
FIS 10, 50, 100, 500 Year Model
Duplicate Effective Floodway Model
Corrected Effective Floodway Model
SFHA Analysis
Segment 2 – HEC-2 Analysis, Section 11858 to 13000 (Subcritical)
Segment 3 – HEC-2 Analysis, Section 13000 to 17150 (Supercritical)
Floodway Analysis
Segment 2 – HEC-2 Analysis, Section 11858 to 13000 (Subcritical)
Segment 3 – HEC-2 Analysis, Section 13000 to 17150 (Supercritical)

Form 5 **Riverine Coastal Mapping Form**
Revised Floodplain Map Drawings (Topographic Work Map)

Form 6 **Channelization Form, Section 11858 to 13000**
Channelization Form, Section 13000 to 17150

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Bridge/Culvert Form, Powers Blvd.
Bridge/Culvert Form, Zeppelin Drive

APPENDIX B - CORRESPONDENCE

APPENDIX C - COMPUTER DISK OF HYDRAULIC MODEL FILES

I. INTRODUCTION

A. Background

The Peterson Field Drainage Channel conveys stormwater flows from a drainage basin of approximately 8.2 square miles with a 100-year flow of 3,738 cfs at the channel's confluence with Sand Creek. Recent construction of concrete channel improvements west of Powers Boulevard has prompted this effort to update the floodplain limits in the study area from Hancock Expressway east to the Colorado Springs Airport Boundary, shown in Figure 1.

Prior to construction of concrete channel improvements, developed flows from the Colorado Springs Airport resulted in potential flood inundation of significant downstream areas along the Peterson Field Drainage Channel. Numerous existing residences as well as large areas planned for future development are currently located within the 100-year floodplain. The current floodplain limits in this reach are shown in Figure 2.

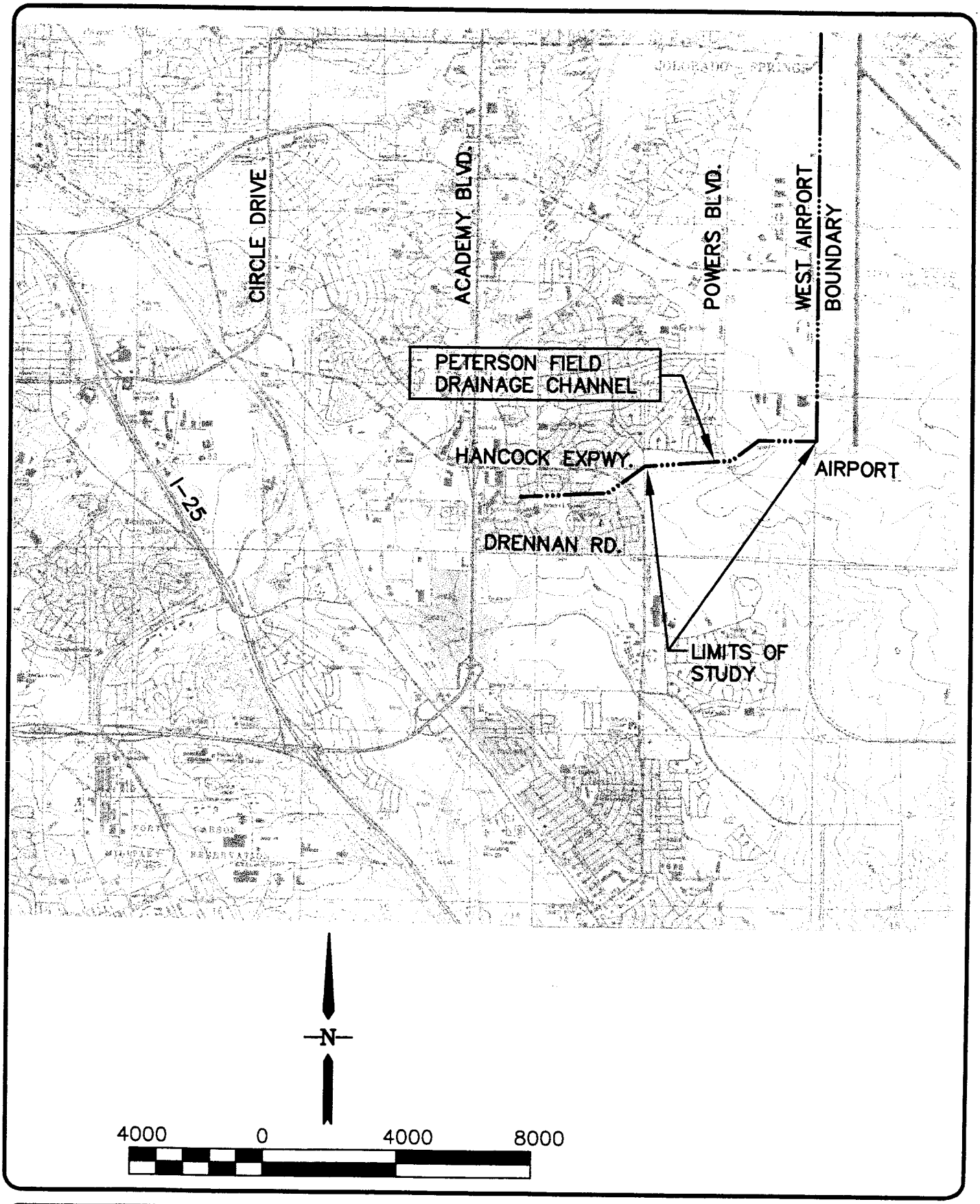
B. Scope

This report has been prepared to justify a Letter of Map Revision (LOMR) updating the floodplain limits along improved segments of the Peterson Field Drainage Channel. The report includes a vicinity map, current FEMA Floodplain Map, and the LOMR forms required for submittal detailing the hydraulic analysis performed in this detailed study. The purpose of this submittal is to provide the analysis and information required to update the delineated FEMA floodplain located along the Peterson Field Drainage Channel from Section AA east of Hancock Expressway to the west boundary of the Colorado Springs Airport.

The analysis in this report will show that the floodplain boundaries delineated on the current Flood Insurance Rate Map (FIRM) are outdated, and should be revised in accordance with the floodplain limits shown in this report.

C. References

- Chow, Ven T., Open Channel Hydraulics, McGraw-Hill, 1988.
- Federal Emergency Management Agency, Flood Insurance Study, Vol. 1, 2, 3, 1992.
- URS Consultants, "Aviation Business Park Filing No. 1", 1985.
- URS Consultants, "Hancock Expressway Extension, Chelton to Powers Drainage Report," 1990.
- URS Consultants, Peterson Field Drainage Basin Master Plan Update, 1984.



SITE MAP

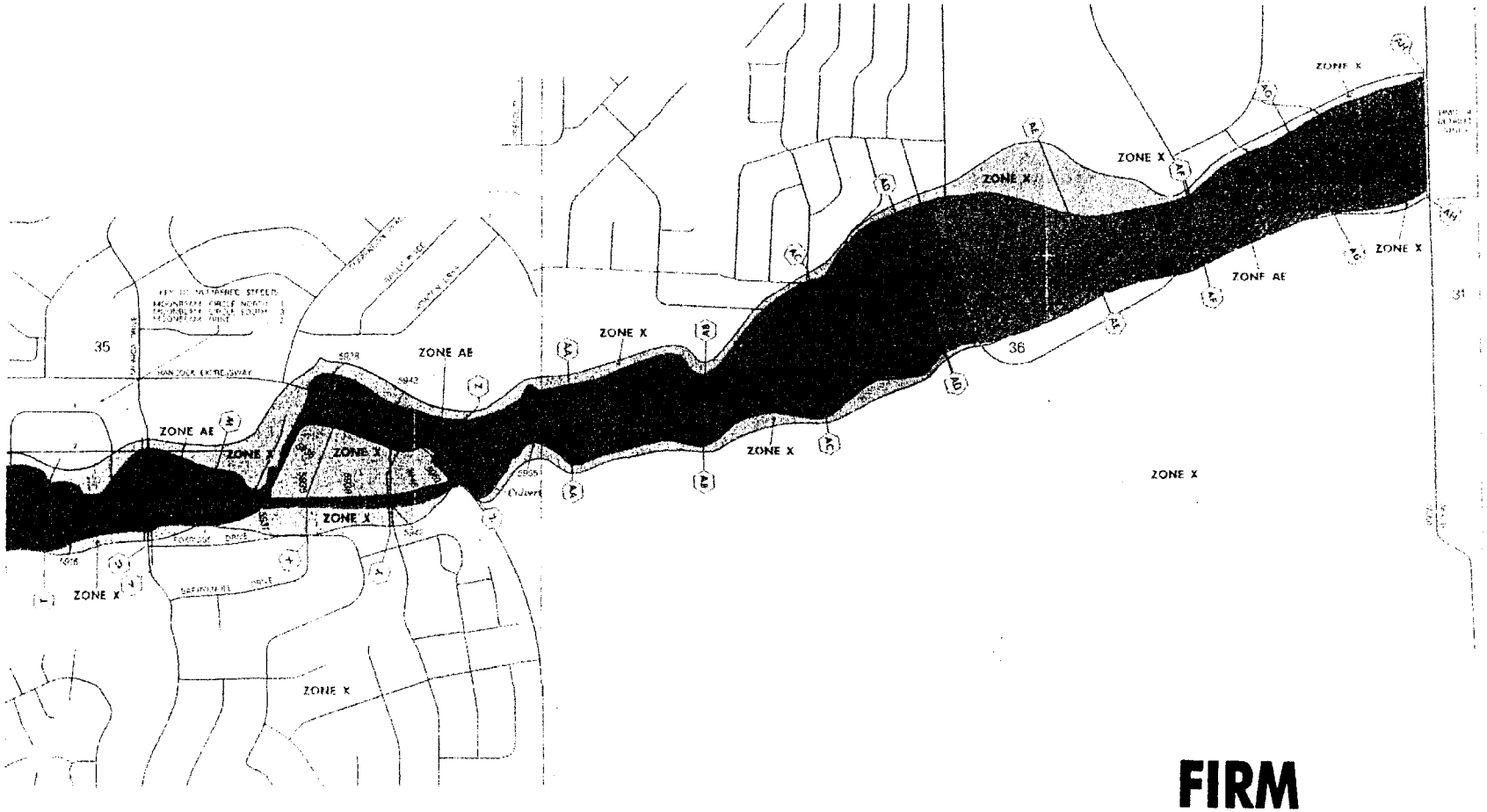
PETERSON FIELD DRAINAGE BASIN LOMR

FIGURE 1

URS Greiner

PROJ NO. 6742167

6742167/CAD\LOMR\SITE_MAP.DWG 10/22/98 MSH



1000 0 1000 2000

APPROXIMATE SCALE IN FEET

MAP NUMBER
08041C0761 F

EFFECTIVE DATE:
MARCH 17, 1997

FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS

URS Greiner

PROJ NO. 67.42167

PETERSON FIELD DRAINAGE BASIN LOMR

HANCOCK EXPRESSWAY EAST TO WEST AIRPORT BOUNDARY

FEMA FIRM MAP

FIGURE

2

- URS Consultants, "Design Report for Powers Boulevard/Hancock Expressway Drainage Channel Outfall", February 1996.

II. HYDROLOGIC ANALYSIS

A hydrologic analysis of this basin was performed in the Peterson Field Drainage Basin Master Plan Update prepared by URS Consultants in 1984. According to the Master Plan, the 100-year design flow at the west boundary of the Colorado Springs Airport is 1,635 cfs. For the purpose of this study, design flows used in the latest Flood Insurance Study (FIS) have been used for consistency. The FEMA design 100-year flows at the upstream and downstream limits of this study are 1,470 cfs and 2,470 cfs, respectively.

III. HYDRAULIC ANALYSIS

The Army Corps of Engineers HEC-2 program was utilized to model the floodplain in this reach of channel. Colorado Springs Facilities Information Management System (FIMS) mapping was used as base topography for the study. Field surveys were performed to verify channel cross-sections and existing culvert crossings.

Our preliminary HEC-2 analysis divided the study area into 3 segments of channel. The preliminary analysis revealed that Segment 1 (from station 64+82 to 109+00) contains several undersized culverts, resulting in the requirement for subcritical modeling of the segment, which matches the current FIRM floodplain limits. Segment 1 was subsequently deleted from the detailed study area.

Segments 2 and 3 consist of the reaches from station 118+58 to 130+00 and station 130+00 to 175+10. These segments contain temporary and permanent channel improvements consisting of grass-lined and concrete-lined trapezoidal and rectangular channel sections. Several multiple box culverts are located along these channel reaches. The box culvert located east of Hancock Expressway at Mason Way was modeled as an open channel due to the extended length of the culvert. Results indicated that design flows through these segments are supercritical, and the improved channel segments have ample capacity available to pass the 100-year flood event.

Segment 2 consists of the reach from station 118+58 to 130+00 and contains temporary channel improvements. This segment is grass-lined throughout with undersized culverts downstream of section 118+58 at Chelton Road and Hancock Expressway. Riprap protection is provided at transition points from culvert to channel flow where scouring may occur. This segment was modeled conservatively as subcritical due to the grass channel lining. Portions of this analysis suggest that supercritical flow may exist. The existing channel section does not contain the 100-year design flow in this reach. Overflow out of the channel follows the floodplain limits as delineated in the current FIS Study at Section AA. Future improvements plan for concrete-lined channel sections with multiple concrete box culverts.

The HY-8 culvert analysis program was used to analyze multiple box culverts located at Powers Boulevard and Zeppelin Drive. Due to the limitations of HEC-2 in the analysis of channels with culverts in supercritical flows, HY-8 tailwater and overtopping water surface levels were used as known water surface levels at the downstream and culvert face, respectively, for the HEC-2 analysis.

Our hydraulic analysis generally indicates that the 100-year design flow is contained within the improved concrete channel segments and culverts in the detailed study area. Existing culverts downstream of the study area crossing Hancock Expressway and Chelton Road are under-sized according to this analysis. The LOMR forms in the appendix contain the detailed hydraulic analysis of the floodplain.

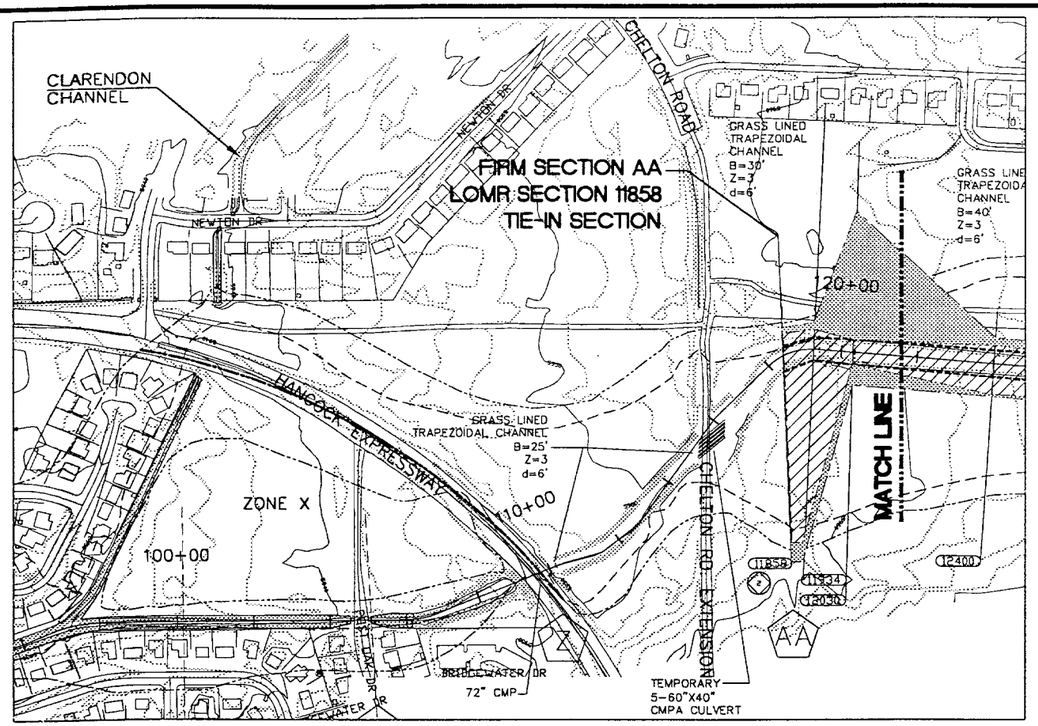
IV. FLOODPLAIN IMPACT

Our analysis indicates that the current FEMA floodplain delineation in this area is more conservative than necessary due to the extensive channel improvements implemented from Hancock Expressway east to the Airport boundary. The HEC-2 analysis enclosed in this report indicates that the floodplain width of spread is narrower in the areas where channel improvements have been constructed. These findings are detailed in the LOMR forms in the appendices.

