

LETTER OF MAP REVISION

For

SILVERADO PINES

JOB #241275

Clark County, Nevada

Prepared by:

Carter=Burgess

6655 Bermuda Road
Las Vegas, Nevada 89119

Submitted to:

MAY, 2005

RFCD

2005 NOV 15 PM 12:46

May 9, 2005

Mr. Sacha Tohme, CFM
State of Nevada, Revisions Coordinator
Michael Baker Jr., Inc.
3601 Eisenhower Avenue
Alexandria, Virginia 22304-6425

Subject: Letter of Map Revision (LOMR) For Silverado Pines Unit 3
C&B Job #241275

Dear Mr. Tohme:

Silverado Pines Unit 3 site consists of a residential development located South of Richmar Avenue and East of Gilespeie Street (Please See Figure 1), on 11± acres. Silverado Pines Unit 3 can be further located as being within unincorporated Clark County, Nevada in a portion of Section 21, Township 22 South, Range 61 East, M.D.M The Silverado Pines Unit 3 site is located within a Special Flood Hazard Area (SFHA) "Zone AE", as shown on the Flood Insurance Rate Map (FIRM) number 32003C2568E, revision date April 7, 2003. This report is the technical information and Hydrologic/Hydraulic data required to support a Letter of Map Revision (LOMR), which will reroute the SFHA "Zone AE" into The Lower Duck Creek Detention Basin.

Silverado Pines Unit 3 was the subject of a Federal Emergency Management Agency (FEMA) Conditional Letter of Map Revision (CLOMR), case number 04-09-1381R. Stantec Inc. prepared the CLOMR and this Letter of Map Revision (LOMR) will conform to the findings of the CLOMR. The LOMR will be based on the constructed "as-built" conditions. The "as-built" topographic data (survey shots) was incorporated into the HEC-RAS analysis:

- Effective Model W/1-ft Floodway

While the existing HEC-RAS analyses were not altered from the CLOMR submittal

- Corrected Model W/1-ft Floodway
- Revised Effective (Pre-Conditions)

The "as-built" information/data showed the Silverado Pines Unit 3 project site was constructed to the proposed grading plans and the minor elevation differences did not have an adverse impact on the performance or conveyance capacity of the proposed Silverado Pines Unit 3 Channel.

Enclosed within this LOMR request is:

- Letter of Map Revision Application
- Form 1, "Overview & Concurrence Form"
- Form 2, "Riverine Hydrology & Hydraulics Form"
- Form 3, "Riverine Structures Form"
- Vicinity Map
- FIRM Map No. 32003C2568E (Showing The Silverado Pines Unit 3 Channel containing and conveying the SFHA Zone "AE" and associated Floodway)
- The Silverado Pines Unit 3 - Conditional Letter of Map Revision
- A topographic map of the Silverado Pines Unit 3, showing "as-built" survey points and corresponding elevations
- The submittal fee of \$3,800.00 (LOMR based on an existing CLOMR).

The Letter of Map Revision (LOMR) request for the Silverado Pines Unit 3 project site has not deviated from the information/data supplied in the Conditional Letter of Map Revision (CLOMR), except where "as-built" elevations were inserted into the HEC-RAS models for proposed elevations.

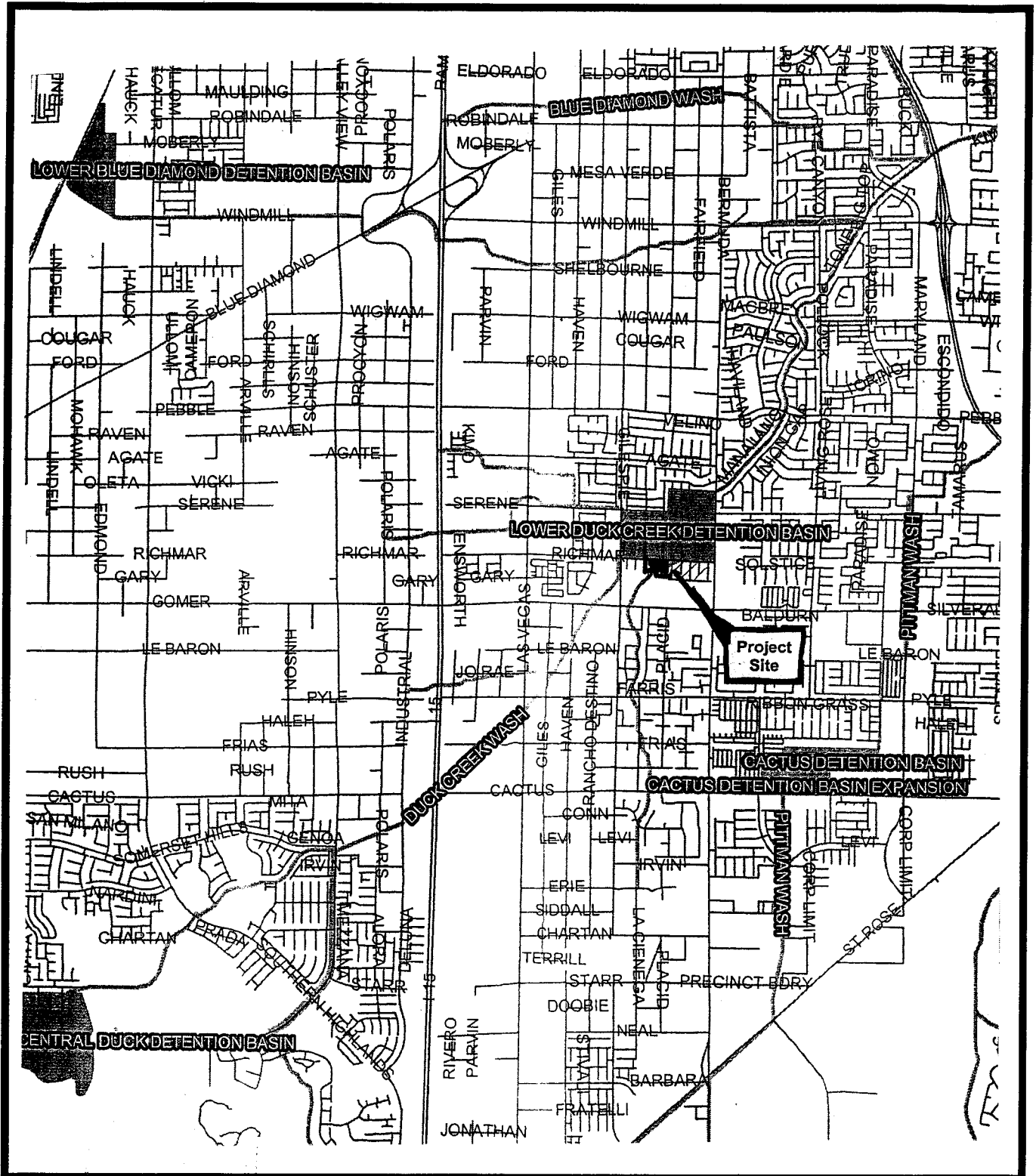
If there are any questions concerning this LOMR or additional information/data is needed, please contact our office at (702) 938-5400.

Sincerely,

Carter-Burgess



Alexander Kingston, E.I.T.
Senior Hydrologist



CarterBurgess

VICINITY MAP

SILVERADO PINES UNIT 3 LOMR

FIGURE 1

Job #: 241275

APPLICATION

FEDERAL EMERGENCY MANAGEMENT AGENCY
OVERVIEW & CONCURRENCE FORM

O.M.B No. 3067-0148
Expires September 30, 2005

PAPERWORK BURDEN DISCLOSURE NOTICE

Public reporting burden for this form is estimated to average 1 hour per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this 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, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

A. REQUESTED RESPONSE FROM FEMA

This request is for a (check one):

- ☐ CLOMR: A letter from FEMA commenting on whether a proposed project, if built as proposed, would justify a map revision, or proposed hydrology changes (See 44 CFR Ch. 1, Parts 60, 65 & 72).
- ☒ LOMR: A letter from FEMA officially revising the current NFIP map to show the changes to floodplains, regulatory floodway or flood elevations. (See Parts 60 & 65 of the NFIP Regulations.)

B. OVERVIEW

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

Community No.	Community Name	State	Map No.	Panel No.	Effective Date
Ex: 480301	City of Katy	TX	480301	0005D	02/08/83
480287	Harris County	TX	48201C	0220G	09/28/90
03	Clark County	NV	3203C	2568E	09/27/02
				Revis	8/13/03

2. Flooding Source: 08DUCK CREEK SOUTH CHANNEL

3. Project Name/Identifier: SILVERADO PINES UNIT NO. 3

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

5. Basis for Request and Type of Revision:

a. The basis for this revision request is (check all that apply)

- ☒ Physical Change ☐ Improved Methodology/Data
- ☐ Regulatory Floodway Revision ☐ Other (Attach Description)

Note: A photograph and narrative description of the area of concern is not required, but is very helpful during review.

b. The area of revision encompasses the following types of flooding and structures (check all that apply)

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

C. REVIEW FEE

Has the review fee for the appropriate request category been included?

☒ Yes

Fee amount: \$ 3,800.⁰⁰

☐ No, Attach Explanation

Please see the FEMA Web site at http://www.fema.gov/fhm/fm_fees.shtm for Fee Amounts and Exemptions.

D. SIGNATURE

All documents submitted in support of this request are 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: Alexander Kingston, EIT

Company: Carter & Burgess

Mailing Address:
6655 bermuda Road

Daytime Telephone No.:
(702) 938-5400

Fax No.:
(702) 938-5454

Las Vegas, Nevada 89119-3605

E-Mail Address: Alex.Kingston@c-b.com

Signature of Requester (required):

Alex Kingston

Date:

5-9-2005

As the community official responsible for floodplain management, I hereby acknowledge that we have received and reviewed this Letter of Map Revision (LOMR) or conditional LOMR request. Based upon the community's review, we find the completed or proposed project meets or is designed to meet all of the community floodplain management requirements, including the requirement that no fill be placed in the regulatory floodway, and that all necessary Federal, State, and local permits have been, or in the case of a conditional LOMR, will be obtained. In addition, we have determined that the land and any existing or proposed structures to be removed from the SFHA are or will be reasonably safe from flooding as defined in 44CFR 65.2(c), and that we have available upon request by FEMA, all analyses and documentation used to make this determination.

Community Official's Name and Title: Mr. Todd Myers, P.E.

Telephone No.:
(702) 455-4600

Community Name: CLARK COUNTY

Community Official's Signature (required):

Date:

CERTIFICATION BY REGISTERED PROFESSIONAL ENGINEER AND/OR LAND SURVEYOR

This certification is to be signed and sealed by a licensed land surveyor, registered professional engineer, or architect authorized by law to certify elevation information. All documents submitted in support of this request are 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.

Certifier's Name: Mr. Edward J. Thurnbeck, P.E.

License No.:

16563

Expiration Date:

6/30/06

Company Name: CARTER & BURGESS

Telephone No.: (702) 938-5527

Fax No.:
(702) 938-5454

Signature:

[Signature]

Date:

May 9, 05

Ensure the forms that are appropriate to your revision request are included in your submittal.

Form Name and (Number)

Required if ...

☒ Riverine Hydrology and Hydraulics Form (Form 2)

New or revised discharges or water-surface elevations

☒ Riverine Structures Form (Form 3)

Channel is modified, addition/revision of bridge/culverts,
addition/revision of levee/floodwall, addition/revision of dam

☐ Coastal Analysis Form (Form 4)

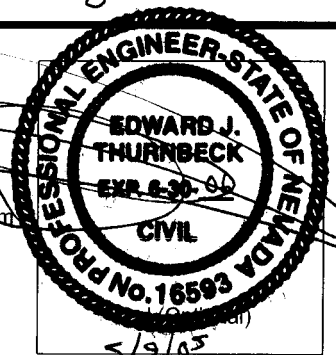
New or revised coastal elevations

☐ Coastal Structures Form (Form 5)

Addition/revision of coastal structure

☐ Alluvial Fan Flooding Form (Form 6)

Flood control measures on alluvial fans



**FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE HYDROLOGY & HYDRAULICS FORM**

**O.M.B No. 3067-0148
Expires September 30, 2005**

PAPERWORK REDUCTION ACT

Public reporting burden for this form is estimated to average 3 hours per response. The burden estimate includes the time for reviewing instructions, searching existing data sources, gathering and maintaining the needed data, and completing, reviewing, and submitting the form. You are not required to respond to this collection of information unless a valid OMB control number appears in the upper right corner of this 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, SW, Washington DC 20472, Paperwork Reduction Project (3067-0148). Submission of the form is required to obtain or retain benefits under the National Flood Insurance Program. **Please do not send your completed survey to the above address.**

Flooding Source: DUCK CREEK SOUTH CHANNEL
Note: Fill out one form for each flooding source studied

A. HYDROLOGY

1. Reason for New Hydrologic Analysis (check all that apply)

- | | | |
|---|--|--|
| ☒ Not revised (skip to section 2) | ☐ No existing analysis | ☐ Improved data |
| ☐ Alternative methodology | ☐ Proposed Conditions (CLOMR) | ☐ Changed physical condition of watershed |

2. Comparison of Representative 1%-Annual-Chance Discharges

Location	Drainage Area (Sq. Mi.)	FIS (cfs)	Revised (cfs)
----------	-------------------------	-----------	---------------

3. Methodology for New Hydrologic Analysis (check all that apply)

- | | | |
|---|--|------------------------------|
| ☐ Statistical Analysis of Gage Records | ☐ Precipitation/Runoff Model | [TR-20, HEC-1, HEC-HMS etc.] |
| ☐ Regional Regression Equations | ☐ Other (please attach description) | |

Please enclose all relevant models in digital format, maps, computations (including computation of parameters) and documentation to support the new analysis. The document, "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtml.

4. Review/Approval of Analysis

If your community requires a regional, state, or federal agency to review the hydrologic analysis, please attach evidence of approval/review.

5. Impacts of Sediment Transport on Hydrology

Was sediment transport considered? ☐ Yes ☐ No If yes, then fill out Section F (Sediment Transport) of Form 3. If No, then attach your explanation for why sediment transport was not considered.

B. HYDRAULICS

1. Reach to be Revised **DUCK CREEK SOUTH CHANNEL - BETWEEN LOWER DUCK CREEK AND EXISTING FIS SECTION 28500 (APPROXIMATELY 500-FT UPSTREAM OF DB).**

	Description	Cross Section	Water-Surface Elevations (ft.)	
			Effective	Proposed/Revised
Downstream Limit	LOWER DUCK CREEK DETENTION BASIN	4.0	2206.75	2206.75
Upstream Limit	EXISTING DUCK CREEK SOUTH CHANNEL FIS CROSS SECTION 28500	28500	2218.64	2218.64

2. Hydraulic Method Used

Hydraulic Analysis HEC-RAS [HEC-2, HEC-RAS, Other (Attach description)]

B. HYDRAULICS (CONTINUED)

3. Pre-Submittal Review of Hydraulic Models

FEMA has developed two review programs, CHECK-2 and CHECK-RAS, to aid in the review of HEC-2 and HEC-RAS hydraulic models, respectively. These review programs verify that the hydraulic estimates and assumptions in the model data are in accordance with NFIP requirements, and that the data are comparable with the assumptions and limitations of HEC-2/HEC-RAS. CHECK-2 and CHECK-RAS identify areas of potential error or concern. These tools do not replace engineering judgment. CHECK-2 and CHECK-RAS can be downloaded from http://www.fema.gov/fhm/firm_soft.shtm. We recommend that you review your HEC-2 and HEC-RAS models with CHECK-2 and CHECK-RAS. If you disagree with a message, please attach an explanation of why the message is not valid in this case. Review of your submittal and resolution of valid modeling discrepancies will result in reduced review time.

HEC-2/HEC-RAS models reviewed with CHECK-2/CHECK-RAS? ☒ Yes ☐ No

4. Models Submitted

Duplicate Effective Model*	Natural File Name: DCU4SUBCR.p01	Floodway File Name:
Corrected Effective Model*	Natural File Name: DCU4SUBCR.p02	Floodway File Name:
Existing or Pre-Project Conditions Model	Natural File Name:	Floodway File Name:
Revised or Post-Project Conditions Model	Natural File Name: SPU3LOMR.p10	Floodway File Name: SPU3LOMR.p10
Other - (attach description)	Natural File Name:	Floodway File Name:

*Not required for revisions to approximate 1%-annual-chance floodplains (Zone A) – for details, refer to the corresponding section of the instructions.

The document "Numerical Models Accepted by FEMA for NFIP Usage" lists the models accepted by FEMA. This document can be found at: http://www.fema.gov/fhm/en_modl.shtm.

C. MAPPING REQUIREMENTS

A **certified topographic map** must be submitted showing the following information (where applicable): the boundaries of the effective, existing, and proposed conditions 1%-annual-chance floodplain (for approximate Zone A revisions) or the boundaries of the 1%- and 0.2%-annual-chance floodplains and regulatory floodway (for detailed Zone AE, AO, and AH revisions); location and alignment of all cross sections with stationing control indicated; stream, road, and other alignments (e.g., dams, levees, etc.); current community easements and boundaries; boundaries of the requester's property; certification of a registered professional engineer registered in the subject State; location and description of reference marks; and the referenced vertical datum (NGVD, NAVD, etc.).

*Note that the boundaries of the existing or proposed conditions floodplains and regulatory floodway to be shown on the revised FIRM and/or FBFM must tie-in with the effective floodplain and regulatory floodway boundaries. Please attach a **copy of the effective FIRM and/or FBFM**, annotated to show the boundaries of the revised 1%- and 0.2%-annual-chance floodplains and regulatory floodway that tie-in with the boundaries of the effective 1%- and 0.2%-annual-chance floodplain and regulatory floodway at the upstream and downstream limits of the area of revision.

D. COMMON REGULATORY REQUIREMENTS

1. For CLOMR requests, do Base Flood Elevations (BFEs) increase? ☐ Yes ☐ No

For CLOMR requests, if either of the following is true, please submit evidence of compliance with Section 65.12 of the NFIP regulations:

- The proposed project encroaches upon a regulatory floodway and would result in increases above 0.00 foot.
- The proposed project encroaches upon a SFHA with BFEs established and would result in increases above 1.00 foot.

2. Does the request involve the placement or proposed placement of fill? ☐ Yes ☐ No

If Yes, the community must be able to certify that the area to be removed from the special flood hazard area, to include any structures or proposed structures, meets all of the standards of the local floodplain ordinances, and is reasonably safe from flooding in accordance with the NFIP regulations set forth at 44 CFR 60.3(a)(3), 65.5(a)(4), and 65.6(a)(14). Please see the MT-2 instructions for more information.

3. For LOMR requests, is the regulatory floodway being revised? ☐ Yes ☒ No

If Yes, attach evidence of regulatory floodway revision notification. As per Paragraph 65.7(b)(1) of the NFIP Regulations, notification is required for requests involving revisions to the regulatory floodway. (Not required for revisions to approximate 1%-annual-chance floodplains [studied Zone A designation] unless a regulatory floodway is being added. Elements and examples of regulatory floodway revision notification can be found in the MT-2 Form 2 Instructions.)

4. For LOMR requests, does this request require property owner notification and acceptance of BFE increases? ☒ Yes ☐ No

If Yes, please attach proof of property owner notification and acceptance (if available). Elements of and examples of property owner notification can be found in the MT-2 Form 2 Instructions.

FEDERAL EMERGENCY MANAGEMENT AGENCY
RIVERINE STRUCTURES FORM

*O.M.B. No. 3067-0148
Expires September 30, 2005*

PAPERWORK REDUCTION ACT

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Flooding Source: DUCK CREEK SOUTH CHANNEL
Note: Fill out one form for each flooding source studied

A. GENERAL

Complete the appropriate section(s) for each Structure listed below:

Channelization.....complete Section B
Bridge/Culvert.....complete Section C
Damcomplete Section D
Levee/Floodwallcomplete Section E
Sediment Transport.....complete Section F (if required)

Description Of Structure

1. Name of Structure: SILVERADO PINES CHANNEL

Type (check one): ☒ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: West of Bermuda Road on Richmar Avenue

Downstream Limit/Cross Section: 3.5 (LOWER DUCK CREEK DETENTION BASIN)

Upstream Limit/Cross Section: 28700

2. Name of Structure: SILVERADO PINES CULVERT

Type (check one): ☐ Channelization ☒ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure: West of Bermuda Road on Richmar Avenue

Downstream Limit/Cross Section: 3.5 (LOWER DUCK CREEK DETENTION BASIN)

Upstream Limit/Cross Section: 5.28

3. Name of Structure:

Type (check one) ☐ Channelization ☐ Bridge/Culvert ☐ Levee/Floodwall ☐ Dam

Location of Structure:

Downstream Limit/Cross Section:

Upstream Limit/Cross Section:

NOTE: For more structures, attach additional pages as needed.

B. CHANNELIZATION

Flooding Source: DUCK CREEK SOUTH CHANNEL

Name of Structure: SILVERADO PINES CHANNEL

1. Accessory Structures

The channelization includes (check one):

- | | |
|---|---|
| ☐ Levees [Attach Section E (Levee/Floodwall)] | ☐ Drop structures |
| ☐ Superelevated sections | ☒ Transitions in cross sectional geometry |
| ☐ Debris basin/detention basin | ☐ Energy dissipator |
| ☒ Other (Describe): SILVERADO PINES CULVERT | |

2. Drawing Checklist

Attach the plans of the channelization certified by a registered professional engineer, as described in the instructions.

3. Hydraulic Considerations

The channel was designed to carry 2315 (cfs) and/or the 100-year flood.

The design elevation in the channel is based on (check one):

- ☒ Subcritical flow ☐ Critical flow ☐ Supercritical flow ☐ Energy grade line

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

- ☐ Inlet to channel ☐ Outlet of channel ☐ At Drop Structures ☐ At Transitions
☐ Other locations (specify):

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If Yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

C. BRIDGE/CULVERT

Flooding Source: DUCK CREEK SOUTH CHANNEL

Name of Structure: SILVERADO PINES CULVERT

1. This revision reflects (check one):

- ☒ New bridge/culvert not modeled in the FIS
☐ Modified bridge/culvert previously modeled in the FIS
☐ New analysis of bridge/culvert previously modeled in the FIS

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

If different than hydraulic analysis for the flooding source, justify why the hydraulic analysis used for the flooding source could not analyze the structures. Attach justification.

3. Attach plans of the structures certified by a registered professional engineer. The plan detail and information should include the following (check the information that has been provided):

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

4. Sediment Transport Considerations

Was sediment transport considered? ☐ Yes ☒ No If yes, then fill out Section F (Sediment Transport).
If No, then attach your explanation for why sediment transport was not considered.

***EFFECTIVE HYDRAULIC
MODEL (HEC-2 BOSS RMS)***

&

***DUPLICATE EFFECTIVE
(HEC-RAS)***

T1	550.039									
T2	DUCK CREEK/ BLUE DIAMOND FIS RESTUDY									
T3	DCU4SUBC									
T4	FLOODPLAIN AND FLOODWAY MODEL									
T4	SUBCRITICAL									
T4	STREAM NAME: DUCK CREEK - "SOUTH CHANNEL"									
T4	UPSTREAM LIMIT: SILVERADO RANCH BOULEVARD									
T4	DOWNSTREAM LIMIT: LOWER DUCK CREEK DETENTION BASIN									
J1	2							2315	2208	
J2	1	-1							-1	-6
J3	150	115	110							
NC	0.045	0.045	0.04	0.1	0.3					
ET			7.1						1073	1175
X1	28200	11	1043.83	1205.78						
GR	2212	1000	2208	1043.83	2204	1082.51	2204	1082.59	2204	1094.39
GR	2208	1205.78	2212	1283.34	2216	1317.72	2216	1335.96	2216	1396.74
GR	2216	1396.79								
NC	0.045	0.045	0.04	0.1	0.3					
ET			7.1						1215	1342
X1	28300	11	1144.94	1425.99	322.05	390.05	366.72			
GR	2214	1000	2212	1050.76	2208	1144.94	2208	1179.29	2208	1314.23
GR	2208	1324.92	2208	1425.99	2208	1427.06	2212	1520.64	2216	1637.61
GR	2220	1741.65								
NC	0.045	0.045	0.04	0.1	0.3					
ET			6.4							
X1	28400	7	1325.02	1409.75	476.93	371.12	433.96			
GR	2220	1000	2216	1135.01	2216	1173.2	2216	1192.95	2212	1325.02
GR	2212	1409.75	2216	1724.75						
NC	0.045	0.045	0.04	0.1	0.3					
ET			7.1						1220	1337
X1	28500	6	1167.42	1392.35	397.65	344.27	390.77			
GR	2220	1000	2216	1167.42	2214	1253.26	2214	1303.05	2216	1392.35
GR	2220	1660.18								
NC	0.045	0.045	0.04	0.1	0.3					
ET			6.4							
X1	28600	6	1274.67	1401.53	425.31	353.59	398.87			
GR	2224	1000	2220	1158.6	2218	1274.67	2218	1401.53	2220	1512.13
GR	2224	1764.47								
NC	0.045	0.045	0.04	0.1	0.3					
ET			7.1						1064	1460
X1	28700	9	1064	1580.73	401.52	546.54	442.2			
GR	2228	1000	2224	1064	2225	1190	2226	1271	2224	1332.28
GR	2223	1476.2	2223	1580.73	2224	1633.49	2228	1722.15		
EJ										
T1	550.039									
T2	DUCK CREEK/ BLUE DIAMOND FIS RESTUDY									
T3	DCU4SUBC									
J1	3							2315	2208	
J2	15	-1							-1	-6

ER

BOSS RMS for AutoCAD HEC-2 Analysis version 2000

PAGE 1

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

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BOSS RMS for AutoCAD (tm)

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Copyright © 2000 BOSS International
All Rights Reserved

Version : 2000

PROGRAM ORIGIN :

BOSS RMS for AutoCAD HEC-2 Analysis uses the standard 4.6.2 version of the U.S. Army Corps of Engineers Hydrologic Engineering Center HEC-2 Program for water-surface profile computations. This HEC-2 program was released on September 1990, last updated on August 1991.

DISCLAIMER :

BOSS RMS for AutoCAD is a complex program which requires engineering expertise to use correctly. BOSS International assumes absolutely no responsibility for the correct use of this program. All results obtained should be carefully examined by an experienced professional engineer to determine if they are reasonable and accurate.

Although BOSS International has endeavored to make BOSS RMS for AutoCAD error free, the program is not and cannot be certified as infallible. Therefore, BOSS International makes no warranty, either implicit or explicit, as to the correct performance or accuracy of this software.

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PROJECT DESCRIPTION :

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

DESCRIPTION : DCU4SUBC

ENGINEER : MJL

DATE OF RUN : 3/17/2002

TIME OF RUN : 8:19 pm

BOSS RMS for AutoCAD HEC-2 Analysis version 2000

PAGE 2

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

T1 550.039
T2 DUCK CREEK/ BLUE DIAMOND FIS RESTUDY
T3 DCU4SUBC
T4 FLOODPLAIN AND FLOODWAY MODEL
T4 SUBCRITICAL
T4 STREAM NAME: DUCK CREEK - "SOUTH CHANNEL"
T4 UPSTREAM LIMIT: SILVERADO RANCH BOULEVARD
T4 DOWNSTREAM LIMIT: LOWER DUCK CREEK DETENTION BASIN

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q
WSEL	FQ							
		2						2315
2208								
J2	NPROF	IPLLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW
CHNIM		ITRACE						
	1		-1				-1	-6

USER-DEFINED SUMMARY TABLES (J3) :

	150	115	110			
NC	0.045	0.045	0.04	0.1	0.3	
ET			7.1			
1073	1175					
X1	28200	11	1043.83	1205.78		
GR	2212	1000	2208	1043.83	2204	1082.51
2204	1082.59		2204	1094.39		
GR	2208	1205.78	2212	1283.34	2216	1317.72
2216	1335.96		2216	1396.74		
GR	2216	1396.79				
NC	0.045	0.045	0.04	0.1	0.3	
ET			7.1			
1215	1342					
X1	28300	11	1144.94	1425.99	322.05	390.05
366.72						
GR	2214	1000	2212	1050.76	2208	1144.94
2208	1179.29		2208	1314.23		
GR	2208	1324.92	2208	1425.99	2208	1427.06
2212	1520.64		2216	1637.61		
GR	2220	1741.65				

NC	0.045	0.045	0.04	0.1	0.3	
ET			6.4			
X1	28400	7	1325.02	1409.75	476.93	371.12
433.96						
GR	2220	1000	2216	1135.01	2216	1173.2
2216	1192.95	2212	1325.02			
GR	2212	1409.75	2216	1724.75		
NC	0.045	0.045	0.04	0.1	0.3	
ET			7.1			
1220	1337					
X1	28500	6	1167.42	1392.35	397.65	344.27
390.77						

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PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

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GR	2220	1000	2216	1167.42	2214	1253.26
2214	1303.05		2216	1392.35		
GR	2220	1660.18				
NC	0.045	0.045	0.04	0.1	0.3	
ET			6.4			
X1	28600	6	1274.67	1401.53	425.31	353.59
398.87						
GR	2224	1000	2220	1158.6	2218	1274.67
2218	1401.53		2220	1512.13		
GR	2224	1764.47				
NC	0.045	0.045	0.04	0.1	0.3	
ET			7.1			
1064	1460					
X1	28700	9	1064	1580.73	401.52	546.54
442.2						
GR	2228	1000	2224	1064	2225	1190
2226	1271		2224	1332.28		
GR	2223	1476.2	2223	1580.73	2224	1633.49
2228	1722.15					

STATUS: Analyzing profile 1.

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

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28200.000.

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

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	Left Overbank Length	Channel Length	Right Overbank Length	Energy Gradient Elevation EG (ft MSL)	Weighted Velocity Head HV (ft)	Friction Energy Loss HL (ft)	Other Energy Loss LOSS (ft)
SLOPE (ft/ft)	XLOBL (ft)	XLCH (ft)	XLOBR (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
28200.000	0.000	0.040	0.000	4.00	2208.00	2207.62	2208.00
0.011627	0	0	0	2208.69	0.69	0.00	0.00
0.00	0	347	0	0.00	2208.00	2208.00	0
2315	0	2314	0	162.0	1043.83	1205.78	10
0.00	0.00	6.66	0.00	0.000	0.0	2204.00	0

Contraction Coefficient (CCHV)

0.100

Expansion Coefficient (CEHV)

0.300

STATUS: Analyzing cross-section reach 28300.000.

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)

2.16

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

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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
28300.000	0.045	0.040	0.045	2.30	2210.30	2209.24	0.00
0.002488	322	366	390	2210.45	0.15	1.70	0.05
4.70	62	645	64	0.00	2208.00	2208.00	4
2315	112	2084	118	390.0	1090.83	1480.82	17
0.03	1.81	3.23	1.85	0.000	2.3	2208.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28400.000.

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.

28400.000	0.045	0.040	0.045	2.02	2214.02	2214.02	0.00
0.017055	476	433	371	2214.68	0.66	2.22	0.15
10.44	67	171	160	0.00	2212.00	2212.00	0
2315	292	1326	696	310.4	1258.35	1568.77	11
0.05	4.34	7.75	4.34	0.000	5.7	2212.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28500.000.

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

Upstream to Downstream Conveyance Ratio (KRATIO) 2.11

28500.000	0.045	0.040	0.045	3.17	2217.17	2216.28	0.00
0.003826	397	390	344	2217.42	0.25	2.70	0.04
14.87	28	537	45	0.00	2216.00	2216.00	5
2315	40	2208	65	352.2	1118.48	1470.64	8
0.08	1.43	4.11	1.43	0.000	8.6	2214.00	0

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PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

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Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28600.000.

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
28600.000	0.045	0.040	0.045	1.76	2219.76	2219.76	0.00
0.017731	425	398	353	2220.40	0.64	2.83	0.12
19.46	89	223	85	0.00	2218.00	2218.00	0
2315	362	1607	345	326.2	1172.61	1498.78	11
0.10	4.04	7.21	4.04	0.000	11.6	2218.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28700.000.

STATUS: (3265) Divided flow.

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

Upstream to Downstream Conveyance Ratio (KRATIO) 1.58

28700.000	0.045	0.040	0.045	2.07	2225.07	2224.58	0.00
0.007096	401	442	546	2225.28	0.21	4.84	0.04
24.88	9	530	95	0.00	2224.00	2223.00	6
2315	16	1964	333	506.1	1046.92	1657.15	11
0.13	1.83	3.70	3.50	0.000	16.0	2223.00	0

T1 550.039

T2 DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

T3 DCU4SUBC

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PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

JOB PARAMETERS :

J1	ICHECK	INQ	NINV	IDIR	STRT	METRIC	HVINS	Q
WSEL	FQ							
2208		3						2315
J2	NPROF	IPLOT	PRFVS	XSECV	XSECH	FN	ALLDC	IBW
CHNIM	ITRACE							
15			-1				-1	-6

STATUS: Analyzing profile 2.

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

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28200.000.

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1073.00
Right Encroachment Station (ft, STENCR)	1175.00
Encroachment Method (TYPE)	1
Width or Percent Target	102.000

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PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

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
28200.000	0.000	0.040	0.000	4.00	2208.00	2207.69	2208.00
0.012578	0	0	0	2209.01	1.01	0.00	0.00
0.00	0	286	0	0.00	100000.00	100000.00	0
2315	0	2314	0	102.0	1073.00	1175.00	10
0.00	0.00	8.08	0.00	0.000	0.0	2204.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28300.000.