V. CONCLUSIONS

We are requesting a Letter of Map Revision to the floodplain that currently traverses this reach of the Peterson Field Channel to reflect the findings of our analysis. Our analysis identifies in detail the location of the revised floodplain boundary, and the enclosed floodplain maps show the revised floodplain limits.

PETERSON FIELD DRAINAGE BASIN REVISED FLOODPLAIN MAP



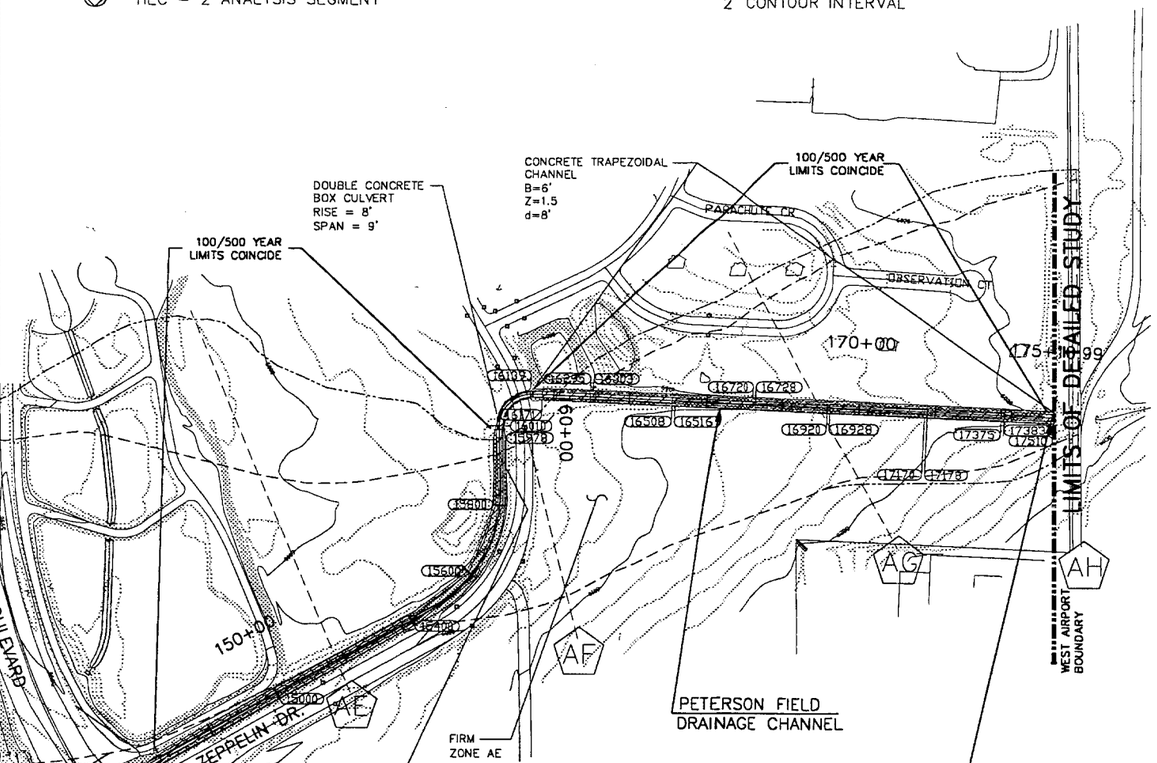
LEGEND

- FIRM ZONE AE
- FIRM ZONE X
- Y — FIRM SECTION ID
- 7070 — LOMR SECTION ID
- LOMR FLOODPLAIN BOUNDARY, ZONE AE
- LOMR FLOODPLAIN BOUNDARY, ZONE X
- LOMR FLOODWAY BOUNDARY
- EXISTING BLDG.
- HEC – 2 ANALYSIS SEGMENT

N

200 0 200 400

2' CONTOUR INTERVAL



SURVEY CONTROL			
BM 1	FIMS	FX35	N = 1346038.738 E = 3222420.968
BM 2	FIMS	DH1	N = 1346253.915 E = 3217053.786

DATUM = NGVD1929

BM 1
NTS

FIGURE 3
SEGMENT 2–3

URS Greiner

City of Colorado Springs

LETTER OF MAP REVISION
HANCOCK EXPRESS WY.
TO AIRPORT BOUNDARY

No.	REVISION	BY	DATE
1	LOMR SUBMITTAL	RJS	6/18/98
2	REVISED LOMR SUBMITTAL NO.2	RJS	10/23/98
3	REVISED LOMR SUBMITTAL NO.3	RJS	01/21/99
4	REVISED LOMR SUBMITTAL NO.4	RJS	5/03/99

SURVEY INFO. DATE:
BENCH MARK: 1. FIMS FX35
2. FIMS DH1

HORZ. SCALE:	AS SHOWN
VERT. SCALE:	N/A
APPROVED:	JPS
PROJECT NO:	6742167
DRAWN:	MSH
CHECKED:	RS
SURVEYED:	N/A
DATE:	01/26/98
SHEET NO:	1 OF 1

6742167/CAD/LOMR/0131995DW1/LOMR1A-2.DWG 01/25/99 MSH

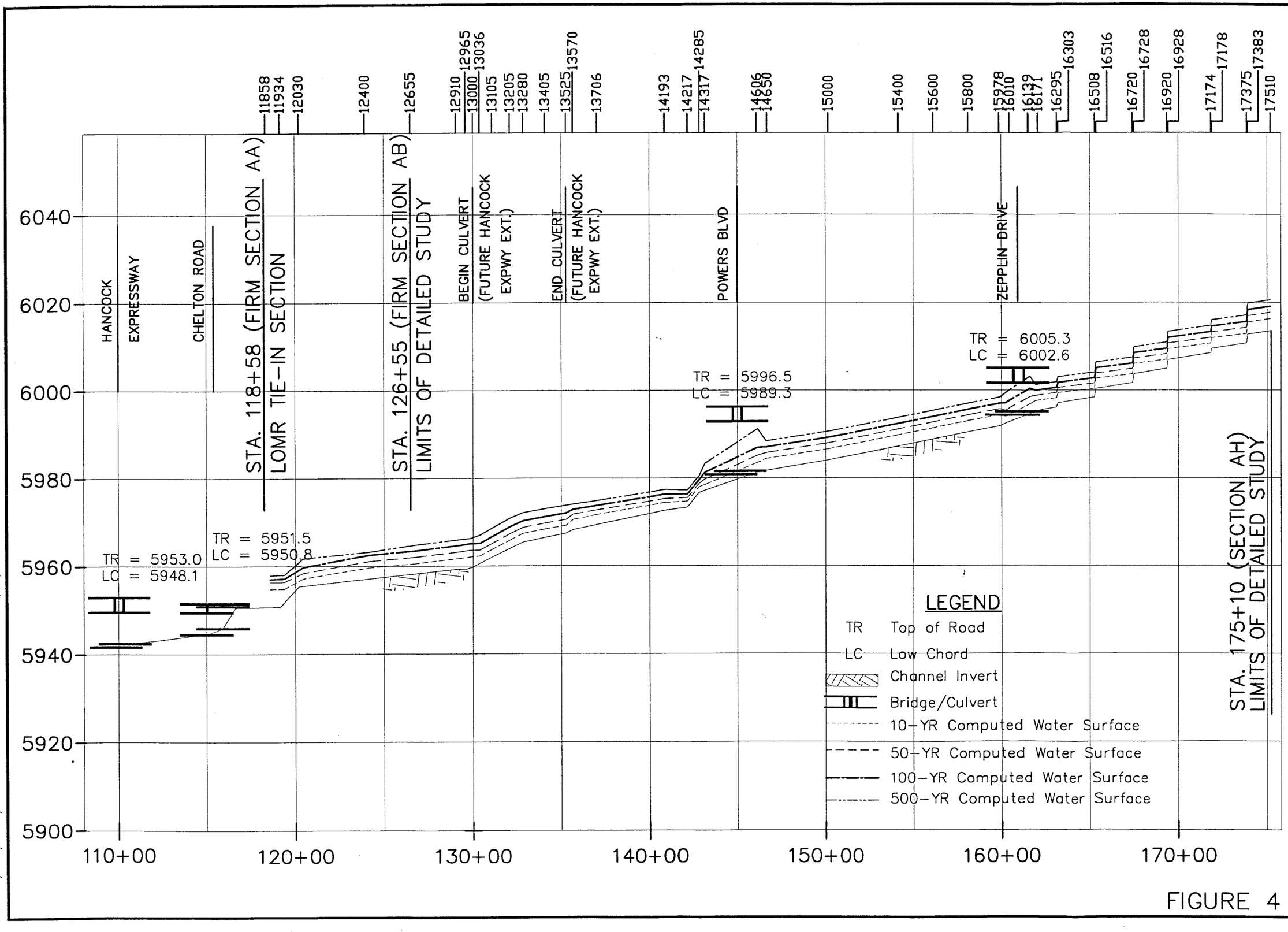


FIGURE 4

PETERSON FIELD DRAINAGE BASIN
REVISED FLOODPLAIN PROFILE

City of Colorado Springs

SECTION 13000 TO 17510
FLOOD PROFILE

No.	REVISION	BY	DATE
1	LOMR SUBMITTAL		6/18/98
2	REVISED LOMR SUBMITTAL-NO.2		10/10/98
3	REVISED LOMR SUBMITTAL-NO.3		1/19/99
4	REVISED LOMR SUBMITTAL-NO.3		5/6/99

SURVEY INFO

URS Greiner

HORZ. SCALE:	1"=500'
VERT. SCALE:	1"=20'
PROJECT NO:	6742167
SHEET NO:	1 OF 1
DRAWN:	RS
CHECKED:	JPS
SURVEYED:	N/A
DATE:	10/10/98

6742167/CAD/LOMR/PRFSP4E1.DWG RJS 01/19/99

APPENDIX A

LOMR FORMS

FORM 1

FEDERAL EMERGENCY MANAGEMENT AGENCY REVISION REQUESTOR AND COMMUNITY OFFICIAL FORM	O.M.B. Burden No. 3067-0148 Expires July 31, 1997	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 2.13 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067-0148), Washington, DC 20503.

1. OVERVIEW

1. The basis for this revision request is (are): *(check all that apply)*
   - ☒ Physical change
     - ☒ Existing
     - ☐ Proposed
   - ☐ Improved methodology
   - ☐ Improved data
   - ☒ Floodway revision
   - ☐ Other _____

   Explain _____
2. Flooding Source: Peterson Field Drainage Basin
3. Project Name/Identifier: Peterson Field Drainage Basin LOMR
4. FEMA zone designations affected: AE, X
   (example: A, AH, AO, A1-A30, A99, AE, V, V1-30, VE, B, C, D, X)
5. The NFIP map panel(s) affected for all impacted communities is (are):

Community No.	Community Name	County	State	Map No.	Panel No.	Effective Date
EX: 480301	Katy,City	Harris, Fort Bend	TX	480301	0005D	02/08/83
480287	Harris County	Harris	TX	48201C	0220G	09/28/90
080060	Colorado Springs, City of	El Paso	CO	08041C0742F	0742F	03/17/97
080060	Colorado Springs, City of	El Paso	CO	08041C0761F	0761F	03/17/97

6. The area of revision encompasses the following types of flooding, structures, and associated disciplines: *(check all that apply)*

Types of Flooding
- ☐ Riverine
- ☐ Coastal
- ☐ Alluvial Fan
- ☐ Shallow Flooding *(e.g. Zones AO and AH)*
- ☐ Lakes

Affected by wind/wave action
- ☐ Yes
- ☒ No

Structures
- ☒ Channelization
- ☐ Levee/Floodwall
- ☒ Bridge/Culvert
- ☐ Dam
- ☐ Coastal
- ☐ Fill
- ☐ Pump Station
- ☐ None
- ☒ Channel Relocation
- ☐ Excavation
- ☐ Other *(describe)*

Disciplines*
- ☒ Water Resources
  - ☐ Hydrology
  - ☒ Hydraulics
  - ☐ Sediment Transport
  - ☐ Interior Drainage
- ☐ Structural
- ☐ Geotechnical
- ☐ Land Surveying
- ☐ Other *(describe)*

☐ Other(describe) _____

* Attach completed "Certification by Registered Professional Engineer and/or Land Surveyor" Form for each discipline checked. (Form 2)

2. FLOODWAY INFORMATION

7. Does the affected flooding source have a floodway designated on the effective FIRM or FBFM? ☒ Yes ☐ No
8. Does the revised floodway delineation differ from that shown on the effective FIRM or FBFM ☒ Yes ☐ No

   If yes, give reason: Channelization has reduced areas inundated during 100 yr. event

Attach copy of either a public notice distributed by the community stating the community's intent to revise the floodway or a statement by the community that it has notified all affected property owners and affected adjacent jurisdictions.

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

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

3. PROPOSED ENCROACHMENTS

10. With floodways:

1A. Does the revision request involve fill, new construction, substantial improvement, or other development in the floodway? ☒ Yes ☐ No

1B. If yes, does the development cause the 100-year water surface elevation to increase at any location by more than 0.000 feet? ☐ Yes ☒ No

11. Without floodways:

2A. Does the revision request involve fill, new construction, substantial improvement, or other development in the 100-year floodplain? ☒ Yes ☐ No

2B. If yes, does the cumulative effect of all development that has occurred since the effective SFHA was originally identified cause the 100-year water surface elevation to increase at any location by more than one foot *(or other surcharge limit if community or state has adopted more stringent criteria)*? ☐ Yes ☒ No

If the answer to either Items 1B or 2B is yes, please provide documentation that all requirements of Section 65.12 of the NFIP regulations have been met, regarding evaluation of alternatives, notice to individual legal property owners, concurrence of CEO, and certification that no insurable structures are impacted.

4. REVISION REQUESTOR ACKNOWLEDGMENT

12. Having read NFIP Regulations, 44 CFR Ch. I, parts 59, 60, 61, and 72, I believe that the proposed revision ☒ is ☐ is not in compliance with the requirements of the aforementioned NFIP Regulations.

5. COMMUNITY OFFICIAL ACKNOWLEDGMENT

13. Was this revision request reviewed by the community for compliance with the community's adopted floodplain management ordinances? ☒ Yes ☐ No

14. Does this revision request have the endorsement of the community? ☒ Yes ☐ No

If no to either of the above questions, please explain: _____

Please note that community acknowledgment and /or notification is required for all requests as outlined in Section 65.4 (b) of the NFIP Regulations.

6. OPERATION AND MAINTENANCE

15. Does the physical change involve a flood control structure (e.g., levees, floodwalls, channelization, basins, dams)? ☒ Yes ☐ No

If yes, please provide the following information for each of the new flood control structures:

A. Inspection of the flood control project will be conducted periodically by City of Colorado Springs (entity) _____ with a maximum interval of 12 months between inspections.

B. Based on the results of scheduled periodic inspections, appropriate maintenance of the flood control facilities will be conducted by City of Colorado Springs (entity) to ensure the integrity and degree of flood protection of the structure.

C. A formal plan of operation, including documentation of the flood warning system, specific actions and assignments of responsibility by individual name or title, and provisions for testing the plan at intervals not less than one year, ☐ has ☒ has not been prepared for the flood control structure.

D. The community is willing to assume responsibility for ☒ performing ☐ overseeing compliance with the maintenance and operation plans of the Peterson Held Drainage Basin Channel (Name)

flood control structure. If not performed promptly by an owner other than the community, the community will provide the necessary services without cost to the Federal government.

Attach operation and maintenance plans

7. REQUESTED RESPONSE FROM FEMA

16. After examining the pertinent NFIP regulations and reviewing the document entitled "Appeals, Revisions, and Amendments to Flood Insurance Maps: A guide for Community Officials," dated January 1990, this request is for a:

_____a.	CLOMR	A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision *(LOMR or PMR)*, or proposed hydrology changes *(see 44 CFR Ch. I, Parts 60, 65, and 72)*.
X b.	LOMR	A letter from FEMA officially revising the current NFIP map to show changes to floodplains, floodways, or flood elevations. LOMRs typically depict decreased flood hazards. *(See 44 CFR Ch. I Parts 60 and 65.)*
_____c.	PMR	A reprinted NFIP map incorporating changes to floodplains, floodways, or flood elevations. Because of the time and cost involved to change, reprint, and redistribute an NFIP map, a PMR is usually processed when a revision reflects increased flood hazards or large-scope changes. *(See 44 CFR Ch. I, Parts 60 and 65.)*
_____d.	Other:	Describe_____

8. FORMS INCLUDED

17. Form 2 entitled, "Certification By Registered Professional Engineer and/or Land Surveyor" must be submitted.

The following forms should be included with this request if (check the included forms):

• Hydrologic analysis for flooding source differs from that used to develop FIRM	☐ Hydrologic Analysis Form (Form 3)
• Hydraulic analysis for riverine flooding differs from that used to develop FIRM	☒ Riverine Hydraulic Analysis Form (Form 4)
• The request is based on updated topographic information or a revised floodplain or floodway delineation is requested	☒ Riverine /Coastal Mapping Form (Form 5)
• The request involves any type of channel modification	☒ Channelization Form (Form 6)
• The request involves new bridge or culvert or revised analysis of an existing bridge or culvert	☒ Bridge/Culvert Form (Form 7)
• The request involves a new revised levee/floodwall system	☐ Levee/Floodwall System Analysis Form (Form 8)
• The request involves analysis of coastal flooding	☐ Coastal Analysis Form (Form 9)
• The request involves coastal structures credited as providing protection from the 100-year flood	☐ Coastal Structures (Form 10)
• The request involves an existing, proposed, or modified dam	☐ Dam Form (Form 11)
• The request involves structures credited as providing protection from the 100-year flood on an alluvial fan	☐ Alluvial Fan Flooding Form (Form 12)

9. INITIAL REVIEW FEE

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

Initial fee amount: $ _____

Check or money order only. Make check or money order payable to : **National Flood Insurance Program.** If paying by Visa or Mastercard please refer to the credit card information form which follows this form.

or

19. This request is for a project that is for public benefit and is primarily intended for flood loss reduction to insurable structures in identified flood hazard areas which were in existence prior to the commencement of construction of the flood control project. ☒ Yes ☐ No

or

20. This request is to correct map errors, to include the effects of natural changes within the areas of special flood hazard, or solely to provide more detailed data. ☐ Yes ☐ No

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

Michael A Chaves
Signature of Revision Requester

Michael A. Chaves Project Manager
Printed Name and Title of Revision Requester

City of Colorado Springs
Company Name

719 385-5408 6/19/98
Telephone No. Date

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

Signature of Community Official

Dan Bunting
Regional Floodplain Administration
Printed Name and Title of Community Official

City of Colorado Springs
Community Name

6-18-98
Date

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

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

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

CITY OF COLORADO SPRINGS

PUBLIC WORKS
City Engineering

January 29, 1999

Michael Baker Jr., Inc.
Attn: Ms. Pernille Buch-Pedersen
3601 Eisenhower Avenue, Suite 600
Alexandria, VA 22304

Subject: **Petersen Field Drainage Channel**
FIRM Letter of Map Revision
Case No. 98-08-372P
City of Colorado Springs, Colorado
URSG Project No. 67-42167.08

Dear Ms. Buch-Pedersen:

The purpose of this letter is to acknowledge the City's awareness of the continued erosion potential along the temporary grass-lined segment of channel from station 11+015 to station 13+000 (Segment 2 of the LOMR study area). Prior to the recent upstream channel improvement project, flows ran unconfined in this area. There are no insurable structures located near the channel along this unimproved segment.

The drainage basin study for this area calls for the remaining channel segment to be concrete lined in the future. No development within the current floodplain limits will be allowed without construction of the planned channel improvements. These improvements will be the responsibility of the developers of the adjacent land. If no development occurs for several years, the remaining unimproved section may become a funded City construction project in the future. The developer or City will apply for another LOMR within 6 months of completing the remaining concrete channel improvements, as specified in Section 65.3 of the NFIP regulations.

The City will maintain the temporary channel, as it deems necessary, until the ultimate channel improvements are constructed. In the event that the base flood would occur, the City acknowledges the risk of channel scouring and erosion due to excessive velocities in the grass-lined channel. The City understands that channel repairs may be necessary if a base flood occurs prior to the completion of permanent channel improvements.

Sincerely,

Mike Chaves

Mike Chaves
Project Manager,
Colorado Springs Engineering Division

cc: Dan Bunting, Pikes Peak Regional Floodplain Administrator

30 S. Nevada Ave., Suite 403 • TEL 719-385-5918 FAX 719-578-6216
Mailing Address: Post Office Box 1575, Mail Code 435 • Colorado Springs, Colorado 80901-1575

URS Greiner, Inc.
8415 Explorer Drive, Suite 110
Colorado Springs, Colorado 80920
Telephone: (719) 531-0001
Facsimile: (719) 531-0007
Offices in Principal Cities Nationwide

URS Greiner

June 19, 1998

Larry Lang
Colorado Water Conservation Board
1313 Sherman Street Room 721
Denver, CO 80203

Re: Peterson Field Drainage Basin Letter of Map Revision (LOMR)
URSG Project No. 67.42167.08

Dear Larry:

As requested by the Community Floodplain Administrator, Dan Bunting, this letter is to inform you that the attached list of property owners have been notified of the proposed changes to the Flood Insurance Rate Map (FIRM) for the Peterson Field Drainage Basin. These properties are within proximity to the existing FIRM map and thus require notification.

Generally, the updated Floodplain Study reduces the floodplain limits to account for concrete channel improvements in this area. The reduced floodplain will benefit many of the properties in this area. Please call if you have any questions or comments.

Sincerely,

URS Greiner, Inc.

Ronald J. Sanchez, E.I.T.
Project Engineer

Enclosure
Cc: John Schwab (No Attachments)
Dan Bunting (No Attachments)
Mike Chaves (No Attachments)
67.42167-Coor Out

URS Greiner, Inc.
8415 Explorer Drive, Suite 110
Colorado Springs, Colorado 80920
Telephone: (719) 531-0001
Facsimile: (719) 531-0007
Offices in Principal Cities Nationwide

URS Greiner

February 27, 1998

«Owner»
«OwnerAddress»
«City»,«State»,«Zip»

Re: Peterson Field Drainage Basin Letter of Map Revision (LOMR)

Dear Property Owner:

This letter is to notify you of pending revisions to the Flood Insurance Rate Map (FIRM) for the Peterson Field Drainage Basin. Your property is within proximity of the detailed floodway study and thus requires notification of any revisions to the floodway boundaries. This notification pertains to the following property:

Parcel No: «Parcel»

Address/Location: «Address»

Owner: «Owner»

Owner Address: «OwnerAddress»
«City»,«State» «Zip»

Generally, the updated Floodplain Study reduces the floodplain limits to account for concrete channel improvements in this area. The reduced floodplain limit will benefit many of the properties in this area, as shown in the attached figure. Please call if you have any questions or comments.

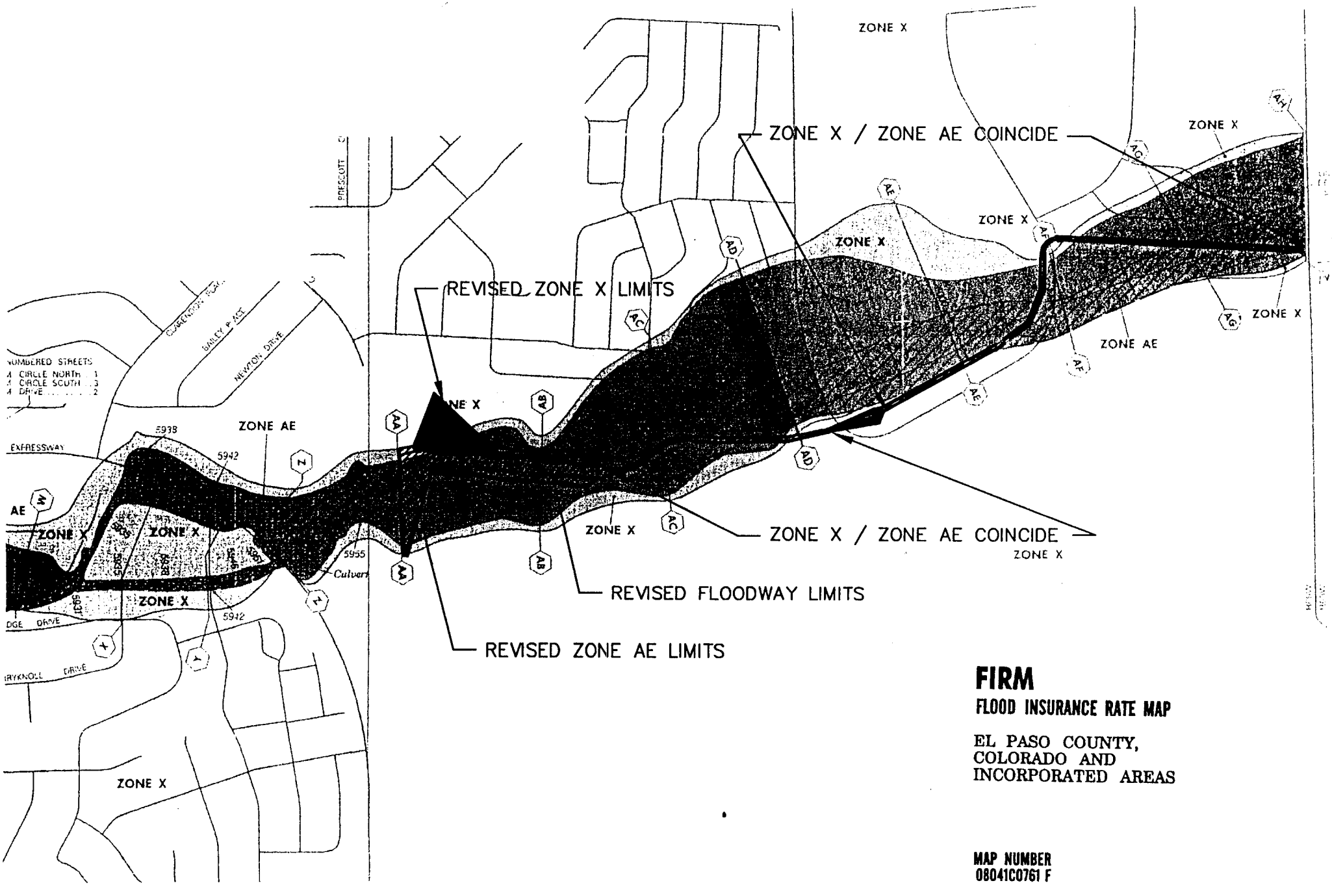
Sincerely,

URS Greiner, Inc.

Ron Sanchez
Project Engineer

Enclosure
Cc: File 67.42167

«No»
F:\CAD\lomr\LOMR_notice.doc



FIRM

FLOOD INSURANCE RATE MAP

EL PASO COUNTY,
COLORADO AND
INCORPORATED AREAS

MAP NUMBER
08041C0761 F

EFFECTIVE DATE:
MARCH 17, 1997

FORM 2

FEDERAL EMERGENCY MANAGEMENT AGENCY

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR FORM

O.M.B. Burden No. 3067-0148
Expires July 31, 1997

FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average . 23 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing and reviewing the form. Send comments regarding the accuracy of the burden estimate and any suggestions for reducing this burden, to: Information Collections Management, Federal Emergency Management Agency, 500 C Street, S.W., Washington, DC 20472; and to the Office of Management and Budget, Paperwork Reduction Project (3067- 0148), Washington, DC 20503.

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

2. I am licensed with an expertise in Water Resources (Hydraulics)
[example: water resources *(hydrology, hydraulics, sediment transport, interior drainage)** structural, geotechnical, land surveying.]

3. I have 6 years experience in the expertise listed above.

4. I have ☐ prepared ☒ reviewed the attached supporting data and analyses related to my expertise.

5. I ☒ have ☐ have not visited and physically viewed the project.

6. In my opinion, the following analyses and /or designs, is/are being certified:

Hydraulic analysis of flood control structures in the Peterson Field Drainage Basin

7. Base upon the following review, the modifications in place have been constructed in general accordance with plans and specifications.

Basis for above statement: (check all that apply)

a. ☐ Viewed all phases of actual construction.

b. ☐ Compared plans and specifications with as-built survey information.

c. ☒ Examined plans and specifications and compared with completed projects(where available

d. ☐ Other _____

8. All information submitted in support of this request is correct to the best of my knowledge. I understand that any false statement may be punishable by fine or imprisonment under Title 18 of the United States Code, Section 1001.

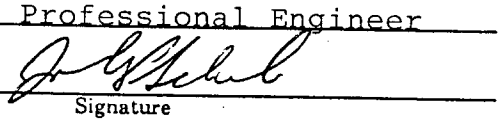
Name: John Schwab
(please print or type)

Title: Project Manager
(please print or type)

Registration No. 29891 Expiration Date: 7-31-98

State Colorado

Type of License Professional Engineer


Signature

6/18/98
Date

Seal
(Optional)

*Specify Subdiscipline

Note: Insert not applicable (N/A) when statement does not apply.

FORM 4

For areas which have detailed flooding:

Full input and output listings along with files on diskette (if available) for each of the models listed below (items 1, 2, 3, 4, and 5) and summary of the source of input parameters used in the models must be provided. The summary must include a complete description of any changes made from model to model (e.g. duplicate effective model to corrected effective model) At a minimum, the Duplicate Effective (item 1) and the Revised or Post-Project Conditions (item 4) models must be submitted. See instructions for directions on when other models may be required.

For areas which do not have detailed flooding:

Only the 100-year flood profile is required. A hydraulic model is not required for areas which do not have detailed flooding; however, BFEs may not be added to the revised FIRM. If a hydraulic model is developed for the area, items 3 and 4 described below must be submitted.

If hydraulic models are not developed, hydraulic analyses for existing or pre-project conditions and revised or post-project conditions must be submitted. All calculations must be submitted for these analyses. (See item 6 below)

1. Duplicate Effective Model — Natural ☒ Floodway ☒

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

2. Corrected Effective Model — Natural ☒ Floodway ☒

The corrected effective model is the model that corrects any errors that occur in the duplicate effective model, adds any additional cross sections to the duplicate effective model, or incorporates more detailed topographic information than that used in the currently effective model. The corrected effective model must not reflect any man-made physical changes since the date of the effective model. An error could be a technical error in the modeling procedures, or any construction in the floodplain that occurred prior to the date of the effective model but was not incorporated into the effective model.

3. Existing or Pre-Project Conditions Model — Natural ☐ Floodway ☐

The duplicate effective or corrected model is modified to produce the existing or pre-project conditions model to reflect any modifications that have occurred within the floodplain since the date of the effective model but prior to the construction of the project for which the revision is being requested. If no modification has occurred since the date of the effective model, then this model would be identical to the corrected effective or duplicate effective model.

4. Revised or Post-Project Conditions Model — Natural ☒ Floodway ☒

The existing or pre-project conditions model *(or duplicate effective or corrected effective model, as appropriate)* is revised to reflect revised or post-project conditions. This model must incorporate any physical changes to the floodplain since the effective model was produced as well as the effects of the project. When the request is for proposed project this model should reflect proposed conditions.

5. Other: Please attach a sheet describing all other models submitted. — Natural ☐ Floodway ☐

6. Hydraulic Analyses (Only if Hydraulic Models are not developed)

Please attach all calculations for the existing or pre-project conditions and the revised or post-project conditions. Proceed to Form 5, "Riverine/Coastal Mapping Form".

FEDERAL EMERGENCY MANAGEMENT AGENCY **RIVERINE HYDRAULIC ANALYSIS FORM**	*O.M.B. Burden No. 3067-0148* *Expires July 31, 1997*	FEMA USE ONLY

PUBLIC BURDEN DISCLOSURE NOTICE

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

Community Name: City of Colorado Springs

Flooding Source: Peterson Field Drainage Basin
(One form for each flooding source)

Project Name/Identifier: Peterson Field Drainage Basin LOMR

1. REACH TO BE REVISED

Downstream limit: Section AB (12655)

Upstream limit: Section AH (17510)

2. EFFECTIVE FIS

☐ Not studied

☐ Studied by approximate methods

Downstream limit of study _____

Upstream limit of study _____

☒ Studied by detailed methods

Downstream limit of study Section AA

Upstream limit of study Section AH

☐ Floodway delineated

Downstream limit of Floodway Section AA

Upstream limit of Floodway Section AH

3. HYDRAULIC ANALYSIS

Why is the hydraulic analysis different from that used to develop the FIRM. *(Check all that apply)*

☐ Not studied in FIS

☐ Improved hydrologic data/analysis. Explain: _____

☒ Improved hydraulic analysis. Explain: Hydraulic analysis incorporates improvements to floodway and supercritical flow analysis used in permanent channel sections constructed of reinforced concrete.

☒ Flood control structure. Explain: Drainage channel between reach to be revised has been improved with concrete lined channel from section AB to AH. Temporary grass lined channel has been constructed between section Z and AB

☐ Other. Explain: _____

4. MODEL PARAMETERS *(from model used to revise 100-year water surface elevation)*

1. Discharges:

	Upstream Limit	Downstream Limit
10-year	360	600
50-year	820	1370
100-year	1470	2470
500-year	2440	4087

Attach diagram showing changes in 100-year discharge

2. Explain how the starting water surface elevations were determined Starting water surface elevation was determined by calculating normal or critical depth at the starting cross-section and respective flow.

3. Give range of friction loss coefficients (*Manning's "N"*) Channel ..... .013-.04

Overbanks ..... .013-.040

If friction loss coefficients are different anywhere along the revised reach from those used to develop the FIRM, give location, value used in the effective FIS, and revised values and an explanation as to how the revised values were determined.

Location	FIS	Revised
Section AA to AH	.035-.04	.013-.04

Explain: Loss coefficients used are typical values for concrete, riprap and grass lined channels and surfaces.