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) 1.61

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1215.00
Right Encroachment Station (ft, STENCR)	1342.00
Encroachment Method (TYPE)	1
Width or Percent Target	127.000

28300.000	0.000	0.040	0.000	3.29	2211.29	2210.17	2210.30
0.004838	322	366	390	2211.77	0.48	2.70	0.05
2.97	0	418	0	0.00	100000.00	100000.00	3
2315	0	2315	0	127.0	1215.00	1342.00	11
0.02	0.00	5.53	0.00	0.000	1.0	2208.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28400.000.

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

3/17/2002

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	177.27
Natural Water Surface Elevation (ft MSL, WSEL)	2214.02
Encroached Flow (cfs, ENC Q1)	177.27
Encroached Water Surface Elevation (ft MSL, WSEL)	2214.62
Interpolation Distance Ratio (RATIO)	0.0000
Flow (cfs, NAT Q1)	308.23
Left Overbank Ratio (LOB RATIO)	0.1452
Channel Ratio (CH RATIO)	0.5083
Right Overbank Ratio (ROB RATIO)	0.3465

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)	1325.02
Right Encroachment Station (ft, STENCR)	1424.13
Encroachment Method (TYPE)	4
Width or Percent Target	0.425

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRWS	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
28400.000	0.000	0.040	0.045	2.58	2214.58	2214.58	2214.02
0.018585	476	433	371	2215.89	1.30	3.65	0.25
6.30	0	218	35	0.00	2212.00	2212.00	0
2315	0	2047	267	99.1	1325.02	1424.13	15
0.03	0.00	9.35	7.47	0.000	2.1	2212.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28500.000.

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

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

PROJECT NUMBER : 550.039

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

Upstream to Downstream Conveyance Ratio (KRATIO) 2.37

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1220.00
Right Encroachment Station (ft, STENCR)	1337.00
Encroachment Method (TYPE)	1
Width or Percent Target	117.000

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRWS	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
28500.000	0.000	0.040	0.000	4.11	2218.11	2216.52	2217.17
0.003303	397	390	344	2218.51	0.40	2.54	0.09
9.46	0	455	0	0.00	100000.00	100000.00	5
2315	0	2315	0	117.0	1220.00	1337.00	8
0.05	0.00	5.09	0.00	0.000	3.0	2214.00	0

Contraction Coefficient (CCHV) 0.100

Expansion Coefficient (CEHV) 0.300

STATUS: Analyzing cross-section reach 28600.000.

STATUS: (2800) Special encroachment note.

Natural Flow (cfs, NAT Q1)	173.86
Natural Water Surface Elevation (ft MSL, WSEL)	2219.76
Encroached Flow (cfs, ENC Q1)	196.97
Encroached Water Surface Elevation (ft MSL, WSEL)	2220.36
Interpolation Distance Ratio (RATIO)	-0.1330
Flow (cfs, NAT Q1)	322.40
Left Overbank Ratio (LOB RATIO)	0.1990
Channel Ratio (CH RATIO)	0.6109
Right Overbank Ratio (ROB RATIO)	0.1901

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) 0.43

PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

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STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1274.67
Right Encroachment Station (ft, STENCR)	1401.53
Encroachment Method (TYPE)	4
Width or Percent Target	0.389

SECNO	XNL	XNCH	XNR	DEPTH	CWSEL	CRIWS	WSELK
SLOPE	XLOBL	XLCH	XLOBR	EG	HV	HL	OLOSS
VOL	ALOB	ACH	AROB	CORAR	LTKNK	RTBNK	ITRIAL
Q	QLOB	QCH	QROB	TOPWD	SSTA	ENDST	IDC
TIME	VLOB	VCH	VROB	WTN	TWA	ELMIN	ICONT
28600.000	0.000	0.040	0.000	2.22	2220.22	2220.17	2219.76
0.017590	425	398	353	2221.27	1.05	2.56	0.19
12.84	0	282	0	0.00	2218.00	2218.00	2
2315	0	2314	0	126.9	1274.67	1401.53	11
0.07	0.00	8.20	0.00	0.000	4.2	2218.00	0

Contraction Coefficient (CCHV)	0.100
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Expansion Coefficient (CEHV)	0.300
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STATUS: Analyzing cross-section reach 28700.000.

STATUS: (3265) Divided flow.

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)	1.54
--	------

STATUS: (3470) Encroachment computation information follows:

Left Encroachment Station (ft, STENCL)	1064.00
Right Encroachment Station (ft, STENCR)	1460.00
Encroachment Method (TYPE)	1
Width or Percent Target	396.000

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PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

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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
28700.000	0.000	0.040	0.000	2.90	2225.90	2225.37	2225.07
0.007383	401	442	546	2226.16	0.26	4.81	0.08
17.14	0	565	0	0.00	2224.00	100000.00	4
2315	0	2315	0	385.5	1064.00	1460.00	8
0.10	0.00	4.09	0.00	0.000	6.8	2223.00	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.

3/17/2002

SUMMARY PRINTOUT TABLE 150 : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

DCU4SUBC

550.039

Cross- Section Number	Channel Reach Length (ft)	Top of Roadway Elevation (ft MSL)	Max. Low Chord Elevation (ft MSL)	Minimum C. S. Elevation (ft MSL)	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	Critical W. S. Elevation (ft MSL)	Energy Gradient Elevation (ft MSL)	Energy Gradient Slope * 10,000 10K*S	Channel Mean Flow Velocity (ft/s)	Cross- Section Area (sq ft)	Index Q (0.01 * Convey.) .01K
SECNO	XLCH	ELTRD	ELLCL	ELMIN	Q	CWSEL	CRIWS	EG		VCH	AREA	
28200.000	0.00	0.00	0.00	2204.00	2315.00	2208.00	2207.62	2208.69	116.27	6.66	347.66	214.69
28200.000	0.00	0.00	0.00	2204.00	2315.00	2208.00	2207.69	2209.01	125.78	8.08	286.65	206.41
* 28300.000	366.72	0.00	0.00	2208.00	2315.00	2210.30	2209.24	2210.45	24.88	3.23	772.29	464.15
* 28300.000	366.72	0.00	0.00	2208.00	2315.00	2211.29	2210.17	2211.77	48.38	5.53	418.45	332.82
* 28400.000	433.96	0.00	0.00	2212.00	2315.00	2214.02	2214.02	2214.68	170.55	7.75	398.96	177.27
* 28400.000	433.96	0.00	0.00	2212.00	2315.00	2214.58	2214.58	2215.89	185.85	9.35	254.83	169.81
* 28500.000	390.77	0.00	0.00	2214.00	2315.00	2217.17	2216.28	2217.42	38.26	4.11	612.08	374.27
* 28500.000	390.77	0.00	0.00	2214.00	2315.00	2218.11	2216.52	2218.51	33.03	5.09	455.03	402.84
* 28600.000	398.87	0.00	0.00	2218.00	2315.00	2219.76	2219.76	2220.40	177.31	7.21	398.33	173.86
* 28600.000	398.87	0.00	0.00	2218.00	2315.00	2220.22	2220.17	2221.27	175.90	8.20	282.15	174.55
* 28700.000	442.20	0.00	0.00	2223.00	2315.00	2225.07	2224.58	2225.28	70.96	3.70	635.25	274.81
* 28700.000	442.20	0.00	0.00	2223.00	2315.00	2225.90	2225.37	2226.16	73.83	4.09	565.97	269.43

SUMMARY PRINTOUT TABLE 150 : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY

DCU4SUBC

550.039

Cross- Section Number	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Profile (ft)	W.S. Elev Diff per Section (ft)	W.S. Elev Diff per Know/Comp (ft)	Water Surface Top Width (ft)	Channel Reach Length (ft)
SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
28200.000	2315.00	2208.00	0.00	0.00	0.00	161.95	0.00
28200.000	2315.00	2208.00	0.00	0.00	0.00	102.00	0.00
* 28300.000	2315.00	2210.30	0.00	2.30	0.00	389.99	366.72
* 28300.000	2315.00	2211.29	1.00	3.29	1.00	127.00	366.72

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PROJECT NUMBER : 550.039

3/17/2002

Cross- Section Number	Discharge Flow (cfs)	Computed W. S. Elevation (ft MSL)	W.S. Elev Diff per Profile (ft)	W.S. Elev Diff per Section (ft)	W.S. Elev Diff per Know/Comp (ft)	Water Surface Top Width (ft)	Channel Reach Length (ft)
SECNO	Q	CWSEL	DIFWSP	DIFWSX	DIFKWS	TOPWID	XLCH
* 28400.000	2315.00	2214.02	0.00	3.72	0.00	310.42	433.96
* 28400.000	2315.00	2214.58	0.57	3.29	0.57	99.11	433.96
* 28500.000	2315.00	2217.17	0.00	3.15	0.00	352.15	390.77
* 28500.000	2315.00	2218.11	0.94	3.53	0.94	117.00	390.77
* 28600.000	2315.00	2219.76	0.00	2.59	0.00	326.16	398.87
* 28600.000	2315.00	2220.22	0.47	2.11	0.47	126.86	398.87
* 28700.000	2315.00	2225.07	0.00	5.31	0.00	506.11	442.20
* 28700.000	2315.00	2225.90	0.83	5.67	0.83	385.45	442.20

SUMMARY OF WARNING AND STATUS MESSAGES :

Section 28300, profile 1, conveyance change outside acceptable range.

Section 28300, profile 2, conveyance change outside acceptable range.

Section 28400, profile 1, critical depth assumed.

Section 28400, profile 1, minimum specific energy.

Section 28400, profile 2, critical depth assumed.

Section 28400, profile 2, minimum specific energy.

Section 28500, profile 1, conveyance change outside acceptable range.

Section 28500, profile 2, conveyance change outside acceptable range.

Section 28600, profile 1, critical depth assumed.

Section 28600, profile 1, minimum specific energy.

Section 28600, profile 2, conveyance change outside acceptable range.

Section 28700, profile 1, conveyance change outside acceptable range.

Section 28700, profile 2, conveyance change outside acceptable range.

13 Warning and status message(s) generated

Floodway width summary: DCU4SUBC

Profile No. 2

Section Number	Elevation Increase	Top Width	Left Encroach Station	Left Sta Distance From Center	Center Station	Right Sta Distance From Center	Right Encroach Station
28200.000	0.00	102.00	1073.00	51.80	1124.80	50.20	1175.00

BOSS RMS for AutoCAD HEC-2 Analysis version 2000
PROJECT TITLE : DUCK CREEK/ BLUE DIAMOND FIS RESTUDY
PROJECT NUMBER : 550.039

PAGE 15

3/17/2002

28300.000	1.00	127.00	1215.00	70.46	1285.46	56.54	1342.00
28400.000	0.57	99.11	1325.02	42.36	1367.39	56.74	1424.13
28500.000	0.94	117.00	1220.00	59.89	1279.89	57.11	1337.00
28600.000	0.47	126.86	1274.67	63.43	1338.10	63.43	1401.53
28700.000	0.83	396.00	1064.00	258.36	1322.36	137.64	1460.00

END OF OUTPUT

HEC-RAS Version 3.1.1 May 2003
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street, Suite D
Davis, California 95616-4687
(916) 756-1104

X	X	XXXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
XXXXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
X	X	XXXXXX	XXXX	X	X	XXXXX

PROJECT DATA

Project Title: duck_ck_south_CLOMR
Project File : dcu4subcr.prj
Run Date and Time: 7/29/2004 12:00:29 PM

Project in English units

Project Description:

Hydraulic analysis for Duck Creek South Channel
Prepared in support of the Approved CLOMR FEMA Case No. 04-09-0432R
Lower Duck Creek Detention Basin to Silverado Ranch Boulevard
Regulatory Flow with 1.0 foot floodway
Stantec Consulting Inc June 2004 Revised July 2004
By vcg

PLAN DATA

Plan Title: **Effective Model w/1ft FW**

Plan File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.p01

Geometry Title: Imported Effective HEC-2 Model

Geometry File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.g02

Flow Title : Regulatory Flow

Flow File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.f01

Plan Summary Information:

Number of:	Cross Sections =	6	Mulitple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculaton tolerance = 0.01

Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
Left Offset = 0
Right Offset = 0

River	Profile	Method	Value1	Value2
28700	1.0ft FW	1	1064	1460
28600	1.0ft FW	1	1274.67	1401.53
28500	1.0ft FW	1	1220	1337
28400	1.0ft FW	1	1325.02	1424.13
28300	1.0ft FW	1	1215	1342
28200	1.0ft FW	1	1073	1175

FLOW DATA

Flow Title: Regulatory Flow
Flow File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.f01

Flow Data (cfs)

River	Reach	RS	100-Year	1.0ft FW
RIVER-1	Reach-1	28700	2315	2315

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-Year		Known WS = 2208
RIVER-1	Reach-1	1.0ft FW		Known WS = 2208

GEOMETRY DATA

Geometry Title: Imported Effective HEC-2 Model
Geometry File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.g02

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1

RS: 28700

INPUT

Description: FEMA XS D - Upstream cross-section

Station Elevation Data		num=		9					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2228	1064	2224	1190	2225	1271	2226	1332.28	2224
1476.2	2223	1580.73	2223	1633.49	2224	1722.15	2228		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1064	.04	1580.73	.045

Bank Sta:	Left	Right	Lengths: Left Channel		Right	Coeff Contr.	
Expan.							
	1064	1580.73	401.52	442.2	546.54	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1

RS: 28600

INPUT

Description: FEMA XS C

Station Elevation Data		num=		6					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2224	1158.6	2220	1274.67	2218	1401.53	2218	1512.13	2220
1764.47	2224								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1274.67	.04	1401.53	.045

Bank Sta:	Left	Right	Lengths: Left Channel		Right	Coeff Contr.	
Expan.							
	1274.67	1401.53	425.31	398.87	353.59	.1	.3

CROSS SECTION

RIVER: RIVER-1
REACH: Reach-1

RS: 28500

INPUT

Description: New cross-section

Station Elevation Data		num=		6					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2220	1167.42	2216	1253.26	2214	1303.05	2214	1392.35	2216
1660.18	2220								

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1167.42	.04	1392.35	.045

Bank Sta:	Left	Right	Lengths: Left Channel			Right	Coeff Contr.	
Expan.								
	1167.42	1392.35		397.65	390.77	344.27		.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28400

INPUT

Description: FEMA XS B

Station Elevation Data		num=	7							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
1000	2220	1135.01	2216	1173.2	2216	1192.95	2216	1325.02	2212	2212
1409.75	2212	1724.75	2216							

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val		
1000	.045	1325.02	.04	1409.75	.045		

Bank Sta:	Left	Right	Lengths: Left Channel			Right	Coeff Contr.	
Expan.								
	1325.02	1409.75		476.93	433.96	371.12		.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28300

INPUT

Description: New cross-section

Station Elevation Data		num=	11							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta
1000	2214	1050.76	2212	1144.94	2208	1179.29	2208	1314.23	2208	2208
1324.92	2208	1425.99	2208	1427.06	2208	1520.64	2212	1637.61	2216	
1741.65	2220									

Manning's n Values		num=	3				
Sta	n Val	Sta	n Val	Sta	n Val		
1000	.045	1144.94	.04	1425.99	.045		

Bank Sta:	Left	Right	Lengths: Left Channel			Right	Coeff Contr.	
Expan.								
	1144.94	1425.99		322.05	366.72	390.05		.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28200

INPUT

Description: FEMA XS A - Downstream cross section

Station Elevation Data		num=	11							
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta

1000	2212	1043.83	2208	1082.51	2204	1082.59	2204	1094.39	2204
1205.78	2208	1283.34	2212	1317.72	2216	1335.96	2216	1396.74	2216
1396.79	2216								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1043.83	.04	1205.78	.045

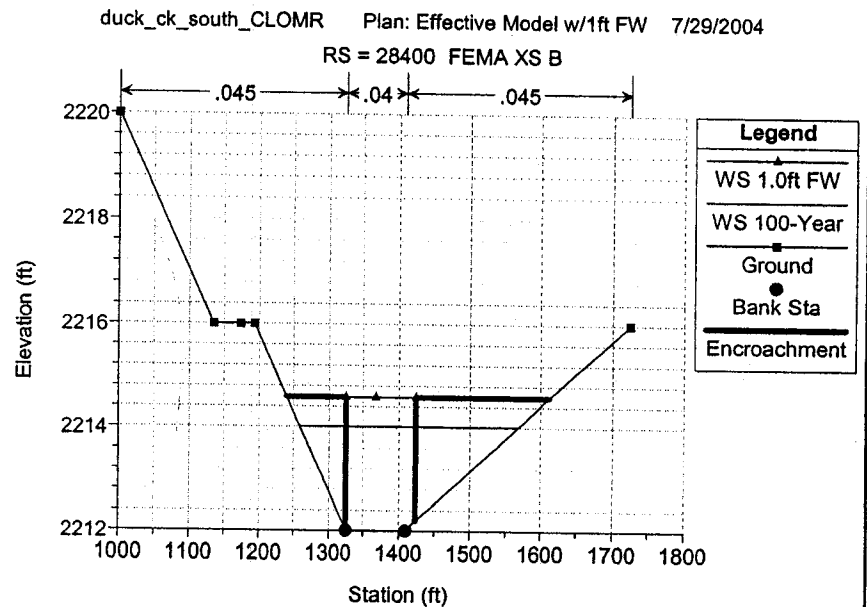
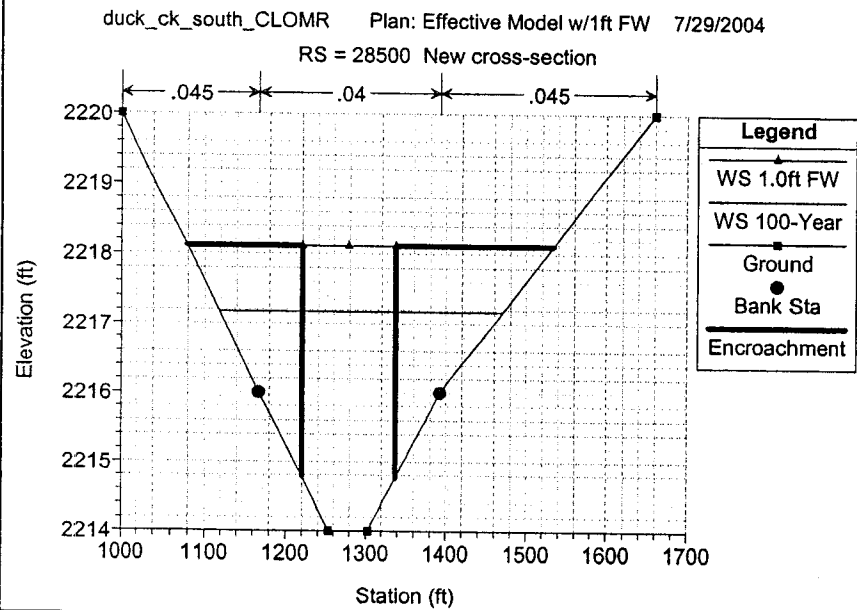
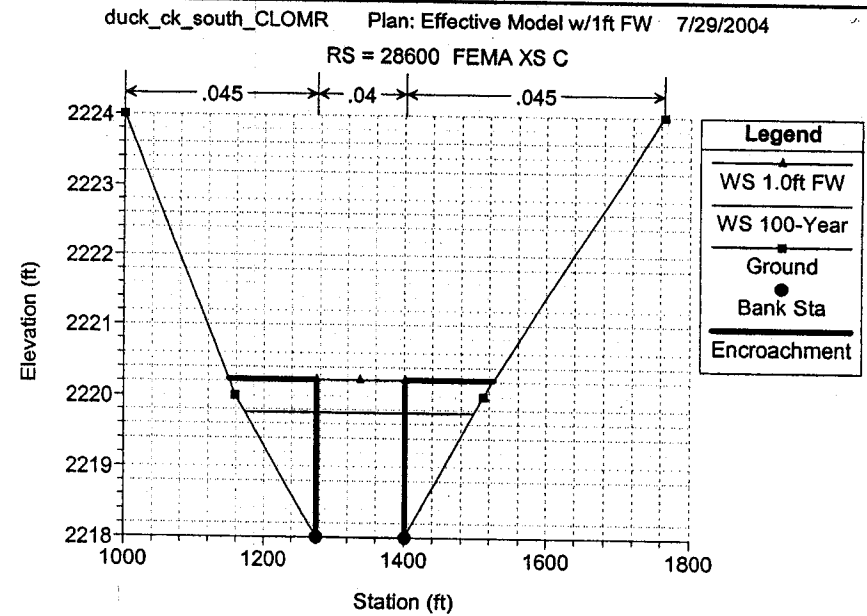
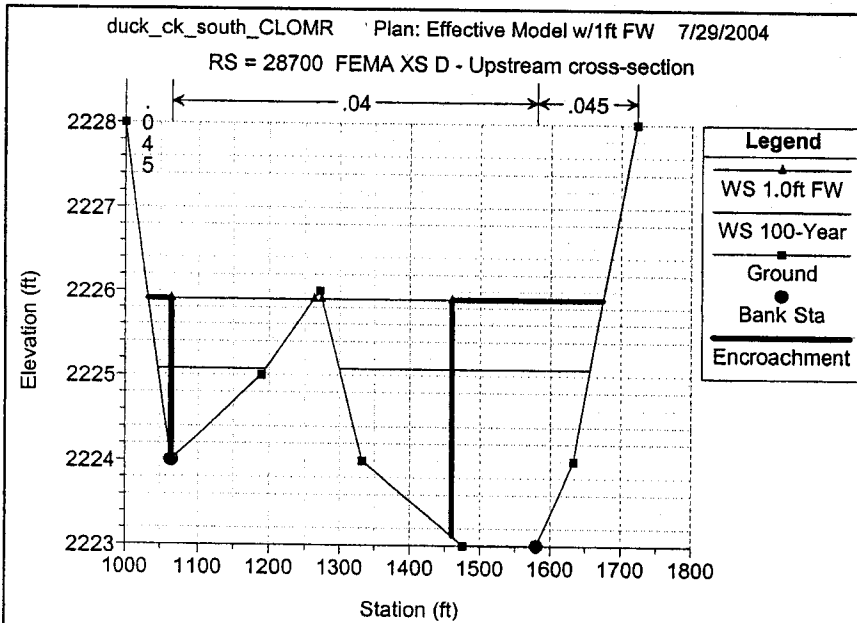
Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	1043.83	1205.78	0	0	0	.1	.3

HEC-RAS Plan: DE River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	28700	100-Year	2315.00	2223.00	2225.08		2225.28	0.007135	3.72	639.20	507.28	0.58
Reach-1	28700	1.0ft FW	2315.00	2223.11	2225.90	2225.37	2226.16	0.007418	4.10	565.04	385.18	0.60
Reach-1	28600	100-Year	2315.00	2218.00	2219.76	2219.76	2220.40	0.017694	7.20	398.65	326.28	0.96
Reach-1	28600	1.0ft FW	2315.00	2218.00	2220.22	2220.17	2221.27	0.017612	8.21	282.06	126.86	0.97
Reach-1	28500	100-Year	2315.00	2214.00	2217.17	2216.27	2217.42	0.003822	4.11	612.34	352.23	0.47
Reach-1	28500	1.0ft FW	2315.00	2214.00	2218.11		2218.51	0.003296	5.08	455.35	117.00	0.45
Reach-1	28400	100-Year	2315.00	2212.00	2214.02	2214.02	2214.68	0.017170	7.77	397.98	310.07	0.96
Reach-1	28400	1.0ft FW	2315.00	2212.00	2214.58	2214.58	2215.89	0.018704	9.37	254.35	99.11	1.03
Reach-1	28300	100-Year	2315.00	2208.00	2210.30		2210.45	0.002482	3.22	773.15	390.10	0.37
Reach-1	28300	1.0ft FW	2315.00	2208.00	2211.29		2211.77	0.004854	5.54	418.05	127.00	0.54
Reach-1	28200	100-Year	2315.00	2204.00	2208.00	2207.64	2208.69	0.011629	6.66	347.66	161.95	0.80
Reach-1	28200	1.0ft FW	2315.00	2204.00	2208.00	2207.71	2209.01	0.012580	8.08	286.65	102.00	0.85

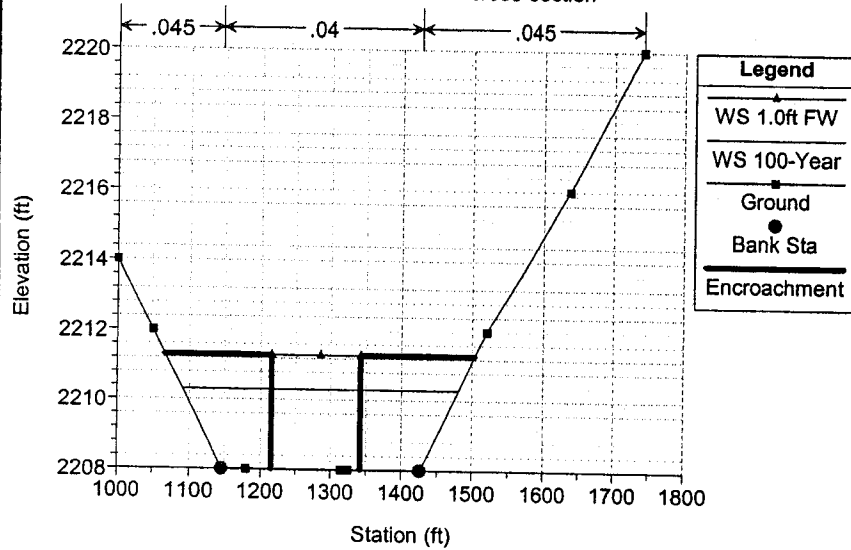
HEC-RAS Plan: DE River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev. (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	28700	100-Year	2225.08		2225.28	507.28	17.03	1987.23	310.74		1064.00	1580.73	
Reach-1	28700	1.0ft FW	2225.90	0.83	2226.16	385.18		2315.00		1064.00	1064.00	1580.73	1480.00
Reach-1	28600	100-Year	2219.76		2220.40	326.28	362.26	1607.56	345.18		1274.67	1401.53	
Reach-1	28600	1.0ft FW	2220.22	0.46	2221.27	126.86		2315.00		1274.67	1274.67	1401.53	1401.53
Reach-1	28500	100-Year	2217.17		2217.42	352.23	40.89	2208.68	65.43		1167.42	1392.35	
Reach-1	28500	1.0ft FW	2218.11	0.94	2218.51	117.00		2315.00		1220.00	1167.42	1392.35	1337.00
Reach-1	28400	100-Year	2214.02		2214.68	310.07	291.81	1327.02	696.17		1325.02	1409.75	
Reach-1	28400	1.0ft FW	2214.58	0.56	2215.89	99.11		2047.28	267.72	1325.02	1325.02	1409.75	1424.13
Reach-1	28300	100-Year	2210.30		2210.45	390.10	112.42	2084.92	117.66		1144.94	1425.99	
Reach-1	28300	1.0ft FW	2211.29	0.99	2211.77	127.00		2315.00		1215.00	1144.94	1425.99	1342.00
Reach-1	28200	100-Year	2208.00		2208.69	161.95		2315.00			1043.83	1205.78	
Reach-1	28200	1.0ft FW	2208.00	0.00	2209.01	102.00		2315.00		1073.00	1043.83	1205.78	1175.00



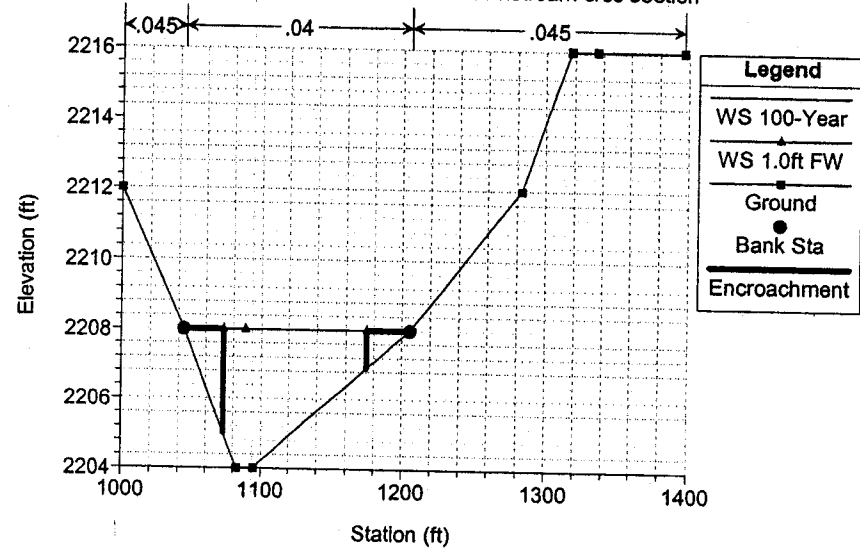
duck_ck_south_CLOMR Plan: Effective Model w/1ft FW 7/29/2004

RS = 28300 New cross-section

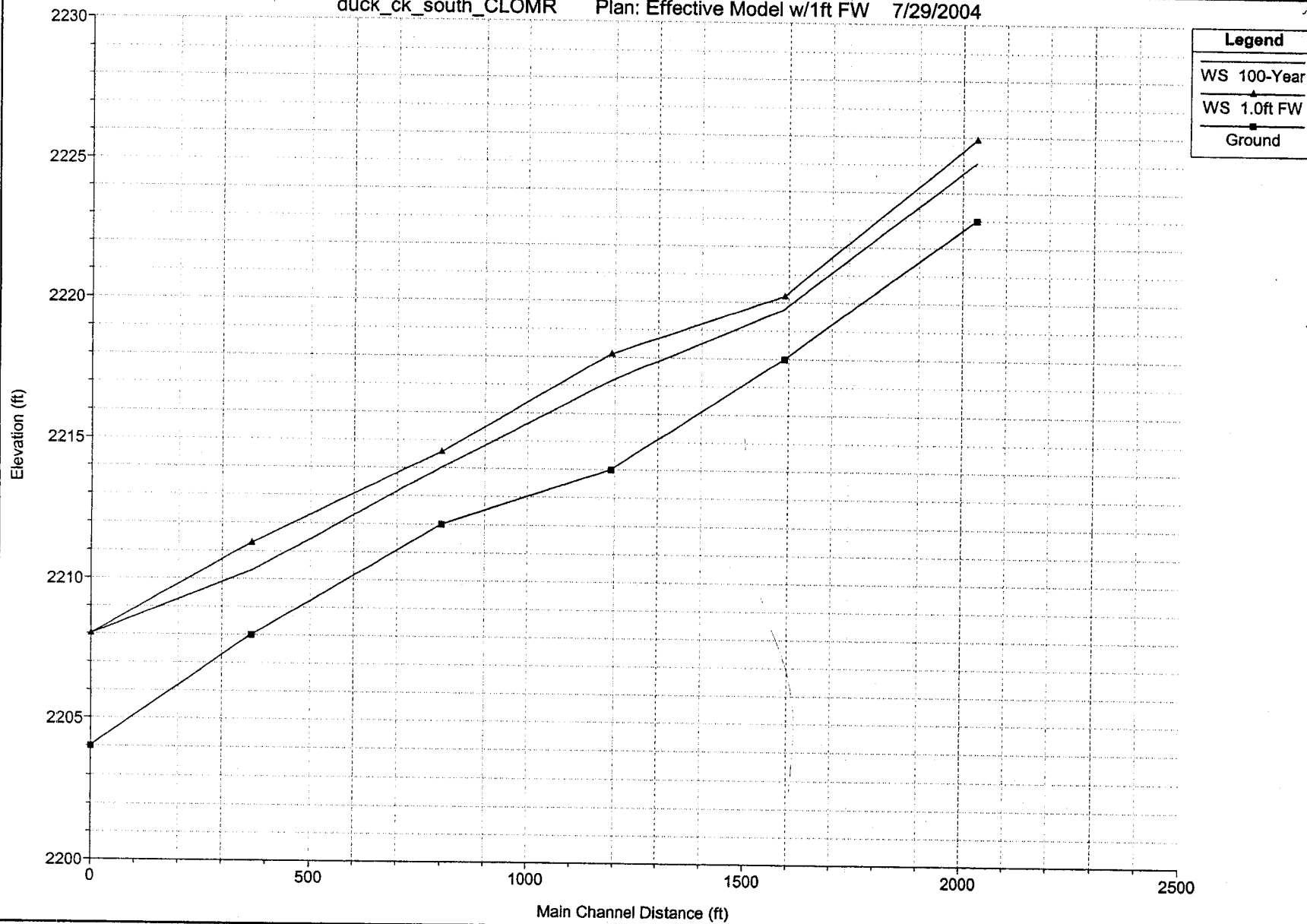


duck_ck_south_CLOMR Plan: Effective Model w/1ft FW 7/29/2004

RS = 28200 FEMA XS A - Downstream cross section



duck_ck_south_CLOMR Plan: Effective Model w/1ft FW 7/29/2004



CORRECTED EFFECTIVE

HEC-RAS Version 3.1.1 May 2003
 U.S. Army Corp of Engineers
 Hydrologic Engineering Center
 609 Second Street, Suite D
 Davis, California 95616-4687
 (916) 756-1104

X	X	XXXXXX	XXXX	XXXX	XX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
XXXXXXXX	XXXX	X	XXX	XXXX	XXXXXX	XXXX
X	X	X	X	X	X	X
X	X	X	X	X	X	X
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PROJECT DATA

Project Title: duck_ck_south_CLOMR
 Project File : dcu4subcr.prj
 Run Date and Time: 7/29/2004 12:01:28 PM

Project in English units

Project Description:

Hydraulic analysis for Duck Creek South Channel
 Prepared in support of the Approved CLOMR FEMA Case No. 04-09-0432R
 Lower Duck Creek Detention Basin to Silverado Ranch Boulevard
 Regulatory Flow with 1.0 foot floodway
 Stantec Consulting Inc June 2004 - Revised July 2004
 By vcg

PLAN DATA

Plan Title: **Corrected Effective Model w/1ft FW**
 Plan File : V:\52873\active\188130117\civil\design\analysis\hec-
 ras\DCSC\dcu4subcr.p02

Geometry Title: Corrected Effective Model

Geometry File : V:\52873\active\188130117\civil\design\analysis\hec-
 ras\DCSC\dcu4subcr.g01

Flow Title : Regulatory Flow - Corrected Boundary

Flow File : V:\52873\active\188130117\civil\design\analysis\hec-
 ras\DCSC\dcu4subcr.f02

Plan Summary Information:

Number of:	Cross Sections =	7	Multple Openings =	0
	Culverts =	0	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance = 0.01
 Critical depth calculaton tolerance = 0.01

Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

Computation Options

Critical depth computed only where necessary
Conveyance Calculation Method: At breaks in n values only
Friction Slope Method: Average Conveyance
Computational Flow Regime: Subcritical Flow

Encroachment Data

Equal Conveyance = True
Left Offset = 0
Right Offset = 0

River	Profile	Reach	Method	Value1	Value2
RIVER-1		Reach-1			
RS					
28700	1.0ft FW		1	1064	1460
28650	1.0ft FW		1	1225	1505
28600	1.0ft FW		1	1274.67	1401.53
28500	1.0ft FW		1	1220	1337
28400	1.0ft FW		1	1325.02	1424.13
28300	1.0ft FW		1	1215	1342
28200	1.0ft FW		1	1073	1175

FLOW DATA

Flow Title: Regulatory Flow - Corrected Boundary
Flow File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.f02

Flow Data (cfs)

River	Reach	RS	100-Year	1.0ft FW
RIVER-1	Reach-1	28700	2315	2315

Boundary Conditions

River	Reach	Profile	Upstream	Downstream
RIVER-1	Reach-1	100-Year		Known WS = 2210.37
RIVER-1	Reach-1	1.0ft FW		Known WS = 2211.37

GEOMETRY DATA

Geometry Title: Corrected Effective Model
Geometry File : V:\52873\active\188130117\civil\design\analysis\hec-ras\DCSC\dcu4subcr.g01

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 28700

INPUT

Description: FEMA XS D - Upstream cross-section

Station Elevation Data		num= 9		Sta		Elev		Sta		Elev	
1000	2230.37	1064	2226.37	1190	2227.37	1271	2228.37	1332.28	2226.37		
1476.2	2225.37	1580.73	2225.37	1633.49	2226.37	1722.15	2230.37				

Manning's n Values		num= 3		Sta		n Val	
1000	.045	1064	.04	1580.73	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	1064	1580.73	200	221	280	.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 28650

INPUT

Description: New Cross-section

Station Elevation Data		num= 13		Sta		Elev		Sta		Elev	
1000	2226	1060	2225	1090	2224.8	1170	2225	1245	2225.4		
1355	2225	1400	2224	1450	2223	1500	2222.8	1552	2223		
1605	2224	1645	2225	1685	2226						

Manning's n Values		num= 3		Sta		n Val	
1000	.045	1400	.04	1552	.045		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.	1400	1552	201.52	221.2	266.54	.1	.3

CROSS SECTION

RIVER: RIVER-1

REACH: Reach-1

RS: 28600

INPUT

Description: FEMA XS C

Station Elevation Data		num= 6		Sta		Elev		Sta		Elev	
1000	2226.37	1158.6	2222.37	1274.67	2220.37	1401.53	2220.37	1512.13	2222.37		
1764.47	2226.37										

Manning's n Values		num= 3	

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1274.67	.04	1401.53	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	1274.67	1401.53		425.31	398.87	353.59	.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28500

INPUT

Description: New cross-section

Station	Elevation	Data	num=	6					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2222.37	1167.42	2218.37	1253.26	2216.37	1303.05	2216.37	1392.35	2218.37
1660.18	2222.37								

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1167.42	.04	1392.35	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	1167.42	1392.35		397.65	390.77	344.27	.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28400

INPUT

Description: FEMA XS B

Station	Elevation	Data	num=	7					
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2222.37	1135.01	2218.37	1173.2	2218.37	1192.95	2218.37	1325.02	2214.37
1409.75	2214.37	1724.75	2218.37						

Manning's n Values	num=	3			
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1325.02	.04	1409.75	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	1325.02	1409.75		476.93	433.96	371.12	.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28300

INPUT

Description: New cross-section

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2216.37	1050.76	2214.37	1144.94	2210.37	1179.29	2210.37	1314.23	2210.37
1324.92	2210.37	1425.99	2210.37	1427.06	2210.37	1520.64	2214.37	1637.61	2218.37
1741.65	2222.37								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1144.94	.04	1425.99	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	1144.94	1425.99		322.05	366.72	390.05	.1 .3

CROSS SECTION

RIVER: RIVER-1
 REACH: Reach-1 RS: 28200

INPUT

Description: FEMA XS A - Downstream cros section

Station Elevation Data num= 11

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2214.37	1043.83	2210.37	1082.51	2206.37	1082.59	2206.37	1094.39	2206.37
1205.78	2210.37	1283.34	2214.37	1317.72	2218.37	1335.96	2218.37	1396.74	2218.37
1396.79	2218.37								

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1043.83	.04	1205.78	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.
Expan.							
	1043.83	1205.78		0	0	0	.1 .3

HEC-RAS Plan: CE River: RIVER-1 Reach: Reach-1

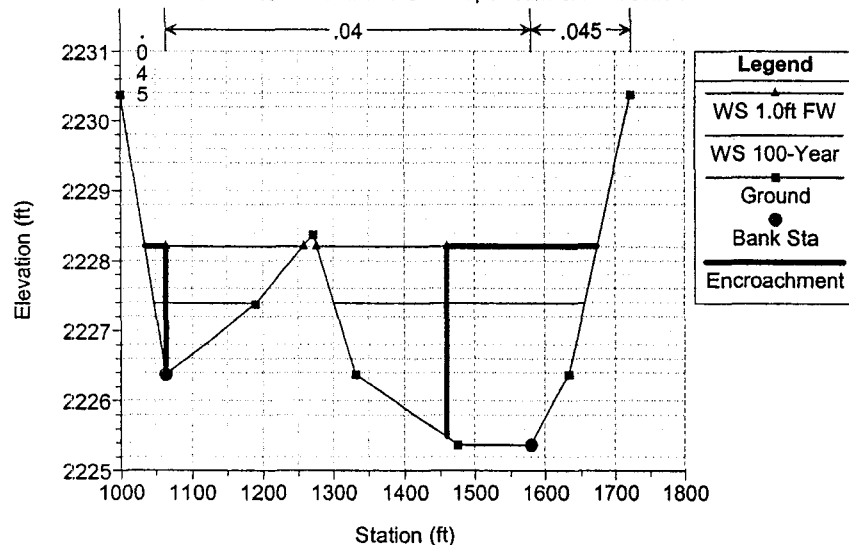
Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Reach-1	28700	100-Year	2315.00	2225.37	2227.39	2226.95	2227.62	0.008074	3.89	611.93	499.16	0.61
Reach-1	28700	1.0ft FW	2315.00	2225.48	2228.21		2228.50	0.008365	4.28	540.99	378.15	0.63
Reach-1	28650	100-Year	2315.00	2222.80	2225.16	2224.87	2225.61	0.009254	5.80	494.91	491.75	0.71
Reach-1	28650	1.0ft FW	2315.00	2222.80	2225.83	2225.79	2226.47	0.009920	6.94	415.78	280.00	0.75
Reach-1	28600	100-Year	2315.00	2220.37	2222.13	2222.13	2222.77	0.017694	7.20	398.65	326.28	0.96
Reach-1	28600	1.0ft FW	2315.00	2220.37	2222.62	2222.54	2223.64	0.016918	8.11	285.53	126.86	0.95
Reach-1	28500	100-Year	2315.00	2216.37	2219.54	2218.64	2219.79	0.003822	4.11	612.34	352.23	0.47
Reach-1	28500	1.0ft FW	2315.00	2216.37	2220.42		2220.83	0.003482	5.17	447.72	117.00	0.47
Reach-1	28400	100-Year	2315.00	2214.37	2216.39	2216.39	2217.05	0.017170	7.77	397.98	310.07	0.96
Reach-1	28400	1.0ft FW	2315.00	2214.37	2217.10	2216.95	2218.27	0.015608	8.87	268.82	99.11	0.95
Reach-1	28300	100-Year	2315.00	2210.37	2212.67		2212.82	0.002482	3.22	773.15	390.10	0.37
Reach-1	28300	1.0ft FW	2315.00	2210.37	2213.38		2213.95	0.006539	6.07	381.65	127.00	0.62
Reach-1	28200	100-Year	2315.00	2206.37	2210.37	2210.01	2211.06	0.011629	6.66	347.66	161.95	0.80
Reach-1	28200	1.0ft FW	2315.00	2206.37	2211.37	2210.08	2211.92	0.004675	5.96	388.65	102.00	0.54

HEC-RAS Plan: CE River: RIVER-1 Reach: Reach-1

Reach	River Sta	Profile	W.S. Elev (ft)	Prof Delta WS (ft)	E.G. Elev (ft)	Top Width Act (ft)	Q Left (cfs)	Q Channel (cfs)	Q Right (cfs)	Enc Sta L (ft)	Ch Sta L (ft)	Ch Sta R (ft)	Enc Sta R (ft)
Reach-1	28700	100-Year	2227.39		2227.62	499.16	15.78	1988.72	310.50		1064.00	1580.73	
Reach-1	28700	1.0ft FW	2228.21	0.82	2228.50	378.15		2315.00		1064.00	1064.00	1580.73	1460.00
Reach-1	28650	100-Year	2225.16		2225.61	491.75	91.77	1819.88	403.35		1400.00	1552.00	
Reach-1	28650	1.0ft FW	2225.83	0.66	2226.47	280.00	387.10	1927.90		1225.00	1400.00	1552.00	1505.00
Reach-1	28600	100-Year	2222.13		2222.77	326.28	362.26	1607.56	345.18		1274.67	1401.53	
Reach-1	28600	1.0ft FW	2222.62	0.49	2223.64	126.86		2315.00		1274.67	1274.67	1401.53	1401.53
Reach-1	28500	100-Year	2219.54		2219.79	352.23	40.89	2208.68	65.43		1167.42	1392.35	
Reach-1	28500	1.0ft FW	2220.42	0.88	2220.83	117.00		2315.00		1220.00	1167.42	1392.35	1337.00
Reach-1	28400	100-Year	2216.39		2217.05	310.07	291.81	1327.02	696.17		1325.02	1409.75	
Reach-1	28400	1.0ft FW	2217.10	0.71	2218.27	99.11		2047.61	267.40	1325.02	1325.02	1409.75	1424.13
Reach-1	28300	100-Year	2212.67		2212.82	390.10	112.42	2084.92	117.66		1144.94	1425.99	
Reach-1	28300	1.0ft FW	2213.38	0.70	2213.95	127.00		2315.00		1215.00	1144.94	1425.99	1342.00
Reach-1	28200	100-Year	2210.37		2211.06	161.95		2315.00			1043.83	1205.78	
Reach-1	28200	1.0ft FW	2211.37	1.00	2211.92	102.00		2315.00		1073.00	1043.83	1205.78	1175.00

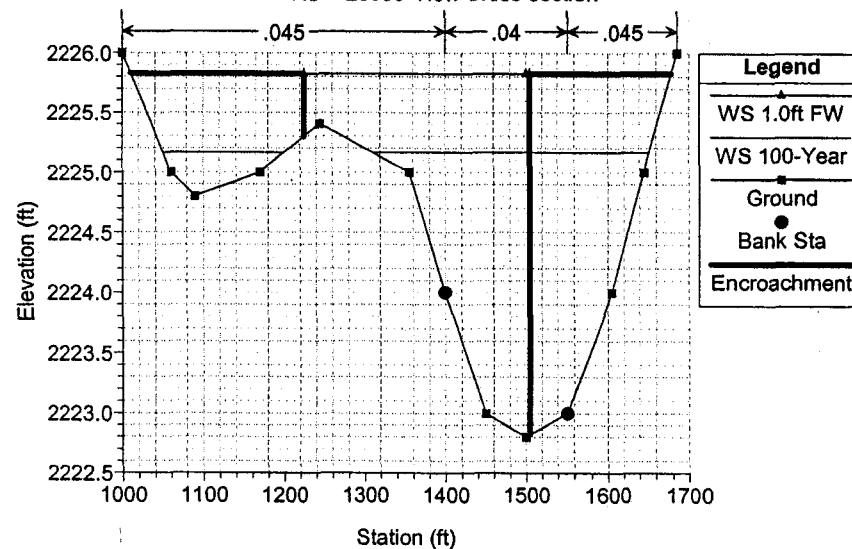
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28700 FEMA XS D - Upstream cross-section



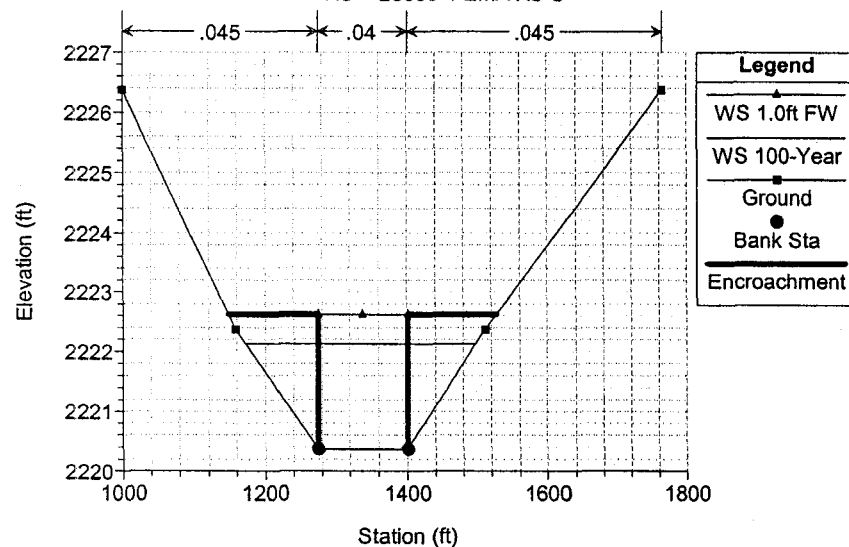
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28650 New Cross-section



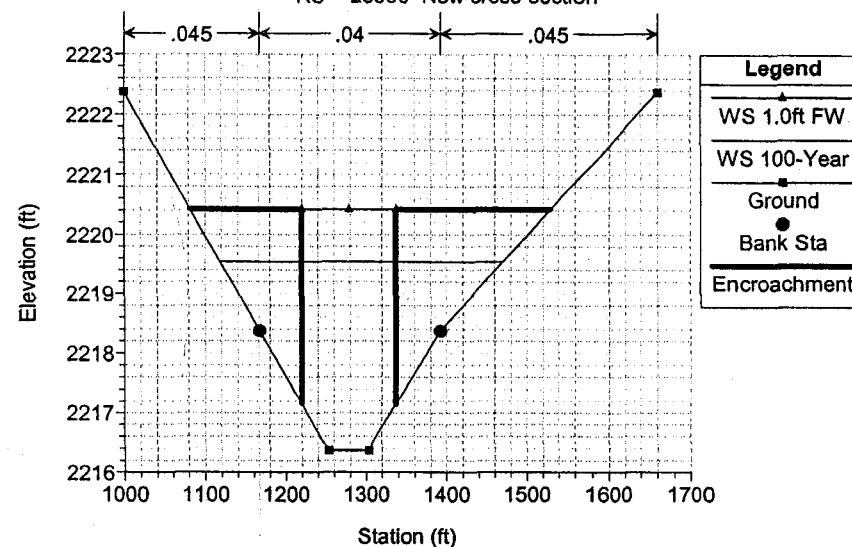
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28600 FEMA XS C



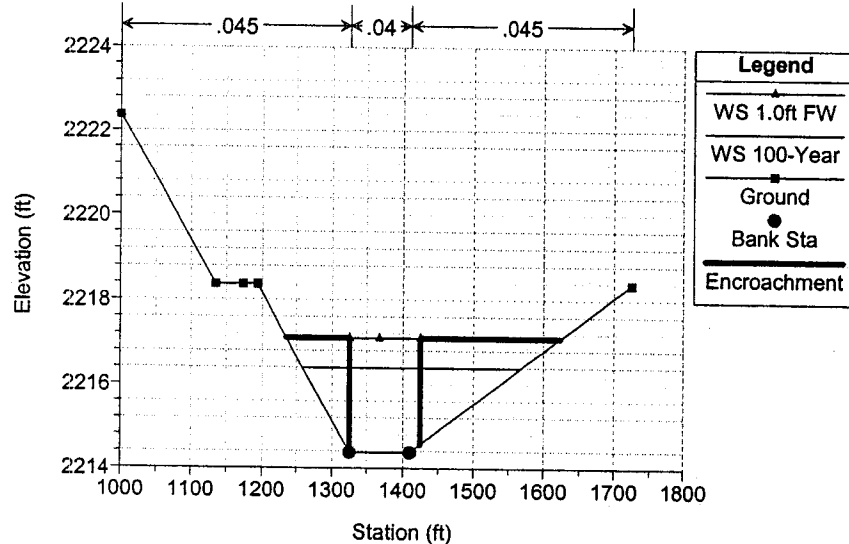
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28500 New cross-section



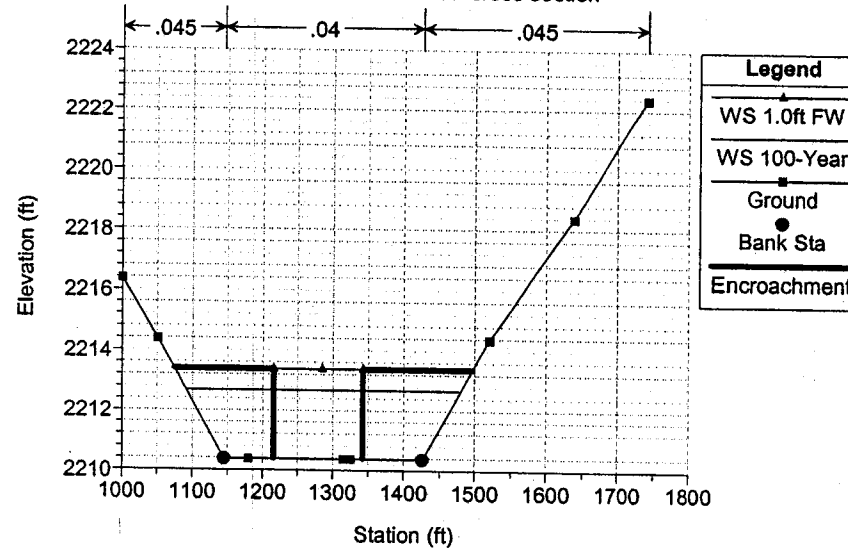
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28400 FEMA XS B



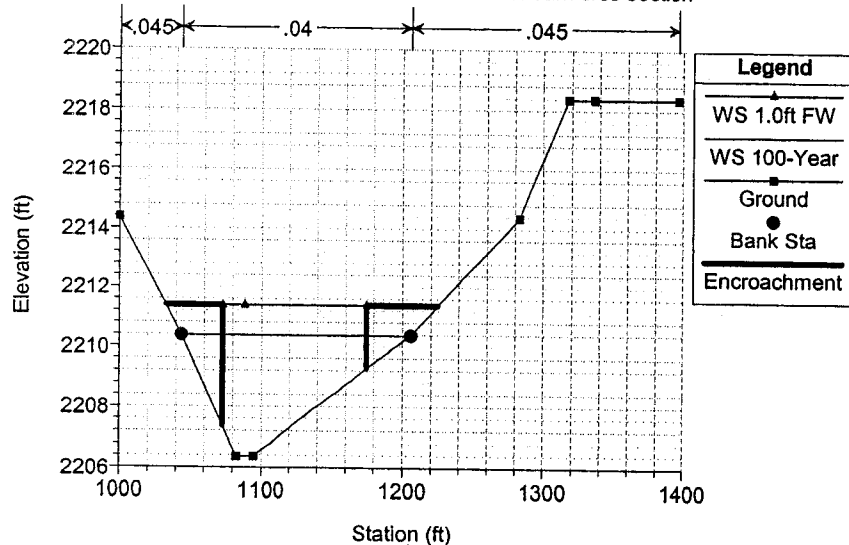
duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28300 New cross-section

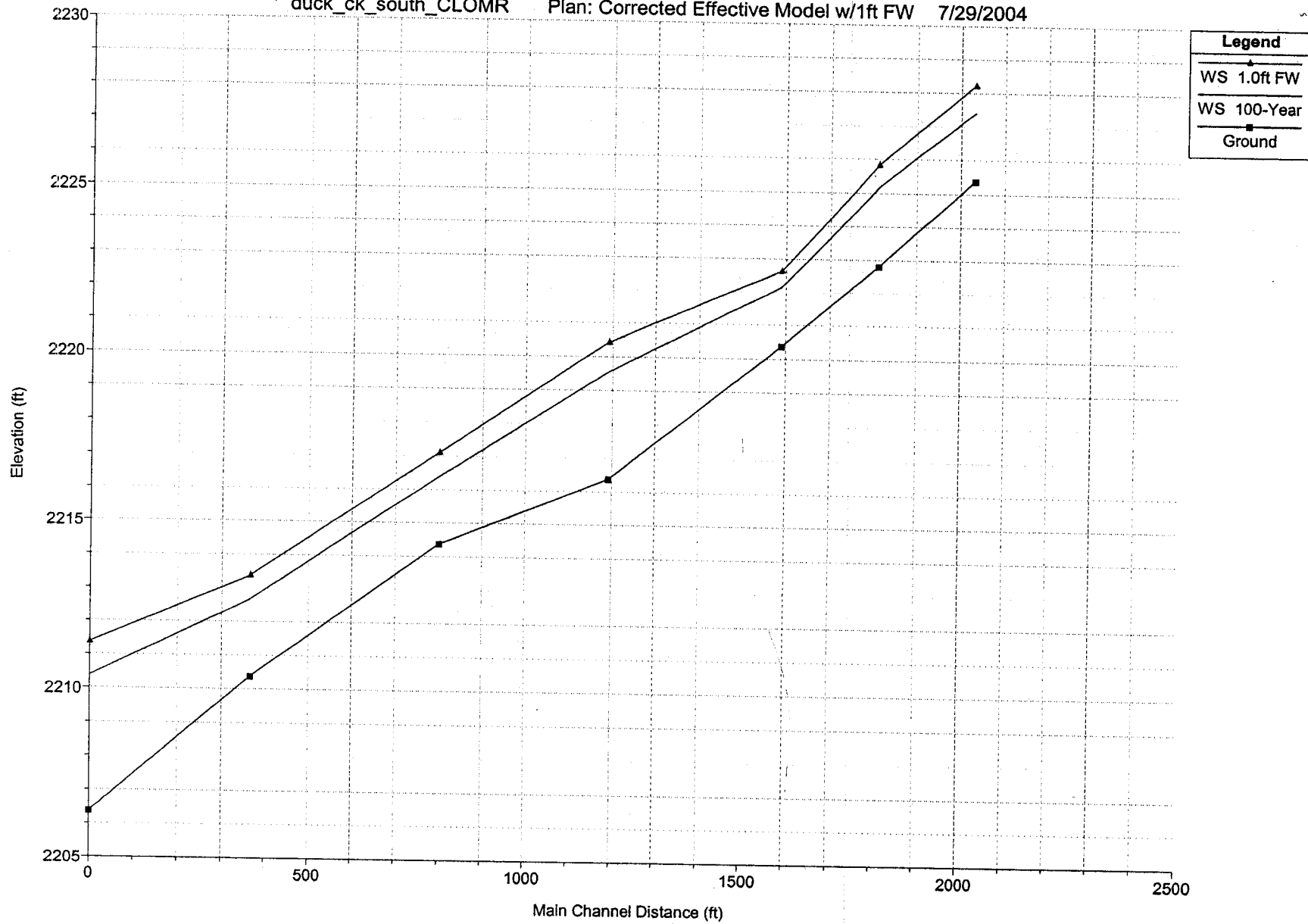


duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004

RS = 28200 FEMA XS A - Downstream cross section



duck_ck_south_CLOMR Plan: Corrected Effective Model w/1ft FW 7/29/2004



REVISED EFFECTIVE

SPU3LOMR

HEC-RAS Version 3.1.2 April 2004
U.S. Army Corp of Engineers
Hydrologic Engineering Center
609 Second Street
Davis, California

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X      X  XXXXXX      XXXX      XXXX      XX      XXXX
X      X  X          X      X      X  X      X
X      X  X          X      X      X  X      X
XXXXXXXX XXXX      X      XXX XXXX      XXXXXX      XXXX
X      X  X          X      X      X  X      X
X      X  X          X      X      X  X      X
X      X  XXXXXX      XXXX      X      X      X      XXXXX

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PROJECT DATA

Project Title: duck_ck_south_LOMR(4-2005)
Project File : SPU3LOMR.prj
Run Date and Time: 5/8/2005 1:03:29 PM

Project in English units

Project Description:

Hydraulic analysis for Duck Creek South Channel
Prepared in support of the
Approved CLOMR FEMA Case No. 04-09-0432R
Lower Duck Creek Detention Basin to
Silverado Ranch Boulevard
Regulatory Flow with 1.0 foot floodway
Stantec
Consulting Inc June 2004
By vcg

PLAN DATA

Plan Title: Plan 10
Plan File : I:\241275\DRAINAGE\LOMR\DCSC\SPU3LOMR.p10

Geometry Title: Revised Effective Model
Geometry File : I:\241275\DRAINAGE\LOMR\DCSC\SPU3LOMR.g03

Flow Title : Regulatory Flow - Corrected Boundary
Flow File : I:\241275\DRAINAGE\LOMR\DCSC\SPU3LOMR.f02

Plan Summary Information:

Number of:	Cross Sections =	21	Multiple Openings =	0
	Culverts =	1	Inline Structures =	0
	Bridges =	0	Lateral Structures =	0

Computational Information

Water surface calculation tolerance = 0.01
Critical depth calculation tolerance = 0.01
Maximum number of iterations = 20
Maximum difference tolerance = 0.3
Flow tolerance factor = 0.001

SPU3LOMR

Computation Options

Critical depth computed only where necessary
 Conveyance Calculation Method: At breaks in n values only
 Friction Slope Method: Average Conveyance
 Computational Flow Regime: Subcritical Flow

FLOW DATA

Flow Title: Regulatory Flow - Corrected Boundary
 Flow File : I:\241275\DRAINAGE\LOMR\DCSC\SPU3LOMR.f02

Flow Data (cfs)

 * River Reach RS * 100-Year 1.0ft FW *
 * Duck Ck S Silverado Pines 28700 * 2315 2315 *

Boundary Conditions

 * River Reach Profile * Upstream
 Downstream *

 * Duck Ck S Silverado Pines 100-Year *
 Known WS = 2202 *
 * Duck Ck S Silverado Pines 1.0ft FW *
 Known WS = 2202 *

GEOMETRY DATA

Geometry Title: Revised Effective Model
 Geometry File : I:\241275\DRAINAGE\LOMR\DCSC\SPU3LOMR.g03

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 28700

INPUT

Description: FEMA XS D - Upstream cross-section

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2230.37	1064	2226.37	1190	2227.37	1271	2228.37	1332.28	2226.37
1476.2	2225.37	1580.73	2225.37	1633.49	2226.37	1722.15	2230.37		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1064	.04	1580.73	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1064	1580.73		200 221	280	.1	.3

SPU3LOMR

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 28650

INPUT

Description: New Cross-Section

Station Elevation Data num= 13									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2226	1060	2225	1090	2224.8	1170	2225	1245	2225.4
1355	2225	1400	2224	1450	2223	1500	2222.8	1552	2223
1605	2224	1645	2225	1685	2226				

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1400	.04	1552	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1400	1552		200	221	266.54	.1
							.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 28600

INPUT

Description: FEMA XS C

Station Elevation Data num= 6									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2226.37	1158.6	2222.37	1274.67	2220.37	1401.53	2220.37	1512.13	2222.37
1764.47	2226.37								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val
1000	.045	1274.67	.04	1401.53	.045

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
	1274.67	1401.53		425.32	398.86	353.64	.1
							.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 28500

INPUT

Description: GC Wallace cross-section

Station Elevation Data num= 6									
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
1000	2222.37	1167.42	2218.37	1253.26	2216.37	1303.05	2216.37	1392.35	2218.37
1660.18	2222.37								

Manning's n Values num= 3					
Sta	n Val	Sta	n Val	Sta	n Val

1000 .045 1167.42 .04 1392.35 .045 SPU3LOMR

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
1167.42 1392.35 102 102 102 .1 .3

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 12

INPUT

Description: Transistion to natural channel

Station Elevation Data num= 12
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

825 2217 925 2216 934 2215 984 2214 990 2213.45
995 2213.45 1005 2213.45 1010 2213.45 1017 2214 1044 2215
1070 2216 1124 2217

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

825 .03 990 .03 1010 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
990 1010 50 50 50 .1 .3

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 11.5

INPUT

Description: Drop Section

Station Elevation Data num= 8
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

800 2217 900 2216 920 2215 945 2214 970 2212
1030 2212 1070 2215 1090 2216

Manning's n Values num= 3
Sta n Val Sta n Val Sta n Val

800 .03 970 .03 1030 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
970 1030 50 50 50 .1 .3

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 11

INPUT

Description: Graded Channel

Station Elevation Data num= 9
Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

800 2217 910 2215 940 2212 950 2211.6 1000 2211.45
1020 2211.6 1030 2211.68 1070 2212 1110 2216

SPU3LOMR

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 800 .03 950 .03 1030 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 950 1030 100 100 100 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1070 1110 2217 F

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 10.0

INPUT

Description: Graded Channel

Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 892 2215 910 2214 940 2211 965 2210.792 1000 2210.5
 1050 2210.857 1140 2211.5 1150 2213.5 1160 2215.5

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 892 .03 965 .03 1050 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 965 1050 100 100 100 .1 .3
 Ineffective Flow num= 1
 Sta L Sta R Elev Permanent
 1070 1160 2216 F

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 9.0

INPUT

Description: Graded Channel

Station Elevation Data num= 9
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 955 2215.75 975 2209.5 1000 2209.5 1050 2209.813 1080 2210
 1115 2210.6 1225 2210.8 1240 2213.8 1246 2215

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 955 .03 975 .03 1050 .03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.
 975 1050 22 25 30 .1 .3
 Ineffective Flow num= 2
 Sta L Sta R Elev Permanent
 955 975 2216 F
 1070 1246 2216 F

SPU3LOMR

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 8.75

INPUT

Description: Crest approach

Station		Elevation Data		num=	10	Sta		Elev		Sta		Elev	
930	2215	945	2210			975	2209.356	1000	2209.13	1020	2209.13		
1040	2209.13	1070	2209.8			1140	2209.8	1150	2212.8	1160	2215		

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
930	.03	975	.03	1040	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	975	1040		12	45		.1	.3
Ineffective Flow			num=	2				
Sta L	Sta R	Elev	Permanent					
930	945	2217	F					
1075	1160	2217	F					

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 8.3

INPUT

Description: Drop Crest

Station		Elevation Data		num=	6	Sta		Elev		Sta		Elev	
958	2214.8	972	2208.35			1000	2208.24	1027	2208.18	1043	2214.91		
1053	2214.91												

Manning's n Values		num=		3	
Sta	n Val	Sta	n Val	Sta	n Val
958	.035	972	.035	1027	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	972	1027		60	60		.1	.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 7.71

INPUT

Description: Channelized Section - Riprap Toe of Slope
 Grade Break

Station		Elevation Data		num=	7	Sta		Elev		Sta		Elev	
952	2214.91	975	2207.09			1000	2207.1	1025	2206.87	1045	2213.38		
1055	2213.38	1055.1	2214.75										

SPU3LOMR

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
952	.035	975	.035	1025	.035

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

975	1025	71	71	71	.1	.3
-----	------	----	----	----	----	----

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 7.0

INPUT

Description: Channelized Section - End Riprap

Station Elevation Data num= 9

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
943	2214.4	943	2212.23	953	2212.23	980	2205.81	1000	2205.77
1025	2206.12	1044	2212.99	1053	2212.99	1053	2214.4		

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
943	.03	980	.03	1025	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

980	1025	50	50	50	.1	.3
-----	------	----	----	----	----	----

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 6.5

INPUT

Description: Channelized Section - Earthen

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
954	2213.17	980	2205.31	1000	2205.16	1025	2205.67	1041	2213.32
1053	2212.93	1053	2214.15						

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
954	.03	980	.03	1025	.03

Bank Sta: Left Right Lengths: Left Channel Right Coeff Contr. Expan.