4. Describe how the cross section geometry data were determined *(e.g., field survey, topographic map, taken from previous study)* and list cross sections that were added.

Cross-section geometry was obtained from City of Colorado Springs supplied topographic mapping, available as-built construction drawings, field survey and measurements.

5. Were natural channel banks selected as the location of the left and right channel banks in the model?

☒ Yes ☐ No If no, explain why not:

6. Explain how reach lengths for channel and overbanks were determined:

Reach lengths were determined by distances between cross-section. Lengths for Left and Right overbank distances generally following along the overbank. Center reach lengths were typically obtained from flowline of existing floodplain or center line of channel.

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

1. Do the results indicate:

a. Water surface elevations higher than end points of cross sections? ☐ Yes ☒ No

b. Supercritical depth? ☒ Yes ☐ No

c. Critical depth? ☒ Yes ☐ No

d. Other unique situations ☒ Yes ☐ No

If yes to any of the above, attach an explanation that discusses the situation and how it is presented on the profiles, tables, and maps.

See report narrative.

2. What is the maximum change in energy gradient between cross-sections? 16.1 ft.

Specify location 14317 to 14285

3. What is the distance between the cross-sections in 2 above? 32.4 ft.

4. What is the maximum distance between cross-sections? 378 ft.

Specify location 12030 to 12400

5. Floodway determination

a. What is the maximum surcharge allowed by the community or State? 1.0 foot

b. What is the maximum surcharge for the revised conditions? 0.1 foot

Specify location 11934

c. What is the maximum velocity? 39.3 fps

Specify location 14217/14285

d. Are there any negeative surcharge values at any cross-section? ☐ Yes ☒ No

If yes, the floodway may need to be widened. If it is not widened, please explain and indicate the maximum negative surcharge.

Explain:

6. Is the discharge value used to determine the floodway anywhere different from that used to determine the natural 100-year flood elevations? ..... ☐ Yes ☒ No

If Yes, explain:

_____

_____

_____

7. Do 100-year water surface elevations increase at any location? ..... ☐ Yes ☒ No

If yes, please attach a list of the locations where the increases occur, state whether or not the increases are located on the requestor's property, and provide an explanation of the reason for the increases. *(For example: State if the increase is due to fill placed within the floodway fringe or placed within the currently adopted floodway limits)*

_____

_____

_____

Please attach a completed comparison table entitled: Water Surface Elevation Check (See page 6)

6. REVISED FIRM/FBFM AND FLOOD PROFILES

A. The revised water surface elevations tie into those computed by the effective FIS Model *(10-, 50-, 100-, and 500-year)*, downstream of the project at cross-section AA within -0.50 feet *(vertical)* and upstream of the project at cross section AH within -6.0 feet *(vertical)*.

B. The revised floodway elevations tie into those computed by the effective FIS model, dowstream of the project at cross section AA within -0.50 feet *(vertical)* and upstream of the project at cross section AH within -6.7 feet *(vertical)*.

C. Attach profiles, at the same vertical and horizontal scale as the profiles in the effective FIS report, showing stream bed and profiles of all floods studied (without encroachment). Also, label all cross sections, road crossings (including low chord and top-of-road data), culverts, tributaries, corporate limits, and study limits. If channel distance has changed, the stationing should be revised for all profile sheets.

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

Proceed to Riverine /Coastal Mapping Form

FEDERAL EMERGENCY MANAGMENT AGENCY

WATER SURFACE ELEVATION CHECK

COMMUNITY NAME: Colorado Springs, City of

FLOODIND SOURCE: Peterson field Drainage Basin

PROJECT NAME /IDENTIFIER: Peterson Field Drainage BASIN LOMR

	EFFECTIVE			DUPLICATE EFFECTIVE			CORRECTED EFFECTIVE			EXISTING/PRE-PROJECT			REVISED/PROJECT		
SECNO	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]	NCWSEL[1]	FCWSEL[2]	SURC.[3]
~~Z~~	~~5951.2~~	~~5951.9~~	0.7	~~5951.2~~	~~5952.0~~	~~0.8~~	~~5951.4~~	~~5952.1~~	0.7				~~5948.7~~	~~5948.7~~	~~0.0~~
AA	5957.5	5958.0	0.5	5957.4	5957.1	-0.3	5957.4	5957.9	0.5				5957.0	5957.0	0.0
AB	5967.4	5968.3	0.9	5967.5	5968.6	1.1	5967.5	5968.4	0.9				5963.4	5963.4	0.0
AC	5979.4	5979.8	0.4	5979.4	5979.6	0.2	5979.4	5979.8	0.4				(5971.8)	(5971.8)	0.0
AD	5988.3	5989.1	0.8	5988.3	5989.2	0.9	5988.3	5989.1	0.8				(5978.0)	(5978.0)	0.0
AE	5999.8	6000.8	1.0	5999.8	5999.8	0.0	5999.2	6000.2	1.0				(5990.8)	(5990.8)	0.0
AF	6006.7	6007.4	0.7	6006.7	6007.3	0.6	6006.7	6007.4	0.7				5997.1	5997.1	0.0
AG	6016.0	6016.7	0.7	6016.0	6016.7	0.7	6016.1	6016.8	0.7				(6007.4)	(6007.4)	0.0
AH	6025.1	6025.8	0.7	6025.1	6025.7	0.6	6025.1	6025.8	0.7				6019.1	6019.1	0.0

COMMENTS:

1) Duplicate Effective Model Results are based on actual data. PROVIDEDED BY FEMA.

2) CORRECTED EFFECTIVE Model was CORRECTED TO MATCH FIS STUDY BY modifying Floodway Encroachment station.

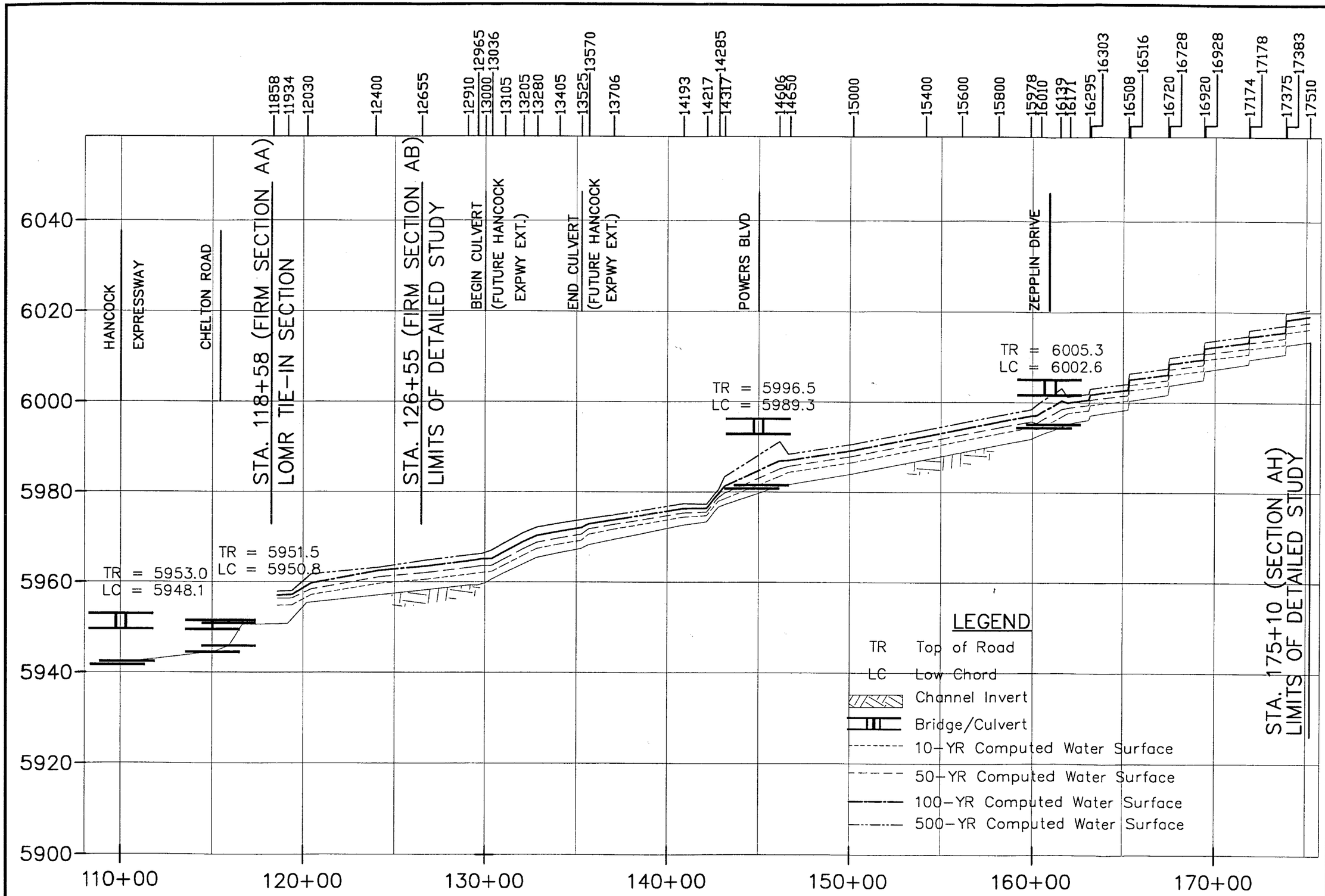
1-100-year (natural) Water Surface Elevation

2-Encroachment (floodway) Water Surface Elevation

3-Surcharge Value

Include all cross sections in the models between tie-in points. Any interpolated values should be indicated in parentheses.

PETERSON FIELD DRAINAGE BASIN
REVISED FLOODPLAIN PROFILE



No.	REVISION	BY	DATE
1	LOMR SUBMITTAL		6/18/98
2	REVISED LOMR SUBMITTAL-NO.2		10/10/98
3	REVISED LOMR SUBMITTAL-NO.3		1/19/99
4	REVISED LOMR SUBMITTAL-NO.3		5/6/99

SURVEY INFO

DATE

City of Colorado Springs

SECTION 13000 TO 17510
FLOOD PROFILE

HORZ. SCALE:	1"=500'
VERT. SCALE:	1"=20'
PROJECT NO:	6742167
SHEET NO:	1 OF 1
DRAWN:	RS
CHECKED:	JPS
SURVEYED:	N/A
DATE:	10/10/98

URS Greiner

6742167/CAD/LOMR/PRFSP4E1.DWG RJS 01/19/99

Duplicate Effective

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
Y 18.000	50.	213.	11.8	5941.7	5941.7	.0
Z 19.000	261.	433.	5.7	5952.0	5951.2	.8
19.100	261.	1101.	2.2	5954.5	5954.5	.0
AA 20.000	146.	303.	8.1	5957.1	5957.4	-.3
AB 21.000	155.	349.	7.1	5968.6	5967.5	1.1
AC 22.000	172.	320.	7.7	5979.6	5979.4	.2
AD 23.000	284.	407.	3.6	5989.2	5988.3	.9
AE 24.000	812.	385.	3.8	5999.8	5999.8	.0
AF 25.000	207.	316.	4.6	6007.3	6006.7	.6
AG 26.000	208.	272.	5.4	6016.7	6016.0	.7
AH 27.000	257.	314.	4.7	6025.7	6025.1	.6

END OF OUTPUT

CORRECTED EFFECTIVE

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
Y 18.000	50.	213.	11.8	5941.8	5941.8	.0
Z 19.000	230.	391.	6.3	5952.1	5951.4	.7
19.100	261.	1103.	2.2	5954.5	5954.5	.0
AA 20.000	57.	219.	11.3	5957.9	5957.4	.5
AB 21.000	230.	490.	5.0	5968.4	5967.5	.9
AC 22.000	172.	348.	7.1	5979.8	5979.4	.4
AD 23.000	284.	374.	3.9	5989.1	5988.3	.8
AE 24.000	145.	212.	6.9	6000.2	5999.2	1.0
AF 25.000	245.	383.	3.8	6007.4	6006.7	.7
AG 26.000	130.	206.	7.1	6016.8	6016.1	.7
AH 27.000	275.	357.	4.1	6025.8	6025.1	.7

END OF OUTPUT

Revised Project

SUMMARY PRINTOUT TABLE 200 : PETERSON FIELD DRAINAGE BASIN LOMR
---------- SECT.11858/13000/SBCRT/ FWSP4E2.*
67.42167.08

Profile Number 2

	Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)
AA	- 11858.000	60.	324.	7.6	5957.0	5957.0	.0
	11934.000	60.	316.	7.8	5957.2	5957.1	.1
	12030.000	66.	232.	10.6	5959.7	5959.7	.0
	12400.000	70.	311.	7.9	5962.5	5962.5	.0
AB	- 12655.000	70.	301.	8.2	5963.4	5963.4	.0
	12910.000	71.	311.	8.0	5964.7	5964.7	.0
	12965.000	73.	340.	7.3	5965.1	5965.1	.0
	13000.000	70.	306.	8.1	5965.1	5965.1	.0

Revised/Project

SUMMARY PRINTOUT TABLE 200 : PETERSON FIELD DRAINAGE BASIN LOMR
---------- SECT.13000/17150 SPRCRIT/FWSP4E3.*
67.42167.08

Profile Number 2

Cross-Section Number	Floodway Width (ft)	Floodway Section Area (sq ft)	Floodway Mean Velocity (ft/s)	W. S. Elevation with Floodway (ft MSL)	W. S. Elevation without Floodway (ft MSL)	W. S. Elevation Diffrence (ft)	
17510.000	23.	81.	18.2	6019.1	6019.1	.0	AH
17383.000	23.	80.	18.3	6018.3	6018.3	.0	
17375.000	21.	65.	22.5	6015.6	6015.6	.0	
17178.000	21.	69.	21.4	6014.6	6014.6	.0	
17174.000	20.	64.	23.1	6013.3	6013.3	.0	
16928.000	21.	68.	21.6	6012.0	6012.0	.0	
16920.000	20.	59.	24.9	6009.5	6009.5	.0	
16728.000	20.	63.	23.2	6008.5	6008.5	.0	
16720.000	19.	56.	26.1	6006.2	6006.2	.0	AG
16516.000	20.	61.	24.0	6005.1	6005.1	.0	
16508.000	19.	55.	26.8	6002.8	6002.8	.0	
16303.000	20.	60.	24.5	6001.7	6001.7	.0	
16295.000	19.	57.	25.8	6000.6	6000.6	.0	
16171.000	20.	60.	24.5	5999.9	5999.9	.0	
16139.000	19.	105.	14.0	6000.4	6000.4	.0	
16010.000	19.	82.	17.9	5997.1	5997.1	.0	AF
15978.000	21.	71.	20.7	5997.0	5997.0	.0	
15800.000	22.	71.	20.7	5995.6	5995.6	.0	
15600.000	21.	71.	20.7	5994.0	5994.0	.0	
15400.000	21.	71.	20.7	5992.4	5992.4	.0	AE
15000.000	22.	71.	20.7	5989.2	5989.2	.0	
14650.000	22.	75.	19.5	5987.0	5987.0	.0	
14606.000	19.	106.	13.8	5986.9	5986.9	.0	
14317.000	19.	73.	20.0	5981.3	5981.3	.0	
14285.000	17.	37.	39.3	5979.6	5979.6	.0	AD
14217.000	17.	37.	39.3	5976.3	5976.3	.0	
14193.000	25.	72.	34.5	5976.3	5976.3	.0	
13706.000	27.	89.	27.9	5973.7	5973.7	.0	
13570.000	26.	93.	26.5	5972.9	5972.9	.0	

13525.000	20.	92.	26.8	5972.0	5972.0	.0	AC
13405.000	20.	96.	25.8	5971.3	5971.2	.1	
13280.000	20.	98.	25.3	5970.3	5970.3	.0	
13205.000	19.	95.	25.9	5968.9	5968.9	.0	
13105.000	20.	92.	26.9	5966.7	5966.7	.0	
13036.000	20.	90.	27.5	5965.1	5965.1	.0	
13000.000	51.	82.	30.0	5961.6	5961.6	.0	

END OF OUTPUT

Summary of Attached Files:

HECSP4E*.*	Supercritical/Subcritical - Input/Output for HEC-2 Analysis Segment 2-3
FWSP4E*.*	Floodway Analysis Segment 2-3
NATFIS.*	FIS 10,50,100,500 Year Model
FISFW.*	Dupilicate Effective Model
CORRFW.*	Corrected Effective Model
167*.*	HY-8 Input/Output Data

See following page for detailed contents
See Appendix C for 3 1/2 " Disk

My Computer \ 3½ Floppy (A:) \ FIS_MODEL

Name	Size	Type	Modified
CORRFW.dat	7,922	WordPerfect 7 Document	1/21/99 11:56 AM
CORRFW.out	65KB		1/21/99 11:56 AM
FISFW.dat	7,166	WordPerfect 7 Document	1/21/99 12:02 PM
FISFW.out	63KB		1/21/99 12:02 PM
NATFIS.dat	7,028	WordPerfect 7 Document	1/25/99 12:38 PM
NATFIS.out	101KB		1/25/99 12:38 PM

My Computer \ 3½ Floppy (A:) \ Floodway

Name	Size	Type	Modified
Fwsp4e2.dat	4,100	WordPerfect 7 Document	5/4/99 10:21 AM
Fwsp4e2.out	40KB		5/4/99 10:24 AM
Fwsp4e3.dat	12KB	WordPerfect 7 Document	1/20/99 8:50 AM
Fwsp4e3.out	163KB		1/20/99 8:50 AM

My Computer \ 3½ Floppy (A:) \ hy-8_DATA

Name	Size	Type	Modified
167pwr.inp	3,049		10/6/98 4:57 PM
167pwr.lst	9,722		6/11/98 7:07 PM
167pwr.pc	3,416		10/6/98 4:57 PM
167zep.inp	3,049		10/8/98 3:45 PM
167zep.lst	9,564		6/10/98 4:16 PM
167zep.pc	3,416		10/8/98 3:45 PM

My Computer \ 3½ Floppy (A:) \ LOMR_MODEL

Name	Size	Type	Modified
Hecsp4e2.dat	4,100	WordPerfect 7 Document	5/4/99 10:27 AM
Hecsp4e2.out	61KB		5/4/99 10:28 AM
Hecsp4e3.dat	10KB	WordPerfect 7 Document	10/19/98 11:32 AM
Hecsp4e3.out	248KB		10/20/98 7:03 PM

FIS EFFECTIVE MODELS

FIS 10, 50, 100, 500 YEAR MODEL

==========
BOSS RMS for AutoCAD (tm)
==========

Version : 3.5
Serial Number : 23543

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PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

DISCLAIMER :

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PROJECT DESCRIPTION :

PROJECT TITLE : PETERSON CREEK - BELOW PETERSON FIELD
PROJECT NUMBER : COLO SPGS FLOOD INSURANCE
DESCRIPTION : PETERSON DRAINAGE CALIBRATION: NATFIS.*
ENGINEER :
DATE OF RUN : 1/25/1999
TIME OF RUN : 12:36 pm

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: NATFIS.*

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2			-1			610	5938.66	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-10	-6		

USER-DEFINED SUMMARY TABLES (J3) :

	150	201								
NC	0.04	0.04	0.035	0.3	0.5					
X1	18	24	1273	1323						
GR	5951.4	1000	5949.2	1037	5947.1	1084	5945.4	1122	5944.2	1156
GR	5943	1215	5942.1	1253	5941.7	1264	5938	1273	5936.4	1289
GR	5935	1294	5935.5	1300	5941.9	1323	5943.3	1378	5944.1	1450
GR	5944.5	1525	5944.9	1583	5945.1	1638	5945.5	1670	5945	1673
GR	5945.8	1679	5947.2	1718	5947.9	1748	5947.8	1750		
NC	0.04	0.04	0.024	0.3	0.5					
QT	4	600	1370	2470	4087					
X1	19	19	1489	1495	370	370	370			
GR	5957.8	1000	5956.4	1116	5954.6	1284	5953	1383	5952	1489
GR	5945.4	1489	5943.5	1490	5942.7	1491	5942.3	1492	5942.7	1493
GR	5943.5	1494	5945.4	1495	5952	1495	5950.9	1580	5949.9	1655
GR	5949.4	1700	5950	1880	5952	2120	5954	2310		
SB	1.05	1.25	2.6	0	6	0	31	0	5943.5	5942.3
X1	19.1	19	1489	1495	119	119	119			
X2			1	5949.8	5952					
BT	-11	1383	5952	5953	1489	5952	5952	1489	5952	5945.4
BT		1490	5952	5947.6	1491	5952	5948.3	1492	5952	5948.6
BT		1493	5952	5948	1494	5952	5947.6	1495	5952	5945.4
BT		1495	5952	5952	1580	5952	5950.9			
GR	5957.8	1000	5956.4	1116	5954.6	1284	5953	1383	5952	1489
GR	5945.4	1489	5943.5	1490	5942.7	1491	5942.3	1492	5942.7	1493
GR	5943.5	1494	5945.4	1495	5952	1495	5950.9	1580	5949.9	1655
GR	5949.4	1700	5950	1880	5952	2120	5954	2310		

NC	0.04	0.04	0.04	0.3	0.5					
X1	20	30	1552	1651	861	861	861			
GR	5960.7	1000	5960.3	1031	5958.5	1057	5958.2	1085	5957.3	1136
GR	5956.9	1183	5957.1	1228	5957.2	1271	5957.3	1326	5956.7	1368
GR	5956.5	1416	5956.7	1468	5956.3	1514	5956.2	1552	5953.5	1587
GR	5952	1596	5951.9	1607	5955.3	1627	5957.6	1651	5958.6	1673
GR	5958.1	1681	5958.3	1736	5958.9	1794	5959.8	1874	5959.5	1888
GR	5959.8	1900	5959.3	1917	5960.5	1937	5960.7	1948	5960.7	1950
X1	21	25	1394	1555	810	810	810			
GR	5970.3	1000	5969.4	1032	5968.2	1064	5967.2	1101	5966.8	1133
GR	5966.8	1157	5966.7	1165	5966.5	1207	5966.4	1243	5966.4	1275
GR	5966.6	1299	5966.1	1321	5966.4	1364	5965.9	1394	5965.5	1406
GR	5965.9	1416	5965.6	1439	5965.3	1453	5966.5	1485	5967.6	1555
GR	5968.1	1632	5969	1712	5969.5	1778	5969.8	1890	5970.8	2000
X1	22	29	1239	1401	710	710	710			
GR	5980.6	1000	5980.1	1059	5979.9	1108	5978.6	1157	5978.1	1183
GR	5978.2	1223	5977.5	1239	5976.9	1282	5978.1	1304	5977.3	1317
GR	5977.1	1349	5979	1369	5979	1401	5979	1443	5978.7	1478
GR	5978.7	1556	5979.1	1602	5979.2	1674	5979.4	1730	5979.1	1791
GR	5979	1830	5978.8	1888	5978.7	1933	5978.9	1964	5979.8	2010
GR	5979.9	2058	5979.9	2133	5981.1	2198	5980.5	2250		
QT	4	360	820	1470	2440					
X1	23	25	1094	1508	770	770	770			
GR	5990.4	1000	5991.2	1051	5990.5	1094	5989.8	1146	5988.6	1196
GR	5988	1243	5987.6	1282	5987.2	1345	5987.8	1392	5988	1443
GR	5988.7	1508	5988.4	1556	5987.9	1615	5988	1664	5987.8	1710
GR	5987.7	1760	5987.6	1810	5987.2	1822	5987.4	1942	5987.8	2004
GR	5987.9	2072	5988.6	2104	5987.8	2111	5988.8	2128	5989.9	2200
X1	24	25	1069	1226	920	920	920			
X3	0					1548	5999.5			
GR	6000.1	1000	5999.9	1069	6000.4	1100	6000.4	1134	6000.8	1169
GR	6001	1195	6000.5	1226	5999.7	1264	5998.5	1298	5998.5	1332
GR	5998	1381	5999.1	1419	5999.6	1465	5999.6	1505	5999.5	1548
GR	5998.8	1587	5998.6	1635	5998.2	1678	5998.4	1743	5998	1790
GR	5998.2	1841	5998.4	1896	5998.5	1953	5999.3	2025	6000	2100
X1	25	23	1069	1433	650	650	650			
GR	6008.9	1000	6009.7	1023	6009.9	1039	6008.5	1069	6007	1132
GR	6006.1	1178	6005.6	1228	6005.6	1288	6005.5	1336	6005.4	1394
GR	6005.3	1433	6005.6	1492	6006.5	1548	6007.8	1611	6008.6	1671
GR	6008.7	1735	6009.5	1808	6010.3	1883	6010	1932	6009.2	1983
GR	6009.8	2054	6010.2	2090	6010.4	2100				
X1	26	35	1087	1521	830	830	830			
GR	6020.3	1000	6019.6	1024	6018.9	1055	6017.8	1087	6016.9	1119
GR	6016.8	1149	6016	1185	6015.9	1213	6016	1245	6015.8	1283
GR	6015.3	1303	6014.6	1341	6015	1370	6015.3	1396	6015.9	1428
GR	6015.4	1456	6015.2	1489	6014.9	1521	6014.7	1558	6014.9	1606

GR	6015.1	1629	6015.4	1660	6016.2	1705	6016.6	1736	6016.5	1778
GR	6016.7	1822	6017	1866	6017.7	1916	6017.9	1946	6017.9	1991
GR	6018	2033	6018.1	2059	6018.2	2079	6018.3	2090	6018.4	2100
X1	27	21	1135	1638	650	650	650			
GR	6028.5	1000	6027.5	1049	6026.4	1092	6026	1135	6025.3	1180
GR	6024.9	1217	6024.5	1280	6024.4	1336	6024.2	1415	6024.2	1509
GR	6024.1	1578	6024.3	1638	6024.4	1715	6024.6	1772	6025.2	1832
GR	6025.5	1881	6025.7	1923	6026.2	1970	6026.2	2011	6027.3	2054
GR	6027.9	2100								

STATUS: Analyzing profile 1.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

Cross Section Number SECNO	Left Overbank Manning XNL	Channel Manning n XNCH	Right Overbank Manning XNR	Flow Depth DEPTH (ft)	Water Surface Elevation CWSEL (ft MSL)	Critical W. S. Elevation CRIWS (ft MSL)	Known W. S. Elevation WSELK (ft MSL)
Energy Gradient SLOPE (ft/ft)	Left Overbank Length XLOBL (ft)	Channel Length XLCH (ft)	Right Overbank Length XLOBR (ft)	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss OLOSS (ft)
Cummul-ative Volume VOL (acre-ft)	Left Overbank Area ALOB (sq ft)	Channel Area ACH (sq ft)	Right Overbank Area AROB (sq ft)	Bridge Deck Area CORAR (sq ft)	Left Bank Elevation LTBNK (ft MSL)	Right Bank Elevation RTBNK (ft MSL)	Number of Balance Trials ITRIAL
Total Flow Q (cfs)	Left Overbank Flow QLOB (cfs)	Channel Flow QCH (cfs)	Right Overbank Flow QROB (cfs)	Computed W. S. Top Width TOPWD (ft)	Left W. S. Station SSTA (ft)	Right W. S. Station ENDST (ft)	Number of Crit Dpth Trials IDC
Flow Travel Time TIME (hrs)	Left Overbank Velocity VLOB (ft/s)	Channel Mean Velocity VCH (ft/s)	Right Overbank Velocity VROB (ft/s)	Length Weighted Manning n WTN	Cummul. Surface Area TWA (acres)	Minimum C. S. Elevation ELMIN (ft MSL)	Number of Other Trials ICONT
18.000	.040	.035	.000	3.63	5938.63	5938.63	5938.66
.014889	0	0	0	5939.64	1.01	.00	.00
.00	0	75	0	.00	5938.00	5941.90	0
610	0	609	0	39.8	1271.46	1311.27	4
.00	2.00	8.06	.00	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.000	.000	.024	.040	8.27	5950.57	5950.57	.00
.002500	370	370	370	5950.76	.19	1.87	.24
1.51	0	43	235	.00	5952.00	5952.00	0
600	0	229	370	350.1	1489.00	1948.67	25
.03	.00	5.30	1.58	.000	1.7	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	7.91

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	5957.84
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5951.78
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	279.
Total Pressure or Low Flow (cfs, QPR)	322.08
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.100	.040	.024	.040	10.36	5952.66	.00	.00
.000040	119	119	119	5952.67	.00	1.90	.00
3.86	23	55	1364	.00	5952.00	5952.00	0
600	2	40	556	765.2	1418.25	2183.41	0
.11	.11	.72	.41	.000	3.2	5942.30	5

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

20.000	.000	.040	.000	2.86	5954.76	5954.76	.00
.020750	861	861	861	5955.56	.80	.13	.40
18.96	0	83	0	.00	5956.20	5957.60	0
600	0	599	0	53.2	1570.64	1623.84	11
.14	.00	7.19	.00	.000	11.3	5951.90	0

STATUS: Analyzing cross-section reach 21.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.45

21.000	.040	.040	.000	1.53	5966.83	5966.72	.00
.009893	810	810	810	5966.98	.15	11.22	.20
21.67	105	103	0	.00	5965.90	5967.60	5
600	238	361	0	377.0	1129.72	1506.69	8
.22	2.27	3.49	.00	.000	15.3	5965.30	0

STATUS: Analyzing cross-section reach 22.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
22.000	.040	.040	.000	1.40	5978.30	5978.30	.00
.019210	710	710	710	5978.66	.36	9.52	.11
24.43	14	115	0	.00	5977.50	5979.00	0
600	31	568	0	188.9	1172.72	1361.61	8
.26	2.21	4.94	.00	.000	19.9	5976.90	0

STATUS: Analyzing cross-section reach 23.000.

STATUS: (3265) Divided flow.

23.000	.000	.040	.040	.76	5987.96	5987.80	.00
.006609	770	770	770	5988.01	.05	9.25	.09
27.41	0	65	142	.00	5990.50	5988.70	6
360	0	98	261	618.2	1247.67	2113.59	13
.38	.00	1.51	1.83	.000	27.0	5987.20	0

STATUS: Analyzing cross-section reach 24.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	.00
Right Encroachment Station (ft, STENCR)	1548.00
Encroachment Method (TYPE)	1
Width or Percent Target	1547.999

24.000	.000	.000	.040	1.05	5999.05	5999.05	.00
.025166	920	920	920	5999.35	.30	10.63	.13
30.46	0	0	81	.00	5999.90	6000.50	0
360	0	0	359	135.1	1282.31	1417.40	11
.44	.00	.00	4.40	.000	35.0	5998.00	0

STATUS: Analyzing cross-section reach 25.000.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	2.11

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
25.000	.000	.040	.040	.82	6006.12	6005.87	.00
.005631	650	650	650	6006.18	.06	6.75	.07
32.49	0	141	48	.00	6008.50	6005.30	9
360	0	265	94	347.6	1176.88	1524.48	8
.54	.00	1.88	1.96	.000	38.6	6005.30	0

STATUS: Analyzing cross-section reach 26.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

26.000	.000	.040	.040	.76	6015.36	6015.36	.00
.026577	830	830	830	6015.54	.19	8.77	.06
35.32	0	48	58	.00	6017.80	6014.90	0
360	0	136	223	290.4	1300.75	1655.46	8
.60	.00	2.79	3.80	.000	44.6	6014.60	0

STATUS: Analyzing cross-section reach 27.000.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) 1.75

27.000	.000	.040	.040	.59	6024.69	6024.55	.00
.008720	650	650	650	6024.75	.05	9.16	.04
37.59	0	158	37	.00	6026.00	6024.30	9
360	0	303	56	530.3	1250.46	1780.74	11
.70	.00	1.91	1.51	.000	50.8	6024.10	0

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: NATFIS.*

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			-1			1390	5940.13	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	2		-1				-10	-6		

STATUS: Analyzing profile 2.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
18.000	.040	.035	.000	5.15	5940.15	5940.15	5940.13
.012215	0	0	0	5941.66	1.51	.00	.00
.00	5	137	0	.00	5938.00	5941.90	0
1390	22	1367	0	48.9	1267.78	1316.70	4
.00	4.09	9.94	.00	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.000	.000	.024	.040	8.60	5950.90	5950.90	.00
.005582	370	370	370	5951.25	.35	2.95	.35
2.33	0	45	359	.00	5952.00	5952.00	0
1370	0	361	1008	414.7	1489.00	1988.40	17
.02	.00	7.98	2.80	.000	2.0	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	9.25

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	5988.81
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5952.45
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	1014.
Total Pressure or Low Flow (cfs, QPR)	363.81
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.100	.040	.024	.040	11.27	5953.57	.00	.00
.000065	119	119	119	5953.58	.01	2.32	.00
5.91	124	61	2030	.00	5952.00	5952.00	0
1370	37	60	1272	922.5	1347.32	2269.78	0
.08	.30	.98	.63	.000	3.8	5942.30	6

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

20.000	.040	.040	.000	4.42	5956.32	5956.32	.00
.012836	861	861	861	5957.11	.79	.20	.39
29.72	2	191	0	.00	5956.20	5957.60	0
1370	1	1368	0	125.5	1512.15	1637.60	12
.11	.68	7.16	.00	.000	14.2	5951.90	0

STATUS: Analyzing cross-section reach 21.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

21.000	.040	.040	.000	1.89	5967.19	5967.11	.00
.012253	810	810	810	5967.43	.24	10.16	.17
34.82	206	148	0	.00	5965.90	5967.60	4
1370	721	648	0	428.9	1100.86	1529.80	13
.17	3.49	4.37	.00	.000	19.3	5965.30	0

STATUS: Analyzing cross-section reach 22.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
22.000	.040	.040	.040	2.07	5978.97	5978.97	.00
.011525	710	710	710	5979.34	.37	8.44	.07
40.30	69	199	48	.00	5977.50	5979.00	0
1370	240	1062	67	494.0	1143.12	1967.49	5
.21	3.48	5.32	1.38	.000	26.8	5976.90	0

STATUS: Analyzing cross-section reach 23.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) .61

23.000	.000	.040	.040	.91	5988.11	5988.04	.00
.011228	770	770	770	5988.21	.10	8.79	.08
45.93	0	98	220	.00	5990.50	5988.70	4
820	0	226	593	720.1	1233.97	2116.36	13
.29	.00	2.30	2.68	.000	37.6	5987.20	0

STATUS: Analyzing cross-section reach 24.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	.00
Right Encroachment Station (ft, STENCR)	1548.00
Encroachment Method (TYPE)	1
Width or Percent Target	1547.999

24.000	.000	.000	.040	1.65	5999.65	5999.65	.00
.010713	920	920	920	5999.80	.15	10.09	.03
52.05	0	0	260	.00	5999.90	6000.50	0
820	0	0	819	781.8	1265.47	2047.27	15
.37	.00	.00	3.15	.000	53.4	5998.00	0

STATUS: Analyzing cross-section reach 25.000.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
25.000	.000	.040	.040	1.04	6006.34	6006.13	.00
.009871	650	650	650	6006.49	.14	6.68	.00
56.01	0	199	69	.00	6008.50	6005.30	5
820	0	606	213	372.8	1165.52	1538.31	8
.43	.00	3.04	3.05	.000	62.0	6005.30	0

STATUS: Analyzing cross-section reach 26.000.