980	1025	50	50	50	.1	.3
-----	------	----	----	----	----	----

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 6.0

INPUT

Description: Channelized Section - Earthen

Station Elevation Data num= 7

Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev

				SPU3LOMR			
955	2212.79	980	2205.02	1000	2204.95	1024	2205.23
1053	2213.27	1053	2213.9				1041 2213.31

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
955	.03	980	.03	1024	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	980	1024		50 50	50		.1	.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 5.5

INPUT

Description: Channelized Section - Riprap

Station	Elevation	Data	num=	9			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****	*****	*****	*****	*****	*****	*****
945	2213.1	945	2211.46	955	2211.46	975	2204.83
1024	2204.74	1041	2211.6	1053	2211.6	1053	2213.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
945	.03	975	.03	1024	.03

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	975	1024		17 17	17		.1	.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 5.28

INPUT

Description: ENTRANCE TO PROPOSED CULVERT

Station	Elevation	Data	num=	6			
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
*****	*****	*****	*****	*****	*****	*****	*****
970	2214.7	980	2214.6	980.1	2204.43	1020	2204.39
1030	2214.7					1020.1	2214.6

Manning's n Values num= 3

Sta	n Val	Sta	n Val	Sta	n Val
*****	*****	*****	*****	*****	*****
970	.013	980.1	.013	1020	.013

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	980.1	1020		75 75	75		.3	.5

CULVERT

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 5

INPUT

Description: Richmar Ave Crossing 3 Barrell 12'x6' RCB

SPU3LOMR

Distance from Upstream XS = 2
 Deck/Roadway width = 70
 Weir Coefficient = 2.6
 Upstream Deck/Roadway Coordinates

num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 950 2214.6 1050 2214.6

Upstream Bridge Cross Section Data

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 970 2214.7 980 2214.6 980.1 2204.43 1020 2204.39 1020.1 2214.6
 1030 2214.7

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 970 .013 980.1 .013 1020 .013

Bank Sta: Left Right Coeff Contr. Expan.
 980.1 1020 .3 .5

Downstream Deck/Roadway Coordinates

num= 2
 Sta Hi Cord Lo Cord Sta Hi Cord Lo Cord

 900 2214.8 1100 2214.8

Downstream Bridge Cross Section Data

Station Elevation Data num= 6
 Sta Elev Sta Elev Sta Elev Sta Elev Sta Elev

 875 2215 947 2214.8 980 2204.18 1020 2204.03 1053 2214.8
 1125 2215

Manning's n Values num= 3
 Sta n Val Sta n Val Sta n Val

 875 .035 980 .035 1020 .035

Bank Sta: Left Right Coeff Contr. Expan.
 980 1020 .3 .5

Upstream Embankment side slope = 0 horiz. to 1.0 vertical
 Downstream Embankment side slope = 0 horiz. to 1.0 vertical
 Maximum allowable submergence for weir flow = .95
 Elevation at which weir flow begins =
 Energy head used in spillway design =
 Spillway height used in design =
 Weir crest shape = Broad Crested

Number of culverts = 1

Culvert Name Shape Rise Span
 Culvert #1 Box 6 12
 FHWA Chart # 9 - flared wingwalls and Inlet top edge bevel
 FHWA Scale # 1 - wingwall flared 45 deg.; inlet top edge bevel=0.043D
 Solution Criteria = Highest U.S. EG
 Culvert Upstrm Dist Length Top n Bottom n Depth Blocked Entrance Loss Coef
 Exit Loss Coef
 2 72 .013 .013 0 .4

SPU3LOMR

1
Number of Barrels = 3
Upstream Elevation = 2204.35
Centerline Stations
Sta. Sta. Sta.
987 1000 1013
Downstream Elevation = 2204
Centerline Stations
Sta. Sta. Sta.
987 1000 1013

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 4.6

INPUT

Description: OUTLET OF PROPOSED CULVERT

Station	Elevation	Data	num=	6	Sta	Elev	Sta	Elev	Sta	Elev
875	2215	947	2214.8	980	2204.18	1020	2204.03	1053	2214.8	
1125	2215									

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val
875	.035	980	.035	1020	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
980	1020	10	10	10	.3	.5	

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 4.5

INPUT

Description:

Station	Elevation	Data	num=	6	Sta	Elev	Sta	Elev	Sta	Elev
875	2215.5	945	2215.5	980	2203.75	1020	2203.75	1055	2215.5	
1225	2216									

Manning's n	Values	num=	3	Sta	n Val	Sta	n Val
875	.035	980	.035	1020	.035		

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff Contr.	Expan.
980	1020	50	50	50	.1	.3	

CROSS SECTION

RIVER: Duck Ck S
REACH: Silverado Pines RS: 4.0

INPUT

Description:

SPU3LOMR

Station Elevation Data		num= 6		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
880	2212	950	2212	980	2202.5	1020	2202.5	1048	2211
1140	2211.5								

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
880	.035	980	.035	1020	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	980	1020		50	50		.1	.3

CROSS SECTION

RIVER: Duck Ck S
 REACH: Silverado Pines RS: 3.5

INPUT

Description: DETENTION POND

Station Elevation Data		num= 8		Sta Elev		Sta Elev		Sta Elev	
Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev	Sta	Elev
490	2206	500	2204	970	2204	980	2201.35	1020	2201.35
1030	2204	1500	2204	1510	2206				

Manning's n Values		num= 3		Sta n Val	
Sta	n Val	Sta	n Val	Sta	n Val
490	.035	980	.035	1020	.035

Bank Sta:	Left	Right	Lengths:	Left Channel	Right	Coeff	Contr.	Expan.
	980	1020		0	0		.1	.3

SUMMARY OF MANNING'S N VALUES

River: Duck Ck S

* Reach	* River Sta.	* n1	* n2	* n3
*Silverado Pines	* 28700	* .045*	* .04*	* .045*
*Silverado Pines	* 28650	* .045*	* .04*	* .045*
*Silverado Pines	* 28600	* .045*	* .04*	* .045*
*Silverado Pines	* 28500	* .045*	* .04*	* .045*
*Silverado Pines	* 12	* .03*	* .03*	* .03*
*Silverado Pines	* 11.5	* .03*	* .03*	* .03*
*Silverado Pines	* 11	* .03*	* .03*	* .03*
*Silverado Pines	* 10.0	* .03*	* .03*	* .03*
*Silverado Pines	* 9.0	* .03*	* .03*	* .03*
*Silverado Pines	* 8.75	* .03*	* .03*	* .03*
*Silverado Pines	* 8.3	* .035*	* .035*	* .035*
*Silverado Pines	* 7.71	* .035*	* .035*	* .035*
*Silverado Pines	* 7.0	* .03*	* .03*	* .03*
*Silverado Pines	* 6.5	* .03*	* .03*	* .03*
*Silverado Pines	* 6.0	* .03*	* .03*	* .03*
*Silverado Pines	* 5.5	* .03*	* .03*	* .03*
*Silverado Pines	* 5.28	* .013*	* .013*	* .013*
*Silverado Pines	* 5	* Culvert	* *	* *
*Silverado Pines	* 4.6	* .035*	* .035*	* .035*

SPU3LOMR

*Silverado Pines *	4.5	*	.035*	.035*	.035*
*Silverado Pines *	4.0	*	.035*	.035*	.035*
*Silverado Pines *	3.5	*	.035*	.035*	.035*

SUMMARY OF REACH LENGTHS

River: Duck Ck S

* Reach *	River Sta.	* Left *	* Channel *	* Right *
-----------	------------	----------	-------------	-----------

*Silverado Pines *	28700	* 200*	221*	280*
*Silverado Pines *	28650	* 200*	221*	266.54*
*Silverado Pines *	28600	* 425.32*	398.86*	353.64*
*Silverado Pines *	28500	* 102*	102*	102*
*Silverado Pines *	12	* 50*	50*	50*
*Silverado Pines *	11.5	* 50*	50*	50*
*Silverado Pines *	11	* 100*	100*	100*
*Silverado Pines *	10.0	* 100*	100*	100*
*Silverado Pines *	9.0	* 22*	25*	30*
*Silverado Pines *	8.75	* 12*	45*	70*
*Silverado Pines *	8.3	* 60*	60*	60*
*Silverado Pines *	7.71	* 71*	71*	71*
*Silverado Pines *	7.0	* 50*	50*	50*
*Silverado Pines *	6.5	* 50*	50*	50*
*Silverado Pines *	6.0	* 50*	50*	50*
*Silverado Pines *	5.5	* 17*	17*	17*
*Silverado Pines *	5.28	* 75*	75*	75*
*Silverado Pines *	5	*culvert *	*	*
*Silverado Pines *	4.6	* 10*	10*	10*
*Silverado Pines *	4.5	* 50*	50*	50*
*Silverado Pines *	4.0	* 50*	50*	50*
*Silverado Pines *	3.5	* 0*	0*	0*

SUMMARY OF CONTRACTION AND EXPANSION COEFFICIENTS

River: Duck Ck S

* Reach *	River Sta.	* Contr. *	* Expan. *
-----------	------------	------------	------------

*Silverado Pines *	28700	* .1*	.3*
*Silverado Pines *	28650	* .1*	.3*
*Silverado Pines *	28600	* .1*	.3*
*Silverado Pines *	28500	* .1*	.3*
*Silverado Pines *	12	* .1*	.3*
*Silverado Pines *	11.5	* .1*	.3*
*Silverado Pines *	11	* .1*	.3*
*Silverado Pines *	10.0	* .1*	.3*
*Silverado Pines *	9.0	* .1*	.3*
*Silverado Pines *	8.75	* .1*	.3*
*Silverado Pines *	8.3	* .1*	.3*
*Silverado Pines *	7.71	* .1*	.3*
*Silverado Pines *	7.0	* .1*	.3*
*Silverado Pines *	6.5	* .1*	.3*
*Silverado Pines *	6.0	* .1*	.3*
*Silverado Pines *	5.5	* .1*	.3*
*Silverado Pines *	5.28	* .3*	.5*
*Silverado Pines *	5	*culvert *	*

				SPU3LOMR	
*silverado Pines *	4.6	*	.3*		.5*
*Silverado Pines *	4.5	*	.1*		.3*
*Silverado Pines *	4.0	*	.1*		.3*
*Silverado Pines *	3.5	*	.1*		.3*

Legend

WS 100-Year

WS 1.0ft FW

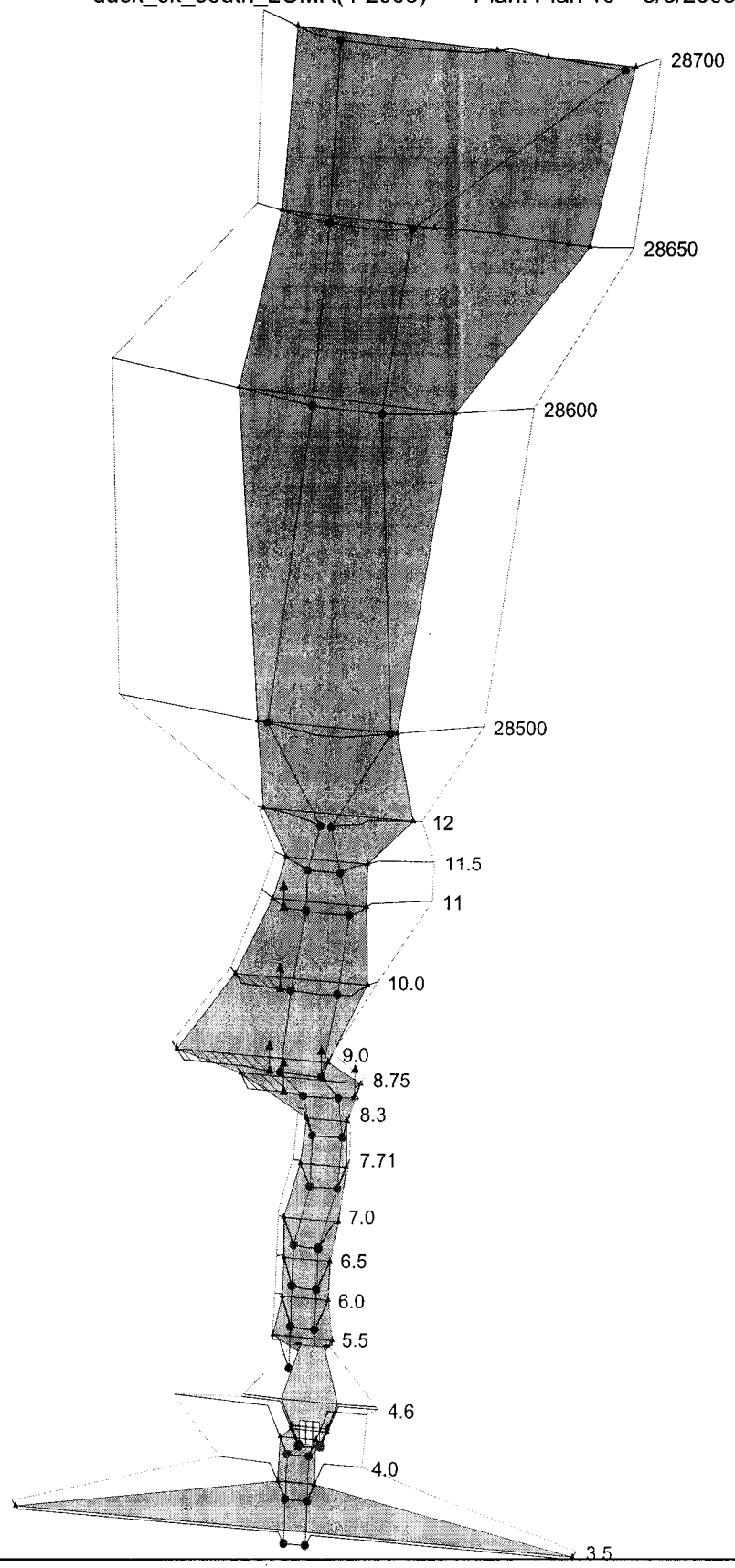
Ground

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Bank Sta

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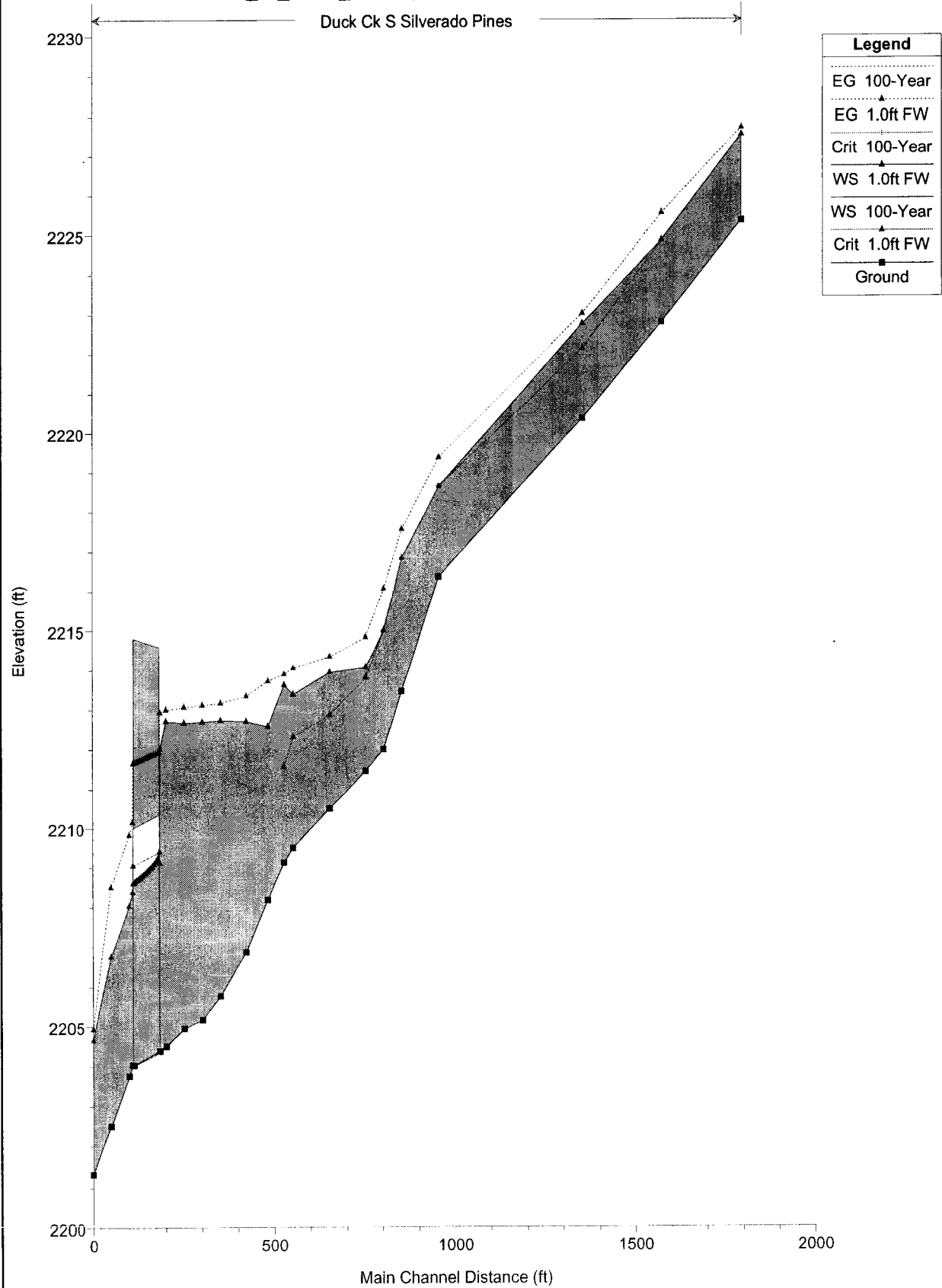


HEC-RAS Plan: Plan 10 River: Duck Ck S Reach: Silverado Pines

Reach	River Sta	Profile	Q Total (cfs)	Min Ch El (ft)	W.S. Elev (ft)	Crit W.S. (ft)	E.G. Elev (ft)	E.G. Slope (ft/ft)	Vel Chnl (ft/s)	Flow Area (sq ft)	Top Width (ft)	Froude # Chl
Silverado Pines	26700	100-Year	2315.00	2225.37	2227.54		2227.72	0.005799	3.46	687.80	521.43	0.52
Silverado Pines	26700	1.0ft FW	2315.00	2225.37	2227.54		2227.72	0.005799	3.46	687.80	521.43	0.52
Silverado Pines	28650	100-Year	2315.00	2222.80	2224.87	2224.87	2225.55	0.016841	7.05	374.83	315.96	0.93
Silverado Pines	28650	1.0ft FW	2315.00	2222.80	2224.87	2224.87	2225.55	0.016841	7.05	374.83	315.96	0.93
Silverado Pines	28600	100-Year	2315.00	2220.37	2222.76	2222.13	2223.02	0.005133	4.76	627.00	393.84	0.54
Silverado Pines	28600	1.0ft FW	2315.00	2220.37	2222.76	2222.13	2223.02	0.005133	4.76	627.00	393.84	0.54
Silverado Pines	28500	100-Year	2315.00	2216.37	2218.64	2218.64	2219.38	0.020107	6.88	339.79	254.47	0.99
Silverado Pines	28500	1.0ft FW	2315.00	2216.37	2218.64	2218.64	2219.38	0.020107	6.88	339.79	254.47	0.99
Silverado Pines	12	100-Year	2315.00	2213.45	2216.84	2216.84	2217.57	0.007838	9.89	388.53	273.70	0.95
Silverado Pines	12	1.0ft FW	2315.00	2213.45	2216.84	2216.84	2217.57	0.007838	9.89	388.53	273.70	0.95
Silverado Pines	11.5	100-Year	2315.00	2212.00	2214.99	2214.99	2216.06	0.008002	9.20	301.29	149.69	0.94
Silverado Pines	11.5	1.0ft FW	2315.00	2212.00	2214.99	2214.99	2216.06	0.008002	9.20	301.29	149.69	0.94
Silverado Pines	11	100-Year	2315.00	2211.45	2214.07	2213.80	2214.83	0.006448	7.38	334.97	171.29	0.82
Silverado Pines	11	1.0ft FW	2315.00	2211.45	2214.07	2213.80	2214.83	0.006448	7.38	334.97	171.29	0.82
Silverado Pines	10.0	100-Year	2315.00	2210.50	2213.94	2212.86	2214.35	0.002484	5.44	457.05	241.52	0.53
Silverado Pines	10.0	1.0ft FW	2315.00	2210.50	2213.94	2212.86	2214.35	0.002484	5.44	457.05	241.52	0.53
Silverado Pines	9.0	100-Year	2315.00	2209.50	2213.38	2212.31	2214.05	0.003043	6.62	353.00	275.29	0.60
Silverado Pines	9.0	1.0ft FW	2315.00	2209.50	2213.38	2212.31	2214.05	0.003043	6.62	353.00	275.29	0.60
Silverado Pines	8.75	100-Year	2315.00	2209.13	2213.61	2211.55	2213.89	0.001055	4.34	549.53	219.50	0.36
Silverado Pines	8.75	1.0ft FW	2315.00	2209.13	2213.61	2211.55	2213.89	0.001055	4.34	549.53	219.50	0.36
Silverado Pines	8.3	100-Year	2315.00	2208.18	2212.58		2213.71	0.006115	8.81	280.03	74.62	0.75
Silverado Pines	8.3	1.0ft FW	2315.00	2208.18	2212.58		2213.71	0.006115	8.81	280.03	74.62	0.75
Silverado Pines	7.71	100-Year	2315.00	2206.87	2212.70		2213.33	0.002497	6.74	381.67	84.42	0.50
Silverado Pines	7.71	1.0ft FW	2315.00	2206.87	2212.70		2213.33	0.002497	6.74	381.67	84.42	0.50
Silverado Pines	7.0	100-Year	2315.00	2205.77	2212.73		2213.16	0.001044	5.77	473.74	100.27	0.39
Silverado Pines	7.0	1.0ft FW	2315.00	2205.77	2212.73		2213.16	0.001044	5.77	473.74	100.27	0.39
Silverado Pines	6.5	100-Year	2315.00	2205.16	2212.69		2213.11	0.000884	5.57	472.63	84.10	0.36
Silverado Pines	6.5	1.0ft FW	2315.00	2205.16	2212.69		2213.11	0.000884	5.57	472.63	84.10	0.36
Silverado Pines	6.0	100-Year	2315.00	2204.95	2212.67		2213.06	0.000800	5.43	487.60	84.24	0.35
Silverado Pines	6.0	1.0ft FW	2315.00	2204.95	2212.67		2213.06	0.000800	5.43	487.60	84.24	0.35
Silverado Pines	5.5	100-Year	2315.00	2204.51	2212.71		2213.00	0.000548	4.66	589.07	108.00	0.29
Silverado Pines	5.5	1.0ft FW	2315.00	2204.51	2212.71		2213.00	0.000548	4.66	589.07	108.00	0.29
Silverado Pines	5.28	100-Year	2315.00	2204.39	2212.03	2209.11	2212.93	0.000297	7.62	304.41	40.05	0.49
Silverado Pines	5.28	1.0ft FW	2315.00	2204.39	2212.03	2209.11	2212.93	0.000297	7.62	304.41	40.05	0.49
Silverado Pines	5	Culvert										
Silverado Pines	4.6	100-Year	2315.00	2204.03	2208.37	2208.37	2210.15	0.010228	11.30	226.89	66.33	0.96
Silverado Pines	4.6	1.0ft FW	2315.00	2204.03	2208.37	2208.37	2210.15	0.010228	11.30	226.89	66.33	0.96
Silverado Pines	4.5	100-Year	2315.00	2203.75	2208.03	2208.03	2209.82	0.010238	11.33	225.82	65.50	0.96
Silverado Pines	4.5	1.0ft FW	2315.00	2203.75	2208.03	2208.03	2209.82	0.010238	11.33	225.82	65.50	0.96
Silverado Pines	4.0	100-Year	2315.00	2202.50	2206.75	2206.75	2208.51	0.010230	11.26	228.17	67.41	0.96
Silverado Pines	4.0	1.0ft FW	2315.00	2202.50	2206.75	2206.75	2208.51	0.010230	11.26	228.17	67.41	0.96
Silverado Pines	3.5	100-Year	2315.00	2201.35	2204.66	2204.66	2204.94	0.004550	6.36	794.58	1006.60	0.62
Silverado Pines	3.5	1.0ft FW	2315.00	2201.35	2204.66	2204.66	2204.94	0.004550	6.36	794.58	1006.60	0.62

duck_ck_south_LOMR(4-2005) Plan: Plan 10 5/8/2005

Duck Ck S Silverado Pines



Plan: Plan 10 Duck Ck S Silverado Pines RS: 28700 Profile: 100-Year

E.G. Elev (ft)	2227.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2227.54	Reach Len. (ft)	200.00	221.00	280.00
Crit W.S. (ft)		Flow Area (sq ft)	10.95	573.60	103.25
E.G. Slope (ft/ft)	0.005799	Area (sq ft)	10.95	573.60	103.25
Q Total (cfs)	2315.00	Flow (cfs)	19.22	1984.66	311.12
Top Width (ft)	521.43	Top Width (ft)	18.71	424.03	78.69
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)	1.76	3.46	3.01
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)	0.58	1.35	1.31
Conv. Total (cfs)	30399.4	Conv. (cfs)	252.4	26061.6	4085.4
Length Wtd. (ft)	229.46	Wetted Per. (ft)	18.75	424.06	78.72
Min Ch El (ft)	2225.37	Shear (lb/sq ft)	0.21	0.49	0.47
Alpha	1.02	Stream Power (lb/ft s)	0.37	1.69	1.43
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)	2.92	11.94	5.05
C & E Loss (ft)	0.05	Cum SA (acres)	2.41	5.16	3.28

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28700 Profile: 1.0ft FW

E.G. Elev (ft)	2227.72	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.18	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2227.54	Reach Len. (ft)	200.00	221.00	280.00
Crit W.S. (ft)		Flow Area (sq ft)	10.95	573.60	103.25
E.G. Slope (ft/ft)	0.005799	Area (sq ft)	10.95	573.60	103.25
Q Total (cfs)	2315.00	Flow (cfs)	19.22	1984.66	311.12
Top Width (ft)	521.43	Top Width (ft)	18.71	424.03	78.69
Vel Total (ft/s)	3.37	Avg. Vel. (ft/s)	1.76	3.46	3.01
Max Chl Dpth (ft)	2.17	Hydr. Depth (ft)	0.58	1.35	1.31
Conv. Total (cfs)	30399.4	Conv. (cfs)	252.4	26061.6	4085.4
Length Wtd. (ft)	229.46	Wetted Per. (ft)	18.75	424.06	78.72
Min Ch El (ft)	2225.37	Shear (lb/sq ft)	0.21	0.49	0.47
Alpha	1.02	Stream Power (lb/ft s)	0.37	1.69	1.43
Frctn Loss (ft)	2.11	Cum Volume (acre-ft)	2.92	11.94	5.05
C & E Loss (ft)	0.05	Cum SA (acres)	2.41	5.16	3.28

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28650 Profile: 100-Year

E.G. Elev (ft)	2225.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2224.87	Reach Len. (ft)	200.00	221.00	266.54
Crit W.S. (ft)	2224.87	Flow Area (sq ft)	18.20	269.08	87.54
E.G. Slope (ft/ft)	0.016841	Area (sq ft)	18.20	269.08	87.54
Q Total (cfs)	2315.00	Flow (cfs)	42.16	1898.23	374.62
Top Width (ft)	315.96	Top Width (ft)	76.25	152.00	87.71
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)	2.32	7.05	4.28
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)	0.24	1.77	1.00
Conv. Total (cfs)	17838.9	Conv. (cfs)	324.8	14627.4	2886.7
Length Wtd. (ft)	226.55	Wetted Per. (ft)	76.26	152.01	87.73
Min Ch El (ft)	2222.80	Shear (lb/sq ft)	0.25	1.86	1.05
Alpha	1.15	Stream Power (lb/ft s)	0.58	13.13	4.49
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)	2.85	9.81	4.44
C & E Loss (ft)	0.13	Cum SA (acres)	2.19	3.70	2.75

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28650 Profile: 1.0ft FW

E.G. Elev (ft)	2225.55	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.68	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2224.87	Reach Len. (ft)	200.00	221.00	266.54
Crit W.S. (ft)	2224.87	Flow Area (sq ft)	18.20	269.08	87.54
E.G. Slope (ft/ft)	0.016841	Area (sq ft)	18.20	269.08	87.54
Q Total (cfs)	2315.00	Flow (cfs)	42.16	1898.23	374.62
Top Width (ft)	315.96	Top Width (ft)	76.25	152.00	87.71
Vel Total (ft/s)	6.18	Avg. Vel. (ft/s)	2.32	7.05	4.28
Max Chl Dpth (ft)	2.07	Hydr. Depth (ft)	0.24	1.77	1.00
Conv. Total (cfs)	17838.9	Conv. (cfs)	324.8	14627.4	2886.7
Length Wtd. (ft)	226.55	Wetted Per. (ft)	76.26	152.01	87.73
Min Ch El (ft)	2222.80	Shear (lb/sq ft)	0.25	1.86	1.05
Alpha	1.15	Stream Power (lb/ft s)	0.58	13.13	4.49
Frctn Loss (ft)	1.93	Cum Volume (acre-ft)	2.85	9.81	4.44
C & E Loss (ft)	0.13	Cum SA (acres)	2.19	3.70	2.75

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28600 Profile: 100-Year

E.G. Elev (ft)	2223.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2222.76	Reach Len. (ft)	425.32	398.86	353.64
Crit W.S. (ft)	2222.13	Flow Area (sq ft)	164.66	303.49	158.85
E.G. Slope (ft/ft)	0.005133	Area (sq ft)	164.66	303.49	158.85
Q Total (cfs)	2315.00	Flow (cfs)	452.19	1444.76	418.05
Top Width (ft)	393.84	Top Width (ft)	131.63	126.86	135.35
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)	2.75	4.76	2.63
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	1.25	2.39	1.17
Conv. Total (cfs)	32313.6	Conv. (cfs)	6311.8	20166.5	5835.3
Length Wtd. (ft)	397.34	Wetted Per. (ft)	131.65	126.86	135.37
Min Ch El (ft)	2220.37	Shear (lb/sq ft)	0.40	0.77	0.38
Alpha	1.24	Stream Power (lb/ft s)	1.10	3.65	0.99
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	2.43	8.35	3.68
C & E Loss (ft)	0.05	Cum SA (acres)	1.72	2.99	2.06

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28600 Profile: 1.0ft FW

E.G. Elev (ft)	2223.02	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.26	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2222.76	Reach Len. (ft)	425.32	398.86	353.64
Crit W.S. (ft)	2222.13	Flow Area (sq ft)	164.66	303.49	158.85
E.G. Slope (ft/ft)	0.005133	Area (sq ft)	164.66	303.49	158.85
Q Total (cfs)	2315.00	Flow (cfs)	452.19	1444.76	418.05
Top Width (ft)	393.84	Top Width (ft)	131.63	126.86	135.35
Vel Total (ft/s)	3.69	Avg. Vel. (ft/s)	2.75	4.76	2.63
Max Chl Dpth (ft)	2.39	Hydr. Depth (ft)	1.25	2.39	1.17
Conv. Total (cfs)	32313.6	Conv. (cfs)	6311.8	20166.5	5835.3
Length Wtd. (ft)	397.34	Wetted Per. (ft)	131.65	126.86	135.37
Min Ch El (ft)	2220.37	Shear (lb/sq ft)	0.40	0.77	0.38
Alpha	1.24	Stream Power (lb/ft s)	1.10	3.65	0.99
Frctn Loss (ft)	3.60	Cum Volume (acre-ft)	2.43	8.35	3.68
C & E Loss (ft)	0.05	Cum SA (acres)	1.72	2.99	2.06

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28500 Profile: 100-Year

E.G. Elev (ft)	2219.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2218.64	Reach Len. (ft)	102.00	102.00	102.00
Crit W.S. (ft)	2218.64	Flow Area (sq ft)	1.54	335.78	2.47
E.G. Slope (ft/ft)	0.020107	Area (sq ft)	1.54	335.78	2.47
Q Total (cfs)	2315.00	Flow (cfs)	1.91	2310.04	3.05
Top Width (ft)	254.47	Top Width (ft)	11.36	224.93	18.18
Vel Total (ft/s)	6.81	Avg. Vel. (ft/s)	1.24	6.88	1.24
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.14	1.49	0.14
Conv. Total (cfs)	16325.9	Conv. (cfs)	13.4	16291.0	21.5
Length Wtd. (ft)	102.00	Wetted Per. (ft)	11.37	224.98	18.18
Min Ch El (ft)	2216.37	Shear (lb/sq ft)	0.17	1.87	0.17
Alpha	1.02	Stream Power (lb/ft s)	0.21	12.89	0.21
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	1.62	5.43	3.03
C & E Loss (ft)	0.00	Cum SA (acres)	1.02	1.38	1.44

Plan: Plan 10 Duck Ck S Silverado Pines RS: 28500 Profile: 1.0ft FW

E.G. Elev (ft)	2219.38	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.045	0.040	0.045
W.S. Elev (ft)	2218.64	Reach Len. (ft)	102.00	102.00	102.00
Crit W.S. (ft)	2218.64	Flow Area (sq ft)	1.54	335.78	2.47
E.G. Slope (ft/ft)	0.020107	Area (sq ft)	1.54	335.78	2.47
Q Total (cfs)	2315.00	Flow (cfs)	1.91	2310.04	3.05
Top Width (ft)	254.47	Top Width (ft)	11.36	224.93	18.18
Vel Total (ft/s)	6.81	Avg. Vel. (ft/s)	1.24	6.88	1.24
Max Chl Dpth (ft)	2.27	Hydr. Depth (ft)	0.14	1.49	0.14
Conv. Total (cfs)	16325.9	Conv. (cfs)	13.4	16291.0	21.5
Length Wtd. (ft)	102.00	Wetted Per. (ft)	11.37	224.98	18.18
Min Ch El (ft)	2216.37	Shear (lb/sq ft)	0.17	1.87	0.17
Alpha	1.02	Stream Power (lb/ft s)	0.21	12.89	0.21
Frctn Loss (ft)	1.21	Cum Volume (acre-ft)	1.62	5.43	3.03
C & E Loss (ft)	0.00	Cum SA (acres)	1.02	1.38	1.44