STATUS: (3265) Divided flow.

26.000	.000	.040	.040	1.16	6015.76	6015.62	.00
.013245	830	830	830	6015.95	.18	9.44	.02
60.91	0	125	118	.00	6017.80	6014.90	5
820	0	369	450	380.4	1284.58	1680.26	5
.50	.00	2.94	3.80	.000	69.2	6014.60	0

STATUS: Analyzing cross-section reach 27.000.

27.000	.000	.040	.040	.75	6024.85	6024.74	.00
.014550	650	650	650	6024.98	.13	9.02	.02
64.86	0	223	61	.00	6026.00	6024.30	5
820	0	664	155	571.8	1225.08	1796.85	8
.56	.00	2.97	2.54	.000	76.3	6024.10	0

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: NATFIS.*

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		4			-1			2520	5941.76	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	3		-1				-10	-6		

STATUS: Analyzing profile 3.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
18.000	.040	.035	.000	6.72	5941.72	5941.72	5941.76
.010945	0	0	0	5943.72	2.00	.00	.00
.00	16	210	0	.00	5938.00	5941.90	0
2520	94	2425	0	58.9	1263.49	1322.35	4
.00	5.60	11.51	.00	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

19.000	.000	.024	.040	8.88	5951.17	5951.17	.00
.009603	370	370	370	5951.73	.56	3.79	.43
3.20	0	46	477	.00	5952.00	5952.00	0
2470	0	494	1975	468.2	1489.00	2020.98	16
.02	.00	10.52	4.13	.000	2.2	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

STATUS: (3280) For cross-section 19.10, ends have been extended vertically .53 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	10.99

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	6074.40
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5952.93
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	2066.
Total Pressure or Low Flow (cfs, QPR)	407.83
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.100	.040	.024	.040	12.22	5954.52	.00	.00
.000080	119	119	119	5954.53	.01	2.80	.00
8.22	287	67	2797	.00	5952.00	5952.00	1
2470	134	77	2258	1021.6	1288.38	2310.00	0
.06	.47	1.15	.81	.000	4.3	5942.30	8

Contraction Coefficient (CCHV)	.300
Expansion Coefficient (CEHV)	.500

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
20.000	.040	.040	.000	5.50	5957.40	5957.40	.00
.007115	861	861	861	5957.92	.52	.22	.26
44.55	233	290	0	.00	5956.20	5957.60	0
2470	588	1881	0	518.7	1130.25	1648.93	12
.10	2.52	6.48	.00	.000	19.5	5951.90	0

STATUS: Analyzing cross-section reach 21.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

21.000	.040	.040	.000	2.19	5967.49	5967.49	.00
.016676	810	810	810	5967.90	.42	8.43	.03
53.89	290	189	0	.00	5965.90	5967.60	0
2470	1426	1043	0	457.3	1090.43	1547.73	13
.15	4.91	5.51	.00	.000	28.6	5965.30	0

STATUS: Analyzing cross-section reach 22.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

22.000	.040	.040	.040	2.46	5979.36	5979.36	.00
.011634	710	710	710	5979.72	.36	9.81	.02
62.64	110	262	221	.00	5977.50	5979.00	0
2470	478	1451	539	841.5	1128.25	1987.66	8
.19	4.35	5.53	2.44	.000	39.2	5976.90	0

STATUS: Analyzing cross-section reach 23.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) .62

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
23.000	.000	.040	.040	1.14	5988.34	5988.19	.00
.010770	770	770	770	5988.48	.14	8.70	.06
72.23	0	152	338	.00	5990.50	5988.70	3
1470	0	412	1057	801.3	1216.34	2120.19	15
.26	.00	2.71	3.13	.000	53.7	5987.20	0

STATUS: Analyzing cross-section reach 24.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	.00
Right Encroachment Station (ft, STENCR)	1548.00
Encroachment Method (TYPE)	1
Width or Percent Target	1547.999

24.000	.000	.000	.040	1.82	5999.82	5999.81	.00
.014718	920	920	920	6000.03	.22	11.51	.04
81.58	0	0	394	.00	5999.90	6000.50	2
1470	0	0	1469	814.0	1258.48	2072.46	16
.33	.00	.00	3.73	.000	70.7	5998.00	0

STATUS: Analyzing cross-section reach 25.000.

25.000	.000	.040	.040	1.44	6006.74	6006.41	.00
.007981	650	650	650	6006.93	.19	6.88	.01
87.68	0	308	115	.00	6008.50	6005.30	4
1470	0	1072	397	413.9	1145.50	1559.43	11
.38	.00	3.48	3.44	.000	79.9	6005.30	0

STATUS: Analyzing cross-section reach 26.000.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	.69

26.000	.000	.040	.040	1.42	6016.02	6015.97	.00
.017005	830	830	830	6016.31	.29	9.33	.05
95.13	0	195	161	.00	6017.80	6014.90	2
1470	0	659	810	510.8	1184.08	1694.90	5
.44	.00	3.37	5.01	.000	88.7	6014.60	0

STATUS: Analyzing cross-section reach 27.000.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
27.000	.000	.040	.040	1.03	6025.13	6024.95	.00
.011361	650	650	650	6025.29	.17	8.94	.04
101.17	0	342	109	.00	6026.00	6024.30	5
1470	0	1143	326	628.6	1196.04	1824.63	11
.49	.00	3.34	2.98	.000	97.2	6024.10	0

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: NATFIS.*

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		5			-1			4148	5944.07	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1				-10	-6		

STATUS: Analyzing profile 4.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
18.000	.040	.035	.040	9.08	5944.08	5944.08	5944.07
.004594	0	0	0	5945.33	1.25	.00	.00
.00	148	328	108	.00	5938.00	5941.90	0
4148	580	3266	301	285.8	1162.07	1447.89	4
.00	3.91	9.94	2.78	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

19.000	.000	.024	.040	9.43	5951.73	5951.73	.00
.008668	370	370	370	5952.22	.50	2.27	.23
5.94	0	50	763	.00	5952.00	5952.00	0
4087	0	507	3579	577.3	1489.00	2087.36	5
.02	.00	10.10	4.69	.000	3.7	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

STATUS: (3280) For cross-section 19.10, ends have been extended vertically 1.69 feet in order to calculate the hydraulic cross-section properties.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	10.23

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	6289.10
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5953.42
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	3644.
Total Pressure or Low Flow (cfs, QPR)	443.41
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.100	.040	.024	.040	13.39	5955.69	.00	.00
.000083	119	119	119	5955.70	.01	3.48	.00
13.07	581	74	3745	.00	5952.00	5952.00	1
4087	357	93	3636	1128.0	1182.04	2310.00	0
.05	.62	1.26	.97	.000	6.0	5942.30	8

Contraction Coefficient (CCHV)	.300
Expansion Coefficient (CEHV)	.500

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
20.000	.040	.040	.040	5.98	5957.88	5957.88	.00
.008027	861	861	861	5958.49	.61	.24	.30
64.25	440	336	0	.00	5956.20	5957.60	0
4087	1559	2526	0	553.7	1103.39	1657.06	12
.09	3.54	7.50	.89	.000	22.6	5951.90	0

STATUS: Analyzing cross-section reach 21.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

21.000	.040	.040	.040	2.52	5967.82	5967.82	.00
.019106	810	810	810	5968.46	.64	9.57	.01
77.43	393	242	3	.00	5965.90	5967.60	0
4087	2448	1634	4	510.3	1078.16	1588.46	15
.13	6.23	6.74	1.17	.000	32.5	5965.30	0

STATUS: Analyzing cross-section reach 22.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

22.000	.040	.040	.040	2.75	5979.65	5979.65	.00
.012968	710	710	710	5980.11	.46	11.07	.06
89.54	143	309	393	.00	5977.50	5979.00	0
4087	742	2016	1327	885.2	1117.31	2002.49	5
.17	5.17	6.51	3.37	.000	43.9	5976.90	0

STATUS: Analyzing cross-section reach 23.000.

STATUS: (3265) Divided flow.

23.000	.000	.040	.040	1.44	5988.64	5988.45	.00
.008936	770	770	770	5988.81	.17	8.62	.09
103.61	0	236	508	.00	5990.50	5988.70	4
2440	0	694	1745	914.6	1194.49	2125.22	9
.23	.00	2.94	3.43	.000	59.8	5987.20	0

STATUS: Analyzing cross-section reach 24.000.

STATUS: (3265) Divided flow.

STATUS: (3280) For cross-section 24.00, ends have been extended vertically .04 feet in order to calculate the hydraulic cross-section properties.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	.00
Right Encroachment Station (ft, STENCR)	1548.00
Encroachment Method (TYPE)	1
Width or Percent Target	1547.999

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
24.000	.040	.040	.040	2.04	6000.04	6000.04	.00
.015273	920	920	920	6000.31	.27	10.56	.05
117.63	3	0	579	.00	5999.90	6000.50	0
2440	2	0	2436	908.2	1021.37	2100.00	9
.29	.77	.77	4.21	.000	79.0	5998.00	0

STATUS: Analyzing cross-section reach 25.000.

25.000	.000	.040	.040	1.82	6007.12	6006.74	.00
.008134	650	650	650	6007.38	.27	7.07	.00
126.38	0	422	167	.00	6008.50	6005.30	6
2440	0	1752	687	451.0	1127.02	1577.99	16
.34	.00	4.15	4.10	.000	89.2	6005.30	0

STATUS: Analyzing cross-section reach 26.000.

26.000	.000	.040	.040	1.71	6016.31	6016.27	.00
.016177	830	830	830	6016.68	.38	9.24	.06
136.85	0	294	214	.00	6017.80	6014.90	3
2440	0	1241	1198	542.4	1171.09	1713.44	6
.38	.00	4.21	5.58	.000	98.6	6014.60	0

STATUS: Analyzing cross-section reach 27.000.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
27.000	.000	.040	.040	1.29	6025.39	6025.19	.00
.011746	650	650	650	6025.63	.24	8.90	.04
145.30	0	460	162	.00	6026.00	6024.30	5
2440	0	1847	592	688.2	1174.38	1862.57	11
.43	.00	4.01	3.65	.000	107.8	6024.10	0

SPECIAL NOTE :

An asterisk (*) to the left of the cross-section number indicates a special note is present in the SUMMARY OF WARNING AND STATUS MESSAGES section.

SUMMARY PRINTOUT TABLE 150 : PETERSON CREEK - BELOW PETERSON FIELD
PETERSON DRAINAGE CALIBRATION: NATFIS.*
COLO SPGS FLOOD INSURANCE

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	18.000	.00	.00	.00	5935.00	610.00	5938.63	5938.63	5939.64	148.89	8.06	76.09	49.99
*	18.000	.00	.00	.00	5935.00	1390.00	5940.15	5940.15	5941.66	122.15	9.94	143.15	125.77
*	18.000	.00	.00	.00	5935.00	2520.00	5941.72	5941.72	5943.72	109.45	11.51	227.52	240.88
*	18.000	.00	.00	.00	5935.00	4148.00	5944.08	5944.08	5945.33	45.94	9.94	585.39	611.96
*	19.000	370.00	.00	.00	5942.30	600.00	5950.57	5950.57	5950.76	25.00	5.30	278.46	120.00
*	19.000	370.00	.00	.00	5942.30	1370.00	5950.90	5950.90	5951.25	55.82	7.98	405.05	183.37
*	19.000	370.00	.00	.00	5942.30	2470.00	5951.17	5951.17	5951.73	96.03	10.52	524.89	252.05
*	19.000	370.00	.00	.00	5942.30	4087.00	5951.73	5951.73	5952.22	86.68	10.10	814.11	438.97
*	19.100	119.00	5952.00	5949.80	5942.30	600.00	5952.66	.00	5952.67	.40	.72	1444.38	949.14
*	19.100	119.00	5952.00	5949.80	5942.30	1370.00	5953.57	.00	5953.58	.65	.98	2215.79	1695.72
*	19.100	119.00	5952.00	5949.80	5942.30	2470.00	5954.52	.00	5954.53	.80	1.15	3152.43	2769.12
*	19.100	119.00	5952.00	5949.80	5942.30	4087.00	5955.69	.00	5955.70	.83	1.26	4401.29	4489.60
*	20.000	861.00	.00	.00	5951.90	600.00	5954.76	5954.76	5955.56	207.50	7.19	83.47	41.65
*	20.000	861.00	.00	.00	5951.90	1370.00	5956.32	5956.32	5957.11	128.36	7.16	193.65	120.92
*	20.000	861.00	.00	.00	5951.90	2470.00	5957.40	5957.40	5957.92	71.15	6.48	524.04	292.83

	Cross-Section Number SECNO	Channel Reach Length (ft) XLCH	Top of Roadway Elevation (ft MSL) ELTRD	Max. Low Chord Elevation (ft MSL) ELLC	Minimum C. S. Elevation (ft MSL) ELMIN	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	Critical W. S. Elevation (ft MSL) CRIWS	Energy Gradient Elevation (ft MSL) EG	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s) VCH	Cross-Section Area (sq ft) AREA	Index Q (0.01 * Convey.) .01K
*	20.000	861.00	.00	.00	5951.90	4087.00	5957.88	5957.88	5958.49	80.27	7.50	777.94	456.17
*	21.000	810.00	.00	.00	5965.30	600.00	5966.83	5966.72	5966.98	98.93	3.49	208.64	60.32
	21.000	810.00	.00	.00	5965.30	1370.00	5967.19	5967.11	5967.43	122.53	4.37	355.06	123.76
*	21.000	810.00	.00	.00	5965.30	2470.00	5967.49	5967.49	5967.90	166.76	5.51	479.90	191.27
*	21.000	810.00	.00	.00	5965.30	4087.00	5967.82	5967.82	5968.46	191.06	6.74	639.18	295.68
*	22.000	710.00	.00	.00	5976.90	600.00	5978.30	5978.30	5978.66	192.10	4.94	129.31	43.29
*	22.000	710.00	.00	.00	5976.90	1370.00	5978.97	5978.97	5979.34	115.25	5.32	317.53	127.61
*	22.000	710.00	.00	.00	5976.90	2470.00	5979.36	5979.36	5979.72	116.34	5.53	594.40	229.00
*	22.000	710.00	.00	.00	5976.90	4087.00	5979.65	5979.65	5980.11	129.68	6.51	847.07	358.89
	23.000	770.00	.00	.00	5987.20	360.00	5987.96	5987.80	5988.01	66.09	1.51	207.77	44.28
*	23.000	770.00	.00	.00	5987.20	820.00	5988.11	5988.04	5988.21	112.28	2.30	319.38	77.39
*	23.000	770.00	.00	.00	5987.20	1470.00	5988.34	5988.19	5988.48	107.70	2.71	490.60	141.65
	23.000	770.00	.00	.00	5987.20	2440.00	5988.64	5988.45	5988.81	89.36	2.94	744.59	258.11
*	24.000	920.00	.00	.00	5998.00	360.00	5999.05	5999.05	5999.35	251.66	.00	81.73	22.69
*	24.000	920.00	.00	.00	5998.00	820.00	5999.65	5999.65	5999.80	107.13	.00	260.34	79.23
	24.000	920.00	.00	.00	5998.00	1470.00	5999.82	5999.81	6000.03	147.18	.00	394.30	121.17
*	24.000	920.00	.00	.00	5998.00	2440.00	6000.04	6000.04	6000.31	152.73	.77	583.37	197.44
*	25.000	650.00	.00	.00	6005.30	360.00	6006.12	6005.87	6006.18	56.31	1.88	189.62	47.98
	25.000	650.00	.00	.00	6005.30	820.00	6006.34	6006.13	6006.49	98.71	3.04	269.64	82.53
	25.000	650.00	.00	.00	6005.30	1470.00	6006.74	6006.41	6006.93	79.81	3.48	423.93	164.54
	25.000	650.00	.00	.00	6005.30	2440.00	6007.12	6006.74	6007.38	81.34	4.15	589.62	270.55
*	26.000	830.00	.00	.00	6014.60	360.00	6015.36	6015.36	6015.54	265.77	2.79	107.67	22.08
	26.000	830.00	.00	.00	6014.60	820.00	6015.76	6015.62	6015.95	132.45	2.94	244.52	71.25
*	26.000	830.00	.00	.00	6014.60	1470.00	6016.02	6015.97	6016.31	170.05	3.37	357.54	112.73
	26.000	830.00	.00	.00	6014.60	2440.00	6016.31	6016.27	6016.68	161.77	4.21	509.29	191.84
*	27.000	650.00	.00	.00	6024.10	360.00	6024.69	6024.55	6024.75	87.20	1.91	195.89	38.55
	27.000	650.00	.00	.00	6024.10	820.00	6024.85	6024.74	6024.98	145.50	2.97	284.67	67.98
	27.000	650.00	.00	.00	6024.10	1470.00	6025.13	6024.95	6025.29	113.61	3.34	451.80	137.91
	27.000	650.00	.00	.00	6024.10	2440.00	6025.39	6025.19	6025.63	117.46	4.01	623.25	225.14