Plan: Plan 10 Duck Ck S Silverado Pines RS: 12 Profile: 100-Year

E.G. Elev (ft)	2217.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2216.84	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2216.84	Flow Area (sq ft)	182.39	67.71	138.42
E.G. Slope (ft/ft)	0.007838	Area (sq ft)	182.39	67.71	138.42
Q Total (cfs)	2315.00	Flow (cfs)	916.59	669.52	728.89
Top Width (ft)	273.70	Top Width (ft)	148.57	20.00	105.13
Vel Total (ft/s)	5.96	Avg. Vel. (ft/s)	5.03	9.89	5.27
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)	1.23	3.39	1.32
Conv. Total (cfs)	26148.5	Conv. (cfs)	10353.1	7562.4	8233.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	148.66	20.00	105.19
Min Ch El (ft)	2213.45	Shear (lb/sq ft)	0.60	1.66	0.64
Alpha	1.32	Stream Power (lb/ft s)	3.02	16.38	3.39
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	1.40	4.95	2.86
C & E Loss (ft)	0.03	Cum SA (acres)	0.83	1.09	1.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 12 Profile: 1.0ft FW

E.G. Elev (ft)	2217.57	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.73	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2216.84	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2216.84	Flow Area (sq ft)	182.39	67.71	138.42
E.G. Slope (ft/ft)	0.007838	Area (sq ft)	182.39	67.71	138.42
Q Total (cfs)	2315.00	Flow (cfs)	916.59	669.52	728.89
Top Width (ft)	273.70	Top Width (ft)	148.57	20.00	105.13
Vel Total (ft/s)	5.96	Avg. Vel. (ft/s)	5.03	9.89	5.27
Max Chl Dpth (ft)	3.39	Hydr. Depth (ft)	1.23	3.39	1.32
Conv. Total (cfs)	26148.5	Conv. (cfs)	10353.1	7562.4	8233.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	148.66	20.00	105.19
Min Ch El (ft)	2213.45	Shear (lb/sq ft)	0.60	1.66	0.64
Alpha	1.32	Stream Power (lb/ft s)	3.02	16.38	3.39
Frctn Loss (ft)	0.40	Cum Volume (acre-ft)	1.40	4.95	2.86
C & E Loss (ft)	0.03	Cum SA (acres)	0.83	1.09	1.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 11.5 Profile: 100-Year

E.G. Elev (ft)	2216.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2214.99	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2214.99	Flow Area (sq ft)	62.10	179.52	59.68
E.G. Slope (ft/ft)	0.008002	Area (sq ft)	62.10	179.52	59.68
Q Total (cfs)	2315.00	Flow (cfs)	318.32	1651.47	345.21
Top Width (ft)	149.69	Top Width (ft)	49.80	60.00	39.89
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)	5.13	9.20	5.78
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)	1.25	2.99	1.50
Conv. Total (cfs)	25879.9	Conv. (cfs)	3558.6	18462.1	3859.2
Length Wtd. (ft)	50.00	Wetted Per. (ft)	49.90	60.00	40.00
Min Ch El (ft)	2212.00	Shear (lb/sq ft)	0.62	1.49	0.75
Alpha	1.17	Stream Power (lb/ft s)	3.19	13.75	4.31
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1.26	4.81	2.75
C & E Loss (ft)	0.09	Cum SA (acres)	0.72	1.05	1.21

Plan: Plan 10 Duck Ck S Silverado Pines RS: 11.5 Profile: 1.0ft FW

E.G. Elev (ft)	2216.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.07	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2214.99	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2214.99	Flow Area (sq ft)	62.10	179.52	59.68
E.G. Slope (ft/ft)	0.008002	Area (sq ft)	62.10	179.52	59.68
Q Total (cfs)	2315.00	Flow (cfs)	318.32	1651.47	345.21
Top Width (ft)	149.69	Top Width (ft)	49.80	60.00	39.89
Vel Total (ft/s)	7.68	Avg. Vel. (ft/s)	5.13	9.20	5.78
Max Chl Dpth (ft)	2.99	Hydr. Depth (ft)	1.25	2.99	1.50
Conv. Total (cfs)	25879.9	Conv. (cfs)	3558.6	18462.1	3859.2
Length Wtd. (ft)	50.00	Wetted Per. (ft)	49.90	60.00	40.00
Min Ch El (ft)	2212.00	Shear (lb/sq ft)	0.62	1.49	0.75
Alpha	1.17	Stream Power (lb/ft s)	3.19	13.75	4.31
Frctn Loss (ft)	0.36	Cum Volume (acre-ft)	1.26	4.81	2.75
C & E Loss (ft)	0.09	Cum SA (acres)	0.72	1.05	1.21

Plan: Plan 10 Duck Ck S Silverado Pines RS: 11 Profile: 100-Year

E.G. Elev (ft)	2214.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2214.07	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2213.80	Flow Area (sq ft)	43.96	202.02	88.99
E.G. Slope (ft/ft)	0.006448	Area (sq ft)	43.96	202.02	110.30
Q Total (cfs)	2315.00	Flow (cfs)	221.85	1490.00	603.15
Top Width (ft)	171.29	Top Width (ft)	30.65	80.00	60.65
Vel Total (ft/s)	6.91	Avg. Vel. (ft/s)	5.05	7.38	6.78
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)	1.43	2.53	2.22
Conv. Total (cfs)	28830.1	Conv. (cfs)	2762.8	18555.9	7511.4
Length Wtd. (ft)	100.00	Wetted Per. (ft)	30.76	80.00	40.00
Min Ch EI (ft)	2211.45	Shear (lb/sq ft)	0.58	1.02	0.90
Alpha	1.03	Stream Power (lb/ft s)	2.90	7.50	6.07
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	1.20	4.59	2.65
C & E Loss (ft)	0.11	Cum SA (acres)	0.67	0.97	1.16

Plan: Plan 10 Duck Ck S Silverado Pines RS: 11 Profile: 1.0ft FW

E.G. Elev (ft)	2214.83	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.77	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2214.07	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2213.80	Flow Area (sq ft)	43.96	202.02	88.99
E.G. Slope (ft/ft)	0.006448	Area (sq ft)	43.96	202.02	110.30
Q Total (cfs)	2315.00	Flow (cfs)	221.85	1490.00	603.15
Top Width (ft)	171.29	Top Width (ft)	30.65	80.00	60.65
Vel Total (ft/s)	6.91	Avg. Vel. (ft/s)	5.05	7.38	6.78
Max Chl Dpth (ft)	2.61	Hydr. Depth (ft)	1.43	2.53	2.22
Conv. Total (cfs)	28830.1	Conv. (cfs)	2762.8	18555.9	7511.4
Length Wtd. (ft)	100.00	Wetted Per. (ft)	30.76	80.00	40.00
Min Ch EI (ft)	2211.45	Shear (lb/sq ft)	0.58	1.02	0.90
Alpha	1.03	Stream Power (lb/ft s)	2.90	7.50	6.07
Frctn Loss (ft)	0.38	Cum Volume (acre-ft)	1.20	4.59	2.65
C & E Loss (ft)	0.11	Cum SA (acres)	0.67	0.97	1.16

Plan: Plan 10 Duck Ck S Silverado Pines RS: 10.0 Profile: 100-Year

E.G. Elev (ft)	2214.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2213.94	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2212.86	Flow Area (sq ft)	119.02	277.91	60.12
E.G. Slope (ft/ft)	0.002484	Area (sq ft)	119.02	277.91	262.87
Q Total (cfs)	2315.00	Flow (cfs)	494.63	1511.22	309.16
Top Width (ft)	241.52	Top Width (ft)	54.35	85.00	102.17
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)	4.16	5.44	5.14
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)	2.19	3.27	3.01
Conv. Total (cfs)	46448.5	Conv. (cfs)	9924.3	30321.3	6203.0
Length Wtd. (ft)	100.00	Wetted Per. (ft)	54.49	85.00	20.00
Min Ch EI (ft)	2210.50	Shear (lb/sq ft)	0.34	0.51	0.47
Alpha	1.03	Stream Power (lb/ft s)	1.41	2.76	2.40
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	1.02	4.04	2.22
C & E Loss (ft)	0.03	Cum SA (acres)	0.57	0.78	0.97

Plan: Plan 10 Duck Ck S Silverado Pines RS: 10.0 Profile: 1.0ft FW

E.G. Elev (ft)	2214.35	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.41	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2213.94	Reach Len. (ft)	100.00	100.00	100.00
Crit W.S. (ft)	2212.86	Flow Area (sq ft)	119.02	277.91	60.12
E.G. Slope (ft/ft)	0.002484	Area (sq ft)	119.02	277.91	262.87
Q Total (cfs)	2315.00	Flow (cfs)	494.63	1511.22	309.16
Top Width (ft)	241.52	Top Width (ft)	54.35	85.00	102.17
Vel Total (ft/s)	5.07	Avg. Vel. (ft/s)	4.16	5.44	5.14
Max Chl Dpth (ft)	3.43	Hydr. Depth (ft)	2.19	3.27	3.01
Conv. Total (cfs)	46448.5	Conv. (cfs)	9924.3	30321.3	6203.0
Length Wtd. (ft)	100.00	Wetted Per. (ft)	54.49	85.00	20.00
Min Ch El (ft)	2210.50	Shear (lb/sq ft)	0.34	0.51	0.47
Alpha	1.03	Stream Power (lb/ft s)	1.41	2.76	2.40
Frctn Loss (ft)	0.27	Cum Volume (acre-ft)	1.02	4.04	2.22
C & E Loss (ft)	0.03	Cum SA (acres)	0.57	0.78	0.97

Plan: Plan 10 Duck Ck S Silverado Pines RS: 9.0 Profile: 100-Year

E.G. Elev (ft)	2214.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	2213.38	Reach Len. (ft)	22.00	25.00	30.00
Crit W.S. (ft)	2212.31	Flow Area (sq ft)		282.97	70.04
E.G. Slope (ft/ft)	0.003043	Area (sq ft)	24.05	282.97	522.91
Q Total (cfs)	2315.00	Flow (cfs)		1873.72	441.28
Top Width (ft)	275.29	Top Width (ft)	12.41	75.00	187.89
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)		6.62	6.30
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		3.77	3.50
Conv. Total (cfs)	41965.9	Conv. (cfs)		33966.5	7999.4
Length Wtd. (ft)	25.81	Wetted Per. (ft)		75.00	20.00
Min Ch El (ft)	2209.50	Shear (lb/sq ft)		0.72	0.67
Alpha	1.00	Stream Power (lb/ft s)		4.75	4.19
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.85	3.40	1.32
C & E Loss (ft)	0.12	Cum SA (acres)	0.50	0.60	0.64

Plan: Plan 10 Duck Ck S Silverado Pines RS: 9.0 Profile: 1.0ft FW

E.G. Elev (ft)	2214.05	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.67	Wt. n-Val.		0.030	0.030
W.S. Elev (ft)	2213.38	Reach Len. (ft)	22.00	25.00	30.00
Crit W.S. (ft)	2212.31	Flow Area (sq ft)		282.97	70.04
E.G. Slope (ft/ft)	0.003043	Area (sq ft)	24.05	282.97	522.91
Q Total (cfs)	2315.00	Flow (cfs)		1873.72	441.28
Top Width (ft)	275.29	Top Width (ft)	12.41	75.00	187.89
Vel Total (ft/s)	6.56	Avg. Vel. (ft/s)		6.62	6.30
Max Chl Dpth (ft)	3.88	Hydr. Depth (ft)		3.77	3.50
Conv. Total (cfs)	41965.9	Conv. (cfs)		33966.5	7999.4
Length Wtd. (ft)	25.81	Wetted Per. (ft)		75.00	20.00
Min Ch El (ft)	2209.50	Shear (lb/sq ft)		0.72	0.67
Alpha	1.00	Stream Power (lb/ft s)		4.75	4.19
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.85	3.40	1.32
C & E Loss (ft)	0.12	Cum SA (acres)	0.50	0.60	0.64

Plan: Plan 10 Duck Ck S Silverado Pines RS: 8.75 Profile: 100-Year

E.G. Elev (ft)	2213.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2213.61	Reach Len. (ft)	12.00	45.00	70.00
Crit W.S. (ft)	2211.55	Flow Area (sq ft)	117.91	288.28	143.34
E.G. Slope (ft/ft)	0.001055	Area (sq ft)	137.44	288.28	415.46
Q Total (cfs)	2315.00	Flow (cfs)	472.47	1252.17	590.36
Top Width (ft)	219.50	Top Width (ft)	40.83	65.00	113.67
Vel Total (ft/s)	4.21	Avg. Vel. (ft/s)	4.01	4.34	4.12
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)	3.93	4.44	4.10
Conv. Total (cfs)	71258.2	Conv. (cfs)	14543.2	38543.0	18172.0
Length Wtd. (ft)	44.77	Wetted Per. (ft)	30.01	65.00	35.01
Min Ch EI (ft)	2209.13	Shear (lb/sq ft)	0.26	0.29	0.27
Alpha	1.00	Stream Power (lb/ft s)	1.04	1.27	1.11
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.81	3.23	1.00
C & E Loss (ft)	0.09	Cum SA (acres)	0.48	0.55	0.53

Plan: Plan 10 Duck Ck S Silverado Pines RS: 8.75 Profile: 1.0ft FW

E.G. Elev (ft)	2213.89	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2213.61	Reach Len. (ft)	12.00	45.00	70.00
Crit W.S. (ft)	2211.55	Flow Area (sq ft)	117.91	288.28	143.34
E.G. Slope (ft/ft)	0.001055	Area (sq ft)	137.44	288.28	415.46
Q Total (cfs)	2315.00	Flow (cfs)	472.47	1252.17	590.36
Top Width (ft)	219.50	Top Width (ft)	40.83	65.00	113.67
Vel Total (ft/s)	4.21	Avg. Vel. (ft/s)	4.01	4.34	4.12
Max Chl Dpth (ft)	4.48	Hydr. Depth (ft)	3.93	4.44	4.10
Conv. Total (cfs)	71258.2	Conv. (cfs)	14543.2	38543.0	18172.0
Length Wtd. (ft)	44.77	Wetted Per. (ft)	30.01	65.00	35.01
Min Ch EI (ft)	2209.13	Shear (lb/sq ft)	0.26	0.29	0.27
Alpha	1.00	Stream Power (lb/ft s)	1.04	1.27	1.11
Frctn Loss (ft)	0.09	Cum Volume (acre-ft)	0.81	3.23	1.00
C & E Loss (ft)	0.09	Cum SA (acres)	0.48	0.55	0.53

Plan: Plan 10 Duck Ck S Silverado Pines RS: 8.3 Profile: 100-Year

E.G. Elev (ft)	2213.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2212.58	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)		Flow Area (sq ft)	19.37	237.69	22.96
E.G. Slope (ft/ft)	0.006115	Area (sq ft)	19.37	237.69	22.96
Q Total (cfs)	2315.00	Flow (cfs)	99.30	2093.66	122.04
Top Width (ft)	74.62	Top Width (ft)	9.17	55.00	10.45
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)	5.13	8.81	5.31
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)	2.11	4.32	2.20
Conv. Total (cfs)	29604.2	Conv. (cfs)	1269.8	26773.7	1560.6
Length Wtd. (ft)	60.00	Wetted Per. (ft)	10.10	55.00	11.34
Min Ch EI (ft)	2208.18	Shear (lb/sq ft)	0.73	1.65	0.77
Alpha	1.06	Stream Power (lb/ft s)	3.75	14.53	4.11
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.79	2.96	0.65
C & E Loss (ft)	0.15	Cum SA (acres)	0.48	0.49	0.43

Plan: Plan 10 Duck Ck S Silverado Pines RS: 8.3 Profile: 1.0ft FW

E.G. Elev (ft)	2213.71	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.13	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2212.58	Reach Len. (ft)	60.00	60.00	60.00
Crit W.S. (ft)		Flow Area (sq ft)	19.37	237.69	22.96
E.G. Slope (ft/ft)	0.006115	Area (sq ft)	19.37	237.69	22.96
Q Total (cfs)	2315.00	Flow (cfs)	99.30	2093.66	122.04
Top Width (ft)	74.62	Top Width (ft)	9.17	55.00	10.45
Vel Total (ft/s)	8.27	Avg. Vel. (ft/s)	5.13	8.81	5.31
Max Chl Dpth (ft)	4.40	Hydr. Depth (ft)	2.11	4.32	2.20
Conv. Total (cfs)	29604.2	Conv. (cfs)	1269.8	26773.7	1560.6
Length Wtd. (ft)	60.00	Wetted Per. (ft)	10.10	55.00	11.34
Min Ch El (ft)	2208.18	Shear (lb/sq ft)	0.73	1.65	0.77
Alpha	1.06	Stream Power (lb/ft s)	3.75	14.53	4.11
Frctn Loss (ft)	0.22	Cum Volume (acre-ft)	0.79	2.96	0.65
C & E Loss (ft)	0.15	Cum SA (acres)	0.48	0.49	0.43

Plan: Plan 10 Duck Ck S Silverado Pines RS: 7.71 Profile: 100-Year

E.G. Elev (ft)	2213.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2212.70	Reach Len. (ft)	71.00	71.00	71.00
Crit W.S. (ft)		Flow Area (sq ft)	46.32	283.10	52.25
E.G. Slope (ft/ft)	0.002497	Area (sq ft)	46.32	283.10	52.25
Q Total (cfs)	2315.00	Flow (cfs)	188.47	1907.77	218.76
Top Width (ft)	84.42	Top Width (ft)	16.51	50.00	17.92
Vel Total (ft/s)	6.07	Avg. Vel. (ft/s)	4.07	6.74	4.19
Max Chl Dpth (ft)	5.83	Hydr. Depth (ft)	2.81	5.66	2.92
Conv. Total (cfs)	46331.0	Conv. (cfs)	3771.9	38181.0	4378.1
Length Wtd. (ft)	71.00	Wetted Per. (ft)	17.43	50.00	18.84
Min Ch El (ft)	2206.87	Shear (lb/sq ft)	0.41	0.88	0.43
Alpha	1.10	Stream Power (lb/ft s)	1.68	5.95	1.81
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.74	2.60	0.59
C & E Loss (ft)	0.06	Cum SA (acres)	0.46	0.42	0.41

Plan: Plan 10 Duck Ck S Silverado Pines RS: 7.71 Profile: 1.0ft FW

E.G. Elev (ft)	2213.33	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.63	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2212.70	Reach Len. (ft)	71.00	71.00	71.00
Crit W.S. (ft)		Flow Area (sq ft)	46.32	283.10	52.25
E.G. Slope (ft/ft)	0.002497	Area (sq ft)	46.32	283.10	52.25
Q Total (cfs)	2315.00	Flow (cfs)	188.47	1907.77	218.76
Top Width (ft)	84.42	Top Width (ft)	16.51	50.00	17.92
Vel Total (ft/s)	6.07	Avg. Vel. (ft/s)	4.07	6.74	4.19
Max Chl Dpth (ft)	5.83	Hydr. Depth (ft)	2.81	5.66	2.92
Conv. Total (cfs)	46331.0	Conv. (cfs)	3771.9	38181.0	4378.1
Length Wtd. (ft)	71.00	Wetted Per. (ft)	17.43	50.00	18.84
Min Ch El (ft)	2206.87	Shear (lb/sq ft)	0.41	0.88	0.43
Alpha	1.10	Stream Power (lb/ft s)	1.68	5.95	1.81
Frctn Loss (ft)	0.11	Cum Volume (acre-ft)	0.74	2.60	0.59
C & E Loss (ft)	0.06	Cum SA (acres)	0.46	0.42	0.41

Plan: Plan 10 Duck Ck S Silverado Pines RS: 7.0 Profile: 100-Year

E.G. Elev (ft)	2213.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.73	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	105.07	308.30	60.37
E.G. Slope (ft/ft)	0.001044	Area (sq ft)	105.07	308.30	60.37
Q Total (cfs)	2315.00	Flow (cfs)	329.77	1779.55	205.68
Top Width (ft)	100.27	Top Width (ft)	37.00	45.00	18.27
Vel Total (ft/s)	4.89	Avg. Vel. (ft/s)	3.14	5.77	3.41
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)	2.84	6.85	3.30
Conv. Total (cfs)	71655.3	Conv. (cfs)	10207.4	55081.7	6366.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	38.25	45.00	19.43
Min Ch El (ft)	2205.77	Shear (lb/sq ft)	0.18	0.45	0.20
Alpha	1.17	Stream Power (lb/ft s)	0.56	2.58	0.69
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.62	2.12	0.50
C & E Loss (ft)	0.01	Cum SA (acres)	0.41	0.34	0.38

Plan: Plan 10 Duck Ck S Silverado Pines RS: 7.0 Profile: 1.0ft FW

E.G. Elev (ft)	2213.16	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.44	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.73	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	105.07	308.30	60.37
E.G. Slope (ft/ft)	0.001044	Area (sq ft)	105.07	308.30	60.37
Q Total (cfs)	2315.00	Flow (cfs)	329.77	1779.55	205.68
Top Width (ft)	100.27	Top Width (ft)	37.00	45.00	18.27
Vel Total (ft/s)	4.89	Avg. Vel. (ft/s)	3.14	5.77	3.41
Max Chl Dpth (ft)	6.96	Hydr. Depth (ft)	2.84	6.85	3.30
Conv. Total (cfs)	71655.3	Conv. (cfs)	10207.4	55081.7	6366.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	38.25	45.00	19.43
Min Ch El (ft)	2205.77	Shear (lb/sq ft)	0.18	0.45	0.20
Alpha	1.17	Stream Power (lb/ft s)	0.56	2.58	0.69
Frctn Loss (ft)	0.05	Cum Volume (acre-ft)	0.62	2.12	0.50
C & E Loss (ft)	0.01	Cum SA (acres)	0.41	0.34	0.38

Plan: Plan 10 Duck Ck S Silverado Pines RS: 6.5 Profile: 100-Year

E.G. Elev (ft)	2213.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.69	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	90.09	331.00	51.54
E.G. Slope (ft/ft)	0.000884	Area (sq ft)	90.09	331.00	51.54
Q Total (cfs)	2315.00	Flow (cfs)	307.74	1843.56	163.70
Top Width (ft)	84.10	Top Width (ft)	24.41	45.00	14.68
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)	3.42	5.57	3.18
Max Chl Dpth (ft)	7.53	Hydr. Depth (ft)	3.69	7.36	3.51
Conv. Total (cfs)	77856.5	Conv. (cfs)	10349.8	62001.4	5505.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	25.51	45.01	16.28
Min Ch El (ft)	2205.16	Shear (lb/sq ft)	0.19	0.41	0.17
Alpha	1.12	Stream Power (lb/ft s)	0.67	2.26	0.56
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.51	1.76	0.44
C & E Loss (ft)	0.01	Cum SA (acres)	0.38	0.29	0.36

Plan: Plan 10 Duck Ck S Silverado Pines RS: 6.5 Profile: 1.0ft FW

E.G. Elev (ft)	2213.11	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.42	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.69	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	90.09	331.00	51.54
E.G. Slope (ft/ft)	0.000884	Area (sq ft)	90.09	331.00	51.54
Q Total (cfs)	2315.00	Flow (cfs)	307.74	1843.56	163.70
Top Width (ft)	84.10	Top Width (ft)	24.41	45.00	14.68
Vel Total (ft/s)	4.90	Avg. Vel. (ft/s)	3.42	5.57	3.18
Max Chl Dpth (ft)	7.53	Hydr. Depth (ft)	3.69	7.36	3.51
Conv. Total (cfs)	77856.5	Conv. (cfs)	10349.8	62001.4	5505.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	25.51	45.01	16.28
Min Ch EI (ft)	2205.16	Shear (lb/sq ft)	0.19	0.41	0.17
Alpha	1.12	Stream Power (lb/ft s)	0.67	2.26	0.56
Frctn Loss (ft)	0.04	Cum Volume (acre-ft)	0.51	1.76	0.44
C & E Loss (ft)	0.01	Cum SA (acres)	0.38	0.29	0.36

Plan: Plan 10 Duck Ck S Silverado Pines RS: 6.0 Profile: 100-Year

E.G. Elev (ft)	2213.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.67	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	94.03	335.41	58.16
E.G. Slope (ft/ft)	0.000800	Area (sq ft)	94.03	335.41	58.16
Q Total (cfs)	2315.00	Flow (cfs)	312.31	1820.00	182.69
Top Width (ft)	84.24	Top Width (ft)	24.60	44.00	15.64
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)	3.32	5.43	3.14
Max Chl Dpth (ft)	7.72	Hydr. Depth (ft)	3.82	7.62	3.72
Conv. Total (cfs)	81847.8	Conv. (cfs)	11041.8	64347.0	6459.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	25.76	44.00	17.32
Min Ch EI (ft)	2204.95	Shear (lb/sq ft)	0.18	0.38	0.17
Alpha	1.13	Stream Power (lb/ft s)	0.61	2.07	0.53
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.40	1.37	0.37
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.24	0.35

Plan: Plan 10 Duck Ck S Silverado Pines RS: 6.0 Profile: 1.0ft FW

E.G. Elev (ft)	2213.06	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.39	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.67	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)		Flow Area (sq ft)	94.03	335.41	58.16
E.G. Slope (ft/ft)	0.000800	Area (sq ft)	94.03	335.41	58.16
Q Total (cfs)	2315.00	Flow (cfs)	312.31	1820.00	182.69
Top Width (ft)	84.24	Top Width (ft)	24.60	44.00	15.64
Vel Total (ft/s)	4.75	Avg. Vel. (ft/s)	3.32	5.43	3.14
Max Chl Dpth (ft)	7.72	Hydr. Depth (ft)	3.82	7.62	3.72
Conv. Total (cfs)	81847.8	Conv. (cfs)	11041.8	64347.0	6459.0
Length Wtd. (ft)	50.00	Wetted Per. (ft)	25.76	44.00	17.32
Min Ch EI (ft)	2204.95	Shear (lb/sq ft)	0.18	0.38	0.17
Alpha	1.13	Stream Power (lb/ft s)	0.61	2.07	0.53
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.40	1.37	0.37
C & E Loss (ft)	0.03	Cum SA (acres)	0.35	0.24	0.35

Plan: Plan 10 Duck Ck S Silverado Pines RS: 5.5 Profile: 100-Year

E.G. Elev (ft)	2213.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.71	Reach Len. (ft)	17.00	17.00	17.00
Crit W.S. (ft)		Flow Area (sq ft)	103.73	394.92	90.43
E.G. Slope (ft/ft)	0.000548	Area (sq ft)	103.73	394.92	90.43
Q Total (cfs)	2315.00	Flow (cfs)	261.76	1841.13	212.11
Top Width (ft)	108.00	Top Width (ft)	30.00	49.00	29.00
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)	2.52	4.66	2.35
Max Chl Dpth (ft)	8.20	Hydr. Depth (ft)	3.46	8.06	3.12
Conv. Total (cfs)	98863.4	Conv. (cfs)	11178.6	78626.4	9058.3
Length Wtd. (ft)	17.00	Wetted Per. (ft)	32.32	49.00	31.44
Min Ch El (ft)	2204.51	Shear (lb/sq ft)	0.11	0.28	0.10
Alpha	1.20	Stream Power (lb/ft s)	0.28	1.29	0.23
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.29	0.95	0.29
C & E Loss (ft)	0.06	Cum SA (acres)	0.32	0.19	0.32

Plan: Plan 10 Duck Ck S Silverado Pines RS: 5.5 Profile: 1.0ft FW

E.G. Elev (ft)	2213.00	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.29	Wt. n-Val.	0.030	0.030	0.030
W.S. Elev (ft)	2212.71	Reach Len. (ft)	17.00	17.00	17.00
Crit W.S. (ft)		Flow Area (sq ft)	103.73	394.92	90.43
E.G. Slope (ft/ft)	0.000548	Area (sq ft)	103.73	394.92	90.43
Q Total (cfs)	2315.00	Flow (cfs)	261.76	1841.13	212.11
Top Width (ft)	108.00	Top Width (ft)	30.00	49.00	29.00
Vel Total (ft/s)	3.93	Avg. Vel. (ft/s)	2.52	4.66	2.35
Max Chl Dpth (ft)	8.20	Hydr. Depth (ft)	3.46	8.06	3.12
Conv. Total (cfs)	98863.4	Conv. (cfs)	11178.6	78626.4	9058.3
Length Wtd. (ft)	17.00	Wetted Per. (ft)	32.32	49.00	31.44
Min Ch El (ft)	2204.51	Shear (lb/sq ft)	0.11	0.28	0.10
Alpha	1.20	Stream Power (lb/ft s)	0.28	1.29	0.23
Frctn Loss (ft)	0.01	Cum Volume (acre-ft)	0.29	0.95	0.29
C & E Loss (ft)	0.06	Cum SA (acres)	0.32	0.19	0.32

Plan: Plan 10 Duck Ck S Silverado Pines RS: 5.28 Profile: 100-Year

E.G. Elev (ft)	2212.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2212.03	Reach Len. (ft)	75.00	75.00	75.00
Crit W.S. (ft)	2209.11	Flow Area (sq ft)	0.28	303.84	0.29
E.G. Slope (ft/ft)	0.000297	Area (sq ft)	0.28	303.84	0.29
Q Total (cfs)	2315.00	Flow (cfs)	0.06	2314.88	0.06
Top Width (ft)	40.05	Top Width (ft)	0.07	39.90	0.07
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)	0.22	7.62	0.22
Max Chl Dpth (ft)	7.64	Hydr. Depth (ft)	3.80	7.61	3.82
Conv. Total (cfs)	134430.3	Conv. (cfs)	3.6	134423.0	3.6
Length Wtd. (ft)	75.00	Wetted Per. (ft)	7.59	39.90	7.64
Min Ch El (ft)	2204.39	Shear (lb/sq ft)	0.00	0.14	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.07	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.27	0.82	0.27
C & E Loss (ft)		Cum SA (acres)	0.31	0.17	0.32

Plan: Plan 10 Duck Ck S Silverado Pines RS: 5.28 Profile: 1.0ft FW

E.G. Elev (ft)	2212.93	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.90	Wt. n-Val.	0.013	0.013	0.013
W.S. Elev (ft)	2212.03	Reach Len. (ft)	75.00	75.00	75.00
Crit W.S. (ft)	2209.11	Flow Area (sq ft)	0.28	303.84	0.29
E.G. Slope (ft/ft)	0.000297	Area (sq ft)	0.28	303.84	0.29
Q Total (cfs)	2315.00	Flow (cfs)	0.06	2314.88	0.06
Top Width (ft)	40.05	Top Width (ft)	0.07	39.90	0.07
Vel Total (ft/s)	7.60	Avg. Vel. (ft/s)	0.22	7.62	0.22
Max Chl Dpth (ft)	7.64	Hydr. Depth (ft)	3.80	7.61	3.82
Conv. Total (cfs)	134430.3	Conv. (cfs)	3.6	134423.0	3.6
Length Wtd. (ft)	75.00	Wetted Per. (ft)	7.59	39.90	7.64
Min Ch El (ft)	2204.39	Shear (lb/sq ft)	0.00	0.14	0.00
Alpha	1.00	Stream Power (lb/ft s)	0.00	1.07	0.00
Frctn Loss (ft)		Cum Volume (acre-ft)	0.27	0.82	0.27
C & E Loss (ft)		Cum SA (acres)	0.31	0.17	0.32

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.6 Profile: 100-Year

E.G. Elev (ft)	2210.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2208.37	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2208.37	Flow Area (sq ft)	27.31	170.69	28.89
E.G. Slope (ft/ft)	0.010228	Area (sq ft)	27.31	170.69	28.89
Q Total (cfs)	2315.00	Flow (cfs)	185.83	1928.11	201.06
Top Width (ft)	66.33	Top Width (ft)	13.03	40.00	13.31
Vel Total (ft/s)	10.20	Avg. Vel. (ft/s)	6.81	11.30	6.96
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	2.10	4.27	2.17
Conv. Total (cfs)	22891.0	Conv. (cfs)	1837.5	19065.4	1988.1
Length Wtd. (ft)	10.00	Wetted Per. (ft)	13.69	40.00	14.00
Min Ch El (ft)	2204.03	Shear (lb/sq ft)	1.27	2.72	1.32
Alpha	1.10	Stream Power (lb/ft s)	8.67	30.78	9.17
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.24	0.41	0.25
C & E Loss (ft)	0.39	Cum SA (acres)	0.30	0.10	0.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.6 Profile: 1.0ft FW

E.G. Elev (ft)	2210.15	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.77	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2208.37	Reach Len. (ft)	10.00	10.00	10.00
Crit W.S. (ft)	2208.37	Flow Area (sq ft)	27.31	170.69	28.89
E.G. Slope (ft/ft)	0.010228	Area (sq ft)	27.31	170.69	28.89
Q Total (cfs)	2315.00	Flow (cfs)	185.83	1928.11	201.06
Top Width (ft)	66.33	Top Width (ft)	13.03	40.00	13.31
Vel Total (ft/s)	10.20	Avg. Vel. (ft/s)	6.81	11.30	6.96
Max Chl Dpth (ft)	4.34	Hydr. Depth (ft)	2.10	4.27	2.17
Conv. Total (cfs)	22891.0	Conv. (cfs)	1837.5	19065.4	1988.1
Length Wtd. (ft)	10.00	Wetted Per. (ft)	13.69	40.00	14.00
Min Ch El (ft)	2204.03	Shear (lb/sq ft)	1.27	2.72	1.32
Alpha	1.10	Stream Power (lb/ft s)	8.67	30.78	9.17
Frctn Loss (ft)	0.03	Cum Volume (acre-ft)	0.24	0.41	0.25
C & E Loss (ft)	0.39	Cum SA (acres)	0.30	0.10	0.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.5 Profile: 100-Year

E.G. Elev (ft)	2209.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2208.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2208.03	Flow Area (sq ft)	27.29	171.23	27.29
E.G. Slope (ft/ft)	0.010238	Area (sq ft)	27.29	171.23	27.29
Q Total (cfs)	2315.00	Flow (cfs)	187.90	1939.19	187.90
Top Width (ft)	65.50	Top Width (ft)	12.75	40.00	12.75
Vel Total (ft/s)	10.25	Avg. Vel. (ft/s)	6.88	11.33	6.88
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)	2.14	4.28	2.14
Conv. Total (cfs)	22879.8	Conv. (cfs)	1857.1	19165.6	1857.1
Length Wtd. (ft)	50.00	Wetted Per. (ft)	13.45	40.00	13.45
Min Ch El (ft)	2203.75	Shear (lb/sq ft)	1.30	2.74	1.30
Alpha	1.10	Stream Power (lb/ft s)	8.93	30.98	8.93
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.24	0.37	0.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.30	0.09	0.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.5 Profile: 1.0ft FW

E.G. Elev (ft)	2209.82	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.79	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2208.03	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2208.03	Flow Area (sq ft)	27.29	171.23	27.29
E.G. Slope (ft/ft)	0.010238	Area (sq ft)	27.29	171.23	27.29
Q Total (cfs)	2315.00	Flow (cfs)	187.90	1939.19	187.90
Top Width (ft)	65.50	Top Width (ft)	12.75	40.00	12.75
Vel Total (ft/s)	10.25	Avg. Vel. (ft/s)	6.88	11.33	6.88
Max Chl Dpth (ft)	4.28	Hydr. Depth (ft)	2.14	4.28	2.14
Conv. Total (cfs)	22879.8	Conv. (cfs)	1857.1	19165.6	1857.1
Length Wtd. (ft)	50.00	Wetted Per. (ft)	13.45	40.00	13.45
Min Ch El (ft)	2203.75	Shear (lb/sq ft)	1.30	2.74	1.30
Alpha	1.10	Stream Power (lb/ft s)	8.93	30.98	8.93
Frctn Loss (ft)	0.51	Cum Volume (acre-ft)	0.24	0.37	0.24
C & E Loss (ft)	0.01	Cum SA (acres)	0.30	0.09	0.30

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.0 Profile: 100-Year

E.G. Elev (ft)	2208.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2206.75	Reach Len. (ft)	50.00	50.00	50.00
Crit W.S. (ft)	2206.75	Flow Area (sq ft)	28.50	169.94	29.73
E.G. Slope (ft/ft)	0.010230	Area (sq ft)	28.50	169.94	29.73
Q Total (cfs)	2315.00	Flow (cfs)	195.90	1914.25	204.85
Top Width (ft)	67.41	Top Width (ft)	13.42	40.00	14.00
Vel Total (ft/s)	10.15	Avg. Vel. (ft/s)	6.87	11.26	6.89
Max Chl Dpth (ft)	4.25	Hydr. Depth (ft)	2.12	4.25	2.12
Conv. Total (cfs)	22887.8	Conv. (cfs)	1936.8	18925.7	2025.3
Length Wtd. (ft)	50.00	Wetted Per. (ft)	14.07	40.00	14.63
Min Ch El (ft)	2202.50	Shear (lb/sq ft)	1.29	2.71	1.30
Alpha	1.10	Stream Power (lb/ft s)	8.89	30.57	8.95
Frctn Loss (ft)	0.33	Cum Volume (acre-ft)	0.21	0.17	0.21
C & E Loss (ft)	0.44	Cum SA (acres)	0.29	0.05	0.29

Plan: Plan 10 Duck Ck S Silverado Pines RS: 4.0 Profile: 1.0ft FW

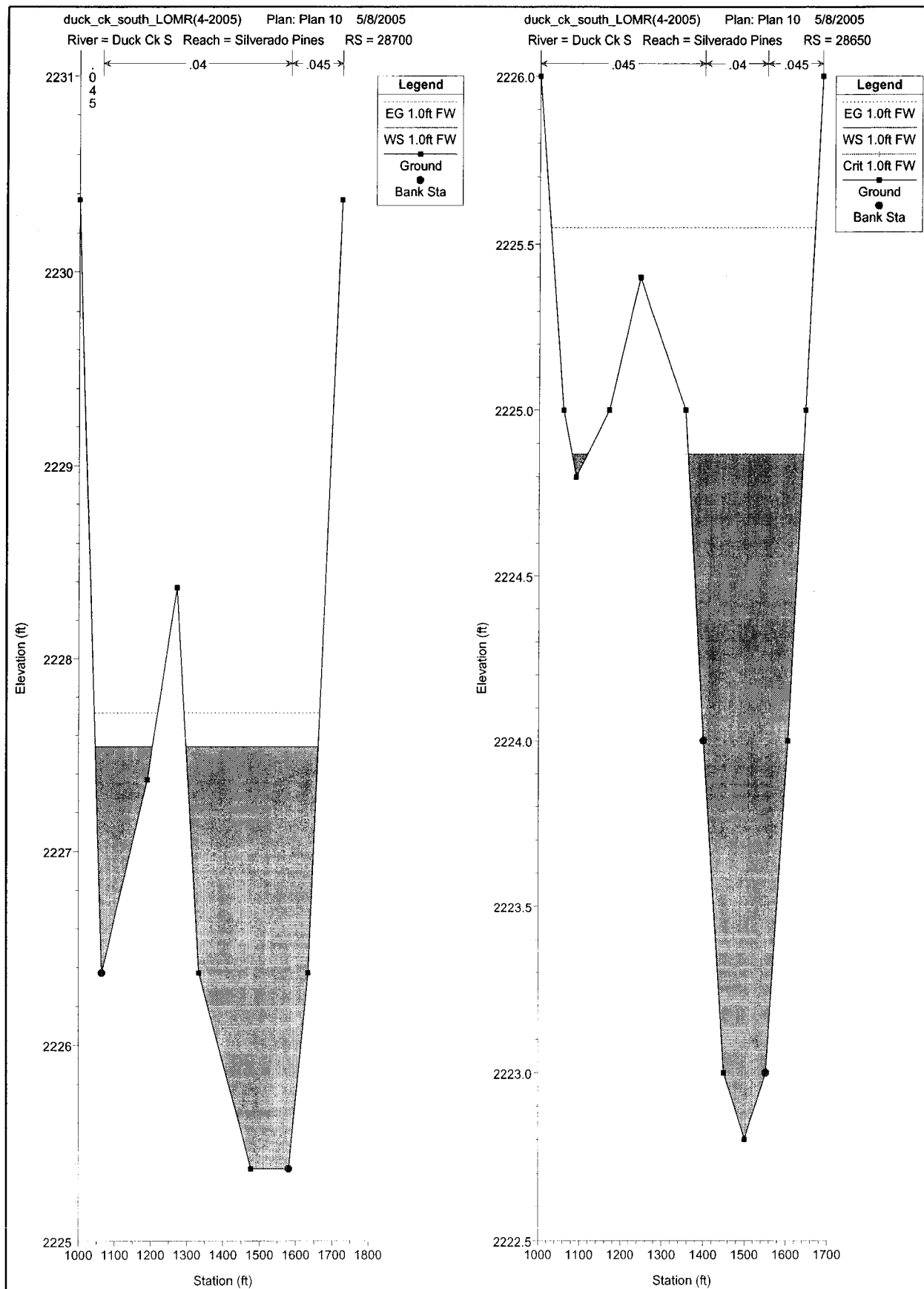
E.G. Elev (ft)	2208.51	Element	Left OB	Channel	Right OB
Vel Head (ft)	1.76	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2206.75	Reach Len. (ft)	50.00	50.00	50.00
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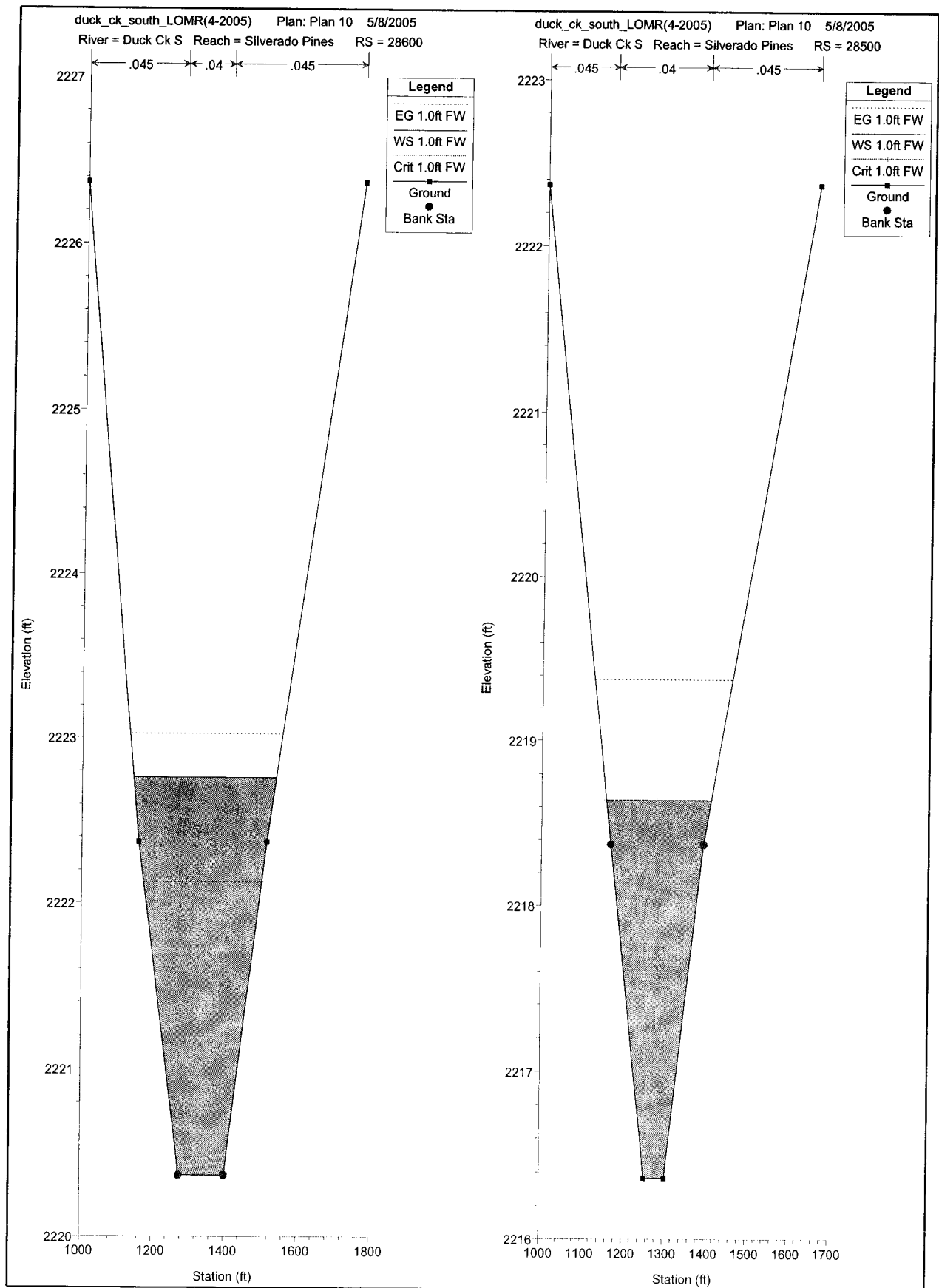
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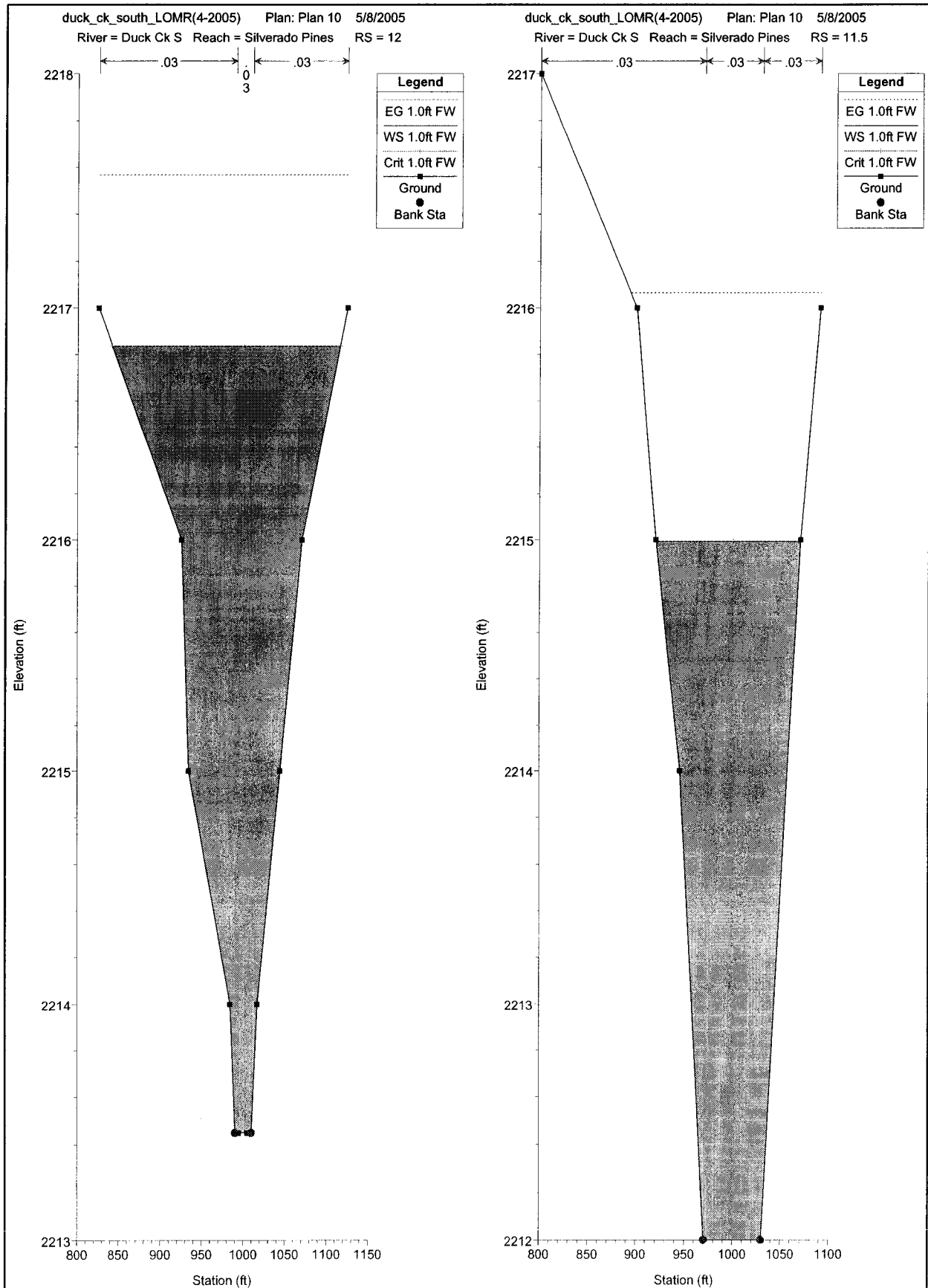
E.G. Elev (ft)	2204.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.035	0.035	0.035
W.S. Elev (ft)	2204.66	Reach Len. (ft)			
Crit W.S. (ft)	2204.66	Flow Area (sq ft)	331.10	132.39	331.10
E.G. Slope (ft/ft)	0.004550	Area (sq ft)	331.10	132.39	331.10
Q Total (cfs)	2315.00	Flow (cfs)	736.46	842.07	736.46
Top Width (ft)	1006.60	Top Width (ft)	483.30	40.00	483.30
Vel Total (ft/s)	2.91	Avg. Vel. (ft/s)	2.22	6.36	2.22
Max Chl Dpth (ft)	3.31	Hydr. Depth (ft)	0.69	3.31	0.69
Conv. Total (cfs)	34318.4	Conv. (cfs)	10917.6	12483.2	10917.6
Length Wtd. (ft)		Wetted Per. (ft)	483.71	40.00	483.71
Min Ch El (ft)	2201.35	Shear (lb/sq ft)	0.19	0.94	0.19
Alpha	2.10	Stream Power (lb/ft s)	0.43	5.98	0.43
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

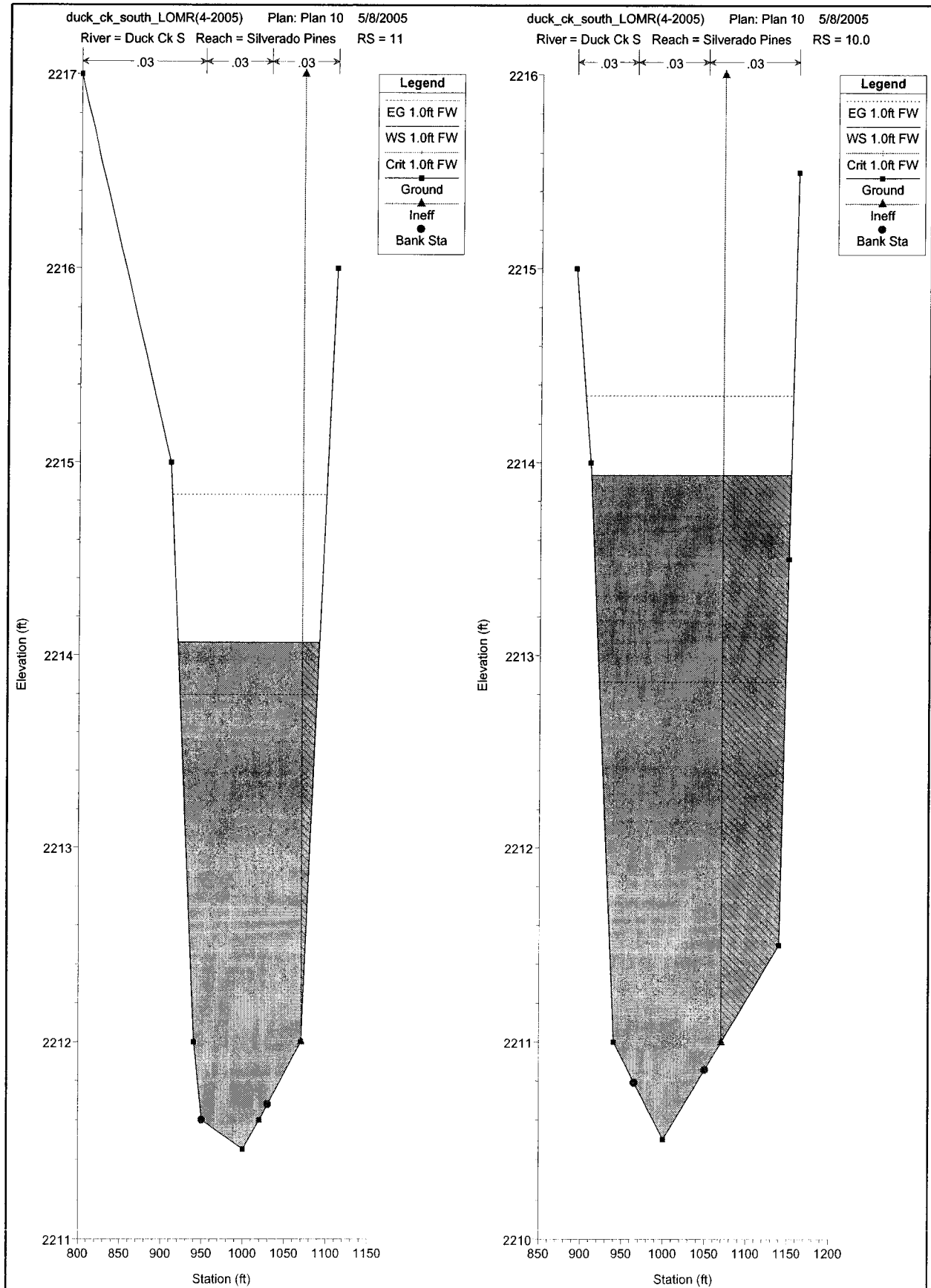
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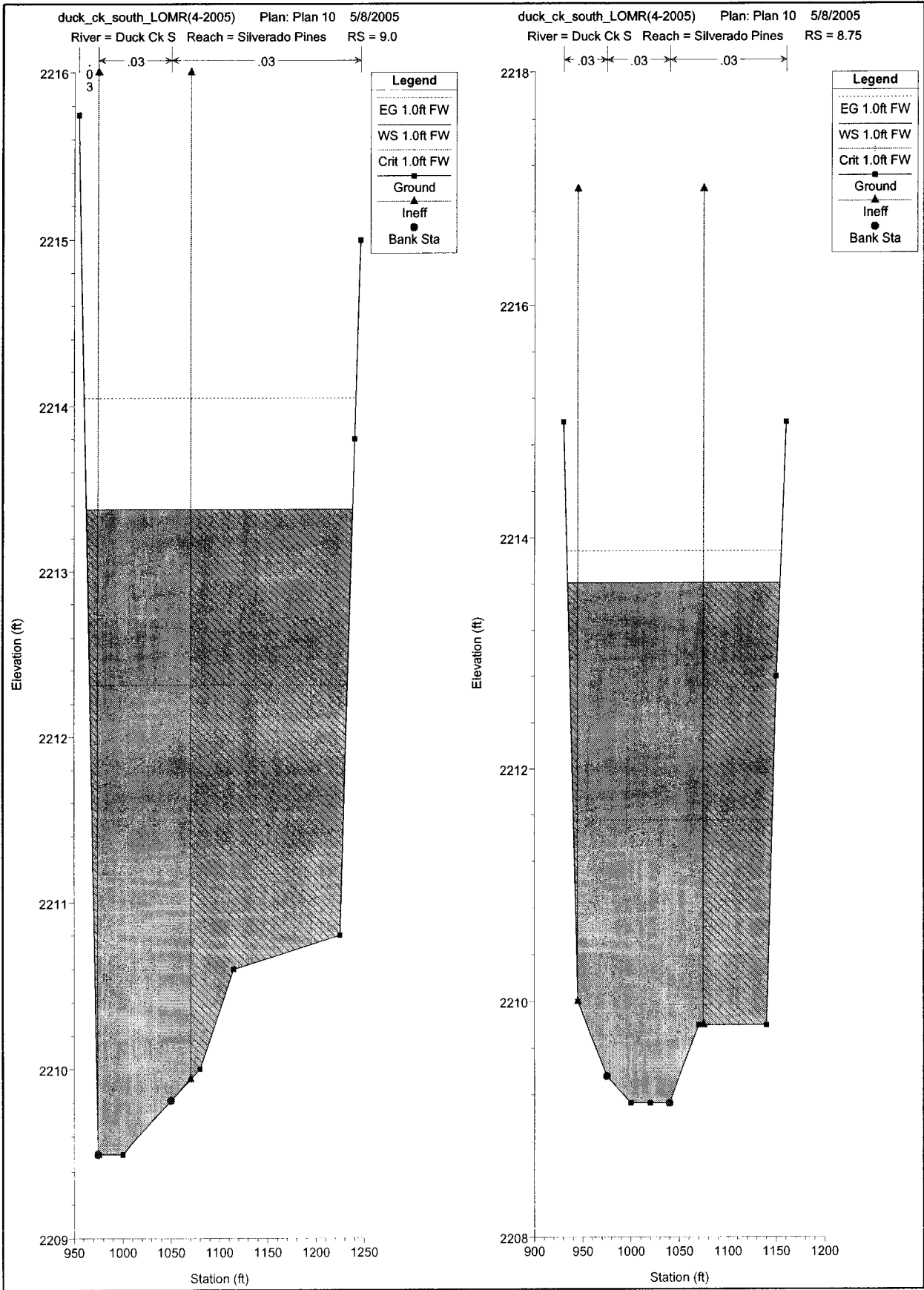
E.G. Elev (ft)	2204.94	Element	Left OB	Channel	Right OB
Vel Head (ft)	0.28	Wt. n-Val.	0.035	0.035	0.035
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Alpha	2.10	Stream Power (lb/ft s)	0.43	5.98	0.43
Frctn Loss (ft)		Cum Volume (acre-ft)			
C & E Loss (ft)		Cum SA (acres)			