SUMMARY PRINTOUT TABLE 150 : PETERSON CREEK - BELOW PETERSON FIELD
---------- PETERSON DRAINAGE CALIBRATION: NATFIS.*
COLO SPGS FLOOD INSURANCE

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
*	18.000	610.00	5938.63	.00	.00	-.03	39.81	.00
*	18.000	1390.00	5940.15	1.51	.00	.02	48.92	.00
*	18.000	2520.00	5941.72	1.57	.00	-.04	58.86	.00
*	18.000	4148.00	5944.08	2.36	.00	.01	285.82	.00
*	19.000	600.00	5950.57	.00	11.94	.00	350.10	370.00
*	19.000	1370.00	5950.90	.33	10.76	.00	414.66	370.00
*	19.000	2470.00	5951.17	.27	9.46	.00	468.22	370.00
*	19.000	4087.00	5951.73	.55	7.65	.00	577.35	370.00
*	19.100	600.00	5952.66	.00	2.09	.00	765.16	119.00
*	19.100	1370.00	5953.57	.91	2.67	.00	922.46	119.00
*	19.100	2470.00	5954.52	.95	3.35	.00	1021.62	119.00
*	19.100	4087.00	5955.69	1.16	3.96	.00	1127.96	119.00
*	20.000	600.00	5954.76	.00	2.10	.00	53.20	861.00
*	20.000	1370.00	5956.32	1.55	2.75	.00	125.45	861.00
*	20.000	2470.00	5957.40	1.09	2.88	.00	518.68	861.00
*	20.000	4087.00	5957.88	.47	2.19	.00	553.67	861.00
*	21.000	600.00	5966.83	.00	12.07	.00	376.96	810.00
	21.000	1370.00	5967.19	.36	10.88	.00	428.95	810.00
*	21.000	2470.00	5967.49	.29	10.08	.00	457.30	810.00
*	21.000	4087.00	5967.82	.33	9.94	.00	510.30	810.00
*	22.000	600.00	5978.30	.00	11.47	.00	188.89	710.00
*	22.000	1370.00	5978.97	.67	11.77	.00	493.97	710.00
*	22.000	2470.00	5979.36	.39	11.88	.00	841.46	710.00
*	22.000	4087.00	5979.65	.29	11.84	.00	885.17	710.00
	23.000	360.00	5987.96	.00	9.66	.00	618.20	770.00
*	23.000	820.00	5988.11	.15	9.14	.00	720.09	770.00
*	23.000	1470.00	5988.34	.23	8.98	.00	801.26	770.00
	23.000	2440.00	5988.64	.30	8.99	.00	914.56	770.00
*	24.000	360.00	5999.05	.00	11.09	.00	135.08	920.00
*	24.000	820.00	5999.65	.59	11.54	.00	781.80	920.00

	Cross-Section Number SECNO	Discharge Flow (cfs) Q	Computed W. S. Elevation (ft MSL) CWSEL	W.S. Elev Diff per Profile (ft) DIFWSP	W.S. Elev Diff per Section (ft) DIFWSX	W.S. Elev Diff per Know/Comp (ft) DIFKWS	Water Surface Top Width (ft) TOPWID	Channel Reach Length (ft) XLCH
	24.000	1470.00	5999.82	.17	11.48	.00	813.98	920.00
*	24.000	2440.00	6000.04	.22	11.39	.00	908.25	920.00
*	25.000	360.00	6006.12	.00	7.07	.00	347.60	650.00
	25.000	820.00	6006.34	.22	6.70	.00	372.79	650.00
	25.000	1470.00	6006.74	.40	6.92	.00	413.93	650.00
	25.000	2440.00	6007.12	.38	7.08	.00	450.97	650.00
*	26.000	360.00	6015.36	.00	9.24	.00	290.43	830.00
	26.000	820.00	6015.76	.41	9.42	.00	380.41	830.00
*	26.000	1470.00	6016.02	.25	9.28	.00	510.82	830.00
	26.000	2440.00	6016.31	.29	9.19	.00	542.35	830.00
*	27.000	360.00	6024.69	.00	9.34	.00	530.28	650.00
	27.000	820.00	6024.85	.16	9.09	.00	571.77	650.00
	27.000	1470.00	6025.13	.28	9.11	.00	628.59	650.00
	27.000	2440.00	6025.39	.26	9.08	.00	688.18	650.00

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 18, profile 1, critical depth assumed.

Section 18, profile 2, critical depth assumed.

Section 18, profile 3, critical depth assumed.

Section 18, profile 4, critical depth assumed.

Section 19, profile 1, critical depth assumed.

Section 19, profile 1, minimum specific energy.

Section 19, profile 2, critical depth assumed.

Section 19, profile 2, minimum specific energy.

Section 19, profile 3, critical depth assumed.

Section 19, profile 3, minimum specific energy.

Section 19, profile 4, critical depth assumed.

Section 19, profile 4, minimum specific energy.

Section 19.1, profile 1, conveyance change outside acceptable range.

Section 19.1, profile 2, conveyance change outside acceptable range.

Section 19.1, profile 3, conveyance change outside acceptable range.

Section 19.1, profile 4, conveyance change outside acceptable range.

Section 20, profile 1, critical depth assumed.

Section 20, profile 1, minimum specific energy.

Section 20, profile 2, critical depth assumed.

Section 20, profile 2, minimum specific energy.

Section 20, profile 3, critical depth assumed.

Section 20, profile 3, minimum specific energy.

Section 20, profile 4, critical depth assumed.

Section 20, profile 4, minimum specific energy.

Section 21, profile 1, conveyance change outside acceptable range.

Section 21, profile 3, critical depth assumed.

Section 21, profile 3, minimum specific energy.

Section 21, profile 4, critical depth assumed.

Section 21, profile 4, minimum specific energy.

Section 22, profile 1, critical depth assumed.

Section 22, profile 1, minimum specific energy.

Section 22, profile 2, critical depth assumed.

Section 22, profile 2, minimum specific energy.

Section 22, profile 3, critical depth assumed.

Section 22, profile 3, minimum specific energy.

Section 22, profile 4, critical depth assumed.

Section 22, profile 4, minimum specific energy.

Section 23, profile 2, conveyance change outside acceptable range.

Section 23, profile 3, conveyance change outside acceptable range.

Section 24, profile 1, critical depth assumed.

Section 24, profile 1, minimum specific energy.

Section 24, profile 2, critical depth assumed.

Section 24, profile 2, minimum specific energy.

Section 24, profile 4, critical depth assumed.

Section 24, profile 4, minimum specific energy.

Section 25, profile 1, conveyance change outside acceptable range.

Section 26, profile 1, critical depth assumed.

Section 26, profile 1, minimum specific energy.

Section 26, profile 3, conveyance change outside acceptable range.

Section 27, profile 1, conveyance change outside acceptable range.

50 Warning and status message(s) generated

FLOODWAY INSURANCE ZONE DATA : PETERSON CREEK - BELOW PETERSON FIELD
PETERSON DRAINAGE CALIBRATION: NATFIS.*
COLO SPGS FLOOD INSURANCE

FLOOD HAZARD FACTOR FOR ENTIRE REACH USING SECTIONS :

Cross-Section Number	Cumulative Distance (ft)	Elevation Difference Between Base Flood and 10 Year Flood 10% prb. (ft)	50 Year Flood 2% prb. (ft)	500 Year Flood 0.2% prb. (ft)
18.000	0.	-3.08	-1.57	2.36
19.000	370.	-.60	-.27	.55
19.100	489.	-1.86	-.95	1.16
20.000	1350.	-2.64	-1.09	.47
21.000	2160.	-.65	-.29	.33
22.000	2870.	-1.06	-.39	.29
23.000	3640.	-.38	-.23	.30
24.000	4560.	-.76	-.17	.22
25.000	5210.	-.62	-.40	.38
26.000	6040.	-.66	-.25	.29
27.000	6690.	-.44	-.28	.26
Weighted Avg for Reach:		-1.07	-.47	.45

Flood hazard factor (FHF) is 010 for the reach , with 59.8 percent of the reach within .50 feet. Zone for the reach = A 2.

CONTINUOUS FLOOD HAZARD FACTORS BY EVEN INCREMENTS :

Increment Number	Total Length (ft)	Avg Elev for 10yr Flood 10% prb. (ft MSL)	Avg Elev for 100yr Flood 1% prb. (ft MSL)	Average Elevation Flood Diffrence (ft)	Weighted Average (ft)	Flood Hazard Factor FHF	Percent Within (%)
	0.				Section: 18.000		
1	121.	5940.59	5943.26	-2.67	-2.67	025	100.0
2	242.	5944.49	5946.36	-1.87	-2.27	025	100.0
3	363.	5948.39	5949.45	-1.06	-1.87	020	33.3
	370.				Section: 19.000		
4	484.	5951.46	5952.69	-1.23	-1.71	015	50.0
	489.				Section: 19.100		
5	605.	5952.76	5954.65	-1.89	-1.74	015	40.0
6	726.	5953.09	5955.11	-2.02	-1.79	020	50.0
7	847.	5953.39	5955.52	-2.13	-1.84	020	57.1
8	968.	5953.68	5955.92	-2.24	-1.89	020	62.5
9	1089.	5953.98	5956.33	-2.35	-1.94	020	66.7
10	1210.	5954.27	5956.73	-2.46	-1.99	020	70.0
11	1331.	5954.57	5957.14	-2.57	-2.04	020	100.0
	1350.				Section: 20.000		
12	1452.	5955.50	5958.00	-2.50	-2.08	020	91.7
13	1573.	5957.18	5959.42	-2.24	-2.09	020	92.3
14	1694.	5958.99	5960.93	-1.94	-2.08	020	92.9
15	1815.	5960.79	5962.44	-1.65	-2.05	020	100.0
16	1936.	5962.59	5963.94	-1.35	-2.01	020	100.0
17	2057.	5964.40	5965.45	-1.05	-1.95	020	52.9
	2160.				Section: 21.000		
18	2178.	5966.21	5967.00	-.79	-1.89	020	50.0
19	2299.	5968.10	5968.80	-.70	-1.83	020	47.4
20	2420.	5970.05	5970.82	-.77	-1.77	020	45.0
21	2541.	5972.01	5972.85	-.84	-1.73	015	38.1
22	2662.	5973.96	5974.87	-.91	-1.69	015	36.4
23	2783.	5975.92	5976.90	-.98	-1.66	015	34.8
	2870.				Section: 22.000		
24	2904.	5977.81	5978.83	-1.02	-1.63	015	33.3
25	3025.	5979.48	5980.46	-.98	-1.61	015	28.0
26	3146.	5981.00	5981.88	-.88	-1.58	015	26.9
27	3267.	5982.52	5983.29	-.77	-1.55	015	33.3
28	3388.	5984.04	5984.70	-.66	-1.52	015	35.7
29	3509.	5985.56	5986.11	-.55	-1.49	015	31.0
30	3630.	5987.08	5987.52	-.44	-1.45	015	36.7
	3640.				Section: 23.000		
31	3751.	5988.57	5988.98	-.41	-1.42	015	32.3
32	3872.	5990.03	5990.48	-.45	-1.39	015	34.4
33	3993.	5991.49	5991.99	-.50	-1.36	015	30.3
34	4114.	5992.95	5993.50	-.55	-1.34	015	32.4
35	4235.	5994.41	5995.01	-.60	-1.31	015	31.4

36	4356.	5995.86	5996.52	-.66	-1.30	015	30.6
37	4477.	5997.32	5998.03	-.71	-1.28	015	32.4
	4560.				Section:	24.000	
38	4598.	5998.76	5999.50	-.74	-1.27	015	36.8
39	4719.	6000.12	6000.87	-.75	-1.25	015	38.5
40	4840.	6001.44	6002.16	-.72	-1.24	010	40.0
41	4961.	6002.76	6003.44	-.68	-1.23	010	39.0
42	5082.	6004.07	6004.73	-.66	-1.21	010	42.9
43	5203.	6005.39	6006.02	-.63	-1.20	010	44.2
	5210.				Section:	25.000	
44	5324.	6006.72	6007.34	-.62	-1.19	010	43.2
45	5445.	6008.06	6008.69	-.63	-1.17	010	44.4
46	5566.	6009.41	6010.04	-.63	-1.16	010	50.0
47	5687.	6010.75	6011.39	-.64	-1.15	010	48.9
48	5808.	6012.10	6012.75	-.65	-1.14	010	50.0
49	5929.	6013.45	6014.10	-.65	-1.13	010	57.1
	6040.				Section:	26.000	
50	6050.	6014.81	6015.47	-.66	-1.12	010	60.0
51	6171.	6016.37	6017.01	-.64	-1.11	010	60.8
52	6292.	6018.11	6018.70	-.59	-1.10	010	61.5
53	6413.	6019.84	6020.40	-.56	-1.09	010	62.3
54	6534.	6021.58	6022.09	-.51	-1.08	010	61.1
55	6655.	6023.32	6023.79	-.47	-1.07	010	60.0
	6690.				Section:	27.000	

This reach can be subdivided by increment number to meet FIA requirements. Input 20N where N is the number of reaches and then input the end of each reach by increment number. For example, 202 16 55. A negative increment will suppress intermediate increment output.

CONTINUOUS FLOOD HAZARD FACTORS BY EVEN INCREMENTS :

Increment Number	Total Length	----Weighted Average Diff---- Between Base Flood and 10 Year Flood 10% prb.	50 Year Flood 2% prb.	500 Year Flood 0.2% prb.
	(ft)	(ft)	(ft)	(ft)
16	1936.	-2.01	-.91	.82

Flood hazard factor (FHF) is 020 for reach 1, with 100.0 percent of the reach within 1.00 feet. Zone for the reach = A 4.

55	6655.	-.68	-.29	.30

Flood hazard factor (FHF) is 005 for reach 2, with 100.0 percent of the reach within .50 feet. Zone for the reach = A 1.

END OF OUTPUT

DUPLICATE EFFECTIVE MODEL

==========
BOSS RMS for AutoCAD (tm)
==========

Version : 3.5
Serial Number : 23543

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PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis is an enhanced version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 program for water-surface profile computations. Program based upon the September 1990 version, updated on August 1991.