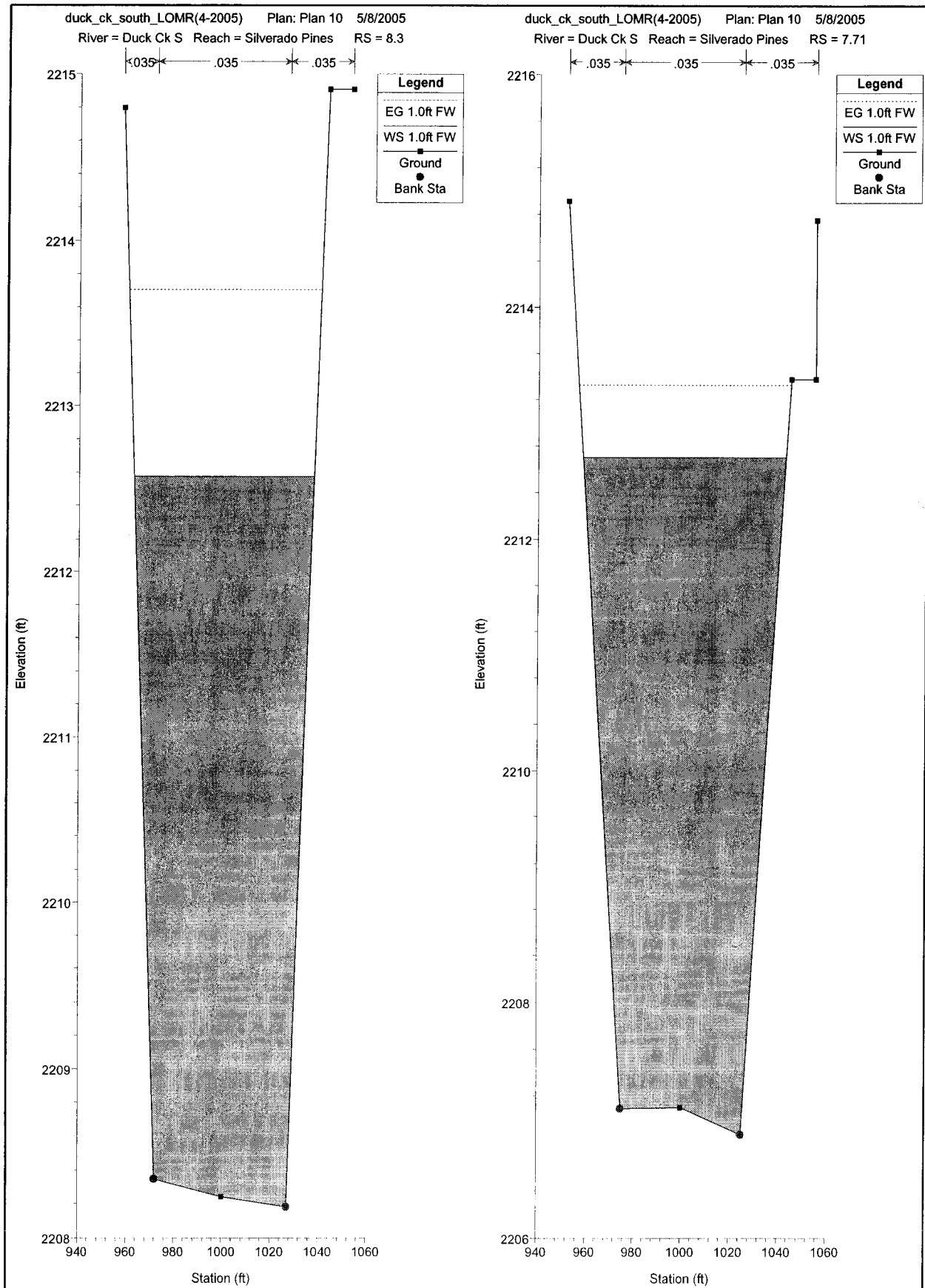


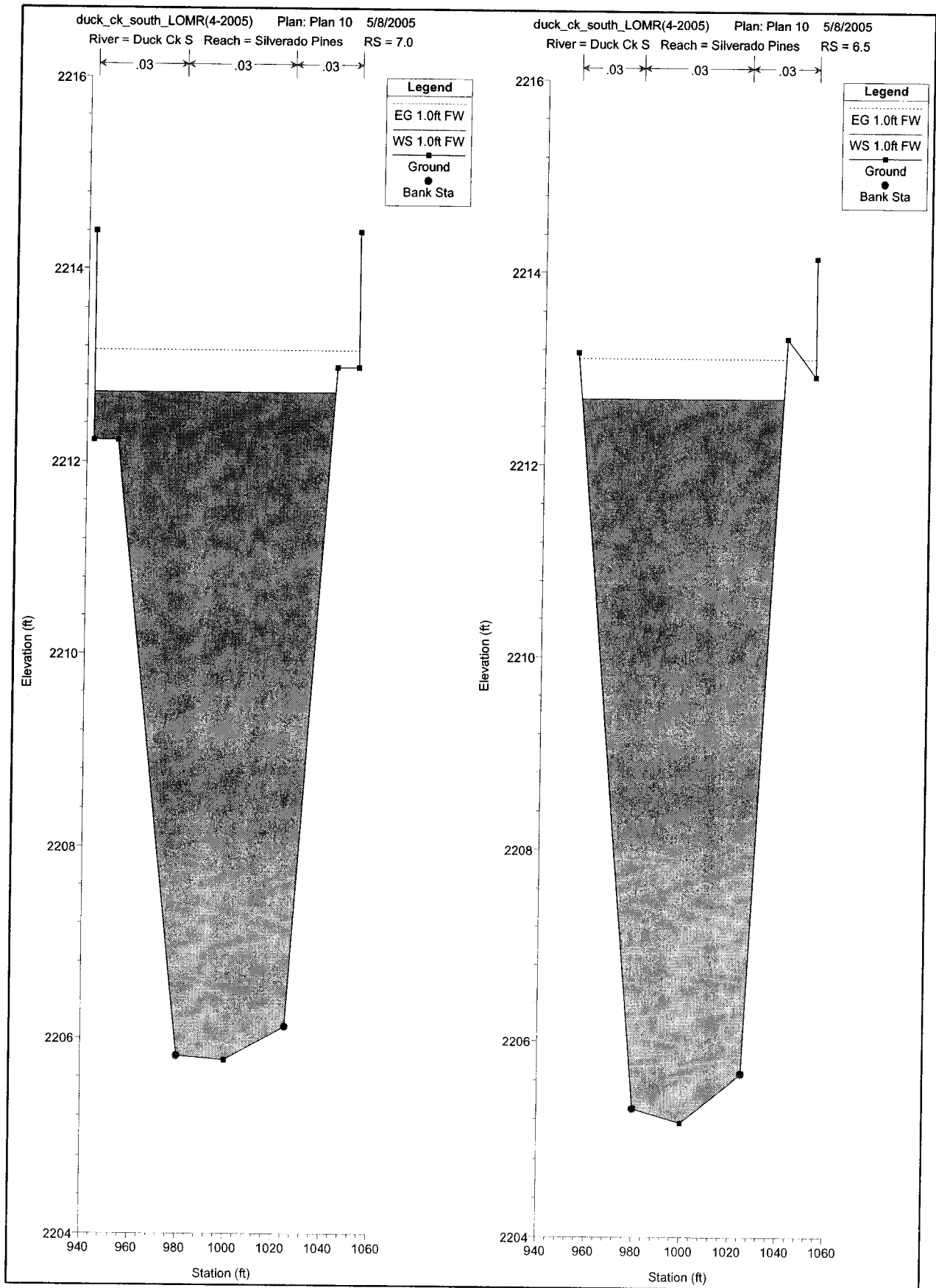


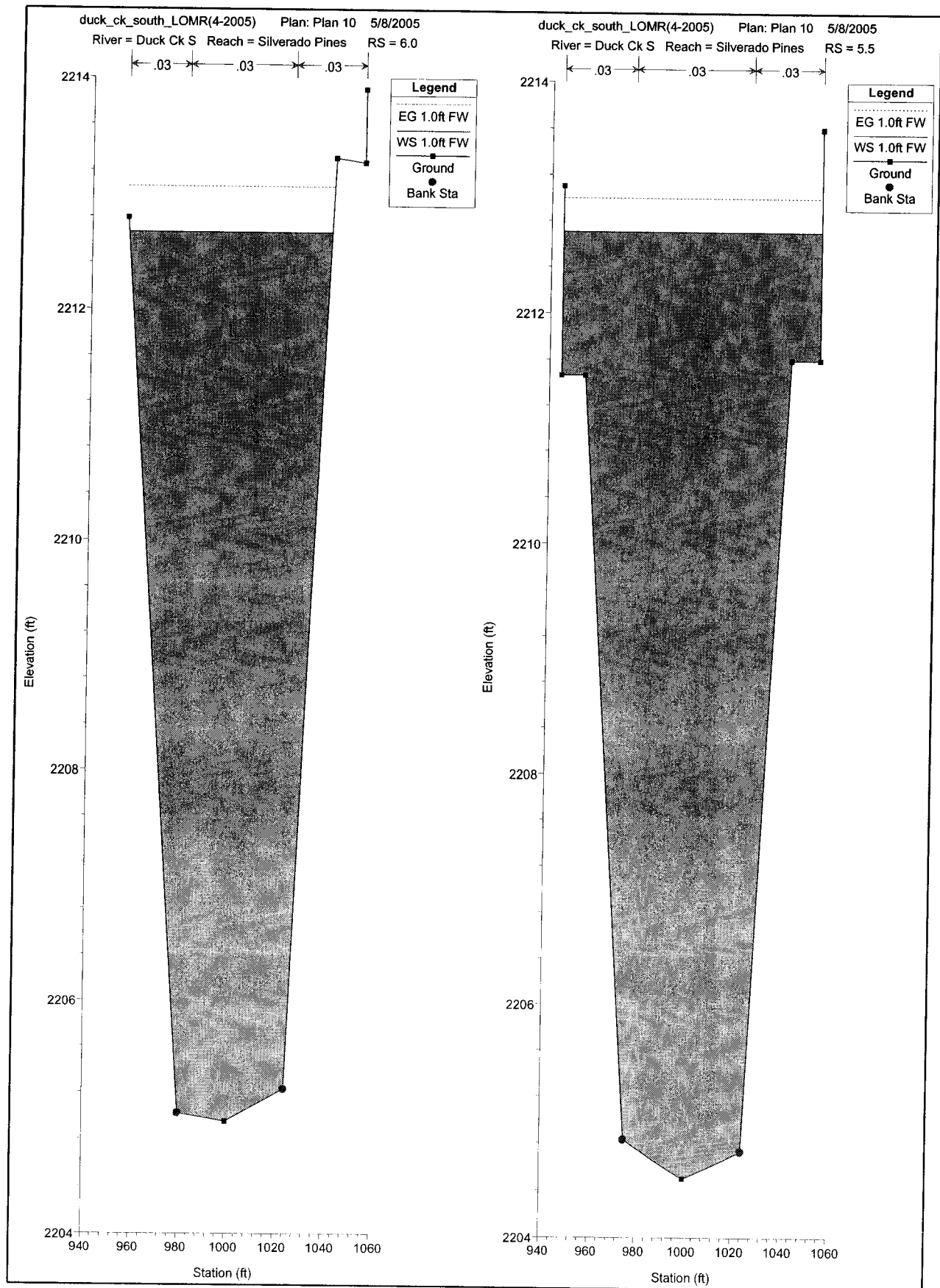


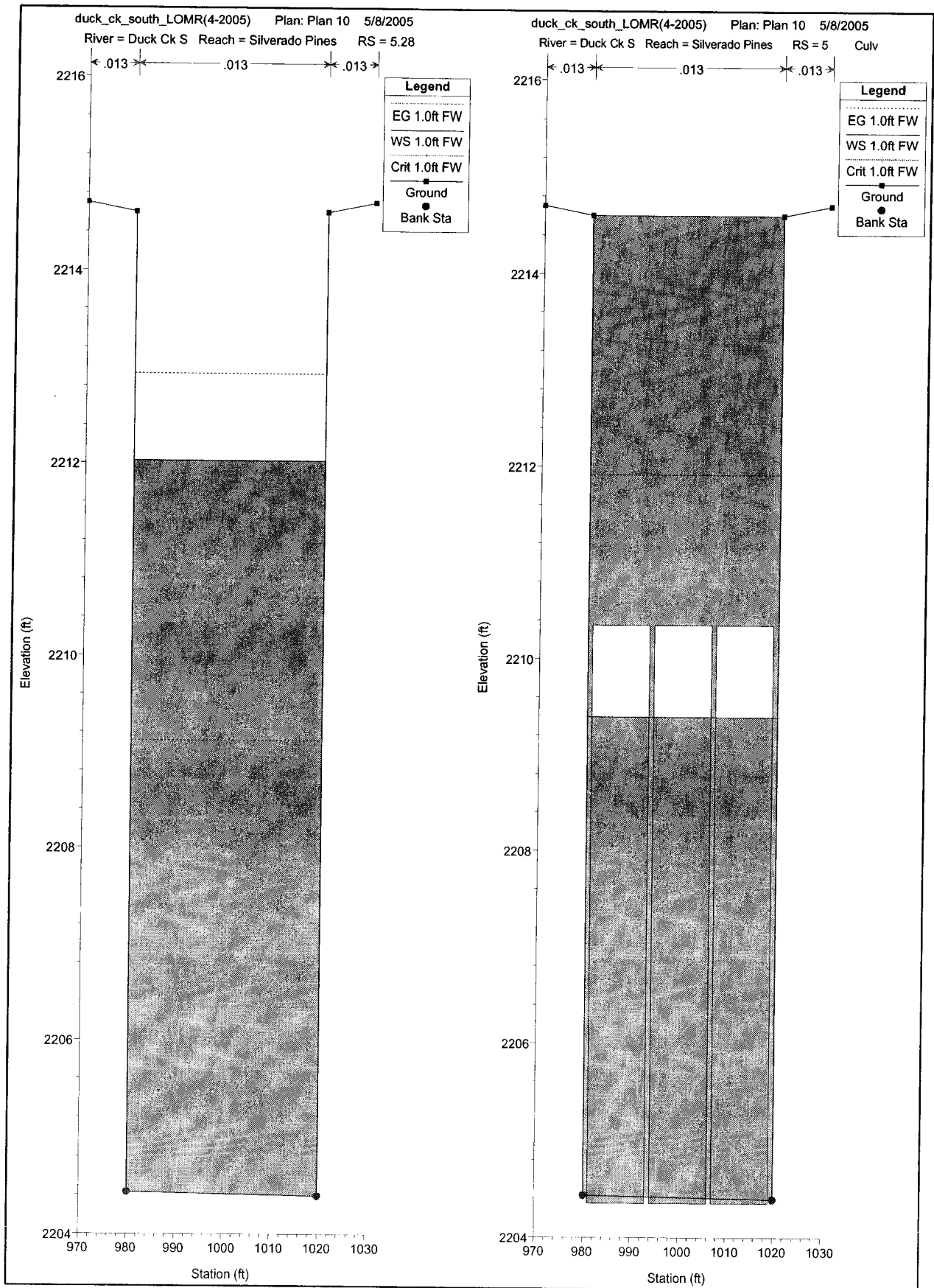


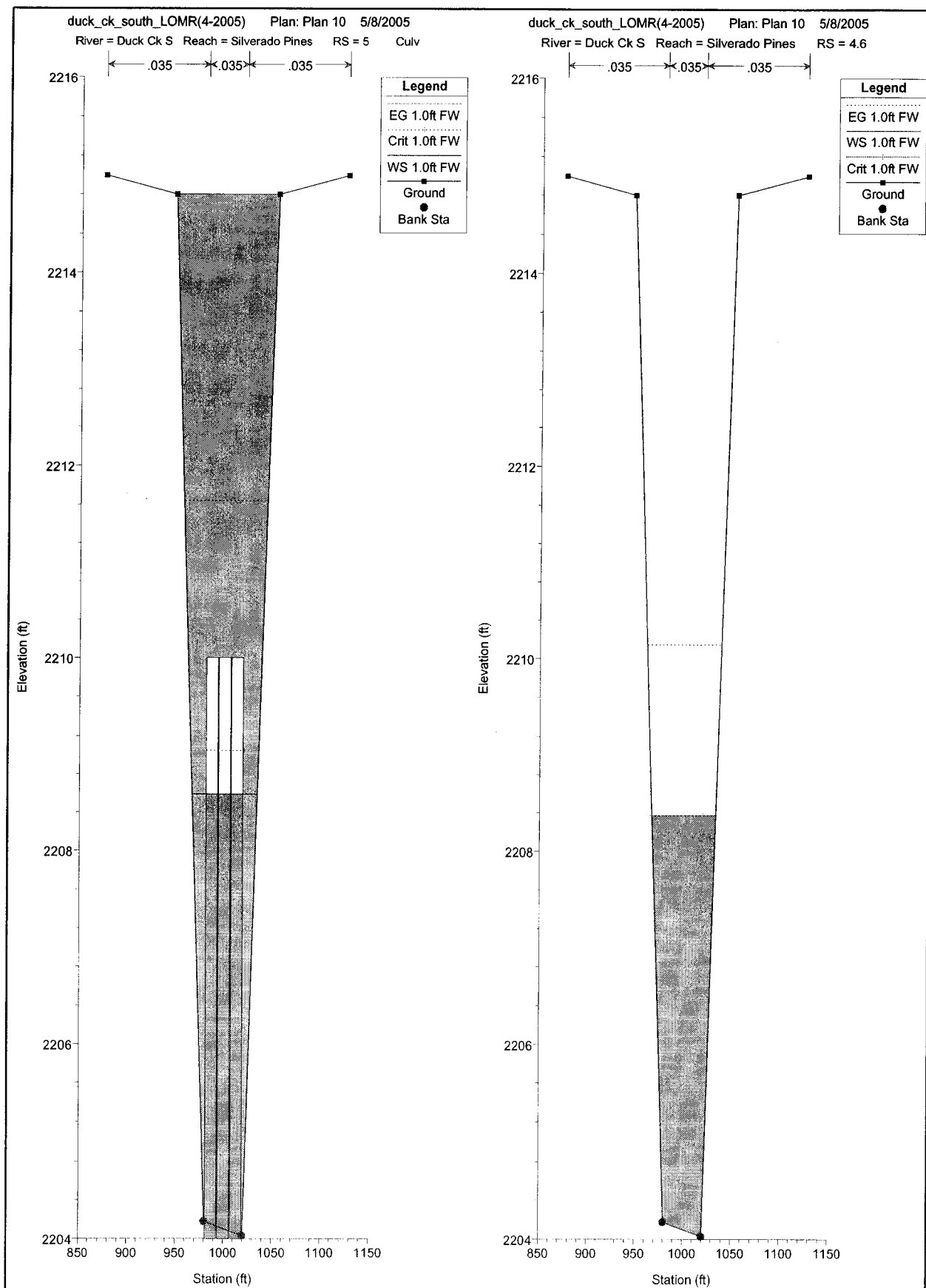


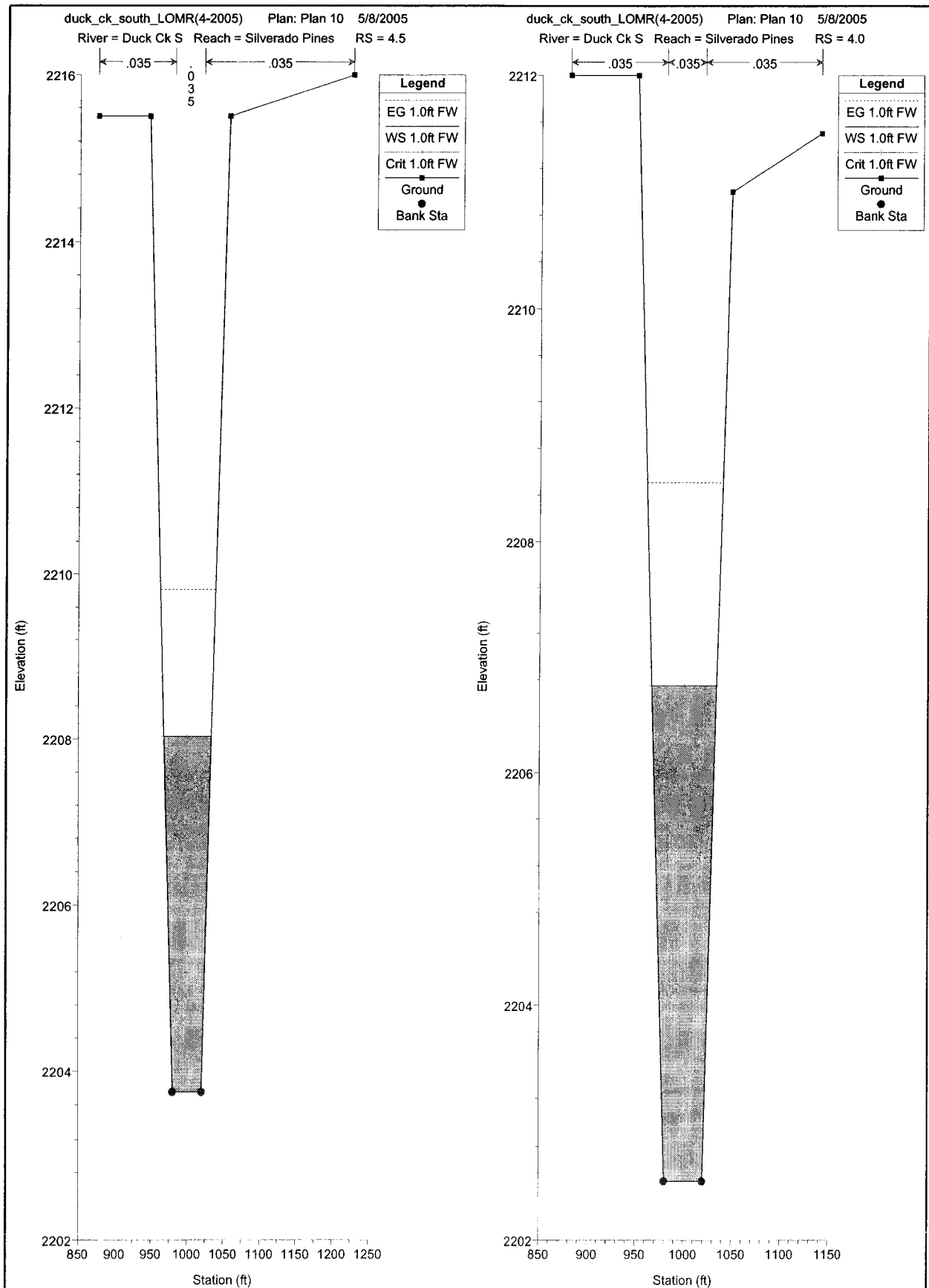




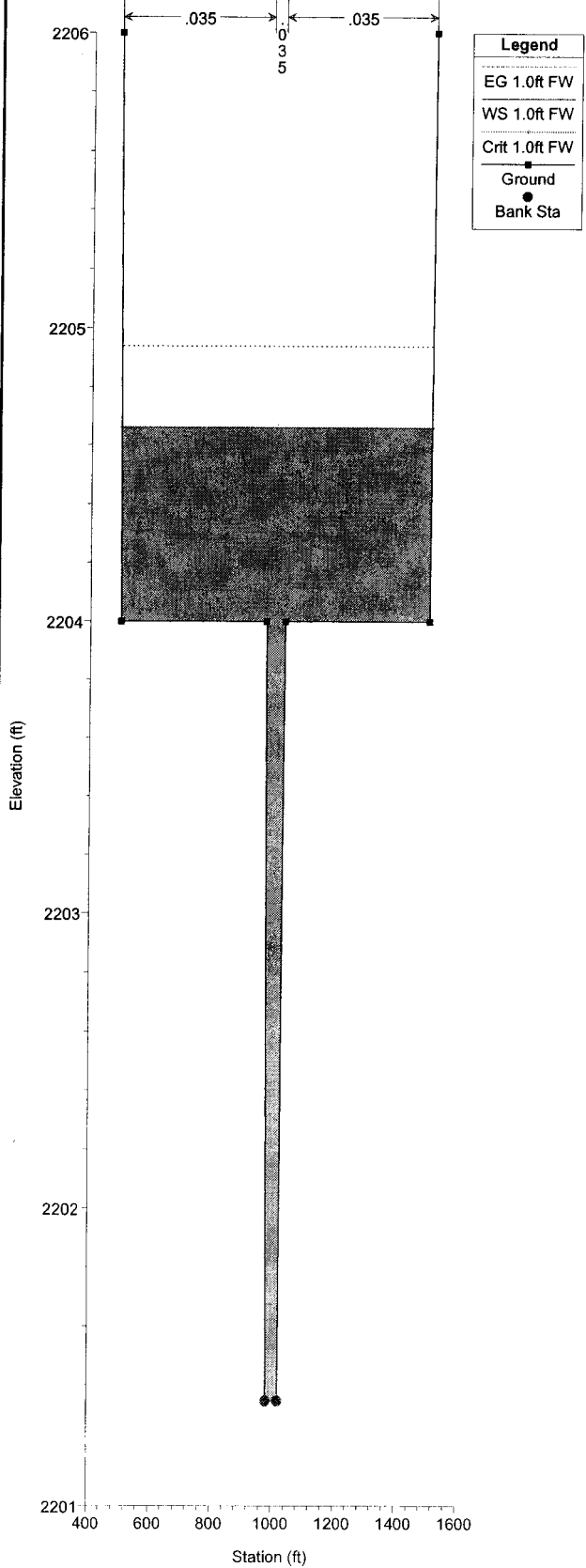








duck_ck_south_LOMR(4-2005) Plan: Plan 10 5/8/2005
River = Duck Ck S Reach = Silverado Pines RS = 3.5



“AS-BUILT MAP”

CLOMR REFERENCE



Federal Emergency Management Agency

Washington, D.C. 20472

OCT 28 2004

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

IN REPLY REFER TO:

Case No.: 04-09-1381R

The Honorable Chip Maxfield, P.E.
Chair, Clark County Board
of Commissioners
500 South Grand Central Parkway
Las Vegas, NV 89155

Community: Clark County, NV
Community No.: 320003

104

Dear Mr. Maxfield:

This responds to a request that the Department of Homeland Security's Federal Emergency Management Agency (FEMA) comment on the effects that a proposed project would have on the effective Flood Insurance Rate Map (FIRM) and Flood Insurance Study (FIS) report for Clark County, Nevada and Incorporated Areas, in accordance with Part 65 of the National Flood Insurance Program (NFIP) regulations. In a letter dated July 13, 2004, Mr. Dubernia B. Bales, P.E., Senior Project Manager, Stantec Consulting Inc., requested that FEMA evaluate the effects along Duck Creek South Channel that proposed channelization from just upstream to approximately 500 feet upstream of the Lower Duck Creek Detention Basin (LDCDB), proposed construction of a culvert under Richmar Avenue, proposed excavation of a ponding area from approximately 500 feet upstream to approximately 900 feet upstream of the LDCDB, and updated topographic information from approximately 900 feet upstream of the LDCDB to the confluence with Duck Creek (confluence) would have on the flood hazard information shown on the effective FIRM and FIS report. This Conditional Letter of Map Revision (CLOMR) request follows and supersedes a CLOMR issued on April 22, 2004 (Case No. 04-09-0432R).

All data required to complete our review of this CLOMR request were submitted with letters from Mr. Bales.

We reviewed the submitted data and the data used to prepare the effective FIRM for your community and determined that the proposed project meets the minimum floodplain management criteria of the NFIP. We believe that, if the proposed project is constructed as shown on the plans entitled "Silverado Pines Unit 3, Duck Creek South Channel," dated July 29, 2004 and as described in the report entitled "Floodplain Modification Study for Duck Creek South Channel," dated June 2004 and revised July 2004, both prepared by Stantec Consulting Inc., and the data listed below are received, a revision to the FIRM would be warranted.

As a result of the updated topographic information and proposed project, the elevations of the flood having a 1-percent chance of being equaled or exceeded in any given year (base flood) for Duck Creek South Channel will increase and decrease compared to the effective Base Flood Elevations (BFEs). The maximum increase in BFE, 0.7 foot, will occur approximately 400 feet downstream of the confluence. The maximum decrease in BFE, 3.5 feet, will occur approximately 800 feet upstream of the LDCDB. The width of the Special Flood Hazard Area (SFHA), the area that would be inundated by the base flood, will increase in some areas and decrease in other areas compared to the effective SFHA width. The maximum increase in SFHA width, approximately 170 feet, will occur approximately 600 feet upstream of the LDCDB. The maximum decrease in SFHA width, approximately 150 feet, will occur approximately

350 feet downstream of the confluence. The width of the regulatory floodway will increase in some areas and decrease in other areas compared to the effective floodway width. The maximum increase in floodway width, approximately 70 feet, will occur approximately 800 feet downstream of the confluence. The maximum decrease in floodway width, approximately 40 feet, will occur approximately 800 feet upstream of the LDCDB. Evidence that the project satisfies the requirements of Section 65.12 of the NFIP regulations was provided by Mr. Bales. The base flood will be contained in the proposed culvert, channel, and ponding area.

Upon completion of the project, your community may submit the data listed below and request that we make a final determination on revising the effective FIRM and FIS report.

- Detailed application and certification forms must be used for requesting final revisions to the maps. Therefore, when the map revision request for the area covered by this letter is submitted, Form 1, entitled "Overview & Concurrence Form," must be included. (A copy of this form is enclosed.)
- The detailed application and certification forms listed below may be required if as-built conditions differ from the preliminary plans. If required, please submit new forms (copies of which are enclosed) or annotated copies of the previously submitted forms showing the revised information.

Form 2, entitled "Riverine Hydrology & Hydraulics Form"

Form 3, entitled "Riverine Structures Form"

Hydraulic analyses, for as-built conditions, of the base flood and the regulatory floodway, together with a topographic work map showing the revised floodplain and floodway boundaries, must be submitted with Form 2.

- Effective September 1, 2002, FEMA revised the fee schedule for reviewing and processing requests for conditional and final modifications to published flood information and maps. In accordance with this schedule, the current fee for this map revision request is \$3,800 and must be received before we can begin processing the request. Please note, however, that the fee schedule is subject to change, and requesters are required to submit the fee in effect at the time of the submittal. Payment of this fee shall be made in the form of a check or money order, made payable in U.S. funds to the National Flood Insurance Program, or by credit card. The payment must be forwarded to the following address:

Federal Emergency Management Agency
 Fee-Charge System Administrator
 P.O. Box 22787
 Alexandria, VA 22304

- As-built plans, certified by a registered professional engineer, of all proposed project elements
- Community acknowledgment of the map revision request

- A copy of the public notice distributed by your community stating its intent to revise the regulatory floodway, or a statement by your community that it has notified all affected property owners and affected adjacent jurisdictions

After receiving appropriate documentation to show that the project has been completed, FEMA will initiate a revision to the FIRM and FIS report. Because the BFEs would change as a result of the project, a 90-day appeal period would be initiated, during which community officials and interested persons may appeal the revised BFEs based on scientific or technical data.

The basis of this CLOMR is, in whole or in part, a channel-modification/culvert project. NFIP regulations, as cited in Paragraph 60.3(b)(7), require that communities assure that the flood-carrying capacity within the altered or relocated portion of any watercourse is maintained. This provision is incorporated into your community's existing floodplain management regulations. Consequently, the ultimate responsibility for maintenance of the modified channel and culvert rests with your community.

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

If you have any questions regarding floodplain management regulations for your community or the NFIP in general, please contact the Consultation Coordination Officer (CCO) for your community. Information on the CCO for your community may be obtained by calling the Director, Federal Insurance and Mitigation Division of FEMA in Oakland, California, at (510) 627-7103. If you have any questions regarding this CLOMR, please call our Map Assistance Center, toll free, at 1-877-FEMA MAP (1-877-336-2627).

Sincerely,



Max H. Yuan, P.E., Project Engineer
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

For: Doug Bellomo, P.E., CFM, Chief
Hazard Identification Section
Mitigation Division
Emergency Preparedness
and Response Directorate

Enclosures

cc: Mr. David Betley, P.E.
Principal Engineer
Civil Engineering Division
Department of Development Services
Clark County

Mr. Dubernia B. Bales, P.E.
Senior Project Manager
Stantec Consulting Inc.

Mr. Kevin Eubanks, P.E., CFM
Assistant General Manager
Clark County Regional Flood
Control District

Mr. James Leland, P.E.
Associate
Stantec Consulting Inc.

I. PURPOSE

This study evaluates the impacts to the Federal Emergency Management Agency (FEMA) designated 100-year special flood hazard area Zone "AE" located along Duck Creek South Channel resulting from proposed construction of the Silverado Pines Unit No. 3 development. A Conditional Letter of Map Revision (CLOMR) was issued for the project on April 22, 2004 (FEMA Case No. 04-09-0432R) based on the information submitted with the *Conditional Letter of Map Revision (CLOMR) for the Silverado Pines Unit No. 3 Flood Insurance Rate Map (FIRM)* by Stantec Consulting Inc, August 2001 (Reference 1).

This report will serve as an addendum to the original study and the data provided herein will supersede the results from the earlier report. The information and data provided in this addendum satisfies a request from the Clark County Regional Flood Control District to address the conditions of the April 22, 2004 CLOMR. The appendices of this report include supporting data, tables and figures, and summary results from the hydraulic computations. The back pockets of this report include a certified topographic map with floodplain and floodway delineations, annotated mark-up of the effective FEMA Flood Insurance Rate Map (FIRM) reflecting changes due to the completed channel improvements, and a CD-ROM containing the hydraulic models.

II. LOCATION AND STUDY AREA DESCRIPTION

A. Location

Silverado Pines Unit No. 3 is located within unincorporated Clark County, Nevada in a portion of Section 21, Township 22 South, Range 61 East, M.D.M. Unit No. 3 is the third and final phase of the Silverado Pines residential development project. The project site lies south of Richmar Avenue and east of Gilespe Street. Duck Creek South Channel flows through the subject property to the north into the Lower Duck Creek Detention Basin located to the north of Richmar Avenue. The study reach is the portion of Duck Creek South Channel from the divergence from Duck Creek to the confluence with Duck Creek. The Duck Creek and Duck Creek South Channel confluence at the Lower Duck Creek Detention Basin. A Vicinity Map showing the study reach is included in the appendix of this report.

B. Project Description

The project site will include 94 single-family homes on approximately 11 acres. The site will include the development of interior streets, improvements to the south half of Richmar Avenue, and a channelized drainageway to re-route the existing Duck Creek South Channel through the site.



C. Benchmark Description

The vertical control used for this study is based on the Clark County Benchmark 10-0C21-20C4. This benchmark is described as rivet and square aluminum plate in the West corner of a 4'x3' concrete pad in the northeast corner of Industrial Road and Serene Avenue. The calculated benchmark elevation in feet is 2283.98 NAVD'88. The topographic mapping used was based on the benchmark elevation. Regional FEMA publications are also based on the NAVD'88 datum. The effective hydraulic analysis used to determine the base flood elevations was studied using the NGVD'29 datum and the results were adjusted up 2.37 feet to match FEMA publications.

III. PREVIOUS INVESTIGATIONS AND EXISTING DATA

The *Duck Creek Hydrologic Unit Flood Insurance Study* by Michael Baker Jr. May 1993 (Reference 2), *Lower Duck Creek Detention Basin Design Memorandum* by Montgomery Watson, July 1998 (Reference 2), and the *Conditional Letter of Map Revision (CLOMR) for the Silverado Pines Unit No. 3 Flood Insurance Rate Maps (FIRM)* by Stantec Consulting Inc, August 2001 have analyzed the Duck Creek watershed and areas that encompass the subject site. More recently G.C. Wallace studied the Duck Creek watershed in their request for a letter of map change to FEMA, which resulted in a revision to several FIRM panels in the Duck Creek watershed including map number 32003C2568 D, published August 16, 1995. The same FIRM panel was revised by FEMA in two Letter of Map Changes (LOMC) on April 7, 2003 and April 21, 2003. The effective (most recent revision) date for the aforementioned FIRM panel is August 13, 2003 (FEMA Case No. 03-09-0980X). A copy of the LOMC is provided in Appendix A.

IV. DUCK CREEK SOUTH CHANNEL HYDROLOGY

FEMA regulated flows exist along Duck Creek South Channel from the Lower Duck Creek Detention Basin to the divergence from Duck Creek or where Duck Creek flow splits into the south channel. These flows are not presented explicitly in the FIS but must be calculated using the Floodway "Section Area" and "Mean Velocity" from the Floodway Table (i.e. $Q=A \times V$). There are no flow change locations used in this hydraulic analysis and the data is consistent with the effective FIS data and peak flow rates presented in the most recent hydraulic analyses of the drainageway. The 1% chance annual flow rate used in this analysis is 2,315 cu-ft per second. No new hydrology is requested for this analysis.

V DUCK CREEK SOUTH CHANNEL HYDRAULICS

A. Introduction

An investigation was performed analyzing the impacts of the drainageway channelization improvements, fill into the floodplain of Duck Creek South Channel and construction of a three cell 12' x 6' concrete box culvert. The U.S. Army Corps of Engineers' Hydraulic Engineering Center's River Analysis System (HEC-RAS) computer program, version 3.1.1, was used to perform the hydraulic analysis. The certified plan and profile sheets included in the back pocket of this report show the location of the hydraulic analysis cross-sections, provide the water surface profile results, and delineate the effective and revised (pre-conditions) 100-year floodplain and 1-foot floodway. The structure alignments and dimensions were established in the construction documents for the development.

Four hydraulic models were performed to estimate the Duck Creek South Channel impacts from the proposed development. The hydraulic model input and results are provided in the appendices. The models are: a Duplicate Effective Model, Corrected Effective Model, a Revised Effective Hydraulic Model, and a Revised Hydraulic Model based on the mixed flow regime (for information only).

Manning's "n" values used are consistent with those used in the effective models. Variations in the Manning's "n" value reflect the anticipated variations occurring in the natural channel reach. The "n" values in the engineered channel range from 0.030 to 0.035 and the "n" values in the original hydraulic model vary from 0.035 to 0.040. Cross-section geometry and channel "n" value at station 5 reflects the Richmar Avenue roadway crossing. The channel "n" value in this section is 0.013, which is consistent with a concrete box. Manning's "n" values were not adjusted at Cross-sections C and D where the values change from 0.40 in the channel to 0.45 in the overbank area.

Coefficients for contraction and expansion are, in general, 0.1 and 0.3 respectively. Higher contraction and expansion coefficients of 0.3 and 0.5 are used directly upstream and downstream of the culvert crossings for the Revised Effective Pre-project Conditions Model.

B. Effective and Duplicate Effective Model

The FEMA effective hydraulic model was obtained from the website of the Clark County Regional Flood Control District. The model was compared to the recent hydraulic model used by G.C. Wallace Inc. as the basis for the most recent map change to the effective FIRM. The two models were found to be the same. The hydraulic model used to establish the base flood elevations was the U.S. Army Corps of Engineers' HEC-2 Water Surface Profile program integrated into Boss RMS software. Note that the results

of the hydraulic model known to be used for the FEMA effective FIS does not match the published information because of the difference in the datum used. The results of the hydraulic model used for the FEMA effective FIRM need to be adjusted by 2.37 feet to correspond to published Base Flood Elevations (BFE) shown on the revised FIRM dated August 13, 2003.

The preferred one-dimensional steady flow model accepted by FEMA is HEC-RAS. For this reason the effective HEC-2 hydraulic model was imported into the HEC-RAS engine and evaluated. The results of the analysis and a comparison to the effective HEC-2 results are shown in Appendix A. The HEC-RAS model is referred to as a duplicate hydraulic model even though different programs are being used in the evaluation. The results from the two models show little difference in the computed water surface elevations.

All cross-sections were replicated from the effective FIRM. The downstream cross-section for the effective model study reach is located upstream of the Lower Duck Creek Detention Basin. Flood stage in the basin was not being used as the boundary condition for the water surface profile. The downstream boundary condition was maintained from the original hydraulic model, elevation 2208.00. Several changes were made to the imported model to overcome problems importing from HEC-2 to HEC-RAS. The encroachment stations needed to be reset to the HEC-2 model values. The floodway model, starting water surface elevation was set at the same elevation used in the HEC-2 study. Descriptions were added to the profiles and the cross-section as needed. No changes were made that would alter the hydraulic results.

The downstream cross-section (28200) for the Duck Creek South Channel Effective Hydraulic Model and the Corrected Effective Hydraulic Model defines the starting water surface elevation some distance upstream from the Lower Duck Creek Detention Basin at elevation 2208.0. The Duplicate Effective Floodway Model starts at the same water surface elevation, no increase was given for the 1.0-foot rise criteria. The Duplicate Effective and the Corrected Effective water surface elevation and floodplain width ties into the FEMA Effective data at cross-section 28700.

B. Corrected Effective Model

The duplicated HEC-RAS hydraulic model was examined and errors were found. The Corrected Effective Model was established from the duplicate model by removing input errors from the program. Only minor changes were necessary to improve the effective hydraulic model. All ground elevations and boundary conditions were adjusted plus 2.37 feet to correspond to North American Vertical Datum of 1988 to match the datum referenced by the August 13, 2003 LOMC (FEMA Case No. 03-09-0980X). The boundary condition for the floodway profile was corrected. The new starting water surface elevation was set to 1.0 foot above base flood elevation. These changes made only negligible differences to the published information and the model output.

An additional cross-section was added between cross-sections 28700 and 28600 in order to improve the HEC-RAS conveyance calculations between the two sections.

E. Revised Effective Pre-Project Conditions Model

The Revised Effective Pre-project Conditions Model was prepared from the Corrected Effective Model. The downstream reach from cross-section 28200 to 28400 is within the reach to be revised by the Silverado Pines Unit No. 3 project. The revised reach is shown on the attached plan maps. The downstream cross-section has been relocated to the Lower Duck Creek Detention Basin. The boundary condition has changed to the 1% annual chance flood event flood elevation shown on the effective FIRM for the detention basin, elevation 2202. The sub-critical hydraulic model defaults to critical depth and the downstream starting water surface elevation becomes 2204.66.

Cross-sectional stationing was completely revised in the reach proposed for improvements. The new cross-sections were added to the Revised Effective Pre-project Conditions Model based on proposed conditions defined in the construction plans for the development. The three cell 12'x6' box culvert crossing at Richmar Avenue was set up in the Revised Effective Pre-project Conditions Model as per design information. The HEC-RAS culvert routine was used to model the culvert. The Revised Effective Pre-project Conditions Model incorporated the channel cross-section and longitudinal slope per design information.