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PROJECT DESCRIPTION :

PROJECT TITLE : PETERSON CREEK - BELOW PETERSON FIELD
PROJECT NUMBER : COLO SPGS FLOOD INSURANCE
DESCRIPTION : PETERSON DRAINAGE CALIBRATION: FISFW.DAT
ENGINEER :
DATE OF RUN : 1/21/1999
TIME OF RUN : 12:00 pm

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: FISFW.DAT

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		2			-1			2520	5941.76	
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	1		-1				-10	-6		

USER-DEFINED SUMMARY TABLES (J3) :

	150	200								
NC	0.04	0.04	0.035	0.3	0.5					
ET			7.1				1273	1323		
X1	18	24	1273	1323						
GR	5951.4	1000	5949.2	1037	5947.1	1084	5945.4	1122	5944.2	1156
GR	5943	1215	5942.1	1253	5941.7	1264	5938	1273	5936.4	1289
GR	5935	1294	5935.5	1300	5941.9	1323	5943.3	1378	5944.1	1450
GR	5944.5	1525	5944.9	1583	5945.1	1638	5945.5	1670	5945	1673
GR	5945.8	1679	5947.2	1718	5947.9	1748	5947.8	1750		
NC	0.04	0.04	0.024	0.3	0.5					
QT	2	2470	2470							
ET			7.1				1489	1750		
X1	19	19	1489	1495	370	370	370			
GR	5957.8	1000	5956.4	1116	5954.6	1284	5953	1383	5952	1489
GR	5945.4	1489	5943.5	1490	5942.7	1491	5942.3	1492	5942.7	1493
GR	5943.5	1494	5945.4	1495	5952	1495	5950.9	1580	5949.9	1655
GR	5949.4	1700	5950	1880	5952	2120	5954	2310		
ET			7.1				1489	1750		
SB	1.05	1.25	2.6	0	6	0	31	0	5943.5	5942.3
X1	19.1	19	1489	1495	119	119	119			
X2			1	5949.8	5952					
BT	-11	1383	5952	5953	1489	5952	5952	1489	5952	5945.4
BT		1490	5952	5947.6	1491	5952	5948.3	1492	5952	5948.6
BT		1493	5952	5948	1494	5952	5947.6	1495	5952	5945.4
BT		1495	5952	5952	1580	5952	5950.9			
GR	5957.8	1000	5956.4	1116	5954.6	1284	5953	1383	5952	1489
GR	5945.4	1489	5943.5	1490	5942.7	1491	5942.3	1492	5942.7	1493

```
GR   5943.5     1494    5945.4     1495     5952     1495    5950.9     1580    5949.9     1655
GR   5949.4     1700      5950     1880     5952     2120      5954     2310

NC      0.04     0.04     0.04      0.3      0.5
ET                        7.1
X1        20       30     1552     1651      861      861      1500     1651
GR    5960.7     1000    5960.3     1031    5958.5     1057     861
GR    5956.9     1183    5957.1     1228    5957.2     1271    5958.2     1085    5957.3     1136
GR    5956.5     1416    5956.7     1468    5956.3     1514    5957.3     1326    5956.7     1368
GR      5952     1596    5951.9     1607    5955.3     1627    5956.2     1552    5953.5     1587
GR    5958.1     1681    5958.3     1736    5958.9     1794    5957.6     1651    5958.6     1673
GR    5959.8     1900    5959.3     1917    5960.5     1937    5959.8     1874    5959.5     1888
                                                               5960.7     1948    5960.7     1950
ET                        7.1
X1        21       25     1394     1555      810      810      1400     1555
GR    5970.3     1000    5969.4     1032    5968.2     1064     810
GR    5966.8     1157    5966.7     1165    5966.5     1207    5967.2     1101    5966.8     1133
GR    5966.6     1299    5966.1     1321    5966.4     1364    5966.4     1243    5966.4     1275
GR    5965.9     1416    5965.6     1439    5965.3     1453    5965.9     1394    5965.5     1406
GR    5968.1     1632      5969     1712    5969.5     1778    5966.5     1485    5967.6     1555
                                                               5969.8     1890    5970.8     2000
ET                        7.1
X1        22       29     1239     1401      710      710      1228     1400
GR    5980.6     1000    5980.1     1059    5979.9     1108     710
GR    5978.2     1223    5977.5     1239    5976.9     1282    5978.6     1157    5978.1     1183
GR    5977.1     1349      5979     1369      5979     1401    5978.1     1304    5977.3     1317
GR    5978.7     1556    5979.1     1602    5979.2     1674     5979     1443    5978.7     1478
GR      5979     1830    5978.8     1888    5978.7     1933    5979.4     1730    5979.1     1791
GR    5979.9     2058    5979.9     2133    5981.1     2198    5978.9     1964    5979.8     2010
                                                               5980.5     2250

QT         2     1470      1470
ET                        7.1
X1        23       25     1094     1508      770      770      1216     1500
GR    5990.4     1000    5991.2     1051    5990.5     1094     770
GR      5988     1243    5987.6     1282    5987.2     1345    5989.8     1146    5988.6     1196
GR    5988.7     1508    5988.4     1556    5987.9     1615    5987.8     1392      5988     1443
GR    5987.7     1760    5987.6     1810    5987.2     1822      5988     1664    5987.8     1710
GR    5987.9     2072    5988.6     2104    5987.8     2111    5987.4     1942    5987.8     2004
                                                               5988.8     2128    5989.9     2200

ET                        7.1
X1        24       25     1069     1226      920      920      1038     1350
X3         0                                            1548     920
GR    6000.1     1000    5999.9     1069    6000.4     1100    5999.5
GR      6001     1195    6000.5     1226    5999.7     1264    6000.4     1134    6000.8     1169
GR      5998     1381    5999.1     1419    5999.6     1465    5998.5     1298    5998.5     1332
GR    5998.8     1587    5998.6     1635    5998.2     1678    5999.6     1505    5999.5     1548
GR    5998.2     1841    5998.4     1896    5998.5     1953    5998.4     1743      5998     1790
                                                               5999.3     2025      6000     2100

ET                        7.1
X1        25       23     1069     1433      650      650      1143     1350
GR    6008.9     1000    6009.7     1023    6009.9     1039     650
GR    6006.1     1178    6005.6     1228    6005.6     1288    6008.5     1069      6007     1132
                                                               6005.5     1336    6005.4     1394
```

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GR   6005.3    1433    6005.6    1492    6006.5    1548    6007.8    1611    6008.6    1671
GR   6008.7    1735    6009.5    1808    6010.3    1883    6010      1932    6009.2    1983
GR   6009.8    2054    6010.2    2090    6010.4    2100

ET                          7.1
X1        26      35    1087    1521     830      830     1192      1400
GR   6020.3    1000    6019.6    1024    6018.9    1055    6017.8    1087    6016.9    1119
GR   6016.8    1149      6016    1185    6015.9    1213      6016    1245    6015.8    1283
GR   6015.3    1303    6014.6    1341      6015    1370    6015.3    1396    6015.9    1428
GR   6015.4    1456    6015.2    1489    6014.9    1521    6014.7    1558    6014.9    1606
GR   6015.1    1629    6015.4    1660    6016.2    1705    6016.6    1736    6016.5    1778
GR   6016.7    1822      6017    1866    6017.7    1916    6017.9    1946    6017.9    1991
GR     6018    2033    6018.1    2059    6018.2    2079    6018.3    2090    6018.4    2100

ET                          7.1
X1        27      21    1135    1638     650      650     1193      1450
GR   6028.5    1000    6027.5    1049    6026.4    1092      650
GR   6024.9    1217    6024.5    1280    6024.4    1336     6026     1135    6025.3    1180
GR   6024.1    1578    6024.3    1638    6024.4    1715   6024.2     1415    6024.2    1509
GR   6025.5    1881    6025.7    1923    6026.2    1970   6024.6     1772    6025.2    1832
GR   6027.9    2100                                      6026.2     2011    6027.3    2054
```

STATUS: Analyzing profile 1.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

Cross Section Number SECNO	Left Overbank Manning XNL	Channel Manning n XNCH	Right Overbank Manning XNR	Flow Depth DEPTH (ft)	Water Surface Elevation CWSEL (ft MSL)	Critical W. S. Elevation CRIWS (ft MSL)	Known W. S. Elevation WSELK (ft MSL)
Energy Gradient SLOPE (ft/ft)	Left Overbank Length XLOBL (ft)	Channel Length XLCH (ft)	Right Overbank Length XLOBR (ft)	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss OLOSS (ft)
Cummul-ative Volume VOL (acre-ft)	Left Overbank Area ALOB (sq ft)	Channel Area ACH (sq ft)	Right Overbank Area AROB (sq ft)	Bridge Deck Area CORAR (sq ft)	Left Bank Elevation LTBNK (ft MSL)	Right Bank Elevation RTBNK (ft MSL)	Number of Balance Trials ITRIAL
Total Flow Q (cfs)	Left Overbank Flow QLOB (cfs)	Channel Flow QCH (cfs)	Right Overbank Flow QROB (cfs)	Computed W. S. Top Width TOPWD (ft)	Left W. S. Station SSTA (ft)	Right W. S. Station ENDST (ft)	Number of Crit Dpth Trials IDC
Flow Travel Time TIME (hrs)	Left Overbank Velocity VLOB (ft/s)	Channel Mean Velocity VCH (ft/s)	Right Overbank Velocity VROB (ft/s)	Length Weighted Manning n WTN	Cummul. Surface Area TWA (acres)	Minimum C. S. Elevation ELMIN (ft MSL)	Number of Other Trials ICONT
18.000	.040	.035	.000	6.72	5941.72	5941.72	5941.76
.010945	0	0	0	5943.72	2.00	.00	.00
.00	16	210	0	.00	5938.00	5941.90	0
2520	94	2425	0	58.9	1263.49	1322.35	4
.00	5.60	11.51	.00	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.000	.000	.024	.040	8.88	5951.17	5951.17	.00
.009603	370	370	370	5951.73	.56	3.79	.43
3.20	0	46	477	.00	5952.00	5952.00	0
2470	0	494	1975	468.2	1489.00	2020.98	16
.02	.00	10.52	4.13	.000	2.2	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

STATUS: (3280) For cross-section 19.10, ends have been extended vertically .53 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	10.99

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	6074.40
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5952.93
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	2066.
Total Pressure or Low Flow (cfs, QPR)	407.83
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.100	.040	.024	.040	12.22	5954.52	.00	.00
.000080	119	119	119	5954.53	.01	2.80	.00
8.22	287	67	2797	.00	5952.00	5952.00	1
2470	134	77	2258	1021.6	1288.38	2310.00	0
.06	.47	1.15	.81	.000	4.3	5942.30	8

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 20.000.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

20.000	.040	.040	.000	5.50	5957.40	5957.40	.00
.007115	861	861	861	5957.92	.52	.22	.26
44.55	233	290	0	.00	5956.20	5957.60	0
2470	588	1881	0	518.7	1130.25	1648.93	12
.10	2.52	6.48	.00	.000	19.5	5951.90	0

STATUS: Analyzing cross-section reach 21.000.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

21.000	.040	.040	.000	2.19	5967.49	5967.49	.00
.016676	810	810	810	5967.90	.42	8.43	.03
53.89	290	189	0	.00	5965.90	5967.60	0
2470	1426	1043	0	457.3	1090.43	1547.73	13
.15	4.91	5.51	.00	.000	28.6	5965.30	0

STATUS: Analyzing cross-section reach 22.000.

STATUS: (3265) Divided flow.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
22.000	.040	.040	.040	2.46	5979.36	5979.36	.00
.011634	710	710	710	5979.72	.36	9.81	.02
62.64	110	262	221	.00	5977.50	5979.00	0
2470	478	1451	539	841.5	1128.25	1987.66	8
.19	4.35	5.53	2.44	.000	39.2	5976.90	0

STATUS: Analyzing cross-section reach 23.000.

STATUS: (3265) Divided flow.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) .62

23.000	.000	.040	.040	1.14	5988.34	5988.19	.00
.010770	770	770	770	5988.48	.14	8.70	.06
72.23	0	152	338	.00	5990.50	5988.70	3
1470	0	412	1057	801.3	1216.34	2120.19	15
.26	.00	2.71	3.13	.000	53.7	5987.20	0

STATUS: Analyzing cross-section reach 24.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL) .00
Right Encroachment Station (ft, STENCR) 1548.00
Encroachment Method (TYPE) 1
Width or Percent Target 1547.999

24.000	.000	.000	.040	1.82	5999.82	5999.81	.00
.014718	920	920	920	6000.03	.22	11.51	.04
81.58	0	0	394	.00	5999.90	6000.50	2
1470	0	0	1469	814.0	1258.48	2072.46	16
.33	.00	.00	3.73	.000	70.7	5998.00	0

STATUS: Analyzing cross-section reach 25.000.

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
25.000	.000	.040	.040	1.44	6006.74	6006.41	.00
.007981	650	650	650	6006.93	.19	6.88	.01
87.68	0	308	115	.00	6008.50	6005.30	4
1470	0	1072	397	413.9	1145.50	1559.43	11
.38	.00	3.48	3.44	.000	79.9	6005.30	0

STATUS: Analyzing cross-section reach 26.000.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO) .69

26.000	.000	.040	.040	1.42	6016.02	6015.97	.00
.017005	830	830	830	6016.31	.29	9.33	.05
95.13	0	195	161	.00	6017.80	6014.90	2
1470	0	659	810	510.8	1184.08	1694.90	5
.44	.00	3.37	5.01	.000	88.7	6014.60	0

STATUS: Analyzing cross-section reach 27.000.

27.000	.000	.040	.040	1.03	6025.13	6024.95	.00
.011361	650	650	650	6025.29	.17	8.94	.04
101.17	0	342	109	.00	6026.00	6024.30	5
1470	0	1143	326	628.6	1196.04	1824.63	11
.49	.00	3.34	2.98	.000	97.2	6024.10	0

T1 COLO SPGS FLOOD INSURANCE
T2 PETERSON CREEK - BELOW PETERSON FIELD
T3 PETERSON DRAINAGE CALIBRATION: FISFW.DAT

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q	WSEL	FQ
		3			-1			2520	5941.76	

J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW	CHNIM	ITRACE
	15		-1				-10	-6		

STATUS: Analyzing profile 2.

STATUS: Critical depth to be calculated at all cross-sections.

STATUS: Allowable error for critical depth determination (ALLDC) is 10.000 percent of the depth.

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 18.000.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1273.00
Right Encroachment Station (ft, STENCR)	1323.00
Encroachment Method (TYPE)	1
Width or Percent Target	50.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
18.000	.000	.035	.000	6.76	5941.76	5941.76	5941.72
.012625	0	0	0	5943.94	2.18	.00	.00
.00	0	212	0	.00	5938.00	100000.00	0
2520	0	2519	0	49.5	1273.00	1322.50	4
.00	.00	11.84	.00	.000	.0	5935.00	0

Contraction Coefficient (CCHV) .300

Expansion Coefficient (CEHV) .500

STATUS: Analyzing cross-section reach 19.000.

STATUS: (3265) Divided flow.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (7185) Critical depth has been crossed, therefore critical depth has been assumed for the current cross-section.

WARNING: (3720) Critical depth has been assumed.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1489.00
Right Encroachment Station (ft, STENCR)	1750.00
Encroachment Method (TYPE)	1
Width or Percent Target	261.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTBNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
19.000	.000	.024	.040	9.63	5951.93	5951.93	5951.17
.008423	370	370	370	5952.58	.65	3.78	.46
2.74	0	51	381	.00	5952.00	5952.00	0
2470	0	514	1955	255.8	1489.00	1750.00	12
.02	.00	10.00	5.13	.000	1.3	5942.30	0

STATUS: Special bridge analysis being performed.

BRIDGE DESCRIPTION :

Bridge Total Loss Coefficient (XKOR)		1.25
Bridge Opening Total Area (sq ft, BAREA)		31.00
Bridge Opening Bottom Width (ft, BWC)		6.00
Bridge Opening Side Slope (SS)	1 :	.00
Bridge Opening Upstream Invert (ft MSL, ELCHU)		5943.50
Bridge Opening Downstream Invert (ft MSL, ELCHD)		5942.30
Bridge Skew Factor (BSQ)		1.00
Roadway Length (ft, RDLEN)		.00
Roadway Weir Flow Discharge Coefficient (COFQ)		2.60
Pier Width (ft, BWP)		.00
Pier Loss Drag Coefficient (CMOM)		2.00
Pier Shape Coefficient (XK)		1.05

STATUS: Analyzing cross-section reach 19.100.

WARNING: (1860) Bridge low chord elevation exceeds corresponding top of roadway elevation.

Bridge Low Chord Elevation (ft MSL, XLCEL)	5953.00
Top of Roadway Elevation (ft MSL, RDEL)	5952.00

STATUS: (3280) For cross-section 19.10, ends have been extended vertically .49 feet in order to calculate the hydraulic cross-section properties.

STATUS: (3301) The velocity head difference for current and previous cross-sections exceeded the allowable specified by HVINS.

WARNING: (3302) Conveyance change is outside of acceptable range.

Upstream to Downstream Conveyance Ratio (KRATIO)	3.94

STATUS: Pressure and weir flow. Weir submergence based on TRAPEZOIDAL shape.

BRIDGE ANALYSIS RESULTS :

Pressure Flow Energy Grade Line Elevation (ft MSL, EGPRS)	6075.16
Low Flow Energy Grade Line Elevation (ft MSL, EGLWC)	5953.78
Low Flow Water Surface Drop Through Bridge (ft, H3)	.00
Total Weir Flow (cfs, QWEIR)	2112.
Total Pressure or Low Flow (cfs, QPR)	361.45
Actual Bridge Opening Area (sq ft, BAREA)	31.
Trapezoidal Approx. Opening Area less Pier Area (sq ft, TAREA)	38.
Bridge Low Chord Elevation (ft MSL, ELLC)	5949.80
Top of Roadway Elevation (ft MSL, ELTRD)	5952.00
Roadway Weir Length (ft, WEIRLN)	197.0

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1489.00
Right Encroachment Station (ft, STENCR)	1750.00
Encroachment Method (TYPE)	1
Width or Percent Target	261.000