Pre-project Manning's "n" values were estimated from field inspection of similar mature channels and from the HEC-RAS Users Manual. Expansion and contraction coefficients 0.1 and 0.3 were used for most of the study reach. The expansion/contraction coefficients were increased at the location of the box culvert for the roadway crossing.

All adjacent lots proposed, as part of the development plan for the site, will be above the base flood profile throughout the study reach.

The Revised Effective Hydraulic Model downstream cross-section was located at the Lower Duck Creek Detention Basin. The starting water surface elevation was set to the 1% annual chance flood event elevation shown on the FIRM, 2002.0. The Revised Effective Model ties into the Effective Model within the FEMA acceptable tolerances. The flood profiles at the upstream end of the study are within 0.1 foot.

An FIS versus Revised Effective Pre-project water surface elevation (WSEL) comparison table for the 100-year flood event is provided in Appendix A of this report. Hydraulic model results at the two furthest upstream cross-sections 28600 and 28700 correlate well to the published base flood elevations shown on the effective FIRM panel. The proposed improvements modeled in the Revised Effective Pre-project Conditions Hydraulic Model presented in this study meet the requirements of the National Flood Insurance Program regulations.

The results of the studies and a comparison the results are shown in the table in Appendix A.

F. Floodway Analysis

The FIRM delineates an existing FEMA 1.0-foot floodway. The existing FEMA floodway is shown on the enclosed plan maps. In order to comply with FEMA regulations, a new, revised 1.0-foot floodway has been computed and is shown on plan sheets included in the back pocket of this report. The floodway ties into the existing FIS floodway elevation at cross-section 28700. The width of the revised floodway ties into the width of the 1.0-foot floodway published in the effective FIRM at cross-section 28700. Results from the floodway models are provided in each appropriate appendix.

VI. CONCLUSION

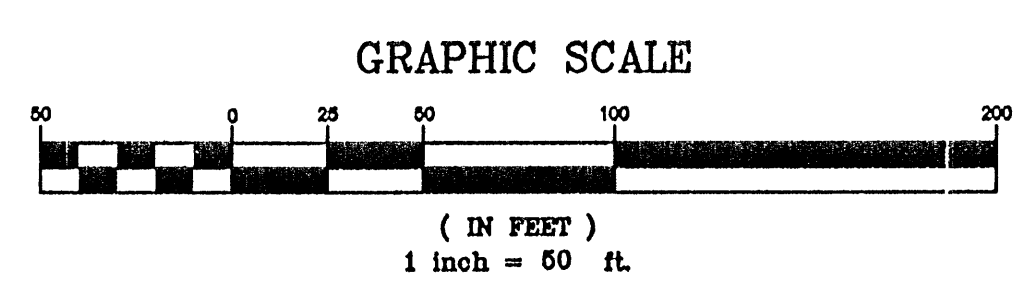
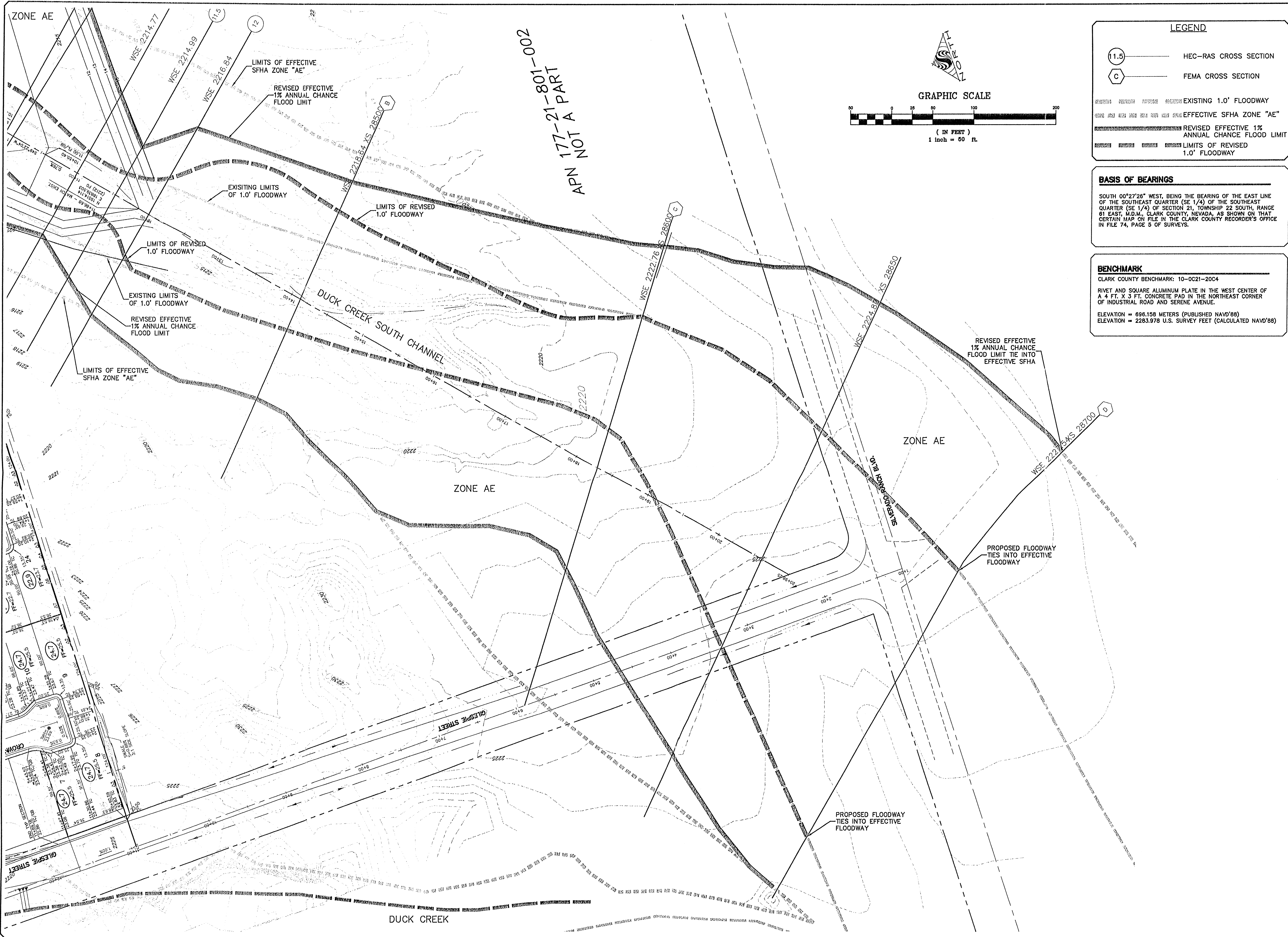
The Duck Creek South Channel reach through the proposed Silverado Pines Unit No. 3 will be substantially revised. The improvements proposed to the channel as part of the development plans were studied in the August 2001 *Conditional Letter of Map Revision (CLOMR) for the Silverado Pines Unit No. 3 Flood Insurance Rate Map (FIRM)* by Stantec Consulting Inc. That study and subsequent correspondence with the authors provided the basis for a FEMA CLOMR issued April 22, 2004. In order to comply with local criteria, Stantec was asked to provide an up to date analysis using the effective hydraulic model to re-study the affects of the Silverado Pines Unit No. 3 development. The analyses needed to show a clear sequence of change between the effective model, existing (same as corrected in this study) model, to the proposed conditions model. This addendum provides that information. This study also shows that the channel has the capacity to carry the FEMA regulatory flows published in the effective FIS. The results of the analysis show that the revised hydraulic profile will tie into the effective base flood elevations shown on the effective FIS and FIRM. The Revised Effective Pre-project Conditions Model results also tie in to the effective floodplain and floodway widths at the upstream cross-section. The downstream tie-in will occur at the Lower Duck Creek Detention Basin.

All impacted property owners have been notified regarding this potential change to the floodplain. Consent letters from the property owners are provided in Appendix A. No insurable structures are located in the Duck Creek South Channel revised special flood hazard area created by the FEMA regulated flow rate for the 1-percent annual chance flood.

The appendices of this report include supporting data, tables and figures, and summary results from the hydraulic computations. The back pockets of this report include a certified plan map and profile map with floodplain and floodway delineations, an annotated mark-up of the effective FEMA FIRM reflecting changes due to the proposed

annel improvements, and a CD-ROM containing the hydraulic models. These materials address the Clark County Regional Flood Control District's request for additional data to address the conditions of the approved April 22, 2004 CLOMR for Duck Creek South Channel.

A revised hydraulic study based on completed post-project record information will be submitted to FEMA with the application for a Letter of Map Revision at the conclusion of this project.



LEGEND

- 11.5 — HEC-RAS CROSS SECTION
- C — FEMA CROSS SECTION
- EXISTING 1.0' FLOODWAY
- EFFECTIVE SFHA ZONE "AE"
- REVISED EFFECTIVE 1% ANNUAL CHANCE FLOOD LIMIT
- LIMITS OF REVISED 1.0' FLOODWAY

BASIS OF BEARINGS

SOUTH 00°27'26" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 21, TOWNSHIP 22 SOUTH, RANGE 61 EAST, M.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON THAT CERTAIN MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN FILE 74, PAGE 5 OF SURVEYS.

BENCHMARK

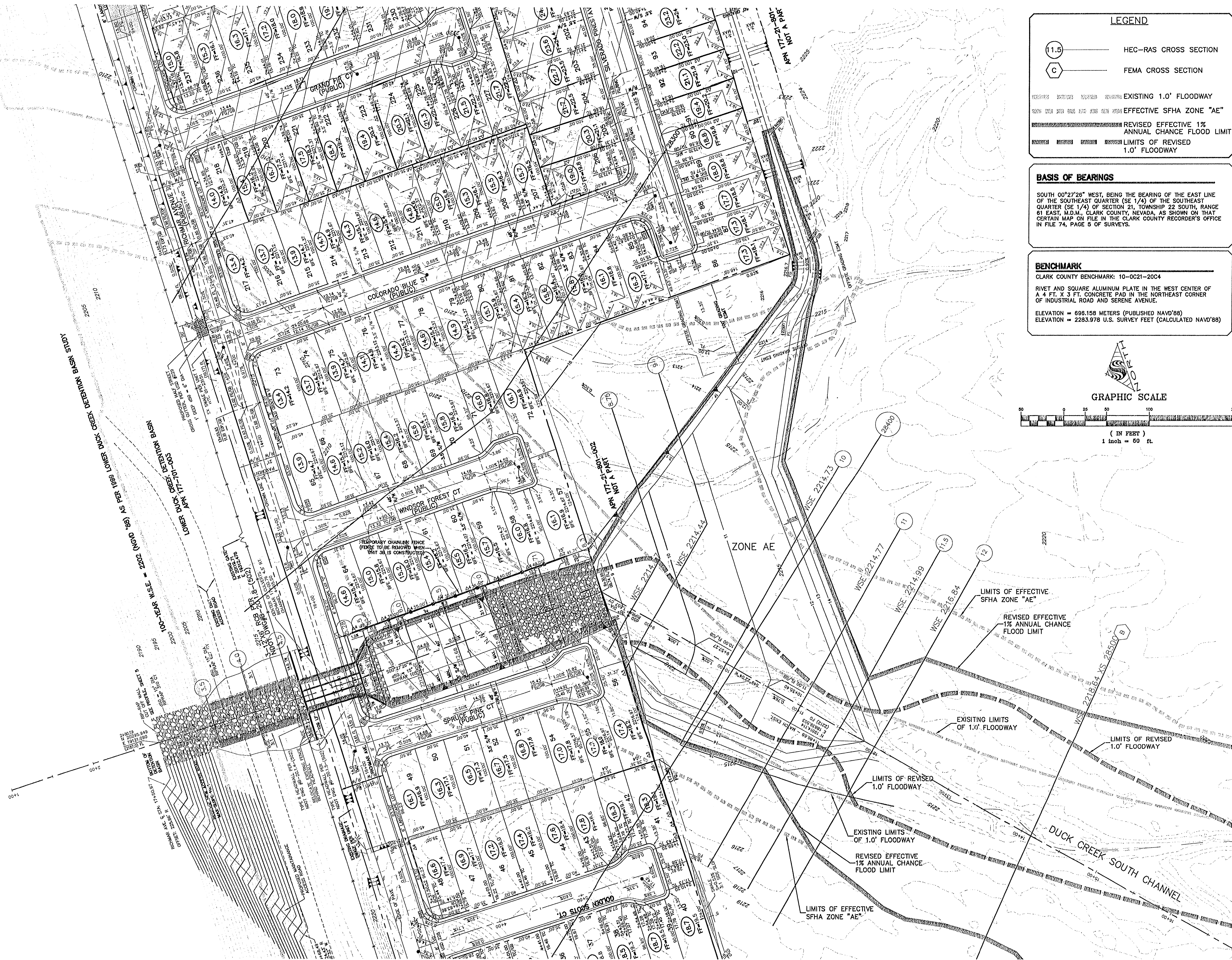
CLARK COUNTY BENCHMARK: 10-0C21-20C4

RIVET AND SQUARE ALUMINUM PLATE IN THE WEST CENTER OF A 4 FT. X 3 FT. CONCRETE PAD IN THE NORTHEAST CORNER OF INDUSTRIAL ROAD AND SERENE AVENUE.

ELEVATION = 696.158 METERS (PUBLISHED NAVD'88)
ELEVATION = 2283.978 U.S. SURVEY FEET (CALCULATED NAVD'88)

1 PER FEMA COMMENTS		7/29/04	VCS
NO. DESCRIPTION DATE APP'D			
DATE : 7/29/2004			
PM :	DRAWN BY :	DESIGNED BY :	CHECKED BY :
Santec Consulting, Inc.		7251 W. Charleston Blvd. Las Vegas, Nevada, U.S.A. 89117	
Tel. (702) 258-0115		Fax. (702) 258-4956	
www.santec.com			
SILVERADO PINES UNIT NO. 3			
DUCK CREEK SOUTH CHANNEL			
SHEET			
2			
OF 3			

AUG 02 2004



LEGEND

11.5 — HEC-RAS CROSS SECTION
C — FEMA CROSS SECTION

EXISTING 1.0' FLOODWAY
EFFECTIVE SFHA ZONE "AE"
REVISED EFFECTIVE 1% ANNUAL CHANCE FLOOD LIMIT
LIMITS OF REVISED 1.0' FLOODWAY

BASIS OF BEARINGS

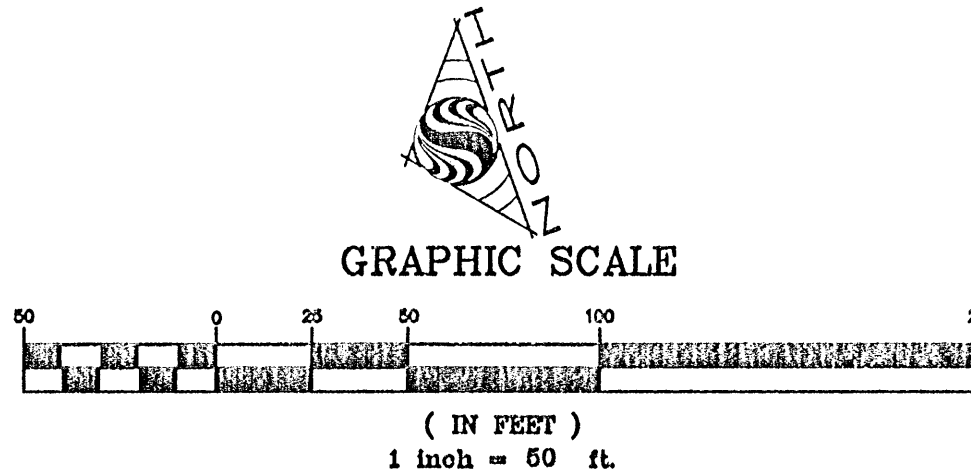
SOUTH 00°27'26" WEST, BEING THE BEARING OF THE EAST LINE OF THE SOUTHEAST QUARTER (SE 1/4) OF THE SOUTHEAST QUARTER (SE 1/4) OF SECTION 21, TOWNSHIP 22 SOUTH, RANGE 81 EAST, W.D.M., CLARK COUNTY, NEVADA, AS SHOWN ON THAT CERTAIN MAP ON FILE IN THE CLARK COUNTY RECORDER'S OFFICE IN FILE 74, PAGE 5 OF SURVEYS.

BENCHMARK

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NO.	DESCRIPTION	DATE	APP'D
1	PER FEMA COMMENTS	7/29/04	VCC

DATE: 7/29/2004
DRAWN BY: [blank]
DESIGNED BY: [blank]
CHECKED BY: [blank]
JOB NO.: 88130117
SCALE: [blank]

Stattec Consulting, Inc.
7251 W. Charleston Blvd.
Las Vegas, Nevada, U.S.A.
89117
Tel. (702) 258-0115
Fax. (702) 258-4956
www.stattec.com

STATTEC

KBHOME
SILVERADO PINES UNIT NO. 3
DUCK CREEK SOUTH CHANNEL

PROFESSIONAL ENGINEER - STATE OF NEVADA
SUBDIVISION
EX. 12/31/01
CIVIL
No. 14993
10/6/01

SHEET
1
OF 3

August 2, 2004

***LETTERS OF
NOTIFICATION***



Department of Development Services

Civil Engineering Division

500 S Grand Central Pky 1st Fl • PO Box 551799 • Las Vegas NV 89155-1799
(702) 455-4600 • Fax (702) 388-2550

Phil Rosenquist, Director

May 5, 2005

Broadcast Associates, Inc.
201 Wildrose Street
Las Vegas, NV 89107

Reference: Silverado Pines Unit 3 - Letter of Map Revision (LOMR) Request

Dear Sirs

This letter is being mailed to you to inform you that KB HOMES is submitting a request to the Federal Emergency Management Agency (FEMA) to relocate the existing Floodway affecting your property. This letter is also a follow up to the Conditional Letter of Map Revision (CLOMR) (FEMA Case # 04-09-1381R) letter sent to on October 23, 2003, which notified you of Base Flood Elevations (BFE's) would be altered by the proposed Silverado Pines Unit 3 development. This letter is being sent to inform you - the Duck Creek Wash's Floodway will be relocated.

The relocation of the existing Floodway results from the cumulative effect of watercourse modifications associated with development along the Duck Creek Wash from the Lower Duck Creek Detention Basin to a point approximately 600-feet South. Specifically, the Silverado Pines Unit 3 project has constructed a flood channel, which will redirect 100-year (1% Chance) flows and associated Floodway, both of which are being conveyed within the Duck Creek Wash, to enter the Lower Duck Creek Detention Basin.

The relocation of the Duck Creek Floodway will deviate from the Floodway published on the FEMA Flood Insurance Rate Map (FIRM) Number 32003C2568E, dated August 13, 2003. At the time of this LOMR, no residential structures on the affected properties are subject to increased flood hazard, due to the relocation of the Duck Creek Wash Floodway. The revised Floodway boundaries are proposed to be the same or less on the affected properties.

If you should have any questions please contact me at (702) 455-4856.

Sincerely,

A handwritten signature in black ink, appearing to read "T. Myers", is written over a horizontal line.

Todd L. Myers, P.E.
Principal Engineer
Clark County Development Services
Civil Engineering

cc: KB Home

Carter & Burgess, Inc.

BOARD OF COUNTY COMMISSIONERS

RORY REID, Chairman • MYRNA WILLIAMS, Vice Chair
TOM COLLINS • YVONNE ATKINSON GATES • CHIP MAXFIELD • LYNETTE BOGGS McDONALD • BRUCE L. WOODBURY
THOM REILLY, County Manager

REVISED FIRM

32003C2568E

NOTES TO USERS

This map is for use in administering the National Flood Insurance Program. It does not necessarily identify all areas subject to flooding, particularly from local drainage sources of small size. The community map repository should be consulted for possible updated or additional flood hazard information.

To obtain more detailed information in areas where Base Flood Elevation (BFE) and/or Floodway Data have been determined, users are encouraged to consult the Flood Profiles and Floodway Data tables contained within the Flood Insurance Study (FIS) report that accompanies this FIRM. Users should be aware that BFEs shown on the FIRM represent rounded whole-foot elevations. These BFEs are intended for flood insurance rating purposes only and should not be used as the sole source of flood elevation information. Accordingly, flood elevation data presented in the FIS should be utilized in conjunction with the FIRM for purposes of construction and/or floodplain management.

Coastal Base Flood Elevation (BFEs) shown on this map apply only landward of 0.0' North American Vertical Datum (NAVD). Users of this FIRM should be aware that coastal flood elevations may also be provided in the Summary of Stillwater Elevations table in the Flood Insurance Study report for this community. Elevations shown in the Summary of Stillwater Elevations table should be used for construction, and/or floodplain management purposes when they are higher than the elevations shown on this FIRM.

Boundaries of the floodways were computed at cross sections and interpolated between cross sections. The floodways were based on hydraulic considerations with regard to requirements of the National Flood Insurance Program. Floodway widths and other pertinent floodway data are provided in the Flood Insurance Study report for this jurisdiction.

Certain areas not in Special Flood Hazard Areas may be protected by flood control structures. Refer to Section 2.4 "Flood Protection Measures" of the Flood Insurance Study report for information on flood control structures in this jurisdiction.

The projection used in the preparation of this map is Universal Transverse Mercator (UTM) zone 11. The horizontal datum is NAD83, GRS1980 spheroid. Differences in datum, spheroid, projection or UTM zones used in the production of FIRMs for adjacent jurisdictions may result in slight positional differences in map features across jurisdiction boundaries. These differences do not affect the accuracy of the FIRM.

Flood elevations on the map are referenced to the North American Vertical Datum of 1988. These flood elevations must be compared to structure and ground elevations referenced to the same vertical datum. For information regarding conversion between the National Geodetic Vertical Datum of 1929 and the North American Vertical Datum of 1988, visit the National Geodetic Survey website at www.ngs.noaa.gov or contact the National Geodetic Survey at the following address:

Spatial Reference System Division
National Geodetic Survey, NOAA
Silver Spring Metro Center
1315 East-West Highway
Silver Spring, Maryland 20910
(301) 713-3191

To obtain current elevation, description, and/or location information for benchmarks shown on this map, please contact the Information Services Branch of the National Geodetic Survey at (301) 713-3242, or visit their website at www.ngs.noaa.gov.

Base map information shown on this FIRM was provided in digital format by Clark County Regional Flood Control District. This information was converted using Orthophotography, dated 1999 or newer, and GDB/IME data. Segments were digitized off of the orthophotography based on center of pavement.

Corporate limits shown on this map are based on the best data available at the time of publication. Because changes due to annexations or de-annexations may have occurred after this map was published, map users should contact appropriate community officials to verify current corporate limits locations.

Please refer to the separately printed Map Index for an overview map of the county showing the layout of map panels; community map repository addresses; and a listing of Communities table containing National Flood Insurance Program data for each community as well as a listing of the panels on which each community is located.

An accompanying Flood Insurance Study report, Letters of Map Revision or Letters of Map Amendment revising portions of this panel, and digital versions of this panel, may be available. Contact the FEMA Map Service Center at the following phone numbers and Internet address for information on all related products available from FEMA:

Phone: 800-368-9818
FAX: 800-353-9020
www.fema.gov/inms

If you have questions about this map or questions concerning the National Flood Insurance Program in general, please call 1-877-FEMA-MAP (1-877-338-2827) or visit the FEMA website at www.fema.gov.

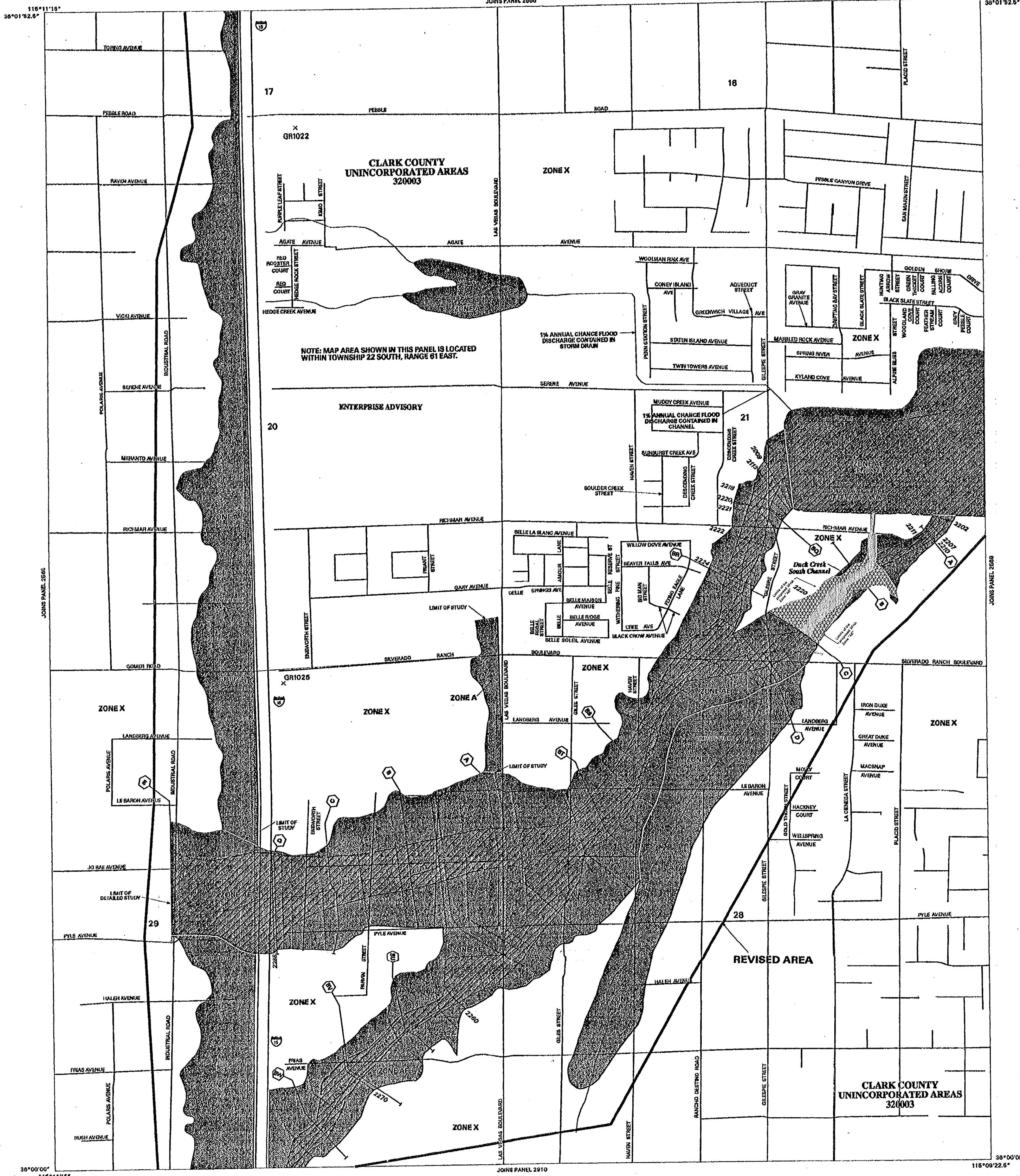
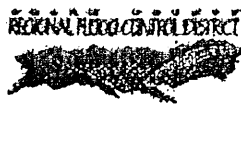
This map reflects more detailed and up-to-date stream channel configurations than those shown on the previous FIRM for this jurisdiction. The floodplains and floodways that were transferred from the previous FIRM may have been adjusted to conform to these new stream channel configurations. As a result, the Flood Profiles and Floodway Data tables in the Flood Insurance Study report may reflect stream channel distances that differ from what is shown on this map.

This Digital Flood Insurance Rate Map (DFIRM) was produced through a unique partnership between Clark County and the Federal Emergency Management Agency (FEMA). Clark County has developed a long-term approach of floodplain management to decrease the costs associated with flooding. This is demonstrated by the Clark County commitment to share and maintain floodplain layers within their Geographic Information System Management Office (GISMO).

This DFIRM reflects several innovative features. These include:
+ Southern Nevada GIS-Cooperation among local governmental agencies throughout Clark County. The foundation of cooperation is the GIS Interlocal Agreements formed between fourteen regional participants. In part, the agreements specify that the Clark County GIS Management Office (GISMO) will be responsible for maintaining a GIS data warehouse and associated Southern Nevada GIS Metadata.

+ The GISMO's responsibilities go beyond maintaining the GIS data warehouse. GISMO also maintains the Street Centerline Database used by 911 dispatch services. This centerline database serves as the base map for this DFIRM.

DIGITAL DATA AVAILABILITY: <http://www.co.clark.nv.us/cgi/gis/gisinfo.htm>



LEGEND

SPECIAL FLOOD HAZARD AREAS SUBJECT TO INUNDATION BY THE 1% ANNUAL CHANCE FLOOD EVENT

The 1% annual chance flood (100-year flood), also known as the base flood, is the flood that has a 1% chance of being equaled or exceeded in any given year. The Special Flood Hazard Area is the area subject to flooding by the 1% annual chance flood. Areas of Special Flood Hazard include Zones A, AE, AH, AO, AR, ABB, AV, and VE. The Base Flood Elevation is the water surface elevation of the 1% annual chance flood.

- ZONE A** No base flood elevations determined.
- ZONE AE** Base flood elevations determined.
- ZONE AH** Flood depths of 1 to 3 feet usually areas of ponding; base flood elevations determined.
- ZONE AO** Flood depths of 1 to 3 feet usually sheet flow on sloping terrain; average depths determined. For areas of sheet flow, velocities also determined.
- ZONE AR** Area of special flood hazard formerly protected from the 1% annual chance flood event by a flood control system that was subsequently decertified. Zone AR indicates that the former flood control system is being restored to provide protection from the 1% annual chance or greater flood event.
- ZONE ABB** Area to be protected from 1% annual chance flood event by a Federal flood protection system under construction; no base flood elevations determined.
- ZONE AV** Coastal flood zone with velocity hazard (wave action); no base flood elevations determined.
- ZONE VE** Coastal flood zone with velocity hazard (wave action); base flood elevations determined.

FLOODWAY AREAS IN ZONE AE

The floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1% annual chance flood can be carried without substantial increases in flood heights.

OTHER FLOOD AREAS

ZONE X Areas of 0.2% annual chance flood with 1% annual chance flood with average depths of less than 1 foot or with drainage areas less than 1 square mile; and areas protected by levees from 1% annual chance flood.

OTHER AREAS

ZONE X Areas determined to be outside the 0.2% annual chance floodplain.

ZONE D Areas in which flood hazards are undetermined, but possible.

COASTAL BARRIER RESOURCES SYSTEM (CBRS) AREAS

CBRS areas and OFAs are normally located within or adjacent to Special Flood Hazard Areas.

OTHERWISE PROTECTED AREAS (OPAs)

OPAs are areas that are normally located within or adjacent to Special Flood Hazard Areas.

- Floodplain boundary
- Floodway boundary
- Zone D boundary
- CBRS and OPA boundary
- Boundary dividing Special Flood Hazard Areas of different Base Flood Elevations, flood depths or velocities.
- Base Flood Elevation line and value; elevation in feet*

(EL 987) Base Flood Elevation value where uniform within zones.

*Referenced to the North American Vertical Datum of 1988.

- Cross Section Line
- Transect Line
- 97°10'30", 32°22'30" Geographic coordinates referenced to the North American Datum of 1983 (NAD 83)
- 4275000M 1000-meter Universal Transverse Mercator grid values, zone 11
- 600000 FT 5000-foot grid ticks
- DX6510 Bench mark (see explanation in Notes to Users section of this FIRM panel).
- 1 Mile

MAP REPOSITORY

Refer to Repository Listing on Index Map.

EFFECTIVE DATE OF COUNTYWIDE FLOOD INSURANCE RATE MAP

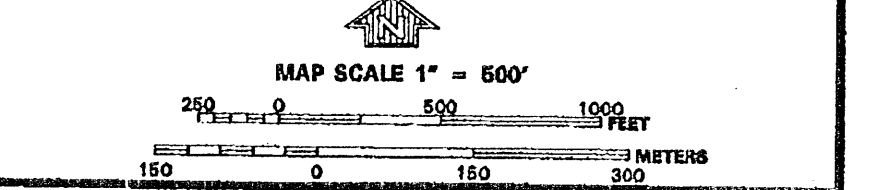
AUGUST 16, 1995

EFFECTIVE DATE(S) OF REVISION(S) TO THIS PANEL

September 27, 2002: to update corporate limits, to change base flood elevations, to add base flood elevations, to add special flood hazard areas, to change special flood hazard areas, to delete special flood hazard areas, to change zone designations, to add roads and road names, to incorporate previously issued letters of map revision, to incorporate previously issued letters of map amendment, and to change floodway.

For community map revision history prior to countywide mapping, refer to the Community Map History table located in the Flood Insurance Study report for this jurisdiction.

To determine if flood insurance is available in this community, contact your insurance agent or call the National Flood Insurance Program at (800) 638-6622.



PANEL 2568E

**Annotated
FIRM**

FLOOD INSURANCE RATE MAP

**CLARK COUNTY,
NEVADA
AND INCORPORATED AREAS**

PANEL 2568 OF 4090

(SEE MAP INDEX FOR FIRM PANEL LAYOUT)

CONTAINS	NUMBER	PANEL	DATE
CLARK COUNTY UNINCORPORATED AREAS	320003	2568E	02

AUG 13 2003

MAP NUMBER
32003C2568E

MAP REVISED:
SEPTEMBER 27, 2002

Federal Emergency Management Agency